Electrohydraulic Motion Controls

Proportional Directional & Pressure Control Valves
Servovalves, Electronics, Accessories

Catalog HY14-2550/US

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

Parker

ENGINEERING YOUR SUCCESS.

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SAFETY GUIDE

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

Cat HY14-2550-frtcvr.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Contents

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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Proportional Pressure Control Valves

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Alphabetical Index

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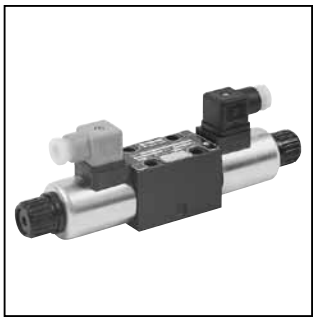
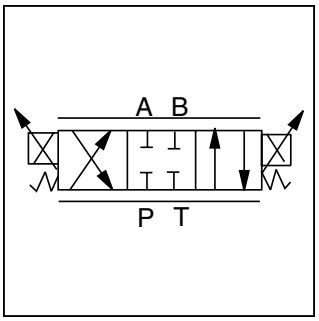
A

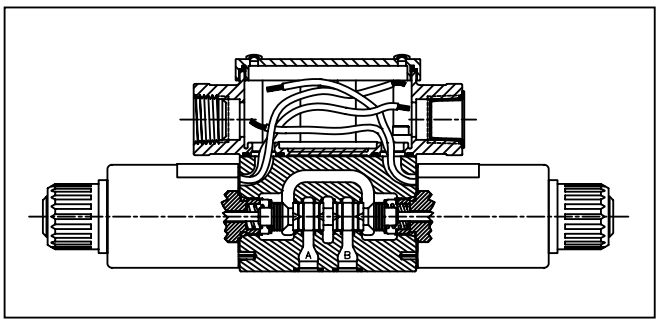
General Description

Series D*FW direct operated proportional directional control solenoid valves are available in sizes NG6 (CETOP 3) and NG10 (CETOP 5).

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





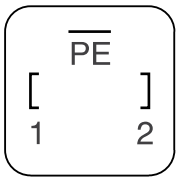


Features

- Standard DIN/ISO/CETOP/NFPA interfaces.
- Progressive flow characteristics for improved low flow resolution.
- Spring centered spool.
- Wide selection of spool options and flow capacity.

Wiring D*FW — Solenoid Coil

(without integrated electronics)



1 = coil connection
2 = coil connection
PE = ground potential

Specifications

Interface DIN	NG6 (CETOP 3)	NG10 (CETOP 5)
Flow Rating @10 Bar (150 PSI) Δp (P→A, B→T) (spool options up to) LPM (GPM)	20 (5.3)	60 (15.9)
Maximum Flow (refer to operating limit curves) LPM (GPM)	48 (12.5)	170 (45)
Step Response (time to reach 90% of a 100% step command) ms	100	165

Hysteresis	%	<8	**Fluid Viscosity, Recommended**	80 – 1000 SSU
Repeatability	%	<2	**Fluid Temperature, Recommended**	0°C to +60°C (+32°F to +140°F)
Max. Operating Pressure Port P, A, B Port T	Bar (PSI)	315 (4500) 35 (500)	**Environmental Protection Class**	NEMA 1 (IP54)
Fluid Cleanliness Level		ISO Class 16/13	**Ambient Operating Temperature**	-20°C to +60°C (-4°F to +140°F)

Ordering Information

Series D*FW

D		F	W									
Directional Control Valve	Size	Flow Control	Open Loop	Spool Type	Flow	Style	Seal	Solenoid Voltage	Solenoid Accessories	Valve Accessories	Design Series

NOTE: Not required when ordering.

Code	Description
1	NG6/CETOP 3
3	NG10/CETOP 5

Code	Description
J(2)	24 VDC
K	12 VDC
M(2)	9 VDC

(2) Not for D3FW

Code	Description
0	Standard(1)

(1) Metal can coils

Code	Description
F(3)	Free Coil Lead Wires
W(5)	Socket Connector DIN 43650 without Plug

(3) D1FW, 9V overmolded coil only.
(4) Contact factory for custom lead wire and connector options in OEM quantities.
(5) Not available 9V coil.

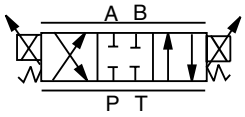
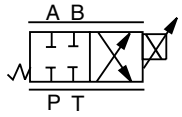
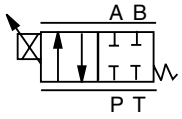
Code	Description
N	Nitrile
V	Fluorocarbon

Code	Spool Overlap			
	$Q_A > Q_B$ 1)		$Q_A = Q_B$	
	10%	Spool Type	10%	20%	Spool Type
B31			E01	E81*	
B32			E02	E82*	
			E09	–	

1) Reduced Flow Rate on Port B, Nominal Flow Rate on Port A
Code A* for spool $Q_B > Q_A$ optional
Refer to factory for ratio spool options.
* Use E01 or E02 for new applications.

Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge	
	D1FW LPM (GPM)	D3FW LPM (GPM)
C	7.5 (2.0)*†	–
F	15 (4.0)	–
H	20 (5.3)†#	20 (5.3)*†
K**	–	30 (7.8)
M	–	40 (10.6)
S	–	60 (15.9)†#

Refer to factory for ratio spool options.
* E09 spools only available where indicated.
** E01 spool only.
† Type E spool only.
# Not available with E81, E82.

Code	Style
C	
E	
K	

Bolt Kits:

D1FW	BK209	(4) 10-24x1.25 SHCS
D3FW	BK98	(4) 1/4-20x1.62 SHCS

Weight:

D1FW	2.5 kg (5.5 lbs.)
D3FW	6.8 kg (15.0 lbs.)

Driver Cards

Refer to the Electronics section for driver cards and support electronics.

Mounting Interface

Refer to Mounting Interface Dimensions in the Proportional Directional Valve section of this catalog.

Accessories

Refer to the Accessories section for bolt kits, subplates and connectors.

D_FW.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Electrical Specifications

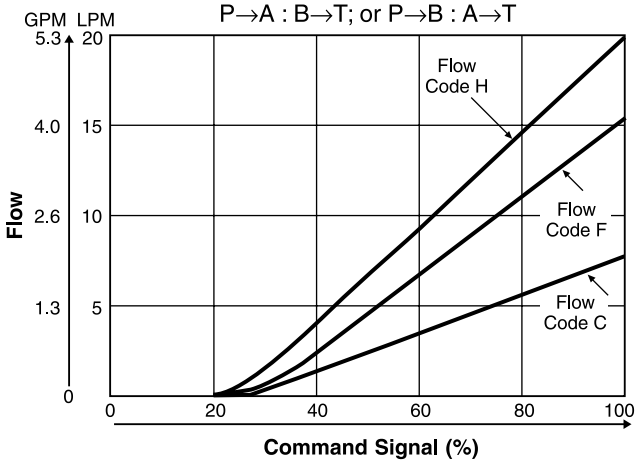
A

Series D*FW
without integrated electronics

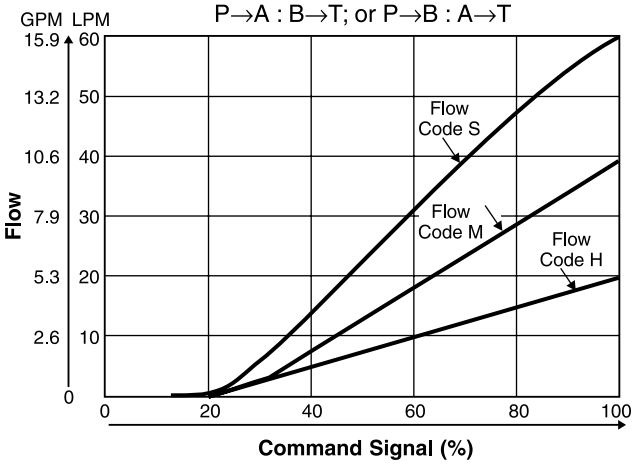
Interface DIN		NG6 (CETOP 3)			NG10 (CETOP 5)	
Solenoid Order Code		**J**	**K**	**M**	**K**	**J**
Nominal Resistance	**ohms**	24	6	3.3	4	16
Nominal Current	**amps**	0.9	1.8	2.5	2.5	1.25
Nominal Voltage	**voltage**	**24**	**12**	**9**	**12**	**24**
Environmental Protection Class		NEMA 1 (IP54)				
Mating Connectors — Solenoid (DIN 43650)		Part #692914 (Black)				
		Part #692915 (Gray)				

Performance Curves

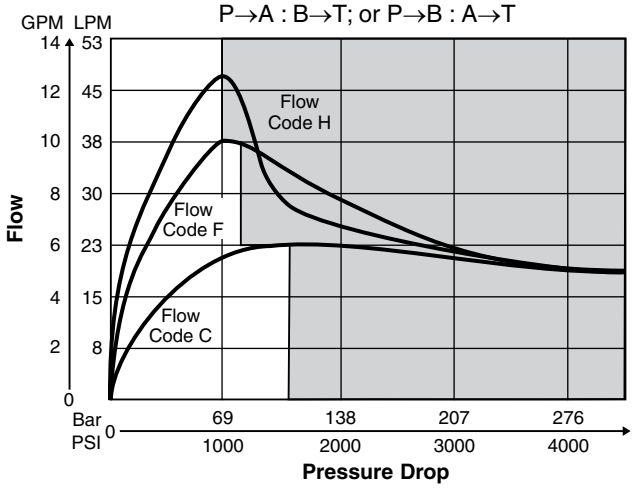
D1FW Flow Characteristics
at Δp = 5 Bar (72.5 PSI) per metering edge
P→A : B→T; or P→B : A→T



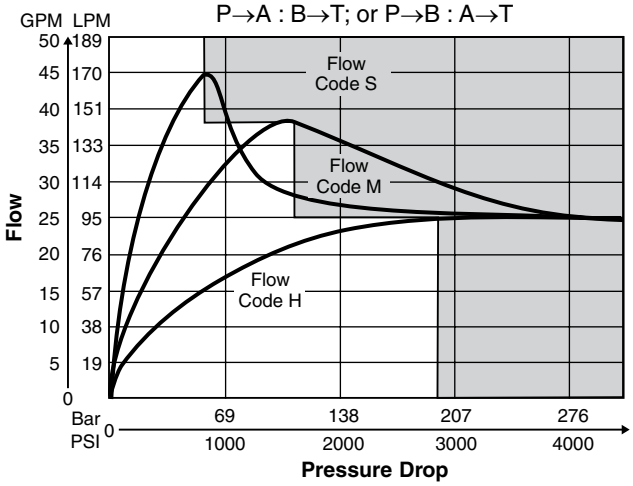
D3FW Flow Characteristics
at Δp = 5 Bar (72.5 PSI) per metering edge
P→A : B→T; or P→B : A→T



D1F* Operating Limits [1)]
at 100% Command
P→A : B→T; or P→B : A→T



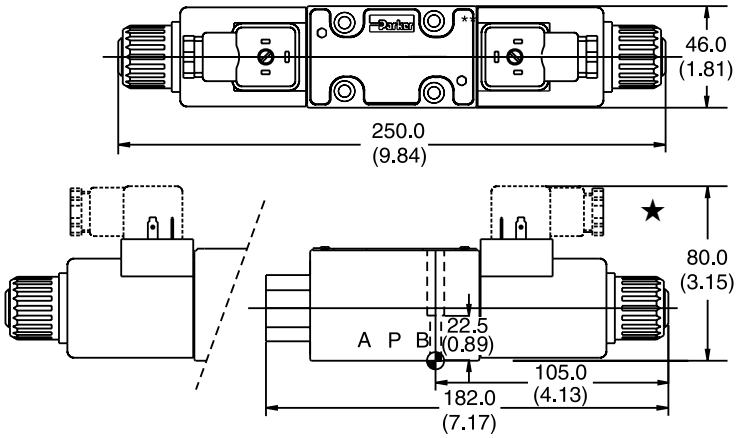
D3F* Operating Limits [1)]
at 100% Command
P→A : B→T; or P→B : A→T



1) Shaded area: Actual flow subject to the system load dynamics
Note: 81 and 82 spools - decrease limits by 15%

D1FW with Hirschmann Connectors

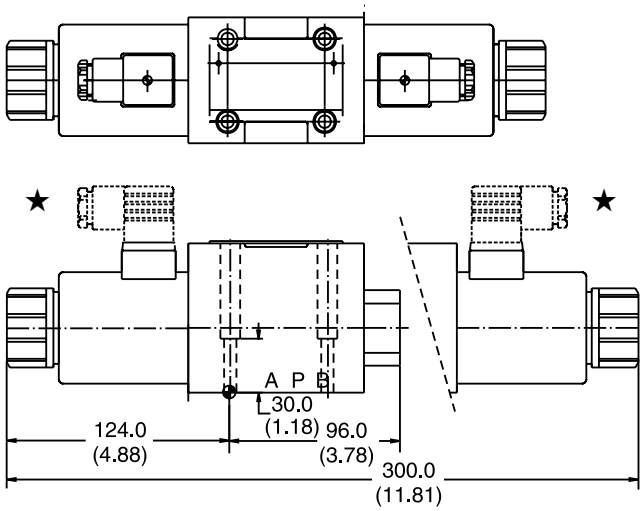
Inch equivalents for millimeter dimensions are shown in (**)



D3FW with Hirschmann Connectors

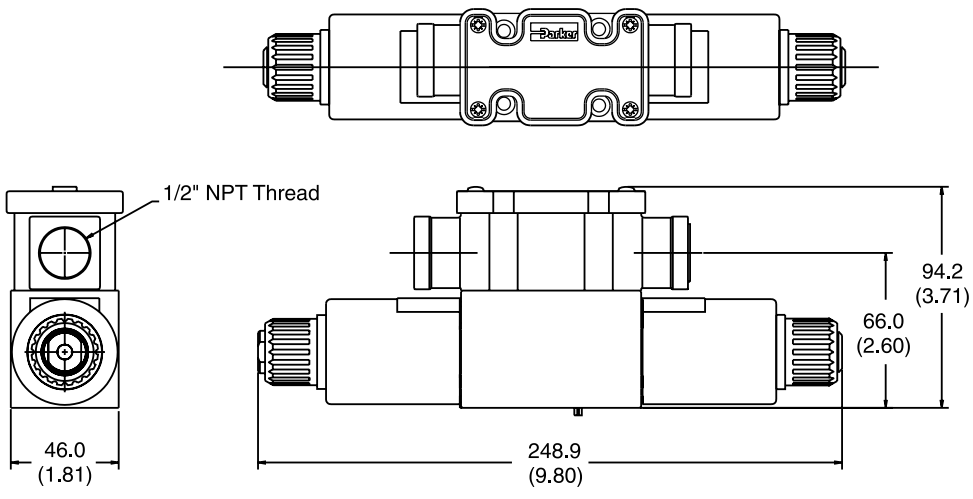
★ Order plugs separately.

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



D1FW with Conduit Box

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



D_FW.indd, dd

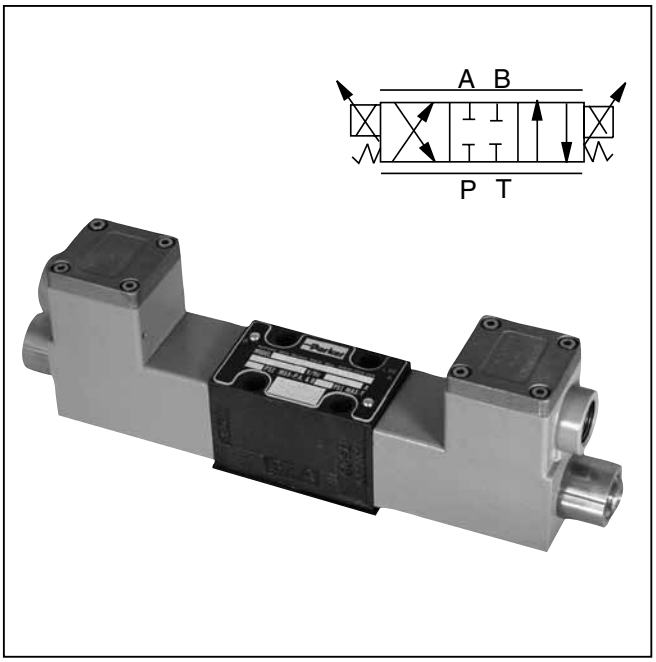
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

General Description

Series D1FW direct operated proportional directional control solenoid valves are available with explosion proof solenoids for hazardous conditions. Valves are available in sizes NG6 (CETOP 3).

Typical applicatons include reproducible control of acutator 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 spool.
- Wide selection of spool options and flow capacity.
- Single piece rugged solenoid assembly.

Specifications

Interface DIN	**NG6 (CETOP 3)**
Flow Rating @10 Bar (150 PSI) Δp (P→A, B→T) (spool options up to) LPM (GPM)	20 (5.3)
Maximum Flow (refer to operating limit curves) LPM (GPM)	48 (12.5)
Step Response (time to reach 90% of a 100% step command) ms	100

Hysteresis	%	<8	**Fluid Viscosity, Recommended**	80 – 1000 SSU
Repeatability	%	<2	**Fluid Temperature, Recommended**	0°C to +60°C (+32°F to +140°F)
Max. Operating Pressure			**Environmental Protection Class**	NEMA 4 (IP65)
Port P, A, B	Bar (PSI)	315 (4500)		
Port T		35 (500)	**Ambient Operating Temperature**	-20°C to +60°C (-4°F to +140°F)
Fluid Cleanliness Level		ISO Class 16/13		

Complies with:

Ex d IIC

AEx d IIC for Class I Zone 1

UL1203, UL1604, CSA E61241-1-1
Class II Div 1

C US

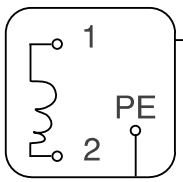
Ex d IIC Ex tD A21 CE 1180 Ex II 2GD

EN60079-0, EN60079-1
EN61241-0, EN61241-1

Wiring D1FW — Solenoid Coil

(without integrated electronics)

CE



1 = coil connection
2 = coil connection
PE = ground potential

Ex

C US

D	1	F	W					L	E	T	
Directional Control Valve	Size	Flow Control	Open Loop	Spool Type	Flow	Style	Seal	Solenoid Voltage	Solenoid Accessories	Valve Accessories	Design Series

NOTE: Not required when ordering.

Code	Description
1	DIN NG6 CETOP 3 NFPA D03

Code	Description
L	6 VDC

Code	Description
T	Exd IIc ATEX / CSA

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
E	Explosion Proof

Code		
Spool Overlap		
10%	20%	Spool Type
E01	E81*	
E02	E82*	
E09	–	

Refer to factory for ratio spool options.

* Use E01 or E02 for new applications.

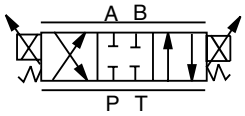
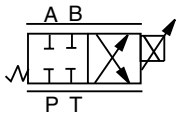
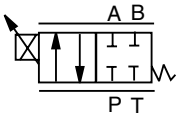
Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge LPM (GPM)
C	7.5 (2.0)*
F	15 (4.0)
H	20 (5.3)†#

Refer to factory for ratio spool options.

* E09 spools only available where indicated.

† Type E spool only.

\# Not available with E81, E82.

Code	Style
C	
E	
K	

Bolt Kit:

BK209	(4) 10-24x1.25 SHCS
BK375	(4) M5 x 30mm SHCS

Weight:

NG6	4.1 kg (9.1 lbs.)

A

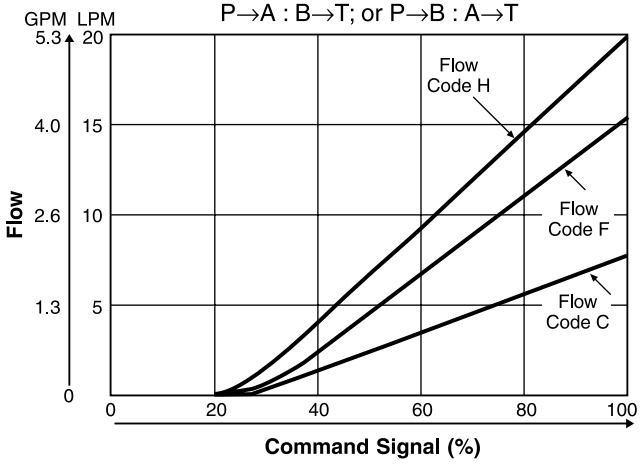
Electrical Specifications
Explosion Proof

Interface DIN		NG6 (CETOP 3)
Solenoid Order Code		**L**
Nominal Resistance	ohms	2.0
Nominal Current	amps	2.4
Nominal Voltage	voltage	5
Nominal Wattage	watts	11.5
Environmental Protection Class		IP66

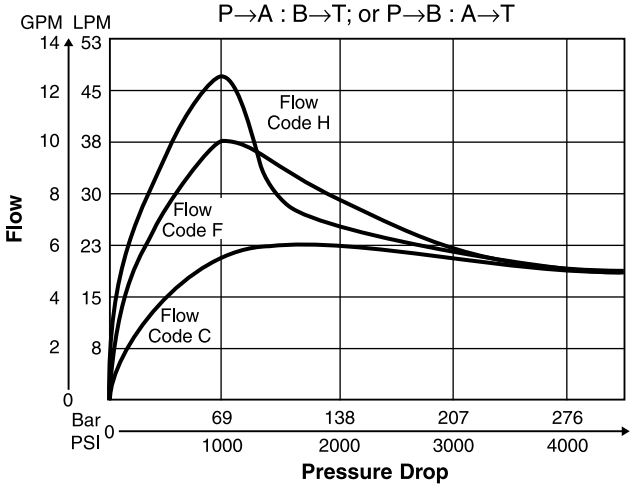
Explosion Proof Ratings	
CSA	Exd IIc, AExd Class I Zone I
ATEX	EEx d IIc G T4 -54°C to 90°C

Performance Curves

D1FW Flow Characteristics
at Δp = 5 Bar (72.5 PSI) per metering edge
P→A : B→T; or P→B : A→T



D1FW Operating Limits
at 100% Command
P→A : B→T; or P→B : A→T



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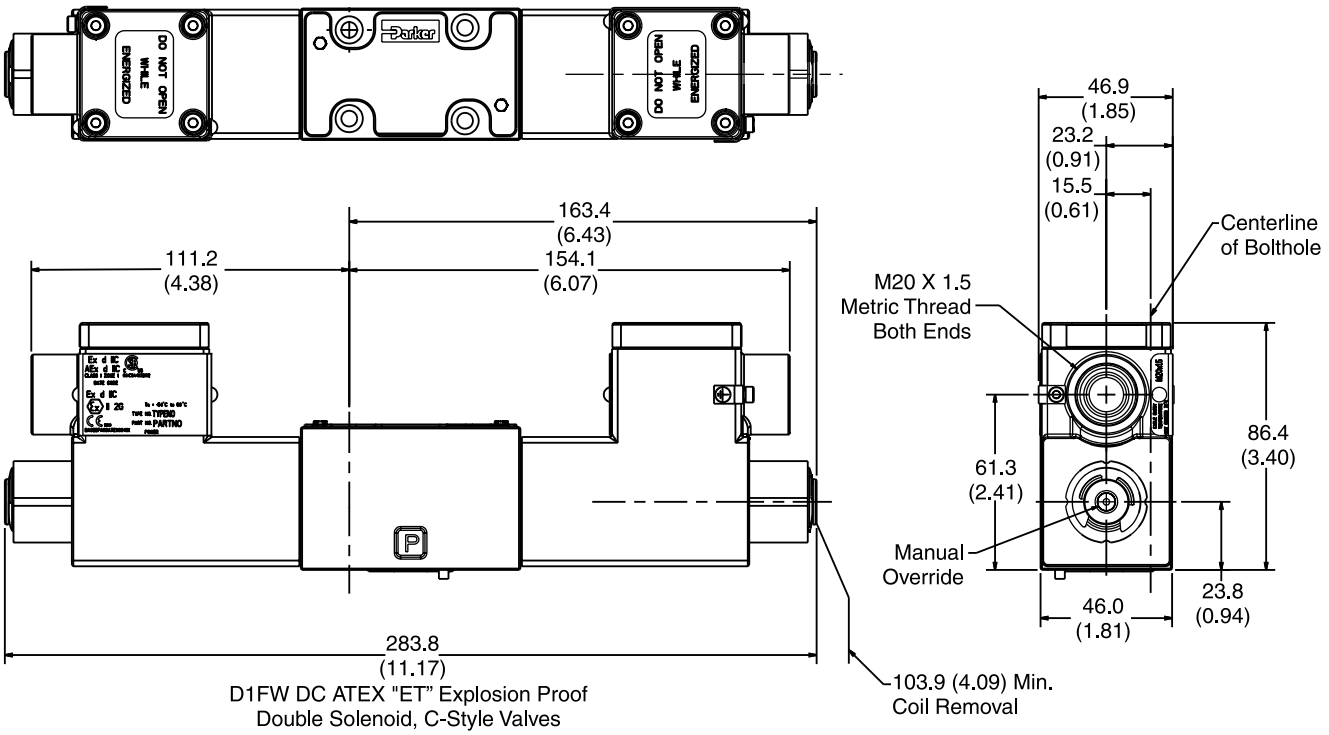
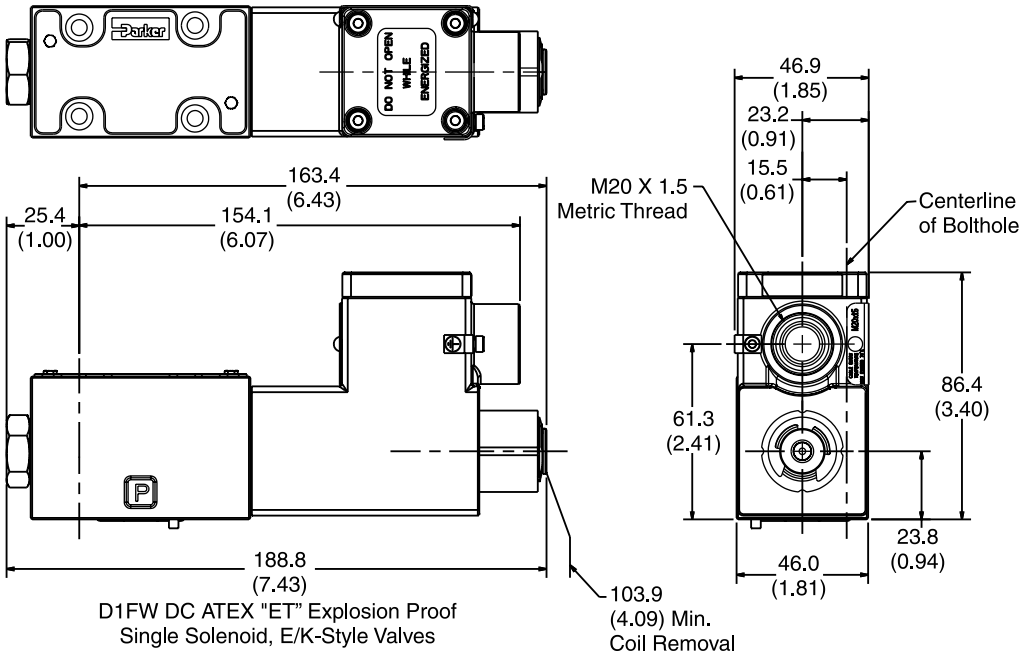
Inch equivalents for millimeter dimensions are shown in (**)



D1FW DC ATEX "ET" Explosion Proof
Double Solenoid, C-Style Valves



D1FW DC ATEX "ET" Explosion Proof
Single Solenoid, E/K-Style Valves

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 RS232 interface is available as an accessory.

D1FB for external electronics:

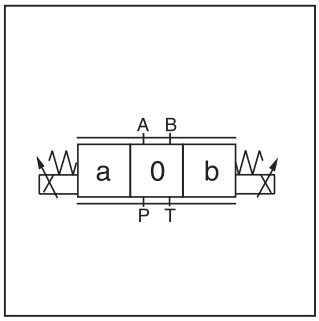
The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400.

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

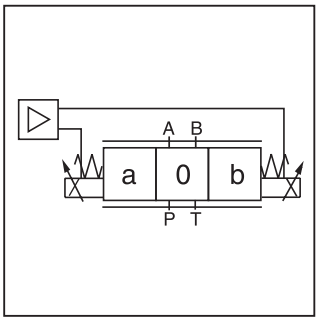
Series D1FB valves can be ordered with spool/sleeve design (D1FB*0) for maximum precision, as well as spool/body design (D1FB*3) for high nominal flow - see functional limit curves for maximum flow capability.

D1FB

D1FB OBE



D1FB

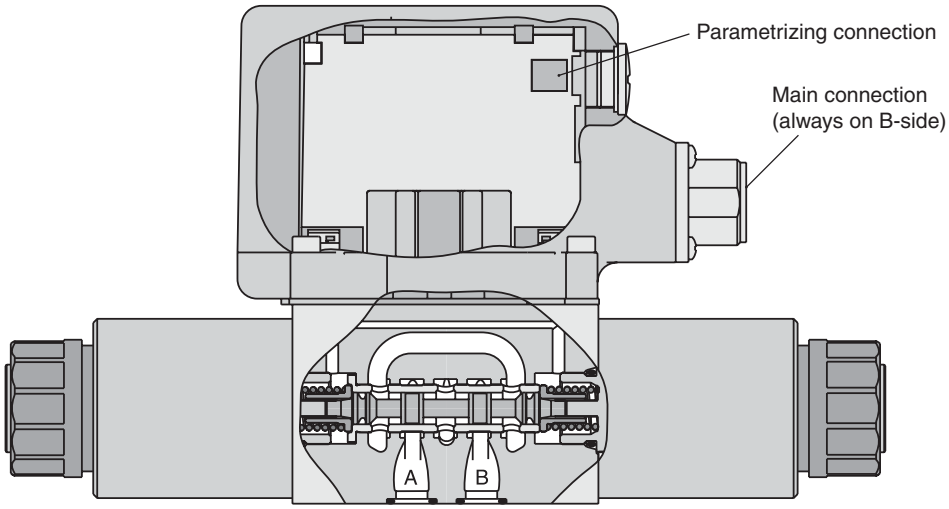


D1FB OBE

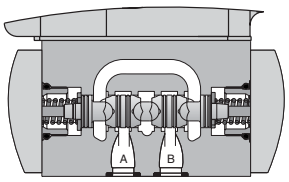
Features

- 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



Ordering Information
Series D1FB

A

D	1	F	B			0					
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style		Seal	Solenoid Voltage	Solenoid Accessories	Design	Design Series

NOTE: Not required when ordering.

Code	Description
1	DIN NG6 CETOP 3 NFPA D03

D1FB*0: Spool/Sleeve Design

Code	Solenoid
M	9V/2.7A
J	24V/0.8A

D1FB*3: Spool/Body Design

Code	Solenoid
K	12V / 2.2A
J	24V / 1.1A

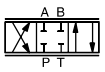
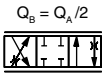
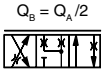
Code	Description
0	Spool/sleeve design
3	Spool/body design

Code	Description
N	Nitrile
V	Fluorocarbon

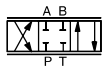
Code	Description
W*	Connector as per DIN 43650 without plug
J*	Connector DT04-2P "Deutsch"

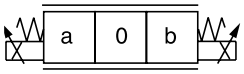
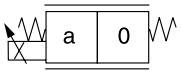
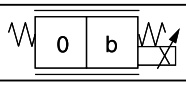
* Please order plugs separately. See Accessories.

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		20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F		20/10 (5.3/2.6) 12/6 (3.2/1.6)

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)

Code	Style
C	
E	
K	

Bolt Kit:

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

Weight:

D1FB	2.2 kg (4.9 lbs.)

[1] Only for style C.
No defined spool positioning at power down.

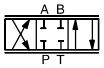
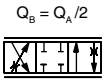
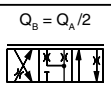
D	1	F	B	☐	☐	0	☐	☐	☐	☐	☐
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style		Seal	Input Signal	Options	Design	Design Series

NOTE: Not required when ordering.

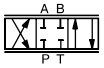
Code	Description
1	DIN NG6 CETOP 3 NFPA D03

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		20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F		20/10 (5.3/2.6) 12/6 (3.2/1.6)

D1FB*3: Spool/Body Design

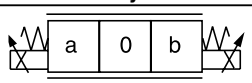
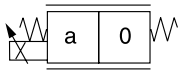
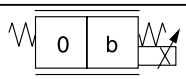
Overlap		
Code	**Spool**	**Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge**
E01K E01H E01F		30 (7.9) 20 (5.3) 10 (2.6)
E02K E02H E02F		30 (7.9) 20 (5.3) 10 (2.6)

[1] Only for style C.
No defined spool positioning at power down.

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 ± 10V on delivery

Code	Description
N	Nitrile
V	Fluorocarbon

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 => RS232
Item no. 40982923

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...535, other on request	
Fluid Temperature	**[°C]**	-20...+60; (-4°F...+140°F)	
Viscosity **Permitted** **Recommended**	 **[cSt] / [mm²/s]** **[cSt] / [mm²/s]**	 20...380 (93...1761 SSU) 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)** 6 LPM (1.6 GPM) / 12 LPM (3.2 GPM) / 20 LPM (5.3 GPM)	**D1FB*3 (Spool/body)** 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 spool) <400 (zerolap spool)	<60
Overlap	**[%]**	25, electrically normalized at 10 (see flow characteristics)	
Static / Dynamic			
Step Response at 100% Step	**[ms]**	30	30
Hysteresis	**[%]**	<4	<6
Temperature Drift Solenoid Current	**[%/K]**	<0.02	
Electrical			
Duty Ratio	**[%]**	100	
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.)		

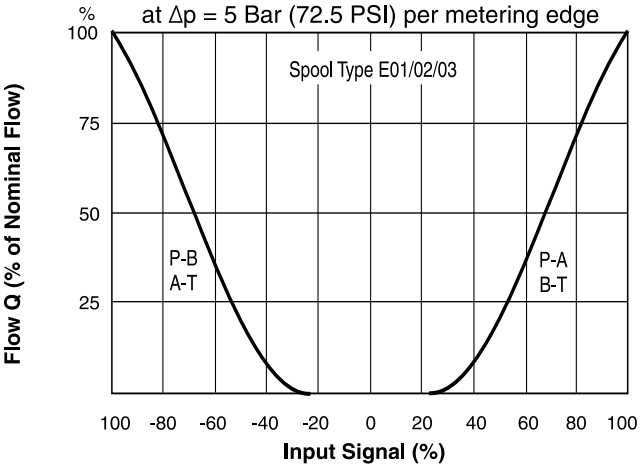
* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

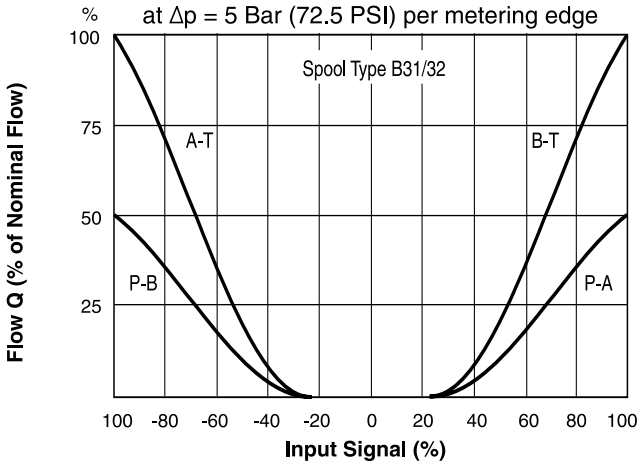
Continued on the next page

Electrical		
Duty Ratio	**[%]**	100
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 max.		
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)
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.)

A

D1FB*0 Flow

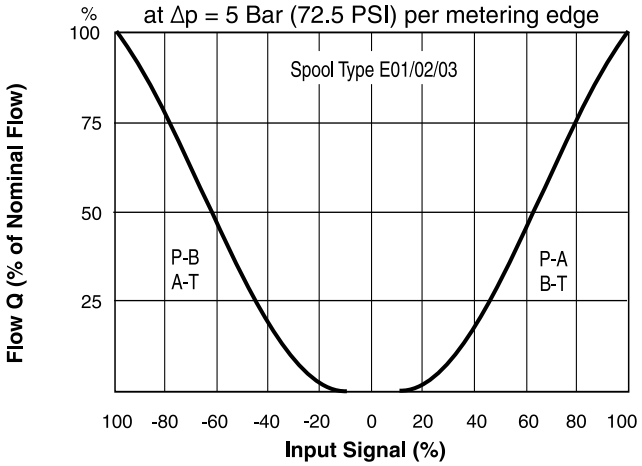


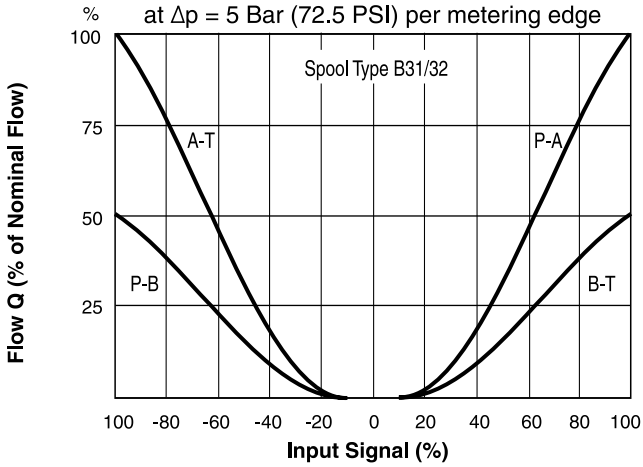


All performance curves measured with HLP46 at 50°C (122°F).

D1FB*0 OBE Flow

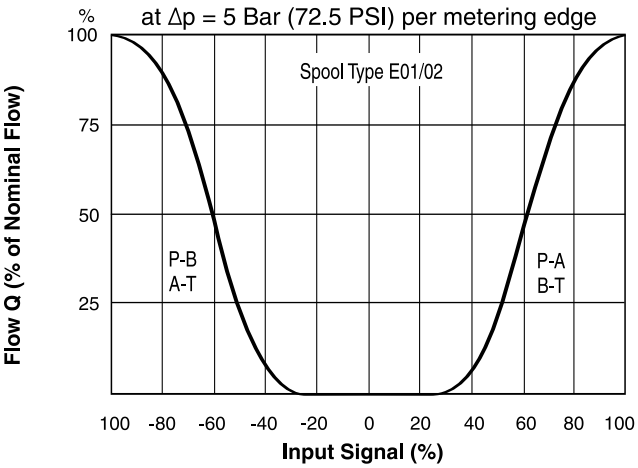
(Electrically set to opening point 10%)





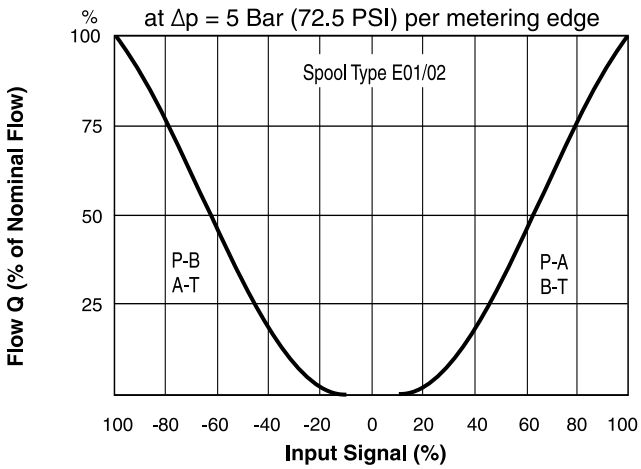
All performance curves measured with HLP46 at 50°C (122°F).

D1FB*3 Flow



D1FB*3 OBE Flow

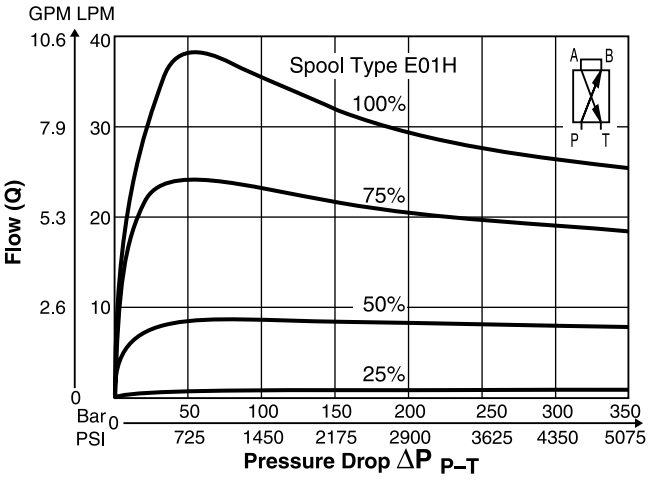
(Electrically set to opening point 10%)

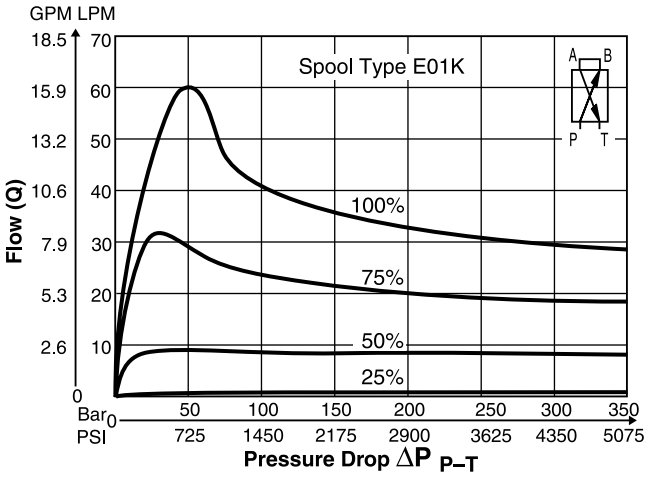


All performance curves measured with HLP46 at 50°C (122°F).

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.



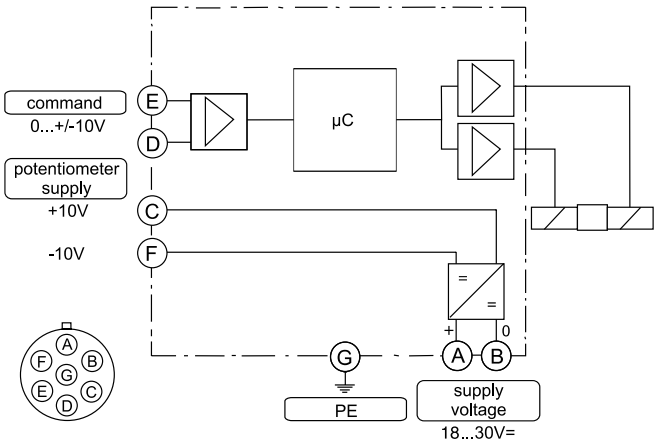


All performance curves measured with HLP46 at 50°C (122°F).

A

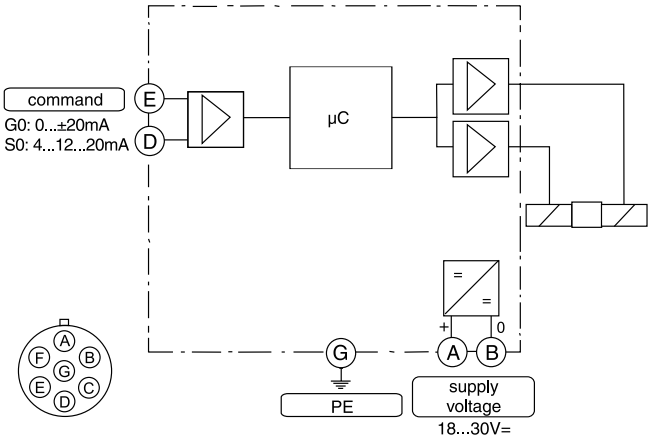
Code F0

6 + PE acc. to EN 175201-804



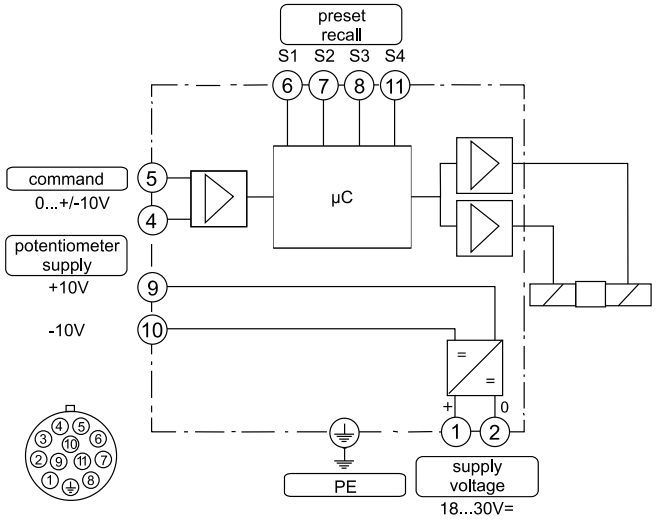
Code G0, S0

6 + PE acc. to EN 175201-804



Code W5

11 + PE acc. to EN 175201-804

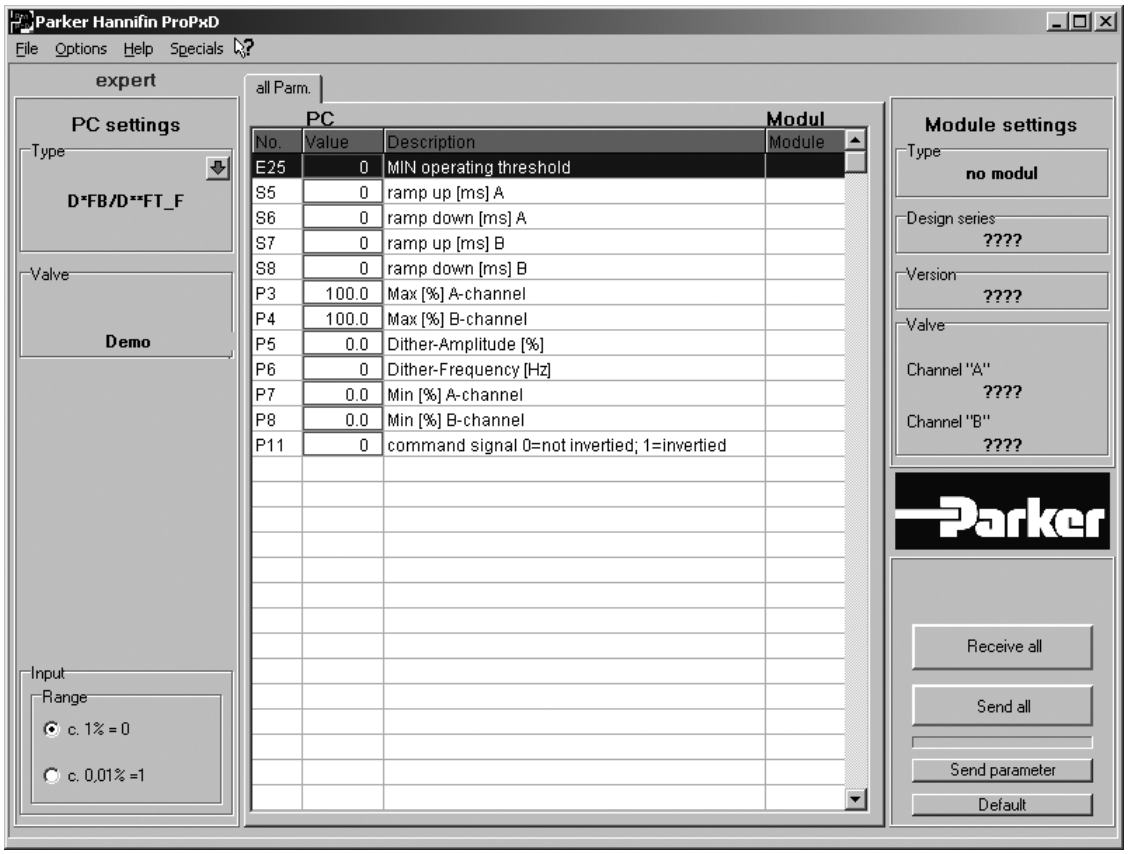


ProPxD Interface Program

The ProPxD software permits 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 nonvolatile memory stores the data with the option for recalling or modification.

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.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd – see "Software Downloads"

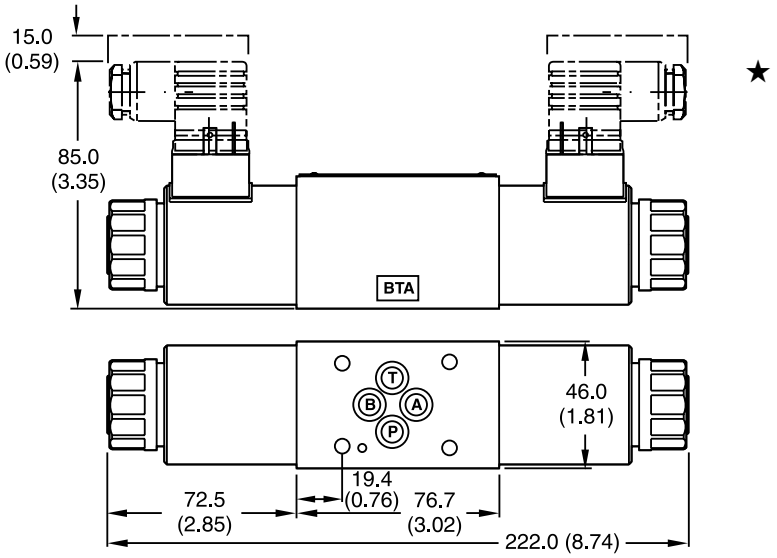


The parametrizing cable may be ordered under item no. 40982923.

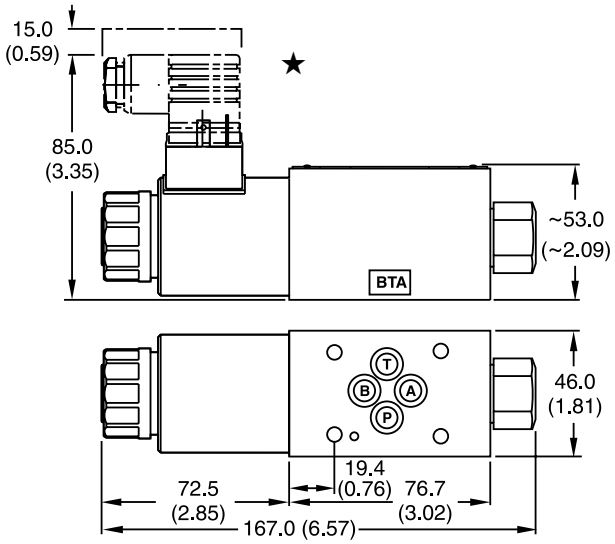
A

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

D1FB*C



D1FB*K

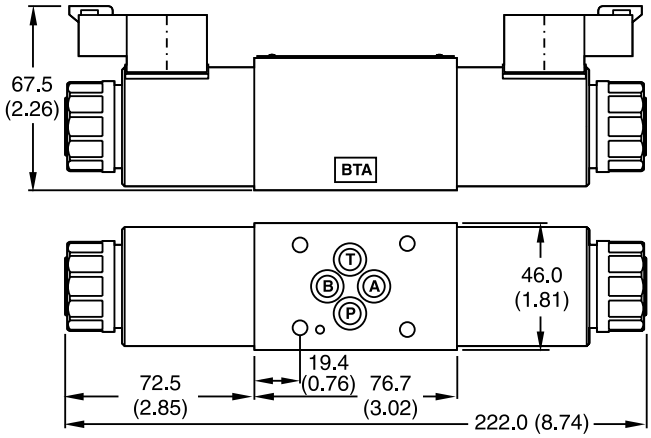


★ Order plugs separately.

Dimensions with DT04-2P "Deutsch" Connector

(Only C style shown)

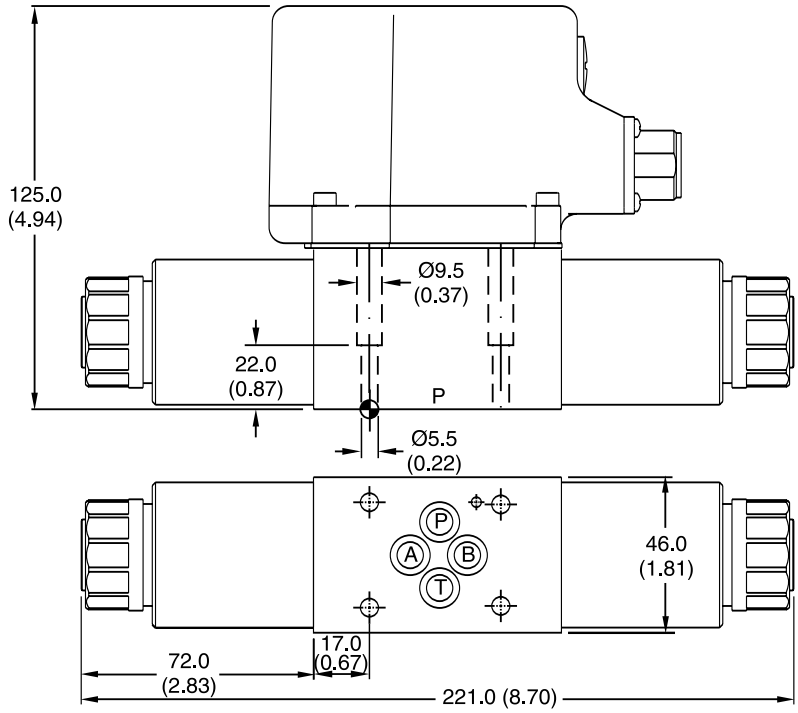
D1FB*C



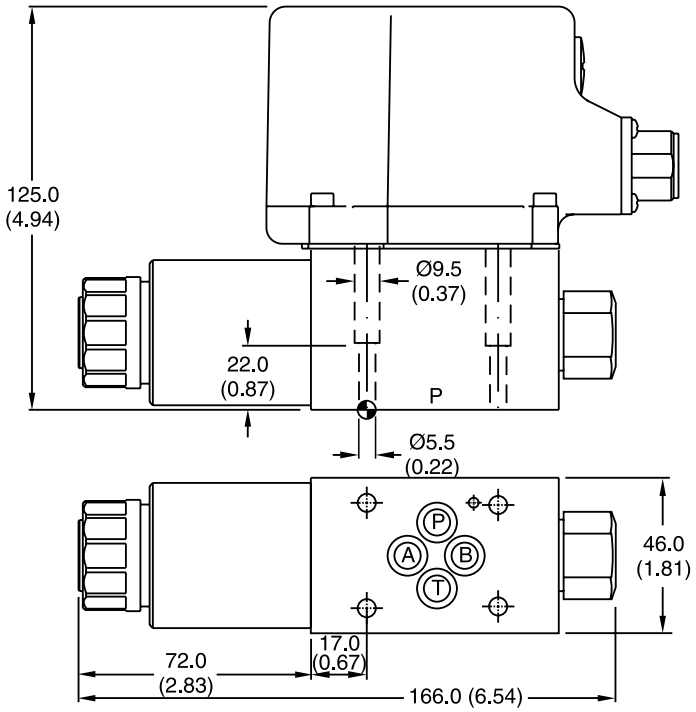
Surface Finish	Kit			Seal Kit
R_{max}6.3 ⏥ 0.01/100	BK375 BK209	4x M5x30 DIN 912 12.9 4x 10-24x1.25	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB Fluorocarbon: SK-D1FBV

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

D1FB*C OBE



D1FB*E OBE



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

A

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 RS232 interface is available as accessory.

D3FB for external electronics:

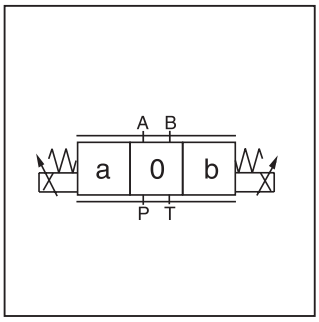
The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400.

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

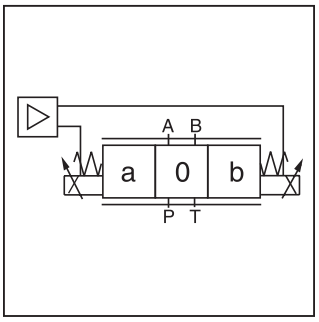
Series D3FB valves can be ordered with spool/sleeve design (D3FB*0) for maximum precision, as well as spool/body design (D3FB*3) for high nominal flow - see functional limit curves for maximum flow capability.

D3FB

D3FB OBE



D3FB



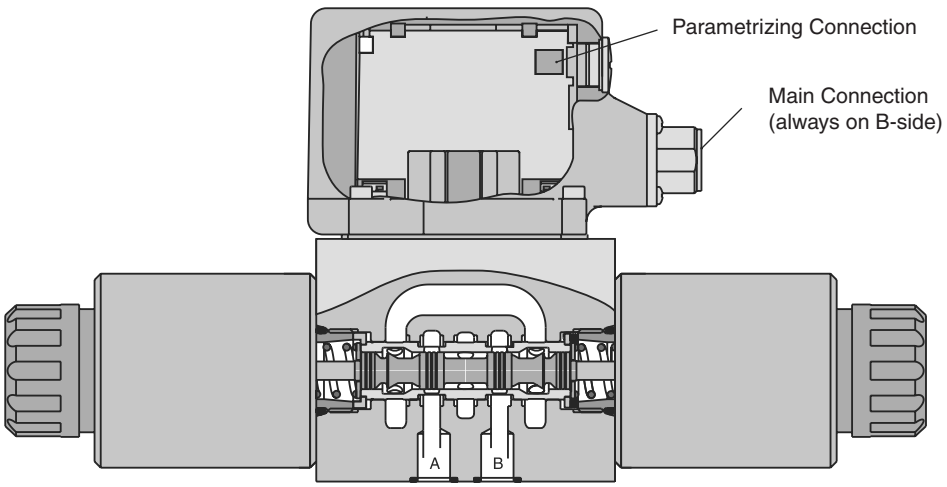
D3FB OBE

CE

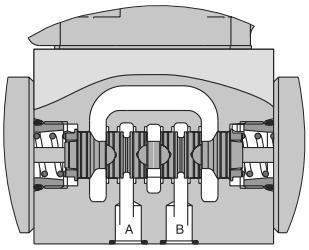
Features

- 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



D	3	F	B			0			W		
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style		Seal	Solenoid Voltage	Solenoid Accessories	Design	Design Series

NOTE: Not required when ordering.

Code	Description
	DIN NG10
3	CETOP 5 NFPA D05

D3FB*0: Spool/Sleeve Design

Code	Solenoid
K	12V / 2.95A

D3FB*3: Spool/Body Design

Code	Solenoid
K	12V / 2.95A
J	24V / 1.5A

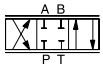
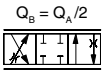
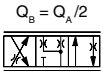
Code	Description
0	Spool/sleeve design
3	Spool/body design

Code	Description
N	Nitrile
V	Fluorocarbon

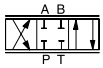
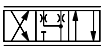
Code	Description
W*	Connector as per DIN 43650 without plug

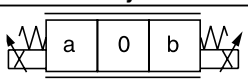
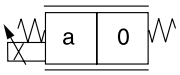
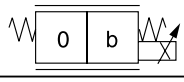
* Please order plugs separately. See Accessories.

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		40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)
B32M B32S		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)

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	3	F	B			0					
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style		Seal	Input Signal	Options	Design	Design Series

NOTE: Not required when ordering.

Code	Description
3	DIN NG10 CETOP 5 NFPA D05

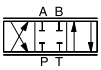
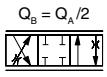
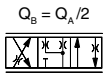
Code	Description
0	Spool/sleeve design
3	Spool/body design

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

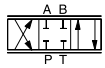
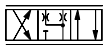
[1] Single solenoid always 0...+10V respectively 4...20 mA
[2] Factory set ± 10V on delivery

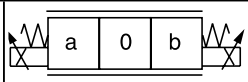
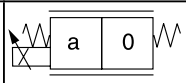
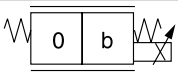
Code	Description
N	Nitrile
V	Fluorocarbon

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		40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)
B32M B32S		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)

Code	Style
C	
E	
K	

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 => RS232
Item no. 40982923

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...535, other on request	
Fluid Temperature	**[°C]**	-20...+60; (-4°F...+140°F)	
Viscosity **Permitted** **Recommended**	 **[cSt] / [mm²/s]** **[cSt] / [mm²/s]**	 20...380 (93...1761 SSU) 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	<100
Overlap	**[%]**	25, electrically normalized at 10 (see flow characteristics)	
Static / Dynamic			
Step Response at 100% Step	**[ms]**	40	
Hysteresis	**[%]**	<4	<5
Temperature Drift Solenoid Current	**[%/K]**	<0.02	
Electrical			
Duty Ratio	**[%]**	100 ED; CAUTION: Coil temperature up to 155°C (331°F)	
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)	
Solenoid		**Code "K"**	**Code "J"**
Supply Voltage	**[V]**	12	24
Current Consumption	**[A]**	2.95	1.5
Resistance	**[Ohm]**	3.84	16.5
Solenoid Connection		Connector as per EN 175301-803	
Wiring Minimum	**[mm²]**	3x1.5 recommended	
Wiring Length Maximum	**[m]**	50 (164 ft.)	

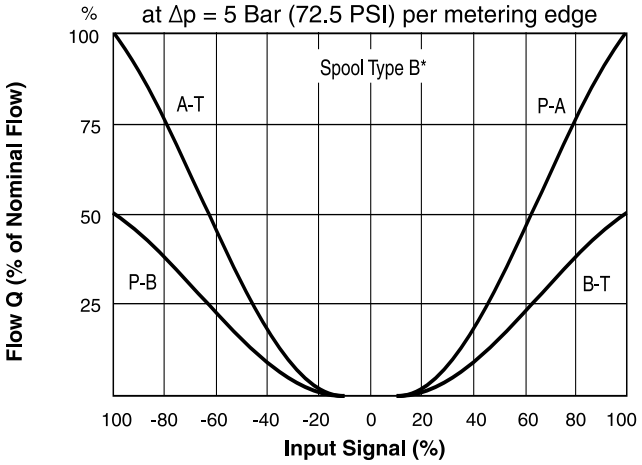
* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

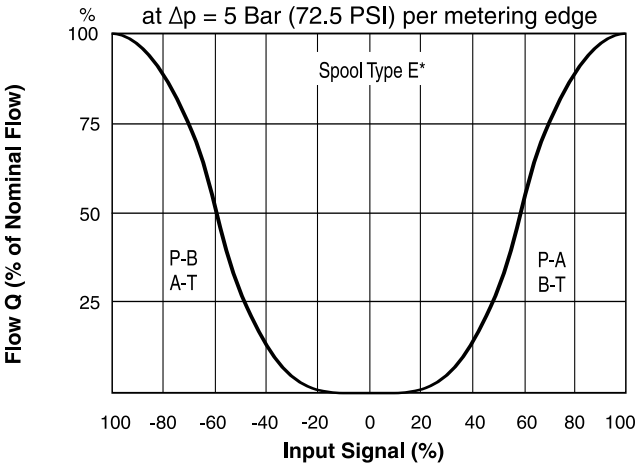
Continued on the next page

Electrical		
Duty Ratio	**[%]**	100
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 max.		
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)
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 5pole
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.)

A

(Electrically set to opening point 10%)



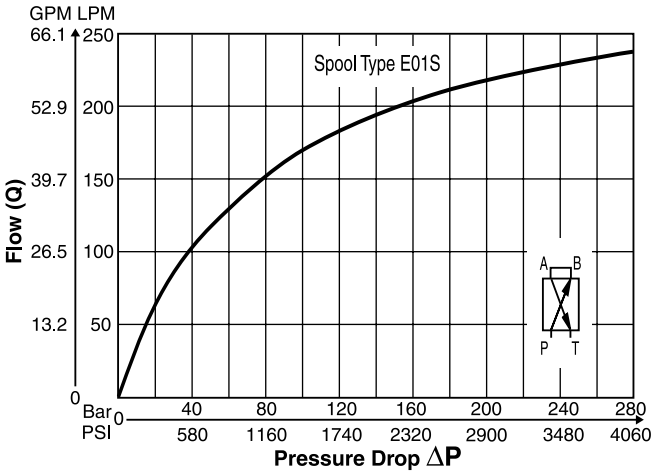


All performance curves measured with HLP46 at 50°C (122°F).

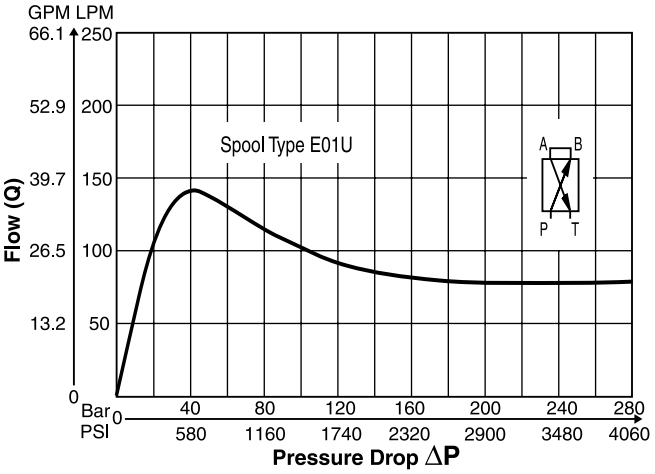
Functional Limits

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

D3FB*0

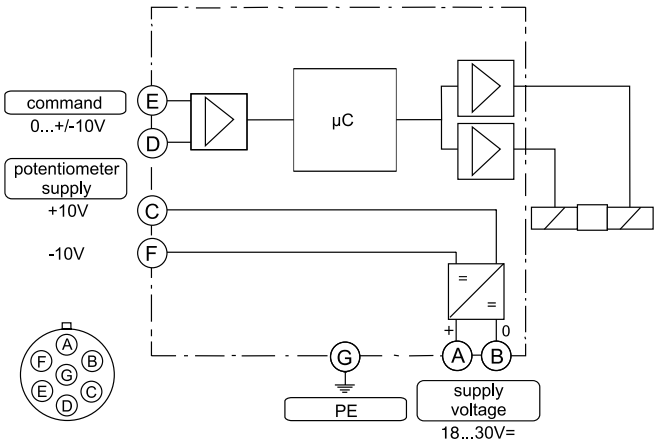


D3FB*3

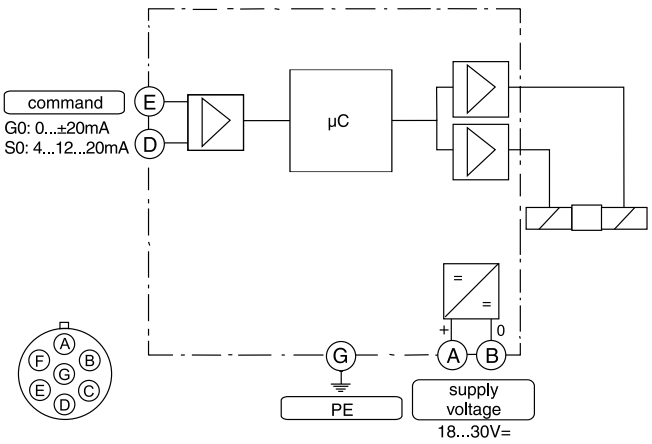


All performance curves measured with HLP46 at 50°C (122°F).

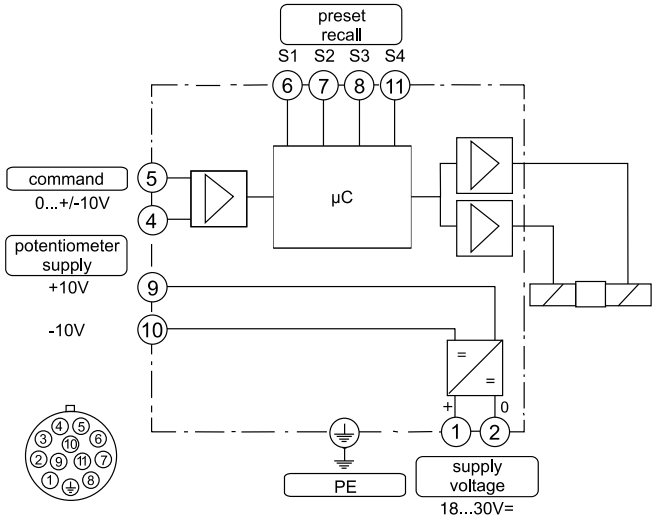
Code F0
6 + PE acc. to EN 175201-804



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



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



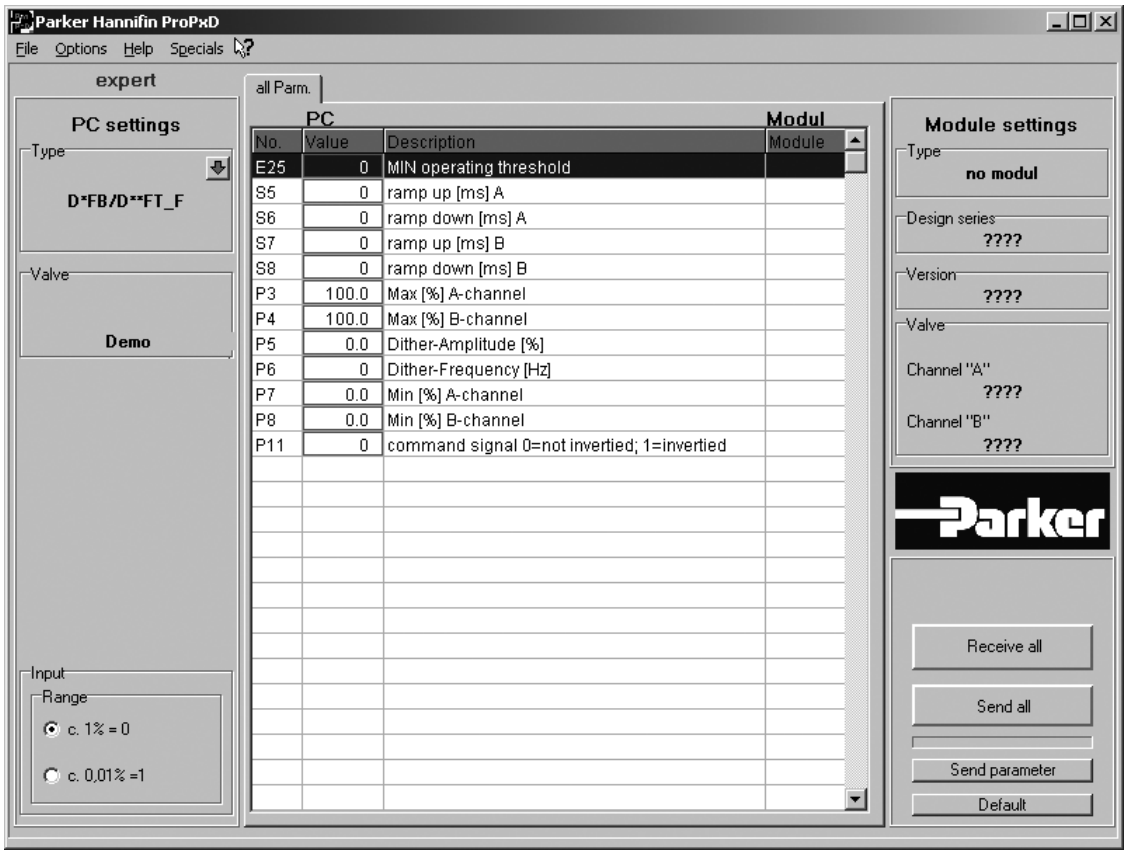
A

ProPxD Interface Program

The ProPxD software permits 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 nonvolatile memory stores the data with the option for recalling or modification.

Features

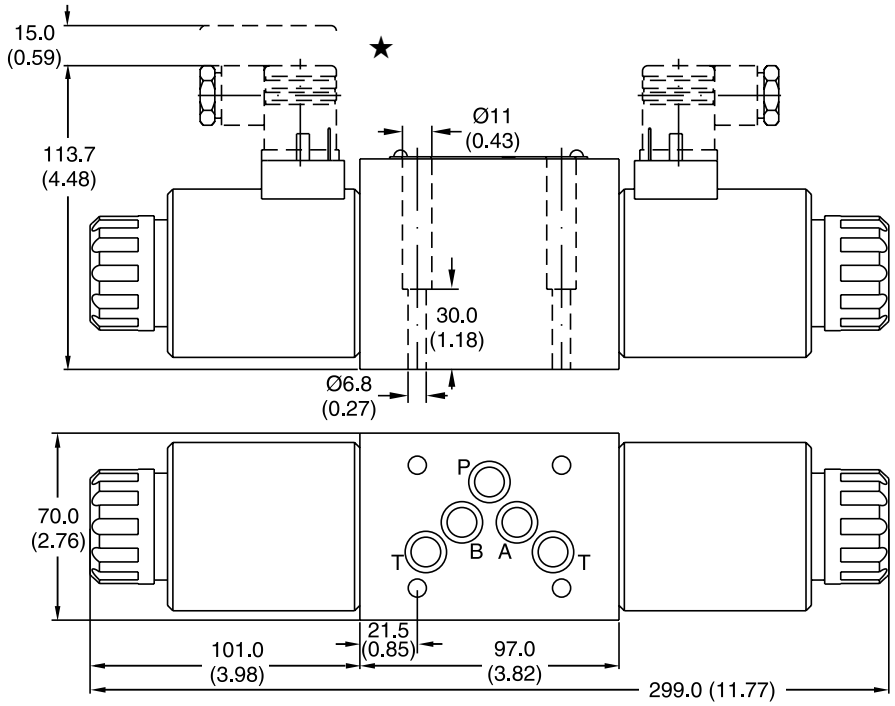
- Simple editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronics via serial interface RS-232.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd – see "Software Downloads"



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

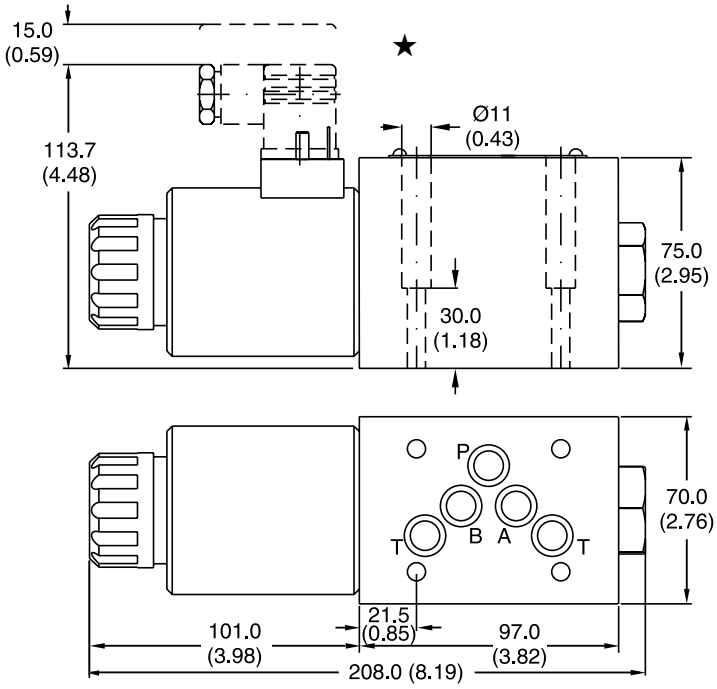
Inch equivalents for millimeter dimensions are shown in (**)

D3FB*C



D3FB*K

★ Order plugs separately.



Surface Finish	Kit			Seal Kit
R_{max}6.3 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

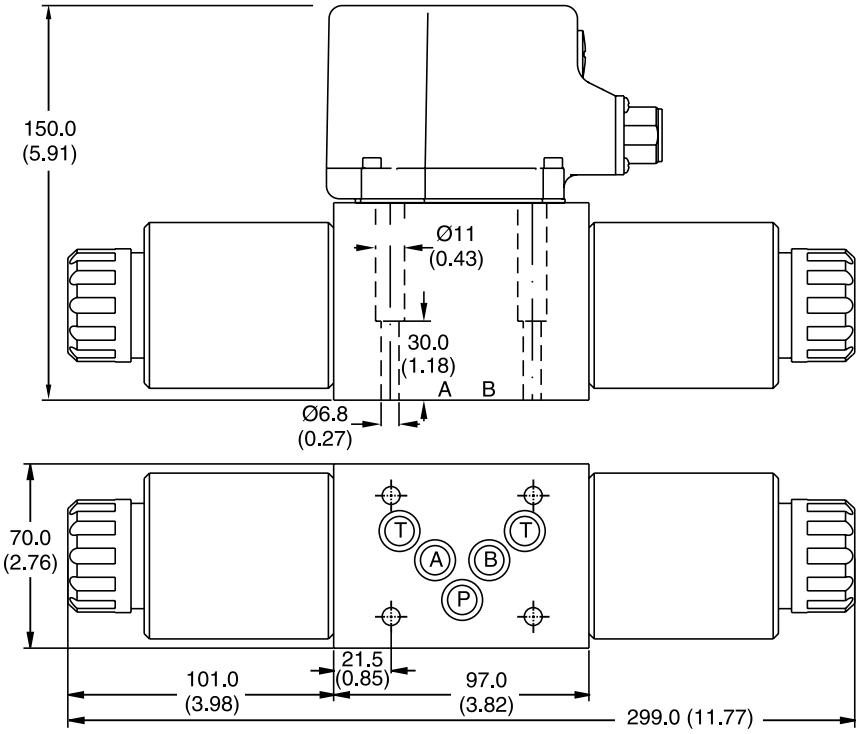
D3FB.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

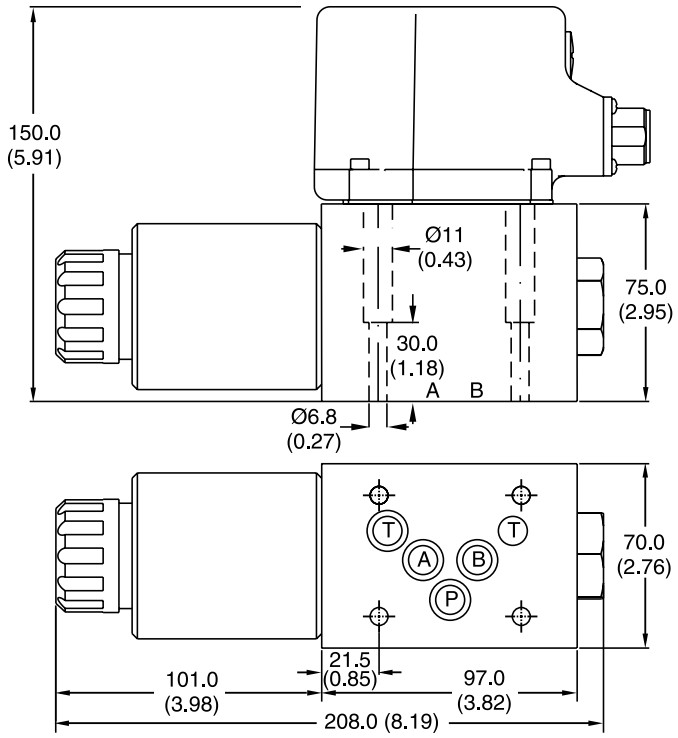
Inch equivalents for millimeter dimensions are shown in (**)

A

D3FB*C OBE



D3FB*E OBE



Surface Finish	Kit			Seal Kit
R_{max}6.3 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

D3FB.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

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 the usage under rough environmental conditions.

The nominal values are factory set. The cable connection to a serial RS232 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.

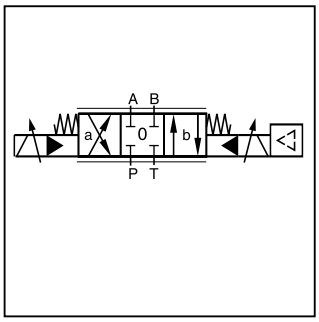
Series D*1FB valve parameters can be edited with the common ProPxD software for both versions.

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.

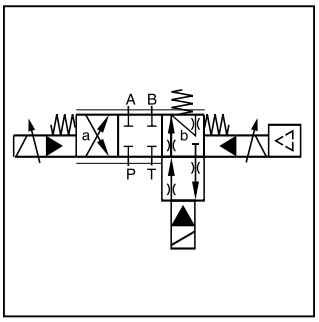
The innovative integrated regenerative function into the A-line (optional) allows new energy saving circuits for differential cylinders. The hybrid version can be switched between regenerative mode and standard mode at any time.

D91FB

D91FB OBE



D*1FB

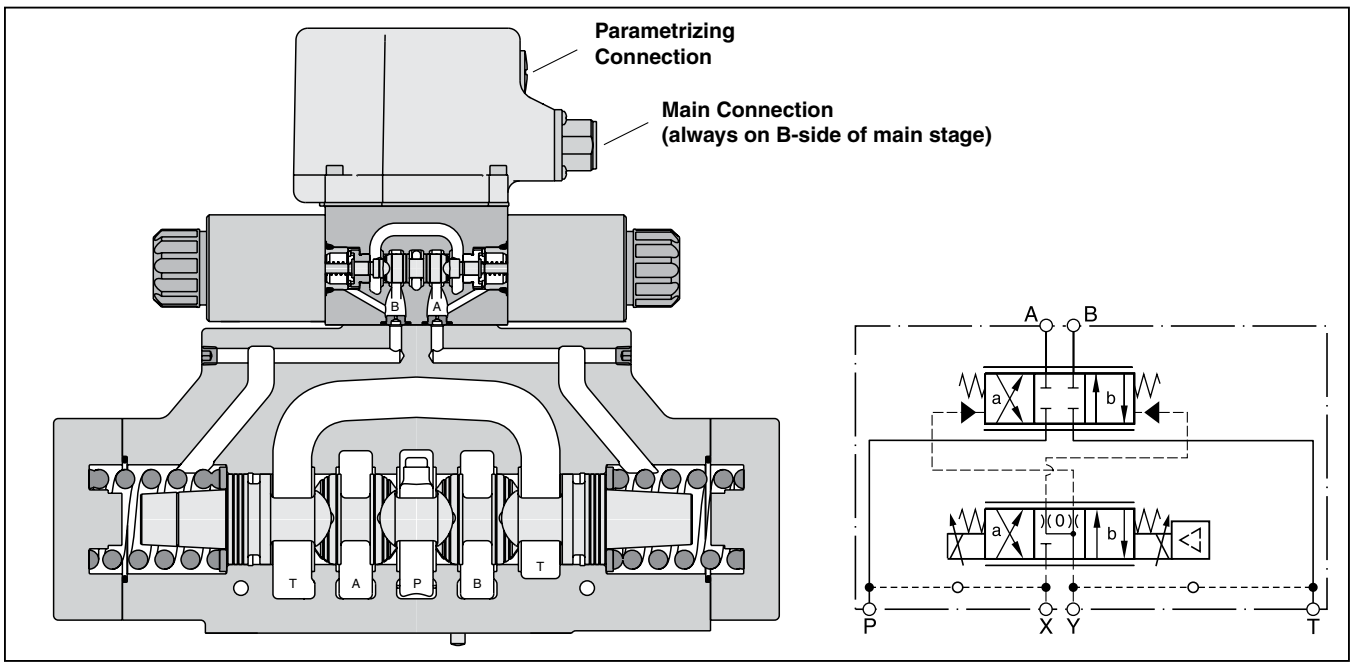


D*1FBZ

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



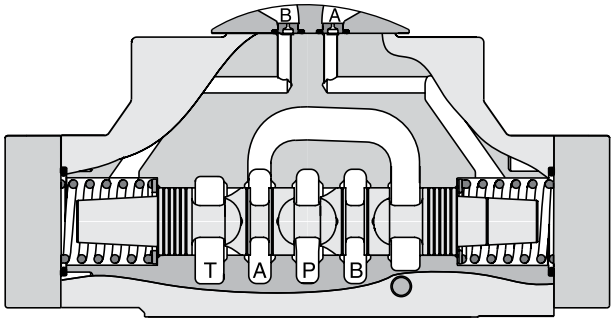
D_1FB.indd, dd

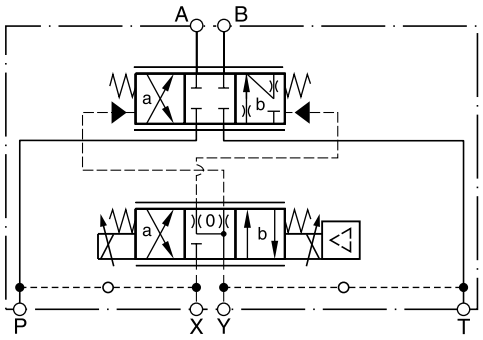
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

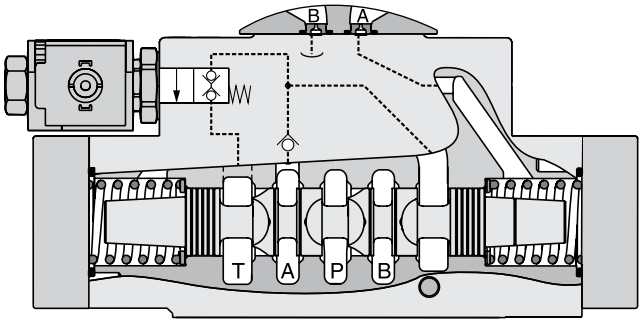
D*1FBR and D*1FBZ

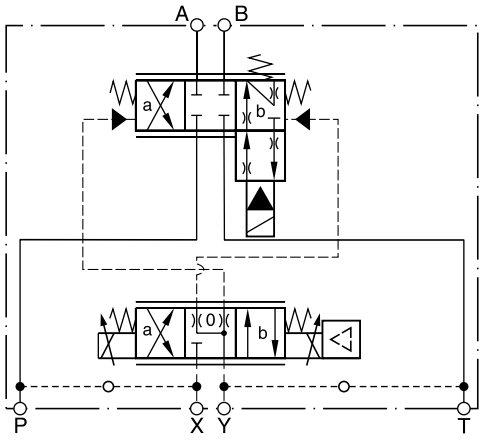
Regenerative Valve D*1FBR





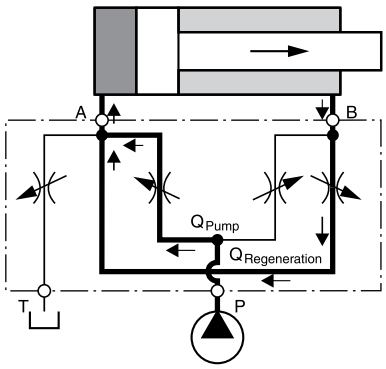
Hybrid Valve D*1FBZ





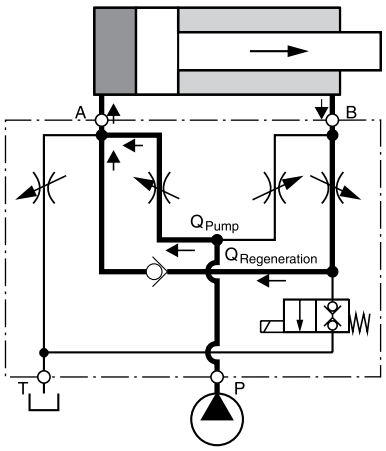
D*1FBR (Regenerative Valve)

Cylinder extending

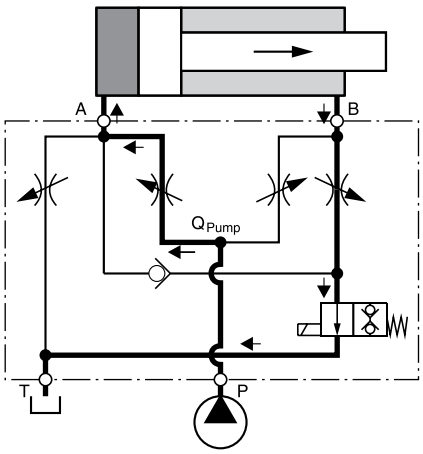


D*1FBZ (Hybrid Valve)

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%	20%
D91FBR/Z	31/32	100%	50%	100%	50%	50%	25%
D111FBR/Z	31/32	on request					

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

NOTE: Not required when ordering.

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

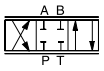
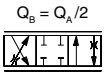
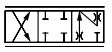
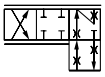
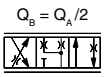
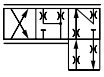
[1] For enlarged connections Ø 32 mm

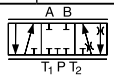
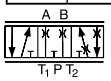
Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
0	Standard
8 [7]	Monitor Switch
L [8]	Hybrid valve 24V normally closed for spool type Z

[7] Not available with regenerative or hybrid function.

[8] See page page A35 for regenerative and hybrid spool information. (not available in D31FB)

Standard		NEW: Regenerative Function		NEW: Hybrid Function [2]	
Code	Spool Type	Code	Spool Type	Code	Spool Type
E01					
E02					
B31		R31		Z31	
B32		R32		Z32	

D31FB spool type: R31  R32 

[2] not available in D31FB.

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

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	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.

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.)

D		1	F	B			C						
Directional Control Valves	Size	NG6 Pilot	Flow Control	Onboard Electronics	Spool	Flow	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

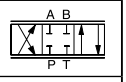
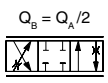
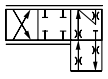
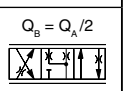
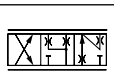
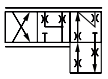
[1] With enlarged connections Ø 32 mm

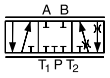
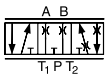
Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
0	Standard
8 [5]	Monitor Switch
L [6]	Hybrid valve 24V normally closed for spool type Z

[5] Not available with regenerative or hybrid function.

[6] See page page A35 for regenerative and hybrid spool information. (not available in D31FB)

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

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 + Proset Commands

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.

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 => RS232
Item no. 40982923

D_1FB.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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...535, other on request			
Fluid Temperature	**[°C]**	-20...+60; (-4°F...+140°F)			
Viscosity **Permitted** **Recommended**	 **[cSt] / [mm²/s]** **[cSt] / [mm²/s]**	 20...380 (93...1761 SSU) 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) 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 (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			
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

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Hydraulic Valve Division
Elyria, Ohio, USA

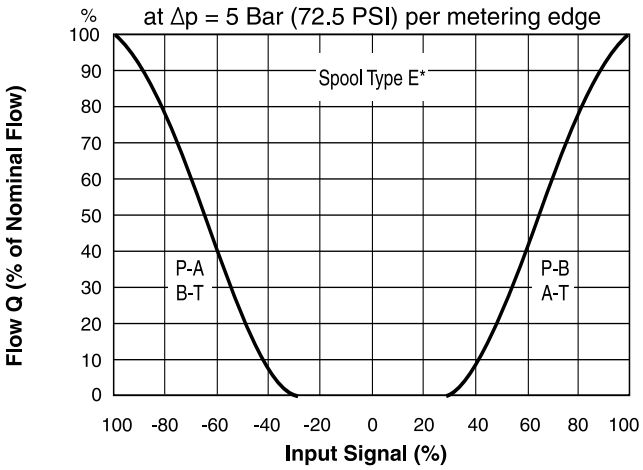
Continued from previous page

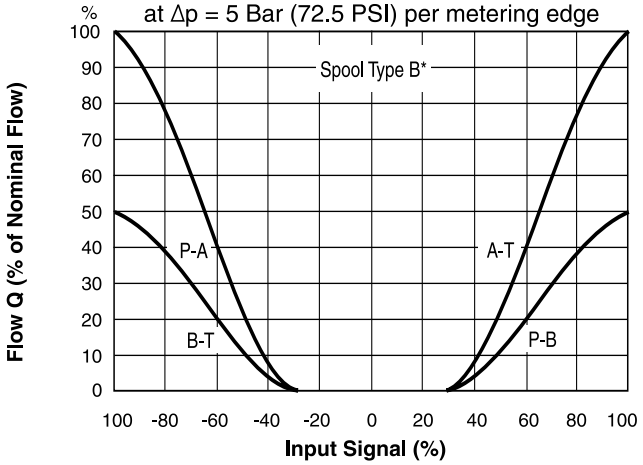
Electrical Monitor Switch (Offboard Electronics)		
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)
Ambient Temperature	**[°C]**	0...70; (32°F...158°F)
Supply Voltage/Ripple	**[V]**	18...42, ripple <10% eff.
Current Consumption without Load	**[mA]**	<30
Maximum Output Current per Channel, Ohmic	**[mA]**	400
Minimum Output Load per Channel, Ohmic	**[kOhm]**	100
Max. output drop at 0.2A **Max. output drop at 0.4A**	**[V]** **[V]**	<1.1 <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
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)
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 5pole
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.)

A

D*1FB Flow

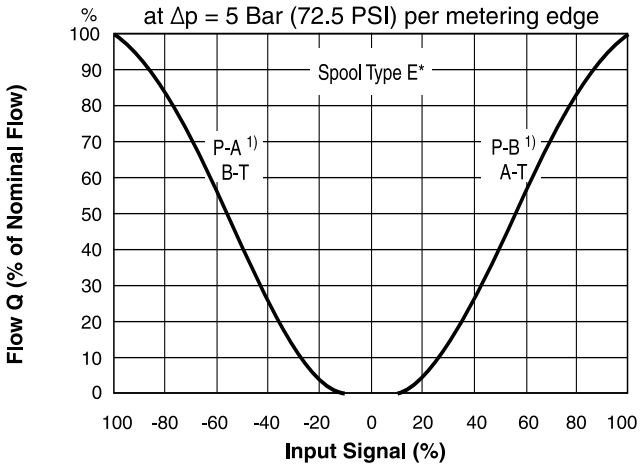


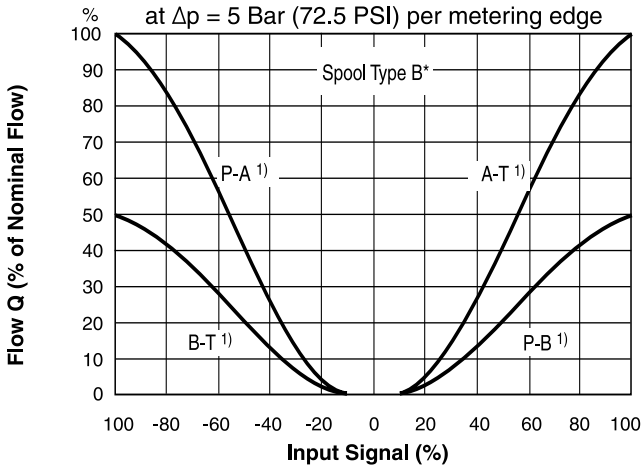


All performance curves measured with HLP46 at 50°C (122°F).

D*1FB OBE Flow

(Electrically set to opening point 10%)





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

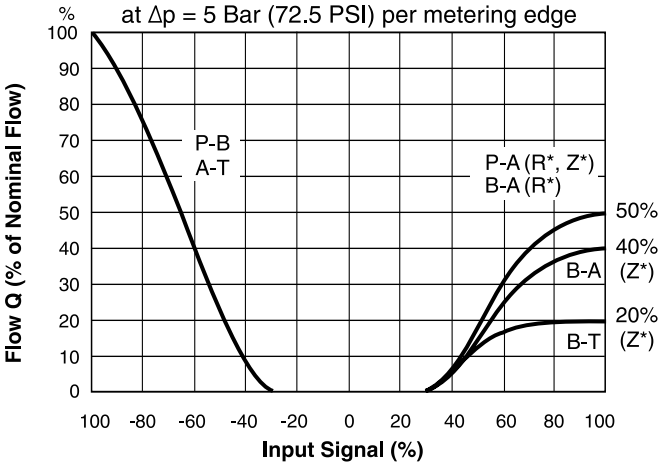
1) Flow direction depending on ordering code.

A

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

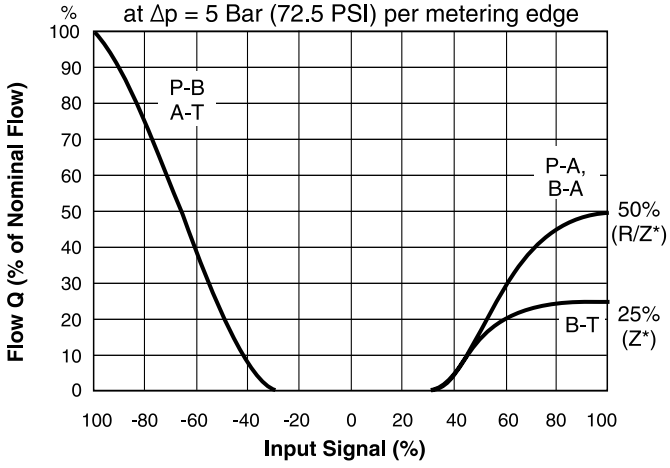
D41FB R/Z

Spool Code **R/Z31/32**



D91FB R/Z

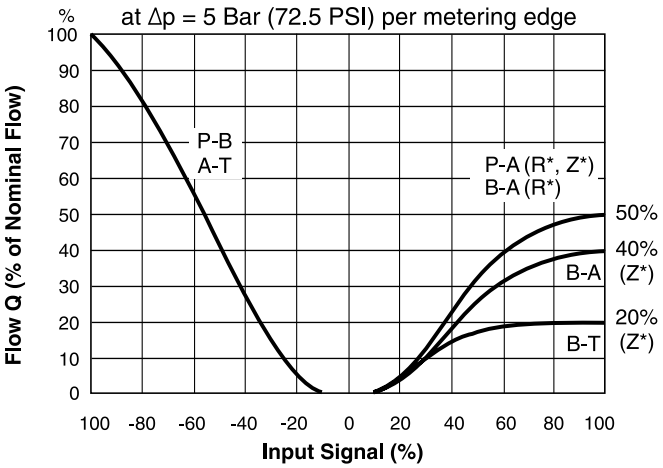
Spool Code **R/Z31/32**



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

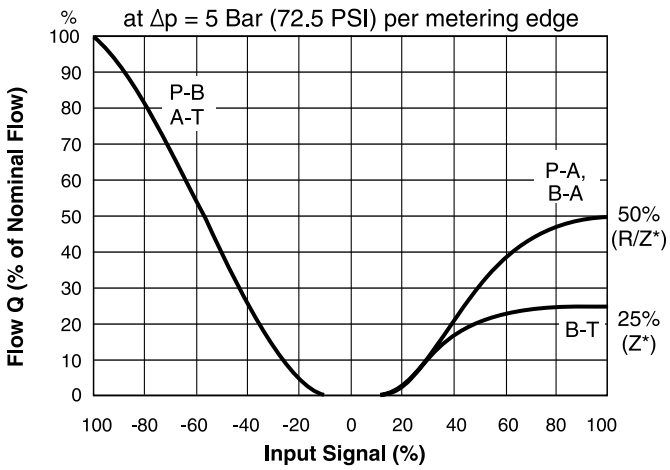
D41FB R/Z OBE

Spool Code **R/Z31/32**



D91FB R/Z OBE

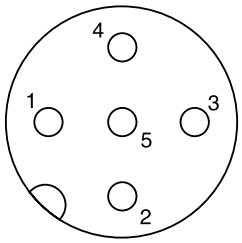
Spool Code **R/Z31/32**



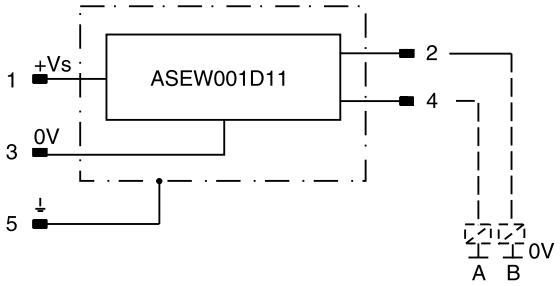
All performance curves measured with HLP46 at 50°C (122°F).

A

Monitor Switch M12x1 Pin Assignment



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



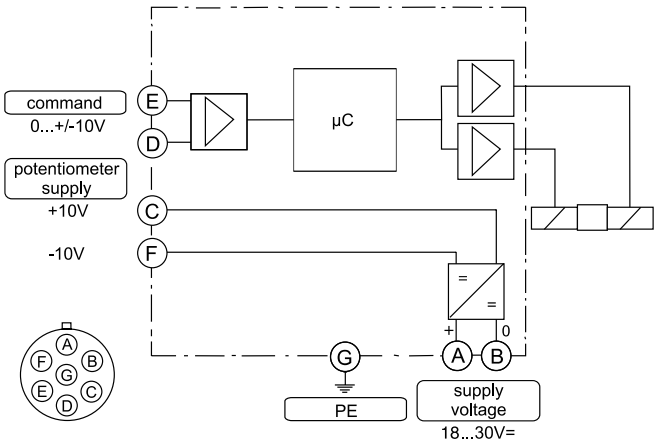
Signal	Output A (pin 4)	Output B (pin 2)
neutral	closed	closed
	open	closed
	closed	open

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

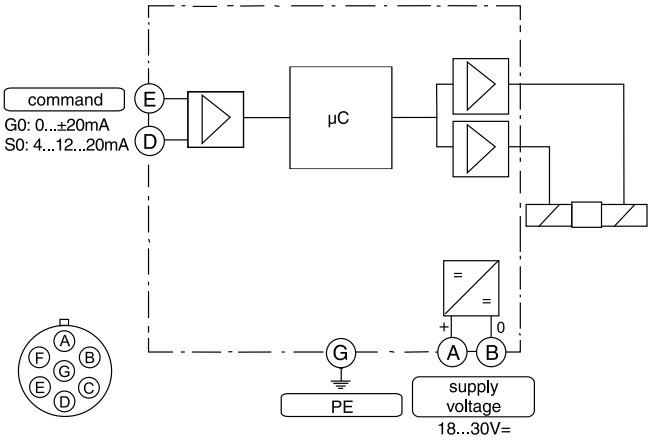
Electrical Monitor Switch

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]**	5x0.5 (AWG 20) overall braid shield
Wiring Length Maximum	**[m]**	50 (164 ft.)

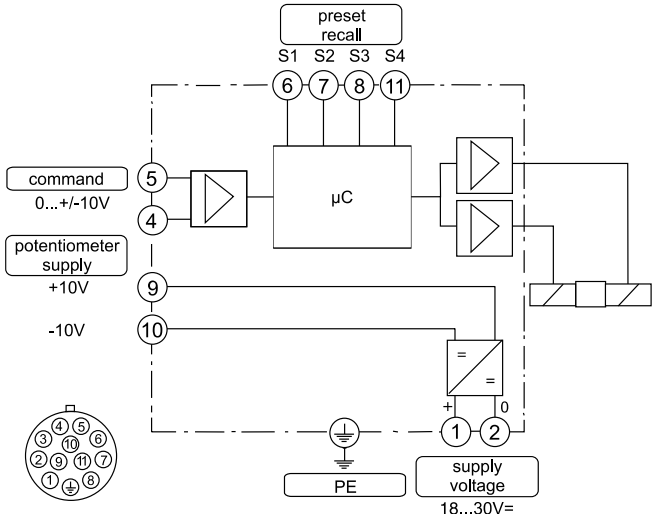
Code F0, M0
6 + PE acc. to EN 175201-804



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



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



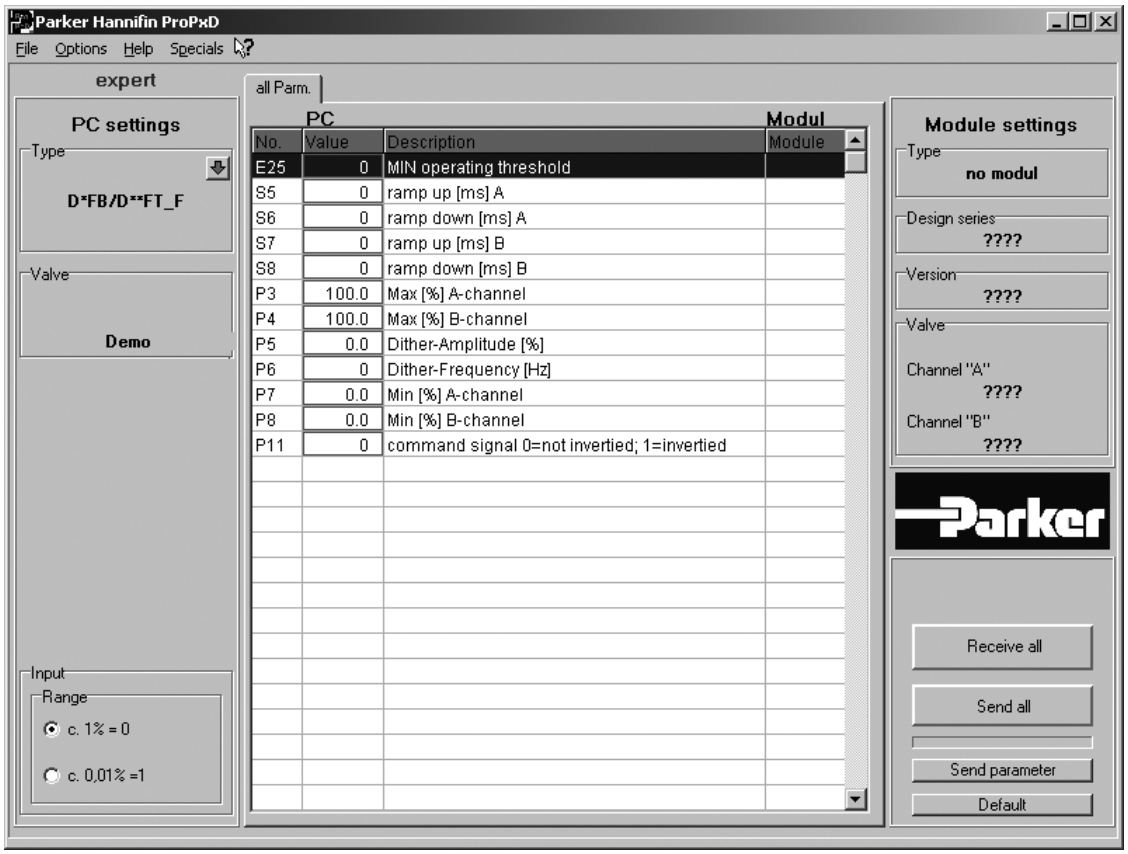
A

ProPxD Interface Program

The ProPxD software permits 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 nonvolatile memory stores the data with the option for recalling or modification.

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.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd – see "Software Downloads"



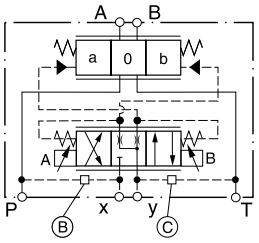
The parametrizing cable may be ordered under item no. 40982923.

A

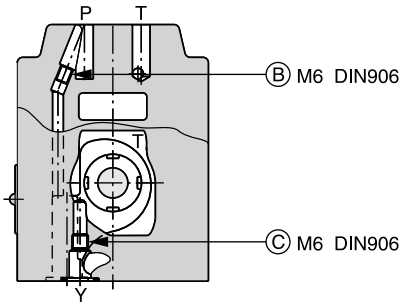
Pilot Flow — Pilot Oil Inlet (Supply) and Outlet (Drain)

○ **open,** ● **closed**

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

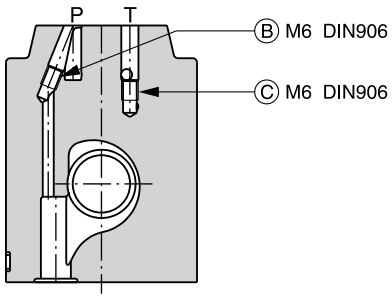


D31FBB/E

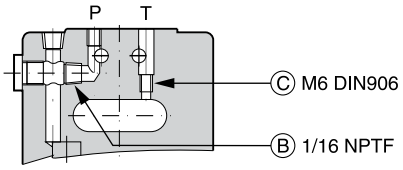


(drawn offset)

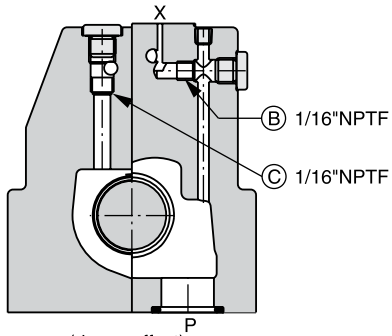
D31FBR



D41FBB/E



D41FBR



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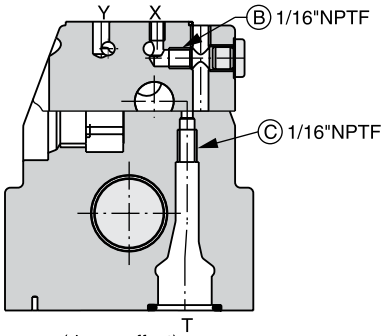
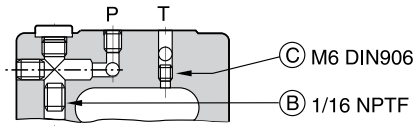
D41FBZ

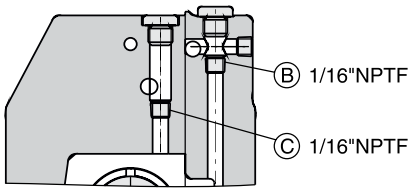


(drawn offset)

D91FBB/E

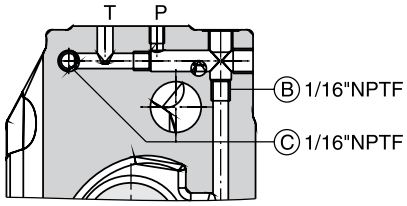


D91FBR



(drawn offset)

D91FBZ



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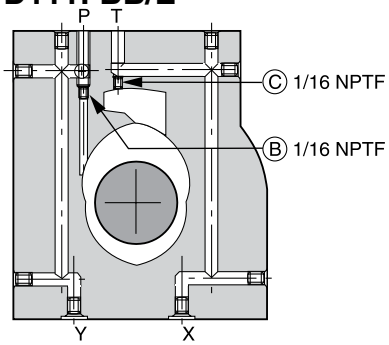
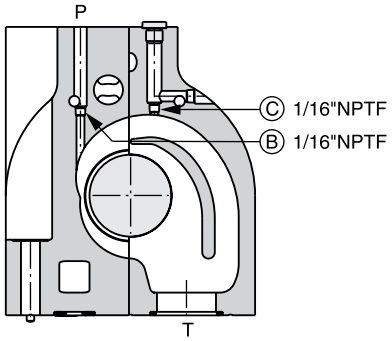


D111FBR



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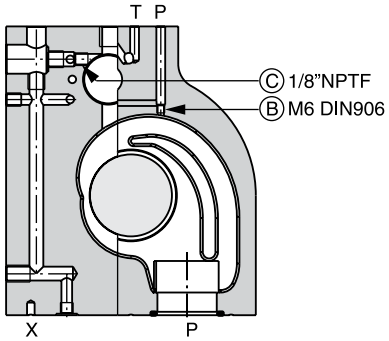
D111FBZ

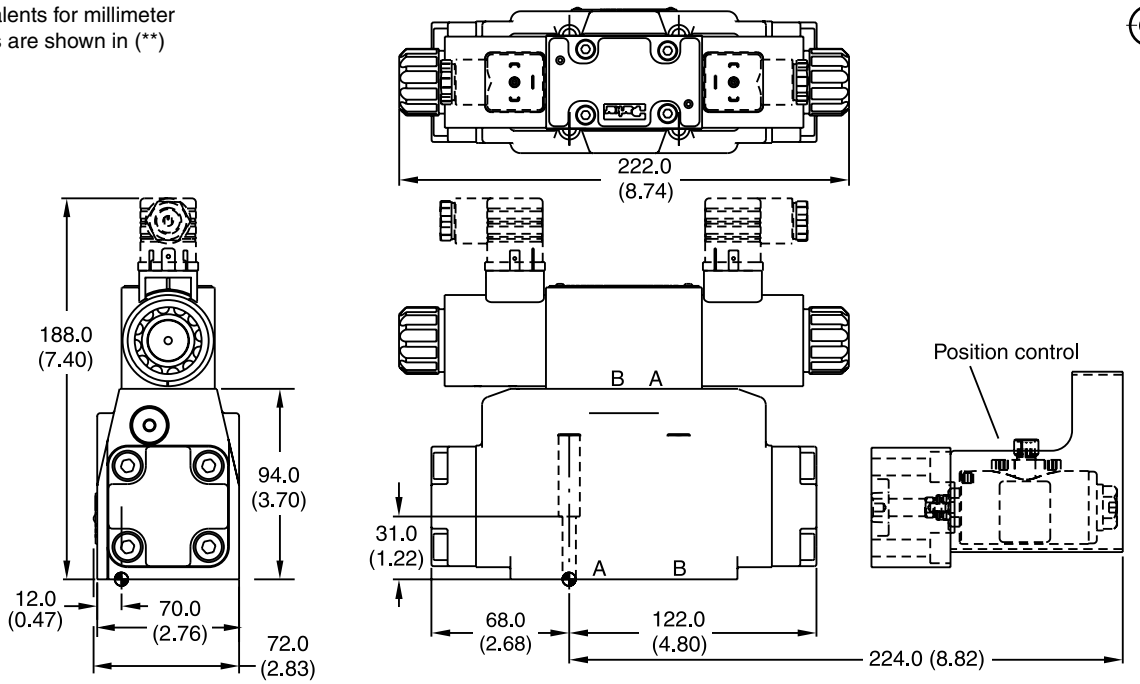


(drawn offset)

A

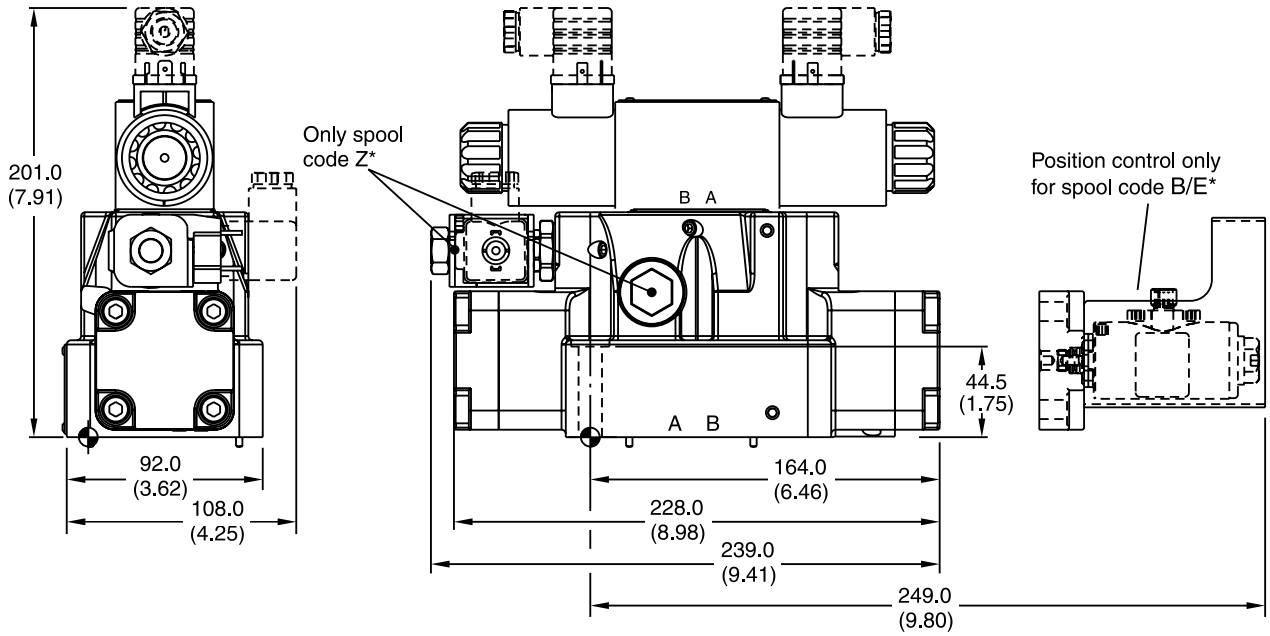
Inch equivalents for millimeter dimensions are shown in (**)

D31FB



Surface Finish	Kit			Seal Kit
R_{max}6.3 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-D31FB Fluorocarbon: SK-D31FBV

D41FB



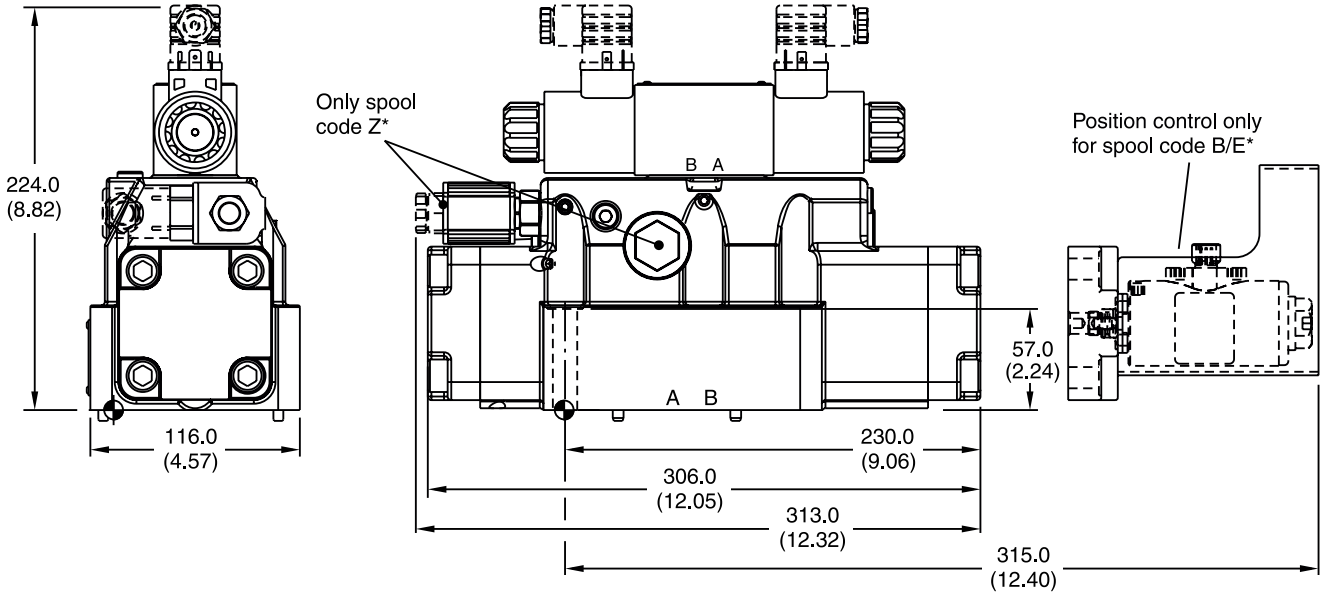
Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK320 BK160	2x M6x55 4x M10x60 DIN 912 12.9 4x 3/8-16x2.5 2x 1/4-20x2.5	13.2 Nm (9.7 lb.-ft.) 63 Nm (46.5 lb.-ft.) ±15 %	Nitrile: SK-D41FB Fluorocarbon: SK-D41FBV

D_1FB.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

D91FB

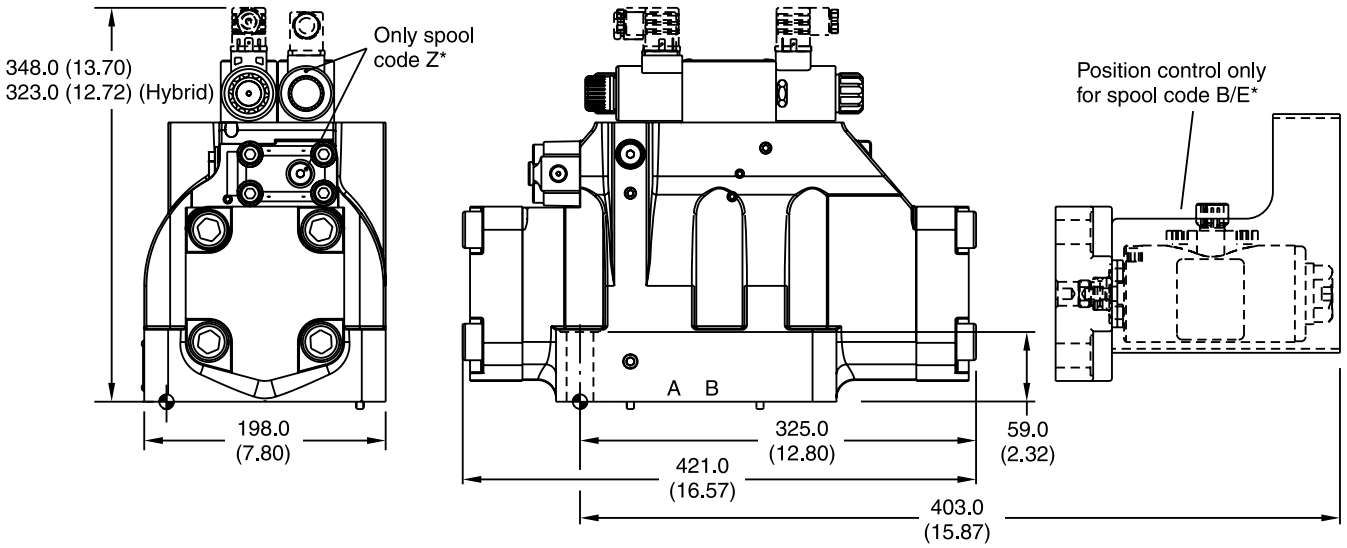


Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK360 BK228	6x M12x75 DIN 912 12.9 6x 1/2-13x3.0	108 Nm (79.7 lb.-ft.) ±15 %	Nitrile: SK-D91FB Fluorocarbon: SK-D91FBV

A

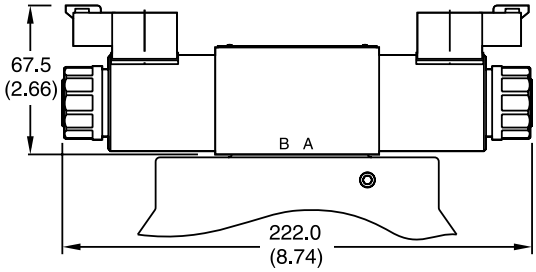
Inch equivalents for millimeter dimensions are shown in (**)

D111FB



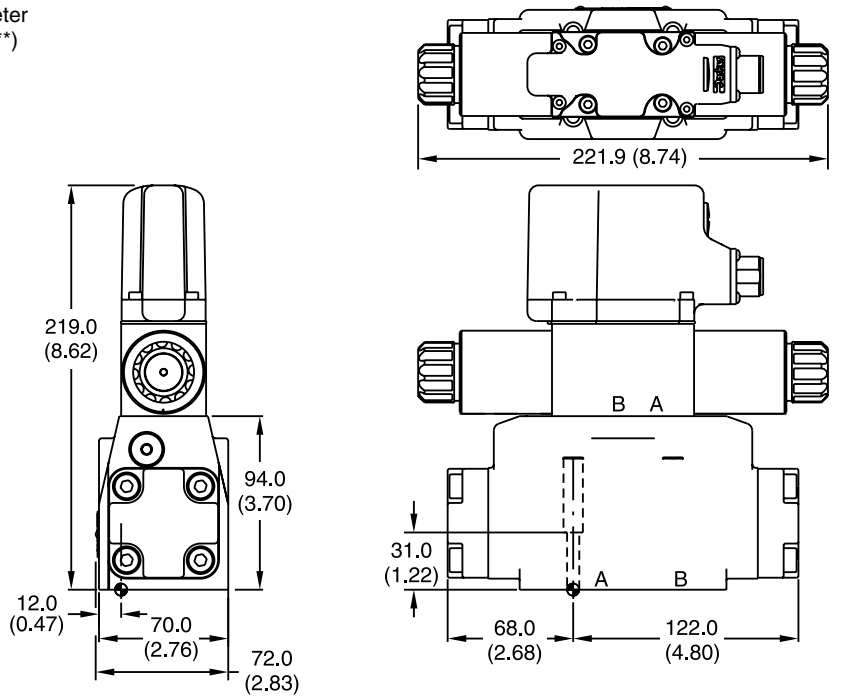
Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK386 BK150	6x M20x90 DIN 912 12.9 6x 3/4-10x3.5	517 Nm (373.9 lb.-ft.) ±15 %	Nitrile: SK-D111FB Fluorocarbon: SK-D111FBV

Dimension with DT04-2P "Deutsch" Connector



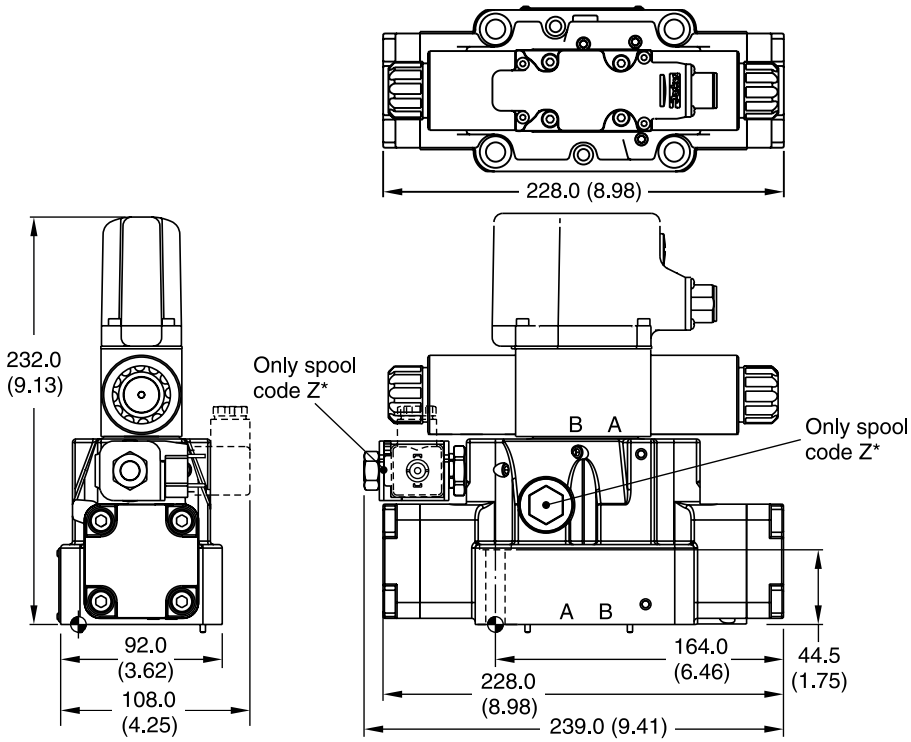
Inch equivalents for millimeter dimensions are shown in (**)

D31FB OBE



Surface Finish	Kit			Seal Kit
R_{max}6.3 ⏥ 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-D31FB Fluorocarbon: SK-D31FBV

D41FB OBE



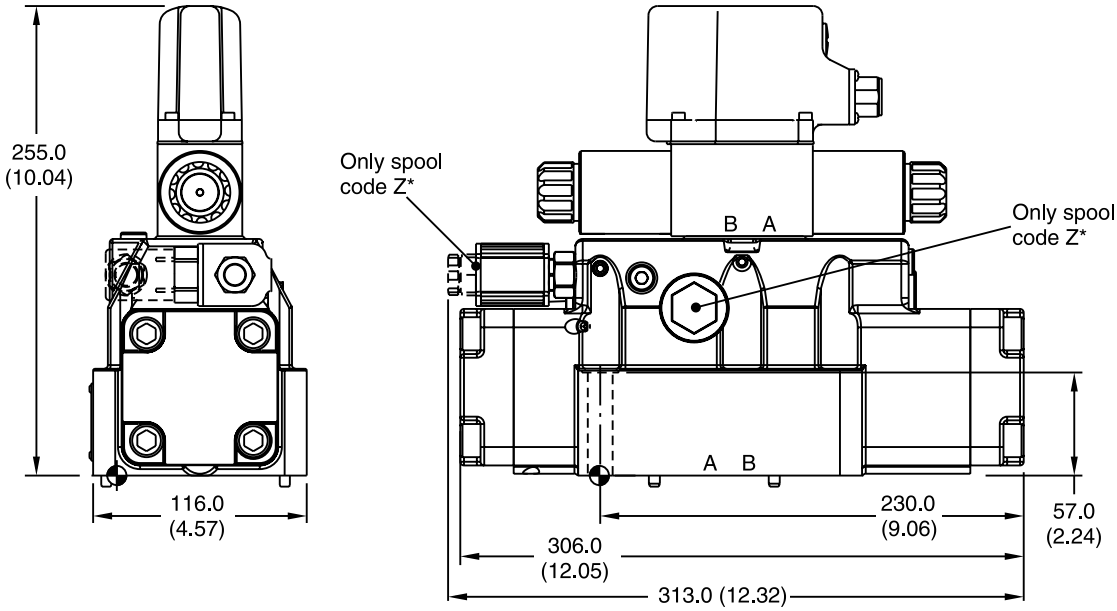
Surface Finish	Kit			Seal Kit
R_{max}6.3 ⏥ 0.01/100	BK320 BK160	2x M6x55 4x M10x60 DIN 912 12.9 4x 3/8-16x2.5 2x 1/4-20x2.5	13.2 Nm (9.7 lb.-ft.) 63 Nm (46.5 lb.-ft.) ±15 %	Nitrile: SK-D41FB Fluorocarbon: SK-D41FBV

D_1FB.indd, dd

A

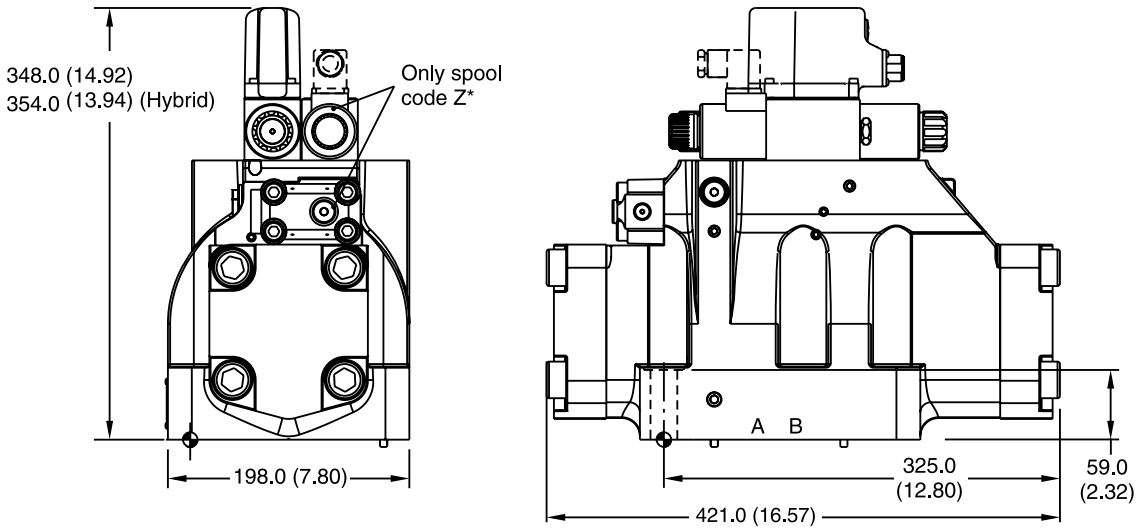
Inch equivalents for millimeter dimensions are shown in (**)

D91FB OBE



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	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

D111FB OBE



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	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

D_1FB.indd, dd

A

General Description

Series D1FB (NG6) and D3FB (NG10) proportional directional valves with CANopen interface are based on the series for standard digital electronics of the same name.

CANopen-Profile

CANopen Application Layer and Communication Layer
CiA DS - 301 Version 4.01

CANopen Layer Setting Services (LSS) and Protocols
CiA DS – 305 Version 2.0

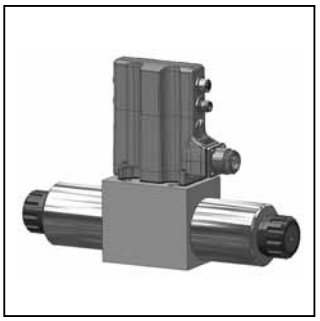
Device Profile in accordance with
CiA DSP – 408 Version 1.5.2

The baud rate and node ID can be set by dip switches or Layer Setting Service (LSS).

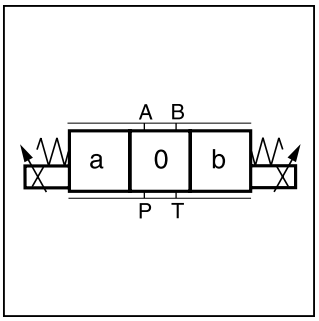
The valve parameters are factory set. Additionally the ProPxD software permits the editing of all parameters via the separate communication port. The software is also used for the valves with digital onboard electronics and the electronics modules. The cable for connection to a serial RS232 interface is available as accessory.

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

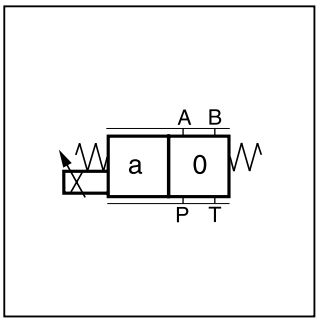
The series D1FB and D3FB are available with spool/sleeve design as well as with spool/body design.



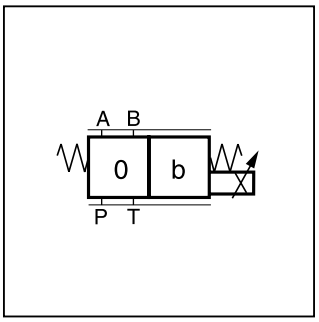
D3FB*C



D*FB*C



D*FB*E



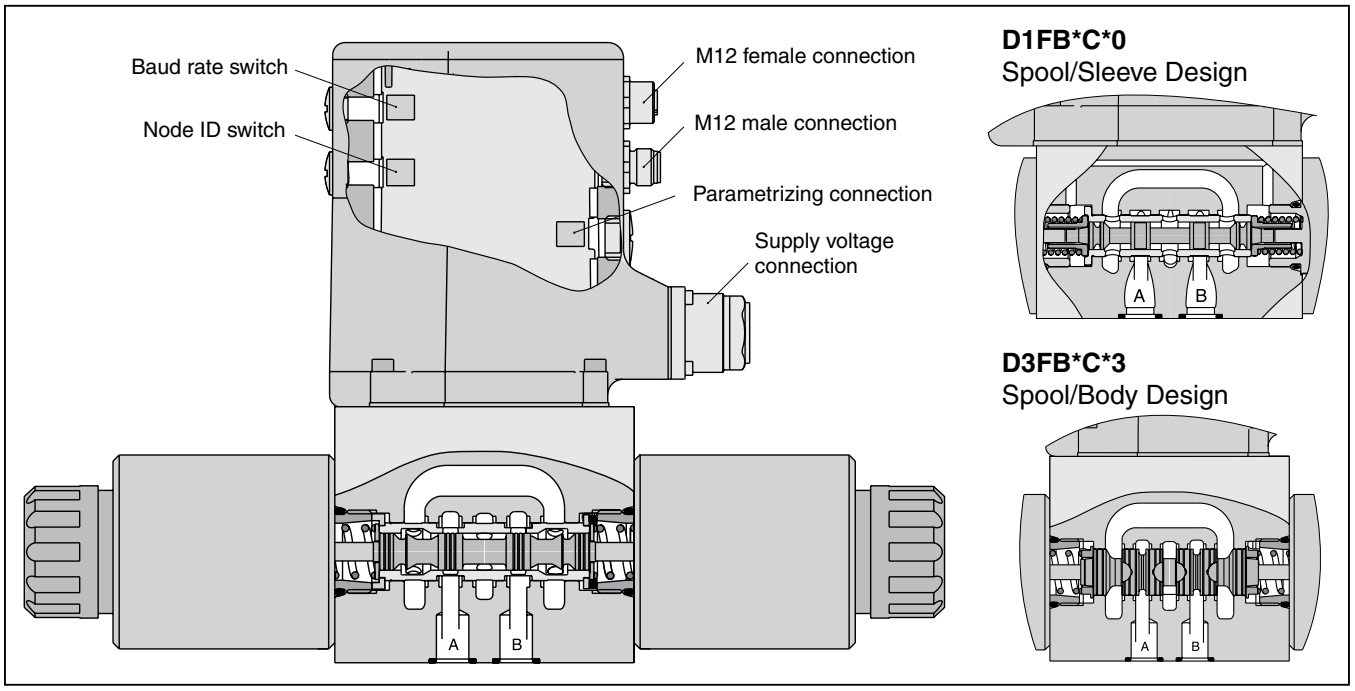
D*FB*K

Features

- CANopen interface.
- Spool/sleeve design and spool/body design.
- High repeatability from valve to valve.
- Low hysteresis.
- Manual override.
- Failsafe center position.

D3FB*C*0

Spool/Sleeve Design



D_FB with CANopen.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

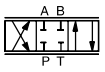
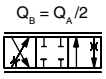
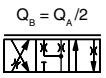
D	1	F	B			0		U	0		
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style		Seal	Communication Interface CANopen DSP 408, 6 + PE, 1xM12 Male 1xM12 Female	Options	Design	Design Series NOTE: Not required when ordering.

Code	Description
1	DIN NG6 CETOP 3 NFPA D03

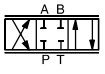
Code	Description
0	Spool/sleeve design
3	Spool/body design

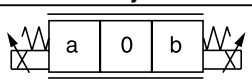
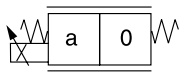
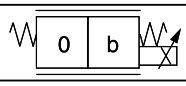
Code	Description
N	Nitrile
V	Fluorocarbon

D1FB*0: 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		20/10 (5.3/2.6) 12/6 (3.2/1.6)
B32H B32F		20/10 (5.3/2.6) 12/6 (3.2/1.6)

D1FB*3: 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)

Code	Style
C	
E	
K	

Bolt Kit:

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

Weight:

D1FB	2.5 kg (5.5 lbs.)

Parametrizing cable OBE => RS232
Item no. 40982923

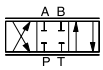
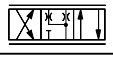
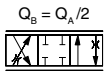
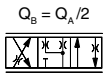
D	3	F	B			0		U	0		
Directional Control Valves	Size	Flow Control	Standard Dynamics Standard Repeatability	Spool	Style		Seal	Communication Interface CANopen DSP 408, 6 + PE, 1xM12 Male 1xM12 Female	Options	Design	Design Series NOTE: Not required when ordering.

Code	Description
3	DIN NG10 CETOP 5 NFPA D05

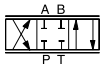
Code	Description
N	Nitrile
V	Fluorocarbon

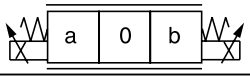
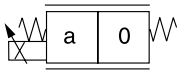
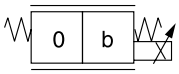
Code	Description
0	Spool/sleeve design
3	Spool/body design

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		40 / 20 (10.6 / 5.3) 60 / 30 (15.9 / 7.9)
B32M B32S		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)

Code	Style
C	
E	
K	

Bolt Kit:

BK98	(4) 1/4-20x1.625 SHCS
BK385	4x M6x40

Weight:

D3FB	7.0 kg (15.4 lbs.)

Parametrizing cable OBE => RS232
Item no. 40982923

A

General			
Design	Direct operated proportional DC valve		
Actuation	Proportional solenoid		
Size	**NG6 / CETOP 3 / NFPA D03**		**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]	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...535, other on request		
Fluid Temperature [°C]	-20...+60 (-4°F...+140°F)		
Viscosity **Permitted [cSt] / [mm²/s]** **Recommended [cSt] / [mm²/s]**	 20...380 (93...1761 SSU) 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**	**D1FB*3**	**D3FB*0/3**
	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)	40 LPM (10.6 GPM) / 60 LPM (15.9 GPM) / 80 LPM (21.2 GPM)
Leakage at 100 Bar (1450 PSI) [ml/min]	<50 (3.0 cu. in.)	<60 (3.7 cu. in.)	<100 (6.1 cu. in.)
Overlap [%]	25, electrically normalized at 10 (see flow characteristics)		
Static / Dynamic			
Step Response at 100% Step [ms]	30	30	40
Hysteresis [%]	<4	<6	<5
Temperature Drift Solenoid Current [%/K]	<0.02		
Electrical			
Duty Ratio [%]	100		
Protection Class	IP65 in accordance with EN60529 (with correctly mounted plug-in connector)		
Supply Voltage/Ripple DC [V]	18...30, ripple < 5% eff., surge free		
Current Consumption Maximum [A]	2.0		3.0
Pre-fusing Medium Lag [A]	2.5		4.0
EMC	EN 61000-6-2, EN 61000-6-4		
Connection Supply Voltage	6 + PE acc. to EN 175201-804		
Connection CANopen	1 x Male M12x1: 5p 1 x Female M12x1: 5p acc. to IEC61076-2-101		
Wiring Supply Voltage Minimum [mm²]	3 x 1.0 (AWG16) overall braid shield		
Wiring Length Maximum [m]	50 (164 ft.)		
Wiring CANopen	acc. to CiA DS-301 Version 4 / Twisted pair cable acc. to ISO11898		

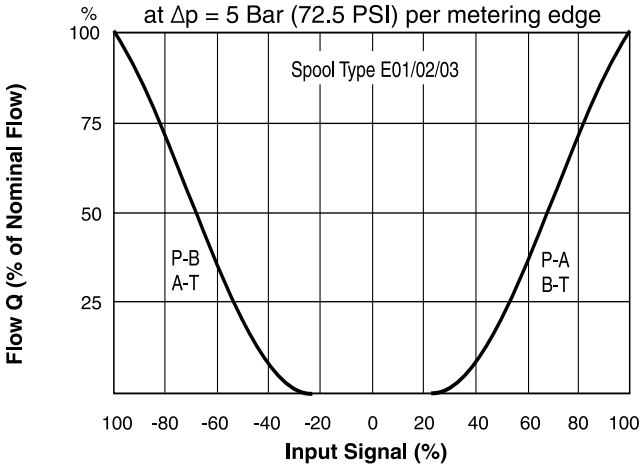
* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

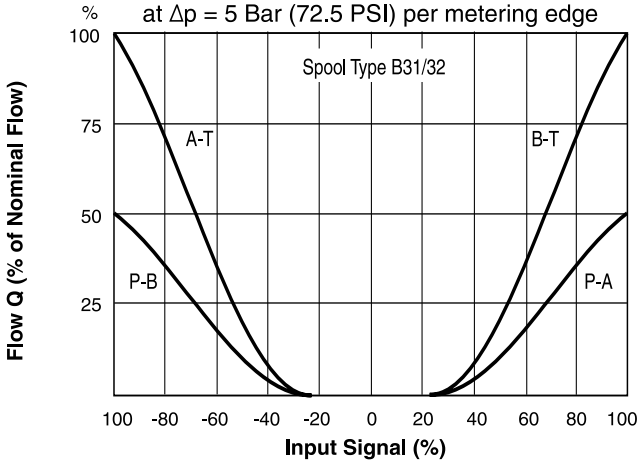
Continued on the next page

CANopen		
Profiles		Communication Layer CIA DS - 301 Version 4 Device Profile in accordance with CIA DS - 408 Version 1.5.2 Layer Setting Service CIA DS - 305 Version 2
Functionality		CANopen slave One PDO (Receive) One PDO (Transmit) One SDO (not useable for valve parameterizing) Emergency object Sync object Node guarding Life guarding Heartbeat time (producer/consumer) Minimum boot - up Node - ID - adjustment by DIP switch and LSS Baud Rate - adjustment by DIP switch and LSS
Parameterization		
Interface		RS 232, parametrizing cable order code 40982923
Interface Program		ProPxD (see www.parker.com/euro_hcd)
Adjustment Ranges		
	Minimum **[%]**	0...50
	Maximum **[%]**	50...100
	Ramp **[s]**	0...32.5

A

D1FB*0 Flow

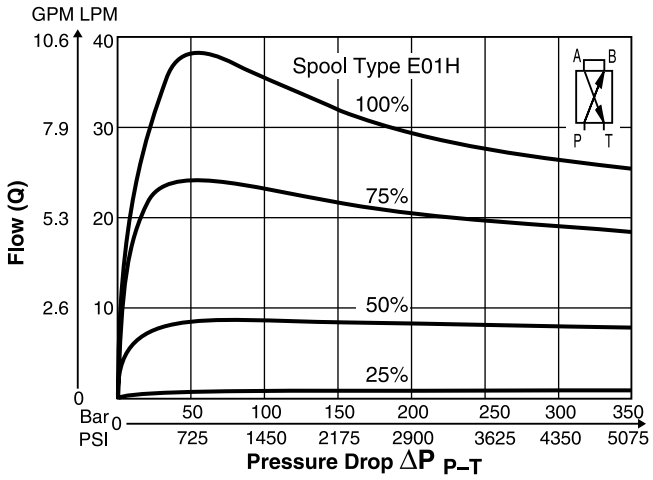




All performance curves measured with HLP46 at 50°C (122°F).

Flow Limit

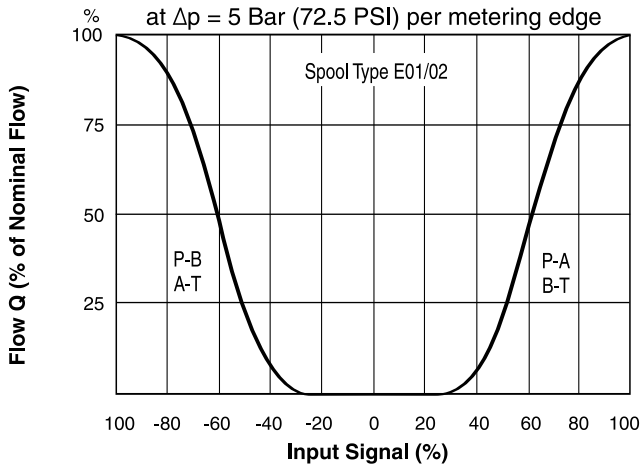
At 25%, 50%, 75% and 100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.



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

A

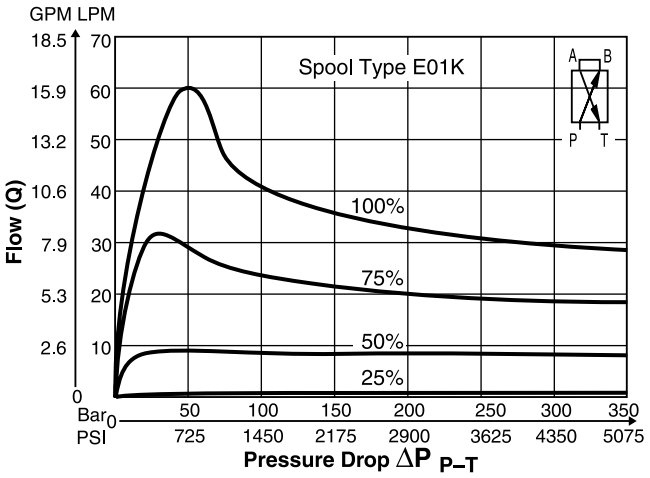
D1FB*3 Flow



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

Flow Limit

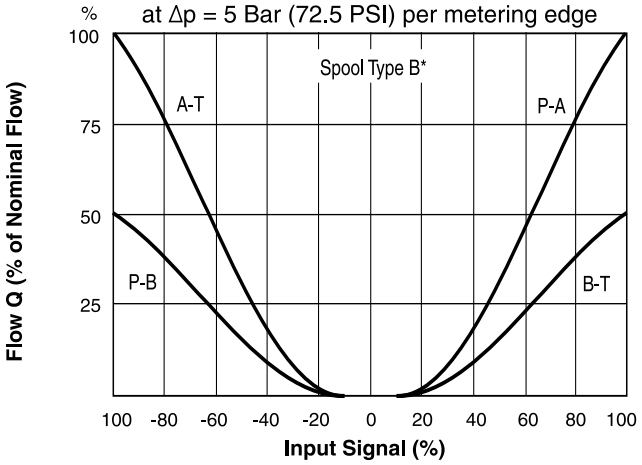
At 25%, 50%, 75% and 100% command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered – typically approx. 10% lower.

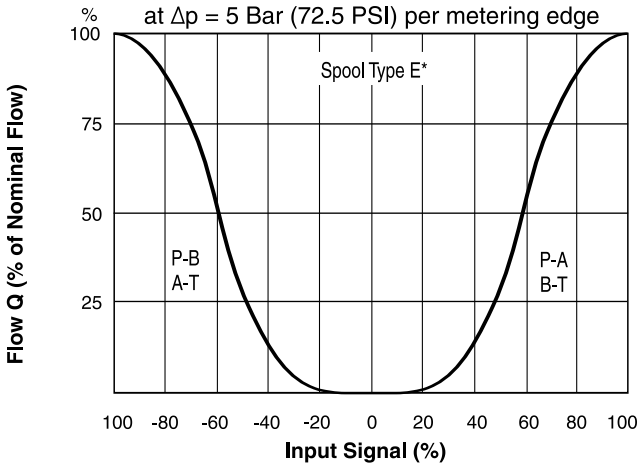


All performance curves measured with HLP46 at 50°C (122°F).

A

D3FB Flow



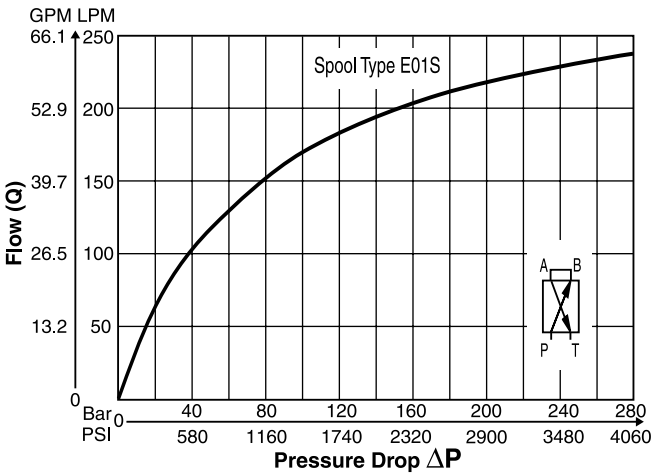


All performance curves measured with HLP46 at 50°C (122°F).

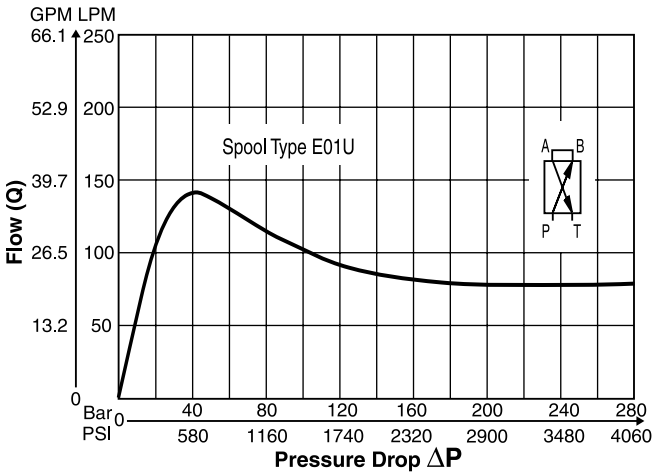
Flow Limit

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

D3FB*0

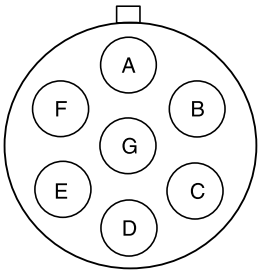


D3FB*3



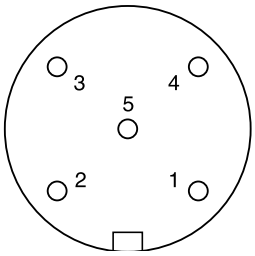
All performance curves measured with HLP46 at 50°C (122°F).

Supply Voltage Connection
6 + PE



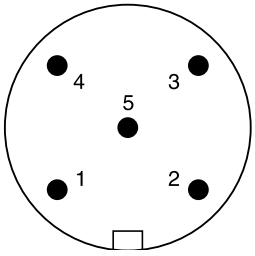
A Supply voltage 18...30V
B Supply voltage 0V
C hC
D hC
E hC
F hC
G PE

CANopen Connection



CAN in: M12, 5 pole male terminals.
Pin 1: CAN_SHLD
Pin 2: nc
Pin 3: CAN_GND
Pin 4: CAN_H
Pin 5: CAN_L

Shield is CAN_GND.

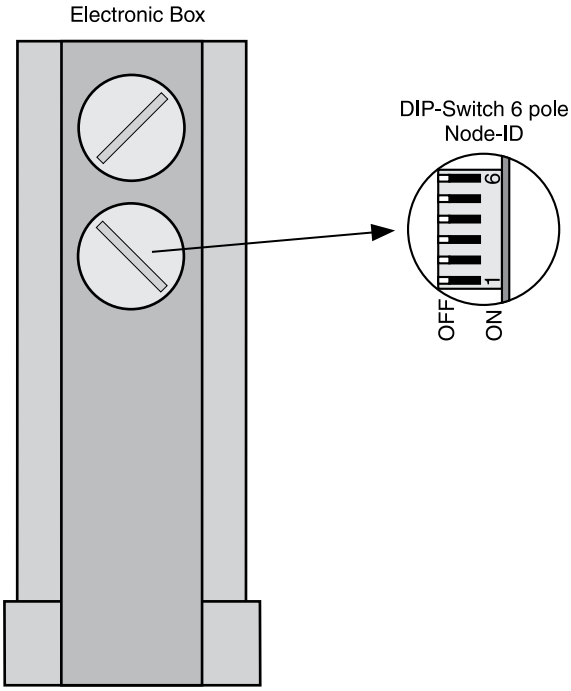


CAN out: M12, 5 pole female terminals.
Pin 1: CAN_SHLD
Pin 2: nc
Pin 3: CAN_GND
Pin 4: CAN_H
Pin 5: CAN_L

Shield is CAN_GND.

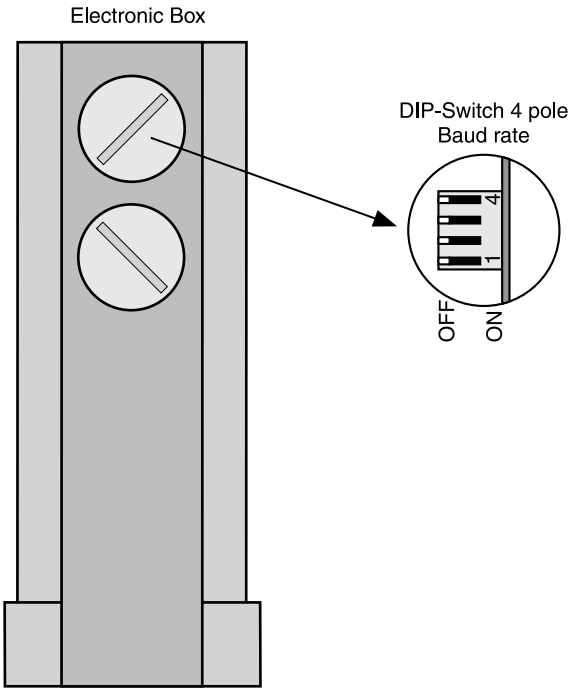
A

Node–ID Adjustment with DIP Switches



Node-ID	DIP Switch Setting					
	1	2	3	4	5	6
0 LSS -Priority	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**
1	**ON**	OFF	OFF	OFF	OFF	OFF
2	OFF	**ON**	OFF	OFF	OFF	OFF
3	**ON**	**ON**	OFF	OFF	OFF	OFF
…						
61	**ON**	OFF	**ON**	**ON**	**ON**	**ON**
62	OFF	**ON**	**ON**	**ON**	**ON**	**ON**
63	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**
	1	2	3	4	5	6
	Value					

Baud Rate Adjustment with DIP Switches



Baud Rate	DIP Switch Setting			
	1	2	3	4
0 LSS -Priority	**OFF**	**OFF**	**OFF**	Valve Parameterization and Diagnostics ON/OFF
10 kBit/s	**ON**	OFF	OFF	
20 kBit/s	OFF	**ON**	OFF	
50 kBit/s	**ON**	**ON**	OFF	
125 kBit/s	OFF	OFF	**ON**	
250 kBit/s	**ON**	OFF	**ON**	
500 kBit/s	OFF	**ON**	**ON**	
1 MBit/s	**ON**	**ON**	**ON**	

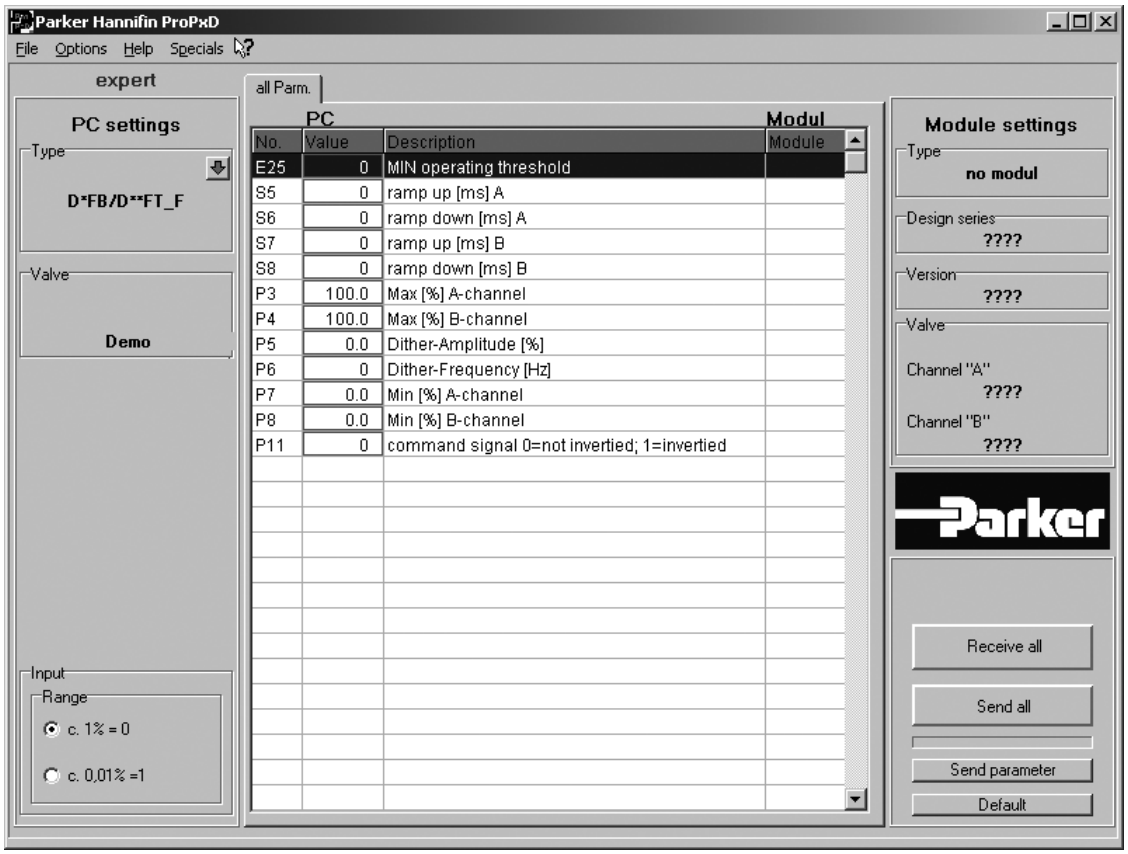
A

ProPxD Interface Program

The ProPxD software permits 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 nonvolatile memory stores the data with the option for recalling or modification.

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.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd – see "Software Downloads"

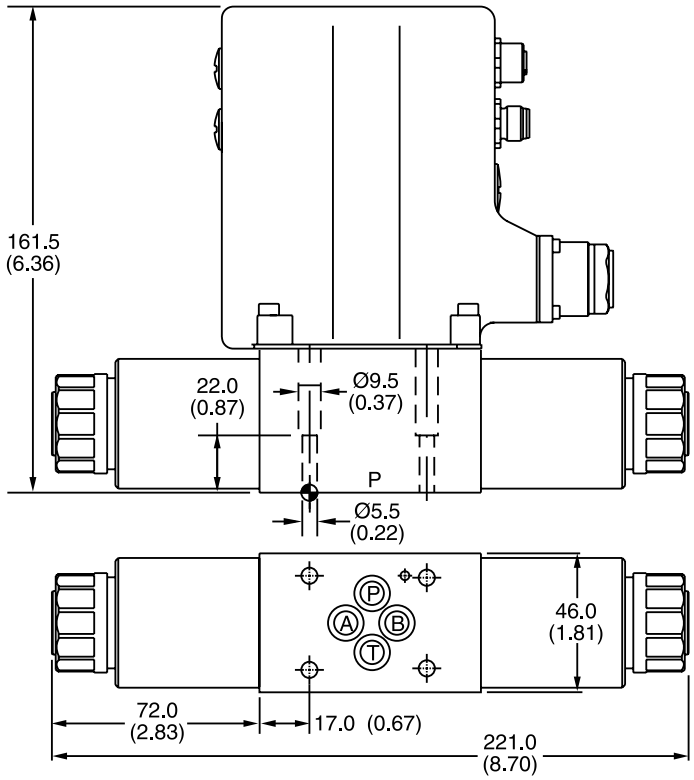


The parametrizing cable may be ordered under item no. 40982923.

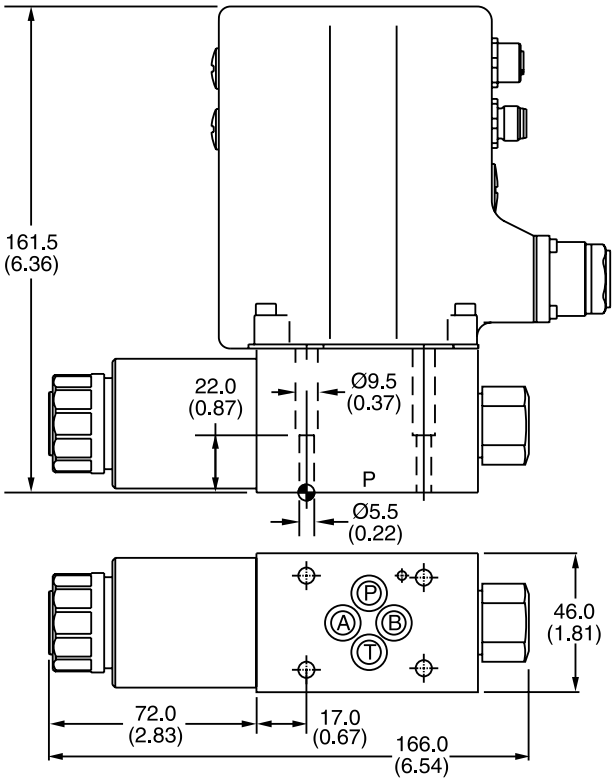
A

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

D1FB*C



D1FB*E

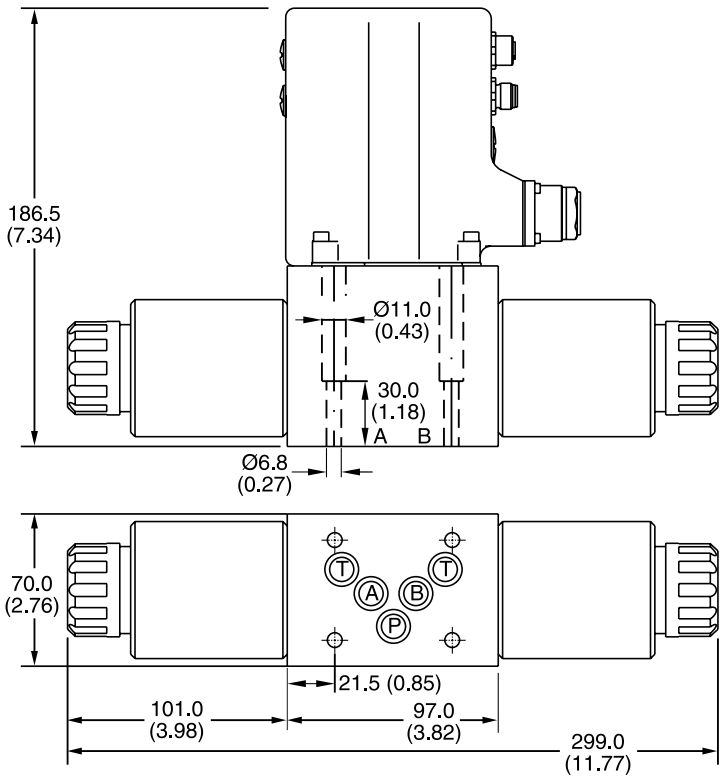


Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK375 BK209	4x M5x30 DIN 912 12.9 4x 10-24x1.25	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB Fluorocarbon: SK-D1FBV

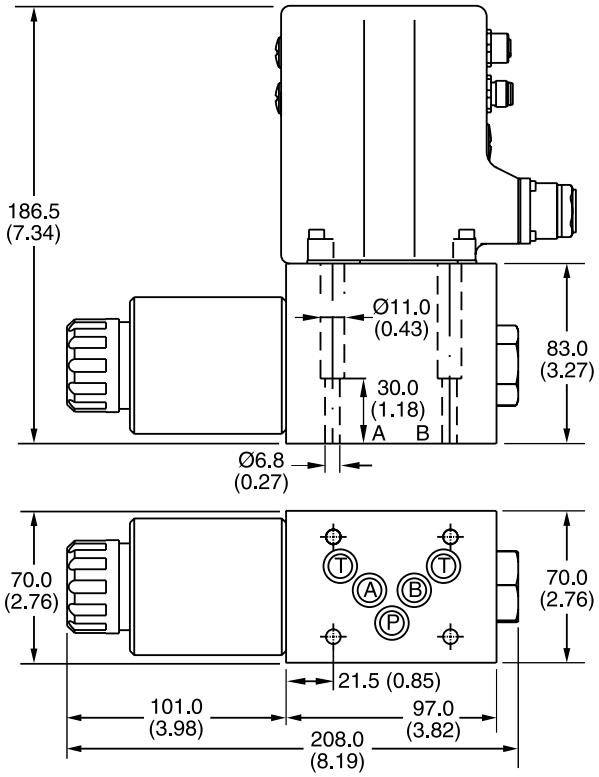
A

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

D3FB*C OBE



D3FB*E OBE



Surface Finish	Kit			Seal Kit
R_{max}6.3 ⏥ 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

D_FB with CANopen.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

General Description

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

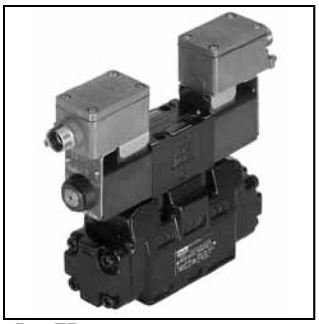
CE Ex II 2 G

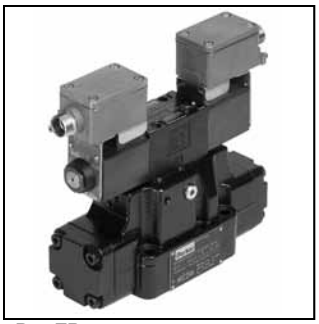
Ex mbe II T4

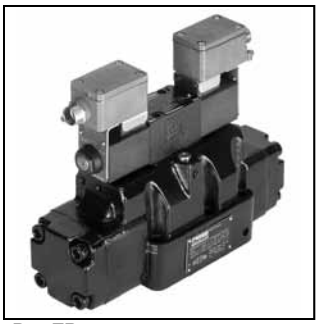
for use in zone 1 (conform to ATEX).

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).

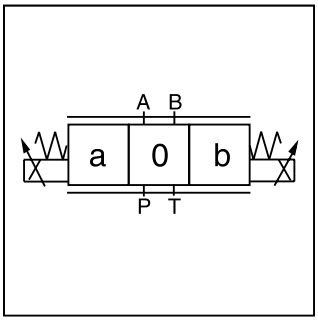
The valve parameters can be edited with the common ProPxD software.


