

The direct operated control valve D1FP of the nominal size NG06 (CETOP 03) shows extremely high dynamics combined with maximum flow. It is the preferred choice for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

Driven by the VCD actuator the D1FP reaches the frequency response of real servovalves. Compared with solenoid driven valves the D1FP can also be used in applications with pressure drops up to 350 bar across the valve. Because of the high flow capability the D1FP can be a substitute for NG10 valves in some cases.

At power-down the spool moves in a defined position. All common input signals are available.

Features

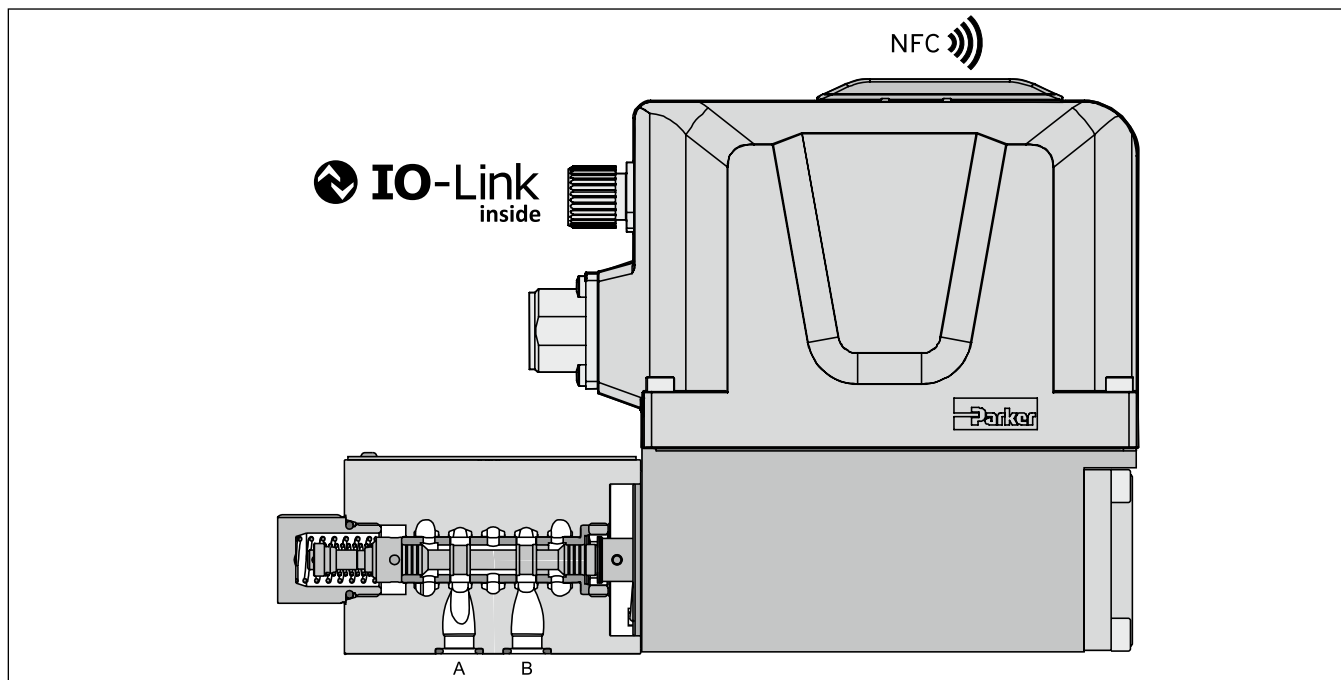
- Real servovalve dynamics
(-3 dB / 350 Hz at $\pm 5\%$ input signal)
- No flow limit up to 350 bar pressure drop through the valve
- Max. tank pressure 350 bar
(with external drain port Y)
- High flow
- Defined spool positioning at power-down – optional P-A/B-T or P-B/A-T or center position
(for overlapped spools)
- Onboard electronics
- IO-Link Class A parameterization and communication
- Interface included as standard
- IO-Link Class B interface available
- RGB Diode for optical status check
- NFC interface
- Adjustable setpoint signal



D1FP with IO-Link Class A interface



IO-Link
inside



Ordering Code

Direct Operated Proportional DC Valve
Series D1FP

D	1	F	P			9				0	
Directional control valve	Size DIN NG06 CETOP 03 NFFA D03	Proportional control	VCD	Spool type	Spool position on power down ¹⁾	Y-port (plugged) ⁵⁾	Seals	Command signal	Electronics option	Spool/sleeve design	Design series (not required for ordering)

