

4/3 Proportional Directional Valve, Size SAE 10

$Q_{\max} = 8.0 \text{ gpm [30 l/min]}$, $p_{\max} = 4000 \text{ psi [280 bar]}$
Direct acting, sliding-spool design, with solenoid operation
Series PDFC-10...



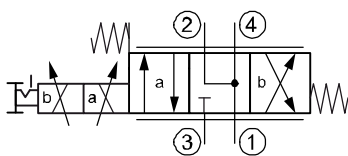
- Compact construction for cavity type C1040 – 7/8-14 UNF
- Operated by a proportional high pressure wet-armature solenoid
- Minimum current threshold/ dead band (position b) is factory set for better consistency
- Manual over-ride optionally available, detented in neutral position
- Excellent reproducibility and repeatability, and low hysteresis
- All exposed parts with zinc-nickel plating
- The slip-on coil can be rotated, and it can be replaced without opening the hydraulic envelope
- Various plug-connector systems and voltages are available
- Can be fitted in a line-mounting body

1 Description

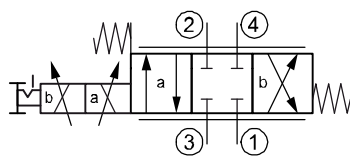
Series PDFC-10... proportional directional valves are direct acting screw-in cartridges with a sliding spool design and a 7/8-14 UNF mounting thread. In the neutral position, port 3 is closed and depending on the spool type, ports 2 and 4 are connected to tank (1) (spool configuration M) or ports 1, 2 and 4 are all blocked (spool configuration L). The version with the M spool is used in motor control circuits where free-wheeling in the neutral position is required. The L configuration is the version to use for cylinder applications. These cartridges are particularly suitable for precise and controlled lifting and lowering movements and can also be used for reliable operation in mobile and industrial applications. Best controllability is achieved when using the valve with a bypass pressure compensator to control pressure drop through the valve. Using the valve without pressure

compensator is not recommended because higher pressure drops cause the flow to be more restricted (see performance graph). The proportional directional valve is optionally equipped with a manual over-ride which is detented in the neutral position. To unlatch the detent mechanism, the button on the back can be pushed. That allows shifting the valve in both directions. Pushing the knob shifts the valve to position (a) (3→2 and 4→1) and pulling shifts it to position (b) (3→4 and 2→1). All external parts of the cartridge are zinc plated and chromited (CrVI-free). The slip-on coils can be replaced without opening the hydraulic envelope and can be positioned at any angle through 360°. If you intend to manufacture your own cavities or are designing a line-mounting installation, please refer to the section "Related data sheets".

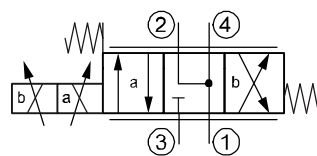
2 Symbol



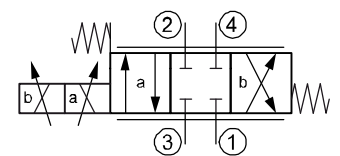
PDFC-10-...-4M-M...



PDFC-10-...-4L-M...



PDFC-10-...-4M-0...



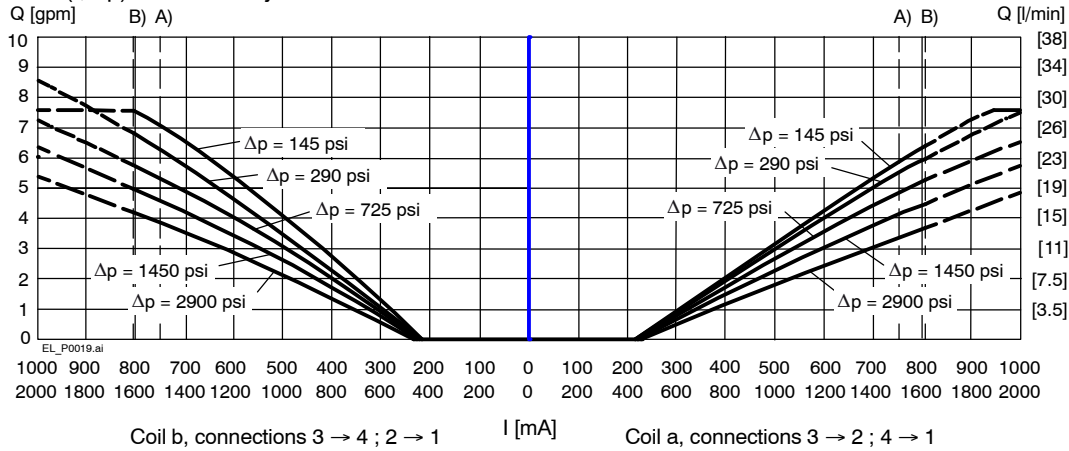
PDFC-10-...-4L-0...

