Series D*1FP Servo Proportional Control Valves

Bulletin HY14-2554-B1/US

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

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Page

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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.

Bul HY14-2554-B1.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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 05)

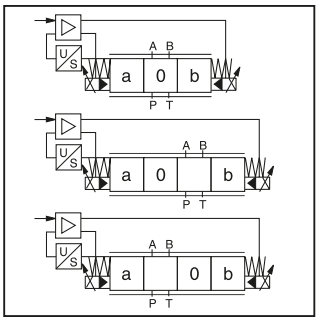
D41FP NG16 (CETOP 07)

D81FP NG25 (CETOP 08)
for port diameter up to 26 mm (1.02 in.)

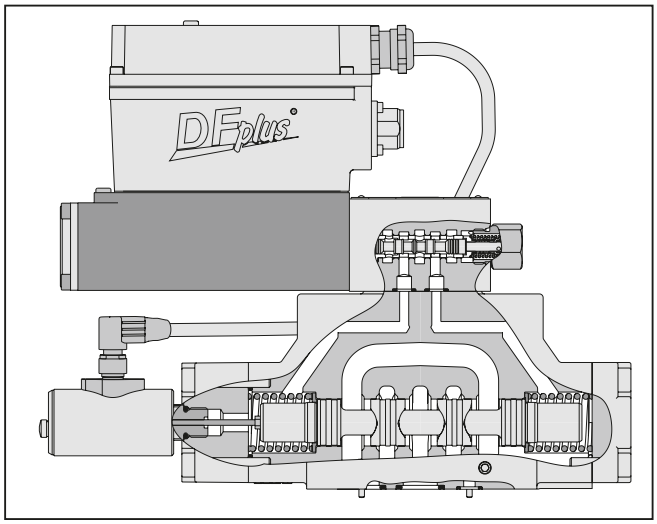
D91FP NG25 (CETOP 08)
for port diameter up to 32 mm (1.26 in.)

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).



D41FP



CE

Features

- High dynamics
- High flow
- Defined spool positioning in case of power supply breakdown
- Onboard electronics
- Closed loop position – controlled pilot valve and main stage

Specifications

General				
Size	**NG10 (CETOP 05)**	**NG16 (CETOP 07)**	**NG25 (CETOP 08)**	**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)			

(Continued on next page)

Hydraulic		NG10 (CETOP 05)	NG16 (CETOP 07)	NG25 (CETOP 08)	NG32 (CETOP 10)
Maximum Operating Pressure		Internal Pilot Drain P, A, B, X: 350 Bar (5075 PSI); T, Y: 35 Bar (500 PSI)			
		External Pilot Drain P, A, B, T, X: 350 Bar (5075 PSI); Y: 35 Bar (500 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		20 to 380 cSt (mm^2/s) (94 to 1727 SSU)			
Viscosity Recommended		30 to 80 cSt (mm^2/s) (140 to 375 SSU)			
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Nominal Flow at Δp=5 Bar (73 PSI)	**per control edge** [1]	120 LPM (32 GPM)	200 LPM (53 GPM)	400 LPM (106 GPM)	1000 LPM (265 GPM)
Maximum Recommended Flow		250 LPM (66 GPM)	600 LPM (159 GPM)	1000 LPM (265 GPM)	3000 LPM (794 GPM)
Leakage at 100 Bar (1450 PSI)	**Overlapped Spool**	0.2 LPM (0.05 GPM)	0.2 LPM (0.05 GPM)	0.6 LPM (0.16 GPM)	1 LPM (0.26 GPM)
	Zerolapped Spool	0.9 LPM (0.24 GPM)	0.9 LPM (0.24 GPM)	1 LPM (0.26 GPM)	—
	Pilot	< 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)		10 LPM (2.6 GPM)	12 LPM (3.2 GPM)	24 LPM (6.3 GPM)	40 LPM (10.6 GPM)
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**	128 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			
Switch on Current		22 A for 0.2 ms, typical			
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 ⏚) 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 Minimum	**Code 0/7** **Code 5**	7 x AWG16 overall braid shield 8 x AWG16 overall braid shield			
Wiring Length		50 m (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