Code	Spool type	Flow [l/min] at Δp 35 bar per metering edge
Zerolap		
E50B		3
E50C		6
E50F		12
E50G		16
E50H		25
E50M		40
E50P		60
B60C		6 / 3
B60F		12 / 6
B60G		16 / 8
B60H		25 / 12.5
B60M		40 / 20
B60P		60 / 30
Underlap		
E55B		3
E55C		6
E55F		12
E55G		16
E55H		25
E55M		40
E55P		60
Overlap		
E01B		3
E01C		6
E01F		12
E01G		16
E01H		25
E01M		40
B31C		6 / 3
B31F		12 / 6
B31G		16 / 8
B31H		25 / 12.5
B31M		40 / 20
E02B		3
E02C		6
E02F		12
E02G		16
E02H		25
E02M		40
B32C		6 / 3
B32F		12 / 6
B32G		16 / 8
B32H		25 / 12.5
B32M		40 / 20

Short delivery time for all variations

Code	Command	Description
0	B; E; S; Y; W	6 + PE acc. EN175201-804
5	B; E; S; Y; W	11 + PE acc. EN175201-804
7	B; E; S; Y; W	6 + PE + Enable
0	I	IO-Link Class B

Code	Signal	Function
B	0...±10 V	0...+10 V -> P-A
E	0...±20 mA	0...+20 mA -> P-A
S	4...20 mA	12...20 mA -> P-A
Y	0...±50 mA	0...+20 mA -> P-A
W ⁴⁾	adjustable	Default +/-10V
I	IO-Link Class B	—

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

Code	Spool position at power down
A ²⁾	
B ²⁾	
C ³⁾	
H ⁴⁾	
J ⁴⁾	

Note:

The above mentioned zerolap spools are available with a inflected characteristic curve. Inflection at 20 %; 40 % and 60 %. Characteristic curves at page 4

¹⁾ On power down the spool moves in a defined position. This cannot be guaranteed in case of single flow path on the control edge A - T resp. B - T with pressure drops above 120 bar or contamination in the hydraulic fluid.

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

³⁾ Only for overlapped spools.

⁴⁾ Flow for code M: 35 l/min at Δp 35 bar; not possible for code P.

⁵⁾ Plug in the Y-port needs to be removed at tank pressure >35 bar.

⁶⁾ Available command signals – see technical data.

Technical Data

General			
Design			Direct operated servo proportional DC valve
Actuation			VCD® actuator
Size			NG06 / CETOP 03 / NFPA D03
Mounting interface			DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position			unrestricted
Ambient temperature	[°C]		-20...+60
MTTF ₀ value ¹⁾	[years]		150
Weight	[kg]		3.6
Vibration resistance	[g]		10 Sinus 5...2000 Hz acc. IEC 60068-2-6 20 (RMS) Random noise 20...2000 Hz acc. IEC 60068-2-64 15 Shock acc. IEC 60068-2-27
Hydraulic			
Max. operating pressure	[bar]		Ports P, A, B 350, port T 35 for internal drain, 350 for external drain, port Y 35 ²⁾
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
Viscosity recommended	[cSt]/mm ² /s		30...80
Filtration			ISO 4406; 18/16/13
Nom. flow at Δp=35 bar per control edge ³⁾	[l/min]		3 / 6 / 12 / 16 / 25 / 40 / 60
Flow maximum	[l/min]		90 (at Δp=350 bar over two control edges)
Leakage at 100 bar	[ml/min]		<400 (zerolap spool); <50 (overlap spool)
Opening point	[°]		set to 23 command signal (see flow characteristics)
Static / Dynamic			
Step response at 100 % step ⁴⁾	[ms]		<3.5
Frequency response (±5 % signal) ⁴⁾	[Hz]		350 (amplitude ratio -3 dB), 350 (phase lag -90°)
Hysteresis	[°]		<0.05
Sensitivity	[°]		<0.03
Temperature drift	[°/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 characteristics			
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 V nom. (tolerance range 22 ... 30V), electric shut-off at < 19, ripple < 5 % eff., surge free
Current consumption max.	[A]		3.5
Pre-fusing	[A]		4.0 medium lag
Command			Depending on choosen signal type
Voltage signal	[V]		10...0...-10, ripple <0.01 % eff., surge free
Impedance	[kOhm]		100
Current signal	[mA]		20...0...-20, ripple <0.01 % eff., surge free
Impedance	[Ohm]		<250
Current signal	[mA]		"4...12...20, ripple <0.01 % eff., surge free <3.6 mA = disable, >3.8 mA = according to NAMUR NE43"
Impedance	[Ohm]		<250
Current signal	[mA]		10...0...-10, ripple <0.01 % eff., surge free
Impedance	[Ohm]		<250
Current signal	[mA]		50...0...-50, ripple <0.01 % eff., surge free
Impedance	[Ohm]		<250
Differential input max.		Code 0	[V] 30 for terminal D and E against PE (terminal G)
		Code 5	[V] 30 for terminal 4 and 5 against PE (terminal W)
		Code 7	[V] 30 for terminal D and E against PE (terminal G)
Enable signal (only code 5/7)			acc. EN 61131-2; Type 3 Low -3...+5; High 11...30; input current 3 mA
Diagnostic signal			[V] +10...0...-10; 4...12...20 (max. 5mA)
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	[mm ²] 7x1.0 (AWG 16) overall braid shield
		Code 5	[mm ²] 8x1.0 (AWG 16) 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.

