* VCD® = Voice Coil Drive technology

Introduction: Proportional DC Valves

Proportional valves and servo proportional valves are characterized by a number of design features that determine their quality to fit into different applications. The main features are listed below.

Solenoid drive (proportional valves):
Solenoids operate unidirectionally against a spring, provide high force and are - because of high inductance - limited in their dynamics.

Voice Coil Drive® :
A moving coil in the field of a static permanent magnet operates bi-directionally. Springs are only needed to ensure the power-down position. The low inductance allows highest dynamics.

External electronics:
Valves without integrated electronics are less sensitive to vibration and high temperature. LVDTs always include integrated electronics.

Integrated electronics (onboard electronics - OBE):
Onboard electronics simplifies the installation and improves the repeatability from valve to valve.

LVDT (spool position feedback):
Closed loop control of the spool position improves the sensitivity and accuracy.

Direct operated (d.o.):
High hydraulic output can be achieved with low electric power input.

Pilot operated (p.o.):
Beyond the functional limits of direct operated valves hydraulic amplification is required.

Positive spool overlap:
To avoid load drifting in the zero position, spools with positive overlap are used.

Zero lap spools:
In closed loop circuits zero lap spools are used for an effective control of the spool at low position errors.

Spool/sleeve design:
For minimal hysteresis, high precision, and better wear resistance, the spool/sleeve design is preferred over the spool/body design.

Regenerative valves:
In applications with differential cylinders it is common to feed the return flow from the rod side of the cylinder back to the piston side to achieve higher velocity or lower pump flow. Parker differentiates between regeneration to the pressure level of the pump (P-regeneration) or directly to the piston area respectively the A-port of the valve (A-regeneration). The Parker regenerative valves use the advantageous A-regeneration.

Hybrid valves:
Regenerative valves with an integrated solenoid valve - to switch to the standard mode - are called Hybrid Valves at Parker. The regenerative mode is used for maximum velocity, the standard mode for maximum force.

Regenerative and hybrid valves are also available as on/off directional control valves.

The proportional directional valves D1FB (NG06) are available with and without onboard electronics (OBE).

D1FB OBE:

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 cable connection to a serial RS232 interface is available as accessory.

D1FB for external electronics:

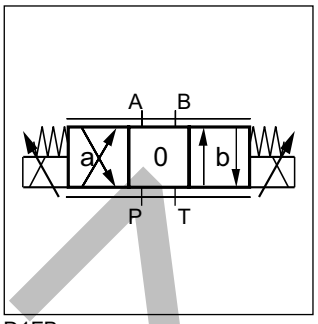
The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400.

The valve parameters can be edited with the common ProPxD software for both versions.

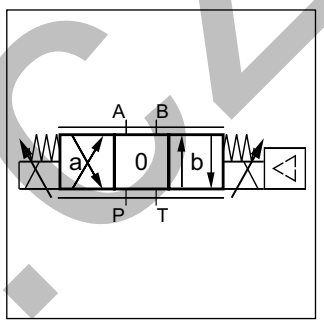
The D1FB valves can be ordered with spool/sleeve design (D1FB*0) for maximum precision as well as spool/body design (D1FB*3) for high nominal flow - see functional limit curves for maximum flow capability.
Valves with explosion proof solenoids Ex e mb II see catalogueMSG11-3343.
Download: www.parker.com/ISDE, see “Support”


D1FB


D1FB OBE



D1FB



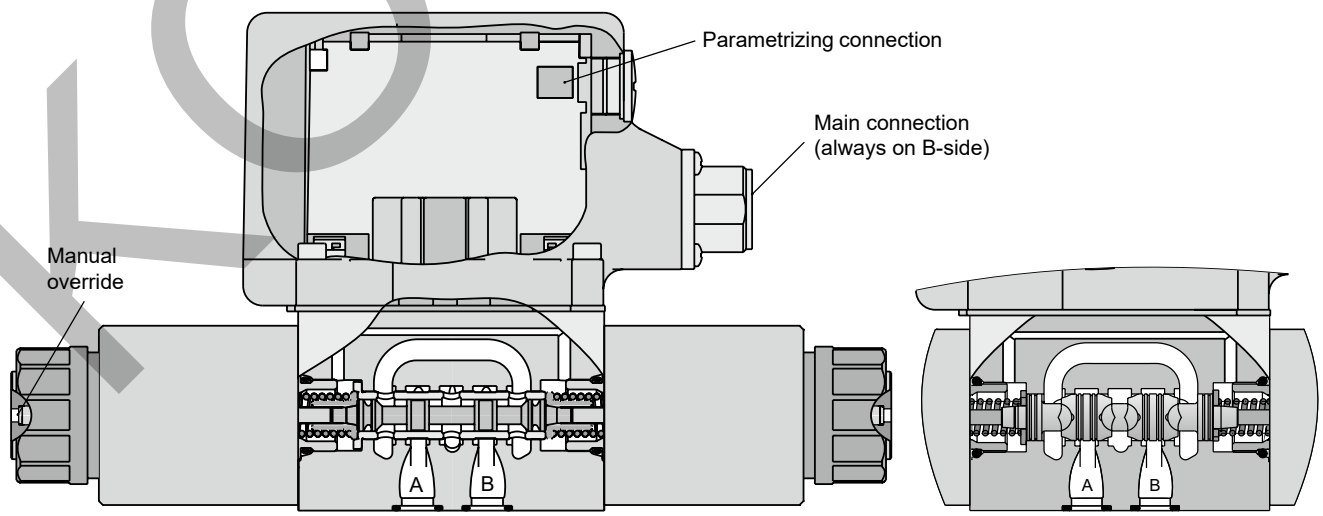
D1FB OBE

Features

- Spool/sleeve and spool/body
- 3 command options for D1FB OBE:
  +/- 10 V, 4…20 mA, +/- 20 mA
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Digital onboard electronics

D1FB*0 OBE
Spool/sleeve design

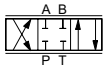
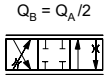
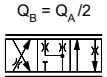
D1FB*3 OBE
Spool/body design

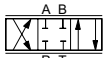
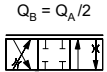
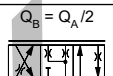


D1FB

D	1	F	B			0	N				
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**Proportional control**	**Standard dynamics standard repeatability**	**Spool type**	**Spool position**		**Seals NBR** (other seal compounds on request)	**Solenoid**	**Connector**	**Design**	**Design series** (not required for ordering)

3

D1FB*0: Spool/sleeve design		
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Overlap		
E01C **E01F** **E01H**		**6** **12** **20**
E02C **E02F** **E02H**		**6** **12** **20**
E03C **E03F** **E03H**		**6** **12** **20**
B31F **B31H**	$Q_B = Q_A/2$ 	**12 / 6** **20 / 10**
B32F **B32H**	$Q_B = Q_A/2$ 	**12 / 6** **20 / 10**

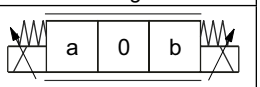
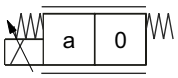
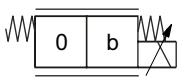
D1FB*3: Spool/body design		
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Overlap		
E01F **E01H** **E01K**		**10** **20** **30**
E02F **E02H** **E02K**		**10** **20** **30**
B31F **B31H** **B31K**	$Q_B = Q_A/2$ 	**10 / 5** **20 / 10** **30 / 15**
B32F **B32H** **B32K**	$Q_B = Q_A/2$ 	**10 / 5** **20 / 10** **30 / 15**

Code	Design
0	**Spool/sleeve design**
3	**Spool/body design**

Code	Connector
W [1]	**Connector as per EN 175301-803**
J [1] [2]	**Connector DT04-2P "Deutsch"**

D1FB*0: Spool/sleeve design	
Code	Solenoid
M	**9 V / 2.7 A**
J	**24 V / 0.8 A**

D1FB*3: Spool/body design	
Code	Solenoid
K	**12 V / 2.2 A**
J	**24 V / 1.1 A**

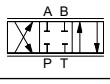
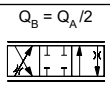
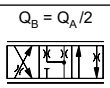
Code	Design
C	
E	
K	

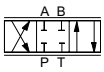
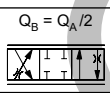
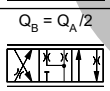
Short delivery time for all variations

[1] Please order connector separately, see chapter 3 accessories.
[2] Not for spool/sleeve design.

D1FB OBE (with onboard electronics)

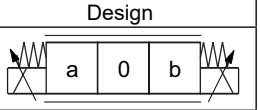
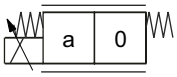
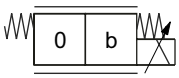
D	1	F	B			0	N				
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**Proportional control**	**Standard dynamics standard repeatability**	**Spool type**	**Spool position**		**Seals NBR** (other seal compounds on request)	**Input signal**	**Options**	**Design**	**Design series** (not required for ordering)

D1FB*0: Spool/sleeve design		
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Overlap		
E01C **E01F** **E01H**		**6** **12** **20**
E02C **E02F** **E02H**		**6** **12** **20**
E03C **E03F** **E03H**		**6** **12** **20**
B31F **B31H**		**12 / 6** **20 / 10**
B32F **B32H**		**12 / 6** **20 / 10**

D1FB*3: Spool/body design		
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Overlap		
E01F **E01H** **E01K**		**10** **20** **30**
E02F **E02H** **E02K**		**10** **20** **30**
B31F **B31H** **B31K**		**10 / 5** **20 / 10** **30 / 15**
B32F **B32H** **B32K**		**10 / 5** **20 / 10** **30 / 15**

Code	Design
0	**Spool/sleeve design**
3	**Spool/body design**

Code	Input signal [2]	Function	Port	Options
F0	**0...+/-10 V**	**0...+10 V > P-A**	**6 + PE**	**Potentiometer supply**
G0	**0...+/-20 mA**	**0...+20 mA > P-A**	**6 + PE**	**—**
S0	**4...20 mA**	**12...20 mA > P-A**	**6 + PE**	**—**
W5 [1]	**0...+/-10 V** **4...20 mA**	**0...+10 V > P-A** **12...20 mA > P-A**	**11 + PE**	**Command channel & potentiometer supply**

Code	Design
C	
E	
K	

Please order connector separately, see chapter 3 accessories.
Parametrizing cable OBE → RS232: Item no. 40982923

Short delivery time for all variations

[1] Factory set ± 10 V on delivery.
[2] Single solenoid always 0...+10 V respectively 4...20 mA.

3

General				
Design		Direct operated proportional DC valve		
Actuation		Proportional solenoid		
Size		NG06/CETOP 03/NFPA D03		
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA		
Mounting position		unrestricted		
Ambient temperature	[°C]	-20...+60		
$MTTF_D$ value [1]	[years]	150		
Weight (OBE)	[kg]	2.2 (2.9)		
Hydraulic				
Max. operating pressure	[bar]	Ports P, A, B 350; Port T 210		
Max. pressure drop PABT / PBAT	[bar]	350		
Fluid		Hydraulic oil according to DIN 51524 ... 535, other on request		
Fluid temperature	[°C]	-25...+60		
Viscosity permitted recommended	[cSt] / [mm^2/s] [cSt] / [mm^2/s]	20...400 30...80		
Filtration		ISO 4406; 18/16/13		
		D1FB*0 (Spool/sleeve)	**D1FB*3 (Spool/body)**	
Nominal flow at Δp = 5 bar per control edge [2]	[l/min]	6/12/20	10/20/30	
Leakage at 100 bar	[ml/min]	<50	<60	
Opening point (OBE)	[%]	see flow characteristics (set to 10 command signal)		
Static / Dynamic				
Step response at 100 % step	[ms]	30	30	
Hysteresis	[%]	<4	<6	
Temperature drift solenoid current	[%/K]	<0.02		
Electrical characteristics				
Duty ratio	[%]	100 ED; CAUTION: Coil temperature up to 150 °C possible		
Protection class		Standard (as per EN 175301-803) IP65 in accordance with EN 60529 (with correctly mounted plug-in connector) DT04-2P “Deutsch“ IP69K (with correctly mounted plug-in connector)		
Solenoid		**Code "M"**	**Code "K"**	**Code "J" (Spool/sleeve)**
Supply voltage	[V]	9	12	24
Current consumption	[A]	2.7	2.2	1.1 (0.8)
Resistance	[Ohm]	2.7	4.4	18.6
Solenoid connection		Connector as per EN 175301-803 (code W), DT04-2P “Deutsch“ connector (code J). Solenoid identification as per ISO 9461.		
Wiring min.	[mm²]	3x1.5 (AWG 16) overall braid shield (Code W), "Deutsch" connector DP4 2-Pin (Code J)		
Wiring lenght max.	[m]	50		

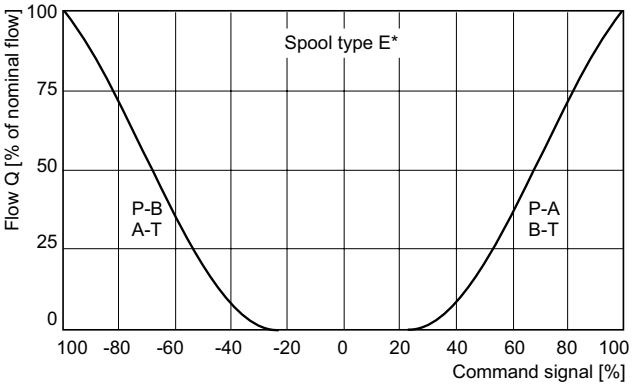
[1] If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

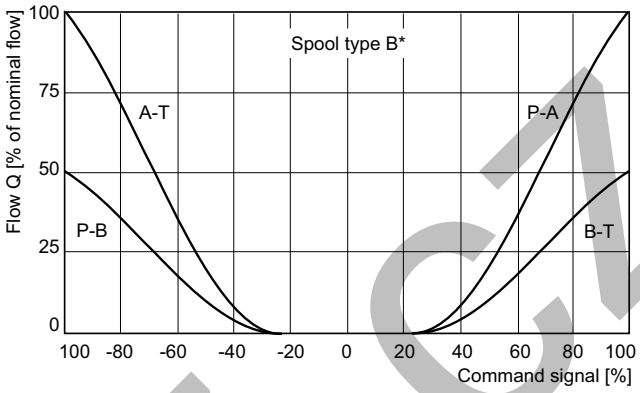
[2] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

Electrical characteristics OBE		
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
Duty ratio	[%]	100 ED; CAUTION: Coil temperature up to 150 °C possible
Protection class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple DC	[V]	18...30, ripple < 5 % eff., surge free
Current consumption max.	[A]	2.0
Pre fusing medium lag	[A]	2.5
Input signal		
Codes F0 & W5 voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm, 0...+10 V ⇒ P -> A
Codes S0 & W5 current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, Ri = <250 Ohm, 12...20 mA ⇒ P -> A < 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Code G0	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, Ri = <250 Ohm, 0...+20 mA ⇒ P -> A
Differential input max.		
Codes F0, G0 & S0	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
Code W5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0V (terminal 2)
Channel recall signal	[V]	0...2.5: off / 5...30: on / Ri = 100 kOhm
Adjustment ranges Min	[%]	0...50
Max	[%]	50...100
Ramp	[s]	0...32.5
Interface		RS 232, parametrizing connection 5pole
EMC		EN 61000-6-2, EN 61000-6-4
Central connection		
Codes F0, G0 & S0		6 + PE acc. to EN 175201-804
Code W5		11 + PE acc. to EN 175201-804
Wiring min.		
Codes F0, G0 & S0	[mm²]	7 x 1.0 (AWG16) overall braid shield
Code W5	[mm²]	11 x 1.0 (AWG16) overall braid shield
Wiring length max.		50

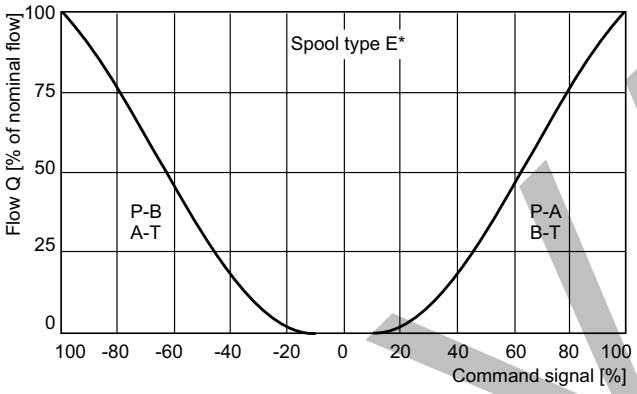
3

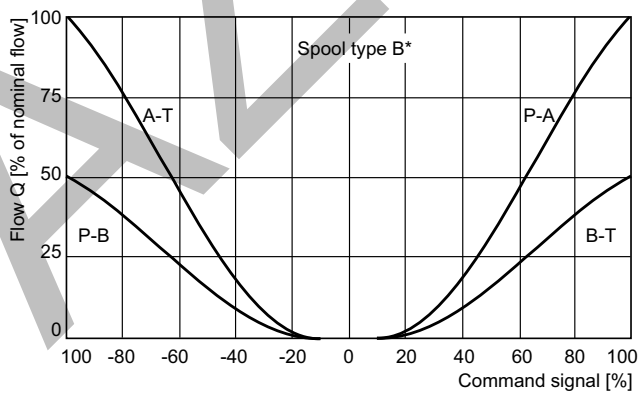
Flow characteristics
D1FB*0 external electronics
at Δp = 5 bar per metering edge
Spool type E01/02/03, B31/32





D1FB*0 OBE
(set to opening point 10 %)
at Δp = 5 bar per metering edge
Spool type E01/02/03, B31/32

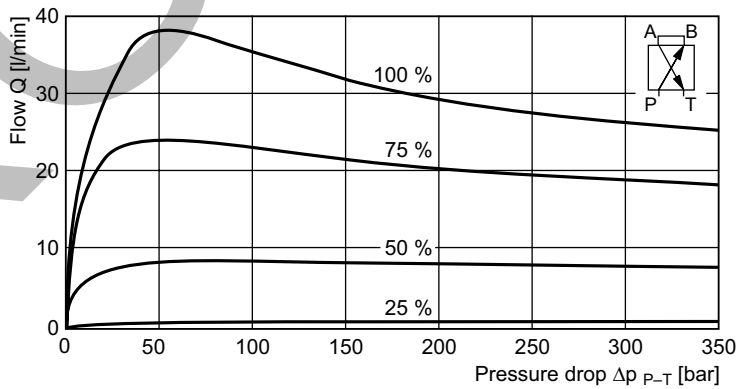




Functional limits
at 25 %, 50 %, 75 % and 100 % command signal (symmetric flow)

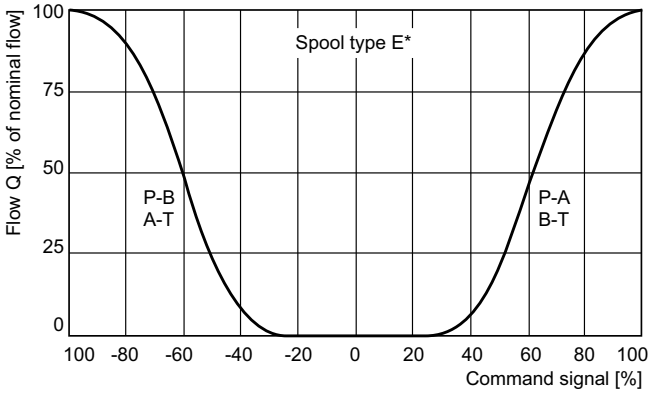
At asymmetric flow a reduced flow limit has to be considered.

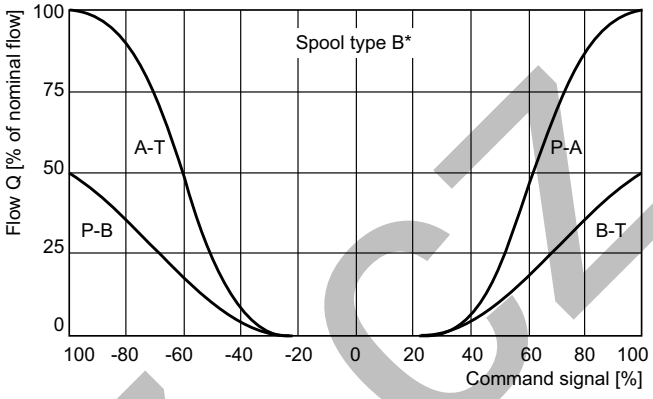
Spool type E01H



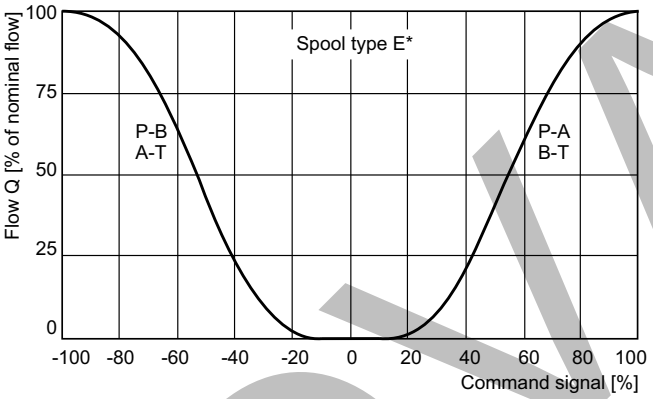
All characteristic curves measured with HLP46 at 50 °C.

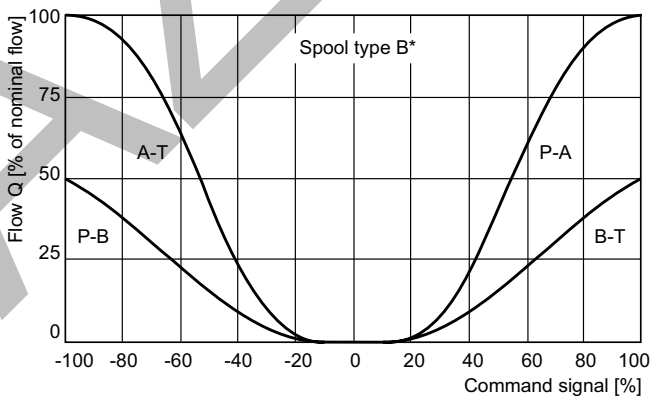
Flow characteristics
D1FB*3 external electronics
at Δp = 5 bar per metering edge
Spool type E01/02/03, B31/32





D1FB*3 OBE
(set to opening point 10 %)
at Δp = 5 bar per metering edge
Spool type E01/02

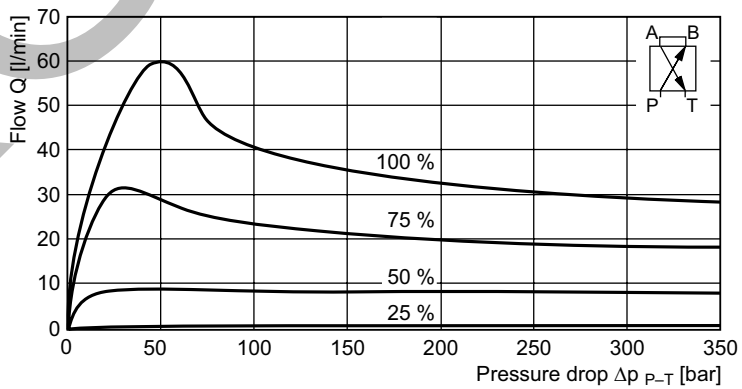




Functional limits
at 25 %, 50 %, 75 % and 100 % command signal (symmetric flow)

At asymmetric flow a reduced flow limit has to be considered.

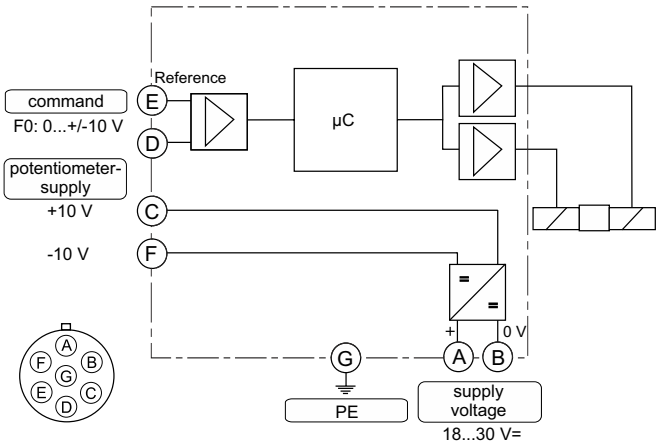
Spool type E01K



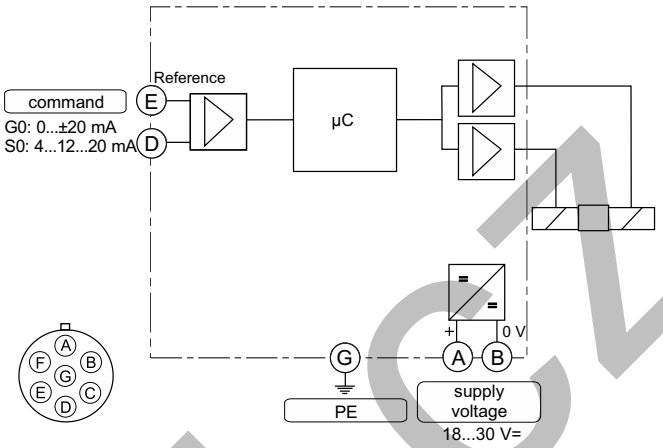
All characteristic curves measured with HLP46 at 50 °C.

3

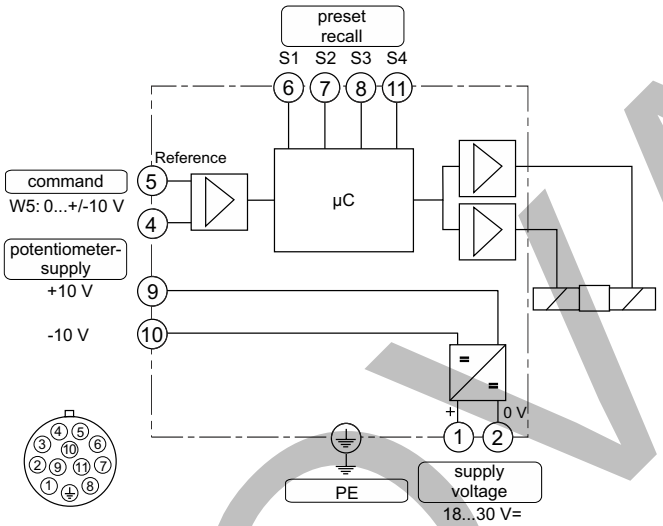
Code F0
6 + PE acc. to EN 175201-804



Code G0, S0
6 + PE acc. to EN 175201-804



Code W5
11 + PE acc. to EN 175201-804



ProPxD interface program

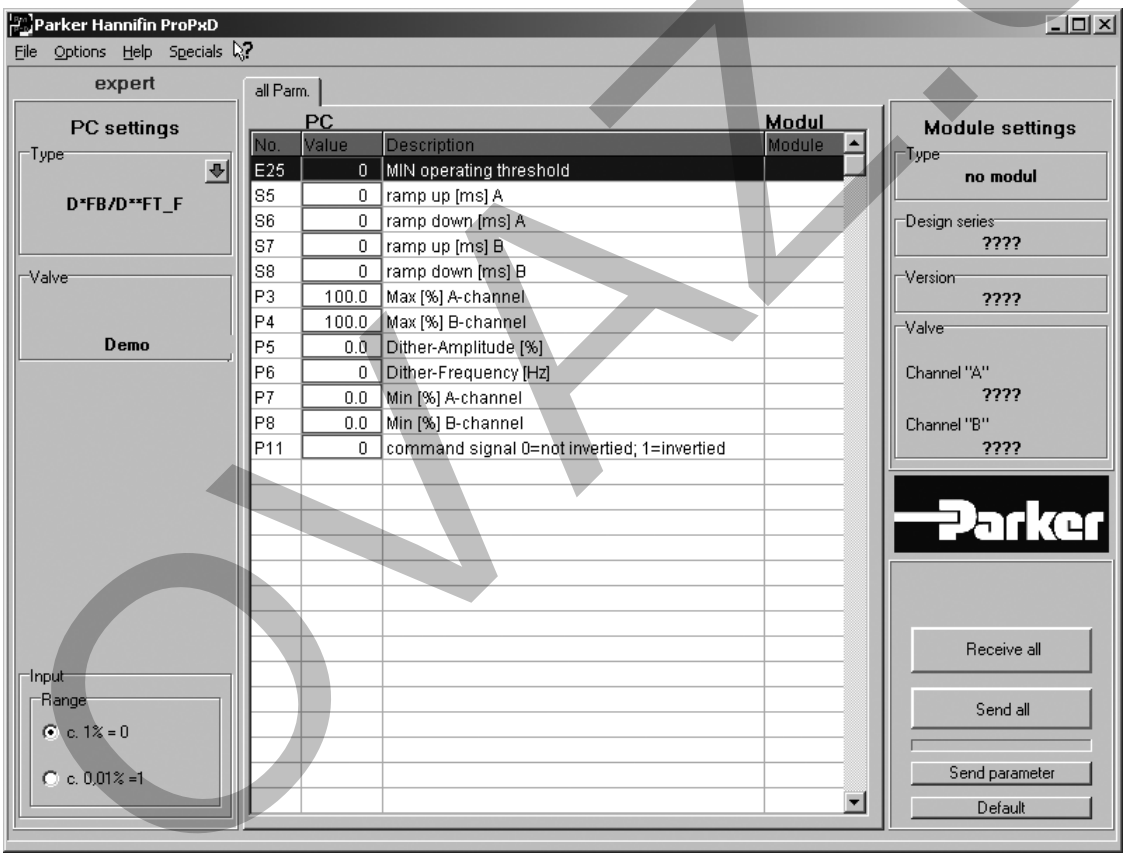
The ProPxD software permits comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a non-volatile memory stores the data with the option for recalling or modification.

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

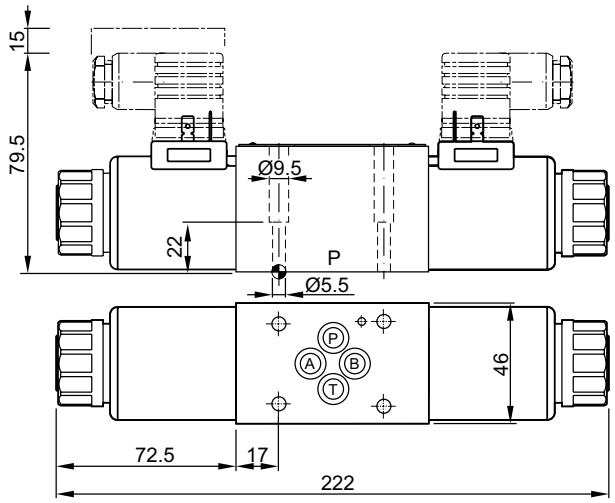
- Comfortable editing of all parameters
- Depiction and documentation of parameter sets
- Storage and loading of optimized parameter adjustments
- Executable with all actual Windows® operating systems from Windows® XP upwards
- Plain communication between PC and electronics via serial interface RS232C

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

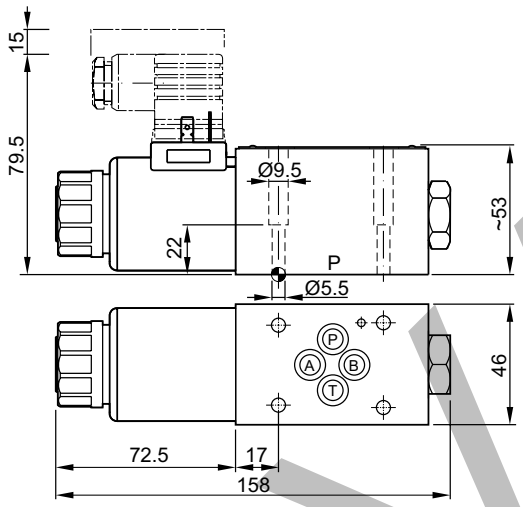


3

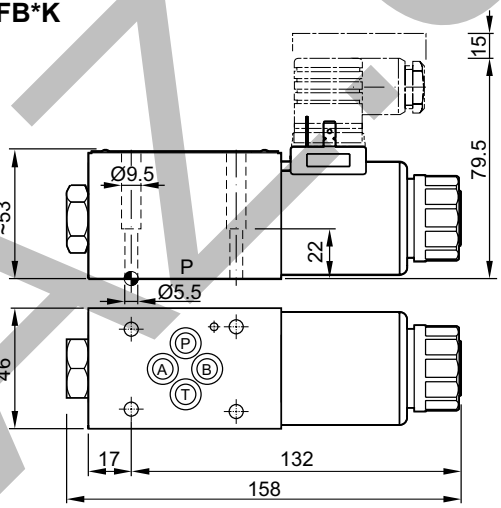
D1FB*C



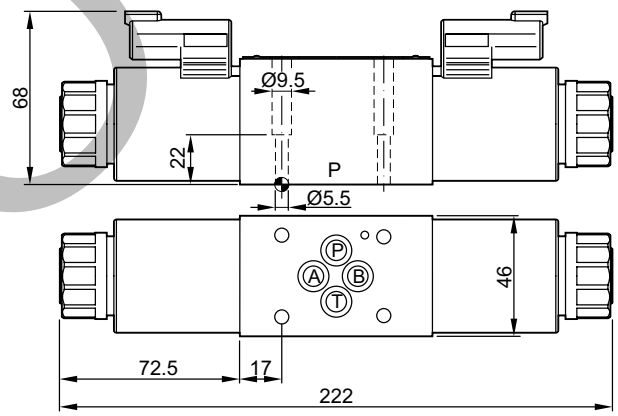
D1FB*E



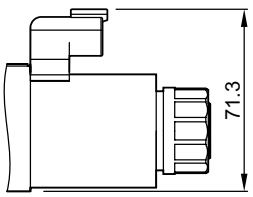
D1FB*K



D1FB*C*0 with DT04-2P "Deutsch" connector
(only C style shown)

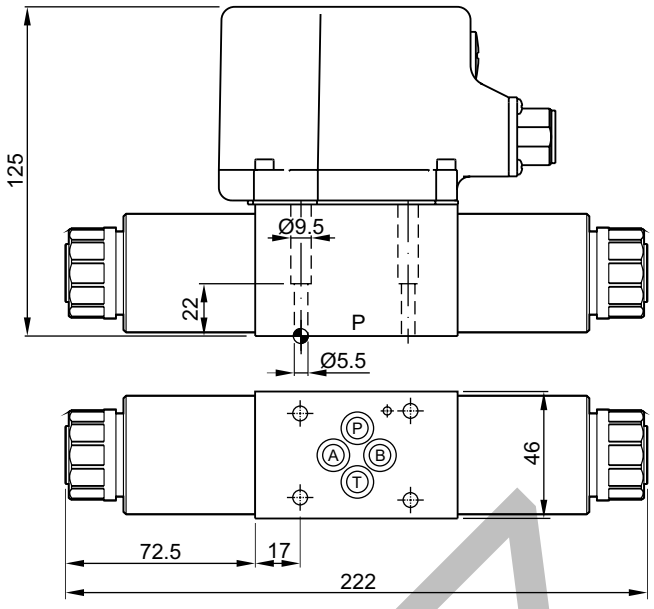


D1FB*C*3

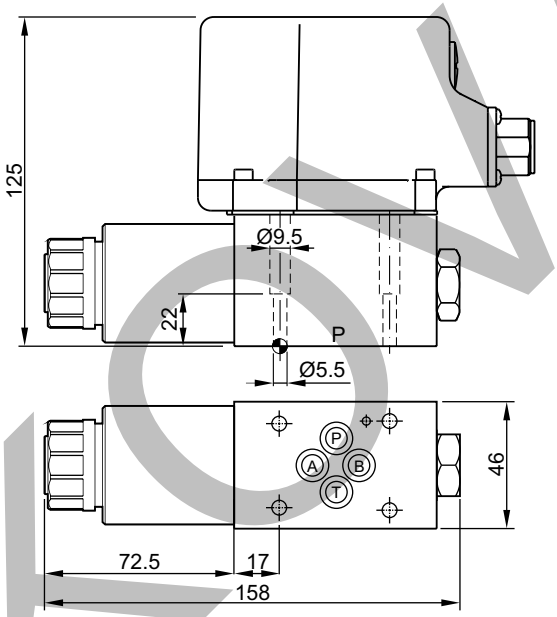


Surface finish	Kit			Kit NBR
R_{max}6.3 ⊡ 0.01/100	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	SK-D1FB

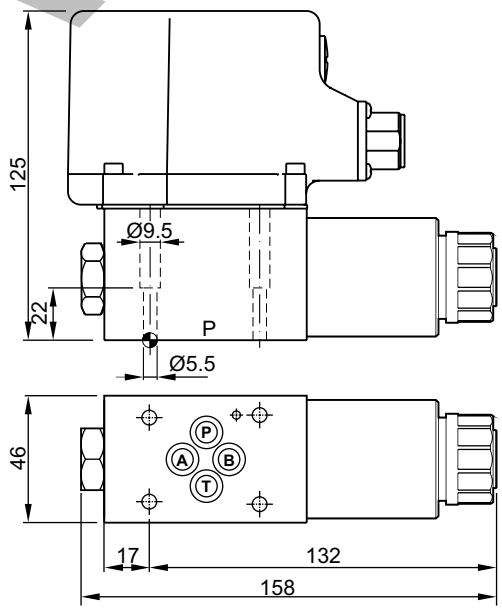
D1FB*C OBE

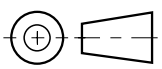


D1FB*E OBE



D1FB*K OBE





Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	SK-D1FB

3

The proportional directional valves D3FB (NG10) are available with and without onboard electronics (OBE).

D3FB OBE

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 cable connection to a serial RS232 interface is available as accessory.

D3FB for external electronics

The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400.

The valve parameters can be edited with the common ProPxD software for both versions.

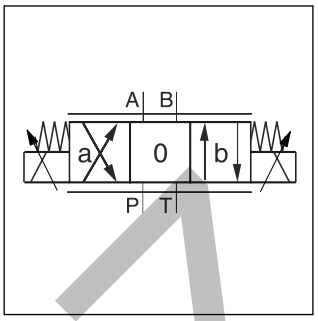
The D3FB valves can be ordered with spool/sleeve design (D3FB*0) for maximum precision as well as spool/body design (D3FB*3) for high nominal flow - see functional limit curves for maximum flow capability.

Features

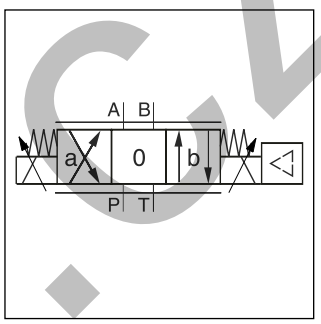
- Spool/sleeve and spool/body
- 3 command options for D3FB OBE: +/- 10 V, 4…20 mA, +/- 20 mA
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Digital onboard electronics

D3FB

D3FB OBE



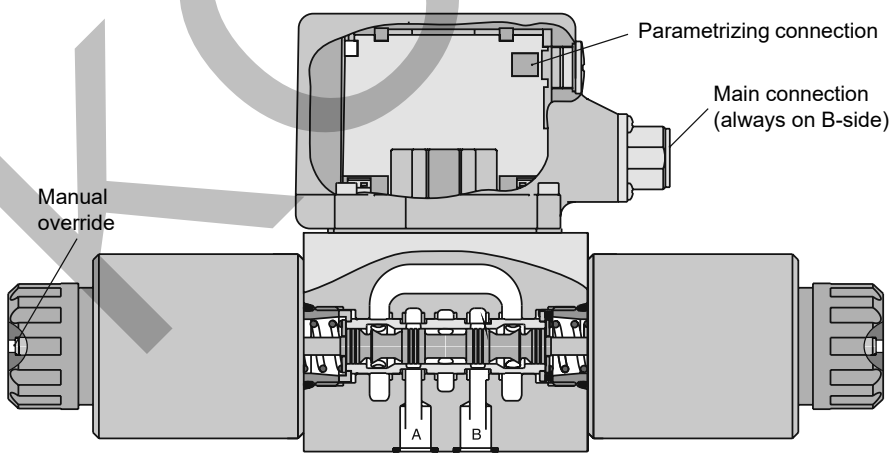
D3FB



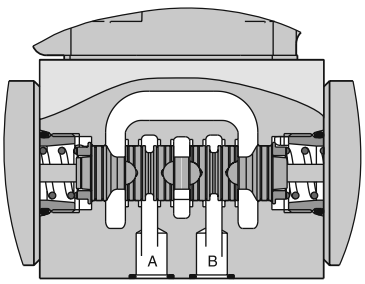
D3FB OBE

CE

D3FB*0 OBE
Spool/sleeve design

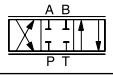
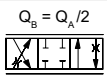
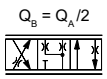


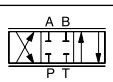
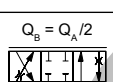
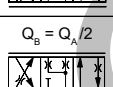
D3FB*3 OBE
Spool/body design



D3FB

D	3	F	B			0	N		W		
DC valve	Size DIN NG10 CETOP 05 NFPA D05	Proportional control	Standard dynamics standard repeatability	Spool type	Spool position		Seal NBR (other seal compounds on request)	Solenoid	Connector as per EN 175301-803 without plug [1]	Design	Design series (not required for ordering)

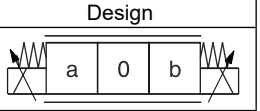
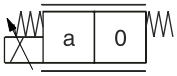
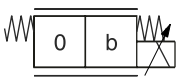
D3FB*0: Spool/sleeve design		
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Overlap		
E01M **E01S**		**40** **60**
E02M **E02S**		**40** **60**
B31M **B31S**	$Q_B = Q_A/2$ 	**40 / 20** **60 / 30**
B32M **B32S**	$Q_B = Q_A/2$ 	**40 / 20** **60 / 30**

D3FB*3: Spool/body design		
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Overlap		
E01M **E01S** **E01U**		**40** **60** **80**
E02M **E02S** **E02U**		**40** **60** **80**
B31M **B31S** **B31U**	$Q_B = Q_A/2$ 	**40 / 20** **60 / 30** **80 / 40**
B32M **B32S** **B32U**	$Q_B = Q_A/2$ 	**40 / 20** **60 / 30** **80 / 40**

Code	Design
0	**Spool/sleeve design**
3	**Spool/body design**

D3FB*0: Spool/sleeve design	
Code	Solenoid
K	**12 V / 2.95 A**

D3FB*3: Spool/body design	
Code	Solenoid
K	**12 V / 2.95 A**
J	**24 V / 1.5 A**

Code	Design
C	
E	
K	

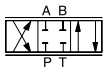
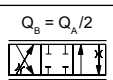
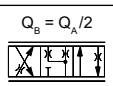
Short delivery time for all variations

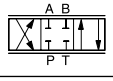
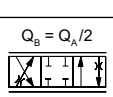
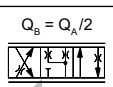
For regenerative and hybrid function refer solution with sandwich and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

[1] Please order connector separately, see chapter 3 accessories.

D3FB OBE (with onboard electronics)

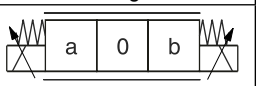
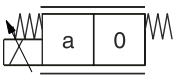
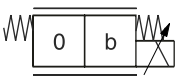
D	3	F	B			0	N				
Directional control valve	**Size DIN NG10 CETOP 05 NFPA D05**	**Proportional control**	**Standard dynamics standard repeatability**	**Spool type**	**Spool position**		**Seals NBR** (other seal compounds on request)	**Input signal**	**Options**	**Design**	**Design series** (not required for ordering)

D3FB*0: Spool/sleeve design		
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Overlap		
E01M **E01S**		**40** **60**
E02M **E02S**		**40** **60**
B31M **B31S**		**40 / 20** **60 / 30**
B32M **B32S**		**40 / 20** **60 / 30**

D3FB*3: Spool/body design		
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Overlap		
E01M **E01S** **E01U**		**40** **60** **80**
E02M **E02S** **E02U**		**40** **60** **80**
B31M **B31S** **B31U**		**40 / 20** **60 / 30** **80 / 40**
B32M **B32S** **B32U**		**40 / 20** **60 / 30** **80 / 40**

Code	Design
0	**Spool/sleeve design**
3	**Spool/body design**

Code	Input signal [1]	Function	Port	Options
F0	**0...+/-10 V**	**0...+10 V > P-A**	**6 + PE**	**Potentiometer supply**
G0	**0...+/-20 mA**	**0...+20 mA > P-A**	**6 + PE**	**—**
S0	**4...20 mA**	**12...20 mA > P-A**	**6 + PE**	**—**
W5 [2]	**0...+/-10 V** **4...20 mA**	**0...+10 V > P-A** **12...20 mA > P-A**	**11 + PE**	**Command channel & potentiometer supply**

Code	Design
C	
E	
K	

Short delivery time for all variations

For regenerative and hybrid function refer solution with sandwich and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.
Please order connector separately, see chapter 3 accessories.
Parametrizing cable OBE → RS232: Item no. 40982923

[1] Single solenoid always 0...+10 V respectively 4...20 mA.

[2] Factory set ±10 V on delivery.