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

D		1	F	P									0	
Directional Control Valve	Size	NG6 Pilot	Proportional Control	High Response	Spool Type	Flow	Spool Position on Power Down	Pilot Connections	Seals	Electronic Options	Valve Options		Design Series	

Code	Description
3	NG10 / CETOP 05
4	NG16 / CETOP 07
8	NG25 / CETOP 08
9 [1]	NG25 / CETOP 08
11	NG32 / CETOP 10

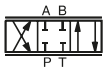
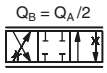
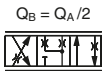
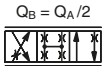
[1] for enlarged connections Ø 32 mm

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

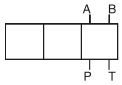
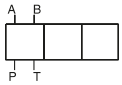
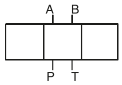
Code	Description
N	Nitrile
V	Fluorocarbon
H	For HFC fluid

Code	Description
K	Voltage input 0...±10V
S	Current input 4...20mA

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

Code	Spool Type
Overlap	
E01	
E02	
B31	
B32	
Zerolap	
E52 [2]	
B61 [2]	

[2] not for D111FP.

Code	Spool Position on Power Down [3]
A [4]	
B [4]	
C [5]	

[3] On power down the spool moves into a defined position.

[4] approx. 10% opening, only zero lapped spools.

[5] only for overlapped spools.

Code	Flow LPM (GPM) at Δp = 5 Bar (73 PSI) per metering edge			
	D31	D41	D81/91	D111
E	120 (32)	—	—	—
F	—	200 (53)	—	—
H	—	—	400 (106)	—
L	—	—	—	1000 (265)

Weight:

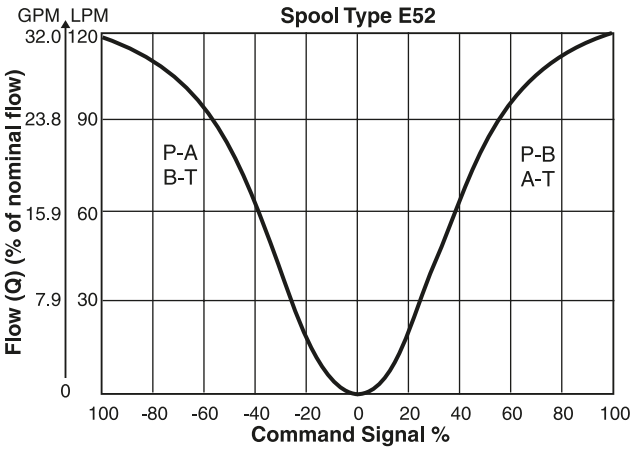
D31FP	11.3 kg (24.9 lbs.)
D41FP	14.2 kg (31.3 lbs.)
D81FP / D91FP	23.5 kg (51.8 lbs.)
D111FP	64.5 kg (142.2 lbs.)

Please order plugs separately.

