

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 5 sizes:

D31FP NG10 (CETOP 05)

D41FP NG16 (CETOP 07)

D81FP NG25 (CETOP 08) for port diam. up to 26 mm

D91FP NG25 (CETOP 08) for port diam. up to 32 mm

D111FP NG32 (CETOP 10)

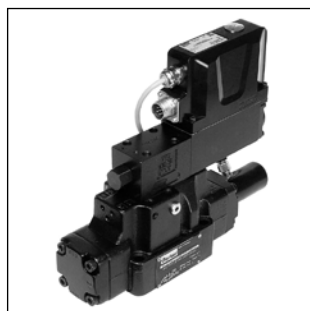
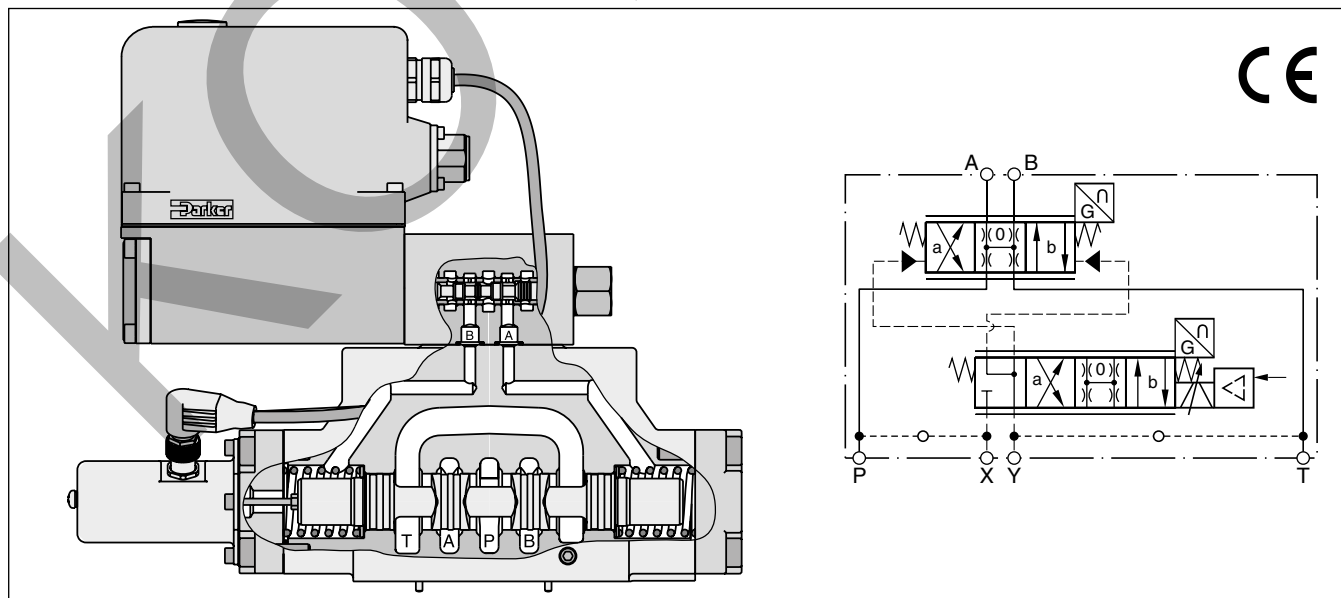
The safety concept works with a safe 4th position at the D1FP pilot valve. This ensures that the main stage is hydraulically balanced at power down and allows to have the main spool spring centered (for overlapped spools) or approximately 10 % spring offset to spool position A or B (for zerolap spools).

The innovative integrated regenerative function into the A-line (optional) allows new energy saving circuits for differential cylinders. The hybrid version can be switched between regenerative mode and standard mode at any time.

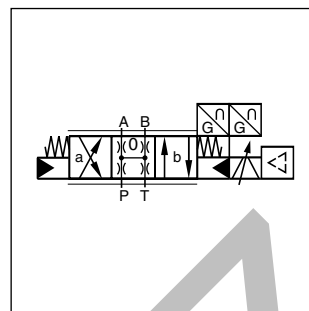
Features

- 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
- Energy saving A-regeneration
- Switchable hybrid version

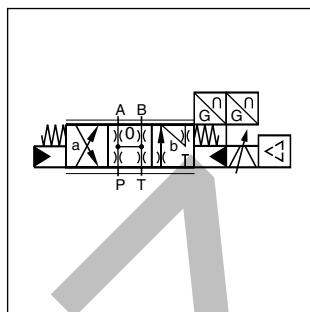
D41FPE52 (Standard)



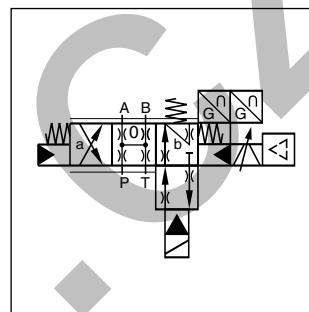
D41FP Standard



Standard D*1FPE



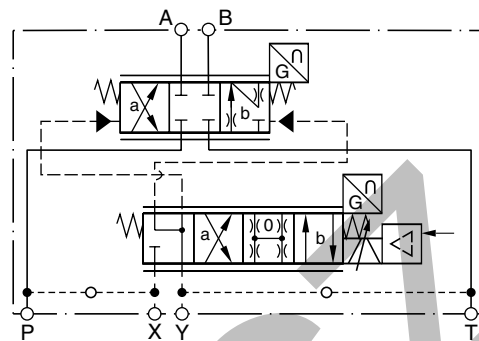
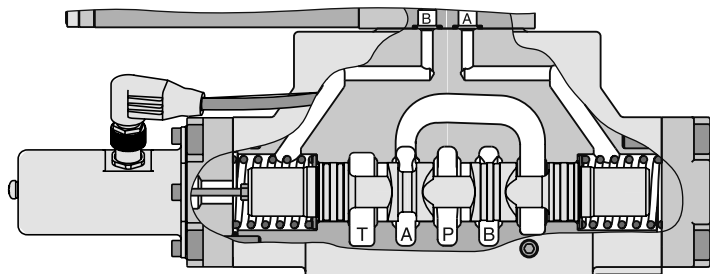
A-regeneration D*1FPR



