

The direct operated control valves D1FP / D3FP and pilot operated D30FP with freely configurable control circuit of the nominal size NG06 (CETOP 03) and D3FP/D30FP of the nominal size NG10 (CETOP 05) 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.

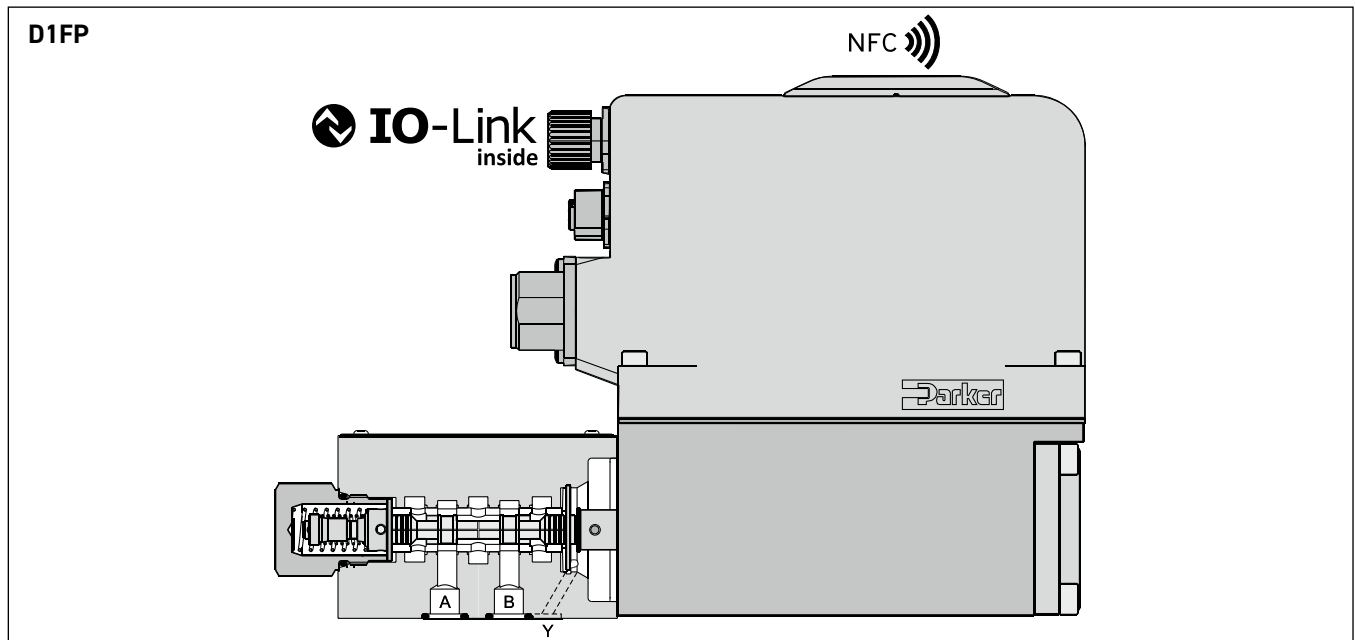
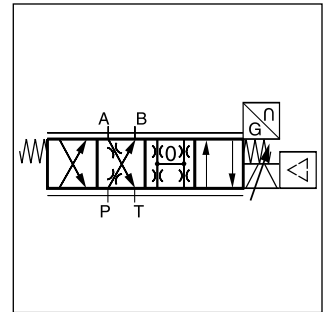
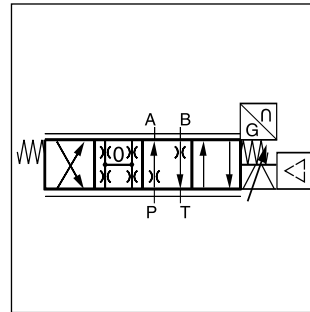
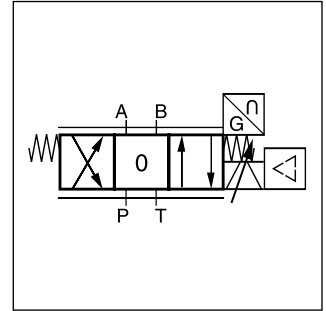
Driven by the VCD actuator the D*FP reaches the frequency response of real servovalves. At power-down the spool moves in a defined position. All common input signals are available.

Features

- Freely configurable supervising control circuit
- Analogue sensor input
- Onboard electronics
- Real servovalve dynamics (-3 dB / 350 Hz at $\pm 5\%$ input signal)
- Max. tank pressure 350 bar (D1FP), 250 bar (D3FP, D30FP) (with external drain port Y)
- Defined spool positioning at power-down - optional P-A/B-T or P-B/A-T or center position (for overlapped spools)
- IO-Link interface for parametrizing
- RGB diode for optical status check
- NFC interface
- Adjustable command signal
- Pressure or position control
- Optional PQ function with operation mode switching

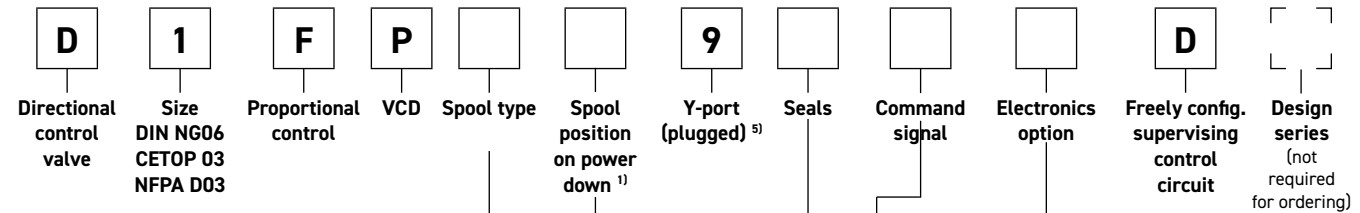


D1FP



Direct Operated Proportional DC Valve Series D*FP*D

Ordering Code



3

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
E01P		60
B31C		6 / 3
B31F		12 / 6
B31G		16 / 8
B31H		25 / 12.5
B31M		40 / 20
B31P		60 / 30
E02B		3
E02C		6
E02F		12
E02G		16
E02H		25
E02M		40
E02P		60
B32C		6 / 3
B32F		12 / 6
B32G		16 / 8
B32H		25 / 12.5
B32M		40 / 20
B32P		60