General			
Design		Direct operated proportional DC valve	
Actuation		Proportional solenoid	
Size		NG10 / CETOP 05 / NFPA D05	
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA	
Mounting position		unrestricted	
Ambient temperature	[°C]	-20...+60	
$MTTF_D$ value [1]	[years]	150	
Weight (OBE)	[kg]	6.5 (7.2)	
Hydraulic			
Max. operating pressure	[bar]	Ports P, A, B 350, T 210	
Max. pressure drop PABT / PBAT	[bar]	350	
Fluid		Hydraulic oil according to DIN 51524 ... 535, other on request	
Fluid temperature	[°C]	-25...+60	
Viscosity permitted recommended	[cSt] / [mm²/s] [cSt] / [mm²/s]	20...400 30...80	
Filtration		ISO 4406; 18/16/13	
		D3FB*0 (Spool/sleeve)	**D3FB*3 (Spool/body)**
Nominal flow at Δp=5 bar per control edge [2]	[l/min]	40 / 60	40 / 60 / 80
Leakage at 100 bar	[ml/min]	<100	<100
Opening point (OBE)	[%]	see flow characteristics (set to 10 command signal)	
Static / Dynamic			
Step response at 100 % step	[ms]	40	
Hysteresis	[%]	<4	<5
Temperature drift solenoid current	[%/K]	<0.02	
Electrical characteristics			
Duty ratio	[%]	100 ED; CAUTION: Coil temperature up to 150 °C possible	
Protection class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)	
Solenoid		**Code "K"**	**Code "J"**
Supply voltage	[V]	12	24
Current consumption	[A]	2.95	1.5
Resistance	[Ohm]	3.84	16.25
Solenoid connection		Connector as per EN 175301-803	
Wiring min.	[mm²]	3 x 1.5 recommended	
Wiring lenght max.	[m]	50 recommended	

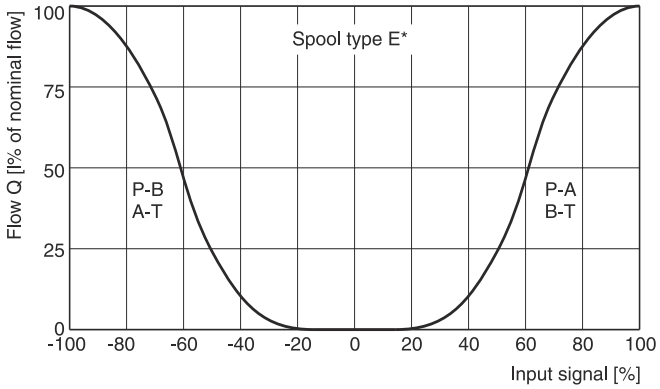
[1] If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

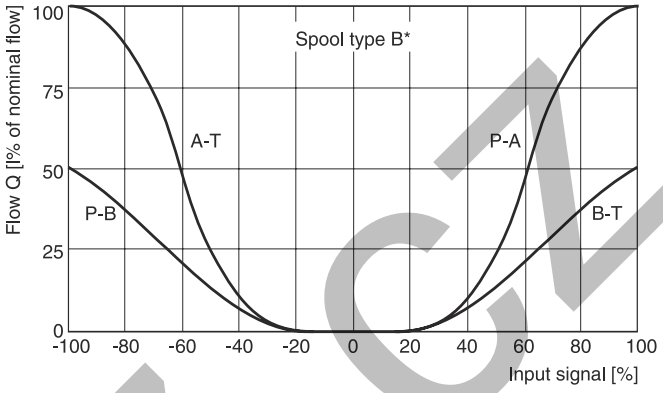
[2] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

3

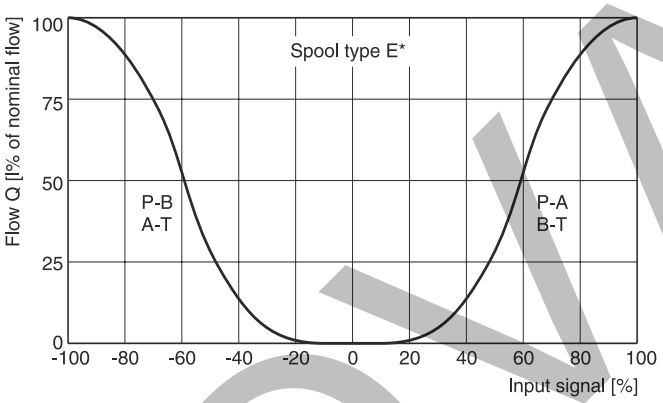
Electrical characteristics OBE		
Vibration resistance	[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 10 (RMS) Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Duty ratio	[%]	100 ED; CAUTION: coil temperatures up to 150 °C possible
Protection class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple DC	[V]	18...30, ripple < 5 % eff., surge free
Current consumption max.	[A]	3.5
Pre fusing medium lag	[A]	4.0
Input signal		
Codes F0 & W5 voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm, 0...+10 V ⇒ P -> A
Codes S0 & W5 current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, Ri = <250 Ohm, 12...20 mA ⇒ P -> A < 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Code G0	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, Ri = <250 Ohm, 0...+20 mA ⇒ P -> A
Differential input max.		
Codes F0, G0 & S0	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
Code W5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0V (terminal 2)
Channel recall signal	[V]	0...2.5: off / 5...30: on / Ri = 100 kOhm
Adjustment ranges Min	[%]	0...50
Max	[%]	50...100
Ramp	[s]	0...32.5
Interface		RS 232, parametrizing connection 5pole
EMC		EN 61000-6-2, EN 61000-6-4
Central connection		
Codes F0, G0 & S0		6 + PE acc. to EN 175201-804
Code W5		11 + PE acc. to EN 175201-804
Wiring min.		
Codes F0, G0 & S0	[mm²]	7 x 1.0 (AWG16) overall braid shield
Code W5	[mm²]	11 x 1.0 (AWG16) overall braid shield
Wiring length max.		50

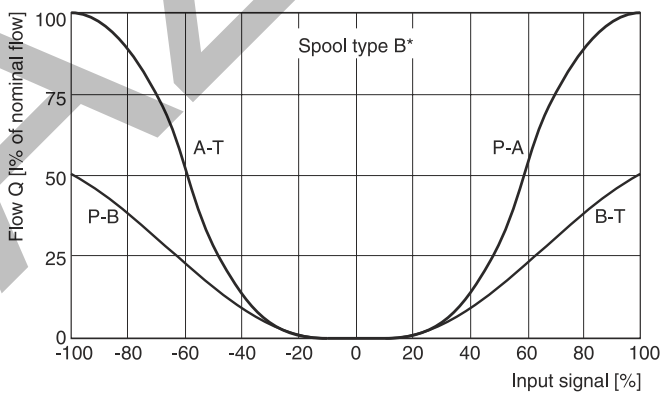
Flow characteristics
D3FB external electronics
at Δp = 5 bar per metering edge
Spool type E01/02, B31/32





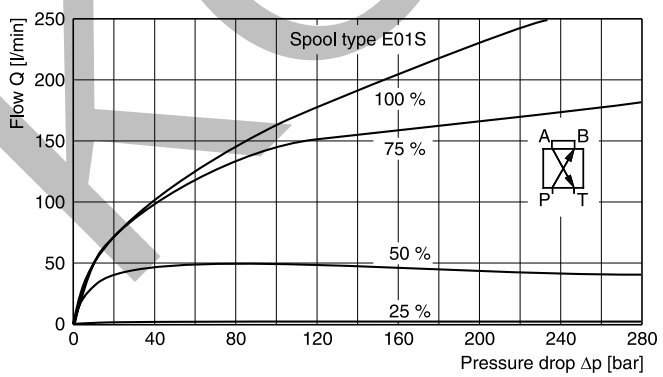
D3FB OBE
(set to opening point 10 %)
at Δp = 5 bar per metering edge
Spool type E01/02, B31/32



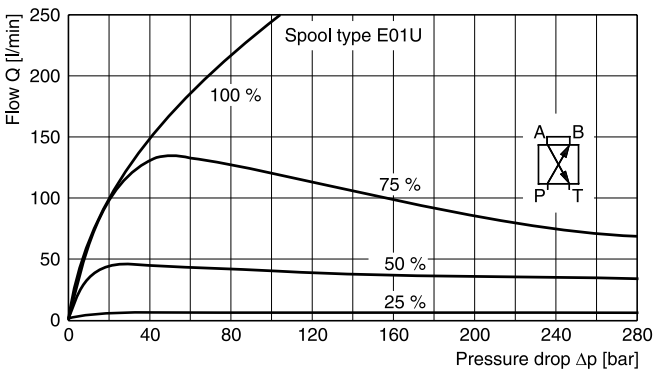


Functional limits
100 % command signal (symmetric flow). At asymmetric flow a reduced flow limit has to be considered.

D3FB*0



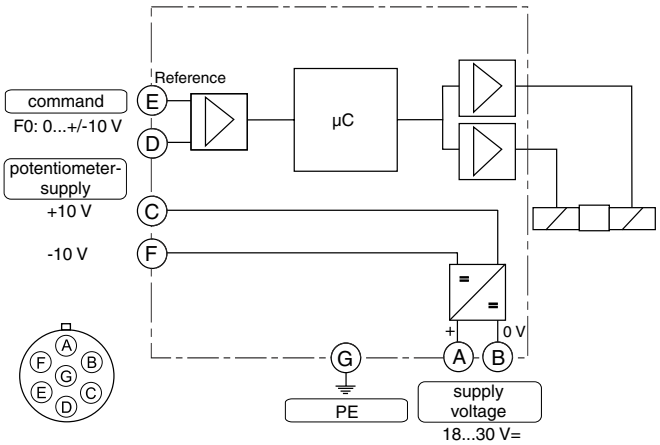
D3FB*3



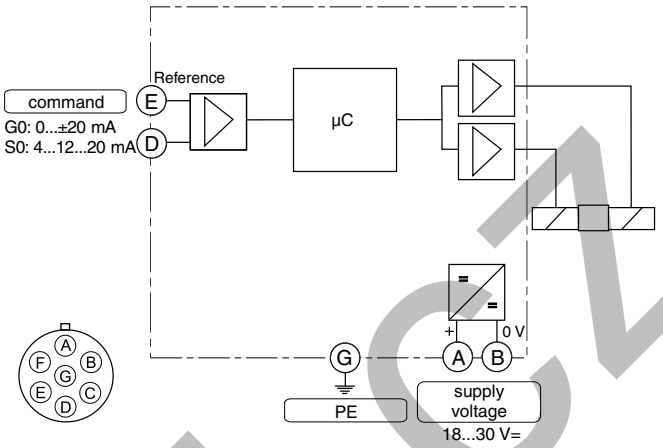
All characteristic curves measured with HLP46 at 50 °C.

3

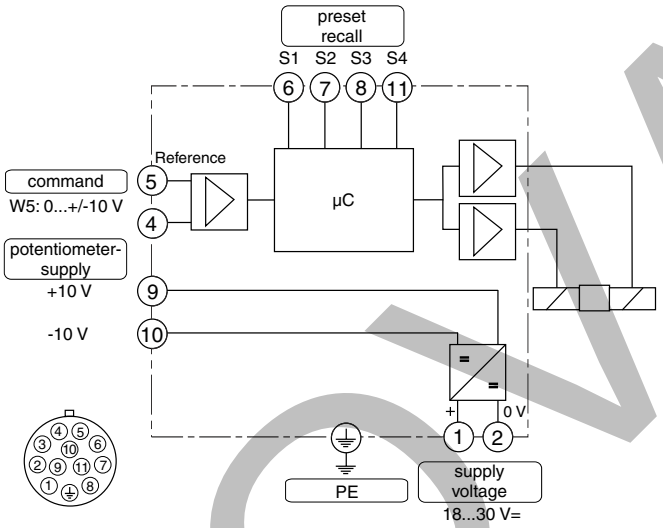
Code F0
6 + PE acc. to EN 175201-804



Code G0, S0
6 + PE acc. to EN 175201-804



Code W5
11 + PE acc. to EN 175201-804



ProPxD interface program

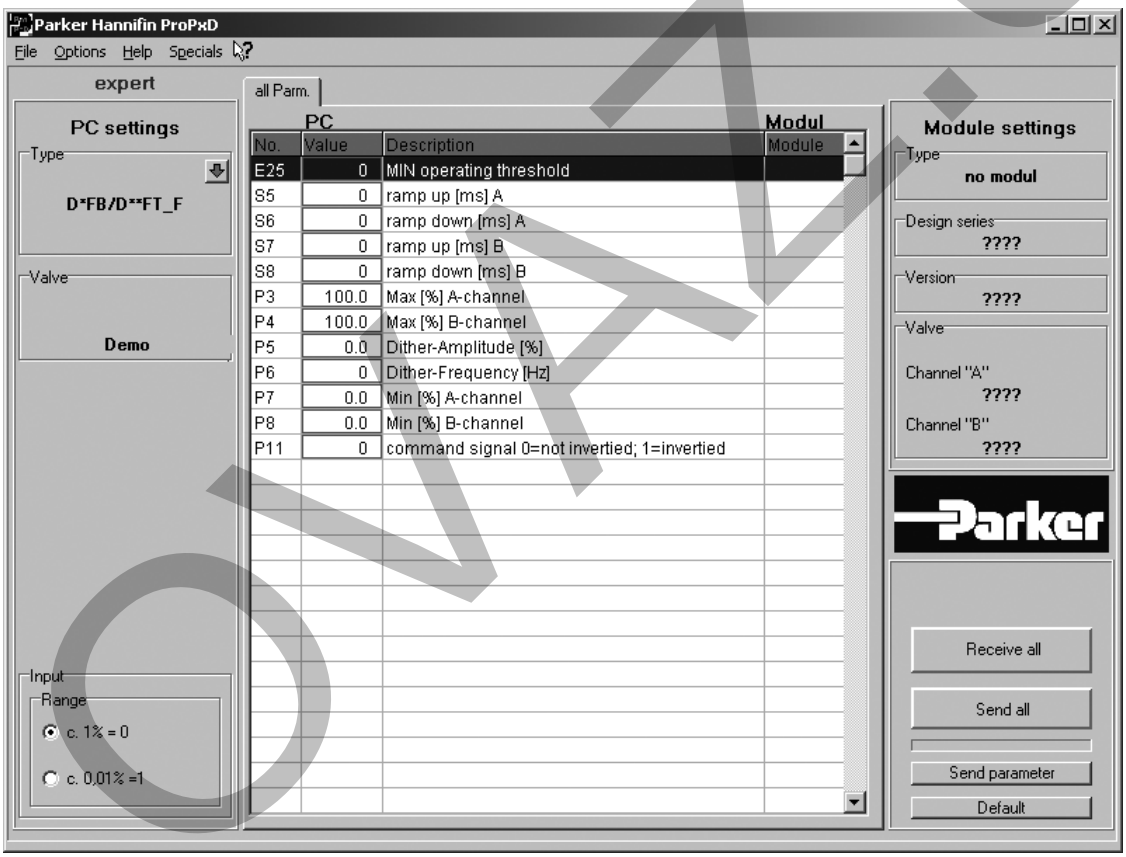
The ProPxD software permits comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a non-volatile memory stores the data with the option for recalling or modification.

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

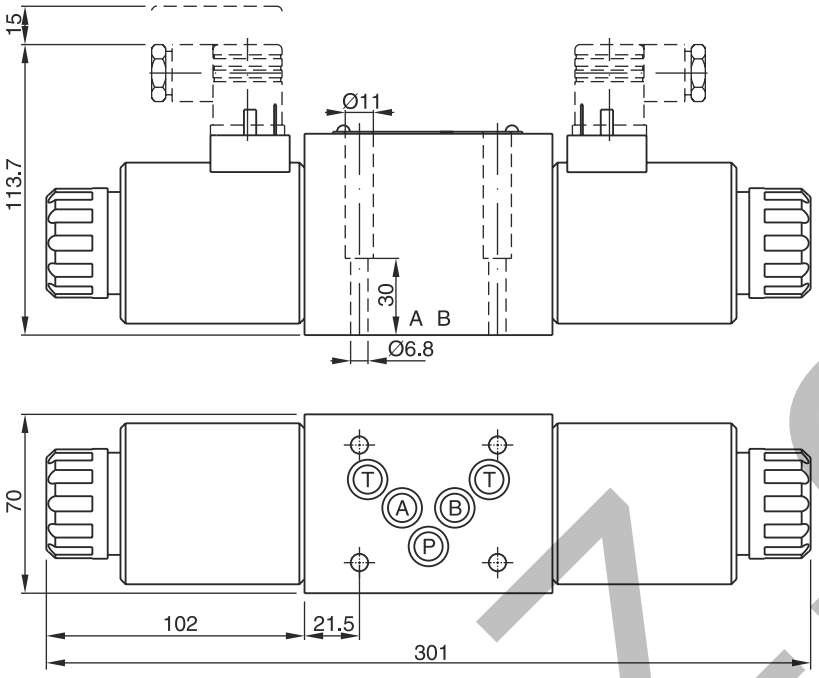
- Comfortable editing of all parameters
- Depiction and documentation of parameter sets
- Storage and loading of optimized parameter adjustments
- Executable with all actual Windows® operating systems from Windows® XP upwards
- Plain communication between PC and electronics via serial interface RS232C

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

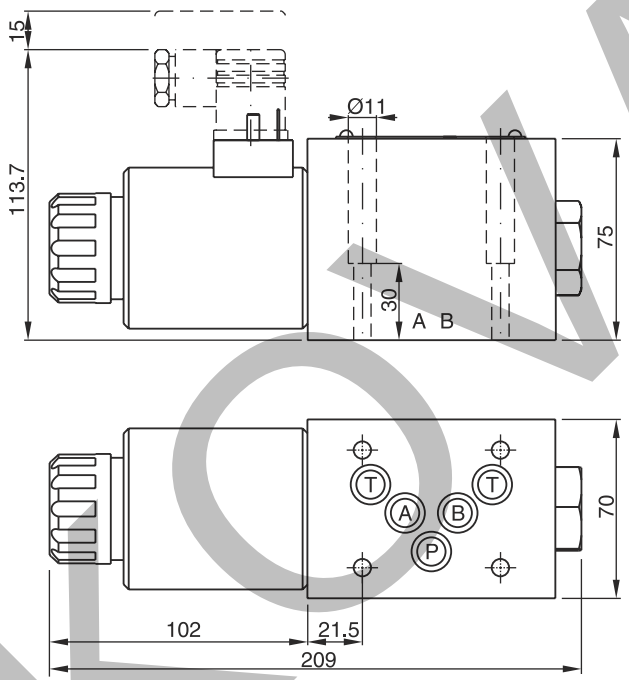


3

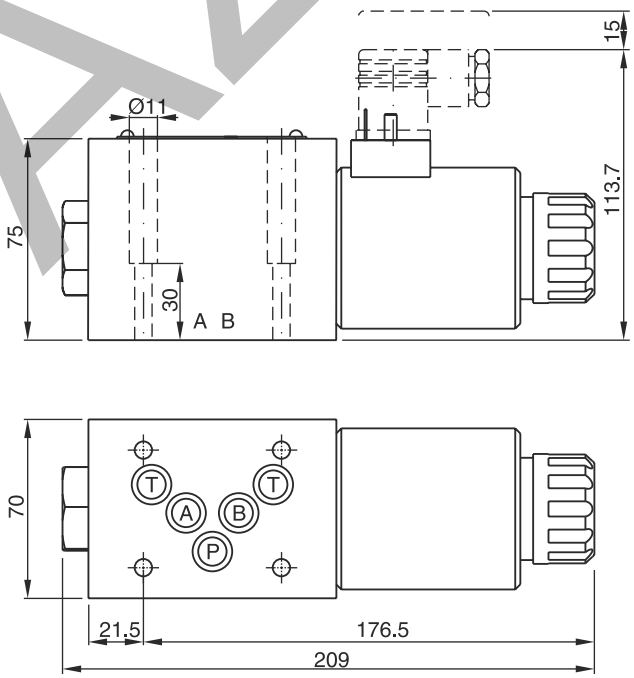
D3FB*C



D3FB*E

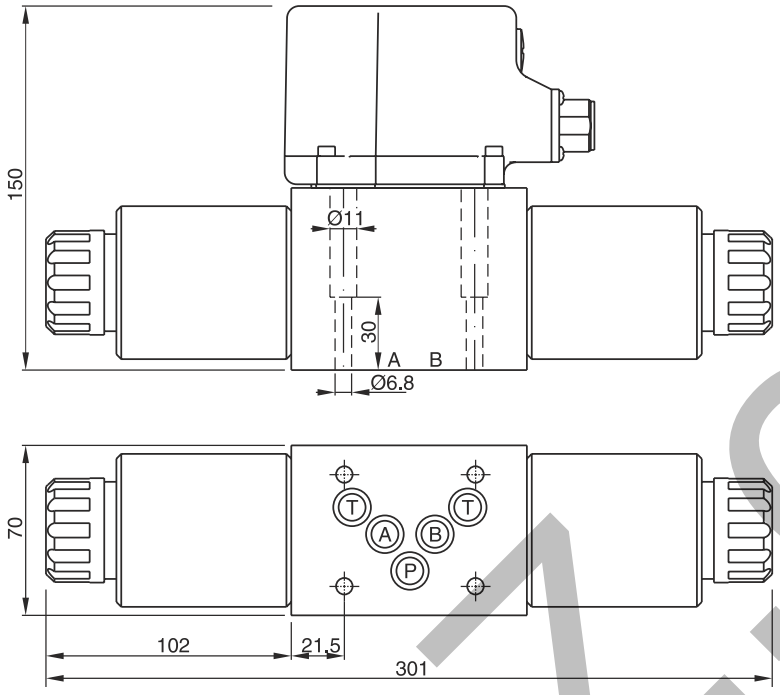


D3FB*K

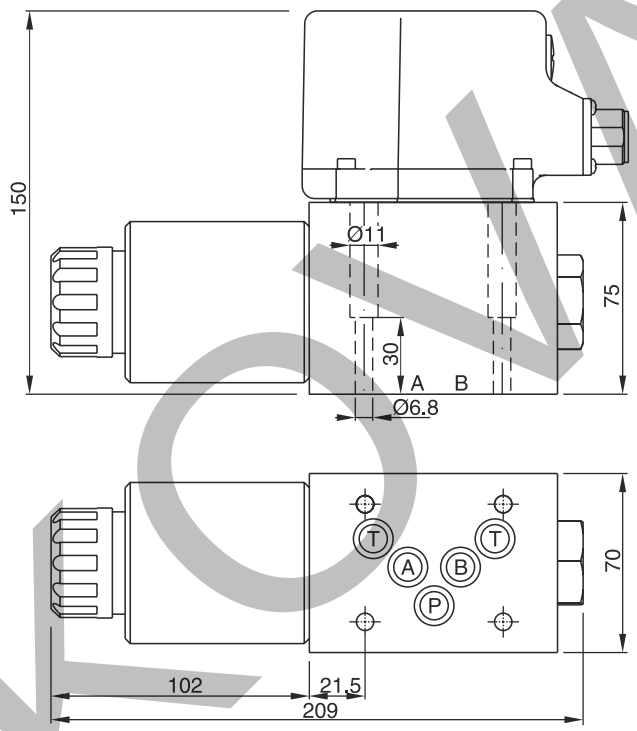


Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ ⏥ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	SK-D3FB

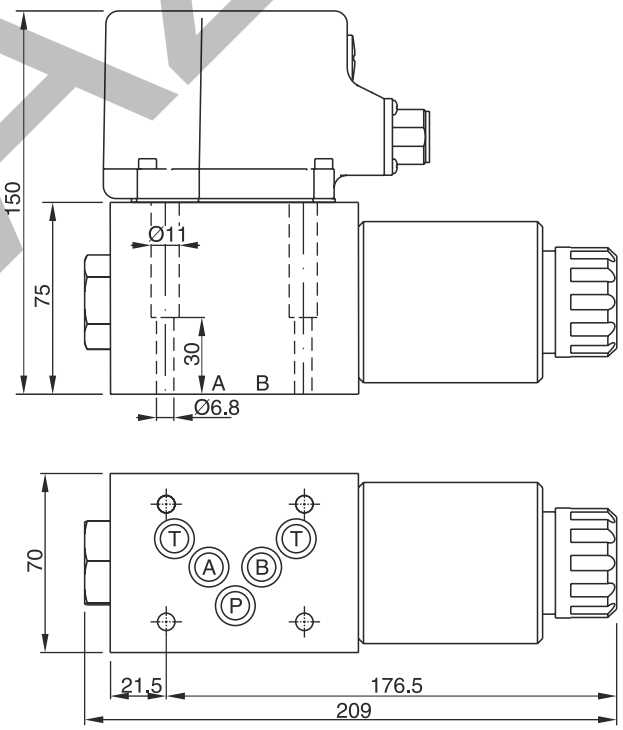
D3FB*C OBE

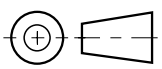


D3FB*E OBE



D3FB*K OBE





Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	SK-D3FB

The pilot operated proportional directional valves D*1FB are available in 4 sizes:

D31FB - NG10 (CETOP 05)
D41FB - NG16 (CETOP 07)
D91FB - NG25 (CETOP 08)
D111FB - NG32 (CETOP 10)

The valves are available with and without onboard electronics (OBE).

3

D*1FB OBE

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 cable connection to a serial RS232 interface is available as accessory.

D*1FB for external electronics

The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400.

The valve parameters can be edited with the common ProPxD software for both versions.

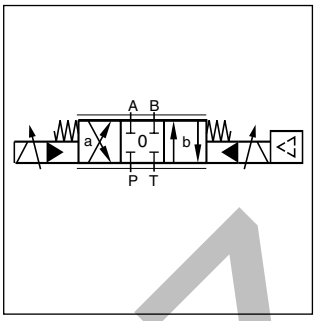
The D*1FB valves work with barometric feedback of the main stage to the pressure reducing pilot valve. The pilot control pressure of 25 bar allows high flow rates at maximum stability.

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

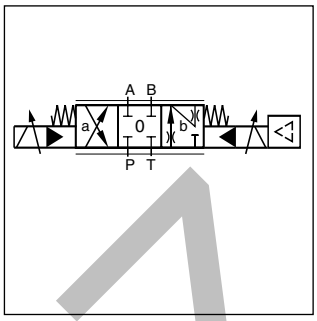
Valves with explosion proof solenoids Ex e mb II see catalogue HY11-3343.

Download: www.parker.com/euro_hcd - see “Literature”

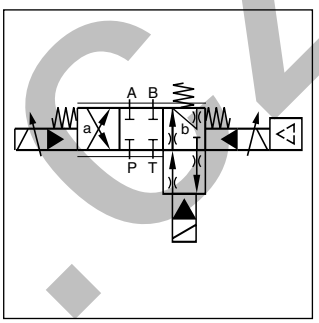
D91FB OBE



Standard D*1FB OBE



A-regeneration D*1FBR OBE

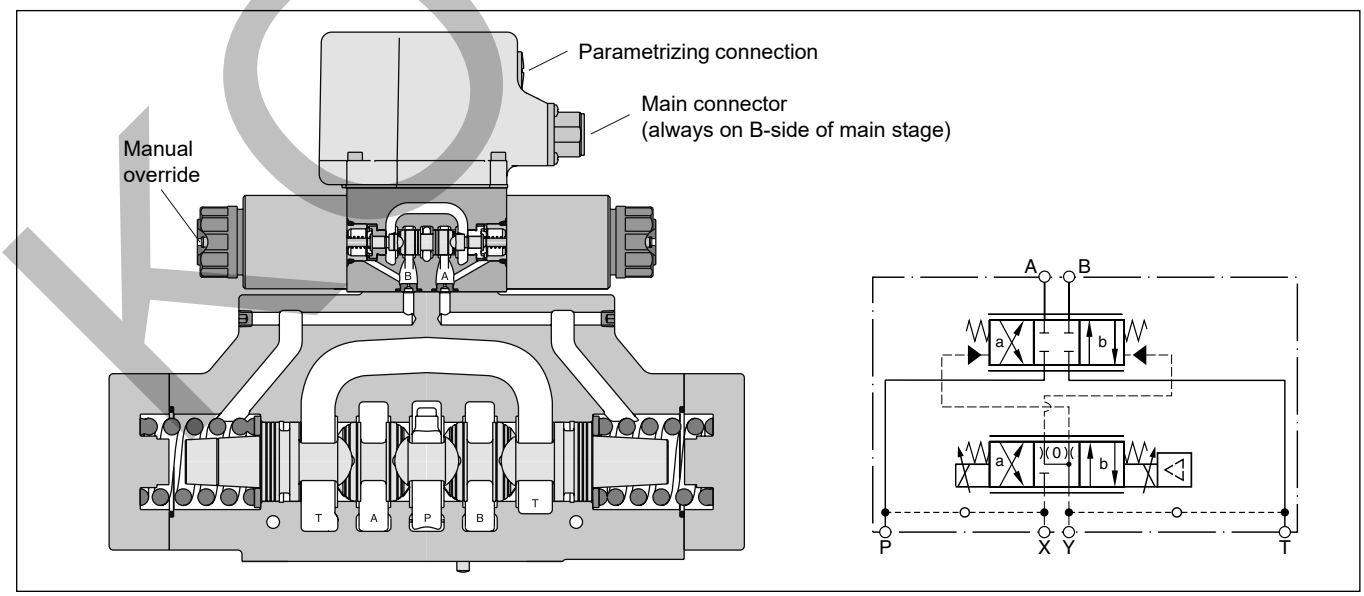


Hybrid D*1FBZ OBE

Technical Features

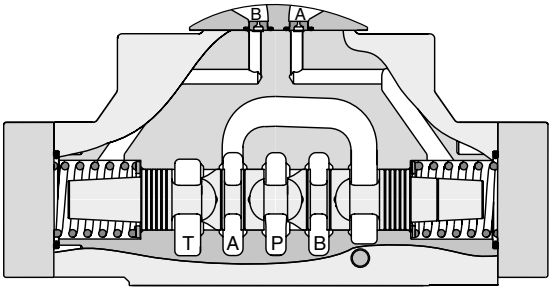
- Progressive flow characteristics for sensitive adjustment of flow rate
- High flow capacity
- Digital onboard electronics optional
- Centre position monitoring optional
- Energy saving A-regeneration optional
- Switchable hybrid version optional

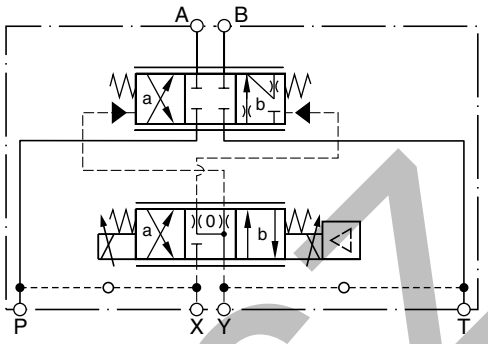
D91FB OBE



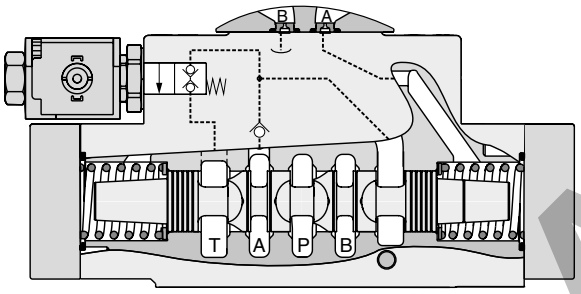
D*1FBR and D*1FBZ

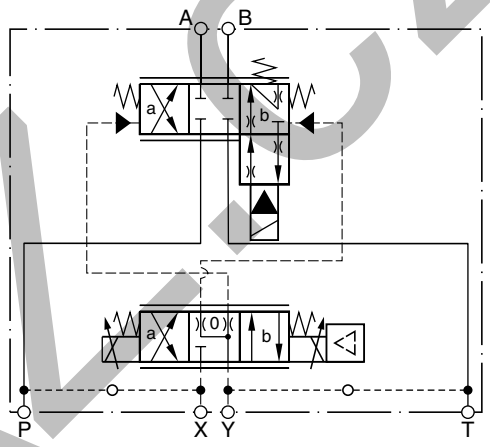
Regenerative valve D*1FBR



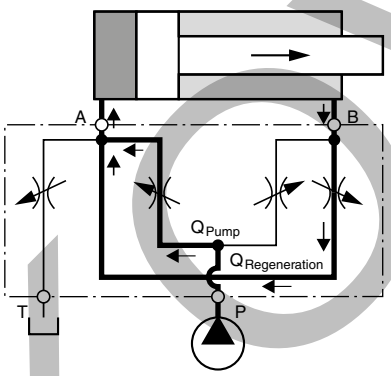


Hybrid valve D*1FBZ

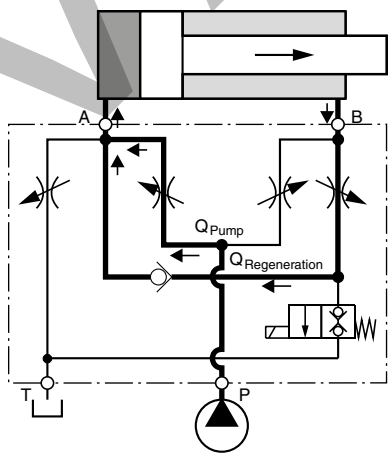




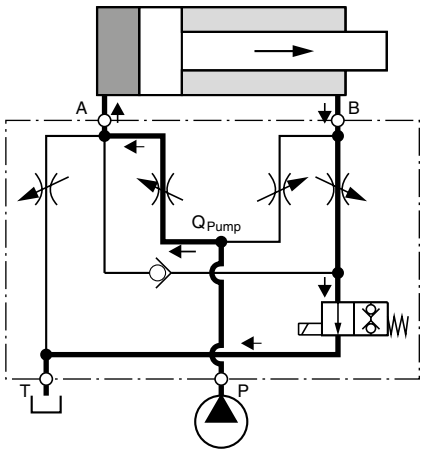
D*1FBR (regenerative valve)
Cylinder extending



D*1FBZ (hybrid valve)
Cylinder extending
regenerative mode
(high speed)



Cylinder extending
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)
D41FBR/Z	31/32	100 %	50 %	100 %	50 %	45 %	20 %
D91FBR/Z	31/32	100 %	50 %	100 %	50 %	50 %	25 %
D111FBR/Z	31/32	100 %	50 %	100 %	50 %	50 %	20 %

[1] D31FB: For size NG10 please refer solution with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

D*1FB

D		1	F	B									
Directional control valve	Size	NG06 pilot	Proportional control	Dynamics standard	Function	Flow	Spool position	Pilot connection	Seal	Solenoid description (other voltage on request)	Electronic options	Valve options	Design series (not required for ordering)

3

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

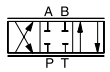
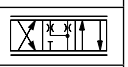
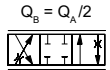
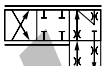
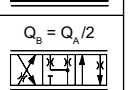
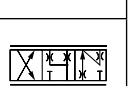
Code	Valve options
0	**Standard for spool type B, E, R**
8 [9][10][11]	**Monitor switch**
L [8]	**Hybrid valve 24 V normally closed for spool type Z**

Code	Electronic options
W [6]	**EN 175301-803**
J [6][7]	**DT04-2P "Deutsch"**

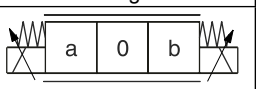
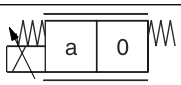
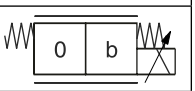
Code	Solenoid voltage
J	**24 V/1,1A**
K	**12 V/2,5A**

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

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

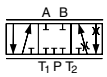
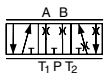
Code	Standard		NEW: Regenerative function [2]		NEW: Hybrid function [2][3]	
	Code	Spool type	Code	Spool type	Code	Spool type
	Overlap		Overlap		Overlap	
E01						
E02						
B31	$Q_B = Q_A/2$		R31		Z31	
B32	$Q_B = Q_A/2$		R32		Z32	

Code	Flow [l/min] at Δp = 5 bar per metering edge			
	D31	D41	D91	D111
B	–	100 [4][5]	–	–
C	75 [5]	130 [4][5]	–	–
D	90 [5]	–	–	–
E	120	–	250 [4][5]	–
F	–	200	-	–
H	–	–	400	–
L	–	–	–	1000

Code	Design
C	
E [5]	
K [5]	

Short delivery time for all variations

[1] With enlarged connections Ø 32 mm.
[2] For regenerative and hybrid function at D31FB (NG10) please refer solutions with sandwich - and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

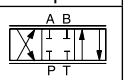
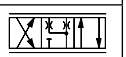
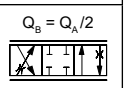
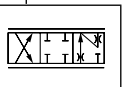
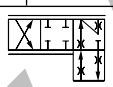
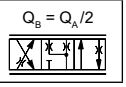
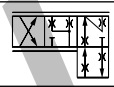
D31FB spool type: R31  R32 

[3] Not for D31FB.
[4] Not for spool type B31 und B32.
[5] Not for regenerative and hybrid function.
[6] Please order plugs separately. See accessories.
[7] Not for hybrid function.
[8] See page "regenerative and hybrid function" (not for D31FB).
[9] Not for D111FBZ*.
[10] Monitor switch for hybrid valves: code 8 includes options of code L (24 V normally closed).
[11] Please order female connector M12x1 separately (see accessories , female connector M12x1 (order no.: 5004109).

D*1FB OBE

D		1	F	B									
Directional control valve	Size	NG06 pilot	Proportional control	Onboard electronics	Function	Flow	Spool position	Pilot connection	Seal	Command signal	Option	Valve options	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

Standard		Regenerative function [2]		Hybrid function [2] [3]	
Code	Spool type	Code	Spool type	Code	Spool type
Overlap		Overlap		Overlap	
E01					
E02					
B31	$Q_B = Q_A/2$ 	R31		Z31	
B32	$Q_B = Q_A/2$ 	R32		Z32	

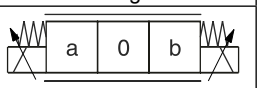
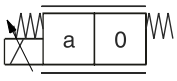
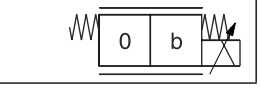
Code	Command signal [7]	Function	Connection [6]
F0 [9]	0...±10 V	0...+10 V > P-B	6 + PE
G0 [8]	0...±20 mA	0...+20 mA > P-B	6 + PE
M0 [8] [9]	0...±10 V	0...+10 V > P-A	6 + PE
S0	4...20 mA	12...20 mA > P-A	6 + PE
W5 [8] [9]	0...±10 V 4...20 mA	0...+10 V > P-A 12...20 mA > P-A	11 + PE

Code	Valve options
0	Standard for spool type B, E, R
8 [11] [12] [13]	Monitor switch
L [10]	Hybrid valve 24V normally closed for spool type Z

Code	Seal
N	NBR
V	FPM

Code	Flow [l/min] at Δp = 5 bar per metering edge			
	D31	D41	D91	D111
B	–	100 [4] [5]	–	–
C	75 [5]	130 [4] [5]	–	–
D	90 [5]	–	–	–
E	120	–	250 [4] [5]	–
F	–	200	-	–
H	–	–	400	–
L	–	–	–	1000

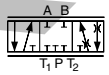
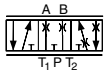
Code	Inlet	Drain
1	Internal	External
2	External	External
4	Internal	Internal
5	External	Internal

Code	Design
C	
E [5]	
K [5]	

Parametrizing cable OBE → RS232, item no. 40982923

Short delivery time for all variations

[1] With enlarged connections Ø 32 mm.
[2] For regenerative and hybrid function at D31FB (NG10) please refer solutions with sandwich - and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

D31FB spool type: R31  R32 

[3] Not for D31FB.
[4] Not for spool type B31 und B32.
[5] Not for regenerative and hybrid function.
[6] Please order plugs seperately, see accessories.
[7] For 1 solenoid 0...+10 V respectively 4...20 mA.
[8] Not for spool position E and K.
[9] F0, M0 potentiometer supply, W5 command channel & potentiometer supply.
[10] See page "regenerative and hybrid function" (not for D31FB).
[11] Not for D111FBZ*.
[12] Monitor switch for hybrid valves: code 8 includes options of code L (24 V normally closed).
[13] Please order female connector M12x1 separately (see accessories , female connector M12x1 (order no.: 5004109)

3

General					
Design		Pilot operated DC valve			
Actuation		Proportional solenoid			
Size		**NG10 (CETOP 05)**	**NG16 (CETOP 07)**	**NG25 (CETOP 08)**	**NG32 (CETOP 10)**
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA			
Mounting position		unrestricted			
Ambient temperature	[°C]	-20...+60			
$MTTF_D$ value [1]	[years]	75			
Weight (OBE)	[kg]	8.6 (9.3)	11.9 (12.6)	20.4 (21.1)	68 (68.7)
Hydraulic					
Max. operating pressure	[bar] [bar]	Pilot drain internal: P, A, B, X 350; T, Y 185 Pilot drain external: P, A, B, T, X 350; Y 185			
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] [cSt] / [mm²/s]	20...400 30...80			
Filtration		ISO 4406; 18/16/13			
Nominal flow at Δp=5 bar per control edge [2]	[l/min]	75/90/120	130/200	250/400	1000
Leakage at 100 bar	[ml/min]	100	200	600	1000
Opening point (OBE)	[%]	see flow characteristics (set to 10 command signal)			
Pilot supply pressure	[bar] [bar] [bar]	min. 30 (+ T/Y pressure) max. 350 optimal dynamics at 50			
Pilot flow at 100 bar	[l/min]	<0.5	<1.2	<1.2	<1.2
Pilot flow, step response	[l/min]	2.0	1.9	4.5	18
Static / Dynamic					
Step response at 100 % step	[ms]	50	75	100	180
Hysteresis	[%]	<5			
Electrical characteristics					
Duty ratio	[%]	100 ED; CAUTION: Coil temperature up to 150 °C possible			
Protection class		Standard (as per EN175301-803) IP65 in accordance with EN 60529 DT04-2P "Deutsch" IP69K (with correctly mounted plug-in connector)			
Solenoid	Code	K		J	
Supply voltage	[V]	12		24	
Current consumption	[A]	2.5		1.1	
Resistance	[Ohm]	4.4		18.6	
Solenoid connection		Connector as per EN 175301-803 (code W), DT04-2P "Deutsch" connector (code J). Solenoid identification as per ISO 9461.			
Wiring min.	[mm²]	3x1.5 (AWG 16) overall braid shield			
Wiring length max.	[m]	50			

Electrical characteristics (hybrid option)				
Duty ratio	[%]	100 ED; CAUTION: Coil temperature up to 150 °C possible		
Protection class		IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)		
		D41	**D91**	**D111**
Supply voltage	[V]	24	24	24
Tolernace 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.	[mm²]	3 x 1.5 recommended		
Wiring length max.	[m]	50 recommended		

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

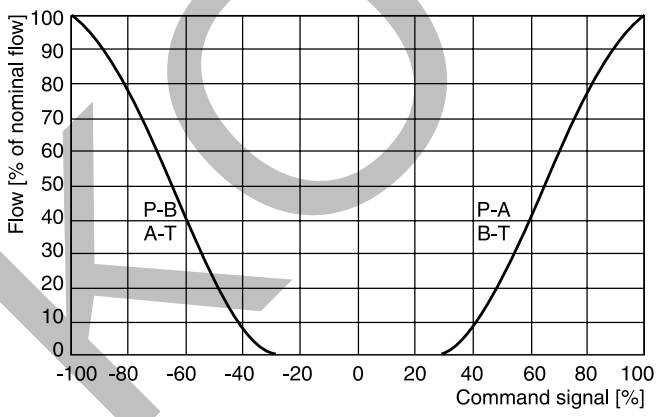
Electrical characteristics (D*1FB OBE)		
Vibration resistance	[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 10 (RMS) Random noise 20...2000 Hz acc. IEC 68-2-36 15 Shock acc. IEC 68-2-27
Duty ratio	[%]	100 ED; CAUTION: coil temperature up to 150 °C possible
Protection class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple DC	[V]	18...30, ripple < 5 % eff., surge free
Current consumption max.	[A]	2.0
Pre fusing medium lag	[A]	2.5
Input signal		
Codes F0, M0, W5 voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm
Code G0 current	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, Ri = <250 Ohm
Codes S0 & W5 current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, Ri = <250 Ohm < 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Differential input max.		
Codes F0, M0 G0 & S0	[V]	30 for terminal D and E against PE (terminal G)
	[V]	11 for terminal D and E against 0V (terminal B)
Code W5	[V]	30 for terminal 4 and 5 against PE (terminal PE)
	[V]	11 for terminal 4 and 5 against 0V (terminal 2)
Channel recall signal	[V]	0...2.5: off / 5...30: on / Ri = 100 kOhm
Adjustment ranges Min	[%]	0...50
Max	[%]	50...100
Ramp	[s]	0...32.5
Interface		RS 232, parametrizing connection 5pole
EMC		EN 61000-6-2, EN 61000-6-4
Central connection		
Codes F0, M0 G0 & S0		6 + PE acc. to EN 175201-804
Code W5		11 + PE acc. to EN 175201-804
Wiring min.		
Codes F0, M0 G0 & S0	[mm²]	7 x 1.0 (AWG16) overall braid shield
Code W5	[mm²]	11 x 1.0 (AWG16) overall braid shield
Wiring length max.		50

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

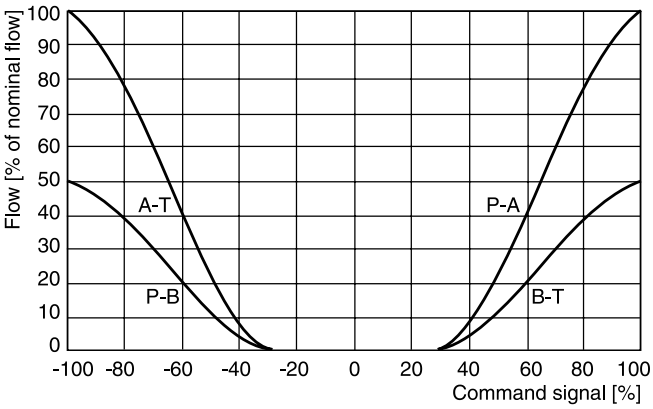
D*1FB B/E Flow characteristics

at Δp = 5 bar per metering edge

Spool code **E01/02**



Spool code **B31/32***

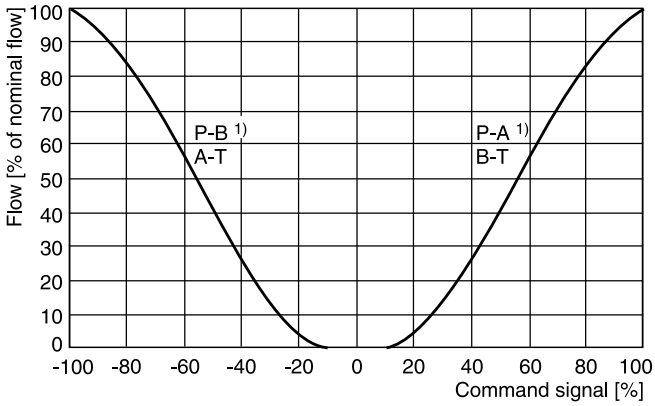


All characteristic curves measured with HLP46 at 50 °C.

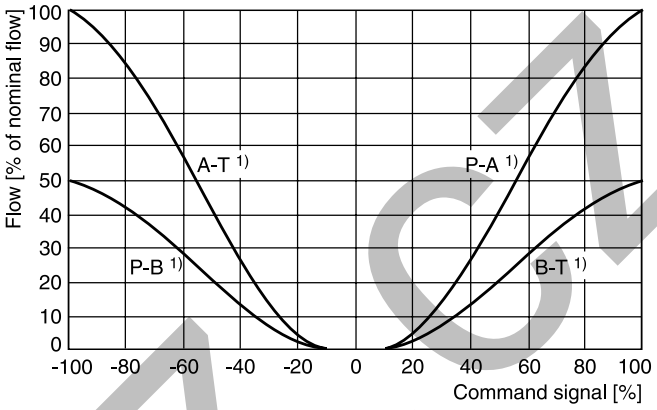
3

D*1FB B/E OBE
Flow characteristics
(set to opening point 10 %)
at ∆p = 5 bar per metering edge

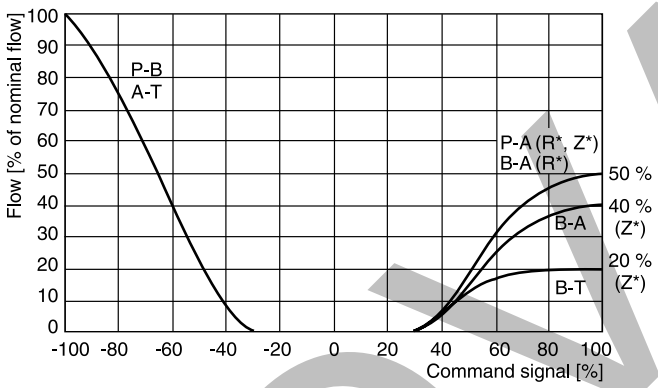
Spool code **E01/02**



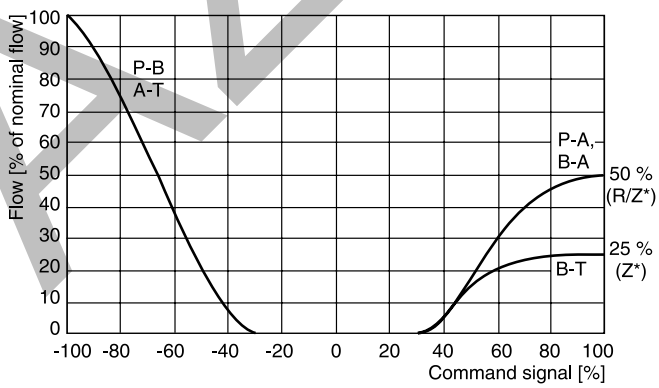
Spool code **B31/32**



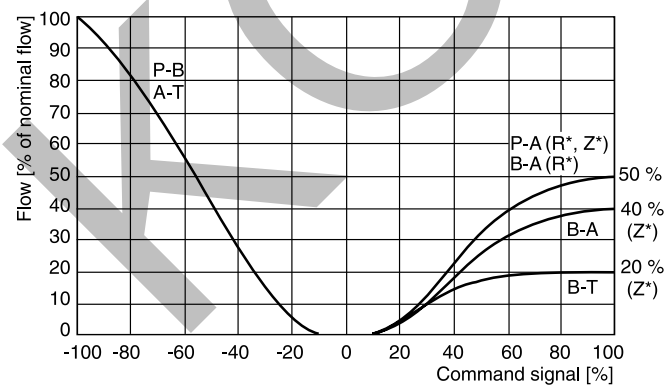
D*1FB R/Z (regenerative and hybrid)
D41FB R/Z
Spool code **R/Z31/32**



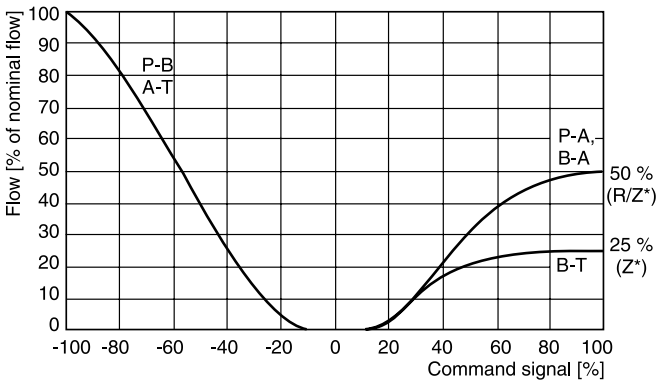
D91FB R/Z
Spool code **R/Z31/32**



D41FB R/Z OBE
Spool code **R/Z31/32**
(set to opening point 10 %)



D91FB R/Z OBE
Spool code **R/Z31/32**



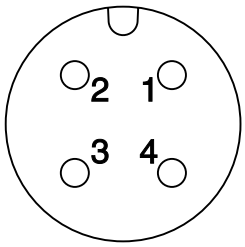
All characteristic curves measured with HLP46 at 50 °C.