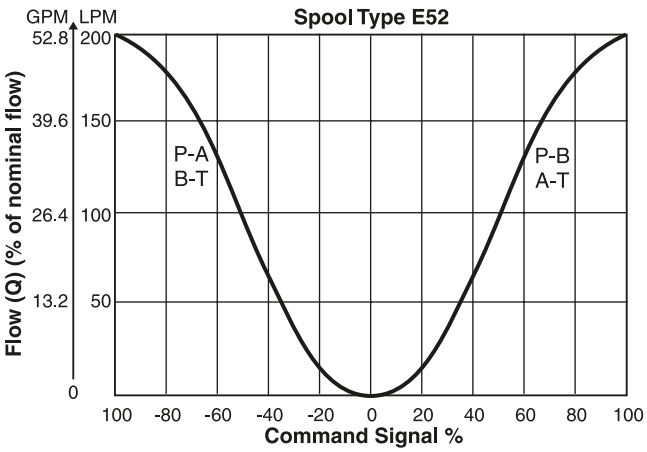
Flow Curves

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

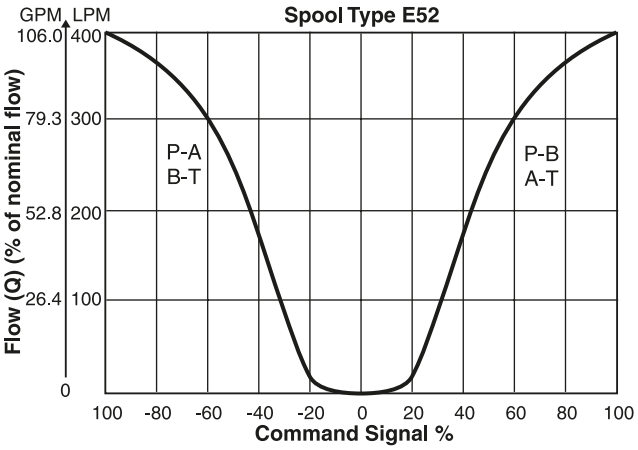
D31FP



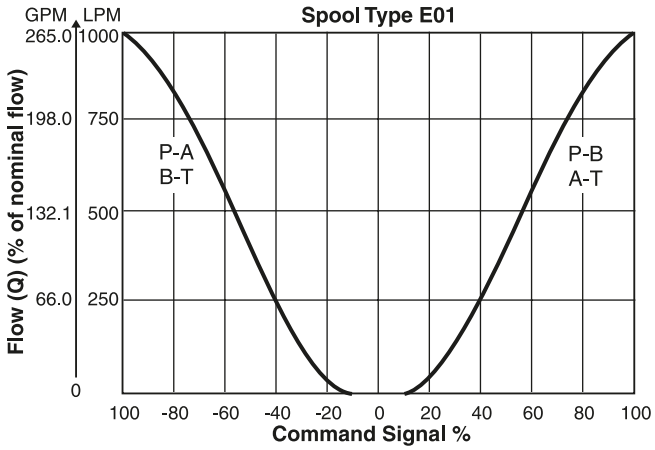
D41FP



D81FP and D91FP



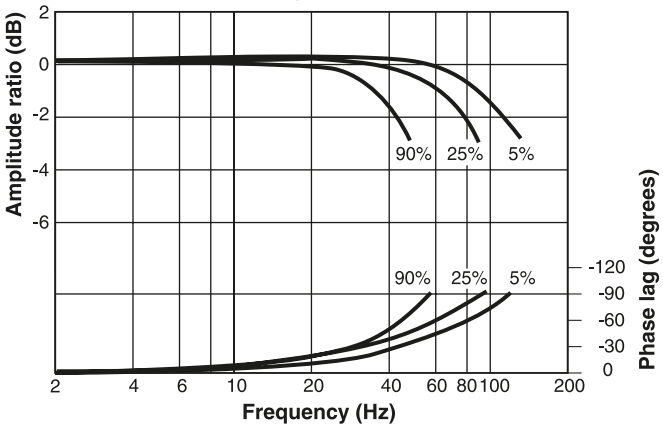
D111FP



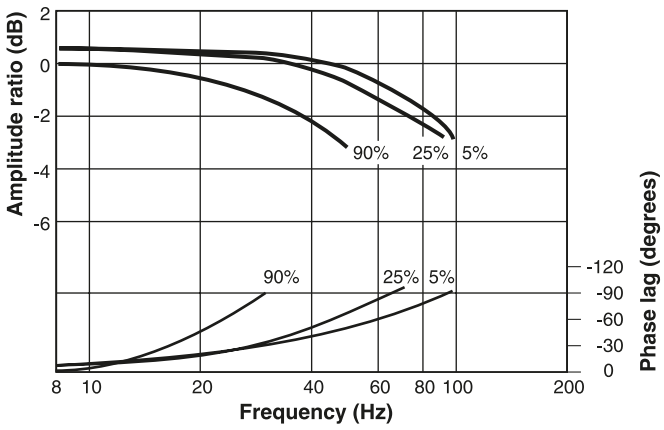
Frequency Response

±5% / ±25% / ±90% command signal
Dynamics at 210 Bar (3045 PSI) pilot supply pressure