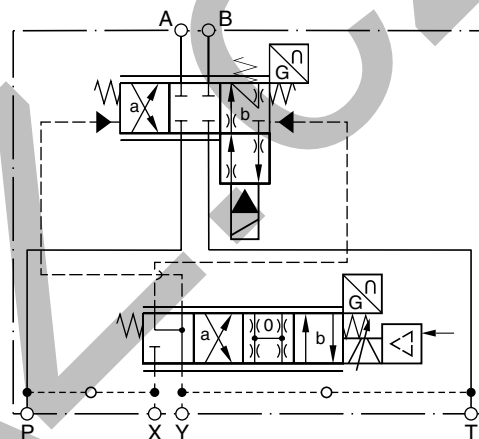
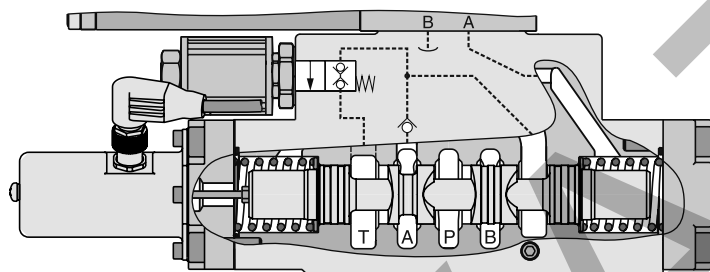
Hybrid D*1FPZ

D*1FPR and D*1FPZ

Regenerative valve D*1FPR

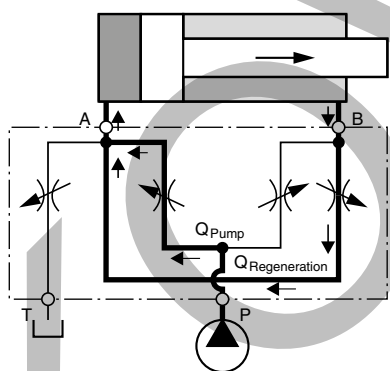


Hybrid valve D*1FPZ



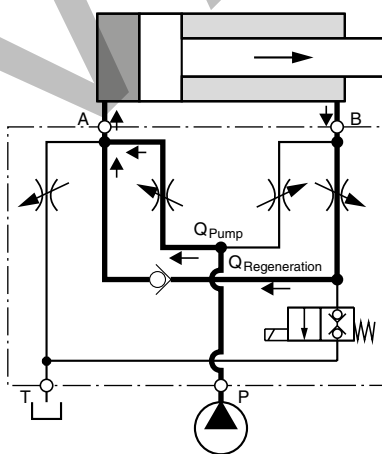
D*1FPR (regenerative valve)

Cylinder extending

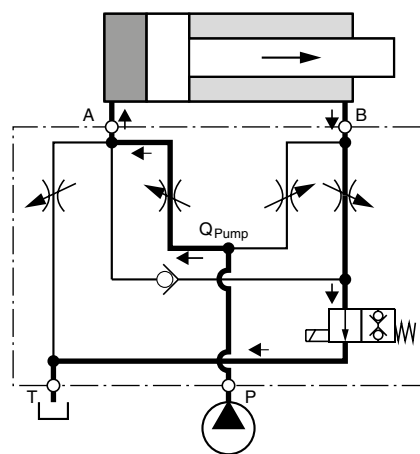


D*1FPZ (hybrid valve)

Cylinder extending
in regenerative mode (high speed)



Cylinder extending
in standard mode (high force)



Flow rate in % of nominal flow

Size ¹⁾	Spool	Port					
		A-T	P-A	P-B	B-A (R-Valve)	B-A (Hybrid)	B-T (Hybrid)
D41FPR/Z	31/32/61	100 %	50 %	100 %	50 %	40 %	20 %
D91FPR/Z	31/32/61	100 %	50 %	100 %	50 %	50 %	25 %
D111FPR/Z	31/32/61	100 %	50 %	100 %	50 %	50 %	20 %

¹⁾ D31FP: For size NG10 please refer solution with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

Ordering Code

D		1	F	P											
Directional control valve	Size	NG06 pilot	Proportional control	VCD performance	Function	Flow	Spool position on power down	Pilot connections	Seals	Command signal	Electronics options	Valve option	Design series (not required for ordering)		
Code	Size											Code	Valve option		
3	NG10 / CETOP 05											0	Standard for spool code B, E, R		
4	NG16 / CETOP 07											L ⁷⁾	Hybrid valve 24 V normally closed for spool code Z		
8	NG25 / CETOP 08														
9 ¹⁾	NG25 / CETOP 08														
11	NG32 / CETOP 10														
Code	Spool type	Code	Spool type	Code	Spool type	Code	Connection type	Code	Signal	Function	Code	Seals	Code	Inlet	Drain
Standard		Regenerative function ^{4) 5)}		Hybrid function ^{5) 6)}											
overlap		overlap		overlap											
E01		R31		Z31											
E02		R32		Z32											
B31	$Q_B = Q_A / 2$ 														
B32	$Q_B = Q_A / 2$ 														
zerolap		zerolap		zerolap											
E52		R61		Z61											
B61	$Q_B = Q_A / 2$ 														
Flow [l/min] at $\Delta p = 5$ bar per metering edge															
Code	D31	D41	D81	D91	D111										
D	90	—	—	—	—										
E	120	—	—	—	—										
F	—	200	—	—	—										
H	—	—	400	450	—										
L	—	—	—	—	1000										

Please order connector separately. See chapter 3 accessories.
Parametrizing cable OBE -> RS232, item no. 40982923

¹⁾ For enlarged connections Ø 32 mm.