Code	Signal	Description
0	W	6 + PE acc. EN175201-804
5	W	11 + PE acc. EN175201-804
7	W	6 + PE + Enable
0	I	IO-Link Class B
P	I	IO Link Class B + switchable closed loop P control

Code	Signal	Description
W	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⁾	

Short delivery time
for all variations

Please order connector separately, see catalogue MSG11-3500/UK, chapter 3 accessories.
IO-LINK-MASTER-USB order no. 40983544

- 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 zerolap and underlap spools.
- ³⁾ Only for overlap 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

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Ordering Code

Direct Operated Proportional DC Valve Series D*FP*D

D	3	F	P			9				D	
Direct. control valve	Size DIN NG10 CETOP 05 NFFA D05	Proportional control	VCD	Spool type	Spool position on power down ¹⁾	Y-port (plugged) ⁴⁾	Seals	Command signal	Electronics option	Freely config. supervising control circuit	Design series (not required for ordering)

Code	Spool type	Flow [l/min] at Δp 35 bar per metering edge
Zerolap		
E50P		50
E50Y		100
B60P	$Q_b = Q_a / 2$ 	50
B60Y	$Q_b = Q_a / 2$ 	100
Underlap approx. -0.5 %		
E55P		50
E55Y		100
Overlap		
E01P		50
E01Y		100
E02P		50
E02Y		100
B31P	$Q_b = Q_a / 2$ 	50 / 25
B31Y		100 / 50
B32P	$Q_b = Q_a / 2$ 	50 / 25
B32Y		100 / 50

Code	Signal	Description
0	W	6 + PE acc. EN175201-804
5	W	11 + PE acc. EN175201-804
7	W	6 + PE + Enable
0	I	IO-Link Class B
P	I	IO Link Class B + switchable closed loop P control

Code	Signal	Description
W	adjustable	Default +/-10V
I	IO-Link Class B	—

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

Code	Spool pos. at power down
A ²⁾	
B ²⁾	
C ³⁾	
J ⁵⁾	

Short delivery time
for all variations

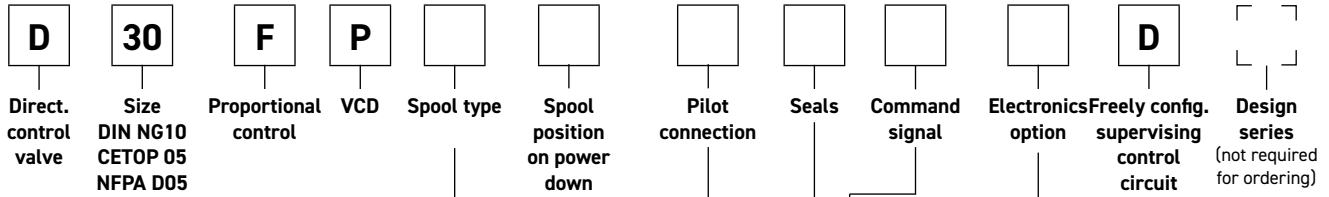
Please order connector separately, see catalogue MSG11-3500/UK, chapter 3 accessories.
IO-LINK-MASTER-USB order no. 40983544

- 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 zerolap spools and underlap spools.
³⁾ Only for overlap spools.
⁴⁾ Plug in the Y-port needs to be removed at tank pressure >35 bar.
⁵⁾ Flow for code Y: 80 l/min at Δp 35 bar
⁶⁾ Available command signals – see technical data

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Direct Operated Proportional DC Valve Series D*FP*D

Ordering Code



3

Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Zerolap		
E50U		80
B60U	$Q_B = Q_A / 2$ 	80 / 40
Overlap		
E01U		80
E02U		80
B31U	$Q_B = Q_A / 2$ 	80 / 40
B32U	$Q_B = Q_A / 2$ 	80 / 40

Code	Spool pos. at power down
A ¹⁾	
B ¹⁾	
C ²⁾	

Code	Signal	Description
0	W	6 + PE acc. EN175201-804
5	W	11 + PE acc. EN175201-804
7	W	6 + PE + Enable
0	I	IO-Link Class B
P	I	IO Link Class B + switchable closed loop P control

Code	Signal	Description
W	adjustable	Default +/-10V
I	IO-Link Class B	—

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

Code	Inlet	Drain
1 ³⁾	internal	external
4	internal	internal

Short delivery time
for all variations

Please order connector separately, see chapter 3 accessories.

IO-LINK-MASTER-USB order no. 40983544

¹⁾ Approx. 10 % opening, only zerolapped spools.

²⁾ Only for overlapped spools.

³⁾ For tank pressure >35 bar.

⁴⁾ Available command signals – see technical data

Technical Data

General		
Design		Direct operated servo proportional DC valve
Actuation		VCD® actuator
Size		NG06 / CETOP03 / NFPA D03, NG10 / CETOP05 / NFPA D05
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+60
MTTF _b value ¹⁾	[years]	150
Weight	[kg]	5.0 (D1FP), 6.5 (D3FP)
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 (D1FP), 250 (D3FP) 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 recommended	[cSt]/ mm²/s]	20...400
	[cSt]/ mm²/s]	30...80
Filtration		ISO 4406; 18/16/13
Nominal flow		
at Δp=35 bar per control edge ³⁾	[l/min]	3 / 6 / 12 / 16 / 25 / 40 (D1FP), 50 / 100 (D3FP)
Flow maximum	[l/min]	90 at Δp=350 bar over two control edges (D1FP), 150 (D3FP)
Leakage at 100 bar	[ml/min]	< 400 (zerolap spool); < 50 (D1FP overlap spool); < 100 (D3FP overlap spool)
Opening point	[%]	set to 23 (D1FP), 19 (D3FP), < 7 (D30FP) commande signal (see flow characteristics)
Static / Dynamic		
Step response at 100 % step ⁴⁾	[ms]	< 3.5 (D1FP), < 6 (D3FP)
Frequency response (±5 % signal) ⁴⁾	[Hz]	350 amplitude ratio -3 dB, 350 phase lag -90° (D1FP), 200 amplitude ratio -3 dB, 200 phase lag -90° (D3FP)
Hysteresis	[%]	< 0.05
Sensitivity	[%]	< 0.03
Temperature drift	[%/K]	< 0.025

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_y>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: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