3 Technical data

General characteristics		Description, value, unit	
Designation		4/3 proportional directional valve	
Design		sliding-spool design, direct acting, with solenoid operation	
Mounting method		screw-in cartridge 7/8-14 UNF	
Tightening torque		40...45 ft-lbs	[54...61 Nm]
Size		size SAE 10, cavity type C1040	
Weight		1.65 lbs	[0.75 kg]
Mounting attitude		unrestricted (preferably vertical, coil down)	
Ambient temperature range		-15 °F ... +125 °F	[-25 °C ... +50 °C]
Hydraulic characteristics		Description, value, unit	
Maximum operating pressure	- ports 2, 3, 4 - port 1	4000 psi 2000 psi	[280 bar] [140 bar]
		higher pressure, please consult BUCHER	
Maximum flow rate	- port 3 → 4 and 2 → 1 - port 3 → 2 and 4 → 1	7.0 gpm at Δp 140 psi 6.2 gpm at Δp 140 psi at 100% duty cycle	[26 l/min at Δp 10 bar] [24 l/min at Δp 10 bar]
Leakage flow rate	(port to port)	15 inch ³ at 3000 psi	[245 ml/min at 210 bar]
Hydraulic fluid		HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER	
Hydraulic fluid temperature range		-15 °F ... +160 °F	[-25 °C ... +70 °C]
Viscosity range		15...380 mm ² /s (cSt), recommended 20...130 mm ² /s (cSt)	
Minimum fluid cleanliness Cleanliness class to ISO 4406 : 1999		class 18/16/13	
Electrical characteristics		Description, value, unit	
Supply voltage		12 V DC, 24 V DC	
Control current		12 V = 0...1400 mA, 24 V = 0...750 mA (100% duty cycle) 12 V = 0...1600 mA, 24 V = 0...880 mA (50% duty cycle)	
Power consumption at max. control current		max. 19 W	
Coil resistance R	- cold value at 20 °C - max. warm value	12 V = 5.8 Ω / 24 V = 20.9 Ω 12 V = 9.1 Ω / 24 V = 32.7 Ω	
Recommended PWM frequency (dither)		200 Hz	
Hysteresis with PWM		2...5 % I _N	
Reversal error with PWM		2...5 % I _N	
Sensitivity with PWM		< 1.5 % I _N	
Reproducibility with PWM		< 3 % p _N	
Relative duty cycle		100 % / 50 %	
Protection class to ISO 20 653 / EN 60 529		IP 65 / IP 67 / IP 69K, see "Ordering code" (with appropriate mating connector and proper fitting and sealing)	
Electrical connection		3-pin square plug to ISO 4400 / DIN 43 650 (standard) for other connectors, see "Ordering code"	

4 Performance graphs

Q = f (I; Δp) Flow rate adjustment characteristic 4M

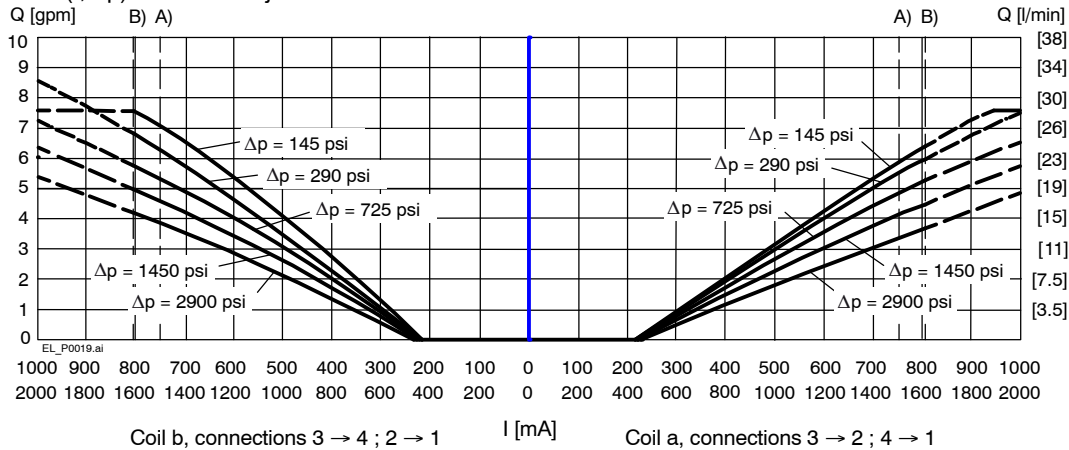


A) 100% duty cycle

B) 50% duty cycle

--- depending on coil temperature, solenoid may draw a voltage higher than the nominal voltage

