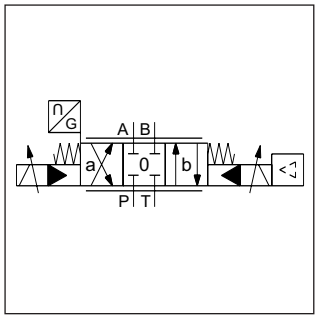
The pilot operated proportional directional valves D*1FC with position feedback are available in 4 sizes:

D31FC - NG10 (CETOP 05)
D41FC - NG16 (CETOP 07)
D91FC - NG25 (CETOP 08)
D111FC - NG32 (CETOP 10)

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 parametrizing cable to connect to a serial RS232 interface is available as accessory.

D41FC

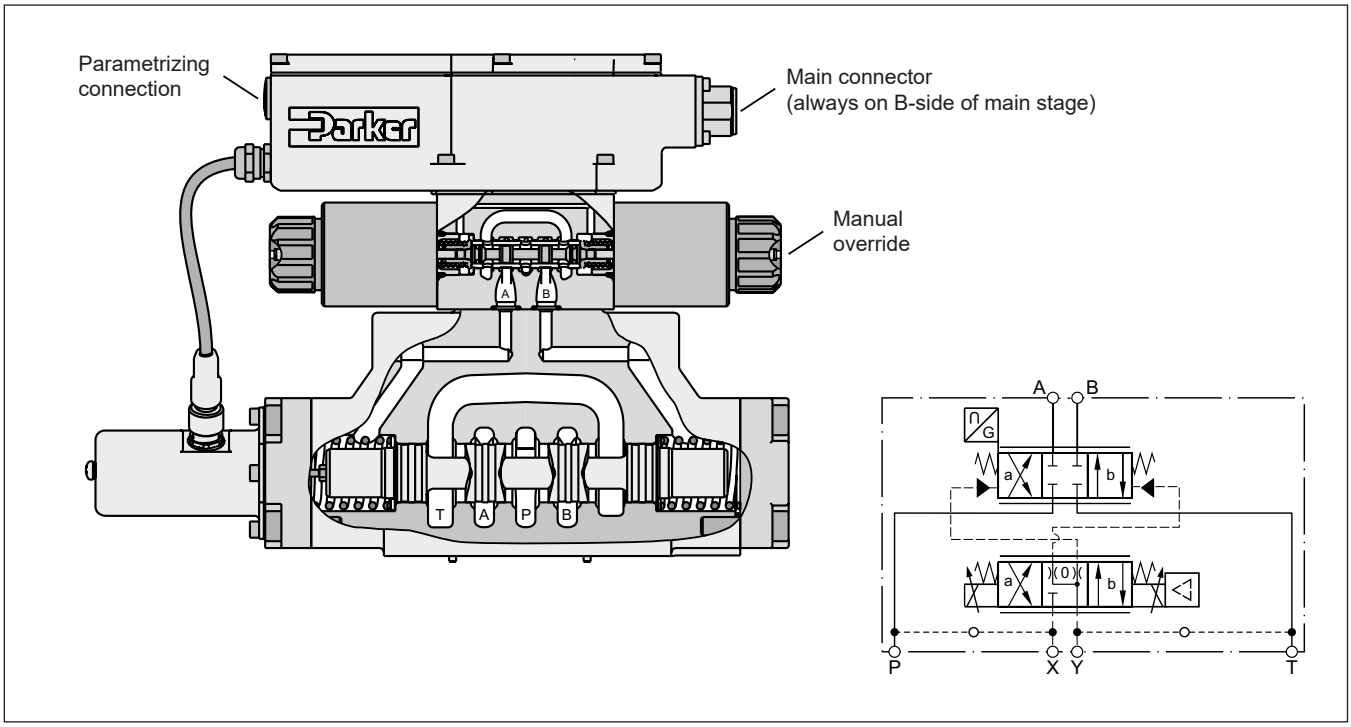


Standard D*1FC

Features

- Progressive flow characteristics for sensitive adjustment
- Low hysteresis
- High dynamics
- High flow capacity
- Centre position monitoring optional
- Optional pressure compensation element for valve electronics available for environments with strong temperature fluctuations.