D31FB


D41FB


D91FB

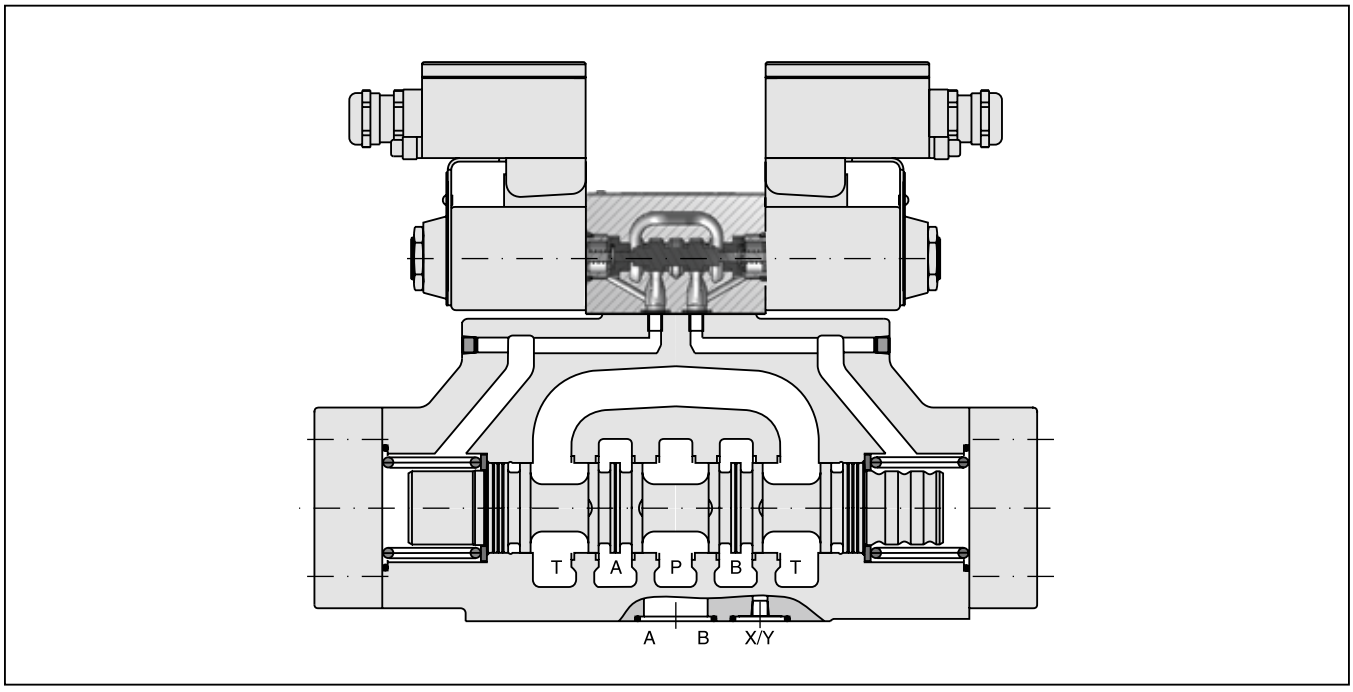

D111FB



Features

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

D91FB*EE



A

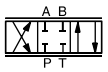
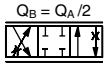
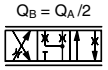
Ordering Information

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	
B32	

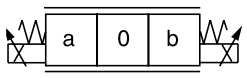
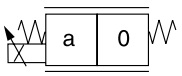
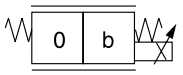
Code	Description
J	24V / 1.5A
K	24V / 2.3A

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:

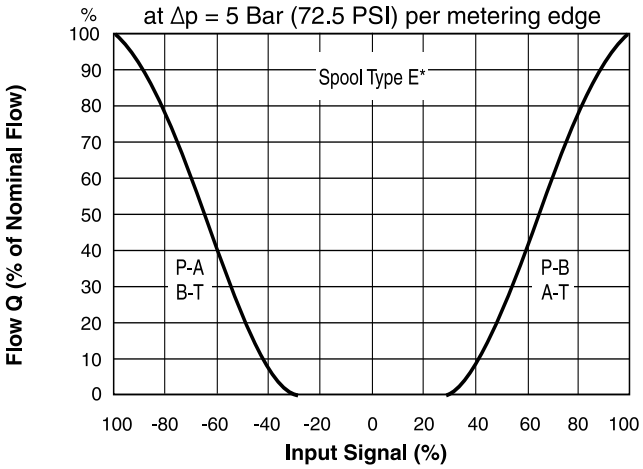
D31FB*EE	BK98
D41FB*EE	BK160
D91FB*EE	BK228
D111FB*EE	BK150

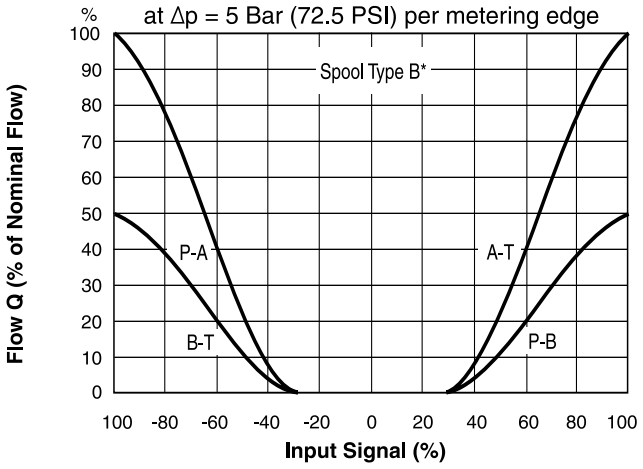
Weight:

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).

D_1FB_EE.indd, dd

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Hydraulic Valve Division
Elyria, Ohio, USA

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		unrestriced			
Ambient Temperature	**[°C]**	-20...+40; (-4°F...+104°F)			
$MTTF_D$ 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...535, other on request			
Fluid temperature	**[°C]**	-20...+40; (-4°F...+104°F)			
Viscosity **Permitted** **Recommended**	 **[cSt] / [mm²/s]** **[cSt] / [mm²/s]**	 20...380 (93...1761 SSU) 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 presure]; 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			
Protection Class		CE Ex II 2 G , Ex mbe II T4, IP66 (plugged and mounted correctly)			
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: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

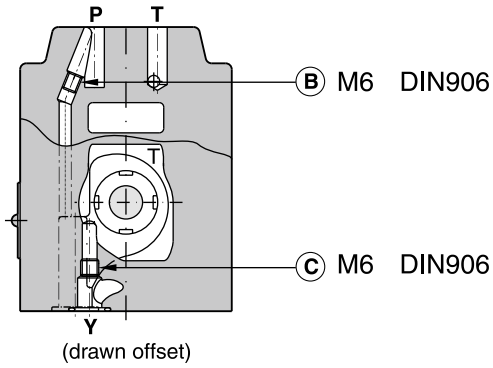
D_1FB_EE.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

Pilot Flow
Pilot Oil Inlet (supply) and Outlet (drain)

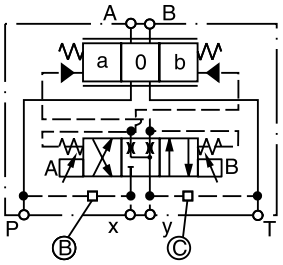
D31FB



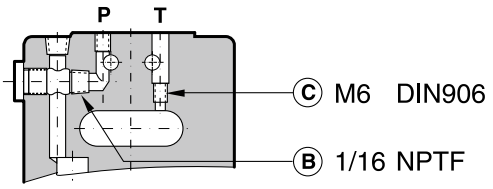
(drawn offset)

○ open, ● closed

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

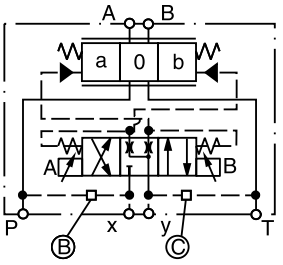


D41FB

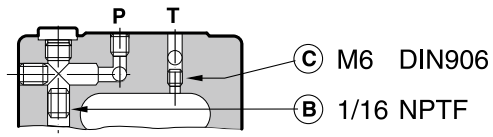


○ open, ● closed

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

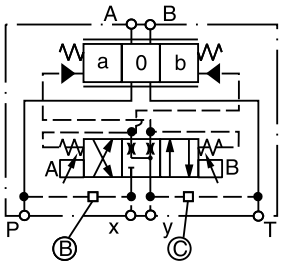


D91FB

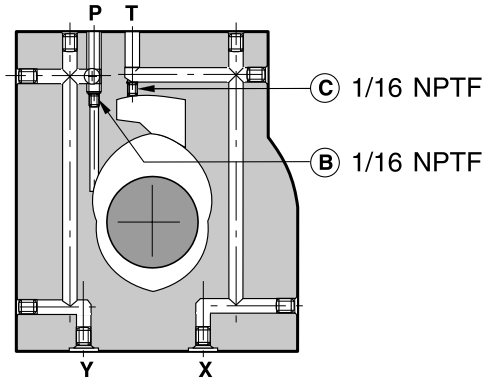


○ open, ● closed

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

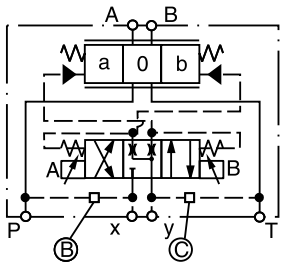


D111FB



○ open, ● closed

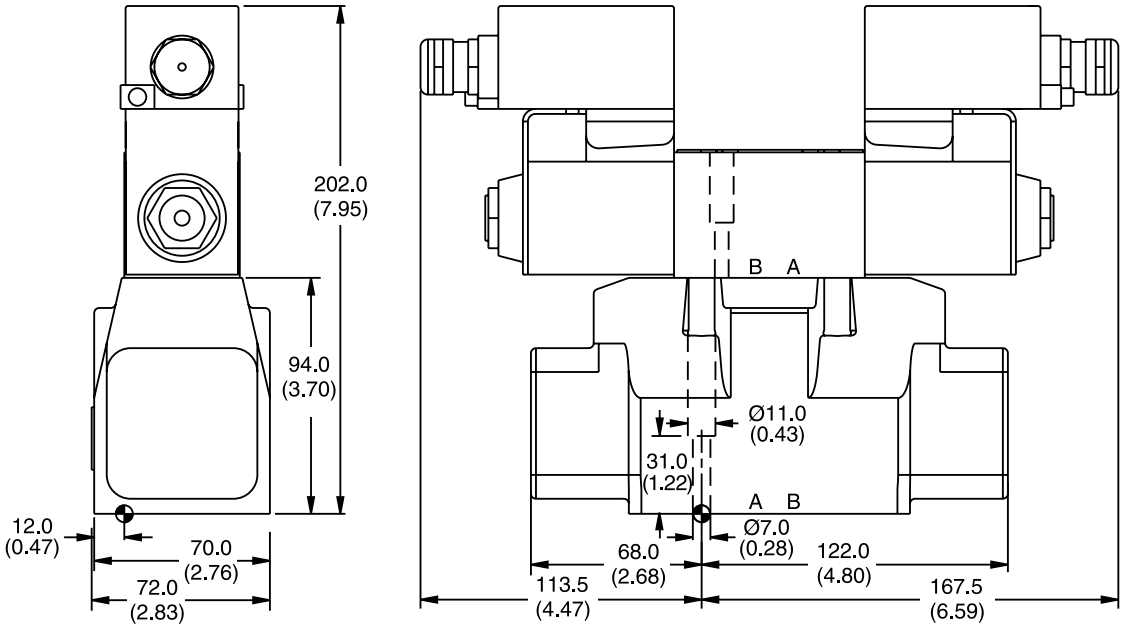
Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



A

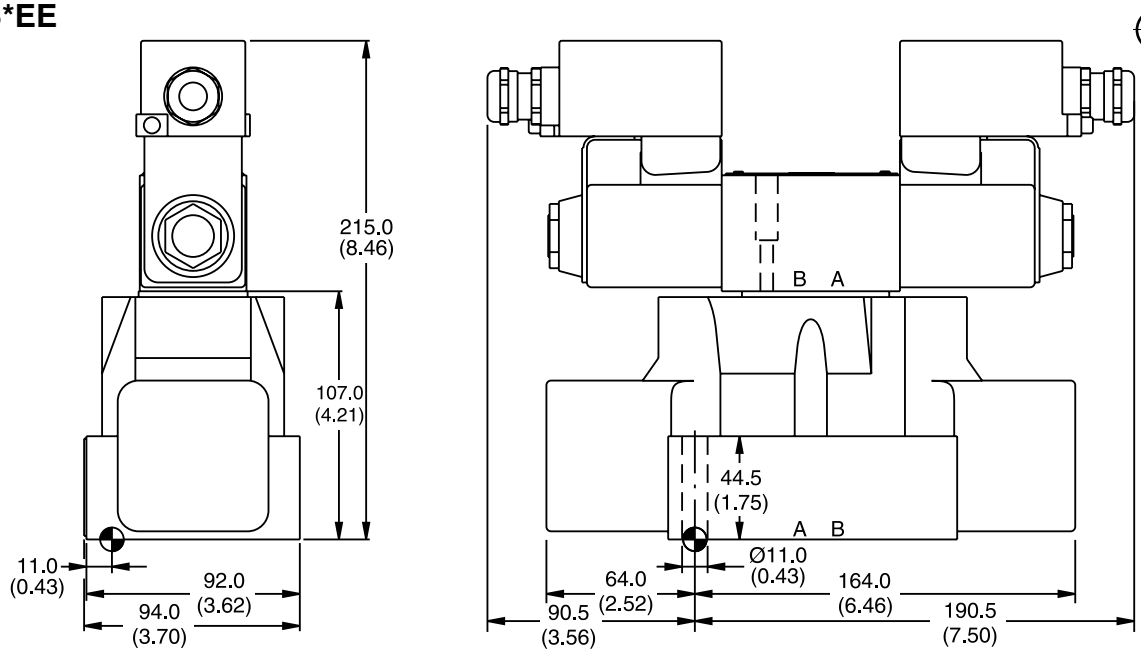
Inch equivalents for millimeter dimensions are shown in (**)

D31FB*EE



Surface Finish	Kit			Kit
R_{max}6.3 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-D31FB Fluorocarbon: SK-D31FBV

D41FB*EE



Surface Finish	Kit			Kit
R_{max}6.3 0.01/100	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

D_1FB_EE.indd, dd

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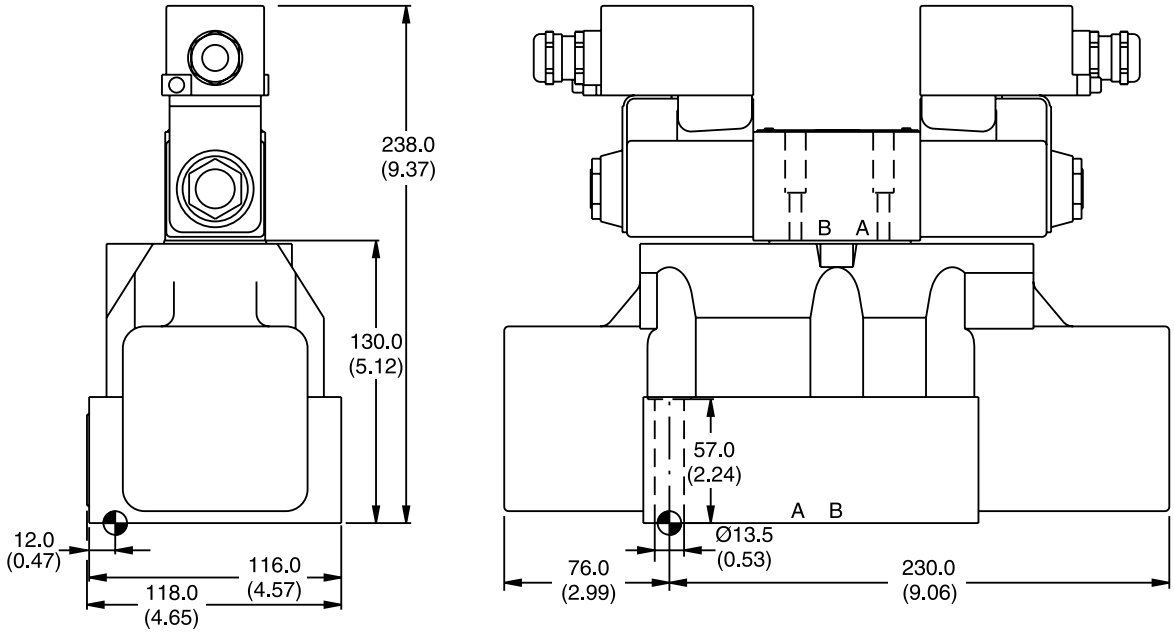
Hydraulic Valve Division
Elyria, Ohio, USA

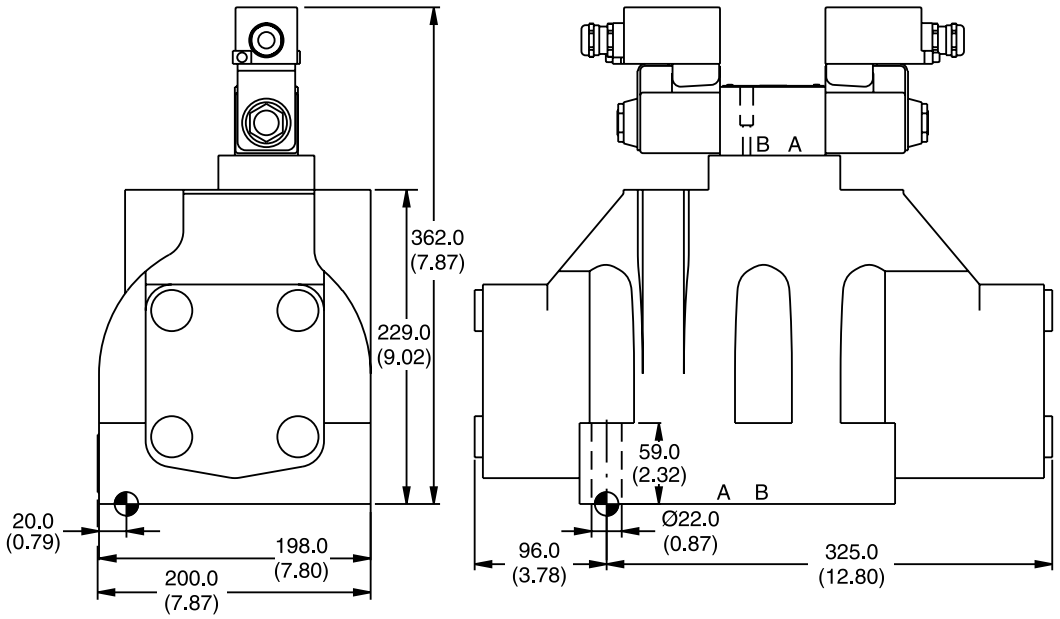
Inch equivalents for millimeter dimensions are shown in (**)

D91FB*EE



Surface Finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	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

D111FB*EE



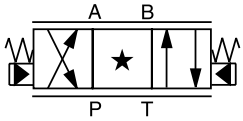
Surface Finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK386 BK150	6x M20x90 DIN 912 12.9 6x 3/4-10x3.5	517 Nm (373.9 lb.-ft.) ±15 %	Nitrile: SK-D111FB Fluorocarbon: SK-D111FBV

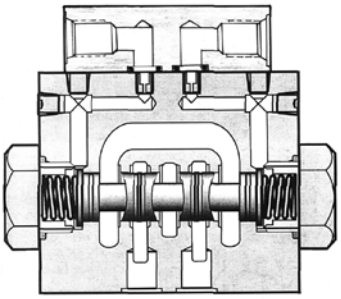
A

General Description

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

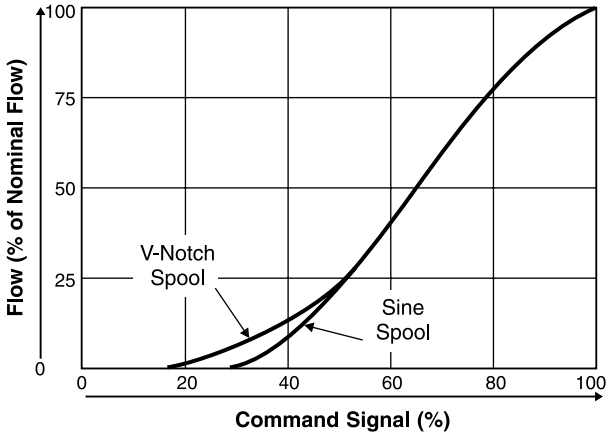
- Standard DIN/ISO/CETOP/NFPA interfaces.
- Progressive flow characteristics for improved low flow resolution.
- Spring centered main stage spool.
- 2:1 ratio spool options.

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

D*9FF Flow Characteristics
at Δp = 5 Bar (72.5 PSI) per metering edge



D_9FF.indd, dd

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Hydraulic Valve Division
Elyria, Ohio, USA

D		9	F	F			C	2		
Directional Control Valve	Size	No Pilot	Flow Control	Remote Pilot	Spool Type	Flow	Style	Pilot Connection	Seal	Design Series

NOTE: Not required when ordering.

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

* 32mm Ø ports

Code	Style
C	

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Pilot	Drain
2	External	External

Sine Spool Options - Spool Type and Flow Codes

Code $Q_A=Q_B$	Code $Q_A>Q_B$ [1]	Sine Spool Type
E01	B31	
E02	B32	

Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge			
	D39 LPM (GPM)	D49 LPM (GPM)	D99 LPM (GPM)	D119 LPM (GPM)
C	75 (20)	–	–	–
F	–	200 (53)	–	–
H	–	–	400 (106)	_
L	_	_	_	1000 (264)

V-Notch Spool Options - Spool Type and Flow Codes

Code $Q_A=Q_B$	Code $Q_A>Q_B$ [1]	V-Notch Spool Type
E21	B41	
E22	B42	

Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge			
	D39 LPM (GPM)	D49 LPM (GPM)	D99 LPM (GPM)	D119 LPM (GPM)
B	–	–	–	–
D	–	120 (32)	–	–
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

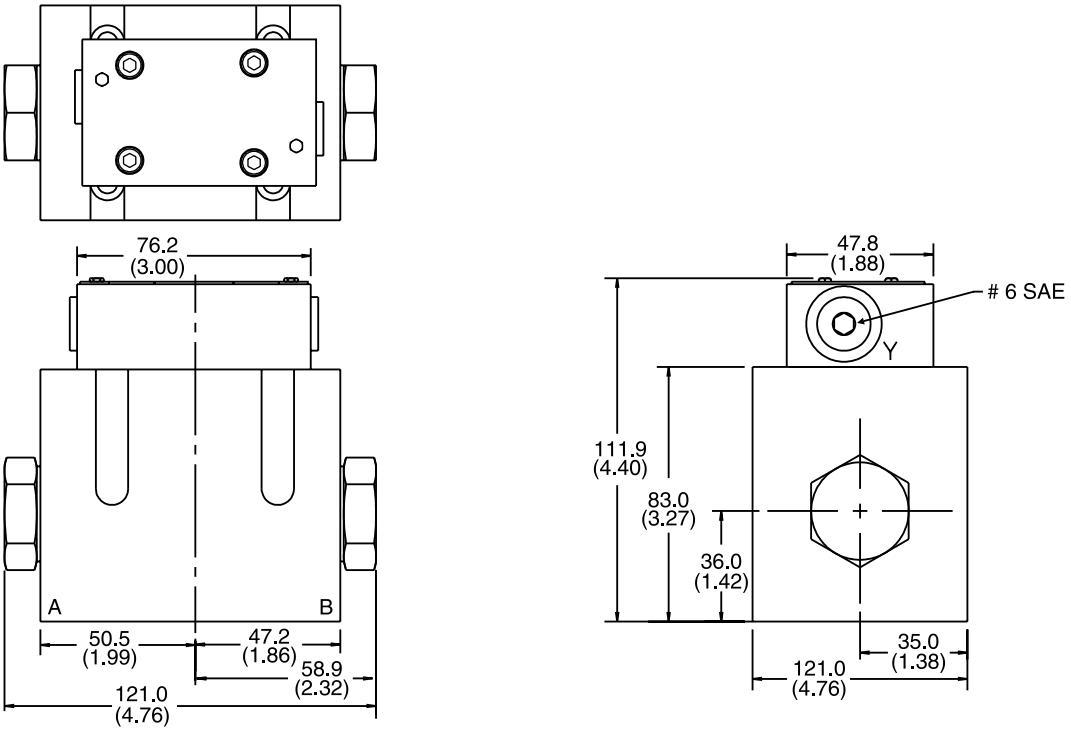
Weight:

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.)

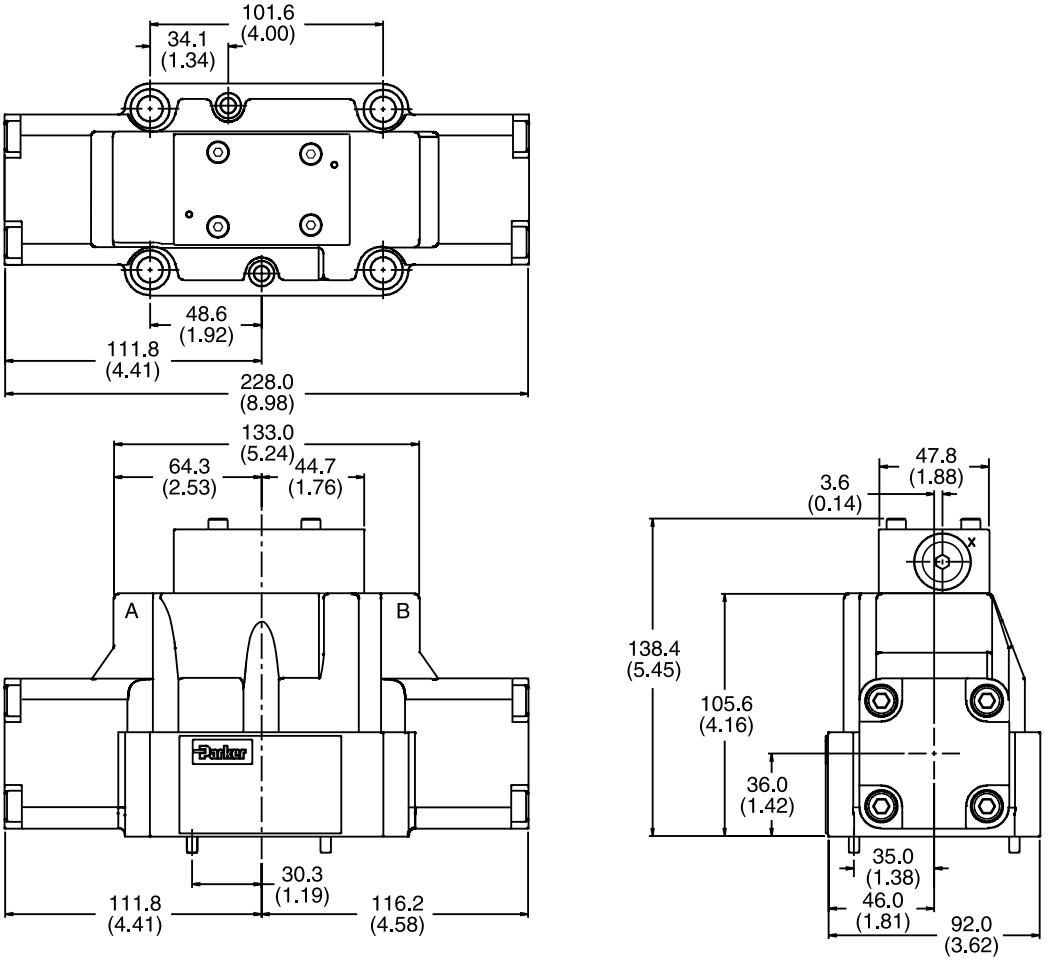
A

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

D39FF



D49FF



D_9FF.indd, dd

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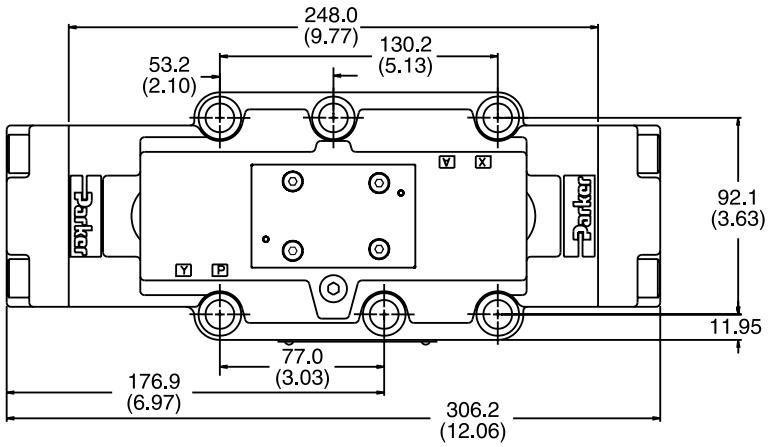
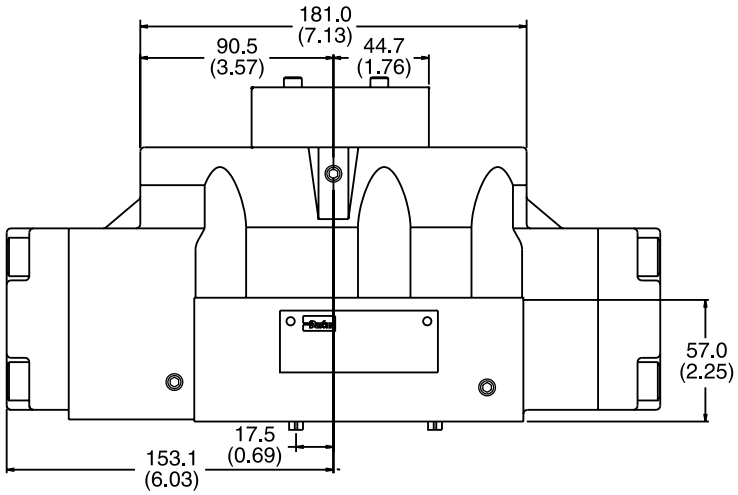
Hydraulic Valve Division
Elyria, Ohio, USA

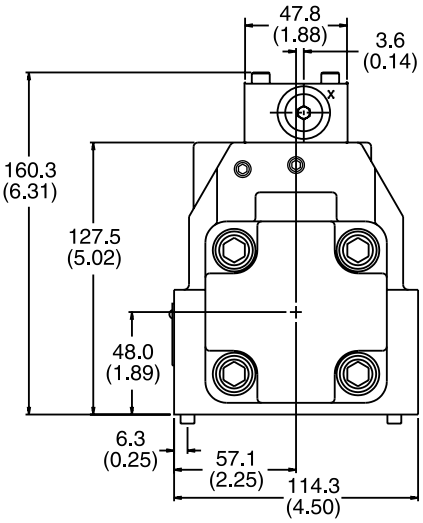
A

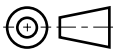
D99FF

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





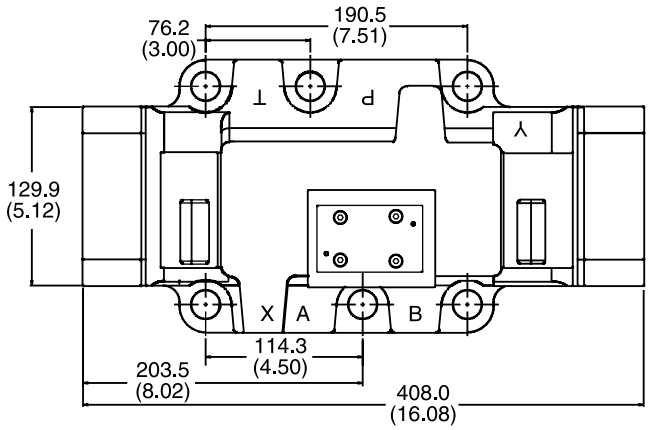


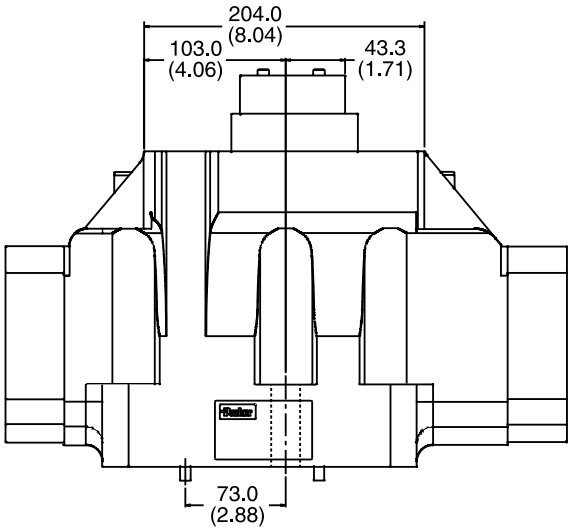


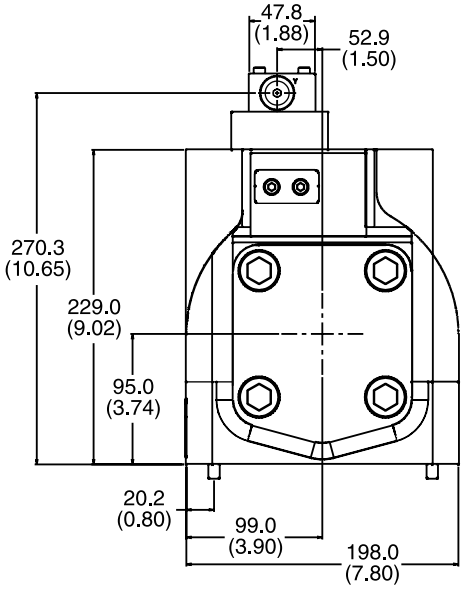
A

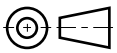
D119FF

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	D39F*	BK98	4	1/4-20 x 1.62"	SPD31D6NS35	3/4" NPTF	Bottom
CETOP 5		BK385	4	M6 x 40mm	SPD31D6NAS35	3/4" NPTF	Side
					SPD31D6SS35	#12 SAE	Bottom
					SPD31D6SAS35	#12 SAE	Side
NG16	D49F*	BK160	4	3/8-16 x 2.5"	SPD46SA	#12 SAE	Side
CETOP 7			2	1/4-20 x 2.25"			
		BK320	4	M10 x 60mm			
			2	M6 x 55mm			
NG25	D99F*	BK228	6	1/2-13 x 3"	SPD66NS35	3/4" NPTF	Bottom
CETOP 8		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	D119F*	BK150	6	3/4-10 x 3.5"	SPD1010N35	1 1/4" NPTF	Bottom
CETOP 10		BK386	6	M20 x 90	SPD1012N35	1 1/2" NPTF	Bottom

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

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

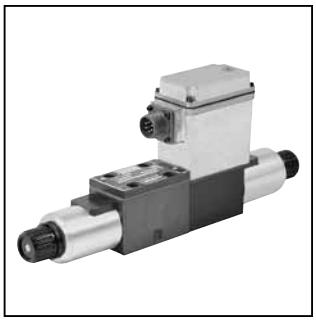
A

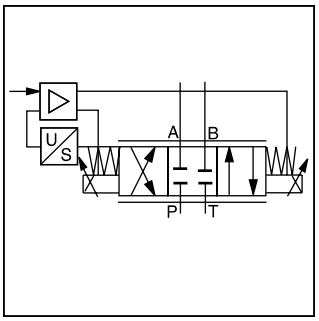
General Description

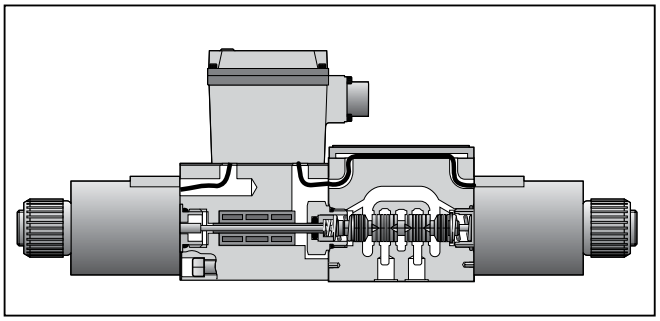
Series D*FX proportional directional control valves are direct operated solenoid valves with electronic spool position feedback, and on-board integrated control electronics. D*FX valves are user configurable to proportionally control flow in response to voltage or current command signals. Valves are available in sizes NG6 (CETOP 3) and NG10 (CETOP 5).

Three electronic control options are available simplifying user application. Configurations include the industrial standard 7-pin interface, or options for a user configurable simple proportional analog outer closed loop, or ± 10V reference outputs which can be used as user command voltage references.

D*FX valve performance is characterized by high resolution flow control, repeatability, and good dynamic performance. Typical applications include precise and reproducible control of actuator speed in rapid/slow speed profiling, and smooth acceleration and deceleration performance.







Features

- Integrated valve electronics.
- Versatile electronic control options.
- Spool position feedback.
- Spring centered spool.
- Manual override.
- Progressive flow characteristics for high resolution flow rate adjustment for small commands.
- LED functional diagnostics.

Specifications

Interface DIN	**NG6 (CETOP 3)**	**NG10 (CETOP 5)**
Flow Rating @10 Bar (150 PSI) Δp (P→A, B→T) (spool options up to)[1] LPM (GPM)	20 (5.3)	60 (15.9)
Maximum Flow LPM (GPM)	47 (12.5)	170 (45)
Step Response (time to reach 90% of a 100% step command) ms	60	75

Hysteresis %	<1.5
Repeatability %	<0.5
Max. Operating Pressure Port P, A, B Bar (PSI) Port T	 315 (4500) 35 (500)
Fluid Cleanliness Level	ISO Class 18/16/13
Fluid Viscosity, Recommended	75 – 600 SSU
Fluid Temperature, Recommended	0°C to +60°C (+32°F to +140°F)
Ambient Operating Temperature	-20°C to +60°C (-4°F to +140°F)
Electrical Power Requirements 24V Version 'J': NG6 (03) 24V Version 'J': NG10 (05) 12V Version 'K': NG06 (03) only	 18 to 30 VDC, 3A 18 to 30 VDC, 4A 11.5 to 15 VDC, 4A

Command Signal (impedance) (select by ordering code) 24V Version 'J'	 0 ± 10 VDC (100K ohm) 0 ± 20 mA (499 ohm)
Command Polarity	Pin 'D' more positive than 'E'; Flow P to A
Spool Position Monitor 24V Version 'J' 12V Version 'K'	 0 ± 10 VDC 0 ± 5 VDC
Mating Connector 7-Pin CE for Electronic Design 'B' 6-Pin for Electronic Design 'C' & 'D'	 Part #5004072 Part #697561
Environmental Protection Class	NEMA 4 (IP65)

1) Actual pressure drop required for each metering land, up to the specified maximum flow rate is:

$$\Delta P_{actual} = (5)\left(\frac{Q_{actual}}{Q_{rated}}\right)^2 \text{ Bar; (Q in LPM)} \quad [or] \quad = (75)\left(\frac{Q_{actual}}{Q_{rated}}\right)^2 \text{ PSI; (Q in GPM)}$$

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

D_FX.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

D*FX

Proportional Directional Flow Control Valve with Spool Position Feedback and Integrated Electronics

Code	Description
D1FX	NG6/CETOP 3
D3FX	NG10/CETOP 5

Spool Type | Flow | Style | Seal | Electronic Design | Supply Voltage | 0 Electronic Accessories | 0 Valve Accessories | Design Series

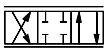
NOTE: Not required when ordering.

Code	Description
J	24 VDC
K	12 VDC*

* Available only with D1FX Electronic Design Codes C & D.

Code	Description*
B	Standard CE Compliant
C	On-board Configurable Outer Closed Loop
D	On-board ±10V Reference Voltages

*All designs are user configurable to voltage or current command.

Code			Spool Type
$Q_A=Q_B$	$Q_A>Q_B$*	$Q_B>Q_A$**	
E01	B31	A31	
E02	B32	A32	
E85***	–	–	

* Reduced flow rate on port B.

** Reduced flow rate on port A.

*** 5% lap spool for special applications. Consult Factory;
D1FX: Flow code F, C style only.
D3FX: Flow code M, C style only.

Code	Description
N	Nitrile
V	Fluorocarbon

Note: NG10 (CETOP5) valves are supplied with bolt kit BK98 (1/4 – 20 x 1.625). For metric bolt kit BK385 (M6 x 40 mm), add "-X6181" to ordering code.

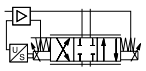
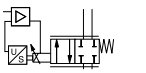
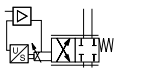
Weight:

D1FX	3.4 kg (7.5 lbs.)
D3FX	8.3 kg (18.3 lbs.)

Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge	
	D1FX LPM (GPM)	D3FX LPM (GPM)
C	7.5 (2)*	–
F	15 (4)	–
H	20 (5.3)*	20 (5.3)*
K**	–	30 (7.9)
M	–	40 (10.6)
S	–	60 (15.9)*

* Spool type E only.

** Spool type E01 only.

Code	Style
C	
K	
E*	

* Only available on D1FX

Mounting Interface

Refer to Mounting Interface Dimensions in the Proportional Directional Valve section of this catalog.

Accessories

Refer to the Accessories section for bolt kits, subplates, connectors and pre-assembled cable assemblies.

A

Application Guidelines

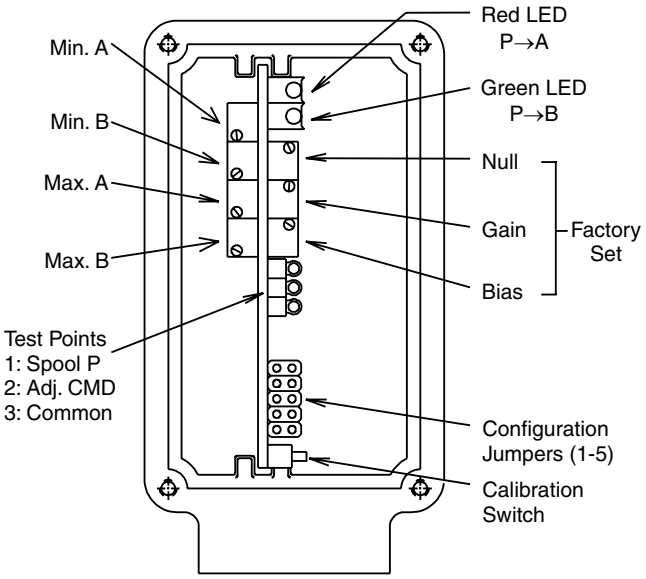
D*FX proportional valves are available in three control configurations. Option 'B' conforms to the industrial proportional valve standard and is interchangeable with most competitors' valves of this type. Options 'C' and 'D' are designed to simplify user application by providing specific features. Note that the 'B' control option uses the industrial standard CE compliant 7-pin MS connector while options 'C' and 'D' use a 6-pin MS connector. Refer to the table below for connector pin-out assignments.

Specifications		Electronic Design Option		
		'-B'	'-C'	'-D'
Function		Connector Pin Assignment		
Power Supply	+V	A	E	E
	0V	B	D	D
Reference	+10V	–	A	A
Outputs	-10V	–	F	F
Enable		C	–	–
Command	+CMD	D	B	B
	-CMD	E	–	–
Spool Position Monitor		F	–	C
Outer Loop Feedback – user		–	C	–
Protective Ground		G	–	–

Internal Adjustment

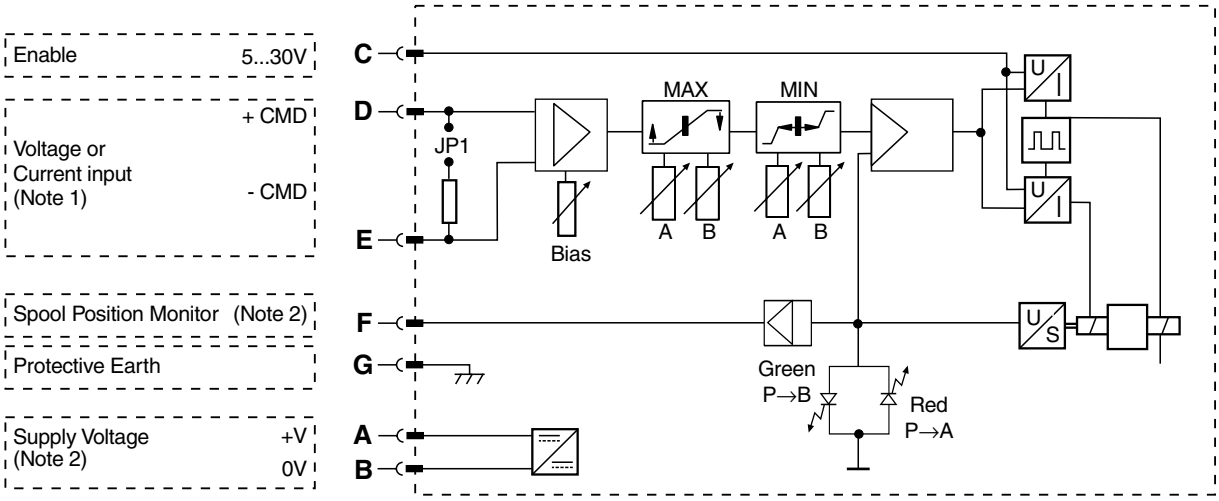
Refer to the Installation Guide for set-up, configuration, and application guidelines (packaged with each valve).

D1FX: Installation Bulletin 2583-M1/USA
D3FX: Installation Bulletin 2587-M1/USA



Design 'B' Option — Industrial Standard 7-Pin MS Connector Interface

Electronic design option 'B' implements the industrial standard 7-pin MS connector interface. The design provides a differential command input that is user configurable as voltage or current, an external valve enable feature, and a spool position monitor output. To specify this option, refer to the Ordering Information page, Electronic Design block.

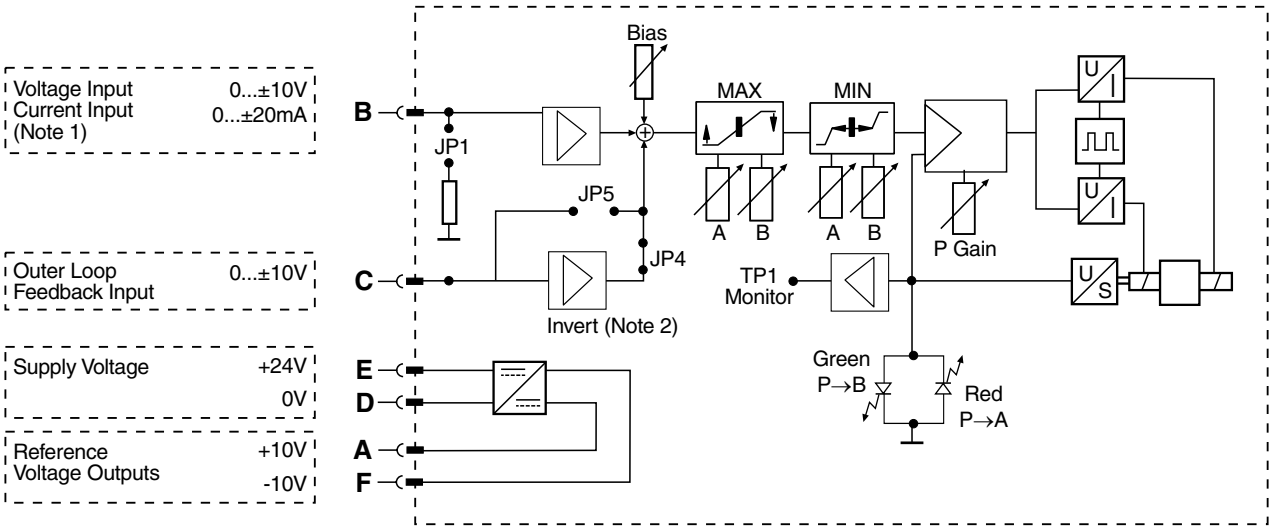


Note 1: Install jumper JP1 for current command input. Refer to Installation Bulletin 2583-M1/USA (D1FX).
Note 2: Refer to specifications.

A

Design 'C' Option — User Configurable Analog Outer Closed Loop

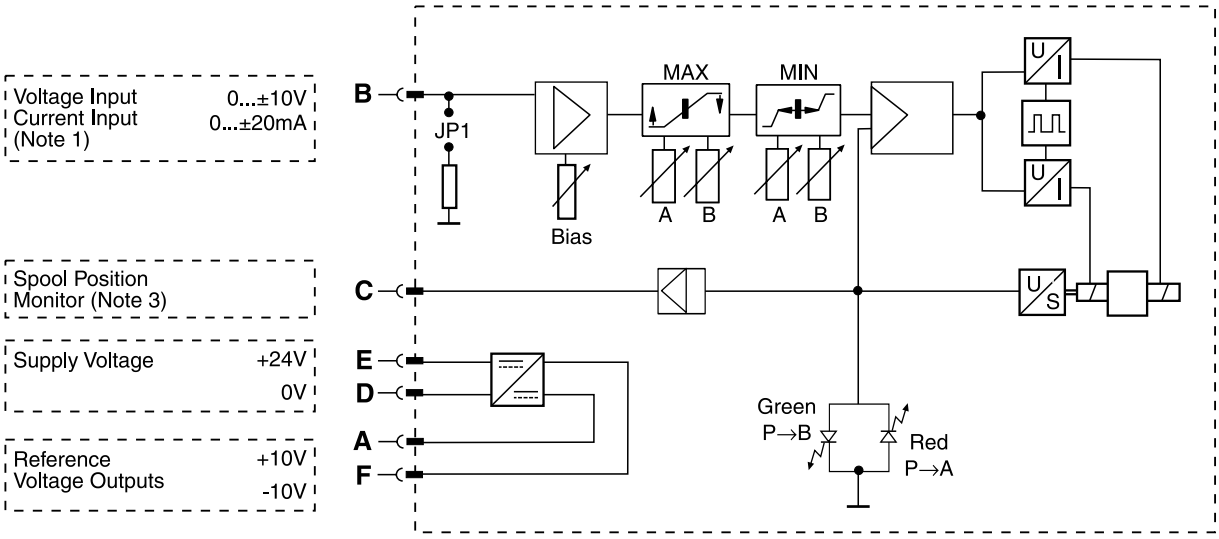
Electronic design option 'C' provides an additional analog closed outer loop function for user application. This feature can be used to control simple position control loops where analog resolution and a single proportional gain control are adequate. The design provides a single ended command input that is user configurable as voltage or current, and an outer loop feedback sensor voltage input. ±10 volt outputs are available to reference the outer loop feedback sensor if required. To specify this option, refer to the Ordering Information page, Electronic Design block.



Note 1: Install jumper JP1 for current command input. Refer to Installation Bulletin 2583-M1/USA (D1FX).
Note 2: Install jumper JP4 to invert user outer loop feedback input signal.

Design 'D' Option — Single Ended, Bipolar Command Input, with ± Volt Reference Output

Electronic design option 'D' provides a single ended, bipolar command input that is user configurable as voltage or current. ±10 volt references are available for user supplied off-board command potentiometers. A spool position monitor output is also provided. To specify this option, refer to the Ordering Information page, Electronic Design block.

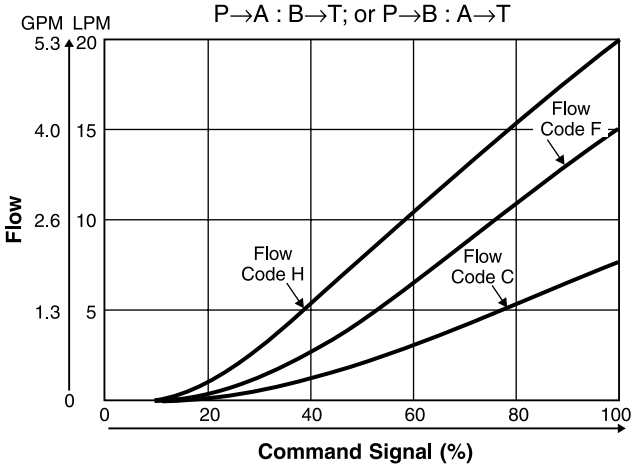


Note 1: Install jumper JP1 for current command input. Refer to Installation Bulletin 2583-M1/USA (D1FX).
Note 2: Refer to specifications.

A

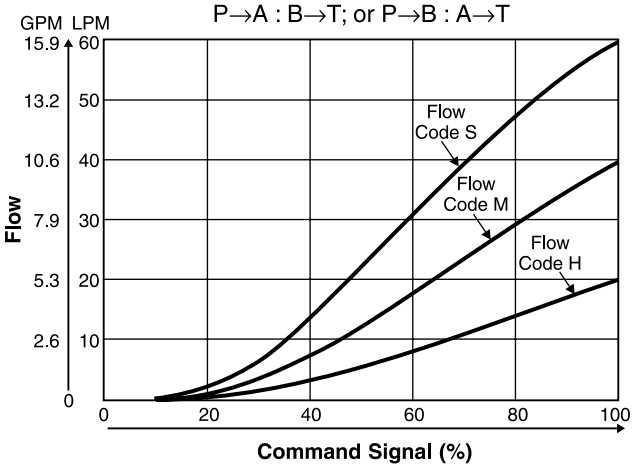
D1FX Flow Characteristics

at Δp = 5 Bar (72.5 PSI) per metering edge
P→A : B→T; or P→B : A→T



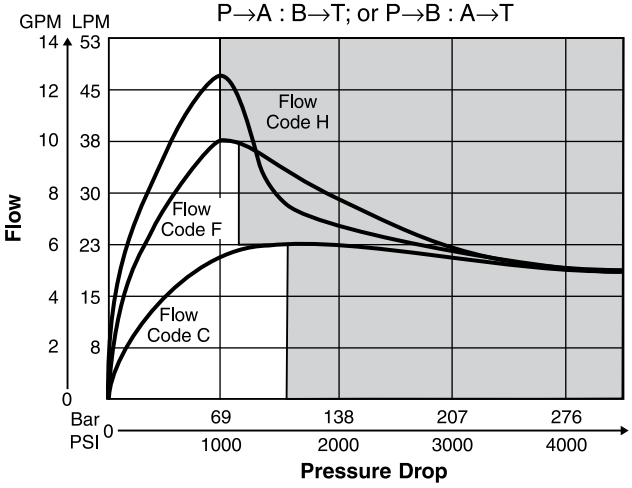
D3FX Flow Characteristics

at Δp = 5 Bar (72.5 PSI) per metering edge
P→A : B→T; or P→B : A→T



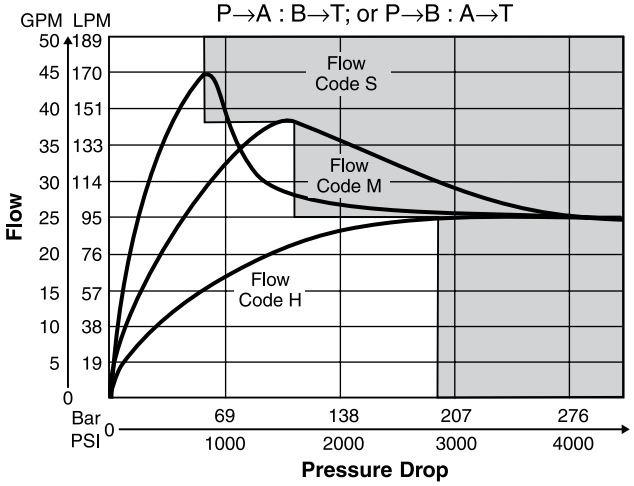
D1FX Operating Limits [1]

at 100% Command
P→A : B→T; or P→B : A→T



D3FX Operating Limits [1]

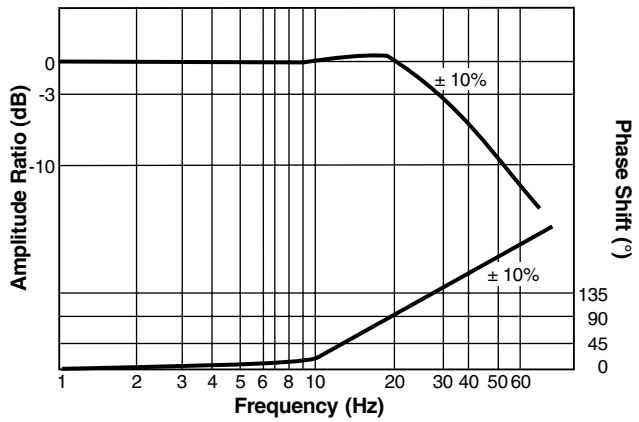
at 100% Command
P→A : B→T; or P→B : A→T



1) Shaded area: Actual flow subject to the system load dynamics
Note: 81 and 82 spools - decrease limits by 15%

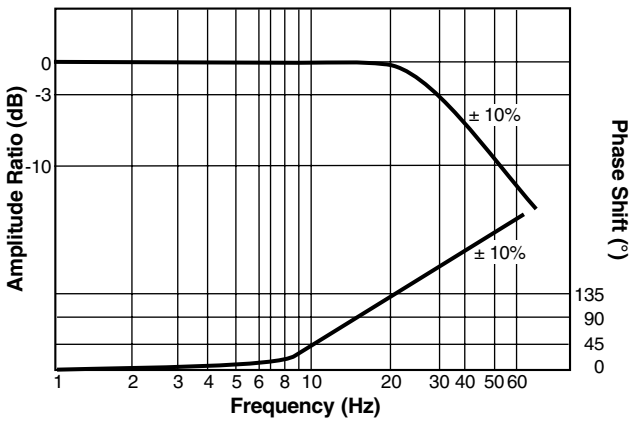
D1FX Frequency Response

at 10% Command, 50% Offset



D3FX Frequency Response

at 10% Command, 50% Offset



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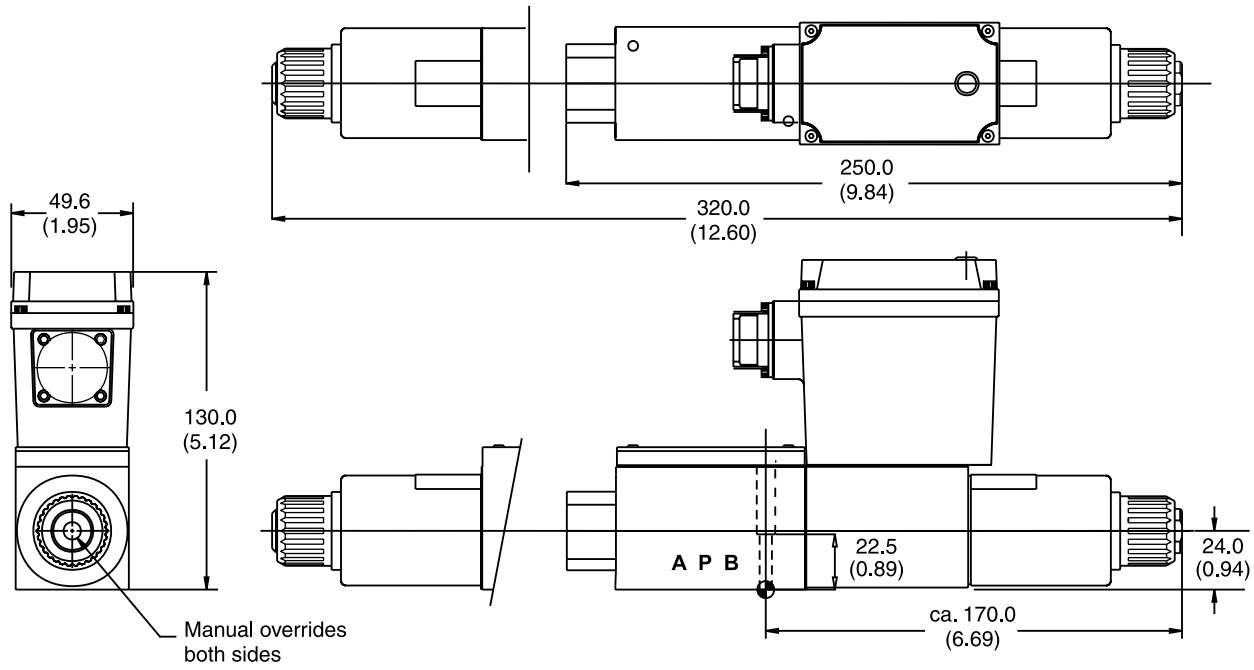
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

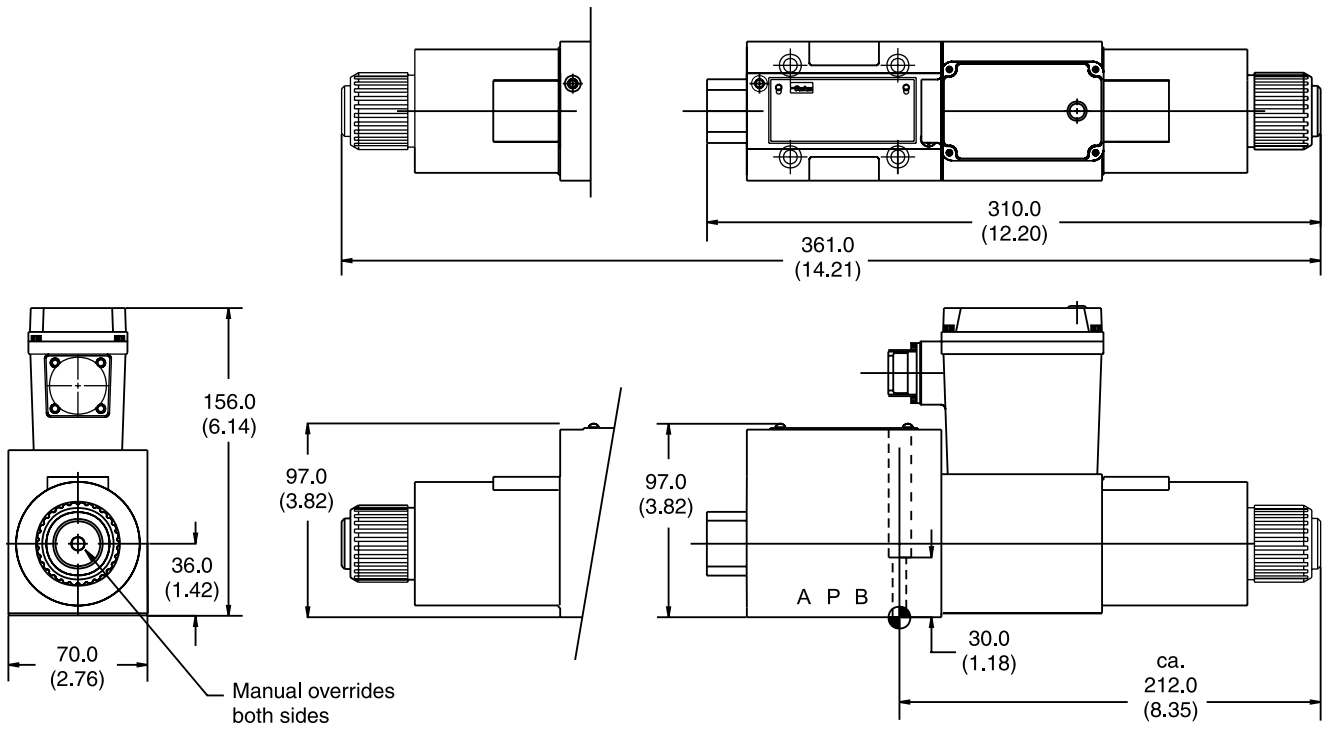
D1FX

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



D3FX

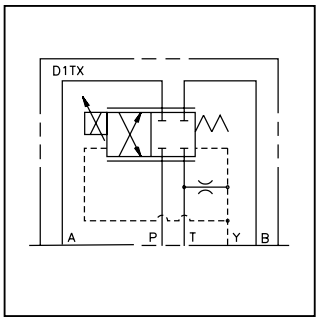
Inch equivalents for millimeter dimensions are shown in (**)



A

General Description

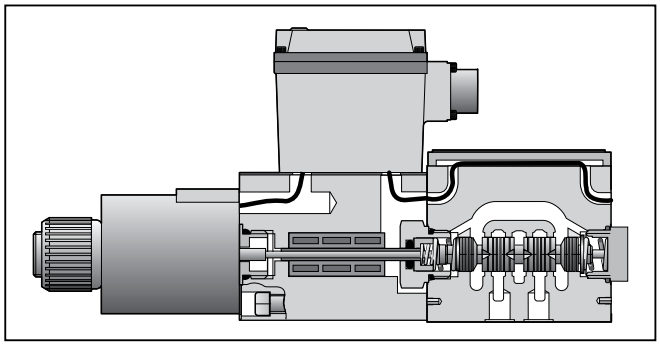
The D1TX throttle valve is designed to vary the amount of fluid flow in proportion to a variable input command signal. The valve will respond to voltage command signals of 0 to +10 VDC, or current command signals of 4-20 mA. The valve features on-board electronics and built-in spool position feedback for low hysteresis.



Operation

A minimum of 20 PSI must be maintained on the “Y or L” ports for proper operation. An external supply of 20 PSI or a 20 PSI check valve may be used for this purpose.

To simplify piping of the valve for the maximum flow output, order our flow conversion module, FCB03** which has the 20 PSI check valve already installed. This module converts all of the flow paths internally. Connect the “P” for supply pressure, “B” for outlet flow, and “Y or L” for drain line flow.



Features

- **Integral Electronics** — Eliminates the time consuming and often costly wiring between the valve and driver card. Provides a fully tested valve/driver package.
- **LVDT** — The spool position feedback provides low hysteresis.
- **Manual Override**
- **Diagnostic Indicator** — An LED confirms movement of the spool.
- **Rugged Construction** — Integral electronics are packaged in a rugged die cast aluminum enclosure to protect it from harsh environments.
- **Electrical Interface** — Standard MS style connector for interface to computers and PLC's.

Specifications

Interface	NFPA D03, CETOP 3
Maximum Pressure	207 Bar (3000 PSI)
Drain Line Pressure ("T" and "Y" or "L")	1.4 Bar (20 PSI) minimum 35 Bar (500 PSI) maximum
Flow	Up to 61 LPM (16 GPM) (Dual Ported)
Frequency Response	> 20 Hz with 10% CMD at 50% spool stroke
Step Response	Versions BJ, DJ: Full Shift, <60 mS Version DK: Full Shift, <70 mS
Repeatability	< 0.5% of spool stroke
Hysteresis	< 1.5%
Nominal Deadband	10%
Power Requirements	24 VDC @ 3 amps nom.** (BJ, DJ) Range 21 to 30 VDC regulated 12 VDC @ 3 amps nom. (DK)** Range 11.5 to 15 VDC regulated ****4 amp regulated power supply recommended**

Version	Command Signal	Input Impedance
BJ, DJ	0 to + 10 VDC Sgl. Coil	100 k ohms
DK	0 to + 5 VDC Sgl. Coil	100 k ohms
BJ, DJ	4 to 20 mA Command	499 ohms
DK	4 to 20 mA Command	249 ohms

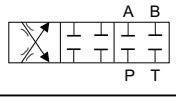
Operating Temp. Range (Ambient)	24 volt model: -20° to 60°C (-4° to 140°F) 12 volt model: -29° to 60°C (-20° to 140°F)
Spool Position Voltage	Version BJ, DJ: (-10 VDC) Version DK: (-5 VDC)
Reference Supply	+10 VDC @ 10 mA (BJ, DJ) +5 VDC @ 10 mA (DK)
Low Power Fault Protection	20 VDC (BJ, DJ) 11 VDC (DK)
Diagnostics	Red LED for spool position
Viscosity Range	75 - 600 SSU
Fluid Cleanliness	ISO Class 16/13, SAE Class 4 or better
Protection Class	Nema 4 (IP65)

D1T — D03 Electrohydraulic Directional Flow Control Valve

X — Control Option
- Integral LVDT & Control Electronics

E — Equal Metering

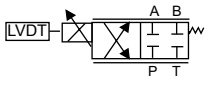
01 — Spool Type

Code	Spool
01	

[ ] — Flow

Code	Flow @ ΔP = 5 Bar (72.5 PSI) per metering edge
C	15 LPM (4.0 GPM)
F	30 LPM (7.9 GPM)

E — Style

Code	Description	Style
E	Uni-Directional	

9 — External Drain

[ ] — Seal

Code	Description
N	Nitrile
V	Fluorocarbon

[ ] — Electronic Variations

Code	Description
B	Euro Driver (7 pin MS) w/external shutdown
D	Standard Driver w/deadband eliminator & 6 pin MS

[ ] — Supply Voltage

Code	Description
J	24 VDC
*K	12 VDC

* Only available in version 'D'

0 — Electronic Accessories

0 — Valve Accessories

[ ] — Design Series

NOTE: Not required when ordering

Bolt Kit:
BK209 (4) 10-24x1.25 SHCS

Weight:
Single Solenoid 3.2 kg (7.0 lbs.)

FCB — Flow Conversion Block

03 — Size

Code	Description
03	D03

[ ] — Subplate Drain Port

Code	Description
Y	"Y" Drain Port (standard)
L	"L" Drain Port (optional)

[ ] — Seal

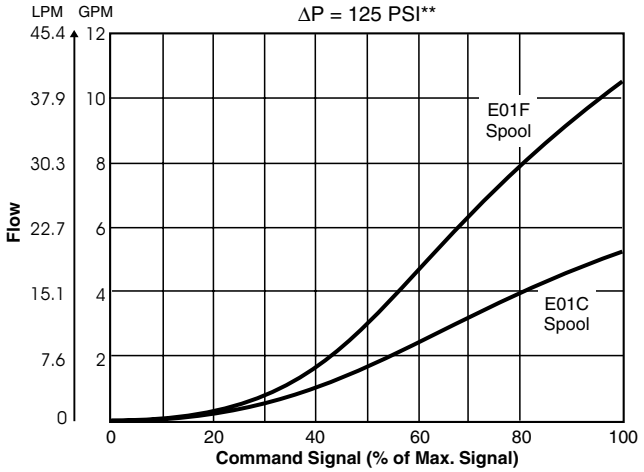
Code	Description
N	Nitrile
V	Fluorocarbon

Use Bolt Kit BK243 when including the FCB under the D1TX.

A

Performance Curves

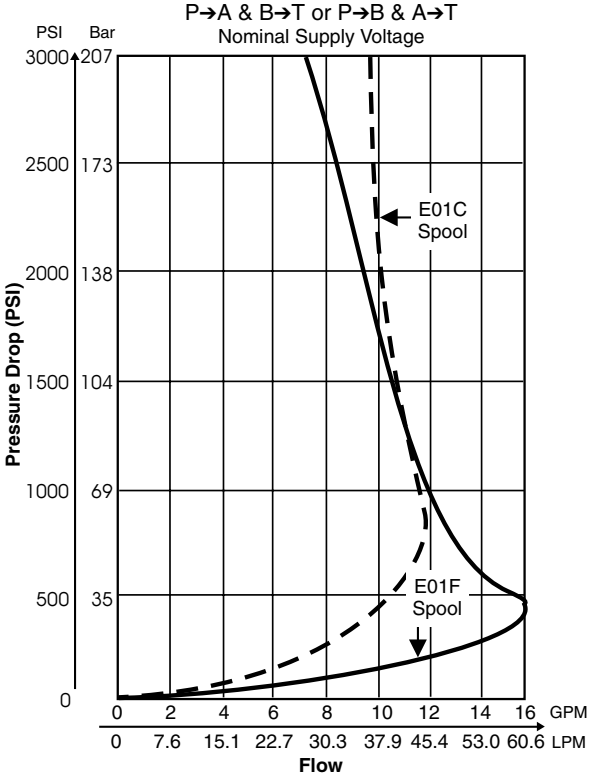
Flow vs. Input Command
Parallel Flow Path Connected*
ΔP = 125 PSI**



* Requires Flow Conversion Block FCB**

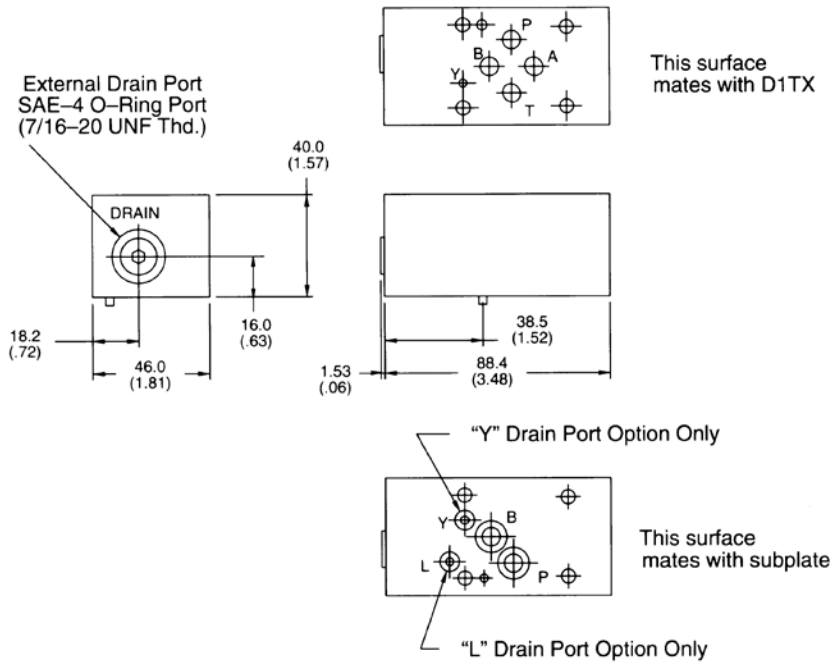
** Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

Operating Limits
Max. Pressure Drop/Flow Envelope
at 100% Command Signal
Parallel Flow Path*
P→A & B→T or P→B & A→T
Nominal Supply Voltage

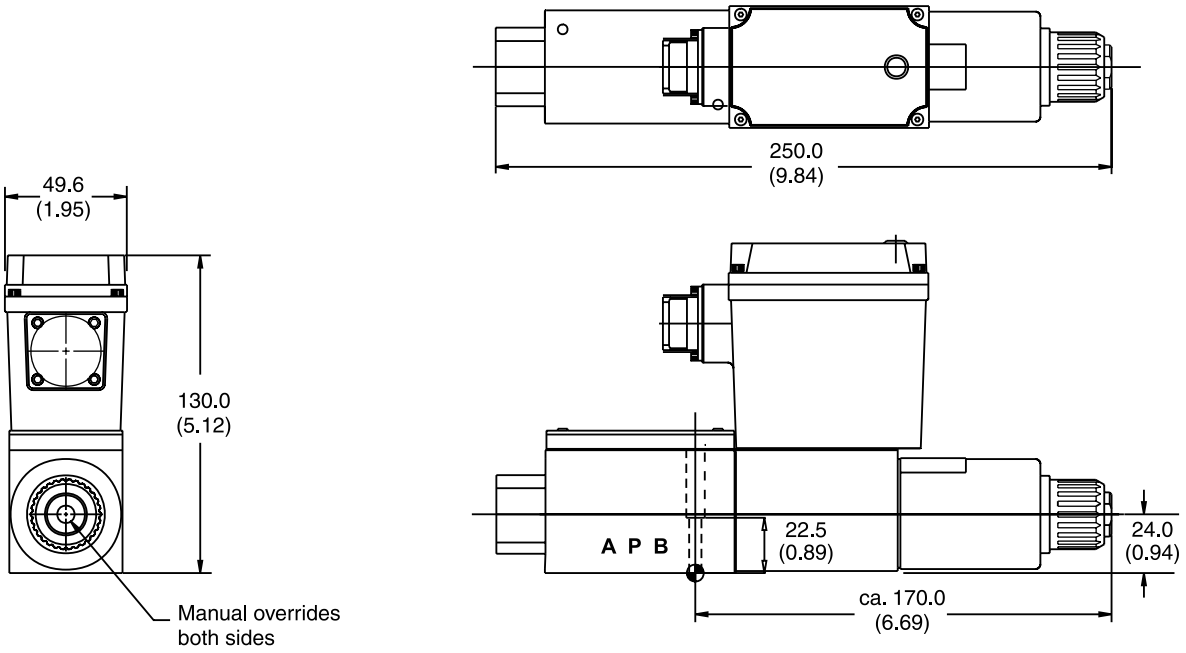


Flow Conversion Block FCB03

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

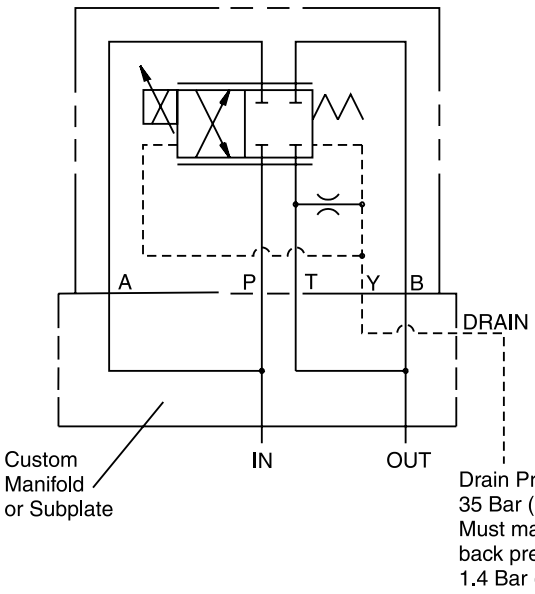


Inch equivalents for millimeter dimensions are shown in (**)

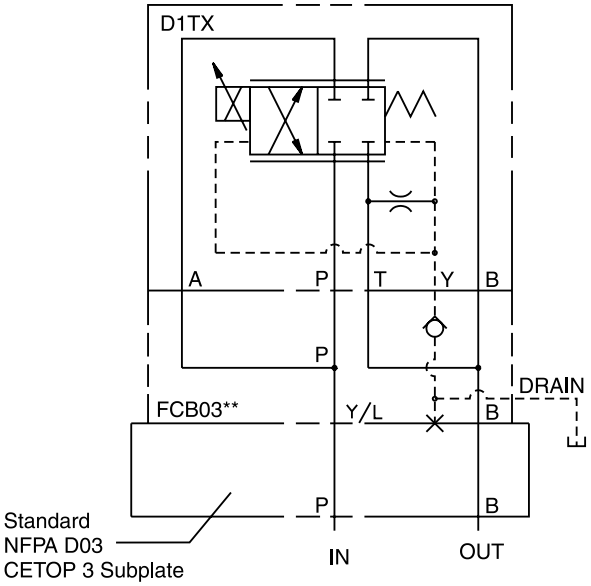


Hydraulic Connections

Parallel Flow Hydraulic
Connections for D1TX Valve



Parallel Flow Hydraulic Connections for
D1TX Valve with Flow Conversion Block



Mounting Surface

Surface must be flat within
0.10 (.0004) T.I.R. and
smooth within 32 micro-inch.

Torque bolts to 5.6 N.m.
(50 in.-lbs.)

COMBINATION	Required Ports					
	P	A	B	T	Y	L
D1TX valve alone	✓	✓	✓	✓	✓	
D1TX w/FCB03Y	✓		✓		✓*	
D1TX w/FCB03L	✓		✓			✓*

*Y & L port not required if external drain port (SAE-4) is used.

D1TX.indd, dd

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Elyria, Ohio, USA

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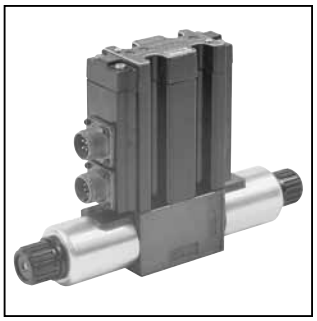
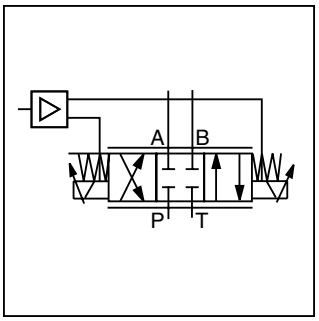
General Description

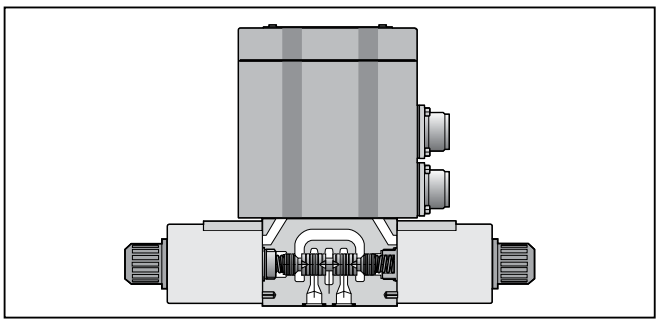
Series D**FL proportional directional control valves are packaged with an integrated microprocessor based open-loop motion profiler. The valve directly accepts electrical on/off logic signals which trigger simple motion profiles controlling actuator speed, acceleration, and deceleration.

D**FL valves are user configurable to operate in one of two control modes: 'Slow Shift' or 'Motion Profiler'. Refer to application guidelines for details. Both DC and AC voltage logic interfaces are available providing a direct interface to PLC's, for a simple field upgrade from AC operated directional valves.

Valves are available in sizes NG6 (CETOP 3), NG10 (CETOP 5), NG16 (CETOP 7) and NG25 (CETOP 8).







Features

- Integrated microprocessor based valve electronics.
- On-board, open-loop motion control profiler.
- Optically isolated 'on-off' inputs trigger motion profiles.
- User selectable operation modes: Slow Shift or Profiler.
- Test points indicating speed and ramp settings.
- On-board microprocessor self diagnostics on start-up.
- LED functional diagnostic indicators.
- Spring centered spool.
- Manual overrides.

CE

Specifications

Interface DIN		**NG6 (CETOP 3)**	**NG10 (CETOP 5)**	**NG16 (CETOP 7)**	**NG25 (CETOP 8)**
Flow Rating @10 Bar (150 PSI) Δp (P→A, B→T) (spool options up to)[1]	LPM (GPM)	20 (5.3)	60 (15.9)	100 (26)	200 (53)
Maximum Flow	LPM (GPM)	27 (7.3) / 34.1 (9) / 30 (8)	62.1 (18) / 83.3 (22) / 118 (31)	144 (38)	372 (98)
Pilot Flow					
Continuous	LPM (GPM)	N/A	N/A	<1.2 (0.3)	<1.2 (0.3)
Step Input	LPM (GPM)	N/A	N/A	2.2 (0.6)	4.5 (1.2)
Operating Pressure					
Port P, A, B	Bar (PSI)	315 (4500)		345 (5000) max.	
Port P, internal pilot		N/A		20 (290) min.	
Port T, internal drain		35 (500)		10 (150) max.	
Port T, external drain		N/A		345 (5000) max.	
Port Y, pilot drain		N/A		10 (150) max.	
Port X, external pilot		N/A		20-345 (290-5000)	
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)			
Environmental Protection Class		NEMA 4 (IP65)			
Ambient Operating Temperature		-20°C to +60°C (-4°F to +140°F)			

1) Actual pressure drop required for each metering land, up to the specified maximum flow rate is:

$$\Delta P_{actual} = (5)\left(\frac{Q_{actual}}{Q_{rated}}\right)^2 \text{ Bar; (Q in LPM)} \quad [or] \quad = (75)\left(\frac{Q_{actual}}{Q_{rated}}\right)^2 \text{ PSI; (Q in GPM)}$$

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

D_1FL.p65, dd

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D*FL — Proportional Directional Control Valves with Intergrated Motion Control Electronics

Code	Description
D1FL	NG6/CETOP 3
D3FL	NG10/CETOP 5

See Note 1.

□ Spool Type

Code		
$Q_A=Q_B$	$Q_A>Q_B$ [1]	Spool Type
E01	B31	
E02	B32	

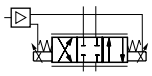
1) Reduced flow rate on Port B, nominal flow on Port A.

□ Flow

Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge	
	D1FL LPM (GPM)	D3FL LPM (GPM)
C	7.5 (2.0)*	–
F	15 (4.0)	–
H	20 (5.3)*	20 (5.3)*
M	–	40 (10.6)
S	–	60 (15.9)*

* Only with spool type E*

C Style

Code	Style
C	

□ Seal

Code	Description
N	Nitrile
V	Fluorocarbon

□ Electronic Variation

Code	Description
T	AC Voltage Logic Interface
W	DC Voltage Logic Interface

J Supply Voltage

Code	Description
J	24 VDC

0 Electronic Accessories

□ Valve Accessories

Code	Description
0	Standard
4	CSA Approved

[ ] Design Series

NOTE: Not required when ordering.

Note 1: NG10 (CETOP5) valves are supplied with bolt kit BK98 (1/4-20 x 1.625). For metric bolt kit BK385 (M6 x 40 mm), add "-X6181" to ordering code.

Weight:
D1FL 3.2 kg (7.0 lbs.)
D3FL 7.9 kg (17.5 lbs.)

DFL** — Pilot Operated Proportional Directional Control Valves with Intergrated Motion Control Electronics

Code	Description
D41FL	NG16/CETOP 7
D91FL	NG25/CETOP 8

□ Spool Type

V-Notch Spools			
Code			Spool Type
$Q_A=Q_B$	$Q_A>Q_B$	$Q_B>Q_A$	
E21	B41	A41	
E22	B42	A42	

□ Flow

Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge	
	D41FL LPM (GPM)	D91FL LPM (GPM)
D	100 (26.5)	–
F	–	200 (53)

C Style

□ Pilot Connection

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

□ Seal

Code	Description
N	Nitrile
V	Fluorocarbon

□ Electronic Variation

Code	Description
T	AC Voltage Logic Interface
W	DC Voltage Logic Interface

0 Electronic Accessories

□ Valve Accessories

Code	Description
0	Standard
2	Pilot Pressure Reducer[3]
4	CSA Approved

(3) Recommended for pilot pressure applications >205 Bar (3000 PSI)

[ ] Design Series

NOTE: Not required when ordering.

Weight:
D41FL 10.9 kg (24.0 lbs.)
D91FL 19.1 kg (42.0 lbs.)

Mounting Interface

Refer to Mounting Interface Dimensions in the Proportional Directional Valve section of this catalog.

Accessories

Refer to the Accessories section for bolt kits, subplates, connectors and pre-assembled cable assemblies.

D_1FL.p65, dd

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Supply Voltage	V	12 to 28	
Maximum Current	A	3.5	
Motion Profile Adjustment Speed Ramps (minimum limited by actual valve step response)		User set; potentiometers inside electronics enclosure. 0 to 100% valve opening; two speeds forward, two speeds retract. 0.025 to 15 seconds; one acceleration, two deceleration adjustments. Shared both forward/retract.	
Test Points V1, V2, V3, V4 R1, R2, R3		Inside electronics enclosure. 0 to 5 volts, corresponding to 0 to 100% valve opening, or speed. 0 to 5 volts, corresponding to 0.025 to 15 seconds ramp time.	
Logic Interface Ordering code field: Electrical variation (options available all valve sizes)		**W**	**T**
Electrical Isolation		DC Optical-Coupled	AC Optical-Coupled
Polarity		Signal pins A, C & E; referenced to 0V pins B, D & F respectively.	Signal pins A, C & E; referenced to AC neutral pins B, D & F respectively.
Input Impedance	ohms	>2000	>2000
Input Voltage, Absolute Max.	V	28 VDC	130 VAC
Logic "on" (1), Min. Voltage	V	>9.6 VDC	>96 VAC
Logic "on" (1), Current	mA	3.2 mA	3.2 mA
Logic "off" (0), Min. Voltage	V	<6.0 VDC	<51 VAC
Logic "off" (0), Current	mA	3.2 mA	3.2 mA
Mating Connectors (order separately) **Power Supply Connector** **Logic Input Connector**		Part # 1210292 (4-pin MS) Part # MS3106E-14S-6S (6-pin MS)	

Application Guidelines

The D**FL series proportional valves accept discrete on/off logic signals which trigger simple motion profiles controlling actuator speed, acceleration, and deceleration. All motion control potentiometer adjustments and jumper headers are located inside the electronics enclosure. Two modes of operation are user selectable by a jumper setting (JP1): 'Motion Profiler' or 'Slow Shift'. The 'Motion Profiling' mode provides two-speed velocity control typically used in rapid traverse and feed circuits. The 'Slow Shift' provides single velocity control. Both modes allow individual speed adjustment for actuator extend and retract. Ramp adjustments for extend and retract profiles are shared.
Refer to **Interface and Motion Profile** diagrams on the following pages.

Both DC and AC voltage logic interfaces are available. Refer to ordering code field 'Electronic Variation' and the technical data sheet for more information. Note that the interface connections are polarity sensitive. Refer to the block diagram and technical specifications.

Refer to the Installation Guide for set-up, configuration, and application guidelines (packaged with each valve):

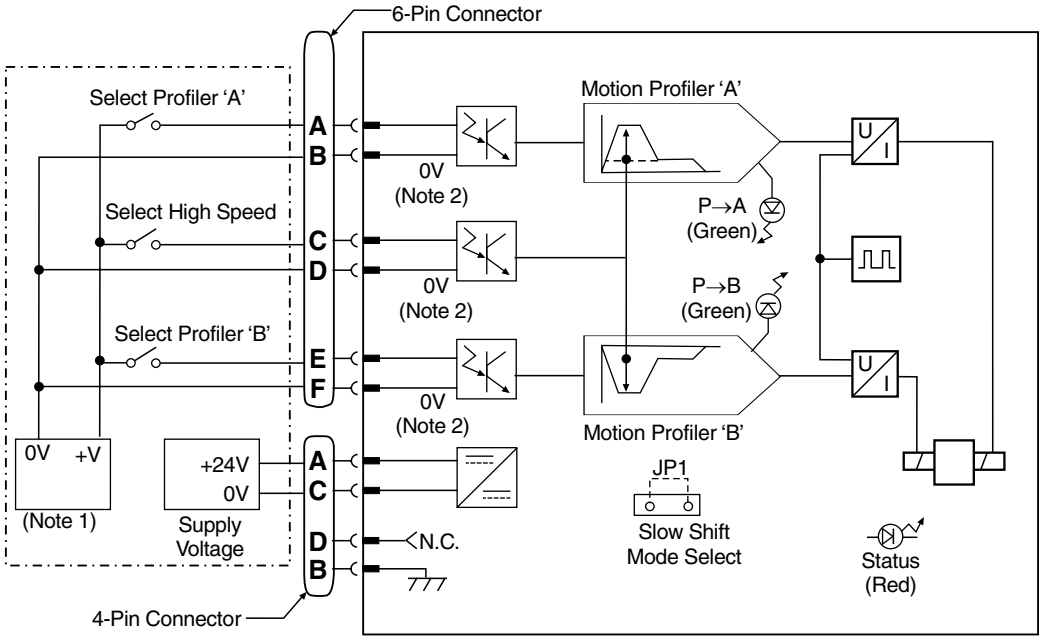
D1FL: Installation Guide Bulletin 2589-M2/USA

D3FL: Installation Guide Bulletin 2589-M3/USA

D41FL,
D91FL: Installation Guide Bulletin 2589-M1/USA

A

Block Diagram — Wiring

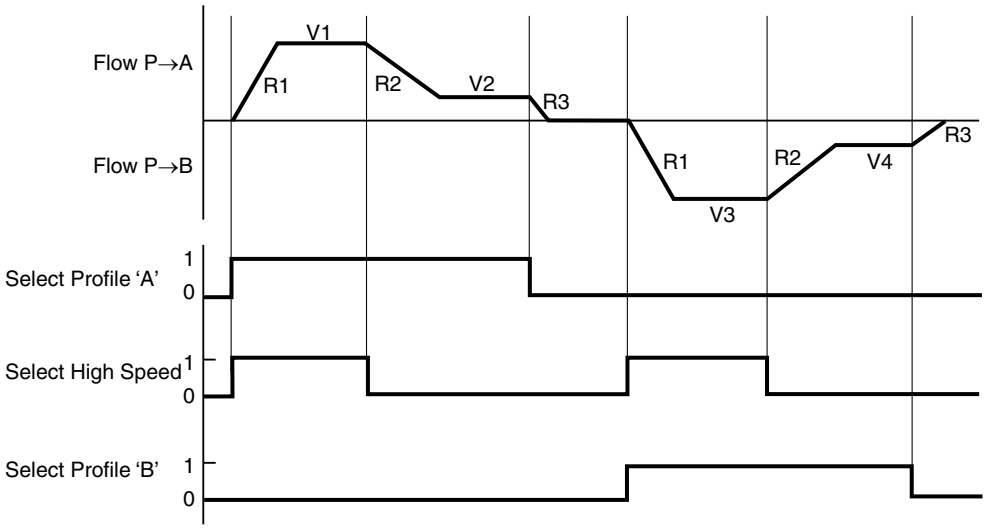


Notes:

1) DC logic source shown, refer to technical data for A.C.
2) 0V reference for DC interface, neutral for AC version.

Interface — 'Motion Profiler' mode (see timing diagram below)

The 'Motion Profiler' mode is selected by removing connecting jumper 'JP1' on the electronics card inside the electronics enclosure. To trigger a rapid traverse, opening the valve P→A / B→T; apply a positive logic signal to logic inputs 'Select Profile A', and 'Select High Speed' (6-pin connector input pins A&B, and C&D). The valve will smoothly accelerate the actuator to the velocity set by potentiometer 'V1', at a ramp rate set by potentiometer 'R1'. When logic input 'Select High Speed' is deselected the actuator will smoothly decelerate the actuator to the feed velocity set by Potentiometer 'V2', at a ramp rate set by potentiometer 'R2'. When logic input 'Select ProfileA' is deselected the actuator will smoothly decelerate the actuator to a stop at a ramp rate set by potentiometer 'R3'. When neither 'Select Profile' inputs are selected, regardless of the 'Select High Speed' input state, the valve is held in the centered hydraulic condition. Reversing the actuator, directing flow P→B / A→T, follows the same logic using logic input 'Select Profile B'. Refer to the timing diagram below for the corresponding potentiometers. Note that although all four speeds are independent, the three ramps are shared by both 'A' and 'B' profiles.



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Elyria, Ohio, USA

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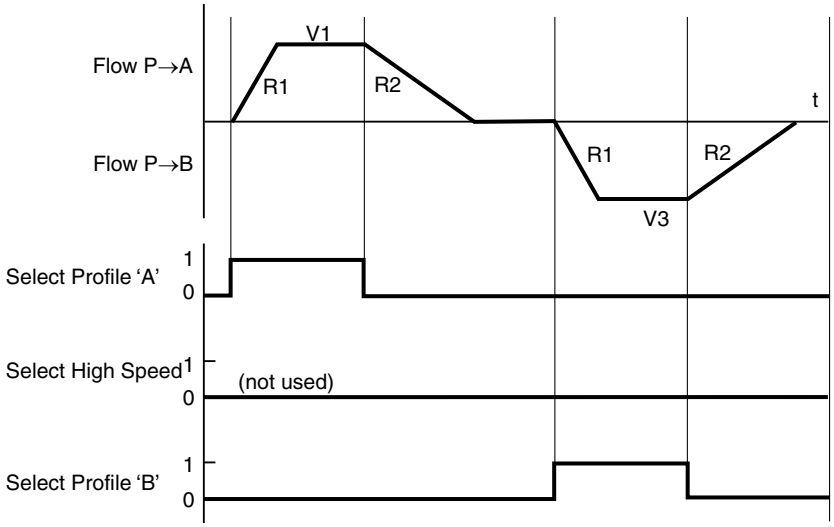
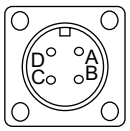
Interface — 'Slow Shift' mode (see timing diagram below)

The 'Slow Shift' mode is selected by connecting jumper 'JP1' on the electronics card inside the electronics enclosure. The 'Slow Shift' mode logically operates the same as the 'Motion Profiler' mode, except the 'Select High Speed' logic input is not used and only one speed for each actuator direction is available.

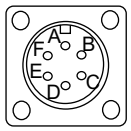


4-Pin Power Supply Plug



Pin	Description
A	Supply Voltage
B	Protective Ground
C	Supply 0V
D	Not Used

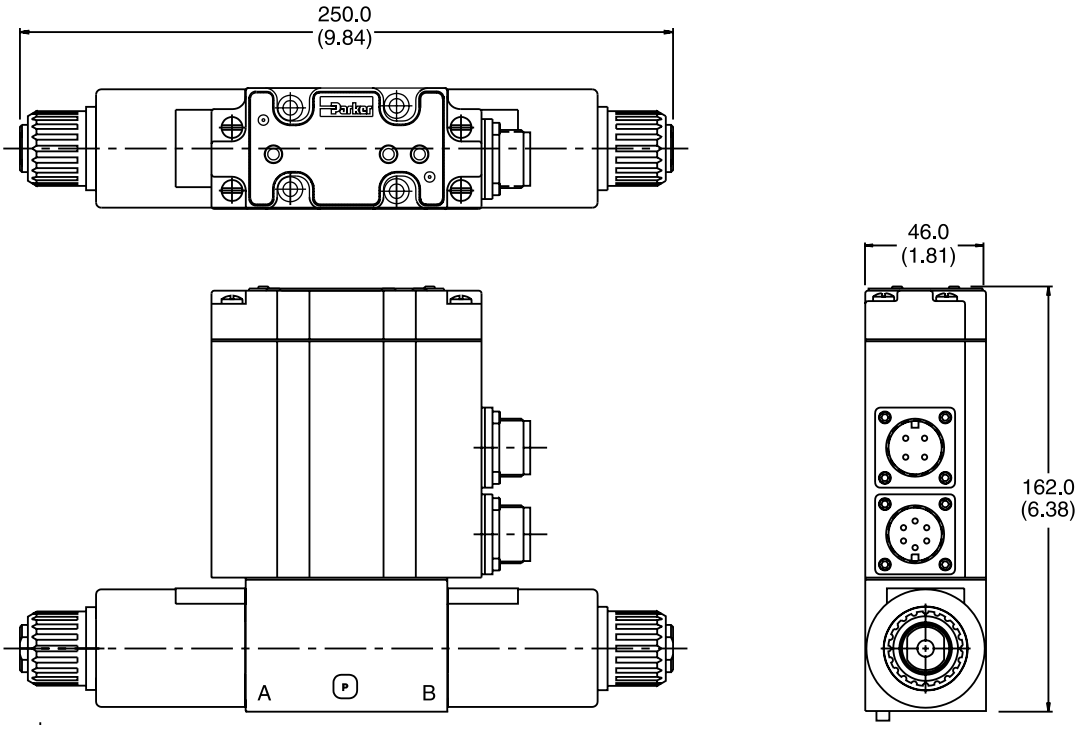
6-Pin Logic Input Plug



Pin	Description
A	Select Profile "A" (+)
B	Select Profile "A" (0V or neutral)
C	Select "High Speed" (+)
D	Select "High Speed" (0V or neutral)
E	Select Profile "B" (+)
F	Select Profile "B" (0V or neutral)

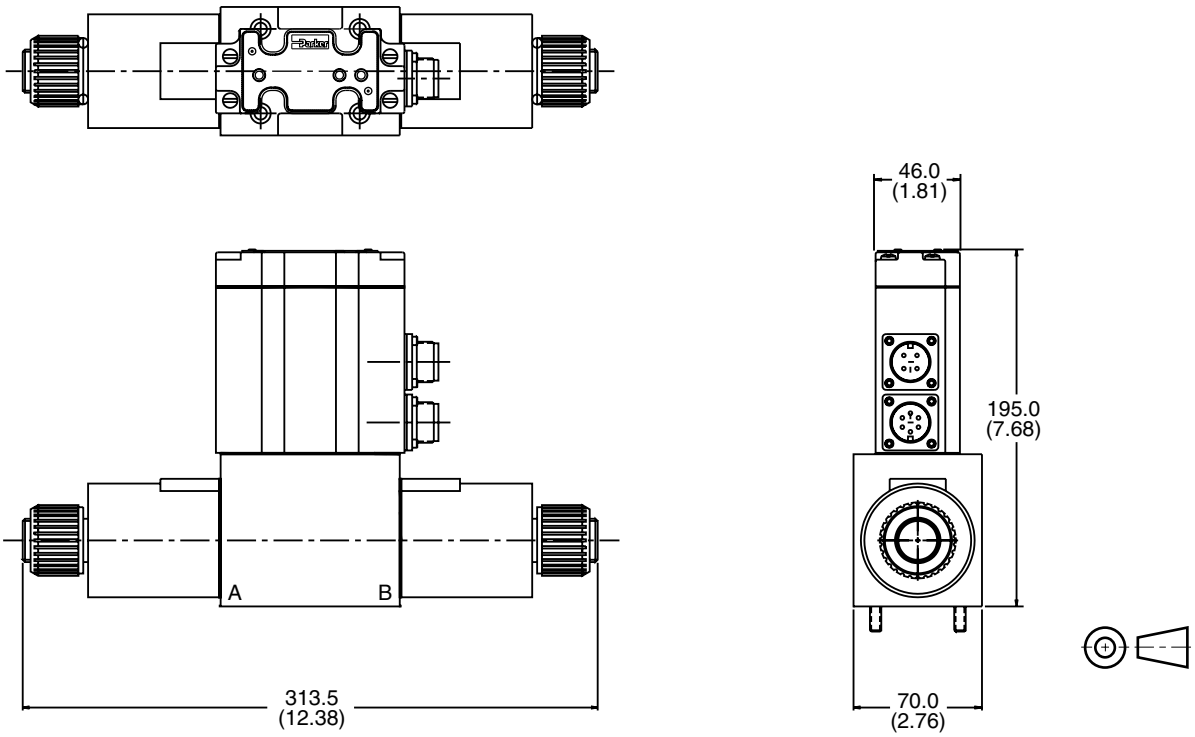
D1FL

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



D3FL

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

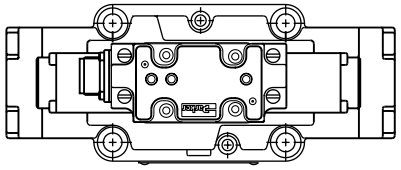


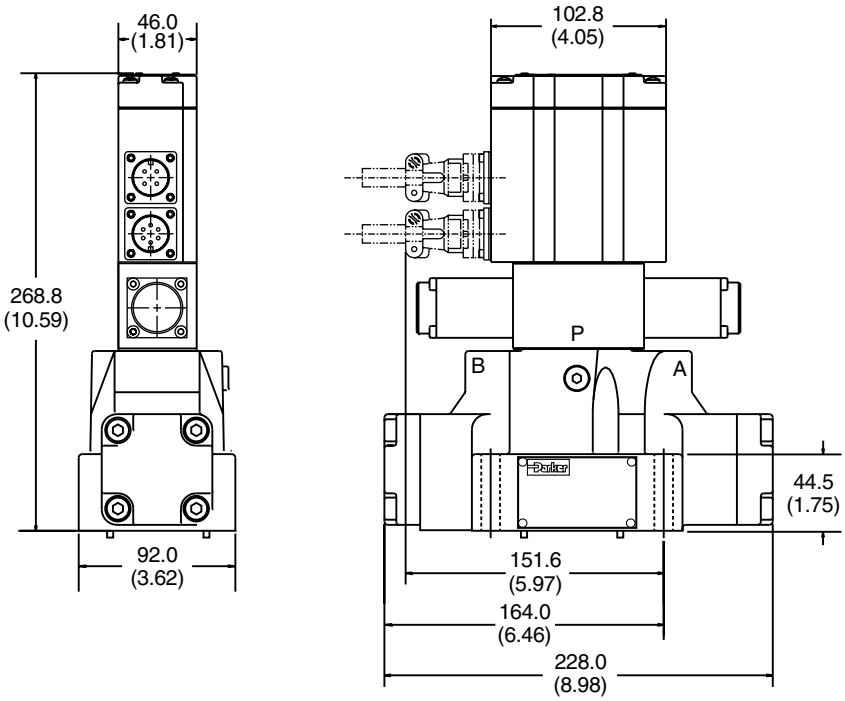
D_1FL.p65, dd

A

D41FL

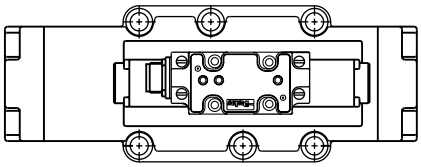
Inch equivalents for millimeter dimensions are shown in (**)

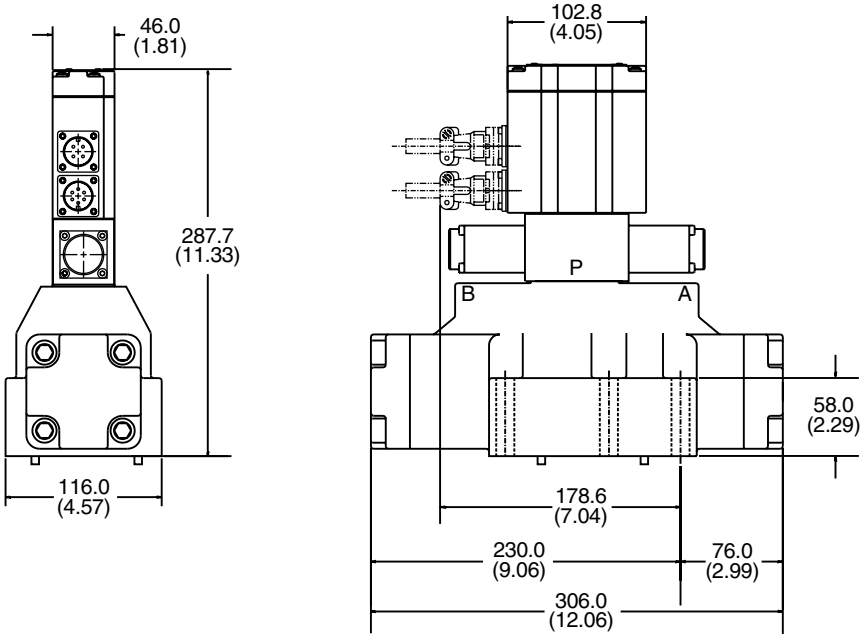


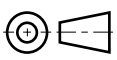


D91FL

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







D_1FL.p65, dd

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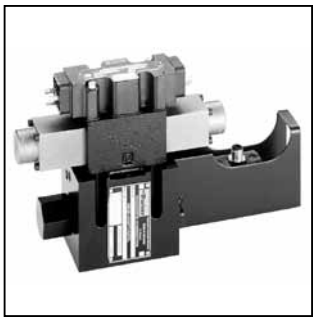
Elyria, Ohio, USA

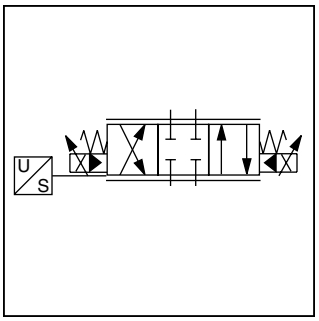
A

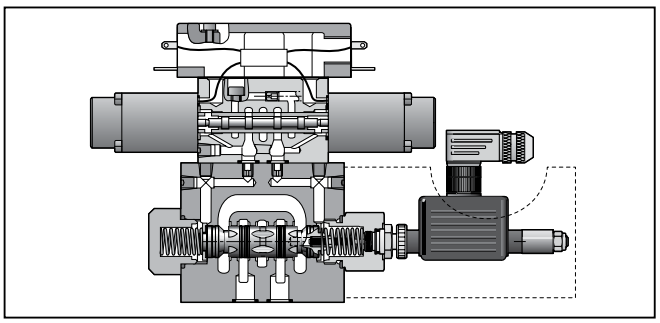
General Description

Series D*1FS proportional directional control valves are high performance, two stage pilot operated solenoid valves with electronic spool position feedback. Valves are controlled by 'PWD' Series DIN electronics. Valves are available in sizes NG10 (CETOP 5), NG16 (CETOP 7), NG25 (CETOP 8) and NG32 (CETOP 10).

D*1FS valve performance is characterized by high resolution flow control, repeatability and good dynamic performance. Typical applications include precise and reproducible control of actuator speed in rapid / slow speed profiling, and smooth acceleration and deceleration performance.

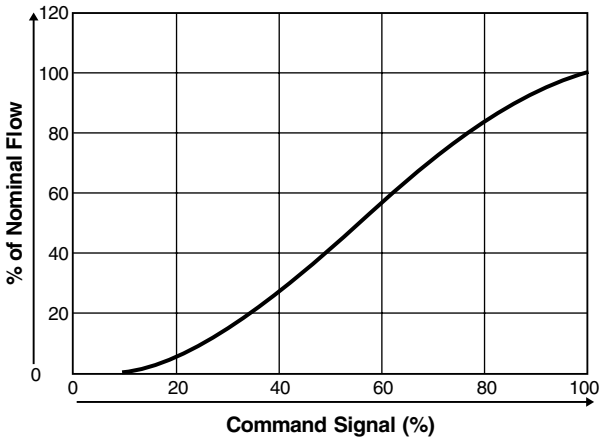






Performance Curve

Flow Characteristics
at 5 Bar (72.5 PSI) per metering edge
Typical flow curve



Features

- Standard DIN/ISO/CETOP/NFPA interfaces.
- Spool position feedback.
- High Frequency response.
- Spring centered main stage spool.
- LED functional diagnostic indicator.
- Wide selection of spool options, and flow capacity.
- 2:1 ratio, and Regeneration 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) LPM (GPM)	45 (12)	120 (32)	300/400 (79/106)	1000 (264)
Maximum Flow	389@ 1500 PSID	1208@ 2700 PSID	193@ 1500 PSID	
Step Response (time to reach 90% of a 100% step command) ms	35	60	80	200

Repeatability	%	<0.5		
Hysteresis	%	<0.5		
Pilot Flow Continuous	LPM (GPM)	<1.2 (0.3)		
Operating Pressure				
Port P, A, B	Bar (PSI)	345	(5000)	max.
Port P, internal pilot		20	(290)	min.
Port T, internal drain		10	(150)	max.
Port T, external drain		345	(5000)	max.
Port Y, pilot drain		10	(150)	max.
Port X, external pilot		20-345	(290-5000)	
Fluid Viscosity, Recommended		80 – 1000 SSU		

Fluid Cleanliness Level	ISO Class 16/13
Fluid Temperature, Recommended	0°C to +60°C (+32°F to +140°F)
Ambient Operating Temperature	-20°C to +60°C (-4°F to +140°F)
Electronic Driver Boards (refer to electronics section)	PWD Series Drivers
Mating Connector Solenoid (DIN 43650)	Part #692914 (black) Part #692915 (gray)
LVDT (M12, 5 pin)	included w/valve
Environmental Protection Class	NEMA 1 (IP54)

A

D		1	F	S							W		
Directional Control Valve	Size	Pilot Operated	Flow Control	With Spool Position Feedback	Spool Type	Flow	Pilot Connection	Seal	Solenoid Voltage		Solenoid Connection	Valve Accessories	Design Series

NOTE: Not required when ordering.

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

[1)] with enlarged ∅ 32mm ports

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
W	Socket connector DIN 43650 without plugs

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

Code	Description
L	6 VDC
X*	16 VDC

* For use with "EW" driver card

Code	Description
0	Std., no accessories
2	Pilot pressure reducer

V-Notch Spool Options - Spool Type and Flow Codes

Code $Q_A=Q_B$	Code $Q_A>Q_B$ [2)]	Spool Type
E01	B31	
E02	B32	

Code	Flow: LPM (GPM) at ∆p 5 Bar (72.5 PSI) per metering edge				
	D31	D41	D81	D91	D111
B	45 (12)	–	–	–	–
C	–	120 (32)	–	–	–
E	–	–	300 (79)	–	–
H	–	–	–	400 (106)	–
L	–	–	–	–	1000 (264)

2) Reduced flow rate on port B, nominal flow at port A

Code A* for spool $Q_B > Q_A$ optional

Weight:

D31FS	7.1 kg (15.7 lbs.)
D41FS	10.8 kg (23.8 lbs.)
D81/91FS	19.0 kg (41.9 lbs.)

Accessories

Refer to the Accessories section for bolt kits, subplates, connectors.

Driver Cards

Refer to the Electronics section for driver cards and support electronics.

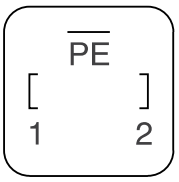
Mounting Interface

Refer to Mounting Interface Dimensions in the Proportional Directional Valve Section of this catalog.

A

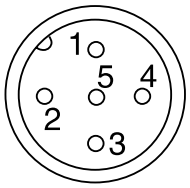
Wiring

Solenoid Coil



1 = coil connection
2 = coil connection
PE = ground potential

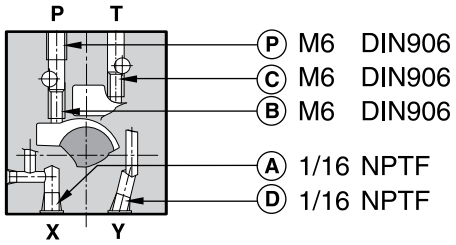
Spool position sensor (LVDT)



1 = output, spool position
2 = supply (+24V)
3 = GND (0V)
4 = not used
5 = protective ground

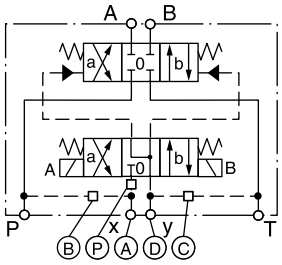
Pilot Connection

D31FS

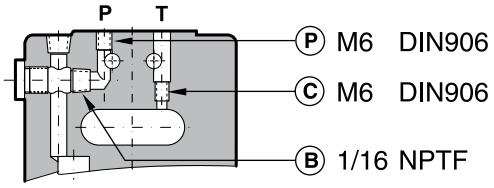


○ open, ● closed

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

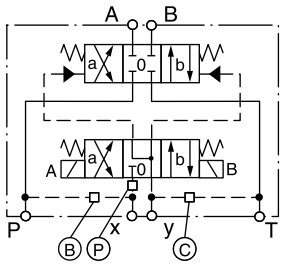


D41FS

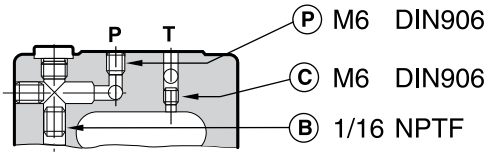


○ open, ● closed

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

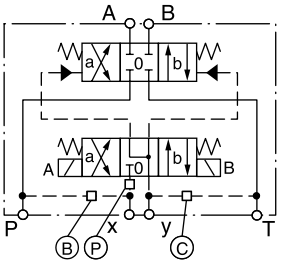


D91FS

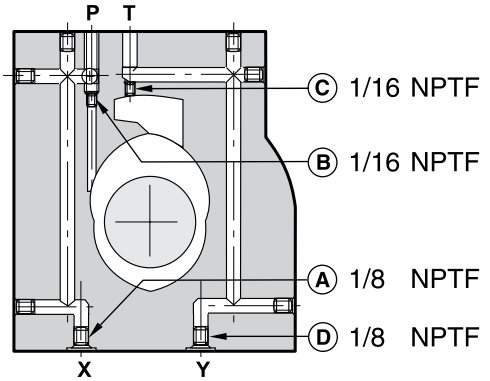


○ open, ● closed

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

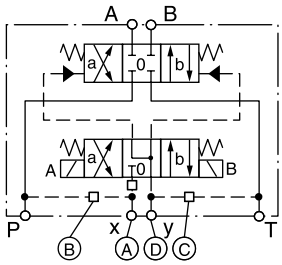


D111FS



○ open, ● closed

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



D_1FS.indd, dd

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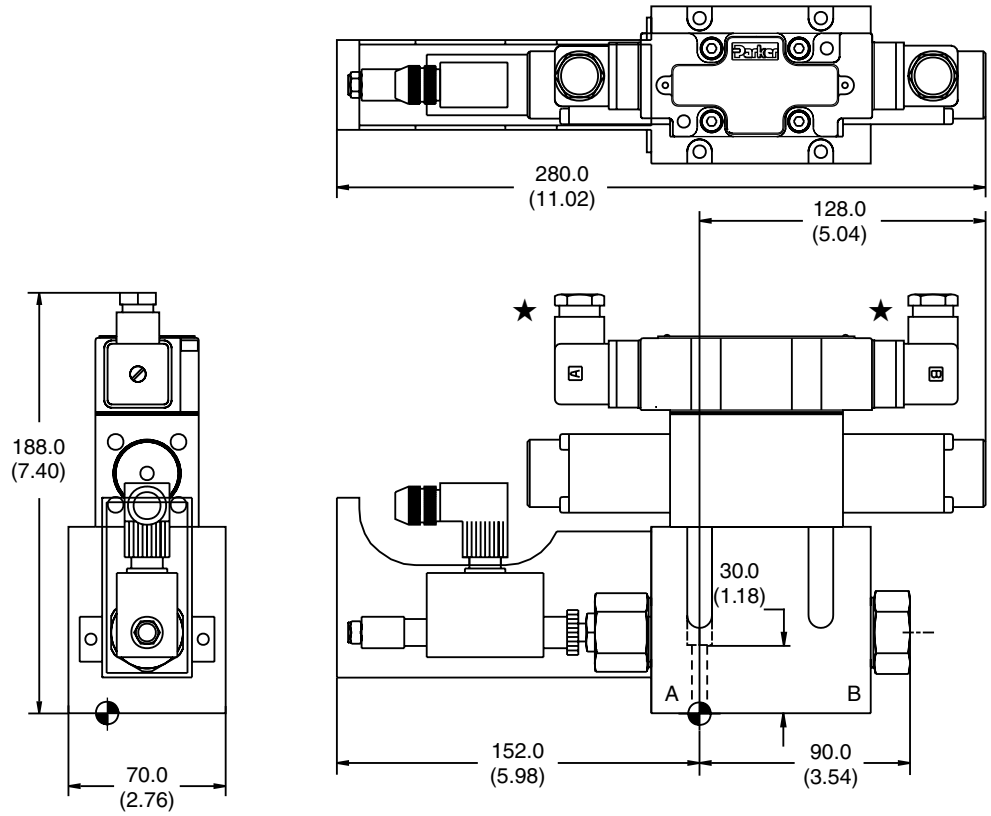
A

D31FS

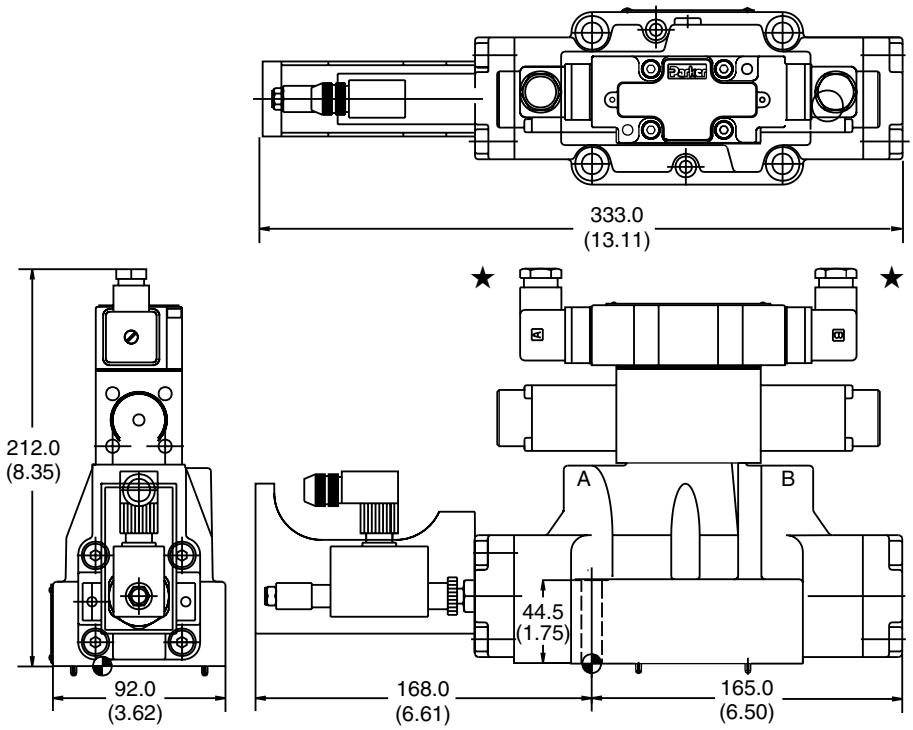
Inch equivalents for millimeter dimensions are shown in (**)



★ Order plugs separately.

D41FS

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



D_1FS.indd, dd

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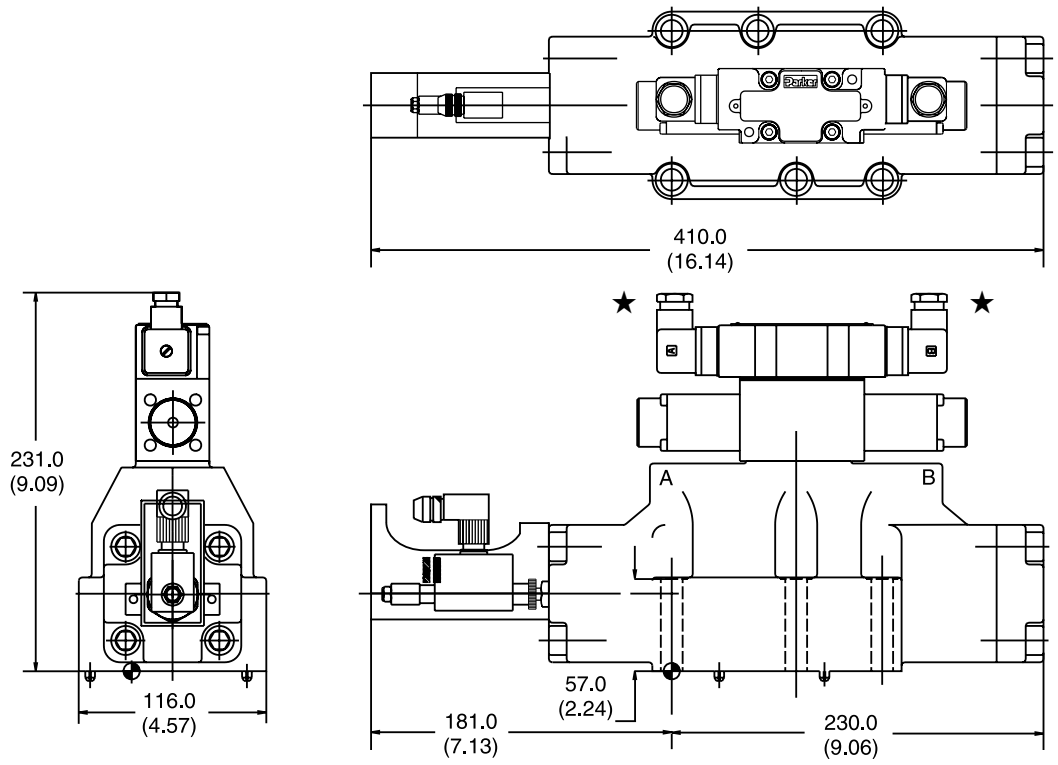
D81FS and D91FS

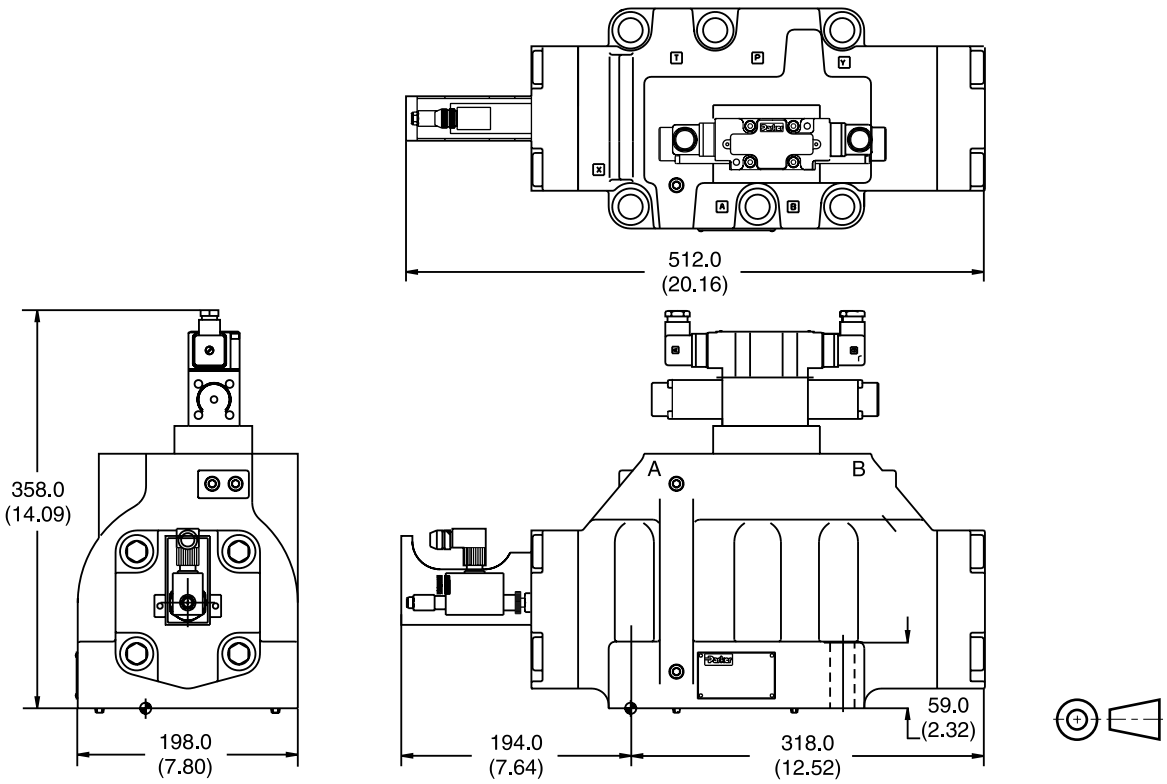
Inch equivalents for millimeter dimensions are shown in (**)



★ Order plugs separately.

D111FS

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



D_1FS.indd, dd

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A

General Description

Series D*FH is a high response, proportional servo-valve with an on-board drive amplifier. The D*FM is a high response, direct actuated servovalve with high resolution around low command inputs. The D*FM is designed for more precise control of position loops, force loops, and machine tool feed rates.

Series D*FH and D*FM incorporate the use of state-of-the-art drive electronics with an LVDT for continuous monitoring of the spool position. Zero lap spools are standard for closed loop applications with two different 'power down' configurations. The valves feature frequency response levels greater than 100 Hz for D1FH and D1FM, and 45 Hz for D3FH and D3FM, along with low hysteresis and excellent repeatability.

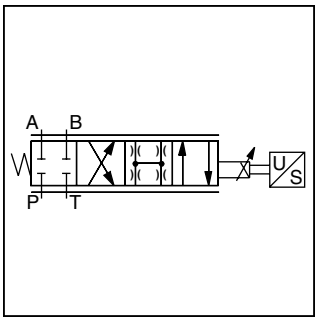
Operation

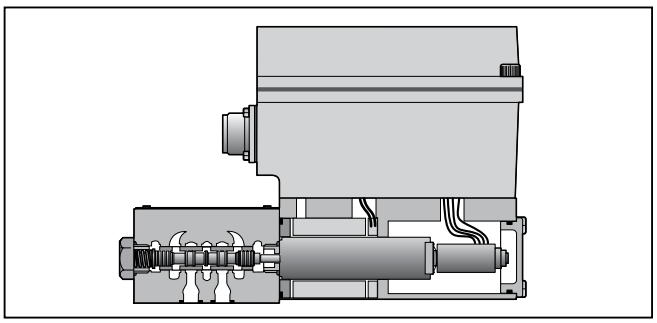
Series D*FH

Series D*FH valve uses a precision lapped spool and sleeve configured with four control positions. During normal operation, the valve will shift from the center position to either side providing flow out the 'A' or 'B' port. When the drive amplifier is disabled by either removing the enable or loss of electrical power, the valve will shift through P→B in less than 10ms to a fourth position. The fourth position will block all four ports in one version. A second version that is available will block the 'P' port and allow the 'A' and 'B' ports to bleed to the 'T' (tank line). (Refer to the "Flow With No Enable" in Troubleshooting section)

Series D*FM

The high resolution Series D*FM adds hydraulic and electronic control compensation to the standard D*FH valve. This feature enhances the tuning and accuracy of systems utilizing high resolution feedback transducers and control compensation available in high performance motion controllers. The D*FM valve uses a precision lapped spool and sleeve configured with four control positions. The fourth position (disabled) is available in an all ports blocked configuration or 'A' and 'B' ports bleed to tank configuration.





Features

- **On-Board Electronic Drive Amplifier —** The unit is shipped as a factory preset and tested unit. (No adjustment is necessary)
- **High Frequency Response —** The valve has a very high frequency response which is necessary for many closed loop applications.
- **Four Position Spool Capability —** The four position spool provides predictable flow in the event of a power failure to the drive electronics, within the limits of the power curve.
- **315 Bar Pressure Capability —** The maximum operating pressure rating for the D*FH and D*FM is 315 Bar or 4500 PSI (Port P, A, B).
- **Spool Position Feedback —** The LVDT continuous feedback monitoring circuit provides low hysteresis and excellent repeatability.
- **Drive Enable Feature —** Output to the coil is shut down when the enable signal (10 to 30 VDC) is not present. The valve will then shift to the fourth position flow path selected by the user. (E50 or E80 spool)
- **High Resolution Around Null —** For precise control of critical position, force, or feed rates (D*FM Version only)
- **Cylinder Ratio Adjust —** To match following error on extend and retract. (D*FM Version only)

Note:
The tank line of either style valve must have a minimum pressure of 1.4 Bar (20 PSI). Maximum tank line pressure is 35 Bar (500 PSI).

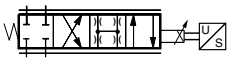
D		F					C		B	J	0	0		
Directional Control Valve	Size	Flow Control	Style	Spool Type	Flow	Style	Seal	Electronic Variation	Supply Voltage	Electric Accessories	Valve Accessories	Design Series	Product Variation

NOTE: Not required when ordering.

Code	Description
1	NG6/CETOP 3
3	NG10/CETOP 5

Code	Description
H	High Response
M	High Response, Dual Gain

Spool Type
Flow QA equal to flow QB

Code	Symbol
E50[1]	
E80[1]	
E53[2] (60/40)	
E83[2] (60/40)	
E84[2,3] (40/60)	

1) D1FH and D3FH only
2) D1FM only
3) D1FM*M flow code only
D3FM*Y flow code only

Code	Description
C	Bi-directional, 4 way, with 4th position on power down

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
B	Voltage Input 0 ... ±10 V (user configurable to 0 ... ± 20 mA)

Code	Description
J	24 VDC

Code	Description
Omit	Standard (with enable)
X6262	Pin 'C' is 0V reference instead of an enable (for competitive interchange only). Valve enables with power. (note 4)

Note 4: **Do NOT apply an enable signal to Pin C.** Unlike many other valves with the same 7-pin connector, Pin C is not for an enable signal. Pin C is a 0V reference used for DMMs or scopes to monitor pin F. It is not a power supply common. Using it as a power supply common will damage the PC board.

Code	Flow at Δp 35 Bar (500 PSI) per metering edge			
	D1FH LPM (GPM)	D1FM LPM (GPM)	D3FH LPM (GPM)	D3FM LPM (GPM)
B	5 (1.3)	–	–	–
D	10 (2.6)	–	–	–
F	–	12 (3.2)	–	–
H	20 (5.3)	–	–	–
M	40 (10.6)	40 (10.6)	–	–
P	–	–	50 (13.2)	–
Y	–	–	100 (26.5)	100 (26.5)

Maximum supply pressure is 315 Bar (4500 PSI). This is the pressure drop across the load and the valve. For maximum pressure drop per land, refer to the table on page A47.

Weight:

D1F	3.7 kg (8.2 lbs.)
D3F	7.7 kg (17.0 lbs.)

Mounting Interface

Refer to the Mounting Interface Dimensions in the Proportional Directional Valve section of this catalog.

Accessories

Refer to the Accessories section for bolt kits, subplates, connectors and pre-assembled cable assemblies.

A

Specifications

	D1FH, D1FM	D3FH, D3FM
Interface	NFPA D03, CETOP 3, NG6	NFPA D05, CETOP 5, NG10
Flow Rating At 35 Bar DP (500 PSI) per metering edge	[1] B spool 5 LPM (1.3 GPM) [1] D spool 10 LPM (2.6 GPM) [1] H spool 20 LPM (5.3 GPM) [1,2] M spool 40 LPM (10.6 GPM) [2] F spool 12 LPM (3.2 GPM)	[1] P spool 50 LPM (13.2 GPM) [1,2] Y spool 100 LPM (26.4 GPM)
Frequency Response	> 100 Hz (-3 dB at 5% signal)	> 45Hz (-3 dB at 5% signal)
Step Response	< 12 ms at 100% signal	< 25 ms at 100% signal
Power Consumption	40 VA max (See voltage supply)	60 VA max (See voltage supply)

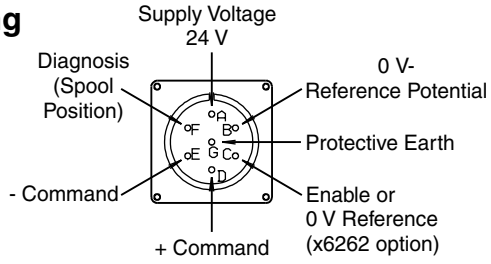
D1FH, D1FM, D3FH, D3FM			
Max. Operating Press. **Port P, A, B** **Port T**	315 Bar (4500 PSI) 35 Bar (500 PSI)	**Operating Temp. Range (Ambient)**	0 to 60° C (32 to 140° F)
Min. Tank Line Press.	1.4 Bar (20 PSI)	**Fluid Cleanliness Level**	ISO Class 15/12/10 (For longer life) ISO Class 16/14/11 (For normal operation)
Typical Spool Overlap	Zero Lap		
Pressure Gain **% of Change/1%** **Change in Command**	[1] Typical 40% [1] Minimum 25% [2] Typical 90%	**Voltage Supply**	24 VDC (21 VDC Min., 30 VDC Max.) Peak Current 4A (PSD24 power supply recommended)
Hysteresis	< 0.5%	**Command Signals**	± 10 VDC at 100 K ohm input impedance ± 20 mA at 499 ohm input impedance
Repeatability	< 0.5%		
Viscosity Range	17 to 65 cSt / mm^2/s (79 to 301 SSU)		
Fluids	Mineral base hydraulic fluid	**Protection Class**	IP65, NEMA 4 (As factory sealed)

Note: 1) D*FH only 2) D*FM only

Maximum Flow and Pressure Differential

Spool Code		Flow Code						
		B	**D**	**F**	**H**	**M**	**P**	**Y**
E50	**Max ΔP Per Land**	100 Bar (1500 PSI)	100 Bar (1500 PSI)	60 Bar (850 PSI)	70 Bar (1000 PSI)	52 Bar (750 PSI)	70 Bar (1000 PSI)	50 Bar (725 PSI)
	Max Flow	8.3 LPM (2.2 GPM)	16.3 LPM (4.3 GPM)	9.7 LPM (5.2 GPM)	26.9 LPM (7.1 GPM)	46.2 LPM (12.2 GPM)	69.6 LPM (18.4 GPM)	121 LPM (32 GPM)
E80	**Max ΔP Per Land**	100 Bar (1500 PSI)	100 Bar (1500 PSI)	60 Bar (850 PSI)	70 Bar (1000 PSI)	52 Bar (750 PSI)	70 Bar (1000 PSI)	50 Bar (725 PSI)
	Max Flow	8.3 LPM (2.2 GPM)	16.3 LPM (4.3 GPM)	9.7 LPM (5.2 GPM)	26.9 LPM (7.1 GPM)	46.2 LPM (12.2 GPM)	69.6 LPM (18.4 GPM)	121 LPM (32 GPM)

Wiring



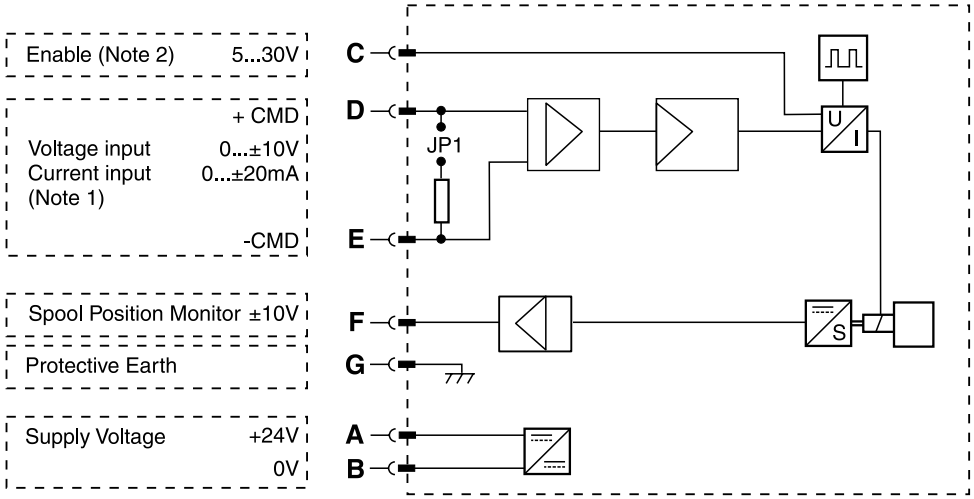
Installation Guidelines

Refer to the Installation Guide for set-up, configuration, and application guidelines (packaged with each valve).

D*FH and D*FM: Bul. HY14-2599-M1/US

A

Block Diagram

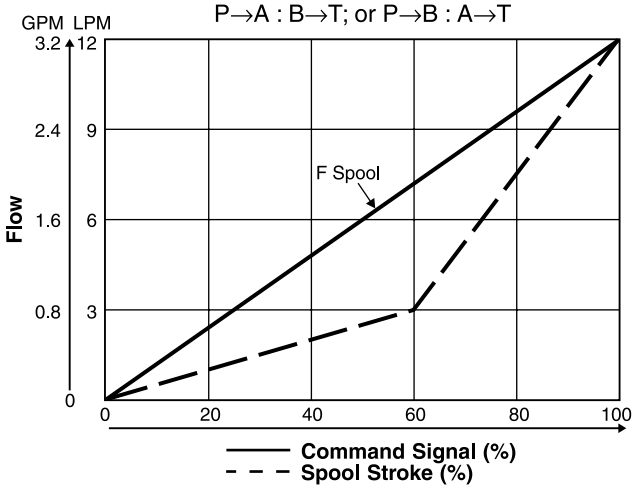


Note 1: Install jumper JP1 for current command input. Refer to installation guide Bul. HY14-2599-M1/US.
Note 2: Valves can be ordered with pin 'C' internally grounded to be interchangeable with some competitor products. Refer to Ordering Information page.

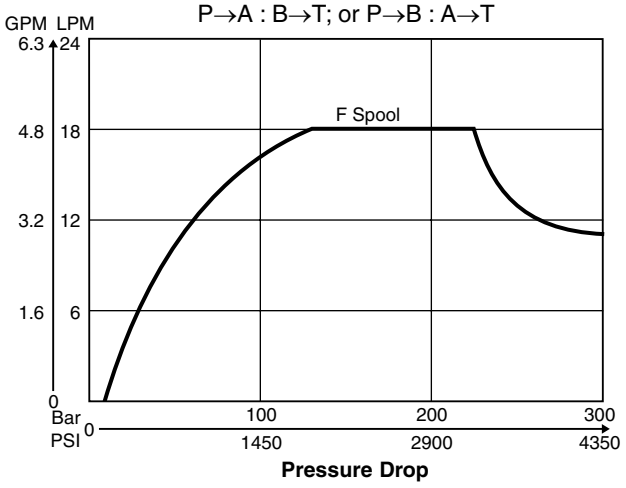
Performance Curves

D1FM series proportional valves are electronically compensated dual flow-gain valves. The command voltage/flow transfer function is linear while the actual spool stroke/flow gain is designed to provide very high resolution at low flows. The D1FM series proportional valves are particularly well suited for machine tool feed applications, or where very fine flow resolution is required while maintaining a rapid advance function in a single valve. The D1FM frequency response is the same as the D1FH; refer to the next page.

D1FM Flow Characteristics
at Δp = 35 Bar (500 PSI) per metering edge
P→A : B→T; or P→B : A→T



D1FM Operating Limits
at 100% Command
P→A : B→T; or P→B : A→T



D_FH-D_FM.indd, dd

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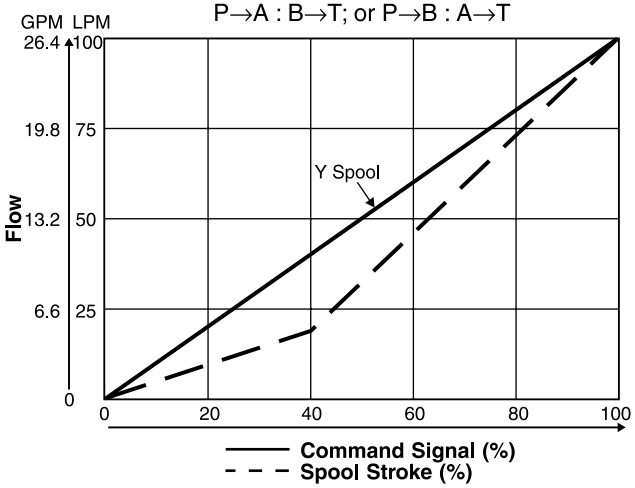
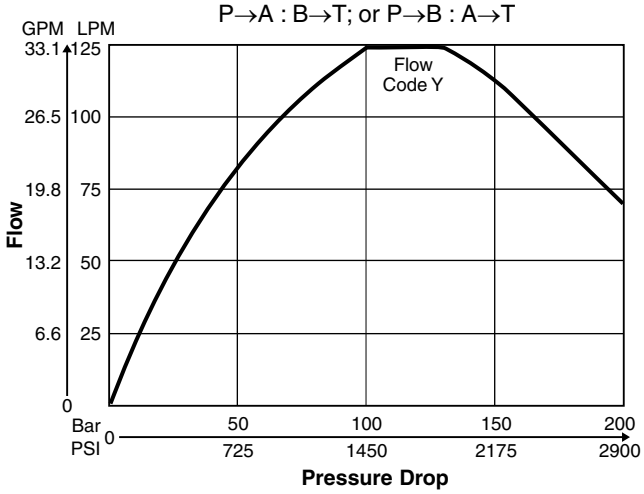
D3FM Flow Characteristics

at Δp = 35 Bar (500 PSI) per metering edge
P→A : B→T; or P→B : A→T



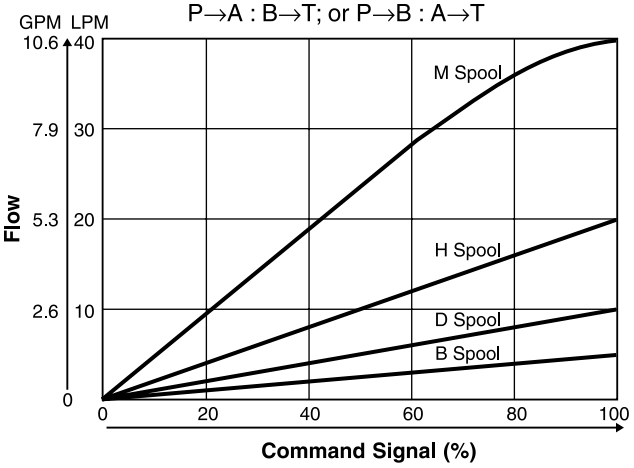
D3FM Operating Limits

at 100% Command
P→A : B→T; or P→B : A→T



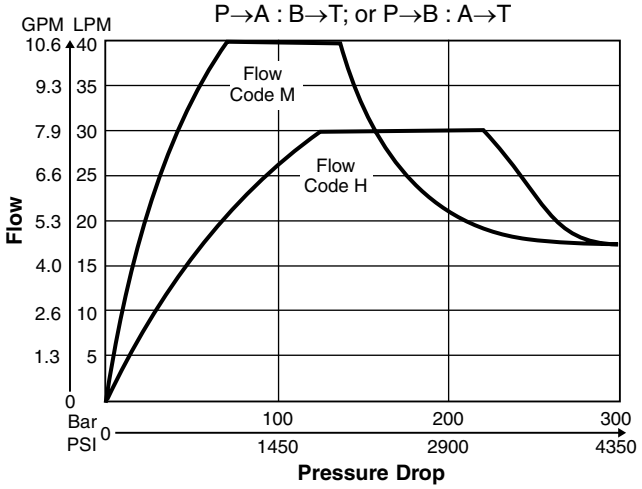
D1FH Flow Characteristics

at Δp = 35 Bar (500 PSI) per metering edge
P→A : B→T; or P→B : A→T



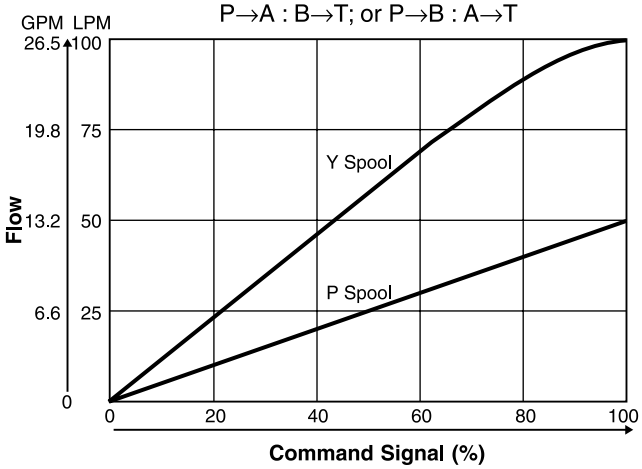
D1FH Operating Limits

at 100% Command
P→A : B→T; or P→B : A→T



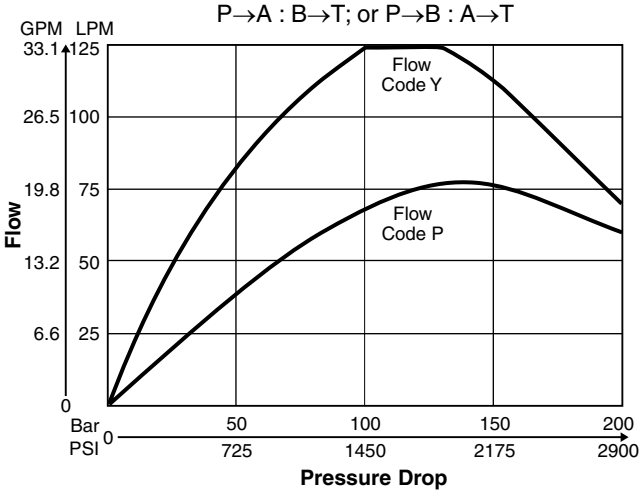
D3FH Flow Characteristics

at Δp = 35 Bar (500 PSI) per metering edge
P→A : B→T; or P→B : A→T



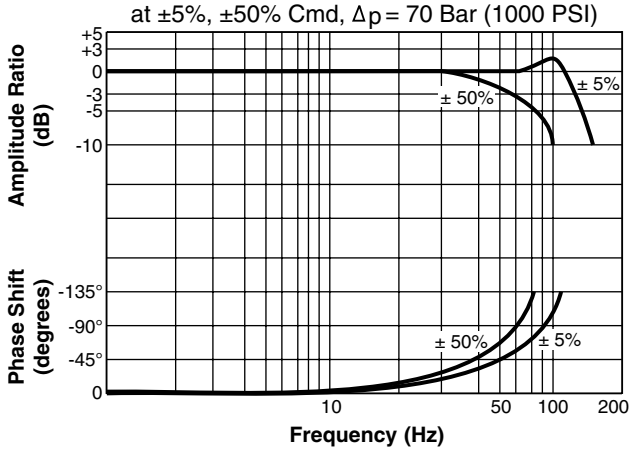
D3FH Operating Limits

at 100% Command
P→A : B→T; or P→B : A→T



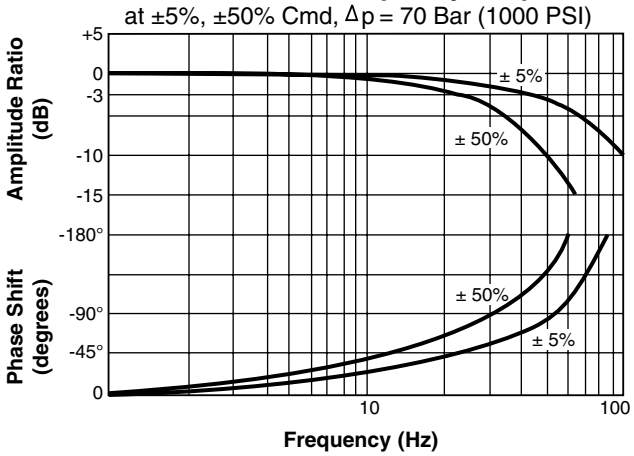
D1FH and D1FM Frequency Response

at ±5%, ±50% Cmd, Δp = 70 Bar (1000 PSI)



D3FH and D3FM Frequency Response

at ±5%, ±50% Cmd, Δp = 70 Bar (1000 PSI)



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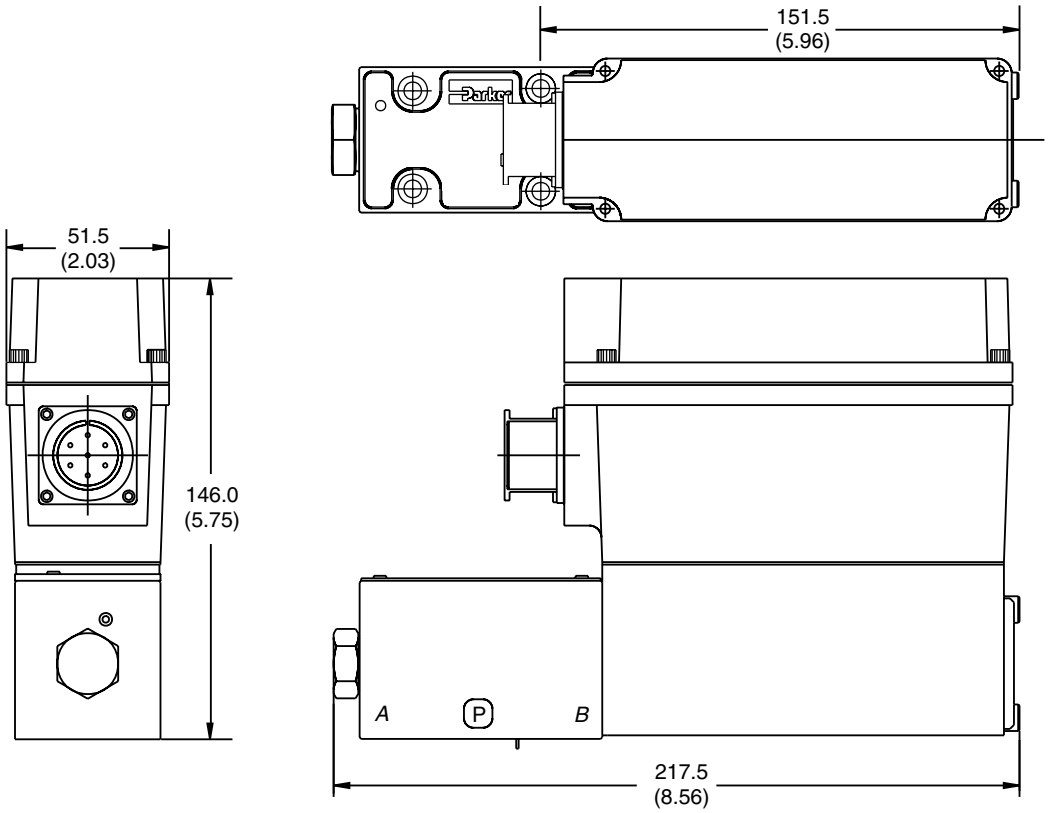
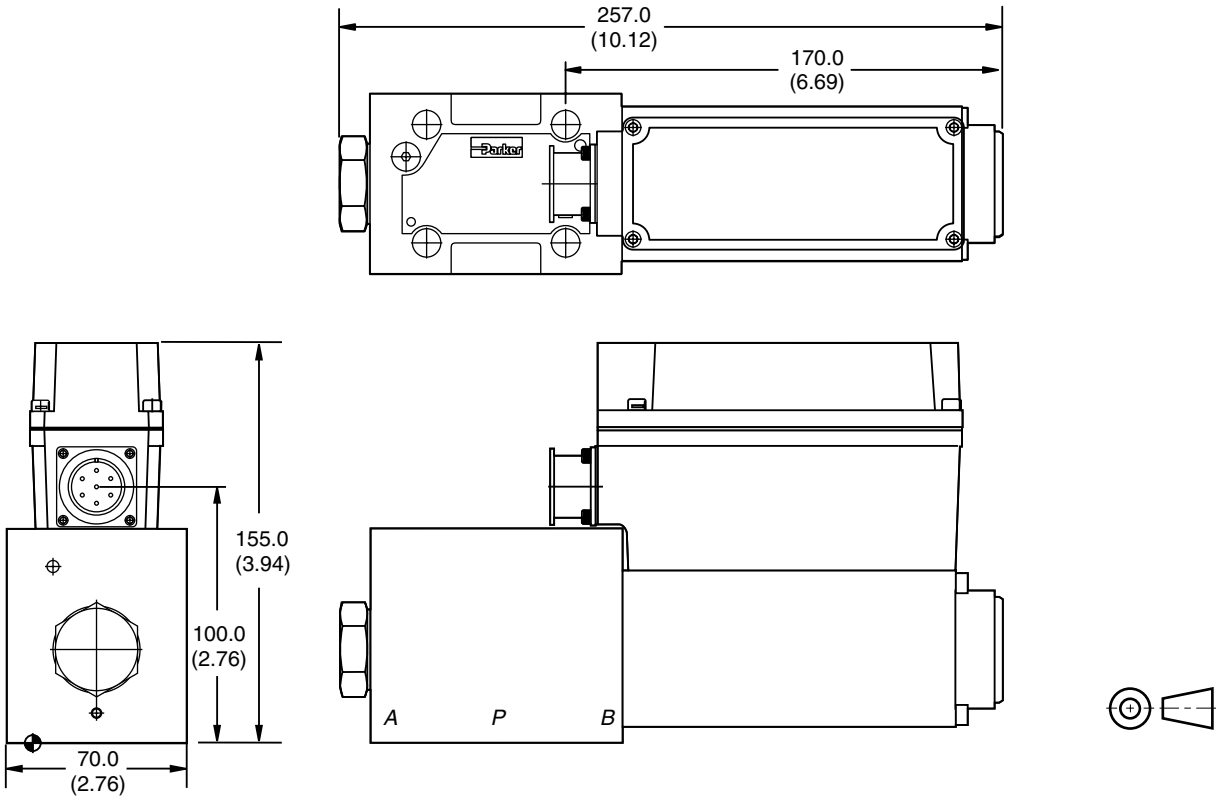
D1FH and D1FM

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



D3FH and D3FM

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



D_FH-D_FM.indd, dd

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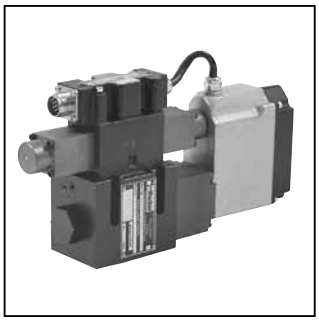
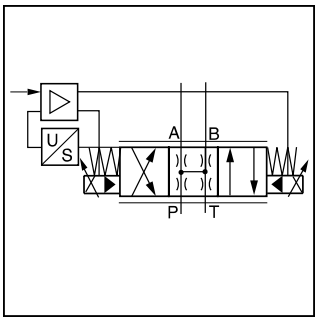
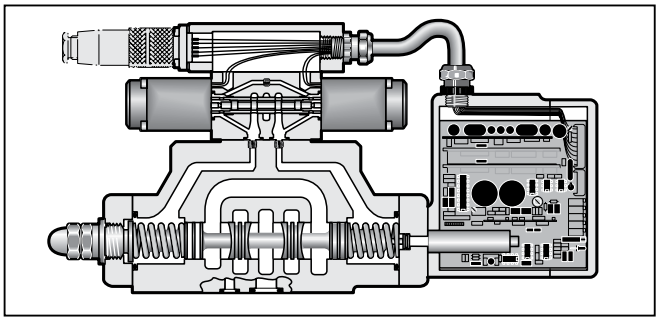
General Description

Series D*1FH proportional directional control valves are high performance, two stage pilot operated solenoid valves with electronic spool position feedback, and on-board integrated control electronics. Valves are available in sizes NG10 (CETOP 5), NG16 (CETOP 7), NG25 (CETOP 8) and NG32 (CETOP 10).

D*1FH valve performance is characterized by high resolution flow control, repeatability and high dynamic performance. Typical applications include precise and reproducible control of actuator speed in rapid/slow speed profiling, and smooth acceleration and deceleration performance. Zero lap spools are available for closed loop applications.







Features

- Standard DIN/ISO/CETOP/NFPA interfaces.
- Integrated valve electronics.
- Spool position feedback.
- High frequency response.
- Spring centered main stage spool.
- LED functional diagnostic indicator.
- Wide selecton of spool options, and flow capacity.
- 2:1 ratio spool options.

CE

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)[1] LPM (GPM)	80 (21)	240 (63)	400 (106)	1000 (264)
Pressure Gain (Zero Lap Spool) %	3.5	3.0	2.5	—
Maximum Flow (spool options up to)[1] LPM (GPM)	170 (45)	420 (111)	900 (238)	2000 (528)
Pilot Flow				
Continuous LPM (GPM)	<1.2 (0.3)	<1.2 (0.3)	<1.2 (0.3)	<1.2 (0.3)
Step Input LPM (GPM)	2 (0.5)	4 (1.1)	9 (2.4)	18 (4.8)
Step Response (time to reach 90% of a 100% step command) ms	25	45	65	150

Hysteresis %	<0.5
Repeatability %	<0.5
Operating Pressure	
Port P, A, B Bar (PSI)	345 (5000) max.
Port P, internal pilot	20 (290) min.
Port T, internal drain	10 (150) max.
Port T, external drain	345 (5000) max.
Port Y, pilot drain	10 (150) max.
Port X, external pilot	20-345 (290-5000)
Electrical Power Requirements	18 to 30 VDC, 2.2A
Command Signal (impedance) (select by ordering code)	0 ± 10 VDC (100K ohm) 0 ± 20 mA (500 ohm)
Command Polarity	Pin 'D' more positive than 'E' produces flow P to B

Mating Connector (order separately)	Part #5004072 (7-pin CE)
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)
Environmental Protection Class	NEMA 4 (IP65)
Ambient Operating Temperature	-20°C to +60°C (-4°F to +140°F)
Temperature Drift	0.005%/°C (0.009%/°F)

1) Actual pressure drop required for each metering land, up to the specified maximum flow rate is:

$$\Delta P_{actual} = (5)\left(\frac{Q_{actual}}{Q_{rated}}\right)^2 \text{Bar; (Q in LPM)} \quad [or] \quad = (75)\left(\frac{Q_{actual}}{Q_{rated}}\right)^2 \text{PSI; (Q in GPM)}$$

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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D		1	F	H						0		
Directional Control Valve	Size	Pilot Operated	Flow Control	High Response	Spool Type	Flow	Pilot Oil Connection	Seal	Input Signal	Options	Valve Accessories	Design Series

NOTE: Not required when ordering.

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

1) with enlarged ports ∅ 32mm

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
B	Voltage Input 0 ... ±10V
E	Current Input 0 ... ±20 mA
S	Current Input 4 ... 20 mA

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

Code	Description
0	Standard
8	Monitor Switch

Code			
$Q_A=Q_B$	$Q_A>Q_B$ [2)]	$Q_B>Q_A$ [3)]	Spool Type
			Overlap Sine
E01	B31	A31	
E02	B32	A32	

2) 2:1 Ratio: Reduced Flow Rate; Port B, Rated Flow Rate; Port A
3) 2:1 Ratio: Reduced Flow Rate; Port A, Rated Flow Rate; Port B

Code	Flow at Δp 5 Bar (72.5 PSI) per Metering Edge Sine Notch Spools			
	D31 LPM (GPM)	D41 LPM (GPM)	D81/91 LPM (GPM)	D111 LPM (GPM)
A	55 (14.6)	–	–	–
B	–	105 (27.8)	–	–
C	80 (21)	140 (37)	–	–
E	–	190 (50)	250 (66)	–
F	–	240 (63)	310 (82)	–
H	–	–	400 (106)	500 (32)
L	–	–	–	1000 (264)

V-Notch Spool Options - Spool Type and Flow Codes

Code		V-Notch
$Q_A=Q_B$	$Q_A>Q_B$ [4)]	Spool Type
E21	B41	
E22	B42	

Code	Flow at Δp 5 Bar (72.5 PSI) per metering edge		
	D31 LPM (GPM)	D41 LPM (GPM)	D81/D91 LPM (GPM)
B	–	–	–
D	–	120 (32)	–
F	–	–	300 (79)

4) 2:1 Ratio: Reduced Flow Rate on Port B, Rated Flow Rate on Port A
Code A* for spool $Q_B>Q_A$ optional

Bolt Kit:		Weight:	
D31FH	BK98	D31FH	8.1 kg (17.9 lbs.)
D41FH	BK160	D41FH	11.6 kg (25.6 lbs.)
D81/91FH	BK228	D81/91FH	20.7 kg (45.6 lbs.)
D111FH	BK150	D111FH	62.0 kg (137.0 lbs.)

Mating Connector: Part # 5004072 (7-Pin CE) Order Separately

Mounting Interface

Refer to the Mounting Interface Dimensions in the Proportional Directional Valve section of this catalog.

Accessories

Refer to the Accessories section for bolt kits, subplates, connectors and pre-assembled cable assemblies.

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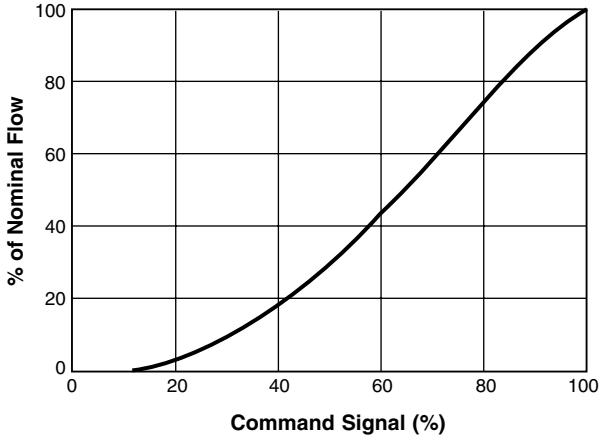
Note: Depending on the spool type selected, the actual flow characteristic may deviate from the typical flow curves as shown.

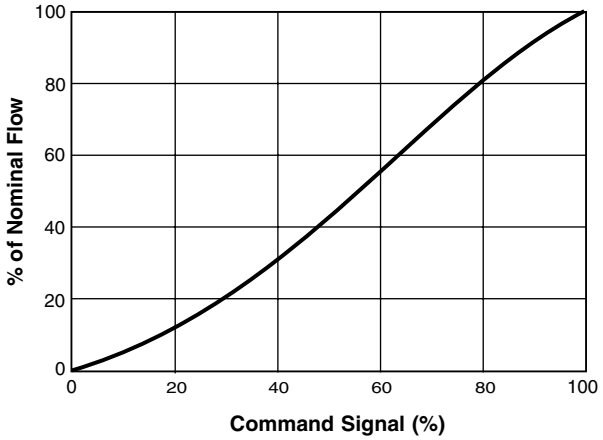
Flow Characteristics – Overlap Spools

Typical, at 5 Bar (72.5 PSI) per metering edge

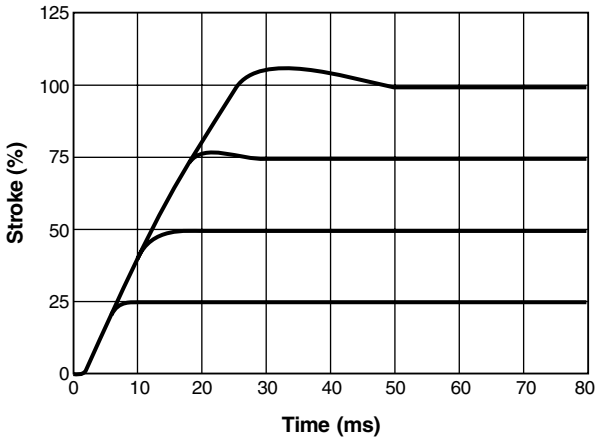


Flow Characteristics – Zero Lap Spools

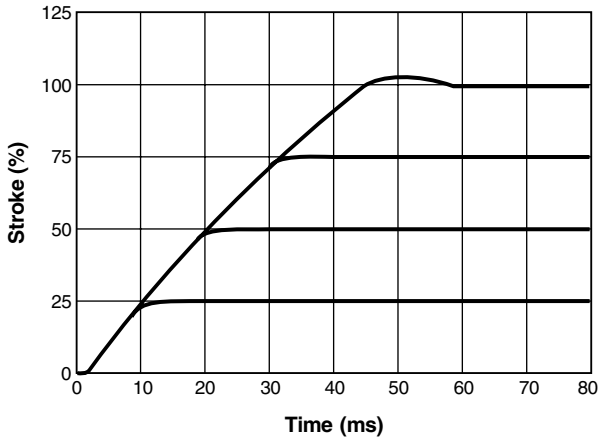
Typical, at 5 Bar (72.5 PSI) per metering edge



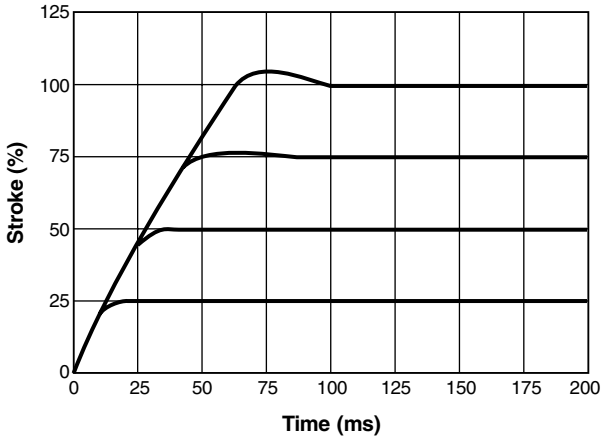
D31FH Step Response



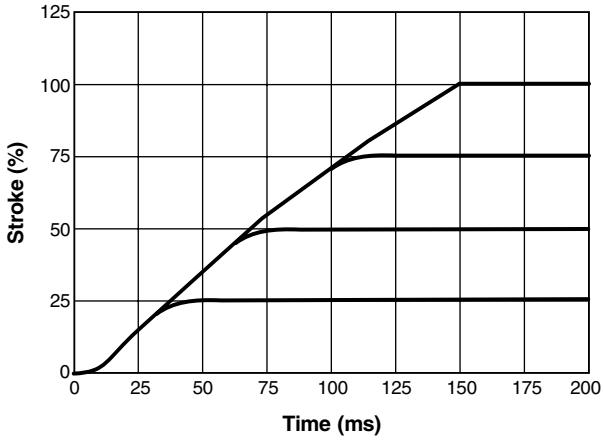
D41FH Step Response



D81FH and D91FH Step Response



D111FH Step Response



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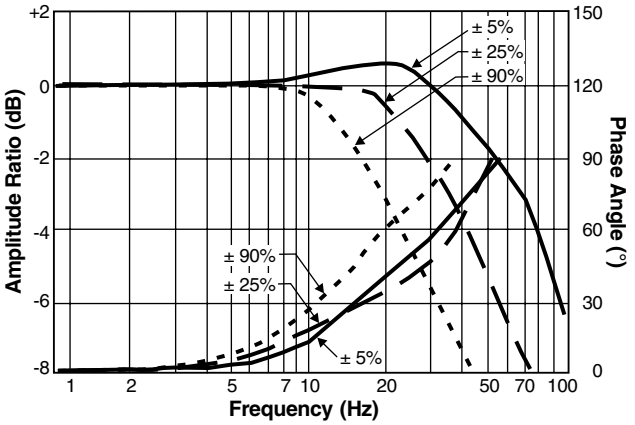
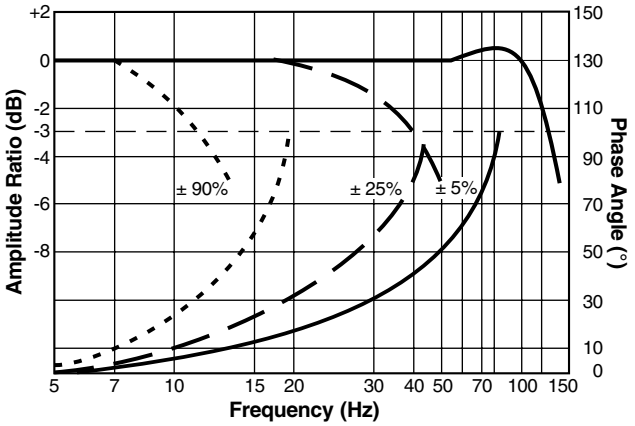
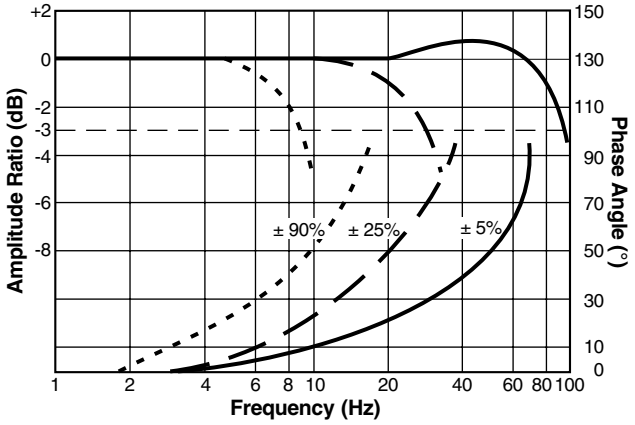
D31FH Frequency Response



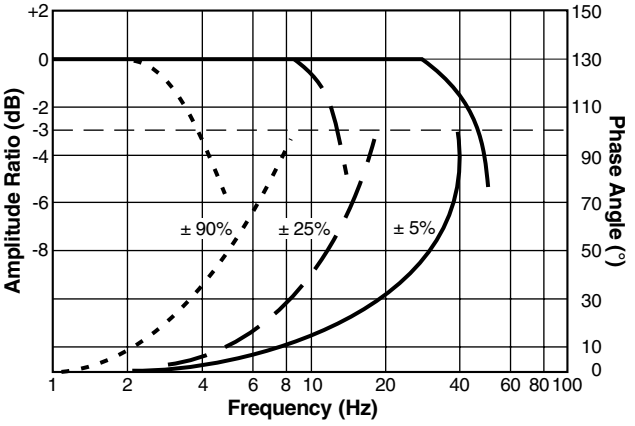
D41FH Frequency Response



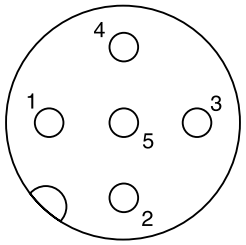
D81FH and D91FH Frequency Response



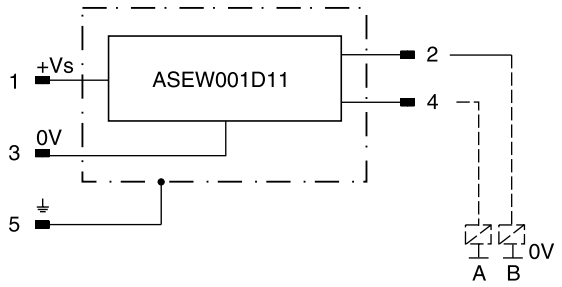
D111FH Frequency Response



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.