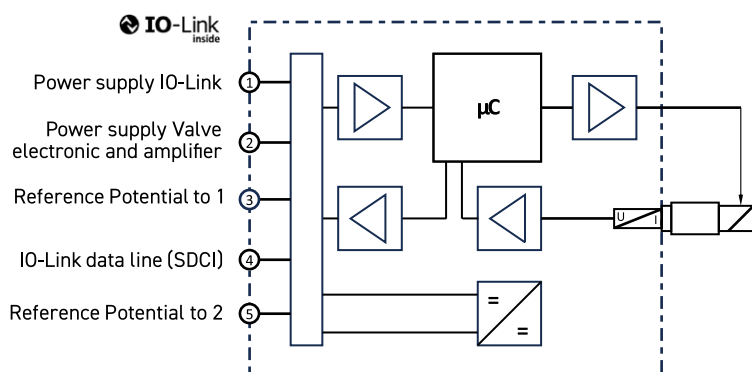
²⁾ For applications with p_t>35 bar (max. 350 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

³⁾ Flow rate for different Δp per control edge: $Q_x = Q_{\text{Nom.}} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{\text{Nom.}}}}$

⁴⁾ Measured with load (100 bar pressure drop/two control edges).

Electrical characteristics		
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
Directive		IO-Link Interface and System Specification Version 1.1.2
Valve amplifiers Supply voltage/ripple	[V]	24 V nominal (tolerance range 22 ... 30V), electric shut-off at < 19, ripple < 5 % eff., surge free
Valve amplifiers max. power consumption	[A]	3.5
Valve amplifiers Pre-fusing	[A]	4.0 medium lag
IO-Link Interface Supply voltage/ripple	[V]	24 V nominal (tolerance range 22 ... 30V), electric shut-off at < 19, ripple < 5 % eff., surge free
IO-Link Interface max. power consumption	[A]	1.2
Functional ground and screening		Provide via valve block
Required master port class		Class B
EMC		EN 61000-6-2, EN 61000-6-4
Electrical connection		M12 sensor/actuator connection line, 5-pole; M12 connector/bush, A-coded, without shield
Wiring min.	[mm ²]	0.34 mm ² for a cable length of up to 5 m
Wiring length max.	[m]	20

Block diagram



Pin	Signal	Signal - IO-Link B Class / viewing direction of the valve	
1	L+	Voltage Supply IO-Link	
2	P24	Voltage supply valve electronics and power part power consumption 4A	
3	L-	Reference potential pin 1	
4	C/Q	IO-Link data line (SDCI)	
5	N24	Reference potential pin 2	

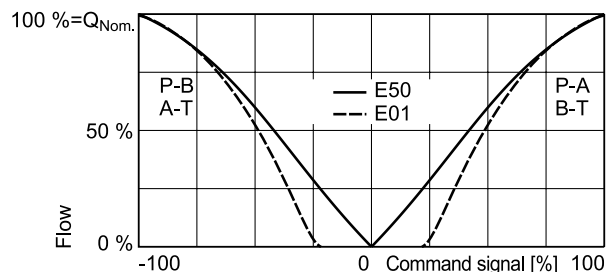
Pin 3 and 5 are linked with each other in the valve electronics. The reference potentials L- and N24 of the two supply voltages must also be linked with each other on the power supply unit side.

