

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...



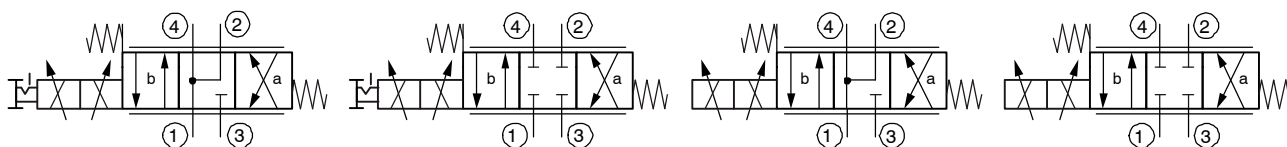
- Compact construction for cavity type C1040 – 7/8-14 UNF
- Operated by a proportional high pressure wet-armature solenoid
- Minimum current threshold/ dead band (position b) is factory set for better consistency
- Manual over-ride optionally available, detented in neutral position
- Excellent reproducibility 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

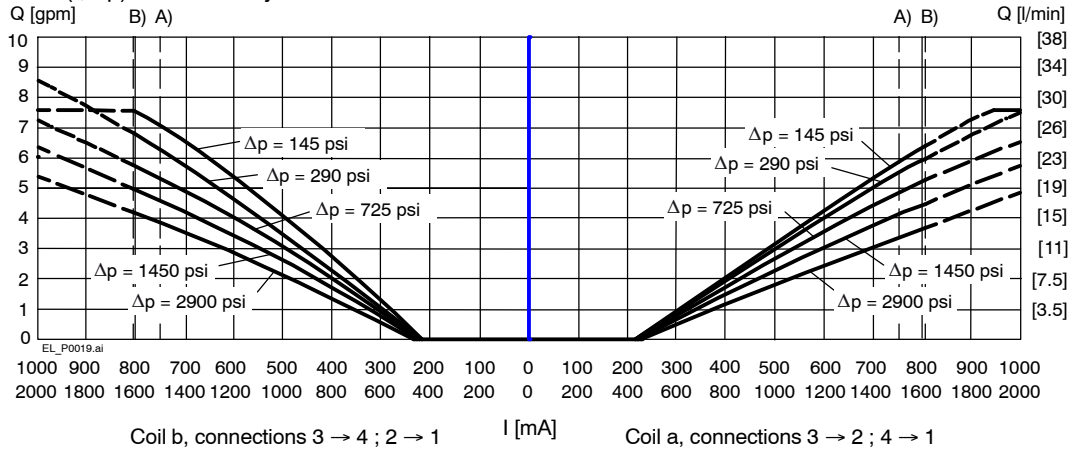
General characteristics	Description, value, unit
Designation	4/3 proportional directional valve
Design	sliding-spool design, direct acting, with solenoid operation
Mounting method	screw-in cartridge 7/8-14 UNF
Tightening torque	40...45 ft-lbs [54...61 Nm]
Size	size SAE 10, cavity type C1040
Weight	1.65 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 [280 bar] 2000 psi [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 [26 l/min at Δp 10 bar] 6.2 gpm at Δp 140 psi [24 l/min at Δp 10 bar] at 100% duty cycle
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