D_1FH.p65, dd

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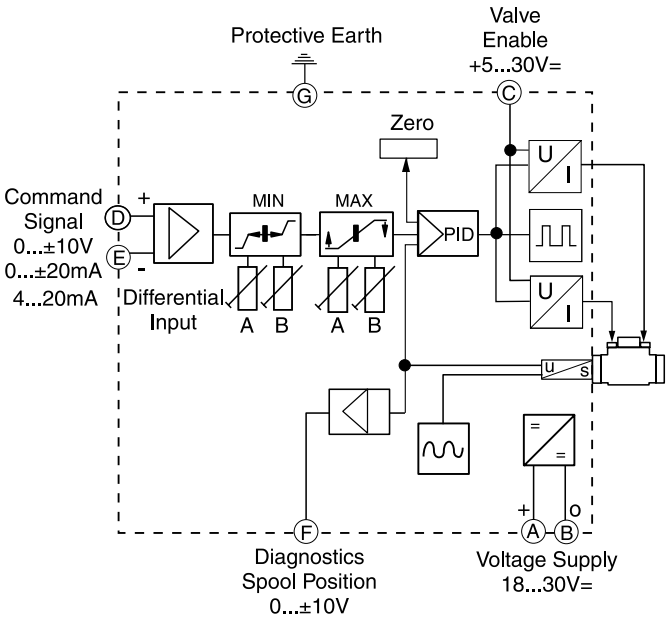
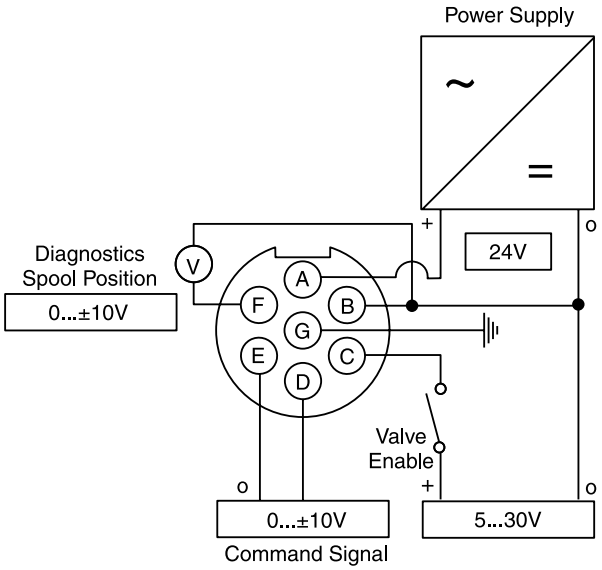
Function Diagram, Valve Electronics



Wiring Connection



Valve Enable Input

The valve power stage electronics is enabled by applying a positive voltage to pin 'C' with respect to power supply 0V pin 'B'. A voltage between 5 and 30 volts is a logical enable, less than 5 volts disables the valve.

Diagnostics — Valve Spool Position

Spool position can be monitored by measuring the voltage on pin 'F' with respect to power supply 0V pin 'B' of the valve input connector. The same signal is available inside the enclosure as a calibration aid as shown.

Status LED

A status lamp (LED) is located inside the electronics enclosure and visible through a transparent lens. Refer to the table below.

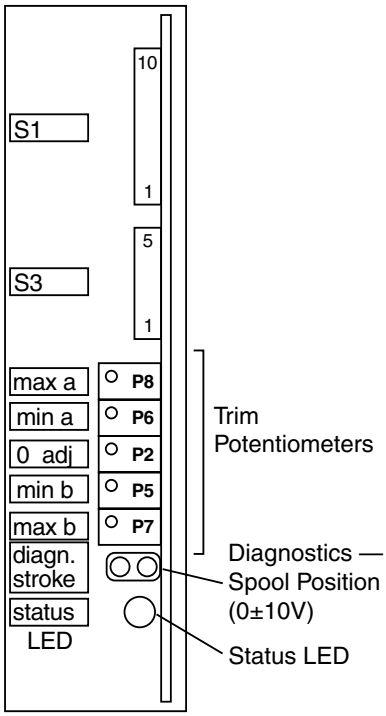
Display Color	Indicates
Green	Normal operation
Off	Supply voltage outside permissible range of 18 to 30 VDC
Red	Spool position error / Low pilot pressure

Electronics Adjustment

Electronic valve adjustments are located inside the electronics enclosure. Refer to installation manual: DFH- (Series 30) 2573 / GB.

Integrated Control Electronics

Arrangement of potentiometers, status LED, and internal valve spool monitor point.



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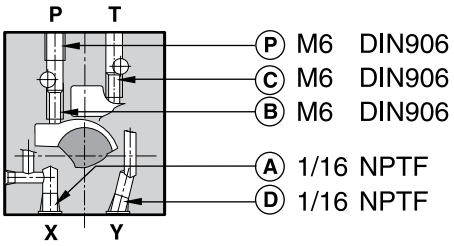
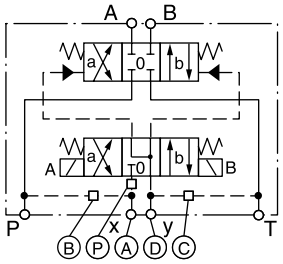
Pilot Flow
Oil Inlet (Supply) and Outlet (Drain)

D31FH

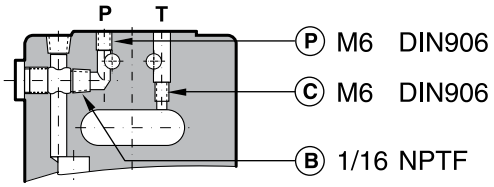


○ open, ● closed

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

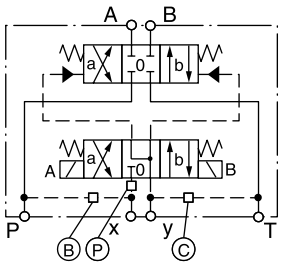


D41FH

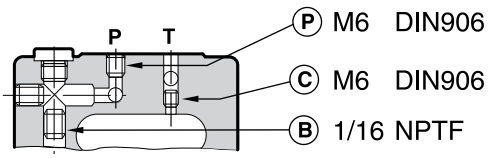


○ open, ● closed

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

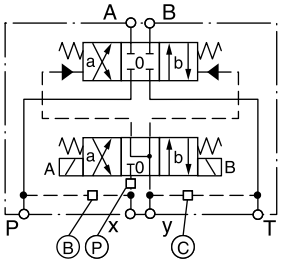


D81FH and D91FH

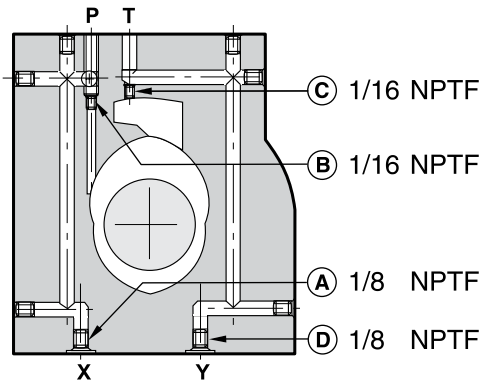


○ open, ● closed

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

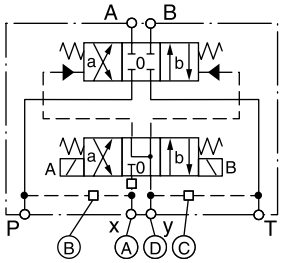


D111FH



○ open, ● closed

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



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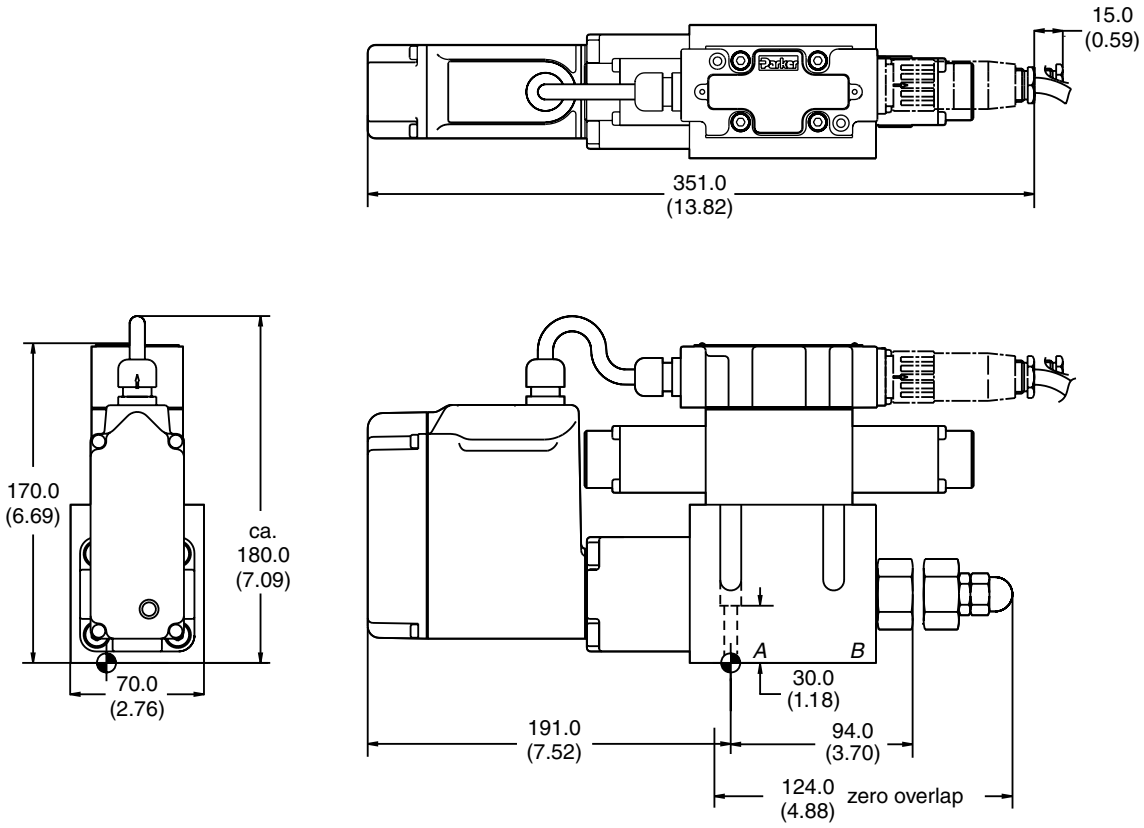
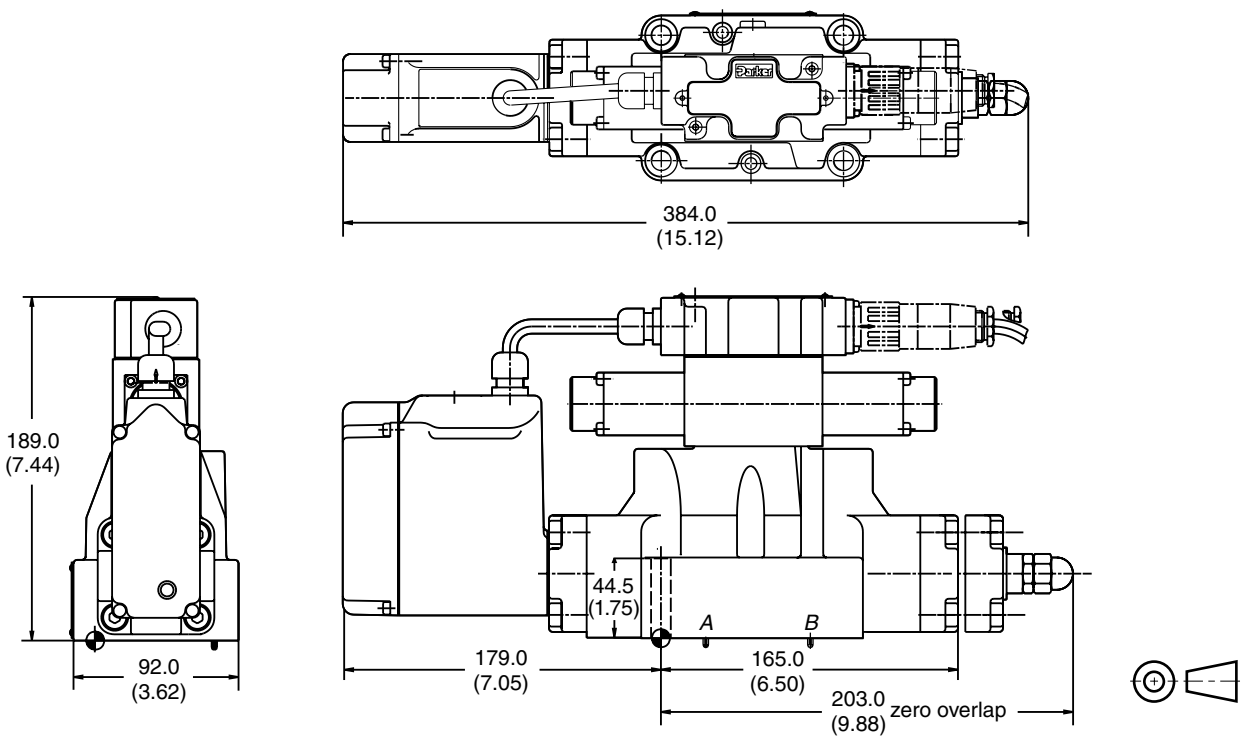
D31FH

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



D41FH

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



D_1FH.p65, dd

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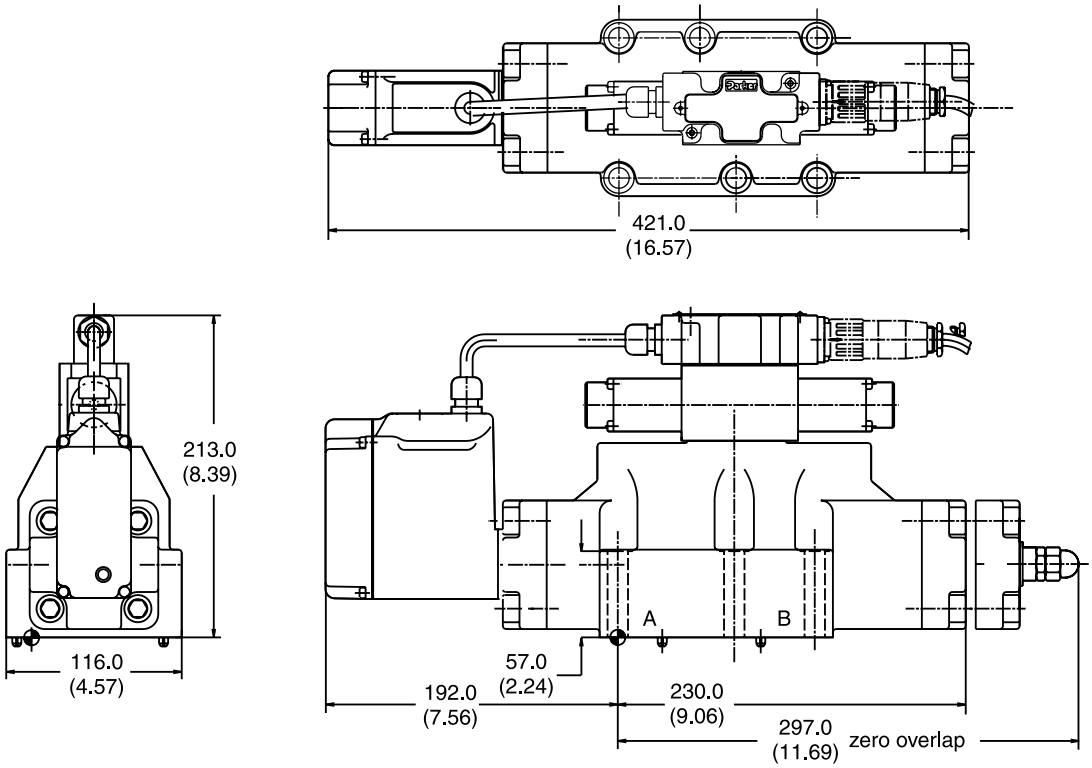
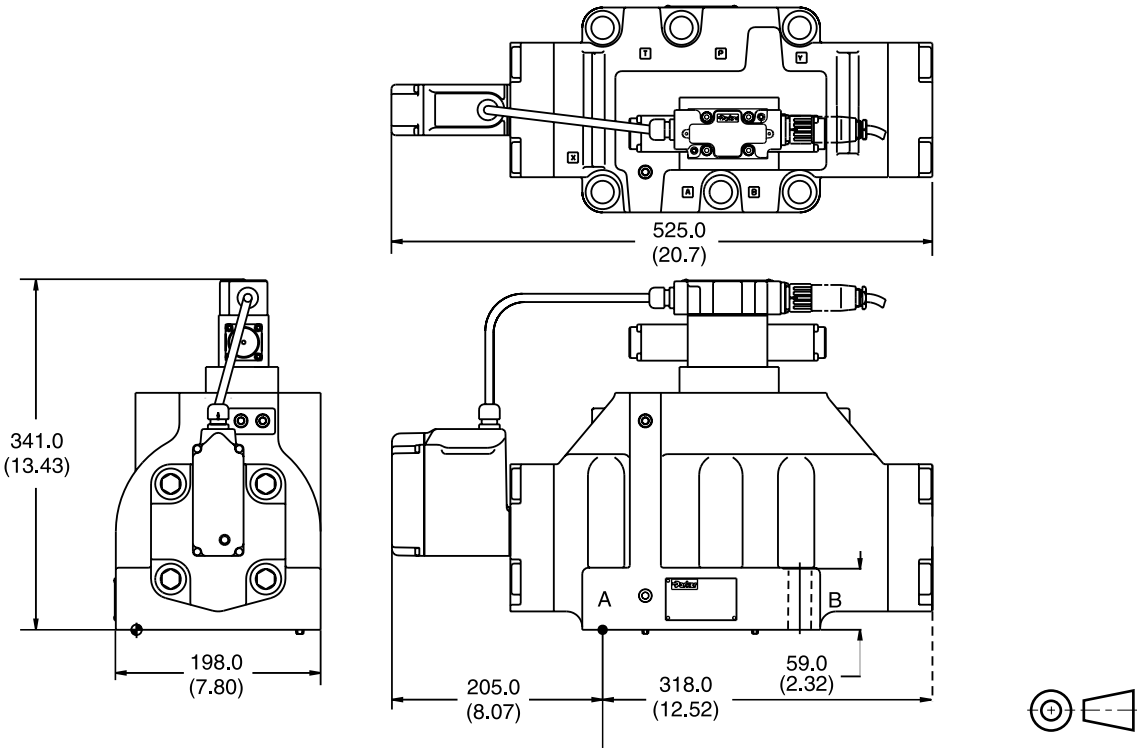
D81FH and D91FH

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



D111FH

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



D_1FH.p65, dd

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General Description

Series D*1FE pilot operated proportional valves are designed for high precision applications that require a safe middle position of the main spool at power down.

The pilot is a 3-position valve with an overlapped middle position. This ensures that the main stage spring pushes the spool into the middle position at power down without an unintended jerk of the actuator.

The D*1FE series is available in 5 sizes:

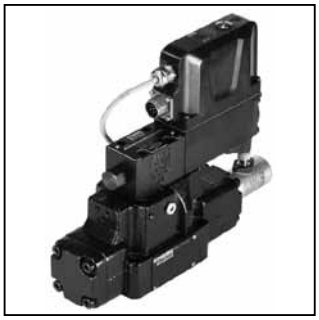
D31FE NG10 (CETOP 5)

D41FE NG16 (CETOP 7)

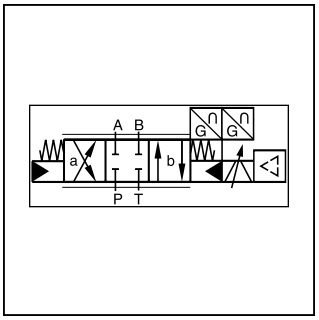
D91FE NG25 (CETOP 8) for port diam. up to 32 mm

D111FE NG32 (CETOP10)

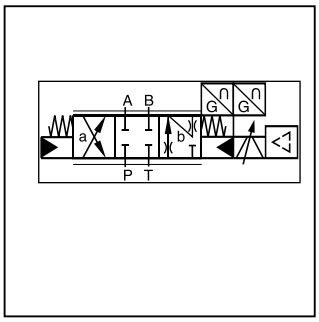
The innovative integrated regenerative function in the A-line (optional) allows new energy saving circuits with differential cylinders. The hybrid version can switch between regenerative mode and standard mode at any time.



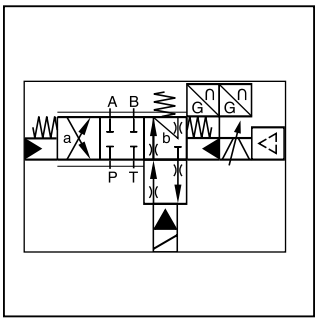
D41FE Standard



Standard D*1FE



NEW: A-Regeneration D*1FER

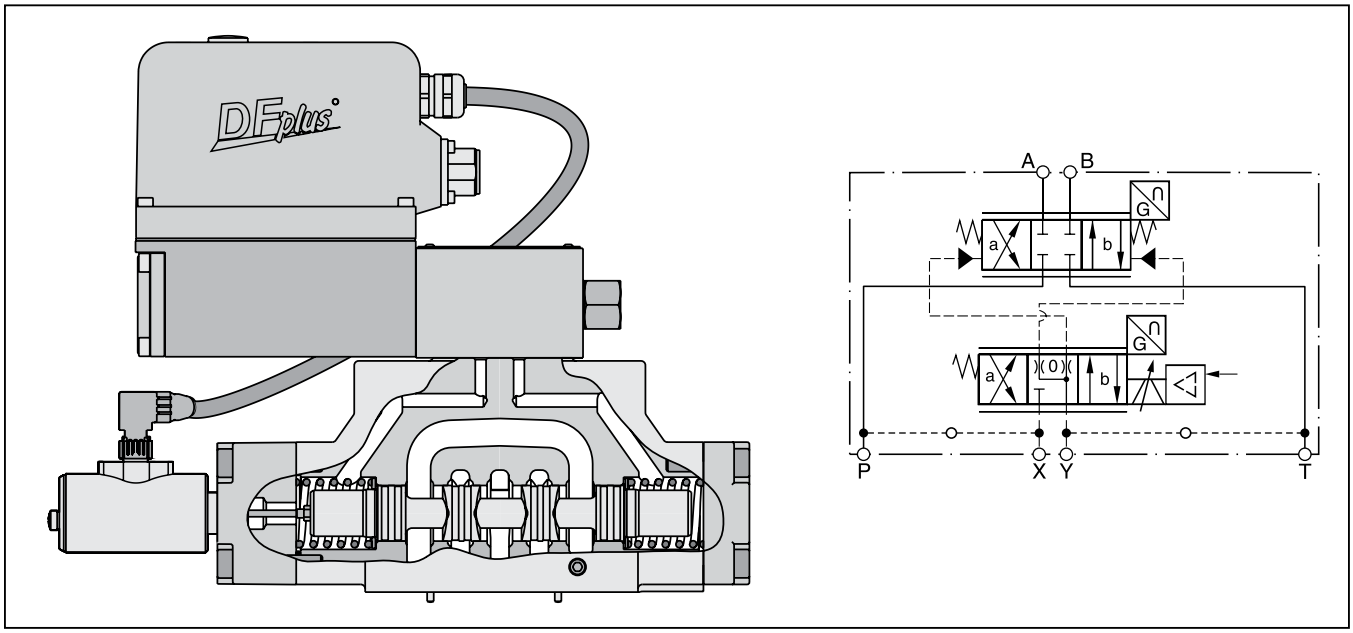


NEW: Hybrid D*1FEZ

Features

- High dynamics.
- High flow.
- Defined spool positioning at power-down.
- Onboard electronics.
- **NEW:** Energy saving A-regeneration optionally integrated.
- **NEW:** Switchable hybrid version.

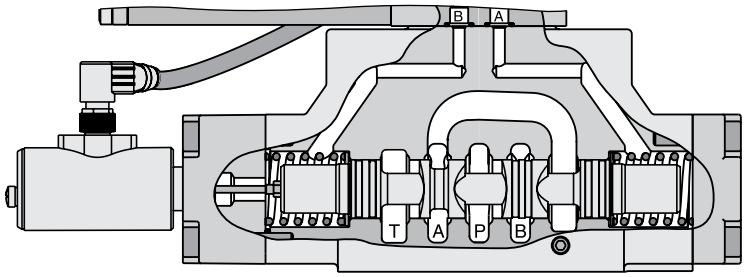
D41FEE52 (Standard)

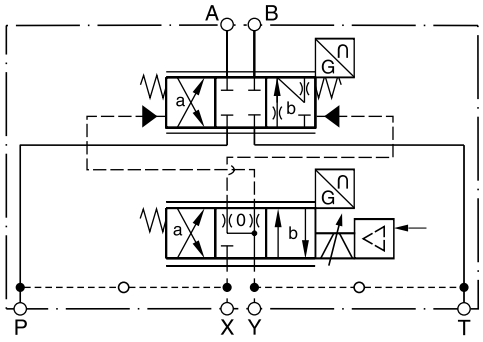


A

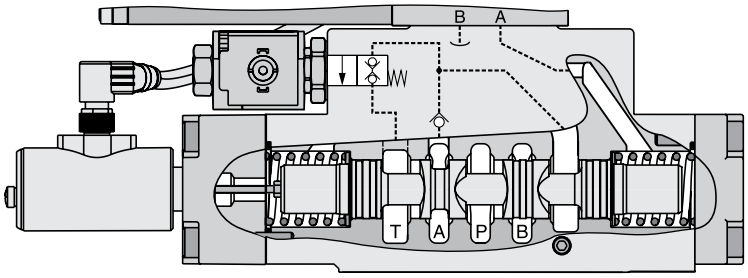
D*1FER and D*1FEZ

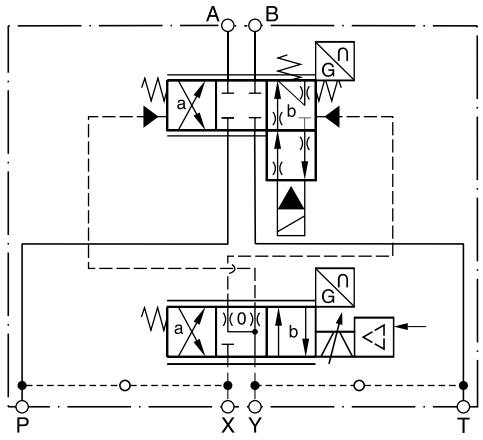
Regenerative Valve D*1FER





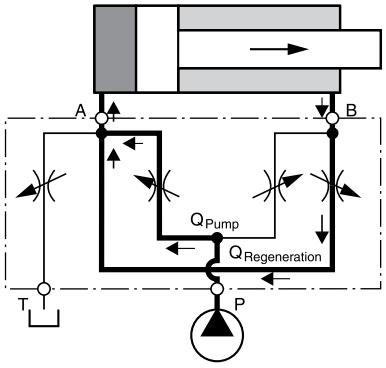
Hybrid Valve D*1FEZ





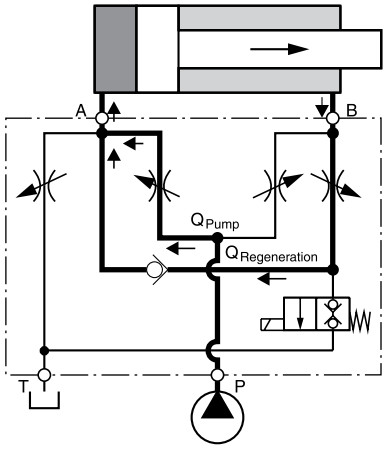
D*1FER (Regenerative Valve)

Cylinder extending

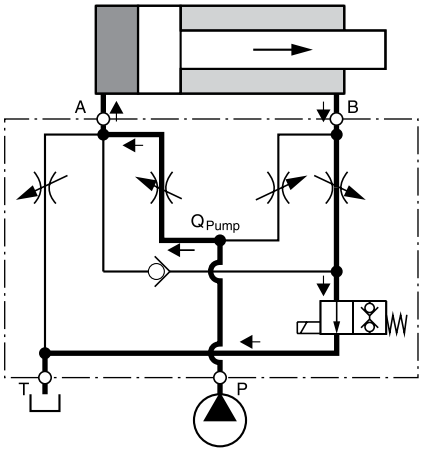


D*1FEZ (Hybrid Valve)

Cylinder extending
in regenerative mode (high speed)



Cylinder extending
in 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)
D41FER/Z	31/32	100%	50%	100%	50%	40%	20%
D91FER/Z	31/32	100%	50%	100%	50%	50%	25%
D111FER/Z	31/32	on request					

D		1	F	E			C							
Directional Control Valves	Size	NG6 Pilot	Flow Control	High Response	Spool	Flow	Spool Position	Pilot Connection	Seal	Input Signal	Options	Hybrid Option	Design Series

NOTE: Not required when ordering.

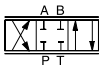
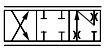
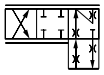
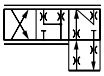
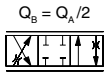
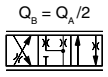
Code	Description
3	NG10 / CETOP 5
4	NG16 / CETOP 7
9 [1]	NG25 / CETOP 8
11	NG32 / CETOP 10

[1] With enlarged connections Ø 32 mm

Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC fluid

Code	Description
0	Standard for Spool Codes B, E, R
L [5]	Hybrid valve 24V normaly closed for spool type Z

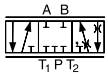
[5] See page page A114 for regenerative and hybrid spool information. (not available in D31FE).

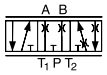
Standard		NEW: Regenerative Function [2]		NEW: Hybrid Function [4]	
Code	Spool Type	Code	Spool Type	Code	Spool type
E01		R31		Z31	
E02		R32		Z32	
B31					
B32					

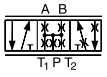
[2] Not available in D91FE.
[4] Not available in D31FE.

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

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

D31FE spooltype: R31 

R32 

R61 

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	Flow LPM (GPM) at Δp 5 Bar (72.5 PSI) per metering edge			
	D31	D41	D91	D111
D	90 (24)	—	—	—
E	120 (32)	—	—	—
F	—	200 (53)	—	—
H	—	—	450 (119)	—
L	—	—	—	1000 (265)

Weight:

D31FE	11.3 kg (24.9 lbs.)
D41FE	14.2 kg (31.3 lbs.)
D91FE	23.5 kg (51.8 lbs.)
D111FE	64.5 kg (142.2 lbs.)

A

General					
Design		Proportional directional control valve, pilot operated			
Actuation		VCD® actuator			
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...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 35 Bar (507.5 PSI) Pilot Drain External: Ports P, A, B, T, X 350 Bar (5075 PSI); Port Y 35 Bar (507.5 PSI)			
Fluid		Hydraulic oil as per DIN 51524...535, 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=Bar (72.5 PSI) per Control Edge [1]	**LPM (GPM)**	120 (31.7)	200 (52.9)	400/450 (105.8/119.0)	1000 (264.2)
Max. Recommended Flow (Standard)	**LPM (GPM)**	250 (66.1)	600 (158.7)	1000 (264.2)	3000 (792.5)
Regenerative B-A / B-T		Depending on application, all flow curves			
Leakage at 100 Bar (1450 PSI)	**[ml/min]**	200 (12 cu. in.)	200 (12 cu. in.)	600 (37 cu. in.)	1000 (61 cu. in.)
Pilot	**[ml/min]**	<100 (6.1 cu. in.)	<100 (6.1 cu. in.)	<100 (6.1 cu. in.)	<100 (6.1 cu. in.)
Pilot Supply Pressure		20 Bar (290 PSI) 350 Bar (5075 PSI)			
Pilot Flow, Step Response @ 210 Bar		9 LPM (2.4 GPM)	10 LPM (2.6 GPM)	18 LPM (4.8 GPM)	30 LPM (7.9 GPM)
Static / Dynamic					
Step Resp. at 100% Stroke [2]	**[ms]**	13	19	24	60
Frequency Response					
Amplitude ±5% at 210 Bar (3045 PSI)	**[Hz]**	180	80	65	38
Phase ±5% at 210 Bar (3045 PSI)	**[Hz]**	130	100	75	64
Hysteresis	**[%]**	<0.1			
Sensitivity	**[%]**	<0.05			
Temperature Drift of Center Position	**[%K]**	<0.025			

[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 next page

Continued from previous page

A

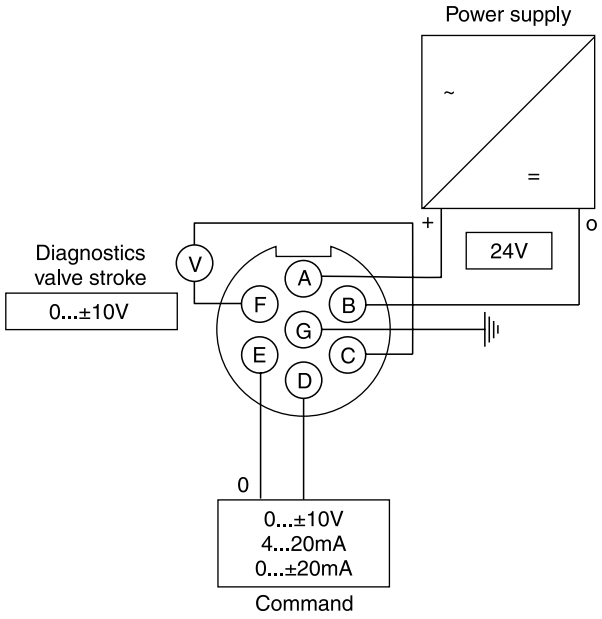
Electrical		
Duty Ratio	**[%]**	100
Protection Class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply Voltage/Ripple	**[V]**	18...30, ripple < 5% eff., surge free
Current Consumption Maximum	**[A]**	3.5
Pre-fusing Medium Lag	**[A]**	4.0
Input Signal		
Code K (B) Voltage	**[V]**	+10...0...-10, ripple < 0.01 % eff., surge free, 0...+10 P–>A (P–>B)
Impedence	**kOhm**	100
Code E Voltage	**[mA]**	+20...0...-20 ripple < 0.01 % eff., surge free, 0...+20mA P–>B
Impedence	**Ohm**	250
Code S Current	**[mA]**	4...12...20, ripple < 0.01 % eff., surge free, 12...20mA P–>A
Impedence	**Ohm**	250
	[mA]	< 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Input Capacitance Typ.	**[nF]**	1
Differential Input Maximum		
Code 0	**[V]**	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
Code 5	**[V]**	30 for terminal 4 and 5 against PE (terminal ⏚) 11 for terminal 4 and 5 against 0V (terminal 2)
Code 7	**[V]**	30 for terminal D and E against PE (terminal G)
Enable Signal Code 5 / 7	**[V]**	5...30, Ri = 9 kOhm
Diagnostic Signal	**[V]**	+10...0...-10 / +ub, rated max. 5 mA
EMC		EN 61000-6-2, EN 61000-6-4
Electrical Connection		
Code 0 / 7		6 + PE acc. to EN 175201-804
Code 5		11 + PE acc. to EN 175201-804
Wiring Minimum		
Code 0 / 7	**[mm²]**	7 x 1.0 (AWG16) overall braid shield
Code 5	**[mm²]**	11 x 1.0 (AWG20) overall braid shield
Wiring Length Maximum	**[m]**	50 (164 ft.)

Electrical Specifications Hybrid Option				
Duty Ratio		100%		
Protection Class		IP65 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		

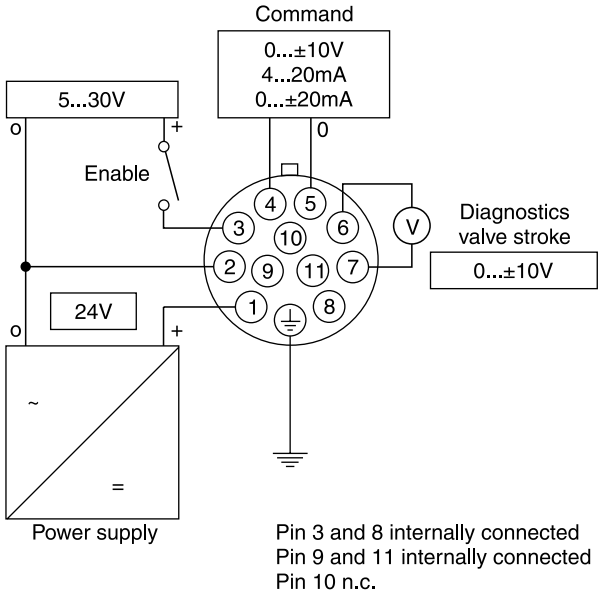
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

A

Code 0
6 + PE acc. EN 175201-804

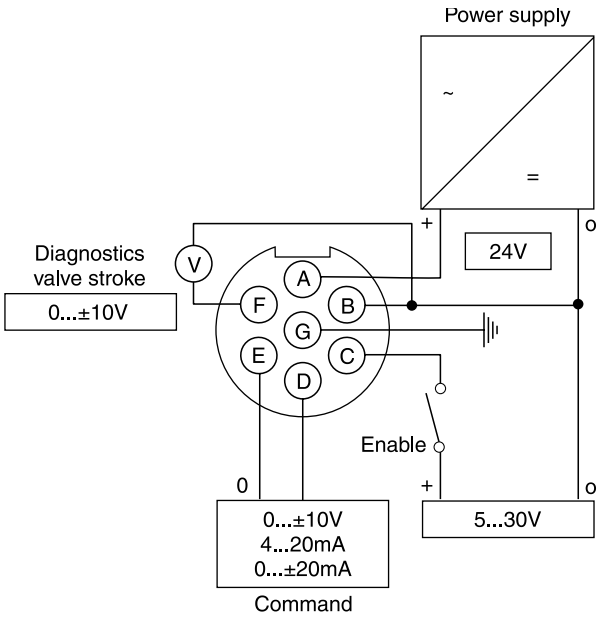


Code 5
11 + PE acc. EN 175201-804



Pin 3 and 8 internally connected
Pin 9 and 11 internally connected
Pin 10 n.c.

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

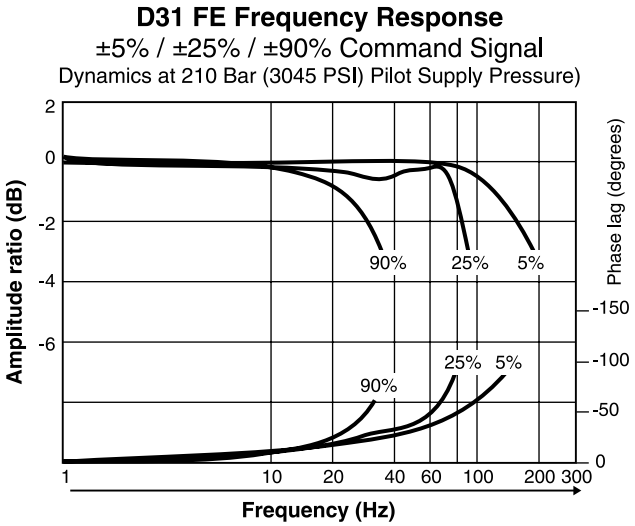


A

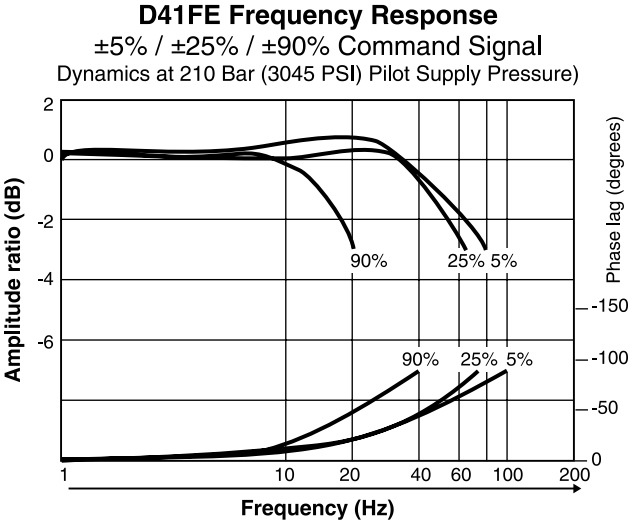
Frequency Response

±5% / ±25% / ±90% command signal
Dynamics at 210 bar pilot supply pressure

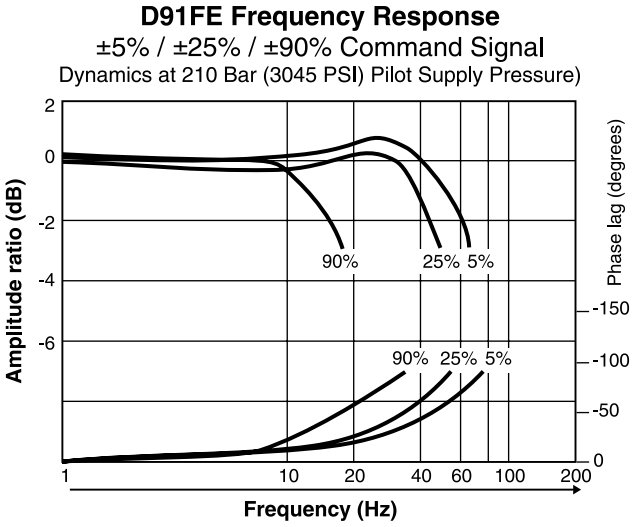
D31FE



D41FE



D91FE



D111FE

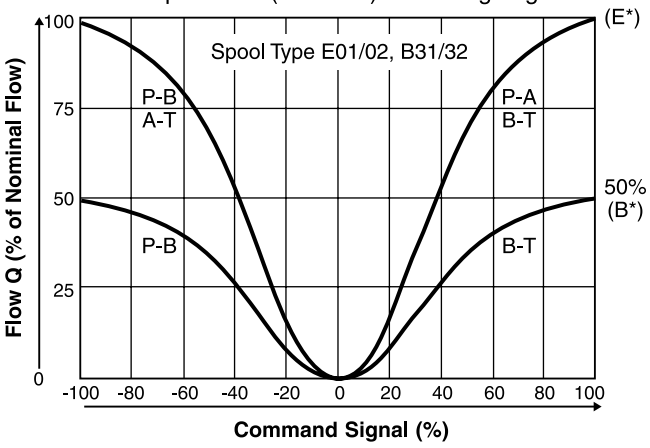
Spool Type R/Z* on request

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

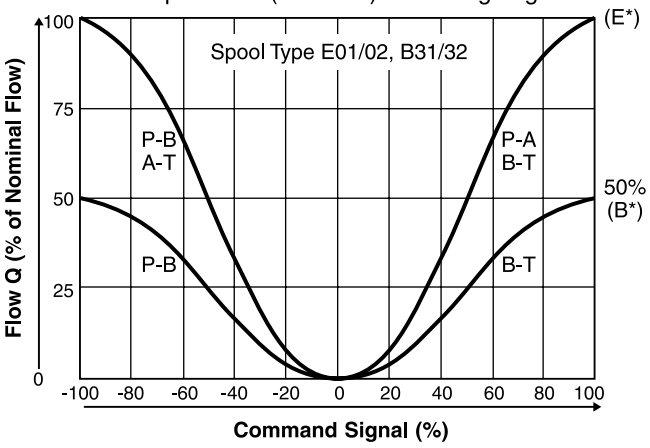
A

D*1FEB/E Flow

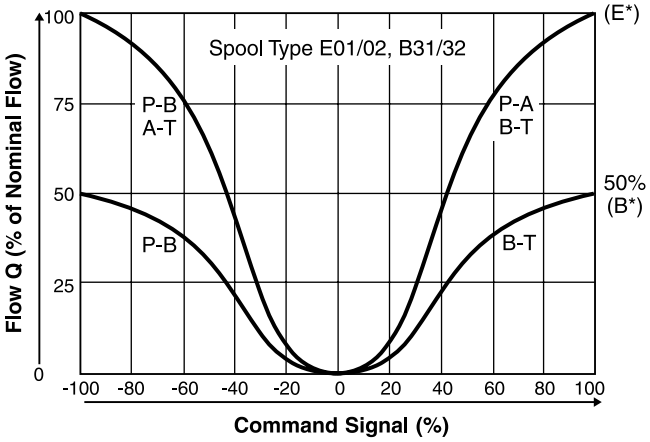
D31FE Flow Characteristics
at Δp = 5 Bar (72.5 PSI) / metering edge



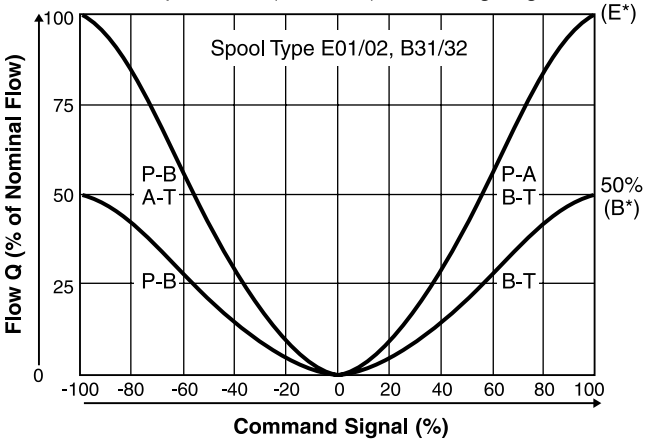
D41FE Flow Characteristics
at Δp = 5 Bar (72.5 PSI) / metering edge



D91FE Flow Characteristics
at Δp = 5 Bar (72.5 PSI) / metering edge



D111FE Flow Characteristics
at Δp = 5 Bar (72.5 PSI) / metering edge

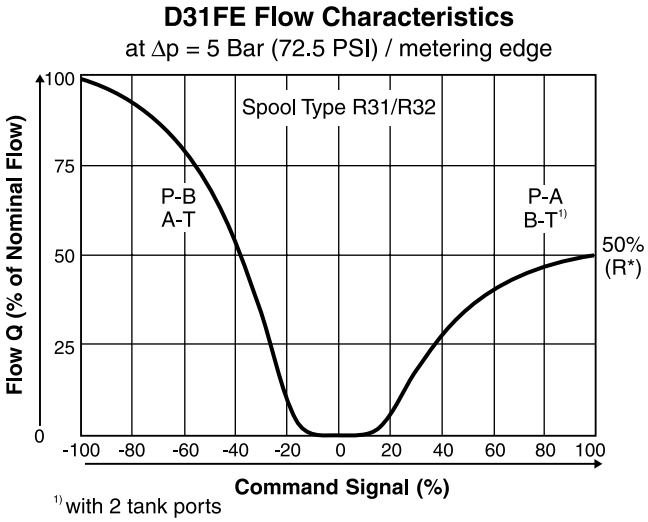


All performance curves measured with HLP46 at 50°C (122°F).

A

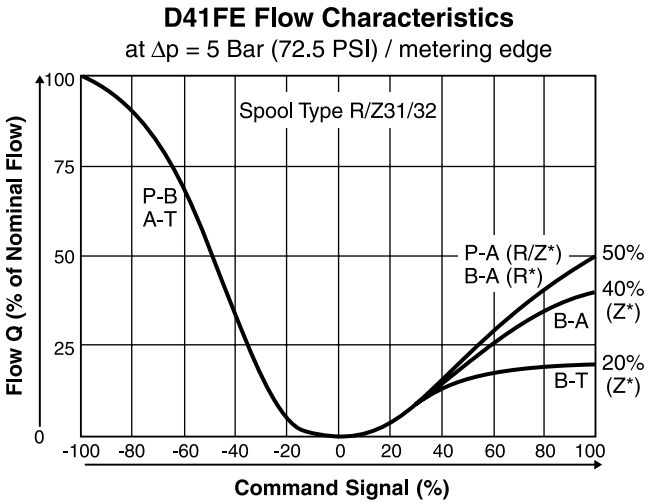
D*1FE R/Z Flow

D31FE R/Z

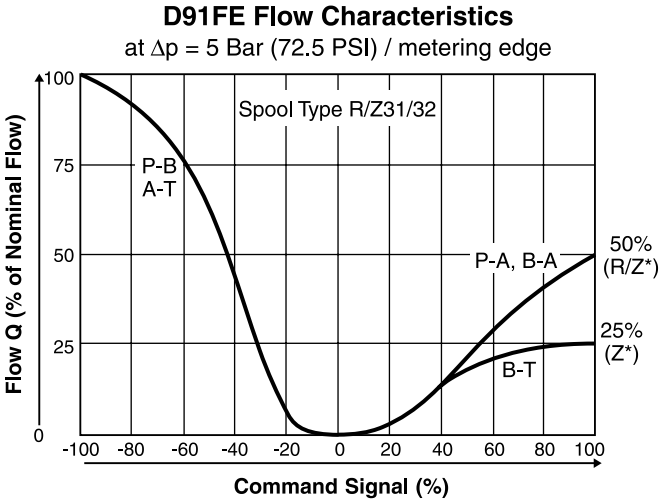


1) with 2 tank ports

D41FE R/Z



D91FE R/Z OBE



D111FEB R/Z*

SpoolType R/Z* on request

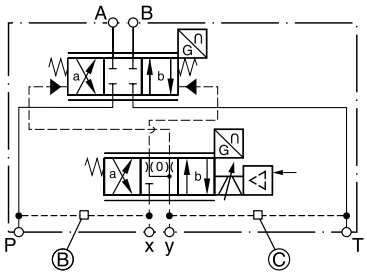
All performance curves measured with HLP46 at 50°C (122°F).

A

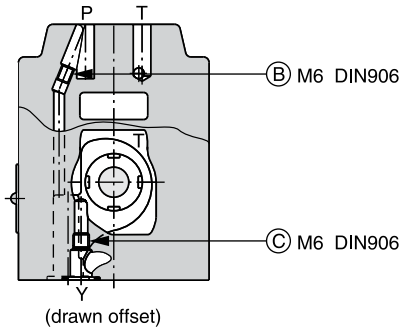
Pilot Flow — Pilot Oil Inlet (supply) and Outlet (drain)

○ open, ● closed

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

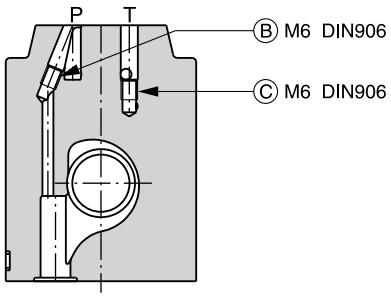


D31FEB/E

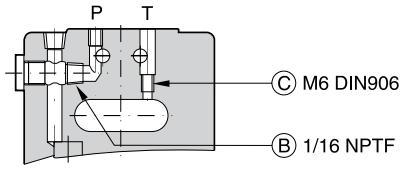


(drawn offset)

D31FER



D41FEB/E



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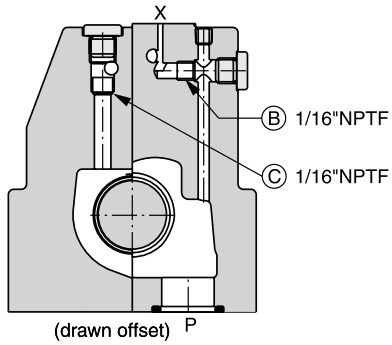

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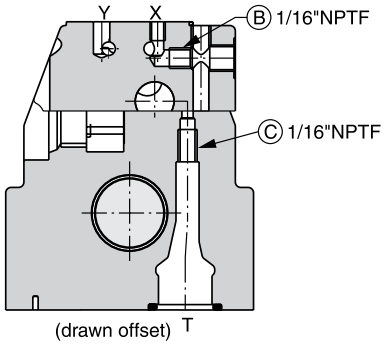

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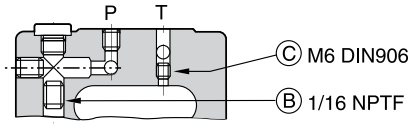

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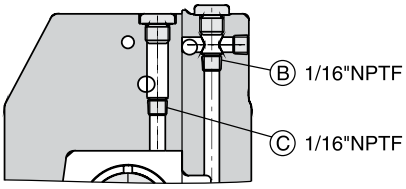

(drawn offset)

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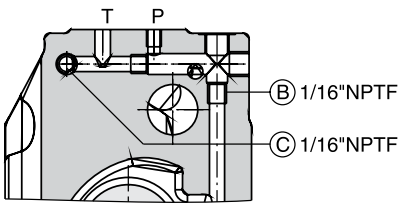
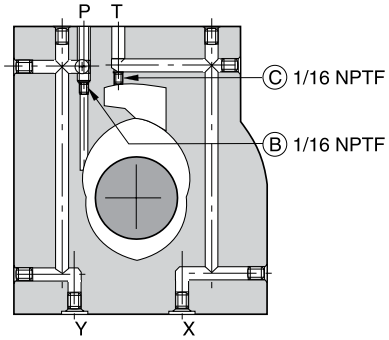
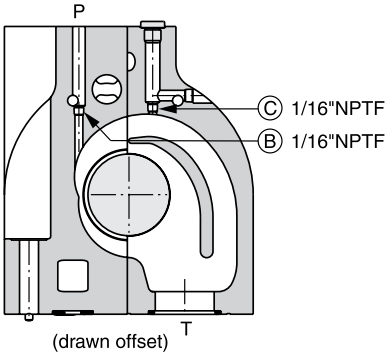


D111FEB/E



D111FER



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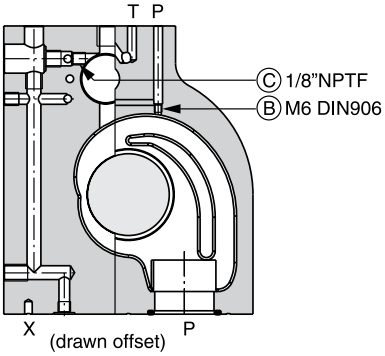
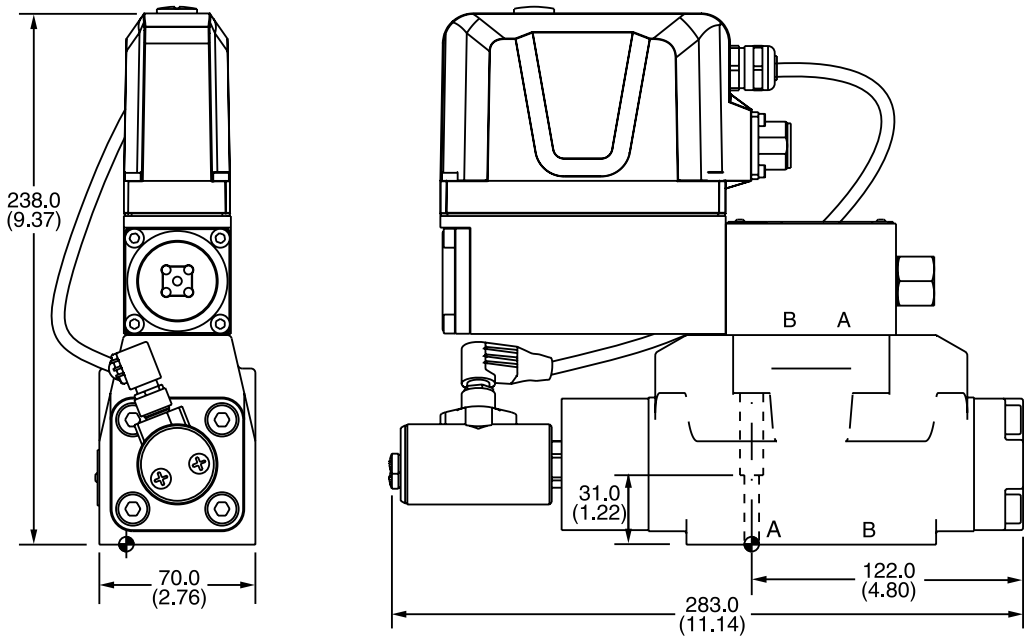


D_1FE.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

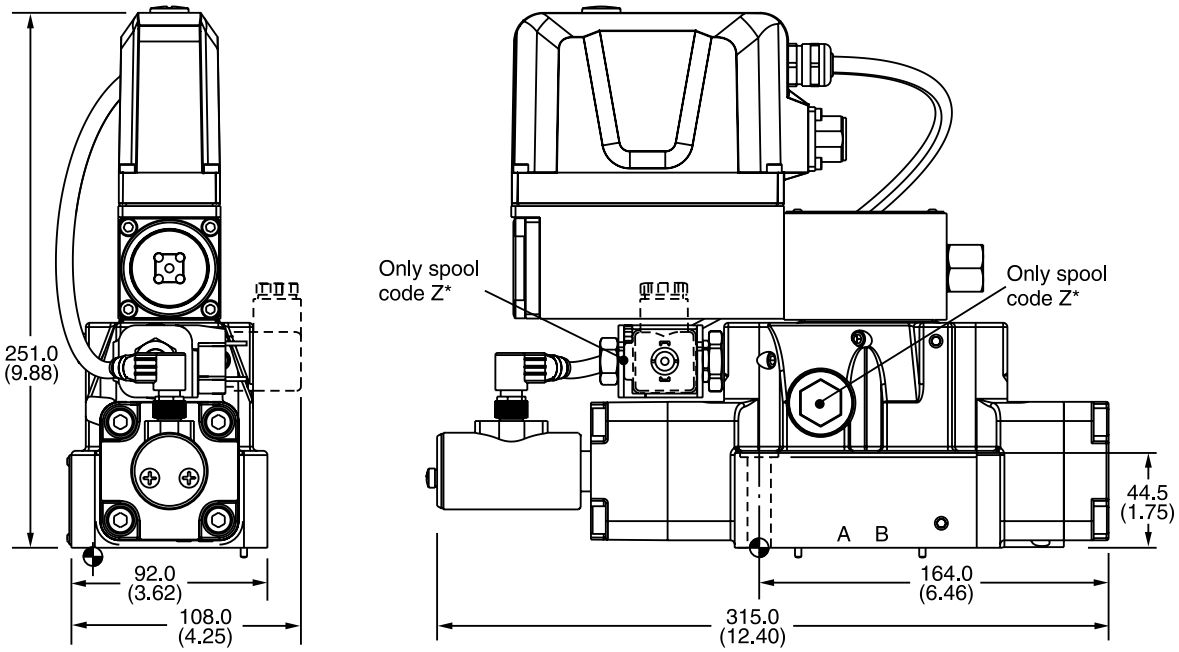
Inch equivalents for millimeter dimensions are shown in (**)

D31FE



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.625	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D31FP Fluorocarbon: SK-D31FP-V

D41FE



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	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

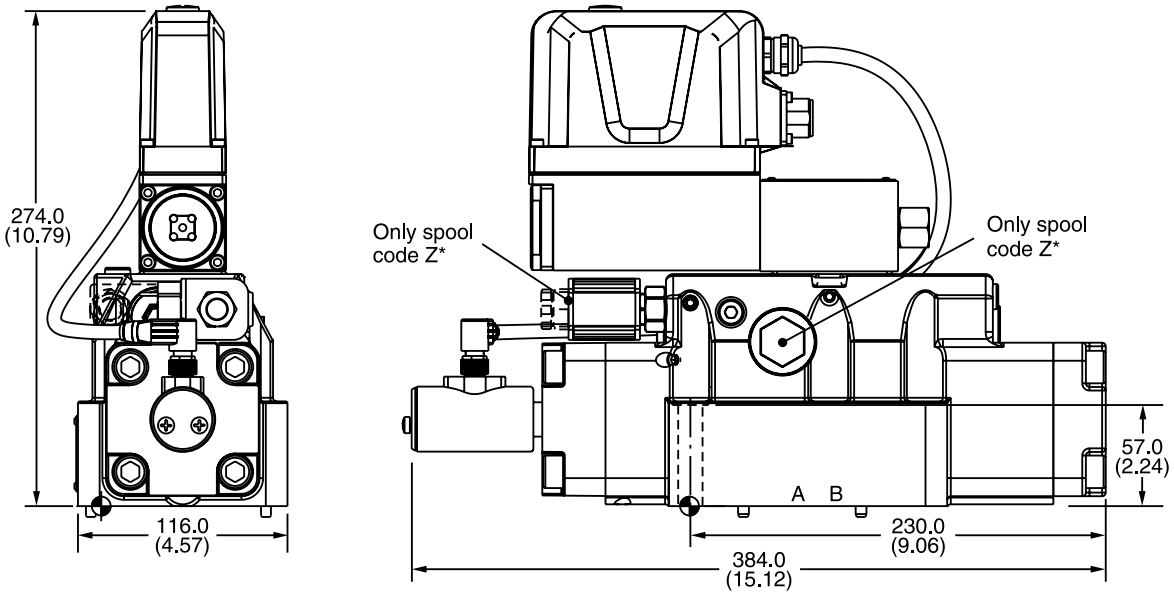
D_1FE.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

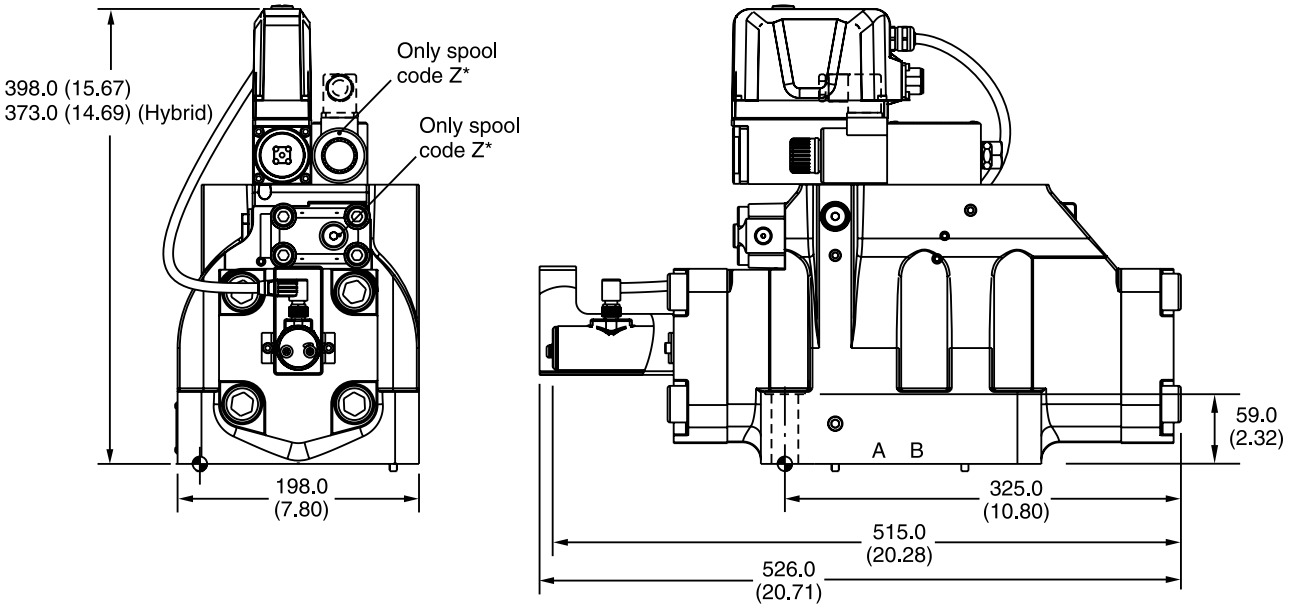
A

D91FE



Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ 0.01/100	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

D111FE



Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK386 BK150	6x M20x90 DIN 912 12.9 6x 3/4-10x3.5	517 Nm (381.3 lb.-ft.) ±15 %	Nitrile: SK-D111FP Fluorocarbon: SK-D111FP-V

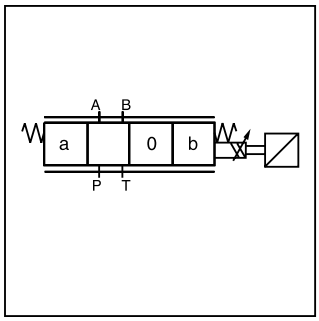
A

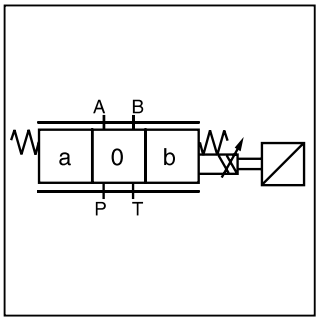
General Description

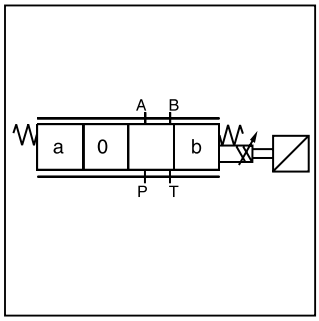
Series D1FP direct operated control NG6 (CETOP 3) valve features extremely high dynamics combined with maximum flow. It is used for high accuracy in positioning of a hydraulic axis, and for controlling force and velocity.

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.

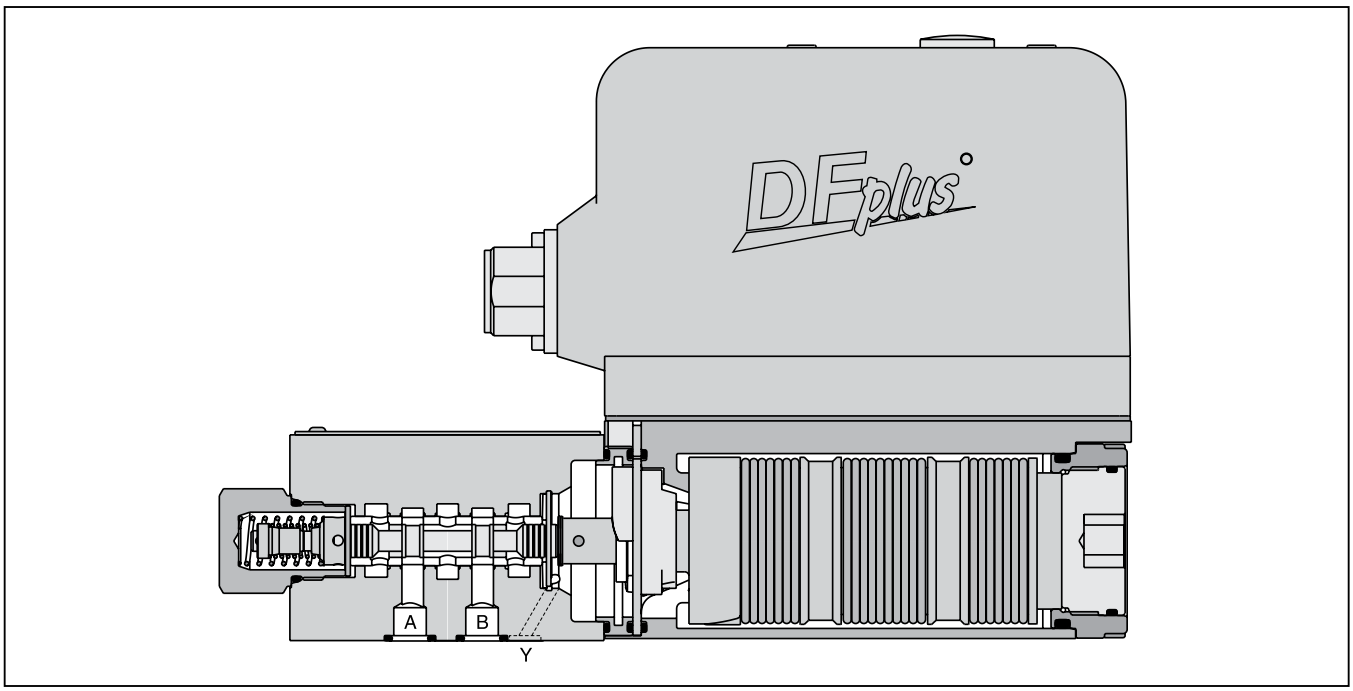




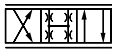
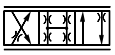
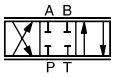
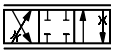


Features

- 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.
- Defined spool positioning at power-down.
- Onboard electronics.



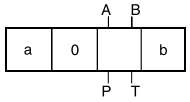
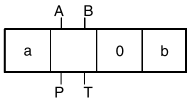
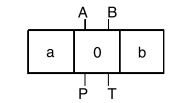
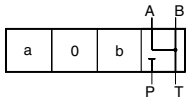
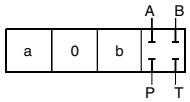
D	1	F	P	☐	☐	9	☐	☐	☐	0	⌜⌝
Directional Control Valve	Size DIN NG6 CETOP 3 NFPA D03	Proportional Control	VCD	Spool Type	Spool Position on Power Down [1]	Y-Port Plugged [4]	Seal	Input Signal	Options	Spool/ Sleeve Design	Design Series NOTE: Not required when ordering.

Code	Spool	Flow LPM (GPM) at Δp 35 Bar (508 PSI) per metering edge
Zerolap		
E50M E50H E50G E50F E50C E50B		40 (10.6) 25 (6.6) 16 (4.2) 12 (3.2) 6 (1.6) 3 (0.8)
B60M E60H E60G E60F E60C	$Q_B = Q_A/2$ 	40 (10.6) / 20 (5.3) 25 (6.6) / 12.5 (3.3) 16 (4.2) / 8 (2.1) 12 (3.2) / 6 (1.6) 6 (1.6) / 3 (0.8)
Underlap approximately -0.5%		
E55M E55H E55G E55F E55C E55B		40 (10.6) 25 (6.6) 16 (4.2) 12 (3.2) 6 (1.6) 3 (0.8)
Overlap 25%		
E01M E01H E01G E01F E01C E01B		40 (10.6) 25 (6.6) 16 (4.2) 12 (3.2) 6 (1.6) 3 (0.8)
B31M E31H E31G E31F E31C	$Q_B = Q_A/2$ 	40 (10.6) / 20 (5.3) 25 (6.6) / 12.5 (3.3) 16 (4.2) / 8 (2.1) 12 (3.2) / 6 (1.6) 6 (1.6) / 3 (0.8)
E02M E02H E02G E02F E02C E02B		40 (10.6) 25 (6.6) 16 (4.2) 12 (3.2) 6 (1.6) 3 (0.8)
B32M E32H E32G E32F E32C	$Q_B = Q_A/2$ 	40 (10.6) / 20 (5.3) 25 (6.6) / 12.5 (3.3) 16 (4.2) / 8 (2.1) 12 (3.2) / 6 (1.6) 6 (1.6) / 3 (0.8)

Please order plugs separately. See Accessories.

Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC Fluid

Code	Connection Type
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	
J	

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:
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$_D$ 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. 35 Bar (508 PSI), port Y max. 35 Bar (508 PSI) [1]
Fluid		Hydraulic oil as per DIN 51524...535, 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]		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
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 ⏚)
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**	6 + PE acc. EN 175201-804
	Code 5	11 + PE acc. EN 175201-804
	Code 7	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.

D1FP.indd, dd

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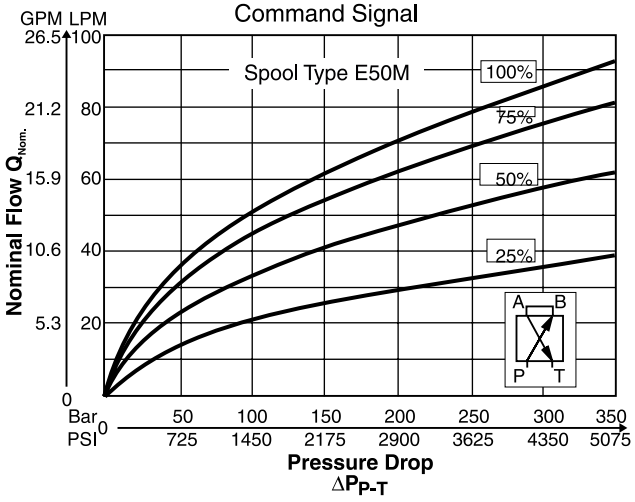
Hydraulic Valve Division
Elyria, Ohio, USA

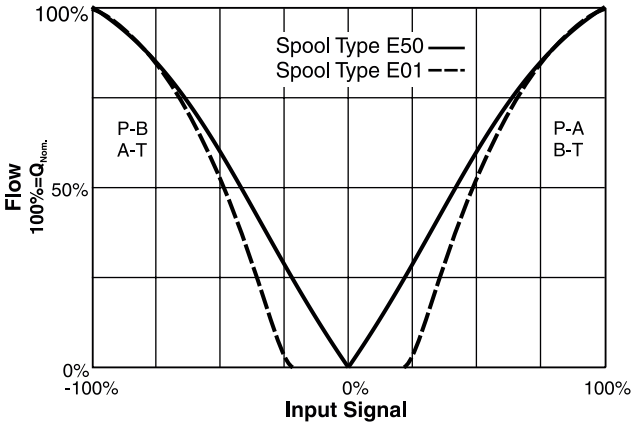
A

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

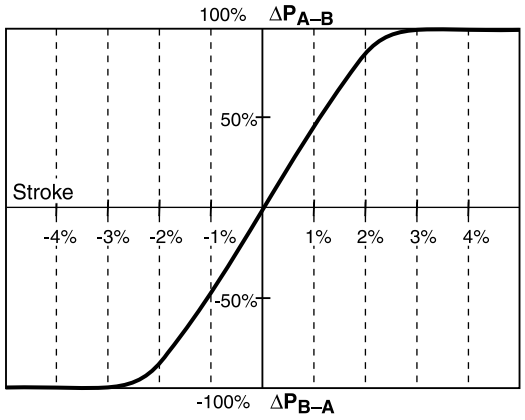


Spool Type **E01/E50**

Flow Curves
at Δp = 35 Bar (508 PSI) per metering edge

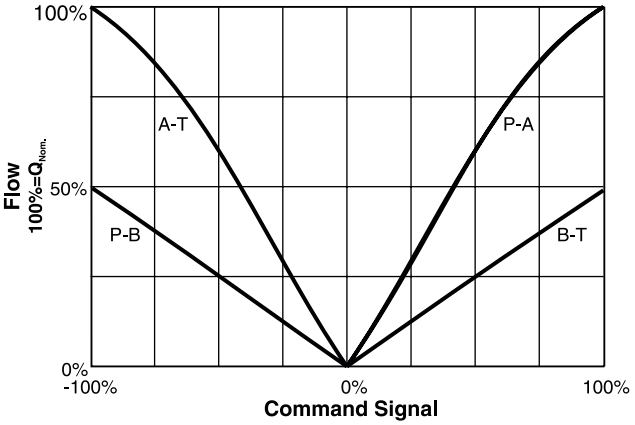


Pressure Gain

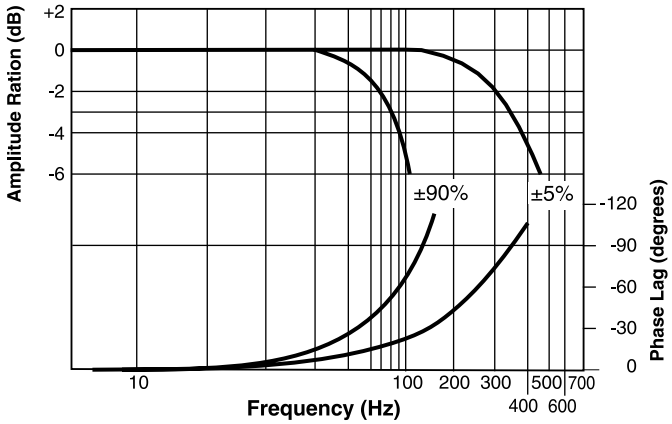


Spool Type **B60**

Flow Curves
at Δp = 35 Bar (508 PSI) per metering edge

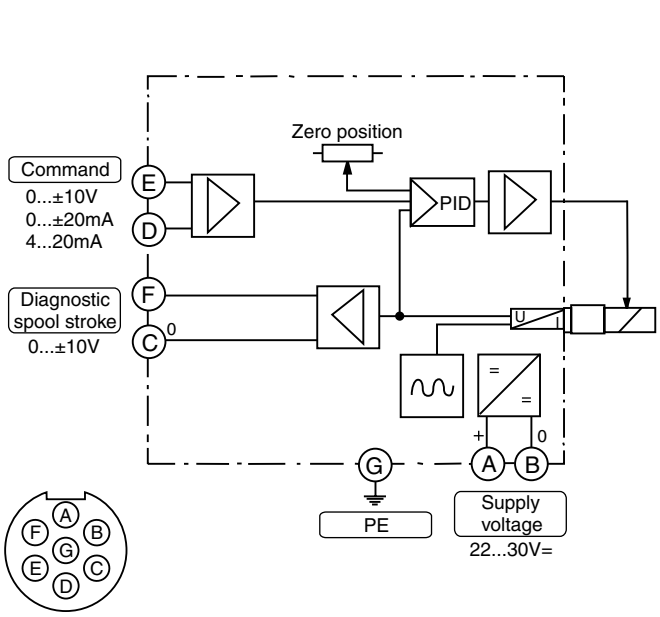


Frequency Response
±5% Command Signal
±90% Command Signal



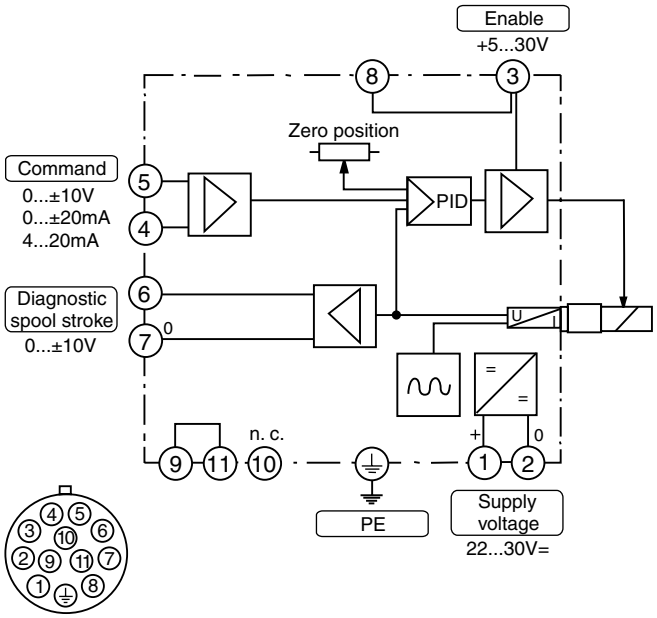
Code 0

6 + PE acc. to EN 175201-804



Code 5

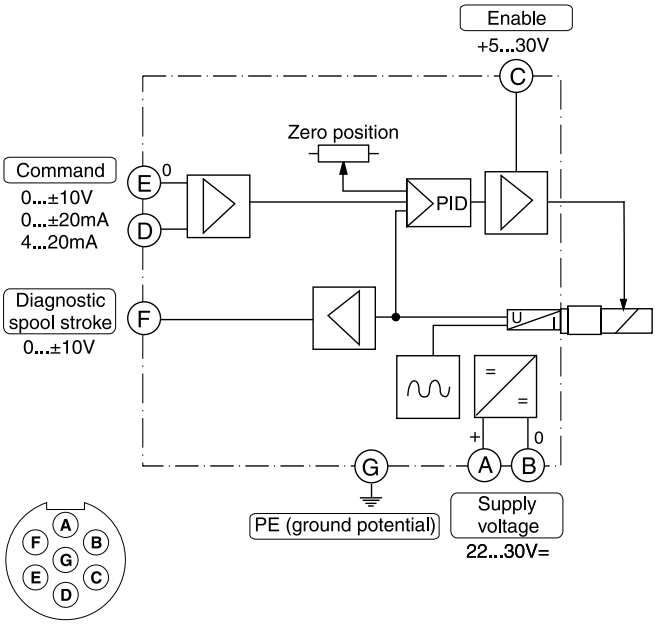
11 + PE acc. to EN 175201-804



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

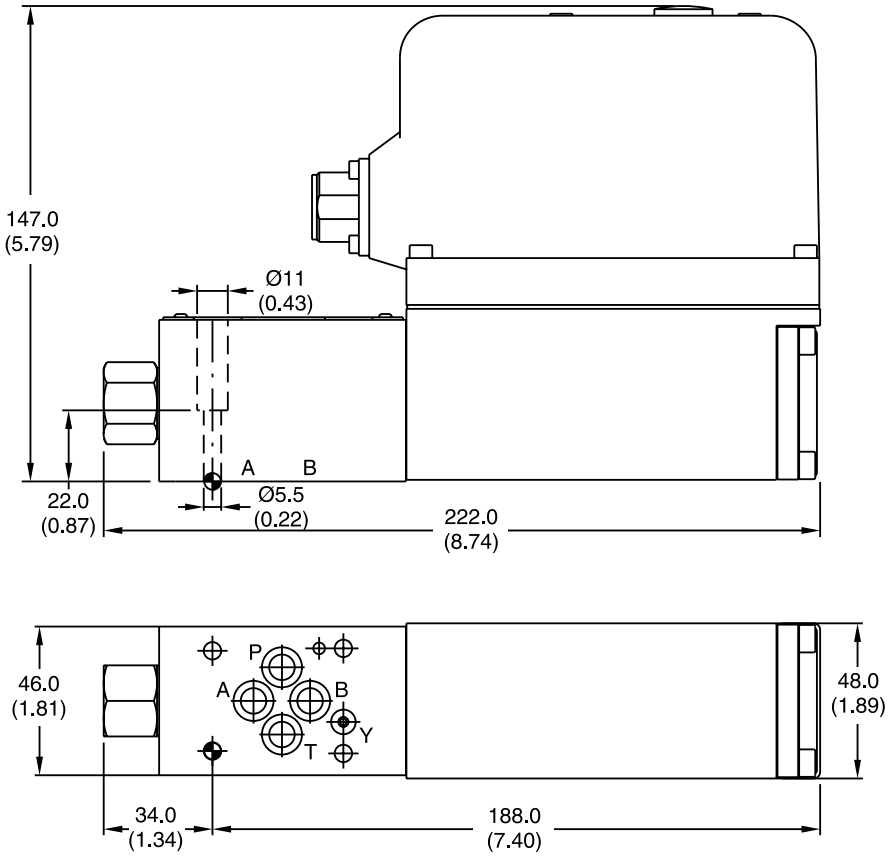
Code 7

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



A

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



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	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

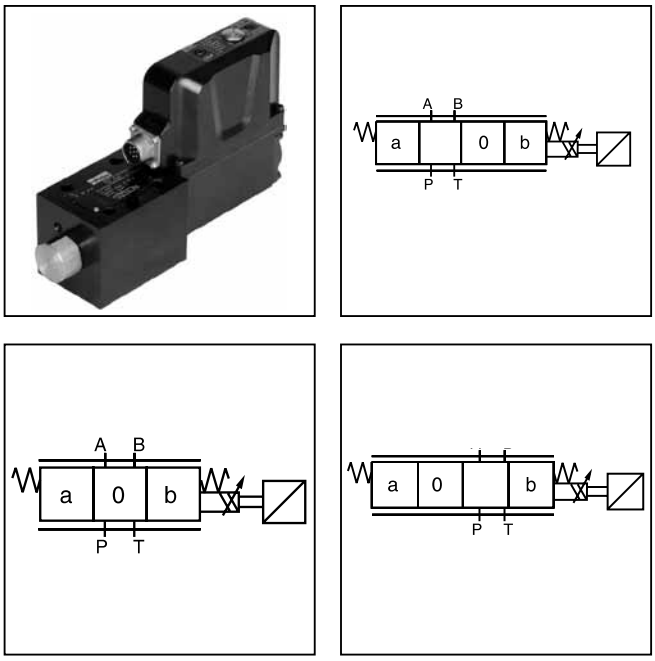
A

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.

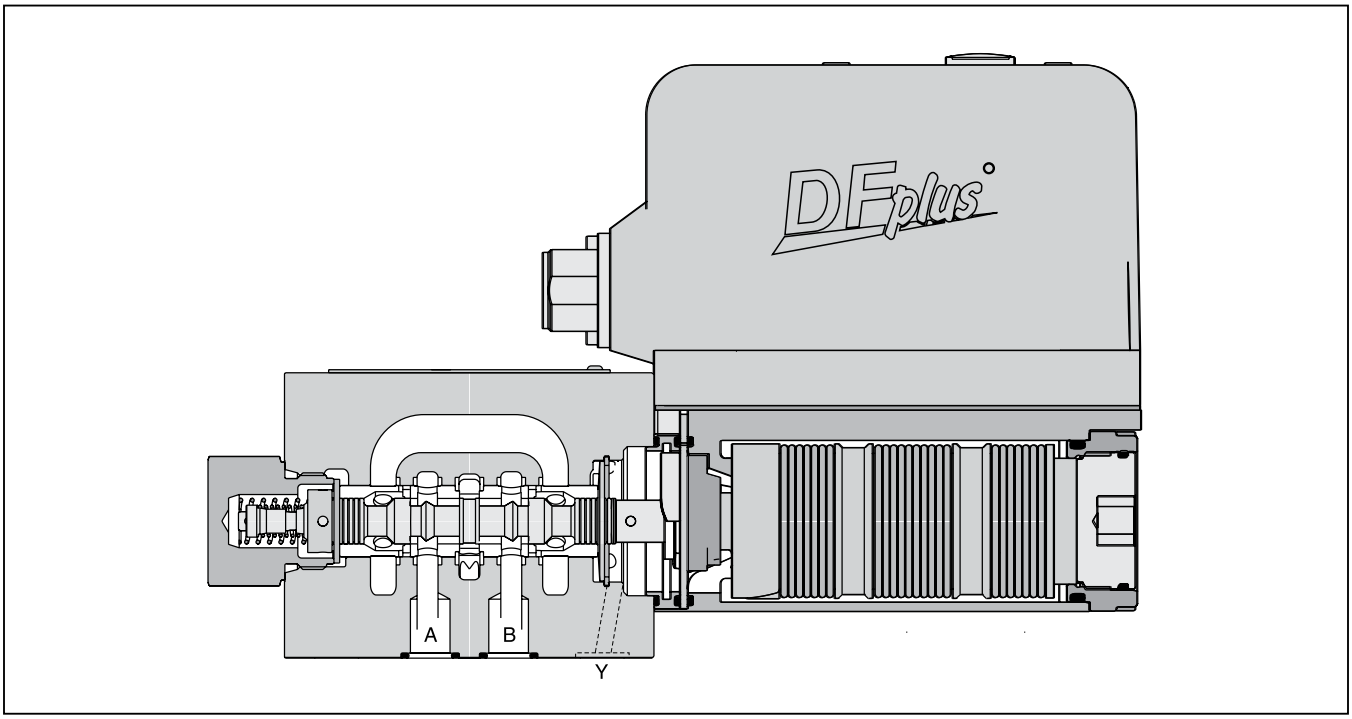
At power-down the spool moves in a defined position. All common input signals are available.



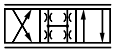
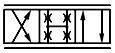
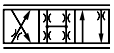
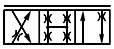
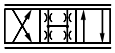
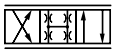
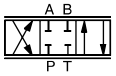
Features

- Extremely high dynamics.
- Maximum tank pressure 350 Bar (5075 PSI) with external drain Y-port.
- Defined spool positioning at power down.
- Onboard electronics.
- Spool/Sleeve design.

CE

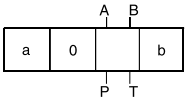
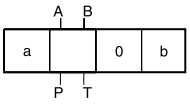
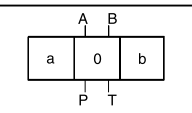


D	3	F	P	☐	☐	9	☐	☐	☐	0	⌜⌝
Directional Control Valve	Size DIN NG10 CETOP 5 NFPA D05	Proportional Control	VCD	Spool Type	Spool Position on Power Down [1]	Y-Port Plugged [4]	Seal	Input Signal	Options	Spool/ Sleeve Design	Design Series NOTE: Not required when ordering.

Code	Spool	Flow LPM (GPM) at Δp 35 Bar (508 PSI) per metering edge
Zerolap		
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)

Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC Fluid

Code	Connection Type
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.

Please order plugs separately. See Accessories.

Bolt Kit:
BK98 (4) 1/4-20x1.62
BK385 (4) M6x40
Weight: 6.5 kg (14.3 lbs.)

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. 35 Bar (508 PSI), port Y max. 35 Bar (508 PSI) [1]
Fluid		Hydraulic oil as per DIN 51524...535, 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]		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
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 ⏚)
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**	6 + PE acc. EN 175201-804
	Code 5	11 + PE acc. EN 175201-804
	Code 7	6 + PE + Enable
Wiring Minimum	**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: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

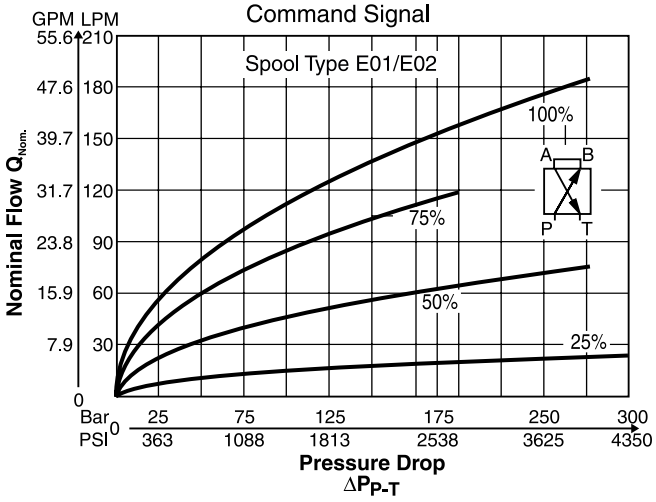
[3] Measured with load 100 Bar (1450 PSI) pressure drop/two control edges)

D3FP.indd, dd

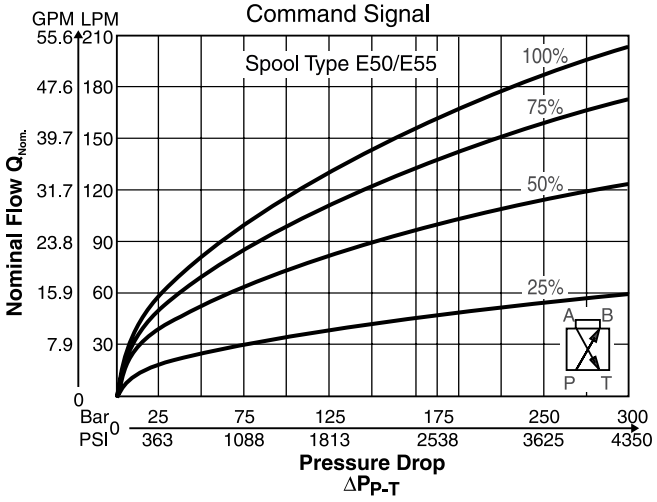
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

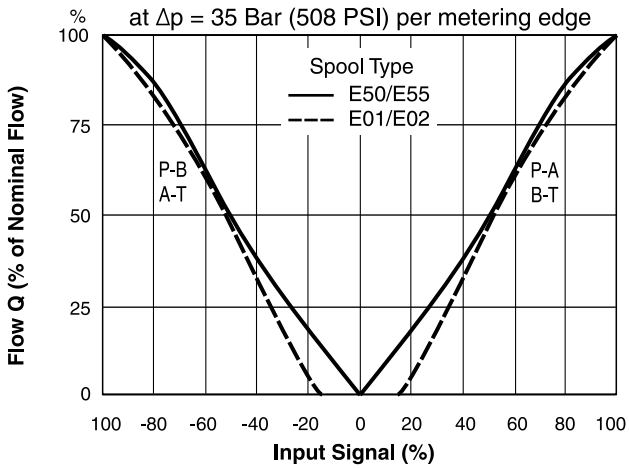
Functional Limit
at 25%, 50%, 75% and 100%
Command Signal



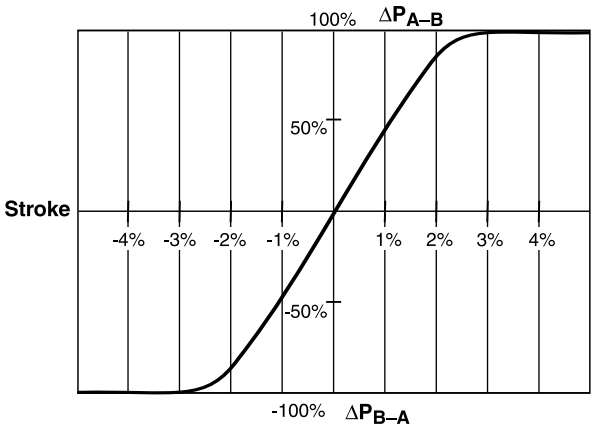
Functional Limit
at 25%, 50%, 75% and 100%
Command Signal



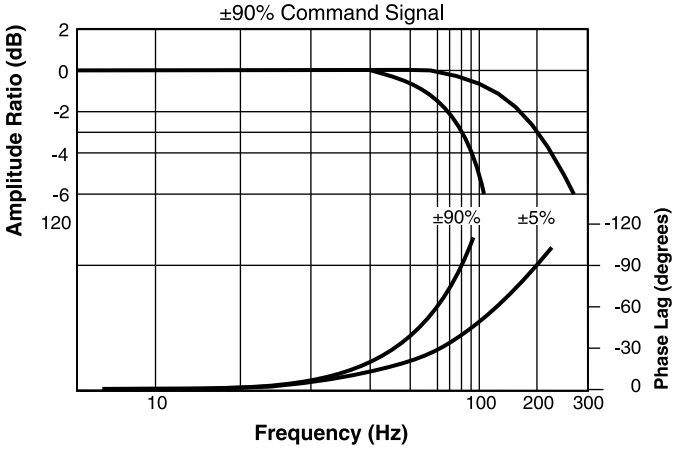
Flow Curves
at Δp = 35 Bar (508 PSI) per metering edge



Pressure Gain

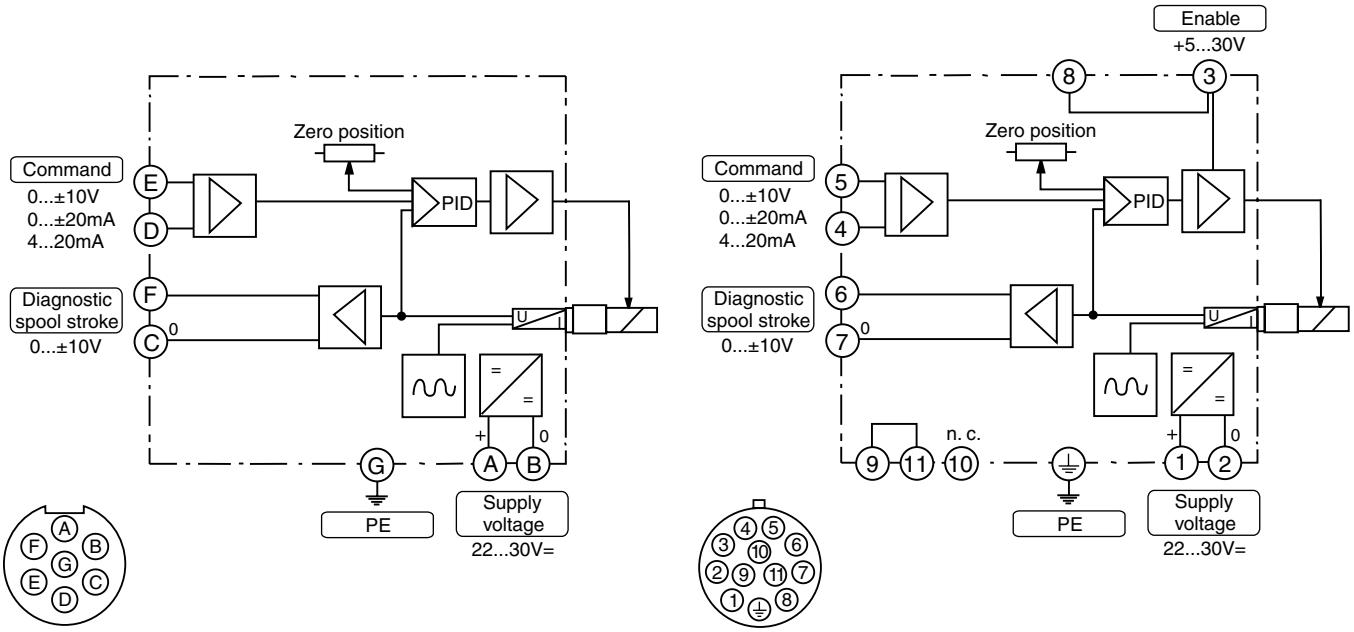


Frequency Response
±5% Command Signal
±90% Command Signal



D3FP.indd, dd

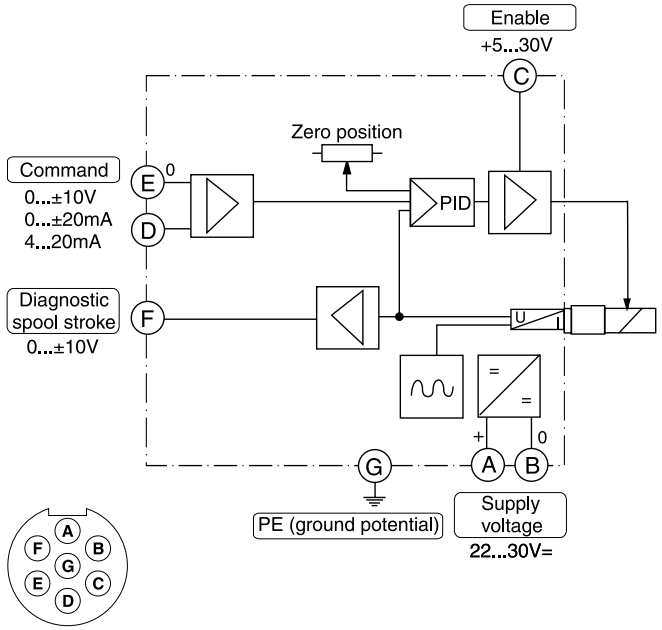
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA



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

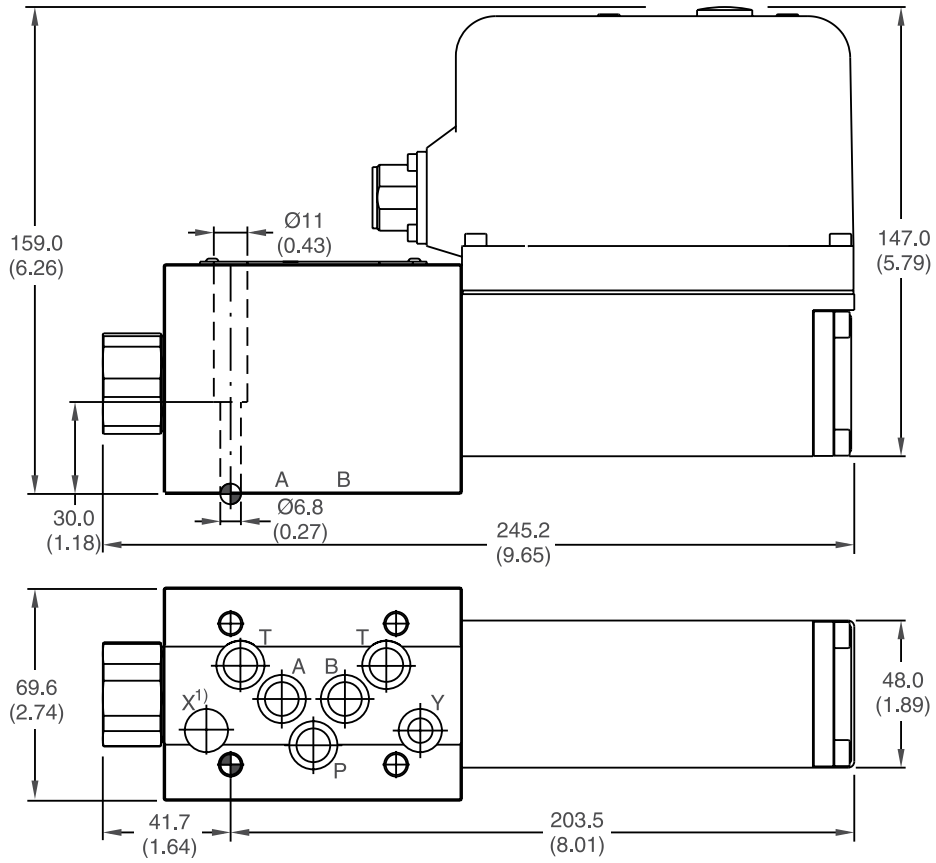
Code 7

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



A

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



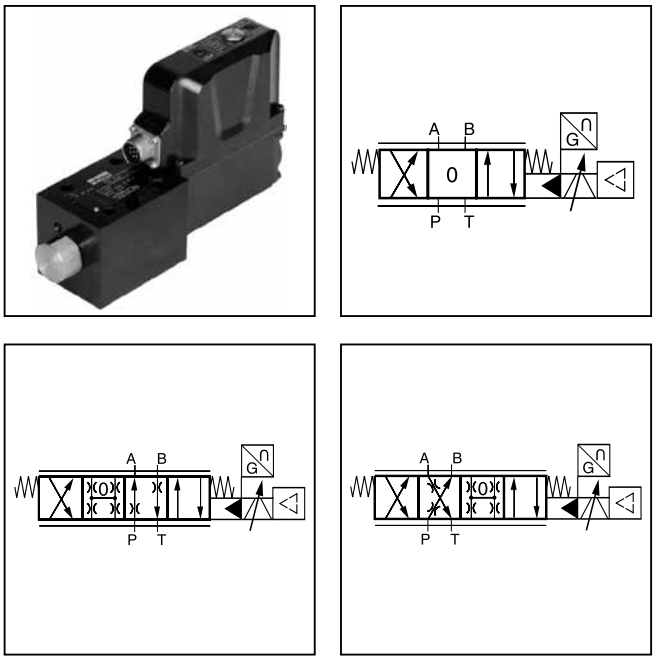
Surface Finish	Kit			Seal Kit
$R_{max}6.3$ 0.01/100	BK385 BK98	4x M6x40 DIN 912 12.9 4x 1/4-20x1.62	13.2 Nm (9.7 lb.-ft.) ±15 %	Nitrile: SK-D3FP Fluorocarbon: SK-D3FP-V for HFC Fluid: SK-D3FP-H

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.

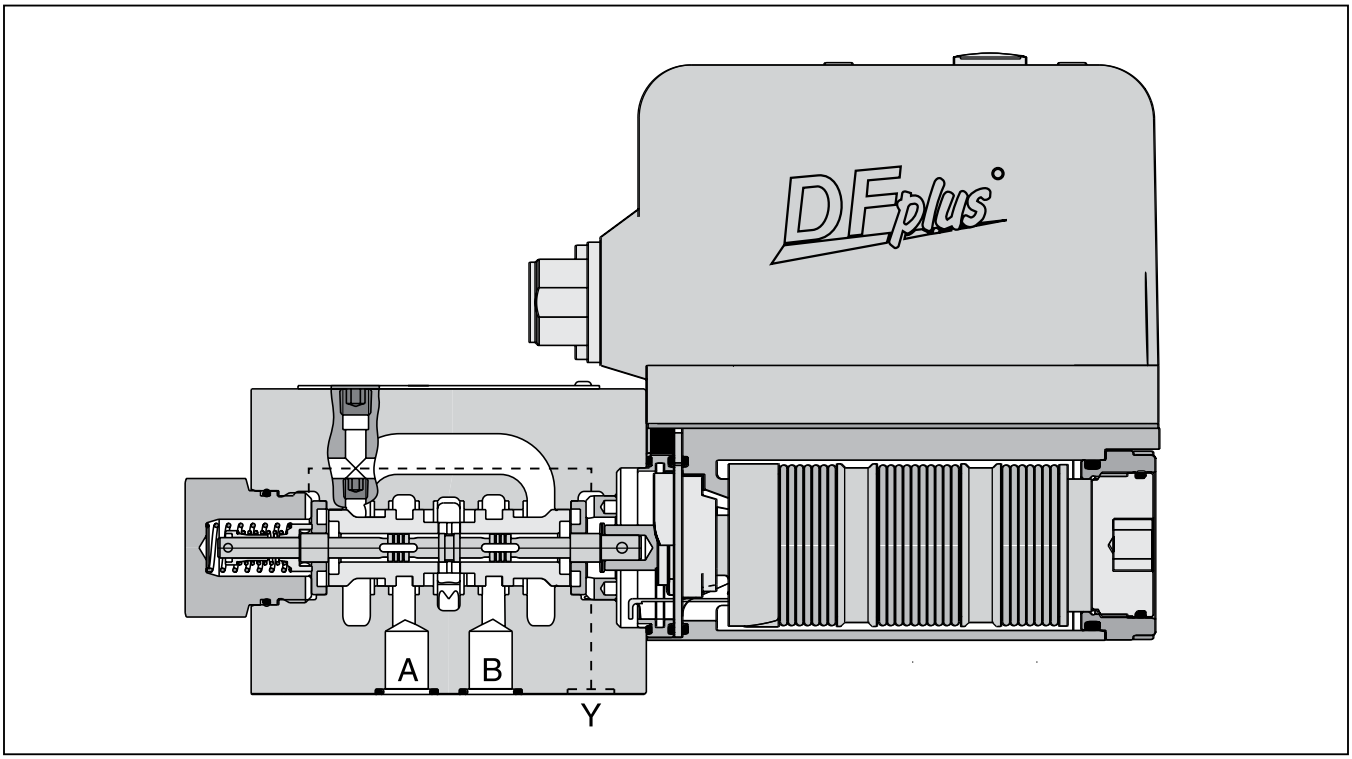
The valve works with the hydraulic follower principle, with a moving sleeve as main spool.



Features

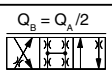
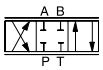
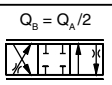
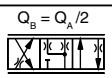
- Pilot operated with hydraulic follower sleeve.
- No flow limit up to 350 bar through the valve.
- Defined spool positioning at power down.

CE



A

D	30	F	P	☐	☐	☐	☐	☐	☐	3	⌐ ¬
Directional Control Valve	Size DIN NG10 CETOP 5 NFPA 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)
E60U	$Q_B = Q_A/2$ 	80 (21.2)
Overlap 18%		
E01U	A B P T 	80 (21.2)
E02U		80 (21.2)
B31U	$Q_B = Q_A/2$ 	80 (21.2)
B32U	$Q_B = Q_A/2$ 	80 (21.2)

Code	Description
N	Nitrile
V	Fluorocarbon

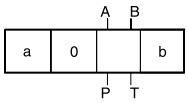
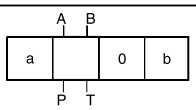
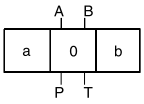
Code	Connection Type
0	6 + PE acc. EN175201-804
5	11 + PE acc. EN175201-804
7	6 + PE + Enable

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.)

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)
$MTTF_D$ 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, 315 Bar (4568 PSI) for external drain Port Y 35 Bar (508 PSI)
Fluid		Hydraulic oil as per DIN 51524...535, 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)
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
Protection Class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
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		<3.6 mA = disable, >3.8 mA = according to NAMUR NE43
	[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 ⏚)
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**	6 + PE acc. EN 175201-804
	Code 5	11 + PE acc. EN 175201-804
	Code 7	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)

D30FP.indd, dd

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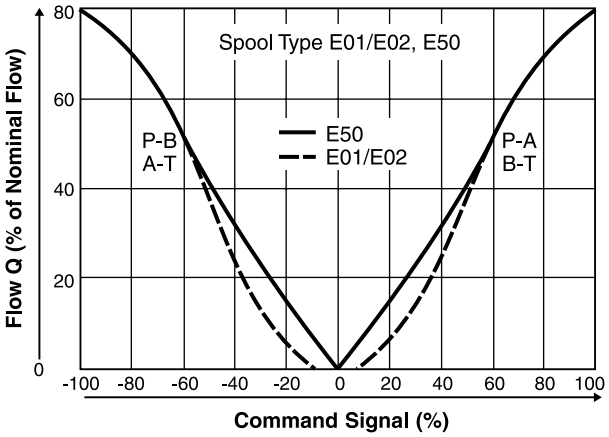
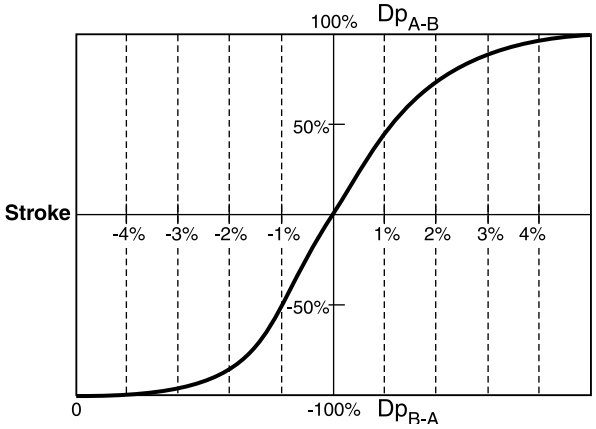
Flow

D30FP Flow Characteristics
at Dp = 5 Bar (72.5 PSI) / metering edge



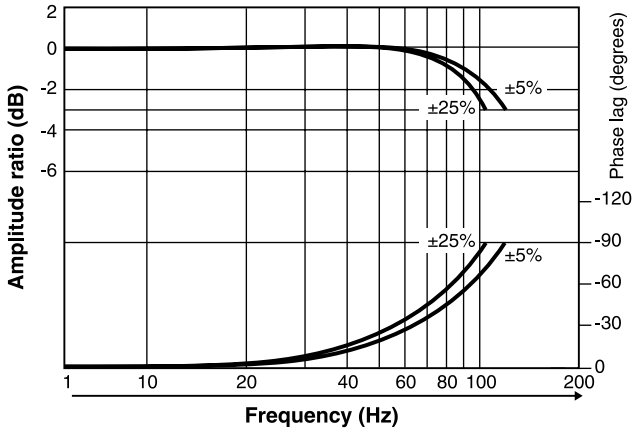
Pressure Gain

D30FP Pressure Gain



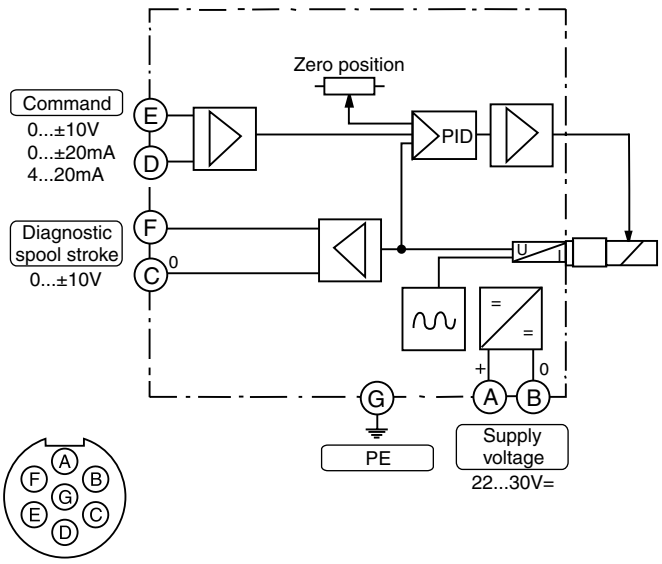
Frequency Response

D30FP Frequency Response
±5% / ±25% Command Signal



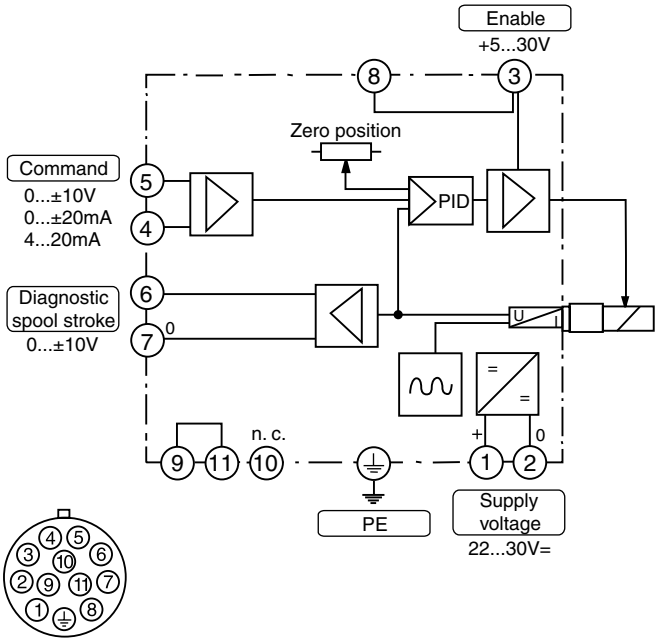
Code 0

6 + PE acc. to EN 175201-804



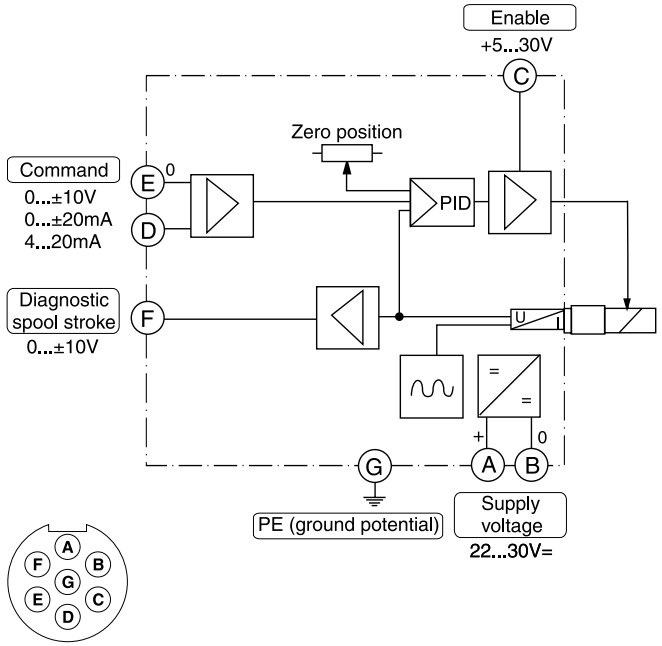
Code 5

11 + PE acc. to EN 175201-804



Code 7

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



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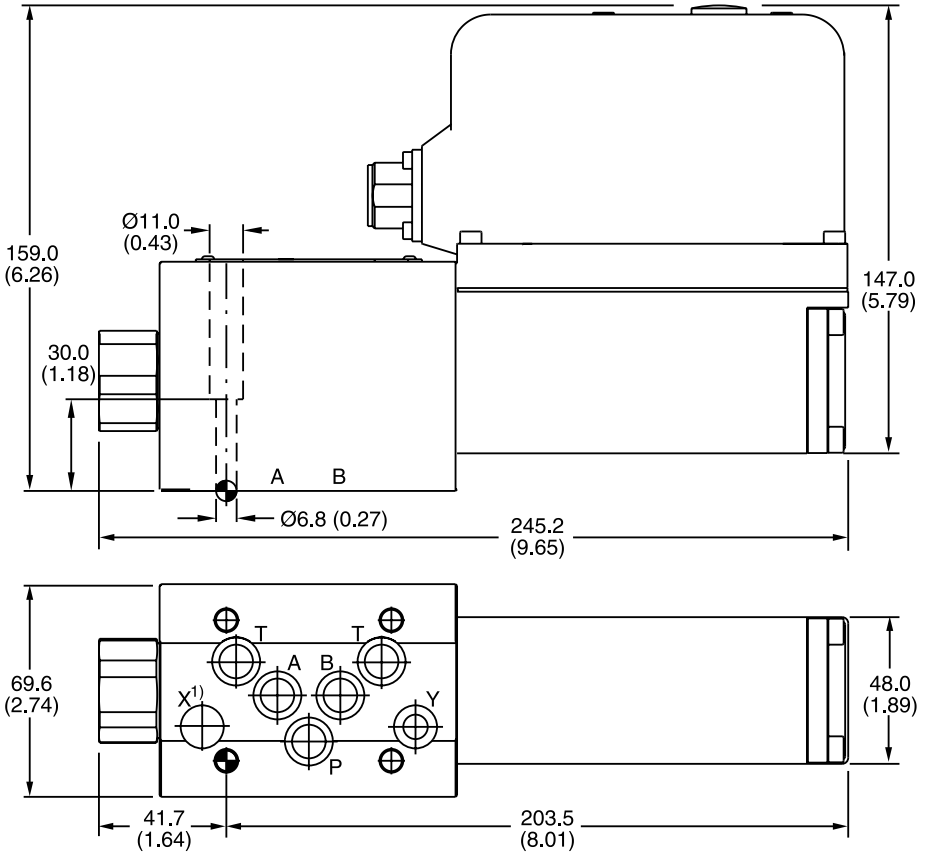
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Kit			Seal Kit
R_{max}6.3 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-D3FP Fluorocarbon: SK-D3FP-V

A

General Description

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)

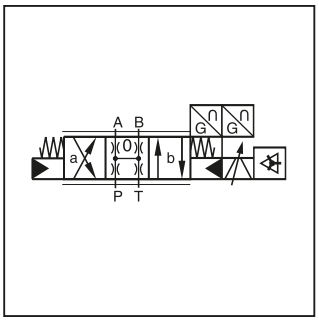
D91FP NG25 (CETOP 8)
for port diameter up to 32 mm (1.26 in.)

D111FP NG32 (CETOP 10)

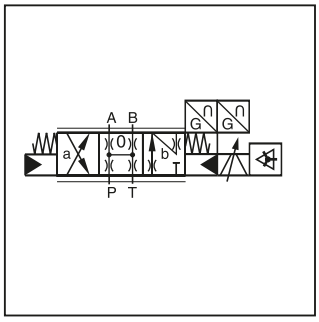
The power down mode works with a safe 4th position of the D1FP pilot valve. This ensures that the main stage is hydraulically balanced at power down and allows the main spool spring to center (for overlapped spools), or approximately 10% spring offset to spool position A or B (for zerolap spools).

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.

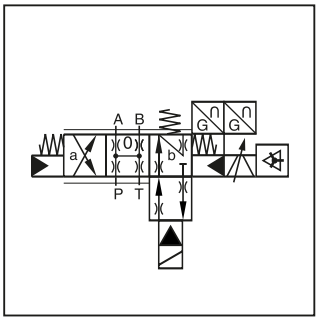
D41FP Standard



Standard D*1FPE



NEW: A-Regeneration D*1FPR



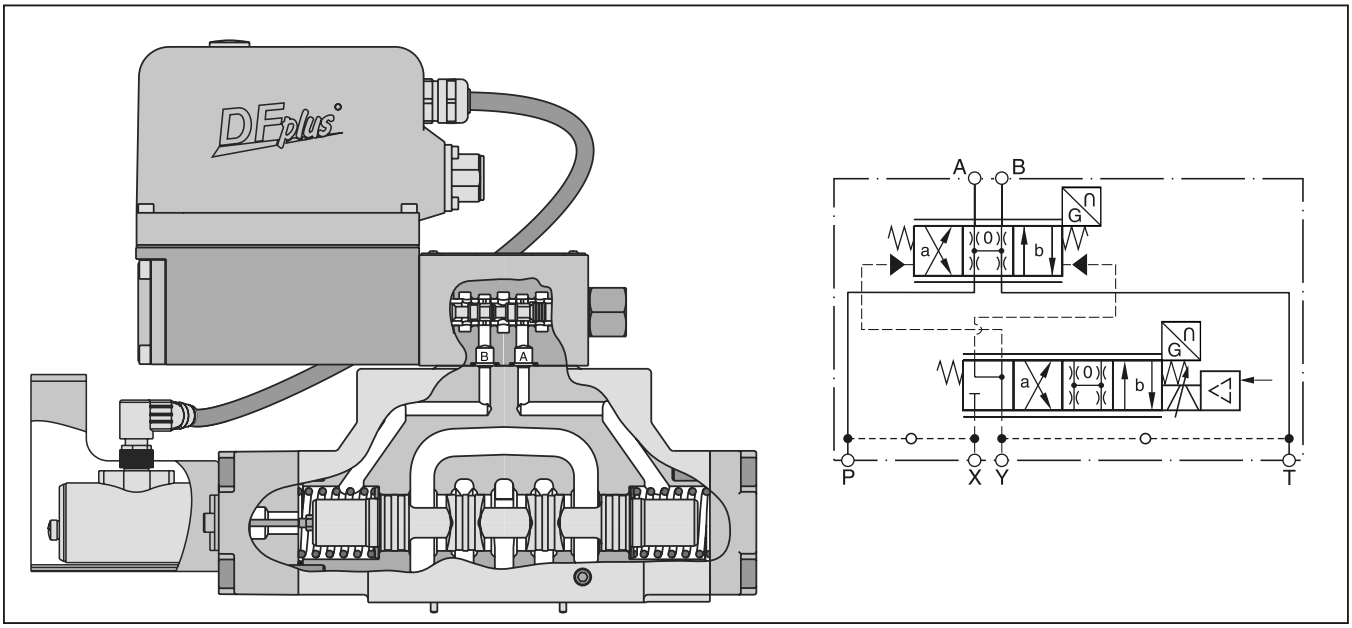
NEW: Hybrid D*1FPZ

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.

CE

D41FPE52 (Standard)



D_1FP.indd, dd

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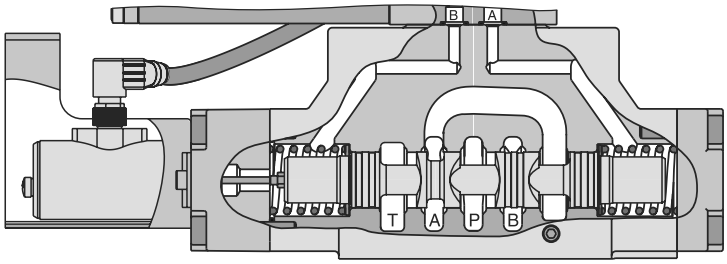
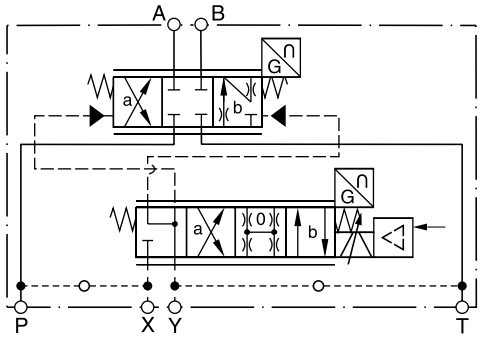
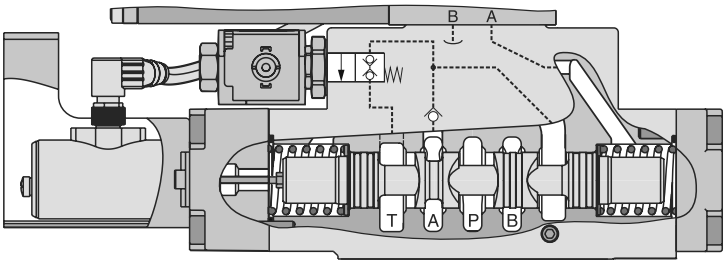
D*1FPR and D*1FPZ

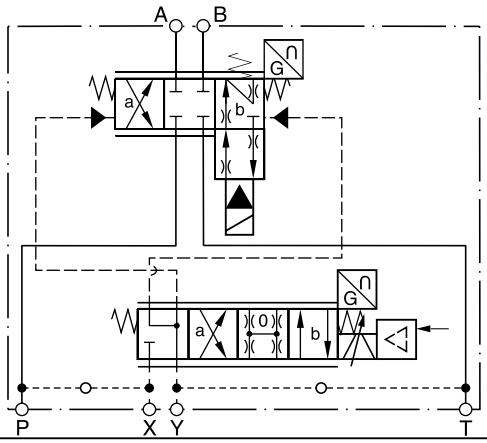
Regenerative Valve D*1FPR





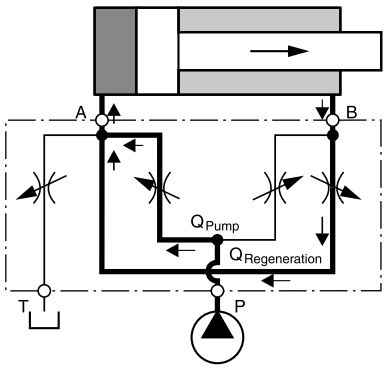
Hybrid Valve D*1FPZ





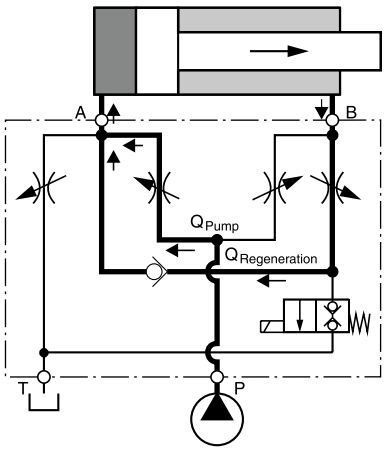
D*1FPR (Regenerative Valve)

Cylinder extending

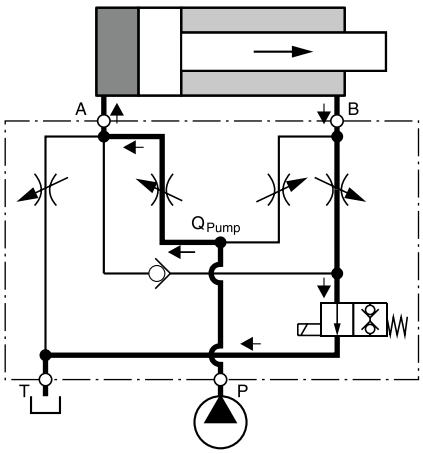


D*1FPZ (Hybrid Valve)

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					

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Ordering Information

D		1	F	P										
Directional Control Valve	Size	NG6 Pilot	Proportional Control	High Response	Spool Type	Flow	Spool Position on Power Down	Pilot Connections	Seal	Input Signal	Options	Hybrid Options	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] For enlarged connections Ø 32 mm

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

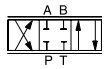
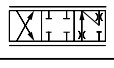
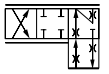
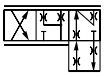
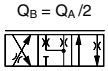
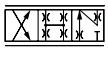
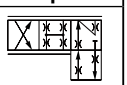
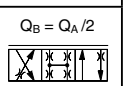
Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC fluid

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

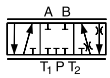
Code	Description
0	6+PE acc. EN175201-804
5	11+PE acc. EN175201-804
7	6+PE + Enable

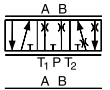
Code	Description
0	Standard
L [6]	Hybrid valve 24V normally closed for spool type Z

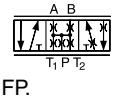
[6] See page A144 for regenerative and hybrid spool information. (not available in D31FP)

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

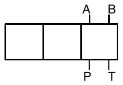
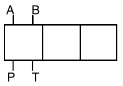
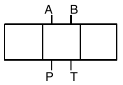
[4] Not available with D91FP.

D31FP spool style: R31 

R32 

R61 

[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	Flow LPM (GPM) at Δp = 5 Bar (72.5 PSI) per metering edge			
	D31	D41	D91	D111
E	120 (32)	—	—	—
F	—	200 (53)	—	—
H	—	—	400 (106)	—
L	—	—	—	1000 (265)

Please order plugs separately. See Accessories.

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.)

D_1FP.indd, dd

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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)	400 (106)	1000 (265)
Max. Recommended Flow	**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		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%			
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			

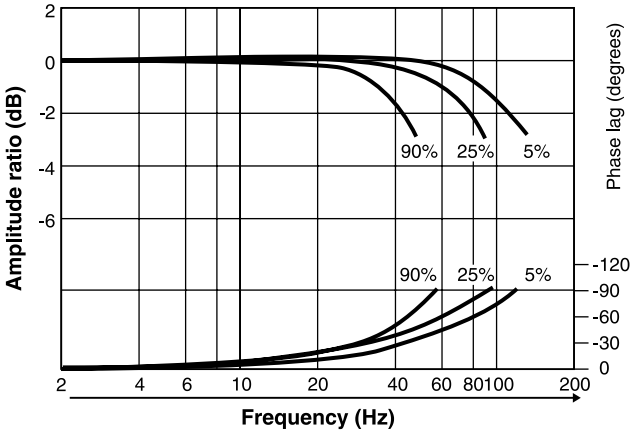
[1] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

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

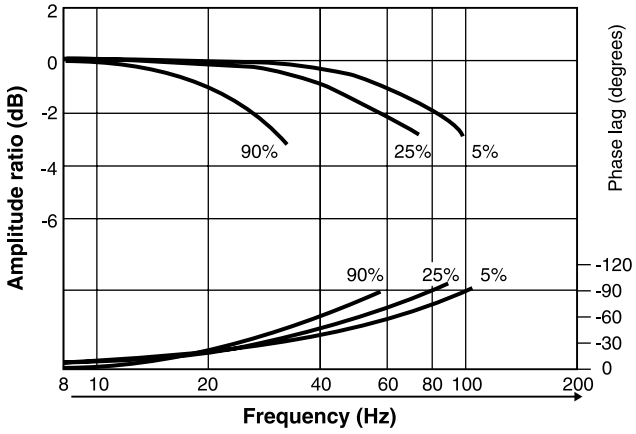
A

Frequency Response

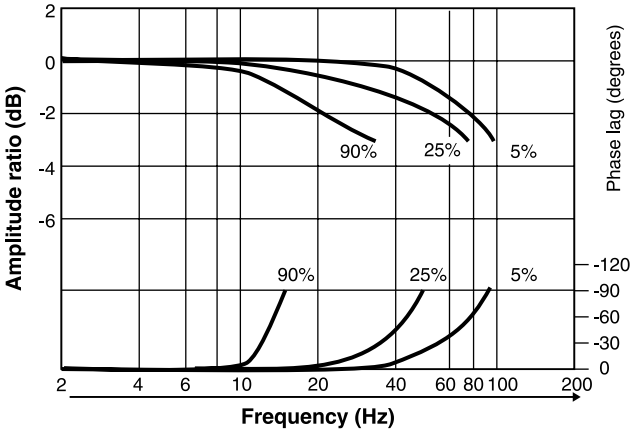
D31FP Frequency Response
±5% / ±25% / ±90% Command Signal
Dynamics at 210 Bar (3045 PSI) Pilot Supply Pressure



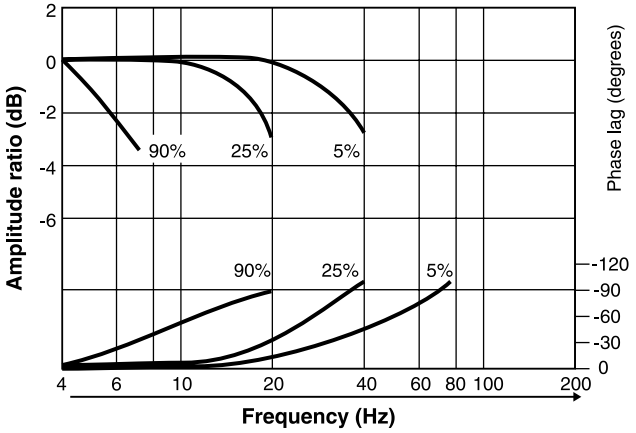
D41FP Frequency Response
±5% / ±25% / ±90% Command Signal
Dynamics at 210 Bar (3045 PSI) Pilot Supply Pressure



D91FP Frequency Response
±5% / ±25% / ±90% Command Signal
Dynamics at 210 Bar (3045 PSI) Pilot Supply Pressure

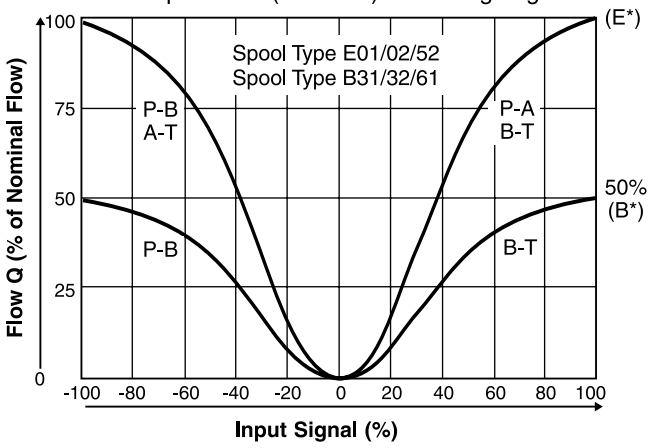


D111FP Frequency Response
±5% / ±25% / ±90% Command Signal
Dynamics at 210 Bar (3045 PSI) Pilot Supply Pressure

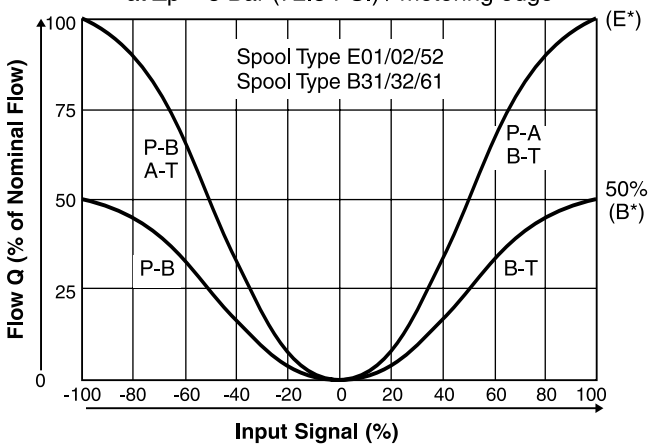


D*1FPB/E Flow

D31FP Flow Characteristics
at Δp = 5 Bar (72.5 PSI) / metering edge



D41FP Flow Characteristics
at Δp = 5 Bar (72.5 PSI) / metering edge



D_1FP.indd, dd

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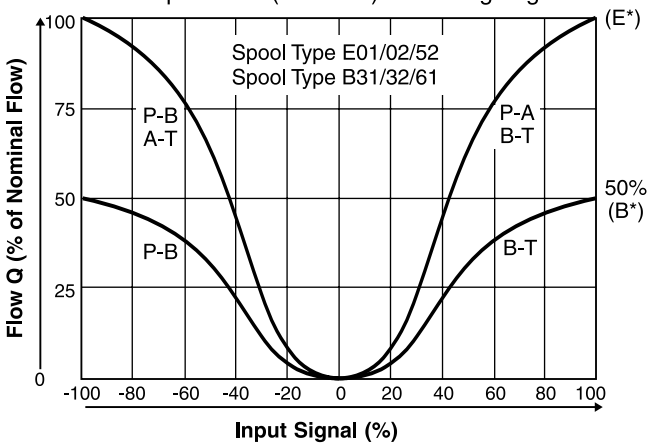
A

D*1FPB/E Flow

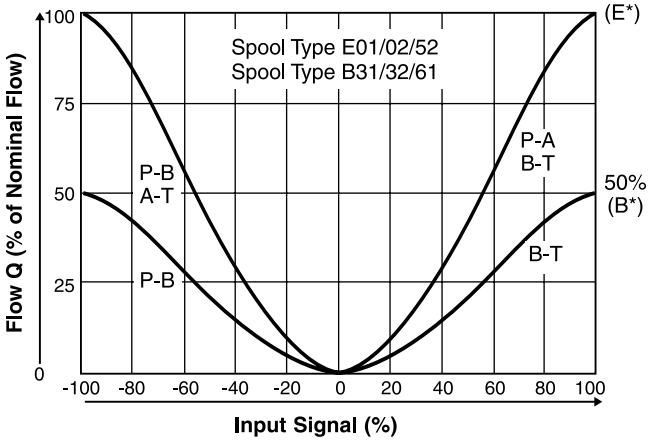
D91FP Flow Characteristics

at Δp = 5 Bar (72.5 PSI) / metering edge



D111FP Flow Characteristics

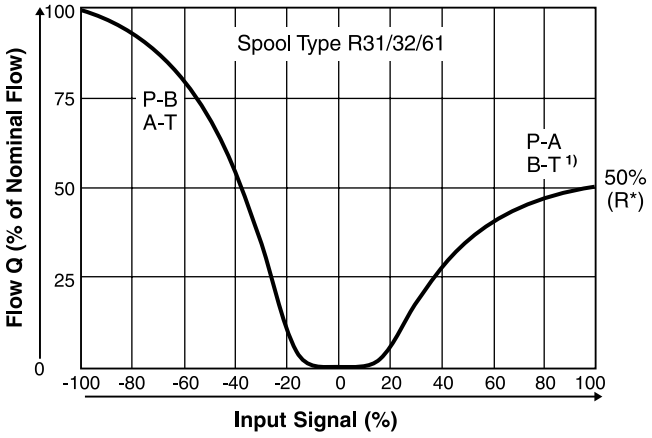
at Δp = 5 Bar (72.5 PSI) / metering edge



D*1FPR/Z Flow

D31FPR Flow Characteristics

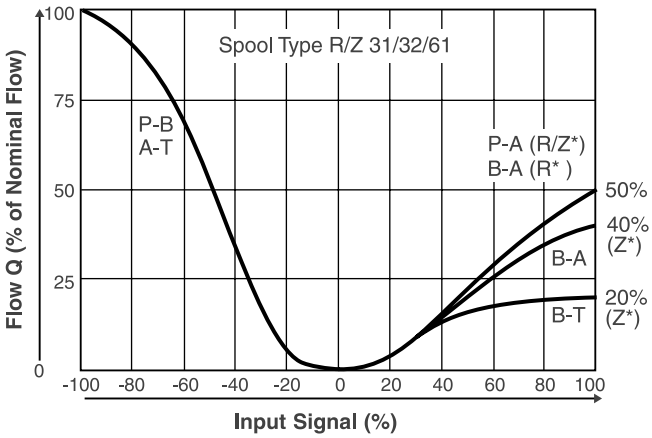
at Δp = 5 Bar (72.5 PSI) / metering edge



1) with 2 tank ports

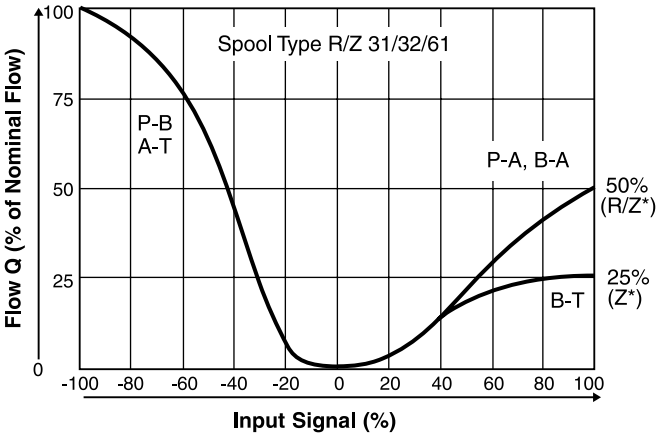
D41FPR/Z Flow Characteristics

at Δp = 5 Bar (72.5 PSI) / metering edge



D91FPR/Z Flow Characteristics

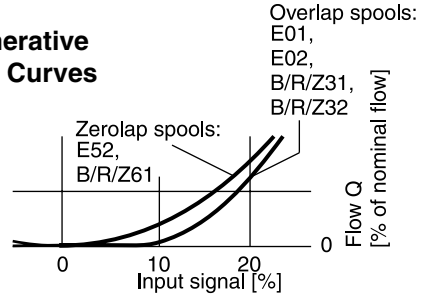
at Δp = 5 Bar (72.5 PSI) / metering edge



D111FP R/Z *

Spool Type R/Z* on request

Detail:
Standard, Regenerative and Hybrid Flow Curves

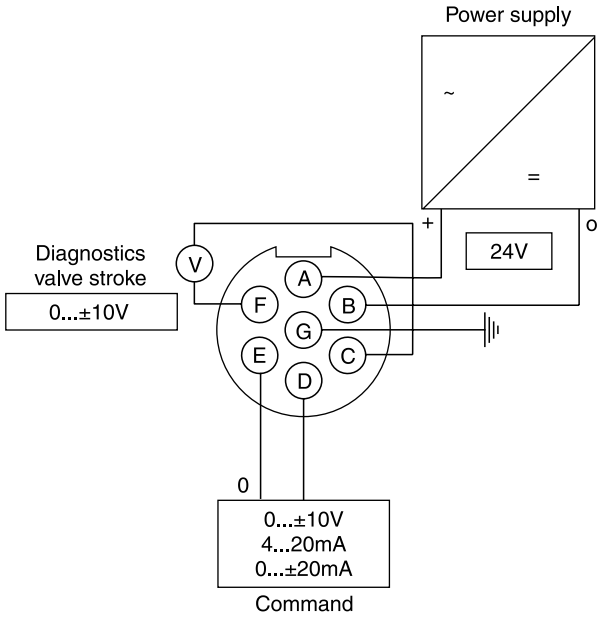


Electrical Characteristics Hybrid Option

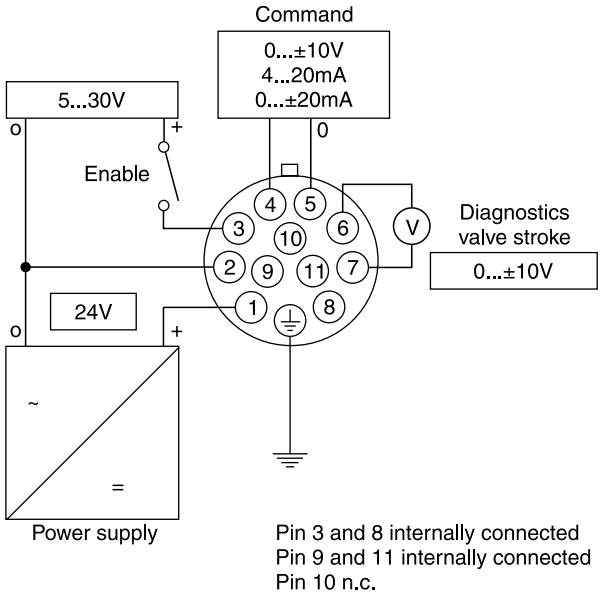
Duty Ratio		100%		
Protection Class		IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)		
		D41	**D91**	**D111**
Supply Voltage	**[V]**	24	24	24
Tolernace Supply Voltage	**[%]**	±10	±10	±10
Current Consumption	**[A]**	1.21	0.96	1.29
Power Consumption	**[W]**	29	23	31
Solenoid 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

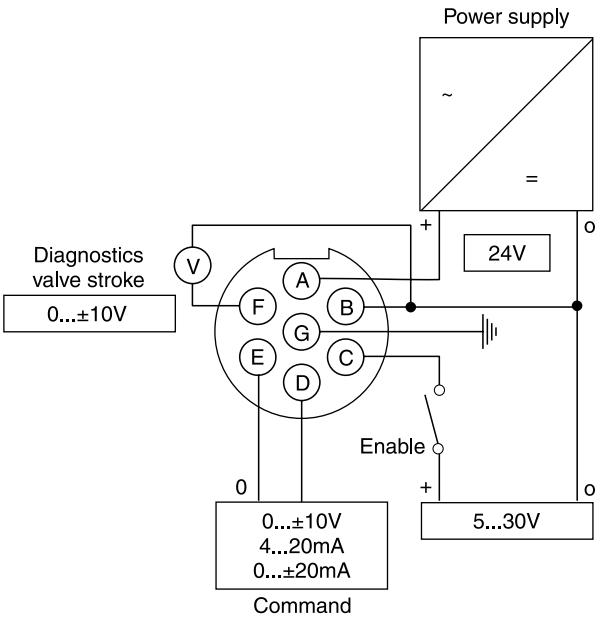


Code 5
11 + PE acc. EN 175201-804



Pin 3 and 8 internally connected
Pin 9 and 11 internally connected
Pin 10 n.c.

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



D_1FP.indd, dd

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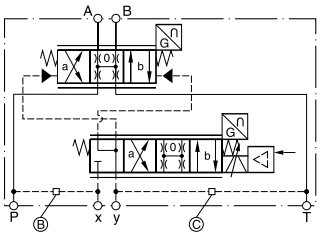
Elyria, Ohio, USA

A

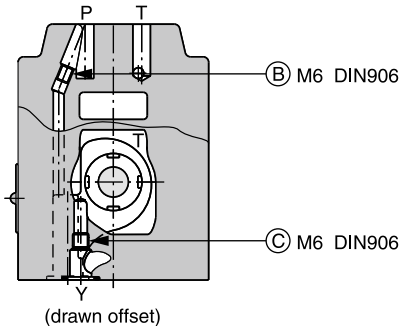
Pilot Flow — Pilot Oil Inlet (Supply) and Outlet (Drain)

○ open, ● closed

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

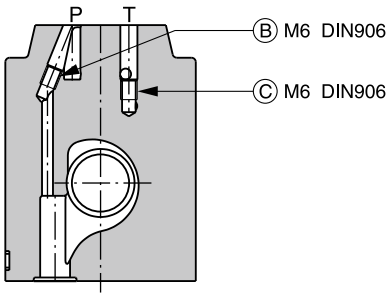


D31FPB/E

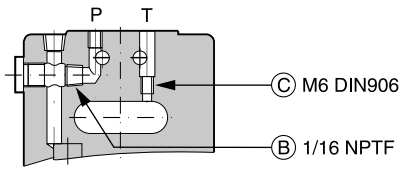


(drawn offset)

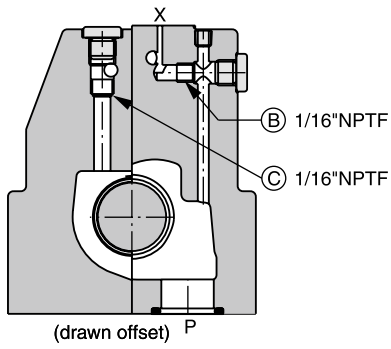
D31FPR



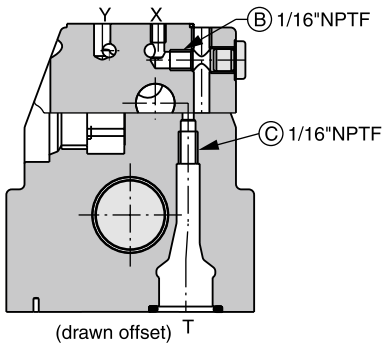
D41FPB/E



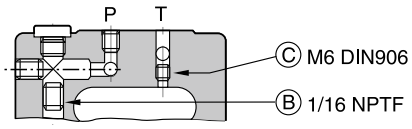
D41FPR



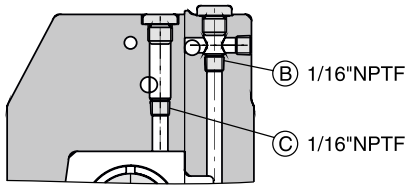
D41FPZ



D91FPB/E

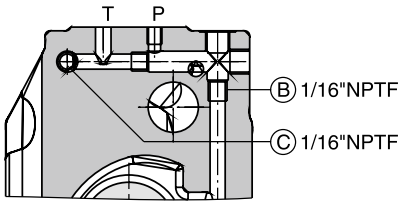


D91FPR

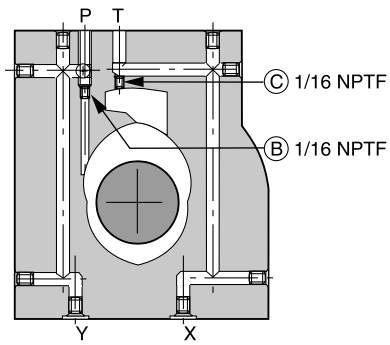


(drawn offset)

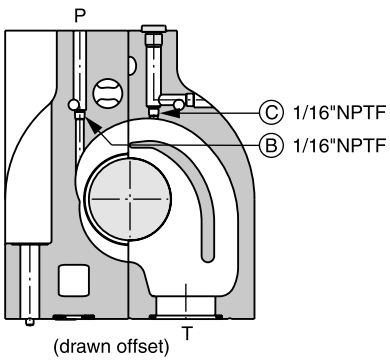
D91FPZ



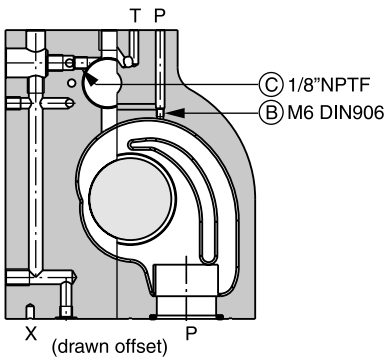
D111FPB/E



D111FPR



D111FPZ



D_1FP.indd, dd

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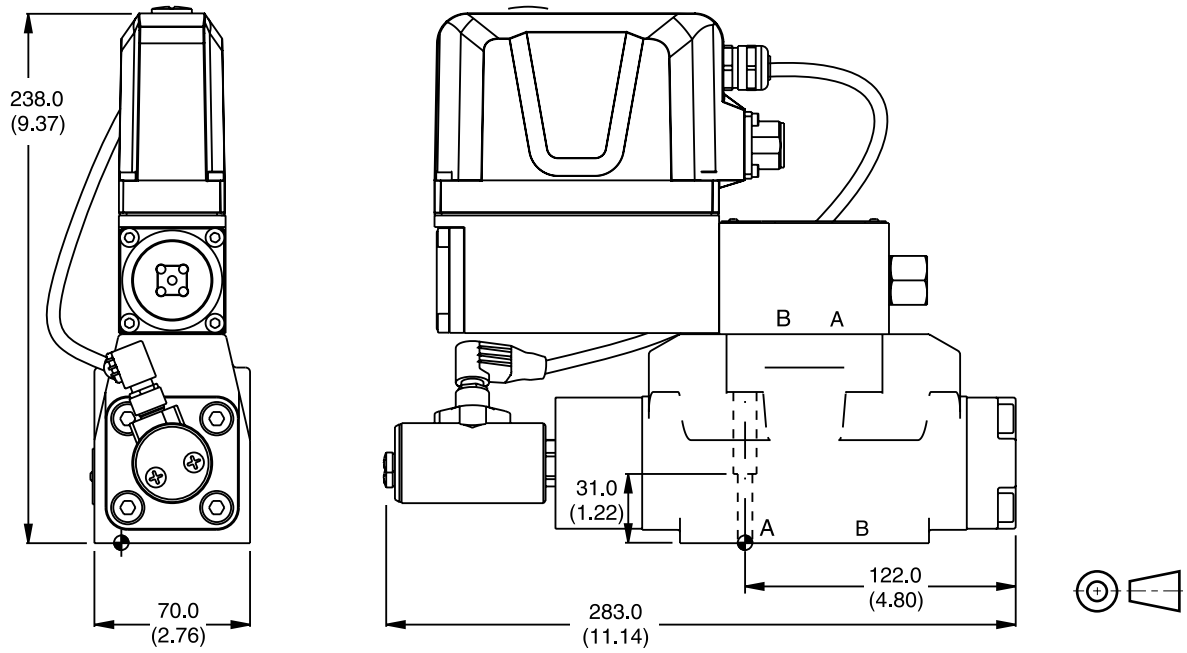
Elyria, Ohio, USA

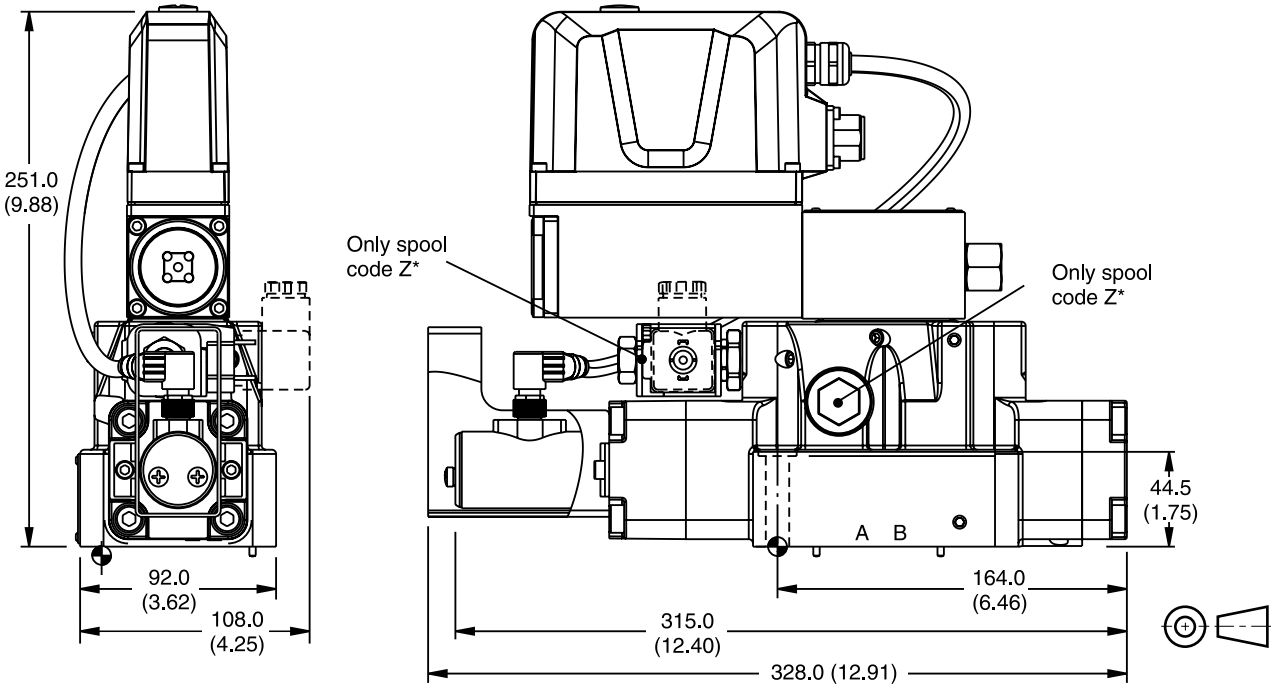
Inch equivalents for millimeter dimensions are shown in (**)

D31FP



Surface Finish	Kit			Seal Kit
R_{max}6.3 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-D31FP Fluorocarbon: SK-D31FP-V

D41FP



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	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

D_1FP.indd, dd

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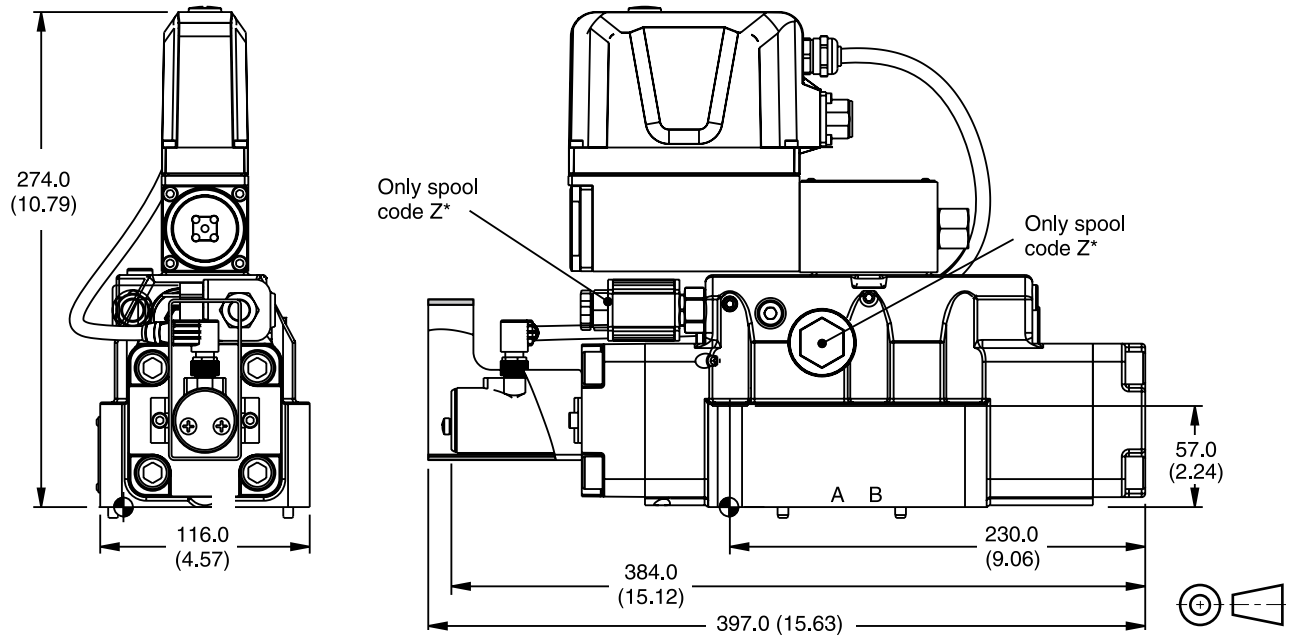
Elyria, Ohio, USA

A

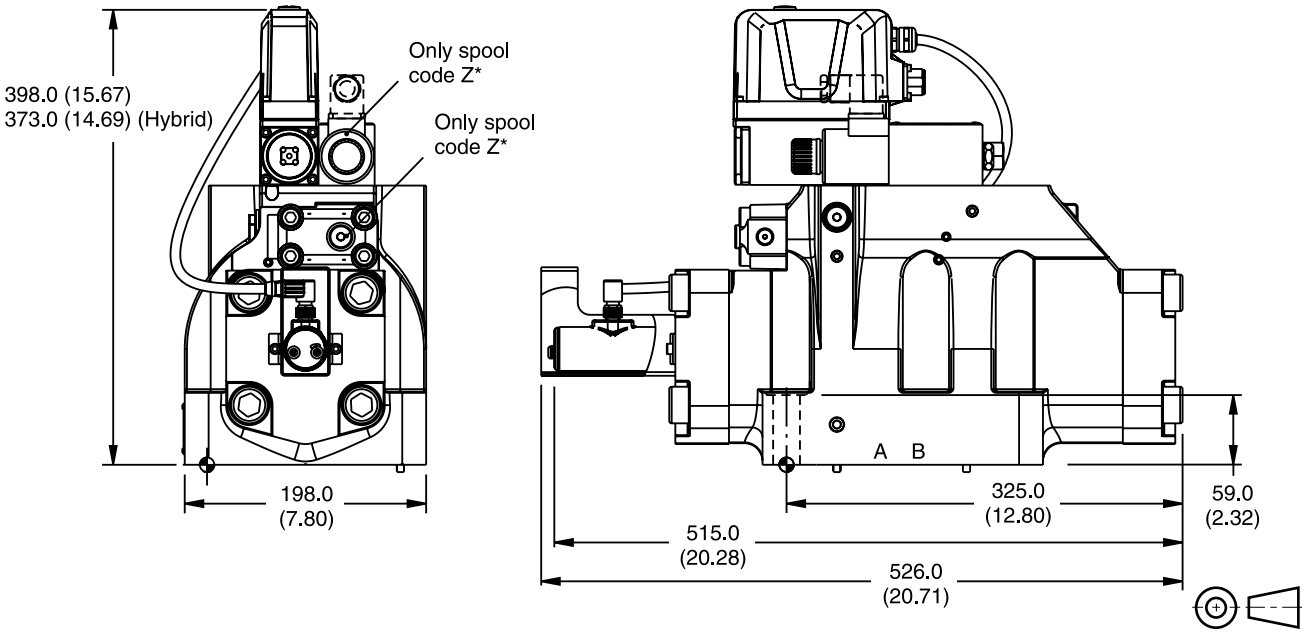
Inch equivalents for millimeter dimensions are shown in (**)

D91FP



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	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
R_{max}6.3 0.01/100	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

D_1FP.indd, dd

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A

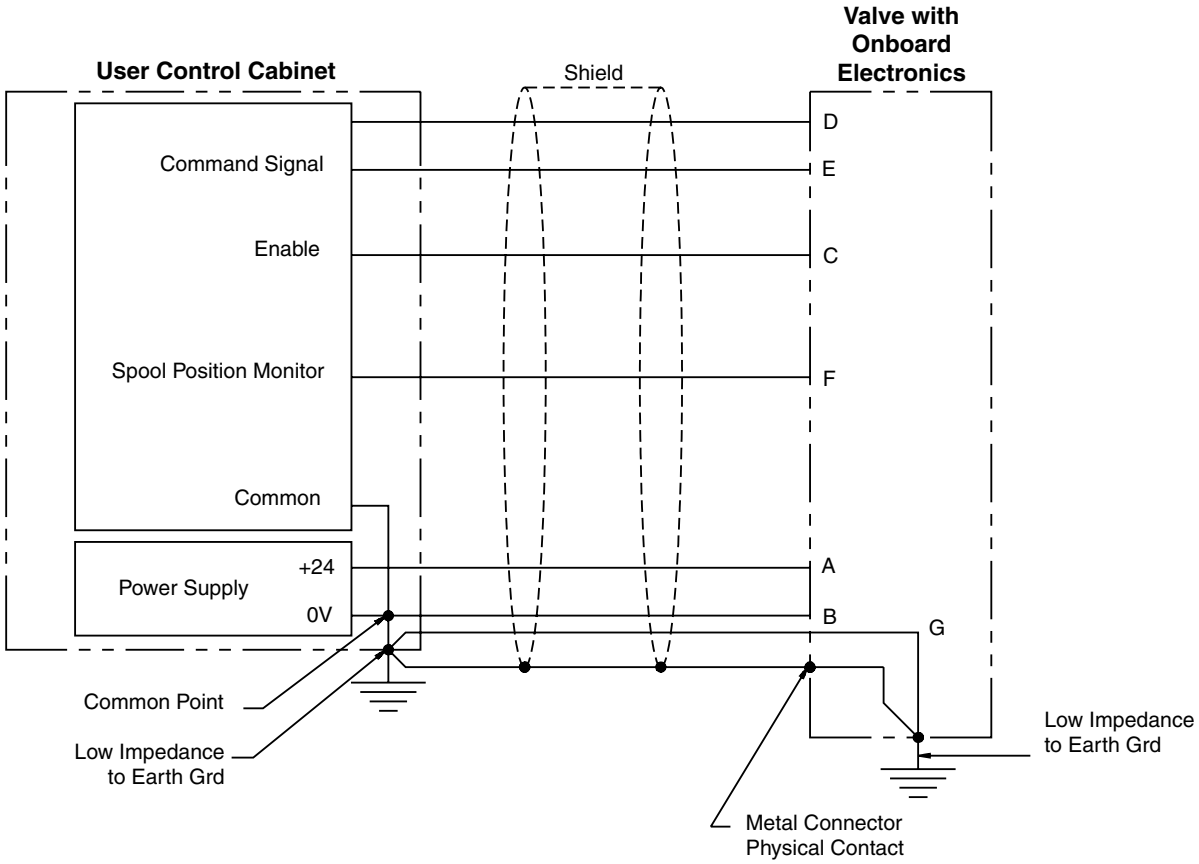
RFI/EMC Immunity for Valves with Integrated Electronics

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 assemblies, 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.

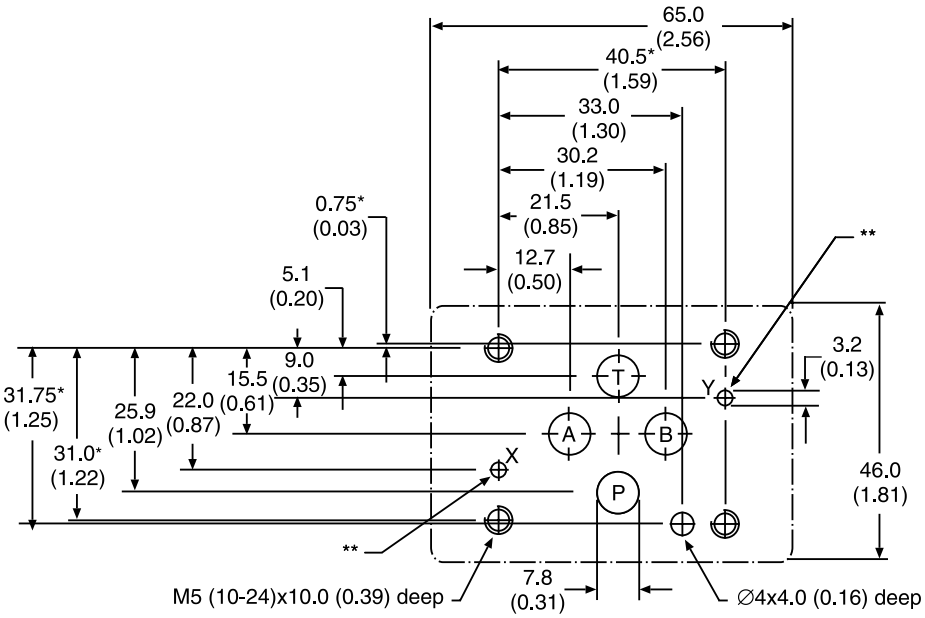


Note: PE on Functional Block Diagrams refers to "Potential Earth".