[1] Flow direction depending on ordering code.

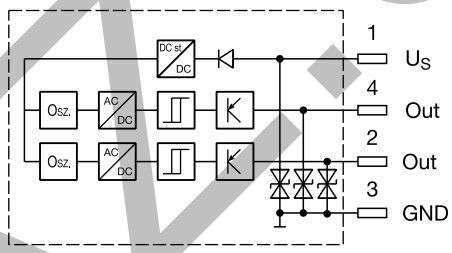
Electrical characteristics of position control M12x1 as per IEC 61076-2-101

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 to IEC 61076-2-101

M12 pin assignment



1 + U_S 19.2...28.8 V
2 Out B: normally open
3 0V
4 Out A: normally closed



Outputs: Open collector

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

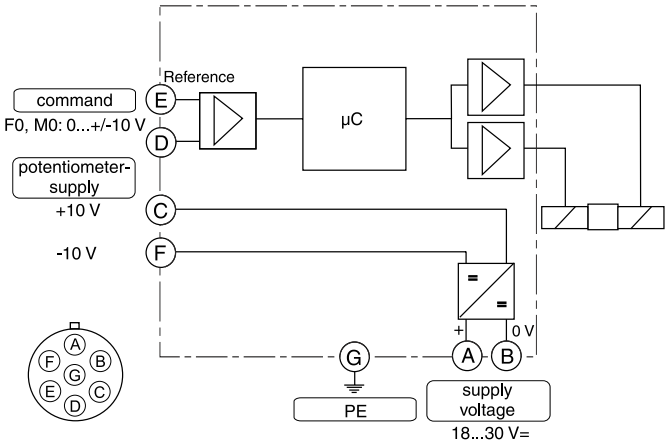
The neutral position is monitored. The signal changes after less than 10 % of the spool stroke.

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

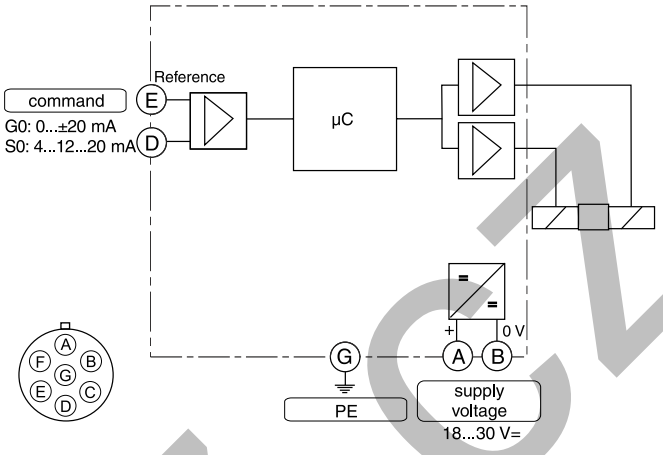
[1] Only guaranted with screened cable and female connector

3

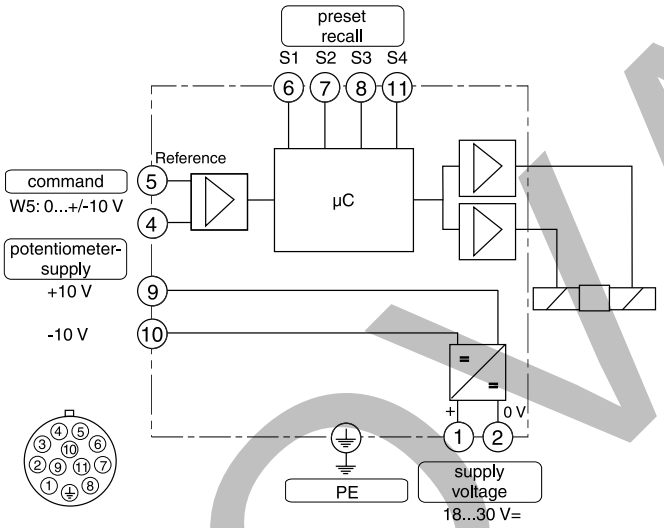
Code F0, M0
6 + PE acc. to EN 175201-804



Code G0, S0
6 + PE acc. to EN 175201-804



Code W5
11 + PE acc. to EN 175201-804



ProPxD interface program

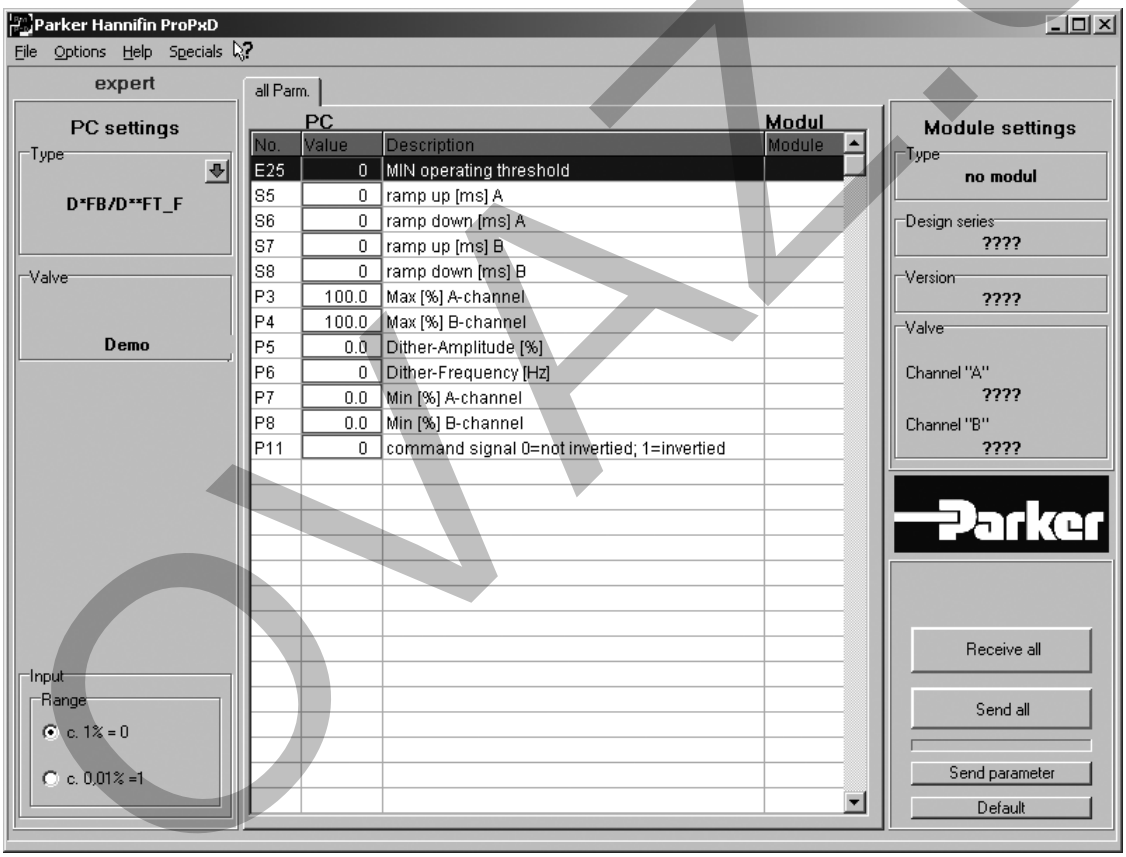
The ProPxD software permits comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a non-volatile memory stores the data with the option for recalling or modification.

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
- Depiction and documentation of parameter sets
- Storage and loading of optimized parameter adjustments
- Executable with all actual Windows® operating systems from Windows® XP upwards
- Plain communication between PC and electronics via serial interface RS232C

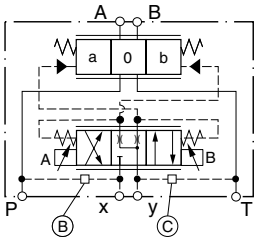
The parametrizing cable may be ordered under item no. 40982923.



Pilot oil inlet (supply) and outlet (drain)

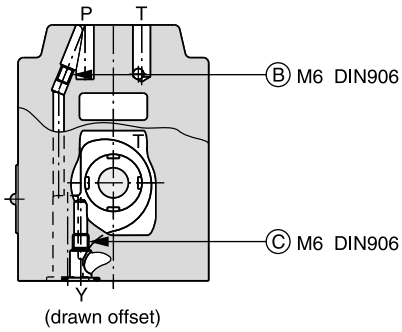
○ **open,** ● **closed**

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



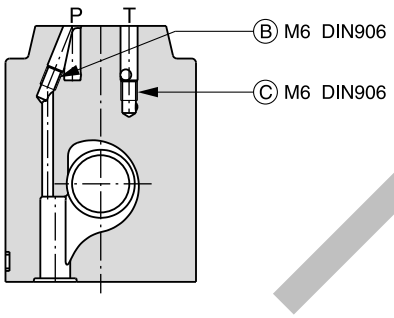
3

D31FBB/E

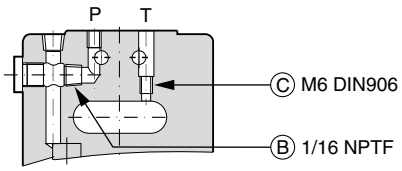


(drawn offset)

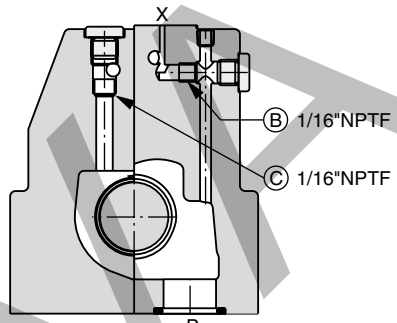
D31FBR



D41FBB/E

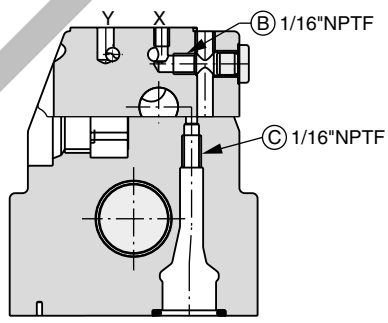


D41FBR



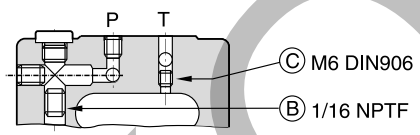
(drawn offset)

D41FBZ

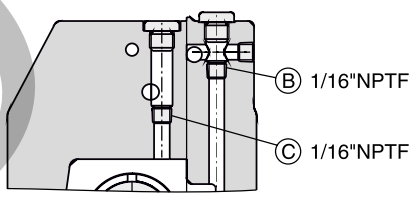


(drawn offset)

D91FBB/E

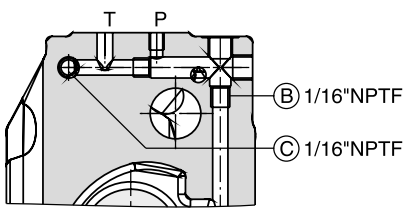


D91FBR

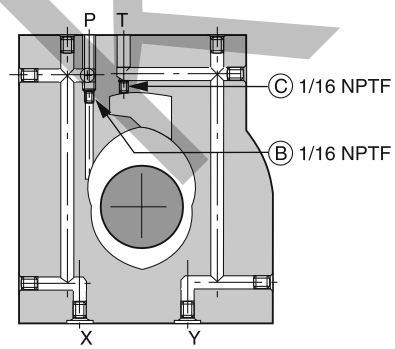


(drawn offset)

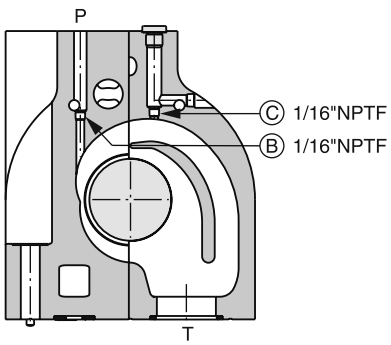
D91FBZ



D111FBB/E

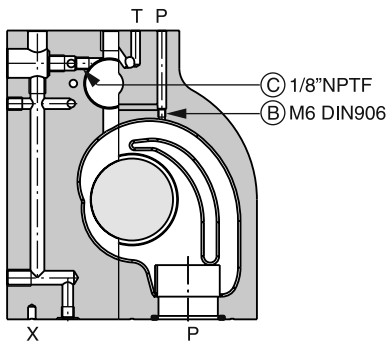


D111FBR



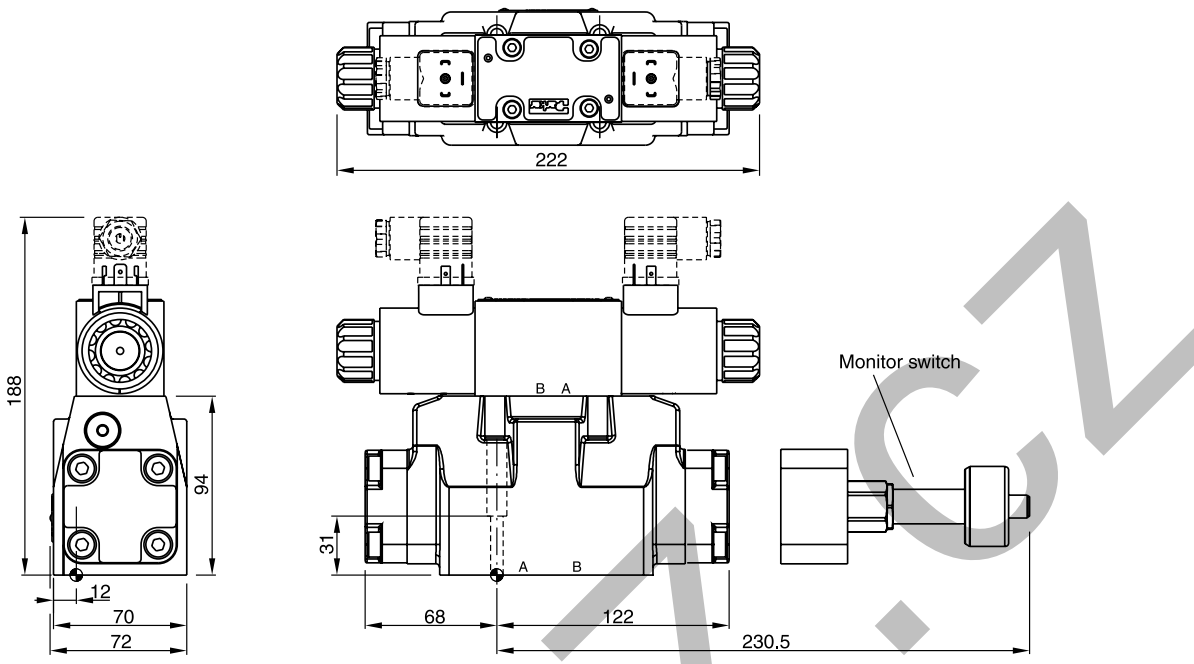
(drawn offset)

D111FBZ



(drawn offset)

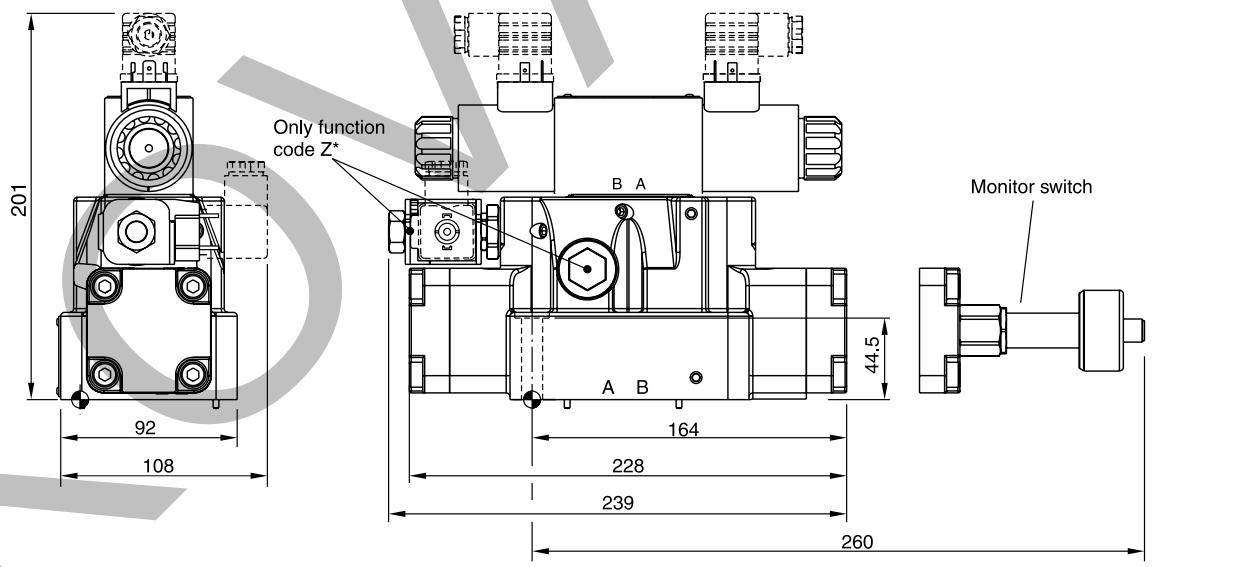
D31FB



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

Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D31FB FPM: SK-D31FB-V

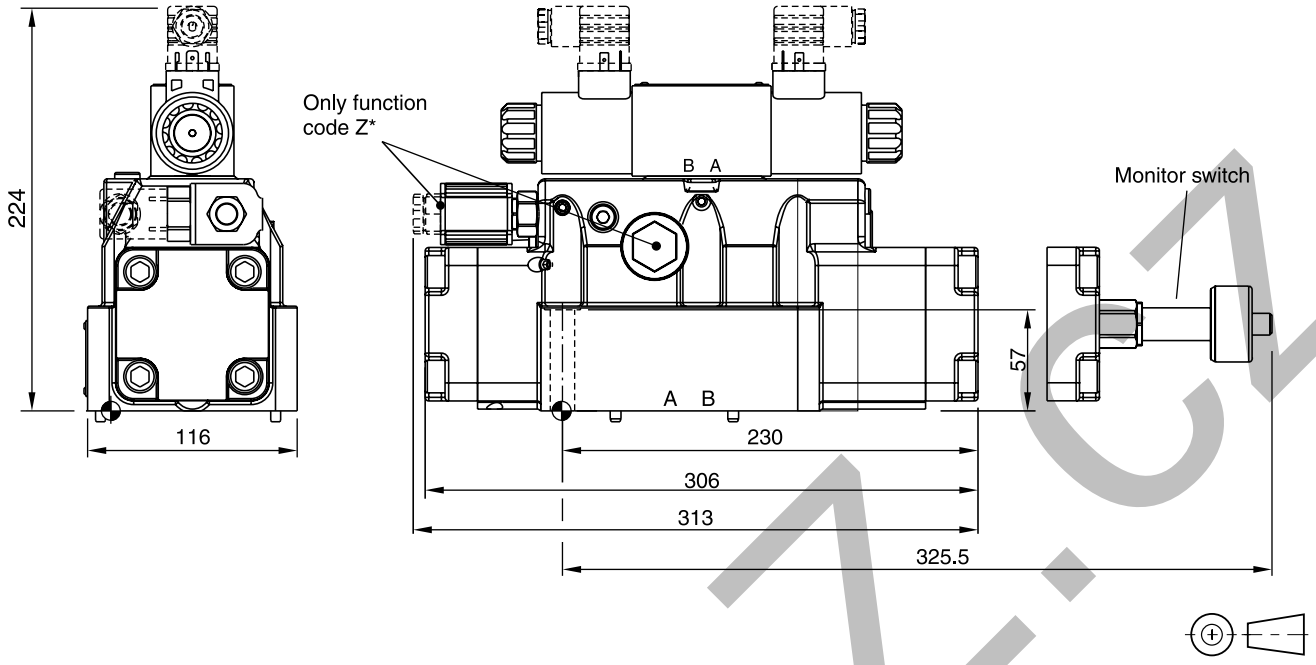
D41FB



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-D41FB FPM: SK-D41FB-V

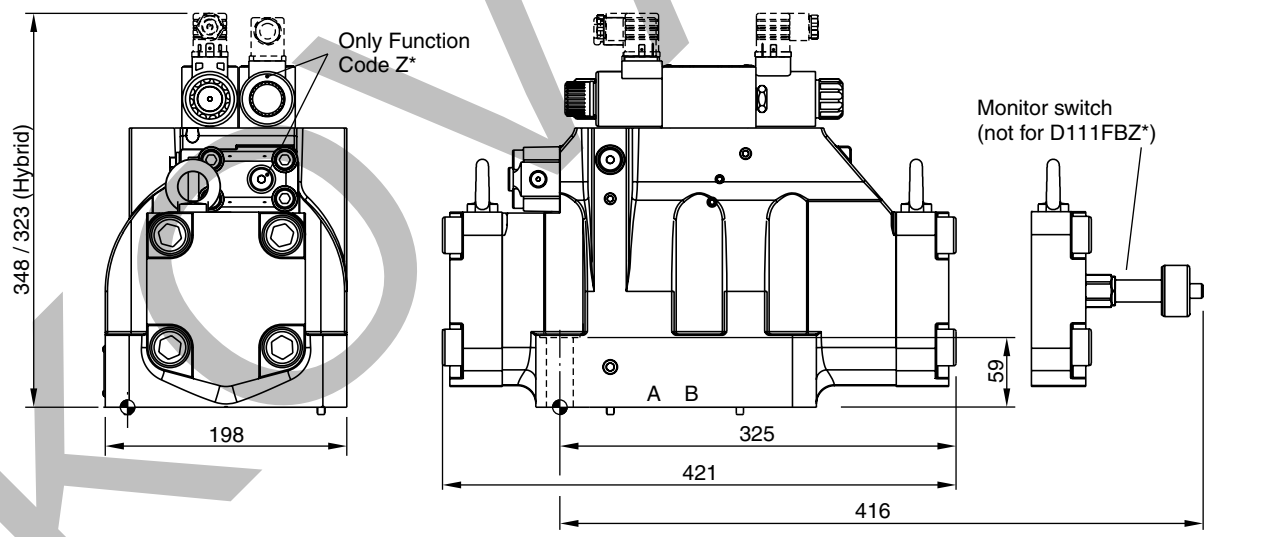
3

D91FB



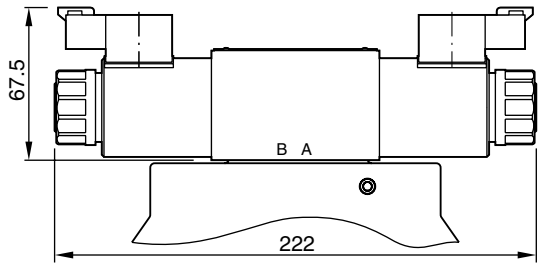
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK360	6x M12x75 ISO 4762-12.9	108 Nm ±15 %	NBR: SK-D91FB FPM: SK-D91FB-V

D111FB



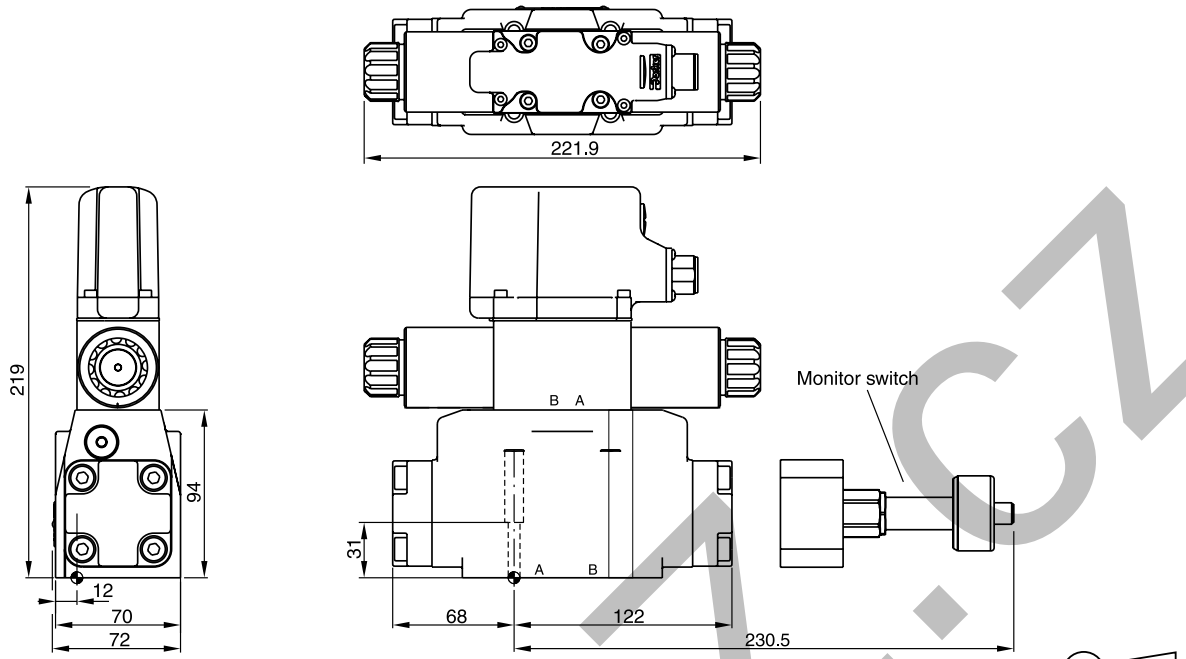
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK386	6x M20x90 ISO 4762-12.9	517 Nm ±15 %	NBR: SK-D111FB FPM: SK-D111FB-V

Dimension with DT04-2P "Deutsch" Connector



3

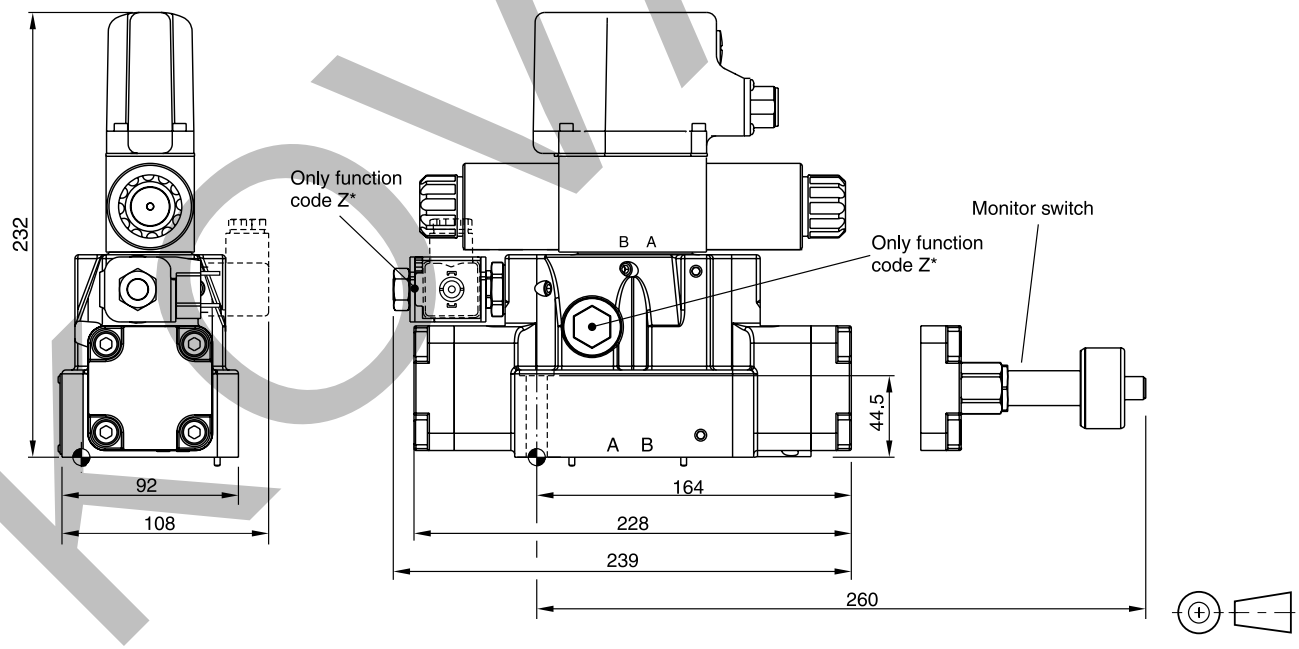
D31FB OBE



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

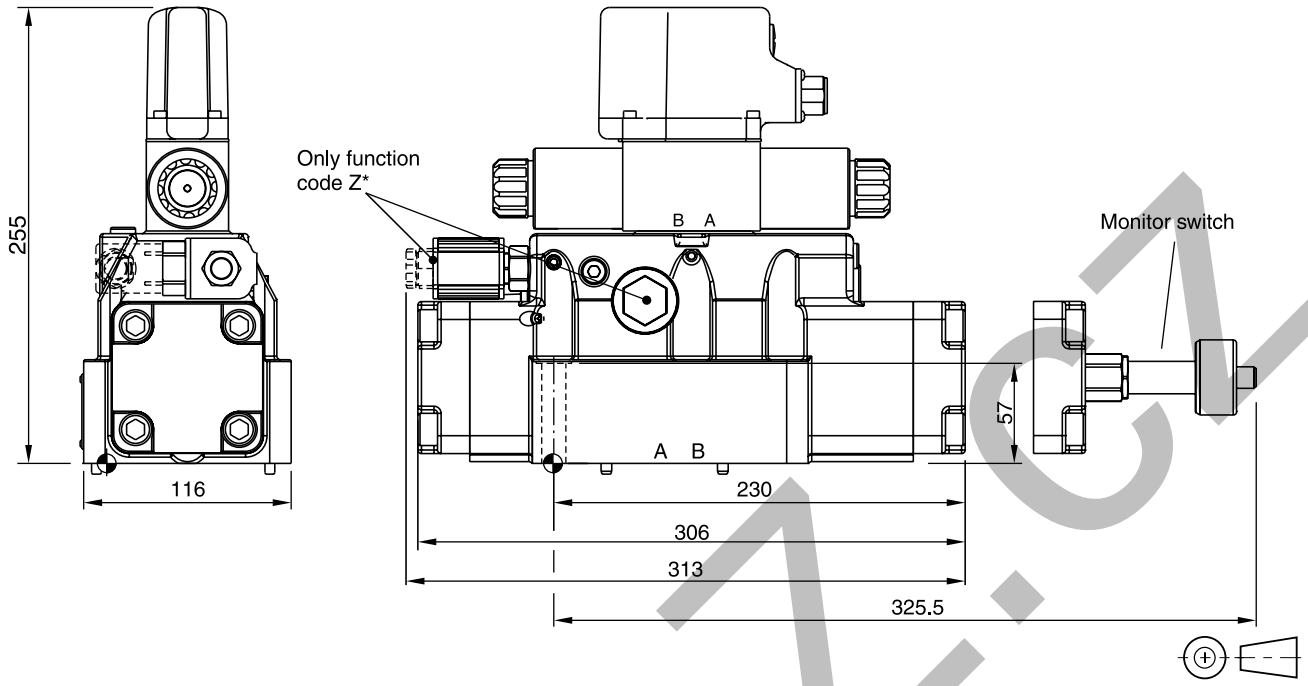
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D31FB FPM: SK-D31FB-V

D41FB OBE



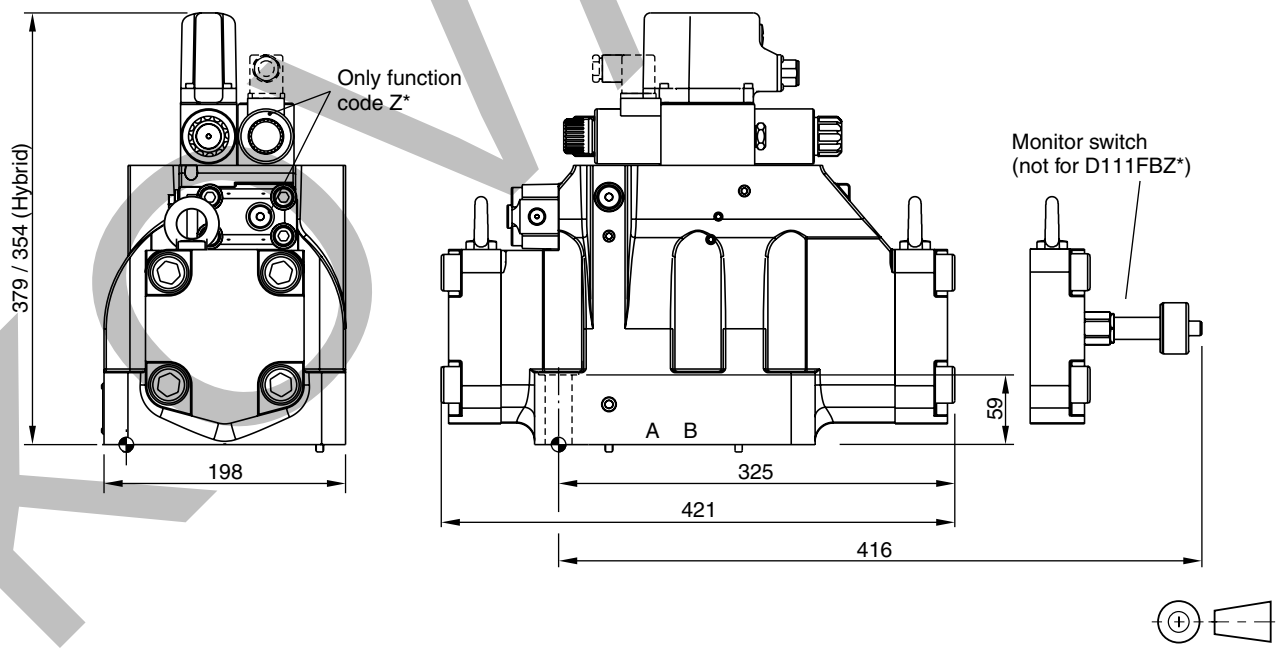
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK320	2x M6x55 4x M10x60 ISO 4762-12.9	13.2 Nm ±15 % 63 Nm ±15 %	NBR: SK-D41FB FPM: SK-D41FB-V

D91FB OBE



Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK360	6x M12x75 ISO 4762-12.9	108 Nm ±15 %	NBR: SK-D91FB FPM: SK-D91FB-V

D111FB OBE



Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK386	6x M20x90 ISO 4762-12.9	517 Nm ±15 %	NBR: SK-D111FB FPM: SK-D111FB-V

The proportional pressure reducing valves series D1FV are available with and without onboard electronics (OBE).

D1FV OBE

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 cable for connection to a serial RS232 interface is available as accessory.

3

D1FV for external electronics

The parameters can be saved, changed and duplicated in combination with the digital power amplifier PWD00A-400. The value parameters can be edited with the common ProPxD software for both versions.

The D1FV valves control the pressure in the A- or B-ports using the barometric feedback principle.

Valves with explosion proof solenoids Ex e mb II see catalogue HY11-3343.

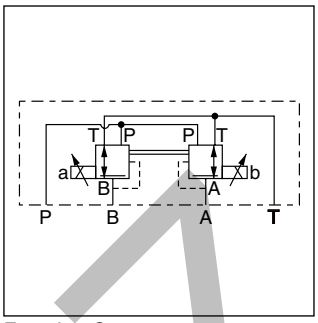
Download: www.parker.com/euro_hcd - see “Literature”

Technical Features

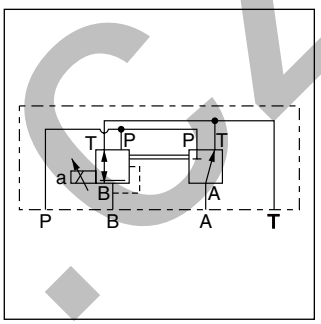
- Barometric feedback
- 3 command options for D1FV OBE: ±10 V, 4...20 mA, ±20 mA
- High repeatability from valve to valve
- Low hysteresis
- Manual override
- Pressure stages 25 bar and 45 bar


D1FV

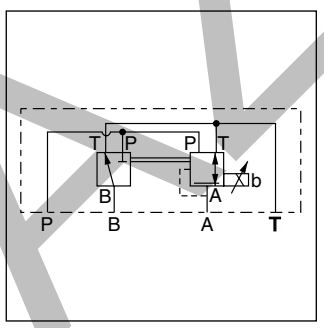

D1FV OBE



Function C

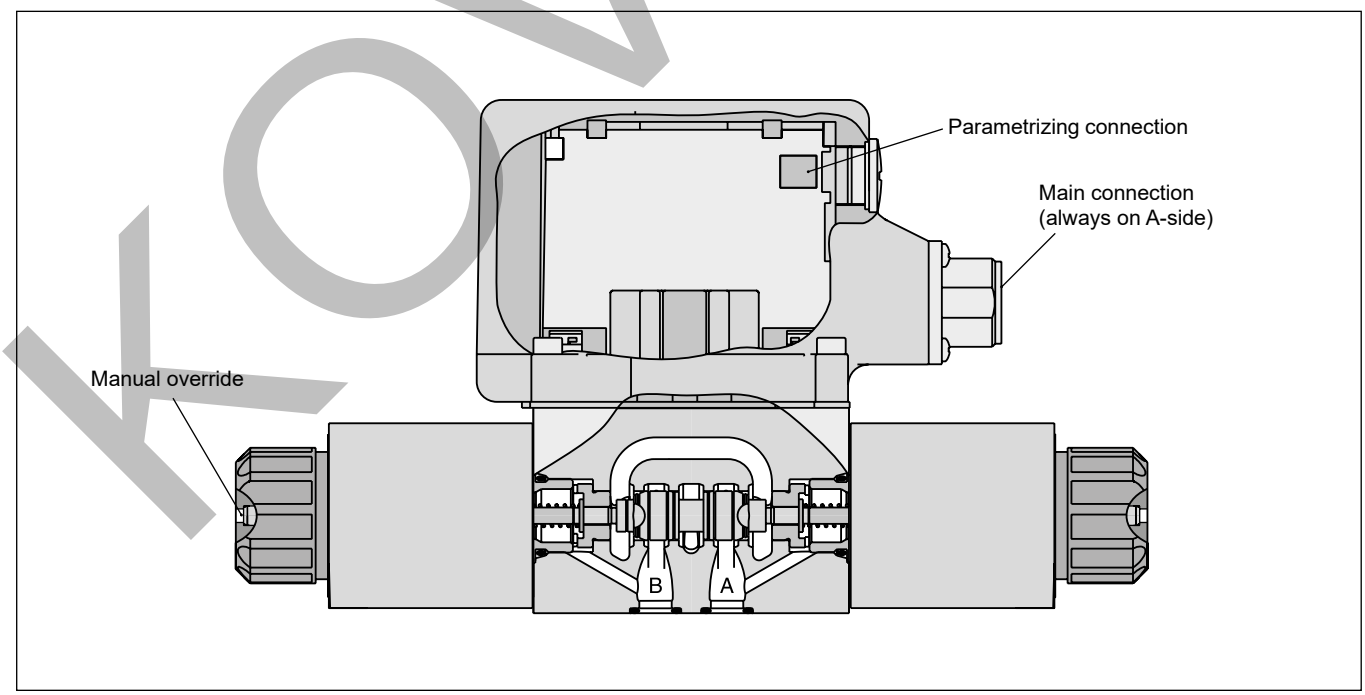


Function E



Function K

D1FV*3 OBE

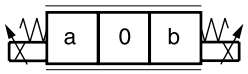
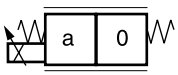
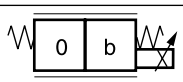


D1FV

D	1	F	V	E02			0		K		3	
Proportional pressure reducing valve	Size DIN NG06 CETOP 03 NFPA D03	Proportional control		Spool type	Pressure range	Control function		Seals	Solenoid 12 V / 2.2 A	Connector	Spool/ body design	Design series (not required for ordering)

Code	Pressure range
C	25 bar
D	45 bar

Code	Connector
W	Connector as per EN 175301-803
J	Connector DT04-2P "Deutsch"

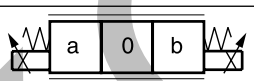
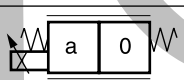
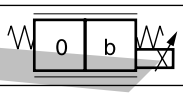
Code	Control function
C	
E	
K	

Code	Seals
N	NBR
V	FPM

D1FV OBE (with onboard electronics)

D	1	F	V	E02			0				3	
Proportional pressure reducing valve	Size DIN NG06 CETOP 03 NFPA D03	Proportional control		Spool type	Pressure range	Control function		Seals	Input signal	Electronic attachment	Spool/ body design	Design series (not required for ordering)

Code	Pressure range
C	25 bar
D	45 bar

Code	Control function
C	
E	
K	

Spool position				
Code	Input signal [1]	Function	Port	Options
F0	0...+/-10 V	0...+10 V > P-A	6 + PE	Potentiometer supply
G0	0...+/-20 mA	0...+20 mA > P-A	6 + PE	—
M0	0...+/-10 V	0...+10 V > P-B	6 + PE	Potentiometer supply
S0	4...20 mA	12...20 mA > P-A	6 + PE	—
W5 [2]	0...+/-10 V 4...20 mA 0...+/-20 mA	0...+10 V > P-A 12...20 mA > P-A 0...+20 mA > P-A	11 + PE	Command channel & potentiometer supply

Code	Seals
N	NBR
V	FPM

Short delivery time for all variations

Please order connector separately, see chapter 3 accessories.
Parametrizing cable OBE → RS232, item no. 40982923

[1] Single solenoid always 0...+10 V respectively 4...20 mA.

[2] Factory set ±10 V on delivery.

3

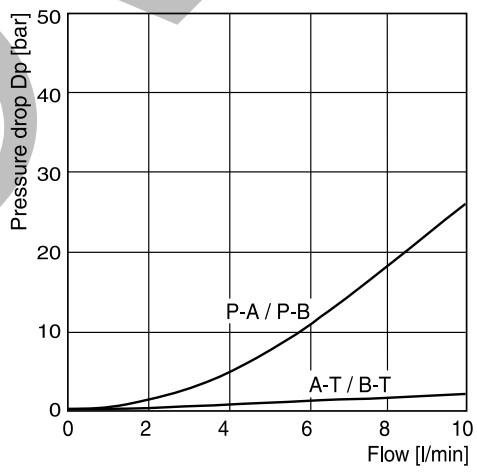
General		
Design		Direct operated proportional pressure reducing valve
Actuation		Proportional solenoid
Size		NG06/CETOP 03/NFPA D03
Mounting interface		DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position		unrestricted
Ambient temperature	[°C]	-20...+60
$MTTF_D$ value [1]	[years]	150
Weight (OBE)	[kg]	2.2 (2.9)
Hydraulic		
Max. operating pressure	[bar]	Ports P, A, B 350; Port T 185
Max. pressure drop PABT / PBAT	[bar]	350
Fluid		Hydraulic oil according to DIN 51524...535, other on request
Fluid temperature	[°C]	-20...+60 (NBR: -25...+60)
Viscosity permitted recommended	[cSt] / [mm^2/s] [cSt] / [mm^2/s]	20...400 30...80
Filtration		ISO 4406; 18/16/13
Max. flow	[l/min]	10
Min. primary pressure	[bar]	30 at 25 pressure range, 50 at 45 pressure range
Static / Dynamic		
Hysteresis	[%]	<4
Temperature drift solenoid current	[%/K]	<0.02
Electrical characteristics (D1FV)		
Duty ratio	[%]	100 ED; CAUTION: coil temperature up to 150 °C possible
Protection class		Standard (as per EN175301-803) IP65 in accordance with EN60529 (with correctly mounted plug-in connector); DT04-2P “Deutsch“ IP69K (with correctly mounted plug-in connector)
Supply voltage	[V]	12
Current consumption	[A]	2.2
Resistance	[Ohm]	4.4
Solenoid connection		Connector as per EN 175301-803 (code W), DT04-2P “Deutsch“ connector (code J). Solenoid identification as per ISO 9461.
Wiring min.	[mm²]	3x1.5 (AWG 16) overall braid shield (code W), "Deutsch" connector DP4 2 Pin (code J)
Wiring length max.	[m]	50 recommended

[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.

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

Electrical characteristics (D1FV OBE)		
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
Duty ratio	[%]	100 ED; CAUTION: coil temperature up to 150 °C possible
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)
Supply voltage/ripple DC	[V]	18...30, ripple < 5 % eff., surge free
Current consumption max.	[A]	2.0
Pre fusing medium lag	[A]	2.5
Input signal		
Codes F0 & W5 voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm, 0...+10 V ⇒ P -> A
Codes M0 voltage	[V]	+10...0...-10, ripple < 0.01 % eff., surge free, Ri = 100 kOhm, 0...+10 V ⇒ P -> B
Codes S0 & W5 current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, Ri = <250 Ohm, 12...20 mA ⇒ P -> A < 3.6 mA = enable off, > 3.8 mA = enable on (acc. to NAMUR NE43)
Code G0	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, Ri = <250 Ohm, 0...+20 mA ⇒ P -> A
Differential input max.		
Codes F0, G0, M0 & S0	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
Code W5	[V]	30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0V (terminal 2)
Channel recall signal	[V]	0...2.5: off / 5...30: on / Ri = 100 kOhm
Adjustment ranges Min	[%]	0...50
Max	[%]	50...100
Ramp	[s]	0...32.5
Interface		RS 232, parametrizing connection 5pole
EMC		EN 61000-6-2, EN 61000-6-4
Central connection		
Codes F0, G0, M0 & S0		6 + PE acc. to EN 175201-804
Code W5		11 + PE acc. to EN 175201-804
Wiring min.		
Codes F0, G0, M0 & S0	[mm²]	7 x 1.0 (AWG16) overall braid shield
Code W5	[mm²]	11 x 1.0 (AWG16) overall braid shield
Wiring length max.		50

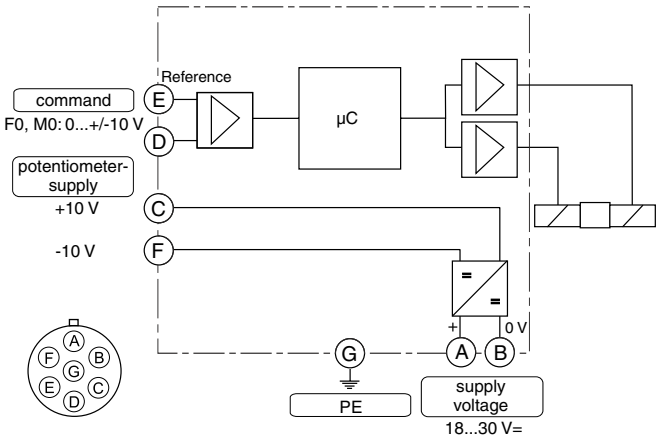
Flow characteristics



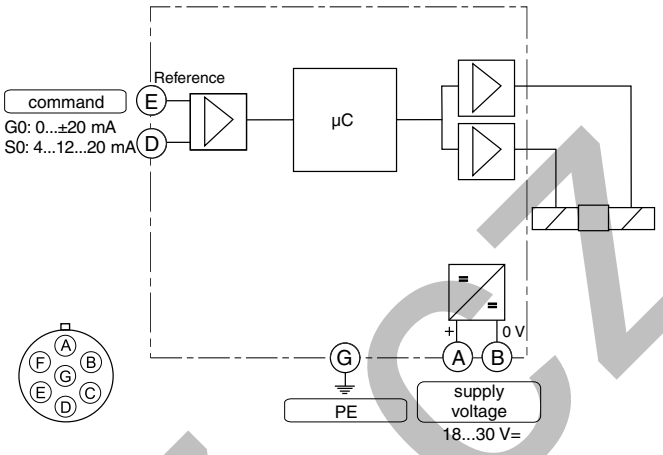
All characteristic curves measured with HLP46 at 50 °C.

