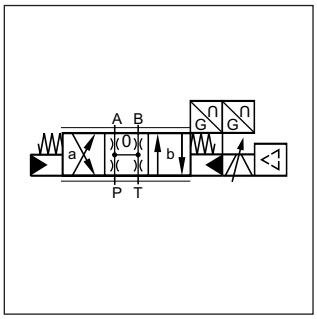
The series of pilot operated servo proportional valves D*1FP transfers the advantages of the Parker patented Voice Coil Drive (VCD) to larger frame sizes and thus high flow rates. The high dynamics / high precision drive of the pilot valve allows the optimum control of the main spool and results in servo class performance of the complete valves.

The D*1FP series is available in 4 sizes:

D31FP NG10 (CETOP 05)
D41FP NG16 (CETOP 07)
D91FP NG25 (CETOP 08) for port diam. up to 32 mm
D111FP NG32 (CETOP 10)

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

D31FP

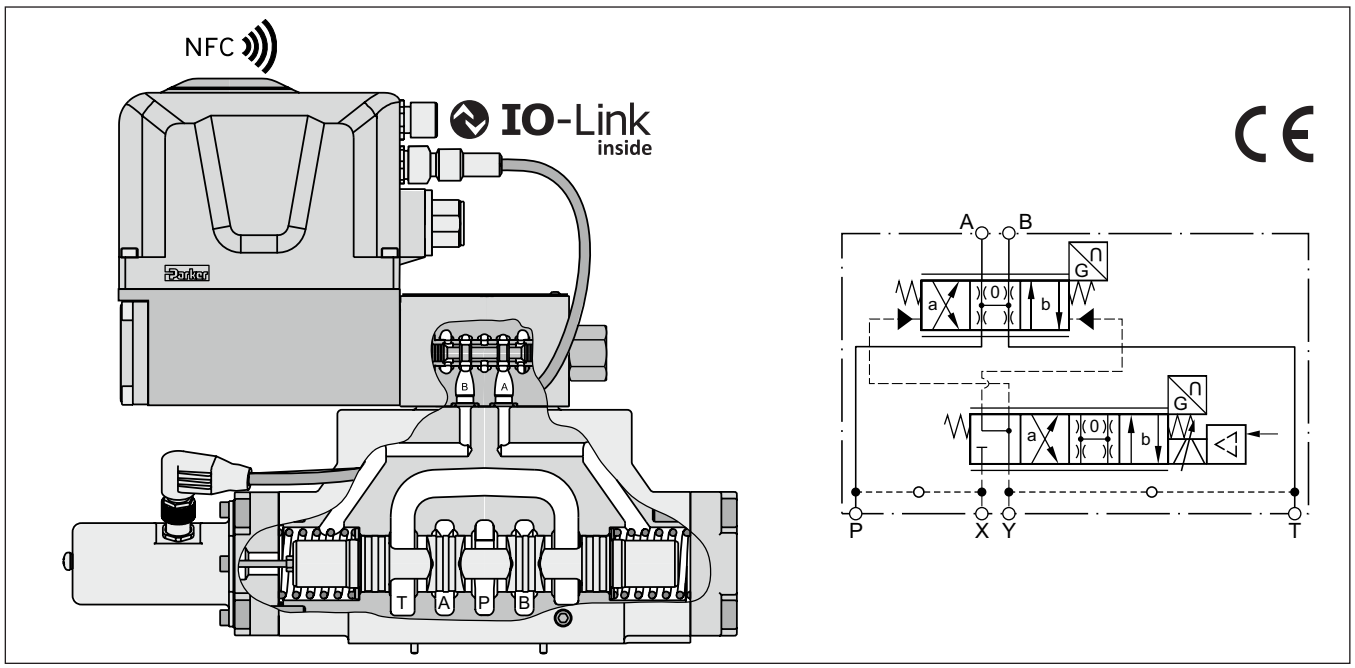


D*1FPE

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
- IO-Link interface for parametrizing
- RGB diode for optical status check
- NFC interface

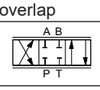
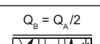
D41FPE52



Ordering Code

D		1	F	P								0	
Directional control valve	Size	NG06 pilot	Proportional control	VCD performance	Spool type	Flow	Spool position on power down	Pilot connections	Seals	Command signal	Electronics options	Valve option	Design series (not required for ordering)

