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Electrohydraulic Motion Controls

Proportional Directional & Pressure Control Valves
Servovalves, Electronics, Accessories

Catalog MSG14-2550/US

June 2021



ENGINEERING YOUR SUCCESS.

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SAFETY GUIDE

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

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Proportional Directional Control Valves**A****Proportional Pressure Control Valves****B****Servovalves****C****Electronics****D****Accessories****E**

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

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

When you are ready to order, call your local Parker Hydraulic distributor for fast delivery and service. Consult your Parker Hydraulic Sales Office for the location of the distributor serving your area (see listing at the back of this catalog).

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A

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General Description

Series D1FB (NG6) proportional directional valves are available with and without onboard electronics (OBE).

D1FB OBE:

The digital onboard electronics is situated in a robust metal housing, which allows the usage under rough environmental conditions.

The nominal values are factory set. The cable connection to a serial RS-232 interface is available as an accessory.

D1FB for external electronics:

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

The valve parameters can be edited with the common ProPxD software for both versions.

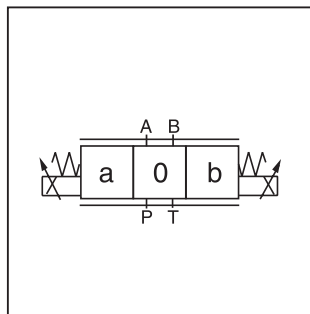
Series D1FB valves can be ordered with spool/sleeve design (D1FB*0) for maximum precision, as well as spool/body design (D1FB*3) for high nominal flow – see functional limit curves for maximum flow capability.



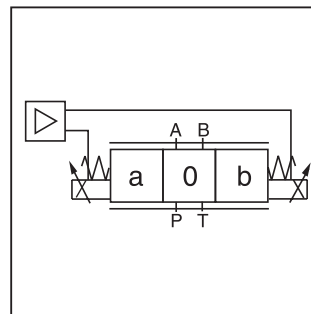
D1FB



D1FB OBE



D1FB



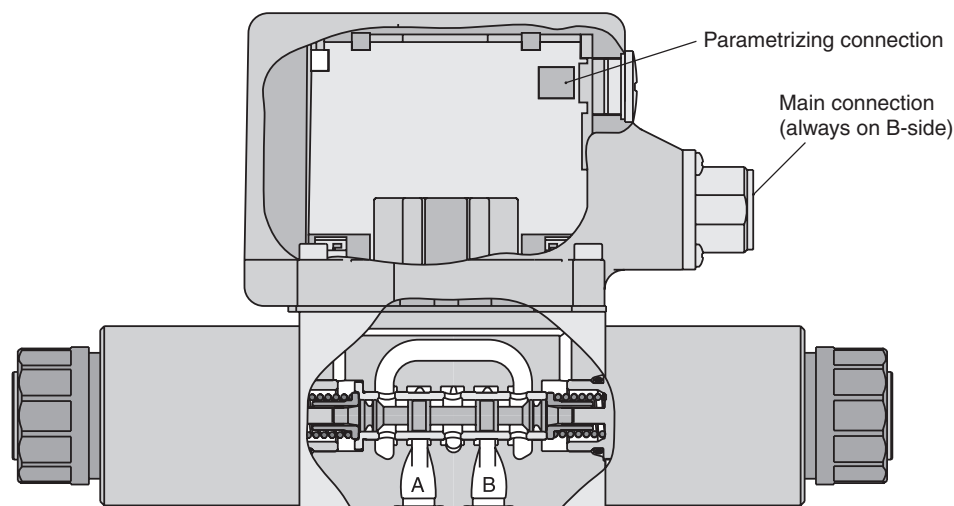
D1FB OBE

Features

- Spool/sleeve and spool/body
- 3 command options for D1FB OBE:
+/- 10V, 4...20mA, +/- 20mA
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Digital onboard electronics

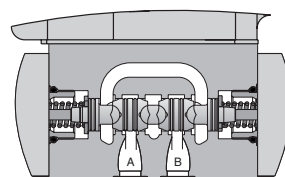
D1FB*0 OBE

Spool/Sleeve Design



D1FB*3 OBE

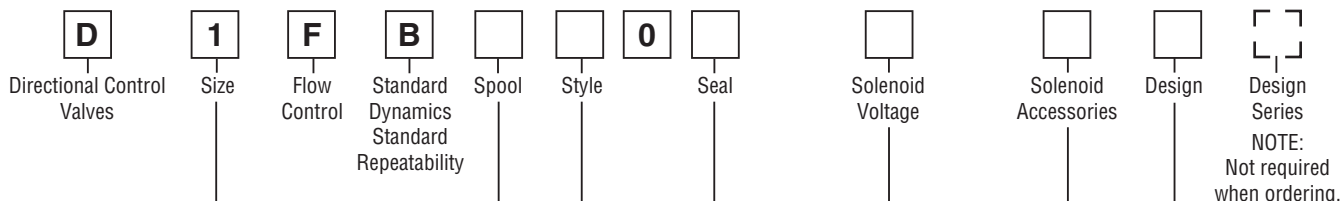
Spool/Body Design



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

A01_Cat2550.indd, ddp, 06/21

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Code	Description
1	DIN NG6 CETOP 3 NFPA D03

D1FB*0: Spool/Sleeve Design	
Code	Solenoid
M	9V/2.7A
J	24V/0.8A

Code	Description
0	Spool/sleeve design
3	Spool/body design

D1FB*3: Spool/Body Design	
Code	Solenoid
K	12V / 2.2A
J	24V / 1.1A

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
W*	Connector as per DIN 43650 without plug
J*†	Connector DT04-2P "Deutsch"

* Please order plugs separately.
† Not for spool/sleeve design.

D1FB*0: Spool/Sleeve Design		
Overlap		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01H E01F E01C		20 (5.3) 12 (3.2) 6 (1.6)
E02H E02F E02C		20 (5.3) 12 (3.2) 6 (1.6)
E03H E03F E03C		20 (5.3) 12 (3.2) 6 (1.6)
B31H B31F	$Q_B = Q_A / 2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F	$Q_B = Q_A / 2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)

Code	Style
C	
E	
K	

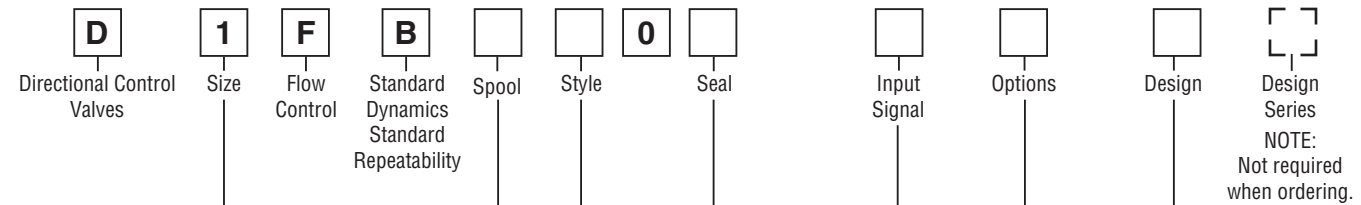
D1FB*3: Spool/Body Design		
Overlap		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01K E01H E01F		30 (7.9) 20 (5.3) 10 (2.6)
E02K E02H E02F		30 (7.9) 20 (5.3) 10 (2.6)
B31H B31F	$Q_B = Q_A / 2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F	$Q_B = Q_A / 2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)

Bolt Kit:

BK209	(4) 10-24x1.25 SHCS
BK375	(4) M5x30

Weight:

D1FB	2.2 kg (4.9 lbs.)
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Code	Description
1	DIN NG6 CETOP 3 NFPA D03

Code	Description
0	Spool/sleeve design
3	Spool/body design

D1FB*0: Spool/Sleeve Design		
Overlap		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01H E01F E01C		20 (5.3) 12 (3.2) 6 (1.6)
E02H E02F E02C		20 (5.3) 12 (3.2) 6 (1.6)
E03H E03F E03C		20 (5.3) 12 (3.2) 6 (1.6)
B31H B31F	$Q_B = Q_A / 2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F	$Q_B = Q_A / 2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)

Code	Input signal ¹⁾	Function	Port	Options
F0	0...+/-10V	0...+10V > P-A	6 + PE	Potentiometer supply
G0	0...+/-20mA	0...+20mA > P-A	6 + PE	—
S0	4...20mA	12...20mA > P-A	6 + PE	—
W5 ²⁾	0...+/-10V 4...20mA	0...+10V > P-A 12...20mA > P-A	11 + PE	Potentiometer supply & command preset channel

¹⁾ Single solenoid always 0...+10V respectively 4...20 mA

²⁾ Factory set $\pm 10V$ on delivery

Code	Description
N	Nitrile
V	Fluorocarbon

D1FB*3: Spool/Body Design		
Overlap		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01K E01H E01F		30 (7.9) 20 (5.3) 10 (2.6)
E02K E02H E02F		30 (7.9) 20 (5.3) 10 (2.6)
B31H B31F	$Q_B = Q_A / 2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F	$Q_B = Q_A / 2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)

Code	Style
C	
E	
K	

Bolt Kit:

BK209	(4) 10-24x1.25 SHCS
BK375	(4) M5x30

Weight:

D1FB	2.5 kg (5.5 lbs.)
------	-------------------

Please order plugs separately. See Accessories.

Parametrizing cable OBE => RS-232
 Item no. 40982923

A

General			
Design		Direct operated proportional DC valve	
Actuation		Proportional solenoid	
Size		NG6 / CETOP 3 / NFPA D03	
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting Position		Unrestricted	
Ambient Temperature [°C]		-20...+60; (-4°F...+140°F)	
MTTF _D Value (OBE) [years]		150 (75)	
Vibration Resistance [g]		10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27	
Hydraulic			
Maximum Operating Pressure		Ports P, A, B 350 Bar (5075 PSI); Port T 210 Bar (3045 PSI)	
Maximum Pressure Drop PABT / PBAT		350 Bar (5075 PSI)	
Fluid		Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature [°C]		-20...+60; (-4°F...+140°F)	
Viscosity Permitted [cSt] / [mm²/s]		20...380 (93...1761 SSU)	
Recommended [cSt] / [mm²/s]		30...80 (139...371 SSU)	
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Nominal Flow at Δp= 5 Bar (72.5 PSI) per Control Edge *		D1FB*0 (Spool/sleeve)	D1FB*3 (Spool/body)
		6 LPM (1.6 GPM) / 12 LPM (3.2 GPM) / 20 LPM (5.3 GPM)	10 LPM (2.6 GPM) / 20 LPM (5.3 GPM) / 30 LPM (7.9 GPM)
Leakage at 100 Bar (1450 PSI) Per Land [ml/min]		<50 (overlap spool)	<60
Overlap [%]		25, electrically normalized at 10 (see flow characteristics for OBE valves)	
Static / Dynamic			
Step Response at 100% Step [ms]		30	30
Hysteresis [%]		<4	<6
Temperature Drift Solenoid Current [%/K]		<0.02	
Electrical			
Duty Ratio [%]		100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible	
Protection Class		Standard (as per EN175301-803) IP65 in accordance with EN60529 (plugged and mounted) DT04-2P “Deutsch” IP69K (plugged and mounted)	
Solenoid		Code "M"	Code "K" Code "J" (Spool/sleeve)
Supply Voltage [V]		9	12 24
Current Consumption [A]		2.7	2.2 0.8 (1.1)
Resistance [Ohm]		2.7	4.4 18.6
Coil Insulation Class		F (155 °C); (331°F)	
Solenoid Connection		Connector as per EN 175301-803 (code W), DT04-2P “Deutsch” connector (code J). Solenoid identification as per ISO 9461.	
Wiring Minimum [mm²]		3x1.5 (AWG 16) overall braid shield (Code W), "Deutsch" connector DP4 2-Pin (Code J)	
Wiring Length Maximum [m]		50 (164 ft.)	

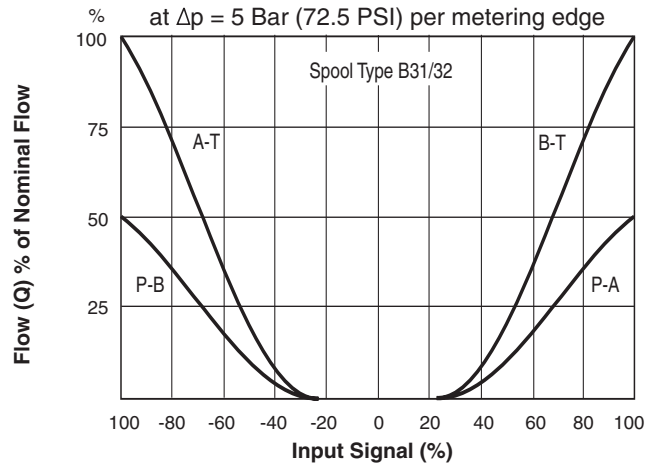
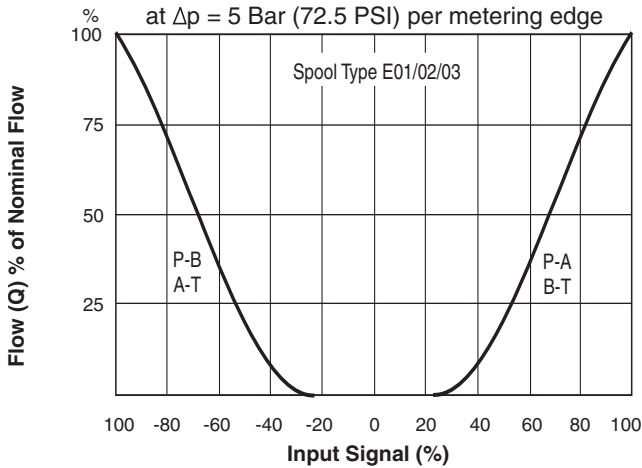
* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

Continued on the next page

Electrical		
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage/ripple DC	[V]	18...30, ripple < 5% eff., surge free
Current Consumption Maximum	[A]	2.0
Pre-fusing Medium Lag	[A]	2.5
Input Signal		
Codes F0 & W5 Voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100kOhm, 0...+10V => P -> A
Codes S0 & W5 Current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, Ri = 200Ohm, 12...20mA => P -> A < 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Code G0	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, Ri = 200Ohm, 0...+20mA => P -> A
Differential Input Maximum		
Codes F0, G0 & S0	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
Code W5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0V (terminal 2)
Voltage References:		Not a powered output, +10 VDC at Pin C, -10 VDC at Pin F Only for 10K Ohm pots
Channel Recall Signal	[V]	0...2.5: off / 5...30: on / Ri = 100 kOhm
Adjustment Ranges:		
Min	[%]	0...50
Max	[%]	50...100
Ramp	[s]	0...32.5
Interface		RS-232, parametrizing connection 5 pole
EMC		EN 61000-6-2, EN 61000-6-4
Central Connection		
Codes F0, G0 & S0		6 + PE acc. to EN 175201-804
Code W5		11 + PE acc. to EN 175201-804
Wiring Minimum		
Codes F0, G0 & S0	[mm²]	7 x 1.0 (AWG16) overall braid shield
Code W5	[mm²]	11 x 1.0 (AWG20) overall braid shield
Wiring Length Maximum	[m]	50 (164 ft.)

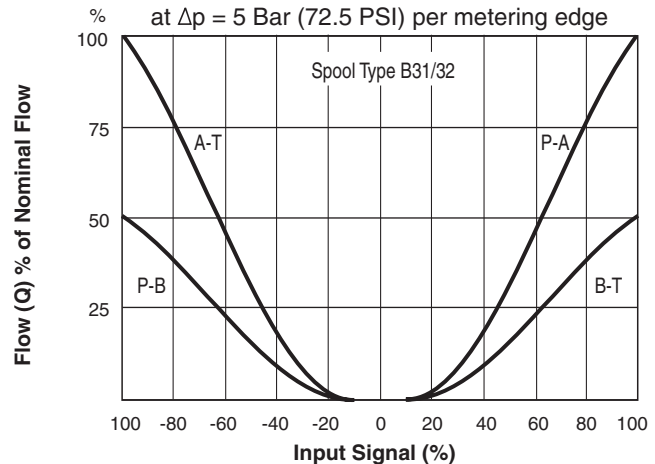
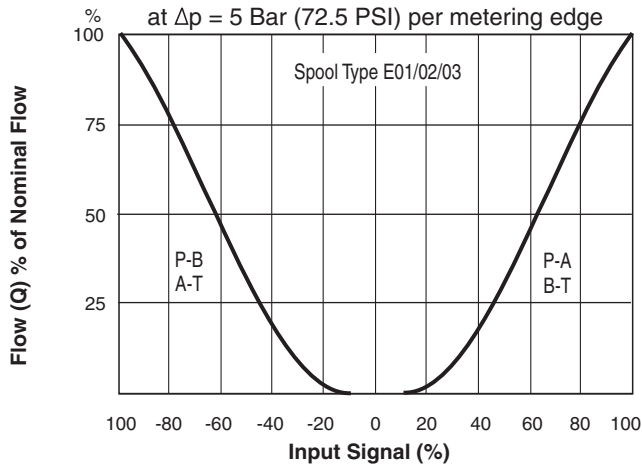
D1FB Flow

A



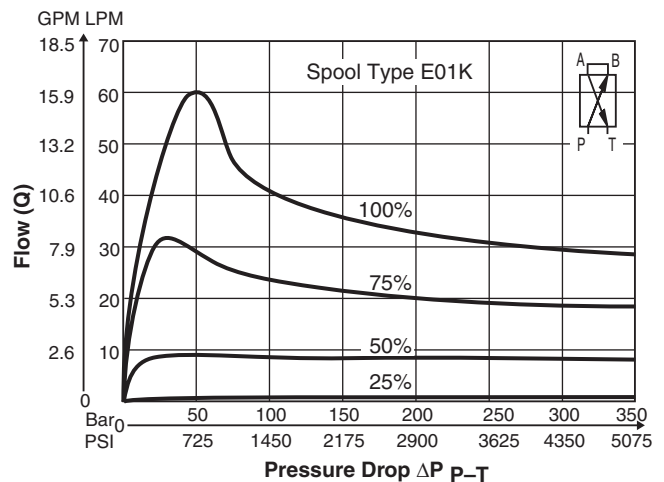
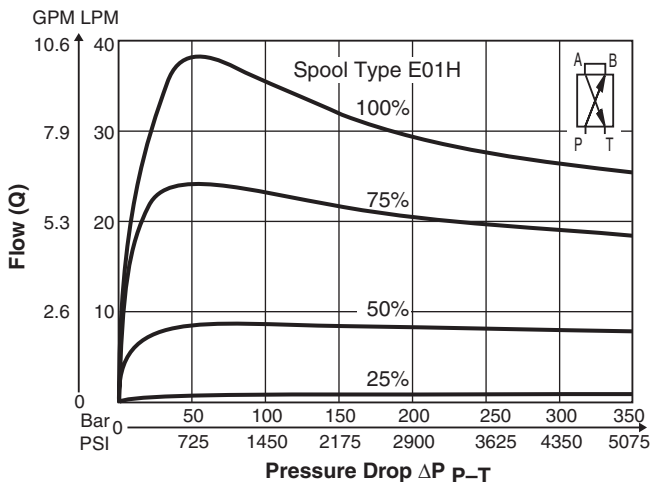
D1FB OBE Flow

(Electrically set to opening point 10%)



Functional Limits

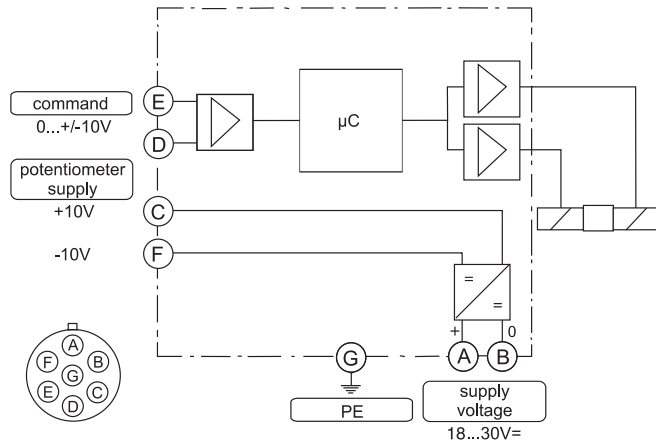
At 25%, 50%, 75% and 100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.



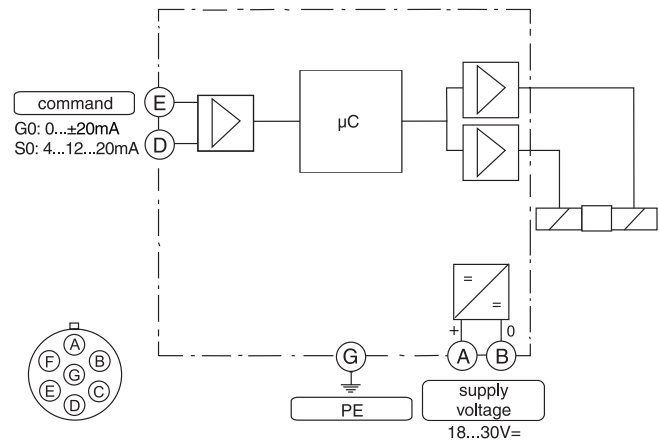
All performance curves measured with HLP46 at 50°C (122°F).

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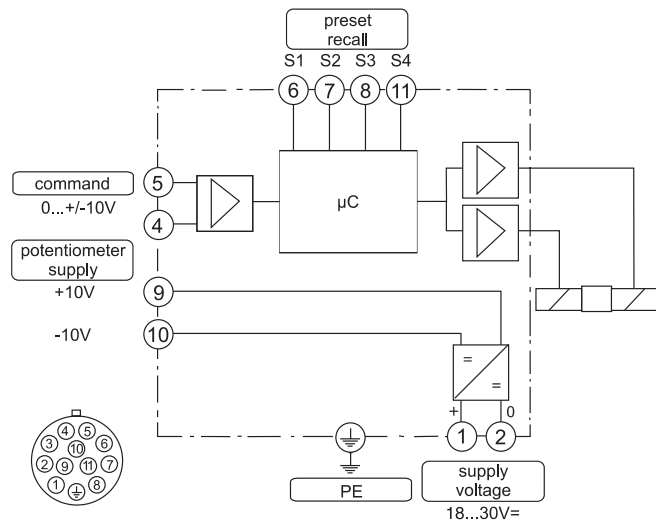
Code F0
6 + PE acc. to EN 175201-804



Code G0, S0
6 + PE acc. to EN 175201-804



Code W5
11 + PE acc. to EN 175201-804



ProPxD Interface Program

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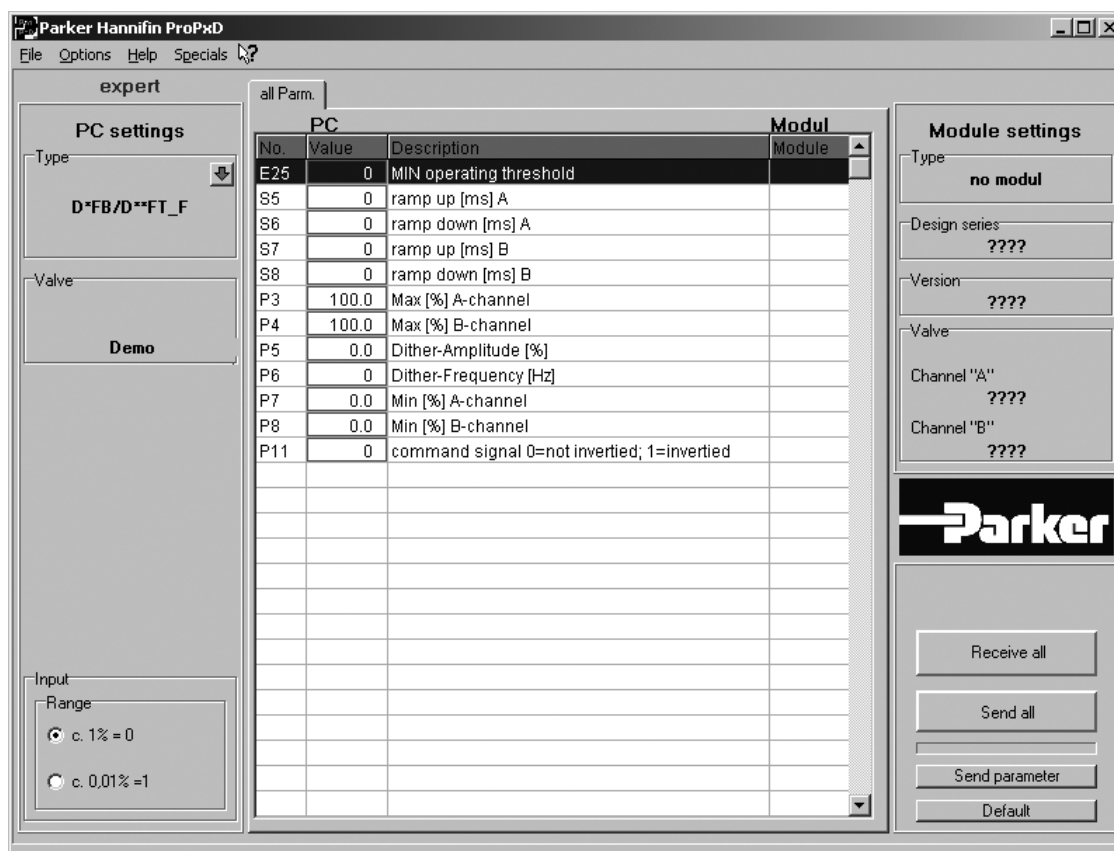
The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

Features

- Simple editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronics via serial interface RS-232.

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

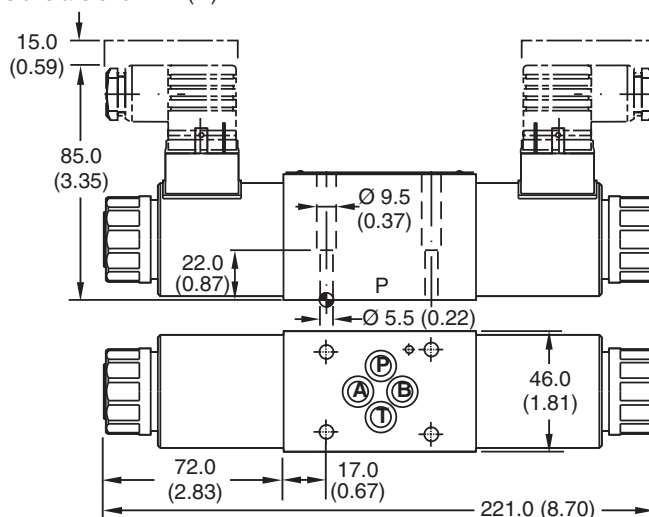
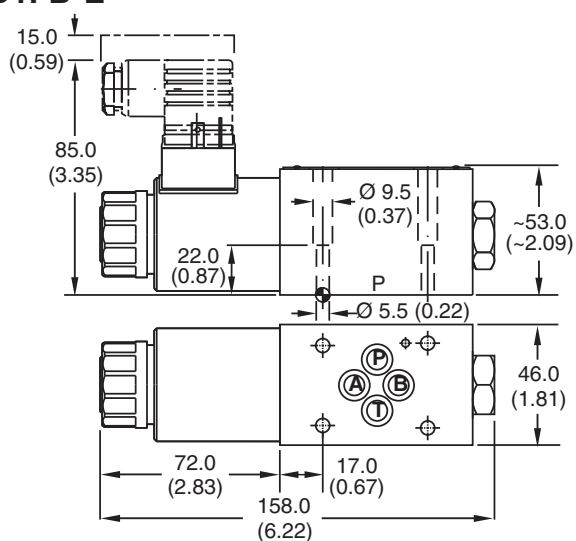
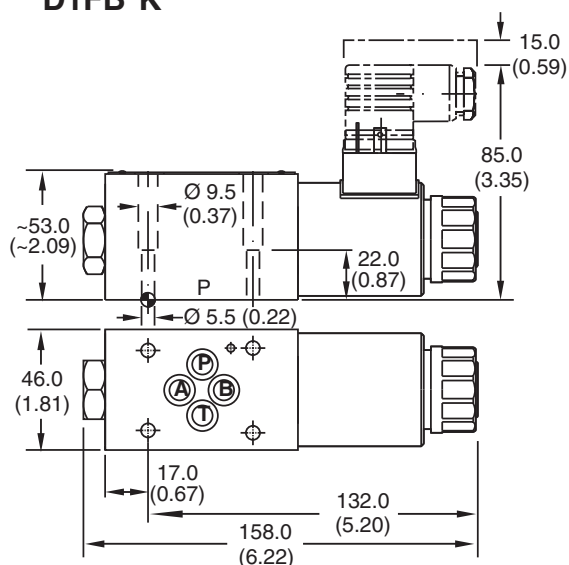
Simple to use interface program. Download free of charge
www.parker.com/propxd



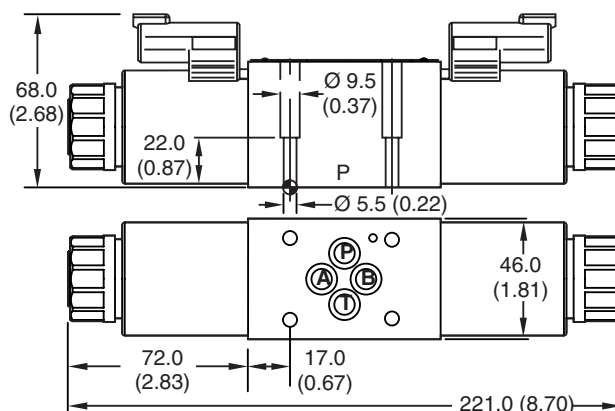
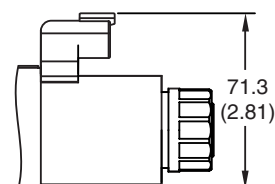
The parametrizing cable may be ordered under item no. 40982923.

Dimensions**Proportional Directional Control Valves
Series D1FB (Offboard Electronics)**

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

D1FB*C**A****D1FB*E****D1FB*K****D1FB*C*0 with DT04-2P “Deutsch” Connector**

(Only C style shown)

**D1FB*C*3**

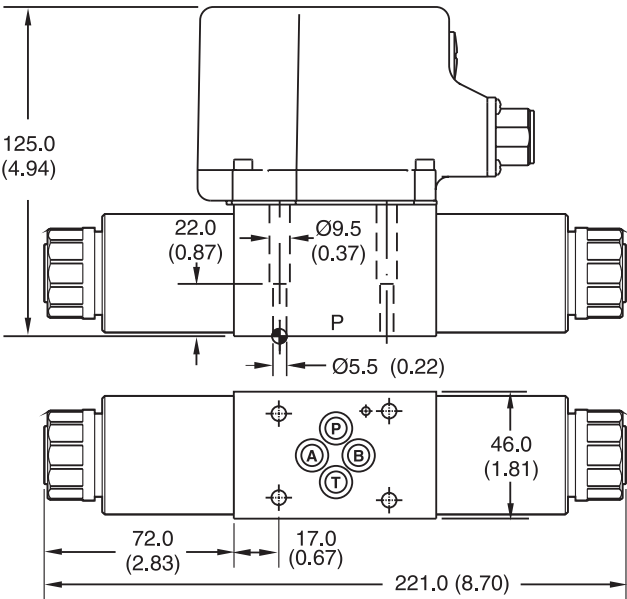
Surface Finish	Kit	Kit	Kit	Seal Kit
$\sqrt{R_{max} 6.3}$ $\square 0.01/100$	BK375	4x M5x30 DIN 912 12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB Fluorocarbon: SK-D1FBV
	BK209	4x 10-24x1.25		

A01_Cat2550.indd, ddp, 06/21

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

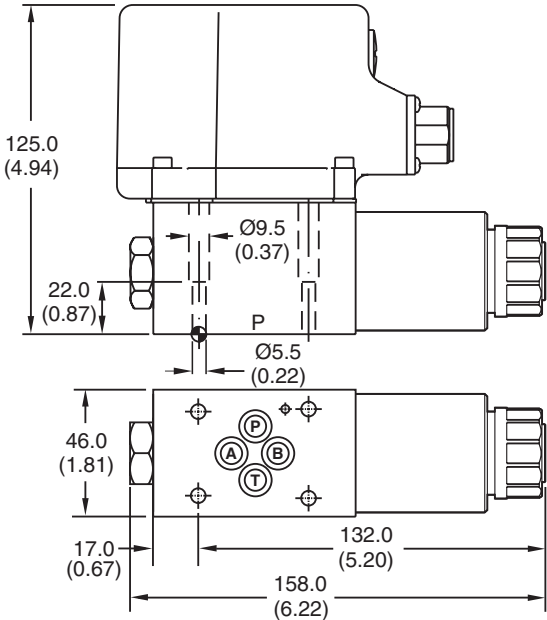
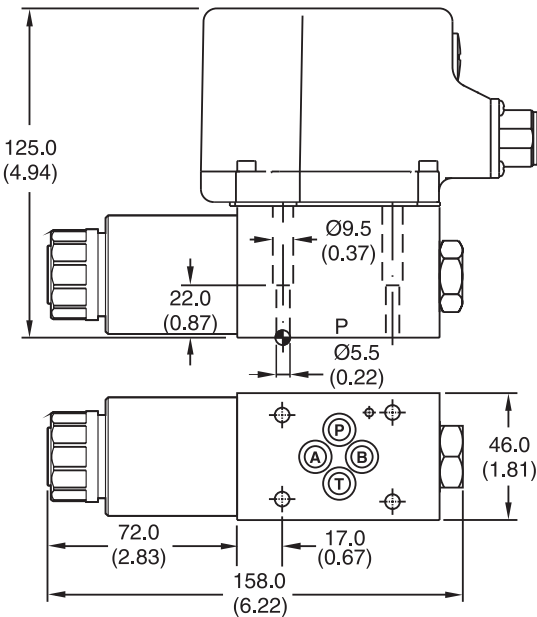
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D1FB*C OBE



D1FB*E OBE

D1FB*K OBE



Surface Finish	Kit	Kit	Kit	Seal Kit
	BK375	4x M5x30 DIN 912 12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB Fluorocarbon: SK-D1FBV
	BK209	4x 10-24x1.25		

General Description

Series D1FB*EE series with explosion proof solenoids is based on the standard D1FB series. The specific solenoid design allows the usage in hazardous environments. The explosion proof class is

CE  II 2 G
 Ex e mb II T4 Gb

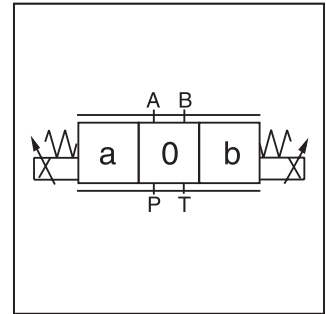
for use in zone 1 and 2 (conform to ATEX).

Additionally the solenoids have IECEx conformity.

The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400 (to be used in an explosion proof cabinet or outside of the hazardous area).

The valve parameters can be edited with the common ProPxD software.

The D1FB valves can be ordered with spool/sleeve de-sign (D1FB*0) for maximum precision as well as spool/body design (D1FB*3) for high nominal flow – see functional limit curves for maximum flow capability.



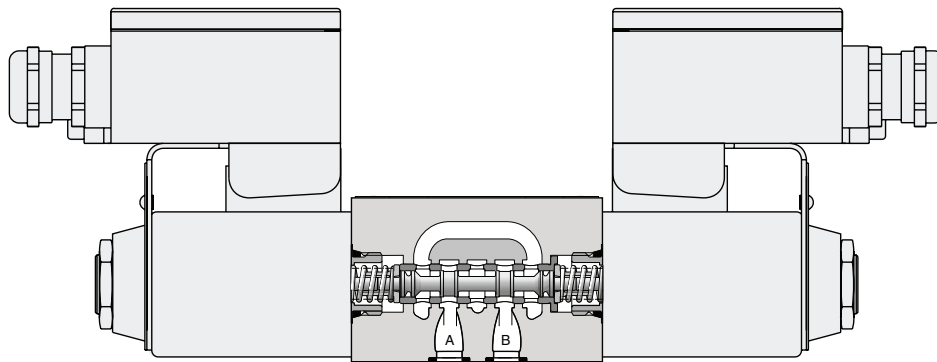
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Features

- Spool/sleeve and spool/body
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Optional: coil to permit ambient temperature up to +60°C (+140°F), modification XG371

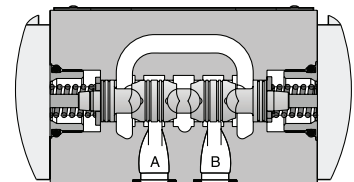
D1FB*0*EE

Spool/Sleeve Design



D1FB*3*EE

Spool/Body Design



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

A01_Cat2550.indd, ddp, 06/21

A

D	1	F	B			0	N		E			EE															
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style	Seal	Solenoid Voltage	Explosion Proof	Design	Design Series	Connection	Modification															
<table><tr><th>Code</th><th>Description</th></tr><tr><td>1</td><td>DIN NG6 CETOP 3 NFPA D03</td></tr></table>					Code	Description	1	DIN NG6 CETOP 3 NFPA D03	<table><tr><th>Code</th><th>Description</th></tr><tr><td>N</td><td>Nitrile</td></tr></table>			Code	Description	N	Nitrile	<table><tr><th>Code</th><th>Description</th></tr><tr><td>0</td><td>Spool/sleeve design</td></tr><tr><td>3</td><td>Spool/body design</td></tr></table>						Code	Description	0	Spool/sleeve design	3	Spool/body design
Code	Description																										
1	DIN NG6 CETOP 3 NFPA D03																										
Code	Description																										
N	Nitrile																										
Code	Description																										
0	Spool/sleeve design																										
3	Spool/body design																										
NOTE: Not required when ordering.																											

D1FB*0*EE: Spool/Sleeve Design		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01H E01F E01C		20 (5.3) 12 (3.2) 6 (1.6)
E02H E02F E02C		20 (5.3) 12 (3.2) 6 (1.6)
E03H E03F E03C		20 (5.3) 12 (3.2) 6 (1.6)
B31H B31F	$Q_B = Q_A/2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F	$Q_B = Q_A/2$ 	20/10 (5.3/2.6) 12/6 (3.2/1.6)

Code	Style
C	
E	
K	

Code	Description
EE	Explosion Proof with Cable Glands Ex e mb II T4 Gb + IECEx conformity

Code	Description
omit	Standard
XG371	Coil to permit ambient temperature up to +60°C (+140°F)

D1FB*3*EE: Spool/Body Design		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01K E01H E01F		30 (7.9) 20 (5.3) 10 (2.6)
E02K E02H E02F		30 (7.9) 20 (5.3) 10 (2.6)
B31K B31H B31F	$Q_B = Q_A/2$ 	30/15 (7.9/3.96) 20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32K B32H B32F	$Q_B = Q_A/2$ 	30/15 (7.9/3.96) 20/10 (5.3/2.6) 12/6 (3.2/1.6)

Bolt Kit:
BK375 (4) M5x30

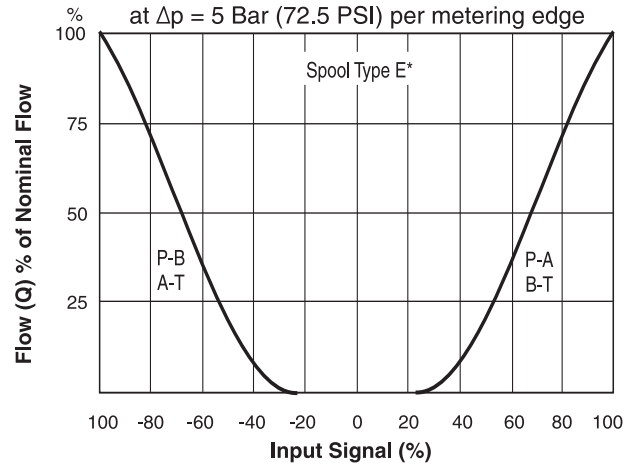
Weight:
2 Solenoids 3.5 kg (7.7 lbs.)
1 Solenoid 2.5 kg (5.5 lbs.)

General				
Design		Direct operated proportional DC valve		
Actuation		Proportional solenoid		
Size		NG06/CETOP 03/NFPA D03		
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA		
Mounting Position		Unrestricted		
Ambient Temperature		[°C]	-20...+40 (-4°F...+104°F); XG371: -20...+60 (-4°F...+140°F)	
MTTF _D Value		[years]	150	
Vibration Resistance		[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27	
Hydraulic				
Maximum Operating Pressure		[Bar]	Ports P, A, B 350 Bar (5076 PSI); Port T 210 Bar (3046 PSI)	
Maximum Pressure Drop PABT / PBAT		[Bar]	350 Bar (5076 PSI)	
Fluid		Hydraulic oil as per DIN 51524...51535, other on request		
Fluid Temperature		[°C]	-20...+40 (-4°F...+104°F); XG371: -20...+60 (-4°F...+140°F)	
Viscosity				
Permitted		[cSt] / [mm²/s]	20...400 (93...1854 SSU)	
Recommended		[cSt] / [mm²/s]	30...80 (139...371 SSU)	
Filtration		ISO 4406 (1999) 18/16/13		
Nominal Flow at Δp=Bar (72.5 PSI) per Control Edge *		[LPM]	D1FB*0*EE (Spool/Sleeve)	
			D1FB*3*EE (Spool/Body)	
			6 LPM (1.6 GPM) 12 LPM (3.2 GPM) 20 LPM (5.3 GPM)	
			10 LPM (2.6 GPM) 20 LPM (5.3 GPM) 30 LPM (7.9 GPM)	
Leakage at 100 Bar (1450 PSI)		[ml/min]	<50	
Overlap		[%]	25, electrically normalized at 10 (see flow characteristics)	
Static / Dynamic				
Step Response at 100% Step		[ms]	30	
Hysteresis		[%]	<4	
Temperature Drift Solenoid Current		[%/K]	<0.02	
Electrical				
Duty Ratio		[%]	100	
Protection Class		CE Ⓢ II 2 G, Ex e mb II T4 Gb, IP66 (plugged and mounted correctly)		
Solenoid		Code J	Code J*XG371	Code K
Supply Voltage		[V]	24	12
Current Consumption		[A]	1.15	2.3
Resistance		[Ohm]	12.0	3.0
Solenoid Connection		Box with M20x1.5 entry for cable glands. Solenoid identifications per ISO 9461.		
Wiring Minimum		[mm²]	3x1.5 recommended	
Wiring Length Maximum		[m]	50 (164 ft.) recommended	

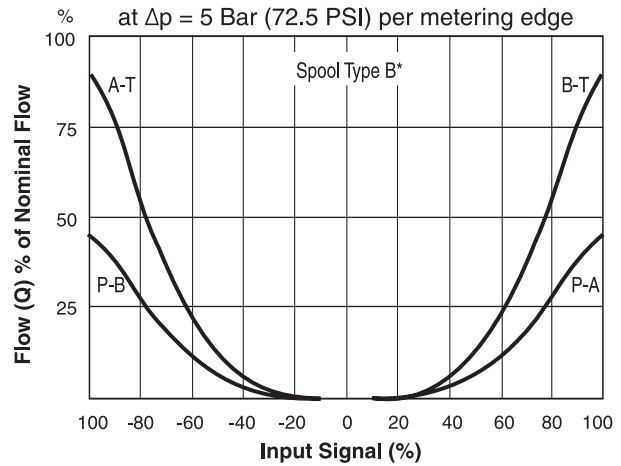
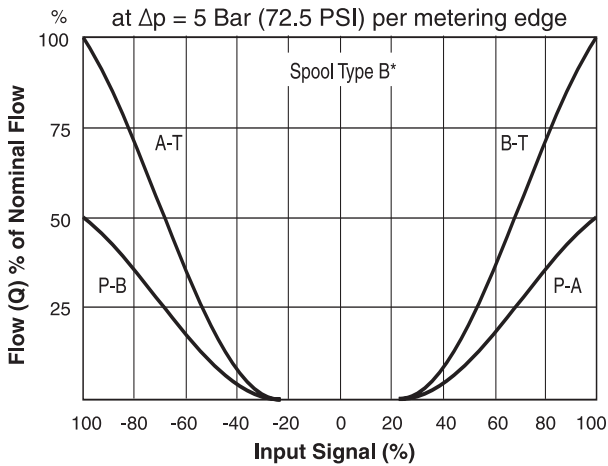
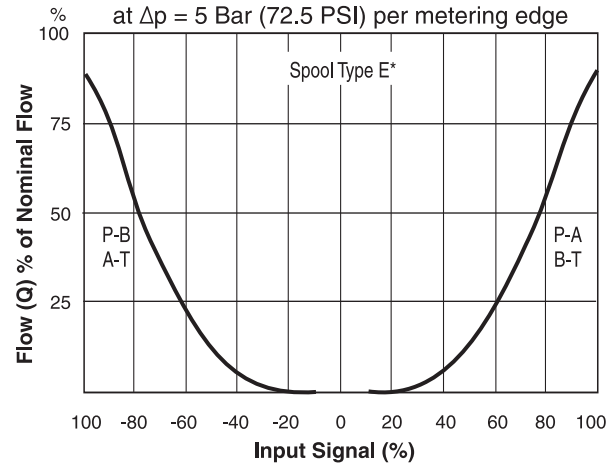
With electrical connections the protective conductor (PE ⚡) must be connected according to the relevant regulations.

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

D1FB*0*EE

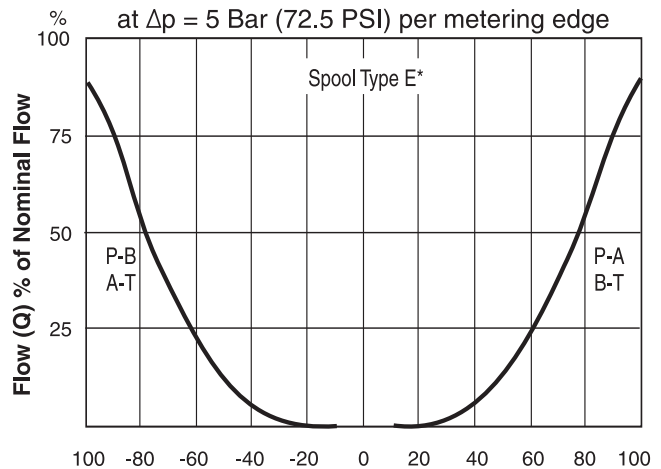
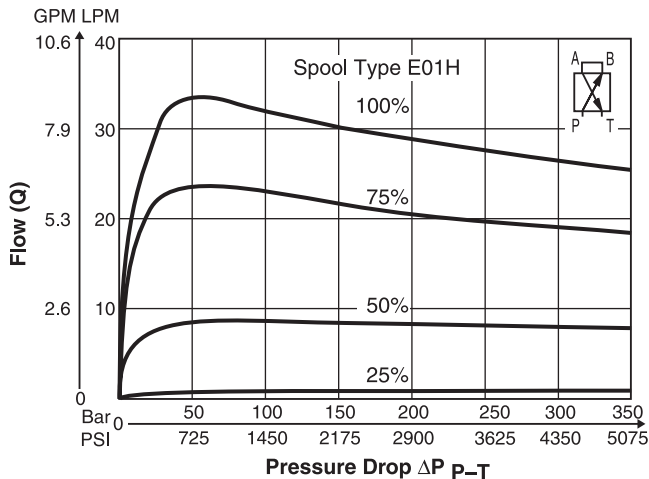


D1FB*0*EEEXG371



Functional Limits

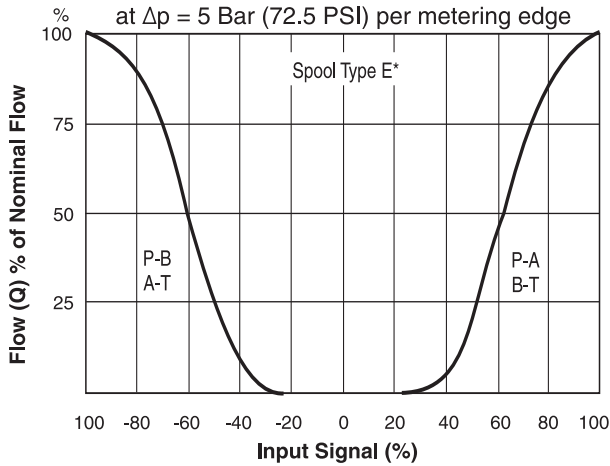
At 25%, 50%, 75% and 100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.



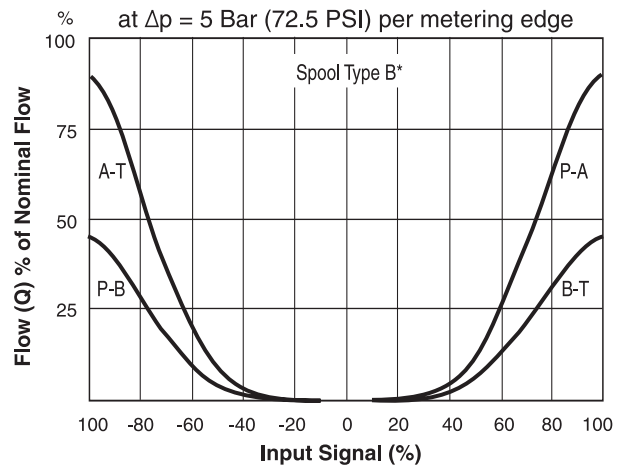
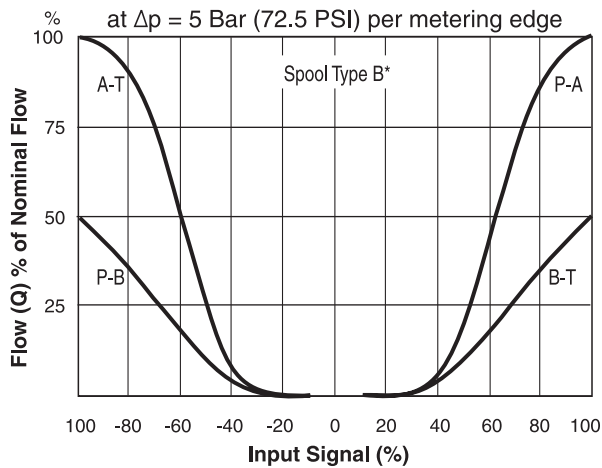
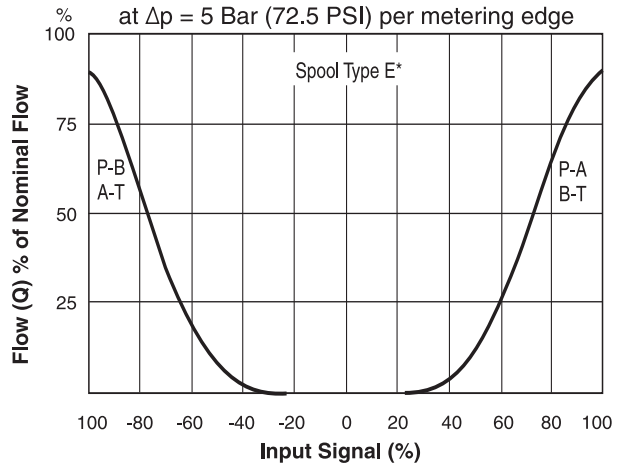
All performance curves measured with HLP46 at 50°C (122°F).

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D1FB*3*EE

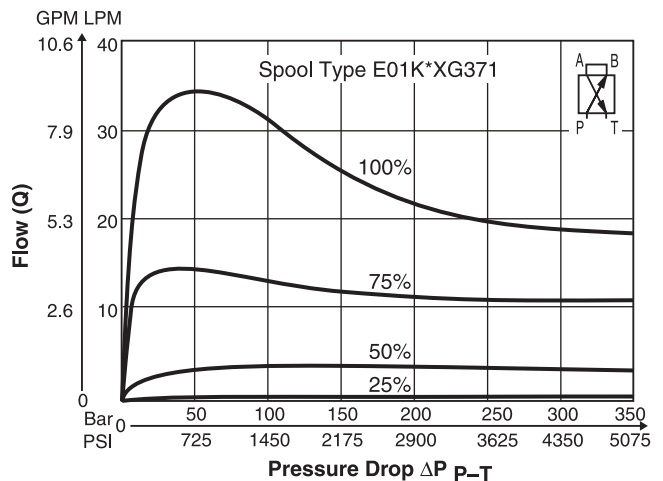
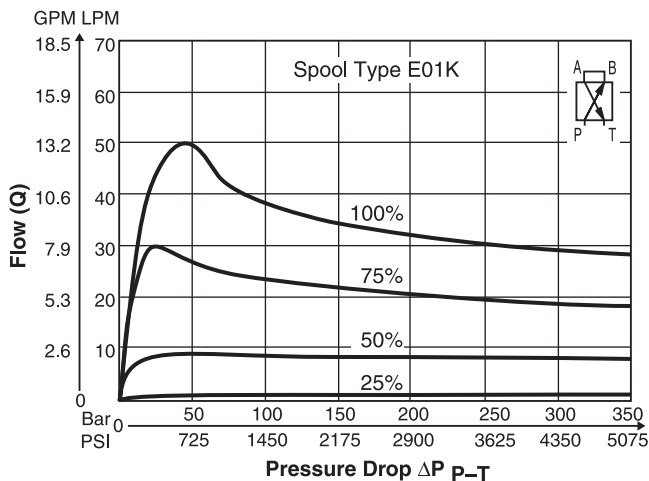


D1FB*3*EEXG371



Functional Limits

At 25%, 50%, 75% and 100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.

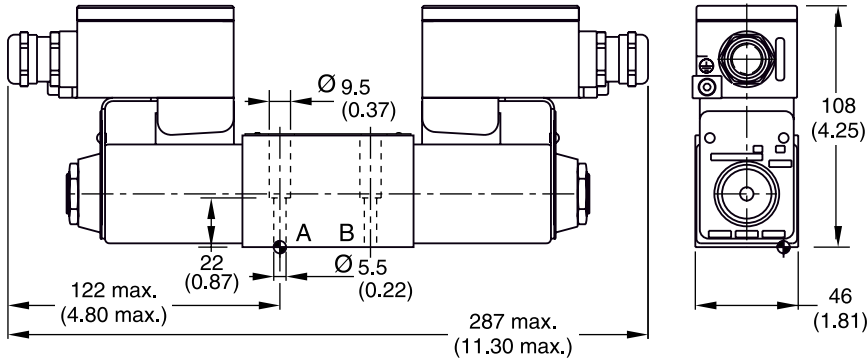


All performance curves measured with HLP46 at 50°C (122°F).

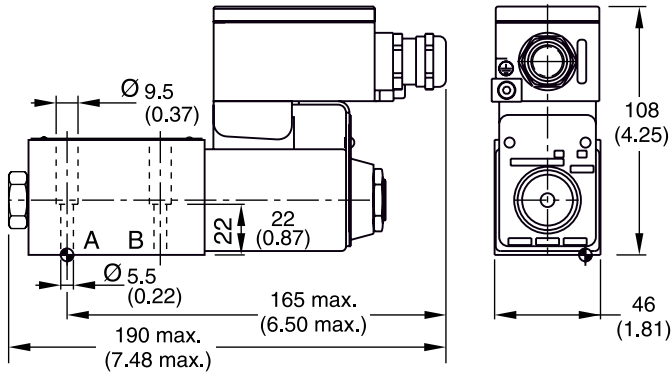
Inch equivalents for millimeter dimensions are shown in (**)

A

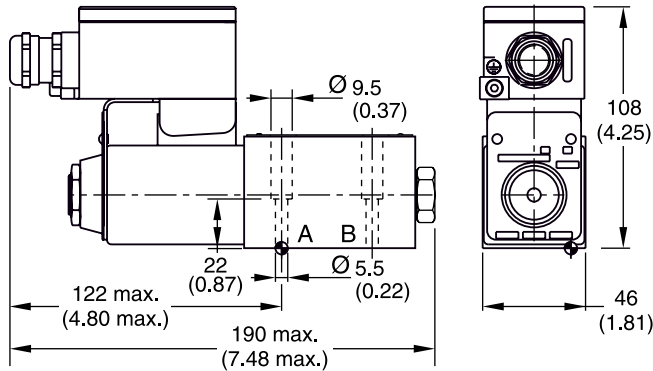
D1FB*C*EE

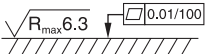


D1FB*K*EE



D1FB*E*EE



Surface Finish	 Kit	 4x M5x30 ISO 4762-12.9	 7.6 Nm (5.6 lb.-ft.)	Seal  Kit
	BK375			Nitrile: SK-D1FB

General Description

Series D3FB (NG10) proportional directional valves are available with and without onboard electronics (OBE).

D3FB OBE:

The digital onboard electronics is situated in a robust metal housing, which allows the usage under rough environmental conditions.

The nominal values are factory set. The cable connection to a serial RS-232 interface is available as accessory.

D3FB for external electronics:

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

The valve parameters can be edited with the common ProPx software for both versions.

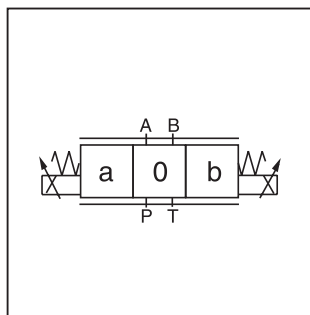
Series D3FB valves can be ordered with spool/sleeve design (D3FB*0) for maximum precision, as well as spool/body design (D3FB*3) for high nominal flow – see functional limit curves for maximum flow capability.



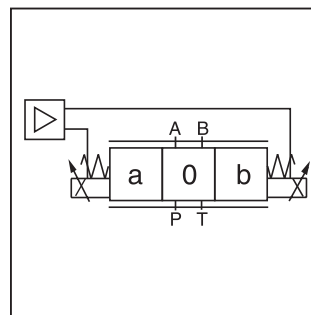
D3FB



D3FB OBE



D3FB



D3FB OBE

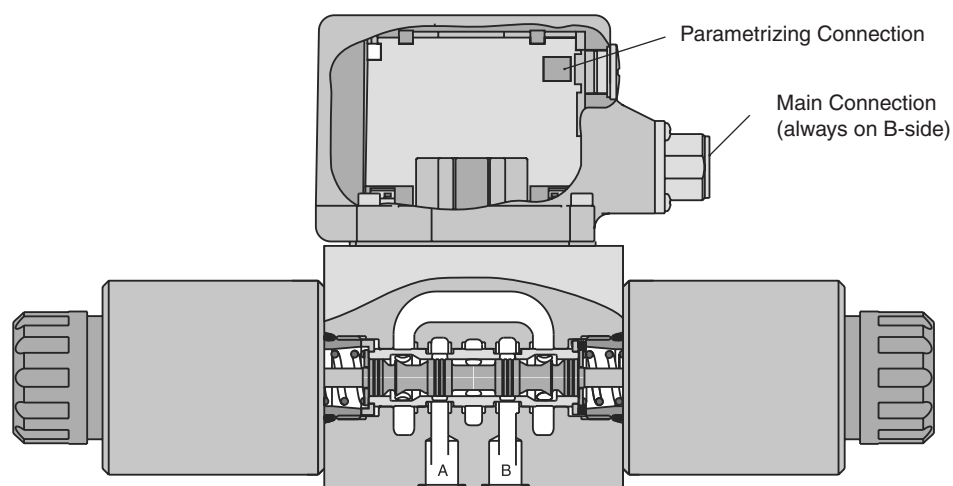


Features

- Spool/sleeve and spool/body
- 3 command options for D3FB OBE:
+/- 10V, 4...20mA, +/- 20mA
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Digital onboard electronics

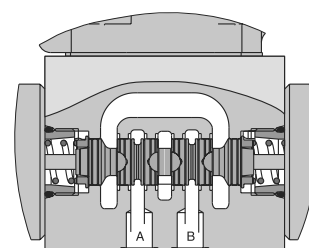
D3FB*0 OBE

Spool/Sleeve Design



D3FB*3 OBE

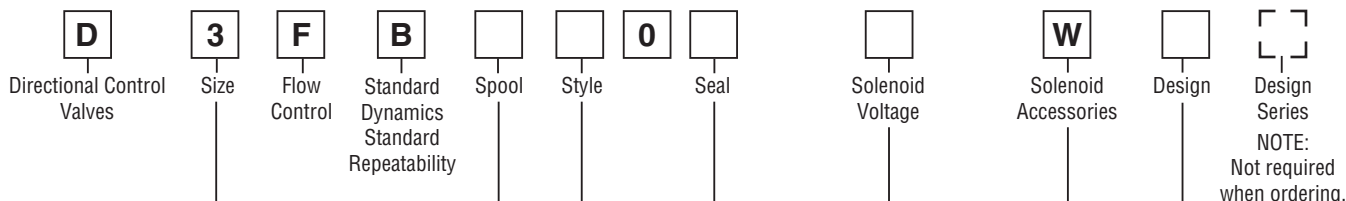
Spool/Body Design



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

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A



Code	Description
3	DIN NG10 CETOP 5 NFPA D05

D3FB*0: Spool/Sleeve Design	
Code	Solenoid
K	12V / 2.95A

Code	Description
0	Spool/sleeve design
3	Spool/body design

D3FB*3: Spool/Body Design	
Code	Solenoid
K	12V / 2.95A
J	24V / 1.5A

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
W*	Connector as per DIN 43650 without plug

* Please order plugs separately.
 See Accessories.

D3FB*0: Spool/Sleeve Design		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01M E01S		40 (10.6) 60 (15.9)
E02M E02S		40 (10.6) 60 (15.9)
B31M B31S	$Q_B = Q_A / 2$ 	40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)
B32M B32S	$Q_B = Q_A / 2$ 	40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)

D3FB*3: Spool/Body Design		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01M E01S E01U		40 (10.6) 60 (15.9) 80 (21.2)
E02M E02S E02U		40 (10.6) 60 (15.9) 80 (21.2)
B31M B31S	$Q_B = Q_A / 2$ 	40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)
B32M B32S	$Q_B = Q_A / 2$ 	40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)

Code	Style
C	
E	
K	

Bolt Kit:

BK98 (4) 1/4-24x1.625 SHCS
 BK385 (4) M6x40

Weight:

D3FB 6.5 kg (14.3 lbs.)

D

Directional Control Valves

3

Size

F

Flow Control

B

Standard Dynamics Standard Repeatability

Spool

Style

0

Seal

Input Signal

Options

Design

Design Series

NOTE:
Not required when ordering.

Code

Description

3

DIN NG10
CETOP 5
NFA D05

D3FB*0: Spool/Sleeve Design

Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01M E01S		40 (10.6) 60 (15.9)
E02M E02S		40 (10.6) 60 (15.9)
B31M B31S	$Q_B = Q_A / 2$ 	40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)
B32M B32S	$Q_B = Q_A / 2$ 	40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)

D3FB*3: Spool/Body Design

Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01M E01S E01U		40 (10.6) 60 (15.9) 80 (21.2)
E02M E02S E02U		40 (10.6) 60 (15.9) 80 (21.2)
B31M B31S	$Q_B = Q_A / 2$ 	40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)
B32M B32S	$Q_B = Q_A / 2$ 	40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)

Code

Description

N

Nitrile

V

Fluorocarbon

Code

Style

C

E

K

Code

Description

0

Spool/sleeve design

3

Spool/body design

Code

Input signal ¹⁾

Function

Port

Options

F0

0...+/-10V

0...+10V > P-A

6 + PE

Potentiometer supply

G0

0...+/-20mA

0...+20mA > P-A

6 + PE

—

S0

4...20mA

12...20mA > P-A

6 + PE

—

W5 ²⁾

0...+/-10V
4...20mA

0...+10V > P-A
12...20mA > P-A

11 + PE

Potentiometer supply & command preset channel

¹⁾ Single solenoid always 0...+10V respectively 4...20 mA

²⁾ Factory set $\pm$ 10V on delivery

Bolt Kit:

BK98 (4) 1/4-20x1.625 SHCS

BK385 (4) M6x40

Weight:

D3FB 7.2 kg (15.9 lbs.)

Please order plugs separately. See Accessories.

Parametrizing cable OBE => RS-232
Item no. 40982923

A01_Cat2550.indd, ddp, 06/21

A21

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

General			
Design		Direct operated proportional DC valve	
Actuation		Proportional solenoid	
Size		NG10 / CETOP 5 / NFPA D05	
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting Position		Unrestricted	
Ambient Temperature		[°C]	-20...+60; (-4°F...+140°F)
MTTF _D Value (OBE)		[years]	150 (75)
Vibration Resistance		[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Hydraulic			
Maximum Operating Pressure		Ports P, A, B 350 Bar (5075 PSI); Port T 210 Bar (3045 PSI)	
Maximum Pressure Drop PABT / PBAT		350 Bar (5075 PSI)	
Fluid		Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature		[°C]	-20...+60; (-4°F...+140°F)
Viscosity			
Permitted		[cSt] / [mm²/s]	20...380 (93...1761 SSU)
Recommended		[cSt] / [mm²/s]	30...80 (139...371 SSU)
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Nominal Flow at Δp=5 Bar (72.5 PSI) per Control Edge *		D3FB*0 (Spool/sleeve)	D3FB*3 (Spool/body)
		40 LPM (10.6 GPM) / 60 LPM (15.9 GPM)	40 LPM (10.6 GPM) 60 LPM (15.9 GPM) / 80 LPM (21.2 GPM)
Leakage at 100 Bar (1450 PSI)		[ml/min]	<100
Overlap		[%]	25, electrically normalized at 10 (see flow characteristics)
Static / Dynamic			
Step Response at 100% Step		[ms]	40
Hysteresis		[%]	<4
Temperature Drift Solenoid Current		[%/K]	<0.02
Electrical			
Duty Ratio		[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)	
Solenoid		Code "K"	Code "J"
Supply Voltage		[V]	12
Current Consumption		[A]	2.95
Resistance		[Ohm]	3.84
Solenoid Connection		Connector as per EN 175301-803	
Wiring Minimum		[mm²]	3x1.5 recommended
Wiring Length Maximum		[m]	50 (164 ft.)

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

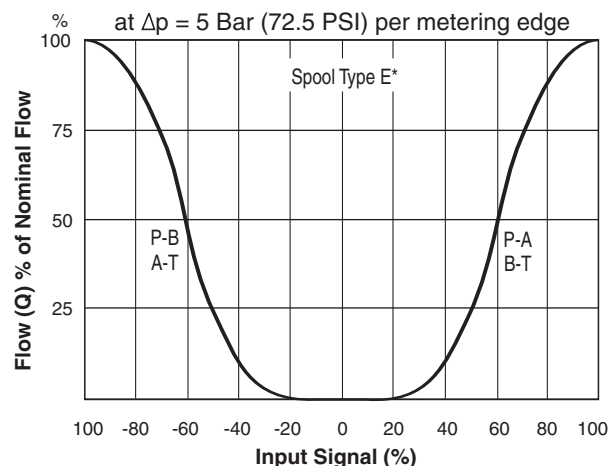
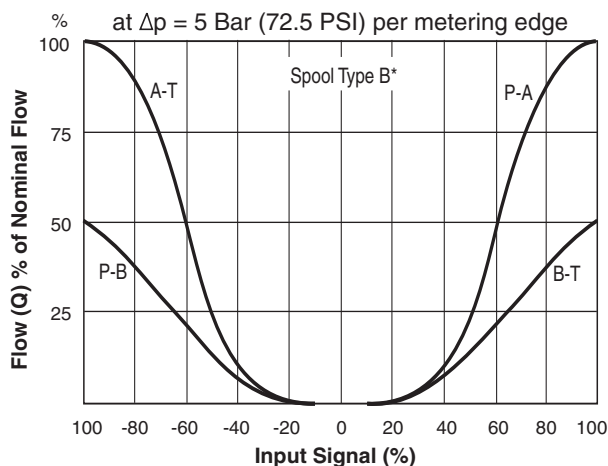
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Electrical		
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage/Ripple DC	[V]	18...30, ripple < 5% eff., surge free
Current Consumption Maximum	[A]	3.5
Pre-fusing Medium Lag	[A]	4.0
Input Signal		
Codes F0 & W5 Voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100kOhm, 0...+10V => P -> A
Codes S0 & W5 Current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, Ri = 200Ohm, 12...20mA => P -> A < 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Code G0	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, Ri = 200Ohm, 0...+20mA => P -> A
Differential Input Maximum		
Codes F0, G0 & S0	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
Code W5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0V (terminal 2)
Voltage References:		Not a powered output Only for 10K Ohm pots
Channel Recall Signal	[V]	0...2.5: off / 5...30: on / Ri = 100 kOhm
Adjustment Ranges:		
Minimum	[%]	0...50
Maximum	[%]	50...100
Ramp	[s]	0...32.5
Interface		RS-232, parametrizing connection 5 pole
EMC		EN 61000-6-2, EN 61000-6-4
Central Connection		
Codes F0, G0 & S0		6 + PE acc. to EN 175201-804
Code W5		11 + PE acc. to EN 175201-804
Wiring Minimum		
Codes F0, G0 & S0	[mm ²]	7 x 1.0 (AWG16) overall braid shield
Code W5	[mm ²]	11 x 1.0 (AWG20) overall braid shield
Wiring Length Maximum	[m]	50 (164 ft.)

Flow Characteristics

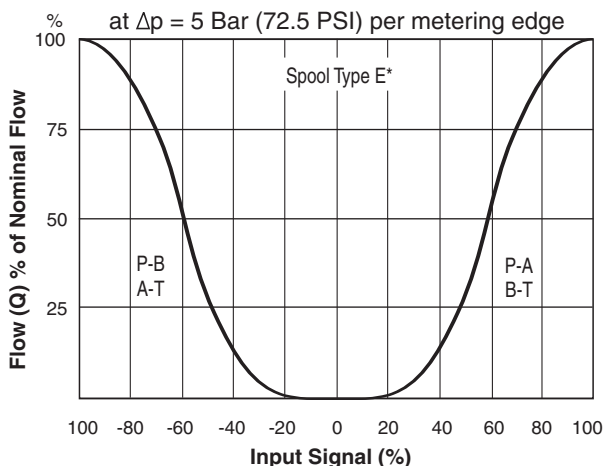
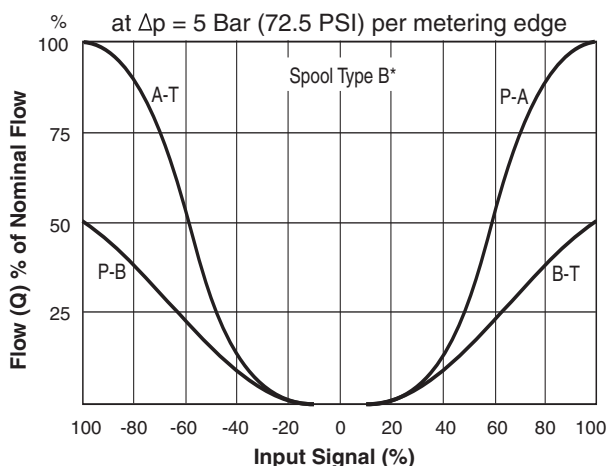
D3FB External Electronics

Spool type E01/02, B31/32
 (Electrically set to opening point 10%)



D3FB OBE

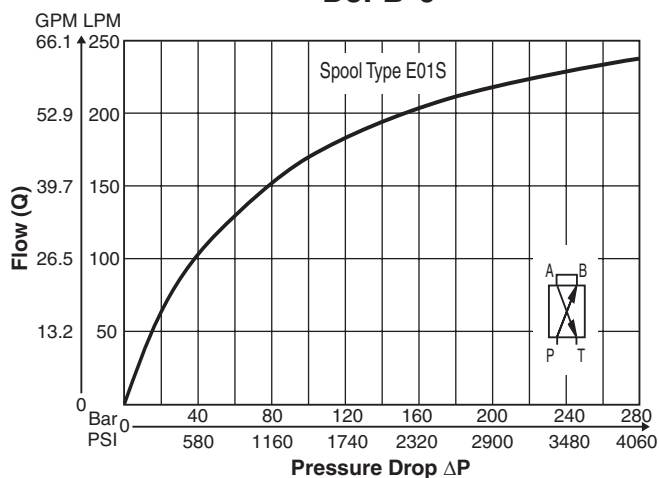
Spool type E01/02, B31/32
 (Electrically set to opening point 10%)



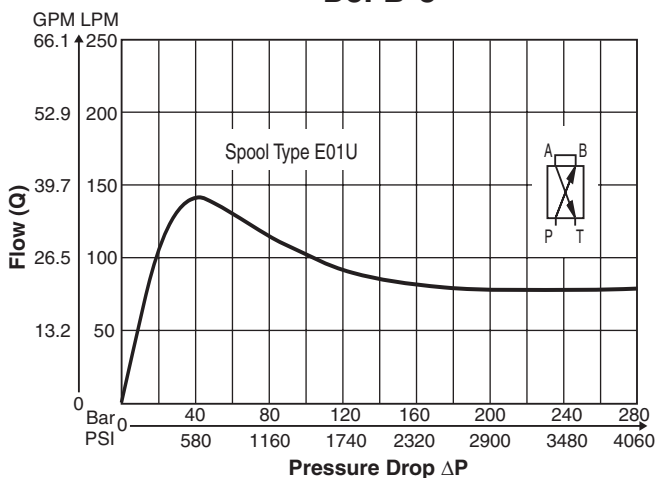
Functional Limits

100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.

D3FB*0



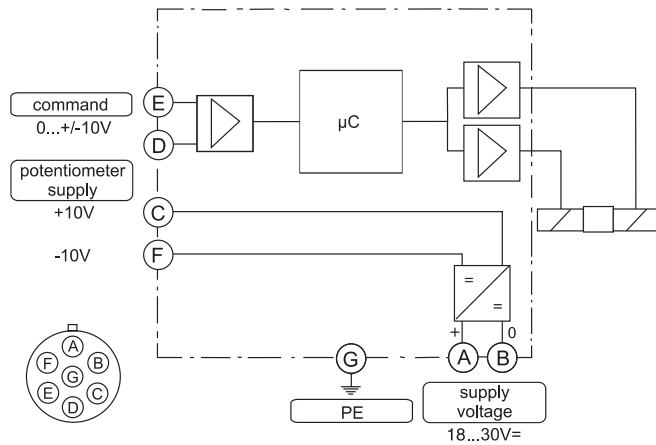
D3FB*3



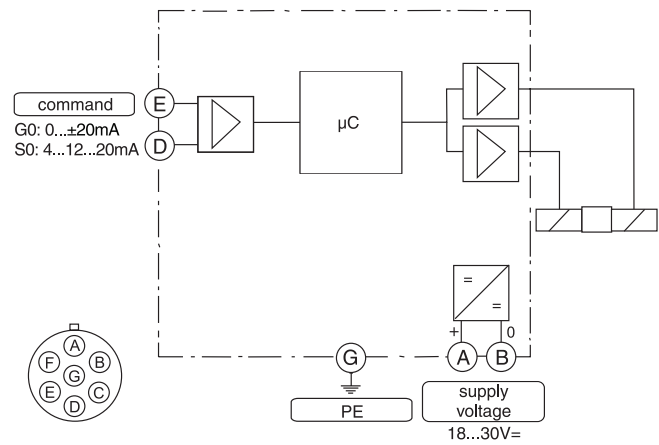
All performance curves measured with HLP46 at 50°C (122°F).

A01_Cat2550.indd, ddp, 06/21

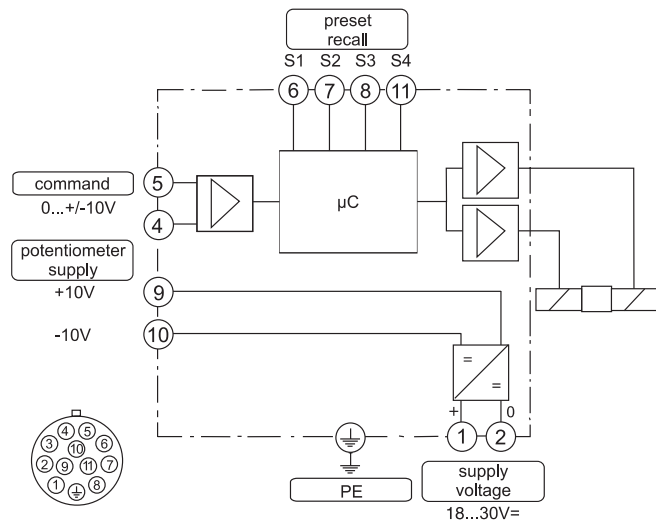
Code F0
6 + PE acc. to EN 175201-804



Code G0, S0
6 + PE acc. to EN 175201-804



Code W5
11 + PE acc. to EN 175201-804



ProPxD Interface Program

A

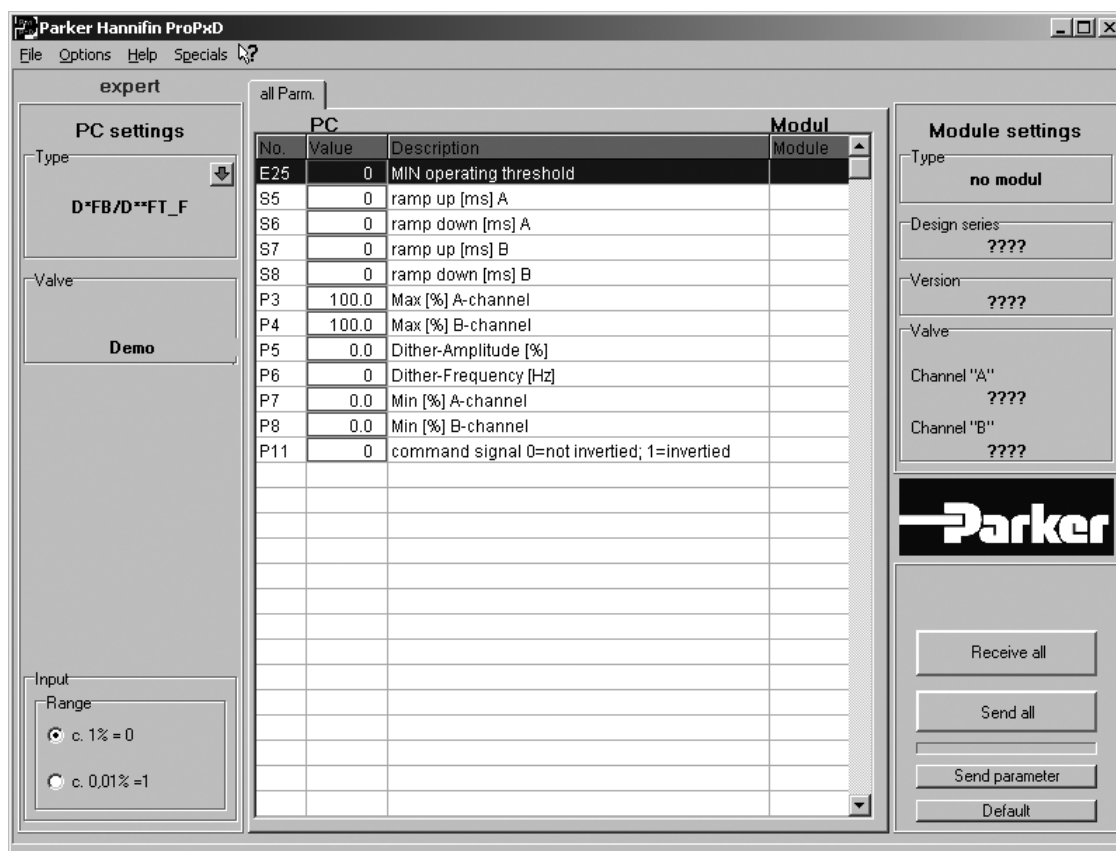
The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

Features

- Simple editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronics via serial interface RS-232.

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

Simple to use interface program. Download free of charge
www.parker.com/propxd

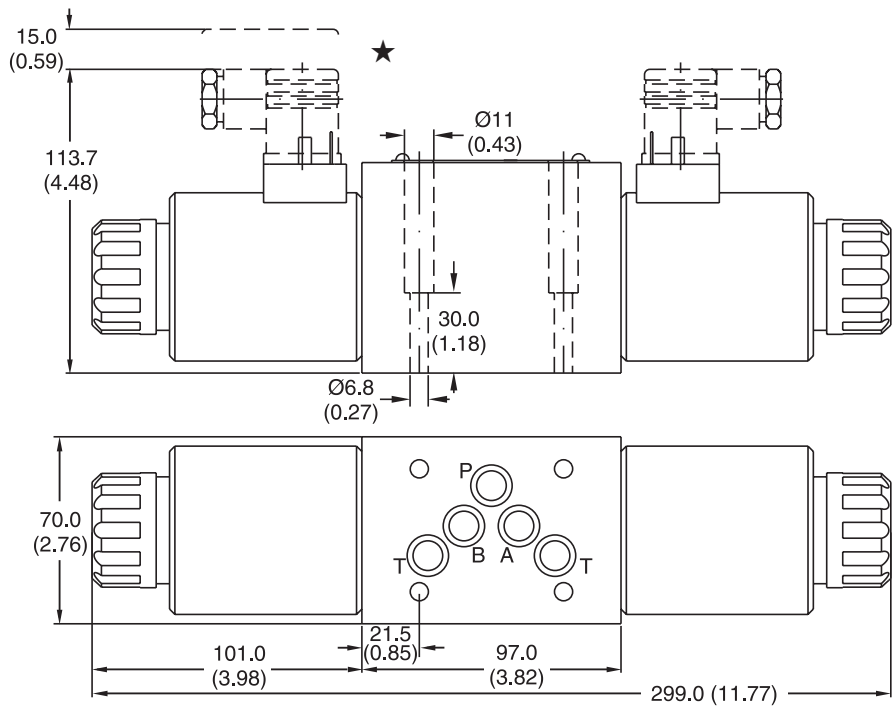


The parametrizing cable may be ordered under item no. 40982923.

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

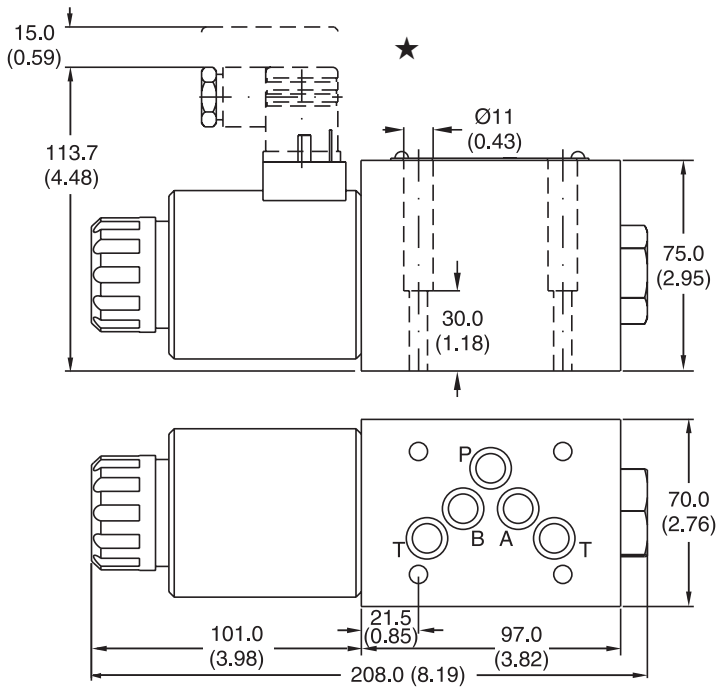
D3FB*C

A



D3FB*K

★ Order plugs separately.

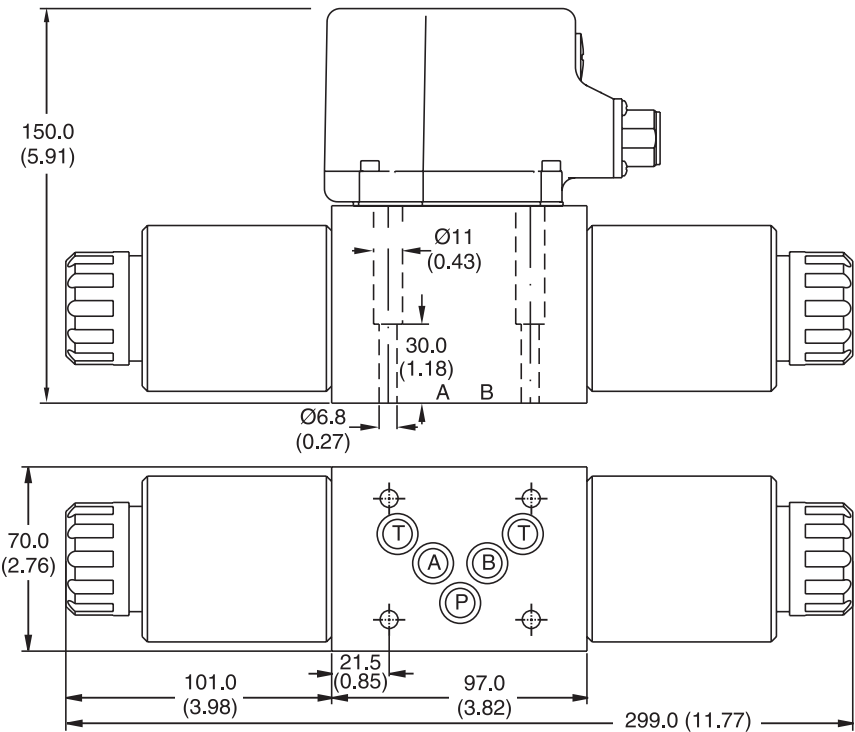


Surface Finish	Kit	Kit	Kit	Seal Kit
$\sqrt{R_{max} 6.3}$ $\square 0.01/100$	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D3FB Fluorocarbon: SK-D3FBV

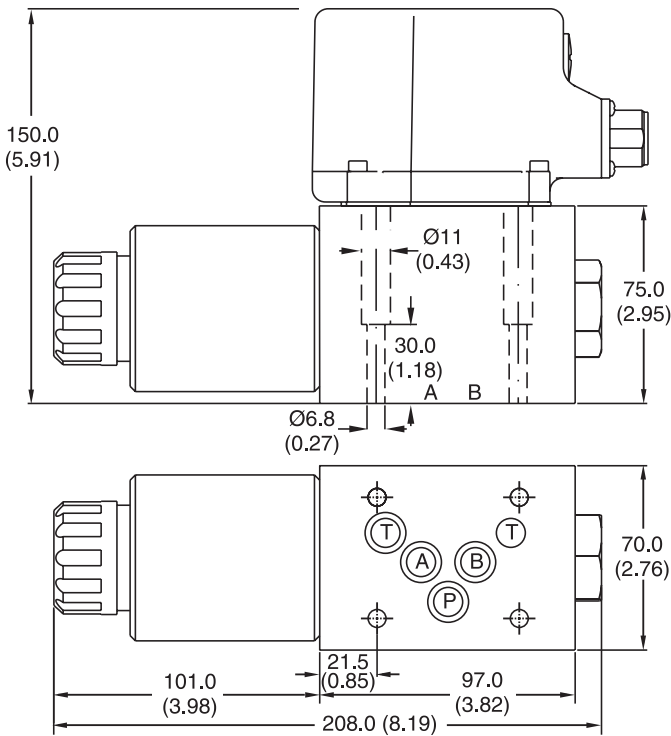
Inch equivalents for millimeter dimensions are shown in (**)

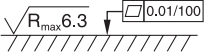
A

D3FB*C OBE



D3FB*E OBE



Surface Finish	 Kit	 Kit		Seal  Kit
	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D3FB Fluorocarbon: SK-D3FBV

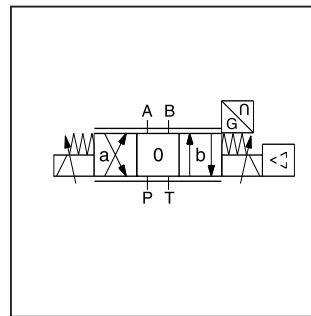
General Description

Series D1FC direct operated proportional directional valves with digital onboard electronics and position feedback provide high dynamics combined with high flow.

The D1FC is available with overlap spools for open loop applications as well as low lap spools for closed loop control.

The LVDT is completely integrated into the housing and it does not require an exposed cable connection. Thus an unintended disconnection is impossible.

The digital onboard electronics are situated in a robust metal housing which allows usage under rough environmental conditions. The nominal values are factory set. The parametrizing cable to connect to a serial RS-232 interface is available as an accessory.

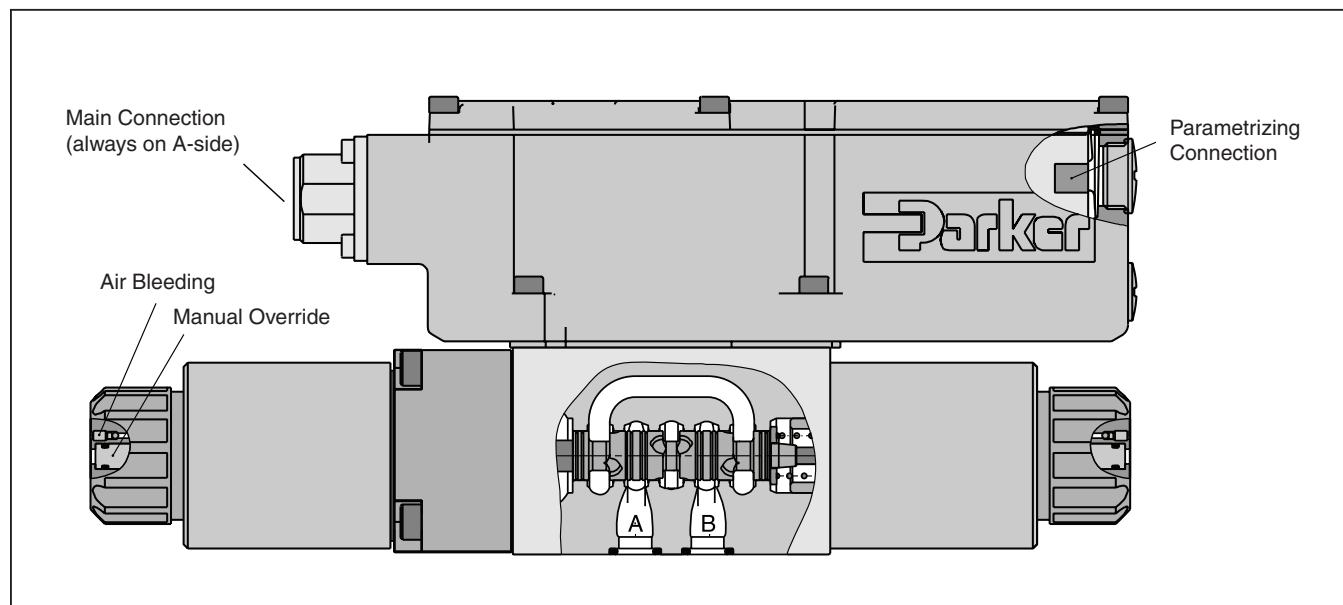


A

CE

Features

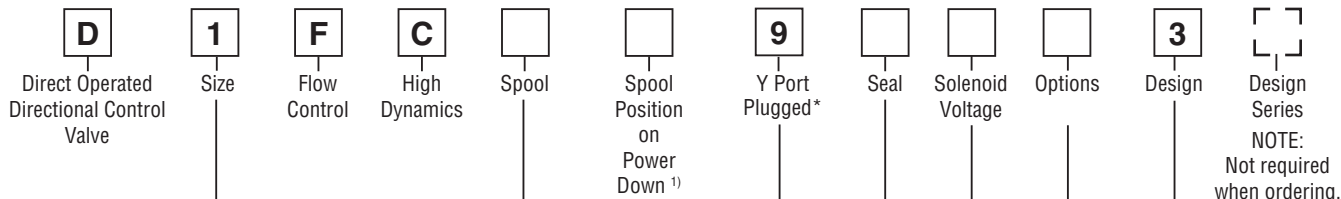
- Progressive flow characteristics for sensitive adjustment
- Low hysteresis
- High dynamics
- High flow capacity
- Compact dimensions
- Solenoid disable optional



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

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A



Code	Description
1	DIN NG6 CETOP 3 NFPA D03

Low Lap		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E50C E50F E50H E50K		5 (1.3) 10 (2.6) 20 (5.3) 30 (7.9)
B60F B60H B60K	$Q_B = Q_A/2$ 	5/10 (1.3/2.6) 10/20 (2.6/5.3) 15/30 (4.0/7.9)

Overlap		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01C E01F E01H E01K		5 (1.3) 10 (2.6) 20 (5.3) 30 (7.9)
E02C E02F E02H E02K		5 (1.3) 10 (2.6) 20 (5.3) 30 (7.9)
B31F B31H B31K	$Q_B = Q_A/2$ 	5/10 (1.3/2.6) 10/20 (2.6/5.3) 15/30 (4.0/7.9)
B32F B32H B32K	$Q_B = Q_A/2$ 	5/10 (1.3/2.6) 10/20 (2.6/5.3) 15/30 (4.0/7.9)

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Command Signal	Function
B	0...±10 V	0...+10 V P – A
E	0...±20 mA	0...+20 mA P – A
K	0...±10 V	0...+10 V P – B
S	4...20 mA	12...20 mA P – A

Code	Style ¹⁾
A ²⁾	
B ²⁾	
C ³⁾	

Code	Option ¹⁾
0	6 + PE acc. EN175201-804
1	6+PE + enable acc. EN175201-804 with solenoid disable
3	6+PE acc. EN175201-804 with solenoid disable
5	11 + PE acc. EN175201-804
7	6 + PE + enable acc. EN175201-804

¹⁾ On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A – T resp. B – T with pressure drops above 120 bar (1740 PSI) or contamination in the hydraulic fluid.

²⁾ Approximately 10% opening, only low lap spools.

³⁾ Only for overlap spools.

Parametrizing cable OBE => RS-232
 Item no. 40982923

Bolt Kit:

BK375 (4) M5x30

Weight:

D1FC 3.4 kg (7.5 lbs.)

General			
Design		Direct operated proportional DC valve with position feedback	
Actuation		Proportional solenoid	
Size		NG06 / CETOP 03 / NFPA D03	
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting Position		Unrestricted	
Ambient Temperature		[°C]	-20...+60; (-4°F...+140°F)
MTTF _D Value (OBE) ¹⁾		[years]	150
Weight		[kg]	3.4 (7.5 lbs)
Vibration Resistance		[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Hydraulic			
Maximum Operating Pressure		[Bar]	Ports P, A, B 350 Bar (5075 PSI), Port T max. 35 Bar (508 PSI); 210 Bar (3045 PSI) external drain; Port Y max. 35 Bar (508 PSI)
Max. Pressure Drop PABT / PBAT		[Bar]	350 Bar (5075 PSI)
Fluid		Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature		[°C]	-20...+60; (-4°F...+140°F); Nitrile -25...+60 (-13°F...+140°F)
Viscosity			
Permitted		[cSt] / [mm²/s]	20...400 (93...1854 SSU)
Recommended		[cSt] / [mm²/s]	30...80 (139...371 SSU)
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Nominal Flow at Δp=5 Bar (72.5 PSI) per Control Edge ²⁾		[LPM]	5 LPM (1.3 GPM) / 10 LPM (2.6 GPM) / 20 LPM (5.3 GPM) / 30 LPM (7.9 GPM)
Leakage at 100 Bar (1450 PSI)		[ml/min]	<800 (low lap spool); <300 (overlap spool)
Opening Point		Set to 10% command signal (see flow characteristics)	
Static / Dynamic			
Step Response at 100% Step		[ms]	20
Hysteresis		[%]	<0.1
Temperature Drift		[%/K]	<0.01
Electrical			
Duty Ratio		[%]	100
Protection Class		IP65 in accordance with EN60529 (with correctly mounted plug-in connector)	
Supply Voltage/Ripple DC		[V]	18...30, electric shut-off at <17, ripple <5% eff., surge free
Current Consumption Maximum		[A]	2.0
Pre-Fusing Medium Lag		[A]	2.5
Command Code B	Voltage	[V]	+10...0...-10, ripple <0.01% eff., surge free, 0...+10 V P–A
	Impedance	[kOhm]	100
	Code S Current	[mA]	+4...12...20, ripple <0.01% eff., surge free, 12...20 mA P–A
			<3.6 mA = enable off, >3.8 mA = enable on (according to NAMUR NE43)
Code E	Impedance	[Ohm]	<250
	Current	[mA]	+20...0...-20, ripple <0.01% eff., surge free, 0...+20 mA P–A
	Impedance	[Ohm]	<250

Continued on the next page

¹⁾ If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

²⁾ Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

A

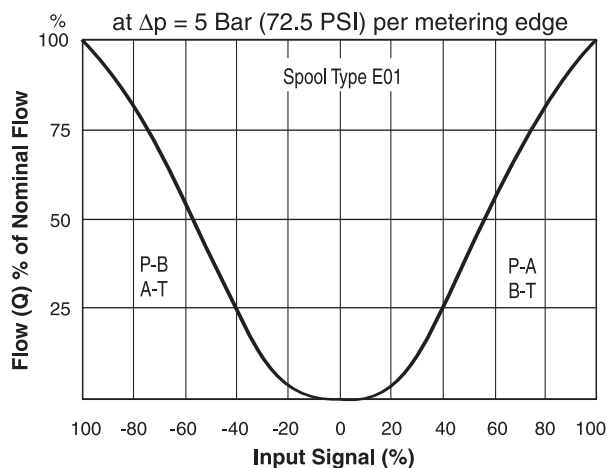
Electrical			
Differential Input Max. Code 0/1/3/7		[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0 V (terminal B)
	Code 5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0 V (terminal 2)
Adjustment Ranges	Minimum	[%]	0...50
	Maximum	[%]	50...100
	Ramp	[s]	0...32.5
Parametrizing Interface			RS-232C, parametrizing connection 5 pole
Enabling Signal	Code 1/5/7	[V]	5...30
Diagnostic Signal		[V]	+10...0...-10 / =12.5 error detection, rate max. 5 mA
EMC			61000-6-2, EN 61000-6-4
Electrical Connection	Code 0/1/3/7		6 + PE acc. to EN 175201-804
	Code 5		11 + PE acc. to EN 175201-804
Wiring Minimum	Code 0/1/3/7	[mm ²]	7x1.0 (AWG 16) overall braid shield
	Code 5	[mm ²]	8x1.0 (AWG 16) overall braid shield
Wiring Length Maximum		[m]	50 (164 ft.)
Solenoid Disable:			
Electrical Connection	Code 1/3		Female M12x1; 5p acc. to IEC-61076-2-101
Wiring Minimum		[mm ²]	0.34 (AWG 22)
Wiring Length Maximum		[m]	50 (164 ft.)

Flow Characteristics

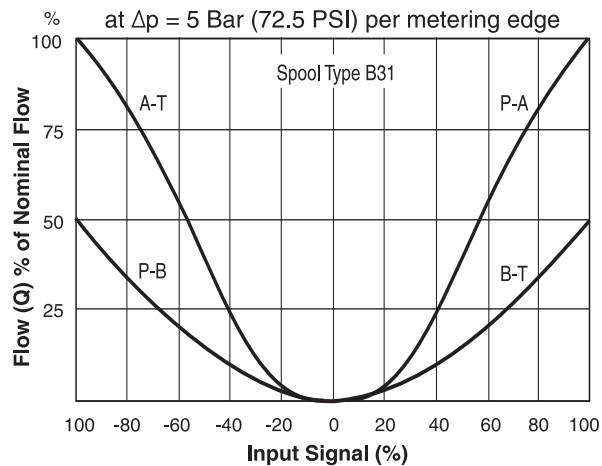
(Set to opening point 10%) at $\Delta p = 5$ Bar (72.5 PSI) per metering edge

A

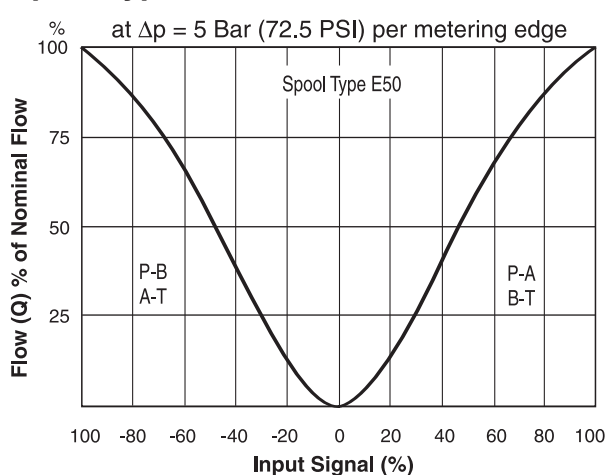
Spool Type E01



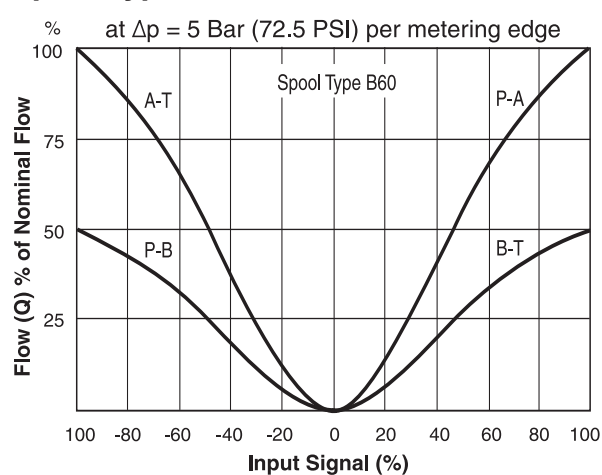
Spool Type B31



Spool Type E50



Spool Type B60

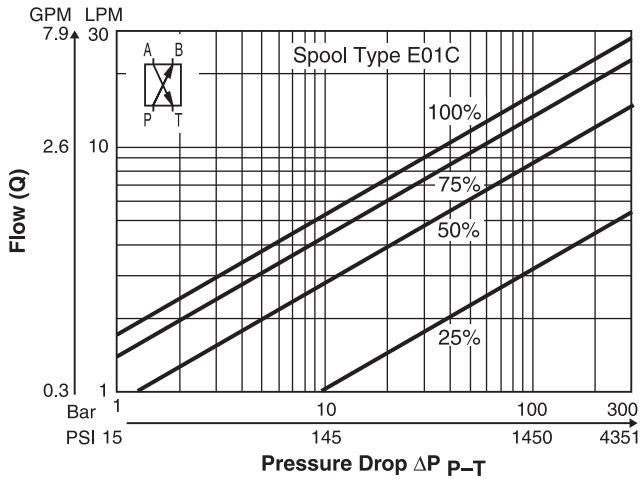
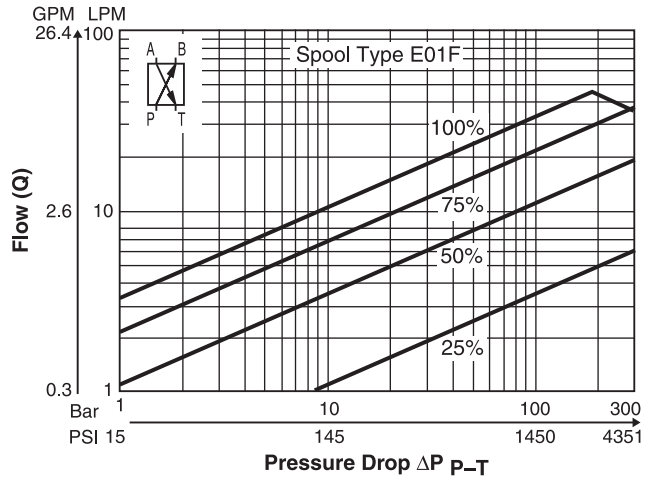
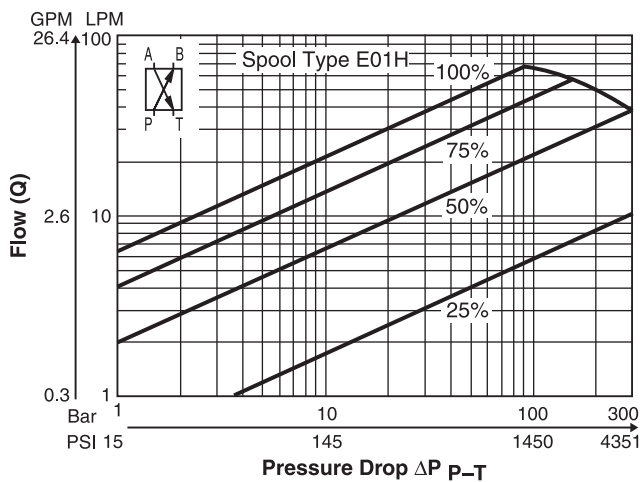
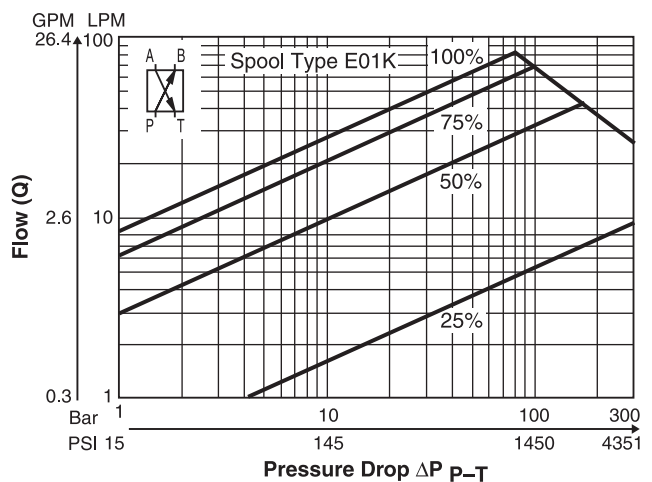
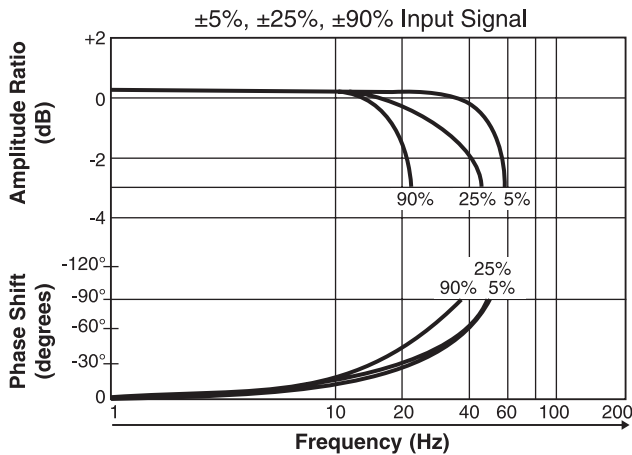
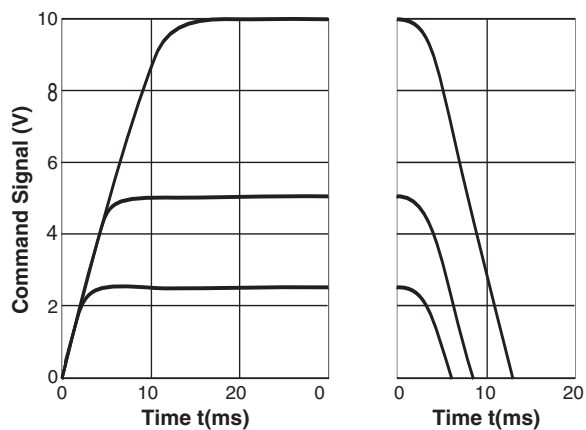


All performance curves measured with HLP46 at 50°C (122°F).

A**Functional Limits**

25%, 50%, 75%, and 100% command signal (symmetric flow).

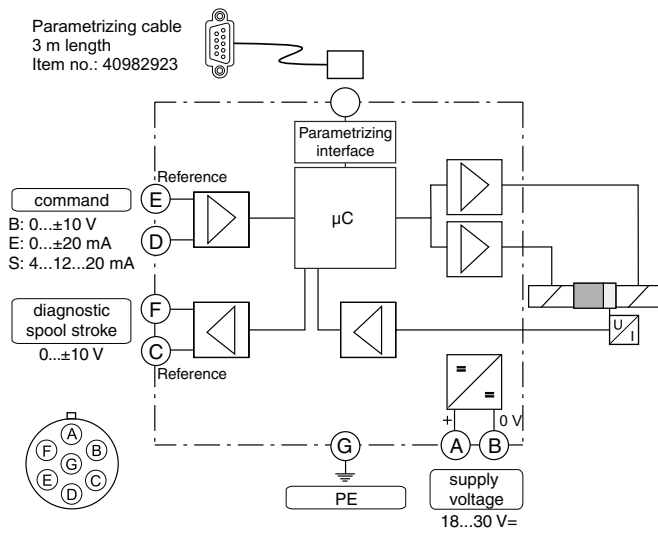
At asymmetric flow a reduced flow limit has to be considered.

Spool type E01C**Spool type E01F****Spool type E01H****Spool type E01K****Frequency****Step Response**

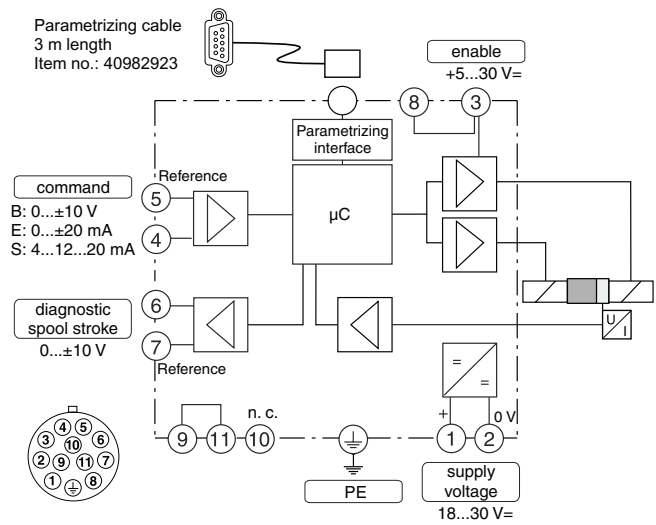
All performance curves measured with HLP46 at 50°C (122°F).

A01_Cat2550.indd, ddp, 06/21

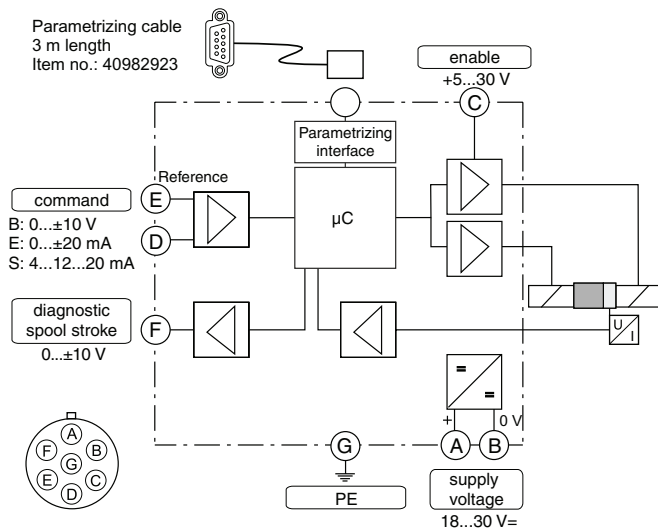
Code 0
6 + PE acc. to EN 175201-804



Code 5
11 + PE acc. to EN 175201-804



Code 7
6 + PE acc. to EN 175201-804 + enable



ProPxD Interface Program

The ProPxD software allows comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a non-volatile memory stores the data with the option for recalling or modification.

The PC software can be downloaded free of charge at www.parker.com/propxd.

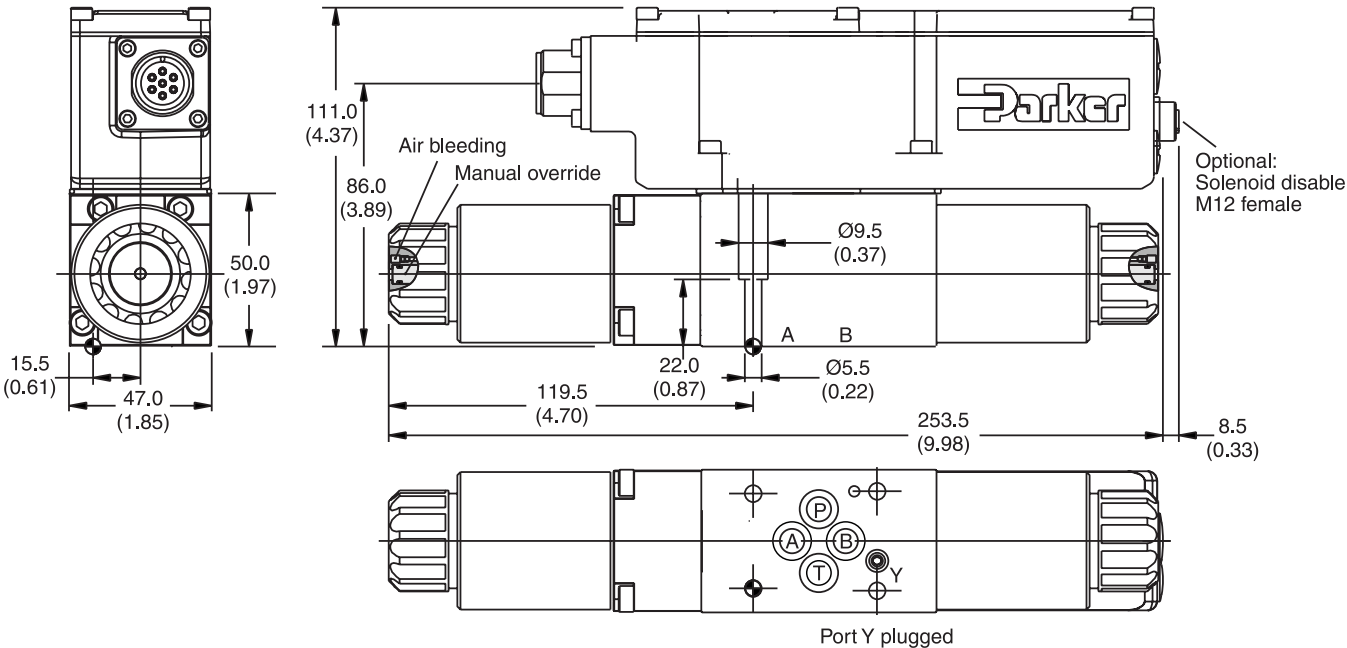
Features

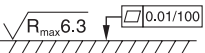
- Simple editing of all parameters.
- Depiction and documentatino of parameter sets.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® XP upwards.
- Communication between PC and electronics via serial interface RS-232C.

The parametrizing cable may be ordered under item no. 40982923.

[illegible]

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



Surface Finish	 Kit			Seal  Kit
	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FC Fluorocarbon: SK-D1FC-V

A

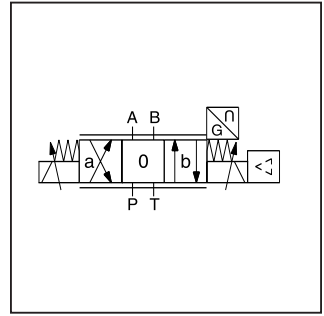
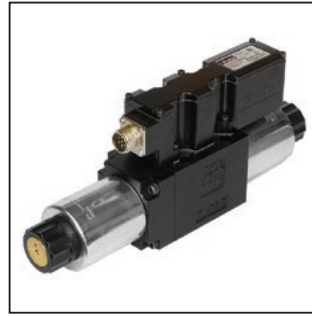
General Description

Series D3FC (NG10) direct operated proportional directional valves with digital onboard electronics and position feedback provides high dynamics combined with high flow.

The D3FC is available with overlap spools for open loop applications as well as low lap spools for closed loop control.

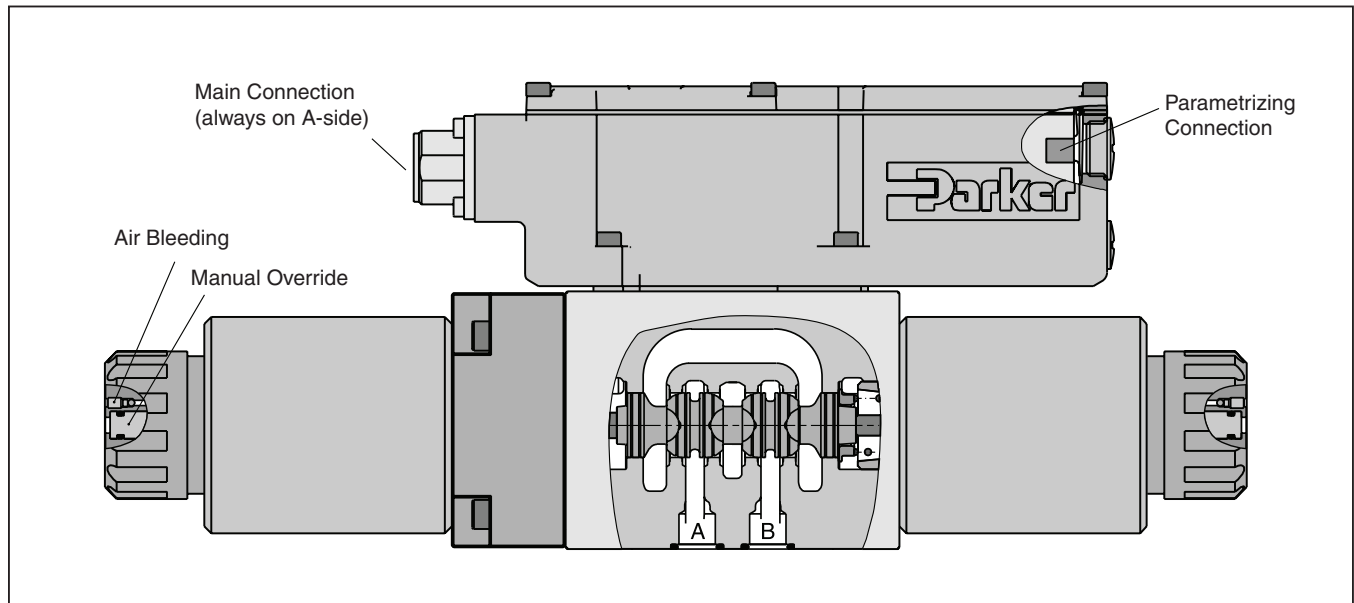
The LVDT is completely integrated into the housing and it does not require an exposed cable connection. Thus an unintended disconnection is impossible.

The digital onboard electronics is situated in a robust metal housing, which allows usage under rough environmental conditions. The nominal values are factory set. The parametrizing cable to connect to a serial RS-232 interface is available as an accessory.



Features

- Progressive flow characteristics for sensitive adjustment
- Low hysteresis
- High dynamics
- High flow capacity
- Compact dimensions



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

A01_Cat2550.indd, ddp, 06/21

A

D Direct Operated Directional Control Valves

3 Size

F Flow Control

C High Dynamics

Spool

Code	Description
3	DIN NG10 CETOP 05 NFFA D05

Low Lap		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E50M E50S E50U		35 (9.2) 55 (14.5) 75 (19.8)
B60M B60S B60U	$Q_B = Q_A/2$ 	17/35 (4.5/9.2) 27/55 (7.1/14.5) 37/75 (9.8/19.8)

Overlap		
Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
E01M E01S E01U		35 (9.2) 55 (14.5) 75 (19.8)
E02M E02S E02U		35 (9.2) 55 (14.5) 75 (19.8)
B31M B31S B31U	$Q_B = Q_A/2$ 	17/35 (4.5/9.2) 27/55 (7.1/14.5) 37/75 (9.8/19.8)
B32M B32S B32U	$Q_B = Q_A/2$ 	17/35 (4.5/9.2) 27/55 (7.1/14.5) 37/75 (9.8/19.8)

Spool Position on Power Down ¹⁾

9 Y Port Plugged ⁴⁾

Seal

Solenoid Voltage

Options

3 Design

Design Series
NOTE:
Not required when ordering.

⁴⁾ Plug in port Y must be removed at tank pressure > 35 bar (507.6 psi).

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Command Signal	Function
B	0...±10 V	0...+10 V P – A
E	0...±20 mA	0...+20 mA P – A
K	0...±10 V	0...+10 V P – B
S	4...20 mA	12...20 mA P – A

Code	Description
3	Spool/body design

Code	Style ¹⁾
A ²⁾	
B ²⁾	
C ³⁾	

Code	Description ⁵⁾
0	6+PE acc. EN175201-804
5	11+PE acc. EN175201-804
7	6+PE + enable acc. EN175201-804

⁵⁾ Please order connector separately. See Accessories.

¹⁾ On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A – T resp. B – T with pressure drops above 120 bar (1740 PSI) or contamination in the hydraulic fluid.

²⁾ Approximately 10% opening, only low lap spools.

³⁾ Only for overlap spools.

Bolt Kit:

BK385 (4) M6x40

Weight:

D3FC 7.7 kg (17.0 lbs.)

Parametrizing cable OBE => RS-232
Item no. 40982923

A

General			
Design		Direct operated proportional DC valve with position feedback	
Actuation		Proportional solenoid	
Size		NG10 / CETOP 05 / NFPA D05	
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting Position		Unrestricted	
Ambient Temperature		[°C]	-20...+60; (-4°F...+140°F)
MTTF _D Value (OBE) ¹⁾		[years]	150
Weight		[kg]	7.7 (17.0 lbs)
Vibration Resistance		[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Hydraulic			
Maximum Operating Pressure		[Bar]	Ports P, A, B 350 Bar (5075 PSI); Port T max. 35 Bar (508 PSI); 210 Bar (3046 PSI) external drain; Port Y max. 35 Bar (508 PSI)
Max.m Pressure Drop PABT / PBAT		[Bar]	350 Bar (5075 PSI)
Fluid		Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature		[°C]	-20...+60; (-4°F...+140°F); Nitrile -25...+60 (-13°F...+140°F)
Viscosity			
Permitted		[cSt] / [mm²/s]	20...400 (93...1854 SSU)
Recommended		[cSt] / [mm²/s]	30...80 (139...371 SSU)
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Nominal Flow at Δp=5 Bar (72.5 PSI) per Control Edge ²⁾		[LPM]	35 LPM (9.2 GPM) / 55 LPM (14.5 GPM) / 75 LPM (19.8 GPM)
Leakage at 100 Bar (1450 PSI)		[ml/min]	<1000 (low lap spool); <500 (overlap spool)
Opening Point		Set to 10% command signal (see flow characteristics)	
Static / Dynamic			
Step Response at 100% Step		[ms]	40
Hysteresis		[%]	<0.1
Temperature Drift		[%/K]	<0.01
Electrical			
Duty Ratio		[%]	100
Protection Class		IP65 in accordance with EN60529 (with correctly mounted plug-in connector)	
Supply Voltage/Ripple DC		[V]	18...30, electric shut-off at <17, ripple <5% eff., surge free
Current Consumption Maximum		[A]	3.5
Pre-Fusing Medium Lag		[A]	4.0
Command	Code B	Voltage	[V]
		Impedance	[kOhm]
	Code S	Current	[mA]
	Code E	Impedance	[Ohm]
	Current	[mA]	
	Impedance	[Ohm]	
+10...0...-10, ripple <0.01% eff., surge free, 0...+10 V P–A 100 4...12...20, ripple <0.01% eff., surge free, 12...20 mA P–A <3.6 mA = enable off, >3.8 mA = enable on (according to NAMUR NE43) <250 +20...0...-20, ripple <0.01% eff., surge free, 0...+20 mA P–A <250			

Continued on the next page

¹⁾ If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

²⁾ Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

Electrical			
Differential Input Max. Code 0/1/3/7		[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0 V (terminal B)
	Code 5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0 V (terminal 2)
Adjustment Ranges	Minimum	[%]	0...50
	Maximum	[%]	50...100
	Ramp	[s]	0...32.5
Parametrizing Interface			RS-232C, parametrizing connection 5 pole
Enabling Signal	Code 1/5/7	[V]	5...30
Diagnostic Signal		[V]	+10...0...-10 / =12.5 error detection, rate max. 5 mA
EMC			61000-6-2, EN 61000-6-4
Electrical Connection	Code 0/1/3/7		6 + PE acc. to EN 175201-804
	Code 5		11 + PE acc. to EN 175201-804
Wiring Minimum	Code 0/1/3/7	[mm ²]	7x1.0 (AWG 16) overall braid shield
	Code 5	[mm ²]	8x1.0 (AWG 16) overall braid shield
Wiring Length Maximum		[m]	50 (164 ft.)
Solenoid Disable:			
Electrical Connection	Code 1/3		Female M12x1; 5p acc. to IEC-61076-2-101
Wiring Minimum		[mm ²]	0.34 (AWG 22)
Wiring Length Maximum		[m]	50 (164 ft.)

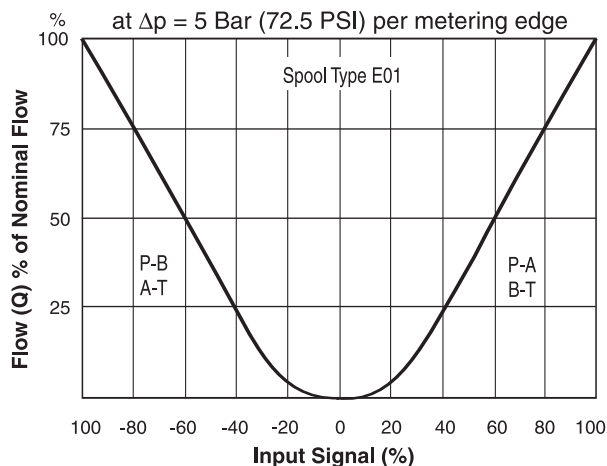
A

Flow Characteristics

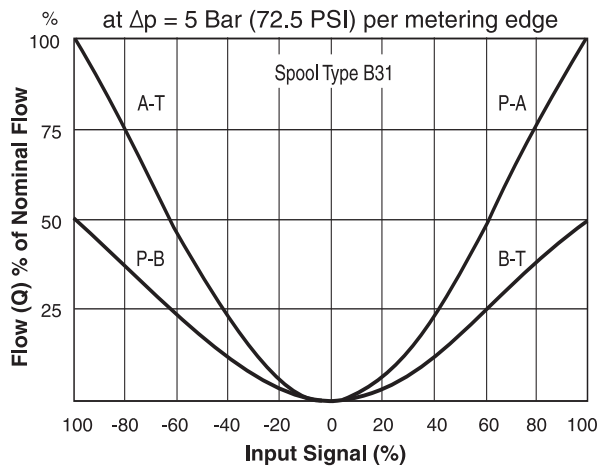
Electrically set to opening point 10% at Δp 5 Bar (72.5 PSI) per metering edge

A

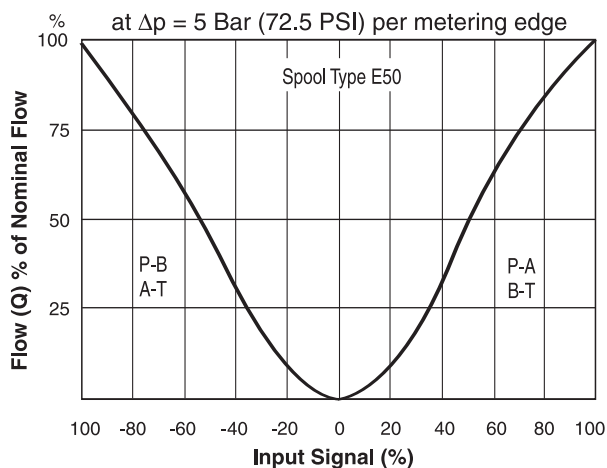
Spool Type E01



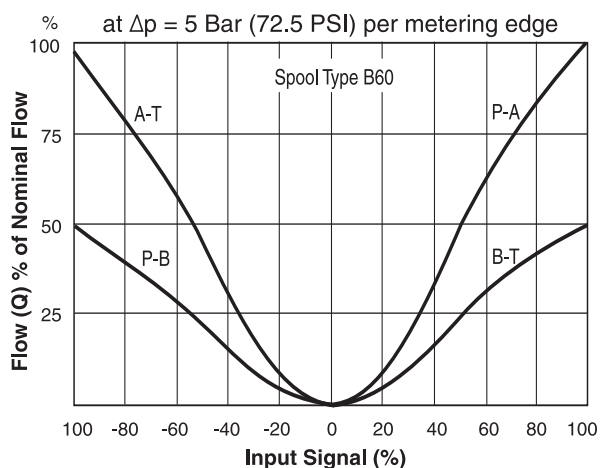
Spool Type B31



Spool Type E50



Spool Type B60



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

A01_Cat2550.indd, ddp, 06/21

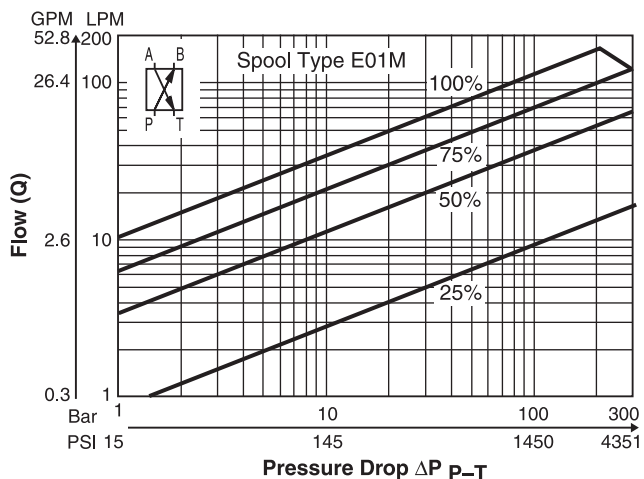
Functional Limits

25%, 50%, 75%, and 100% command signal (symmetric flow).

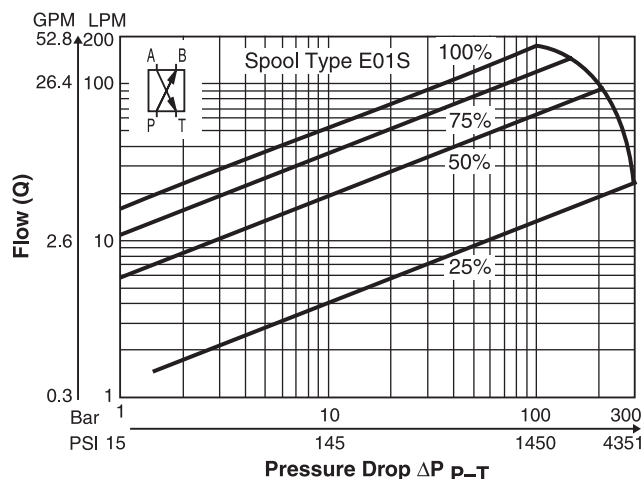
At asymmetric flow a reduced flow limit has to be considered.

A

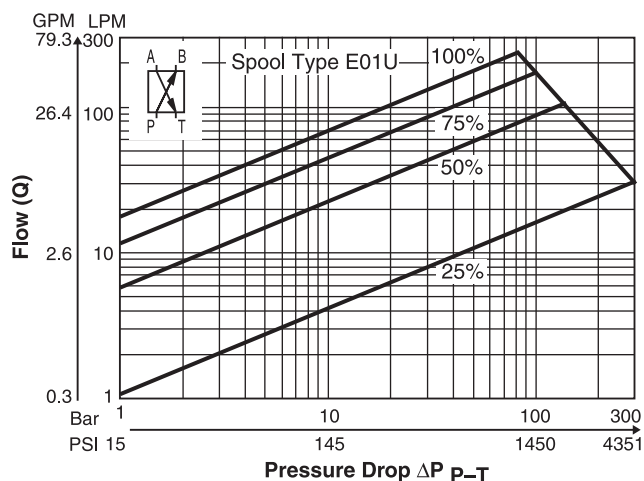
Spool type E01M



Spool type E01S



Spool type E01U

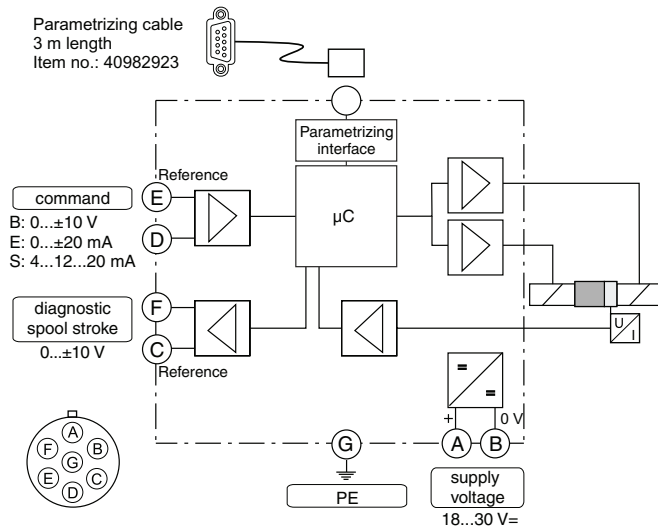


All performance curves measured with HLP46 at 50°C (122°F).

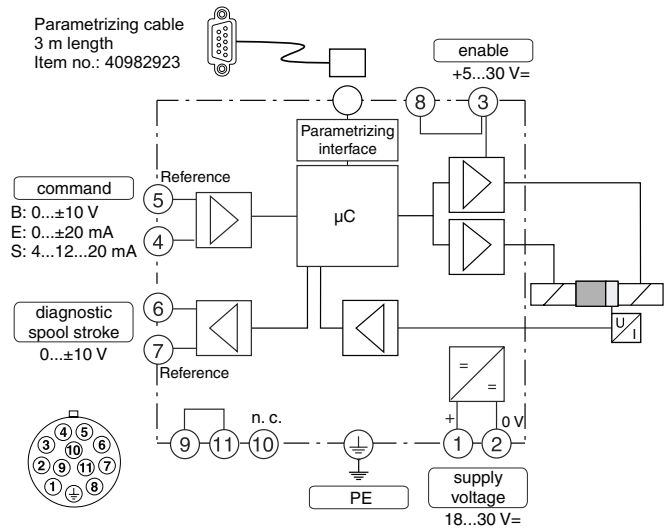
A01_Cat2550.indd, ddp, 06/21

A

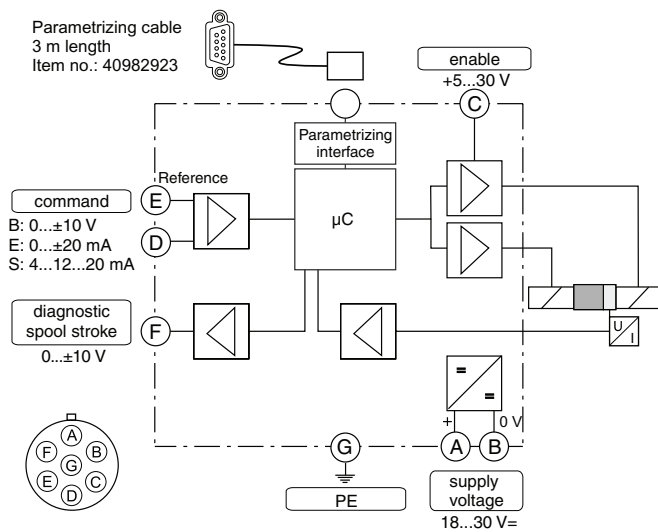
Code 0
6 + PE acc. to EN 175201-804



Code 5
11 + PE acc. to EN 175201-804



Code 7
6 + PE acc. to EN 175201-804 + enable



ProPxD Interface Program

The ProPxD software allows comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a non-volatile memory stores the data with the option for recalling or modification.

The PC software can be downloaded free of charge at www.parker.com/propxd.

Features

- Simple editing of all parameters.
- Depiction and documentatino of parameter sets.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® XP upwards.
- Communication between PC and electronics via serial interface RS-232.

The parametrizing cable may be ordered under item no. 40982923.

Parker Hannifin ProPxD

File Options Diagnostics Specials Help

basic

PC settings

Type: D*FC dig.

Valve: default

Input

Upper limit: 90.0

Lower limit: -90.0

P1 = 0.0

Update list

all Parm.

No.	Value	Description	Module
P1	0.0	zero adjustment [%]	
P3	100.0	MAX A-channel [%]	
P4	100.0	MAX B-channel [%]	
P7	0.0	MIN A-channel [%]	
P8	0.0	MIN B-channel [%]	
S5	0	ramp up A-channel [ms]	
S6	0	ramp down A-channel [ms]	
S7	0	ramp up B-channel [ms]	
S8	0	ramp down B-channel [ms]	

valve settings

Type: no modul

serial number: ????

Version: ????

Valve: ????

Parker

Receive all Valve >> PC

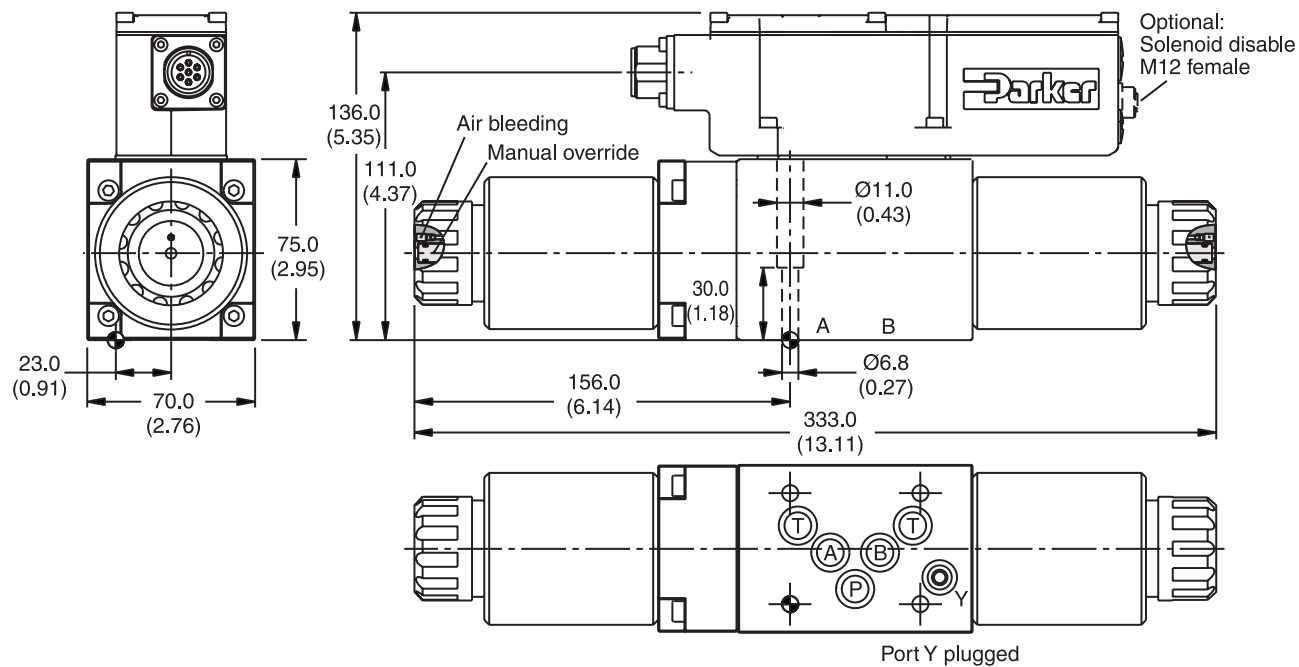
Send all PC >> Valve

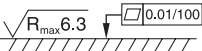
save parameter

Default

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

A



Surface Finish	 Kit	 Kit	 Kit	Seal  Kit
	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D3FC Fluorocarbon: SK-D3FC-V

General Description

Series D*1FB pilot operated proportional directional valves come in 4 sizes:

D31FB NG10 (CETOP 5)
 D41FB NG16 (CETOP 7)
 D91FB NG25 (CETOP 8)
 D111FB NG32 (CETOP 10)

The valves are available with and without onboard electronics (OBE).

D*1FB OBE: The digital onboard electronics is situated in a robust metal housing, which allows usage under rough environmental conditions.

The nominal values are factory set. The cable connection to a serial RS-232 interface is available as an accessory.

D*1FB for external electronics: The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400.

Series D*1FB valve parameters can be edited with the common ProPxD software for both versions.

The D*1FB valves work with barometric feedback of the main stage to the pressure reducing pilot valve. The pilot control pressure of 25 Bar (363 PSI) allows high flow rates of maximum of stability.

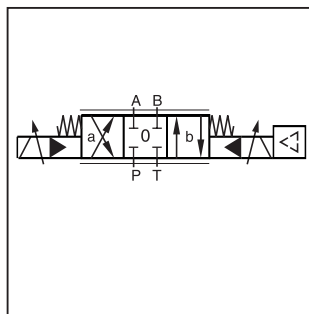
The innovative integrated regenerative function into the A-line (optional) allows new energy saving circuits for differential cylinders. The hybrid version can be switched between regenerative mode and standard mode at any time.



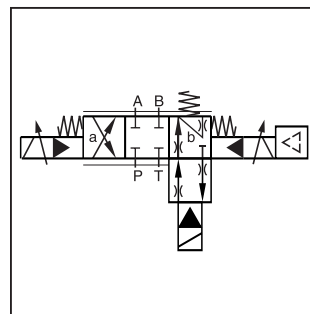
D91FB



D91FB OBE



D*1FB

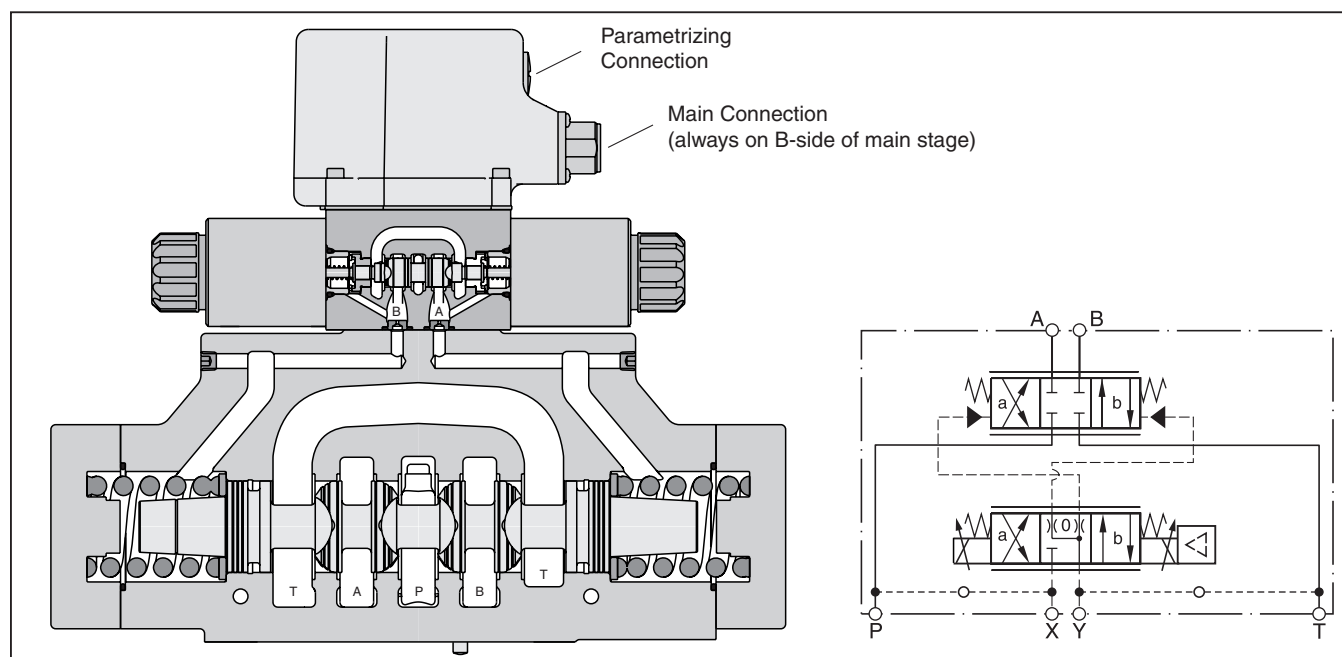


D*1FBZ

Features

- Progressive flow characteristics for precise adjustment of flow rate
- High flow capacity
- Digital onboard electronics
- Center position monitoring optional
- New: Switchable regenerative hybrid version

D91FB OBE



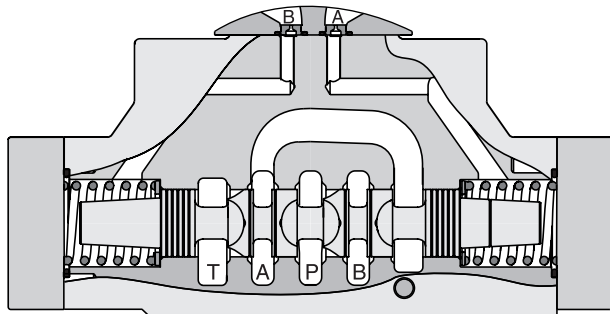
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

A01_Cat2550.indd, ddp, 06/21

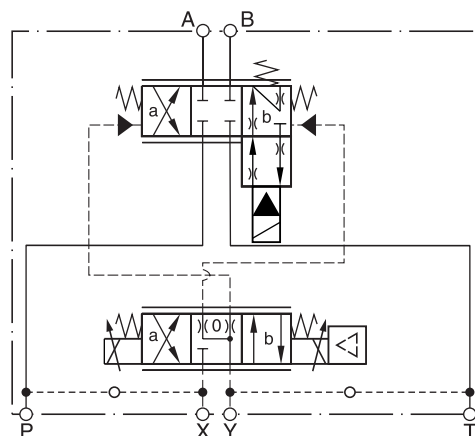
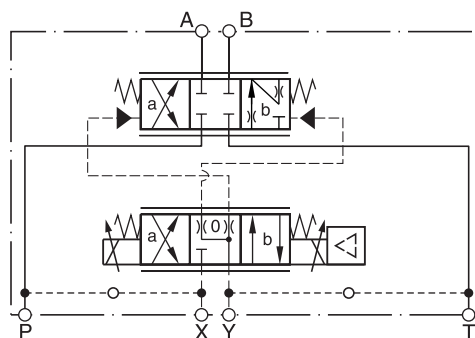
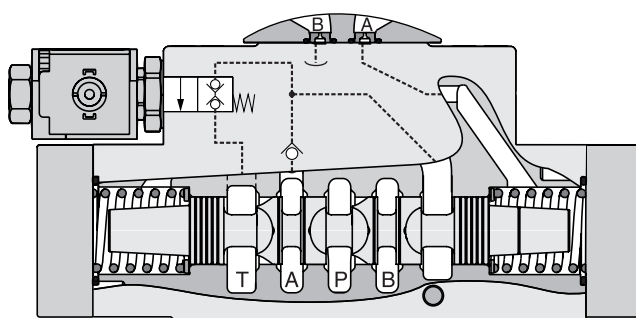
D*1FBR and D*1FBZ

A

Regenerative Valve D*1FBR

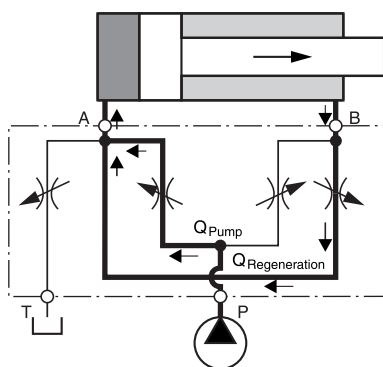


Hybrid Valve D*1FBZ



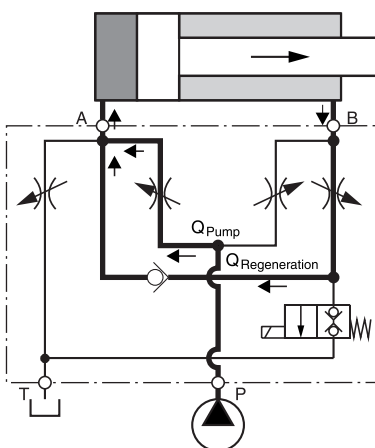
D*1FBR (Regenerative Valve)

Cylinder extending

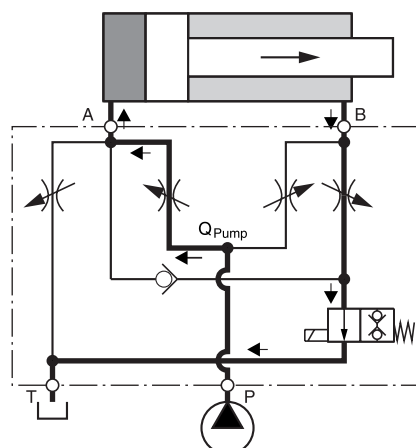


D*1FBZ (Hybrid Valve)

Cylinder extending
regenerative mode
(high speed)



Cylinder extending
standard mode
(high force)



Flow Rate in % of Nominal Flow

Size	Spool	Port					
		A-T	P-A	P-B	B-A (R-Valve)	B-A (Hybrid)	B-T (Hybrid)
D41FBR/Z	31/32	100%	50%	100%	50%	45%	41 LPM (11 GPM) Max
D91FBR/Z	31/32	100%	50%	100%	50%	50%	98 LPM (26 GPM) Max
D111FBR/Z	31/32	100%	50%	100%	50%	50%	189 LPM (50 GPM) Max

A

D		1	F	B			C							
Directional Control Valves	Size	NG6 Pilot	Flow Control	Dynamics Standard	Spool	Flow	Spool Position	Pilot Connection	Seal	Solenoid Voltage	Solenoid Connector	Valve Accessories	Design Series	

Code	Description
3	NG10 / CETOP 5
4	NG16 / CETOP 7
9 ¹⁾	NG25 / CETOP 8
11	NG32 / CETOP 10

¹⁾ For enlarged connections
 Ø 32 mm

Standard		NEW: Regenerative Function		NEW: Hybrid Function ²⁾	
Code	Spool Type	Code	Spool Type	Code	Spool Type
E01					
E02					
B31	$Q_B = Q_A / 2$ 	R31		Z31	
B32	$Q_B = Q_A / 2$ 	R32		Z32	

D31FB spool type: R31 R32

²⁾ not available in D31FB.