Flow curves

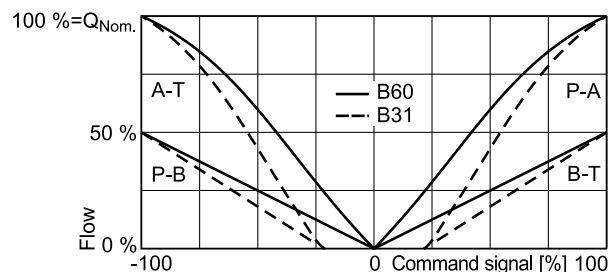
(Overlapped spool opening point 23 %)

at $\Delta p = 35$ bar per metering edge

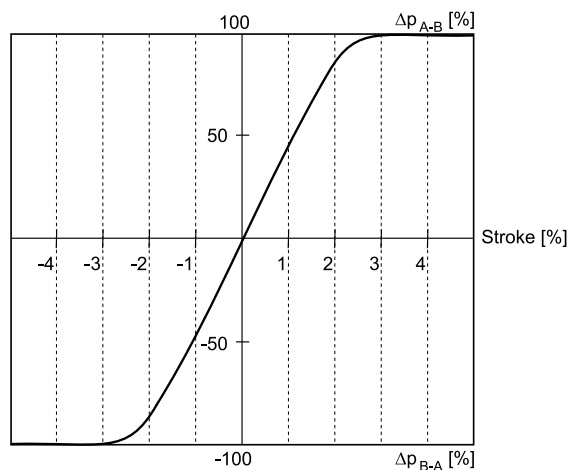
Spool type **E01/E50**



Spool type **B31/B60**



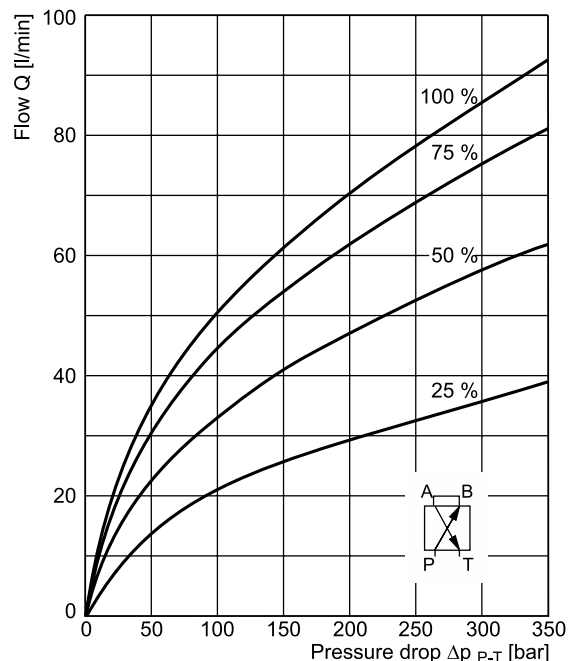
Pressure gain



Functional limits

at 25 %, 50 %, 75 % and 100 % command signal

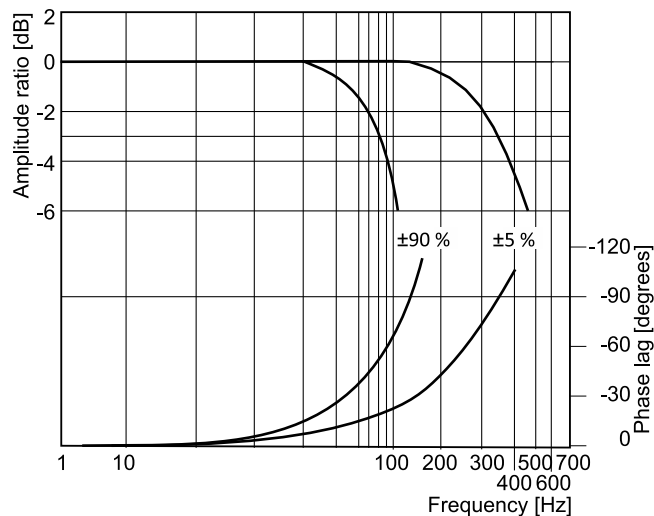
Spool type **E01M/E50M**



Frequency response

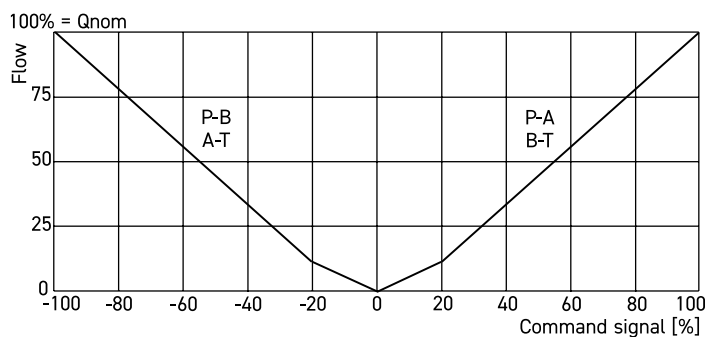
± 5 % command signal