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

Code	Spool type
overlap	
E01	
E02	
B31	$Q_B = Q_A/2$ 
B32	$Q_B = Q_A/2$ 
zerolap	
E52	
B61	$Q_B = Q_A/2$ 

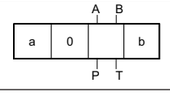
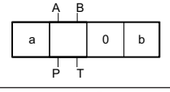
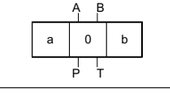
Code	Flow [l/min] at Δp = 5 bar per metering edge			
	D31	D41	D91	D111
D	90	—	—	—
E	120	—	—	—
F	—	200	—	—
H	—	—	450	—
L	—	—	—	1000

Code	Connection type
0	6+PE acc. EN175201-804
5	11+PE acc. EN175201-804
7	6+PE + enable

Code	Signal	Function
B	0...±10 V	0...+10 V P -> B
E	0...±20 mA	0...+20 mA P -> B
K	0...±10 V	0...+10 V P -> A
S	4...20 mA	12...20 mA P -> A

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

Code	Inlet	Drain
1	internal	external
2	external	external
4	internal	internal
5	external	internal

Code	Spool pos. on power down
A [2]	
B [2]	
C [3]	

Short delivery time for all variations

Please order connector separately. See chapter 3 accessories.
IO-LINK-MASTER-USB order no. 40983544

[1] For enlarged connections Ø 32 mm.
[2] Approx. 10 % opening, only zero lapped spools.
[3] For overlapped spools.

Technical Data

General						
Design				Pilot operated servo proportional DC valve		
Actuation				VCD-actuator		
Size				NG10 (CETOP 05) D31	NG16 (CETOP 07) D41	NG25 (CETOP 08) D91 / NG32 (CETOP 10) D111
Mounting Interface				DIN 24340 / ISO 4401 / CETOP RP121 / NFPA		
Mounting position				unrestricted		
Ambient temperature			[°C]	-20...+60		
$MTTF_D$ value [1]			[years]	75		
Weight			[kg]	11.3	14.2	23.5 / 64.5
Vibration resistance			[g]	10 Sinus 5...2000 Hz acc. IEC 60068-2-6 10 (RMS) Random noise 20...2000 Hz acc. IEC 60068-2-64 15 Shock acc. IEC 60068-2-27		
Hydraulic						
Max. operating pressure			[bar]	Internal pilot drain P, A, B, X 350; T, Y 35 External pilot drain P, A, B, T, X 350; Y 35		
Fluid				Hydraulic oil according to DIN 51524 ... 535, other on request		
Fluid temperature			[°C]	-20...+60 (NBR: -25...+60)		
Viscosity	permitted		[cSt]/[mm²/s]	20...400		
	recommended		[cSt]/[mm²/s]	30...80		
Filtration				ISO 4406; 18/16/13		
Nominal flow at Δp = 5 bar per control edge [2]			[l/min]	120	200	450 / 1000
Max. recommended flow (standard)			[l/min]	250	600	1000 / 3000
Leakage at 100 bar	Overlapped spool		[ml/min]	200	200	600 / 1000
	Zerolapped spool		[ml/min]	900	900	1000 / 5000
	Pilot		[ml/min]	< 500		
Opening point			[%]	set to 10 command signal (see flow characteristics)		
Pilot supply pressure			[bar]	20...350		
Pilot flow during step response at 210 bar			[l/min]	10	12	24 / 40
Static / Dynamic						
Step response at 100 % stroke [3]			[ms]	10	13	19 / 45
Frequency response						
	Amplitude ±5 % at 210 bar		[Hz]	128	95	95 / 40
	Phase ±5 % at 210 bar		[Hz]	118	95	90 / 75
Hysteresis			[%]	< 0.1		
Sensitivity			[%]	< 0.05		
Temperature drift of center position			[%/K]	< 0.025		
Interfaces						
IO-Link				IEC 61131-9		
NFC ISO/IEC 15693				NFC Forum Type 5 tag certified by the NFC Forum Frequency 13.56 MHz; -27.2 dBµA/m at 10 meters distance		
Electrical						
Duty ratio			[%]	100		
Protection class				IP65 in accordance with EN 60529 (with correctly mounted plug-in connector) 6 = Full protection against contact, dust tight 5 = Protection against water jets (nozzle) from any angle		
Supply voltage / ripple			[V]	24 nominal (tolerance range 22 … 30), electric shut-off at < 19, ripple < 5 % eff., surge free		
Current consumption max.			[A]	3.5		
Pre-fusing			[A]	4.0 A medium lag		
Input signal	Code K (B)	Voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, 0...+10 V P–>A (P–>B)		
		Impedance	[kOhm]	100		
	Code E	Current	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, 0...+20 mA P–>B		
		Impedance	[Ohm]	<250		
	Code S	Current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, 12...20 mA P–>A		
		Impedance	[Ohm]	<250 < 3.6 mA = enable off, > 3.8 mA = enable on acc. NAMUR NE43		
Input Capacitance typ.			[nF]	1		
Differential input max.		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]	acc. EN 61131-2; Type 3 Low -3…+5; High 11…30; input current 3 mA		
Diagnostic signal			[V]	+10...0...-10 / +12.5 V (overload), rated max. 5 mA		
EMC				EN 61000-6-2, EN 61000-6-4		
Electrical connection		Code 0/7		6 + PE acc. EN 175201-804		
		Code 5		11 + PE acc. EN 175201-804		
Wiring min.		Code 0/7	[mm²]	7 x 1.0 (AWG16) overall braid shield		
		Code 5	[mm²]	8 x 1.0 (AWG16) overall braid shield		
Wiring length max.			[m]	50		