²⁾ Approx. 10 % opening, only zero lapped spools.

³⁾ For overlapped spools.

⁴⁾ Not for D81FP.

⁵⁾ For regenerative and hybrid function at D31FP (NG10) please refer to solutions with sandwich and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

D31FP spooltype: R31 R32 R61

⁶⁾ Not for valve D31FP and D81FP.

⁷⁾ See page "Regenerative and hybrid function" (not for D31FP).

Short delivery time
for all variations

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

General						
Design		Pilot operated servo proportional DC valve				
Actuation		VCD®-actuator				
Size		NG10 (CETOP 05)	NG16 (CETOP 07)	NG25 (CETOP 08)	NG32 (CETOP 10)	
		D31	D41	D81 / D91	D111	
Mounting Interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA				
Mounting position		unrestricted				
Ambient temperature		[°C] -20...+50				
MTTF ₀ value ¹⁾		[years] 75				
Weight		[kg] 11.3 14.2 23.5 64.5				
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]	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			
Viscosity 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	400 / 450	1000
Max. recommended flow (standard)		[l/min]	250	600	1000	3000
Regenerative B-A / B-T			depending on application, see flow curves			
Leakage at 100 bar		[ml/min]	200	200	600	1000
Overlapped spool		[ml/min]	900	900	1000	5000
Zerolapped spool		[ml/min]	< 500			
Pilot		[ml/min]	set to 10 command signal (see flow characteristics)			
Opening point		[°]	20...350			
Pilot supply pressure		[bar]	10 12 24 40			
Pilot flow during step response at 210 bar		[l/min]				
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			
Electrical						
Duty ratio		[%]	100			
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)			
Supply voltage / ripple		[V]	22...30, 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 1) 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]	5...30, R _i > 8 kOhm		
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: $Q_x = Q_{\text{Nom.}} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{\text{Nom.}}}}$

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

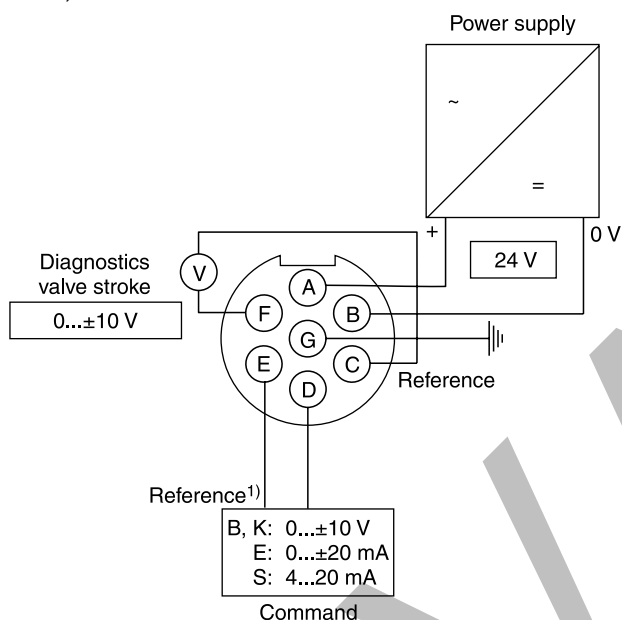
Electrical characteristics hybrid option

Duty ratio		100 %		
Protection class		IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)		
		D41	D91	D111
Supply voltage	[V]	24	24	24
Tolerance supply voltage	[%]	±10	±10	±10
Current consumption	[A]	1.21	0.96	1.29
Power consumption	[W]	29	23	31
Solenoid connection		Connector as per EN 175301-803		
Wiring min.	[mm ²]	3 x 1.5 recommended		
Wiring length max.	[m]	50 recommended		

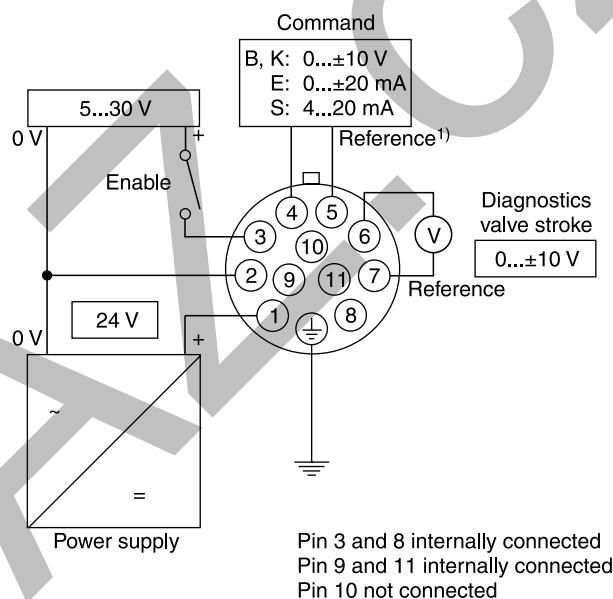
With electrical connections the protective conductor (PE \downarrow) must be connected according to the relevant regulations.