A

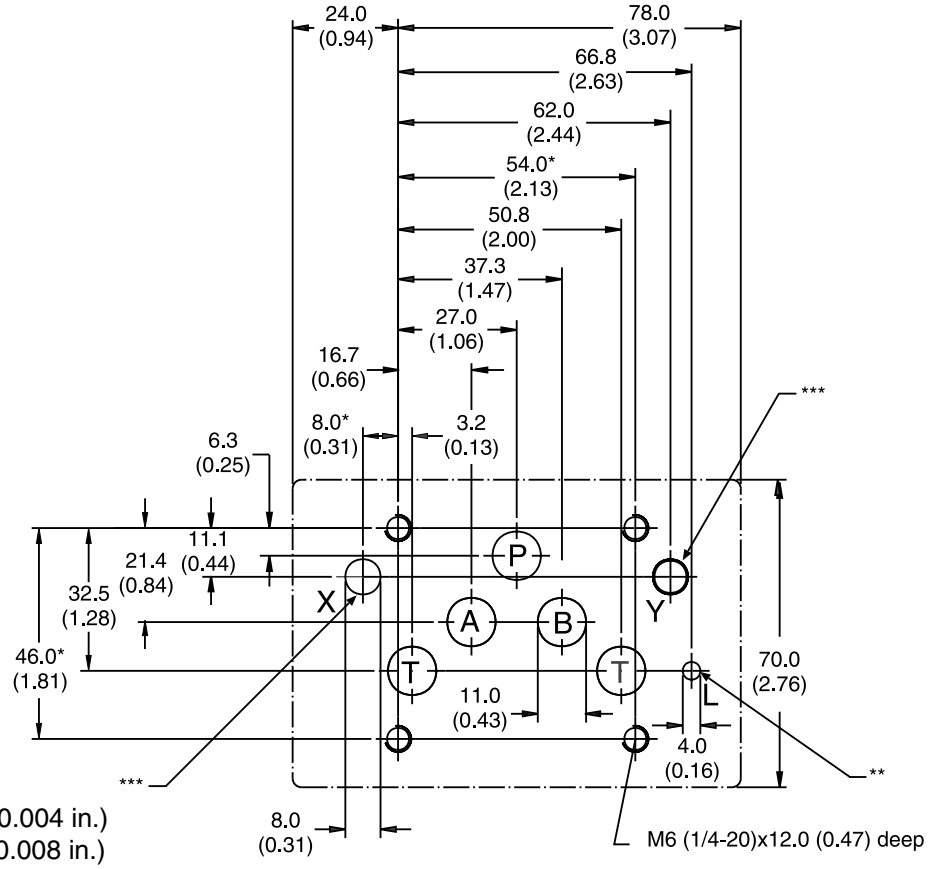
Size NG6 (NFPA/ISO/CETOP 3)

mounting pattern per DIN 24340-A6



Size NG10 (NFPA/ISO/CETOP 5HE)

mounting pattern per DIN 24340-A6



* 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

D_techinfo.indd, dd

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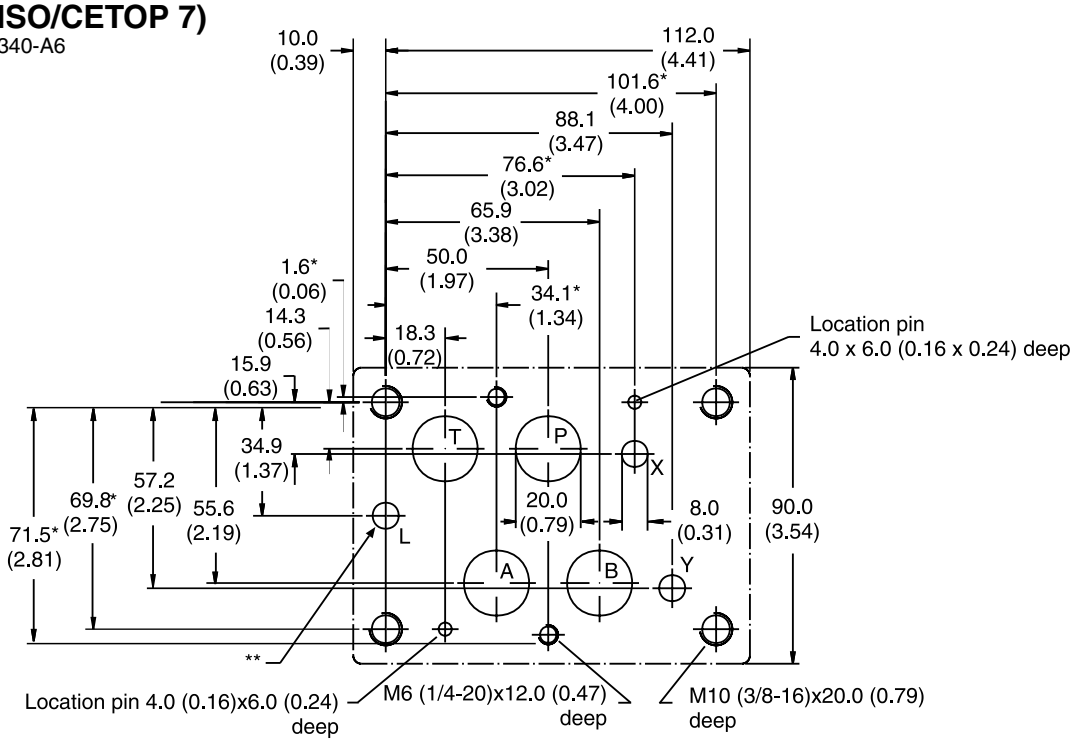
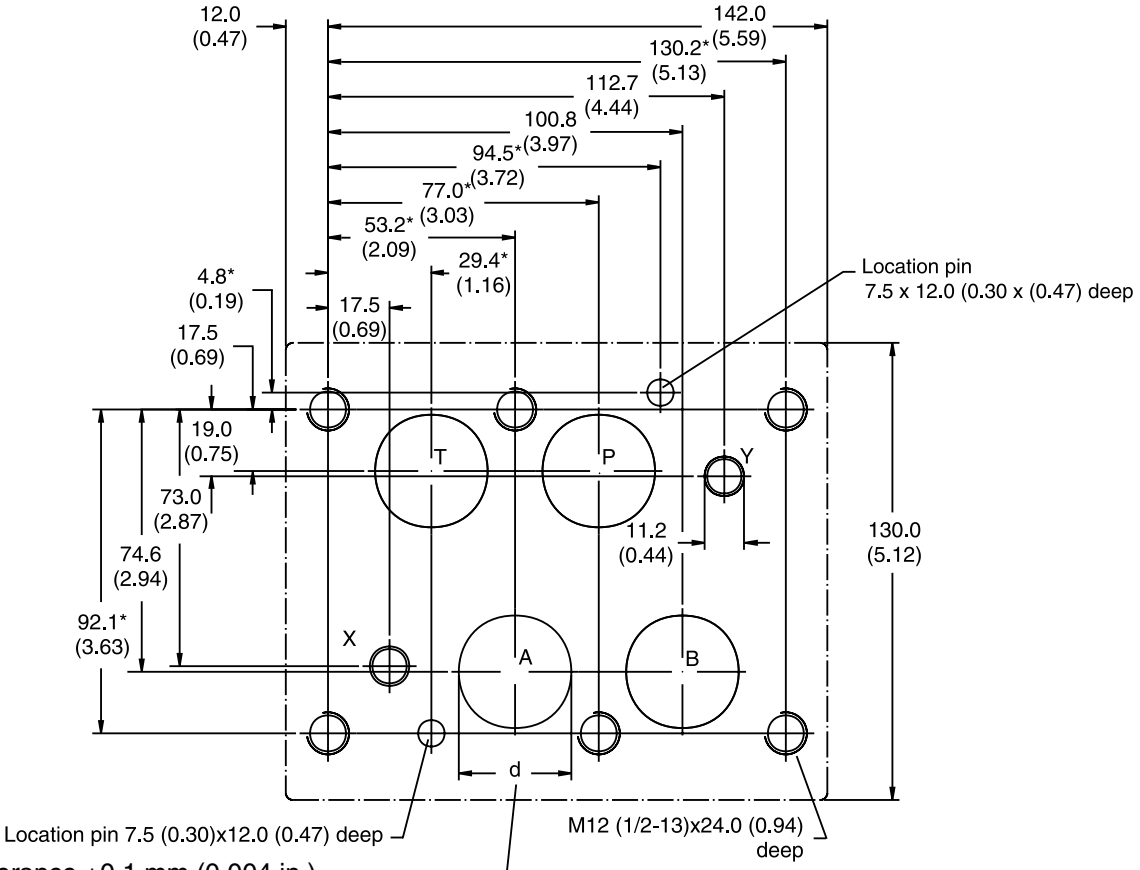
Size NG16 (NFPA/ISO/CETOP 7)

mounting pattern per DIN 24340-A6



Size NG25 (NFPA/ISO/CETOP 8)

mounting pattern per DIN 24340-A6



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

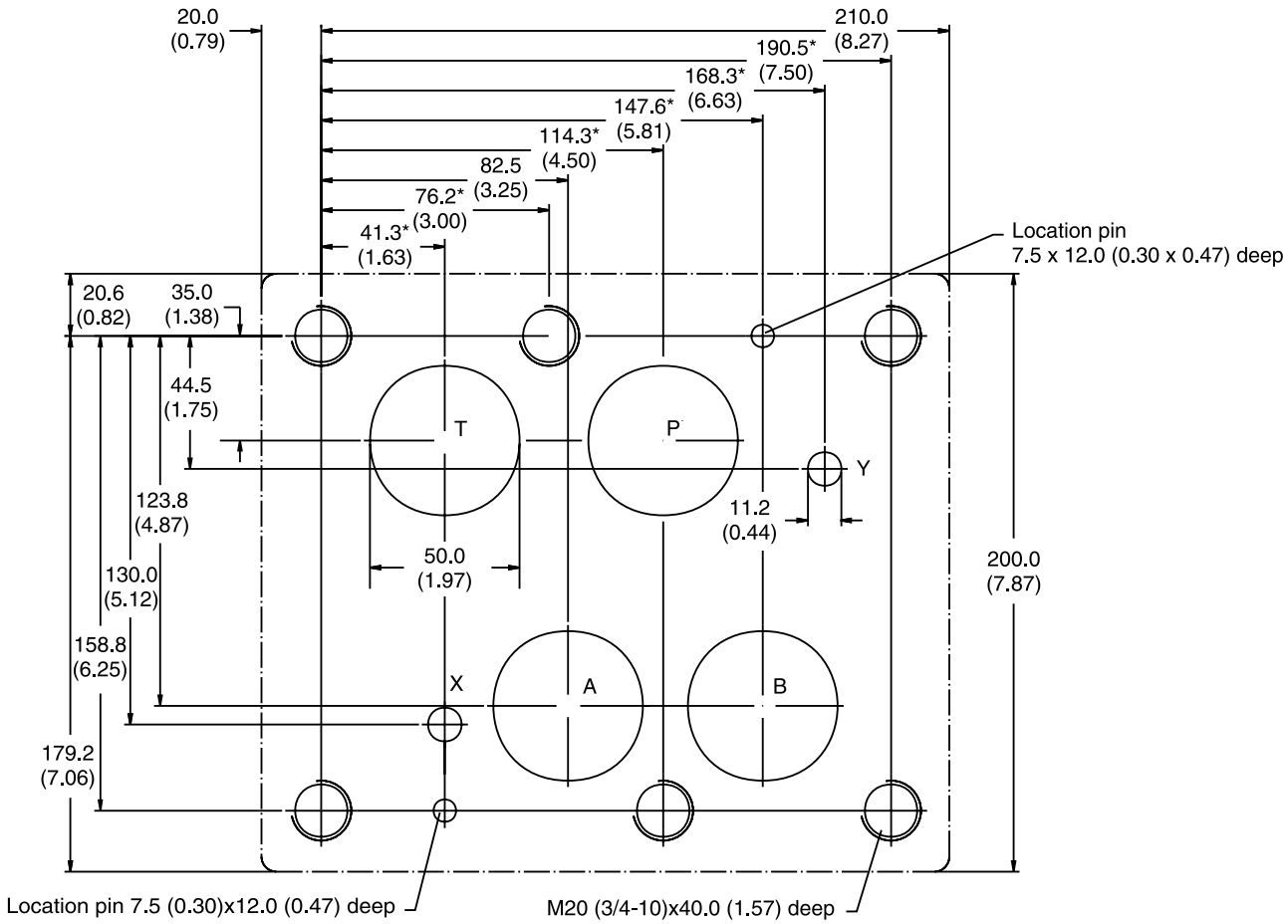
** Port not used with valves in this catalog

D_techinfo.indd, dd

A

Size NG32 (NFPA/ISO/CETOP 10)

mounting pattern per DIN 24340-A6



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

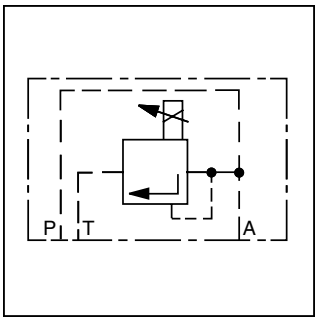
Contents

B

B

General Description

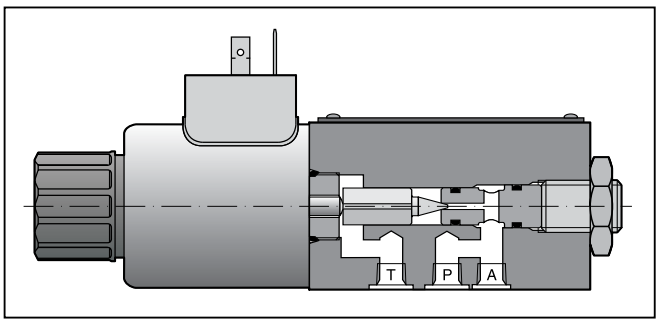
Series RE06M*W proportional relief valves are direct operated proportional valves typically used as remote control valves for flow rates of below 3 LPM (0.8 GPM).



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 prefered
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 ... 525
Viscosity, Recommended [cSt] / [mm²/s] **Permitted [cSt] / [mm²/s]**	30 ... 80 (139 ... 371 SSU) 12 ... 380 (56 ... 1761SSU)
Fluid Temperature [°C]	-20 ... +60; (-4°F ... +140°F)
Filtration	ISO 4406 (1999), 18/16/13
Linearity [%]	±2.8
Repeatability [%]	<±1
Hysteresis [%]	±1.5 of p_{max}
Electrical	
Duty Ratio [%]	100 ED
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)
Solenoid Connection	Connector as per DIN 43650
Power Amplifier, Recommended	PCD00A-400

Ordering Information

RE	06	M		W	2		1		W	
Proportional Pressure Relief Valve	Size	Manifold Mounting	Pressure Range	Offboard Electronics		Seal	Valve Open at Zero Command	Solenoid Type	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

* Use with “PCD” Series Driver cards

** Order if currently using “ED” card

Code	Description
W	Socket Connector DIN 43650 without plug

Please order plug separately. See Accessories.

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

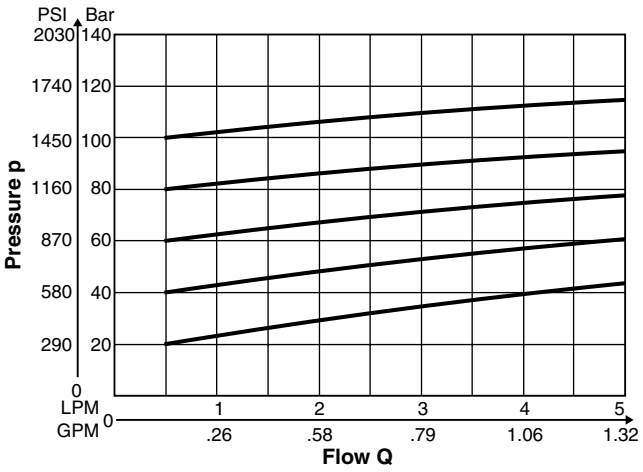
Weight: 1.8 kg (4.0 lbs.)

B

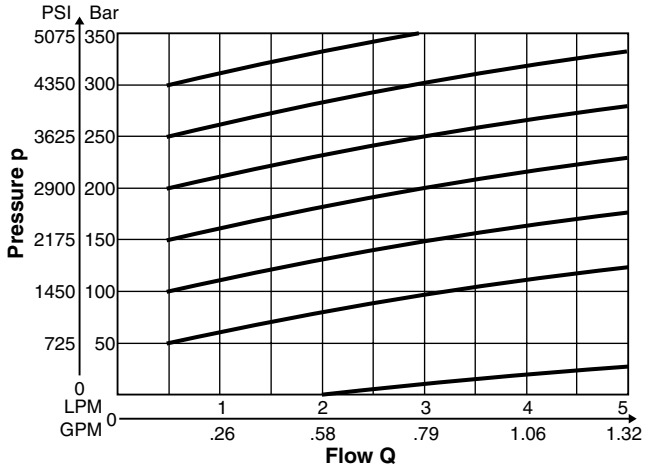
Performance Curves

p/Q Curves

Pressure Stage 105 Bar



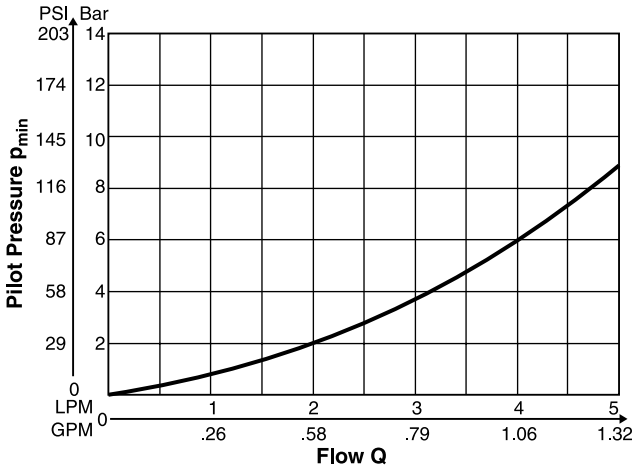
Pressure Stage 350 Bar



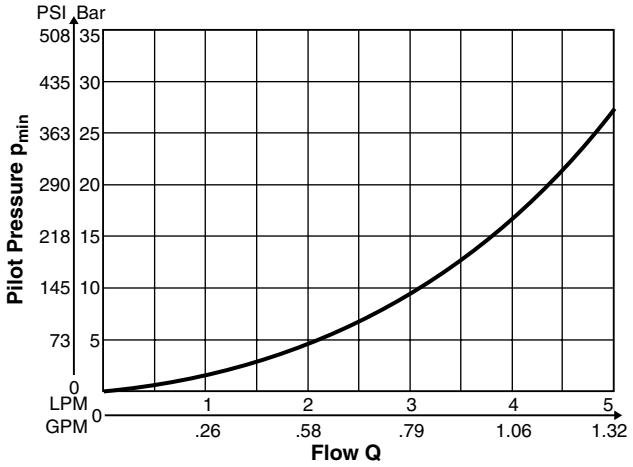
B

p_{min}/Q curves

Pressure Stage 105 Bar

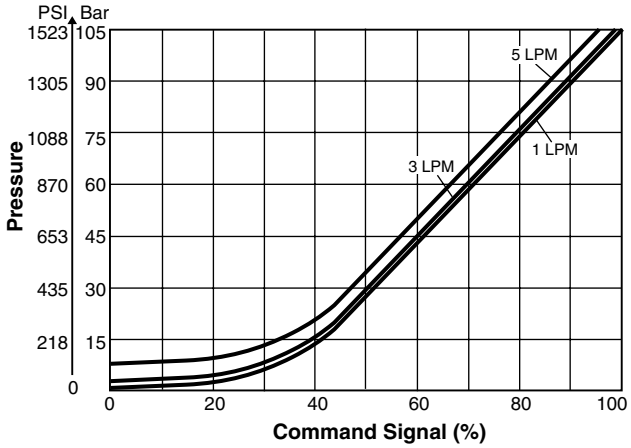


Pressure Stage 350 Bar

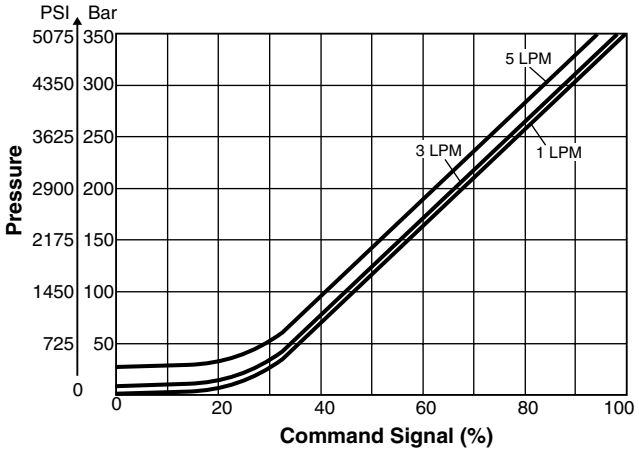


$p_{set\text{-}voltage}$ Curves

Pressure Stage 105 Bar

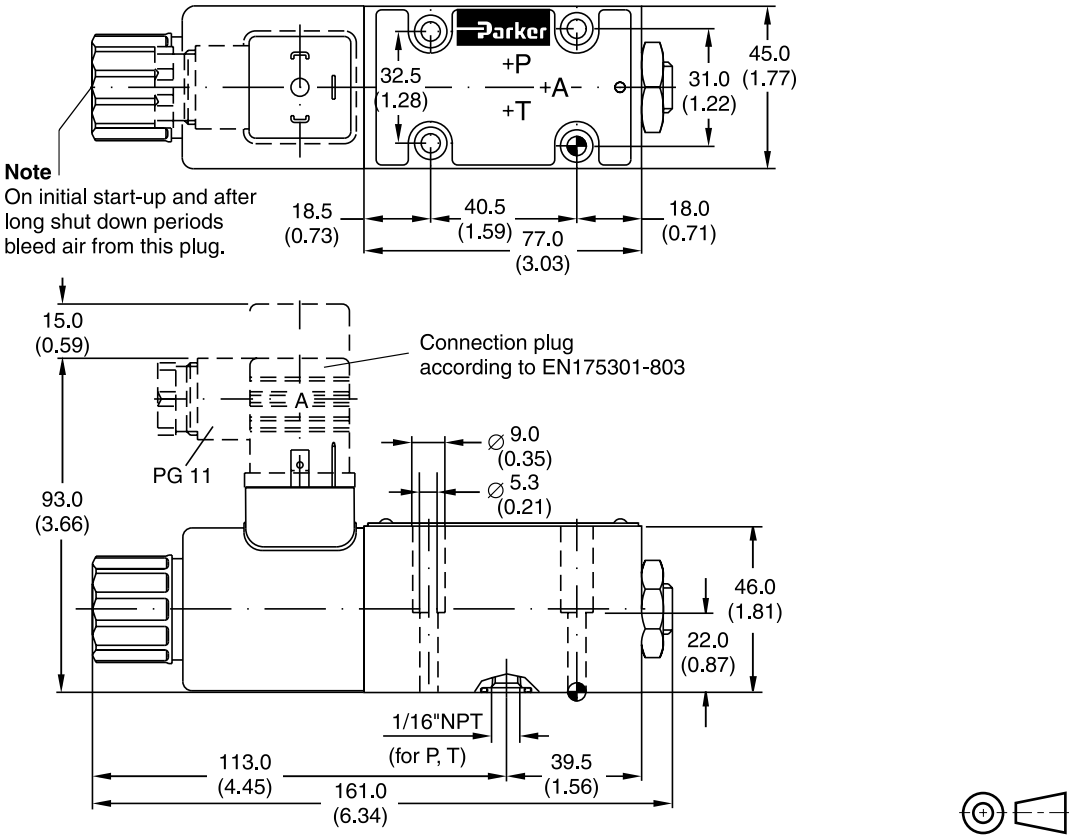


Pressure Stage 350 Bar



B

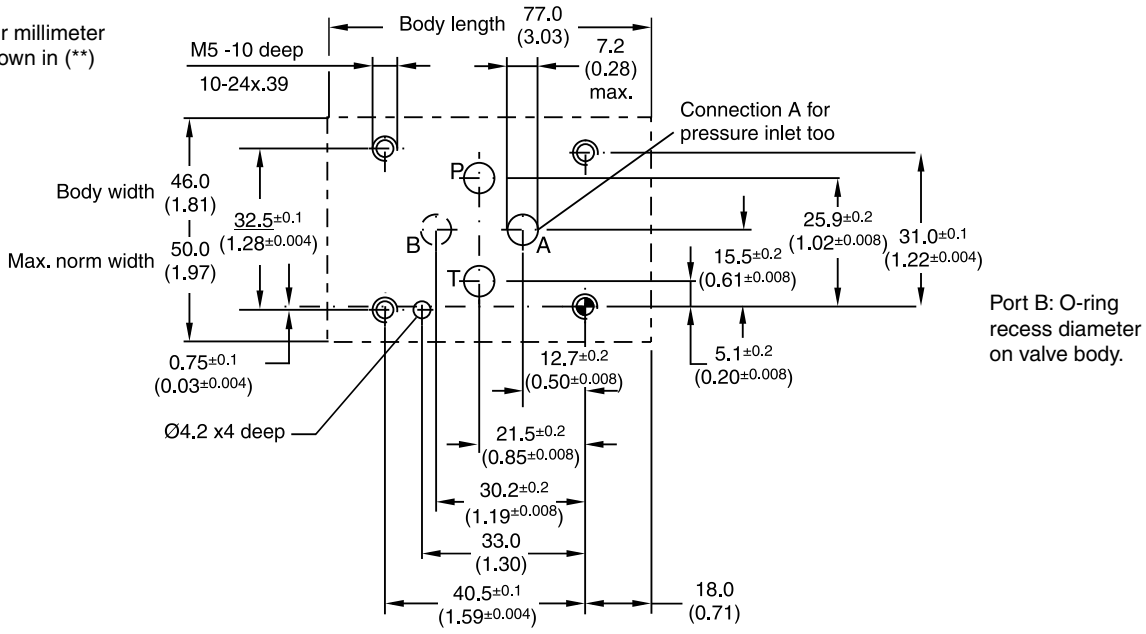
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt Kit			Seal Kit	
				Nitrile	Fluorocarbon
R_{max}6.3 ▱ 0.01/100	BK375 BK209	4x M5x30 DIN 912 12.9 4x 10-24x1.25	7.6 Nm (5.6 lb.-ft.) ±15%	SK-RE06MWN	SK-RE06MWV

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

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



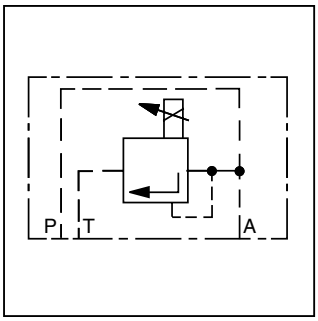
RE06M_W.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

General Description

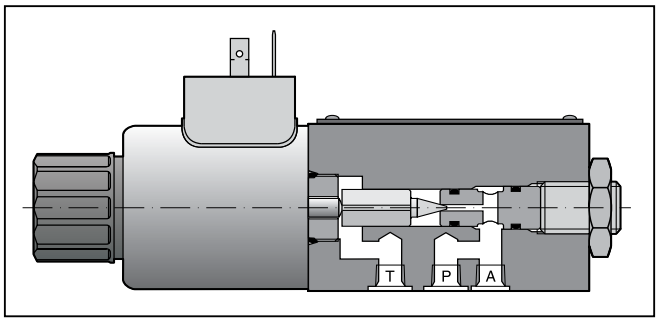
Series 4VP01 direct operated proportional pressure relief valves are equipped with one pressure port (port P). The solenoid is located on the A port side of the mounting pattern.



Function

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

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



Features

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

Ordering Information

4VP01	☐	☐	G12	B	☐	☐
Proportional Pressure Relief Valve	Pressure Range	Orifice in Port P	Solenoid Voltage 12V / 2.3 A	Design Series	Seal	Options Check with Factory

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

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

Code	Description
1	Nitrile
5	Fluorocarbon

Bolt Kits:

BK209	(4) 10-14x1.25 SHCS
BK375	(4) M5x30 SHCS

Weight: 1.8 kg (4.0 lbs.)

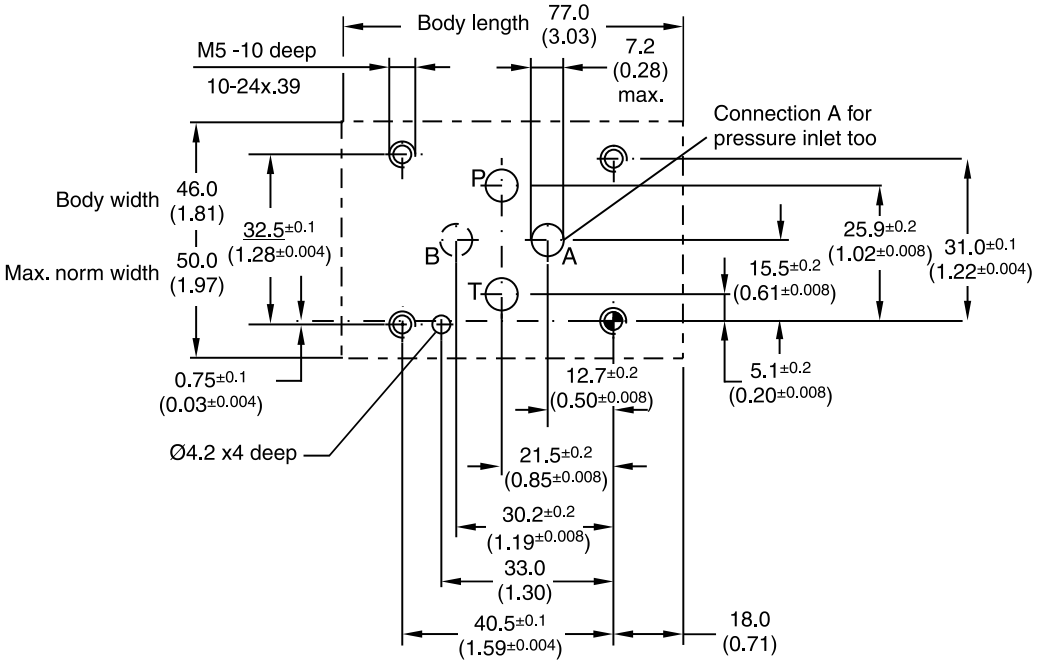
B

Specifications

General	
Size	DIN NG6 / CETOP 3 / NFPA D03
Interface	Subplate Mounting acc. ISO 6264
Mounting Position	As desired, horizontal position preferred
Ambient Temperature Range	-20°C to +70°C (-4°F to +158°F)
Hydraulic	
Maximum Operating Pressure	Port P 350 Bar (5075 PSI); Port T depressurized
Pressure Range	50 Bar (725 PSI), 105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)
Nominal Flow	See p/Q Curves
Fluid	Hydraulic oil as per DIN 51524 ... 51525
Fluid Temperature	-20°C to +60°C (-4°F to +140°F)
Viscosity Permitted Recommended	12 to 380 cSt / mm^2/s (56 to 1761 SSU) 30 to 80 cSt / mm^2/s (139 to 371 SSU)
Filtration	ISO Class 4406 (1999) 18/16/13
Linearity	±2.8%
Repeatability	<±1%
Hysteresis	±1.5 of p_{max}
Electrical	
Duty Ratio	100% ED
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Supply Voltage	12 VDC
Maximum Current	2.3 amps
Coil Resistance	4 Ohm at 20°C (68°F)
Solenoid Connection	Connector as per EN 175301-803
Power Amplifier	PCD00A-400, recommended

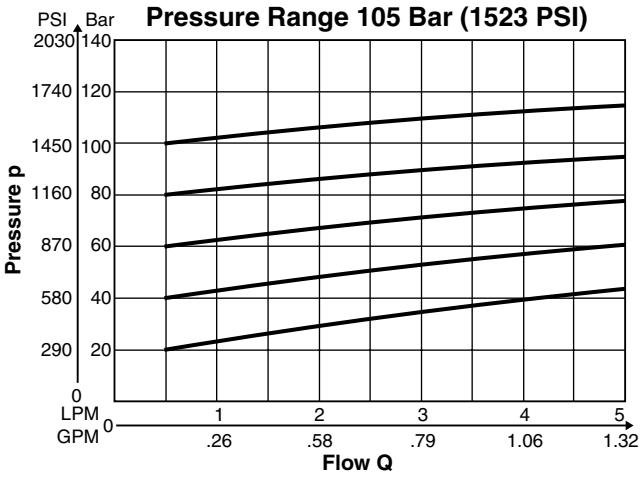
Mounting Pattern ISO 6264-03-04-*-97

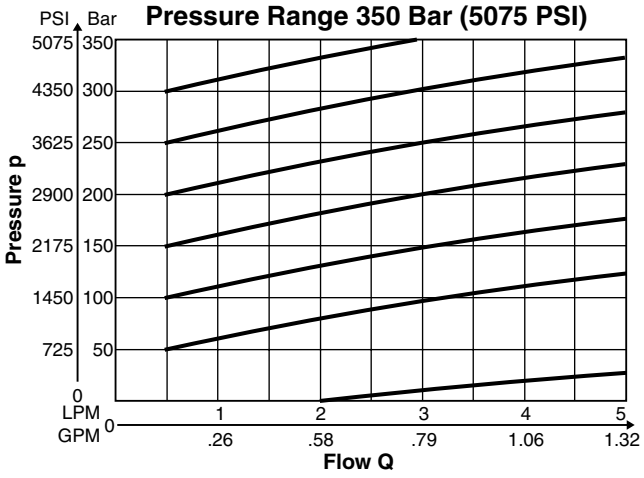
Inch equivalents for millimeter dimensions are shown in (**)



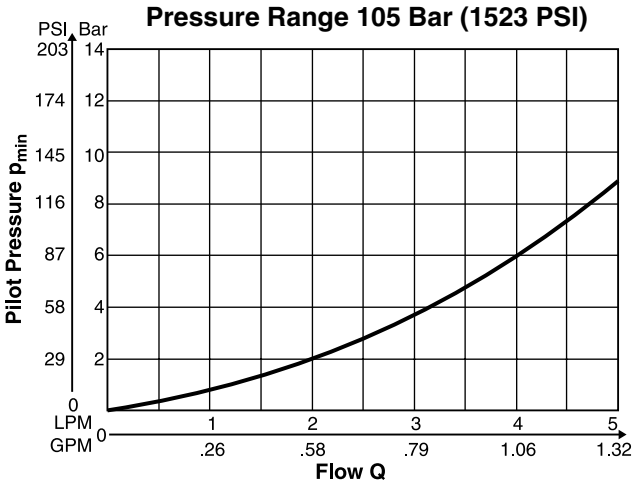
B

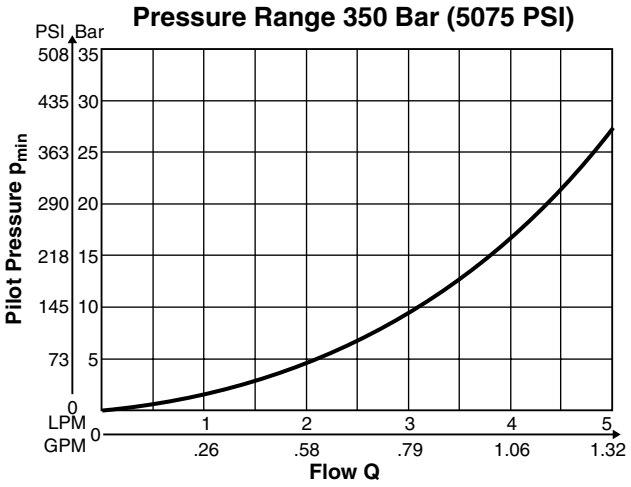
p/Q Curves



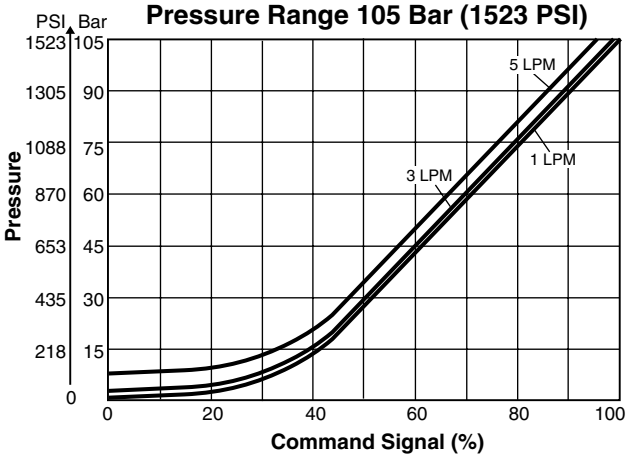


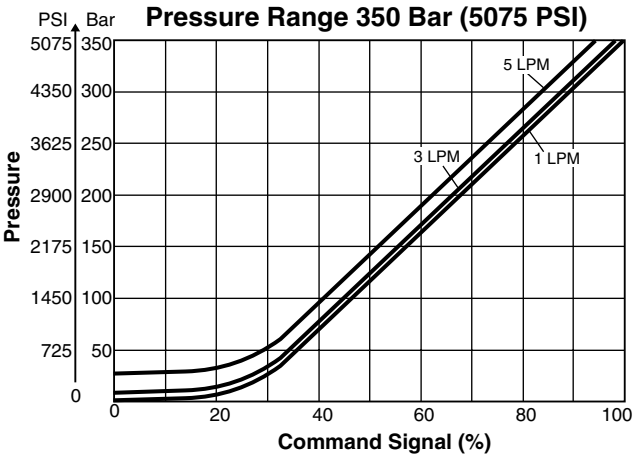
Minimum Adjusted Pressure



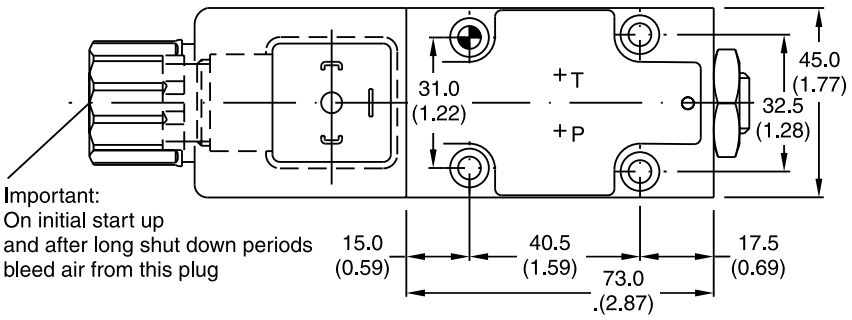


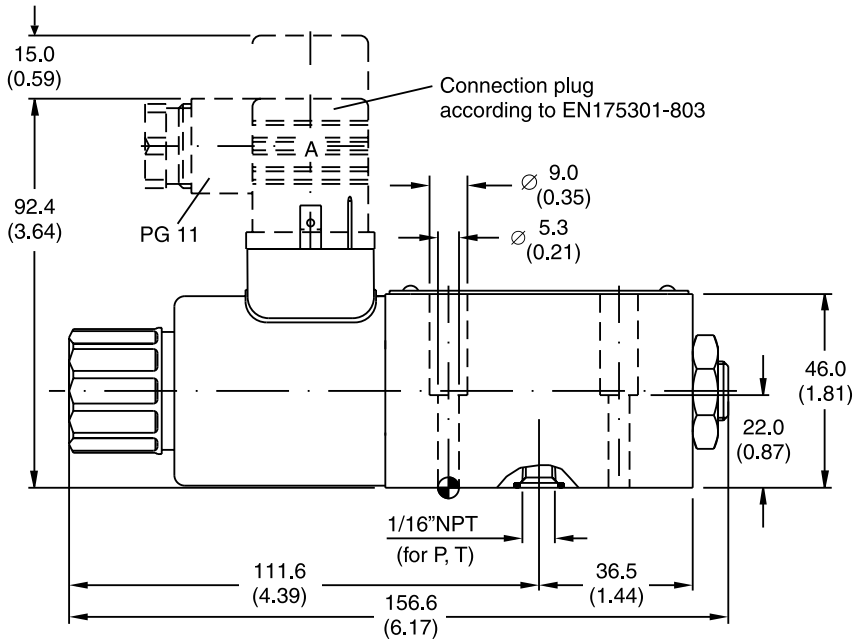
Pressure / Signal Curve





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





Surface Finish	Bolt Kit			Seal Kit	
				Nitrile	Fluorocarbon
R_{max}6.3 0.01/100	BK375 BK209	4x M5x30 DIN 912 12.9 4x 10-24x1.25	7.6 Nm (5.6 lb.-ft.) ±15%	SK-RE06MWN	SK-RE06MWV

B

General Description

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

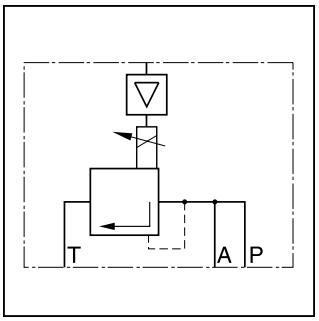
The digital onboard electronic is situated in a robust metal housing and can be used in rough environments. The nominal values of the valves are factory set. Additionally the ProPxD software permits the editing of all parameters. The software is also used for the digital electronic modules. The cable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

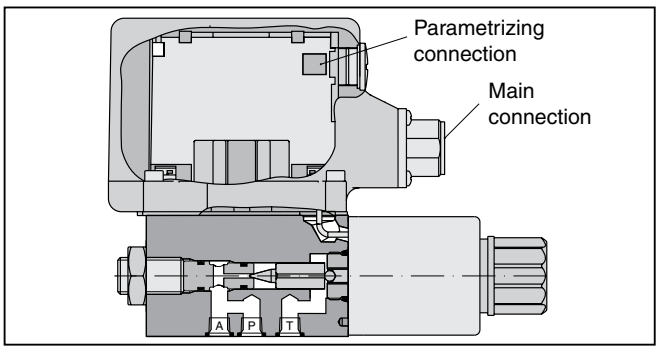
The electrical connection is available in 2 options:
Code F: 6 + PE central connection
+/- 10V command signal (preset)
+10V reference voltage output
Code R: 6 + PE central connection
4…20mA command signal (preset)

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	0	
Proportional Pressure Relief Valve	Size	Manifold Mounting	Pressure Range	Integrated Electronics	Configuration	Seal	Valve Open at Zero Command	Electronic Variations	Electronic Option	Accessory	Design Series

NOTE: Not required when ordering.

Code	Description
06	NG6 D03, CETOP 3

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
05	50 Bar (725 PSI)
10	105 Bar (1523 PSI)
17	175 Bar (2538 PSI)
21	210 Bar (3045 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

Code	Description
F	Voltage input 0...+10V with reference output +10V
R	Current input 4...20mA

Weight: NG6 2.2 kg (4.9 lbs.)

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

Please order plugs separately. See Accessories.

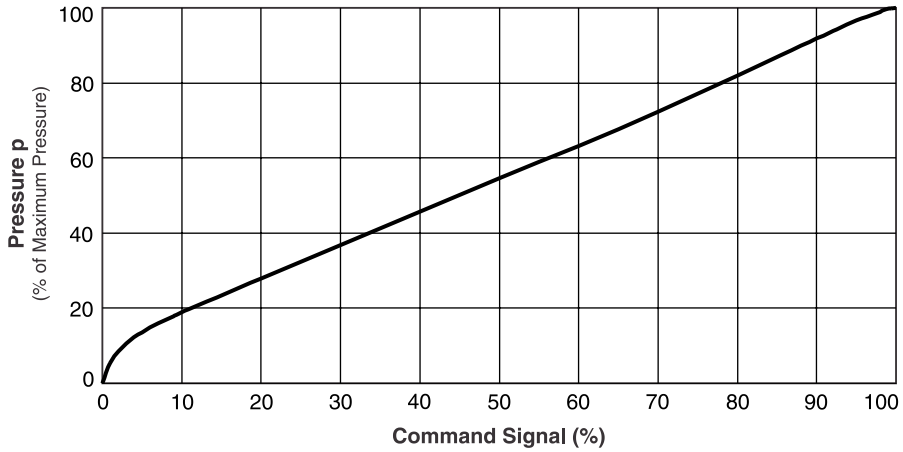
Parametrizing cable OBE => RS232
Item no. 40982923

B

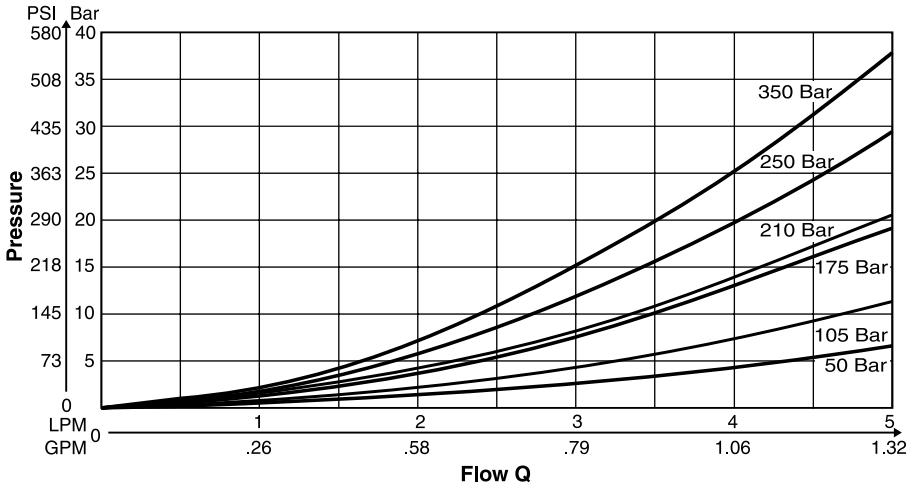
General		
Size		DIN NG6 / CETOP 3 / NFPA D03
Interface		Subplate mounting according to ISO 6264
Mounting Position		as desired, horizontal mounting prefered
Ambient Temperature	**[°C]**	-20...+60; (-4°F ... +140°F)
$MTTF_D$ value	**[years]**	75
Vibration Strength	**[g]**	10 sinus 5...2000 Hz acc. to IEC 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 ... 525
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
Linearity	**[%]**	See curve
Repeatability	**[%]**	<±1
Hysteresis	**[%]**	±1.5 of p_{max}
Electrical		
Duty Ratio ED	**[%]**	100
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 F Voltage** **Code R Current**	**[V]** **[mA]**	0...+10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm 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]** **[V]**	30 for terminal D and E against PE (terminal G) 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

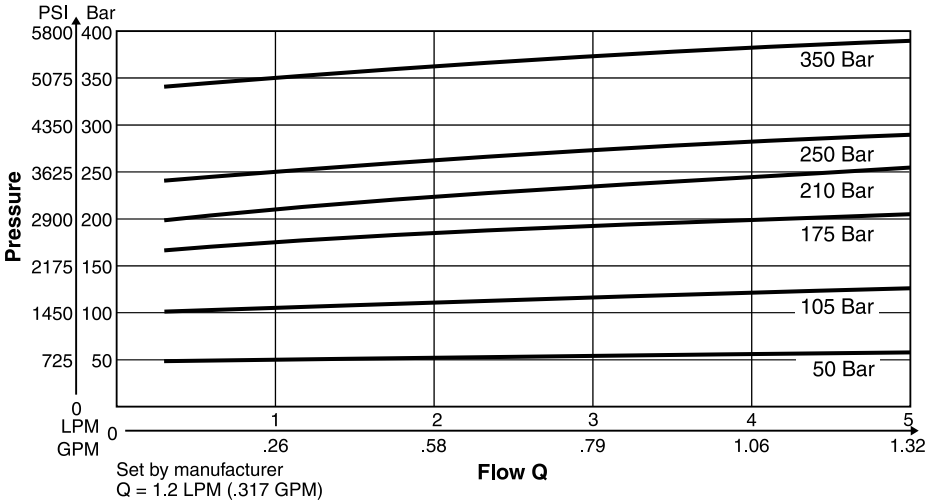
Command/Pressure Curve



p_{min}/Q Curves



P/Q Curves

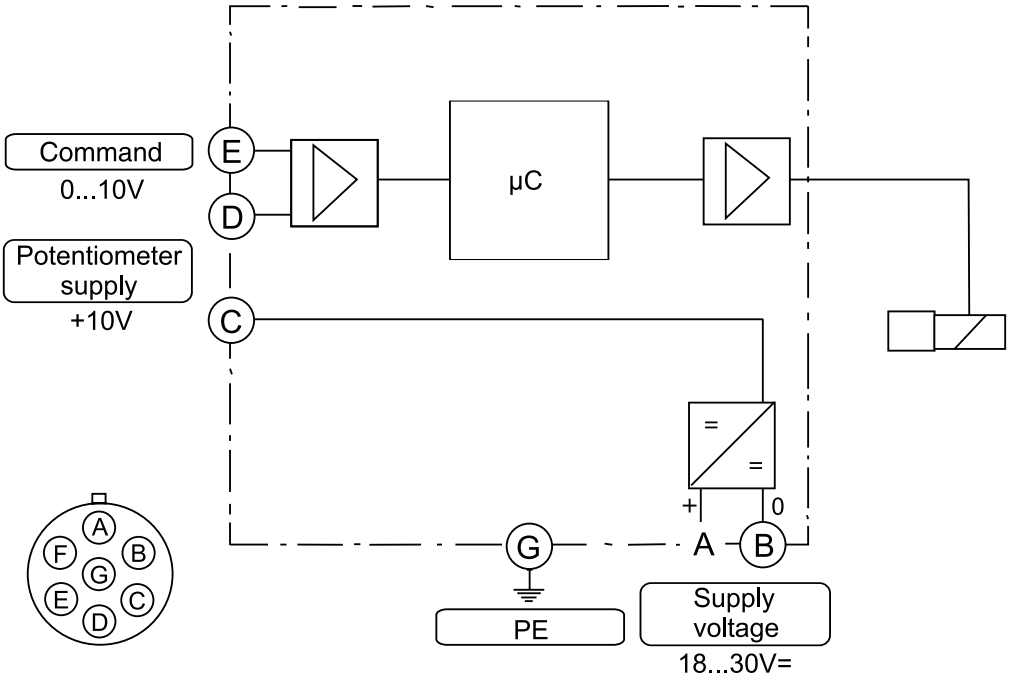


RE06M_T.indd, dd

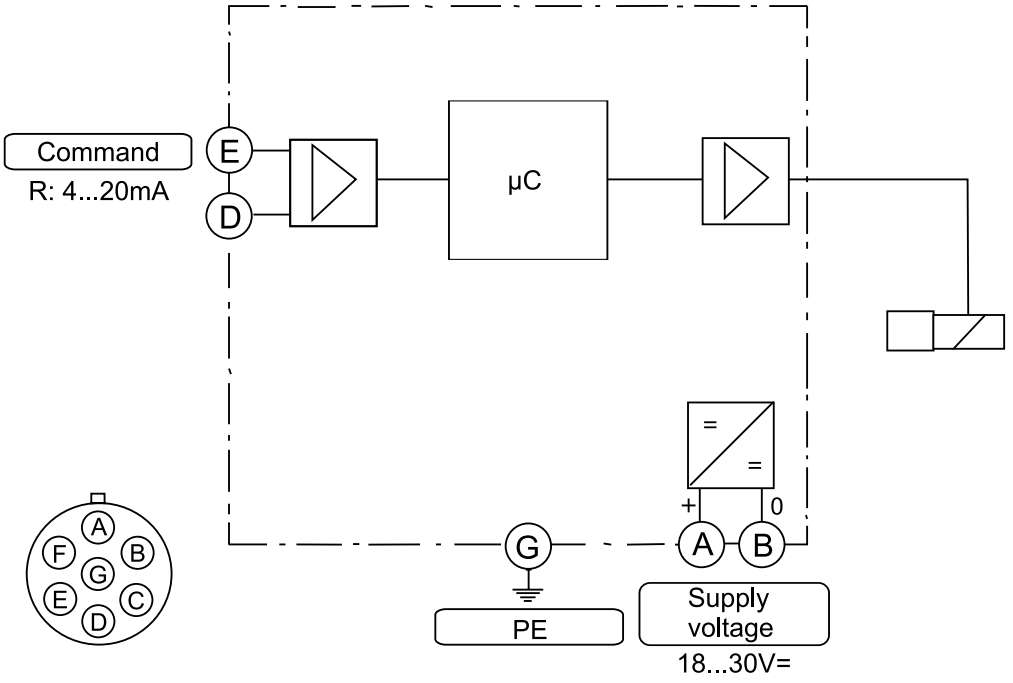
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

Code F
6 + PE acc. EN 175201-804



Code R
6 + PE acc. EN 175201-804



B

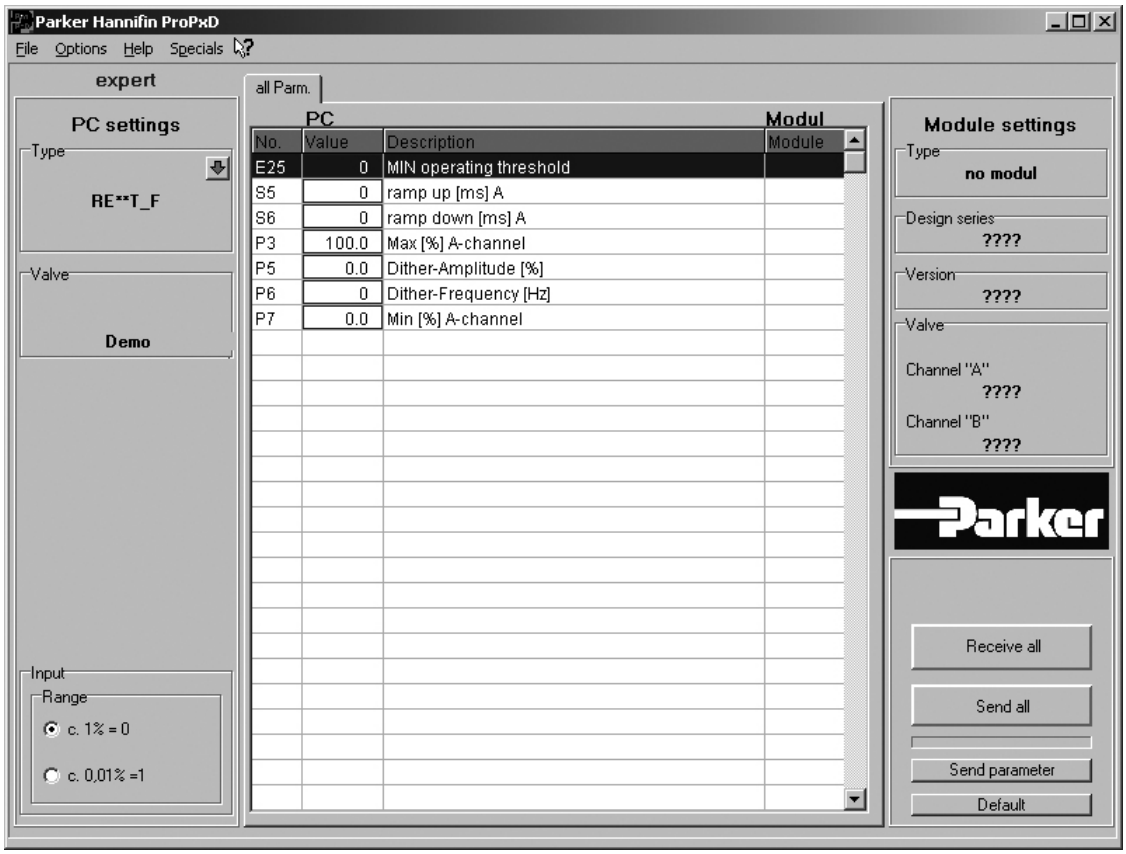
ProPxD Interface Program

The new ProPxD software permits comfortable parameter setting for the electronic modules series PCD, PWD, PZD, PID and PWDXX.

Via the clearly arranged entry mask the parameters can be displayed 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 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.

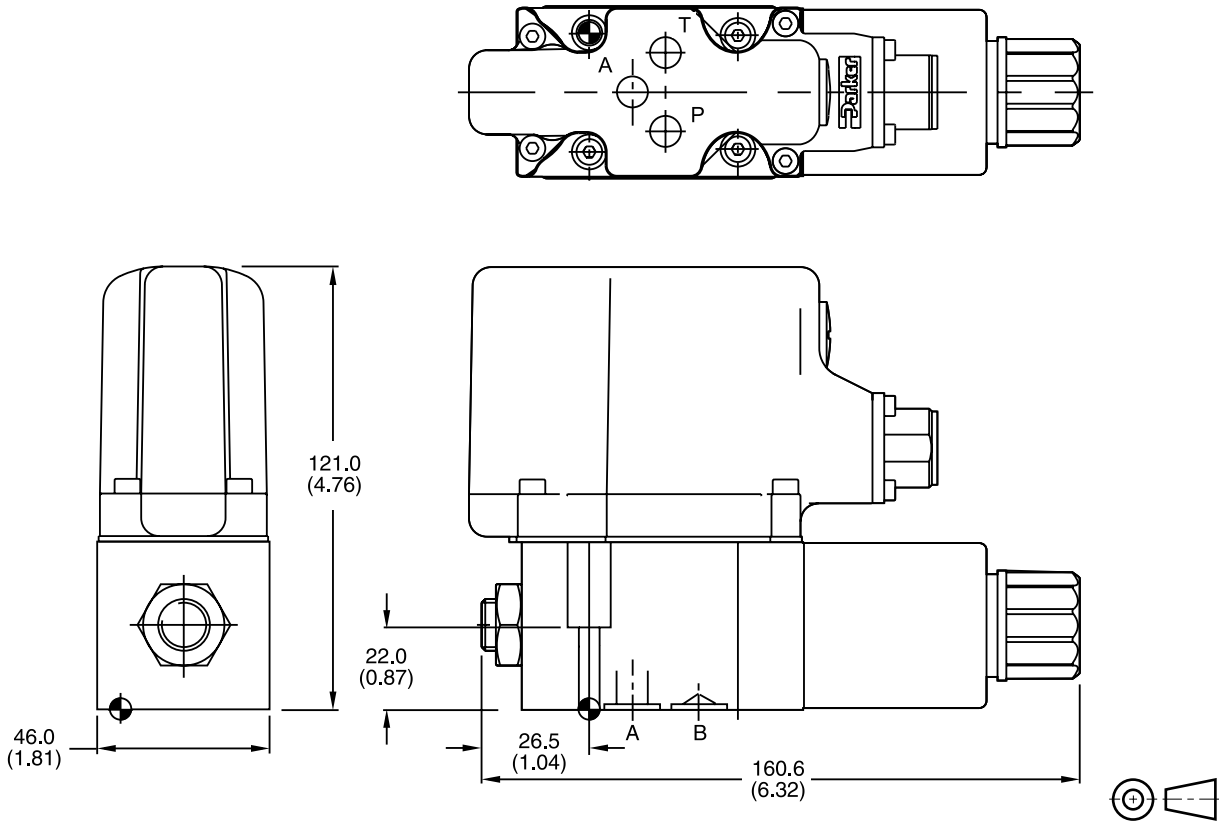
Features

- 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 electronic via serial interface RS-232 and null modem cable.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd – see "Software Downloads"



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

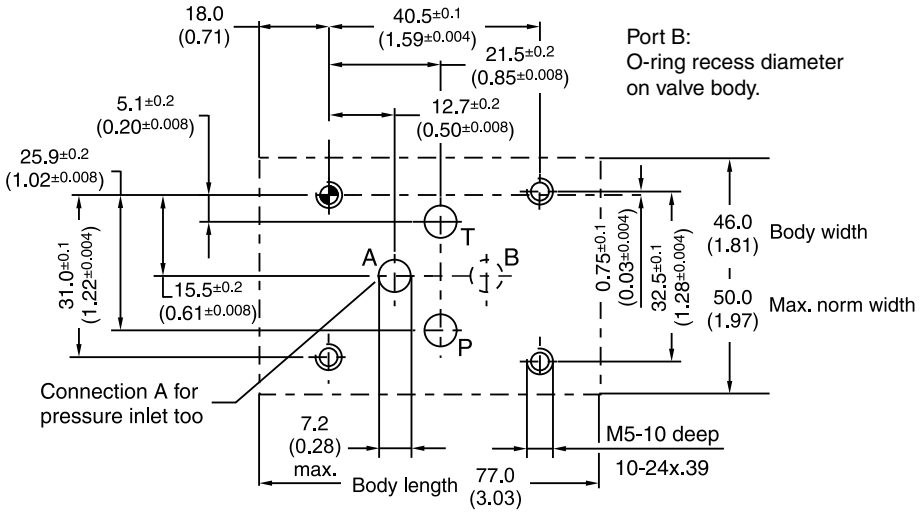
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt Kit			Seal Kit	
				Nitrile	Fluorocarbon
$R_{max}6.3$ 0.01/100	BK375 BK209	4x M5x30 DIN 912 12.9 4x 10-24x1.25	7.6 Nm (5.6 lb.-ft.) ±15%	SK-RE06MTN	SK-RE06MTV

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

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



RE06M_T.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

General Description

Series R4V and R6V proportional pressure relief valves for external electronics feature a proportionally adjusted pilot stage which controls a seated type main stage. The valves are equipped with a mechanical maximum pressure stage (optional for R6V).

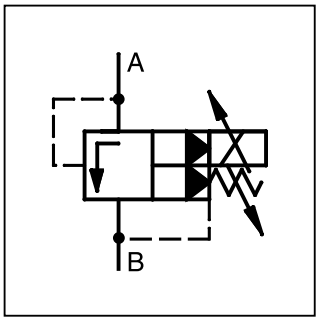
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

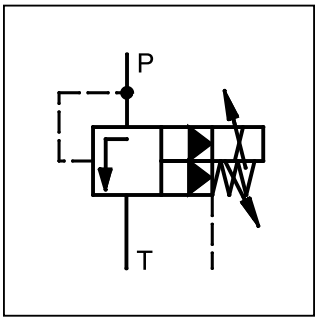
Features

- Pilot operated with proportional solenoid.
- Continuous adjustment by proportional solenoid.
- 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).

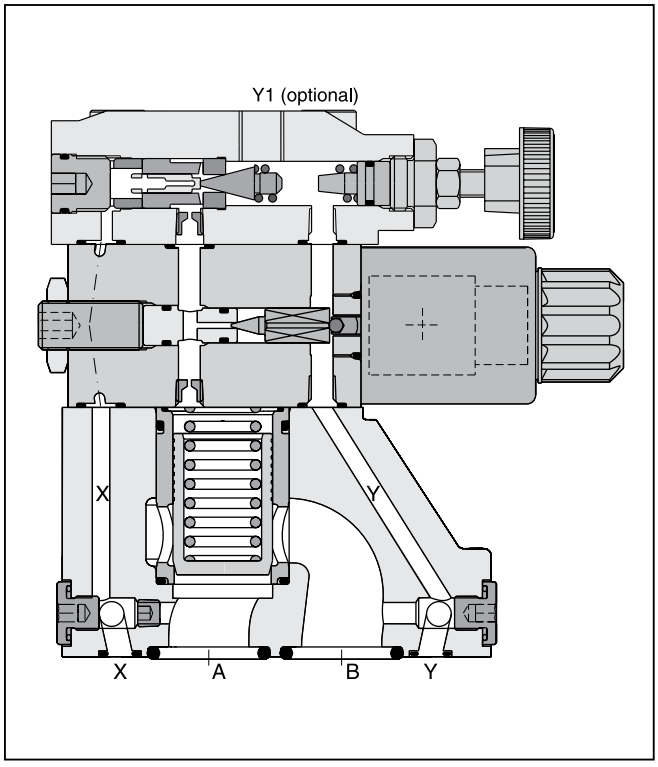
R4V

R6V

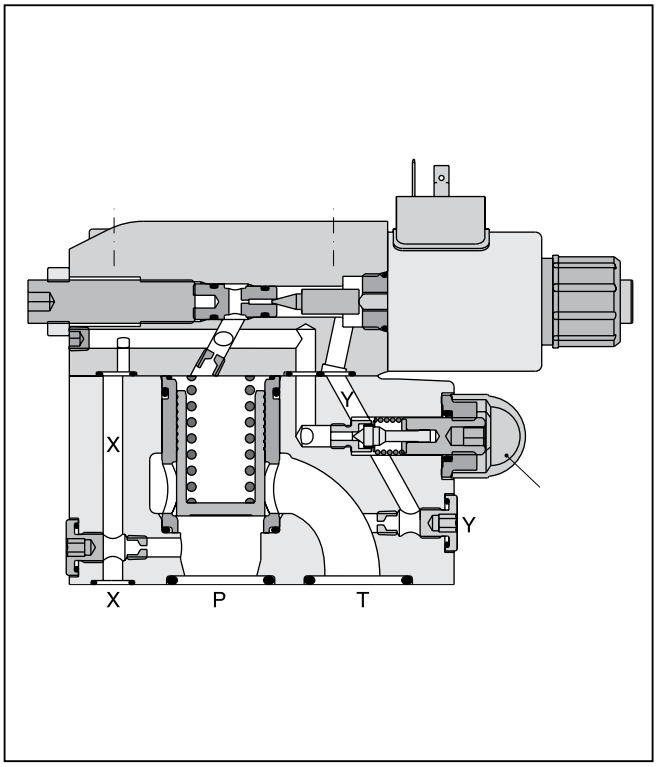




R4V



R6V



B

R	□	V	□	—	5	□	□	□	□	□	G0R	□	□	□
Pressure Relief Valve	Interface	Relief Function	Size		Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Range	Mechanical Adjustment	Pilot Oil	Options	Solenoid Voltage 12V 2.3A	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
P2	with Mechanical maximum adjustment
PS [4]	without Mechanical maximum adjustment

[4] R6V only

Code	Description
A	R4V
B	R6V

Code	Description
1	Nitrile
5	Fluorocarbon

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	NG 10 and 25 / NG 32
6		NG 10; 25; 32

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.)

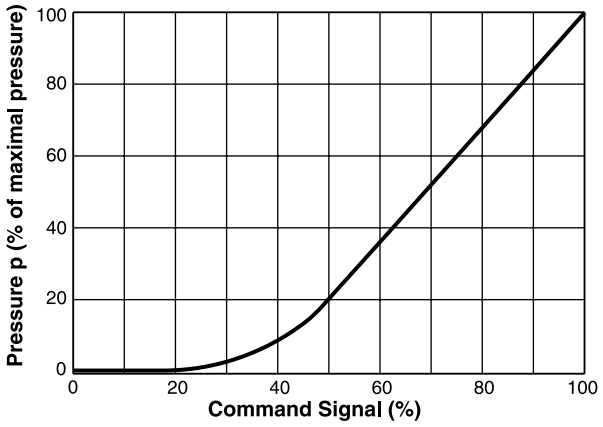
B

Specifications

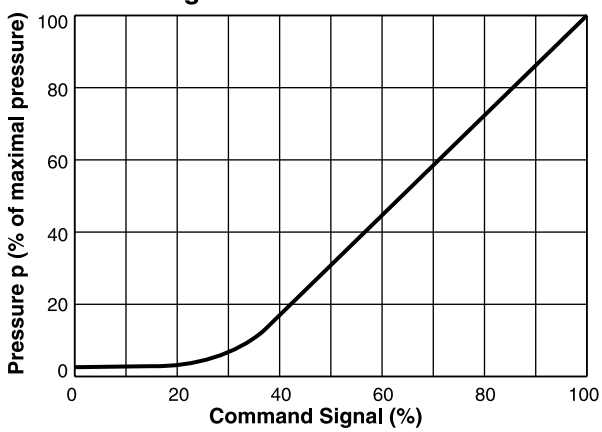
General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate Mounting acc. ISO 6264		
Mounting Position	As desired, horizontal position preferred		
Ambient Temperature Range	-20°C to +80°C (-4°F to +176°F)		
Hydraulic			
Maximum Operating Pressure	Ports P (or A) and X 350 Bar (5075 PSI); Port T (or B) and Y depressurized		
Pressure Range	105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)		
Nominal Flow			
R4V	150 LPM (39.7 GPM)	350 LPM (92.6 GPM)	650 LPM (172.0 GPM
R6V	250 LPM (66.1 GPM)	500 LPM (132.3 GPM)	650 LPM (172.0 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525		
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)		
Viscosity Permitted	20 to 380 cSt / mm^2/s (93 to 1761 SSU)		
Recommended	30 to 50 cSt / mm^2/s (139 to 232 SSU)		
Filtration	ISO Class 4406 (1999) 18/16/13		
Electrical (Proportional Solenoid)			
Duty Ratio	100% ED		
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)		
Supply Voltage	12 VDC (maximum current 2.3 amps) or 16 VDC (maximum current 1.3 amps)		
Coil Resistance	4 Ohm at 20°C (68°F)		
Solenoid Connectors	Connector as per EN 175301-803		
Power Amplifier, Recommended	PCD00A-400		

Performance Curves

Signal / Pressure – R4V

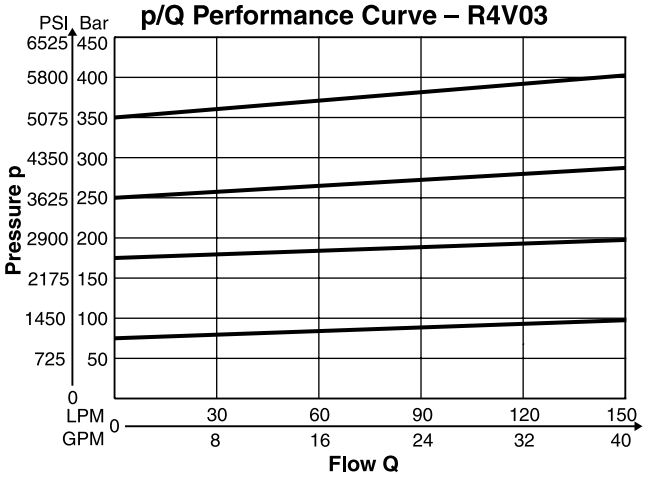


Signal / Pressure – R6V

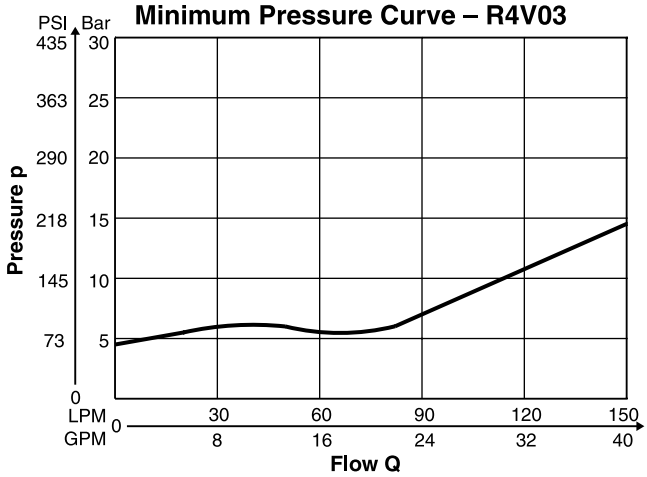


B

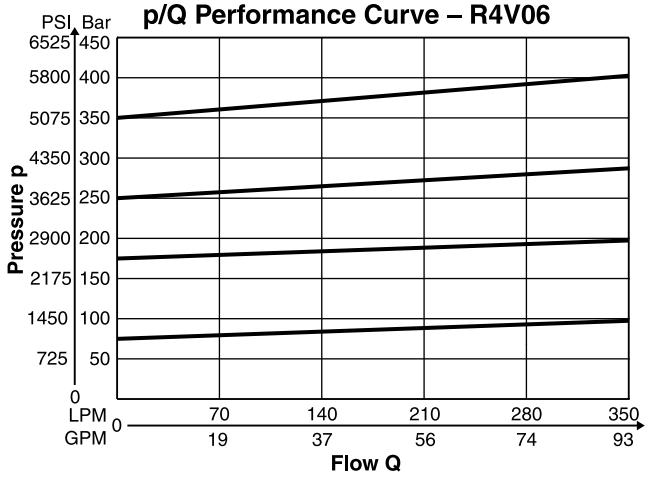
p/Q Performance Curve – R4V03



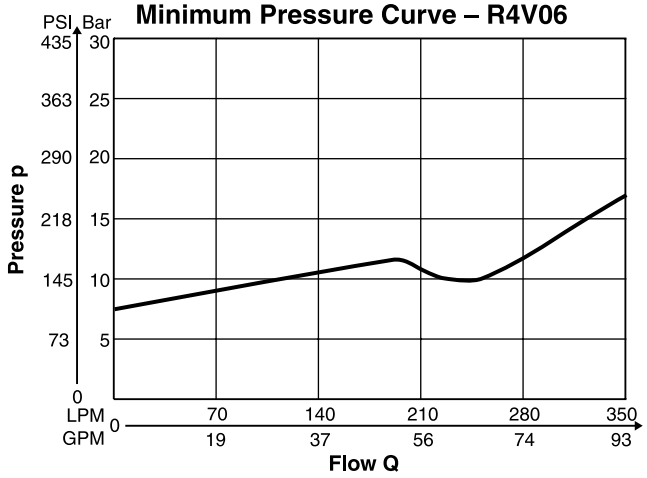
Minimum Pressure Curve – R4V03



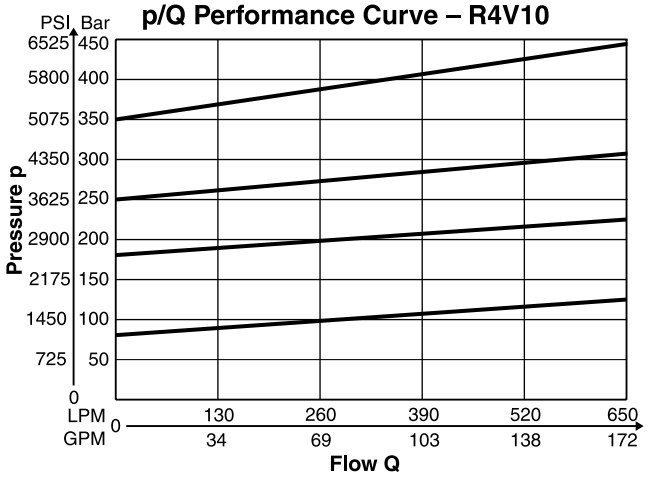
p/Q Performance Curve – R4V06



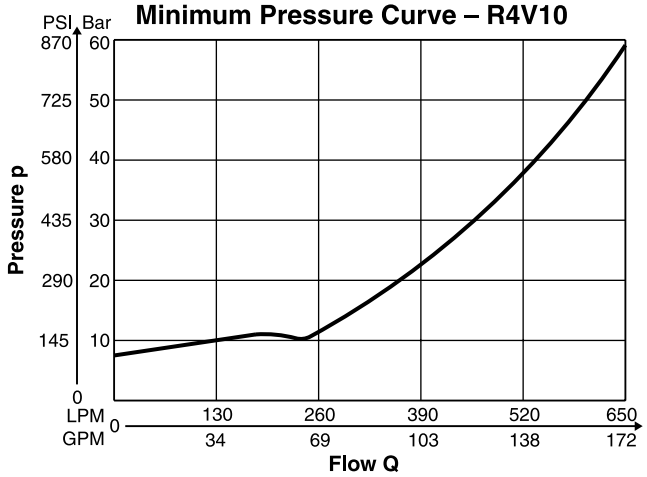
Minimum Pressure Curve – R4V06



p/Q Performance Curve – R4V10



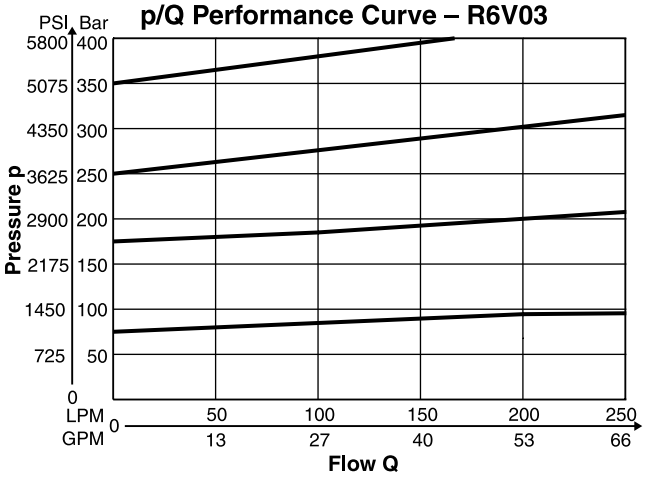
Minimum Pressure Curve – R4V10



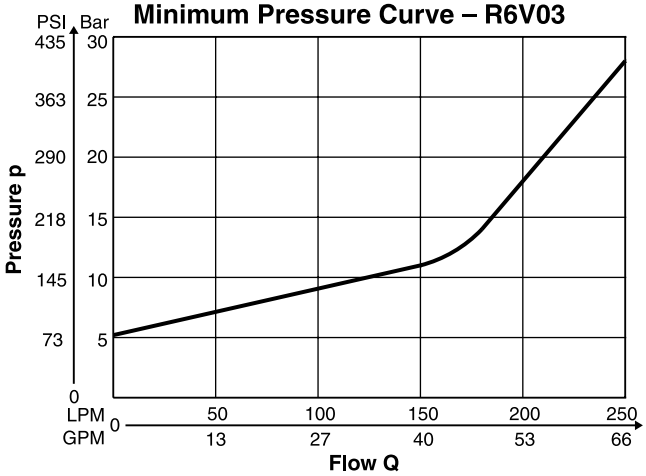
The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

B

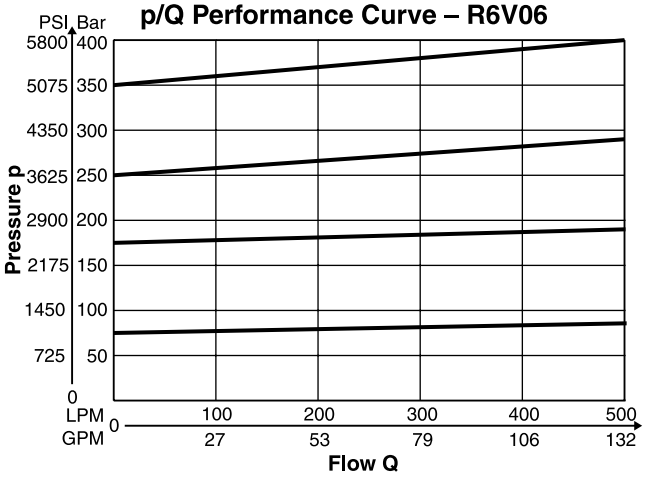
p/Q Performance Curve – R6V03



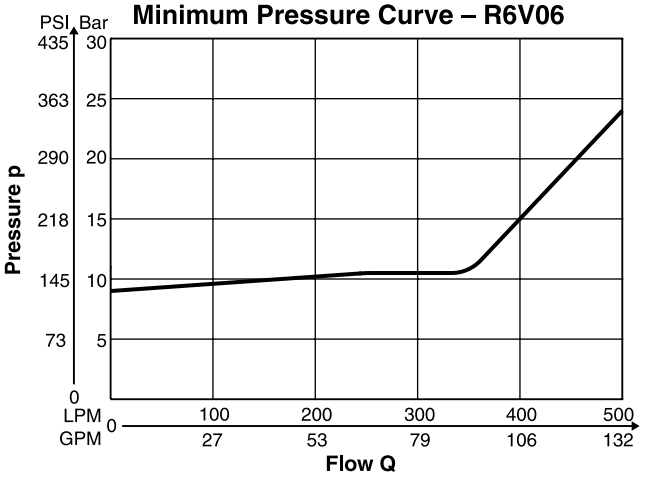
Minimum Pressure Curve – R6V03



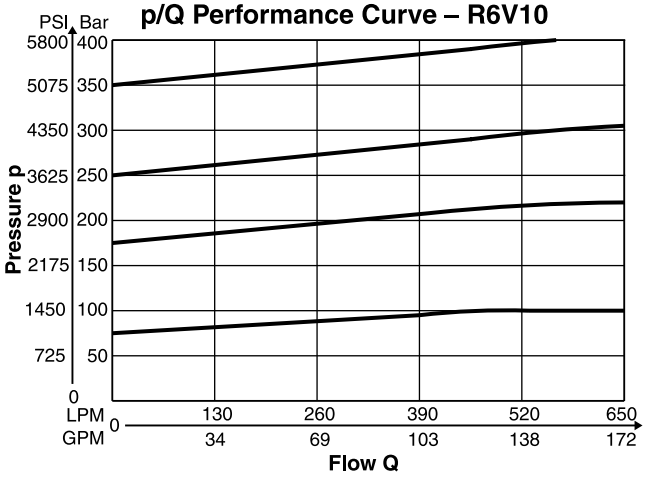
p/Q Performance Curve – R6V06



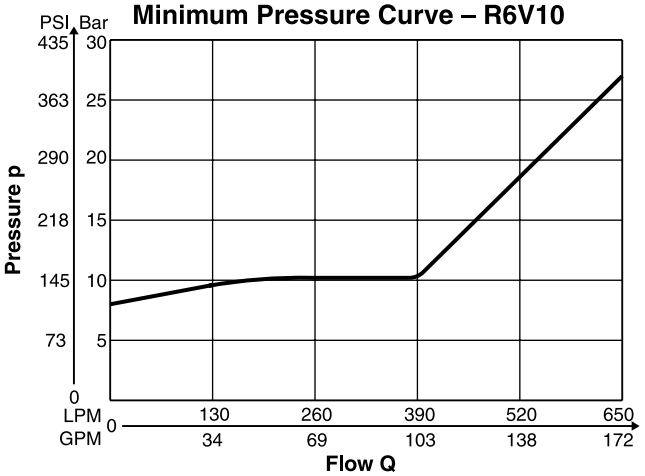
Minimum Pressure Curve – R6V06



p/Q Performance Curve – R6V10

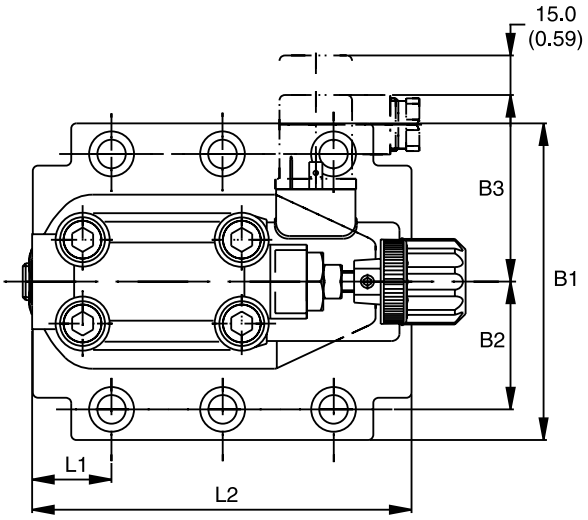


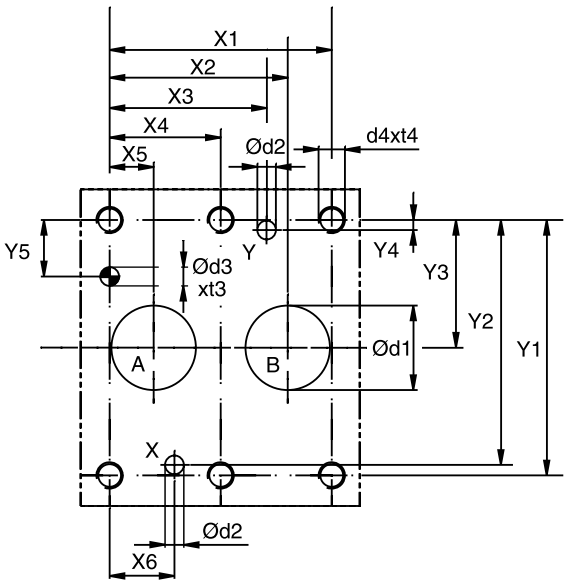
Minimum Pressure Curve – R6V10

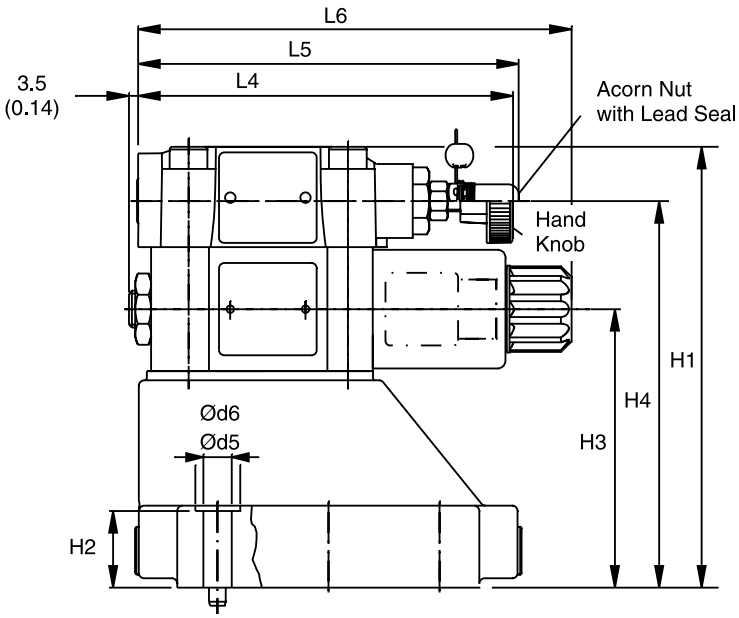


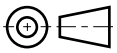
The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

B









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

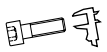
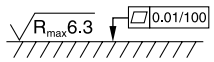
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	–	7.2 (0.28)	21.5 (0.85)	0	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	–
25	6264-08-11-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	20.6 (0.81)	0	79.4 (3.13)	73 (2.87)	39.7 (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.

B

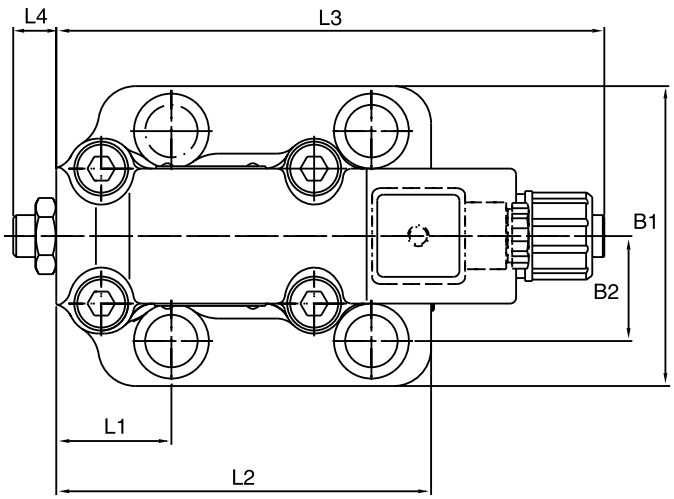
NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	71.0 (2.80)	130.0 (5.12)	21.0 (0.83)	68.5 (2.70)	109.5 (4.31)	–	29.0 (1.14)	94.8 (3.73)	–	143.0 (5.63)	144.8 (5.70)	164.8 (6.49)
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.56)	71.0 (2.80)	156.5 (6.16)	29.0 (1.14)	95.0 (3.74)	136.0 (5.35)	–	34.7 (1.37)	126.8 (4.99)	–	143.0 (5.63)	144.8 (5.70)	164.8 (6.49)
32	6264-10-15-*-97	120.0 (4.72)	48.4 (1.91)	71.0 (2.80)	167.0 (6.57)	29.0 (1.14)	105.5 (4.15)	146.5 (5.77)	–	30.6 (1.18)	143.3 (5.68)	–	143.0 (5.63)	144.8 (5.70)	164.8 (6.49)

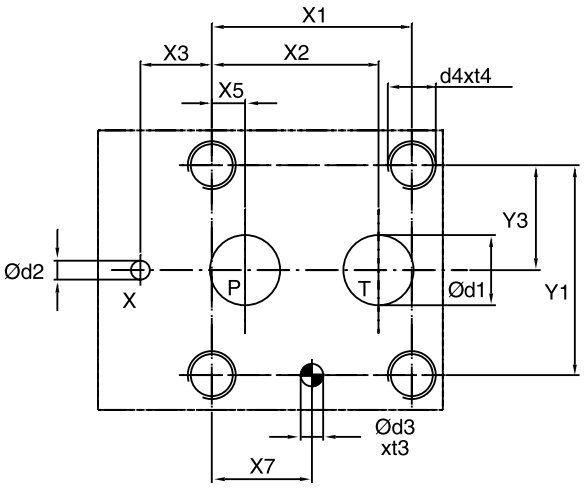
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6	Subplate
10	6264-06-07-*-97	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)	SPP3M6B910
25	6264-08-11-*-97	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)	SPP6M8B910
32	6264-10-15-*-97	32.0 (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

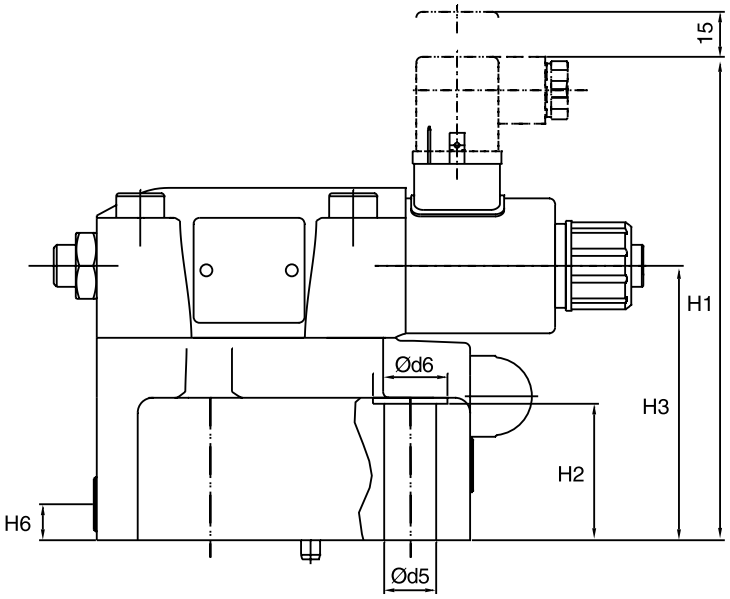
NG	ISO-code	Bolt Kit			Seal Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK505	4x M10 x 35 DIN912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0	S26-58507-5	
25	6264-08-11-*-97	BK485	4x M10 x 45 DIN912 12.9		S26-58475-0	S26-58475-5	
32	6264-10-15-*-97	BK506	6x M10 x 45 DIN912 12.9		S26-58508-0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

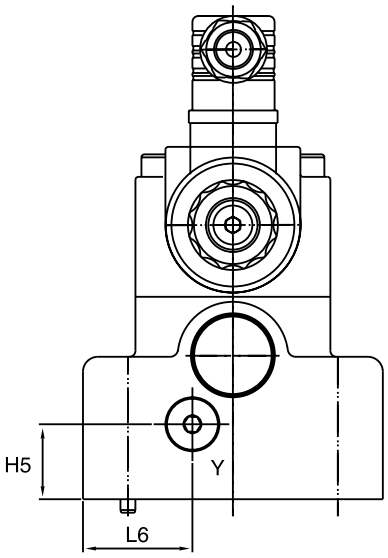
* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

B

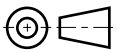








Y: external drain port G 1/8"



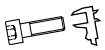
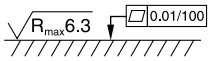
Inch equivalents for millimeter dimensions are shown in (**)

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)	52.5 (2.07)	118.5 (4.67)	182.3 (7.18)	14.4 (0.57)	–	29.5 (1.16)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	161.2 (6.35)	45.5 (1.19)	91.5 (3.60)	–	25.0 (0.98)	12.0 (0.47)	37.9 (1.49)	124.5 (4.90)	182.3 (7.18)	14.4 (0.57)	–	36.5 (1.44)
32	6264-10-17-*-97	120.0 (4.72)	41.3 (1.63)	166.7 (6.56)	52.0 (2.05)	97.0 (3.82)	–	26.5 (1.04)	13.5 (0.53)	45.0 (1.77)	153.0 (6.02)	182.3 (7.18)	14.4 (0.57)	–	46.5 (1.83)

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6	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.) ±15%	S26-96396-0	S26-96396-5	
25	6264-08-13-*-97	BK366	4x M16 x 70 DIN912 12.9	264 Nm (194.7 lb.-ft.) ±15%	S26-98589-0	S26-98589-5	
32	6264-10-17-*-97	BK507	4x M18 x 75 DIN912 12.9	398 Nm (293.5 lb.-ft.) ±15%	S26-96392-0	S26-96392-5	

B

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.

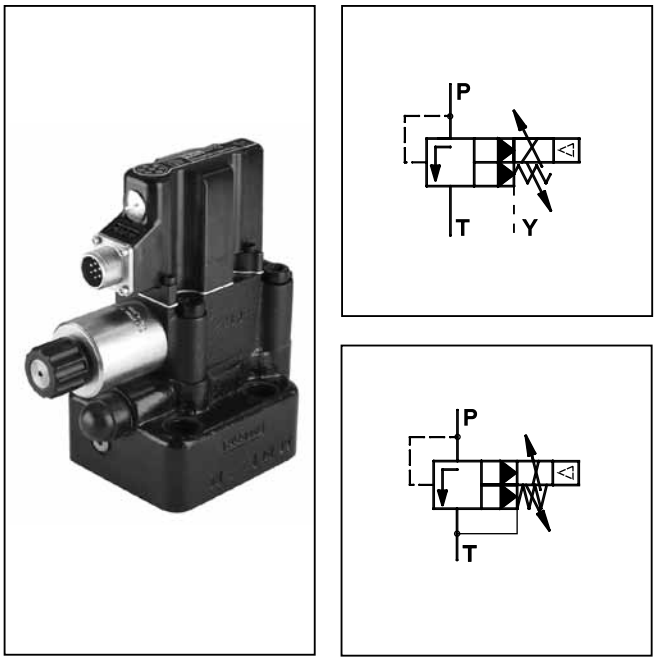
The nominal values of the valves are factory set. Additionally the ProPxD software permits the editing of all parameters. The software is also used for the digital electronic modules. The cable for connection to a serial RS232 interface is available as accessory.

The electrical connection is available in 2 options:

Code 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)

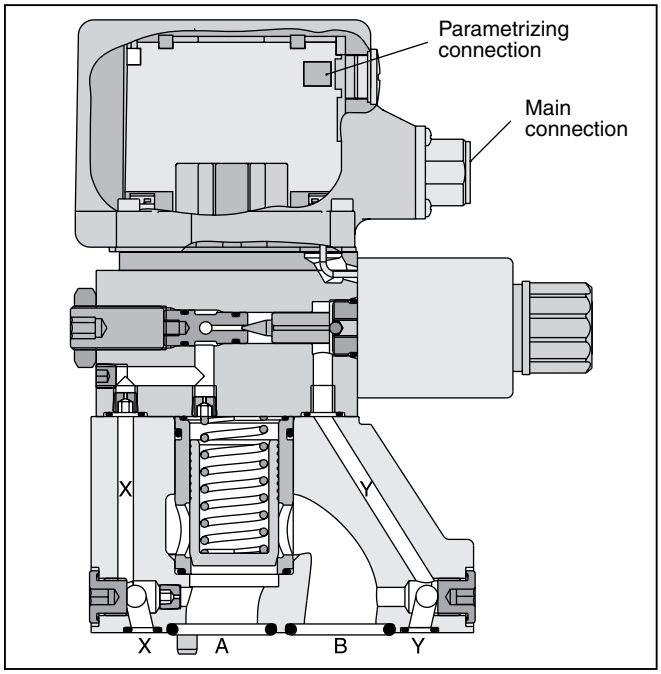
The proportional solenoid operated pilot stage with integrated electronics controls a seated type main stage. The valves are available with an optional mechanical maximum pressure adjustment.



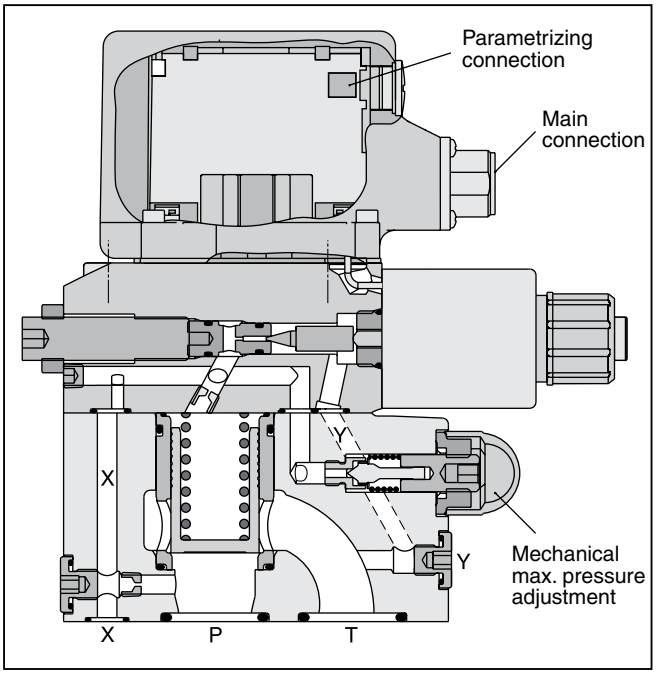
Features

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



R4V-R6V-OBE.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

Ordering Information

R		V		—	5			P							
Pressure Relief Valve	Interface	Relief Function	Size		Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Range	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 = 1/8"

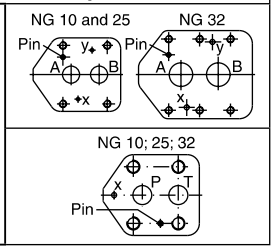
Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
A	R4V
B	R6V

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

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



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

[1] R4V only

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

Bolt Kits:

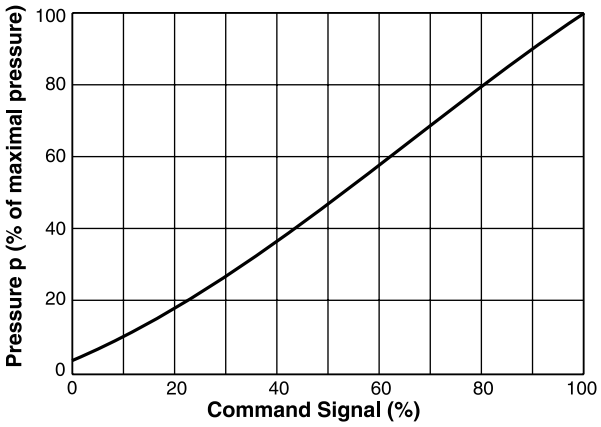
R4V03	BK505
R4V06	BK485
R4V10	BK506
R6V03	BK494
R6V06	BK366
R6V10	BK507

Weight:

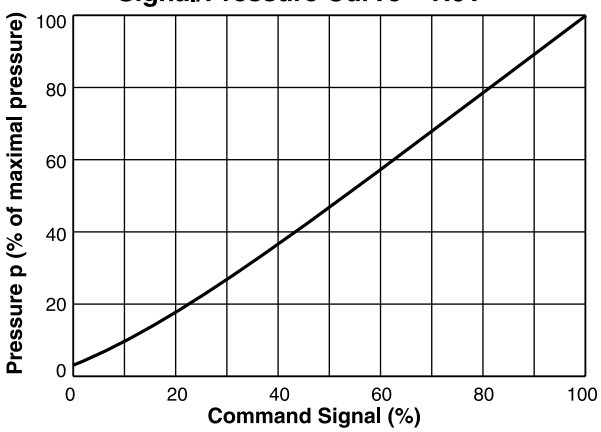
R4V03	4.5 kg (9.9 lbs.)
R4V06	6.3 kg (13.9 lbs.)
R4V10	7.8 kg (17.2 lbs.)
R6V03	5.4 kg (11.9 lbs.)
R6V06	6.6 kg (14.6 lbs.)
R6V10	8.6 kg (19.0 lbs.)

Performance Curves

Signal/Pressure Curve – R4V



Signal/Pressure Curve – R6V



R4V-R6V-OBE.indd, dd

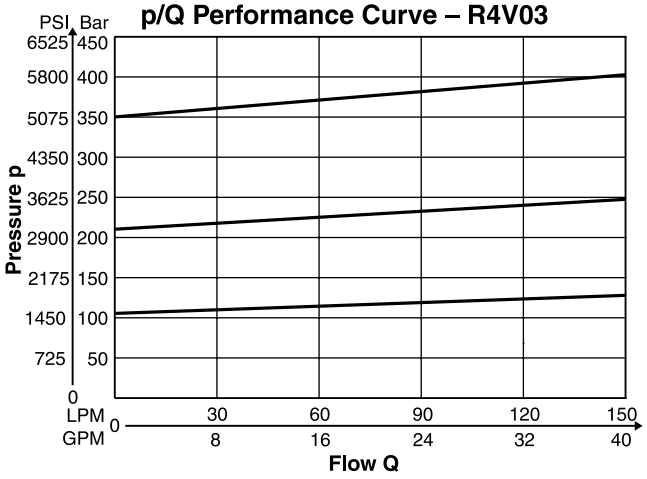
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

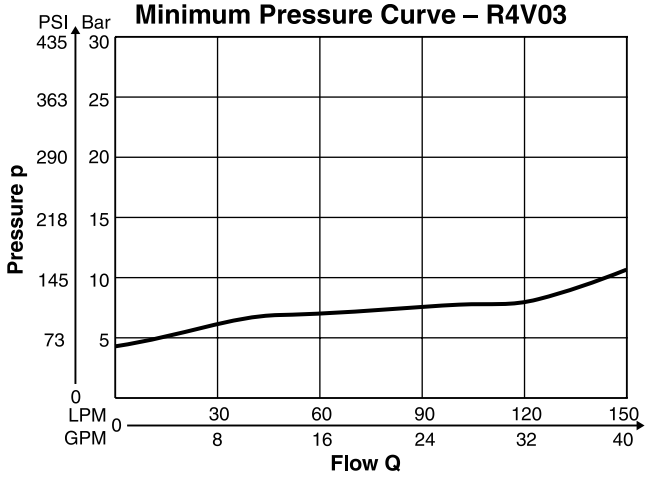
General			
Size	NG10	NG25	NG32
Interface	Subplate mounting acc. ISO 6264		
Mounting Position	as desired, horizontal mounting prefered		
Ambient Temperature [°C]	-20...+60; (-4°F ... +140°F)		
$MTTF_D$ Value [years]	50		
Vibration Strength [g]	10 sinus 5...2000 Hz acc. to IEC 68-2-6 30 noise 20...2000 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** **Series 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 according to DIN 51524 ... 525		
Viscosity **Recommended [cSt] / [mm²/s]** **Permitted [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		
Hysteresis [%]	< 1.5		
Electrical			
Duty Ratio ED [%]	100		
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]** **Code 4MA Current [mA]**	 0...+10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm 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] **[V]**	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)		
Adjustment Ranges **Minimum current [%]** **Maximum current [%]** **Ramp [s]**	 0...50 50...100 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

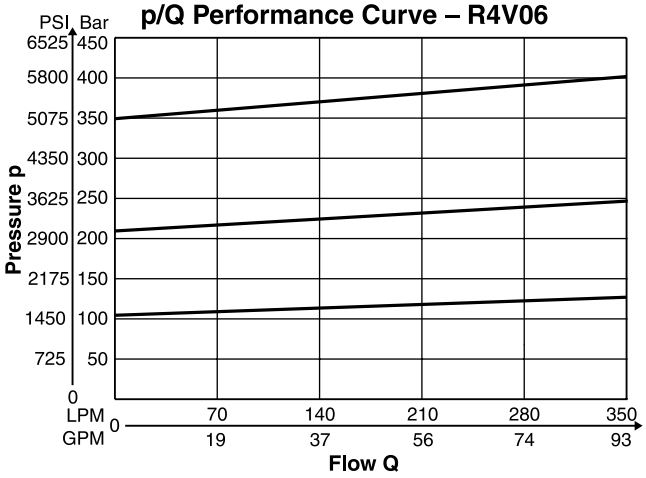
p/Q Performance Curve – R4V03



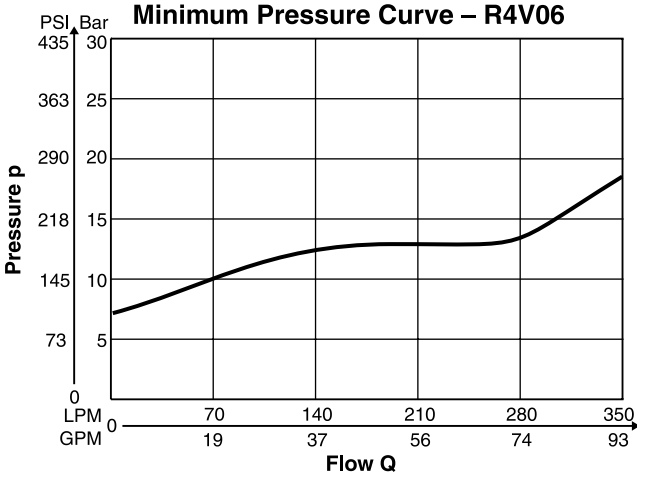
Minimum Pressure Curve – R4V03



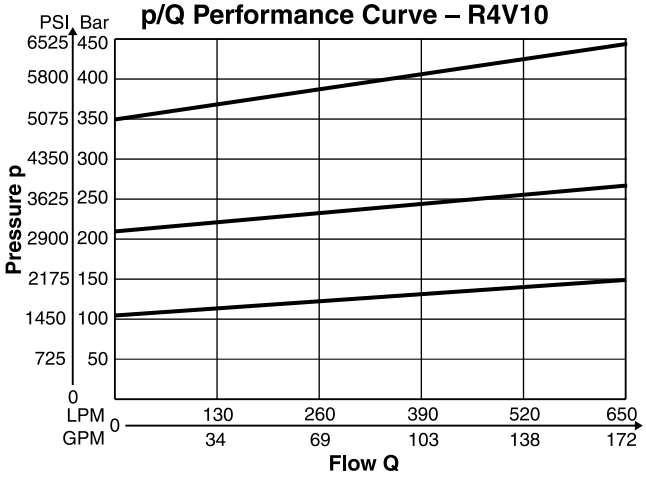
p/Q Performance Curve – R4V06



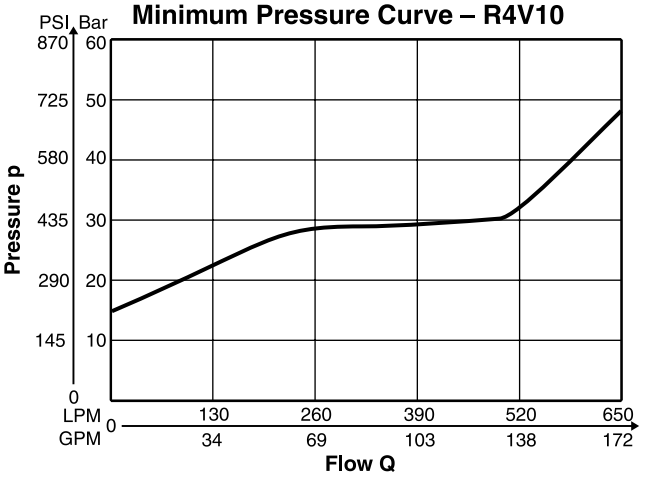
Minimum Pressure Curve – R4V06



p/Q Performance Curve – R4V10

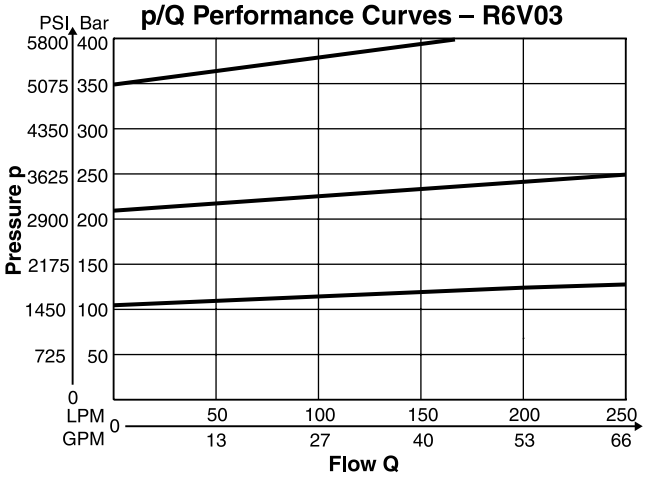


Minimum Pressure Curve – R4V10

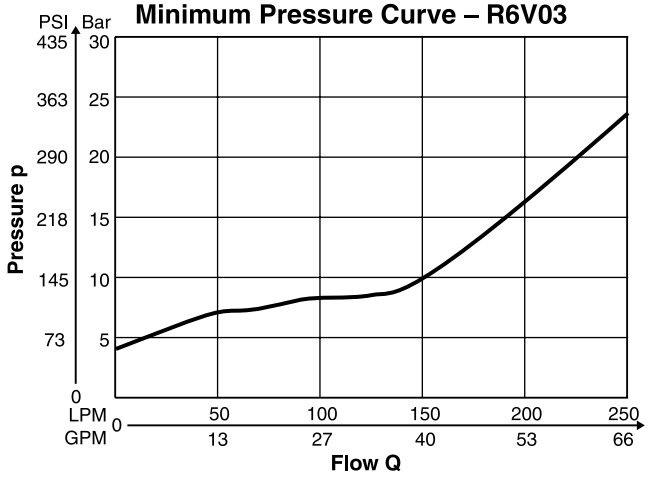


B

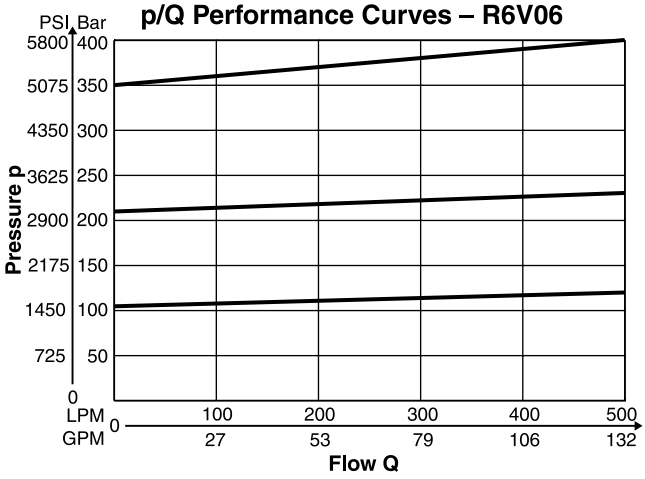
p/Q Performance Curves – R6V03



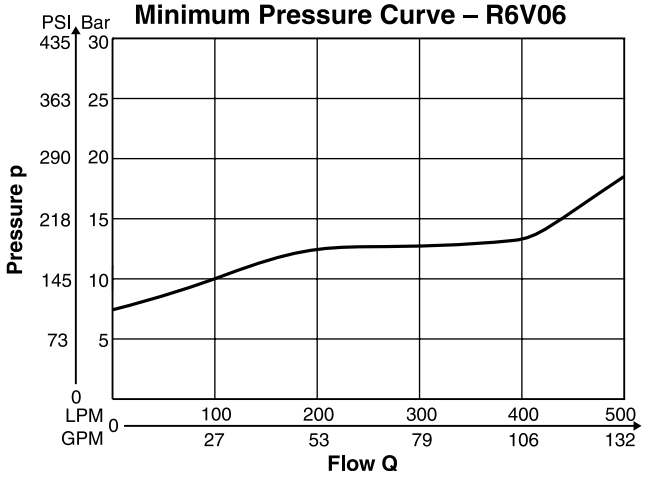
Minimum Pressure Curve – R6V03



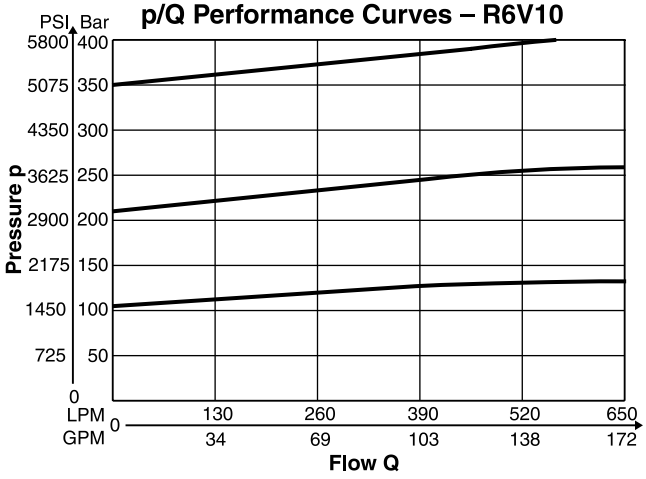
p/Q Performance Curves – R6V06



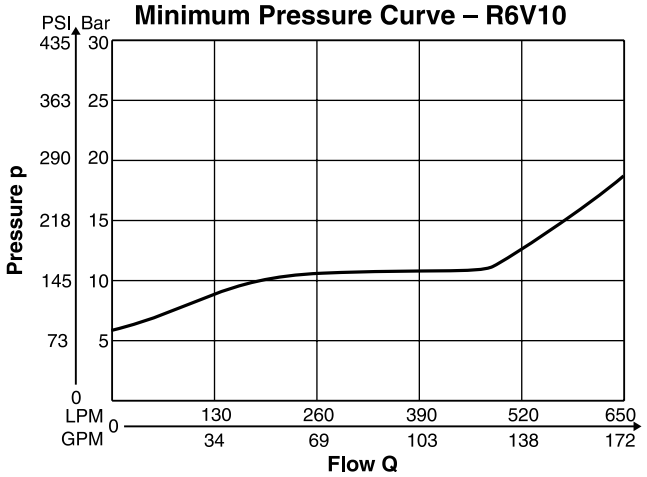
Minimum Pressure Curve – R6V06



p/Q Performance Curves – R6V10

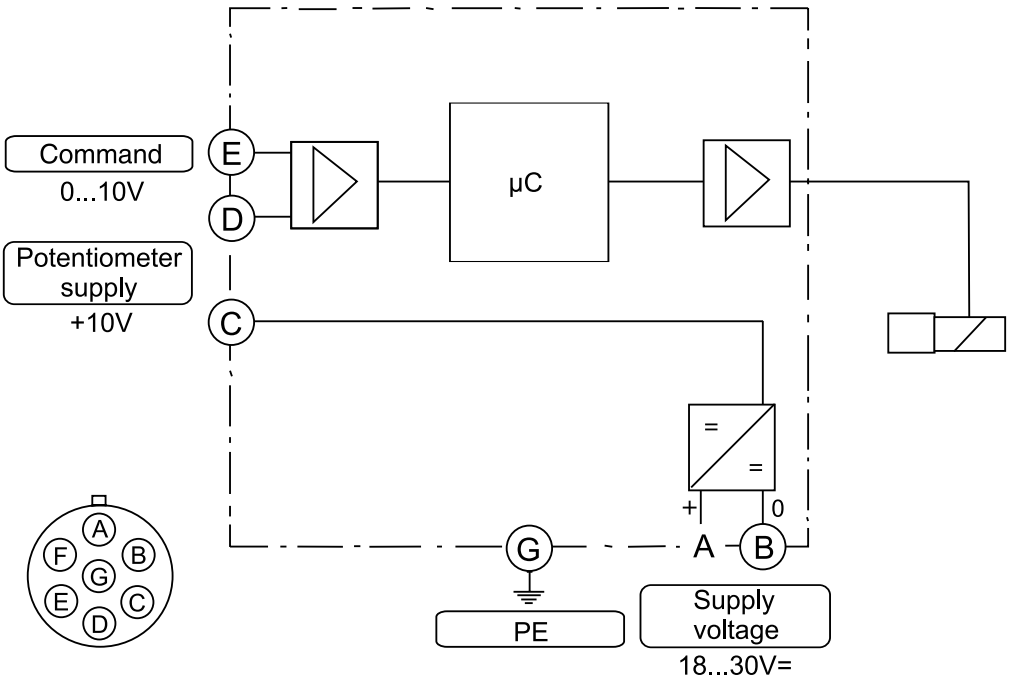


Minimum Pressure Curve – R6V10

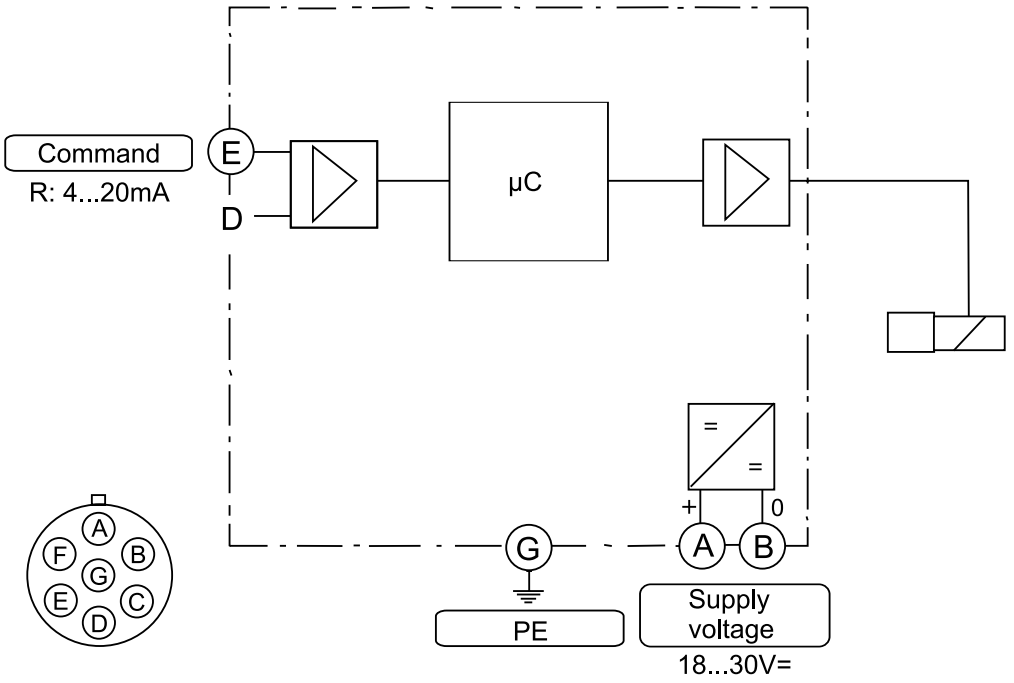


B

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



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



ProPxD Interface Program

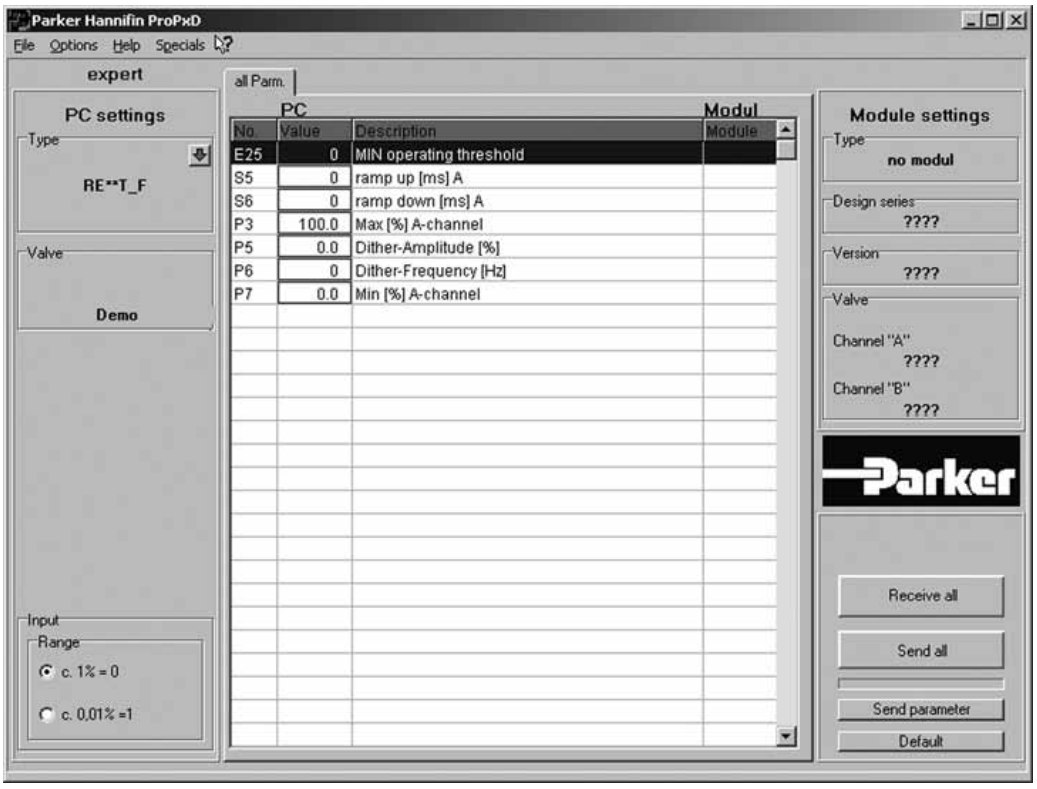
The new ProPxD software permits comfortable parameter setting for the electronic modules series PCD, PWD, PZD, PID and PWDXX.

Via the clearly arranged entry mask the parameters can be displayed 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 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

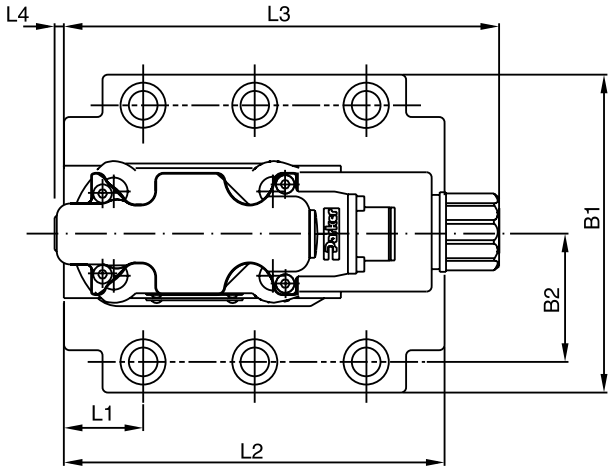
- Simple editing of all parameters.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronic via serial interface RS-232 and null modem cable.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd – see “Software Downloads”

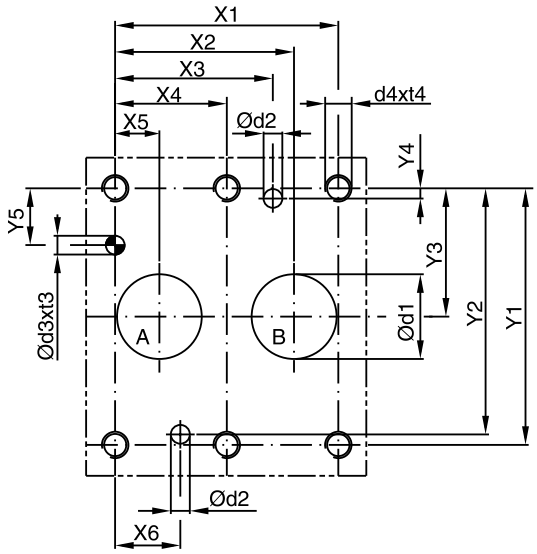
B

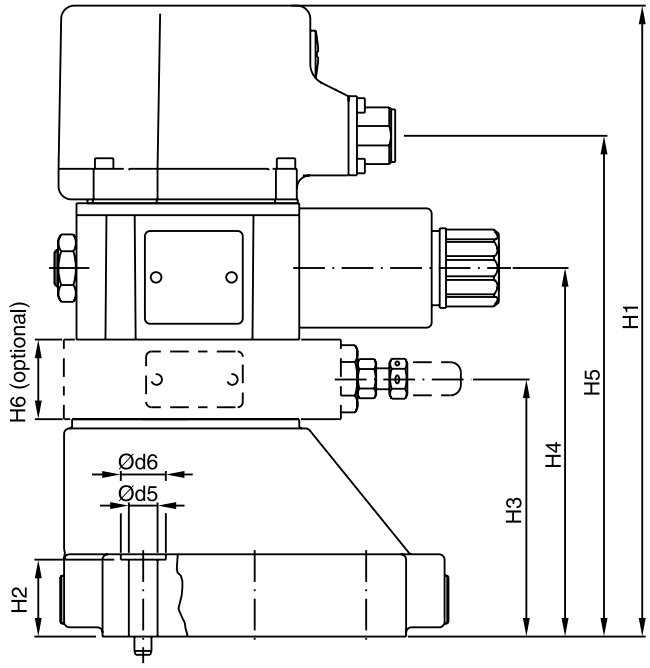


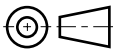
The parametrizing cable may be ordered under item no. 40982923.

B









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

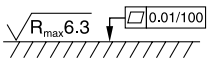
NG	ISO-Code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	–	7.2 (0.28)	21.5 (0.85)	0	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	–
25	6264-08-11-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	20.6 (0.81)	0	79.4 (3.13)	73 (2.87)	39.7 (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.

B

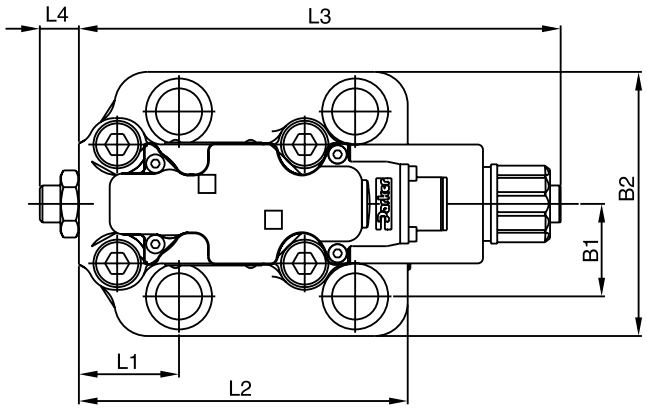
NG	ISO-Code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	200.3 (7.89)	21.0 (0.83)	60.0 (2.36)	102.0 (4.02)	151.0 (5.94)	30.0 (1.18)	28.3 (1.11)	94.1 (3.70)	164.2 (6.46)	4.5 (0.18)	–	–
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.56)	226.8 (8.93)	29.0 (1.14)	86.5 (3.41)	128.5 (5.06)	184.0 (7.24)	30.0 (1.18)	34.0 (1.34)	126.1 (4.96)	164.2 (6.46)	4.5 (0.18)	–	–
32	6264-10-15-*-97	120.0 (4.72)	48.4 (1.91)	237.3 (9.34)	29.0 (1.14)	97.0 (3.82)	139.0 (5.47)	194.5 (7.66)	30.0 (1.18)	29.9 (1.18)	143.6 (5.65)	164.2 (6.46)	4.5 (0.18)	–	–

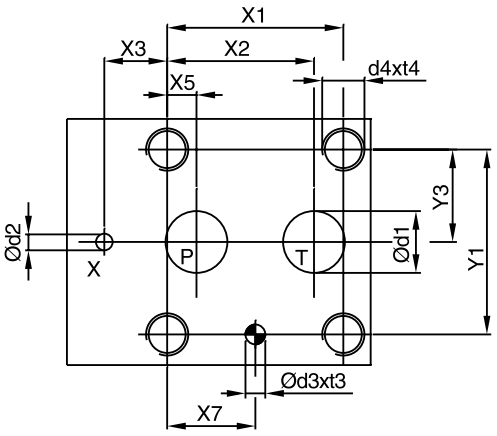
NG	ISO-Code	d1max	d2max	d3	t3	d4	t4	d5	d6	Subplate
10	6264-06-07-*-97	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)	SPP3M6B910
25	6264-08-11-*-97	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)	SPP6M8B910
32	6264-10-15-*-97	32.0 (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

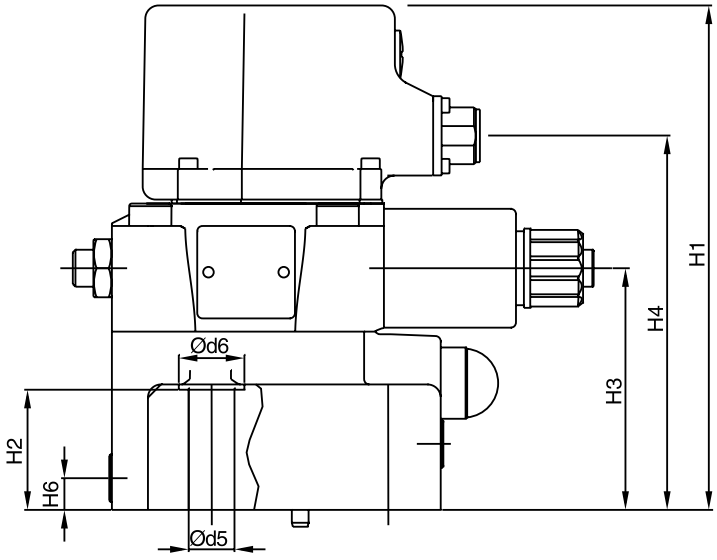
NG	ISO-Code	Bolt Kit			Seal Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK505	4x M10 x 35 DIN912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0*	S26-58507-5*	
25	6264-08-11-*-97	BK485	4x M10 x 45 DIN912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58475-0*	S26-58475-5*	
32	6264-10-15-*-97	BK506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

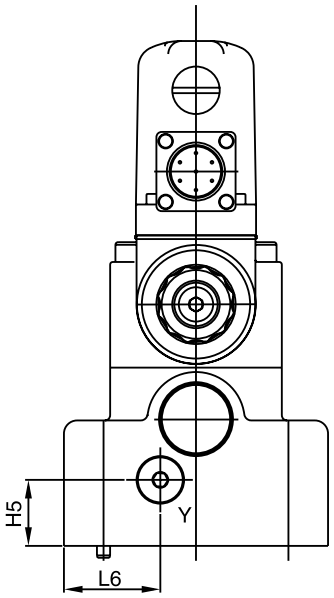
* Please combine seal kit of one size with seal kit of Prop. Section P2 for complete seal kit.

B

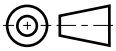








Y: external drain port G 1/8"



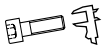
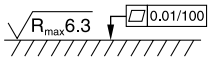
Inch equivalents for millimeter dimensions are shown in (**)

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)	52.5 (2.07)	118.5 (4.67)	182.3 (7.18)	14.4 (0.57)	–	29.5 (1.16)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	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)	45.0 (1.77)	153.0 (6.02)	182.3 (7.18)	14.4 (0.57)	–	46.5 (1.83)

NG	ISO-Code	d1max	d2max	d3	t3	d4	t4	d5	d6	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.) ±15%	S26-96396-0	S26-96396-5	
25	6264-08-13-*-97	BK366	4x M16 x 70 DIN912 12.9	264 Nm (194.7 lb.-ft.) ±15%	S26-98589-0	S26-98589-5	
32	6264-10-17-*-97	BK507	4x M18 x 75 DIN912 12.9	398 Nm (293.5 lb.-ft.) ±15%	S26-96392-0	S26-96392-5	

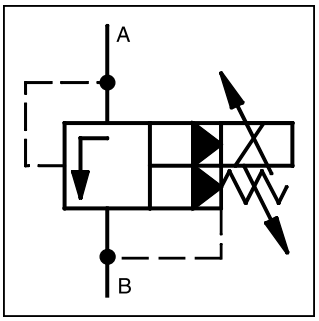
B

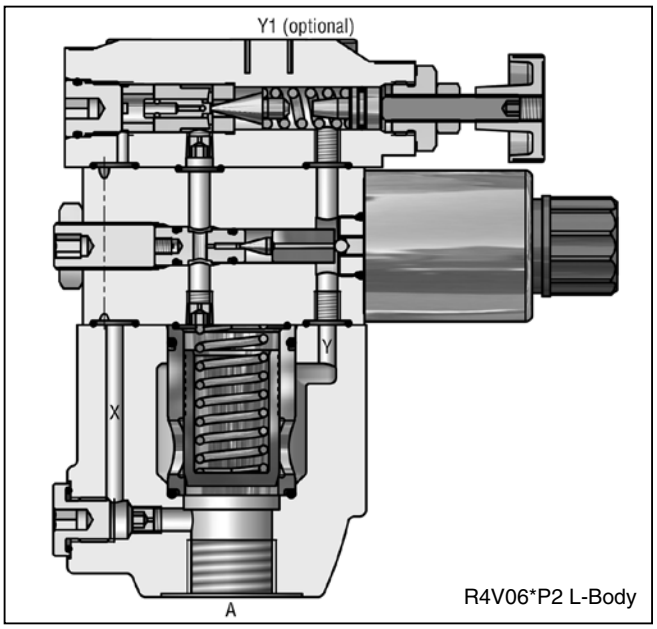
General Description

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

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


R4V*P2 L-Body





R4V06*P2 L-Body

Features

- Pilot operated with manual adjustment.
- Continuous adjustment by proportional solenoid.
- 2 interfaces:
  – L-body (R4V06-G3/4", R4V10-G1 1/4")
  – T-body (R4V03-G1/2", R4V06-G1")
- 3 pressure ranges.
- With mechanical maximum pressure adjustment.

Specifications

General				
	T-Body		**L-Body**	
Size	**03 (1/2")**	**06 (1")**	**06 (3/4")**	**10 (1-1/4")**
Mounting	Threaded Body			
Mounting Position	Unrestricted			
Ambient Temp. Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Max. Operating Pressure	Ports A and X up to 350 Bar (5075 PSI); Ports B and Y 30 Bar (435 PSI)			
Pressure Range	105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)			
Nominal Flow	60 LPM (15.9 GPM)	200 LPM (52.9 GPM)	200 LPM (52.9 GPM)	450 LPM (119.0 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525			
Fluid Temperature	-20°C to 80°C (-4°F to 176°F)			
Viscosity Permitted **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%			
Nominal Voltage	12 VDC			
Max. Current	2.3 amps			
Coil Resistance	4 Ohm at 20°C (68°F)			
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)			
Power Amplifier	PCD00A-400			

Ordering Information

R4V	☐	—	5	☐	☐	☐	☐	P2	G0R	A	☐	☐
Proportional Pressure Relief Valve	Size		Max Pressure 350 Bar (5075 PSI)	Body	Pressure Range	Adjustment	Drain Line	Proportional Pressure Control	Solenoid Voltage 12V 2.3A	Design Series	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
0	Internal
2	External from Pilot Head (Y1)

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
6	R4V03 T-Body R4V06 T-Body
D	R4V06 L-Body R4V10 L-Body

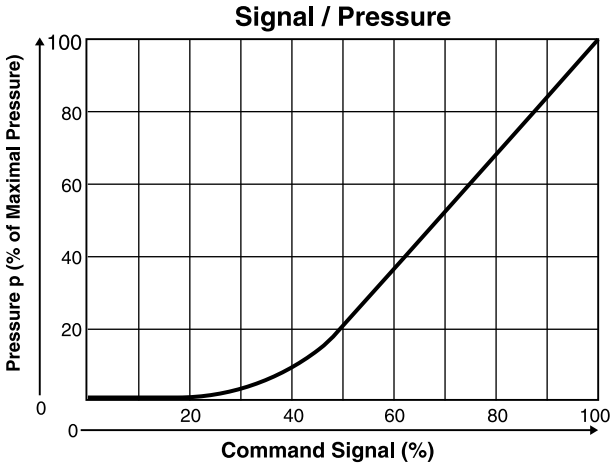
Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

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

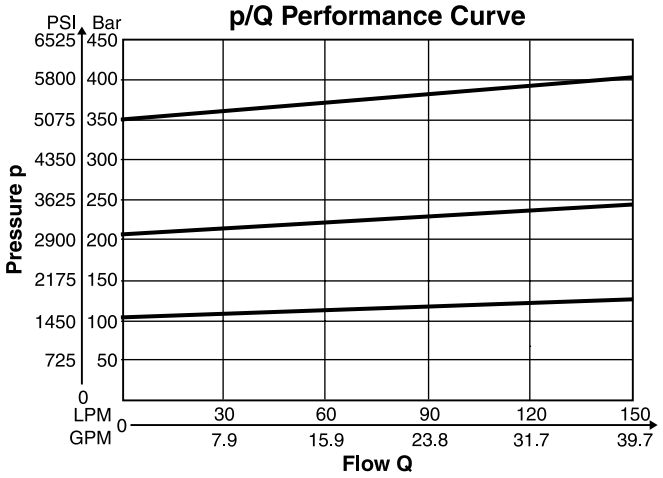
Weight:

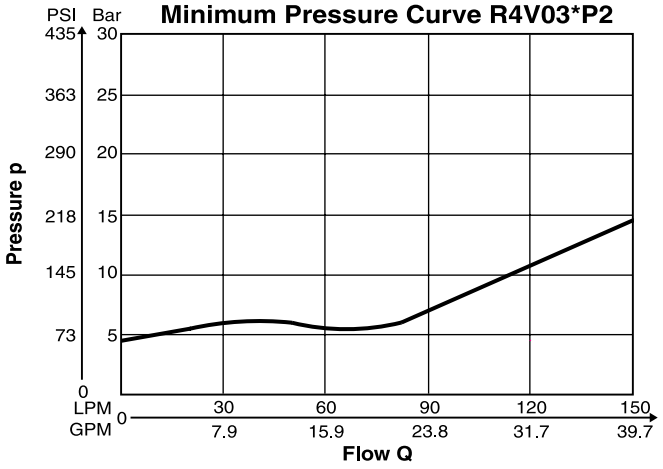
R4V03*P2	5.0 kg (11.0 lbs.)
R4V06*6*P2	5.1 kg (11.2 lbs.)
R4V06*D*P2	7.4 kg (16.3 lbs.)
R4V10*P2	8.4 kg (18.5 lbs.)

Performance Curve

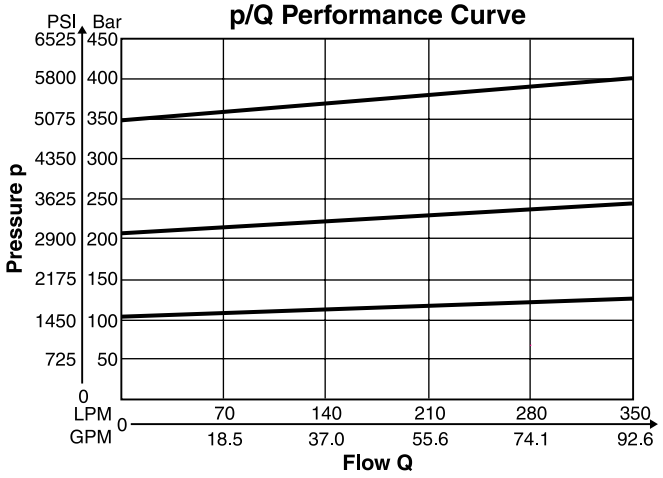


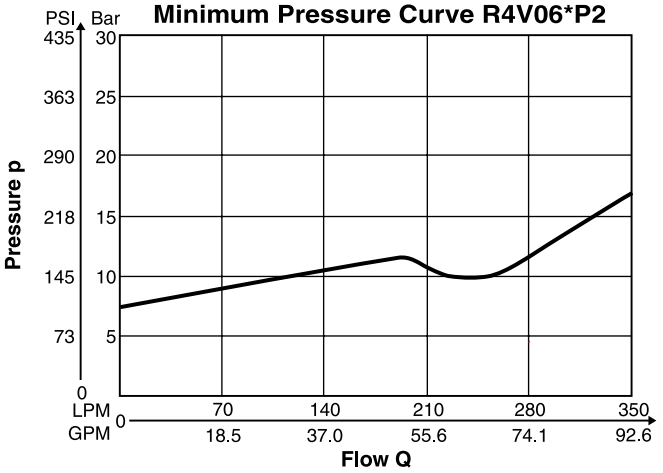
R4V03*P2 [1)]



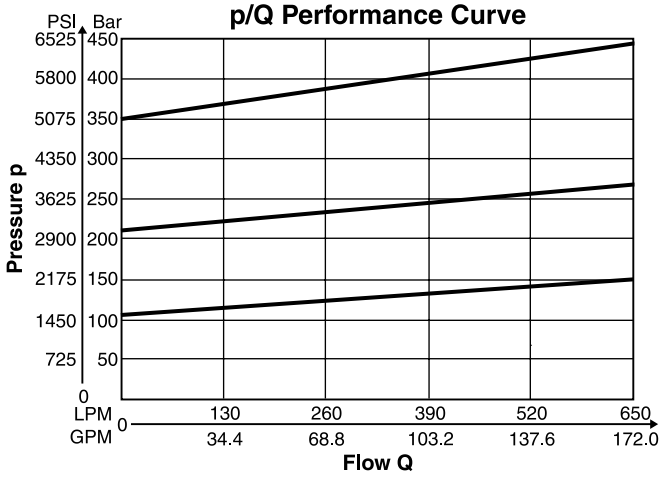


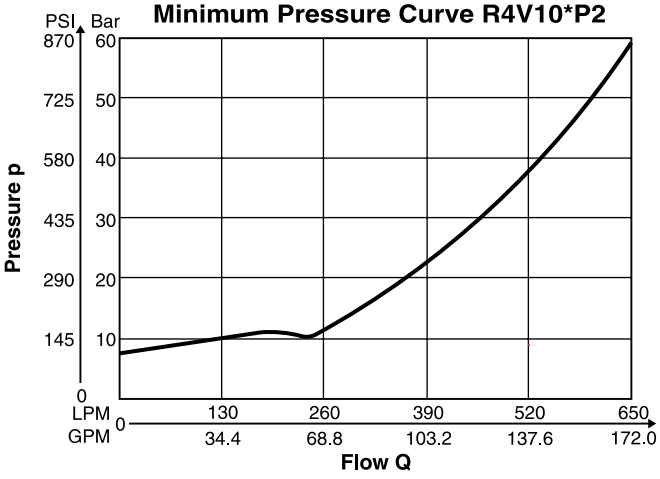
R4V06*P2 [1)]





R4V10*P2 [1)]

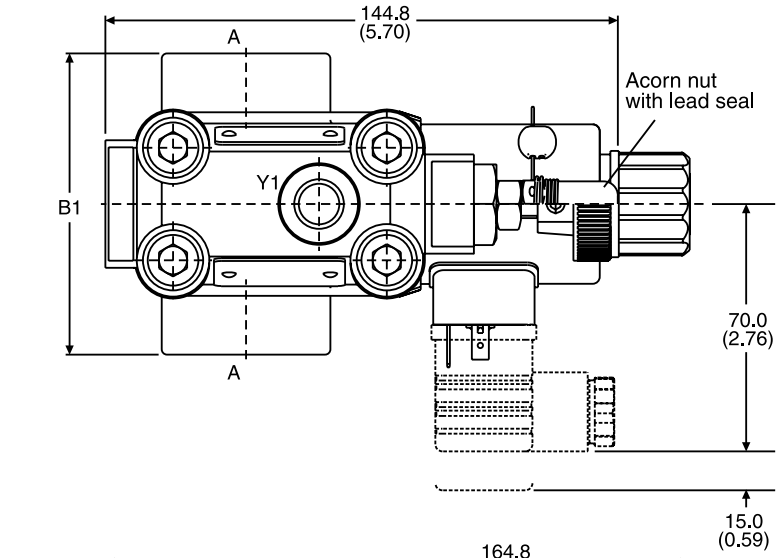


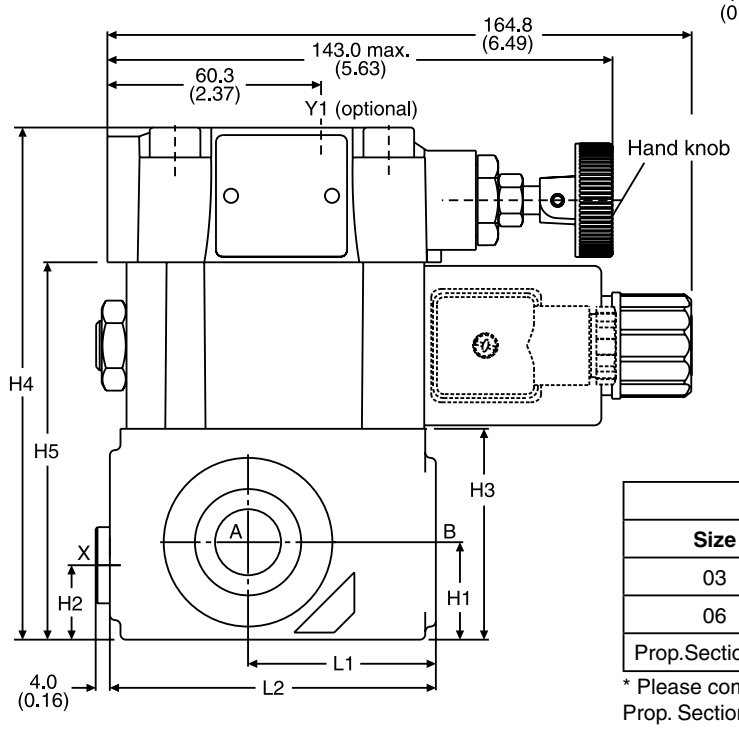


[1)] The performance curves are measured with external drain.
For internal drain, the tank pressure has to be added to the curve.

T-Body

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





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

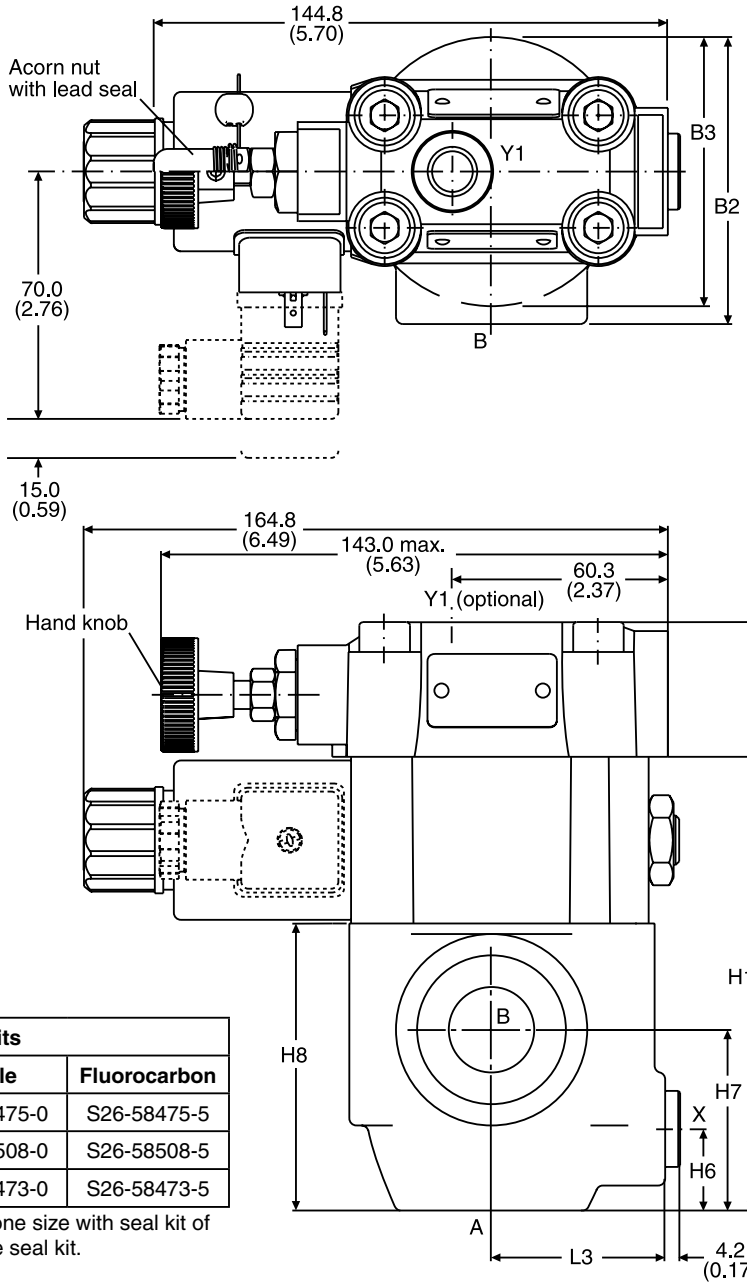
R4V_P2.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

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

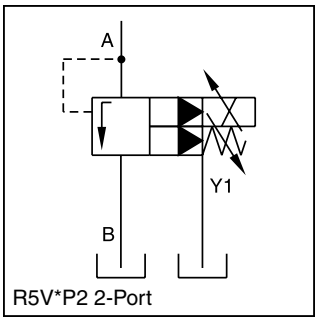
R4V_P2.indd, dd

General Description

Series R5V*P2 proportional pressure relief valves are based on the mechanical adjusted Series R5V. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.

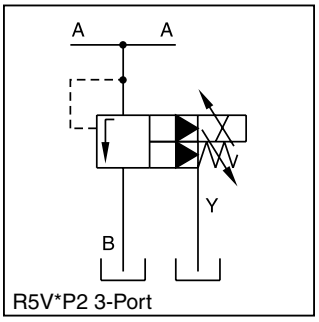
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.


R5V*P2 2-Port



R5V*P2 2-Port

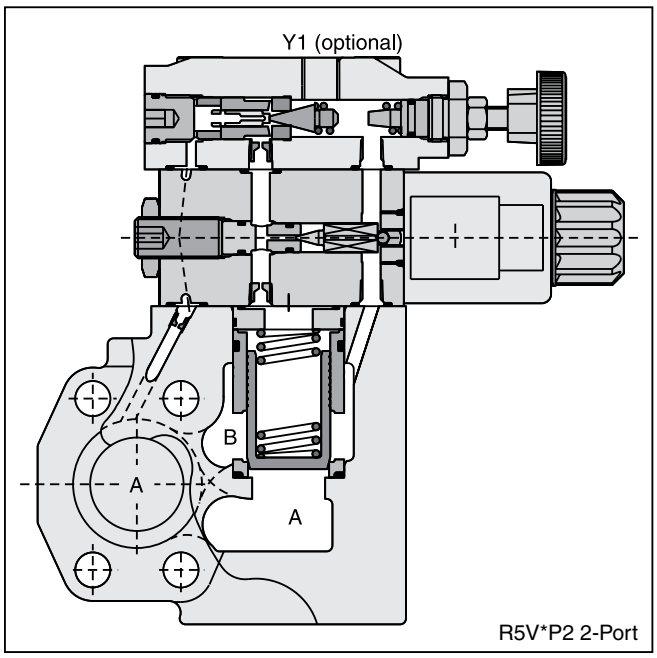

R5V*P2 3-Port



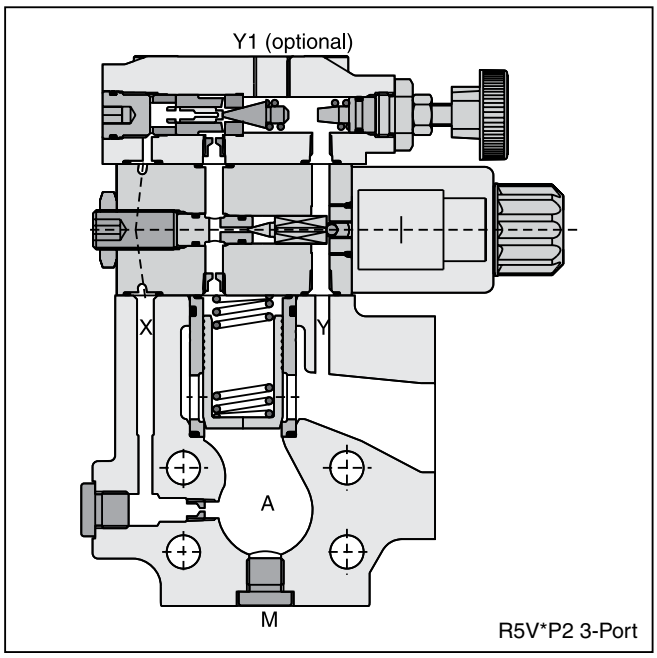
R5V*P2 3-Port

Features

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



R5V*P2 2-Port



R5V*P2 3-Port

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 ... 51525			
Fluid Temperature		-20°C to +80°C (-4°F to +176°F)			
Viscosity	**Permitted**	10 to 650 cSt / mm^2/s (46 to 3013 SSU)			
	Recommended	30 to 80 cSt / mm^2/s (139 to 371 SSU)			
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (Proportional Solenoid)					
Duty Ratio		100%			
Nominal Voltage		12 VDC			
Max. Current		2.3 amps			
Coil Resistance		4 Ohm at 20°C (68°F)			
Solenoid Connection		Connector as per EN175301-803			
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)			
Power Amplifier		PCD00A-400			

Ordering Information

R5V [ ] — [ ] [ ] [ ] [ ] [ ] [ ] **P2** **G0R** **A** [ ] [ ]

R5V	Size	—	SAE Interface	Pilot Ports	Pressure Range	Adjustment	Pilot Oil	P2	G0R	A	Seal	Options
Proportional Pressure Relief Valve								Proportional Pressure Control	Solenoid Voltage 12V 2.3A	Design Series		

Size

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

* R5V 3-Port only

SAE Interface

SAE 61

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

SAE 62

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

* R5V 3-Port only

Pilot Ports

2-Port Body

Code	Description
3*	No Ports
7	Y1 = G1/4"

3-Port Body

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

* 2-Port: only in combination with pilot oil code 2.

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

Pressure Range

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

Adjustment

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Pilot Oil

Code	Drain Line
2	Internal
6	External from Y1-Port

Seal

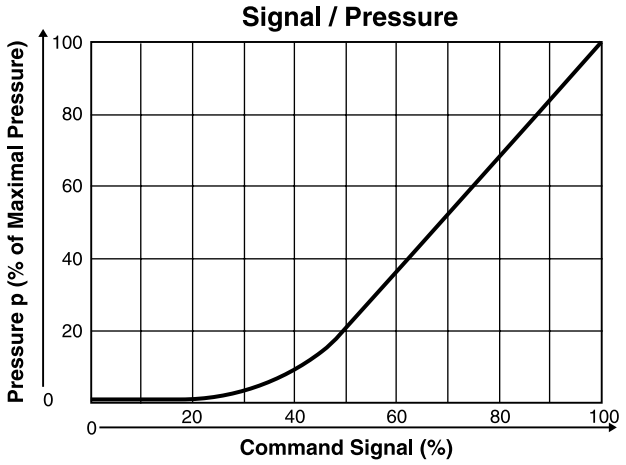
Code	Description
1	Nitrile
5	Fluorocarbon

Options

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

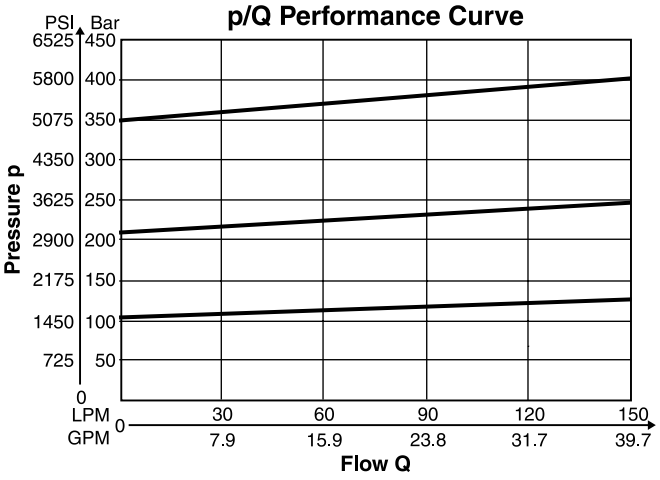
Weight:	2-Port	3-Port
R5V06*P2	5.8 kg (12.8 lbs.)	5.4 kg (11.9 lbs.)
R5V08*P2	6.4 kg (14.1 lbs.)	6.4 kg (14.1 lbs.)
R5V10*P2	7.7 kg (17.0 lbs.)	7.0 kg (15.4 lbs.)
R5V12*P2	——	9.8 kg (21.6 lbs.)

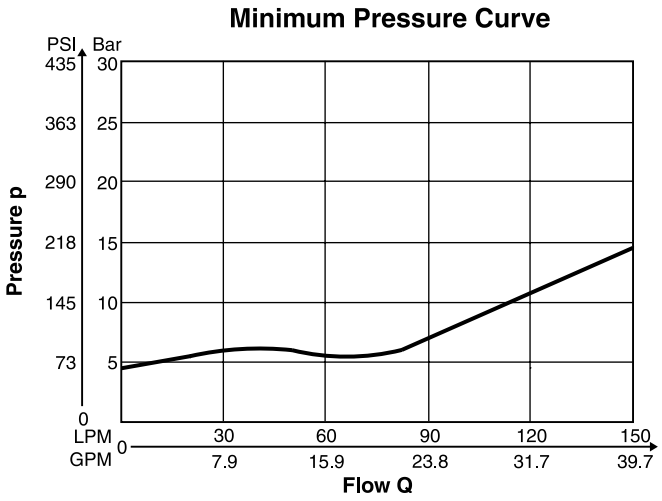
Performance Curve



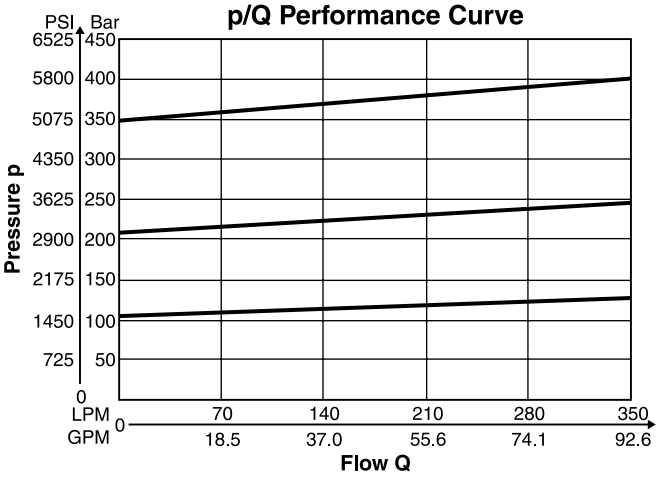
B

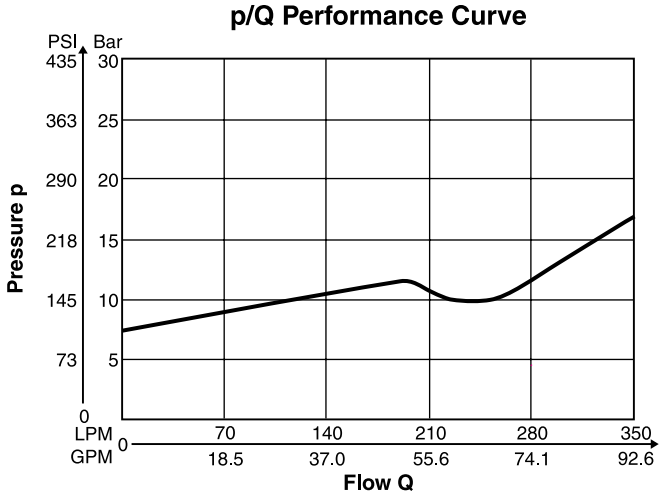
R5V06*P2 [1)]



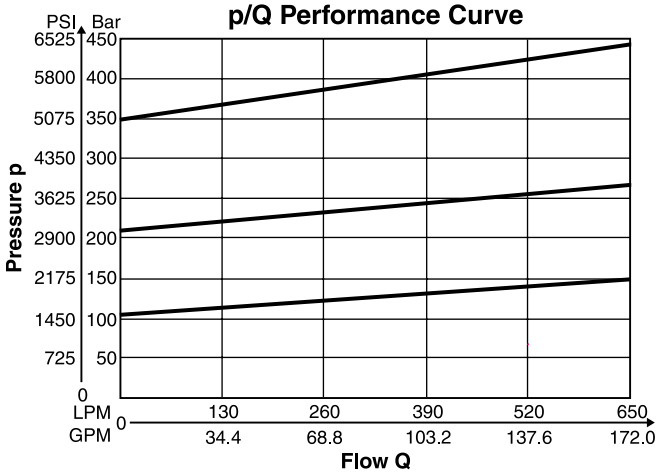


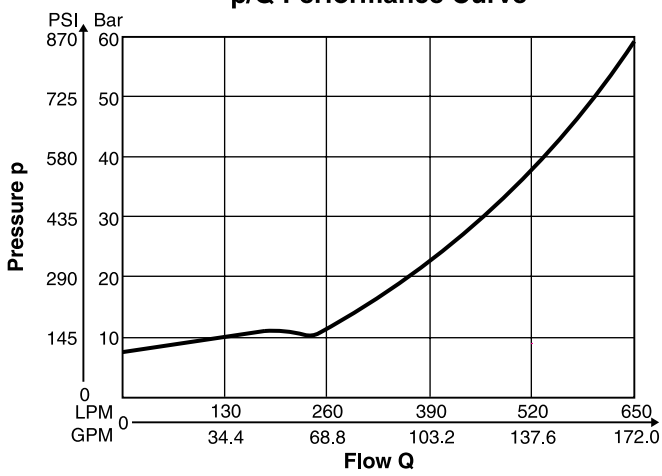
R5V08*P2 [1)]





R5V10*P2 [1)]





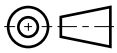
[1)] The performance curves are measured with external drain.
For internal drain, the tank pressure has to be added to the curve.

R5P_P2.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

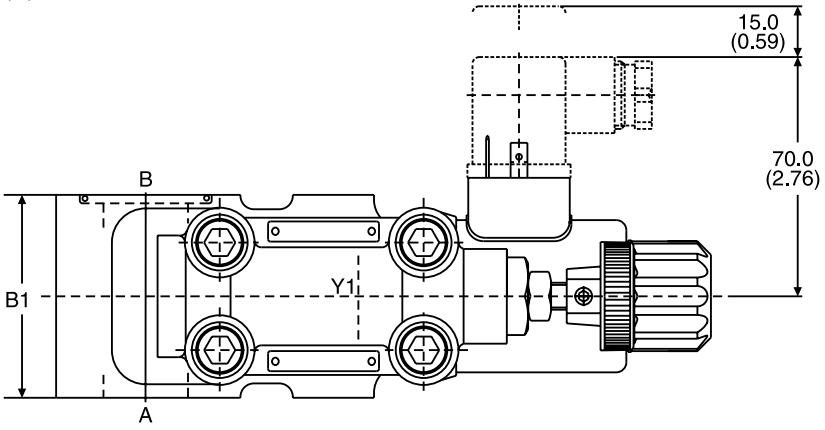
Inch equivalents for millimeter dimensions are shown in (**)

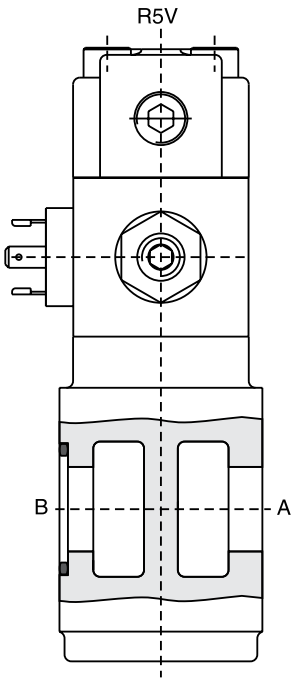
2-Port

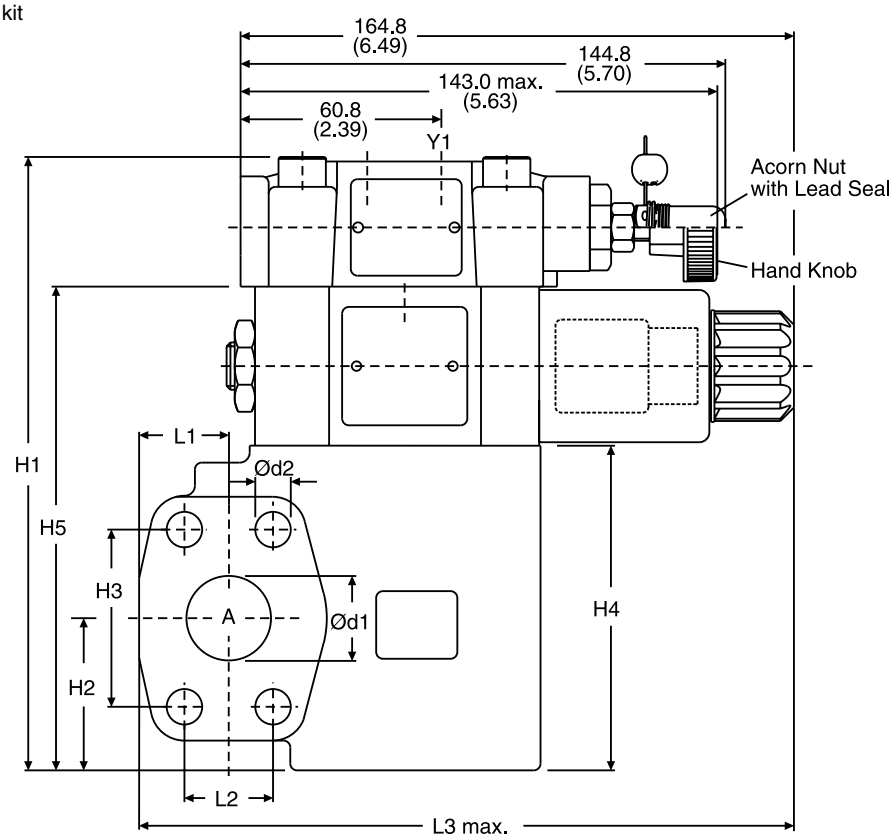


Seal Kits		
Size	**Nitrile**	**Fluorocarbon**
06	S16-91850-0	S16-91850-5
08	S16-91851-0	S16-91851-5
10	S16-91852-0	S16-91852-5
Prop. Section P2*	S26-58473-0	S26-58473-5

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







SAE 61

Size	B1	H1	H2	H3	H4	H5	L1	L2	L3	d1	d2
06	60.0 (2.36)	175.0 (6.89)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	137.0 (5.39)	24.6 (0.97)	22.2 (0.87)	174.0 (6.85)	19.0 (0.75)	10.5 (0.41)
08	60.0 (2.36)	181.0 (7.13)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	143.0 (5.63)	26.5 (1.04)	26.2 (1.03)	193.6 (7.62)	25.0 (0.98)	10.5 (0.41)
10	75.0 (2.95)	194.0 (7.64)	48.0 (1.89)	58.7 (2.31)	109.0 (4.29)	156.0 (6.14)	34.0 (1.34)	30.2 (1.19)	201.0 (7.91)	32.0 (1.26)	12.5 (0.49)

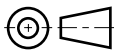
Port	Function	Port size		
		R5V06	**R5V08**	**R5V10**
A	Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
B	Tank	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
Y1	External Drain	G1/4"		

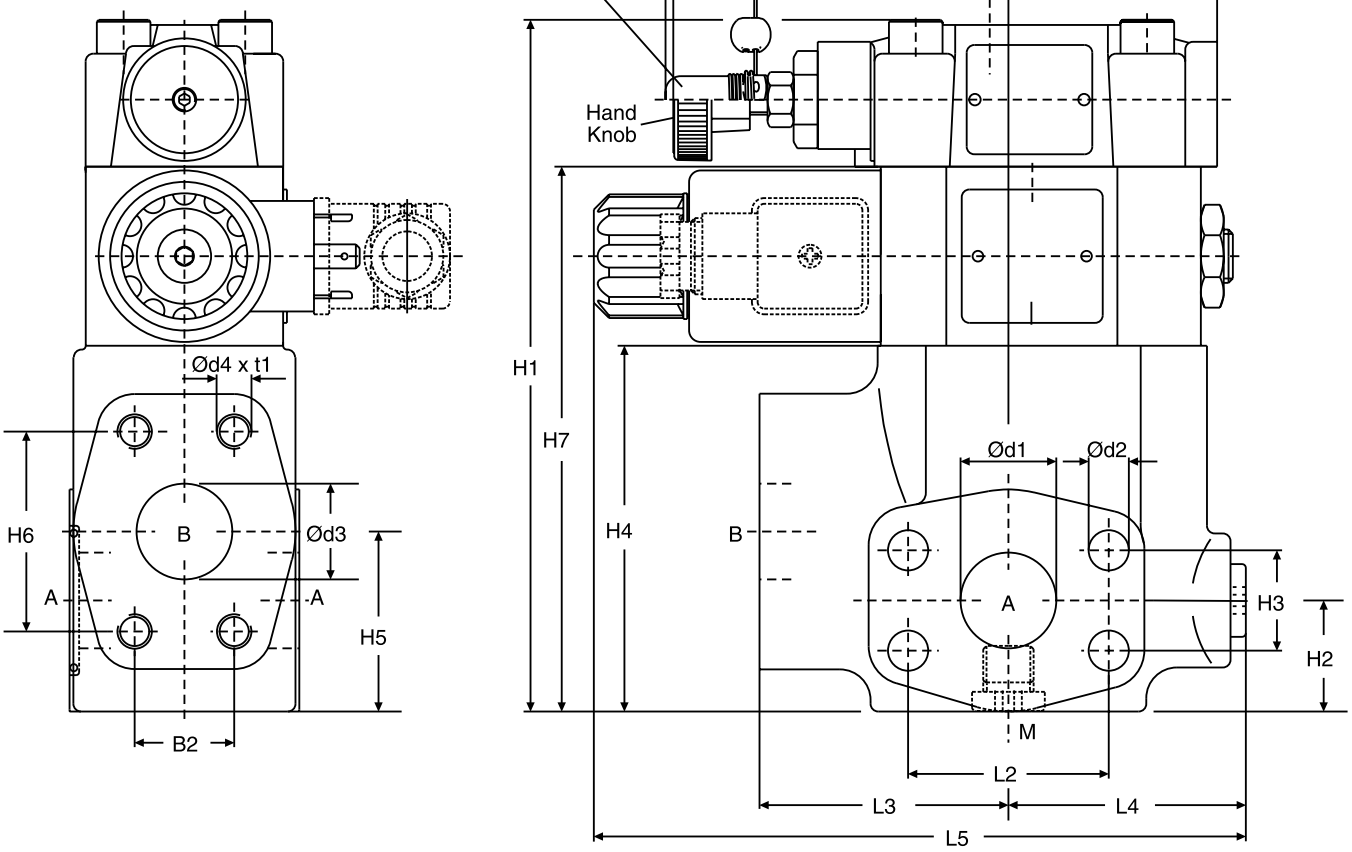
R5V_P2.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

3-Port





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.

B

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).

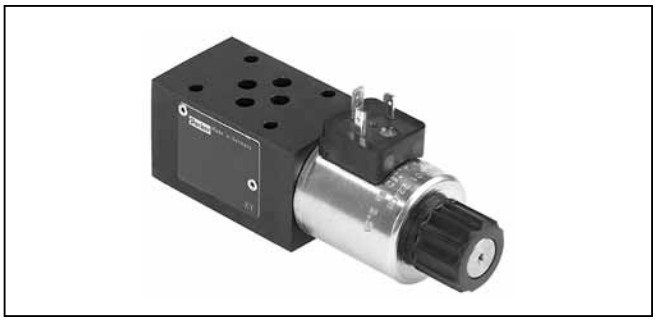
Function

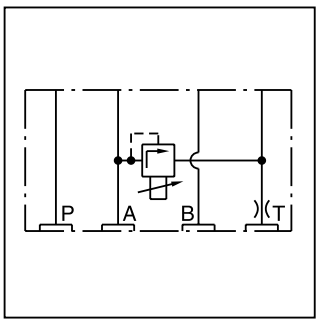
When the pressure in port P exceeds the pressure setting at the solenoid, the cone opens to port T and limits the pressure in port P to the adjusted level.

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

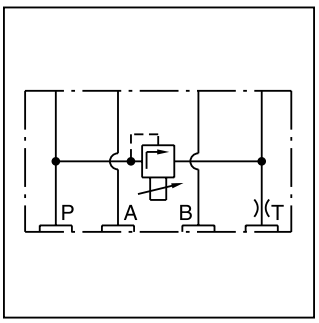
Features

- 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	2				V	
Pressure Control Valve	Size NG6 / D03	Pressure Relief	Pressure Range	Solenoid Voltage	Seal Fluorocarbon	Design Series

NOTE: Not required when ordering.