Code	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge			
	D31	D41	D91	D111
B	—	100 ³⁾ ⁴⁾ (26.4)	—	—
C	75 ⁴⁾ (19.8)	130 ³⁾ ⁴⁾ (34.3)	—	—
D	90 ⁴⁾ (23.8)	—	—	—
E	120 (31.7)	—	250 ³⁾ ⁴⁾ (66.0)	—
F	—	200 (52.8)	—	—
H	—	—	400 (105.7)	—
L	—	—	—	1000 (264.2)

³⁾ Not available with spool type B31 und B32.
⁴⁾ Not available with regenerative or hybrid function.

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Inlet	Drain
1	Internal	External
2	External	External
4	Internal	Internal
5	External	Internal

Code	Description
0	Standard for Spool Type B, E, R
8 ⁶⁾ ⁷⁾	Monitor Switch
L ⁵⁾	Hybrid valve 24V normally closed for spool type Z

⁵⁾ See previous page for regenerative and hybrid spool information. (Not available in D31FB.)
⁶⁾ Not for D111FCZ*
⁷⁾ Monitor switch for hybrid valves: Code 8 includes options of Code L (24 normally closed).
 Switch cover available, add -XG373 to part number.

Code	Description
W ⁵⁾	Connector as per DIN 43650 without plug
J ⁵⁾ ⁶⁾	Connector DT04-2P "Deutsch"

⁵⁾ Please order plugs separately. See Accessories.
⁶⁾ Not available with hybrid function.

Code	Solenoid
K	12V / 2.5A
J	24V / 1.1A

Code	Solenoid
K	12V / 2.5A
J	24V / 1.1A

Bolt Kits:

D31FB	BK98	(4) 1/4-20x1.625 SHCS
D41FB	BK160	(4) 3/8-16x2.5 SHCS
		(2) 1/4-20x2.5 SHCS
D91FB	BK228	(6) 1/2-13x3 SHCS
D111FB	BK150	(6) 3/4-10x3.5 SHCS

Weight:

D31FB	8.1 kg (17.9 lbs.)
D41FB	10.8 kg (23.8 lbs.)
D91FB	19.0 kg (41.9 lbs.)
D111FB	68.0 kg (149.9 lbs.)

A

D Directional Control Valves

1 NG6 Pilot

F Flow Control

B Onboard Electronics

C Spool Position

Pilot Connection

Seal

Input Signal / Options

Valve Accessories

Design Series

NOTE:
Not required when ordering.

Code Description

3	NG10 / CETOP 5
4	NG16 / CETOP 7
9 ¹⁾	NG25 / CETOP 8
11	NG32 / CETOP 10

¹⁾ With enlarged connections
Ø 32 mm

Standard

Code	Spool Type
E01	
E02	
B31	
B32	

D31FB spool type: R31 R32

²⁾ not available in D31FB.

NEW: Regenerative Function

Code	Spool Type
R31	
R32	

NEW: Hybrid Function ²⁾

Code	Spool Type
Z31	
Z32	

Code Description

N	Nitrile
V	Fluorocarbon

Code Description

0	Standard
8 ⁵⁾	Monitor Switch
L ⁶⁾	Hybrid valve 24V normally closed for spool type Z

⁵⁾ Not available for D111FBZ.
⁶⁾ See page A48 for regenerative and hybrid spool information. (Not available in D31FB.)
Switch cover available, add -XG373 to part number.

Code	Input Signal	Function	Connection	Option
F0	0...±10V	0...+10V P->B	6 + PE	Pot.-supply
G0	0...±20mA	0...+20mA P->B	6 + PE	—
M0	0...±10V	0...+10V P->A	6 + PE	Pot.-supply
S0	4...20mA	12...20mA P->A	6 + PE	—
W5	0...±10V 4...20mA	0...+10V P->A 12...20mA P->A	11 + PE	Pot.-supply + Preset Commands

Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge

Code	D31	D41	D91	D111
B	—	100 ^{3) 4)} (26.4)	—	—
C	75 ⁴⁾ (19.8)	130 ^{3) 4)} (34.3)	—	—
D	90 ⁴⁾ (23.8)	—	—	—
E	120 (31.7)	—	250 ^{3) 4)} (66.0)	—
F	—	200 (52.8)	—	—
H	—	—	400 (105.7)	—
L	—	—	—	1000 (264.2)

³⁾ Not available with spool type B31 und B32.
⁴⁾ Not available with regenerative or hybrid function.

Bolt Kits:

D31FB	BK98	(4) 1/4-20x1.625 SHCS
D41FB	BK160	(4) 3/8-16x2.5 SHCS (2) 1/4-20x2.5 SHCS
D91FB	BK228	(6) 1/2-13x3 SHCS
D111FB	BK150	(6) 3/4-10x3.5 SHCS

Weight:

D31FB	8.4 kg (18.5 lbs.)
D41FB	11.1 kg (24.5 lbs.)
D91FB	19.3 kg (42.6 lbs.)
D111FB	68.3 kg (150.6 lbs.)

Please order plugs separately. See Accessories.

Parametrizing cable OBE => RS-232
Item no. 40982923

A

General				
Design	Pilot operated DC valve			
Actuation	Proportional solenoid			
Size	NG10 (CETOP 5)	NG16 (CETOP 7)	NG25 (CETOP 8)	NG32 (CETOP 10)
Mounting Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA			
Mounting Position	Unrestricted			
Ambient Temperature [°C]	-20...+60; (-4°F...+140°F)			
MTTF _D Value (OBE) [years]	75 (50)			
Vibration Resistance [g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27			
Hydraulic				
Maximum Operating Pressure	Pilot Drain Internal: Ports P, A, B, X 350 Bar (5075 PSI); Port T, Y 185 Bar (2683 PSI) NG10: Port T, Y 15 Bar (218 PSI) Pilot Drain External: Ports P, A, B, T, X 350 Bar (5075 PSI); Port Y 185 Bar (2683 PSI) NG10: Port Y 15 Bar (218 PSI)			
Fluid	Hydraulic oil as per DIN 51524...51535, other on request			
Fluid Temperature [°C]	-20...+60; (-4°F...+140°F)			
Viscosity Permitted [cSt] / [mm²/s]	20...380 (93...1761 SSU)			
Viscosity Recommended [cSt] / [mm²/s]	30...80 (139...371 SSU)			
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Nominal Flow at Δp=Bar (72.5 PSI) per Control Edge *	D31FB	D41FB	D91FB	D111FB
	75 LPM (19.8 GPM)	100 LPM (26.4 GPM)	250 LPM (66.1 GPM)	1000 LPM (264.2 GPM)
	90 LPM (23.8 GPM)	130 LPM (34.4 GPM)	400 LPM (105.8 GPM)	
	120 LPM (31.7 GPM)	200 LPM (52.9 GPM)		
Leakage at 100 Bar (1450 PSI) [ml/min]	100	200	600	1000
Pilot Supply Pressure	Minimum 30 Bar (435 PSI) [+T/Y pressure]; Maximum 350 Bar (5075 PSI) Optimal Dynamics at 50 Bar (725 PSI)			
Pilot Flow at 100 Bar (1450 PSI)	<0.5 LPM (0.13 GPM)	<1.2 LPM (0.3 GPM)	<1.2 LPM (0.3 GPM)	<1.2 LPM (0.3 GPM)
Pilot Flow, Step Response	2 LPM (0.5 GPM)	1.9 LPM (0.5 GPM)	4.5 LPM (1.2 GPM)	18 LPM (4.8 GPM)
Static / Dynamic				
Step Response at 100% Step [ms]	50	75	100	180
Hysteresis [%]	<5			
Electrical				
Duty Ratio [%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible			
Protection Class	Standard (as per EN175301-803) IP65 in accordance with EN60529 (plugged and mounted) DT04-2P “Deutsch” IP69K (plugged and mounted)			
Solenoid	Code "K"		Code "J"	
Supply Voltage [V]	12		24	
Current Consumption [A]	2.5		1.1	
Resistance [Ohm]	4.4		18.6	
Coil Insulation Class	F (155 °C); (331°F)			
Solenoid Connection	Connector as per EN 175301-803 (code W), DT04-2P “Deutsch” connector (code J). Solenoid identification as per ISO 9461.			
Wiring Minimum [mm²]	3x1.5 (AWG 16) overall braid shield			
Wiring Length Maximum [m]	50 (164 ft.)			

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

Continued on next page

A

Electrical Monitor Switch (Offboard Electronics)		
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)
Ambient Temperature	[°C]	0...70; (32°F...158°F)
Supply Voltage/Ripple	[V]	18...42, ripple <10% eff.
Current Consumption without Load	[mA]	<30
Maximum Output Current per Channel, Ohmic	[mA]	400
Minimum Output Load per Channel, Ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	<1.1
Max. output drop at 0.4A	[V]	<1.6
EMV		EN 50081-1 / EN50082-2
Maximum tol. Ambient Field Strength	[A/m]	1200
Minimum Distance to next AC Solenoid	[m]	0.1 (0.2 ft.)
Interface		4+PE acc. IEC 61076-2-101 (M12)
Wiring Minimum	[mm²]	5x0.5 (AWG 20) overall braid shield
Wiring Length Maximum	[m]	50 (164 ft.)

Electrical (Onboard Electronics)		
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage/ripple DC	[V]	18...30, ripple < 5% eff., surge free
Current Consumption Maximum	[A]	2.0
Pre-fusing Medium Lag	[A]	2.5
Input Signal		
Codes F0, M0 & W5 Voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100kOhm, 0...+10V
Codes S0 & W5 Current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, Ri = 200Ohm, 12...20mA < 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Code G0	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, Ri = 200Ohm, 0...+20mA
Differential Input Maximum		
Codes F0, G0, M0 & S0	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
Code W5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0V (terminal 2)
Voltage References:		Not a powered output Only for 10K Ohm pots
Channel Recall Signal	[V]	0...2.5: off / 5...30: on / Ri = 100 kOhm
Adjustment Ranges:		
Minimum	[%]	0...50
Maximum	[%]	50...100
Ramp	[s]	0...32.5
Interface		RS-232, parametrizing connection 5 pole
EMC		EN 61000-6-2, EN 61000-6-4
Central Connection		
Codes F0, G0 & S0		6 + PE acc. to EN 175201-804
Code W5		11 + PE acc. to EN 175201-804
Wiring Minimum		
Codes F0, G0 & S0	[mm²]	7 x 1.0 (AWG16) overall braid shield
Code W5	[mm²]	11 x 1.0 (AWG20) overall braid shield
Wiring Length Maximum	[m]	50 (164 ft.)

Continued on next page

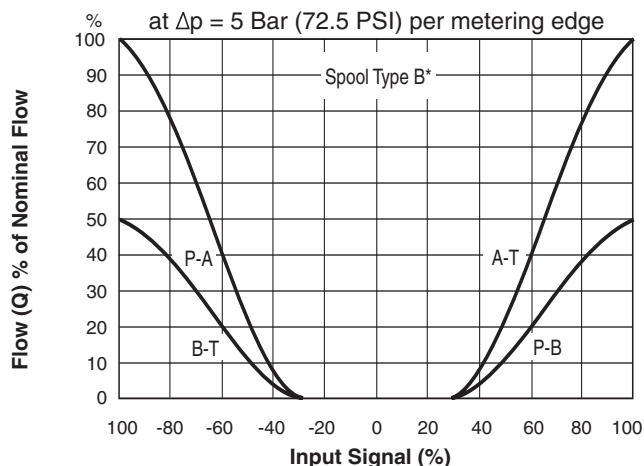
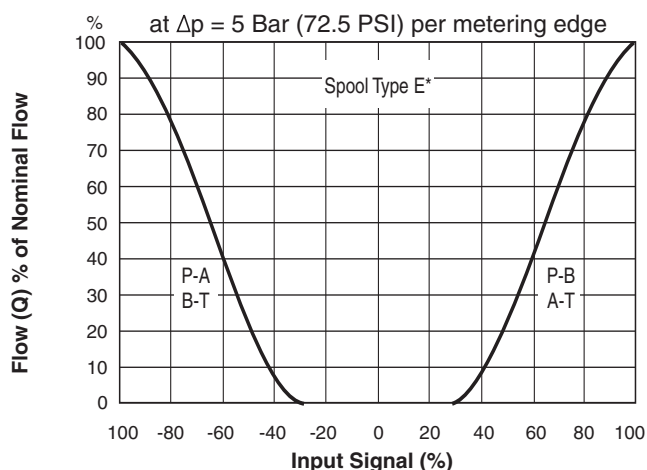
Specifications (cont.)

Electrical (Hybrid Option)			
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible	
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)	
		D41	D91
Supply Voltage	[V]	24	24
Tolerance Supply Voltage	[%]	±10	±10
Current Consumption	[A]	1.21	0.96
Power Consumption	[W]	29	23
Solenoid Connection		Connector as per EN 175301-803	
Wiring Minimum	[mm²]	3 x 1.5 recommended	
Wiring Length Maximum	[m]	50 (164 ft.) recommended	

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

Performance Curves

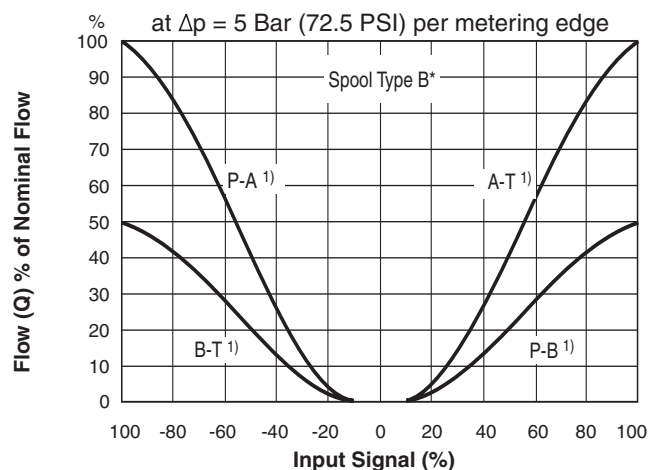
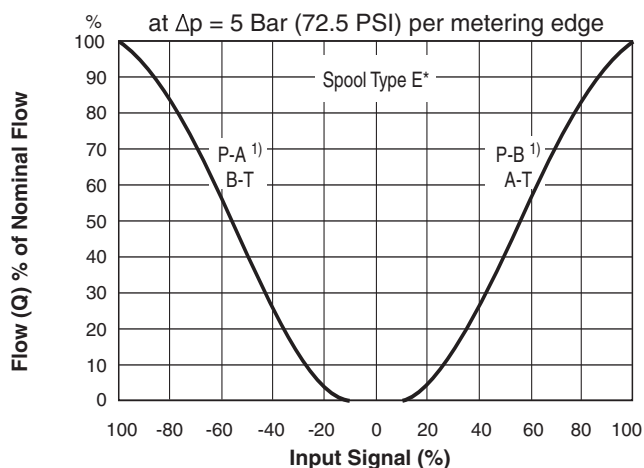
D*1FB Flow



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

D*1FB OBE Flow

(Electrically set to opening point 10%)



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

¹⁾ Flow direction depending on ordering code.

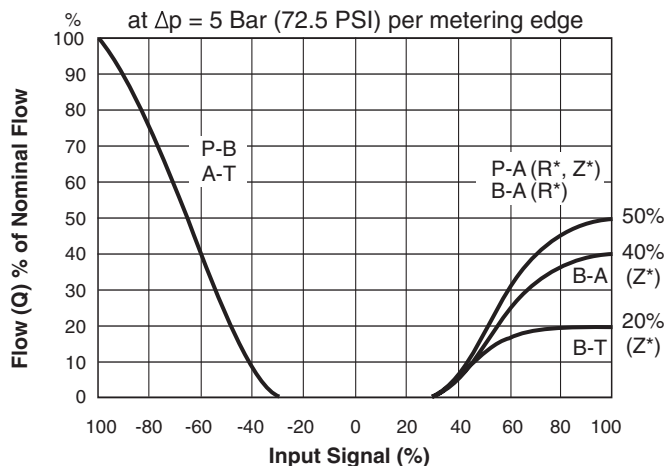
D*1FB R/Z (Regenerative and Hybrid)

A

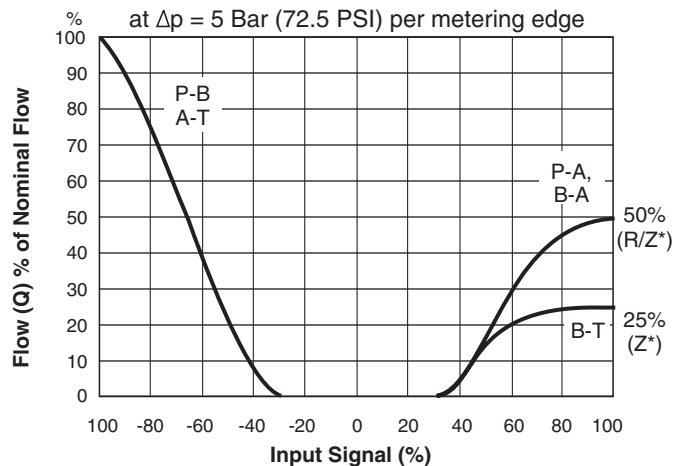
D41FB R/Z

D91FB R/Z

Spool Code **R/Z31/32**



Spool Code **R/Z31/32**

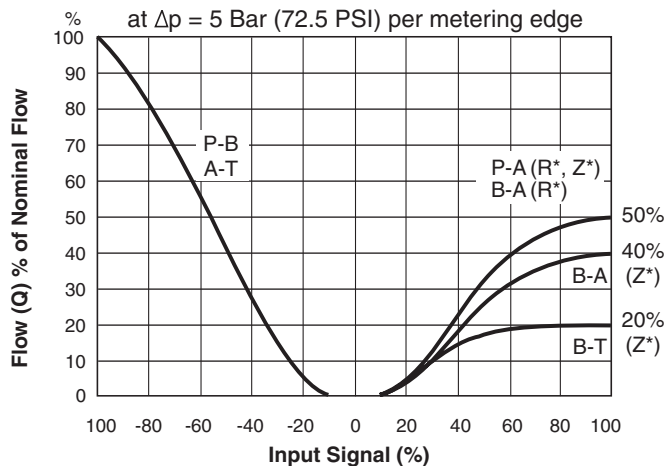


All performance curves measured with HLP46 at 50°C (122°F).

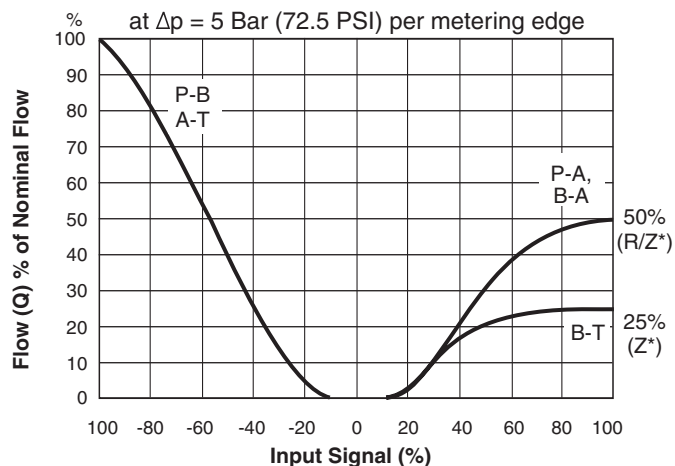
D41FB R/Z OBE

D91FB R/Z OBE

Spool Code **R/Z31/32**

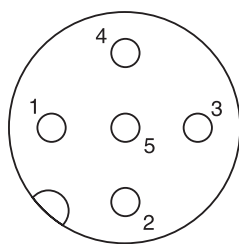


Spool Code **R/Z31/32**

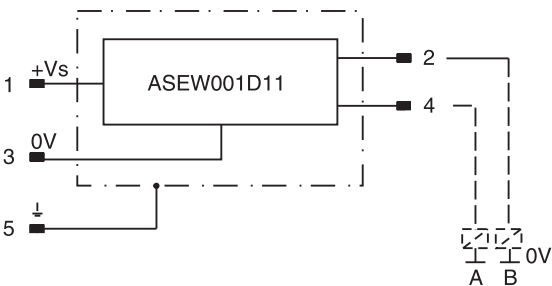


All performance curves measured with HLP46 at 50°C (122°F).

Monitor Switch M12x1 Pin Assignment



- 1 + Supply 18...42V
- 2 Output B (normally closed)
- 3 0V
- 4 Output A (normally closed)
- 5 Earth ground



Signal	Output A (pin 4)	Output B (pin 2)
neutral	closed	closed
	open	closed
	closed	open

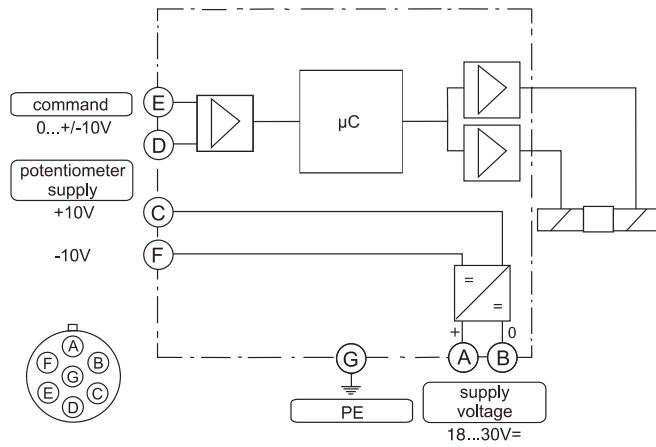
The neutral position is monitored. The signal changes after less than 10% of the spool stroke.

Electrical Monitor Switch

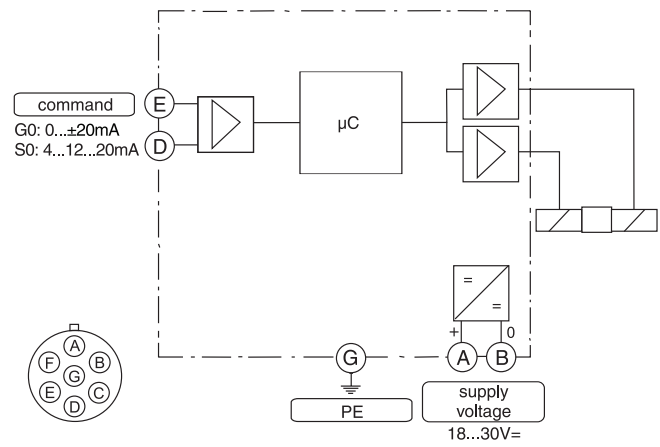
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)
Ambient Temperature	[°C] 0...70; (32°F...158°F)
Supply Voltage/Ripple	[V] 18...42, ripple < 10% eff.
Current Consumption without Load	[mA] < 30
Maximum Output Current per Channel, Ohmic	[mA] 400
Minimum Output Load per Channel, Ohmic	[kOhm] 100
Maximum Output Drop at 0.2A	[V] < 1.1
Maximum Output Drop at 0.4A	[V] < 1.6
EMC	EN 50081-1, EN50082-2
Maximum tol. Ambient Field Strength	[A/m] 1200
Minimum Distance to Next AC solenoid	[m] 0.1
Interface	4+PE acc. IEC 61076-2-101 (M12)
Wiring Minimum	[mm²] 5 x 0.5 (AWG 20) overall braid shield
Wiring Length Maximum	[m] 50 (164 ft.)

A

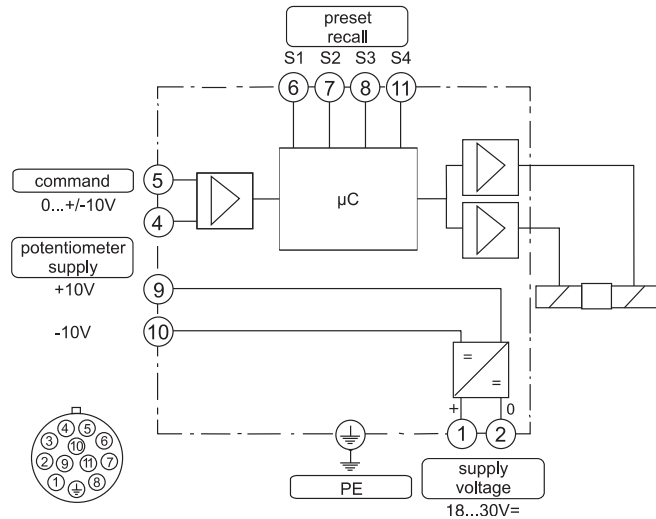
Code F0, M0
6 + PE acc. to EN 175201-804



Code G0, S0
6 + PE acc. to EN 175201-804



Code W5
11 + PE acc. to EN 175201-804



ProPxD Interface Program

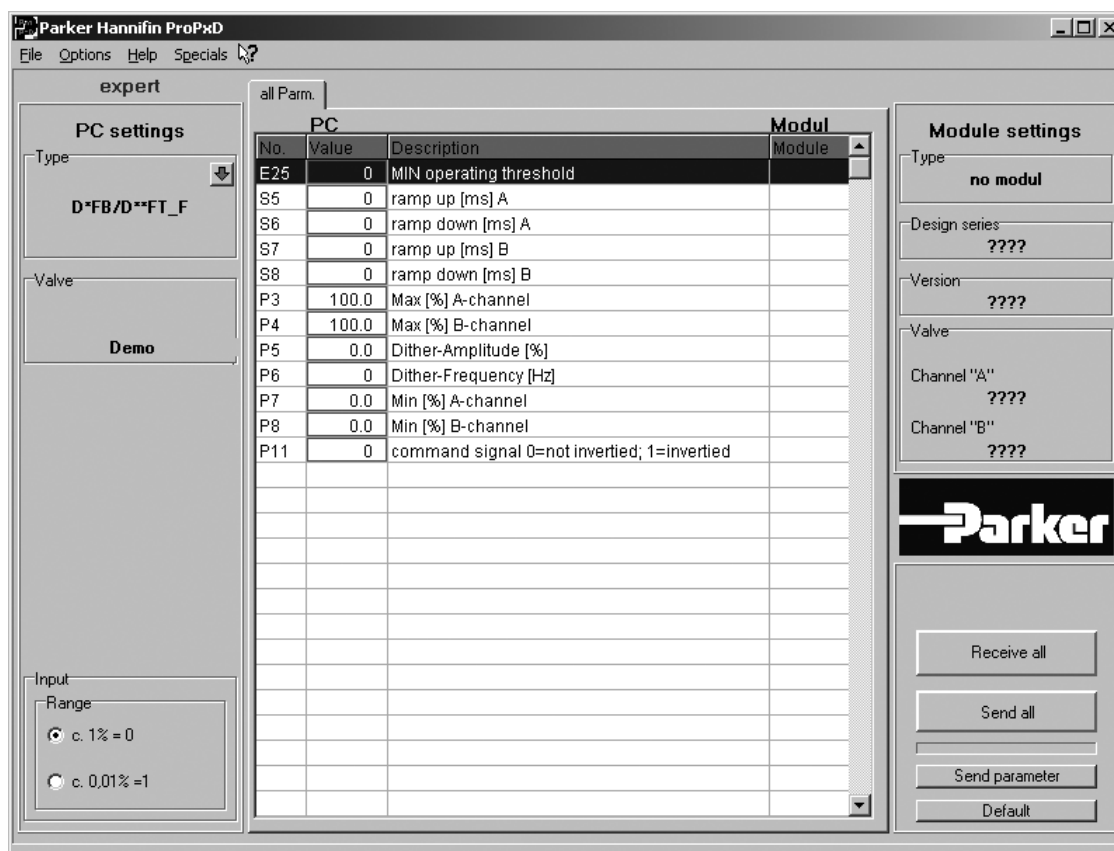
The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

Features

- Simple editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronics via serial interface RS-232.

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

Simple to use interface program. Download free of charge
www.parker.com/propxd



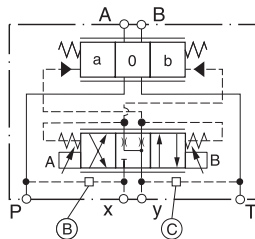
The parametrizing cable may be ordered under item no. 40982923.

Pilot Flow — Pilot Oil Inlet (Supply) and Outlet (Drain)

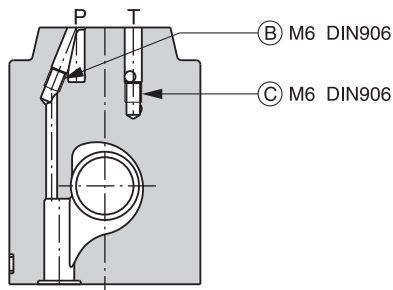
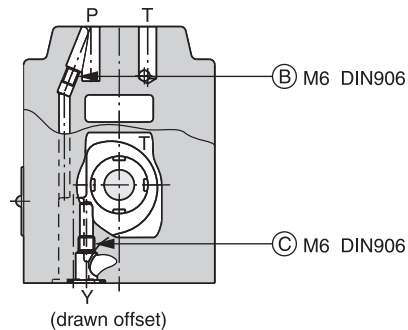
A

○ open, ● closed

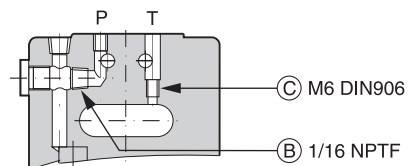
Pilot oil		B	C
Inlet	Drain		
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



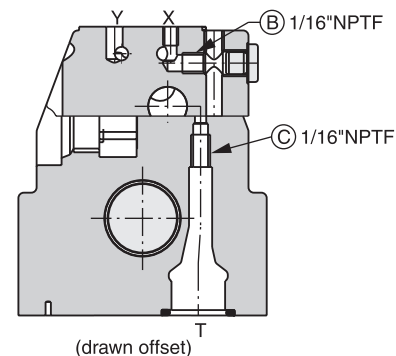
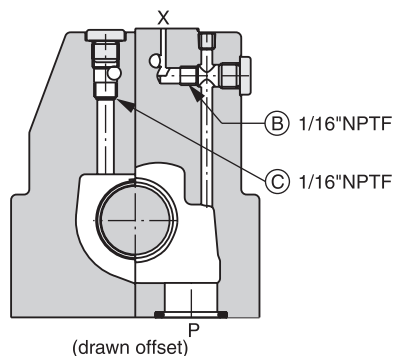
D31FBB/E D31FBR



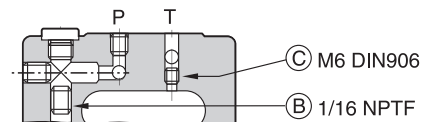
D41FBB/E D41FBR



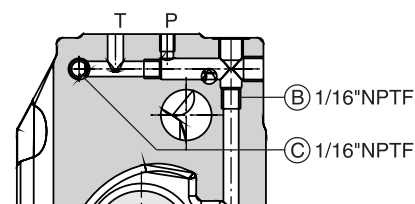
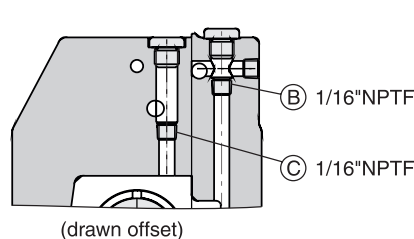
D41FBZ



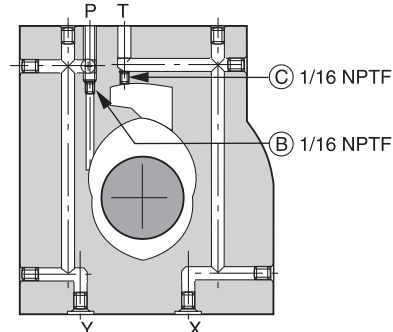
D91FBB/E D91FBR



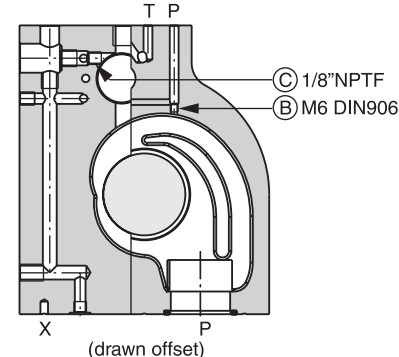
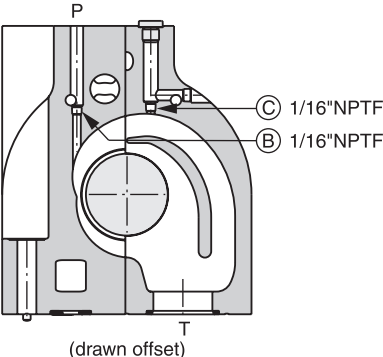
D91FBZ



D111FBB/E D111FBR



D111FBZ

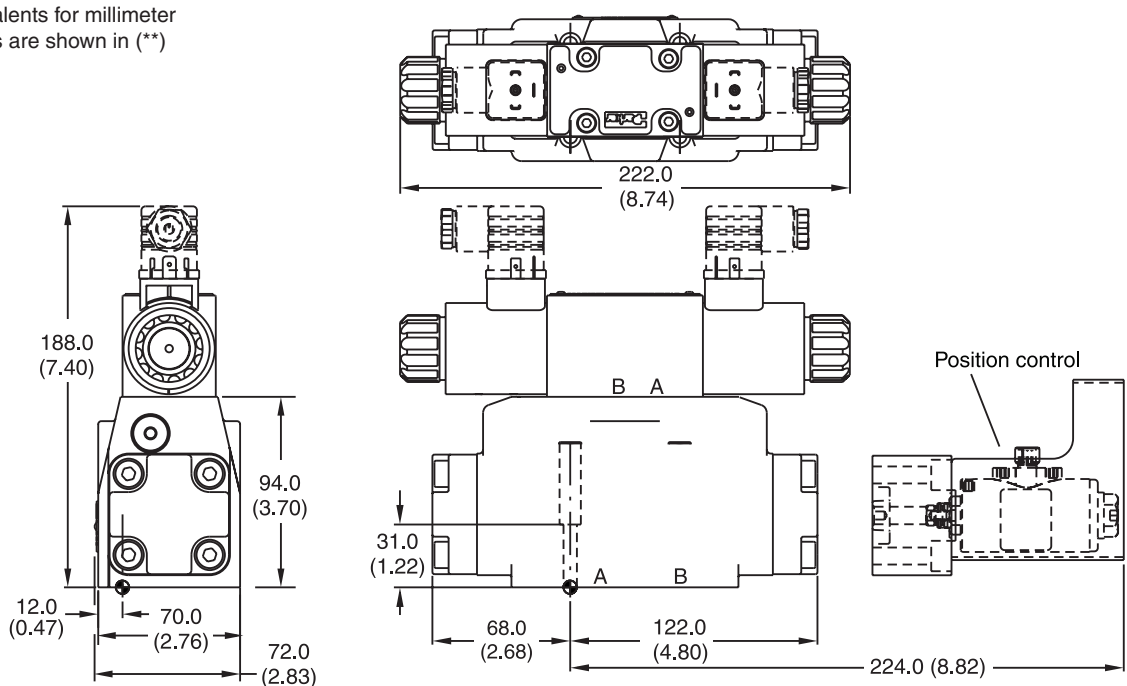


Dimensions

Proportional Directional Control Valves
Series D*1FB (Offboard Electronics)

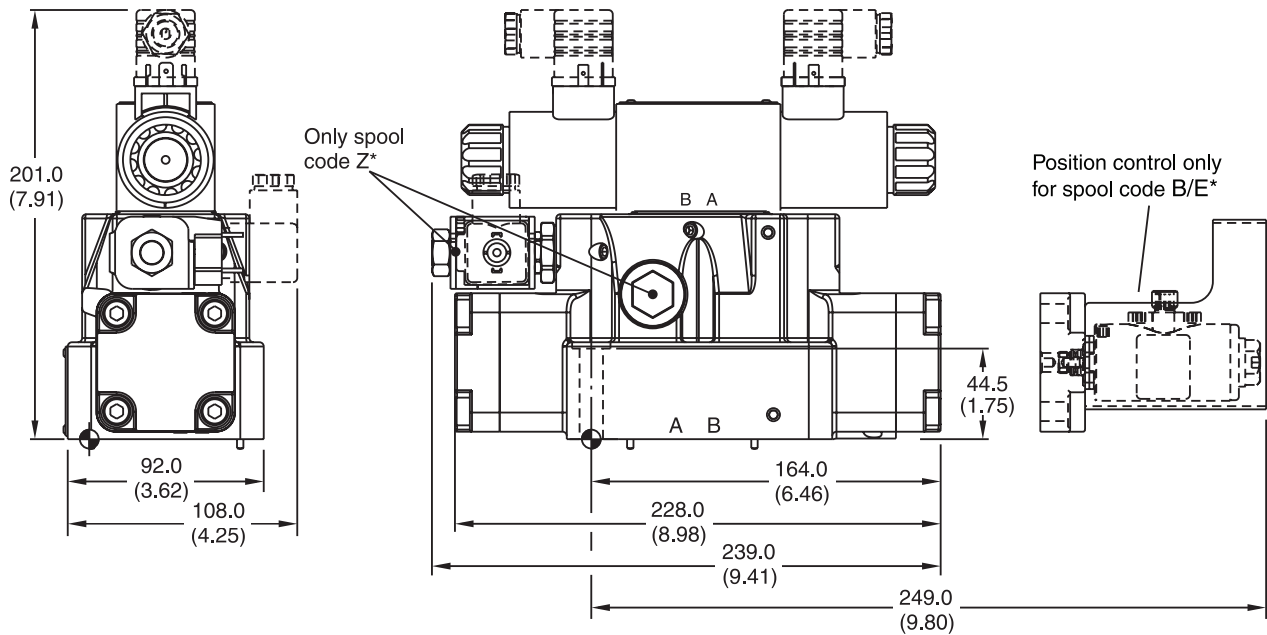
Inch equivalents for millimeter dimensions are shown in (**)

D31FB



Surface Finish	Kit			Seal Kit
	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D31FB Fluorocarbon: SK-D31FBV

D41FB



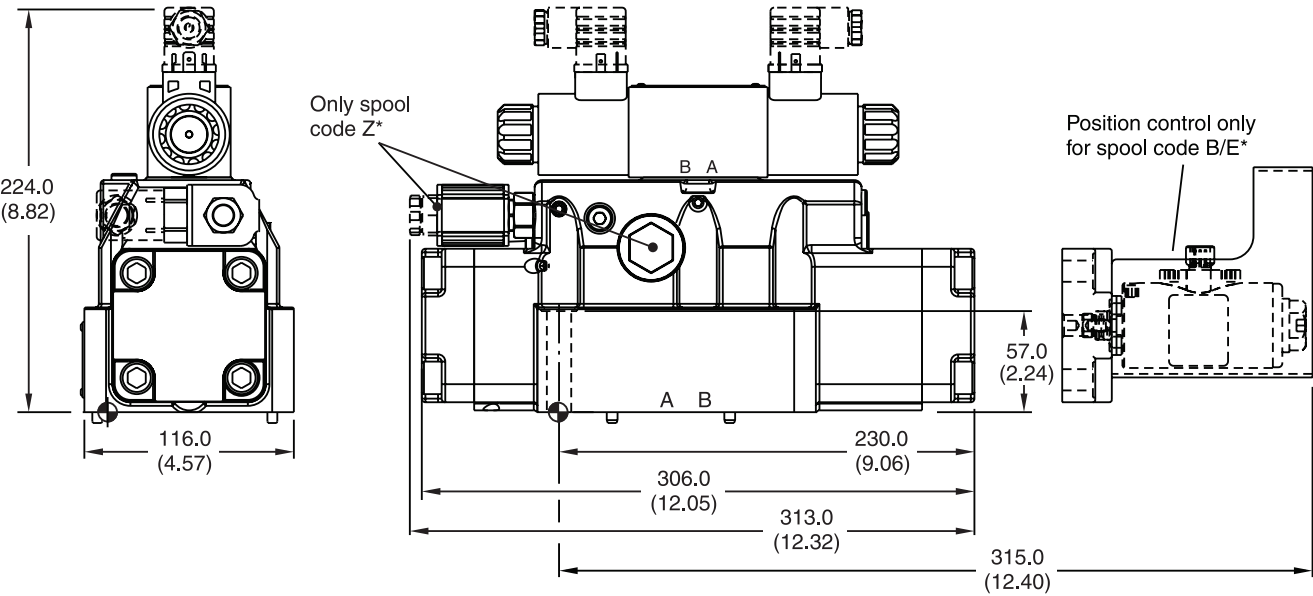
Surface Finish	Kit			Seal Kit
	BK320 BK160	2x M6x55 4x M10x60 DIN 912 12.9 4x 3/8-16x2.5 2x 1/4-20x2.5	13.2 Nm (9.7 lb.-ft.) 63 Nm (46.5 lb.-ft.) ±15 %	Nitrile: SK-D41FB Fluorocarbon: SK-D41FBV

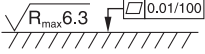
Inch equivalents for millimeter dimensions are shown in (**)



D91FB

A



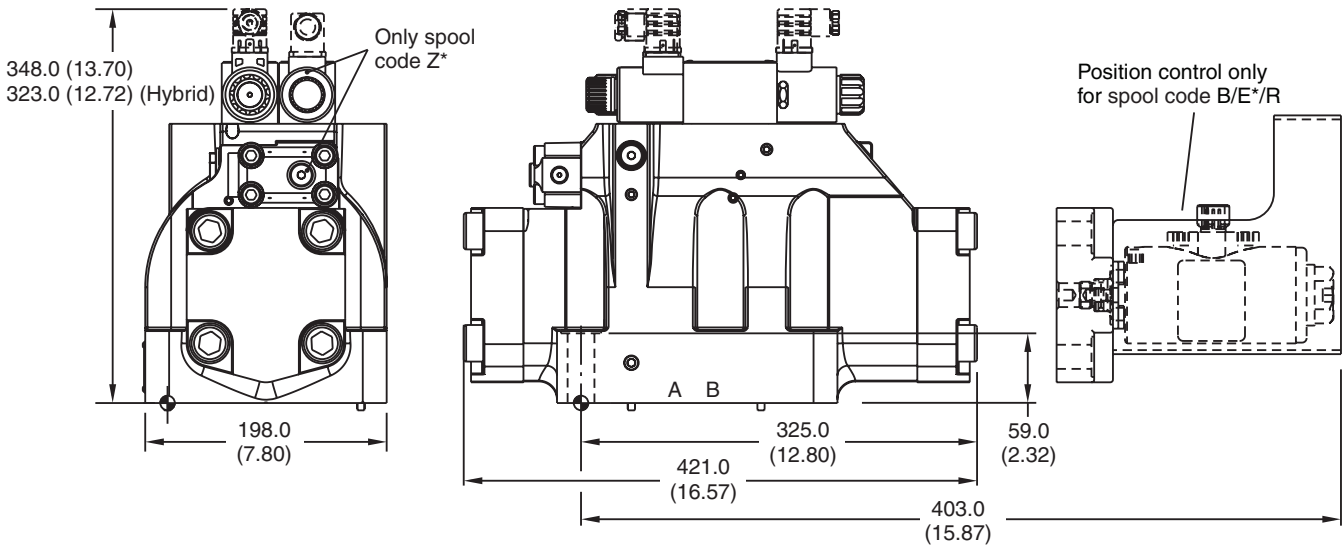
Surface Finish	 Kit			Seal  Kit
	BK360 BK228	6x M12x75 DIN 912 12.9 6x 1/2-13x3.0	108 Nm (79.7 lb.-ft.) ±15 %	Nitrile: SK-D91FB Fluorocarbon: SK-D91FBV

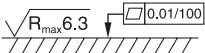
Inch equivalents for millimeter dimensions are shown in (**)

D111FB

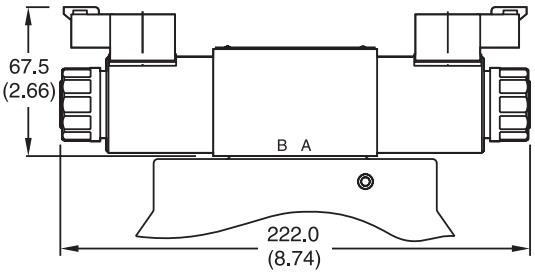


A



Surface Finish	 Kit	 Kit	 Kit	Seal  Kit
	BK386 BK150	6x M20x90 DIN 912 12.9 6x 3/4-10x3.5	517 Nm (373.9 lb.-ft.) ±15 %	Nitrile: SK-D111FB Fluorocarbon: SK-D111FBV

Dimension with DT04-2P "Deutsch" Connector

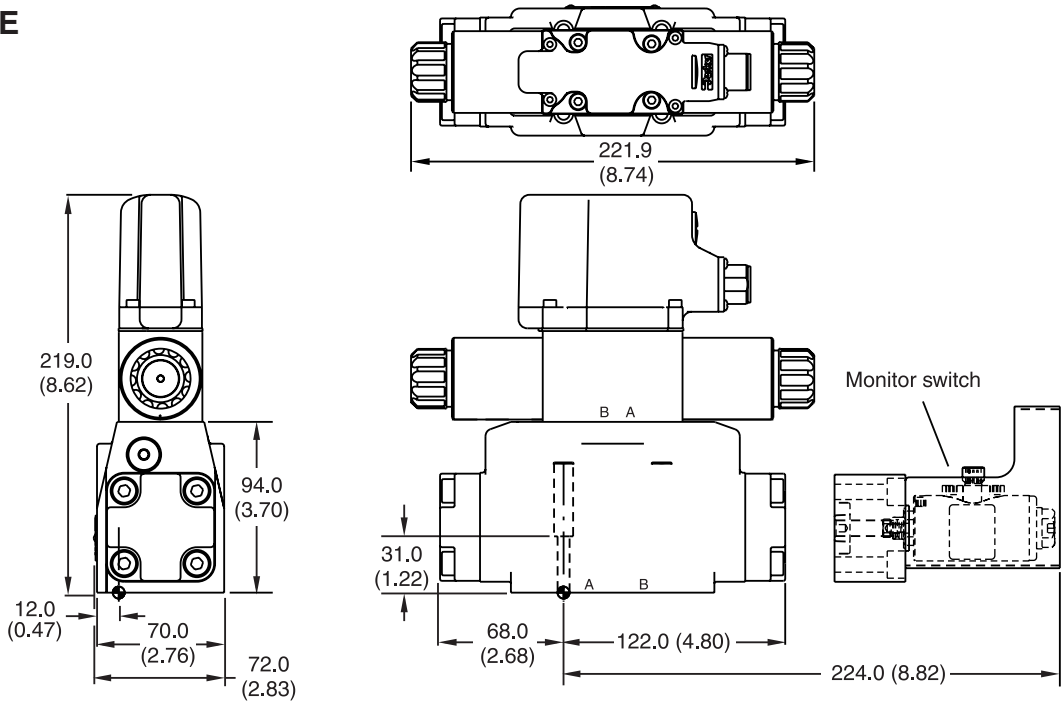


Inch equivalents for millimeter dimensions are shown in (**)



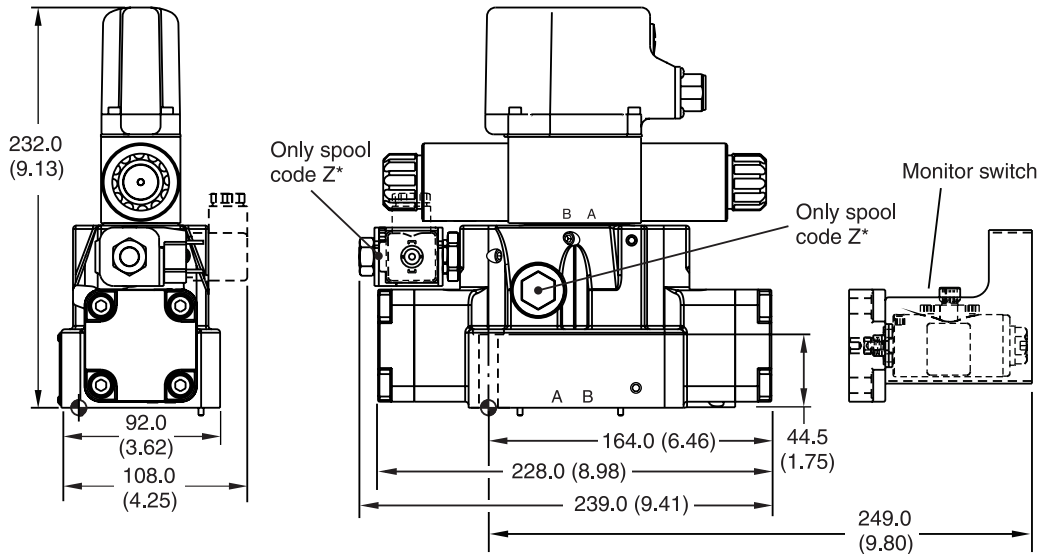
A

D31FB OBE



Surface Finish	Kit	Kit	Kit	Seal Kit
	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D31FB Fluorocarbon: SK-D31FBV

D41FB OBE



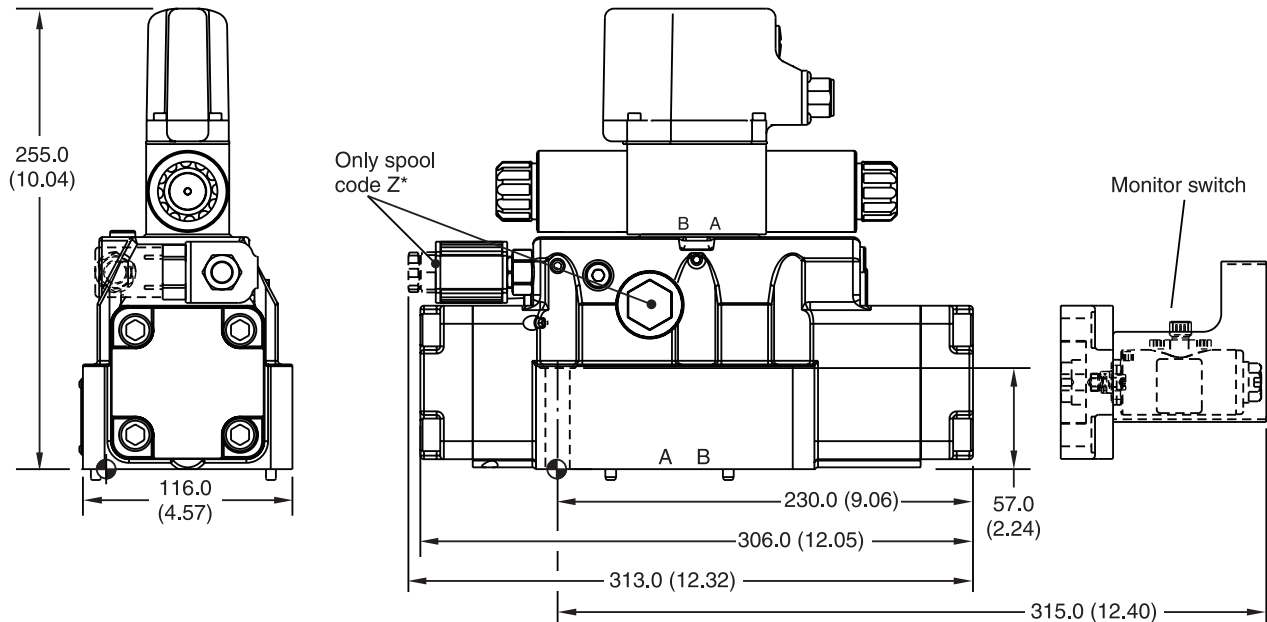
Surface Finish	Kit	Kit	Kit	Seal Kit
	BK320 BK160	2x M6x55 4x M10x60 DIN 912 12.9 4x 3/8-16x2.5 2x 1/4-20x2.5	13.2 Nm (9.7 lb.-ft.) 63 Nm (46.5 lb.-ft.) ±15 %	Nitrile: SK-D41FB Fluorocarbon: SK-D41FBV

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



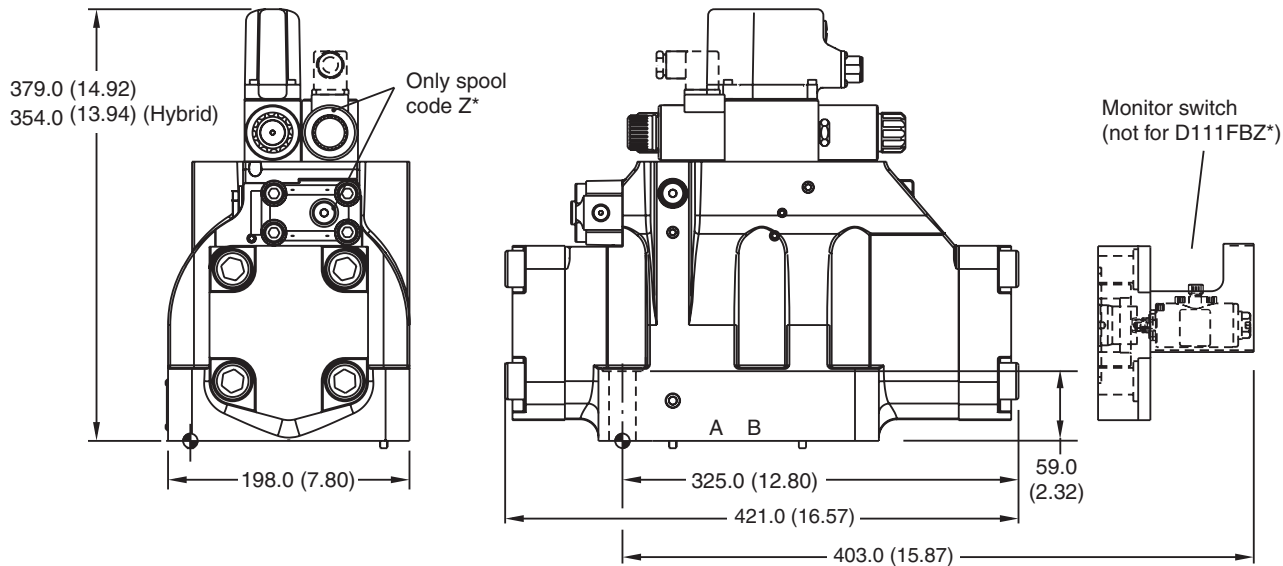
A

D91FB OBE



Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ $\square 0.01/100$	BK360	6x M12x75 DIN 912 12.9	108 Nm (79.7 lb.-ft.) ±15 %	Nitrile: SK-D91FB Fluorocarbon: SK-D91FBV
	BK228	6x 1/2-13x3.0		

D111FB OBE



Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ $\square 0.01/100$	BK386	6x M20x90 DIN 912 12.9	517 Nm (373.9 lb.-ft.) ±15 %	Nitrile: SK-D111FB Fluorocarbon: SK-D111FBV
	BK150	6x 3/4-10x3.5		

General Description

A

Series D*1FB*EE pilot operated proportional directional valves come in 4 sizes:

D31FB*EE	NG10 (CETOP 5)
D41FB*EE	NG16 (CETOP 7)
D91FB*EE	NG25 (CETOP 8)
D111FB*EE	NG32 (CETOP 10)

The D*1FB*EE series with explosion proof solenoids is based on the standard D*1FB series. The specific solenoid design allows the usage in hazardous environments. The explosion proof class is

CE  II 2 G

Ex mbe II T4

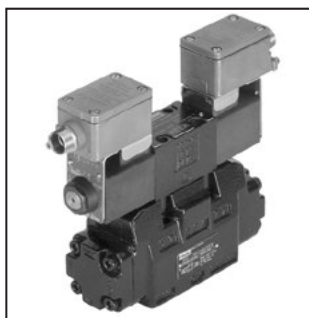
for use in zone 1 (conform to ATEX).

The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400 (to be used in an explosion proof cabinet or outside of the hazardous area).

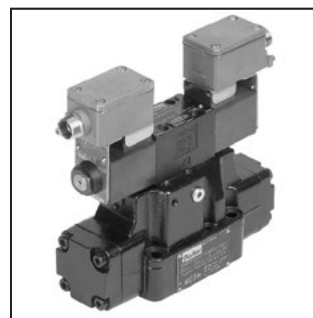
The valve parameters can be edited with the common ProPxD software.

Features

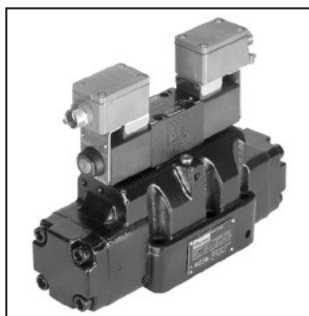
- Progressive flow characteristics for precise adjustment of flow rate
- High flow capacity



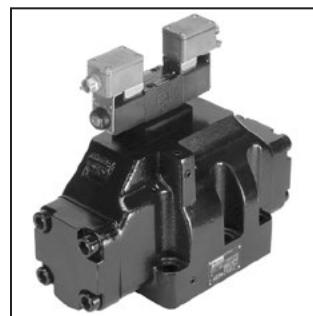
D31FB



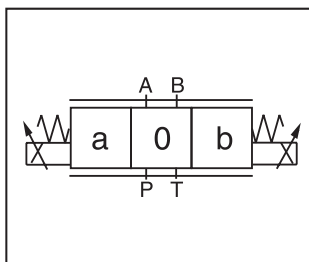
D41FB



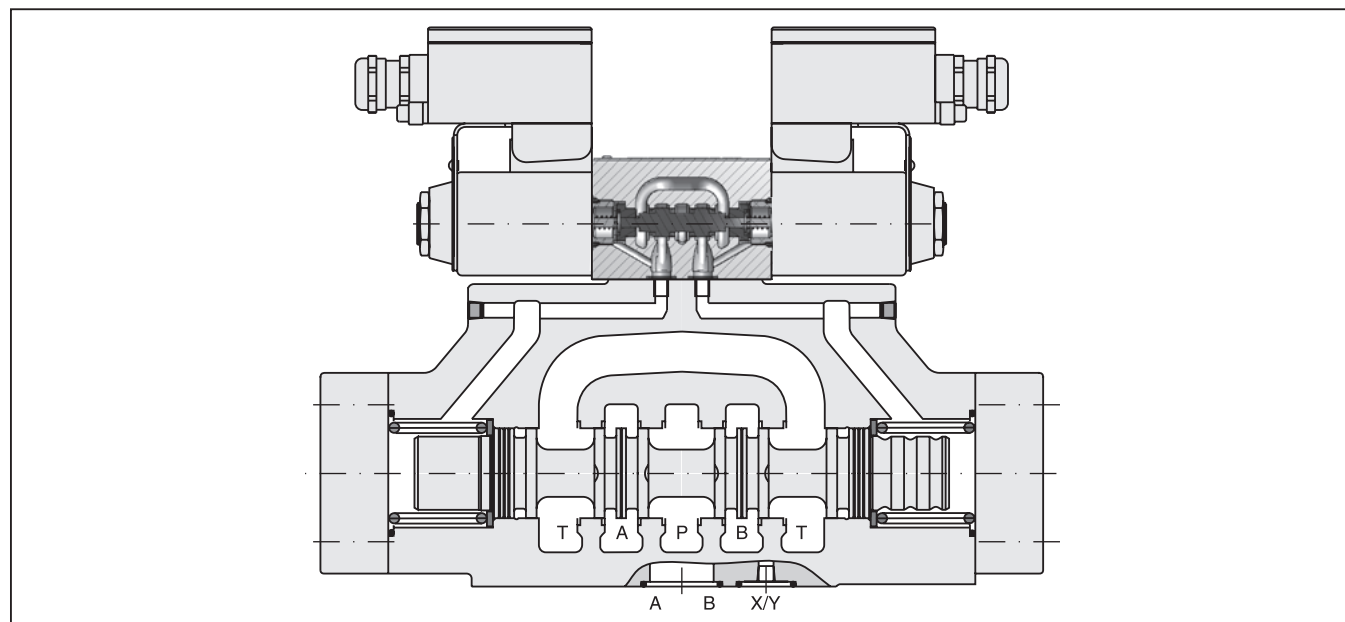
D91FB



D111FB



D91FB*EE



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

A01_Cat2550.indd, ddp, 06/21

Ordering Information

D	1	F	B							E	0		EE
Directional Control Valves	Size NG6 Pilot	Flow Control	Dynamics Standard	Spool	Flow	Spool Position	Pilot Connection	Seal	Solenoid Voltage	Explosion Proof	Valve Accessories	Design Series	Connection: Explosion Proof with Cable Glands Ex me II T4

NOTE: Not required when ordering

Code	Description
3	NG10 / CETOP 5
4	NG16 / CETOP 7
9 ¹⁾	NG25 / CETOP 8
11	NG32 / CETOP10

¹⁾ With enlarged connections Ø 32 mm

Code	Spool Type
E01	
E02	
B31	$Q_B = Q_A / 2$
B32	$Q_B = Q_A / 2$

Code	Description
J	24V / 1.5A
K	24V / 2.3A

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Inlet	Drain
1	Internal	External
2	External	External
4	Internal	Internal
5	External	Internal

Code	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge			
	D31	D41	D91	D111
B	—	100 ²⁾ (26.4)	—	—
C	75 ²⁾ (19.8)	130 ²⁾ (34.3)	—	—
D	90 (23.8)	—	—	—
E	120 (31.7)	—	250 ²⁾ (66.1)	—
F	—	200 (52.8)	—	—
H	—	—	400 (105.8)	—
L	—	—	—	1000 (264.2)

²⁾ Not for spool type B31 and B32

Code	Style
C	
E	
K	

Mounting Bolt Kits:

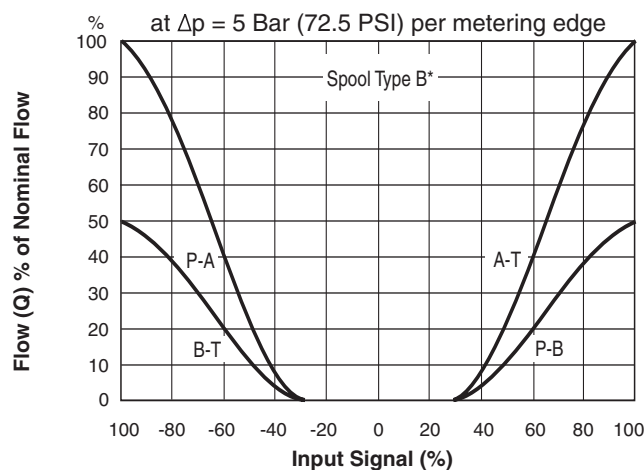
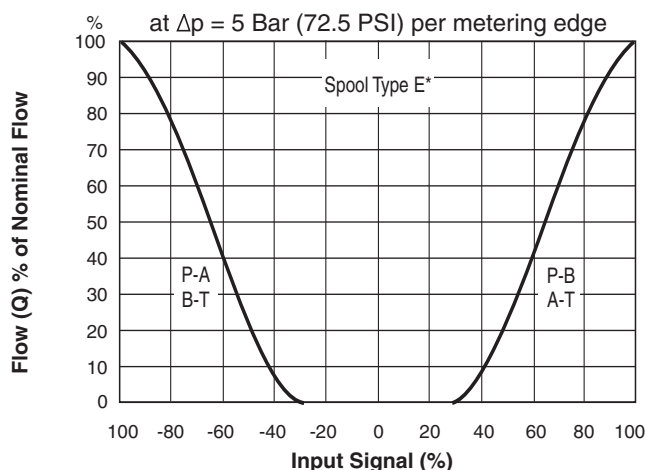
D31FB*EE	BK98
D41FB*EE	BK160
D91FB*EE	BK228
D111FB*EE	BK150

Weight:

D31FB*EE	9.4 kg (20.7 lbs.)
D41FB*EE	12.8 kg (28.2 lbs.)
D91FB*EE	20.3 kg (44.8 lbs.)
D111FB*EE	69.3 kg (152.8 lbs.)

Performance Curves

D*1FB Flow



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

A

General				
Design	Pilot operated DC valve			
Actuation	Proportional solenoid			
Size	NG10 (CETOP 5)	NG16 (CETOP 7)	NG25 (CETOP 8)	NG32 (CETOP 10)
Mounting Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA			
Mounting Position	unrestricted			
Ambient Temperature	[°C]	-20...+40; (-4°F...+104°F)		
MTTF _p Value	[years]	75		
Vibration Resistance	[g]	10 Sinus 5...200Hz acc. IEC 68-2-6 30 Random noise 20...20Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27		
Hydraulic				
Maximum Operating Pressure	Pilot Drain Internal: Ports P, A, B, X 350 Bar (5075 PSI); Port T, Y 185 Bar (2683 PSI) NG10: Port T, Y 15 Bar (218 PSI) Pilot Drain External: Ports P, A, B, T, X 350 Bar (5075 PSI); Port Y 185 Bar (2683 PSI) NG10: Port Y 15 Bar (218 PSI)			
Fluid	Hydraulic oil as per DIN 51524...51535, other on request			
Fluid temperature	[°C]	-20...+40; (-4°F...+104°F)		
Viscosity				
Permitted	[cSt] / [mm²/s]	20...380 (93...1761 SSU)		
Recommended	[cSt] / [mm²/s]	30...80 (139...371 SSU)		
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Nominal Flow at Δp=Bar (72.5 PSI) per Control Edge *		75 LPM (19.8 GPM) 90 LPM (23.8 GPM) 120 LPM (31.7 GPM)	100 LPM (26.4 GPM) 130 LPM (34.4 GPM) 200 LPM (52.9 GPM)	250 LPM (66.1 GPM) 400 LPM (105.8 GPM) 1000 LPM (264.2 GPM)
Leakage at 100 Bar	[ml/min]	100	200	600 1000
Pilot Supply Pressure	Minimum 30 Bar (435 PSI) [+T/Y pressure]; Maximum 350 Bar (5075 PSI)) Optimal Dynamics at 50 Bar (725 PSI)			
Pilot flow at 100 Bar		<0.5 LPM (0.13 GPM)	<1.2	<1.2 <1.2
Pilot Flow, Step Response		2 LPM (0.5 GPM)	1.9 LPM (0.5 GPM)	4.5 LPM (1.2 GPM) 18 LPM (4.8 GPM)
Static / Dynamic				
Step Response at 100% Step	[ms]	50	75	100 180
Hysteresis	[%]	<5		
Electrical				
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible		
Protection Class		C Ⅱ 2 G , Ex mbe II T4, IP66 (plugged and mounted)		
Solenoid	Code	K	J	
Supply Voltage	[V]	12	24	
Current Consumption	[A]	2.3	1.15	
Resistance	[Ohm]	3.7	14.8	
Solenoid Connection	Box with M20x1.5 entry for cableglands. Solenoid identificationas per ISO 9461.			
Wiring Minimum	[mm²]	3 x 1.5 recommended		
Wiring Length Maximum	[m]	50 (164 ft.) recommended		

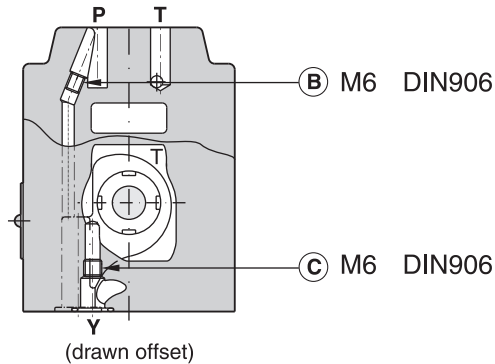
With electrical connections the protective conductor (PE ⚡) must be connected according to the relevant regulations.

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

Pilot Flow

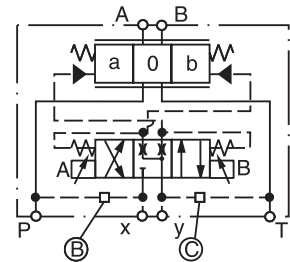
Pilot Oil Inlet (supply) and Outlet (drain)

D31FB

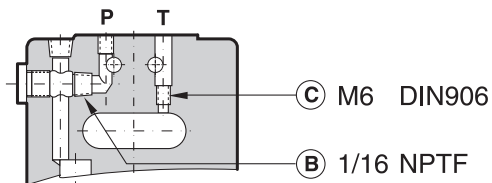


○ open, ● closed

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

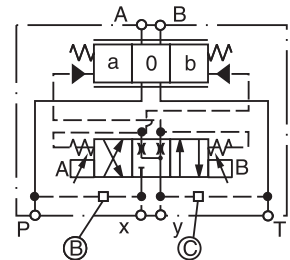


D41FB

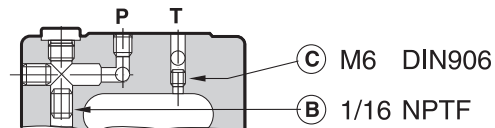


○ open, ● closed

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

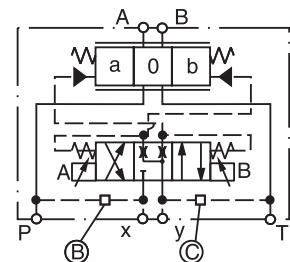


D91FB

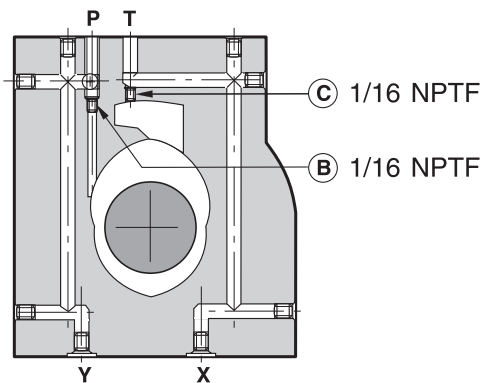


○ open, ● closed

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

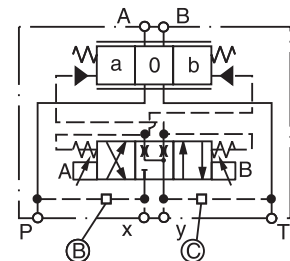


D111FB



○ open, ● closed

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



Dimensions

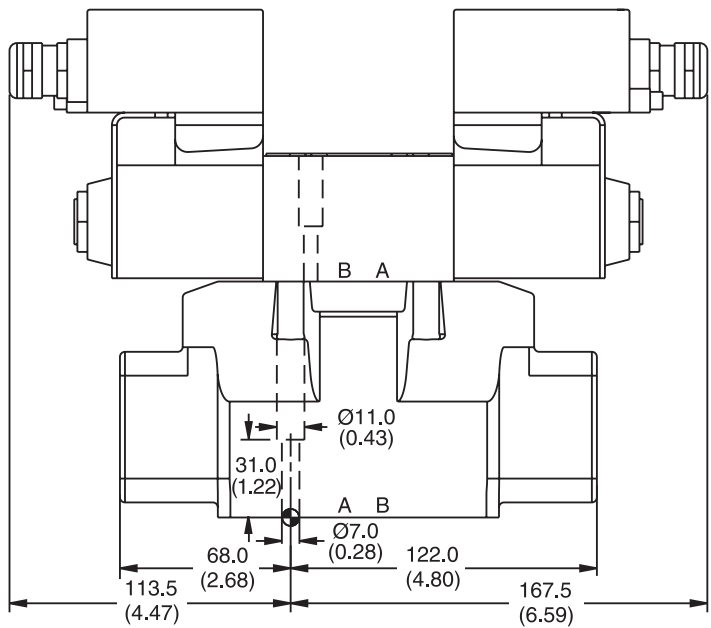
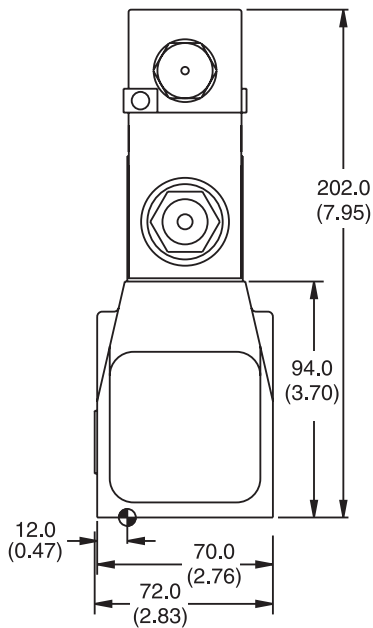
Proportional Directional Control Valves
Series D*1FB*EE with ATEX Coils

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



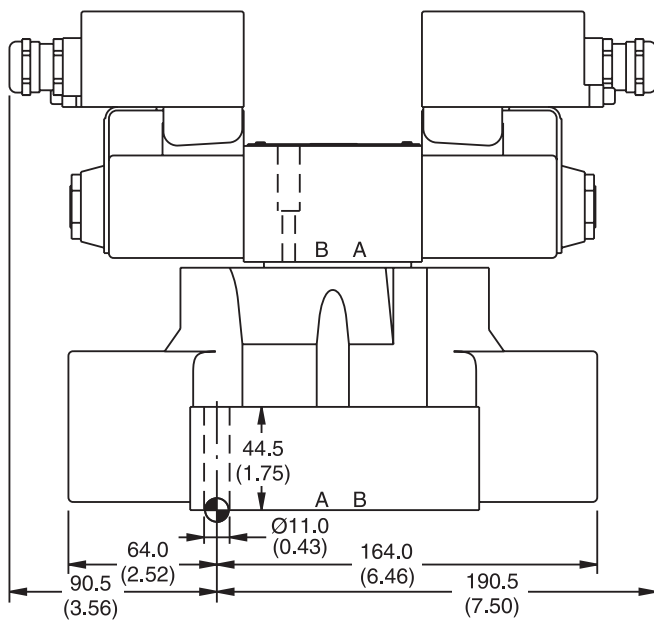
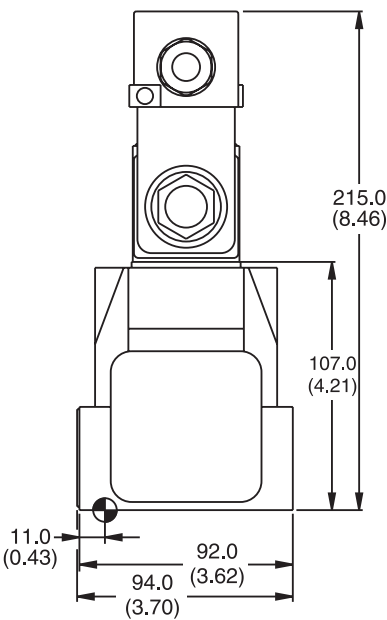
D31FB*EE

A



Surface Finish	Kit	Kit	Kit	Seal Kit
	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D31FB Fluorocarbon: SK-D31FBV

D41FB*EE



Surface Finish	Kit	Kit	Kit	Seal Kit
	BK320 BK160	2x M6x55 4x M10x60 DIN 912 12.9 4x 3/8-16x2.5 4X 3/8-16X2.5	13.2 Nm (9.7 lb.-ft.) 63 Nm (46.5 lb.-ft.) ±15 %	Nitrile: SK-D41FB Fluorocarbon: SK-D41FBV

Dimensions

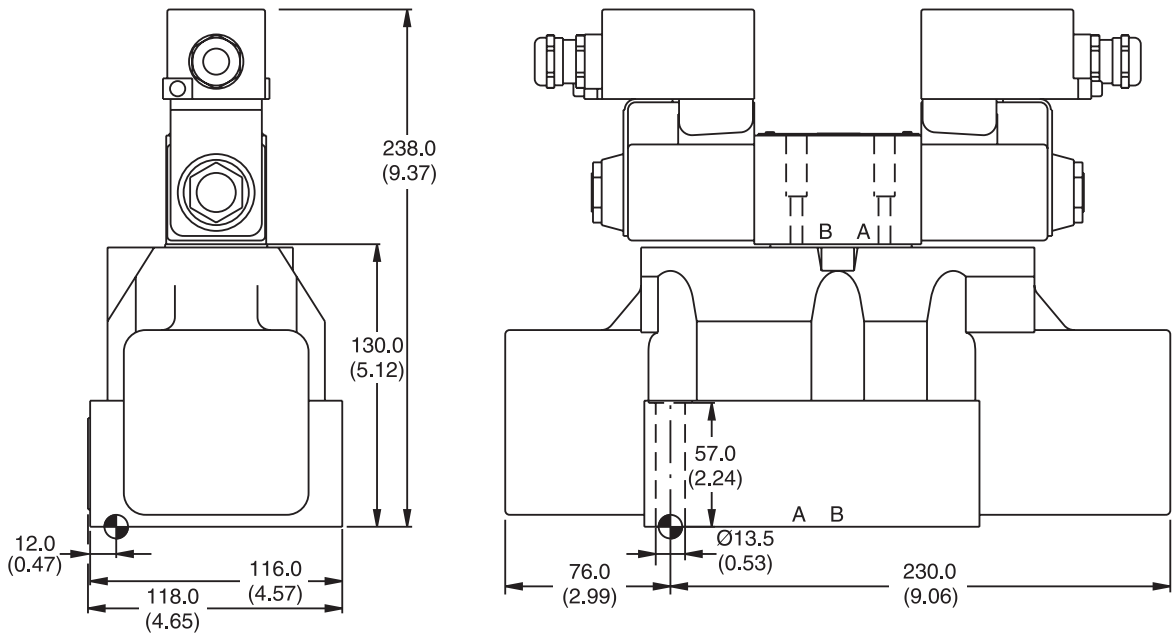
Proportional Directional Control Valves
Series D*1FB*EE with ATEX Coils

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

D91FB*EE

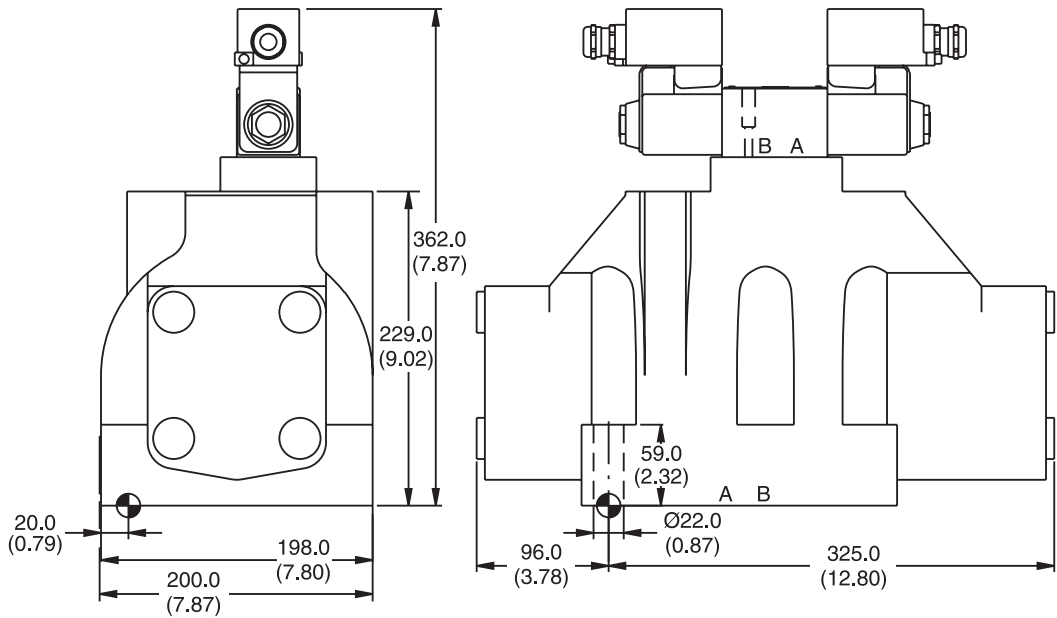


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Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ $\square 0.01/100$	BK360	6x M12x75 DIN 912 12.9	108 Nm (79.7 lb.-ft.) ±15 %	Nitrile: SK-D91FB Fluorocarbon: SK-D91FBV
	BK228	6x 1/2-13x3.0		

D111FB*EE



Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ $\square 0.01/100$	BK386	6x M20x90 DIN 912 12.9	517 Nm (373.9 lb.-ft.) ±15 %	Nitrile: SK-D111FB Fluorocarbon: SK-D111FBV
	BK150	6x 3/4-10x3.5		

General Description

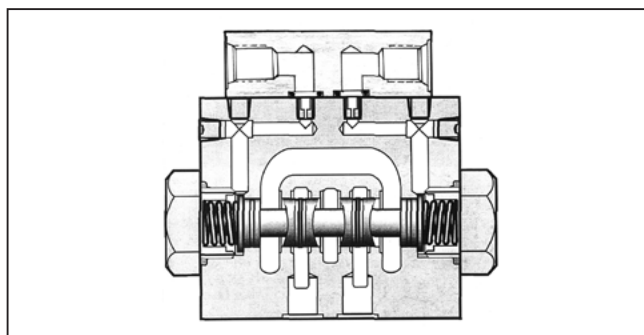
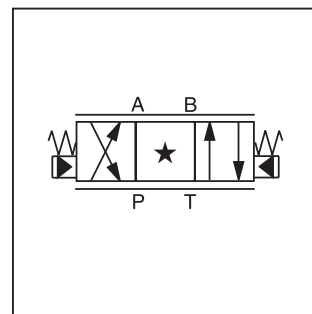
A

Series D*9FF main-stage, pilot operated, proportional directional control valves are operated with remote hydraulic hand controllers. Valves are available in sizes NG10 (CETOP 5), NG16 (CETOP 7), NG25 (CETOP 8) and NG32 (CETOP 10).

Typical applications include reproducible control of actuator speed in rapid/slow speed profiling, and smooth acceleration and deceleration performance.

Features

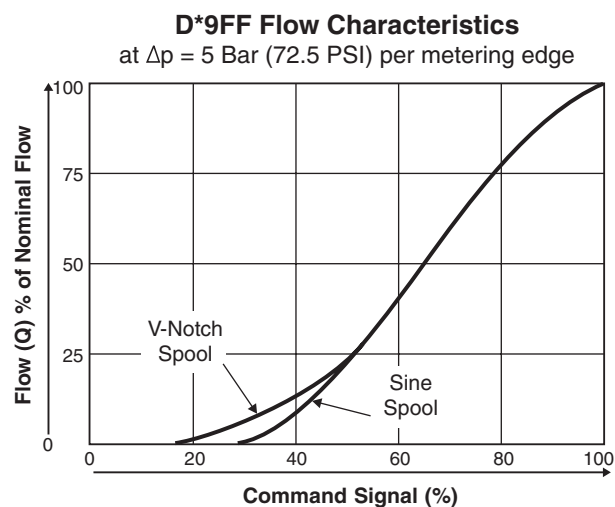
- Standard DIN/ISO/CETOP/NFPA interfaces
- Progressive flow characteristics for improved low flow resolution
- Spring centered main stage spool
- 2:1 ratio spool options



Specifications

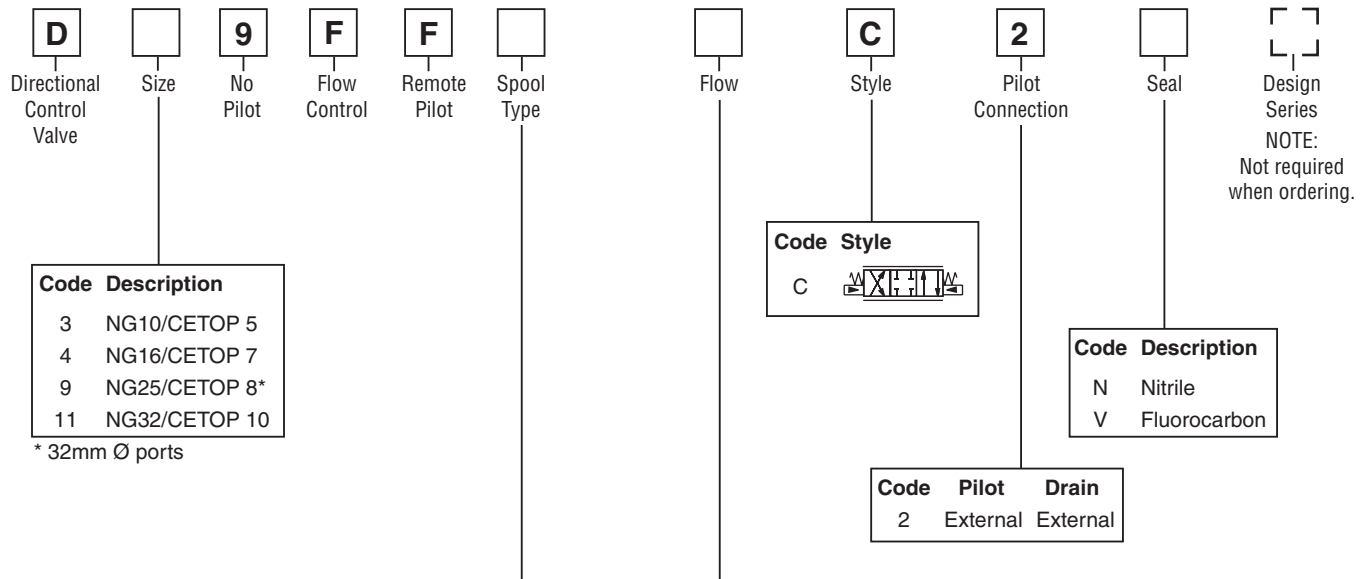
Interface DIN		NG10 (CETOP 5)	NG16 (CETOP 7)	NG25 (CETOP 8)	NG32 (CETOP 10)
Flow Rating @ 10 Bar (150 PSI) Δp (P→A, B→T) (Spool options up to) LPM (GPM)		75 (20)	200 (53)	400 (106)	1000 (264)
Pilot Flow – Continuous LPM (GPM)		1.2 (0.3)	1.2 (0.3)	1.2 (0.3)	1.2 (0.3)
Step Response (time to reach 90% of a 100% step command) ms		60	75	100	200
Hysteresis	%	<5			
Repeatability	%	<2			
Operating Pressure					
Port P, A, B, T	Bar (PSI)	345 (5000) max.			
Pilot Pressure Ranges					
	Bar (PSI)	0-25 (0-363 PSI)			
Fluid Cleanliness Level		ISO Class 16/13			
Fluid Viscosity, Recommended		80 – 1000 SSU			
Fluid Temperature, Recommended		0°C to +60°C (+32°F to +140°F)			
Ambient Operating Temperature		-50°C to +100°C (-58°F to +212°F)			

Performance Curves



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

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Sine Spool Options - Spool Type and Flow Codes							
Code		Sine Spool Type	Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge			
Q _A =Q _B	Q _A >Q _B ¹⁾			D39 LPM (GPM)	D49 LPM (GPM)	D99 LPM (GPM)	D119 LPM (GPM)
E01	B31		C	75 (20)	—	—	—
E02	B32		F	—	200 (53)	—	—
			H	—	—	400 (106)	—
			L	—	—	—	1000 (264)

V-Notch Spool Options - Spool Type and Flow Codes							
Code		V-Notch Spool Type	Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge			
Q _A =Q _B	Q _A >Q _B ¹⁾			D39 LPM (GPM)	D49 LPM (GPM)	D99 LPM (GPM)	D119 LPM (GPM)
E21	B41		B	—	—	—	—
E22	B42		D	—	120 (32)	—	—
1) Reduced Flow Rate on Port B, Nominal Flow Rate on Port A Code A* for spool Q _A >Q _A optional			F	—	—	300 (79)	—
			L	—	—	—	1000 (264)

1) Reduced Flow Rate on Port B, Nominal Flow Rate on Port A
 Code A* for spool Q_B>Q_A optional

Bolt Kits:

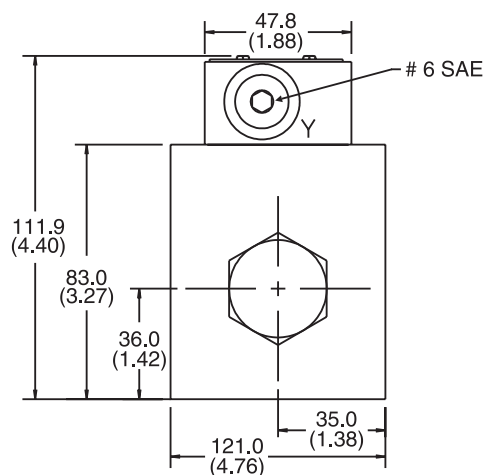
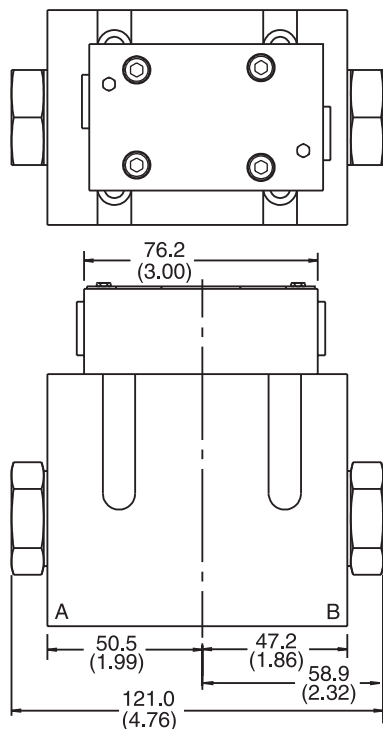
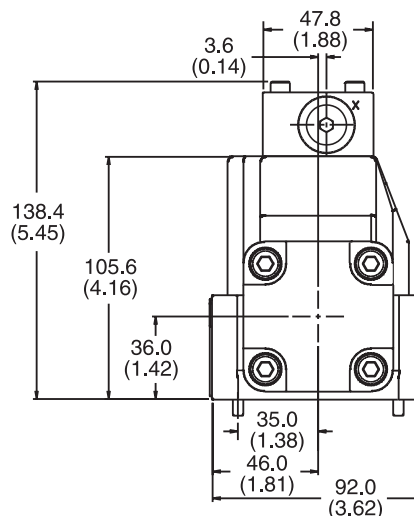
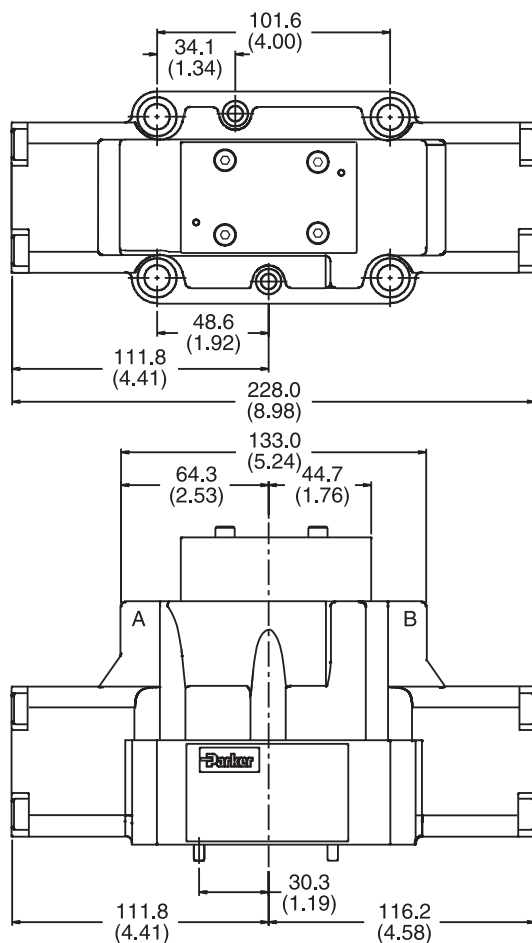
D39FF	BK98	(4) 1/4-20x1.62 SHCS
D49FF	BK160	(4) 3/8-16x2.5 SHCS
		(2) 1/4-20x2.5 SHCS
D99FF	BK228	(6) 1/2-13x3.0 SHCS
D119FF	BK150	(6) 3/4-10x3.5 SHCS

Weight:

D39FF	7.1 kg (16.0 lbs.)
D49FF	10.8 kg (25.0 lbs.)
D99FF	19.0 kg (42.0 lbs.)
D119FF	62.0 kg (136.0 lbs.)

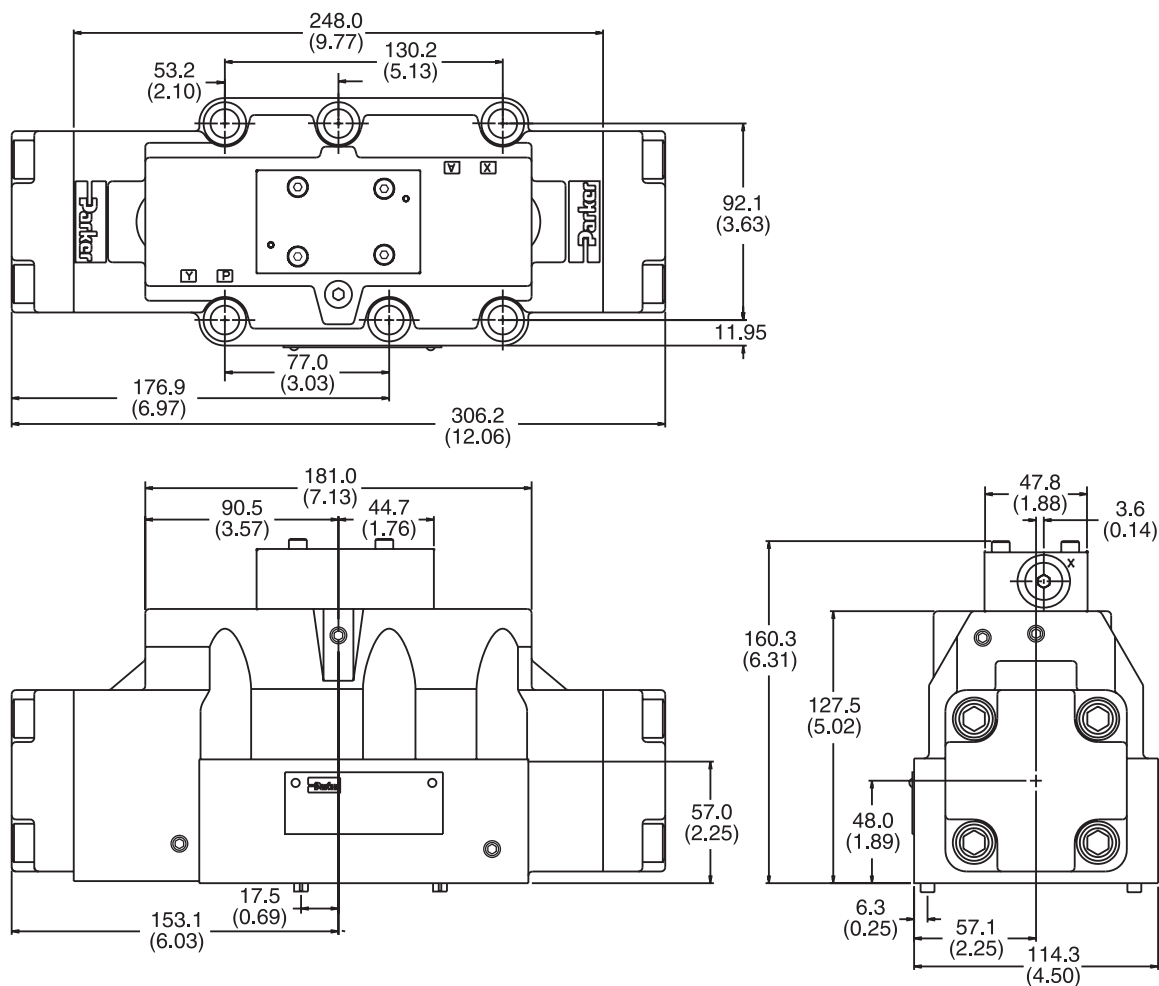
Dimensions**Proportional Directional Control Valves
Series D39FF and D49FF**

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

**D39FF****D49FF**

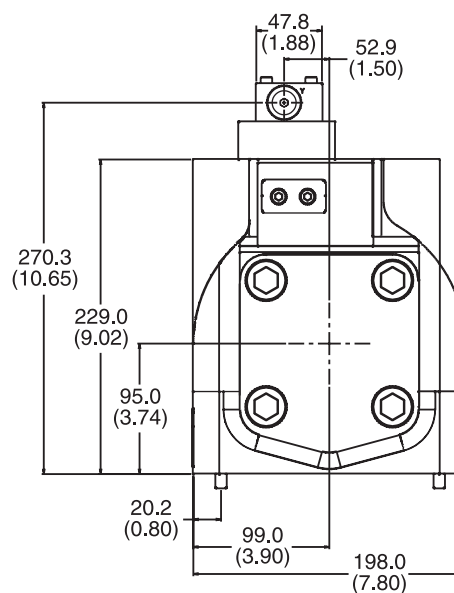
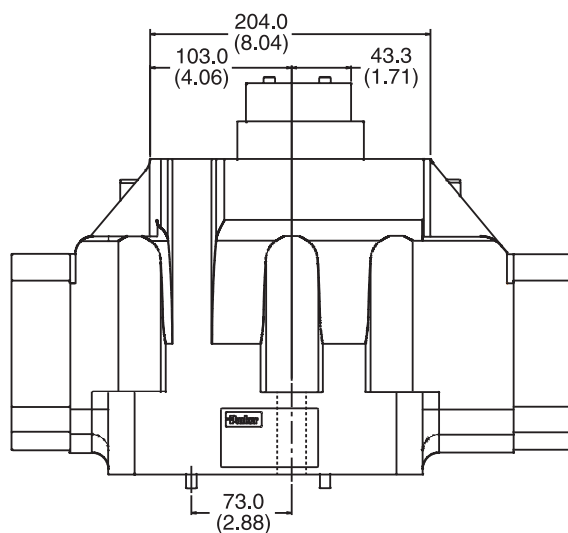
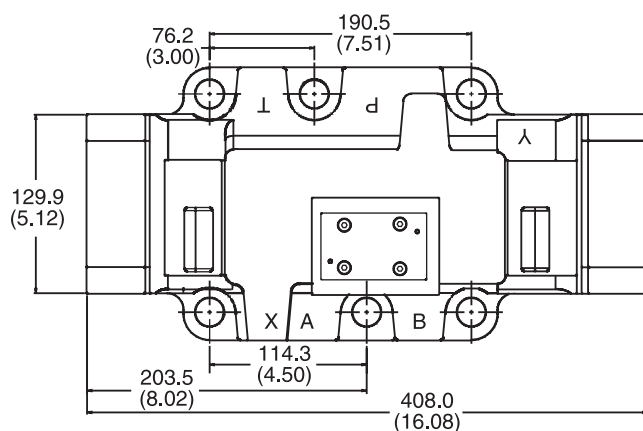
D99FF

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

A

D119FF

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

A

Bolt Kits, Subplates, Mounting Interface

Interface	Valve	Bolt Kit	Qty	Size	Subplate ⁽¹⁾	Port Size	Port Location
NG10 CETOP 5	D39F*	BK98	4	1/4-20 x 1.62"	SPD31D6NS35	3/4" NPTF	Bottom
		BK385	4	M6 x 40mm	SPD31D6NAS35	3/4" NPTF	Side
					SPD31D6SS35	#12 SAE	Bottom
					SPD31D6SAS35	#12 SAE	Side
NG16 CETOP 7	D49F*	BK160	4	3/8-16 x 2.5"	SPD46SA	#12 SAE	Side
			2	1/4-20 x 2.25"			
		BK320	4	M10 x 60mm			
			2	M6 x 55mm			
NG25 CETOP 8	D99F*	BK228	6	1/2-13 x 3"	SPD66NS35	3/4" NPTF	Bottom
		BK360	6	M12 x 75	SPD66NAS35	3/4" NPTF	Side
					SPD68NS35	1" NPTF	Bottom
					SPD68NAS35	1" NPTF	Side
					SPD610NS35	1 1/4" NPTF	Bottom
					SPD610NAS35	1 1/4" NPTF	Side
					SPD610SS35	#20 SAE	Bottom
					SPD610SAS35	#20 SAE	Side
NG32 CETOP 10	D119F*	BK150	6	3/4-10 x 3.5"	SPD1010N35	1 1/4" NPTF	Bottom
		BK386	6	M20 x 90	SPD1012N35	1 1/2" NPTF	Bottom

(1) Ductile iron; maximum operating pressure: 350 Bar (5075 PSI). Refer to valve specifications for actual recommended maximums.

Note: All subplates listed use SAE mounting bolt hardware. Refer to Catalog HY14-2500/US for metric options.

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General Description

Series D*1FC pilot operated proportional directional valves come in 4 sizes:

- D31FC NG10 (CETOP 5)
- D41FC NG16 (CETOP 7)
- D91FC NG25 (CETOP 8)
- D111FC NG32 (CETOP 10)

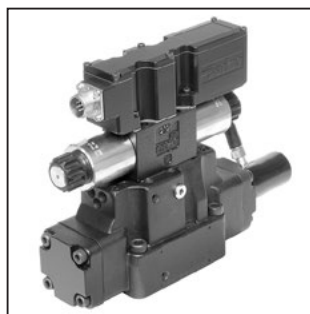
The digital onboard electronics is situated in a robust metal housing, which allows usage under rough environmental conditions.

The nominal values are factory set. The cable connection to a serial RS-232 interface is available as an accessory.

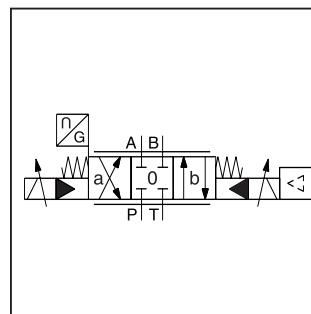
The innovative integrated regenerative function into the A-line (optional) allows energy saving circuits for differential cylinders. The hybrid version can be switched between regenerative mode and standard mode at any time.

Features

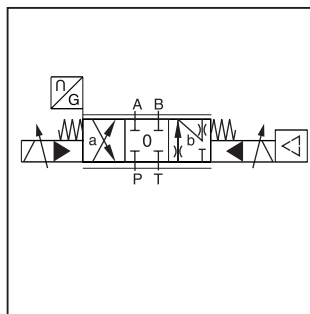
- Progressive flow characteristics for precise adjustment of flow rate
- Low hysteresis
- High dynamics
- High flow capacity
- Center position monitoring optional
- Energy saving A-regeneration optional
- Switchable hybrid version optional



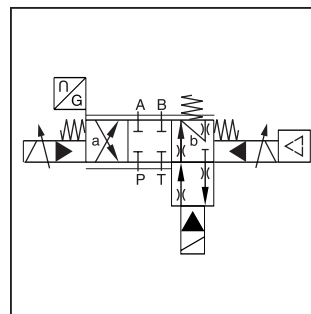
D41FC



Standard D*1FC



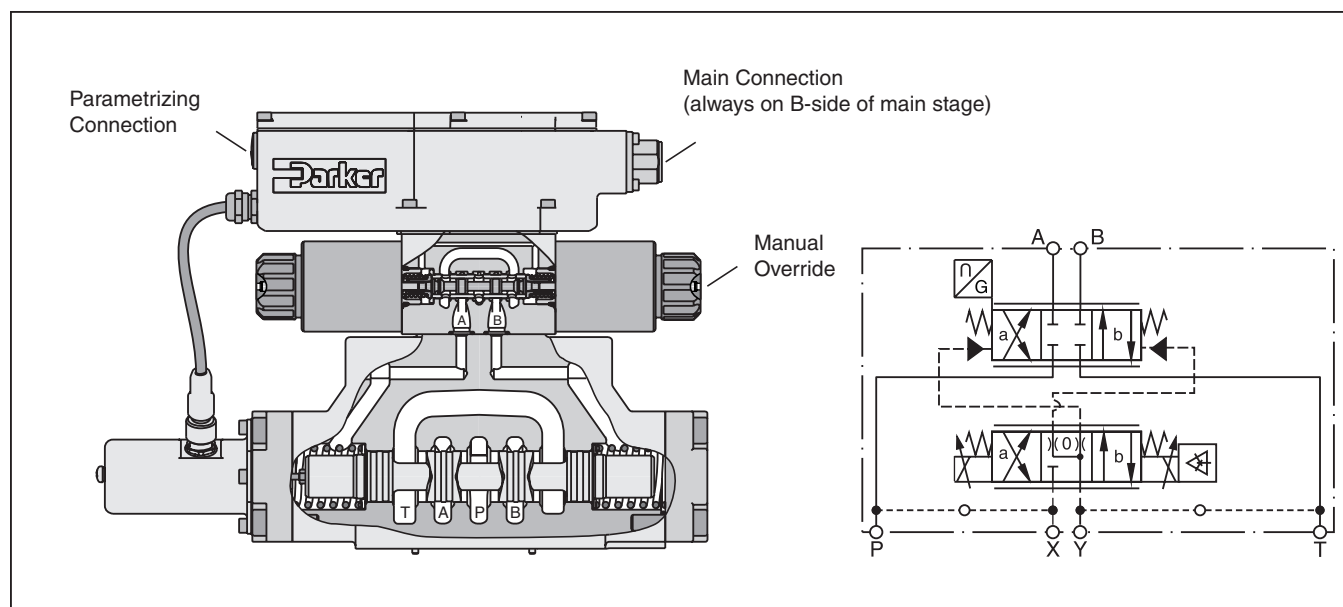
Regeneration D*1FCR



Hybrid D*1FCZ

Further literature about the opportunities of energy savings and more functional details of the integrated regeneration is available on request at Parker HVD Technical Service.

D41FC

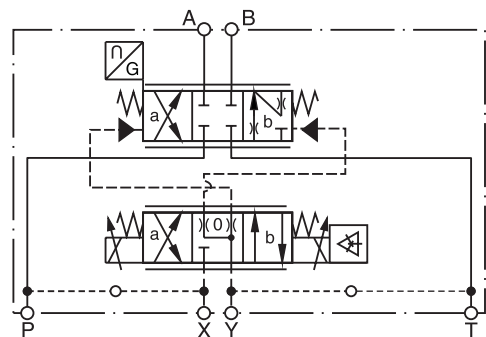
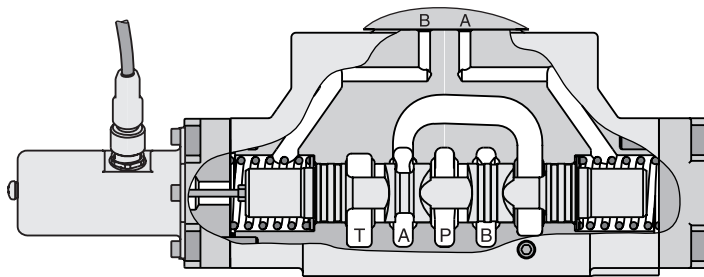


WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

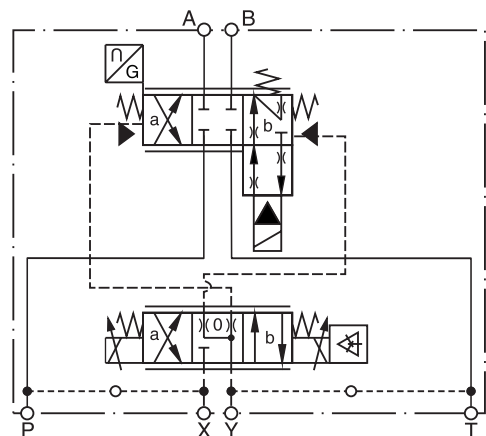
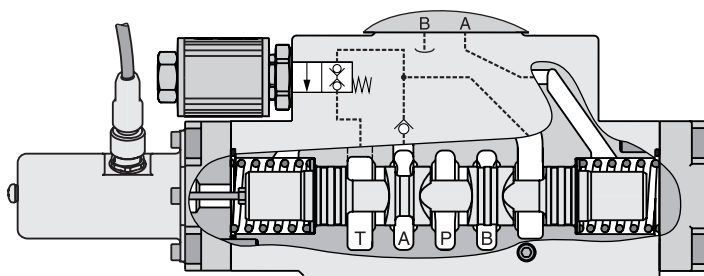
A01_Cat2550.indd, ddp, 06/21

D*1FCR and D*1FCZ

Regenerative Valve D*1FCR

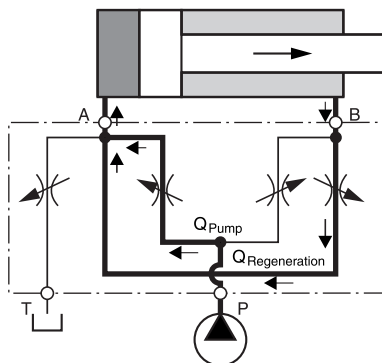


Hybrid Valve D*1FCZ



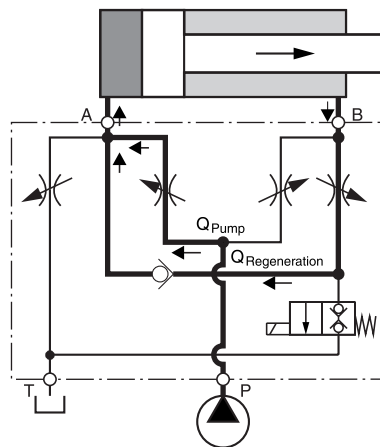
D*1FCR (Regenerative Valve)

Cylinder extending
(high speed)

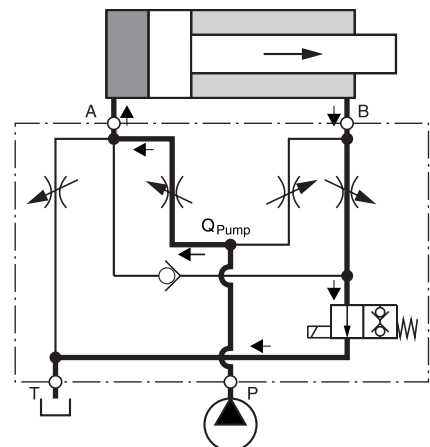


D*1FCZ (Hybrid Valve)

Cylinder extending
regenerative mode
(high speed)



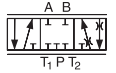
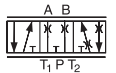
Cylinder extending
standard mode
(high force)



Flow Rate in % of Nominal Flow

Size	Spool	Port					
		A-T	P-A	P-B	B-A (R-Valve)	B-A (Hybrid)	B-T (Hybrid)
D41FBR/Z	31/32	100%	50%	100%	50%	45%	41 LPM (11 GPM) Max
D91FBR/Z	31/32	100%	50%	100%	50%	50%	98 LPM (26 GPM) Max
D111FBR/Z	31/32	100%	50%	100%	50%	50%	189 LPM (50 GPM) Max

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D		1	F	C			C																																				
Directional Control Valves	Size	NG6 Pilot	Flow Control	Intergrated Electronics with Position Feedback	Spool	Flow	Spool Position on Power Down	Pilot Connection	Seal	Input Signal	Options ⁴⁾	Valve Accessories	Design Series																														
Code Description 3 NG10 / CETOP 5 4 NG16 / CETOP 7 9 ¹⁾ NG25 / CETOP 8 11 NG32 / CETOP 10 ¹⁾ For enlarged connections Ø 32 mm																																											
Code Description 0 Standard for Spool Type B, E, R 8 ⁶⁾ ⁷⁾ Monitor Switch Hybrid valve 24V normally closed for spool type Z L ⁵⁾ ⁵⁾ See previous page for regenerative and hybrid spool information. (Not available in D31FC.) ⁶⁾ Not for D111FCZ* ⁷⁾ Monitor switch for hybrid valves: Code 8 includes options of Code L (24 normally closed). Switch cover available, add -XG373 to part number.																																											
Code Description N Nitrile V Fluorocarbon																																											
Code Description 1 Internal External 2 External External 4 Internal Internal 5 External Internal																																											
Code Description 0 6+PE acc. EN175201-804 1 6+PE + enable + solenoid disable 3 6+PE + solenoid disable 5 11+PE 7 6+PE + enable ⁴⁾ Please order plugs separately. See Accessories.																																											
Code Description D31FC spool type: R31  R32  ²⁾ For regenerative and hybrid function at D31FC (NG10) please refer to solutions with sandwich and adapter plates: A10-1664 / A10-1665L / H10-1662 / H10-1666L.																																											
Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge <table border="1"> <thead> <tr> <th>Code</th> <th>D31</th> <th>D41</th> <th>D91</th> <th>D111</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>90 (23.8)</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>E</td> <td>120 (31.7)</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>F</td> <td>—</td> <td>200 (52.8)</td> <td>—</td> <td>—</td> </tr> <tr> <td>H</td> <td>—</td> <td>—</td> <td>450 (119.0)</td> <td>—</td> </tr> <tr> <td>L</td> <td>—</td> <td>—</td> <td>—</td> <td>1000 (264.2)</td> </tr> </tbody> </table>														Code	D31	D41	D91	D111	D	90 (23.8)	—	—	—	E	120 (31.7)	—	—	—	F	—	200 (52.8)	—	—	H	—	—	450 (119.0)	—	L	—	—	—	1000 (264.2)
Code	D31	D41	D91	D111																																							
D	90 (23.8)	—	—	—																																							
E	120 (31.7)	—	—	—																																							
F	—	200 (52.8)	—	—																																							
H	—	—	450 (119.0)	—																																							
L	—	—	—	1000 (264.2)																																							
Bolt Kits: D31FC BK385 D41FC BK320 D91FC BK360 D111FC BK386																																											
Weight: D31FC 9.0 kg (19.8 lbs.) D41FC 12.5 kg (27.6 lbs.) D91FC 21.0 kg (46.3 lbs.) D111FC 68.5 kg (151.0 lbs.)																																											

General					
Design		Pilot operated DC valve			
Actuation		Proportional solenoid			
Size		NG10 (CETOP 5) D31	NG16 (CETOP 7) D41	NG25 (CETOP 8) D91	NG32 (CETOP 10) D111
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA			
Mounting Position		Unrestricted			
Ambient Temperature		[°C]	-20...+60; (-4°F...+140°F)		
MTTF _D Value		[years]	50		
Vibration Resistance		[g]	10 Sinus 5...200 Hz acc. IEC 68-2-6 30 Random noise 20...20 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27		
Hydraulic					
Maximum Operating Pressure		Pilot Drain Internal Ports P, A, B, X 350 Bar (5075 PSI); Ports T, Y 210 Bar (3045 PSI) Pilot Drain External Ports P, A, B, T, X 350 Bar (5075 PSI); Port Y 210 Bar (3045 PSI)			
Fluid		Hydraulic oil as per DIN 51524...51535, other on request			
Fluid Temperature		[°C]	-20...+60; (-4°F...+140°F)		
Viscosity					
Permitted		[cSt] / [mm²/s]	20...380 (93...1761 SSU)		
Recommended		[cSt] / [mm²/s]	30...80 (139...371 SSU)		
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Nominal Flow at Δp= 5 Bar (72.5 PSI) per Control Edge ¹⁾		90/120 LPM (23.8/31.7 GPM)	200 LPM (52.9 GPM)	450 LPM (119.0 GPM)	1000 LPM (264.6 GPM)
Leakage at 100 Bar (1450 PSI)					
Main Stage		[ml/min]	200 (12 cu. in.)	200 (12 cu. in.)	600 (37 cu. in.)
Pilot Stage		[ml/min]	<100 (6.1 cu. in.)		
Pilot Supply Pressure		20 Bar (290 PSI) to 350 Bar (5075 PSI)			
Pilot Flow, Step Response		2.9 LPM (0.8 GPM)	4.1 LPM (1.1 GPM)	6.7 LPM (1.8 GPM)	15.0 LPM (4.0 GPM)
Static / Dynamic					
Step Response at 100% Step ²⁾		[ms]	35	37	66
Hysteresis		[%]	≤ 0.1		
Sensitivity		[%]	≤ 0.5		

¹⁾ Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

²⁾ Measured with load [210 Bar (3045 PSI) pressure drop/two control edges].

Continued on the next page

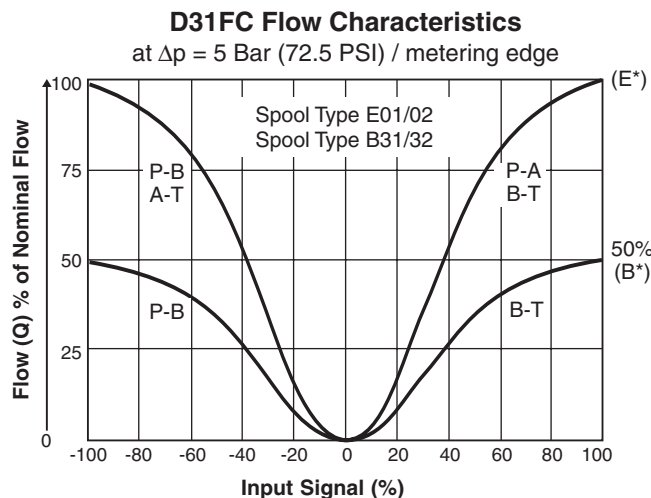
A

Electrical			
Duty Ratio		[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class			IP65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage/Ripple DC		[V]	18...30, ripple < 5% eff., surge free
Current Consumption Maximum		[A]	2.0
Pre-fusing Medium Lag		[A]	2.5
Input Signal			
Code K (B)	Voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, 0...+10V P→A (P→B)
	Impedance	[kOhm]	100
Code E	Current	[mA]	20...0...-20, ripple < 0.01 % eff., surge free, 0...+20 mA P→A (P→B)
	Impedance	[Ohm]	200
Code S	Current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, 12...20mA P→A
			< 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
	Impedance	[Ohm]	200
Differential Input Maximum			
Code 0/7		[V]	30 for terminal D and E against PE (terminal G)
Code 0		[V]	11 for terminal D and E against 0V (terminal B)
Adjustment Ranges:			
Minimum		[%]	0...50
Maximum		[%]	50...100
Ramp		[s]	0...32.5
Interface			RS-232, parametrizing connection 5 pole
EMC			EN 61000-6-2, EN 61000-6-4
Electrical Connection			6 + PE acc. to EN 175201-804
Wiring Minimum		[mm²]	7 x 1.0 (AWG16) overall braid shield
Wiring Length Maximum		[m]	50 (164 ft.)
Electrical (Hybrid Option)			
Duty Ratio		[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class			IP65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage		[V]	24
Tolerance Supply Voltage		[%]	±10
Current Consumption		[A]	1.21
Power Consumption		[W]	29
Solenoid Connection			Connector as per EN 175301-803
Wiring Minimum		[mm²]	3 x 1.5 recommended
Wiring Length Maximum		[m]	50 (164 ft.) recommended

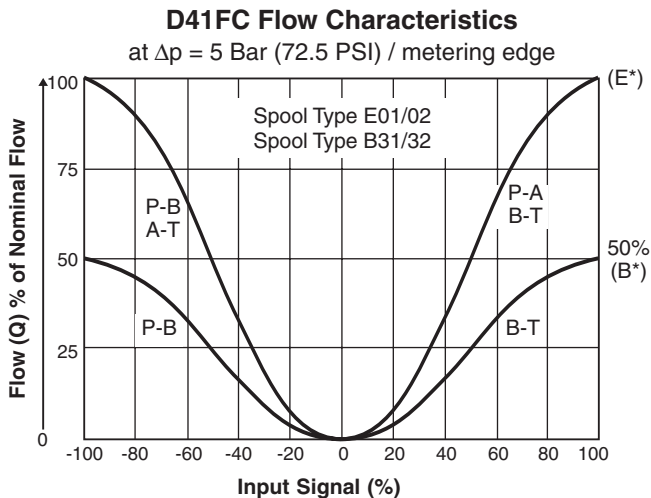
With electrical connections the protective conductor (PE ↓) must be connected according to the relevant regulations.

D*1FC B/E

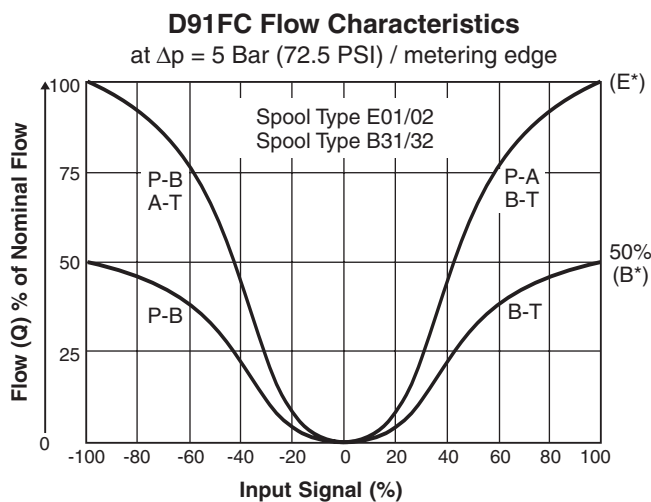
D31FC



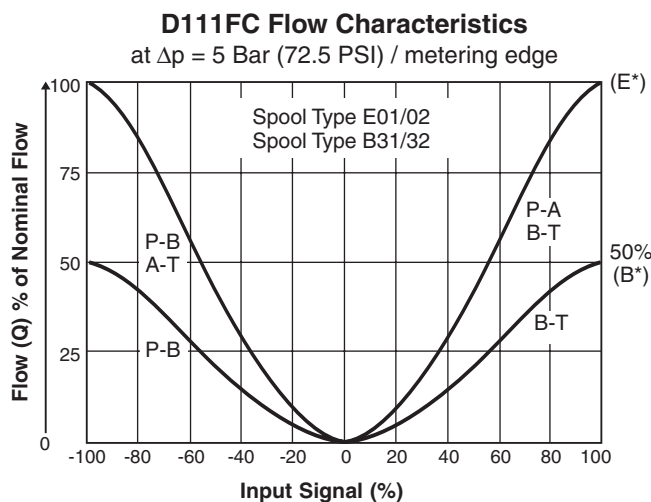
D41FC



D91FC



D111FC

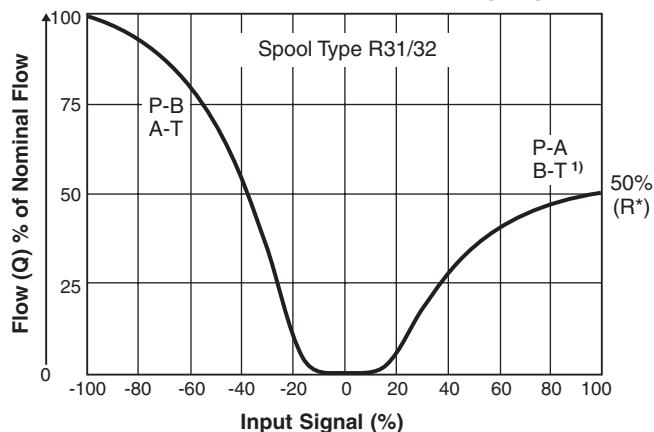


All performance curves measured with HLP46 at 50°C (122°F).

D*1FCR/Z

D31FC

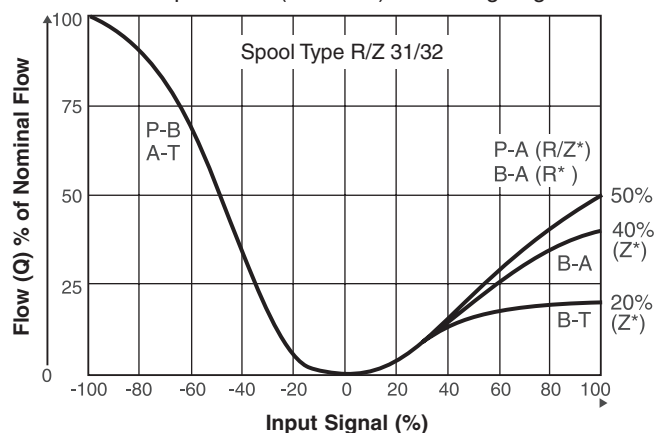
D31FCR Flow Characteristics
 at $\Delta p = 5 \text{ Bar (72.5 PSI)}$ / metering edge



1) with 2 tank ports

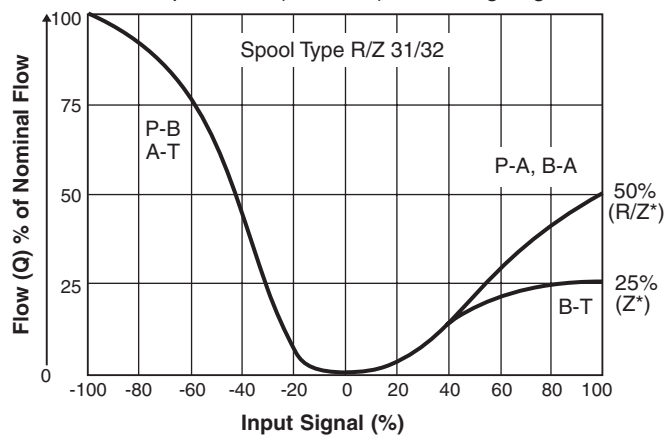
D41FC

D41FCR/Z Flow Characteristics
 at $\Delta p = 5 \text{ Bar (72.5 PSI)}$ / metering edge



D91FC

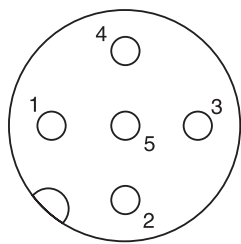
D91FCR/Z Flow Characteristics
 at $\Delta p = 5 \text{ Bar (72.5 PSI)}$ / metering edge



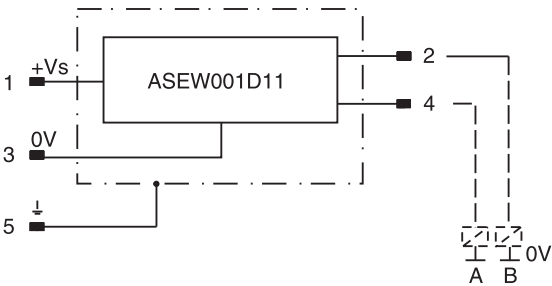
D111FC – Spool Type R/Z on request

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

Monitor Switch M12x1 Pin Assignment



- 1 + Supply 18...42V
- 2 Output B (normally closed)
- 3 0V
- 4 Output A (normally closed)
- 5 Earth ground



Signal	Output A (pin 4)	Output B (pin 2)
neutral	closed	closed
	open	closed
	closed	open

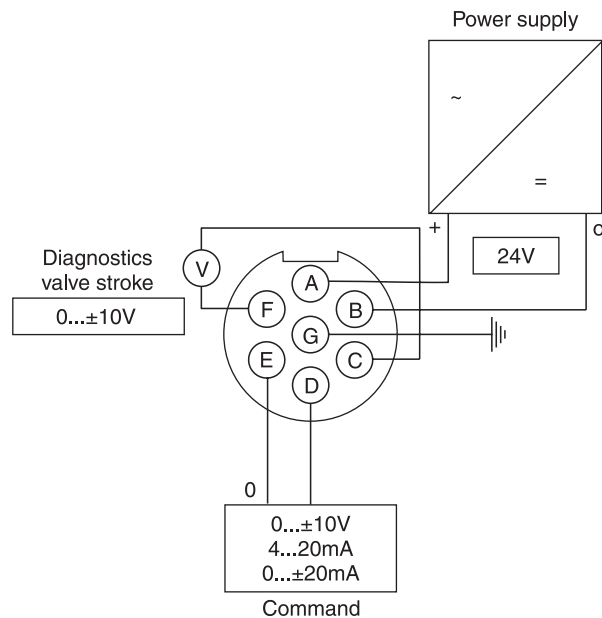
The neutral position is monitored. The signal changes after less than 10% of the spool stroke.

Electrical Monitor Switch

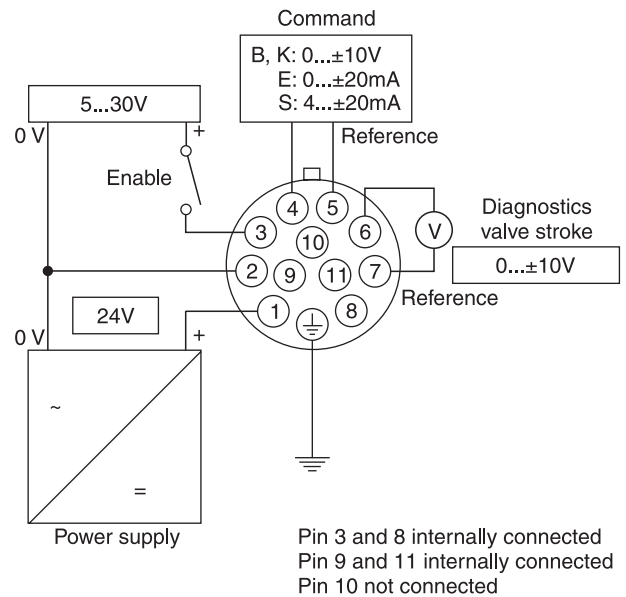
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)
Ambient Temperature	[°C] 0...70; (32°F...158°F)
Supply Voltage/Ripple	[V] 18...42, ripple < 10% eff.
Current Consumption without Load	[mA] < 30
Maximum Output Current per Channel, Ohmic	[mA] 400
Minimum Output Load per Channel, Ohmic	[kOhm] 100
Maximum Output Drop at 0.2A	[V] < 1.1
Maximum Output Drop at 0.4A	[V] < 1.6
EMC	EN 61000-6-2, EN61000-6-4
Maximum tol. Ambient Field Strength	[A/m] 1200
Minimum Distance to Next AC solenoid	[m] 0.1
Interface	4+PE acc. IEC 61076-2-101 (M12)
Wiring Minimum	[mm²] 5 x 0.5 (AWG 20) overall braid shield
Wiring Length Maximum	[m] 50 (164 ft.)

A

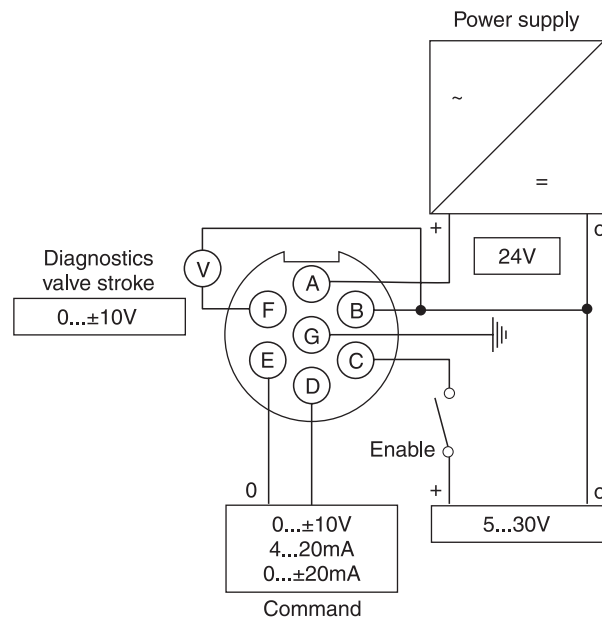
Code 0
6 + PE acc. to EN 175201-804



Code 5
11 + PE



Code 7
6 + PE acc. to EN 175201-804 + enable



ProPxD Interface Program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

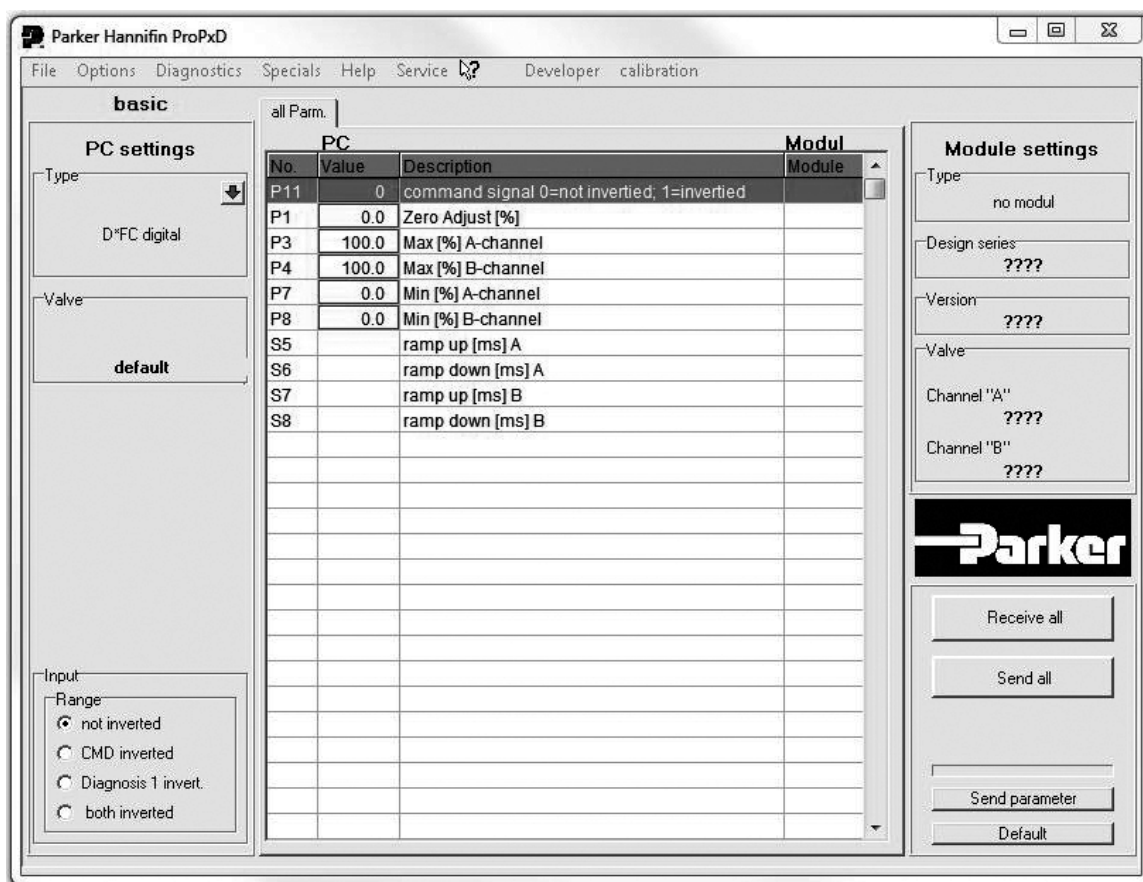
Features

- Simple editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronics via serial interface RS-232.

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

Simple to use interface program. Download free of charge
www.parker.com/euro_hcd → **Services** → **downloads**

A



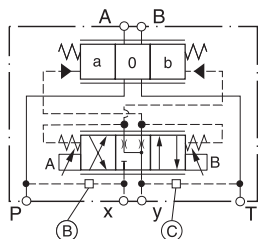
The parametrizing cable may be ordered under item no. 40982923.

Pilot Flow — Pilot Oil Inlet (Supply) and Outlet (Drain)

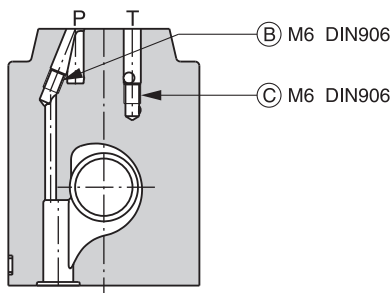
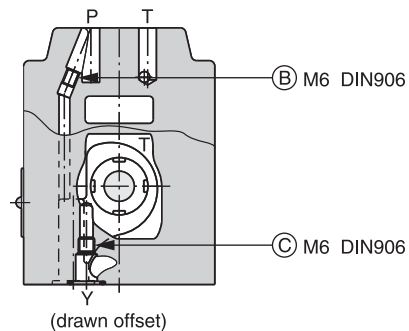
A

○ open, ● closed

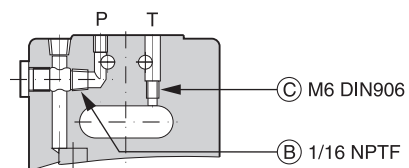
Pilot oil		B	C
Inlet	Drain		
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



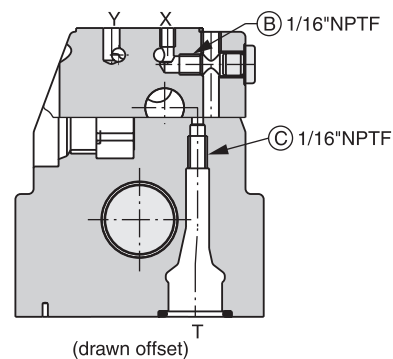
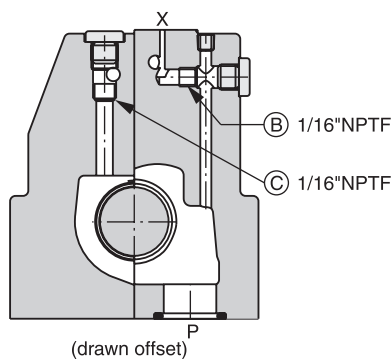
D31FCB/E D31FCR



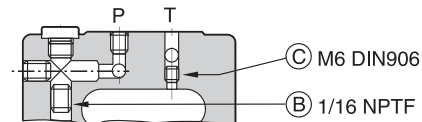
D41FCB/E D41FCR



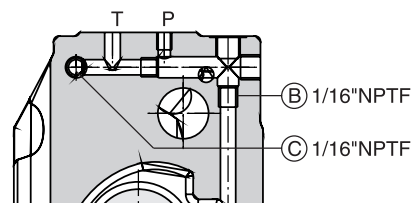
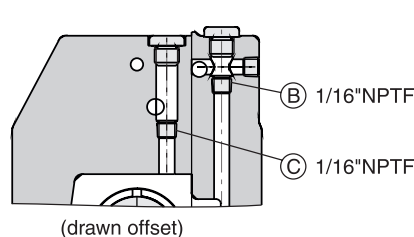
D41FCZ



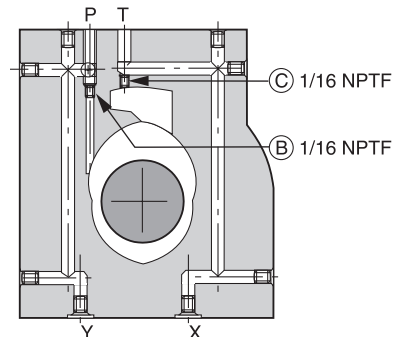
D91FCB/E D91FCR



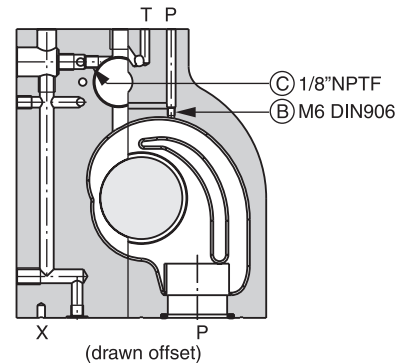
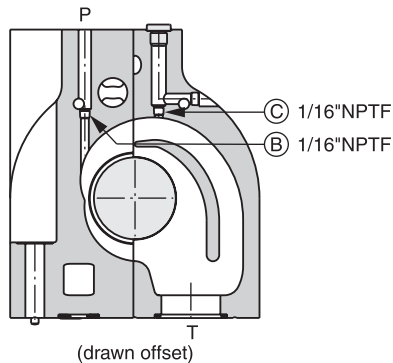
D91FCZ



D111FCB/E D111FCR



D111FCZ

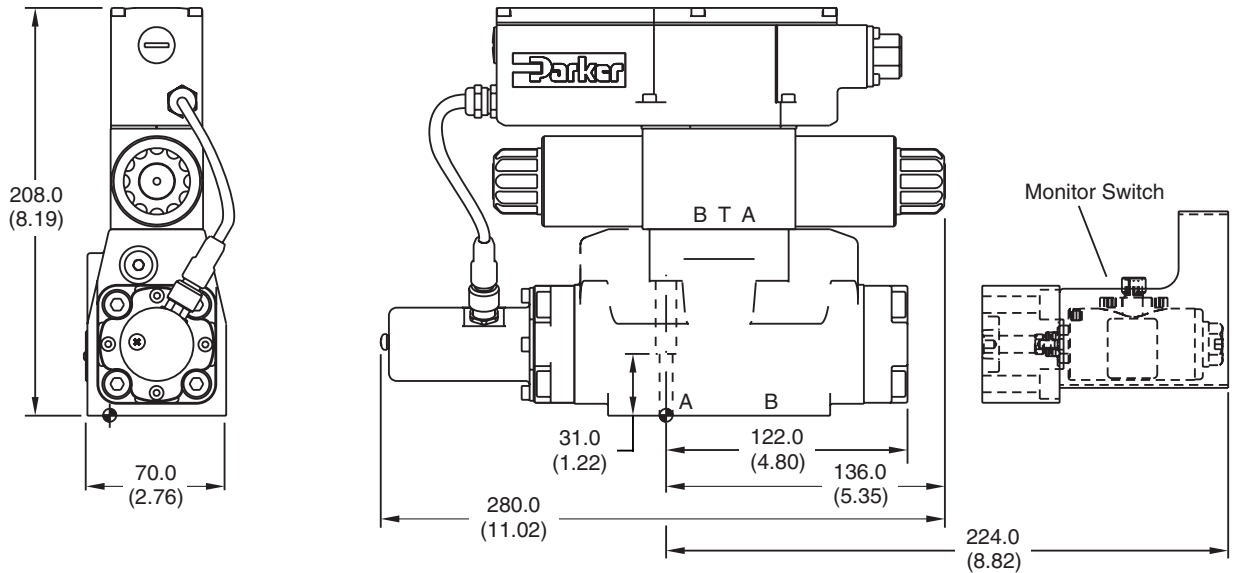


Inch equivalents for millimeter dimensions are shown in (**)



A

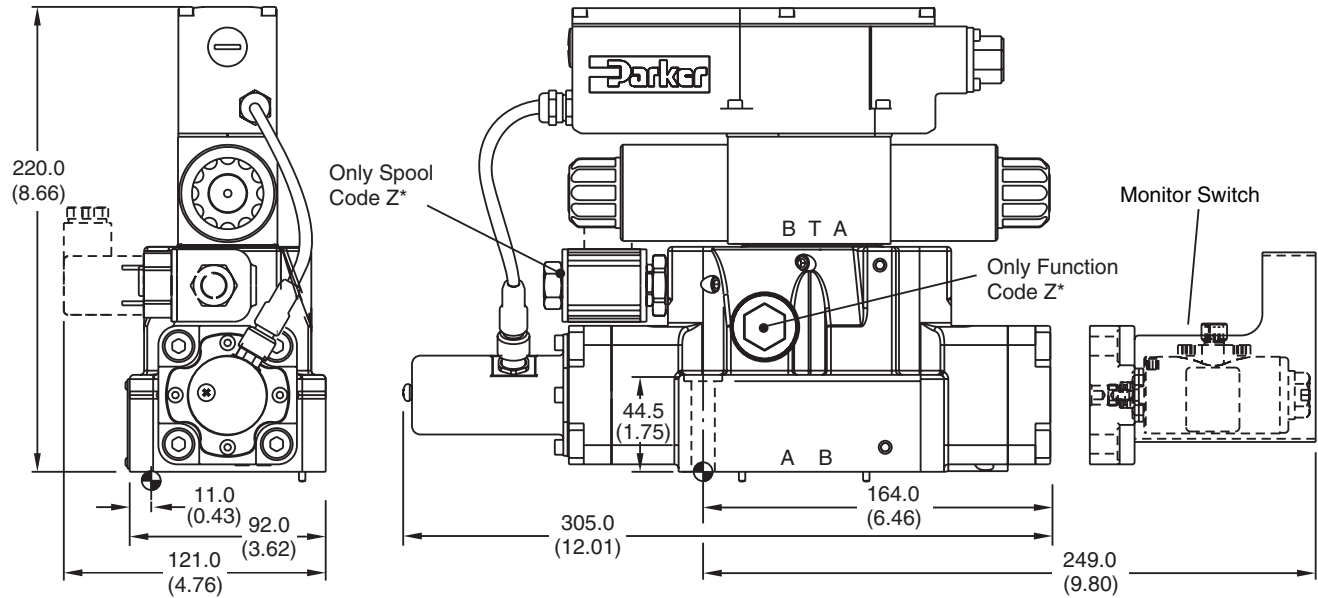
D31FC



Regenerative and hybrid function with additional plate H10-1666L, H10-1662, A10-1664, A10-1665L.

Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ $\downarrow$ $\square 0.01/100$	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm (9.7 lb.-ft.) $\pm 15\%$	Nitrile: SK-D31FC Fluorocarbon: SK-D31FC-V

D41FC



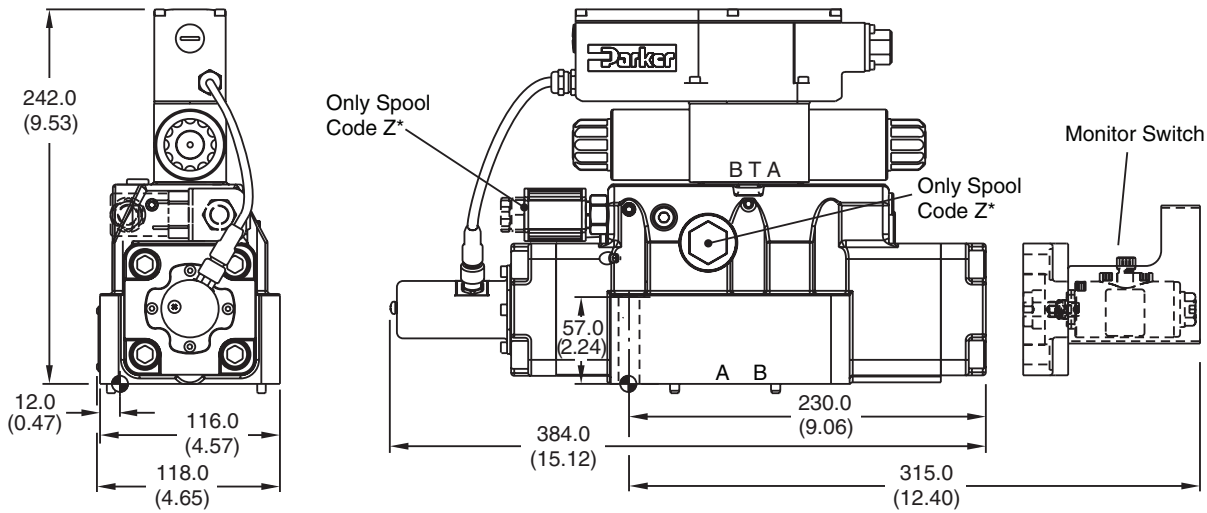
Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ $\downarrow$ $\square 0.01/100$	BK320	2x M6x55 4x M10x60 ISO 4762-12.9	13.2 Nm (9.7 lb.-ft.) 63 Nm (46.5 lb.-ft.) $\pm 15\%$	Nitrile: SK-D41FC Fluorocarbon: SK-D41FC-V

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



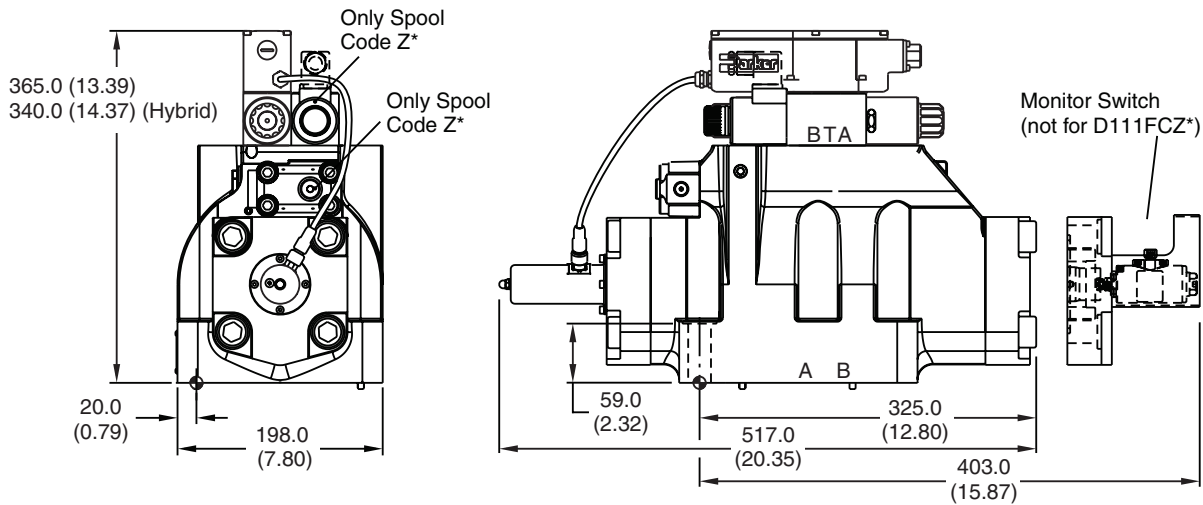
A

D91FC



Surface Finish	Kit	6x M12x75 ISO 4762-12.9	108 Nm (79.7 lb.-ft.) ±15 %	Seal Kit
	BK360			Nitrile: SK-D91FC Fluorocarbon: SK-D91FC-V

D111FC



Surface Finish	Kit	6x M20x90 ISO 4762-12.9	517 Nm (381.3 lb.-ft.) ±15 %	Seal Kit
	BK386			Nitrile: SK-D111FC Fluorocarbon: SK-D111FC-V

General Description

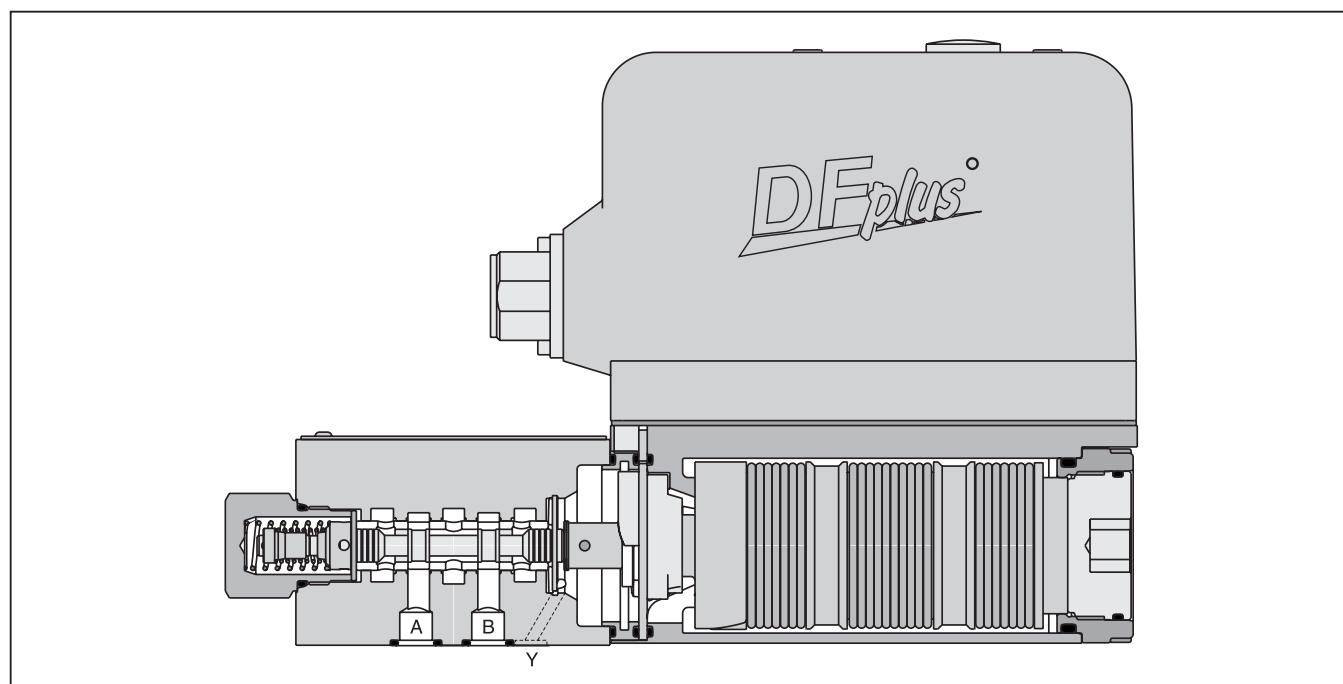
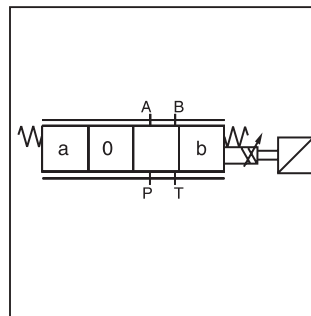
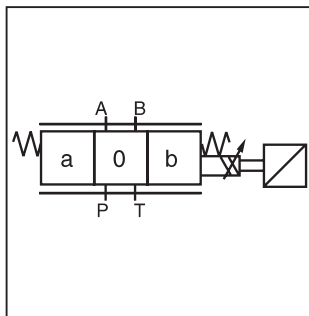
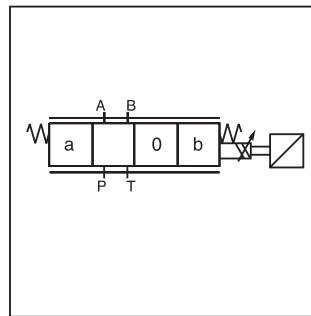
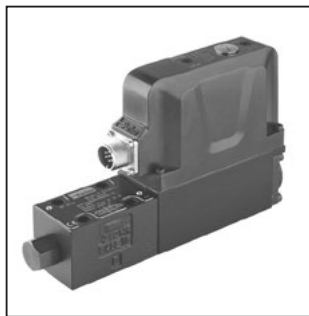
Series D1FP direct operated control NG6 (CETOP 3) valve features extremely high dynamics combined with maximum flow. It is used for high accuracy in positioning of a hydraulic axis, and for controlling force and velocity.

Driven by the new patented VCD® actuator, the D1FP reaches the frequency response of servovalves. Compared with solenoid driven valves, the D1FP can also be used in applications with pressure drops up to 350 Bar (5075 PSI) across the valve. Because of the high flow capability the D1FP can be a substitute for NG10 valves in some cases.

At power-down the spool moves in a defined position. All common input signals are available.

Features

- Servovalve dynamics: -3dB/350Hz at ±5% input signal
- Full flow capacity up to 350 Bar (5075 PSI) pressure drop through the valve
- Maximum tank pressure 350 Bar (5075 PSI) with external drain Y-port
- High flow
- Defined spool positioning in case of loss of electric power supply
- Onboard electronics



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

A01_Cat2550.indd, ddp, 06/21

A

D	1	F	P			9				0	
Directional Control Valve	Size DIN NG6 CETOP 3 NFPA D03	Proportional Control	VCD	Spool Type	Spool Position on Power Down ¹⁾	Y-Port Plugged ⁴⁾	Seal	Input Signal	Options	Spool/Sleeve Design	Design Series NOTE: Not required when ordering.

Code	Spool	Flow LPM (GPM) at Δp 35 Bar (508 PSI) per metering edge
Zerolap		
E50M*		40 (10.6)
E50H		25 (6.6)
E50G		16 (4.2)
E50F		12 (3.2)
E50C		6 (1.6)
E50B		3 (0.8)
B60M*	$Q_B = Q_A / 2$ 	40 (10.6) / 20 (5.3)
B60H		25 (6.6) / 12.5 (3.3)
B60G		16 (4.2) / 8 (2.1)
B60F		12 (3.2) / 6 (1.6)
B60C		6 (1.6) / 3 (0.8)
Underlap approximately -0.5%		
E55M*		40 (10.6)
E55H		25 (6.6)
E55G		16 (4.2)
E55F		12 (3.2)
E55C		6 (1.6)
E55B		3 (0.8)
Overlap 25%		
E01M*		40 (10.6)
E01H		25 (6.6)
E01G		16 (4.2)
E01F		12 (3.2)
E01C		6 (1.6)
E01B		3 (0.8)
B31M*	$Q_B = Q_A / 2$ 	40 (10.6) / 20 (5.3)
B31H		25 (6.6) / 12.5 (3.3)
B31G		16 (4.2) / 8 (2.1)
B31F		12 (3.2) / 6 (1.6)
B31C		6 (1.6) / 3 (0.8)
E02M*		40 (10.6)
E02H		25 (6.6)
E02G		16 (4.2)
E02F		12 (3.2)
E02C		6 (1.6)
E02B		3 (0.8)
B32M*	$Q_B = Q_A / 2$ 	40 (10.6) / 20 (5.3)
B32H		25 (6.6) / 12.5 (3.3)
B32G		16 (4.2) / 8 (2.1)
B32F		12 (3.2) / 6 (1.6)
B32C		6 (1.6) / 3 (0.8)

Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC Fluid

Code	Description
0	6 + PE acc. EN175201-804
5	11 + PE acc. EN175201-804
7	6 + PE + Enable

Code	Spool Position on Power Down
A ²⁾	
B ²⁾	
C ³⁾	
H ⁶⁾	
J ⁶⁾	

Code	Signal	Flow Direction ⁵⁾
B	+/- 10V	0...+10V -> P-A
E	+/- 20mA	0...+20mA -> P-A
S	4...20mA	12...20mA -> P-A

- ¹⁾ On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A → T resp. B → T with pressure drops above 120 Bar (1740 PSI) or contamination in the hydraulic fluid.
- ²⁾ Approximately 10% opening, only available with zerolap spools and underlap spools.
- ³⁾ Only available with overlap spools.
- ⁴⁾ Needs to be removed at tank pressure >35 Bar (507.5 PSI).
- ⁵⁾ Flow direction P → A with Pin D > Pin E.
- ⁶⁾ Not for flow code M.

* Flow is 32 (8.5) when spool power down options H or J are used.

Please order plugs separately. See Accessories.

Bolt Kit:

BK209	(4) 10-24x1.25
BK375	(4) M5x30

Weight: 5.0 kg (11.0 lbs.)

General		
Design	Direct operated proportional DC valve	
Actuation	VCD® actuator	
Size	NG6 / CETOP 3 / NFPA D03	
Mounting Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting Position	Unrestricted	
Ambient Temperature	[°C]	-20...+50; (-4°F...+122°F)
MTTF _p Value	[years]	75
Vibration Resistance	[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Hydraulic		
Maximum Operating Pressure	Ports P, A, B 350 Bar (5075 PSI) Port T max. 35 Bar (508 PSI), port Y max. 35 Bar (508 PSI) ¹⁾	
Fluid	Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature	[°C]	-20...+60; (-4°F...+140°F)
Viscosity		
Permitted	[cSt] / [mm²/s]	20...380 (93...1761 SSU)
Recommended	[cSt] / [mm²/s]	30...80 (139...371 SSU)
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Nominal Flow at Δp=35 Bar (508 PSI) per Control Edge ²⁾	[LPM] [LPM]	3 LPM (0.08 GPM) / 6 LPM (1.6 GPM) / 12 LPM (3.2 GPM) / 25 LPM (6.6 GPM) / 40 LPM (10.6 GPM)
Flow Maximum	90 LPM (23.8 GPM) at Δp=350 Bar (5075 PSI) over two control edges	
Leakage at 100 Bar (1450 PSI)	[ml/min]	<400 (zerolapped spool); <50 (overlapped spool)
Static / Dynamic		
Step Response at 100% Step ³⁾	[ms]	<3.5
Frequency Response (±5% signal) ³⁾	[Hz]	350 (amplitude ratio -3dB), 350 (phase lag -90°)
Hysteresis	[%]	<0.05
Sensitivity	[%]	<0.03
Temperature Drift	[%/K]	<0.025
Electrical		
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)	
Supply Voltage/Ripple	[V]	DC 22 ... 30, ripple <5% eff., surge free
Current Consumption Maximum	[A]	3.5
Pre-Fusing	[A]	4.0 medium lag
Input Signal		
Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A
Impedance	[kOhm]	100
Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A
Impedance	[Ohm]	250
Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A
Impedance	[Ohm]	<3.6 mA = disable, >3.8 mA = according to NAMUR NE43
Differential Input Maximum		
Code 0	[V]	30 for terminal D and E against PE (terminal G)
Code 5 / 7	[V]	30 for terminal 4 and 5 against PE (terminal ⊥)
Enable Signal (Only Code 5 / 7)	[V]	5...30, Ri = 9 kOhm
Diagnostic Signal	[V]	+10...0...-10 / +Ub, rated max. 5mA
EMC	EN61000-6-2 / EN61000-6-4	
Electrical Connection	Code 0 Code 5 Code 7	6 + PE acc. EN 175201-804 11 + PE acc. EN 175201-804 6 + PE + Enable
Wiring Miniimum		
Code 0	[mm²]	7x1.0 (AWG 18) overall braid shield
Code 5	[mm²]	12x1.0 (AWG 20) overall braid shield
Code 7	[mm²]	12x1.0 (AWG 18) overall braid shield
Wiring Length Maximum	[m]	50 (164 ft.)

¹⁾ For applications with pT>35 Bar (508 PSI) the Y-port has to be connected and the plug in the Y-port has to be removed.

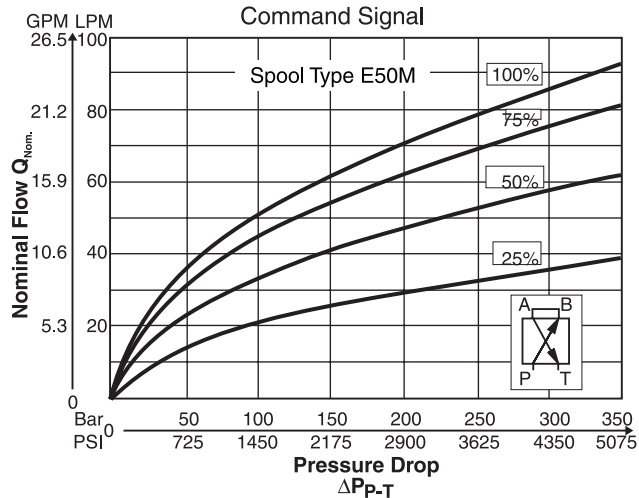
²⁾ Flow rate for different Δp per control edge: $Q_x = Q_{Nom} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom}}}$

³⁾ Measured with load 100 Bar (1450 PSI) pressure drop/two control edges.

A

Functional Limit

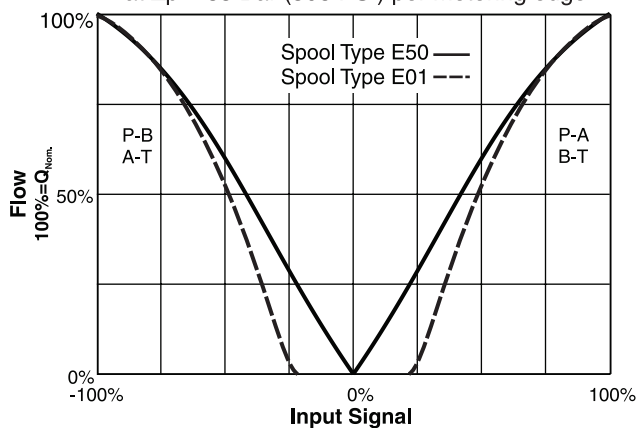
at 25%, 50%, 75% and 100%
 Command Signal



Spool Type E01/E50

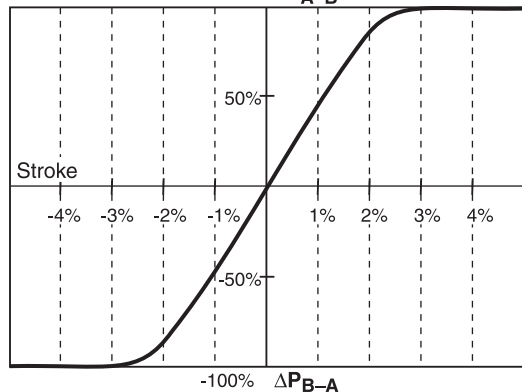
Flow Curves

at $\Delta p = 35$ Bar (508 PSI) per metering edge



Pressure Gain

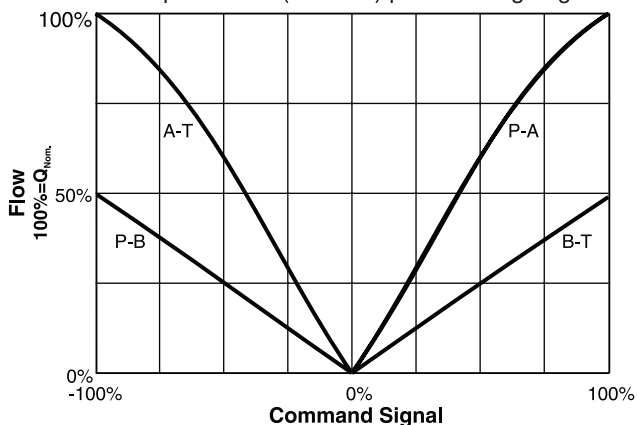
100% ΔP_{A-B}



Spool Type B60

Flow Curves

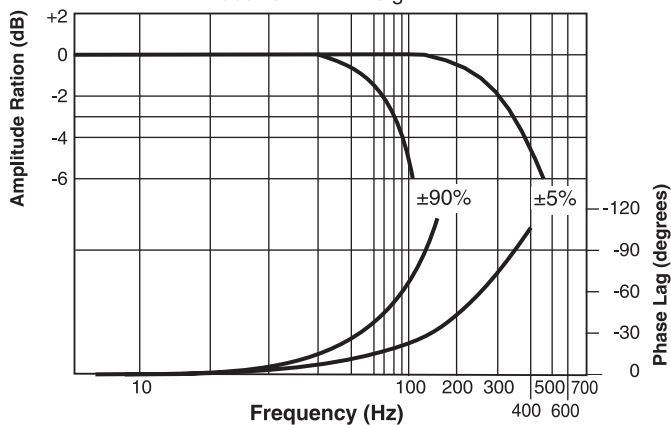
at $\Delta p = 35$ Bar (508 PSI) per metering edge



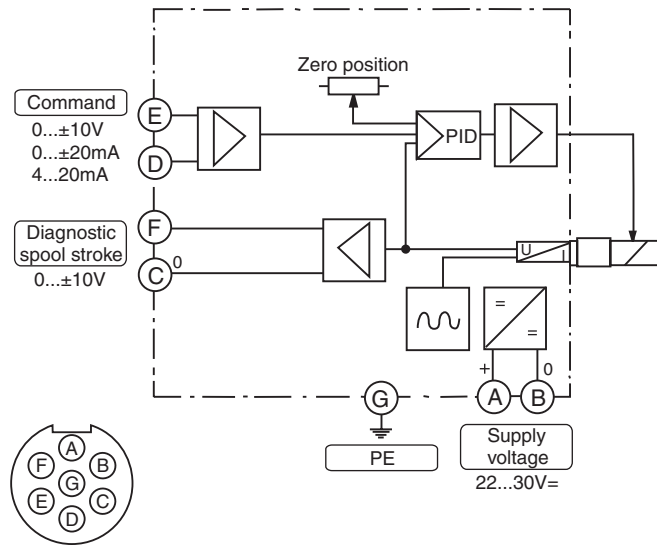
Frequency Response

$\pm 5\%$ Command Signal

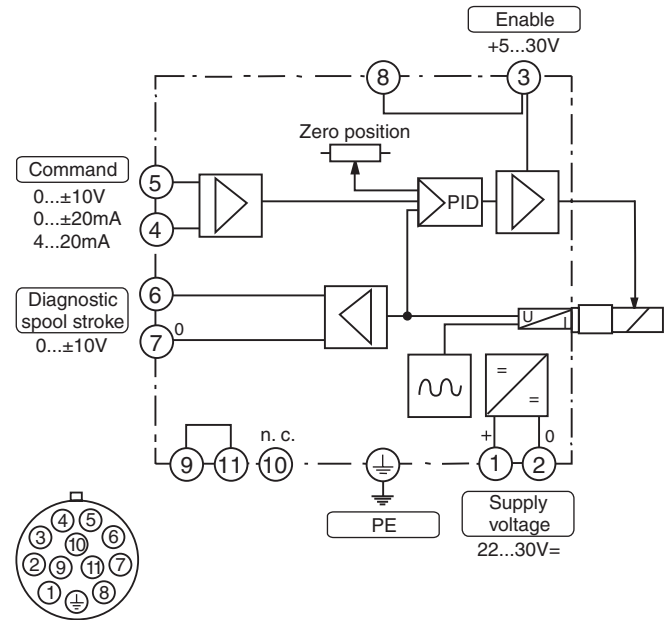
$\pm 90\%$ Command Signal



Code 0
6 + PE acc. to EN 175201-804

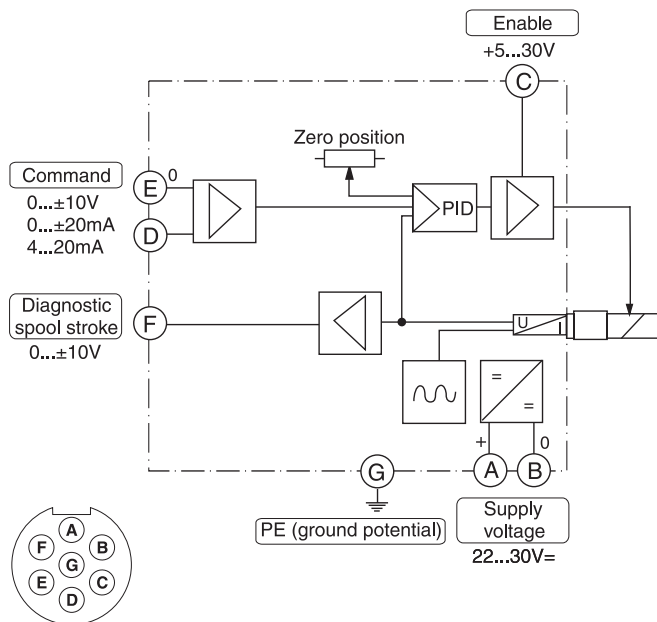


Code 5
11 + PE acc. to EN 175201-804



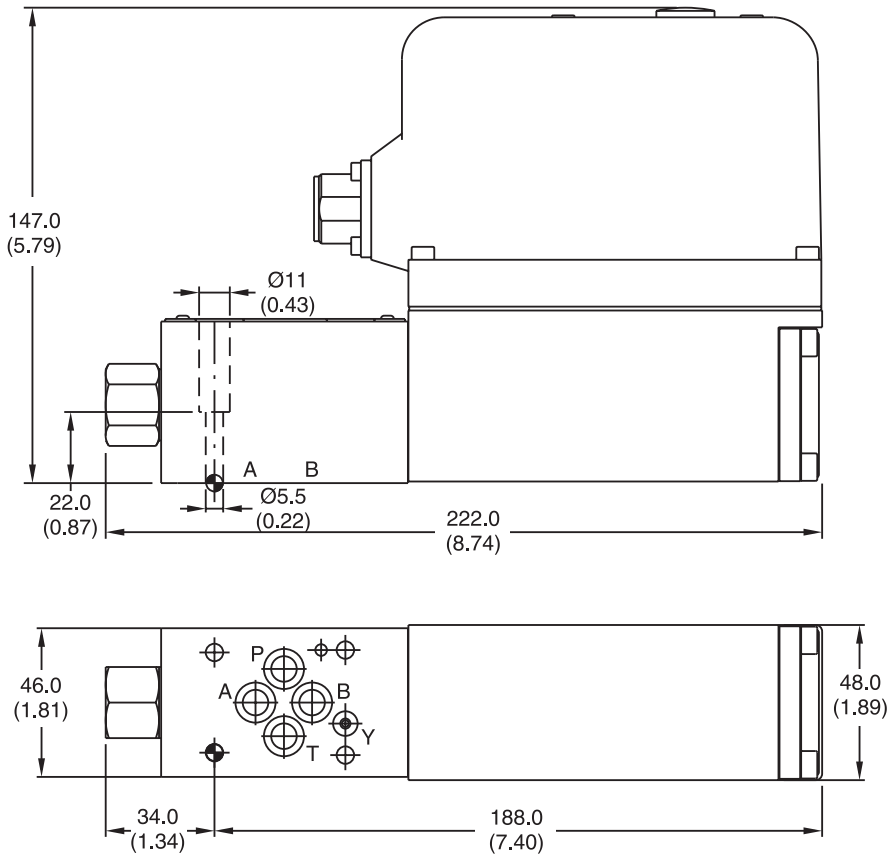
Note: When replacing another valve, verify Pin C is 0 V and not wired as an enable.

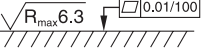
Code 7
6 + PE + Enable acc. to EN 175201-804



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

A



Surface Finish	 Kit	 Kit	 Kit	Seal  Kit
	BK375 BK209	4x M5x30 DIN 912 12.9 4x 10-24x1.25	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FP Fluorocarbon: SK-D1FP-V for HFC Fluid: SK-D1FP-H

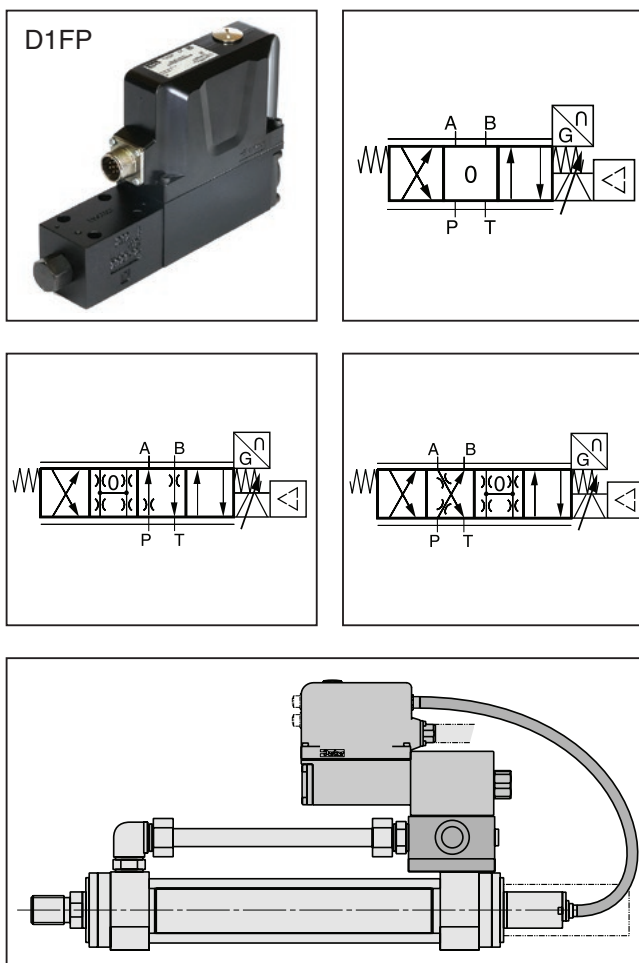
General Description

The direct operated control valves D1FP with freely configurable control circuit of the nominal size NG06 (CETOP 03) and D3FP of the nominal size NG10 (CETOP 05) shows extremely high dynamics combined with maximum flow. It is the preferred choice for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

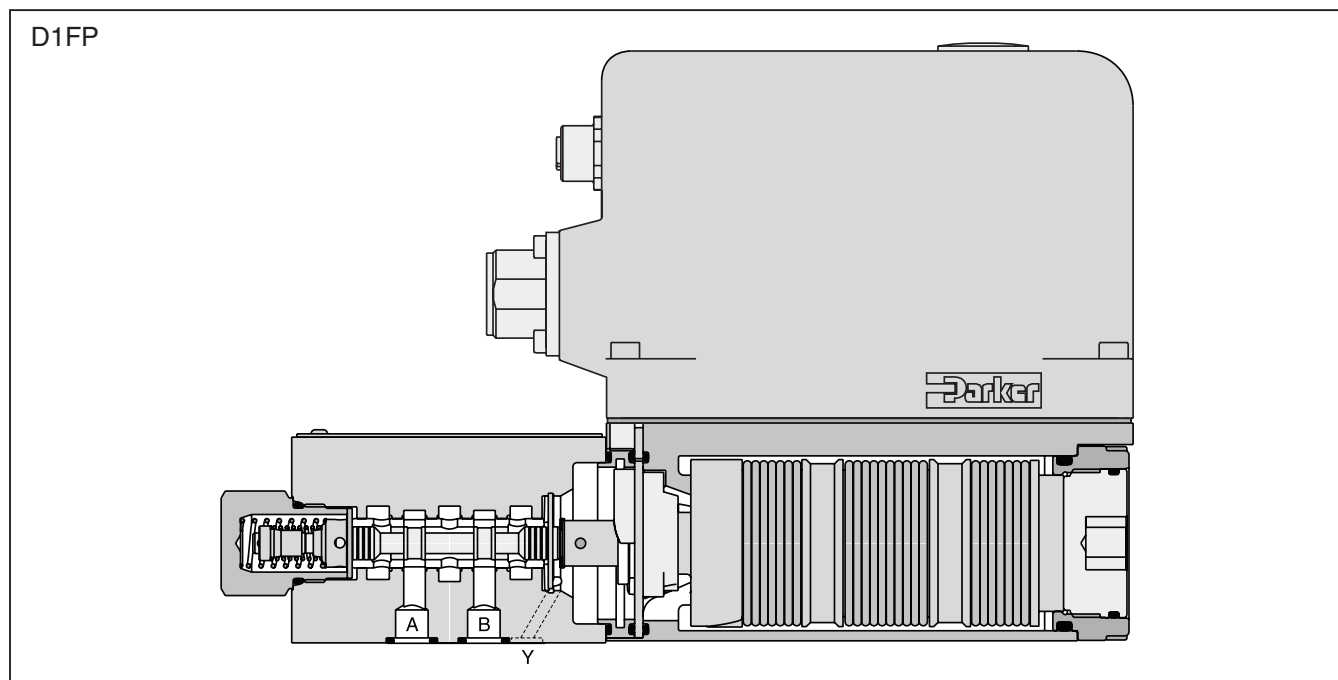
Driven by the patented VCD® actuator the D*FP reaches the frequency response of real servovalves. At power-down the spool moves in a defined position. All common input signals are available.

Features

- Freely configurable supervising control circuit
- Analog sensor input
- Onboard electronics
- Real servovalve dynamics (-3 dB / 350 Hz at ±5% input signal)
- Maximum tank pressure D1FP: 350 Bar (5076 PSI), D3FP 250 Bar (3626 PSI) with external drain port Y
- Defined spool positioning at power-down – optional (for overlapped spools)



Application example



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

A01_Cat2550.indd, ddp, 06/21

A

D

Directional Control Valve

1

Size
DIN NG6
CETOP 3
NFPA D03

F

Proportional Control

P

VCD

Spool Type

Spool Position on Power Down ¹⁾

9

Y-Port Plugged ⁵⁾

Seal

Input Signal

Options

D

Freely Config. Supervising Control Circuit

Design Series
NOTE:
Not required when ordering.

Code	Spool Type	Flow LPM (GPM) at Δp 35 Bar (508 PSI) per metering edge
Zerolap		
E50B		3 (0.8)
E50C		6 (1.6)
E50F		12 (3.2)
E50G		16 (4.2)
E50H		25 (6.6)
E50M		40 (10.6)
B60C	$Q_B = Q_A / 2$ 	6 (1.6) / 3 (0.8)
B60F		12 (3.2) / 6 (1.6)
B60G		16 (4.2) / 8 (2.1)
B60H		25 (6.6) / 12.5 (3.3)
B60M		40 (10.6) / 20 (5.3)
Underlap		
E55B		3 (0.8)
E55C		6 (1.6)
E55F		12 (3.2)
E55G		16 (4.2)
E55H		25 (6.6)
E55M		40 (10.6)
Overlap		
E01B		3 (0.8)
E01C		6 (1.6)
E01F		12 (3.2)
E01G		16 (4.2)
E01H		25 (6.6)
E01M		40 (10.6)
B31C	$Q_B = Q_A / 2$ 	6 (1.6) / 3 (0.8)
B31F		12 (3.2) / 6 (1.6)
B31G		16 (4.2) / 8 (2.1)
B31H		25 (6.6) / 12.5 (3.3)
B31M		40 (10.6) / 20 (5.3)
E02B		3 (0.8)
E02C		6 (1.6)
E02F		12 (3.2)
E02G		16 (4.2)
E02H		25 (6.6)
E02M		40 (10.6)
B32C	$Q_B = Q_A / 2$ 	6 (1.6) / 3 (0.8)
B32F		12 (3.2) / 6 (1.6)
B32G		16 (4.2) / 8 (2.1)
B32H		25 (6.6) / 12.5 (3.3)
B32M		40 (10.6) / 20 (5.3)

Please order plugs separately. See Accessories.

Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC Fluid

Code	Description
0	6 + PE acc. EN175201-804
5	11 + PE acc. EN175201-804
7	6 + PE + Enable

Code	Spool Position on Power Down
A ²⁾	
B ²⁾	
C ³⁾	
H ⁴⁾	
J ⁴⁾	

Code	Signal	Flow Direction
B	+/- 10V	0...+10V -> P-A
E	+/- 20mA	0...+20mA -> P-A
K	+/- 10V	0...+10V -> P-B
S	4...20mA	12...20mA -> P-A

Adapter plate for ISO 4401 to ISO 10372 size 04, ordering code HAP04WV06-1661.

Please order connector separately. See Accessories.
 Parametrizing cable OBE -> RS-232, item no. 40982923.

Notes:

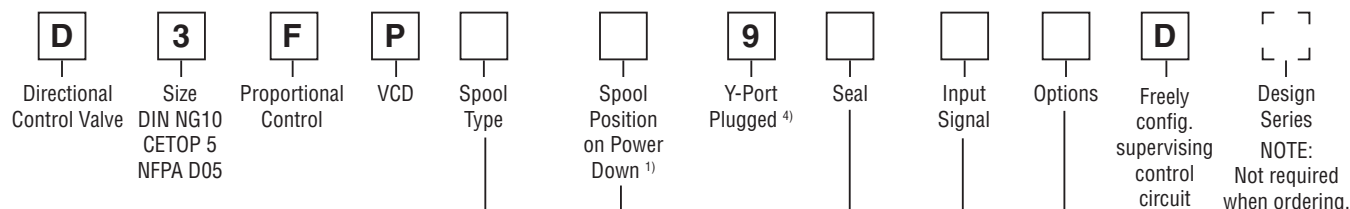
- 1) On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A -> T resp. B -> T with pressure drops above 120 Bar (1740 PSI) or contamination in the hydraulic fluid.
- 2) Approximately 10% opening, only zerolapped spools and underlap spools.
- 3) Only for overlapped spools.
- 4) Not for flow code M, 40 LPM (10.6 GPM).
- 5) Plug in the Y-port needs to be removed at tank pressure > 35 Bar (508 PSI).

Bolt Kit:

BK375 (4) M5x30

Weight:

D1FP*D 5.0 kg (11.0 lbs.)



A

Code	Spool Type	Flow LPM (GPM) at Δp 35 Bar (508 PSI) per metering edge
Zerolap		
E50P		50 (13.2)
E50Y		100 (26.4)
B60P	$Q_B = Q_A/2$ 	50 (13.2)
B60Y	$Q_B = Q_A/2$ 	100 (26.4)
Underlap approx. -0.5%		
E55P		50 (13.2)
E55Y		100 (26.4)
Overlap		
E01P E01Y		50 (13.2) 100 (26.4)
E02P E02Y		50 (13.2) 100 (26.4)
B31P B31Y	$Q_B = Q_A/2$ 	50 (13.2) / 25 (6.6) 100 (26.4) / 50 (13.2)
B32P B32Y	$Q_B = Q_A/2$ 	50 (13.2) / 25 (6.6) 100 (26.4) / 50 (13.2)

Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC Fluid

Code	Description
0	6 + PE acc. EN175201-804
5	11 + PE acc. EN175201-804
7	6 + PE + Enable

Code	Spool Position on Power Down
A ²⁾	
B ²⁾	
C ³⁾	

Code	Signal	Flow Direction
B	+/- 10V	0...+10V -> P-A
E	+/- 20mA	0...+20mA -> P-A
K	+/- 10V	0...+10V -> P-B
S	4...20mA	12...20mA -> P-A

For regenerative and hybrid function please refer to solutions with sandwich and adapter plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in Catalog HY11-3500/UK, chapter 12.

Please order connector separately. See Accessories.
 Parametrizing cable OBE -> RS-232, item no. 40982923.

Notes:

- 1) On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A → T resp. B → T with pressure drops above 120 Bar (1740 PSI) or contamination in the hydraulic fluid.
- 2) Approximately 10% opening, only zerolapped spools and underlap spools.
- 3) Only for overlapped spools.
- 4) Plug in the Y-port needs to be removed at tank pressure > 35 Bar (508 PSI).

Bolt Kit:

BK385 (4) M6x40

Weight:

D3FP*D 6.5 kg (14.3 lbs.)

A

General			
Design		Direct operated servo proportional DC valve	
Actuation		VCD® actuator	
Size		NG06 / CETOP03 / NFPA D03, NG10 / CETOP05 / NFPA D05	
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting Position		Unrestricted	
Ambient Temperature		[°C]	-20...+50; (-4°F...+122°F)
MTTF _D Value ¹⁾		[years]	150
Weight		[kg]	D1FP: 5.0 (11.0 lbs.); D3FP: 6.5 (14.3 lbs.)
Vibration Resistance		[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Hydraulic			
Maximum Operating Pressure		Ports P, A, B 350 Bar (5075 PSI) Port Y 35 Bar (508 PSI) ²⁾ Port T 35 Bar (508 PSI) for internal drain, D1FP: 350 Bar (5076 PSI) for external drain, D3FP: 250 Bar (3626 PSI)	
Fluid		Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature		[°C]	-20...+60; (-4°F...+140°F); Nitrile -25...+60 (-13°F...+140°F)
Viscosity	Permitted	[cSt] / [mm²/s]	20...400 (93...1853 SSU)
	Recommended	[cSt] / [mm²/s]	30...80 (139...371 SSU)
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Nominal Flow at Δp=35 Bar (508 PSI) per Control Edge ³⁾		[LPM]	D1FP: 3 (0.8 GPM) / 6 (1.6 GPM) / 12 (3.2 GPM) / 16 (4.2 GPM) / 25 (6.6 GPM) / 40 (10.6 GPM) D3FP: 50 (13.2 GPM) / 100 (26.4 GPM)
Flow Maximum at Δp=350 Bar (5075 PSI) over two control edges		[LPM]	D1FP: 90 (23.8 GPM) D3FP: 150 (39.6 GPM)
Leakage at 100 Bar (1450 PSI)		[ml/min]	<400 (zerolapped spool); <50 (D1FP overlap spool); <100 (D3FP overlap spool)
Opening Point		[°]	D1FP: Set to 23 command signal (see flow characteristics) D3FP: Set to 19 command signal (see flow characteristics)
Static / Dynamic			
Step Response at 100% Step ⁴⁾		[ms]	D1FP: <3.5; D3FP: <6)
Frequency Response		[Hz]	D1FP: 350 (amplitude ratio -3dB), 350 (phase lag -90°)
(±5% signal) ⁴⁾		[Hz]	D3FP: 200 (amplitude ratio -3 dB), 200 (phase lag -90°)
Hysteresis		[%]	<0.05
Sensitivity		[%]	<0.03
Temperature Drift		[%/K]	<0.025
Electrical			
Duty Ratio		[%]	100
Protection Class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)	
Supply Voltage/Ripple		[V]	DC 22 ... 30, electric shut-off at <19, ripple <5% eff., surge free
Current Consumption Maximum		[A]	3.5
Pre-Fusing		[A]	4.0 medium lag
Input Signal			
Code B, (K)	Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A (P->B)
	Impedance	[kOhm]	100
Code E	Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A
	Impedance	[Ohm]	<250
Code S	Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A
			<3.6 mA = disable, >3.8 mA = according to NAMUR NE43
	Impedance	[Ohm]	<250
Differential Input Maximum			
Code 0 / 7		[V]	30 for terminal D and E against PE (terminal G)
Code 5		[V]	30 for terminal 4 and 5 against PE (terminal ↓)
Enable Signal (Only Code 5 / 7)		[V]	5...30, Ri = >8 kOhm
Diagnostic Signal		[V]	+10...0...-10 / +12.5 error detection, rated max. 5mA
EMC		EN61000-6-2 / EN61000-6-4	
Electrical Connection		Code 0/7	6 + PE acc. EN 175201-804
		Code 5	11 + PE acc. EN 175201-804
Wiring Minimum			
Code 0 / 7		[mm²]	7x1.0 (AWG 16) overall braid shield
Code 5		[mm²]	8x1.0 (AWG 16) overall braid shield
Wiring Length Maximum		[m]	50 (164 ft.)

¹⁾ If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

²⁾ For applications with p_T > 35 Bar (508 PSI) [max. 350 Bar (5076 PSI)] the Y-port has to be connected and the plug in the Y-port has to be removed.

³⁾ Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

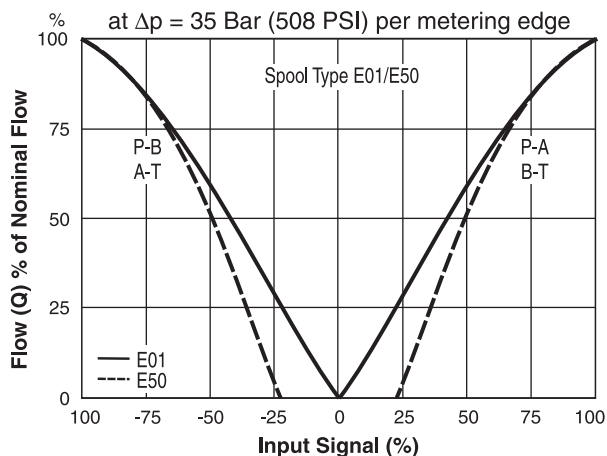
⁴⁾ Measured with load 100 Bar (1450 PSI) pressure drop/two control edges.

Flow Characteristics

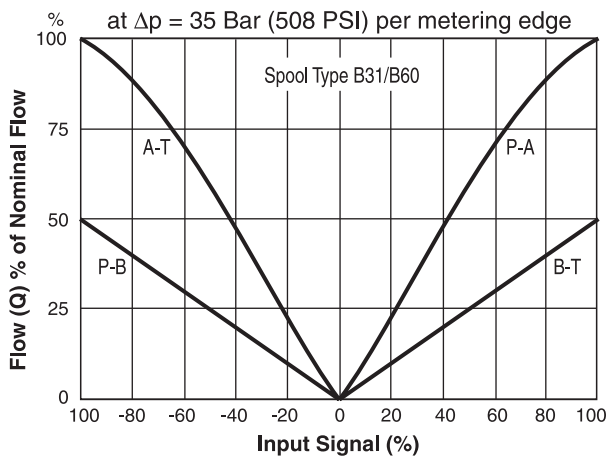
(Overlapped spool set to opening point 23%) at $\Delta p = 35$ Bar (508 PSI) per metering edge

A

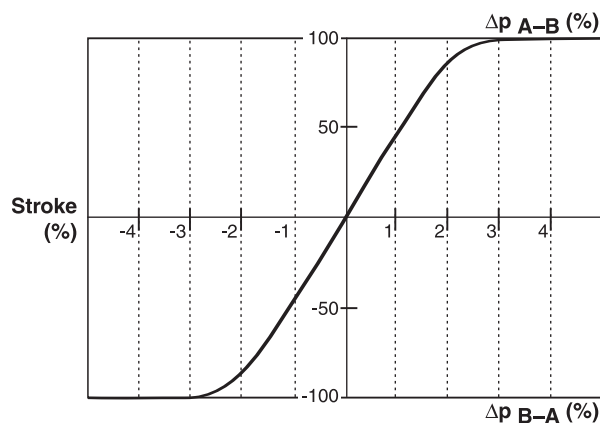
Spool Type E01/E50



Spool Type B31/B60

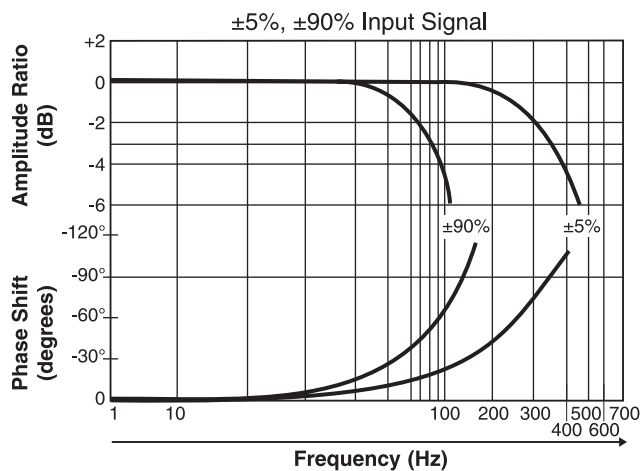


Pressure Gain



Frequency Response

$\pm 5\%$ command signal
 $\pm 90\%$ command signal



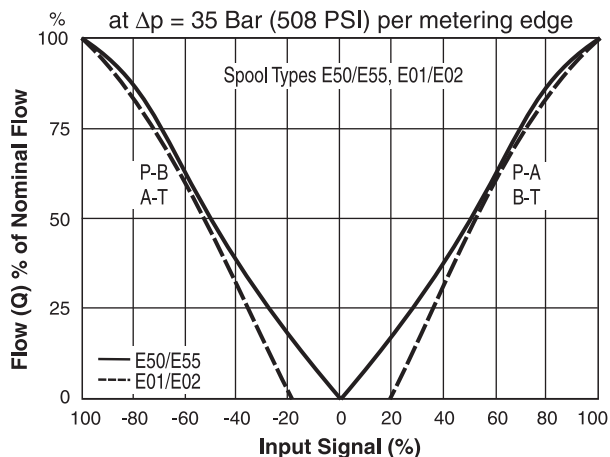
All performance curves measured with HLP46 at 50°C (122°F).

Flow Characteristics

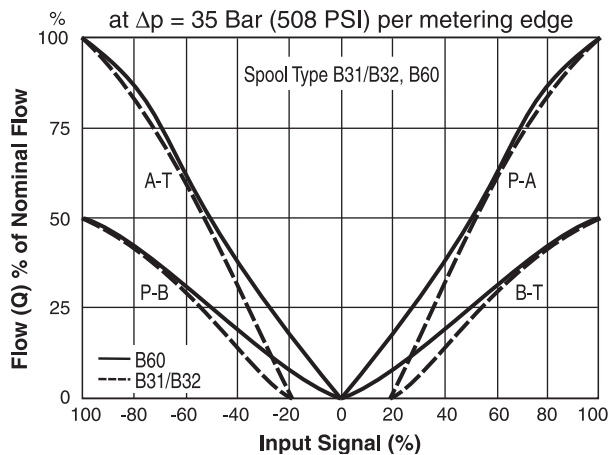
(Overlapped spool set to opening point 19%) at $\Delta p = 35$ Bar (508 PSI) per metering edge

A

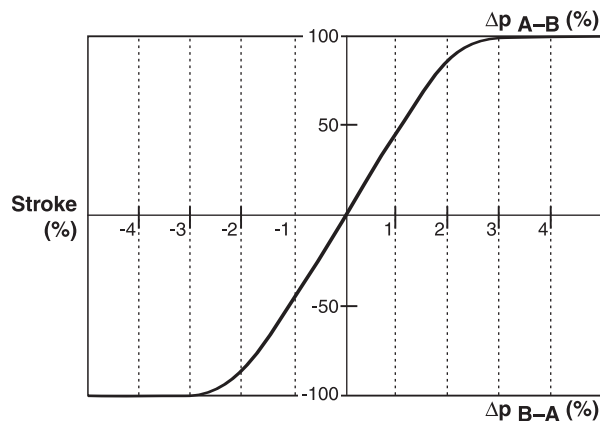
Spool Type E50/E55, E01/E02



Spool Type B31/B32, B60

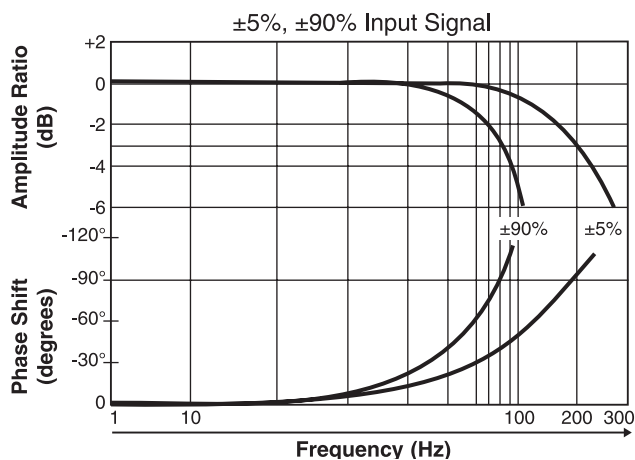


Pressure Gain



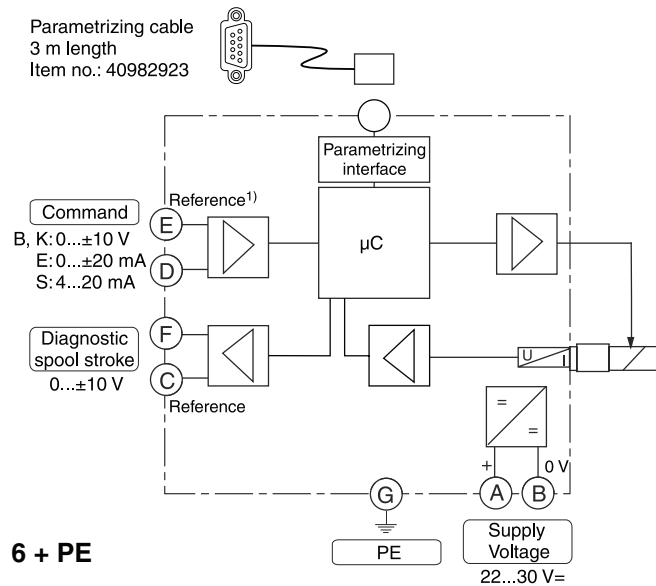
Frequency Response

$\pm 5\%$ command signal
 $\pm 90\%$ command signal

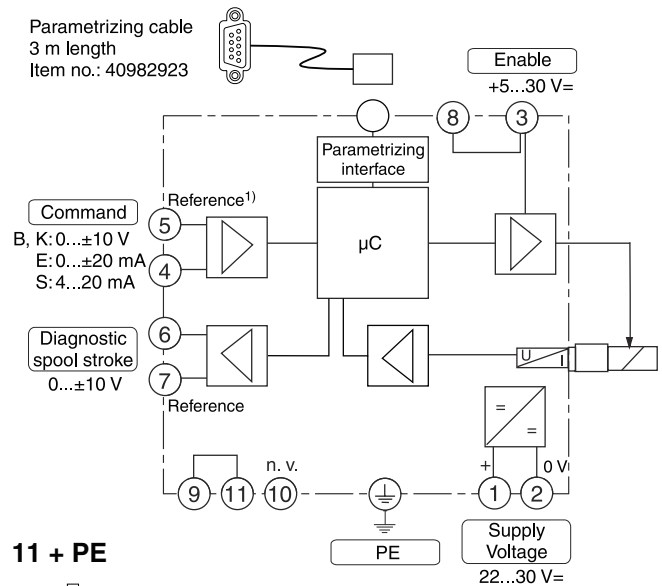


All performance curves measured with HLP46 at 50°C (122°F).

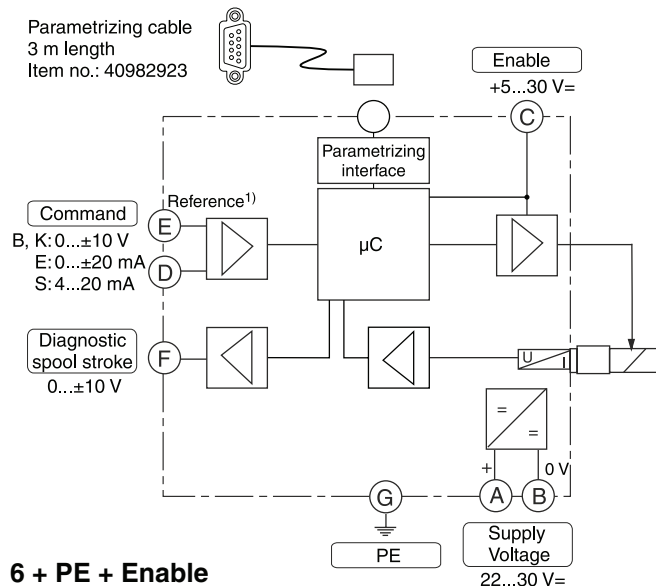
Code 0



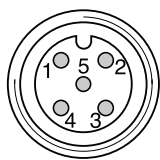
Code 5



Code 7



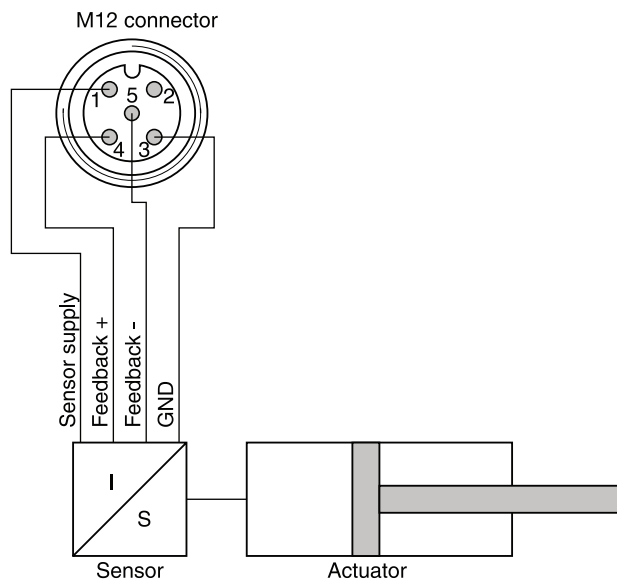
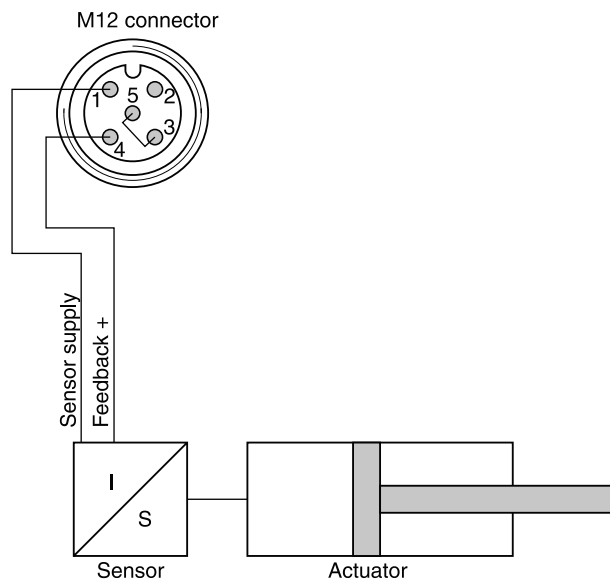
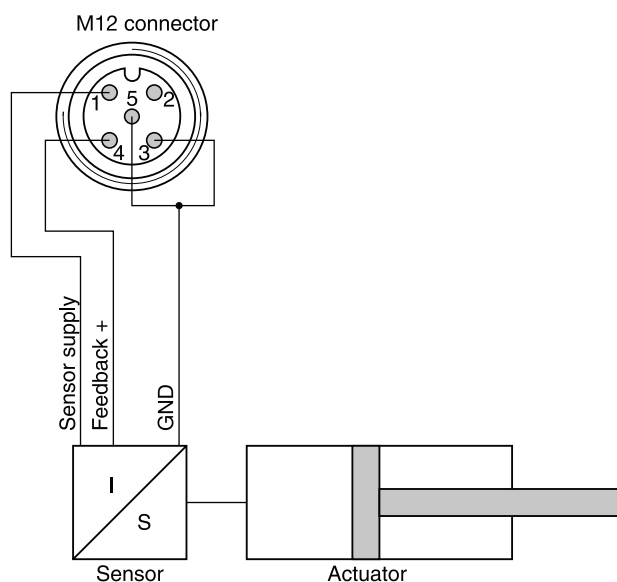
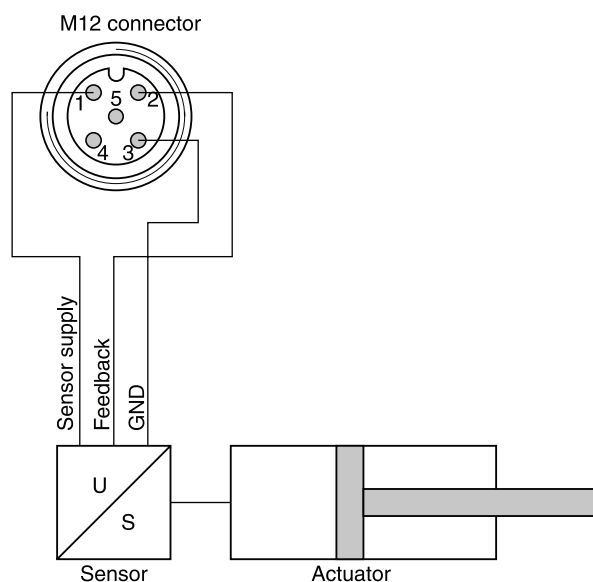
¹⁾ Do not connect with supply voltage zero.

Pin Assignment Analog Sensor, M12 Socket**A**

- 1 U_s
- 2 $\pm 10\text{ V}$
- 3 GND
- 4 4...20 mA+
- 5 4...20 mA-

Examples Position Control

Current 4...12...20 mA contacts at the sensor input

Wiring Diagram Four-Wire**Wiring Diagram Two-Wire****Wiring Diagram Three-Wire****Voltage $\pm 10\text{ V}$ (1...10 V)**

The earth connection is achieved via the shielding.

ProPxD Interface Program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the simple user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

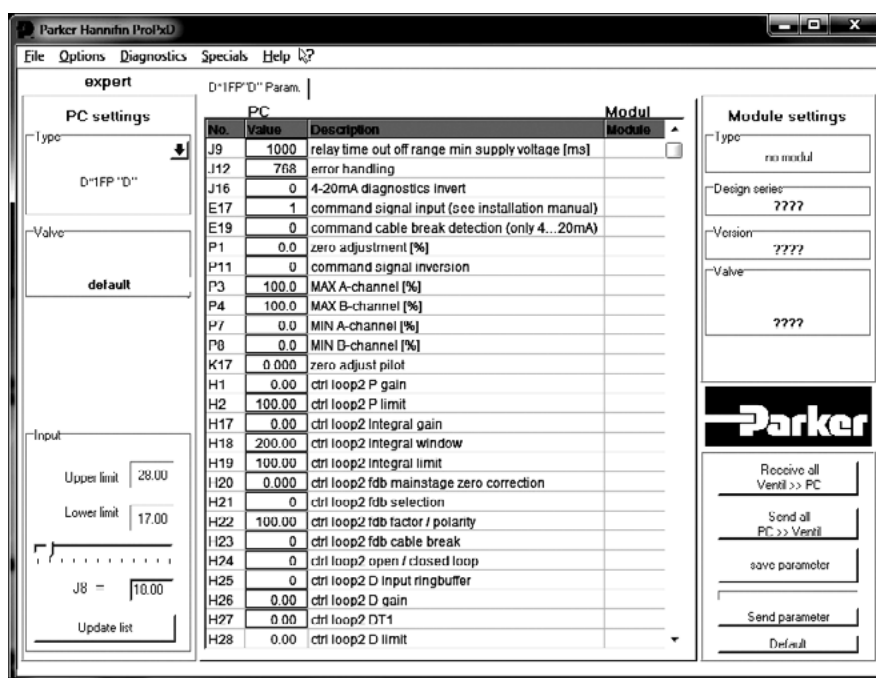
Simple to use interface program. Download free of charge www.parker.com/propxd

Features

- Easy editing of all parameters — configuration of the controller
- Storage and loading of customized parameter adjustments
- Executable with all Windows® operating systems from Windows® XP upwards
- Simple communication between PC and valve electronics via serial interface RS-232

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

The parametrizing cable may be ordered under item no. 40982923.

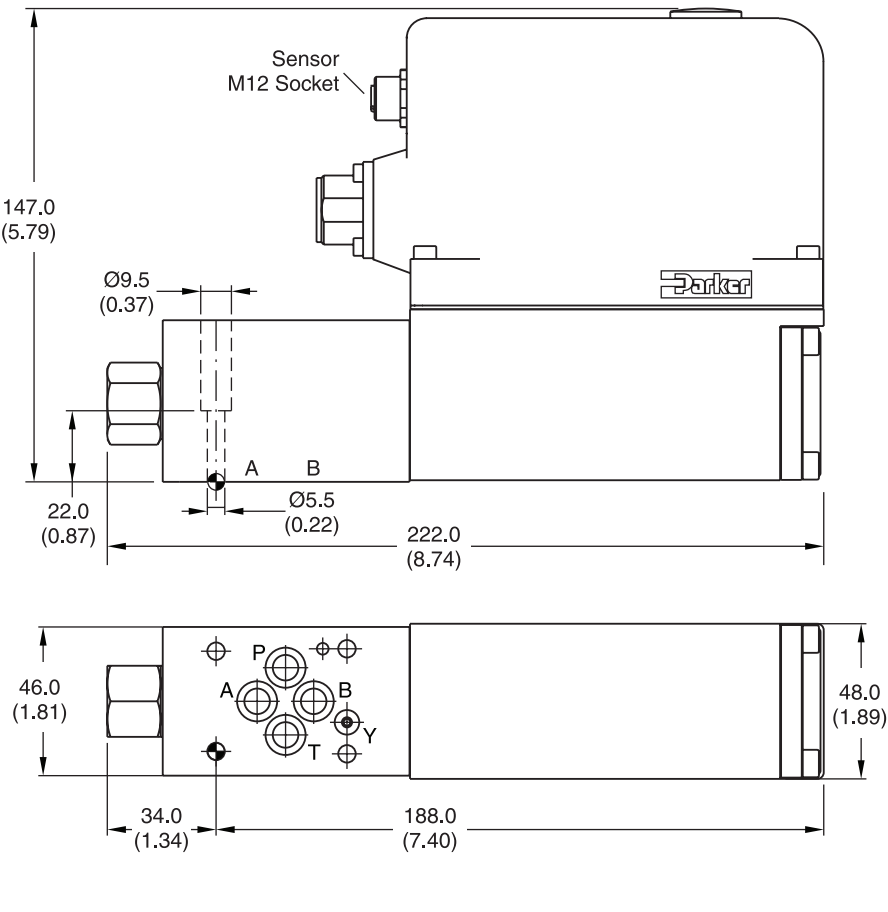


The parametrizing cable may be ordered under item no. 40982923.

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

A

D1FP*D

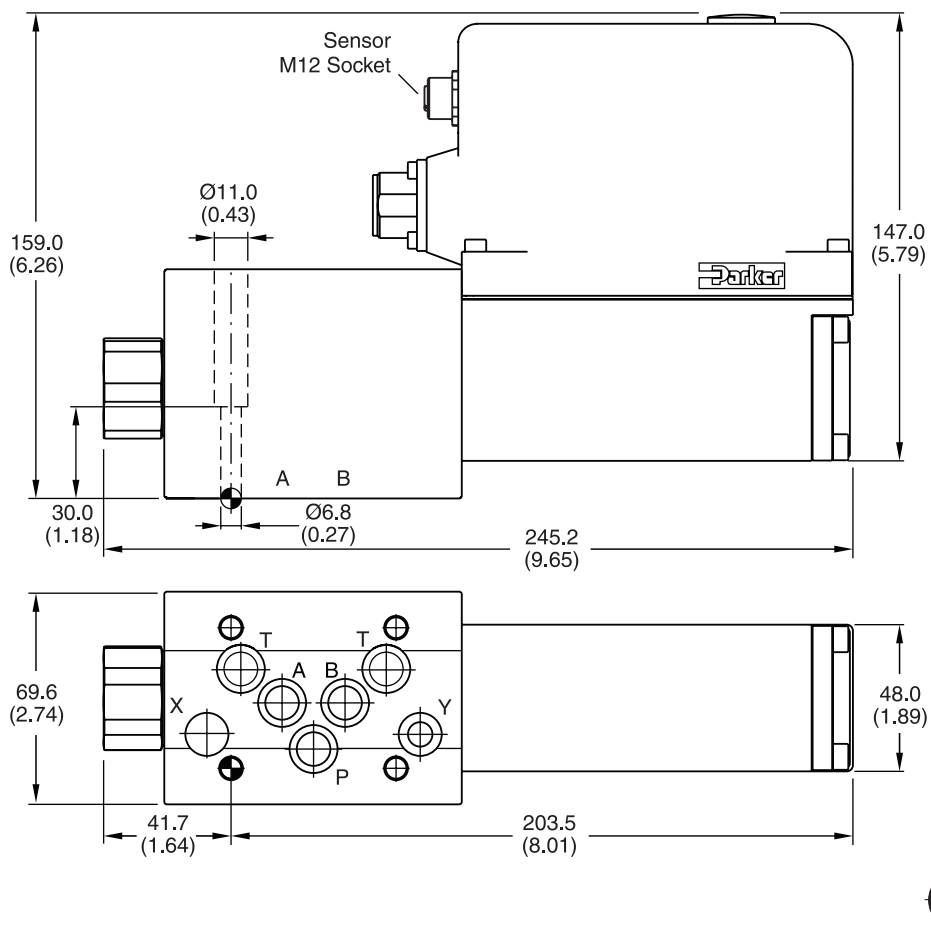


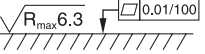
Surface Finish	Kit	Kit	Kit	Seal Kit
	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FP Fluorocarbon: SK-D1FP-V for HFC Fluid: SK-D1FP-H

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

D3FP*D

A



Surface Finish	 Kit	 Kit	 Kit	Seal  Kit
	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D3FP Fluorocarbon: SK-D3FP-V for HFC Fluid: SK-D3FP-H

A

General Description

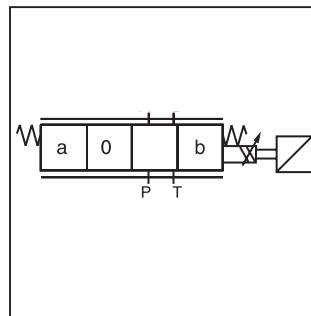
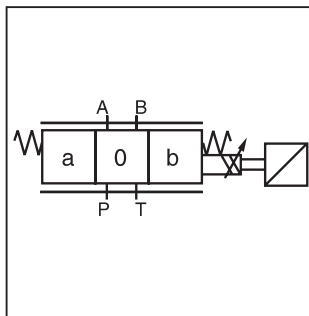
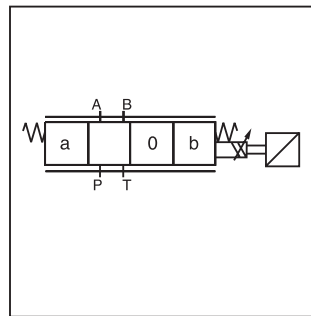
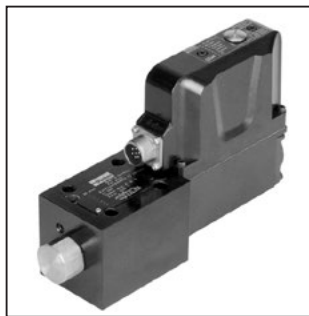
Series D3FP direct operated control NG10 (CETOP 5) valve features extremely high dynamics combined with maximum flow. It is used for high accuracy positioning of a hydraulic axis, and for controlling force and velocity.

Driven by the new patented VCD® actuator, the D3FP reaches the frequency response of servovalves.

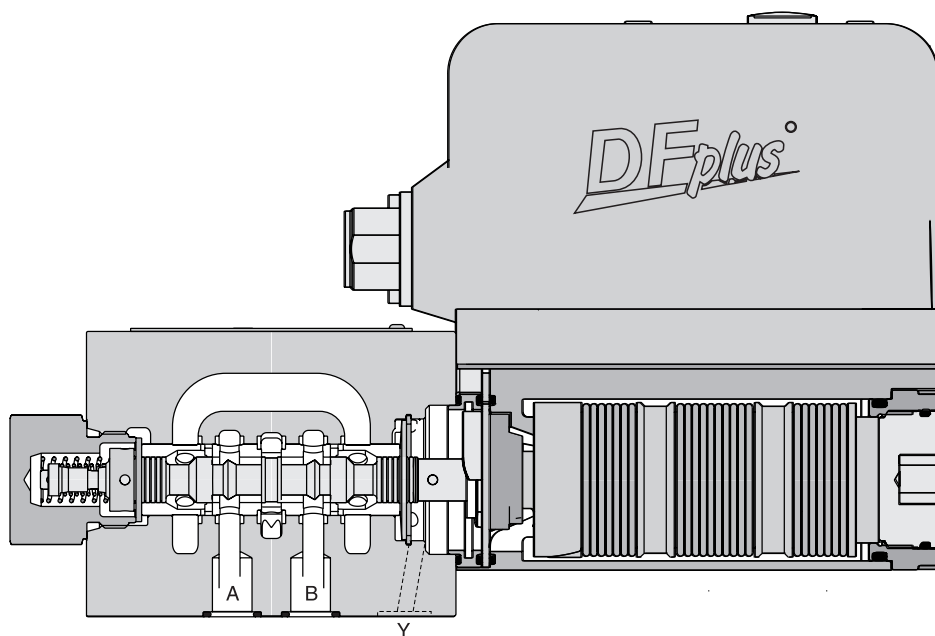
At power-down the spool moves in a defined position. All common input signals are available.

Features

- Extremely high dynamics
- Maximum tank pressure 250 Bar (3600 PSI) with external drain Y-port
- Defined spool positioning at power down
- Onboard electronics
- Spool/Sleeve design



CE



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

A01_Cat2550.indd, ddp, 06/21

D Directional Control Valve
3 Size DIN NG10 CETOP 5 NFPA D05
F Proportional Control
P VCD
 Spool Type

Spool Position on Power Down ¹⁾
9 Y-Port Plugged ⁴⁾
 Seal

Input Signal
 Options
0 Spool/Sleeve Design
 Design Series
 NOTE: Not required when ordering.

A

Code	Spool	Flow LPM (GPM) at Δp 35 Bar (508 PSI) per metering edge
Zerolap		
E50Y		100 (26.5)
E50P		50 (13.2)
B60Y	$Q_B = Q_A / 2$ 	100 (26.5)
B60P	$Q_B = Q_A / 2$ 	50 (13.2)
Underlap approximately -0.5%		
E55Y		100 (26.5)
E55P		50 (13.2)
Overlap 18%		
E01Y E01P		100 (26.5) 50 (13.2)
E02Y E02P		100 (26.5) 50 (13.2)
B31Y B31P		100 / 50 (26.5 / 13.2) 50 / 25 (13.2 / 6.6)
B32Y B32P		100 / 50 (26.5 / 13.2) 50 / 25 (13.2 / 6.6)

Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC Fluid

Code	Description
0	6 + PE acc. EN175201-804
5	11 + PE acc. EN175201-804
7	6 + PE + Enable

Code	Spool Position on Power Down
A ²⁾	
B ²⁾	
C ³⁾	

Code	Signal	Flow Direction ⁵⁾
B	+/- 10V	0...+10V -> P-A
E	+/- 20mA	0...+20mA -> P-A
S	4...20mA	12...20mA -> P-A

- ¹⁾ On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A→ T resp. B→ T with pressure drops above 120 Bar (1740 PSI) or contamination in the hydraulic fluid.
- ²⁾ Approximately 10% opening, only available with zerolap spools and underlap spools.
- ³⁾ Only available with overlap spools.
- ⁴⁾ Needs to be removed at tank pressure >35 Bar (507.5 PSI).
- ⁵⁾ Flow direction P→ A with Pin D > Pin E.

Bolt Kit:

BK98 (4) 1/4-20x1.62
 BK385 (4) M6x40

Weight: 6.5 kg (14.3 lbs.)

Please order plugs separately. See Accessories.

A

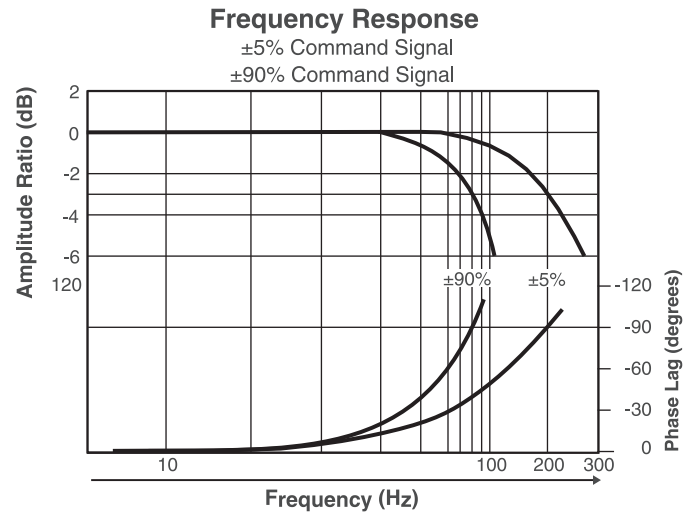
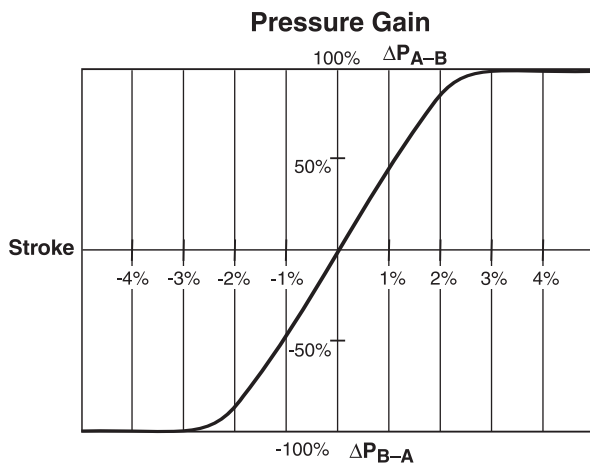
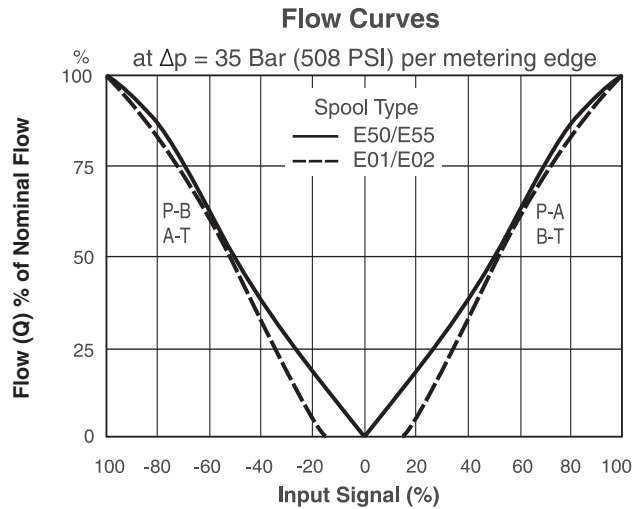
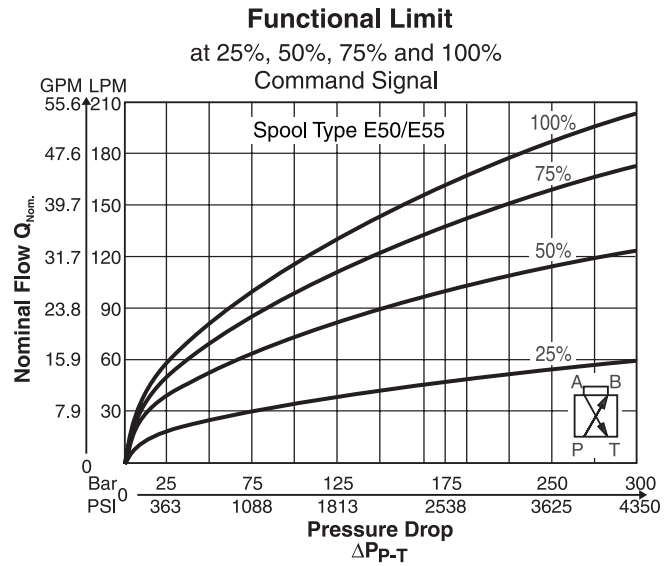
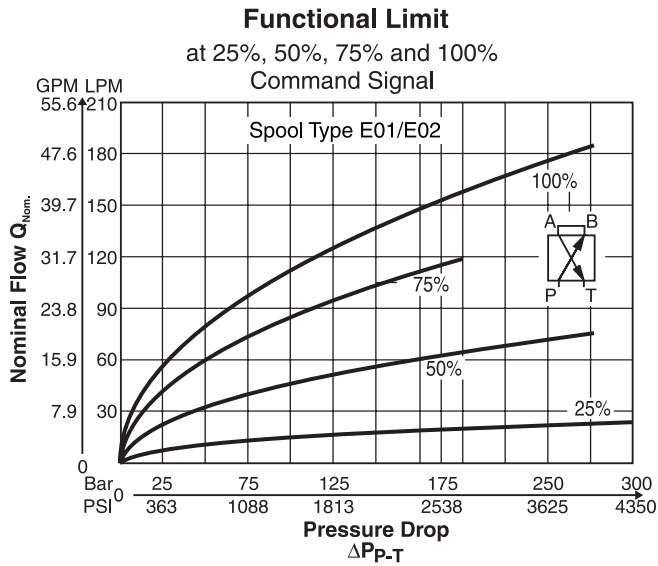
General			
Design		Direct operated proportional DC valve	
Actuation		VCD® actuator	
Size		NG10 / CETOP 5 / NFPA D05	
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting Position		Unrestricted	
Ambient Temperature		[°C]	-20...+50; (-4°F...+122°F)
MTTF _D Value		[years]	75
Vibration Resistance		[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Hydraulic			
Maximum Operating Pressure		Ports P, A, B 350 Bar (5075 PSI) Port T max. 250 Bar (3600 PSI), port Y max. 35 Bar (508 PSI) ¹⁾	
Fluid		Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature		[°C]	-20...+60; (-4°F...+140°F)
Viscosity			
Permitted	[cSt]	/	[mm²/s]
Recommended	[cSt]	/	[mm²/s]
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Nominal Flow at Δp=35 Bar (508 PSI) per Control Edge ²⁾		50 LPM (13.2 GPM) / 100 LPM (26.5 GPM)	
Flow Maximum		150 LPM (39.7 GPM)	
Leakage at 100 Bar (1450 PSI)		[ml/ min]	<400 (zerolap spool); <50 (overlap spool)
Static / Dynamic			
Step Response at 100% Step ³⁾		[ms]	<6
Frequency Response (±5% signal) ³⁾		[Hz]	350 (amplitude ratio -3dB), 350 (phase lag -90°)
Hysteresis		[%]	<0.05
Sensitivity		[%]	<0.03
Temperature Drift		[%/K]	<0.025
Electrical			
Duty Ratio		[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)	
Supply Voltage/Ripple		[V]	DC 22 ... 30, ripple <5% eff., surge free
Current Consumption Maximum		[A]	3.5
Pre-Fusing		[A]	4.0 medium lag
Input Signal			
Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A	
Impedance	[kOhm]	100	
Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A	
Impedance	[Ohm]	250	
Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A <3.6 mA = disable, >3.8 mA = according to NAMUR NE43	
Impedance	[Ohm]	250	
Differential Input Maximum			
Code 0	[V]	30 for terminal D and E against PE (terminal G)	
Code 5 / 7	[V]	30 for terminal 4 and 5 against PE (terminal ⊥)	
Voltage References:		Not a powered output Only for 10K Ohm pots	
Enable Signal (Only Code 5 / 7)		[V]	5...30, Ri = 9 kOhm
Diagnostic Signal		[V]	+10...0...-10 / +Ub, rated max. 5mA
EMC		EN61000-6-2 / EN61000-6-4	
Electrical Connection		Code 0 Code 5 Code 7	6 + PE acc. EN 175201-804 11 + PE acc. EN 175201-804 6 + PE + Enable
Wiring Minimum	Code 0 Code 5 Code 7	[mm²] [mm²] [mm²]	7x1.0 (AWG 18) overall braid shield 12x1.0 (AWG 20) overall braid shield 12x1.0 (AWG 18) overall braid shield
Wiring Length Maximum		[m]	50 (164 ft.)

¹⁾ For applications with pT>35 Bar (508 PSI) the Y-port plug must be removed and the Y-port connected to tank.

²⁾ Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$
 $\Delta p_{Nom.} \cdot \left(\frac{Q_x}{Q_{Nom.}} \right)^2 = \Delta p_x$

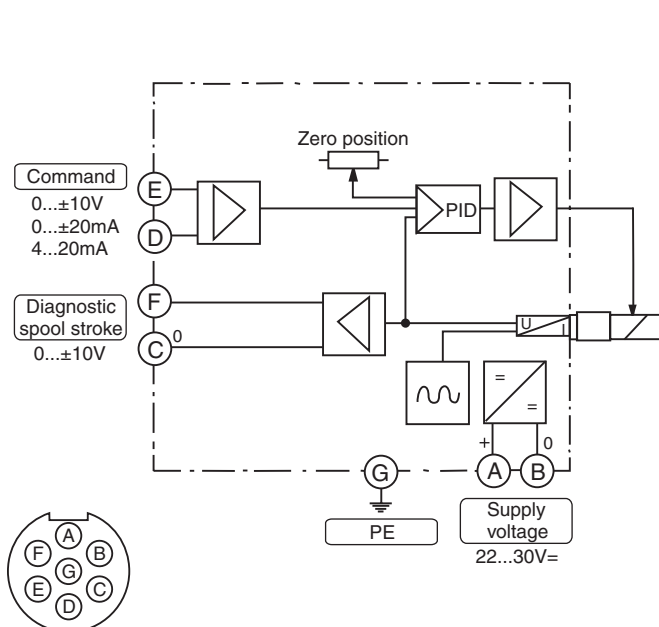
³⁾ Measured with load 100 Bar (1450 PSI) pressure drop/two control edges)

A

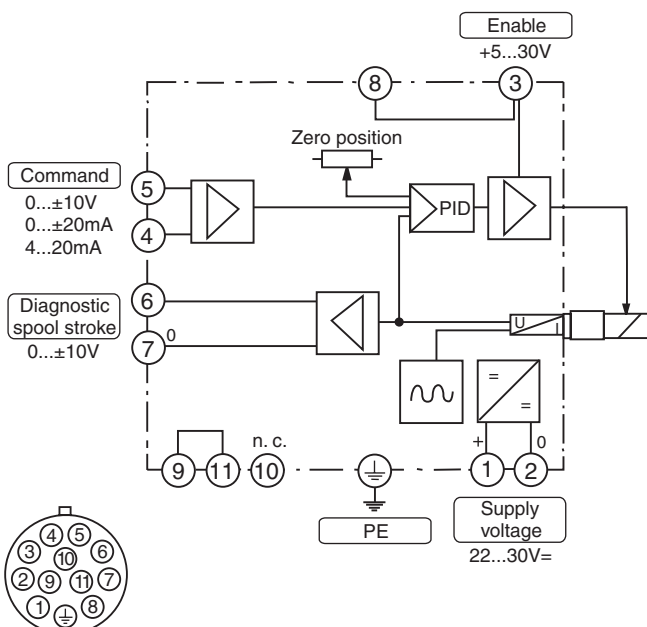


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Code 0
6 + PE acc. to EN 175201-804

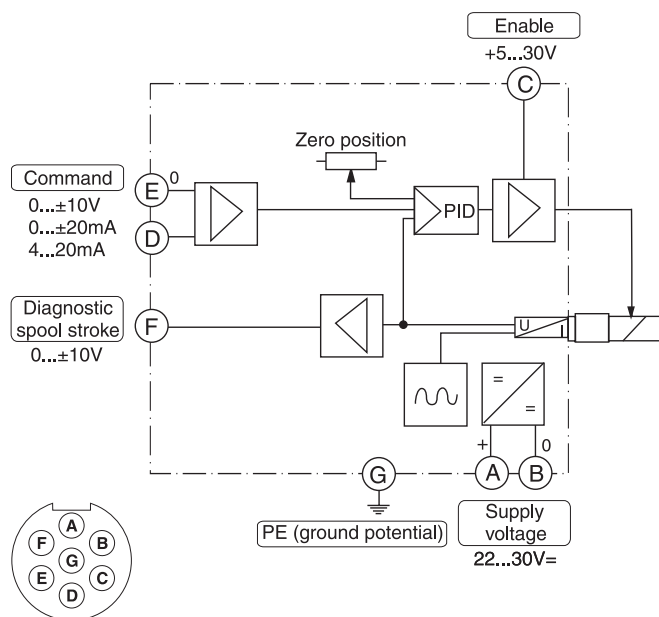


Code 5
11 + PE acc. to EN 175201-804

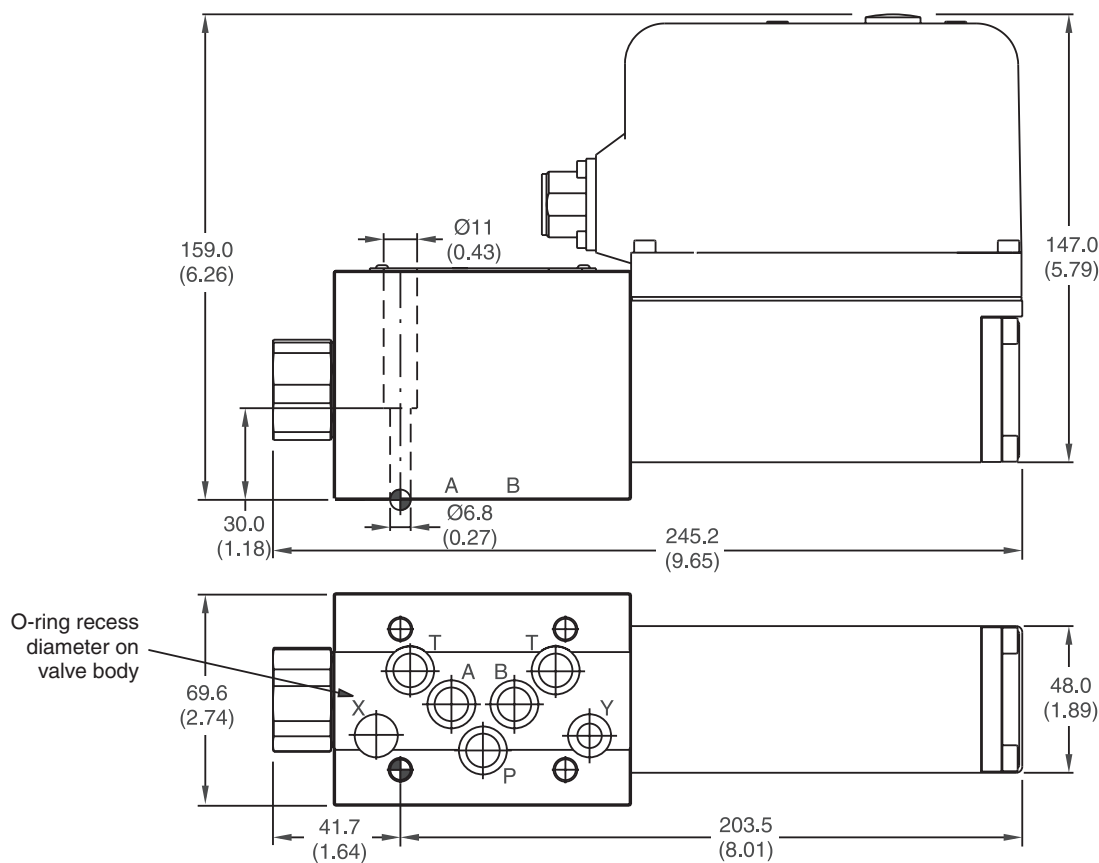


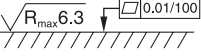
Note: When replacing another valve, verify Pin C is 0 V and not wired as an enable.

Code 7
6 + PE + Enable acc. to EN 175201-804



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



Surface Finish	 Kit			Seal  Kit
	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D3FP Fluorocarbon: SK-D3FP-V for HFC Fluid: SK-D3FP-H

A

General Description

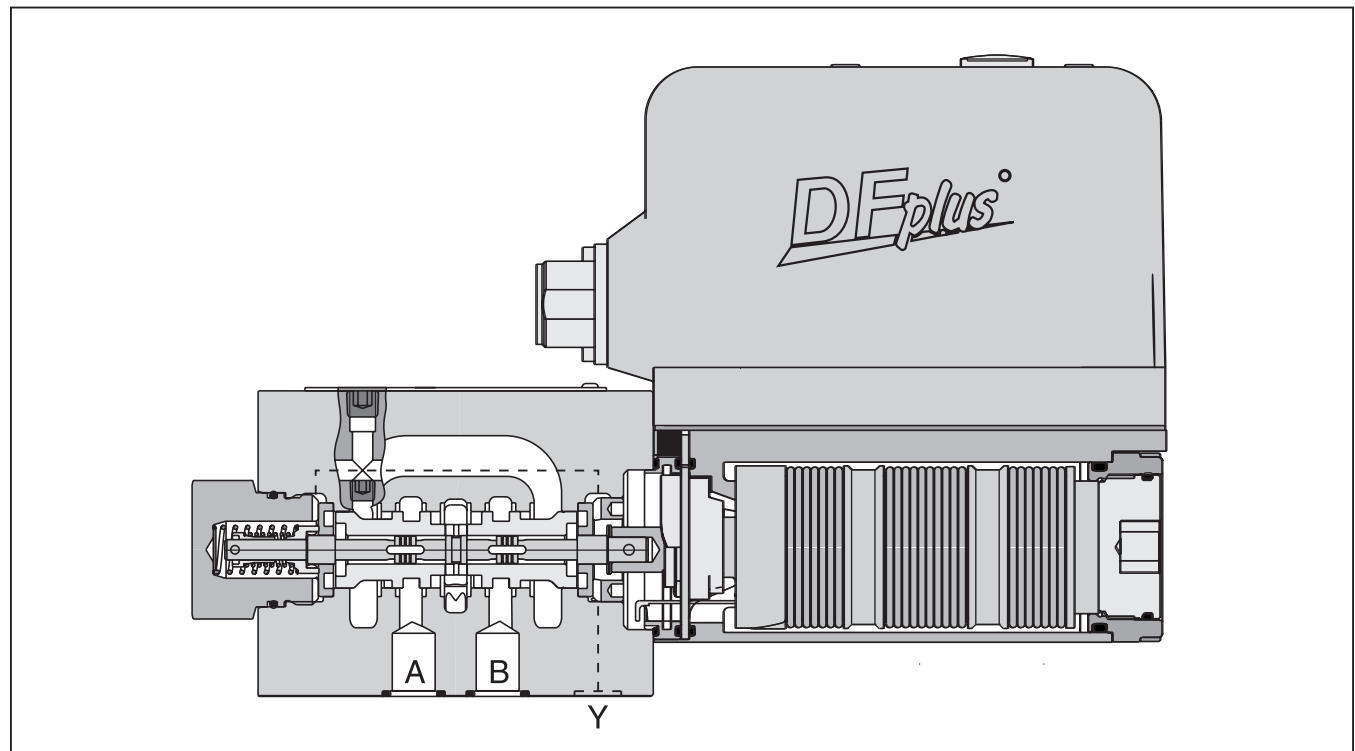
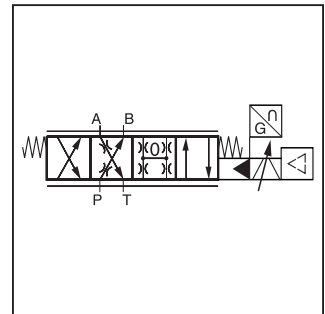
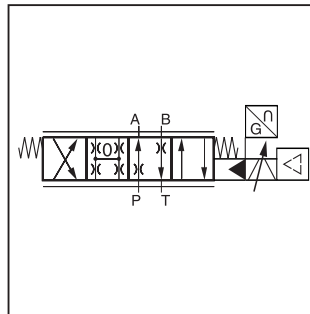
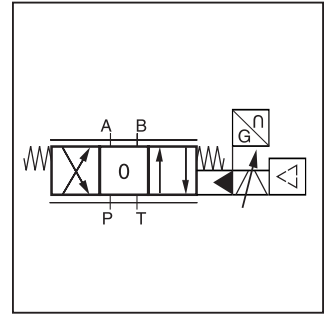
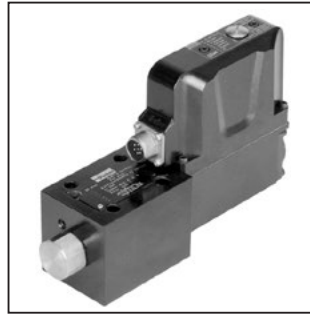
Series D30FP pilot operated control valve closes the gap between the direct operated D3FP valves and the conventional pilot operated D31FP valves.

Providing high flow capacity and practically no flow limits like D31FP in the envelope size of the D3FP.

The valve works with the hydraulic follower principle, with a moving sleeve as main spool.

Features

- Pilot operated with hydraulic follower sleeve
- No flow limit up to 350 bar through the valve
- Defined spool positioning at power down



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

A01_Cat2550.indd, ddp, 06/21

D	30	F	P						3	
Directional Control Valve	Size DIN NG10 CETOP 5 NFFA D05	Proportional Control	VCD	Spool Type	Spool Position on Power Down	Pilot Connection	Seal	Input Signal	Options	Spool/Sleeve Design
										Design Series NOTE: Not required when ordering.

Code	Spool	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge
Zerolap		
E50U		80 (21.2)
B60U		80 (21.2)
Overlap 18%		
E01U		80 (21.2)
E02U		80 (21.2)
B31U		80 (21.2)
B32U		80 (21.2)

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
0	6 + PE acc. EN175201-804
5	11 + PE acc. EN175201-804
7	6 + PE + Enable

Code	Inlet	Dain
1 ¹⁾	Internal	External
4	Internal	Internal

¹⁾ For tank pressure >35 Bar (508 PSI).

Code	Signal	Flow Direction ⁴⁾
B	+/- 10V	0...+10V -> P-A
E	+/- 20mA	0...+20mA -> P-A
S	4...20mA	12...20mA -> P-A

⁴⁾ Flow direction P → A with Pin D > Pin E.

Code	Spool Position on Power Down
A ²⁾	
B ²⁾	
C ³⁾	

²⁾ Approximately 10% opening, only available with zerolap spools and underlap spools.

³⁾ Only available with overlap spools.

Please order plugs separately. See Accessories.

Bolt Kit:

BK98 (4) 1/4-20x1.62
BK385 (4) M6x40

Weight: 6.5 kg (14.3 lbs.)

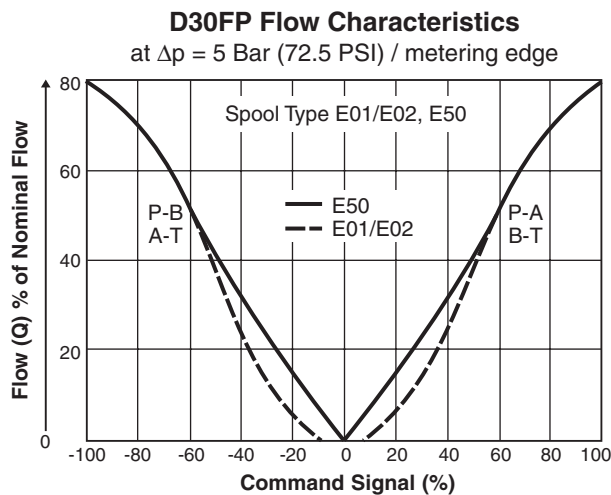
A

General			
Design		Pilot operated proportional DC valve	
Actuation		VCD® actuator	
Size		NG10 / CETOP 5 / NFPA D05	
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting Position		Unrestricted	
Ambient Temperature		[°C]	-20...+50; (-4°F...+122°F)
MTTF _p Value		[years]	50
Vibration Resistance		[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Hydraulic			
Maximum Operating Pressure		Ports P, A, B 350 Bar (5075 PSI) Port T 35 Bar (508 PSI) for internal drain, 250 Bar (3600 PSI) for external drain Port Y 35 Bar (508 PSI)	
Fluid		Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature		[°C]	-20...+60; (-4°F...+140°F)
Viscosity			
Permitted		[cSt] / [mm²/s]	20...380 (93...1761 SSU)
Recommended		[cSt] / [mm²/s]	30...80 (139...371 SSU)
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Nominal Flow at Δp=5 Bar (72.5 PSI) per Control Edge ¹⁾		80 LPM (21.2 GPM)	
Flow Maximum		250 LPM (66.1 GPM)	
Leakage at 100 Bar (1450 PSI)		[ml/min]	<1800 (zerolap spool); <1000 (overlap spool)
Pilot Supply Pressure		5 Bar (72.5 PSI) greater than the tank line pressure	
Static / Dynamic			
Step Response at 100% Step ²⁾		[ms]	<7
Frequency Response (±5% signal) ²⁾		[Hz]	120 (amplitude ratio -3dB), 120 (phase lag -90°)
Hysteresis		[%]	<0.05
Sensitivity		[%]	<0.03
Temperature Drift		[%/K]	<0.025
Electrical			
Duty Ratio		[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)	
Supply Voltage/Ripple		[V]	DC 22 ... 30, ripple <5% eff., surge free
Current Consumption Maximum		[A]	3.5
Pre-Fusing		[A]	4.0 medium lag
Input Signal	Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A
	Impedance	[kOhm]	100
	Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A
	Impedance	[Ohm]	250
	Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A
	Impedance	[Ohm]	<3.6 mA = disable, >3.8 mA = according to NAMUR NE43
			250
Differential Input Maximum			
	Code 0	[V]	30 for terminal D and E against PE (terminal G)
	Code 5 / 7	[V]	30 for terminal 4 and 5 against PE (terminal ⊥)
Enable Signal (Only Code 5 / 7)		[V]	5...30, Ri = 9 kOhm
Diagnostic Signal		[V]	+10...0...-10 / +Ub, rated max. 5mA
EMC		EN 50081-2 / EN50082-2	
Electrical Connection		Code 0 Code 5 Code 7	6 + PE acc. EN 175201-804 11 + PE acc. EN 175201-804 6 + PE + Enable
Wiring Minimum	Code 0	[mm²]	7 x 1.0 (AWG 18) overall braid shield
	Code 5	[mm²]	12 x 1.0 (AWG 20) overall braid shield
	Code 7	[mm²]	12 x 1.0 (AWG 18) overall braid shield
Wiring Length Maximum		[m]	50 (164 ft.)

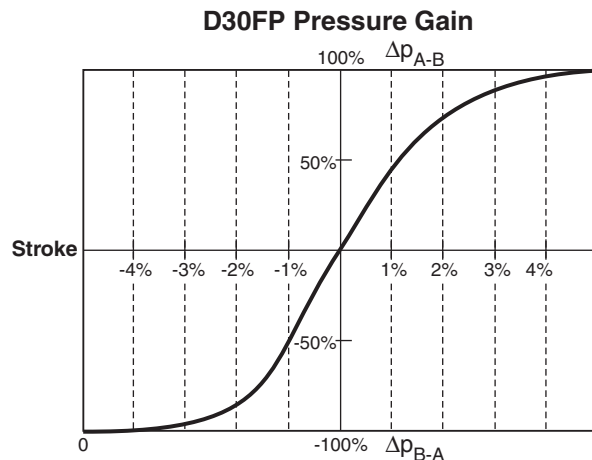
1) Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

2) Measured with load (100 Bar (1450 PSI) pressure drop/two control edges)

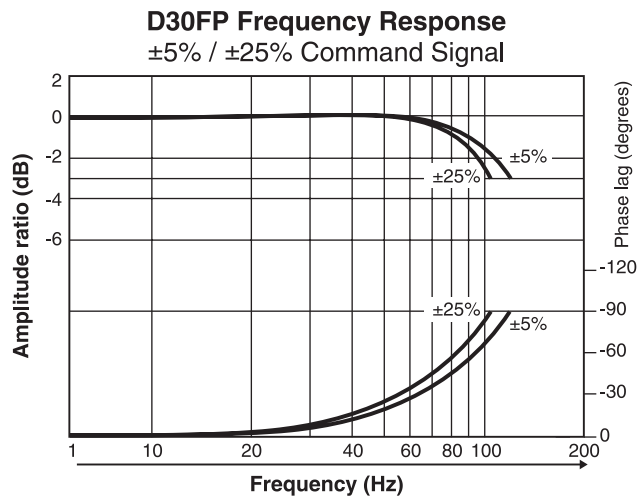
Flow



Pressure Gain



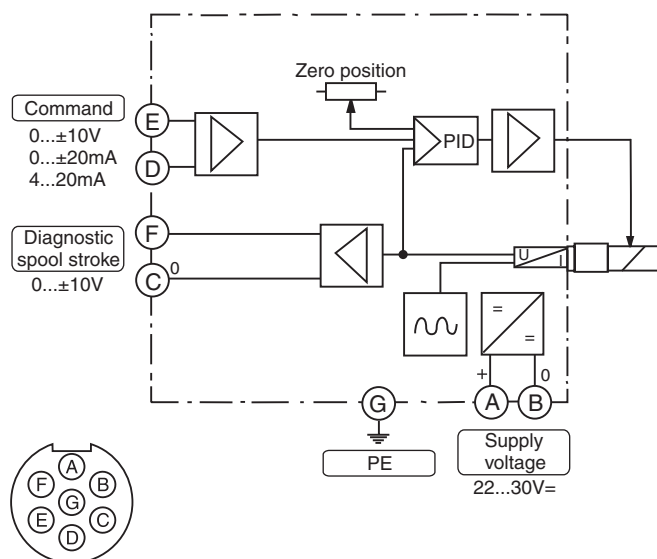
Frequency Response



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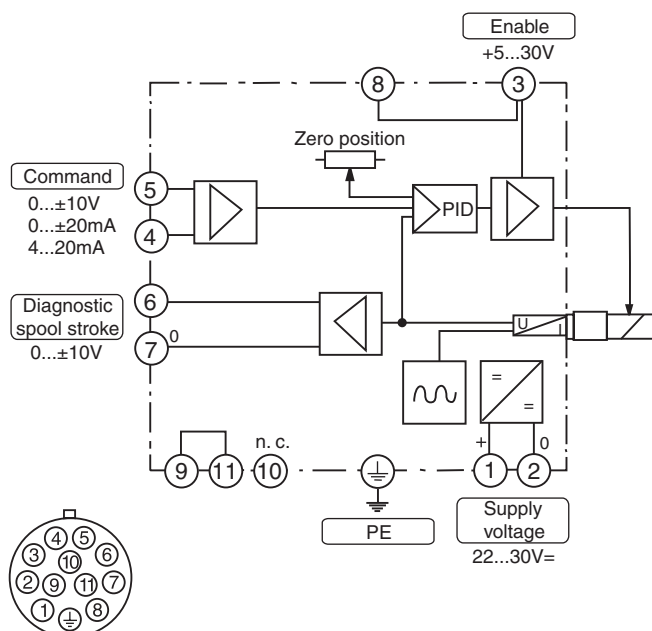
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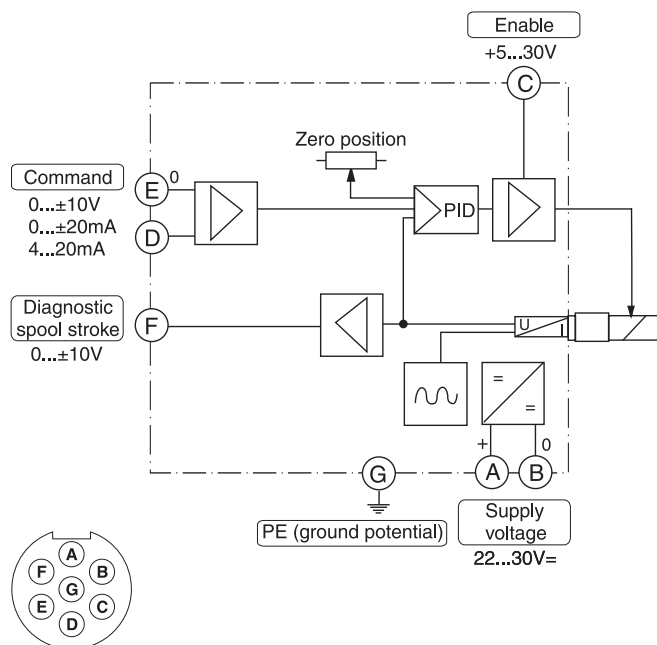
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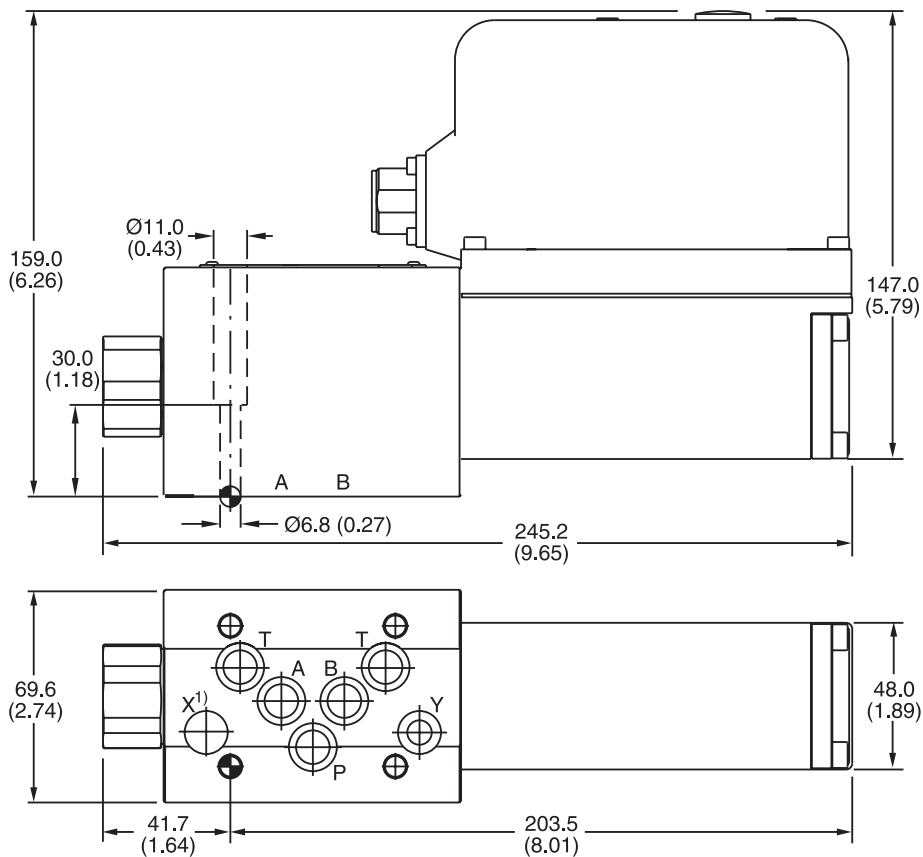


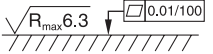
Code 7

6 + PE + Enable acc. to EN 175201-804



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



Surface Finish	 Kit	 Kit		Seal  Kit
	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D3FP Fluorocarbon: SK-D3FP-V

General Description

A

Series D*1FP pilot operated servo proportional valves transfer the advantages of the Parker patented Voice Coil Drive (VCD®) to larger frame sizes for high flow rates. The high dynamic / high precision drive of the pilot valve allows the optimum control of the main spool and results in servo performance of the complete valve.

Series D*1FP is available in 5 sizes:

D31FP NG10 (CETOP 5)

D41FP NG16 (CETOP 7)

D91FP NG25 (CETOP 8)
 for port diameter up to 32 mm (1.26 in.)

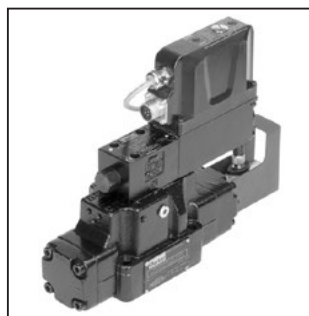
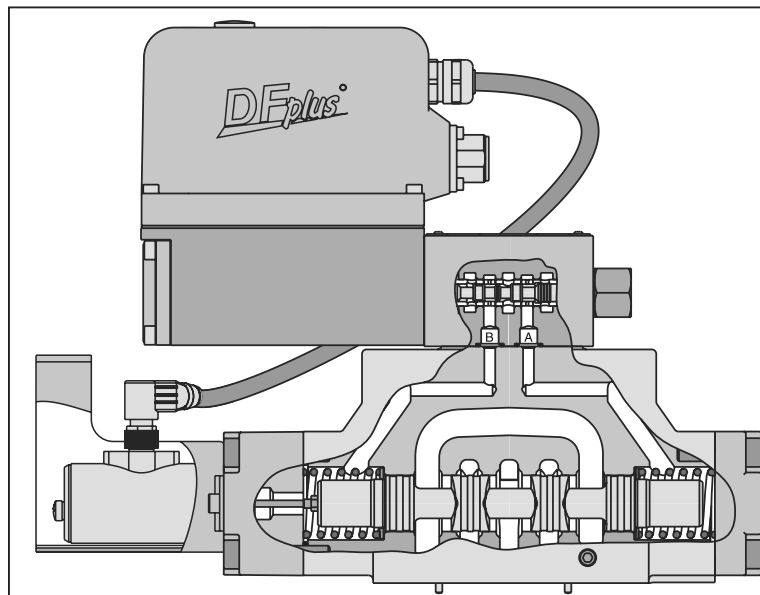
D111FP NG32 (CETOP 10)

The power down mode works with a safe 4th position of the D1FP pilot valve. This ensures that the main stage is hydraulically balanced at power down and allows the main spool spring to center (for overlapped spools), or approximately 10% spring offset to spool position A or B (for zerolap spools).

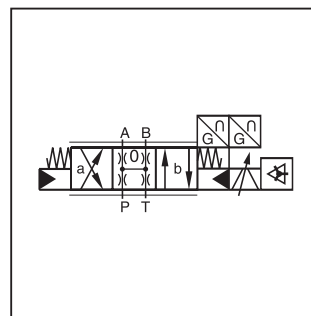
The innovative integrated regenerative function into the A-line (optional) allows new energy saving circuits for differential cylinders. The hybrid version can be switched between regenerative mode and standard mode at any time.



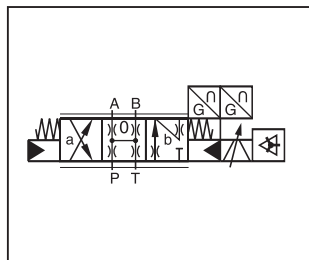
D41FPE52 (Standard)



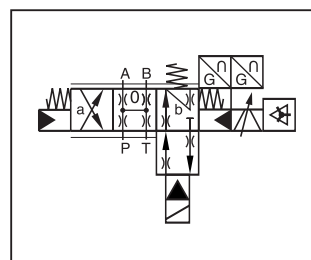
D41FP Standard



Standard D*1FPE



NEW: A-Regeneration D*1FPR



NEW: Hybrid D*1FPZ

Features

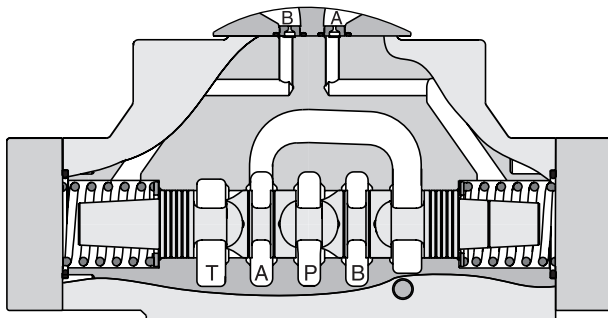
- High dynamics
- High flow
- Defined spool positioning at power-down – optional P-A/B-T or P-B/A-T or center position (for overlapped spools)
- Onboard electronics
- Closed loop position – controlled pilot valve and main stage
- **NEW:** Energy saving A-Regeneration
- **NEW:** Switchable hybrid version

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

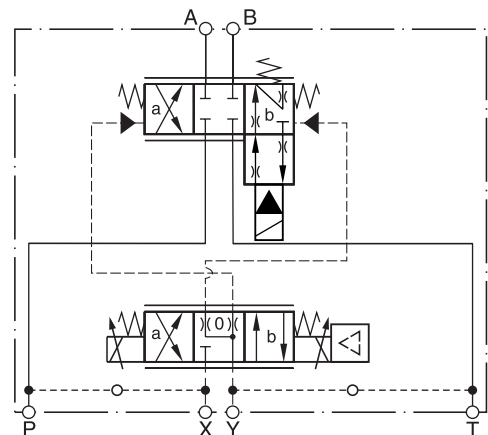
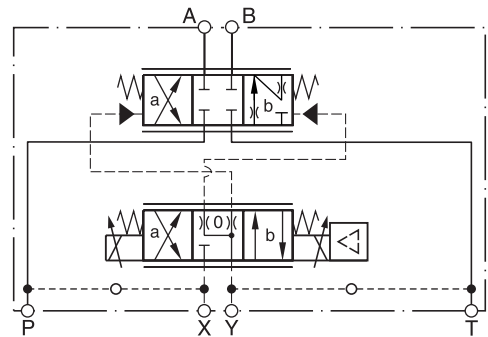
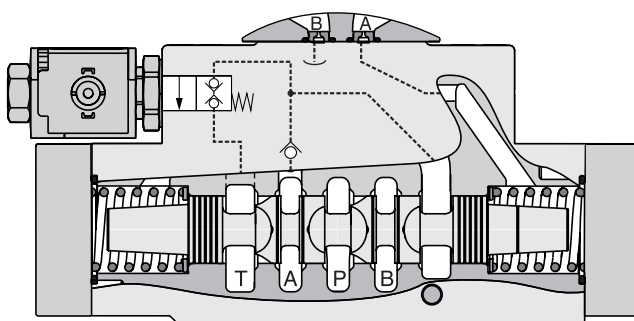
A01_Cat2550.indd, ddp, 06/21

D*1FBR and D*1FBZ

Regenerative Valve D*1FBR

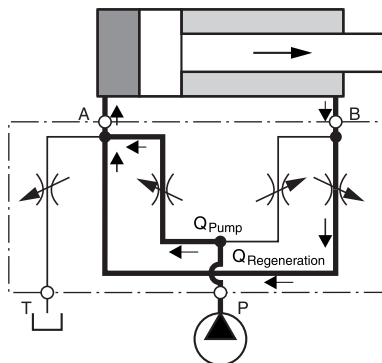


Hybrid Valve D*1FBZ



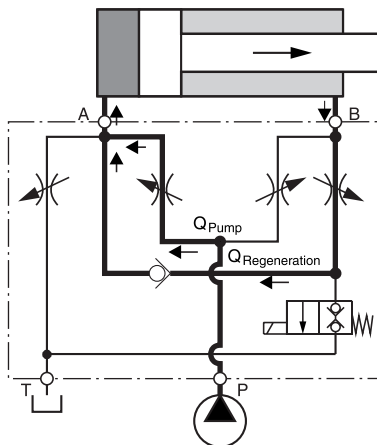
D*1FPR (Regenerative Valve)

Cylinder extending

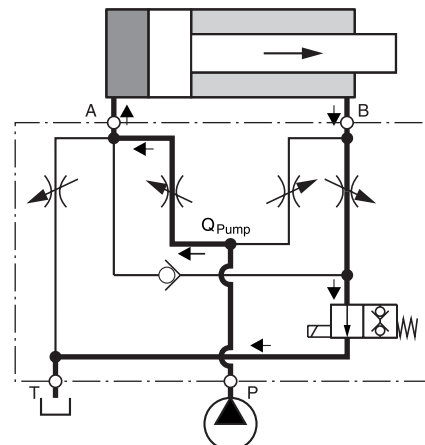


D*1FPZ (Hybrid Valve)

Cylinder extending
regenerative mode
(high speed)



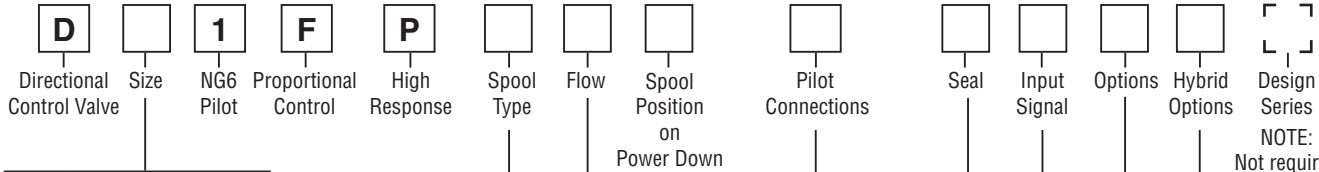
Cylinder extending
standard mode
(high force)



Flow Rate in % of Nominal Flow

Size	Spool	Port					
		A-T	P-A	P-B	B-A (R-Valve)	B-A (Hybrid)	B-T (Hybrid)
D41FPR/Z	31/32/61	100%	50%	100%	50%	40%	20%
D91FPR/Z	31/32/61	100%	50%	100%	50%	50%	25%
D111FPR/Z	31/32/61	on request					

A



Code	Description
3	NG10 / CETOP 5
4	NG16 / CETOP 7
9 ¹⁾	NG25 / CETOP 8
11	NG32 / CETOP 10

¹⁾ For enlarged connections
 Ø 32 mm

Code	Inlet	Drain
1	Internal	External
2	External	External
4	Internal	Internal
5	External	Internal

Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC fluid

Code	Signal	Function
B	0...±10V	0...+10V P → B
E	0...±20mA	0...+20mA P → B
K	0...±10V	0...+10V P → A
S	4...20mA	12...20mA P → A

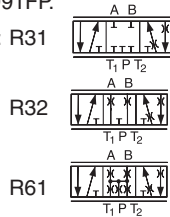
Code	Description
0	6+PE acc. EN175201-804
5	11+PE acc. EN175201-804
7	6+PE + Enable

Standard		NEW: Regenerative Function ⁴⁾		NEW: Hybrid Function ⁵⁾	
Code	Spool Type	Code	Spool Type	Code	Spool Type
Overlap 10%					
E01		R31		Z31	
E02		R32		Z32	
B31	$Q_B = Q_A / 2$				
B32	$Q_B = Q_A / 2$				
Zerolap					
E52		R61		Z61	
B61	$Q_B = Q_A / 2$				

⁴⁾ Not available with D91FP.
 D31FP spool style: R31

For regenerative and hybrid function at D31FP (NG10) please refer to solutions with sandwich and adapter plates:
 A10-1664 / A10-1665L /
 H10-1662 / H10-1666L.

⁵⁾ Not available in valve D31FP.



Code	Spool Position on Power Down
A ²⁾	
B ²⁾	
C ³⁾	

²⁾ Approx. 10% opening, only zerolap spools.
³⁾ Only overlap spools.

Code	Description
0	Standard
L ⁶⁾	Hybrid valve 24V normally closed for spool type Z

⁶⁾ See previous page for regenerative and hybrid spool information.
 (not available in D31FP)

Code	Flow LPM (GPM) at Δp = 5 Bar (72.5 PSI) per metering edge			
	D31	D41	D91	D111
D	90 (23.8)	—	—	—
E	120 (32)	—	—	—
F	—	200 (53)	—	—
H	—	—	450 (119)	—
L	—	—	—	1000 (265)

Bolt Kit:

D31FP	BK98
D41FP	BK160
D91FP	BK228
D111FP	BK150

Weight:

D31FP	11.3 kg (24.9 lbs.)
D41FP	14.2 kg (31.3 lbs.)
D91FP	23.5 kg (51.8 lbs.)
D111FP	64.5 kg (142.2 lbs.)

Please order plugs separately. See Accessories.

General							
Size		NG10 (CETOP 5)		NG16 (CETOP 7)	NG25 (CETOP 8)	NG32 (CETOP 10)	
Mounting		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA					
Mounting Position		Unrestricted					
Ambient Temperature Range		-20°C to +50°C (-4°F to +122°F)					
Hydraulic							
Maximum Operating Pressure		Internal Pilot Drain P, A, B, X: 350 Bar (5075 PSI); T, Y: 35 Bar (508 PSI) External Pilot Drain P, A, B, T, X: 350 Bar (5075 PSI); Y: 35 Bar (508 PSI)					
Fluid		Hydraulic oil as per DIN 51524...51535, other on request					
Fluid Temperature		-20°C to +60°C (-4°F to +140°F)					
Viscosity Permitted Recommended		20 to 380 cSt / mm²/s (93 to 1761 SSU) 30 to 80 cSt / mm²/s (139 to 371 SSU)					
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)					
Nominal Flow at Δp=5 Bar (72.5 PSI) per control edge ¹⁾		LPM (GPM)	120 (32)	200 (53)	450 (119)	1000 (265)	
Max. Recommended Flow Std		LPM (GPM)	250 (66)	600 (159)	1000 (265)	3000 (794)	
Regenerative B-A /B-T		Depending on application, see flow curves					
Leakage at 100 Bar (1450 PSI) Overlap Spool		LPM (GPM)	0.2 (0.05)	0.2 (0.05)	0.6 (0.16)	1 (0.26)	
Zerolap Spool		LPM (GPM)	0.9 (0.24)	0.9 (0.24)	1 (0.26)	—	
Pilot		LPM (GPM)	< 1 LPM (0.26 GPM)				
Pilot Supply Pressure		20 Bar (290 PSI) to 350 Bar (5075 PSI)					
Pilot Flow, Step Response at 210 Bar (3045 PSI)		LPM (GPM)	10 (2.6)	12 (3.2)	24 (6.3)	40 (10.6)	
Static / Dynamic							
Step Response at 100% Stroke ²⁾			10 ms	13 ms	19 ms	45 ms	
Frequency Response ± 5% at 210 Bar (3045 PSI)		Amplitude Phase	28 Hz 118 HZ	95 Hz 95 Hz	95 Hz 90 Hz	40 Hz 75 Hz	
Hysteresis		< 0.1%					
Sensitivity		< 0.05%					
Temperature Drift		< 0.025%					
Electrical							
Duty Ratio		100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible					
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)					
Supply Voltage / Ripple		22...30V, ripple < 0.5% eff., surge free					
Current Consumption		3.5 A maximum					
Input Signal		Voltage	+10...0...-10V, ripple < 0.01% eff., surge free, 0...+10V P→A				
		Impedance	100k Ohm				
		Current	4...12...20 mA, ripple < 0.01% eff., surge free, 12...20 mA P→A < 3.6 mA = enable off, > 3.8 mA = enable on acc. NAMUR NE43				
		Impedance	250 Ohm				
		Input Capacitance	1 nF, typical				
Differential Input Maximum		Code 0	30V for terminal D and E against PE (terminal G) 11V for terminal D and E against 0V (terminal B)				
		Code 5	30V for terminal 4 and 5 against PE (terminal W) 11V for terminal 4 and 5 against 0V (terminal 2)				
		Code 7	30V for terminal D and E against PE (terminal G)				
Enable Signal		Code 5 / 7	5...30V, Ri = 9 kOhm				
Diagnostic Signal		+10...0...-10V / +Ub, rated maximum 5 mA					
Pre-fusing		4.0 A medium lag					
EMC		EN 61000-6-2, EN 61000-6-4					
Electrical Connection		Code 0 / 7 Code 5	6 + PE acc. EN 175201-804 11 + PE acc. EN 175201-804				
Wiring Min.		Code 0 / 7 Code 5	mm² mm²	7 x 1.0 (AWG16) overall braid shield 11 x 1.0 (AWG20) overall braid shield			
Wiring Length		50m (164 ft.) maximum					

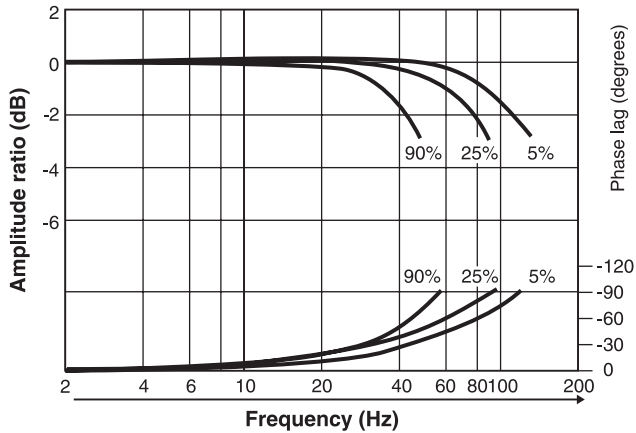
¹⁾ Flow rate for different Δp per control edge: $Q_x = Q_{Nom} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom}}}$
²⁾ Measured with load 210 Bar (3045 PSI)
pressure drop; two control edges

Frequency Response

A

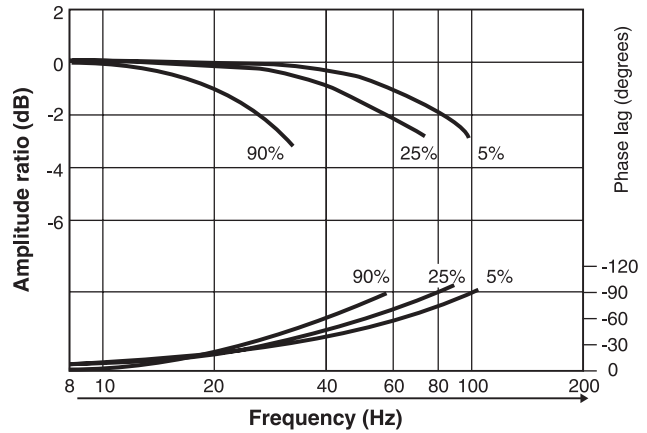
D31FP Frequency Response

±5% / ±25% / ±90% Command Signal
Dynamics at 210 Bar (3045 PSI) Pilot Supply Pressure



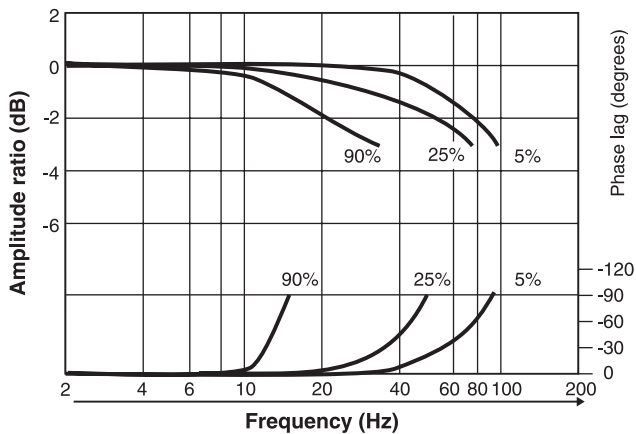
D41FP Frequency Response

±5% / ±25% / ±90% Command Signal
Dynamics at 210 Bar (3045 PSI) Pilot Supply Pressure



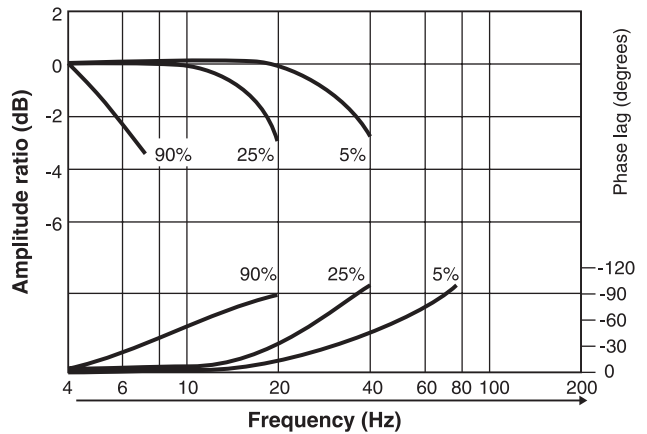
D91FP Frequency Response

±5% / ±25% / ±90% Command Signal
Dynamics at 210 Bar (3045 PSI) Pilot Supply Pressure



D111FP Frequency Response

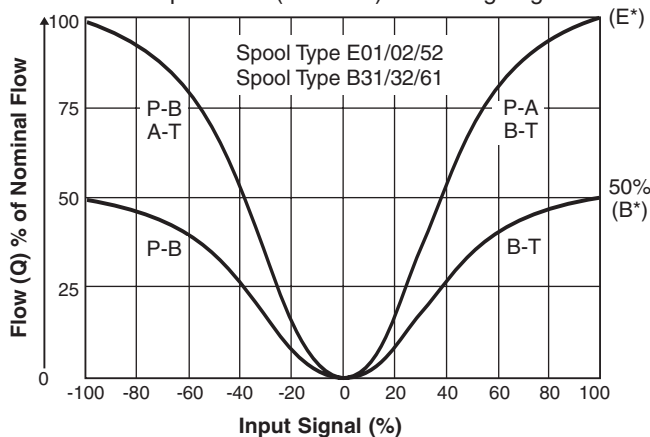
±5% / ±25% / ±90% Command Signal
Dynamics at 210 Bar (3045 PSI) Pilot Supply Pressure



D*1FPB/E Flow

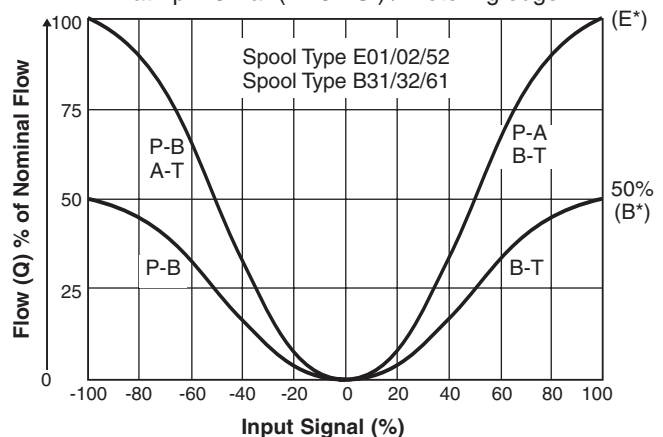
D31FP Flow Characteristics

at $\Delta p = 5$ Bar (72.5 PSI) / metering edge

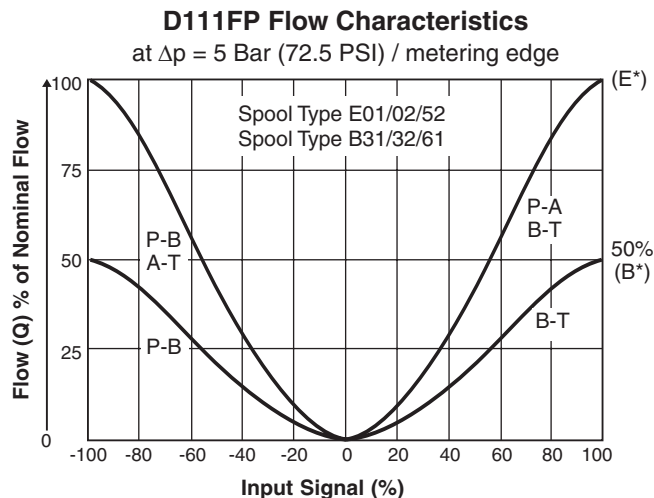
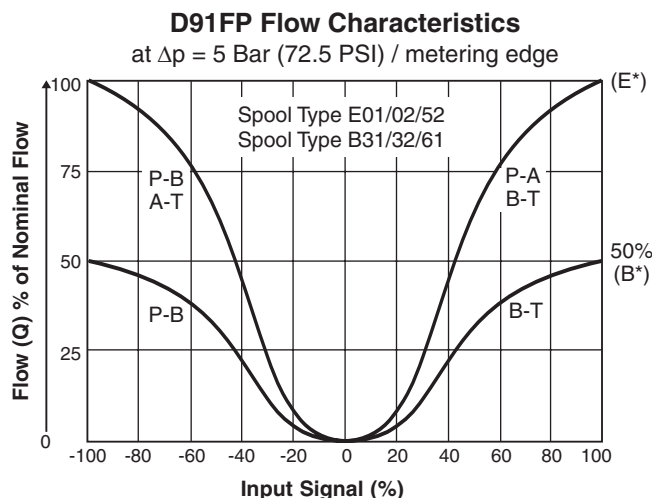


D41FP Flow Characteristics

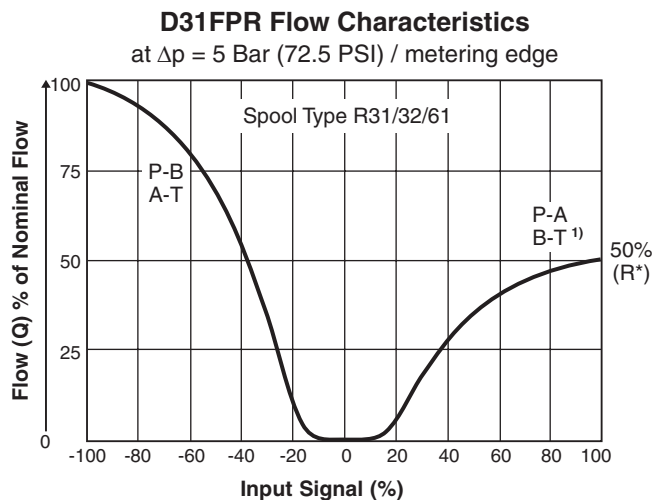
at $\Delta p = 5$ Bar (72.5 PSI) / metering edge



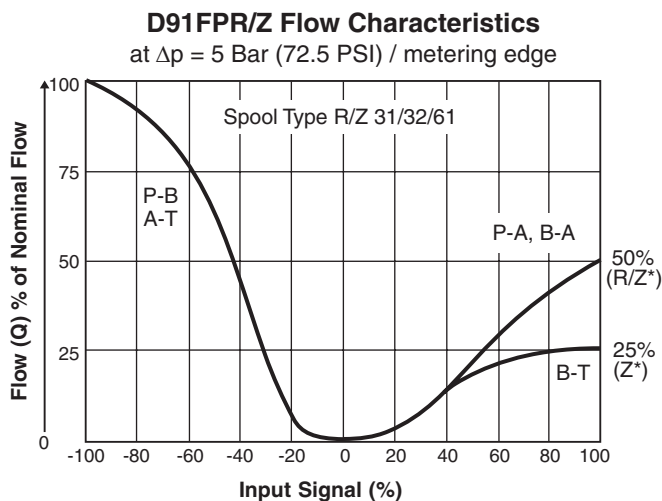
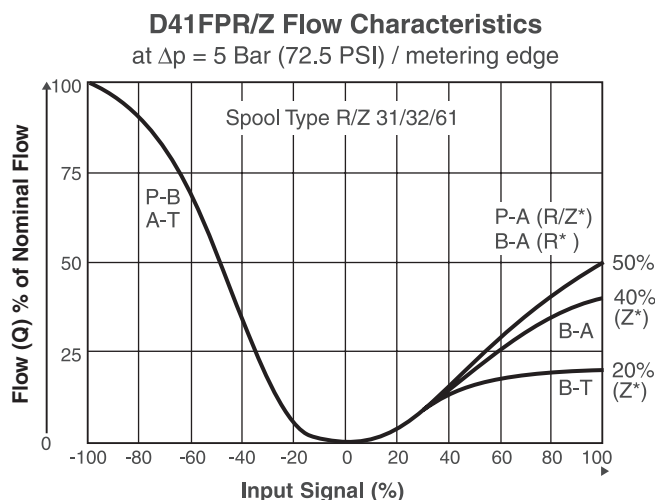
D*1FPB/E Flow



D*1FPR/Z Flow



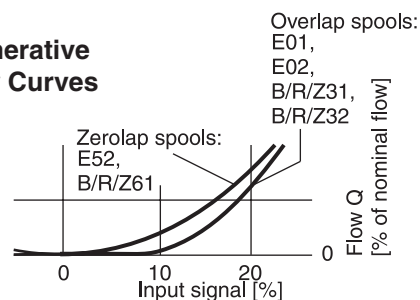
¹⁾ with 2 tank ports



D111FP R/Z *

Spool Type R/Z* on request

Detail: Standard, Regenerative and Hybrid Flow Curves



Electrical Specifications Hybrid Option

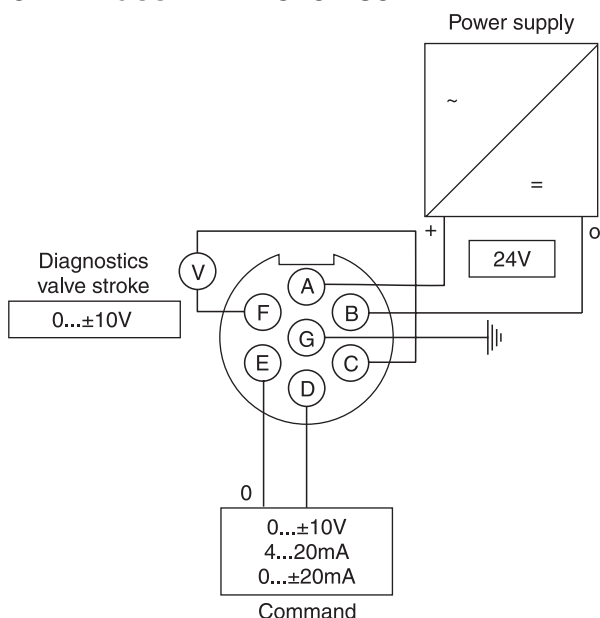
A

Duty Ratio	100%		
Protection Class	IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)		
	D41	D91	D111
Supply Voltage [V]	24	24	24
Tolerance Supply Voltage [%]	±10	±10	±10
Current Consumption [A]	1.21	0.96	1.29
Power Consumption [W]	29	23	31
Solenoid Connection	Connector as per EN 175301-803		
Wiring Minimum [mm²]	3 x 1.5 recommended		
Wiring Length Maximum [m]	50 (164 ft.) recommended		

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

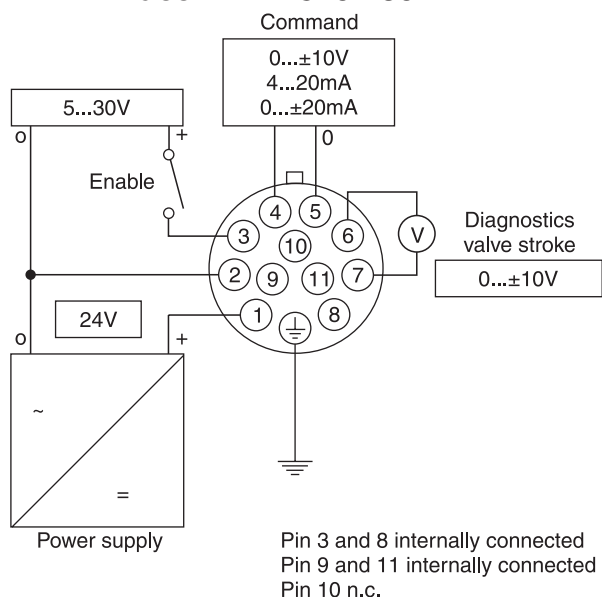
Code 0

6 + PE acc. EN 175201-804



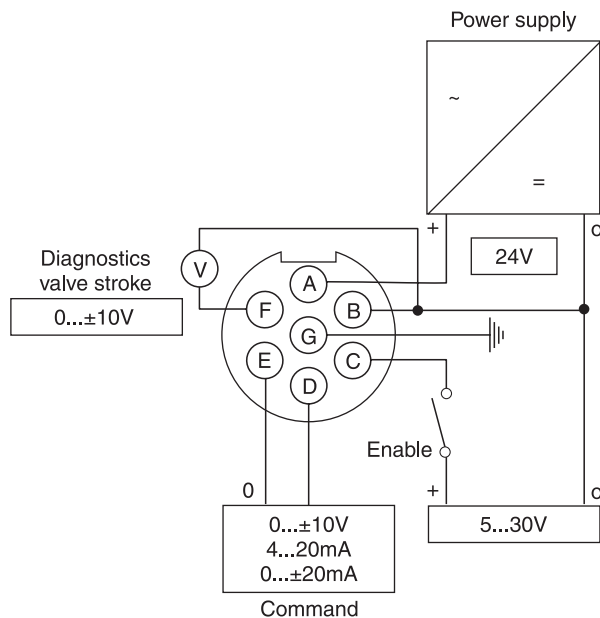
Code 5

11 + PE acc. EN 175201-804



Code 7

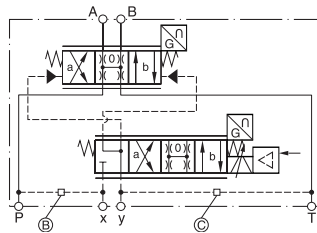
6 + PE acc. EN 175201-804 + Enable



Pilot Flow — Pilot Oil Inlet (Supply) and Outlet (Drain)

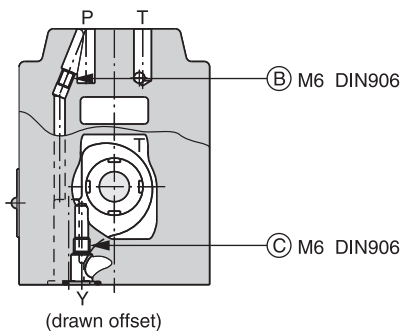
○ open, ● closed

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

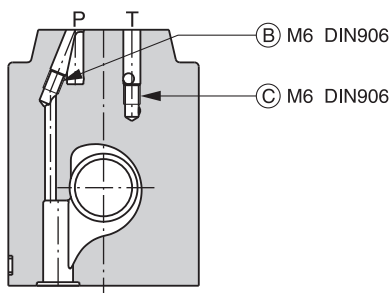


A

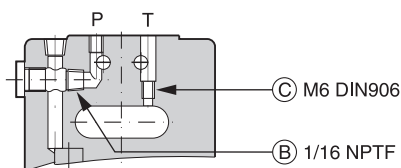
D31FPB/E



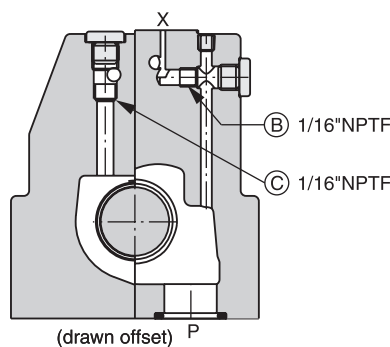
D31FPR



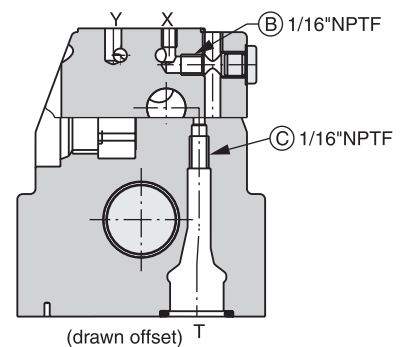
D41FPB/E



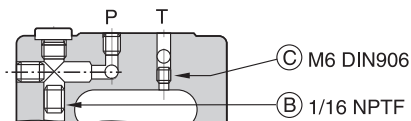
D41FPR



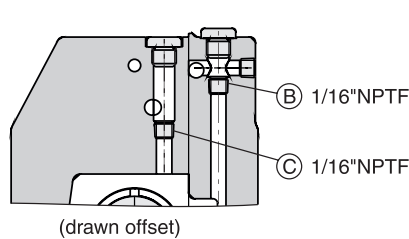
D41FPZ



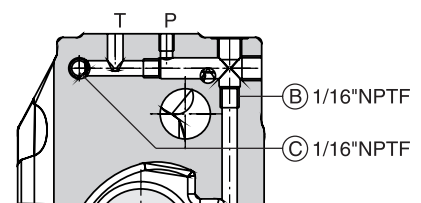
D91FPB/E



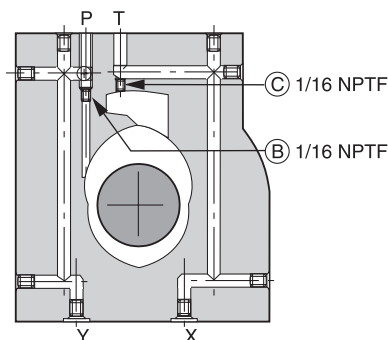
D91FPR



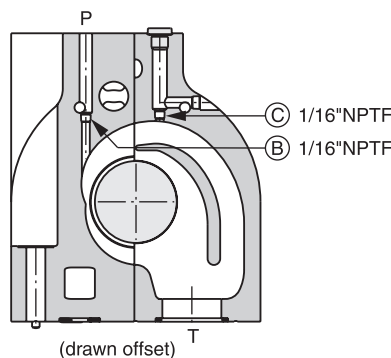
D91FPZ



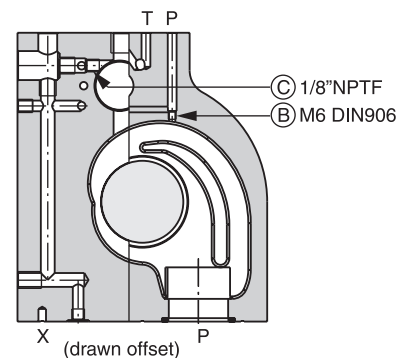
D111FPB/E



D111FPR



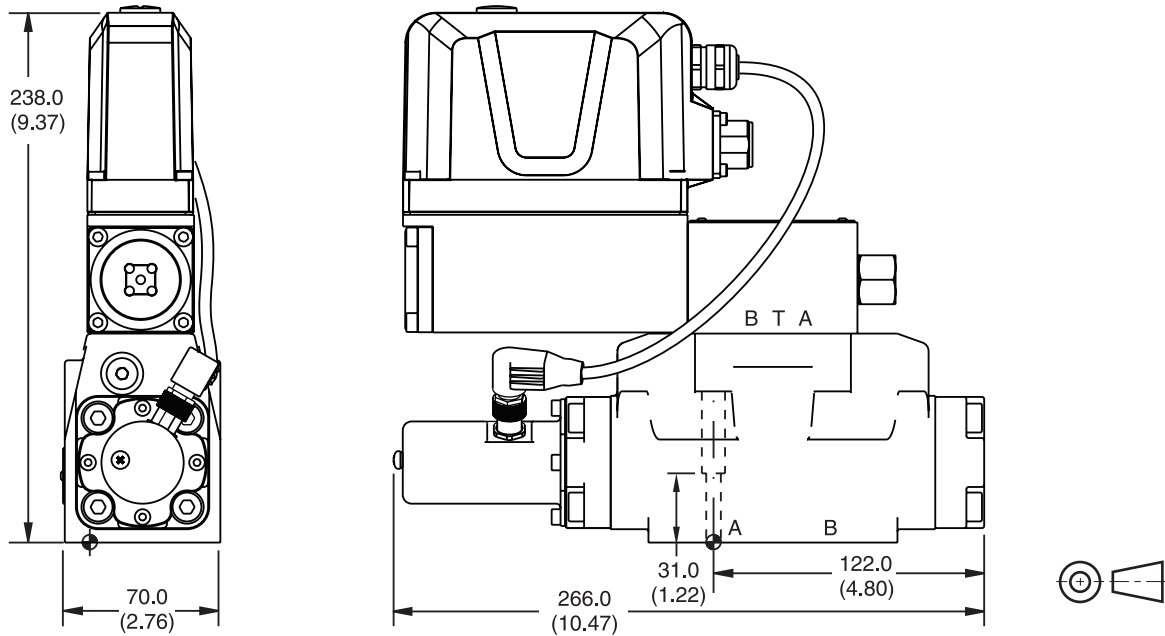
D111FPZ



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

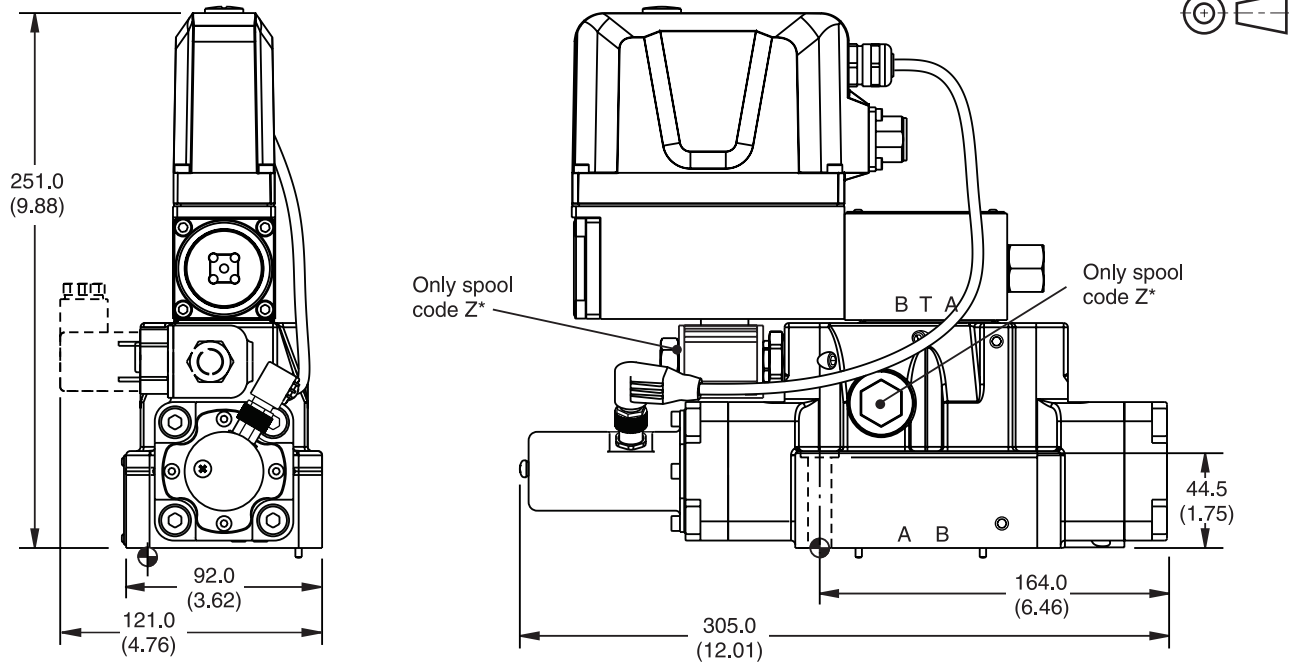
D31FP

A



Surface Finish	Kit	Kit	Kit	Seal Kit
	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D31FP Fluorocarbon: SK-D31FP-V

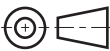
D41FP



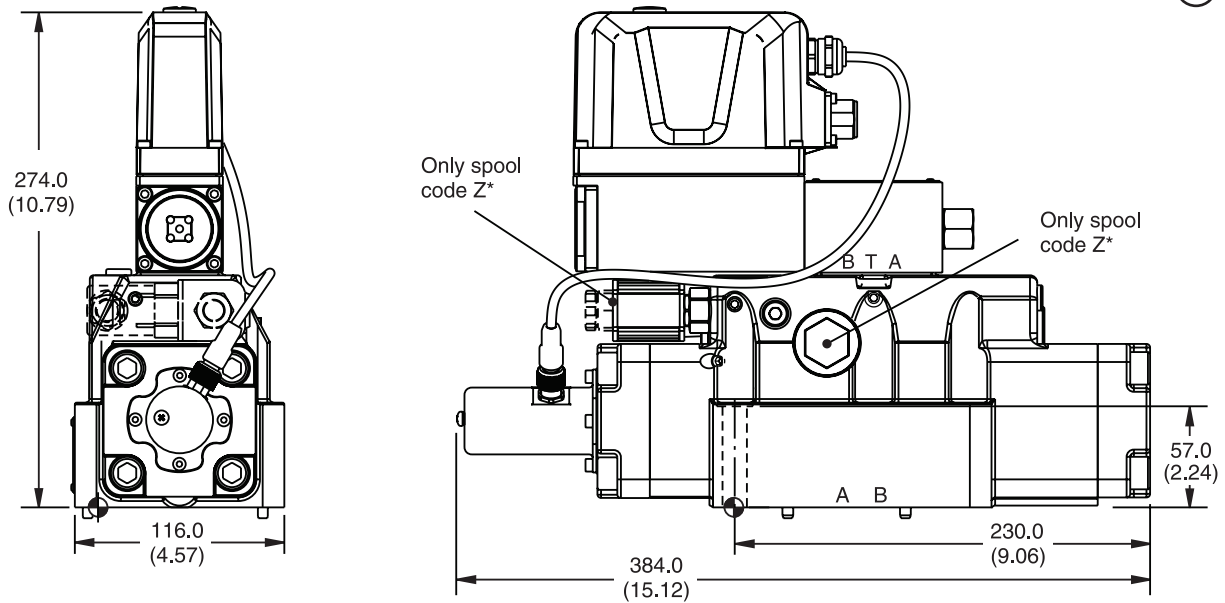
Surface Finish	Kit	Kit	Kit	Seal Kit
	BK320 BK160	2x M6x55 4x M10x60 DIN 912 12.9 4x 3/8-16x2.5 2x 1/4-20x2.5	13.2 Nm (9.7 lb.-ft.) 63 Nm (46.5 lb.-ft.) ±15 %	Nitrile: SK-D41FP Fluorocarbon: SK-D41FP-V

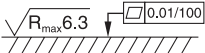
Inch equivalents for millimeter dimensions are shown in (**)

D91FP

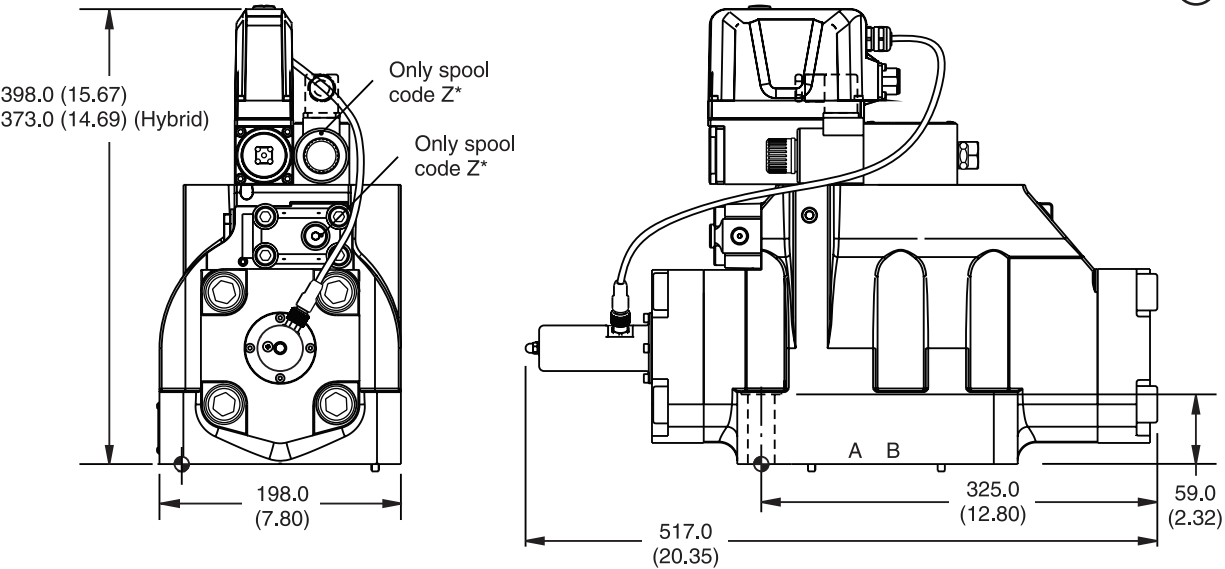


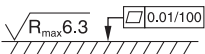
A



Surface Finish	 Kit			Seal  Kit
	BK360 BK228	6x M12x75 DIN 912 12.9 6x 1/2-13x3.0	108 Nm (79.7 lb.-ft.) ±15 %	Nitrile: SK-D91FP Fluorocarbon: SK-D91FP-V

D111FP



Surface Finish	 Kit			Seal  Kit
	BK386 BK150	6x M20x90 DIN 912 12.9 6x 3/4-10x3.5	517 Nm (373.9 lb.-ft.) ±15 %	Nitrile: SK-D111FP Fluorocarbon: SK-D111FP-V

RFI/EMC Immunity for Valves with Integrated Electronics

A

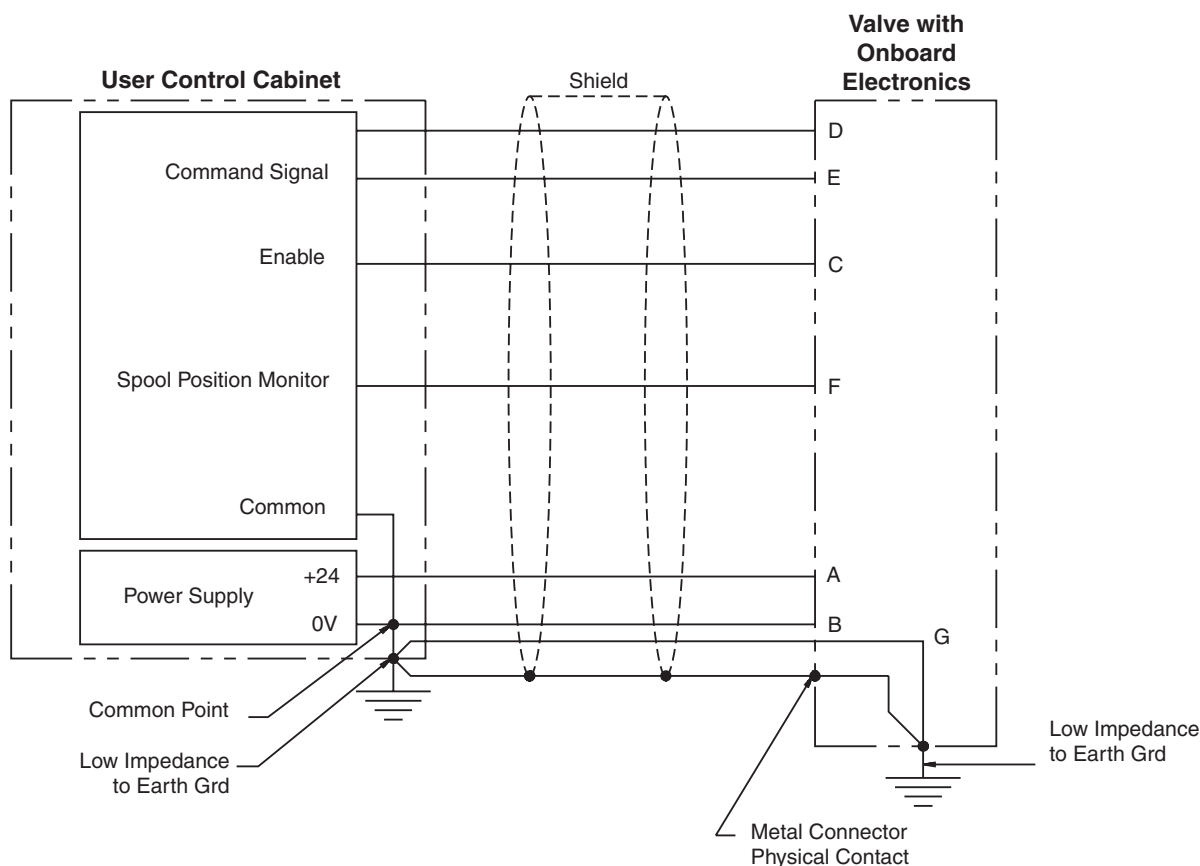
Conformance to the CE RFI/EMC susceptibility and emissions regulations require valves with integrated electronics be properly wired and grounded. The wiring diagram below suggests proper practices, and should be used as a guide for wiring any new application. In some retrofit applications it may be necessary to significantly alter an existing wiring layout and grounding methods to achieve the desired RFI/EMC immunity and avoid ground loops. Note that an improperly wired application can render a system unusable.