± 90 % command signal

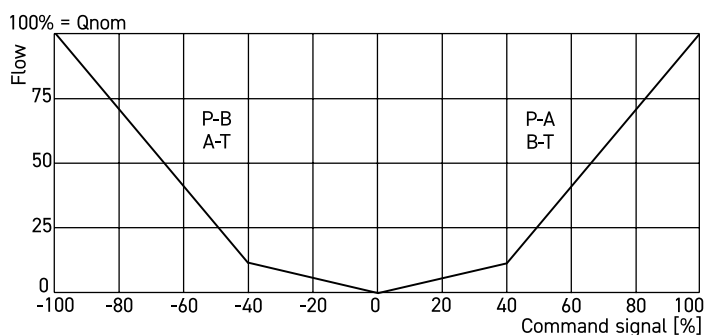


All characteristic curves measured with HLP46 at 50 °C.

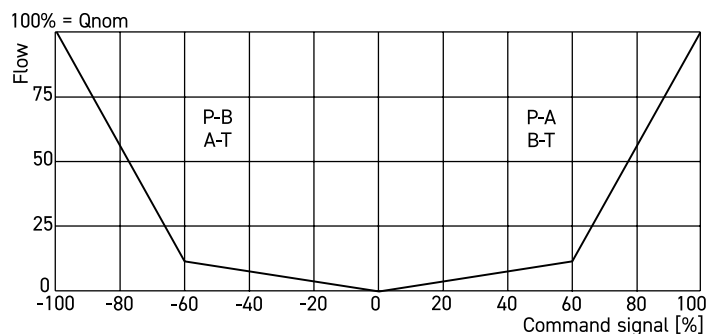
Flow curve at $\Delta p = 35$ bar per meteringedge
 Zero lap spool EP2 inflection at 20 %



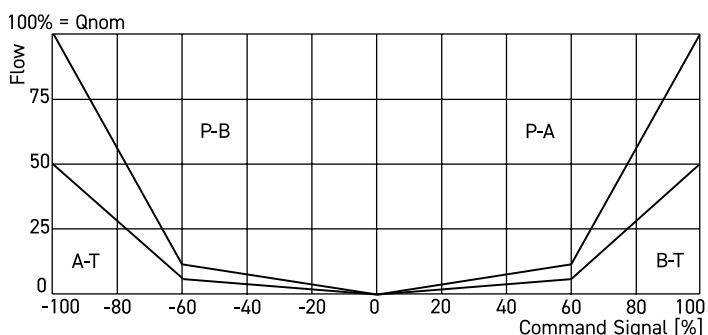
Flow curve at $\Delta p = 35$ bar per meteringedge
 Zero lap spool EP4 inflection at 40 %



Flow curve at $\Delta p = 35$ bar per meteringedge
 Zero lap spool EP6 inflection at 60 %