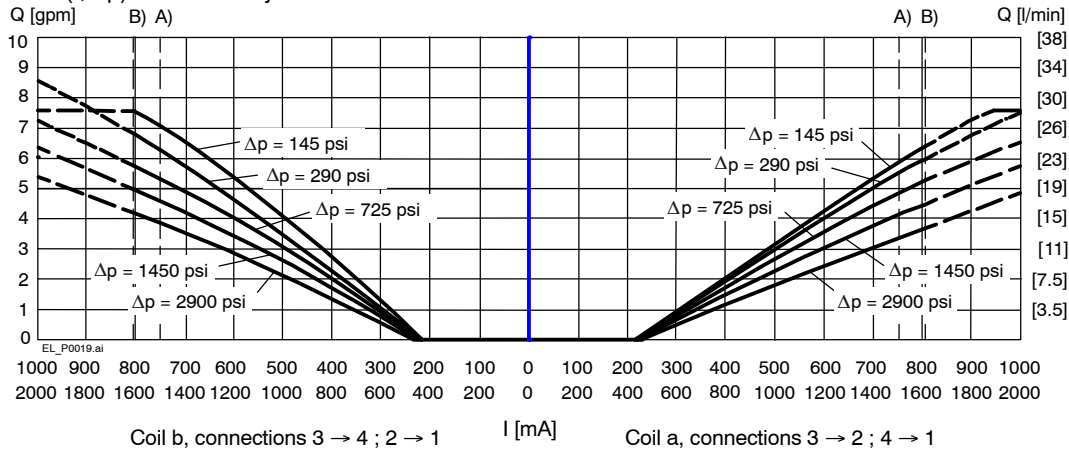


A) 100% duty cycle

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

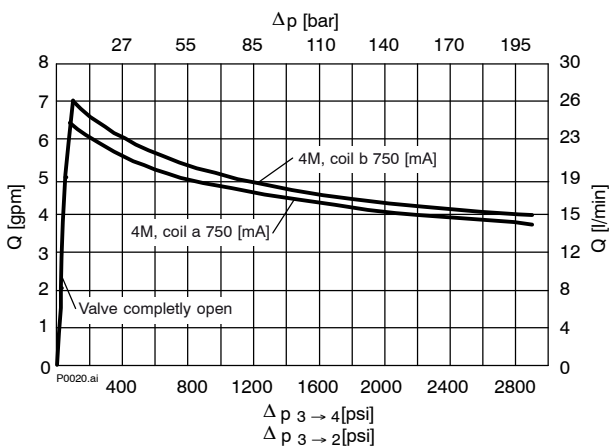


A) 100% duty cycle

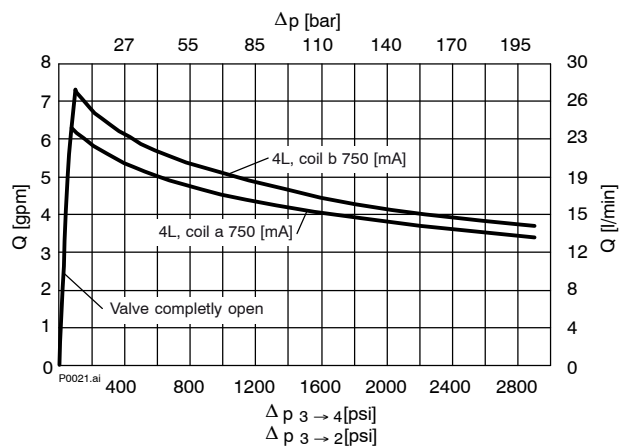
B) 50% duty cycle

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

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

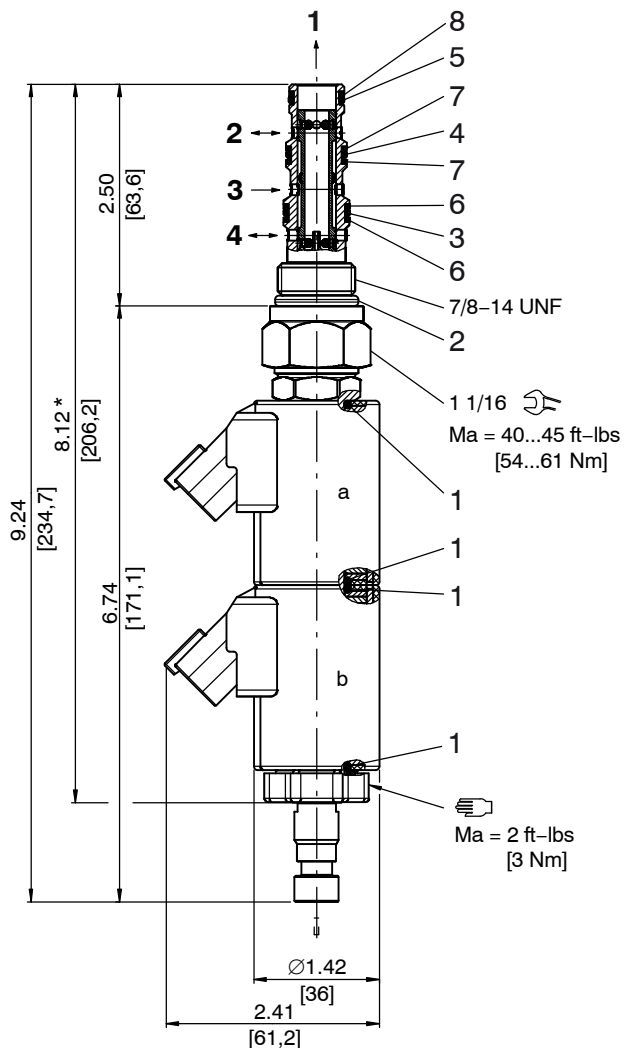


Δp = f (Q) Pressure drop - Flow rate characteristic 4L



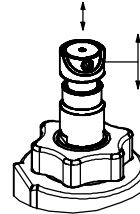
5 Dimensions & sectional view

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.