Valves should be wired to the user control cabinet by shielded cable where the shield is grounded at both ends. These ground points must be very low impedance earth grounds, and proper wiring practices are required to avoid system ground loops. In some applications it may be necessary to install a low impedance ground strap between the valve or manifold and earth to achieve a proper ground.

Note that when assembling cable/connector assem-

blies, the shield must be in electrical contact with the connector shell to complete the shield circuit through the valve mating receptacle. (Refer to the Accessories section of this catalog for pre-assembled 'EHC' cable assemblies)

To minimize the exposure to RFI/EMC radiation, electronic equipment should be isolated from sources of high-energy electromagnetic radiation such as cables carrying high currents, radio transmitters, electrical load control centers and contactors.

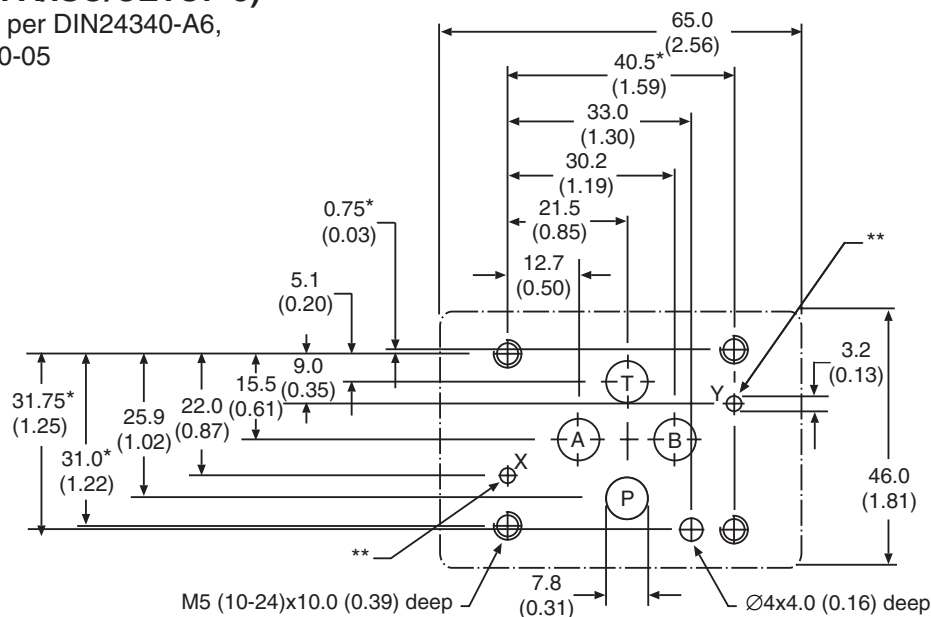


Note: PE on Functional Block Diagrams refers to "Potential Earth".

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

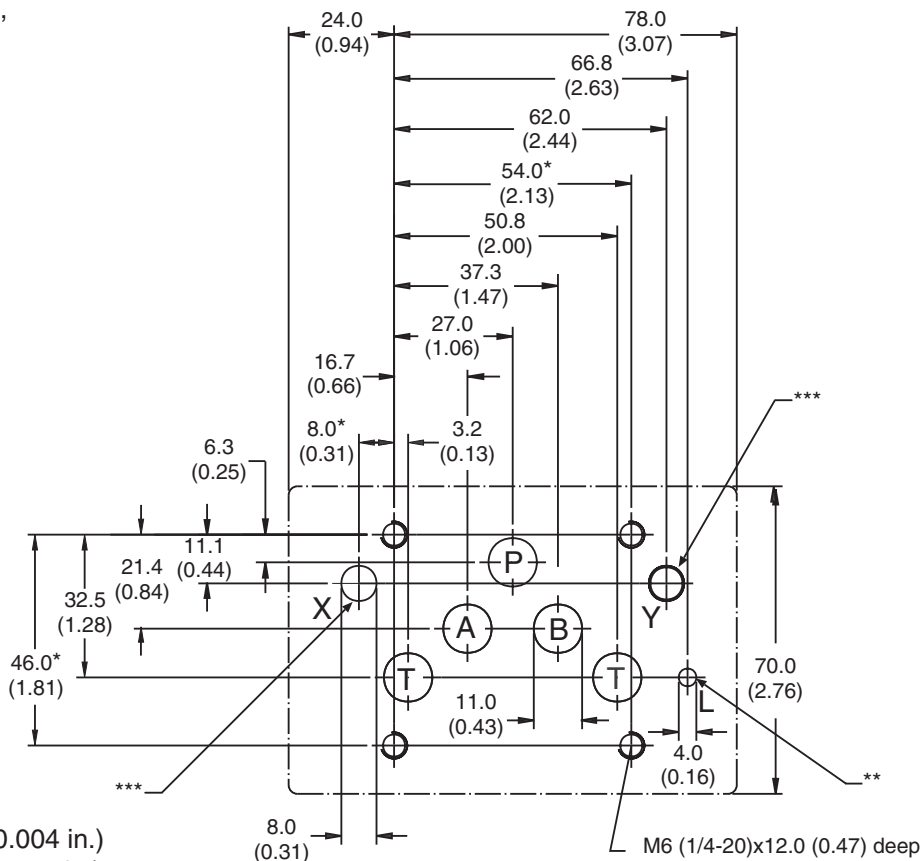
Size NG6 (NFPA/ISO/CETOP 3)

mounting pattern per DIN24340-A6,
 ISO 4401-03-03-0-05



Size NG10 (NFPA/ISO/CETOP 5HE)

mounting pattern per DIN 24340-A6,
 ISO 4401-05-05-0-05



* Dimension tolerance ± 0.1 mm (0.004 in.)

All other dimensions ± 0.2 mm (0.008 in.)

** Port not used with valves in this catalog

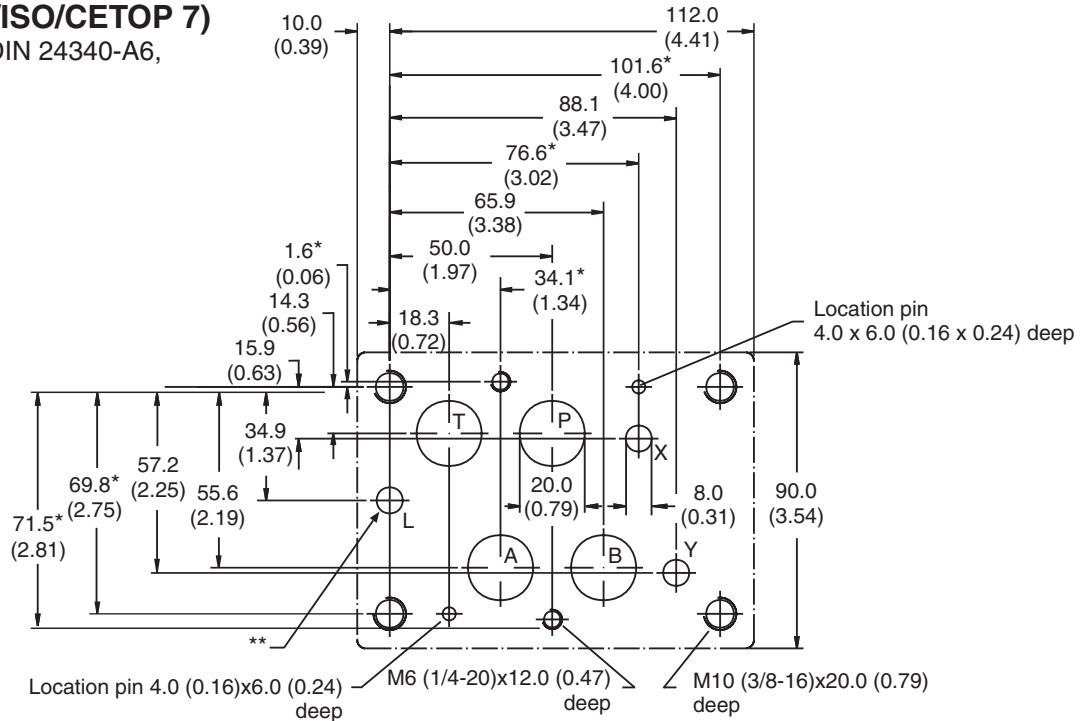
*** Ports only used for pilot operated valves

A01_Cat2550.indd, ddp, 06/21

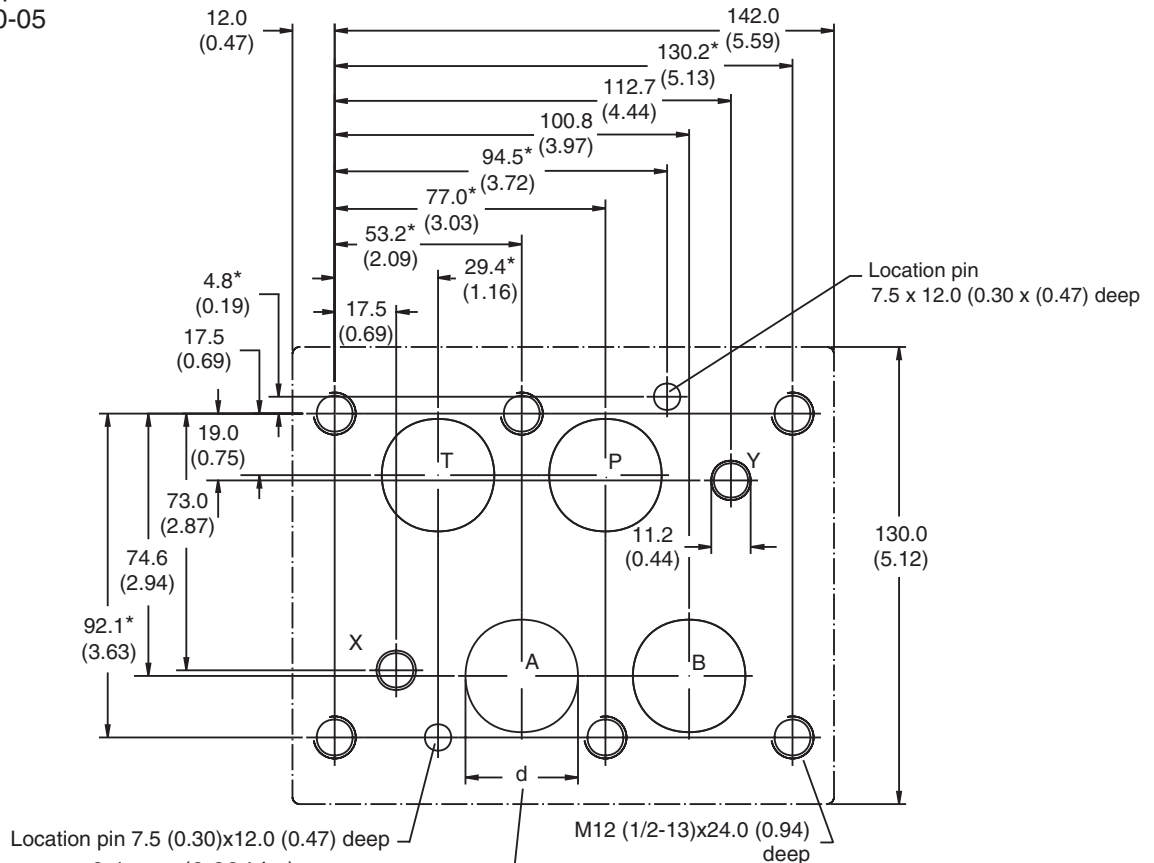
Inch equivalents for millimeter dimensions are shown in (**)

A

Size NG16 (NFPA/ISO/CETOP 7)
 mounting pattern per DIN 24340-A6,
 ISO 4401-07-07-0-05



Size NG25 (NFPA/ISO/CETOP 8)
 mounting pattern per DIN 24340-A6,
 ISO 4401-08-08-0-05



* Dimension tolerance ± 0.1 mm (0.004 in.)
 All other dimensions ± 0.2 mm (0.008 in.)

** Port not used with valves in this catalog

A01_Cat2550.indd, ddp, 06/21

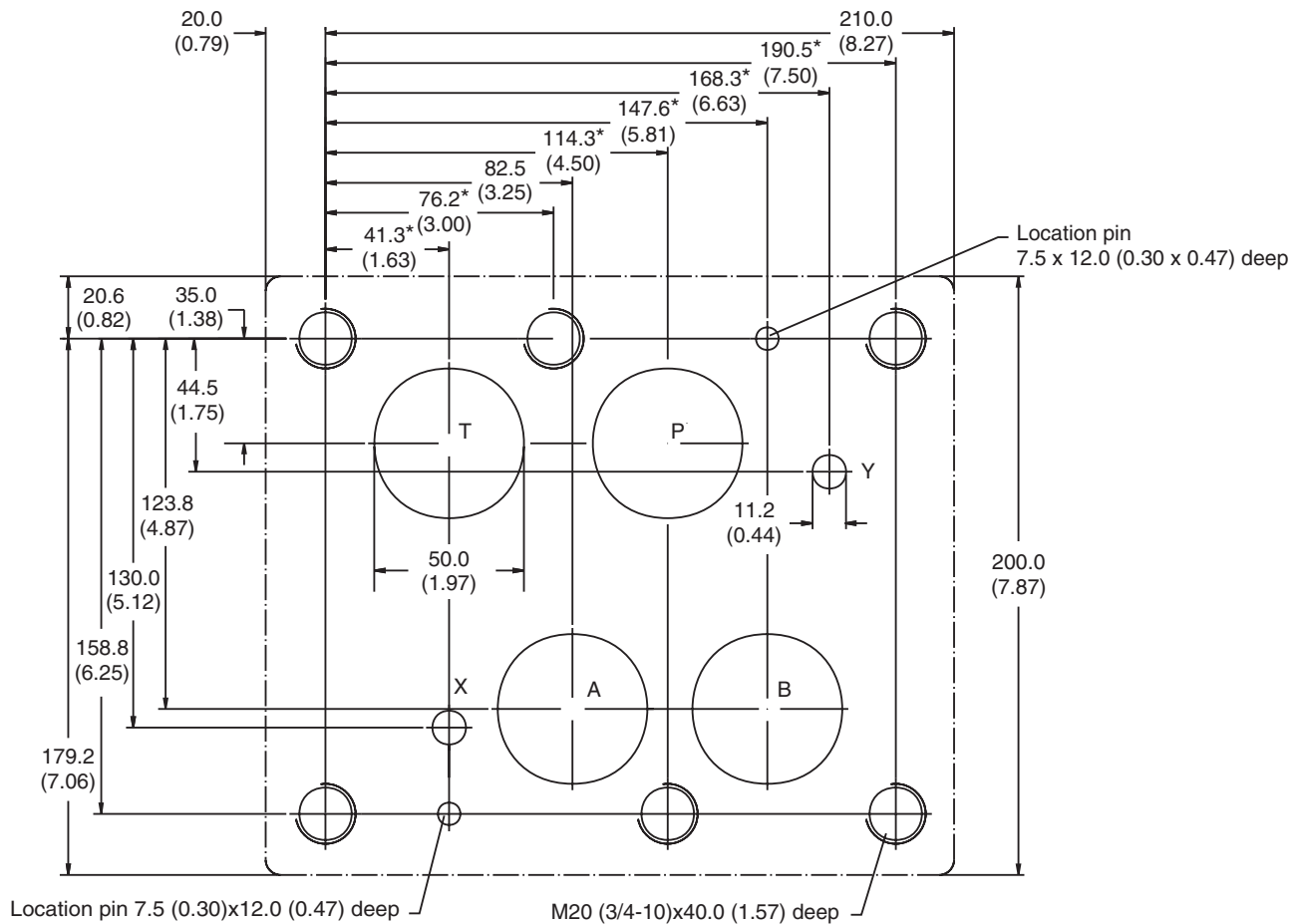
d (A,B,T) series 8: $\varnothing 27.0$ (1.06)
 d (P) series 8: $\varnothing 26.5$ (1.04)
 d (P,A,B,T) series 9: $\varnothing 32.0$ (1.26)

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

Size NG32 (NFPA/ISO/CETOP 10)

mounting pattern per DIN 24340-A6,
 ISO 4401-10-09-0-05

A



- * Dimension tolerance ± 0.1 mm (0.004 in.)
 All other dimensions ± 0.2 mm (0.008 in.)

A

Contents

Series	Description	Direct Operated	Pilot Operated	Flange Mount	Threaded Body	Page
	[size: NG]	6	6 10 25 32	Inch	Inch	
	[size: ISO/CETOP]	3	3 5 8 10	³ / ₄ 1 1 ¹ / ₄ 1 ¹ / ₂	¹ / ₂ ³ / ₄ 1 1 ¹ / ₄	
RE06M*W	Prop. Press. Relief Valves Offboard	•				B2
RE06M*T	Prop. Press. Relief Valves Onboard	•				B6
R4V, R6V	Prop. Press. Relief Valves Offboard (Replaces Series RE*W)		• • •			B12
R4V, R6V	Prop. Press. Relief Valves Onboard (Replaces Series RE*T)		• • •			B21
R4V*P2	Prop. Press. Relief Valves In-line Mounted				• • • •	B32
R5V*P2	Prop. Press. Relief Valves Flange Mounted			• • • •		B37
RPDM2	Prop. Press. Relief Valves	•				B43
VBY*K	Prop. Press. Relief/Sequence Valves		• •			B44
VMY*K	Prop. Press. Reducing/Relieving Valves		• •			B51
D1FV	Prop. Press. Reducing Valves Offboard	•				B58
D1FV OBE	Prop. Press. Reducing Valves Onboard	•				B58
R4R*P2	Prop. Press. Reducing Valves Subplate Mounted		• • •			B66
R4R*P2	Prop. Press. Reducing Valves In-line Mounted				• • • •	B71
PRPM	Prop. Press. Reducing Valves		• •			B76
DUR*L06	Prop. Flow Control Valves		•			B81
F5C	Proportional Throttle Valves Flange Mounted			• • •		B86
R5P	Pressure Compensator Valves Direct Operated, SAE Flange			• • •		B90
LCM	Pressure Compensator Valves		• •			B97

B

General Description

Series RE06M*W proportional relief valves are direct operated proportional valves typically used as remote control valves for flow rates of below 3 LPM (0.8 GPM).

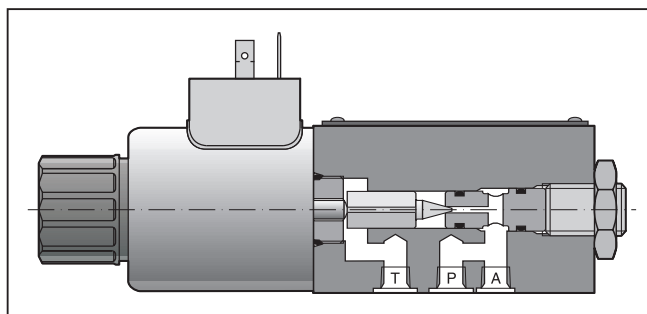
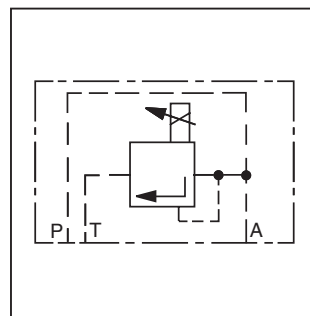
Function

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

The 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} .
- Two pressure ports, A and P
- Subplate mounting according to ISO 6264
- Four pressure ranges available



Specifications

General		
Nominal Size		DIN NG6 / CETOP 3 / NFPA D03
Interface		Subplate mounting according to ISO 6264
Mounting Position		as desired, horizontal mounting preferred
Ambient Temperature	[°C]	-20 ... +70 (-4°F ... +158°F)
MTTF _d value	[years]	150
Hydraulic		
Maximum Operating Pressure		Ports P and A up to 350 (5075 PSI); port T 30 Bar (435 PSI)
Pressure Range		105 Bar (1523 PSI), 175 Bar (2538 PSI), 250 Bar (3625 PSI), 350 (5075 PSI)
Nominal Flow	[l/min]	See p/Q curves
Fluid		Hydraulic oil as per DIN 51524...51535, other on request
Viscosity, Recommended	[cSt] / [mm²/s]	30 ... 80 (139 ... 371 SSU)
Permitted	[cSt] / [mm²/s]	12 ... 380 (56 ... 1761 SSU)
Fluid Temperature	[°C]	-20 ... +60; (-4°F ... +140°F)
Filtration		ISO 4406 (1999), 18/16/13 (acc. NAS 1638: 7)
Linearity	[%]	±2.8
Repeatability	[%]	<±1
Hysteresis	[%]	±1.5 of p_{max}
Electrical		
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)
Nominal Voltage	[V]	12 (2.3 A max. current), 16 (1.3 A max. current)
Coil Resistance	[Ohm]	4 at 20°C (68°F) = K Coil 11.4 - 12 for X Coil
Solenoid Connection		Connector as per DIN 43650
Power Amplifier, Recommended		PCD00A-400

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

B01_Cat2550.indd, ddp, 06/21

Ordering Information

RE

Proportional Pressure Relief Valve

06

Size

M

Manifold Mounting

Pressure Range

W

Offboard Electronics

2

Seal

1

Valve Open at Zero Command

Solenoid Type

W

Electronic Connection

Design Series

NOTE:
Not required when ordering.

Code	Description
06	NG6 D03, CETOP 3

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
10	up to 105 Bar (1522 PSI)
17	up to 175 Bar (2538 PSI)
25	up to 250 Bar (3625 PSI)
35	up to 350 Bar (5075 PSI)

Code	Solenoid Voltage
K*	12 V, 2.5 A
X**	16 V, 1.3 A

Code	Description
	Socket Connector
W	DIN 43650 without plug

* Use with "PCD" Series Driver cards

** Order if currently using "ED" card

Please order plug separately. See Accessories.

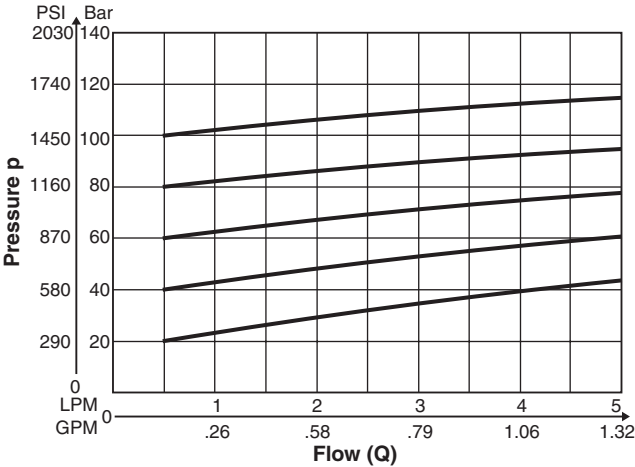
Bolt Kit	Qty	Size
BK209	4	10-24 X 1.25"
BK375	4	M5 x 30mm

Weight: 1.8 kg (4.0 lbs.)

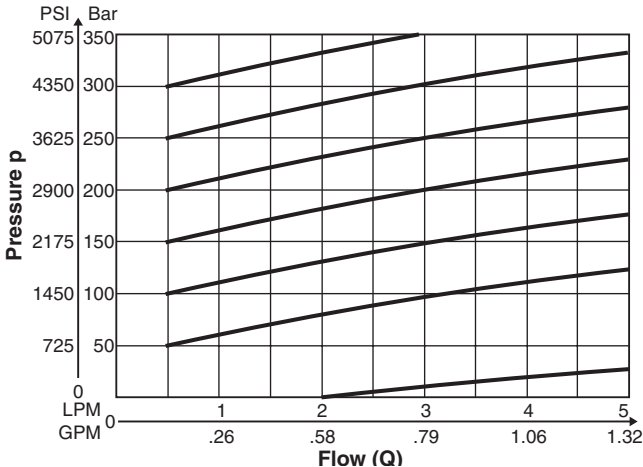
Performance Curves

p/Q Curves

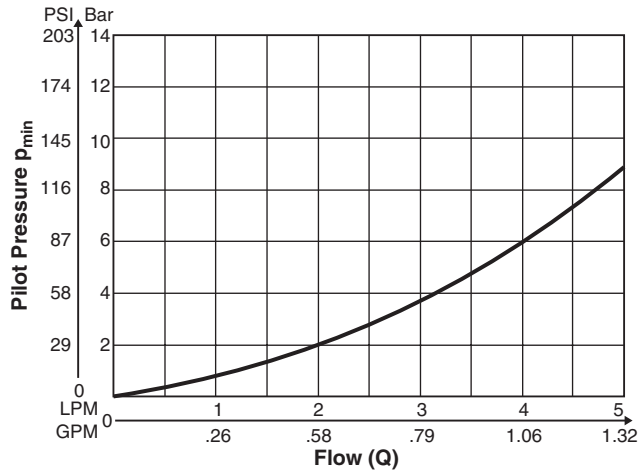
Pressure Stage 105 Bar



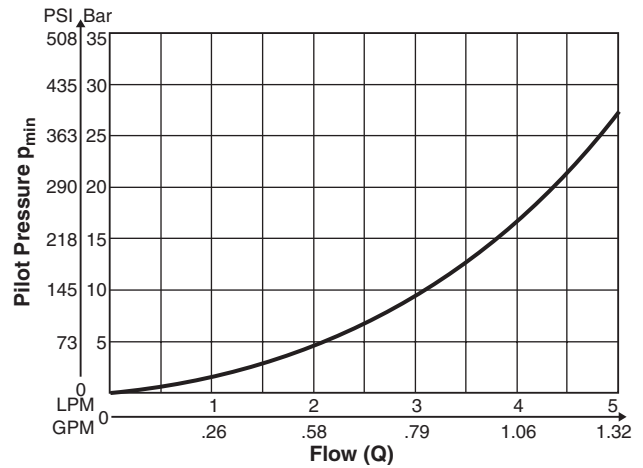
Pressure Stage 350 Bar



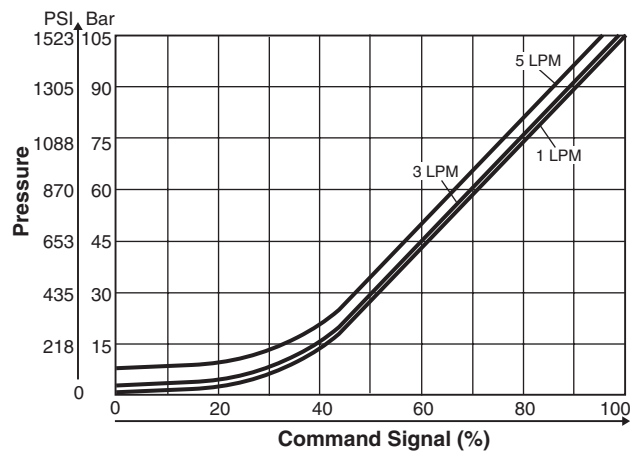
p_{min}/Q Curves
Pressure Stage 105 Bar



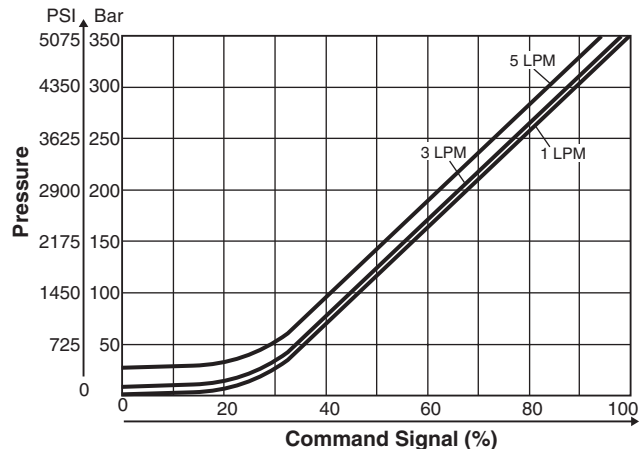
Pressure Stage 350 Bar



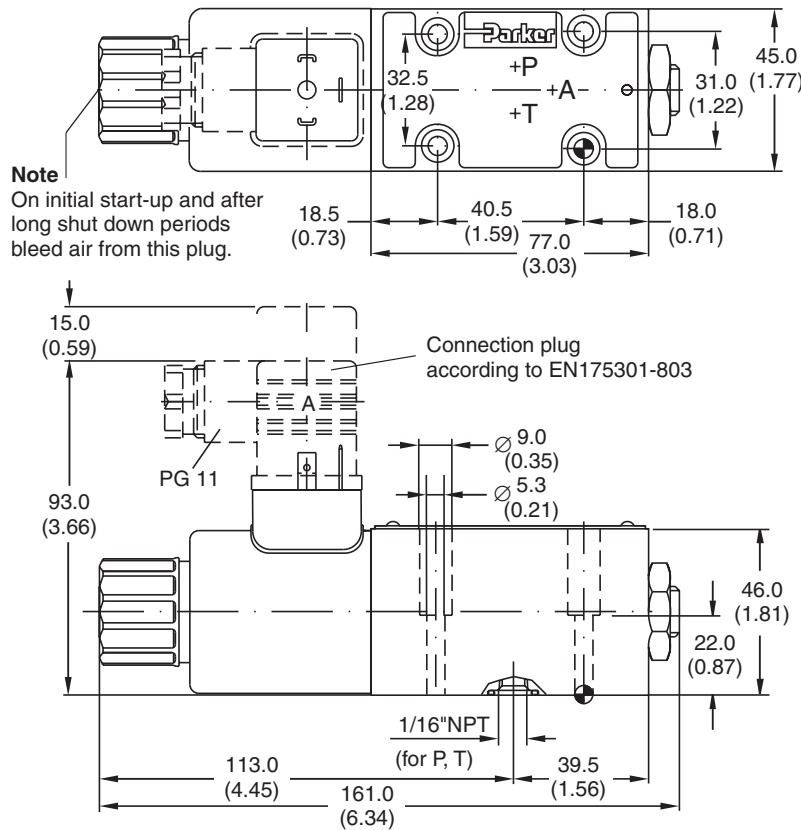
$p_{set-voltage}$ Curves
Pressure Stage 105 Bar



Pressure Stage 350 Bar



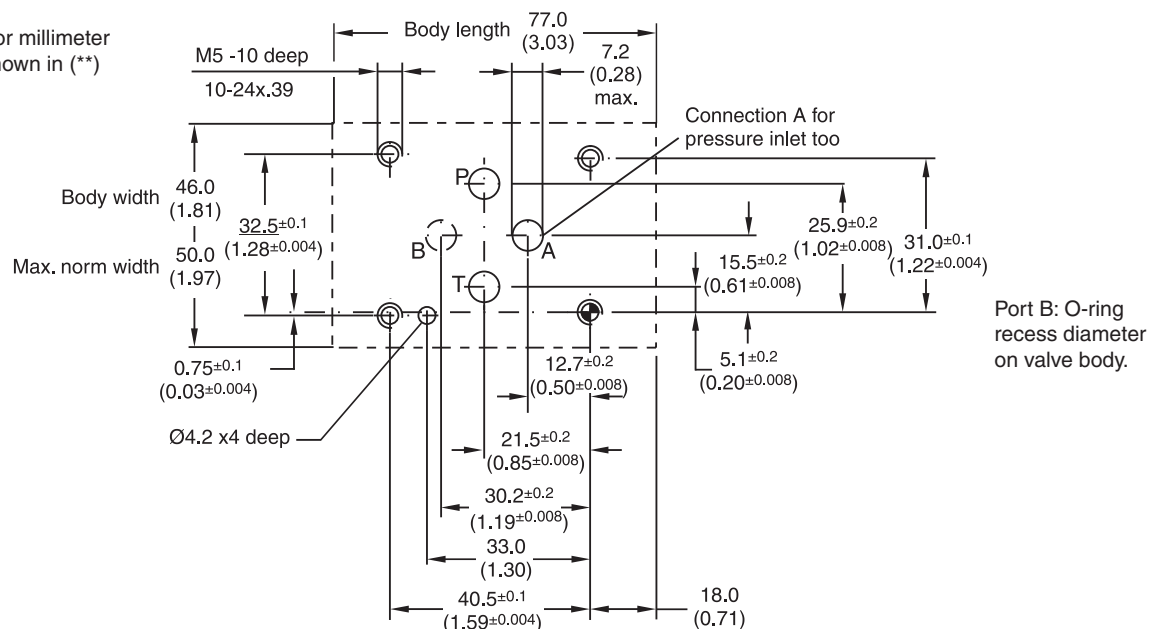
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt Kit			Seal Kit
$\sqrt{R_{max} 6.3}$ 	BK375 BK209	 4x M5x30 DIN 912 12.9 4x 10-24x1.25	 7.6 Nm (5.6 lb.-ft.) $\pm 15\%$	 Nitrile Fluorocarbon
				SK-RE06MWN SK-RE06MWV

Mounting Pattern ISO 6264-03-04-*-97

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



General Description

Series RE06*T (NG6) proportional pressure relief valves are direct operated proportional solenoid valves with integral control electronics.

The digital onboard electronic is situated in a robust metal housing and can be used in rough environments. The nominal values of the valves are factory set. Additionally the ProPx software permits the editing of all parameters. The software is also used for the digital electronic modules. The cable for connection to a serial RS232 interface is available as accessory.

The electrical connection is available in 2 options:

Code F: 6 + PE central connection

+/- 10V command signal (preset)

+10V reference voltage output

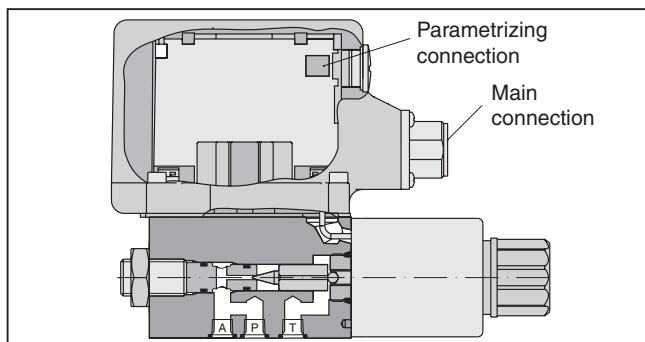
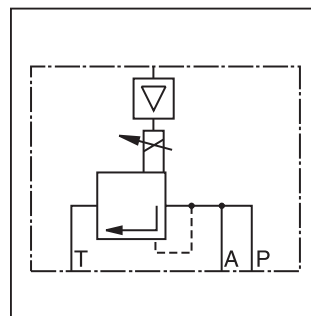
Code R: 6 + PE central connection

4...20mA command signal (preset)

Function

When the pressure in port P or A exceeds the pressure setting at the solenoid, the cone opens to port T and limits the inlet pressure to the adjusted level.

The pressure adjustment is effected by applying current to the solenoid. The control signal is modulated to the solenoid current by the electronics.



Features

- Direct operated pressure relief valve
- Onboard electronics
- Very low pressure adjustment of p_{min} .
- Subplate mounting acc. to ISO 6264
- 6 pressure ranges
- 2 pressure inlet ports, A and P

Ordering Information

RE	06	M		T	2		1		0	
Proportional Pressure Relief Valve	Size	Manifold Mounting	Pressure Range	Integrated Electronics	Configuration	Seal	Valve Open at Zero Command	Electronic Variations	Electronic Option	Design Series
										NOTE: Not required when ordering.
Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	
06	NG6 D03, CETOP 3	05	50 Bar (725 PSI)	N	Nitrile	F	Voltage input 0...+10V with reference output +10V			
		10	105 Bar (1523 PSI)	V	Fluorocarbon	R	Current input 4...20mA			
		17	175 Bar (2538 PSI)							
		21	210 Bar (3045 PSI)							
		25	250 Bar (3625 PSI)							
		35	350 Bar (5075 PSI)							

Please order plugs separately. See Accessories.

Parametrizing cable OBE => RS232
 Item no. 40982923

Weight: NG6 2.2 kg (4.9 lbs.)

Bolt Kit	Qty	Size
BK375	4	M5x30mm
BK209	4	10-24x1.25

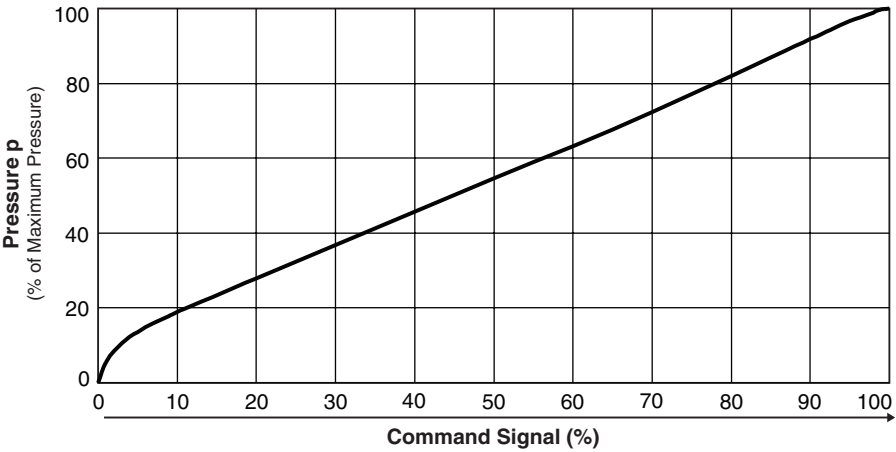
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

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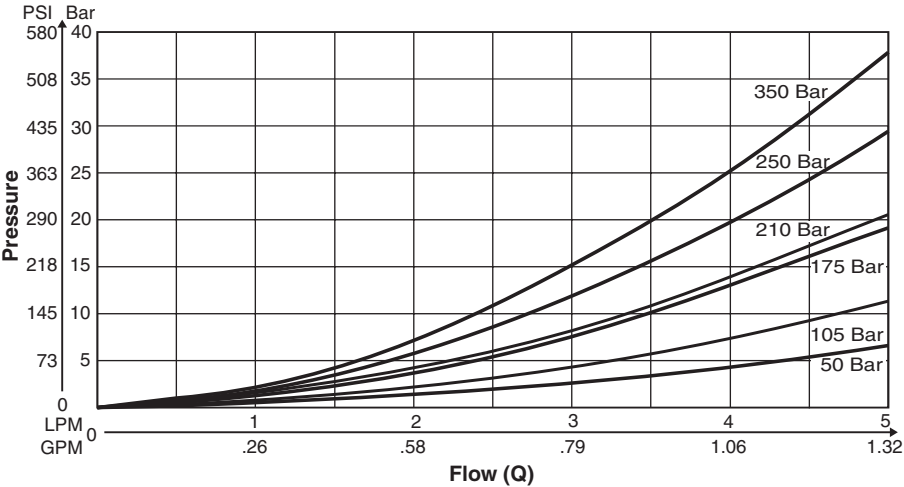
General			
Size			DIN NG6 / CETOP 3 / NFPA D03
Interface			Subplate mounting according to ISO 6264
Mounting Position			as desired, horizontal mounting preferred
Ambient Temperature	[°C]		-20...+60; (-4°F ... +140°F)
MTTF _D value	[years]		75
Vibration Strength	[g]		10 sinus 5...2000 Hz acc. to IEC 68-2-6 30 noise 20...2000 Hz acc. to IEC 68-2-36 15 shock acc. to IEC 68-2-27
Hydraulic			
Maximum Operating Pressure			Ports A and P 350 Bar (5075 PSI), Port T 30 Bar (435 PSI)
Pressure Range			50 Bar (725 PSI), 105 Bar (1523 PSI), 175 Bar (2538 PSI), 210 Bar (3045 PSI), 250 Bar (3625 PSI), 350 (5075 PSI)
Nominal Flow			See p/Q curves
Fluid			Hydraulic oil according to DIN 51524...51535, other on request
Viscosity			
Recommended	[cSt] / [mm²/s]		30 ... 80 (139 ... 371 SSU)
Permitted	[cSt] / [mm²/s]		12 ... 38 (56 ... 1761 SSU)
Fluid Temperature	[°C]		-20 ... +60; (-4°F ... +140°F)
Filtration			ISO 4406 (1999), 18/16/13 (acc. NAS 1638: 7)
Linearity	[%]		See curve
Repeatability	[%]		<±1
Hysteresis	[%]		±1.5 of p _{max}
Electrical			
Duty Ratio	[%]		100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Supply Voltage	[VDC]		18...30, ripple < 5% eff., surge free
Current Consumption Maximum	[A]		2.0
Pre-fusing	[A]		2.5 medium lag
Potentiometer Supply	[V]		+10 / ±5% max. 10mA
Command Signal	[V]		0...+10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm
Code F Voltage	[mA]		4...20, ripple < 0.01 % eff., surge free, Ri = 200 Ohm
Code R Current			< 3.6 mA = enable off, > 3.8 mA = enable on (acc. NAMUR NE43)
Differential Input Voltage Max.	[V]		30 for terminal D and E against PE (terminal G)
	[V]		11 for terminal D and E against 0V (terminal B)
Adjustment Ranges			
Minimum Current	[%]		0...50
Maximum Current	[%]		50...100
Ramp	[s]		0...32.5
Interface			RS 232, parametrizing connection 5pole
EMC			EN 61000-6-2, EN 61000-6-4
Central Connection			6 + PE acc. EN 175201-804
Cable Specification	[mm²]		7 x 1.0 (AWG 18) overall braid shield
Cable Length Maximum	[m]		50 (164 ft.)

B

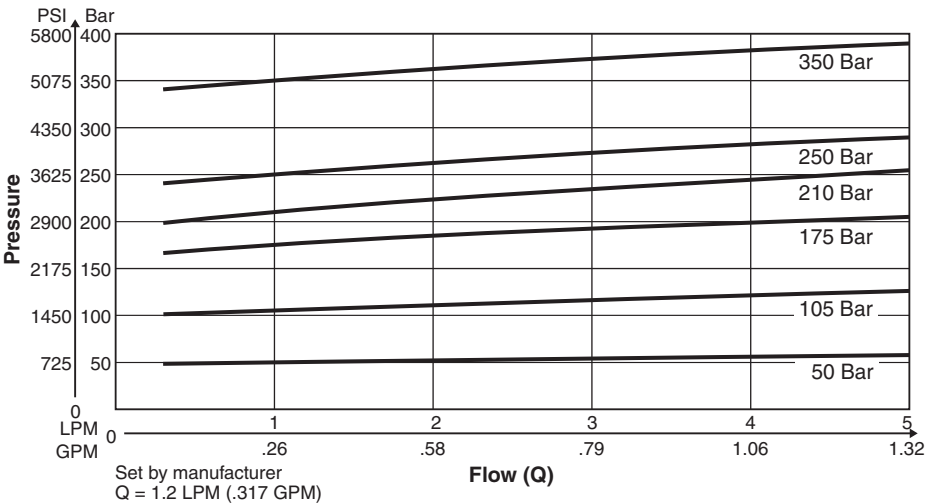
Command/Pressure Curve



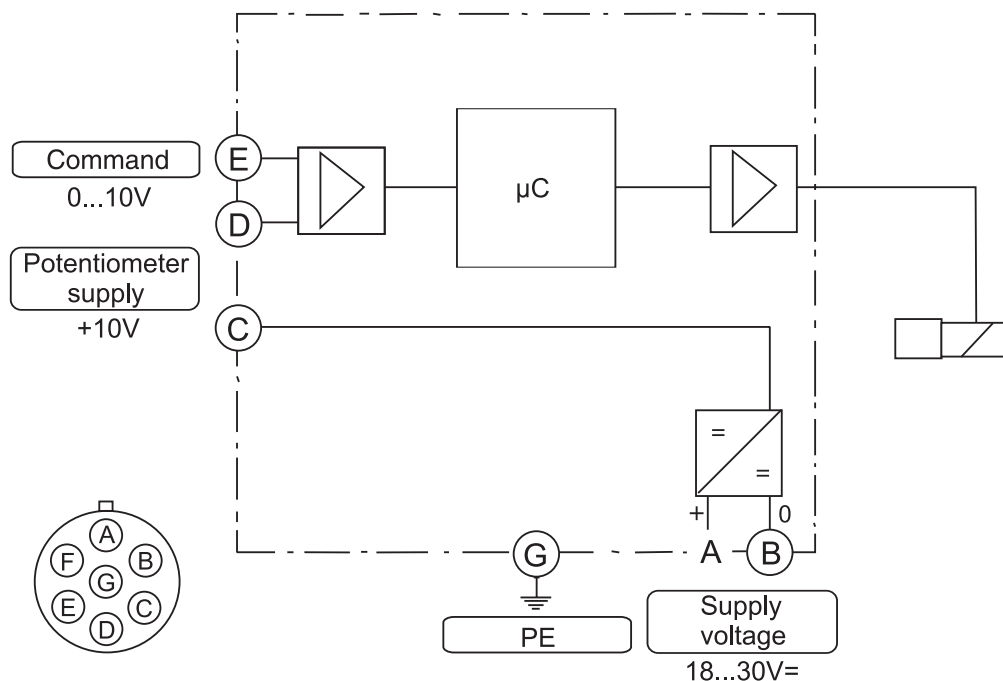
p_{min}/Q Curves



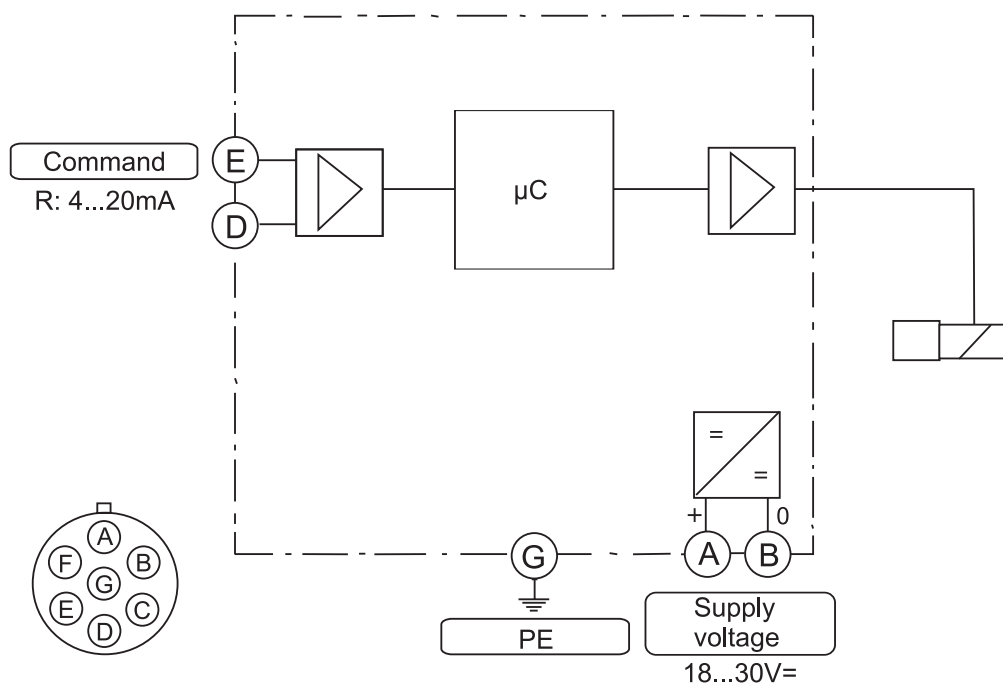
P/Q Curves



Code F
6 + PE acc. EN 175201-804



Code R
6 + PE acc. EN 175201-804



ProPxD Interface Program

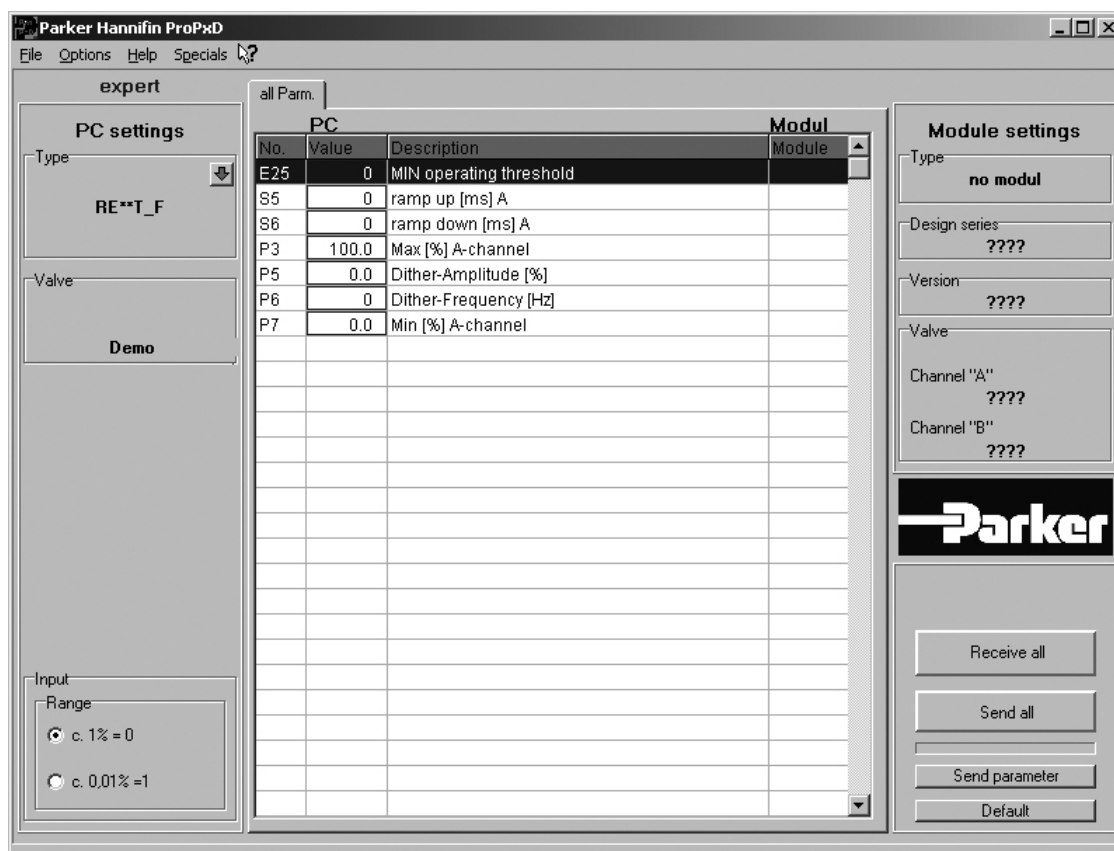
The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

Features

- Simple editing of all parameters
- Storage and loading of optimized parameter adjustments
- Executable with all Windows® operating systems from Windows® 95 upwards
- Communication between PC and electronics via serial interface RS-232

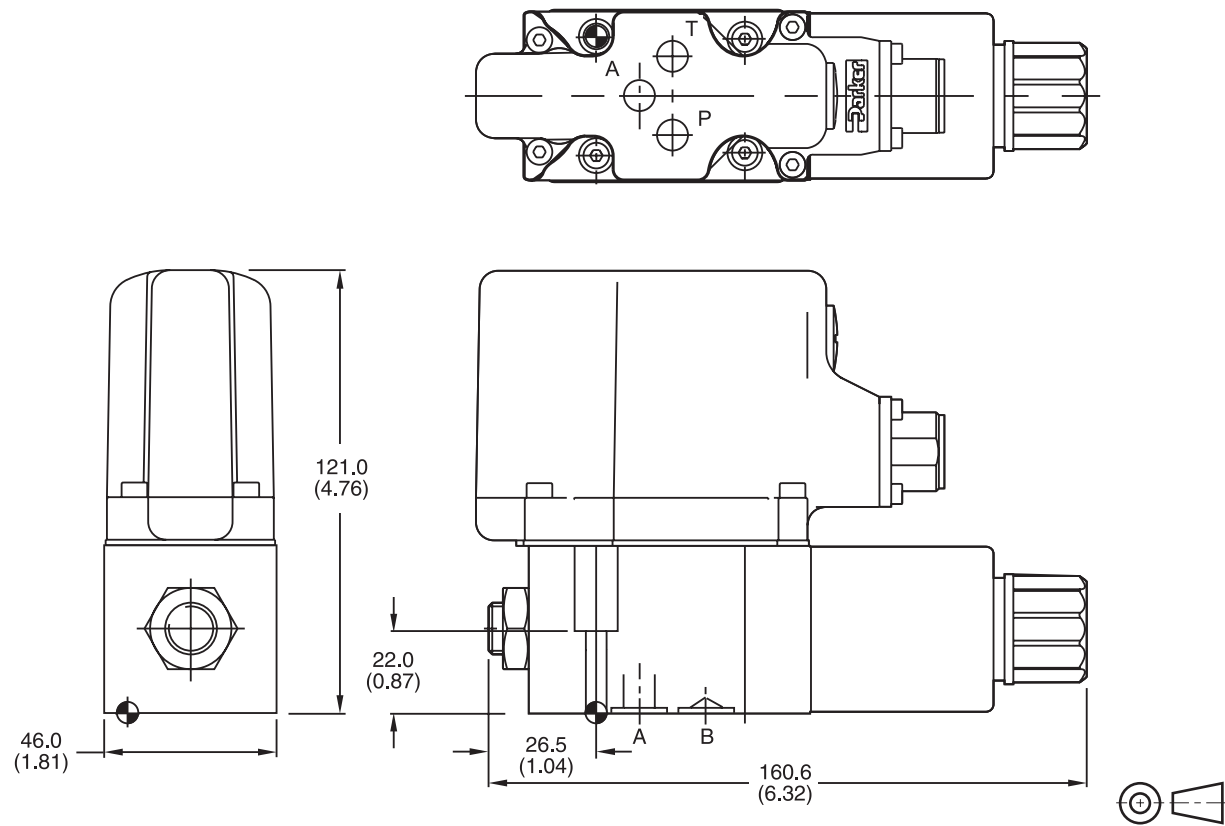
The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

Simple to use interface program. Download free of charge
www.parker.com/propxd

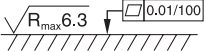


The parametrizing cable may be ordered under item no. 40982923.

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

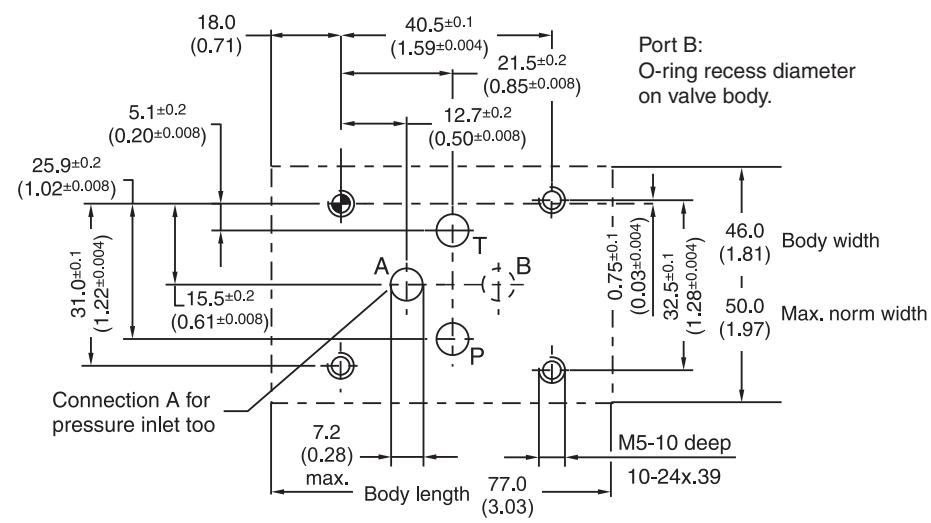


B

Surface Finish	Bolt Kit			Seal  Kit
	BK375 BK209	4x M5x30 DIN 912 12.9 4x 10-24x1.25	7.6 Nm (5.6 lb.-ft.) ±15%	Nitrile SK-RE06MTN Fluorocarbon SK-RE06MTV

Mounting Pattern ISO 6264-03-04-*-97

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



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).

B

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

Features

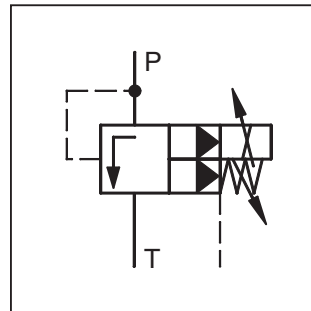
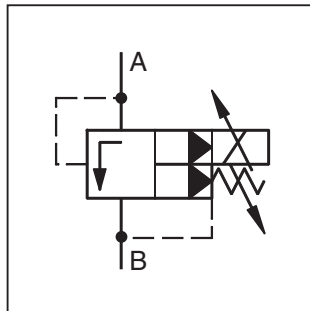
- Pilot operated with proportional solenoid
- Continuous adjustment by proportional solenoid
- 3 pressure ranges
- Optional mechanical maximum pressure adjustment
- 2 interfaces
 - R4V Subplate ISO 6264 (DIN 24340 Form D)
 - R6V Subplate ISO 6264 (DIN 24340 Form E)



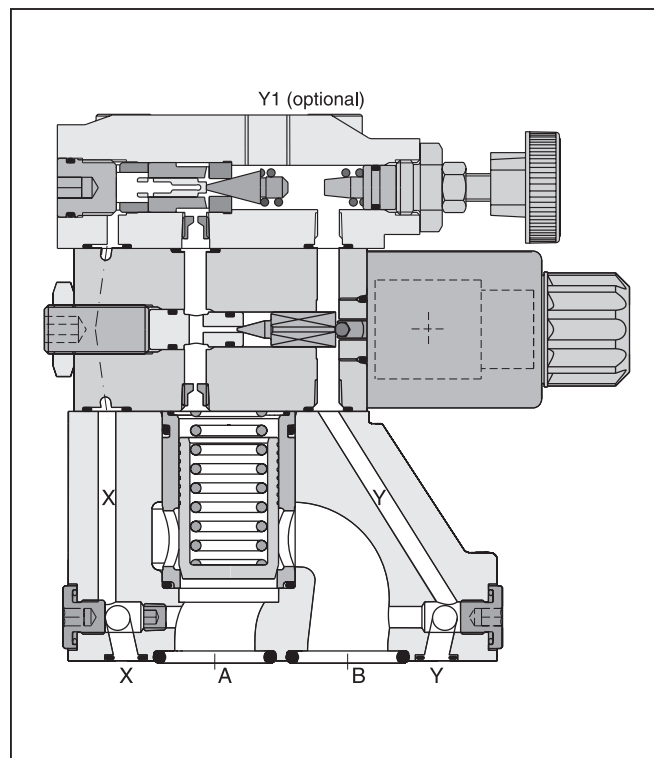
R4V



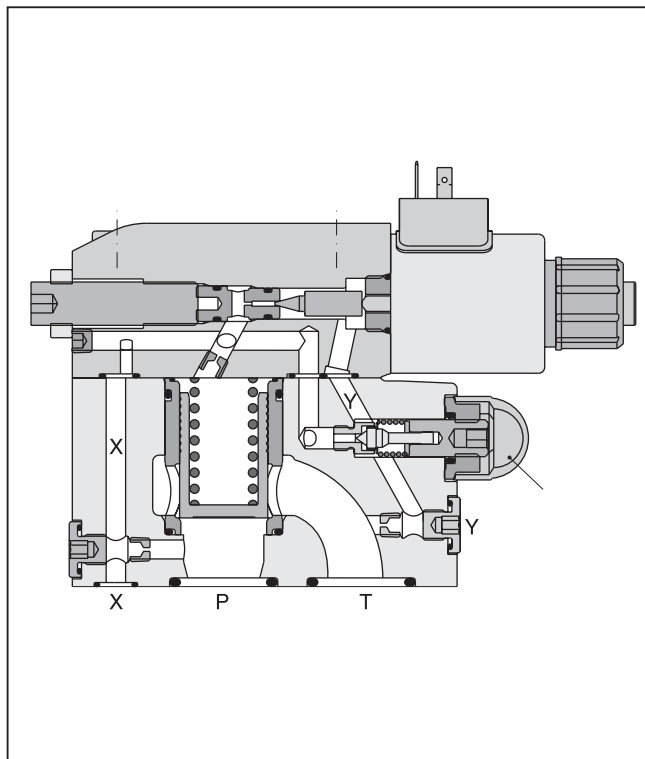
R6V



R4V



R6V



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

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R		V		5										
Pressure Relief Valve	Interface	Relief Function	Size	Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Range	Mechanical Adjustment	Pilot Oil	Options	Solenoid Voltage	Design Series	Seal	Options Check with Factory	

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
G0R	12V 2.3A
G0S	16V 1.3A

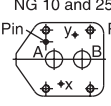
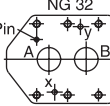
Code	Description
P2	with Mechanical maximum adjustment
PS ⁴⁾	without Mechanical maximum adjustment

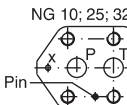
⁴⁾ R6V only

Code	Drain Port
0	Internal
1 ²⁾	External from Subplate
2	External from Valve Body (Y-port)

²⁾ R4V only

Code	Description
4	Subplate Mounting ISO 6264
6	Subplate Mounting ISO 6264



B

Bolt Kits:

R4V03	BK505
R4V06	BK485
R4V10	BK506
R6V03	BK494
R6V06	BK366
R6V10	BK507

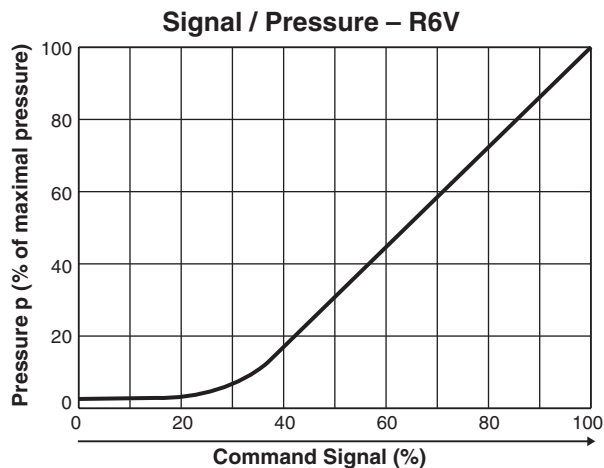
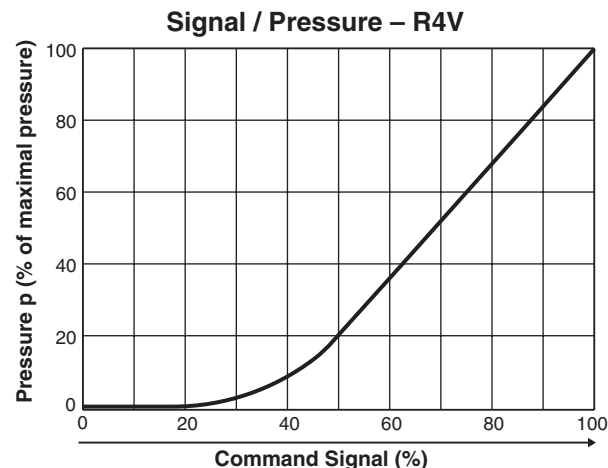
Weight:

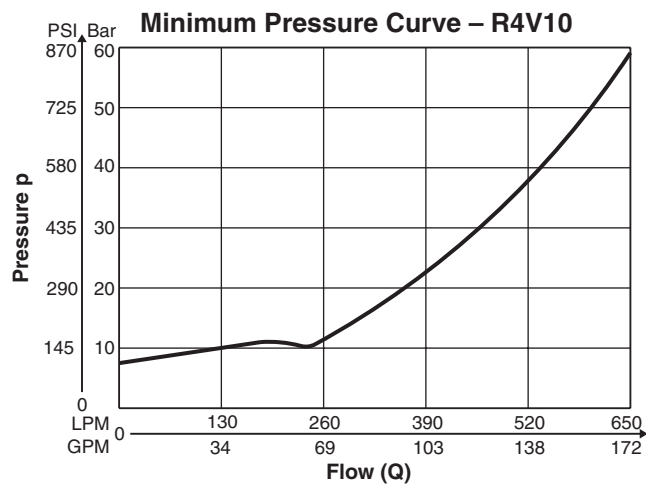
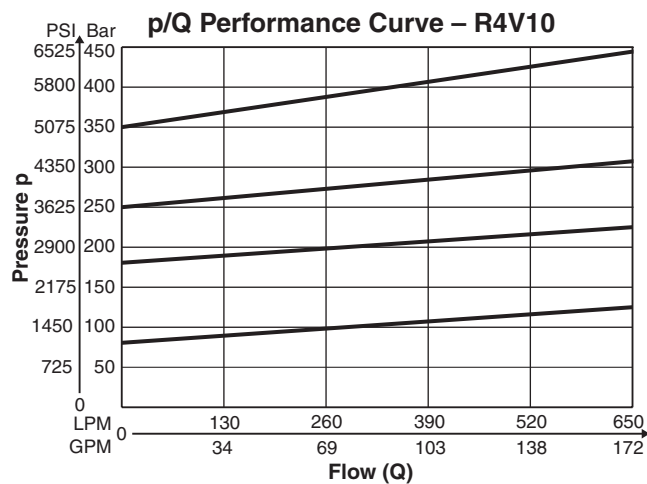
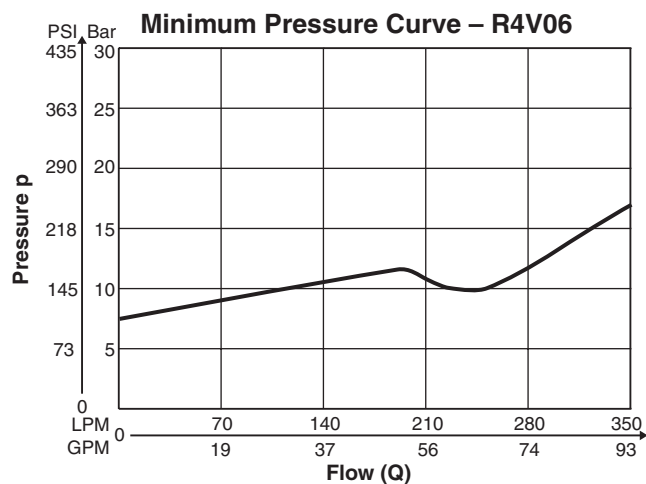
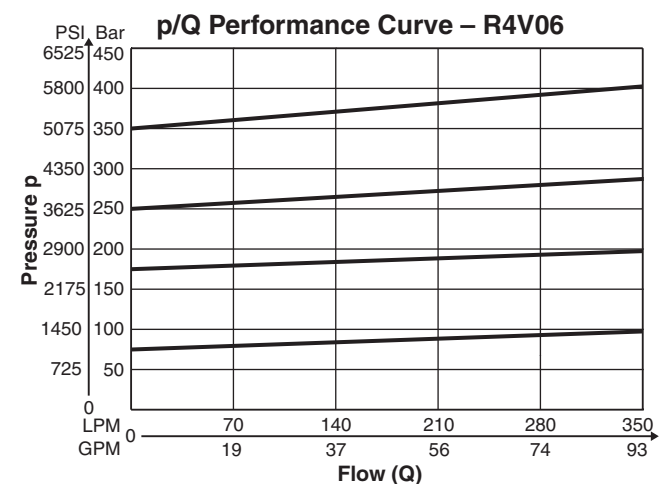
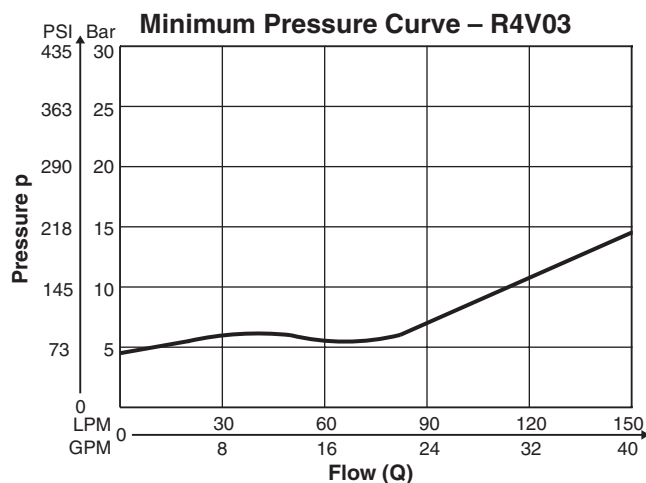
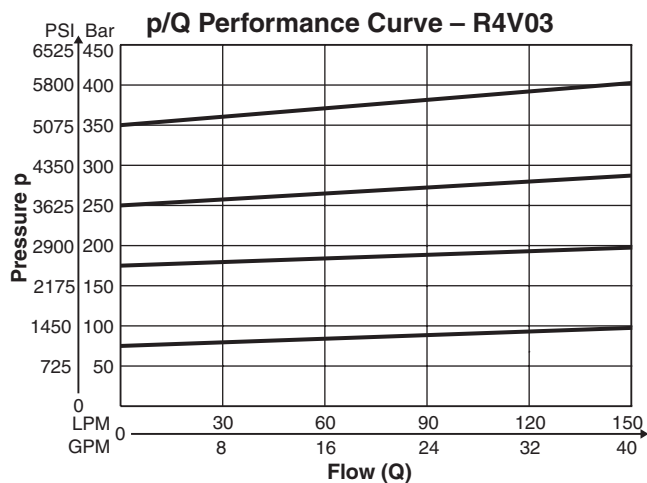
R4V03	4.5 kg (9.9 lbs.)
R4V06	6.3 kg (13.9 lbs.)
R4V10	7.8 kg (17.2 lbs.)
R6V03	5.2 kg (11.5 lbs.)
R6V06	6.4 kg (14.1 lbs.)
R6V10	8.3 kg (18.3 lbs.)

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	105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)			
Nominal Flow	R4V R6V	150 LPM (39.7 GPM) 250 LPM (66.1 GPM)	350 LPM (92.6 GPM) 500 LPM (132.3 GPM)	650 LPM (172.0 GPM) 650 LPM (172.0 GPM)
Fluid	Hydraulic oil as per DIN 51524...51535, other on request			
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)			
Viscosity	Permitted Recommended	20 to 380 cSt / mm²/s (93 to 1761 SSU) 30 to 50 cSt / mm²/s (139 to 232 SSU)		
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (Proportional Solenoid)				
Duty Ratio	100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible			
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 (68°F) for 12V; 12 Ohm at 20°C (68°F) for 16V			
Solenoid Connectors	Connector as per EN 175301-803			
Power Amplifier, Recommended	PCD00A-400			

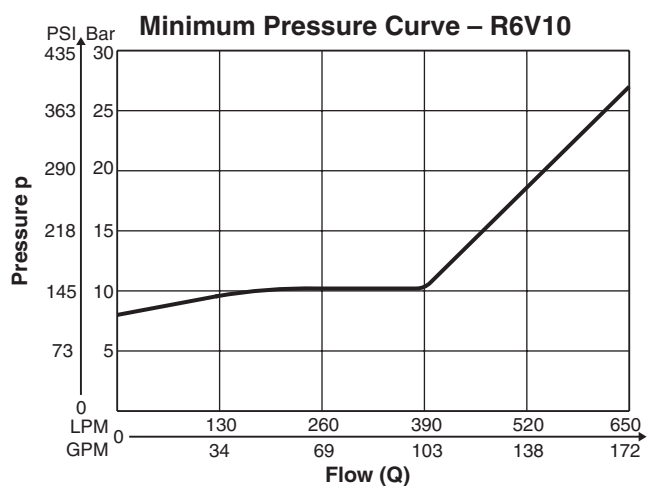
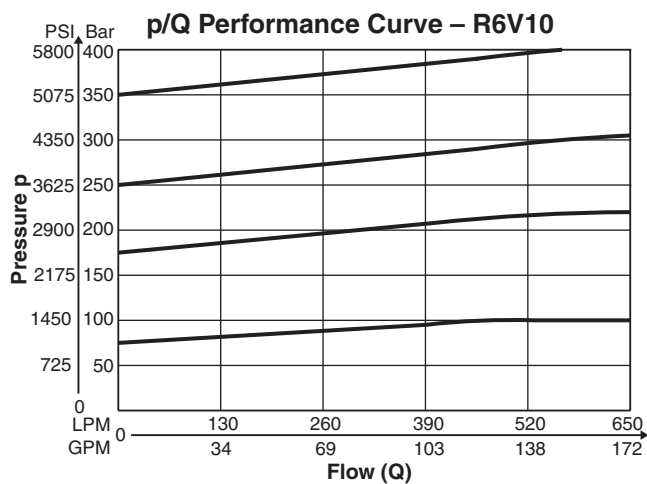
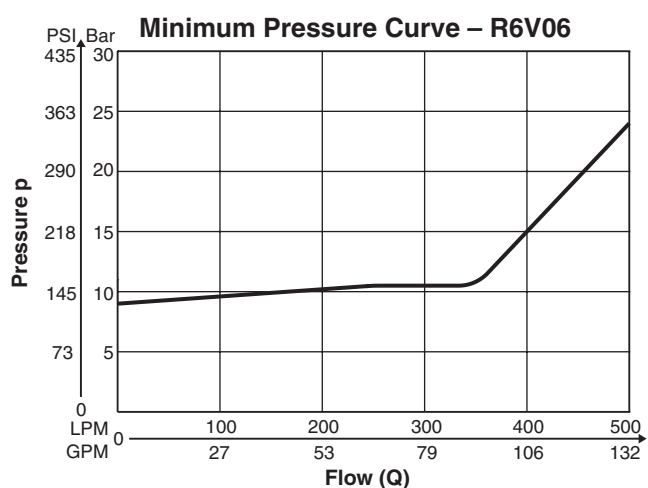
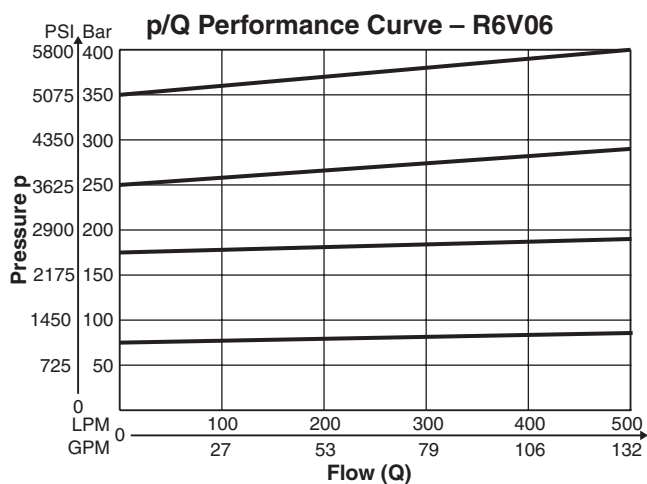
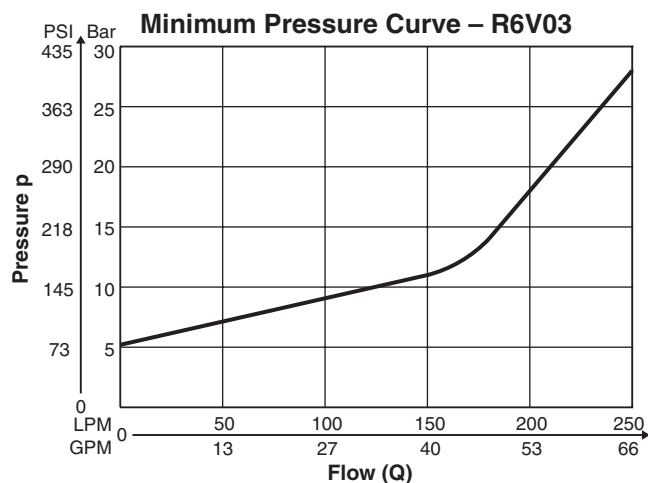
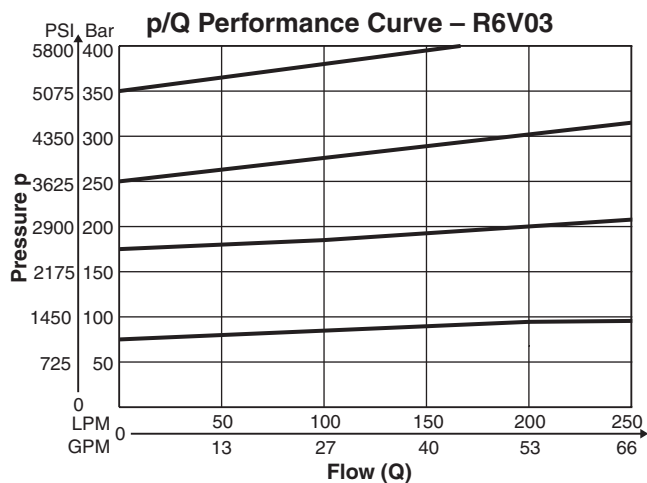
Performance Curves



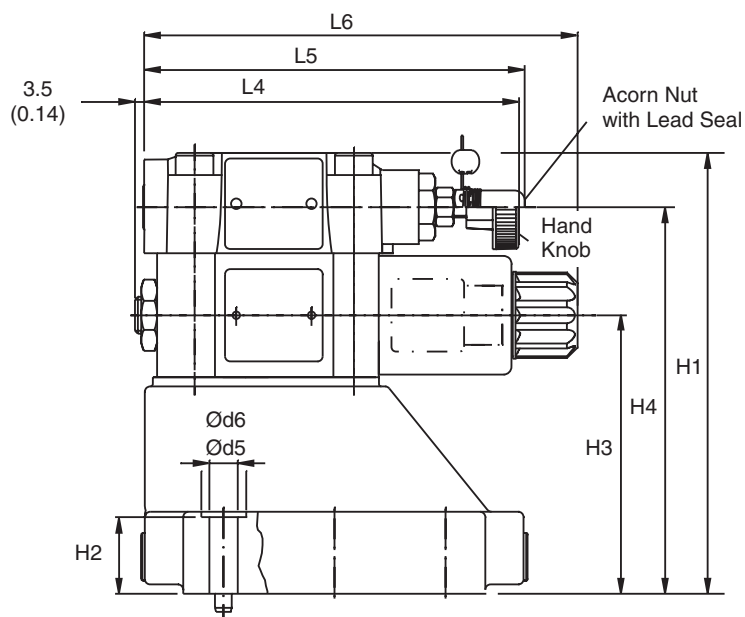
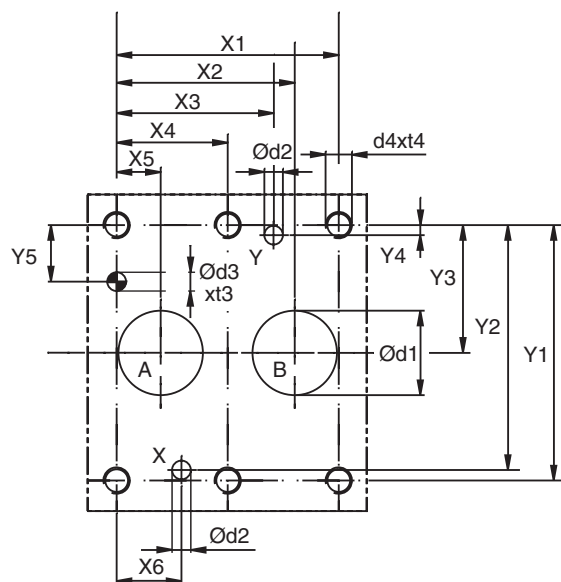
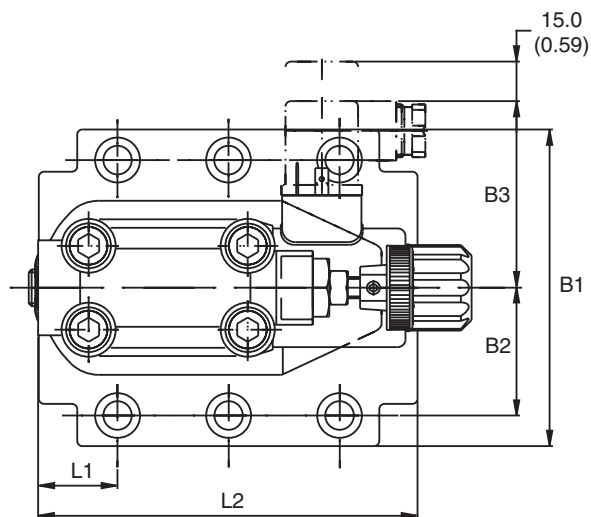


The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

B



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

B

Dimensions

Proportional Pressure Relief Valves
Series R4V (Offboard Electronics)

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)	—

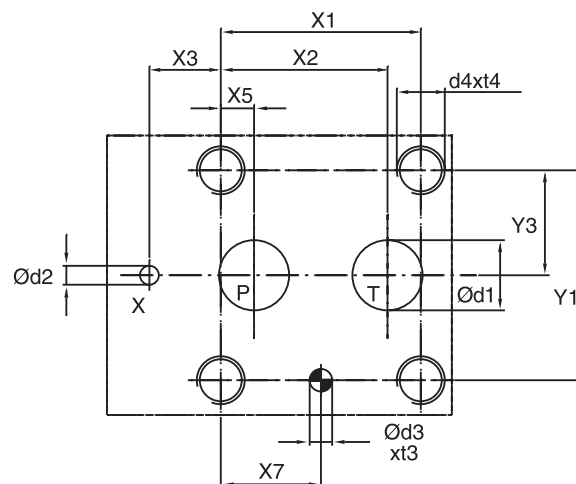
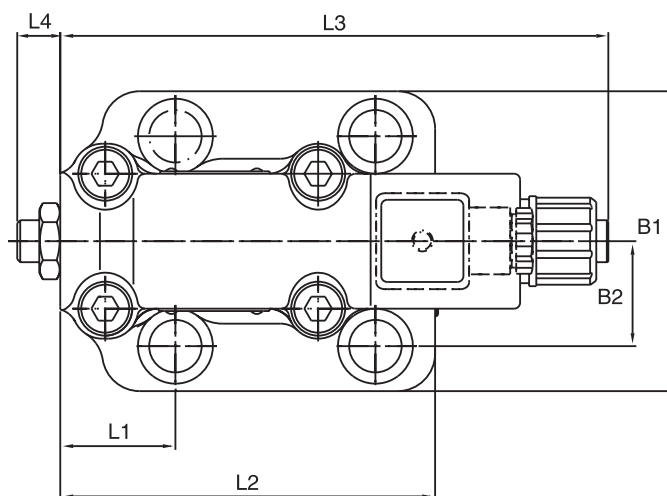
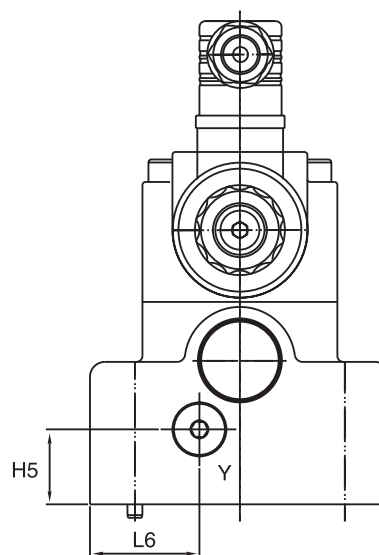
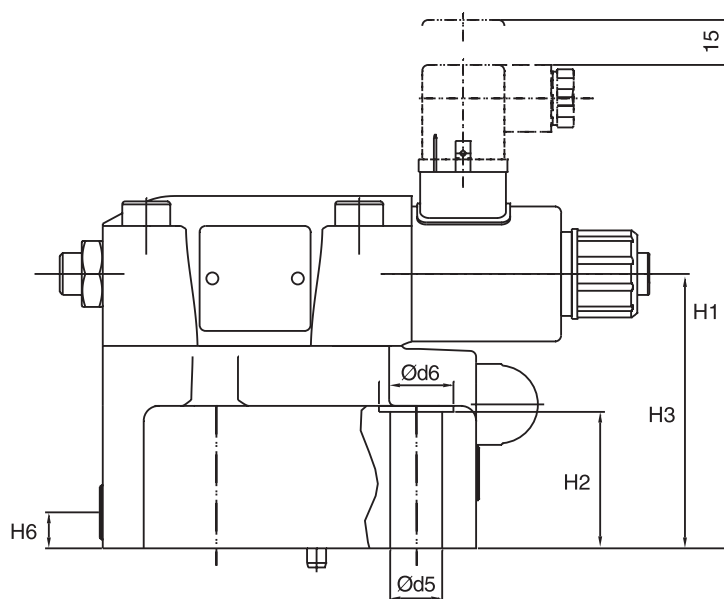
Tolerance at X and Y pin holes and screw holes ± 0.1 , at port holes ± 0.2 .

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)	—	25.0 (0.98)	90.8 (3.57)	—	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)	154.5 (6.08)	29.0 (1.14)	95.0 (3.74)	136.0 (5.35)	—	30.9 (1.22)	123.0 (4.84)	—	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)	30.0 (1.18)	105.5 (4.15)	146.5 (5.77)	—	29.8 (1.17)	143.5 (5.65)	—	143.0 (5.63)	144.8 (5.70)	164.8 (6.49)

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6	Subplate
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)	SPP3M6B910
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)	SPP6M8B910
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)	SPP10M12B910

NG	ISO-code	Bolt Kit			Seal  Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK505	4x M10 x 35 DIN912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0	S26-58507-5	
25	6264-08-11-*-97	BK485	4x M10 x 45 DIN912 12.9		S26-58475-0	S26-58475-5	
32	6264-10-15-*-97	BK506	6x M10 x 45 DIN912 12.9		S26-58508-0	S26-58508-0	
Prop Section P2*					S26-58473-0	S26-58473-5	

* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

**B**Y: external drain
port G 1/8"

Dimensions**Proportional Pressure Relief Valves
Series R6V (Offboard Electronics)**

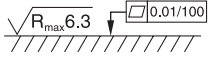
Inch equivalents for millimeter dimensions are shown in (**)

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)	158.7 (6.25)	27.0 (1.06)	88.0 (3.46)	—	20.5 (0.81)	25.0 (0.98)	52.0 (2.05)	117.0 (4.61)	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)	44.3 (1.74)	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	Subplate
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)	SPP3R6B910
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)	SPP6R10B910
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)	SPP10R12B910

NG	ISO-code	Bolt Kit			Seal  Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-09-*-97	BK494	4x M12 x 45 DIN912 12.9	108 Nm (79.7 lb.-ft.) $\pm 15\%$	S26-98589-0	S26-98589-5	
25	6264-08-13-*-97	BK366	4x M16 x 70 DIN912 12.9	264 Nm (194.7 lb.-ft.) $\pm 15\%$	S26-96396-0	S26-96396-5	
32	6264-10-17-*-97	BK507	4x M18 x 75 DIN912 12.9	398 Nm (293.5 lb.-ft.) $\pm 15\%$	S26-96392-0	S26-96392-5	

General Description

Series R4V and R6V proportional pressure relief valves feature onboard electronics based on the functionality of the digital amplifier PCD00.

The digital onboard electronic is situated in a robust metal housing and can be used in rough environments.

The nominal values of the valves are factory set. Additionally the ProPx software permits the editing of all parameters. The software is also used for the digital electronic modules. The cable for connection to a serial RS-232 interface is available as accessory.

The electrical connection is available in 2 options:

Code 10V: 6 + PE central connection
 0...+10V command signal (preset)
 +10V reference voltage output

Code 4MA: 6 + PE central connection
 4...20mA command signal (preset)

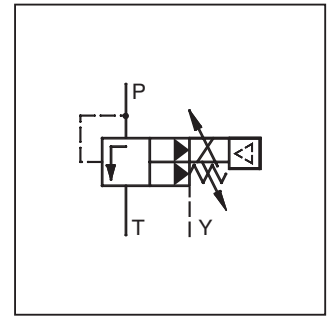
The proportional solenoid operated pilot stage with integrated electronics controls a seated type main stage. The valves are available with an optional mechanical maximum pressure adjustment.

Features

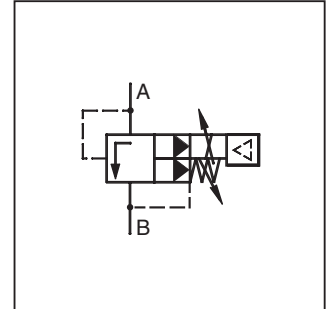
- Pilot operated pressure relief valve
- Onboard electronics
- Factory set
- Ramp time adjustment
- Linearized characteristics



R6V06



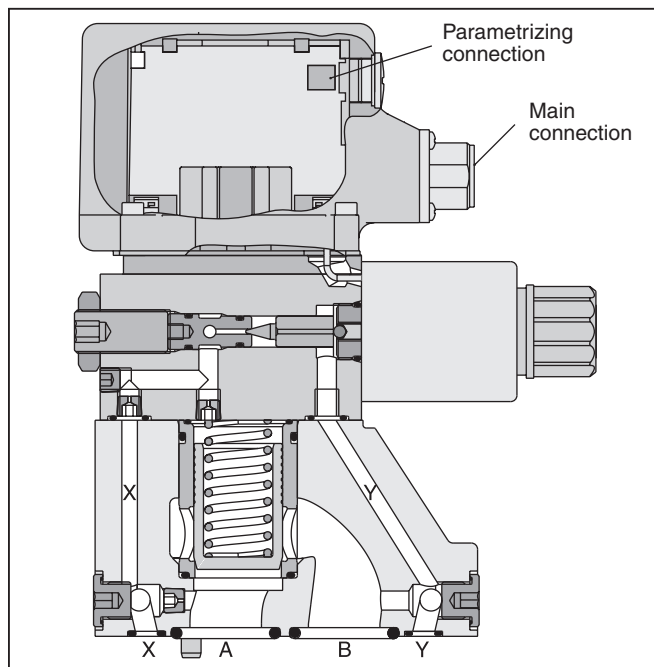
R6V



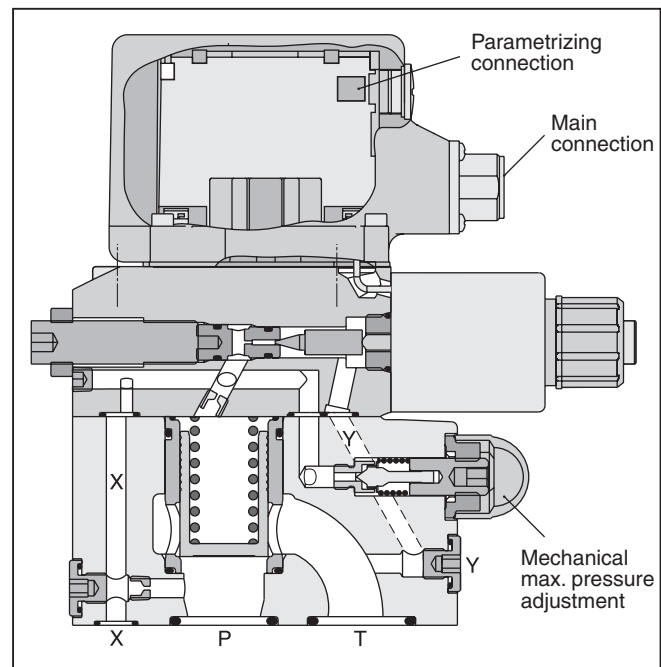
R4V

- 3 pressure ranges
- 2 interfaces:
 R4V Subplate, ISO 6264 (DIN 24340 Form D)
 R6V Subplate, ISO 6264 (DIN 24340 Form E)
- Optional mechanical maximum pressure adjustment

R4V OBE



R6V OBE



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

B01_Cat2550.indd, ddp, 06/21

Ordering Information

R

Pressure Relief Valve

Interface

V

Relief Function

Size

5

Maximum Pressure
350 Bar
(5075 PSI)

Drain Port

Pressure Range

P

Proportional Operation

Pilot Oil

Options

Input Signal

Design Series

Seal

Options Check with Factory

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	0...+10V with ref. output +10V
4MA	4...20mA

Code	Description
PN	without Mechanical maximum adjustment
PM	with Mechanical maximum adjustment

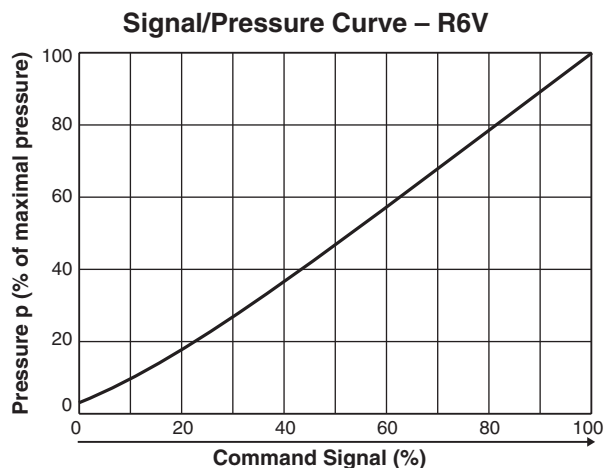
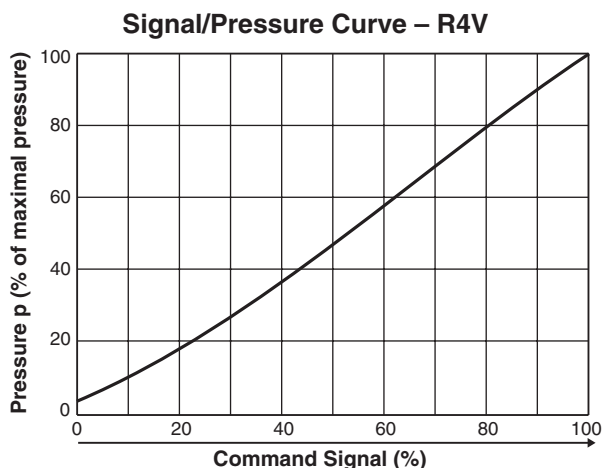
Code	Description
4	Subplate Mounting ISO 6264
6	Subplate Mounting ISO 6264

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

¹⁾ R4V only

Bolt Kits:		Weight:	
R4V03	BK505	R4V03	4.5 kg (9.9 lbs.)
R4V06	BK485	R4V06	6.3 kg (13.9 lbs.)
R4V10	BK506	R4V10	7.8 kg (17.2 lbs.)
R6V03	BK494	R6V03	5.4 kg (11.9 lbs.)
R6V06	BK366	R6V06	6.6 kg (14.6 lbs.)
R6V10	BK507	R6V10	8.6 kg (19.0 lbs.)

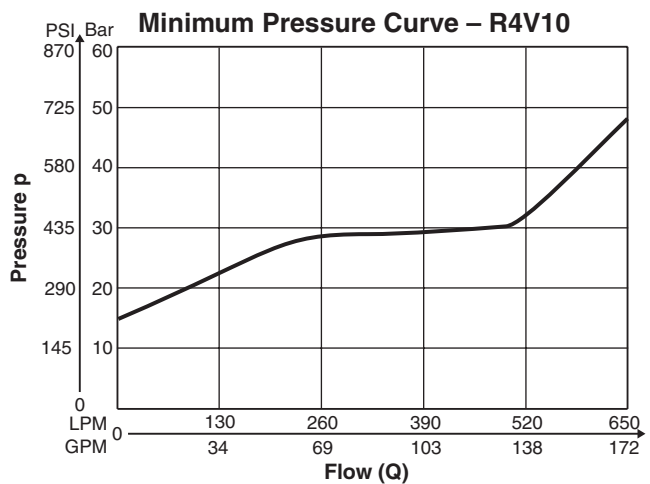
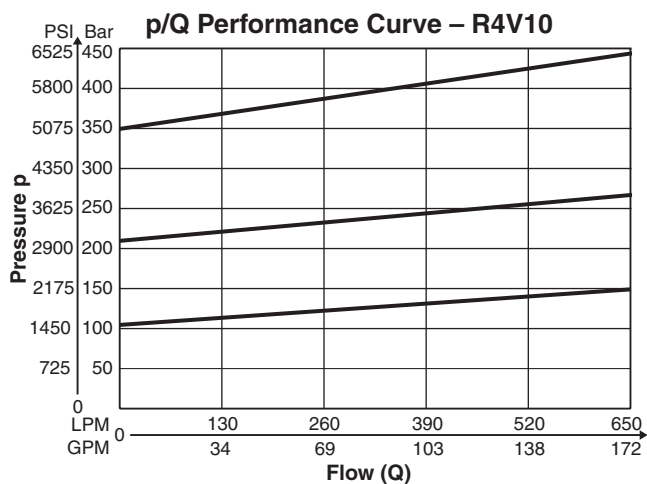
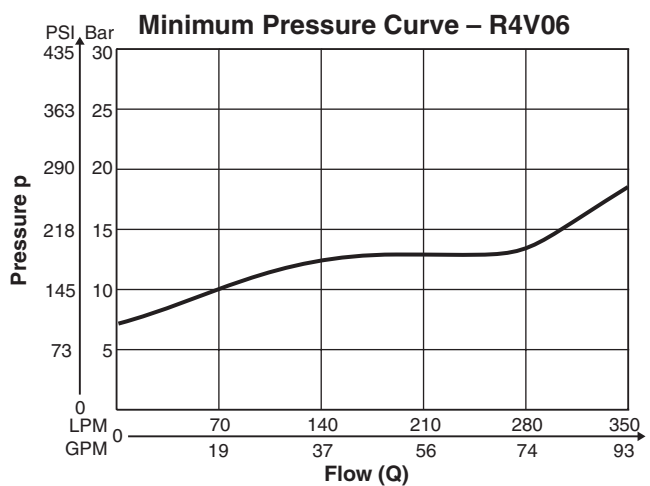
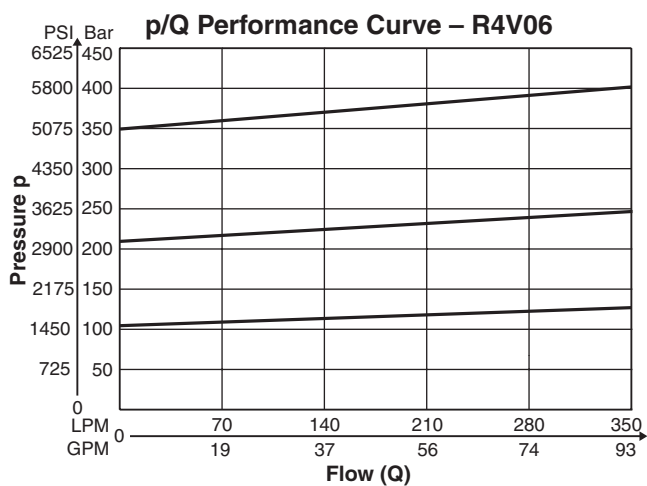
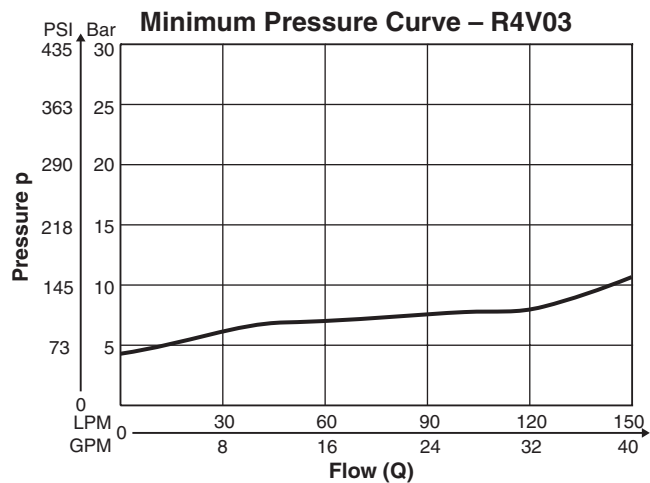
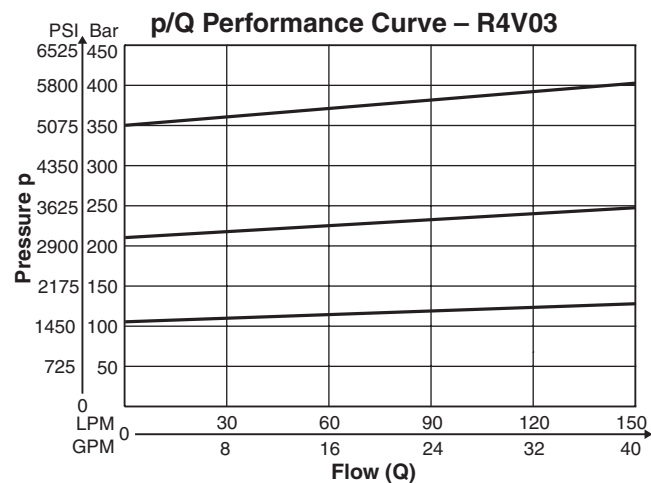
Performance Curves

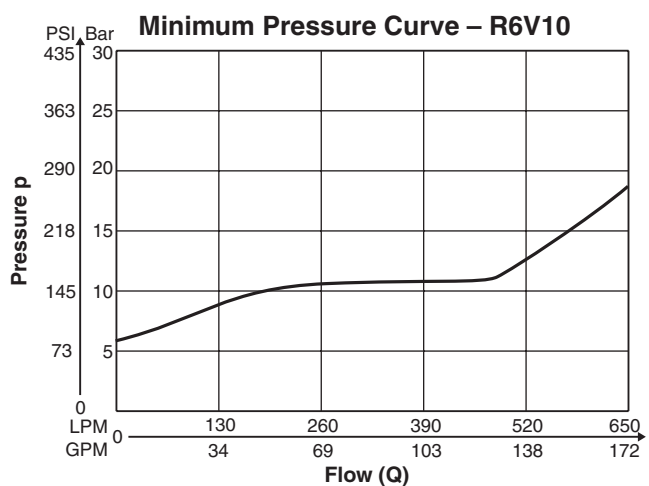
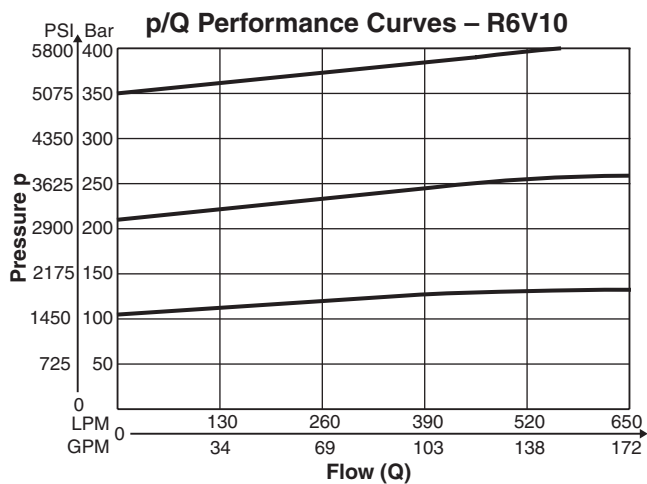
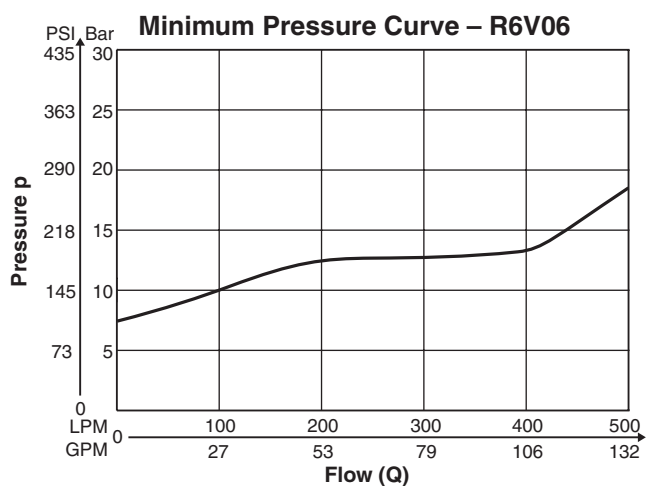
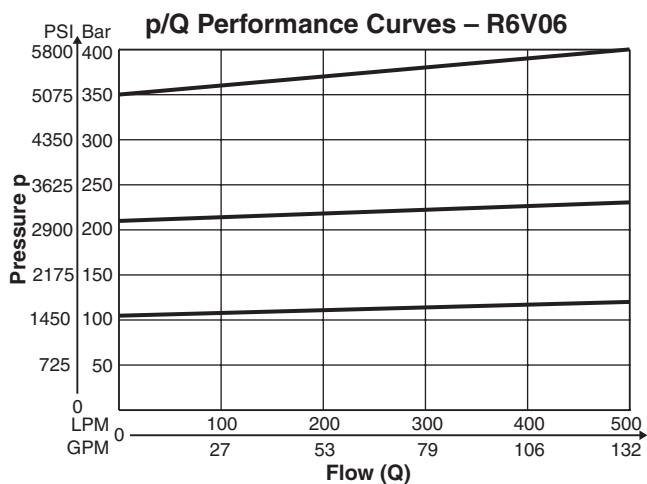
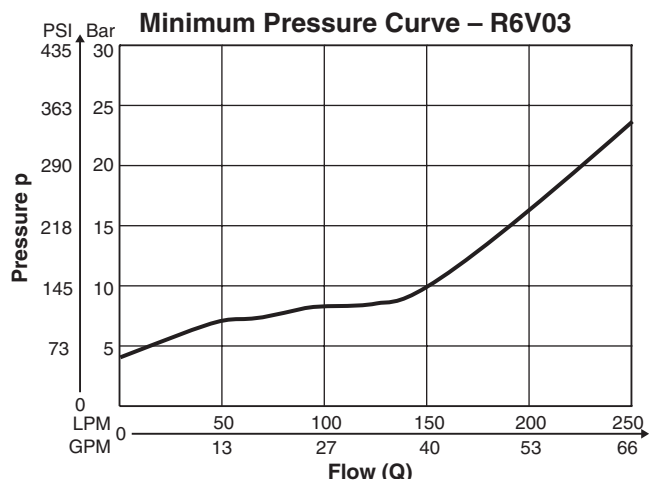
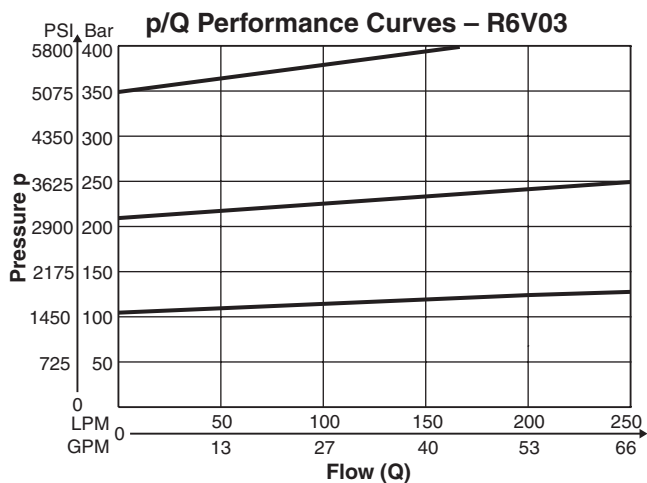


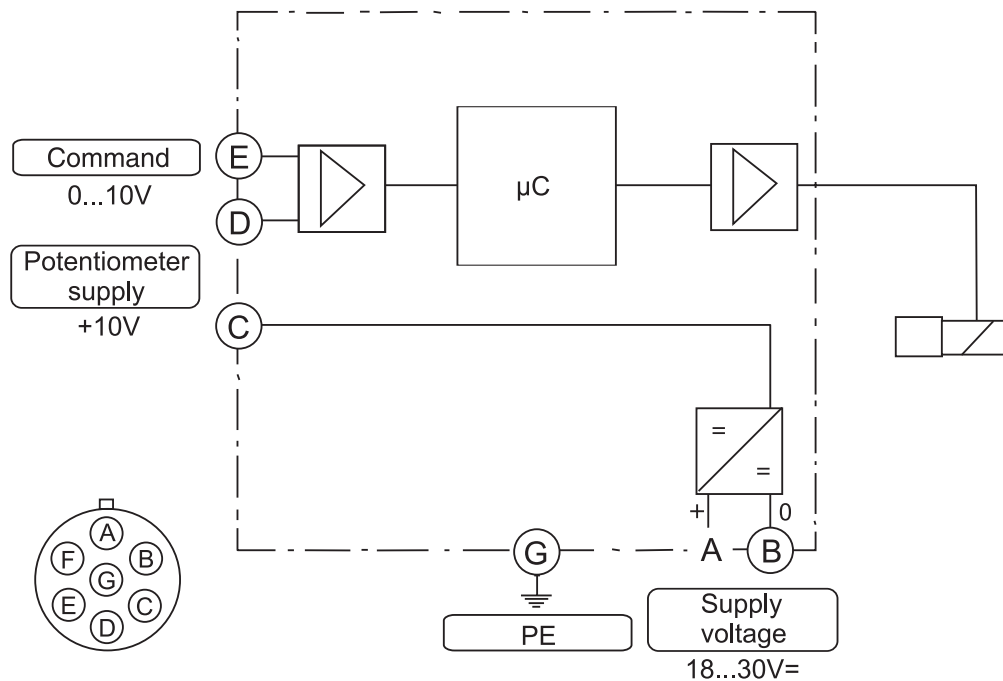
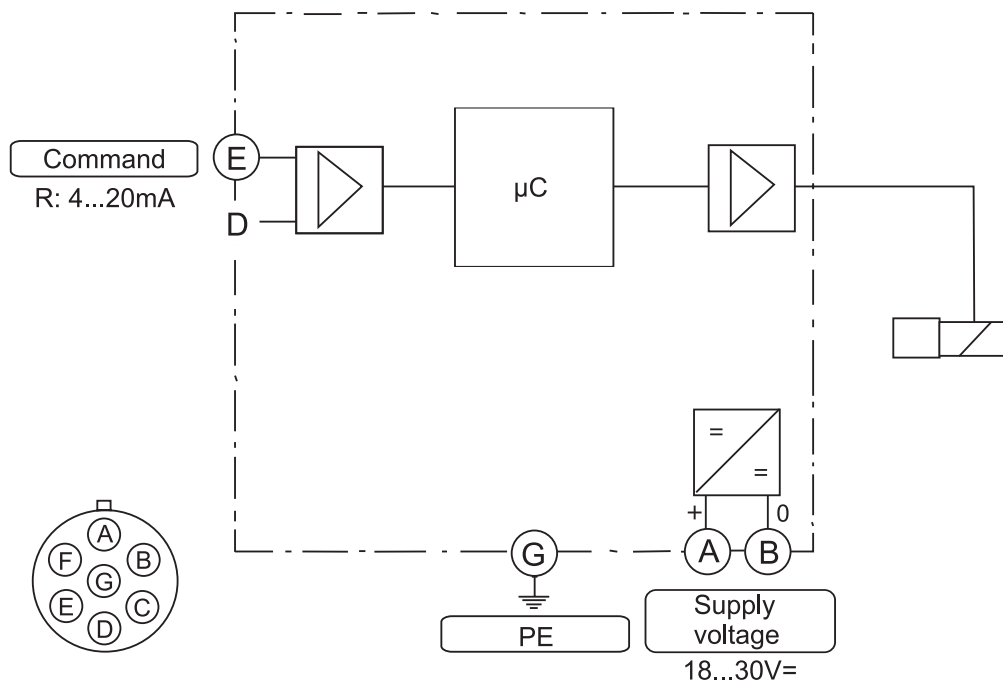
General				
Size		NG10	NG25	NG32
Interface		Subplate mounting acc. ISO 6264		
Mounting Position		as desired, horizontal mounting preferred		
Ambient Temperature	[°C]	-20...+60; (-4°F ... +140°F)		
MTTF _D Value	[years]	50		
Vibration Strength	[g]	10 sinus 5...2000 Hz acc. to IEC 68-2-6 30 noise 20...2000 Hz acc. to IEC 68-2-36 15 shock acc. to IEC 68-2-27		
Hydraulic				
Maximum Operating Pressure		Ports P (or A) and X up to 350 Bar (5075 PSI), port T (or B) and Y 30 Bar (435 PSI)		
Pressure Range		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 (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...51535, other on request		
Viscosity				
Recommended Permitted	[cSt] / [mm²/s] [cSt] / [mm²/s]	30 ... 50 (139 ... 232 SSU) 20 ... 380 (93 ... 1761 SSU)		
Fluid Temperature	[°C]	-20 ... +60; (-4°F ... +140°F)		
Filtration		ISO 4406 (1999); 18/16/13 (acc. NAS 1638: 7)		
Hysteresis	[%]	< 1.5		
Electrical				
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible		
Supply Voltage	VDC	18...30, ripple < 5% eff., surge free		
Current Consumption Maximum	[A]	2.0		
Pre-fusing	[A]	2.5 medium lag		
Potentiometer Supply	[V]	+10 / ±5% max. 10mA		
Command Signal				
Code 10V Voltage	[V]	0...+10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm		
Code 4MA Current	[mA]	4...20, ripple < 0.01 % eff., surge free, Ri = 200 Ohm < 3.6 mA = enable off, > 3.8 mA = enable on (acc. NAMUR NE43)		
Differential Input Voltage Max.	[V]	30 for terminal D and E against PE (terminal G)		
	[V]	11 for terminal D and E against 0V (terminal B)		
Adjustment Ranges				
Minimum current	[%]	0...50		
Maximum current	[%]	50...100		
Ramp	[s]	0...32.5		
Interface		RS-232, parametrizing connection 5 pole		
EMC		EN 61000-6-2, EN 61000-6-4		
Central Connection		6 + PE acc. EN 175201-804		
Cable Specification	[mm²]	7 x 1.0 (AWG 18) overall braid shield		
Cable Length Maximum	[m]	50 (164 ft.)		

B

B





Code 10V**6 + PE acc. EN 175201-804****Code 4MA****6 + PE acc. EN 175201-804**

ProPxD Interface Program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

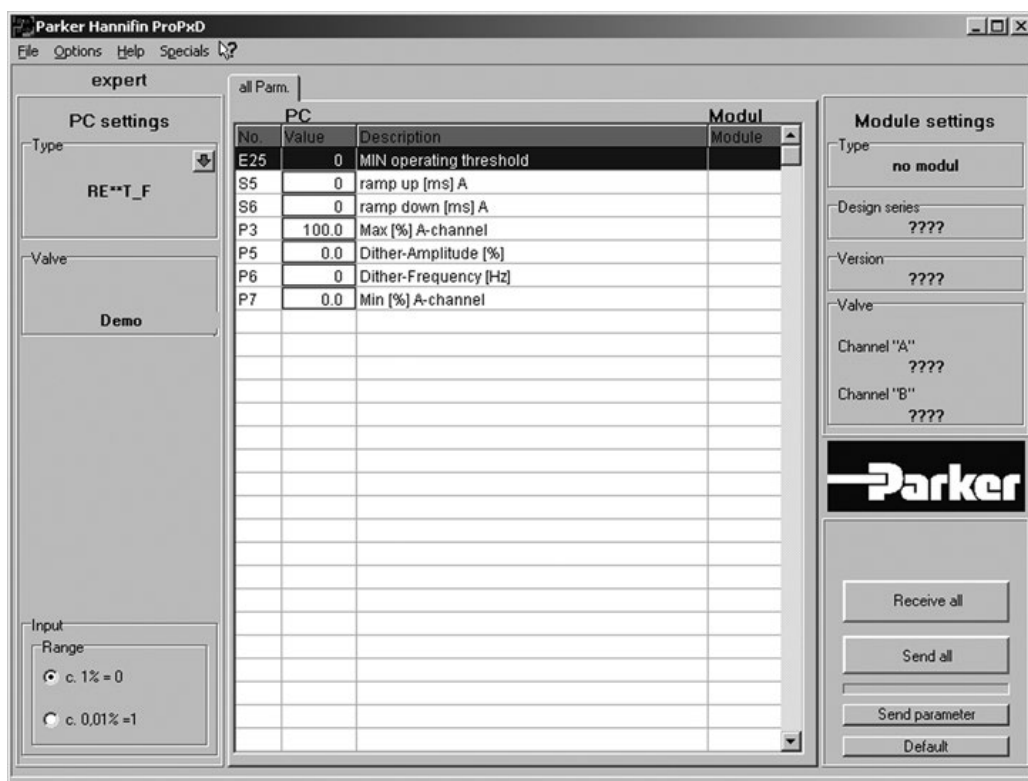
Features

- Simple editing of all parameters
- Storage and loading of optimized parameter adjustments
- Executable with all Windows® operating systems from Windows® 95 upwards
- Communication between PC and electronics via serial interface RS-232

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

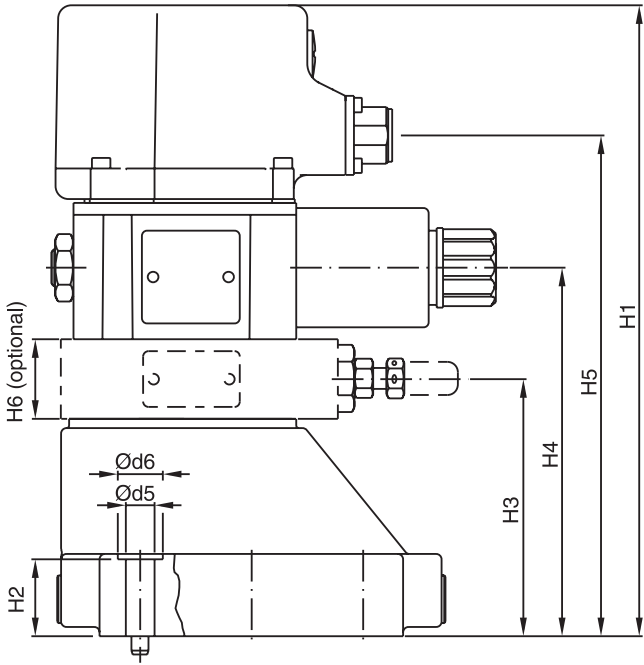
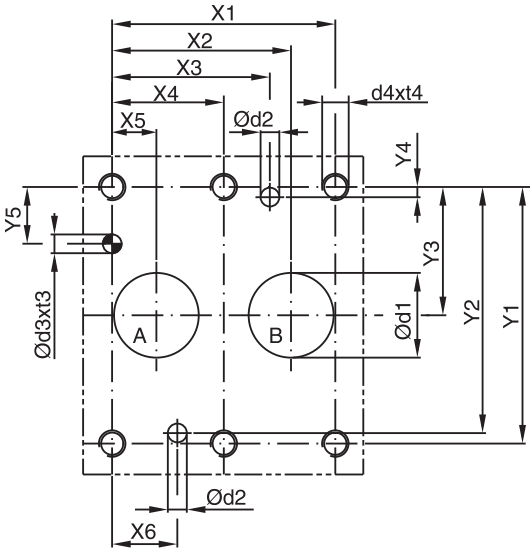
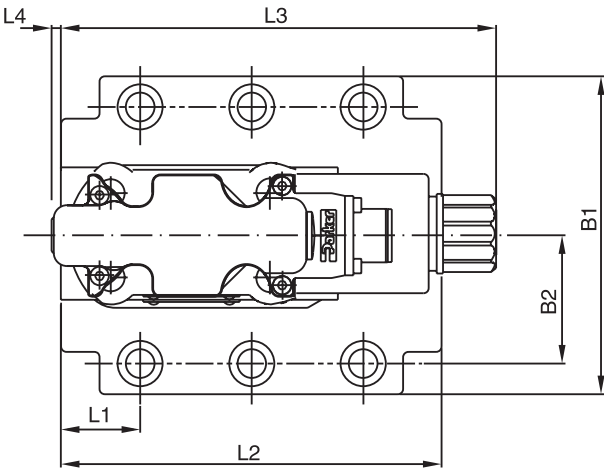
Simple to use interface program. Download free of charge
www.parker.com/propxd

B



The parametrizing cable may be ordered under item no. 40982923.

B



Dimensions

Proportional Pressure Relief Valves
Series R4V (Onboard Electronics)

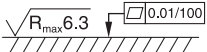
Inch equivalents for millimeter dimensions are shown in (**)

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 .

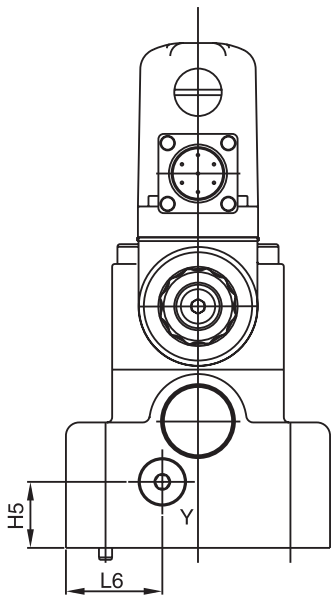
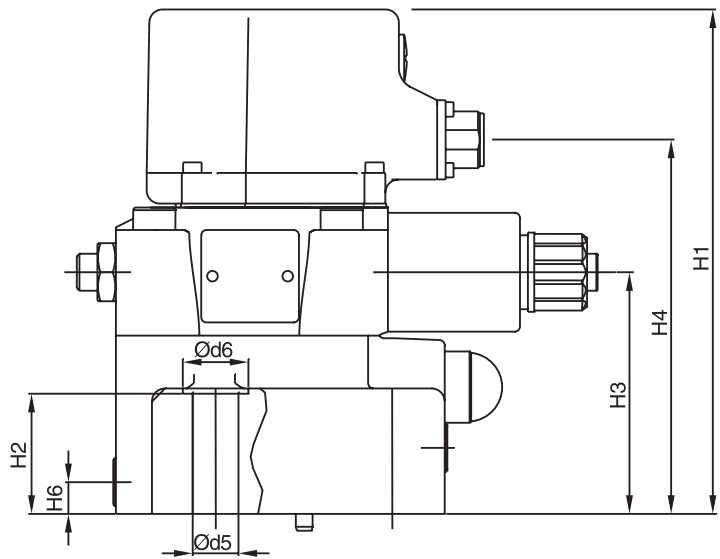
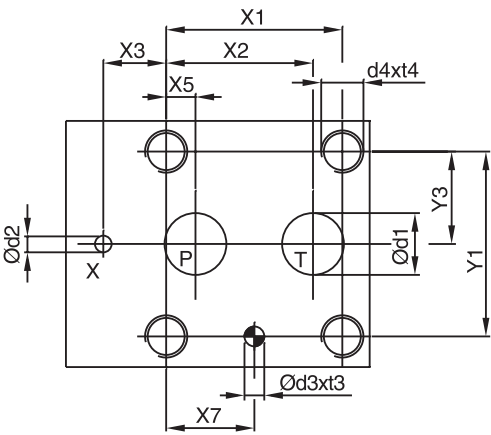
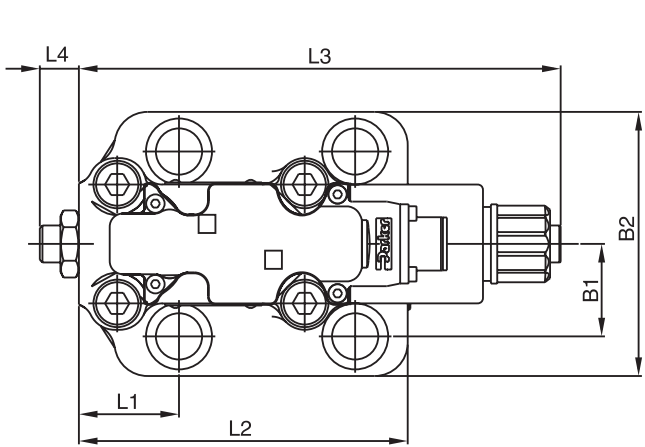
NG	ISO-Code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	200.3 (7.89)	21.0 (0.83)	60.0 (2.36)	102.0 (4.02)	151.0 (5.94)	30.0 (1.18)	25.0 (0.98)	90.8 (3.57)	164.2 (6.46)	4.5 (0.18)	—	—
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.56)	226.8 (8.93)	29.0 (1.14)	86.5 (3.41)	128.5 (5.06)	184.0 (7.24)	30.0 (1.18)	30.9 (1.22)	123.0 (4.84)	164.2 (6.46)	4.5 (0.18)	—	—
32	6264-10-15-*-97	120.0 (4.72)	48.4 (1.91)	237.3 (9.34)	29.0 (1.14)	97.0 (3.82)	139.0 (5.47)	194.5 (7.66)	30.0 (1.18)	29.8 (1.17)	143.5 (5.65)	164.2 (6.46)	4.5 (0.18)	—	—

NG	ISO-Code	d1max	d2max	d3	t3	d4	t4	d5	d6	Subplate
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)	SPP3M6B910
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)	SPP6M8B910
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)	SPP10M12B910

NG	ISO-Code	Bolt Kit			Seal  Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK505	4x M10 x 35 DIN912 12.9	63 Nm (46.5 lb.-ft.) $\pm 15\%$	S26-58507-0*	S26-58507-5*	
25	6264-08-11-*-97	BK485	4x M10 x 45 DIN912 12.9	63 Nm (46.5 lb.-ft.) $\pm 15\%$	S26-58475-0*	S26-58475-5*	
32	6264-10-15-*-97	BK506	6x M10 x 45 DIN912 12.9	63 Nm (46.5 lb.-ft.) $\pm 15\%$	S26-58508-0*	S26-58508-5*	
Prop. Section P2*					S26-58473-0	S26-58473-5	

* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

B



Y: external drain
port G 1/8"



Dimensions**Proportional Pressure Relief Valves
Series R6V (Onboard Electronics)**

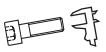
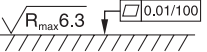
Inch equivalents for millimeter dimensions are shown in (**)

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)	185.1 (7.29)	27.0 (1.06)	88.0 (3.46)	135.8 (5.35)	20.5 (0.81)	25.0 (0.98)	52.0 (2.05)	117.0 (4.61)	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)	188.6 (7.43)	45.5 (1.79)	91.5 (3.60)	139.8 (5.50)	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)	194.1 (7.64)	52.0 (2.05)	97.0 (3.82)	144.8 (5.70)	26.5 (1.04)	13.5 (0.53)	44.3 (1.74)	153.0 (6.02)	182.3 (7.18)	14.4 (0.57)	—	46.5 (1.83)

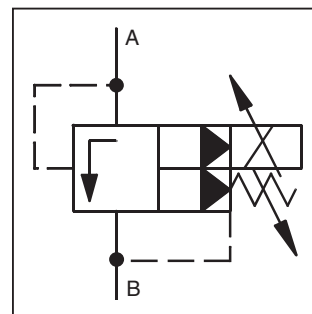
NG	ISO-Code	d1max	d2max	d3	t3	d4	t4	d5	d6	Subplate
10	6264-06-09-*-97	14.7 (0.58)	4.8 (0.19)	7.5 (0.30)	10.0 (0.39)	M12	20.0 (0.79)	13.5 (0.53)	20.0 (0.79)	SPP3R6B910
25	6264-08-13-*-97	23.4 (0.92)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M16	27.0 (1.06)	17.5 (0.69)	25.0 (0.98)	SPP6R10B910
32	6264-10-17-*-97	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)	SPP10R12B910

NG	ISO-Code	Bolt Kit			Seal  Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-09-*-97	BK494	4x M12 x 45 DIN912 12.9	108 Nm (79.7 lb.-ft.) $\pm 15\%$	S26-98589-0	S26-98589-5	
25	6264-08-13-*-97	BK366	4x M16 x 70 DIN912 12.9	264 Nm (194.7 lb.-ft.) $\pm 15\%$	S26-96396-0	S26-96396-5	
32	6264-10-17-*-97	BK507	4x M18 x 75 DIN912 12.9	398 Nm (293.5 lb.-ft.) $\pm 15\%$	S26-96392-0	S26-96392-5	

General Description

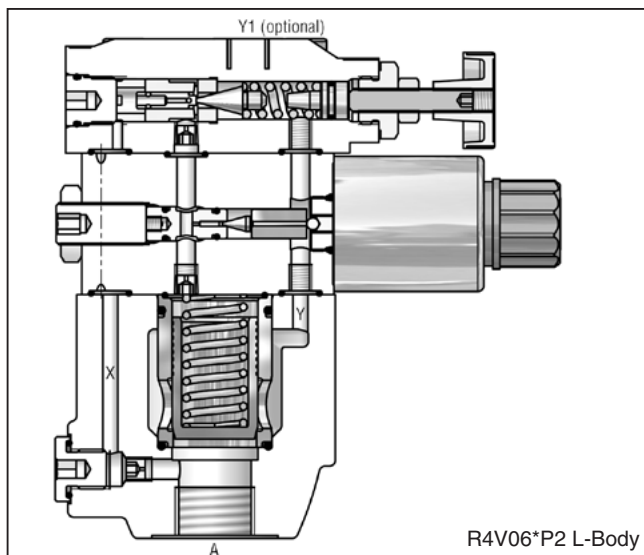
Series R4V*P2 proportional pressure relief valves are based on the mechanically adjusted Series R4V. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.