[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.

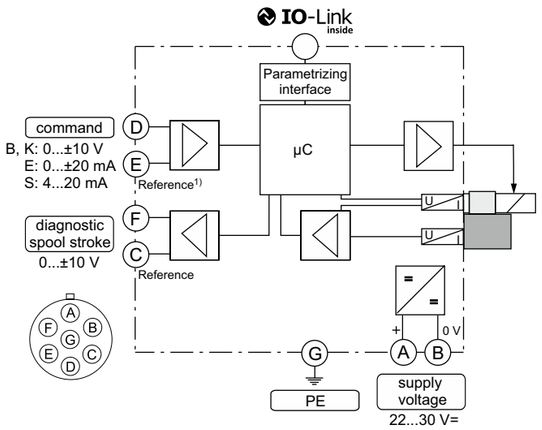
[2] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

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

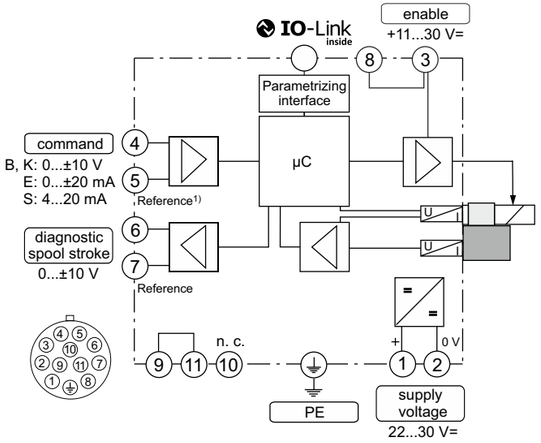
3

Wiring

Code 0, 6 + PE acc. EN 175201-804



Code 5, 11 + PE acc. EN 175201-804



Code 7, 6 + PE acc. EN 175201-804 + enable

Pin assignment IO-Link (parametrizing) interface, M12 socket

PIN assignment acc. IEC 60974-5-2

- Pin 1: 24 VDC
- Pin 3: GND
- Pin 4: IO-Link Communication (C/Q)

[1] Do not connect with supply voltage zero.

3

IO-Link interface

IO-Link communication takes place via the externally accessible M12 interface.

The IO-Link interface allows an external access to the available valve parameters via an IO-Link master or via the ProPxD software.

Parker IO-LINK-MASTER-USB order no. 40983544 (Parameter overview in the operating instructions)

NFC-Interface

The NFC interface allows a wireless access to valve data via the Parker APP ProNFC.

Available for free on the **App Store** and **Google Play Store**.