D41FC

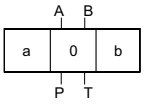


3

D		1	F	C			C						
Directional control valve	Size	NG06 pilot	Proportional control	Integrated electronics with position feedback	Function	Flow	Spool position on power down	Pilot connection	Seal	Command signal	Electronic option	Valve option	Design series (not required for ordering)

Code	Nominal size
3	**NG10 / CETOP 05**
4	**NG16 / CETOP 07**
9 [1]	**NG25 / CETOP 08**
11	**NG32 / CETOP 10**

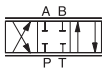
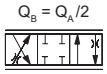
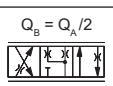
Spool position on power down



Code	Valve option
0	**Standard for spool type B, E R**
8 [4]	**Monitor switch**

Code	Electronic option [2]
0	**6+PE acc. EN175201-804**
5	**11+PE acc. EN175201-804**
7	**6+PE + enable acc. EN175201-804**

Code	Signal	Function
B	**±10 V**	**0...+10 V P-B**
E	**±20 mA**	**0...+20 mA -> P-B**
K	**±10 V**	**0...+10 V P-A**
S	**4...20 mA**	**12...20 mA -> P-A**
W [4]	**Adjustable**	**Default ±10V**

Standard	
Code	Spool type
Overlap	
E01	
E02	
B31	$Q_B = Q_A/2$ 
B32	$Q_B = Q_A/2$ 

Code	Flow [l/min] at Δp = 5 bar per metering edge			
	D31	D41	D91	D111
D	**90**	—	—	—
E	**120**	—	—	—
F	—	**200**	—	—
H	—	—	**450**	—
L	—	—	—	**1000**

Code	Seal
N	**NBR**
V	**FPM**

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

Short delivery time for all variations

Parametrizing cable OBE ® RS232, item no. 40982923

[1] With enlarged connections Ø 32 mm.
[2] Please order plugs separately, see accessories.
[3] Please order female connector M12x1 separately (see accessories, female connector M12x1 (order no.: 5004109).
[4] Available command signals see technical data.

General					
Design		Pilot operated DC valve			
Actuation		Proportional solenoid			
Size		**NG10 (CETOP 05)**	**NG16 (CETOP 07)**	**NG25 (CETOP 08)**	**NG32 (CETOP 10)**
		D31	**D41**	**D91**	**D111**
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+60 (in case of strong temperature fluctuations see footnote [4])			
$MTTF_D$ value [1]	[years]	75			
Weight	[kg]	9.0	12.5	21.0	68.5
Vibration resistance	[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 10 (RMS) Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27			
Hydraulic					
Max. operating pressure	[bar]	Pilot drain internal: P, A, B, X 350; T, Y 210			
	[bar]	Pilot drain external: P, A, B, T, X 350; Y 210			
Fluid		Hydraulic oil according to DIN 51524...535, other on request			
Fluid temperature	[°C]	-20...+60 (NBR: -25...+60)			
Viscosity permitted	[cSt] / [mm^2/s]	20...400			
recommended	[cSt] / [mm^2/s]	30...80			
Filtration		ISO 4406; 18/16/13			
Nominal flow at Δp=5 bar per control edge [2]	[l/min]	90 / 120	200	450	1000
Max. recommended flow	[l/min]	250	600	1000	3000
Leakage at 100 bar, main stage	[ml/min]	200	200	600	1000
pilot stage	[ml/min]	<100			
Opening point	[%]	set to 10 command signal (see flow characteristics)			
Pilot supply pressure	[bar]	20 - 350			
Pilot flow, step response	[l/min]	2.9	4.1	6.7	15
Static / Dynamic					
Step response at 100 % step [3]	[ms]	35	37	66	120
Hysteresis	[%]	≤ 0.1			
Temperature drift	[%/K]	< 0.005			
Sensitivity	[%]	≤ 0.05			

3

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

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

[3] Measured with load (210 bar pressure drop / two control edges)

[4] In case of strong temperature fluctuations, such as in outdoor applications, a pressure compensation element for the onboard electronics is recommended, available on request with ordering code suffix XG481.