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

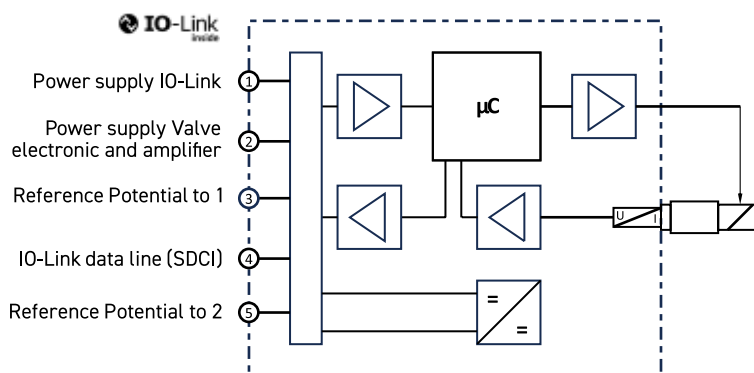
Interfaces			
IO-Link			IEC 61131-9
NFC ISO/IEC 15693			NFC Forum Type 5 tag certified by the NFC Forum Frequency 13.56 MHz; -27.2 dBμA/m at 10 meters distance
Electrical characteristics			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector) 6 = Full protection against contact, dust tight 5 = Protection against water jets (nozzle) from any angle
Supply voltage/ripple		[V]	24 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 medium lag
Command			Depending on choosen signal type
voltage	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
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 ⊥)
	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
		[V]	Low -3...+5; High 11...30; input current 3 mA
Diagnostic signal		[V]	+10...0...-10
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]	7x1.0 (AWG 16) overall braid shield
	Code 5	[mm²]	8x1.0 (AWG 16) overall braid shield
Wiring length max.		[m]	50

Technical Data IO-Link Class B

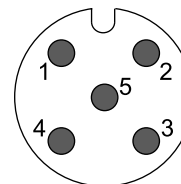
Electrical characteristics		
Duty ratio	[%]	100
Protection class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector) 6 = Full protection against contact, dust tight 5 = Protection against water jets (nozzle) from any angle
Directive		IO-Link Interface and System Specification 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.	[mm²]	0.34 mm² for a cable length of up to 5 m
Wiring length max.	[m]	20

3

Block diagram



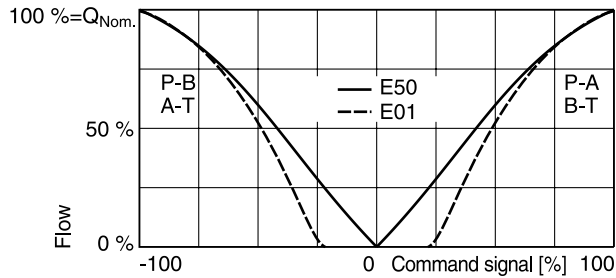
Pin	Signal	Signal – IO-Link B Class / viewing direction of the valve
1	L+	Voltage Supply IO-Link
2	P24	Voltage supply valve electronics and power part power consumption 4A
3	L-	Reference potential pin 1
4	C/Q	IO-Link data line (SDCI)
5	N24	Reference potential pin 2



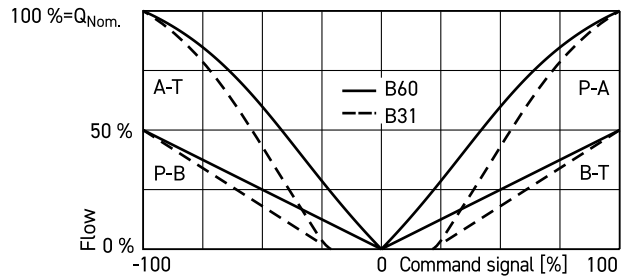
Pin 3 and 5 are linked with each other in the valve electronics. The reference potentials L- and N24 of the two supply voltages must also be linked with each other on the power supply unit side.

Flow curves D1FP

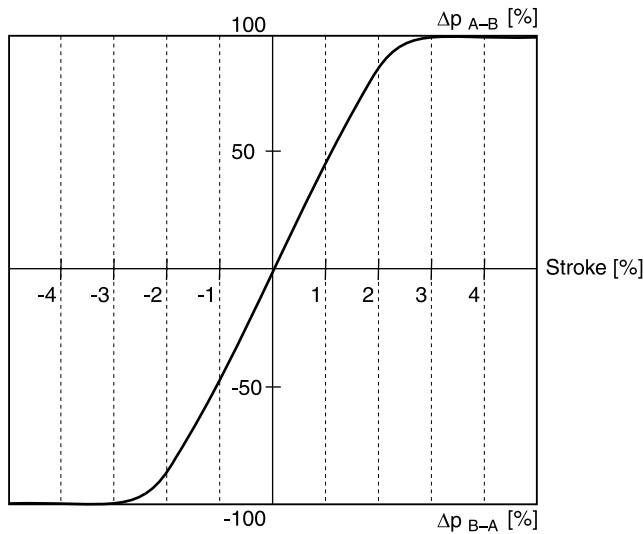
(Overlapped spool set to opening point 23 %)
at $\Delta p = 35$ bar per metering edge
Spool type **E01/E50**



Spool type B31/B60

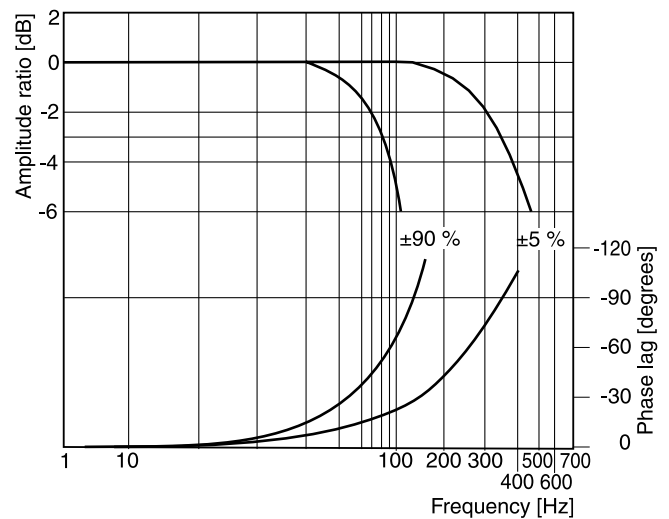


Pressure gain



Frequency response

± 5 % command signal
 ± 90 % command signal



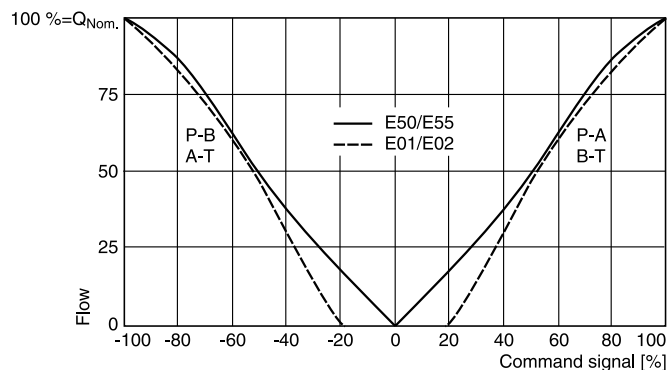
All characteristic curves measured with HLP46 at 50 °C.