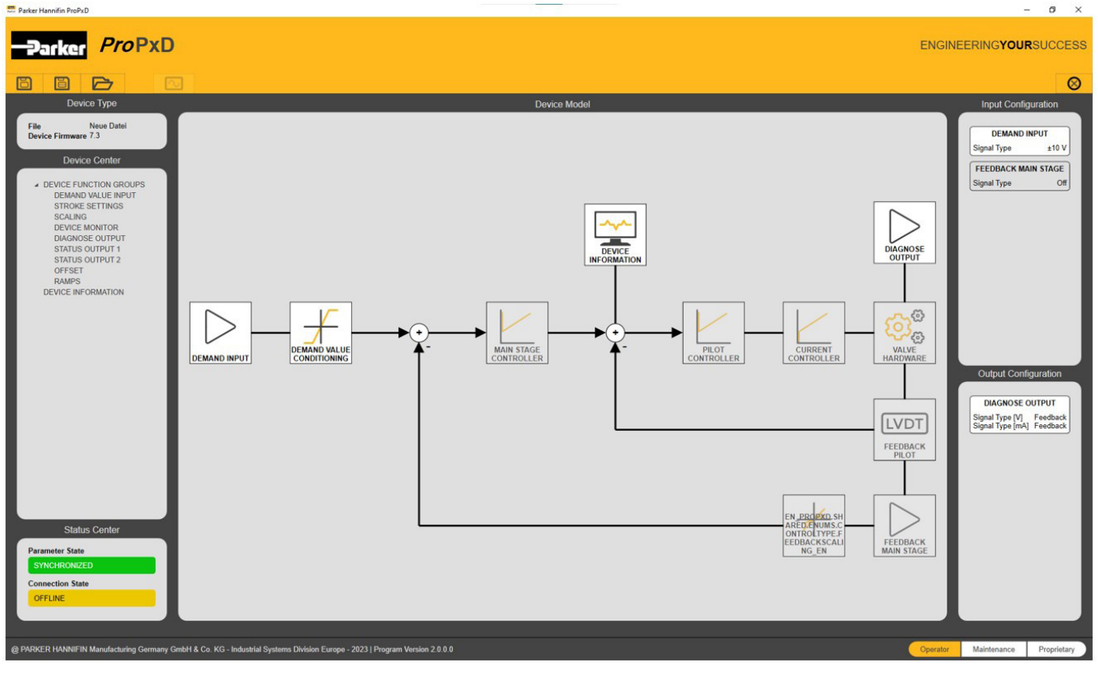
ProPxD parameterization software

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.

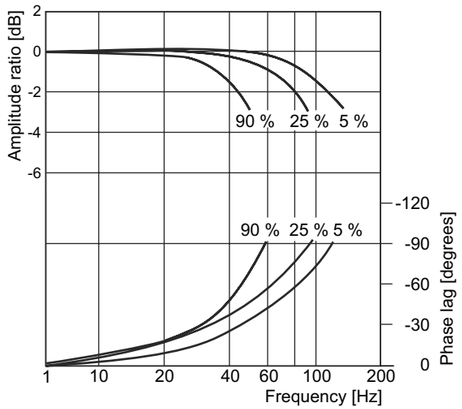
The PC software can be downloaded free of charge directly at www.parker.com/propxd.

Parker IO-LINK-MASTER-USB order no. 40983544

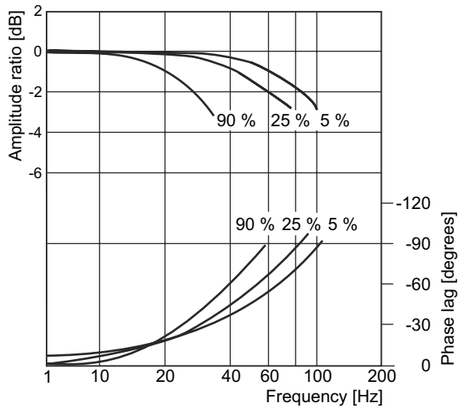


Frequency response
±5 % / ±25 % / ±90 % command signal
Dynamics at 210 bar pilot supply pressure