3

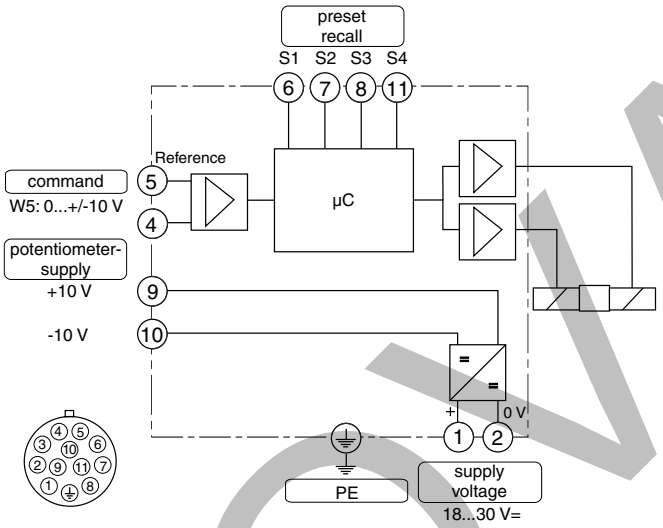
Code F0, M0
6 + PE acc. to EN 175201-804



Code G0, S0
6 + PE acc. to EN 175201-804



Code W5
11 + PE acc. to EN 175201-804



ProPxD interface program

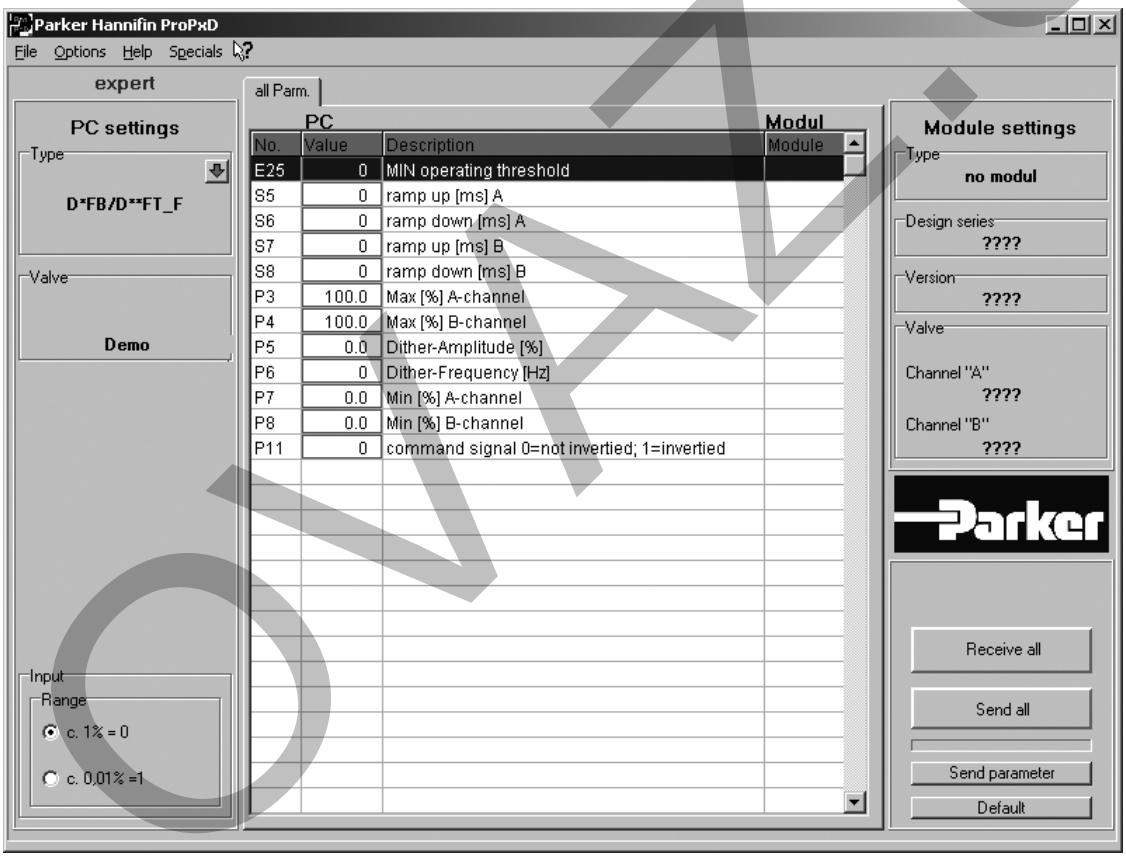
The ProPxD software permits comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a non-volatile memory stores the data with the option for recalling or modification.

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

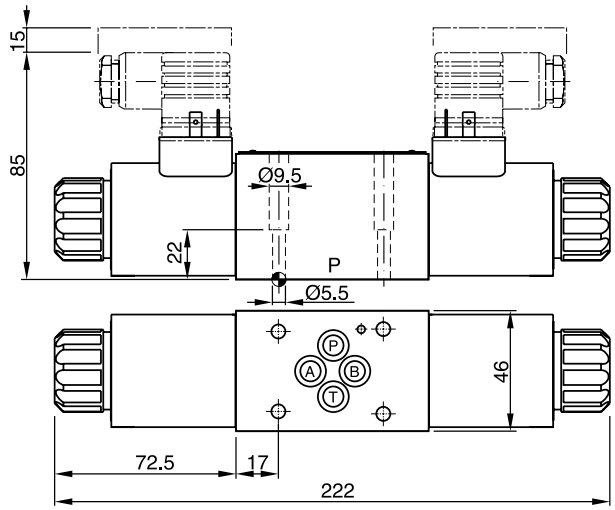
- Comfortable editing of all parameters
- Depiction and documentation of parameter sets
- Storage and loading of optimized parameter adjustments
- Executable with all actual Windows® operating systems from Windows® XP upwards
- Plain communication between PC and electronics via serial interface RS232C

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

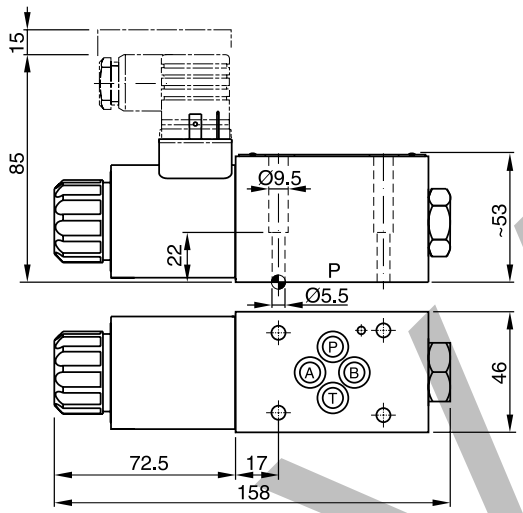


3

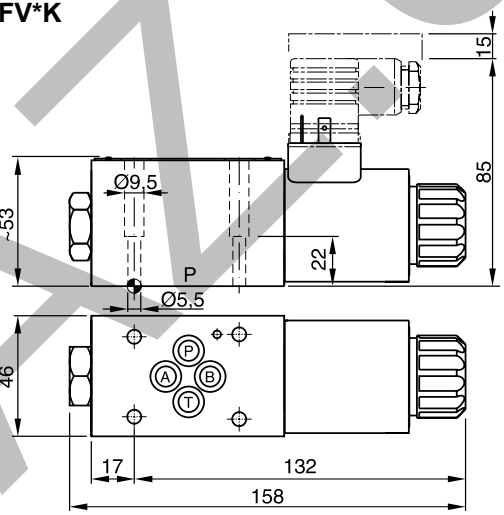
D1FV*C



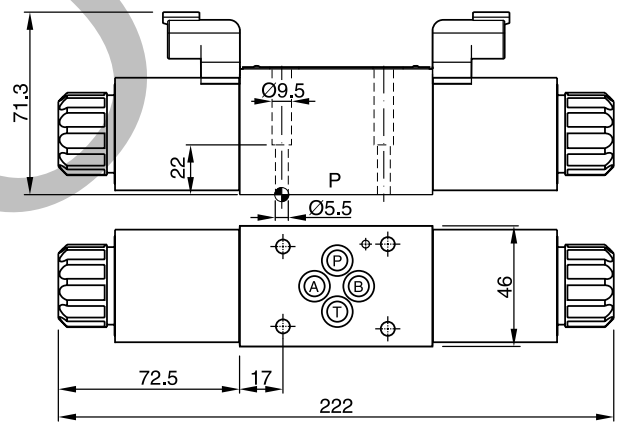
D1FV*E



D1FV*K

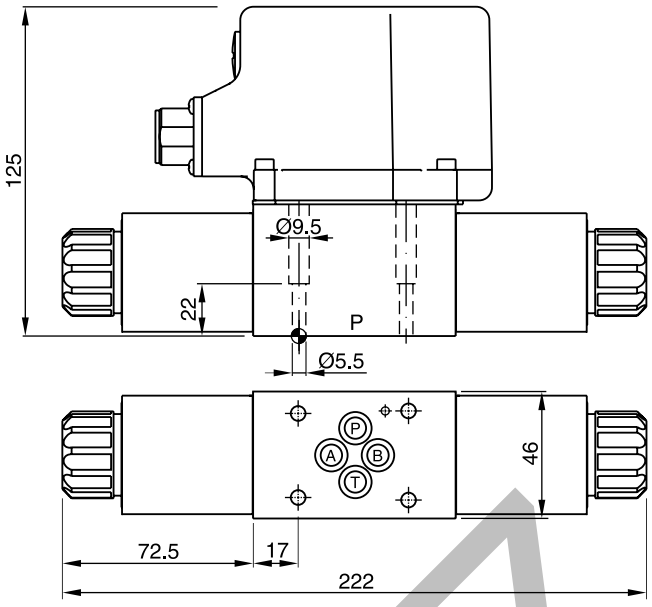


D1FV*C with DT04-2P "Deutsch" connector
(only C style shown)

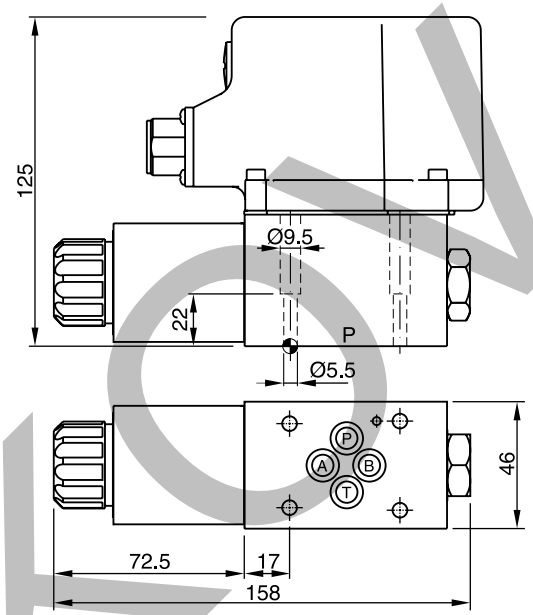


Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	SK-D1FB

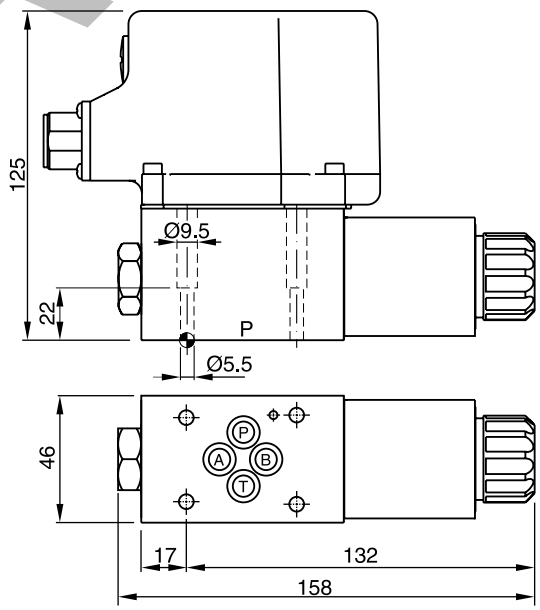
D1FV*C OBE

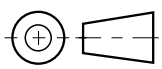


D1FV*E OBE



D1FV*K OBE





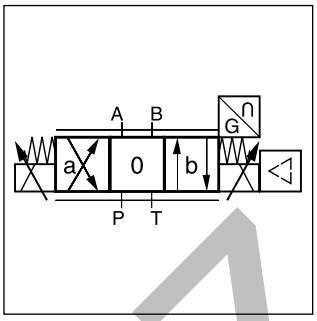
Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	SK-D1FB

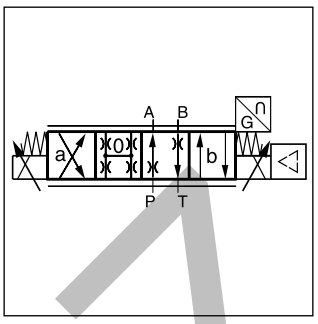
The new direct operated proportional DC valve series D1FC (NG06) with digital onboard electronics and position feedback provides high dynamics combined with high flow.

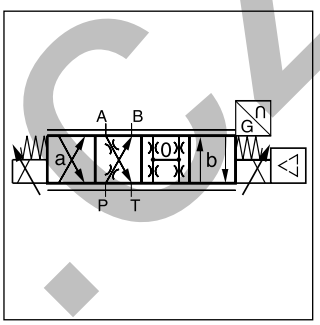
The D1FC is available with overlap spools for open loop applications as well as zero lap spools for closed loop control.

The LVDT is completely integrated into the housing and it does not require an exposed cable connection. Thus an unintended disconnection is impossible.

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.



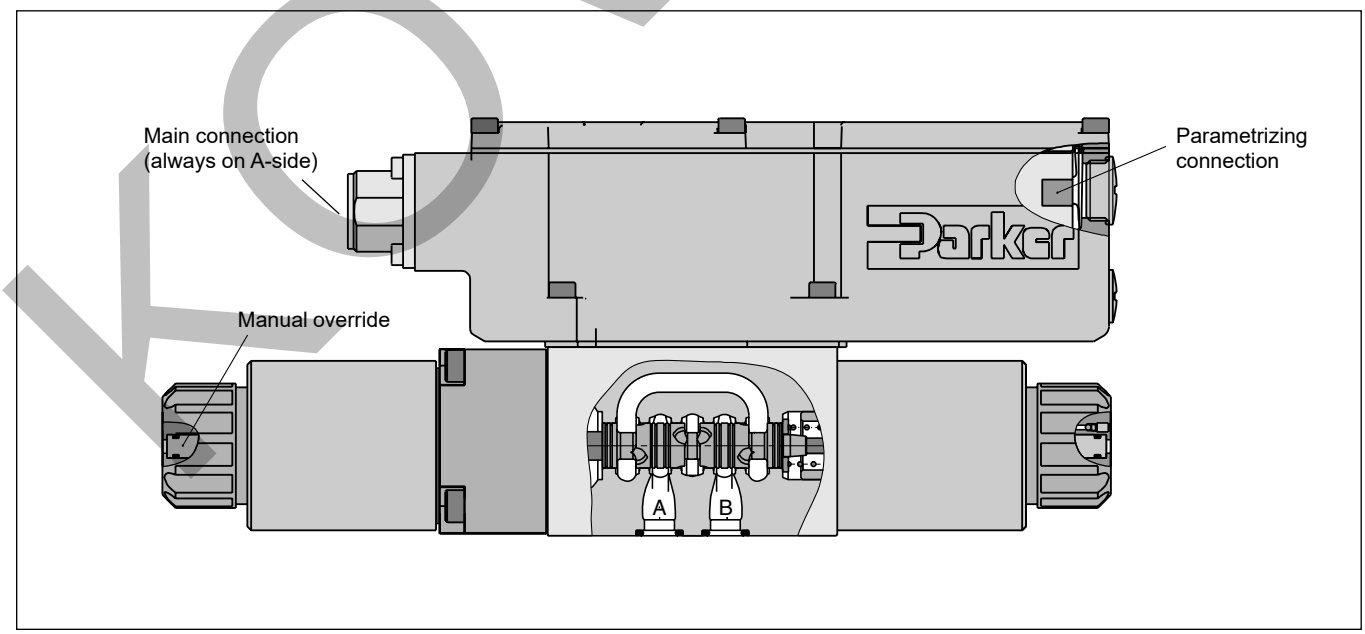




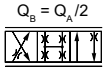
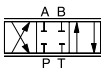
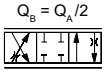
CE

Features

- Progressive flow characteristics for sensitive adjustment
- Low hysteresis
- High dynamics
- High flow capacity
- Compact dimensions
- Defined spool positioning at power-down for zero lap spools



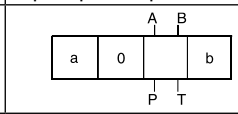
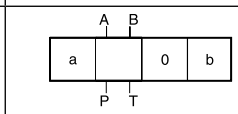
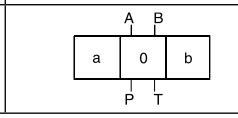
D	1	F	C			9				3	
Direct operated DC Valve	**Size DIN NG06 CETOP 03 NFPA D03**	**Propor-tional control**	**High dynamics**	**Spool type**	**Spool position on power down [1]**	**Drain port Y plugged [4]**	**Seal**	**Command signal**	**Electronic option**	**Spool/ body design**	**Design series** (not required for ordering)

Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Zerolap		
E50C **E50F** **E50H** **E50K**		**5** **10** **20** **30**
B60F **B60H** **B60K**	$Q_B = Q_A/2$ 	**5 / 10** **10 / 20** **15 / 30**
Overlap		
E01C **E01F** **E01H** **E01K**		**5** **10** **20** **30**
E02C **E02F** **E02H** **E02K**		**5** **10** **20** **30**
B31F **B31H** **B31K**	$Q_B = Q_A/2$ 	**5 / 10** **10 / 20** **15 / 30**
B32F **B32H** **B32K**	$Q_B = Q_A/2$ 	**5 / 10** **10 / 20** **15 / 30**

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

Code	Command 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**

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

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

Short delivery time for all variations

Parametrizing cable OBE → RS232, item no. 40982923

[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 lap spools.
[3] Only for overlap spools.
[4] Plug in port Y needs to be removed at tank pressure >35 bar.
[5] Please order connector separately, see chapter 3 accessories.

3

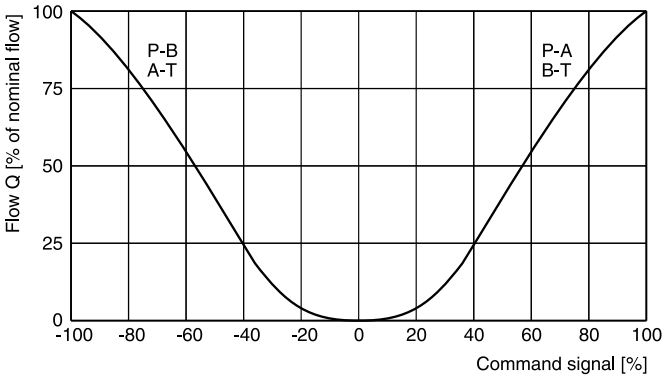
General			
Design			Direct operated proportional DC valve with position feedback
Actuation			Proportional solenoid
Size			**NG06 / CETOP 03 / NFPA D03**
Mounting interface			DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position			unrestricted
Ambient temperature		[°C]	-20...+60
$MTTF_D$ value [1]		[years]	150
Weight		[kg]	3.4
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]	Ports P, A, B 350, port T max. 35; 210 (external drain); port Y max. 35
Max. pressure drop PABT / PBAT		[bar]	350
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]	5 / 10 / 20 / 30
Leakage at 100 bar		[ml/min]	<800 (zerolap spool); <50 (overlap spool)
Opening point			set to 10 % command signal (see flow characteristics)
Static / Dynamic			
Step response at 100 % step		[ms]	20
Hysteresis		[%]	<0.1
Temperature drift		[%/K]	<0.01
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 Code B	voltage	[V]	+10...0...-10, ripple < 0.01% eff., surge free, 0...+10 V P->A
	impedance	[kOhm]	100
Code S	current	[mA]	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
Code E	current	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, 0...+20 mA P–>A
	impedance	[Ohm]	<250
Differential input max.	Code 0/7	[V]	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 PE) 11 for terminal 4 and 5 against 0 V (terminal 2)
	Min	[%]	0...50
Adjustment ranges	Max	[%]	50...100
	Ramp	[s]	0...32.5
Parametrizing interface			RS232C, 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 07	[mm^2]	7 x 1.0 (AWG 16) overall braid shield
	Code 5	[mm^2]	8 x 1.0 (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.

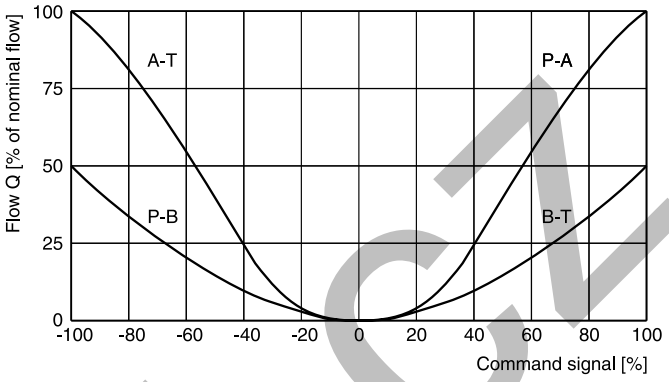
[2] Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

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

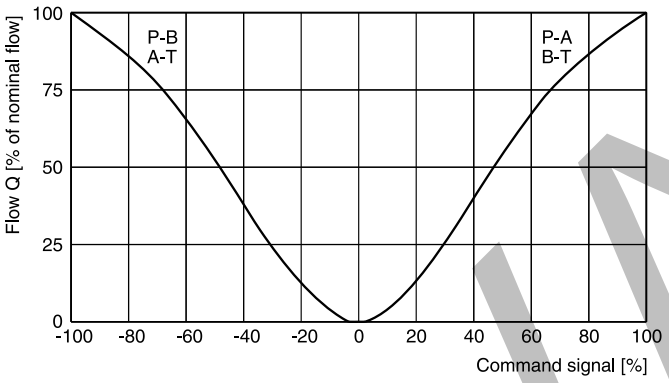
Spool type E01



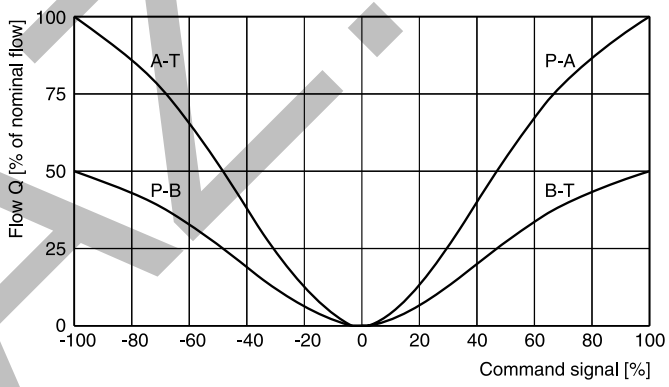
Spool type B31



Spool type E50



Spool type B60

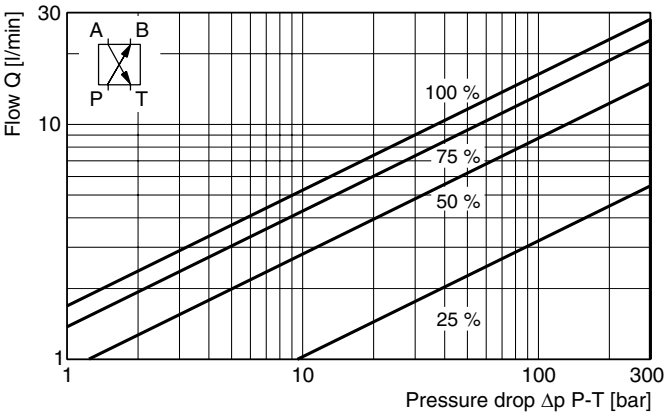


All characteristic curves measured with HLP46 at 50 °C.

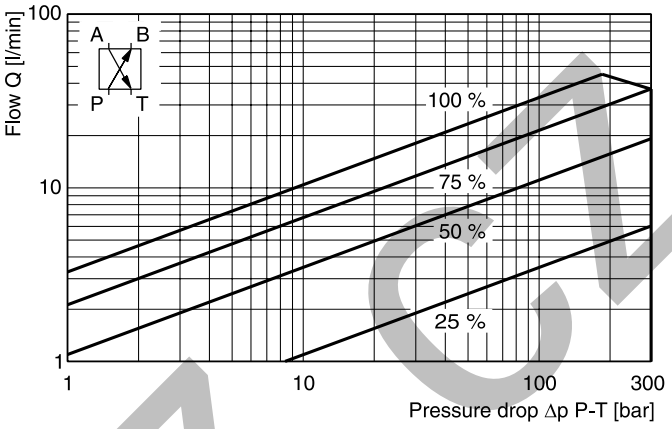
3

Functional limits
25 %, 50 %, 75 % and 100 % command signal (symmetric flow).
At asymmetric flow a reduced flow limit has to be considered.

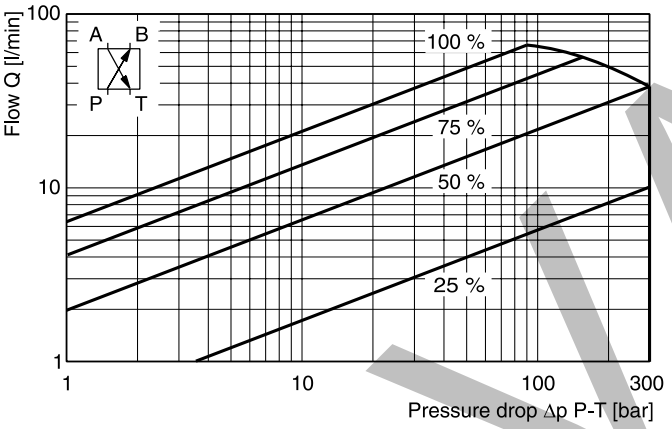
Spool type E01C



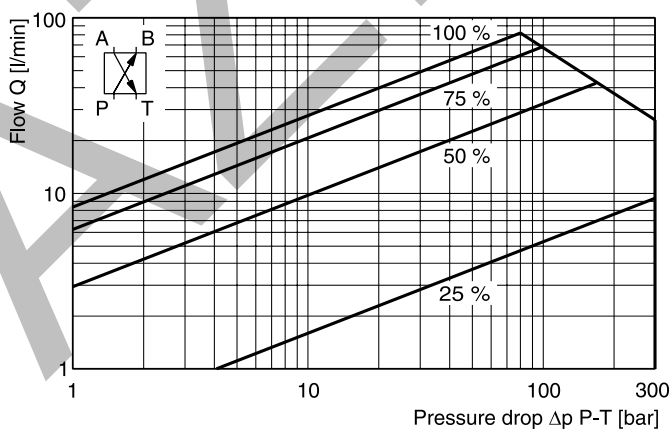
Spool type E01F



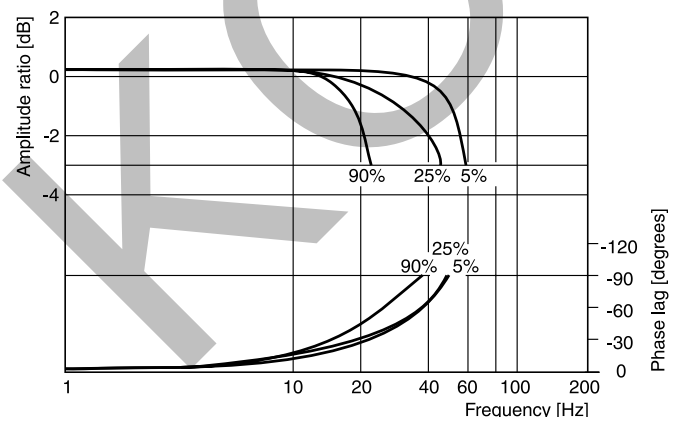
Spool type E01H



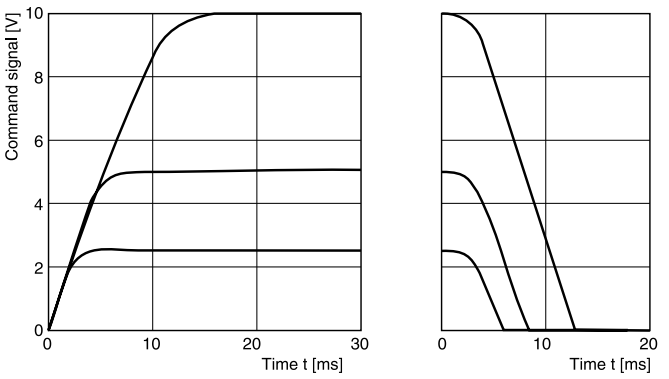
Spool type E01K



Frequency
± 5 %, ± 25 %, ± 90 % input signal

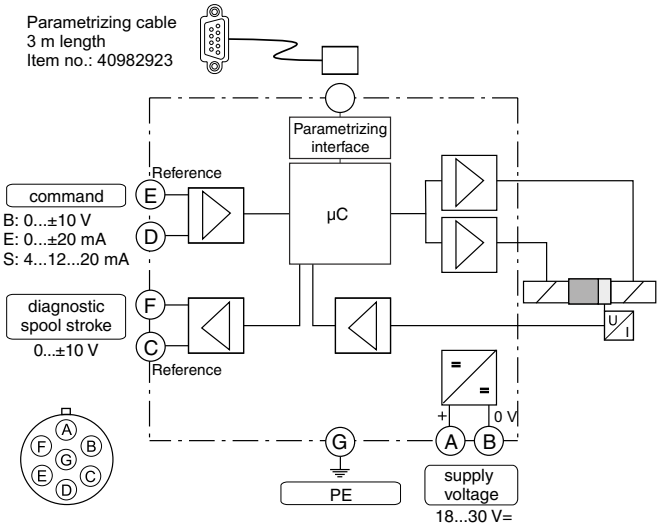


Step response

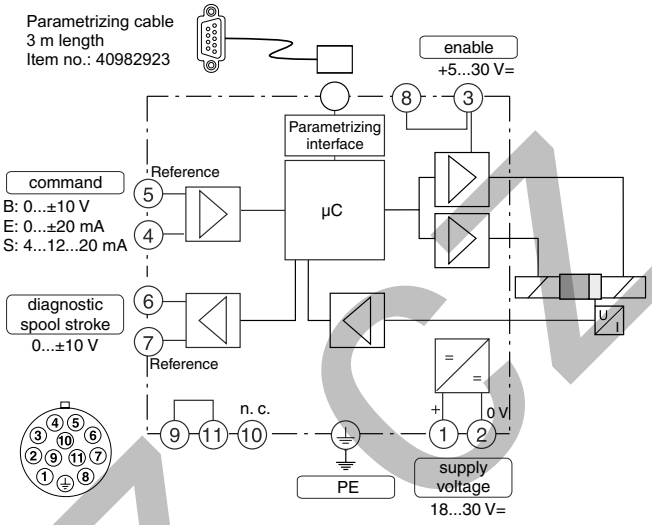


All characteristic curves measured with HLP46 at 50 °C.

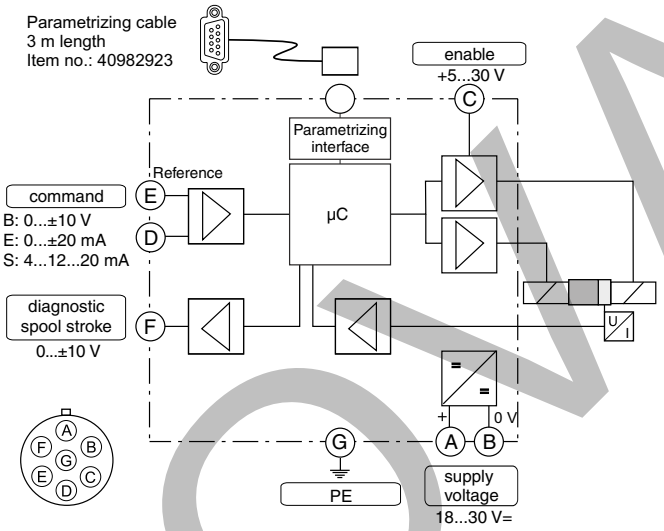
Code 0, 3
6 + PE acc. to EN 175201-804



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



Code 1, 7
6 + PE acc. to EN 175201-804 + enable



3

ProPxD interface program

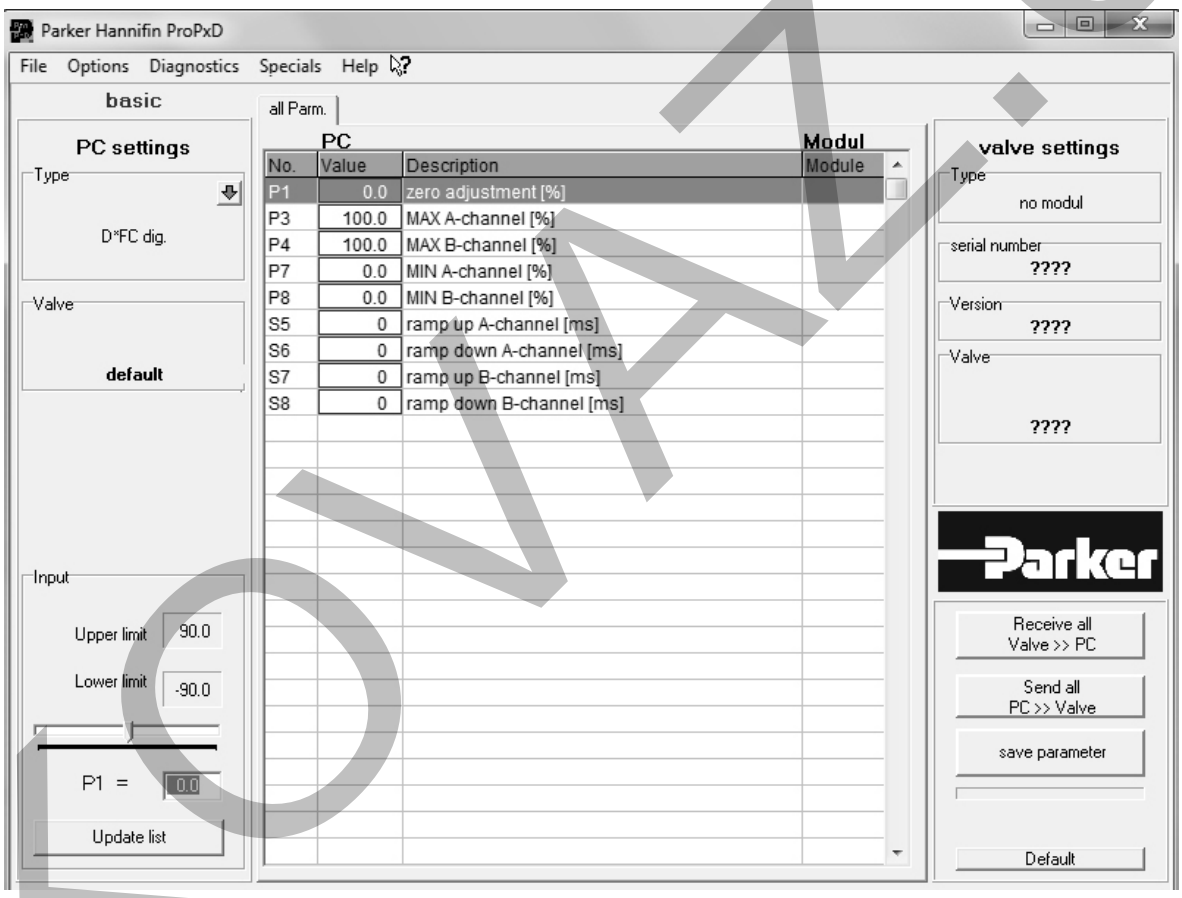
The ProPxD software permits comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a non-volatile memory stores the data with the option for recalling or modification.

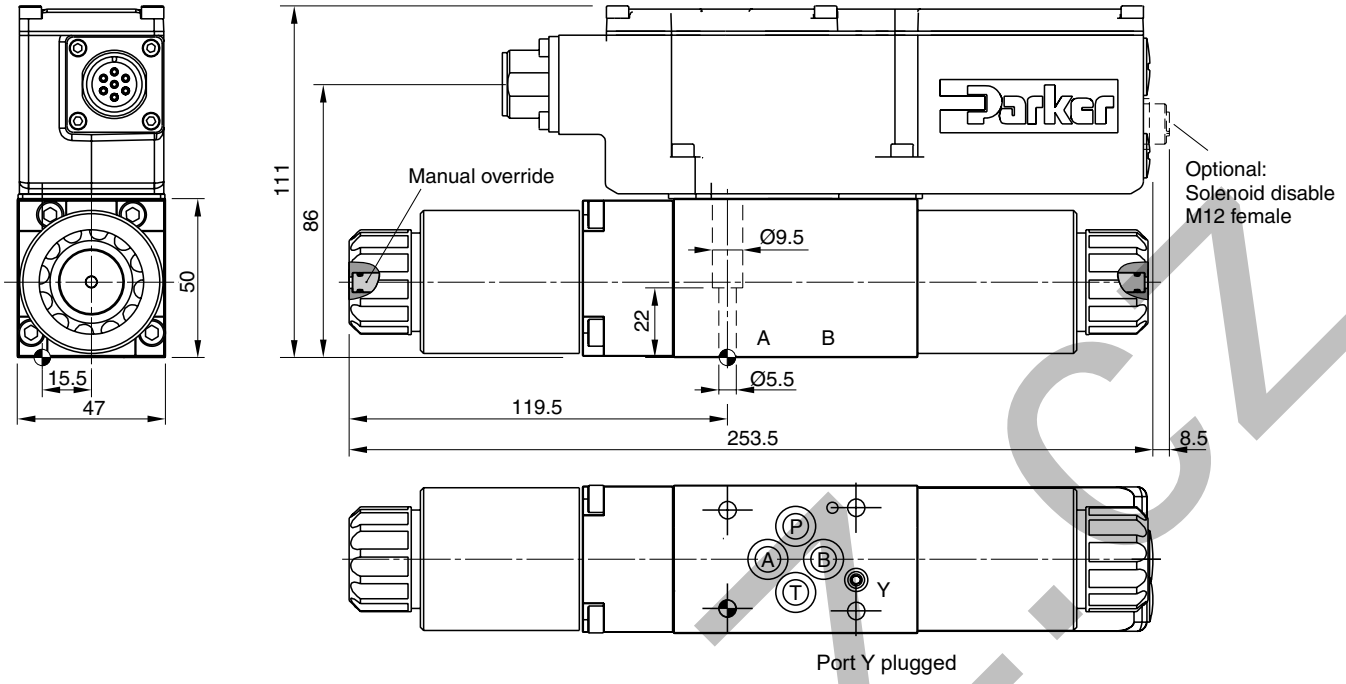
The PC software can be downloaded free of charge at www.parker.com/propxd.

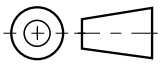
Features

- Comfortable editing of all parameters
- Depiction and documentation of parameter sets
- Storage and loading of optimized parameter adjustments
- Executable with all actual Windows® operating systems from Windows® XP upwards
- Plain communication between PC and electronics via serial interface RS232C

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







Surface finish	Kit			Kit NBR
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	NBR: SK-D1FC FPM: SK-D1FC-V

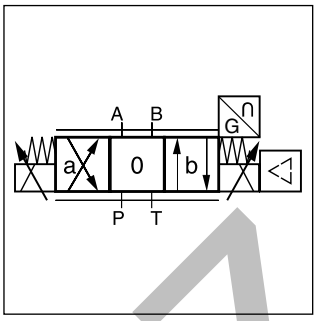
3

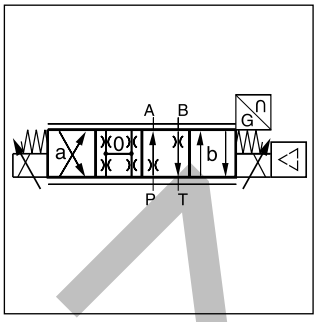
The new direct operated proportional DC valve series D3FC (NG10) with digital onboard electronics and position feedback provides high dynamics combined with high flow.

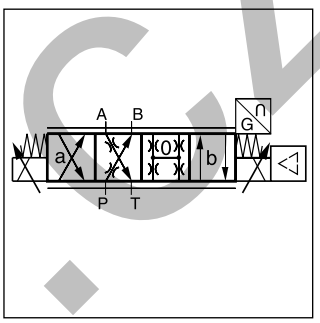
The D3FC is available with overlap spools for open loop applications as well as zero lap spools for closed loop control.

The LVDT is completely integrated into the housing and it does not require an exposed cable connection. Thus an unintended disconnection is impossible.

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.



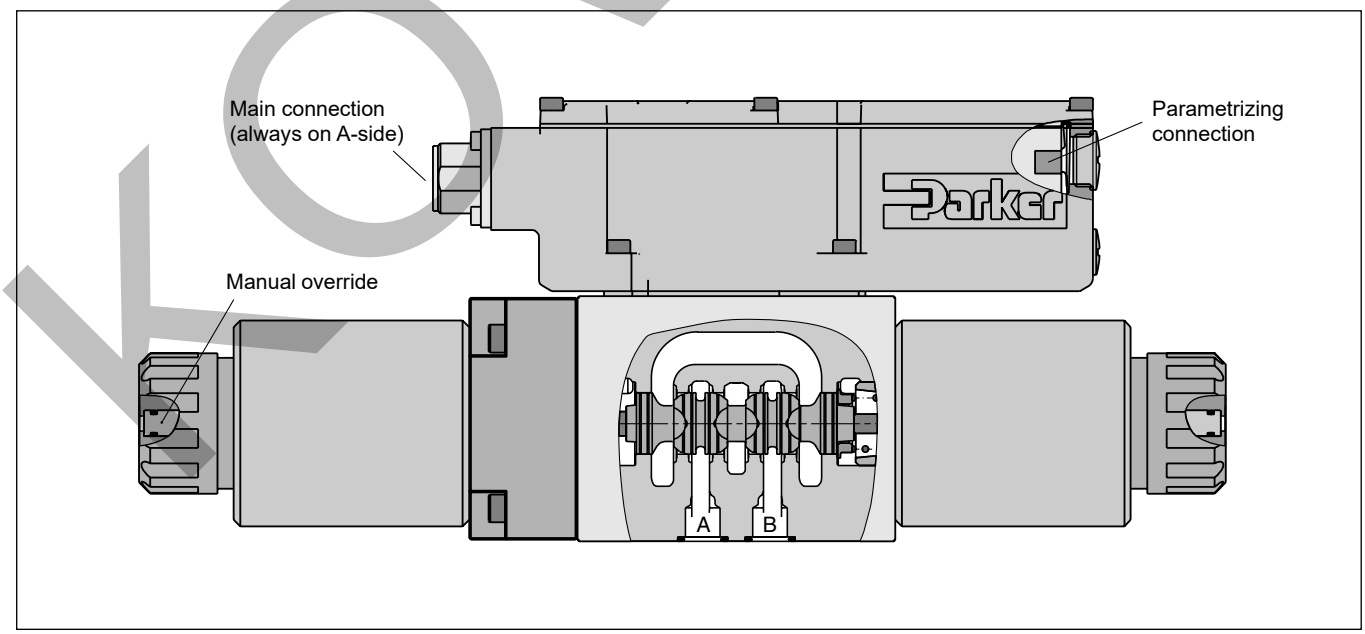




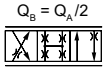
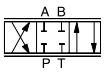
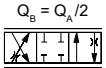
CE

Features

- Progressive flow characteristics for sensitive adjustment
- Low hysteresis
- High dynamics
- High flow capacity
- Compact dimensions
- Defined spool positioning at power-down for zero lap spools



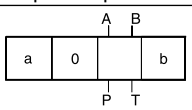
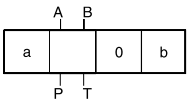
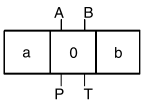
D	3	F	C			9				3	
Direct operated DC Valve	Size DIN NG10 CETOP 05 NFPA D05	Proportional control	High dynamics	Spool type	Spool position on power down [1]	Drain port Y plugged [4]	Seal	Command signal	Electronic option	Spool/ body design	Design series (not required for ordering)

Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
Zerolap		
E50M **E50S** **E50U**		**35** **55** **75**
B60M **B60S** **B60U**	$Q_B = Q_A/2$ 	**17 / 35** **27 / 55** **37 / 75**
Overlap		
E01M **E01S** **E01U**		**35** **55** **75**
E02M **E02S** **E02U**		**35** **55** **75**
B31M **B31S** **B31U**	$Q_B = Q_A/2$ 	**17 / 35** **27 / 55** **37 / 75**
B32M **B32S** **B32U**	$Q_B = Q_A/2$ 	**17 / 35** **27 / 55** **37 / 75**

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

Code	Command 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**

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

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

Short delivery time for all variations

Parametrizing cable OBE → RS232, item no. 40982923

[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 lap spools.
[3] Only for overlap spools.
[4] Plug in port Y needs to be removed at tank pressure >35 bar.
[5] Please order connector separately, see chapter 3 accessories.

3

General			
Design			Direct operated proportional DC valve with position feedback
Actuation			Proportional solenoid
Size			**NG10 / CETOP 05 / NFPA D05**
Mounting interface			DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position			unrestricted
Ambient temperature		[°C]	-20...+60
$MTTF_D$ value [1]		[years]	150
Weight		[kg]	7.7
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]	Ports P, A, B 350, port T max. 35; 210 (external drain); port Y max. 35
Max. pressure drop PABT / PBAT		[bar]	350
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]	35 / 55 / 75
Leakage at 100 bar		[ml/min]	<1000 (zerolap spool); <100 (overlap spool)
Opening point		-	set to 10 % command signal (see flow characteristics)
Static / Dynamic			
Step response at 100 % step		[ms]	40
Hysteresis		[%]	< 0.1
Temperature drift		[%/K]	< 0.01
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]	3.5
Pre fusing medium lag		[A]	4.0
Command Code B	voltage	[V]	+10...0...-10, ripple < 0.01% eff., surge free, 0...+10 V P->A
	impedance	[kOhm]	100
Code S	current	[mA]	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
Code E	current	[mA]	+20...0...-20, ripple < 0.01 % eff., surge free, 0...+20 mA P–>A
	impedance	[Ohm]	< 250
Differential input max.	Code 0/7	[V]	30 for terminal D and E against PE (terminal G) 11 for terminal D and E against 0V (terminal B)
	Code 5		30 for terminal 4 and 5 against PE (terminal PE) 11 for terminal 4 and 5 against 0 V (terminal 2)
	Min	[%]	0...50
Adjustment ranges	Max	[%]	50...100
	Ramp	[s]	0...32.5
Parametrizing interface			RS232C, 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	[mm^2]	7 x 1.0 (AWG 16) overall braid shield
	Code 5	[mm^2]	8 x 1.0 (AWG 16) overall braid shield
Wiring length max.		[m]	50

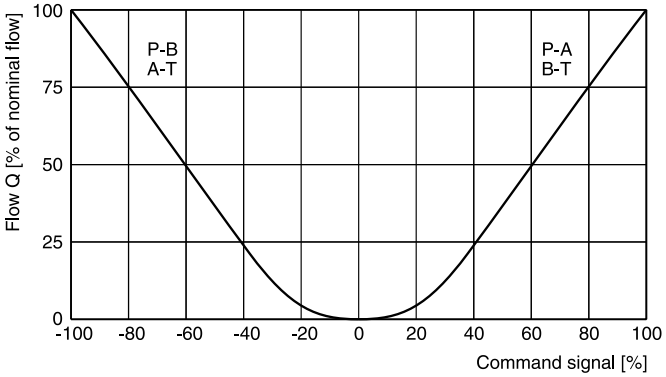
[1] If valves with onboard electronics are used in safety-related parts of control systems, in case the safety function is requested, the valve electronics voltage supply is to be switched off by a suitable switching element with sufficient reliability.