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



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



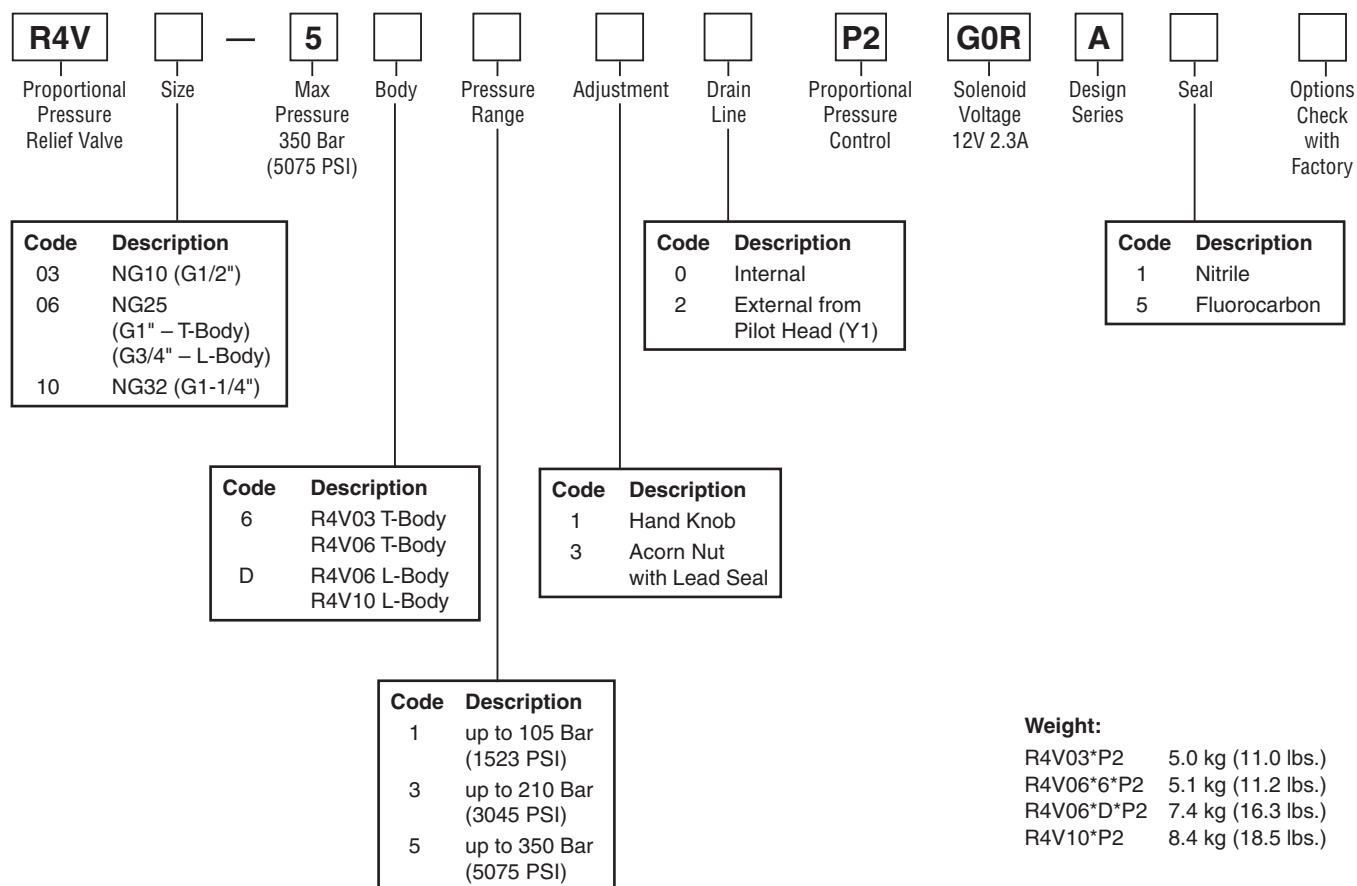
Specifications

General				
Size	T-Body		L-Body	
	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...51535, other on request			
Fluid Temperature	-20°C to 80°C (-4°F to 176°F)			
Viscosity Permitted Recommended	10 to 380 cSt / mm²/s (46 to 1761 SSU) 30 to 80 cSt / mm²/s (139 to 371 SSU)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (Proportional Solenoid)				
Duty Ratio	100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible			
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			

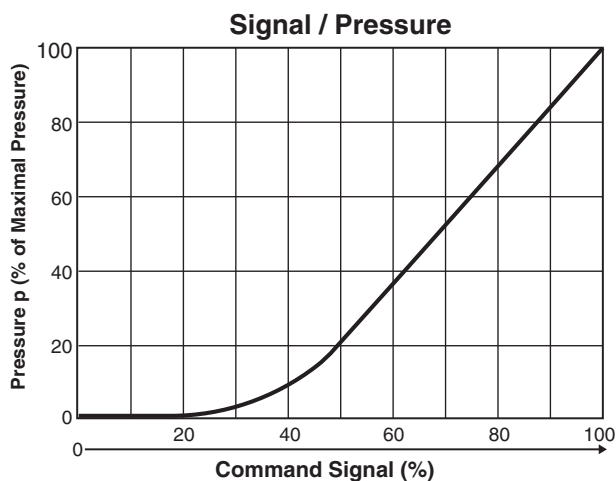
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

B01_Cat2550.indd, ddp, 06/21

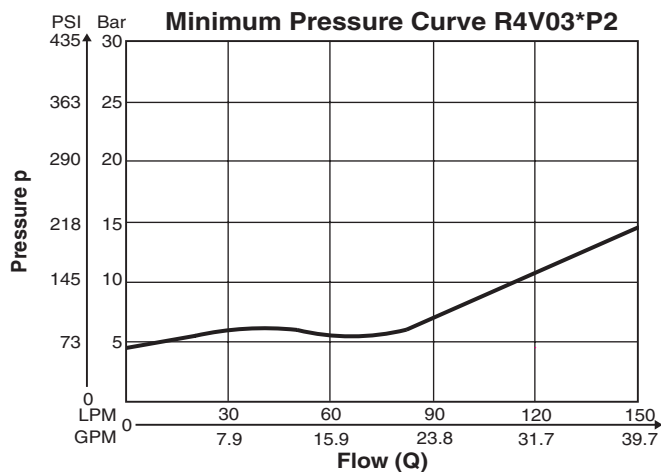
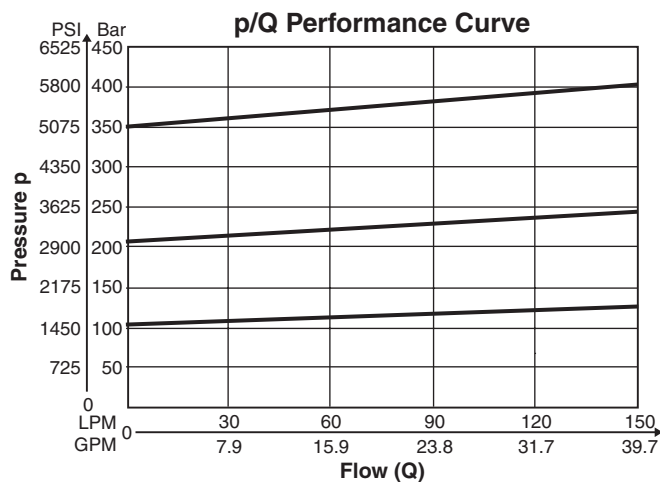
Ordering Information



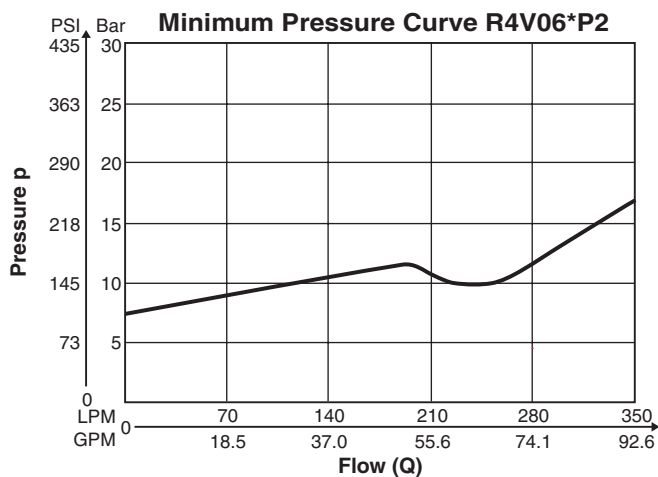
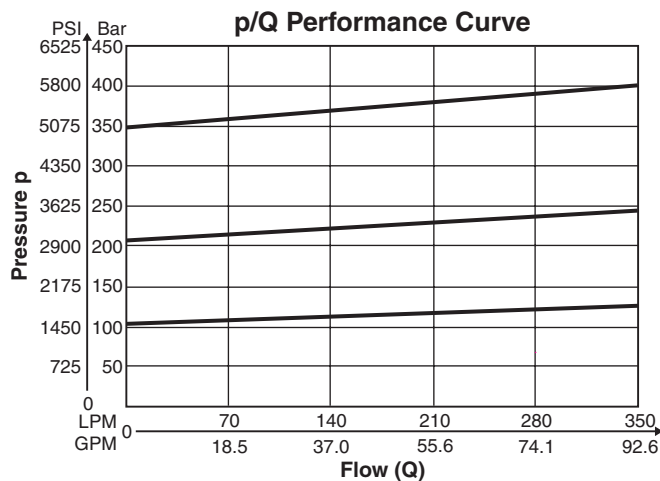
Performance Curve



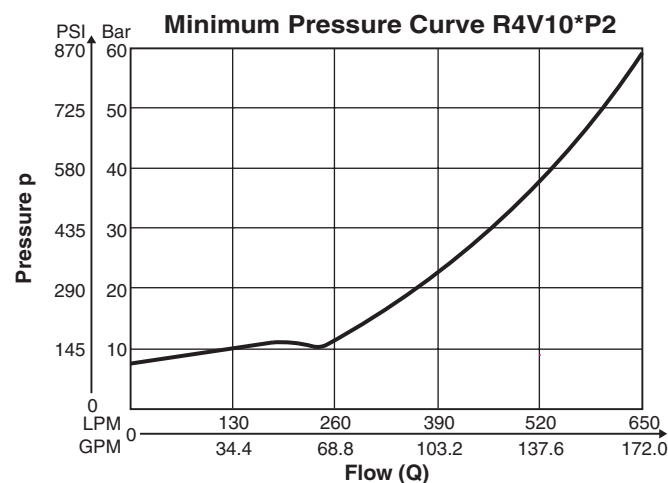
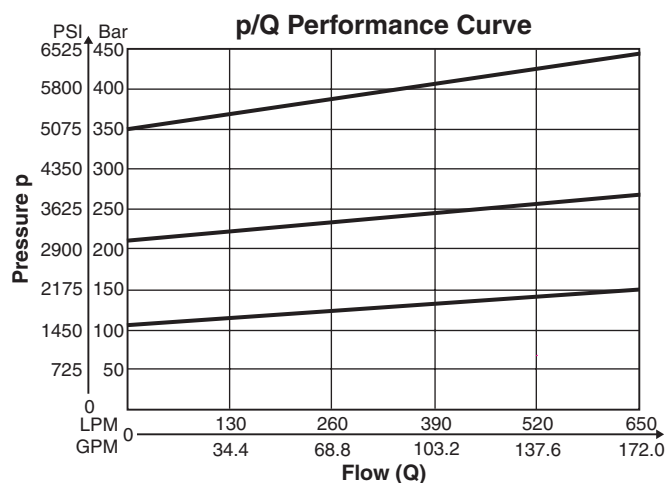
R4V03*P2 ¹⁾



R4V06*P2 ¹⁾



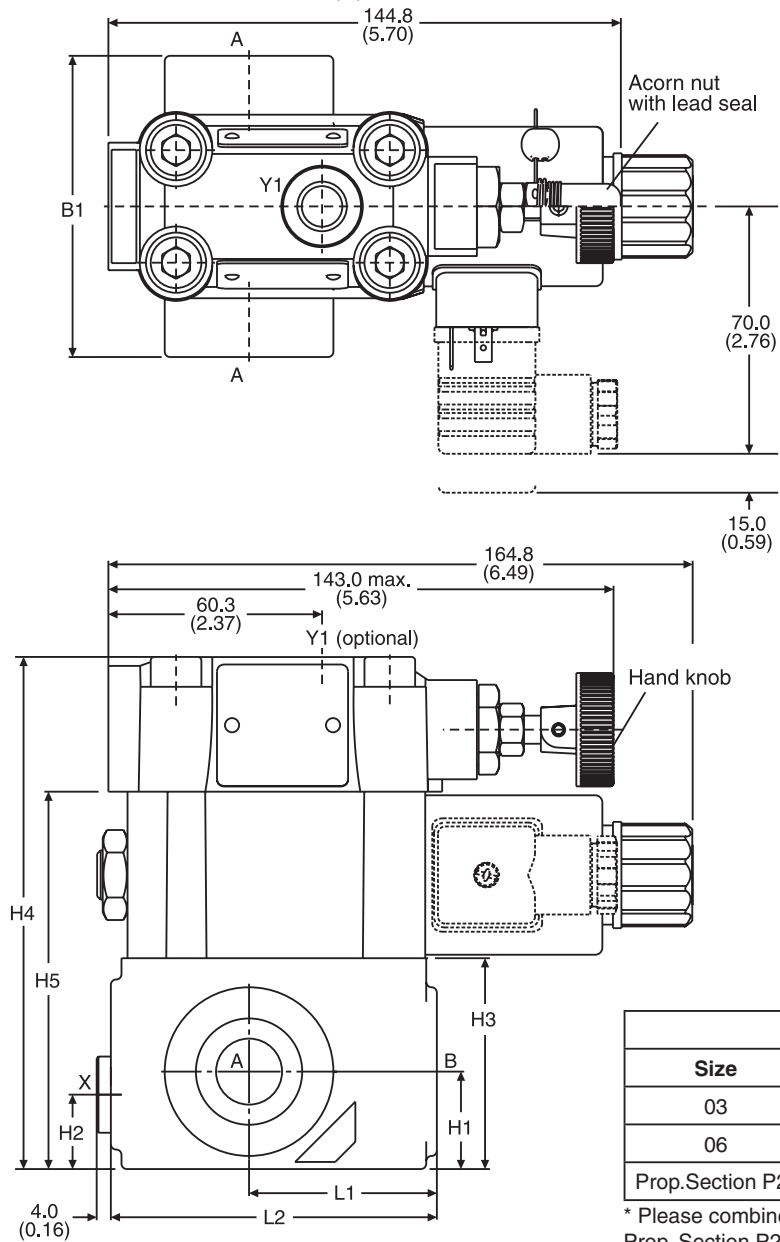
R4V10*P2 ¹⁾



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

T-Body

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



B

Seal Kits		
Size	Nitrile	Fluorocarbon
03	S26-58507-0	S26-58507-5
06	S26-58475-0	S26-58475-5
Prop. Section P2*	S26-58473-0	S26-58473-5

* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

Size	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)

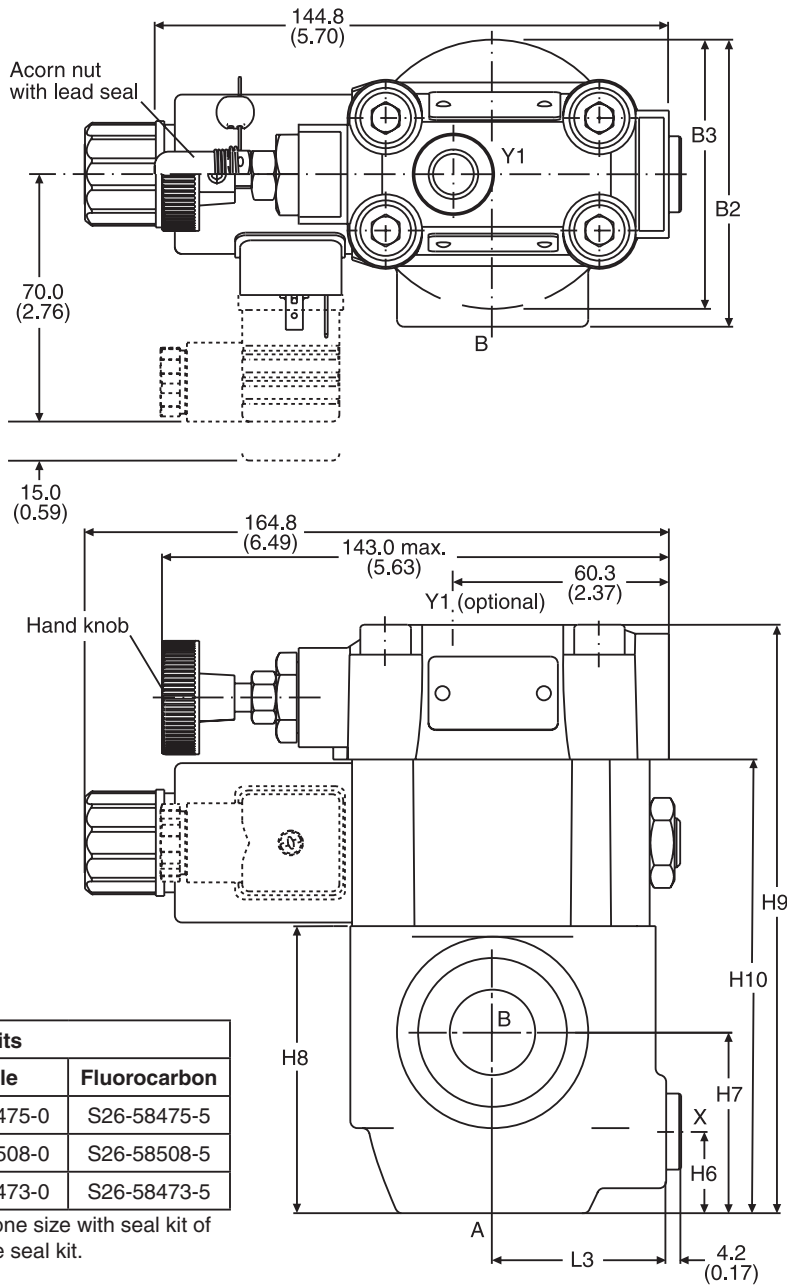
Ports	Function	Port Size	
		R4V03*P2 T-body	R4V06*P2 T-body
A	Pressure (inlet)	G1/2"	G1"
B	Tank (outlet)	G1/2"	G1"
X ¹⁾	Ext. Remote Control or Vent Connection	G1/4"	
Y1 ²⁾	External Drain		

¹⁾ Closed when supplied

²⁾ Port Y1 is only available at drain line (code 2) external from the pilot head

L-Body

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



Seal Kits		
Size	Nitrile	Fluorocarbon
06	S26-58475-0	S26-58475-5
10	S26-58508-0	S26-58508-5
Prop.Section P2*	S26-58473-0	S26-58473-5

* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

Size	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

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.

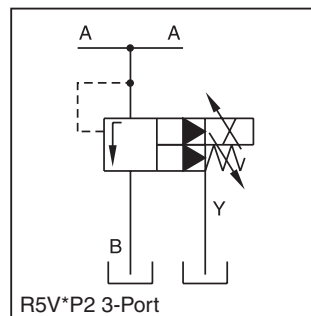
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

Features

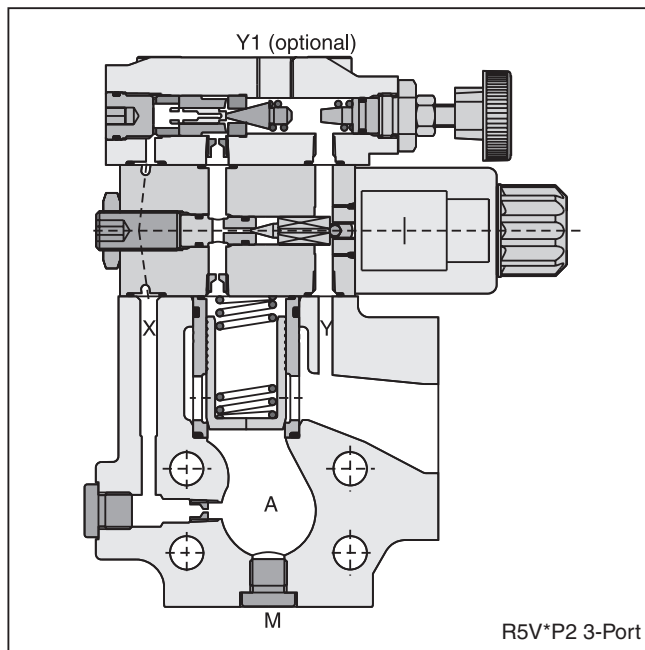
- Pilot operated with manual adjustment
- Continuous adjustment by proportional solenoid
- R5V with 3-port body:
 - 4 sizes (SAE 3/4", 1", 1-1/4", 1-1/2")
 - SAE 61 and SAE 62 flange
- 3 pressure ranges
- With mechanical maximum pressure adjustment



R5V*P2 3-Port



R5V*P2 3-Port



R5V*P2 3-Port

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

B01_Cat2550.indd, ddp, 06/21

Specifications**Proportional Pressure Relief Valves
Series R5V*P2 (Flange Mounted)****B**

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...51535, other on request			
Fluid Temperature		-20°C to +80°C (-4°F to +176°F)			
Viscosity	Permitted Recommended	10 to 650 cSt / mm²/s (46 to 3013 SSU)			
		30 to 80 cSt / mm²/s (139 to 371 SSU)			
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (Proportional Solenoid)					
Duty Ratio		100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible			
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	Size	SAE Interface	Pilot Ports	Pressure Range	Adjustment	Pilot Oil	Proportional Pressure Control	Solenoid Voltage 12V 2.3A	Design Series	Seal	Options	

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

* R5V 3-Port only

Code	Drain Line
2	Internal
6	External from Y1-Port

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
Omit	Standard
152	3-Port body with metric threads

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

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
9	Y1*, X1, M = G1/4"

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

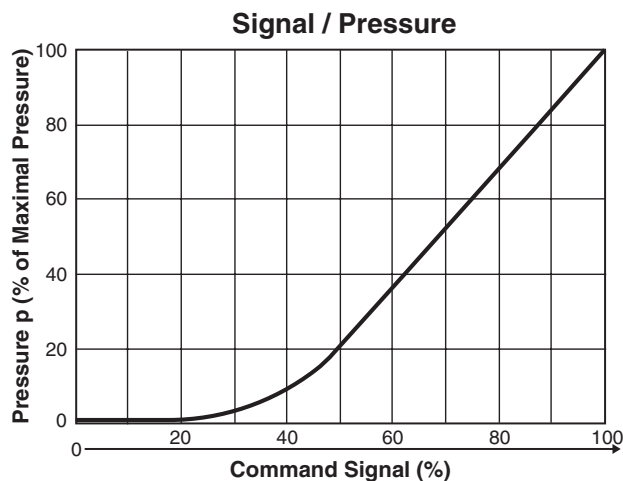
Code	Size	Maximum Pressure
3	12	210 Bar (3045 PSI)
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

Code	Size	Maximum Pressure
6*	06/08/10/12	350 Bar (5075 PSI)

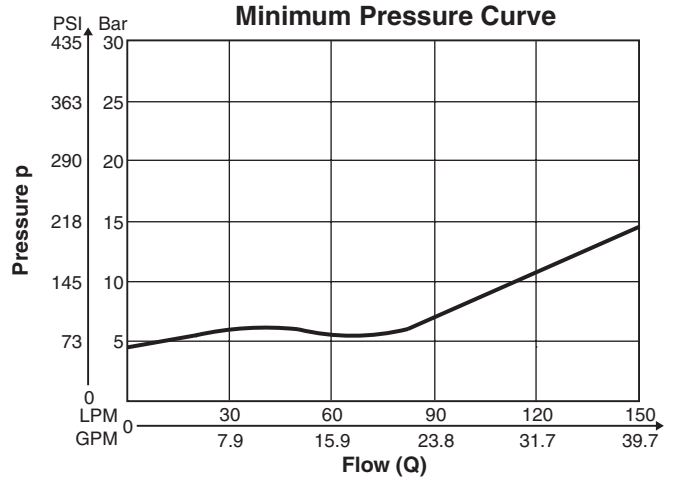
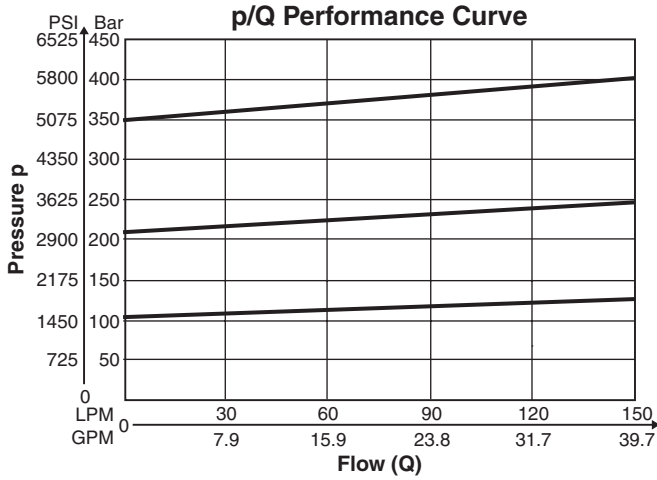
Code	Description
3-Port Body	
9	Y1*, X1, M = G1/4"

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.)
R5V10*P2	7.7 kg (17.0 lbs.)	7.0 kg (15.4 lbs.)
R5V12*P2	—	9.8 kg (21.6 lbs.)

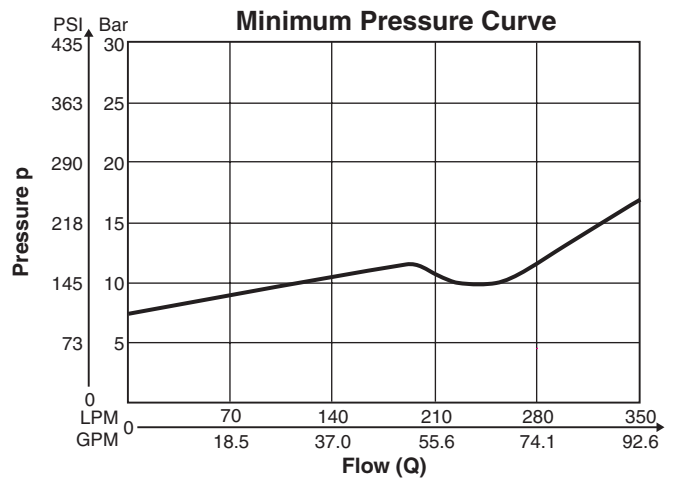
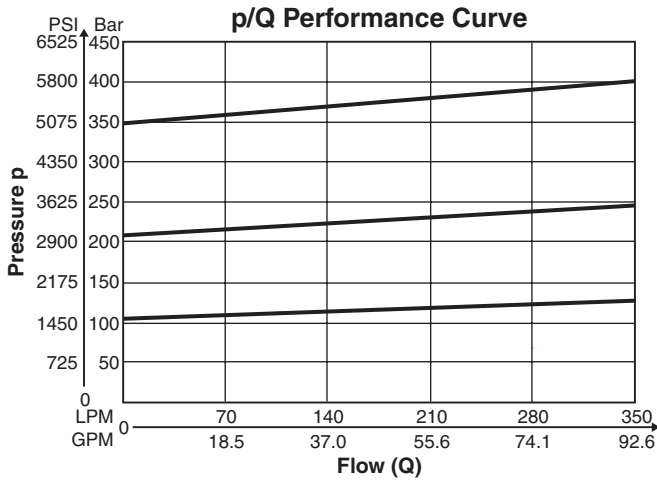
Performance Curve



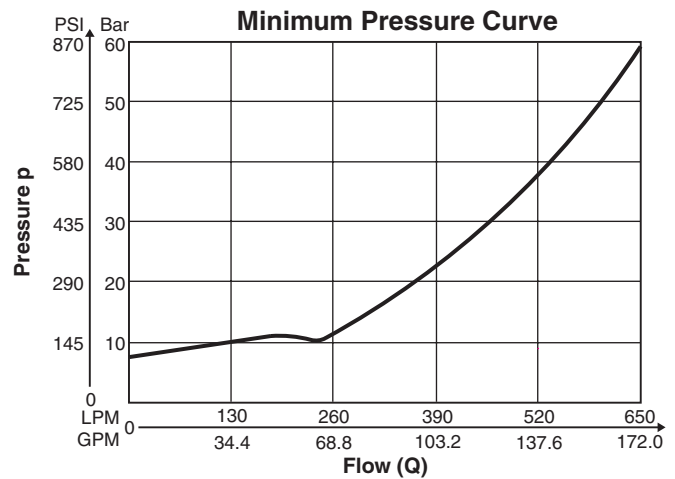
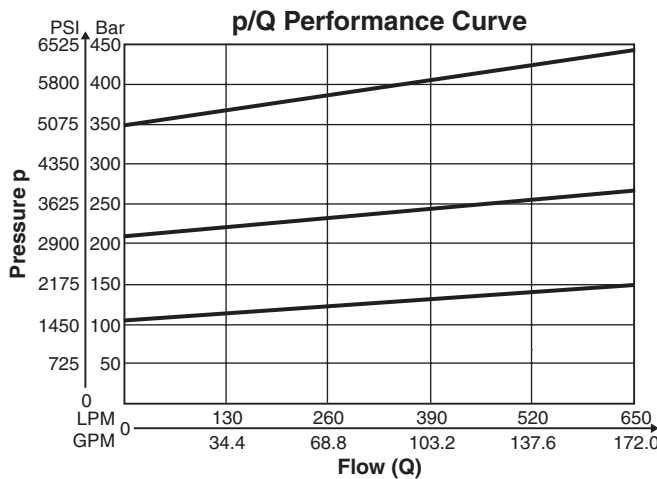
R5V06*P2 ¹⁾



R5V08*P2 ¹⁾



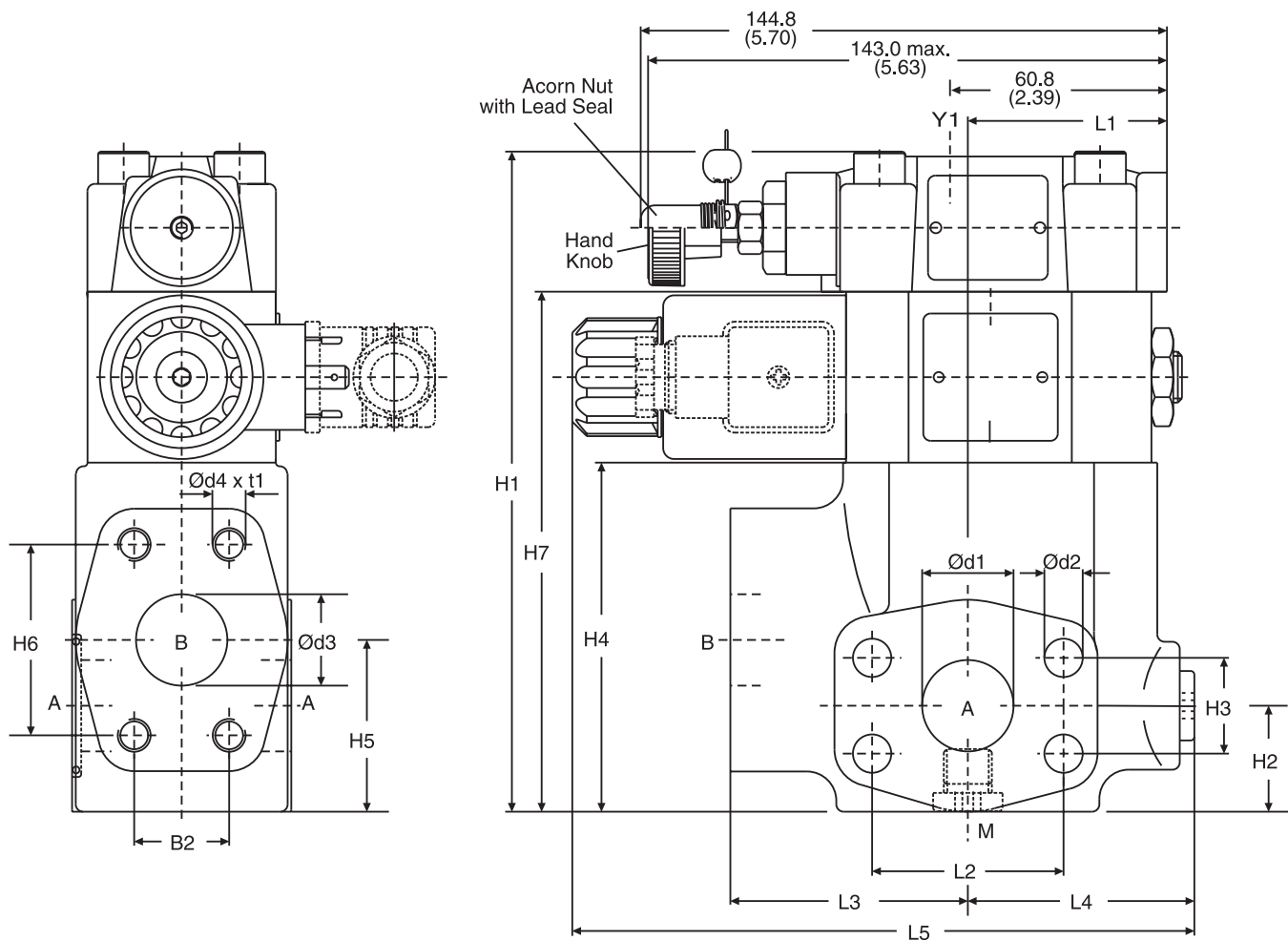
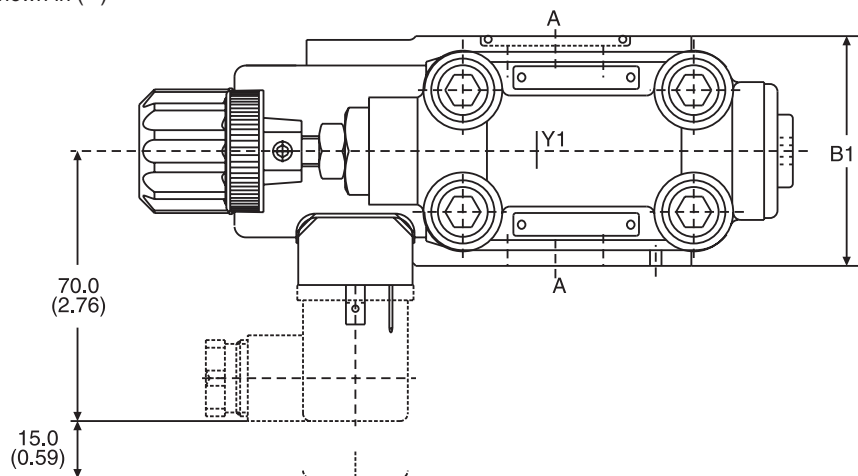
R5V10*P2 ¹⁾



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

Dimensions**Proportional Pressure Relief Valves
Series R5V*P2 (Flange Mounted)**

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

3-Port

Dimensions**Proportional Pressure Relief Valves
Series R5V*P2 (Flange Mounted)**

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

3-Port**SAE 61**

Size	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

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 UNC (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" SAE61/62	1" SAE61/62	1-1/4" SAE61/62	1-1/2" SAE61/62
B	Tank	3/4" SAE61/62	1" SAE61/62	1-1/4" SAE61/62	1-1/2" SAE61/62
Y1	External Drain	G1/4"			
M	Pressure Gauge	G1/4"			

Seal Kits		
Size	Nitrile	Fluorocarbon
06	S16-91850-0	S16-91850-5
08	S16-91851-0	S16-91851-5
10	S16-91852-0	S16-91852-5
12	S26-27421-0	S26-27421-5
Prop. Section P2*	S26-58473-0	S26-58473-5

* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

General Description

Series RPDM2 pressure relief valves are direct operated proportional valves typically used as remote control valves for flow rates of below 3 LPM (0.8 GPM).

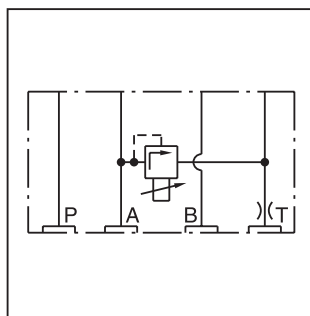
Function

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

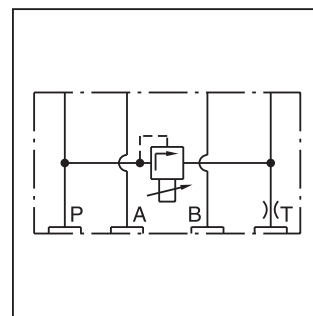
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

Features

- Direct operated by proportional solenoid
- Very low pressure adjustment of p_{min} .
- MTTF_D value 150 years
- Sandwich style NG6 / D03 mount
- 4 pressure ranges



RPDM2AT



RPDM2PT

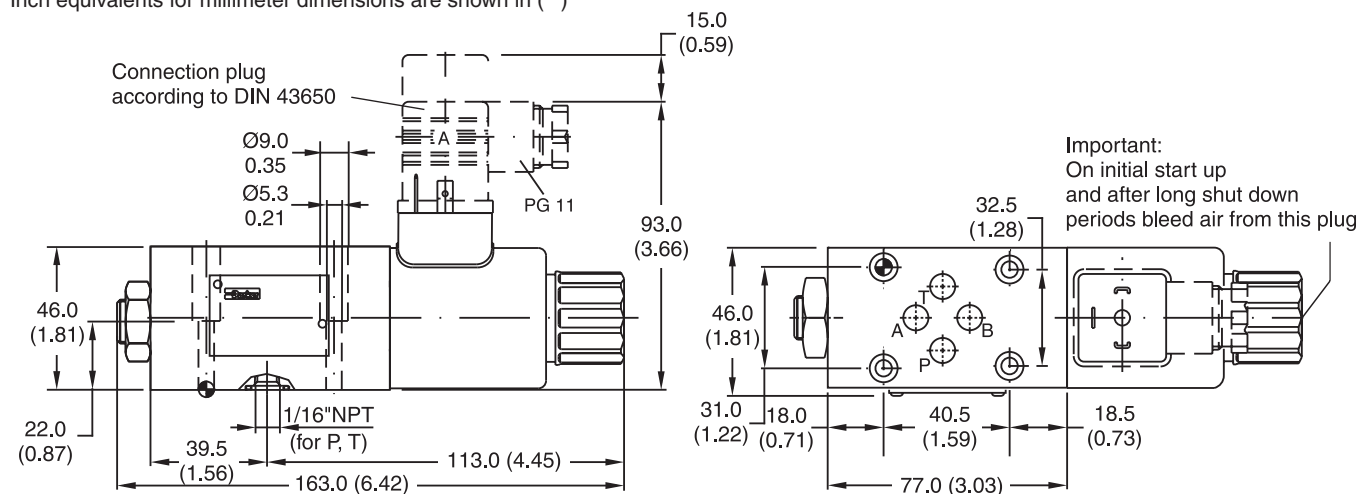
Ordering Information

RPDM Pressure Control Valve	2 Size NG6 / D03	Pressure Relief	Pressure Range	Solenoid Voltage	V Seal Fluorocarbon	Design Series																						
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Code</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>AT</td> <td>A to T</td> </tr> <tr> <td>PT</td> <td>P to T</td> </tr> </tbody> </table>	Code	Description	AT	A to T	PT	P to T	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Code</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>105 Bar (1523 PSI)</td> </tr> <tr> <td>17</td> <td>175 Bar (2538 PSI)</td> </tr> <tr> <td>25</td> <td>250 Bar (3625 PSI)</td> </tr> <tr> <td>35</td> <td>350 Bar (5075 PSI)</td> </tr> </tbody> </table>		Code	Description	10	105 Bar (1523 PSI)	17	175 Bar (2538 PSI)	25	250 Bar (3625 PSI)	35	350 Bar (5075 PSI)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Code</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>K</td> <td>12V, 2.3A</td> </tr> <tr> <td>X</td> <td>16V, 1.3A</td> </tr> </tbody> </table>	Code	Description	K	12V, 2.3A	X	16V, 1.3A	NOTE: Not required when ordering.
Code	Description																											
AT	A to T																											
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Code	Description																											
10	105 Bar (1523 PSI)																											
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25	250 Bar (3625 PSI)																											
35	350 Bar (5075 PSI)																											
Code	Description																											
K	12V, 2.3A																											
X	16V, 1.3A																											

Seal Kit: SK-RPDM20
Weight: 1.3 kg (2.9 lbs.)

Dimensions

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



Please order plugs separately. See Accessories.

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

B01_Cat2550.indd, ddp, 06/21

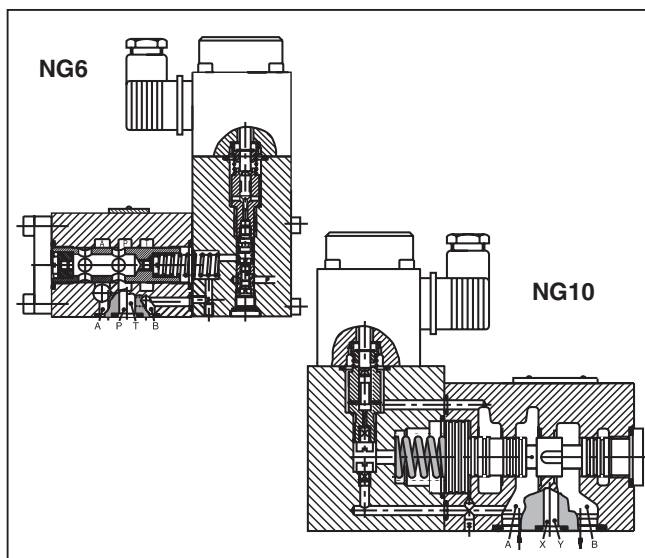
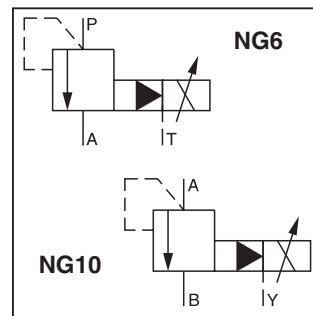
General Description

Series VBY*K pilot operated sequence valves feature proportional adjustment and an external drain. The external drain allows application as both a sequence valve and as a pressure relief valve.

These valves can also be used as a pressure relief valve. Please observe hydraulic connection.

Features

- Proportional adjustment
- Manifold mounting acc. to ISO 5781
- External drain
- Main stage spool type valve
- Pilot stage seated type valve



Ordering Information

VBY			K						
Sequence Valve			Linear Solenoid			Size	Seal	Design Series	NOTE:
Pressure Range									Not required when ordering.
Code	Description		Code	Description		Code	Description	Code	Description
064	64 Bar (928 PSI)		K	9 VDC, 2.5 A		06	NG6	N	Nitrile
100	100 Bar (1450 PSI)					10	NG10	V	Fluorocarbon
160	160 Bar (2320 PSI)								
210	210 Bar (3000 PSI)								
315	315 Bar (4500 PSI)								

Weight:

VBY*K06	2.4 kg (5.3 lbs.)
VBY*K10	4.5 kg (8.9 lbs.)

WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.
 B01_Cat2550.indd, ddp, 06/21

Specifications

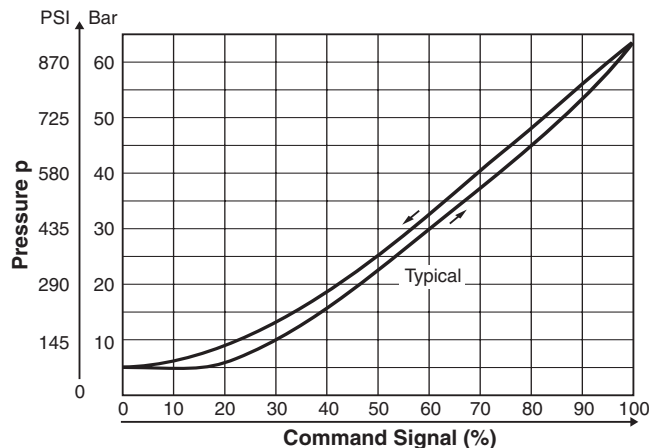
General		
Size	NFPA D03 / NG6 / CETOP 3	NFPA D05 / NG10 / CETOP 5
Design	Proportional Pressure Valve	
Mounting Pattern	ISO 5781	
Actuation	Proportional Solenoid	
Mounting Position	Any	
Ambient Temperature	-20°C to +70°C (-4°F to +158°F)	
Hydraulics		
Operating Pressure, Ports	P, A 315 Bar (4500 PSI) T depresssurized	A, B 315 Bar (4500 PSI) Y depressurized
Flow	40 LPM (10.6 GPM)	160 LPM (42.3 GPM)
Pressure Ranges	64, 100, 160, 210, 315 Bar (928, 1450, 2320, 3045, 4568 PSI)	
Fluid	Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temp.	Recommended Permitted	+30°C to +50°C (+86°F to +122°F) -20°C to +70°C (-4°F to +158°F)
Viscosity Range	Recommended Permitted	30 to 50 cST / mm²/s (139 to 232 SSU) 20 to 380 cST / mm²/s (93 to 1761 SSU)
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Linearity	±3.5% at > 15% p _{nom}	
Repeatability	<±2%	
Hysteresis	<3%	
Response Time	<150 ms	<200 ms
Manufacturing Tolerance	±5% to p _{max}	
Electrical		
Duty Cycle	100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible	
Protection Class	IP54 at DIN 40050 (plugged and mounted)	
Nominal Voltage	9 VDC	
Maximum Current	2.5 A	
Coil Resistance	21 ohm at 20°C (68°F)	
Plug Connectors	2 pole + PE / connector EN 175301-803 / cable Ø 8 to 10mm	
Power Amplifier	PCD00A-400	

B

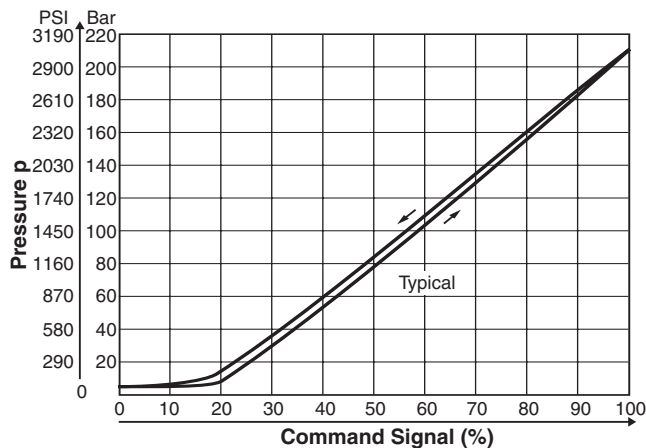
Performance Curves - NG6

Pressure Curves where $p = f(U_{set})$

Setting Range max. 64 Bar (928 PSI)

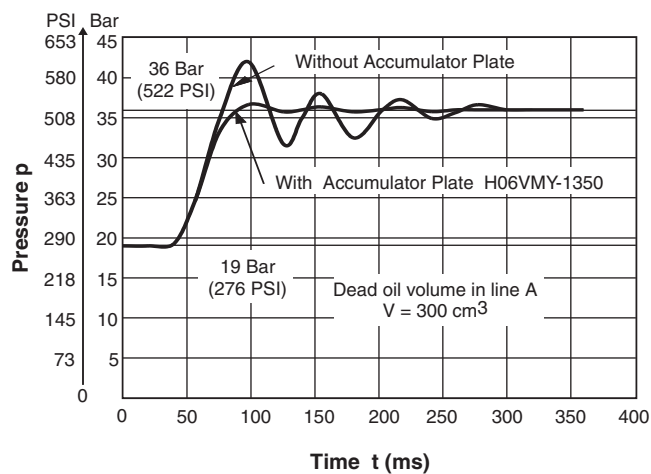
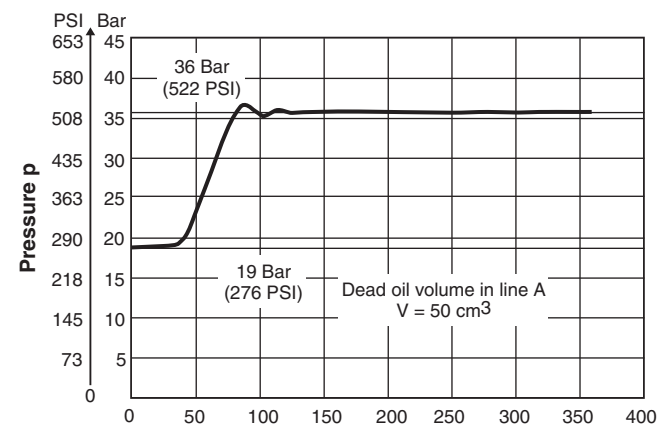


Setting Range max. 210 Bar (3045 PSI)



Step Response Signal

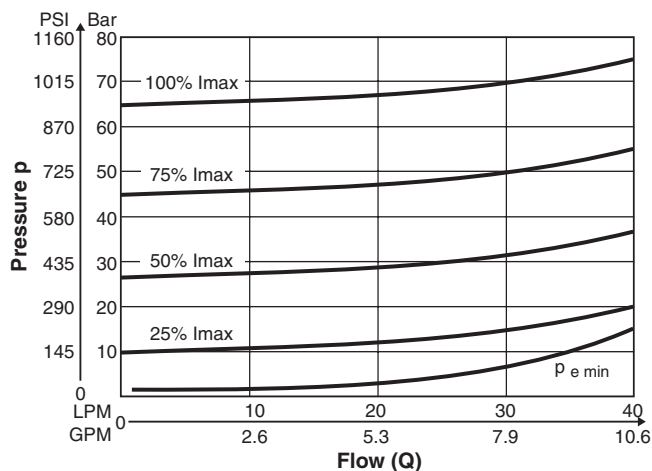
Setting Range max. 210 Bar (3045 PSI)



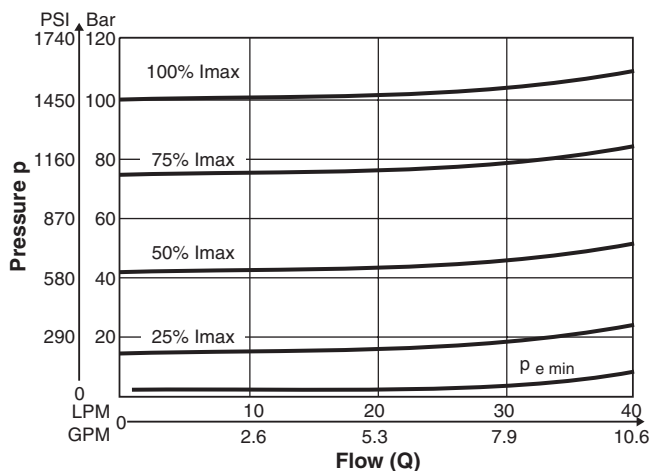
NG6

p/Q Performance Curves measured at $t = 50^{\circ}\text{C}$ (122°F) and $v = 36\text{mm}^2/\text{s}$

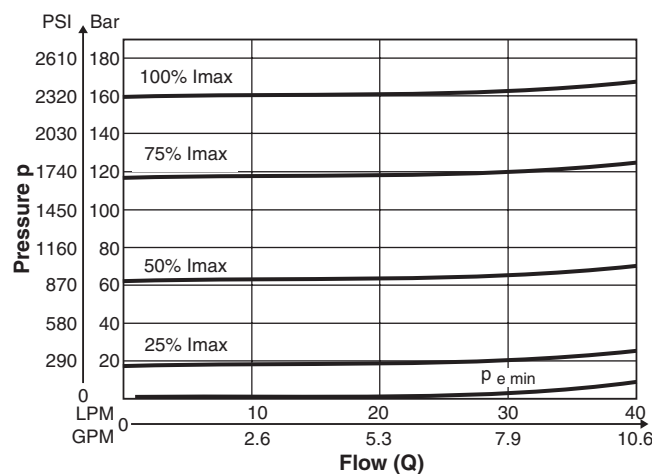
Setting Range max. 64 Bar (928 PSI)



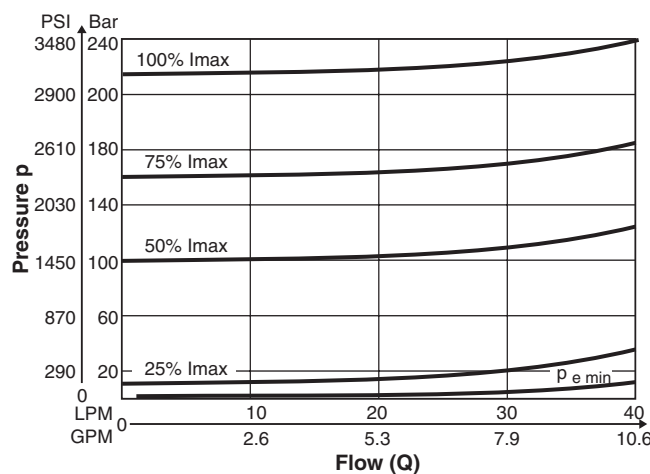
Setting Range max. 100 Bar (1450 PSI)



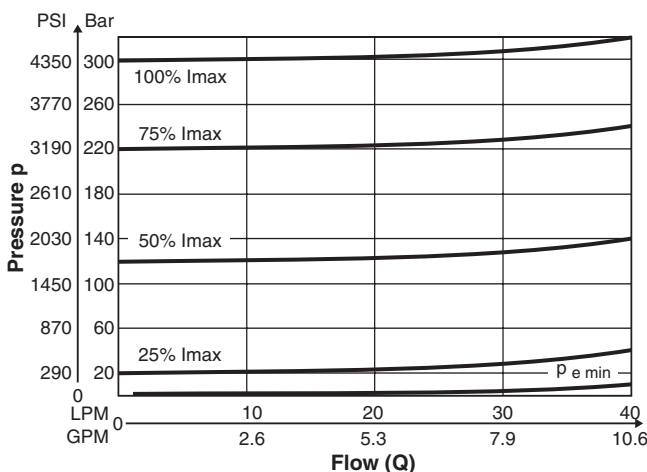
Setting Range max. 160 Bar (2320 PSI)



Setting Range max. 210 Bar (3000 PSI)



Setting Range max. 315 Bar (4500 PSI)



Note:

Accumulator Plate

H06VMY-1350

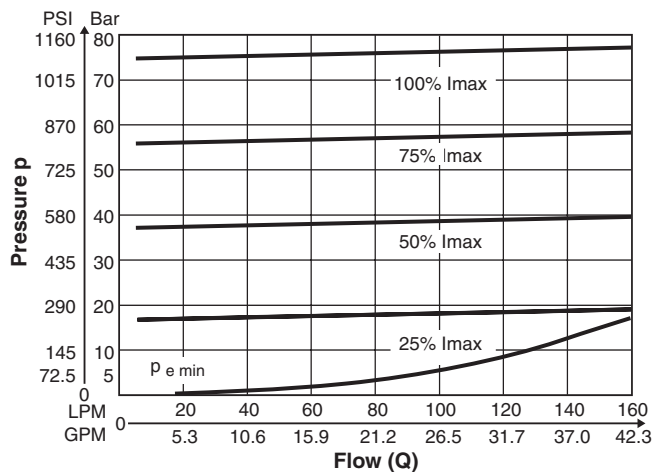
Height: 40 mm (1.58 in.)



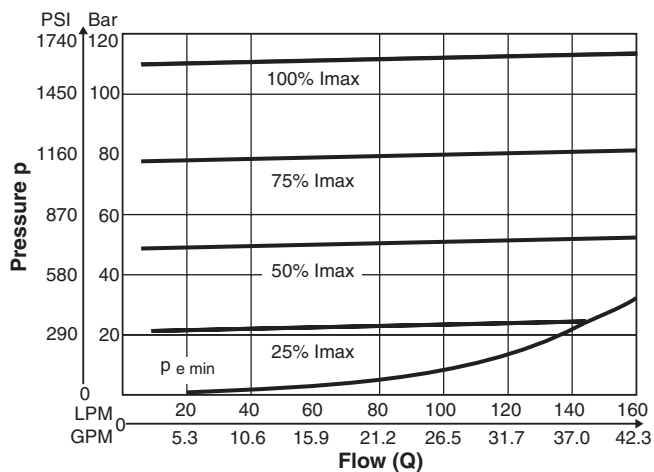
NG10

p/Q Performance Curves measured at $t = 50^{\circ}\text{C}$ (122°F) and $v = 36\text{mm}^2/\text{s}$

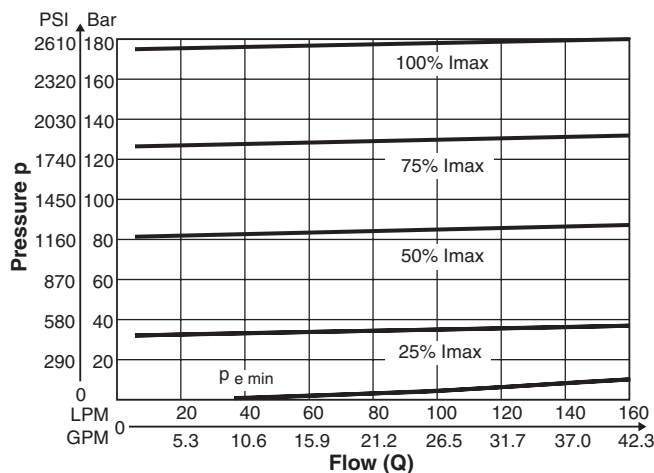
Setting Range max. 64 Bar (928 PSI)



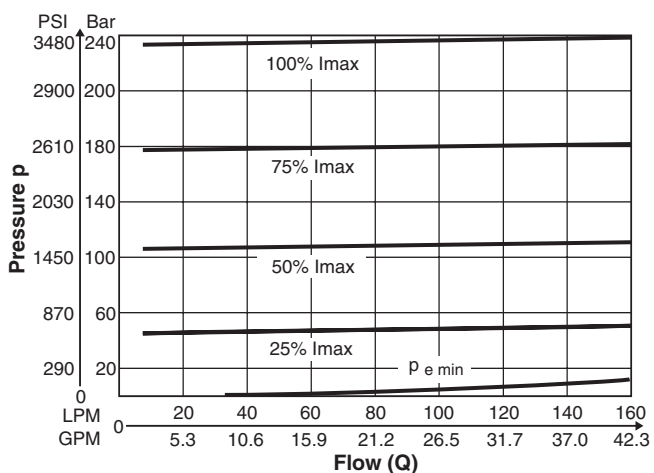
Setting Range max. 100 Bar (1450 PSI)



Setting Range max. 160 Bar (2320 PSI)

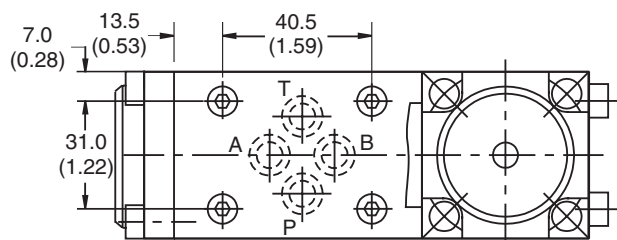


Setting Range max. 210 Bar (3045 PSI)

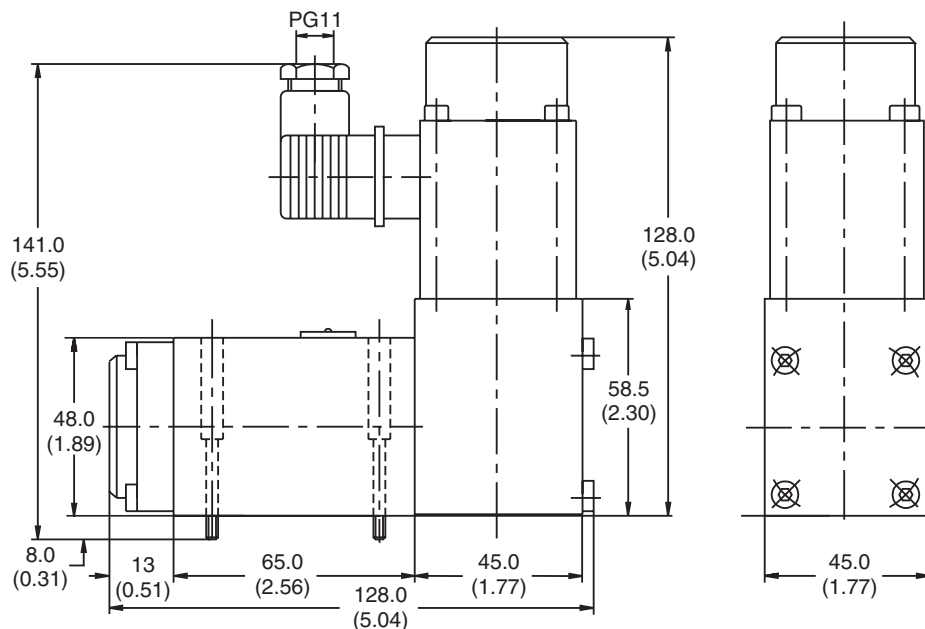


Size NG6

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



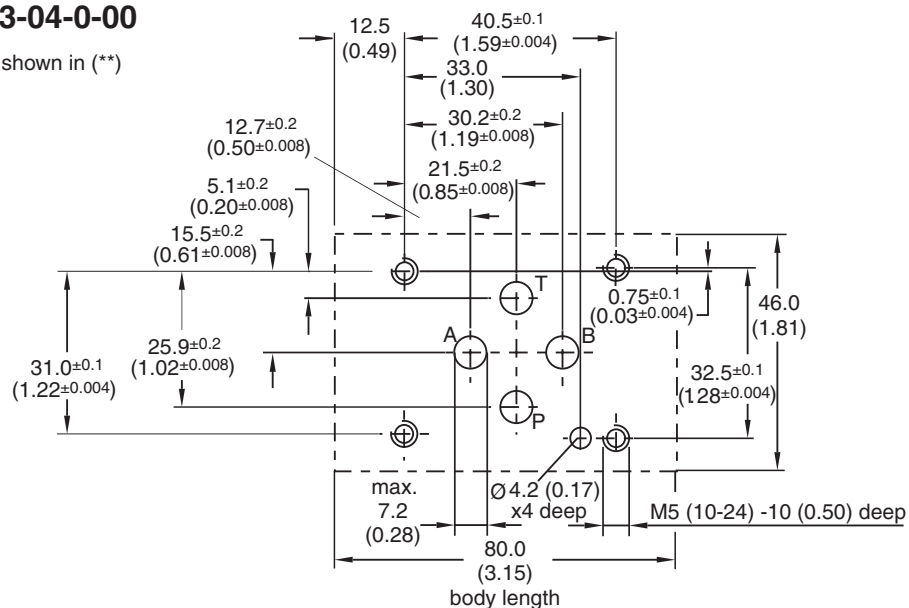
B



Surface Finish	Bolt Kit  DIN912 12.9		Seal  Kit
	BK375 4x-M5x30 BK209 4x10-24x1.25"	7.5 Nm (5.5 lb.-ft.)	Nitrile SK-VMY-L06-N Fluorocarbon SK-VMY-L06-V

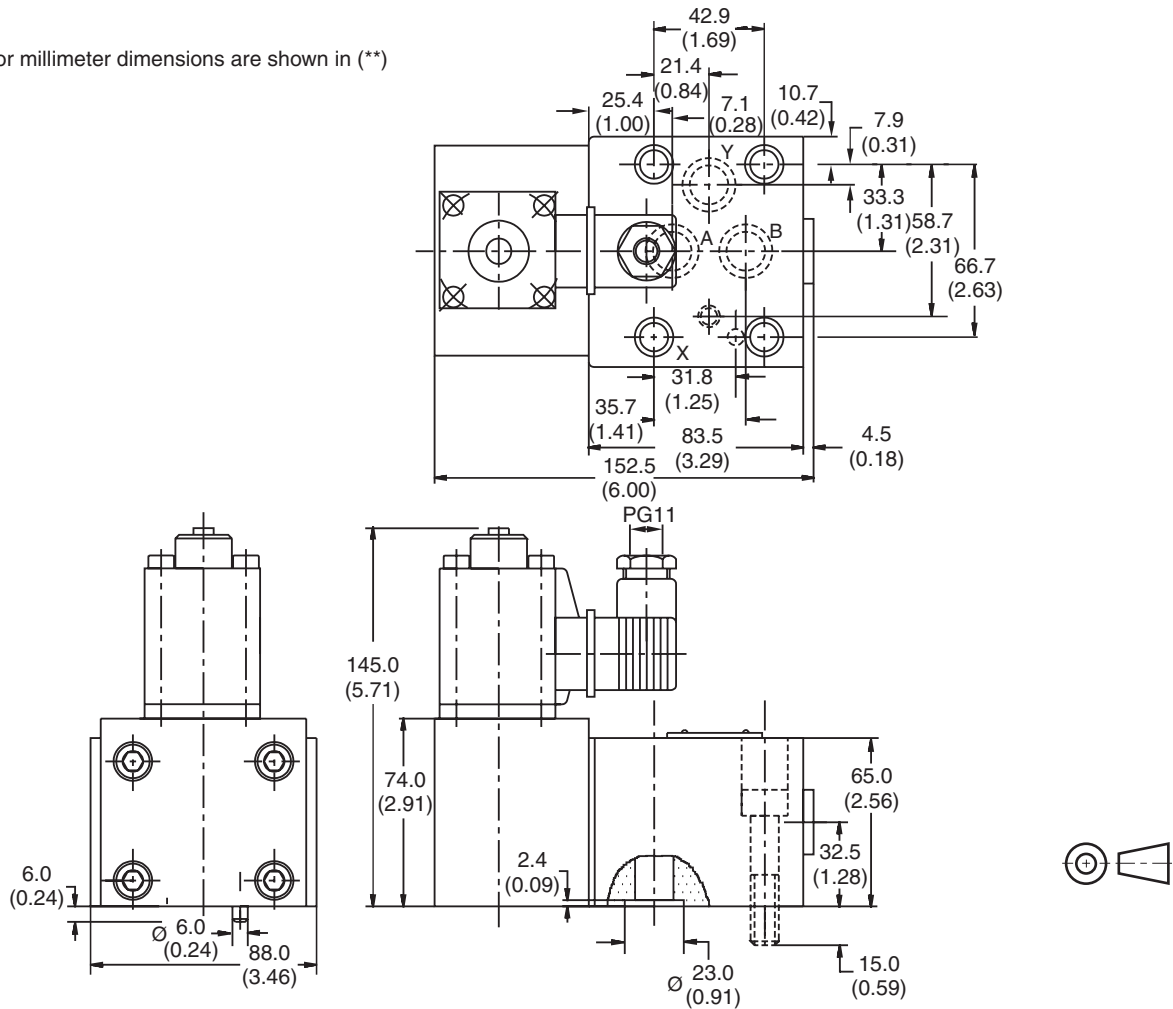
Mounting Pattern ISO 5781-03-04-0-00

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



Size NG10

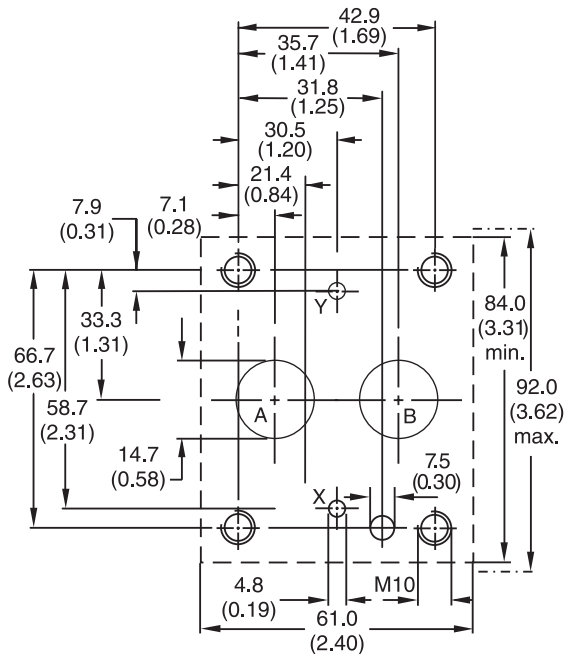
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt Kit  DIN912 12.9	 Nitrile: SK-VB/VM-A10 Fluorocarbon: SK-VB/VM-A10V	Seal  Kit
 $\sqrt{R_{max}6.3}$  0.01/100 BK389 BK242	4xM10x50 4x3/8-16x2	65 Nm (47.9 lb.-ft.)	

Mounting Pattern ISO 5781-06-07-0-00

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



General Description

Series VMY*K valves consist of the main stage with valve spools and the pilot stage with the proportional solenoids. The desired pressure can be variably set corresponding to the command signal specified on the amplifier. The proportional solenoid converts the current of the amplifier into force on the valve poppet of the pilot stage.

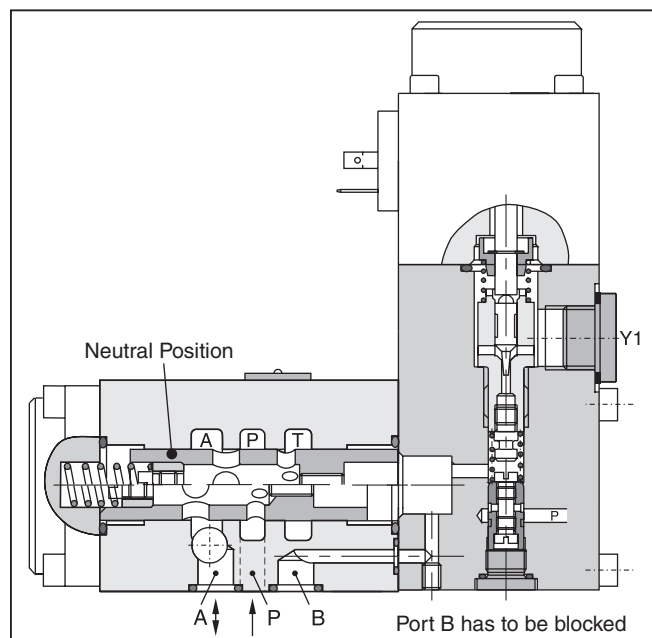
In the pilot stage, there is a flow limiter which supplies the pilot valve with pressure-independent pilot oil flow from the pressure port P.

The proportional pressure reducing/relieving valves of the series VMY*06 allow the variable adjustment of the reduced pressure from 0 bar up to p_{max} . Typical applications are pressure systems, test equipment, or counterweight systems. The electrical control of the valve takes place using the digital amplifier module PCD00A-400. Used in closed loop pressure control circuits with the PWDXXA-400.

Function

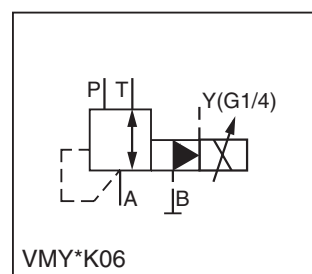
With the proportional solenoids de-energized the main spring forces the main spool into the neutral position. Port A is connected to port T. Thus the reduced pressure only depends on the back pressure in the external drain pipe and/or the tank pressure and can accordingly be reduced down to 0 bar. The pressure present in the P line delivers the pilot oil to the pilot stage via a flow control valve.

VMY*K06N

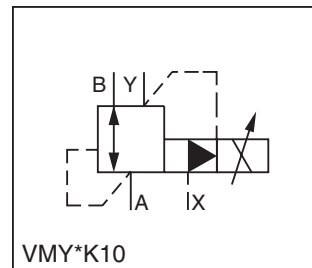


WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

B01_Cat2550.indd, ddp, 06/21



VMY*K06



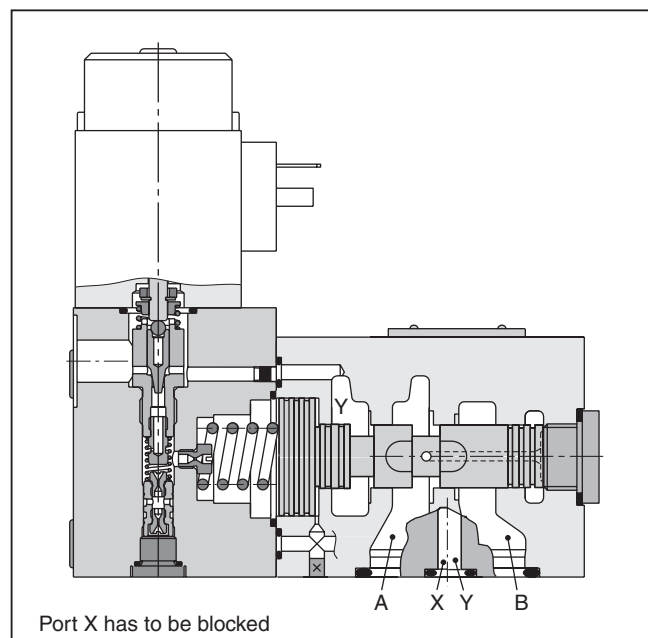
VMY*K10

When the proportional solenoid is energized, the pilot pressure is increased in the pilot pressure area, and the main spool moves against the spring until the connection P - A opens. The regulation of the reduced pressure on connection A takes place by the constant comparison of the actual pressure and the reference pressure of the pilot stage.

Features

- Consistent performance
- Variable adjustment
- Pilot operated with proportional solenoid
- Subplate according to ISO 5781

VMY*K10



Ordering Information

VMY

Reducing/
Relieving
Valve

Pressure Range

Pressure
Range

K

Linear
Solenoid
9V / 2.5A

Size

Code	Description
06	NG6
10	NG10

Pilot Oil

Pilot Oil

Seal

Seal

1

Design
Series

P

High Pressure
Channel

Code	Description
064	64 Bar (928 PSI)
100	100 Bar (1450 PSI)
160	160 Bar (2320 PSI)
210	210 Bar (3000 PSI)
315	315 Bar (4568 PSI)

Code	Description
N*	Nitrile
V	Fluorocarbon

* Size 10 only

Pilot Oil				
Code	Size	Pilot	Drain	P _{min}
Omit	10	Internal	Internal	3 - 4 Bar (43.5 - 58 PSI)
N ¹⁾	06	Internal	External ²⁾	0.5-1 Bar (7 - 14.5 PSI)
T	06	Internal	Internal	1-2 Bar (14.5 - 29 PSI)

¹⁾ Connection on port Y

²⁾ p_{min} = 0 Bar (0 PSI) possible

Weight:

VMY*06	2.8 kg (6.2 lbs.)
VMY*10	5.0 kg (11.0 lbs.)

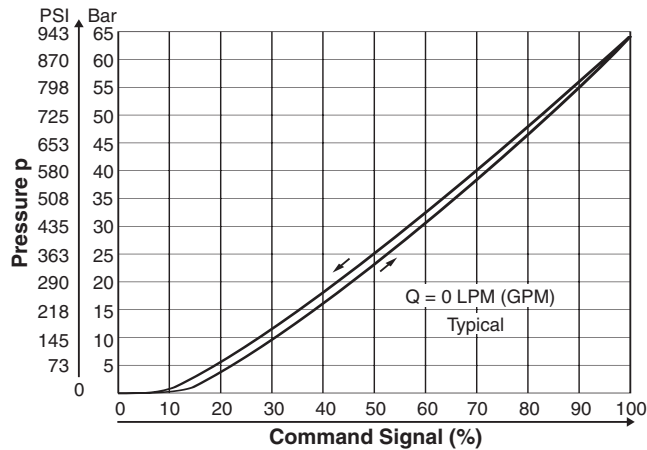
Specifications

General		
Design	Proportional Reducing/Relieving Valve	
Size	NFPA D03 / CETOP 3 / DIN NG6	DIN NG10
Mounting Pattern	ISO 5781	
Actuation	Proportional Solenoid	
Mounting Position	Any	
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)	
Hydraulics		
Operating Pressure, Ports	Ports P, A 315 Bar (4500 PSI) Ports T, Y depressurized; Port B has to be blocked	Ports A, B 350 Bar (5075 PSI) Port Y depressurized; Port X has to be blocked
Flow	40 LPM (10.6 GPM)	160 LPM (42.2 GPM)
Pilot Flow	0.3 - 0.4 LPM (.08 - .011 GPM), not dependent on pressure	
Pressure Ranges	64, 100, 160, 210, 315 Bar (928, 1450, 2320, 3045, 4568 PSI)	
Fluid	Hydraulic oil as per DIN 51524...51535, other on request	
Fluid Temperature	+30°C to +50°C (+86°F to +122°F) -20°C to +70°C (-4°F to +158°F)	
Recommended Permitted		
Viscosity	30 to 50 cSt / mm²/s (139 to 232 SSU) 20 to 380 cSt / mm²/s (93 to 1761 SSU)	
Recommended Permitted		
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	
Linearity	See Performance Curves	±3.5 at >15% p _{nom}
Repeatability	<±2%	
Hysteresis	<3%	
Response Time	<150 ms	<200 ms
Electrical		
Duty Cycle	100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible	
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)	
Nominal Voltage	9 VDC	
Maximum Current	2.5 A	
Ambient Temperature	-20°C to +70°C (-4°F to +158°F)	
Coil Resistance	2.1 ohm at 20°C (68°F)	
Plug Connectors	2 pole + PE / connector EN 175301-803 / cable Ø 8 to 10mm	
Power Amplifier	PCD00A-400	

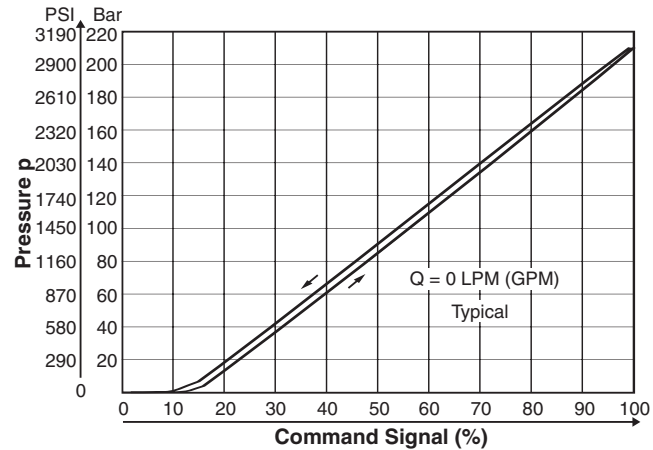
B01_Cat2550.indd, ddp, 06/21

Pressure Curves where $p = f(U_{set})$

Setting Range max. 64 Bar (928 PSI)

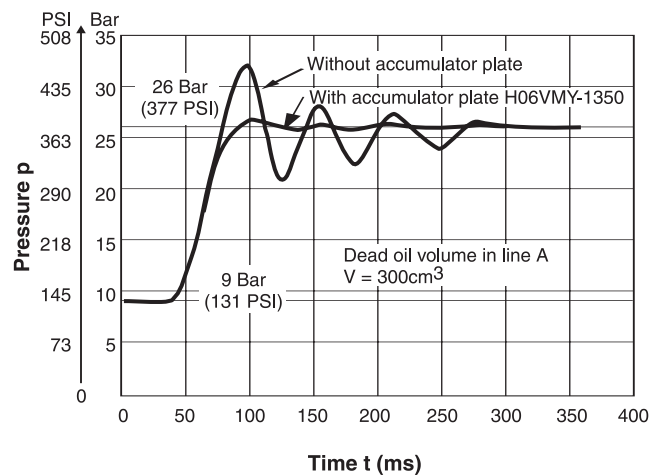
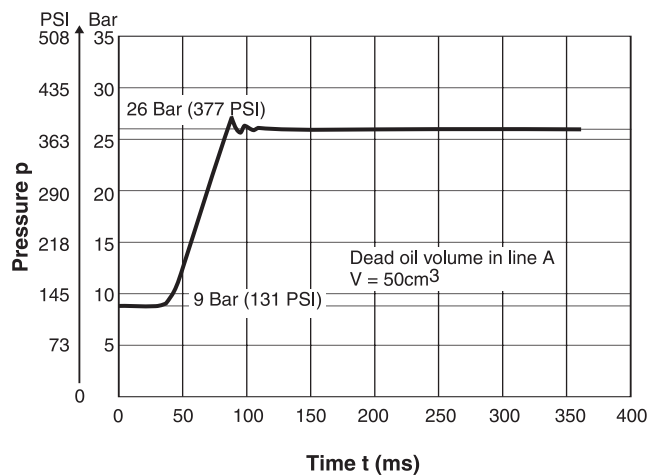


Setting Range max. 210 Bar (3045 PSI)



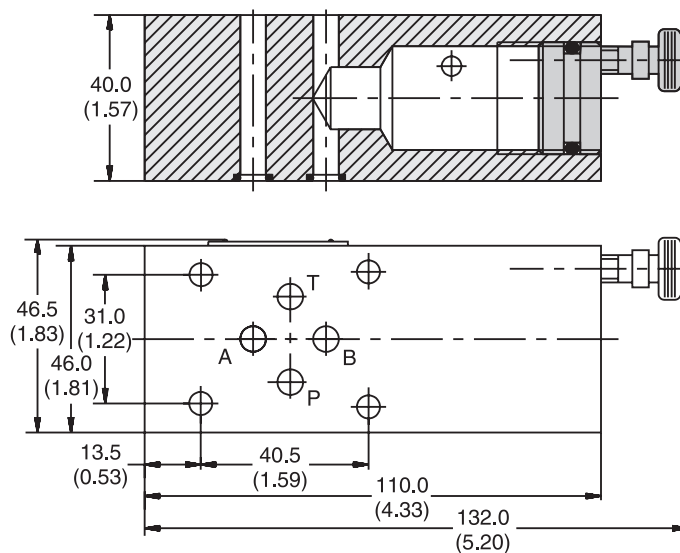
Step Response

Typical Curve



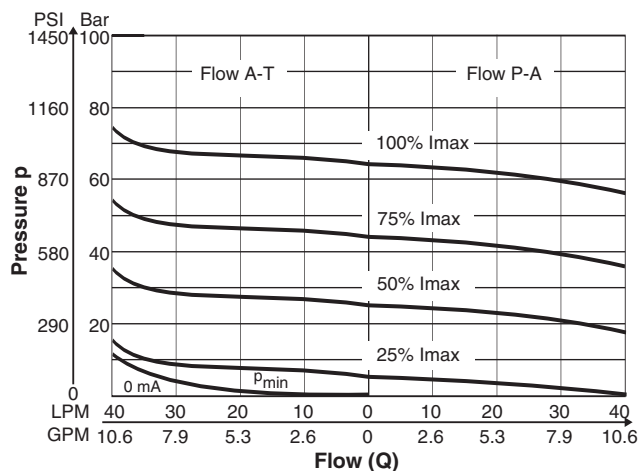
Accumulator Plate H06VMY-1350

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

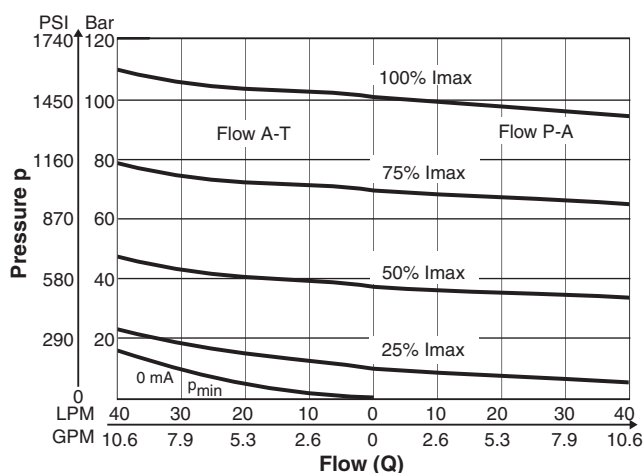


p/Q Performance Curves measured at $t = 50^{\circ}\text{C}$ (122°F) and $v = 35\text{mm}^2/\text{s}$.

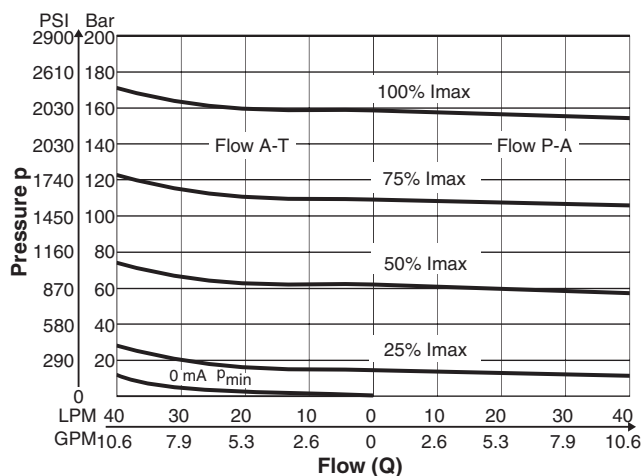
Setting Range max. 64 Bar (928 PSI)



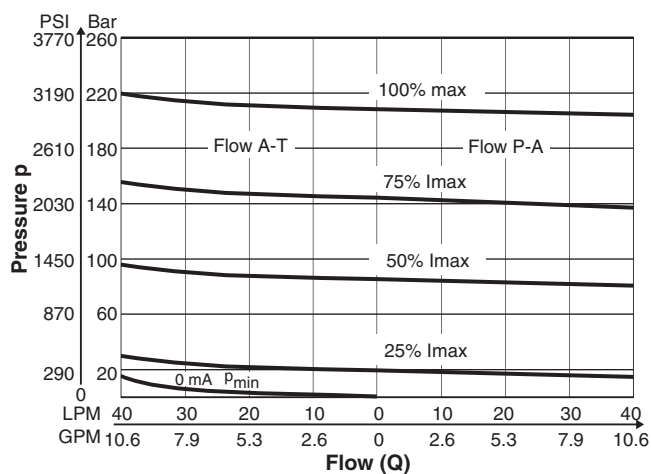
Setting Range max. 100 Bar (1450 PSI)



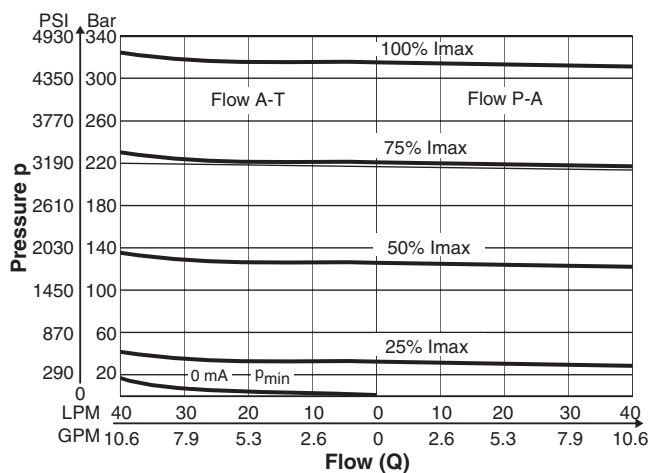
Setting Range max. 160 Bar (2320 PSI)



Setting Range max. 210 Bar (3045 PSI)

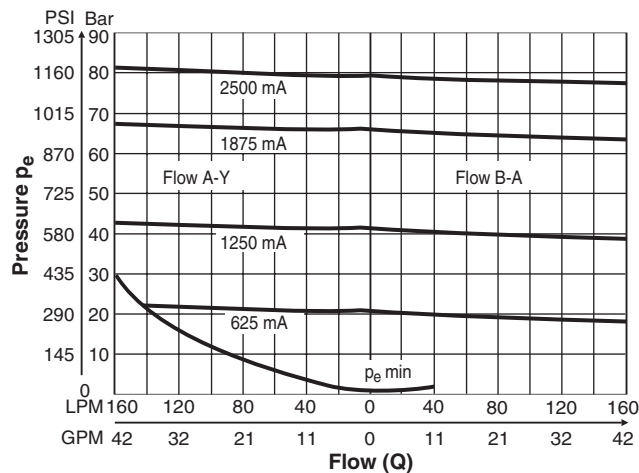


Setting Range max. 315 Bar (4568 PSI)

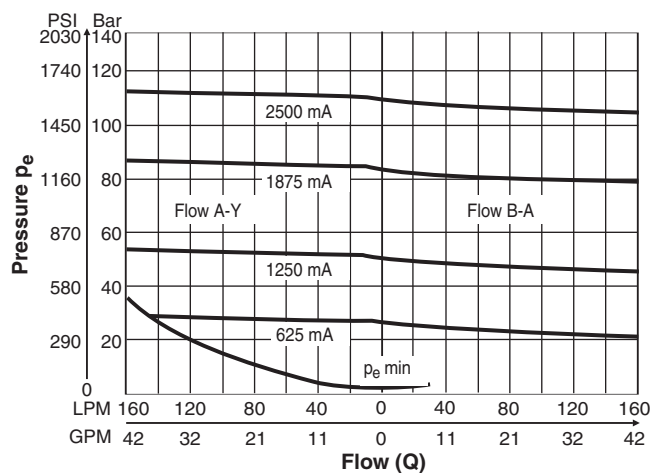


p/Q Performance Curves for pilot oil supply from high pressure channel P, measured with HLP46 at 50°C (122°F).

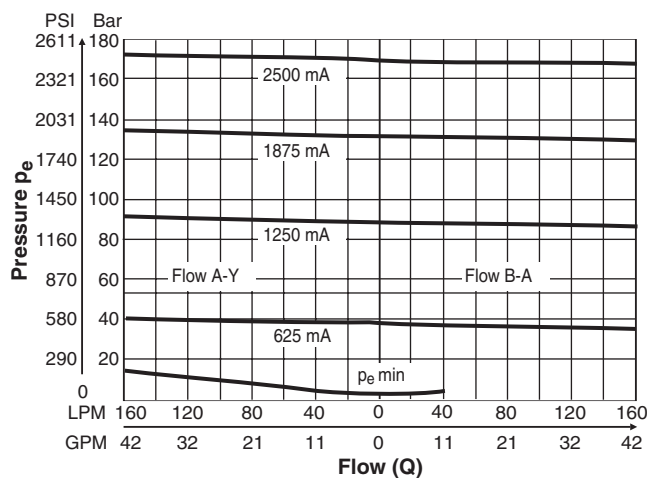
Setting Range max. 64 Bar (928 PSI)



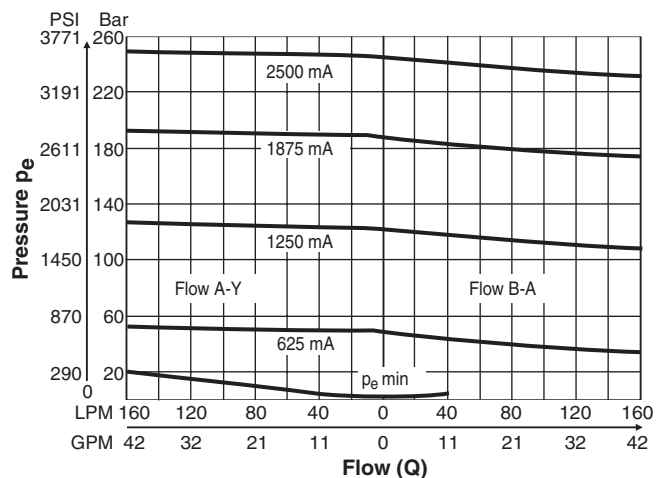
Setting Range max. 100 Bar (1450 PSI)



Setting Range max. 160 Bar (2320 PSI)

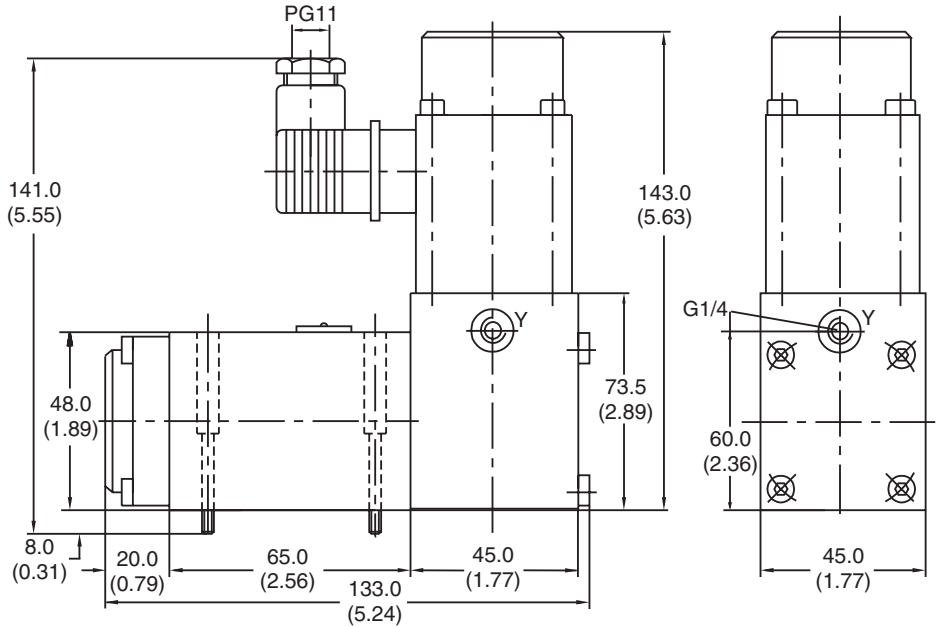
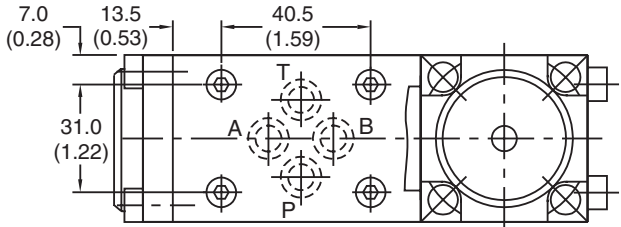


Setting Range max. 210 Bar (3045 PSI)



Size NG6

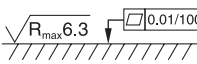
Inch equivalents for millimeter dimensions are shown in (**)



Port Y: G1/4

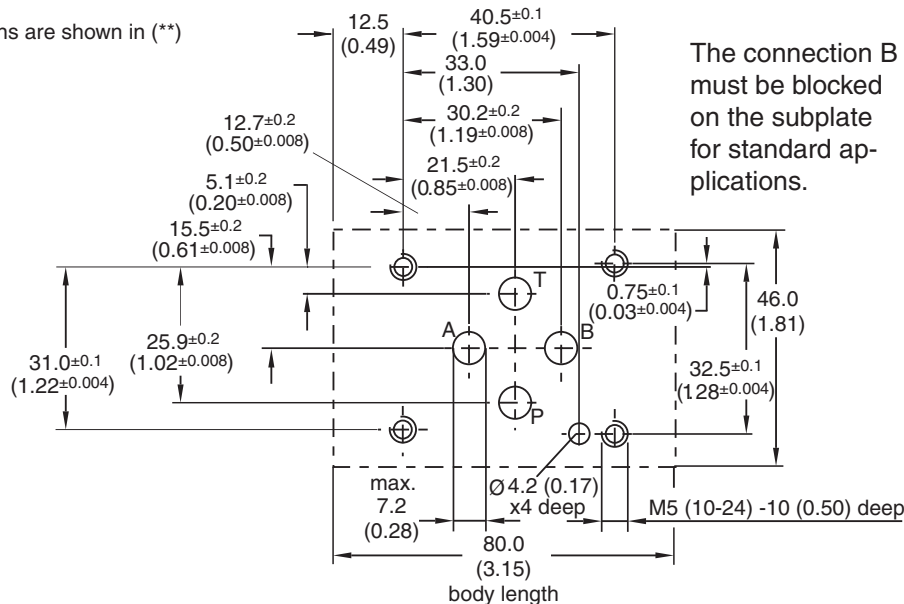
VMY*K06T:
Ports Y1 and Y2:
closed

VMY*K06N:
Drain Ports Y1 or Y2:
Port Y1 closed,
Port Y2 open

Surface Finish	Bolt kit  DIN912 12.9		Seal  Kit
$\sqrt{R_{max} 6.3}$  BK209 BK375	(4) 10-24x1.25 (4) M5x30	7.5 Nm (5.5 lb.-ft.)	Fluorocarbon: SK-VB/VM-A06V

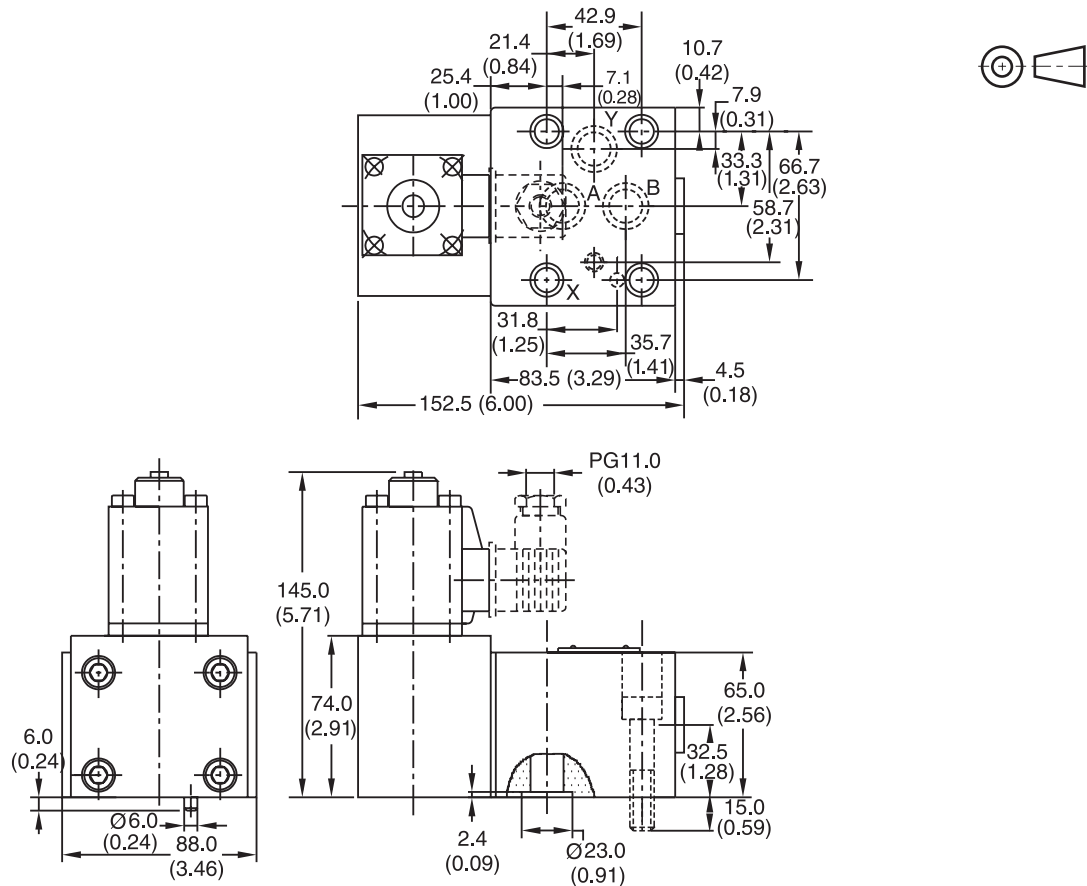
Mounting Pattern ISO 5781-03-04-0-00

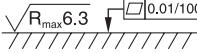
Inch equivalents for millimeter dimensions are shown in (**)



Size NG10

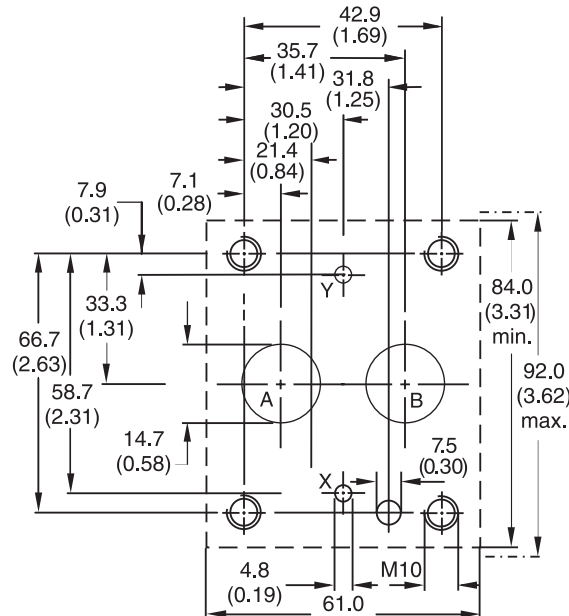
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt kit  DIN912 12.9		Seal  Kit
 $R_{max} 6.3$  0.01/100 BK153 BK242	(4) 3/8-16x2 63 Nm (5.5 lb.-ft.) (4) M10x50	Nitrile: SK-VB/VM-A10 Fluorocarbon: SK-VB/VM-A10V	

Mounting Pattern ISO 5781-06-07-0-00

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



General Description

Series D1FV proportional pressure reducing valves are available with and without onboard electronics (OBE).

D1FV OBE

The digital onboard electronics is situated in a robust metal housing, which allows the usage under rough environmental conditions.

The nominal values are factory set. The cable for connection to a serial RS-232 interface is available as accessory.

D1FV for External Electronics

The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400. The value parameters can be edited with the common ProPxD software for both versions.

The D1FV values control the pressure in the A- or B-ports using the barometric feedback principle.

Features

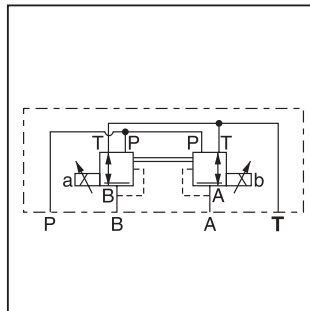
- Barometric feedback
- 3 command options for D1FV OBE: $\pm 10V$, 4...20mA, $\pm 20mA$
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Pressure ranges 25 Bar (363 PSI) and 45 Bar (653 PSI)



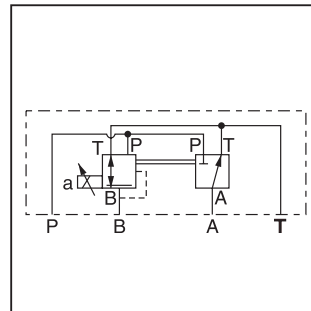
D1FV



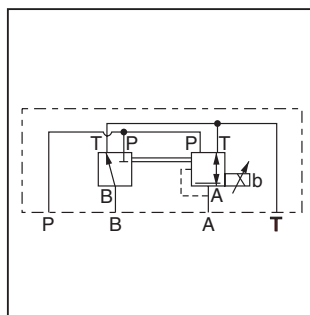
D1FV OBE



Function C

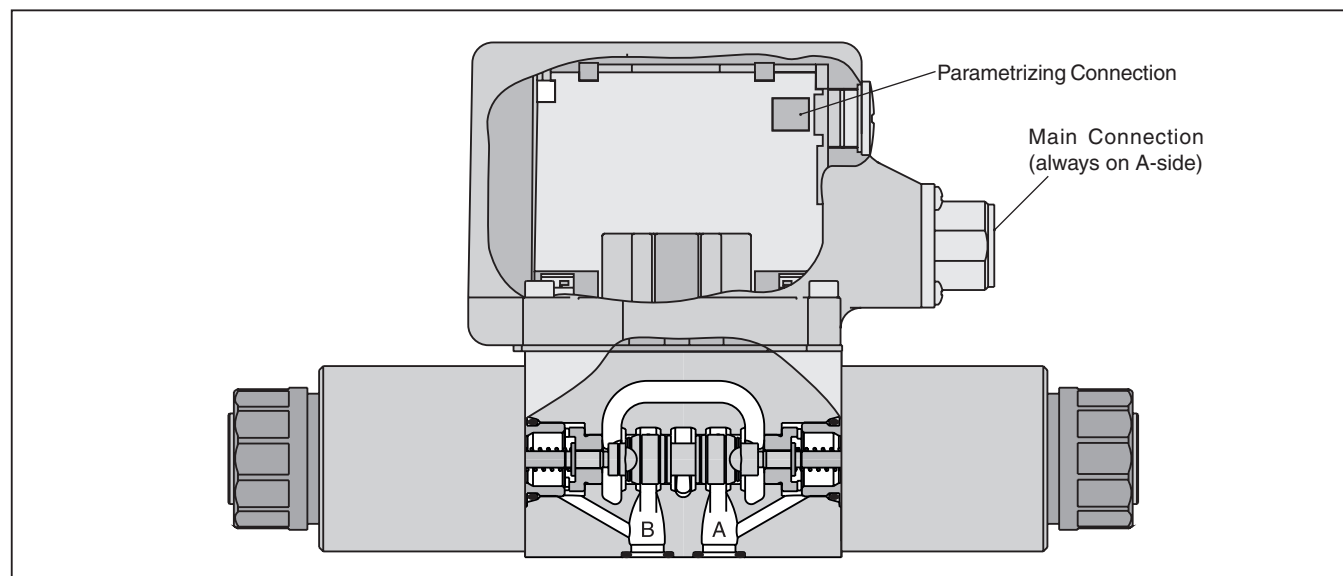


Function E



Function K

D1FV*3 OBE



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

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D1FV Offboard Electronics

D	1	F	V	E02			0		K		3	
Proportional Pressure Reducing Valve	Size DIN NG6 CETOP 3 NFPA D03	Proportional Control	Spool Type	Pressure Range	Spool Position		Seal	Solenoid Voltage 12V 2.2A	Connector	Spool / Body Design	Design Series NOTE: Not required when ordering.	

Code	Description
C	25 Bar (363 PSI)
D	45 Bar (653 PSI)

Code	Style
C	
E	
K	

Code	Description
W*	Connector as per DIN 185301-803 without plug
J*	Connector DT04-2P "Deutsch"

* Please order plugs separately. See Accessories.

Code	Description
N	Nitrile
V	Fluorocarbon

Weight: Offboard
D1FV 2.2 kg (4.9 lbs.)

D1FV Onboard Electronics

D	1	F	V	E02			0				3	
Proportional Pressure Reducing Valve	Size DIN NG6 CETOP 3 NFPA D03	Proportional Control	Spool Type	Pressure Range	Spool Position		Seal	Input Signal	Options	Spool / Body Design	Design Series NOTE: Not required when ordering.	

Code	Description
C	25 Bar (363 PSI)
D	45 Bar (653 PSI)

Code	Style
C	
E	
K	

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Input Signal ¹⁾	Function	Port	Options
F0	0...+/-10V	0...+10V > P-A	6 + PE	Potentiometer supply
G0	0...+/-20mA	0...+20mA > P-A	6 + PE	—
M0	0...+/-10V	0...+10V > P-B	6 + PE	Potentiometer supply
S0	4...20mA	12...20mA > P-A	6 + PE	—
W5 ²⁾	0...+/-10V 4...20mA 0...+/-20mA	0...+10V > P-A 12...20mA > P-A 0... 20mA > P-A	11 + PE	Potentiometer supply & command preset channel

Bolt Kit:

BK209 (4) 10-24x1.25

BK375 (4) M5x30

Weight: Onboard

D1FV 2.9 kg (6.4 lbs.)

Please order plugs separately. See Accessories.

¹⁾ Single solenoid always 0...+/-10V respectively 4...20mA.

²⁾ Factory set ± 10V on delivery.

Parametrizing cable OBE => RS-232
Item no. 40982923

B

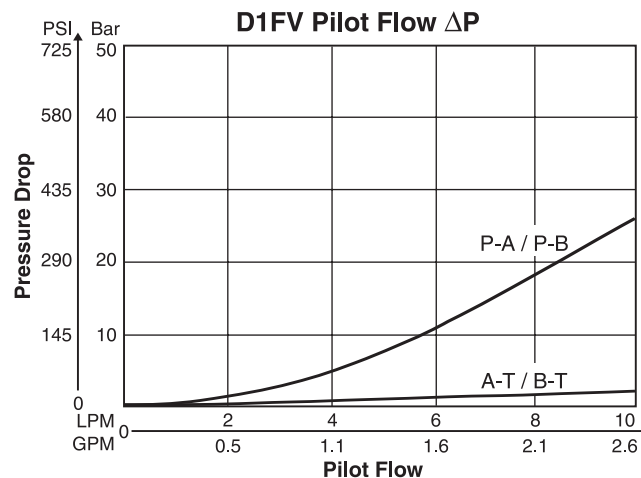
General		
Design		Direct operated proportional pressure reducing valve
Actuation		Proportional solenoid
Size		NG6 / CETOP 3 / NFPA D03
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting Position		Unrestricted
Ambient Temperature	[°C]	-20...+40; (-4°F...+104°F)
MTTF _D Value	[years]	150 (75)
Vibration Resistance	[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Hydraulic		
Maximum Operating Pressure		Ports P, A, B 350 Bar (5075 PSI) Port T 185 Bar (2683 PSI)
Maximum Pressure Drop PABT / PBAT		350 Bar (5075 PSI)
Fluid		Hydraulic oil as per DIN 51524...51535, other on request
Fluid Temperature	[°C]	-20...+40 (-4°F...+104°F)
Viscosity Permitted	[cSt] / [mm²/s]	20...380 (93...1761 SSU)
Viscosity Recommended	[cSt] / [mm²/s]	30...80 (139...371 SSU)
Filtration		ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Maximum Flow		10 LPM (2.6 GPM)
Minimum Primary Pressure		30 Bar (435 PSI)
Static / Dynamic		
Hysteresis	[%]	<4
Temperature Drift Solenoid Current	[%/K]	<0.02
Electrical		
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		Standard (as per EN175301-803) IP65 in accordance with EN60529 (with correctly mounted plug-in connector); DT04-2P “Deutsch“ IP69K (with correctly mounted plug-in connector)
Supply Voltage	[V]	12
Current Consumption	[A]	2.2
Resistance	[Ohm]	4.4
Coil Insulation Class		F (155 °C) (311°F)
Solenoid Connection		Connector as per EN 175301-803 (code W), DT04-2P “Deutsch“ connector (code J). Solenoid identification as per ISO 9461.
Wiring Minimum	[mm²]	3x1.5 (AWG 16) overall braid shield (Code W), "Deutsch" connector DP4 2-Pin (Code J)
Wiring Length Maximum	[m]	50 (164 ft.) recommended

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

Electrical Specifications

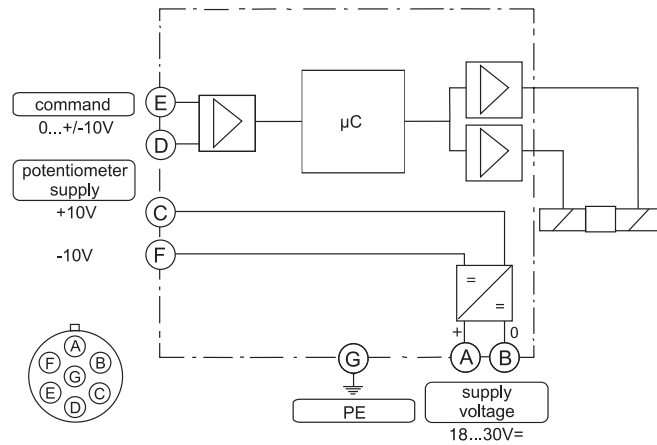
Electrical		
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage/ripple DC	[V]	18...30, ripple < 5% eff., surge free
Current Consumption Maximum	[A]	2.0
Pre-fusing Medium Lag	[A]	2.5
Input Signal		
Codes F0 & W5 Voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100kOhm, 0...+10V => P -> A
Code M0 Voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100kOhm, 0...+10V => P -> B
Codes S0 & W5 Current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, Ri = 200Ohm, 12...20mA => P -> A < 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Code G0	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, Ri = 200Ohm, 0...+20mA => P -> A
Differential input max.		
Codes F0, G0, M0 & S0	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
Code W5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0V (terminal 2)
Channel Recall Signal	[V]	0...2.5: off / 5...30: on / Ri = 100 kOhm
Adjustment Ranges:		
Min	[%]	0...50
Max	[%]	50...100
Ramp	[s]	0...32.5
Interface		RS-232, parametrizing connection 5 pole
EMC		EN 61000-6-2, EN 61000-6-4
Central Connection		
Codes F0, G0 M0 & S0		6 + PE acc. to EN 175201-804
Code W5		11 + PE acc. to EN 175201-804
Wiring Minimum		
Codes F0, G0 M0 & S0	[mm²]	7 x 1.0 (AWG16) overall braid shield
Code W5	[mm²]	11 x 1.0 (AWG16) overall braid shield
Wiring Length Maximum	[m]	50 (164 ft.)

Performance Curves

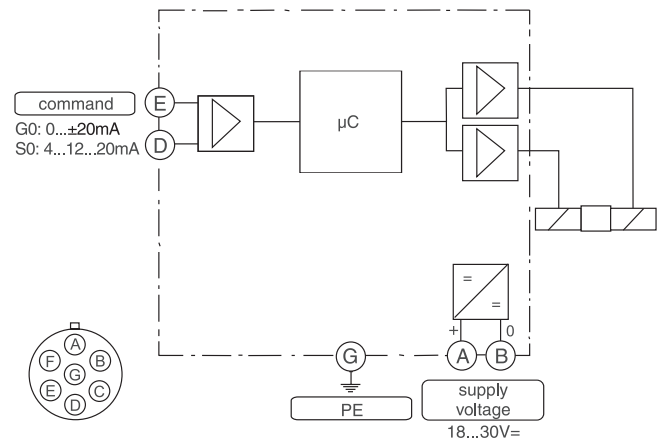


All performance curves measured with HLP46 at 50°C (122°F).

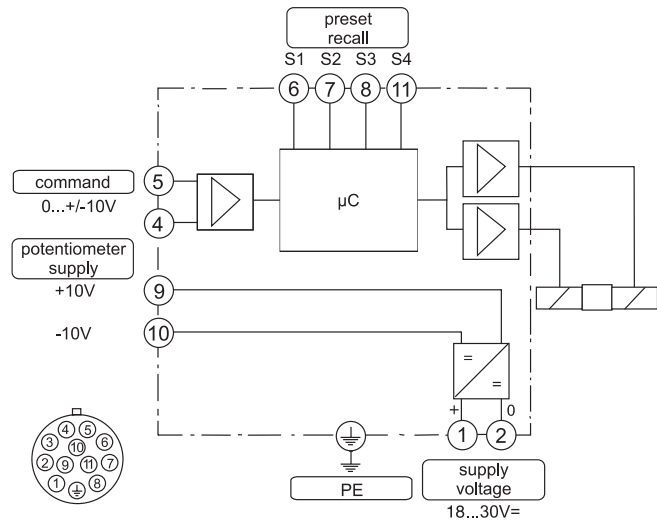
Code F0, M0
6 + PE acc. to EN 175201-804



Code G0, S0
6 + PE acc. to EN 175201-804



Code W5
11 + PE acc. to EN 175201-804



ProPxD Interface Program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation purposes.

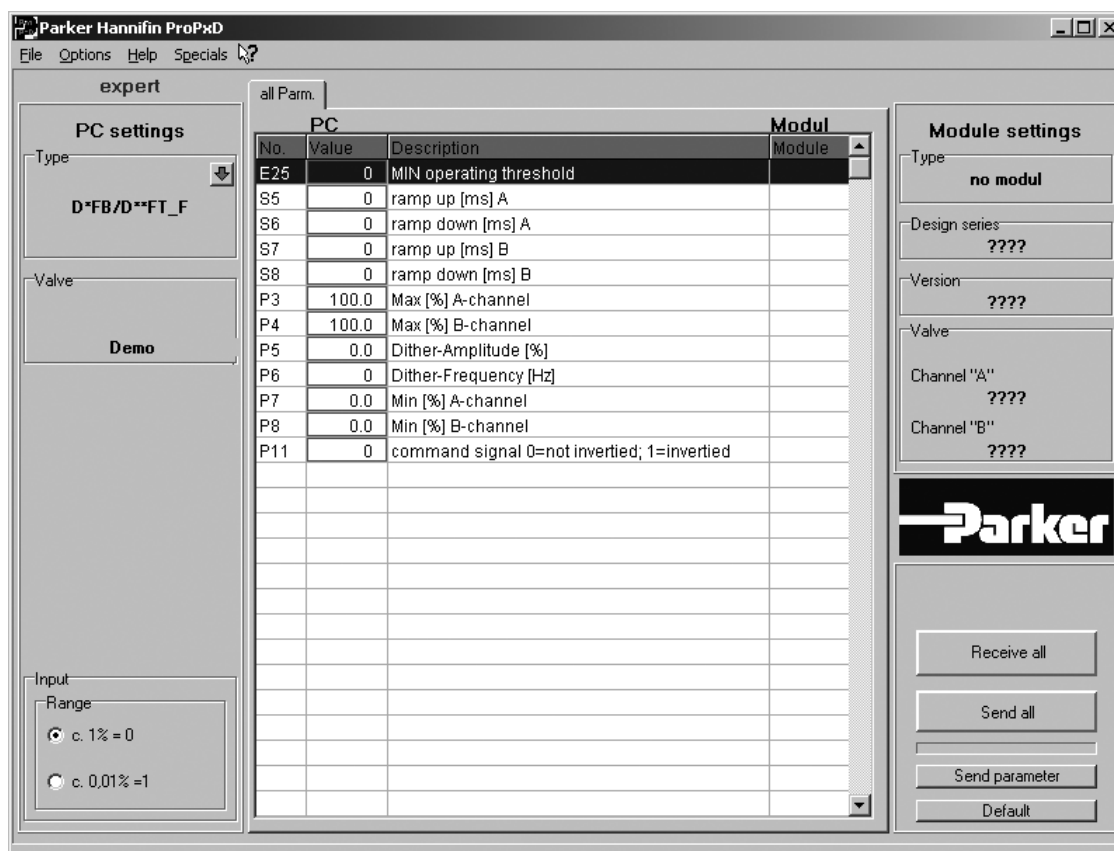
Features

- Simple editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronics via serial interface RS-232.

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

Simple to use interface program. Download free of charge
www.parker.com/euro_hcd → **Services** → **downloads**

B



The parametrizing cable may be ordered under item no. 40982923.

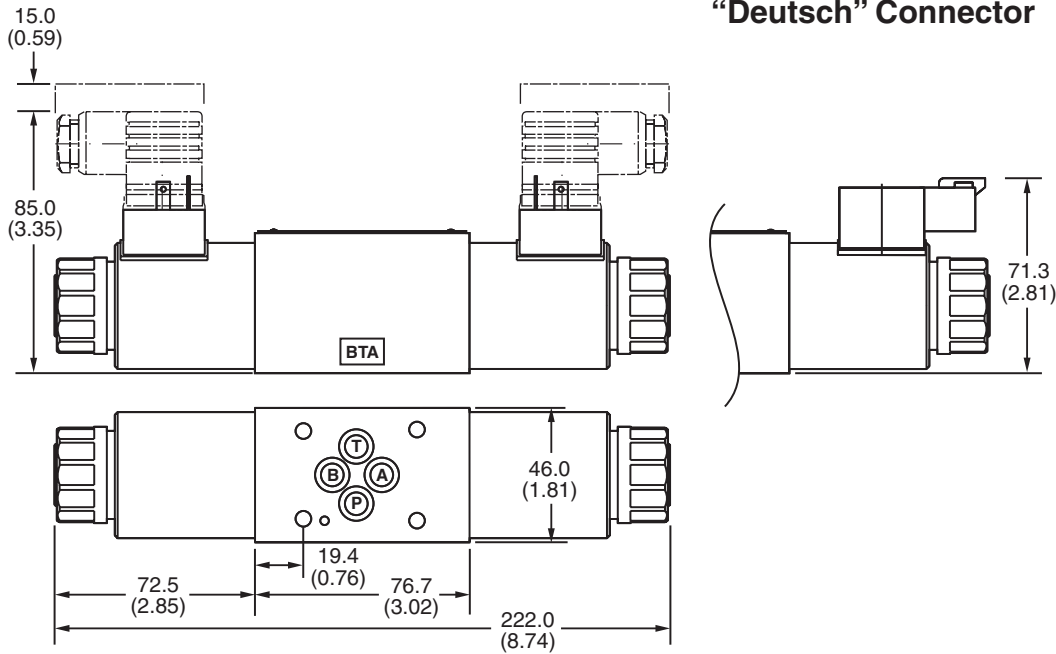
Inch equivalents for millimeter dimensions are shown in (**)

D1FV*C

with DT04-2P
“Deutsch” Connector

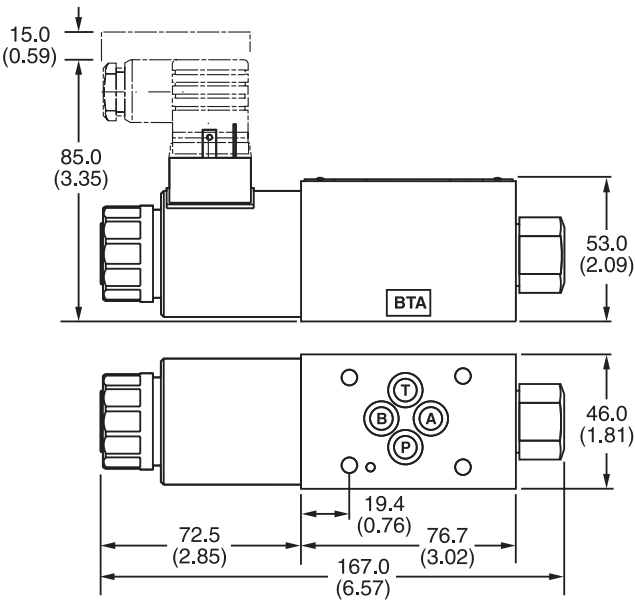
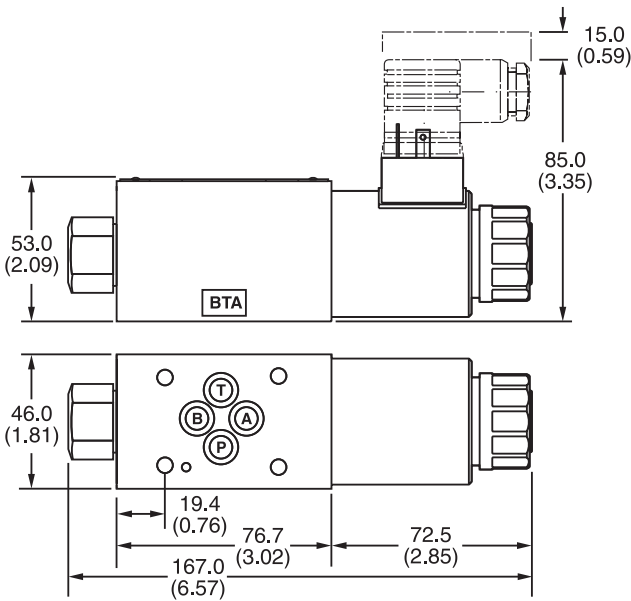


B



D1FV*E

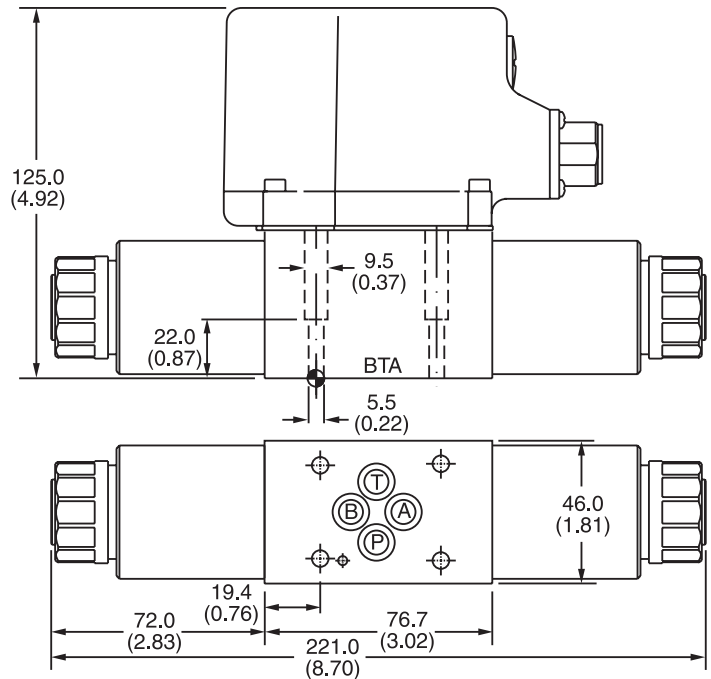
D1FV*K



Surface Finish	Kit	Kit	Kit	Seal Kit
	BK375	4x M5x30 DIN 912 12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB-N Fluorocarbon: SK-D1FBV

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

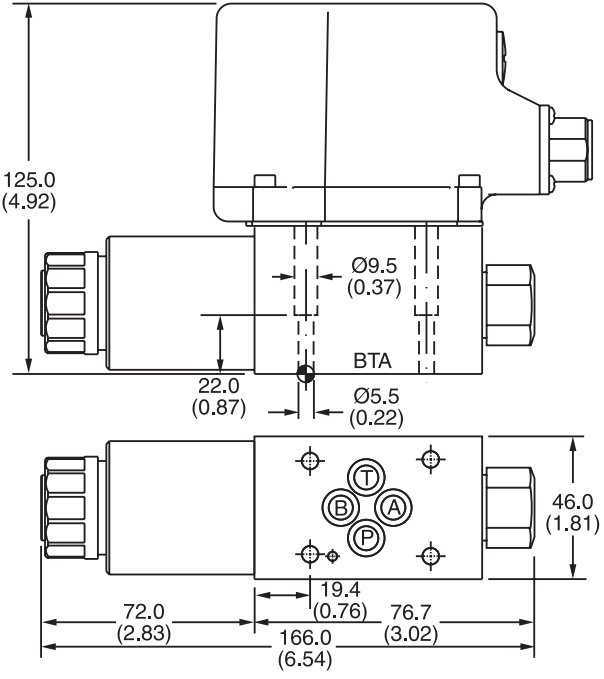
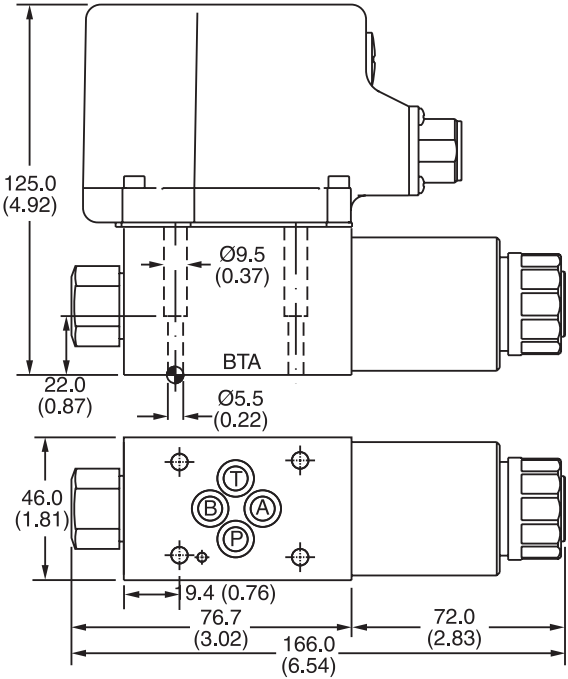
D1FV*C OBE

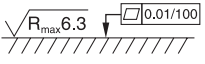


B

D1FV*E OBE

D1FV*K OBE



Surface Finish	 Kit	 Kit	 Kit	Seal  Kit
	BK375	4x M5x30 DIN 912 12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB-N Fluorocarbon: SK-D1FBV

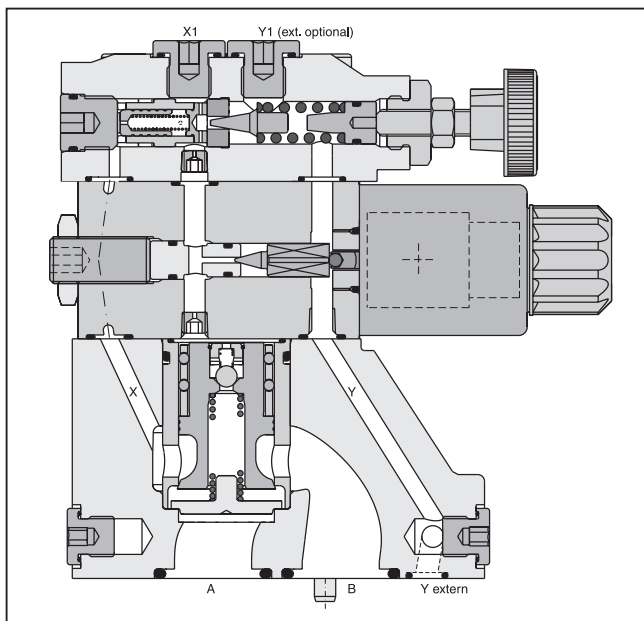
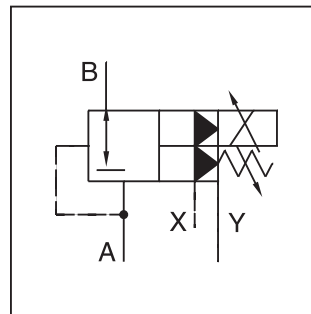
General Description

Series R4R*P2 subplate mounted proportional pressure reducing valves have a proportional solenoid operated pilot stage and a cartridge main stage.

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
- Subplate mounting according to ISO 5781
- 3 pressure ranges
- Mechanical maximum pressure adjustment



Ordering Information

Code	Description
R	Pressure Reducing Valve
4	Interface
R	Reducing Function
5	Size
9	Maximum Pressure 350 Bar (5075 PSI)
P2	Pilot Ports G1/4"
G0R	Proportional Pressure Control
B	Solenoid Voltage 12V 2.3A
	Design Series
	Seal
	Options Check with Factory

Code	Description
03	NG10
06	NG25
10	NG32

Code	Description
1	Internal
2	Internal

Code	Description
1	Hand Knob 32mm dia. Standard
3	Acorn Nut with Lead Seal

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
4	Subplate Mounting ISO 5781

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

Bolt Kit:

R4R03*P2	BK505
R4R06*P2	BK485
R4R10*P2	BK506

Weight:

R4R03*P2	2.7 kg (6.0 lbs.)
R4R06*P2	4.5 kg (9.9 lbs.)
R4R10*P2	6.0 kg (13.2 lbs.)

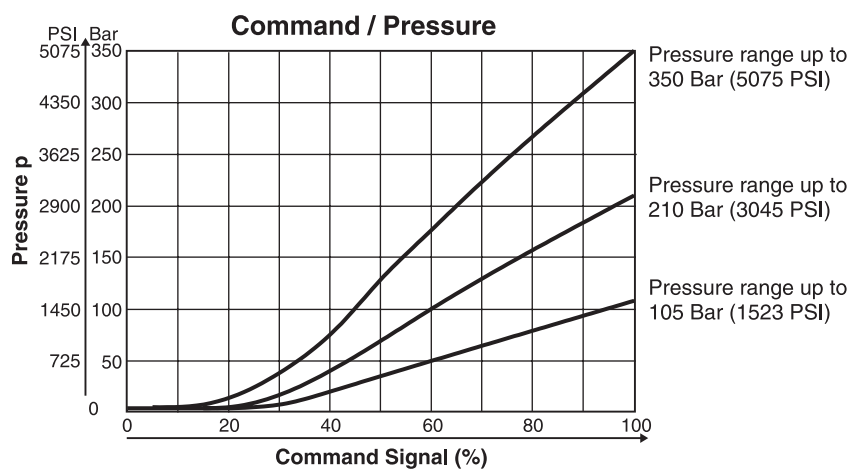
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

B01_Cat2550.indd, ddp, 06/21

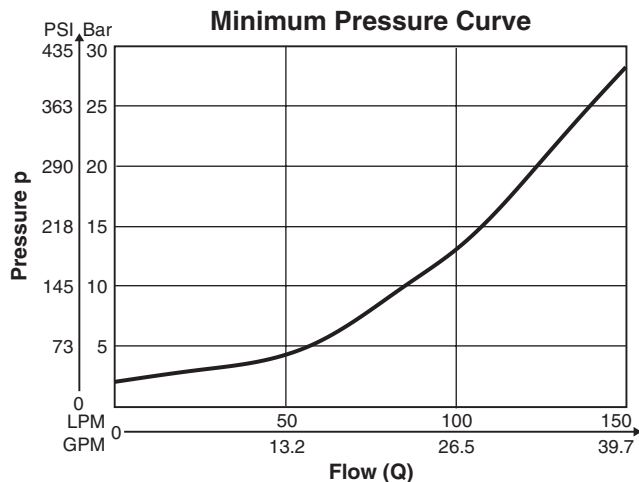
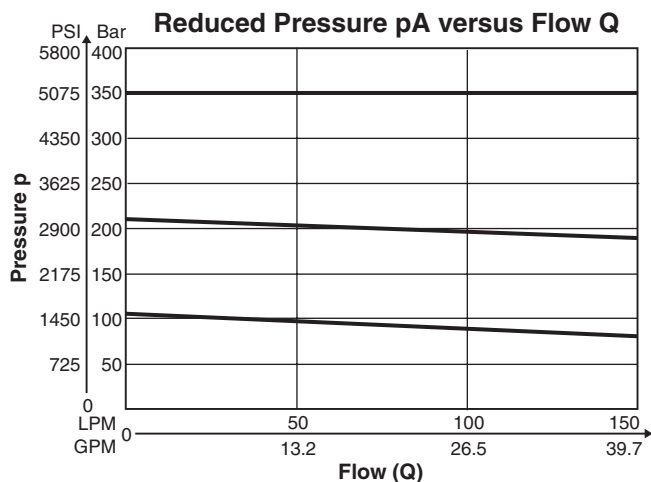
Specifications

General				
Size		NG10	NG25	NG32
Interface	Subplate mounting acc. ISO 5781			
Mounting Position	Unrestricted, horizontal mounting preferred			
Ambient Temperature	[°C]	-20 ... +80; (-4°F ... +176°F)		
MTTF _D Value	[years]	75		
Hydraulic				
Maximum Operating Pressure	Ports A, B and X 350 Bar (5075 PSI), Port Y depressurized			
Pressure Ranges	105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)			
Nominal Flow	150 LPM (39.7 GPM)		350 LPM (92.6 GPM)	500 LPM (132.3 PSI)
Fluid	Hydraulic oil according to DIN 51524...51535, other on request			
Viscosity				
Recommended Permitted	[cSt] / [mm²/s]	30 ... 50 (139 ... 232 SSU)		
	[cSt] / [mm²/s]	20 ... 380 (93 ... 1761 SSU)		
Fluid Temperature	[°C]	-20 ... +70 (-4°F ... +158°F)		
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical				
Duty Ratio	[%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible		
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)			
Nominal Voltage	[V]	12		
Maximum Current	[A]	2.3		
Coil Resistance	[Ohm]	4 at 20°C (68°F)		
Solenoid Connection	Connector as per EN 175301-803, Solenoid identificaton as per ISO9461			
Power Amplifier, Recommended	PCD00A-400			

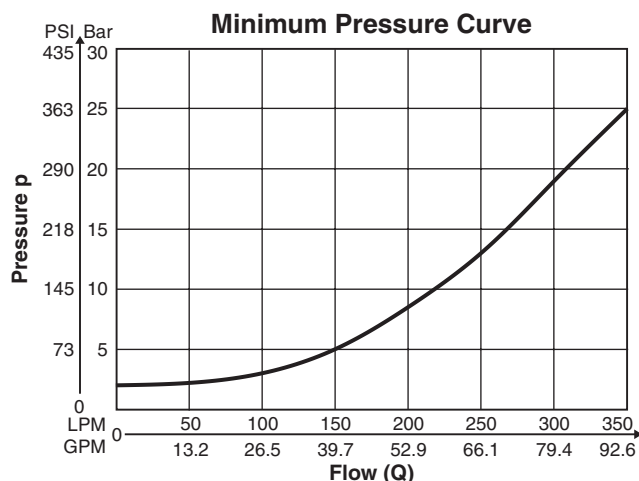
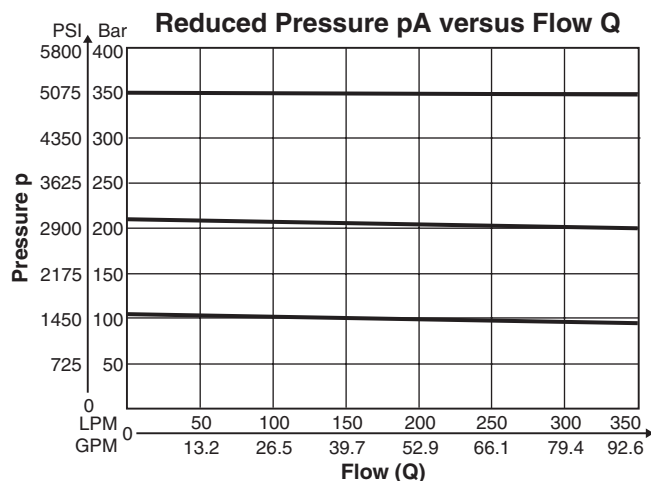
Performance Curves



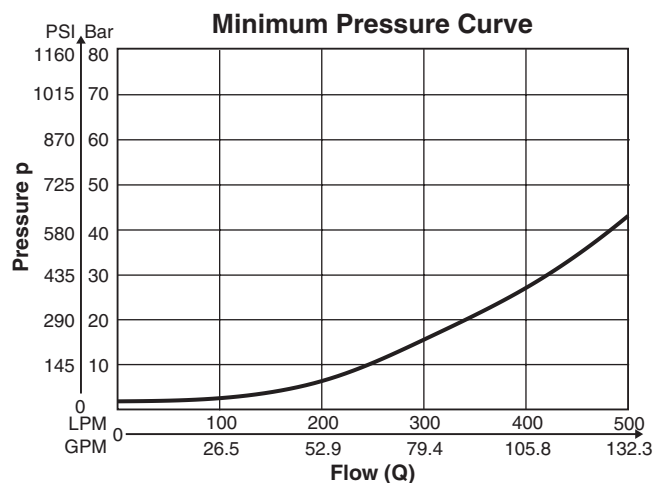
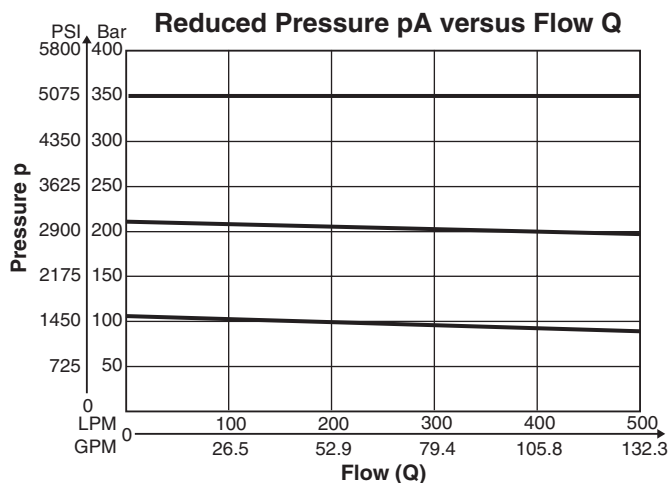
R4R03*P2 ¹⁾



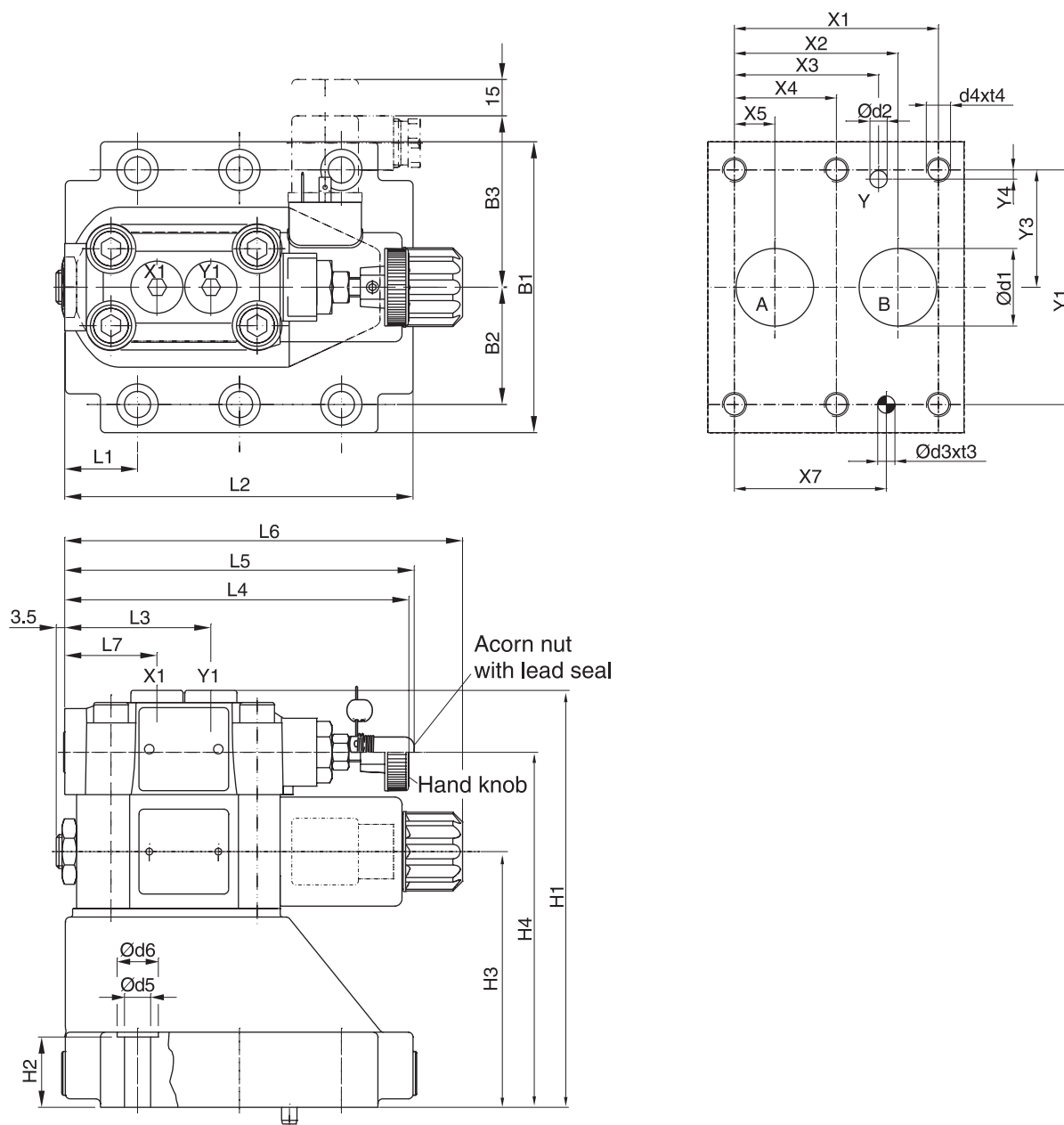
R4R06*P2 ¹⁾



R4R10*P2 ¹⁾



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

**B**

Dimensions**Proportional Pressure Reducing/Relieving Valves
Series R4R*P2 (Subplate Mounted)**

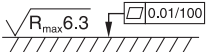
Inch equivalents for millimeter dimensions are shown in (**)

NG	ISO-Code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	—	7.2 (0.28)	—	31.8 (1.25)	66.7 (2.63)	—	33.4 (1.31)	7.9 (0.31)	—	—
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	—	11.1 (0.44)	—	44.5 (1.75)	79.4 (3.13)	—	39.7 (1.56)	6.4 (0.25)	—	—
32	5781-10-13-0-00	84.2 (3.31)	67.5 (2.66)	59.5 (2.34)	42.1 (1.66)	16.7 (0.66)	—	62.7 (2.47)	96.8 (3.81)	—	48.4 (1.91)	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	L1	L2	L3	L4	L5	L6	L7
10	5781-06-07-0-00	87.3 (3.44)	33.4 (1.31)	71.0 (2.80)	134.0 (5.28)	21.0 (0.83)	68.5 (2.70)	109.5 (4.31)	25.0 (0.98)	90.8 (3.57)	60.8 (2.38)	143.0 (5.63)	144.8 (5.70)	164.0 (6.49)	38.6 (1.52)
25	5781-08-10-0-00	105.0 (4.13)	39.7 (1.56)	71.0 (2.80)	158.5 (6.24)	29.0 (1.14)	95.0 (3.74)	136.0 (5.35)	30.9 (1.22)	123.0 (4.84)	60.8 (2.38)	143.0 (5.63)	144.8 (5.70)	164.0 (6.49)	38.6 (1.52)
32	5781-10-13-0-00	120.0 (4.72)	48.4 (1.91)	71.0 (2.80)	171.0 (6.73)	30.0 (1.18)	105.5 (4.15)	146.5 (5.77)	29.8 (1.17)	143.5 (5.65)	60.8 (2.38)	143.0 (5.63)	144.8 (5.70)	164.0 (6.49)	38.6 (1.52)

NG	ISO-Code	d1max	d2max	d3	t3	d4	t4	d5	d6	Subplate
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)	SPP3M6B910
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)	SPP6M8B910
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)	SPP10M12B910

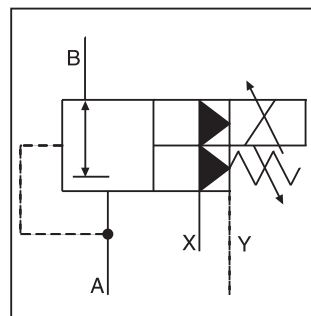
NG	ISO-Code	Bolt Kit			Seal  Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	5781-06-07-0-00	BK505	4x M10 x 35 DIN912 12.9	63 Nm (46.5 lb.-ft.) $\pm 15\%$	S26-58507-0*	S26-58507-5*	
25	5781-08-10-0-00	BK485	4x M10 x 45 DIN912 12.9	63 Nm (46.5 lb.-ft.) $\pm 15\%$	S26-58475-0*	S26-58475-5*	
32	5781-10-13-0-00	BK506	6x M10 x 45 DIN912 12.9	63 Nm (46.5 lb.-ft.) $\pm 15\%$	S26-58508-0*	S26-58508-5*	
Prop. Section P2					S26-58473-0	S26-58473-5	

* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit

General Description

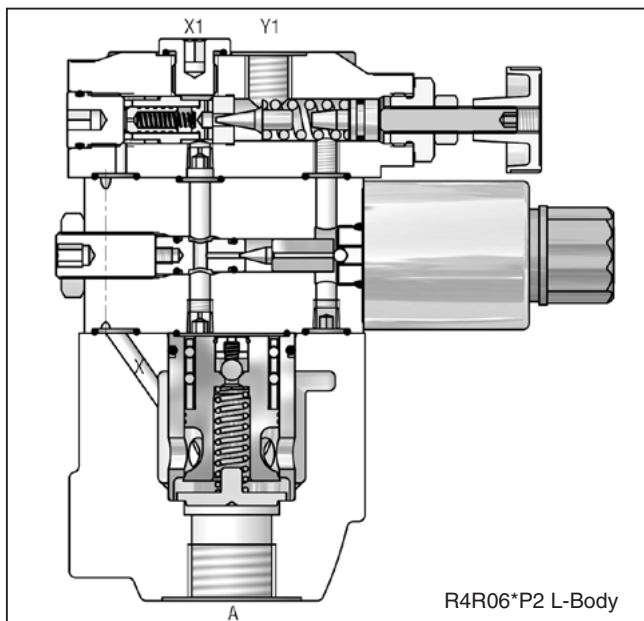
Series R4R*P2 proportional pressure reducing valves are based on the mechanically adjusted Series R4R. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.

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



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") BSPP
 - 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



Ordering Information

R4R		—	5				2	P2	G0R	B		
Pressure Reducing Valve	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	Seal	Options Check with Factory

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
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)

Code	Description
1	Nitrile
5	Fluorocarbon

Bolt Kits:

R4R03: BK505 (4) M10x35
 R4R06: BK485 (4) M10x45
 R4R10 BK506 (6) M10x45

Weight:

R4R03*P2: 5.0 kg (11.0 lbs.)
 R4R06*P2: 5.1 kg (11.2 lbs.)
 R4R06*D*P2: 7.4 kg (16.3 lbs.)
 R4R10*P2 8.4 kg (18.5 lbs.)