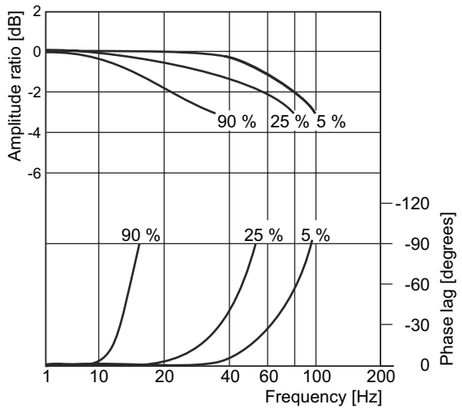
D31FP



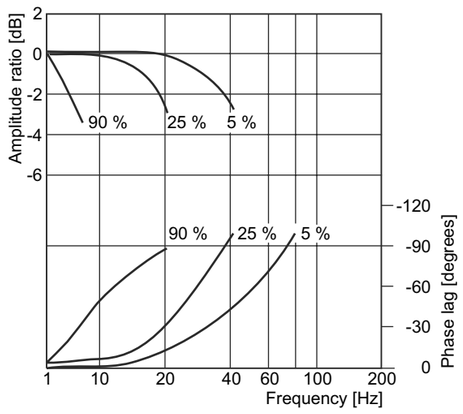
D41FP



D91FP



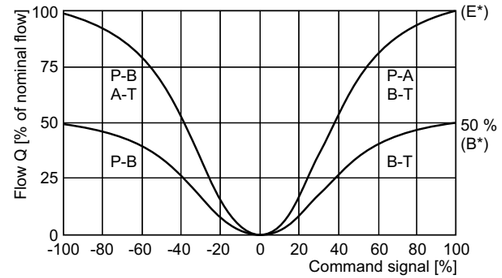
D111FP



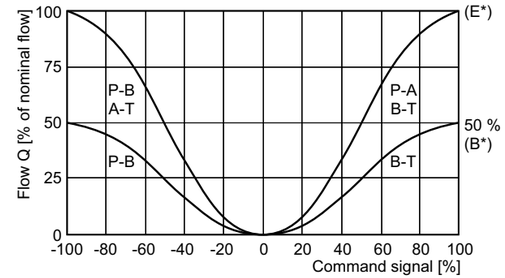
All characteristic curves measured with HLP46 at 50 °C.

Flow curves D*1FPB/E
(Overlapped spool set to opening point 10 %)
at ∆p = 5 bar per metering edge

D31FP
spool type E01/02/52, B31/32/61

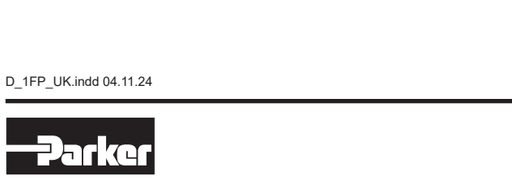


D41FP
spool type E01/02/52, B31/32/61



Flow curves

D91FP
Spool type E01/02/52, B31/32/61

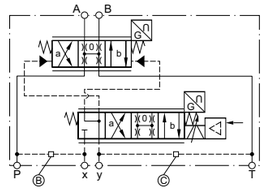


D111FP
Spool type E01/02/52, B31/32/61

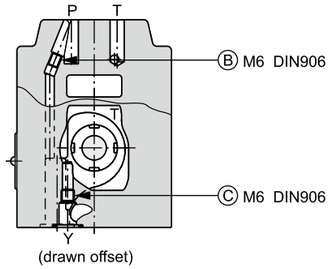
Pilot oil inlet (supply) and outlet (drain)

○ **open,** ● **closed**

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

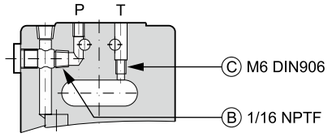


D31FPB/E

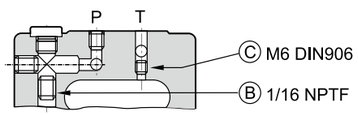


(drawn offset)