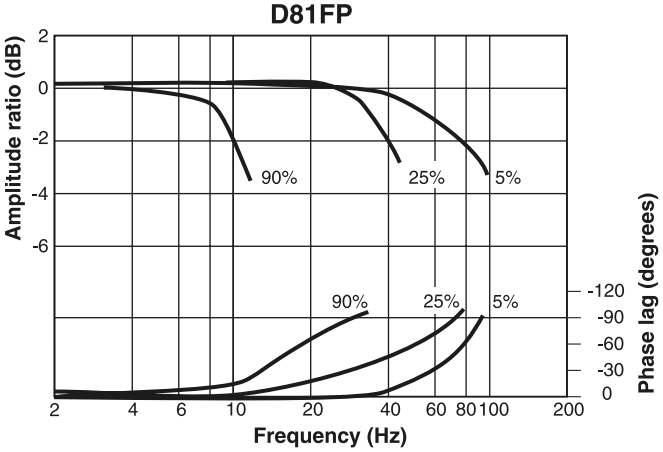
D31FP



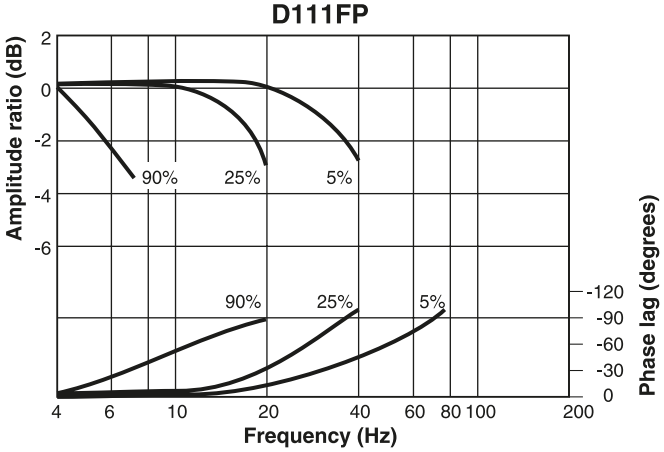
D41FP



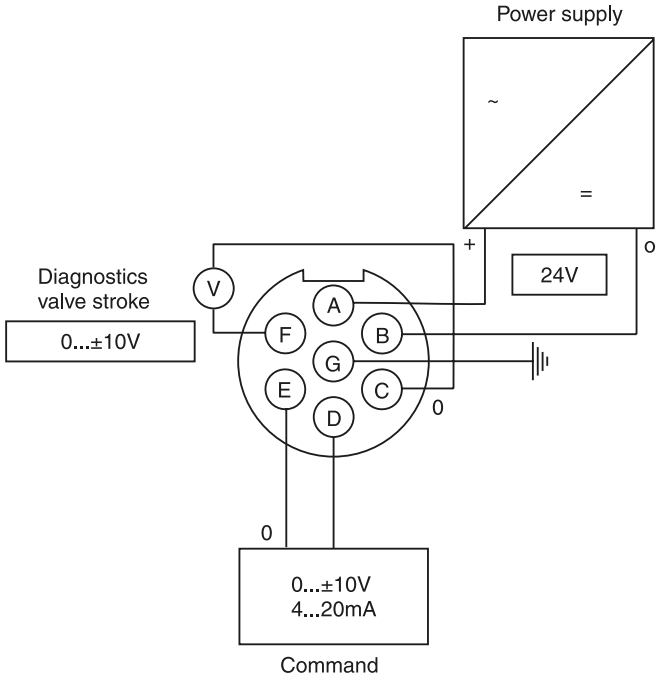
D81FP



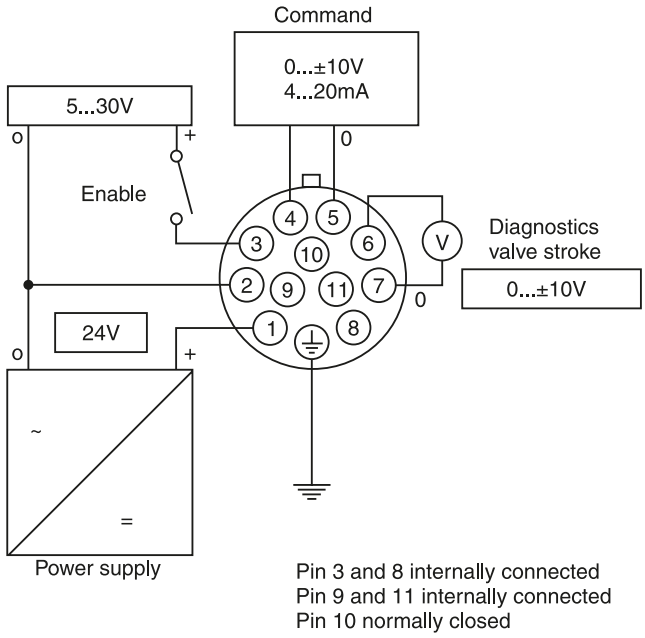
D111FP



Code 0
6 + PE acc. EN 175201-804

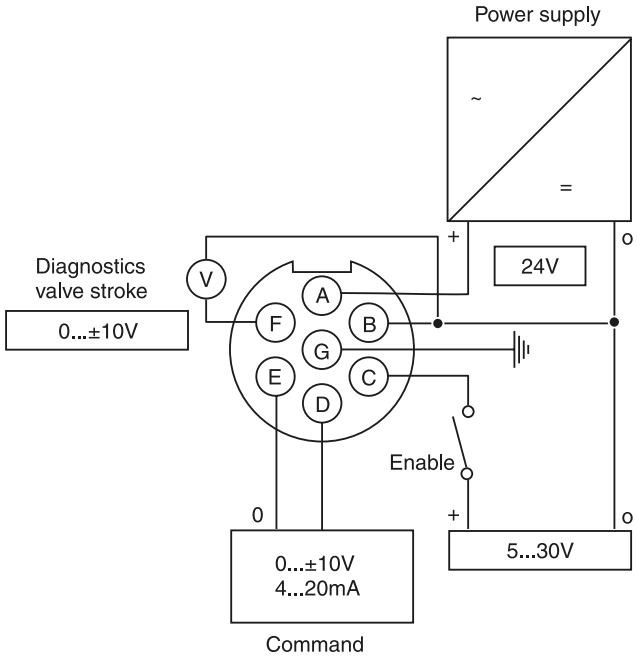


Code 5
11 + PE acc. EN 175201-804



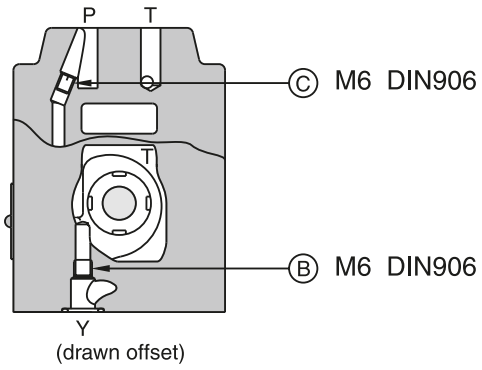
Pin 3 and 8 internally connected
Pin 9 and 11 internally connected
Pin 10 normally closed

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



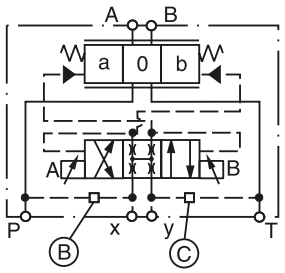
Pilot Oil Inlet (Supply) and Outlet (Drain)

D31FP



○ open ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
Internal	External	○	●
External	External	●	●
Internal	Internal	○	○
External	Internal	●	○