Flow curves D3FP

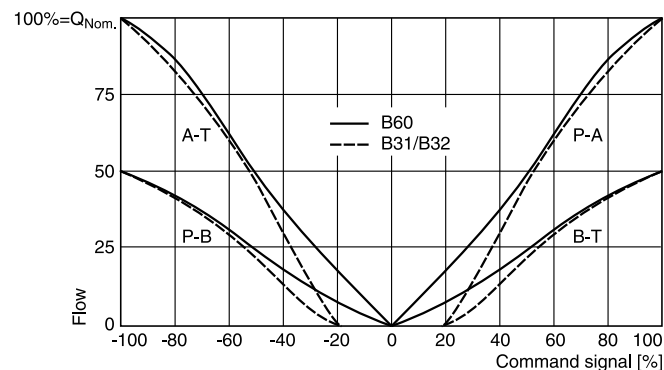
(Overlapped spool set to opening point 19 %)

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

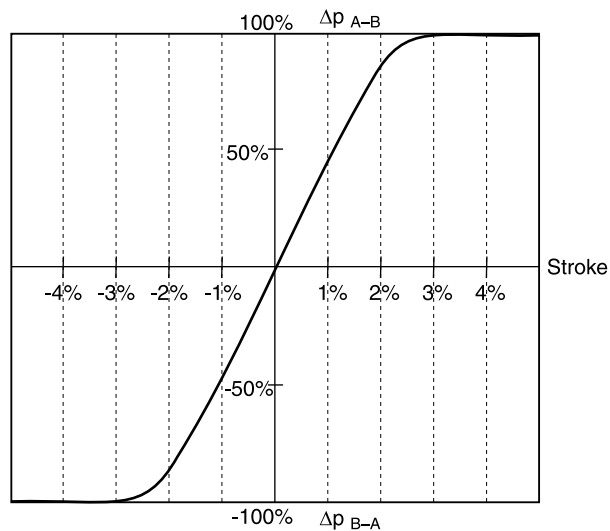
Spool type **E50/E55, E01/E02**



Spool type **B31/B32, B60**



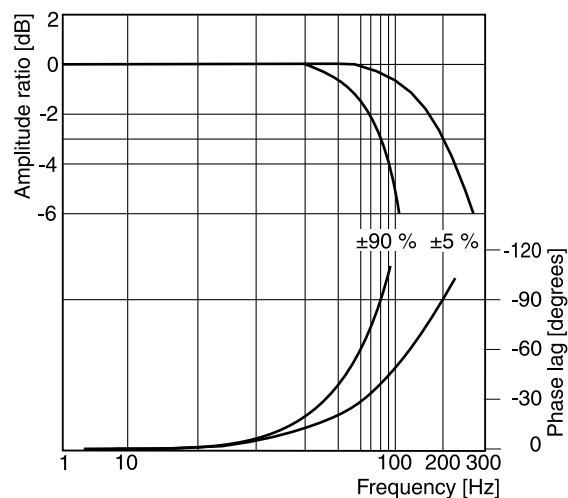
Pressure gain



Frequency response

± 5 % command signal

± 90 % command signal



All characteristic curves measured with HLP46 at 50 °C.

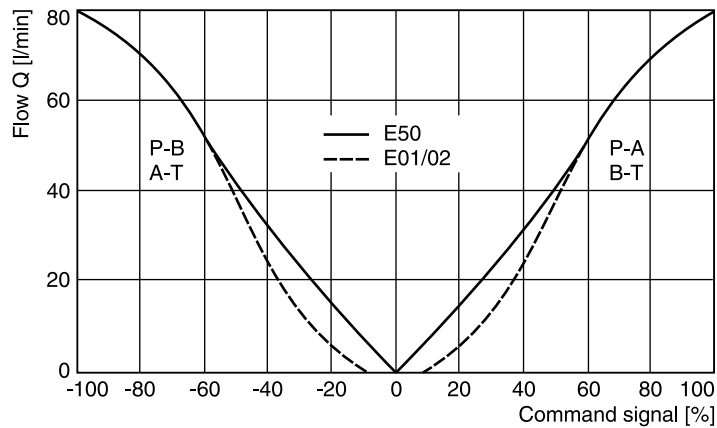
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Flow curves D30FP

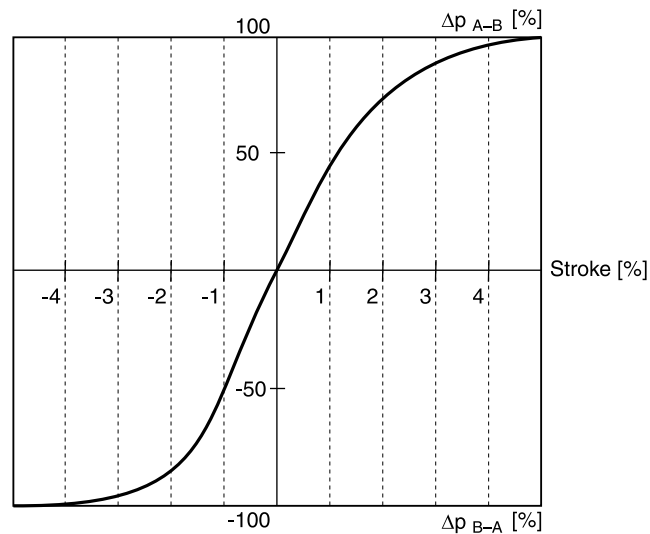
(Overlapped spool set to opening point 9 %)