3

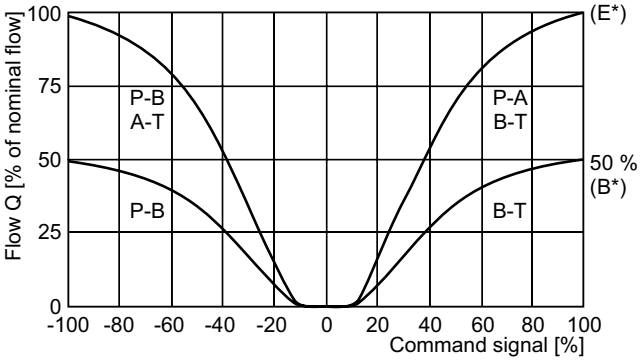
Electrical characteristics			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple DC		[V]	18...30, electric shut-off at < 17, ripple < 5 % eff., surge free
Current consumption max.		[A]	2.0
Pre fusing medium lag		[A]	2.5
Command signal			Depending on choosen signal type
current	signal	[V]	+10...0...-10, ripple < 0.01% eff., surge free, 0...+10 V P->A
	impedance	[kOhm]	100
current	signal	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, 0...+20 mA P–>A
	impedance	[Ohm]	<250
current	signal	[Ohm]	4...12...20, ripple < 0.01 % eff., surge free, 12...20 mA P–>A < 3.6 mA = enable off, > 3.8 mA = enable on (according to NAMUR NE43)
	impedance	[Ohm]	<250
Differential input max.		[V]	
Code 0/7			30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0 V (terminal B)
Code 5			30 for terminal 4 and 5 against PE (terminal ⏚) 11 for terminal 4 and 5 against 0 V (terminal 2)
Adjustment ranges	Min	[%]	0...50
	Max	[%]	50...100
	Ramp	[s]	0...32.5
Interface			RS 232, parametrizing connection 5pole
Enable signal (code 5/7)		[V]	5...30
Diagnostic signal		[V]	+10...0...-10 / +12.5 error detection, 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 min.	Code 0/7	[mm²]	7 x 1.0 (AWG20) overall braid shield
	Code 5	[mm²]	8 x 1.0 (AWG20) overall braid shield
Wiring length max.		[m]	50

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

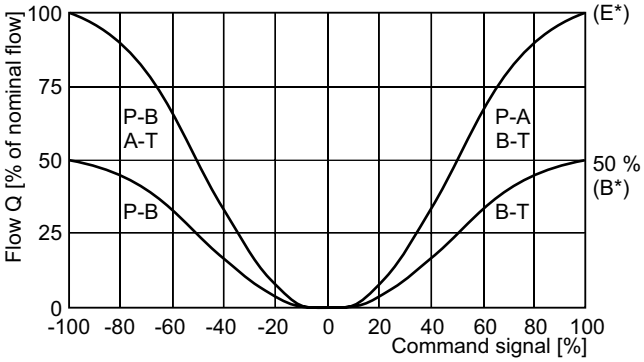
D*1FC B/E Flow characteristics

(set to opening point 10 %) at Δp = 5 bar per metering edge

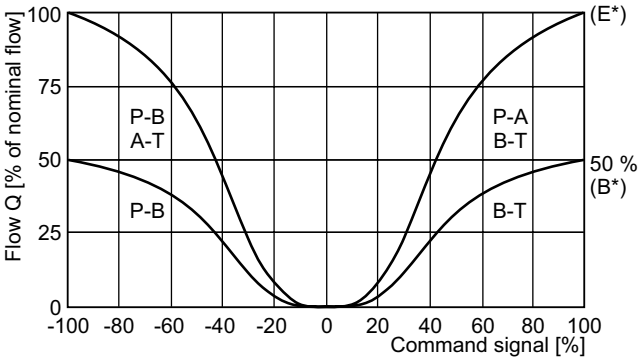
D31FC, Spool code E01, E02[1)], B31, B32[1)]