Wiring

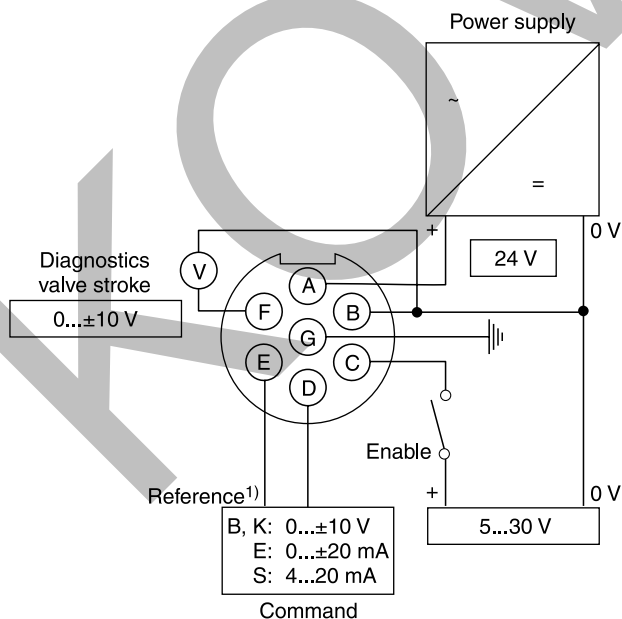
Code 0, 6 + PE acc. EN 175201-804



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



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



¹⁾ Do not connect with supply voltage zero.

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 printed out for documentation purposes.

The PC software can be downloaded free of charge at www.parker.com/isde – see page "Support" or directly at www.parker.com/propxd.

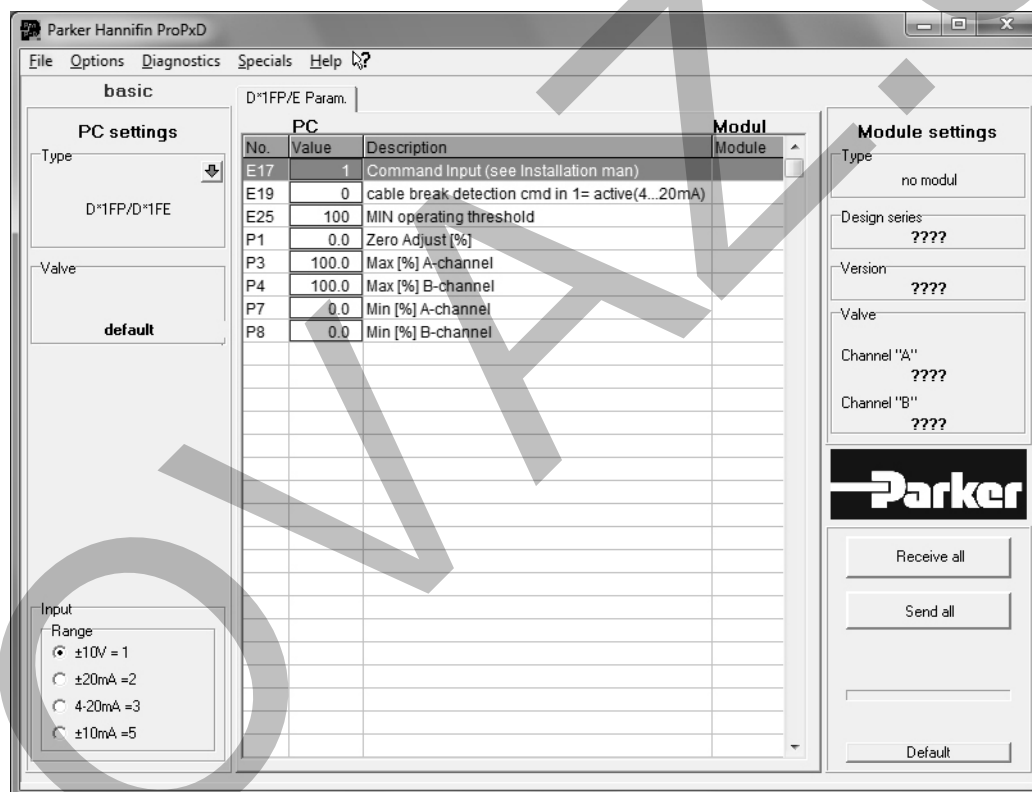
Features

- Comfortable editing of valve parameters
- Saving and loading of customized parameter sets
- Executable with all Windows® operating systems from Windows® XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

The parametrizing cable may be ordered under item no. 40982923.

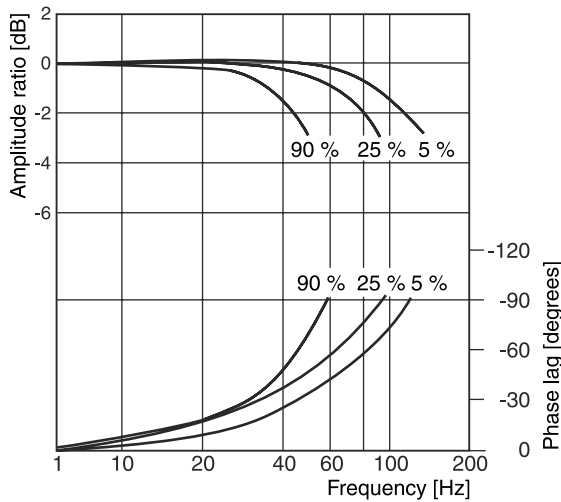
3



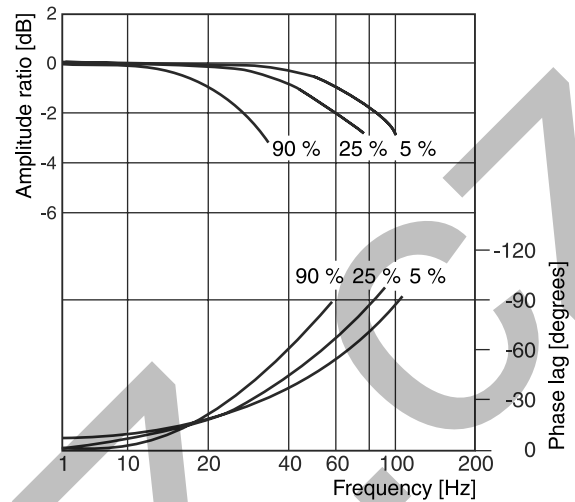
Frequency response

$\pm 5\%$ / $\pm 25\%$ / $\pm 90\%$ command signal
 Dynamics at 210 bar pilot supply pressure