at $\Delta p = 5$ bar per metering edge

Spool type **E01/02**, **E50**



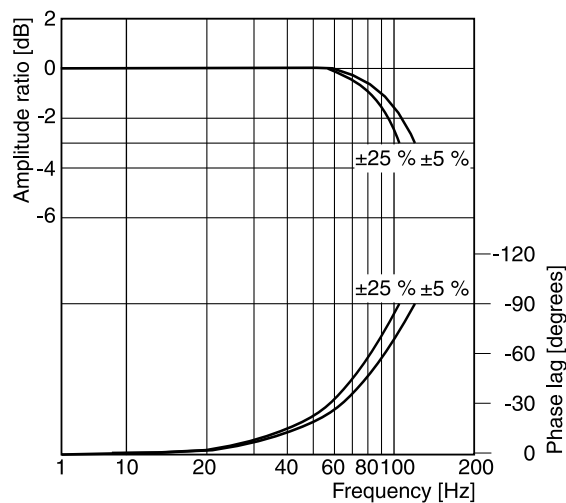
Pressure gain



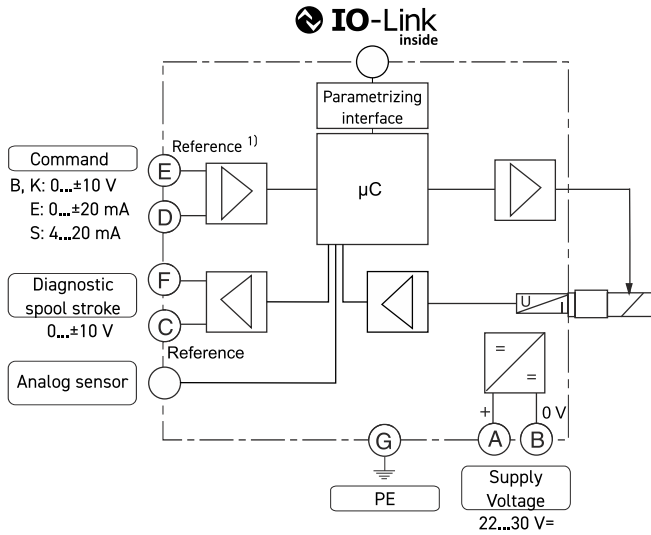
Frequency response

± 5 % command signal

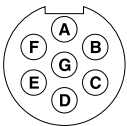
± 25 % command signal



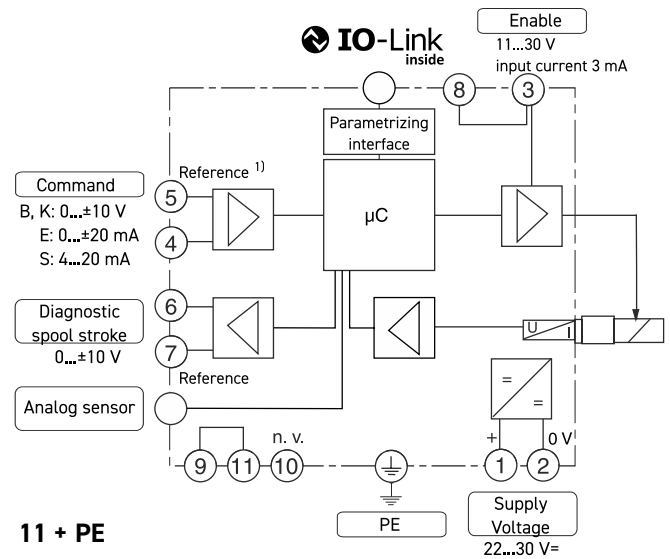
Code 0



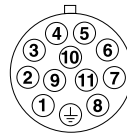
6 + PE



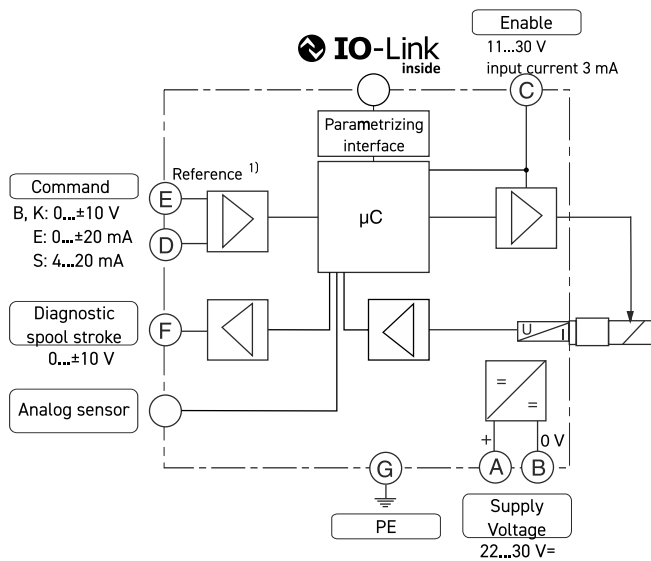
Code 5



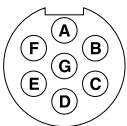
11 + PE



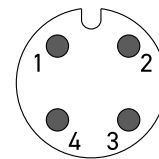
Code 7



6 + PE + Enable



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

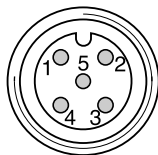


PIN assignment acc. IEC 60974-5-2

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

¹⁾ Do not connect with supply voltage zero.