Code	Description
AT	A to T
PT	P to T

Code	Description
10	105 Bar (1523 PSI)
17	175 Bar (2538 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

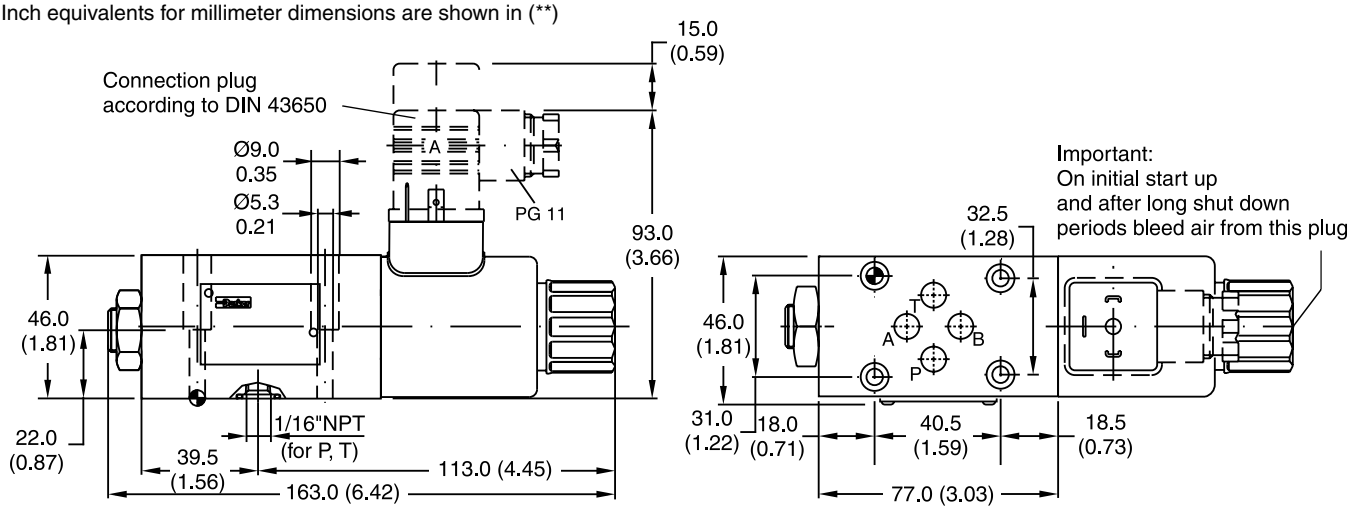
Code	Description
K	12V, 2.3A
X	16V, 1.3A

Seal Kit: SK-RPDM20

Weight: 1.3 kg (2.9 lbs.)

Dimensions

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

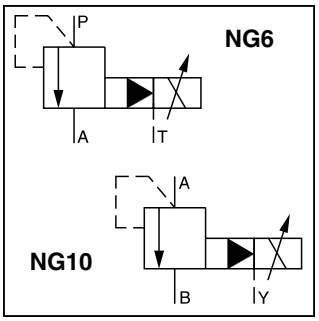


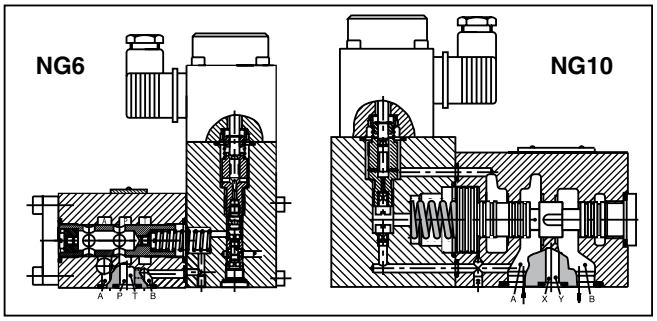
Please order plugs separately. See Accessories.

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.

Specifications

General		
Size	**NG6**	**NG10**
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 51 524 to 525	
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)	
Max. Contamination Level	ISO 4406 (1999) 18/16/13	
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	
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	

VBY_K.indd dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

Ordering Information

VBY — Sequence Valve

□ — Pressure Range

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 (4500 PSI)

K — Linear Solenoid

Code	Description
K	9 VDC, 2.5 A

□ — Size

Code	Description
06	NG6
10	NG10

□ — Seal

Code	Description
N	Nitrile
V	Fluorocarbon

[ ] — Design Series

NOTE: Not required when ordering.

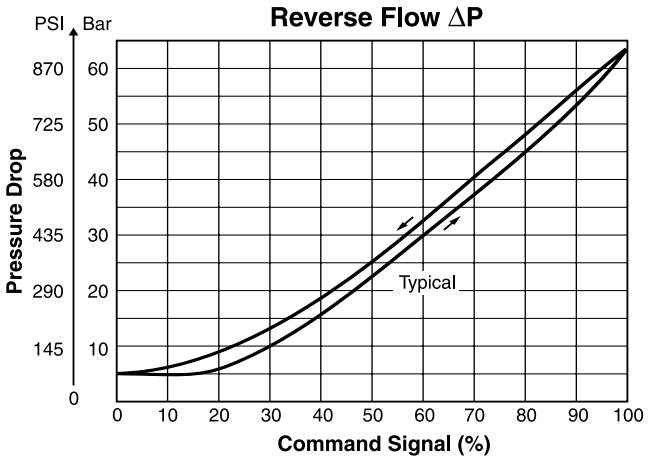
Weight:

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

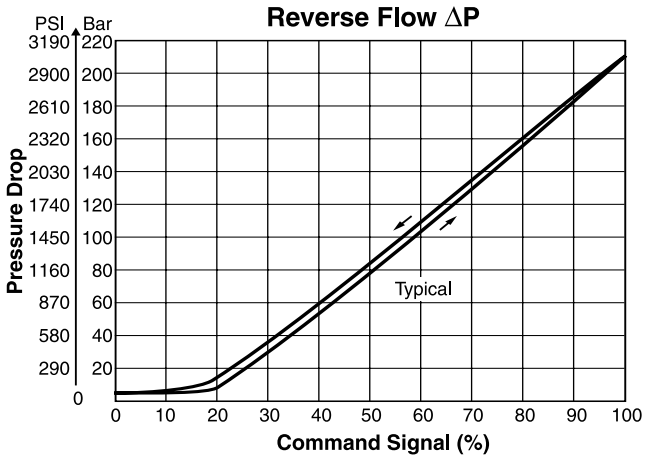
Performance Curves - NG6

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

Setting Range max. 64 Bar (928 PSI)

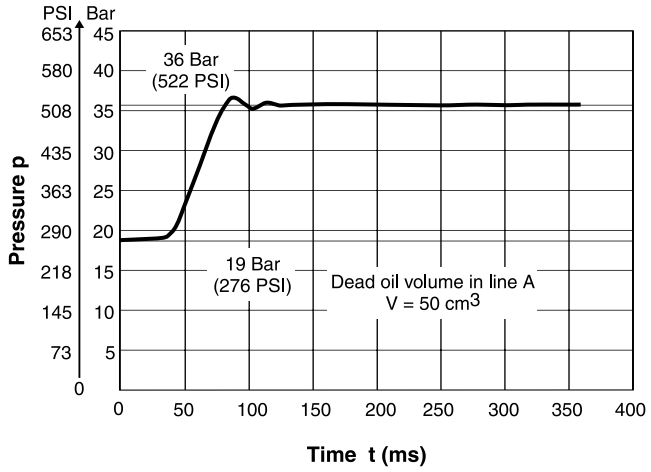


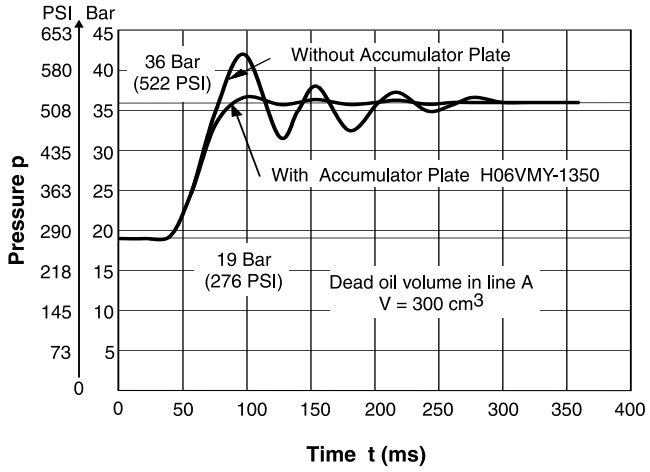
Setting Range max. 210 Bar (3045 PSI)



Step Response Signal

Setting Range max. 210 Bar (3045 PSI)



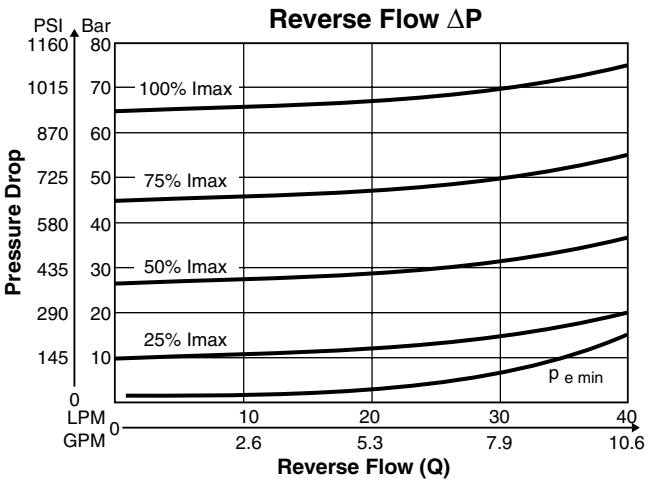


B

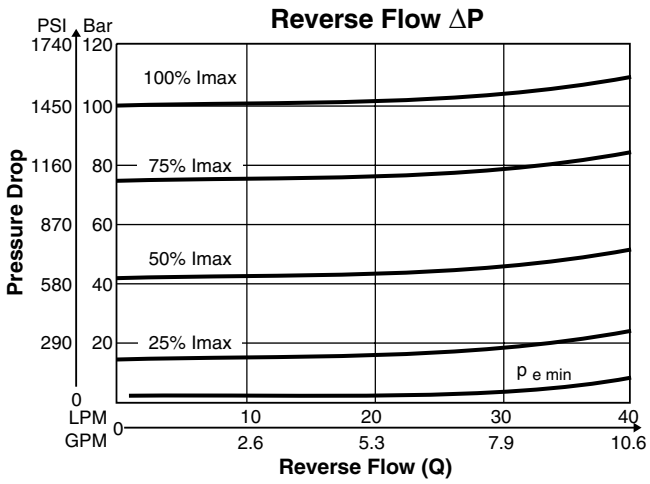
NG6

p/Q Performance Curves measured at t = 50°C (122°F) and v = 36mm²/s

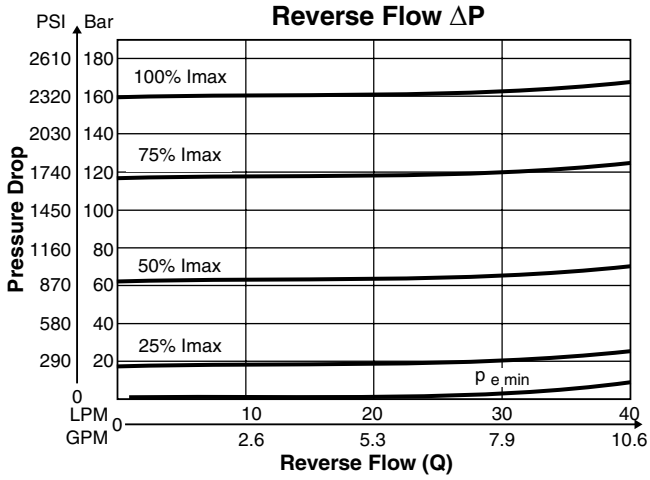
Setting Range max. 64 Bar (928 PSI)



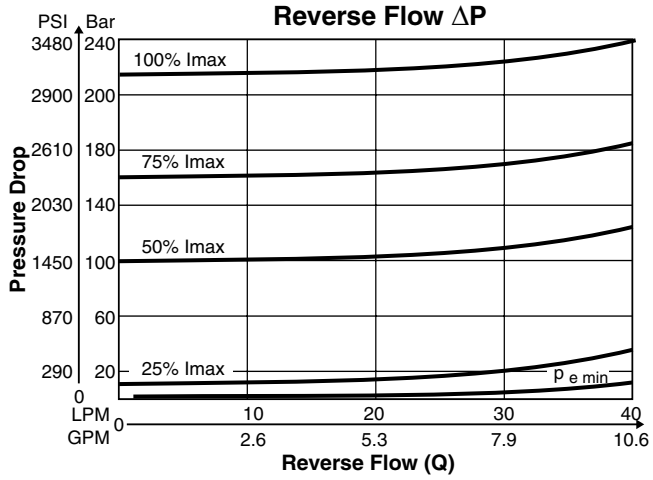
Setting Range max. 100 Bar (1450 PSI)



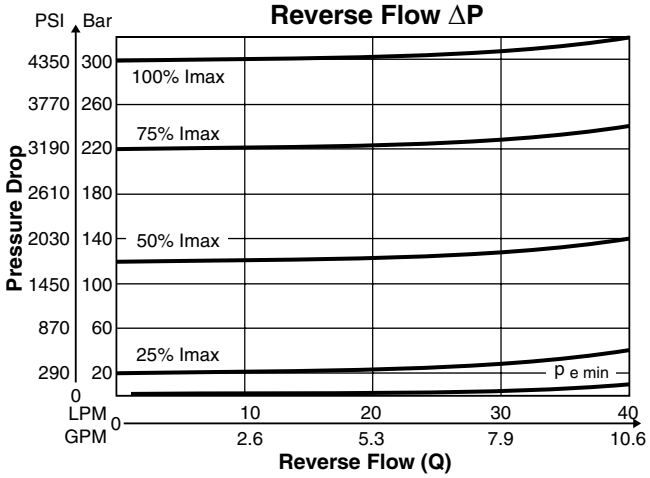
Setting Range max. 160 Bar (2320 PSI)



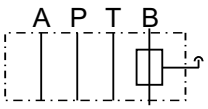
Setting Range max. 210 Bar (3000 PSI)



Setting Range max. 315 Bar (4500 PSI)



Note:
Accumulator Plate
H06VMY-1350
Height: 40 mm (1.58 in.)

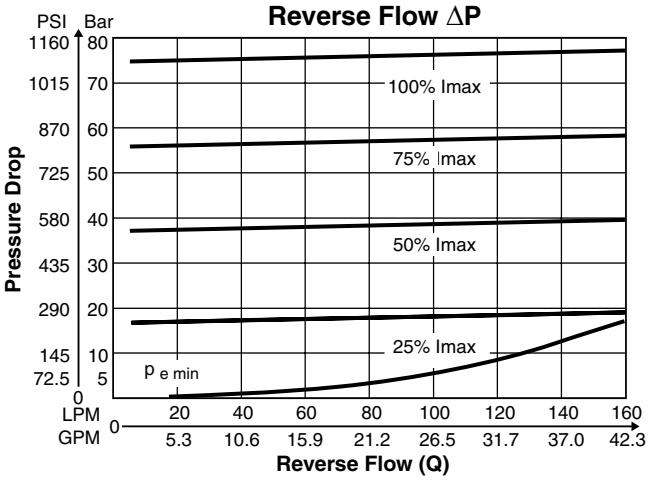


B

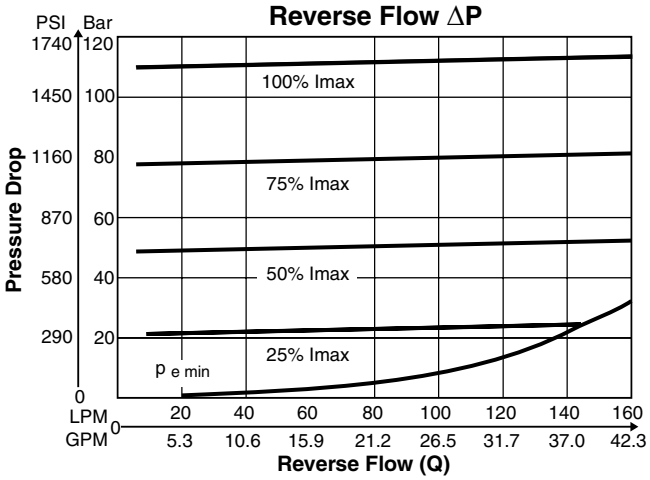
NG10

p/Q Performance Curves measured at t = 50°C (122°F) and v = 36mm²/s

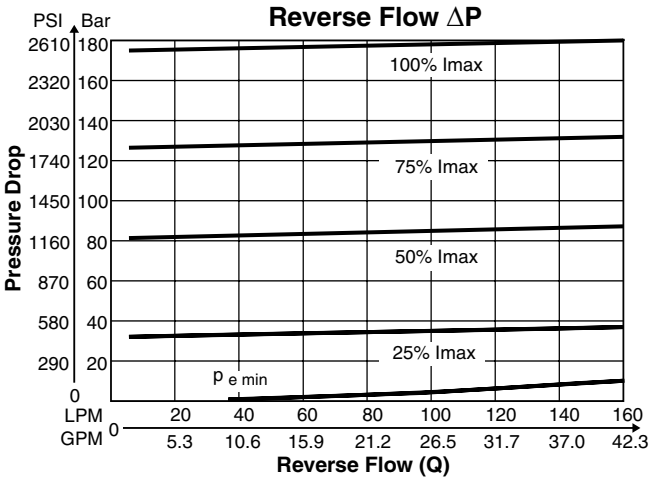
Setting Range max. 64 Bar (928 PSI)



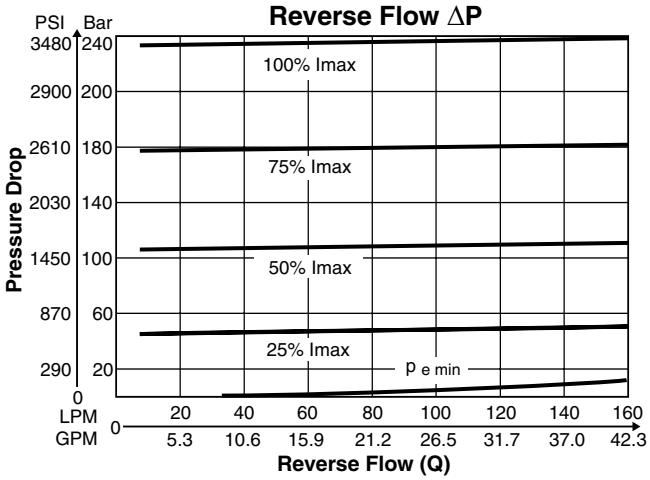
Setting Range max. 100 Bar (1450 PSI)



Setting Range max. 160 Bar (2320 PSI)



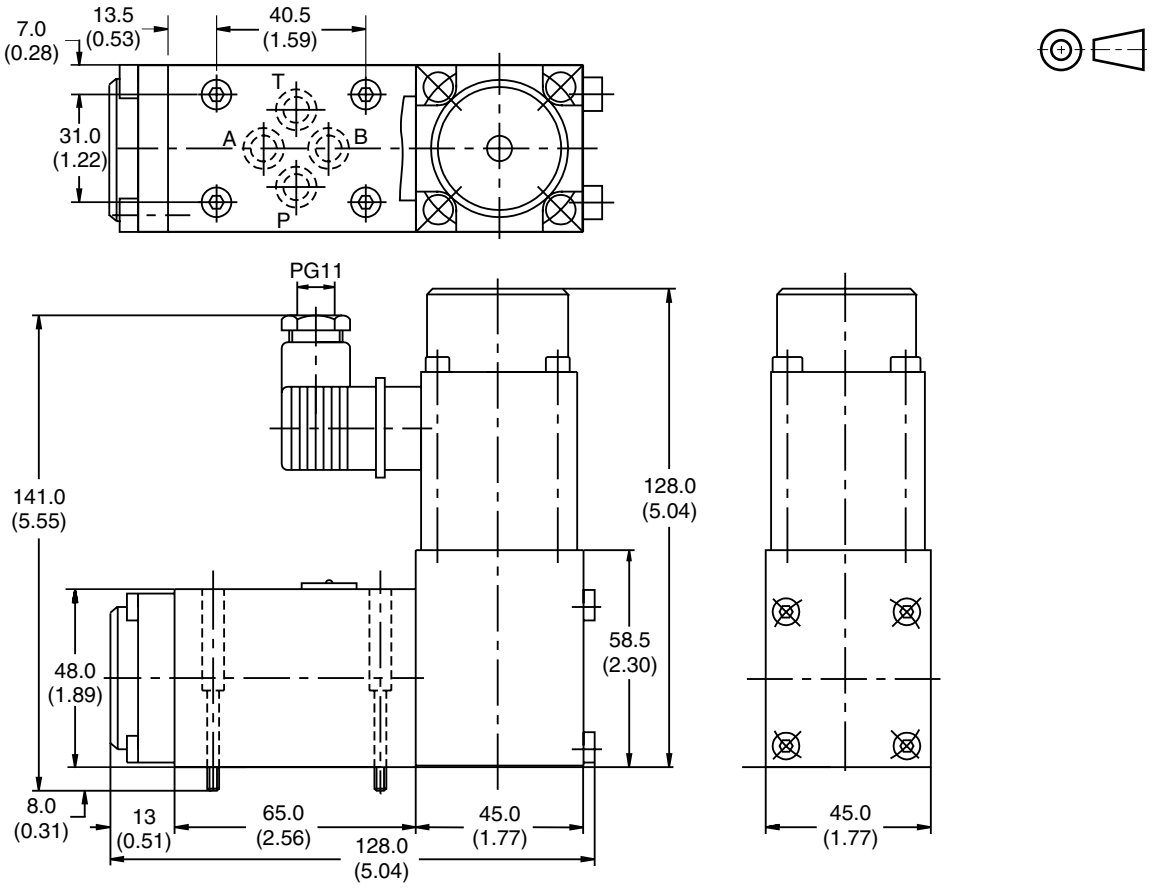
Setting Range max. 210 Bar (3045 PSI)



B

Size NG6

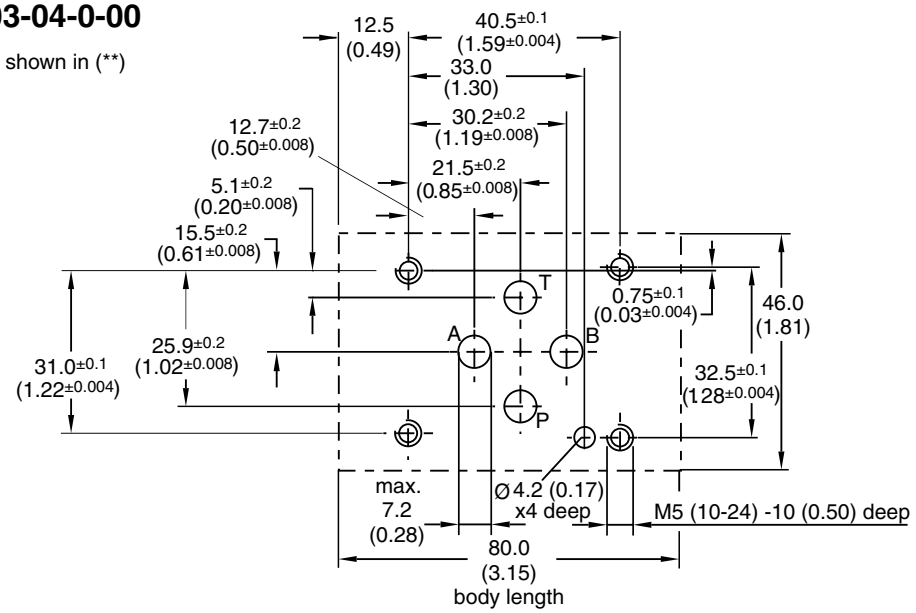
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt Kit DIN912 12.9		Seal Kit	
			Nitrile	Fluorocarbon
R_{max}6.3 0.01/100	BK375 4x-M5x30 BK209 4x10-24x1.25"	7.5 Nm (5.5 lb.-ft.)	SK-VMY-L06-N	SK-VMY-L06-V

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

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



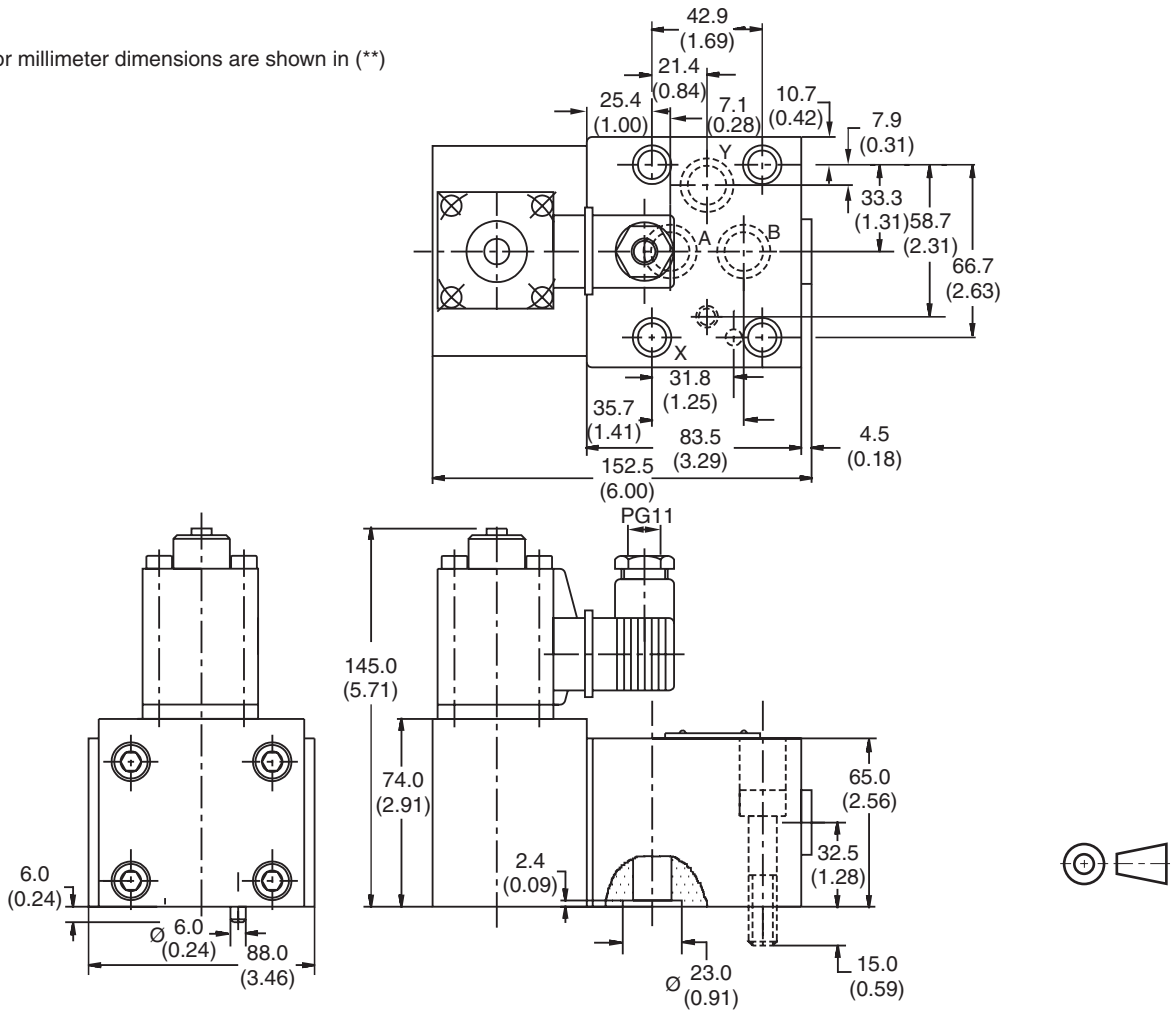
VBY_K.indd dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

Size NG10

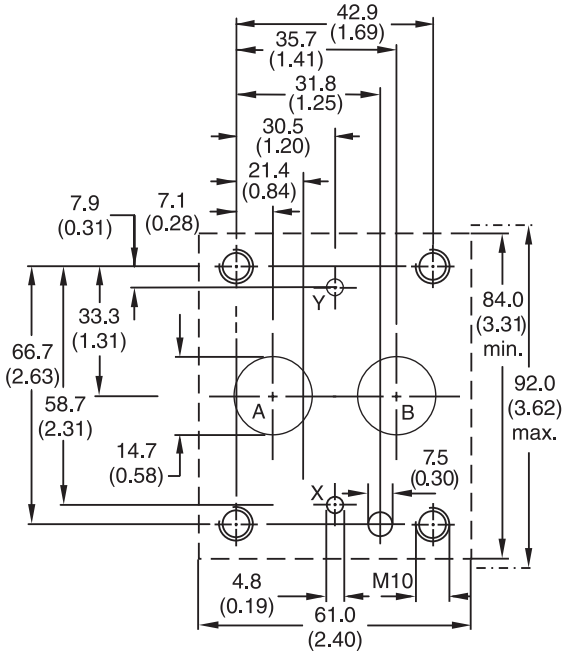
Inch equivalents for millimeter dimensions are shown in (**)



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

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

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



VBY_K.indd dd

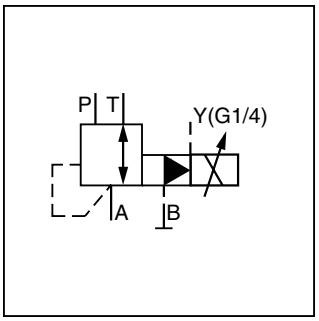
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

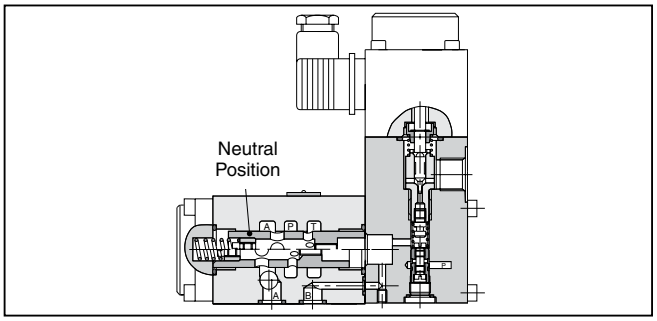
General Description

Series VMY 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 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.





Features

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

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.

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.

Ordering Information

VMY — Reducing Valve

☐ — Pressure Range

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)

K — Linear Solenoid 9V / 2.5A

☐ — Size

Code	Description
06	NG6
10	NG10

☐ — Pilot Oil

Pilot Oil

Code	Size	Pilot	Drain
Omit	10	Internal	Internal
N [1]	06	Internal	External [2]
T	06	Internal	Internal

[1] connection on port Y
[2] p_{min} = 0 Bar (0 PSI) possible

☐ — Seal

Code	Description
N*	Nitrile
V	Fluorocarbon

* Size 10 only

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

P — High Pressure Channel

Weight:

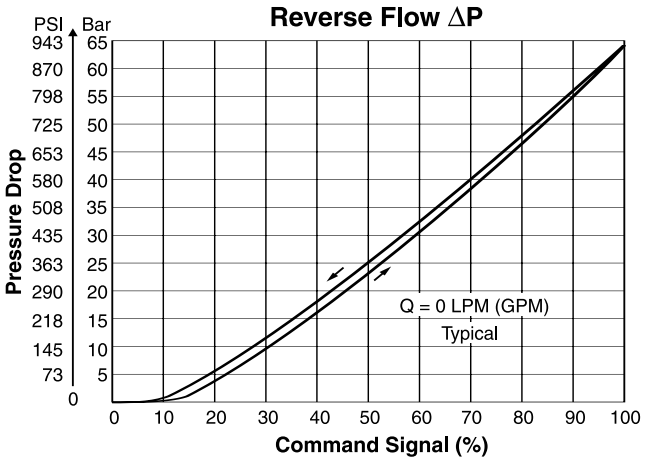
VMY*06	2.8 kg	(6.2 lbs.)
VMY*10	5.0 kg	(11.0 lbs.)

B

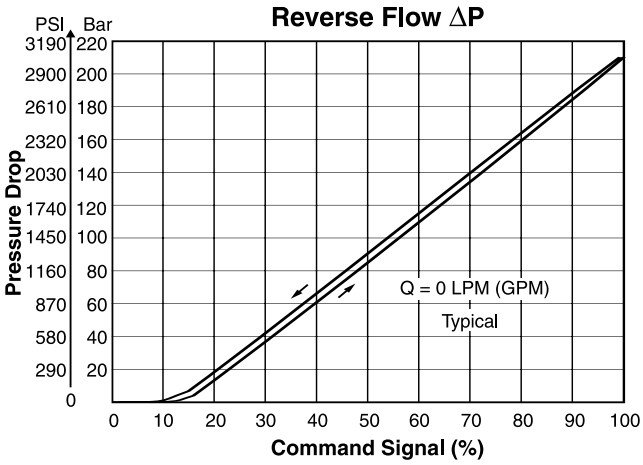
General		
Design	Proportional Reducing Valve	
Size	NFPA D03 / CETOP 3 / DIN NG6	DIN NG10
Mounting Pattern	ISO 5781	
Actuation	Proportional Solenoid	
Mounting Position	Any	
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)	
Hydraulics		
Operating Pressure, Ports	P, A and B 315 Bar (4500 PSI) Port B has to be blocked Y and T depresssurized	
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 51 524 to 535	
Fluid Temperature **Recommended** **Permitted**	 +30°C to +50°C (+86°F to +122°F) -20°C to +70°C (-4°F to +158°F)	
Viscosity **Recommended** **Permitted**	30 to 50 cSt / mm²/s (139 to 232 SSU) 20 to 380 cSt / mm²/s (93 to 1761 SSU)	
Max. Contamination Level	ISO 4406 (1999) 18/16/13	
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	
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	

Presssure Curves where p = f(U_{set})

Setting Range max. 64 Bar (928 PSI)

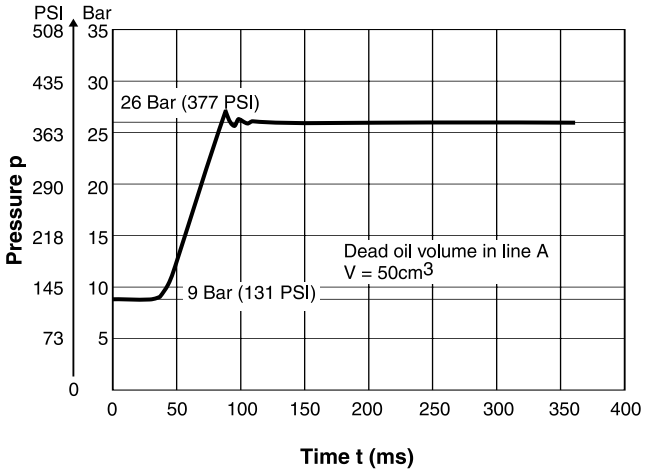


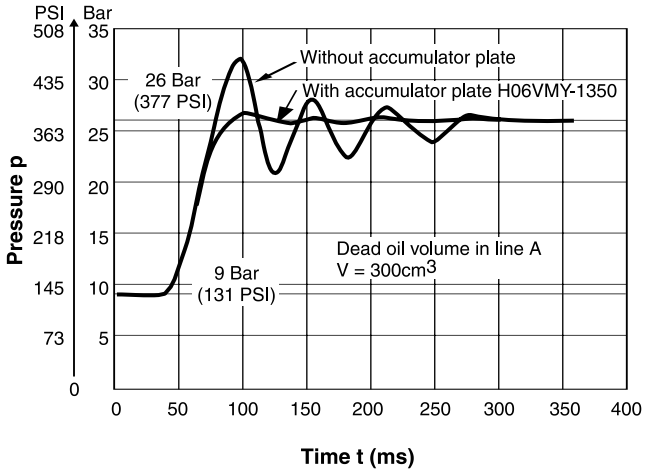
Setting Range max. 210 Bar (3045 PSI)



Step Response

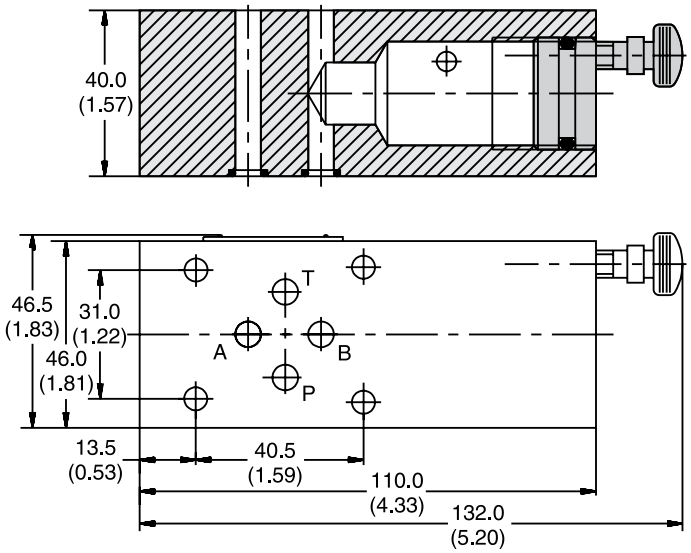
Typical Curve





Accumulator Plate H06VMY-1350

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



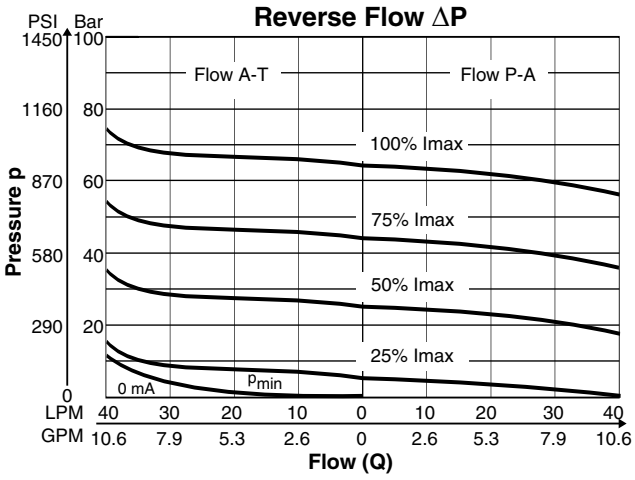
VMY.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

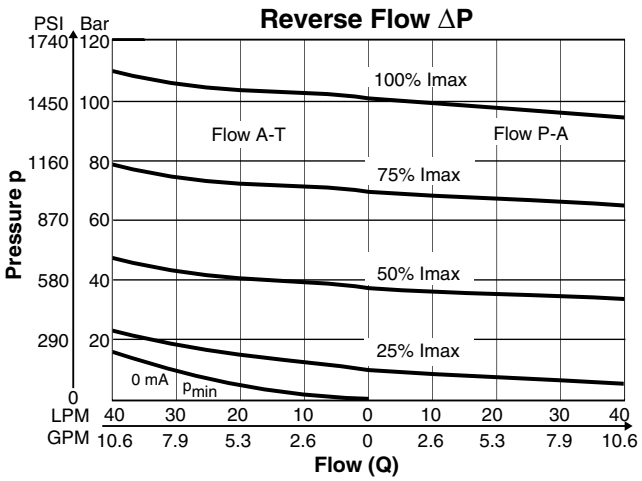
B

p/Q Performance Curves measured at t = 50°C (122°F) and v = 35mm²/s.

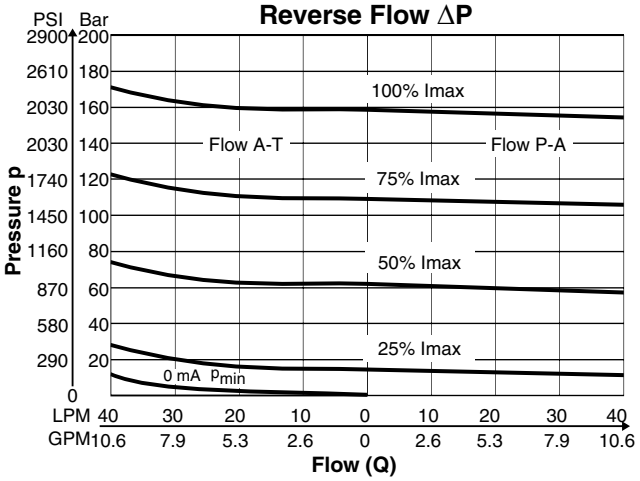
Setting Range max. 64 Bar (928 PSI)



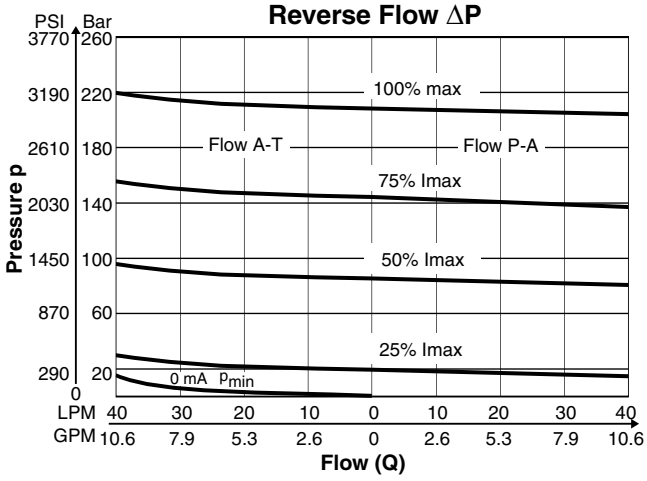
Setting Range max. 100 Bar (1450 PSI)



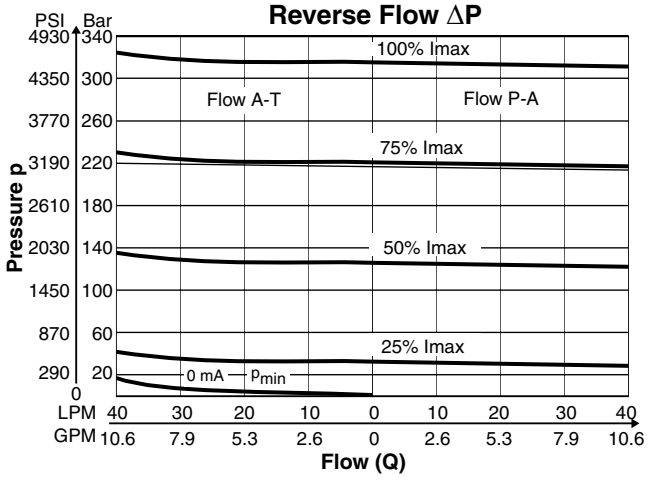
Setting Range max. 160 Bar (2320 PSI)



Setting Range max. 210 Bar (3045 PSI)



Setting Range max. 315 Bar (4568 PSI)



VMY.indd, dd

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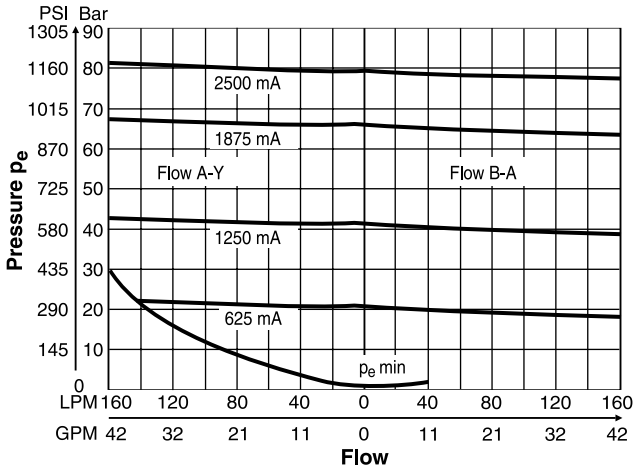
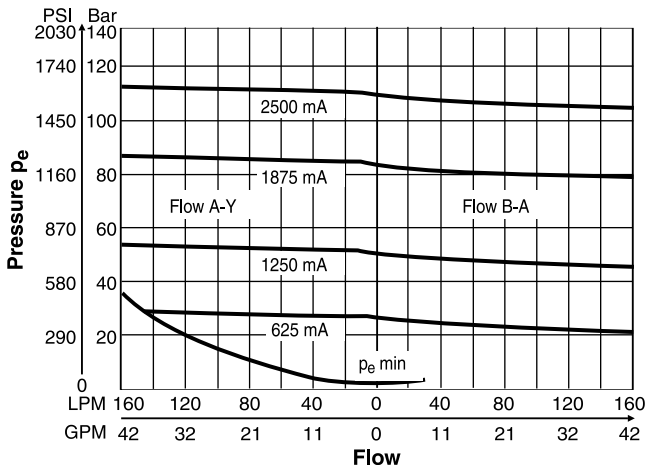
Hydraulic Valve Division
Elyria, Ohio, USA

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

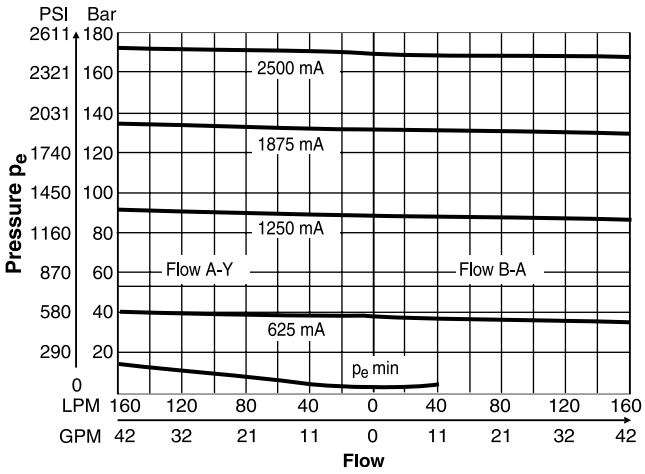
Setting Range max. 64 Bar (928 PSI)



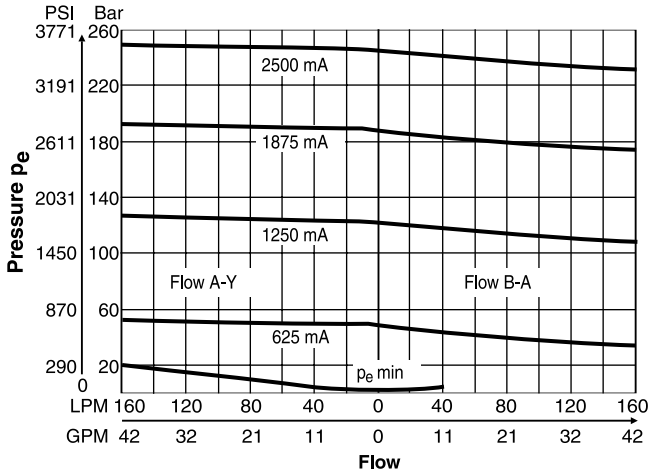
Setting Range max. 100 Bar (1450 PSI)



Setting Range max. 160 Bar (2320 PSI)



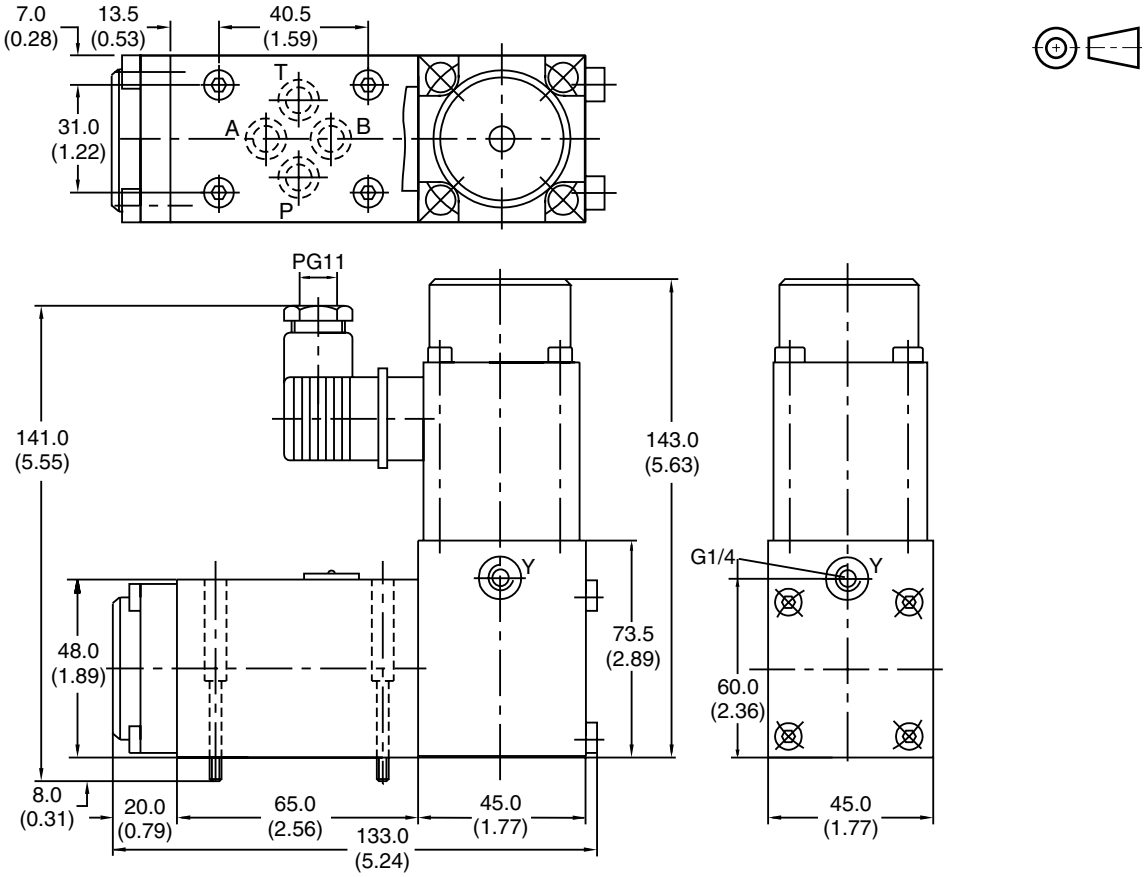
Setting Range max. 210 Bar (3045 PSI)



B

Size NG6

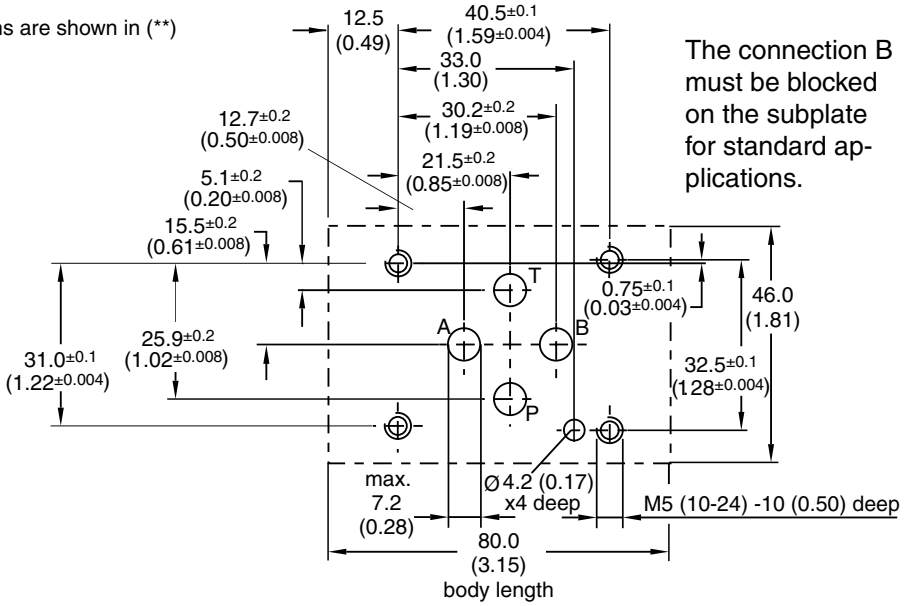
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt kit DIN912 12.9		Seal Kit
R_{max}6.3 0.01/100	BK209 (4) 10-24x1.25 BK375 (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 (**)

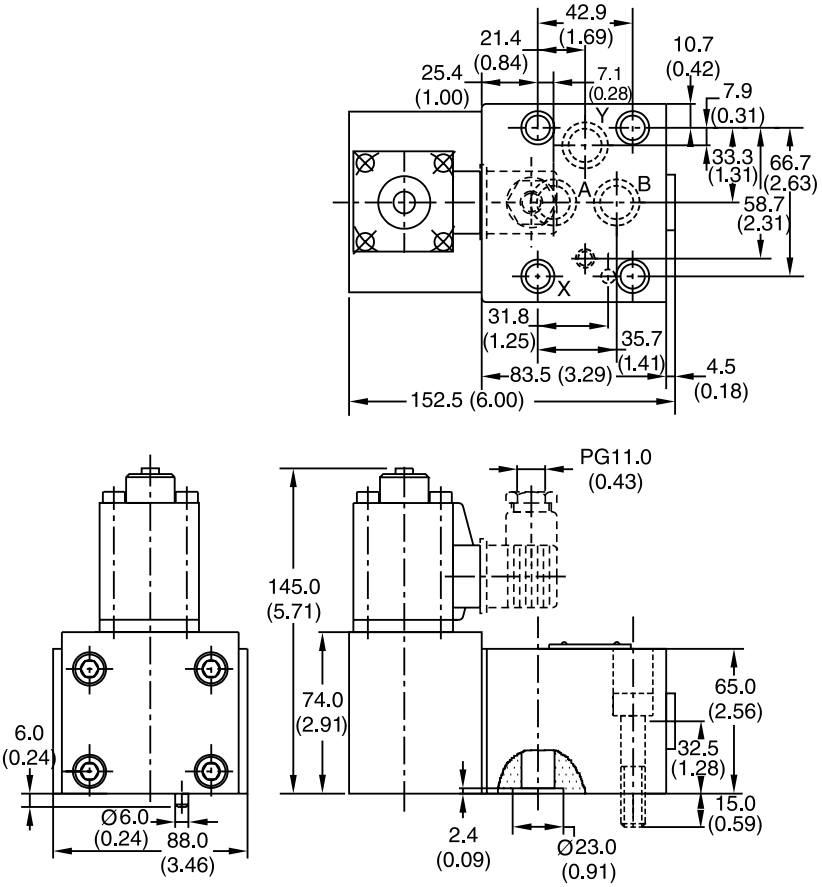


The connection B must be blocked on the subplate for standard applications.

B

Size NG10

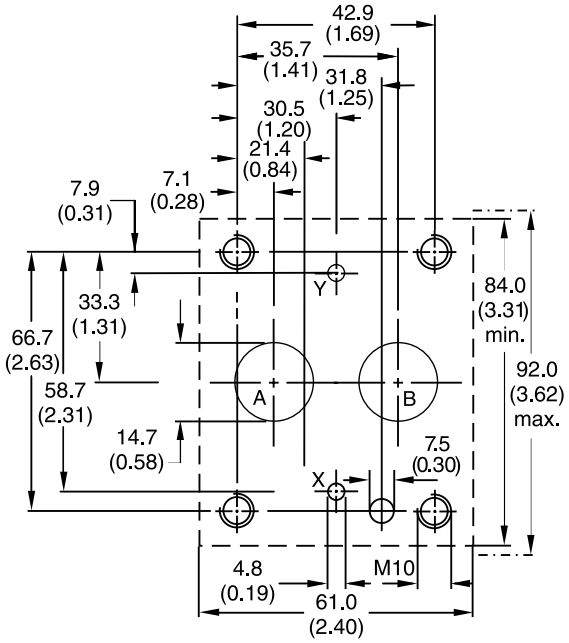
Inch equivalents for millimeter dimensions are shown in (**)



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

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

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



VMY.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

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 RS232 interface is available as accessory.

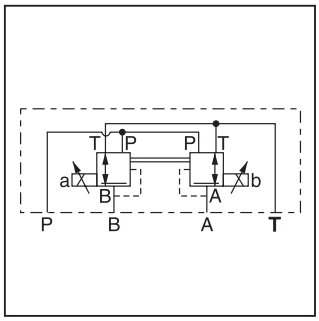
D1FV for External Electronics

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.

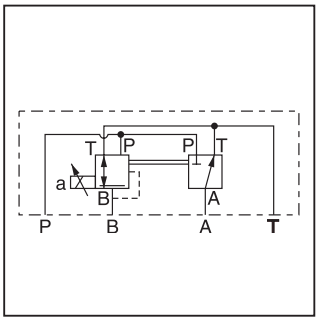
The D1FV values control the pressure in the A- or B-ports using the barometric feedback principle.

D1FV

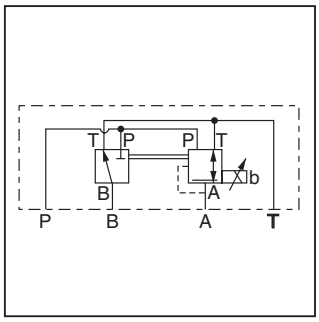
D1FV OBE



Function C



Function E

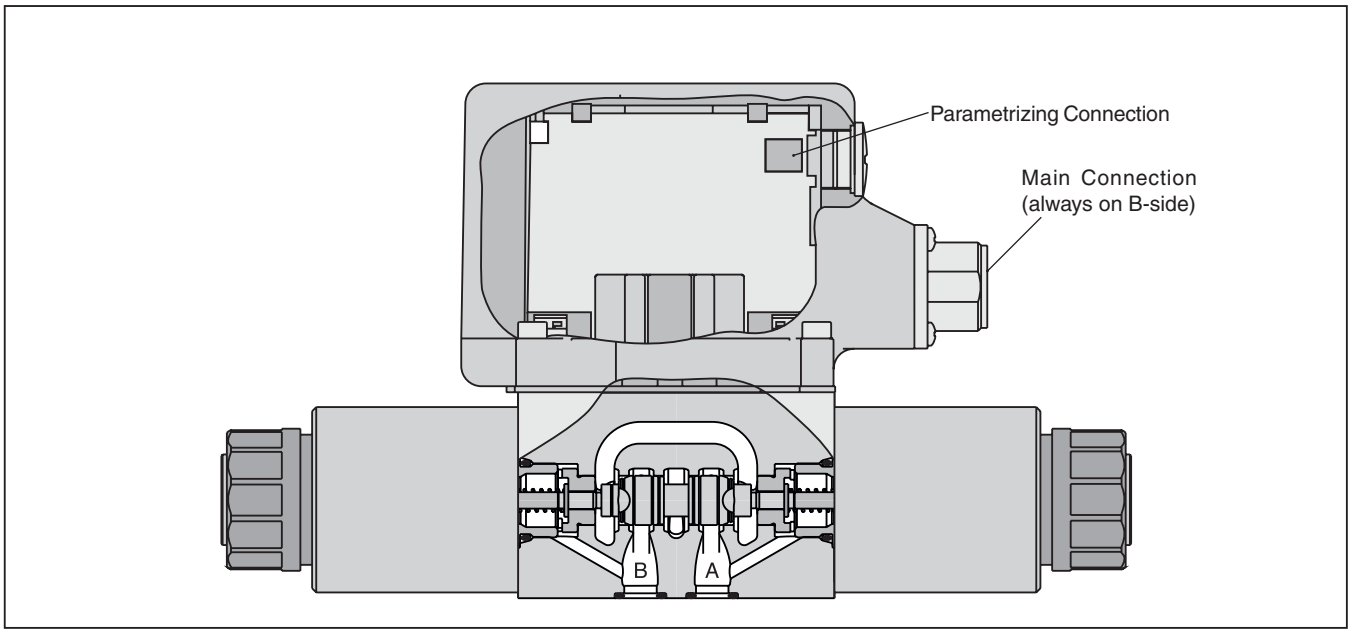


Function K

Features

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

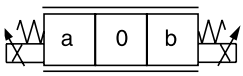
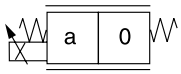
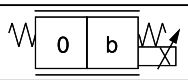
D1FV*3 OBE



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.

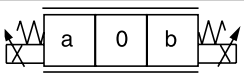
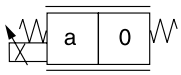
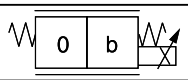
Code	Description
N	Nitrile
V	Fluorocarbon

Weight: Offboard
D1FV 2.2 kg (4.9 lbs.)

D1FV OBE

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

[1] Single solenoid always 0...+/-10V respectively 4...20mA.
[2] Factory set ± 10V on delivery.

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.

Parametrizing cable OBE => RS232
Item no. 40982923

D1FV.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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...535, other on request
Fluid Temperature	**[°C]**	-20...+40 (-4°F...+104°F)
Viscosity **Permitted** **Recommended**	 **[cSt] / [mm²/s]** **[cSt] / [mm²/s]**	 20...380 (93...1761 SSU) 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
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

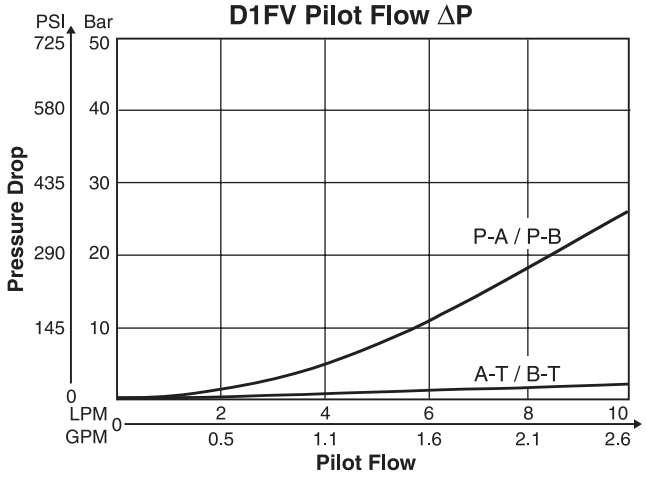
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

B

Electrical Specifications

Electrical		
Duty Ratio	**[%]**	100
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



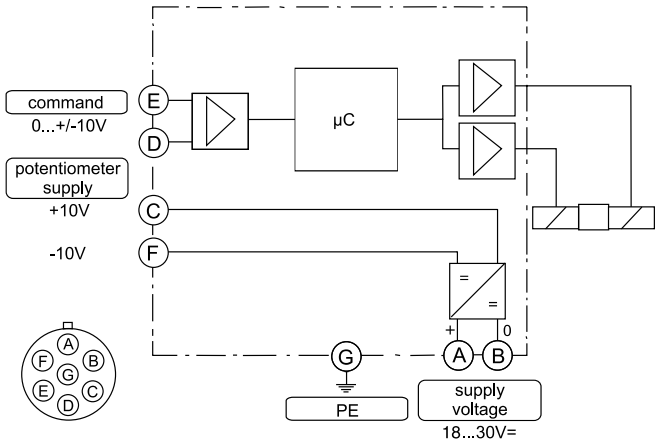
All performance curves measured with HLP46 at 50°C (122°F).

D1FV.indd, dd

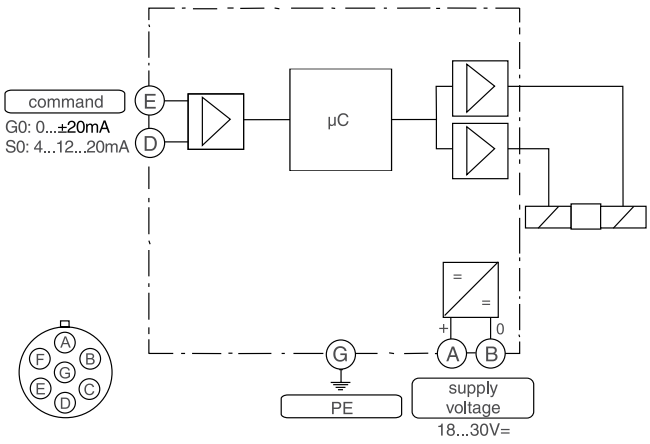
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

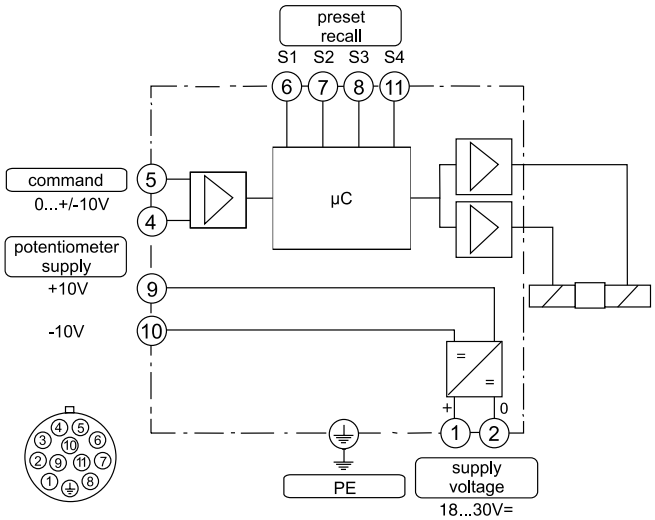
Code F0, M0
6 + PE acc. to EN 175201-804



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



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



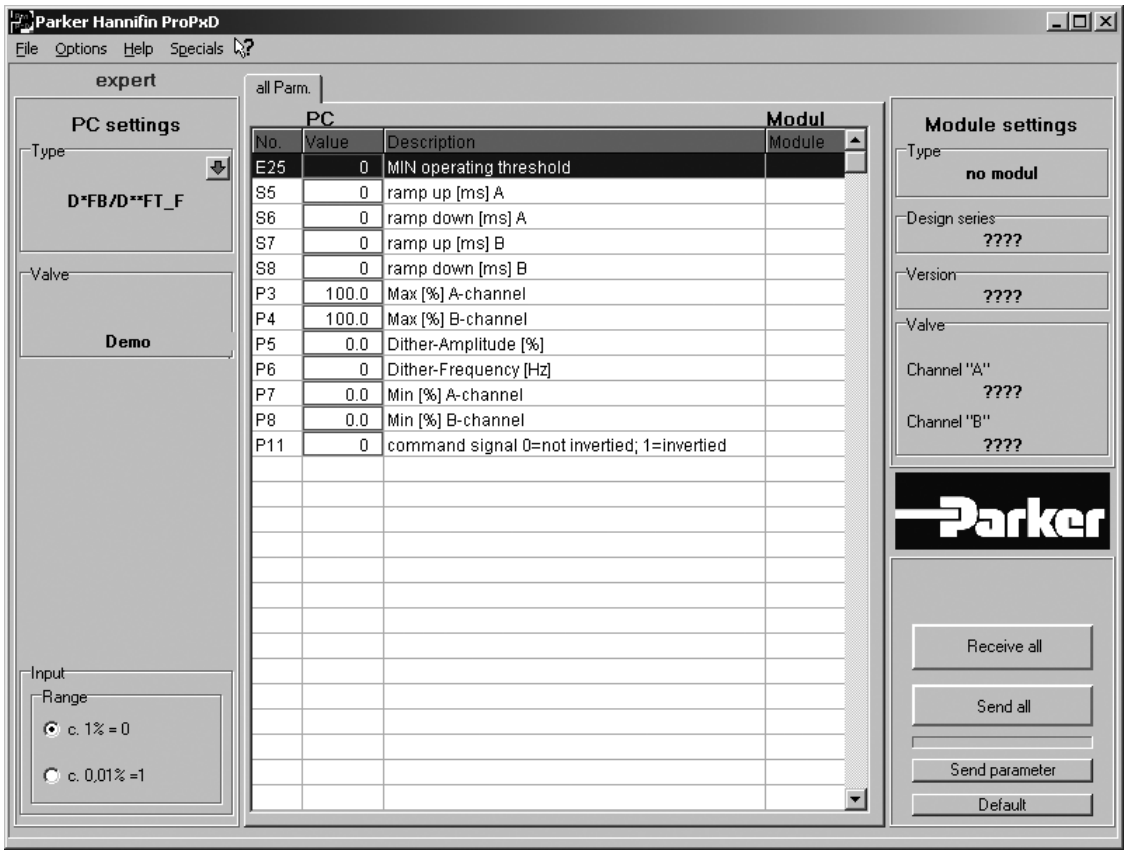
B

ProPxD Interface Program

The ProPxD software permits 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 nonvolatile memory stores the data with the option for recalling or modification.

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.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd – see "Software Downloads"

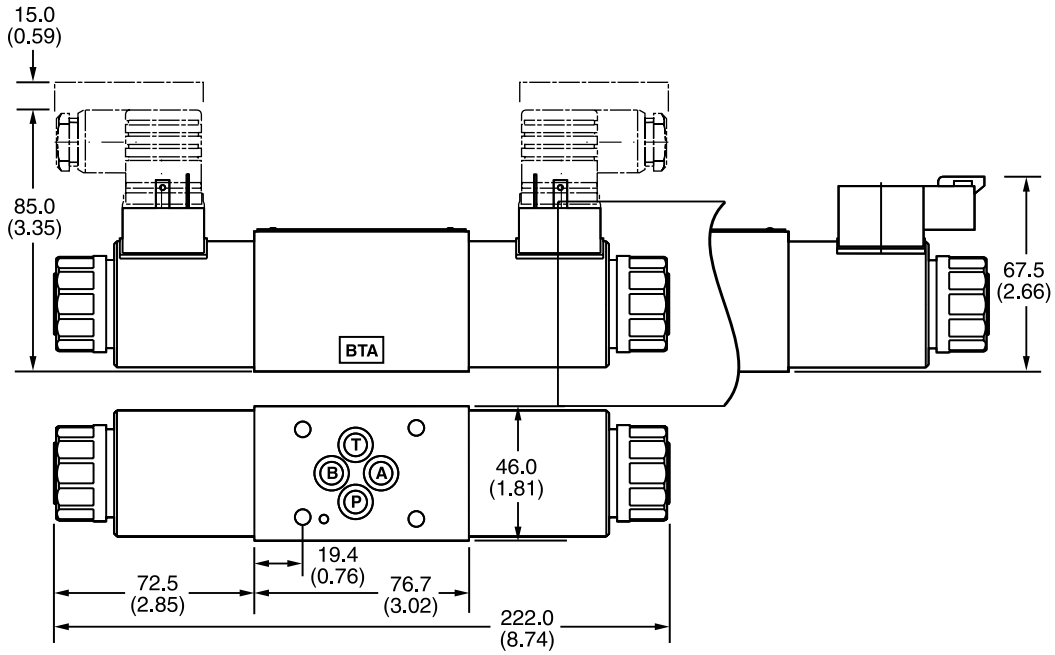


The parametrizing cable may be ordered under item no. 40982923.

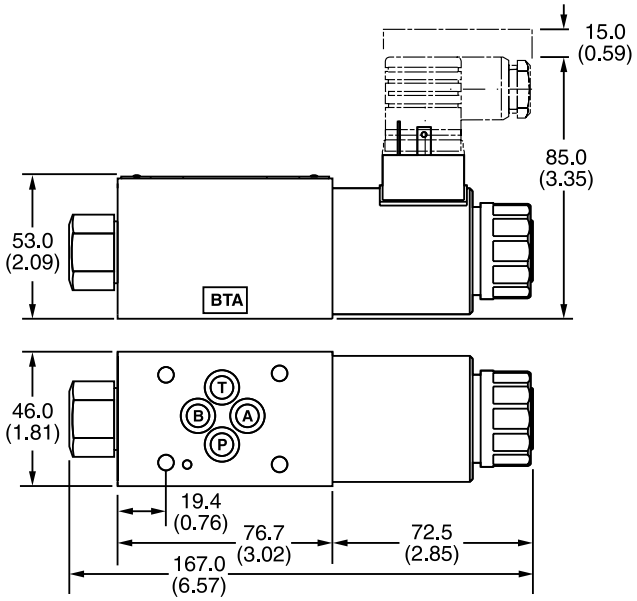
B

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

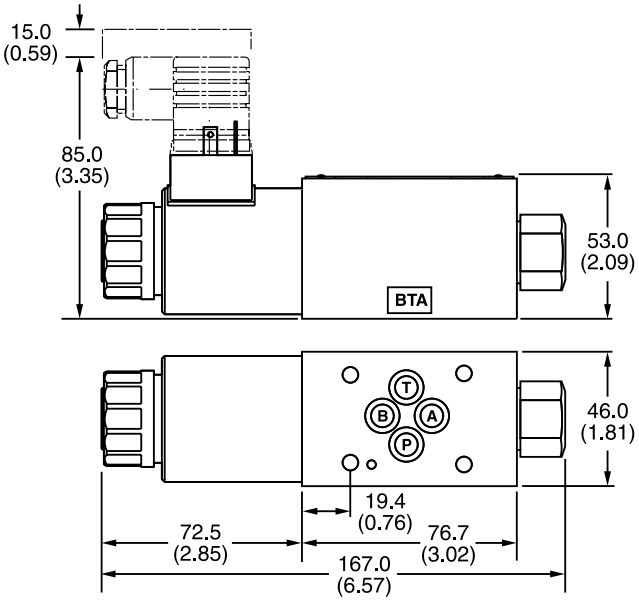
D1FV*C



D1FV*E



D1FV*K



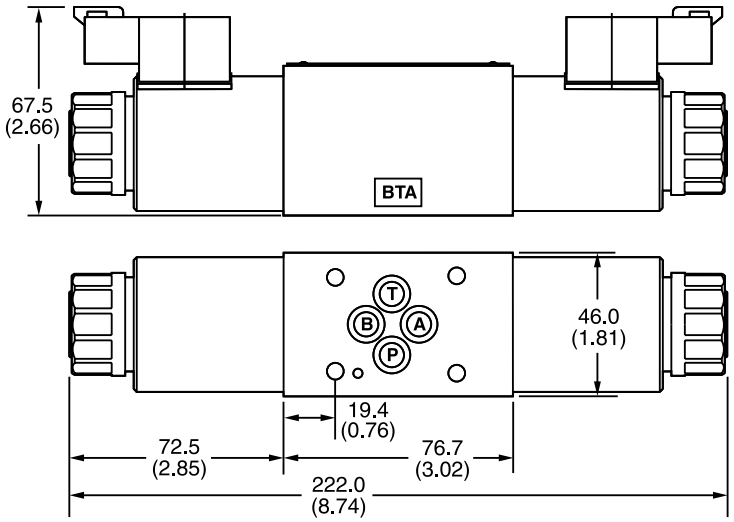
Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB-N Fluorocarbon: SK-D1FBV

D1FV.indd, dd

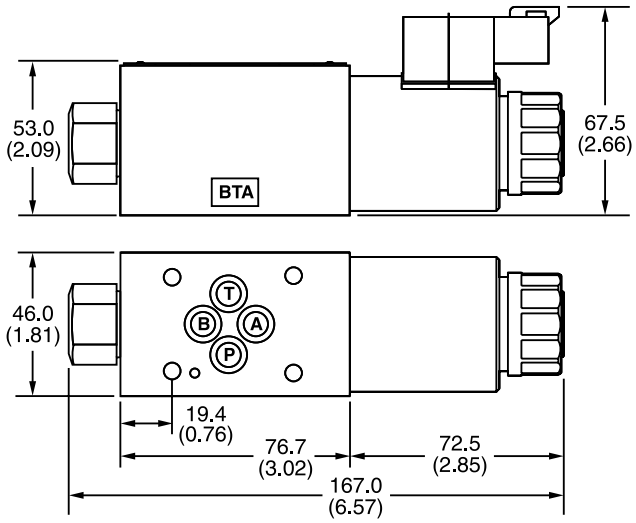
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

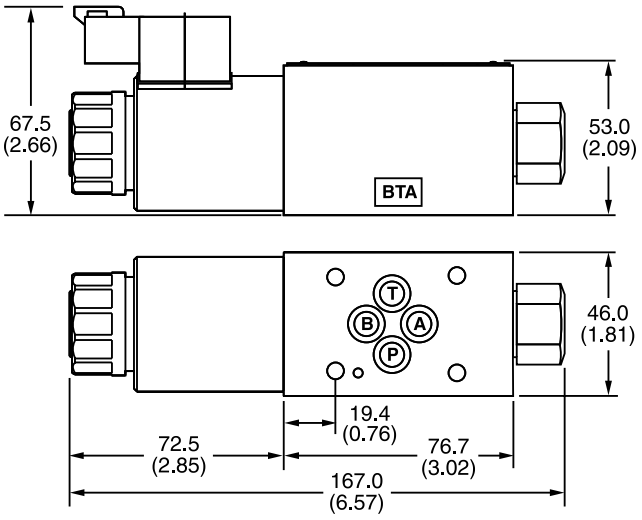
D1FV*C with DT04-2P “Deutsch” Connector



D1FV*E with DT04-2P “Deutsch” Connector



D1FV*K with DT04-2P “Deutsch” Connector

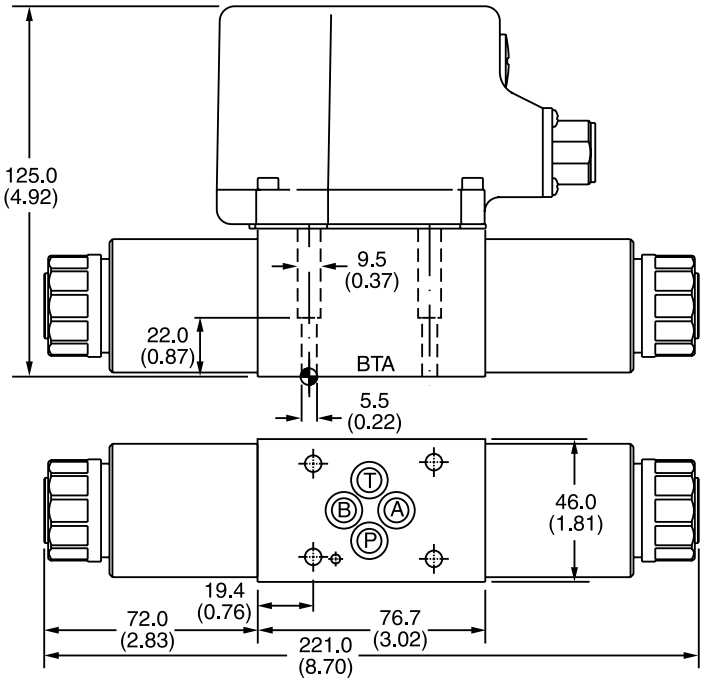


Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB-N Fluorocarbon: SK-D1FBV

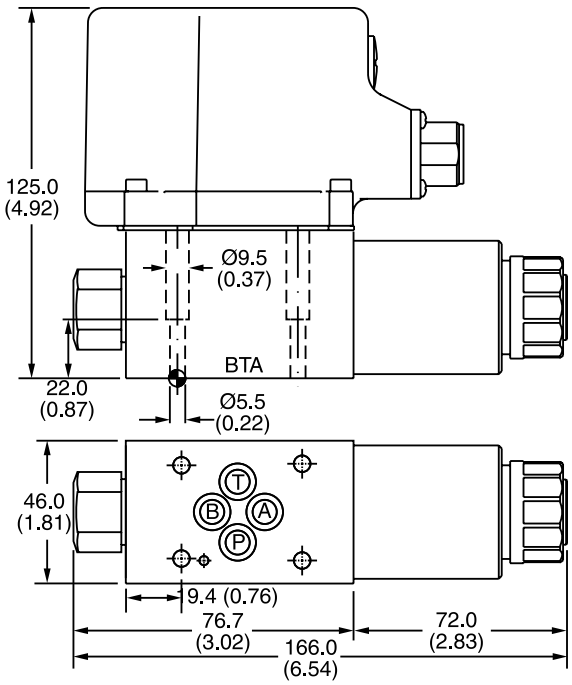
B

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

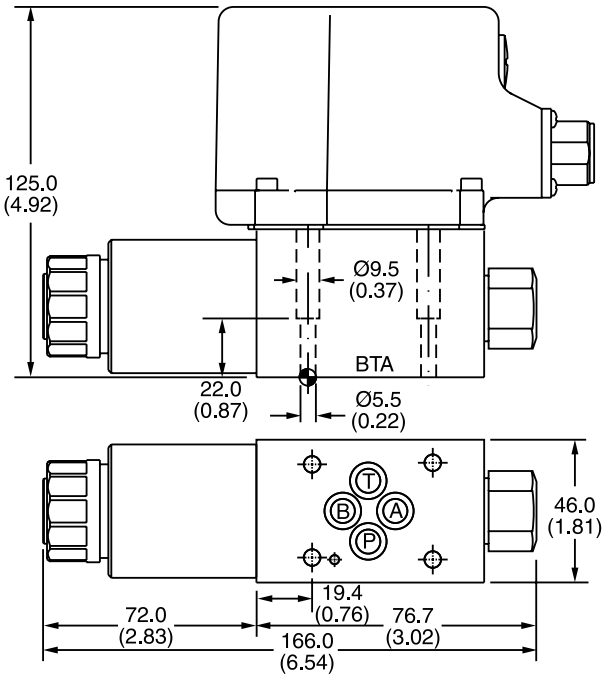
D1FV*C OBE



D1FV*E OBE



D1FV*K OBE



Surface Finish	Kit			Seal Kit
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm (5.6 lb.-ft.) ±15 %	Nitrile: SK-D1FB-N Fluorocarbon: SK-D1FBV

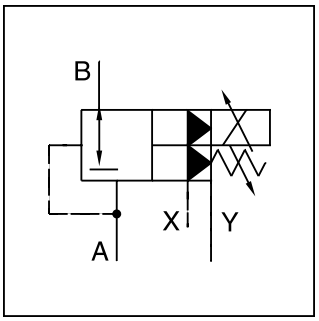
D1FV.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

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

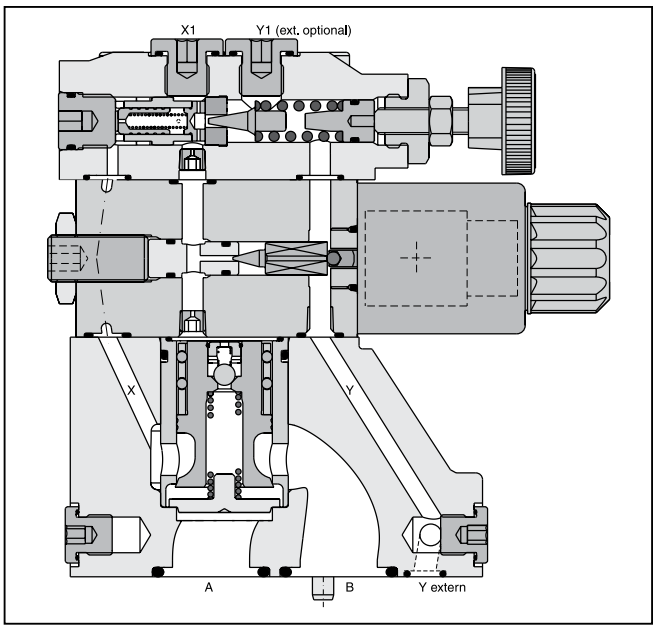
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.



B

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

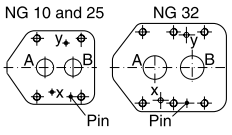
R	4	R	☐	—	5	9	☐	☐	☐	P2	G0R	B	☐	☐
Pressure Reducing Valve	Interface	Reducing Function	Size		Maximum Pressure 350 Bar (5075 PSI)	Pilot Ports G1/4"	Pressure Range	Adjustment	Drain Line Ext. from Pilot Head (Y1)	Proportional Pressure Control	Solenoid Voltage 12V 2.3A	Design Series	Seal	Options Check with Factory

Code	Description
03	NG10
06	NG25
10	NG32

Code	Pilot	Drain
1	Internal	External from Y
2	Internal	External from Y1

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
4	Subplate Mounting ISO 5781



Code	Description
1	Hand Knob 32mm dia. Standard
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)

Bolt Kit:

R4R03*P2	BK505
R4R06*6*P2	BK485
R4R10*P2	BK506

Weight:

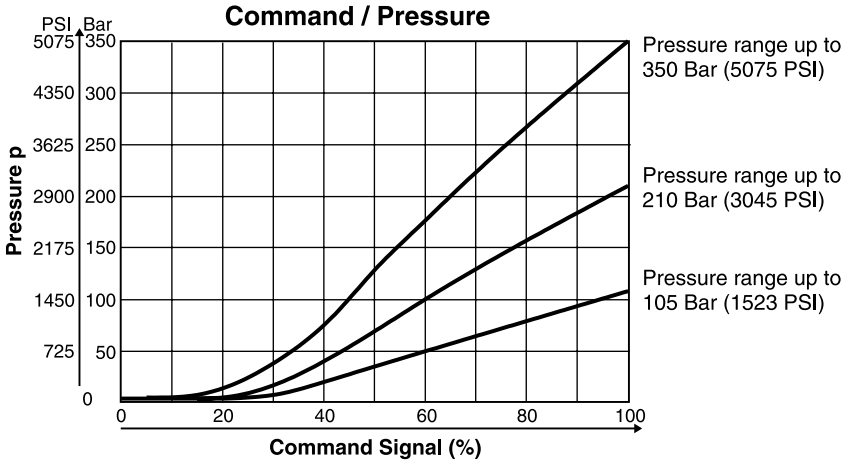
R4R03*P2	2.7 kg (6.0 lbs.)
R4R06*6*P2	4.5 kg (9.9 lbs.)
R4R10*P2	6.0 kg (13.2 lbs.)

B

Specifications

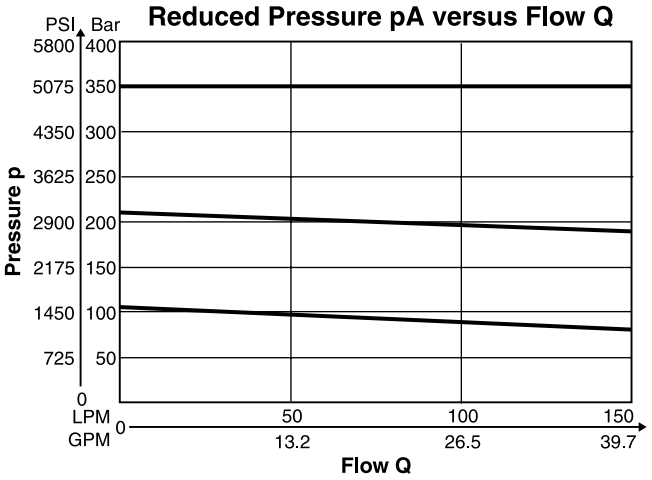
General				
Size		**NG10**	**NG25**	**NG32**
Interface		Subplate mounting acc. ISO 5781		
Mounting Position		as desired, horizontal mounting prefered		
Ambient Temperature	**[°C]**	-20 ... +80; (-4°F ... +176°F)		
$MTTF_D$ Value	**[years]**	75		
Hydraulic				
Maximum Operating Pressure		Ports A, B and 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 ... 525		
Viscosity				
Recommended	**[cSt] / [mm²/s]**	30 ... 50 (139 ... 232 SSU)		
Permitted	**[cSt] / [mm²/s]**	20 ... 380 (93 ... 1761 SSU)		
Fluid Temperature	**[°C]**	-20 ... +70 (-4°F ... +158°F)		
Filtration		ISO 4406 (1999) 18/16/13		
Electrical				
Duty Ratio	**[%]**	100 ED		
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		
Power Amplifier, Recommended		PCD00A-400		

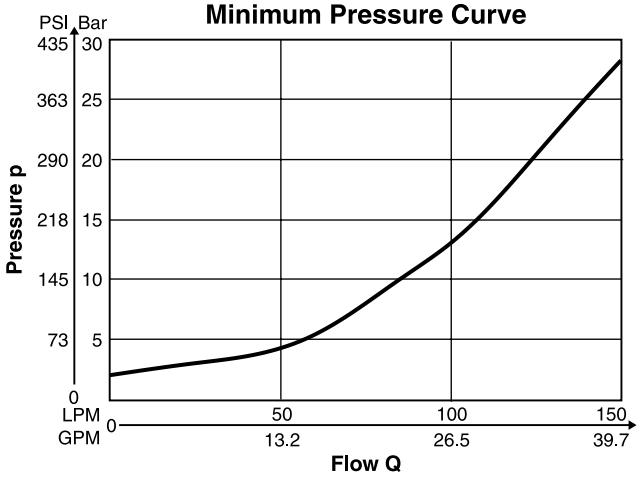
Performance Curves



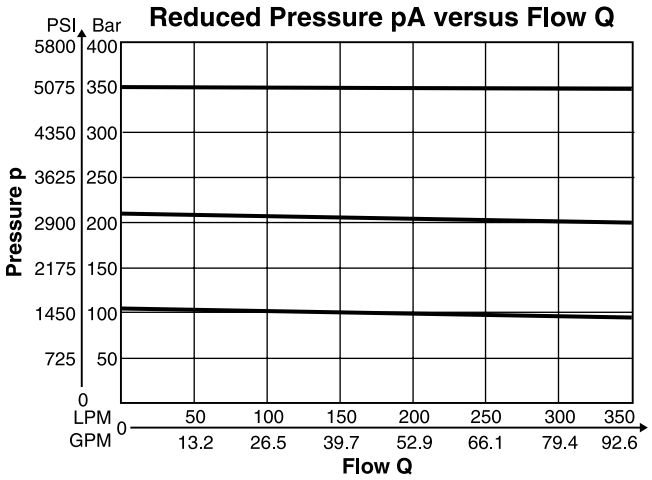
B

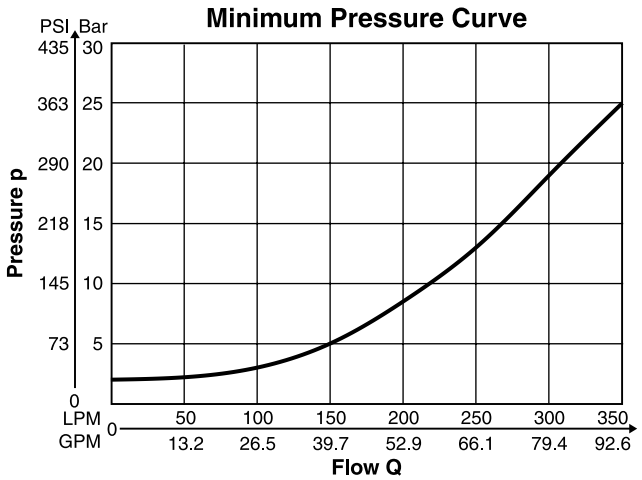
R4R03*P2 [1)]



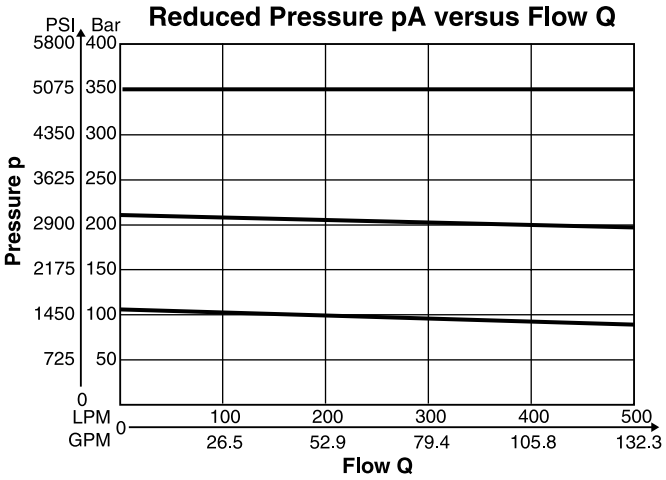


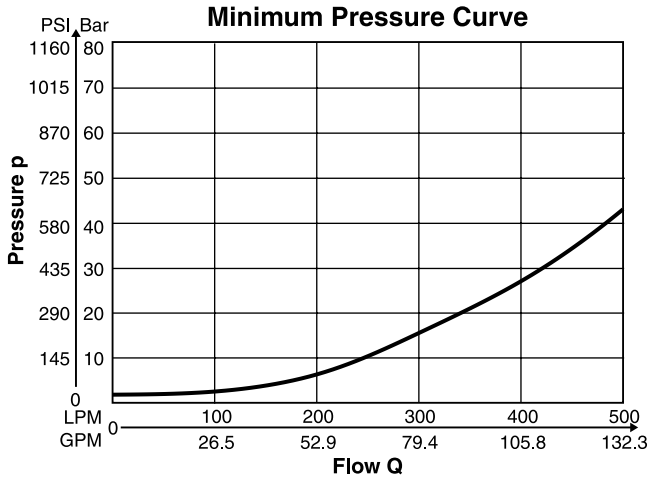
R4R06*P2 [1)]





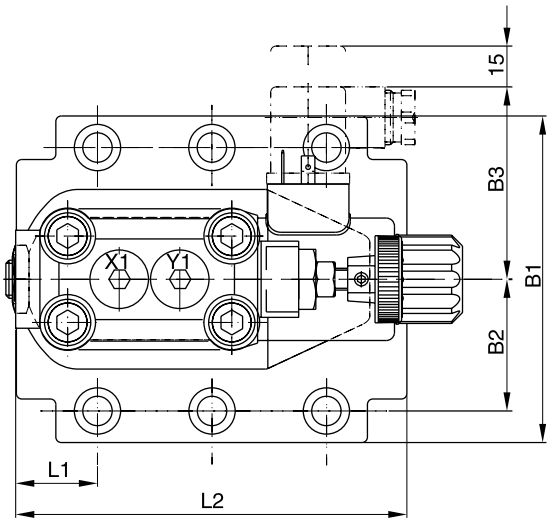
R4R10*P2 [1)]

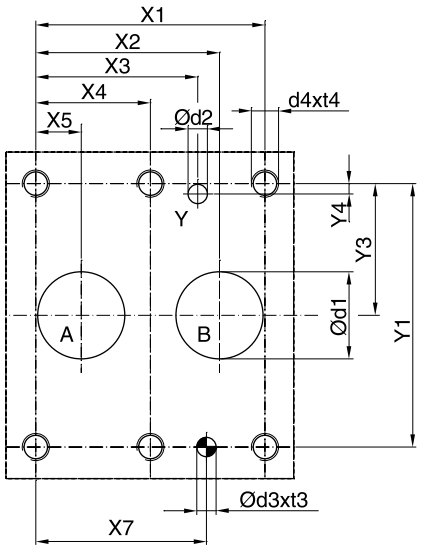


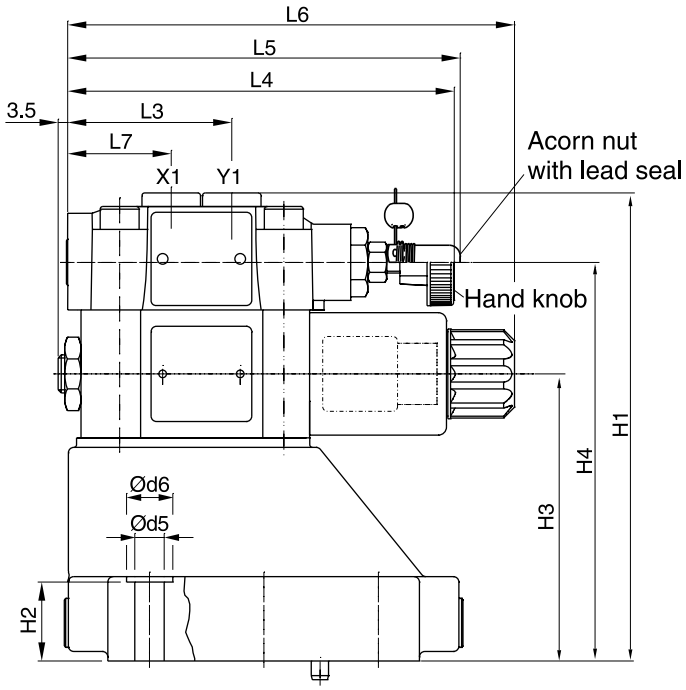


[1)] Measured at 350 Bar (5075 PSI) primary pressure pB.

B







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

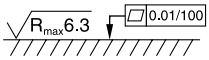
NG	ISO-Code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	–	7.2 (0.28)	–	31.8 (1.25)	66.7 (2.63)	–	33.4 (1.31)	7.9 (0.31)	–	–
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	–	44.5 (1.75)	79.4 (3.13)	–	39.7 (1.56)	6.4 (0.25)	–	–
32	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.

B

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)	29.0 (1.14)	94.8 (3.73)	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)	160.5 (6.32)	29.0 (1.14)	95.0 (3.74)	136.0 (5.35)	34.7 (1.37)	126.8 (4.99)	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)	29.0 (1.14)	105.5 (4.15)	146.5 (5.77)	30.6 (1.20)	144.3 (5.68)	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.) ±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.) ±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.) ±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

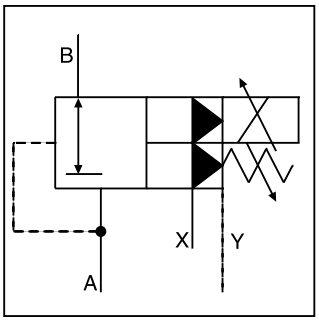
B

General Description

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

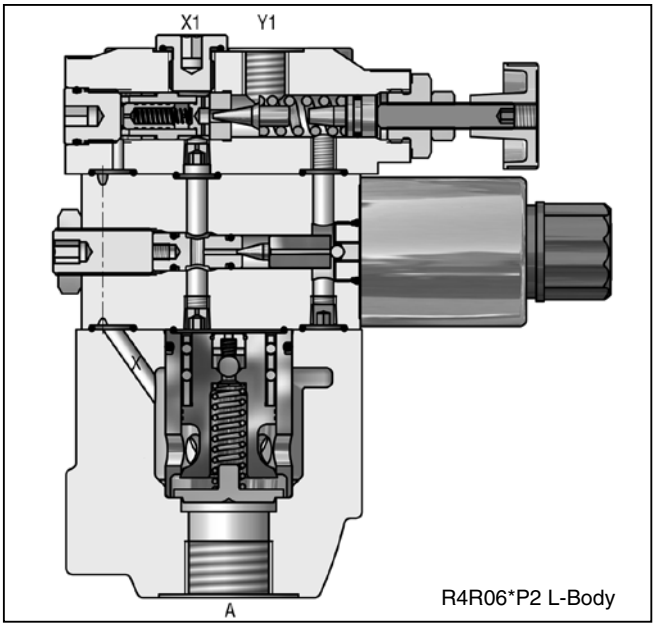
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

R4R10*P2 L-Body



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.



R4R06*P2 L-Body

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
1	Nitrile
5	Fluorocarbon

Code	Description
6	R4R03 T-Body R4R06 T-Body
D	R4R06 L-Body R4R10 L-Body

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

Bolt Kits:

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

Weight:

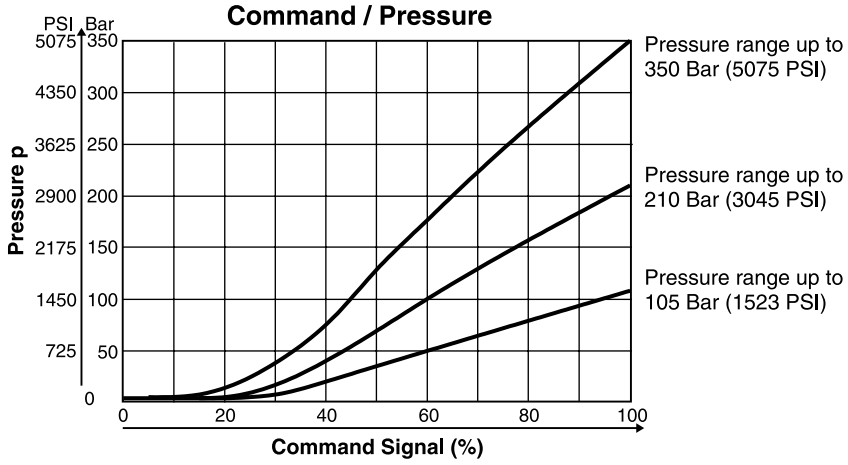
R4R03*P2:	5.0 kg (11.0 lbs.)
R4R06*6*P2:	5.1 kg (11.2 lbs.)
R4R06*D*P2:	7.4 kg (16.3 lbs.)
R4R10*P2	8.4 kg (18.5 lbs.)

B

Specifications

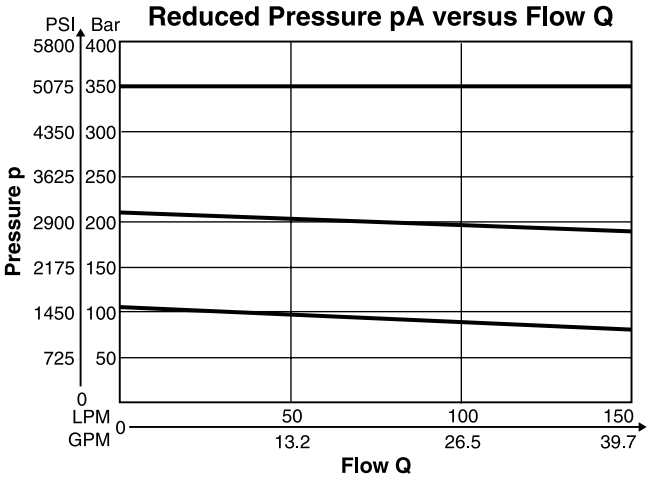
General				
Size	**T-Body**		**L-Body**	
	03 (1/2")	**06 (1")**	**06 (3/4")**	**10 (1-1/4")**
Mounting	Threaded Body			
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Max. Operating Pressure	Ports A, B and X 350 Bar (5075 PSI); Port Y depressurized			
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 ... 51525			
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%			
Nominal Voltage	12 VDC			
Maximum Current	2.3 amps			
Coil Resistance	4 Ohm at 20°C (68°F)			
Solenoid Connection	Connector as per EN175301-803			
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)			
Power Amplifier	PCD00A-400			

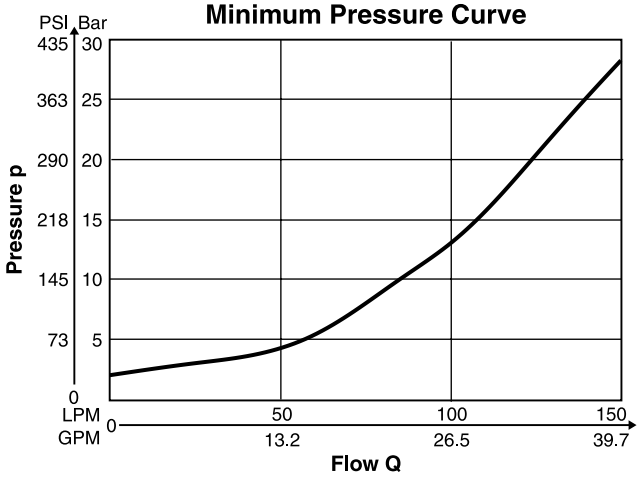
Performance Curves



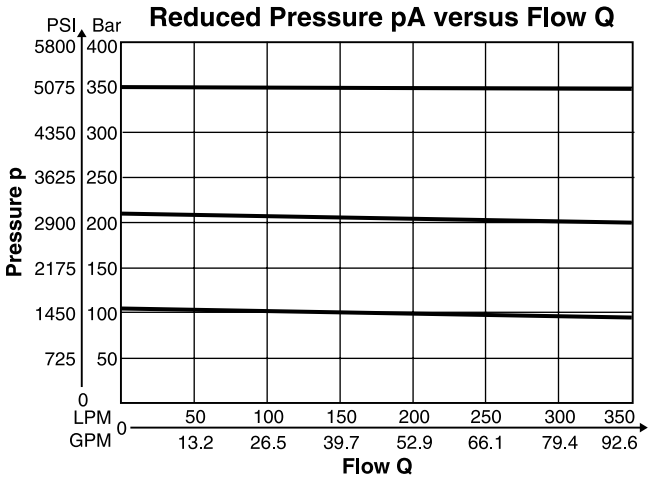
B

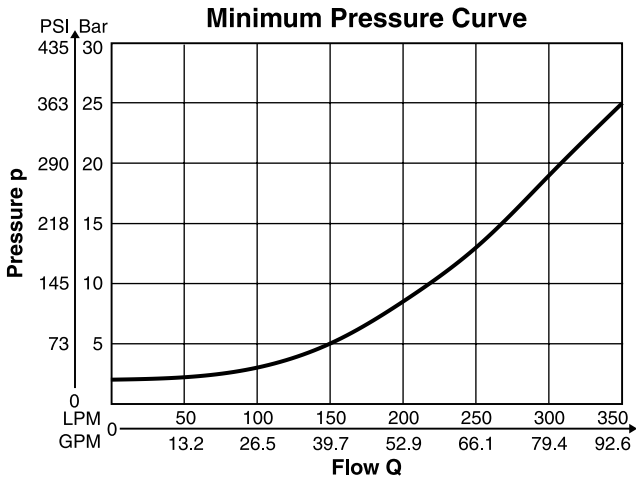
R4R03*P2 [1)]



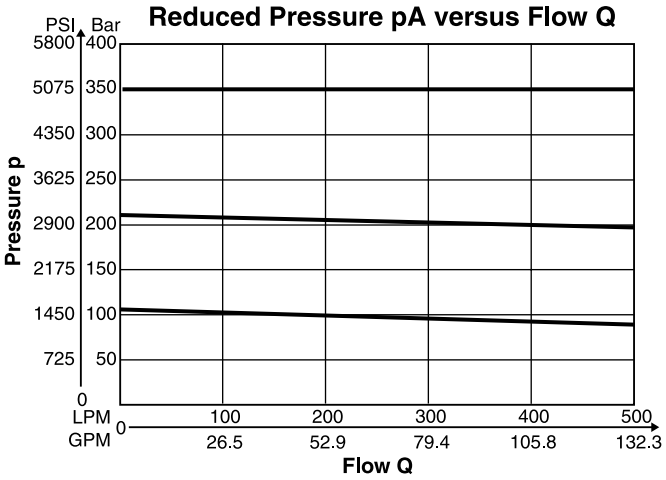


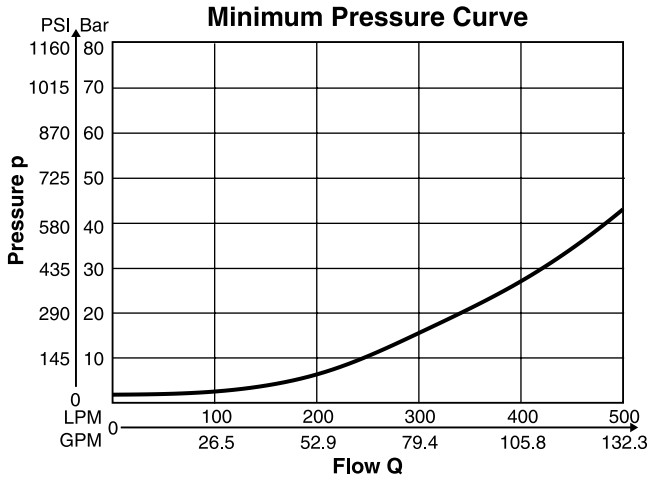
R4R06*P2 [1)]





R4R10*P2 [1)]

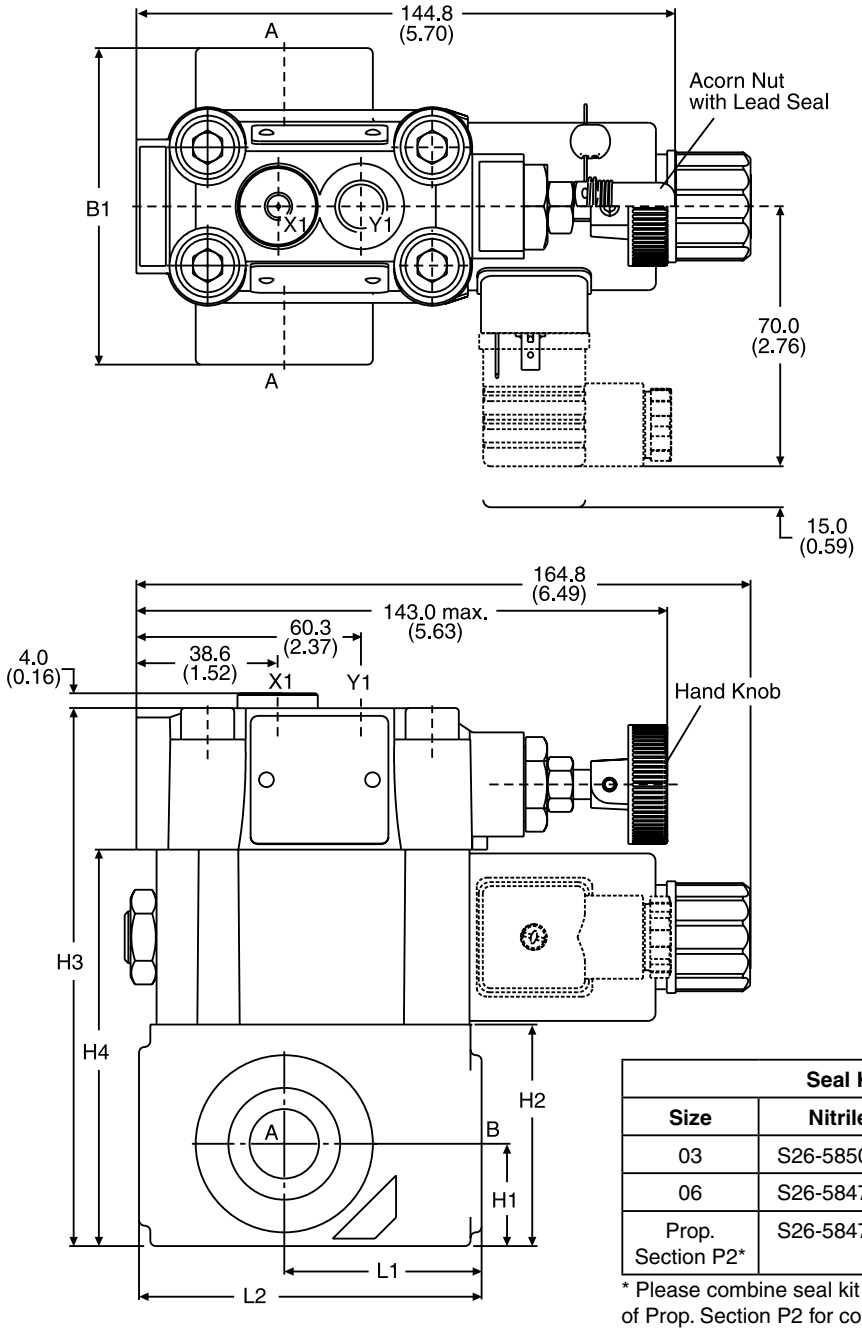




[1)] Measured at 350 Bar (5075 PSI) primary pressure pB.

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.

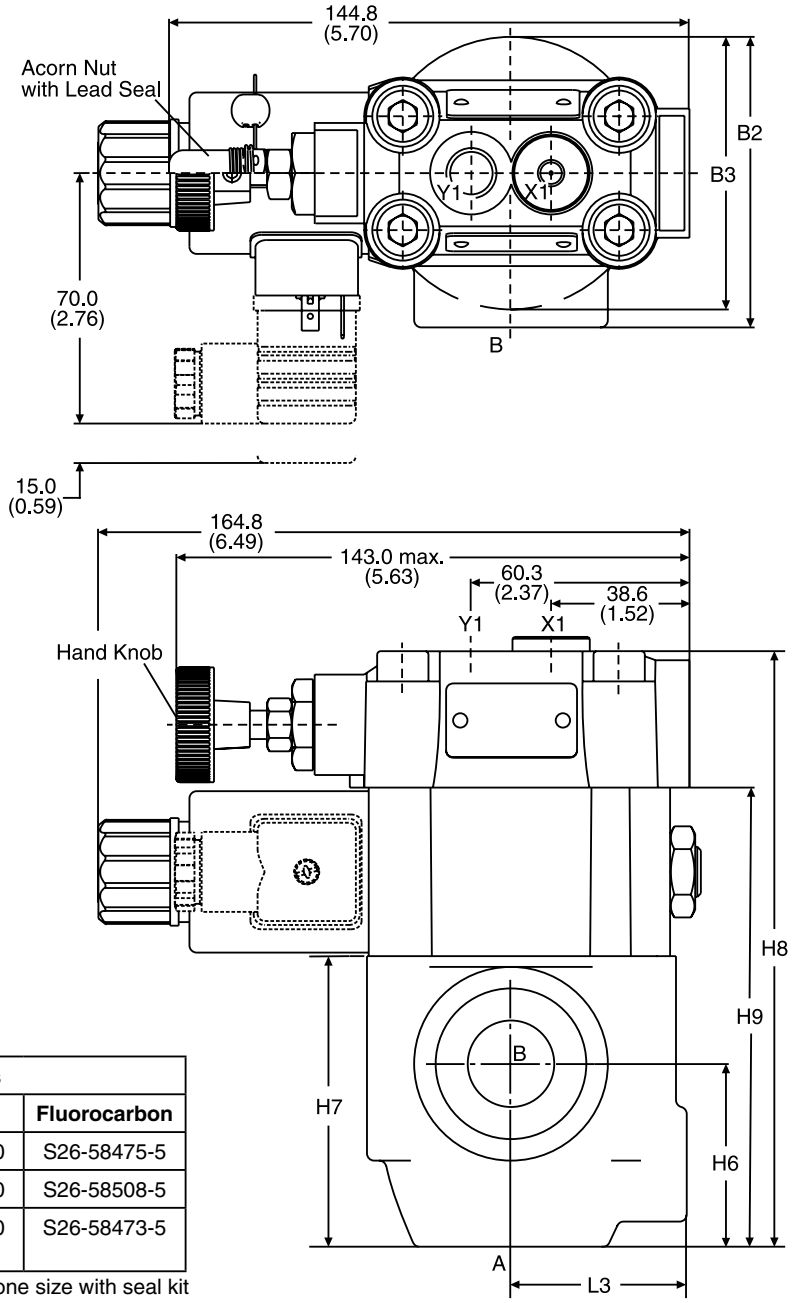
Size	Body	B1	H1	H2	H3	H4	L1	L2
03	T-Body	85.0 (3.35)	27.5 (1.08)	59.5 (2.34)	144.5 (5.69)	106.5 (4.19)	53.0 (2.09)	92.0 (3.62)
06	T-Body	136.0 (5.35)	38.0 (1.50)	93.0 (3.66)	178.0 (7.01)	140.0 (5.51)	66.5 (2.62)	117.5 (4.63)

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		

B

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		

R4R_P2-Inline.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

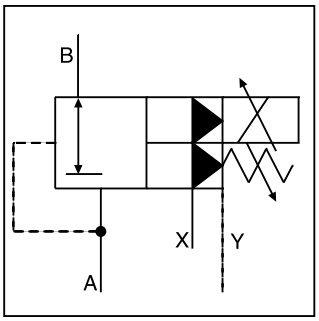
B

General Description

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

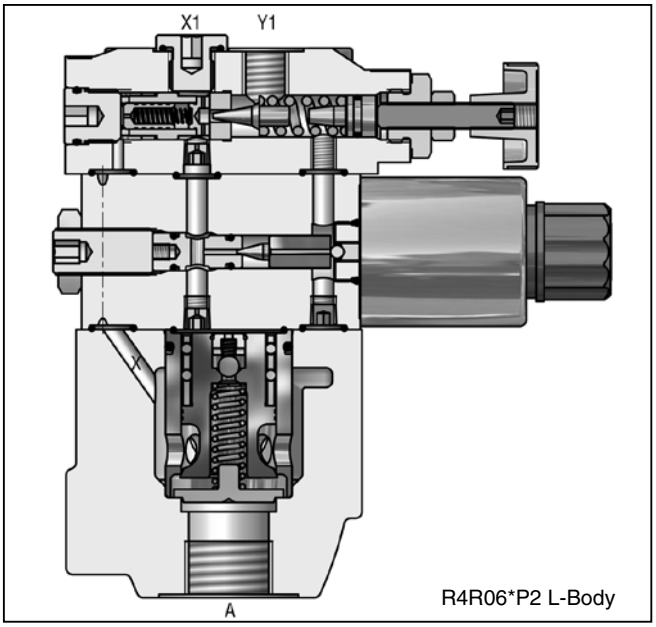
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

R4R10*P2 L-Body



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.



R4R06*P2 L-Body

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
1	Nitrile
5	Fluorocarbon

Code	Description
6	R4R03 T-Body R4R06 T-Body
D	R4R06 L-Body R4R10 L-Body

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

Bolt Kits:

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

Weight:

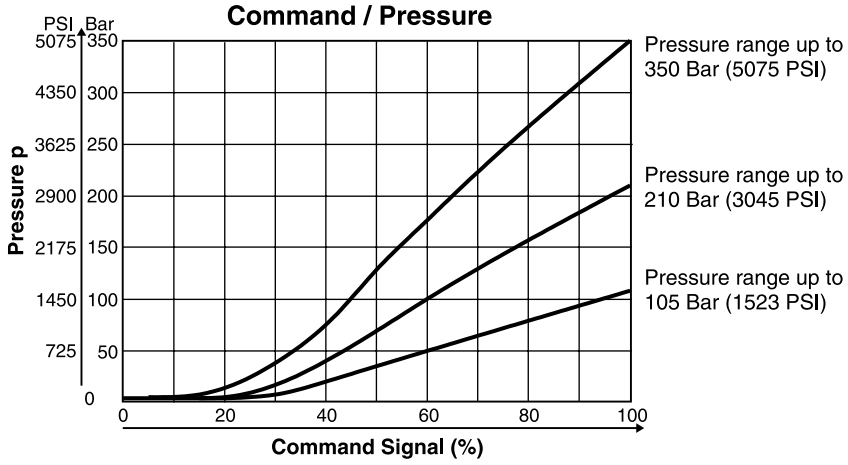
R4R03*P2:	5.0 kg (11.0 lbs.)
R4R06*6*P2:	5.1 kg (11.2 lbs.)
R4R06*D*P2:	7.4 kg (16.3 lbs.)
R4R10*P2	8.4 kg (18.5 lbs.)

B

Specifications

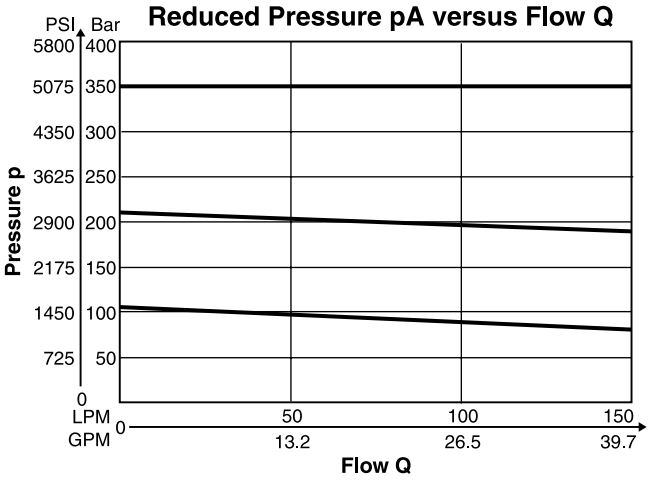
General				
Size	**T-Body**		**L-Body**	
	03 (1/2")	**06 (1")**	**06 (3/4")**	**10 (1-1/4")**
Mounting	Threaded Body			
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Max. Operating Pressure	Ports A, B and X 350 Bar (5075 PSI); Port Y depressurized			
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 ... 51525			
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%			
Nominal Voltage	12 VDC			
Maximum Current	2.3 amps			
Coil Resistance	4 Ohm at 20°C (68°F)			
Solenoid Connection	Connector as per EN175301-803			
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)			
Power Amplifier	PCD00A-400			

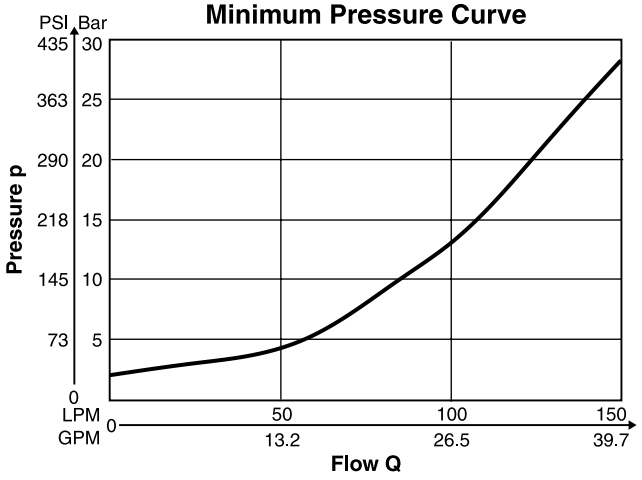
Performance Curves



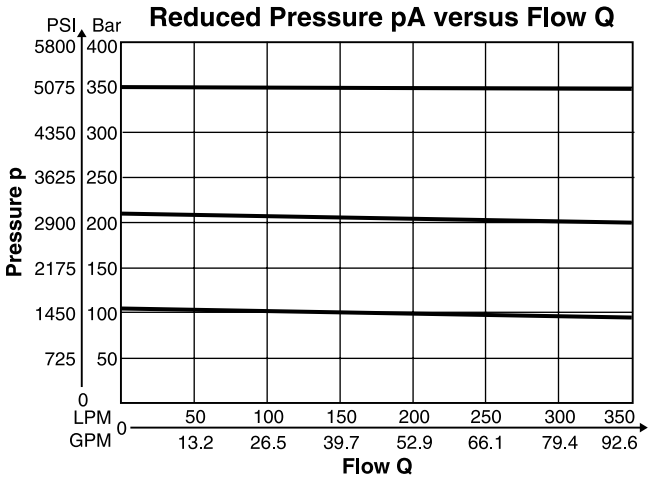
B

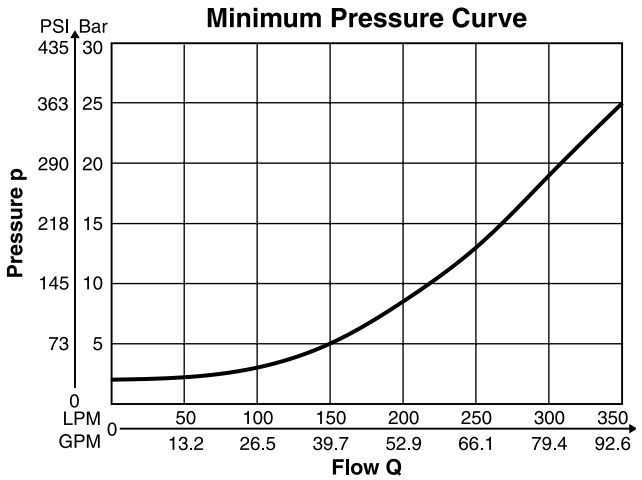
R4R03*P2 [1)]



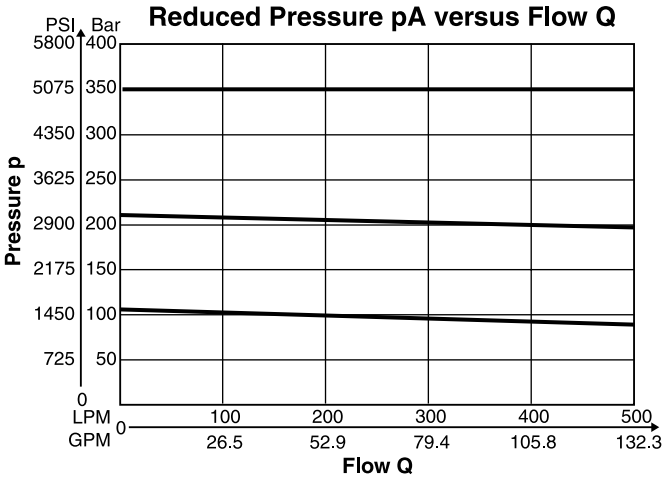


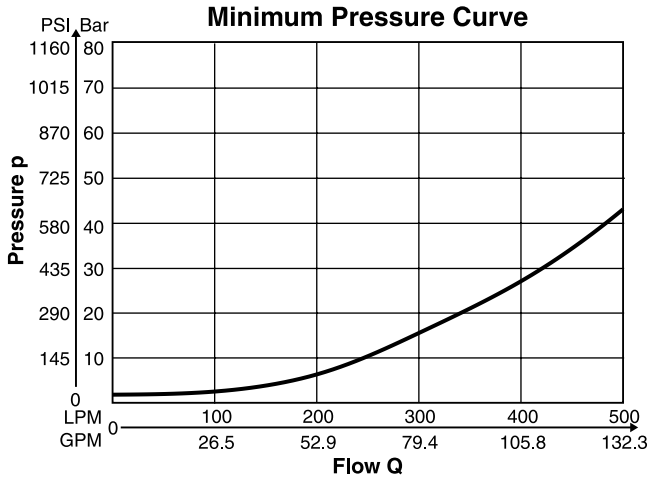
R4R06*P2 [1)]





R4R10*P2 [1)]

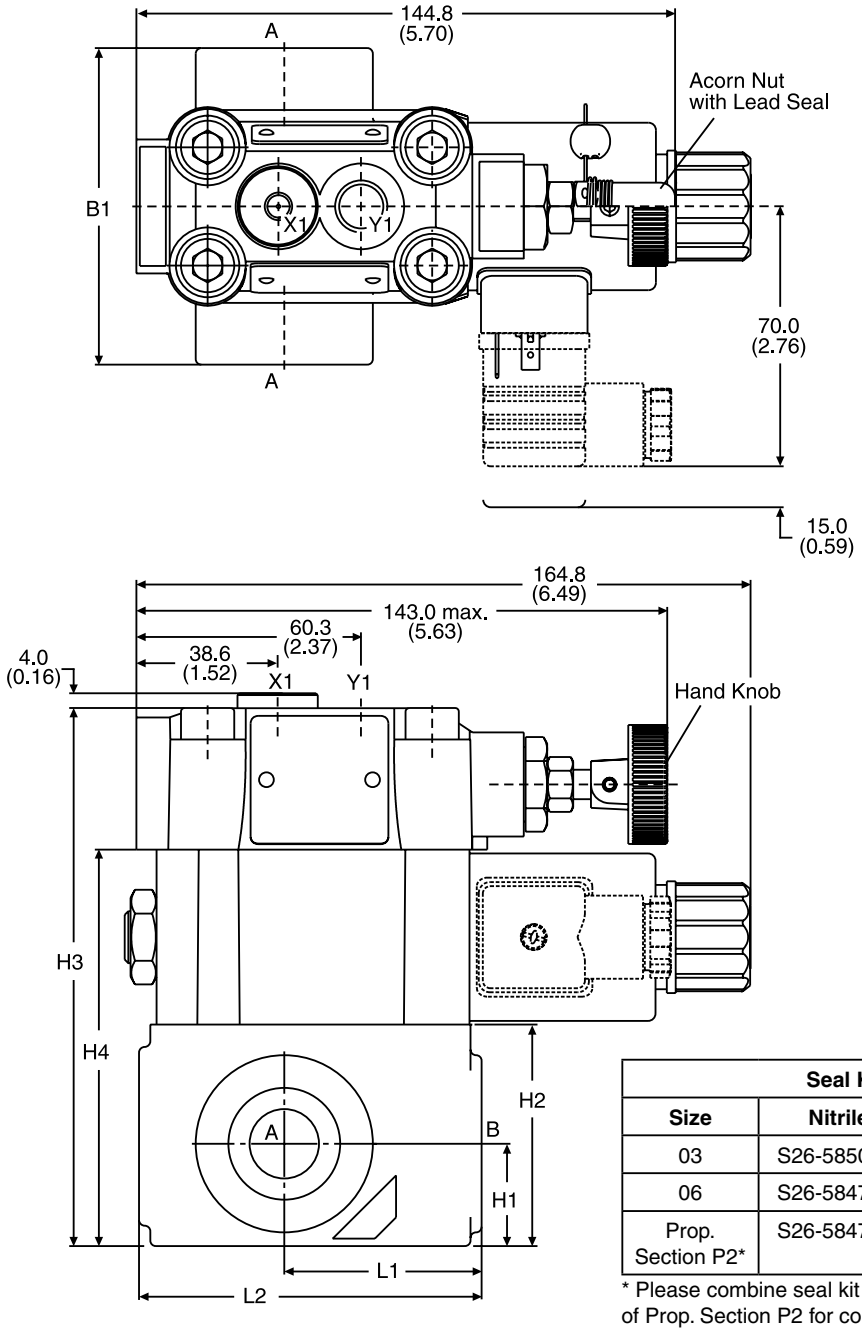




[1)] Measured at 350 Bar (5075 PSI) primary pressure pB.

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.

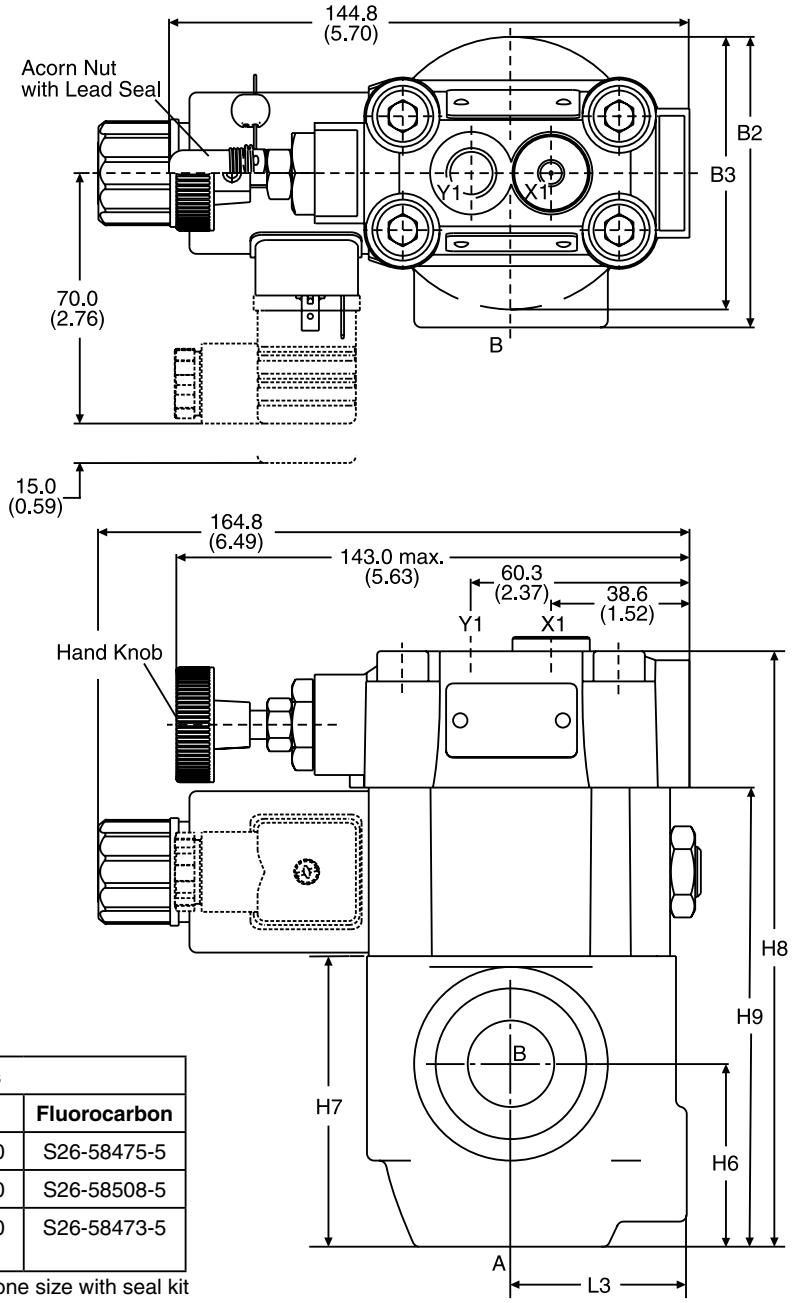
Size	Body	B1	H1	H2	H3	H4	L1	L2
03	T-Body	85.0 (3.35)	27.5 (1.08)	59.5 (2.34)	144.5 (5.69)	106.5 (4.19)	53.0 (2.09)	92.0 (3.62)
06	T-Body	136.0 (5.35)	38.0 (1.50)	93.0 (3.66)	178.0 (7.01)	140.0 (5.51)	66.5 (2.62)	117.5 (4.63)

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		

B

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		

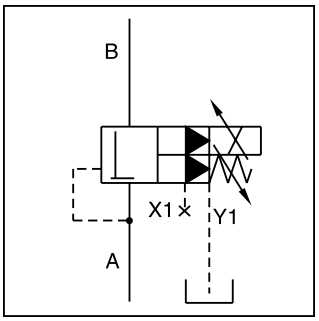
R4R_P2-Inline.indd, dd

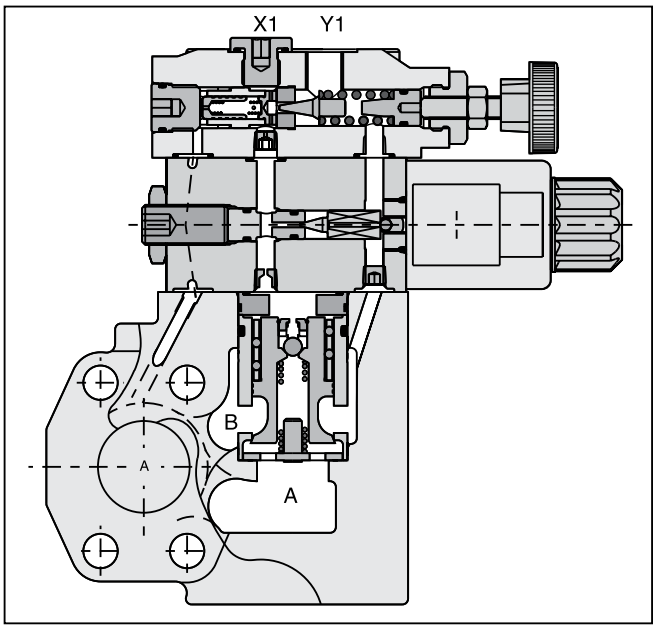
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

General Description

Series R5R*P2 proportional pressure reducing valves are based on the mechanical adjusted Series R5R. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment. The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.





Features

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

Ordering Information

R5R	☐	—	☐	8	☐	☐	6	P2	G0R	A	☐	☐
Pressure Reducing Valve	Size		SAE 61 Interface	Body 2-Port X1, Y1 = G1/4"	Pressure Range	Adjustment	External Drain from Y1 Port	Proportional Pressure Control	Solenoid Voltage 12V 2.3A	Design Series	Seal	Options Check with Factory

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

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Code	Description
1	Nitrile
5	Fluorocarbon

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

Further options on request.

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

Weight:

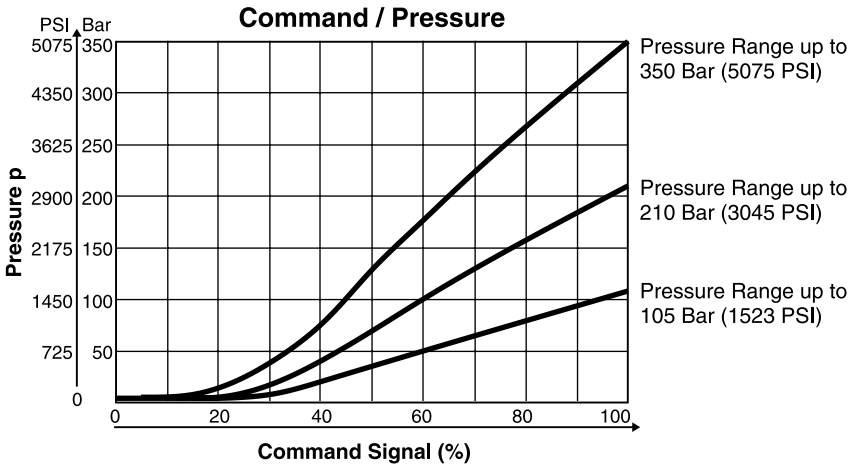
R5R06*P2	5.8 kg (12.8 lbs.)
R5R08*P2	6.4 kg (14.1 lbs.)
R5R10*P2	7.7 kg (17.0 lbs.)

B

Specifications

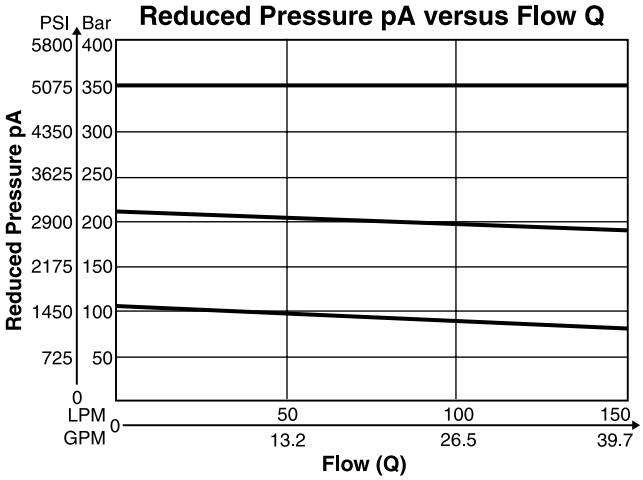
General				
Size		**06**	**08**	**10**
Mounting		Flanged according to SAE 61		
Mounting Position		Unrestricted		
Ambient Temperature Range		-20°C to +50°C (-4°F to +122°F)		
Hydraulic				
Max. Operating Pressure	**Ports A,B, X1**	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)
	Port Y1	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)
Pressure Ranges		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)		
Nominal Flow		90 LPM (23.8 GPM)	300 LPM (79.4 GPM)	500 LPM (132.3 GPM)
Fluid		Hydraulic oil as per DIN 51524 ... 51525		
Fluid Temperature		-20°C to +80°C (-4°F to +176°F)		
Viscosity	**Permitted**	10 to 650 cSt / mm²/s (46 to 3013 SSU)		
	Recommended	30 to 80 cSt / mm²/s (139 to 371 SSU)		
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Electrical (Solenoid)				
Duty Ratio		100%		
Nominal Voltage		12 VDC		
Maximum Current		2.3 amps		
Coil Resistance		4 Ohm at 20°C (68°F)		
Solenoid Connection		Connector as per EN175301-803		
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)		
Power Amplifier		PCD00A-400		

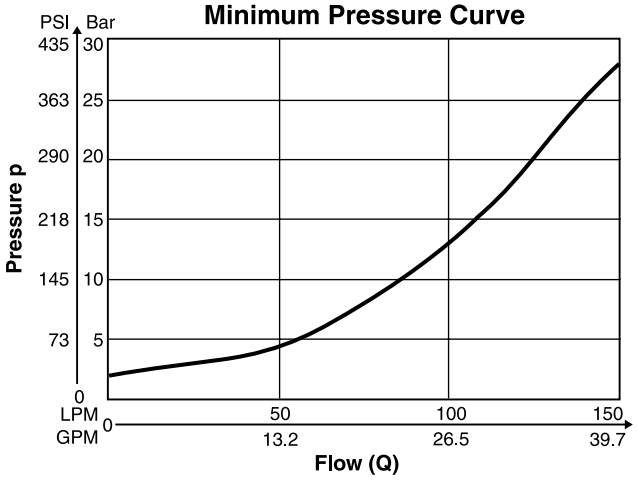
Performance Curves



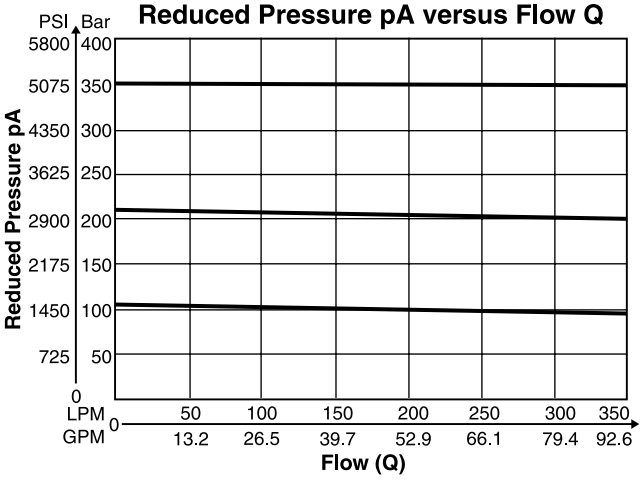
B

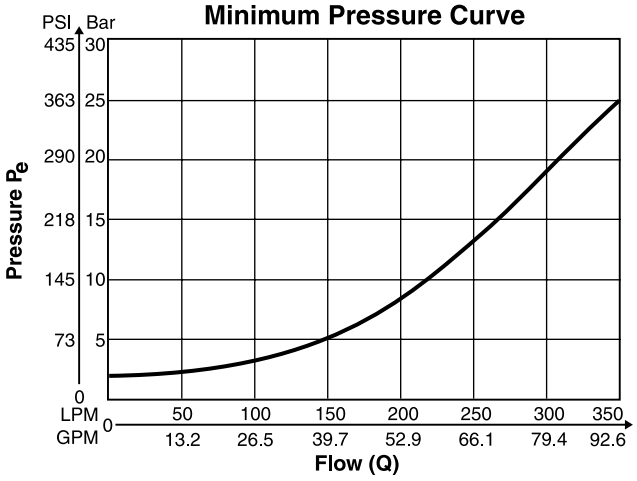
R5R06*P2 [1)]



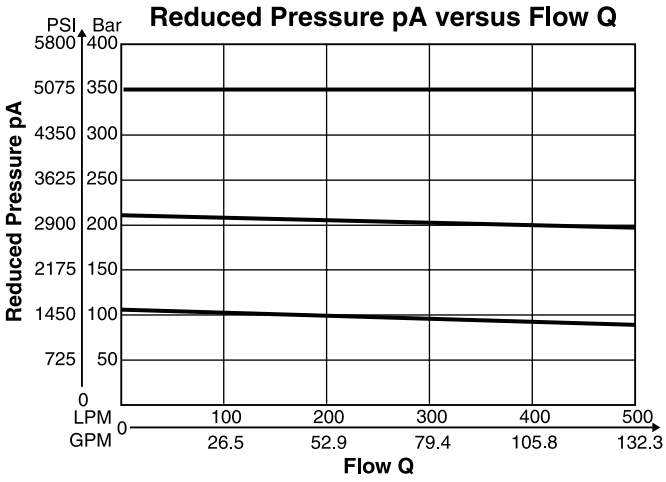


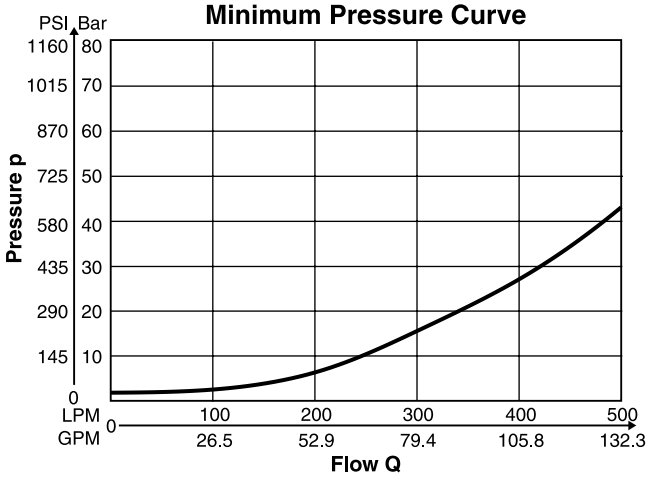
R5R08* P2 [1)]





R5R10* P2 [1)]





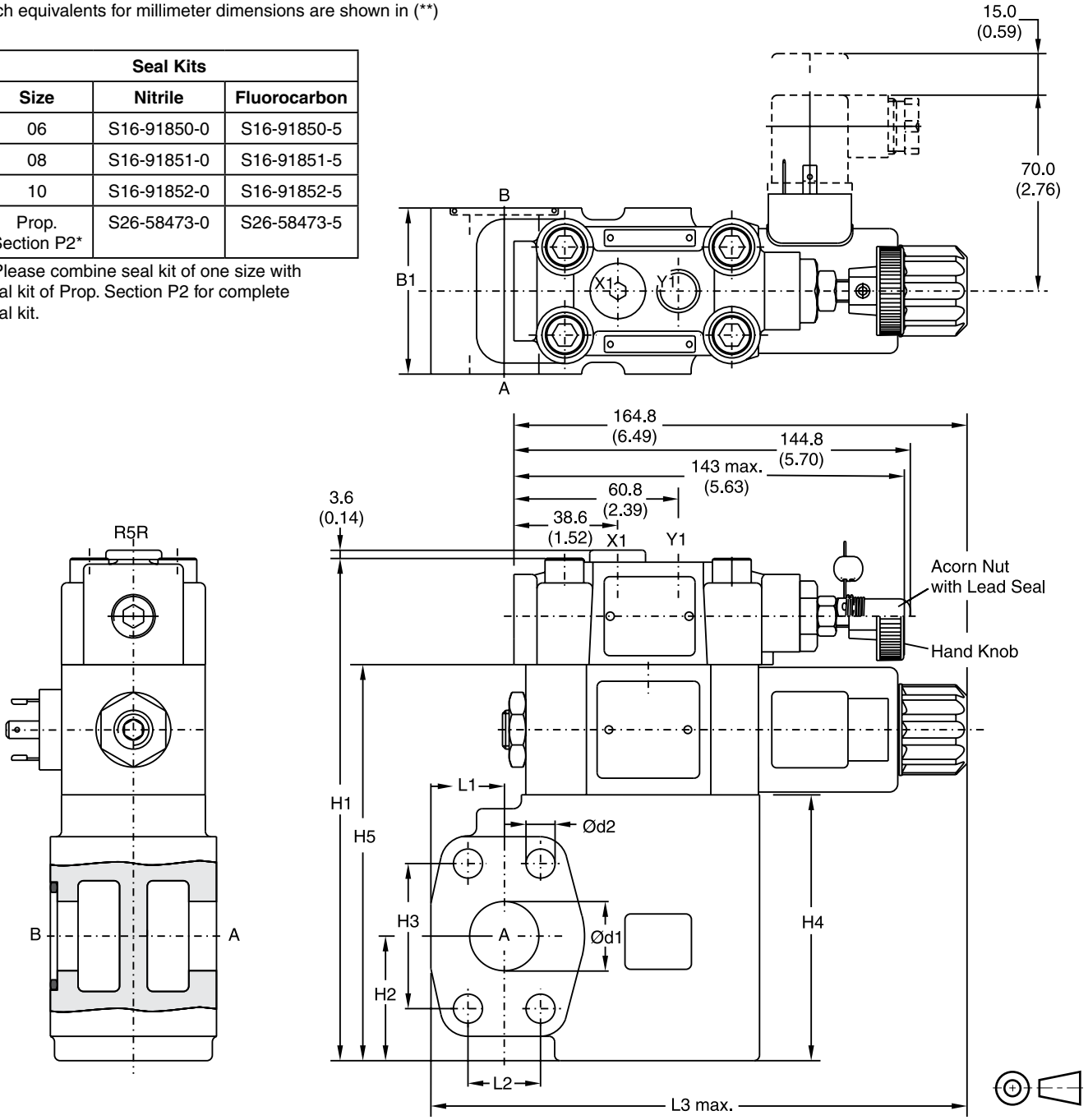
[1)] Measured at 350 Bar (5075 PSI) primary pressure pB.

B

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

Seal Kits		
Size	**Nitrile**	**Fluorocarbon**
06	S16-91850-0	S16-91850-5
08	S16-91851-0	S16-91851-5
10	S16-91852-0	S16-91852-5
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	B1	H1	H2	H3	H4	H5	L1	L2	L3	d1	d2
06	60.0 (2.36)	175.0 (6.89)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	137.0 (5.39)	24.6 (0.97)	22.2 (0.87)	174.0 (6.85)	19.0 (0.75)	10.5 (0.41)
08	60.0 (2.36)	181.0 (7.13)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	143.0 (5.63)	26.5 (1.04)	26.2 (1.03)	193.6 (7.62)	25.0 (0.98)	10.5 (0.41)
10	75.0 (2.95)	194.0 (7.64)	48.0 (5.93)	58.7 (2.31)	109.0 (4.29)	156.0 (6.14)	34.0 (1.34)	30.2 (1.19)	201.0 (7.91)	32.0 (1.26)	12.5 (0.49)

Port	Function	Port Size		
		R5R06	**R5R08**	**R5R10**
B	Inlet Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
A	Reduced Outlet Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
Y1	External Drain	G1/4"		
X1	Pressure Gauge	G1/4"		

R5R_P2.indd, dd

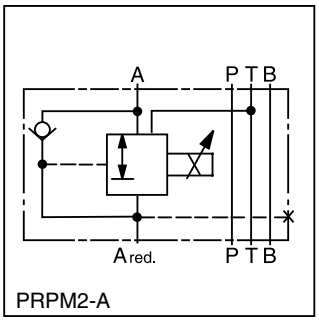
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

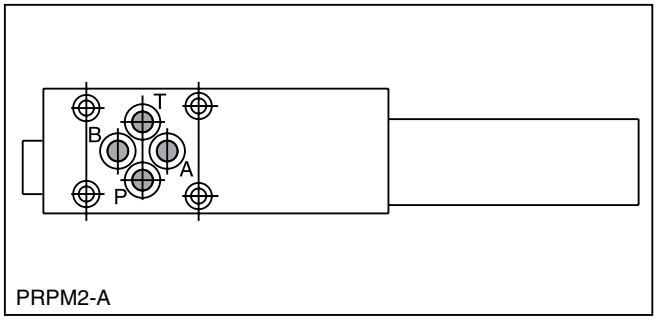
Series PRPM proportional pressure reducing valves keep a constant pressure p_{red} on the secondary, or regulated, side, independent of pressure fluctuations on the primary side. The integrated pressure relief function eliminates the need for an additional pressure relief valve on the secondary side and reliefs to tank, if p_{red} rises above the set pressure.

The proportional pressure reducing valve reduces the pressure in output port p_{red} in proportion to the solenoid current. The PRPM works practically independent of the inlet pressure p_E. In non-activated mode, the connection to the tank is fully open with a min. pressure corresponding to the spring force.

The gauge port is connected to the secondary side. Types A and B have an integrated bypass check valve. The PRPM provides optimum performance in combination with a digital amplifier module PCD00A-400.



PRPM2-A



PRPM2-A

B

Specifications

General		
Size (according to ISO 4401)	**NG6**	**NG10**
Construction	Sandwich type	
Operation	Proportional solenoid	
Mounting	4 holes for socket cap screws M5 (NG10: M6) or studs M5 (NG10: M6)	
Port	Sandwich valve	
Mounting Position	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 / mm^2/s (46 to 1761 SSU)	
Filtration	ISO Class 1406 16/13, to be achieved with $\beta_{6...10} > 75$	
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	
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	

B

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)

□ — Soleoid Voltage

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

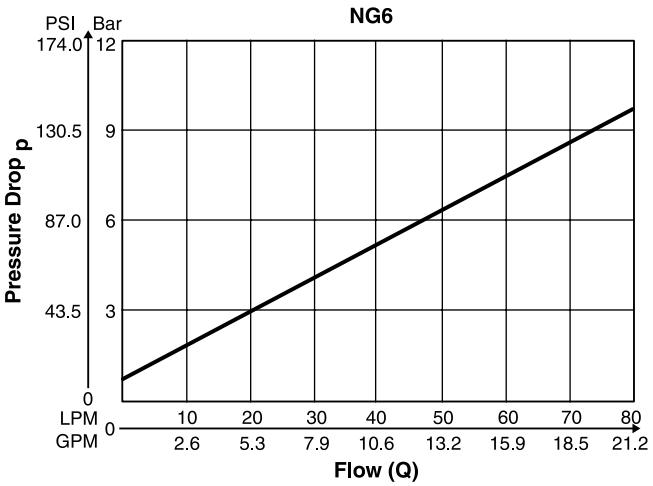
V — Seal Fluorocarbon

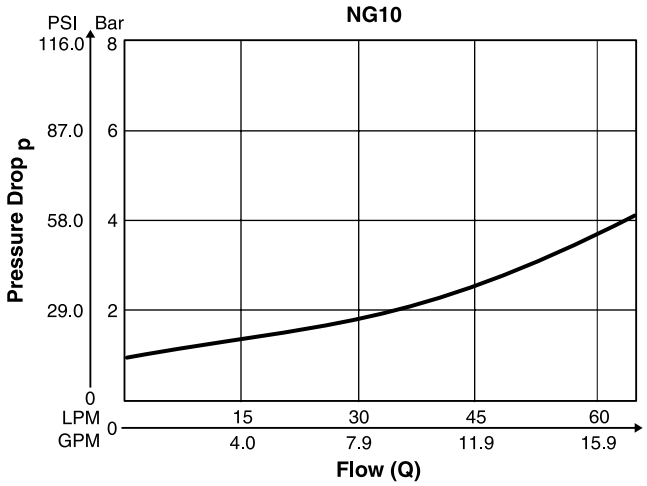
Weight:

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

Performance Curves

Pressure Drop/Flow over check valve

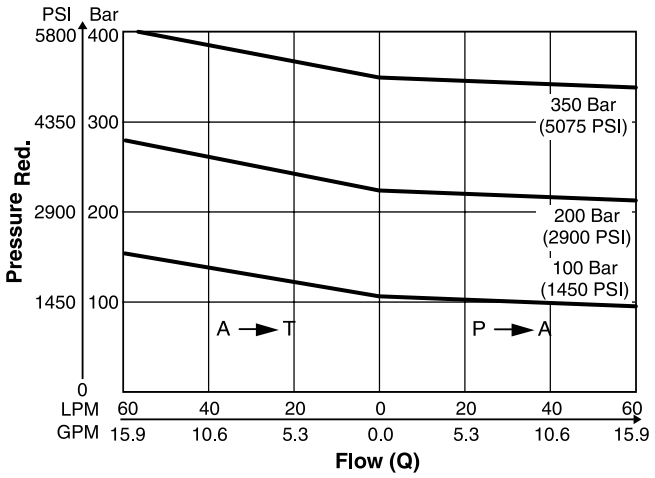




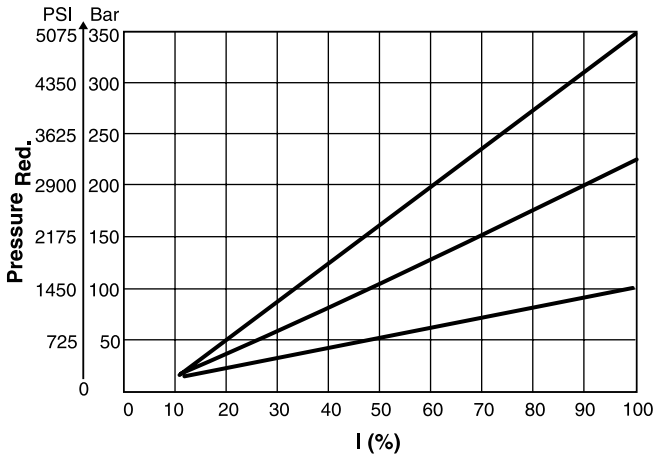
All measures taken at viscosity υ = 30mm²/s.

B

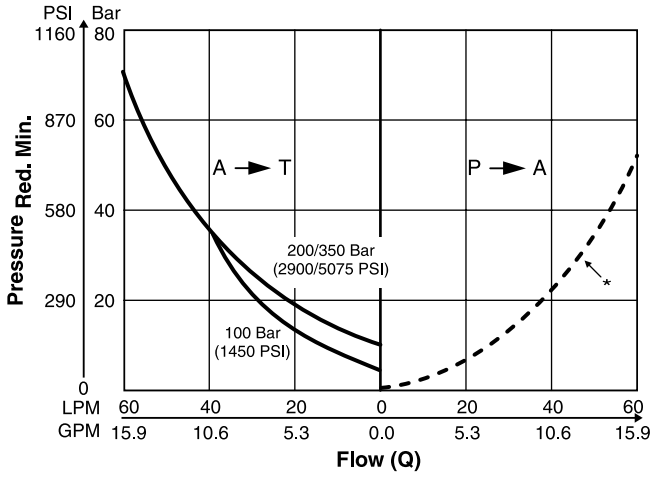
Pressure/Flow NG6/NG10 p_{red} = f(Q)



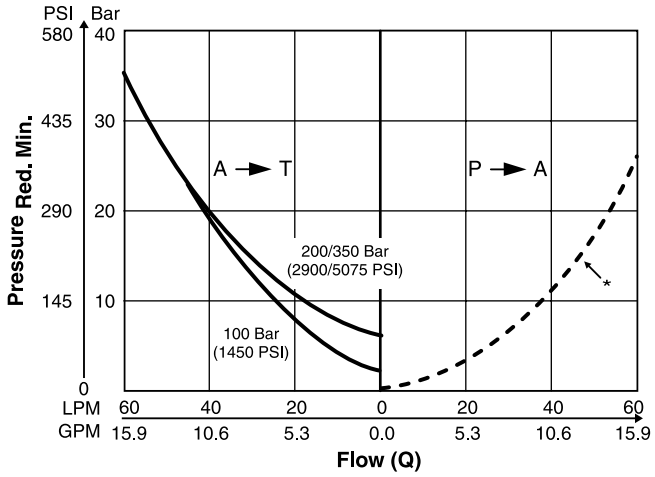
Pressure/Adjustment p_{red} = f(I), at Q=0 LPM (static)



Pressure/Flow NG6 (min. adjustable) p_{red} = f(Q)

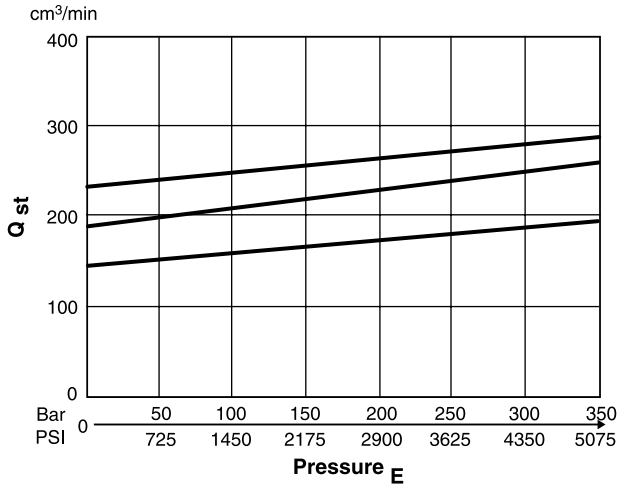


* Backpressure depends on system



* Backpressure depends on system

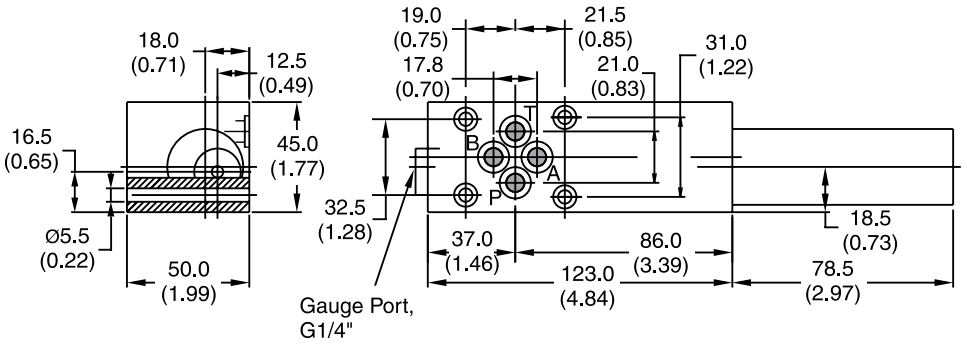
Pilot Flow NG6/NG10 p_{red} = f(Q)



B

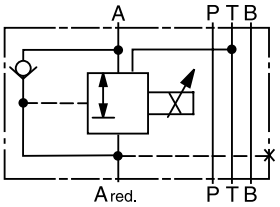
PRPM2A*, B*

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

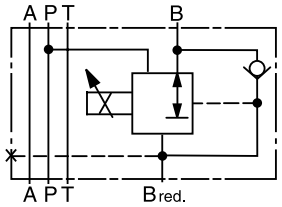


Sandwich type: Pressure reduction code B is located on cartridge side B.

Symbol PRPM2A*

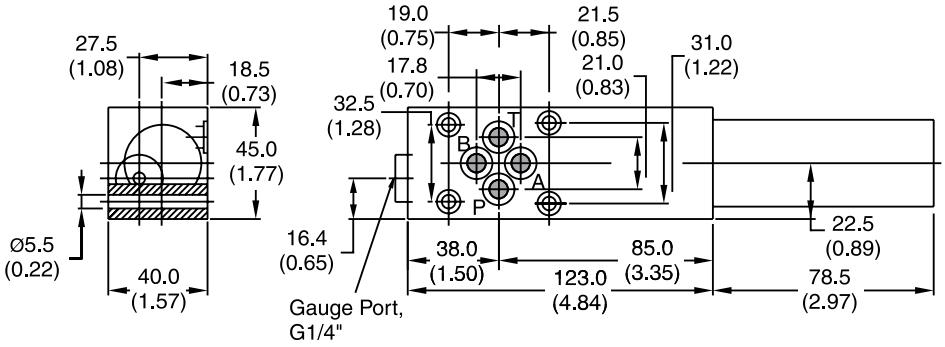


Symbol PRPM2B*

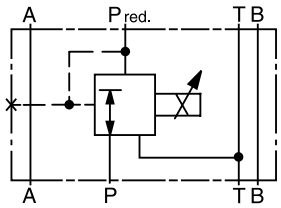


PRPM2P*

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

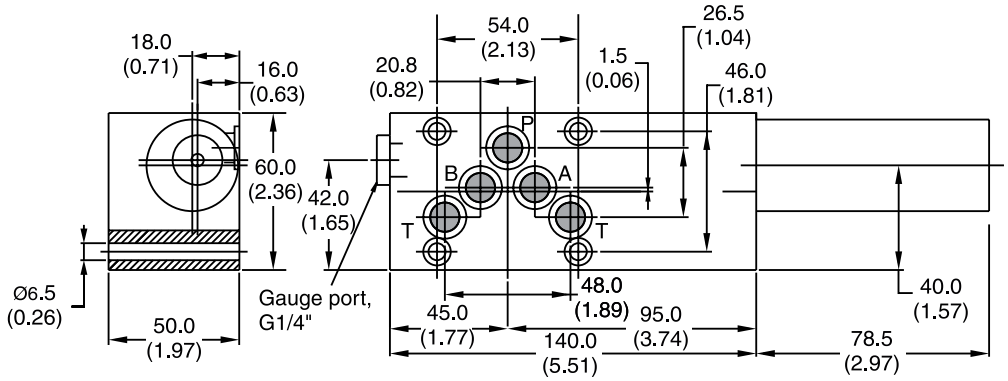


Symbol PRPM2P*



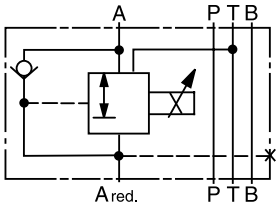
PRPM3A*, B*

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

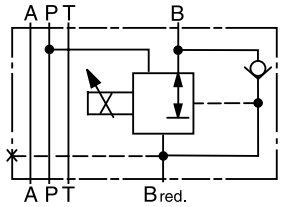


Sandwich type: Pressure reduction code B is located on cartridge side B.

Symbol PRPM3A*

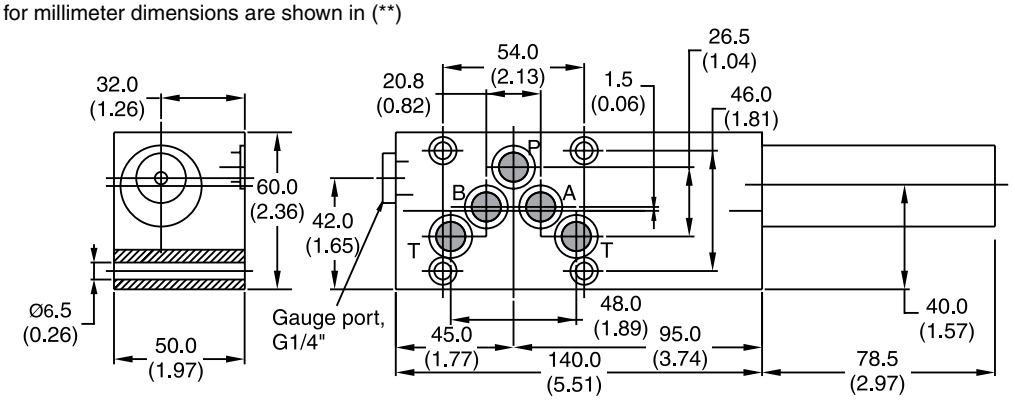


Symbol PRPM3B*



PRPM3P*

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



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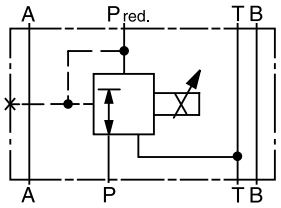


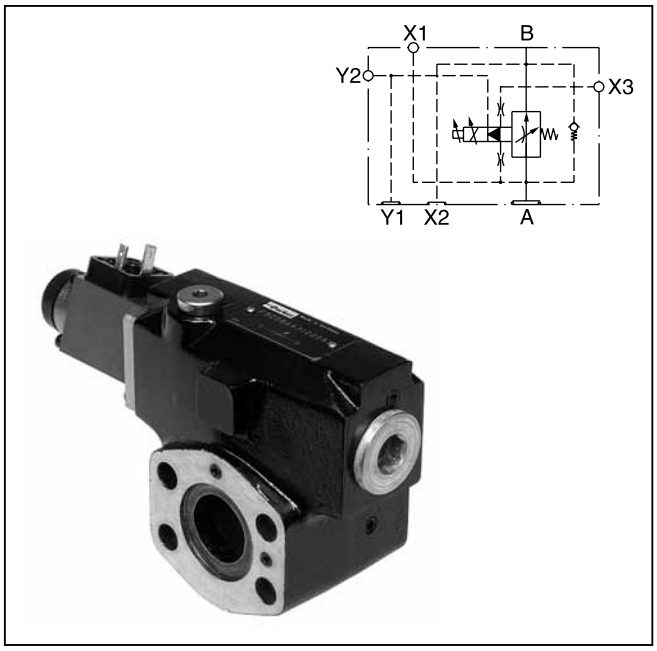
B

General Description

Series F5C proportional throttle valves adjust flow in proportion to the input signal. The combination of the F5C with pressure compensators R5A or R5P serves as a flow control valve, providing load compensated flow.

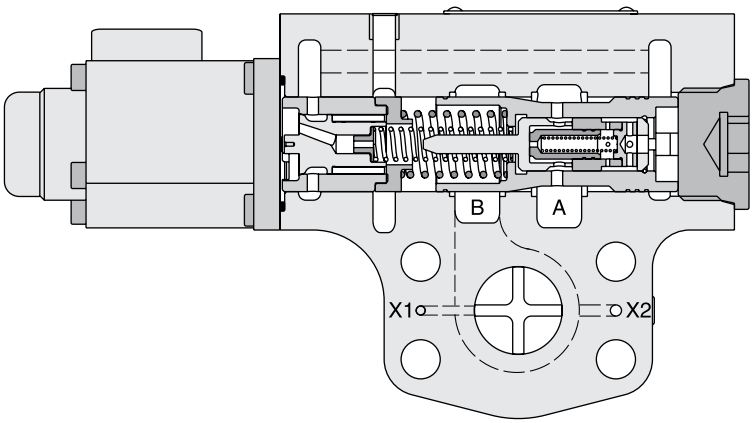
The F5C is offered with two types of response time:

Standard	350 ms at 1 LPM (0.3 GPM) pilot flow
Code A	250 ms at 2 LPM (0.5 GPM) pilot flow



Features

- Spool type proportional throttle valve.
- SAE 61 flange.
- Maximum pressure 270 Bar (3915 PSI).
- Maximum flow 380 LPM (100.5 GPM).
- 3 sizes: SAE 3/4", 1", 1 1/4".
- Load compensated flow in combination with R5A and R5P.