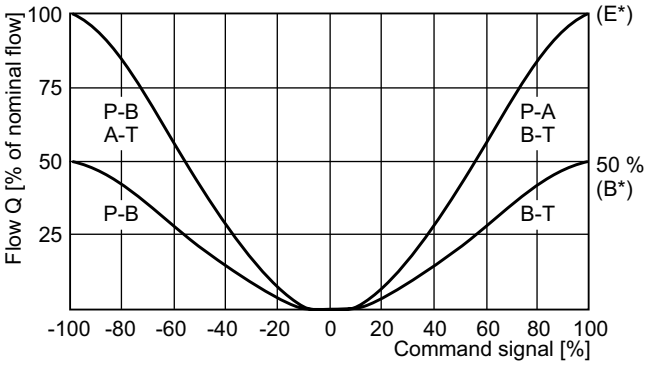
D41FC, Spool code E01, E02[1)], B31, B32[1)]



D91FC, Spool type E01, E02[1)], B31, B32[1)]



D111FC, Spool type E01, E02[1)], B31, B32[1)]



[1)] Note the differing characteristics A-T and B-T for spool types B32 and E02: in the middle position A and B are relieved with a small opening to the tank.

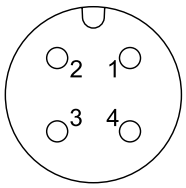
All characteristic curves measured with HLP46 at 50 °C.

3

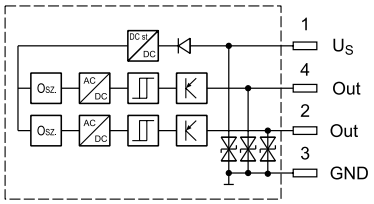
Electrical characteristics of position control M12x1 as per IEC 61076-2-101

Supply voltage	[VDC]	24
Tolernace supply voltage	[%]	±20
Ripple supply voltage	[%]	≤10
Polarity protection	[V]	300
Current consumption without load	[mA]	≤20
Switching hysteresis	[mm]	<0.06
Max. output current per channel, ohmic	[mA]	250
Ambient temperature	[°C]	-20 … +60
Protection		IP65 acc. EN 60529
CE conform		EN 61000-4-2 / EN 61000-4-4 / EN 61000-4-6 [1] / ENV 50140 / ENV 50204
Min. distance to next AC solenoid	[m]	0.1
Interface		M12x1 acc. to IEC 61076-2-101

M12x1 connector pin assignment



1 + US 19.2...28.8 V
2 Output B (normally closed)
3 0 V
4 Output A (normally closed)



Outputs: Open collector

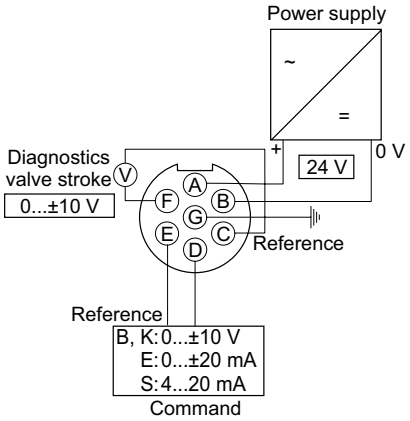
Signal	Output A (pin 4)	Output B (pin 2)
neutral	closed	closed
	open	closed
	closed	open

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

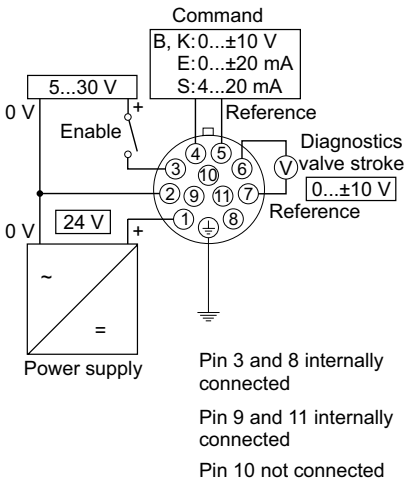
Please order female connector M12x1 separately (see accessories, female connector M12x1 (order no.: 5004109).