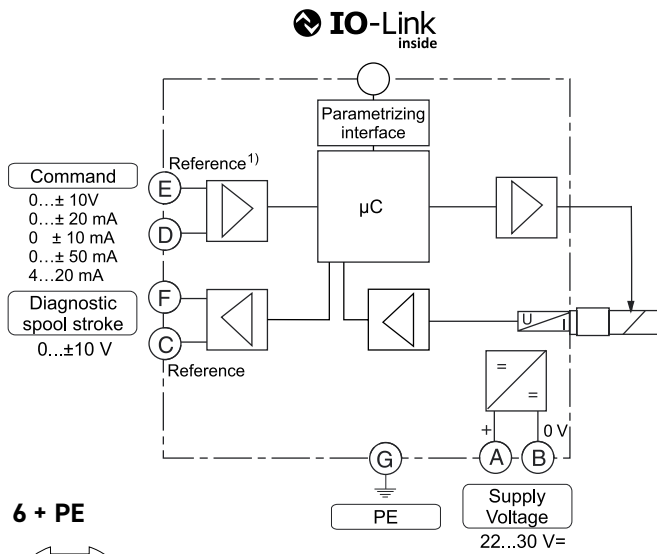
Flow curve at $\Delta p = 35$ bar per meteringedge
 Zero lap spool BP6 inflection at 60 %



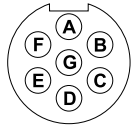
Note: The characteristic of the inflected flow-rate curves is generated by linearization.

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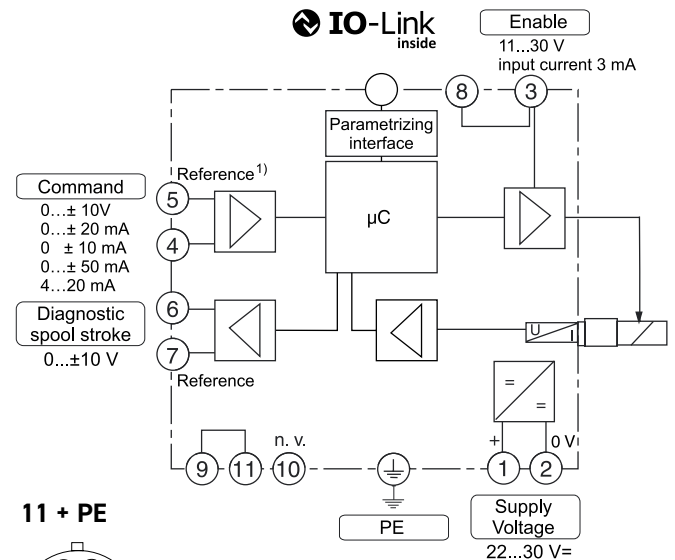
Code 0



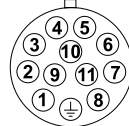
6 + PE



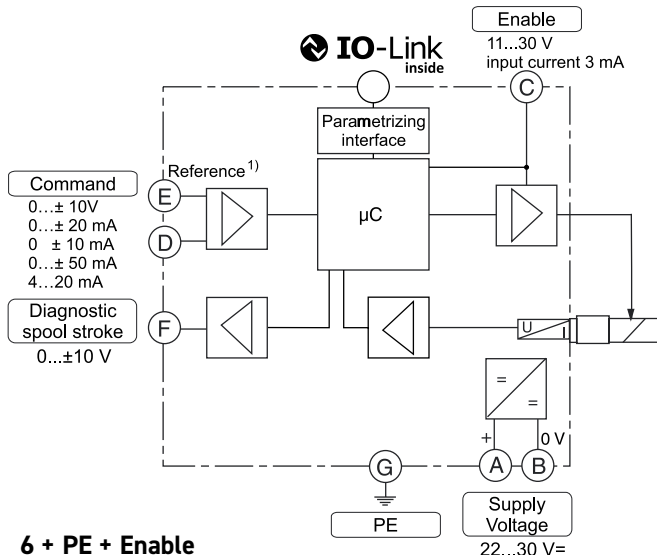
Code 5



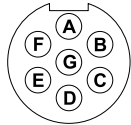
11 + PE



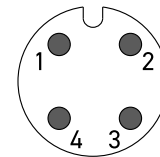
Code 7



6 + PE + Enable



**Pin assignment IO-Link (parametrizing) interface,
 M12 socket / viewing direction of the valve**



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.

IO-Link interface

IO-Link communication and power supply is provided via the M12 interface, which is accessible from the outside. The IO-Link interface allows external access to the available and accessible valve parameters via an IO-Link Master or via the ProPxD software and the Parker IO-LINK MASTER USB.

For reliable parameterization of the valve, it is necessary to connect the power supply of the Parker IO-Link Master. It is not possible to operate the IO-Link B Class valve via the Parker IO-Link Master, as there is no power supply to the amplifiers.