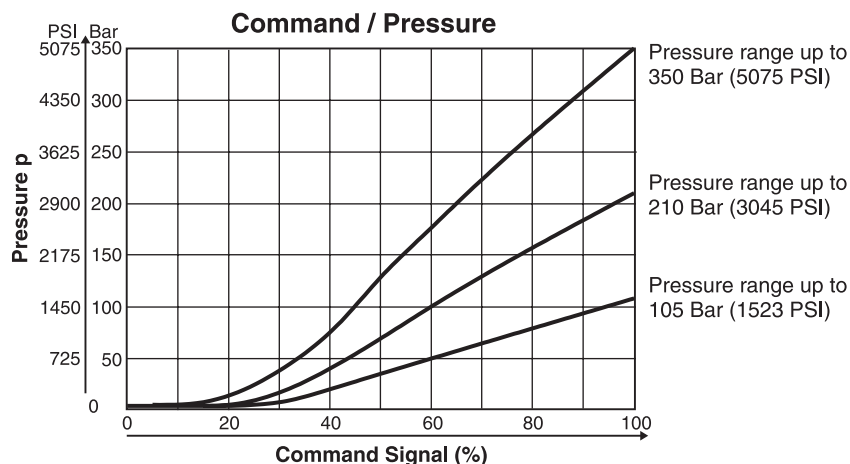
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

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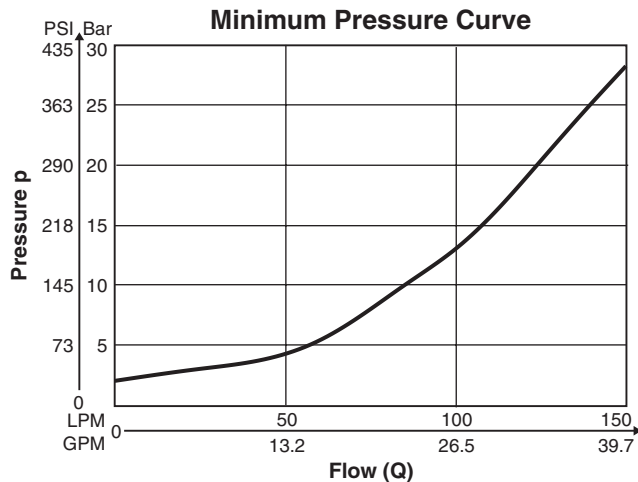
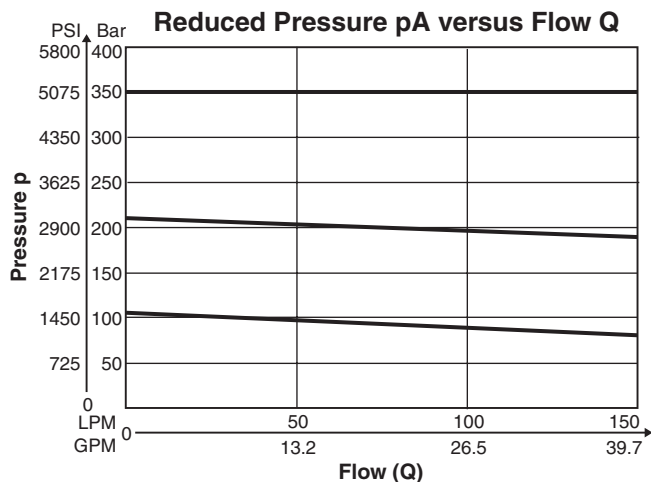
Specifications

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)			
MTTF _D Value	75 years			
Hydraulic				
Max. Operating Pressure	Ports A, B and X 350 Bar (5075 PSI); Port Y depressurized			
Pressure Ranges	105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)			
Nominal Flow	60 LPM (15.9 GPM)	200 LPM (52.9 GPM)	200 LPM (52.9 GPM)	450 LPM (119.0 GPM)
Fluid	Hydraulic oil as per DIN 51524...51535, other on request			
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity	Permitted Recommended	10 to 380 cSt / mm²/s (46 to 1761 SSU)		
		30 to 80 cSt / mm²/s (139 to 371 SSU)		
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (Proportional Solenoid)				
Duty Ratio	100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible			
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, Solenoid identificaton as per ISO9461			
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)			
Power Amplifier	PCD00A-400			

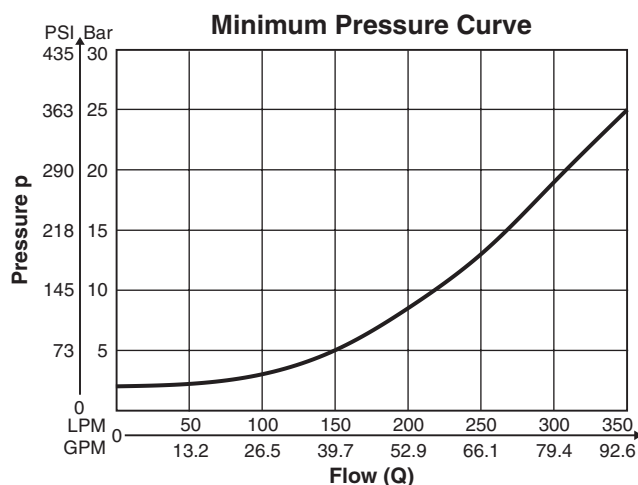
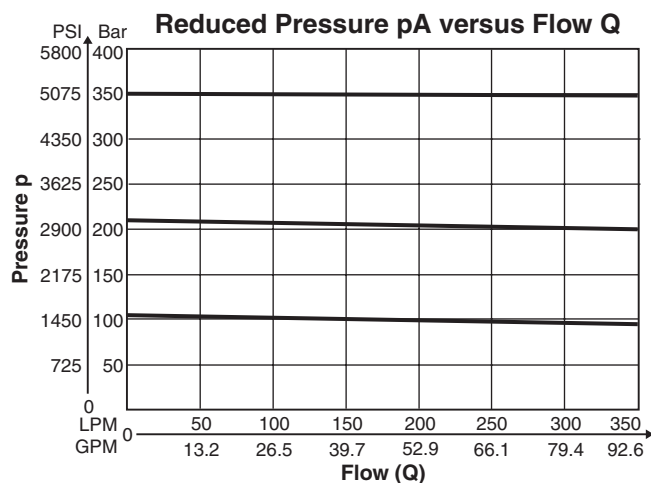
Performance Curves



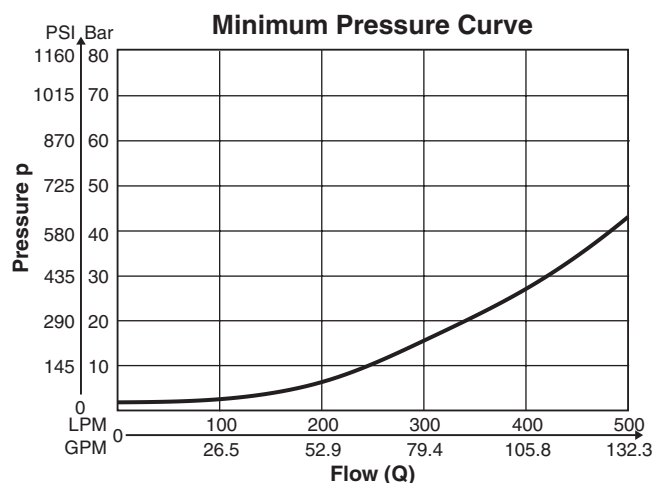
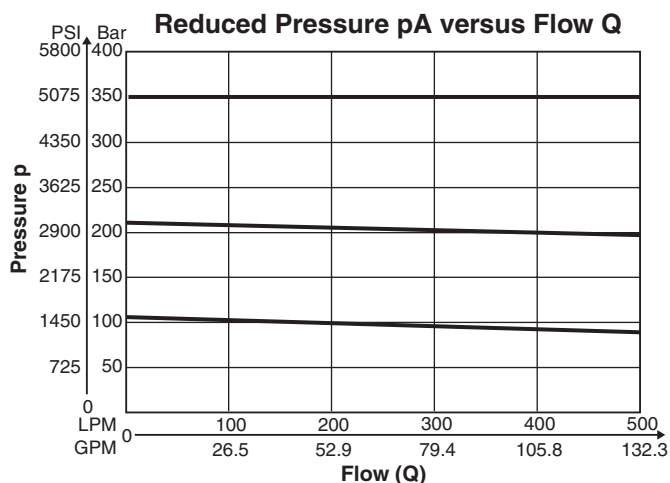
R4R03*P2 ¹⁾



R4R06*P2 ¹⁾



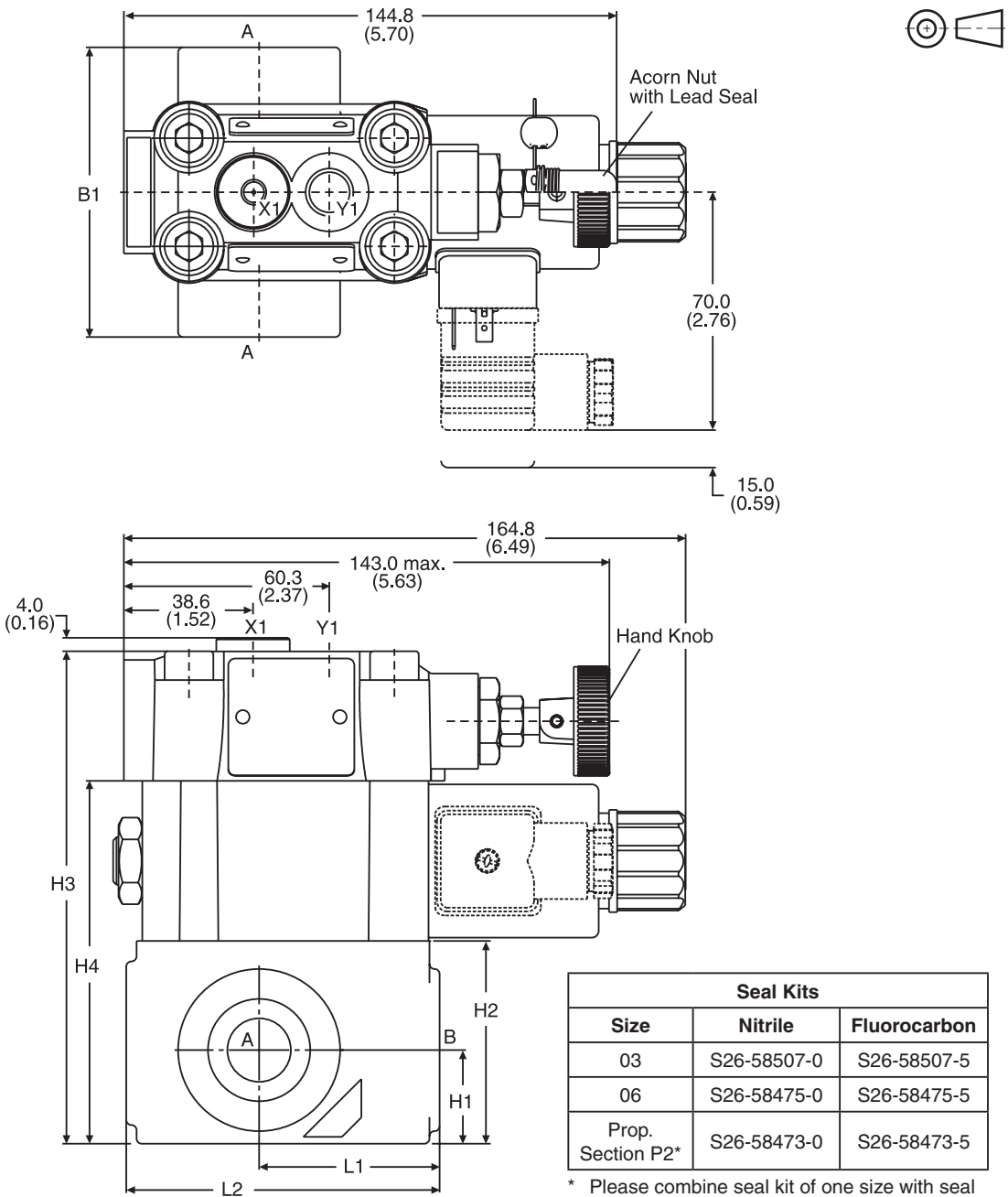
R4R10*P2 ¹⁾



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

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

T-Body



Seal Kits		
Size	Nitrile	Fluorocarbon
03	S26-58507-0	S26-58507-5
06	S26-58475-0	S26-58475-5
Prop. Section P2*	S26-58473-0	S26-58473-5

* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

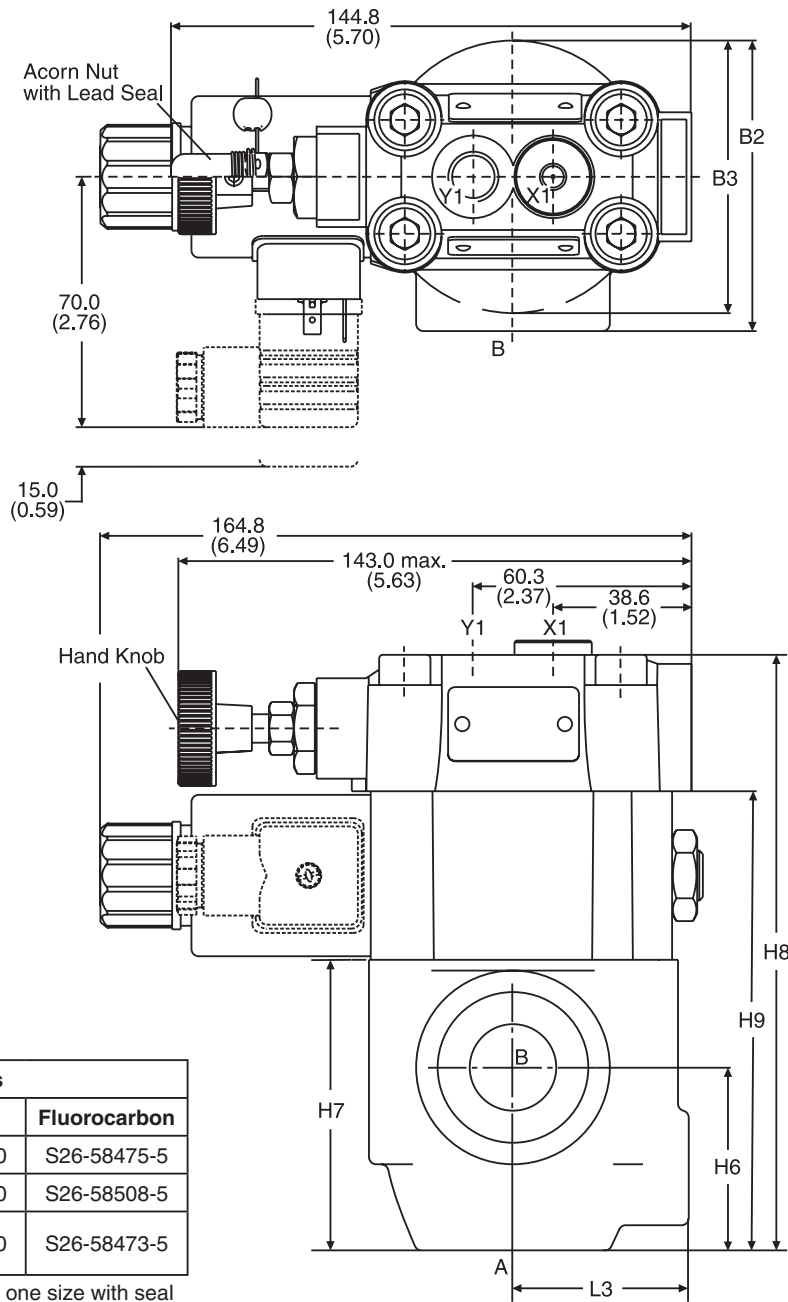
Size	Body	B1	H1	H2	H3	H4	L1	L2
03	T-Body	85.0 (3.35)	27.5 (1.08)	59.5 (2.34)	144.5 (5.69)	106.5 (4.19)	53.0 (2.09)	92.0 (3.62)
06	T-Body	136.0 (5.35)	38.0 (1.50)	93.0 (3.66)	178.0 (7.01)	140.0 (5.51)	66.5 (2.62)	117.5 (4.63)

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		

* Closed when supplied.

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

L-Body



Seal Kits		
Size	Nitrile	Fluorocarbon
06	S26-58475-0	S26-58475-5
10	S26-58508-0	S26-58508-5
Prop. Section P2*	S26-58473-0	S26-58473-5

* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

Size	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		

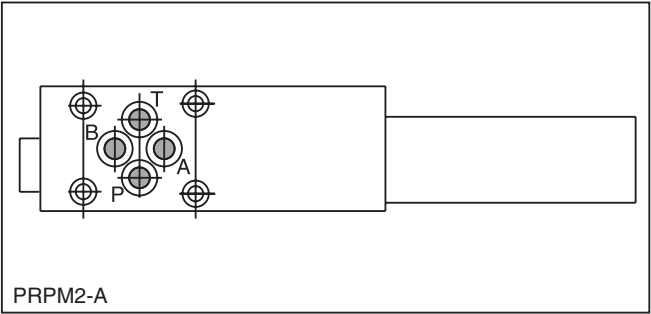
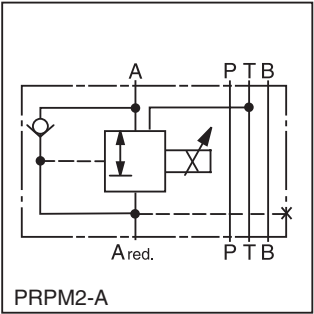
* Closed when supplied.

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.



Ordering Information

PRP

Proportional Pressure Reducing Valve

M

Sandwich

Size

Code	Description
2	NG6
3	NG10

Red. Port

Code	Port
AA	A
BB	B
PP	P

Pressure Range

Code	Description
10	100 Bar (1450 PSI)
20	200 Bar (2900 PSI)
35	350 Bar (5075 PSI)

Solenoid Voltage

Code	Description
J	24V, 680 mA
K	12V, 1250 mA

V

Seal Fluorocarbon

Weight:
PRPM2 0.2 kg (0.4 lbs.)
PRPM3 3.2 kg (7.1 lbs.)

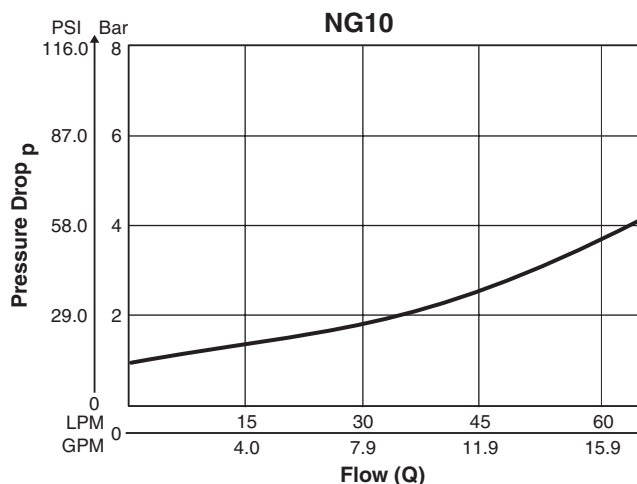
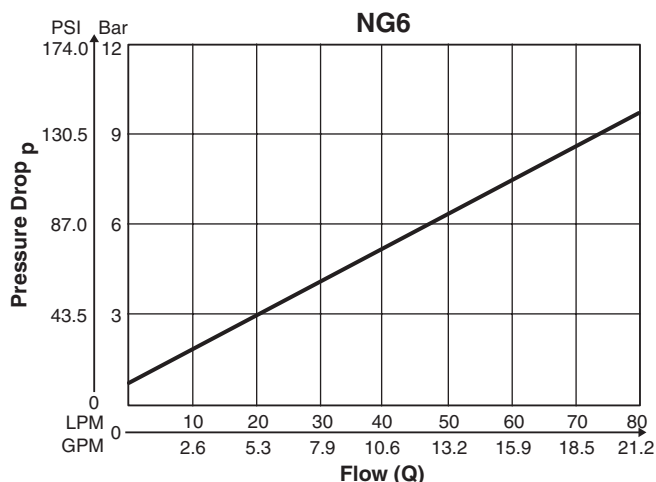
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

General		
Size (according to ISO 4401)	NFPA D03 / NG6 / CETOP 3	NFPA D05 / NG10 / CETOP 5
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	Horizontal preferred	
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	350 Bar (5075 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	10 to 380 cSt / mm²/s (46 to 1761 SSU)	
Filtration	ISO Class 1406 16/13, to be achieved with β _{6...10} > 75	
Resolution	1 mA	
Repeatability	≤1% (with optimal dither signal)	
Hysteresis	≤4% (with optimal dither signal)	
Electrical		
Solenoid	Proportional solenoid, wet-pin push type, pressure tight	
Duty Ratio	100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible	
Protection Class	IP65 in accordance with EN 60529	
Supply Voltage	12 VDC (1320 mA) / 24 VDC (680 mA)	
Solenoid Connection	Connector as per EN 175301-803	
Amplifier	PCD00A-400	

Performance Curves

Pressure Drop/Flow over check valve

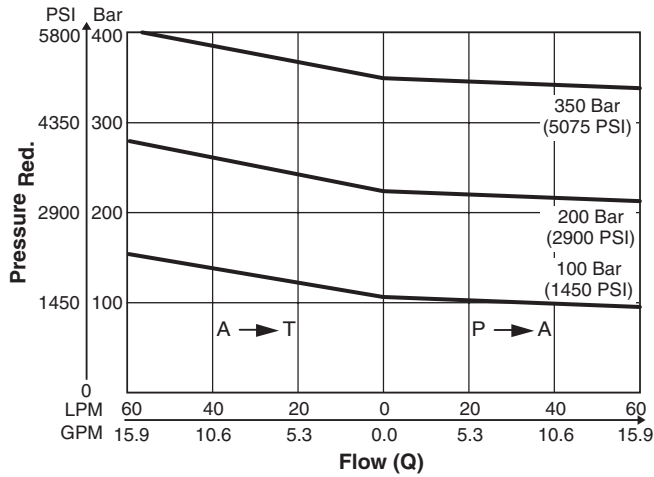


All measures taken at viscosity $\nu = 30\text{mm}^2/\text{s}$.

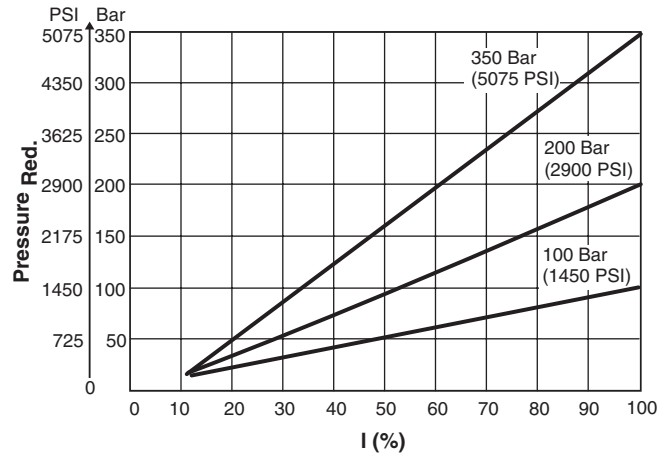
B01_Cat2550.indd, ddp, 06/21

B

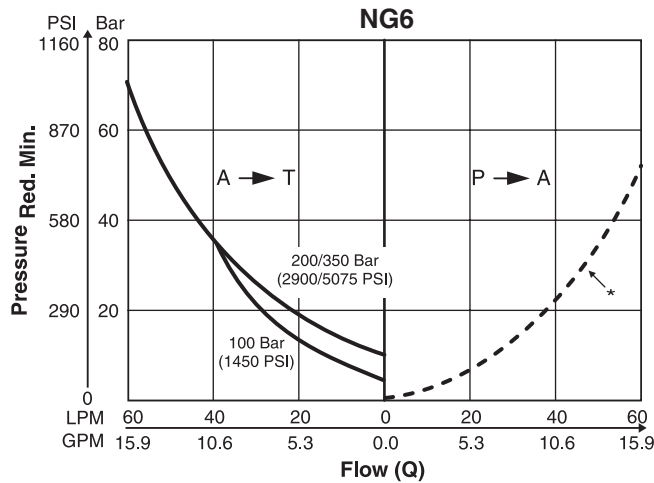
Pressure/Flow NG6/NG10 $p_{red} = f(Q)$



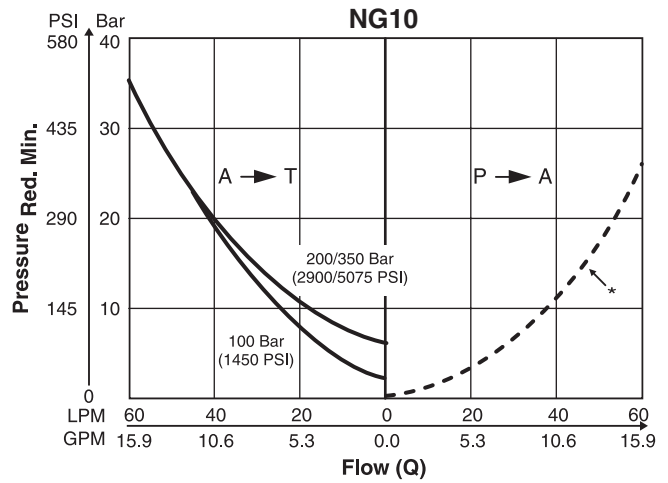
Pressure/Adjustment $p_{red} = f(I)$, at $Q=0$ LPM (static)



Pressure/Flow (min. adjustable) $p_{red} = f(Q)$

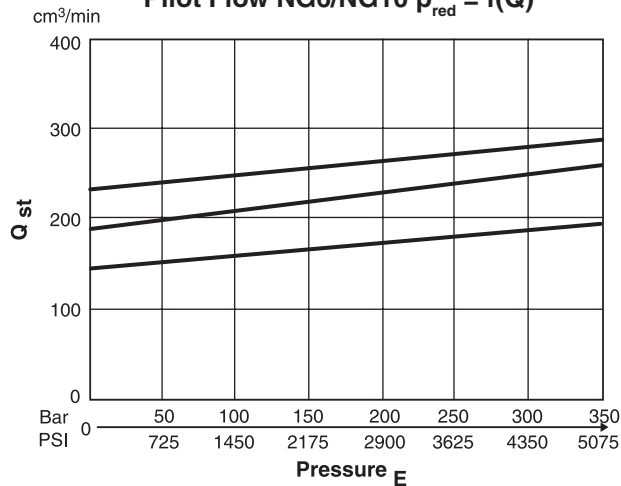


* Backpressure depends on system



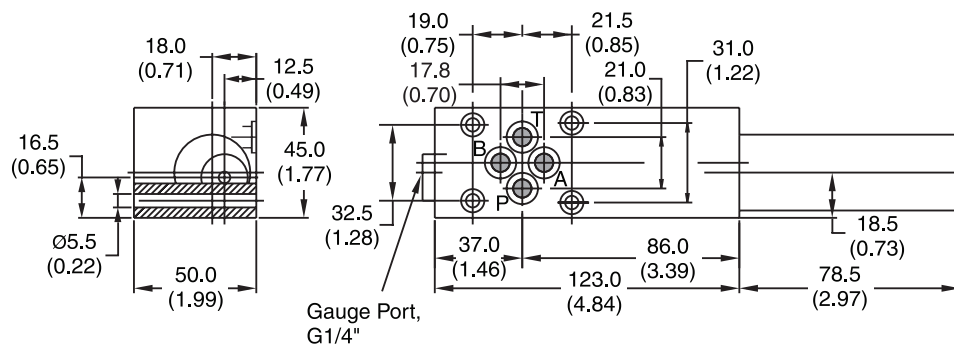
* Backpressure depends on system

Pilot Flow NG6/NG10 $p_{red} = f(Q)$

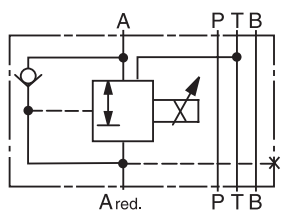


PRPM2A*, B*

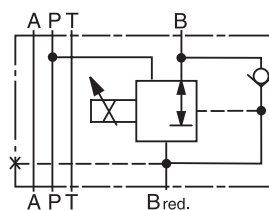
Inch equivalents for millimeter dimensions are shown in (**)

**Sandwich type: Pressure reduction code B is located on cartridge side B.**

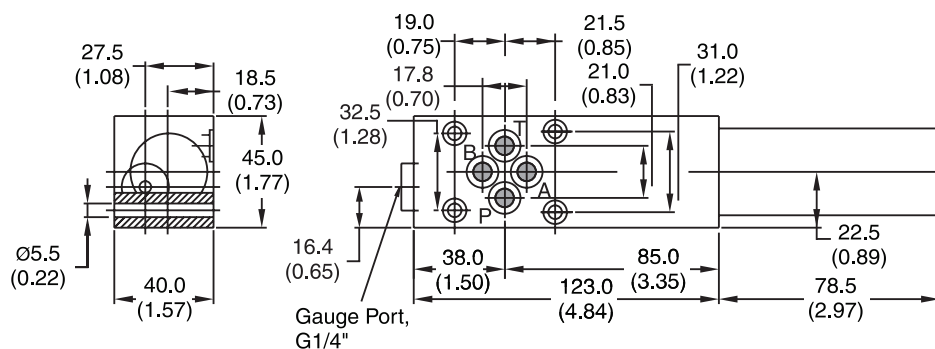
Symbol PRPM2A*



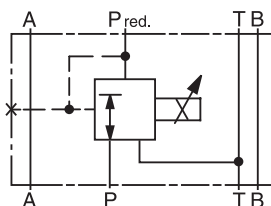
Symbol PRPM2B*

**PRPM2P***

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

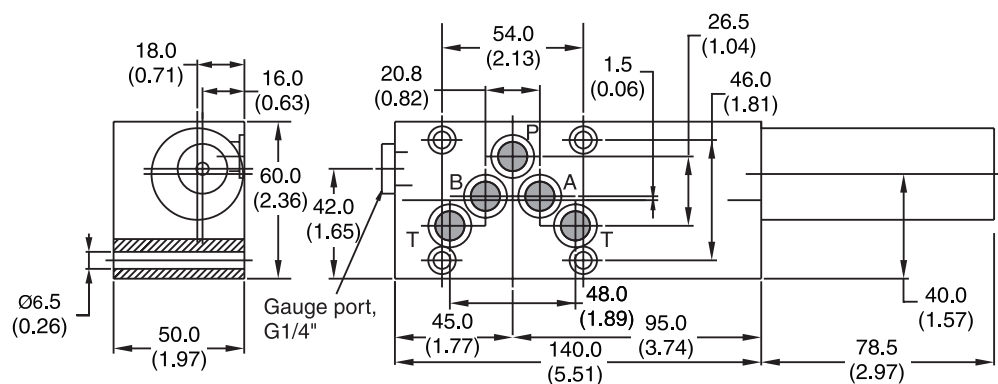


Symbol PRPM2P*

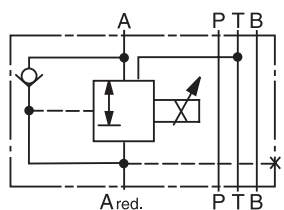


PRPM3A*, B*

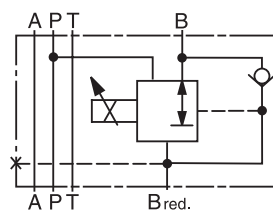
Inch equivalents for millimeter dimensions are shown in (**)

**Sandwich type: Pressure reduction code B is located on cartridge side B.**

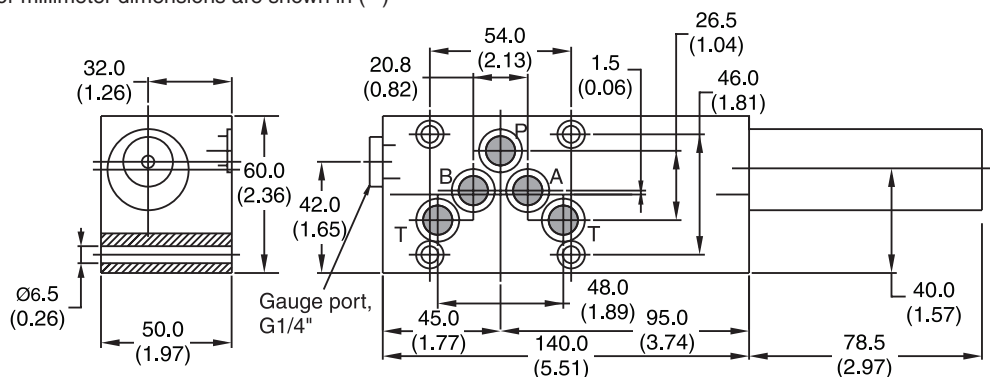
Symbol PRPM3A*



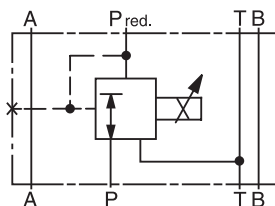
Symbol PRPM3B*

**PRPM3P***

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



Symbol PRPM3P*



General Description

Series DUR*L06 proportional flow control valves are used to generate pressure-compensated flow from A to B. The valves are equipped with a built-in check valve for the return flow.

A rectifier plate can be used for meter-in and meter-out control of an actuator.

Function

When solenoid current is applied, the metering spool opens against the reset spring and the flow is regulated by the pressure compensating spool to port B.

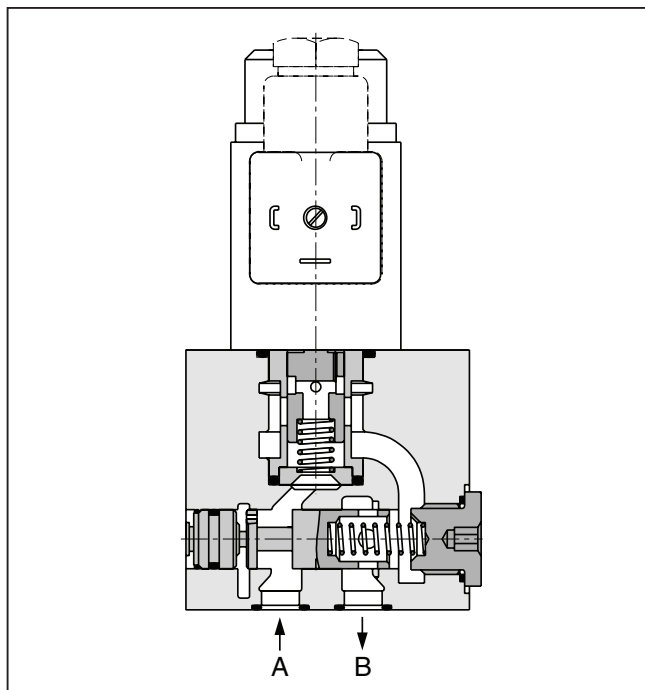
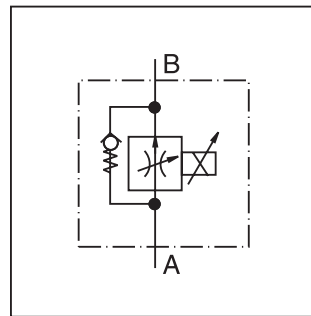
With the aid of the pressure compensating spool, the pressure drop is held constant on the metering window. Thus pressure load changes are compensated, and the oil flow remains constant.

The valve parameters can be saved, changed and duplicated in combination with the digital electronic module PCD00A-400.

Features

- Low hysteresis
- High reproducibility
- Load-independent oil flow
- Bypass check valve
- Mounting pattern to ISO 6263
- 4 flow rates

Note: See "Accessories" for rectifier plate and subplates.



Ordering Information

DUR		L	06	P	K		1	-	[]														
Proportional Pressure Reducing Valve	Nominal Flow	Linear Solenoid 24V / 0.68 A	Size NG6	Progressive Performance Curve		Seal			Design Series NOTE: Not required when ordering.														
<table><tr><th>Code</th><th>Description</th></tr><tr><td>1.6</td><td>1.6 LPM (0.4 GPM)</td></tr><tr><td>6.3</td><td>6.3 LPM (1.7 GPM)</td></tr><tr><td>18</td><td>18.0 LPM (4.8 GPM)</td></tr></table>		Code	Description	1.6	1.6 LPM (0.4 GPM)	6.3	6.3 LPM (1.7 GPM)	18	18.0 LPM (4.8 GPM)	<table><tr><th>Code</th><th>Description</th></tr><tr><td>A</td><td>Nitrile</td></tr><tr><td>1</td><td>Fluorocarbon</td></tr></table>								Code	Description	A	Nitrile	1	Fluorocarbon
Code	Description																						
1.6	1.6 LPM (0.4 GPM)																						
6.3	6.3 LPM (1.7 GPM)																						
18	18.0 LPM (4.8 GPM)																						
Code	Description																						
A	Nitrile																						
1	Fluorocarbon																						

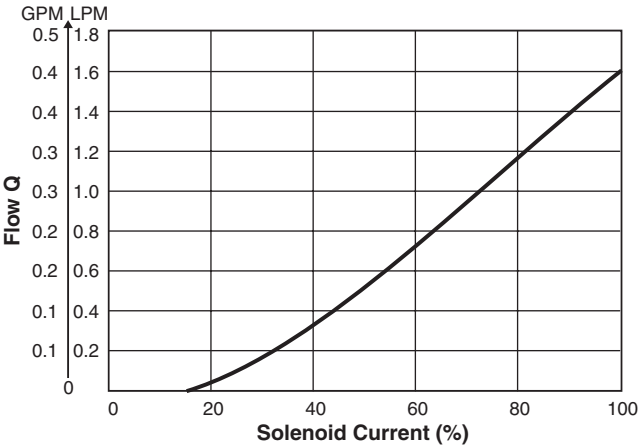
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

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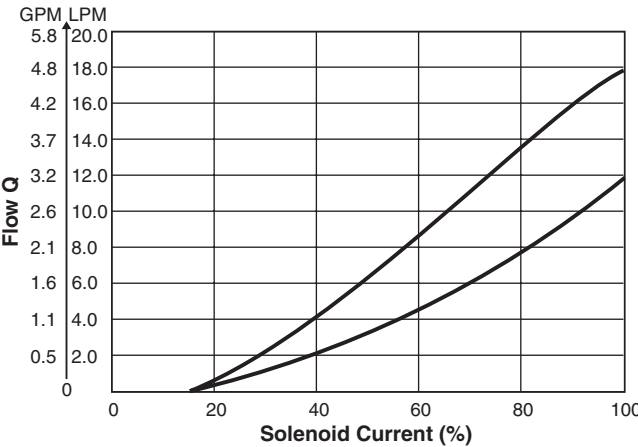
Specifications

General	
Design	Electrically adjustable orifice valve with load sensing
Mounting Interface	Subplate NG6, Interface DIN 24340, ISO, CETOP
Mounting Position	Unrestricted, preferably horizontal
Ambient Temperature [°C]	-20...+60; (-43°F...+140°)
MTTF _D Value [years]	150
Supply Voltage [V]	24
Solenoid Nominal Current [mA]	680
Duty Cycle [%]	100 ED; CAUTION: Coil temperature up to 150°C (302°F) possible
Solenoid Connection	Connector as per EN 175301-803
Protection Class	IP 65 in accordance with EH 60529 (plugged and mounted)
Amplifier Module	PCD00A-400
Maximum Operating Pressure	210 Bar (3045 PSI)
Fluid	Hydraulic oil according to DIN 51524
Fluid Temperature [°C]	-20 ... +70 (-43°F...+158°F) / Nitrile: -25 ... +70 (-13°F...+158°F)
Viscosity Range Permitted [cSt]/[mm²/s]	20...400 (93...1853 SSU)
Viscosity Range Recommended [cSt]/[mm²/s]	30...80 (139...371 SSU)
Filtration	ISO 4406 (1999); 18/16/13 (acc. NAS 1638: 7)
Minimum Pressure Difference	DUR 1.6/3.2: 3 Bar (43.5 PSI); DUR 6.3/12: 5 Bar (72.5 PSI); DUR 18: 8 Bar (116 PSI)
Hysteresis at Q_{nom} [%]	6
Hysteresis at $Q \leq 20 \% \cdot Q_{nom}$ [%]	6
Repeatability at $\Delta U_{set} = 5 V$ [%]	2

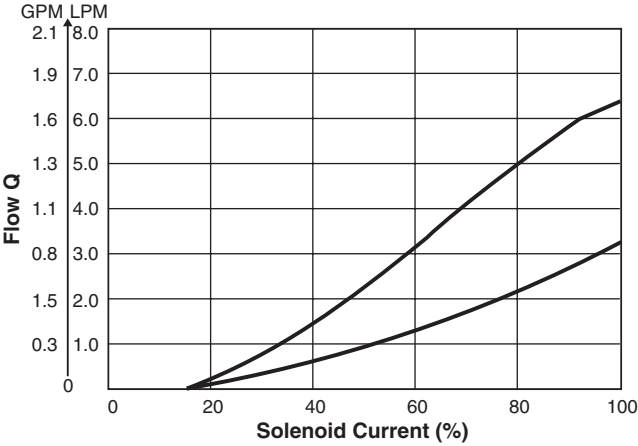
DUR 1.6 L 06 PK*



DUR 18 L 06 PK*



DUR 3.2 L 06 PK* / DUR 6.3 L 06 PK*

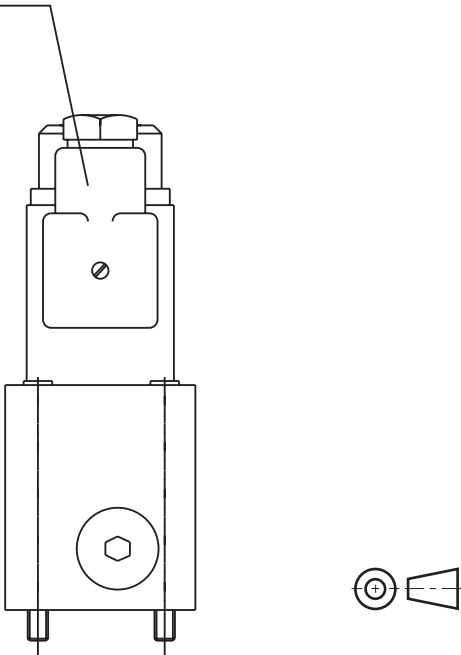
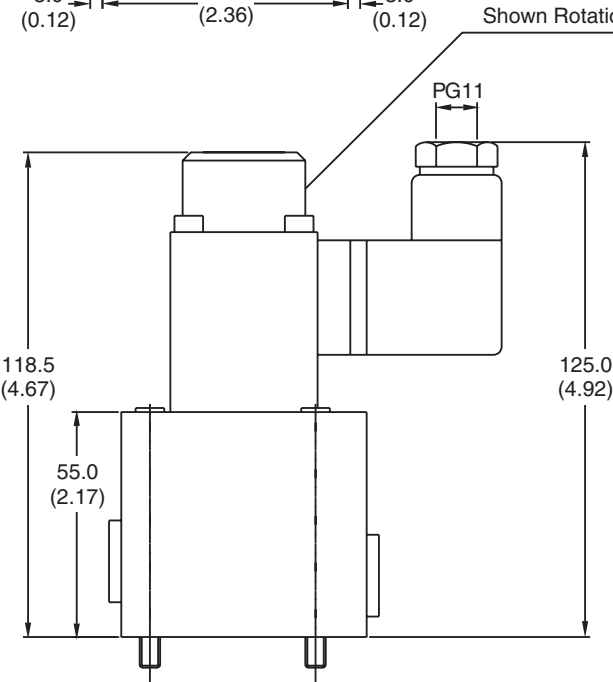
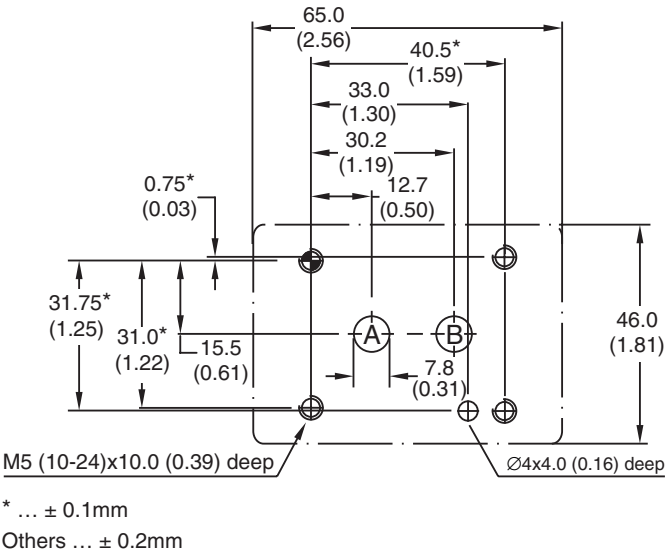
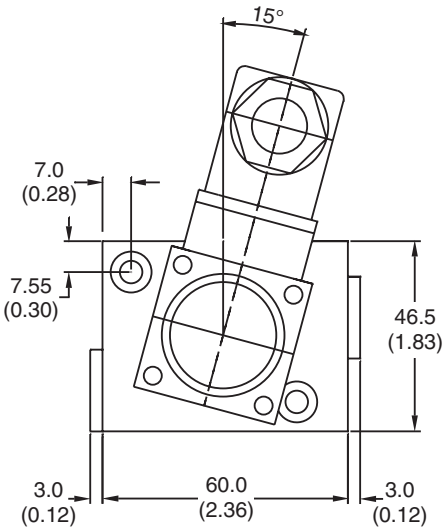


All performance curves measured with HLP46 at 50 °C (122 °F).

B

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

B



Seal Kits

Nitrile	Fluorocarbon
SK-DUR***L	SK-DUR***L FPM

Weight: 1.6 kg (3.5 lbs.)

Bolt Kits (Cylinder head ISO 4662-12.9 not included)

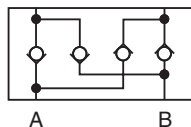
Size	Valve Model	Quantity	Tightening Torque [Nm]	Valve Without Rectifier Plate		Valve Without Rectifier Plate	
				Dimensions	Order No.	Dimensions	Order No.
NG06	DUR*L06	2	7.6 Nm	2x M5X60	BK380	2x M5X100	BK466

Sandwich Rectifier Plate

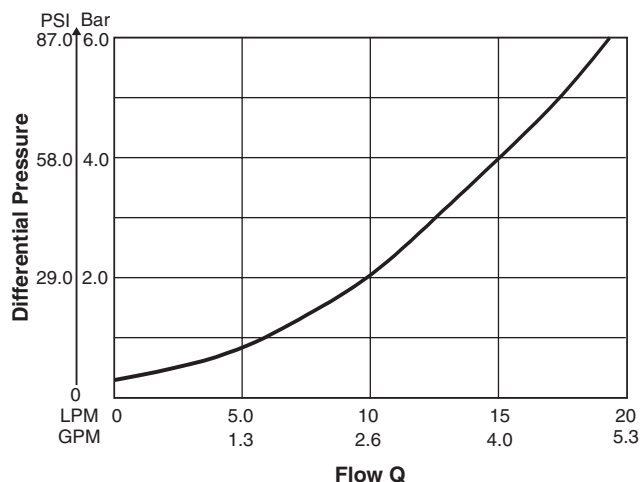
If a 2-way flow control valve is used in combination with a rectifier plate, the valve can be used for meter-in and meter-out flow control of an actuator.

Design

The intermediate rectifier plate is designed with four identical, symmetrically arranged check valves. Thus the differential pressure is the same in both flow directions.

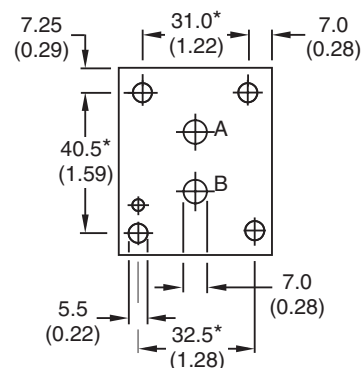
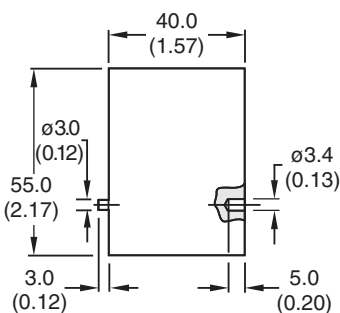
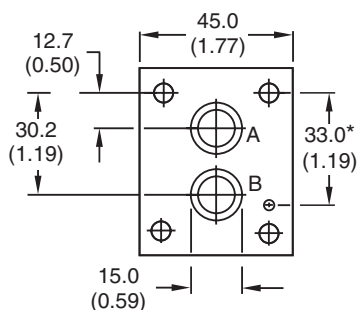


Performance Curve $\Delta p/Q$



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

Dimensions



Dimension Tolerances

* ... $\pm 0.1\text{mm}$

Others ... $\pm 0.2\text{mm}$

Holes and Silhouette of Valve Body ... Untoleranced Dimension



Rectifier Plate

Ordering Code: HROA06C

O-ring for sealing the connecting surface (not included)

Connections	Dimensions	Required Units
A, B	12 x 1.5	2

Subplates

Ordering Code	Description
SPD22B910	P, A, B and T = G1/4
SPD23B910	P, A, B and T = G1/8

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.

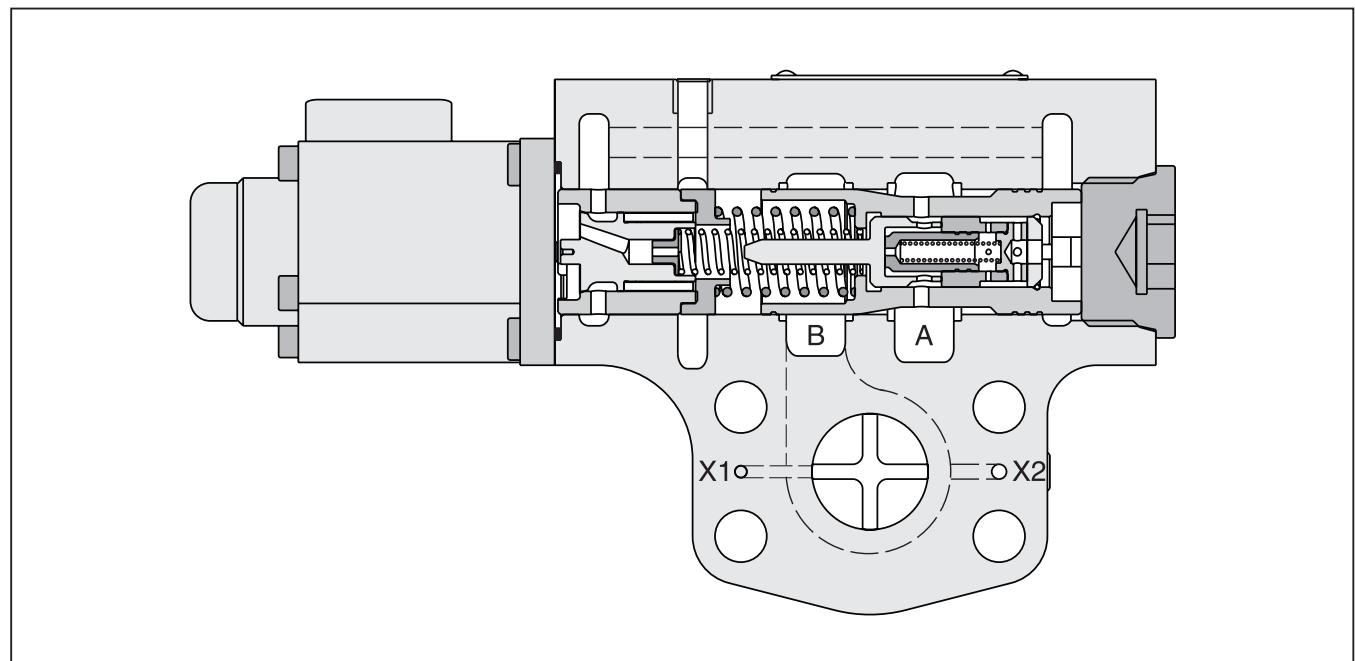
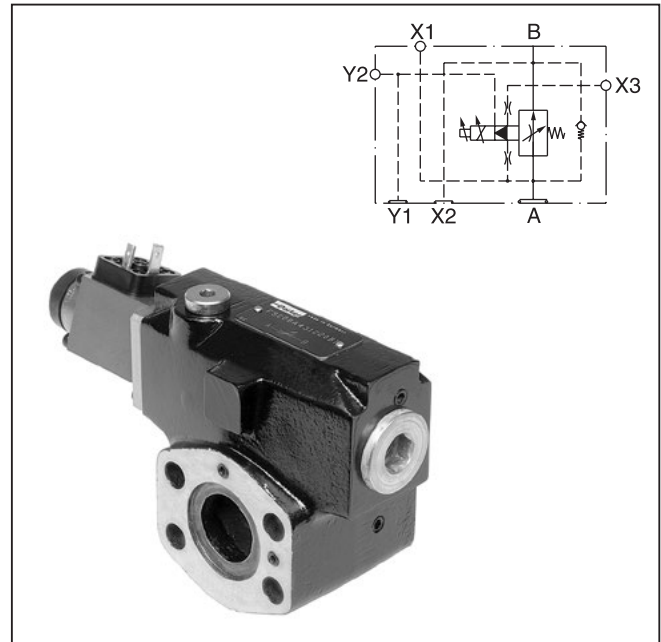
B

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



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

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F5C

Proportional Throttle Valve

Size

Pilot Flow and Response

4

SAE 61 Interface

Pilot Ports

Spool Type

X

Proportional Solenoid
16V / 1.05A

Pilot Connection

0

Accessories

C

Design Series

Seal

Options
Check with
Factory

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1 3/4"

Code	Description
3	G1/4"
N	1/4" NPT

Code	Description
1	Nitrile
5	Fluorocarbon

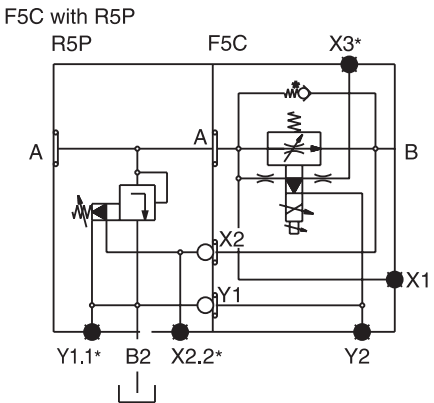
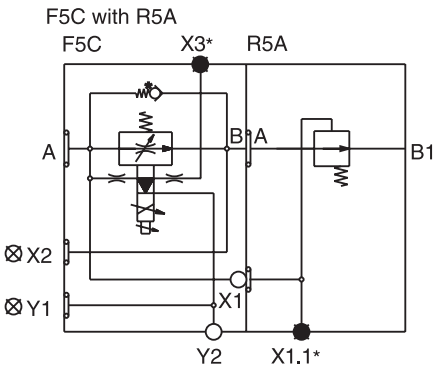
Code	Pilot Flow	Maximum Response
Omit	1 LPM (0.3 GPM)	350 ms
A	2 LPM (0.5 GPM)	250 ms

Code	Size	Maximum Flow*
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
($\Delta p = 8.4$ Bar (121.8 PSI))

Weight:
F5C06 3.9 kg (8.6 lbs.)
F5C08 4.1 kg (9.0 lbs.)
F5C10 5.8 kg (12.8 lbs.)

Code	Pilot Connections	F5C without Compensators R5A, R5P	F5C for Combined with R5A	F5C for Combined 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 ○

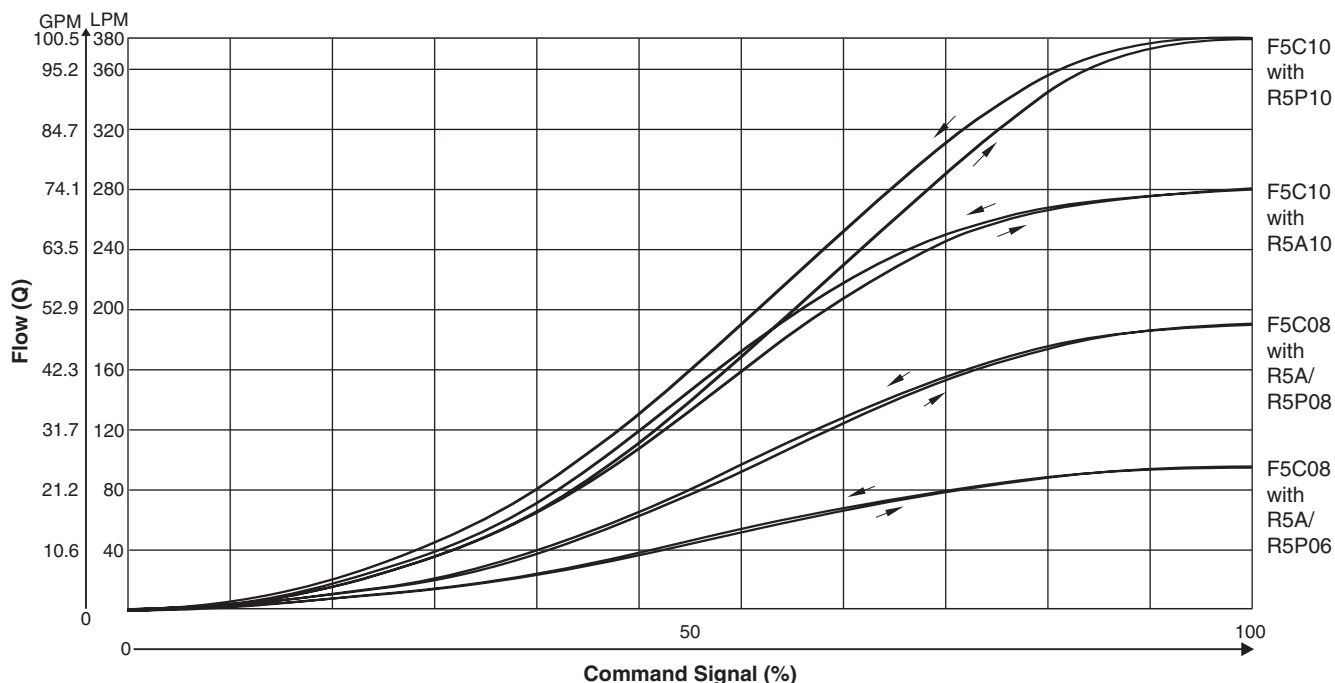


* optional ○ open ● closed ⊗ closed by counterpart

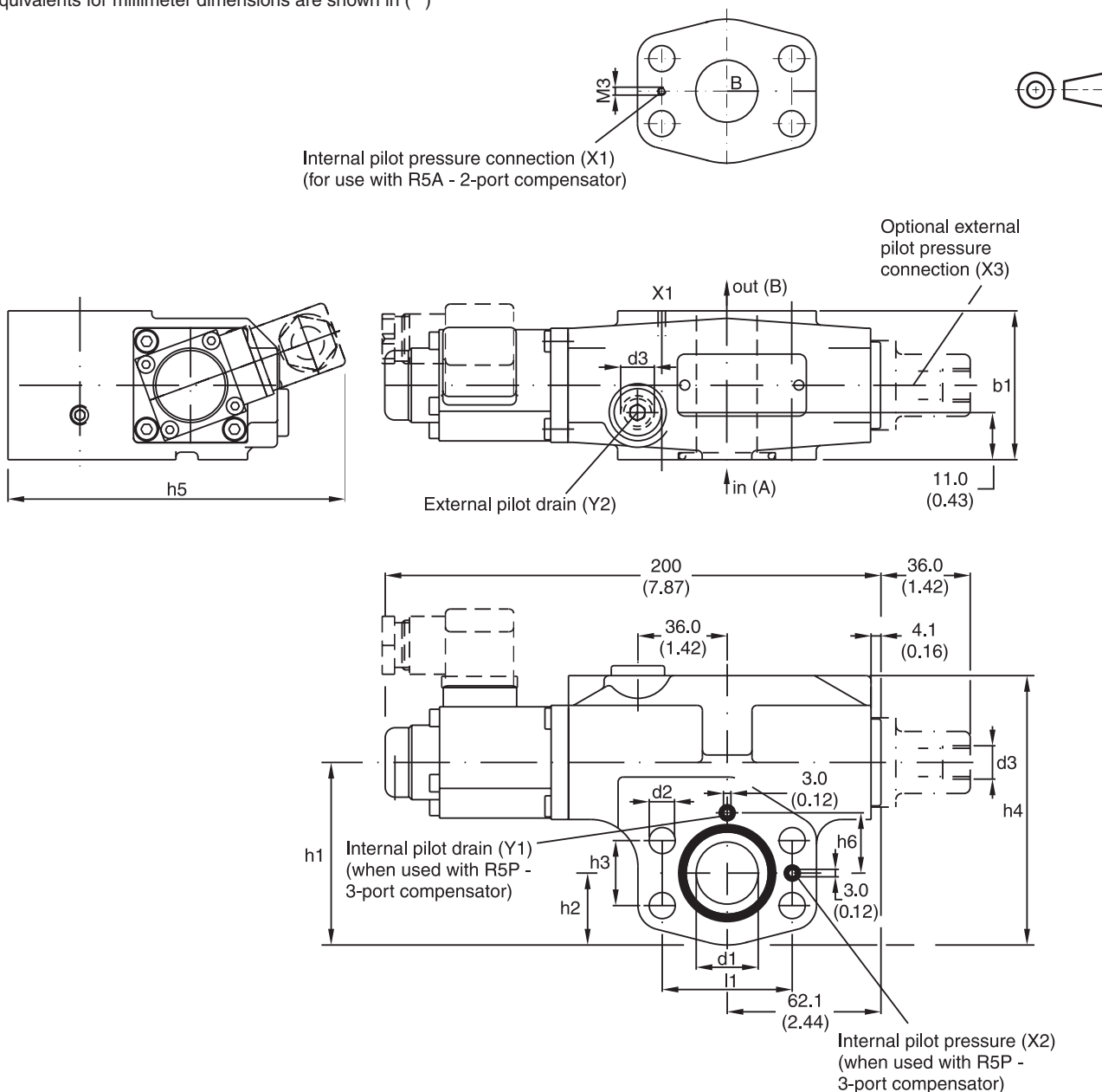
Specifications

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)		
Flows	26 LPM (6.1 GPM) 45 LPM (11.9 GPM) 95 LPM (25.1 GPM)	45 LPM (11.9 GPM) 95 LPM (25.1 GPM) 190 LPM (50.3 GPM)	95 LPM (25.1 GPM) 190 LPM (50.3 GPM) 380 LPM (100.5 GPM)
Fluid	Hydraulic oil as per DIN 51524...51535, other on request		
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)		
Viscosity Permitted Recommended	10 to 380 cSt / mm²/s (46 to 1761 SSU) 30 to 80 cSt / mm²/s (139 to 371 SSU)		
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Electrical			
Duty Ratio	100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible		
Solenoid Connection	Connector as per EN175301-803		
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)		
Supply Voltage	16 VDC		
Power Consumption	1.05A		
Resistance	11.3 Ohm		
Response Time	See Ordering information		
Coil Insulation Class	H (180°C) (356°F)		

Performance Curves



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



Seal Kits		
Size	Nitrile	Fluorocarbon
06 / 08 / 10	S16-91850-0	S16-91850-5

Size	l1	b1	h1	h2	h3	h4	h5	h6	d1	d2	d3
06	47.6 (1.87)	60.0 (2.36)	68.2 (2.69)	26.0 (1.02)	22.2 (0.87)	103.2 (4.06)	183.0 (7.20)	20.8 (0.82)	19.0 (0.75)	10.5 (0.41)	G1/4"
08	52.4 (2.06)	60.0 (2.36)	73.6 (2.90)	29.0 (1.14)	26.2 (1.03)	108.6 (4.28)	187.0 (7.36)	24.3 (0.96)	25.0 (0.98)	10.5 (0.41)	G1/4"
10	58.7 (2.31)	75.0 (2.95)	83.5 (3.29)	36.5 (1.44)	30.2 (1.19)	118.5 (4.67)	198.0 (7.80)	29.3 (1.15)	32.0 (1.26)	12.5 (0.49)	G1/4"

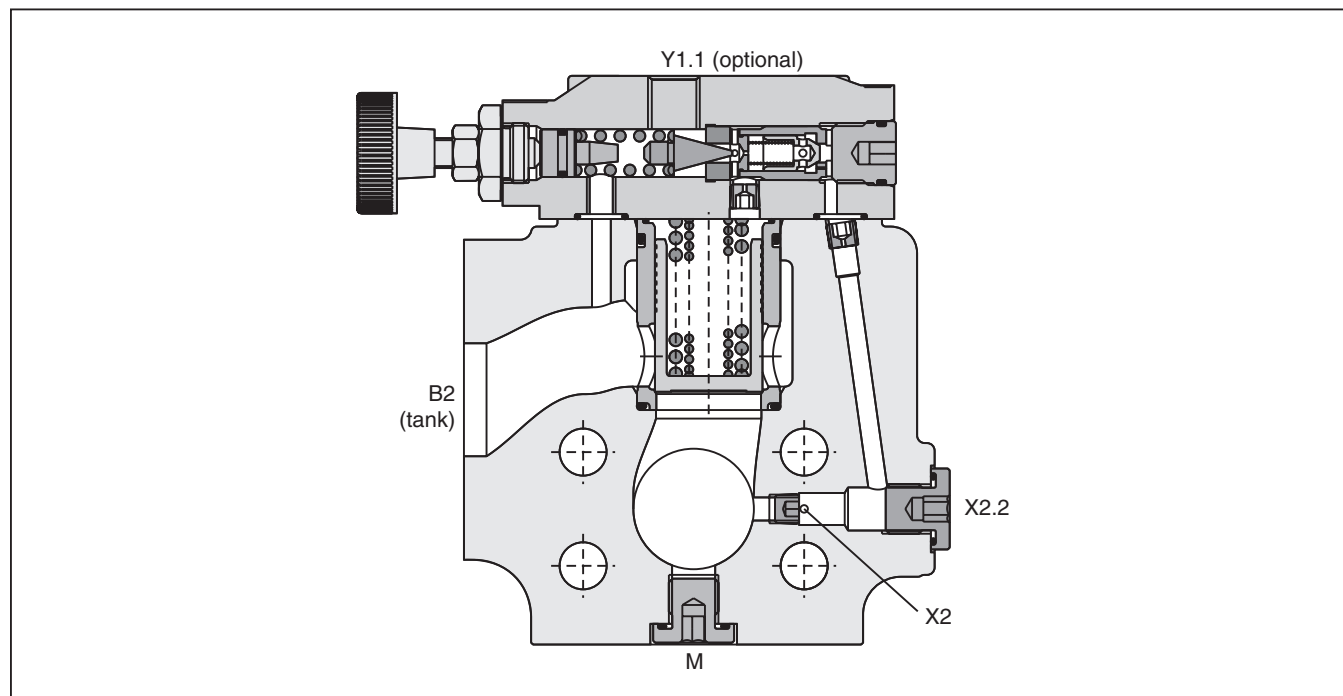
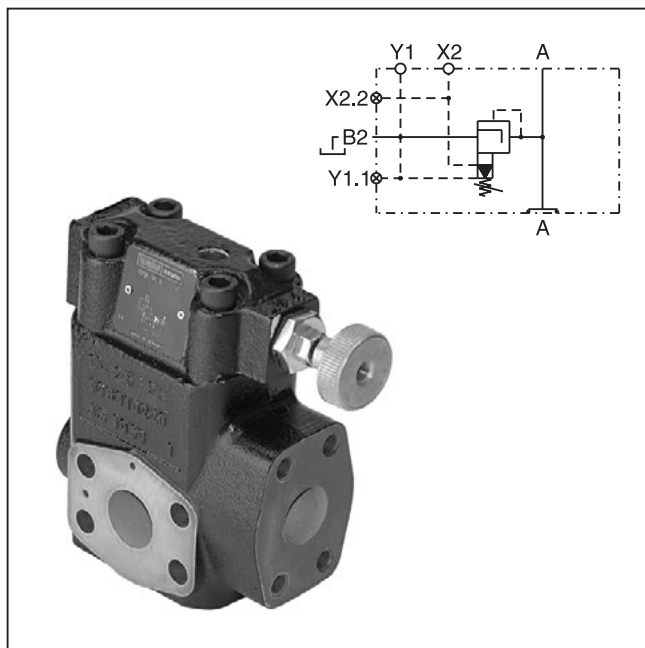
General Description

Series R5P direct operated, 3-way pressure compensators can be combined with any type of fixed or adjustable flow resistor (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



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

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R5P		—								A		
3-Port Compensator	Size	SAE 61 Interface	Pilot Ports	Pressure Range	Adjustment	Pilot Connection	Switching Type	Solenoid Voltage	Design Series	Seal	Options Check with Factory	

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

Code	Size	Max. Pressure
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Code	Description
2	Internal PD Internal PP*
6	External PD** Internal PP*

* PP through port X1 in outlet flange.
 ** Through port Y1.1.

Code	Description
Omit	Standard w/o vent function
G0R	12 VDC
G0Q	24 VDC
G0H	48 VDC
GAR	98 VDC
W30	110V 50Hz/120V 60Hz
W31	220V 50Hz/240V 60Hz

Code	Description*
1	Nitrile
5	Fluorocarbon

* Further seals on request.

Code	Pilot Port	Port Y1*
3	SAE	Plugged
S	SAE	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

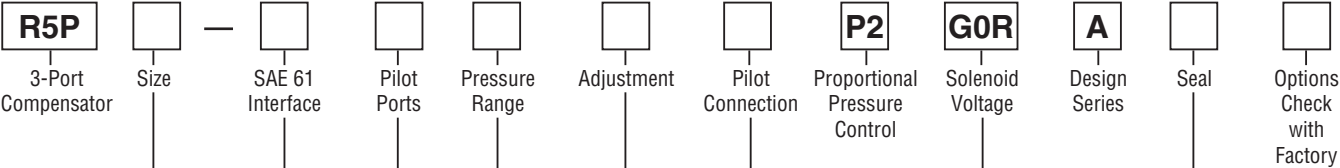
* Solenoid de-energized: open to tank solenoid energized: vent line blocked.
 ** Solenoid de-energized: vent line blocked solenoid energized: open to tank.

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
R5P06	3.7 kg (8.2 lbs.)	5.4 kg (11.9 lbs.)
R5P08	4.4 kg (9.7 lbs.)	6.1 kg (13.5 lbs.)
R5P10	5.3 kg (11.7 lbs.)	7.0 kg (15.4 lbs.)

B

B



Code	Description
06	SAE ¾"
08	SAE 1"
10	SAE 1¼"

Code	Description
1	Hand knob
3	Acorn nut with lead seal

Code	Description
G0R	12V, 2.3A

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 ⁴⁾
6	External PD ³⁾ Internal PP ⁴⁾

³⁾ Through port Y1.1
⁴⁾ PP through port X1 in outlet flange

Code	Pilot Ports	Port Y1 ¹⁾
3	SAE	Plugged
S	SAE	Open

¹⁾ 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 ²⁾	7 to 350 Bar (102 to 5075 Bar)

²⁾ R5P10-4*5 up to 280 Bar (4060 PSI)

Weight:	R5P*P2
R5P06*P2	5.5 kg (12.1 lbs.)
R5P08*P2	6.2 kg (13.7 lbs.)
R5P10*P2	7.1 kg (15.7 lbs.)

R5P

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)							
MTTF _D		150 years							
Hydraulic									
Max. Operating Pressure		Ports A, B		350 Bar (5075 PSI)		350 Bar (5075 PSI)		280 Bar (4060 PSI)	
Pressure Ranges		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)							
Nominal Flow		90 LPM (23.8 GPM)		300 LPM (79.4 GPM)		600 LPM (158.7 GPM)			
Fluid		Hydraulic oil as per DIN 51524...51535, other on request							
Fluid Temperature		-20°C to +80°C (-4°F to +176°F)							
Viscosity		Permitted Recommended		10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 to 80 cSt / mm²/s (139 to 371 SSU)					
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)							
Electrical (Solenoid) R5P with VV01									
Duty Ratio		100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible							
Solenoid Connection		Connector as per EN175301-803							
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)							
		Code	G0R	G0Q	GAR	GOH	W30	W31	
Supply Voltage			12 VDC	24 VDC	98 VDC	48 VDC	110V at 50Hz 120V at 60Hz	230V at 50Hz 240V at 60Hz	
Tolerance Supply Voltage		[%]	±10	±10	±10	±10	±5	±5	
Power Consumption		Hold [W]	32.7	31	32	30	70 / 70 VA	70 / 70 VA	
		In Rush [W]	32.7	31	32	30	280 / 290 VA	280 / 290 VA	
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*P2 (Proportional)

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)		
MTTF _D		150 years		
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...51535, other on request		
Fluid Temperature		-20°C to +80°C (-4°F to +176°F)		
Viscosity	Permitted Recommended	10 to 380 cSt / mm²/s (46 to 1761 SSU) 30 to 80 cSt / mm²/s (139 to 371 SSU)		
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Electrical (Solenoid) R5P with VV01				
Duty Ratio		100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible		
Nominal Voltage		12 VDC		
Maximum Current		2.3 A		
Coil Resistance		4 Ohm at 20°C (68°F)		
Solenoid Connection		Connector as per EN175301-803, Solenoid indentification as per ISO 9461		
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)		
Power Amplifier		PCD00A-400		

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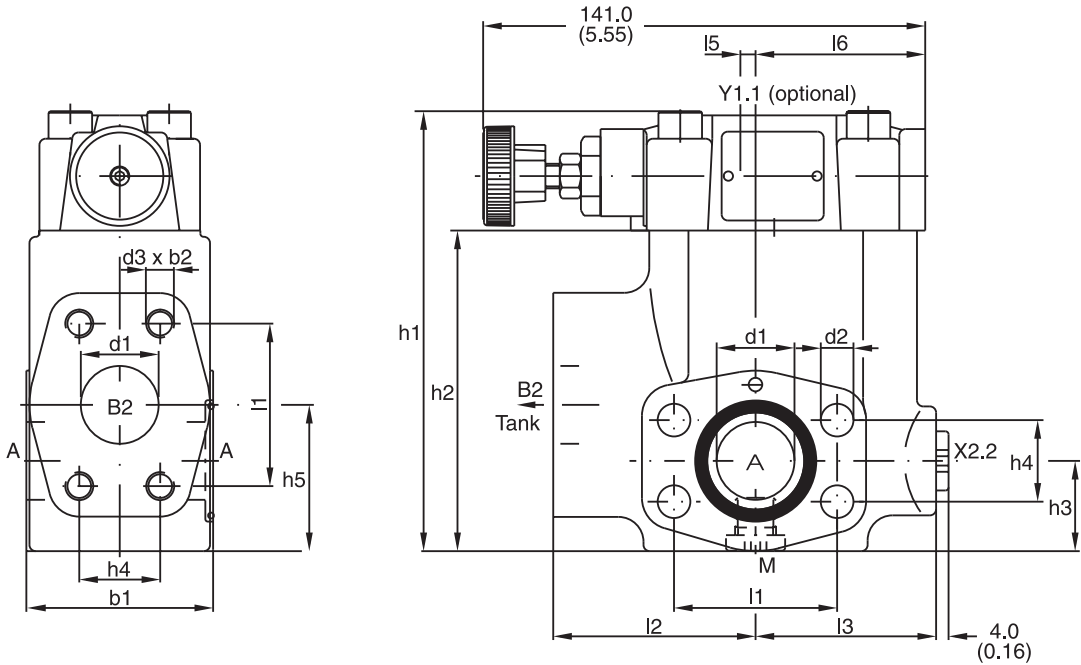
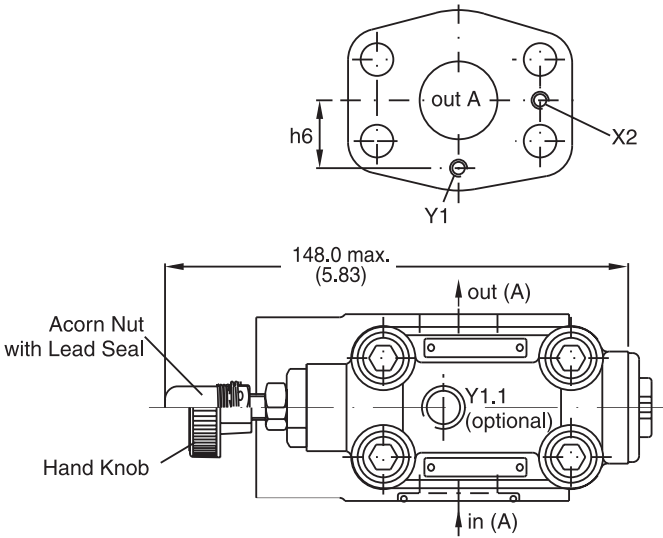
Inch equivalents for millimeter dimensions are shown in (**)



B

Seal Kits*		
Size	Nitrile	Fluorocarbon
06	S16-91461-0	S16-91461-5
08	S16-91460-0	S16-91460-5
10	S16-91459-0	S16-91459-5

* Does not include P2 seal kit.

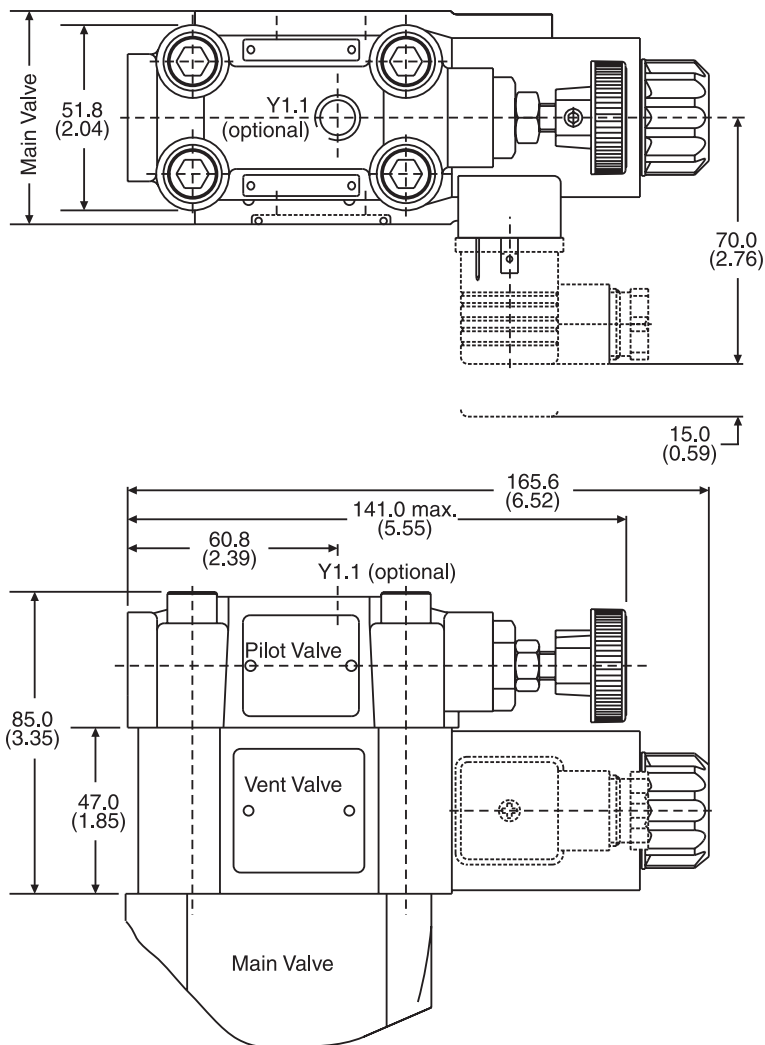


Size	I1	I2	I3	I4	I5	I6	b1	b2	h1	h2	h3	h4	h5	h6	d1	d2	d3
06	47.6 (1.87)	63.0 (2.48)	56.0 (2.20)	148.0 (5.83)	1.0 (0.04)	49.0 (1.93)	60.0 (2.36)	20.0 (0.79)	119.0 (4.69)	81.6 (3.21)	28.5 (1.13)	22.2 (0.87)	41.6 (1.64)	20.8 (0.82)	19.0 (0.75)	10.5 (0.41)	3/8" UNC
08	52.4 (2.06)	65.0 (2.56)	58.0 (2.28)	144.6 (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)	30.5 (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
10	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)	37.5 (1.48)	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 with Vent Function

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



Seal Kits*	
Nitrile	Fluorocarbon
DC solenoid	
S26-58515-0	S26-58515-5
AC solenoid	
S26-35237-0	S26-35237-5

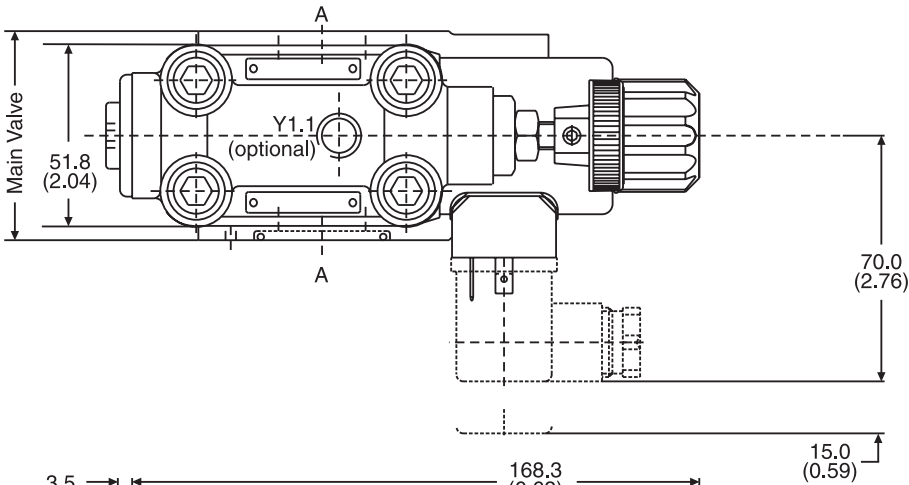
* For vent valve only.



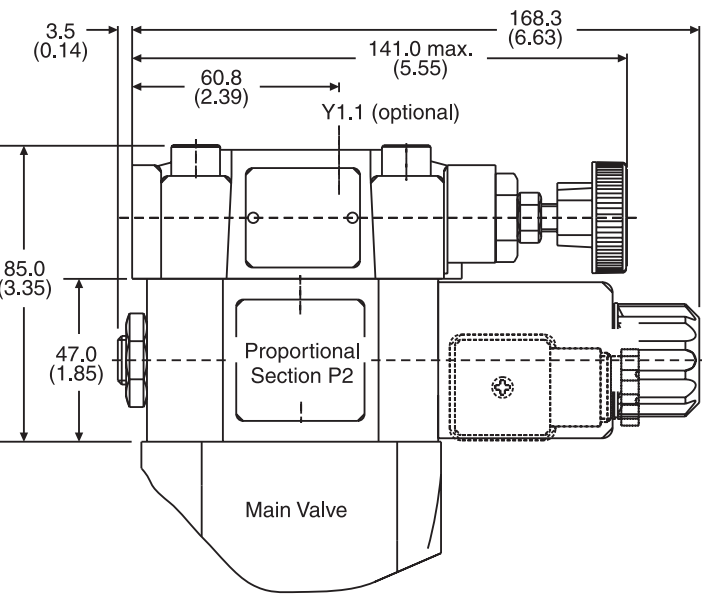
Code	Internal Drain	External Drain
11		
09		

R5P with Proportional Function

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 variations in the drain port should be avoided.



Note: On initial start-up and after long shutdown periods, bleed air from this plug.



	Seal Kit *	
	Nitrile	Fluorocarbon
Prop. Section P2	S26-58473-0	S26-58473-5

* P2 seal kit only.
See previous page for full valve seal kit

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.

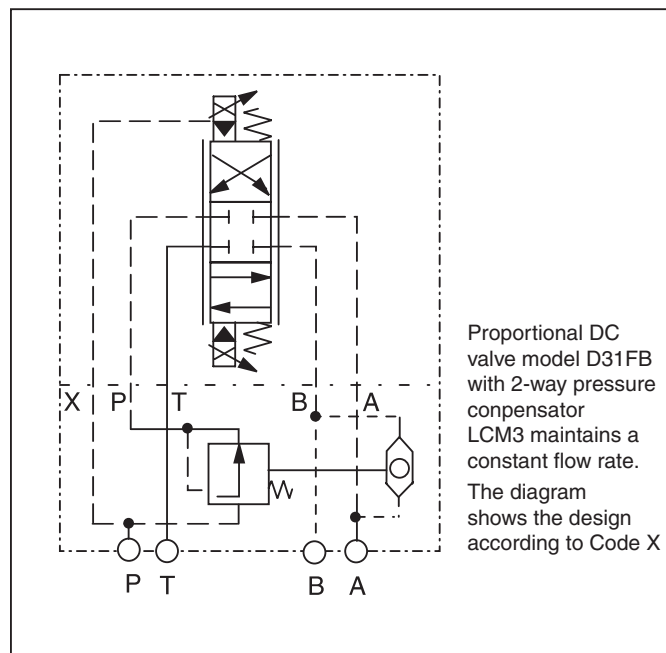
The valve maintains a constant pressure differential between ports P and A or P and B across the directional valve. When the cross sectional opening of the directional valves is held steady, a constant flow rate is achieved, regardless of load fluctuations.

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.

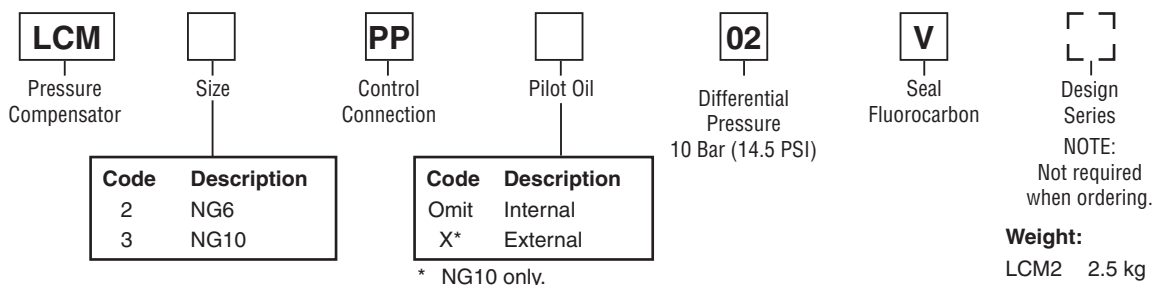
Specifications

General		
Size	NG6	NG10
Mounting Position	NFPA D03 CETOP 3	NFPA D05 CETOP 5
Maximum Flow	20 LPM (5.28 GPM)	52 LPM (13.73 GPM)
Maximum Operating Pressure	350 Bar (5075 PSI)	
Pressure Differential	10 Bar (145 PSI)	

Application Example

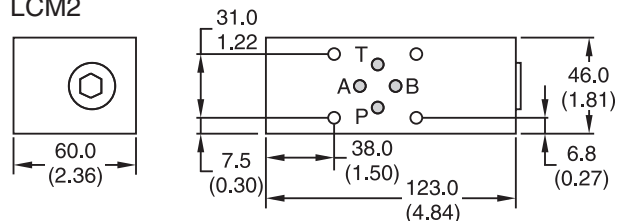


Ordering Information



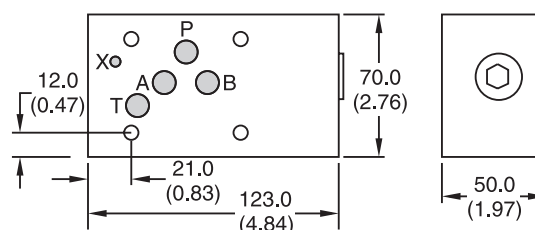
Dimensions – Inch equivalents for millimeter dimensions are shown in (**)

LCM2



Mounting Screws: BK403 (4) M5 x 90
 For mounting screws connected with directional valves D1 or 2-stage valves

LCM3



Mounting Screws: BK412 (4) M6 x 90
 The views show the mounting surface for the directional valve

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

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B

Manifold Mounted Valves

Series	Description	Page
BD15	Two-Stage Torque Motor Servovalve (up to 20 GPM)	C2 - C8
BD30	Two-Stage Torque Motor Servovalve (up to 40 GPM)	C2 - C5, C9 - C11

Flapper Nozzle

Series	Description	Page
SE05, SE10, SE15	Two-stage, 4-way, Flapper and Nozzle Servovalve	C12 - C18
SE2N	Two-stage, 4-way, Flapper and Nozzle Servovalve	C19 - C22
SE20.....	Two-stage, 4-way, Flapper and Nozzle Servovalve	C23 - C27
SE31.....	Two-stage, 4-way, Flapper and Nozzle Servovalve	C28 - C32
SE60.....	Two-stage, 4-way, Flapper and Nozzle Servovalve	C33 - C36

C



Description

Series BD servovalves provide high resolution in the control of position, velocity and force in motion control applications.

Features

- Rugged, reliable, trouble-free operation
- Reduced contaminant sensitivity
- Linear flow gain characteristics
- Explosion proof model available

Operation

When used in conjunction with BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.



Specifications

Rated Flow	3.8 - 151 LPM (1.0 - 40 GPM)
Linearity	≤ 5%
Hysteresis	≤ 3%
Threshold	≤ 0.5%
Fluid	Mineral Oil, 60 – 225 SSU, 1000 SSU maximum
Operating Temperature	-34°C to +82°C (-29°F to +180°F)
Pressure Gain	3% of spool shift
Null Shift with temperature with supply press.	< 2% per 38°C (100°F) < 2% per 70 Bar (1000 PSI)
Quiescent Flow (Std. Spool Lap)	BD15: 1.5 – 2.1 LPM (0.40 – 0.55 GPM) BD30: 2.1 – 3.8 LPM (.55 – 1.0 GPM)
Step Response Input	BD15: 10 – 90%, 26 ms BD30: 10 – 90%, 30 ms
Pressure Ranges For optimum performance, Parker Servo valves are designed to operate within specific system supply pressure ranges. 180 – 210 Bar 2600 – 3000 PSI) 138 – 172 Bar 2000 – 2500 PSI) 95 – 133 Bar 1400 – 1950 PSI) 68 – 90 Bar 1000 – 1300 PSI) 48 – 66 Bar 700 – 950 PSI) 14 – 45 Bar 200 – 650 PSI) 0 – 210 Bar 0 – 300 PSI)	
Filtration	SAE Class 3 or better, ISO Code 17/15/12
Protection Class	NEMA 4, IP65

Flow-Load Characteristics

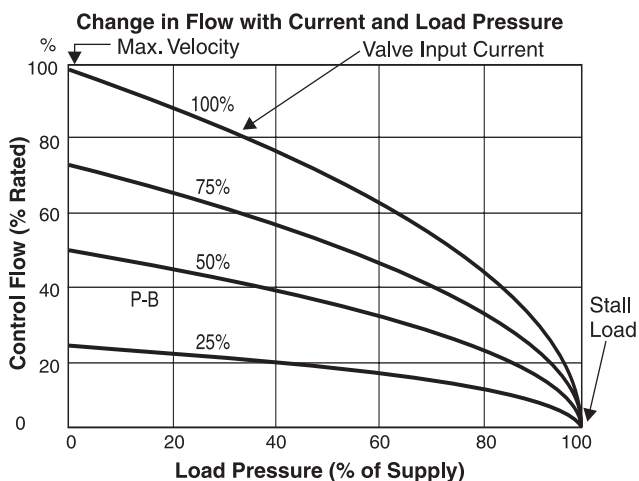
Control flow to the load will change the load pressure and valve current as shown in the flow chart below. These characteristics closely follow the theoretical square root relationship for sharp-edged orifices as illustrated in the equation below.

$$Q = K\sqrt{\Delta P}$$

Q = Control flow, cubic inches/sec

K = Valve constant

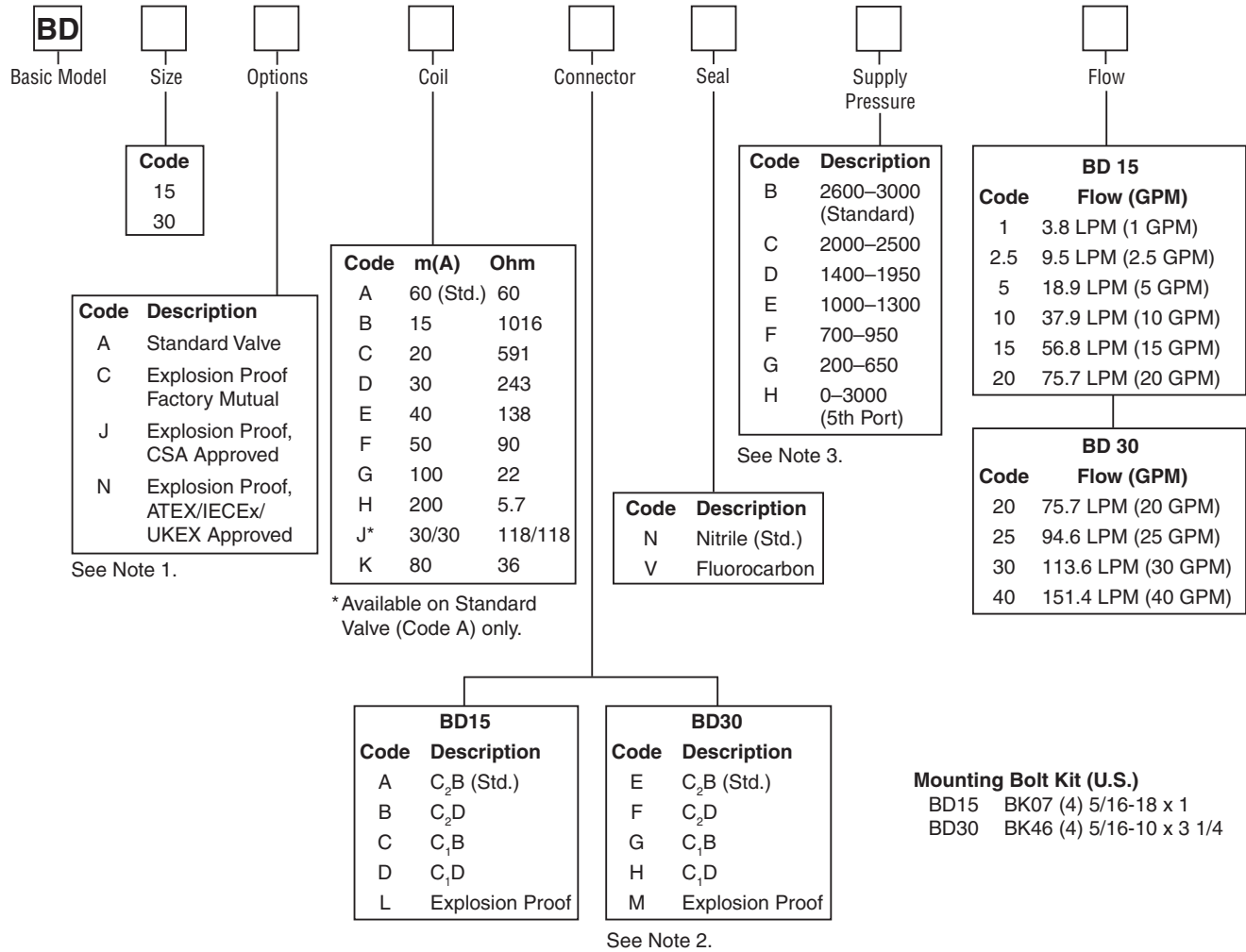
ΔP = Valve pressure drop



Model	Flow Capacity @ 68 Bar (1000 PSI) LPM (GPM)	Max. Pressure Rating Bar (PSI)	Max. Tank Pressure Bar (PSI)	Port Circle	Electrical Input (std.) Single Coil	Coil Resistance (Std.) Each Coil	Weight
BD15	3.8, 9.5, 19, 37, 57, 76 (1, 2.5, 5, 10, 15, 20)	210 Bar (3000 PSI)	14 Bar (200 PSI)	0.875	60 mA (Full Flow)	60 Ohms	1.2 kg (2.6 lbs.)
BD30	76, 95, 113, 151 (20, 25, 30, 40)	210 Bar (3000 PSI)	14 Bar (200 PSI)	1.75	60 mA (Full Flow)	60 Ohms	2.9 kg (6.3 lbs.)

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

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Note 1: “C” Explosion Proof meets:

Factory Mutual Explosion Proof
Class I, II, III, Division 1, Groups A through G
Refer to Parker Bulletin 1451.

“J” Explosion Proof meets:

Canadian Standards Association
Class I, Groups A through D
Class II, Groups E, F and G
Class III

“N” Explosion Proof meets:

CODE II2G Ex mb h IIC T3 Gb T_{amb} -30°C to +45°C
(-22°F to +113°F)

Request Parker Documentation Package: 1200074

Note 2: Connector Location & Flow Polarity

(Standard connector over C₂ + to B = P to C₁ flow).

C₂B = Connector over Port C₂ + to Pin B = P to C₁ flow.

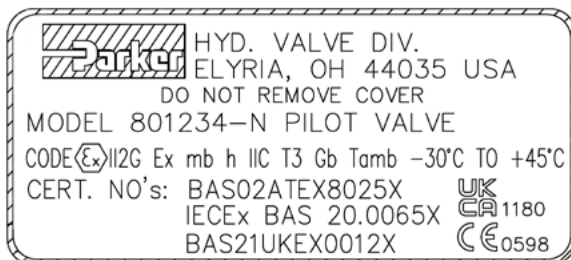
C₂D = Connector over Port C₂ + to Pin D = P to C₁ flow.

C₁B = Connector over Port C₁ + to Pin B = P to C₁ flow.

C₁D = Connector over Port C₁ + to Pin D = P to C₁ flow.

Note 3: Supply Pressure: Code “H” applies to 5th Port/External Pilot Option. This requires the use of a blank orifice “-00”. First stage pressure should be limited to 41.4 Bar (600 PSI) and no less than 27.6 Bar (400 PSI).

Servo valve rated flow at 1000 PSID ±10%.



Accessories

Model	Description	Model	Description
6522A11	1/16" Hex Allen Wrench	810089-1	BD15 Servovalve Shipping Container
810005-1	Orifice Filter	820000TF3	Filter Wrench
810013-**	Valve Orifice Kit, Fluorocarbon	MS3106E-14S-2S	SV Mating Connector
810014-**	Valve Orifice Kit, Nitrile	1200127	Flushing valve for BD15
**Dash #	Operating Pressure	1200128	Flushing valve for BD30
-16	180 – 210 Bar (2600 – 3000 PSI) B		
-18	138 – 176 Bar (2000 – 2550 PSI) C		
-20	96 – 134 Bar (1400 – 1950 PSI) D		
-22	69 – 93 Bar (1000 – 1350 PSI) E		
-33	48 – 66 Bar (700 – 950 PSI) F		
-50	14 – 45 Bar (200 – 650 PSI) G		
-00	0 – 210 Bar (0 – 3000 PSI) 5th Port H		

Adapters

Code	To Mount A	Onto A	Pattern
810092-1	BD15	BD30 (1.75)	
810093-5	BD15	D05	
810094-5	BD15	D03	
810098-1	BD15	.937 Port Circle	
810097-3	BD15	.785 Port Circle	
820006-1	BD30	Moog 62-303B & Atchley 231	
Consult Factory	BD30	1.375	
Consult Factory	BD15	D05H	

Code	Description
Omit	Nitrile
V	Fluorocarbon

Subplates

Valve Model	Subplate	Port Size	Location	Bolt Kit	Torque Specifications (Lubricated)
BD15	810090-3	SAE12	Side	BK07	17 ft. lbs.
BD30	OBSOLETE				

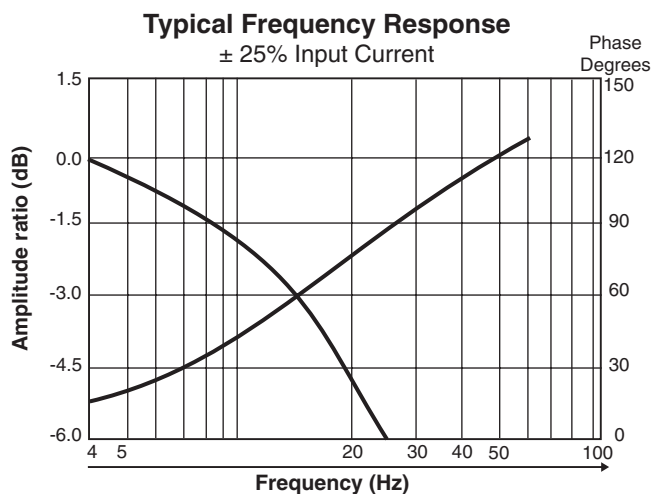
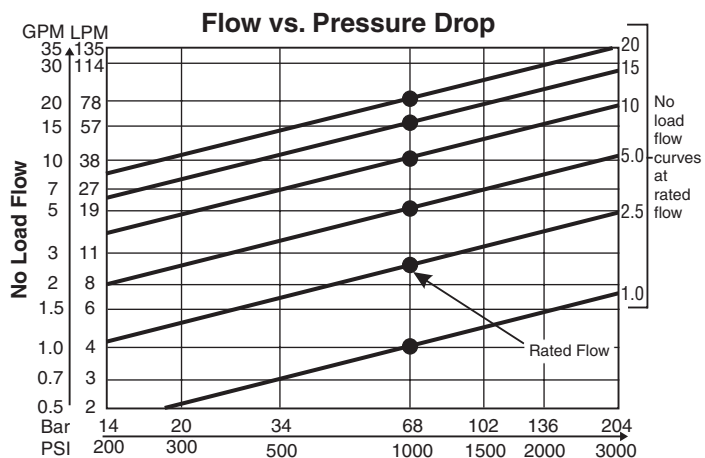
Cables

Code	Length
9	Length
15	in Feet

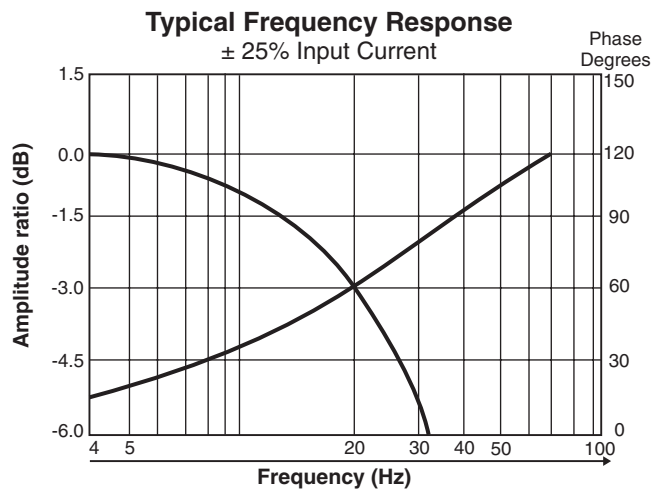
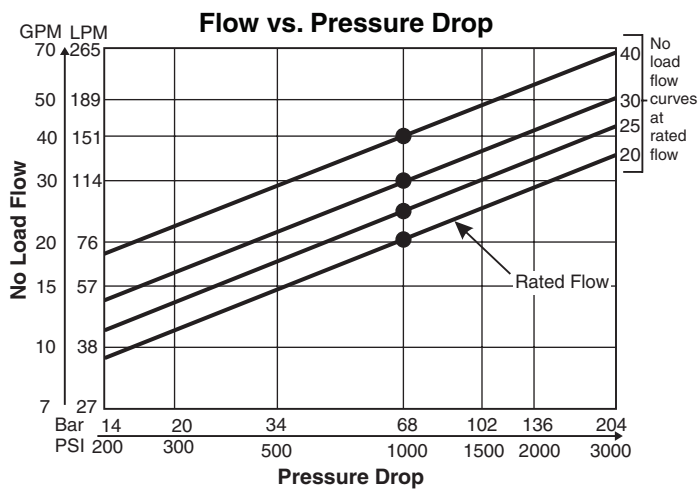
Code	Description
4	4-wire, 20 awg. shielded (Belden 9402)

Code	Description
S	BD Series

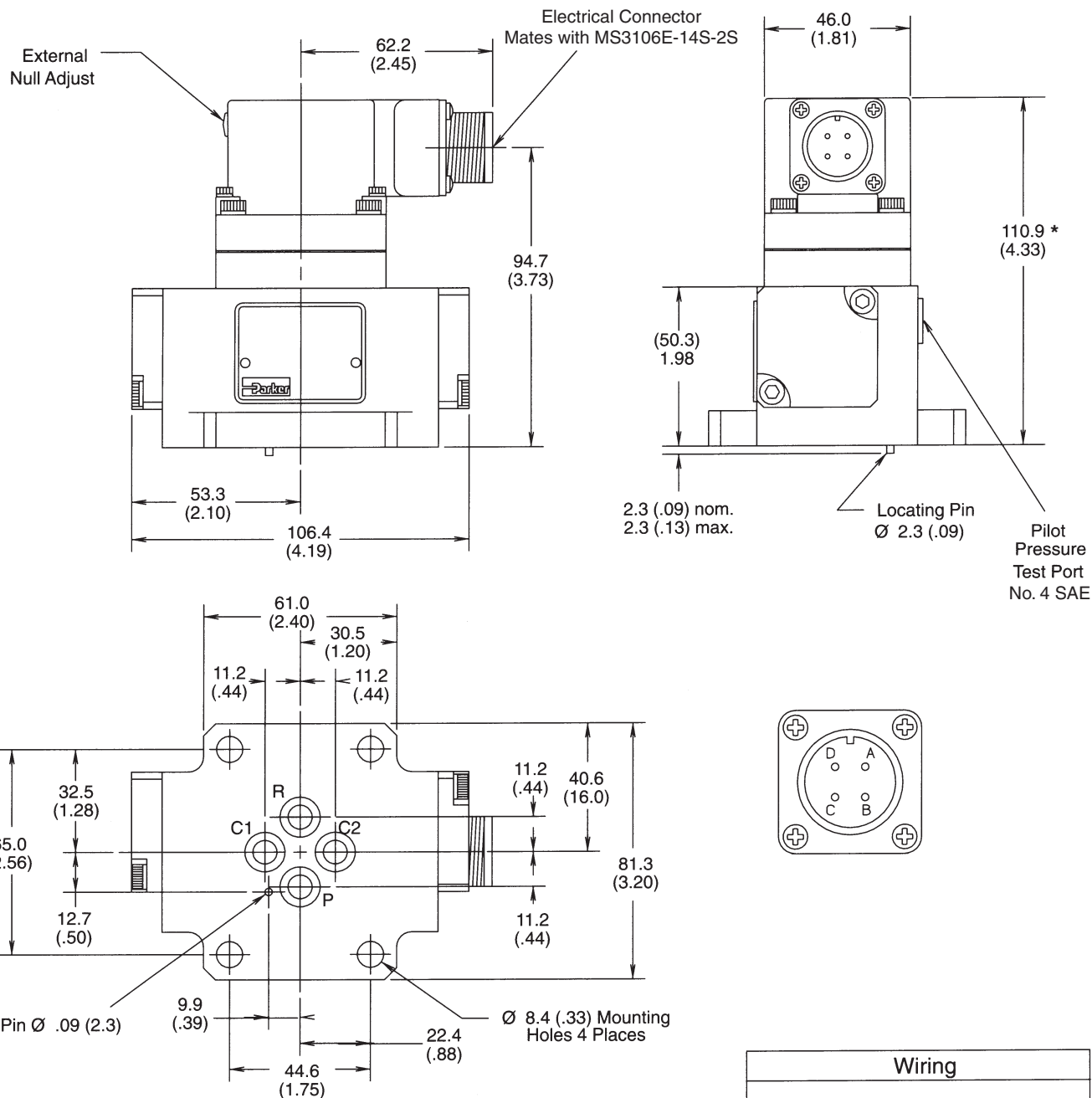
Series BD15



Series BD30



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



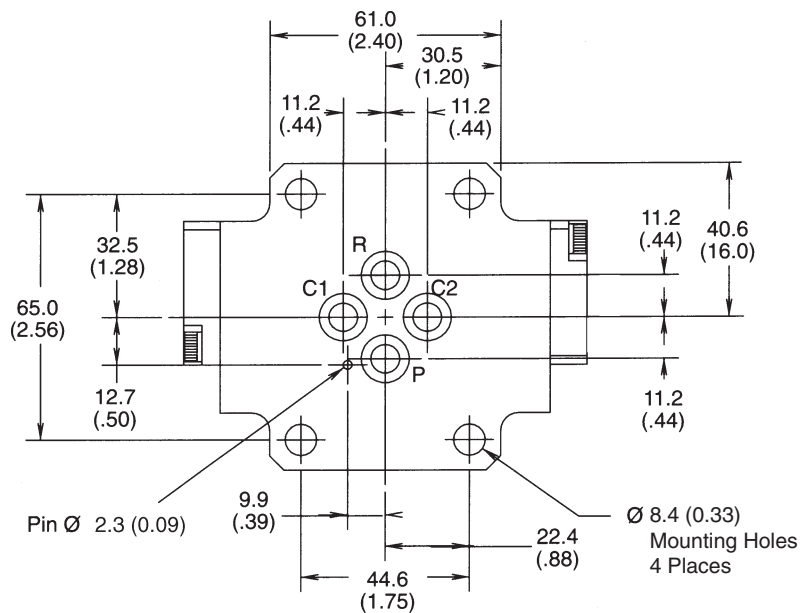
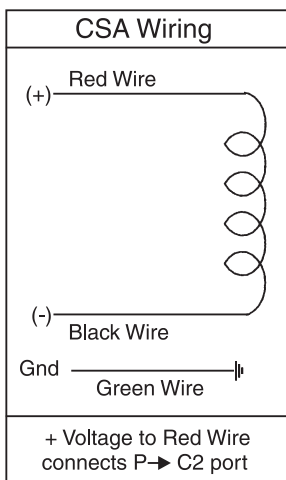
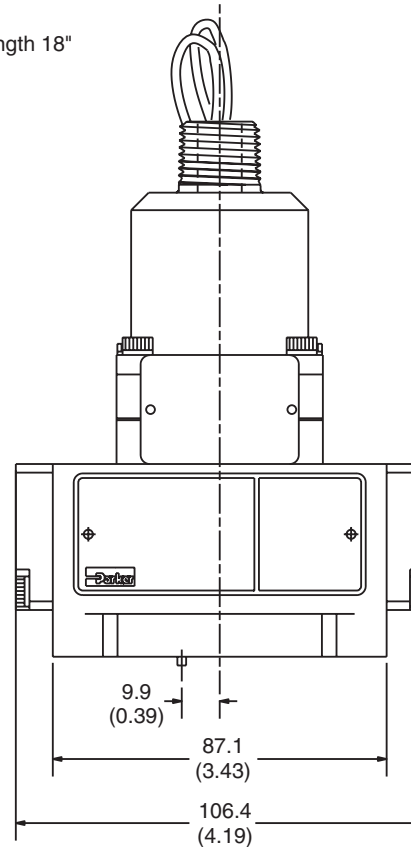
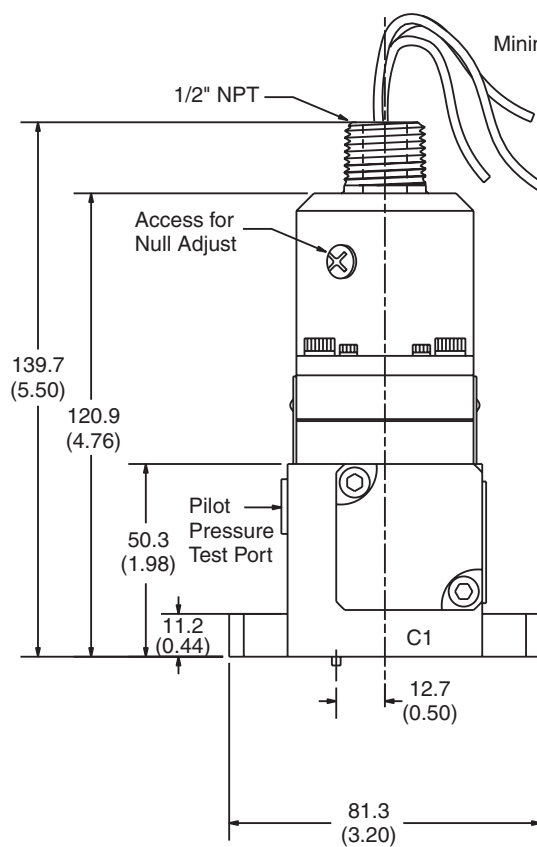
Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

* 140 (5.50) for BD15C; explosion proof, FM approved.

Note: Vertically oriented 1/2 NPT threaded male conduit connection with lead wires (not as shown).

Dimensions

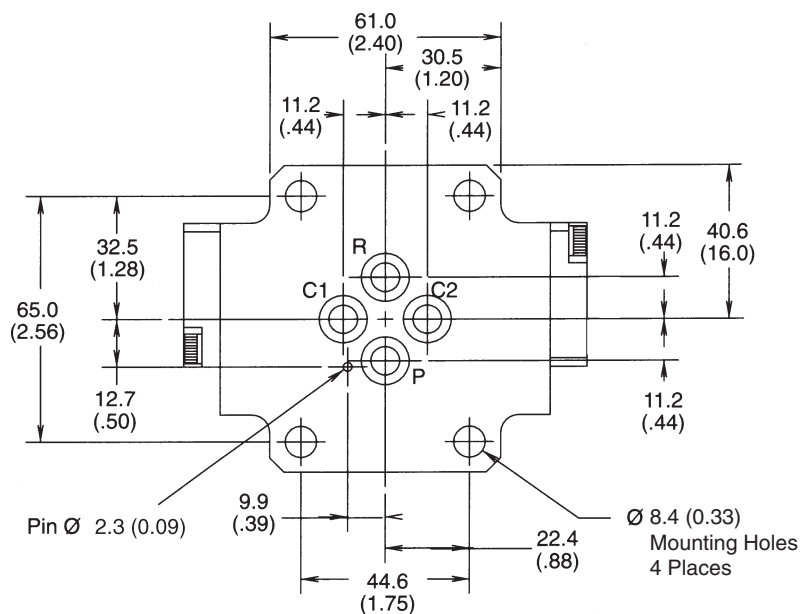
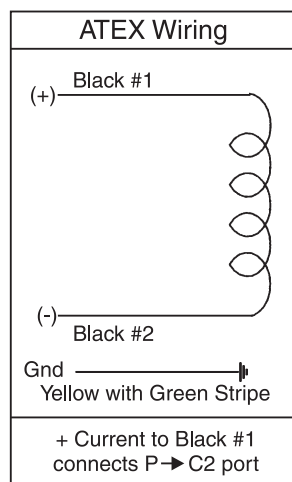
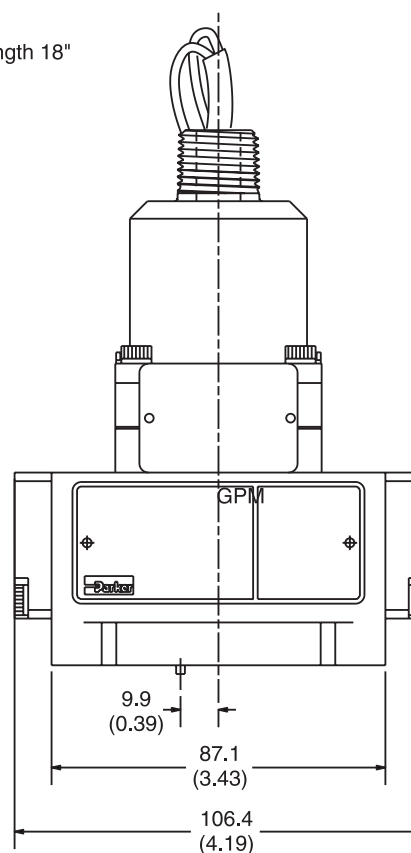
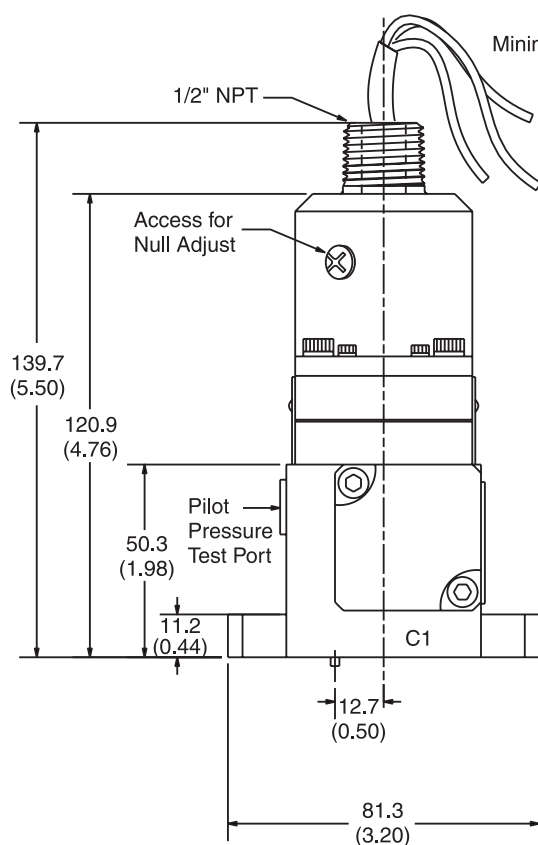
Inch equivalents for millimeter dimensions are shown in (**)



Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

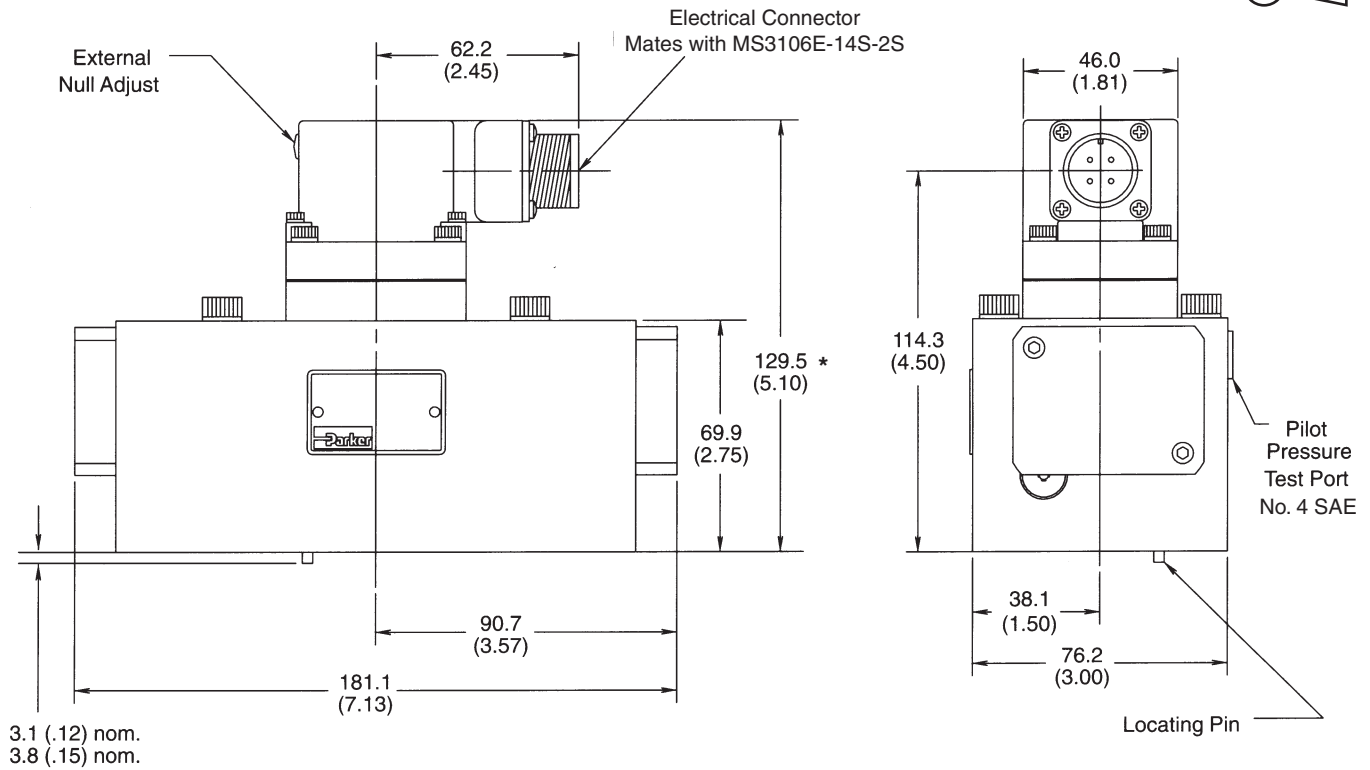
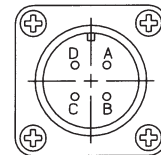
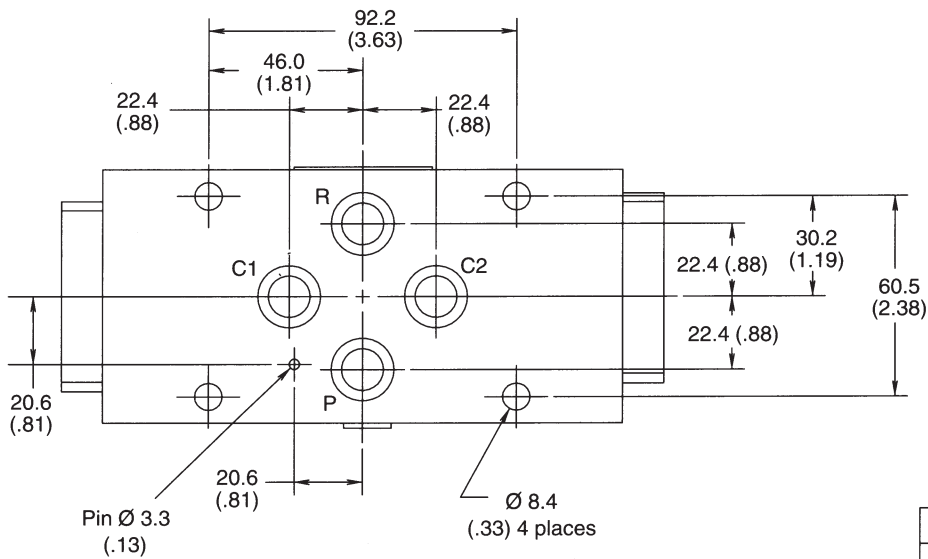
Dimensions

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



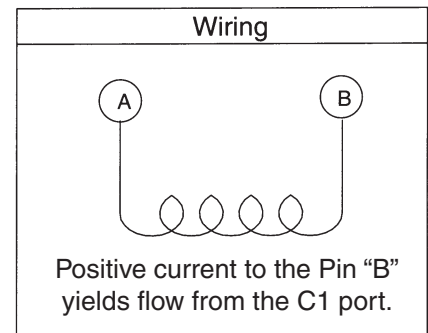
Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

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

**C**

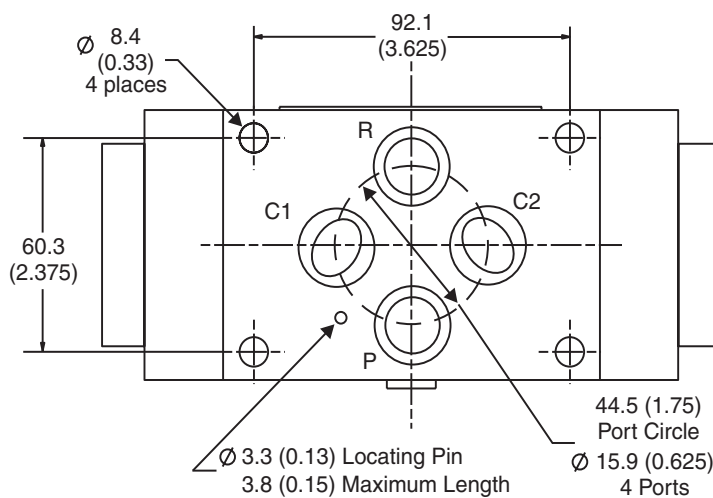
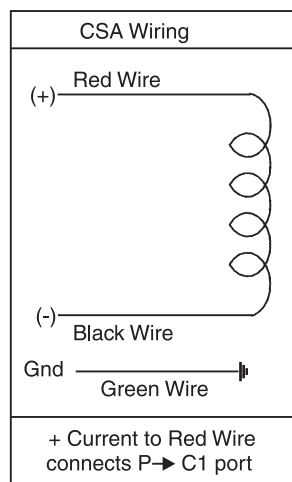
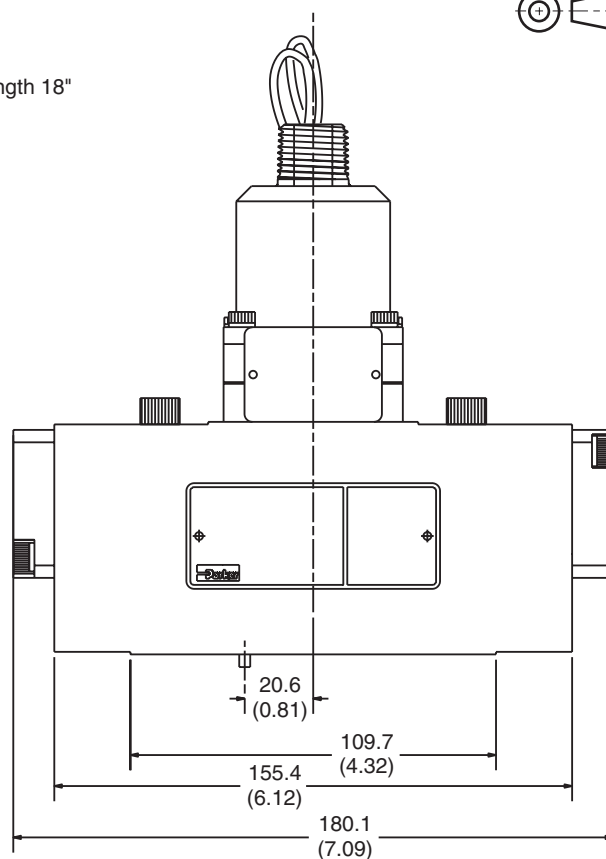
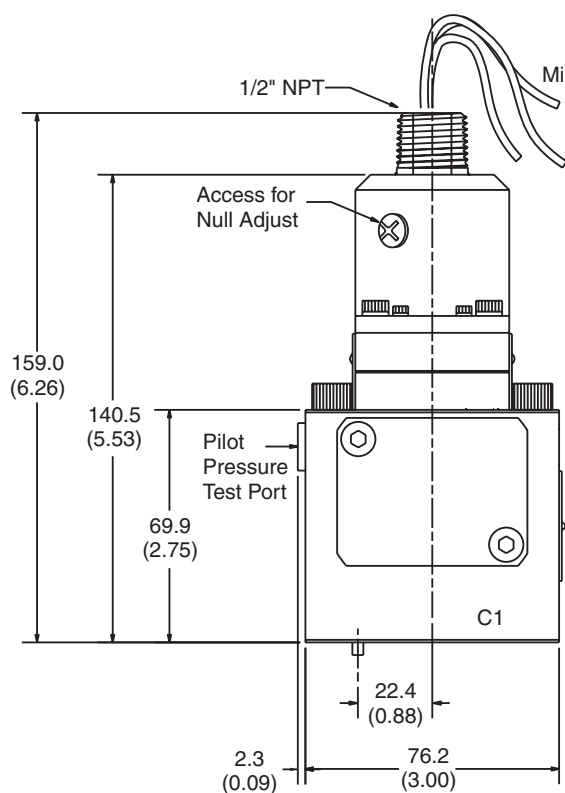
Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

* 160 (6.25) for BD30C; explosion proof, FM approved.
Note: Vertically oriented 1/2 NPT threaded male conduit connection with lead wires (not as shown).



Dimensions

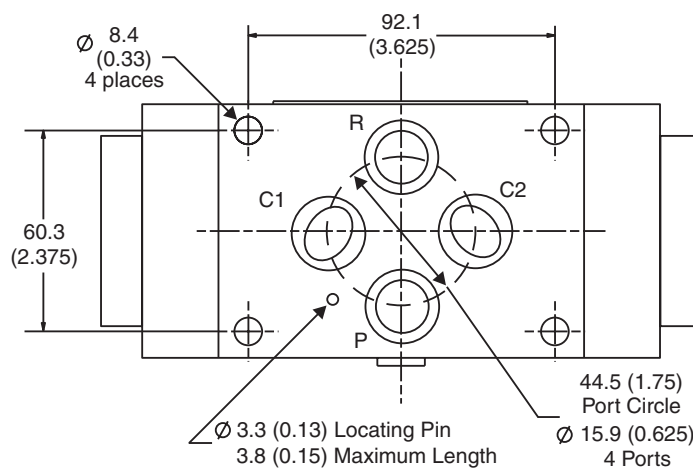
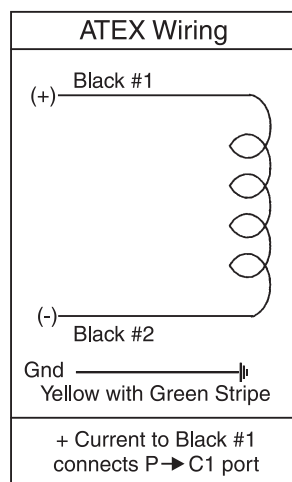
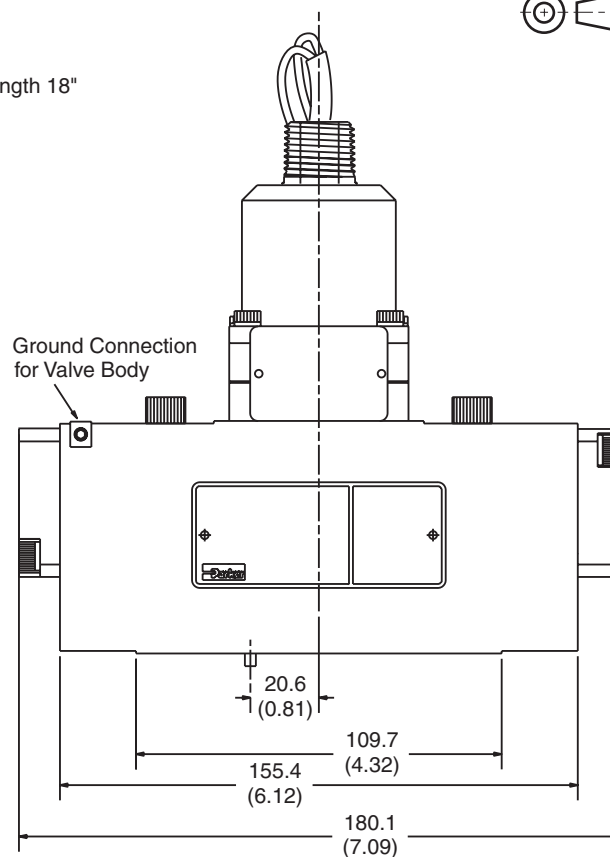
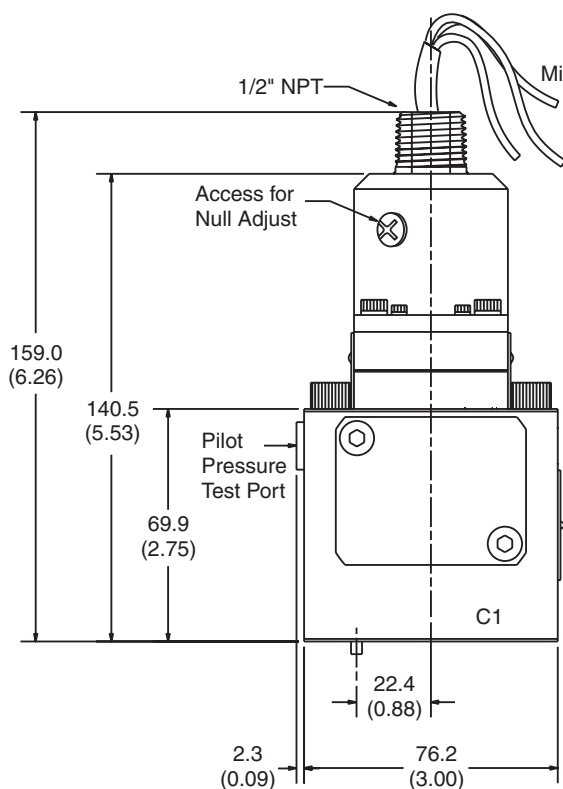
Inch equivalents for millimeter dimensions are shown in (**)



Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

Dimensions

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



Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

General Description

Series SE05, SE10 and SE15 are two stage, 4-way, flapper and nozzle style servovalves. These valves have high performance spool and sleeve designs.

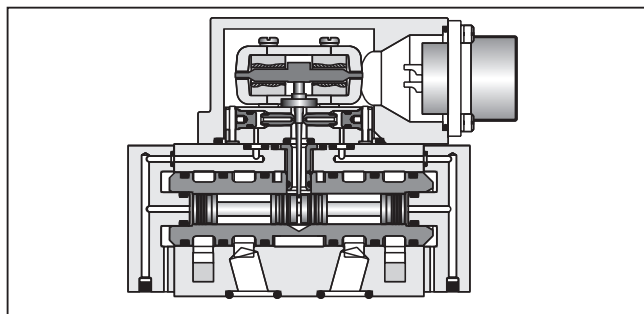
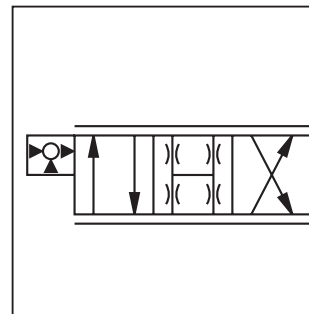
A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves. These valves are rated for 315 Bar (4500 PSI) service.

Features

- Lapped spool and sleeve
- Jewel feedback ball for durability
- Aluminum body
- Medium and High performance
- SE05 15.88 mm (0.625 in.) port circle
- SE10 19.81 mm (0.780 in.) port circle
- SE15 23.80 mm (0.937 in.) port circle

Specifications

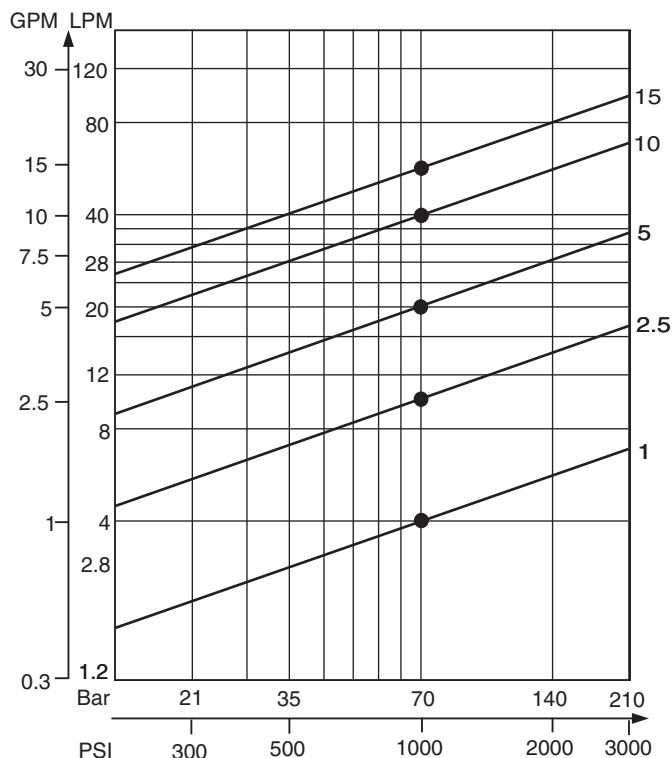
Flow Rating $\pm 10\%$ @ 70 Bar (1000 PSI)	4, 10, 20, 40, 60 LPM (1.0, 2.5, 5, 10, 15 GPM)
Supply Pressure	10 – 315 Bar (145 – 4500 PSI)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Null Leakage Flow per 70 Bar (1000 PSI)	0.6 – 1.0 LPM (0.16 – 0.26 GPM)
Pilot Flow @ 210 Bar (3000 PSI)	0.4 – 0.7 LPM (0.1 – 0.2 GPM)
Input Command @ 210 Bar (3000 PSI)	± 40 mA std.
Frequency Response @ 90° phase shift	> 100 Hz (See Performance Curves)
Non-Linearity	$\leq 10\%$
Hysteresis	$\leq 3\%$
Threshold	$\leq 0.5\%$
Null Shift with temperature with pressure	$\leq 2\%$ per 55°C (100°F) $\leq 2\%$ per 70 Bar (1000 PSI)
Pressure Gain change in pressure per 1% change in input command	60% typical
Step Response	10 – 100%, < 6 ms
Fluid	Petroleum based Mineral Oil, 10 – 110 cSt at 38°C (100°F)
Fluid Cleanliness	ISO 4406 15/12 or better
Operating Temperature	-30°C to +130°C (-22°F to +266°F)
Protection Class	NEMA 4, IP65



Flow vs. Pressure Drop

at 100% command

Flow Path: P→C1→C2→R



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

C01_Cat2550.indd, ddp, 06/21

		A	A				A								
Series	Version	Pilot Source Internal	Material Aluminum	Coils	Wiring	Seal	Operating Pressure 209 Bar (3032 PSI)	Flows	Special Options	Factory Code for Special Options					

Code	Description
SE05	15.8 mm (0.625 in.)
SE10	19.8 mm (0.780 in.)
SE15	23.8 mm (0.937 in.)

Code	Description
H	High Performance ¹⁾
S	Standard

¹⁾ Only available up to 40 LPM (10 GPM)

Code	Description	Parallel	Series
A	40 ohms	60 mA	30 mA
B	300 ohms	30 mA	15 mA
C	800 ohms	30 mA	15 mA
D	22 ohms	80 mA	40 mA
F	80 ohms	40 mA	20 mA
G	22 ohms	200 mA	100 mA
H	200 ohms	15 mA	7.5 mA
L	1200 ohms	20 mA	10 mA
M	27 ohms	100 mA	50 mA
T	1000 ohms	10 mA	5 mA

Code	Description
1	4 LPM (1.0 GPM) SE05 Only
2.5	10 LPM (2.5 GPM) SE05 Only
5	20 LPM (5.0 GPM) SE10 Only
10	40 LPM (10.0 GPM) SE10 Only
15	60 LPM (15.0 GPM) SE15 Only

Code	Description
V	Fluorocarbon (std.)
N	Nitrile

Code	Connector over	Flow P to C2 with:
B	Port C2	(+) signal to A, C
A	Port C1	(+) signal to A, C

Code	Description
Omit	Standard
S	(Specify) ²⁾

²⁾ Consult factory for price and availability of special options.

Weight: 1.0 kg (2.2 lbs.)
Cable with mating connector: EHC154S
Mating connector: MS3106E-14S-2S
Electronics: BD101, 23-5030, 23-7030, PMC10

SE05
Bolt kit: 4 of M5 x 60 mm, or 4 of #10-32x2.25"
Flushing valve: 11-0500
Metric Subplate: DS02SPS8M (M18x1.5 ISO 6149 side ports)
SAE Subplate: DS02SPS8S (#8 SAE side ports)

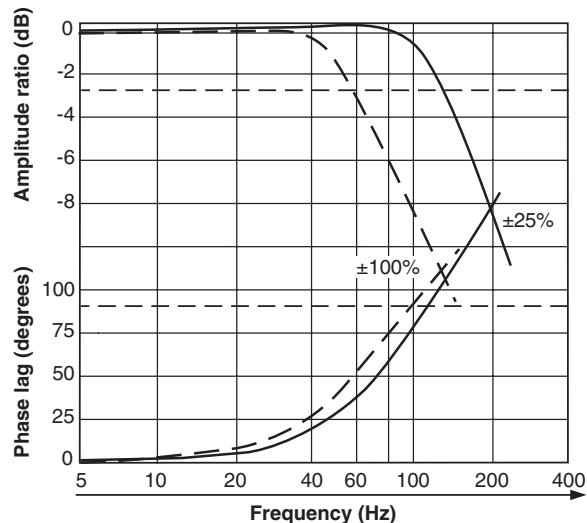
SE10
Bolt kit: 4 of M5 x 60 mm, or 4 of #10-32x2.25"
Flushing valve: 11-0500
Metric Subplate: DS71SPS8M (M18x1.5 ISO 6149 side ports)
SAE Subplate: DS71SPS8S (#8 SAE side ports)

SE15
Bolt kit: 4 of M6 x 60 mm, or 4 of 1/4-20x2.25"
Flushing valve: 11-0500
Metric Subplate: DS72SPS8M (M18x1.5 ISO 6149 side ports)
SAE Subplate: DS72SPS8S (#8 SAE side ports)

Frequency Response at 210 Bar (3000 PSI)

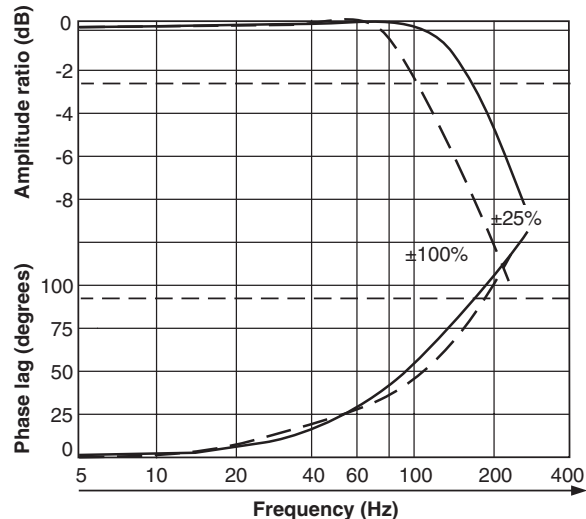
Standard Response

SE05: 4 – 20 LPM (1 – 5 GPM)



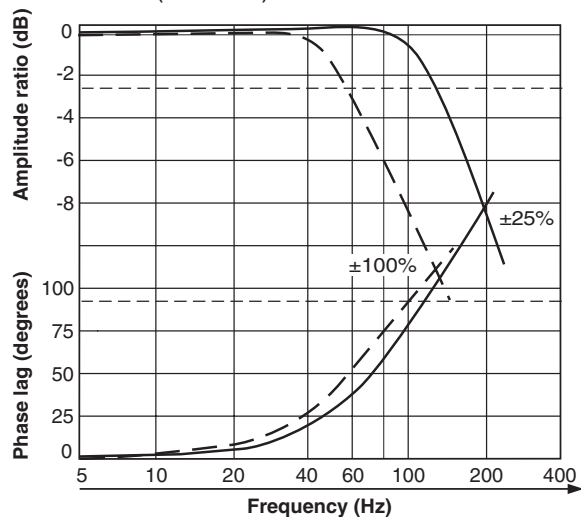
High Response

SE05: 4 – 20 LPM (1 – 5 GPM)



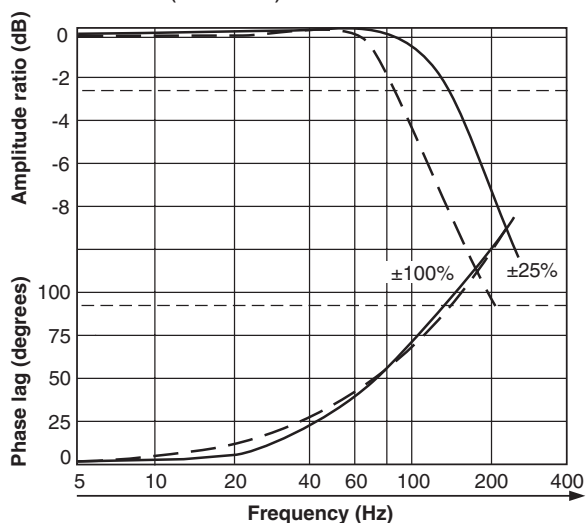
Standard Response

SE10: 40 LPM (10 GPM)

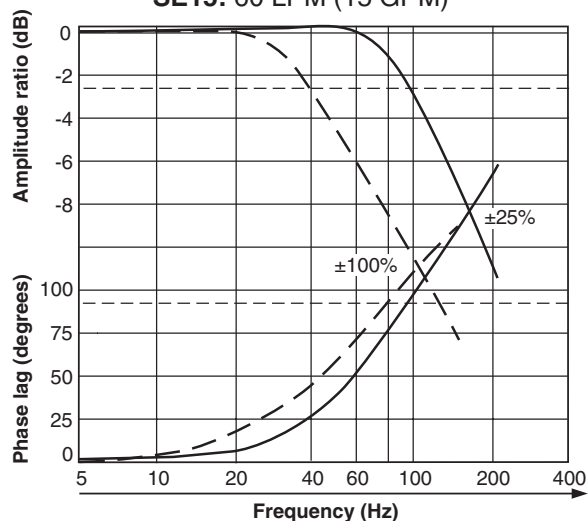


High Response

SE10: 40 LPM (10 GPM)



Standard Response SE15: 60 LPM (15 GPM)

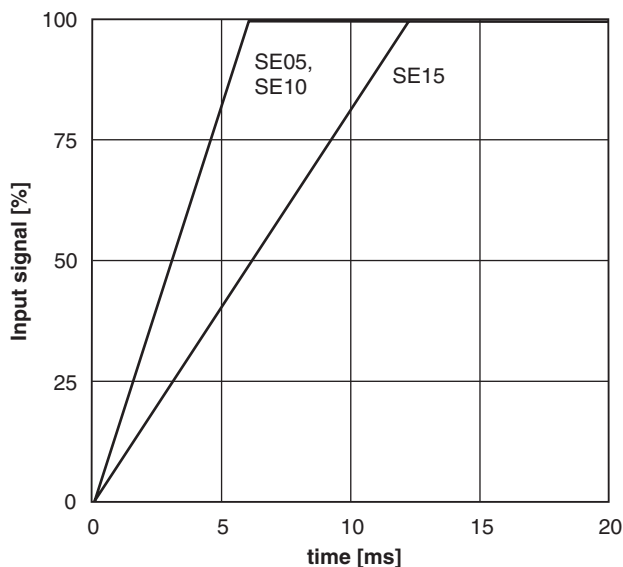


Performance Curves

Step Response at 210 Bar (3000 PSI)

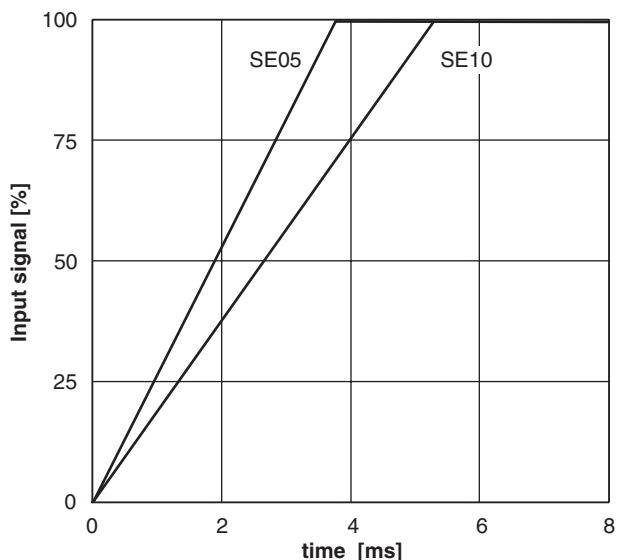
Standard Response

SE05, SE10 & SE15: 4 – 40 LPM (1 – 10 GPM)



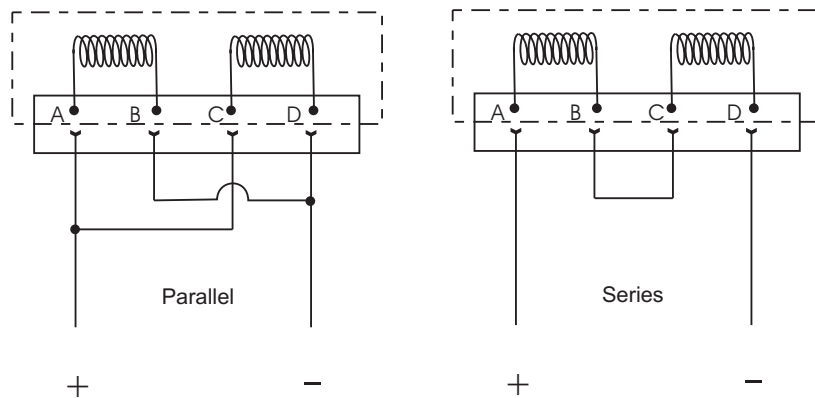
High Response

SE05, SE10 & SE15: 4 – 40 LPM (1 – 10 GPM)



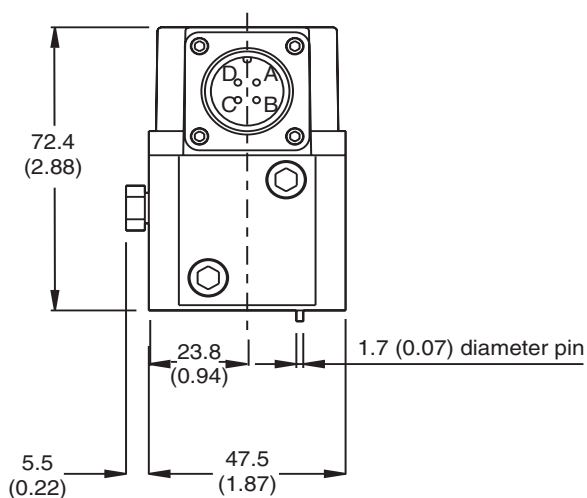
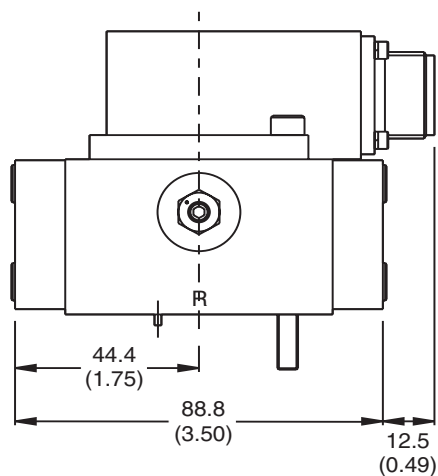
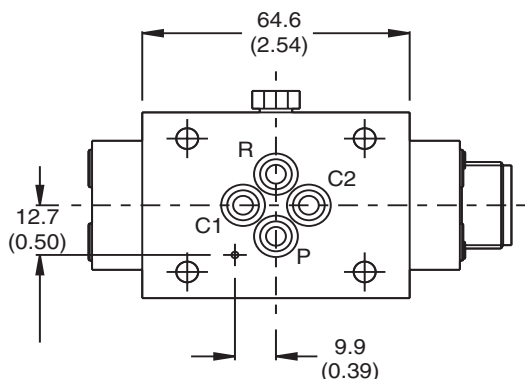
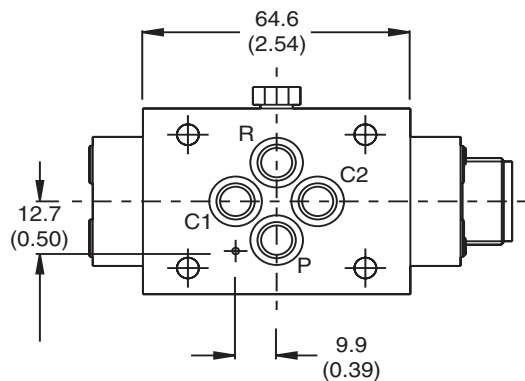
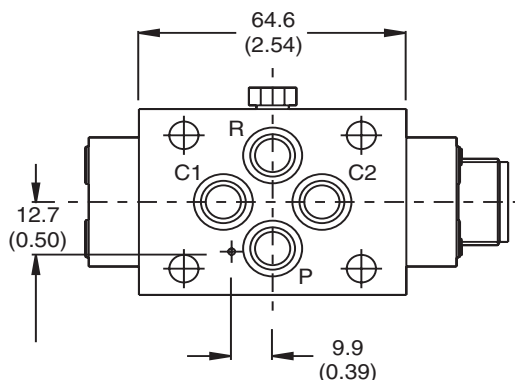
Installation Wiring Options

This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.

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

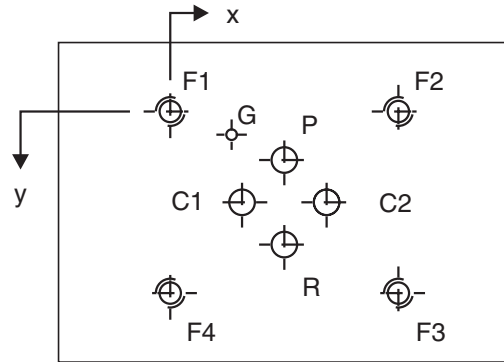
**SE05****SE10****SE15**

1. Suggested mounting bolts: For SE05 and SE10 use M5 x 60 mm or #10-32 x 2.25" long high tensile steel, socket-head cap screws. For SE15 use M6 x 60 mm or 1/4-20 x 2.25" long high tensile steel, socket-head cap screws.
2. 4-way electrical connector mates with MS3106E-14S-2S or equivalent. Is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings:
SE05 use Parker 2011V-9 (7.66 mm I/D x 1.78 section)
SE10 use Parker 2012V-9 (9.25 mm I/D x 1.78 section)
SE15 use Parker 2013V-9 (10.82 mm I/D x 1.78 section)
4. Null adjust requires 10 A/F ring spanner (10 mm box end wrench) and 2.5 hexagon key. Flow out of C1 will increase with clockwise rotation of key.
5. See mounting dimensions for port size and locations.

SE05 Mounting Surface

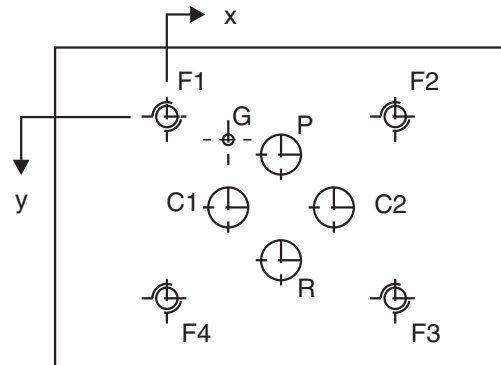
1. The recommended full-thread depth is 16 mm (0.630 in.).
2. The minimum depth of hole G is 4 mm (0.157 in.).
3. Surface roughness $R_a < 0.8 \mu\text{m}$ [N6], as specified in ISO 468 and ISO 1302.
4. Surface flatness: 0.025 mm (0.001) as specified in ISO 1101.

15.88 (0.625) port circle

**SE10 Mounting Surface**

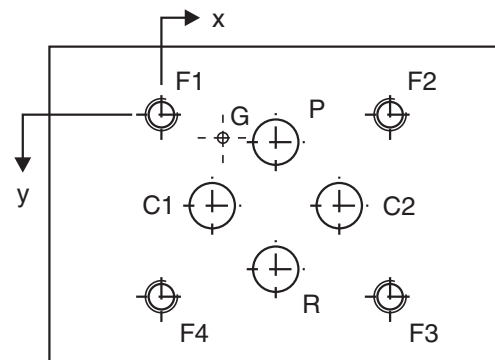
1. The recommended full-thread depth is 16 mm (0.630 in.).
2. The minimum depth of hole G is 4 mm (0.157 in.).
3. Surface roughness $R_a < 0.8 \mu\text{m}$ [N6], as specified in ISO 468 and ISO 1302.
4. Surface flatness: 0.025 mm (0.001) as specified in ISO 1101.

19.81 (0.780) port circle

**SE15 Mounting Surface**

1. The recommended full-thread depth is 18 mm (0.709 in.).
2. The minimum depth of hole G is 4 mm (0.157 in.).
3. Surface roughness $R_a < 0.8 \mu\text{m}$ [N6], as specified in ISO 468 and ISO 1302.
4. Surface flatness: 0.025 mm (0.001 in.) as specified in ISO 1101.