Wiring according EN 175201-804

Code 0/3, 6+PE



Code 5, 11+PE

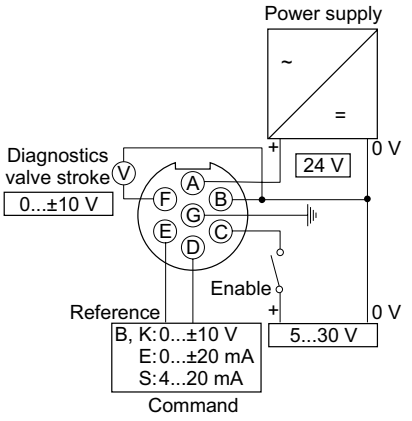


Pin 3 and 8 internally connected

Pin 9 and 11 internally connected

Pin 10 not connected

Code 1/7, 6+PE + enable



[1] Only guaranted with screened cable and female connector

ProPxD interface program

The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface.

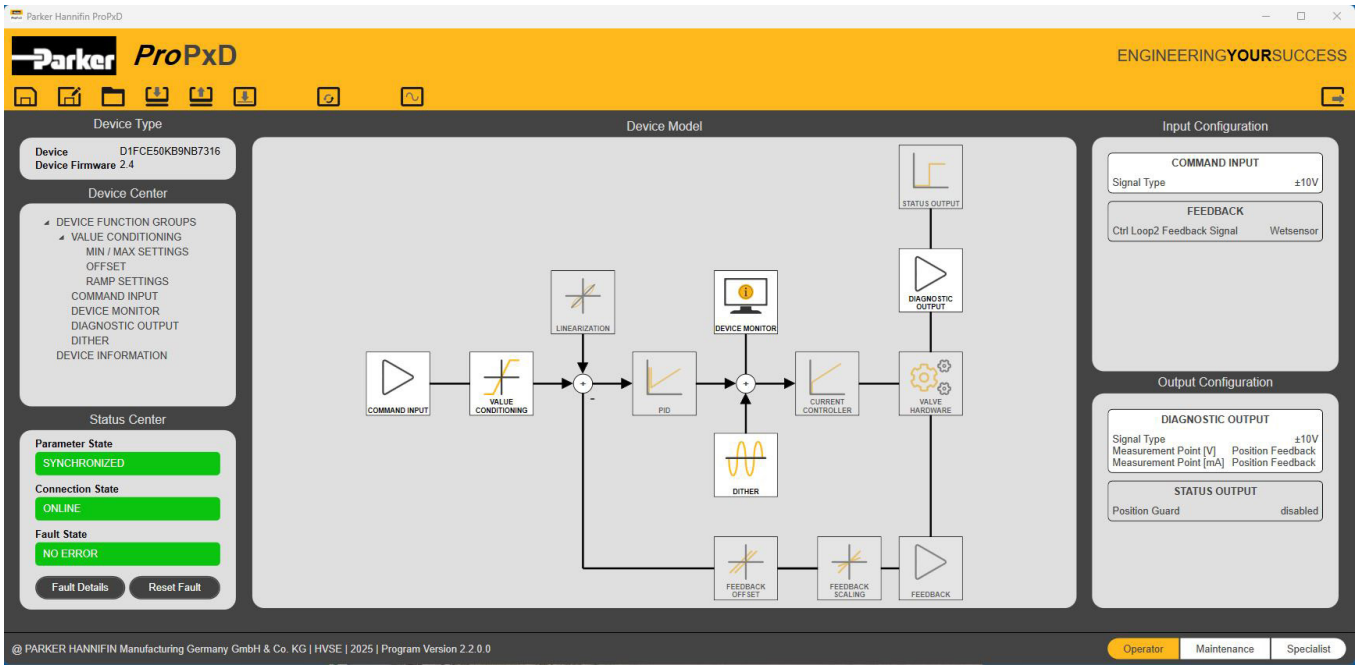
Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or saved for documentation purposes.