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

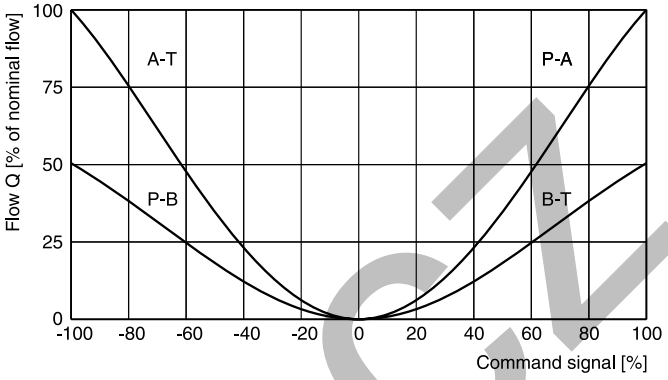
Flow characteristics

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

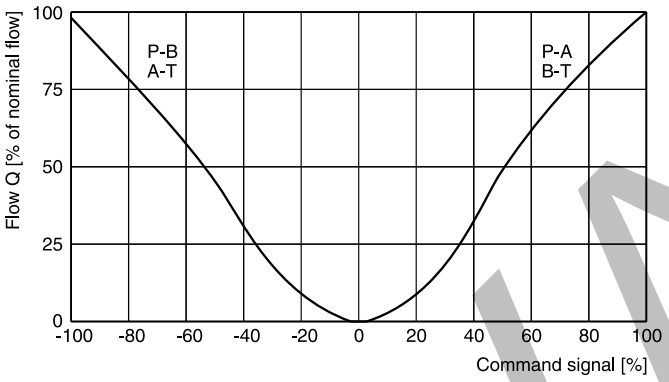
Spool type E01



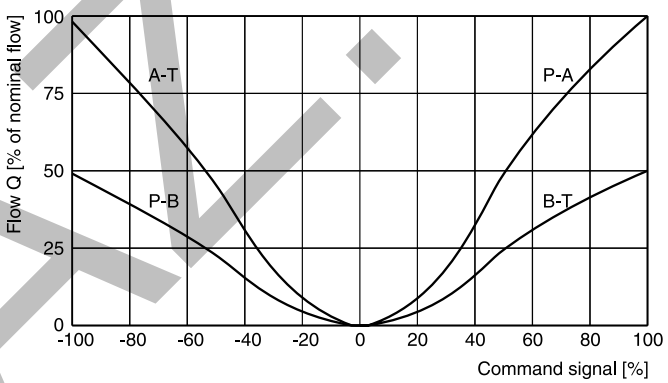
Spool type B31



Spool type E50



Spool type B60



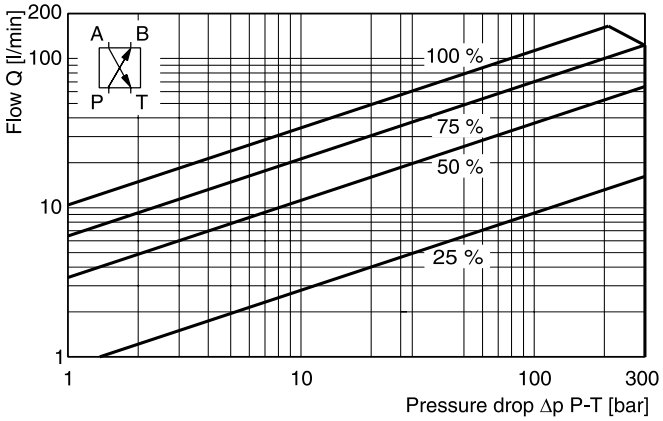
All characteristic curves measured with HLP46 at 50 °C.

3

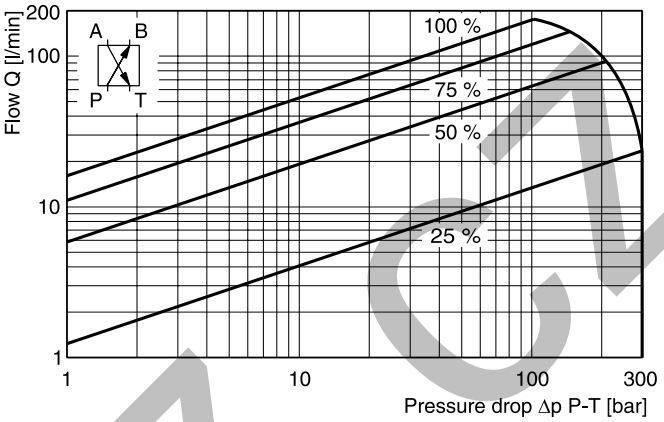
Functional limits

25 %, 50 %, 75 % and 100 % command signal (symmetric flow).
At asymmetric flow a reduced flow limit has to be considered.

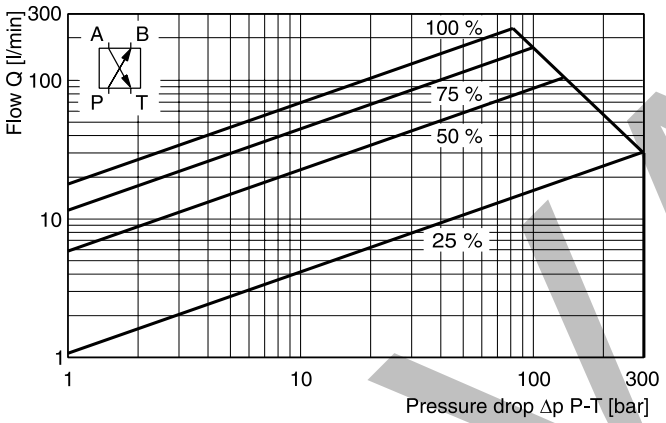
Spool type E01M



Spool type E01S

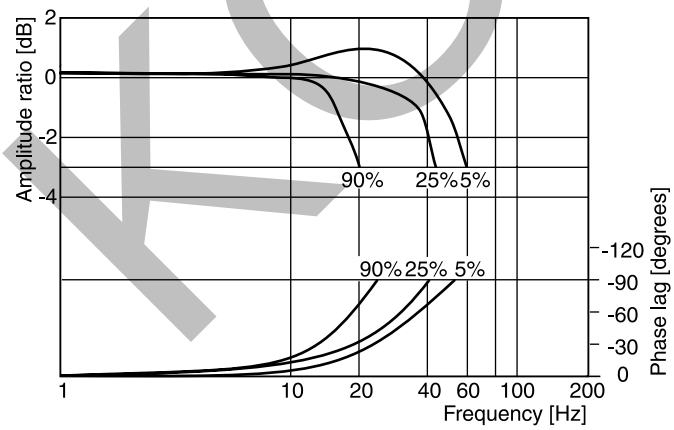


Spool type E01U

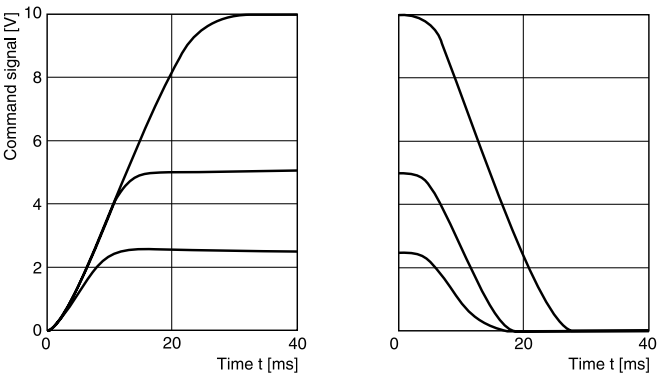


Frequency

± 5 %, ± 25 %, ± 90 % input signal

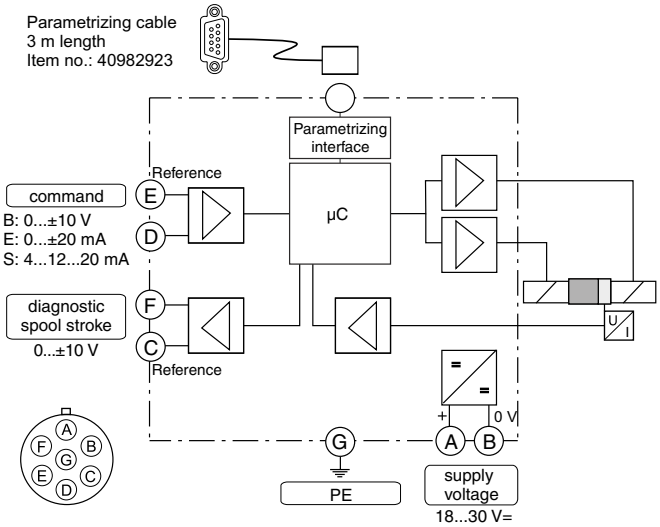


Step response

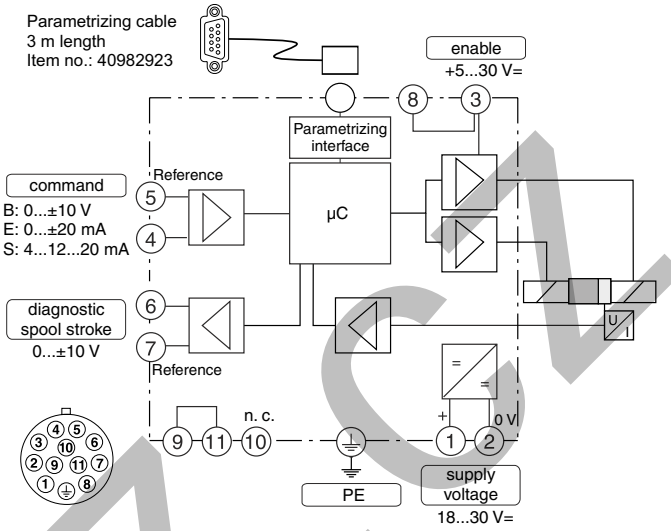


All characteristic curves measured with HLP46 at 50 °C.

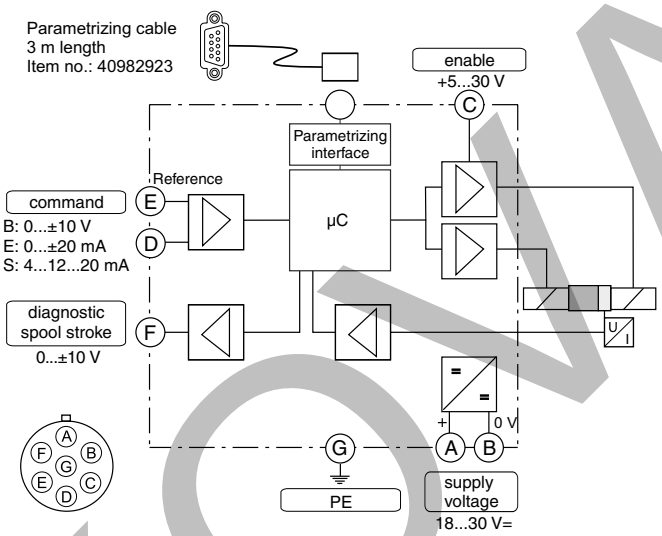
Code 0, 3
6 + PE acc. to EN 175201-804



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



Code 1, 7
6 + PE acc. to EN 175201-804 + enable



3

ProPxD interface program

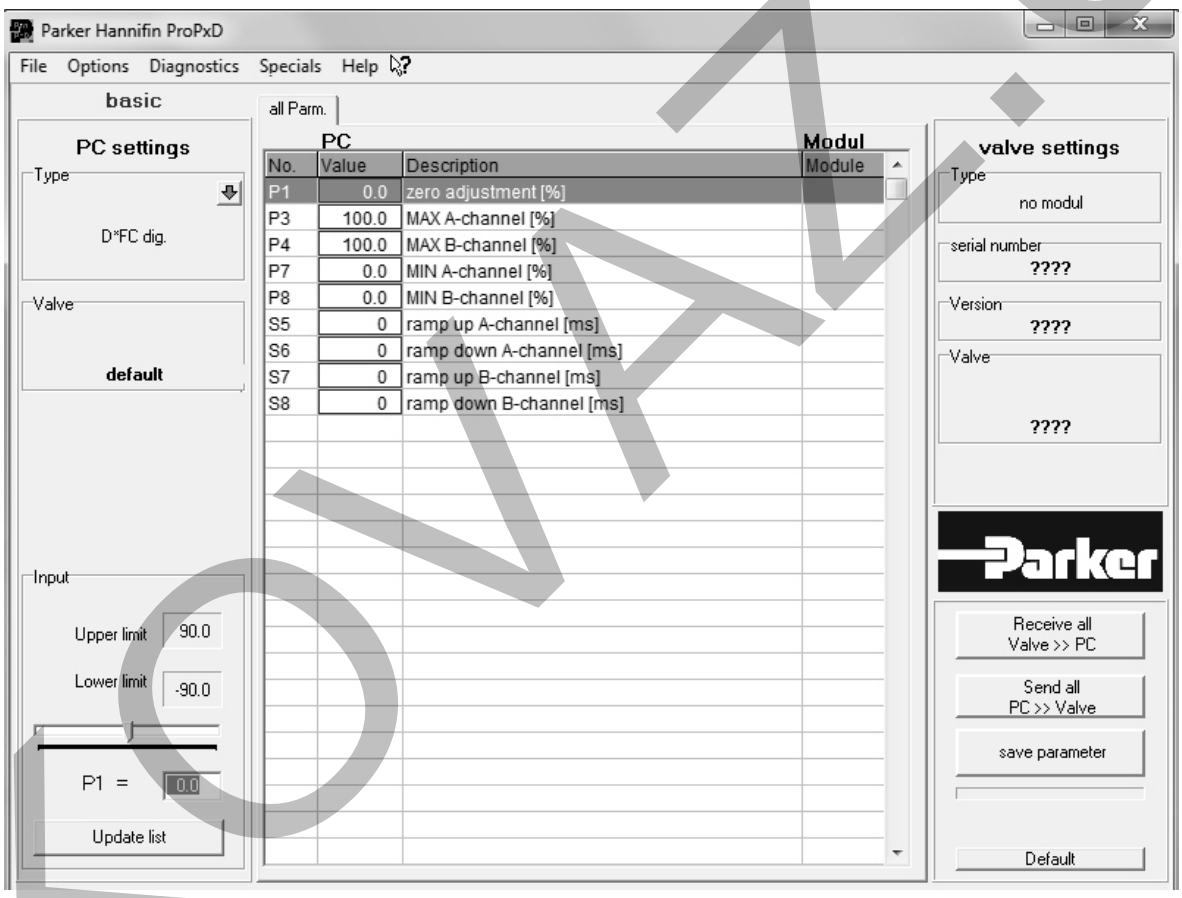
The ProPxD software permits comfortable parameter setting for the module electronics. Via the clearly arranged entry mask the parameters can be noticed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to other valves. Inside the electronics a non-volatile memory stores the data with the option for recalling or modification.

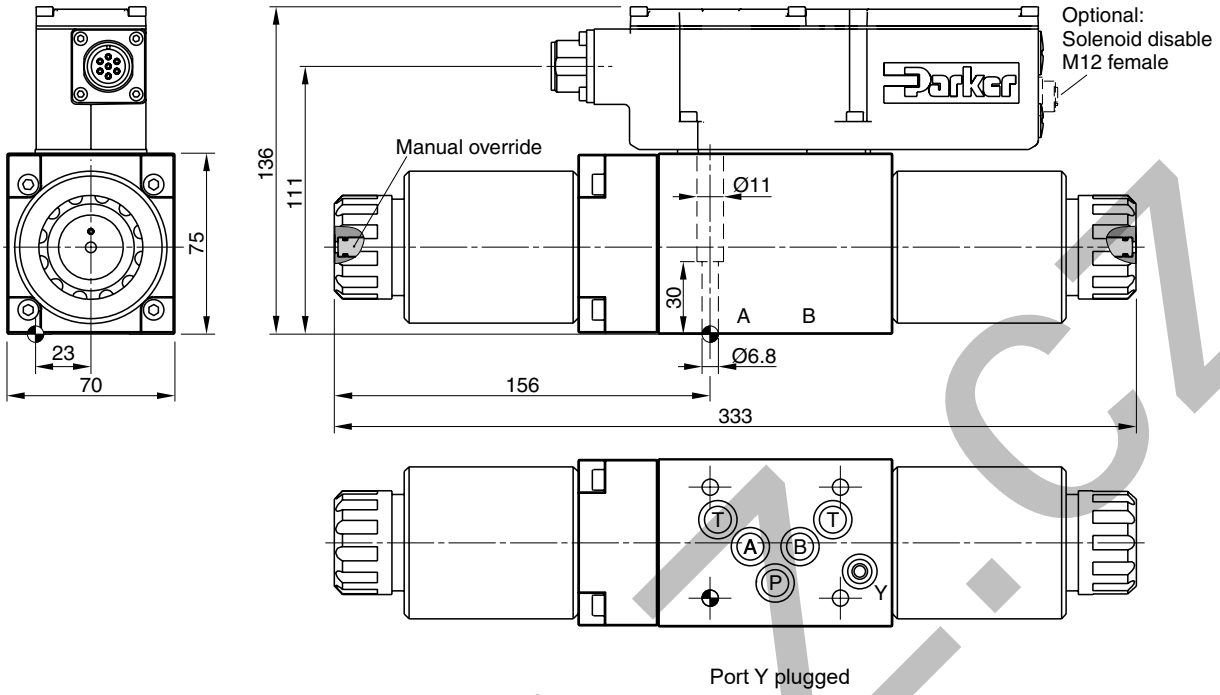
The PC software can be downloaded free of charge at www.parker.com/propxd.

Features

- Comfortable editing of all parameters
- Depiction and documentation of parameter sets
- Storage and loading of optimized parameter adjustments
- Executable with all actual Windows® operating systems from Windows® XP upwards
- Plain communication between PC and electronics via serial interface RS232C

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





Port Y plugged

Surface finish	Kit			Kit NBR
$R_{max}6.3$ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D3FC FPM: SK-D3FC-V

3

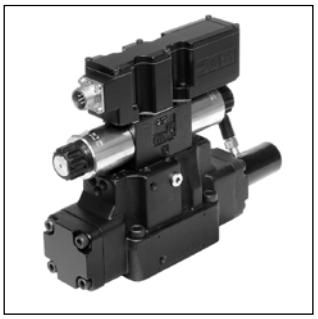
The pilot operated proportional directional valves D*1FC with position feedback are available in 4 sizes:

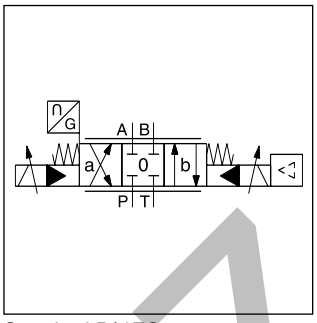
D31FC - NG10 (CETOP 05)
D41FC - NG16 (CETOP 07)
D91FC - NG25 (CETOP 08)
D111FC - NG32 (CETOP 10)

The digital onboard electronics is situated in a robust metal housing, which allows the usage under rough environmental conditions.

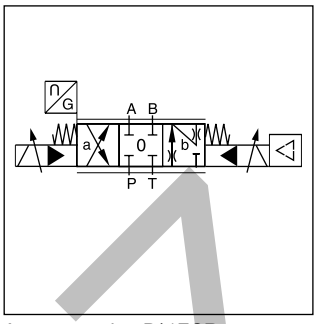
The nominal values are factory set. The parametrizing cable to connect to a serial RS232 interface is available as accessory.

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

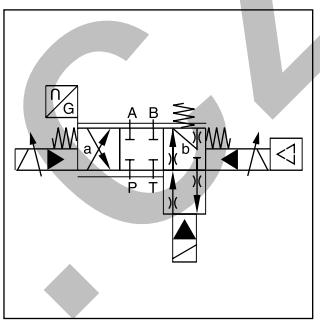

D41FC



Standard D*1FC



A-regeneration D*1FCR

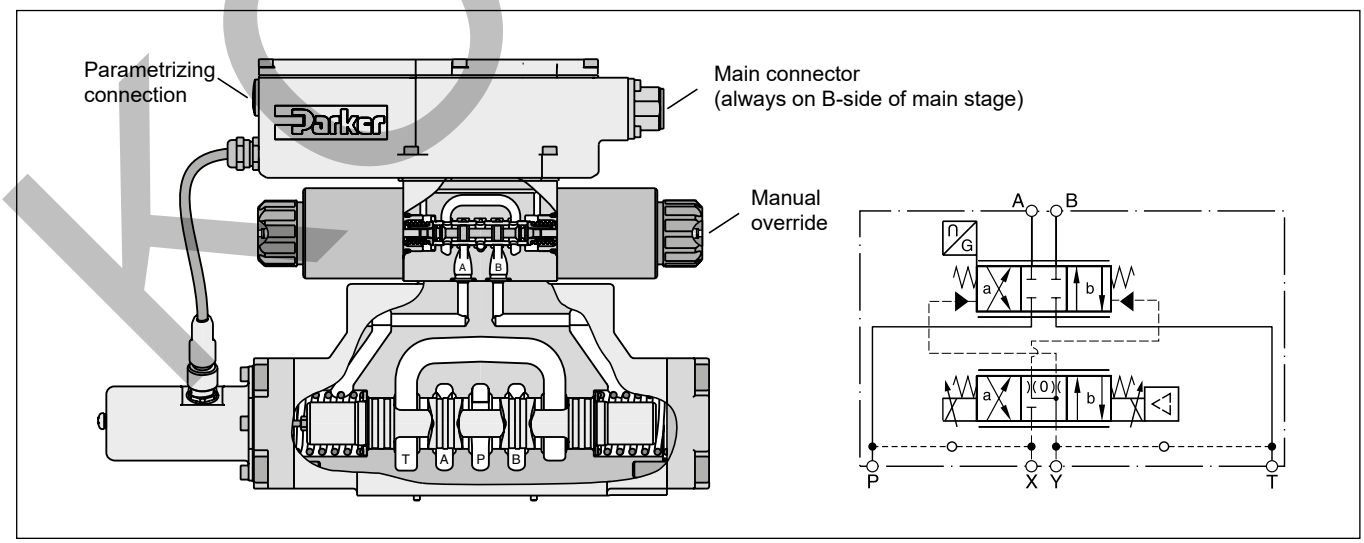


Hybrid D*1FCZ

Features

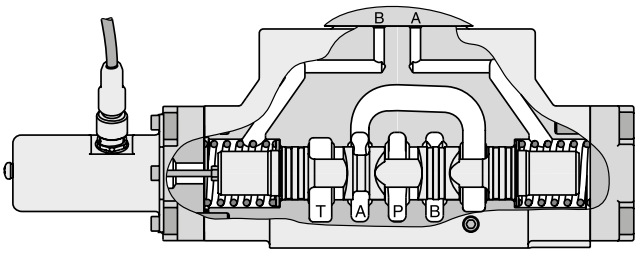
- Progressive flow characteristics for sensitive adjustment
- Low hysteresis
- High dynamics
- High flow capacity
- Centre position monitoring optional
- Energy saving A-regeneration optional
- Switchable hybrid version optional

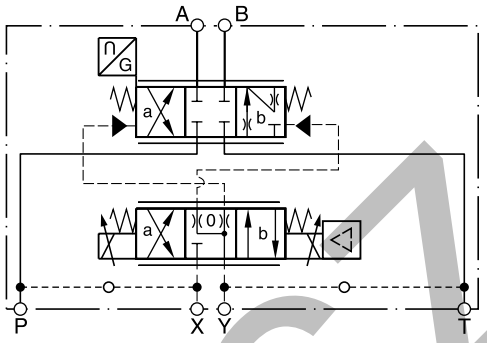
D41FC



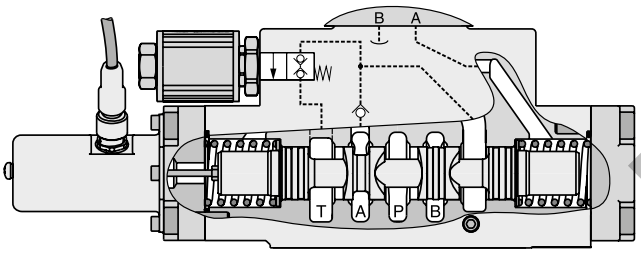
D*1FCR and D*1FCZ

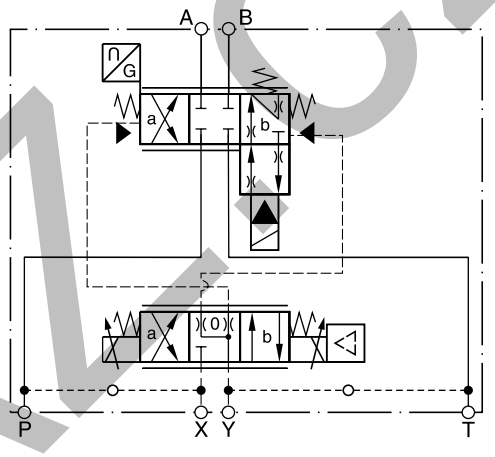
Regenerative valve D*1FCR



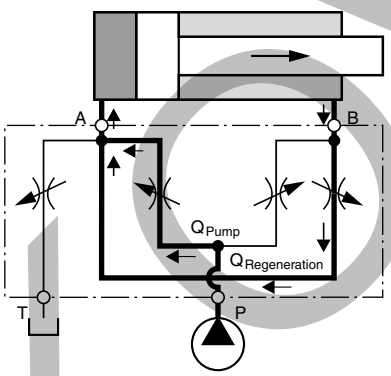


Hybrid valve D*1FCZ

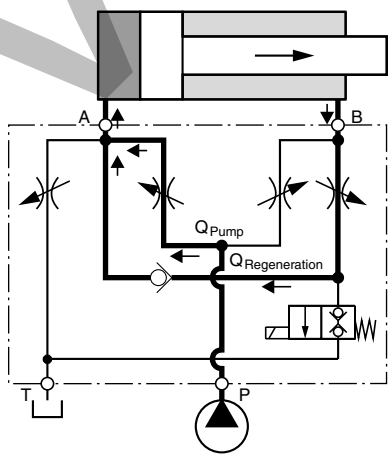




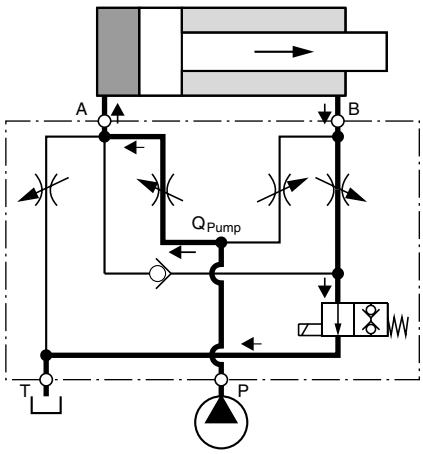
D*1FCR (regenerative valve)
Cylinder extending
(high speed)



D*1FCZ (hybrid valve)
Cylinder extending
regenerative mode
(high speed)



Cylinder extending
standard mode
(high force)



Flow rate in % of nominal flow

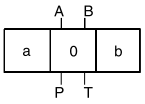
Size	Spool	Port					
		A-T	P-A	P-B	B-A (R-valve)	B-A (hybrid)	B-T (hybrid)
D41FCR/Z	31/32	100 %	50 %	100 %	50 %	45 %	20 %
D91FCR/Z	31/32	100 %	50 %	100 %	50 %	50 %	25 %
D111FCR/Z	31/32	100 %	50 %	100 %	50 %	50 %	20 %

3

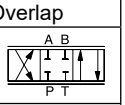
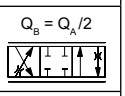
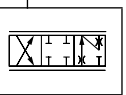
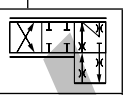
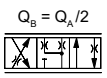
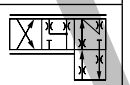
D		1	F	C			C						
Directional control valve	Size	NG06 pilot	Proportional control	Integrated electronics with position feedback	Function	Flow	Spool position on power down	Pilot connection	Seal	Command signal	Electronic option	Valve option	Design series (not required for ordering)

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 [6][7][8]	Monitor switch
L [5]	Hybrid valve 24V normally closed for spool type Z

Standard		Regenerative function [2]		Hybrid function [2][3]	
Code	Spool type	Code	Spool type	Code	Spool type
Overlap		Overlap		Overlap	
E01					
E02					
B31		R31		Z31	
B32		R32		Z32	

Code	Electronic option [4]
0	6+PE acc. EN175201-804
5	11+PE acc. EN175201-804
7	6+PE + enable acc. EN175201-804

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

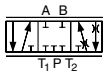
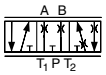
Code	Seal
N	NBR
V	FPM

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] For regenerative and hybrid function at D31FC (NG10) please refer solutions with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

D31FC spool type: R31  R32 

[3] Not for D31FC.
[4] Please order plugs separately, see accessories .
[5] See page "regenerative and hybrid function" (not for D31FC).
[6] Not for D111FCZ*.
[7] Monitor switch for hybrid valves: code 8 includes options of code L (24 V normally closed).
[8] Please order female connector M12x1 separately (see accessories, female connector M12x1 (order no.: 5004109).

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			
$MTTF_D$ 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] / [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]	90 / 120	200	450	1000
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)

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			
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 < 3.6 mA = enable off, > 3.8 mA = enable on acc. 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

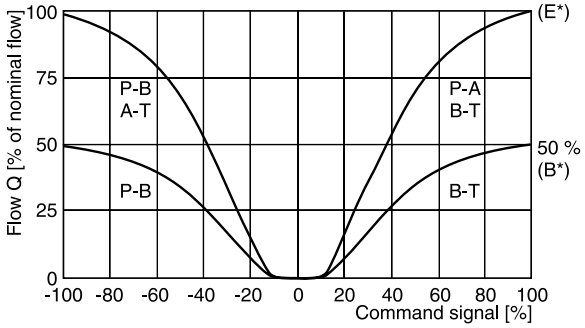
Electrical characteristics hybrid option		
Duty ratio	[%]	100
Protection class		IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage	[V]	24
Tolerance supply voltage	[%]	±10
Current consumption	[A]	1.21
Power consumption	[W]	29
Solenoid connection		Connector as per EN 175301-803
Wiring min.	[mm²]	3 x 1.5 recommended
Wiring length max.	[m]	50 recommended

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

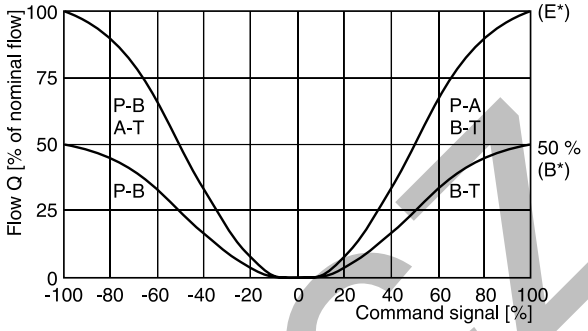
D*1FC B/E Flow characteristics

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

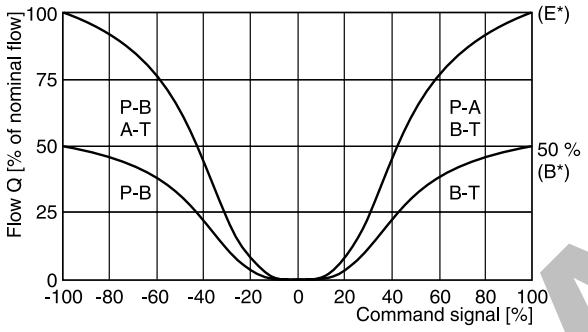
D31FC, Spool code E01, E02, B31, B32



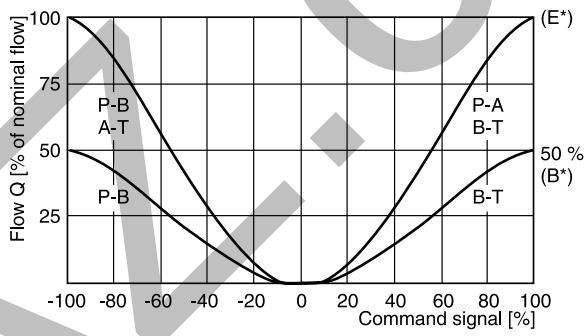
D41FC, Spool code E01, E02, B31, B32



D91FC, Spool type E01, E02, B31, B32



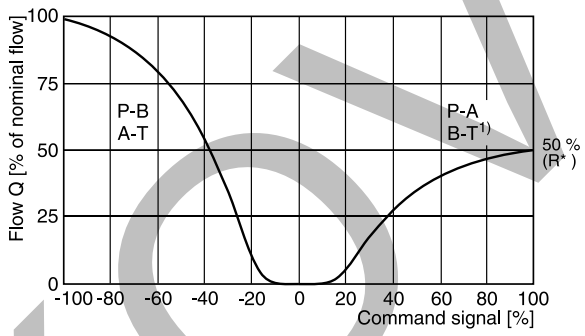
D111FC, Spool type E01, E02, B31, B32



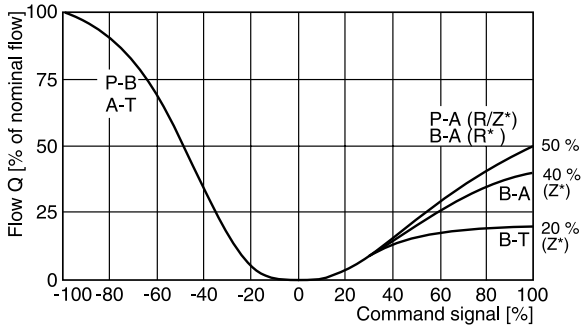
Flow characteristics D*1FCR/Z

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

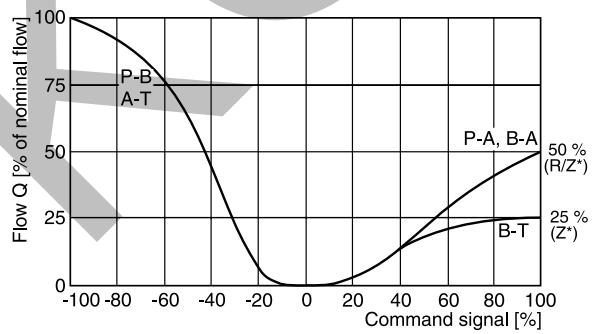
D31FC, Spool type R31, R32



D41FC, Spool type R31, R32, Z31, Z32



D91FC, Spool type R31, R32, Z31, Z32



D111FC, spool type R/Z* on request

[1] With 2 tank ports.

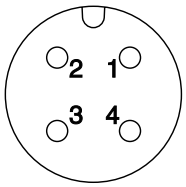
All characteristic curves measured with HLP46 at 50 °C.

3

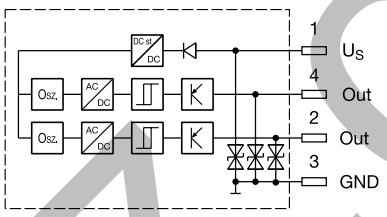
Electrical characteristics of position control M12x1 as per IEC 61076-2-101

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

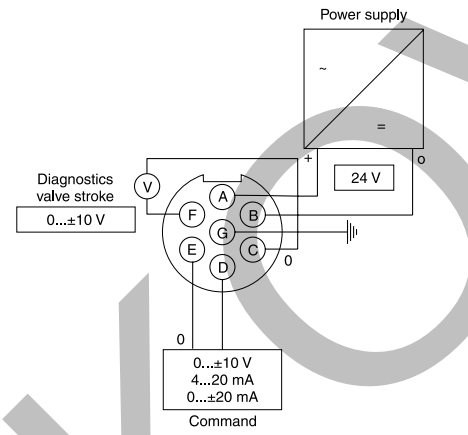
Signal	Output A (pin 4)	Output B (pin 2)
neutral	closed	closed
	open	closed
	closed	open

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

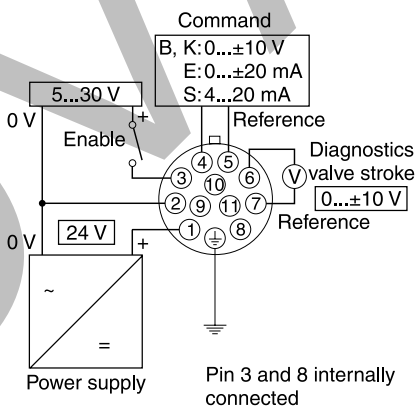
Please order female connector M12x1 separately (see accessories, female connector M12x1 (order no.: 5004109).

Wiring according EN 175201-804

Code 0/3, 6+PE



Code 5, 11+PE

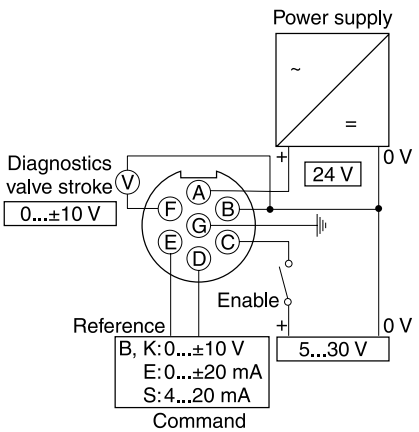


Pin 3 and 8 internally connected

Pin 9 and 11 internally connected

Pin 10 not connected

Code 1/7, 6+PE + enable



[1] Only guaranteed 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 printed out for documentation purposes.

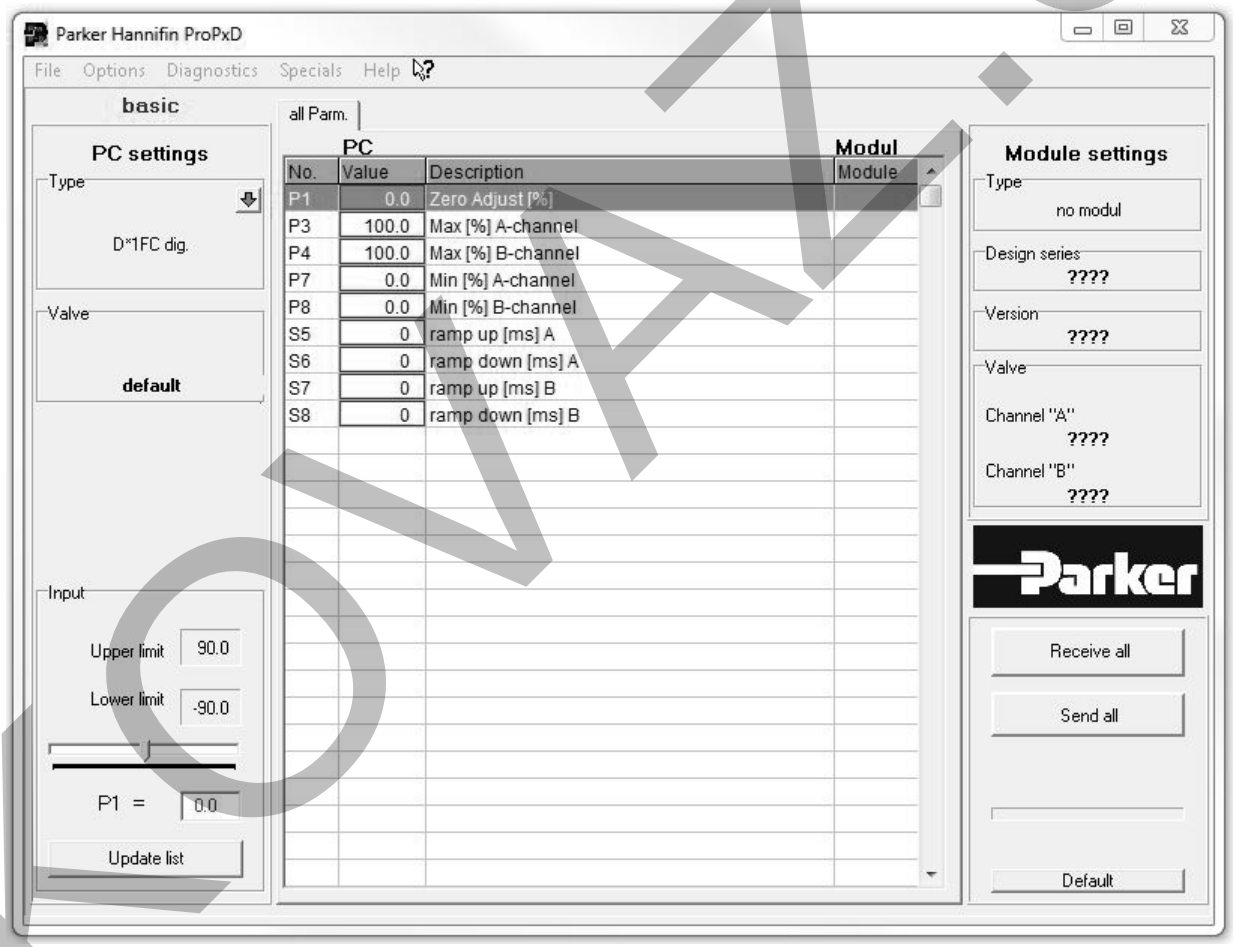
The PC software can be downloaded free of charge at www.parker.com/isde – see page “Support" or directly at www.parker.com/propxd.

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.

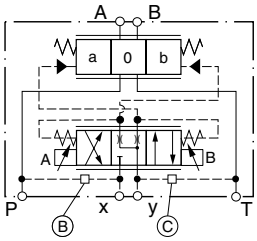
The parametrizing cable may be ordered under item no. 40982923.



Pilot oil inlet (supply) and outlet (drain)

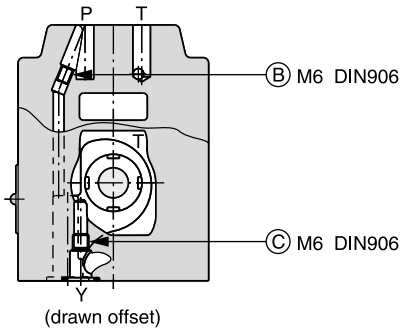
○ **open,** ● **closed**

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



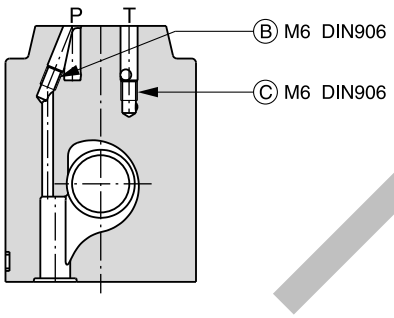
3

D31FCB/E

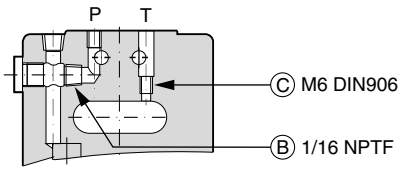


(drawn offset)

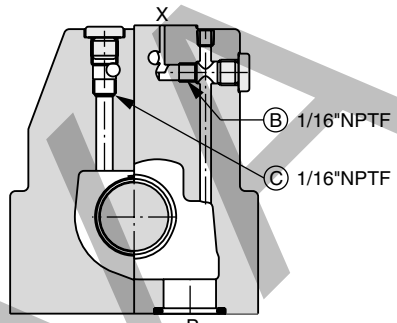
D31FCR



D41FCB/E

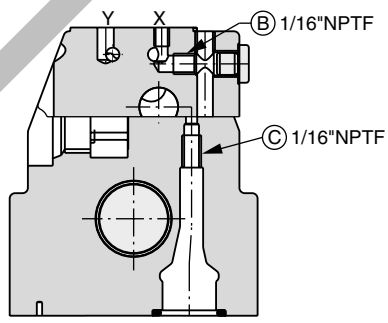


D41FCR



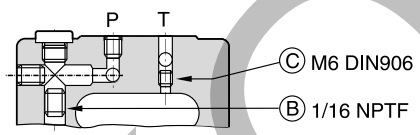
(drawn offset)

D41FCZ

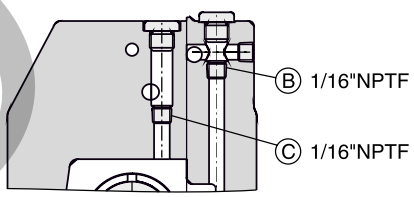


(drawn offset)

D91FCB/E

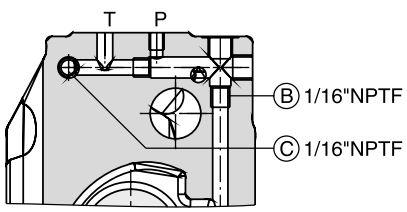


D91FCR

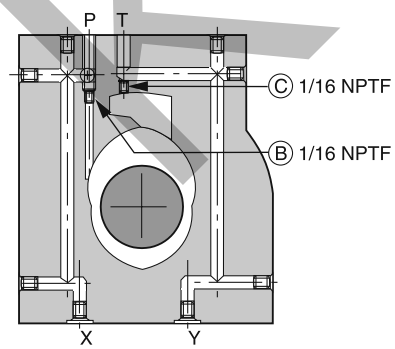


(drawn offset)

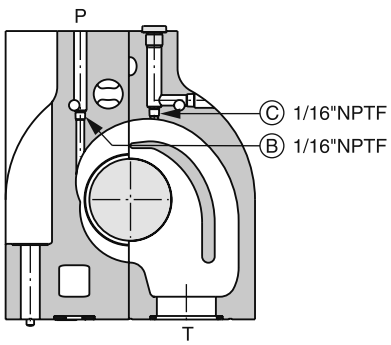
D91FCZ



D111FCB/E

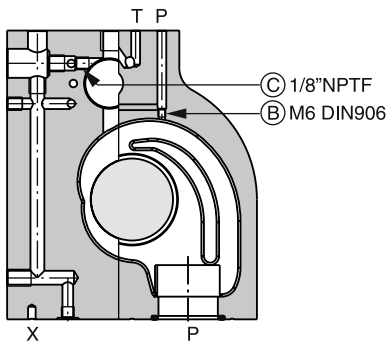


D111FCR



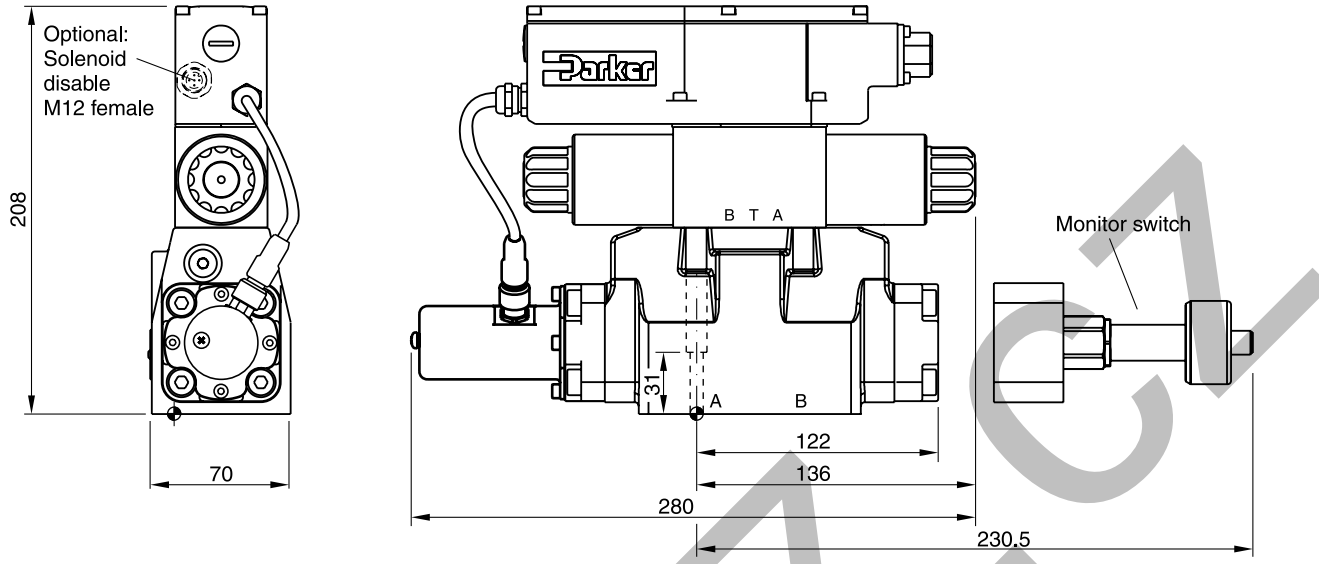
(drawn offset)

D111FCZ



(drawn offset)

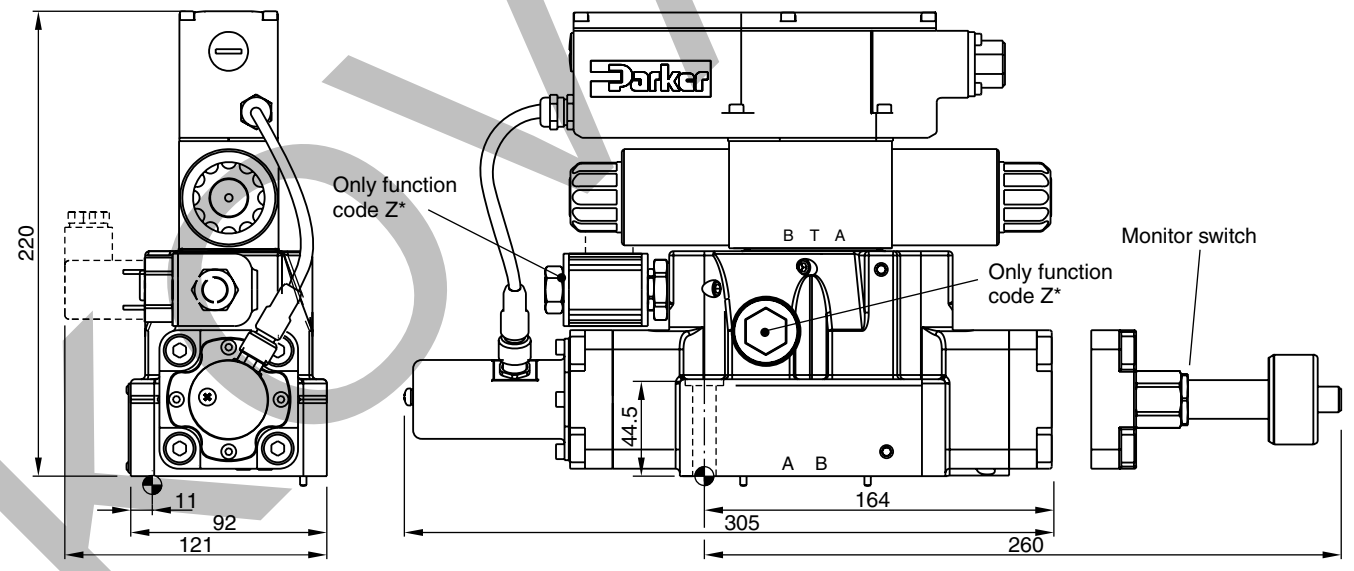
D31FC



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

Surface finish	Kit			Kit
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

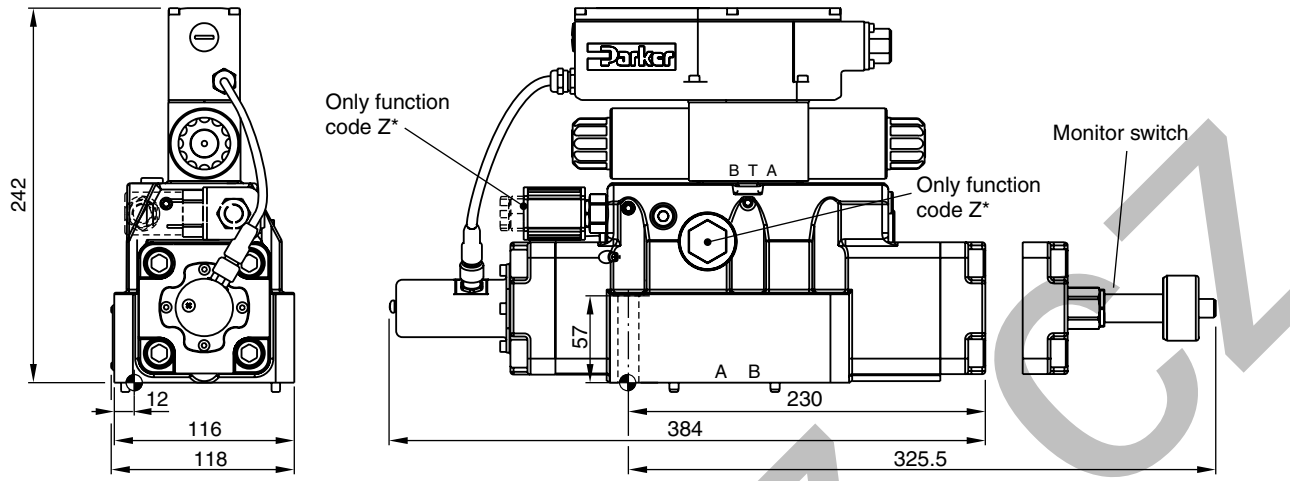
D41FC



Surface finish	Kit			Kit
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

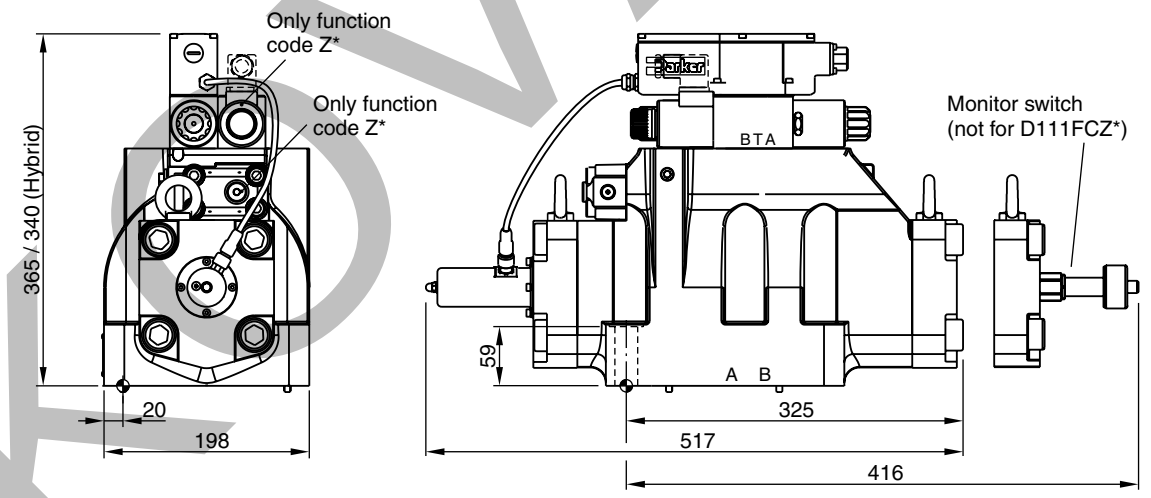
3

D91FC



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK360	6x M12x75 ISO 4762-12.9	108 Nm ±15 %	NBR: SK-D91FC FPM: SK-D111FC-V

D111FC



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

Introduction

The new proportional valves with position feedback series D*FC (direct operated) and D*1FC (pilot operated) with EtherCAT interface fulfill the requirements of modern communication between valve and main control. Due to high data transmission speed and short cycle times, also demanding control functions can be realized within the fieldbus system.