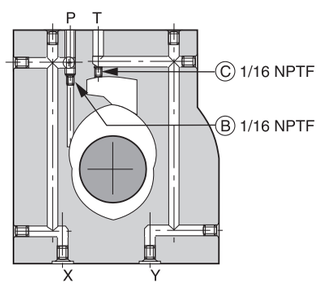
D41FPB/E



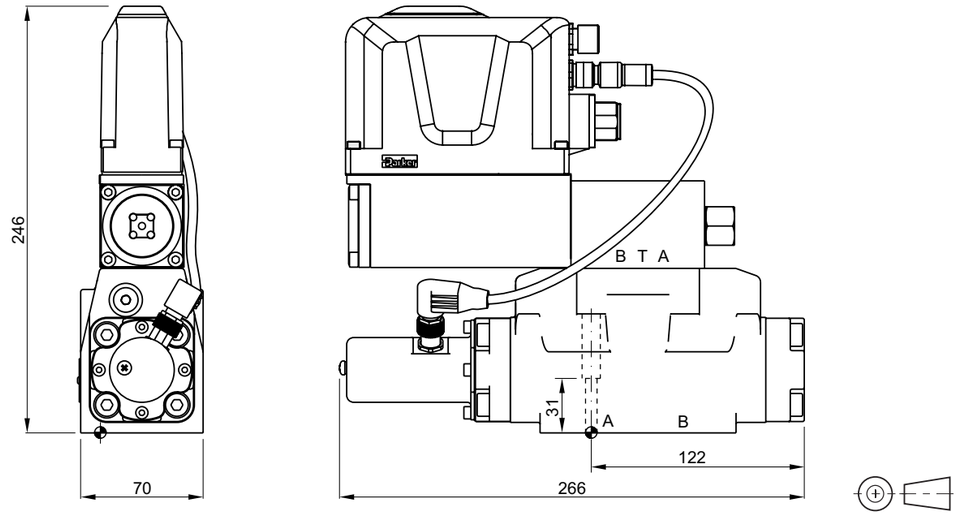
D91FPB/E



D111FPB/E

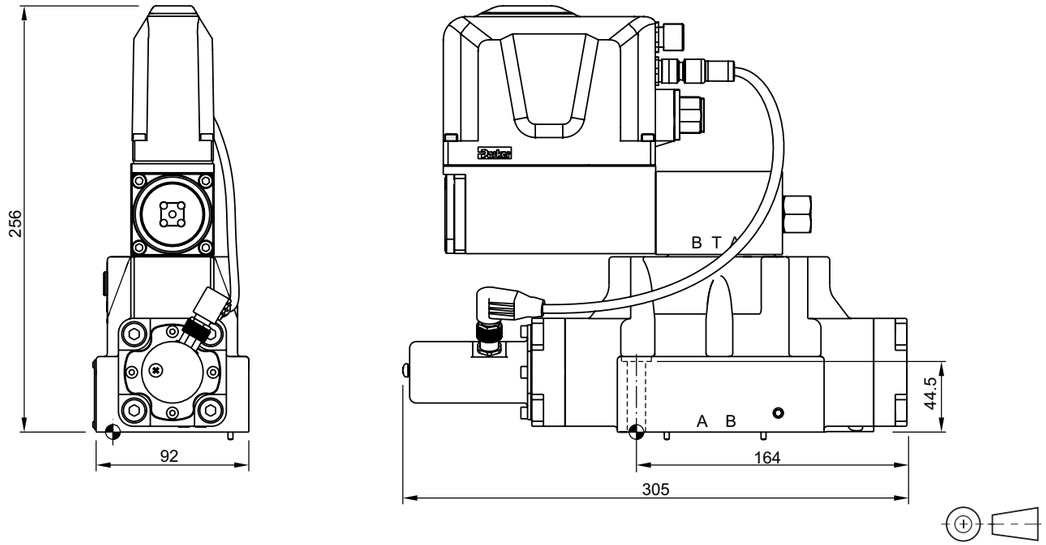


D31FP



Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D31FP FPM: SK-D31FP-V

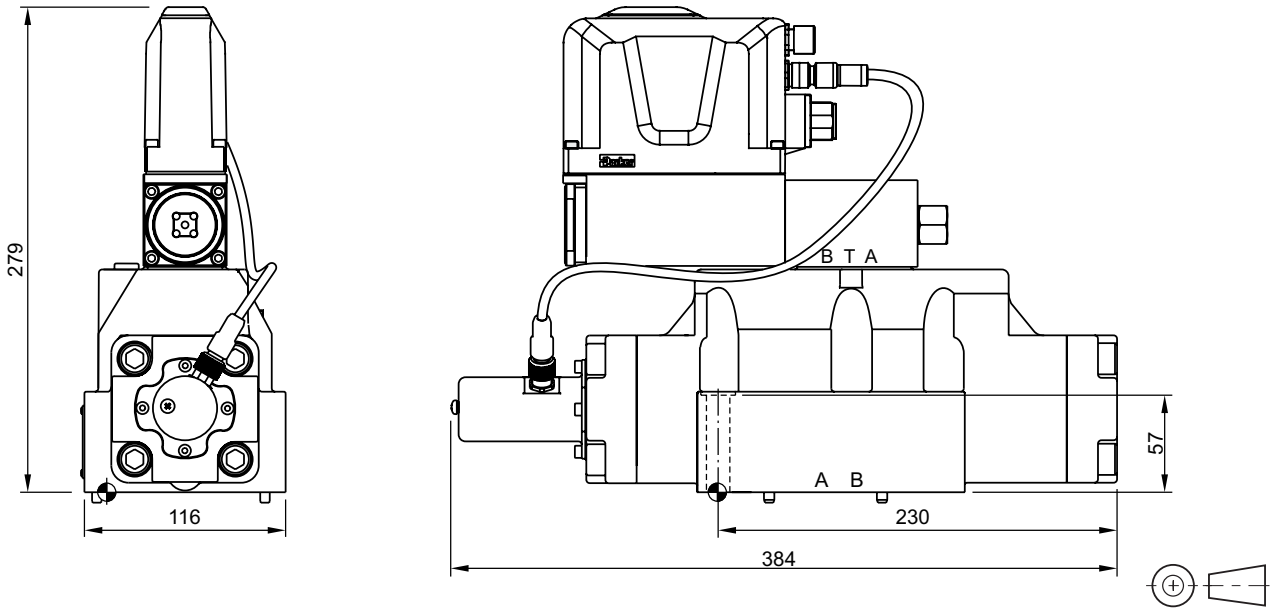
D41FP



Surface finish	Kit			Kit