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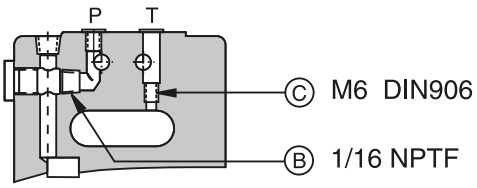
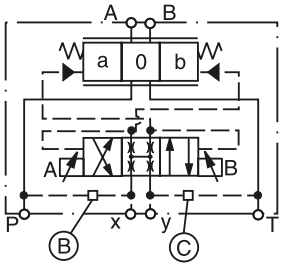
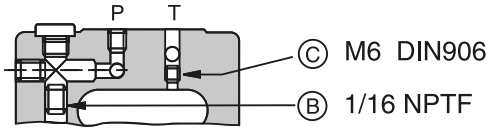


○ open ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
Internal	External	○	●
External	External	●	●
Internal	Internal	○	○
External	Internal	●	○

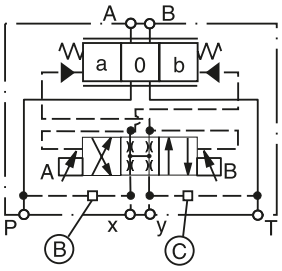


D81FP and D91FP

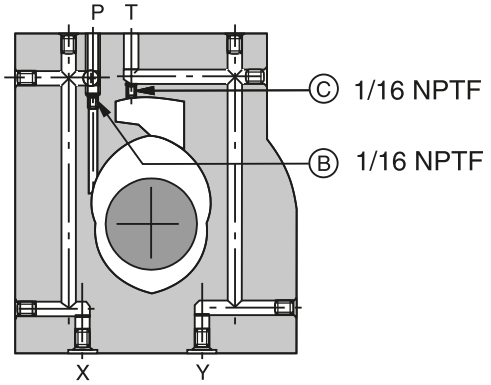


○ open ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
Internal	External	○	●
External	External	●	●
Internal	Internal	○	○
External	Internal	●	○

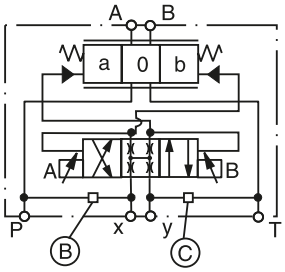


D111FP

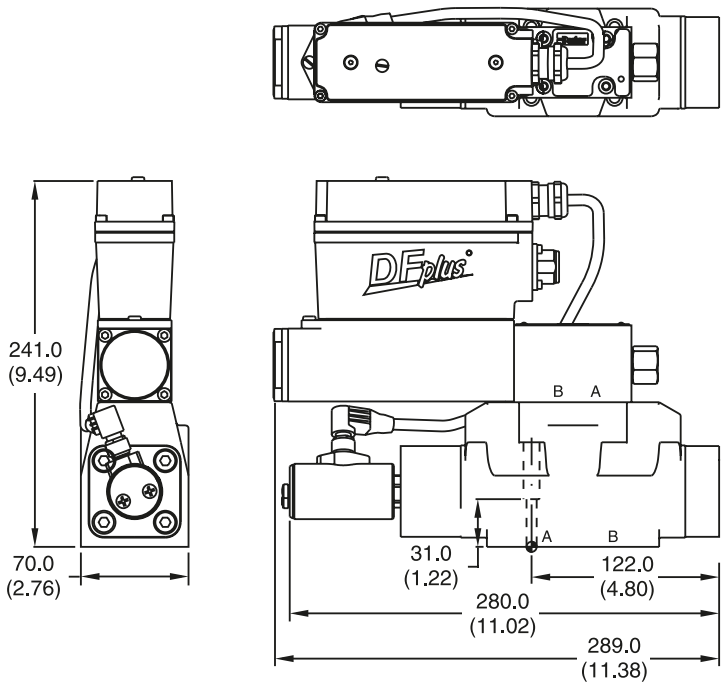


○ open ● closed

Pilot oil Inlet	Pilot oil Drain	B	C
Internal	External	○	●
External	External	●	●
Internal	Internal	○	○
External	Internal	●	○