Pin assignment analog sensor, M12 socket



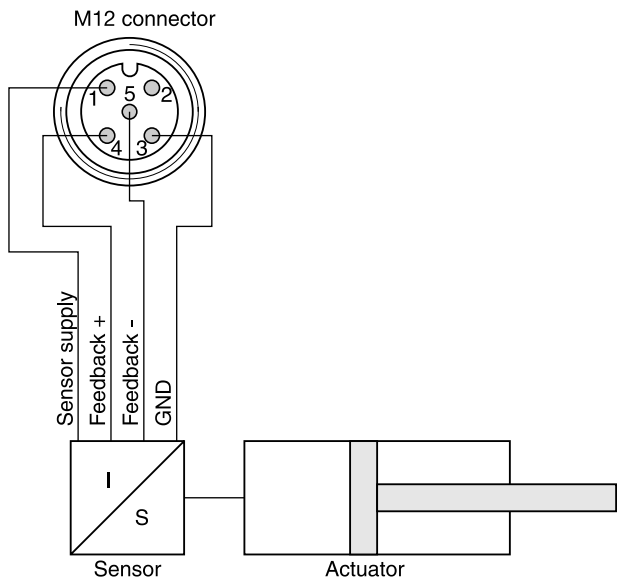
- 1: U_S
- 2: $\pm 10\text{ V}$
- 3: GND
- 4: 4 ... 20 mA +
- 5: 4 ... 20 mA -

3

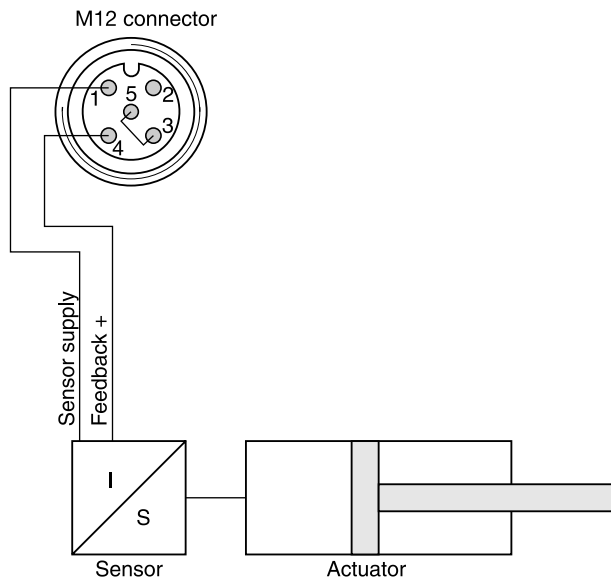
Examples position control

Current 4...12...20 mA contacts at the sensor input

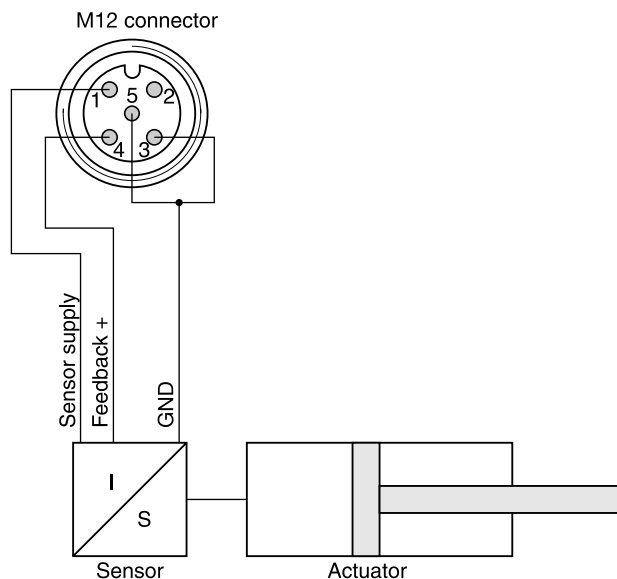
Wiring diagram four-wire



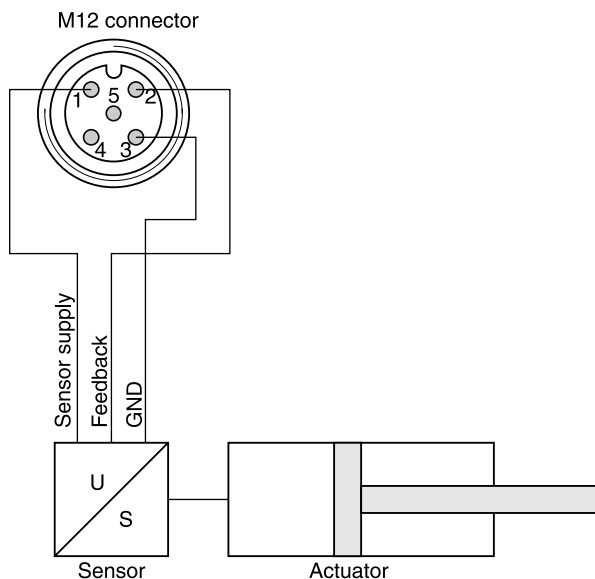
Wiring diagram two-wire



Wiring diagram three-wire



Voltage $\pm 10\text{ V}$ (1...10 V)



The earth connection is achieved via the shielding.

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

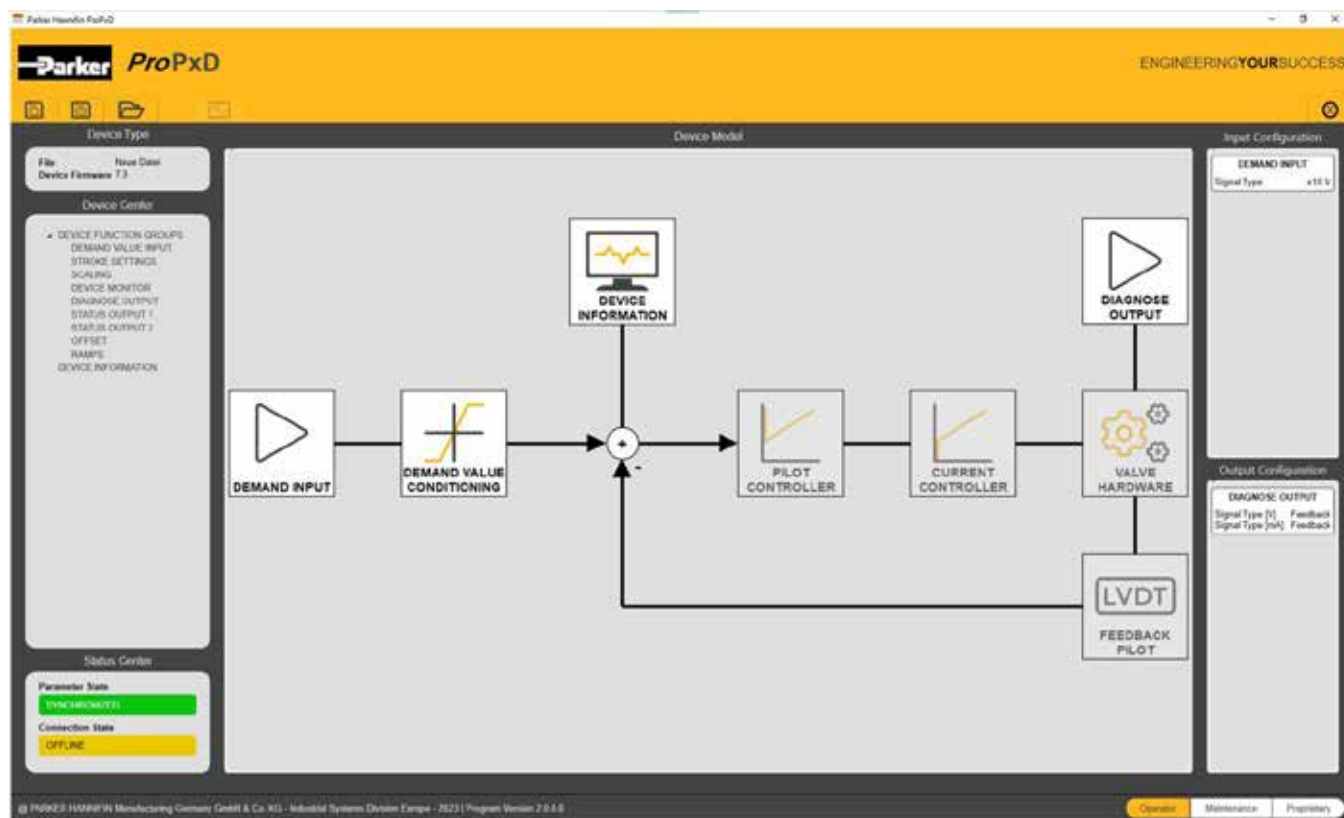
The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface.