The valve is actuated and monitored by the EtherCAT interface. Actual value (spool position), temperature, operating hours and different error messages are available as diagnostic signals. The valve parameters are factory set and can be adapted with the Parker ProPxD software via the parametrizing interface.

In addition to the fieldbus communication, the valves provide the range of functions of the standard version including analogue command signal and diagnostic spare stroke. Thus they can be operated independent of the fieldbus control, particularly during commissioning and maintenance.

The option with EtherCAT is available for the series:

- D1FC, D3FC
- D31FC, D41FC, D91FC, D111FC

D1FC with EtherCAT

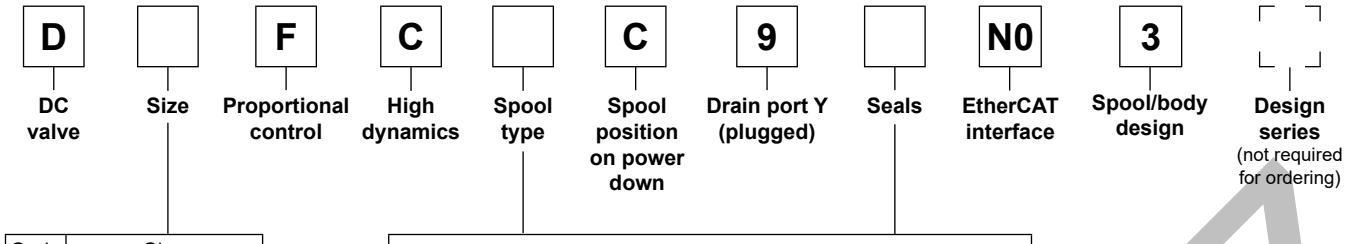
Features EtherCAT interface

- EtherCAT interface, 2x M12x1 connector 4-Pin (EtherCAT In and EtherCAT Out)
- Progressive flow characteristics for sensitive adjustment
- Low hysteresis
- High dynamics
- High flow capacity
- Onboard electronics

Technical Data

Electrical			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple		[V]	18...30, electric shut-off at < 17, ripple < 5 % eff., surge free
Current consumption max.		[A]	2.0 (D1FC, D*1FC), 3.5 (D3FC)
Pre fusing medium lag		[A]	2.5 (D1FC, D*1FC), 4.0 (D3FC)
Differential input		[V]	30 for terminal D and E against PE (terminal G)
Diagnostic signal		[V]	+10...0...-10 / +12.5 error detection
EMC			EN 61000-6-2, EN 61000-6-4
Electrical connection			6 + PE acc. to EN 175201-804
EtherCAT interface			2 x socket M12x1: 5p acc. to IEC61076-2-101
Wiring min.		[mm²]	3 x 1.0 (AWG16) overall braid shield
Wiring length max.		[m]	50
Wiring EtherCAT			acc. to CiA DS-301 Version 4 / Twisted pair cable acc. to ISO11898
EtherCAT profiles			Communication Layer IEC 61158-x-12, 301 Version 4 Device Profile in accordance with CIA DS - 408 Version 1.5.2 CANopen over EtherCAT (object dictionary)
Functionality			One PDO (Receive) One PDO (Transmit) BUS-cycle time down to 0.250 mSec.
Parameterization			
Interface			RS 232, parametrizing cable order code 40982923
Interface program			ProPxD (see www.parker.com/propxd)
Adjustment ranges	Min	[%]	0...50
	Max	[%]	50...100
	Ramp	[%]	0...32.5

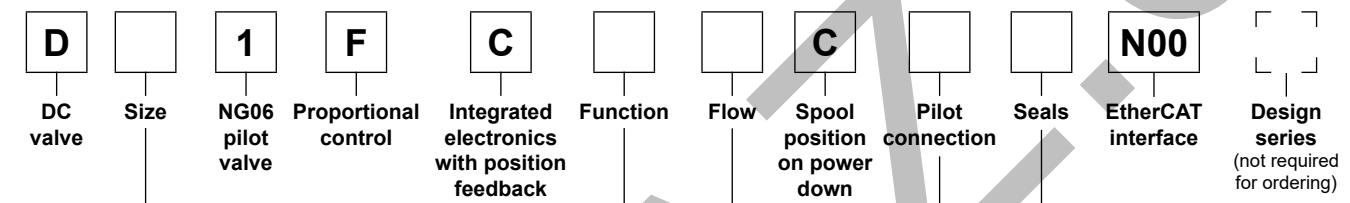
Direct Operated Proportional DC Valve



Code	Size
1	NG06 / CETOP 03
3	NG10 / CETOP 05

See ordering code for valve series without EtherCAT

Pilot Operated Proportional DC Valve



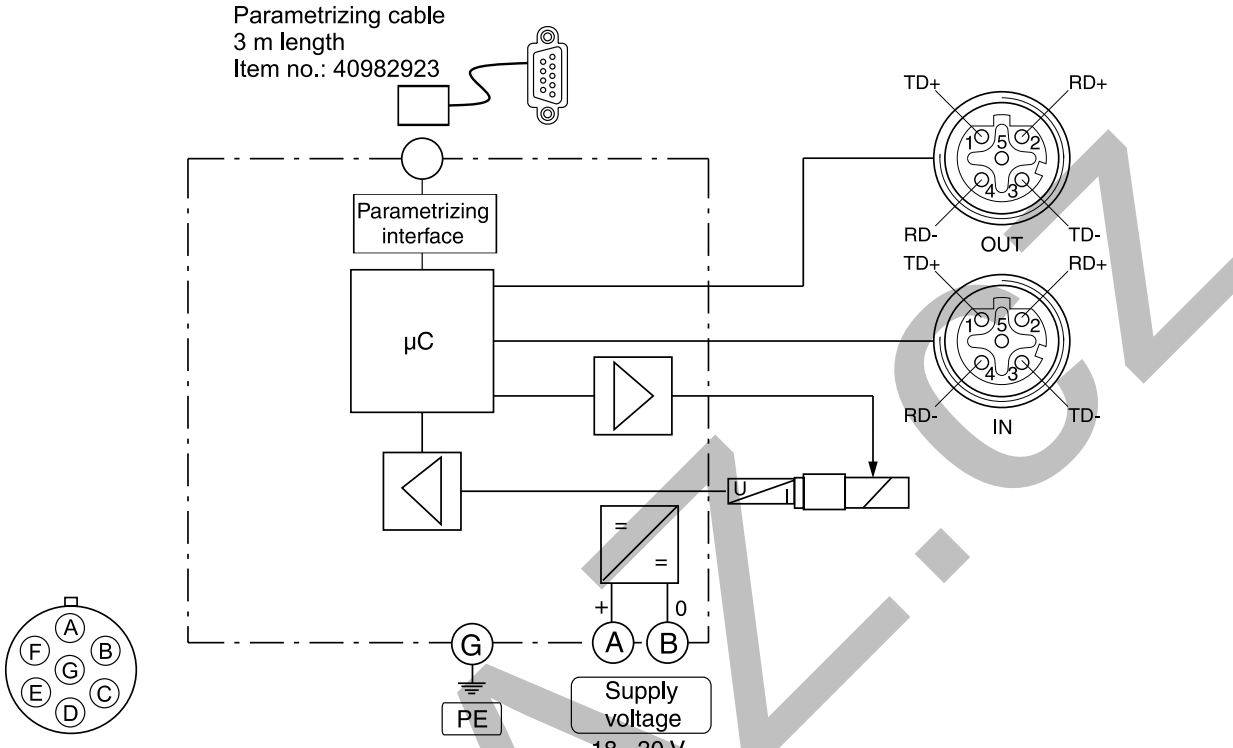
Code	Size
3	NG10 / CETOP 05
4	NG16 / CETOP 07
9	NG25 / CETOP 08
11	NG32 / CETOP 10

See ordering code for valve series without EtherCAT

Please order connector separately, see chapter 3 accessories.
Parametrizing cable OBE → RS232, item no. 40982923

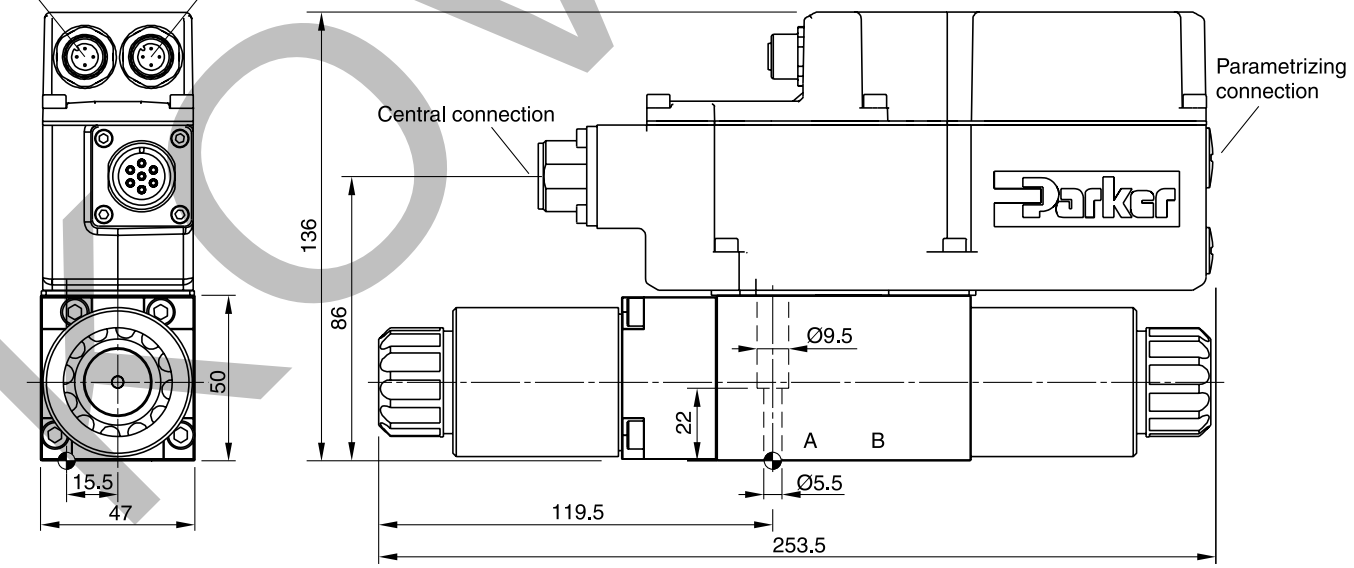
Block diagram

EtherCAT



Dimensions D1FC with EtherCAT

EtherCAT EtherCAT

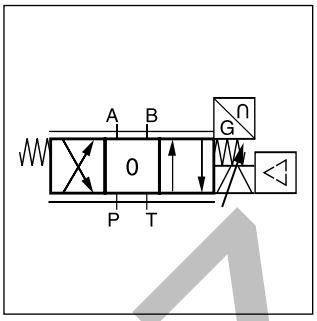


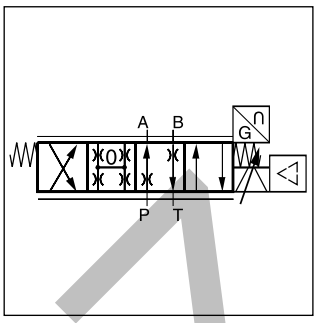
3

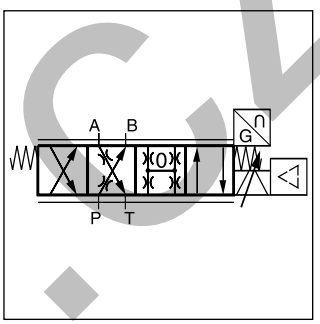
The direct operated control valve D1FP of the nominal size NG06 (CETOP 03) shows extremly high dynamics combined with maximum flow. It is the preferred choice for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

Driven by the patented 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.



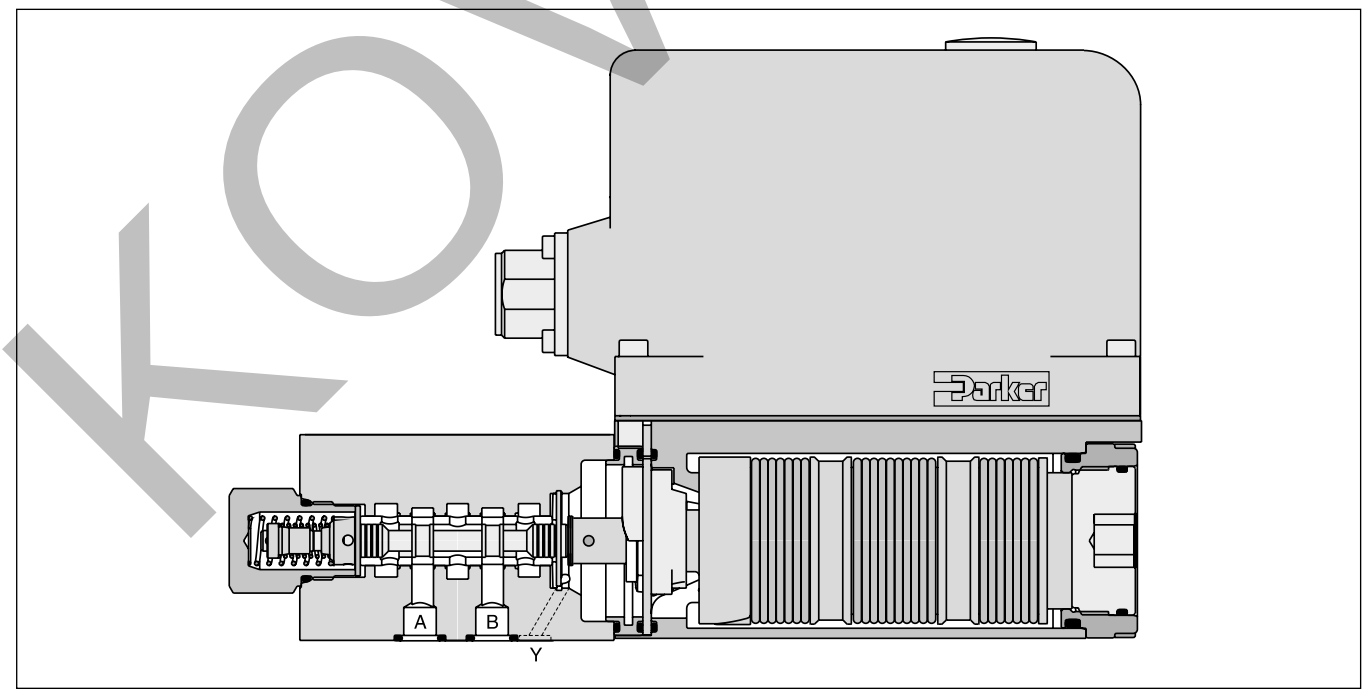




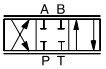
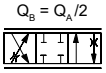
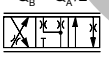
Features

- Real servovalve dynamics
  (-3 dB / 350 Hz at ±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

CE



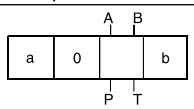
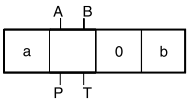
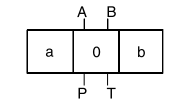
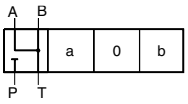
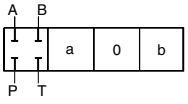
D	1	F	P			9				0	
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	Proportional control	VCD	Spool type	Spool position on power down [1]	Y-port (plugged) [5]	Seals	Command signal	Electronics option	Spool/ sleeve design	Design series (not required for ordering)

Code	Spool type	Flow [l/min] at Δp 35 bar per metering edge
Zerolap		
E50B, E50C, E50F, E50G, E50H, E50M		3, 6, 12, 16, 25, 40
B60C, B60F, B60G, B60H, B60M	$Q_B = Q_A/2$ 	6 / 3, 12 / 6, 16 / 8, 25 / 12.5, 40 / 20
Underlap		
E55B, E55C, E55F, E55G, E55H, E55M		3, 6, 12, 16, 25, 40
Overlap		
E01B, E01C, E01F, E01G, E01H, E01M		3, 6, 12, 16, 25, 40
B31C, B31F, B31G, B31H, B31M	$Q_B = Q_A/2$ 	6 / 3, 12 / 6, 16 / 8, 25 / 12.5, 40 / 20
E02B, E02C, E02F, E02G, E02H, E02M		3, 6, 12, 16, 25, 40
B32C, B32F, B32G, B32H, B32M	$Q_B = Q_A/2$ 	6 / 3, 12 / 6, 16 / 8, 25 / 12.5, 40 / 20

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

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

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

Note:

Adapter plate for ISO 4401 to ISO 10372 size 04, Ordering code HAP04WV06-1661

Please order connector separately, see chapter 3 accessories.

Parametrizing cable OBE -> RS232, item no. 40982923

[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.

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

3

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...+50
$MTTF_D$ value [1]		[years]	150
Weight		[kg]	3.6
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]	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]/mm²/s]	20...400
	recommended	[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
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
Electrical characteristics			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple		[V]	DC 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
Input signal			
Code B	Voltage	[V]	10...0...-10, ripple <0.01 % eff., surge free, 0...+10 V P->A
	Impedance	[kOhm]	100
Code E	Current	[mA]	20...0...-20, ripple <0.01 % eff., surge free, 0...+20 mA P->A
	Impedance	[Ohm]	<250
Code S	Current	[mA]	4...12...20, ripple <0.01 % eff., surge free, 12...20 mA P->A <3.6 mA = disable, >3.8 mA = according to NAMUR NE43
	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)		[V]	5...30, Ri = > 8 kOhm
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 Code 5	6 + PE acc. EN 175201-804 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

[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.

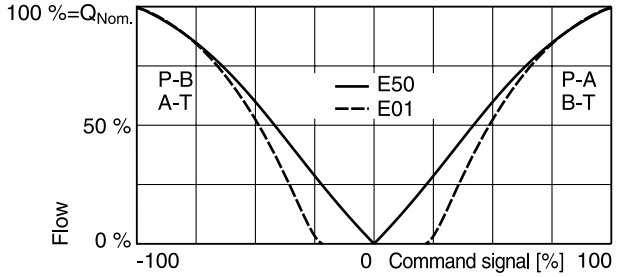
[2] For applications with p_T>35 bar (max. 350 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

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

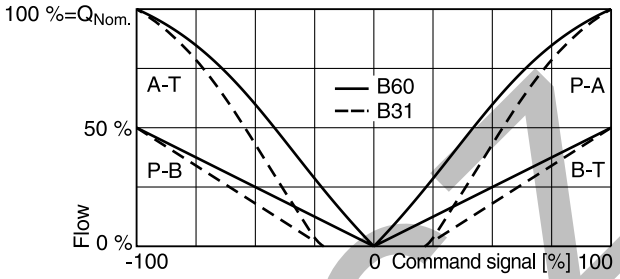
[4] Measured with load (100 bar pressure drop/two control edges).

Flow curves
(Overlapped spool opening point 23 %)
at Δp = 35 bar per metering edge

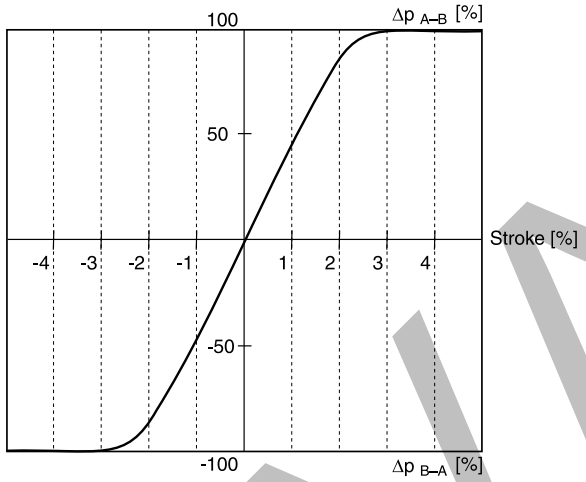
Spool type **E01/E50**



Spool type **B31/B60**

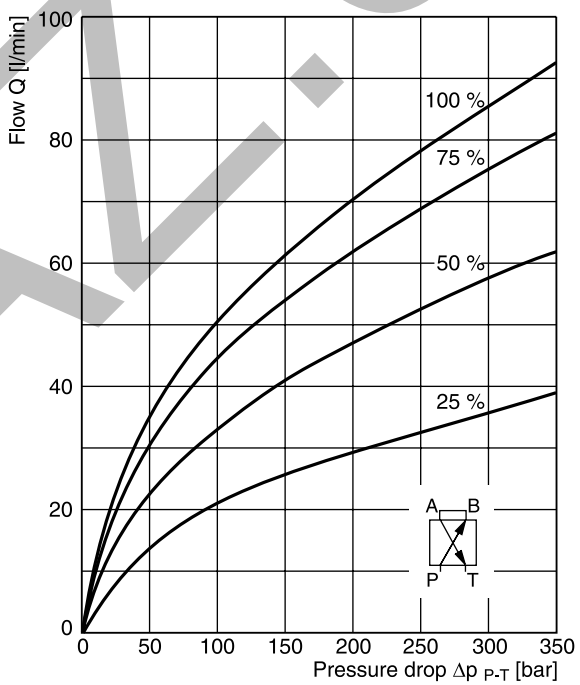


Pressure gain

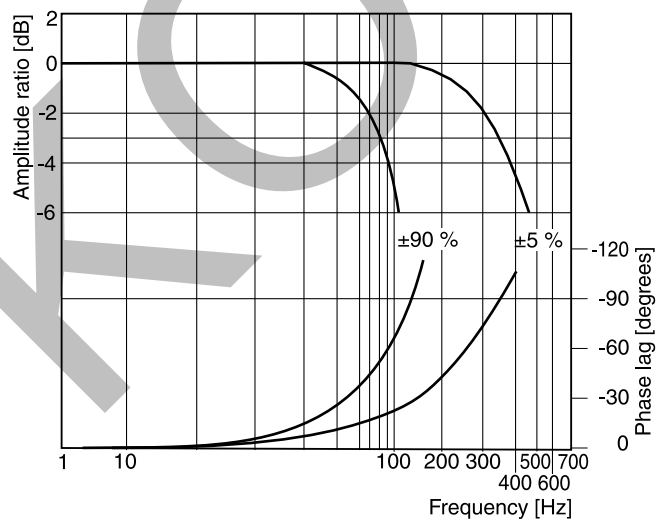


Functional limits
at 25 %, 50 %, 75 % and 100 % command signal

Spool type **E01M/E50M**



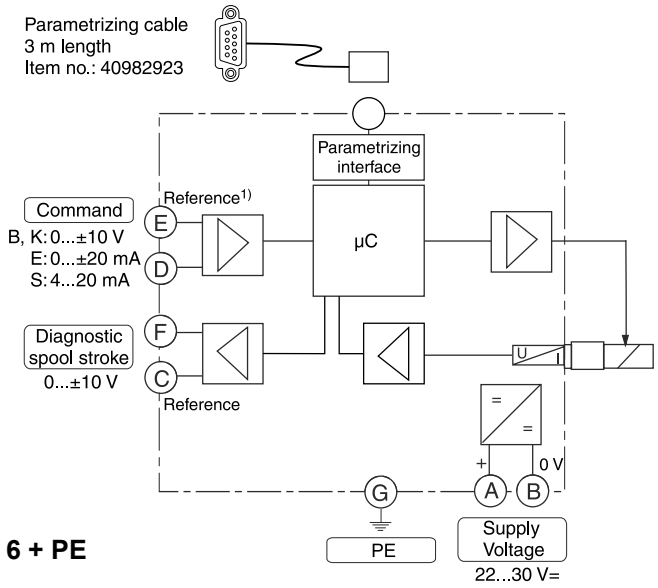
Frequency response
±5 % command signal
±90 % command signal



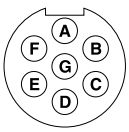
All characteristic curves measured with HLP46 at 50 °C.

3

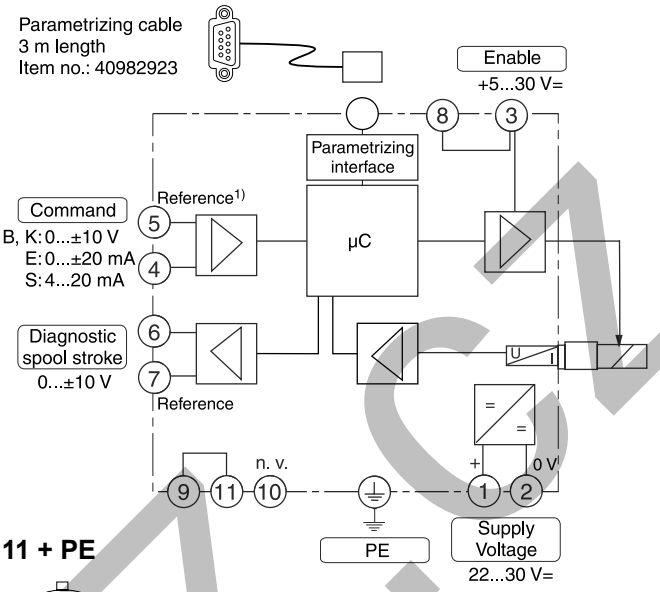
Code 0



6 + PE

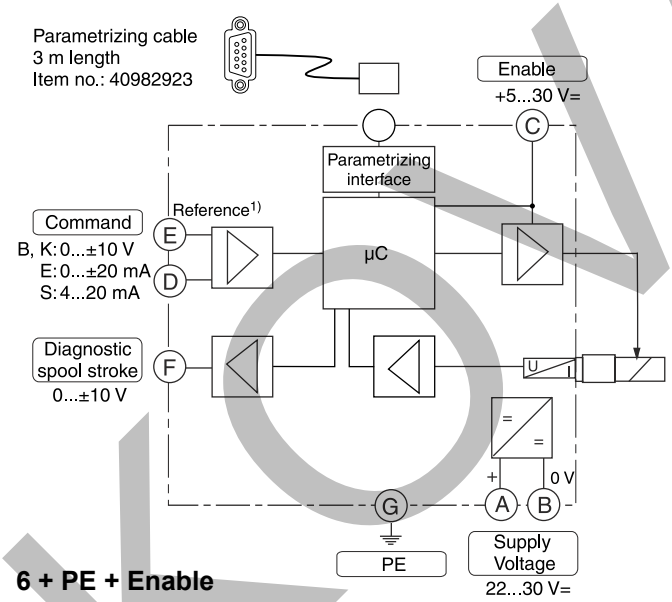


Code 5

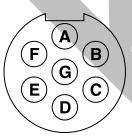


11 + PE

Code 7



6 + PE + 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.

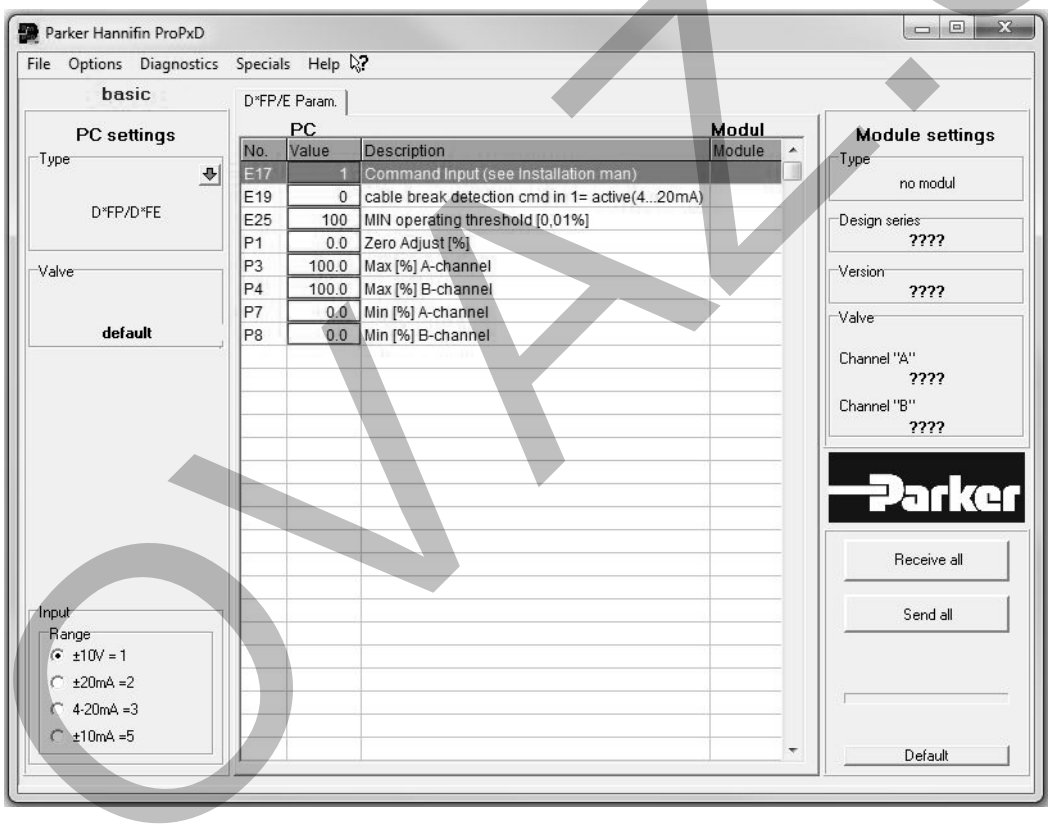
The PC software can be downloaded free of charge at www.parker.com/isde – see page “Support" or directly at www.parker.com/propxd.

Features

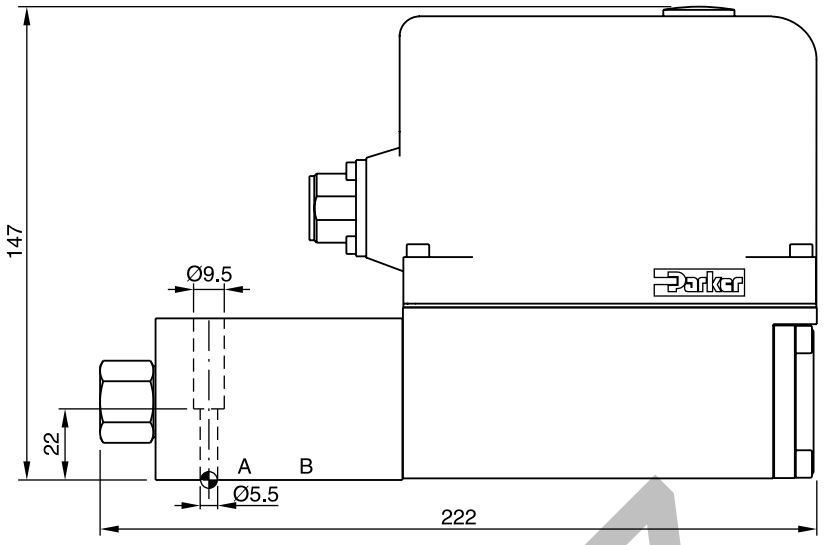
- Comfortable editing of valve parameters
- Saving and loading of customized parameter sets
- Executable with all Windows® operating systems from Windows® XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

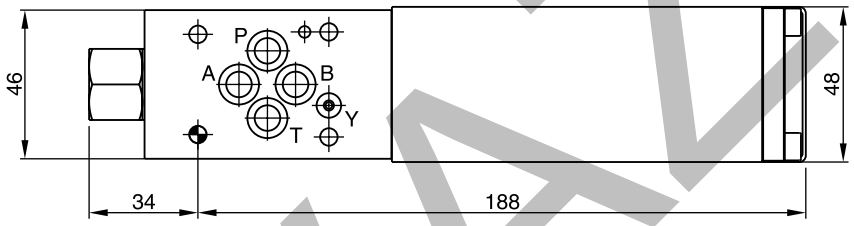
The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.

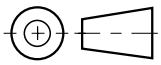
The parametrizing cable may be ordered under item no. 40982923.



3





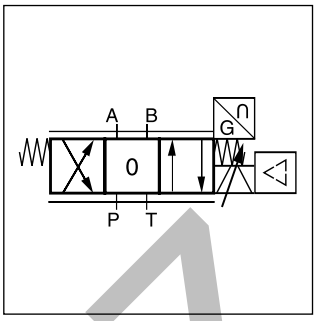


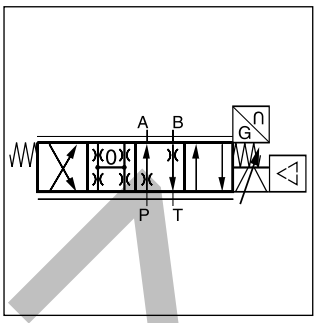
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	NBR: SK-D1FP FPM: SK-D1FP-V HFC: SK-D1FP-H

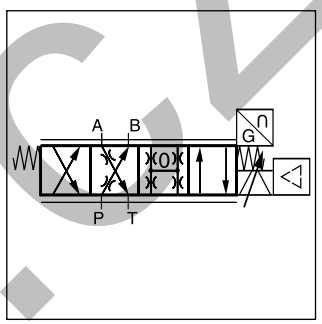
The direct operated control valve D3FP of the nominal size NG10 (CETOP 05) shows extremly high dynamics combined with high flow. It is the preferred choice for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

Driven by the patented VCD® actuator the D3FP reaches the frequency response of real servovalves.

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



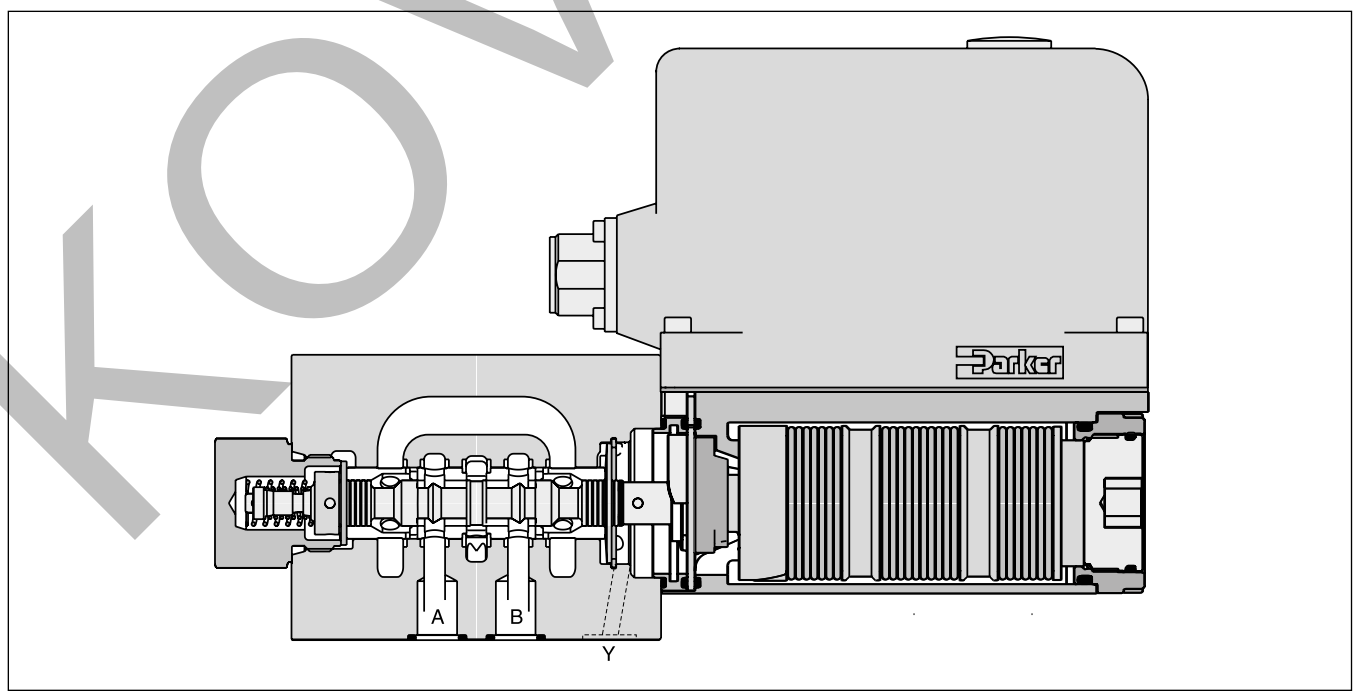




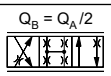
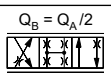
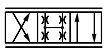
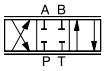
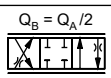
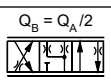
Features

- Real servovalve dynamics
  (-3 dB / 350 Hz at ±5 % input signal)
- Max. tank pressure 250 bar
  (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)
- Onboard electronics
- Spool / sleeve design

CE



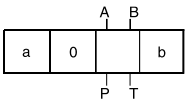
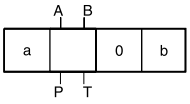
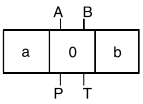
D	3	F	P			9				0	
Direct. control valve	Size DIN NG10 CETOP 05 NFPA D05	Proportional control	VCD	Spool type	Spool position on power down [1]	Y-port (plugged) [4]	Seals	Command signal	Electronics option	Spool/ sleeve design	Design series (not required for ordering)

Code	Spool type	Flow [l/min] at Δp 35 bar per metering edge
	Zerolap	
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 **E01Y**	A B  P T	**50** **100**
E02P **E02Y**		**50** **100**
B31P **B31Y**	$Q_B = Q_A/2$ 	**50 / 25** **100 / 50**
B32P **B32Y**	$Q_B = Q_A/2$ 	**50 / 25** **100 / 50**

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

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

Code	Seals
N	**NBR**
V	**FPM**
H	**for HFC fluid**

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

Short delivery time for all variations

For regenerative and hybrid function please refer solutions with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

Please order connector separately, see chapter 3 accessories.

Parametrizing cable OBE -> RS232, item no. 40982923

[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 zerolapped spools and underlapped spools.

[3] Only for overlapped spools.

[4] Plug in the Y-port needs to be removed at tank pressure >35 bar.

General			
Design			Direct operated servo proportional DC valve
Actuation			VCD® actuator
Size			NG10 / CETOP 05 / NFPA D05
Mounting interface			DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position			unrestricted
Ambient temperature		[°C]	-20...+50
$MTTF_D$ value [1]		[years]	150
Weight		[kg]	6.5
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]	Ports P, A, B 350, port T 35 for internal drain, 250 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]/[mm²/s]	20...400
	recommended	[cSt]/[mm²/s]	30...80
Filtration			ISO 4406; 18/16/13
Flow nominal at Δp=35 bar per control edge [3]		[l/min]	50 / 100
Flow maximum		[l/min]	150
Leakage at 100 bar		[ml/min]	<400 (zerolap spool); <100 (overlap spool)
Opening point		[%]	set to 19 command signal (see flow characteristics)
Static / Dynamic			
Step response at 100 % step [4]		[ms]	<6
Frequency response (±5 % signal) [4]		[Hz]	200 (amplitude ratio -3 dB), 200 (phase lag -90°)
Hysteresis		[%]	<0.05
Sensitivity		[%]	<0.03
Temperature drift		[%/K]	<0.025
Electrical characteristics			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple		[V]	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
Input signal			
Code B	Voltage	[V]	10...0...-10, ripple <0.01 % eff., surge free, 0...+10 V P->A
	Impedance	[kOhm]	100
Code E	Current	[mA]	20...0...-20, ripple <0.01 % eff., surge free, 0...+20 mA P->A
	Impedance	[Ohm]	<250
Code S	Current	[mA]	4...12...20, ripple <0.01 % eff., surge free, 12...20 mA P->A <3.6 mA = disable, >3.8 mA = according to NAMUR NE43
	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)	[V]	5...30, Ri = > 8 kOhm
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 Code 5	6 + PE acc. EN 175201-804 11 + PE acc. EN 175201-804
Wiring min.	Code 0/7	[mm²]	7 x 1.0 (AWG 16) overall braid shield
	Code 5	[mm²]	8 x 1.0 (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.

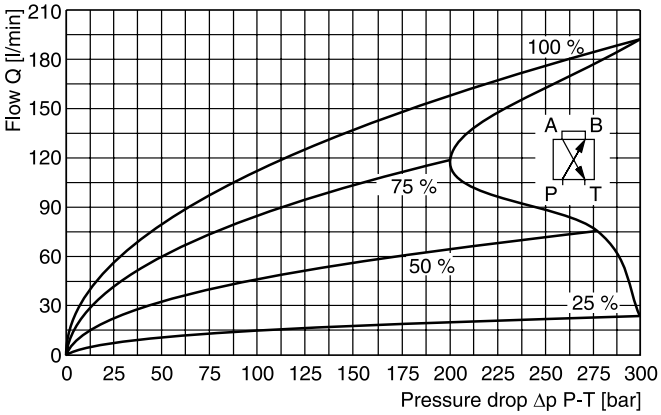
[2] For applications with p_T>35 bar (max. 250 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

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

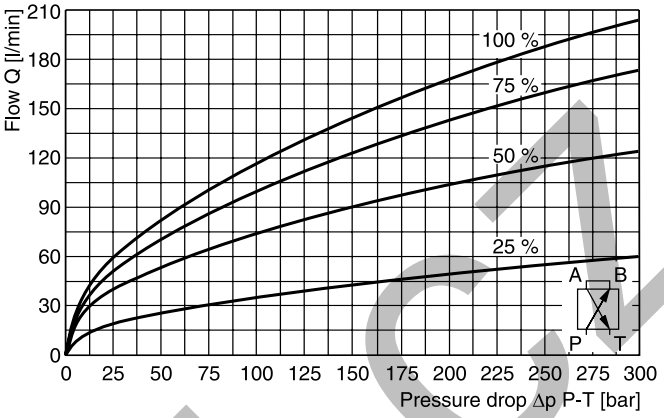
[4] Measured with load (100 bar pressure drop/two control edges).