The PC software "ProPxD" can be downloaded free of charge from www.parker.com

Features

- Comfortable editing of all parameters
- Oscilloscope function
- Storage and loading of optimized parameter adjustments
- Plain communication between PC and electronics via serial interface RS232C

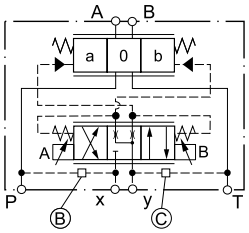
The parametrizing cable may be ordered under item no. 40982923.
If no RS232 interface is available, standard RS232-to-USB adapters can be used. These are available from electronics retailers.



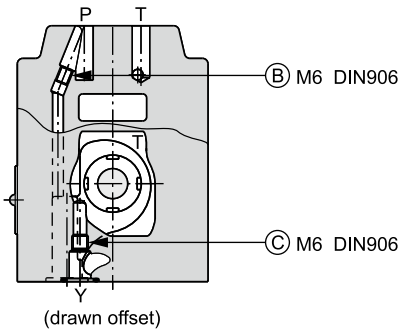
Pilot oil inlet (supply) and outlet (drain)

○ **open,** ● **closed**

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

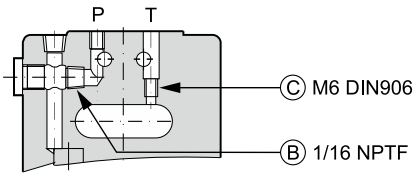


D31FCB/E

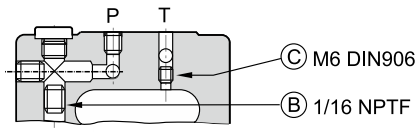


(drawn offset)