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

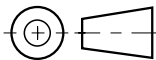
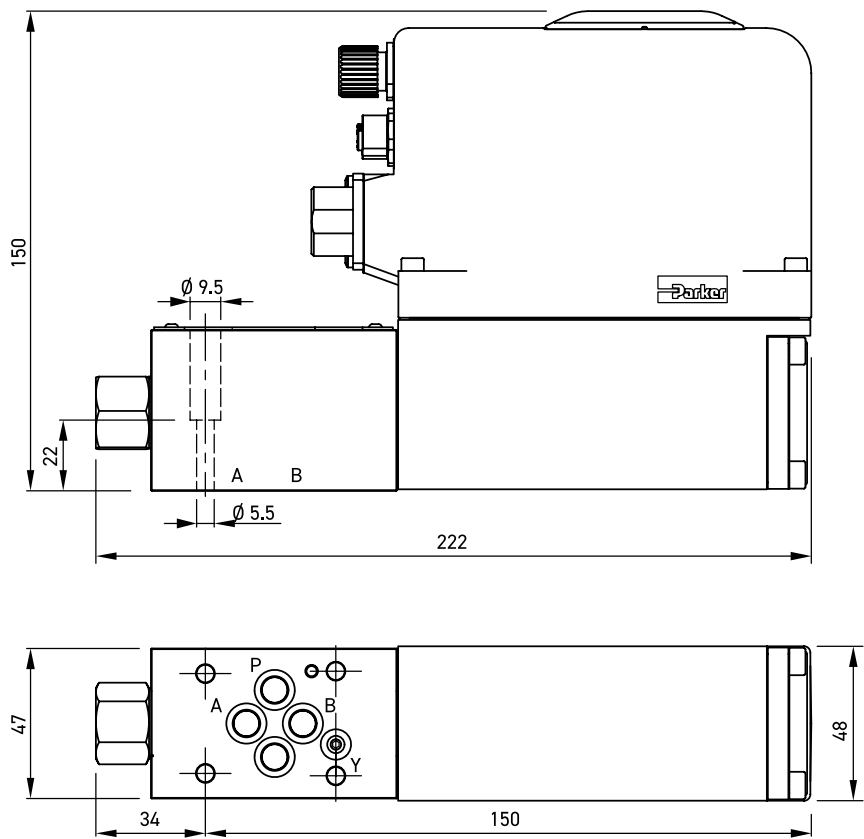
The PC software can be downloaded free of charge at www.parker.com/isde – see page "Support" or directly at www.parker.com/propxd.

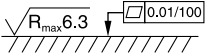
Features

- Comfortable editing of all parameters
- Oscilloscope function
- Storage and loading of optimized parameter adjustments