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-D41FP FPM: SK-D41FP-V

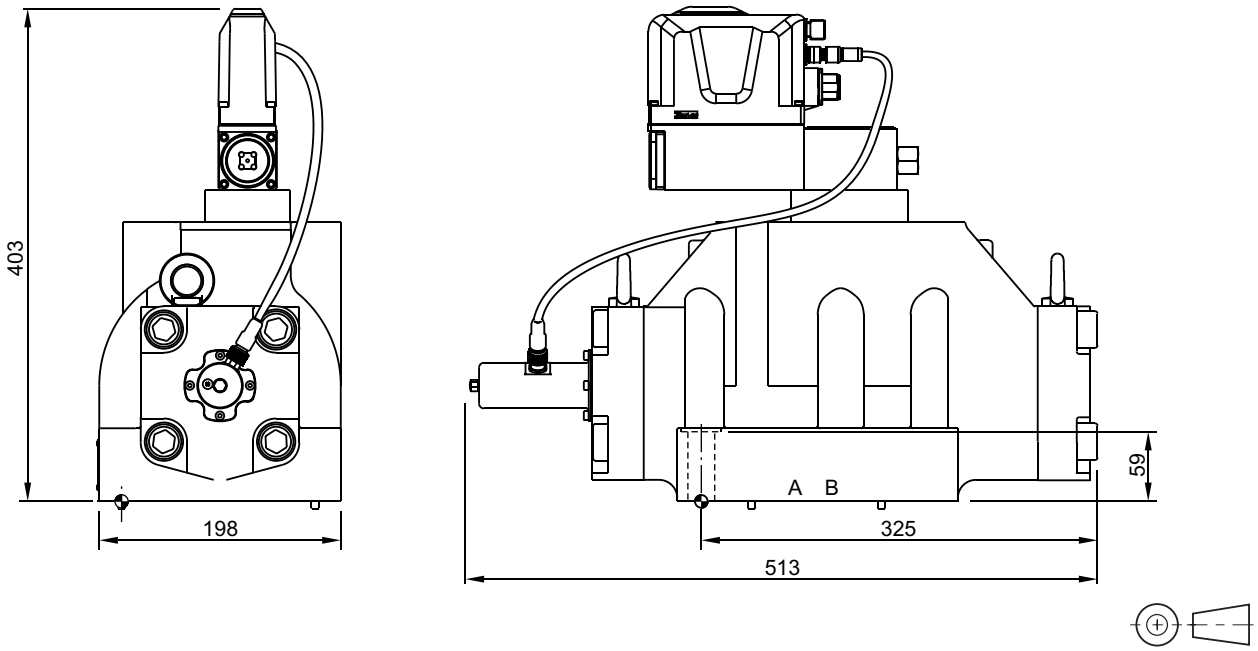
3

D91FP



Surface finish	Kit			Kit
R_{max} 6.3 / 0.01/100	BK360	6x M12x75 ISO 4762-12.9	108 Nm ±15 %	NBR: SK-D81/D91FP FPM: SK-D81/D91FP-V

D111FP



Surface finish	Kit			Kit
R_{max} 6.3 / 0.01/100	BK386	6x M20x90 ISO 4762-12.9	517 Nm ±15 %	NBR: SK-D111FP FPM: SK-D111FP-V