Q = f (I; Δp) Flow rate adjustment characteristic 4L

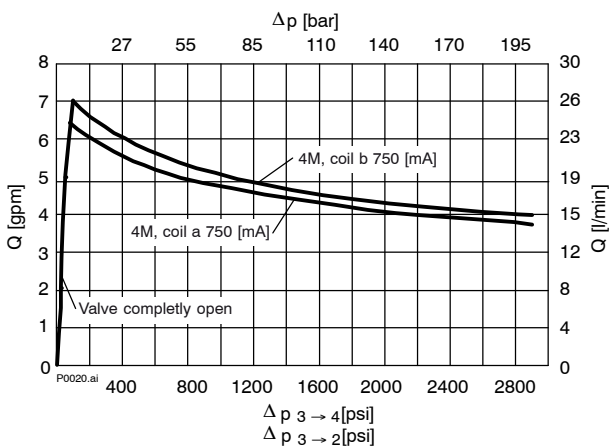


A) 100% duty cycle

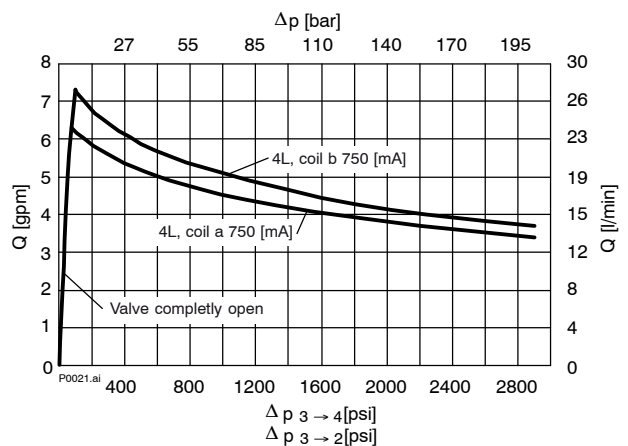
B) 50% duty cycle

--- depending on coil temperature, solenoid may draw a voltage higher than the nominal voltage