F5C	□	□	4	3	□	X	□	0	C	□	□
Proportional Throttle Valve	Size	Pilot Flow and Response	SAE 61 Interface	Pilot Ports G1/4"	Spool Type	Proportional Solenoid 16V / 1.05A	Pilot Connection	Accessories	Design Series	Seal	Options Check with Factory

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

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

Code	Size	Maximum Flow*
A	06	23 LPM (6.1 GPM)
B	06/08	45 LPM (11.9 GPM)
1	06/08/10	95 LPM (25.1 GPM)
2	08/10	190 LPM (50.3 GPM)
3	10	380 LPM (100.5 GPM)

* At nominal pressure drop (Δp = 8.4 Bar (121.8 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

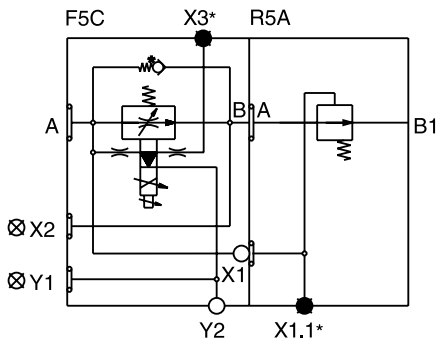
B

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 ○

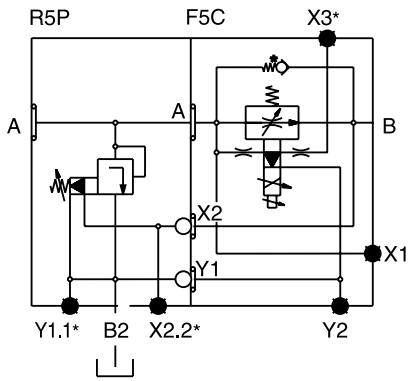
Weight:

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

F5C with R5A



F5C with R5P



* optional

○ open ● closed ⊗ closed by counterpart

F5C.indd, dd

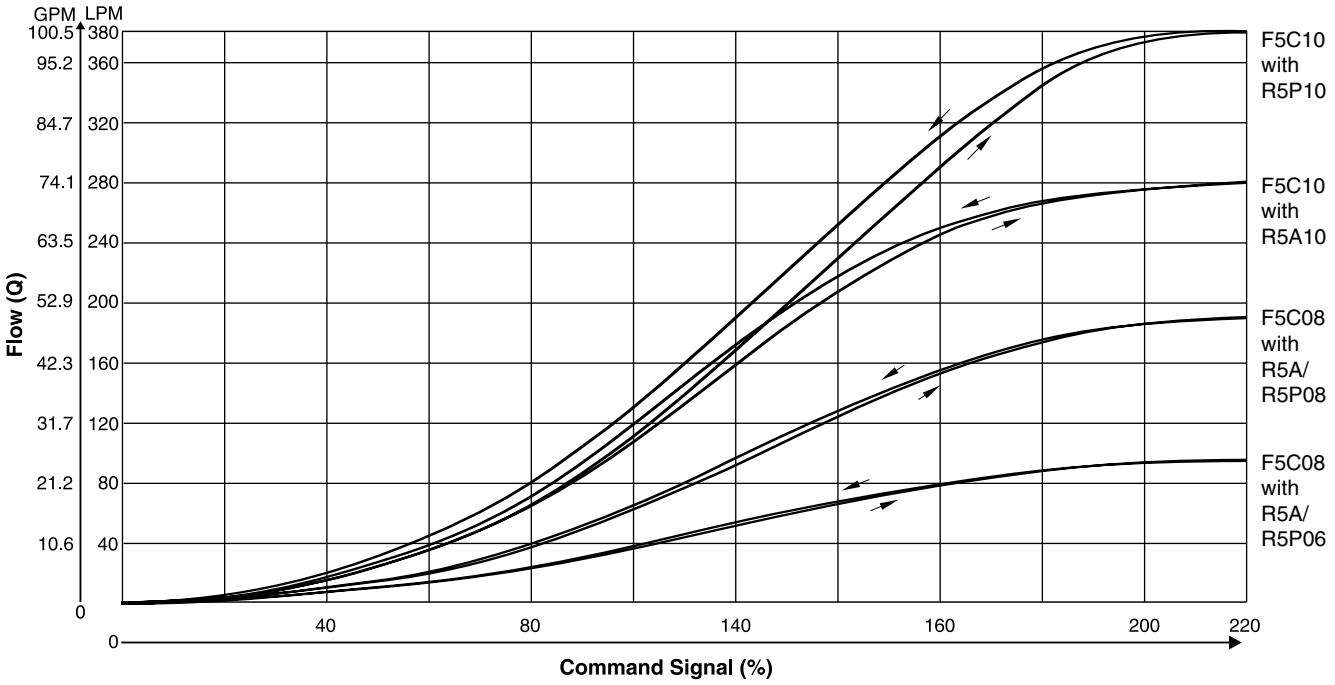
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

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 ... 51525		
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%		
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)		

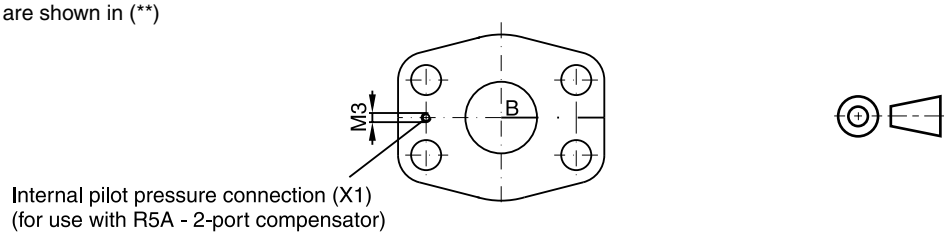
Performance Curves

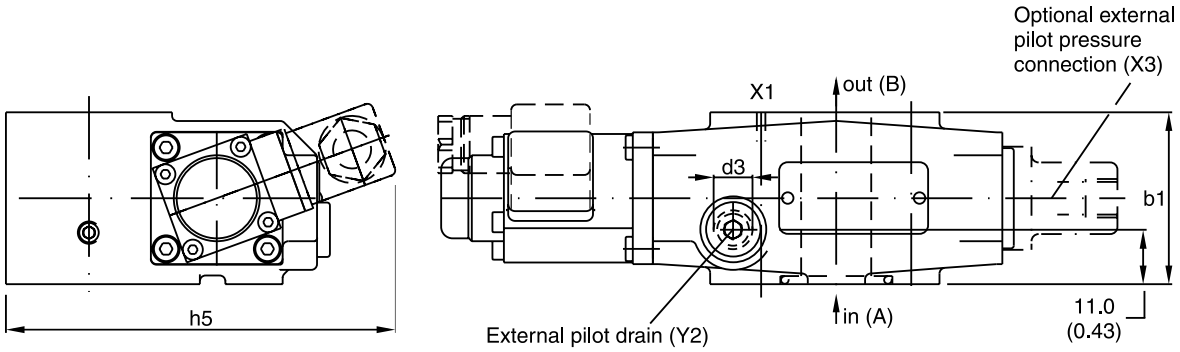


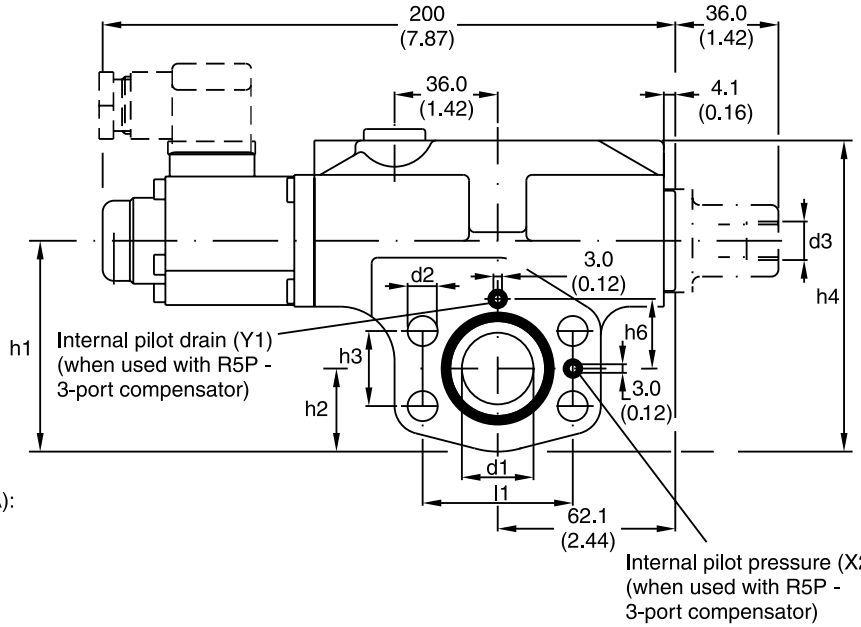
F5C.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

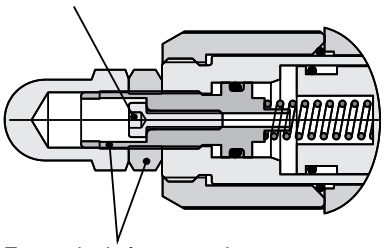
Inch equivalents for millimeter dimensions are shown in (**)







Important (only for solenoid type 1-220 mA):
On initial start up and after long shut down periods bleed air from this plug.



Zero point is factory set!
Lock nut must not be loosened!

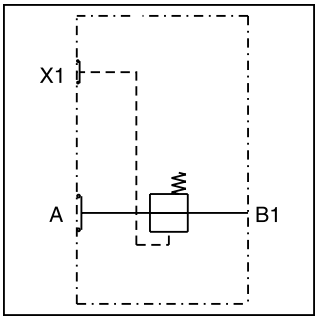
Seal Kits		
Size	**Nitrile**	**Fluorocarbon**
06 / 08 / 10	S16-91850-0	S16-91850-5

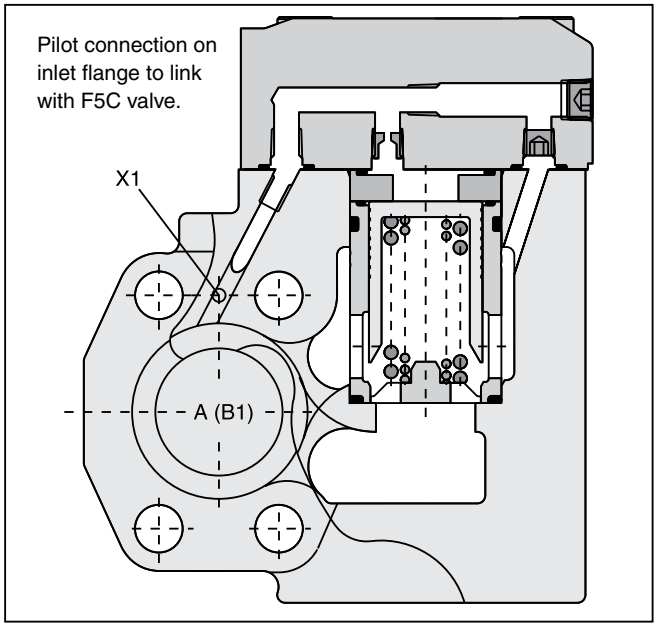
Size	l1	b1	h1	h2	h3	h4	h5	h6	d1	d2	d3
F5C06	47.6 (1.87)	60.0 (2.36)	68.2 (2.69)	26.0 (1.02)	22.2 (0.87)	103.2 (4.06)	183.0 (7.20)	20.8 (0.82)	19.0 (0.75)	10.5 (0.41)	G1/4"
F5C08	52.4 (2.06)	60.0 (2.36)	73.6 (2.90)	29.0 (1.14)	26.2 (1.03)	108.6 (4.28)	187.0 (7.36)	24.3 (0.96)	25.0 (0.98)	10.5 (0.41)	G1/4"
F5C10	58.7 (2.31)	75.0 (2.95)	83.5 (3.29)	36.5 (1.44)	30.2 (1.19)	118.5 (4.67)	198.0 (7.80)	29.3 (1.15)	32.0 (1.26)	12.5 (0.49)	G1/4"

B

General Description

Series R5A direct operated, 2-way pressure compensators can be combined with any type of fixed or adjustable flow valve (throttle) to provide a load compensated flow. The combination with the proportional throttle valve F5C serves as a compact 2-way flow control unit in SAE flange design. The R5A is typically used as meter-out compensator behind the flow resistor.





Features

- Seated type, 2-way pressure compensator.
- SAE 61 flange.
- 8.4 bar (121.8 PSI) control pressure.
- 3 sizes, SAE Code 61 3/4", 1", 1 1/4".
- Load compensated flow in combination with F5C.

Specifications

General			
Size	**06**	**08**	**10**
Subplate Mounting	Flanged according to SAE 61		
Mounting Position	Unrestricted		
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)		
Hydraulic			
Control Pressure	8.4 Bar (121 PSI)		
Maximum Operating Pressure	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)
Nominal Flow	90 LPM (23.8 GPM)	300 LPM (79.4 GPM)	600 LPM (158.7 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525		
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)		
Viscosity **Recommended** **Permitted**	30 to 80 cSt / mm²/s (139 to 371 SSU) 10 to 650 cSt / mm²/s (46 to 1761 SSU)		
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

Ordering Information

R5A	□	—	□	4	1	01	B	□	□
2-Port Compensator	Size		SAE 61 Interface	2-Port Body	Plain Cap	Pilot Connection thru Port X1	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	Nitrile
5	Fluorocarbon

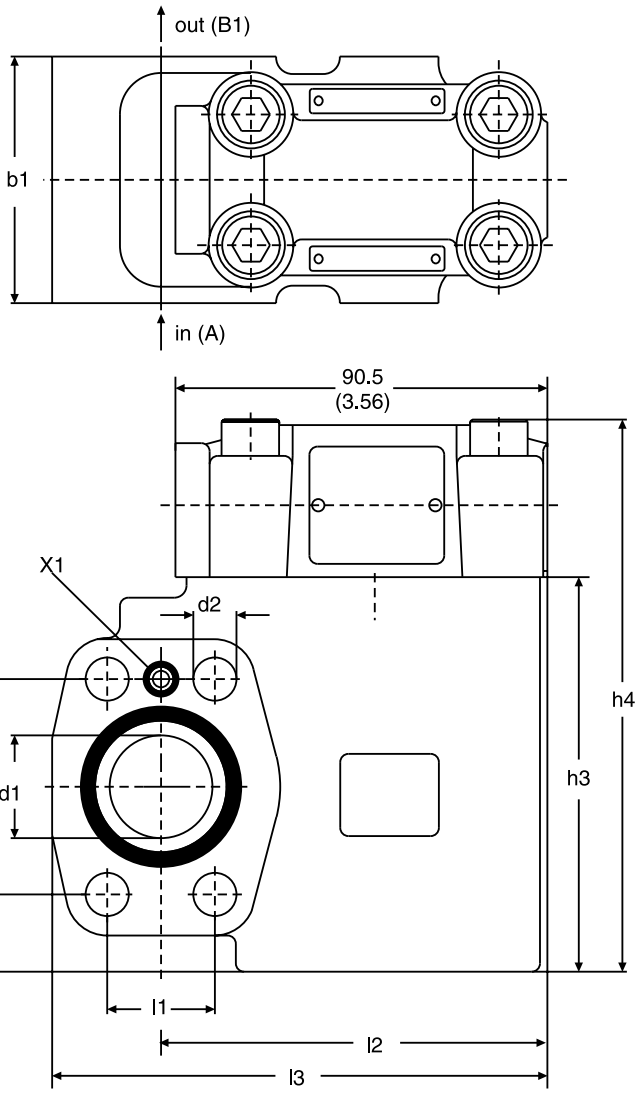
Weight

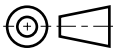
R5A06	3.6 kg (7.9 lbs.)
R5A08	4.3 kg (9.5 lbs.)
R5A10	5.6 kg (12.3 lbs.)

B

Dimensions

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





Seal Kits		
Size	**Nitrile**	**Fluorocarbon**
06	S16-91458-0	S16-91458-5
08	S16-91457-0	S16-91457-5
10	S16-91456-0	S16-91456-5

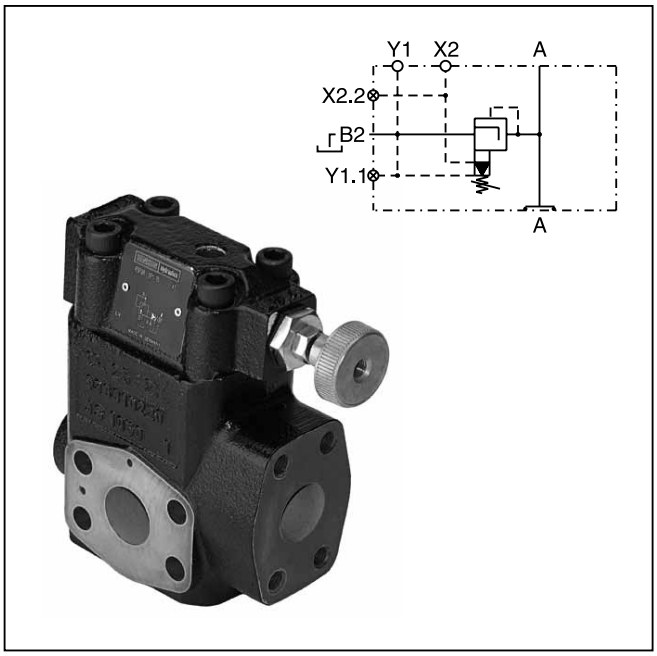
Size	l1	l2	l3	b1	h1	h2	h3	h4	d1	d2
R5A06	22.2 (0.87)	84.0 (3.31)	108.0 (4.25)	60.0 (2.36)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	128.0 (5.04)	19.0 (0.75)	10.5 (0.41)
R5A08	26.2 (1.03)	101.0 (3.98)	128.0 (5.04)	60.0 (2.36)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	134.0 (5.28)	25.0 (0.98)	10.5 (0.41)
R5A10	30.2 (0.44)	101.0 (3.98)	135.0 (5.31)	75.0 (2.95)	48.0 (1.89)	58.7 (2.31)	109.0 (4.29)	147.0 (5.79)	32.0 (1.26)	12.5 (0.49)

R5A.indd, dd

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.

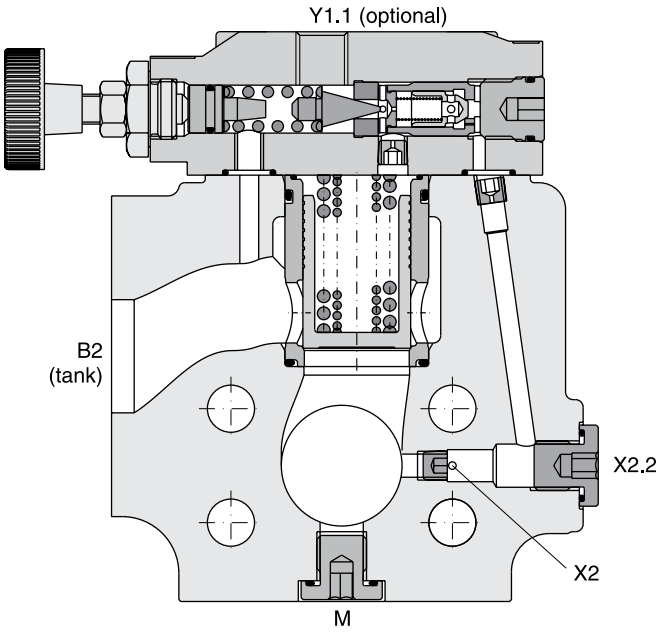
The R5P is additionally equipped with a pressure relief pilot that controls the compensator cartridge and operates a system pressure relief valve. The R5P*P2 provides a proportional relief function.



B

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.



Ordering Information
Series R5P (SAE Flange Mounted)

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

Size

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

SAE 61 Interface

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

Pilot Ports

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).

Pressure Range

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)

Adjustment

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Pilot Connection

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

* PP through port X1 in outlet flange.

** Through port Y1.1.

Switching Type

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.

Solenoid Voltage

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

Seal

Code	Descripton*
1	Nitrile
5	Fluorocarbon

* Further seals on request.

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.)

R5P □ — □ □ □ □ □ □ **P2** **G0R** **A** □ □

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

Size

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

SAE 61 Interface

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

Pilot Ports

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)

Pressure Range

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)

Adjustment

Code	Description
1	Hand knob
3	Acorn nut with lead seal

Pilot Connection

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

Proportional Pressure Control

Solenoid Voltage

Code	Description
G0R	12V, 2.3A

Design Series

A

Seal

Code	Description
1	Nitrile
5	Fluorocarbon

Further seals on request

Options Check with Factory

B

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.)

B

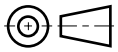
R5P

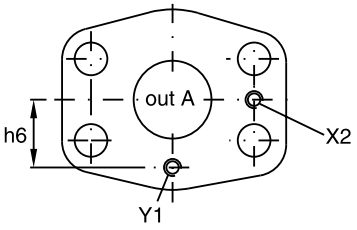
General						
Size		**06 (3/4")**		**08 (1")**		**10 (1 1/4")**
Mounting		Flanged according to SAE 61				
Mounting Position		Unrestricted				
Ambient Temperature Range		-20°C to +50°C (-4°F to +122°F)				
$MTTF_D$		150 years				
Hydraulic						
Max. Operating Pressure	**Ports A, B**	350 Bar (5075 PSI)		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 ... 51525				
Fluid Temperature		-20°C to +80°C (-4°F to +176°F)				
Viscosity	**Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 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%				
Solenoid Connection		Connector as per EN175301-803				
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)				
	Code	**G0R**	**G0Q**	**G0H**	**W30**	**W31**
Supply Voltage		12 VDC	24 VDC	48 VDC	110V at 50Hz 120V at 60Hz	220V at 50Hz 240V at 60Hz
Tolerance Supply Voltage		+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power Consumption	**Hold**	31 W	31 W	31 W	78 W	78 W
	In Rush	—	—	—	264 W	264 W
Response Time		Energized / De-energized AC 20/18ms, DC 46/27 ms				
Maximum Switching Frequency		AC up to 7200, DC 70 to 16,000 switchings/hour				
Coil Insulation Class		H (180°C) (356°F)				

R5P*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 ... 51525		
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%		
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		
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)		
Power Amplifier	PCD00A-400		

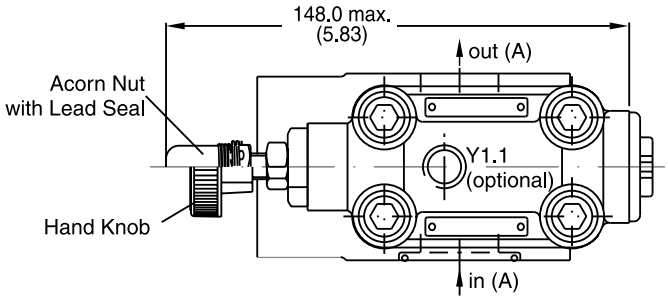
Inch equivalents for millimeter dimensions are shown in (**)

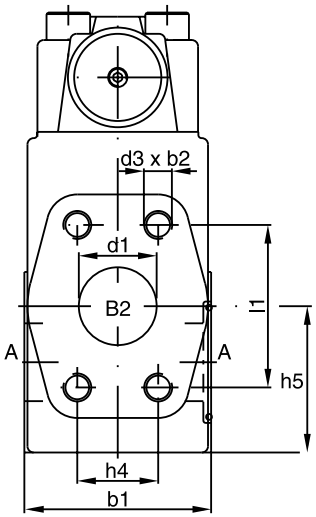


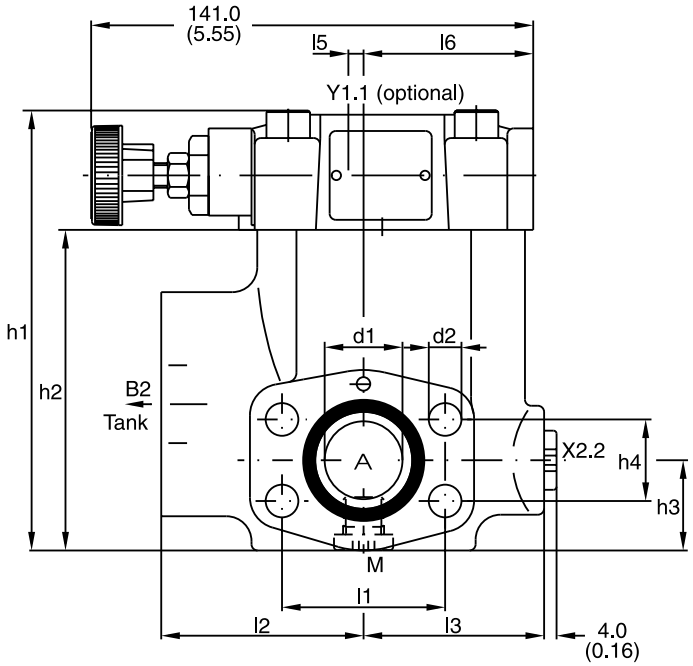


Seal Kits*		
Size	**Nitrile**	**Fluorocarbon**
06	S16-91461-0	S16-91461-5
08	S16-91460-0	S16-91460-5
10	S16-91459-0	S16-91459-5

* Does not inlcude P2 seal kit.







Size	l1	l2	l3	l4	l5	l6	b1	b2	h1	h2	h3	h4	h5	h6	d1	d2	d3
R5P06	47.6 (1.87)	63.0 (2.48)	56.0 (2.20)	148.0 (5.83)	1.0 (0.04)	49.0 (1.93)	60.0 (2.36)	20.0 (0.79)	119.0 (4.69)	81.6 (3.21)	28.5 (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
R5P08	52.4 (2.06)	65.0 (2.56)	58.0 (2.28)	144.6 (5.69)	5.0 (0.20)	54.5 (2.15)	60.0 (2.36)	23.0 (0.91)	142.0 (5.59)	103.0 (4.06)	30.5 (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
R5P10	58.7 (2.31)	61.0 (2.40)	62.0 (2.44)	146.6 (5.77)	3.0 (0.12)	56.5 (2.22)	75.0 (2.95)	22.0 (0.87)	149.0 (5.87)	111.5 (4.39)	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"		

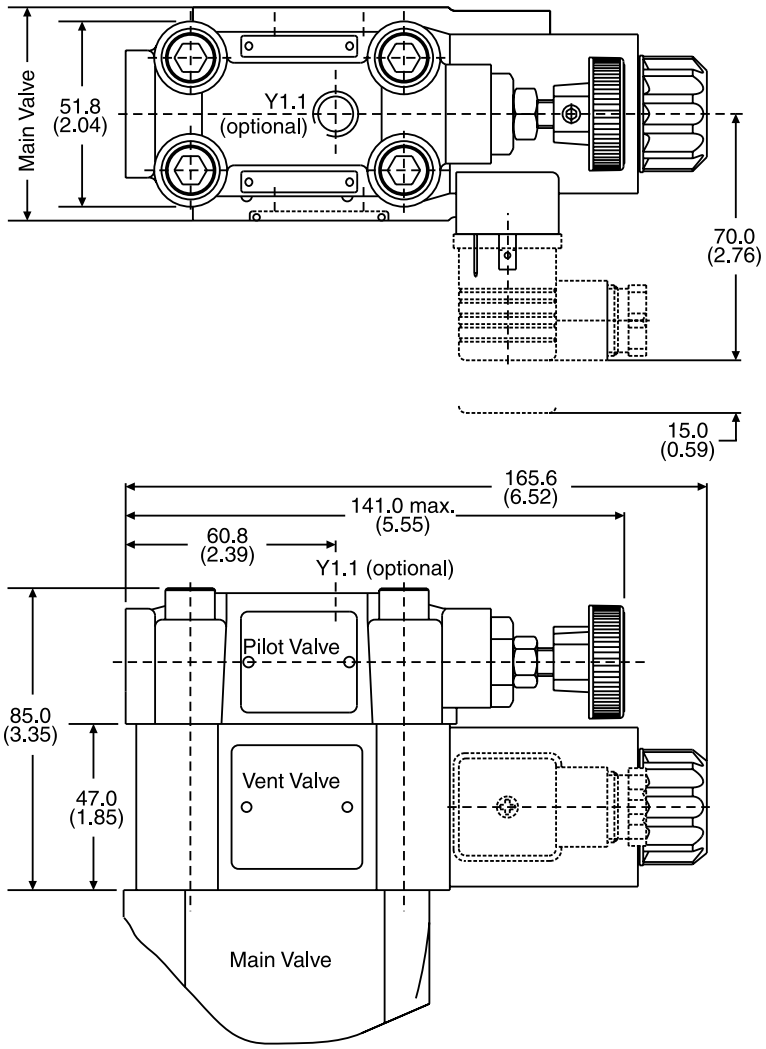
R5P.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

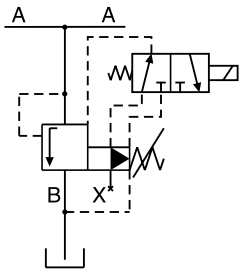
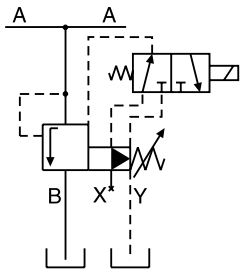
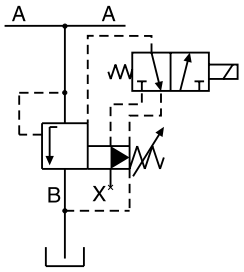
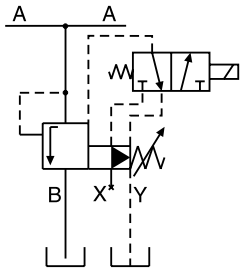
R5P with Vent Function

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		

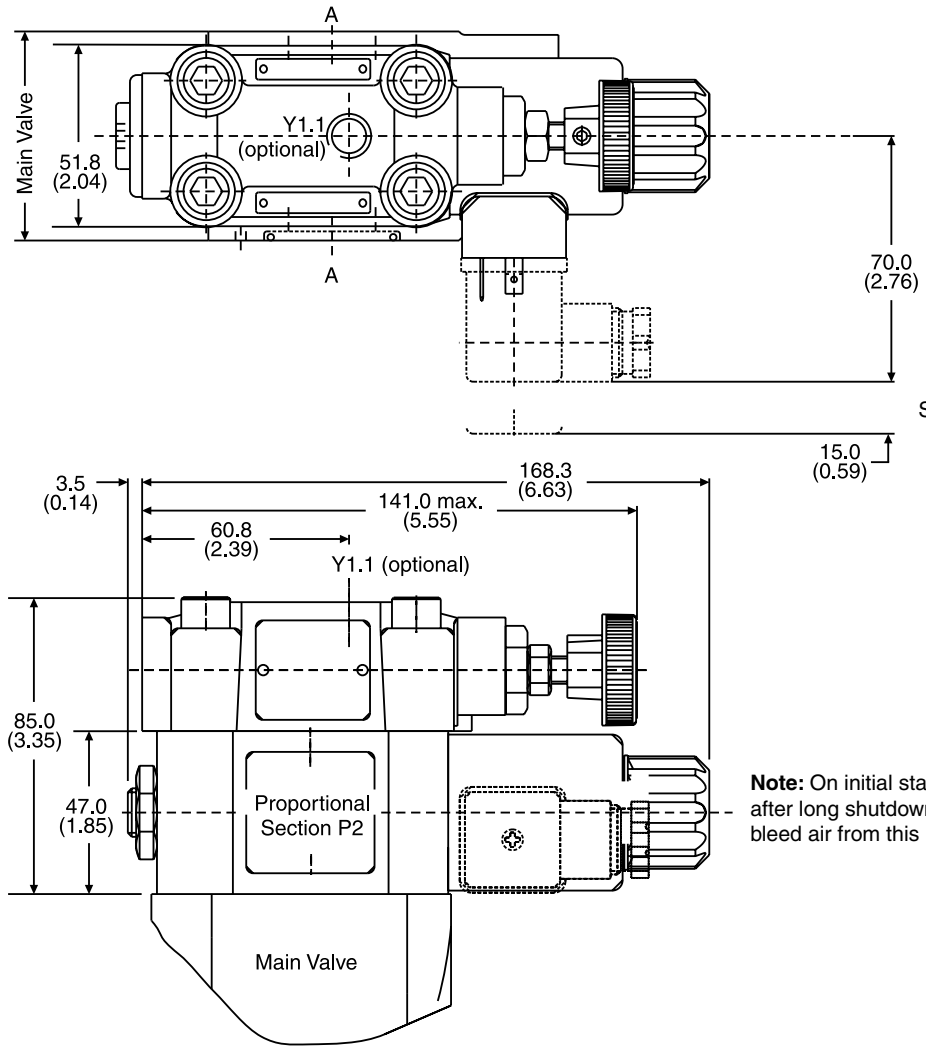
R5P.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

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.

Space for plug removal

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

B

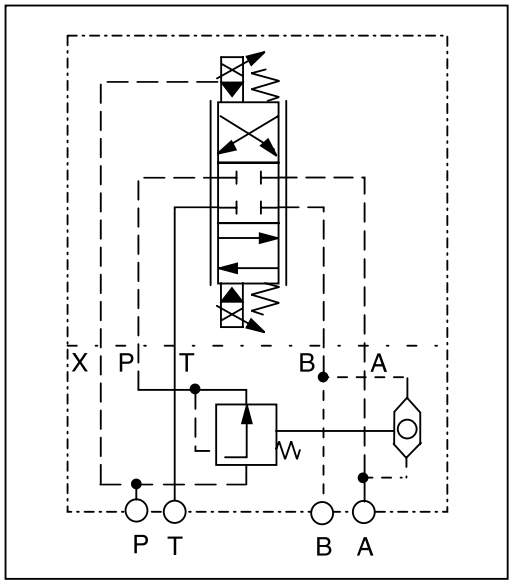
General Description

Series LCM 2-way pressure compensators are sandwich valves designed for stacking beneath a proportional directional control valve with a standardized mounting pattern.

The valve maintains a constant pressure differential between ports P and A or P and B across the directional valve. When the cross sectional opening of the directional valves is held steady, a constant flow rate is achieved, regardless of load fluctuations.

The control pressure applied to the spring side of the compensator spool is supplied from port A or B via a shuttle valve. Flow rate regulation is automatically effective in the port with the highest pressure.

Application Example



Proportional DC valve model D31FB with 2-way pressure conpensator LCM3 maintains a constant flow rate.
The diagram shows the design according to Code X

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)	

Ordering Information

LCM — Pressure Compensator

□ — Size

Code	Description
2	NG6
3	NG10

PP — Control Connection

□ — Pilot Oil

Code	Description
Omit	Internal
X*	External

* NG10 only.

02 — Differential Pressure 10 Bar (14.5 PSI)

V — Seal Fluorocarbon

□ — Design Series

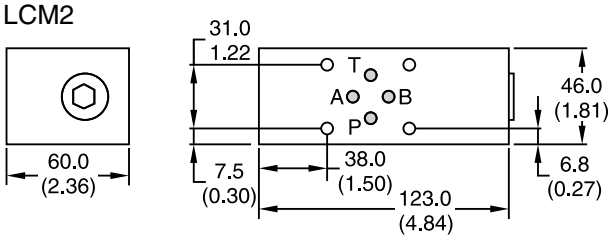
NOTE:
Not required when ordering.

Weight:

LCM2	2.5 kg (5.5 lbs.)
LCM3	3.1 kg (6.8 lbs.)

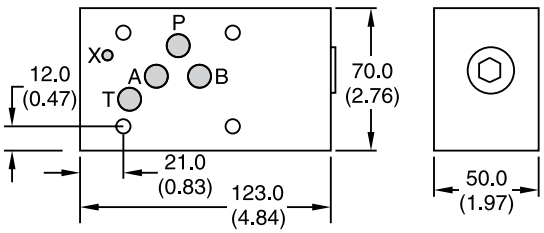
Dimensions – Inch equivalents for millimeter dimensions are shown in (**)

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

LCM.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

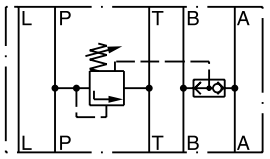
Series SPC sandwich type pressure compensators are typically used in combination with proportional directional control valves. The compensator keeps the pressure drop over the directional valve constant and thus provides load-independent flow to the actuator.

Features

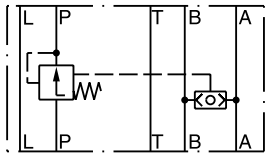
- 2-way or 3-way pressure compensators.
- Standard pressure differential 5 Bar (73 PSI).
- Adjustable differential (2 to 5 Bar) (29 to 73 PSI) and 10 Bar (145 PSI) optional.
- Sizes:

NG6 / CETOP 3	SPC01
NG10 / CETOP 5	SPC02
NG16 / CETOP 7	SPC03
NG25 / CETOP 8	SPC04

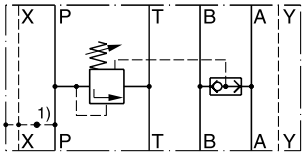
SPC*11 (2-way)



SPC*01/02 (3-way)

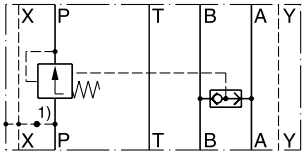


SPC*01/02 (2-way)



1) Plug for pilot connection (external or internal PP)

SPC03/06 (3-way)



1) Plug for pilot connection (external or internal PP)

SPC03/06 (2-way)

Specifications

General				
Size	**NG6**	**NG10**	**NG16**	**NG25**
Mounting Interface	DIN 24340 A6 ISO 4401 NFPA D03 CETOP 3	DIN 24340 A10 ISO 4401 NFPA D05 CETOP 5	DIN 24340 A16 ISO 4401 NFPA D07 CETOP 7	DIN 24340 A25 ISO 4401 NFPA D08 CETOP 8
Mounting Position	Unrestricted			
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Max. Operating Pressure **Drain Port L Connected:**	P, A, B: 350 Bar (5075 PSI) T: 210 Bar (3045 PSI) L: 10 Bar (145 PSI)	P, A, B: 315 Bar (4568 PSI) T: 210 Bar (3045 PSI) L: 10 Bar (145 PSI)	—	—
Without Drain Port:	P, A, B: 350 Bar (5075 PSI) T: 160 Bar (2320 PSI) L: 160 Bar (2320 PSI)	P, A, B: 315 Bar (4568 PSI) T: 210 Bar (3045 PSI) L: 210 Bar (3045 PSI)	P, A, B, X: 350 Bar (5075 PSI) T, Y: 105 Bar (1523 PSI)	P, A, B, X: 350 Bar (5075 PSI) T, Y: 105 Bar (1523 PSI)
Nominal Flow	30 LPM (7.9 GPM)	80 LPM (21.1 GPM)	200 LPM (52.9 GPM)	400 LPM (105.8 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525			
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 to 80 cSt / mm²/s (139 to 371 SSU)			
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

SPC.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information
Series SPC

SPC	□	□	□	1	C	5	A	□
Direct Operated Pressure Compensator	Size	Function	Pressure Differential	Circuit Type	Load Sensing Port	Steel Body	Design Series	Seal

Code	Description
01	NG6
02	NG10

Code	Description
04*	2 to 5 Bar (29 to 73 PSI) Adjustable
05	5 Bar (73 PSI)
10*	10 Bar (145 PSI)

* For 3-way compensator only.

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
01	3-Way Pressure Compensation
11	2-Way Pressure Compensation

Weight:	2-Way Compensator	3-Way Compensator
SPC01	1.5 kg (3.3 lbs)	1.6 kg (3.5 lbs)
SPC02	3.1 kg (6.8 lbs.)	3.5 kg (7.7 lbs.)

SPC01

Type	Model No.
3-Way Compensators with Shuttle Valve P-A/B	SPC0101041C5A1
	SPC0101051C5A1
	SPC0101101C5A1
2-Way Compensators with Shuttle Valve P-A/B	SPC0111051C5A1

SPC02

Type	Model No.
3-Way Compensators with Shuttle Valve P-A/B	SPC0201041C5A1
	SPC0201051C5A1
	SPC0201101C5A1
2-Way Compensators with Shuttle Valve P-A/B	SPC0211051C5A1

SPC	□	□	□	□	C	B	□
Direct Operated Pressure Compensator	Size	Function	Pilot Connection	Pressure Differential	Load Sensing Port	Design Series	Seal

Code	Description
03	NG16
06	NG25

Code	Description
P	Internal Pilot Pressure
X	External Pilot Pressure

Code	Description
05	5 Bar (73 PSI) Standard
10*	10 Bar (145 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
01	3-Way Pressure Compensation
11	2-Way Pressure Compensation

Weight:	
SPC03	8.3 kg (18.3 lbs)
SPC06	11.9 kg (26.2 lbs.)

SPC03

Type	Model No.
3-Way Compensators with Shuttle Valve P-A/B	SPC0301P05CB1
	SPC0301X05CB1
2-Way Compensators with Shuttle Valve P-A/B	SPC0311P05CB1
	SPC0311P10CB1
	SPC0311X05CB1
	SPC0311X10CB1

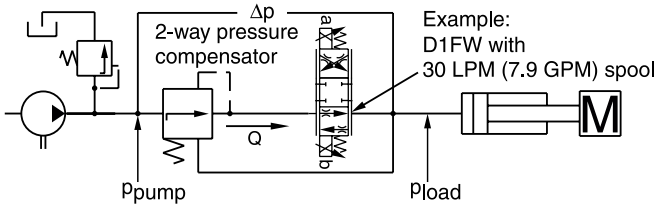
SPC06

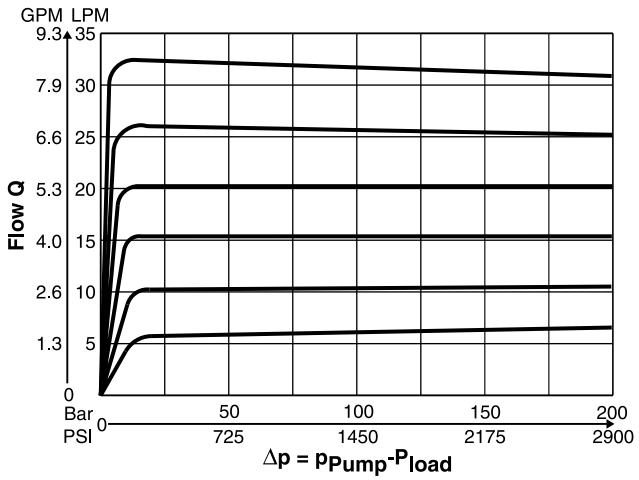
Type	Model No.
3-Way Compensators with Shuttle Valve P-A/B	SPC0601P05CB1
	SPC0601X05CB1
2-Way Compensators with Shuttle Valve P-A/B	SPC0611P05CB1
	SPC0611P10CB1
	SPC0611X05CB1
	SPC0611X10CB1

B

SPC01

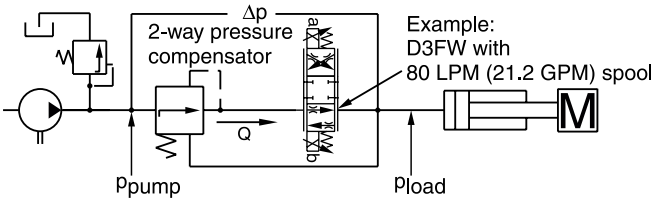
Flow Regulation Example:
2-Way Pressure Compensator at Δp = 5 Bar

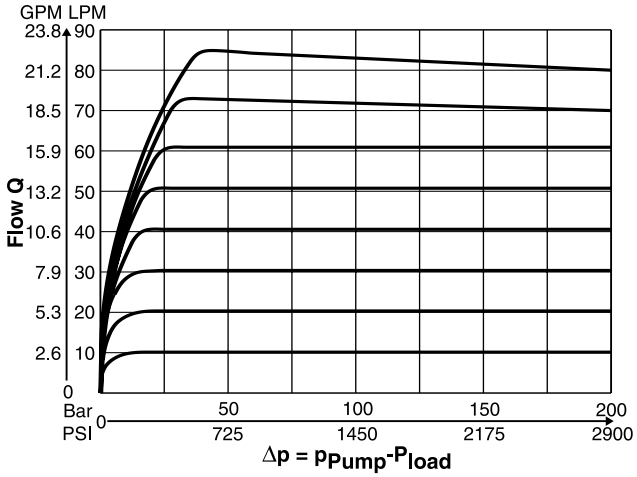




SPC02

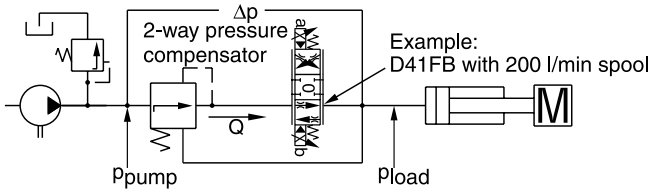
Flow Regulation Example:
2-Way Pressure Compensator at Δp = 5 Bar

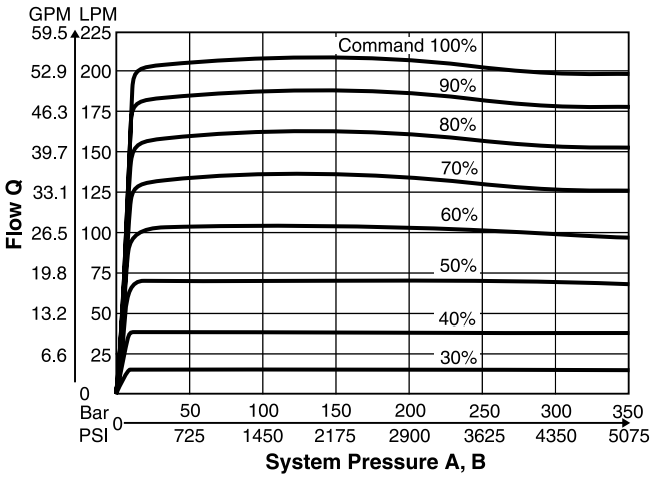




SPC03

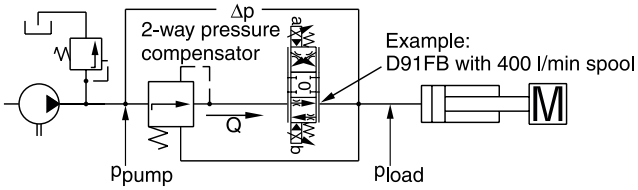
Flow Regulation Example:
2-Way Pressure Compensator at Δp = 5 Bar

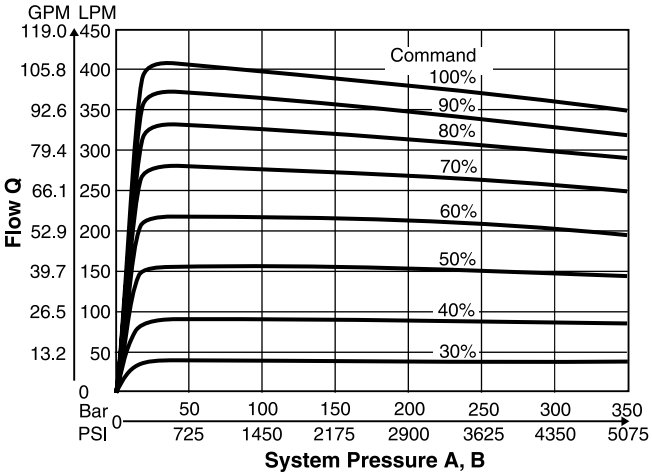




SPC06

Flow Regulation Example:
2-Way Pressure Compensator at Δp = 5 Bar

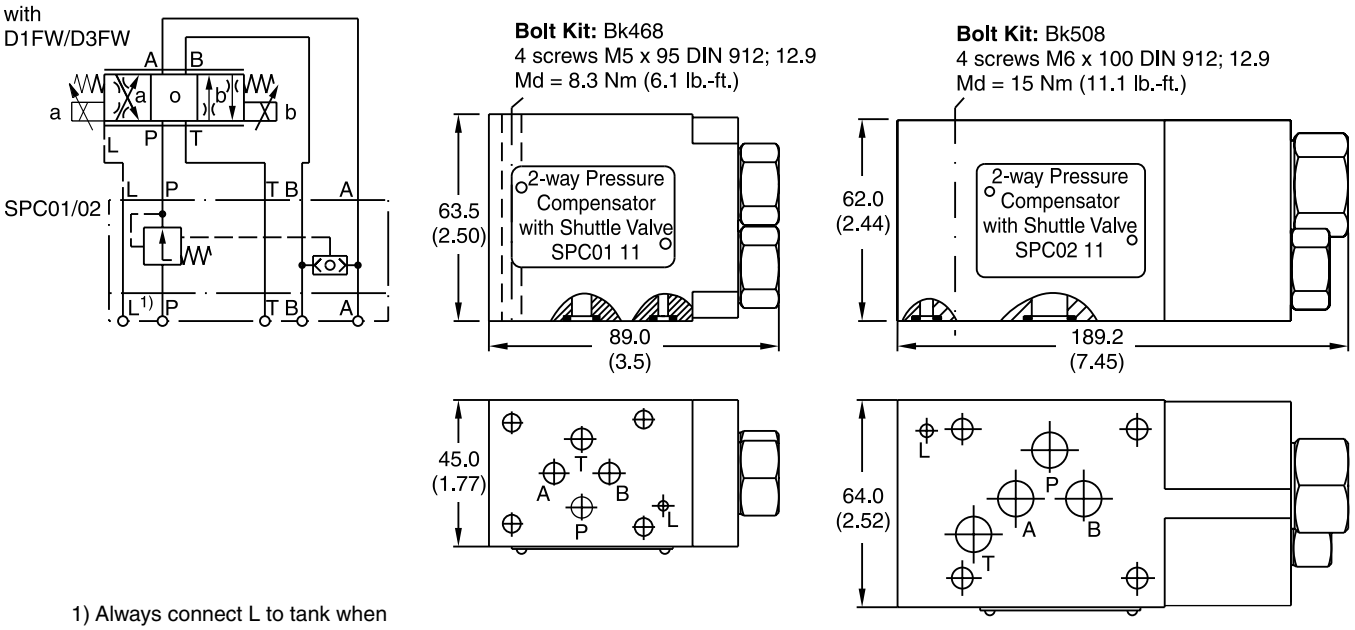




B

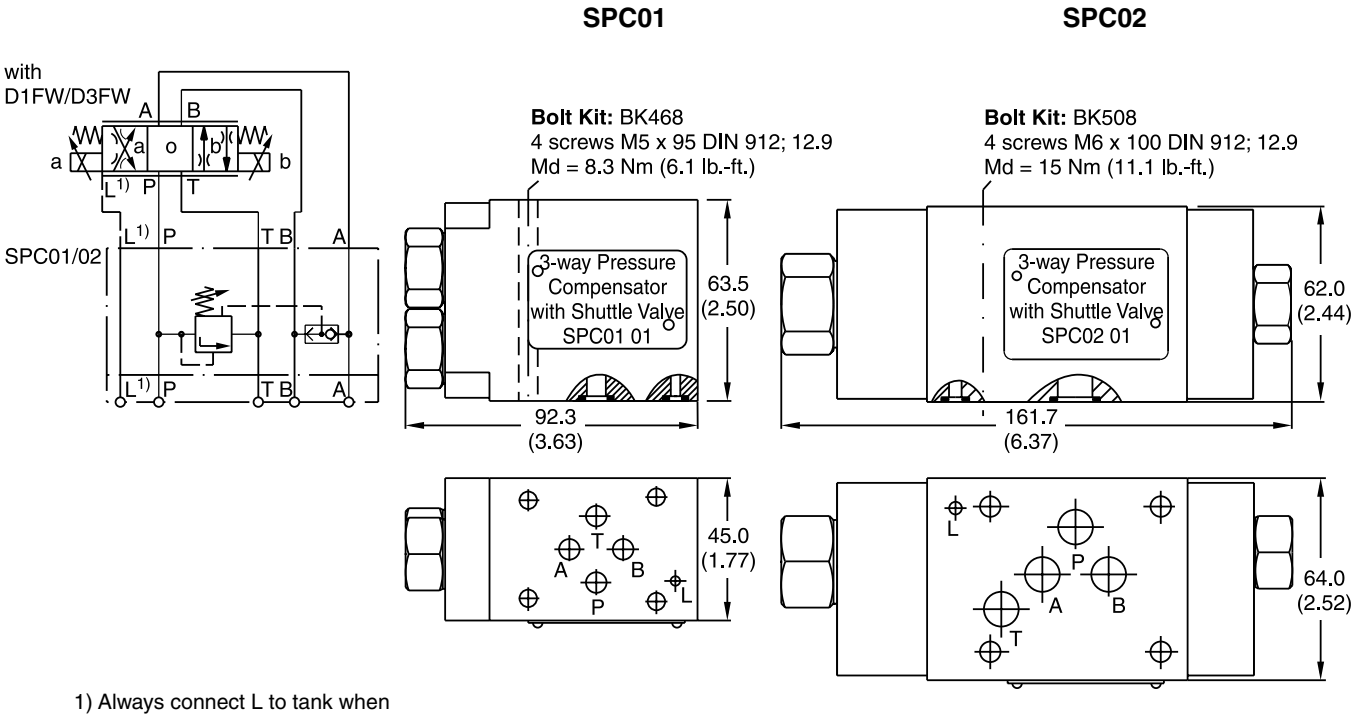
Inch equivalents for millimeter dimensions are shown in (**)

2-Way Pressure Compensator



1) Always connect L to tank when
SPC01 T > 160 Bar (2320 PSI)
SPC02 T > 210 Bar (3045 PSI)

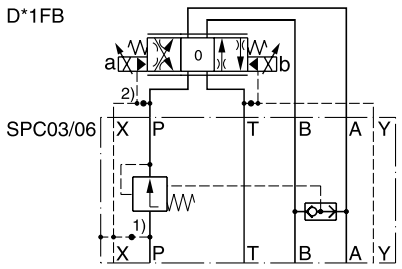
3-Way Pressure Compensator



1) Always connect L to tank when
SPC01 T > 160 Bar (2320 PSI)
SPC02 T > 210 Bar (3045 PSI)

2-Way Pressure Compensator

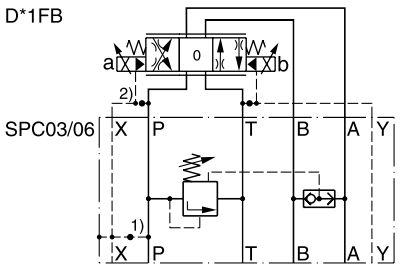
SPC03/SPC06



2)Plug in PX (obligatory for the use with pressure compensator)
1)Plug for pilot connection (external or internal PP)

3-Way Pressure Compensator

SPC03/SPC06

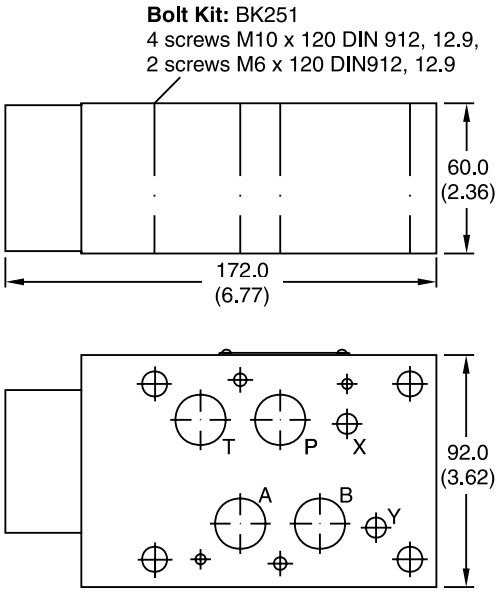


2)Plug in PX (obligatory for the use with pressure compensator)
1)Plug for pilot connection (external or internal PP)

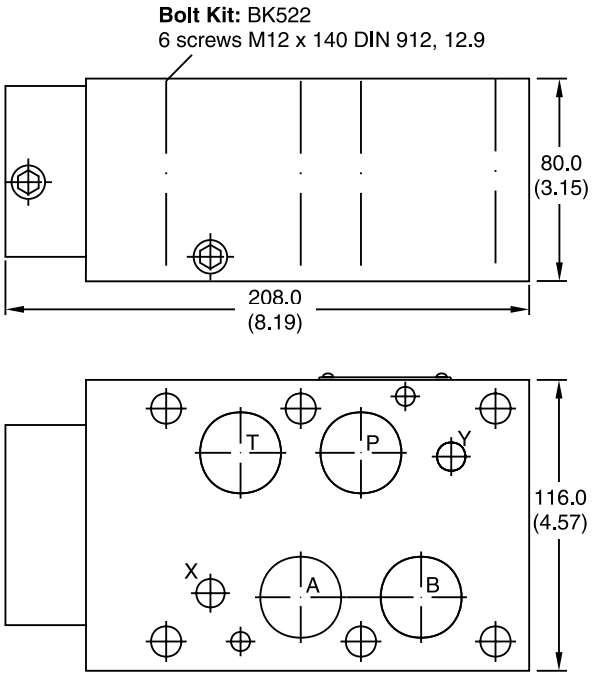
B

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

SPC03



SPC06



Contents

Manifold Mounted Valves

Flapper Nozzle

C

Description

Series BD servovalves provide high resolution in the control of position, velocity and force in motion control applications.

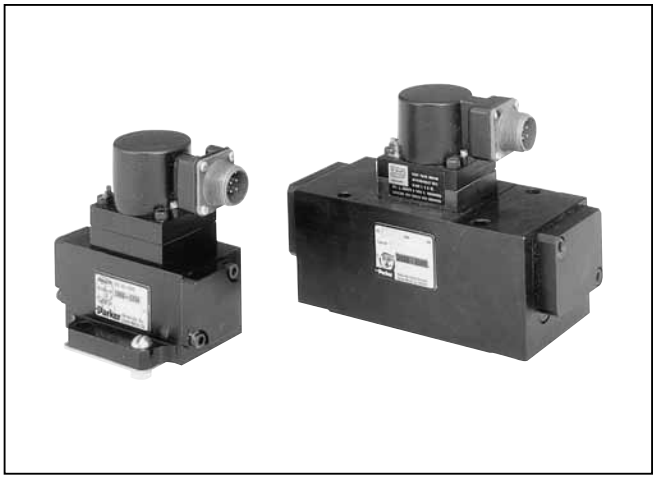
Features

- Rugged reliable trouble-free operation.
- Reduced contaminant sensitivity.
- Linear flow gain characteristics.
- Intrinsically safe model available.
- Explosion proof model available.

C

Operation

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.



Specifications

Rated Flow @ 1000 PSI ΔP	3.78–151 LPM (1.0 – 40 GPM)
Linearity	≤ 5%
Hysteresis	≤ 3%
Threshold	≤ 0.5%
Fluid	Mineral oil, 60–225 SSU, max. 1000 SSU
Oper. Temp. (Ambient)	–1 to 106°C (30 to +225°F)
Pressure Gain	3% of spool shift
Null Shift with Temperature with Supply Pressure	 < ± 2% per 38°C (100°F) < 2% per 69 Bar (1000 PSI)
Quiescent Flow (Std. Spool Lap)	BD15 – 1.5–2.1 LPM (.40–.55 GPM) BD30 – 2.1–3.78 LPM (.55 – 1.0 GPM)
Step Response Input	Model: Typical Step Response Input BD15: 10 to 90%, 26 ms BD30: 10 to 90%, 30 ms
Pressure Ranges For optimum performance, Parker Servo Valves are designed to operate within specific system supply pressure ranges. System Supply Pressure 180–210 Bar (2600–3000 PSI) 48–66 Bar (700–950 PSI) 138–172 Bar (2000–2500 PSI) 14–45 Bar (200–650 PSI) 95–133 Bar (1400–1950 PSI) 0–210 Bar (0–3000 PSI) 68–90 Bar (1000–1300 PSI) External Pilot	
Filtration	SAE Class 3 or better, ISO Code 17/15/12
Protection Class	NEMA 1 (IP54)

Flow–Load Characteristics

Control flow to the load will change with load pressure and valve current as shown in figure 1. 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

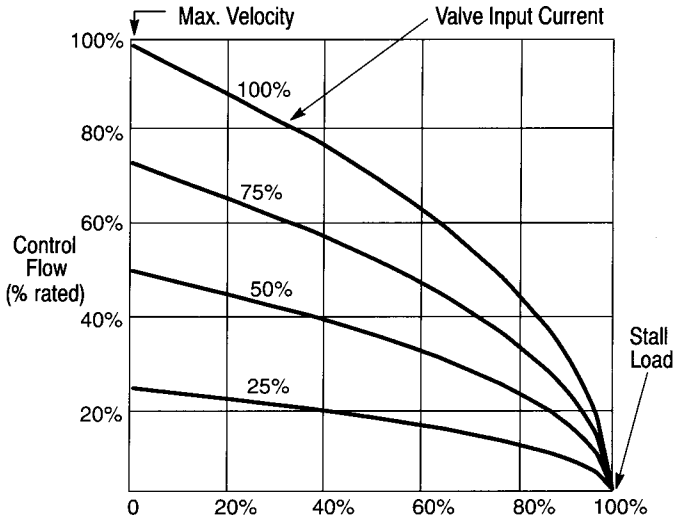


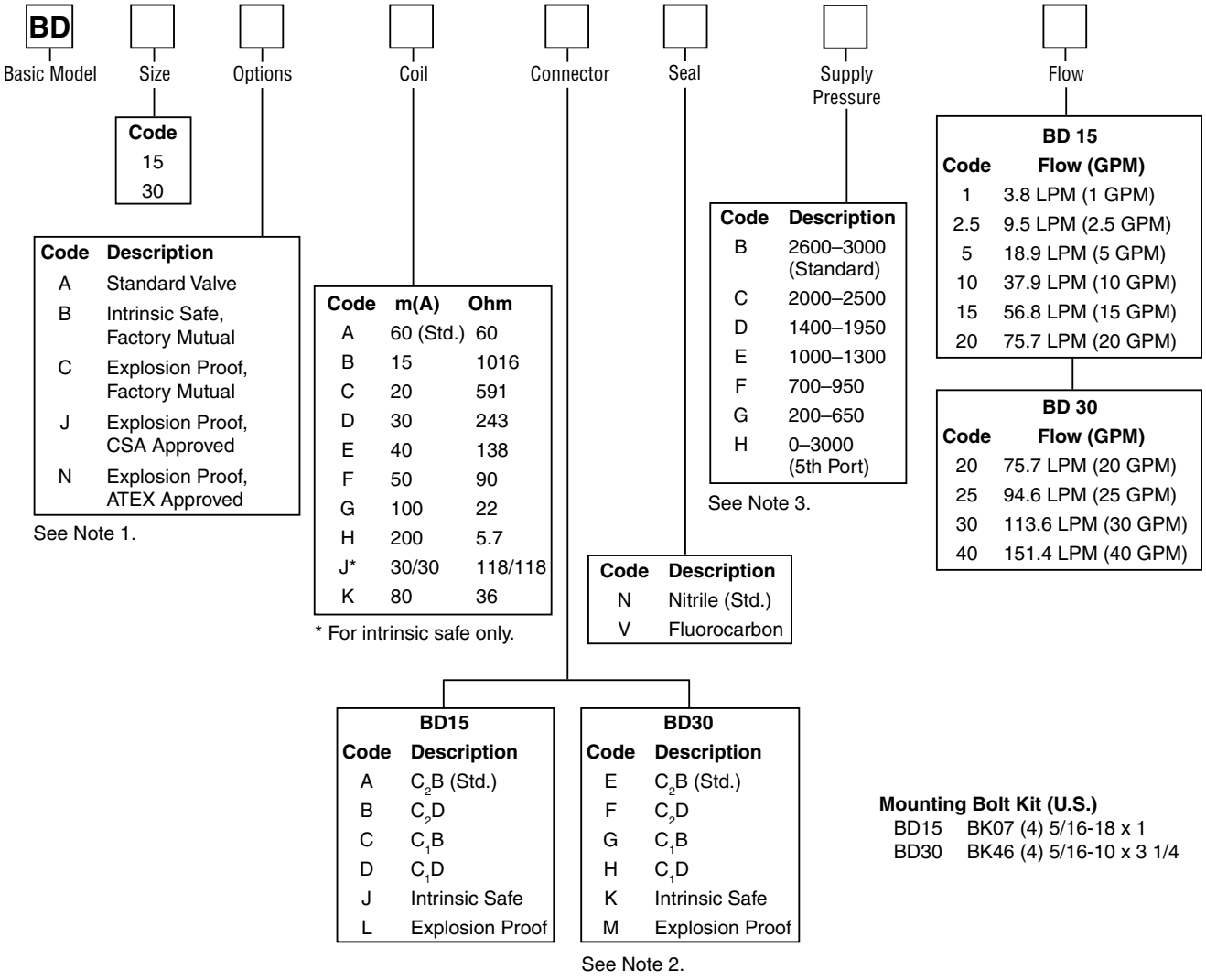
Figure 1. Change in flow with current and load pressure

Quick Reference Data Chart

Model	Flow Capacity @ 1000 PSID LPM (GPM)	Max. Pressure Rating	Max. Tank Pressure	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)	.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.)

BD.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA



Code
15
30

Code	Description
A	Standard Valve
B	Intrinsic Safe, Factory Mutual
C	Explosion Proof, Factory Mutual
J	Explosion Proof, CSA Approved
N	Explosion Proof, ATEX Approved

See Note 1.

Code	m(A)	Ohm
A	60 (Std.)	60
B	15	1016
C	20	591
D	30	243
E	40	138
F	50	90
G	100	22
H	200	5.7
J*	30/30	118/118
K	80	36

* For intrinsic safe only.

Code	Description
N	Nitrile (Std.)
V	Fluorocarbon

Code	Description
B	2600–3000 (Standard)
C	2000–2500
D	1400–1950
E	1000–1300
F	700–950
G	200–650
H	0–3000 (5th Port)

See Note 3.

BD 15

Code	Flow (GPM)
1	3.8 LPM (1 GPM)
2.5	9.5 LPM (2.5 GPM)
5	18.9 LPM (5 GPM)
10	37.9 LPM (10 GPM)
15	56.8 LPM (15 GPM)
20	75.7 LPM (20 GPM)

BD 30

Code	Flow (GPM)
20	75.7 LPM (20 GPM)
25	94.6 LPM (25 GPM)
30	113.6 LPM (30 GPM)
40	151.4 LPM (40 GPM)

BD15

Code	Description
A	C_2B (Std.)
B	C_2D
C	C_1B
D	C_1D
J	Intrinsic Safe
L	Explosion Proof

BD30

Code	Description
E	C_2B (Std.)
F	C_2D
G	C_1B
H	C_1D
K	Intrinsic Safe
M	Explosion Proof

See Note 2.

Mounting Bolt Kit (U.S.)

BD15	BK07 (4) 5/16-18 x 1
BD30	BK46 (4) 5/16-10 x 3 1/4

Note 1: **"B" Intrinsic Safe Option meets** Factory Mutual Intrinsically Safe Class I, II and III, Division 1 Groups A through G. Refer to Parker Bulletin 1452.

"C" Explosion Proof meets:
Factory Mutual Explosion Proof
Class I, II, III, Division 1, Groups A through G

"J" Exposion Proof meets:
Canadian Standards Association
Class I, Groups A through D
Class II, Groups E, F and G
Class III
Refer to Parker Bulletin 1451.

"N" Explosion Proof meets:
ATEX Ex⎔II2G EExm II T3 T_{amb} 45°C to -50°C
Request Parker Documentation Package: 1200074

Note 2: Connector Location & Flow Polarity
(Standard connector over C_2 + to B = P to C_1 flow).

C_2B = Connector over Port C_2, + to Pin B = P to C_1 flow.

C_2D = Connector over Port C_2, + to Pin D = P to C_1 flow.

C_1B = Connector over Port C_1, + to Pin B = P to C_1 flow.

C_1D = Connector over Port C_1, + to Pin D = P to C_1 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%.

C

Accessories

Model	Description
6522A11	1/16" Hex Allen Wrench
810005-1	Orifice Filter
810013-**	Valve Orifice Kit, Fluorocarbon
810014-**	Valve Orifice Kit, Nitrile
**Dash #	**Operating Pressure**
-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

Model	Description
820089-1	BD30 Servovalve Shippping Container
BD830008	BD90/95 Amplifier Board Shipping Container
810089-1	BD15 Servovalve Shipping Container
820000TF3	Filter Wrench
MS3106E-14S-2S	SV Mating Connector
1200127	Flushing valve for BD15
1200128	Flushing valve for BD30
810107	BD15 Block off Plate

Adapters

[ ] — [ ]

Type of Adapter — Seals

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
810096-5	BD15	.625 Port Circle
820006-1	BD30	Moog 62-303B & Atchley 231
820007-1	BD30	D08
820091-1	BD30	BD15 (.875)
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	820090-3	SAE16	Side	BK46	17 ft. lbs.

Cables

[EHC] [ ] [4] [S]

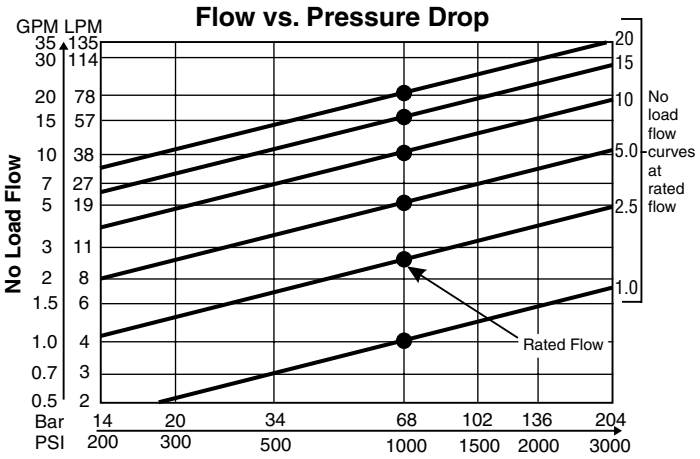
Electrohydraulic Cable for BD Series Valves — Length — Cable Type — Pin Orientation

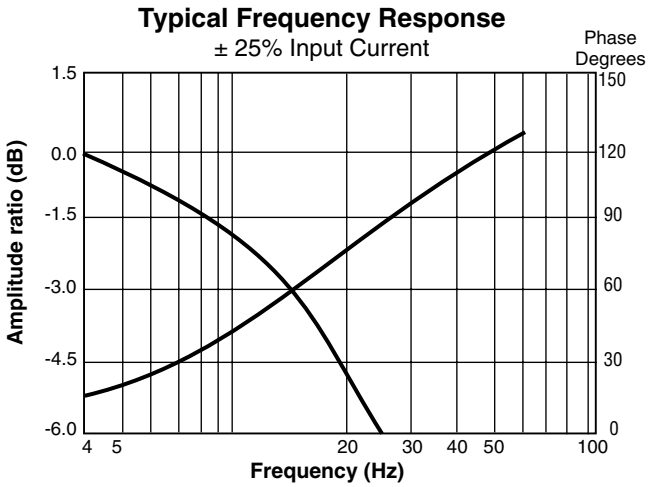
Code	Length
9	Length
15	in Feet

Code	Description
4	4-wire, 20 awg. shielded (Belden 9402)

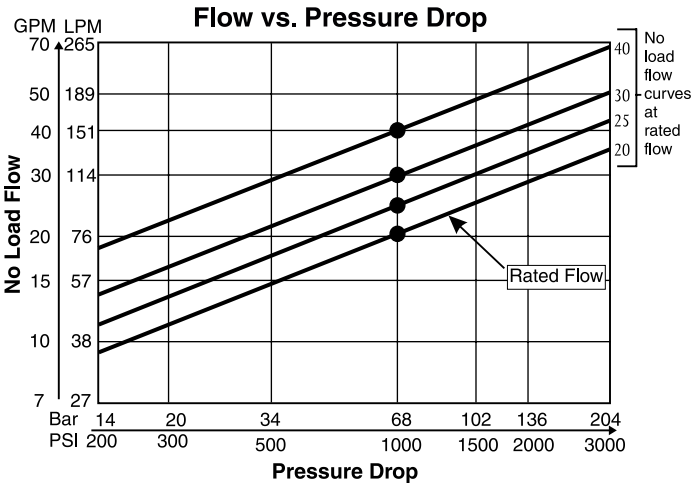
Code	Description
S	BD Series

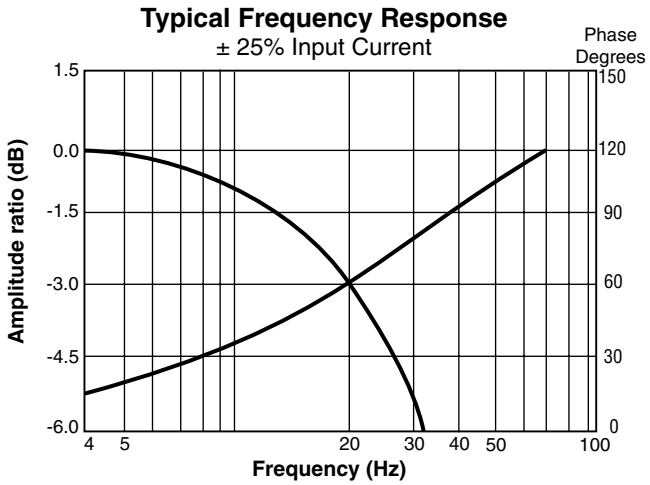
Series BD15





Series BD30

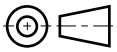


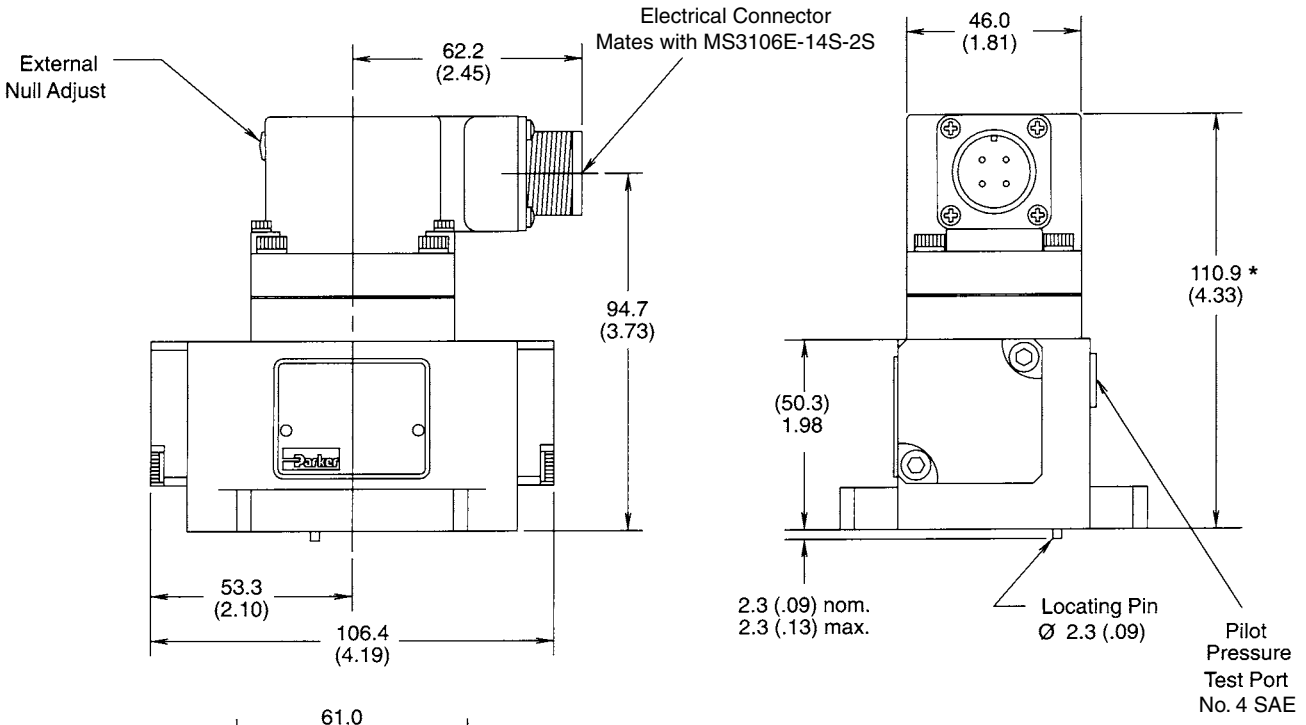


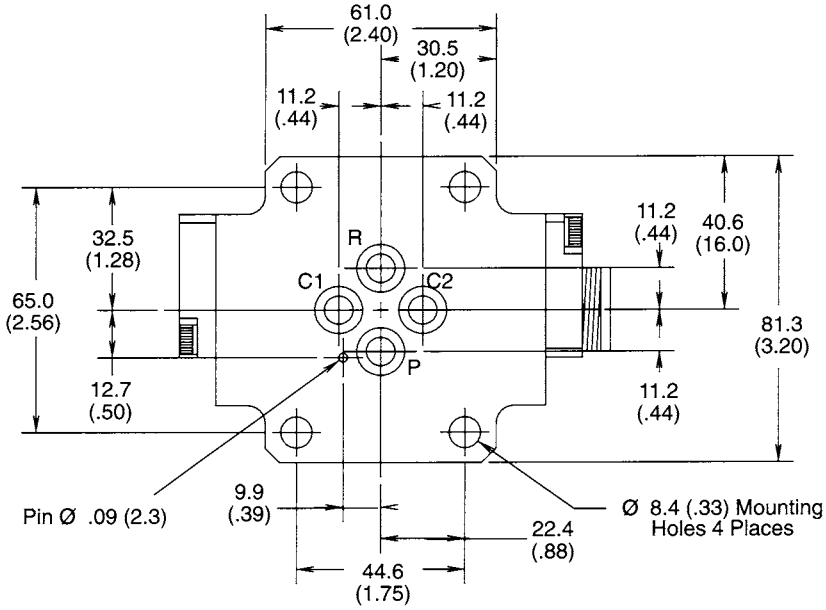
C

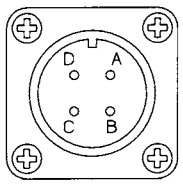
C

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







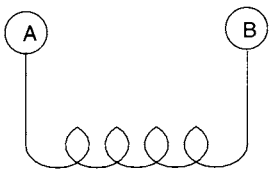


Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

* 140 (5.50) for BD15C; explosion proof, FM approved.

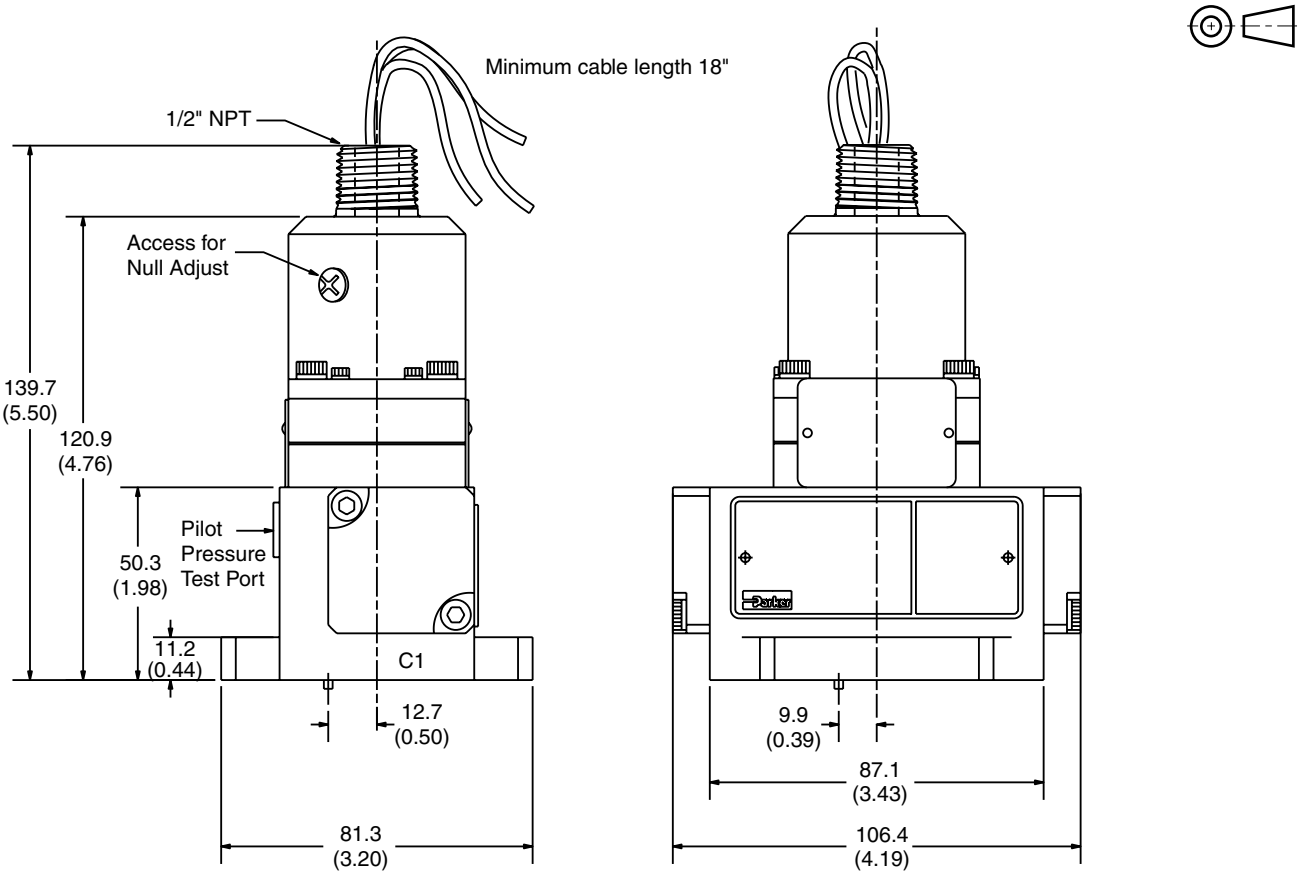
Note: Vertically oriented 1/2 NPT threaded male conduit connection with lead wires (not as shown).

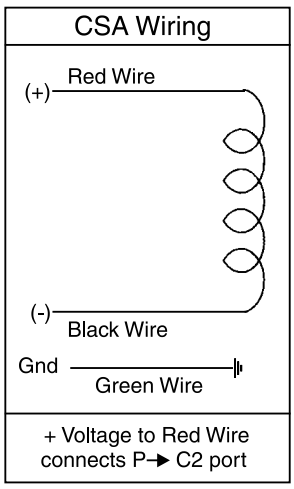
Wiring

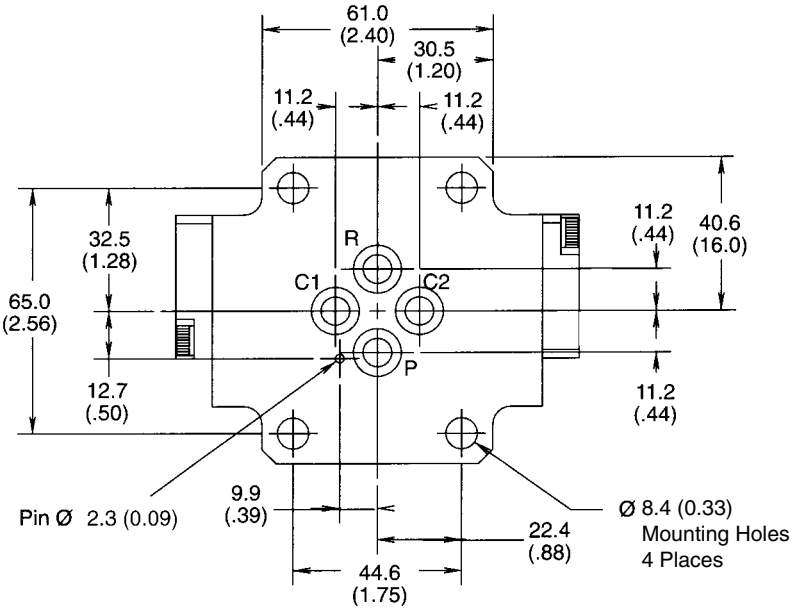


Positive current to the Pin “B” yields flow from the C1 port.

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



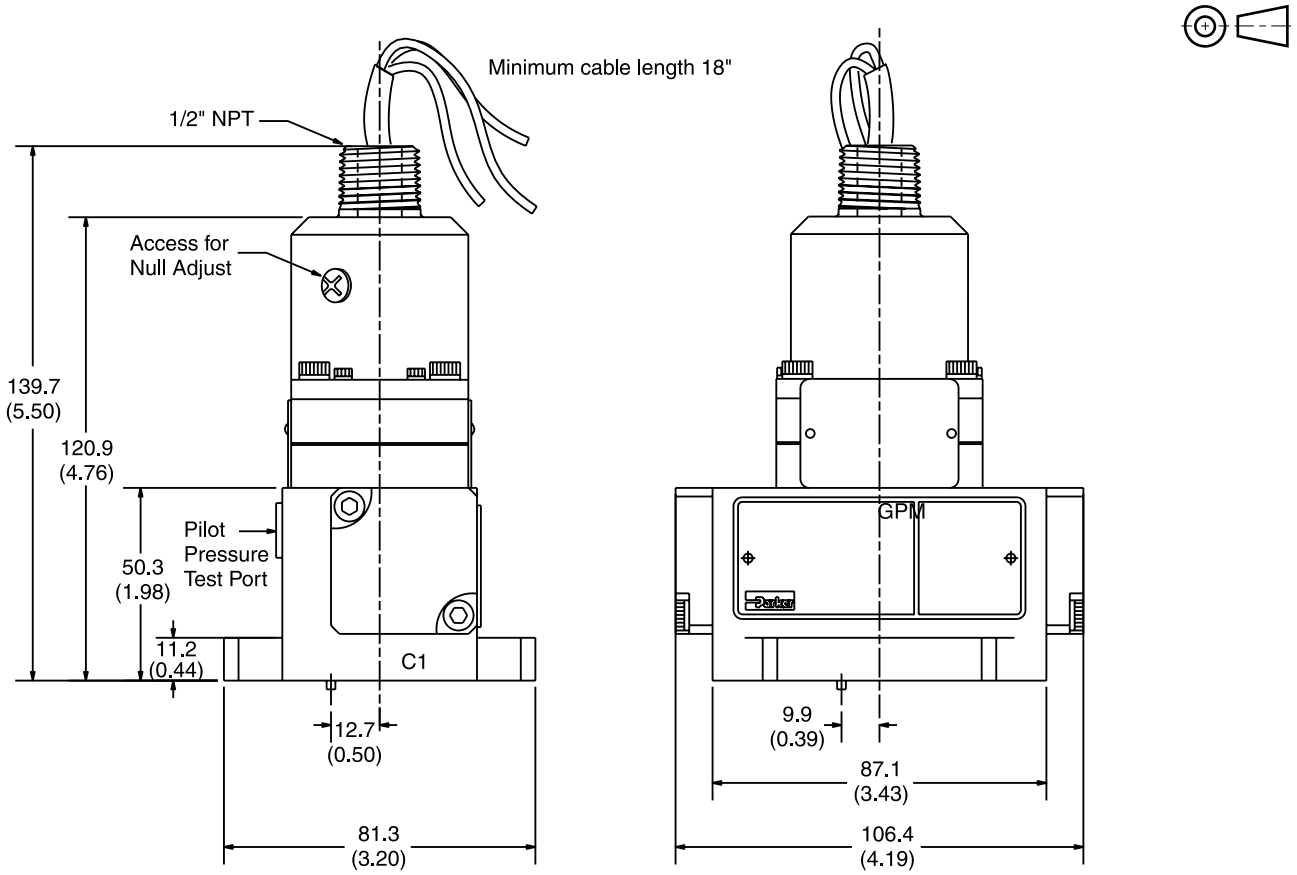


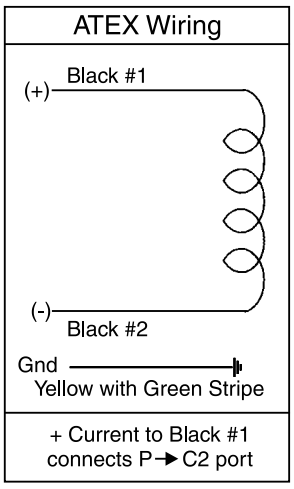


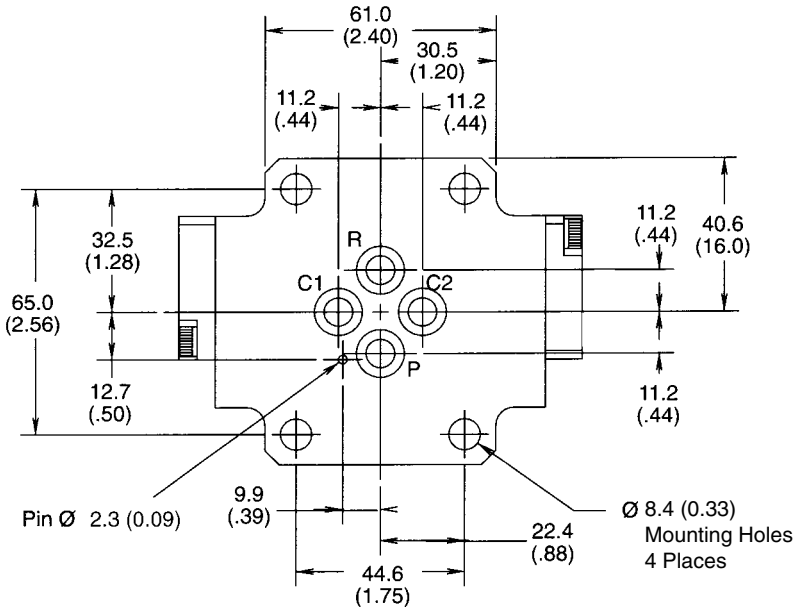
Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

C

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

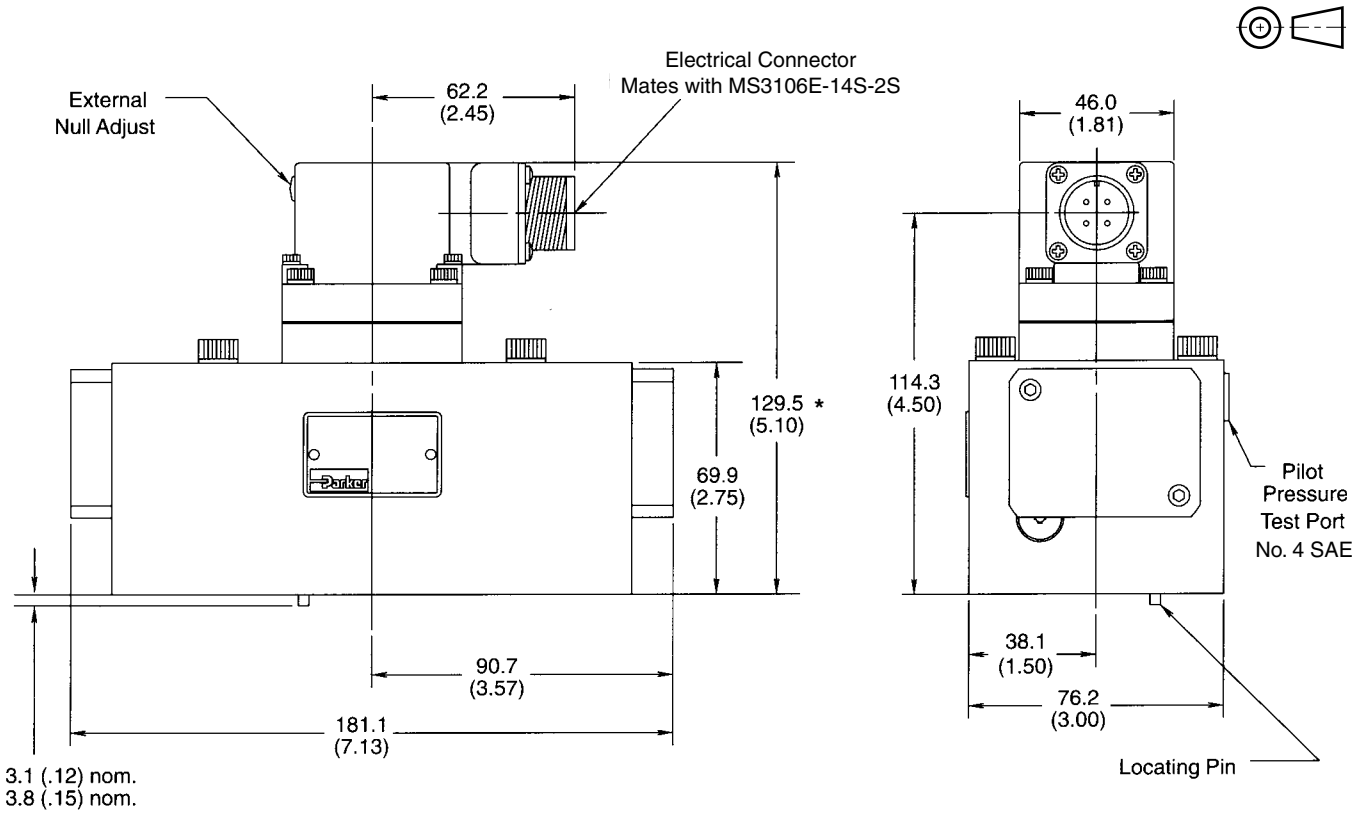


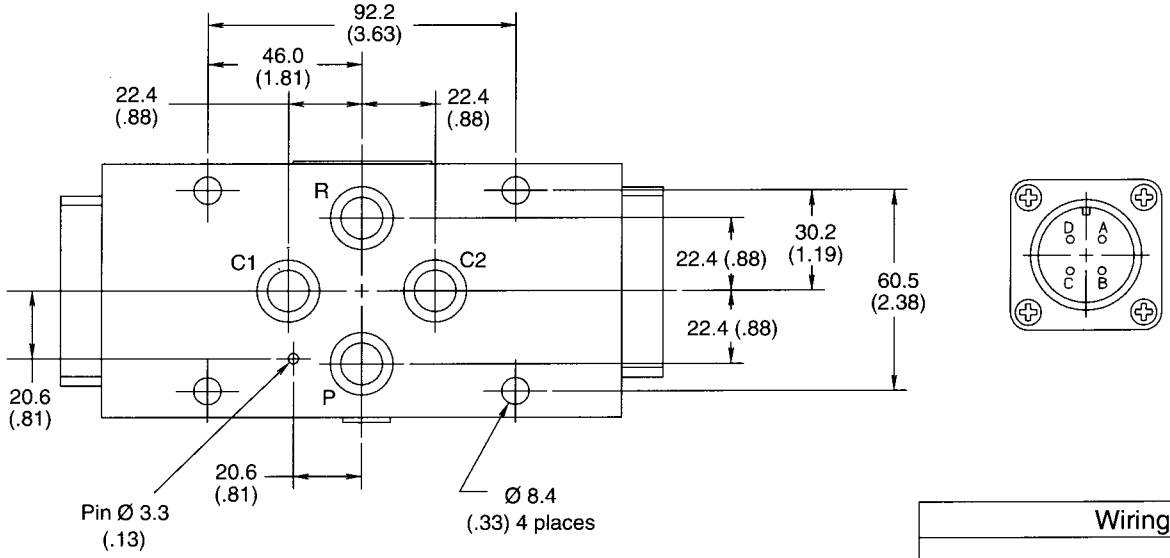




Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

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

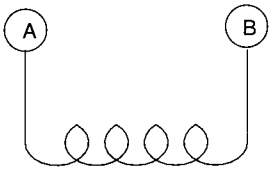




Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

* 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).

Wiring



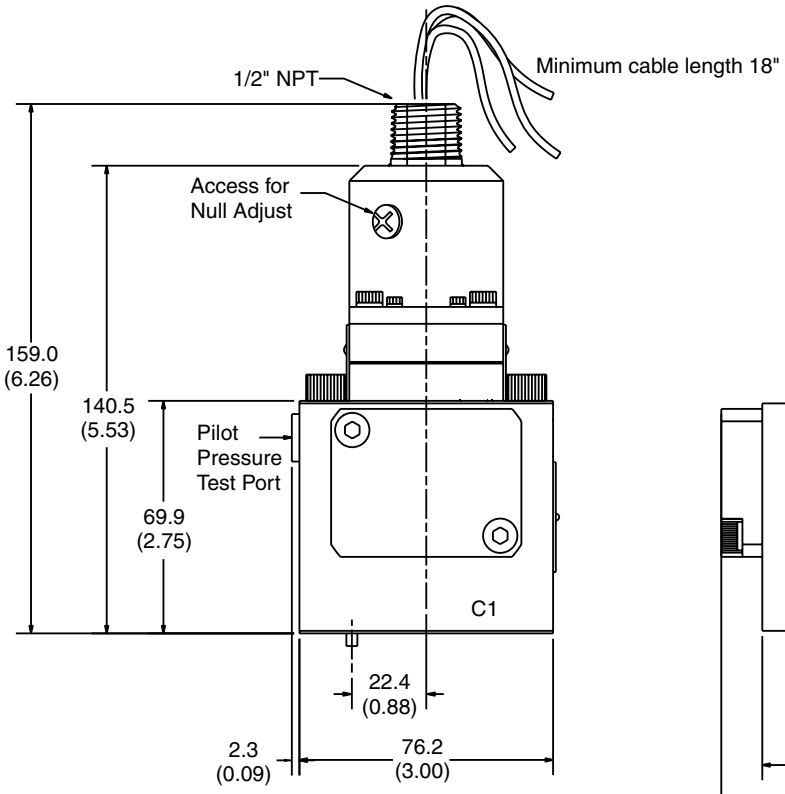
Positive current to the Pin “B” yields flow from the C1 port.

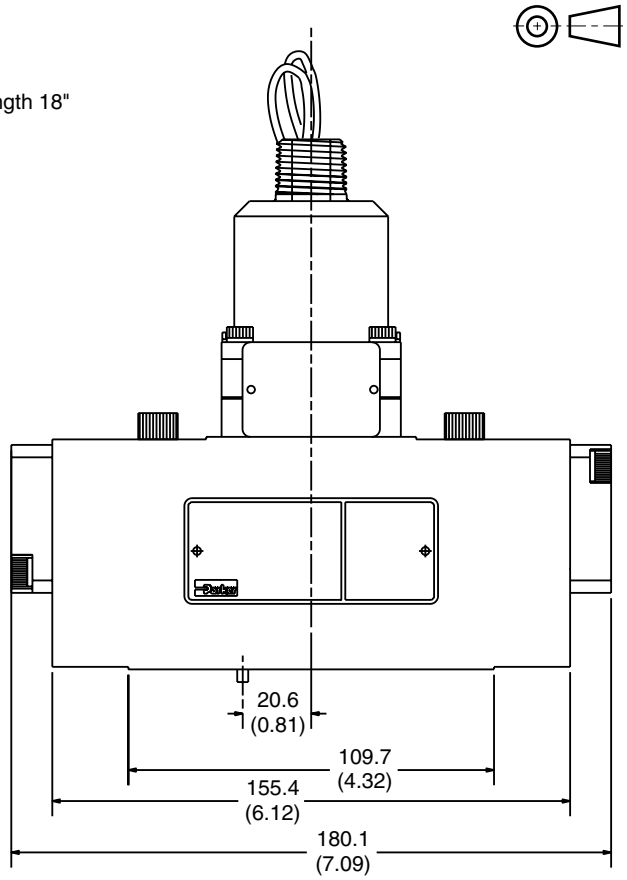
BD.indd, dd

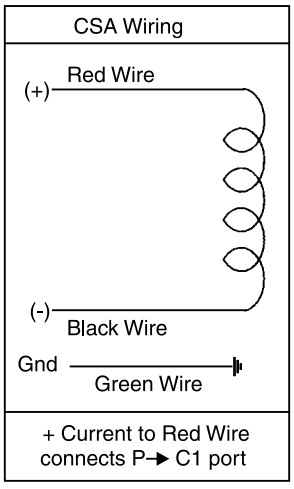
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

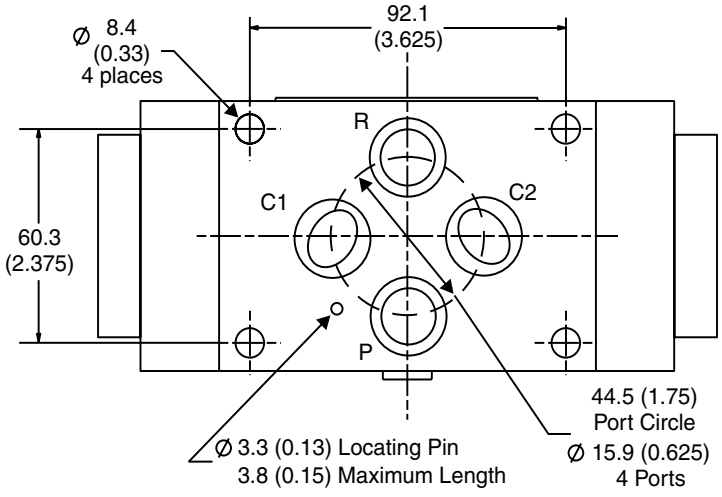
C

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



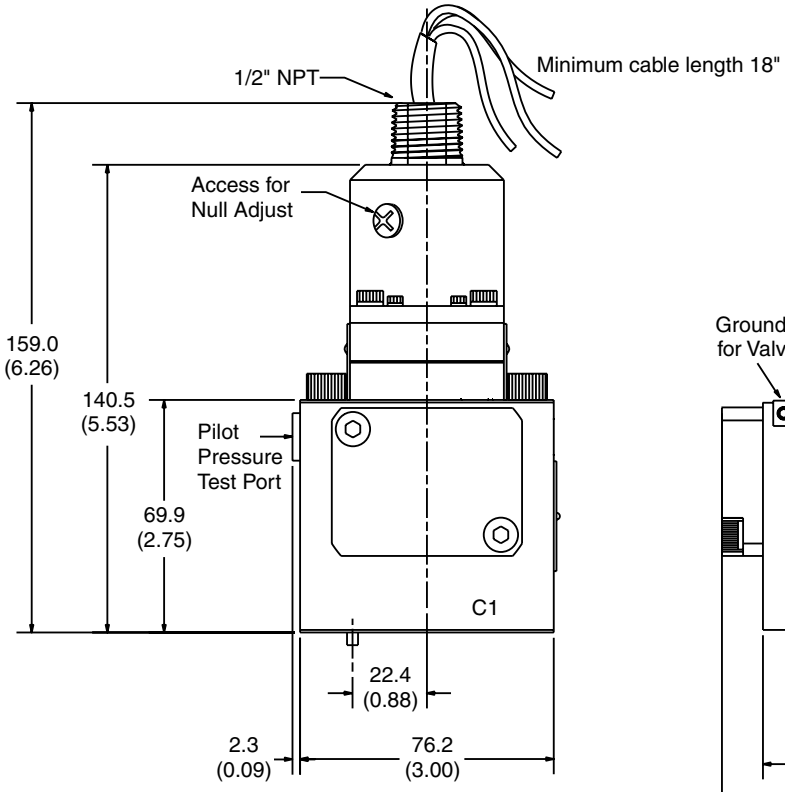


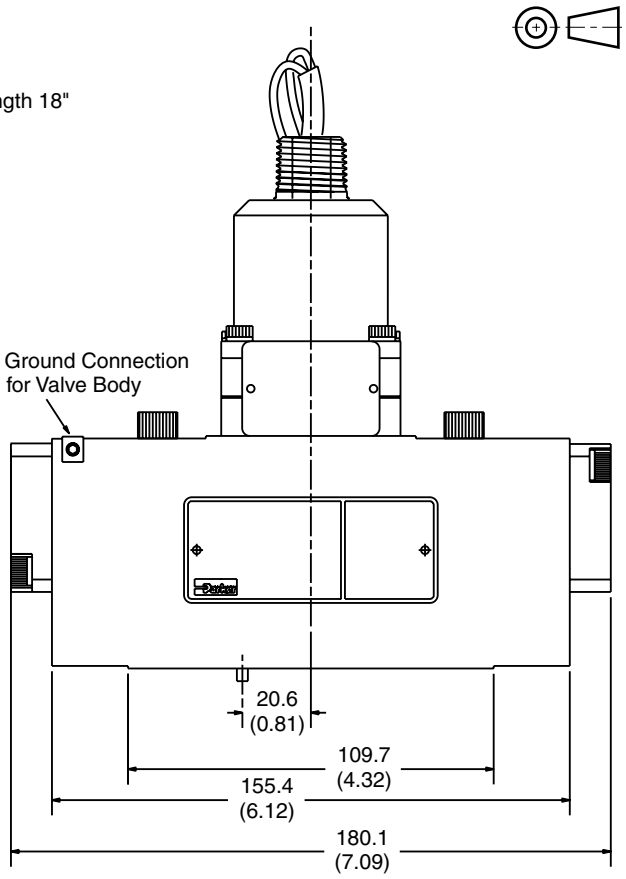


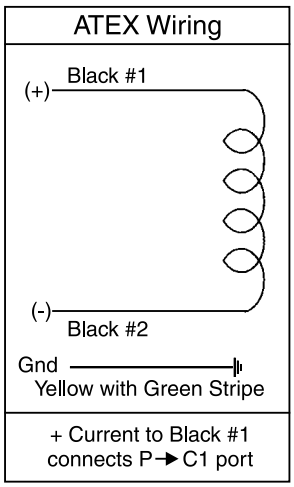


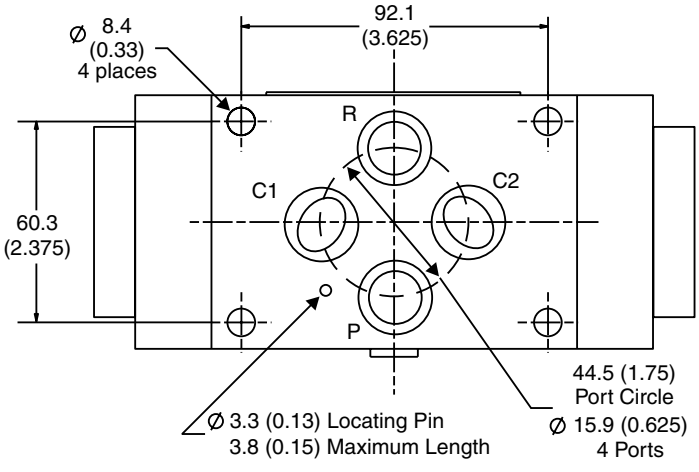
Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

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





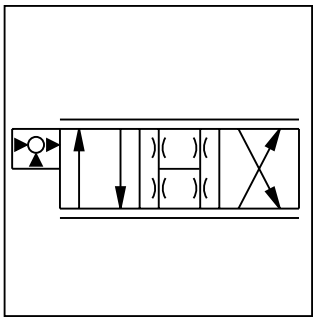


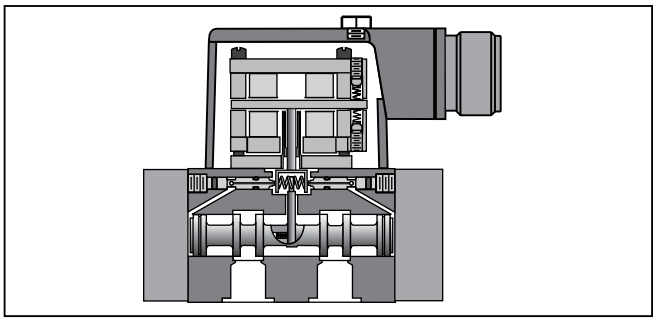


Note: Valve mating surface to be flat within 0.002 TIR, and smooth to within 63 RMS

General Description

Series PH76 servovalves are high performance, two stage valves, with a range of rated flows from 3.8 to 57 LPM (1 to 15 GPM). The pilot stage is a symmetrical double-nozzle and flapper, driven by a double air gap, dry torque motor. A low current signal to the torque motor pilot stage results in a proportional flow from the output stage. The output stage is a 4-way, sliding spool which provides a mechanical feedback using an exclusive “no ball glitch” design.





C

Features

- Built to survive tank port pressure spikes.
- No ball glitch.
- Tool steel spool and body.
- Optional 5th port for external pilot.
- ISO 10372 standard 22.23 mm (0.875 in) port circle.

Specifications

Flow Rating ±10% @ 70 Bar (1000 PSID)	3.8, 9.5, 19, 28, 38, 57 LPM (1, 2.5, 5, 7.5, 10, 15 GPM)	**Threshold**	≤ 0.5%
Supply Pressure	10 – 210 Bar (145 – 3000 PSI)	**Null Shift** with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance	**Pressure Gain** % change in pressure per 1% change in input command	30% minimum, 70% max.
Null Leakage Flow per 70 Bar (1000 PSID)	0.2 – 0.8 LPM (0.05 – 0.20 GPM)	**Step Response**	10 – 90%, < 6 ms
Pilot Flow @ 210 Bar (3000 PSID)	0.8 – 1.2 LPM (0.21 – 0.33 GPM)	**Fluid**	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Input Command	±50 mA std.	**Operating Temperature**	-1°C to +82°C (+30°F to +180°F)
Frequency Response @ 90° phase shift	> 90 Hz (See Performance Curves)	**Protection Class**	NEMA 4, IP65
Non-Linearity	≤ 10%	**Fluid Cleanliness**	ISO 4406 15/12 or better

PH76 — Series | Pilot Source | Material Options | Coils | Wiring | Seal | Operating Pressure | Flows | Special Options | Factory Code for Special Options

Code	Description
C	External (5th port)
A	Internal

For internal pilot the 5th port is blocked internally.

Code	Description
A	Steel (standard)
Z	Special (specify)

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	40 mA	20 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
M	475 ohm	40 mA	20 mA
T	1000 ohm	8 mA	4 mA
Z	Special (Specify)		

Code	Connector over	Flow P to C2 with:
B	Port C2	(+) signal to A, C
A	Port C1	(+) signal to A, C
P	Port P	(+) signal to A, C
T	Port T	(+) signal to A, C

Code	Description
V	Fluorocarbon (std.)
N	Nitrile
E *	EPR
Z *	Special (specify)

* Consult factory for delivery.

Code	Description
A	210 Bar (3000 PSI)
B	450 Bar (5000 PSI)
Z	Special (specify)

Code	Description
1	3.8 LPM (1.0 GPM)
2.5	9.5 LPM (2.5 GPM)
5	19.0 LPM (5.0 GPM)
7.5	28.0 LPM (7.5 GPM)
10	38.0 LPM (10.0 GPM)
15	57.0 LPM (15.0 GPM)

Code	Description
Omit	Standard
D	(Specify) Consult factory for price, delivery, and availability of special options.

Weight: 1 kg (2.2 lb)
Cable with mating connector: EHC154S
Mating connector: MS3106E-14S-2S
Bolt kit: Included with valve. BK07 (4) 5/16-18x1"
Flushing valve: 1200127 (same for 4 or 5 port PH76 valve)
Subplate, 5 ports: 1402303 (4) #12 SAE side ports, (1) #4 SAE side port
Subplate, 4 ports: 810090-3 (4) #12 SAE side ports
Null adjust tool: 6522A13
Driver cards: 23-7030, BD90*, BD101*
When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.
* For output currents >15 mA

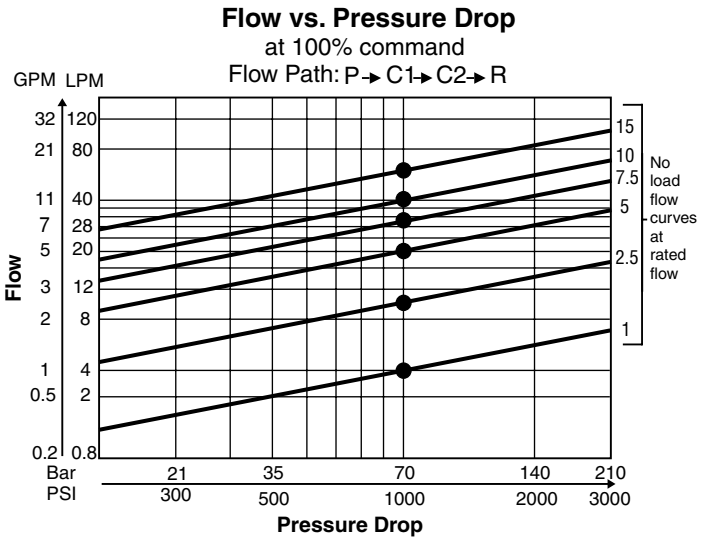
Flushing valve is rated for 3000 psi operation.

C

C

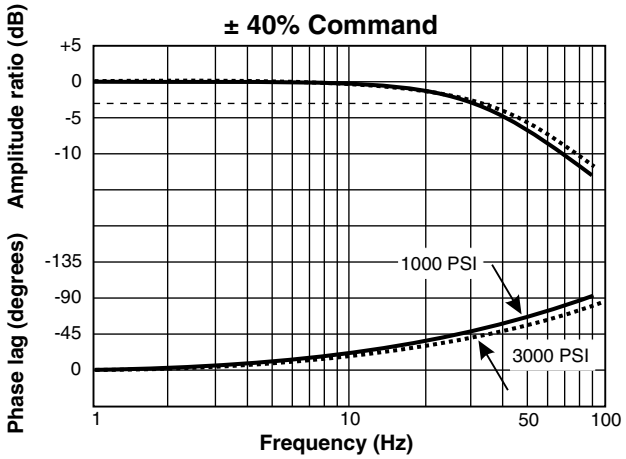
Performance Curves

Servovalve flow is proportional to the square root of the pressure drop through the valve. The nominal flow rating for the servovalves is based upon a 70 Bar (1000 PSI) pressure drop.



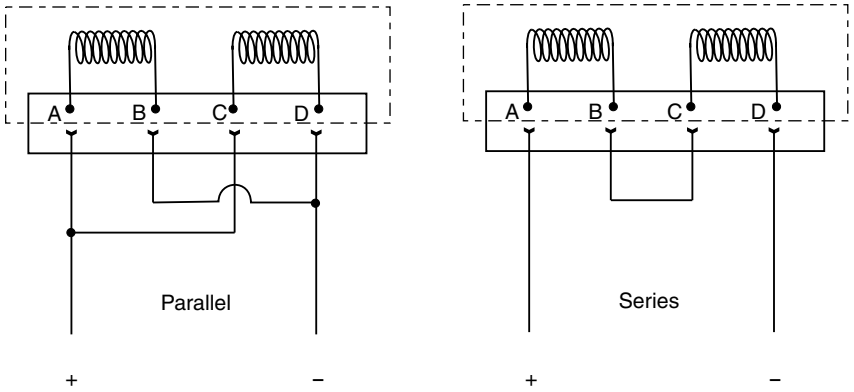
Frequency Response

The frequency response curves for the PH76 servovalves show no significant change for signal amplitudes between ±10% and ±40%. Frequency response is unaffected by changes in supply pressures above 70 Bar (1000 PSI).



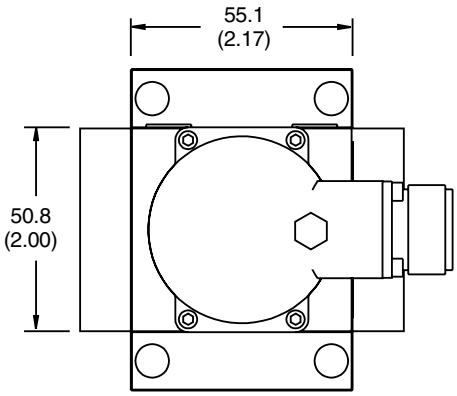
Installation Wiring Options

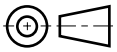
The PH76 servovalve has two coils. One is wired across pins A to B, the other across pins C to D. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. In either case, a positive voltage to pin A connects valve flow from ports P to C2 and ports C1 to R.



Polarity shown (+A, -B, +C, -D) connects flow from P to C2 port.

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

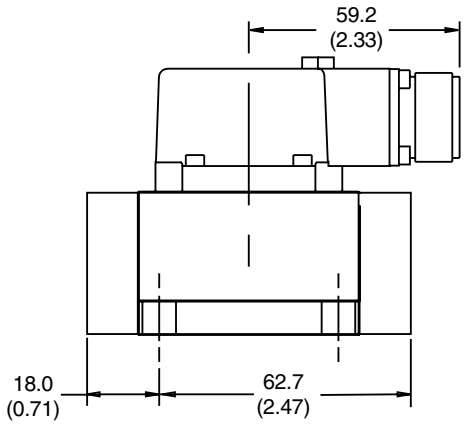


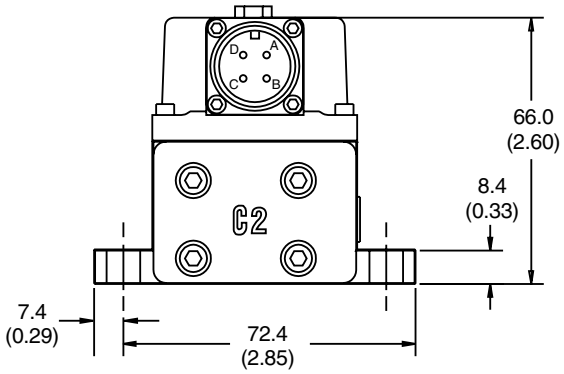


C

Connector shown over C2 port. See ordering information for other connector locations.

The connector location is factory set and is not field changeable.

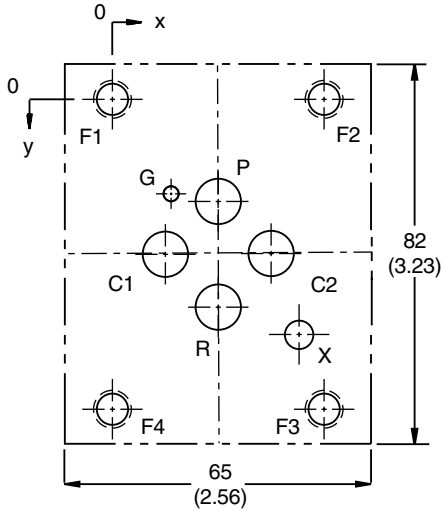




Mounting Surface Dimensions

Metric Dimensions (millimeters)						± 0.1 mm				
Axis	**P**	**C1**	**R**	**C2**	**G**	**X**	**F1**	**F2**	**F3**	**F4**
	∅ 8.2 max.	∅ 8.2 max.	∅ 8.2 max.	∅ 8.2 max.	∅ 3.5 max.	∅ 5	M8	M8	M8	M8
X	22.2	11.1	22.2	33.3	12.3	49.5	0	44.4	44.4	0
Y	21.4	32.5	43.6	32.5	19.8	39	0	0	65	65

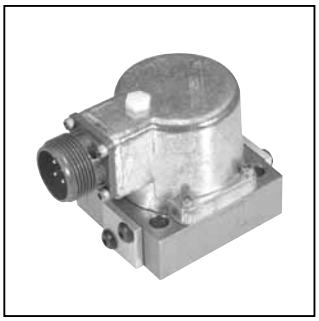
U.S. Dimensions (inches)						± .004 in				
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	∅ 0.32 max.	∅ 0.32 max.	∅ 0.32 max.	∅ 0.32 max.	∅ 0.14 max.	∅ 0.2	5/16 - 18			
X	0.875	0.437	0.875	1.311	0.484	1.531	0	1.750	1.750	0.000
Y	0.846	1.280	1.717	1.280	0.780	1.950	0	0	2.562	2.562

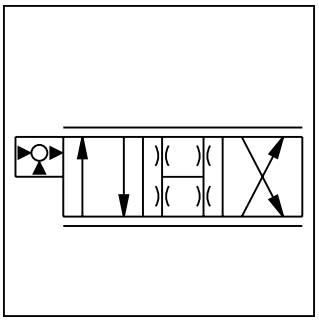


Minimum depth of G is 2 mm (0.08 in)
Recommended full thread depth for bolt holes 22 mm (0.87 in)
Surface roughness: Ra < 0.8 µm (0.031 in) as specified in ISO 468 and 1302
Surface flatness: 0.025 mm (0.001 in) as specified in ISO 1101

General Description

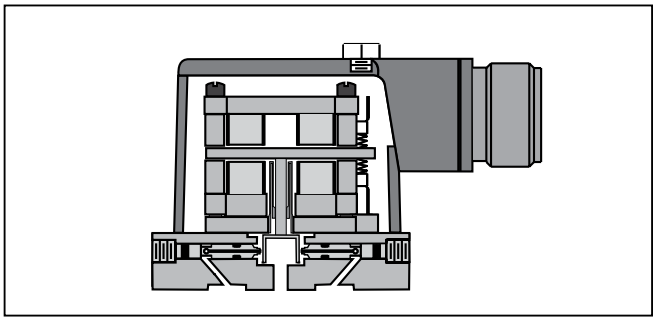
Series DY1S are open center, single stage differential pressure control valves. They are operated by a current driven torque motor. These valves controls the pressure difference between the two actuator ports, C1 and C2, by varying the resistance to flow through their nozzles.





Features

- No mechanical wear points.
- High frequency response.
- Nozzle and flapper design.
- Versatile 21.59 mm (0.850 in.) port circle, can mount to standard 19.81 mm (0.780 in.) and 23.62 mm (0.930 in.) port circle patterns.



Specifications

Flow Rating @ 90 Bar (1300 PSI)	0.4 LPM (0.1 GPM)
Quiescent Flow @ 90 Bar (1300 PSI)	1.3 – 1.9 LPM (0.3 – 0.5 GPM)
Supply Pressure	7 – 90 Bar (100 – 1300 PSI)
Tank Port Pressure	90 Bar (1300 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 100 Hz
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	 ≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	1% minimum
Step Response	10 – 90%, < 5 ms
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

DY1S

Series

Description
0.4 LPM (0.1 GPM)
90 Bar (1300 PSI)

Material Options

Code	Description
A	Standard
Z	Special (specify)

Coils

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
F	80 ohm	80 mA	40 mA
L	360 ohm	30 mA	15 mA
M	475 ohm	40 mA	20 mA
R	650 ohm	30 mA	15 mA
T	1000 ohm	10 mA	5 mA
V	1200 ohm	40 mA	20 mA
Z	Special (specify)		

Wiring

Code	Description
C	Standard
Z	Special

Seal

Code	Description
N	Nitrile
V	Fluorocarbon (standard)
E *	EPR
Z *	Special (specify)

* Consult factory for delivery

Special Options

Code	Description
Omit	Standard
D	(Specify) See list below

Factory Code for Special Options

C

Accessories

Cable with Mating Connector: EHC154S

Mating Connector: MS3106E-14S-2S

Bolt Kit: Included with valve

Flushing Valve: 11-0500

Subplate: 55-0100-2 SAE-6 Side ports

Null Adjust Tool: 6522A13

Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.

* For output currents >15 mA

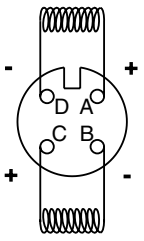
Special Options:

Consult factory for price, delivery and availability of special options.

Special coil
Special wiring
Special seals

Weight: 0.5 kg (1.2 lbs.)

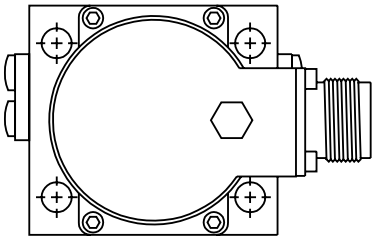
Wiring Option C
(Standard)

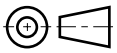


Polarity shown connects
P to C2 port.

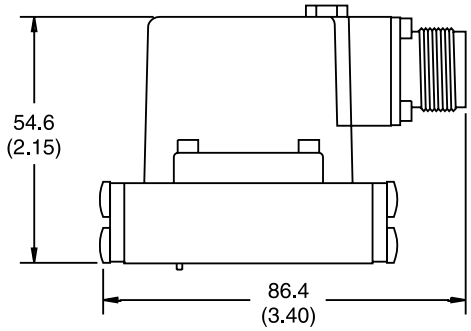
Flushing valve is rated for 3000 psi operation.

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

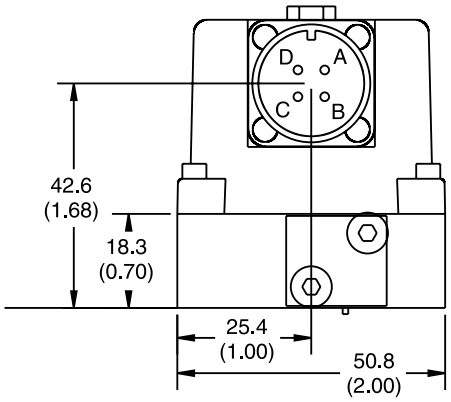




C

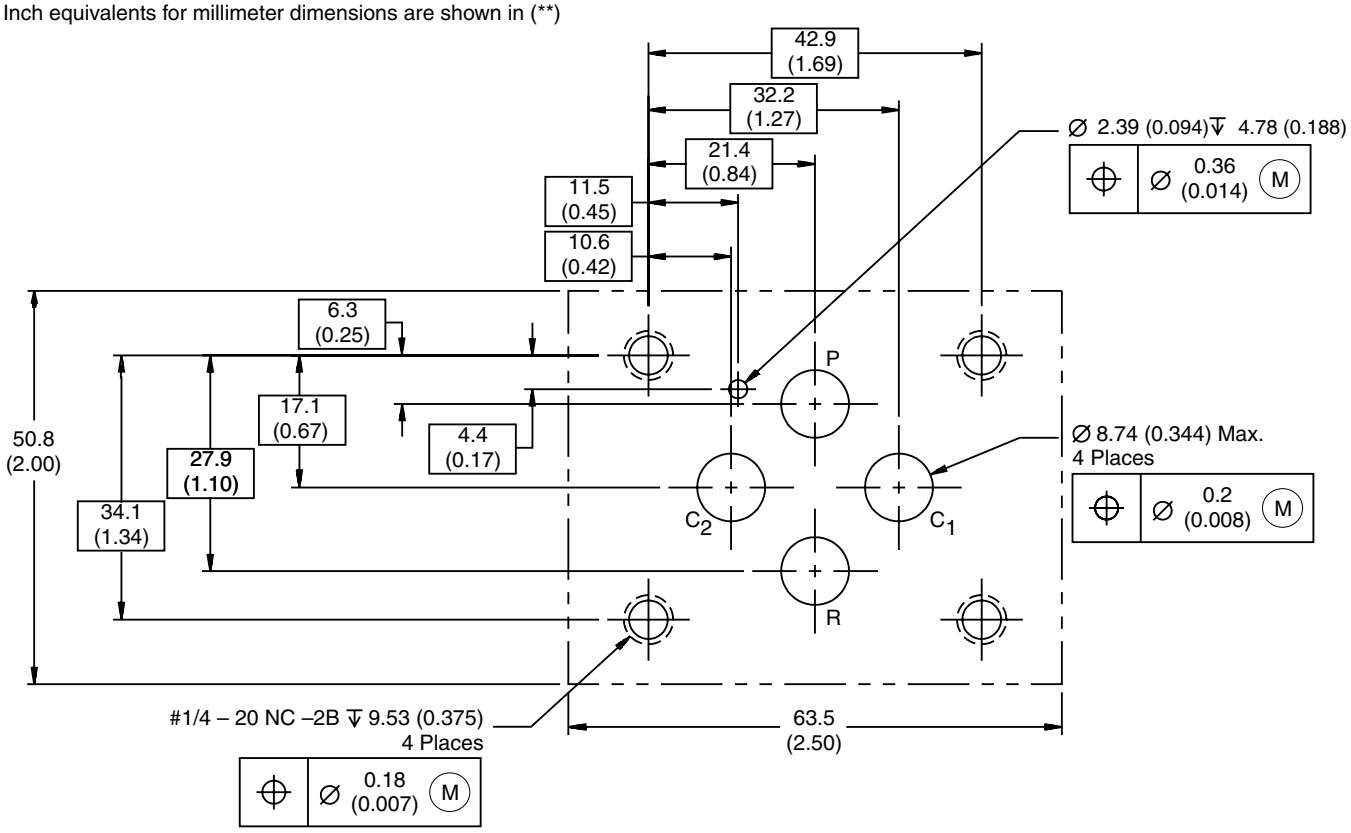


Connector over C1 port



Mounting Interface

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



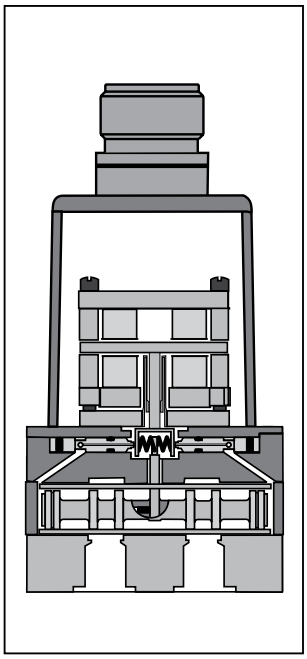
DY1S.indd, dd

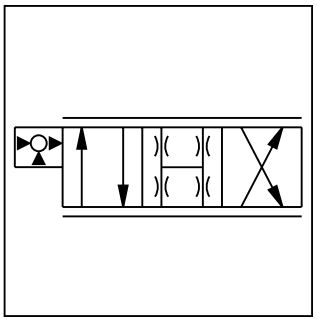
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series DY3H and DY6H are two stage, 4-way, high frequency, closed center servovalves, with mechanical spool position feedback. These valves use a flapper and nozzle type, torque motor driven pilot stage to drive the sliding spool second stage. The unique rigid pin feedback design avoids ball glitch problems, which can occur in other types of servovalves.

The DY3H and DY6H offer a compact, lower cost alternative without sacrificing performance in systems operating at 105 Bar (1500 PSI) or less.





C

Features

- Precision lapped spool and sleeve.
- No ball glitch.
- High frequency response.
- Nozzle and flapper design.
- Adapters available for mounting to D03 or ISO port patterns.

Specifications

Flow Rating @ 70 Bar (1000 PSID)	11 and 22 LPM (3 and 6 GPM)
Supply Pressure	10 – 105 Bar (145 – 1500 PSI)
Leakage Flow @ 70 Bar (1000 PSID)	1.3 – 1.9 LPM (0.3 – 0.5 GPM)
Tank Port Pressure	105 Bar (1500 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 190 Hz (See Performance Curves)
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	 ≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	30% minimum, 70% maximum
Step Response	10 – 90%, < 6 ms for DY3H < 8 ms for DY6H
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

C

Series

Code
DY3H
DY6H

Material Options

Code	Description
A	Standard
Z	Special (specify)

Coils

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	80 mA	40 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
L	360 ohm	30 mA	15 mA
M	475 ohm	40 mA	20 mA
R	650 ohm	30 mA	15 mA
T	1000 ohm	10 mA	5 mA
V	1200 ohm	40 mA	20 mA
Z	Special (specify)		

Wiring

Code	Description
C	Standard
Z	Special

Seal

Code	Description
N	Nitrile (standard)
V	Fluorocarbon
E *	EPR
Z *	Special (specify)

***Consult factory for delivery**

Operating Pressure: **E**

Code	Description
E	105 Bar (1500 PSI)

Flows

Code	Description
3	11 LPM (3 GPM)
6 *	22 LPM (6 GPM)

* 6 GPM for DY6H only.

Special Options

Code	Description
Omit	Standard
D	(Specify) See list below

Factory Code for Special Options

Accessories

Cable with Mating Connector: EHC154S

Mating Connector: MS3106E-14S-2S

Bolt Kit: Included with valve

Flushing Valve: 11-0300

Subplate: 55-0100-2 SAE-6 Side ports

Null Adjust Tool: 6522A13

Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.
* For output currents >15 mA

Special Options:

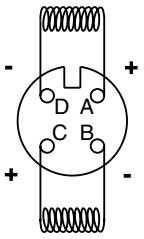
Consult factory for price, delivery and availability of special options.

Special coil
Special wiring
Special seals

Weight:

DY3H	0.34 kg (0.56 lbs.)
DY6H	0.34 kg (0.56 lbs.)

Wiring Option C
(Standard)

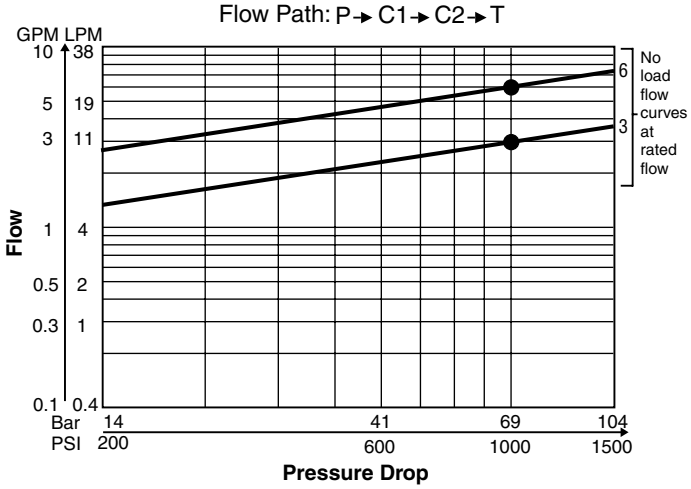


Polarity shown connects
P to C2 port.

Flushing valve is rated for 3000 psi operation.

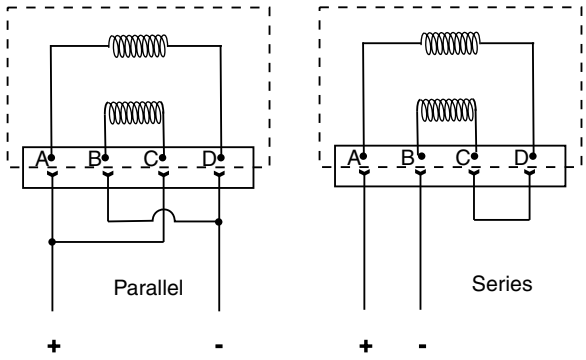
Performance Curves

Flow vs. Pressure Drop
at 100% command
Flow Path: P→ C1→ C2→ T



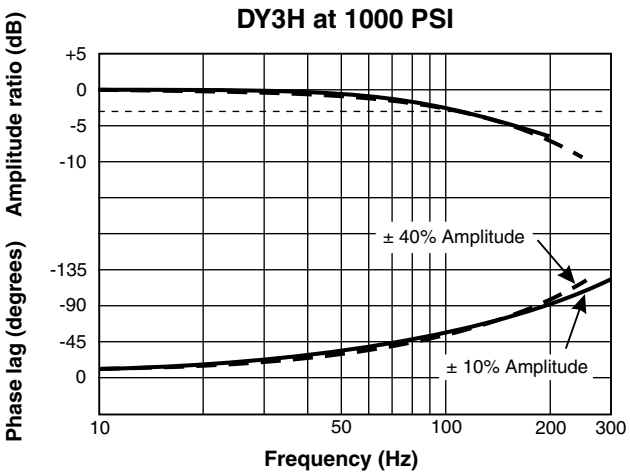
Installation Wiring Options

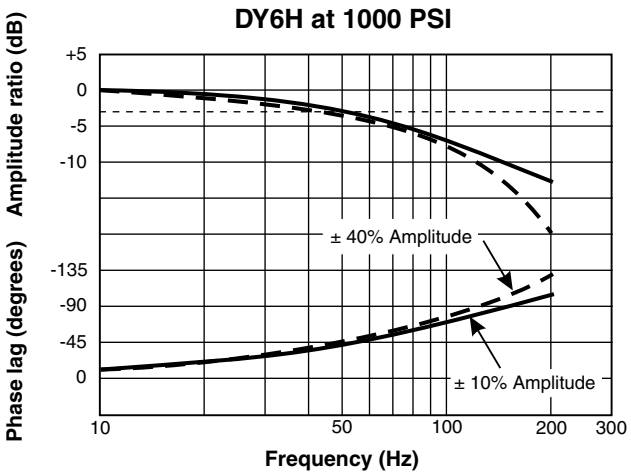
This servovalve has two coils. This illustration shows the internal wiring configurations for these valves. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustration below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.

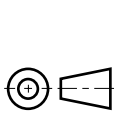
Frequency Response

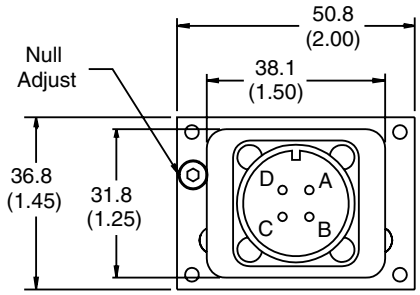


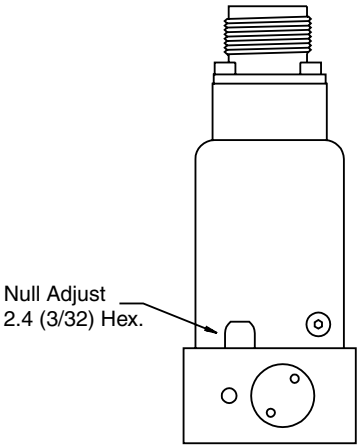


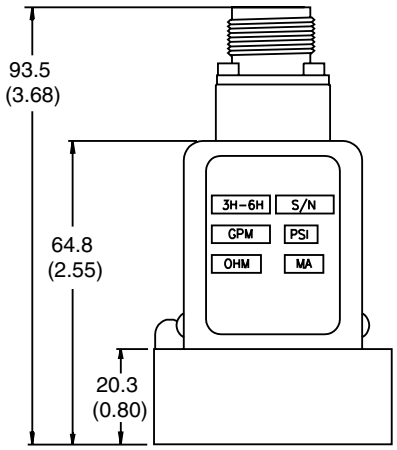
C

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



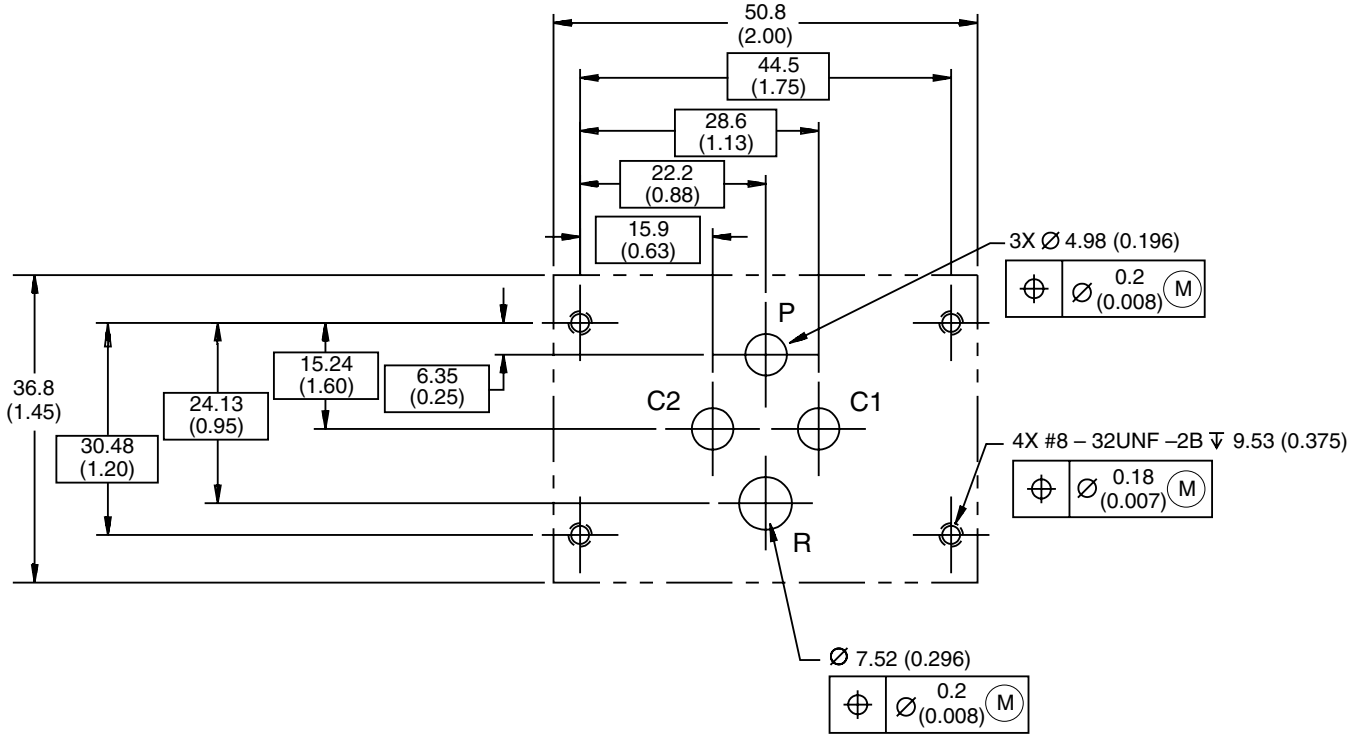






Mounting Interface

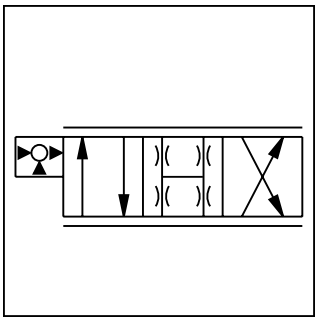
Inch equivalents for millimeter dimensions are shown in (**)

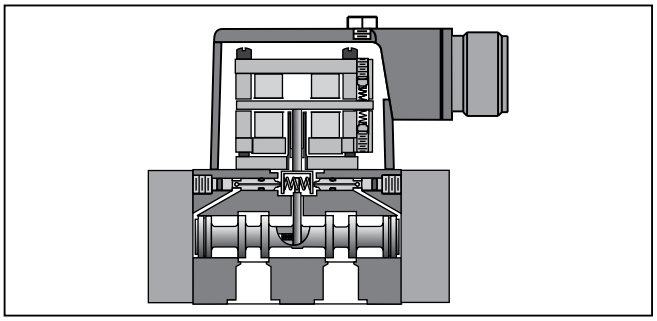


General Description

Series DY01 are two stage, 4-way, flapper and nozzle style servovalves. The DY01 servovalve combines a spool and sleeve construction, and a high frequency torque motor, for optimal performance. The unique rigid pin feedback design avoids ball glitch problems, which can occur in other types of servovalves. This valve is rated for 210 Bar (3000 PSI) standard, or can be built for 350 Bar (5000 PSI) service. The pressure ratings are the same for both the tool steel construction or the optional stainless steel spool and body.

The DY01 servovalve was specially designed for high precision flight simulator applications.





C

Features

- Precision lapped spool and sleeve.
- No ball glitch.
- Tool steel, or stainless steel, spool and body.
- Versatile 21.59 mm (0.850 in.) port circle, can mount to standard 19.81 mm (0.780 in.) and 23.62 mm (0.930 in.) port circle patterns.

Specifications

Flow Rating @ 70 Bar (1000 PSID)	3 and 11 LPM (1 and 3 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI) opt. 350 Bar (5000 PSI)
Leakage Flow @ 70 Bar (1000 PSID)	0.42 – 0.95 LPM (0.11 – 0.25 GPM)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 180 Hz (See Performance Curves)
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	30% Minimum, 70% Maximum
Step Response	10 – 90%, < 8 ms
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

C

DY01 — Series | Material Options | Coils | Wiring | Seal | Operating Pressure | Flows | Special Options | Factory Code for Special Options

Code	Description
A	Steel (standard)
B	Stainless Steel
Z*	Special (specify)

* Material selection does not not affect operating pressure.

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	80 mA	40 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
L	360 ohm	30 mA	15 mA
M	475 ohm	40 mA	20 mA
R	750 ohm	30 mA	15 mA
T	1000 ohm	10 mA	5 mA
V	1200 ohm	40 mA	20 mA
Z	Special (specify)		

Code	Connector over:	Flow P to C2 with:
C	Port C1	(+) Signal to A, C
D	Port C1	(+) Signal to B, D
Z	Special (specify)	

Code	Description
N	Nitrile (standard)
V	Fluorocarbon
E *	EPR
Z *	Special (specify)

* Consult factory for delivery

Code	Description
A	210 Bar (3000 PSI)
B	350 Bar (5000 PSI)
Z	Special (specify)

Operating pressure is independent of material selection.

Code	Description
1	3.8 LPM (1 GPM)
1.5	5.7 LPM (1.5 GPM)
3	11 LPM (3 GPM)

Code	Description
Omit	Standard
D	(Specify) See list below

Weight: 1.0 kg (2.1 lbs.)

Special Options:

Consult factory for price, delivery and availability of special options.

Special coil
Special wiring
Special seals
Special flow rate
Dual flow rate
Dual gain
Zener barriers

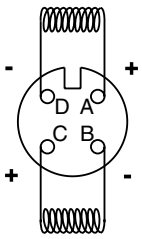
Accessories

Cable with Mating Connector: EHC154S
Mating Connector: MS3106E-14S-2S
Bolt Kit: Included with valve
Flushing Valve: 11-0500
Subplate: 55-0100-8S SAE-8 Side ports
Null Adjust Tool: 6522A13
Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.
* For output currents >15 mA

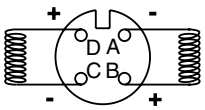
Flushing valve is rated for 3000 psi operation.

Wiring Option C
(Standard)



Polarity shown connects P to C2 port.

Wiring Option D



Moog, Atchley and Vickers standard.

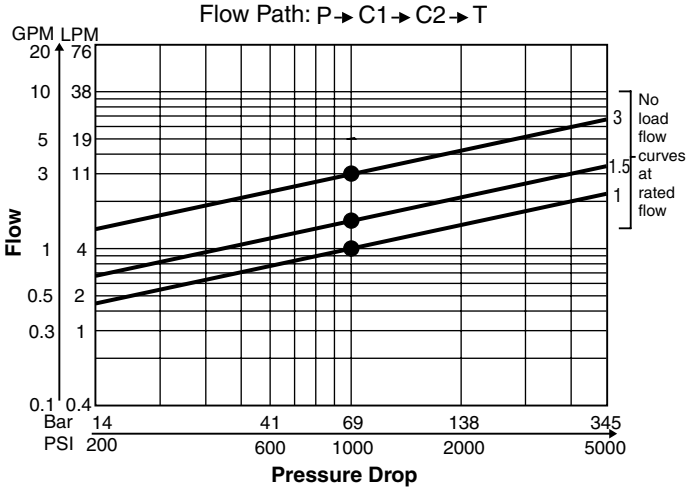
DY01.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Performance Curves

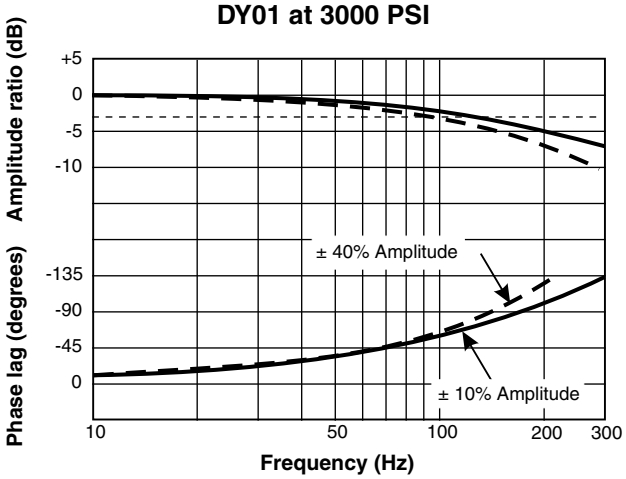
DY01 Flow vs. Pressure Drop

at 100% command
Flow Path: P → C1 → C2 → T



Frequency Response

DY01 at 3000 PSI

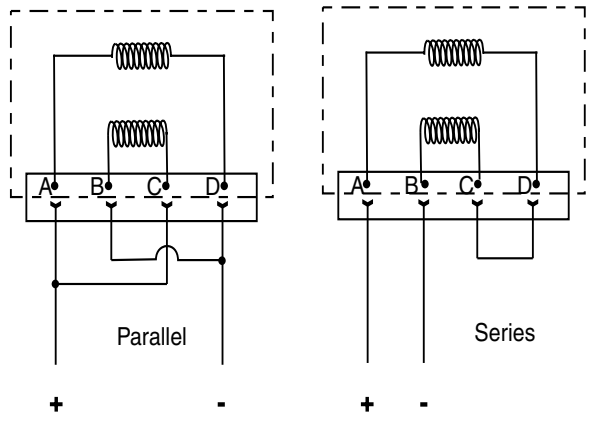


C

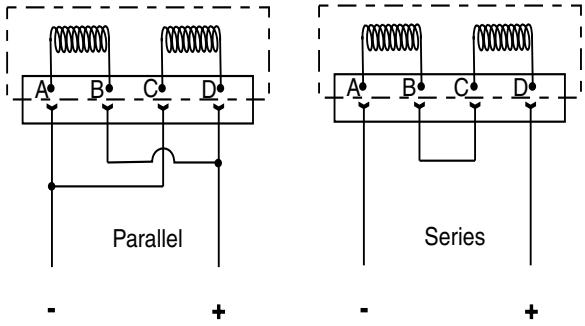
Installation Wiring Options

This servovalve has two coils. This illustration shows the internal wiring configurations for options C and D. 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.

Option C

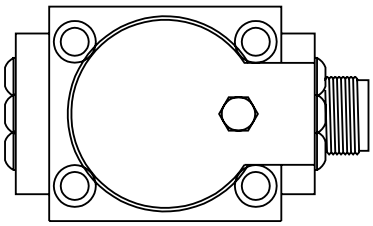


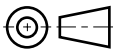
Option D



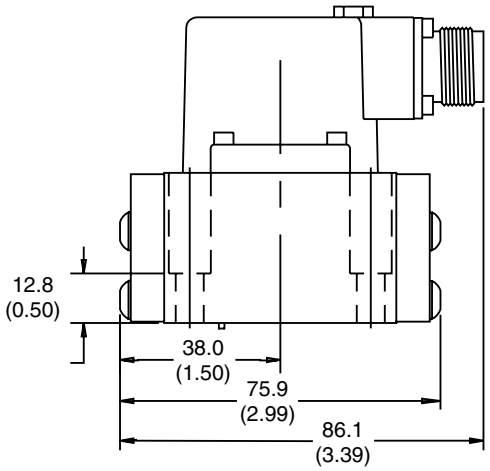
Polarity shown connects flow from P to C2 port.

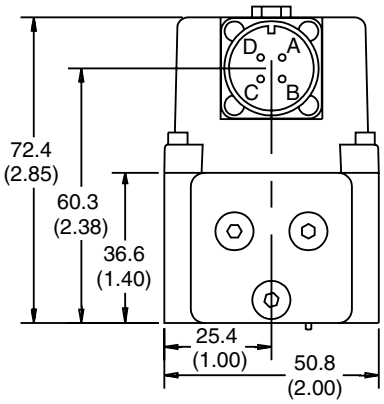
Inch equivalents for millimeter dimensions are shown in (**)





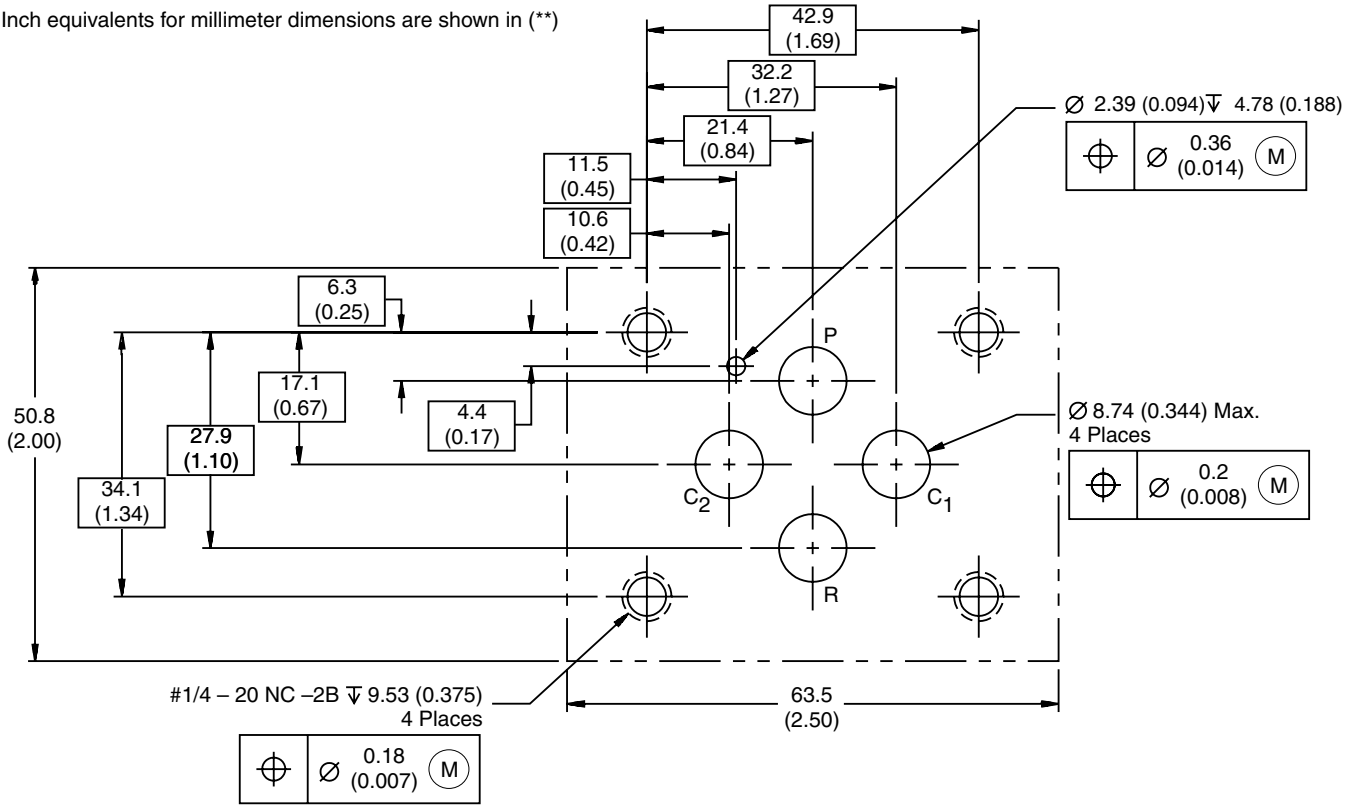
Connector over port C1





Mounting Interface

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

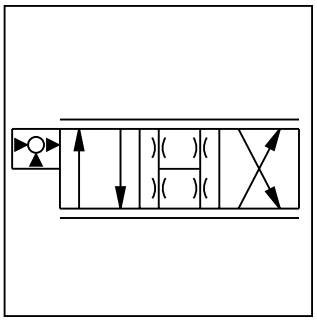


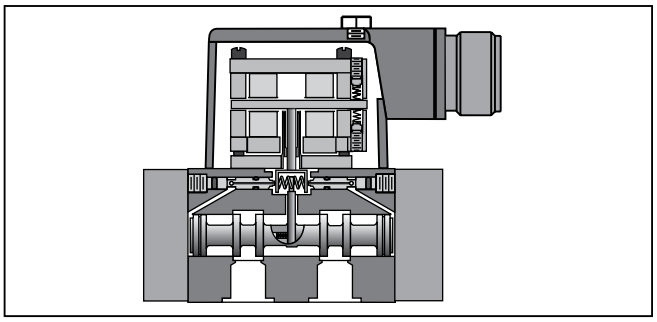
DY01.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series DY05 are two stage, 4-way, flapper and nozzle style servovalves. The DY05 has a wide range of flow ratings within a lower cost spool and body design. The unique rigid pin feedback design avoids ball glitch problems, which can occur in other types of servo-valves. These valves are rated for 210 Bar (3000 PSI) standard, or can be built for 350 Bar (5000 PSI) service. The pressure ratings are the same for both the tool steel construction or the optional stainless steel spool and body.





C

Features

- Lapped spool and body.
- No ball glitch.
- Tool steel, or stainless steel, spool and body.
- Versatile 21.59 mm (0.850 in.) port circle, can mount to standard 19.81 mm (0.780 in.) and 23.62 mm (0.930 in.) port circle patterns.
- Survives high tank port pressures.

Specifications

Flow Rating @ 70 Bar (1000 PSID)	0.95, 1.9, 3.8. 9.5 and 19 LPM (0.25, 0.5, 1.0, 2.5 & 5 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI) opt. 350 Bar (5000 PSI)
Leakage Flow @ 70 Bar (1000 PSID)	0.42 – 0.95 LPM (0.11 – 0.25 GPM)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 100 Hz (See Performance Curves)
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	30% minimum, 70% maximum
Step Response	10 – 90%, < 11 ms
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

DY05 — Series

□ Material Options

Code	Description
A	Steel (standard)
B	Stainless Steel
Z*	Special (specify)

* Material selection does not not affect operating pressure.

□ Coils

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	80 mA	40 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
L	360 ohm	30 mA	15 mA
M	475 ohm	40 mA	20 mA
R	750 ohm	30 mA	15 mA
T	1000 ohm	10 mA	5 mA
V	1200 ohm	40 mA	20 mA
Z	Special (specify)		

□ Wiring

Code	Connector over:	Flow P to C2 with:
C	Port C1	(+) Signal to A, C
D	Port C1	(+) Signal to B, D
Z	Special (specify)	

□ Seal

Code	Description
N	Nitrile (standard)
V	Fluorocarbon
E *	EPR
Z *	Special (specify)

* Consult factory for delivery

□ Operating Pressure

Code	Description
A	210 Bar (3000 PSI)
B	350 Bar (5000 PSI)
Z	Special (specify)

Operating pressure is independent of material selection.

□ Flows

Code	Description
0.25	0.95 LPM (0.25 GPM)
0.5	1.9 LPM (0.5 GPM)
1	3.8 LPM (1 GPM)
2.5	9.5 LPM (2.5 GPM)
5	19 LPM (5 GPM)

□ Special Options

Code	Description
Omit	Standard
D	(Specify) See list below

□□□□□ Factory Code for Special Options

Weight: 1.0 kg (2.1 lbs.)

Accessories

Cable with Mating Connector: EHC154S

Mating Connector: MS3106E-14S-2S

Bolt Kit: Included with Valve

Flushing Valve: 11-0500

Subplate: 55-0100-8S SAE-8 Side ports

Null Adjust Tool: 6522A13

Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.

* For output currents >15 mA

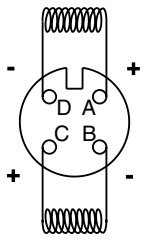
Flushing valve is rated for 3000 psi operation.

Special Options:

Consult factory for price, delivery and availability of special options.

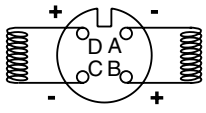
Special coil
Special wiring
Special seals
Special flow rate
Dual flow rate
Dual gain
Zener barriers
High frequency torque motor (Models 5, 10, 12 & 15 only)

Wiring Option C
(Standard)



Dyval and Pegasus standard.

Wiring Option D

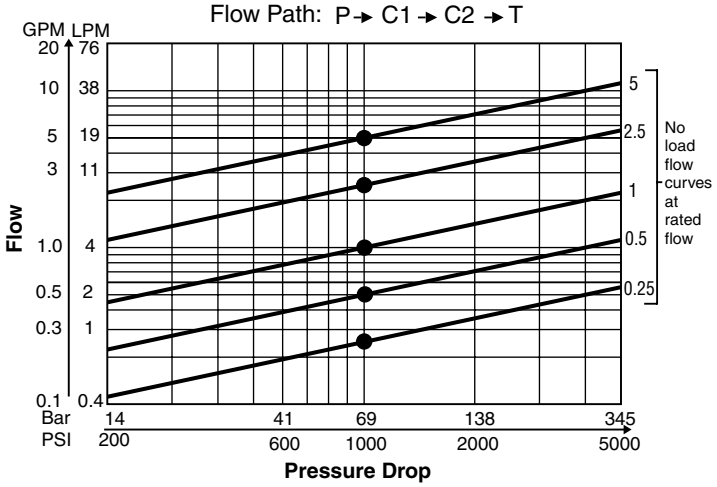


Moog, Atchley and Vickers standard.

In both cases, polarity shown connects P to C2 port.

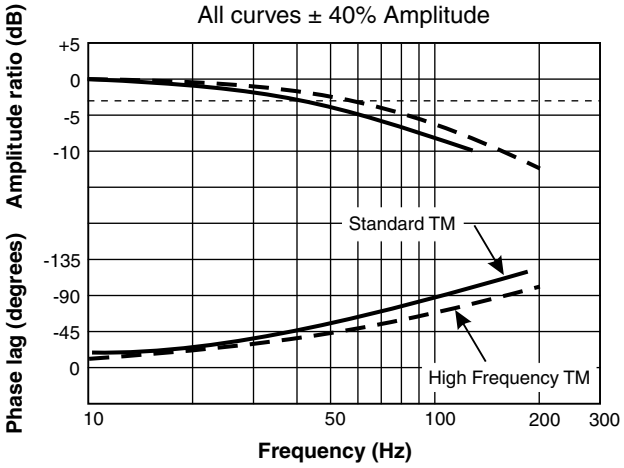
Performance Curves

DY05 Flow vs. Pressure Drop
at 100% command
Flow Path: P → C1 → C2 → T



Frequency Response

DY05 at 3000 PSI
All curves ± 40% Amplitude

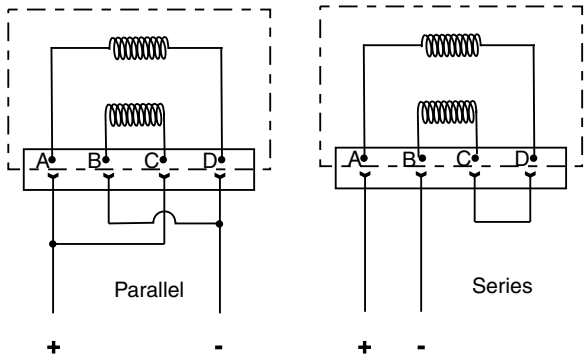


C

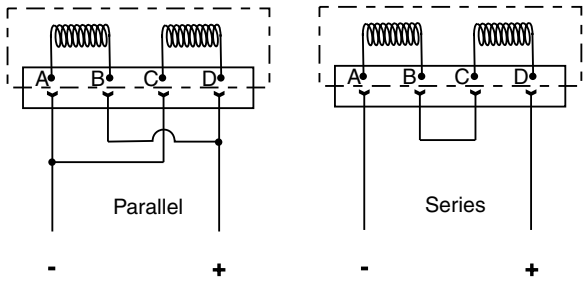
Installation Wiring Options

This servovalve has two coils. This illustration shows the internal wiring configurations for options C and D. 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.

Option C



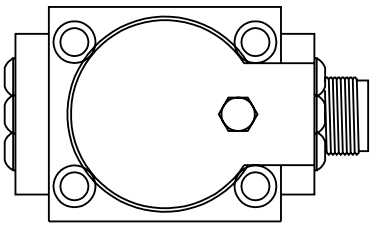
Option D

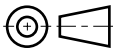


Polarity shown connects flow from P to C2 port.

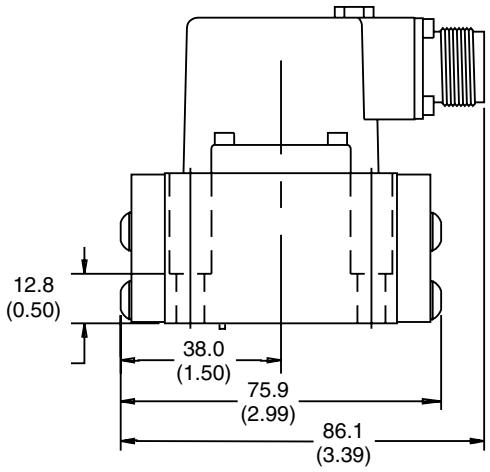
C

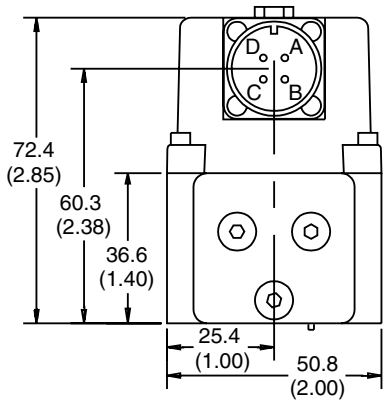
Inch eqivalents for millimeter dimensions are shown in (**)





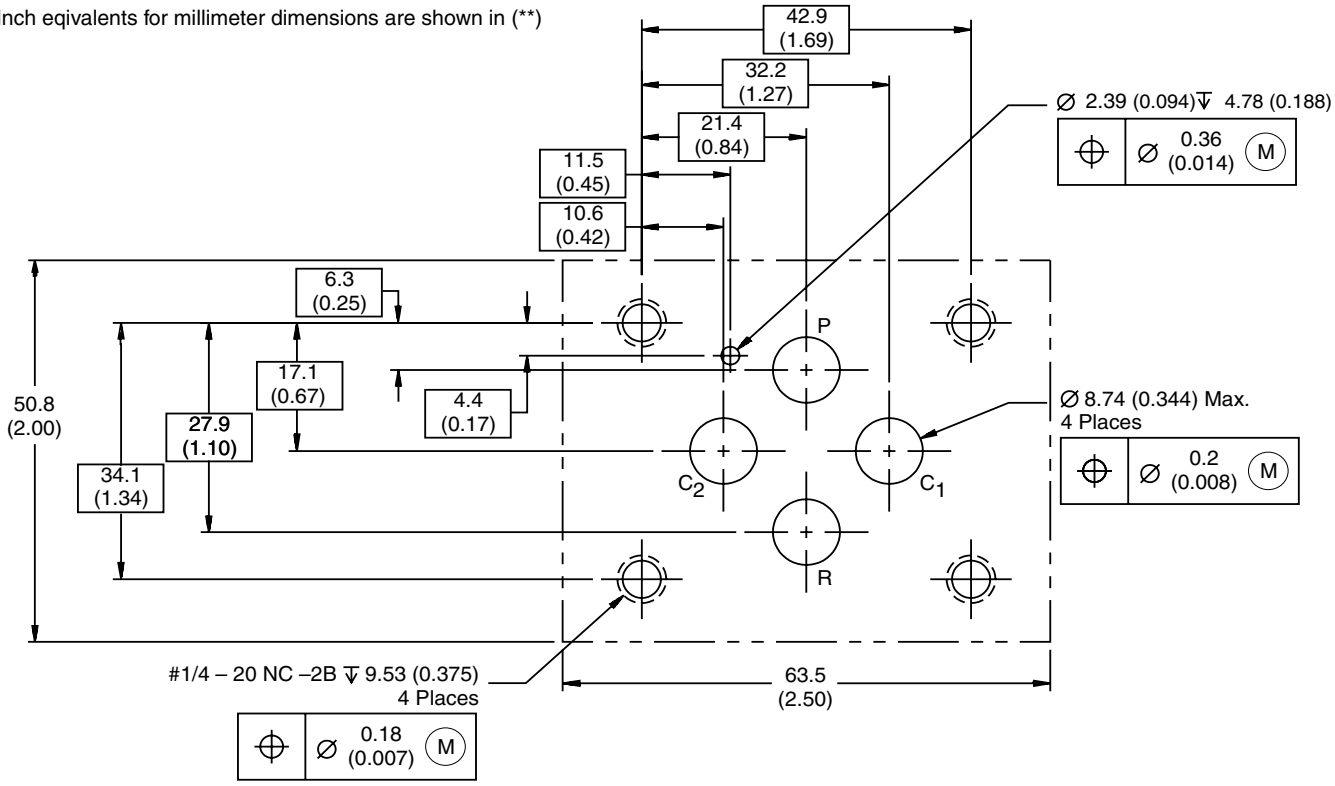
Connector over port C1





Mounting Interface

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

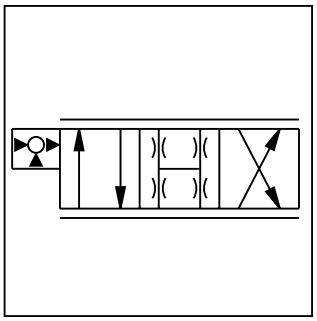


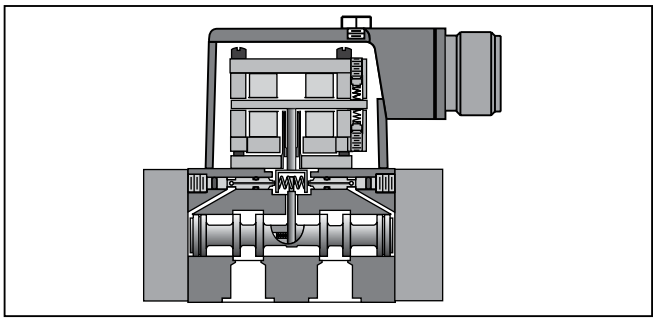
DY05.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series DY10 are two stage, 4-way, flapper and nozzle style servovalves. The DY10 is a higher flow version of the DY05. The unique rigid pin feedback design avoids ball glitch problems, which can occur in other types of servovalves. These valves are rated for 210 Bar (3000 PSI) standard, or can be built for 350 Bar (5000 PSI) service. The pressure ratings are the same for both the tool steel construction or the optional stainless steel spool and body.





Features

- Lapped spool and body.
- No ball glitch.
- Tool steel, or stainless steel, spool and body.
- Versatile 21.59 mm (0.850 in.) port circle, can mount to standard 19.81 mm (0.780 in.) and 23.62 mm (0.930 in.) port circle patterns.
- Survives high tank port pressures.

C

Specifications

Flow Rating @ 70 Bar (1000 PSID)	28 and 38 LPM (7.5 and 10 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI) opt. 350 Bar (5000 PSI)
Leakage Flow @ 70 Bar (1000 PSID)	0.57 – 1.1 LPM (0.15 – 0.3 GPM)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 100 Hz (See Performance Curves)
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	30% minimum, 70% maximum
Step Response	10 – 90%, < 13 ms
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

DY10 — Series

Material Options

Code	Description
A	Steel (standard)
B	Stainless Steel
Z*	Special (specify)

* Material selection does not affect operating pressure.

Coils

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	80 mA	40 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
L	360 ohm	30 mA	15 mA
M	475 ohm	40 mA	20 mA
R	750 ohm	30 mA	15 mA
T	1000 ohm	10 mA	5 mA
V	1200 ohm	40 mA	20 mA
Z	Special (specify)		

Wiring

Code	Connector over:	Flow P to C2 with:
C	Port C1	(+) Signal to A, C
D	Port C1	(+) Signal to B, D
Z	Special (specify)	

Seal

Code	Description
N	Nitrile (standard)
V	Fluorocarbon
E *	EPR
Z *	Special (specify)

* Consult factory for delivery

Operating Pressure

Code	Description
A	210 Bar (3000 PSI)
B	350 Bar (5000 PSI)
Z	Special (specify)

Operating pressure is independent of material selection.

Flows

Code	Description
7.5	28 LPM (7.5 GPM)
10	38 LPM (10 GPM)

Special Options

Code	Description
Omit	Standard
D	(Specify) See list below

Factory Code for Special Options

Weight: 1.0 kg (2.1 lbs.)

Special Options:

Consult factory for price, delivery and availability of special options.

Special coil
Special wiring
Special seals
Special flow rate
Dual flow rate
Dual gain
Zener barriers
High frequency torque motor (Models 5, 10, 12 & 15 only)

Accessories

Cable with Mating Connector: EHC154S

Mating Connector: MS3106E-14S-2S

Bolt Kit: Included with valve

Flushing Valve: 11-0500

Subplate: 55-0100-8S SAE-8 Side ports

Null Adjust Tool: 6522A13

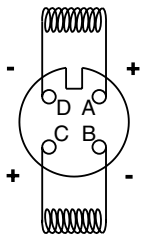
Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.

* For output currents >15 mA

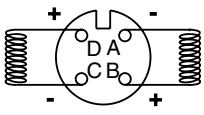
Flushing valve is rated for 3000 psi operation.

Wiring Option C
(Standard)



Dyval and Pegasus standard.

Wiring Option D



Moog, Atchley and Vickers standard.