Parker IO-LINK-MASTER-USB Best. Nr. 40983544

(Parameter overview in the operating instructions)

NFC-interface

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

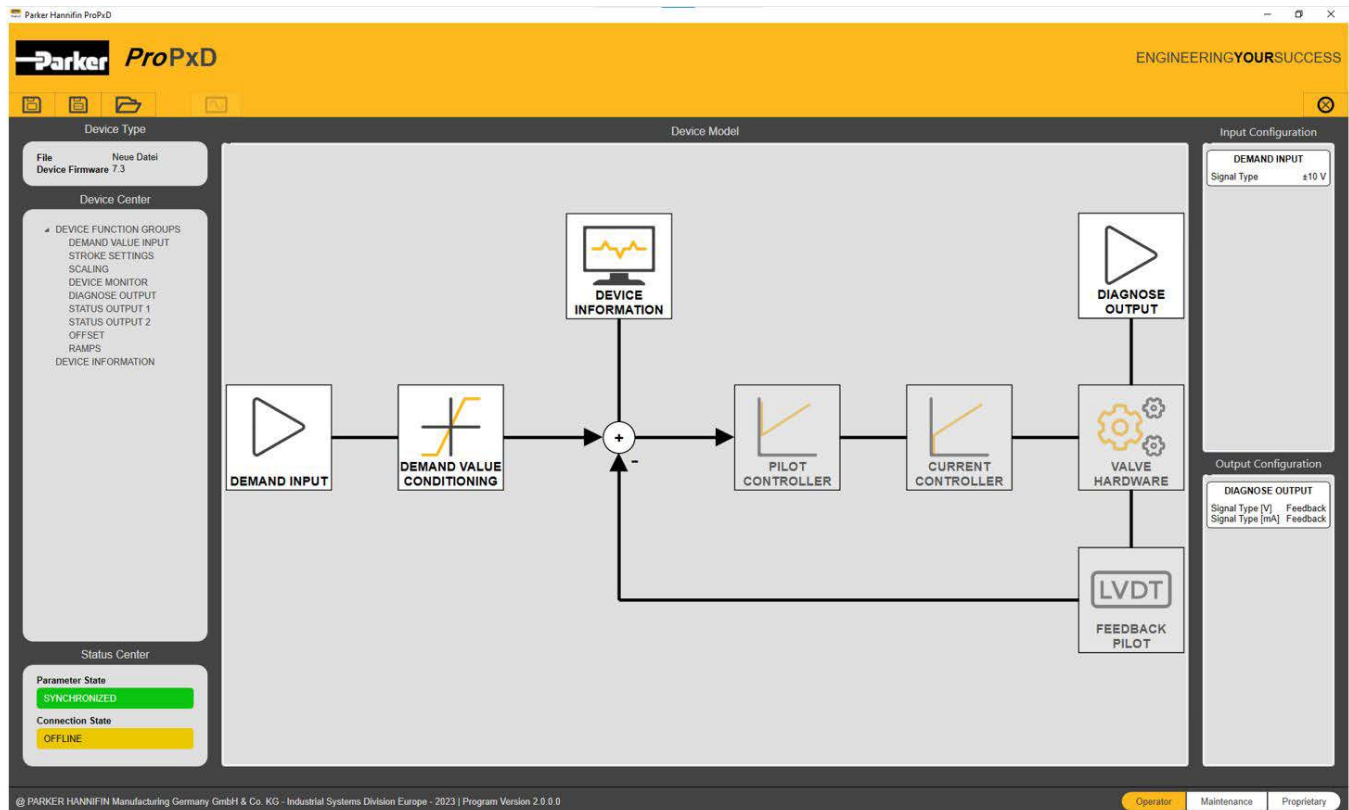
Available for free on the **App Store** and **Google Play Store**.