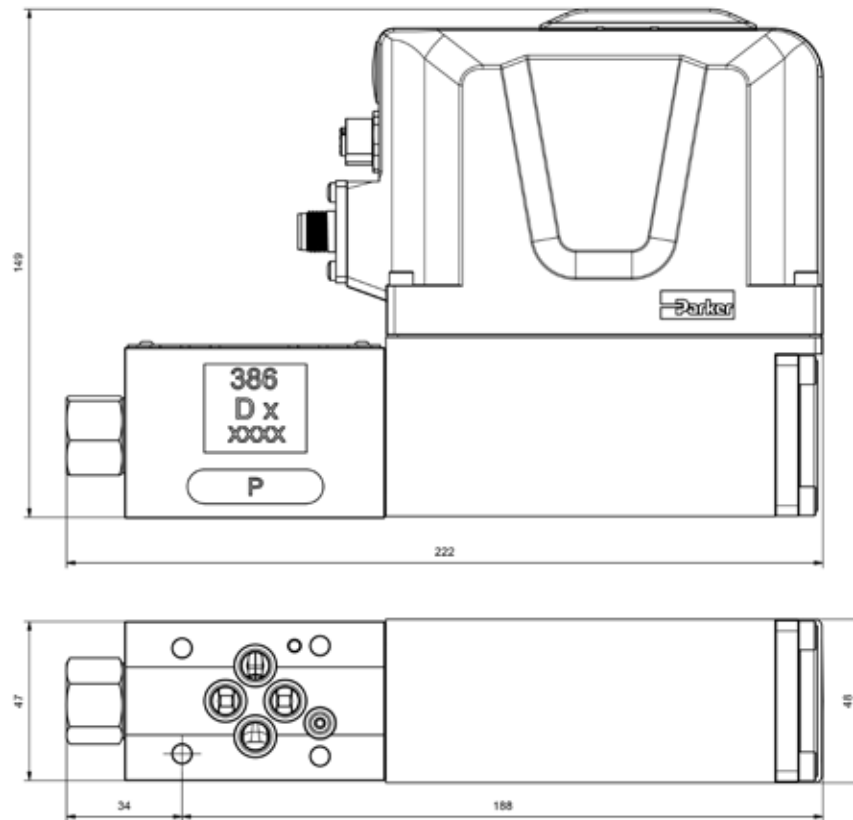


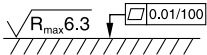
D1FP*D



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

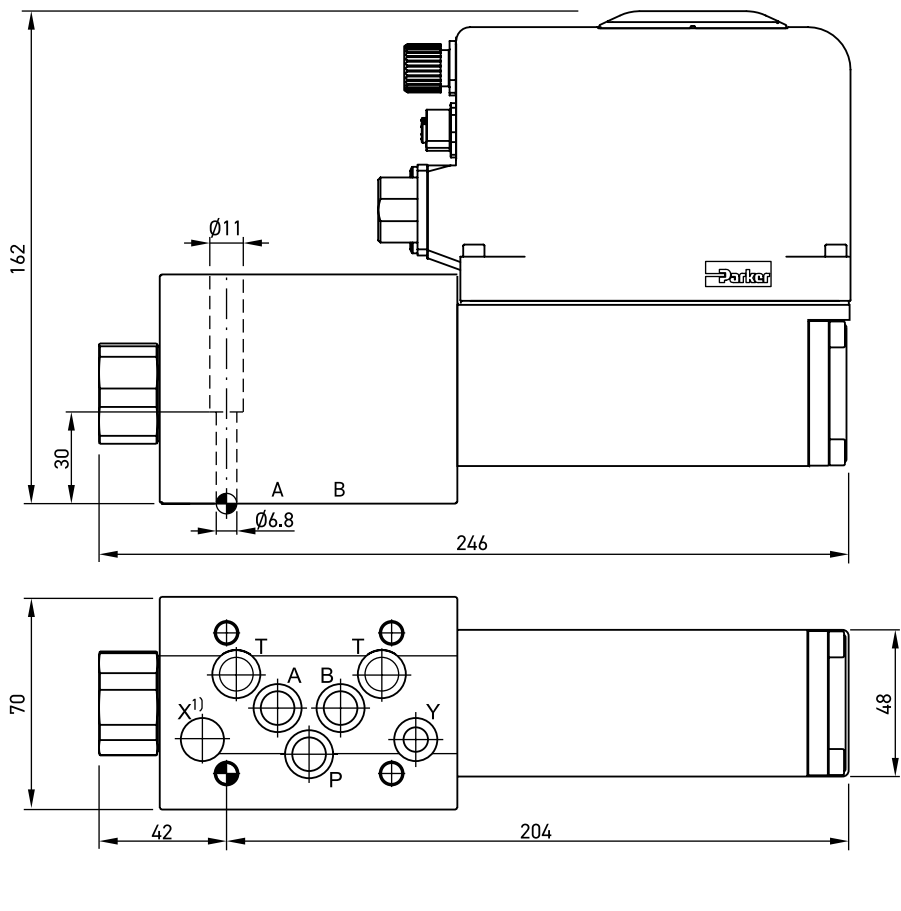
D1FP*D IO Link Class

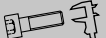
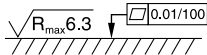


Surface finish	 Kit	 Kit	 Kit	 Kit
	BK375	4x M5x30 ISO 4762-12.9	7,6 Nm ±15 %	NBR: SK-D1FP FPM: SK-D1FP-V HFC: SK-D1FP-H

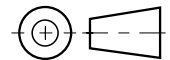
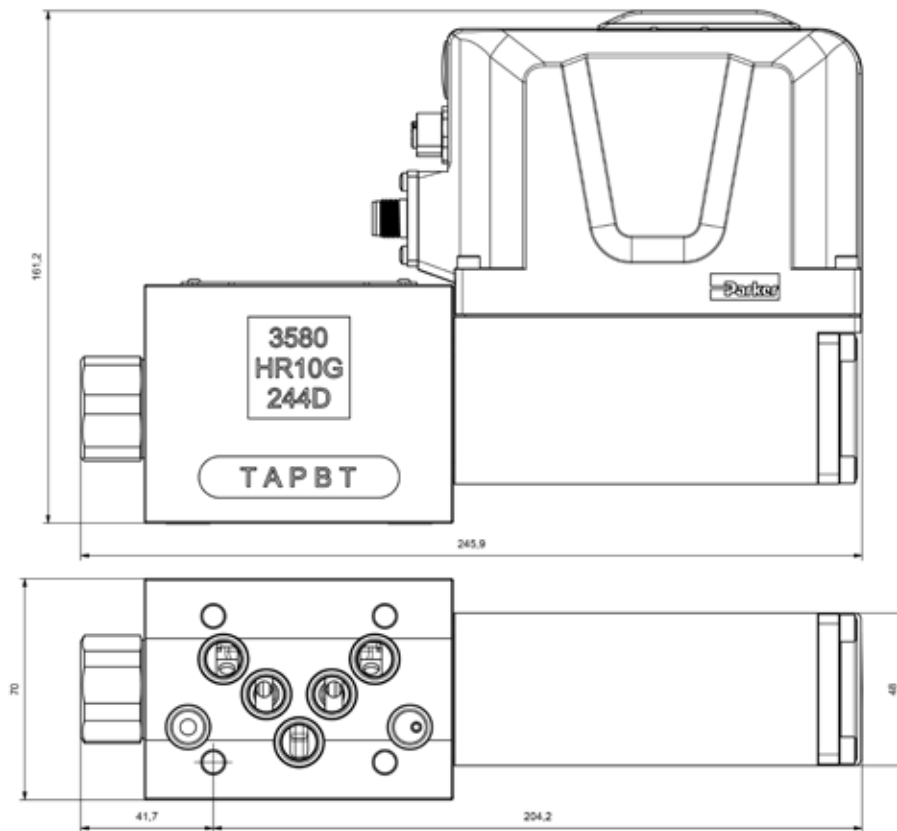
D3FP*D / D30FP*D

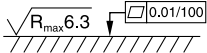
3



Surface finish	 Kit	 Kit	 Kit	 Kit
	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D3FP FPM: SK-D3FP-V HFC: SK-D3FP-H

D3FP*D / D30FP*D IO-Link Class B



Surface finish	 Kit	 Kit	 Kit	 Kit
	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D3FP FPM: SK-D3FP-V HFC: SK-D3FP-H