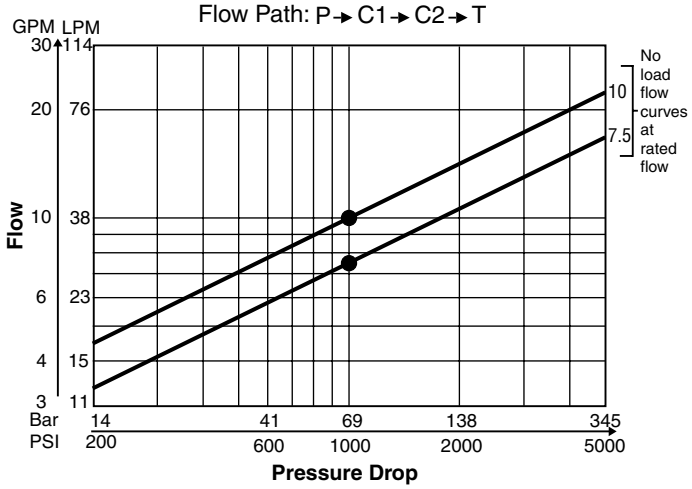
In both cases, polarity shown connects P to C2 port.

Performance Curves

DY10 Flow vs. Pressure Drop

at 100% command

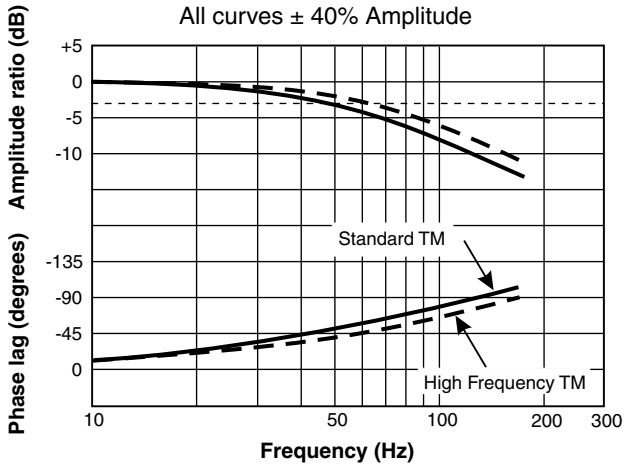
Flow Path: P→C1→C2→T



Frequency Response

DY10 at 3000 PSI

All curves ± 40% Amplitude

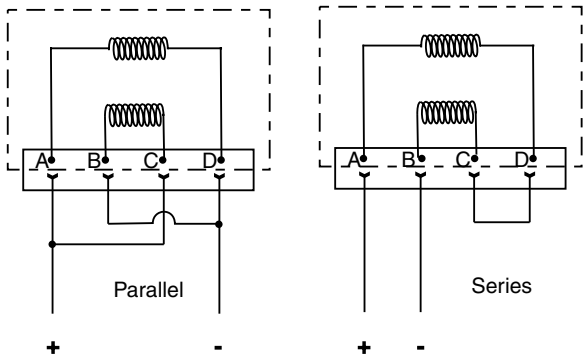


C

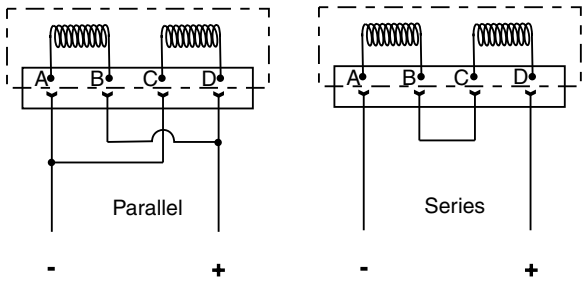
Installation Wiring Options

This servovalve has two coils. This illustration shows the internal wiring configurations for options C and D. 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.

Option C



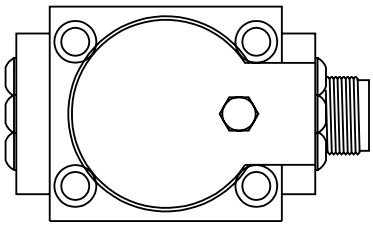
Option D

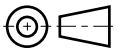


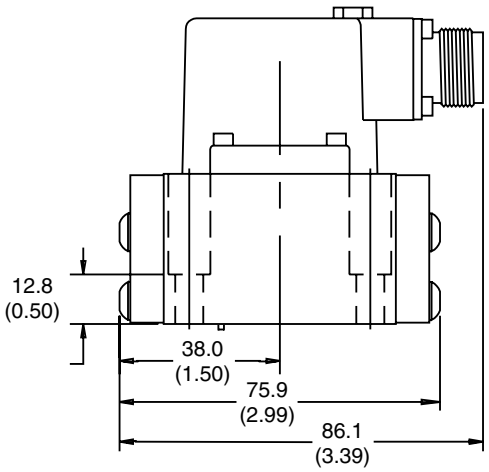
Polarity shown connects flow from P to C2 port.

C

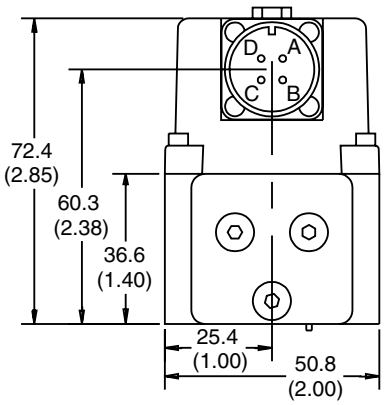
Inch equivalents for millimeter dimensions are shown in (**)





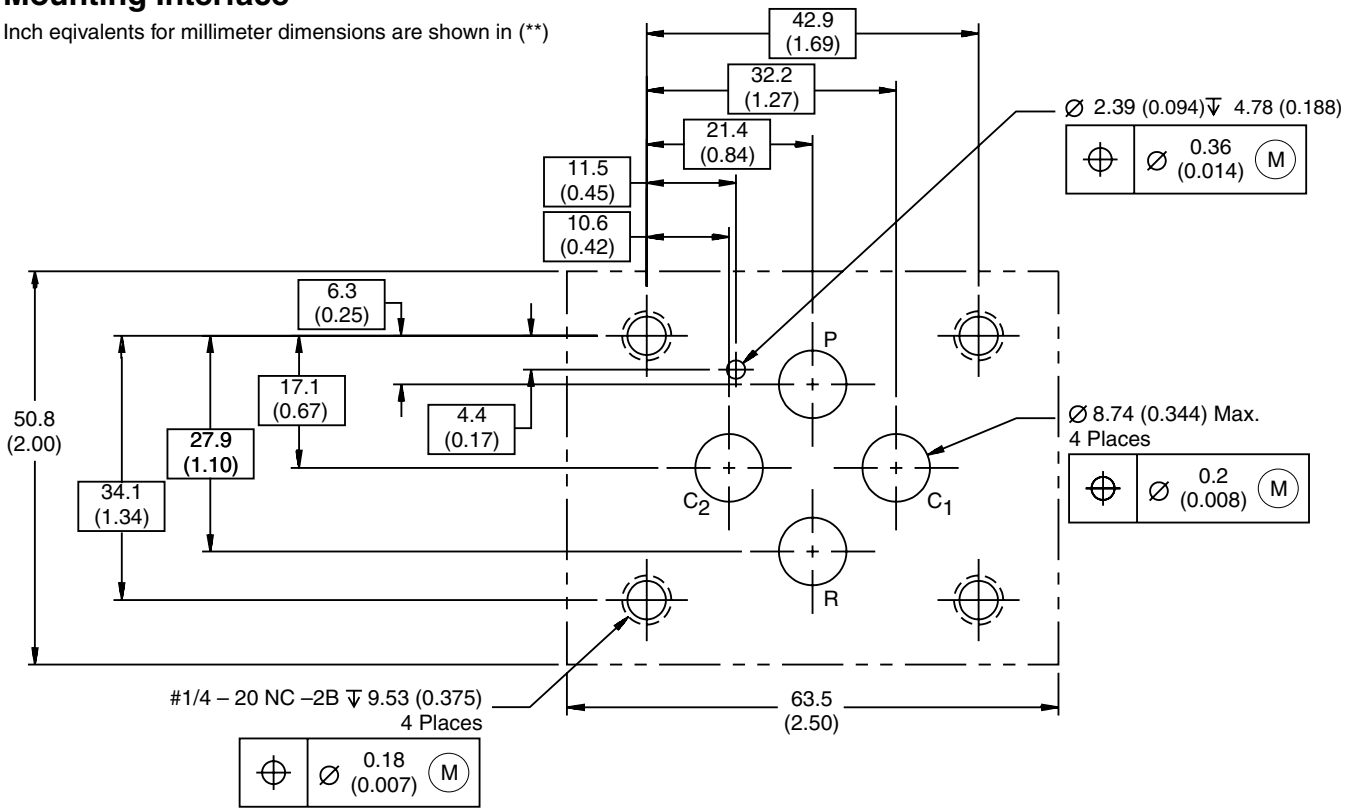


Connector over port C1



Mounting Interface

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

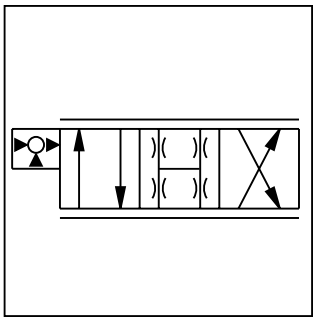


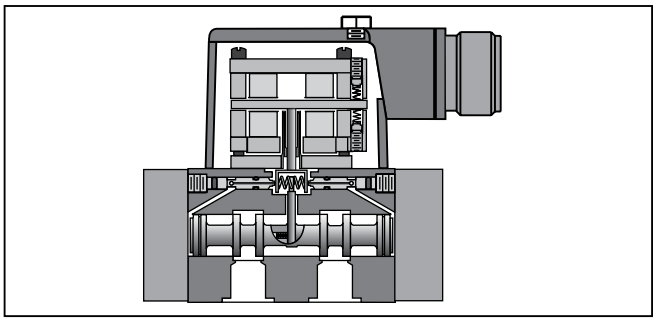
DY10.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series DY12 are two stage, 4-way, flapper and nozzle style servovalves. They have the same port pattern and body as the DY10 valve, but have a longer spool stroke for higher flow. The unique rigid pin feedback design avoids ball glitch problems, which can occur in other types of servovalves. These valves are rated for 210 Bar (3000 PSI) standard, or can be built for 350 Bar (5000 PSI) service. The pressure ratings are the same for both the tool steel construction or the optional stainless steel spool and body.





C

Features

- Lapped spool and body.
- No ball glitch.
- Tool steel, or stainless steel, spool and body.
- Nozzle and flapper design.
- Versatile 21.59 mm (0.850 in.) port circle, can mount to standard 19.81 mm (0.780 in.) and 23.62 mm (0.937 in.) port circle patterns.
- Survives high tank port pressures.

Specifications

Flow Rating @ 70 Bar (1000 PSID)	47 and 57 LPM (12.5 and 15 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI) opt. 350 Bar (5000 PSI)
Leakage Flow @ 70 Bar (1000 PSID)	0.57 – 1.1 LPM (0.15 – 0.3 GPM)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 100 Hz (See Performance Curves)
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	30% minimum, 70% maximum
Step Response	10 – 90%, < 13 ms
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

DY12 Series | Material Options | Coils | Wiring | Seal | Operating Pressure | Flows | Special Options | Factory Code for Special Options

Code	Description
Omit	Standard
D	(Specify) See list below

Code	Description
A	Steel (standard)
B	Stainless Steel
Z*	Special (specify)

* Material selection does not affect operating pressure.

Code	Description
12.5	47 LPM (12.5 GPM)
15	57 LPM (15 GPM)

Code	Description
A	210 Bar (3000 PSI)
B	350 Bar (5000 PSI)
Z	Special (specify)

Operating pressure is independent of material selection.

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	80 mA	40 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
L	360 ohm	30 mA	15 mA
M	475 ohm	40 mA	20 mA
R	750 ohm	30 mA	15 mA
T	1000 ohm	10 mA	5 mA
V	1200 ohm	40 mA	20 mA
Z	Special (specify)		

Code	Description
N	Nitrile (standard)
V	Fluorocarbon
E *	EPR
Z *	Special (specify)

* Consult factory for delivery

Code	Connector over:	Flow P to C2 with:
C	Port C1	(+) Signal to A, C
D	Port C1	(+) Signal to B, D
Z*	Special (specify)	

Weight: 1.0 kg (2.1 lbs.)

Special Options:

Consult factory for price, delivery and availability of special options.

Special coil
Special wiring
Special seals
Special flow rate
Dual flow rate
Dual gain
Zener barriers
High frequency torque motor (Models 5, 10, 12 & 15 only)

Accessories

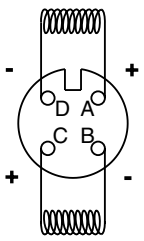
Cable with Mating Connector: EHC154S
Mating Connector: MS3106E-14S-2S
Bolt Kit: Included with valve
Flushing Valve: 11-0500
Subplate: 55-0100-8S SAE-8 Side ports
Null Adjust Tool: 6522A13
Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.

* For output currents >15 mA

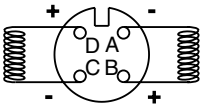
Flushing valve is rated for 3000 psi operation.

Wiring Option C
(Standard)



Dyval and Pegasus standard.

Wiring Option D



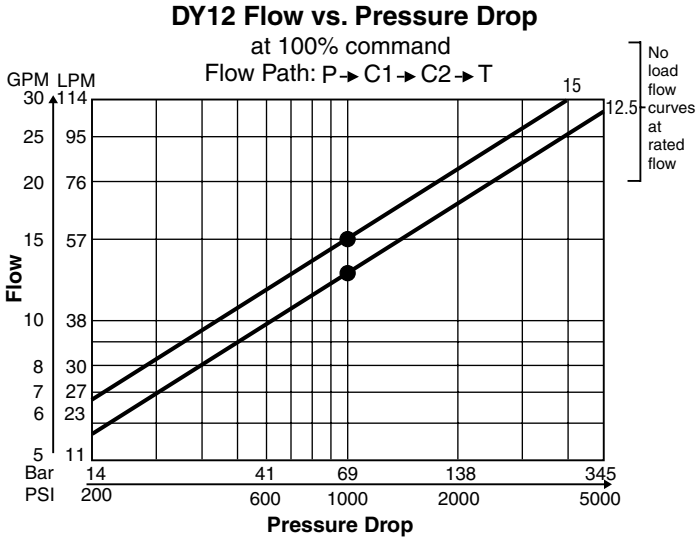
Moog, Atchley and Vickers standard.

In both cases, polarity shown connects P to C2 port.

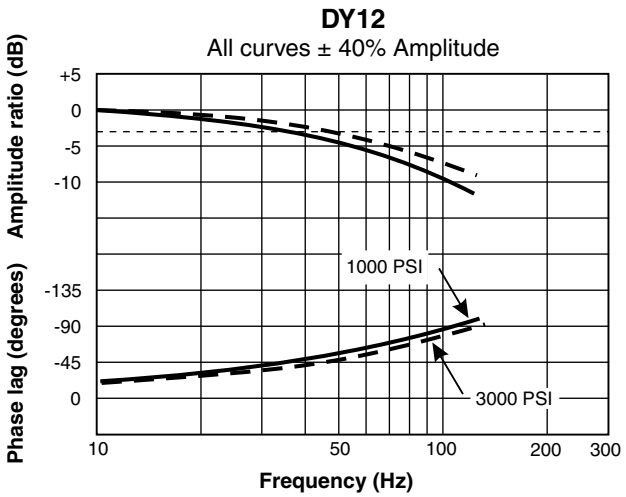
DY12.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Performance Curves



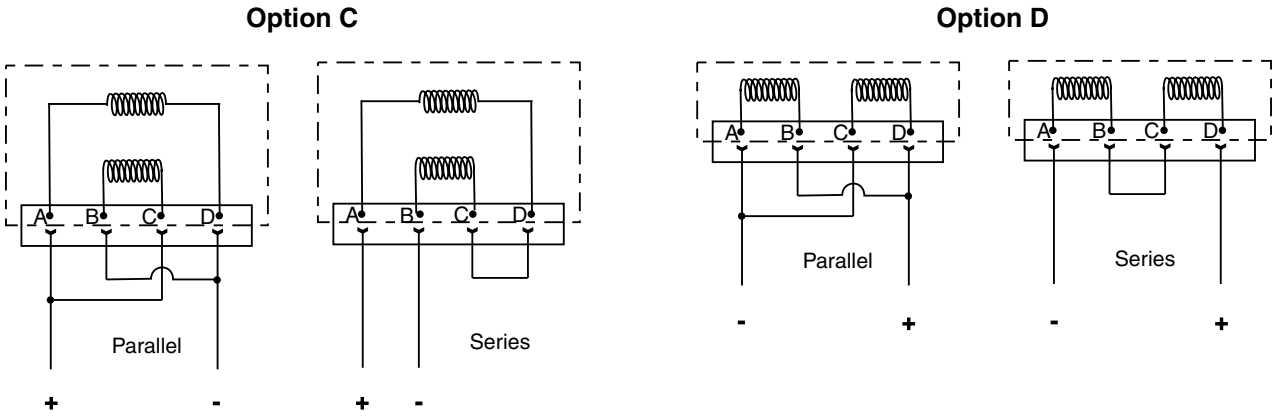
Frequency Response



C

Installation Wiring Options

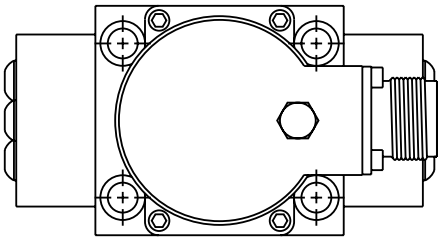
This servovalve has two coils. This illustration shows the internal wiring configurations for these valves. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustration below and to the mounting pattern for this valve to insure proper control phasing.

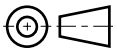


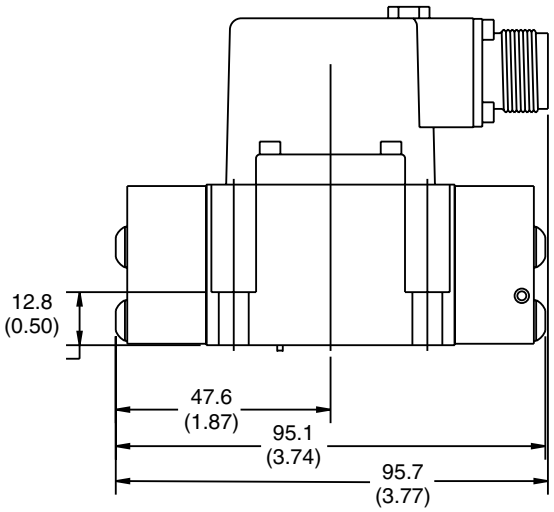
Polarity shown connects flow from P to C2 port.

C

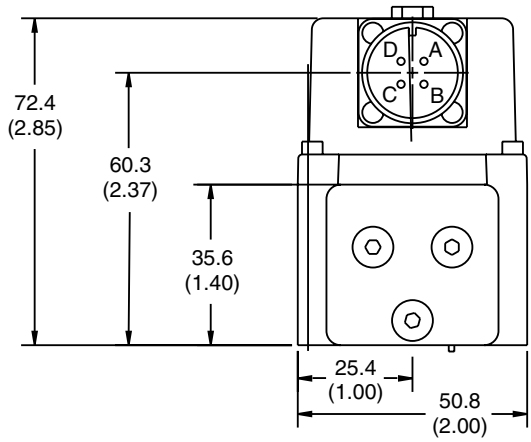
Inch equivalents for millimeter dimensions are shown in (**)





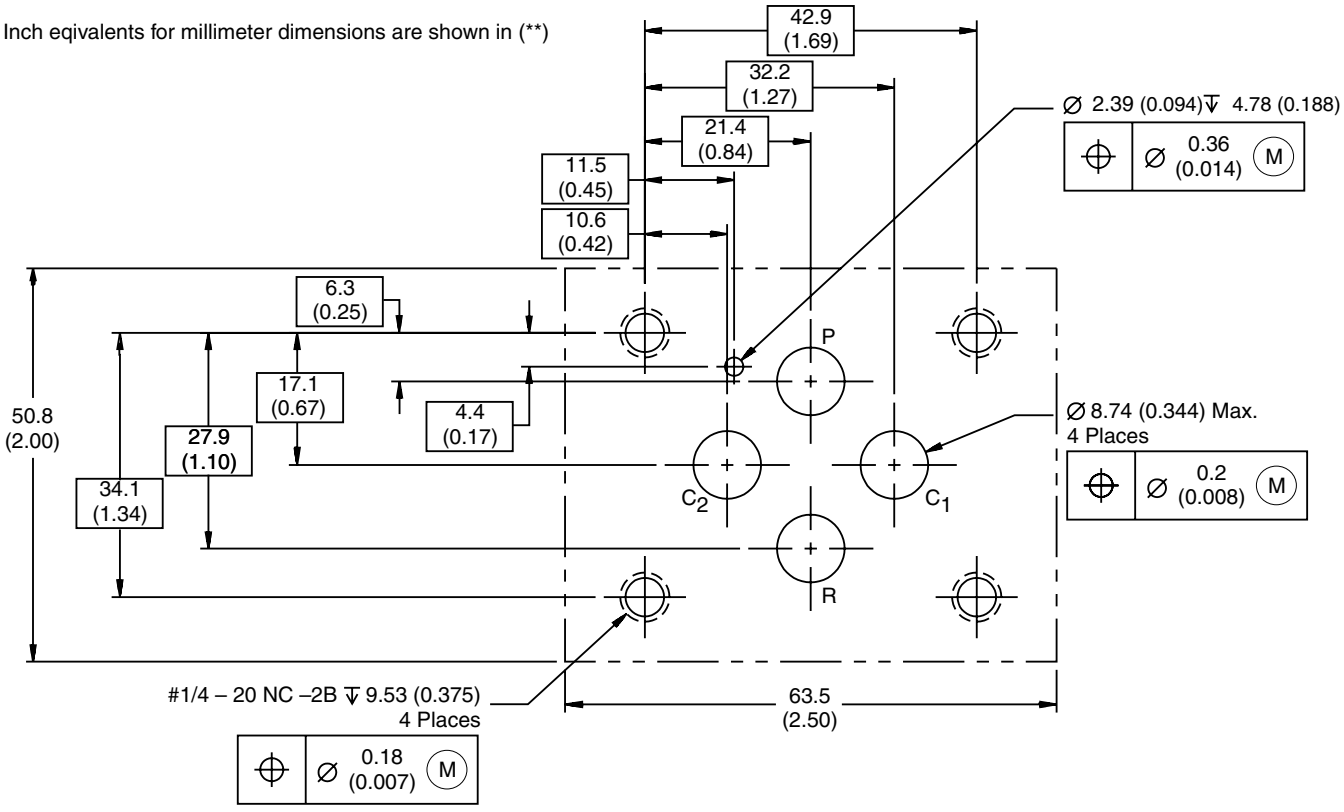


Connector over C1 port



Mounting Interface

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

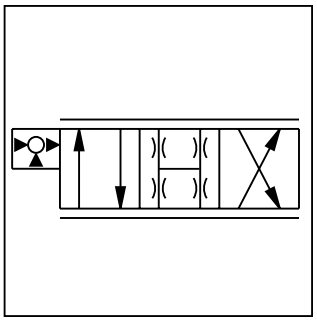


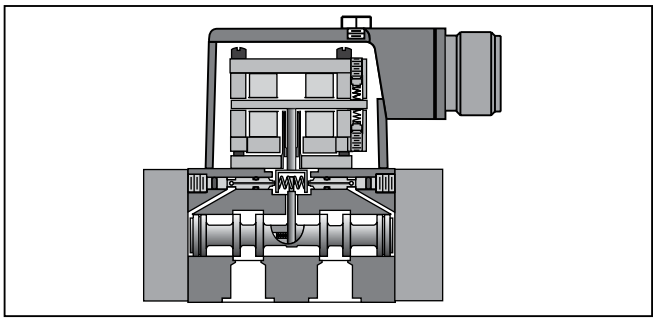
DY12.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series DY15 are two stage, 4-way, flapper and nozzle style servovalves. This valve is rated for 210 Bar (3000 PSI) standard, or can be built for 350 Bar (5000 PSI) service. The pressure ratings are the same for both the tool steel construction or the optional stainless steel spool and body.





Features

- Lapped spool and body.
- No ball glitch.
- Tool steel, or stainless steel, spool and body.
- Nozzle and flapper design.
- Unique port pattern (see next page). (1 in. port circle)
- Survives high tank port pressures.

C

Specifications

Flow Rating @ 70 Bar (1000 PSID)	57, 75 and 95 LPM (15, 20 and 25 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI) opt. 350 Bar (5000 PSI)
Leakage Flow @ 70 Bar (1000 PSID)	0.95 – 1.7 LPM (0.25 – 0.45 GPM)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 45 Hz (See Performance Curves)
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	30% minimum, 70% maximum
Step Response	10 – 90%, < 18 ms < 18 ms up to 75 LPM (20 GPM) < 20 ms up to 95 LPM (25 GPM)
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

C

DY15 □ □ □ □ □ □ □ □ □ □

DY15 Series | Material Options | Coils | Wiring | Seal | Operating Pressure | Flows | Special Options | Factory Code for Special Options

Code	Description
A	Steel (standard)
B	Stainless Steel
Z*	Special (specify)

* Material selection does not affect operating pressure

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	80 mA	40 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
L	360 ohm	30 mA	15 mA
M	475 ohm	40 mA	20 mA
R	750 ohm	30 mA	15 mA
T	1000 ohm	10 mA	5 mA
V	1200 ohm	40 mA	20 mA
Z	Special (specify)		

Code	Connector over:	Flow P to C2 with:
C	Port C1	(+) Signal to A, C
D	Port C1	(+) Signal to B, D
Z	Special (specify)	

Code	Description
N	Nitrile (standard)
V	Fluorocarbon
E *	EPR
Z *	Special (specify)

* Consult factory for delivery

Code	Description
A	210 Bar (3000 PSI)
B	350 Bar (5000 PSI)
Z	Special (specify)

Operating pressure is independent of material selection.

Code	Description
15	57 LPM (15 GPM)
20	76 LPM (20 GPM)
25	95 LPM (25 GPM)

Code	Description
Omit	Standard
D	(Specify) See list below

Weight: 1.8 kg (3.9 lbs.)

Special Options:

Consult factory for price, delivery and availability of special options.

Special coil
Special wiring
Special seals
Special flow rate
Dual flow rate
Dual gain
Zener barriers
High frequency torque motor (Models 5, 10, 12 & 15 only)

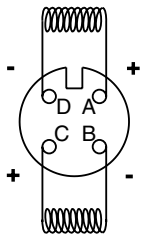
Accessories

Cable with Mating Connector: EHC154S
Mating Connector: MS3106E-14S-2S
Bolt Kit: Included with valve
Flushing Valve: 11-0600
Subplate: 55-0300-2 SAE-16 Side ports
Null Adjust Tool: 6522A13
Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.
* For output currents >15 mA

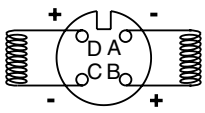
Flushing valve is rated for 3000 psi operation.

Wiring Option C
(Standard)



Dyval and Pegasus standard.

Wiring Option D

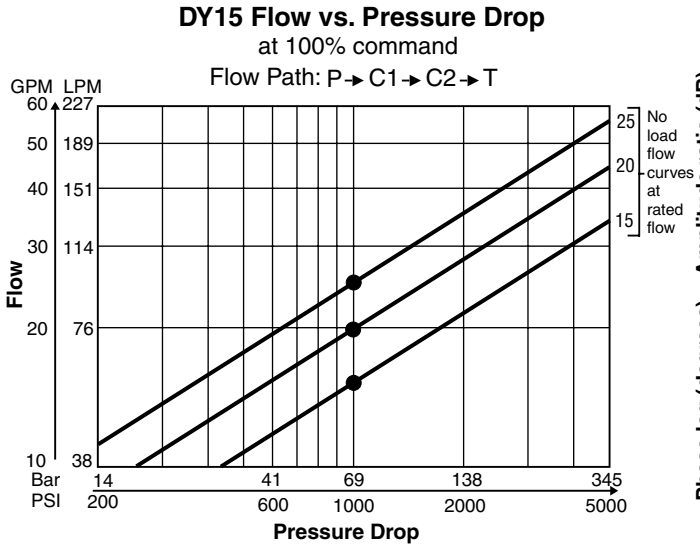


Moog, Atchley and Vickers standard.

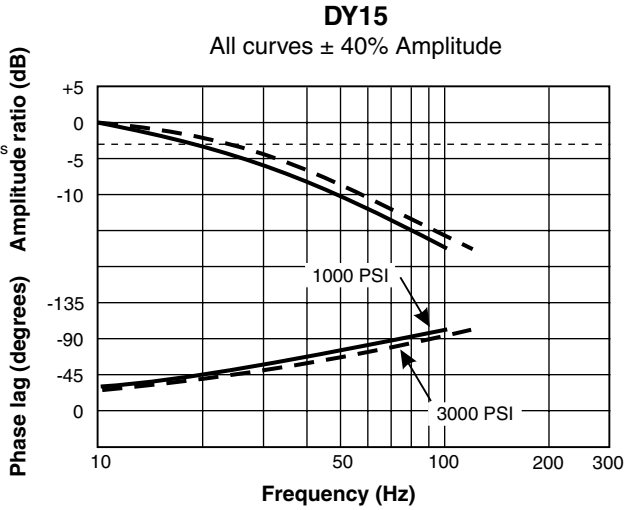
In both cases, polarity shown connects P to C2 port.

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Performance Curves



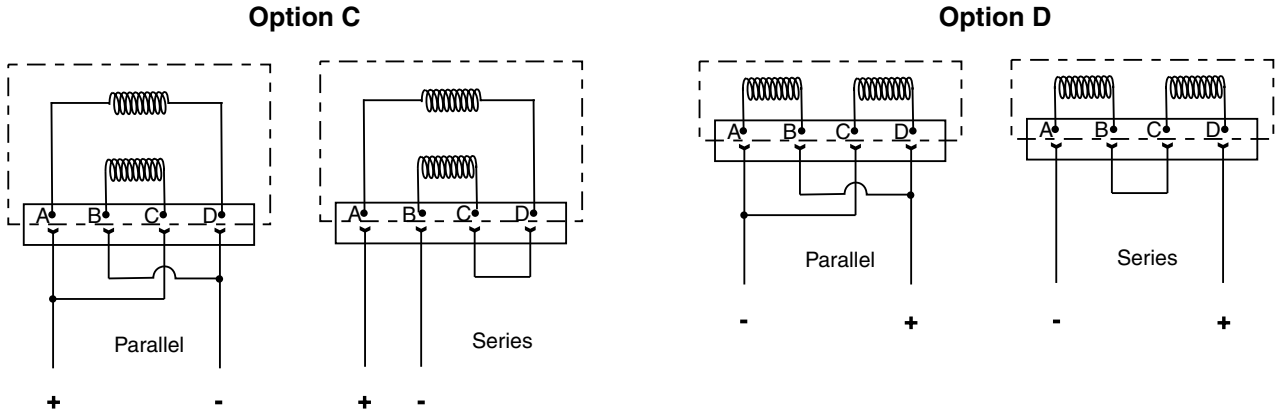
Frequency Response



C

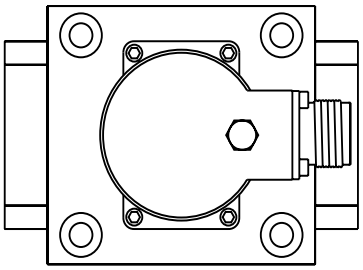
Installation Wiring Options

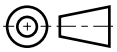
This servovalve has two coils. This illustration shows the internal wiring configurations for options C and D. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.

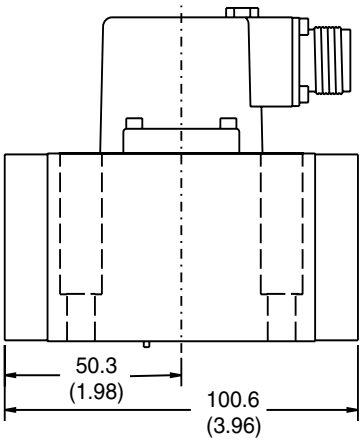
Inch equivalents for millimeter dimensions are shown in (**)

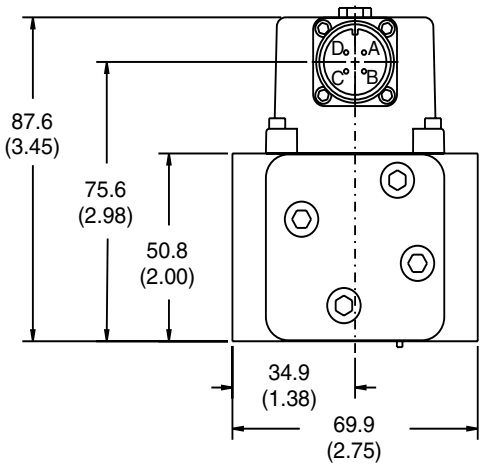




C

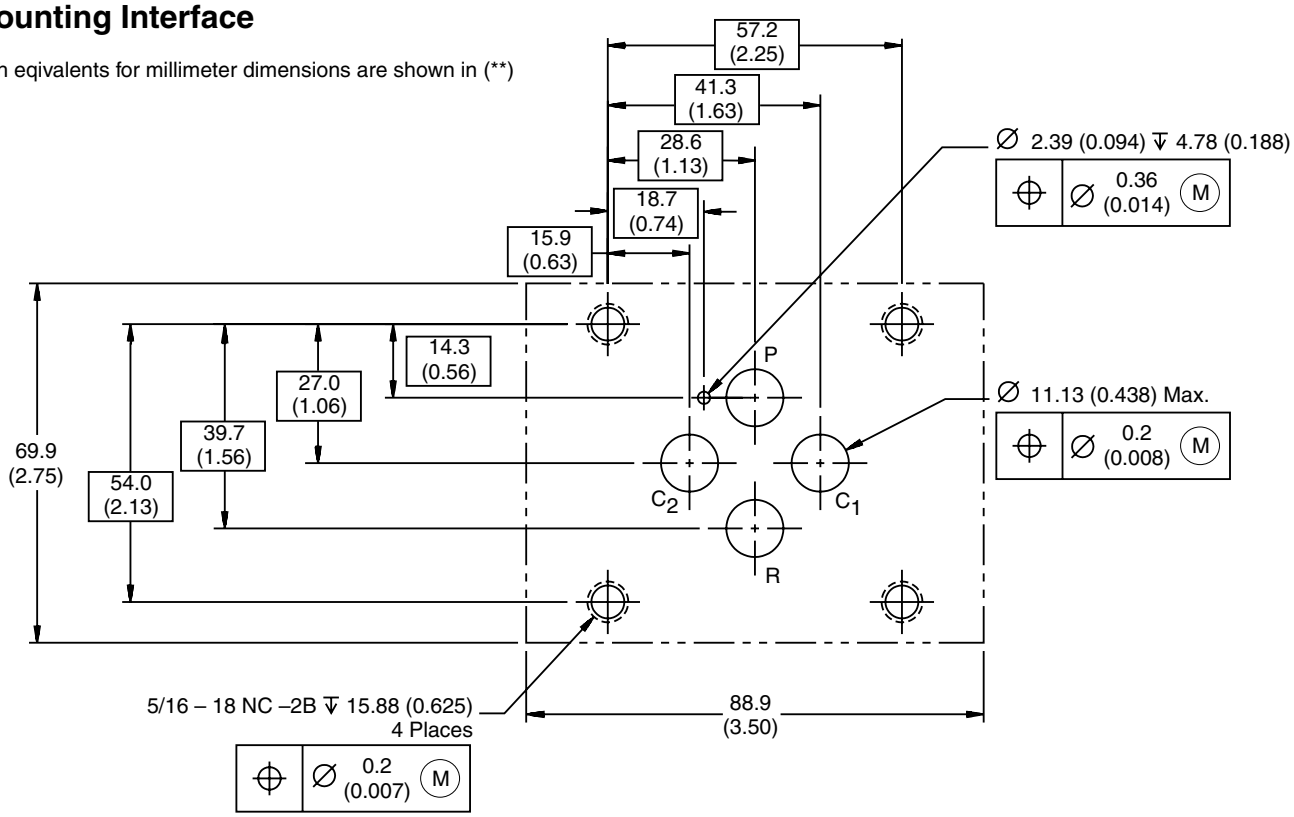
Connector over port C1





Mounting Interface

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

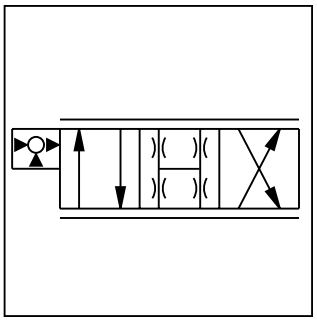


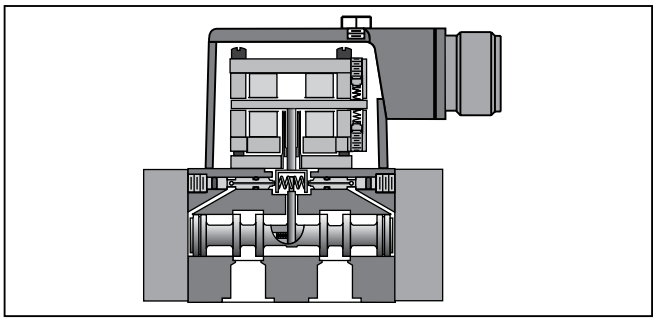
DY15.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series DY25 are two stage, 4-way, flapper and nozzle style servovalves. They have the same port pattern and body dimensions as the DY15, but use a higher force torque motor pilot. These valves are rated for 210 Bar (3000 PSI) standard, or can be built for 350 Bar (5000 PSI) service. The pressure ratings are the same for both the tool steel construction, and the optional stainless steel spool and body.





C

Features

- Lapped spool and body.
- No ball glitch.
- Tool steel, or stainless steel, spool and body.
- Nozzle and flapper design.
- Unique port pattern (see next page). (1 in. port circle)
- Survives high tank port pressures.

Specifications

Flow Rating @ 70 Bar (1000 PSID)	57 and 75 LPM (25 and 30 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI) opt. 350 Bar (5000 PSI)
Leakage Flow @ 70 Bar (1000 PSID)	0.95 – 1.7 LPM (0.25 – 0.45 GPM)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 35 Hz (See Performance Curves)
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	30% minimum, 70% maximum
Step Response	10 – 90%, < 18 ms @ 95 LPM (25 GPM) < 20 ms @ 114 LPM (30 GPM)
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

C

DY25 — Series | Material Options | Coils | Wiring | Seal | Operating Pressure | Flows | Special Options | Factory Code for Special Options

Code	Description
A	Steel (standard)
B	Stainless Steel
Z*	Special (specify)

* Material selection does not affect operating pressure

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	80 mA	40 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
R	750 ohm	30 mA	15 mA
Z	Special (specify)		

Code	Connector over:	Flow P to C2 with:
C	Port C1	(+) Signal to A, C
D	Port C1	(+) Signal to B, D
Z	Special (specify)	

Code	Description
N	Nitrile (standard)
V	Fluorocarbon
E *	EPR
Z *	Special (specify)

* Consult factory for delivery

Code	Description
A	210 Bar (3000 PSI)
B	350 Bar (5000 PSI)
Z	Special (specify)

Operating pressure is independent of material selection.

Code	Description
25	95 LPM (25 GPM)
30	114 LPM (30 GPM)

Code	Description
Omit	Standard
D	(Specify) See list below

Weight: 1.9 kg (4.2 lbs.)

Special Options:

Consult factory for price, delivery and availability of special options.

Special coil
Special wiring
Special seals
Special flow rate
Dual flow rate
Dual gain
Zener barriers

Accessories

Cable with Mating Connector: EHC154S

Mating Connector: MS3106E-14S-2S

Bolt Kit: Included with valve

Flushing Valve: 11-0600

Subplate: 55-0300-2 SAE-16 Side ports

Null Adjust Tool: 6522A13

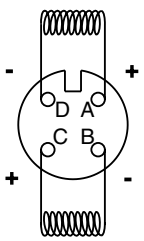
Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.

* For output currents >15 mA

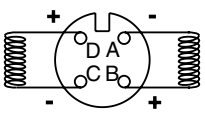
Flushing valve is rated for 3000 psi operation.

Wiring Option C
(Standard)



Dyval and Pegasus standard.

Wiring Option D

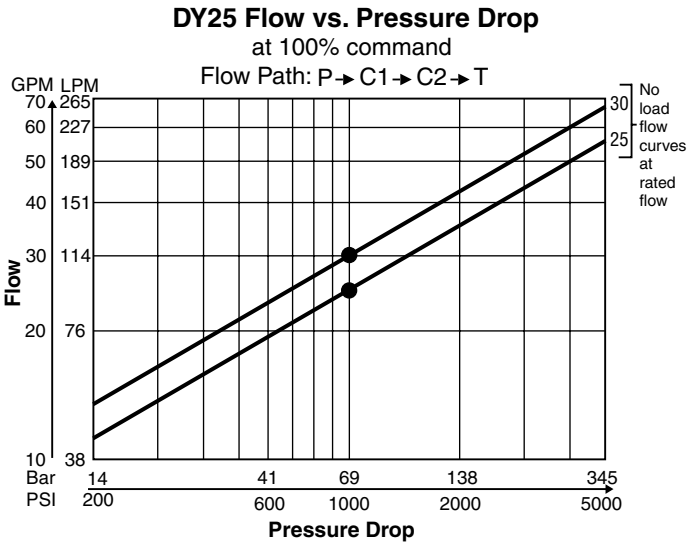


Moog, Atchley and Vickers standard.

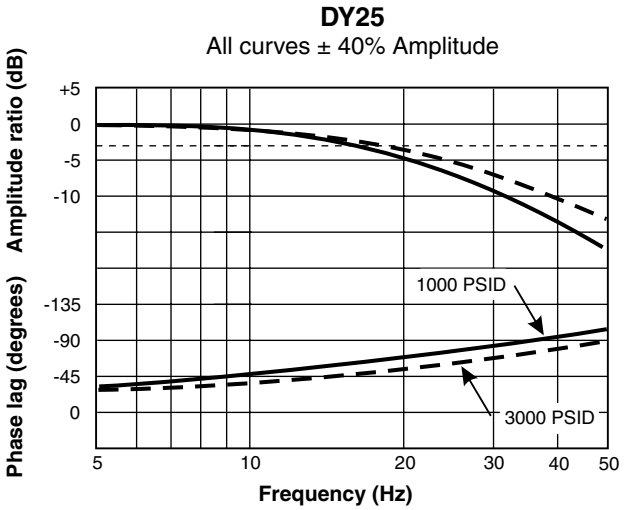
In both cases, polarity shown connects P to C2 port.

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Performance Curves



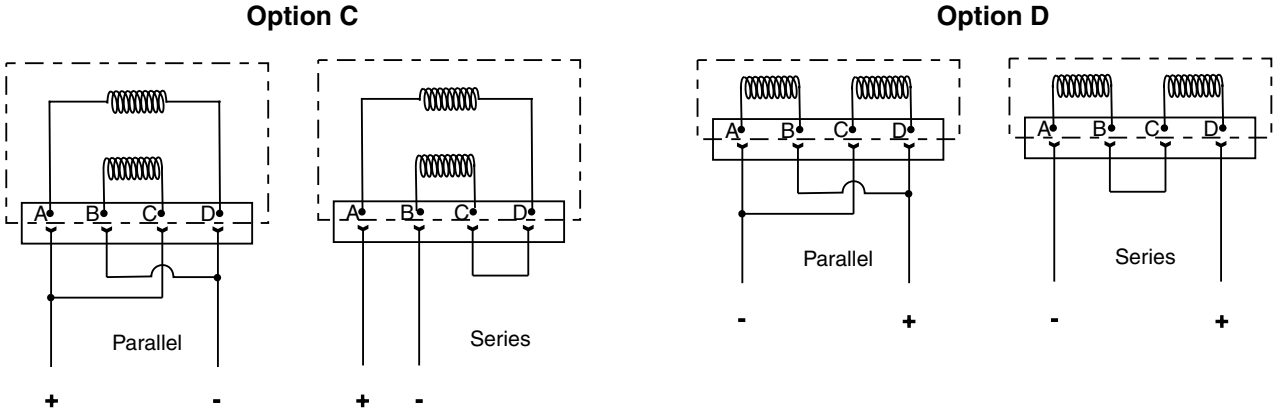
Frequency Response



C

Installation Wiring Options

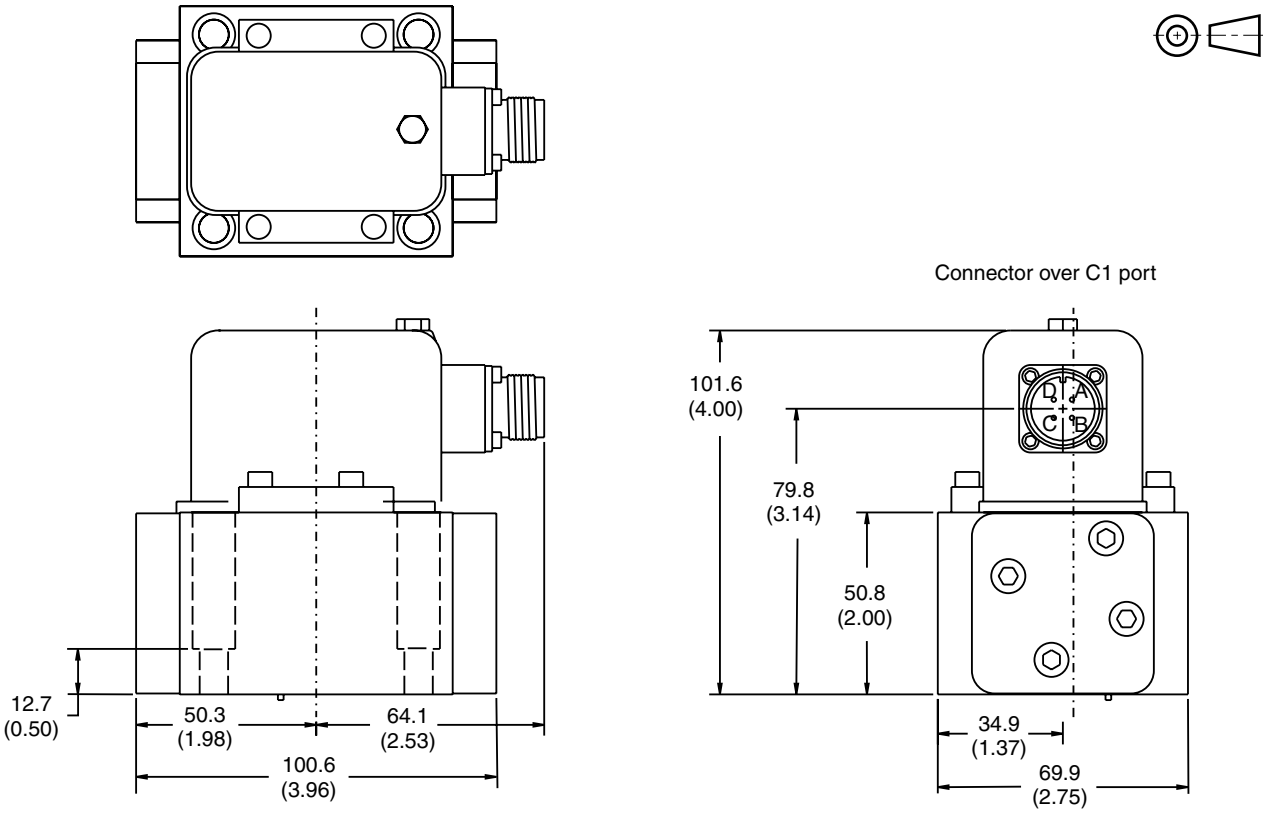
This servovalve has two coils. This illustration shows the internal wiring configurations for options C and D. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.

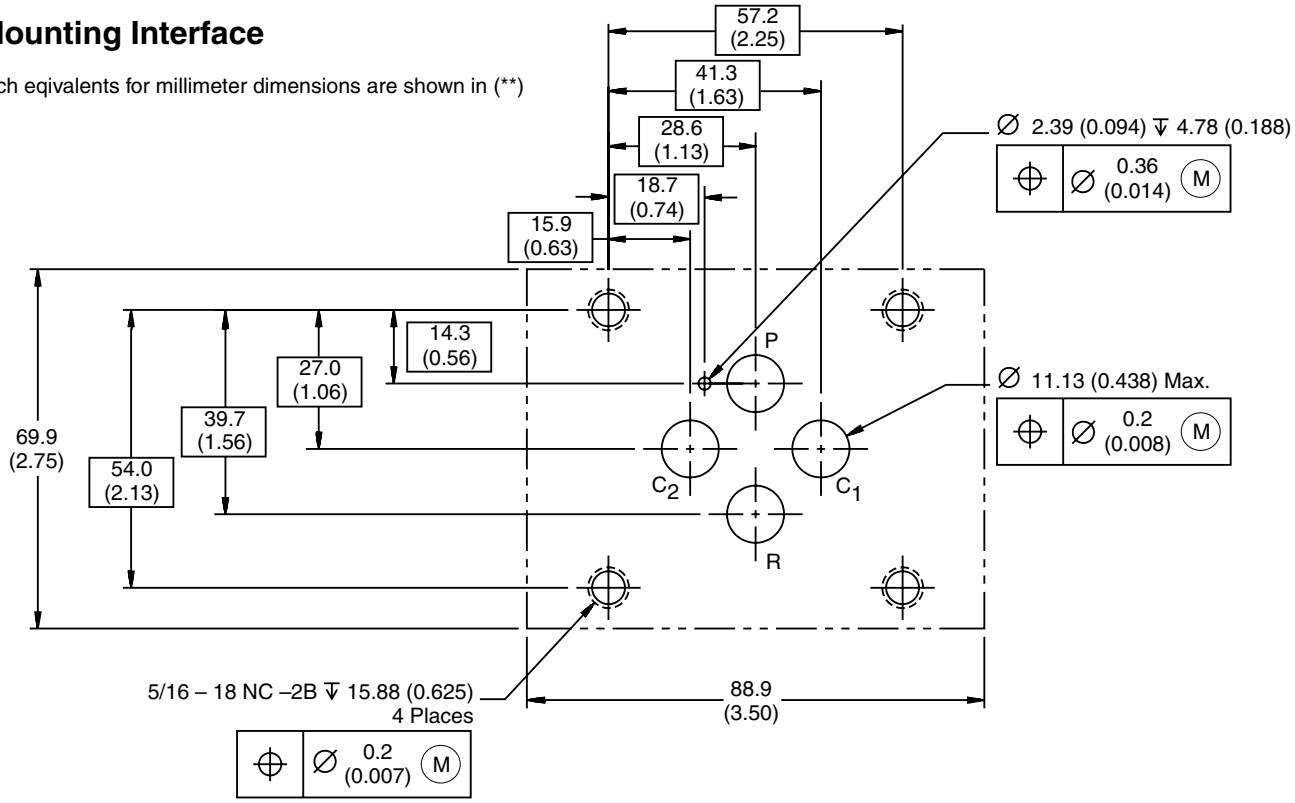
C

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



Mounting Interface

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

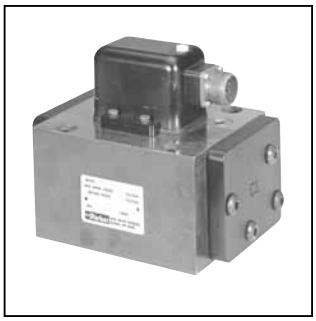


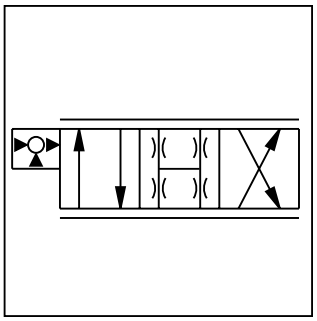
DY25.indd, dd

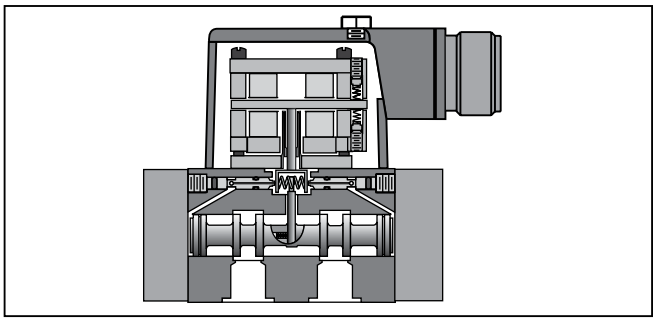
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series DY45 are two stage, 4-way, flapper and nozzle style servovalves. These valves are rated for 210 Bar (3000 PSI) standard, or can be built for 350 Bar (5000 PSI) service. The pressure ratings are the same for both the tool steel construction, and the optional stainless steel spool and body.







Features

- Lapped spool and body.
- No ball glitch.
- Tool steel, or stainless steel, spool and body.
- Nozzle and flapper design.
- Unique port pattern (see mounting pattern). (1 in. port circle)
- Survives high tank port pressures.

Specifications

Flow Rating @ 70 Bar (1000 PSID)	150, 190 and 225 LPM (40, 50 and 60 GPM)
Supply Pressure	10 – 210 Bar (145 – 3000 PSI) opt. 350 Bar (5000 PSI)
Leakage Flow @ 70 Bar (1000 PSID)	1.3 – 2.7 LPM (0.35 – 0.70 GPM)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Input Command	±50 mA std.
Frequency Response @ 90° phase shift	> 30 Hz at ±10% amplitude
Non-Linearity	≤ 10%
Threshold	≤ 0.5%

Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Presssure Gain % change in pressure per 1% change in input command	30% minimum, 70% maximum
Step Response	10 – 90%, < 25 ms
Fluid	Mineral Oil, 60 – 225 SSU 1000 SSU maximum
Operating Temperature	-1°C to + 106°C (+30°F to +225°F)
Protection Class	NEMA 4, IP65
Filtration	ISO 4406 15/12 or better

C

DY45 — Series

□ Material Options

Code	Description
A	Steel (standard)
B	Stainless Steel
Z*	Special (specify)

* Material selection does not affect operating pressure

□ Coils

Code	Description	Parallel	Series
D	200 ohm (Std.)	50 mA	25 mA
F	80 ohm	80 mA	40 mA
G	22 ohm	200 mA	100 mA
K	40 ohm	150 mA	75 mA
R	750 ohm	30 mA	15 mA
Z	Special (specify)		

□ Wiring

Code	Connector over:	Flow P to C2 with:
C	Port C1	(+) Signal to A, C
D	Port C1	(+) Signal to B, D
Z	Special (specify)	

□ Seal

Code	Description
N	Nitrile (standard)
V	Fluorocarbon
E *	EPR
Z *	Special (specify)

* Consult factory for delivery

□ Operating Pressure

Code	Description
A	210 Bar (3000 PSI)
B	350 Bar (5000 PSI)
Z	Special (specify)

Operating pressure is independent of material selection.

□ Flows

Code	Description
40	150 LPM (40 GPM)
50	190 LPM (50 GPM)
60	225 LPM (60 GPM)

□ Special Options

Code	Description
Omit	Standard
D	(Specify) See list below

□□□□□ Factory Code for Special Options

Weight: .3 kg (16.0 lbs.)

Special Options:

Consult factory for price, delivery and availability of special options.

Special coil
Special wiring
Special seals
Special flow rate
Dual flow rate
Dual gain
Zener barriers

Accessories

Cable with Mating Connector: EHC154S

Mating Connector: MS3106E-14S-2S

Bolt Kit: Included with valve

Flushing Valve: 11-0700

Subplate: 55-0200-2 SAE-24 Side ports

Null Adjust Tool: 6522A13

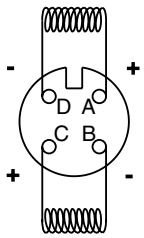
Electronic Drivers: 23-7030, BD90*, BD101*

When used in conjunction with Series BD90 and BD101 servo amplifiers or a motion controller, Series BD valves will provide accurate control of rotary and linear actuators.

* For output currents >15 mA

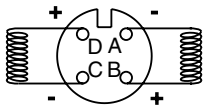
Flushing valve is rated for 3000 psi operation.

Wiring Option C
(Standard)



Dyval and Pegasus standard.

Wiring Option D

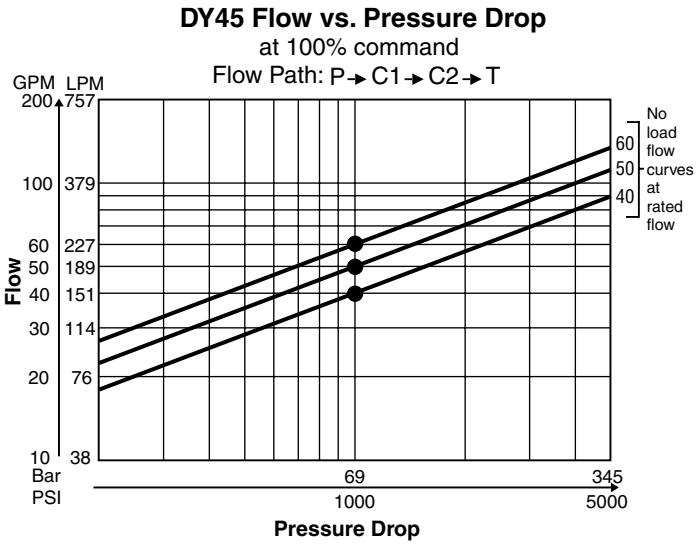


Moog, Atchley and Vickers standard.

In both cases, polarity shown connects P to C2 port.

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

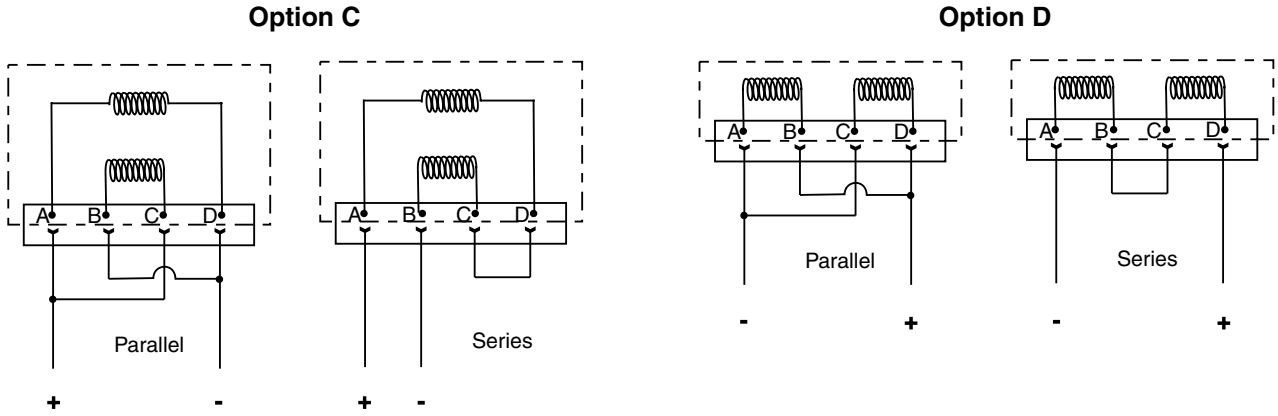
Performance Curves



C

Installation Wiring Options

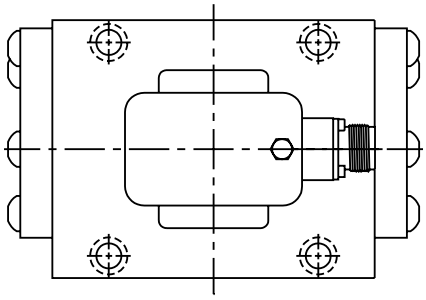
This servovalve has two coils. This illustration shows the internal wiring configurations for options C and D. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.

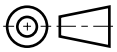


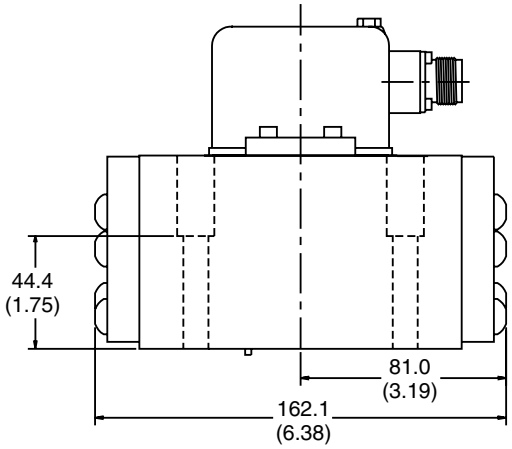
Polarity shown connects flow from P to C2 port.

C

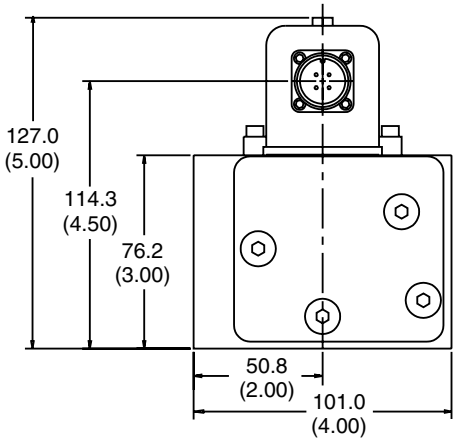
Inch equivalents for millimeter dimensions are shown in (**)





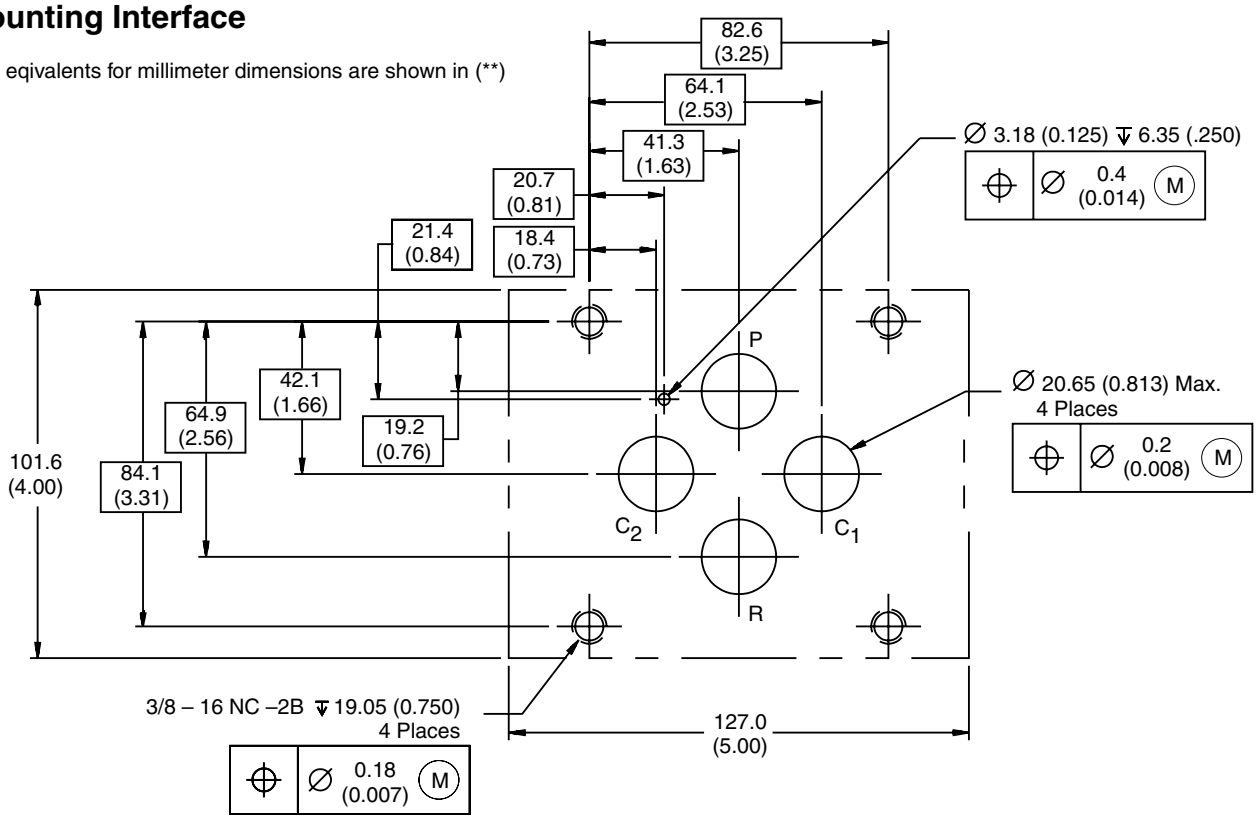


Connector over C1 port



Mounting Interface

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



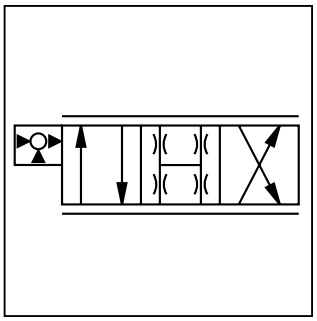
DY45.indd, dd

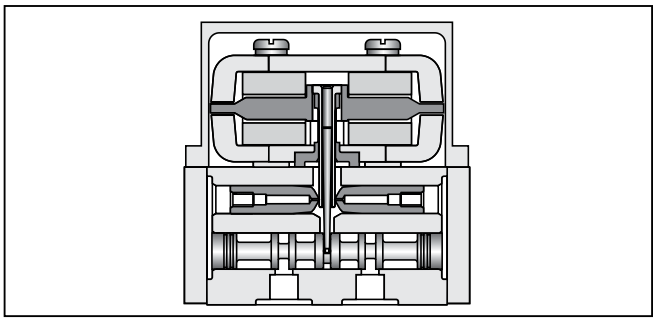
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series SEMT mini-valve is a two stage, 4-way, flapper and nozzle style servovalve. Its remarkably small size makes it optimal for Remotely Operated Vehicles (ROV), motorsport suspension control, or any application requiring a compact, and light-weight, high performance servovalve.

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. Higher pressure capability is available upon request.





C

Features

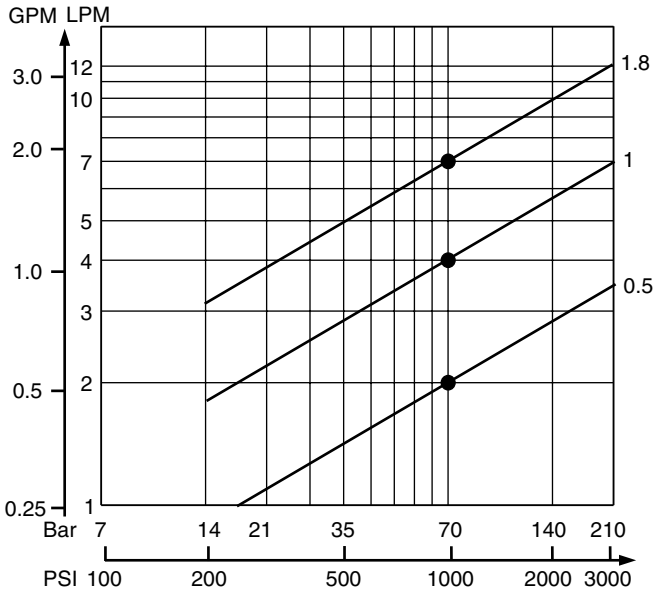
- Jewel feedback ball for durability
- Compact steel body
- High performance
- ISO 10372 standard 12.2 mm (0.480 in.) port circle

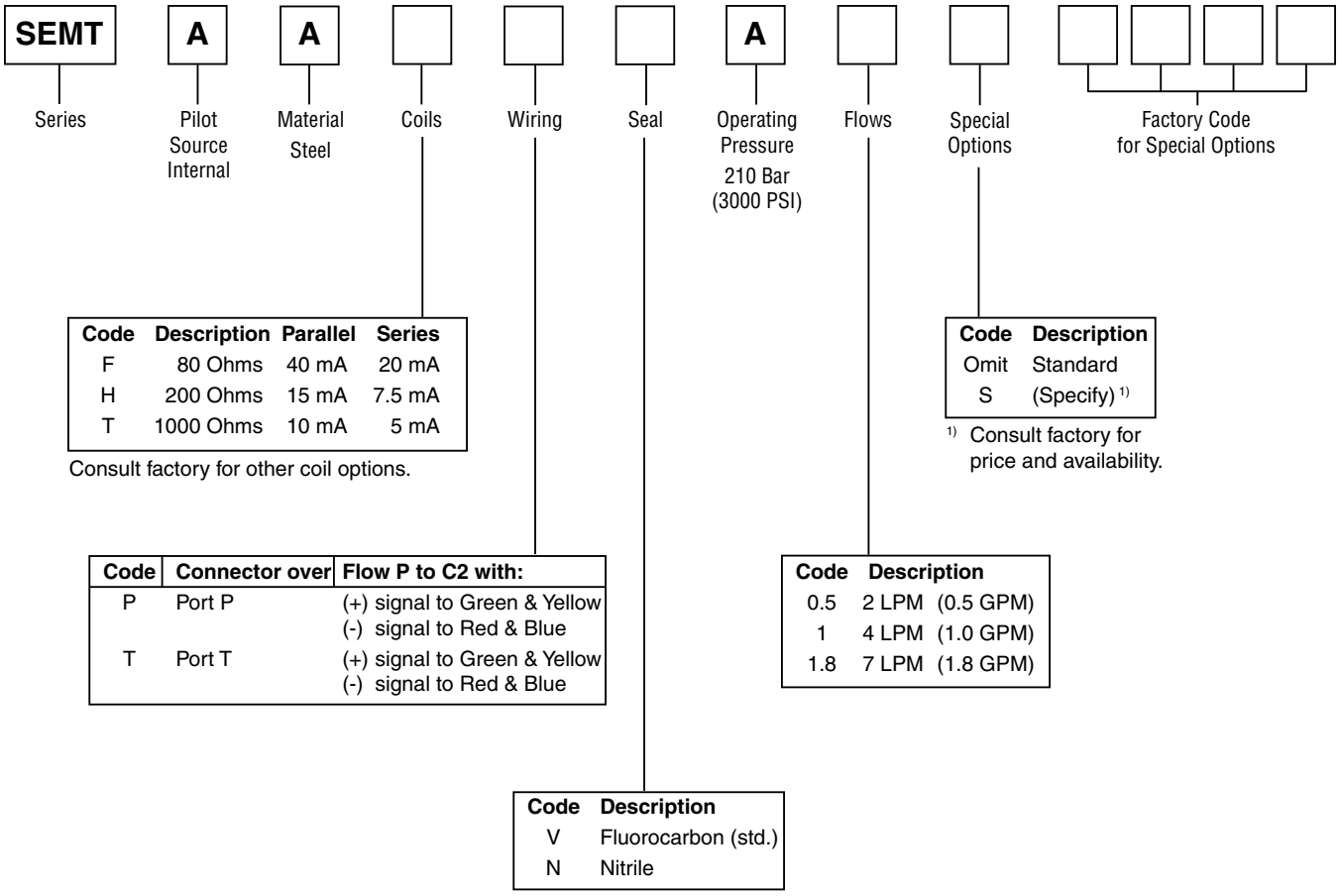
Specifications

Flow Rating ±10% @ 70 Bar (1000 PSI)	2, 4, 7 LPM (0.5, 1.0, 1.8 GPM)
Supply Pressure	15 – 210 Bar (220 – 3000 PSI)
Tank Port Pressure	210 Bar (3000 PSI) Max. < 10 Bar (145 PSI) for best performance
Pilot & Null Leakage Flow per 140 Bar (2000 PSI)	0.4 – 0.7 LPM (0.1 – 0.2 GPM)
Input Command	±10 mA std.
Frequency Response @ 90° phase shift	> 170 Hz (See Performance Curves)
Non-Linearity	≤ 10%
Hysteresis	≤ 3%
Threshold	≤ 0.5%
Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 2% per 70 Bar (1000 PSI)
Pressure Gain change in pressure per 1% change in input command	60% typical
Step Response	10 – 100%, < 4 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





Code	Description	Parallel	Series
F	80 Ohms	40 mA	20 mA
H	200 Ohms	15 mA	7.5 mA
T	1000 Ohms	10 mA	5 mA

Consult factory for other coil options.

Code	Description
Omit	Standard
S	(Specify) [1]

[1] Consult factory for price and availability.

Code	Connector over	Flow P to C2 with:
P	Port P	(+) signal to Green & Yellow (-) signal to Red & Blue
T	Port T	(+) signal to Green & Yellow (-) signal to Red & Blue

Code	Description
0.5	2 LPM (0.5 GPM)
1	4 LPM (1.0 GPM)
1.8	7 LPM (1.8 GPM)

Code	Description
V	Fluorocarbon (std.)
N	Nitrile

Weight: 0.23 kg (0.5 lbs.)
Bolt kit: Qty 4 of M4 x 10 mm, or Qty 4 of # 6-32 x 7/16"
Subplate: Consult factory.
Electronics: BD101, 23-7030, BD90, or BD95

Performance Curves

Frequency Response at 210 Bar (3000 PSI)

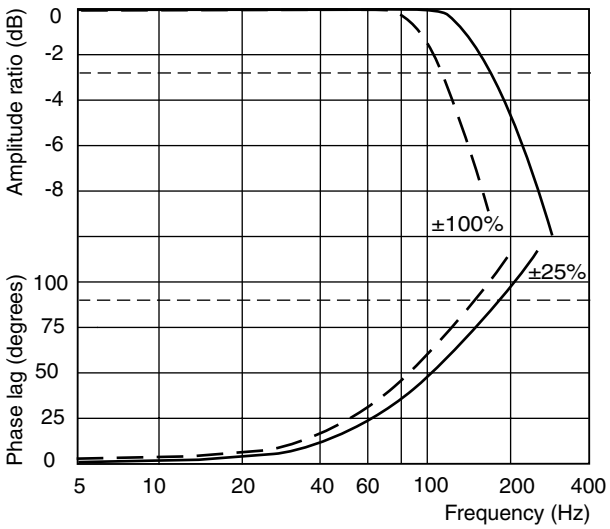
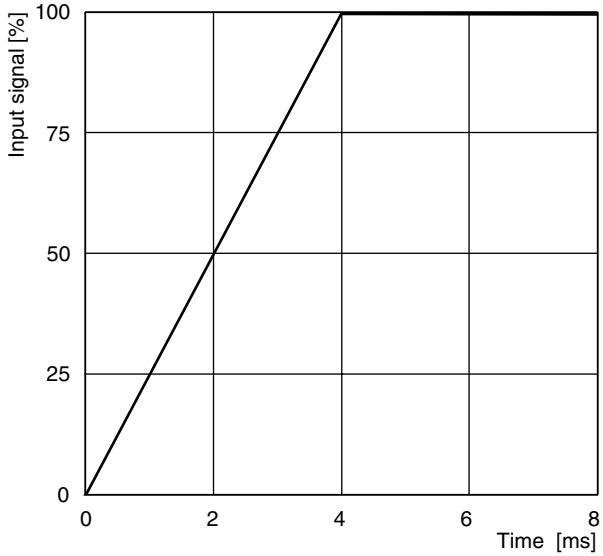


Figure for 7 LPM (1.8 GPM).

Step Response

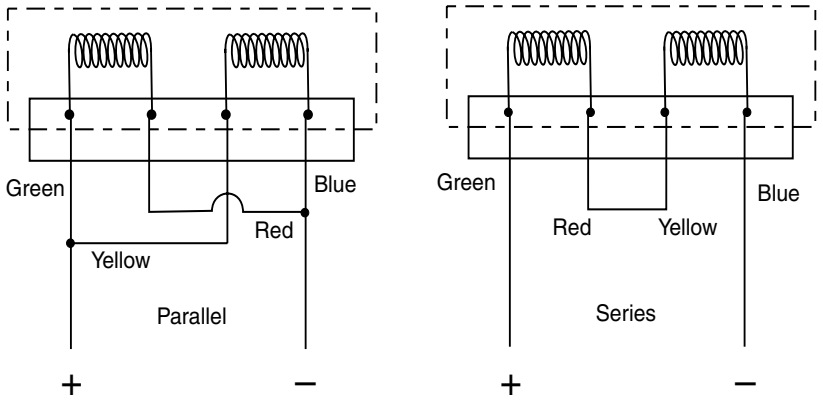
at 100% commmand



C

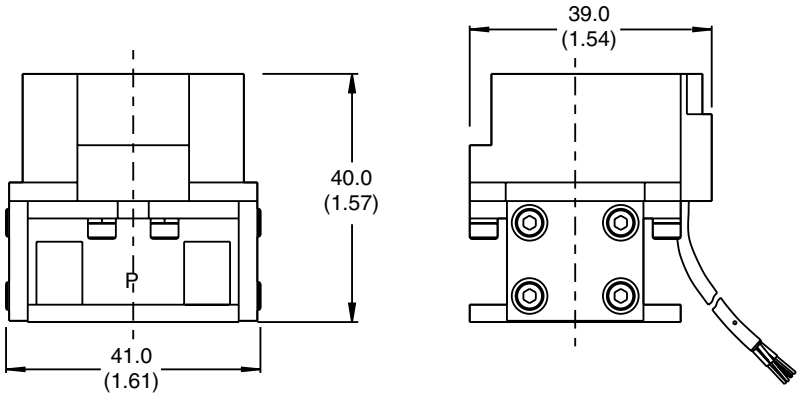
Installation Wiring Options

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.

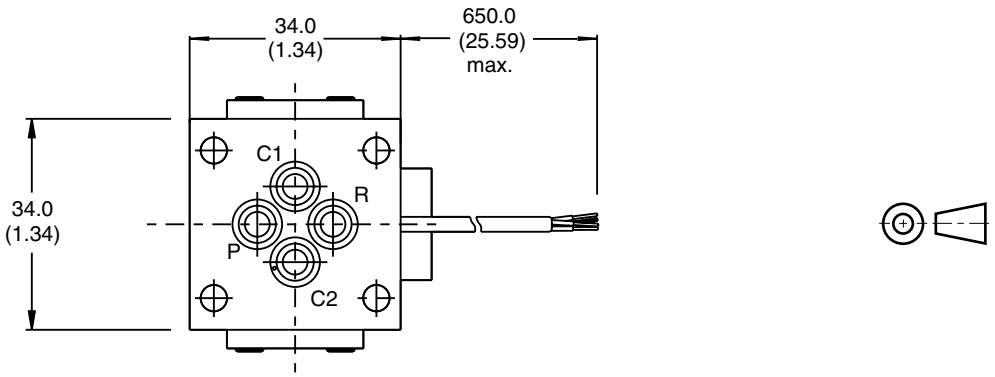


Polarity shown connects flow from P to C2 port.

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

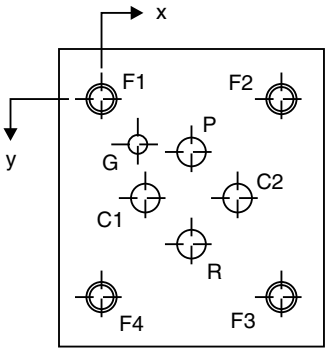


1. Recommended mounting bolts M4 x 10 mm or #6-32 x 7/16" high tensile steel socket-head cap screws.
2. Base O-Rings: 6 mm x 1 mm section, 70 durometer.



Mounting Surface

ISO 10372-01-01-0-92



1. The minimum engagement of mounting threads is 1.5D, where D is the screw diameter.

   The ISO recommended full-thread depth is 14 mm (0.551 in.).
2. The minimum depth of hole G is 2 mm (0.079 in.).
3. Surface roughness Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
4. Surface flatness: 0.025 mm (0.001) as specified in ISO 1101.

Metric Dimensions (mm)						**(± 0.1 mm)**			
	P	C1	R	C2	G	F1	F2	F3	F4
Axis	Ø 3.8 max	Ø 3.8 max	Ø 3.8 max	Ø 3.8 max	Ø 2.5	M4	M4	M4	M4
x	11.9	5.8	11.9	18.0	4.8	0	23.8	23.8	0
y	7.0	13.1	19.2	13.1	6.0	0	0	26.2	26.2

U.S. Dimensions (inches)						**(± 0.004 in.)**			
	P	C1	R	C2	G	F1	F2	F3	F4
Axis	Ø 0.15 max	Ø 0.15 max	Ø 0.15 max	Ø 0.15 max	Ø 0.10	# 6 - 32	# 6 - 32	# 6 - 32	# 6 - 32
x	0.469	0.228	0.469	0.709	0.189	0	0.937	0.937	0
y	0.276	0.516	0.756	0.516	0.238	0	0	1.031	1.031

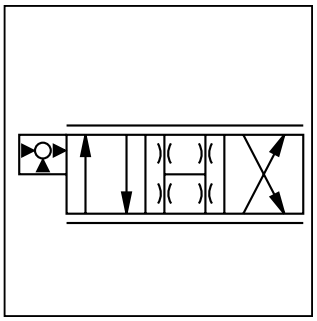
SEMT.indd, dd

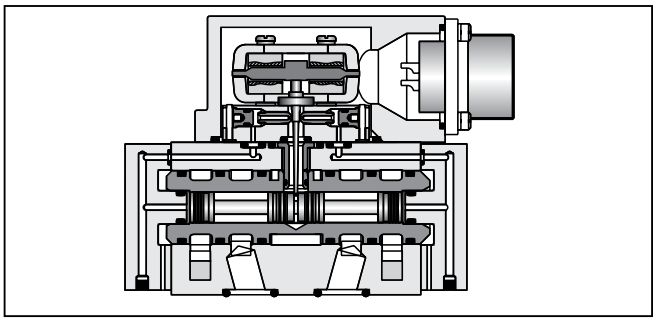
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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.





C

Features

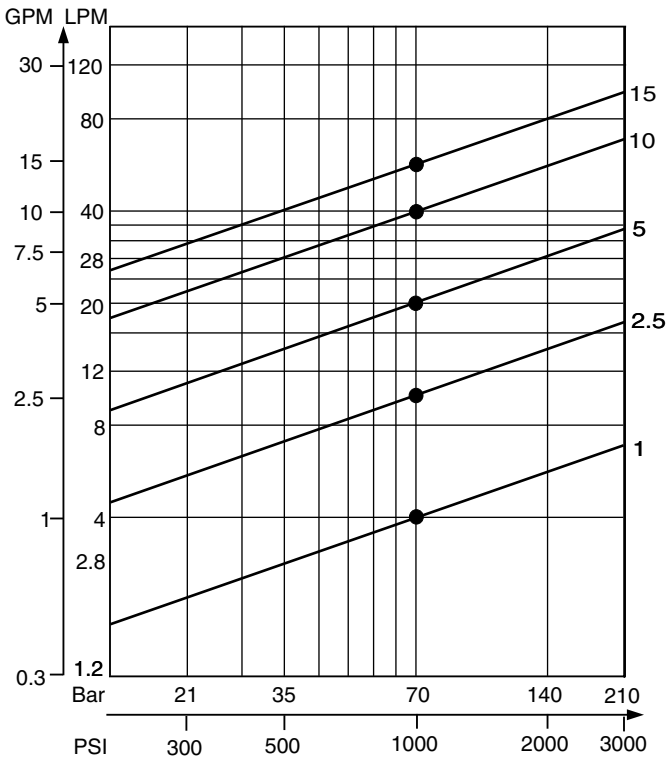
- Lapped spool and sleeve
- Jewel feedback ball for durability
- Aluminum body
- Medium and High performance
- SE05 15.88 mm (0.625 in.) port circle
- SE10 19.81 mm (0.780 in.) port circle
- SE15 23.80 mm (0.937 in.) port circle

Specifications

Flow Rating ±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	≤ 10%
Hysteresis	≤ 3%
Threshold	≤ 0.5%
Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 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

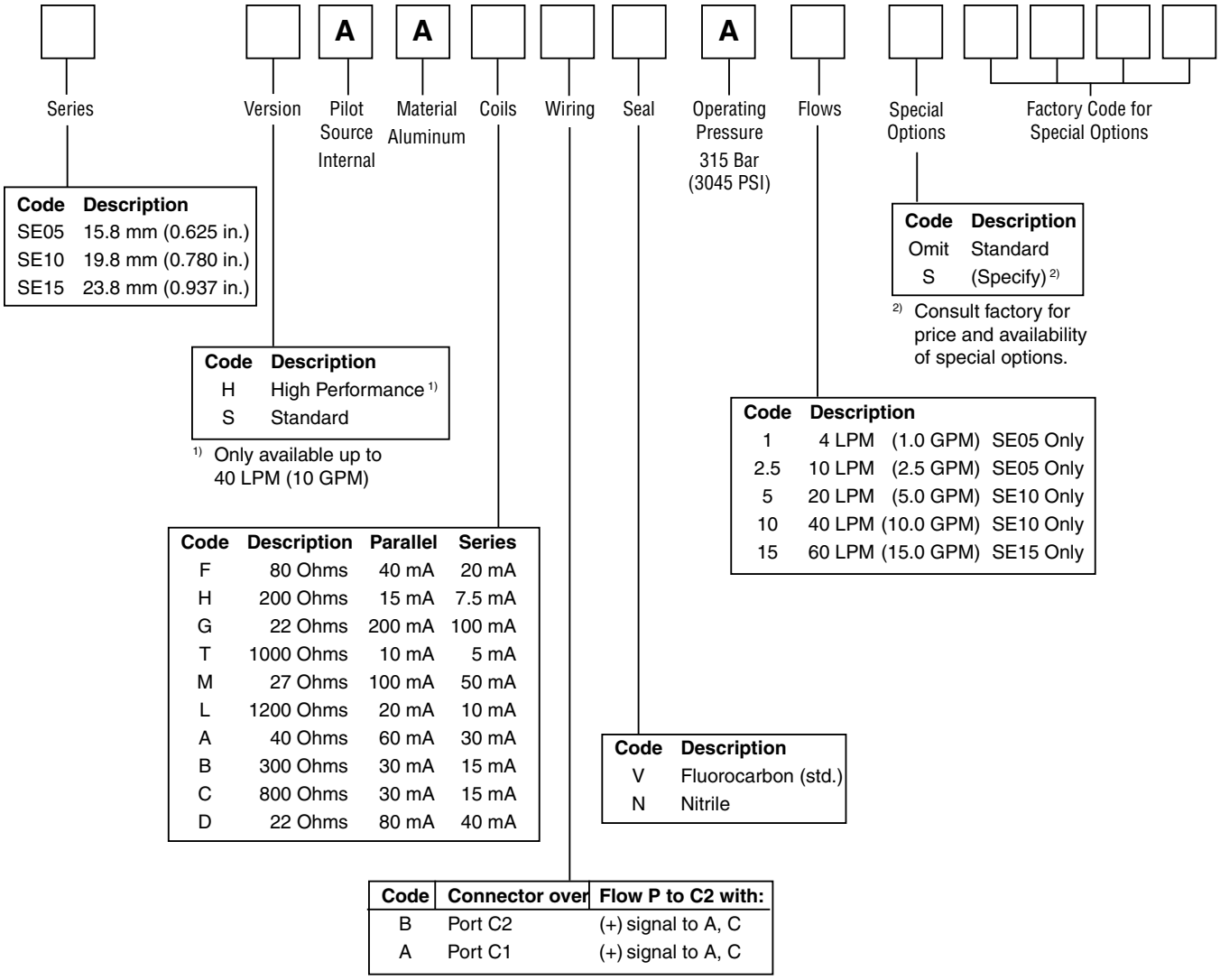
Flow vs. Pressure Drop

at 100% command
Flow Path: P→C1→C2→R



SE05_10_15.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA



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
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	10 mA
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

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.

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

Weight: 1.0 kg (2.2 lbs.)
Cable with mating connector: EHC154S
Mating connector: MS3106E-14S-2S
Electronics: BD101, 23-5030, 23-7030, PMC10, BD90, or BD95

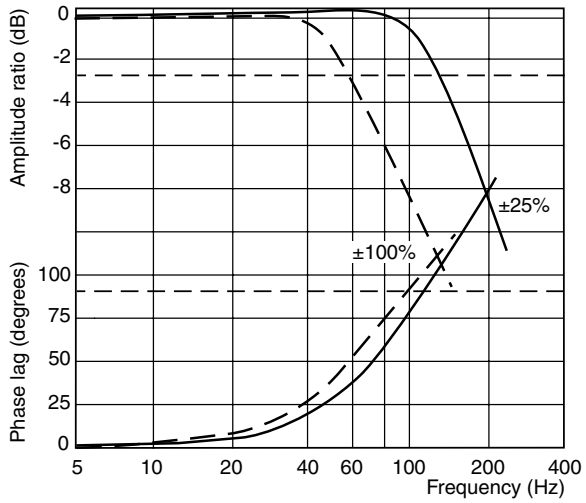
SE05
Bolt kit: 4 of M5 x 60 mm, or 4 of #10-32x2.25"
Flushing valve: 11-0500
Metric Subplate: DS02SPS8M (M18x1.5 ISO 6149 side ports)
SAE Subplate: DS02SPS8S (#8 SAE side ports)

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)

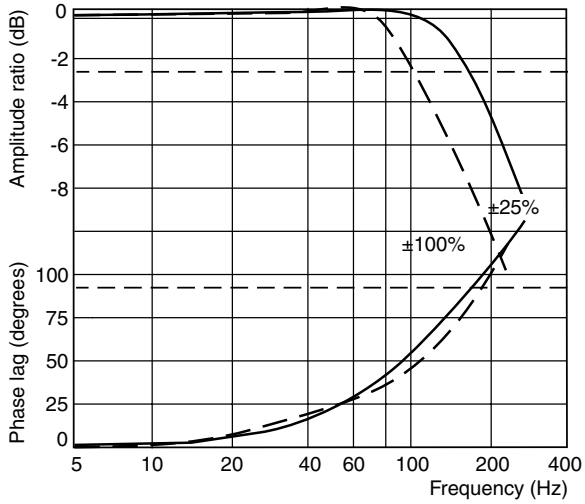
SE15
Bolt kit: 4 of M6 x 60 mm, or 4 of 1/4-20x2.25"
Flushing valve: 11-0500
Metric Subplate: DS72SPS8M (M18x1.5 ISO 6149 side ports)
SAE Subplate: DS72SPS8S (#8 SAE side ports)

Frequency Response at 210 Bar (3000 PSI)

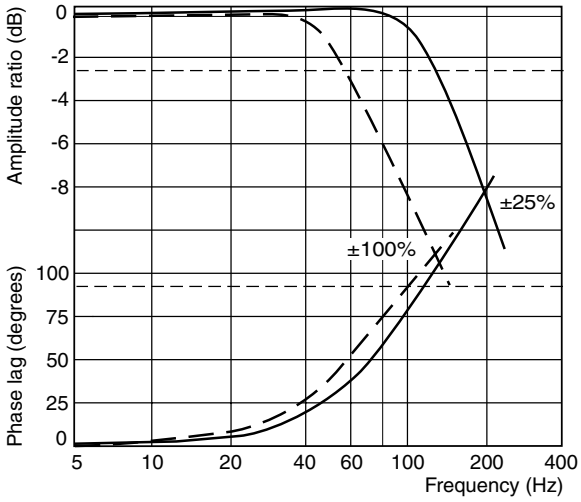
Standard Response
SE05: 4 – 20 LPM (1 – 5 GPM)



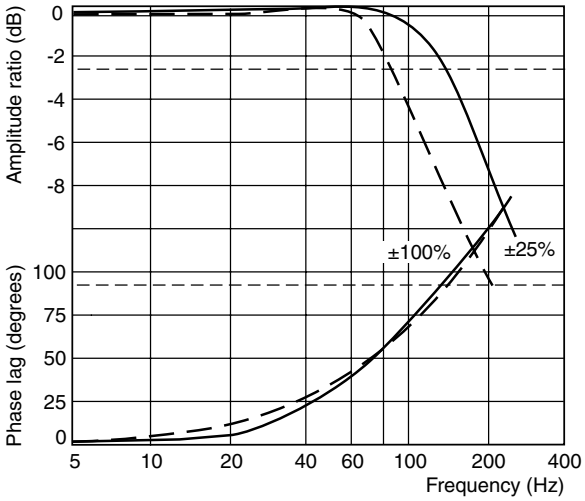
High Response
SE05: 4 – 20 LPM (1 – 5 GPM)



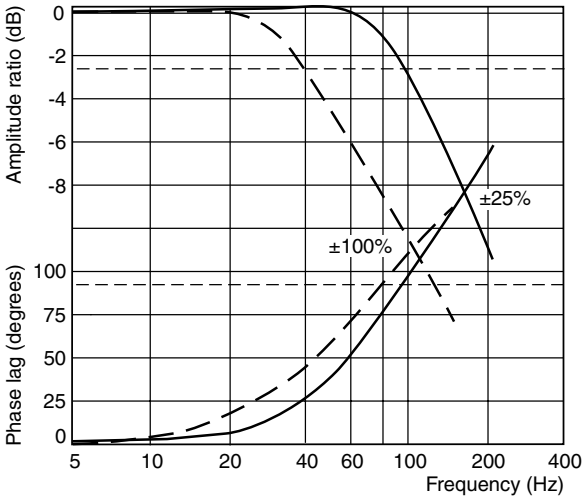
Standard Response
SE10: 40 LPM (10 GPM)



High Response
SE10: 40 LPM (10 GPM)



Standard Response
SE15: 60 LPM (15 GPM)



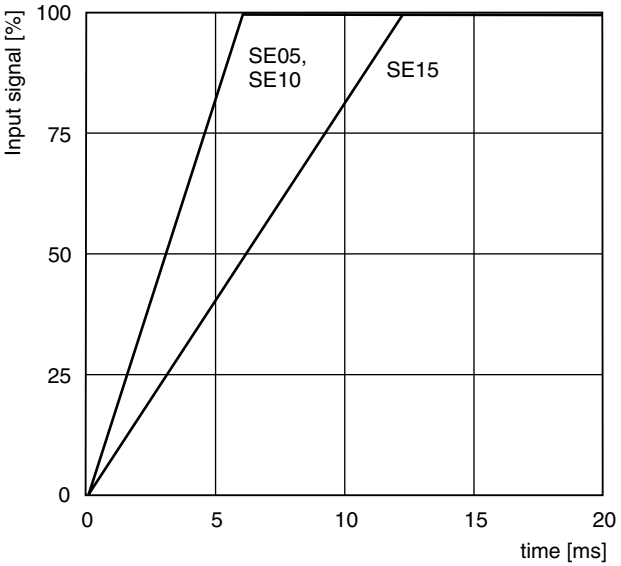
C

C

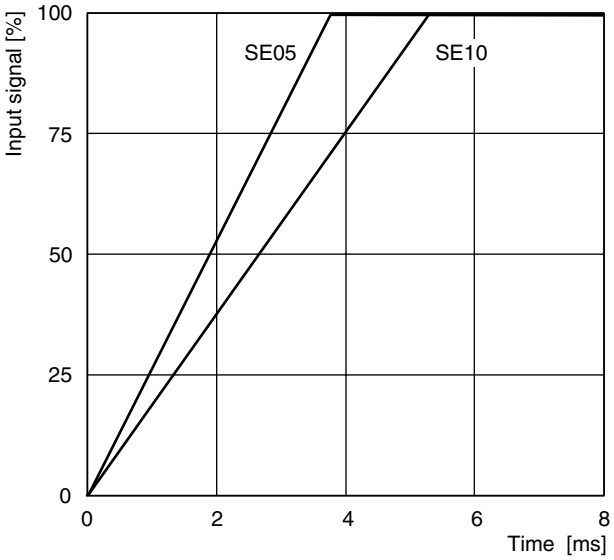
Performance Curves

Step Response at 210 Bar (3000 PSI)

Standard Response
SE05, SE10 & SE15: 4 – 40 LPM (1 – 10 GPM)

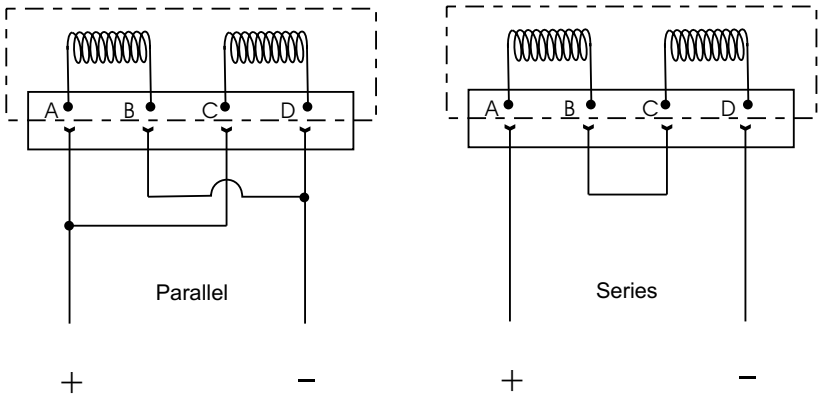


High Response
SE05, SE10 & SE15: 4 – 40 LPM (1 – 10 GPM)



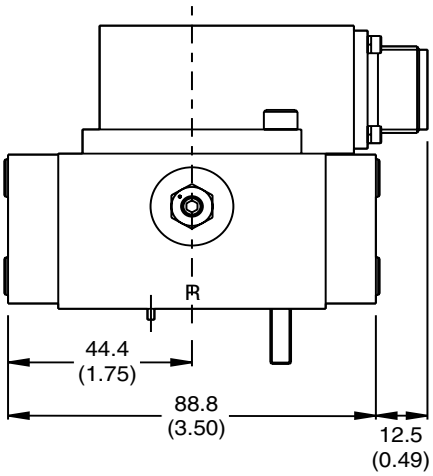
Installation Wiring Options

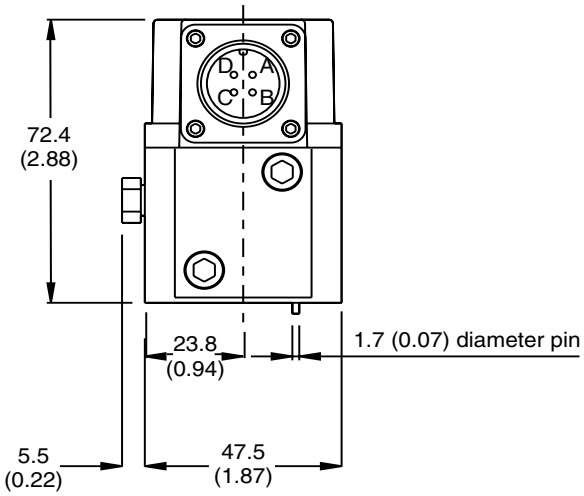
This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



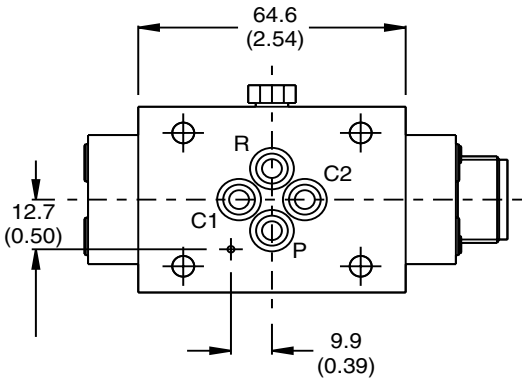
Polarity shown connects flow from P to C2 port.

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

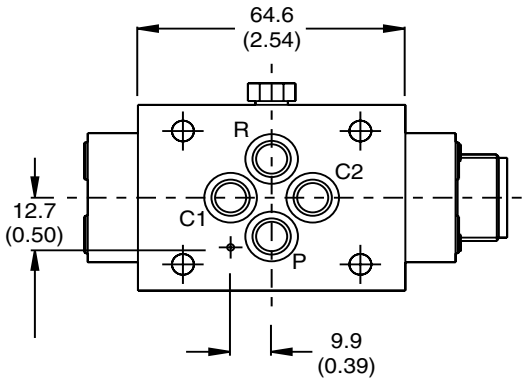




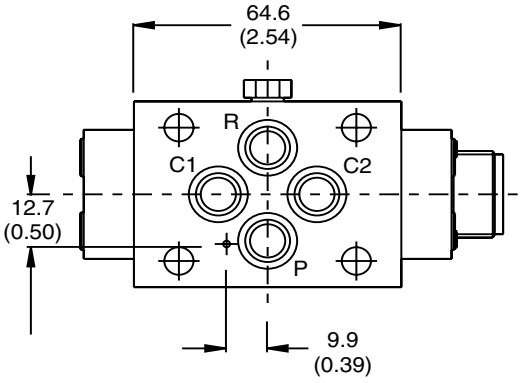
SE05



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 ¼-20 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)

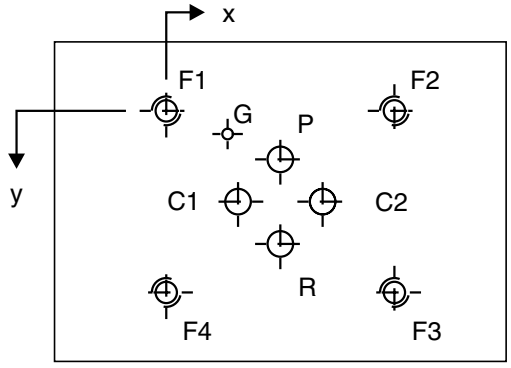
   SE15 use Parker 2013V-9 (10.82 mm I/D x 1.78 section)
4. Null adjust requires 10 A/F ring spanner (10 mm box end wrench) and 2.5 hexagon key. Flow out of C1 will increase with clockwise rotation of key.
5. See mounting dimensions for port size and locations.

C

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 Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
4. Surface flatness: 0.025 mm (0.001) as specified in ISO 1101.

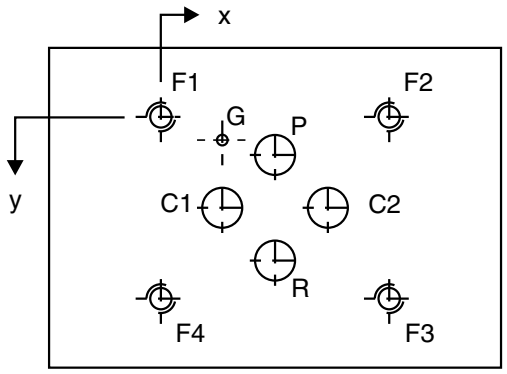
15.88 (0.625) port circle



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 Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
4. Surface flatness: 0.025 mm (0.001) as specified in ISO 1101.

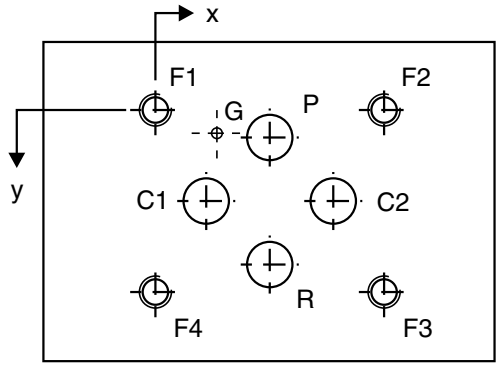
19.81 (0.780) port circle



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 Ra < 0.8 µm [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

C

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

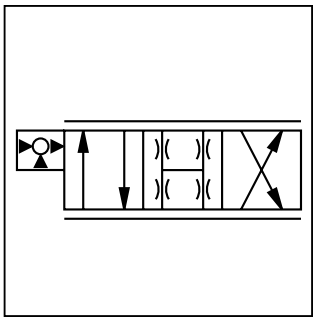
Series SE2N is a two stage, 4-way, flapper and nozzle style servovalve. The SE2N has a narrow body that is a popular size for steam turbine control applications. This valve uses a high performance spool and sleeve design.

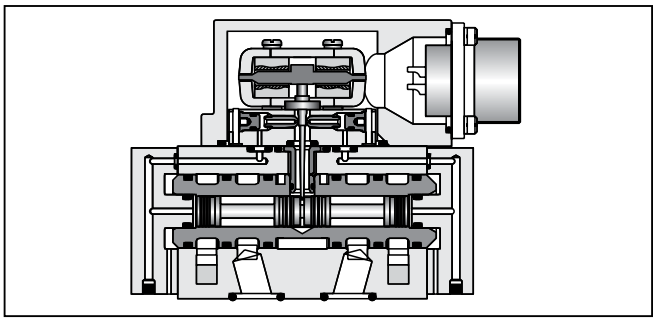
A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves. This valve is rated for 210 Bar (3000 PSI) service.

C

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



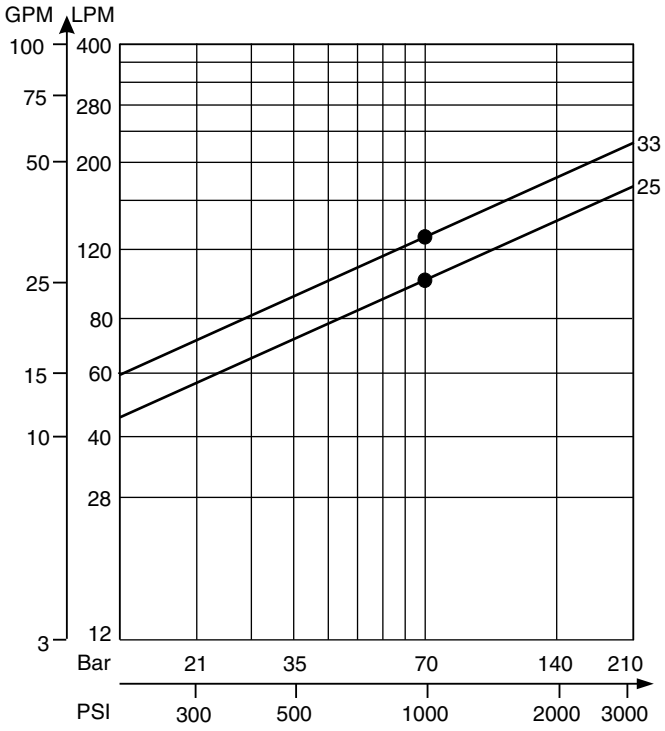


Specifications

Flow Rating ±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	≤ 10%
Hysteresis	≤ 3%
Threshold	≤ 0.5%
Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 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

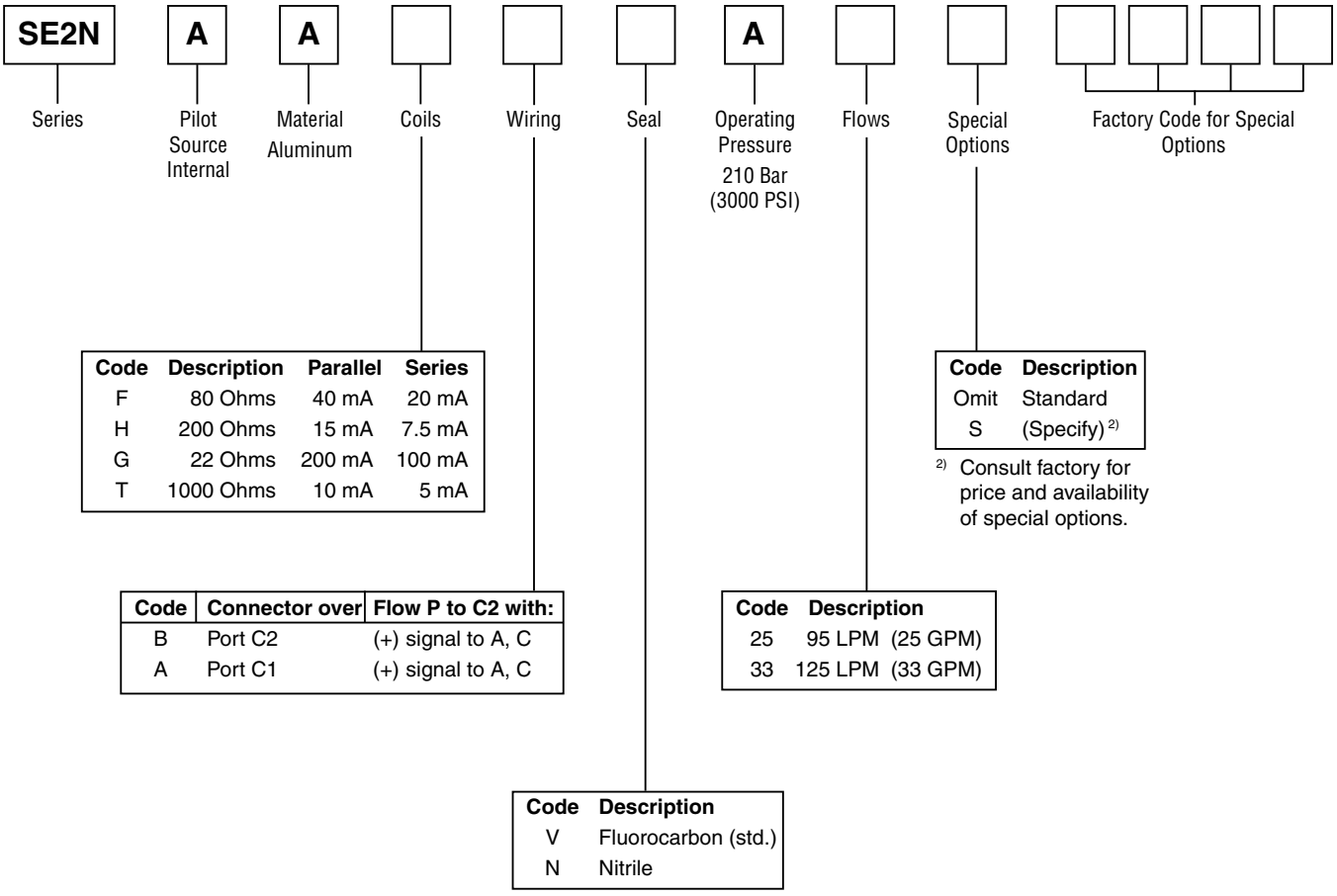
Flow vs. Pressure Drop

at 100% command
Flow Path: P→C1→C2→R



SE2N.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA



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

Code	Description
Omit	Standard
S	(Specify) [2]

[2] Consult factory for price and availability of special options.

Code	Connector over	Flow P to C2 with:
B	Port C2	(+) signal to A, C
A	Port C1	(+) signal to A, C

Code	Description
25	95 LPM (25 GPM)
33	125 LPM (33 GPM)

Code	Description
V	Fluorocarbon (std.)
N	Nitrile

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, BD90, or BD95

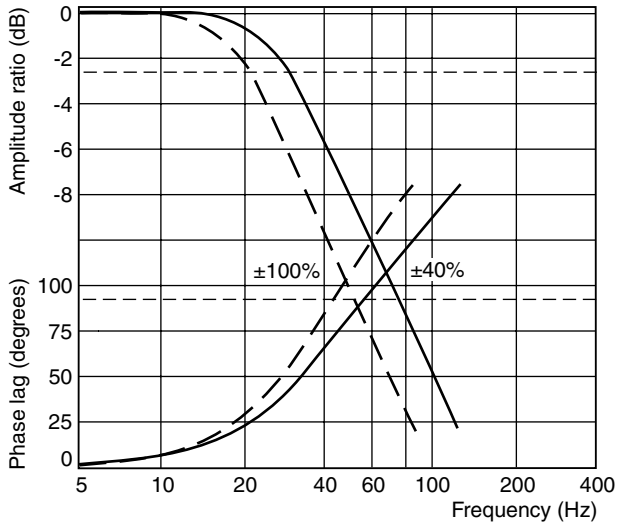
C

Performance Curves

Frequency Response at 210 Bar (3000 PSI)

Standard Response

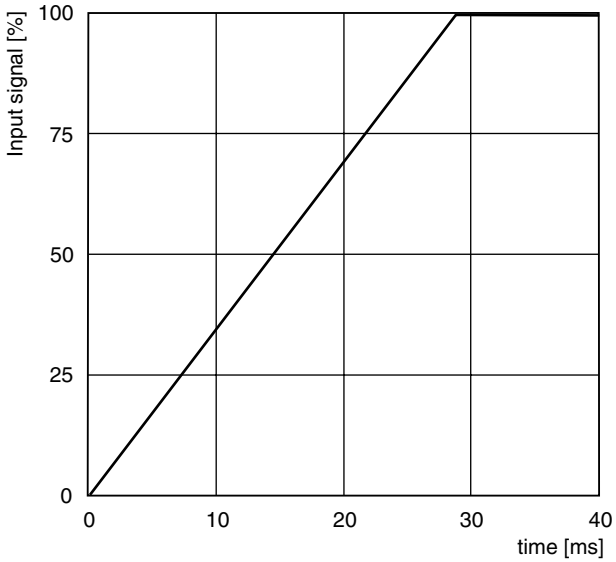
SE2N – 95 LPM (25 GPM)



Step Response at 210 Bar (3000 PSI)

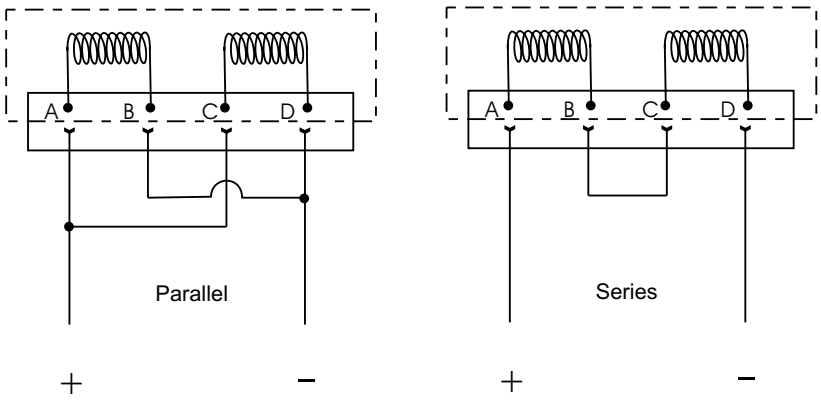
Standard Response

SE2N – 95 LPM (25 GPM)



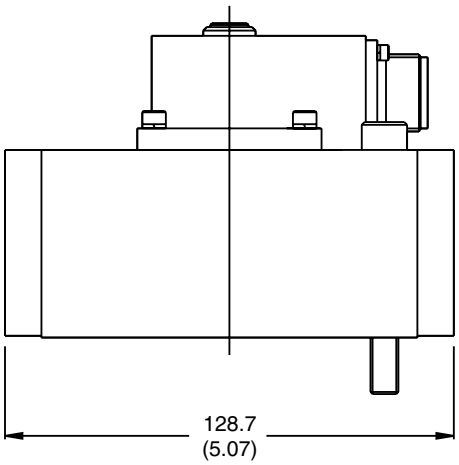
Installation Wiring Options

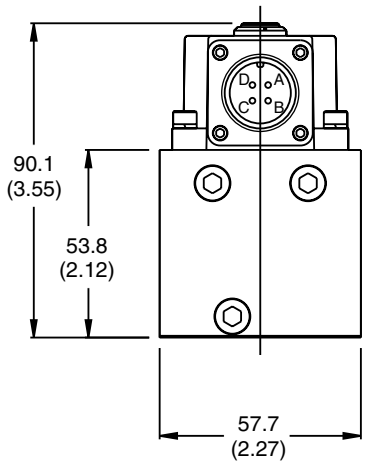
This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.

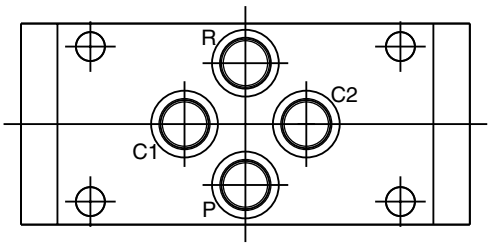


Polarity shown connects flow from P to C2 port.

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



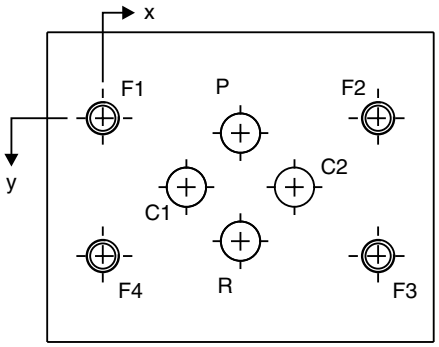




1. Suggested mounting bolts M8 x 70 mm or 5/16-18 x 2.75" long high tensile steel, socket-head cap screws.
2. The 4-way electrical connector mates with MS3106E-14S-2S or equivalent. Is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 14.6 I/D x 2.4 section
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 Ra < 0.8 µm [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

SE2N.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

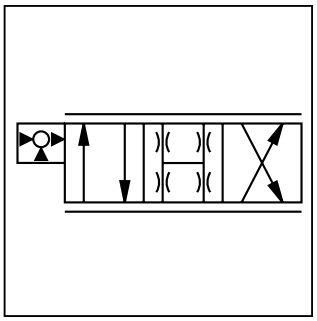
Series SE20 is a two stage, 4-way, flapper and nozzle style servovalve. The SE20 has a wide range of flow ratings and a high performance spool and sleeve design.

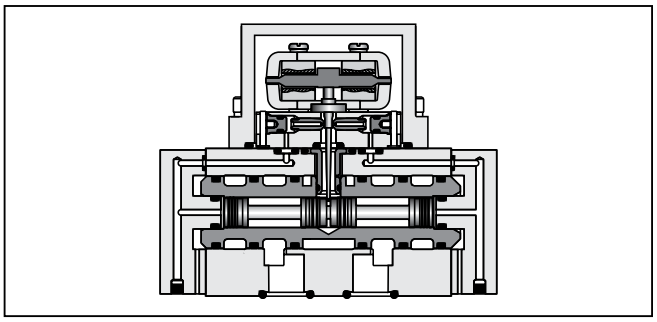
A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves. This valve is rated for 315 Bar (4500 PSI) service with an option for 500 Bar (7250 PSI).

C

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



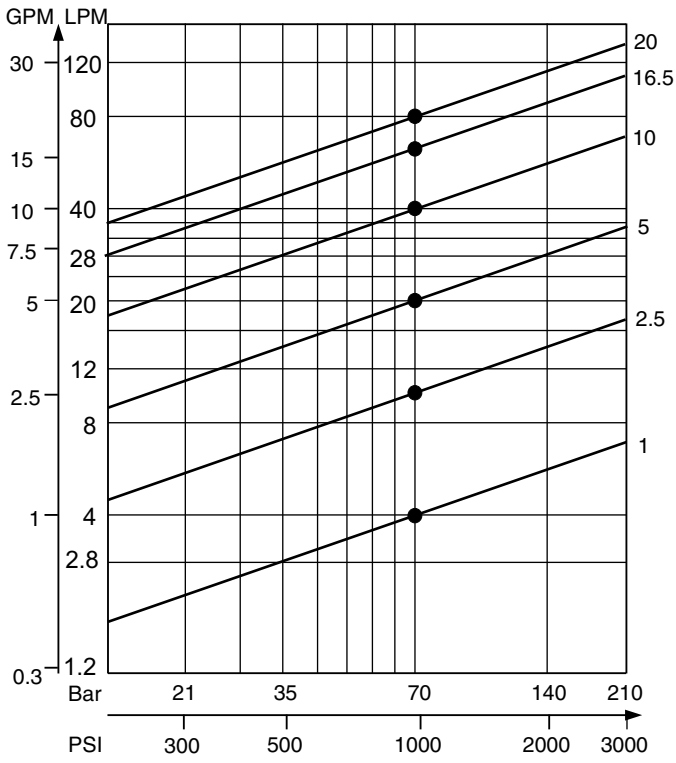


Specifications

Flow Rating ±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	≤ 10%
Hysteresis	≤ 3%
Threshold	≤ 0.5%
Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 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

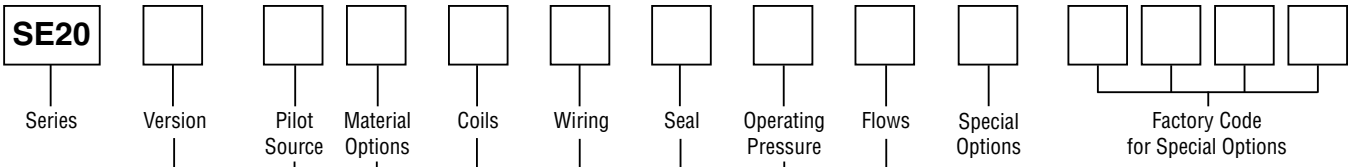
Flow vs. Pressure Drop

at 100% command
Flow Path P →C1 →C2 →R



SE20.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA



Code	Description
H	High performance [1]
S	Standard

[1] only available up to 40 LPM (10 GPM)

Code	Description
A	Internal
C	External (5th port)

Code	Description
A	Aluminum (std.)
S	Stainless Steel

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	10 mA
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

Code	Connector over	Flow P to C2 with:
P	Port P	(+) signal to A, C
B	Port C2	(+) signal to A, C
A	Port C1	(+) signal to A, C
T	Port T	(+) signal to A, C

Code	Description
V	Fluorocarbon (std.)
N	Nitrile

Code	Description
A	315 Bar (4500 PSI)
B	500 Bar (7250 PSI) [3]

[3] Requires steel body

Code	Description	
1	4 LPM	(1.0 GPM)
2.5	10 LPM	(2.5 GPM)
5	20 LPM	(5.0 GPM)
10	40 LPM	(10.0 GPM)
16.5	63 LPM	(16.5 GPM)
20	75 LPM	(20.0 GPM)

Code	Description
Omit	Standard
S	(Specify) [2]

[2] Consult factory for price, delivery and availability of special options.

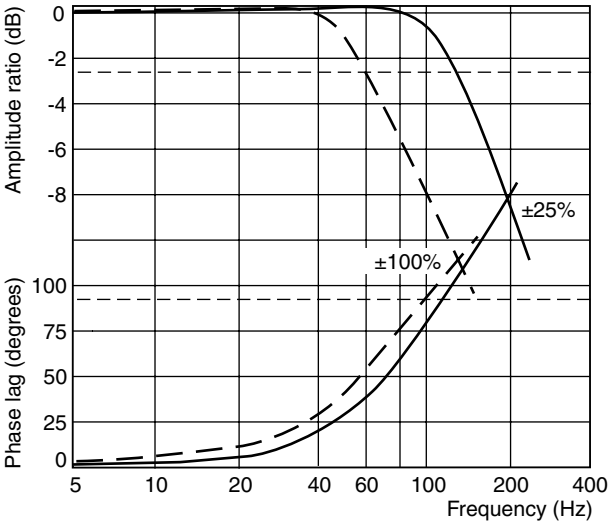
C

Weight: 1.0 kg (2.2 lbs.)
Cable with mating connector: EHC154S
Bolt kit: 4 of M8 x 60 mm, or 4 of 5/16-18x2.25"
Flushing valve: 1200127 (does not cover 5th port)
U.S. Subplate, 5 ports: 1402303 (4) #12 SAE side ports, (1) #4 SAE side ports
U.S. Subplate, 4 ports: 810090-3 (4) #12 SAE side ports
Metric Subplate, 4 ports: DS04SPS12M (M27 x 2.0 ISO 6149 side ports)
Electronics: BD101, 23-7030, BD90, or BD95

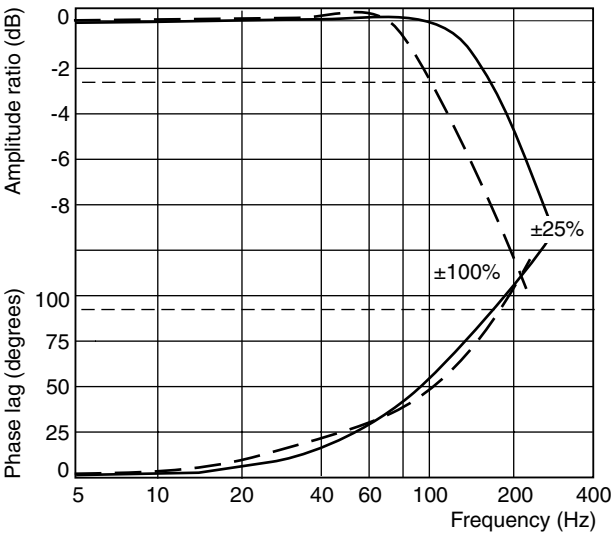
C

Frequency Response at 210 Bar (3000 PSI)

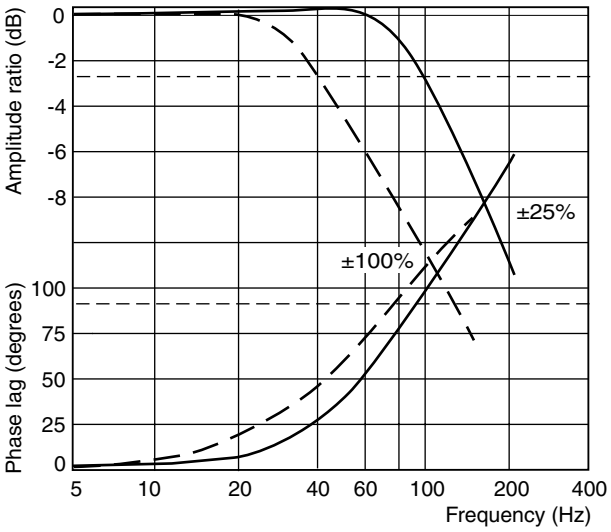
Standard Response
SE20 – 4 LPM (1.0 GPM)



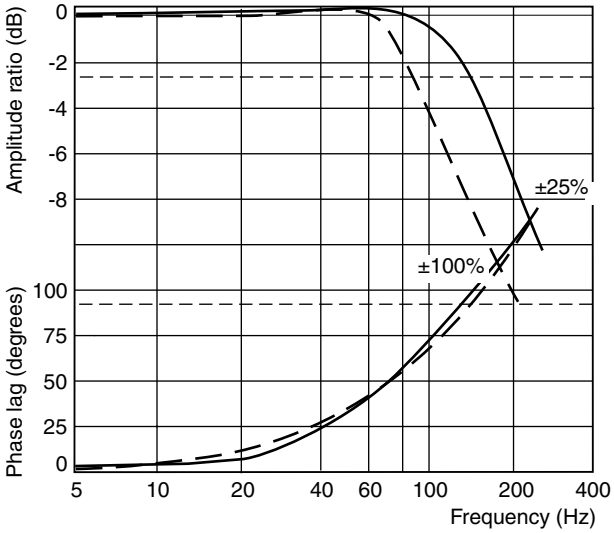
High Response
SE20 – 4 LPM (1.0 GPM)



Standard Response
SE20 – 63 LPM (16.5 GPM)



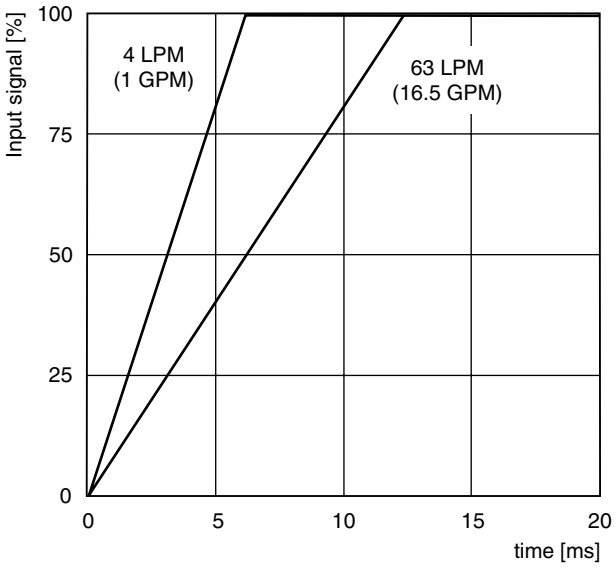
High Response
SE20 – 40 LPM (10 GPM)



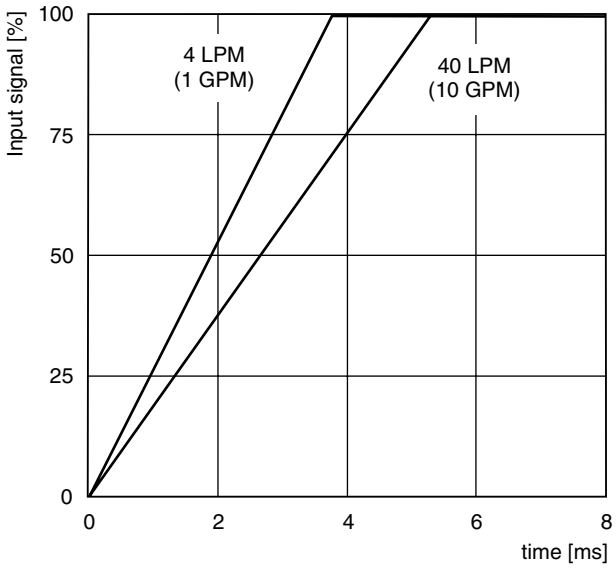
Performance Curves

Step Response at 210 Bar (3000 PSI)

Standard Response



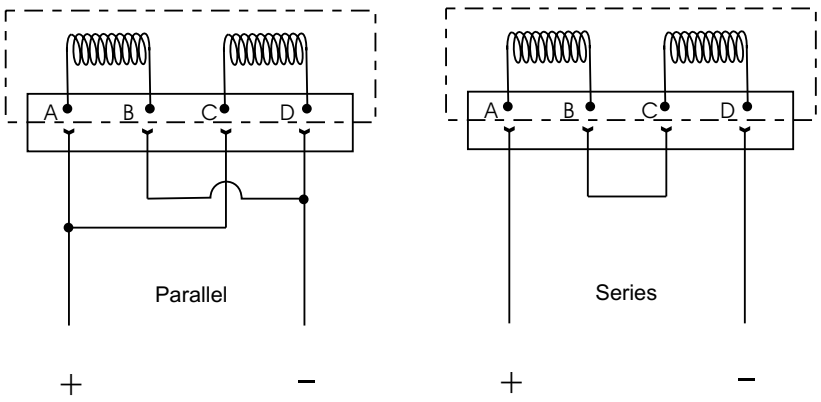
High Response



C

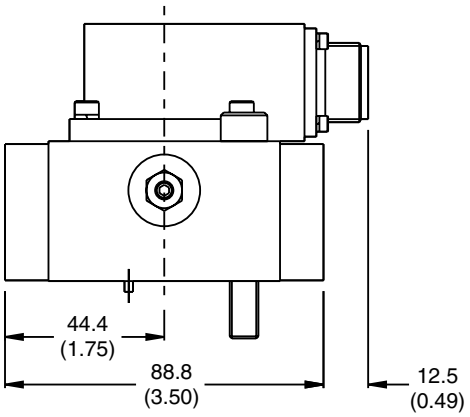
Installation Wiring Options

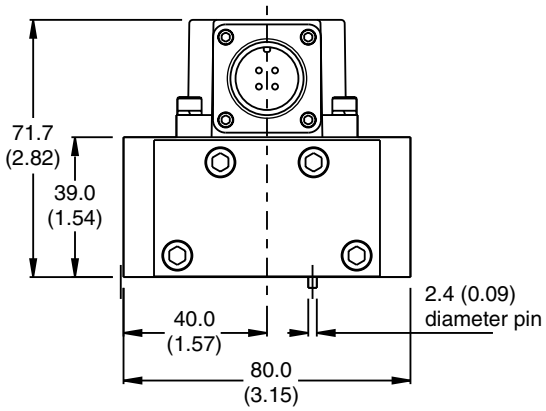
This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.

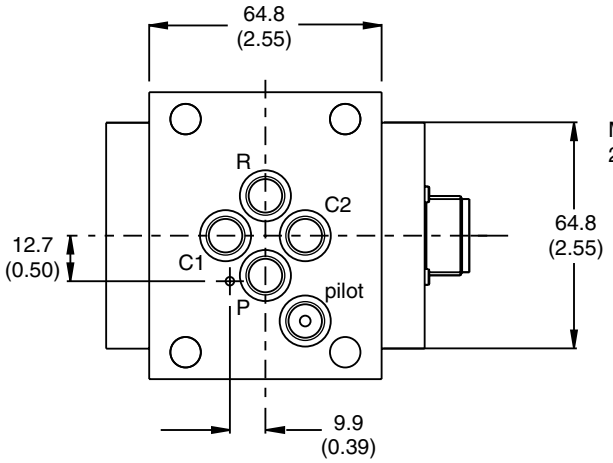


Polarity shown connects flow from P to C2 port.

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





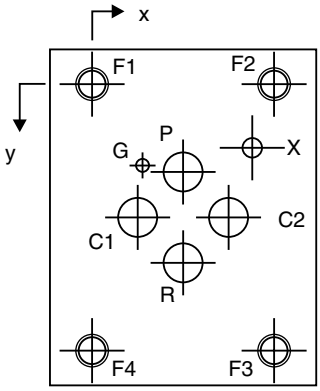


Mounting Torque
29 Nm (21.4 lb.-ft.)

1. Suggested mounting bolts M8 x 60 mm or 5/16-18 x 2.25" high tensile steel, socket-head cap screws.
2. The 4-way electrical connector mates with MS3106-14S-2S or equivalent. It is available at ±90° 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 Ra < 0.8 µm [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 8.2 max	Ø 8.2 max	Ø 8.2 max	Ø 8.2 max	Ø 3.5	Ø 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)										(± 0.004 in.)
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	Ø 0.32 max.	Ø 0.32 max.	Ø 0.32 max.	Ø 0.32 max.	Ø 0.14 max.	Ø 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

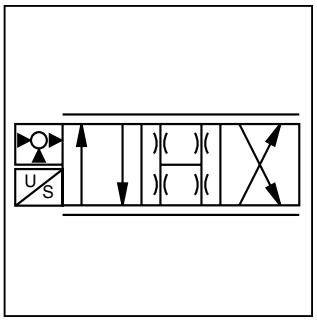
SE20.indd, dd

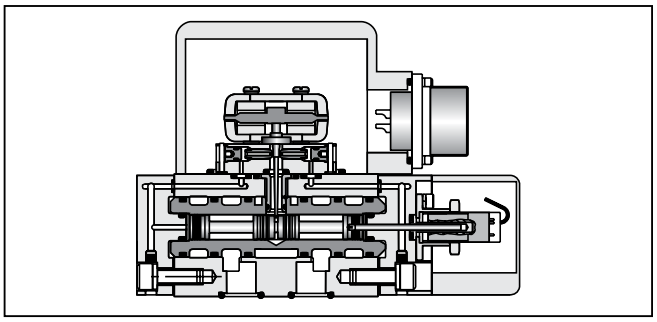
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series SE2E features electronic spool position feedback and on-board electronics. Spool position feedback can be used as a safety monitoring tool, or for minimizing valve hysteresis. The SE2E is a two stage, 4-way, flapper and nozzle style servovalve.

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.





C

Features

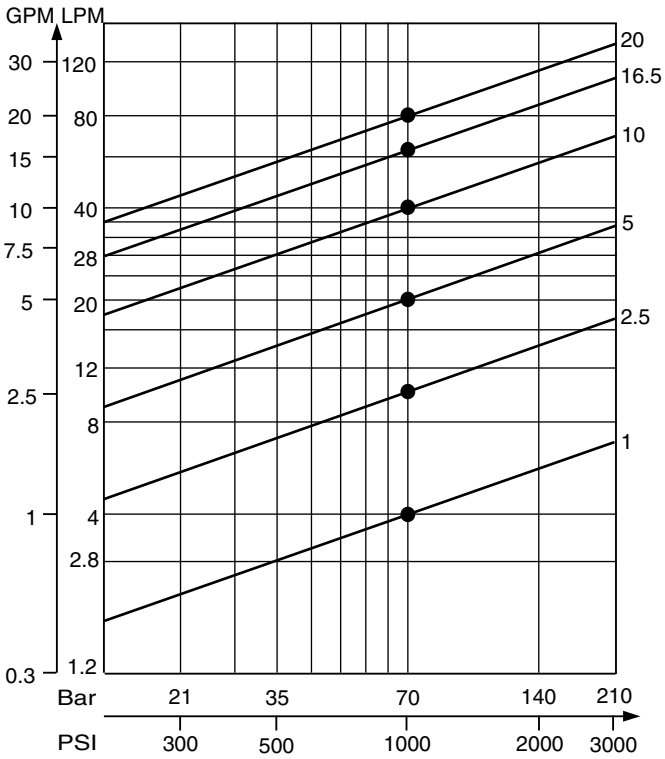
- On-board electronics
- Electronic spool position feedback
- Jewel feedback ball for durability
- High performance
- ISO 10372 standard 22.23 mm (0.875 in.) port circle

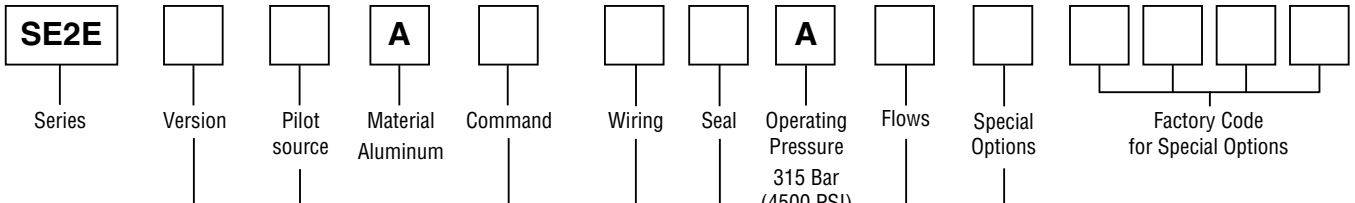
Specifications

Flow Rating ±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)
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 – 0.8 LPM (0.1 – 0.2 GPM)
Input Command	±10 V std.
Frequency Response @ 90° phase shift	≥ 300 Hz (See Performance Curves)
Non-Linearity	≤ 5%
Hysteresis	≤ 0.5%
Threshold	≤ 0.1%
Null Shift with temperature with pressure	≤ 1% per 55°C (100°F) ≤ 1% per 70 Bar (1000 PSI)
Pressure Gain change in pressure per 1% change in input command	80% typical
Step Response	0 - 100%, 4 to 9 ms
Fluid	Petroleum based Mineral Oil, 10 – 110 cSt at 38°C (100°F)
Fluid Cleanliness	ISO 4406 15/12 or better
Operating Temperature	-20°C to +85°C (-4°F to +185°F)
Protection Class	NEMA 4, IP65

Flow vs. Pressure Drop

at 100% command
Flow Path P →C1 →C2 →R





Code	Description
H	High performance
S	Standard

Code	Description
A	Internal
C	External (5th port)

Code	Description	Input Impedence	Power Supply
1	± 10 volts	Re > 50k Ohms	± 15 volts DC power
2	± 10 mA	Re > 1k Ohms	± 15 volts DC power
3	± 10 volts	Re > 50k Ohms	24 volts DC power
4	± 10 mA	Re > 1k Ohms	24 volts DC power

Code	Connector over	Flow P to C2 with:
B	Port C2	Pin D more positive than Pin E

Code	Description
V	Fluorocarbon (std.)
N	Nitrile

Code	Description
1	4 LPM (1.0 GPM)
2.5	10 LPM (2.5 GPM)
5	20 LPM (5.0 GPM)
10	40 LPM (10.0 GPM)
16.5	60 LPM (16.5 GPM)
20	75 LPM (20.0 GPM)

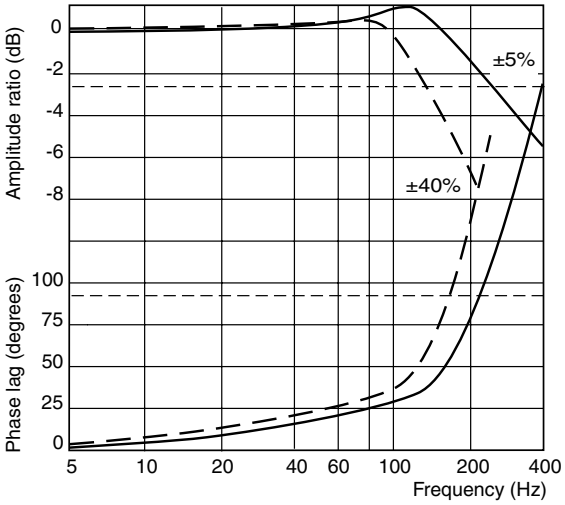
Code	Description
Omit	Standard
S	(Specify) [1]

1) Consult factory for price and availability of special options.

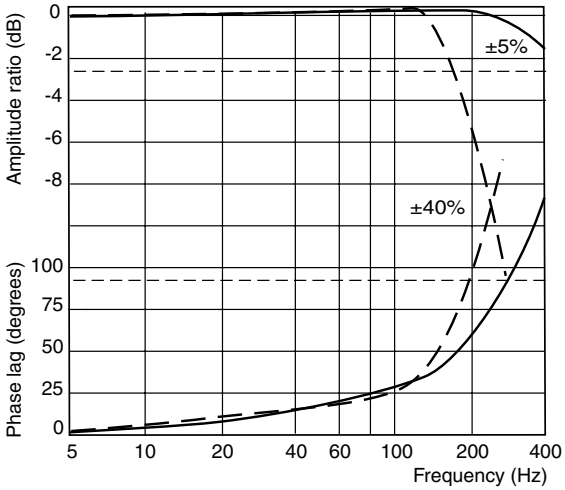
Weight: 1.5 kg (3.3 lbs.)
Cable with mating connector: EHC158GE
Mating connector: 5004072 (a 7-pin metal CE connector)
Bolt kit: 4 of M8 x 60 mm, or 4 of 5/16-18x2.25"
Flushing valve: 1200127 (does not cover 5th port)
U.S. Subplate, 5 ports: 1402303 (4) #12 SAE side ports, (1) #4 SAE side ports
U.S. Subplate, 4 ports: 810090-3 (4) #12 SAE side ports
Metric Subplate, 4 ports: DS04SPS12M (M27 x 2.0 ISO 6149 side ports)
Electronics: BD101, 23-7030, BD90, or BD95

Frequency Response at 210 Bar (3000 PSI)

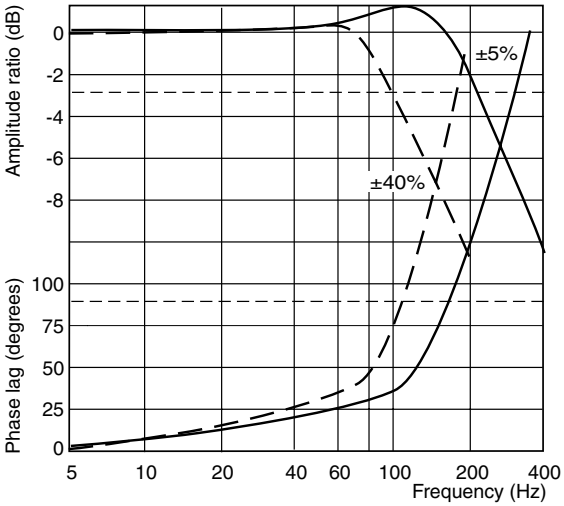
Standard Response
SE2E – 20 LPM (5 GPM)



High Response
SE2E – 4 - 40 LPM (1.0 - 10 GPM)

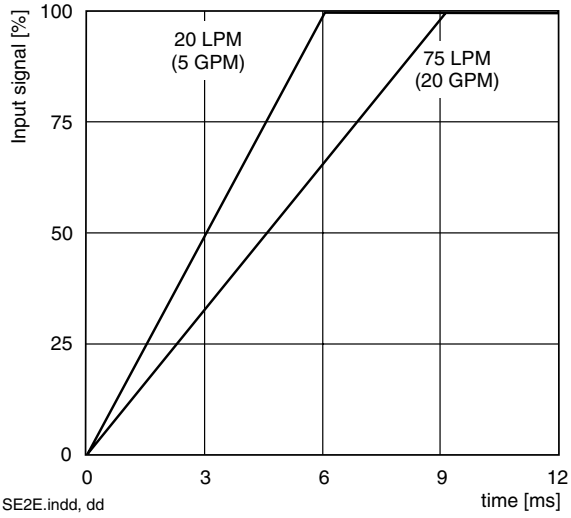


Standard Response
SE2E – 75 LPM (20 GPM)



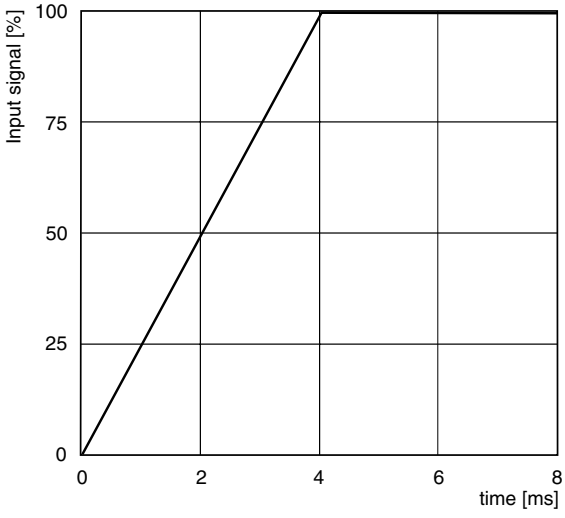
Step Response at 210 Bar (3000 PSI)

Standard Response



SE2E.indd, dd

High Response
SE2E – 4 - 40 LPM (1.0 - 10 GPM)



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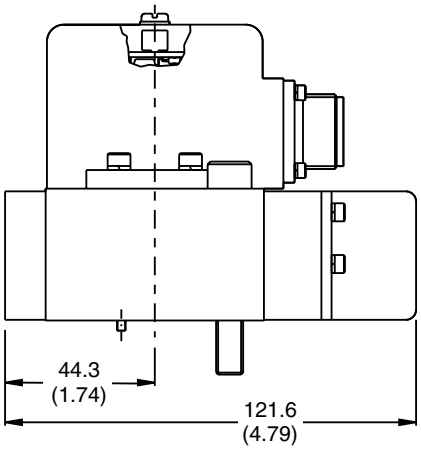
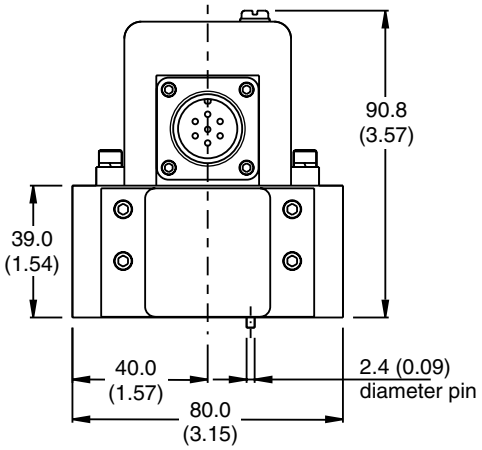
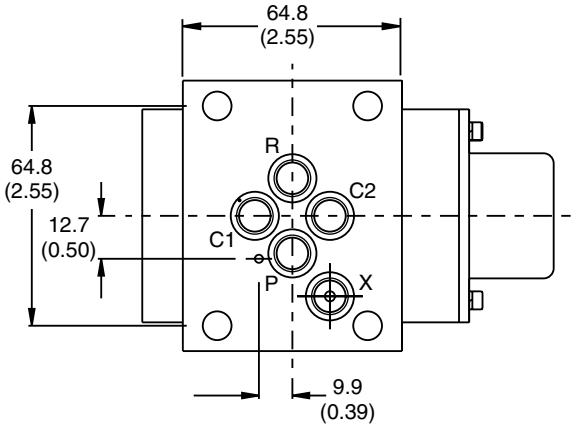
Inch equivalents for millimeter dimensions are shown in (**)



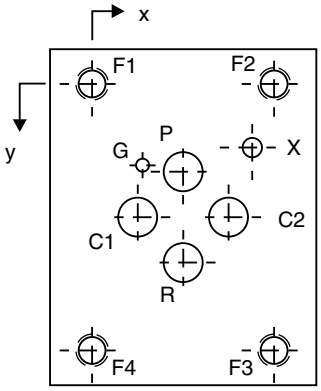




1. Suggested mounting bolts M8 x 60 mm or 5/16-18 x 2.25" long high tensile steel, socket-head cap screws.
2. The 7-pin electrical connector mates with Parker 5004072 connector or equivalent. The connector is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 10.82 I/D x 1.78 section (2013N-9 or 2013V-9) 5 pcs.
4. Null adjustment potentiometer.

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 Ra < 0.8 µm [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 8.2 max	Ø 8.2 max	Ø 8.2 max	Ø 8.2 max	Ø 3.5	Ø 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)							(± 0.004 in.)			
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	Ø 0.32 max.	Ø 0.32 max.	Ø 0.32 max.	Ø 0.32 max.	Ø 0.14 max.	Ø 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

SE2E.indd, dd

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Elyria, Ohio, USA

	Pin	Voltage Command		Current Command	
Supply voltage +15/0/-15 VDC ±3% Ripple < 50 mV_{p-p}	A	+15 VDC	I_{max} = 200 mA		
	B	-15 VDC	I_{max} = 200 mA		
	C	⏚			
Command signal R_e	D	0...±10 VDC	$R_e \geq 50$ kΩ	0...±10 mA	$R_e \geq 1$ kΩ
	E				
Spool position output	F	0...±10 VDC	load resistance 10 kΩ	0...±10 VDC	load resistance 10 kΩ
Protective Earth	G	⏚			

	Pin	Voltage Command		Current Command	
Supply voltage +24 VDC ±3% Ripple < 50 mV_{p-p}	A	+24 VDC	I_{max} = 200 mA		
	B	⏚			
	C	Not used			
Command signal R_e	D	0...±10 VDC	$R_e \geq 50$ kΩ	0...±10 mA	$R_e \geq 1$ kΩ
	E				
Spool position output	F	0...±10 VDC	load resistance 10 kΩ	0...±10 VDC	load resistance 10 kΩ
Protective Earth	G	⏚			

Spool stroke is proportional to command signal.
+10 VDC to pin D causes 100% rated flow in the direction of P→C2, C1→R.

One input D or E must be connected to common if a single ended driver is used.

Connection cable to be 6-core, 0.75 mm^2 (0.03 in^2), screened.
External diameter 6.5~9.5 mm (0.26 - 0.37 in.).
Connect screening to ⏚ on supply side only.

Mating connector is Parker number 5004072.
A mating cable with connector is Parker number EHC158GE.

CE

General Description

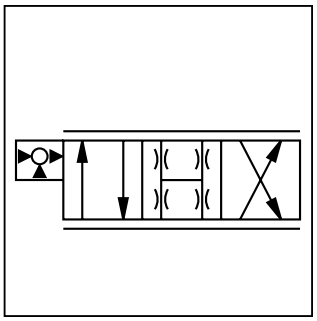
Series SE31 is a two stage, 4-way, flapper and nozzle style servovalve. This valve is designed to fit onto DIN NG10 or NFPA D05 port patterns. The SE31 has a wide range of flow ratings and a high performance spool and sleeve design.

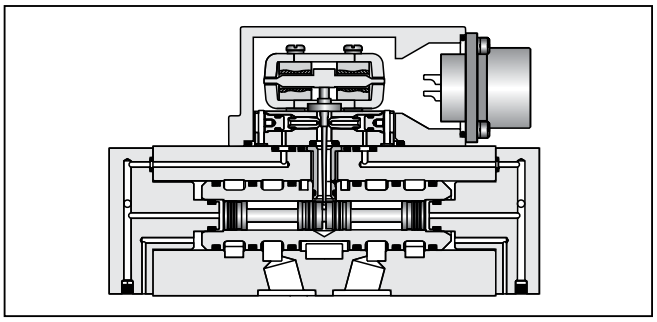
A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves. This valve is rated for 210 Bar (3000 PSI) service.

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)



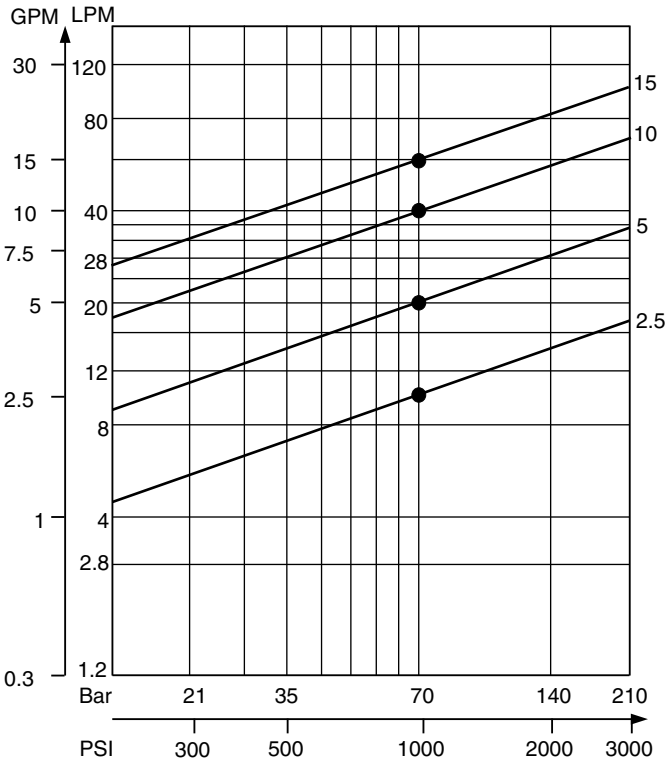


Specifications

Flow Rating ±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	≤ 10%
Hysteresis	≤ 3%
Threshold	≤ 0.5%
Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 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



SE31.indd, dd

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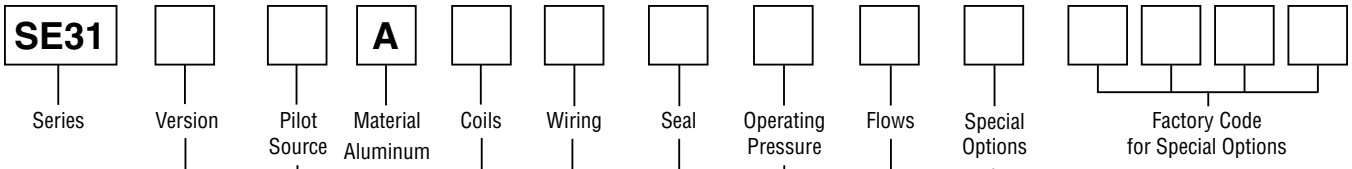


Code	Description
H	High performance [1]
S	Standard

[1] Only available up to 40 LPM (10 GPM)

Code	Description
A	Internal
C	External (5th port)

Code	Description	Parallel	Series
M	27 Ohms	100 mA	50 mA
B	300 Ohms	30 mA	15 mA
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
L	1200 Ohms	20 mA	10 mA
A	40 Ohms	60 mA	30 mA
C	800 Ohms	30 mA	15 mA
D	22 Ohms	80 mA	40 mA

Code	Connector over	Flow P to C2 with:
B	Port C2	(+) signal to A, C
A	Port C1	(+) signal to A, C

Code	Description
V	Fluorocarbon (std.)
N	Nitrile

Code	Description
A	210 Bar (3000 PSI)

Consult factory for other options.

Code	Description
2.5	10 LPM (2.5 GPM)
5	20 LPM (5.0 GPM)
10	40 LPM (10.0 GPM)
15	60 LPM (15.0 GPM)

Code	Description
Omit	Standard
S	(Specify) [2]

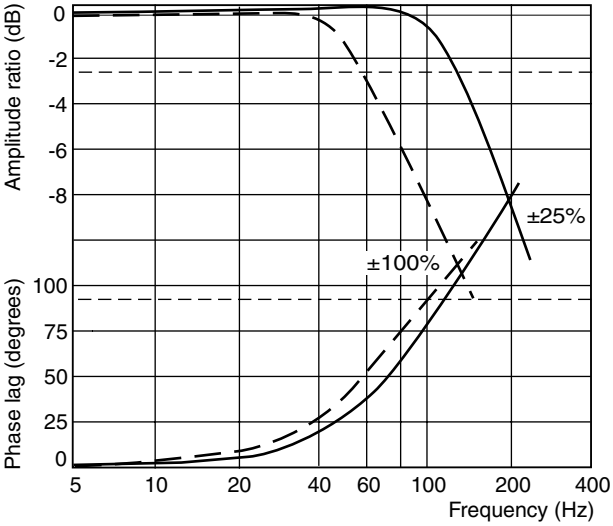
[2] Consult factory for price, delivery and availability of special options.

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, BD90, or BD95

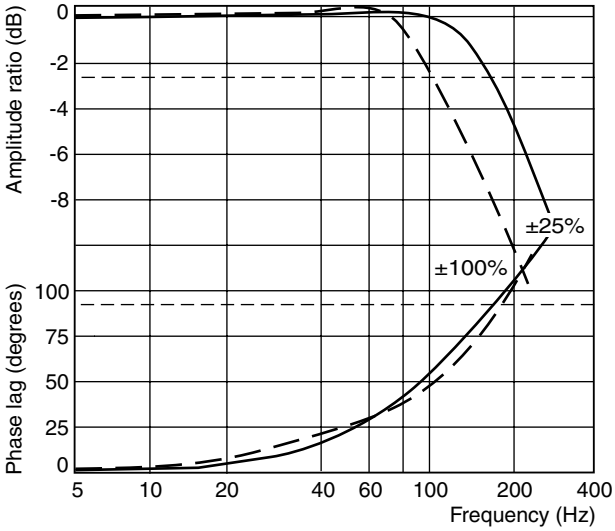
C

Frequency Response at 210 Bar (3000 PSI)

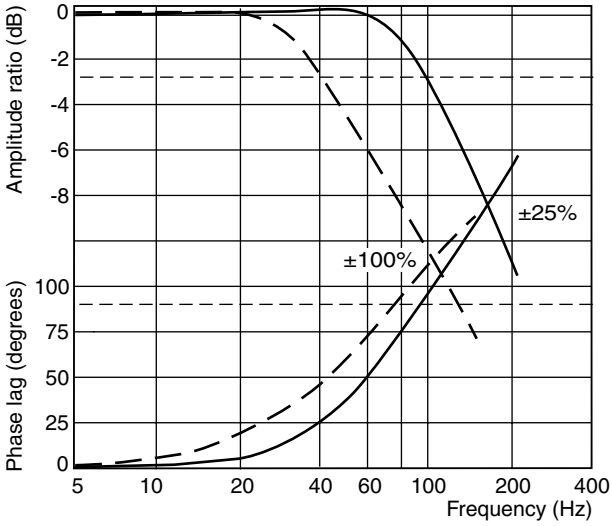
Standard Response
SE31 – 4 LPM (1.0 GPM)



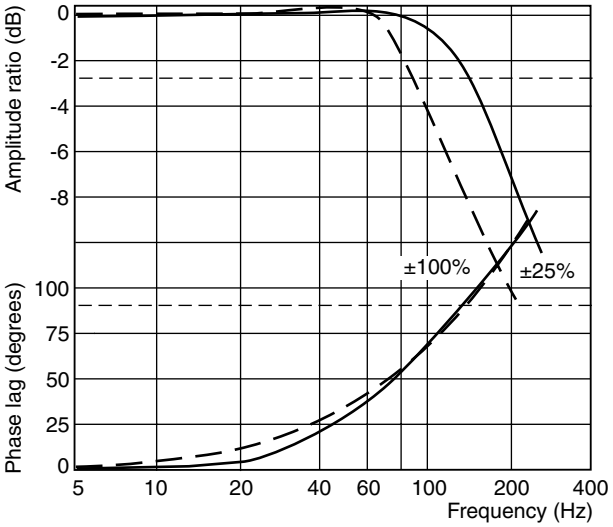
High Response
SE31– 4 LPM (1.0 GPM)



Standard Response
SE31 – 60 LPM (15 GPM)



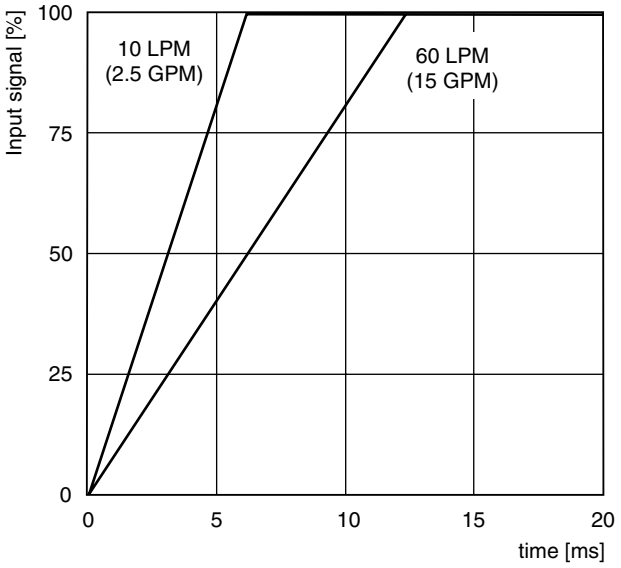
High Response
SE31 – 40 LPM (10 GPM)



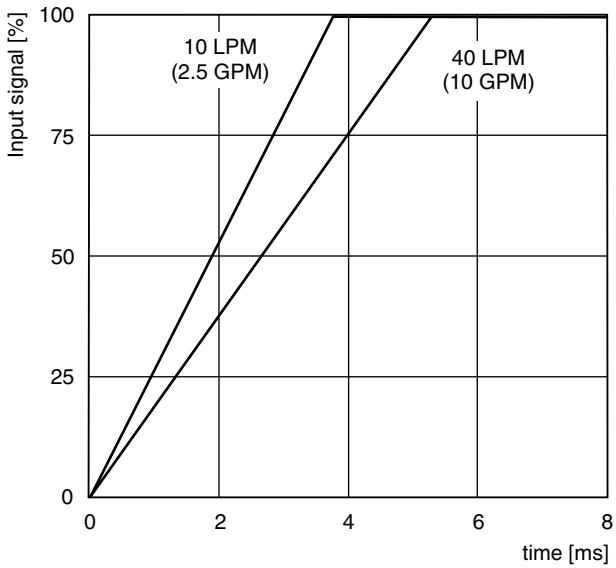
Performance Curves

Step Response at 210 Bar (3000 PSI)

Standard Response



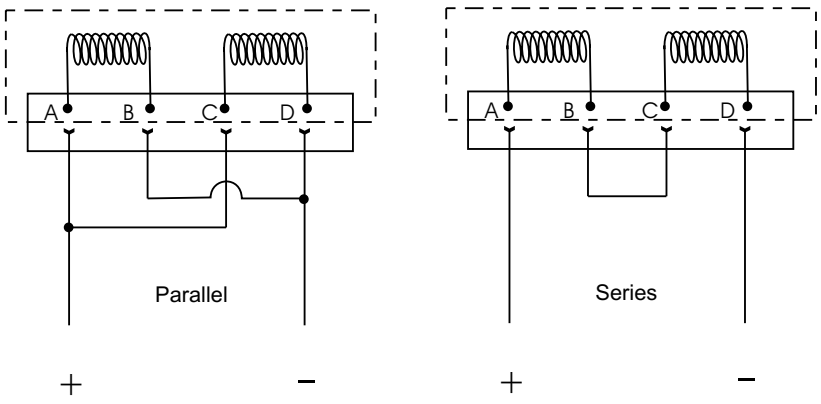
High Response



C

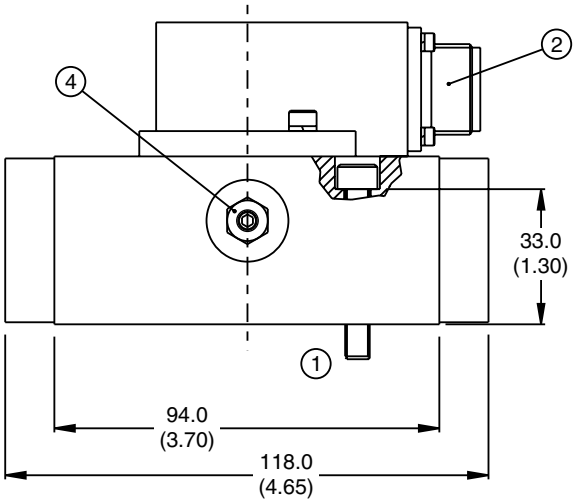
Installation Wiring Options

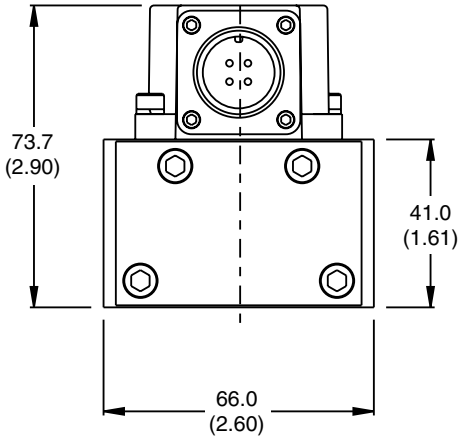
This servovalve has two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.

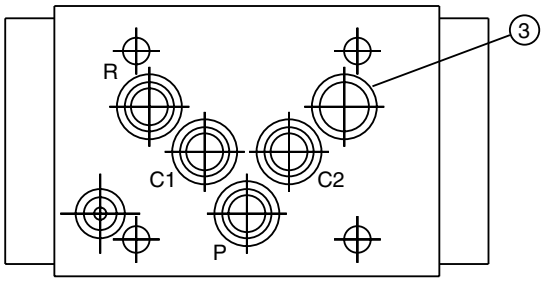


Polarity shown connects flow from P to C2 port.

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



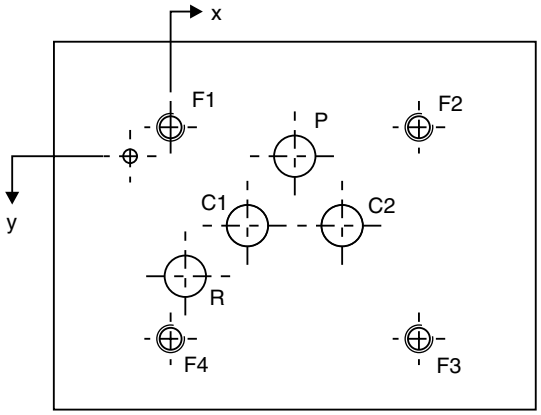




1. Suggested mounting bolts M6 x 50 mm or ¼-20 x 2.25" long high tensile steel, socket-head cap screws.
2. The 4-pin electrical connector mates with MS3106E-14S-2S or equivalent. The valve connector is available ±90° or 180° from the position shown.
3. Base O-Rings: 12 mm I.D. by 2.0 mm section, 90 durometer.
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 Ra < 0.8 µm [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
	Ø 9 max	Ø 9 max	Ø 9 max	Ø 9 max	Ø 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
	Ø 0.354 max	Ø 0.354 max	Ø 0.354 max	Ø 0.354 max	Ø 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

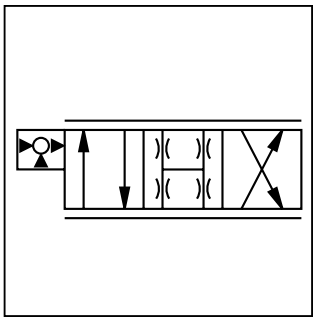
SE31.indd, dd

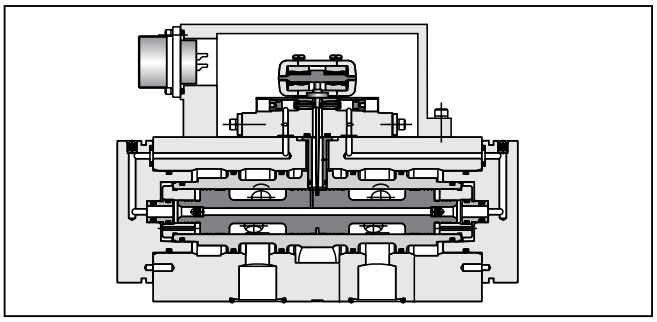
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

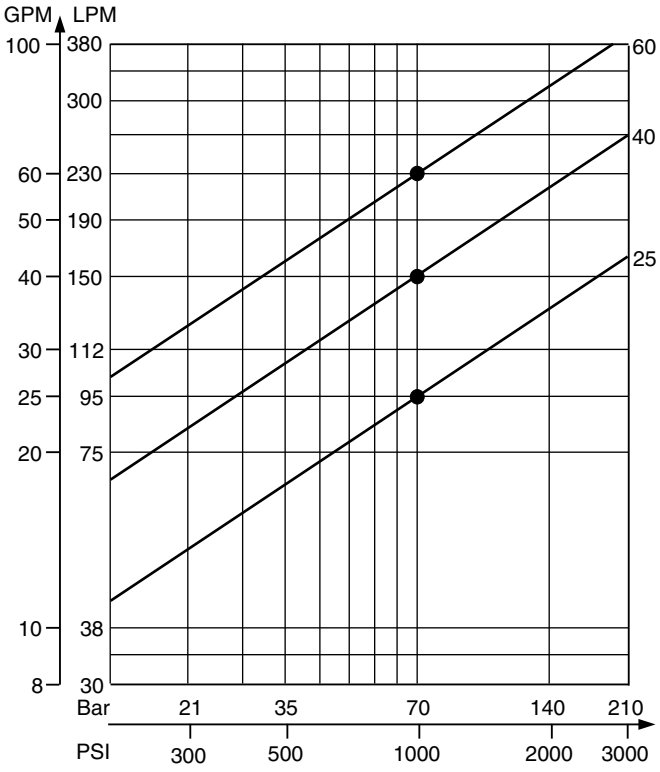
- Lapped spool and sleeve
- Jewel feedback ball for durability
- Aluminum body
- Medium and High performance
- ISO 10372 size 6 standard 50.8 mm (2.000 in.) port circle

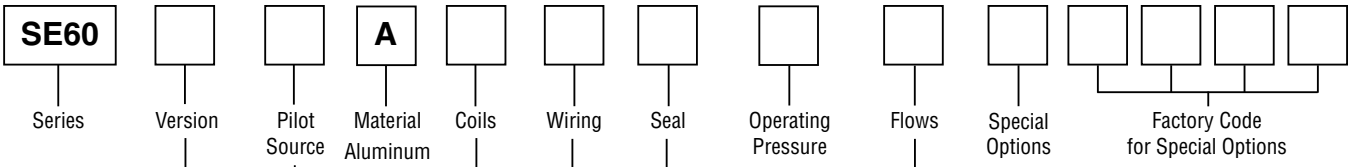
Specifications

Flow Rating ±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	≤ 10%
Hysteresis	≤4%
Threshold	≤ 1%
Null Shift with temperature with pressure	≤ 2% per 55°C (100°F) ≤ 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





C

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

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	Connector over	Flow P to C2 with:
B	Port C2	(+) signal to A, C
A	Port C1	(+) signal to A, C

Code	Description
V	Fluorocarbon (std.)
N	Nitrile

Code	Description
A	210 Bar (3000 PSI)
B	275 LPM (4000 PSI)*

* 4000 PSI requires nitrile seals.