Δp = f (Q) Pressure drop - Flow rate characteristic 4M

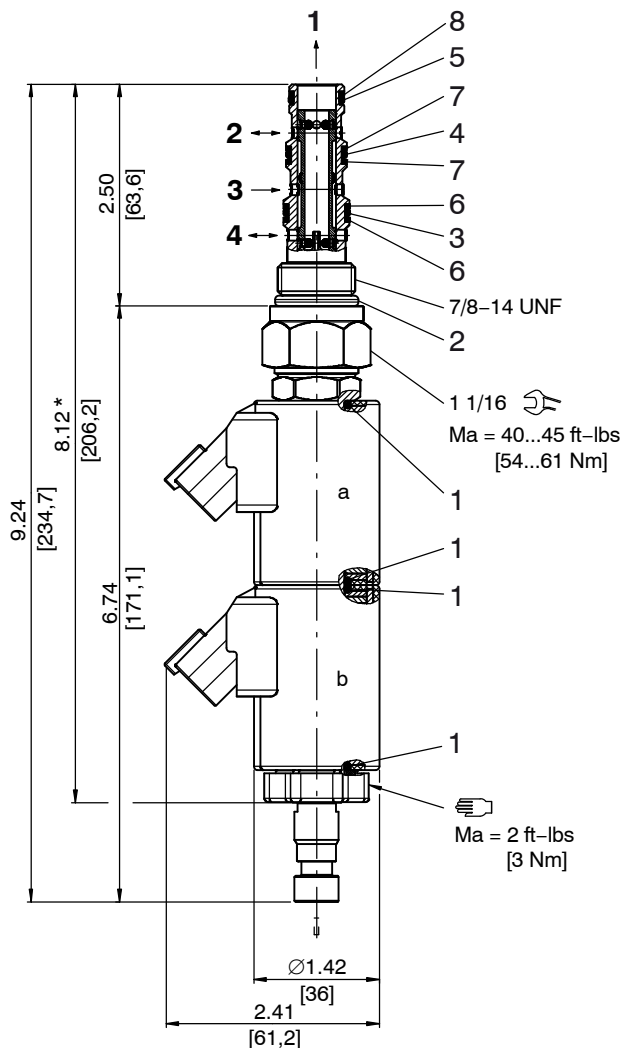


Δp = f (Q) Pressure drop - Flow rate characteristic 4L



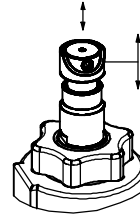
5 Dimensions & sectional view

4/3 proportional directional valve



* overall length without manual over-ride

1. Push button to unlatch manual over-ride



2. Push or pull on whole handle to shift valve to position a or b

Seal kit

Item	Qty.	Description
1	4	O-ring 16 x 2
2	1	O-ring no. 910 $\varnothing 0.755 \times 0.097$ [19,18 x 2,46]
3	1	O-ring no. 016 $\varnothing 0.614 \times 0.070$ [15,60 x 1,78]
4	1	O-ring no. 015 $\varnothing 0.551 \times 0.070$ [14,00 x 1,78]
5	1	O-ring no. 014 $\varnothing 0.489 \times 0.070$ [12,42 x 1,78]
6	2	Backup ring $\varnothing .634 \times .052 \times .047$ [16,10 x 1,32 x 1,19]
7	2	Backup ring $\varnothing .572 \times .052 \times .047$ [14,53 x 1,32 x 1,19]
8	1	Backup ring $\varnothing .510 \times .052 \times .047$ [12,95 x 1,32 x 1,19]



IMPORTANT!

Item no. 5207300112 = Seal kit NBR (Buna)
Item no. 5207300113 = Seal kit FKM (Viton)

6 Installation information



ATTENTION!

Only qualified personnel with mechanical skills may carry out any maintenance work. Generally, the only work that should ever be undertaken is to check, and possibly replace, the seals. When changing seals, oil or grease the new seals thoroughly before fitting them.



IMPORTANT!

When fitting the valves, use the specified tightening torque for the mounting bolts. No adjustments are necessary, since the cartridges are set in the factory.

7 Ordering code

	PDFC	-	10	-	N	-	4M	-	A	-	M	-	0	-	24	D	-
PDFC	= proportional directional valve																
10	= nominal size SAE 10																
N	= NBR (Nitrile) seals (standard)																
V	= FKM (Viton) seals (special seals - please consult BUCHER)																
4L	= cylinder spool, all ports closed in neutral																
4M	= motor spool, 2 and 4 connected to tank in neutral																
A	= factory set min current threshold at position b																
M	= with manual over-ride																
0	= without manual over-ride																
0	= cartridge only																
02BA	= line-mounting body G1/4 BSPP															aluminum	
02BS	= line-mounting body G1/4 BSPP															steel	
03BA	= line-mounting body G3/8 BSPP															aluminum	
03BS	= line-mounting body G3/8 BSPP															steel	
06TA	= line-mounting body SAE-#6															aluminum	
06TS	= line-mounting body SAE-#6															steel	
08TA	= line-mounting body SAE-#8															aluminum	
08TS	= line-mounting body SAE-#8															steel	
...	= voltage e.g. 24 (24 V)																
D	= current DC																
(blank)	= ISO 4400 / DIN 43 650 mating plug (standard, IP 65)																
M100	= without mating DIN plug																
C	= Kostal plug connection (IP 65)																
JT	= Junior Timer radial plug connection (with protection diode, IP65)																
IT	= Junior Timer axial plug connection (with protection diode, IP65)																
D	= Deutsch plug connection DT04-2P (IP 67/69K)																
DT	= Deutsch plug connection DT04-2P (with protection diode, IP 67/69K)																
S	= AMP Superseal 1.5 (IP 67) / Metri-Pack 150 (IP 65)																
F	= flying leads (500 mm)																
	} mating plug not supplied																

8 Related data sheets

Reference	(Old no.)	Description
520-P-000050		The form-tool hire programme
520-P-000420	(0-042.0)	Cavity Type C1040
520-P-000421	(0-042.1)	Line-mounting body, 10 Series – 4-way

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