3

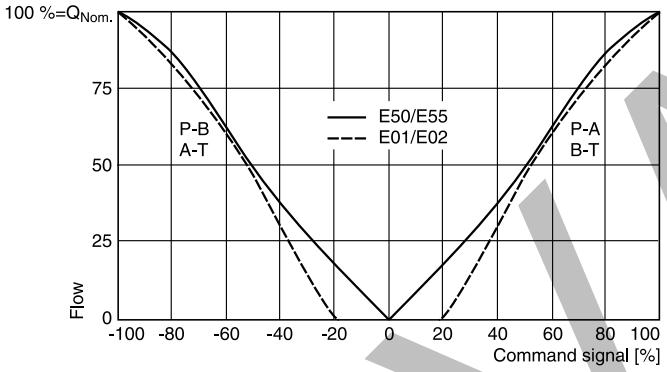
Functional limits [1)]
at 25 %, 50 %, 75 % and 100 % command signal
Spool type **E01Y/E02Y**



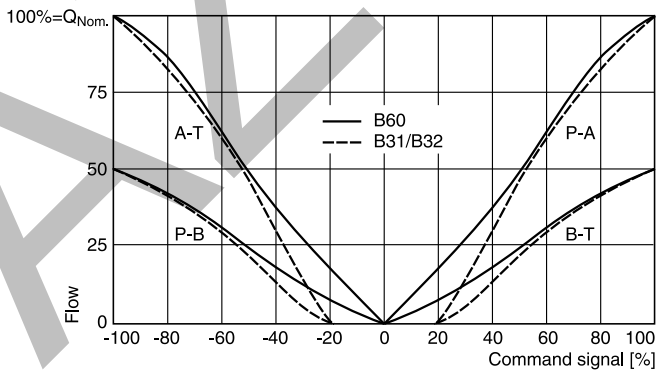
Functional limits [1)]
at 25 %, 50 %, 75 % and 100 % command signal
Spool type **E50Y/E55Y**



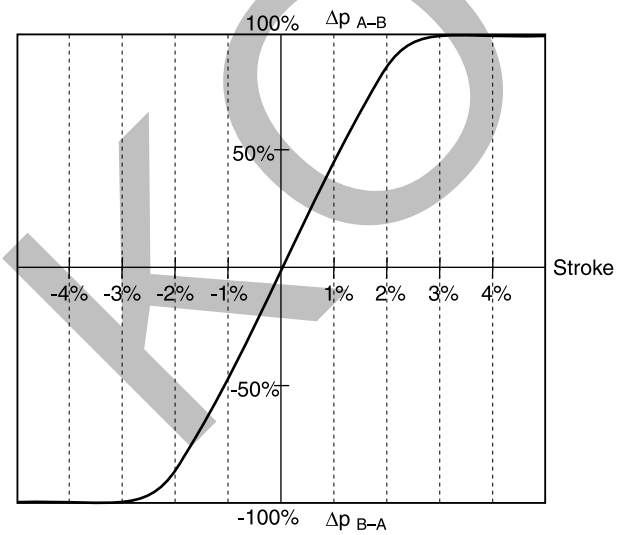
Flow curves
(Overlapped spool set to opening point 19 %)
at Δp = 35 bar per metering edge
Spool type **E50/E55, E01/E02**



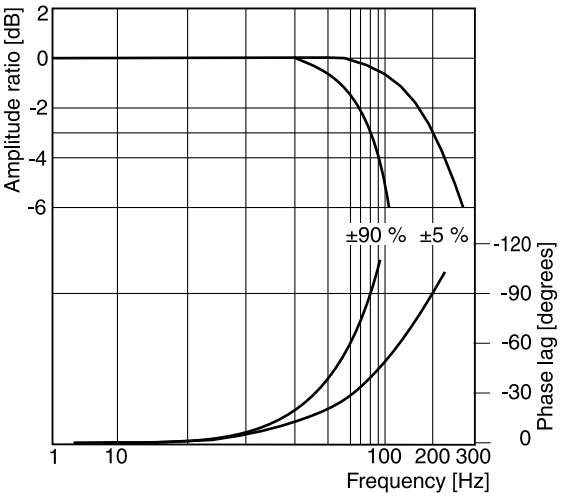
Spool type **B31/B32, B60**



Pressure gain

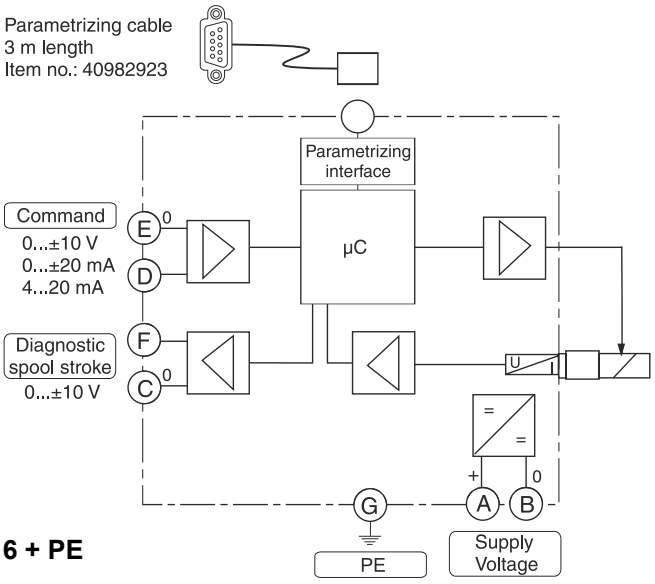


Frequency response
±5 % command signal
±90 % command signal

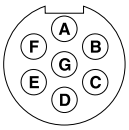


[1)] When exceeding the functional limits, for a period of time the valve will go into fail safe and power supply needs to be switched off/on to re-enable the valve.

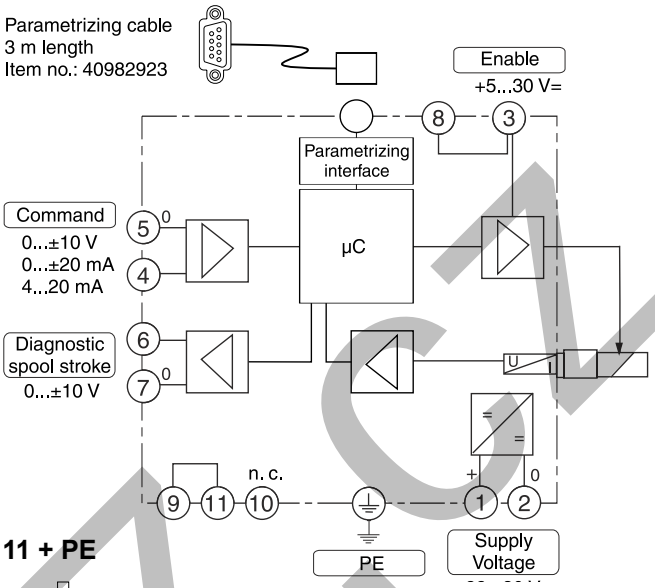
Code 0



6 + PE

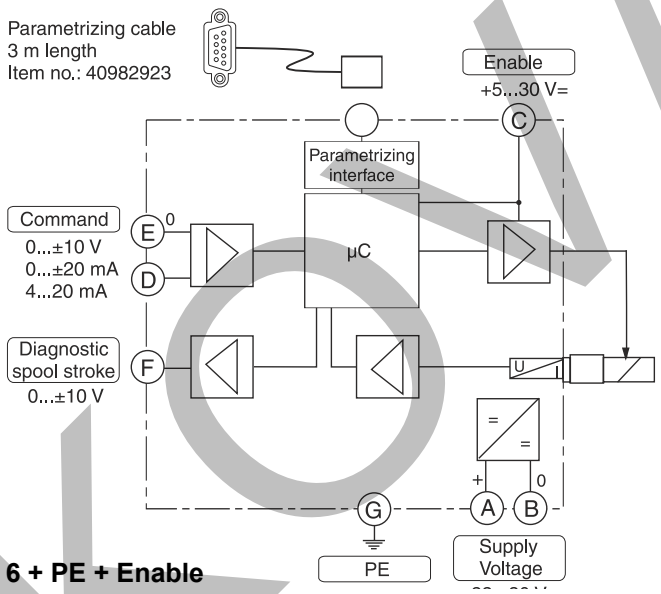


Code 5

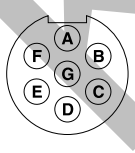


11 + PE

Code 7



6 + PE + Enable



[1] Do not connect with supply voltage zero.

3

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.

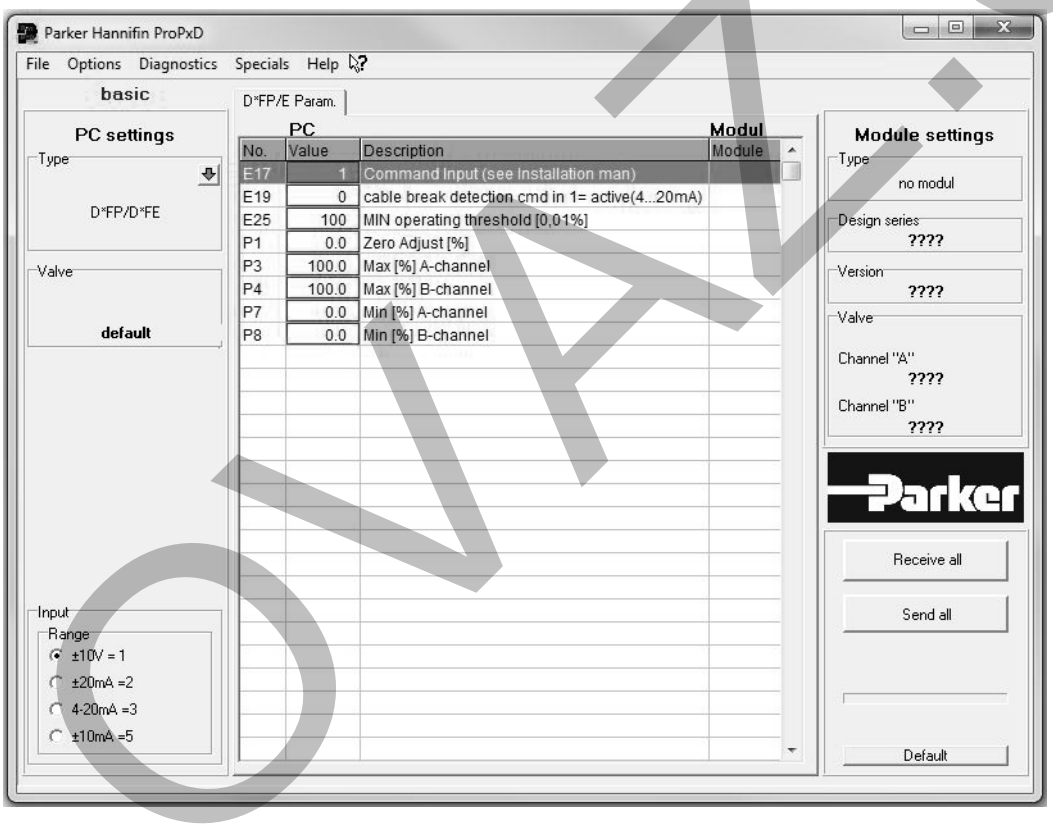
The PC software can be downloaded free of charge at www.parker.com/isde – see page “Support" or directly at www.parker.com/propxd.

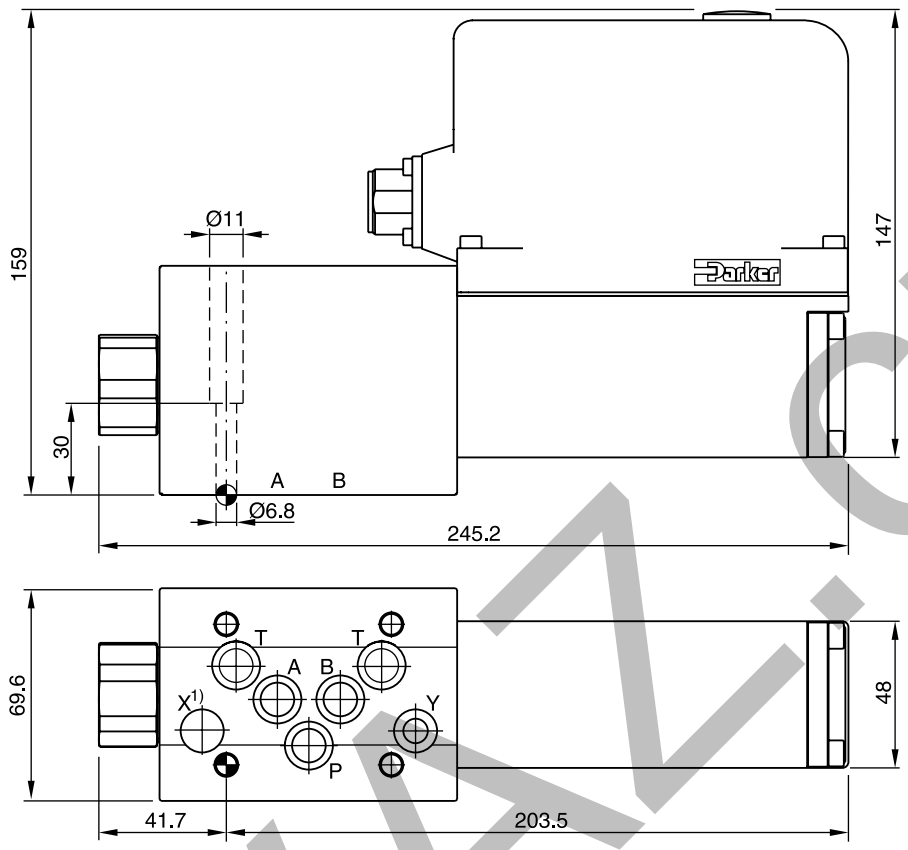
Features

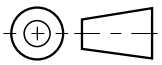
- Comfortable editing of valve parameters
- Saving and loading of customized parameter sets
- Executable with all Windows® operating systems from Windows® XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

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.







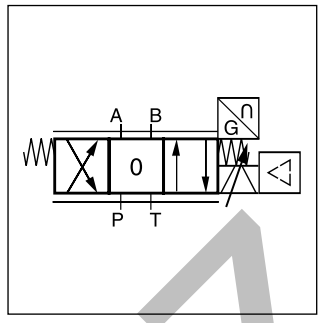
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4xM6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D3FP FPM: SK-D3FP-V HFC: SK-D3FP-H

1) O-ring recess diameter on valve body.

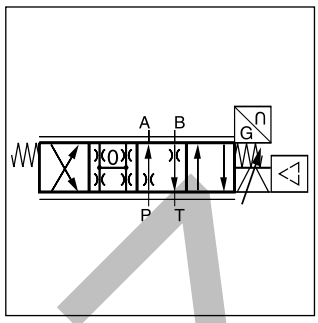
Characteristics

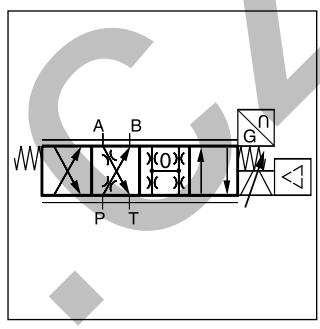
The direct operated control valves D1FP with freely configurable control circuit of the nominal size NG06 (CETOP 03) and D3FP of the nominal size NG10 (CETOP 05) shows extremly high dynamics combined with maximum flow. It is the preferred choice for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

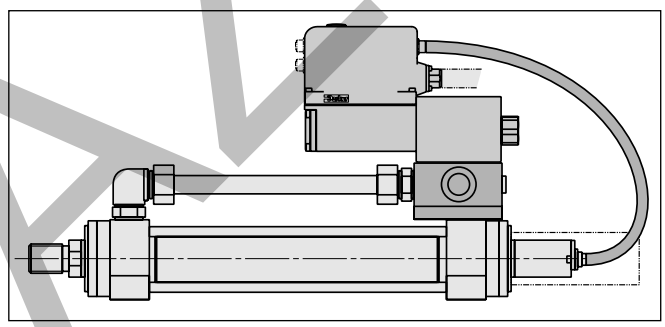
Driven by the patented VCD® actuator the D*FP reaches the frequency response of real servovalves. At power-down the spool moves in a defined position. All common input signals are available.



D1FP







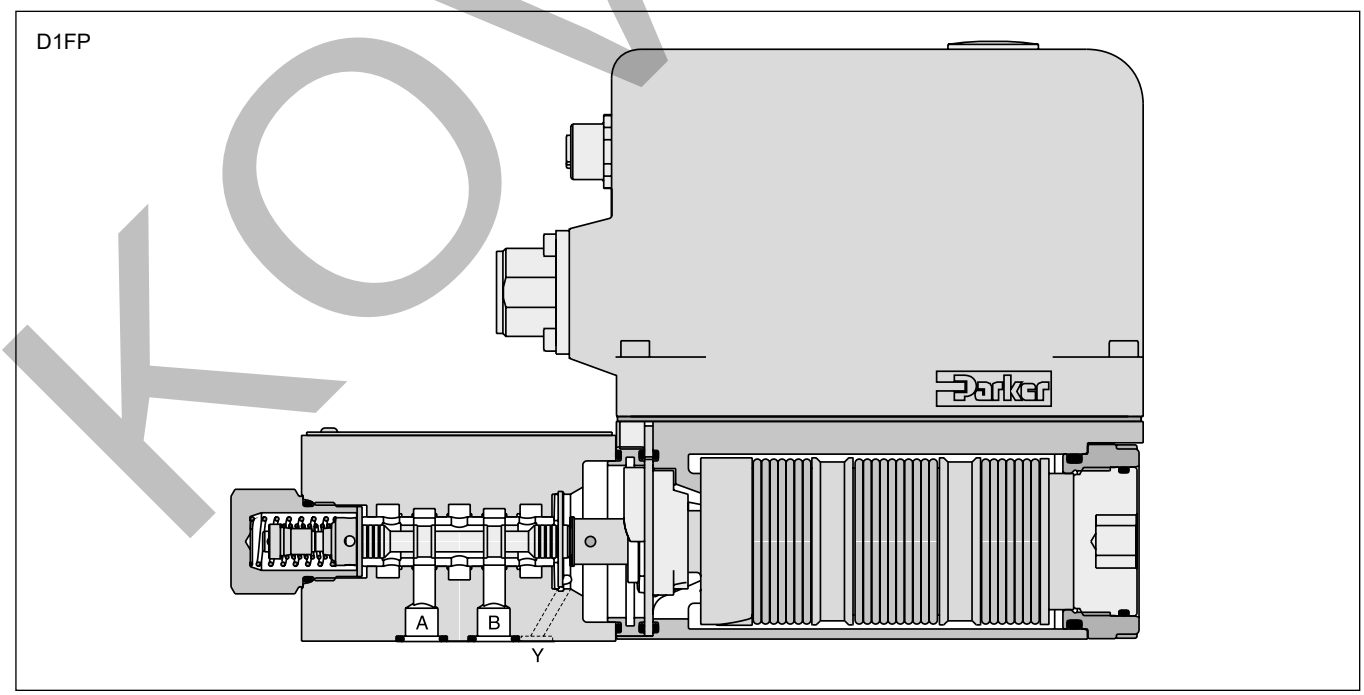
Application example

Features

- Freely configurable supervising control circuit
- Analogue sensor input
- Onboard electronics
- Real servovalve dynamics (-3 dB / 350 Hz at ±5 % input signal)
- Max. tank pressure 350 bar (D1FP), 250 (D3FP) (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)

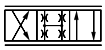
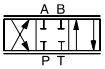
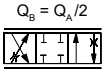
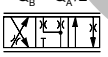
CE

D1FP



Ordering Code

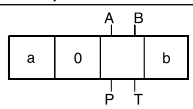
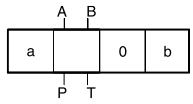
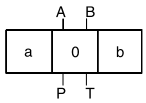
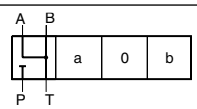
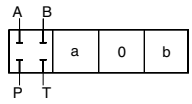
D	1	F	P			9				D	
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	Proportional control	VCD	Spool type	Spool position on power down [1]	Y-port (plugged) [5]	Seals	Command signal	Electronics option	Freely config. supervising control circuit	Design series (not required for ordering)

Code	Spool type	Flow [l/min] at Δp 35 bar per metering edge
	Zerolap	
E50B E50C E50F E50G E50H E50M		3 6 12 16 25 40
B60C B60F B60G B60H B60M	$Q_B = Q_A/2$ 	6 / 3 12 / 6 16 / 8 25 / 12.5 40 / 20
	Underlap	
E55B E55C E55F E55G E55H E55M		3 6 12 16 25 40
	Overlap	
E01B E01C E01F E01G E01H E01M		3 6 12 16 25 40
B31C B31F B31G B31H B31M	$Q_B = Q_A/2$ 	6 / 3 12 / 6 16 / 8 25 / 12.5 40 / 20
E02B E02C E02F E02G E02H E02M		3 6 12 16 25 40
B32C B32F B32G B32H B32M	$Q_B = Q_A/2$ 	6 / 3 12 / 6 16 / 8 25 / 12.5 40 / 20

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

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

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:

Adapter plate for ISO 4401 to ISO 10372 size 04, Ordering code HAP04WV06-1661

Please order connector separately, see catalogue MSG11-3500/UK, chapter 3 accessories.

Parametrizing cable OBE -> RS232, item no. 40982923

[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.

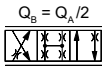
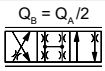
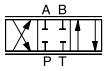
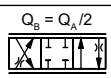
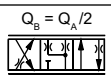
[3] Only for overlap spools.

[4] Not for flow code M (40 l/min).

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

Ordering Code

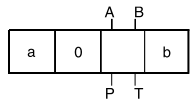
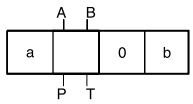
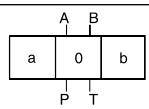
D	3	F	P			9				D	
Direct. control valve	Size DIN NG10 CETOP 05 NFPA D05	Proportional control	VCD	Spool type	Spool position on power down [1]	Y-port (plugged) [4]	Seals	Command signal	Electronics option	Freely config. supervising control circuit	Design series (not required for ordering)

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 E01Y		50 100
E02P E02Y		50 100
B31P B31Y	$Q_B = Q_A/2$ 	50 / 25 100 / 50
B32P B32Y	$Q_B = Q_A/2$ 	50 / 25 100 / 50

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

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

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

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

For regenerative and hybrid function please refer to solutions with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in catalogue MSG11-3500/UK, chapter 12.

Please order connector separately, see catalogue HY11-3500/UK, chapter 3 accessories.

Parametrizing cable OBE -> RS232, item no. 40982923

[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.

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...+50
$MTTF_D$ value [1]		[years]	150
Weight		[kg]	5.0 (D1FP), 6.5 (D3FP)
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]	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	[cSt]/mm²/s]	20...400
	recommended	[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) 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
Electrical characteristics			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple		[V]	DC 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
Input signal			
Code B, (K)	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->A
	Impedance	[Ohm]	< 250
Code S	Current	[mA]	4...12...20, ripple < 0.01 % eff., surge free, 12...20 mA P->A < 3.6 mA = disable, > 3.8 mA = according to NAMUR NE43
	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)		[V]	5...30, Ri = > 8 kOhm
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 Code 5	6 + PE acc. EN 175201-804 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

[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.

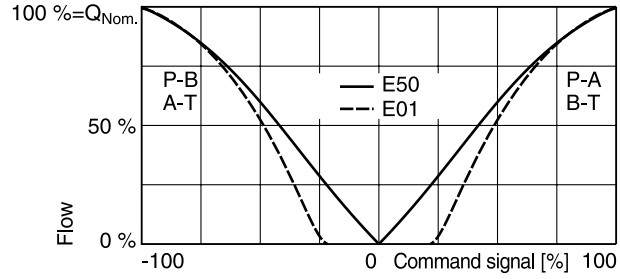
[2] For applications with p_T>35 bar (max. 350 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

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

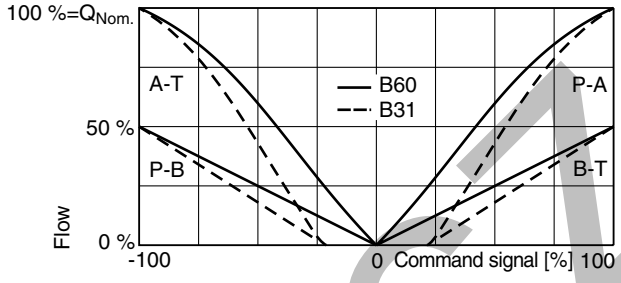
[4] Measured with load (100 bar pressure drop/two control edges).

3

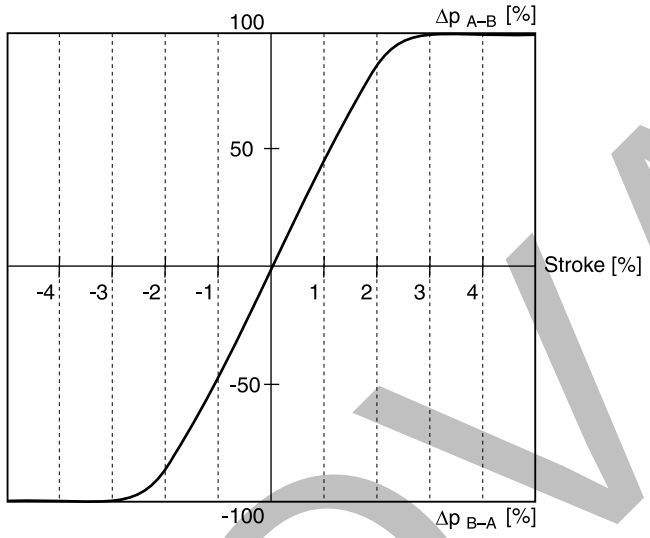
Flow curves
(Overlapped spool set to opening point 23 %)
at ∆p = 35 bar per metering edge
Spool type **E01/E50**



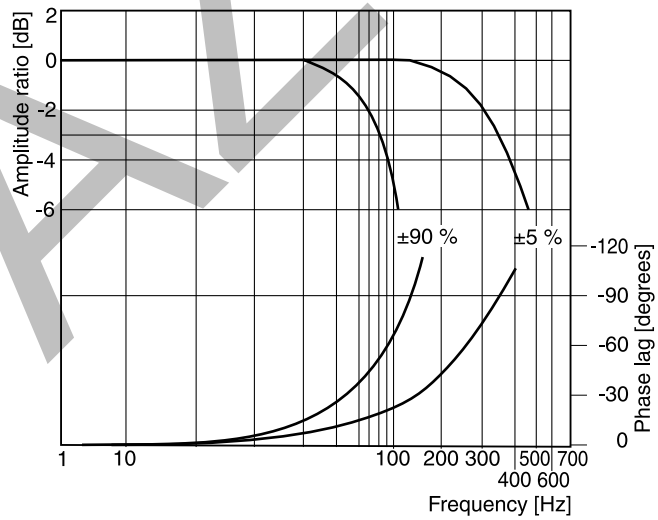
Spool type **B31/B60**



Pressure gain



Frequency response
±5 % command signal
±90 % command signal

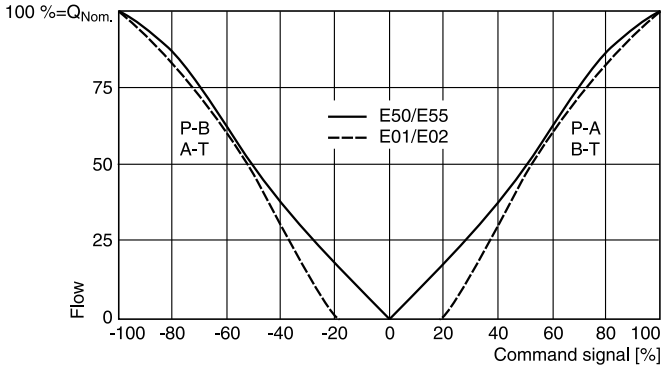


All characteristic curves measured with HLP46 at 50 °C.

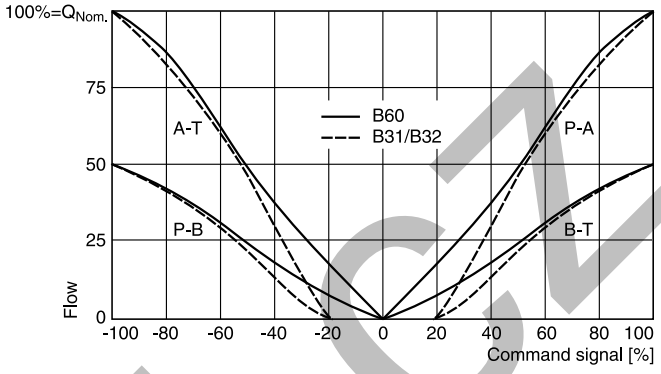
Flow curves

(Overlapped spool set to opening point 19 %)
at Δp = 35 bar per metering edge

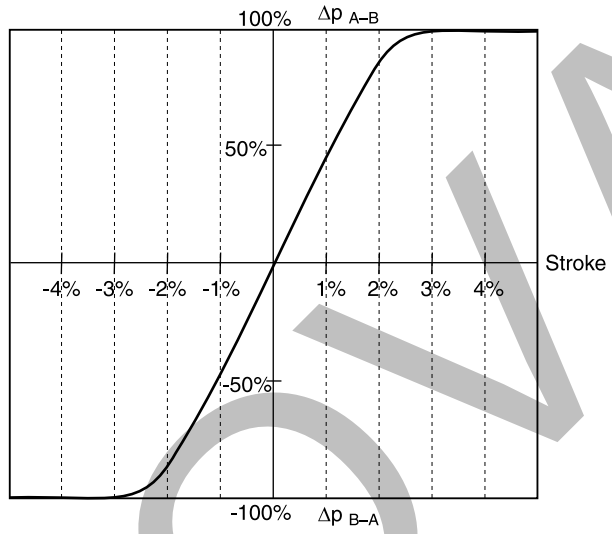
Spool type **E50/E55, E01/E02**



Spool type **B31/B32, B60**

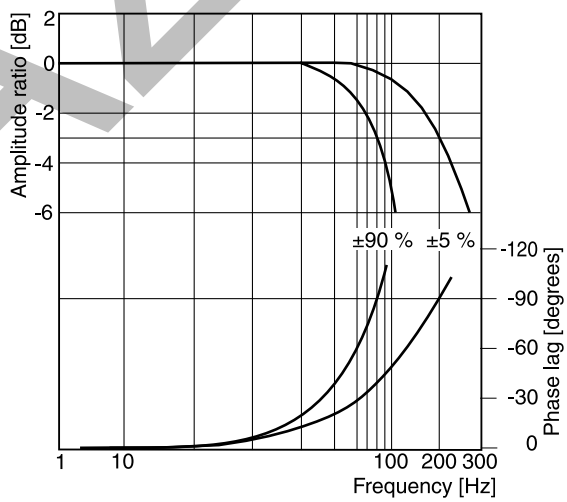


Pressure gain



Frequency response

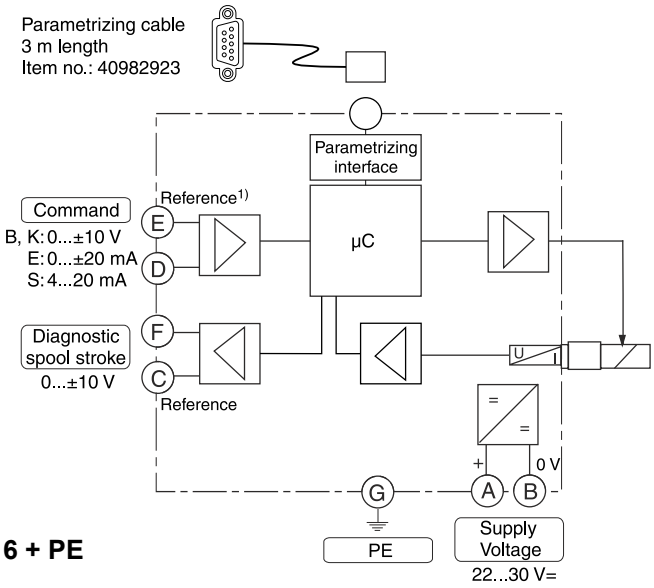
±5 % command signal
±90 % command signal



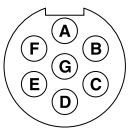
All characteristic curves measured with HLP46 at 50 °C.

3

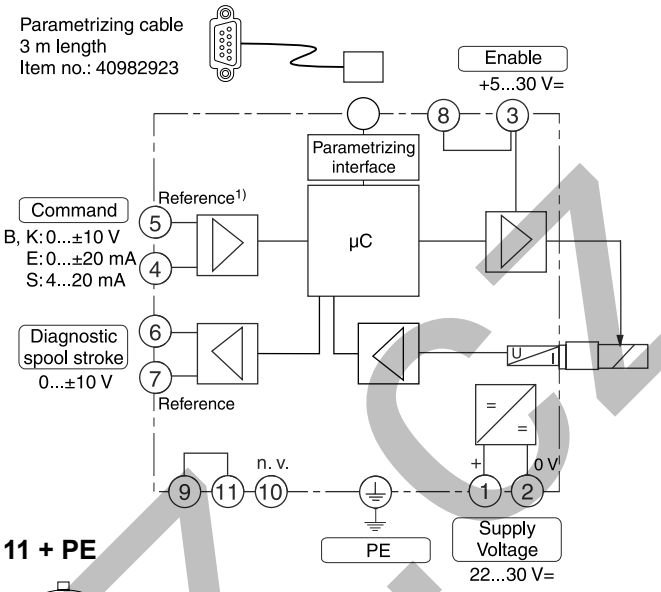
Code 0



6 + PE

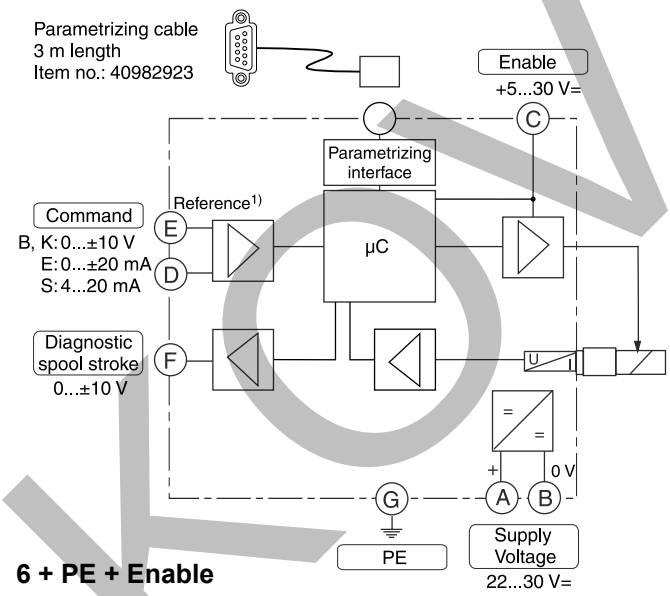


Code 5

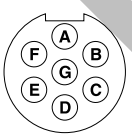


11 + PE

Code 7

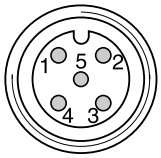


6 + PE + Enable



[1)] Do not connect with supply voltage zero.

Pin assignment analog sensor, M12 socket

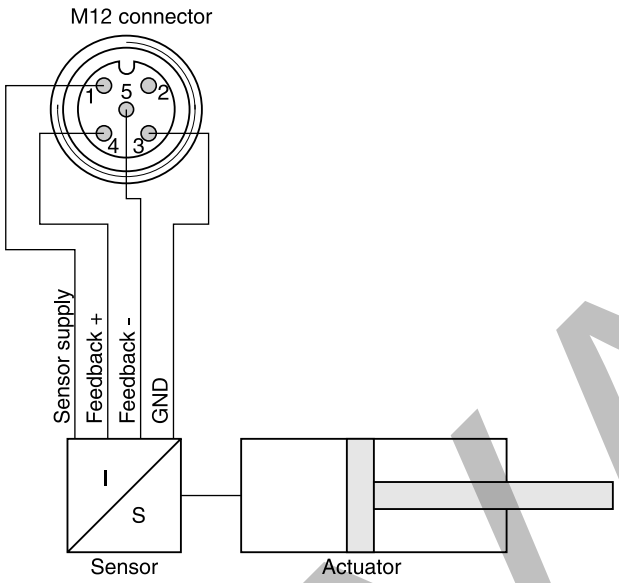


1: U_S
2: ±10 V
3: GND
4: 4 ... 20 mA +
5: 4 ... 20 mA -

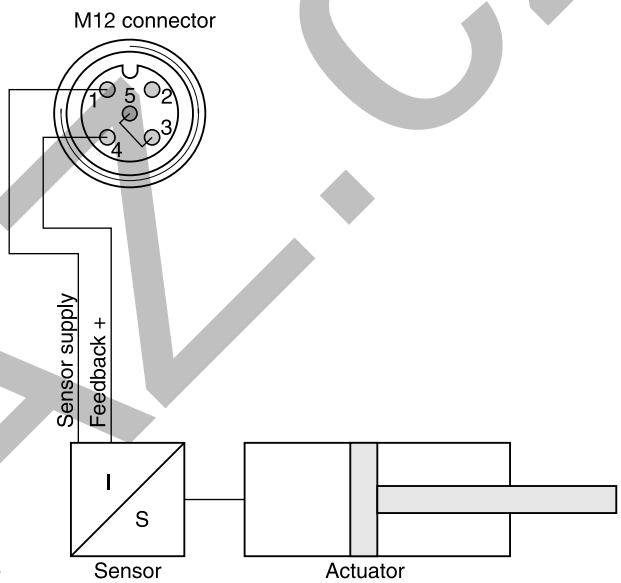
Examples position control

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

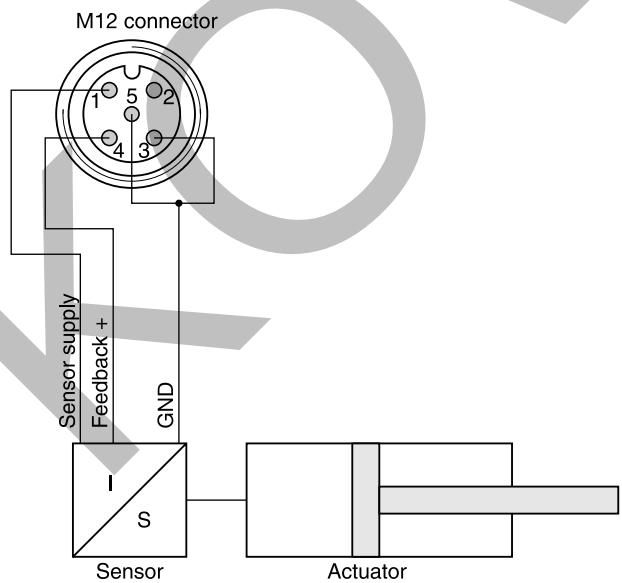
Wiring diagram four-wire



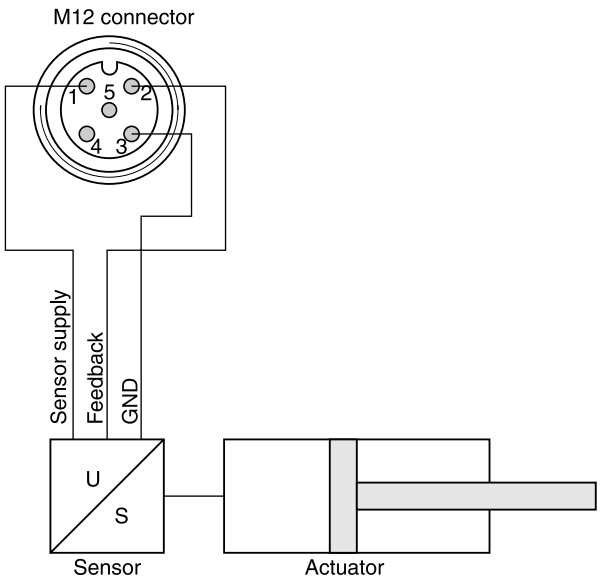
Wiring diagram two-wire



Wiring diagram three-wire



Voltage ±10 V (1...10 V)



The earth connection is achieved via the shilding.

3

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.

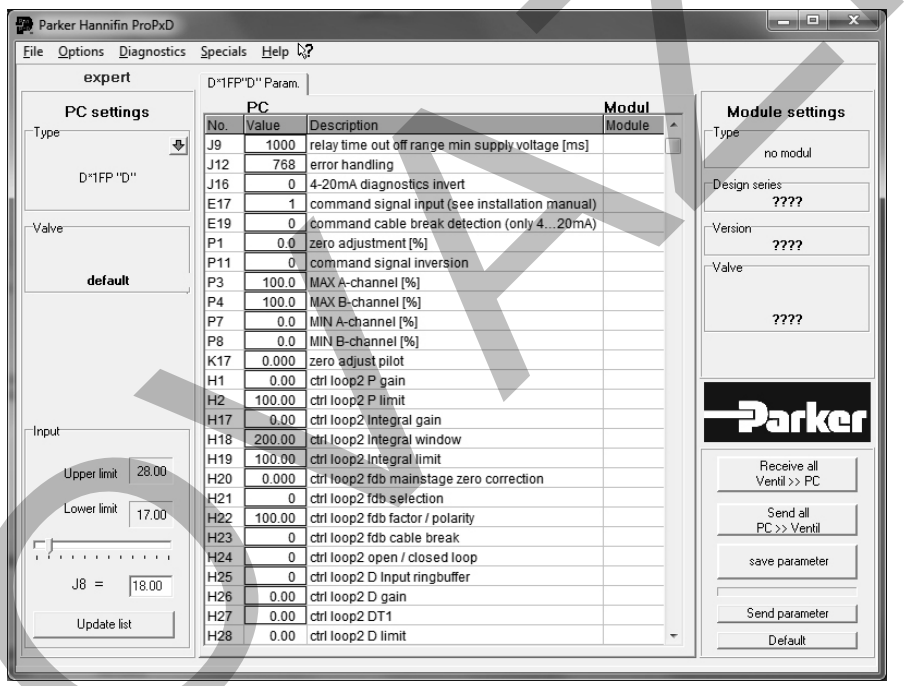
The PC software can be downloaded free of charge at www.parker.com/isde – see page “Support" or directly at www.parker.com/propxd.

Features

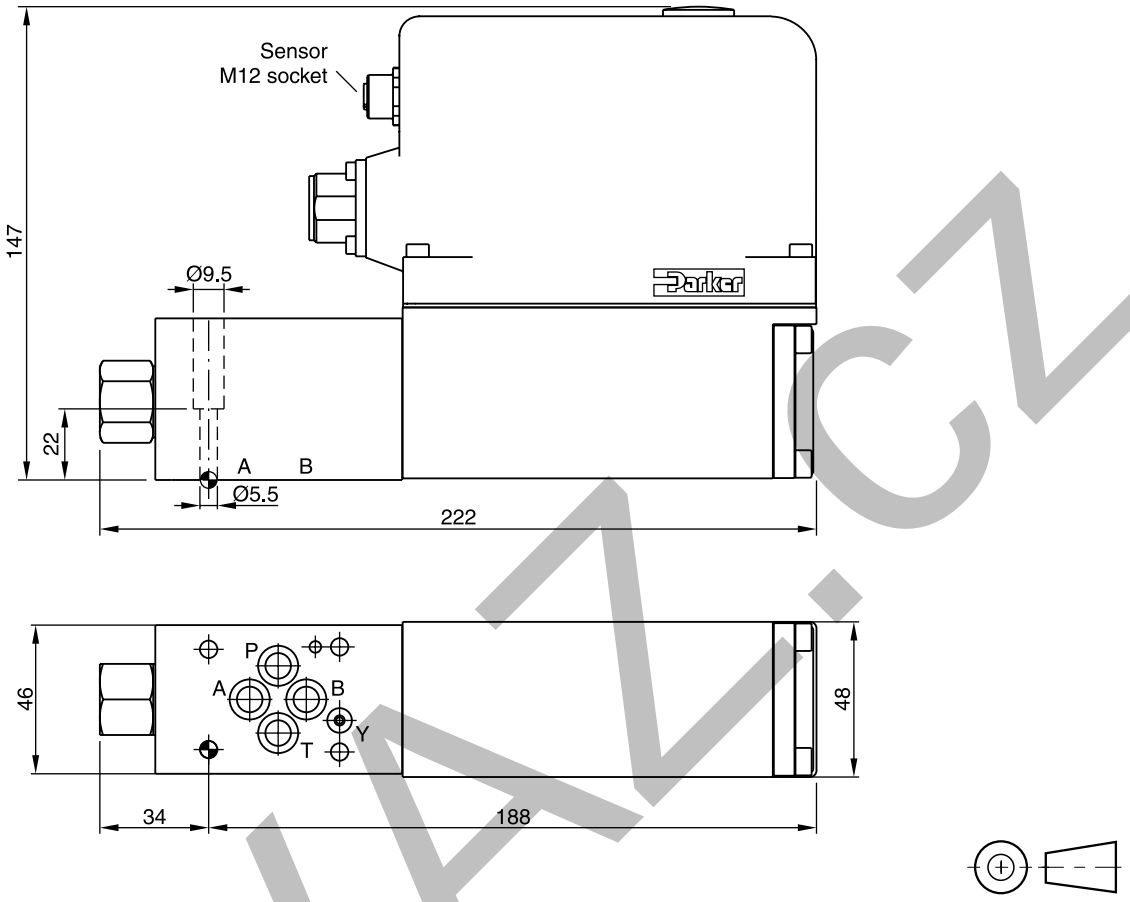
- Comfortable editing of valve parameters - configuration of the controller
- Saving and loading of customized parameter sets
- Executable with all Windows® operating systems from Windows® XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

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.



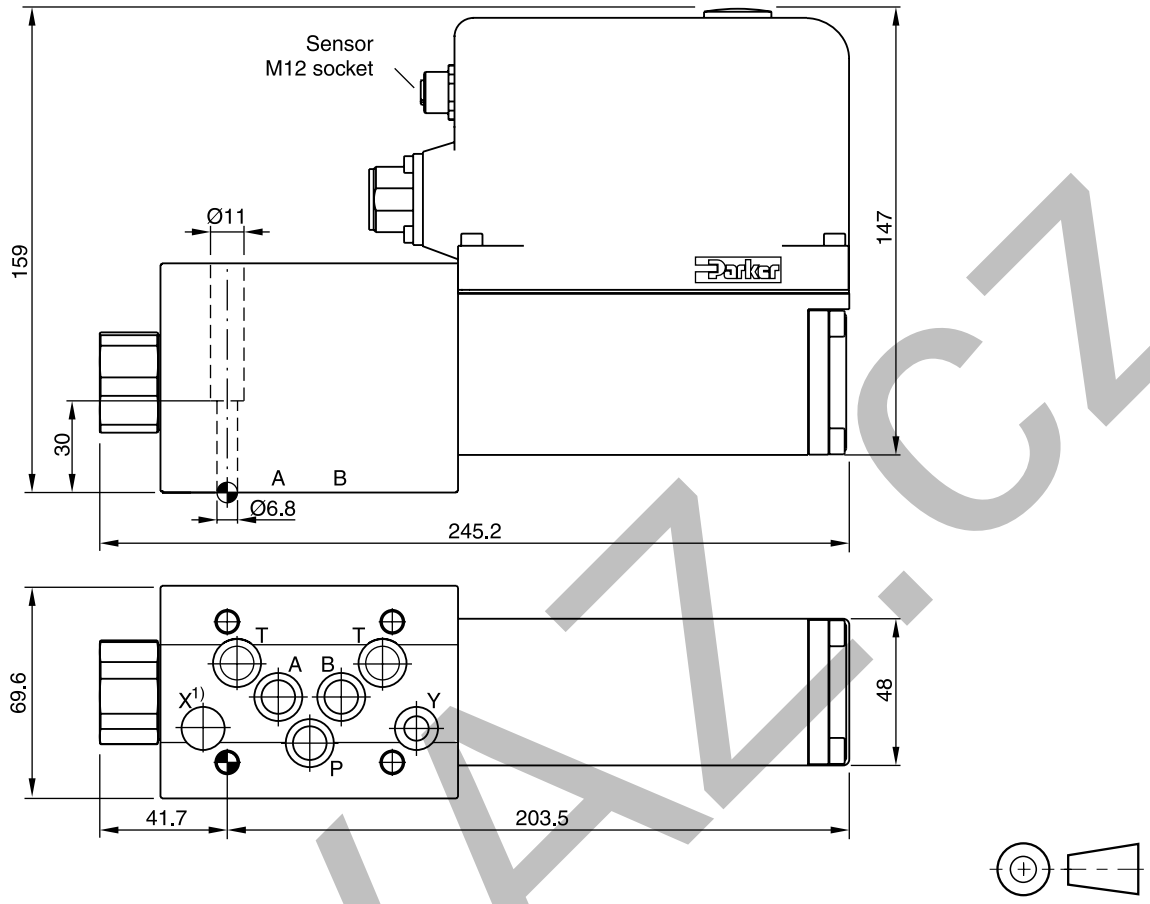
D1FP*D



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 ISO 4762-12.9	7.6 Nm ±15 %	NBR: SK-D1FP FPM: SK-D1FP-V HFC: SK-D1FP-H

3

D3FP*D

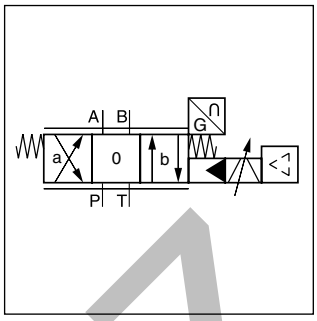


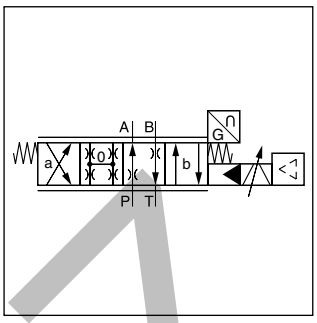
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D3FP FPM: SK-D3FP-V HFC: SK-D3FP-H

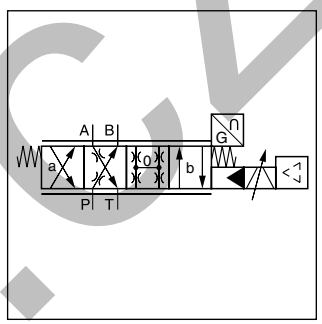
The series of pilot operated control valves D30FP closes the gap between the direct operated D3FP valves and the conventional pilot operated D31FP valves.