23.80 (0.937) port circle



SE05

Metric Dimensions (mm)					(± 0.1 mm)				
Axis	P	C1	R	C2	G	F1	F2	F3	F4
	Ø 5 max	Ø 5 max	Ø 5 max	Ø 5 max	Ø 3.5	M5	M5	M5	M5
x	21.4	13.5	21.4	29.3	11.5	0	42.8	42.8	0
y	9.2	17.1	25.0	17.1	4.4	0	0	34.2	34.2

U.S. Dimensions (inches)					(± 0.004 in.)				
Axis	P	C1	R	C2	G	F1	F2	F3	F4
	Ø 0.195 max	Ø 0.195 max	Ø 0.195 max	Ø 0.195 max	Ø 0.136	# 10 -32	# 10 -32	# 10 -32	# 10 -32
x	0.843	0.531	0.843	1.153	0.453	0	1.685	1.685	0
y	0.362	0.673	0.984	0.673	0.173	0	0	1.347	1.347

SE10

Metric Dimensions (mm)					(± 0.1 mm)				
Axis	P	C1	R	C2	G	F1	F2	F3	F4
	Ø 7.5 max	Ø 7.5 max	Ø 7.5 max	Ø 7.5 max	Ø 3.5	M5	M5	M5	M5
x	21.4	11.5	21.4	31.3	11.5	0	42.8	42.8	0
y	7.2	17.1	27.0	17.1	4.4	0	0	34.2	34.2

U.S. Dimensions (inches)					(± 0.004 in.)				
Axis	P	C1	R	C2	G	F1	F2	F3	F4
	Ø 0.290 max	Ø 0.290 max	Ø 0.290 max	Ø 0.195 max	Ø 0.14	# 10 - 32	# 10 - 32	# 10 - 32	# 10 - 32
x	0.843	0.453	0.843	1.232	0.453	0	1.685	1.685	0
y	0.283	0.673	1.063	0.673	0.173	0	0	1.347	1.347

SE15

Metric Dimensions (mm)					(± 0.1 mm)				
Axis	P	C1	R	C2	G	F1	F2	F3	F4
	Ø 8 max	Ø 8 max	Ø 8 max	Ø 8 max	Ø 3.5	M6	M6	M6	M6
x	21.4	9.5	21.4	33.3	11.5	0	42.8	42.8	0
y	5.1	17.1	29.0	17.1	4.4	0	0	34.2	34.2

U.S. Dimensions (inches)					(± 0.004 in.)				
Axis	P	C1	R	C2	G	F1	F2	F3	F4
	Ø 0.312 max	Ø 0.312 max	Ø 0.312 max	Ø 0.312 max	Ø 0.14	1/4 - 20	1/4 - 20	1/4 - 20	1/4 - 20
x	0.843	0.374	0.843	1.311	0.453	0	1.685	1.685	0
y	0.201	0.673	1.142	0.673	0.173	0	0	1.347	1.347

General Description

Series SE2N is a two stage, 4-way, flapper and nozzle style servovalve. The SE2N has a narrow body that is a popular size for steam turbine control applications. This valve uses a high performance spool and sleeve design.

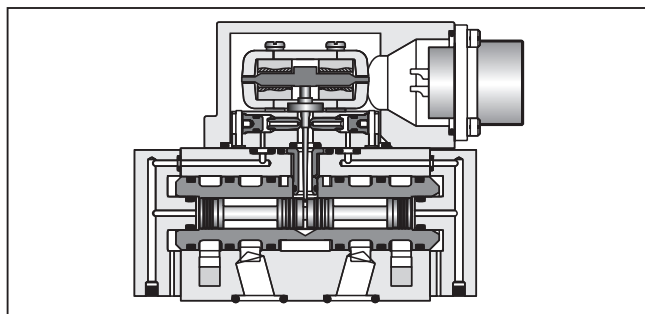
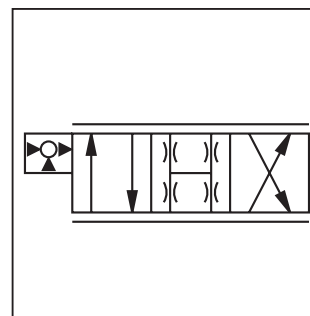
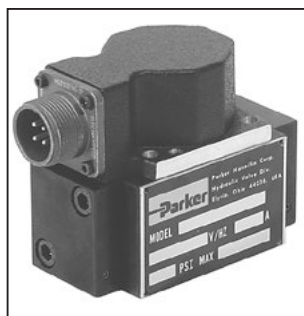
A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves. This valve is rated for 210 Bar (3000 PSI) service.

Features

- Lapped spool and sleeve
- Jewel feedback ball for durability
- Aluminum body
- Medium and High performance
- Steam turbine pattern 34.93 mm (1.375 in.) port circle

Specifications

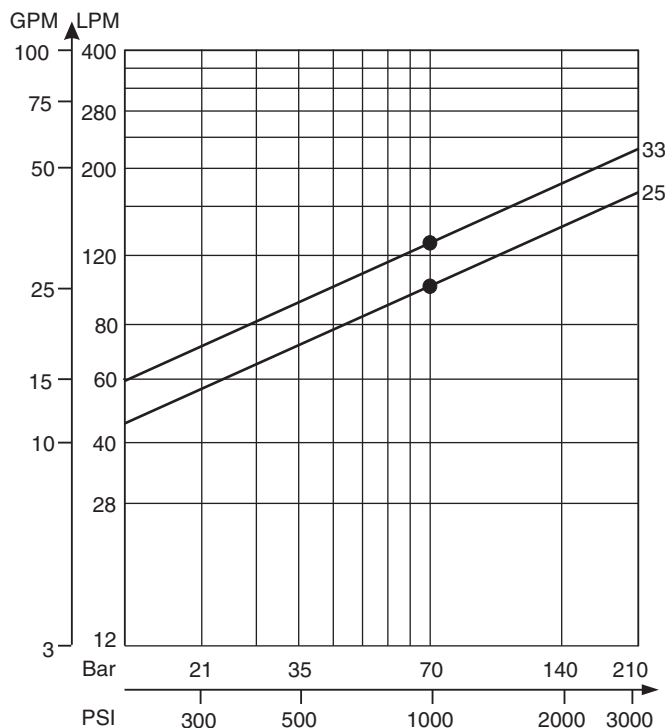
Flow Rating $\pm 10\%$ @ 70 Bar (1000 PSI)	95, 125 LPM (25, 33 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Null Leakage Flow per 70 Bar (1000 PSI)	2.4 LPM (0.6 GPM)
Pilot Flow @ 210 Bar (3000 PSI)	0.4 LPM (0.1 GPM)
Input Command	± 40 mA std.
Frequency Response @ 90° phase shift	> 50 Hz (See Performance Curves)
Non-Linearity	$\leq 10\%$
Hysteresis	$\leq 3\%$
Threshold	$\leq 0.5\%$
Null Shift with temperature with pressure	$\leq 2\%$ per 55°C (100°F) $\leq 2\%$ per 70 Bar (1000 PSI)
Pressure Gain change in pressure per 1% change in input command	60% typical
Step Response	10 – 100%, < 30 ms
Fluid	Petroleum based Mineral Oil, 10 – 110 cSt at 38°C (100°F)
Fluid Cleanliness	ISO 4406 15/12 or better
Operating Temperature	-30°C to +130°C (-4°F to +266°F)
Protection Class	NEMA 4, IP65



Flow vs. Pressure Drop

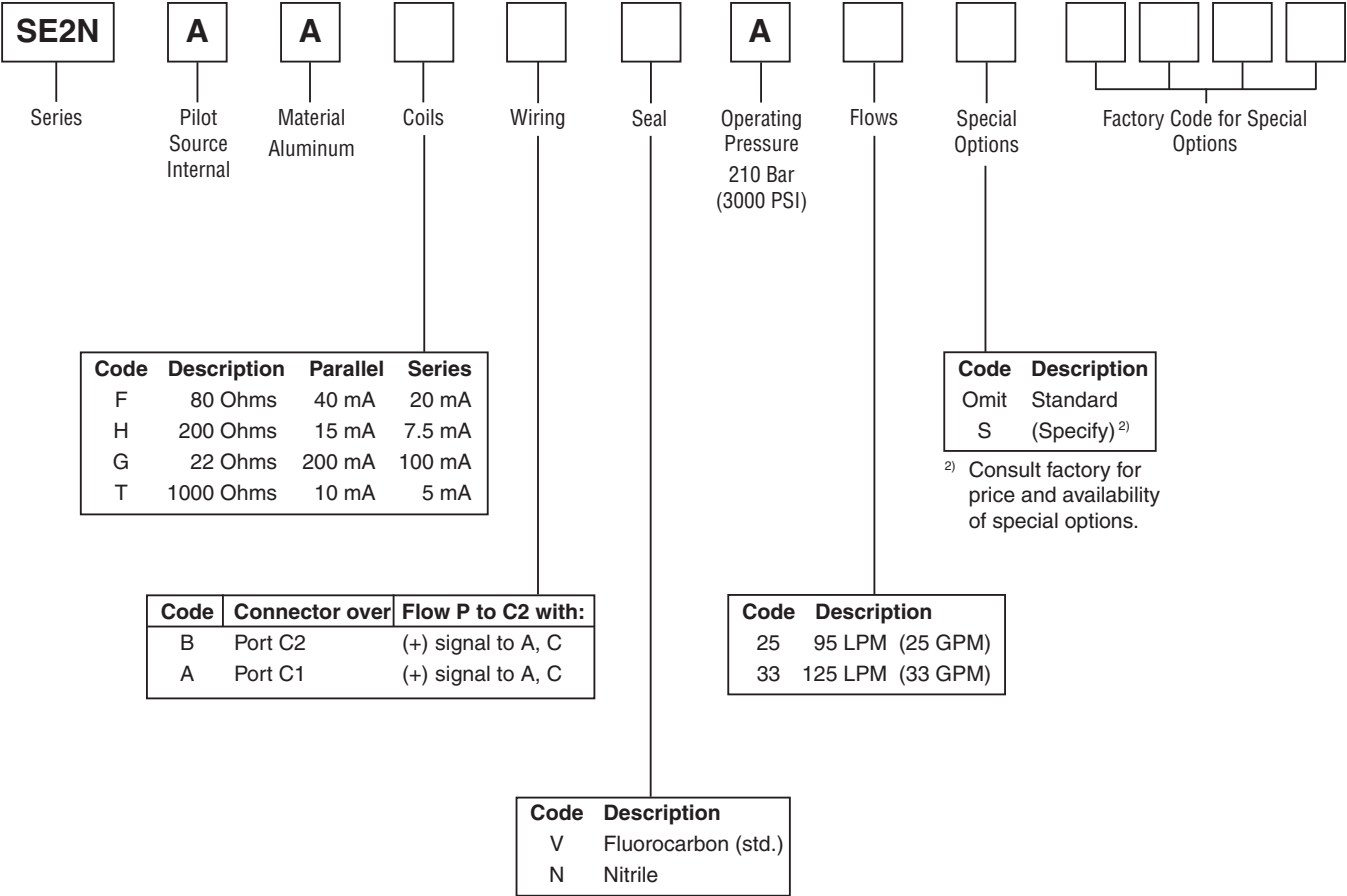
at 100% command

Flow Path: P→C1→C2→R



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

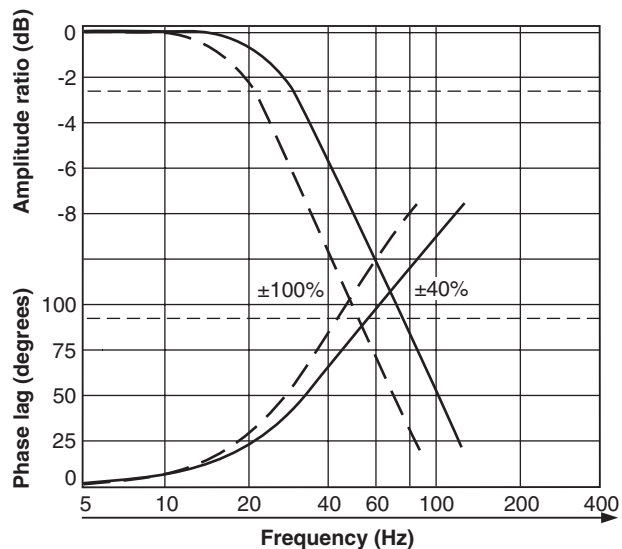
C01_Cat2550.indd, ddp, 06/21



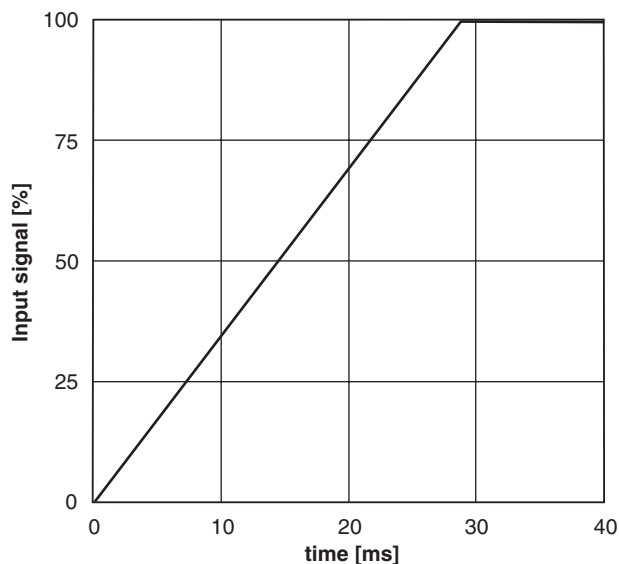
Weight: 1.1 kg (2.4 lbs.)
Cable with mating connector: EHC154S
Mating connector: MS3106E-14S-2S
Bolt kit: 4 of M8 x 70 mm, or 4 of 5/16-18 x 2.75"
Flushing valve: Consult factory
U.S. subplate: AS73SPS8S (SAE #8 side ports)
Metric subplate: AS73SPS8M (M18 x 1.5 ISO 6149 side ports)
Electronics: BD101, 23-7030

Performance Curves

Frequency Response at 210 Bar (3000 PSI)
Standard Response
SE2N – 95 LPM (25 GPM)

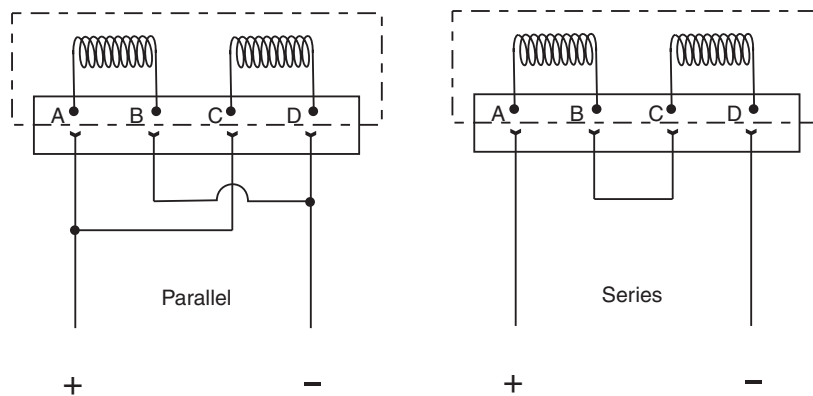


Step Response at 210 Bar (3000 PSI)
Standard Response
SE2N – 95 LPM (25 GPM)



Installation Wiring Options

This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.

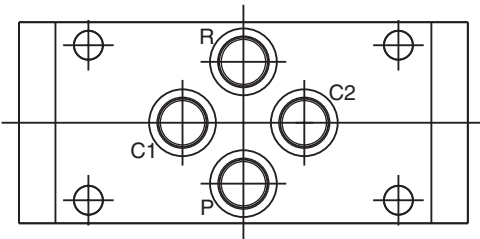
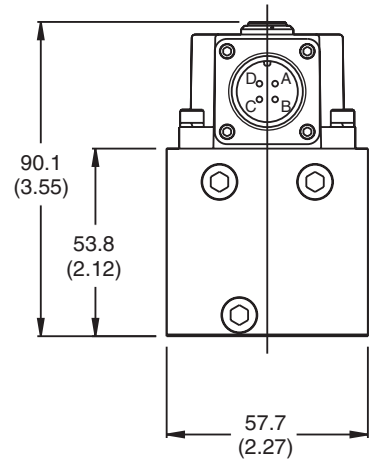
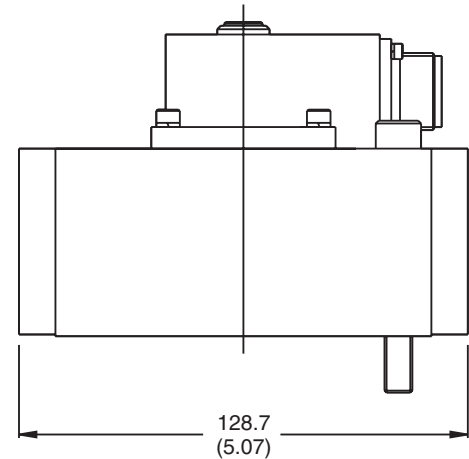


Polarity shown connects flow from P to C2 port.

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



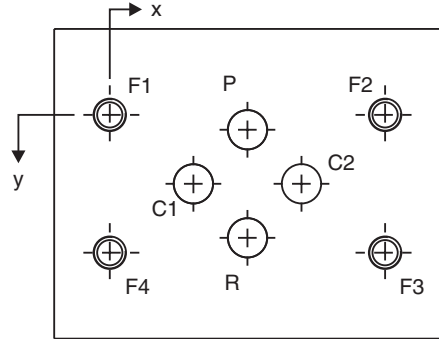
C



1. Suggested mounting bolts M8 x 70 mm or 5/16-18 x 2.75" long high tensile steel, socket-head cap screws.
2. The 4-way electrical connector mates with MS3106E-14S-2S or equivalent. Is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 14.6 I/D x 2.4 section
4. Null adjust requires 2.5 hexagon key. Flow out of C2 will increase with clockwise rotation of key.

Mounting Surface

1. The recommended full-thread depth is 22 mm (0.866 in.).
2. Surface roughness $R_a < 0.8 \mu\text{m}$ [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 0.025 mm (0.001 in.) as specified in ISO 1101.



Metric Dimensions (mm)					(± 0.1 mm)			
Axis	P	C1	R	C2	F1	F2	F3	F4
	Ø 12.7 max	Ø 12.7 max	Ø 12.7 max	Ø 12.7 max	M10	M10	M10	M10
x	44.5	27.0	44.5	61.9	0	88.9	88.9	0
y	4.8	22.3	39.7	22.3	0	0	44.5	44.5

U.S. Dimensions (inches)					(± 0.004 in.)			
Axis	P	C1	R	C2	F1	F2	F3	F4
	Ø 0.5 max	Ø 0.5 max	Ø 0.5 max	Ø 0.5 max	3/8 - 16	3/8 - 16	3/8 - 16	3/8 - 16
x	1.750	1.063	1.750	2.437	0	3.500	3.500	0
y	0.189	0.876	1.563	0.876	0	0	1.750	1.750

General Description

Series SE20 is a two stage, 4-way, flapper and nozzle style servovalve. The SE20 has a wide range of flow ratings and a high performance spool and sleeve design.

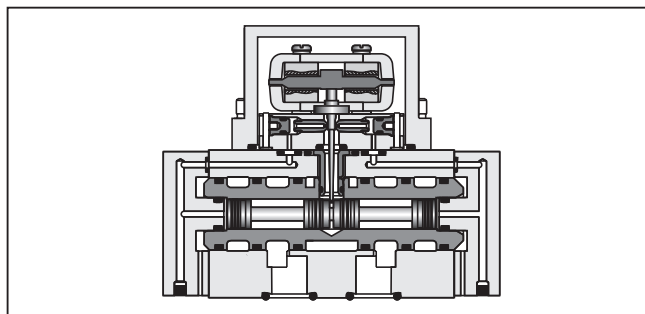
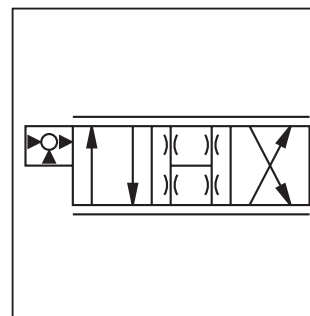
A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves. This valve is rated for 315 Bar (4500 PSI) service with an option for 500 Bar (7250 PSI).

Features

- Lapped spool and sleeve
- Jewel feedback ball for durability
- Aluminum body
- Medium and High performance
- ISO 10372 standard 22.23 mm (0.875 in.) port circle

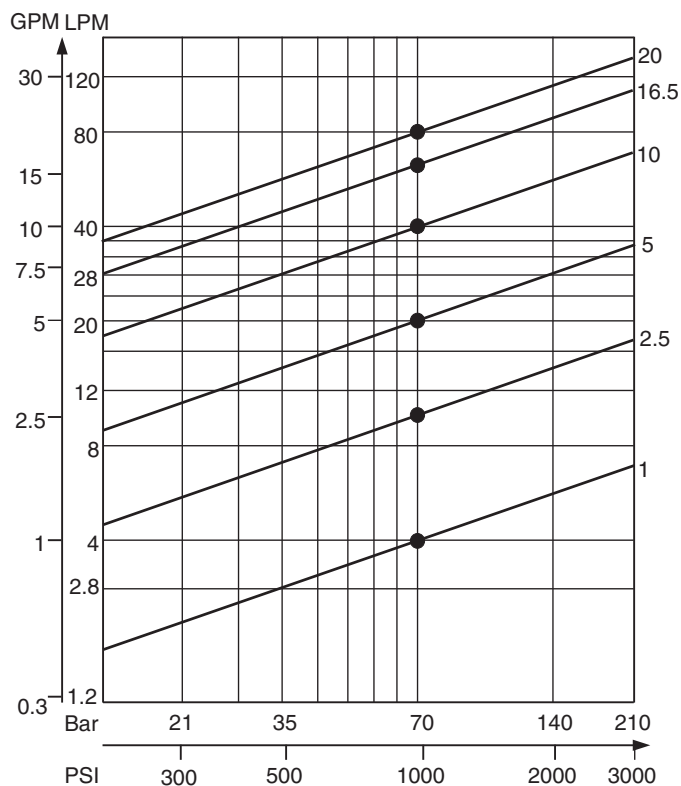
Specifications

Flow Rating $\pm 10\%$ @ 70 Bar (1000 PSI)	3.8, 9.5, 19, 38, 63, 75 LPM (1, 2.5, 5, 10, 16.5, 20 GPM)
Supply Pressure	10 – 315 Bar (145 – 4500 PSI) 500 Bar (7250 PSI) Optional
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Null Leakage Flow per 70 Bar (1000 PSI)	1.2 – 1.9 LPM (0.3 – 0.5 GPM)
Pilot Flow @ 210 Bar (3000 PSI)	0.4 – 0.7 LPM (0.1 – 0.2 GPM)
Input Command	± 40 mA std.
Frequency Response @ 90° phase shift	> 100 Hz (See Performance Curves)
Non-Linearity	$\leq 10\%$
Hysteresis	$\leq 3\%$
Threshold	$\leq 0.5\%$
Null Shift with temperature with pressure	$\leq 2\%$ per 55°C (100°F) $\leq 2\%$ per 70 Bar (1000 PSI)
Pressure Gain change in pressure per 1% change in input command	60% typical
Step Response	See graphs
Fluid	Petroleum based Mineral Oil, 10 – 110 cSt at 38°C (100°F)
Fluid Cleanliness	ISO 4406 15/12 or better
Operating Temperature	-30°C to +130°C (-22°F to +266°F)
Protection Class	NEMA 4, IP65



Flow vs. Pressure Drop

at 100% command
Flow Path P → C1 → C2 → R



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

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Cable with mating connector: EHC154S

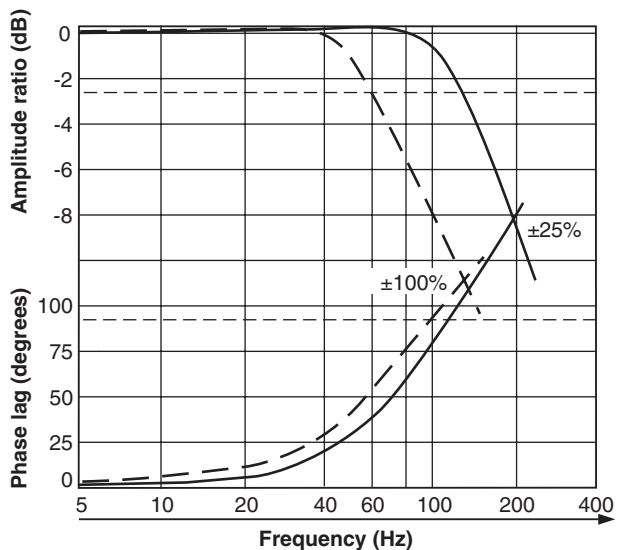
Flushing valve: 1200127 (does not cover 5th port)

U.S. Subplate, 4 ports: 810090-3 (4) #12 SAE side ports

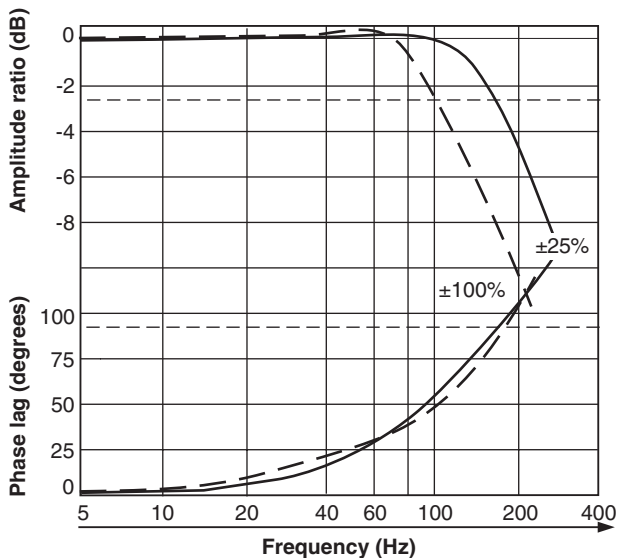
Electronics: BD101, 23-7030

Frequency Response at 210 Bar (3000 PSI)

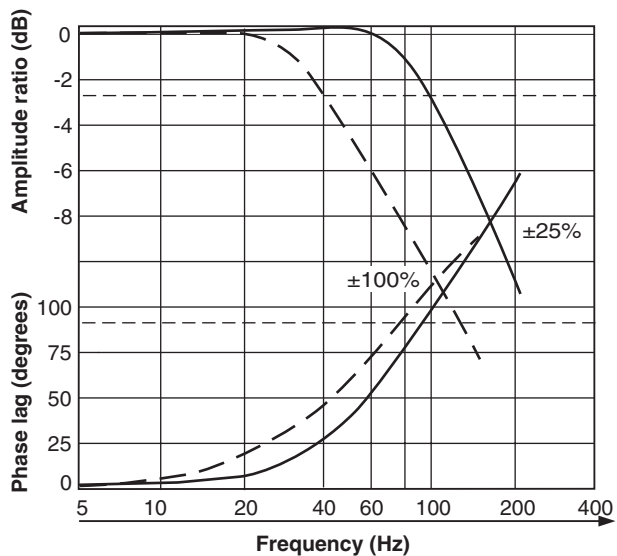
Standard Response
SE20 – 4 LPM (1.0 GPM)



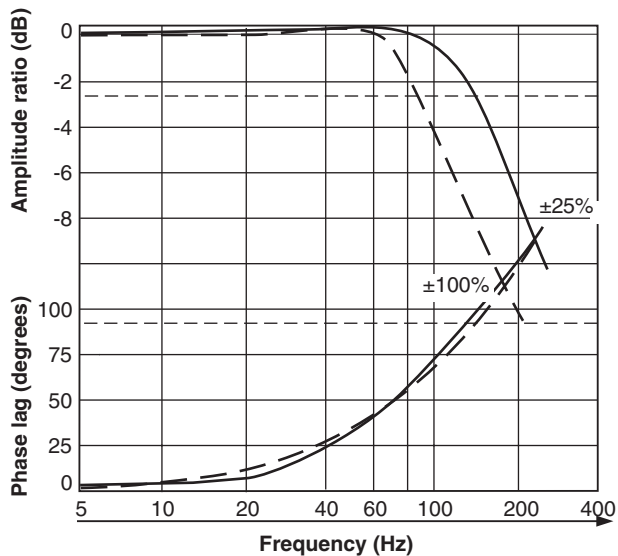
High Response
SE20 – 4 LPM (1.0 GPM)



Standard Response
SE20 – 63 LPM (16.5 GPM)



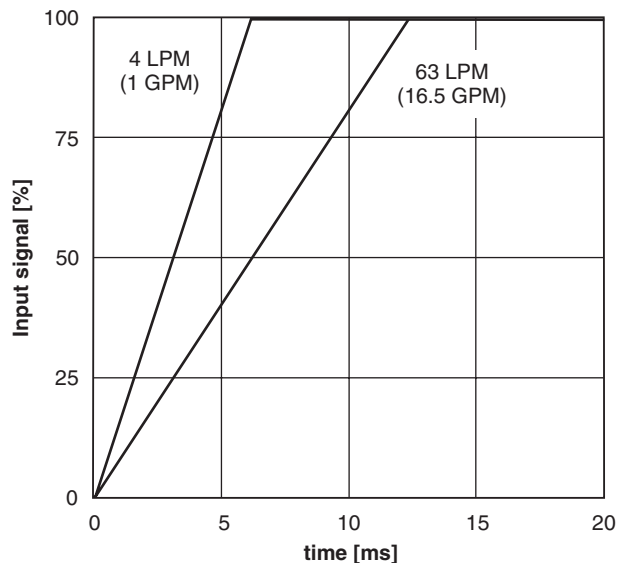
High Response
SE20 – 40 LPM (10 GPM)



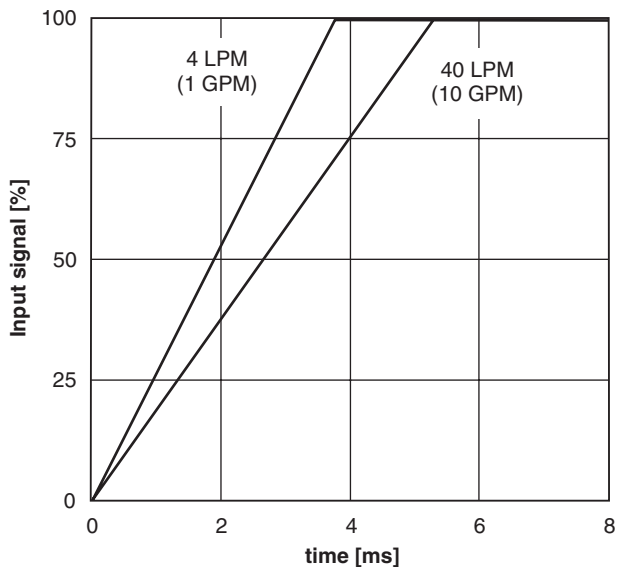
Performance Curves

Step Response at 210 Bar (3000 PSI)

Standard Response

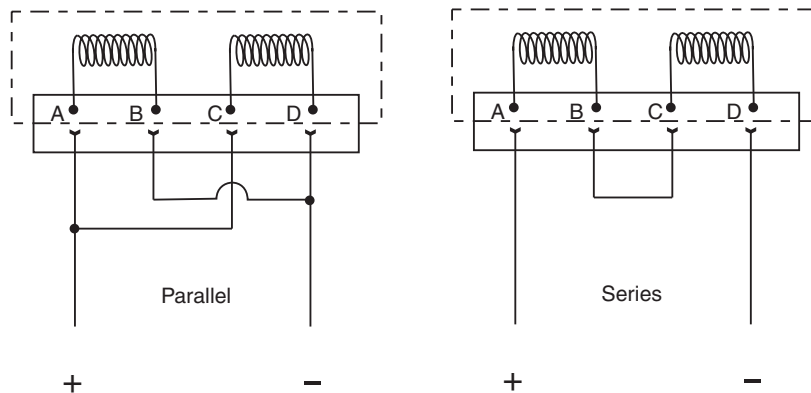


High Response



Installation Wiring Options

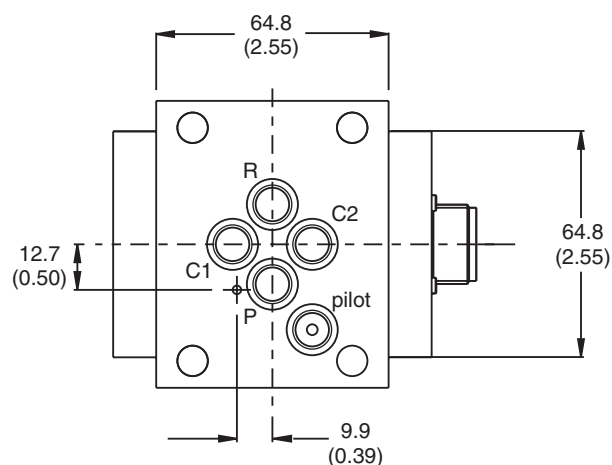
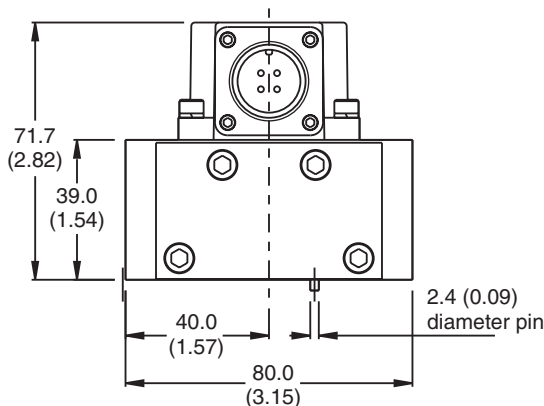
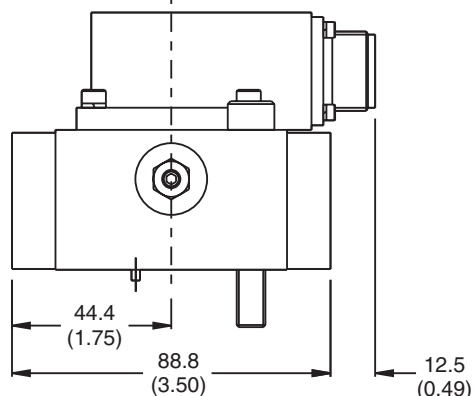
This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.

Dimensions**Servovalves
Series SE20**

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

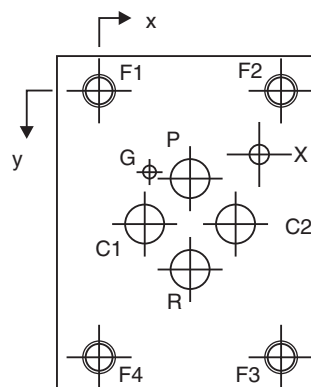


Mounting Torque
29 Nm (21.4 lb.-ft.)

1. Suggested mounting bolts M8 x 60 mm or 5/16-18 x 2.00" high tensile steel, socket-head cap screws.
2. The 4-way electrical connector mates with MS3106-14S-2S or equivalent. It is available at $\pm 90^\circ$ and 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 10.82 I/D x 1.78 section (2013N-9 or 2013V-9) 5 pcs.
4. Null adjust requires 10 A/F ring spanner (10 mm box-end wrench) and 2.5 hexagon key. Flow out of C1 will increase with clockwise rotation of key.

Mounting Surface

1. The minimum depth of hole G is 2 mm (0.079 in.). The ISO recommended full-thread depth is 22 mm (0.866 in.).
2. Surface roughness $R_a < 0.8 \mu\text{m}$ [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 0.025 mm (0.001 in.) as specified in ISO 1101.



Metric Dimensions (mm)						($\pm 0.1 \text{ mm}$)				
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	$\varnothing 8.2 \text{ max}$	$\varnothing 8.2 \text{ max}$	$\varnothing 8.2 \text{ max}$	$\varnothing 8.2 \text{ max}$	$\varnothing 3.5$	$\varnothing 5$	M8	M8	M8	M8
x	22.2	11.1	22.2	33.3	12.3	33.3	0	44.4	44.4	0
y	21.4	32.5	43.6	32.5	19.8	8.7	0	0	65.0	65.0

U.S. Dimensions (inches)						($\pm 0.004 \text{ in.}$)				
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	$\varnothing 0.32 \text{ max.}$	$\varnothing 0.32 \text{ max.}$	$\varnothing 0.32 \text{ max.}$	$\varnothing 0.32 \text{ max.}$	$\varnothing 0.14 \text{ max.}$	$\varnothing 0.2$	5/16 - 18	5/16 - 18	5/16 - 18	5/16 - 18
x	0.875	0.437	0.875	1.311	0.484	1.310	0	1.750	1.750	0
y	0.846	1.280	1.717	1.280	0.780	0.343	0	0	2.562	2.562

General Description

Series SE31 is a two stage, 4-way, flapper and nozzle style servovalve. This valve is designed to fit onto DIN NG10 or NFPA D05 port patterns. The SE31 has a wide range of flow ratings and a high performance spool and sleeve design.

A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves. This valve is rated for 210 Bar (3000 PSI) service.

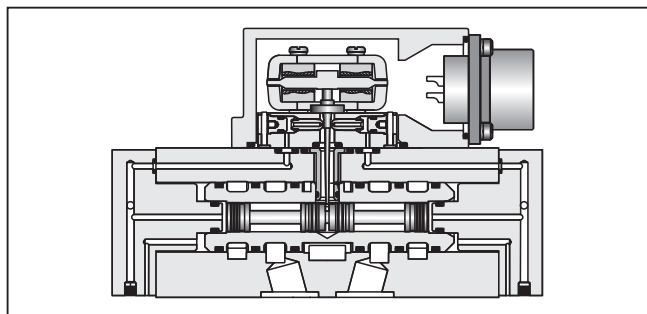
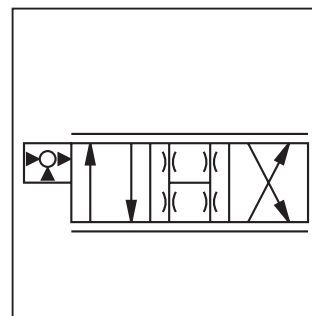
C

Features

- Lapped spool and sleeve
- Jewel feedback ball for durability
- Aluminum body
- Medium and High performance
- ISO 440 -05-05-0-94 (4-ports), DO5HE (no "Y" port)

Specifications

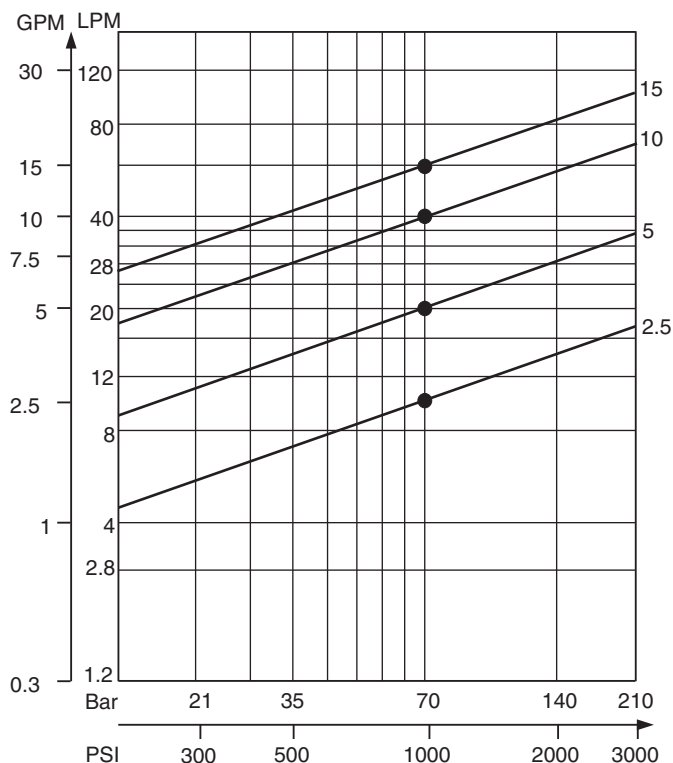
Flow Rating $\pm 10\%$ @ 70 Bar (1000 PSI)	10, 20, 40, 60 LPM (2.5, 5, 10, 15 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Null Leakage Flow per 70 Bar (1000 PSI)	1.2 – 1.9 LPM (0.3 – 0.5 GPM)
Pilot Flow @ 210 Bar (3000 PSI)	0.4 – 0.7 LPM (0.1 – 0.2 GPM)
Input Command	± 100 mA std.
Frequency Response @ 90° phase shift	> 100 Hz (See Performance Curves)
Non-Linearity	$\leq 10\%$
Hysteresis	$\leq 3\%$
Threshold	$\leq 0.5\%$
Null Shift with temperature with pressure	$\leq 2\%$ per 55°C (100°F) $\leq 2\%$ per 70 Bar (1000 PSI)
Pressure Gain change in pressure per 1% change in input command	60% typical
Step Response	0 - 100%, < 15 ms
Fluid	Petroleum based Mineral Oil, 10 – 110 cSt at 38°C (100°F)
Fluid Cleanliness	ISO 4406 15/12 or better
Operating Temperature	-30°C to +130°C (-22°F to +266°F)
Protection Class	NEMA 4, IP65



Flow vs. Pressure Drop

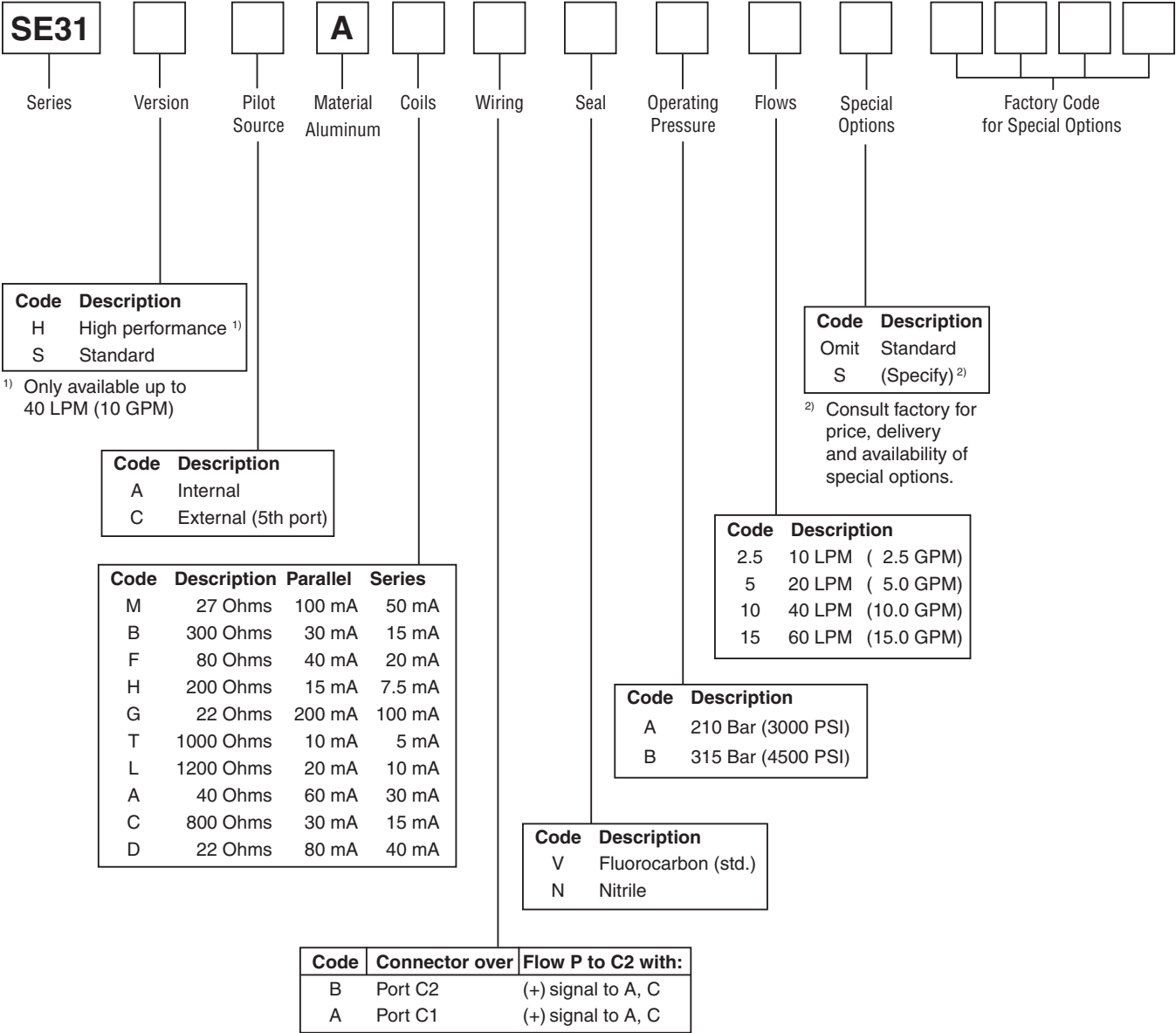
at 100% command

Flow Path P → C1 → C2 → R



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

C01_Cat2550.indd, ddp, 06/21



Weight: 1.1 kg (2.4 lbs.)

Cable with mating connector: EHC154S

Mating connector: MS3106E-14S-2S

Bolt kit: 4 of M6 x 50 mm, or 4 of 1/4-20x2.00"

Flushing valve: D3L8CV

Subplate, 5 ports: D31D6SA35 (4 side ports #12 SAE, 1 pilot port on P side is #4 SAE)

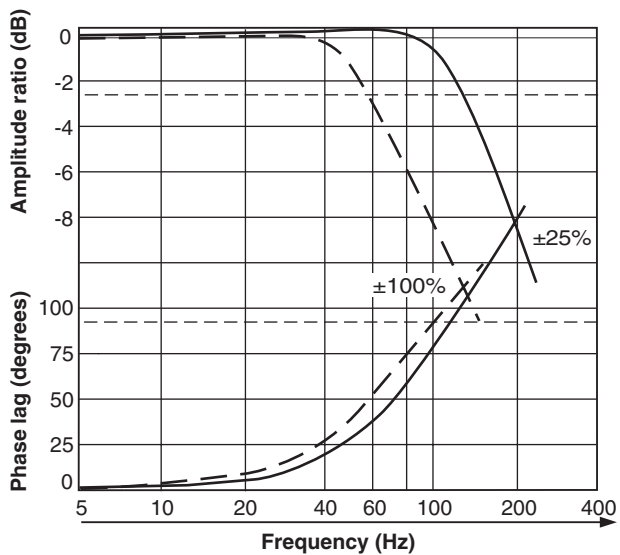
Subplate, 4 ports: D3H6SA35 (4 side ports #12 SAE)

Electronics: BD101, 23-7030

Frequency Response at 210 Bar (3000 PSI)

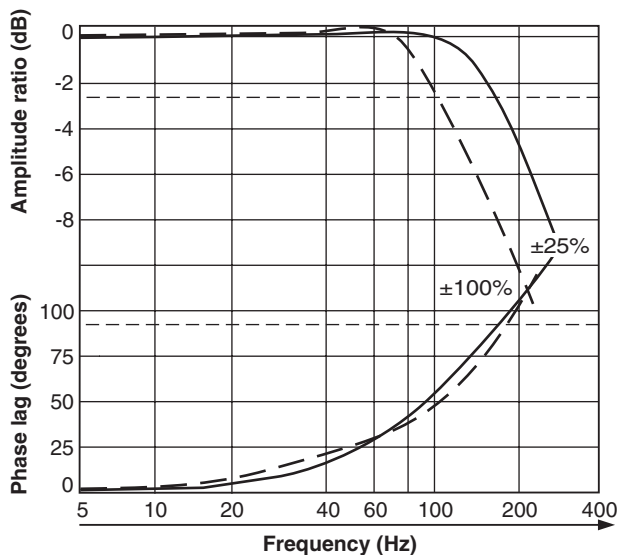
Standard Response

SE31 – 4 LPM (1.0 GPM)



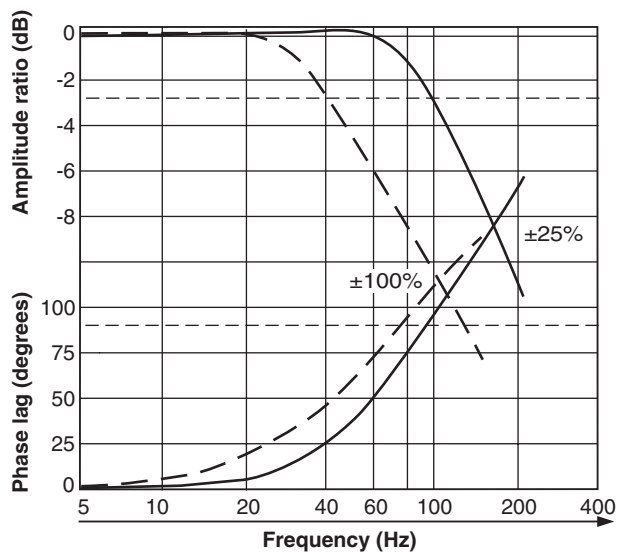
High Response

SE31 – 4 LPM (1.0 GPM)



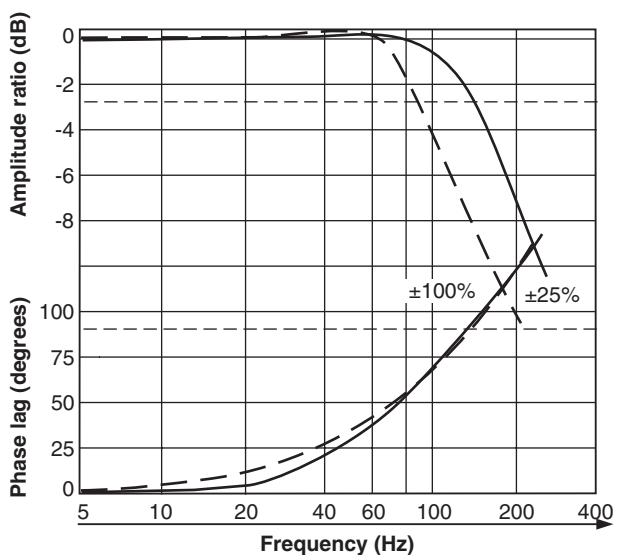
Standard Response

SE31 – 60 LPM (15 GPM)



High Response

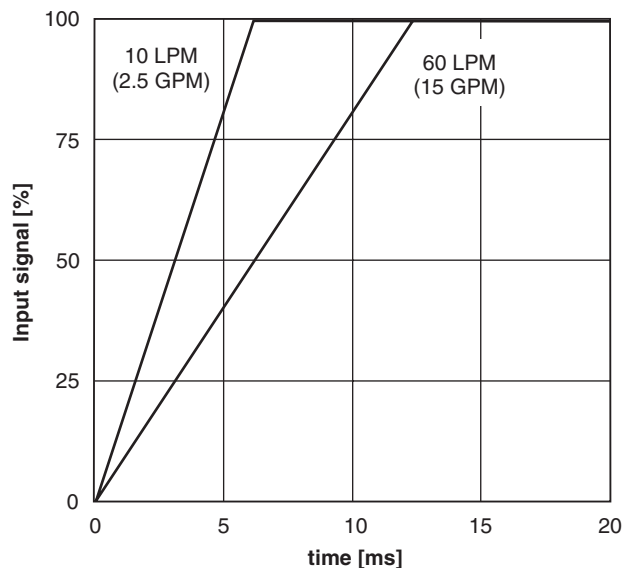
SE31 – 40 LPM (10 GPM)



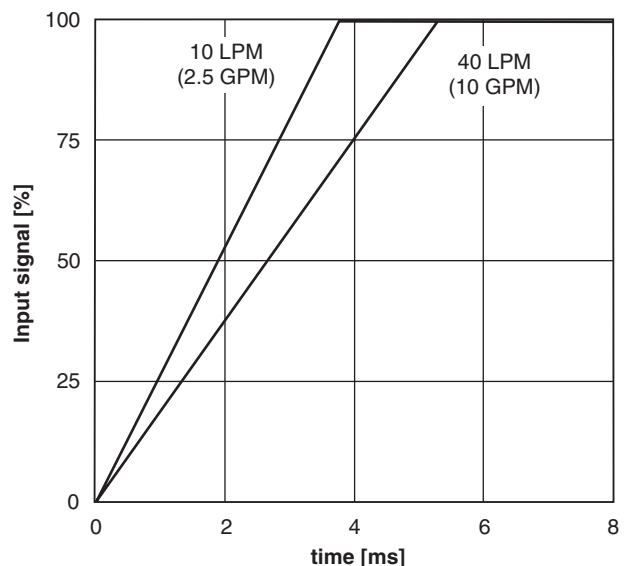
Performance Curves

Step Response at 210 Bar (3000 PSI)

Standard Response

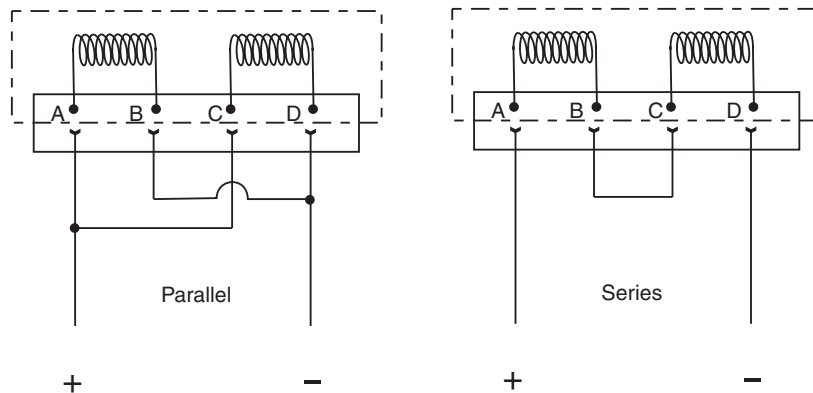


High Response



Installation Wiring Options

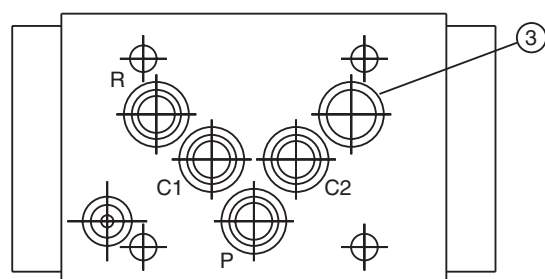
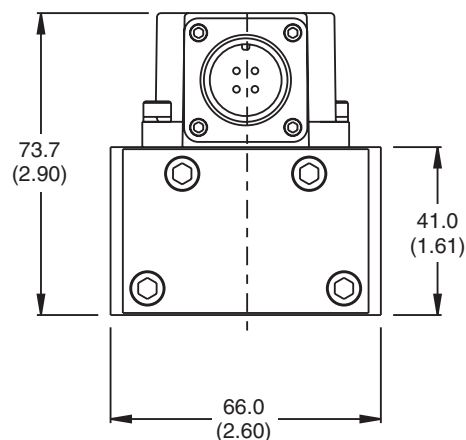
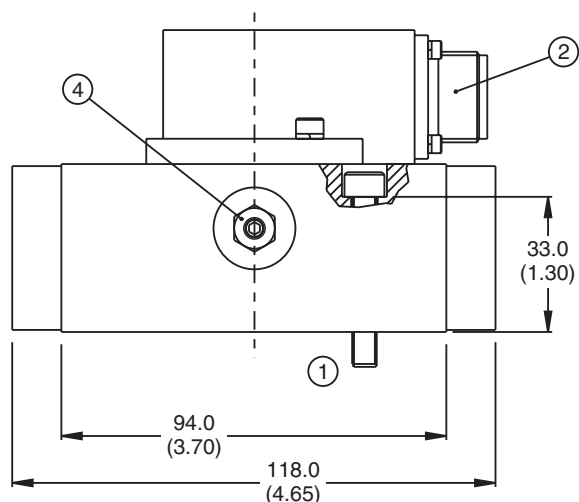
This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.

Dimensions**Servovalves
Series SE31**

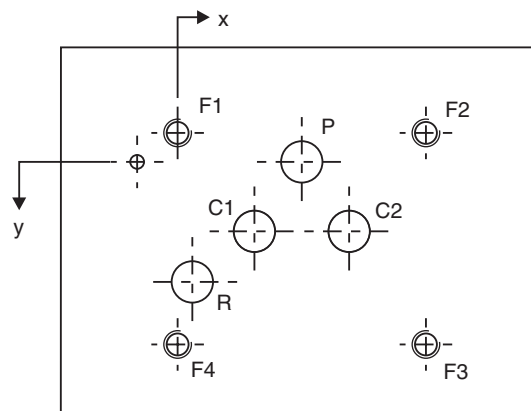
Inch equivalents for millimeter dimensions are shown in (**)



1. Suggested mounting bolts M6 x 50 mm or 1/4-20 x 2.25" long high tensile steel, socket-head cap screws.
2. The 4-pin electrical connector mates with MS3106E-14S-2S or equivalent. The valve connector is available $\pm 90^\circ$ or 180° from the position shown.
3. Base O-Rings: 12 mm I.D. by 2.0 mm section, 90 durometer.
4. Null adjust requires a 10 A/F ring spanner (10 mm box end wrench) and a 2.5 hexagon key. Flow out of C1 will increase with clockwise rotation of key.

Mounting Surface

1. The minimum depth of hole G is 2 mm (0.079 in.). The ISO recommended full-thread depth is 18 mm (0.709 in.).
2. Surface roughness $R_a < 0.8 \mu\text{m}$ [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 0.025 mm (0.001 in.) as specified in ISO 1101.



Metric Dimensions (mm)						(± 0.1 mm)			
Axis	P	C1	R	C2	X	F1	F2	F3	F4
	$\varnothing 9$ max	$\varnothing 9$ max	$\varnothing 9$ max	$\varnothing 9$ max	$\varnothing 3$	M6	M6	M6	M6
x	27.0	16.7	3.2	37.3	-8.8	0	54.0	54.0	0
y	6.3	21.4	32.4	21.4	6.3	0	0	46.0	46.0

U.S. Dimensions (inches)						(± 0.004 in.)			
Axis	P	C1	R	C2	X	F1	F2	F3	F4
	$\varnothing 0.354$ max	$\varnothing 0.354$ max	$\varnothing 0.354$ max	$\varnothing 0.354$ max	$\varnothing 0.12$	1/4 - 20	1/4 - 20	1/4 - 20	1/4 - 20
x	1.063	0.657	0.126	1.469	-0.347	0	2.126	2.126	0
y	0.248	0.843	1.275	0.843	0.248	0	0	1.811	1.811

General Description

Series SE60 is a two stage, 4-way, flapper and nozzle style servovalve. The SE60 has a wide range of flow ratings and a high performance spool and sleeve design.

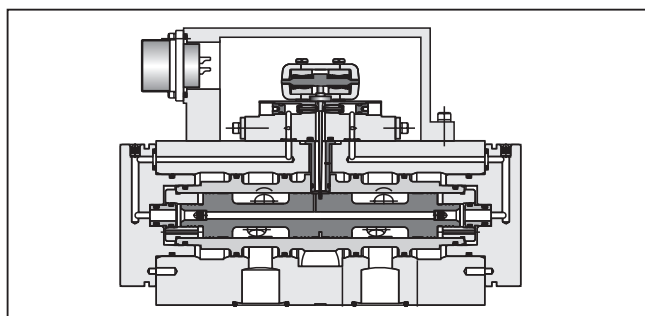
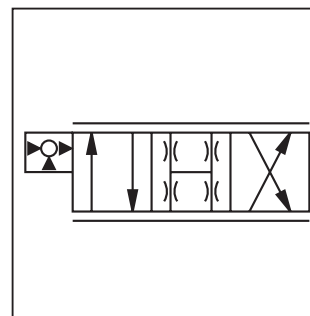
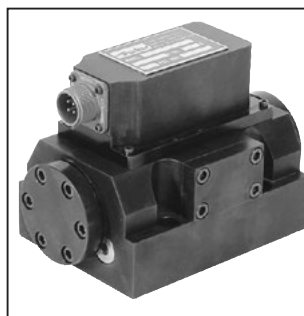
A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves. This valve is rated for 210 Bar (3000 PSI) service.

Features

- Lapped spool and sleeve
- Jewel feedback ball for durability
- Aluminum body
- Medium and High performance
- ISO 10372 size 6 standard 50.8 mm (2.000 in.) port circle

Specifications

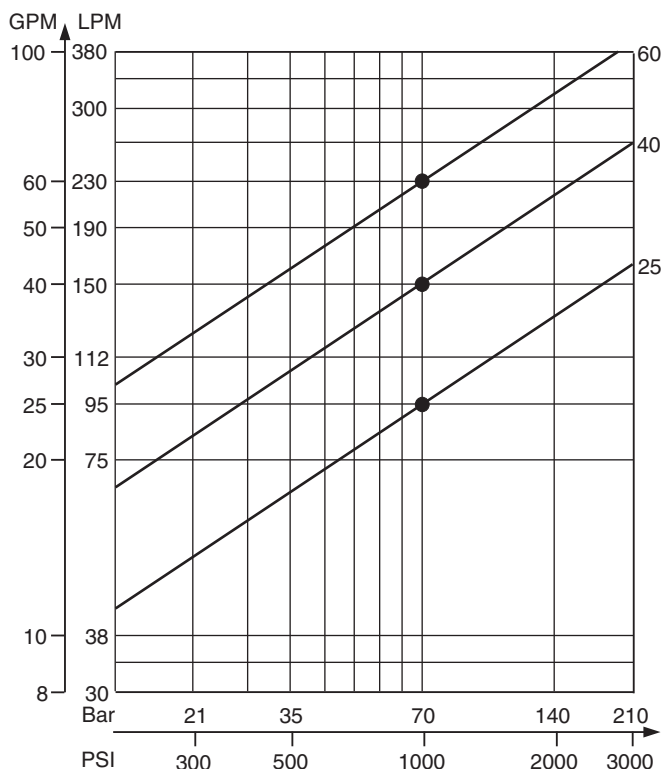
Flow Rating $\pm 10\%$ @ 70 Bar (1000 PSI)	95, 150, 230 LPM (25, 40, 60 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Null Leakage Flow per 70 Bar (1000 PSI)	2.4 – 3.6 LPM (0.6 – 1.0 GPM)
Pilot Flow @ 210 Bar (3000 PSI)	0.4 LPM (0.1 GPM)
Input Command	± 40 mA std.
Frequency Response @ 90° phase shift	> 100 Hz (See Performance Curves)
Non-Linearity	$\leq 10\%$
Hysteresis	$\leq 4\%$
Threshold	$\leq 1\%$
Null Shift with temperature with pressure	$\leq 2\%$ per 55°C (100°F) $\leq 2\%$ per 70 Bar (1000 PSI)
Pressure Gain change in pressure per 1% change in input command	60% typical
Step Response	0 - 100%, < 15 ms
Fluid	Petroleum based Mineral Oil, 10 – 110 cSt at 38°C (100°F)
Fluid Cleanliness	ISO 4406 15/12 or better
Operating Temperature	-30°C to +130°C (-22°F to +266°F)
Protection Class	NEMA 4, IP65



Flow vs. Pressure Drop

at 100% command

Flow Path P → C1 → C2 → R



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

C01_Cat2550.indd, ddp, 06/21

SE60

A

Series

Version

Pilot Source

Material Aluminum

Coils

Wiring

Seal

Operating Pressure

Flows

Special Options

Factory Code for Special Options

Code	Description
H	High performance ¹⁾
S	Standard

¹⁾ Consult factory for price, delivery and availability of high performance version.

Code	Description
A	Internal
C	External (5 th Port)

Code	Description	Parallel	Series
F	80 Ohms	40 mA	20 mA
H	200 Ohms	15 mA	7.5 mA
G	22 Ohms	200 mA	100 mA
T	1000 Ohms	10 mA	5 mA
M	27 Ohms	100 mA	50 mA
L	1200 Ohms	20 mA	10mA
A	40 Ohms	60mA	30mA
B	300 Ohms	30mA	15 mA
C	800 Ohms	30mA	15mA
D	22 Ohms	80mA	40mA

Code	Description
A	210 Bar (3000 PSI)
B	275 Bar (4000 PSI)*

* 4000 PSI requires nitrile seals.

Code	Description
Omit	Standard
F	Field Replaceable Filter
S	(Specify) ²⁾

²⁾ Consult factory for price, delivery and availability of special options.

Code	Description
25	95 LPM (25 GPM)
40	150 LPM (40 GPM)
60	230 LPM (60 GPM)

Code	Description
V	Fluorocarbon (std.)
N	Nitrile

Code	Connector over	Flow P to C2 with:
B	Port C2	(+) signal to A, C
A	Port C1	(+) signal to A, C

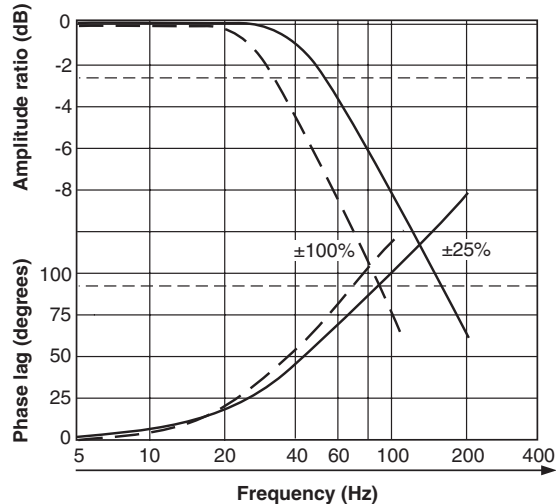
Weight: 3.4 kg (7.5 lbs.)
Cable with mating connector: EHC154S
Mating connector: MS3106E-14S-2S
Bolt kit: 4 of M10 x 60 mm, or 4 of 3/8-16x2.375"
Flushing valve: Consult factory. Use 1278007 and 11-0700.
US Subplate, 4 ports: AS06SPS20S (# 20 SAE side ports)
Metric Subplate, 4 ports: AS06SPS20M (M42 x 2.0 ISO 6149 side ports)
Electronics: BD101, 23-7030

Performance Curves

Frequency Response at 210 Bar (3000 PSI)

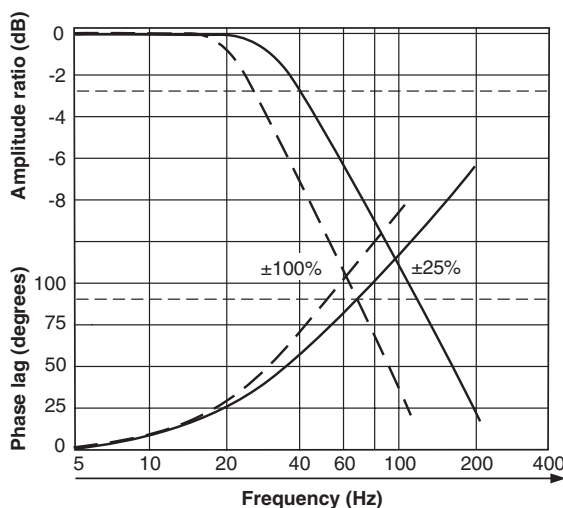
Standard Response

SE60 – 95 LPM (25 GPM)



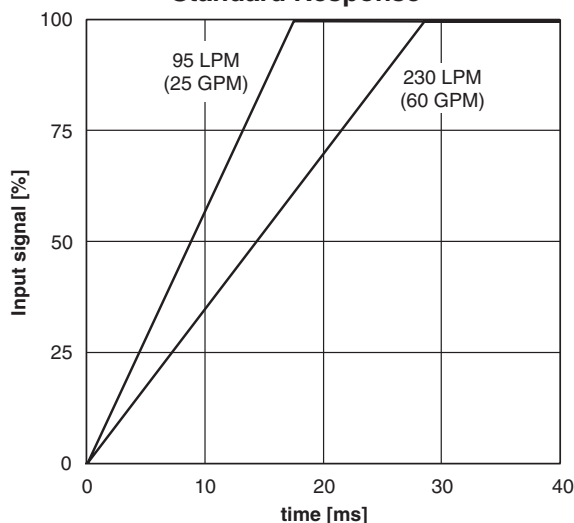
High Response

SE60 – 230 LPM (60 GPM)



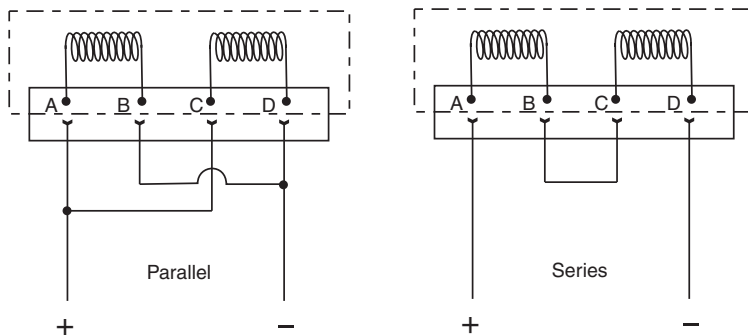
Step Response at 210 Bar (3000 PSI)

Standard Response



Installation Wiring Options

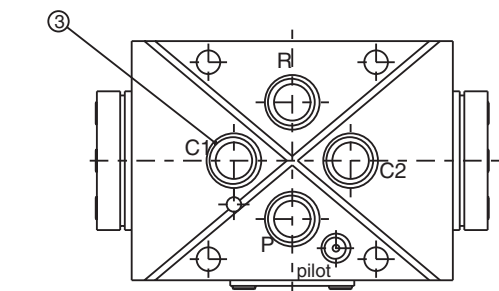
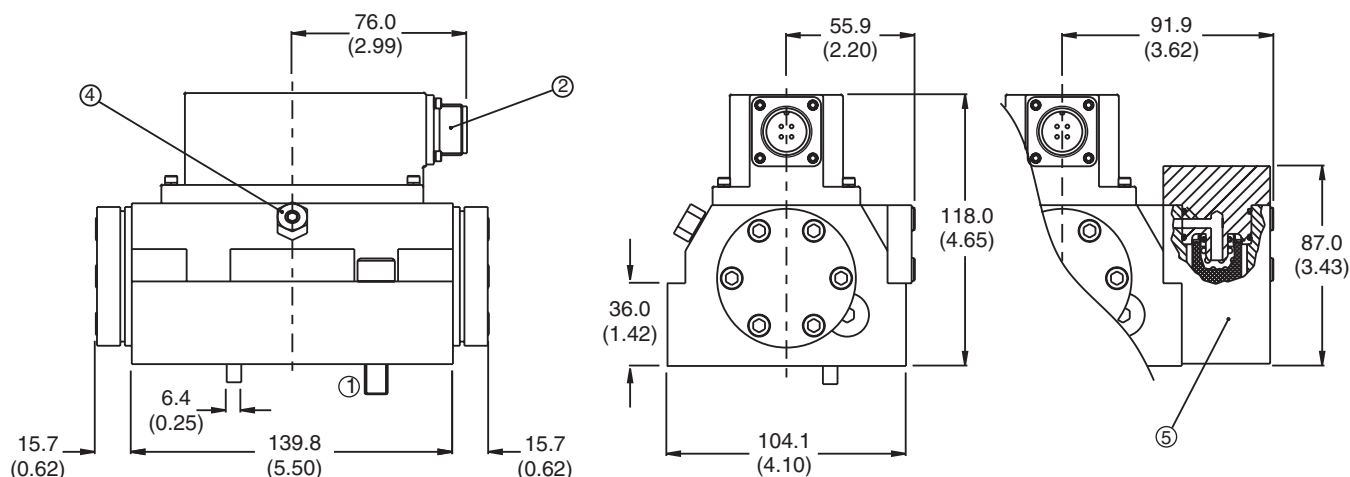
This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.

Dimensions**Servovalves
Series SE60**

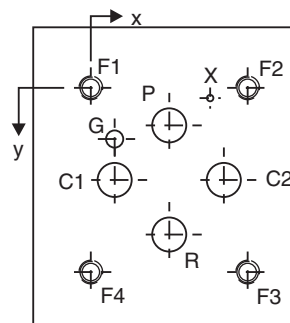
Inch equivalents for millimeter dimensions are shown in (**)



1. Suggested mounting bolts M10 x 60 mm or 3/8-16 x 2.375" long high tensile steel, socket-head cap screws.
2. 4-way electrical connector mates with MS3106-14S-2S or equivalent. Is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 4 of Parker 2019V-7, 1 of Parker 2012V-7 (if external pilot is used).
4. Null adjust requires 12 A/F ring spanner (12 mm box end wrench) and 3.0 hexagon key. Flow out of C2 will increase with clockwise rotation of key.
5. Optional field replaceable filter housing. Element P/N SRS1479.

Mounting Surface

1. The minimum depth of hole G is 2 mm (0.079 in.). The ISO recommended full-thread depth is 30 mm (1.181 in.).
2. Surface roughness $R_a < 0.8 \mu\text{m}$ [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 0.025 mm (0.001 in.) as specified in ISO 1101.



Metric Dimensions (mm)						(± 0.1 mm)				
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	Ø 17.5 max	Ø 17.5 max	Ø 17.5 max	Ø 17.5 max	Ø 8	Ø 5	M10	M10	M10	M10
x	36.5	11.1	36.5	61.9	11.1	55.6	0	73.0	73.0	0
y	17.4	42.8	68.2	42.8	23.7	4.7	0	0	85.7	85.7

U.S. Dimensions (inches)						(± 0.004 in.)				
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	Ø 0.688 max	Ø 0.688 max	Ø 0.688 max	Ø 0.688 max	Ø 0.39	Ø 0.20	3/8 - 16	3/8 - 16	3/8 - 16	3/8 - 16
x	1.437	0.437	1.437	2.437	0.437	2.187	0	2.875	2.875	0
y	0.687	1.687	2.687	1.687	0.937	0.187	0	0	3.375	3.375

Contents**Proportional Directional Valves**

Series	Valve Application	Description	Page
PWD00A-400	D**FW, D*FB, WLL, RLL....	Programmable, Min, Max, Ramps, Setpoints.....	D2
PWDXXA-40*	D**FS, D*FC, RLL*R.....	Programmable, Feedback, Min, Max, Ramps	D5
EW*104	D**FS	Adjustable; Min, Max, 2 Ramps.....	D9

Proportional Pressure Control Valves

Series	Valve Application	Description	Page
ED00104	DWE, DWU, RE*W.....	Adjustable; Min, Max, 2 Ramps.....	D11
PCD00A-400	VBY, VMY, RE*W, PE*W	Programmable, Min, Max, Ramp	D13

Proportional Throttle Valves

Series	Valve Application	Description	Page
PCD00A-400	TDA, TEA	Programmable, Min, Max, Ramp	D13
ET*104	TDA	Adjustable; Min. Max., 2 Ramps ("L" Solenoid).....	D17

Servovalves

Series	Valve Application	Description	Page
BD101	BD15/BD30/Dyval	Closed Loop, PI, Snap Track.....	D19

Auxiliary Function Cards

Series	Valve Application	Description	Page
BD101	D*FP, D*FH, D*FX, BD**	Closed Loop PI, Snap Track.....	D19
PID000A-40		Electronic Module for Closed Loop Control.....	D21
PZD00A-40*	all	Programmable, Signal Conditioning.....	D25

Motion Controllers

Series	Valve Application	Description	Page
C3F Compax		Motion Controller.....	D29

Power Supplies

Series	Valve Application	Description	Page
PSD24	all	24 Volt Power Supply	D48

Card Holders

Series	Valve Application	Description	Page
K.....	all	DIN Card Holders.....	D50

General Description

Series PWD00A-400 electronic module for driving open loop proportional valves is compact and easy to install with DIN rail mounting and plug-in terminals. The digital design allows for programmable parameters such as solenoid drive current, mins and maxs, and ramps. Profiles controlled by on-off logic signals can be configured through internal velocity setpoints and ramps. The module provides flexibility for different applications and repeatability from unit to unit. The module parameters are programmed with an RS-232 interface and user friendly software (ProPx) with default values for the standard valves.

The PWD00A-400 module contains the functions required by typical open loop proportional valve applications (series D*FB, D*FW, D*1FW, WLL, RLL valves).

Features

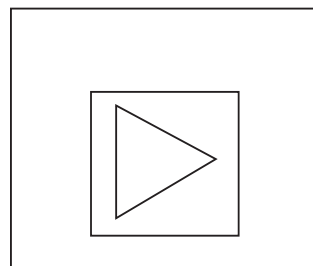
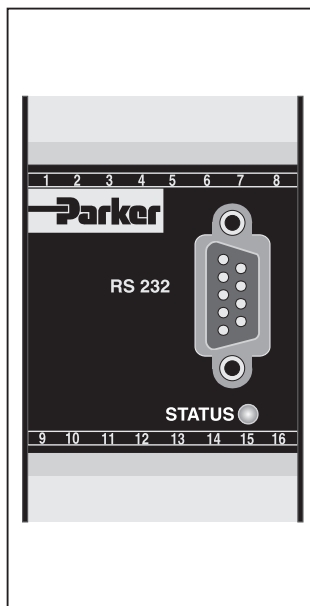
- Programmable parameters.
- Analog or Profile Capability.
- RS-232 Interface.
- User friendly programming software.
- Plug-in terminals.

Specifications

General			
Model	Module package for snap-on mounting on EN 50022 rail	Mounting Position	Any
Package Material	Polycarbonate	Ambient Temperature Range	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	Protection Class	IP 20 acc. DIN 40050
Electrical			
Duty Ratio	100%	Channel Recall Signal	Off – 0 to 5.0 VDC; On – 8.5 to 30 VDC; Ri = 30K ohm
Supply Voltage	18 VDC to 30 VDC, ripple < 5% eff., surge free (29 VDC to 30 VDC for 24V coils)	Status Signal	Off – 0 to 0.5 VDC; On – Supply Voltage; rated max. 15 mA
Switch-on Current Typ.	22A for 0.2 mS	Adjustment Ranges	preset
Current Consumption Max.	2.0A	Minimum	0 to 50% 0 to 1000
Pre-fusing	2.5A medium lag	Maximum	50 to 100% 0 to 1000
Command Signal	+10 to 0 to -10 VDC, ripple < 0.01 % eff., surge free, Ri = 150K ohm Do not input a command greater than ±10 VDC.	Ramp Time	0 to 32.5 s 0 to 32.5
Input Signal Resolution	0.025%	Zero Offset	+75 to -75% +1000 to -1000
Differential Input Voltage Maximum	30V for terminals 5 and 6 against PE (terminal 8)	Current	0.8/3.5/2.7/1.8/1.3 A 0/1/2/3/4/5
Enable Signal	Off – 0 to 5.0 VDC On – 8.5 to 30 VDC; Ri = 30K ohm	Interface	RS 232C, DSub 9p. male for null modem cable
		EMC	EN 50081-2, EN 50082-2
		Connection	Screw terminals 0.2 to 2.5 mm ² , plug-in
		Cable Specification	16 AWG overall braid shield for supply voltage and solenoids 20 AWG overall braid shield for sensor and signal
		Cable Length	50m (164 ft.)

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

D01_Cat2550.indd, ddp, 06/21



- Four independent ramps.
- Input Enable with Status indicator.
- Differential input on analog command.
- Compliant with European EMC Standards.



Ordering Information

PWD

Electronic Module
DC Valve

00

Position Control
Universal

A

400

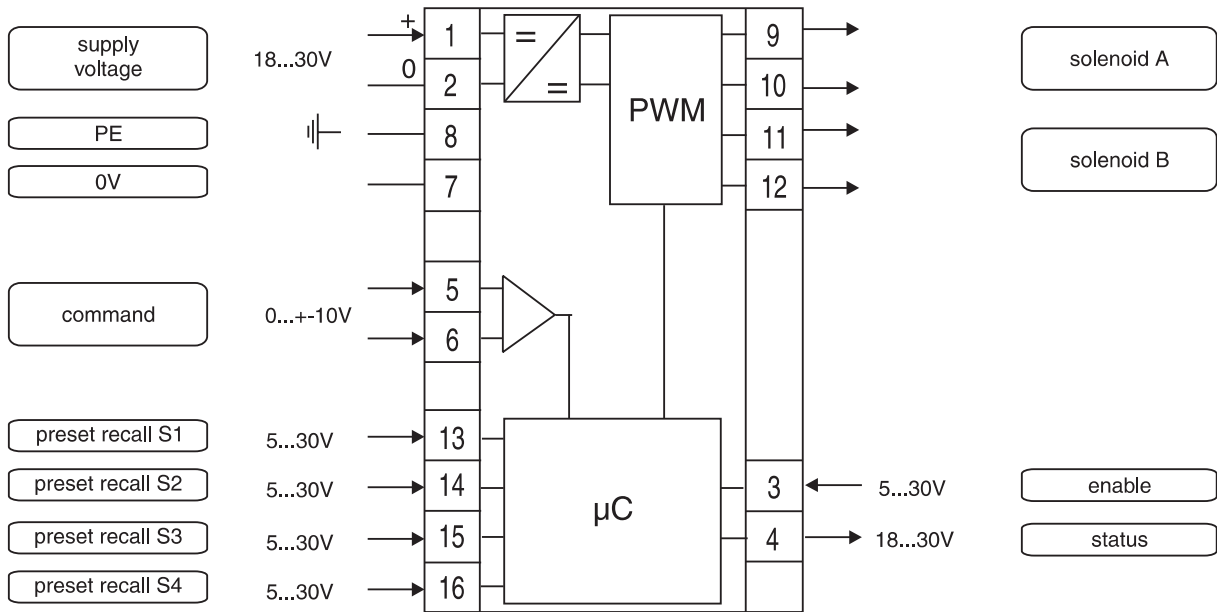
Module Type

Design
Series
NOTE:
Not required
when ordering.

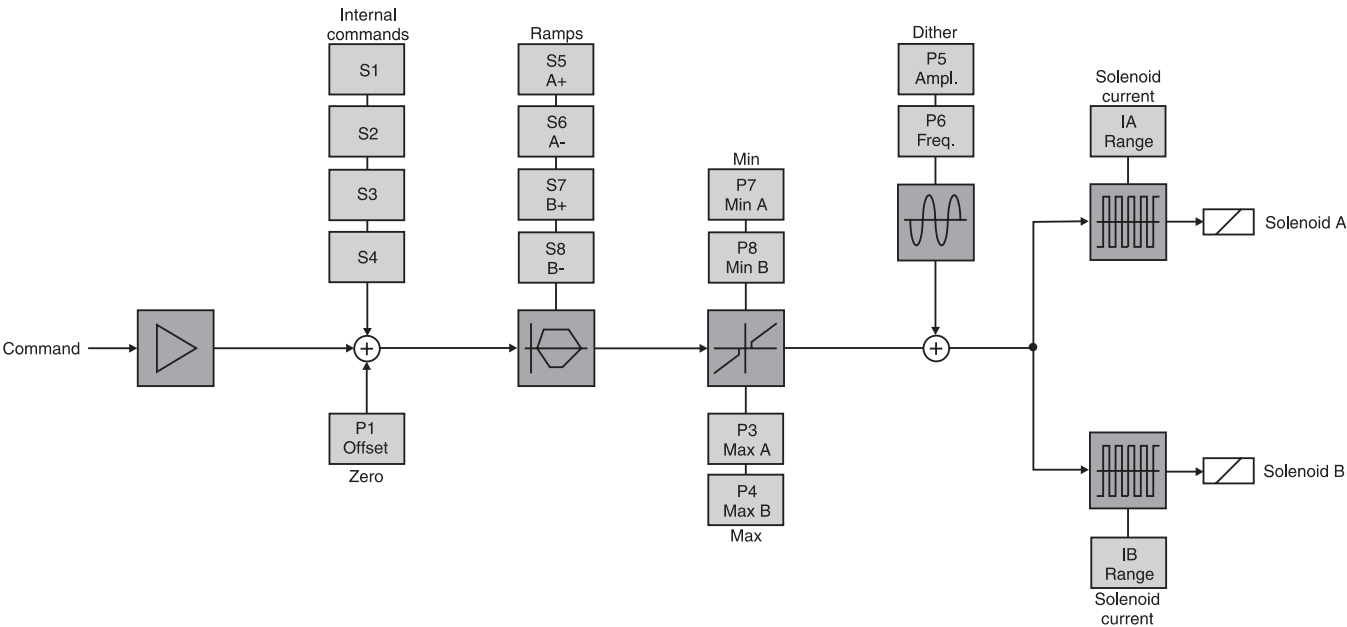
Weight: 160 g (0.35 lbs.)

Code	Description
400	Amplifier, MIN/MAX adjustable, UP/DOWN ramps, Command inputs

Block Diagram — Wiring

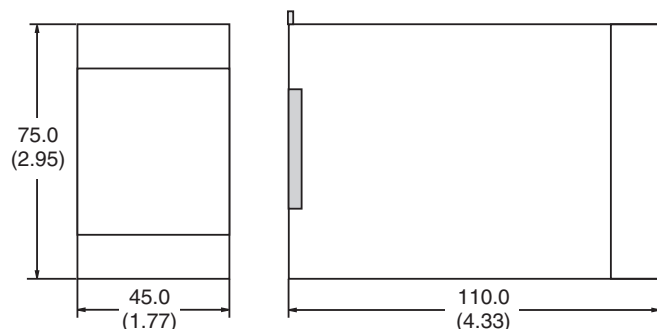


Signal Flow Diagram



Dimensions

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



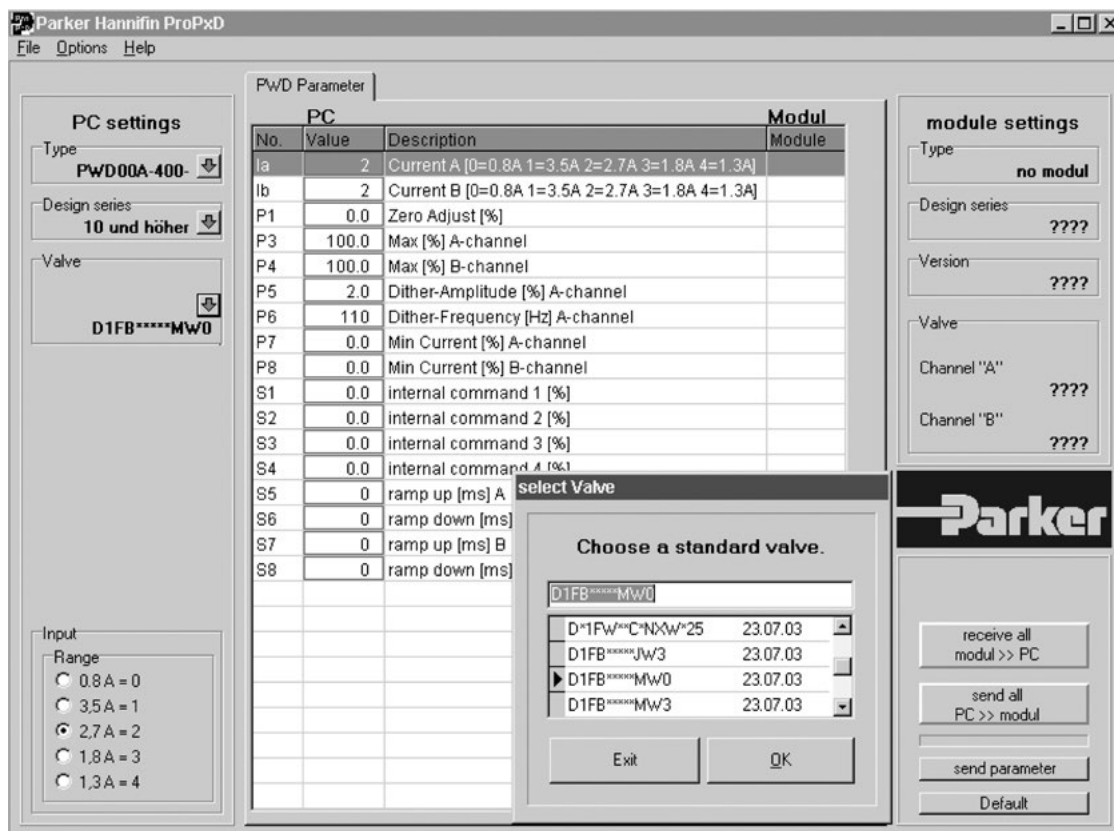
ProPxD Interface Program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

- User-friendly editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronic via serial interface RS-232 and null modem cable.
- Simple to use interface program. Download free of charge www.parker.com/euro_hcd → **Services** → **downloads**



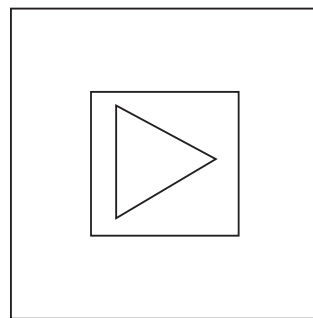
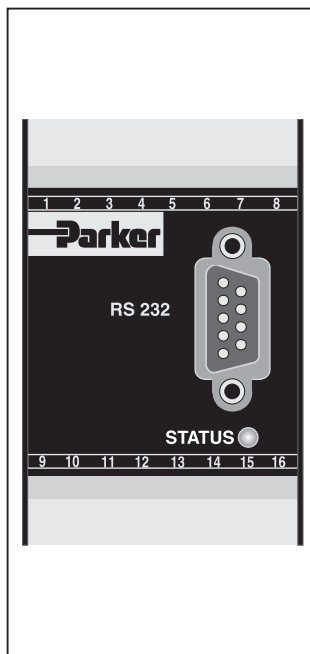
General Description

Series PWDXXA-40* electronic module for driving proportional valves with spool position feedback is compact and easy to install with DIN rail mounting and plug-in terminals. The digital design allows for programmable parameters such as solenoid drive current, mins, maxs, ramps and a range of position feedback signals. The module provides flexibility and repeatability from unit to unit. The module parameters are programmed with an RS-232 interface and user friendly software (ProPxD) with default values for standard valves.

The PWDXXA-40* module contains the functions required by typical internal closed loop proportional valve applications (series D*FC, D*1FS, RLL*R, WLL*R and TEL valves).

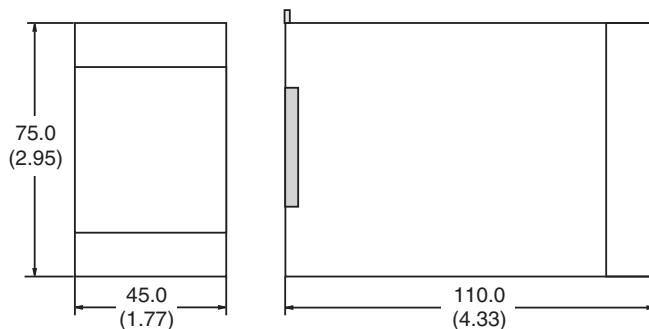
Features

- Interface and tuning for spool position feedback.
- Programmable parameters.
- $\pm 10V$, ± 20 mA, 4-20 mA position transducer input.
- RS-232 Interface.
- User friendly programming software.
- Plug-in terminals.
- Four independent ramps.
- Input Enable with Status indicator.
- Differential command input.
- Compliant with European EMC Standards.



Dimensions

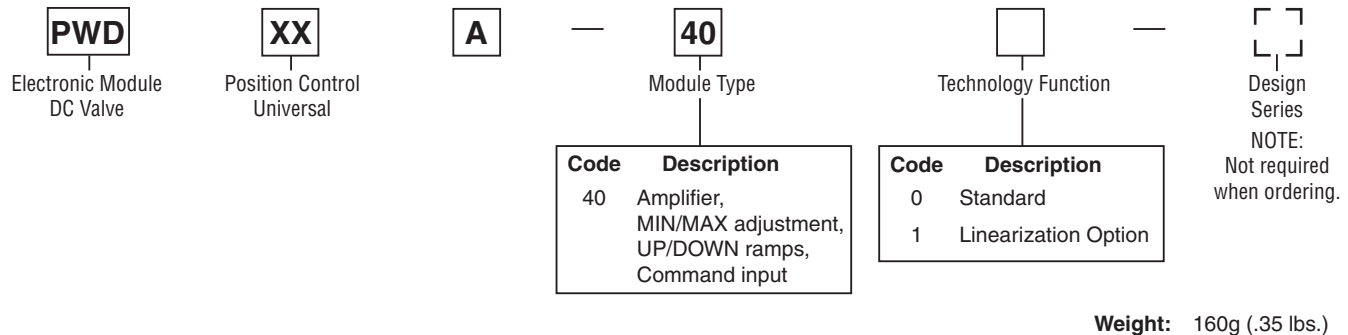
Inch equivalents for millimeter dimensions are shown in (**)



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

D01_Cat2550.indd, ddp, 06/21

Ordering Information

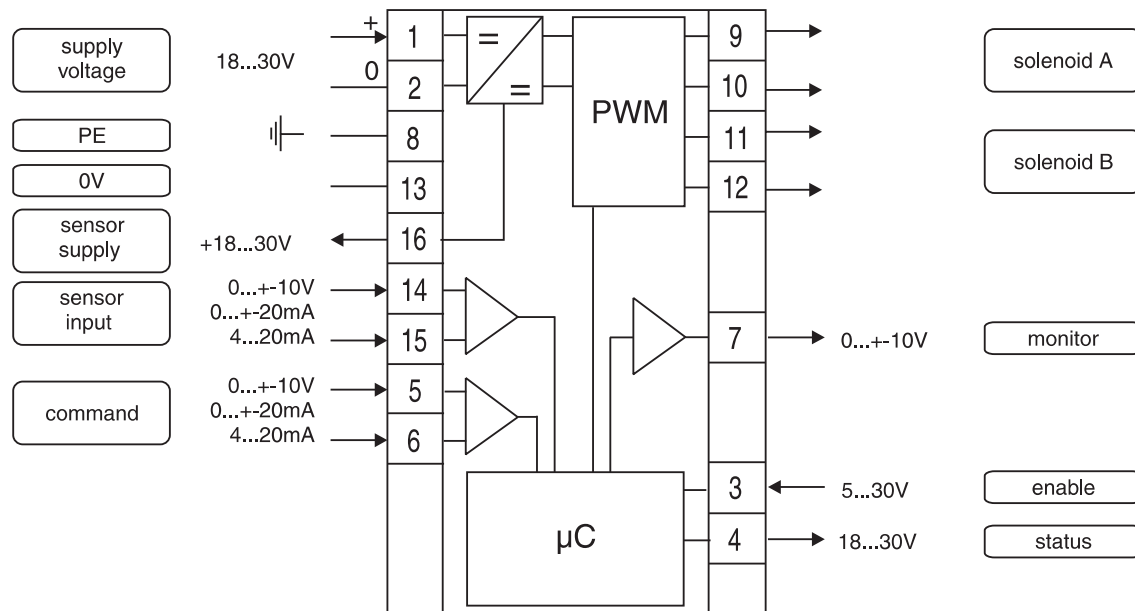


Specifications

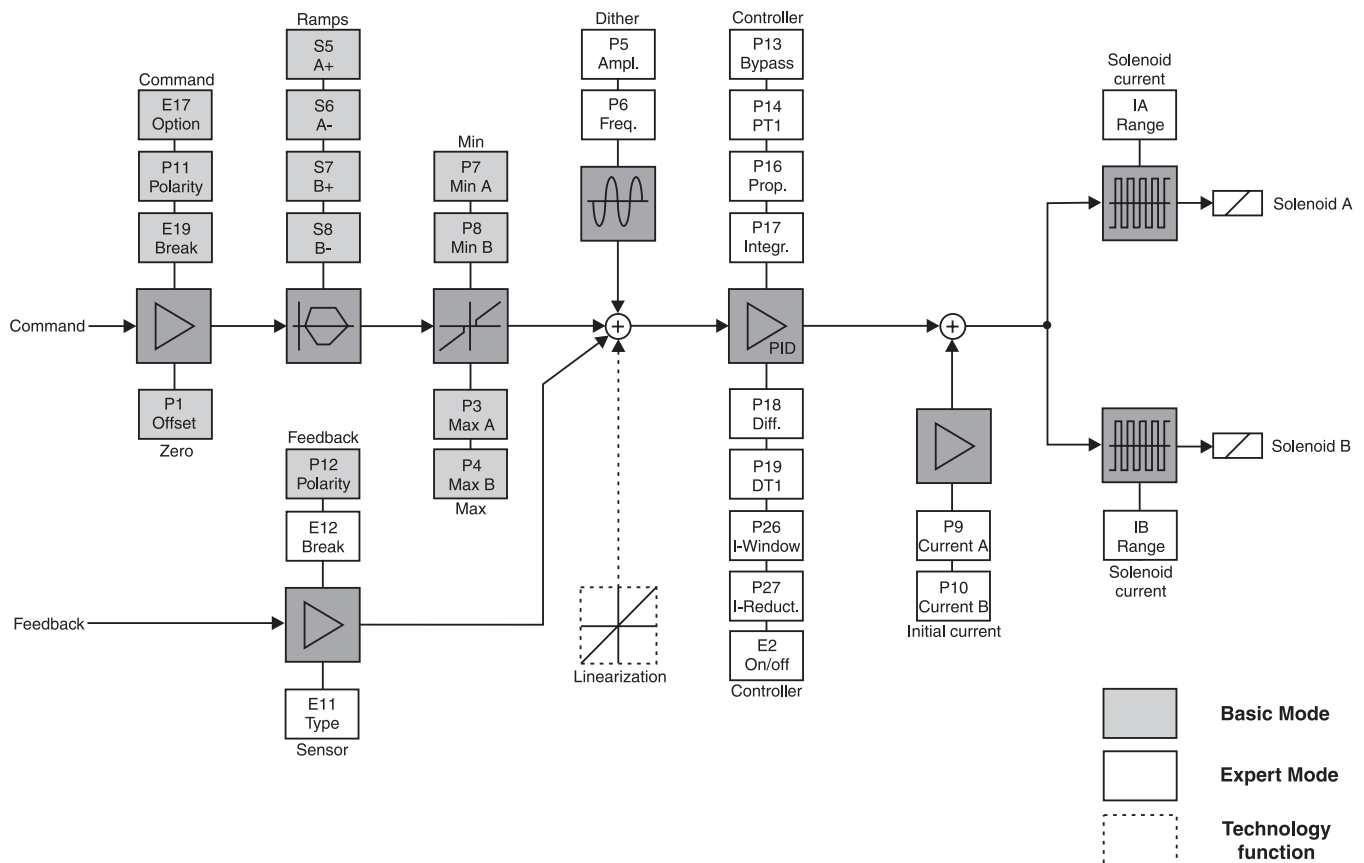
D

General			
Model	Module package for snap-on mounting on EN 50022 rail	Mounting Position	Any
Package Material	Polycarbonate	Ambient Temperature Range	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	Protection Class	IP 20 acc. DIN 40050
Electrical			
Duty Ratio	100%	Status Signal	Off – 0 to 0.5 VDC; On – Supply Voltage; rated max. 15 mA
Supply Voltage	18 VDC to 30 VDC, ripple < 5% eff., surge free	Monitor Signal	+10 to 0 to -10 VDC, rated max. 5 mA, signal resolution 0.4%
Switch-on Current Typ.	22A for 0.2 mS	Adjustment Ranges	Minimum 0 to 50%
Current Consumption Max.	2.0A		Maximum 50 to 100%
Pre-fusing	2.5A medium lag		Ramp Time 0 to 32.5 s
Command Signal	+10 to 0 to -10 VDC, ripple < 0.01 % eff., surge free, Ri = 100K ohm		Zero Offset +100 to -100%
	+20 to 0 to -20 mA, ripple < 0.01 % eff., surge free, Ri = 200 Ohm		Current 1.3/2.7/3.5 A
	4 to 12 to 20 mA, ripple < 0.01 % eff., surge free, Ri = 200 Ohm		Initial Current 0 to 25%
Input Signal Resolution	0.025%	Interface	RS 232C, DSub 9p. male for null modem cable
		EMC	EN 50081-2, EN 50082-2
		Connection	Screw terminals 0.2 to 2.5 mm ² , plug-in
Differential Input Voltage Max.	30V for terminals 5 and 6 against PE (terminal 8)	Cable Specification	16 AWG overall braid shield for supply voltage and solenoids 20 AWG overall braid shield for sensor and signal
Enable Signal	Off – 0 to 2.5 VDC On – 5 to 30 VDC; Ri = 30K ohm	Cable Length	50m (164 ft.)
Options			
Technology Function	Code 1 – Software adjustable transfer function with 10 compensation points for linearization of valve behavior.		

Block Diagram — Wiring



Signal Flow Diagram



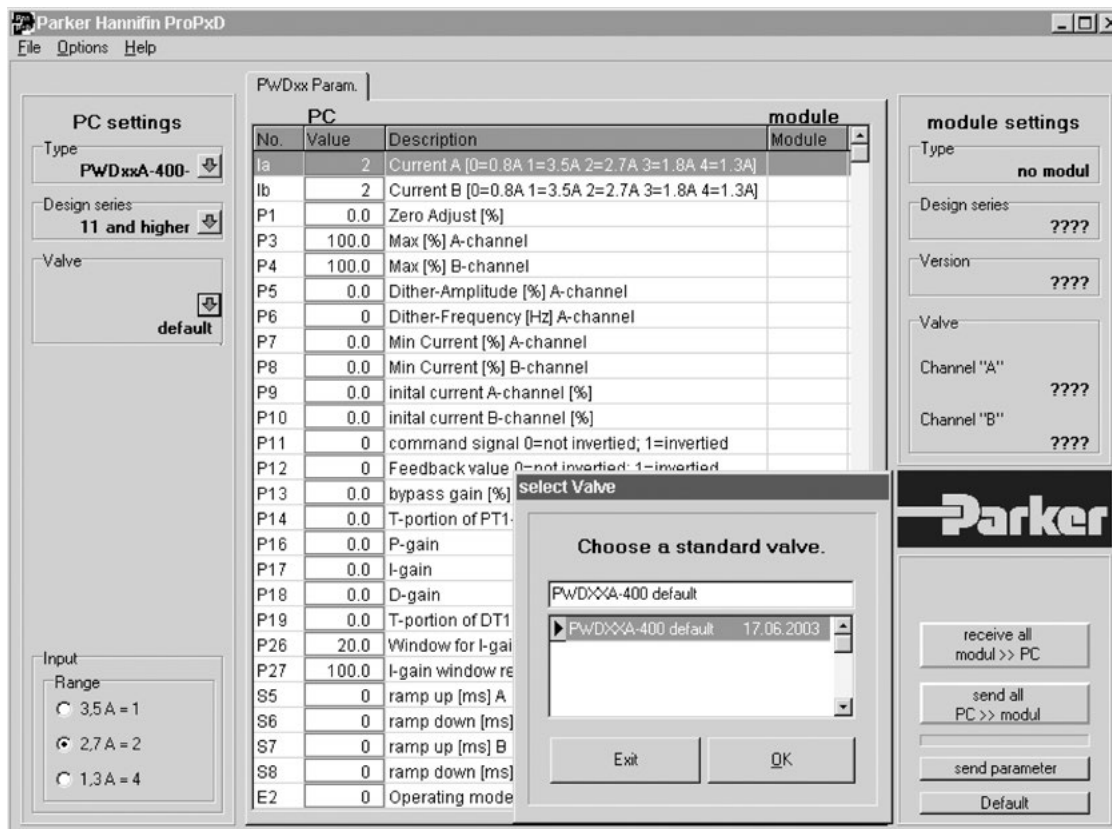
ProPxD Interface Program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

- User-friendly editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronic via serial interface RS-232 and null modem cable.
- Simple to use interface program. Download free of charge www.parker.com/euro_hcd → **Services** → **downloads**



General Description

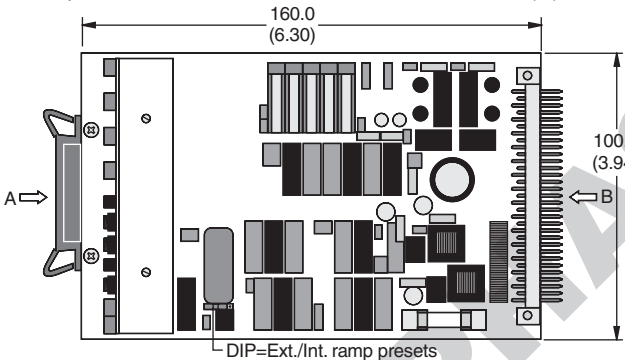
Series EW*104 electronic module is used to control pilot operated D**FS proportional directional valves with main stage spool position feedback. The module accepts a ± 10 volt command signal where spool position is controlled by a closed loop PID circuit on the module.

Features

- Spool overlap range can be manipulated with MIN potentiometer, adjustable by feeding a constant set value of 0.2V.
- MAX limiting of spool stroke with full set value range. Can be set up after MIN has been set and feeding a constant set value of 10V.
- DIP-switch from internal ramp generation to external ramp supply.
- Pulsed low-loss amplifier power stage with supporting constant current control for consistent temperature-independent solenoid forces.
- Dither generator with applied frequency to improve static characteristics.
- Diagnosis of spool stroke by means of measuring sockets as well as LEDs for indicating working conditions.

Dimensions

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



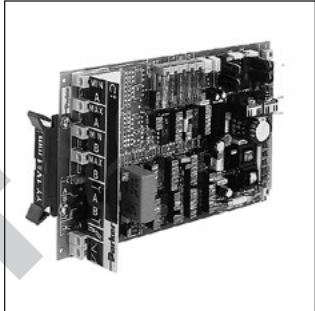
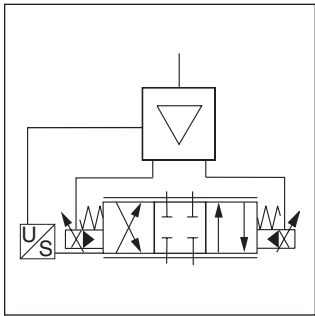
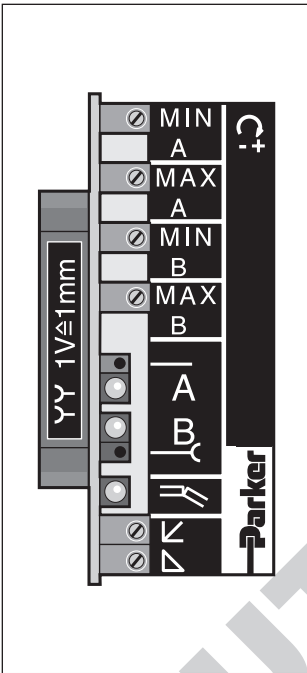
For new applications:
EW*104: Refer to PWDXXA-400

Ordering Information

EW				104	
Electronic Module		Size		Module Type	Design Series
Directional Valve					
Code	Valve Size	Mounting Pattern	Valve Spool Stroke	Code	Description
10	D31FS	NG10	± 5.0 mm (0.20 in.)	104	Amplifier, adjustable, MIN/MAX-limiting Up/Down ramps
16	D41FS	NG16	± 6.0 mm (0.24 in.)		
25	D81FS	NG25	± 9.3 mm (0.37 in.)		
26	D91FS	NG25	± 9.3 mm (0.37 in.)		
32	D111FS	NG32	± 15.0 mm (0.59 in.)		

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

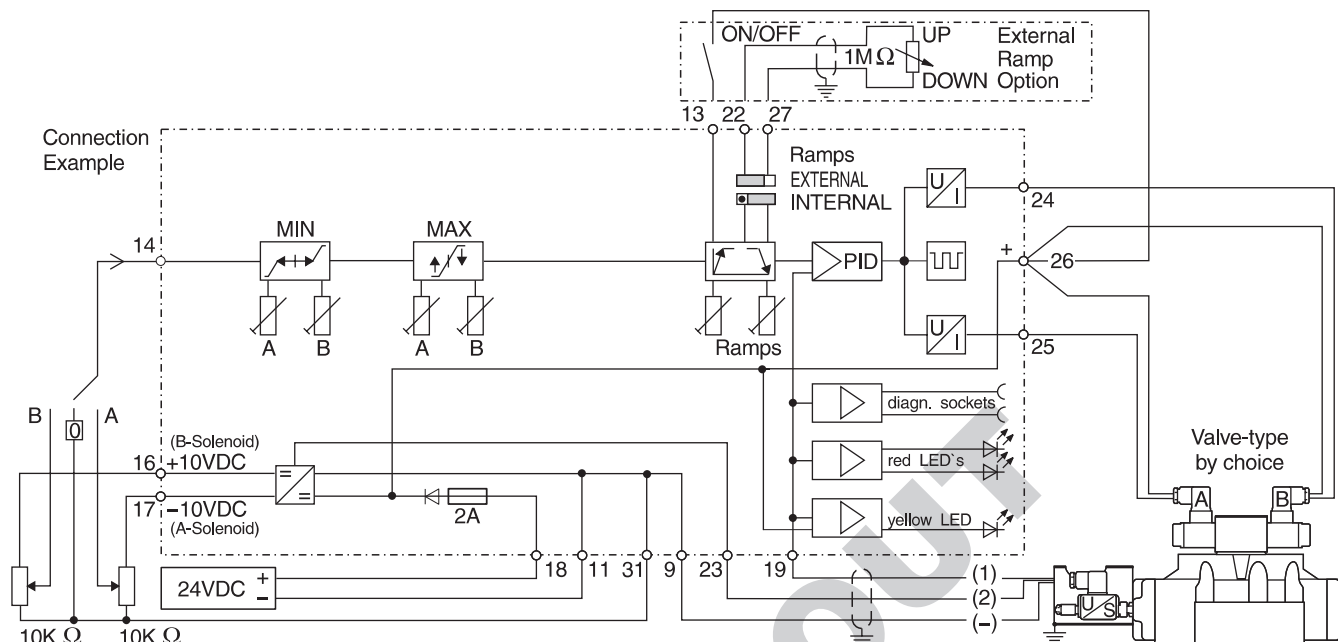
D01_Cat2550.indd, ddp, 06/21



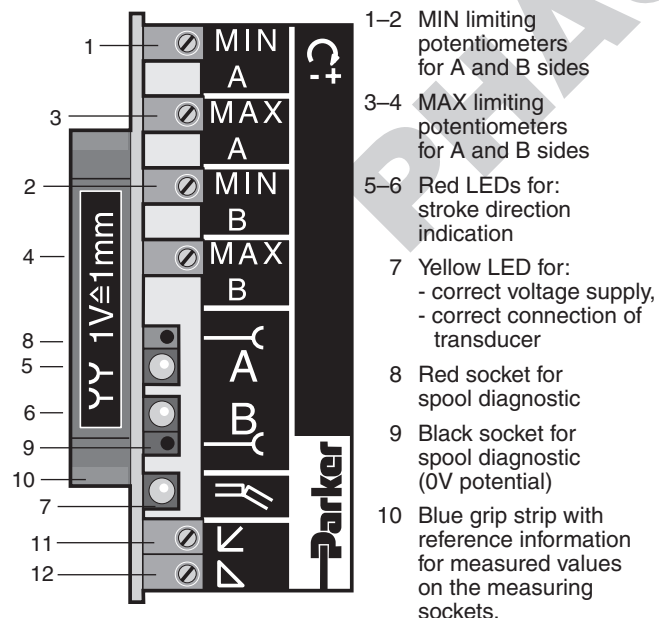
Specifications

Connection	31 Pole Male Connector, DIN 41617
Power Supply	Regulated: 18-26V Unregulated: 22-38V
Command Signal	0 to +10 VDC and 0 to -10 VDC
Input Select Voltage	5 to 30 VDC
Power Required	40 VA
Reference Outputs	± 10 VDC @10 mA
Max. Solenoid Output Current	1.3A
Ambient Temp. Range	0°C to +70°C (+32°F to +158°F), Standard Range
Ramps	0 to 5 seconds adjustable
Shielded Cable Connection	Supply connections + valve: 1.5 sq. mm (16 AWG) Transducer + Command Signals: 0.5 sq. mm (20 AWG)
Fuse	2A medium lag, DIN 41571/5x20 mm

Block Diagram — Wiring



Operating and Diagnostic Elements (Elevation A)

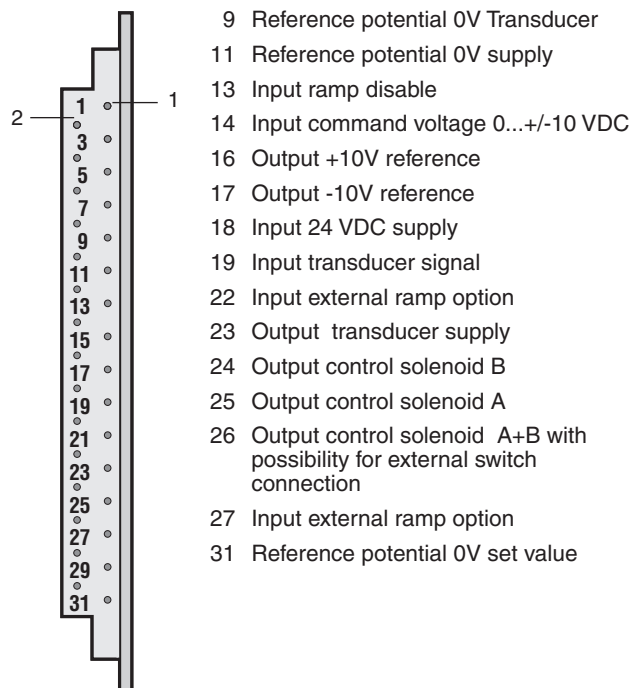


Notes:

- Turn off the electrical power to this board whenever the hydraulic supply to the valve is not on.
- Always turn off the power to this board before removing it from the card holder.

- 1-2 MIN limiting potentiometers for A and B sides
- 3-4 MAX limiting potentiometers for A and B sides
- 5-6 Red LEDs for: stroke direction indication
- 7 Yellow LED for:
 - correct voltage supply,
 - correct connection of transducer
- 8 Red socket for spool diagnostic
- 9 Black socket for spool diagnostic (0V potential)
- 10 Blue grip strip with reference information for measured values on the measuring sockets.
- 11 UP ramp potentiometer
- 12 DOWN ramp potentiometer

Connector (Elevation B)



General Description

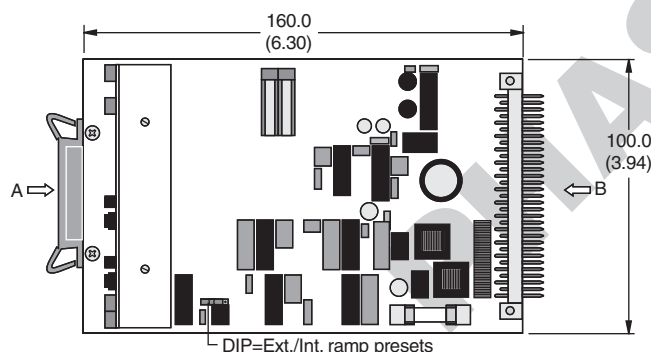
Series ED00104 electronic module is used to control DSA/DWE/DWU pressure control valves. The module accepts a 0 to 10 volt command signal, and produces a proportionally linear output current used to drive the valve's proportional solenoid. Two ramp adjustments provide smooth transition between selected pressures. Note that the linearity of the valve itself determines the linearity of the system. Refer to the specific valve data for actual linearity performance.

Features

- Processing and amplification of the externally supplied positive set-values into output signals for the control solenoid.
- Can be combined with PZD00A-400 or external programmable control.
- DIP switch from internal ramp generation to external ramp setting.
- MIN/MAX limiters for matching the working range to the full set value range.
- Pulsed low-loss amplifier power stage with supporting constant current control for consistent, temperature-independent, solenoid forces.
- Dither generator with applied frequency to improve static characteristics.
- Diagnosis by means of diagnostic sockets as well as LEDs for indicating working conditions.

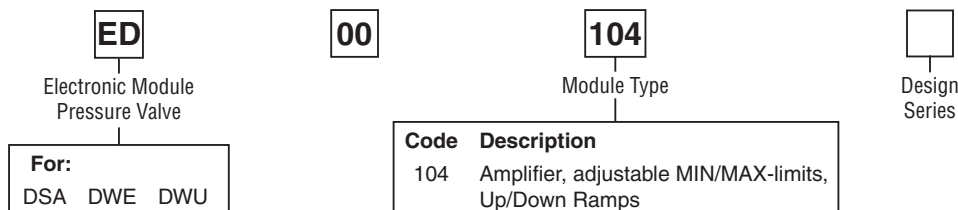
Dimensions

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



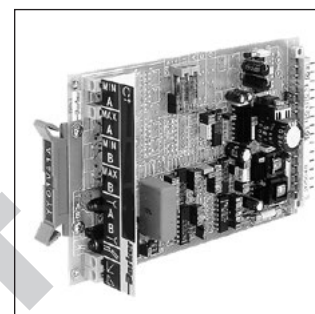
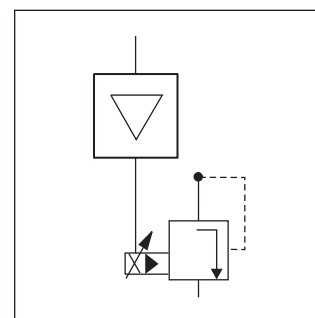
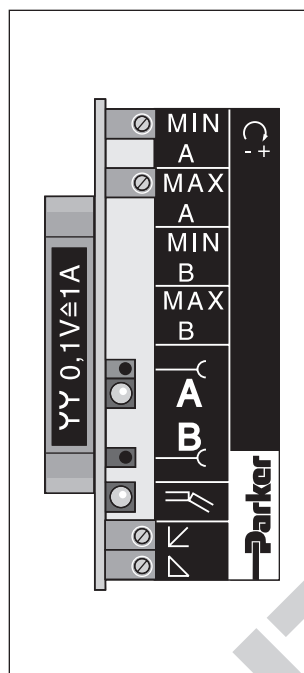
For new applications:
ED00104: Refer to PCD00A-400

Ordering Information



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

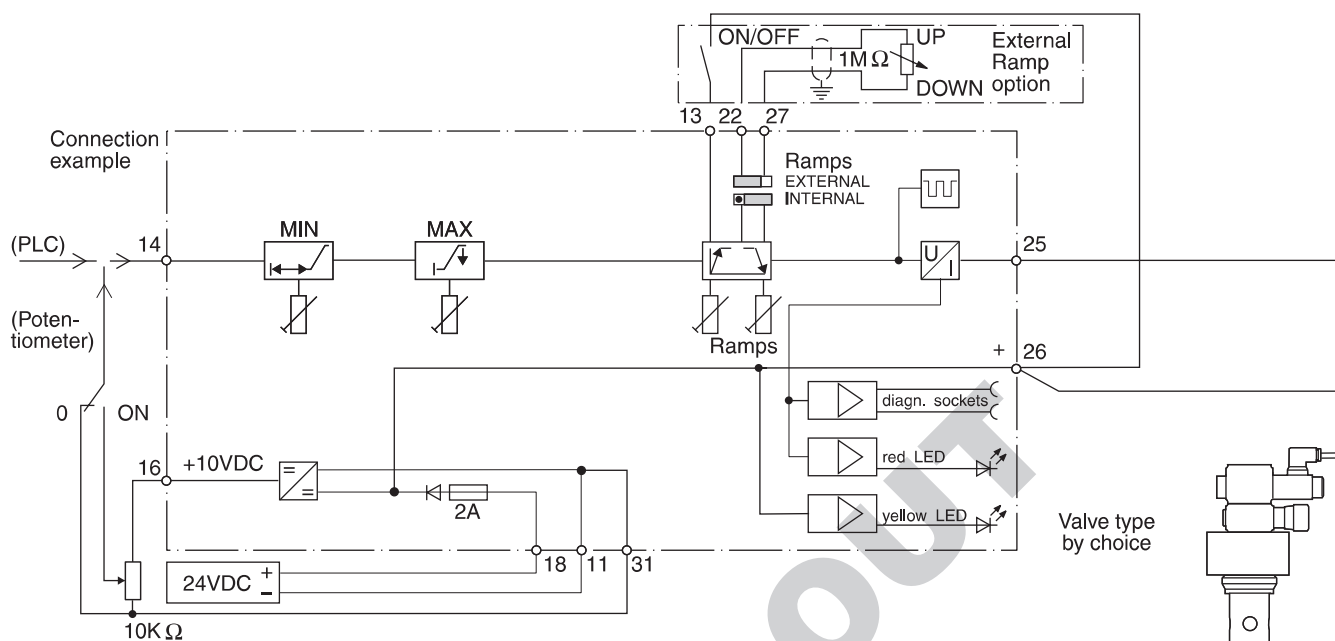
D01_Cat2550.indd, ddp, 06/21



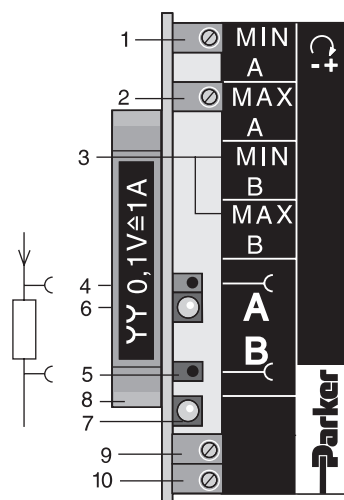
Specifications

Connection	31 Pole Male Connector, DIN 41617
Power Supply	Regulated: 18-26V Unregulated: 22-38V
Command Signal	0 to +10 VDC and 0 to -10 VDC
Input Select Voltage	5 to 30 VDC
Power Required	40 VA
Reference Outputs	+10 VDC 10 mA
Max. Solenoid Output Current	1.3A with set value 10V
Ambient Temp. Range	0°C to +70°C (+32°F to +158°F), Standard Range
Ramps	0 to 5 seconds adjustable
Shielded Cable Connection	Supply connections + valve: 1.5 sq. mm (16 AWG) Command Signals: 0.5 sq. mm (20 AWG)
Fuse	2A medium lag, DIN 41571/5x20 mm

Block Diagram — Wiring



Operating and Diagnostic Elements (Elevation A)



- 1 MIN-limiting for matching the lowest pressure
- 2 MAX-limiting for matching the highest pressure
- 3 Not used
- 4 Red socket for current diagnostic
- 5 Black socket for current diagnostic
- 6 Red LED (A) for:
- function indicator control solenoid
- (B unused here)
- 7 Yellow LED for:
- correct voltage supply
- 8 Red grip strip with reference information for measured values on the diagnostic sockets
- 9 UP ramp potentiometer
- 10 Down ramp potentiometer

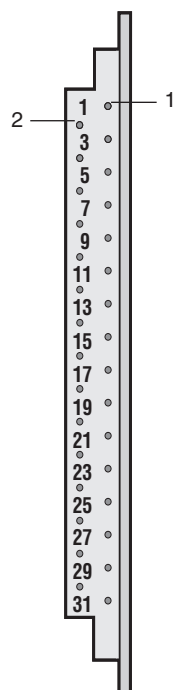
Notes:

● Turn off the electrical power to this board whenever the hydraulic supply to the valve is not on.

● Always turn off the power to this board before removing it from the card holder.

Only potential-free measuring equipment to be used

Connector (Elevation B)



- 11 Reference potential 0V supply
- 13 Input ramp disable
- 14 Input command voltage 0 to +10 VDC
- 16 Output +10V reference
- 18 Input 24 VDC supply
- 22 Input external ramp option
- 25 Output control solenoid
- 26 Output control solenoid
- 27 Input external ramp option
- 31 Reference potential 0V set value

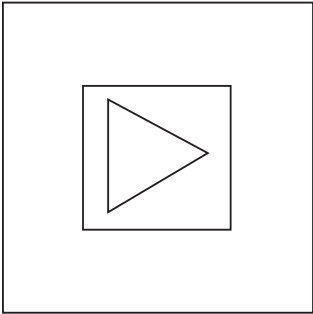
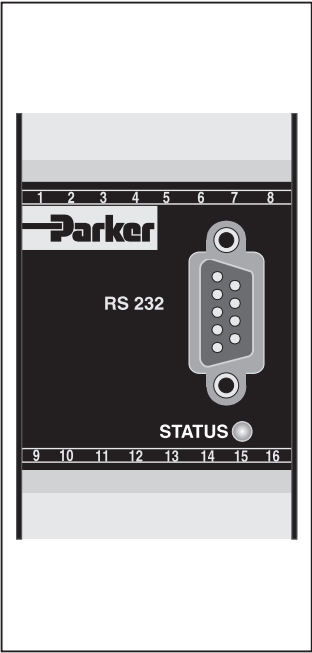
General Description

Series PCD00A-400 electronic module for driving proportional pressure control and proportional throttle valves is compact and easy to install with DIN rail mounting and plug-in terminals. The module is designed to drive two coils independent of each other. The digital design allows for programmable parameters such as solenoid drive current, mins, maxs, ramps and setpoints. The module provides flexibility and repeatability from unit to unit. The module parameters are programmed with an RS-232 interface and user friendly software (ProPxD) with default values for standard valves.

The PCD00A-400 module contains the functions required by typical pressure control and throttle valve applications (series RE*W, PE*W, DSAE, VBY, VMY, TDA, and TEA valves).

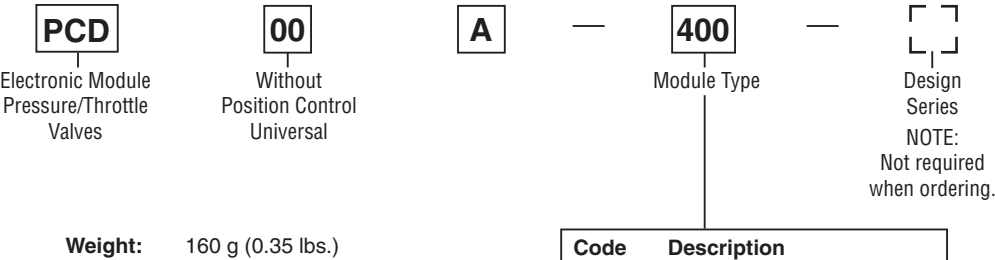
Features

- Two independent valve drivers.
- Ramps, Setpoints, Mins, Maxs.
- 5 output current selections.
- Programmable parameters.
- RS-232 Interface.



- User friendly programming software.
- Plug-in terminals.
- Compliant with European EMC Standards.

Ordering Information



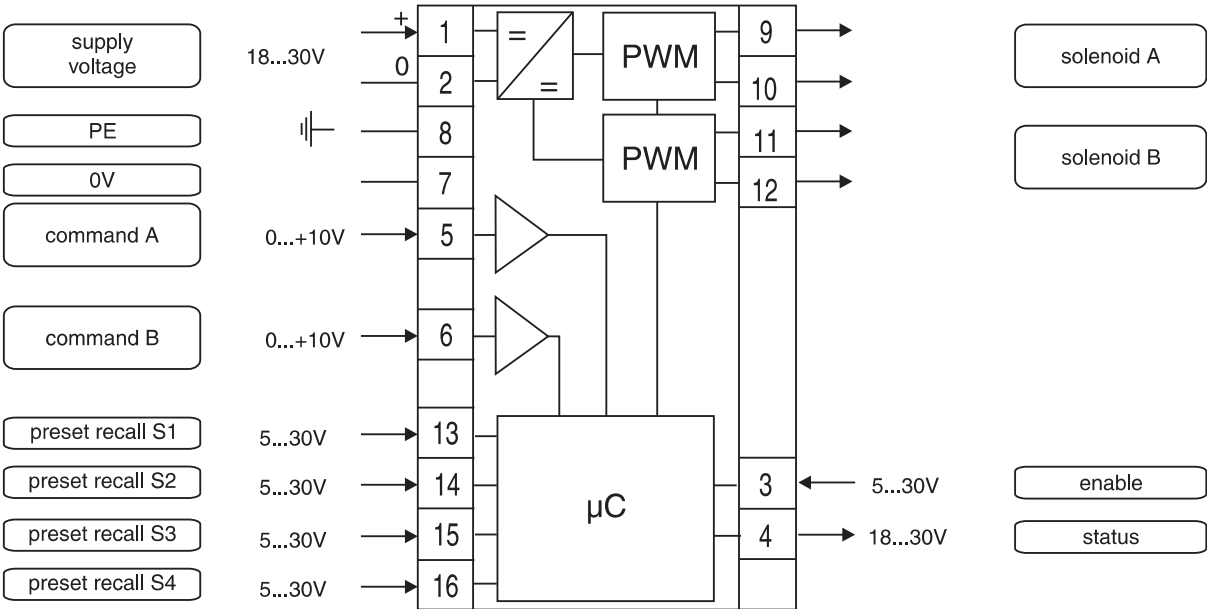
Code	Description
400	2 Amplifiers, MIN/MAX-adjustment, UP/DOWN ramps, Command inputs, 4 Command signal presets

WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.
D01_Cat2550.indd, ddp, 06/21

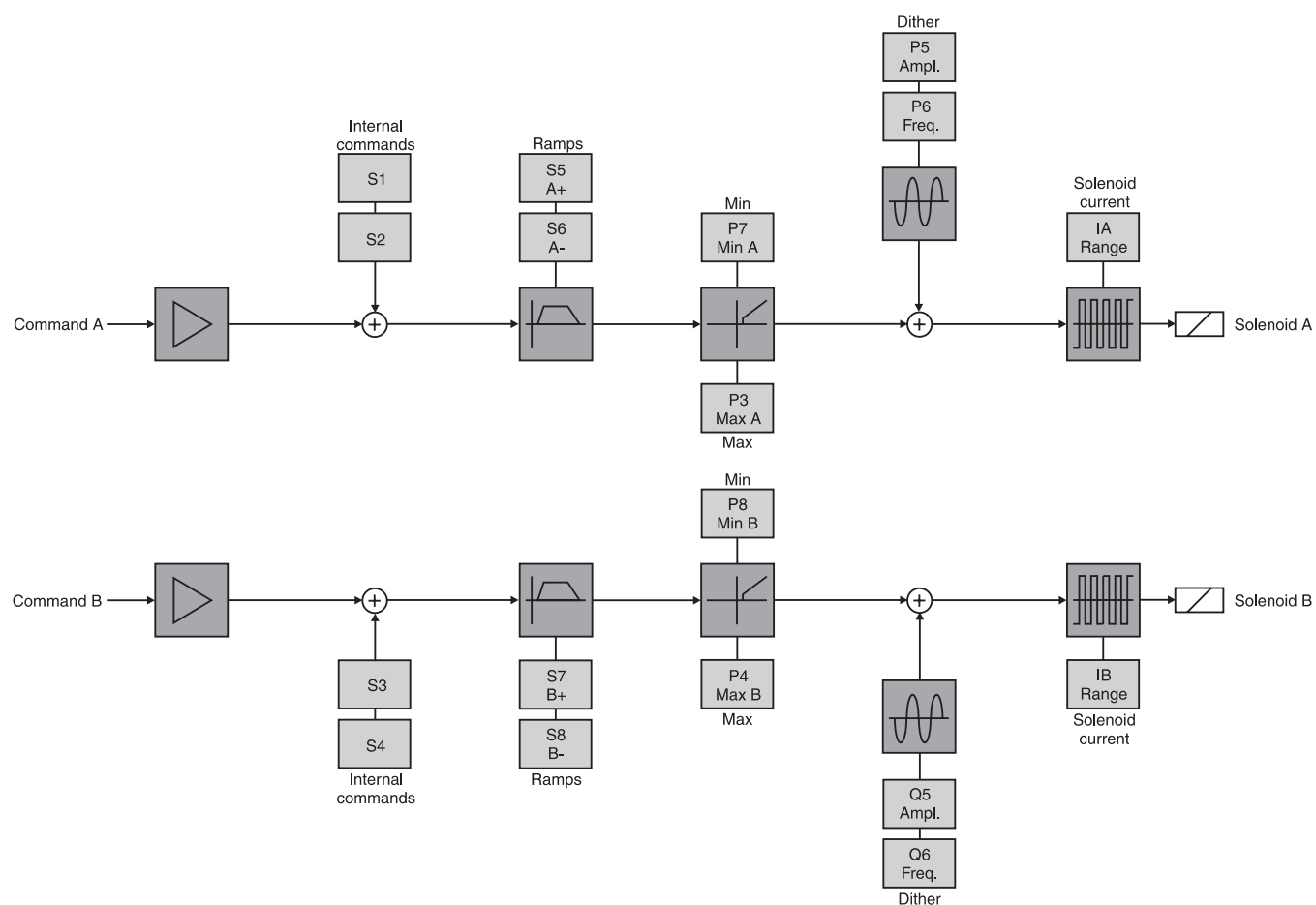
Specifications

General			
Model	Module package for snap-on mounting on EN 50022 rail	Mounting Position	Any
Package Material	Polycarbonate	Ambient Temperature Range	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	Protection Class	IP 20 acc. DIN 40050
Electrical			
Duty Ratio	100%	Status Signal	Off – 0 to 0.5 VDC; On – Us; rated max. 15 mA
Supply Voltage	18 VDC to 30 VDC, ripple < 5% eff., surge free* (29 VDC to 30 VDC for 24 V coils)	Adjustment Ranges	preset 0 to 50% 0 to 1000 50 to 100% 0 to 1000 0 to 32.5 s 0 to 32.5 0.8/3.5/2.7/1.8/1.3 A 0/1/2/3/4/5
Switch-on Current Typ.	22A for 0.2 mS		
Current Consumption Max.	5.0A		
Pre-fusing	6.3A medium lag		
Command Signal	0 to +10 VDC, ripple < 0.01 % eff., surge free, Ri = 150K ohm	Interface	RS 232C, DSub 9p. male for null modem cable
Input Signal Resolution	0.025%	EMC	EN 50081-2, EN 50082-2
Differential Input Voltage Max.	30V for terminals 5 and 6 against PE (terminal 8)	Connection	Screw terminals 0.2 to 2.5 mm², plug-in
Enable Signal	Off – 0 to 5.0 VDC; On – 8.5 to 30 VDC; Ri = 30K ohm	Cable Specification	16 AWG overall braid shield for supply voltage and solenoids 20 AWG overall braid shield for sensor and signal
Channel Recall Signal	Off – 0 to 5.0 VDC; On – 8.5 to 30 VDC; Ri = 30K ohm		
		Cable Length	50m (164 ft.)

Block Diagram — Wiring

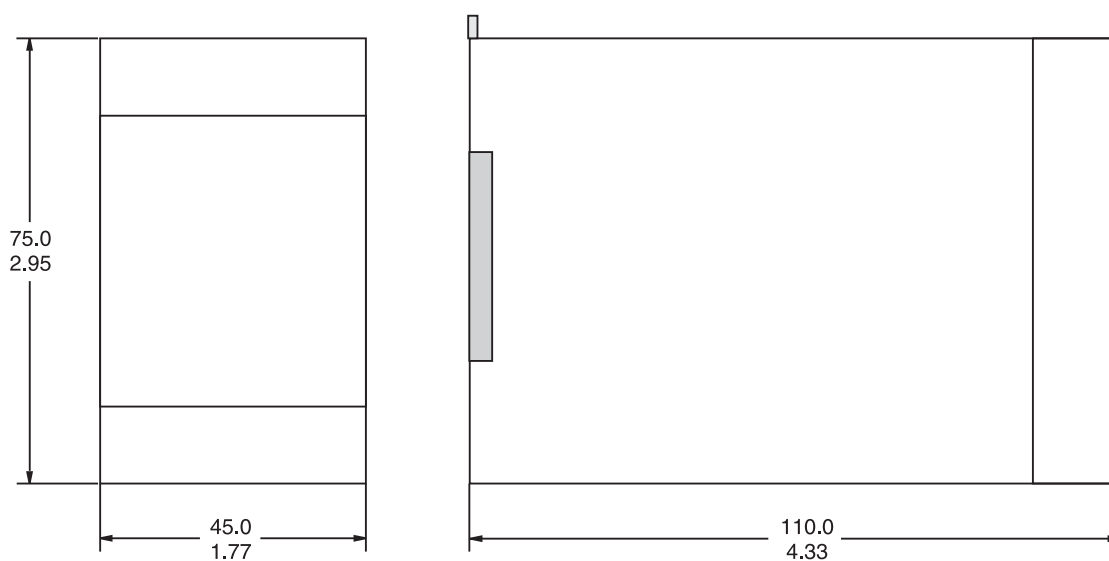


Signal Flow Diagram



Dimensions

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



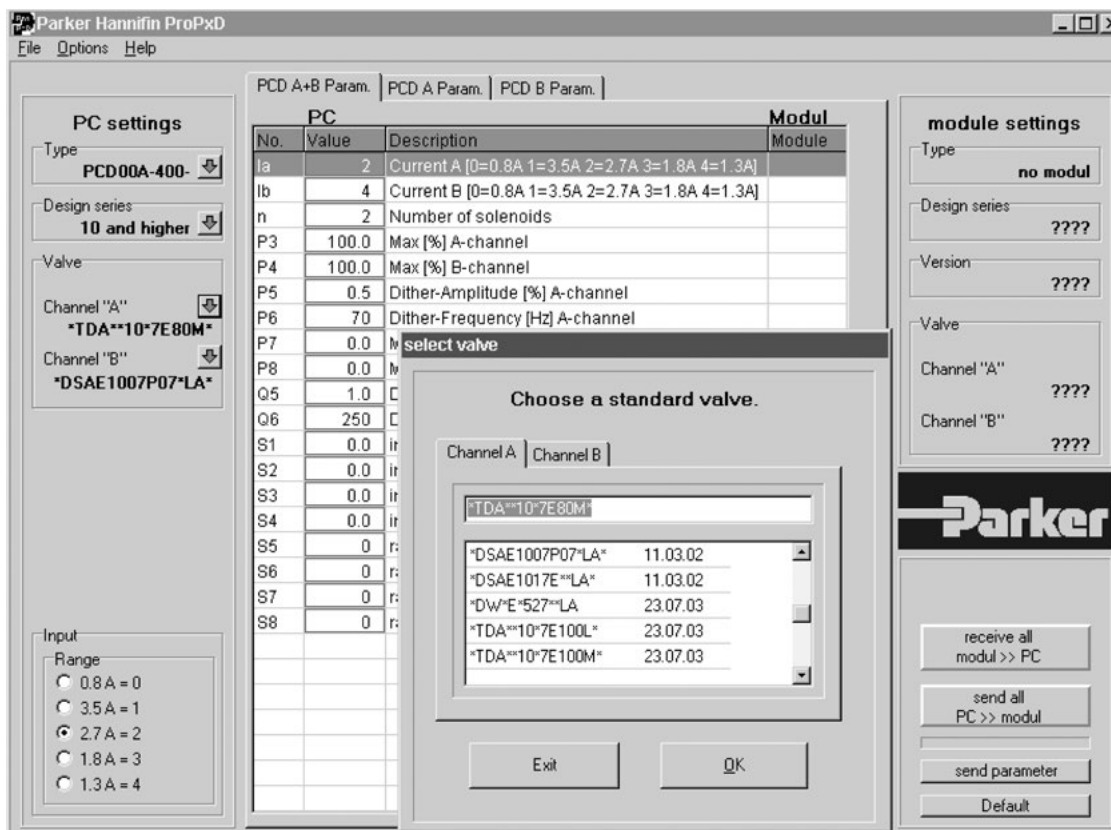
ProPxD Interface Program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

- User-friendly editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronic via serial interface RS-232 and null modem cable.
- Simple to use interface program. Download free of charge www.parker.com/euro_hcd → **Services** → **downloads**



General Description

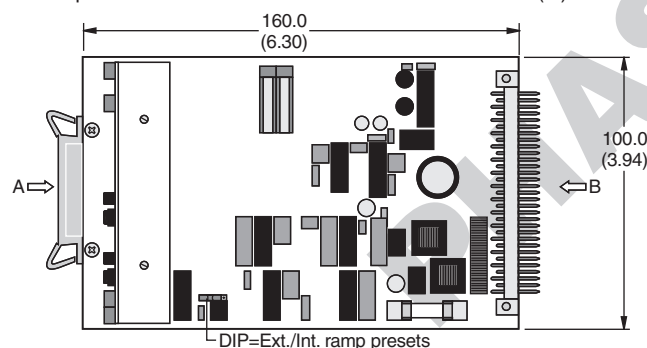
Series ET*104 electronic module is used to control TDA and TEA proportional throttle valves configured with the 'L' solenoid option. For valves configured with the 'M' solenoid option, refer to driver card PCD00A-400. The module accepts a 0 to 10 volt command signal, and produces a proportionally linear output current used to drive the valve's proportional solenoid. Note that the linearity of the valve itself determines the linearity of the system. Refer to the specific valve data for actual linearity performance. Two ramp adjustments provide control of actuator acceleration and deceleration.

Features

- Processing and amplification of the externally supplied positive set-values into output signals for the control solenoid.
- Can be combined with PZD00A-400 or external programmable control.
- DIP switch from internal ramp generation to external ramp setting.
- MIN/MAX limiters for matching the working range to the full set value range.
- Pulsed low-loss amplifier power stage with supporting constant current control for constant, temperature-independent, solenoid forces.
- Dither generator with applied frequency to improve static characteristics.
- Diagnosis by means of diagnostic sockets as well as LEDs for indicating working conditions.

Dimensions

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



**For new applications:
 ET*104: Refer to PCD00A-400**

Ordering Information

ET
 Electronic Module
 Pressure Valve

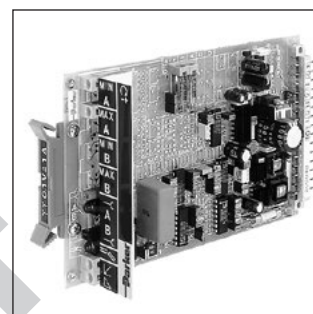
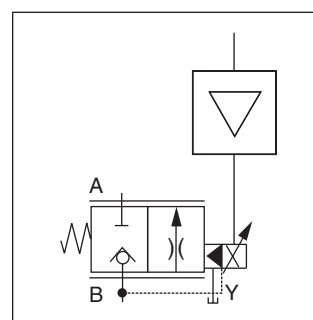
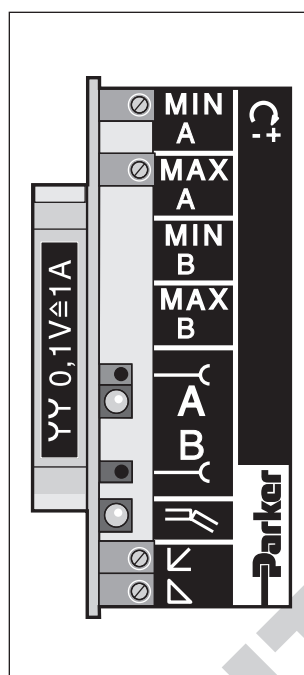
Size

Code	Valve	Sol.
00	TDA...LAF E16 to E50	35mm
00	TEA...LAF E16 to E50	35mm
99	TDA...LAF E63 to E100	60mm
99	TEA...LAF E63 to E100	60mm

104
 Module Type

Design Series

Code	Description
104	Amplifier, adjustable MIN/MAX limits, UP/DOWN ramps for valves with 'L' solenoid option



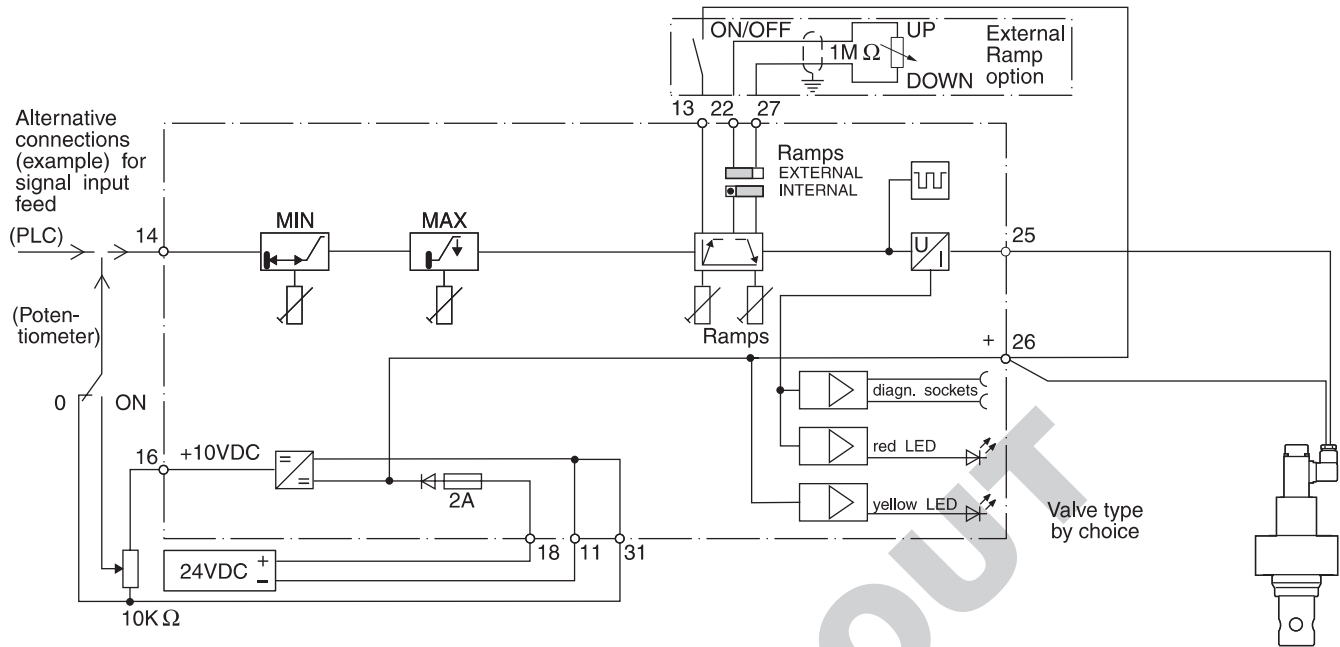
Specifications

Connection	31 Pole Male Connector, DIN 41617
Power Supply	Regulated: 18-26V Unregulated: 22-38V
Power Required	40 VA
Command Signal	0 to +10 VDC
Input Select Voltage	5 to 30 VDC
Reference Outputs	+10 VDC 10 mA
Max. Solenoid Output Current	1.05A with set value 10V
Ambient Temp. Range	0°C to +70°C (+32°F to +158°F), Standard Range
Ramps	0 to 5 seconds adjustable
Shielded Cable Connection	Supply connections + valve: 1.5 sq. mm (16 AWG) Command Signals: 0.5 sq. mm (20 AWG)
Fuse	2A medium lag, DIN 41571/5x20 mm

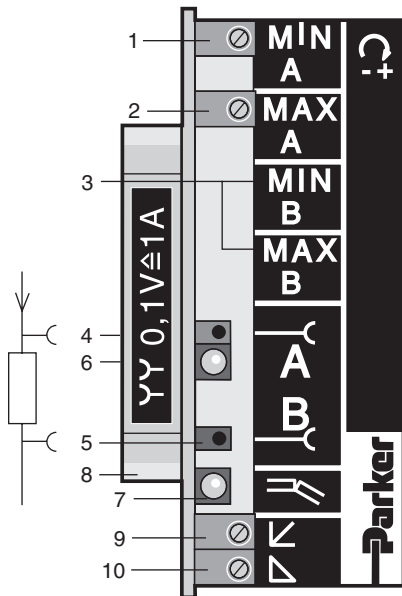
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information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

D01_Cat2550.indd, ddp, 06/21

Block Diagram — Wiring



Operating and Diagnostic Elements (Elevation A)



Notes:

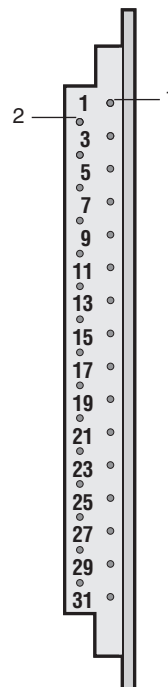
● Turn off the electrical power to this board whenever the hydraulic supply to the valve is not on.

● Always turn off the power to this board before removing it from the card holder.