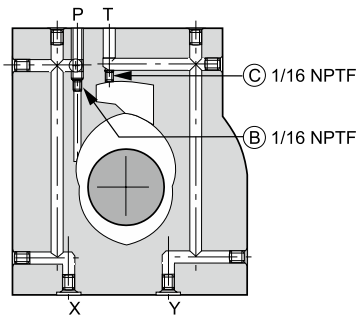
D41FCB/E



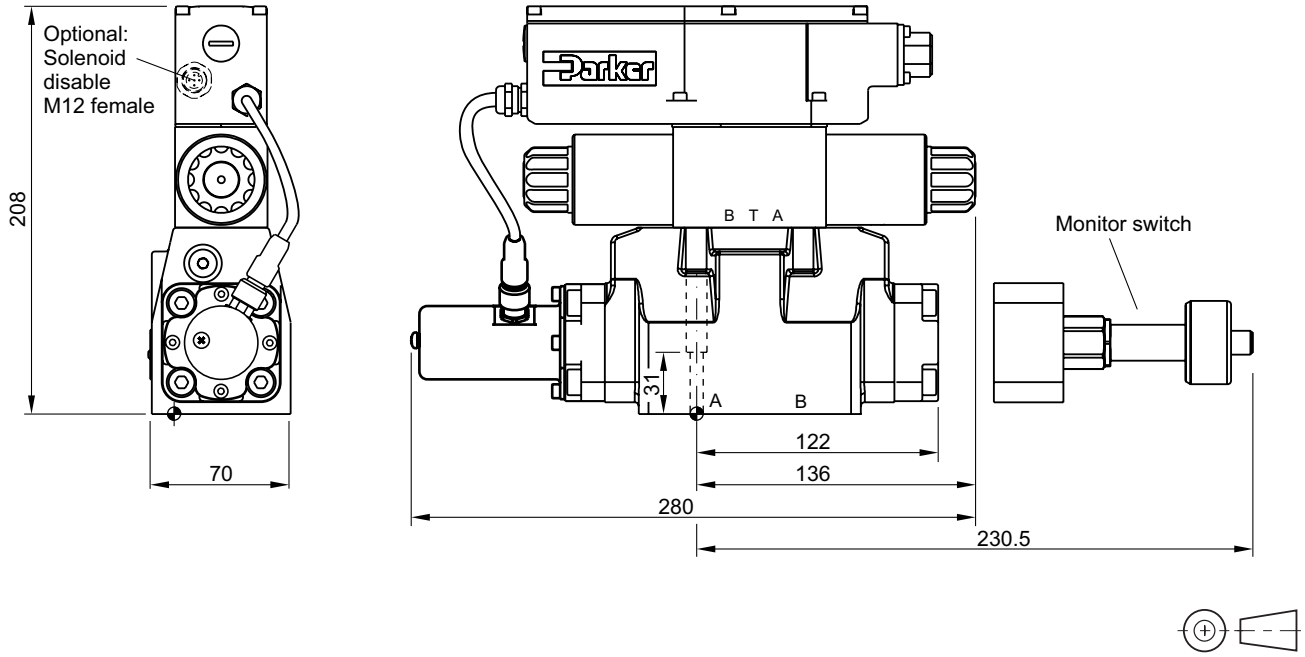
D91FCB/E



D111FCB/E

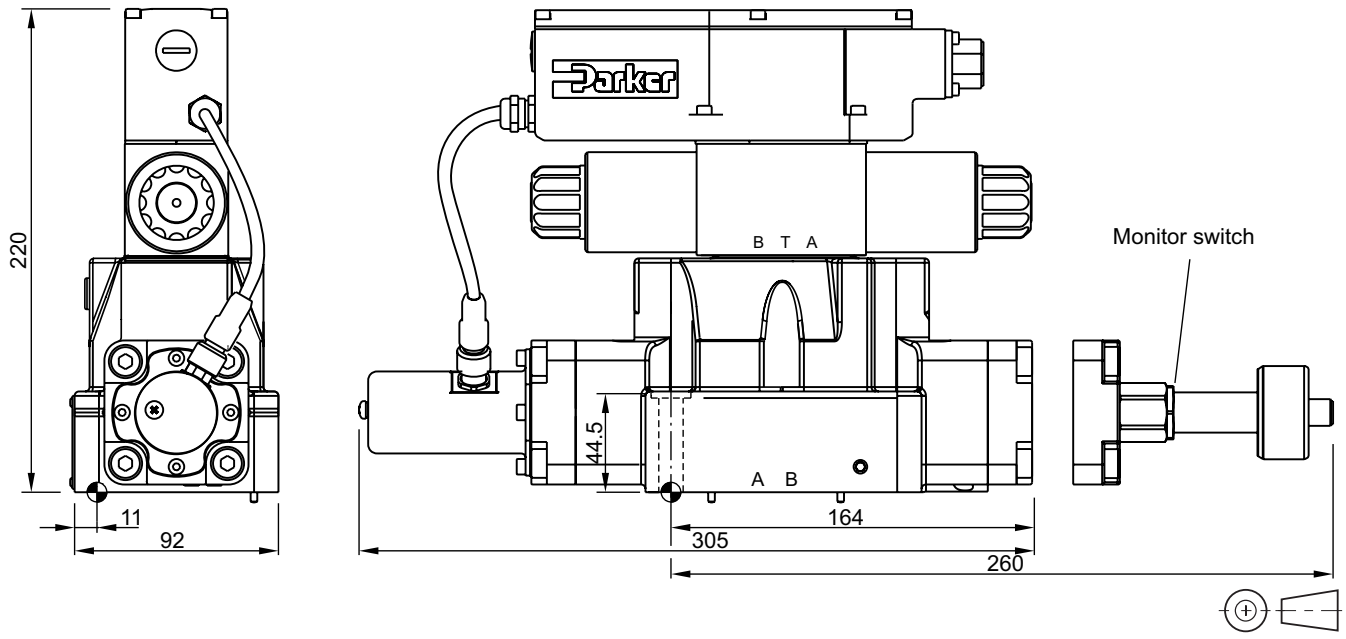


D31FC



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D31FC FPM: SK-D31FC-V

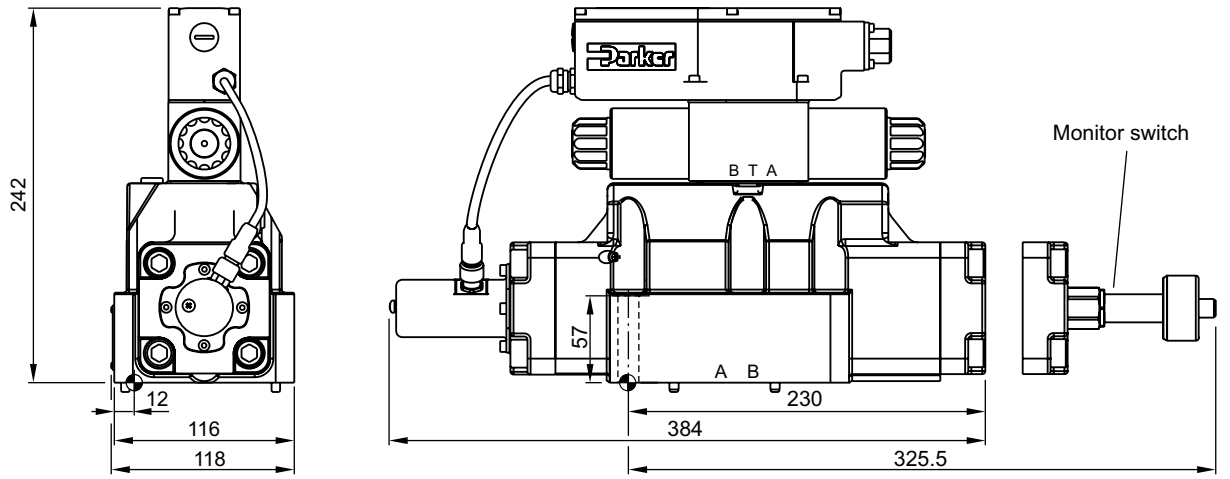
D41FC



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK320	2x M6x55 4x M10x60 ISO 