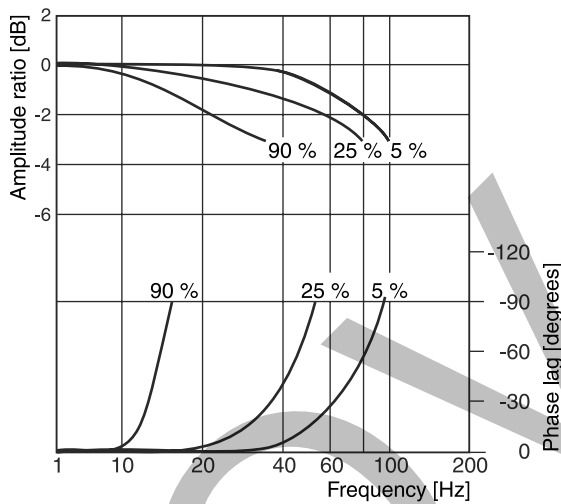
D31FP



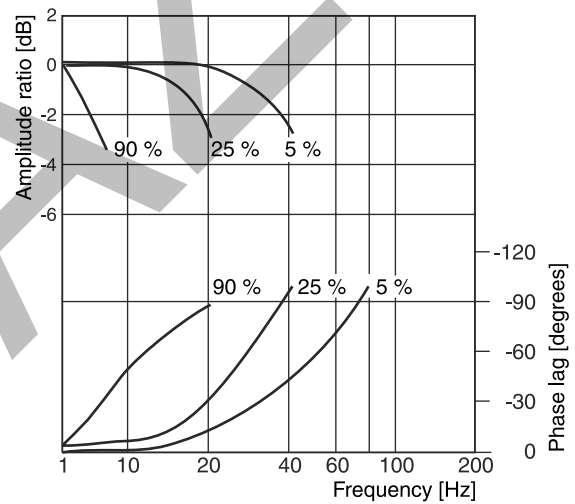
D41FP



D81/91FP



D111FP

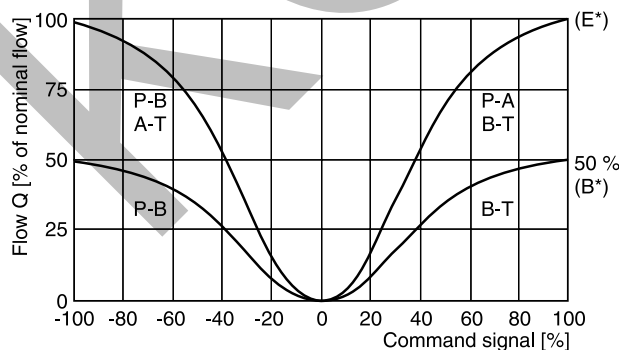


Flow curves D*1FPB/E

(Overlapped spool set to opening point 10 %)
 at $\Delta p = 5$ bar per metering edge

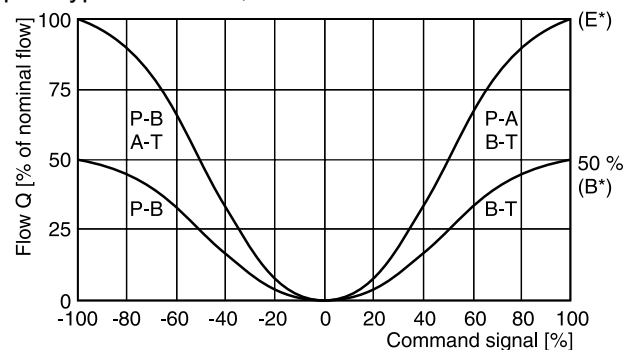
D31FP

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



D41FP

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

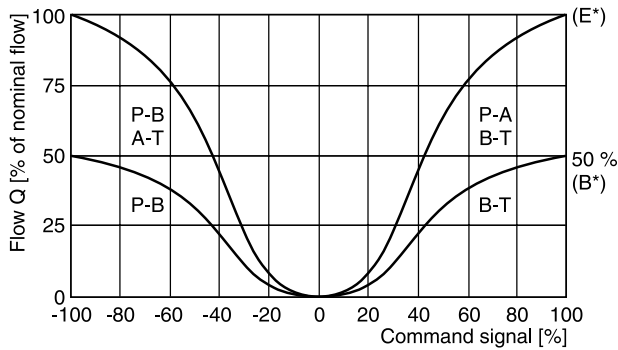


All characteristic curves measured with HLP46 at 50 °C.

Flow curves

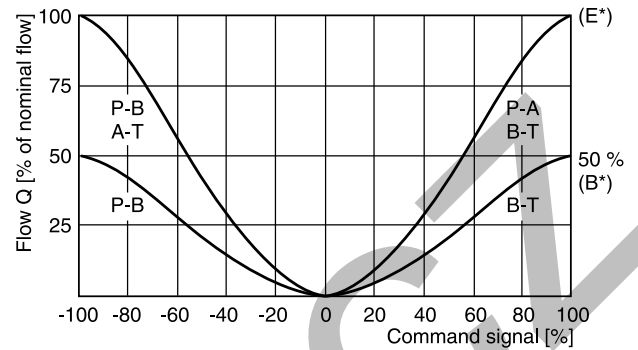
D81/91FP

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



D111FP

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

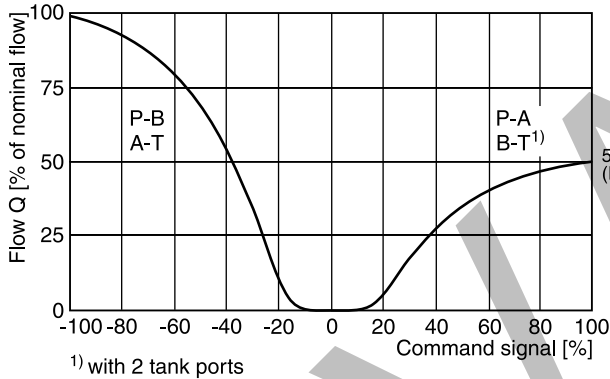


Flow curves D*1FPR/Z

(Overlapped spool set to opening point 10 %)
 at $\Delta p = 5$ bar per metering edge