- 1 MIN limiter for matching the smallest throttle aperture
- 2 MAX limiter for matching the largest throttle aperture
- 3 not used
- 4 Red socket for current diagnostic
- 5 Black socket for current diagnostic
- 6 Red LED (A) for:
 - function indicator control solenoid
 - (B not used)
- 7 Yellow LED for:
 - correct voltage supply
- 8 Green grip strip with reference information for measured values
- 9 UP ramp potentiometer
- 10 DOWN ramp potentiometer

Only potential-free measuring equipment to be used

Connector (Elevation B)



- 11 Reference potential 0V supply
- 13 Input ramp disable
- 14 Input command voltage 0...+10 VDC
- 16 Output +10V reference
- 18 Input 24 VDC supply
- 22 Input external ramp option
- 25 Output control solenoid
- 26 Output control solenoid
- 27 Input external ramp option
- 31 Reference potential 0V set value

General Description

Series BD101 is an accessory card designed to solve a variety of common system problems. It is available in both ± 15 VDC and 24 VDC versions.

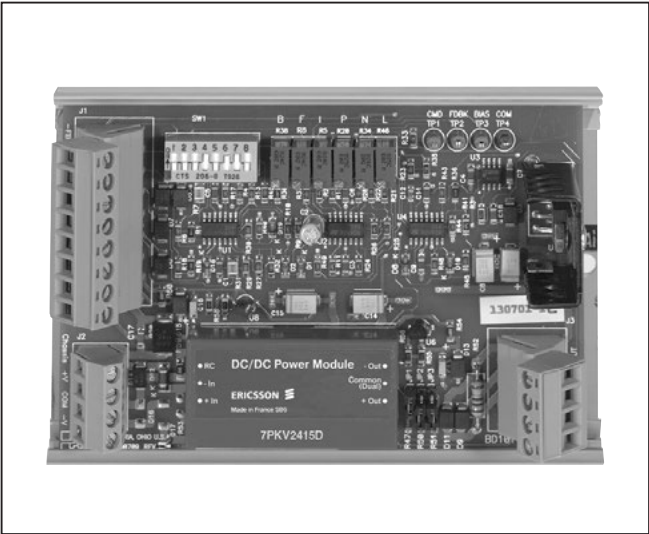
This card can function as a current driver for the BD servo valves. Maximum current outputs of ± 30 mA, ± 60 mA, ± 100 mA and ± 150 mA are jumper configurable.

Closed loop options are switch selectable with integral and proportional control. Feedback scaling, input bias, and gain adjustments are provided. Outputs currents up to ± 150 mA or voltage output of ± 10 VDC are available.

Current command of ± 20 mA can be converted to ± 10 VDC.

Features

- Open loop current driver for up to ± 150 mA.
- ± 20 mA input to ± 10 VDC output option.
- Closed loop option with proportional and/or integral control.
- ± 10 VDC reference voltages available.
- Available in ± 15 VDC and +24 VDC versions.
- Differential inputs provide better noise immunity.
- Scaling and bias available on input signals.



Specifications

Power Supply Input	BD101-15 ± 15 VDC @ 200 mA BD101-24 24 VDC Nominal (22-28 VDC) @ 250 mA
CMD and FDBK Inputs Voltage	Differential Inputs ± 10 VDC max. 100K ohm input impedance
Current	± 20 mA max switch configurable 499 ohm input impedance
Reference Voltages	± 10 VDC @ 10 mA
Current Output	± 30 mA, ± 60 mA, ± 100 mA, or ± 150 mA Fixed up to ± 150 mA Adjustable Icoil Rcoil ≤ 12.5 V
Voltage Output	± 10 VDC @ 10 mA 1000 ohm output impedance
Operating Temperature Range (Ambient)	BD101-15: 0°C to 70°C (32°F to 158°F) BD101-24: 0°C to 70°C (32°F to 158°F) (≤ 100 mA load) 0°C to 55°C (32°F to 131°F) (> 100 mA load)
Size	82.6mm (3.25") wide x 127mm (5.00") long x 38.1mm (1.5") high
Mounting	Snap-Trac Parker PN 830007-5.25

 **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.
D01_Cat2550.indd, ddp, 06/21



Ordering Information

BD
 Signal
 Conditional
 Card

101
 Style


 Power Supply

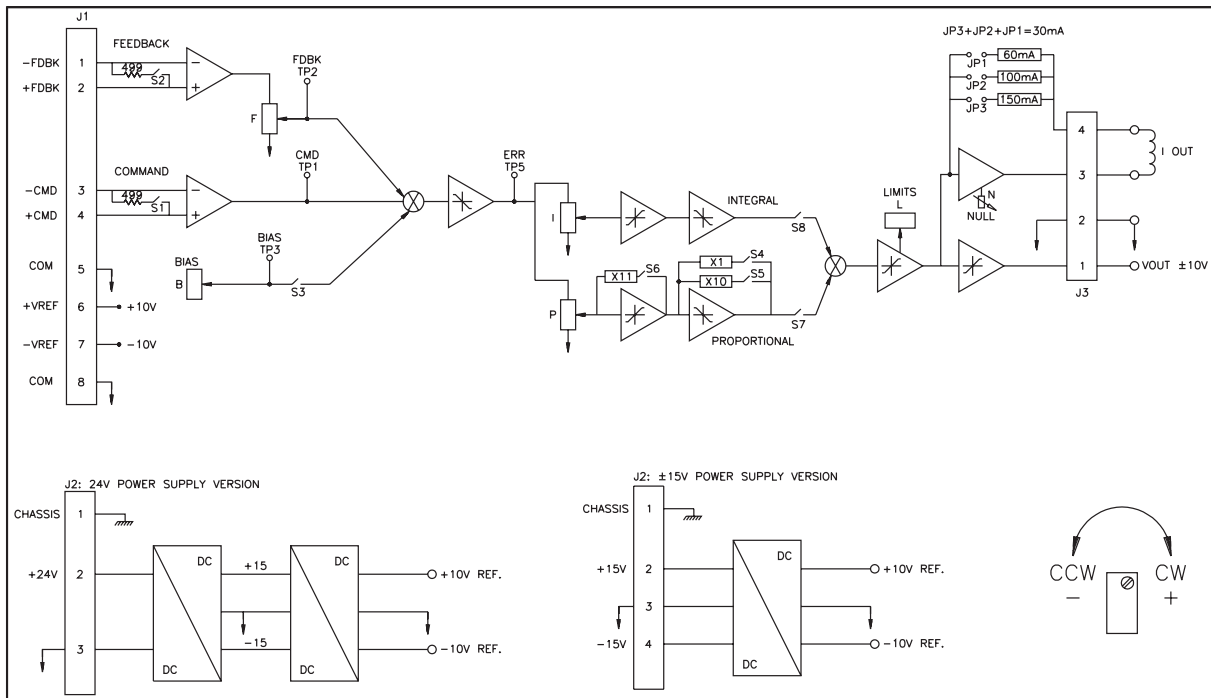

 Design
 Series

NOTE:
 Not required
 when ordering.

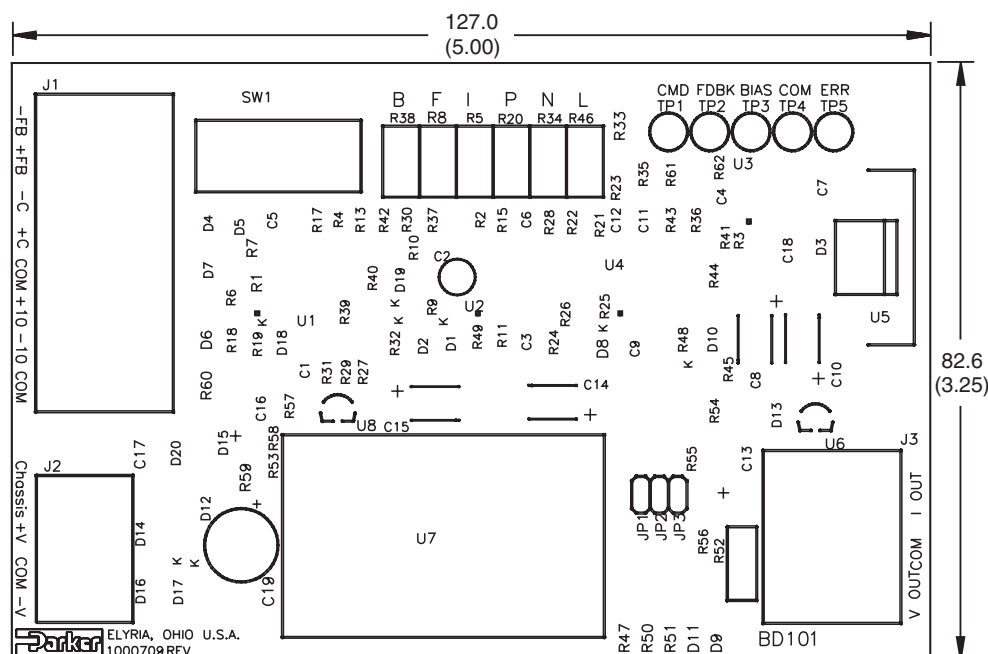
Code	Description
15	±15 VDC @ 200 mA
24	24 VDC nominal

Note: Snap-Trac is included with delivery

Block Diagram — Wiring



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



D01_Cat2550.indd, ddp, 06/21

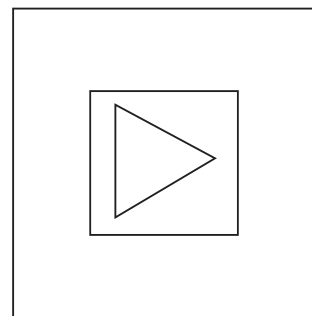
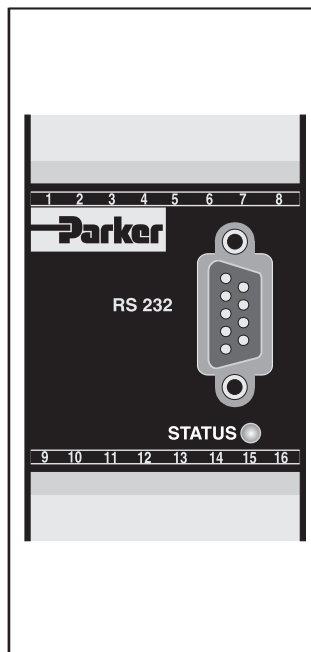
General Description

Parker electronic modules PID00A-40* for rail mounting are compact, easy to install and provide time saving wiring by disconnectable terminals. The digital design of the circuit results in good accuracy and optimal adaption for closed loop controls by a comfortable interface program.

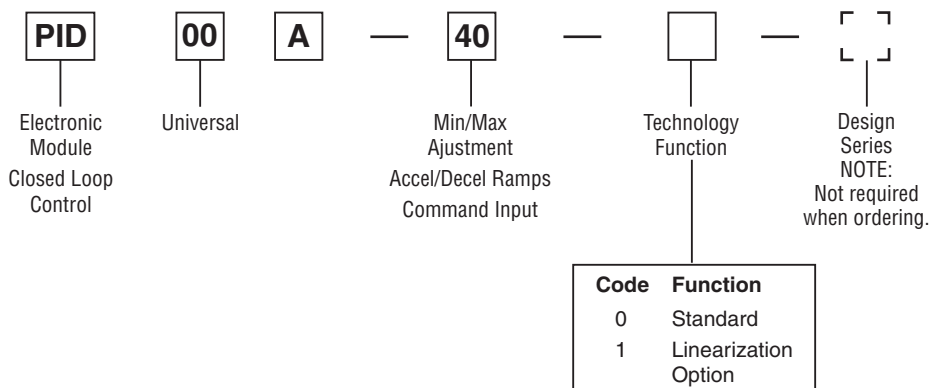
Features

The described electronic unit combines all necessary functions for the optimal operation of closed loop controls. The most important features are:

- Extended PID controls.
- Speed control with position feedback.
- Differential input stage with different signal options.
- Output stage with different output options.
- Four-quadrant ramp function.
- Status indicator.
- Digital circuit design.
- Parametering by serial interface RS-232.
- Connection by disconnectable terminals.
- Compatible to the relevant European EMC standards.
- Optional technology function "linearization"
- Simple to use interface program.



Ordering Information



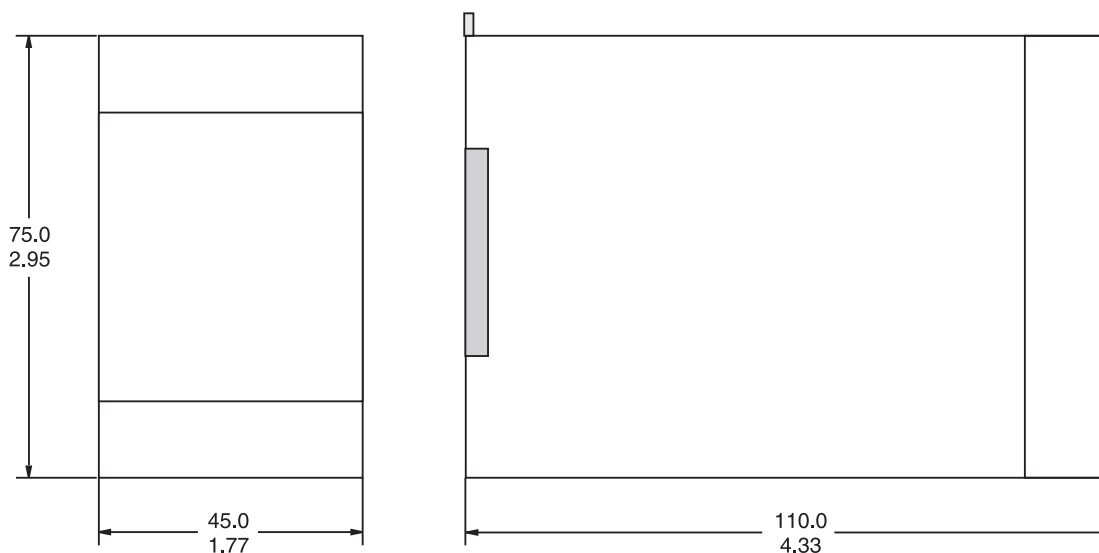
WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.
D01_Cat2550.indd, ddp, 06/21

Specifications

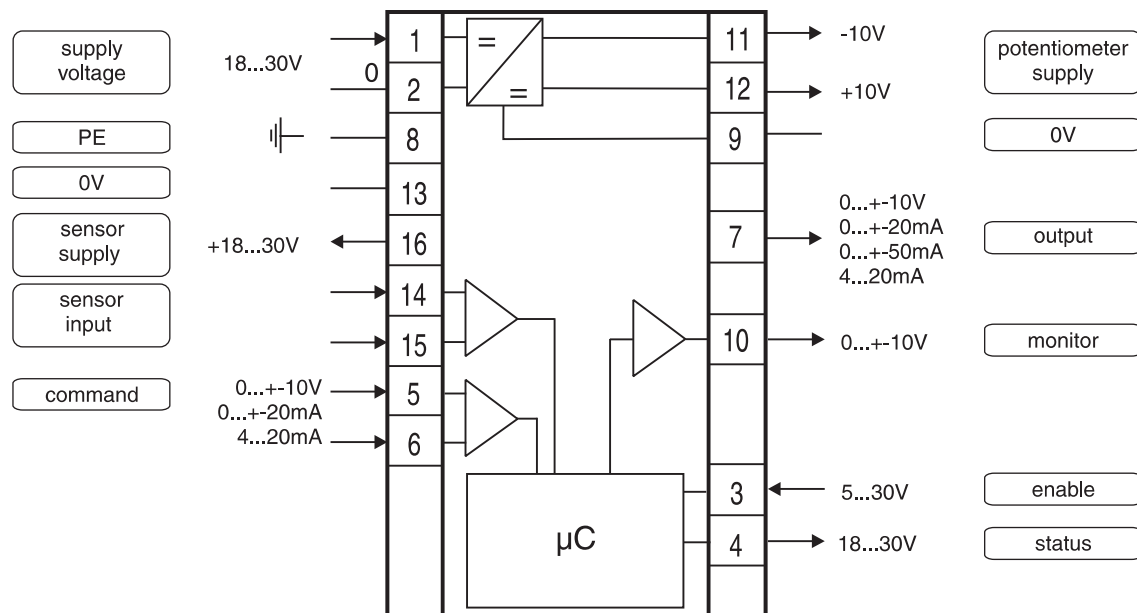
General		Electrical (cont.)	
Model	Module package for snap-on mounting on EN 50022 rail	Input Signal Resolution	0.025 %
Package Material	Polycarbonate	Differential Input Voltage Max.	30 V for terminals 5 and 6 against PE (terminal 8)
Inflammability Class	V2...V0 acc. UL 94	Enable Signal	0...2.5 V: OFF / 5...30 V: ON Ri = 100 kOhm
Mounting Position	Any	Status Signal	0...0.5 V: OFF / Us: ON rated 15 mA maximum
Ambient Temperature	-20°C to +60°C (-4°F to +140°F)	Monitor Signal	+10...0...-10 V, rated 5 mA max., signal resolution 0.4%
Protection Class	IP 20 acc. DIN 40050	Adjustment Ranges	Minimum: 0...50 % Maximum: 50...100% Ramp: 0...32.5 s Zero Offset +100%...-100%
Weight	0.16 kg (0.35 lbs.)	Interface	RS 232C, DSub 9p. male for null modem cable
Electrical		EMC	EN 50081-2, EN 50082-2
Duty Ratio	100%	Connection	Screw Terminals 0.2...2.5 mm², disconnectable
Supply Voltage	18...30 VDC, ripple <5% eff., surge free	Cable Specification	20 AWG overall braid shield
Current Consumption Max.	100 mA	Cable Length	50 m (164 ft.)
Pre-fusing	500 mA	Options	
Command Signal Options	+10...0...-10 V, ripple <0.01 eff., surge free, Ri = 100 kOhm +20...0...-20 mA, ripple <0.01 eff., surge free, Ri = 200 kOhm 4...12...20 mA, ripple <0.01 eff., surge free, Ri = 200 kOhm <3.6 mA = solenoid output OFF, <3.8 mA = solenoid output ON, (acc. NAMUR NE43)	Technology Function	Code 1: Software adjustable transfer function with 10 compensation points for linearization of valve behavior

Dimensions

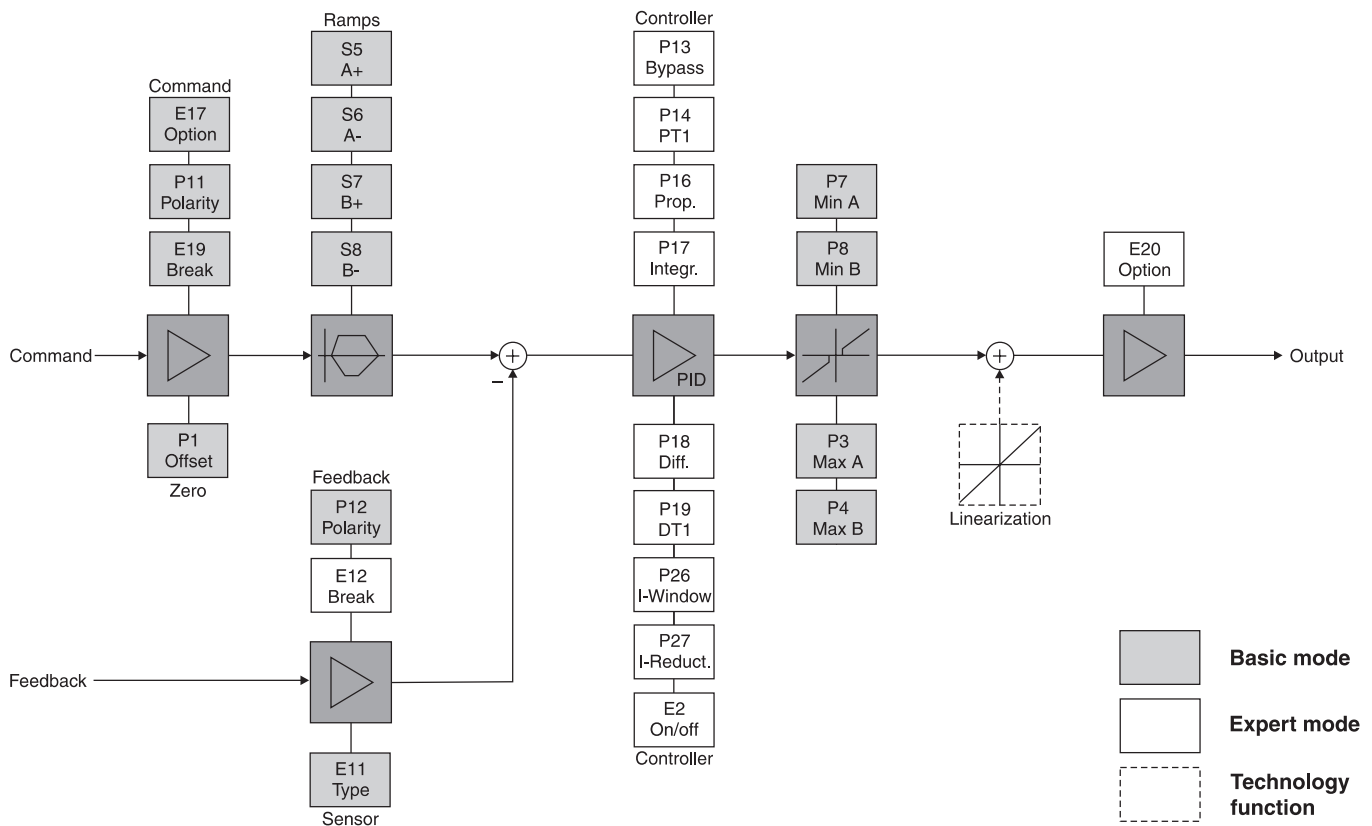
Inch equivalents for millimeter dimensions are shown in (**)



Block Diagram — Wiring



Signal Flow Diagram



ProPxD Interface Program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

- User-friendly editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronic via serial interface RS-232 and null modem cable.
- Simple to use interface program. Download free of charge www.parker.com/euro_hcd → **Services** → **downloads**

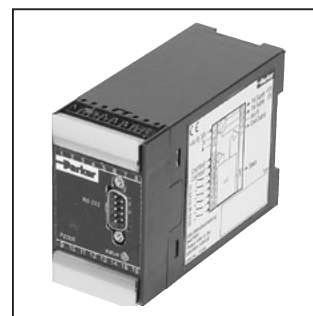
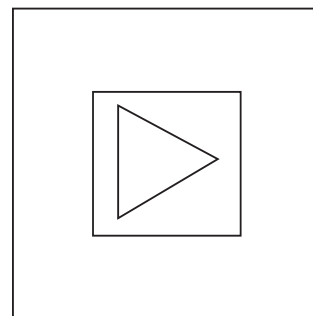
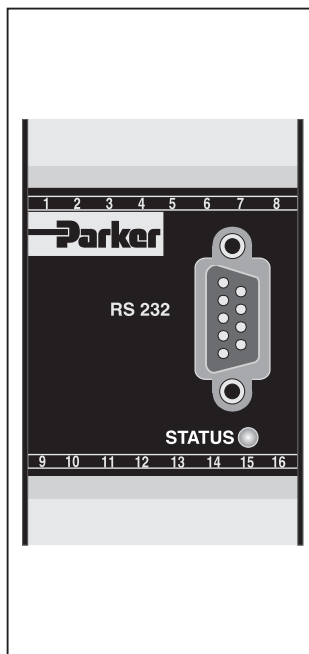
General Description

Series PZD00A-40* electronic modules provide options to enhance PWD, PCD driver modules and valves with onboard electronics. The modules are compact and easy to install with DIN rail mounting and plug-in terminals. The digital design allows for programmable parameters such as input signal conditioning, set-points, ramps, mins, maxs, and command output options. The modules provide flexibility for different applications and repeatability from unit to unit. The module parameters are programmed with an RS-232 interface and user friendly software (ProPxD) with default values for the standard valves.

The PZD00A-40* module contains the functions required by typical proportional valve applications (series D*FP, D**FH valves, PWD, PCD modules).

Features

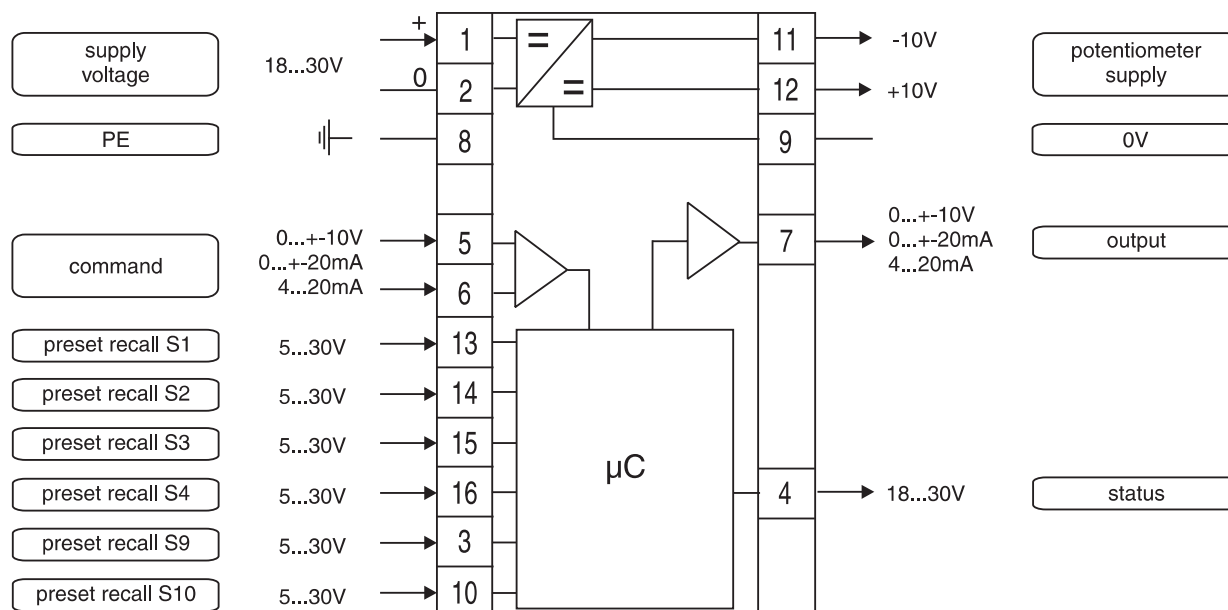
- Setpoints, ramp options, mins, maxs.
- Command output options.
- Programmable parameters.
- Reference voltages.
- RS-232 Interface.
- User friendly programming software.
- Plug-in terminals.
- Compliant with European EMC Standards.



D

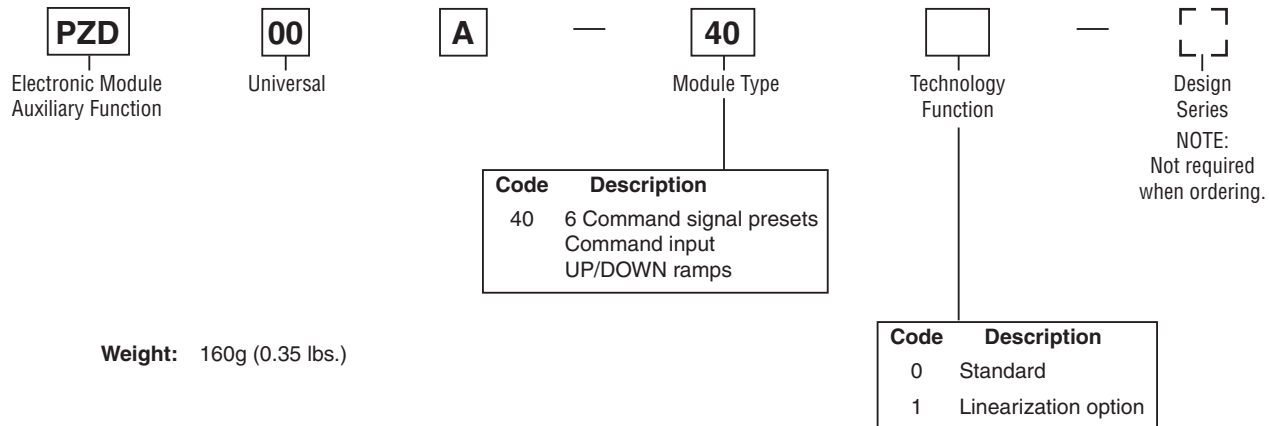


Block Diagram — Wiring



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Ordering Information

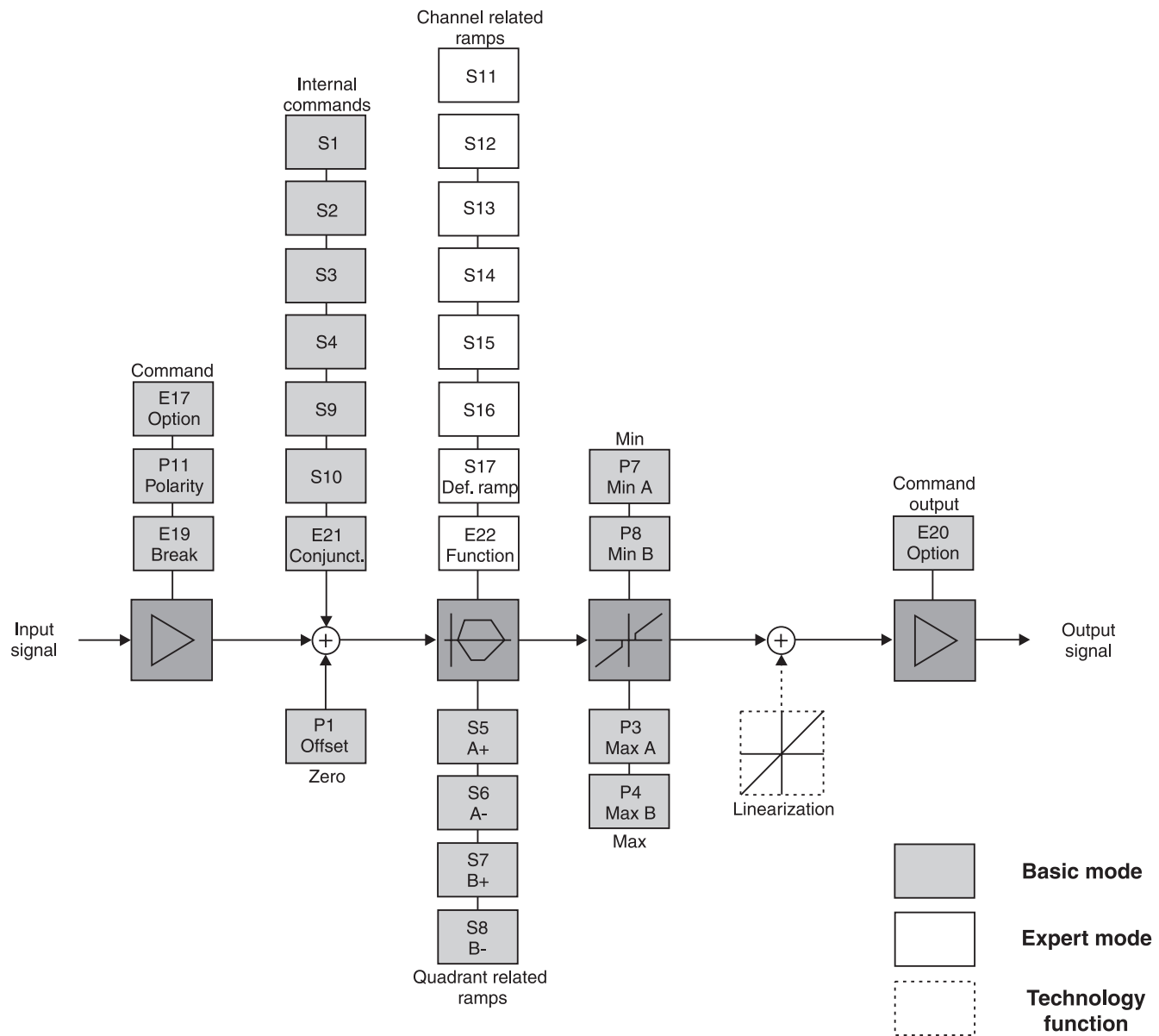


D

Specifications

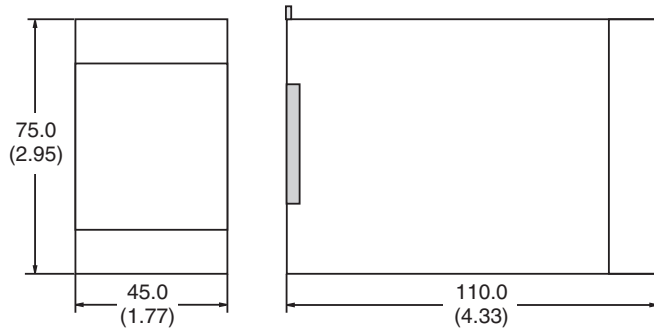
General			
Model	Module package for snap-on mounting on EN 50022 rail	Mounting Position	Any
Package Material	Polycarbonate	Ambient Temperature Range	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	Protection Class	IP 20 acc. DIN 40050
Electrical			
Duty Ratio	100%	Status Signal	Off – 0 to 0.5 VDC; On – Supply Voltage; rated max. 15 mA
Supply Voltage	18 VDC to 30 VDC, ripple < 5% eff., surge free	Output Signal	+10 to 0 to -10 VDC, rated max. 15 mA +20 to 0 to -20 mA, Ro < 500 ohm 4 to 12 to 20 mA, Ro < 500 ohm
Current Consumption Max.	100 mA		
Pre-fusing	500 mA medium lag		
Command Signal	+10 to 0 to -10 VDC, ripple < 0.01 % eff., surge free, Ri = 100K ohm +20 to 0 to -20 mA, ripple < 0.01 % eff., surge free, Ri = 200 Ohm 4 to 12 to 20 mA, ripple < 0.01 % eff., surge free, Ri = 200 Ohm < 3.6 mA = output signal 0 V / 0 mA / 12 mA acc. to output option > 3.8 mA = output signal on (acc. NAMUR NE43)	Output Signal Resolution	0.025%
		Reference output	+10 / -10, 2%, rated max. 15 mA
		Adjustment Ranges	Minimum 0 to 50% Maximum 50 to 100% Cmd Channels +100 to -100% Ramp Time 0 to 32.5 s Zero Offset +100 to -100%
		Interface	RS 232C, DSub 9p. male for null modem cable
		EMC	EN 50081-2, EN 50082-2
Input Signal Resolution	0.025%	Connection	Screw terminals 0.2 to 2.5 mm², disconnectable
Differential Input Voltage Max.	30 VDC for terminals 5 and 6 against PE (terminal 8)	Cable Specification	20 AWG overall braid shield
Channel Recall Signal	Off – 0 to 2.5 VDC On – 5 to 30 VDC Ri = 100K ohm	Cable Length	50m (164 ft.)
Options			
Technology Function	Code 1: Software adjustable transfer function with 10 compensation points for linearization of valve behavior.		

Signal Flow Diagram



Dimensions

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



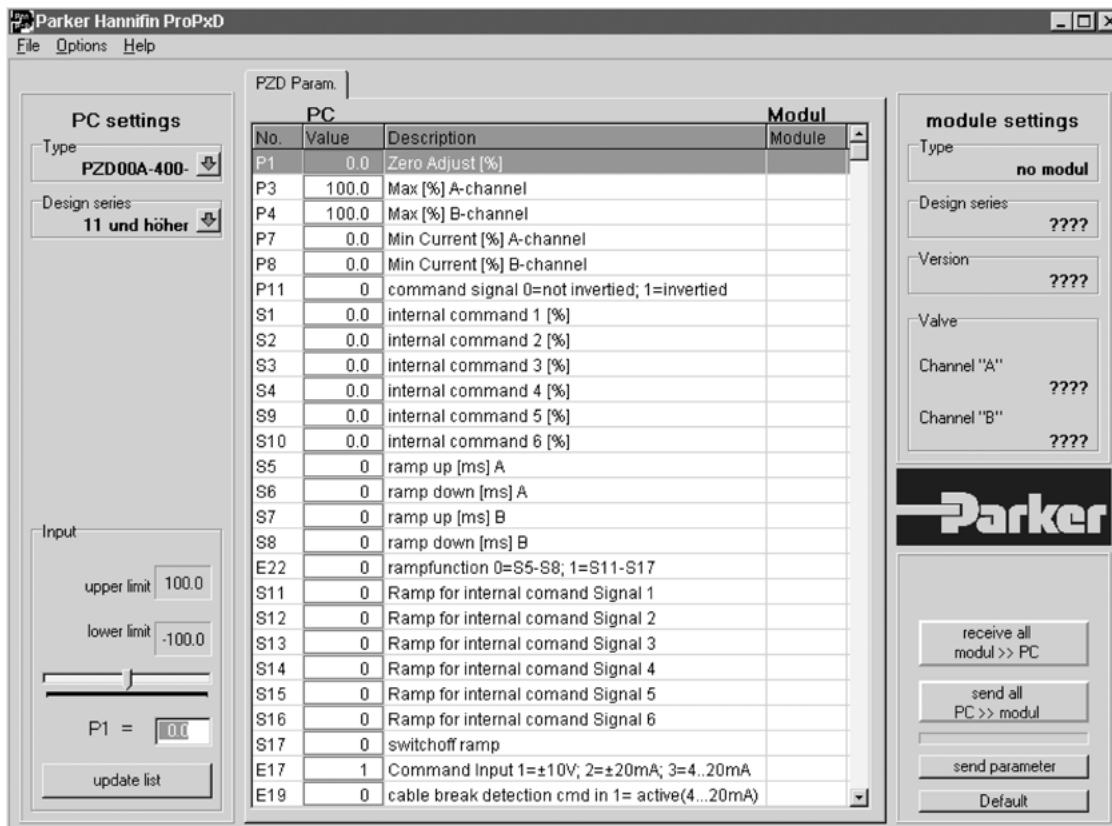
ProPxD Interface Program

The new ProPxD software permits comfortable parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets to floppy or hard disk is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

- User-friendly editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronic via serial interface RS-232 and null modem cable.
- Simple to use interface program. Download free of charge www.parker.com/euro_hcd → **Services** → **downloads**



General Description

Series Compax3F is the new member of the servo drive family of Parker Hannifin. It is especially designed for the requirements of electrohydraulic systems and in particular for position and force control of electrohydraulic axis.

Attention:

For application support and customized software, please contact your local Parker representative.

Large Drive Range

- Valves:
 - Proportional direction control valves
 - Proportional pressure relief and pressure reducing valves
 - Flow valves
- Drives:
 - Cylinders
 - Rotary drives
 - Motors

Range of Application

- Closed loop position and force control of linear cylinders and rotary drives
- Switching between position and force control
- Synchronous run with up to 64 axes

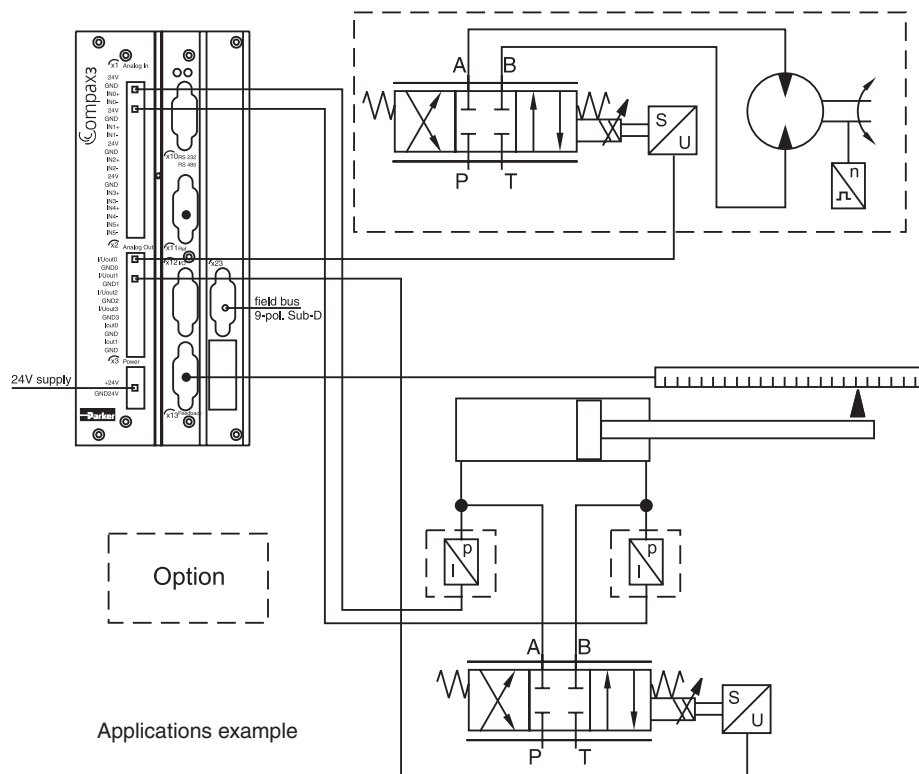


D

Typical Applications



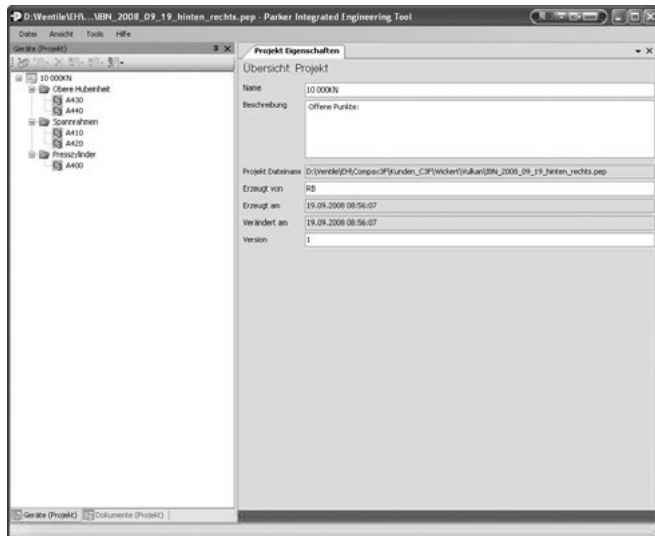
- Feeder axis
- Position and force control of press cylinders in material forming machines
- Roller clearance control in roller presses
- Die casting machines



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

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Project Development, Commissioning and Programming
PC-Tools - Open and Transparent



- Compax3 ServoManager
 - Intuitively understandable user interface
 - Wizard technology
 - Online help
 - Oscilloscope function
 - Optimized co-ordination of complete mechatronic systems
- Valve and Drive manager
 - All technical data of Parker valves, cylinders and drives available
 - Additionally support through the Compax3F Hydraulics-Manager by configuration of user defined valves and drives.

Software download, free of charge:
www.compax3.com

Monitoring and Control

Operator Panels

Control equipment for all text and graphics applications in industrial environments, from two-line displays to touch-panels using field busses:

- Profibus DP
- CANopen
- DeviceNET
- Interbus-S

For further information please refer to POP: "Parker Operator Panels".

Download: www.parker-eme.com/pop.

In addition to drivers for Compax3/Compax3 powerPLmC, drivers for other PLC products can be integrated on request.



Flexible Service and Maintenance

Operating Module

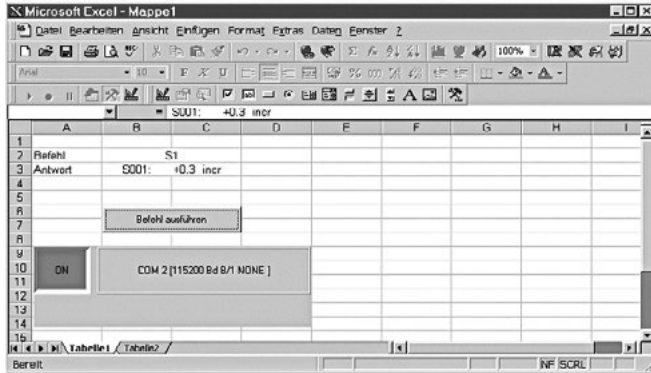
- Backlit plug-in module, text display with two sixteen-character lines
- Simple menu navigation with 4 keys
 - Display of status values and
 - clear text error messages
- Used for changing parameters and manual operation



Integration with the Office Enviroment

ActiveX Plug-in

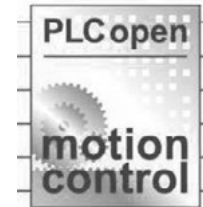
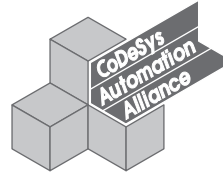
- Office and industrial environments are constantly growing closer together.
- The use of ActiveX technology allows simple integration into Office application.



International Standards in Programming

Advantages Offered by Integrated Standards

- Programming system
 - CoDeSys
- Programming language
 - IEC61131-3
 - Function modules based on PLCopen



D

Interface

Field Bus

- Profibus DP
- CANopen (CiADS402)
- DeviceNet
- PowerLink
- EtherCAT
- Address configurable via Dip switch

Connection of External Inputs/Outputs

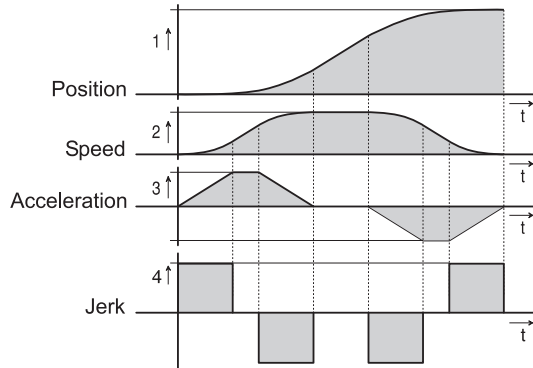
Parker E/A-System (PIO)

Additional external digital and analog inputs and outputs can be integrated via the CANopen.



Jerk-limited Set Point Generation, Resulting In:

- Gentle handling of the items being moved
- Increased service life of mechanical components
- Overshoot-free positioning
- Reduced excitation of mechanical resonance frequencies



D

Control

- 2 control loops for each axis for combined position and force/pressure control

Position Control

- Automatic controller design for position control
 - User-oriented optimization of parameters
- Feed forward control of speed and acceleration which results in:
 - Optimization of the response behaviour
 - Minimization of the following error

Force/Pressure Controller

- PID controller with feed forward control of speed

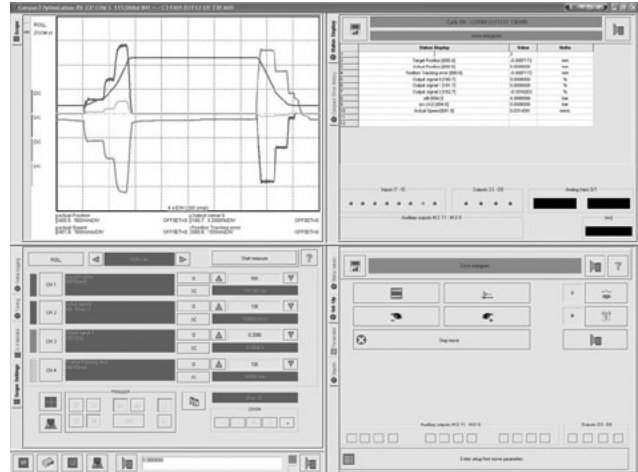
2-Axis Synchronous Run

Hydraulic Specific Functions

- Realization of many different circuit concepts with up to 4 proportional valves possible
- Linearization functions:
 - Consideration of the area of differential cylinders
 - Inverting of the valve set value
 - Compensation of the load pressure (additional pressure sensors necessary)
 - Correction of the nonlinear flow characteristic of the valve
 - Overlap compensation
 - Valve zero point correction
 - Valve set value filters
 - Valve set value limitation
 - All functions for each valve individually available
 - Automatic configuration by component selection in the Compax3 ServoManager

Set Up Controller Optimization

- Compax3F HydraulicsManager
 - All necessary technical data of Parker valves and drives are available
 - additional supported
- Test movement for automatic controller attitude
- Optimization with integrated oscilloscope function
- Automatic pre-setting of the controller for position control possible



Function	Motion control with motion profiles. Suitable for position and force/pressure control
Housing / Protection Class	closed metal housing, isolation according to VDE 0160 / IP 20
Supply Voltage [VDC]	21...27VDC, ripple <1VSS
Current Requirements [A]	0,8 for the device, digital outputs 100mA each
Supported Feedback-Systems	• Analog 0...20mA, 4...20mA, $\pm 10V$ • Start-Stop-Interface • SSI-Interface • EnDat2.1-Interface • 1VSS (max. 400kHz) Interface, 13.5Bit / Distance coding • TTL (RS422) (max. 5MHz), internal post-quadrature resolution
Set Point Generator	• Jerk-limited ramps • Travel data in increments, mm, inches or variable by scale factor • Specification of speed, acceleration, delay and jerk factor • Force/pressure inputs in N, psi, etc. variable by scale factor
Monitoring Functions	• Power/auxiliary supply range • Following error monitoring • Hard- and Software switches
Inputs and Outputs	• 8 control inputs: 24V DC / 10kOhm. • 4 control inputs Active HIGH / short-circuit protected / 24V / 100mA. • 4 analog current input (14Bit). • 2 analog voltage input (14Bit). • 4 analog output (16Bit, current or voltage) switchable in pairs.
RS232 / RS485 (switchable) RS232: RS485 (2 or 4-wire):	• 115200Baud • Word length 8 bits, 1 start bit, 1 stop bit • Hardware handshake XON, XOFF • 9600, 19200, 38400, 57600 or 115200 Baud • Word length 7/8Bit, 1 Start-, 1 Stop bit • Parity (switchable) even/odd
Bus Systems	• Profibus DP V0-V2 (I20), 12Mbit/s, PROFIdrive-Profil Drive technology • CANopen (CiADS402) (I21) • DeviceNet (I22) • PowerLink (I30) • EtherCAT (I31)
CE Compliance	• EMC interference emission/limit values for industrial utilization according to EN61 800-3 first environment (commercial and residential area), class A via integrated mains filter for up to 10mCable length, otherwise with external mains filter • EMC immunity/limit values for industrial utilization according to EN61 800-3
Insulation Requirements	• Protection class I according to EN 50178 (VDE 0160 part 1) • Contact protection: according to DIN VDE 0106, part 100 • Overvoltage: Voltage class III according to HD 625 (VDE 0110-1) • Degree of contamination 2 according to HD 625 (VDE 0110 part 1) and EN 50178 (VDE 0160 part 1)
Environmental Conditions General environmental conditions acc. to EN 60 721-3-1 to 3-3 Permissible ambient temperature Tolerated humidity: non condensing Elevation of operating site: <=1000m above sea level for 100% load ratings	• Climate (temperature / humidity / barometric pressure) • Class 3K3 • Operation: 0 to +45 °C class 3K3 • Storage: -25 to +70 °C class 2K3 • Transport: -25 to +70 °C class 2K3 • Operation: <= 85% class 2K3 • Storage: <= 95% class 3K3 (relative humidity) • Transport: <= 95% class 2K3 • Please inquire for greater elevations • Protection class IP20 according EN 60 529
EMC Directives and Harmonized EC Norms	• EC low voltage directive 73/23/EEC and RL 93/68/EEC: EN 50 178, General industrial safety norm Equipping electric power systems with electronic operating equipment • HD 625, general electrical safety. Insulation principles for electrical operating equipment EN 60 204-1, Machinery norm, partly applied • EC-EMC directive 89/336/EEC: EN 61 800-3, EMC norm Product standard for variable speed drives EN 50 081-2 ... 50 082-2, EN 61 000-4-2 ... 61 000-4-5
UL Certification	USL according to UL508 (listed) / CNL according to C22.2 No: 142-M1987 (listed) Certified: E-File-No: E198563

C3
 Series

F001

D2

F12

Interface

Technology Functions

Options

Code	Interface	T11	T30	T40
I11	Digital inputs/outputs		•	•
I12	Digital inputs/outputs	•		
I20	Profibus DP V0/V1/V2 (12Mbit/s)	•	•	•
I21	CANopen		•	•
I22	DeviceNet		•	•
I30	PowerLink		•	•
I31	EtherCAT		•	•

Code	Technology Functions
T11	Positioning/pressure and force control
T30	Programmable motion control according to IEC61131
T40	Electronic Cam

Code	Options
M00	Standards
M10	Extension 12 digital I/Os & HEDA (motion bus)
M11	HEDA (motionbus)
M12	Extension 12 digital I/Os

Weight: 2.0 kg (4.4 lbs.)

D

Please order connection set ZBH02/04 for Compax 3F separately.

Complete kit with mating plug connectors (X1, X2 and X3) for Compax3 connectors and special shield connecting terminal

Overview Technology Functions

	T11	T30	T40
Set tables for up to 31 motion profiles	x		
Absolute or relative positioning	x	x	x
Force/pressure control	x	x	x
Electronic Gearbox	x	x	x
Dynamic positioning	x	x	x
Hydraulic specific control technology	x	x	x
Reg-related positioning	x	x	x
Programmable according to IEC61131-3		x	x
Programming system DoDeSys		x	x
Up to 6500 instructions		x	x
Recipe table with 288 variables		x	x
PLCopen		x	x
Mark synchronization			x
Cam switching mechanism			x
Cam profiles			x
Coupling and decoupling function			x
Digital I/Os (RS232/485)	x	x	x
Profibus	O	O	O
CANopen		O	O
DeviceNet		O	O
Ethernet Powerlink		O	O
EtherCAT		O	O

x = Standard

O = Optional

Compax3F T11**Benefits**

- No programming skills necessary
- Set table with various motion
- Full controller range available
- an ideal basis for many applications in high-performance motion automation

Function Range T11

- Set tables for positioning, pressure and force control up to 31 motion profiles:
 - Absolute or relative positioning
 - Force/pressure control
 - speed control
 - electronic gearing
- superimposed force and pressure control
- Controller switching between position and force/pressure control

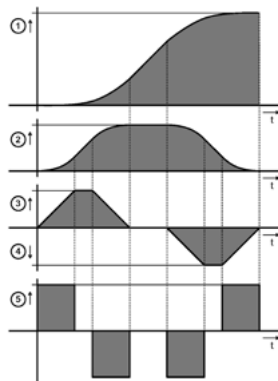
Extended Function Range

- Absolute force control
- superimposed force and pressure control
- Controller switching between position and force/pressure control
- 2-axis synchronous

Absolute or Relative Positioning

A motion set defines a complete motion with all settable parameters

1. Target position
2. Travel speed
3. Maximum acceleration
4. Maximum deceleration
5. Maximum jerk

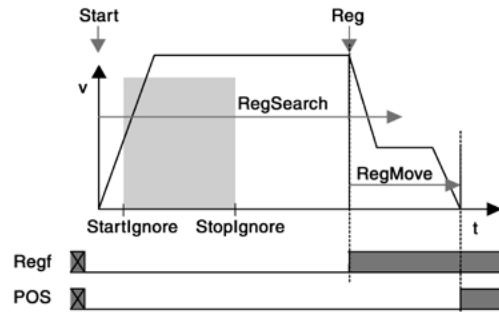
**Stop Movement**

The Stop set interrupts the current motion set.

Reg-related Positioning

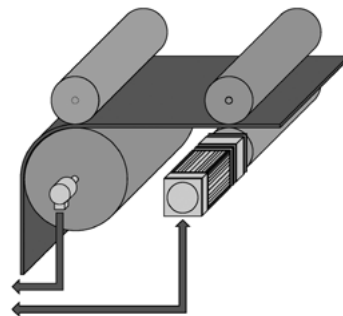
For registration mark-related positioning, 2 motions are defined:

- RegSearch: Search of an external signal, e.g. a registration mark on a product
- RegMove: The external signal interrupts the search movement and the second movement by an offset follows without transition
- Precision of the registration mark detection: $<1\mu s$

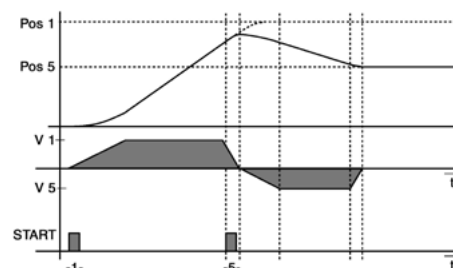
**Electronic Gearbox:**

Motion synchronized to a master axis with any transmission ratio. The position of a master axis can be detected via:

- +/-10V analog input
- Step/direction command Input
- the encoder input or
- HEDA, with Compax3 Master

**Dynamic Positioning**

A new motion profile can be selected during a positioning sequence - a smooth transition takes place.



Compax3 T30 Motion Control According to PLCopen**General**

Due to its high flexibility and efficiency the Compax3 motion control according to PLCopen is for most applications the optimal basis for decentralized motion control.

Positioning with function modules based on PLCopen

- Programmable based on IEC61131-3
- Programming system: CoDeSys
- Up to 5000 instructions
- 500 16-bit variables / 150 32-bit variables
- Recipe table with 288 variables
- 3 16-bit saved variables (power failure protected) / 3 32-bit saved variables (power failure protected)
- PLCopen-function modules:
 - Positioning: absolute, relative, additive and continuous
 - Machine Zero.
 - Stop, energizing the power stage, quit
 - Position, device status, reading axis error
 - Electronic gearbox (Mc_GearIn)
- IEC61131-3-standard modules:
 - Up to 8 timers (TON, TOF, TP)
 - Trigger (R_TRIG, F_TRIG)
 - Flip-flops (RS, SR)
 - Counters (CTU, CTD, CTUD)
- Device-specific function modules:
 - C3_Input: reading digital inputs
 - C3_Output: writing digital inputs
 - C3_ReadArray: access to recipe table
- Inputs/outputs:
 - 8 digital inputs (24V level)
 - 4 digital outputs (24V level)
 - 6 analog inputs (14 bits)
 - 4 analog outputs (16 bits)
 - Optional addition of 12 digital inputs/outputs

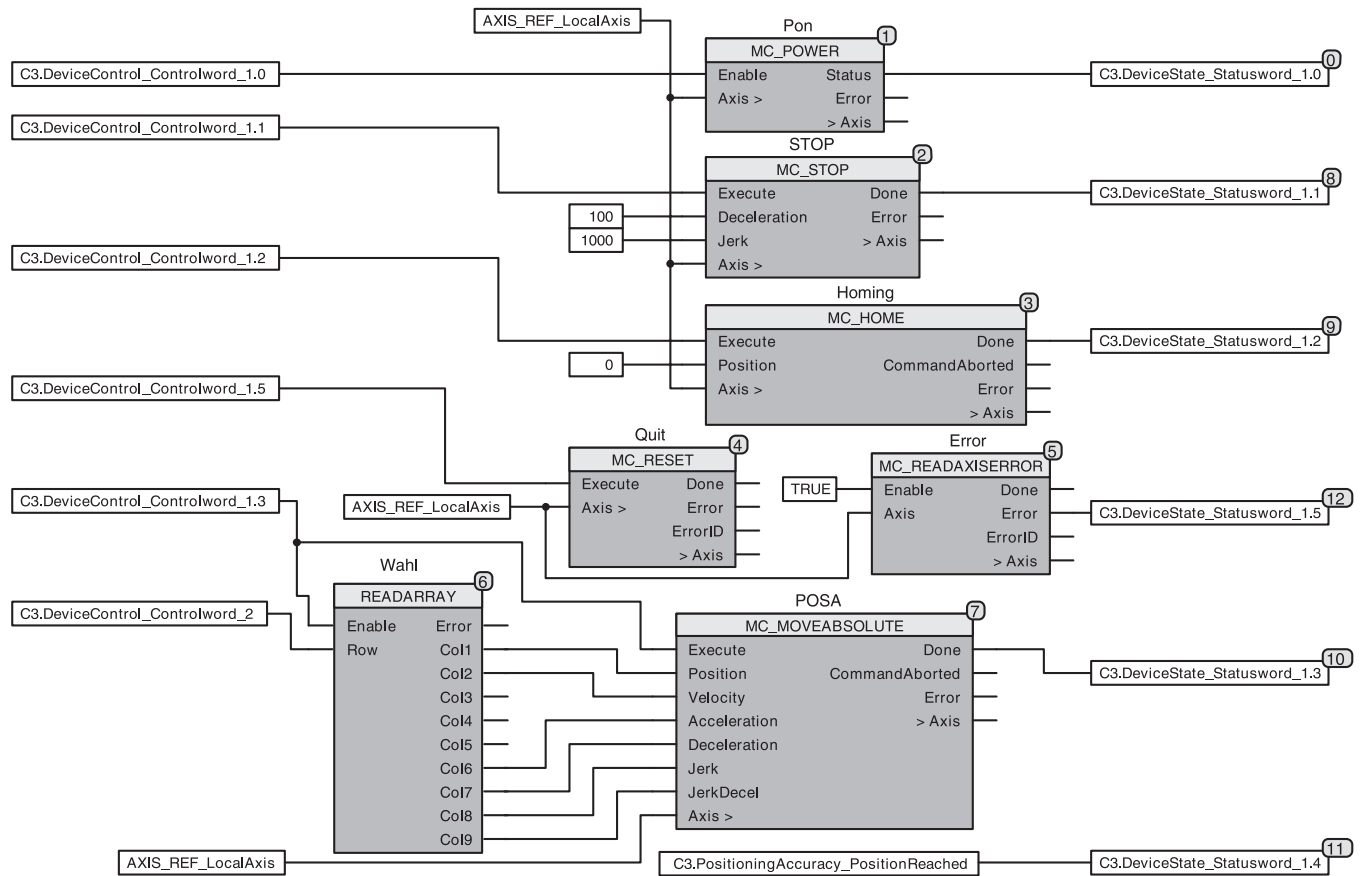
PLCopen function blocks

- Absolute positioning
- Relative positioning
- Additive positioning
- Continuous positioning
- Stop
- Machine zero
- Energizing the power output stage
- Reading device status
- Reading axis error
- Acknowledging errors
- Reading the current position
- Electronic gearbox (gearing)

Example of an field bus interface controlled IEC61131-application

- 2 control words are placed on the cyclic channel of the bus.
- The position data records (position, speed, acceleration etc.) are stored in a table (array).
- The desired position data record is selected with Controlword_2.
- The individual bits of Controlword_1 control positioning.
- A return message is sent via a status word on the cyclic channel of the bus.

D



Example of a bus interface controlled IEC61131 application

**Compax3 T40 IEC61131-3 Positioning
with Cam Function Modules****General**

Compax3 T40 is able to simulate mechanical cams and cam switching mechanisms electronically. The T40 electronic cam was especially optimized for:

- The packaging machine industry
- For the printing industry
- All applications, where a mechanical cam is to be replaced by a flexible, cyclic electronic solution

This helps to solve discontinuous material supply, flying-knife and similar drive applications using distributed drive technology.

Compax3 T40 supports both real and virtual master movements. In addition, the user can switch to other cam profiles or cam segments on the fly.

Programming is carried out in the well-known IEC61131-3 environment.

With the aid of the cam function modules and Cam-Designer, cam applications can be implemented very easily.

Function T40

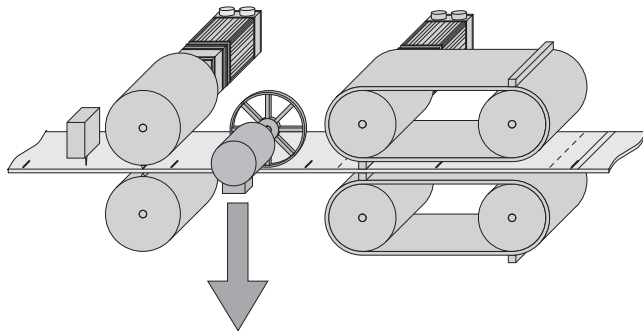
- Technology functions of the T30 version fully integrated and available
- Master position acquisition
- Mark synchronization
- Cam switching mechanism
- Coupling and decoupling function
- Cam profiles
- Cam memory
- Cam creation with CamDesigner

Master Position Acquisition

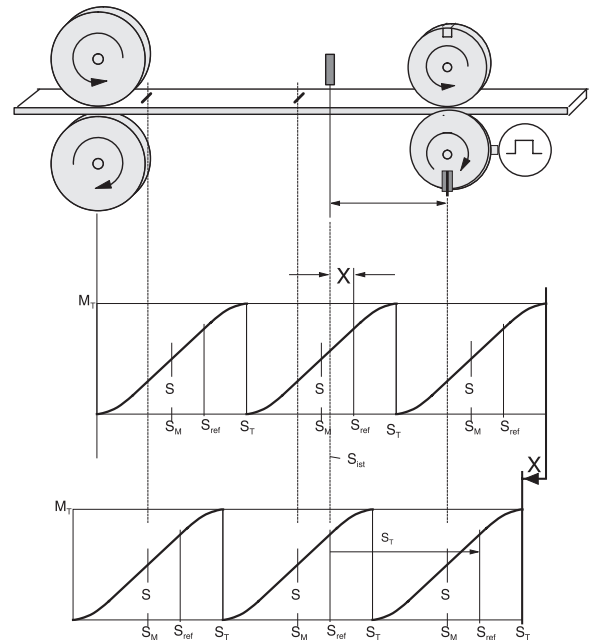
- Acquisition by incremental encoder
- Acquisition by the HEDA real-time bus

Virtual Master:

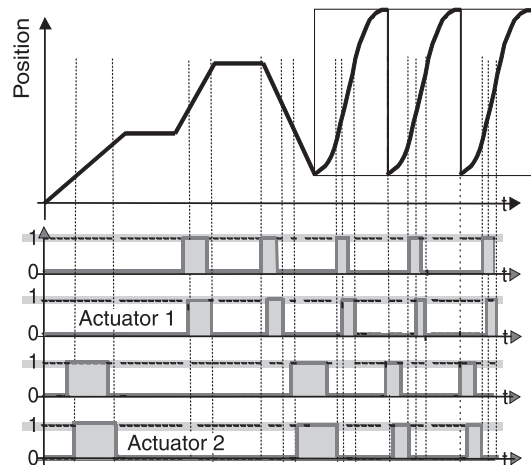
A second axis in the IEC program can be used to program a motion profile, which serves as a master for one or several axes.

**Mark Synchronization**

- Master or slave oriented (simultaneous, cam-independent)
- Highly-precise mark recognition (accuracy <1μs; Touchprobe)

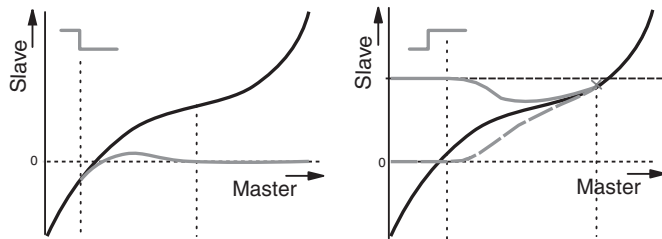
**Cam Switching Mechanism**

- 36 cams with individual profiles
- 4 fast cams (125μs per cam) standard: 500μs
- 32 serial cams, 16ms/cam cycle (0.5ms/cam)
- Delay-time compensated cams: Compax3 can advance the cam to compensate for delays in switching elements.

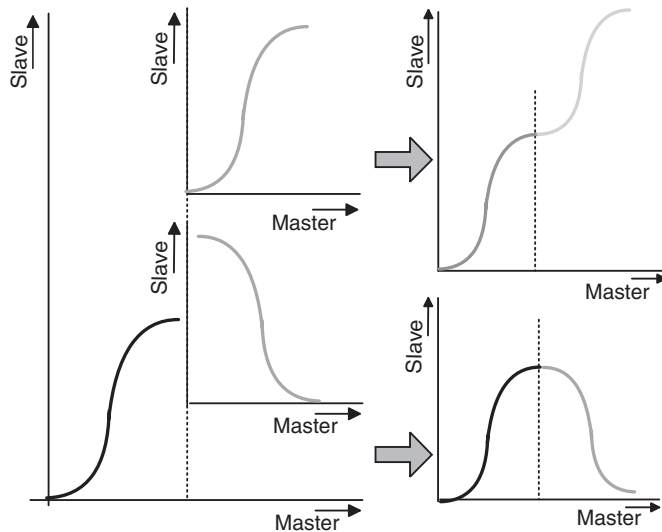


Coupling and Decoupling Functions

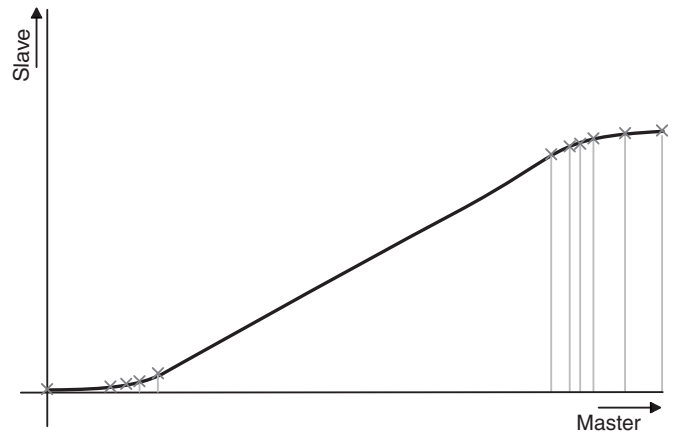
- By means of a set point generator
- By means of a change-over function
- Without overspeeding by coupling over several master cycles
- Virtually free set-up of the coupling and decoupling movement
- Master-guided coupling movement
- Random standstill position

**Cam Profiles**

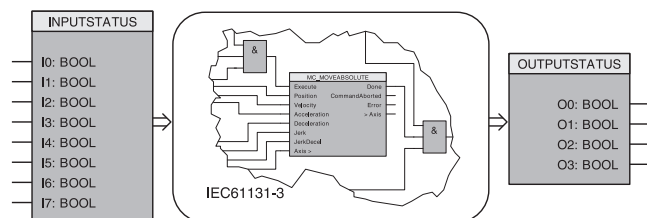
- Up to 20 cam segments can be produced by:
- Virtually random cam links (forwards and backwards)
- Freely programmable event-controlled cam branches
- Scalable cam segments and complete cam profiles

**Cam Memory**

- 10,000 points (Master/Slave) in 24-bit format
- High-precision profile generation:
 - Variable point spacing with full backup of the current master and slave coordinates (even if the power fails)
 - Linear interpolation between points
- Cam memory for up to 20 curves



Connection of High-Level Controllers

Control via Digital Inputs/Outputs
Compax3 I11T30 / I11T40 / I12T11

The digital I/Os can be optionally extended by 12 I/Os (M10 and M12 option).

D

Control via Profibus,
Compax3 I20T11 / I20T30 / I20T40

Profibus-ratings		
DP-Versions		DPV0 / DPV1
Baud rate	[MBit/s]	up to 12
Profibus ID		C320

Control via CANopen, Compax3 I21T30 / I21T40

CANopen-ratings		
Baud rate	[kBit/s]	20, 50, 100, 125, 250, 500, 800, 1000
Service-Data-Object		SDO1
Process-Data-Objects		PDO1, ... PDO4

Control via DeviceNet, Compax3 I22T30 / I22T40

DeviceNet-ratings		
I/O - data		up to 32 bytes
Baud rate	[kBit/s]	125...500
Nodes		up to 63 Slaves

Control via Ethernet Powerlink,
Compax3 I30T30 / I30T40

Ethernet Powerlink ratings		
Baud rate		100Mbits (FastEthernet)
Cycle time		<200µs; to 240 nodes

Control via EtherCAT
Compax3 I30T30 / I30T40

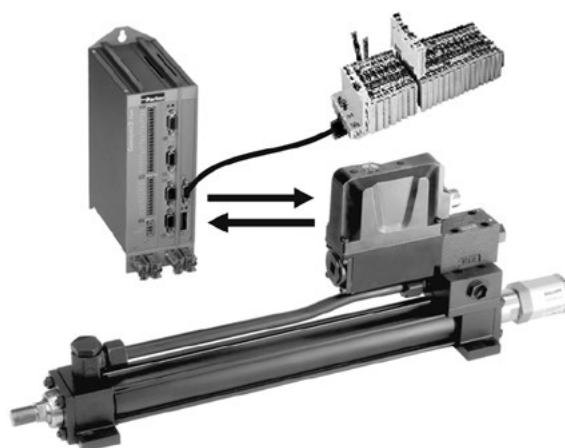
EtherCAT-ratings		
Baud rate		100Mbits (FastEthernet)
Cycle time		<200µs; to 240 nodes

Decentralized Control via CANopen, I21T30 / I21T40

With External Inputs/Outputs (PIO)

Additional external digital and analog inputs and outputs can be integrated via the CANopen master system function. For this purpose we offer the Parker I/O system (PIO):

- CANopen field bus coupler: 650mA/5V, 1650mA/5V
- Digital input terminals: 2-, 4-, and 8-channel
- Analog input terminals: 2-channel (0-10V), 4-channel (0-20mA)
- Digital output terminals: 2-, 4-, and 8-channel
- Analog output terminals: 2-channel (0-10V, 0-20mA, +/-10V)

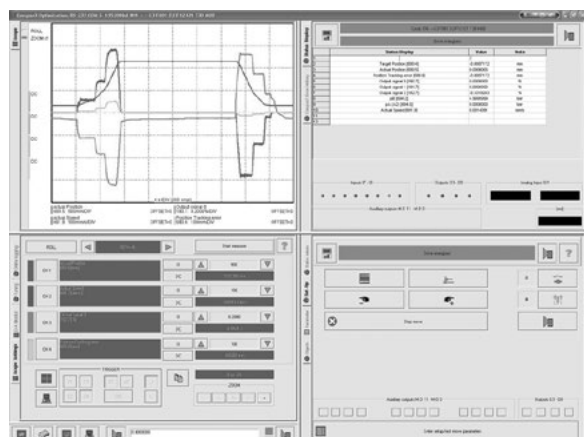


Simple, Wizard-guided Configuration and Commissioning Compax3 ServoManager

Software Tool C3 ServoManager

Configuration is carried out on a PC using the Compax3 ServoManager.

- Wizard-guided configuration
 - Automatic querying of all necessary entries
 - Graphically supported selection
- Setup mode
 - Moving individual axes
 - Predefined profiles
 - Convenient operation
 - Storage of defined profiles
 - Controller pre-setting possible
- Integrated 4-channel oscilloscope
 - Signal tracing directly on the PC
 - Various modes (single/normal/auto/roll)
 - Zoom function
 - Export as image or table (for example to Excel)



Software Tool HydraulicsManager

- Simple set up of customer valves, cylinders and drives.
- Technical data of all Parker valves, cylinders and drives available.

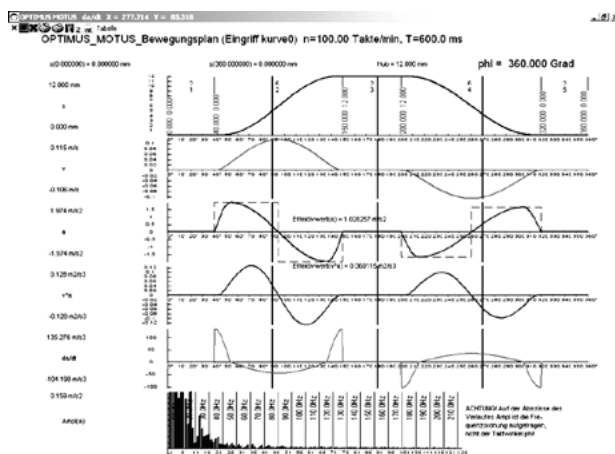


C3 HydraulicsManager valve database

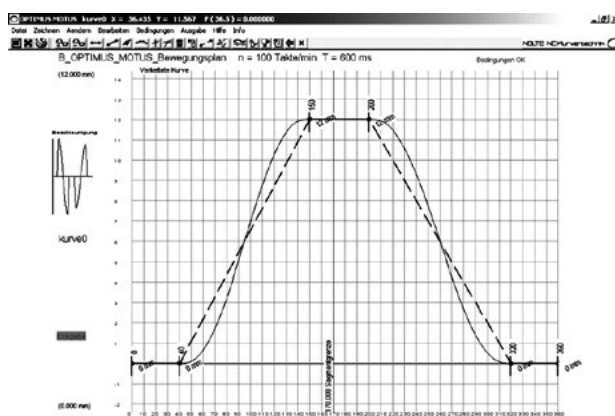
Cam Creation with CamDesigner

Software Tool CamDesigner

- Standardized Nolte cam generating tool with:
 - Standard or extended range of functions
 - Evaluation of the motion profiles
 - Verification of the drive sizing
- Transition laws from VDI directive 2143:
 - Selection of motion laws
 - The CamDesigner basic version features 15 motion laws (based on the dwell-to-dwell (interpolation method))



Evaluation of the motion profile



Cam generation with the integrated CamEditor

Advantages Offered by International Standards in Programming**IEC61131-3 Programming Language**

IEC61131-3 is the only company- and product-independent programming language with worldwide support for industrial automation devices.

- IEC61131-3 includes graphical and textual programming languages:
 - Instruction list
 - Structured text
 - Ladder diagram
 - Sequential function chart
 - Function block diagram

Integrated standards offer:

- A trusted programming environment
- Standardized programming

Integrated standards reduce:

- The overhead of development
- Maintenance costs
- Software upkeep
- Training overhead

Integrated standards increase:

- Productivity
- Software quality
- Concentration on core competence

Examples:

- Program development in IL

```

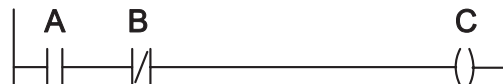
0001 FUNCTION_BLOCK_AWL_EXAMPLE
0002 (* Sinus und Cosinus einer Zahl berechnen *)
0003 VAR_INPUT
0004   r1: REAL := 0.0;
0005 END_VAR
0006 VAR_OUTPUT
0007   sinus: REAL;
0008   cosinus: REAL := 9.9;
0009 END_VAR
0010
0001 (* Den Sinus einer Zahl berechnen und mit 1000 multiplizieren *)
0002 LD   r1
0003 SIN
0004 MUL   1000.0
0005 ST   sinus
0006
0007 (* Den Cosinus einer Zahl berechnen und mit 1000 multiplizieren *)
0008 LD   r1
0009 COS
0010 MUL   1000.0
0011 ST   cosinus
0012
0013 (* Die Zahl weiterschalten *)
0014 LD   r1
0015 ADD   0.1
0016 ST   r1
  
```

- Instruction list (IL)

```

LD      A
ANDN    B
ST      C
  
```

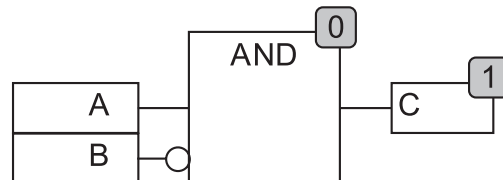
- Ladder diagram



- Structured text

C := A AND NOT B

- Function plan



Function Modules Based on PLCopen

PLCopen is a product and company independent organization that plays a significant role in supporting the IEC61131-3 programming language. Its specific tasks also include defining basic processes relevant to motion. The PLCopen organization consists of both users and manufacturers of automation components.

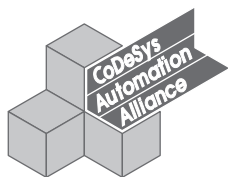
Parker Hannifin is an active member of the "Motion Control" task force. This is a great advantage for the users of Parker drive technology, since they are constantly able to profit directly from the latest developments in PLCopen.



Professional Development Tool CoDeSys

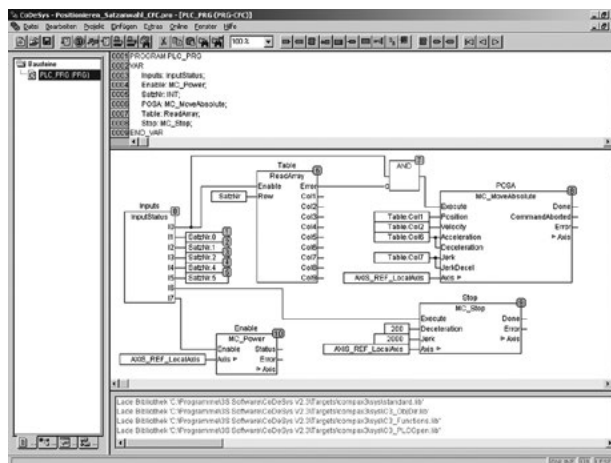
CoDeSys is a development environment for programming that saves a significant amount of time as applications are created.

- One of the most powerful development environments available, established world-wide
- Universal programming platform for various devices
- Visual elements
- Library management for user-defined applications
- Context-sensitive help wizard
- Data exchange between devices from different manufacturers
- Complete online functionality
- Sophisticated technological features
- Standard function modules deposited
- ... and all this for no additional cost



Parker is a member of the
“CoDeSys Automation Alliance”.

Program Development in CFC

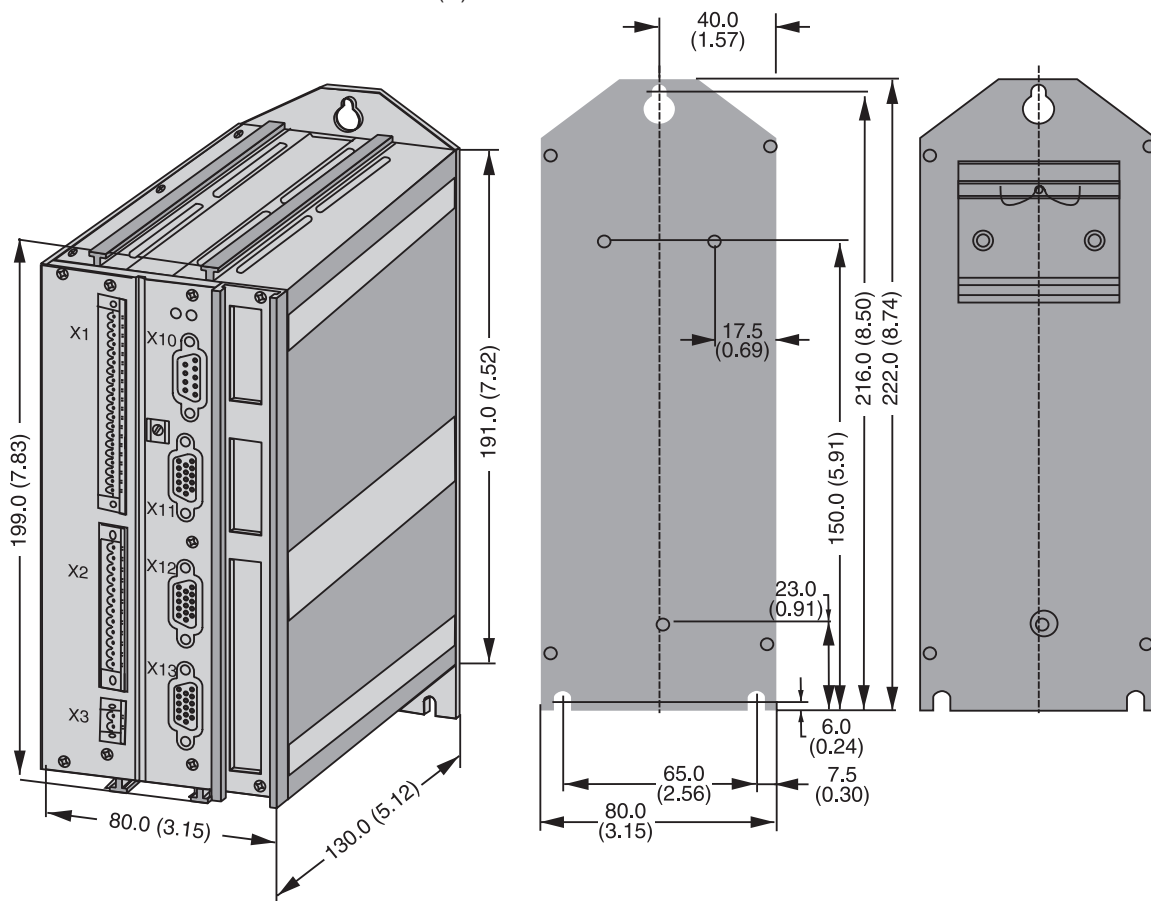


Project Management

Saving an entire project (source file) including symbols and comments to make service calls easier, because there is no need for any project data on the device itself

- Archiving projects as ZIP files
- Creating user-specific libraries that can be reused as tested sections of programs
 - These libraries can be protected
 - Examples include winders, synchronization components etc.
- Various user levels make it possible to lock sections of the program with passwords
- Depending on the task at hand, users can select from among 5 IEC languages plus CFC. These languages can also be mixed

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

**Connection Set ZBH02/04**

Complete kit with mating plug connectors (X1, X2 and X3) for Compax3 connectors and special shield connecting terminal

Feedback Cable GBK../..

Connection to the Motor:

Under the designation "REK.. + GBK.." (Feedback cable) we can deliver feedback connecting cables in various lengths to order.

- Prefabricated with plug and cable eye
- The plugs of the Parker motor and feedback cables contain a special surface area screening.
- Cable plans, if you wish to make up your own cables

Terminal Block EAM06../..

For additional wiring of the inputs and outputs:

- Available with or without LED display
- Can be mounted in the control cabinet on a supporting rail
- Connection EAM06../.. via SSK23../.. to X11, SSK24../.. to X12



RS232 Cable SSK01 (in various lengths)

Configuration:

Via a PC with the aid of the Compax3 ServoManager.

Communication:

Communication with Compax3 either via RS232 or via RS485 in order to read or write into objects.

**Profibus plug BUS08/01**

- BUS08/01 with 2 cable inputs (1x BUS08/01 incoming, 1x BUS08/01 continuing) and screw terminals, as well as a switch for activating the terminating resistor. Set to ON for first and last bus node terminating resistor activated.

Profibus cable: SSL01/.. not prefabricated

- Special cable in any length for Profibus wiring (colors according to DESINA).

**Operating module BDM01/01**

For display and diagnosis purposes:

- Can be plugged in during operation
- Power supply via Compax3 servo control
- For displaying and changing values

**HEDA Bus**

HEDA bus terminal connector (RJ45) BUS07/01:

- For the first and last Compax3 in the HEDA bus.
- HEDA cable: SSK28/.. prefabricated in various lengths:
- Cable for HEDA bus wiring from Compax3-to-Compax3 or PC-to-Compax3 powerPLmC.

**CANbus plug BUS10/01**

- BUS10/01 with 2 cable inputs (1x BUS10/01 incoming, 1x BUS10/01 continuing) and screw terminals, as well as a switch for activating the terminating resistor. Set to ON for first and last bus node terminating resistor activated

CANbus cable SSL02/.. not prefabricated

- Special cable in any length for CANbus wiring (colors according to DESINA)

**External Inputs/Outputs PIO...**

For Compax3 I21 from technology function T30 onwards via CANopen:

- Integration of additional external input and output modules (digital and analog)



Connection set for Compax 3												
for C3F001 D2 F12xxx	ZBH 02/04	Z	B	H	0	2	/		0	4		
Operating module												
Operating module		B	D	M	0	1	/		0	1		
Terminal block												
for I/Os without luminous indicator	for X11, X12	E	A	M	0	6	/		0	1		
for I/Os with luminous indicator	for X12	E	A	M	0	6	/		0	2		
Interface cables and connectors												
PC-Compax3 (RS232)		S	S	K	0	1	/		...	...	¹⁾	
on X11/X13 (Transducer)	With flying leads	S	S	K	2	1	/		...	...	¹⁾	
on X12 (I/O digital)	With flying leads	S	S	K	2	2	/		...	...	¹⁾	
on X11 (Ref/Analog)	For I/O terminal	S	S	K	2	3	/		...	...	¹⁾	
on X12 (I/Os digital)	For I/O terminal	S	S	K	2	4	/		...	...	¹⁾	
PC - POP (RS232)		S	S	K	2	5	/		...	...	¹⁾	
Compax3 - POP (RS485)		S	S	K	2	7	/	..	...	...	³⁾	
Compax3 HEDA - Compax3 HEDA or PC - C3powerPLmC		S	S	K	2	8	/		...	...	²⁾	
Compax3 X11 - Compax3 X11 (Encoder coupling of 2 axes)		S	S	K	2	9	/		...	...	¹⁾	
HEDA bus terminal connector (for the 1st and the last Compax3 in the HEDA Bus)		B	U	S	0	7	/		0	1		
Feedback cable for Balluff SSI transducer and start/stop		G	B	K	4	0	/		...	...	¹⁾	
Feedback cable for SSI transducer and start/stop	With flying leads	G	B	K	5	3	/		...	...	¹⁾	
Profibus cable ⁴⁾	Not prefabricated	S	S	L	0	1	/		...	...	¹⁾	
Profibus connector		B	U	S	0	8	/		0	1		
CAN-Bus cable ⁴⁾	Not prefabricated	S	S	L	0	2	/		...	...	¹⁾	
CAN-Bus connector		B	U	S	1	0	/		0	1		

¹⁾ Length code

Length code 1 (Example: SSK01/09: Length 25m)

Length [m]	1.0	2.5	5.0	7.5	10.0	12.5	15	20	25	30	50
Code	01	02	03	04	05	06	07	08	09	10	14

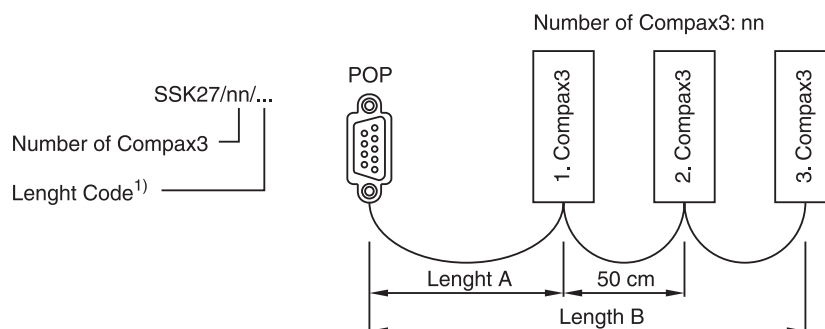
²⁾ Length code for SSK28

Length code 2 (Example: SSK28/22: Length 3m)

Length [m]	0.25	0.5	1.0	3.0	5.0	10.0
Code	20	21	01	22	03	05

³⁾ Length code for SSK27Length A: Cable or connection from POP with **one** Compax3 (POP - 1.Compax3), variable length according to length code¹⁾
(Example: SSK27/01/01: Length 1.0m)Length B: Cable or connection from POP with **more than one** Compax3 (nn > 01) (1.Compax3 - 2.Compax3 - ...), length between Compax connectors is fixed to 50cm, variable length A from POP with first Compax according to length code¹⁾
(Example: SSK27/03/01: Length 1.0m)⁴⁾ Colors according to DESINA

Length Code for SSK27



Decentralized Input terminals									
PIO 2DI 24V DC 3.0ms	2-Channel Digital-Input terminal		P	I	O	4	0	0	
PIO 4DI 24V DC 3.0ms	4-Channel Digital-Input terminal		P	I	O	4	0	2	
PIO 8DI 24V DC 3.0ms	8-Channel Digital-Input terminal		P	I	O	4	3	0	
PIO 2AI DC $\pm 10V$	2-Channel Analog-Input terminal	($\pm 10V$ Differential input)	P	I	O	4	5	6	
PIO 4AI 0-10V DC S.E.	4-Channel Analog-Input terminal	(0-10V Signal voltage)	P	I	O	4	6	8	
PIO 2AI 0-20mA	2-Channel Analog-Input terminal	(0 - 20mA Differential input)	P	I	O	4	8	0	
Decentralized Output terminals									
PIO 2DO 24V DC 0.5A	2-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	0	1	
PIO 4DO 24V DC 0.5A	4-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	0	4	
PIO 8DO 24V DC 0.5A	8-Channel Digital-Output terminal	(Output current 0.5A)	P	I	O	5	3	0	
PIO 2AO 0-10V DC	2-Channel Analog-Output terminal	(0-10V Signal voltage)	P	I	O	5	5	0	
PIO 4AO 0-20mA	2-Channel Analog-Output terminal	(0-20mA Signal voltage)	P	I	O	5	5	2	
PIO 2AO DC $\pm 10V$	2-Channel Analog-Output terminal	($\pm 10V$ Signal voltage)	P	I	O	5	5	6	
CANopen Fieldbus coupler									
CANopen Standard			P	I	O	3	3	7	
CANopen ECO			P	I	O	3	4	7	

D

General Description

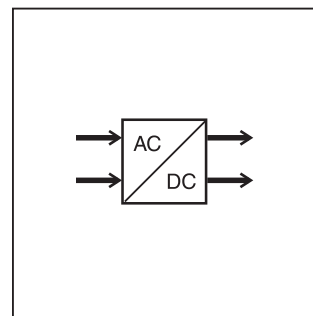
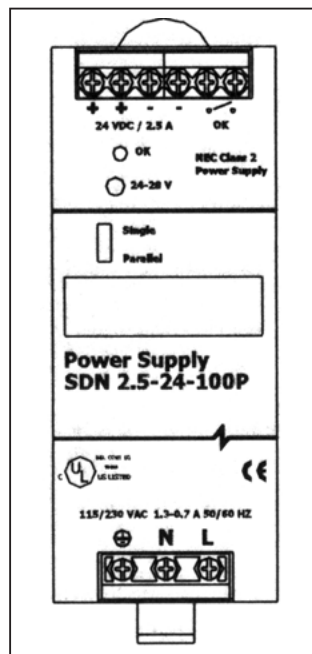
Series PSD24 power supplies are the compact DIN Rail mount version for easy installation with use of the Digital Modules. This single phase power supply automatically adjusts for either 115 or 230 VAC, 50 or 60 Hz input. The nominal output is a filtered and regulated 24 VDC / 120 Watts 5 amperes. Series PSD power supplies are UL recognized, meet CSA standards and also the CE ms. It is ATEX approved for Class 1, Div 2 Hazardous Locations.

These power supplies provide the power necessary to operate the following Electrohydraulic products:

- D*FP, D*1FP, D*FH, D*FL, D*FX, D*FB and RE* valves
- PWD00, PCD00, PWDXX, PID, PZD and EW, electronics

Operation

Series PSD24 power supplies have capability for parallel operation. Conductor sizes are listed below in the specification. DIN rail design provides easy installation. A green LED and power on logic is provided (DC OK signal). Compact, rugged, and with > 640,000 hours MTBF make this ideal for industrial applications.



UL US
UL 508 Listed
IND. CONT. EQ.
E61379

UL US
UL 60950
E137632
CUL/CSA-C22.2
No. 234-M90

CE
EMC and
Low Volt.
Directive

Ordering Information

PSD

Power
Supply

24

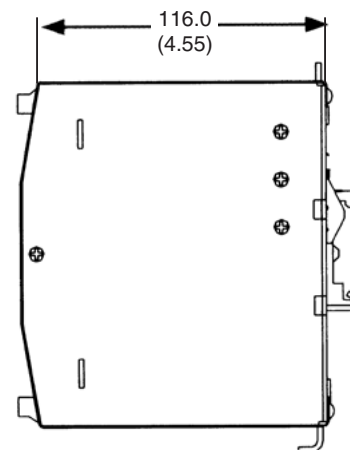
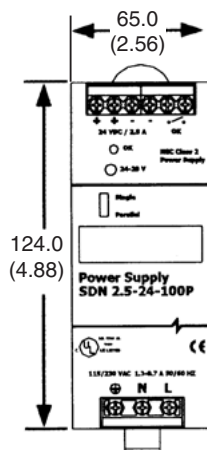
Voltage
Output

Weight: 0.62 kg (1.5 lbs)

Code	Description
24	24 VDC, 5.0 amp, on Rail Power Supply

Dimensions

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



Connector - Pinout

+24 VDC Output	[	○	○	+S ⁽¹⁾
0 VDC Common	[	○	○	-S ⁽¹⁾
AC Ground	[	○	○	
AC Hot	[	○	○	
AC Neutral	[	○	○	

Short = 110V
 Open = 220V

(1) Refer to Operation

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

D01_Cat2550.indd, ddp, 06/21

Specifications

SDN 2.5-24-100P

Input Power Requirements	
Nominal Voltage	115/230 VAC auto select
AC Range	85 - 132 / 176 - 264 VAC
DC Range ²	210 - 375 VDC
Frequency	47 - 63 Hz
Nominal Current ¹	2.2 A / 1.0 A
Inrush Current Maximum	typ. < 20 A
Output Power Specifications	
Nominal Voltage	24 VDC (22.5 - 28.5 VDC adjustable)
Tolerance	< $\pm 2\%$ overall (combination line, load, time and temperature related changes)
Ripple ³	< 50m Vpp
Nominal Current	5 A (120 W)
Peak Current ⁴	6 A 2x Nominal Current < 2 sec.
General Protection Safety	Protected against continuous short-circuit, overload, open-circuit. Protection class 1 (IEC 536), degree of protection IP20 (IEC 529). Safe low voltage: SELV (acc. EN60950)
Installation	
Fusing Input	Internally fused. External 10 A slow acting fusing for the input is recommended to protect input wiring
Mounting	Simple snap on system for DIN Rail TS35/7.5.
Input Connections	IP20-rated screw terminals; connector size range: 16-10 AWG (1.5-6 mm ²) for solid conductors, 16-12 AWG (0.5-4 mm ²) for flexible conductors
Output Connections	Two connectors per output; Connector size range: 16-10 AWG (1.5-6 mm ²) for solid conductors

Notes:

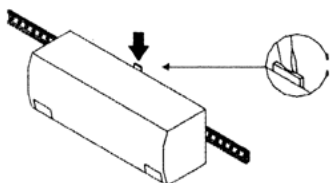
1. Input current ratings are conservatively specified with low input, worst case efficiency and power factor.
2. Losses are heat dissipation in watts at full load, nominal input line.
3. Ripple/noise is stated as typical values when measured with a 20 MHz bandwidth scope and 50 Ohm resistor.
4. All peak current is calculated at 24V levels.

DIN Rail Mounting

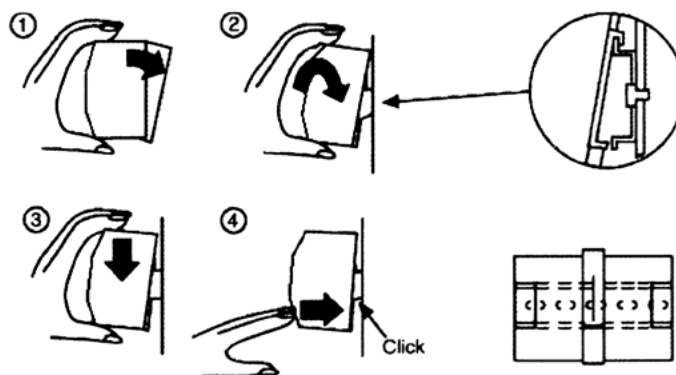
Snap on the DIN Rail

1. Tilt unit slightly backwards
2. Put it onto the DIN Rail
3. Push downwards until stopped
4. Push at the lower front edge to lock
5. Shake the unit slightly to ensure that the retainer has locked

Detachment from DIN Rail



Press button downwards (to unlock) and remove the unit from the DIN Rail.

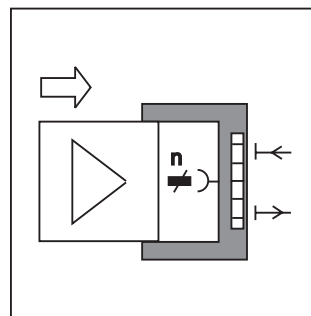
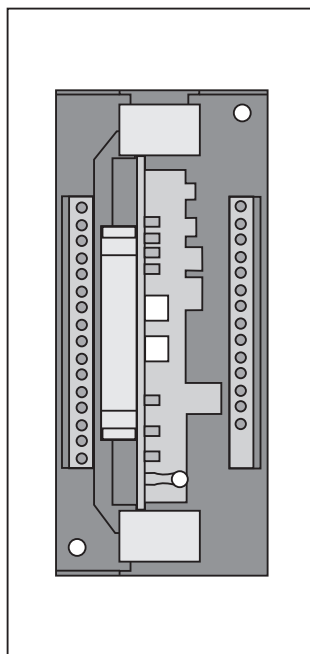


General Description

Card holders allow easy assembly and wiring of individual electronic driver card models EW, ED, and ET.

Technical Data

Base-unit	Fastened with screws or DIN rails 35mm
Printed circuit board	Carries the female connector and connection component for the terminal strip
Terminals	Screw terminals per DIN 41617 with wire prot. nominal cross-section AWG11, 5mm pitch
Female connector (per order code)	31 pole to DIN 41617, double row contacts.



Ordering Code

K Card Holder

For Driver card models:

EW 101, 104

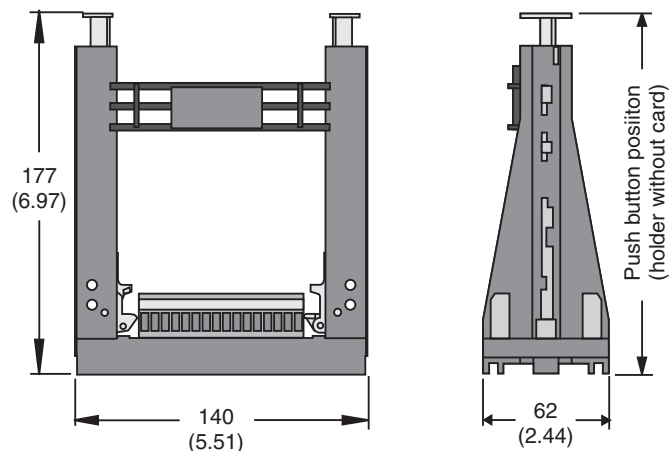
ED 104

ET 104

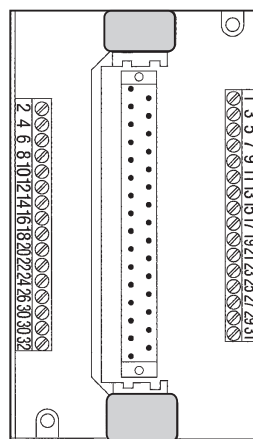
Weight: 0.5 kg (1.0 lbs)

Dimensions

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



Terminal Locations



Model K

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

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Bolt Kits/Subplates	E4
EHC Cable Asemblies Wire Color Assignments.....	E4
Series EX00-M05	E5
Terms of Sale and Warranty Limitations.....	E7
Safety Guide.....	E8



General Description

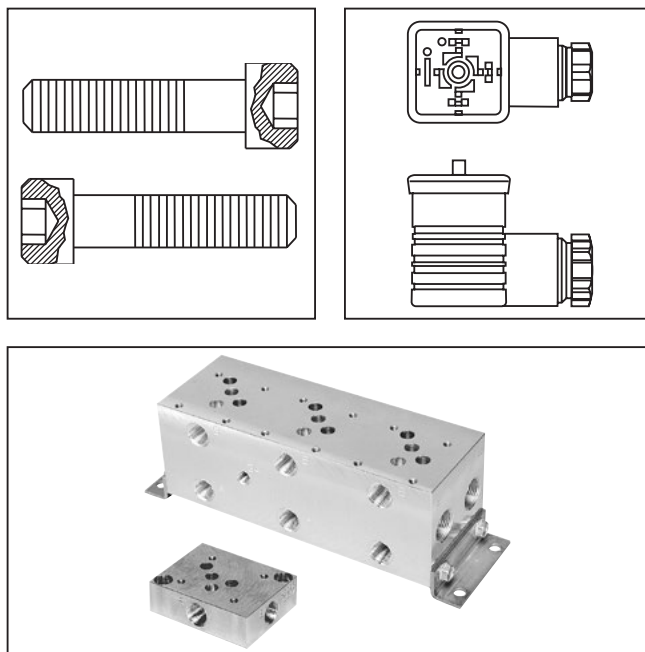
Supporting accessory products for proportional valves listed in this section include cable assemblies, connectors, bolt kits, and subplates. Valve drivers and power supplies can be found in the electronics section.

EHC cable assemblies are listed for specific valves, by function, and are supplied with an installed connector as specified at one end, pig-tails leads at the other.

Note that all valves are not shipped with a mating connector. Mating connectors are listed by valve application.

Electronic Accessories

Refer to the Electronics section for valve driver electronics, power supplies and accessories.



E

EHC Cable Assemblies

Valve Application	Connector		Function	Model
	Option	Pins		
D*FB OBE D*1FB OBE D*FC D*1FC D*FH D*1FH D*FP D*1FP	D*FX ('B' ele. option) D*6FH D*FT D*1FT RE**T RE06*T	CE compliant, 'MS' style (Preferred)	7	Primary cable assembly EHC158GE
D*FX ('C' and 'D' ele. option)	'MS' Style	6	Primary cable assembly	EHC158
D*FL	Environmental 'MS' style Environmental 'MS' style CE compliant 'MS' style CE compliant 'MS' style	4 6 4 6	Power cable Logic I/O Power cable Logic I/O	EHC154LR EHC156R EHC154LRE EHC156RE
BD, DY, SE	'MS' style	4	Primary cable assembly	EHC154S
D*FC B53 D*1FC B50 D*FP B50 D*1FP B50	D*FB W5 D*1FB W5	CE compliant	12	Primary cable assembly EHC1512GE

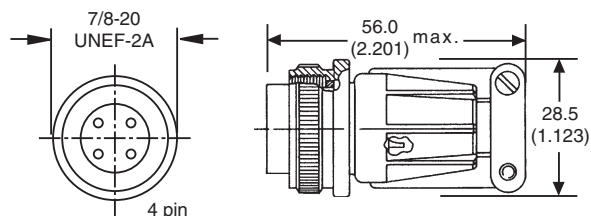
Communication Cable Assemblies

Valve Application	Connector	Function	Model
D*FB OBE D*1FB OBE D*FP D*1FP	D*1FC D*FT 52 Design D*1FT 40 Design RE06*T 26 Design	RS-232 to Mini USB	Parameter change via "ProPXD" software 40982923
D*FB OBE D*1FB OBE D*FT 52 Design	D*1FT 40 Design RE06*T 26 Design	USB to Mini USB	Parameter change via "ProPx" software 1210846

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

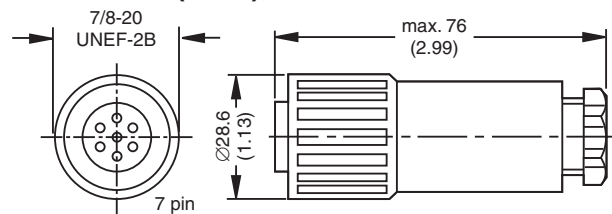
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Power Connector — D*FL



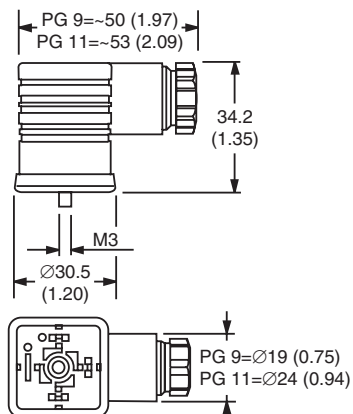
Description	Order Number
4 pin	1210292

Primary Connector — D*FT, D*FH, D*FM, D*FX (Ele. Design 'B'), RE06*T, RE**T, D*FB and D*1FB (OBE), D*FP*0 and D*FP*3



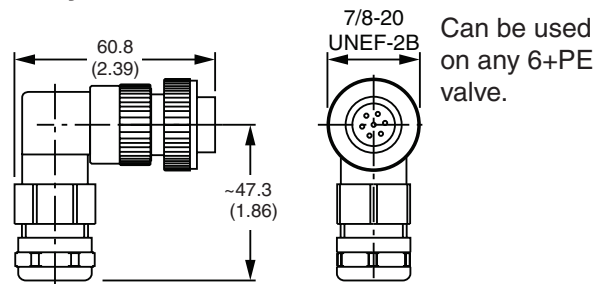
Description	Order Number
DIN 43563 6+PE	5004072

Solenoid Connectors



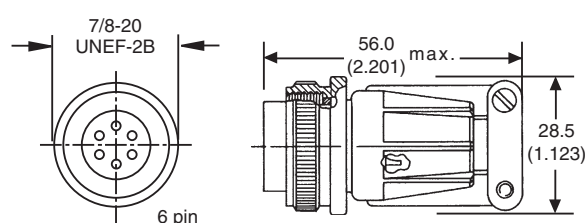
Description	Variation	Order Number
DIN 43650	Black	692914
DIN 43650	Grey	692915

Primary Connector — TDP025 and TDP050



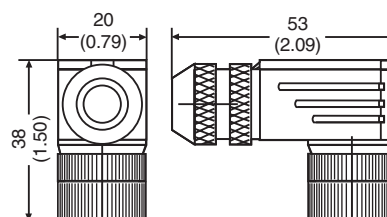
Description	Order Number
90° 7-Pin	5005160

I/O Connector — D*FL



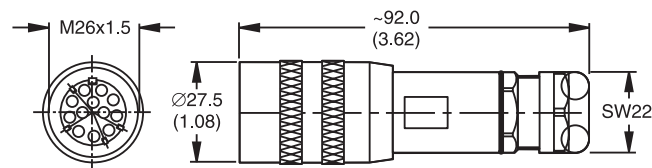
Description	Order Number
6 pin D*FL	MS3106E-14S-6S
Rubber Boot	801227
6 pin D*FX (ele. design A, C & D)	697561

LVDT Connector — D*1FS



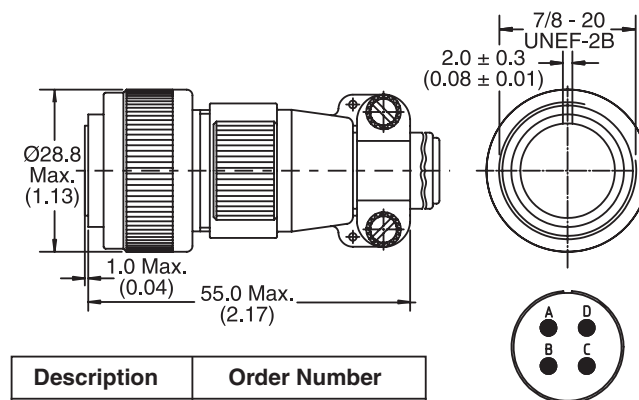
Description	Order Number
M12 / 5 pin	5004109

Primary Connector — D*FP*5, D*1FP*5, D*FB*W5 and D*1FB*W5



Description	Order Number
EN 175201-804 11+PE	5004711

Primary Connector — BD, PH, DY and SE



Description	Order Number
4-pin	MS3106E-14S-2S

Interface	Valve	Bolt Kit	Qty	Size	Subplate ⁽¹⁾	Port Size	Port Location
NG6 CETOP 3	D1F* RE06	BK209	4	10-24 x 1.25"	SPD23NS35	3/8" NPTF	Bottom
		BK375	4	M5 x 30mm	SPD23NAS35	3/8" NPTF	Side
		BK210	4	10-24 x 1.875"	SPD26SS35	#12 SAE	Bottom
					SPD26SAS35	#12 SAE	Side
NG10 CETOP 5	D3F*	BK98	4	1/4-20 x 1.625"	SPD31D6NS35	3/4" NPTF	Bottom
		BK385	4	M6 x 40mm	SPD31D6NAS35	3/4" NPTF	Side
					SPD31D6SS35	#12 SAE	Bottom
					SPD31D6SAS35	#12 SAE	Side
	D31F*	BK02 BK385	4	1/4-20 x 1.5"	SPD31D6NS35	3/4" NPTF	Bottom
			4	M6 x 40mm	SPD31D6NAS35	3/4" NPTF	Side
					SPD31D6SS35	#12 SAE	Bottom
NG16 CETOP 7	D41F*	BK160	4	3/8-16 x 2.5"	DD07SPS012S	#12 SAE	Side
			2	1/4-20 x 2.25"			
		BK320	4	M10 x 60mm	SPD46B910	G3/4"	Bottom
			2	M6 x 55mm			
	D46F*	BK153 BK440	6 6	3/8-16 x 2.0" M10 x 50mm	1402191	#20 SAE	Side
NG25 CETOP 8	D81F* D91F*	BK228 BK360	6	1/2-13 x 3"	SPD66NS35	3/4" NPTF	Bottom
			6	M12 x 75	SPD66NAS35	3/4" NPTF	Side
					SPD68NS35	1" NPTF	Bottom
					SPD68NAS35	1" NPTF	Side
					SPD610NS35	1 1/4" NPTF	Bottom
					SPD610NAS35	1 1/4" NPTF	Side
					SPD610SS35	#20 SAE	Bottom
					SPD610SAS35	#20 SAE	Side
	D96F*	BK227 BK462	6 6	1/2-13 x 2.5" M12 x 60mm	1402192	#24 SAE	Side
NG32 CETOP 10	D111F*	BK150 BK386	6	3/4-10 x 3.5"	SPD1010N35	1 1/4" NPTF	Bottom
			6	M20 x 90	SPD1012N35	1 1/2" NPTF	Bottom

(1) Ductile iron; maximum operating pressure: 350 Bar (5075 PSI). Refer to valve specifications for actual recommended maximums.

Note: All subplates listed use SAE mounting bolt hardware.

EHC Cable Assemblies Wire Color Assignments

Pin	Cable Model – Wire Color					
	154LR 154LRE	156R 156RE	Metal 158	Plastic 158G	Metal 158GE	154S
A	Red	Black	Orange	Red	Red	Black
B	Green	Red	Blue	Black	Black	Red
C	Black	White	Black	Yellow	Red/Black	Green
D	White	Green	Green/Yellow	Blue	Blue	White
E	–	Orange	Red	Orange	Orange	–
F	–	Blue	White	White	White	–
G	–	–	–	Green	Green	–

Description

Series EX00-M05 test unit is suitable for testing and commissioning of all proportional and servo proportional valves with onboard electronics that are offered in this catalog.

For easy on-site service all necessary cables are securely located inside of the rugged case. The test unit provides all command signal sources and measuring ports for concerted and time saving control and diagnosis of the valves. For operation of the new hybrid regenerative valves an additional switchable 24 V output is available.

Features

- Control of valves incorporating integrated electronics and central plug acc. DIN 43563 (6-pin + PE)
- Built-in fuses
- Cable set included
- Locable rugged box

Ordering Information

EX00	—	M05	
Test Unit			Design Series
NOTE: Not required when ordering.			



Specifications

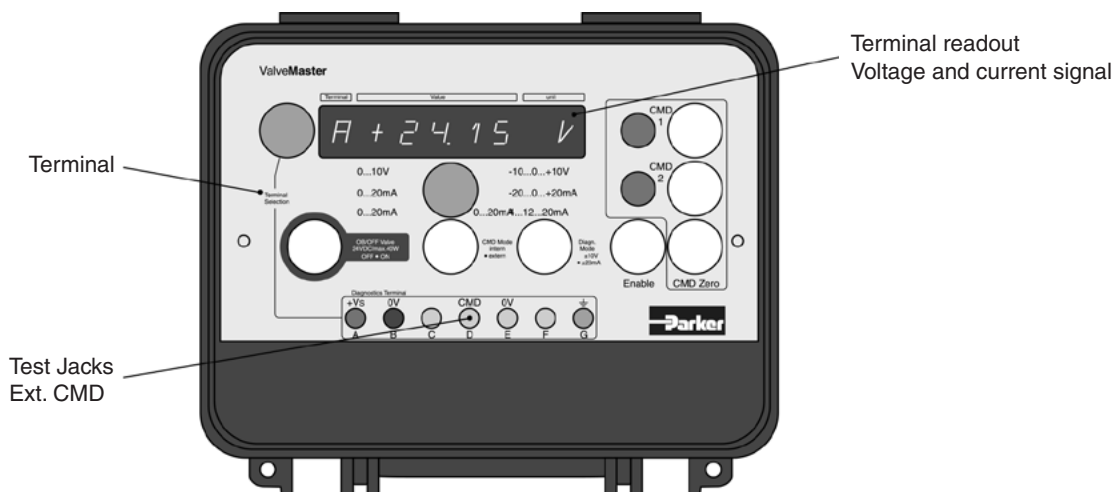
General			Electrical (Continued)		
Design	Lockable rugged box, polypropylene (break proof)		Measurement Terminals	For multimeter with Ri min = 10 kOhm	
Ambient Temperature	[°C]	0...+40; (+32°F...+104°F)	Display	Display Digits Resolution	4 10 mV / 10 mA; 1 digit
Weight	[kg]	3.9 (8.6 lbs)	Main Cord	Unit Site	Cable inlet connector IEC320
Dimensions	[mm]	L 305 x B 270 x H144 (12.0" x 10.6" x 2.7")		Main Site Cable Length	CEE 7/7 plug 2 (79")
Electrical			Valve Cords	A – Control Valves	
Duty Ratio	[%]	100		Unit Site	Connector Amphenol SV70 DIN 40040
Protection Class		IP40		Valve Site	Connector DIN 43563
Supply Voltage	[V]	85...260, 50...60 Hz			B – DC Valves
Power Consumption	[VA]	Maximum 160		Unit Site	Connector 6+PE acc. EN175201-834
Current Consumption Maximum	[A]	1.3 at 230 V		Valve Site	M12x1 as per IEC61076-2-101
Main Input Fuse	[A]	3.15 time lag		Cable Length	3 (118")
Required Main Supply Fuse	[A]	16			
EMC		EN 61000-6-2			
Valve Central Connection	Valve Supply	[V]			
	Command Voltage	[V]			
	Diagnostic Output Enable Signal	[V]			

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

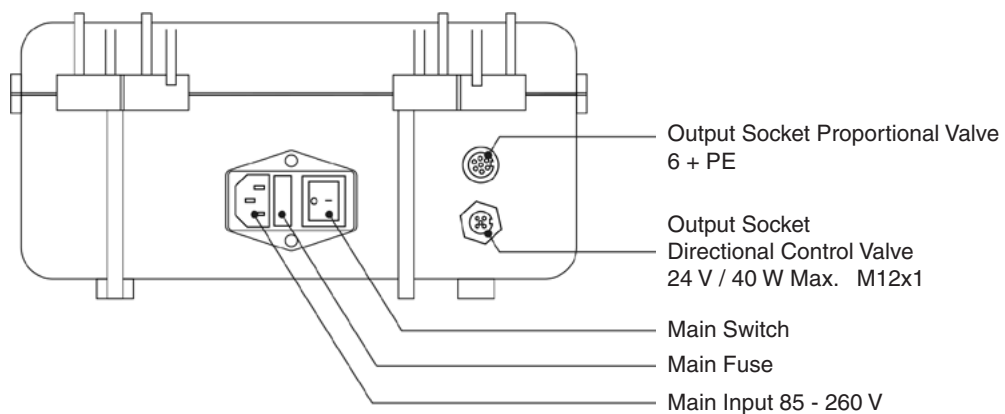
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Operator Panel

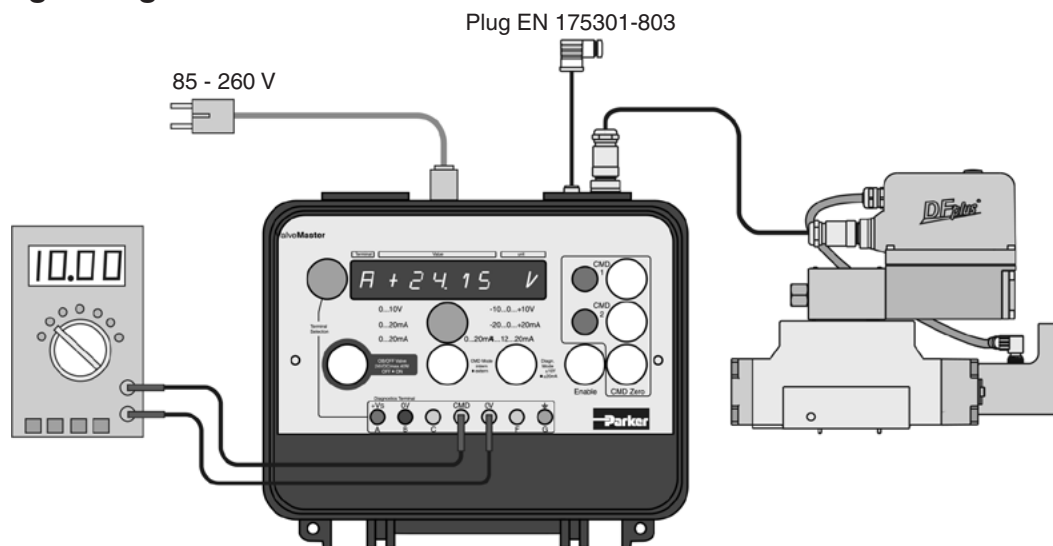
Front



Rear



Wiring Configuration



Terms of Sale with Warranty Limitations

PARKER-HANNIFIN CORPORATION — HYDRAULIC VALVE DIVISION OFFER OF SALE

1. **Definitions.** As used herein, the following terms have the meanings indicated.

Buyer: means any customer receiving a Quote for Products from Seller.
Goods: means any tangible part, system or component to be supplied by the Seller.
Products: means the Goods, Services and/or Software as described in a Quote provided by the Seller.
Quote: means the offer or proposal made by Seller to Buyer for the supply of Products.
Seller: means Parker-Hannifin Corporation, including all divisions and businesses thereof.
Services: means any services to be supplied by the Seller.
Software: means any software related to the Products, whether embedded or separately downloaded.
Terms: means the terms and conditions of this Offer of Sale or any newer version of the same as published by Seller electronically at www.parker.com/saleterms.

2. **Terms.** All sales of Products by Seller are contingent upon, and will be governed by, these Terms and, these Terms are incorporated into any Quote provided by Seller to any Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic data interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. **Price; Payment.** The Products set forth in Seller's Quote are offered for sale at the prices indicated in Seller's Quote. Unless otherwise specifically stated in Seller's Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). All sales are contingent upon credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

4. **Shipment; Delivery; Title and Risk of Loss.** All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the shipment carrier at Seller's facility. Unless otherwise agreed, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyer's request beyond the respective indicated shipping date will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

5. **Warranty.** The warranty related to the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of eighteen (18) months from the date of delivery; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the completion of the Services by Seller; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer:

DISCLAIMER OF WARRANTY: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED. BUYER AGREES AND ACKNOWLEDGES THAT UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".

6. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. **LIMITATION OF LIABILITY.** IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, NON-COMPLETION OF SERVICES, USE, LOSS OF USE OF, OR INABILITY TO USE THE PRODUCTS OR ANY PART THEREOF, LOSS OF DATA, IDENTITY, PRIVACY, OR CONFIDENTIALITY, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.**

8. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which are or become Buyer's property, will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. **Special Tooling.** Special Tooling includes but is not limited to tooling, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Products. A tooling charge may be imposed for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in Special Tooling belonging to Seller that is utilized in the manufacture of the Products, even if such Special Tooling has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property in its sole discretion at any time.

10. **Security Interest.** To secure payment of all sums due, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. **User Responsibility.** The Buyer through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. The Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and other technical information provided with the Product. If Seller provides Product options based upon data or specifications provided

by the Buyer, the Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event the Buyer is not the end-user, Buyer will ensure such end-user complies with this paragraph.

12. **Use of Products.** Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Products. Unauthorized Uses. If Buyer uses or resells the Products for any uses prohibited in Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products provided by Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tooling, equipment, plans, drawings, designs or specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing or tampering with the Products for any reason; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

13. **Cancellations and Changes.** Buyer may not cancel or modify any order for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller, at any time, may change Product features, specifications, designs and availability.

14. **Limitation on Assignment.** Buyer may not assign its rights or obligations without the prior written consent of Seller.

15. **Force Majeure.** Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control ("Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

16. **Waiver and Severability.** Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of these Terms by legislation or other rule of law shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

17. **Termination.** Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or one if filed by a third party (d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

18. **Ownership of Software.** Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

19. **Indemnity for Infringement of Intellectual Property Rights.** Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by the Seller to the Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for such claims of infringement of Intellectual Property Rights.

20. **Governing Law.** These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

21. **Entire Agreement.** These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

22. **Compliance with Laws.** Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Product from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws.





Parker Safety Guide for Selecting and Using Hose, Tubing, Fittings and Related Accessories

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WARNING: Failure or improper selection or improper use of hose, tubing, fittings, assemblies, valves, connectors, conductors or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper selection or improper use of these Products include but are not limited to:

- Fittings thrown off at high speed.
- High velocity fluid discharge.
- Explosion or burning of the conveyed fluid.
- Electrocution from high voltage electric powerlines.
- Contact with suddenly moving or falling objects that
- are controlled by the conveyed fluid.
- Injections by high-pressure fluid discharge.

- Dangerously whipping Hose.
- Tube or pipe burst.
- Weld joint fracture.
- Contact with conveyed fluids that may be hot, cold, toxic or
- otherwise injurious.
- Sparking or explosion caused by static electricity buildup or other sources of electricity.
- Sparking or explosion while spraying paint or flammable liquids.
- Injuries resulting from inhalation, ingestion or exposure to fluids.

Before selecting or using any of these Products, it is important that you read and follow the instructions below. No product from any division in Parker Fluid Connectors Group is approved for in-flight aerospace applications. For hoses and fittings used in in-flight aerospace applications, please contact Parker Aerospace Group.

1.0 GENERAL INSTRUCTIONS

1.1 Scope: This safety guide provides instructions for selecting and using (including assembling, installing, and maintaining) these Products. For convenience, all rubber and/or thermoplastic products commonly called "hose" or "tubing" are called "Hose" in this safety guide. Metallic tube or pipe are called "tube". All assemblies made with Hose are called "Hose Assemblies". All assemblies made with Tube are called "Tube Assemblies".

All products commonly called "fittings", "couplings" or "adapters" are called "Fittings". Valves are fluid system components that control the passage of fluid. Related accessories are ancillary devices that enhance or monitor performance including crimping, flaring, flanging, presetting, bending, cutting, deburring, swaging machines, sensors, tags, lockout handles, spring guards and associated tooling. This safety guide is a supplement to and is to be used with the specific Parker publications for the specific Hose, Fittings and Related Accessories that are being considered for use. Parker publications are available at www.parker.com. SAE J1273 (www.sae.org) and ISO 17165-2 (www.ansi.org) also provide recommended practices for hydraulic Hose Assemblies, and should be followed.

1.2 Fail-Safe: Hose, Hose Assemblies, Tube, Tube Assemblies and Fittings can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Hose, Hose Assembly, Tube, Tube Assembly or Fitting will not endanger persons or property.

1.3 Distribution: Provide a copy of this safety guide to each person responsible for selecting or using Hose, Tube and Fitting products. Do not select or use Parker Hose, Tube or Fittings without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the Products.

1.4 User Responsibility: Due to the wide variety of operating conditions and applications for Hose, Tube and Fittings, Parker does not represent or warrant that any particular Hose, Tube or Fitting is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the Products.
- Assuring that the user's requirements are met and that the application presents no health or safety hazards.
- Following the safety guide for Related Accessories and being trained to operate Related Accessories.
- Providing all appropriate health and safety warnings on the equipment on which the Products are used.
- Assuring compliance with all applicable government and industry standards.

1.5 Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information.

See the Parker publication for the Products being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2.0 HOSE, TUBE & FITTINGS SELECTION INSTRUCTIONS

2.1 Electrical Conductivity: Certain applications require that the Hose be nonconductive to prevent electrical current flow. Other applications require the Hose and the Fittings and the Hose/Fitting interface to be sufficiently conductive to drain off static electricity. Extreme care must be exercised when selecting Hose, Tube and Fittings for these or any other applications in which electrical conductivity or nonconductivity is a factor.

The electrical conductivity or nonconductivity of Hose, Tube and Fittings is dependent upon many factors and may be susceptible to change.

These factors include but are not limited to the various materials used to make the Hose and the Fittings, Fitting finish (some Fitting finishes are electrically conductive while others are nonconductive), manufacturing methods (including moisture control), how the Fittings contact the Hose, age and amount of deterioration or damage or other changes, moisture content of the Hose at any particular time, and other factors.

The following are considerations for electrically nonconductive and conductive Hose. For other applications consult the individual catalog pages and the appropriate industry or regulatory standards for proper selection.

2.1.1 Electrically Nonconductive Hose: Certain applications require that the Hose be nonconductive to prevent electrical current flow or to maintain electrical isolation. For applications that require Hose to be electrically nonconductive, including but not limited to applications near high voltage electric lines, only special nonconductive Hose can be used. The manufacturer of the equipment in which the nonconductive Hose is to be used must be consulted to be certain that the Hose, Tube and Fittings that are selected are proper for the application. Do not use any Parker Hose or Fittings for any such application requiring nonconductive Hose, including but not limited to applications near high voltage electric lines or dense magnetic fields, unless (i) the application is expressly approved in the Parker technical publication for the product, (ii) the Hose is marked "nonconductive", and (iii) the manufacturer of the equipment on which the Hose is to be used specifically approves the particular Parker Hose, Tube and Fittings for such use.

2.1.2 Electrically Conductive Hose: Parker manufactures special Hose for certain applications that require electrically conductive Hose. Parker manufactures special Hose for conveying paint in airless paint spraying applications. This Hose is labeled "Electrically Conductive Airless Paint Spray Hose" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in all airless paint spraying applications. Do not use any other Hose for airless paint spraying, even if electrically conductive. Use of any other Hose or failure to properly connect the Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. All hoses that convey fuels must be grounded.

Parker manufactures a special Hose for certain compressed natural gas ("CNG") applications where static electricity buildup may occur. Parker CNG Hose assemblies comply with the requirements of ANSI/IAS NGV 4.2; CSA 12.52, "Hoses for Natural Gas Vehicles and Dispensing Systems"

(www.ansi.org). This Hose is labeled "Electrically Conductive for CNG Use" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in, for example, high velocity CNG dispensing or transfer. Do not use any other Hose for CNG applications where static charge buildup may occur, even if electrically conductive. Use of other Hoses in CNG applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. Care must also be taken to protect against CNG permeation through the Hose wall. See section 2.6, Permeation, for more information. Parker CNG Hose is intended for dispenser and vehicle use within the specified temperature range. Parker CNG Hose should not be used in confined spaces or unventilated areas or areas exceeding the specified temperature range.

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Final assemblies must be tested for leaks. CNG Hose Assemblies should be tested on a monthly basis for conductivity per ANSI/IAS NGV 4.2; CSA 12.52.

Parker manufactures special Hose for aerospace in-flight applications. Aerospace in-flight applications employing Hose to transmit fuel, lubricating fluids and hydraulic fluids require a special Hose with a conductive inner tube. This Hose for in-flight applications is available only from Parker's Stratoflex Products Division. Do not use any other Parker Hose for in-flight applications, even if electrically conductive. Use of other Hoses for in-flight applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury and property damage. These Hose assemblies for in-flight applications must meet all applicable aerospace industry, aircraft engine and aircraft requirements.

2.2 Pressure: Hose, Tube and Fitting selection must be made so that the published maximum working pressure of the Hose, Tube and Fittings are equal to or greater than the maximum system pressure. The maximum working pressure of a Hose, or Tube Assembly is the lower of the respective published maximum working pressures of the Hose, Tube and the Fittings used. Surge pressures or peak transient pressures in the system must be below the published maximum working pressure for the Hose, Tube and Fitting. Surge pressures and peak pressures can usually only be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressures and cannot be used to determine surge pressures or peak transient pressures. Published burst pressure ratings for Hose is for manufacturing test purposes only and is no indication that the Product can be used in applications at the burst pressure or otherwise above the published maximum recommended working pressure.

2.3 Suction: Hoses used for suction applications must be selected to insure that the Hose will withstand the vacuum and pressure of the system. Improperly selected Hose may collapse in suction application.

2.4 Temperature: Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the Hose, Tube, Fitting and Seals. Temperatures below and above the recommended limit can degrade Hose, Tube, Fittings and Seals to a point where a failure may occur and release fluid. Tube and Fittings performances are normally degraded at elevated temperature. Material compatibility can also change at temperatures outside of the rated range. Properly insulate and protect the Hose Assembly when routing near hot objects (e.g. manifolds). Do not use any Hose in any application where failure of the Hose could result in the conveyed fluids (or vapors or mist from the conveyed fluids) contacting any open flame, molten metal, or other potential fire ignition source that could cause burning or explosion of the conveyed fluids or vapors.

2.5 Fluid Compatibility: Hose, and Tube Assembly selection must assure compatibility of the Hose tube, cover, reinforcement, Tube, Plating and Seals with the fluid media used. See the fluid compatibility chart in the Parker publication for the product being considered or used. This information is offered only as a guide. Actual service life can only be determined by the end user by testing under all extreme conditions and other analysis.

Hose, and Tube that is chemically compatible with a particular fluid must be assembled using Fittings and adapters containing likewise compatible seals. Flange or flare processes can change Tube material properties that may not be compatible with certain requirements such as NACE

2.6 Permeation: Permeation (that is, seepage through the Hose or Seal) will occur from inside the Hose or Fitting to outside when Hose or Fitting is used with gases, liquid and gas fuels, and refrigerants (including but not limited to such materials as helium, diesel fuel, gasoline, natural gas, or LPG). This permeation may result in high concentrations of vapors which are potentially flammable, explosive, or toxic, and in loss of fluid. Dangerous explosions, fires, and other hazards can result when using the wrong Hose for such applications. The system designer must take into account the fact that this permeation will take place and must not use Hose or Fitting if this permeation could be hazardous. The system designer must take into account all legal, government, insurance, or any other special regulations which govern the use of fuels and refrigerants. Never use a Hose or Fitting even though the fluid compatibility is acceptable without considering the potential hazardous effects that can result from permeation through the Hose or Tube Assembly. Permeation of moisture from outside the Hose or Fitting to inside the

Hose or Fitting will also occur in Hose or Tube assemblies, regardless of internal pressure. If this moisture permeation would have detrimental effects (particularly, but not limited to refrigeration and air conditioning systems), incorporation of sufficient drying capacity in the system or other appropriate system safeguards should be selected and used. The sudden pressure release of highly pressurized gas could also result in Explosive Decompression failure of permeated Seals and Hoses.

2.7 Size: Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.

2.8 Routing: Attention must be given to optimum routing to minimize inherent problems (kinking or flow restriction due to Hose collapse, twisting of the Hose, proximity to hot objects or heat sources). For additional routing recommendations see SAE J1273 and ISO 17165-2. Hose Assemblies have a finite life and should be installed in a manner that allows for ease of inspection and future replacement. Hose because of its relative short life, should not be used in residential and commercial buildings inside of inaccessible walls or floors, unless specifically allowed in the product literature. Always review all product literature for proper installation and routing instructions.

2.9 Environment: Care must be taken to insure that the Hose, Tube and Fittings are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants can cause degradation and premature failure.

2.10 Mechanical Loads: External forces can significantly reduce Hose, Tube and Fitting life or cause failure. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration. Use of swivel type Fittings or adapters may be required to insure no twist is put into the Hose. Use of proper Hose or Tube clamps may also be required to reduce external mechanical loads. Unusual applications may require special testing prior to Hose selection.

2.11 Physical Damage: Care must be taken to protect Hose from wear, snagging, kinking, bending smaller than minimum bend radius and cutting, any of which can cause premature Hose failure. Any Hose that has been kinked or bent to a radius smaller than the minimum bend radius, and any Hose that has been cut or is cracked or is otherwise damaged should be removed and discarded. Fittings with damages such as scratches on sealing surfaces and deformation should be replaced.

2.12 Proper End Fitting: See instructions 3.2 through 3.5. These recommendations may be substantiated by testing to industry standards such as SAE J517 for hydraulic applications, or MIL-A-5070, AS1339, or AS3517 for Hoses from Parker's Stratoflex Products Division for aerospace applications.

2.13 Length: When determining the proper Hose or Tube length of an assembly, be aware of Hose length change due to pressure, Tube length change due to thermal expansion or contraction, and Hose or Tube and machine tolerances and movement must be considered. When routing short hose assemblies, it is recommended that the minimum free hose length is always used. Consult the hose manufacturer for their minimum free hose length recommendations. Hose assemblies should be installed in such a way that any motion or flexing occurs within the same plane.

2.14 Specifications and Standards: When selecting Hose, Tube and Fittings, government, industry, and Parker specifications and recommendations must be reviewed and followed as applicable.

2.15 Hose Cleanliness: Hose and Tube components may vary in cleanliness levels. Care must be taken to insure that the Hose and Tube Assembly selected has an adequate level of cleanliness for the application.

2.16 Fire Resistant Fluids: Some fire resistant fluids that are to be conveyed by Hose or Tube require use of the same type of Hose or Tube as used with petroleum base fluids. Some such fluids require a special Hose, Tube, Fitting and Seal, while a few fluids will not work with any Hose at all. See instructions 2.5 and 1.5. The wrong Hose, Tube, Fitting or Seal may fail after a very short service. In addition, all liquids but pure water may burn fiercely under certain conditions, and even pure water leakage may be hazardous.

2.17 Radiant Heat: Hose and Seals can be heated to destruction without contact by such nearby items as hot manifolds or molten metal. The

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same heat source may then initiate a fire. This can occur despite the presence of cool air around the Hose or Seal. Performance of Tube and Fitting subjected to the heat could be degraded.

2.18 Welding or Brazing: When using a torch or arc welder in close proximity to hydraulic lines, the hydraulic lines should be removed or shielded with appropriate fire resistant materials. Flame or weld spatter could burn through the Hose or Seal and possibly ignite escaping fluid resulting in a catastrophic failure. Heating of plated parts, including Hose Fittings and adapters, above 450°F (232°C) such as during welding, brazing or soldering may emit deadly gases. Any elastomer seal on fittings shall be removed prior to welding or brazing, any metallic surfaces shall be protected after brazing or welding when necessary. Welding and brazing filler material shall be compatible with the Tube and Fitting that are joined.

2.19 Atomic Radiation: Atomic radiation affects all materials used in Hose and Tube assemblies. Since the long-term effects may be unknown, do not expose Hose or Tube assemblies to atomic radiation. Nuclear applications may require special Tube and Fittings.

2.20 Aerospace Applications: The only Hose, Tube and Fittings that may be used for in-flight aerospace applications are those available from Parker's Stratoflex Products Division. Do not use any other Hose or Fittings for in-flight applications. Do not use any Hose or Fittings from Parker's Stratoflex Products Division with any other Hose or Fittings, unless expressly approved in writing by the engineering manager or chief engineer of Stratoflex Products Division and verified by the user's own testing and inspection to aerospace industry standards.

2.21 Unlocking Couplings: Ball locking couplings or other Fittings with quick disconnect ability can unintentionally disconnect if they are dragged over obstructions, or if the sleeve or other disconnect member, is bumped or moved enough to cause disconnect. Threaded Fittings should be considered where there is a potential for accidental uncoupling.

3.0 HOSE AND FITTINGS ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1 Component Inspection: Prior to assembly, a careful examination of the Hose and Fittings must be performed. All components must be checked for correct style, size, catalog number, and length. The Hose must be examined for cleanliness, obstructions, blisters, cover looseness, kinks, cracks, cuts or any other visible defects. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion or other imperfections. Do NOT use any component that displays any signs of nonconformance.

3.2 Hose and Fitting Assembly: Do not assemble a Parker Fitting on a Parker Hose that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Do not assemble a Parker Fitting on another manufacturer's Hose or a Parker Hose on another manufacturer's Fitting unless (i) the engineering manager or chief engineer of the appropriate Parker division approves the Assembly in writing or that combination is expressly approved in the appropriate Parker literature for the specific Parker product, and (ii) the user verifies the Assembly and the application through analysis and testing. For Parker Hose that does not specify a Parker Fitting, the user is solely responsible for the selection of the proper Fitting and Hose Assembly procedures. See instruction 1.4.

To prevent the possibility of problems such as leakage at the Fitting or system contamination, it is important to completely remove all debris from the cutting operation before installation of the Fittings. The Parker published instructions must be followed for assembling the Fittings on the Hose. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.

3.3 Related Accessories: Do not crimp or swage any Parker Hose or Fitting with anything but the listed swage or crimp machine and dies in accordance with Parker published instructions. Do not crimp or swage another manufacturer's Fitting with a Parker crimp or swage die unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.4 Parts: Do not use any Parker Fitting part (including but not limited to socket, shell, nipple, or insert) except with the correct Parker mating parts, in accordance with Parker published instructions, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.5 Field Attachable/Permanent: Do not reuse any field attachable Hose Fitting that has blown or pulled off a Hose. Do not reuse a Parker permanent Hose Fitting (crimped or swaged) or any part thereof. Complete Hose Assemblies may only be reused after proper inspection under section 4.0. Do not assemble Fittings to any previously used hydraulic Hose that was in service, for use in a fluid power application.

3.6 Pre-Installation Inspection: Prior to installation, a careful examination of the Hose Assembly must be performed. Inspect the Hose Assembly for any damage or defects. Do NOT use any Hose Assembly that displays any signs of nonconformance.

3.7 Minimum Bend Radius: Installation of a Hose at less than the minimum listed bend radius may significantly reduce the Hose life. Particular attention must be given to preclude sharp bending at the Hose to Fitting juncture. Any bending during installation at less than the minimum bend radius must be avoided. If any Hose is kinked during installation, the Hose must be discarded.

3.8 Twist Angle and Orientation: Hose Assembly installation must be such that relative motion of machine components does not produce twisting.

3.9 Securement: In many applications, it may be necessary to restrain, protect, or guide the Hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

3.10 Proper Connection of Ports: Proper physical installation of the Hose Assembly requires a correctly installed port connection insuring that no twist or torque is transferred to the Hose when the Fittings are being tightened or otherwise during use.

3.11 External Damage: Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

3.12 System Checkout: All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Hose maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

3.13 Routing: The Hose Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame or sparks, a fire or explosion may occur. See section 2.4.

3.14 Ground Fault Equipment Protection Devices (GFEPDs): WARNING! Fire and Shock Hazard. To minimize the danger of fire if the heating cable of a Multitube bundle is damaged or improperly installed, use a Ground Fault Equipment Protection Device. Electrical fault currents may be insufficient to trip a conventional circuit breaker.

For ground fault protection, the IEEE 515: (www.ansi.org) standard for heating cables recommends the use of GFEPDs with a nominal 30 milliampere trip level for "piping systems in classified areas, those areas requiring a high degree of maintenance, or which may be exposed to physical abuse or corrosive atmospheres".

4.0 TUBE AND FITTINGS ASSEMBLY AND INSTALLATION INSTRUCTIONS

4.1 Component Inspection: Prior to assembly, a careful examination of the Tube and Fittings must be performed. All components must be checked for correct style, size, material, seal, and length. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion, missing seal or other imperfections. Do NOT use any component that displays any signs of nonconformance.

4.2 Tube and Fitting Assembly: Do not assemble a Parker Fitting with a Tube that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. The Tube must meet the requirements specified to the Fitting. The Parker published instructions must be followed for assembling the Fittings to a Tube. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.

4.3 Related Accessories: Do not preset or flange Parker Fitting components using another manufacturer's equipment or procedures unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Tube, Fitting component and tool-

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ing must be checked for correct style, size and material. Operation and maintenance of Related Accessories must be in accordance with the operation manual for the designated Accessory.

4.4 Securement: In many applications, it may be necessary to restrain, protect, or guide the Tube to protect it from damage by unnecessary flexing, pressure surges, vibration, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

4.5 Proper Connection of Ports: Proper physical installation of the Tube Assembly requires a correctly installed port connection insuring that no torque is transferred to the Tube when the Fittings are being tightened or otherwise during use.

4.6 External Damage: Proper installation is not complete without insuring that tensile loads, side loads, flattening, potential abrasion, thread damage or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

4.7 System Checkout: All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Tube Assembly maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

4.8 Routing: The Tube Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame or sparks, a fire or explosion may occur. See section 2.4.

5.0 HOSE AND FITTING MAINTENANCE AND REPLACEMENT INSTRUCTIONS

5.1 Even with proper selection and installation, Hose life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible Hose failure, and experience with any Hose failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the Products so that Products are replaced before any failure occurs. Certain products require maintenance and inspection per industry requirements. Failure to adhere to these requirements may lead to premature failure. A maintenance program must be established and followed by the user and, at minimum, must include instructions 5.2 through 5.7

5.2 Visual Inspection Hose/Fitting: Any of the following conditions require immediate shut down and replacement of the Hose Assembly:

- Fitting slippage on Hose;
- Damaged, cracked, cut or abraded cover (any reinforcement exposed);
- Hard, stiff, heat cracked, or charred Hose;
- Cracked, damaged, or badly corroded Fittings;
- Leaks at Fitting or in Hose;
- Kinked, crushed, flattened or twisted Hose; and
- Blistered, soft, degraded, or loose cover.

5.3 Visual Inspection All Other: The following items must be tightened, repaired, corrected or replaced as required:

- Leaking port conditions;
- Excess dirt buildup; /
- Worn clamps, guards or shields; and
- System fluid level, fluid type, and any air entrapment.

5.4 Functional Test: Operate the system at maximum operating pressure and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system. See section 2.2.

5.5 Replacement Intervals: Hose assemblies and elastomeric seals used on Hose Fittings and adapters will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Hose Assemblies and elastomeric seals should be inspected and replaced at specific replacement intervals, based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage, or injury risk. See section 1.2. Hose and Fittings may be subjected to internal mechanical and/or chemical wear from the conveying fluid and may fail without warning. The user must determine the product life under such circumstances by testing. Also see section 2.5.

5.6 Hose Inspection and Failure: Hydraulic power is accomplished by utilizing high pressure fluids to transfer energy and do work. Hoses, Fittings and Hose Assemblies all contribute to this by transmitting fluids at high pressures. Fluids under pressure can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure and handling the Hoses transporting the fluids. From time to time, Hose Assemblies will fail if they are not replaced at proper time intervals. Usually these failures are the result of some form of misapplication, abuse, wear or failure to perform proper maintenance. When Hoses fail, generally the high pressure fluids inside escape in a stream which may or may not be visible to the user. Under no circumstances should the user attempt to locate the leak by "feeling" with their hands or any other part of their body. High pressure fluids can and will penetrate the skin and cause severe tissue damage and possibly loss of limb. Even seemingly minor hydraulic fluid injection injuries must be treated immediately by a physician with knowledge of the tissue damaging properties of hydraulic fluid.

If a Hose failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the Hose Assembly. Simply shutting down the hydraulic pump may or may not eliminate the pressure in the Hose Assembly. Many times check valves, etc., are employed in a system and can cause pressure to remain in a Hose Assembly even when pumps or equipment are not operating. Tiny holes in the Hose, commonly known as pinholes, can eject small, dangerously powerful but hard to see streams of hydraulic fluid. It may take several minutes or even hours for the pressure to be relieved so that the Hose Assembly may be examined safely.

Once the pressure has been reduced to zero, the Hose Assembly may be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a Hose Assembly that has failed. Consult the nearest Parker distributor or the appropriate Parker division for Hose Assembly replacement information.

Never touch or examine a failed Hose Assembly unless it is obvious that the Hose no longer contains fluid under pressure. The high pressure fluid is extremely dangerous and can cause serious and potentially fatal injury.

5.7 Elastomeric seals: Elastomeric seals will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Elastomeric seals should be inspected and replaced.

5.8 Refrigerant gases: Special care should be taken when working with refrigeration systems. Sudden escape of refrigerant gases can cause blindness if the escaping gases contact the eye and can cause freezing or other severe injuries if it contacts any other portion of the body.

5.9 Compressed natural gas (CNG): Parker CNG Hose Assemblies should be tested after installation and before use, and at least on a monthly basis per instructions provided on the Hose Assembly tag. The recommended procedure is to pressurize the Hose and check for leaks and to visually inspect the Hose for damage and to perform an electrical resistance test.

Caution: Matches, candles, open flame or other sources of ignition shall not be used for Hose inspection. Leak check solutions should be rinsed off after use.

6.0 HOSE STORAGE

6.1 Age Control: Hose and Hose Assemblies must be stored in a manner that facilitates age control and first-in and first-out usage based on manufacturing date of the Hose and Hose Assemblies. Unless otherwise specified by the manufacturer or defined by local laws and regulations:

6.1.1 The shelf life of rubber hose in bulk form or hose made from two or more materials is 28 quarters (7 years) from the date of manufacture, with an extension of 12 quarters (3 years), if stored in accordance with ISO 2230;

6.1.2 The shelf life of thermoplastic and polytetrafluoroethylene hose is considered to be unlimited;

6.1.3 Hose assemblies that pass visual inspection and proof test shall not be stored for longer than 2 years.

6.1.4 Storage: Stored Hose and Hose Assemblies must not be subjected to damage that could reduce their expected service life and must be placed in a cool, dark and dry area with the ends capped. Stored Hose and Hose Assemblies must not be exposed to temperature extremes, ozone, oils, corrosive liquids or fumes, solvents, high humidity, rodents, insects, ultraviolet light, electromagnetic fields or radioactive materials.

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