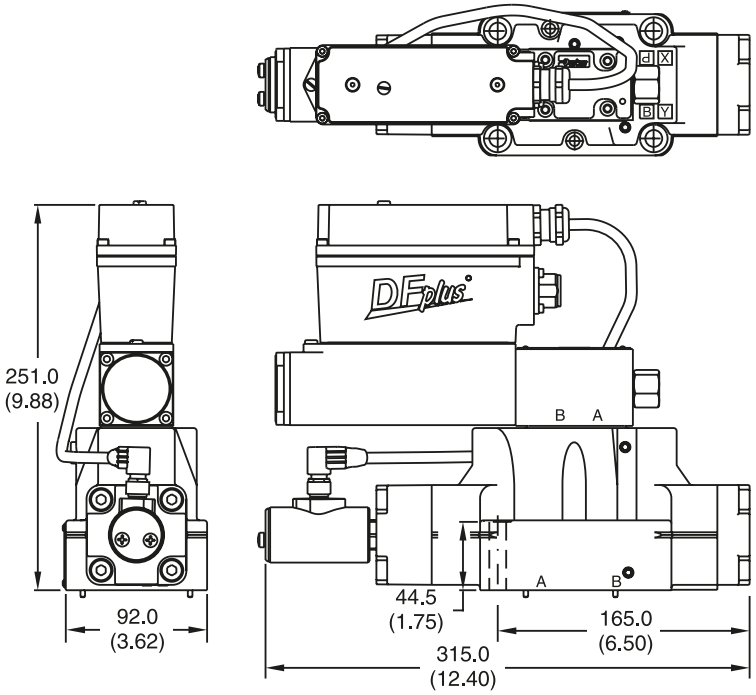


D31FP



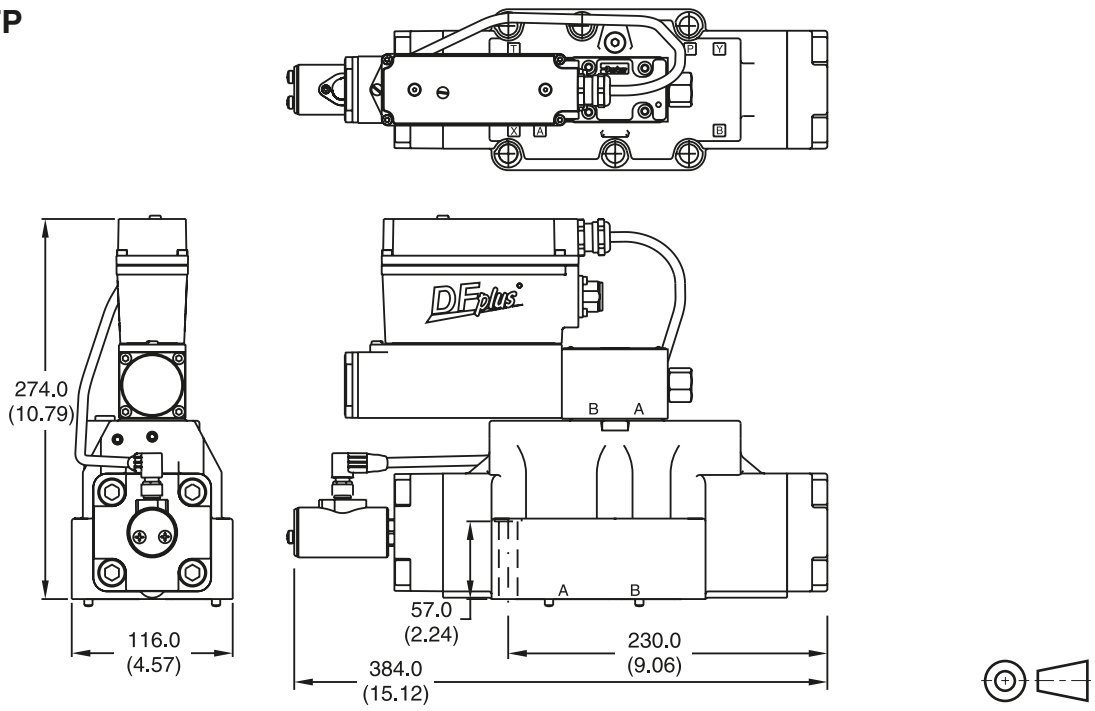
NG	NFPA-Code	Kit			Kit NBR	Surface Finish
10	D05HE	BK385	4x M6 x 40 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.) ±15%	SK-D31FP	R_{max}6.3 ▱ 0.01/100