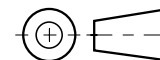
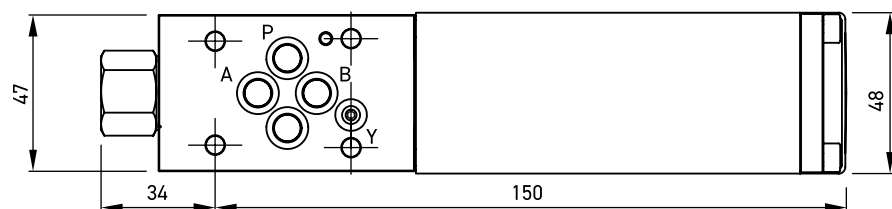
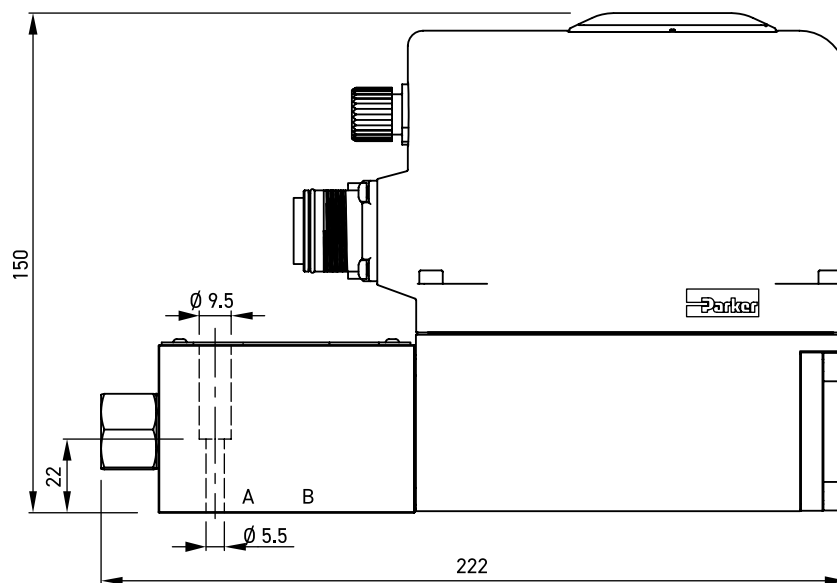
ProPxD parameterization software

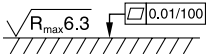
The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface.

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

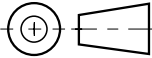
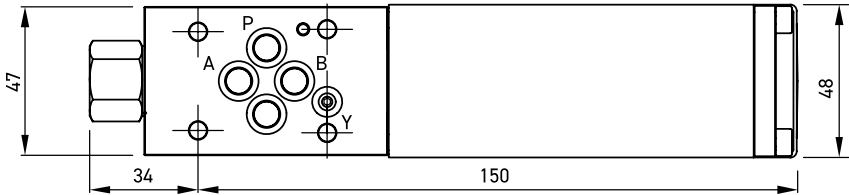
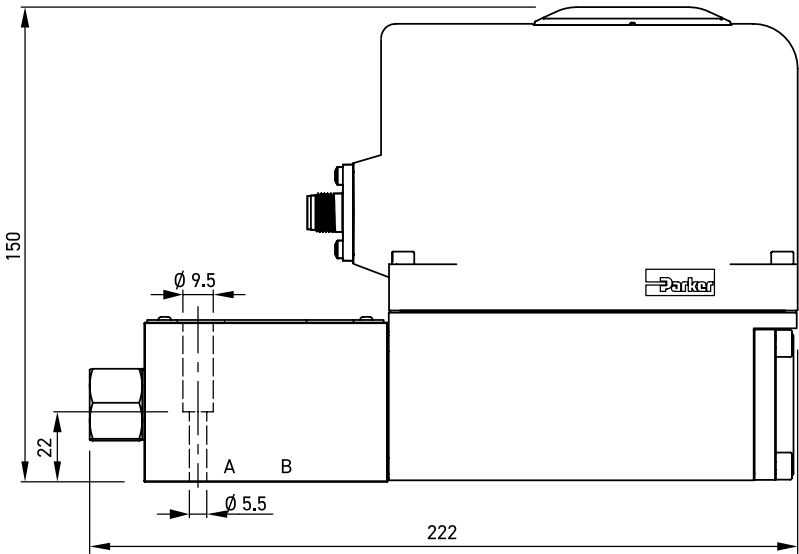
The PC software can be downloaded free of charge directly at www.parker.com/propxd.

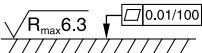




Surface finish	 Kit	 Kit		 Kit
	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	NBR: SK-D1FP FPM: SK-D1FP-V HFC: SK-D1FP-H

3



Surface finish	 Kit	 Kit	 Kit	 Kit
	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	NBR: SK-D1FP FPM: SK-D1FP-V HFC: SK-D1FP-H