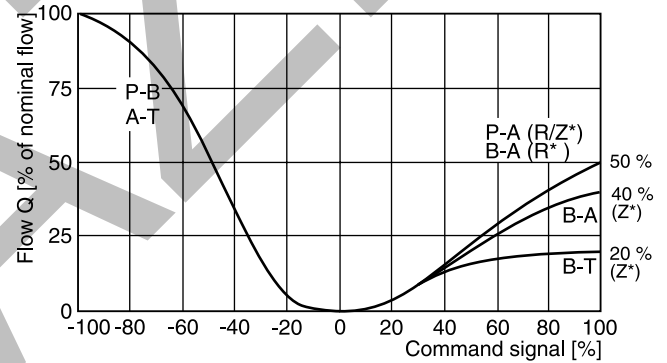
D31FP

Spool type R31/32/61

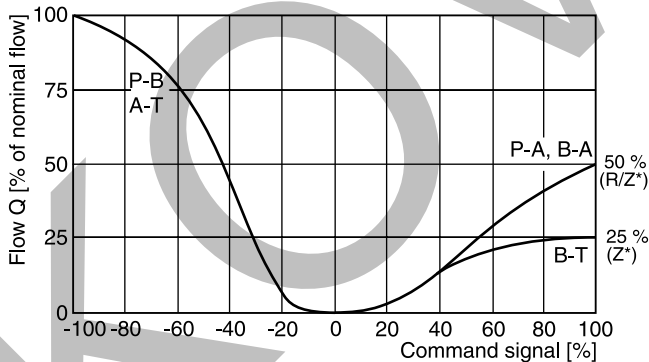


D41FP

Spool type R/Z 31/32/61



D91FP spool type R/Z 31/32/61

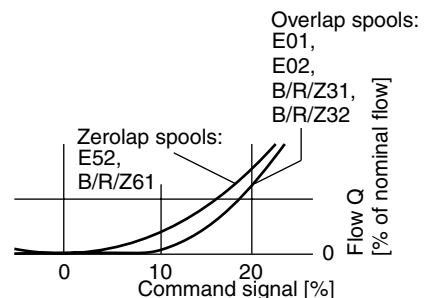


D111FP

spool type R/Z* on request

Detail:

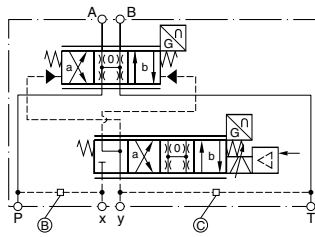
Standard, regenerative and hybrid flow curves



Pilot oil inlet (supply) and outlet (drain)