Code	Description
25	95 LPM (25 GPM)
40	150 LPM (40 GPM)
60	230 LPM (60 GPM)

Code	Description
Omit	Standard
F	Field Replaceable Filter
S	(Specify) [2]

[2] Consult factory for price, delivery and availability of special options.

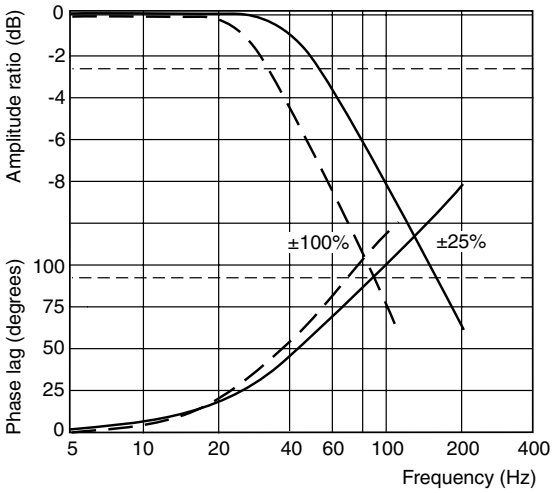
Weight: 3.4 kg (7.5 lbs.)
Cable with mating connector: EHC154S
Mating connector: MS3106E-14S-2S
Bolt kit: 4 of M10 x 60 mm, or 4 of 3/8-16x2.375"
Flushing valve: Consult factory.
US Subplate, 4 ports: AS06SPS20S (# 20 SAE side ports)
Metric Subplate, 4 ports: AS06SPS20M (M42 x 2.0 ISO 6149 side ports)
Electronics: BD101, 23-7030, BD90, or BD95

Performance Curves

Frequency Response at 210 Bar (3000 PSI)

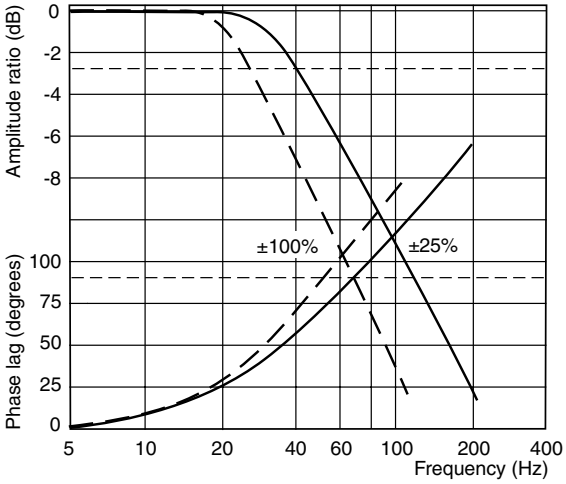
Standard Response

SE60 – 95 LPM (25 GPM)



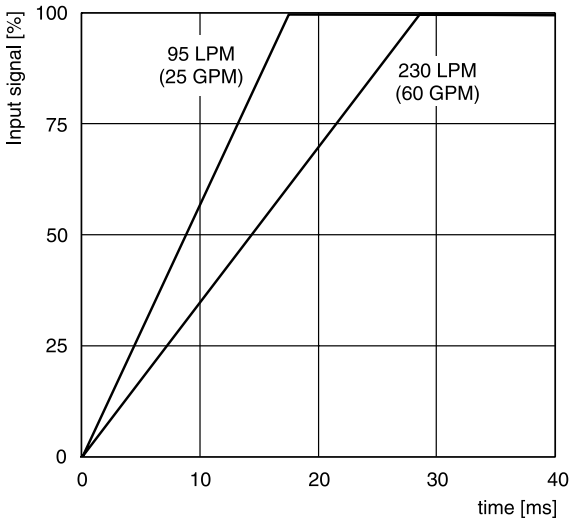
High Response

SE60 – 230 LPM (60 GPM)



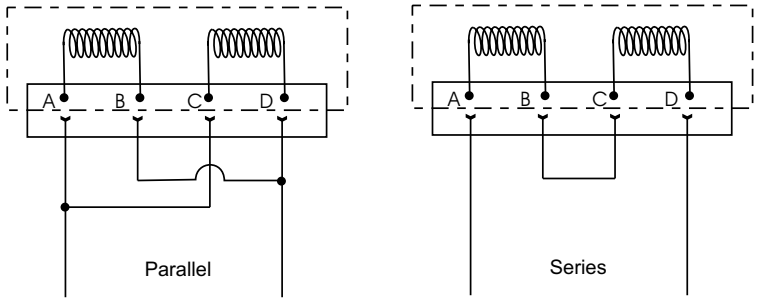
Step Response at 210 Bar (3000 PSI)

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.



\+ – \+ –

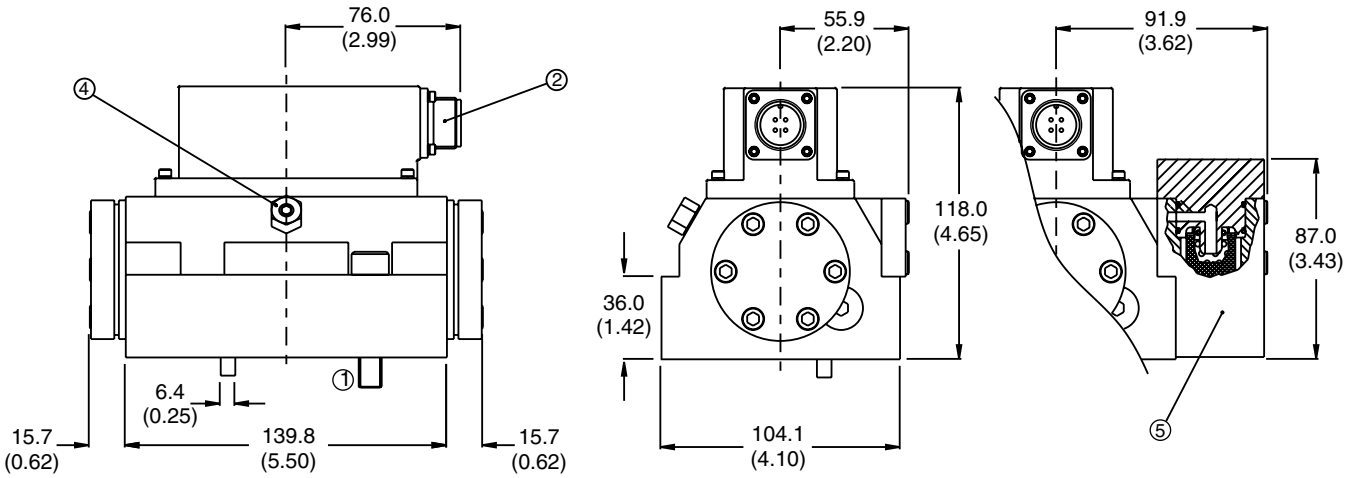
Polarity shown connects flow from P to C2 port.

SE60.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

C

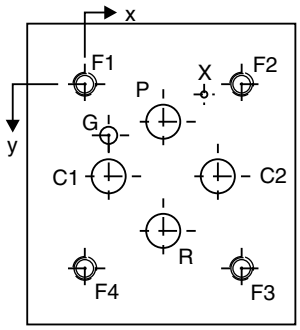
Inch equivalents for millimeter dimensions are shown in (**)



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 Ra < 0.8 µm [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

SE60.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

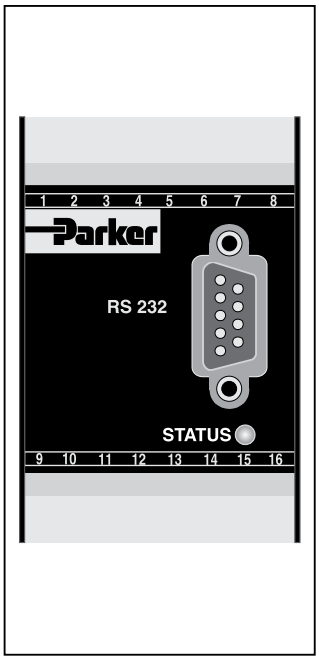
Contents

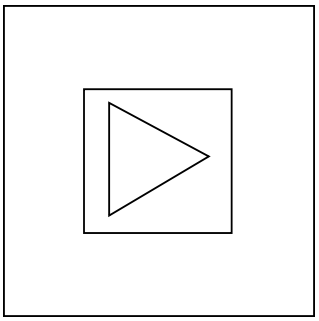
D

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 (ProPxD) 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.
- Four independent ramps.
- Input Enable with Status indicator.
- Differential input on analog command.
- Compliant with European EMC Standards.

CE

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** Minimum Maximum Ramp Time Zero Offset Current	**preset** 0 to 50% 0 to 1000 50 to 100% 0 to 1000 0 to 32.5 s 0 to 32.5 +75 to -75% +1000 to -1000 0.8/3.5/2.7/1.8/1.3 A 0/1/2/3/4/5
Current Consumption Max.	2.0A		
Pre-fusing	2.5A medium lag		
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.**	**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, plug-in
Differential Input Voltage Maximum	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 5.0 VDC On – 8.5 to 30 VDC; Ri = 30K ohm	**Cable Length**	50m (164 ft.)

Ordering Information

PWD — Electronic Module DC Valve

00 — Position Control Universal

A —

400 — Module Type

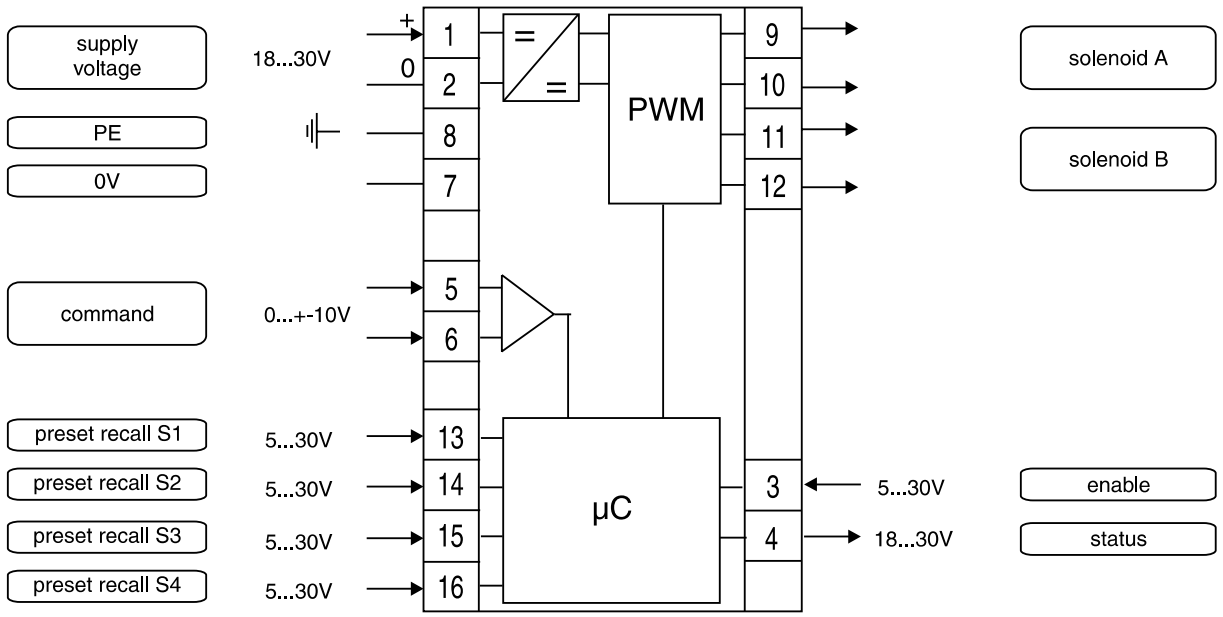
Code	Description
400	Amplifier, MIN/MAX adjustable, UP/DOWN ramps, Command inputs

Design Series

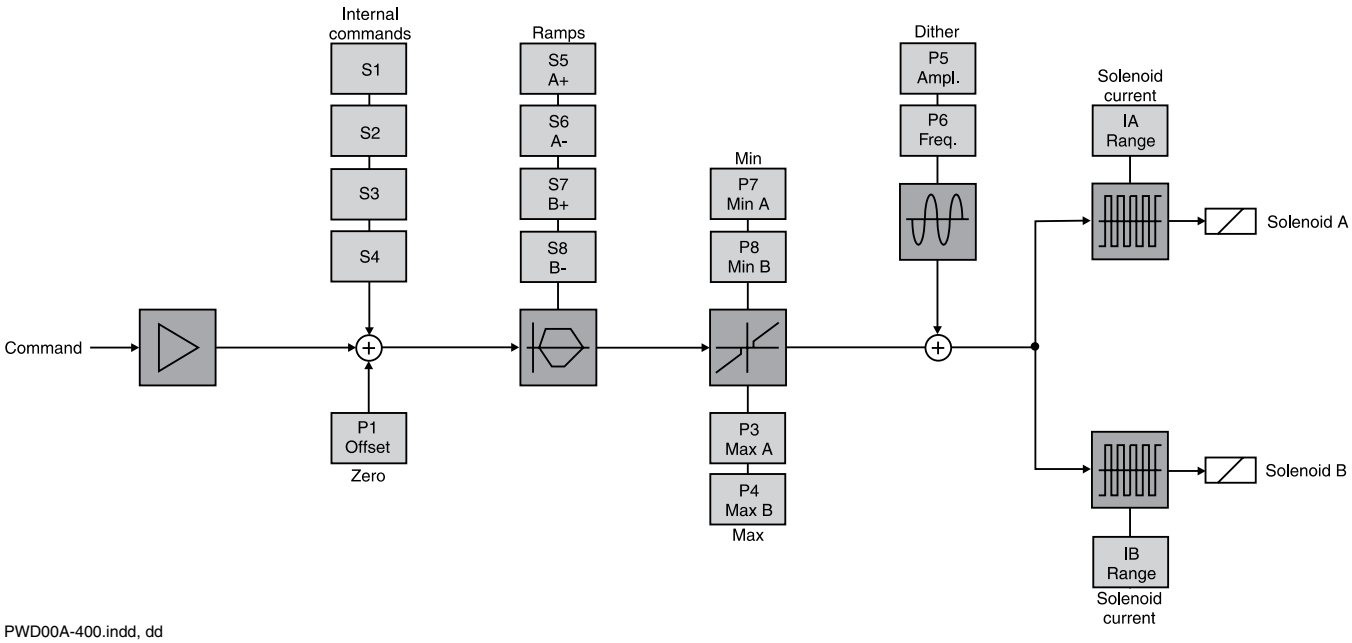
NOTE: Not required when ordering.

Weight: 160 g (0.35 lbs.)

Block Diagram — Wiring



Signal Flow Diagram

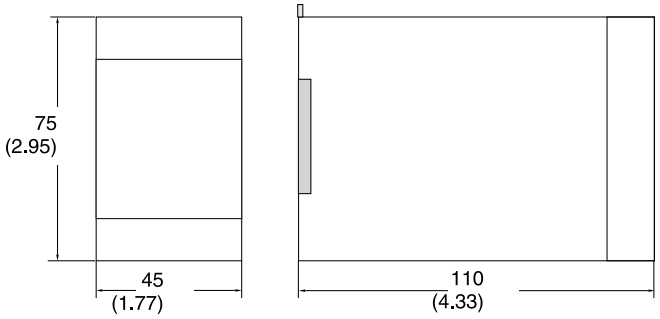


PWD00A-400.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Dimensions

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



D

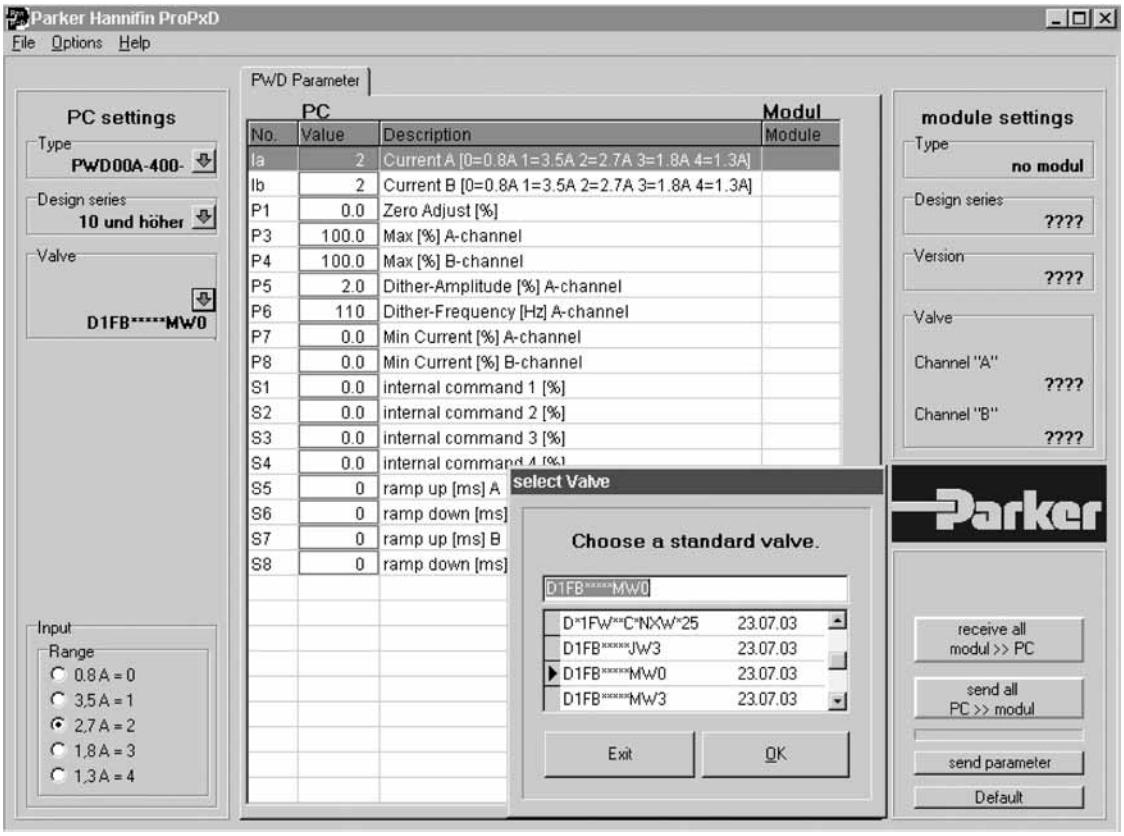
ProPxD Interface Program

The new ProPxD software permits user-friendly parameter setting for the electronic module series PCD, PWD and PZD.

Via the clearly arranged entry screen the parameters can be identified 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 default parameters which are available for all standard valve series. Inside the electronic a nonvolatile memory stores the data with the option for recalling or modification.

Features

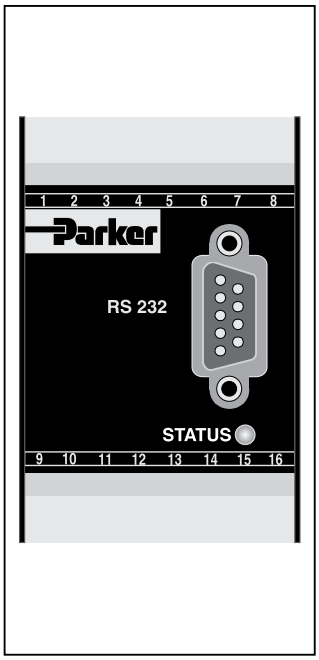
- User-friendly editing of all parameters.
- Default values for standard valves.
- Identification and documentation of parameter sets.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Simple communication between PC and electronic via serial interface RS-232 and nullmodem cable.

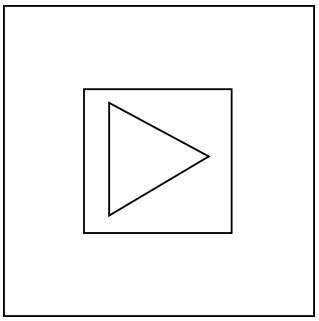


General Description

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).





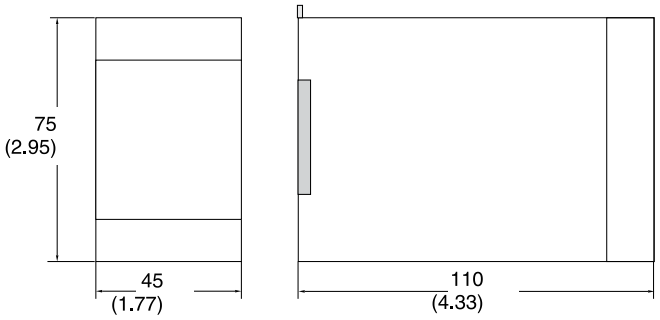
D

Features

- Interface and tuning for spool position feedback.
- Programmable parameters.
- ±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 (**)



Ordering Information

PWD — Electronic Module DC Valve

XX — Position Control Universal

A

—

40 — Module Type

Code	Description
40	Amplifier, MIN/MAX adjustment, UP/DOWN ramps, Command input

☐ — Technology Function

Code	Description
0	Standard
1	Linearization Option

—

⌜ ⌝ ⌞ ⌟ — Design Series

NOTE: Not required when ordering.

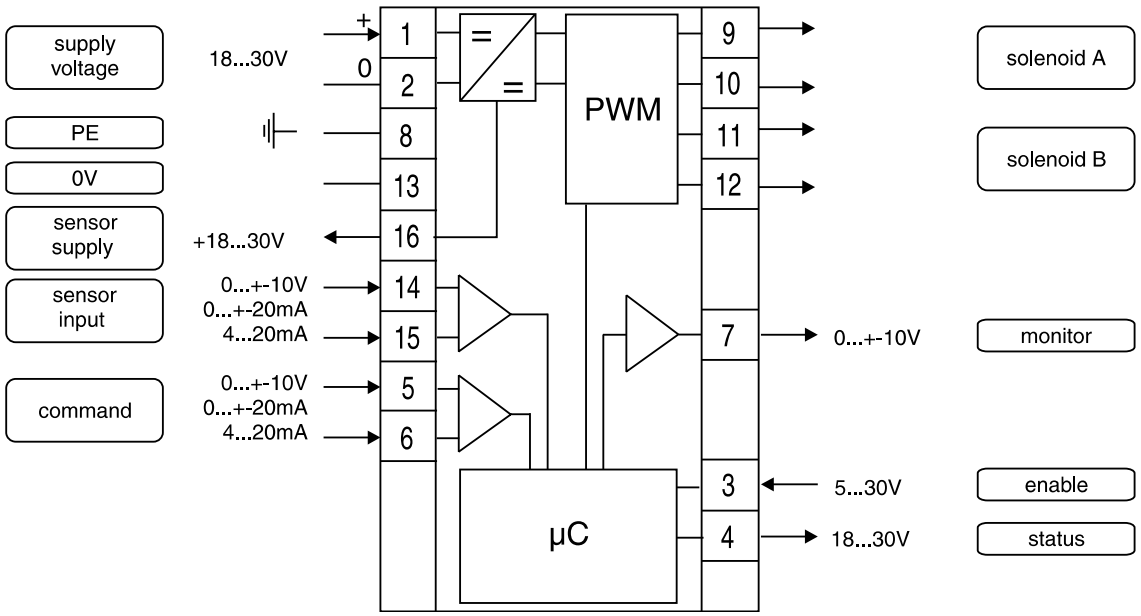
Weight: 160g (.35 lbs.)

D

Specifications

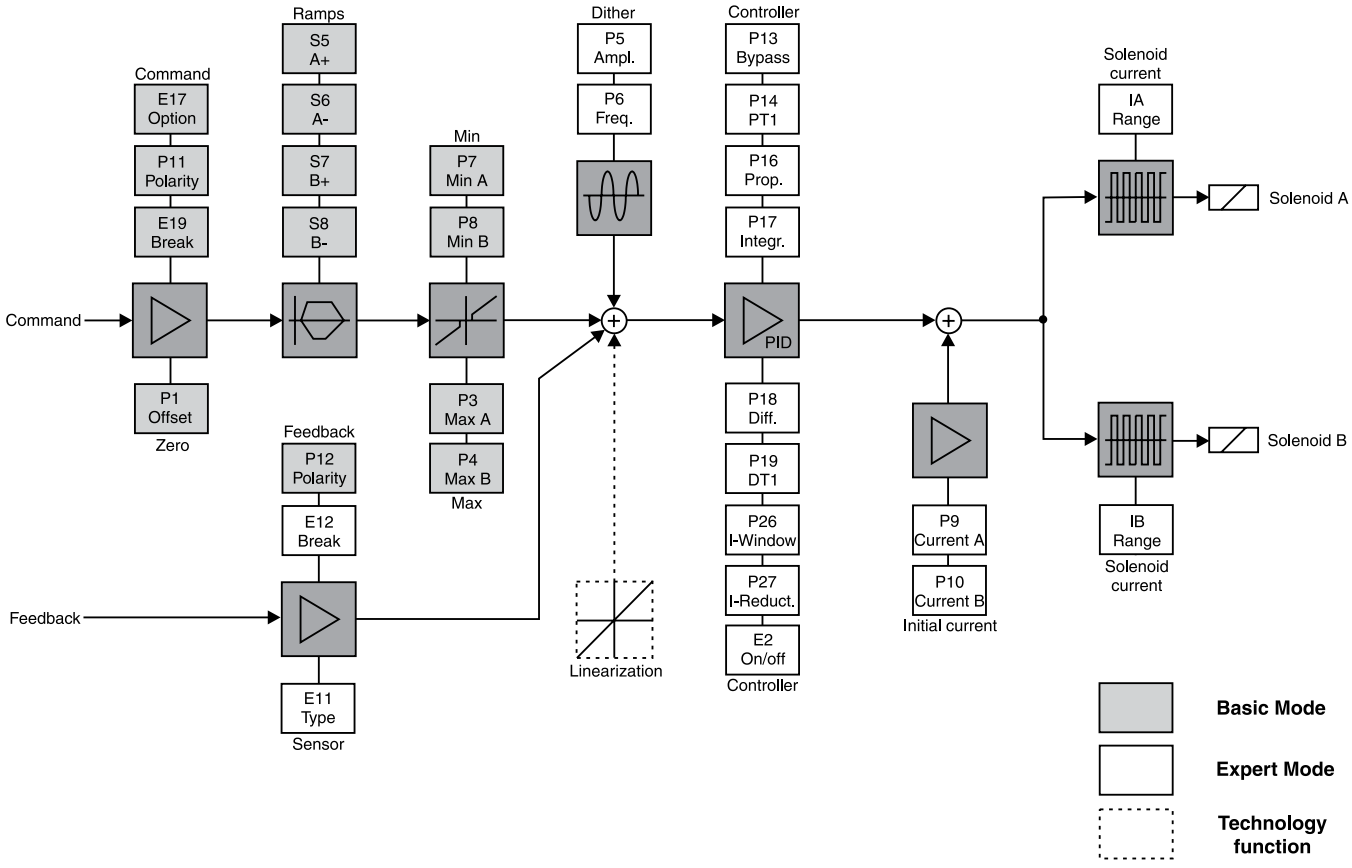
General			
Model	Module package for snap-on mounting on EN 50022 rail	**Mounting Position**	Any
Package Material	Polycarbonate	**Ambient Temperature Range**	-20°C to +60°C (-4°F to +140°F)
Inflammability Class	V2 to V0 acc. UL 94	**Protection Class**	IP 20 acc. DIN 40050
Electrical			
Duty Ratio	100%	**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	**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% Maximum 50 to 100% Ramp Time 0 to 32.5 s Zero Offset +100 to -100% Current 1.3/2.7/3.5 A Initial Current 0 to 25%
Current Consumption Max.	2.0A		
Pre-fusing	2.5A 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 = solenoid output off, > 3.8 mA = solenoid output on (acc. NAMUR NE43)	**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, 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



D

Signal Flow Diagram



PWDXXA-40.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

ProPxD Interface Program

The new ProPxD software permits user-friendly parameter setting for the electronic module series PCD, PWD and PZD.

Via the clearly arranged entry screen the parameters can be identified 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 default parameters which are available for all standard 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.
- Default values for standard valves.
- Identification and documentation of parameter sets.
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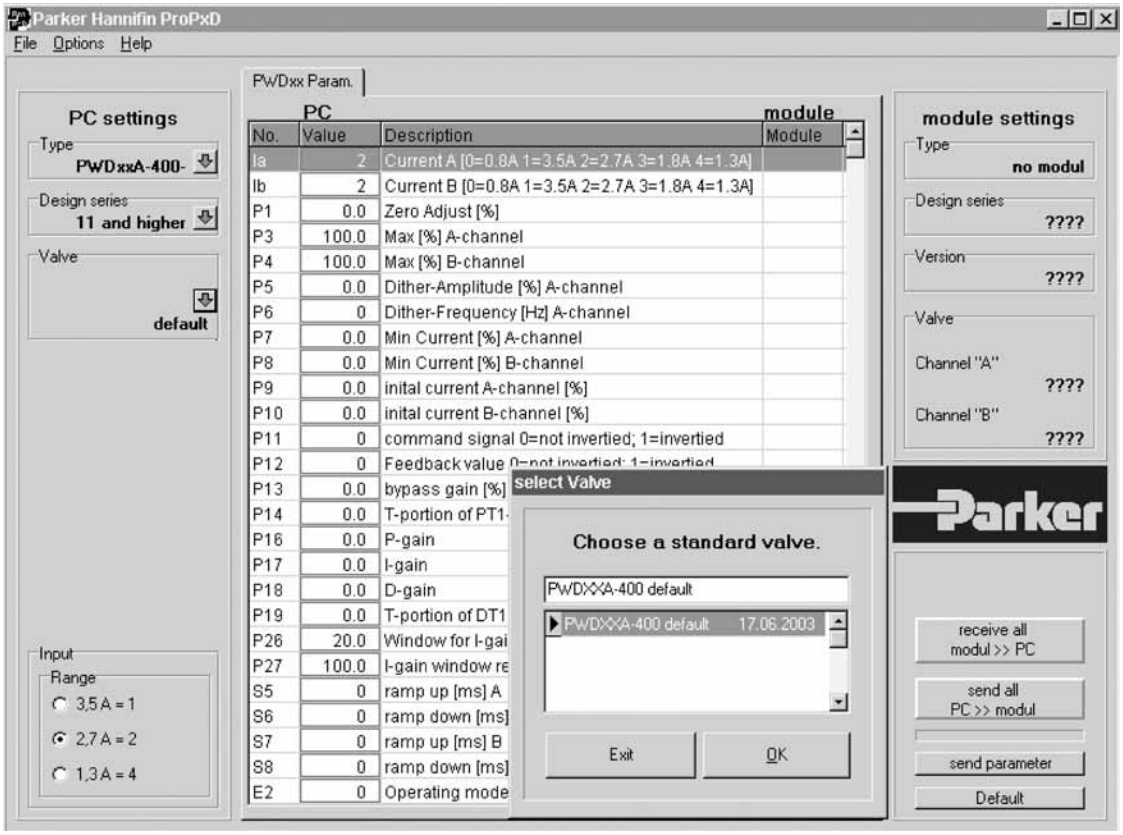
- Simple communication between PC and electronic via serial interface RS-232 and nullmodem cable.

D

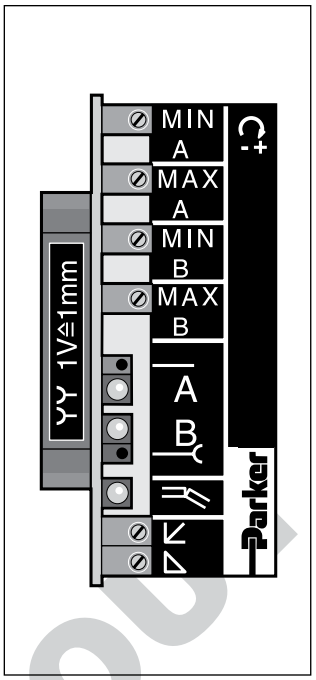


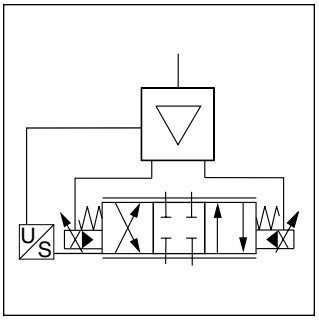
General Description

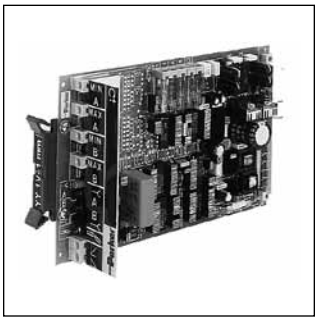
Series EW104 electronic module is used to control pilot operated D**FS proportional directional valves with main stage spool position feedback. The module accepts a ±10 volt command signal where spool position is controlled by a closed loop PID circuit on the module.

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.

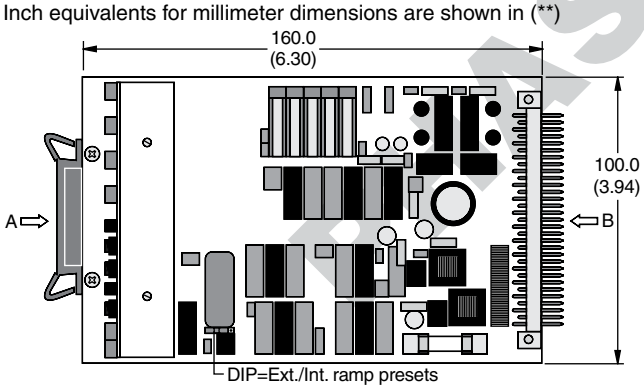






Dimensions

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



For new applications:
EW104: Refer to PWDXXA-400

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

Ordering Information

EW — Electronic Module Directional Valve

☐ — Size

Code	Valve Size	Mounting Pattern	Valve Spool Stroke	
10	D31FS	NG10	±5.0 mm	(0.20 in.)
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.)

104 — Module Type

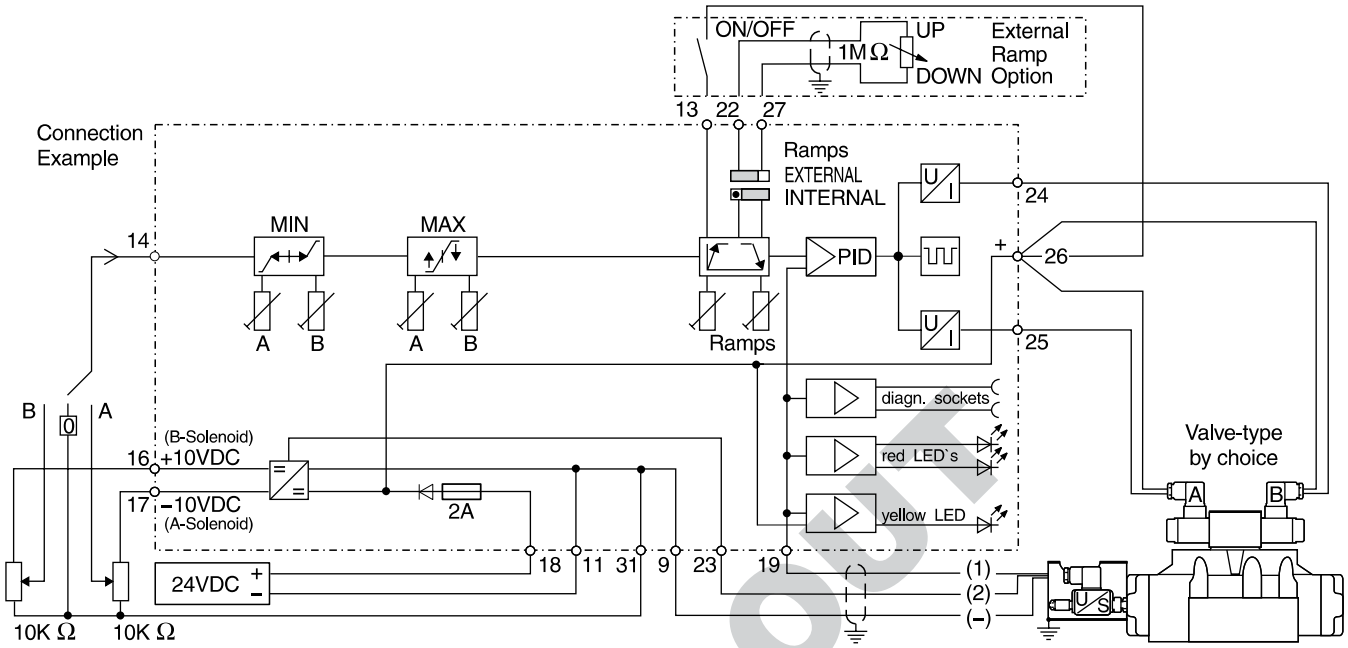
Code	Description
104	Amplifier, adjustable, MIN/MAX-limiting Up/Down ramps

☐ — Design Series

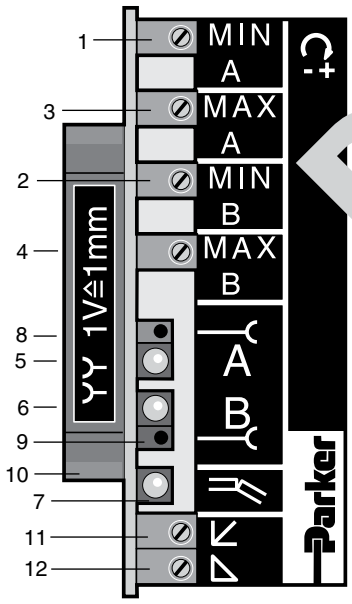
EW104.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Block Diagram — Wiring



Operating and Diagnostic Elements (Elevation A)



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.

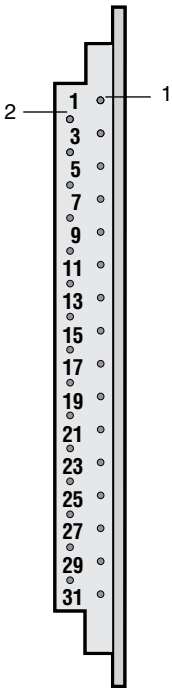
11 UP ramp potentiometer

12 DOWN ramp potentiometer

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.

Connector (Elevation B)



9 Reference potential 0V Transducer
11 Reference potential 0V supply
13 Input ramp disable
14 Input command voltage 0...+/-10 VDC
16 Output +10V reference
17 Output -10V reference
18 Input 24 VDC supply
19 Input transducer signal
22 Input external ramp option
23 Output transducer supply
24 Output control solenoid B
25 Output control solenoid A
26 Output control solenoid A+B with possibility for external switch connection
27 Input external ramp option
31 Reference potential 0V set value

EW104.indd, dd

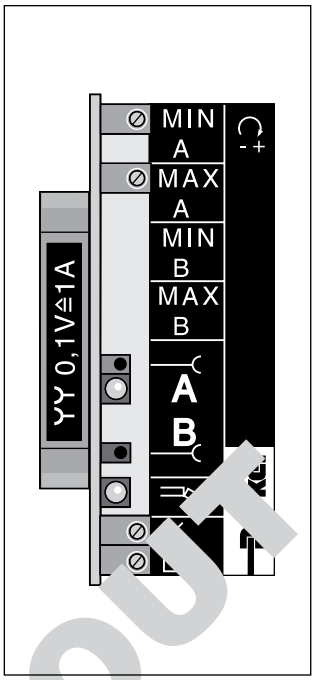
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

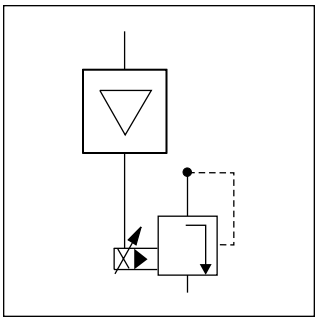
General Description

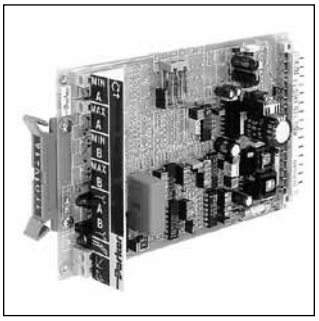
Series ED104 electronic module is used to control DSA/DWE/DWU pressure control valves. The module accepts a 0 to 10 volt command signal, and produces a proportionally linear output current used to drive the valve's proportional solenoid. Two ramp adjustments provide smooth transition between selected 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.



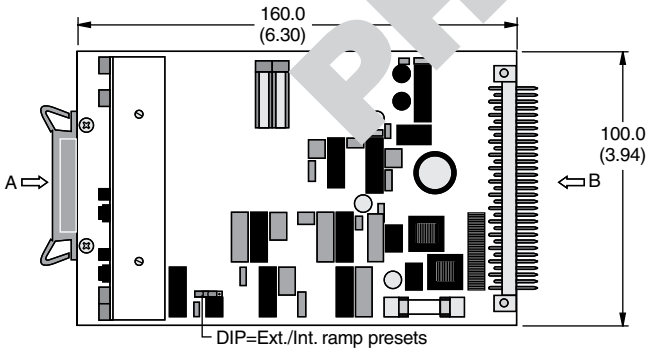




D

Dimensions

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



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

For new applications:
ED104: Refer to PCD00A-400

Ordering Information

ED — Electronic Module Pressure Valve

For:
DSA
DWE
DWU

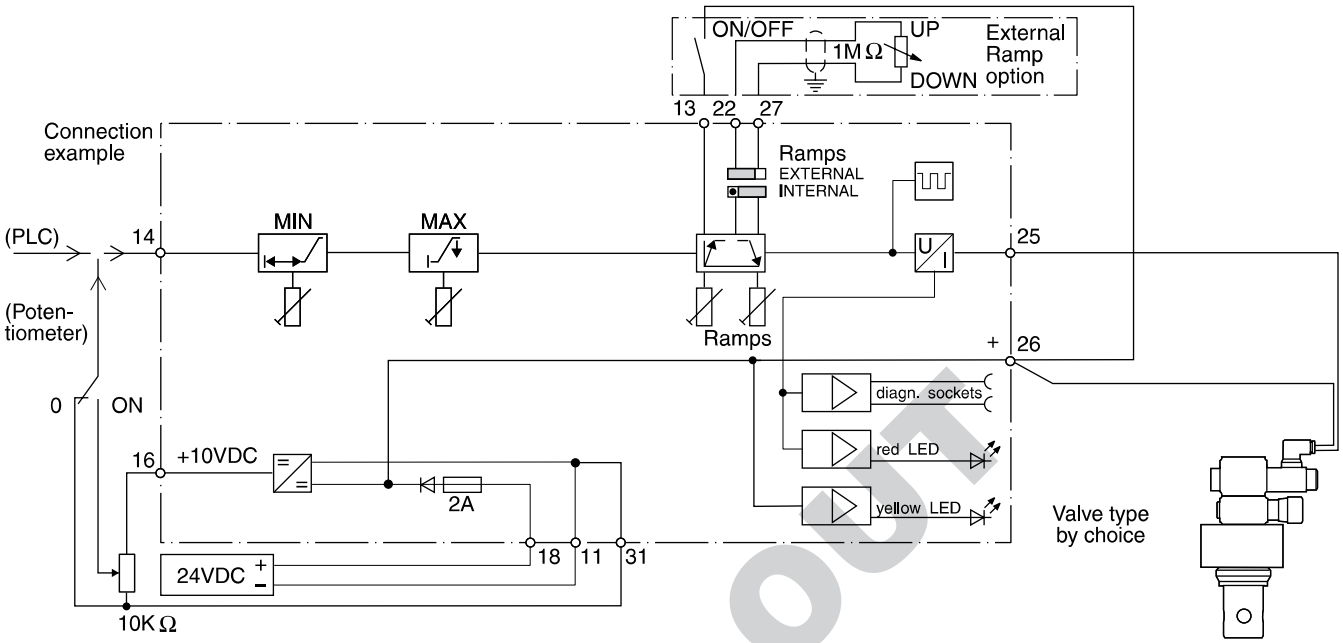
00

104 — Module Type

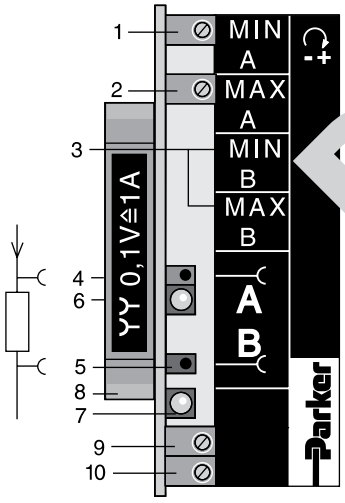
Code	Description
104	Amplifier, adjustable MIN/MAX-limits, Up/Down Ramps

□ — Design Series

Block Diagram — Wiring



Operating and Diagnostic Elements (Elevation A)



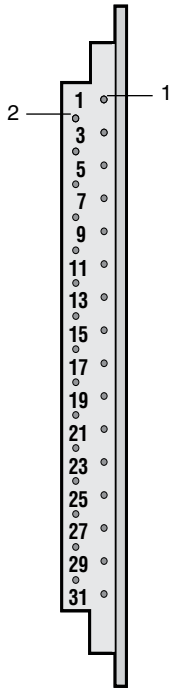
1 MIN-limiting for matching the lowest pressure
2 MAX-limiting for matching the highest pressure
3 Not used
4 Red socket for current diagnostic
5 Black socket for current diagnostic
6 Red LED (A) for:
- function indicator control solenoid
- (B unused here)
7 Yellow LED for:
- correct voltage supply
8 Red grip strip with reference information for measured values on the diagnostic sockets
9 UP ramp potentiometer
10 Down ramp potentiometer

Only potential-free measuring equipment to be used

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.

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

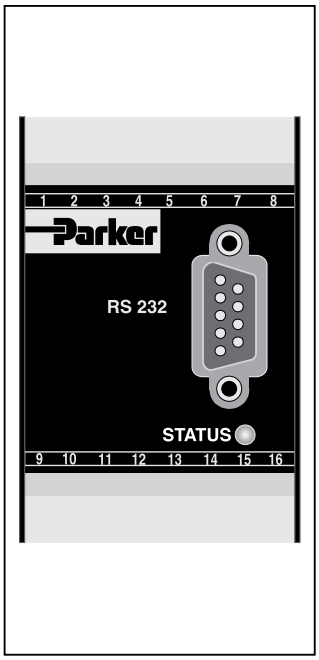
ED104.indd, dd

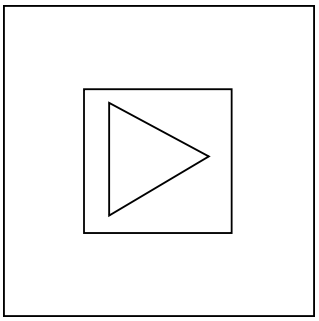
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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.

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**
		Minimum	0 to 50% 0 to 1000
		Maximum	50 to 100% 0 to 1000
		Ramp Time	0 to 32.5 s 0 to 32.5
		Current	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	**Interface**	RS 232C, DSub 9p. male for null modem cable
Current Consumption Max.	5.0A	**EMC**	EN 50081-2, EN 50082-2
Pre-fusing	6.3A medium lag	**Connection**	Screw terminals 0.2 to 2.5 mm², plug-in
Command Signal	0 to +10 VDC, ripple < 0.01 % eff., surge free, Ri = 150K ohm	**Cable Specification**	16 AWG overall braid shield for supply voltage and solenoids 20 AWG overall braid shield for sensor and signal
Input Signal Resolution	0.025%	**Cable Length**	50m (164 ft.)
Differential Input Voltage Max.	30V for terminals 5 and 6 against PE (terminal 8)		
Enable Signal	Off – 0 to 5.0 VDC; On – 8.5 to 30 VDC; Ri = 30K ohm		
Channel Recall Signal	Off – 0 to 5.0 VDC; On – 8.5 to 30 VDC; Ri = 30K ohm		

PCD00A-400.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

PCD — Electronic Module Pressure/Throttle Valves

00 — Without Position Control Universal

A

—

400 — Module Type

—

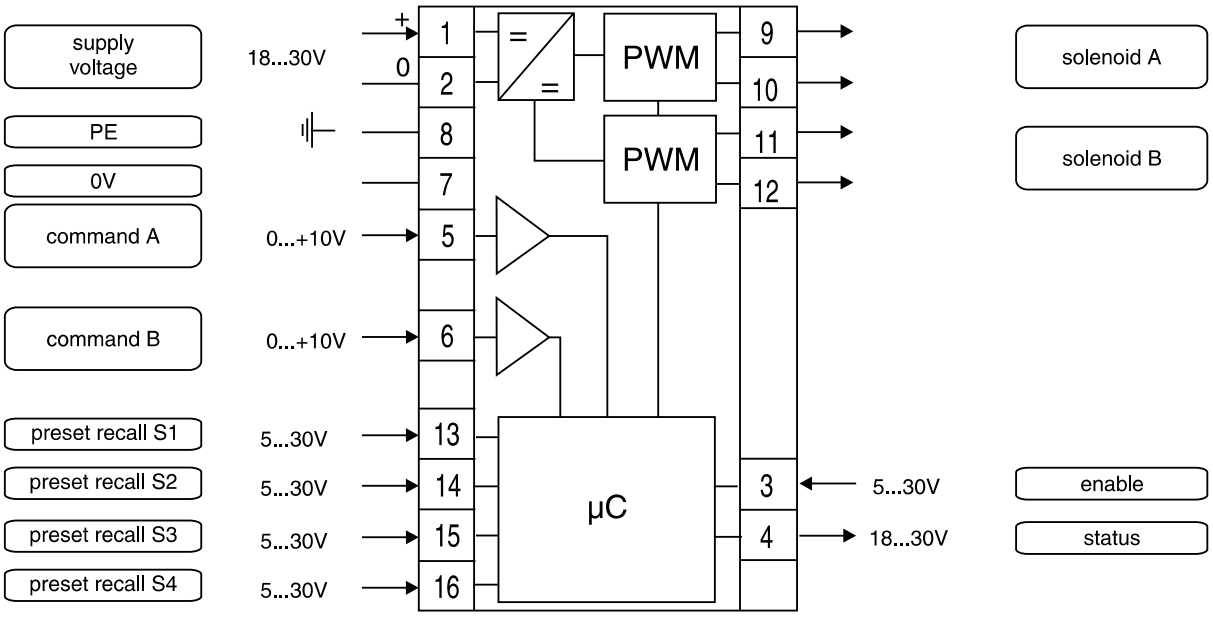
[ ] — Design Series
NOTE: Not required when ordering.

Weight: 160 g (0.35 lbs.)

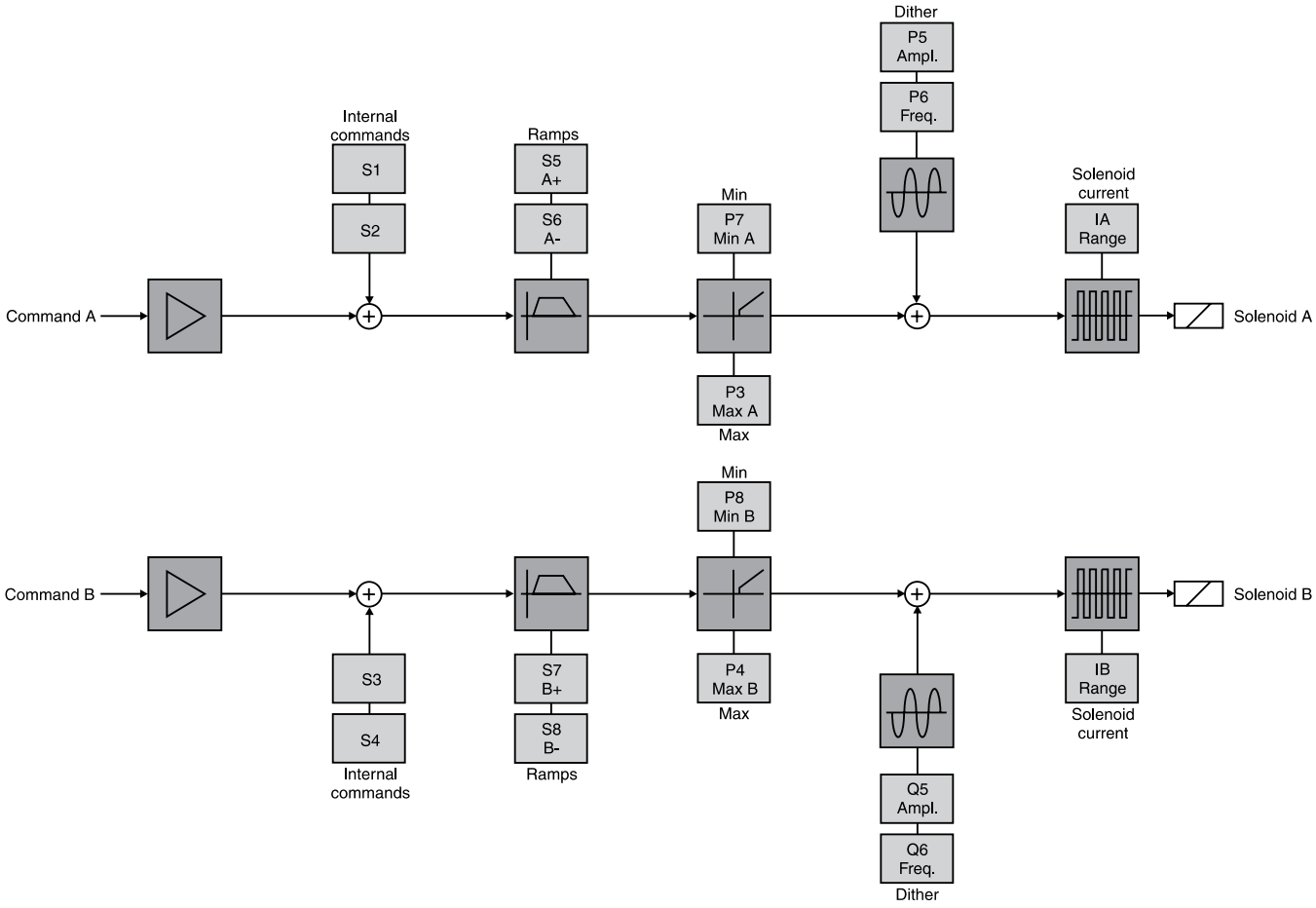
Code	Description
400	2 Amplifiers, MIN/MAX-adjustment, UP/DOWN ramps, Command inputs, 4 Command signal presets

D

Block Diagram — Wiring



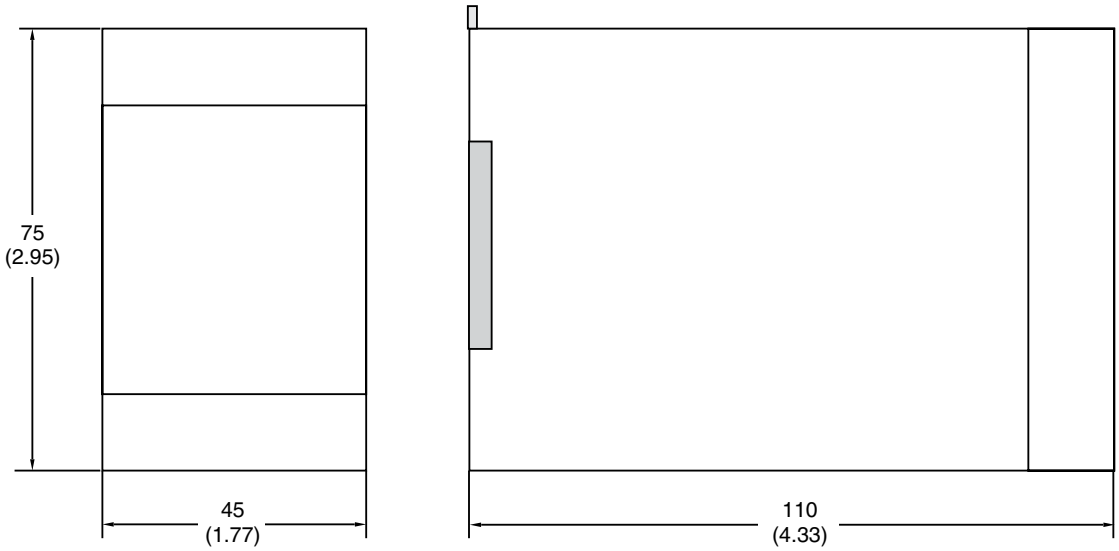
Signal Flow Diagram



D

Dimensions

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



ProPxD Interface Program

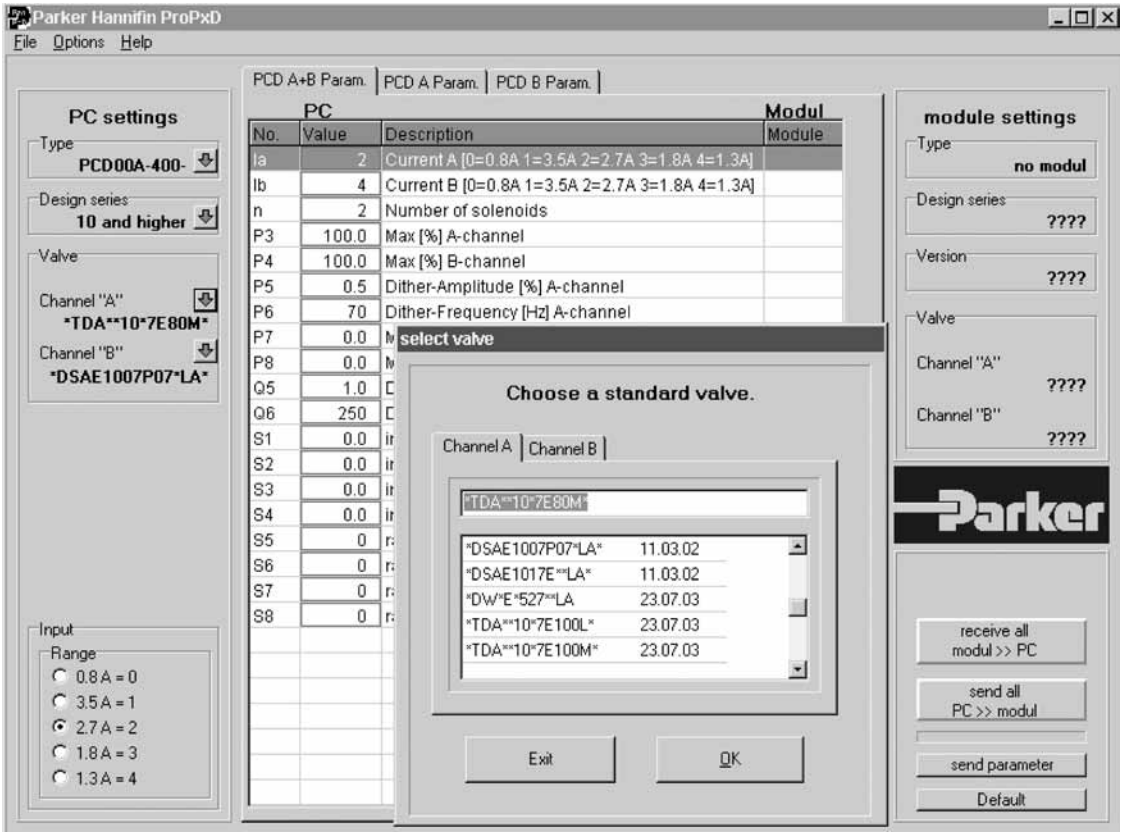
The new ProPxD software permits user-friendly parameter setting for the electronic module series PCD, PWD and PZD.

Via the clearly arranged entry screen the parameters can be identified 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 default parameters which are available for all standard 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.
- Default values for standard valves.
- Identification and documentation of parameter sets.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Simple communication between PC and electronic via serial interface RS-232 and nullmodem cable.

D



General Description

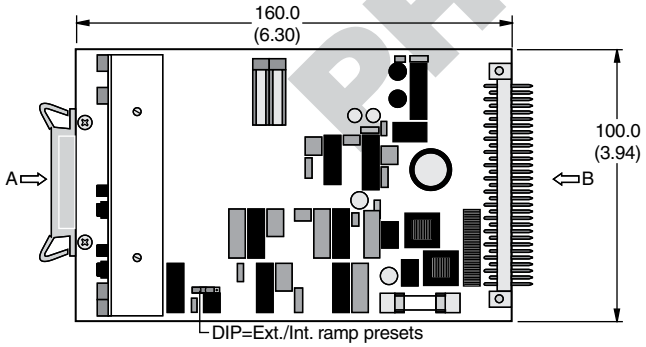
Series ET104 electronic module is used to control TDA and TEA proportional throttle valves configured with the 'L' solenoid option. For valves configured with the 'M' solenoid option, refer to driver card PCD00A-400. The module accepts a 0 to 10 volt command signal, and produces a proportionally linear 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

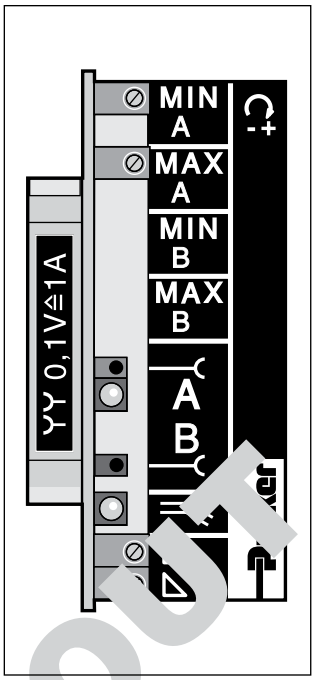
- Processing and amplification of the externally supplied positive set-values into output signals for the control solenoid.
- Can be combined with PZD00A-400 or external programmable control.
- DIP switch from internal ramp generation to external ramp setting.
- MIN/MAX limiters for matching the working 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.

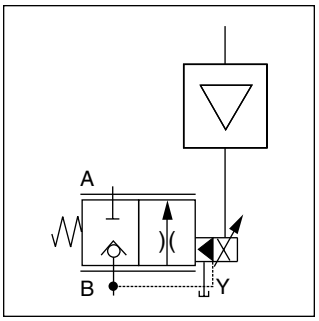
Dimensions

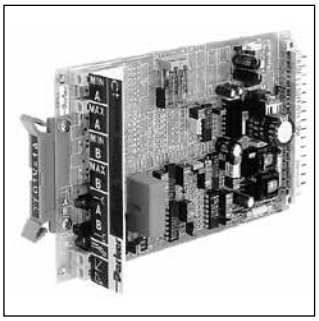
Inch equivalents for millimeter dimensions are shown in (**)



For new applications:
ET104: Refer to PCD00A-400







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

Ordering Information

ET — Electronic Module Pressure Valve

Size

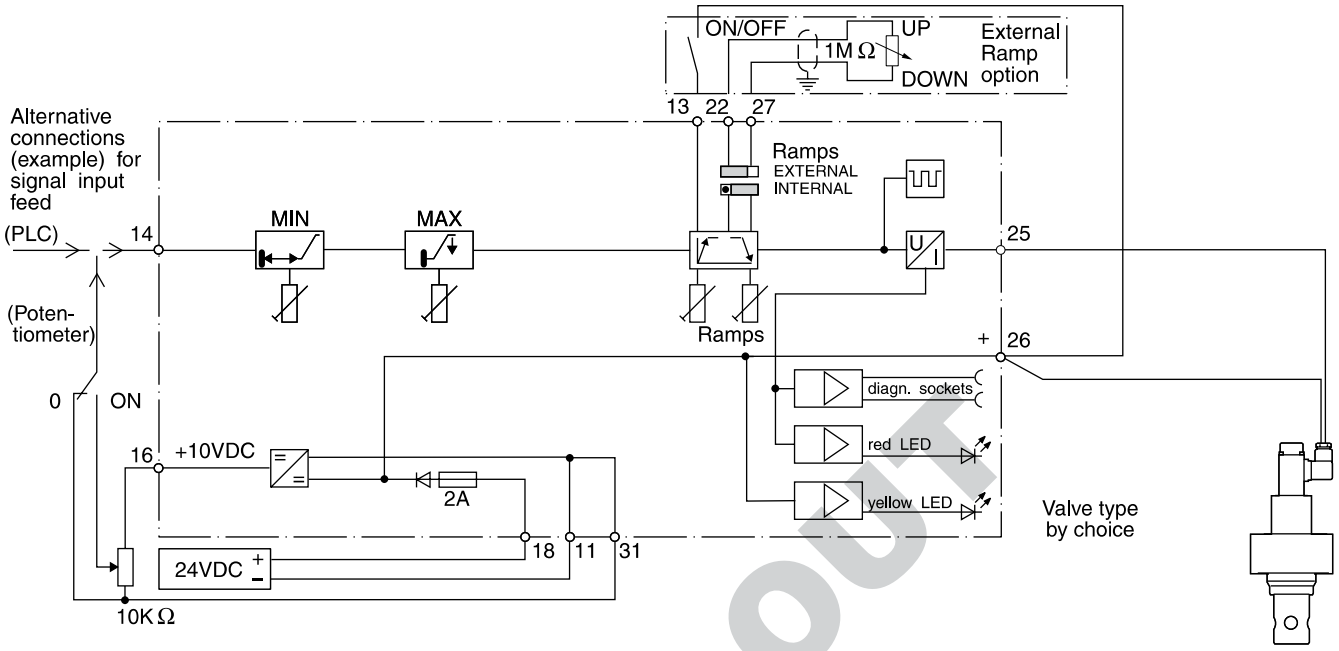
Code	Valve	Sol.
00	TDA...LAF E16 to E50	35mm
00	TEA...LAF E16 to E50	35mm
99	TDA...LAF E63 to E100	60mm
99	TEA...LAF E63 to E100	60mm

104 — Module Type

Code	Description
104	Amplifier, adjustable MIN/MAX limits, UP/DOWN ramps for valves with 'L' solenoid option

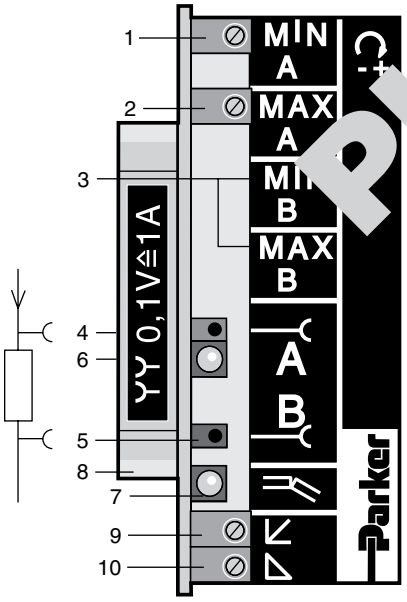
Design Series

Block Diagram — Wiring



D

Operating and Diagnostic Elements (Elevation A)



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

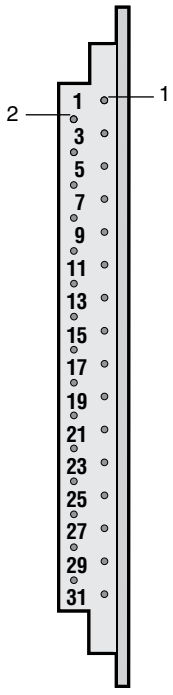
Only potential-free measuring equipment to be used

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.

ET104.indd, dd

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

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series BD90 servo amplifiers are high performance amplifiers designed to work with Series BD and DY servovalves. The amplifiers are packed with many desirable features that make them extremely versatile performers in motion control systems.

Features

- **Voltage or Current Commands —** The user has the option of command input ranges of either ±14 VDC or ±28 mA.
- **Two Differential Input Feedback Amplifiers —** Both inner and outer loops have Proportional-Integral-Derivative gain.
- **Built-in Power Supply —** The BD90 has its own power supply with inputs rated at either 115 VAC or 230 VAC.
- **Dither Circuitry —** The user can select either the on-board 60 Hz dither circuit, or input his own external dither frequency.
- **Reference Power Supply —** A reference suply voltage of ±15 VDC @ 350 mA, and ±10 VDC @ 50 mA.
- **External Logic Shutdown —** Allows the user to shut down the output to the valve by applying an external voltage signal.
- **Convenient Mounting —** The BD90 mounts in a convenient standard “Snap-Trac” mount.
- **Plug-in Terminal Strips —** This feature makes it unnecessary to remove the wires from the terminal strip.

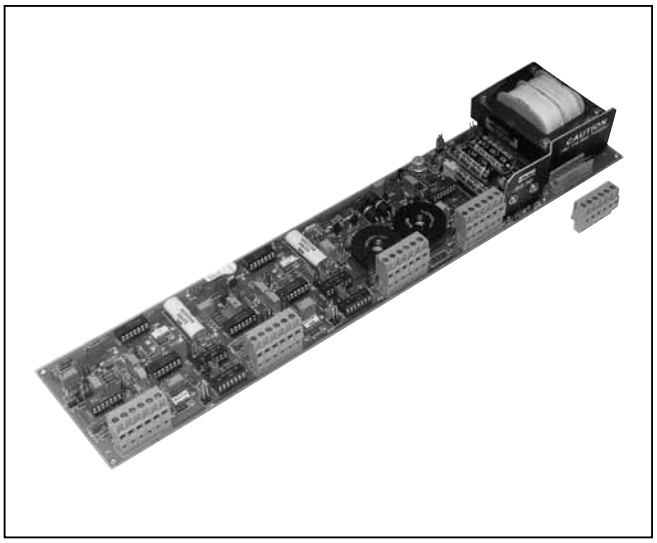
Ordering Information

BD — Servo Amplifier for BD Series and DY (>15mA) Series Servovalves

90 — Input Power

Code	Description
90	115 VAC

BD90 Connector 1000177
Snap-Trac BD90 830007-15
Snap-Trac is included with delivery

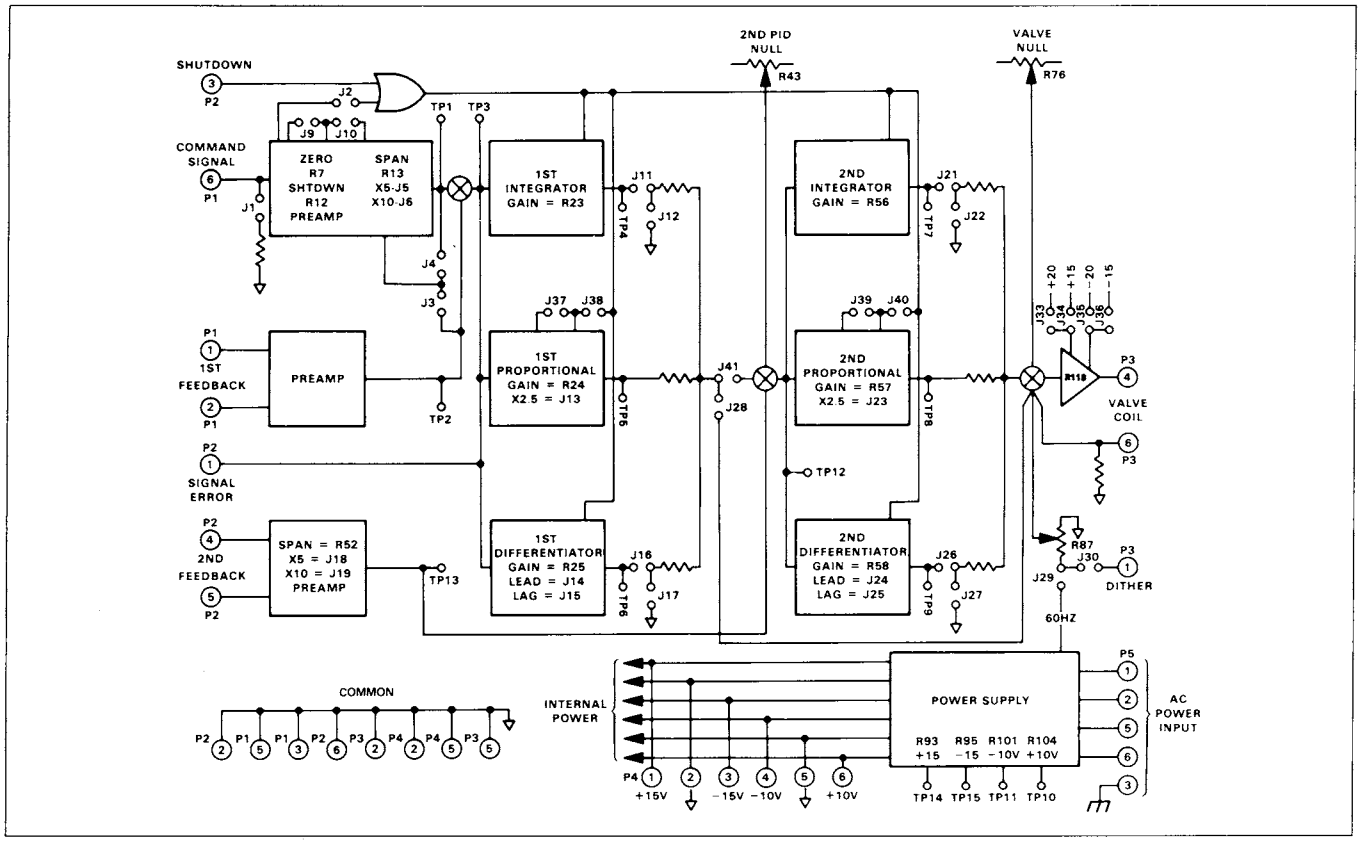


Specifications

Power Supply	BD90 – 115 VAC or 230 VAC @ 30 VA, 50/60 Hz
Command Signal Range	±14 VDC, ± 28 mA
Input Impedance on Command Terminals	100k ohm minimum
Input Impedance on Feedback Terminals	50K ohm minimum
Current Output	15 to 150 mA Icoil x Rcoil ≤12.5V (BD90 up to 200 mA with J33 and J35)
Operating Temperature Range	0°C to 70°C (32°F to 158°F)
Reference Voltage	±15 VDC @ 350 mA
Supplies	±10 VDC @ 50 mA
External Logic Shutdown Voltage Required	+4 to +10 VDC, sink input
Shutdown Input Impedance	10K ohm
Protection Class	Open, not rated

D

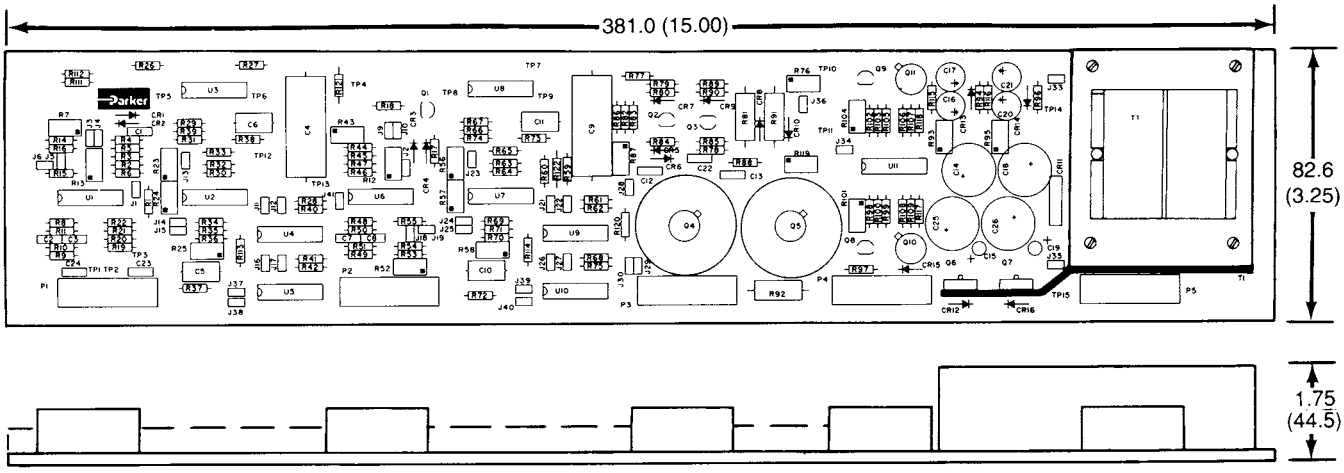
Block Diagram — Wiring



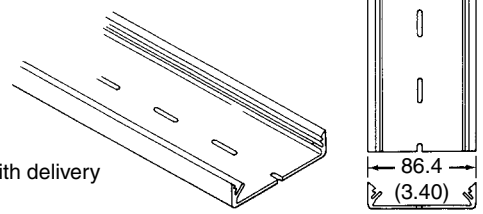
BD90 Servo Amplifier

Dimensions

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



BD90 Servo Amplifier



Snap-Trac is included with delivery

BD90.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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.

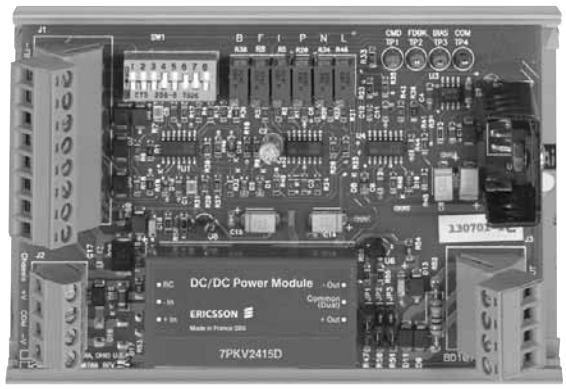
This card can function as a current driver for the BD servo valves. Maximum current outputs of ±30 mA, ±60 mA, ±100 mA and ±150 mA are jumper configurable.

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.



D

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** **Current**	Differential Inputs ±10 VDC max. 100K ohm input impedance ±20 mA max switch configurable 499 ohm input impedance
Reference Voltages	±10 VDC @ 10 mA
Current Output	±30 mA, ±60 mA, ±l00 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

Ordering Information

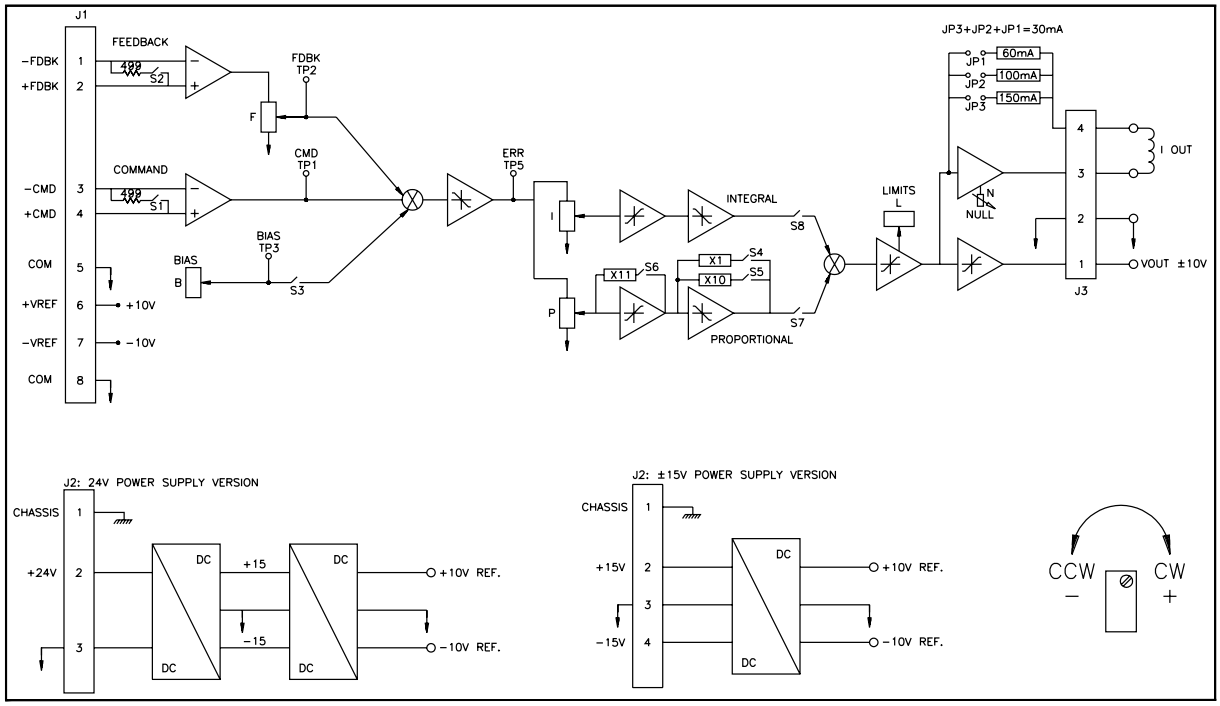
BD	101	—	☐	⌐ ⌐ ⌙ ⌙
Signal Conditional Card	Style		Power Supply	Design Series

Code	Description
15	±15 VDC @ 200 mA
24	24 VDC nominal

NOTE: Not required when ordering.

Note: Snap-Trac is included with delivery

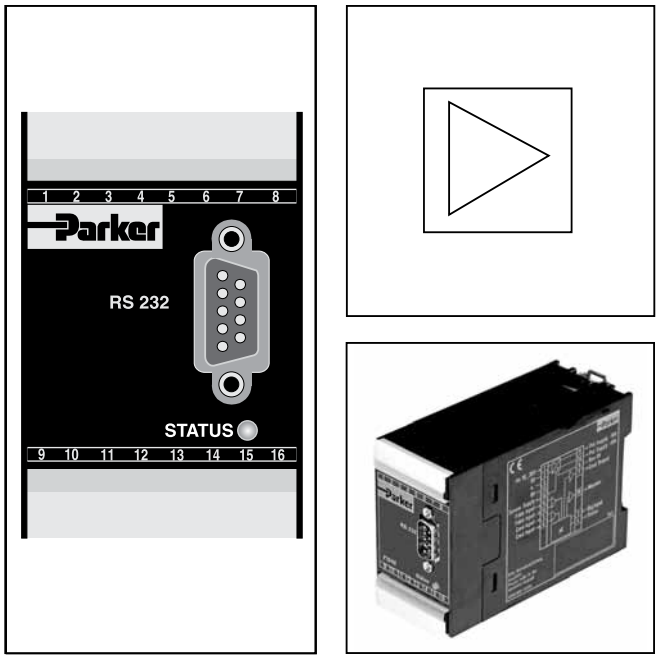
Block Diagram — Wiring



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

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

PID	00	A	—	40	—	☐	—	⌜ ⌝
Electronic Module Closed Loop Control	Universal			Min/Max Ajustment Accel/Decel Ramps Command Input		Technology Function		Design Series NOTE: Not required when ordering.

Code	Function
0	Standard
1	Linearization Option

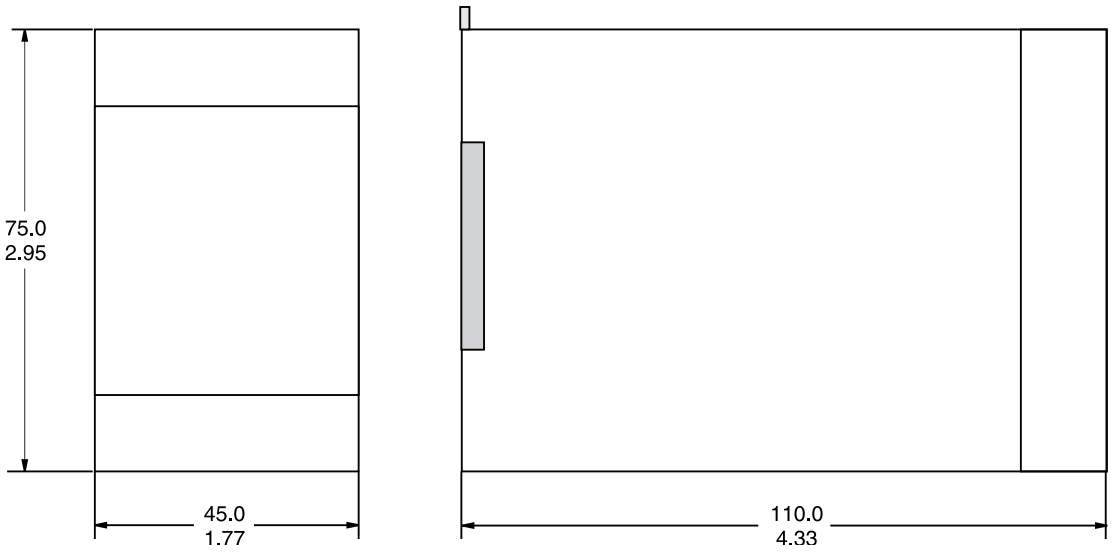
Specifications

General	
Model	Module package for snap-on mounting on EN 50022 rail
Package Material	Polycarbonate
Inflammability Class	V2...V0 acc. UL 94
Mounting Position	Any
Ambient Temperature	-20°C to +60°C (-4°F to +140°F)
Protection Class	IP 20 acc. DIN 40050
Weight	0.16 kg (0.35 lbs.)
Electrical	
Duty Ratio	100%
Supply Voltage	18...30 VDC, ripple <5% eff., surge free
Current Consumption Max.	100 mA
Pre-fusing	500 mA
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)

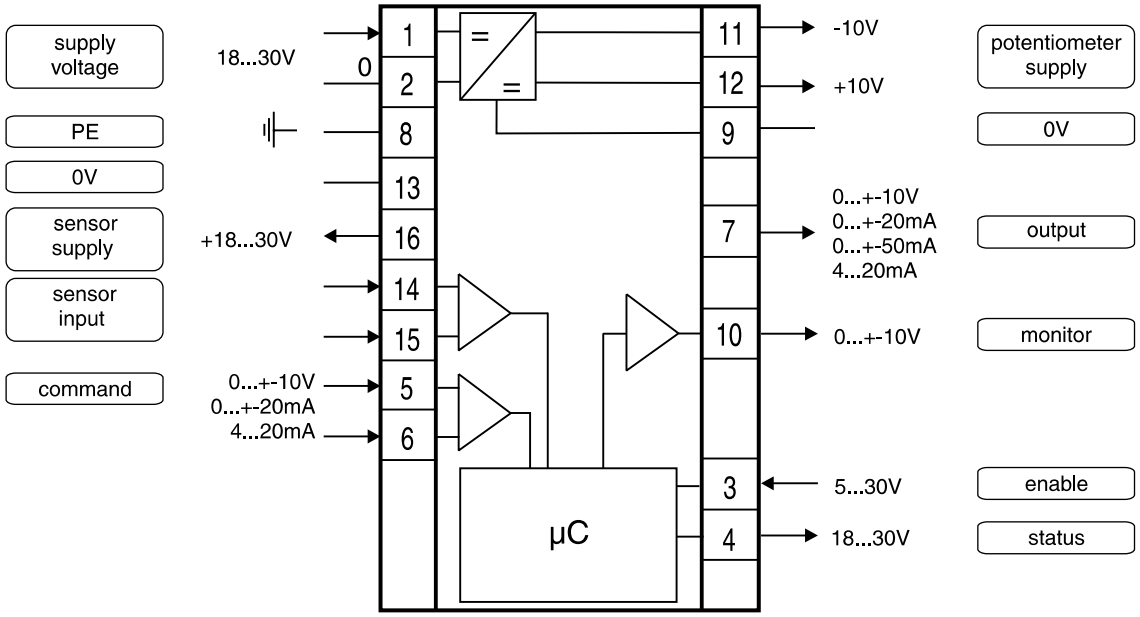
Electrical (cont.)	
Input Signal Resolution	0.025 %
Differential Input Voltage Max.	30 V for terminals 5 and 6 against PE (terminal 8)
Enable Signal	0...2.5 V: OFF / 5...30 V: ON Ri = 100 kOhm
Status Signal	0...0.5 V: OFF / Us: ON rated 15 mA maximum
Monitor Signal	+10...0...-10 V, rated 5 mA max., signal resolution 0.4%
Adjustment Ranges	Minimum: 0...50 % Maximum: 50...100% Ramp: 0...32.5 s Zero Offset +100%...-100%
Interface	RS 232C, DSub 9p. male for null modem cable
EMC	EN 50081-2, EN 50082-2
Connection	Screw Terminals 0.2...2.5 mm², disconnectable
Cable Specification	20 AWG overall braid shield
Cable Length	50 m (164 ft.)
Options	
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



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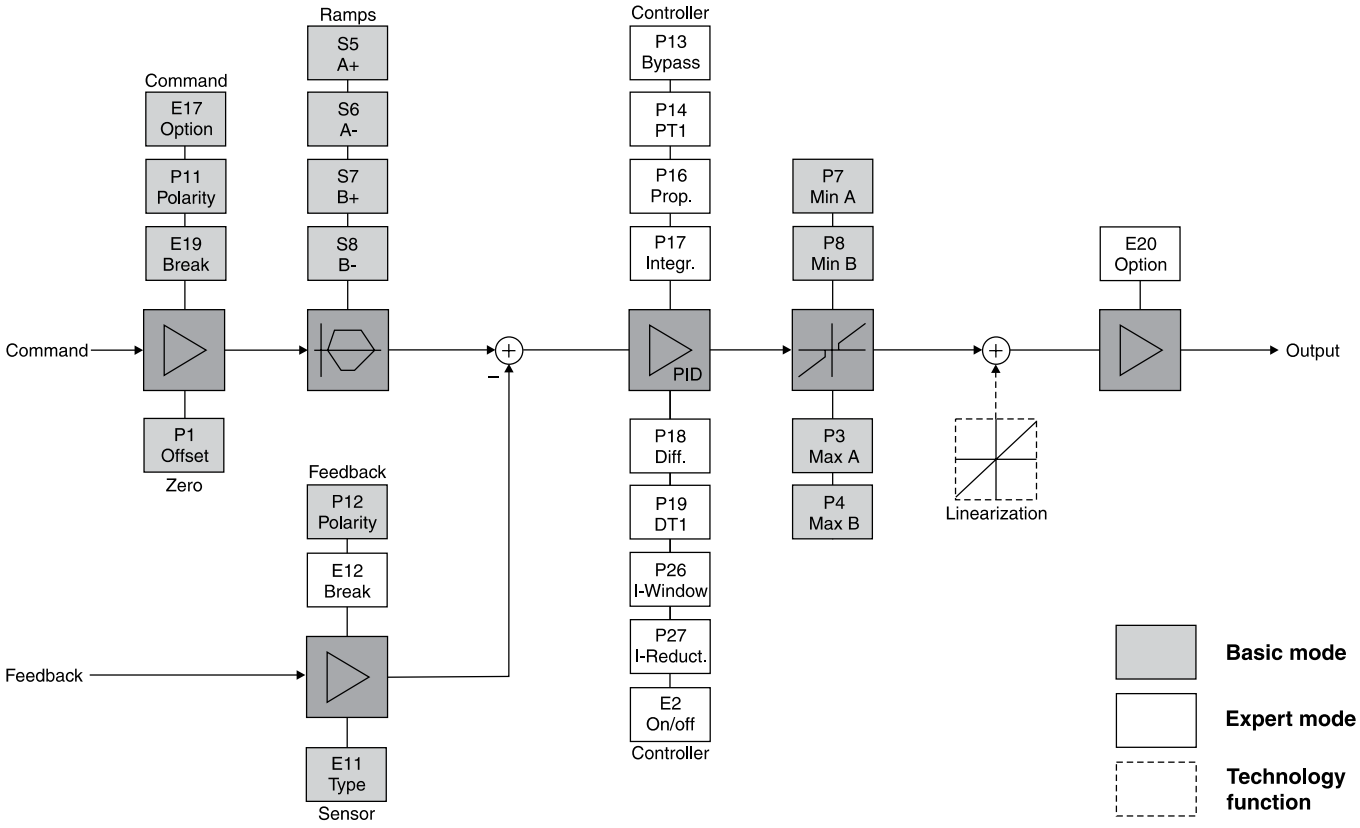
Signal Flow Diagram



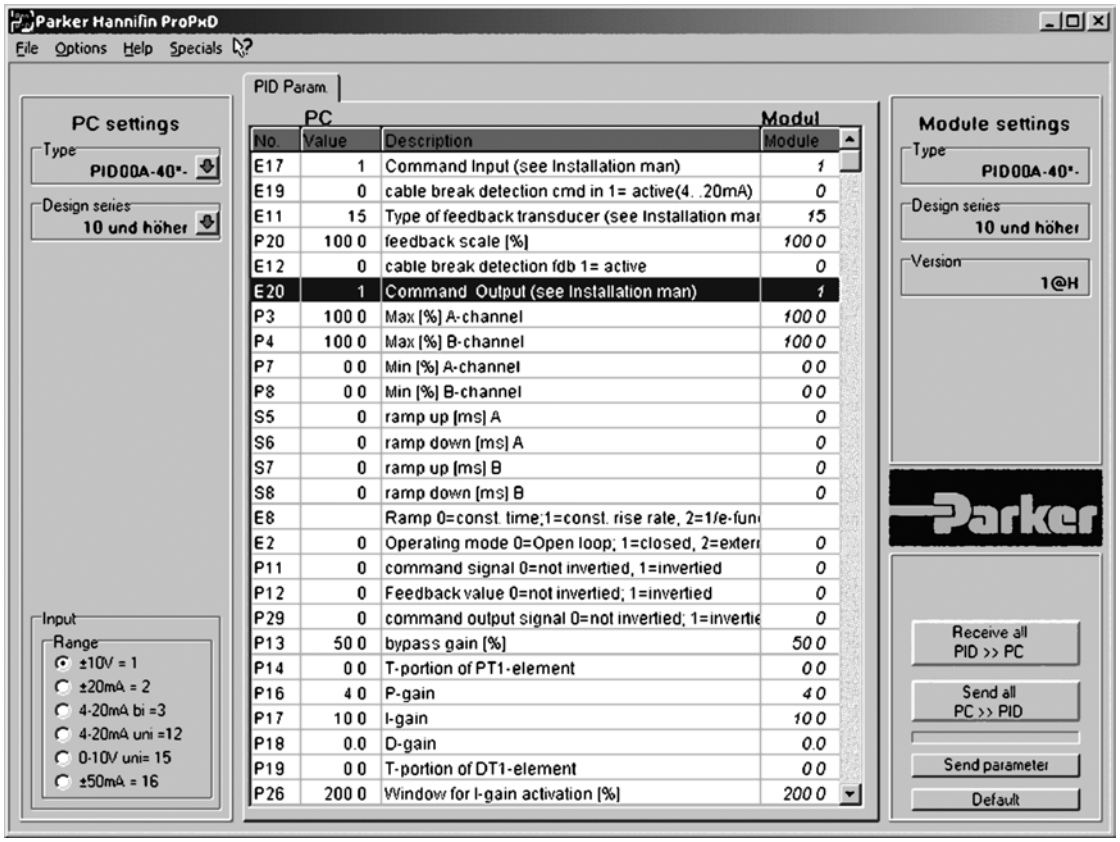
ProPxD Interface Program

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

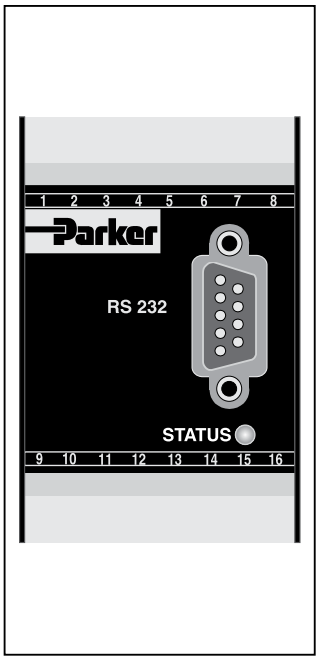
- Simple editing of all parameters
- Storage and loading of optimized parameter adjustments
- Executable with all Windows® operating systems from Windows® 95 upwards
- Communication between PC and electronic via serial interface RS-232 and nullmodem cable
- Simple to use interface program. Download free of charge **www.parker.com/euro_hcd → Services → downloads**

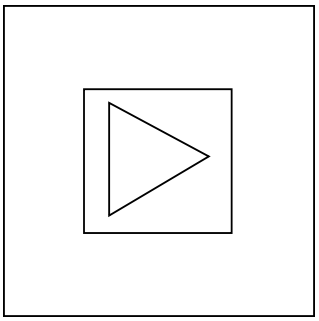


General Description

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, setpoints, 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).



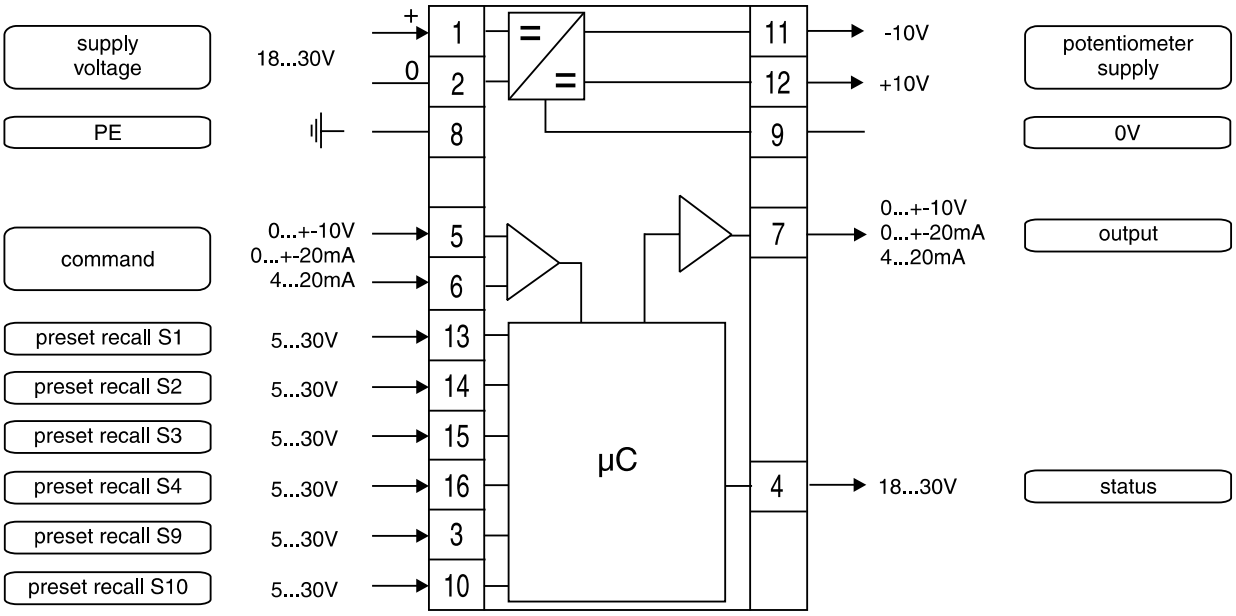


D

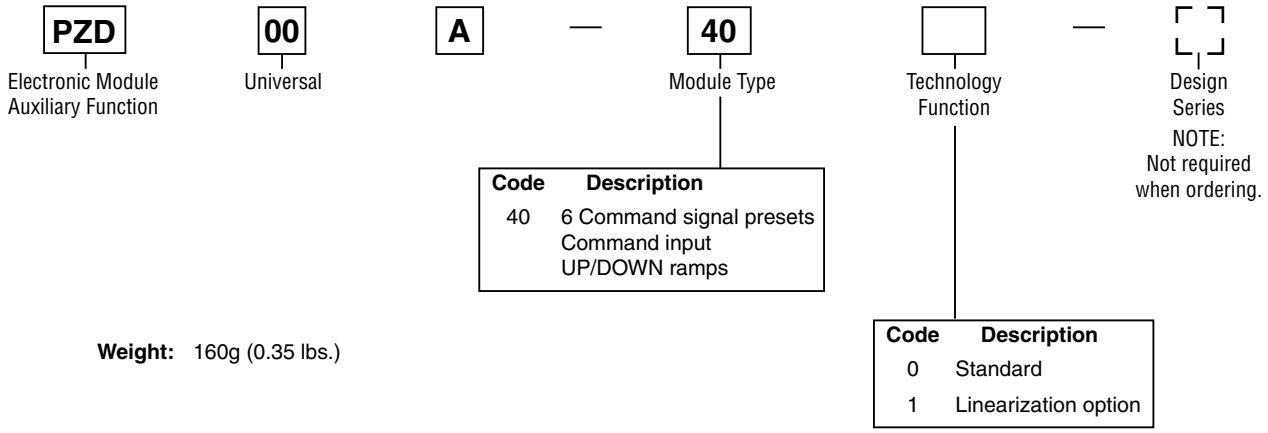
Features

- 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.

Block Diagram — Wiring



Ordering Information



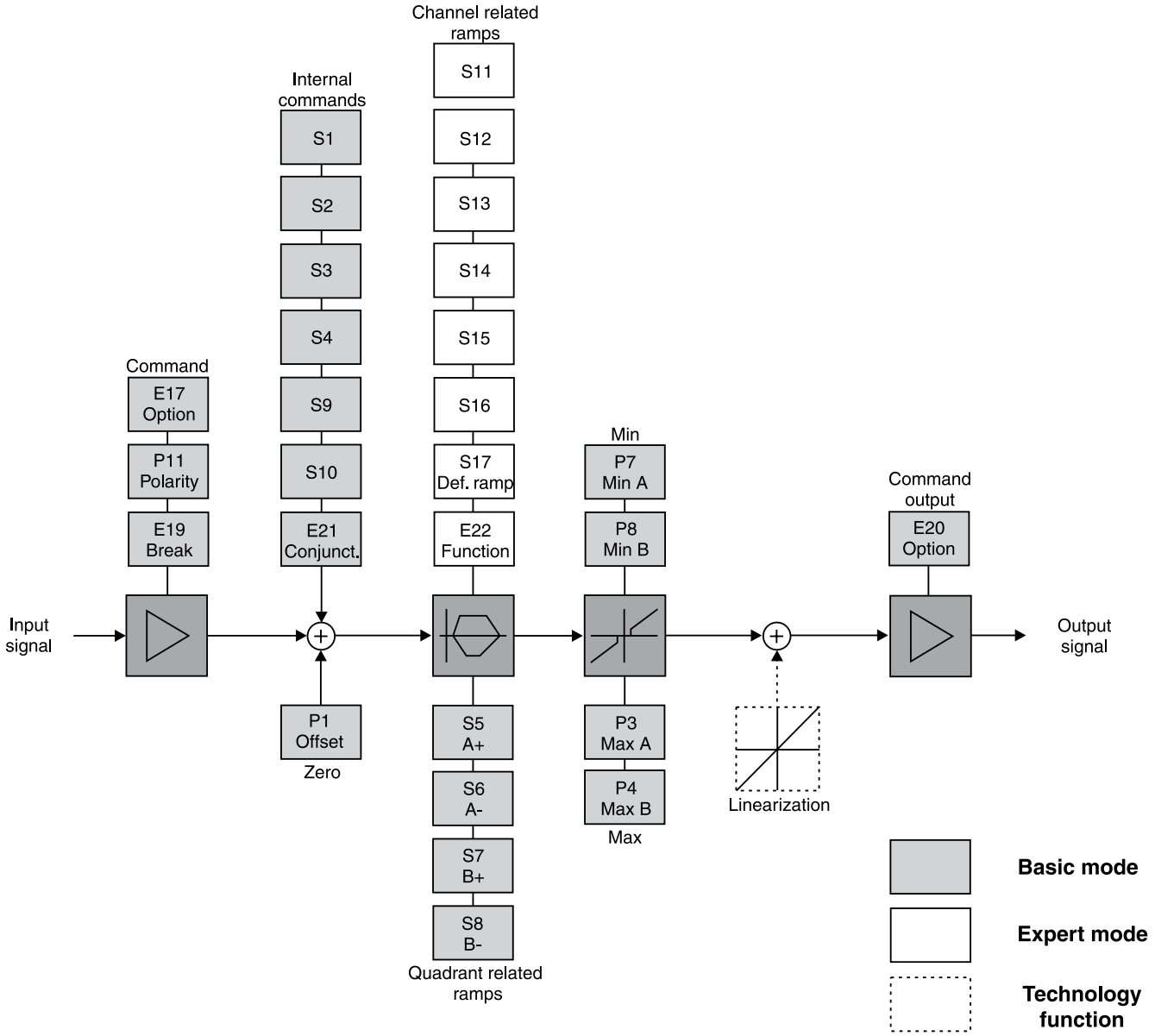
Weight: 160g (0.35 lbs.)

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 Maximum Cmd Channels Ramp Time Zero Offset	 0 to 50% 50 to 100% +100 to -100% 0 to 32.5 s +100 to -100%
		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.	30 VDC for terminals 5 and 6 against PE (terminal 8)	**Connection**	Screw terminals 0.2 to 2.5 mm², disconnectable
Channel Recall Signal	Off – 0 to 2.5 VDC On – 5 to 30 VDC Ri = 100K ohm	**Cable Specification**	20 AWG overall braid shield
		Cable Length	50m (164 ft.)
Options			
Technology Function	Code 1: Software adjustable transfer function with 10 compensation points for linearization of valve behavior.		

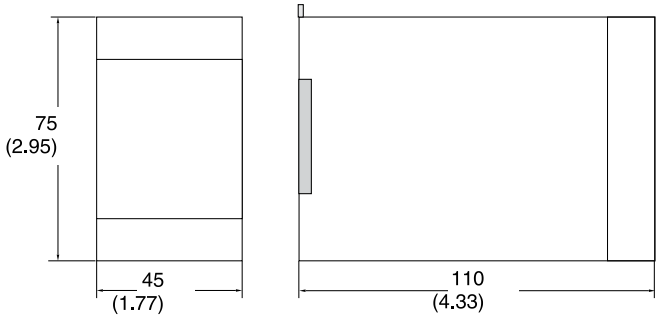
Signal Flow Diagram



D

Dimensions

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



D

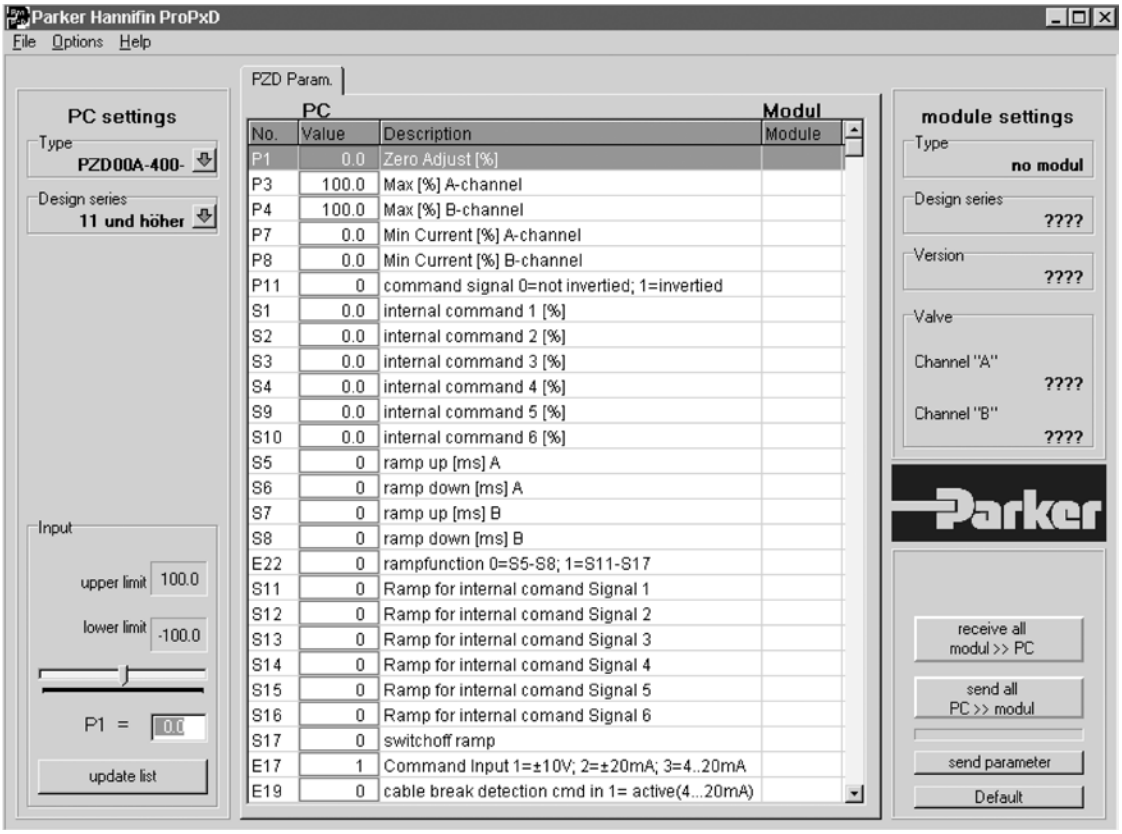
ProPxD Interface Program

The new ProPxD software permits user-friendly parameter setting for the electronic module series PCD, PWD, PZD and PID.

Via the clearly arranged entry screen the parameters can be identified 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 default parameters which are available for all standard 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.
- Default values for standard valves.
- Identification and documentation of parameter sets.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Simple communication between PC and electronic via serial interface RS-232 and nullmodem cable.



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

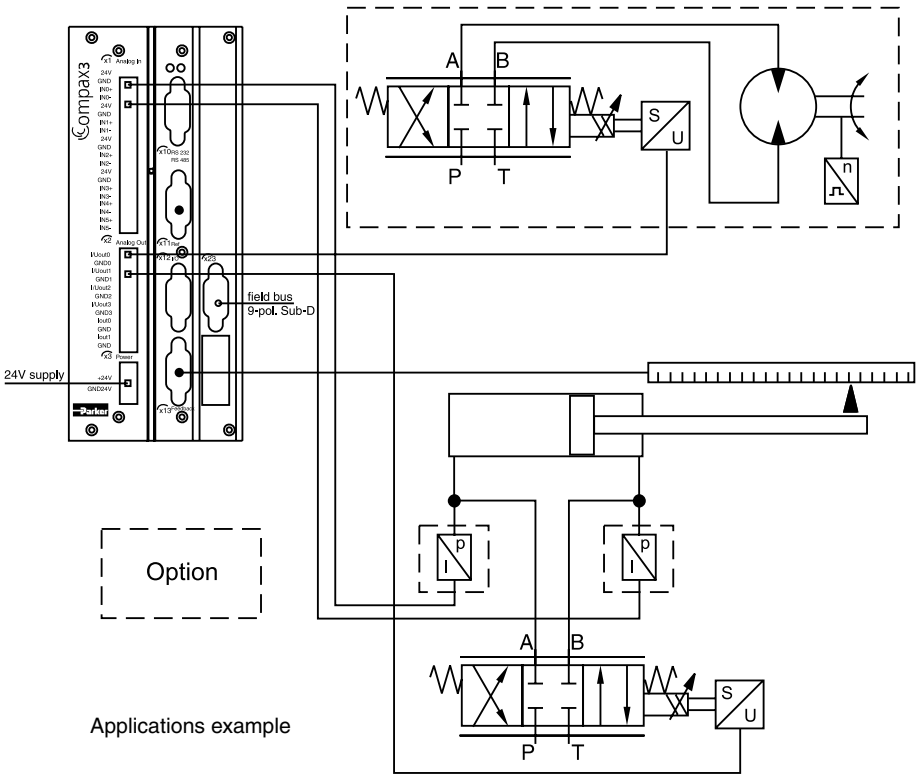
- Valves:
  - Proportional direction control valves
  - Proportional pressure relief and pressure reducing valves
  - Flow valves
- Drives:
  - Cylinders
  - Rotary drives
  - Motors

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

Typical Applications

- Feeder axis
- Position and force control of press cylinders in material forming machines
- Roller clearance control in roller presses
- Die casting machines



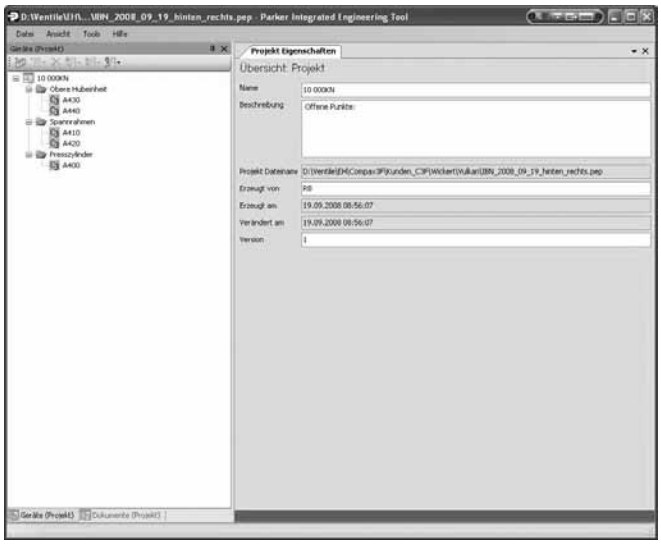
Applications example

C3F.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

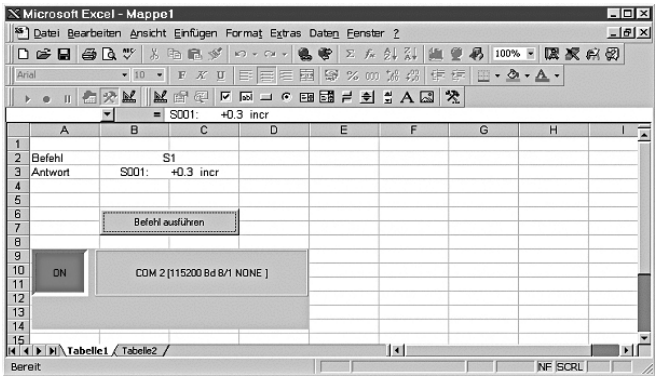
Operating Module

- 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.



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.

International Standards in Programming

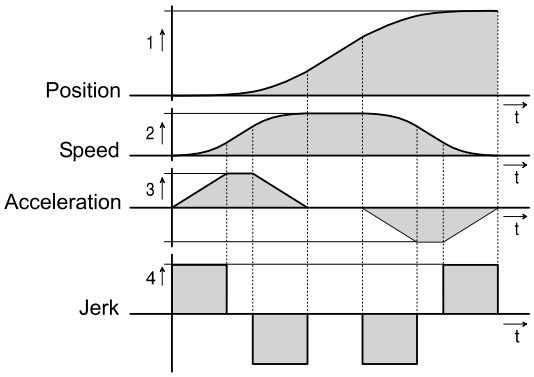
Advantages Offered by Integrated Standards

- Programming system
  - CoDeSys
- Programming language
  - IEC61131-3
  - Function modules based on PLCopen

D

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

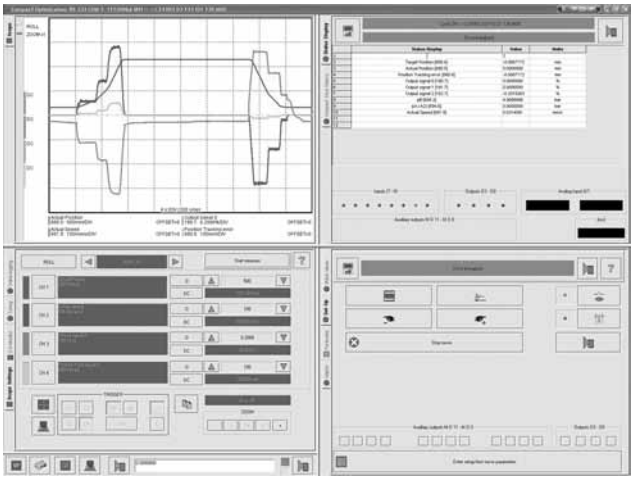
2-Axis Synchronous Run

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 profils. 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, ±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:	• 115200Baud • Word length 8 bits, 1 start bit, 1 stop bit • Hardware handshake XON, XOFF
RS485 (2 or 4-wire):	• 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	• Climate (temperature / humidity / barometric pressure)
General environmental condi tions acc. to EN 60 721-3-1 to 3-3	• Class 3K3
Permissible ambient temperature	• Operation: 0 to +45 °C class 3K3 • Storage: -25 to +70 °C class 2K3 • Transport: -25 to +70 °C class 2K3
Tolerated humidity: non condensing	• Operation: <= 85% class 2K3 • Storage: <= 95% class 3K3 (relative humidity) • Transport: <= 95% class 2K3
Elevation of operating site: <=1000m above sea level for 100% load ratings	• 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

C3F.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

C3 **F001** **D2** **F12** ☐

Series — 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

C3F.indd, dd

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

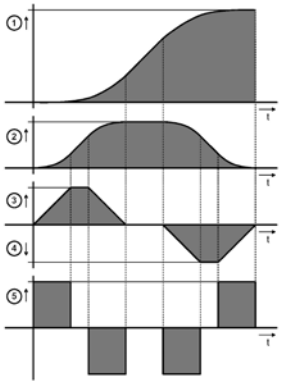
Extended Function Range

- 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



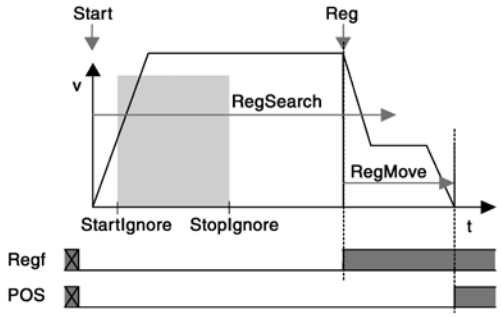
Stop Movement

The Stop set interrupts the current motion set.

Reg-related Positioning

For registration mark-related positioning, 2 motions are defined:

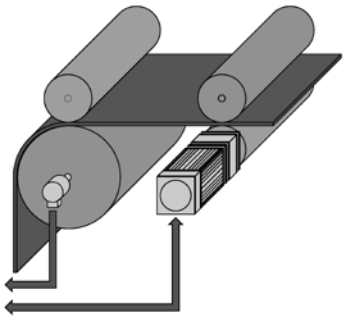
- RegSearch: Search of an external signal, e.g. a registration mark on a product
- RegMove: The external signal interrupts the search movement and the second movement by an offset follows without transition
- Precision of the registration mark detection: <1µs



Electronic Gearbox:

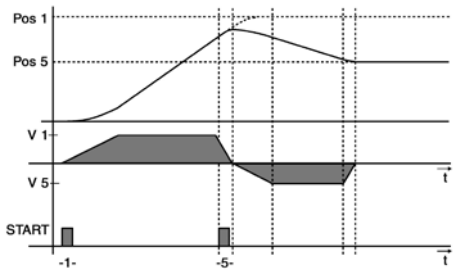
Motion synchronized to a master axis with any transmission ratio. The position of a master axis can be detected via:

- +/-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.



D

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

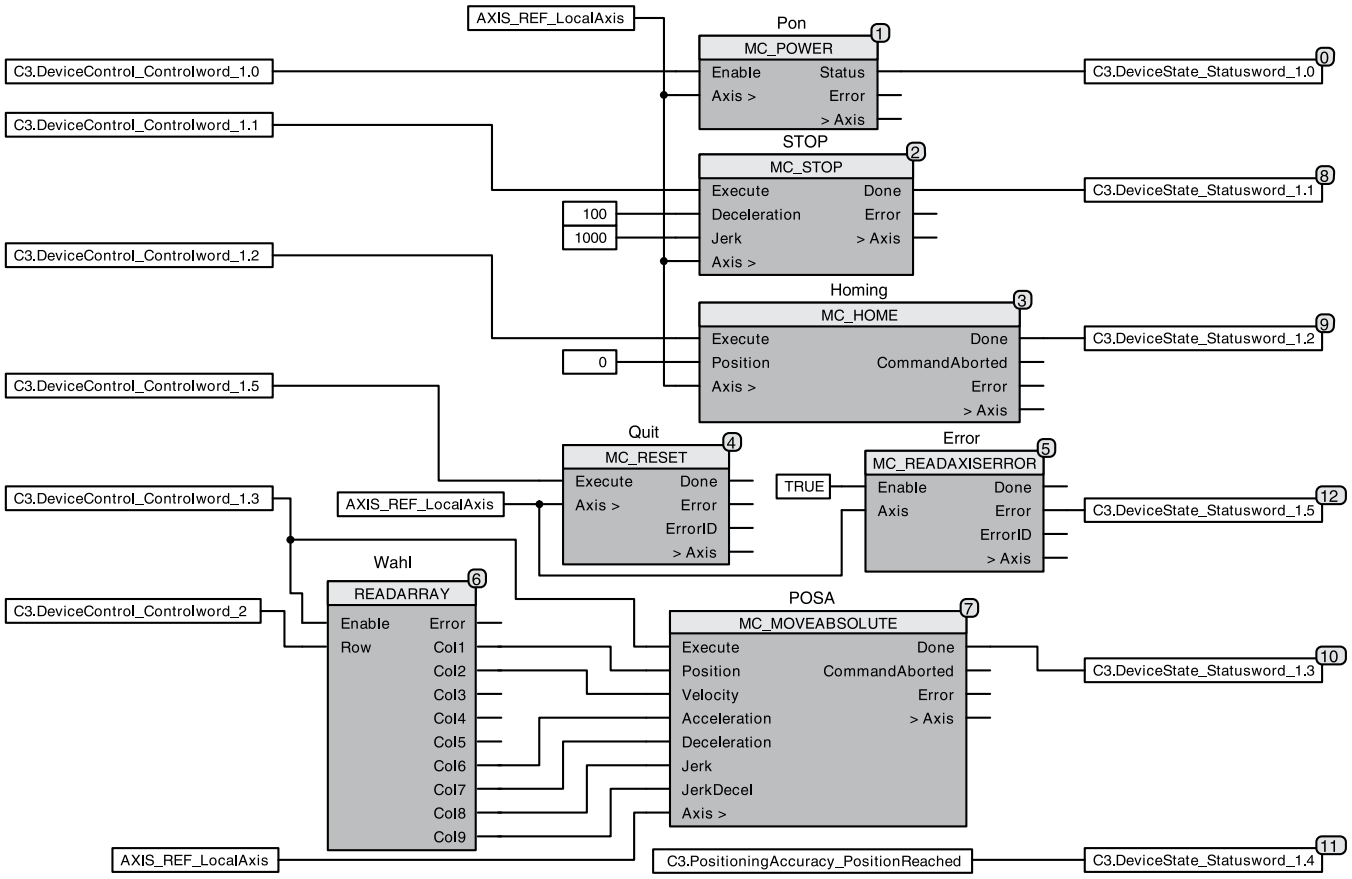
- Programmable based on IEC61131-3
- Programming system: CoDeSys
- Up to 5000 instructions
- 500 16-bit variables / 150 32-bit variables
- Recipe table with 288 variables
- 3 16-bit saved variables (power failure protected) / 3 32-bit saved variables (power failure protected)
- PLCopen-function modules:
  - 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.



Example of a bus interface controlled IEC61131 application

D

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-knive 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 CamDesigner, cam applications can be implemented very easily.

Function T40

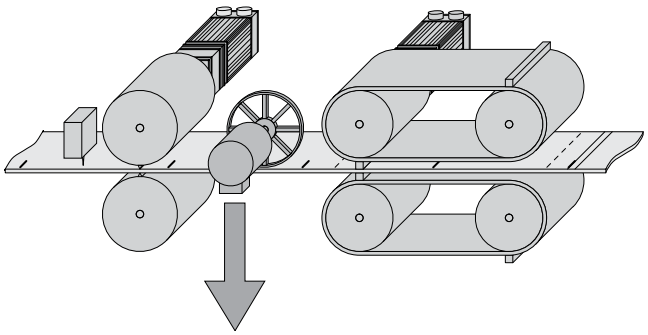
- Technology functions of the T30 version fully integrated and available
- Master position acquisition
- Mark synchronization
- Cam switching mechanism
- Coupling and decoupling function
- Cam profiles
- Cam memory
- Cam creation with CamDesigner

Master Position Acquisition

- Acquisition by incremental encoder
- Acquisition by the HEDA real-time bus

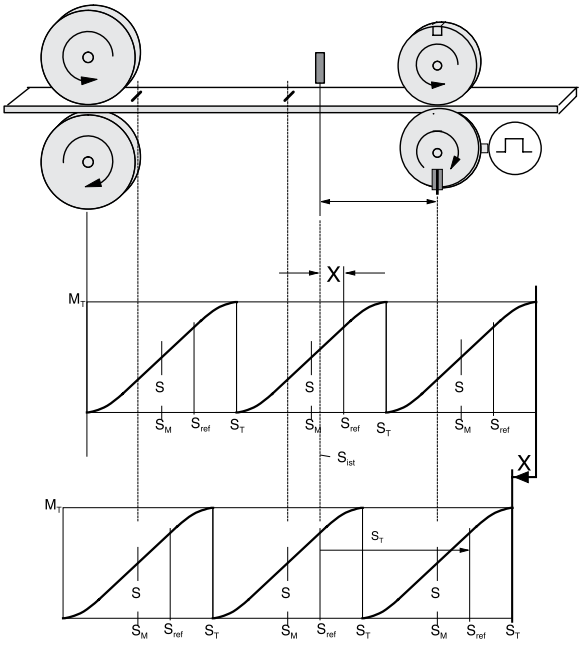
Virtual Master:

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.



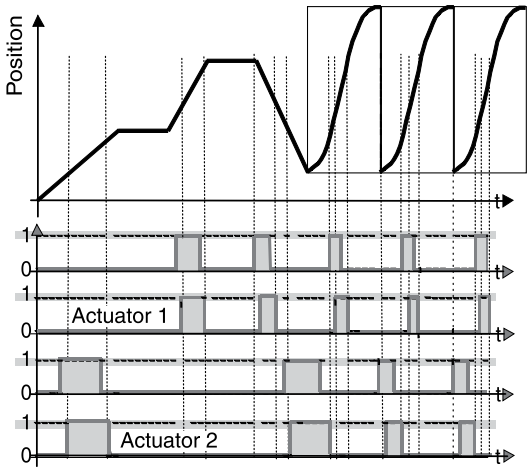
Mark Synchronization

- Master or slave oriented (simultaneous, cam-independent)
- Highly-precise mark recognition (accuracy <1µs; Touchprobe)



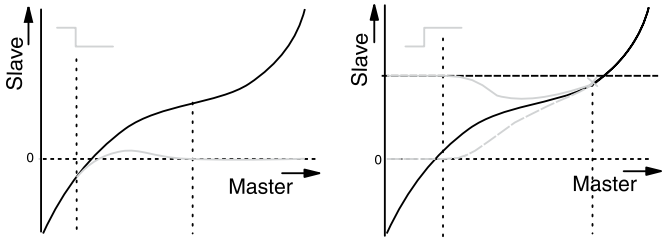
Cam Switching Mechanism

- 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.



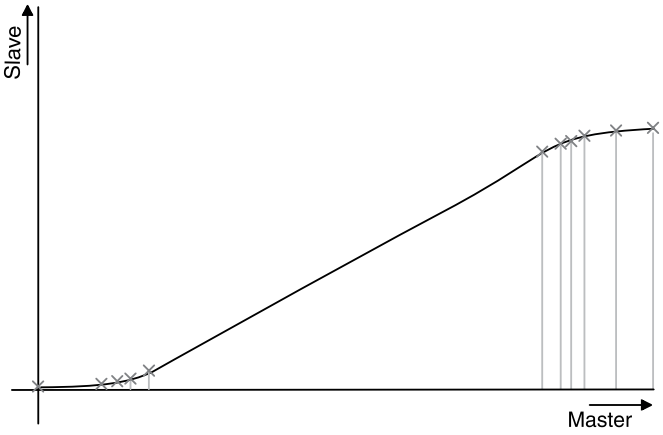
Coupling and Decoupling Functions

- 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



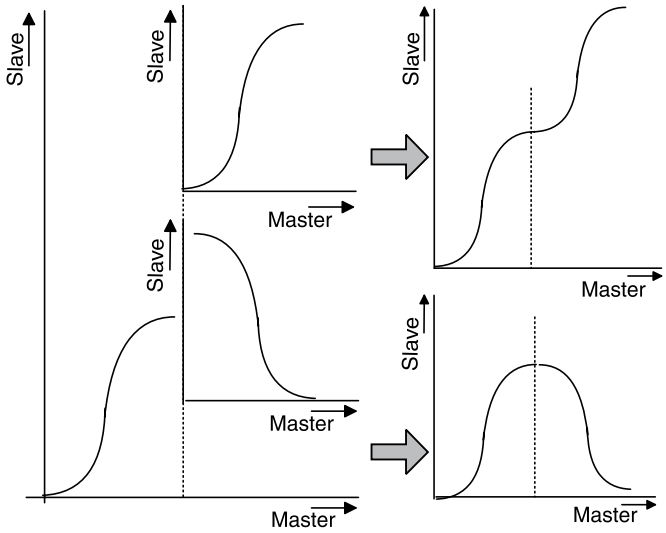
Cam Memory

- 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



Cam Profiles

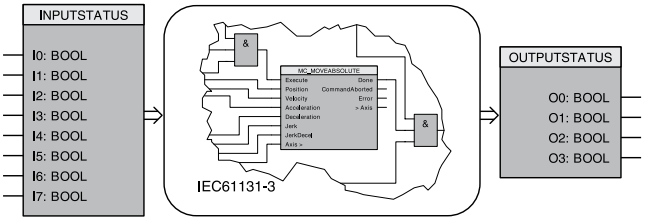
- Up to 20 cam segments can be produced by:
- Virtually random cam links (forwards and backwards)
- Freely programmable event-controlled cam branches
- Scalable cam segments and complete cam profiles



D

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

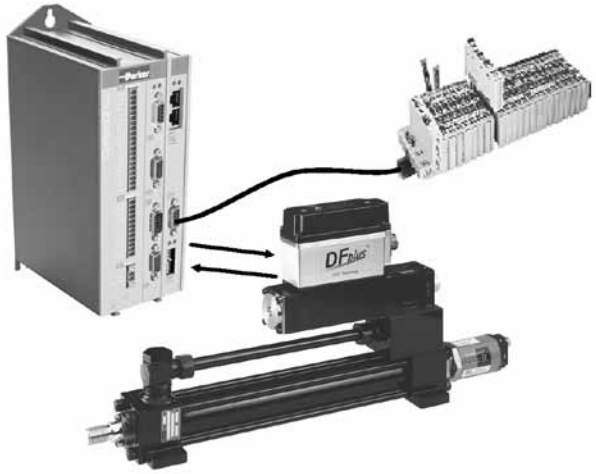
EtherCAT-ratings	
Bau drate	100Mbits (FastEthernet)
Cycle time	<200µs; to 240 nodes

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 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)

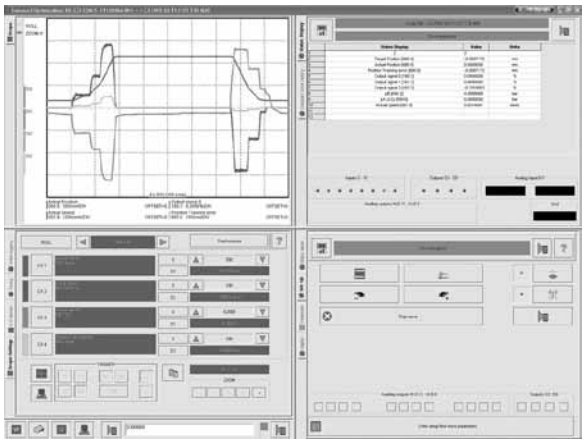


Simple, Wizard-guided Configuration and Commissioning Compax3 ServoManager

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

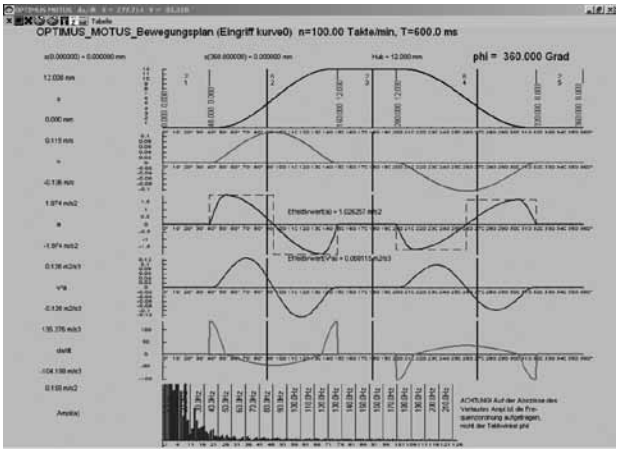
- Simple set up of customer valves, cylinders and drives.
- Technical data of all Parker valves, cylinders and drives available.

C3 HydraulicsManager valve database

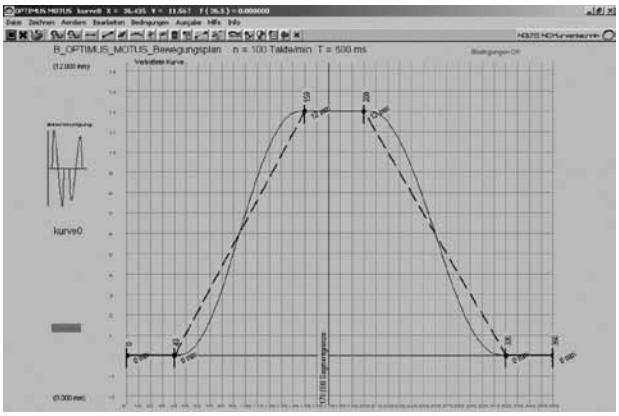
Cam Creation with CamDesigner

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

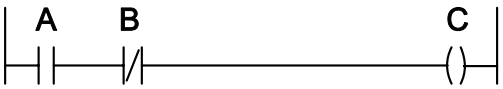
```
0001 FUNCTION_BLOCK AWL_EXAMPLE
0002 (* Sinus und CoSinus einer Zahl berechnen *)
0003 VAR_INPUT
0004    r1: REAL := 0.0;
0005 END_VAR
0006 VAR_OUTPUT
0007    sinus: REAL;
0008    cosinus: REAL := 9.9;
0009 END_VAR
```

```
0001    (* Den Sinus einer Zahl berechnen und mit 1000 multiplizieren *)
0002    LD      r1
0003    SIN
0004    MUL     1000.0
0005    ST      sinus
0006    (* Den Cosinus  einer Zahl berechnen und mit 1000 multiplizieren *)
0007    LD      r1
0008    COS
0009    MUL     1000.0
0010    ST      cosinus
0011
0012    (* Die Zahl weiterschalten *)
0013    LD      r1
0014    ADD     0.1
0015    ST      r1
0016
```

- Instruction list (IL)

LD	**A**
ANDN	**B**
ST	**C**

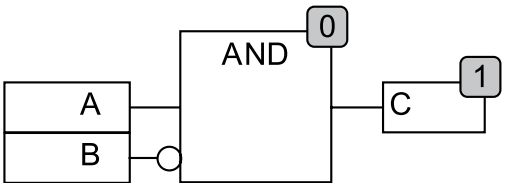
- Ladder diagram



- 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

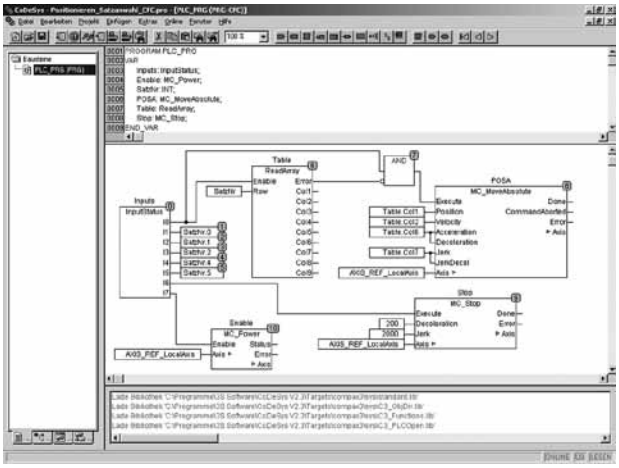
CoDeSys is a development environment for programming that saves a significant amount of time as applications are created.

- 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

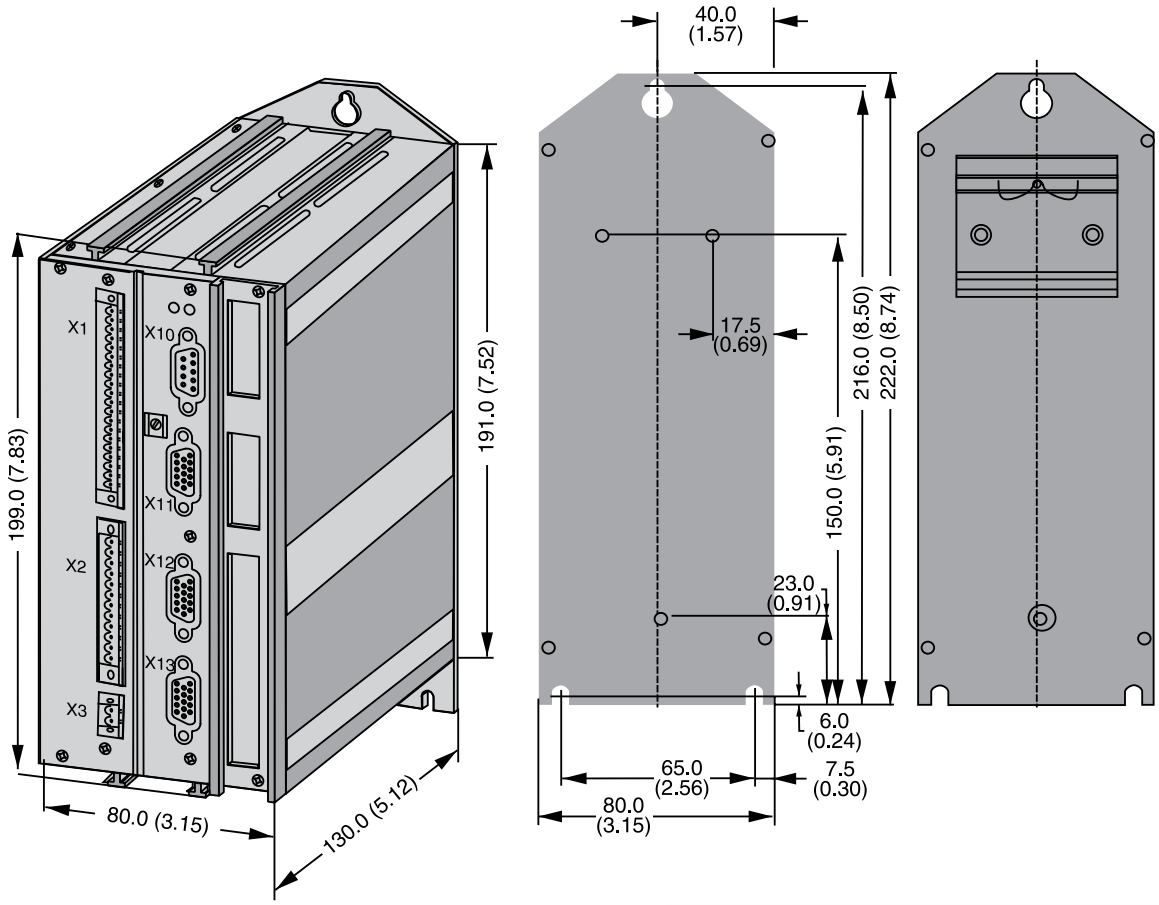
Saving an entire project (source file) including symbols and comments to make service calls easier, because there is no need for any project data on the device itself

- 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

D

D

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

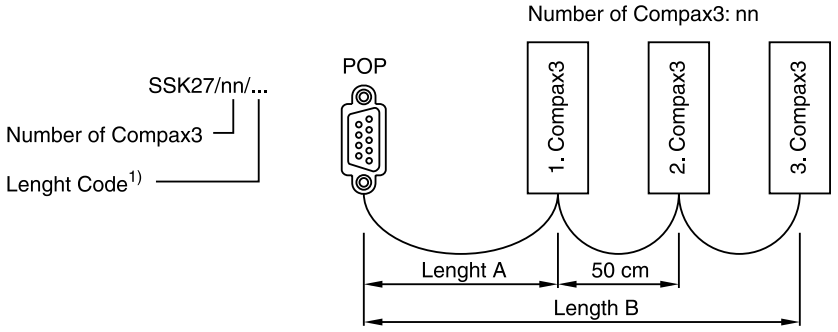
[3] Length code for SSK27

Length A: Cable or connection from POP with **one** Compax3 (POP - 1.Compax3), variable length according to length code[1]
(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 code[1]
(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 ±10V	2-Channel Analog-Input terminal	(± 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 ±10V	2-Channel Analog-Output terminal	(±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

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.

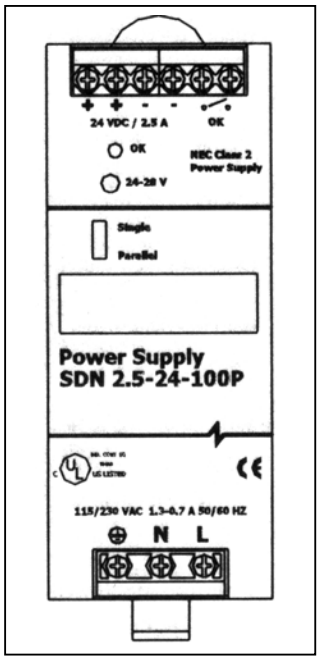
These power supplies provide the power necessary to operate the following Electrohydraulic products:

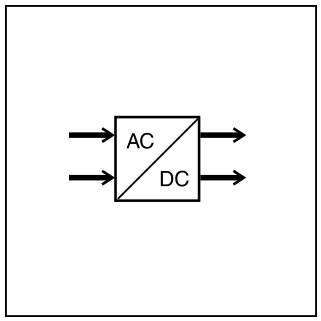
- D*FP, D*1FP, D*FH, D*FL, D*FX, D*FB and RE* valves
- PWD00, PCD00, PWDXX, PID, PZD and EW, electronics

D

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 idustrial applications.





UL 508 Listed
IND. CONT. EQ.
E61379

UL 60950
E137632
CUL/CSA-C22.2
No. 234-M90

EMC and
Low Volt.
Directive

Ordering Information

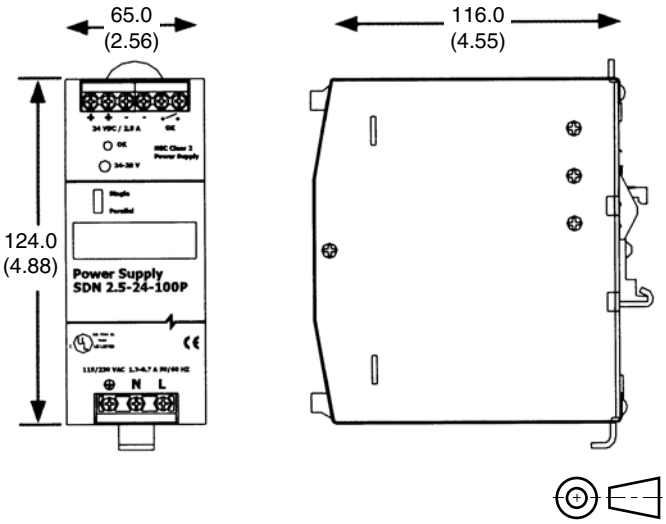
PSD	24
Power Supply	Voltage Output

Code	Description
24	24 VDC, 5.0 amp, on Rail Power Supply

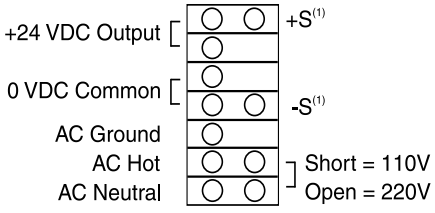
Weight: 0.62 kg (1.5 lbs)

Dimensions

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



Connector - Pinout



(1) Refer to Operation

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	< ± 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 mm2) for solid conductors, 16-12 AWG (0.5-4 mm2) for flexible conductors
Output Connections	Two connectors per output; Connector size range: 16-10 AWG (1.5-6 mm2) for solid conductors

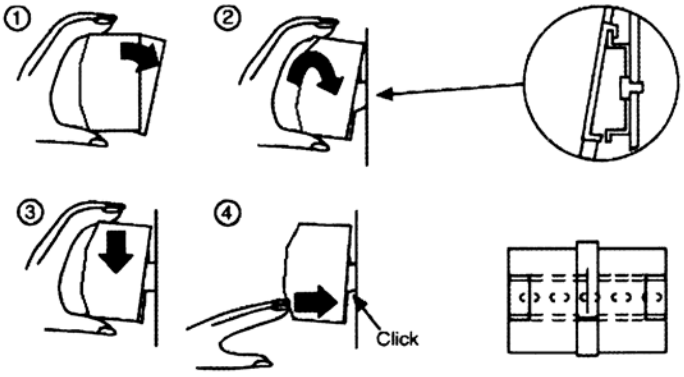
Notes:
1. Input current ratings are conservatively specified with low input, worst case efficiency and power factor.
2. Losses are heat dissipation in watts at full load, nominal input line.
3. Ripple/noise is stated as typical values when measured with a 20 MHz bandwidth scope and 50 Ohm resistor.
4. All peak current is calculated at 24V levels.

D

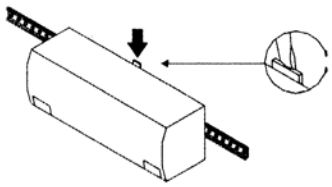
DIN Rail Mounting

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.

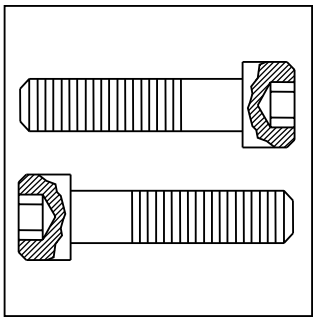
Contents

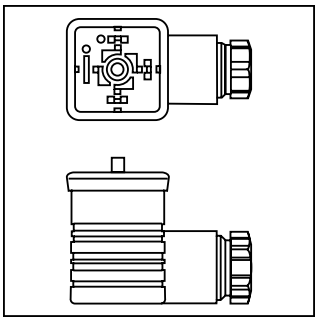
General Description

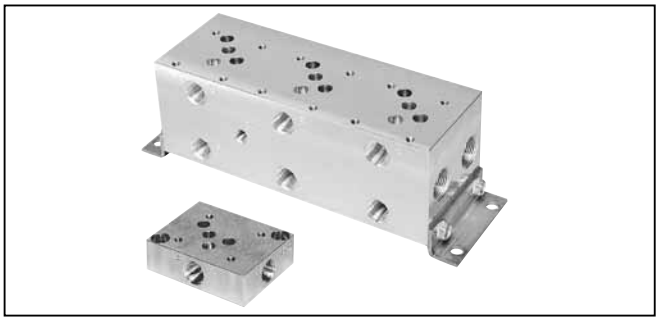
Supporting accessory products for proportional valves listed in this section include cable assemblies, connectors, bolt kits, and subplates. Valve drivers and power supplies can be found in the electronics section.

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

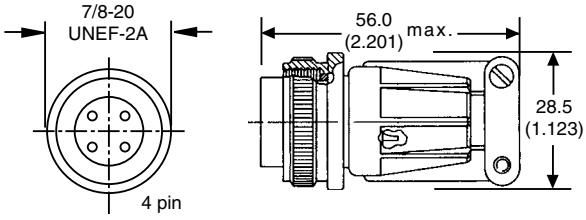
EHC Cable Assemblies

Valve Application	Connector Option (1) (2)	Pins	Function (3)	Model
D*FB OBE D*1FB OBE D*FH D*1FH D*FP D*1FP D*FX ('B' ele. option) D*6FH	CE compliant, 'MS' style (Preferred)	7	Primary cable assembly	EHC158GE
D*FT D*1FT RE**T RE06*T	Plastic	7	Primary cable assembly	EHC158G
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	'MS' style	4	Primary cable assembly	EHC154S
D*FP W5 D*1FP W5 D*FB W5 D*1FB W5	CE compliant	12	Primary cable assembly	EHC1512GE

Communication Cable Assemblies

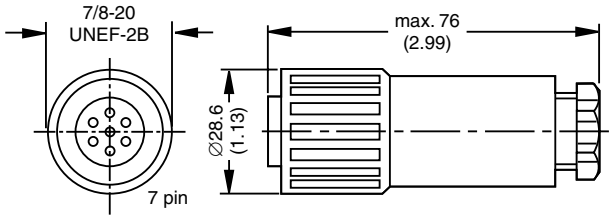
Valve Application	Connector Option (1) (2)	Pins	Function (3)	Model
D*FB OBE D*1FB OBE D*FT 52 Design D*1FT 40 Design RE06*T 26 Design	RS232 to Mini USB		Parameter change via "ProPXD" software	40982923
D*FB OBE D*1FB OBE D*FT 52 Design D*1FT 40 Design RE06*T 26 Design	USB to Mini USB		Parameter change via "ProPxD" software	1210846

Power Connector — D*FL



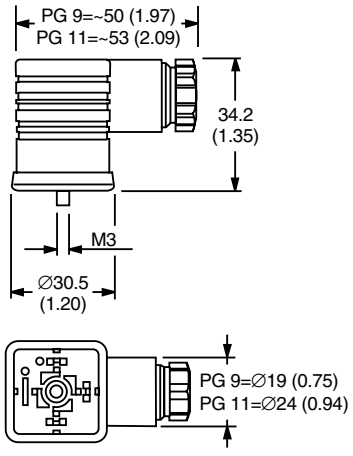
Description	Order Number
4 pin	1210292

Primary Connector — D*FT, D*FX (Ele. Design 'B'), D*FH, D*FM, RE06*T, RE**T, D*FB, and D*1FB (OBE)



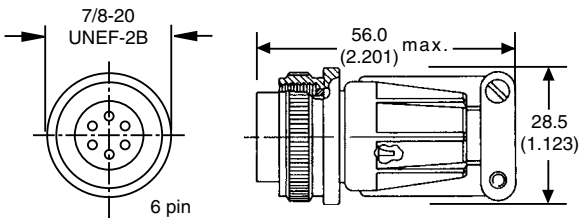
Description	Order Number
DIN 43563 6+PE	5004072

Solenoid Connector



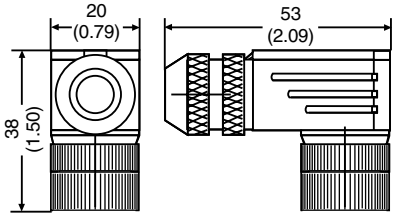
Description	Variation	Order Number
DIN 43650	Black	692914
DIN 43650	Grey	692915

I/O Connector — D*FL



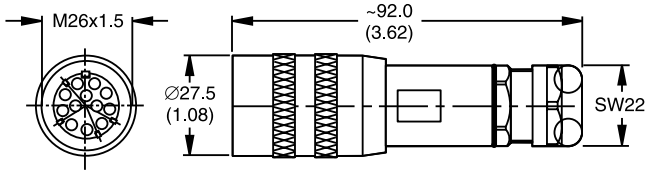
Description	Order Number
6 pin D*FL	MS3106E-14S-6S
Rubber Boot	801227
6 pin D*FX (ele. design A, C & D)	697561

LVDT Connector — D*1FS



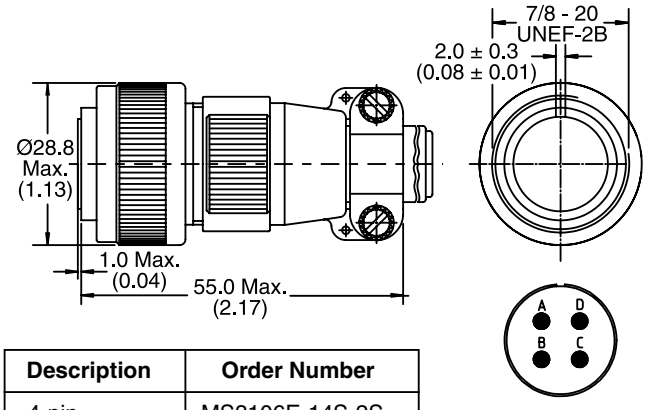
Description	Order Number
M12 / 5 pin	5004109

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

E

Interface	Valve	Bolt Kit	Qty	Size	Subplate(1)	Port Size	Port Location
NG6	D1F*	BK209	4	10-24 x 1.25"	SPD23NS35	3/8" NPTF	Bottom
CETOP 3		BK375	4	M5 x 30mm	SPD23NAS35	3/8" NPTF	Side
	RE06	BK210	4	10-24 x 1.875"	SPD26SS35	#12 SAE	Bottom
					SPD26SAS35	#12 SAE	Side
NG10	D3F*	BK98	4	1/4-20 x 1.625"	SPD31V6NS35	3/4" NPTF	Bottom
CETOP 5		BK385	4	M6 x 40mm	SPD31V6NAS35	3/4" NPTF	Side
					SPD31V6SS35	#12 SAE	Bottom
					SPD31V6SAS35	#12 SAE	Side
	D31F*	BK02	4	1/4-20 x 1.5"	SPD31V6NS35	3/4" NPTF	Bottom
		BK385	4	M6 x 40mm	SPD31V6NAS35	3/4" NPTF	Side
					SPD31V6SS35	#12 SAE	Bottom
					SPD31V6SAS35	#12 SAE	Side
	D36F*	BK03	6	1/4-20 x 1.5"	1402190	#16 SAE	Side
		BK439	6	M6 x 40mm			
NG16	D41F*	BK160	4	3/8-16 x 2.5"	SPD46SA	#12 SAE	Side
CETOP 7			2	1/4-20 x 2.25"			
		BK320	4	M10 x 60mm	DD07SPS012S	#12 SAE	Side
			2	M6 x 55mm			
	D46F*	BK153	6	3/8-16 x 2.0"	1402191	#20 SAE	Side
		BK440	6	M10 x 50mm			
NG25	D81F*	BK228	6	1/2-13 x 3"	SPD66NS35	3/4" NPTF	Bottom
CETOP 8	D91F*	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
	D96F*	BK227	6	1/2-13 x 2.5"	1402192	#24 SAE	Side
		BK462	6	M12 x 60mm			
NG32	D111F*	BK150	6	3/4-10 x 3.5"	SPD1010N35	1 1/4" NPTF	Bottom
CETOP 10		BK386	6	M20 x 90	SPD1012N35	1 1/2" NPTF	Bottom

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

Note: All subplates listed use SAE mounting bolt hardware.

Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, Hydraulics Group, and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods or work described will be referred to as "Products".

1. Terms and Conditions. Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is expressly conditioned on Buyer's assent to these Terms and Conditions and to the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional term or condition of Buyer's order or any other document issued by Buyer.

2. Price Adjustments; Payments. Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated 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 changes in shipping, product specifications or in accordance with Section 13, herein.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of eighteen months from the date of delivery to Buyer. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.

7. Contingencies. Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.

8. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

9. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

10. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed 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. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

12. Improper Use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

13. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer 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 may change product features, specifications, designs and availability with notice to Buyer.

14. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

15. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

16. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

17. Termination. This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

18. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be 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 this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

19. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

20. Taxes. Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. Equal Opportunity Clause. For the performance of government contracts and where dollar value of the Products exceed $10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated. 6/09

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Parker Safety Guide for Selecting and Using Hydraulic Valves and Related Accessories

WARNING: Failure or improper selection or improper use of Parker Hydraulic Valve Division (HVD) Valves or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper use of these Products include but are not limited to:

- Valves or parts thereof thrown off at high speed
- High velocity fluid discharge
- Explosion or burning of the conveyed fluid
- Contact with suddenly moving or falling objects controlled by the Valve
- Injections by high-pressure fluid discharge
- Contact with fluid that may be hot, cold, toxic or otherwise injurious
- Injuries resulting from injection, inhalation or exposure to fluids
- Injury from handling a heavy item (dropped, awkward lift)
- Electric shock from improper handling of solenoid connections
- Injury from slip or fall on spilled or leaked fluid

Before selecting or using any of these Products, it is important that you read and follow the instructions below. In general, the Products are not approved for in-flight aerospace applications. Consult the factory for the few that are FAA approved.

1.0 GENERAL INSTRUCTIONS

1.1 **Scope**: This safety guide provides instructions for selecting and using (including assembling, installing and maintaining) these Products. For convenience all items in this guide are called "Valves". This safety guide is a supplement to and is to be used in conjunction with the specific Parker catalogs for the specific Valves and/or accessories being considered for use. See item 1.6 below for obtaining those catalogs.

1.2 **Fail-Safe:** Valves can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Valve or Valve Assembly will not endanger persons or property.

1.3 **Safety Devices:** Never disconnect, override, circumvent or otherwise disable any safety lockout on any system whether powered by HVD Valves or any motion control system of any manufacturer. (e.g. Automatic shut-off on a riding lawn mower should the operator get out of the seat).

1.4 **Distribution:** Provide a copy of this safety guide to each person that is responsible for selecting or using HVD Valve Products. Do not select HVD Valves without thoroughly reading and understanding this safety guide as well as the specific Parker catalogs for the Products considered or selected.

1.5 **User Responsibility:** Due the wide variety of operating conditions and applications for Valves, HVD and its distributors do not represent or warrant that any particular Valve is suitable for any specific system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing is solely responsible for:

- Making the final selection of the Valve
- Assuring that the user's requirements are met and that the application presents no health or safety hazards.
- Providing all appropriate health and safety warnings on the equipment on which the Valves are used.
- Assuring compliance with all applicable government and industry standards.

1.6 **Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com , for the telephone numbers of the appropriate technical service department. For additional copies of this or any other Parker Safety Guide go to www.parker.com and click on the safety button on the opening page. Catalogs and/or catalog numbers for the various HVD Valve Products can be obtained by calling HVD at 440-366-5100. Phone numbers and catalog information is also available on the Parker website, www.parker.com .

2.0 VALVE SELECTION INSTRUCTIONS

2.1 **Pressure:** Valve selection must be made so that the maximum working pressure of the Valve is equal to or greater than the maximum system pressure. Surge, impulse or peak transient pressures in the system must be below the maximum working pressure of the Valve. Surge, impulse and peak pressures can usually be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressure and cannot be used to determine surge, impulse or peak transient pressures. Burst pressure ratings if given or known are for manufacturing purposes only and are not an indication that the Product can be used in applications at the burst pressure or otherwise above the maximum working pressure.

2.2 **Temperature:** The fluid temperature must be regulated or controlled so that the operating viscosity of the fluid is maintained at a level specified for the particular Valve product. Such ranges are given in the product catalogs or can be obtained from the appropriate customer service department for the particular Valve product.

2.3 **Fluid Compatibility:** The fluid conveyed in Valves has direct implications on the Valve selection. The fluid must be chemically compatible with the Valve component materials. Elastomer seals, brass, cast iron, aluminum for example all are potentially affected by certain fluids. Additionally, fluid selection affects the performance of various Valves. Considerations relative to fluid selection are outlined in the specific HVD Valve product catalog. Of particular importance is that the fluid be for hydraulic use, contain the proper additives and wear inhibitors. See 1.6 "Additional Questions" above for information to obtain such HVD catalogs.

2.4 **Changing Fluids:** If a system requires a different fluid, it should be done with the guidance in number 2.3 above. Additionally, it may be necessary to flush the system (including the Valves) to remove any of the previous fluid. Consult the Parker Valve Division for guidance.

2.5 **Size:** Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.

2.6 **Placement:** Installation of Valves must take into account the orientation of the Valve and the proximity of the Valve to other parts of the system. This includes but is not limited to closeness to hot and cold areas, access for servicing and operation as well as orientation for proper connectors.

2.7 **Ports:** Connection of Valves in systems can be by threaded ports, sub-base surfaces, flanges and manifolds. In all cases, the proper fitting, surface or mounting hardware must be selected to properly seal and contain the system fluid so as to avoid the adverse conditions listed in the initial warning box above. Specifically, if using threaded ports, the designer must make sure that the mating fitting is of the compatible thread. Also, the instructions provided by the connector hardware supplier must be read and understood so as to properly assemble the connector. The Parker Safety Guide for using Hose, Tubing and Fittings and Related Accessories is but one reference to this end.

2.8 **Environment:** Care must be taken to insure that the Valve and Valve Assemblies are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants can cause degradation and premature failure.

2.9 **Electric Power:** For Valves requiring electric power for control, it is imperative that the electricity be delivered at the proper voltage, current and wattage requirements. To obtain the proper control requirements please refer to the respective Parker product catalog for the specific Valve that is intended for use. If further guidance is required, call the appropriate technical service department identified in the respective Parker product catalog.

2.10 **Specifications and Standards:** When selecting Valves, government, industry and Parker specifications and recommendations must be reviewed and followed as applicable.

2.11 **Accessories:** All accessories used in conjunction with any Parker Valve product must be rated to the same requirements of the Valve including but not limited to pressure, flow, material compatibility, power requirements. All of these items must be examined as stated in the "VALVE INSTALLATION INSTRUCTIONS" paragraph 3.0.

(continued on next page)

3.0 VALVE INSTALLATION INSTRUCTIONS

3.1 **Component Inspection:** Prior to use, a careful examination of the Valve(s) must be performed. The Valve intended for use must be checked for correct style, size, catalog number and external condition. The Valve must be examined for cleanliness, absence of external defects or gouges, cracked or otherwise deformed parts or missing items. The mounting surface or port connections must be protected and free of burrs, scratches, corrosion or other imperfections. Do NOT use any item that displays any signs of nonconformance. In addition, any accessory including but not limited to fittings, bolt kits, hoses, sub bases, manifolds, and electrical connectors must be subjected to the same examination.

3.2 **Handling Valves:** Many Valves whether HVD Valves or of another manufacturer can be large, bulky or otherwise difficult to handle. Care must be taken to use proper lifting techniques, tools, braces, lifting belts or other aids so as not to cause injury to the user, any other person or to property.

3.3 **Filtration:** Fluid cleanliness is a necessity in any hydraulic system. Fluid filters must be installed and maintained in the system to provide the required level of fluid cleanliness. Filters can be placed in the inlets, pressure lines and return lines. The level of cleanliness required is specified in the HVD product catalog for the specific Valve(s) selected or intended for use. For additional information on Filter selection contact Parker Filter Division at 800-253-1258 or 419-644-4311.

3.4 **Servo Valves:** Application of Servo Valves in general requires knowledge and awareness of "closed loop control theory" and the use of electronic controls for successful and safe operation. Individuals who do not have such experience or knowledge must gain training before use of such Products. Parker offers both classroom training as well as manuals to assist in gaining this knowledge. These aids can be obtained by contacting Hydraulic Valve Division at 440-366-5100, calling the general Parker help line 800-CPARKER or going to the Parker web site at www.parker.com.

3.5 **Accessory Ratings:** All accessories used in combination with the selected or intended Valve product must be rated and compatible with the selected Valve. Specifically, the items must be of equal or greater rating including but not limited to pressure, flow, power, size, port style, thread connectors and material.

3.6 **Connection Styles:** It is the responsibility of the user of the Parker product to properly select connectors and accessories that match the connections on the sub plate, Valve, flange or threaded connection or manifold. It is also the responsibility of the installer to possess adequate skill and knowledge including but not limited to thread preparation, torque technique, hose assembly and inspection, tube preparation and assembly, and fitting installation. Parker Tube Fitting Division (www.parker.com/tfd) catalog 4300 and Parker Hose Products (www.parkerhose.com) catalog 4400 describe some basic technical information relative to proper fitting assembly.

3.7 **Electrical Connections:** All electrical connections must be made to the applicable codes and local safety requirements.

3.8 **Gauges and Sensors:** The user must install sufficient gauges and sensors in the system so as to be able to determine the condition of the system. This includes but is not limited to pressure gauges, flow meters, temperature sensors and site gauges. These are of utmost importance should removal or disassembly of a Valve, portion of a Valve or portion of the system become necessary. Refer to "VALVE MAINTENANCE AND REPLACEMENT INSTRUCTIONS" for details and especially item 4.8.

3.9 **System Checkout:** Once installed, the Valve installation must be tested to insure proper operation and that no external leakage exists. All safety equipment must be in place including but not limited to safety glasses, helmets, ear protection, splash guards, gloves, coveralls and any shields on the equipment. All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Valve maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potentially hazardous areas while testing and using.

4.0 VALVE MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1 **Maintenance Program:** Even with proper installation, Valves and Valve System life may be significantly reduced without a continuing maintenance program. The severity of the application and risk potential must determine the frequency of the inspection and the replacement of the Products so that Products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at a minimum, must include instructions 4.2 through 4.10. An FMEA (Failure Mode and Effects Analysis) is recommended in determining maintenance requirements.

4.2 **Visual Inspection-Valves:** Any of the following conditions require immediate shut down and replacement of the Valve.

- Evidence that the Valve is in partial dis-assembly.
- Visible crack or suspicion of a crack in the Valve housing or bent, cracked or otherwise damaged solenoid.
- Missing or partially extending drive pin on a flow control knob.
- Missing, loose components, obstructions or other condition impeding the motion or function of the manual knob, lever, foot pedal or other mechanical operator of a hydraulic Valve.
- Any evidence of burning or heat induced discoloration.
- Blistered, soft, degraded or loose cover of any kind.
- Loose wire or electrical connector.

4.3 **Visual Inspection-Other:** The following conditions must be tightened, repaired, corrected or replaced as required.

1. Fluid on the ground must be cleaned immediately. Also, the source of the fluid must be determined prior to running the equipment again.
2. Leaking port or excessive external dirt build-up.
3. System fluid level is too low or air is entrapped or visible in the reservoir.
4. Equipment controlled by the Valve or Valve assembly has been losing power, speed, efficiency

4.4 **Filter Maintenance:** System filters must be maintained and kept in proper working order. The main service requirement is periodic replacement of the filter element or screen. Contact Parker Filter Division at 800-253-1258 or 419-644-4311 for further filter maintenance details.

4.5 **Functional Test:** See "System Checkout" number 3.9 above in "VALVE INSTALLATION INSTRUCTIONS".

4.6 **Replacement Intervals:** Valves and Valve Systems will eventually age and require replacement. Seals especially should be inspected and replaced at specific replacement intervals based on previous experience, government or industry recommendations, or when failures could result in unacceptable downtime, damage or injury risk. At a minimum seals must be replaced whenever service is rendered to a Valve product.

4.7 **Adjustments, Control Knobs, and Other Manual Controls:** System Pressure and Flow are typically adjusted by knobs and/or handles. A set-screw or lock-nut secures the adjustment device so as to maintain the desired setting. This set-screw or lock-nut must first be loosened prior to making any adjustments and re-tightened after adjustment on the HVD Valve. All adjustments must be made in conjunction with pressure gauges and/or flow meters (or by watching the speed of the actuator in the case of setting flow only). See paragraph "Gauges and Sensors" above in the section "VALVE INSTALLATION INSTRUCTIONS'. Under no circumstances should any control knob, adjustment stem, handle, foot pedal or other actuating device be forced beyond the mechanical stop(s) on the Valve. For example, the Parker Safety Notice Bulletin **HY14-3310-B1/US** for HVD Colorflow Valves specifically restricts the adjustment torque to "hand adjust" or "less than 10 ft/lbs" if it cannot be adjusted by hand. Failure to adhere to this may force the knob beyond the stop point allowing it to be ejected at high speed resulting in death, personal injury and property damage. For complete safety instructions on HVD Colorflow Valves, copies of Safety Notice **Bulletin HY14-3310-B1/US** can be obtained directly from the Hydraulic Valve Division at 440-366-5100 or from the Parker web site at www.parker.com by selecting the "Safety" button. Parker help line 800-CPARKER is on call 24/7 as well should there be any question about the use of a HVD Valve. Additionally, when making adjustments, always adjust the Valve with all parts of your body to the side of the Valve (that is, the knob is not pointing toward you or anyone else).

4.8 **High pressure Warning:** Hydraulic power is transmitted by high-pressure fluids through hoses, fittings and valves, pumps and actuators. This condition can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure. From time to time, hoses, Valves, tubes or fittings fail if they are not replaced at proper time intervals. Typically these failures are the result of some form of misapplication, abuse, wear, or failure to perform proper maintenance. When such failure occurs, generally the high pressure fluid inside escapes in a stream which may or may not be visible to the user. Under no circumstances should the user attempt to locate the leak by "feeling" with their hands or any other part of their body. High-pressure fluids can and will penetrate the skin and cause severe tissue damage and possible loss of limb or life. Even seemingly minor hydraulic fluid injection injuries must be treated immediately by a physician with knowledge of the tissue damaging properties of hydraulic fluid.
If a hose, tube, fitting or Valve failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the system. Simply shutting down the pump may or may not eliminate the pressure in the system. It may take several minutes or even hours for the pressure to be relieved so that the leak area can be examined safely. Once the pressure has been reduced to zero, the suspected leaking item can be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a connector (especially a hose) or Valve that has failed. Consult the nearest Parker distributor or the appropriate Parker division for component replacement information. Never touch or examine a failed hydraulic component unless it is obvious that the item no longer contains fluid under pressure.

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