4762-12.9	13.2 Nm ±15 % 63 Nm ±15 %	NBR: SK-D41FC FPM: SK-D41FC-V

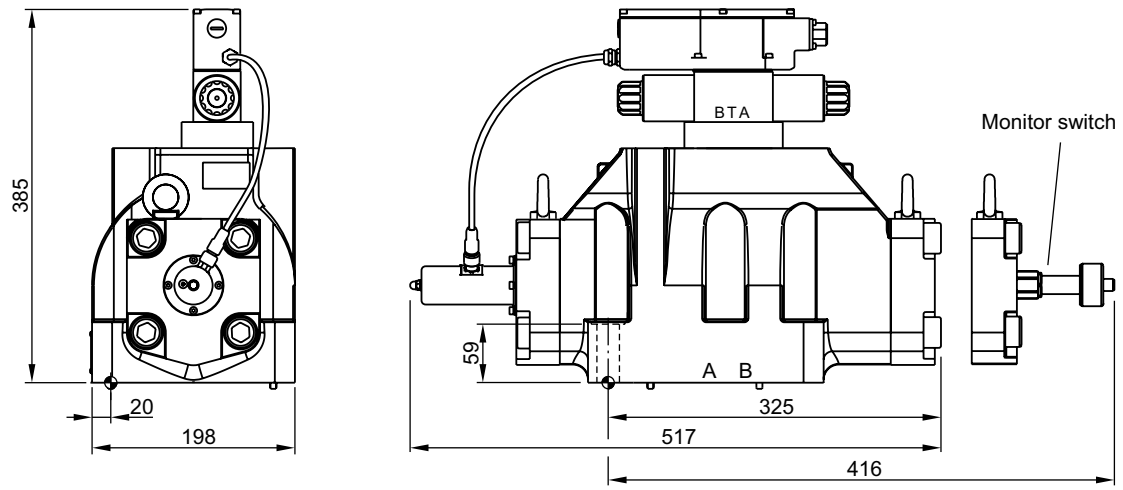
3

D91FC



Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK360	6x M12x75 ISO 4762-12.9	108 Nm ±15 %	NBR: SK-D91FC FPM: SK-D91FC-V

D111FC



Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK386	6x M20x90 ISO 4762-12.9	517 Nm ±15 %	NBR: SK-D111FC FPM: SK-D111FC-V