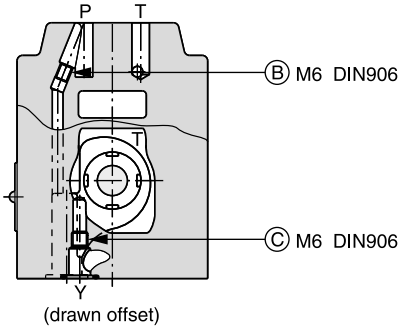
○ open, ● closed

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

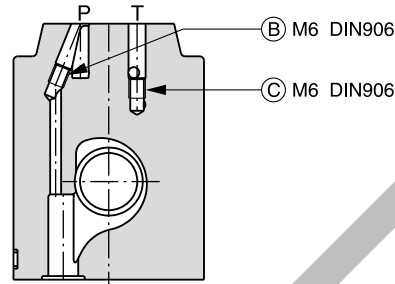


3

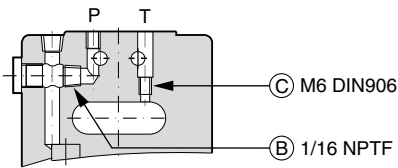
D31FPB/E



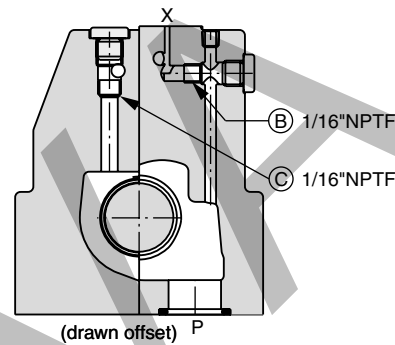
D31FPR



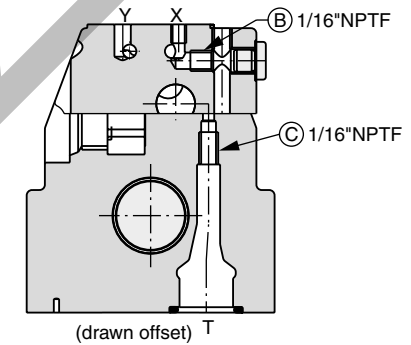
D41FPB/E



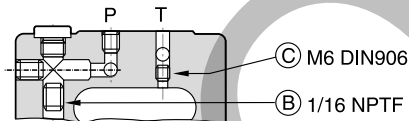
D41FPR



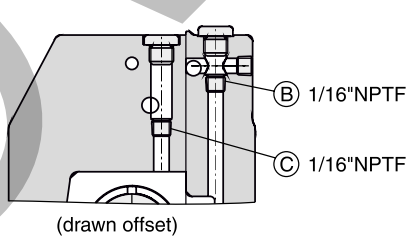
D41FPZ



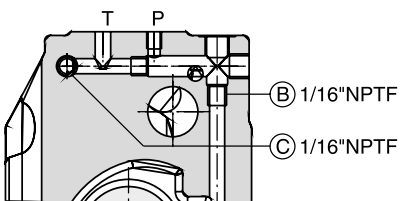
D91FPB/E



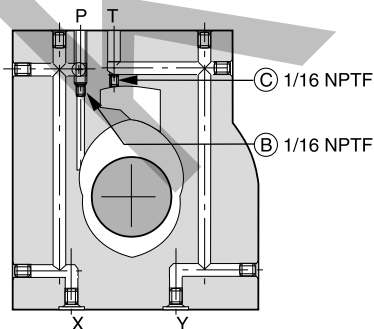
D91FPR



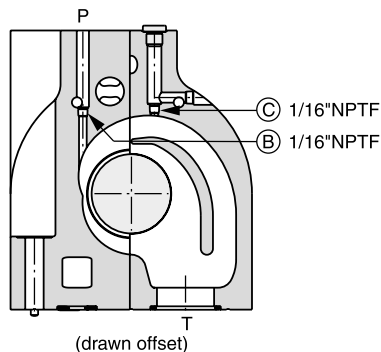
D91FPZ



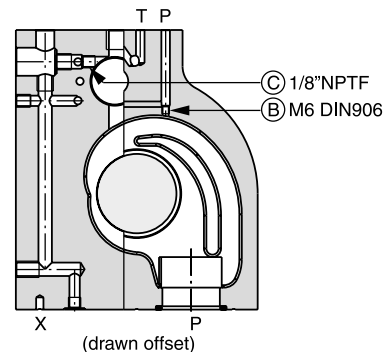
D111FPB/E

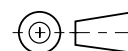
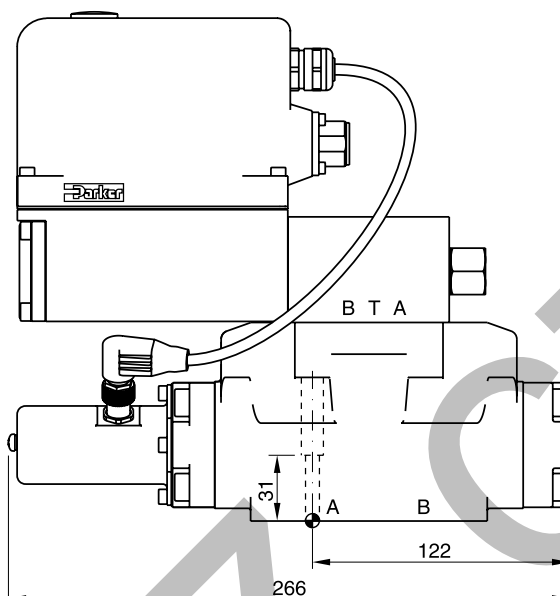
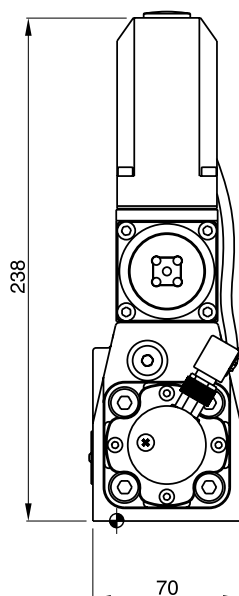


D111FPR



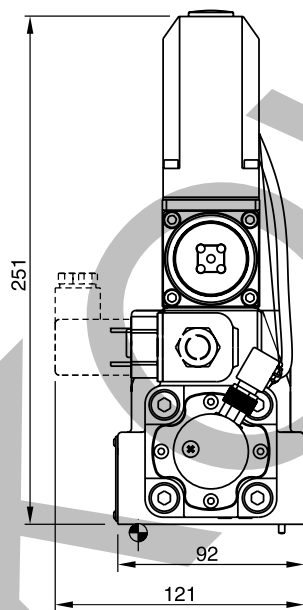
D111FPZ



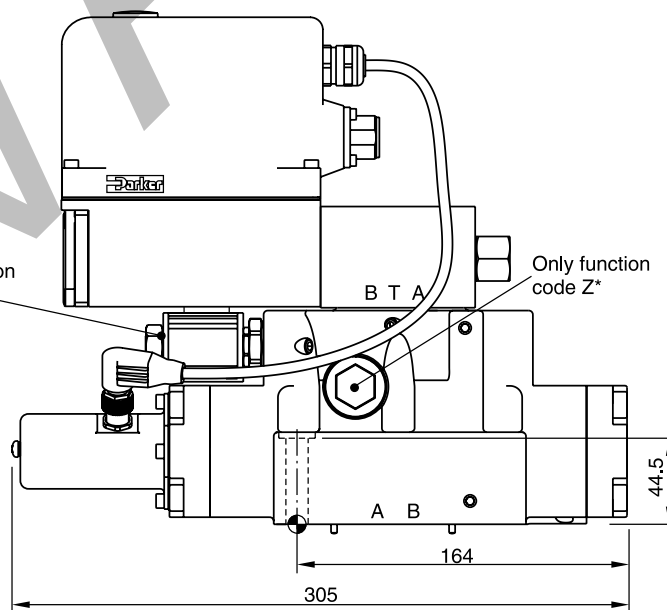
D31FP

Regenerative and hybrid function with additional plate "A10-1664 / A10-1665L / H10-1662 / H10-1666L", see chapter 12.