D41FP



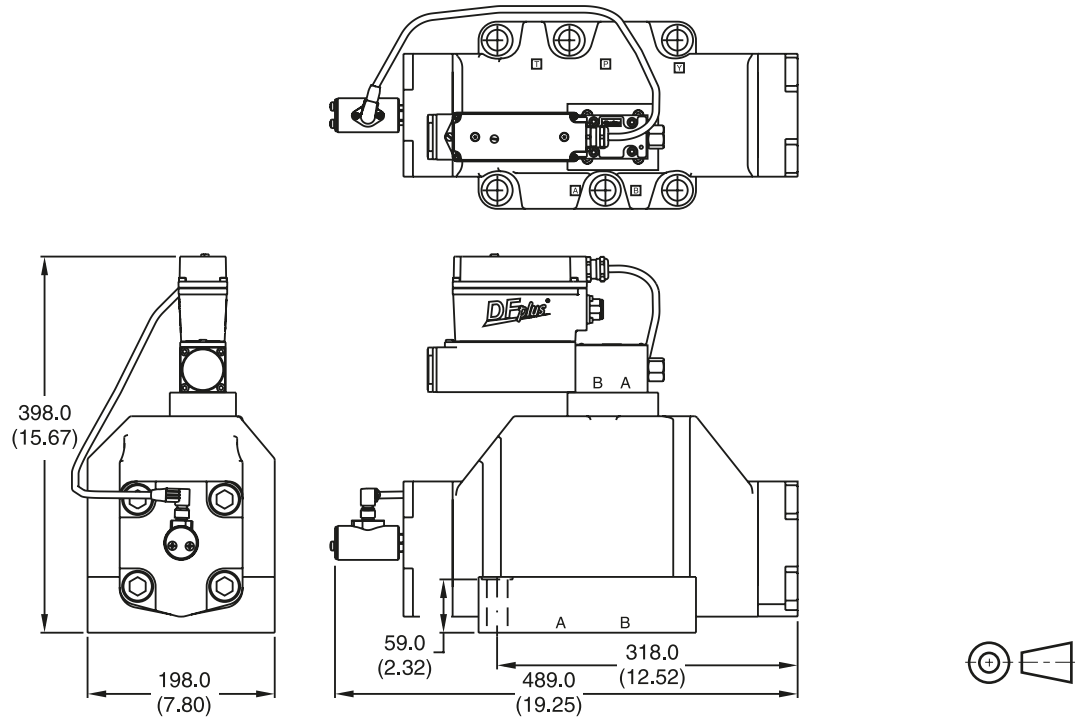
NG	NFPA-Code	Kit			Kit NBR	Surface Finish
16	D07	BK320	2x M6 x 55 4x M10 x 60 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.) 63 Nm (46.5 lb.-ft.) ±15%	SK-D41FP	R_{max}6.3 ▱ 0.01/100

D81FP and D91FP



NG	NFPA-Code	Kit			Kit NBR	Surface Finish
25	D08	BK360	6x M12 x 75 DIN 912 12.9	108 Nm (79.7 lb.-ft.) ±15%	SK-D81FP SK-D91FP	R_{max}6.3 ▱ 0.01/100

D111FP



NG	NFPA-Code	Kit			Kit NBR	Surface Finish
32	D10	BK386	6x M20 x 90 DIN 912 12.9	517 Nm (381.3 lb.-ft.) ±15%	SK-D111FP	R_{max}6.3 ▱ 0.01/100

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