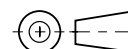
Surface finish	Kit	Kit	Kit	Kit
$\sqrt{R_{max} 6.3}$	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D31FP FPM: SK-D31FP-V

D41FP

Only function
code Z*

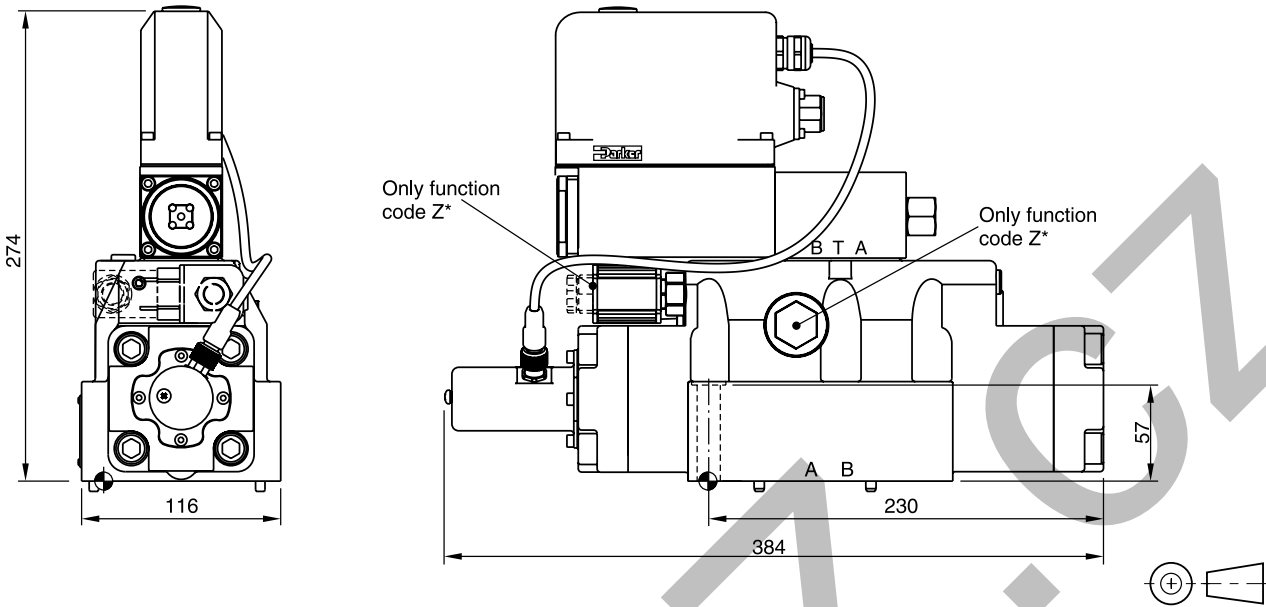






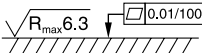
Only function
code Z*



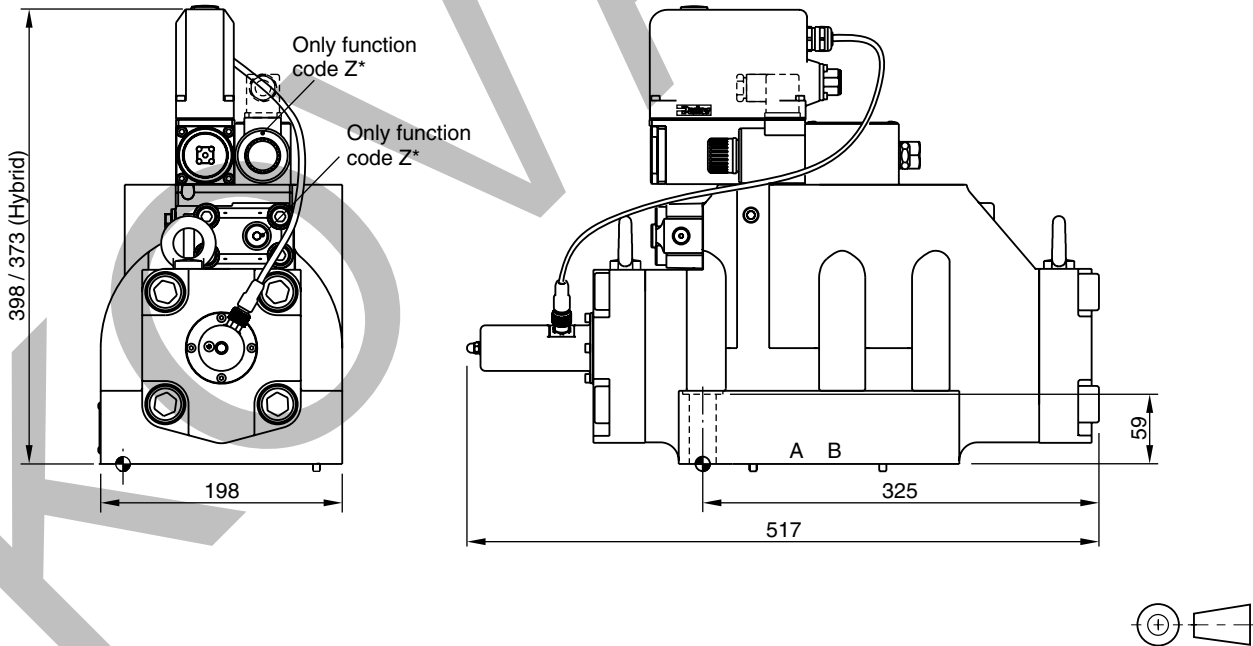
Surface finish	Kit	Kit	Kit	Kit
$\sqrt{R_{max} 6.3}$	BK320	2x M6x55 4x M10x60 ISO 4762-12.9	13.2 Nm ±15 % 63 Nm ±15 %	NBR: SK-D41FP FPM: SK-D41FP-V





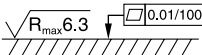
D81/91FP



Surface finish	 Kit	 Kit	 Kit	 Kit
	BK360	6x M12x75 ISO 4762-12.9	108 Nm ±15 %	NBR: SK-D81/D91FP FPM: SK-D81/D91FP-V

D111FP



Surface finish	 Kit	 Kit	 Kit	 Kit
	BK386	6x M20x90 ISO 4762-12.9	517 Nm ±15 %	NBR: SK-D111FP FPM: SK-D111FP-V