Providing high flow capacity and practically no flow limits like D31FP in the envelope size of the D3FP.

The valve works with the hydraulic follower principle, with a moving sleeve as main spool.





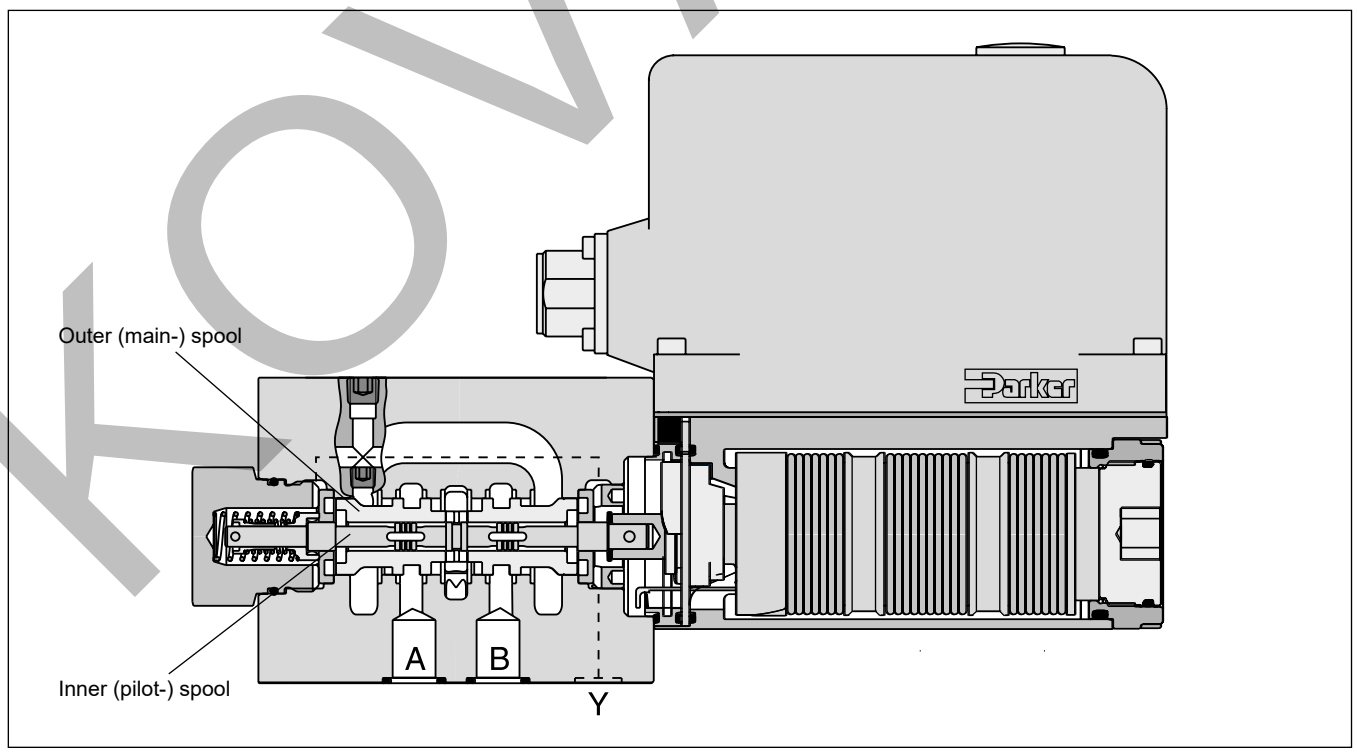


Features

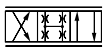
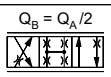
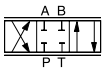
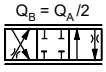
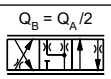
- Pilot operated with hydraulic follower sleeve
- No flow limit up to 350 bar through the valve
- Defined spool positioning at power-down - optional P-A / B-T or P-B / A-T or center position (for overlapped spools)

CE

D30FP*3
with hydraulic follower principle



D	30	F	P							3	
Direct. control valve	Size DIN NG10 CETOP 05 NFPA D05	Proportional control	VCD	Spool type	Spool position on power down	Pilot connection	Seals	Command signal	Electronics option	Spool/ body design	Design series (not required for ordering)

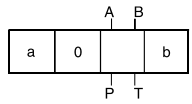
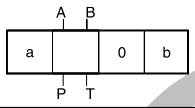
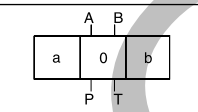
Code	Spool type	Flow [l/min] at Δp 5 bar per metering edge
	Zerolap	
E50U		**80**
B60U	$Q_B = Q_A/2$ 	**80 / 40**
	Overlap	
E01U		**80**
E02U		**80**
B31U	$Q_B = Q_A/2$ 	**80 / 40**
B32U	$Q_B = Q_A/2$ 	**80 / 40**

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

Code	Signal	Function
B	**+/- 10 V**	**0...+10 V -> P-A**
E	**+/- 20 mA**	**0...+20 mA -> 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 [3]	**internal**	**external**
4	**internal**	**internal**

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

Short delivery time for all variations

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

[1] Approx. 10 % opening, only zerolapped spools.
[2] Only for overlapped spools.
[3] For tank pressure >35 bar.

General			
Design			Pilot operated servo proportional DC valve
Actuation			VCD® actuator
Size			NG10 / CETOP 05 / NFPA D05
Mounting interface			DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting position			horizontal mounting preferred (other mounting positions after consultation)
Ambient temperature		[°C]	-20...+50
$MTTF_D$ value [1]		[years]	75
Weight		[kg]	6.5
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]	Ports P, A, B 350; Port T 35 for internal drain, 250 for external drain
		[bar]	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]/[mm²/s]	20...400
	recommended	[cSt]/[mm²/s]	30...80
Filtration			ISO 4406; 18/16/13
Flow nominal at Δp=5 bar per control edge [3]		[l/min]	80
Flow maximum		[l/min]	250
Leakage at 100 bar		[ml/min]	<1800 (Zerolap spool); <1000 (Overlap spool)
Opening point		[%]	set to 9 commande signal (see flow characteristics)
Pilot supply pressure		[bar]	>5 higher than tank pressure (only internal pilot oil supply)
Static / Dynamic			
Step response at 100 % step [4]		[ms]	<7
Frequency response (±5 % signal) [4]		[Hz]	120 (amplitude ratio -3 dB), 120 (phase lag -90°)
Hysteresis		[%]	<0.05
Sensitivity		[%]	<0.03
Temperature drift		[%/K]	<0.025
Electrical characteristics			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple		[V]	DC 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
Input signal			
Code B	Voltage	[V]	10...0...-10, ripple <0.01 % eff., surge free, 0...+10 V P->A
	Impedance	[kOhm]	100
Code E	Current	[mA]	20...0...-20, ripple <0.01 % eff., surge free, 0...+20 mA P->A
	Impedance	[Ohm]	<250
Code S	Current	[mA]	4...12...20, ripple <0.01 % eff., surge free, 12...20 mA P->A <3.6 mA = disable, >3.8 mA = according to NAMUR NE43
	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)		[V]	5...30, Ri = > 8 kOhm
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. EN 175201-804
		Code 5	11 + PE acc. EN 175201-804
Wiring min.	Code 0/7	[mm²]	7 x 1.0 (AWG 18) overall braid shield
	Code 5	[mm²]	8 x 1.0 (AWG 18) 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.

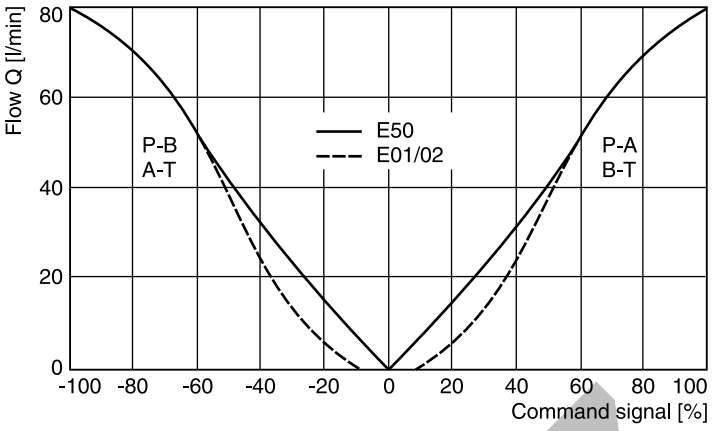
[2] For applications with p_T>35 bar (max. 250 bar) the Y-port has to be connected and the plug in the Y-port has to be removed.

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

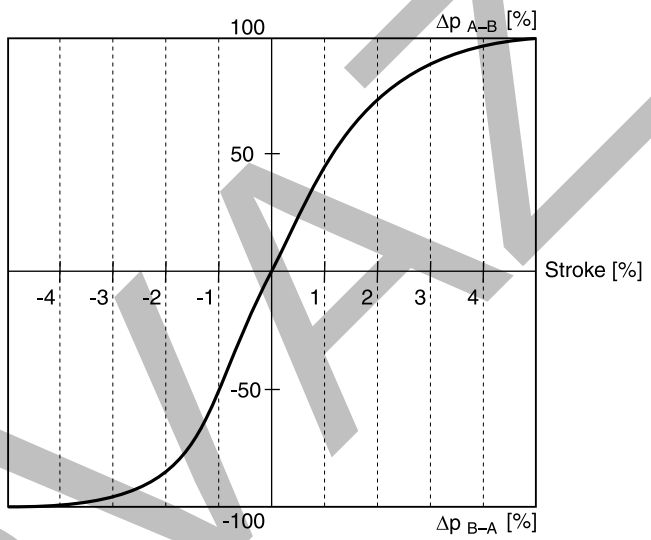
[4] Measured with load (100 bar pressure drop/two control edges).

3

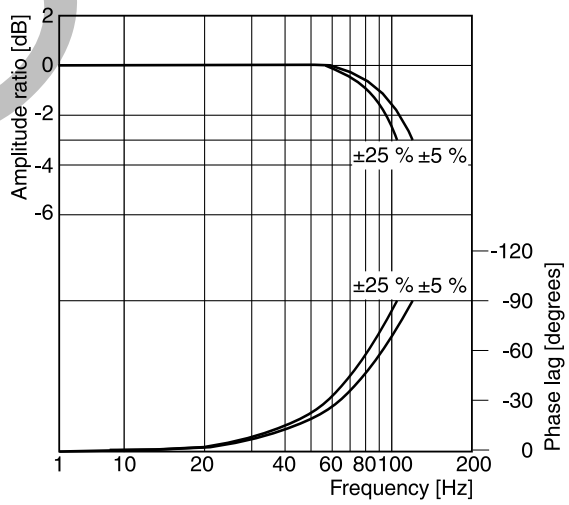
Flow curves
(Overlapped spool set to opening point 9 %)
at Δp = 5 bar per metering edge
Spool type **E01/02, E50**



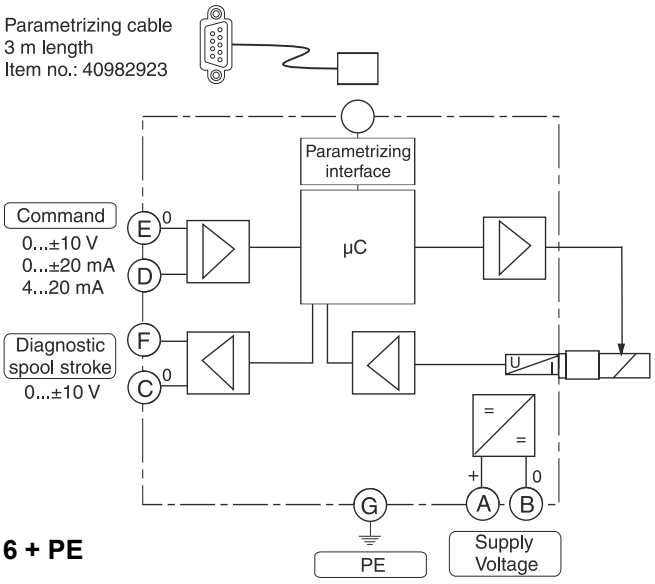
Pressure gain



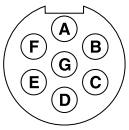
Frequency response
±5 % command signal
±25 % command signal



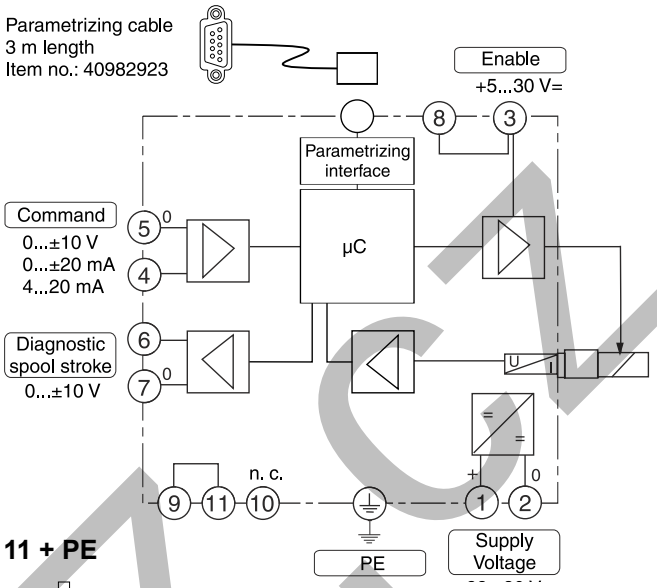
Code 0



6 + PE

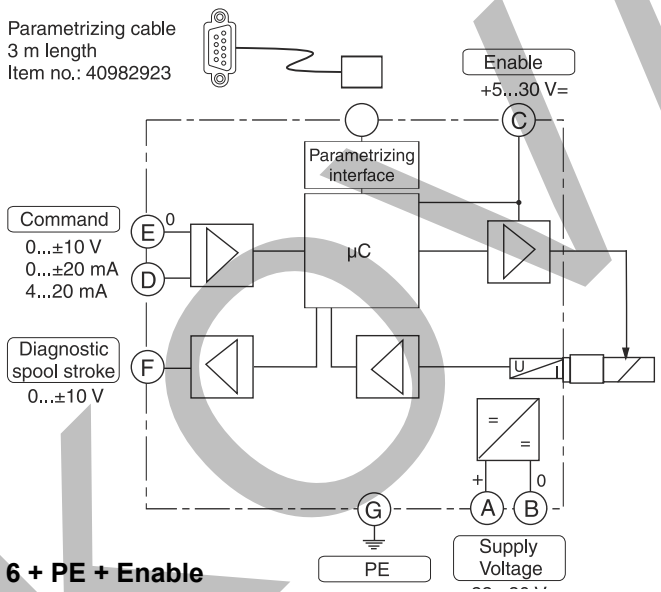


Code 5

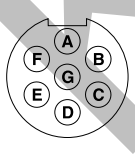


11 + PE

Code 7



6 + PE + Enable



[1] Do not connect with supply voltage zero.

3

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.

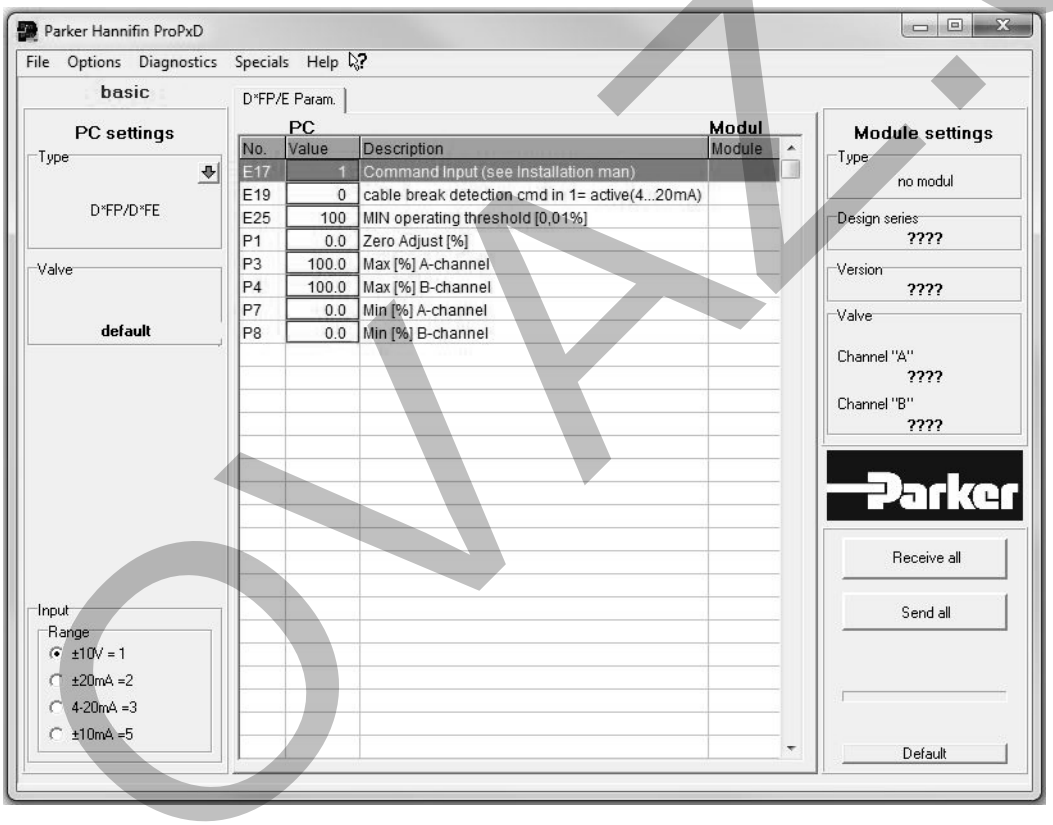
The PC software can be downloaded free of charge at www.parker.com/isde – see page “Support" or directly at www.parker.com/propxd.

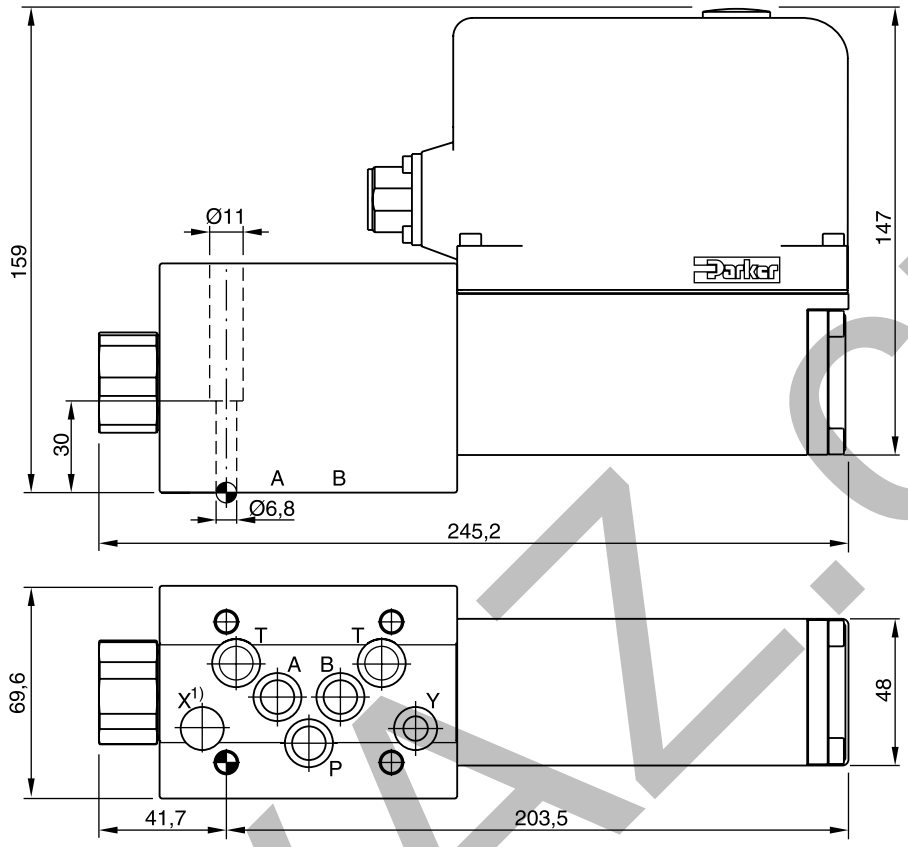
Features

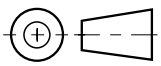
- Comfortable editing of valve parameters
- Saving and loading of customized parameter sets
- Executable with all Windows® operating systems from Windows® XP upwards
- Simple communication between PC and valve electronics via serial interface RS232C

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.







Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK385	4xM6x40 ISO 4762-12.9	13.2 Nm ±15 %	NBR: SK-D3FP FPM: SK-D3FP-V HFC: SK-D3FP-H

1) O-ring recess diameter on valve body.

3

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.

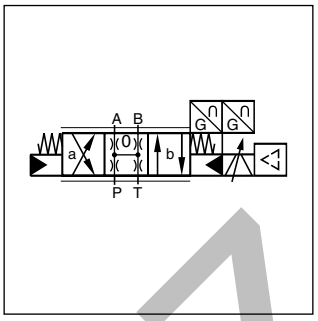
The D*1FP series is available in 5 sizes:

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)

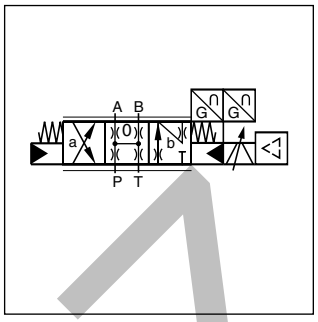
The safety concept works with a safe 4th position at the D1FP pilot valve. This ensures that the main stage is hydraulically balanced at power down and allows to have the main spool spring centered (for overlapped spools) or approximately 10 % spring offset to spool position A or B (for zerolap spools).

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.

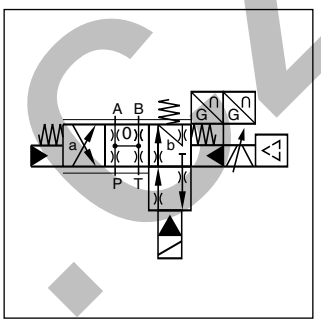

D41FP Standard



Standard D*1FPE



A-regeneration D*1FPR

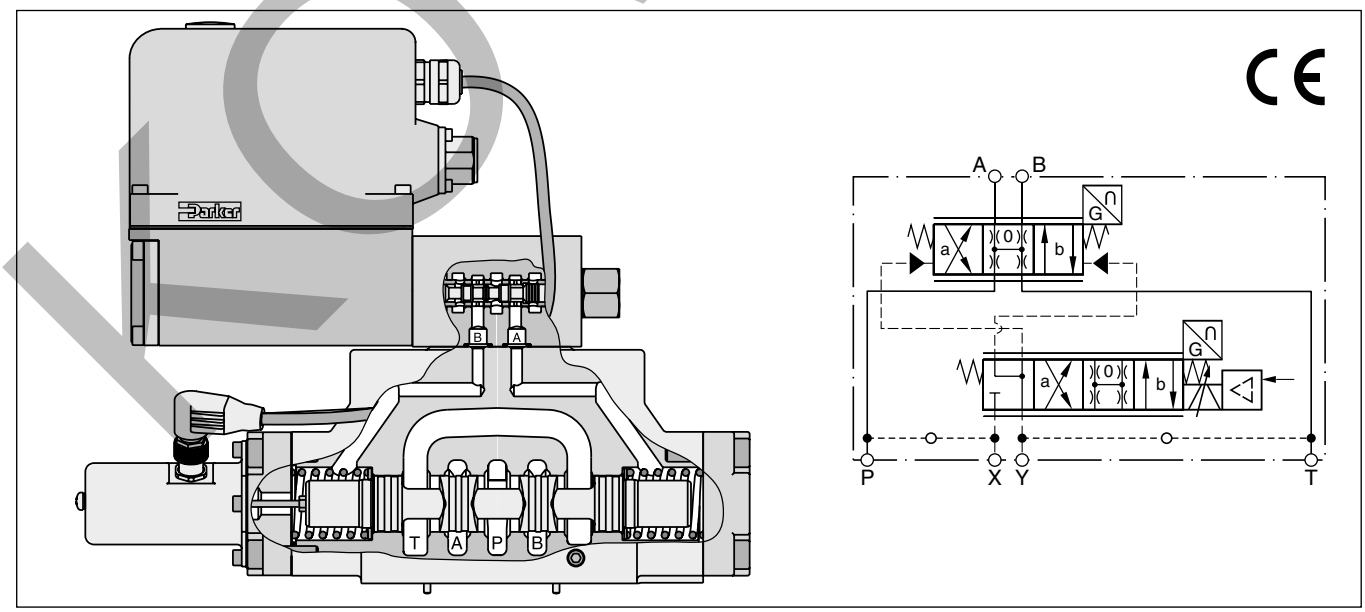


Hybrid D*1FPZ

Features

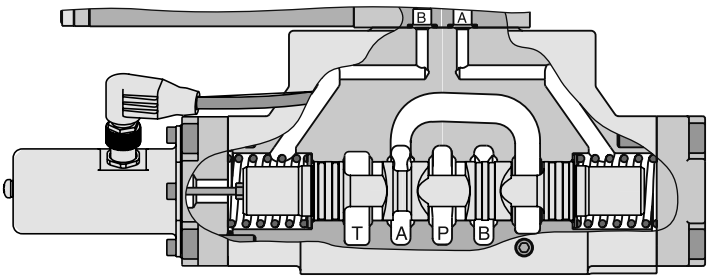
- High dynamics
- High flow
- Defined spool positioning at power-down - optional P-A/B-T or P-B/A-T or center position (for overlapped spools)
- Onboard electronics
- Energy saving A-regeneration
- Switchable hybrid version

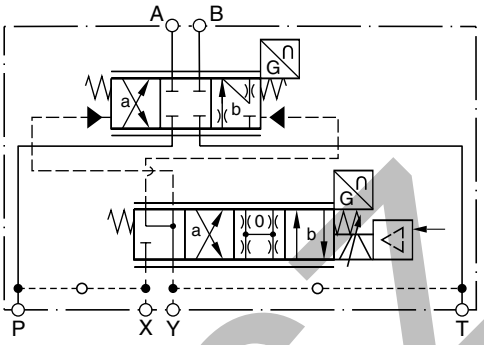
D41FPE52 (Standard)



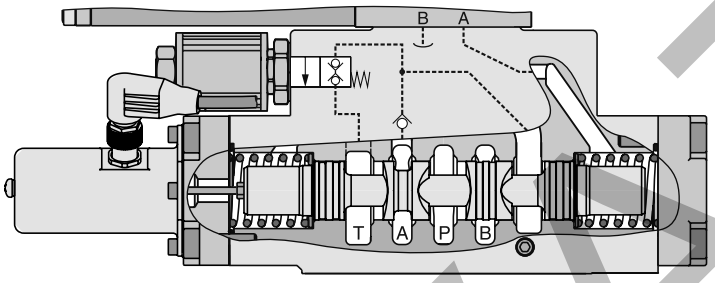
D*1FPR and D*1FPZ

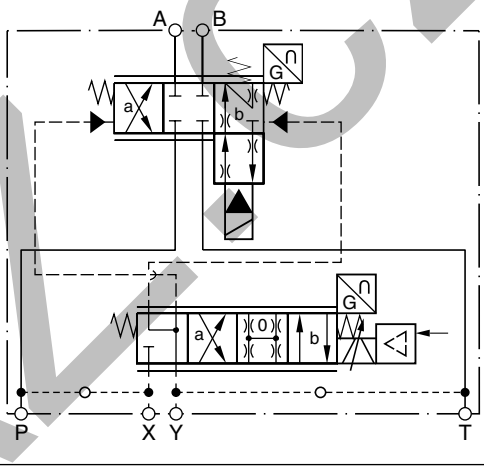
Regenerative valve D*1FPR



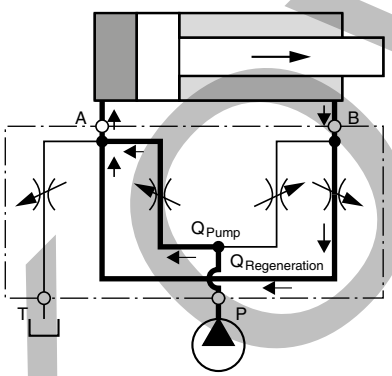


Hybrid valve D*1FPZ

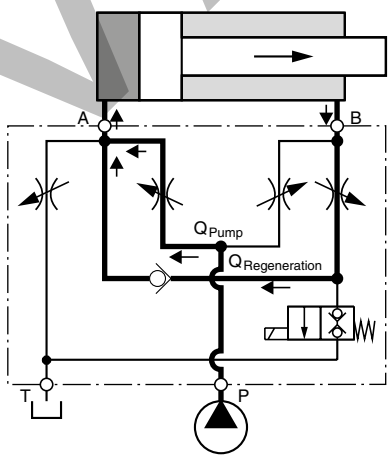




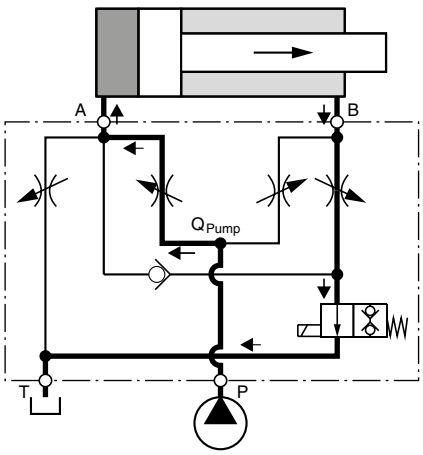
D*1FPR (regenerative valve)
Cylinder extending



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.

3

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

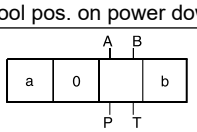
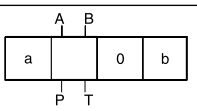
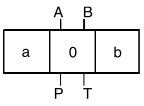
Code	Valve option
0	Standard for spool code B, E, R
L [7]	Hybrid valve 24 V normally closed for spool code Z

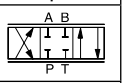
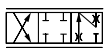
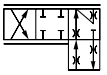
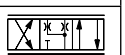
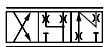
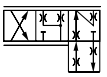
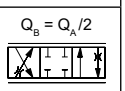
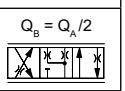
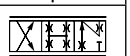
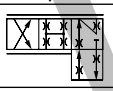
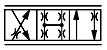
Code	Connection type
0	6+PE acc. EN175201-804
5	11+PE acc. EN175201-804
7	6+PE + enable

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

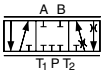
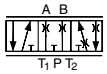
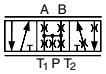
Code	Spool pos. on power down
A [2]	
B [2]	
C [3]	

Standard		Regenerative function [4] [5]		Hybrid function [5] [6]	
Code	Spool type	Code	Spool type	Code	Spool type
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	$Q_B = Q_A/2$ 				

Code	Flow [l/min] at Δp = 5 bar per metering edge				
	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

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			
$MTTF_D$ value [1]		[years]	75			
Weight		[kg]	11.3	14.2	23.5	64.5
Vibration resistance		[g]	10 Sinus 5...2000 Hz acc. IEC 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			
	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	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			
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 ⏚) 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, Ri > 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: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

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

Electrical characteristics hybrid option

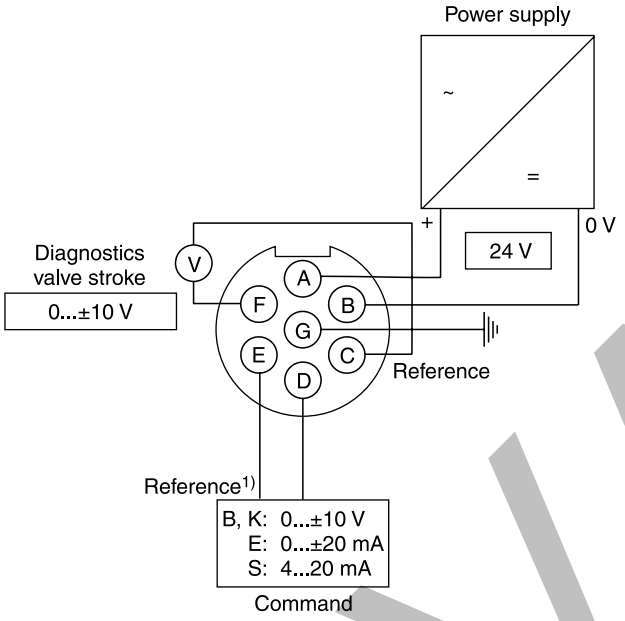
Duty ratio		100 %		
Protection class		IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)		
		D41	**D91**	**D111**
Supply voltage	[V]	24	24	24
Tolerance supply voltage	[%]	±10	±10	±10
Current consumption	[A]	1.21	0.96	1.29
Power consumption	[W]	29	23	31
Solenoid connection		Connector as per EN 175301-803		
Wiring min.	[mm²]	3 x 1.5 recommended		
Wiring length max.	[m]	50 recommended		

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

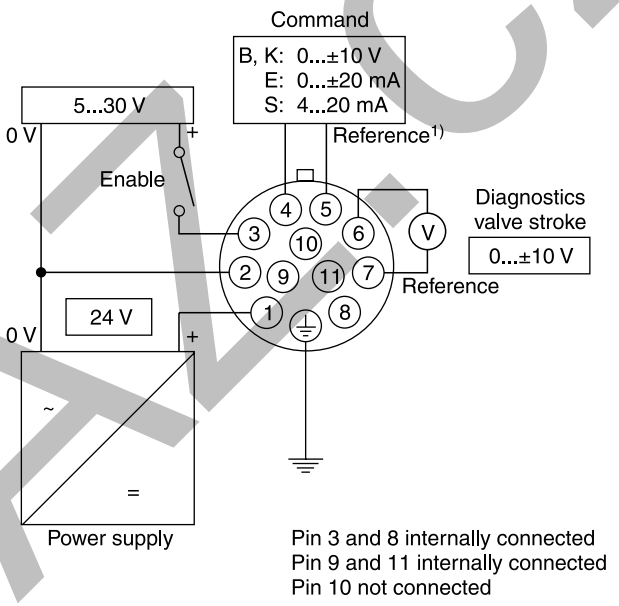
3

Wiring

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

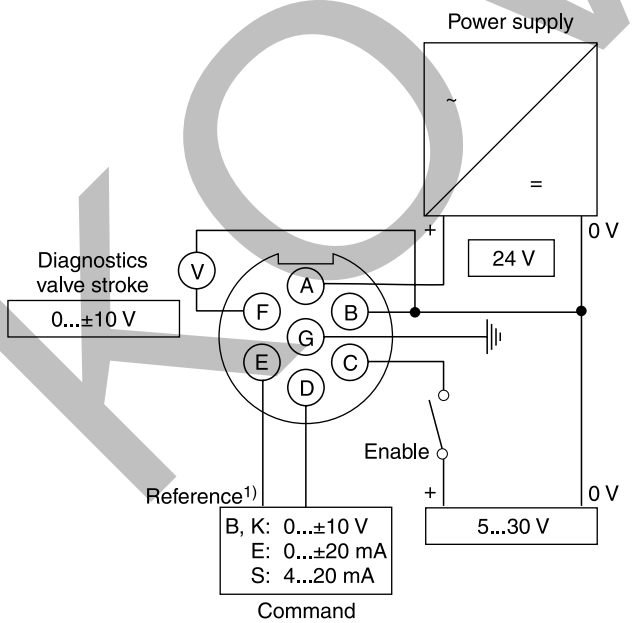


Code 5, 11 + PE acc. EN 175201-804



Pin 3 and 8 internally connected
Pin 9 and 11 internally connected
Pin 10 not connected

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.

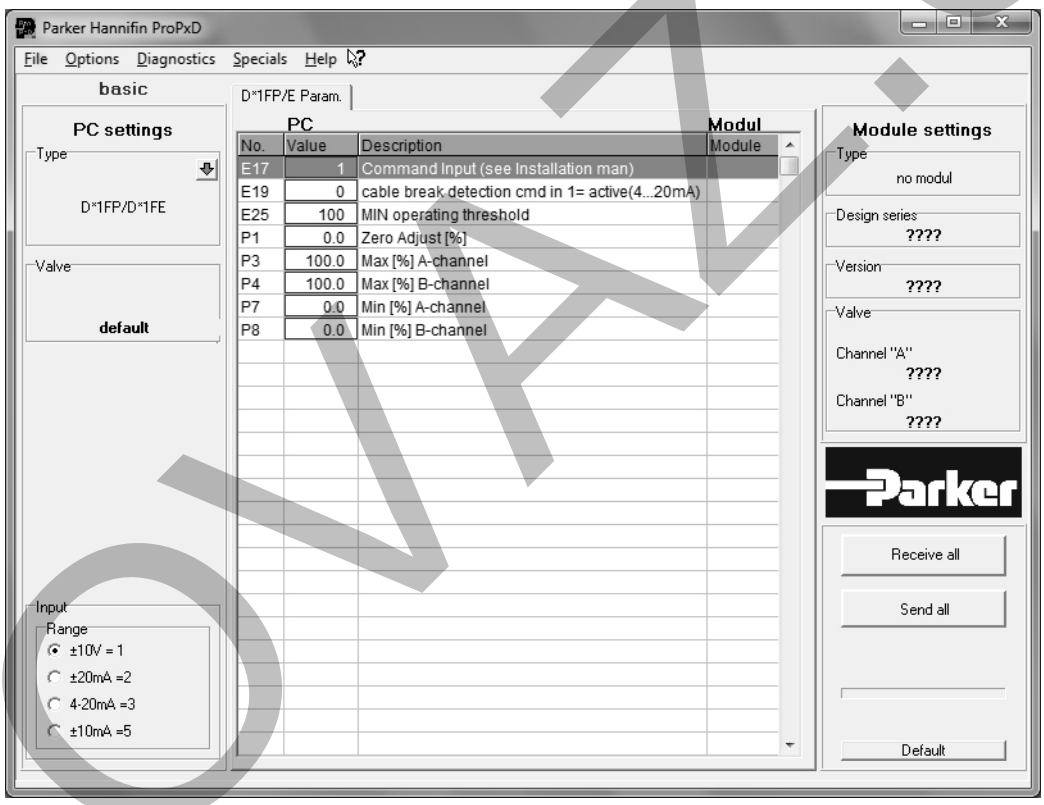
The PC software can be downloaded free of charge at www.parker.com/isde – see page “Support" or directly at www.parker.com/propxd.

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.

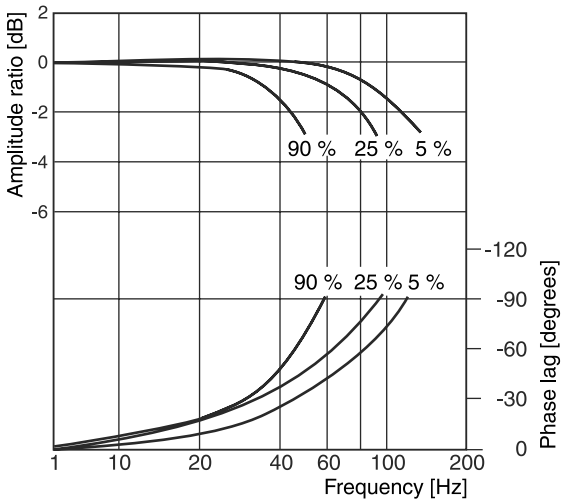
The parametrizing cable may be ordered under item no. 40982923.



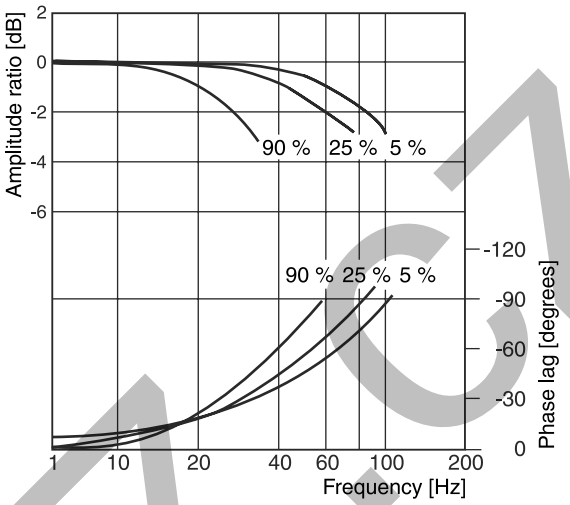
3

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

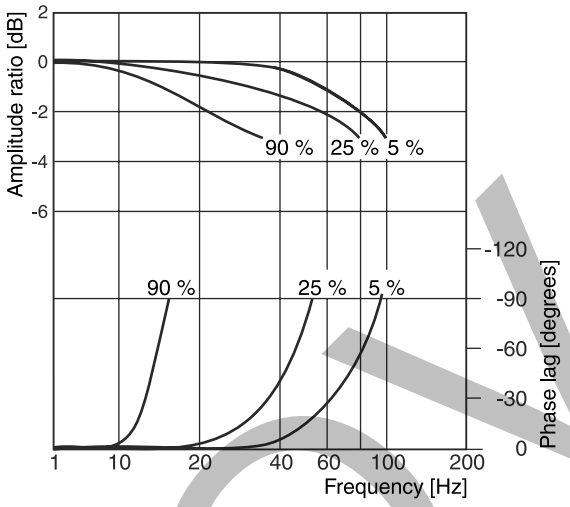
D31FP



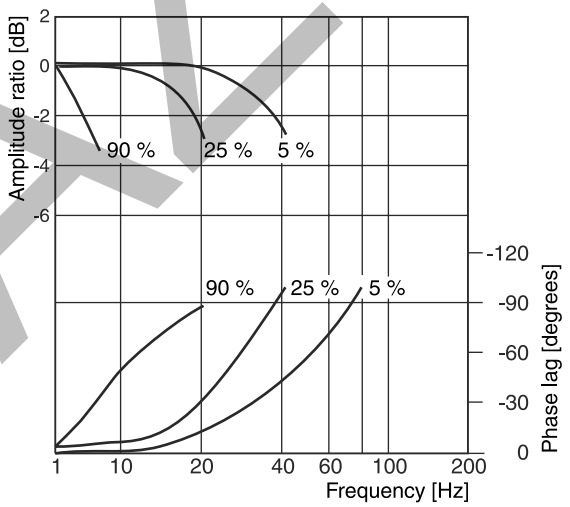
D41FP



D81/91FP

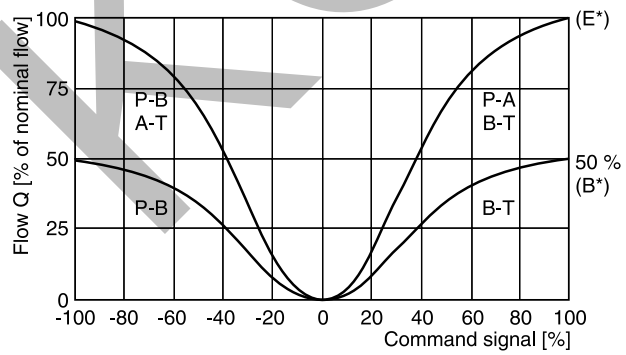


D111FP

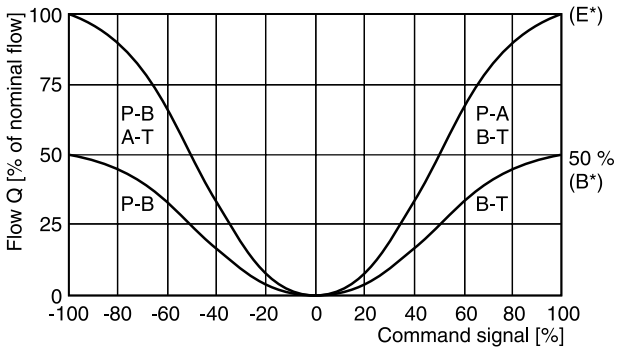


Flow curves D*1FPB/E
(Overlapped spool set to opening point 10 %)
at Δp = 5 bar per metering edge

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



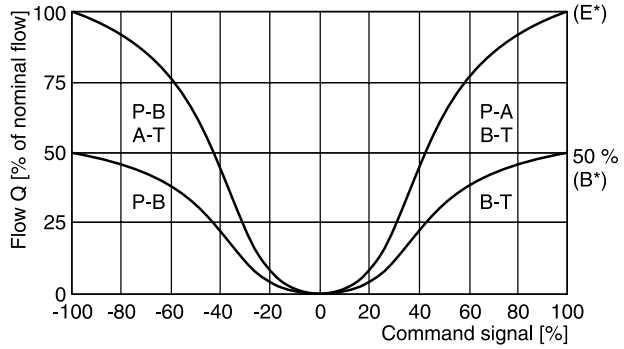
D41FP
spool type E01/02/52, B31/32/61



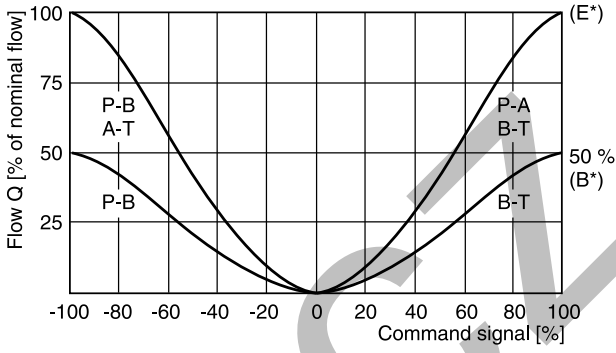
All characteristic curves measured with HLP46 at 50 °C.

Flow curves

D81/91FP
Spool type E01/02/52, B31/32/61

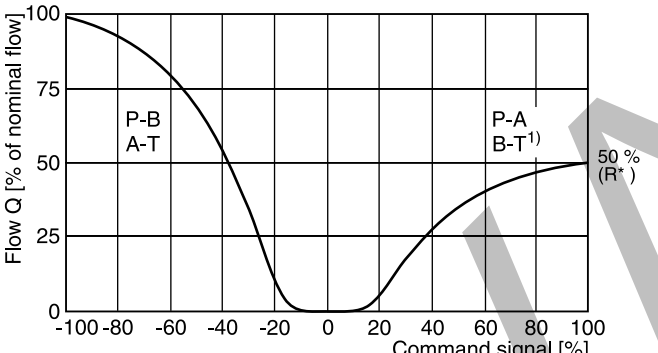


D111FP
Spool type E01/02/52, B31/32/61



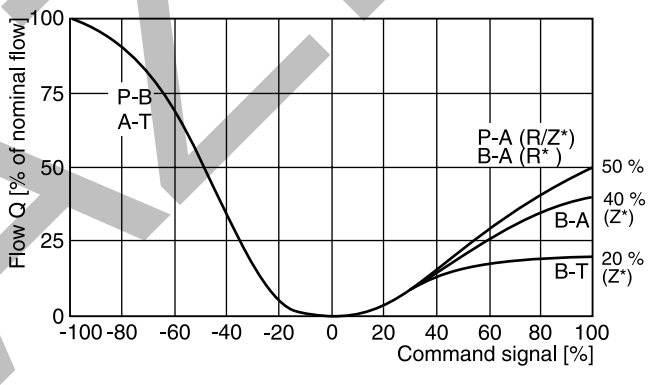
Flow curves D*1FPR/Z
(Overlapped spool set to opening point 10 %)
at Δp = 5 bar per metering edge

D31FP
Spool type R31/32/61

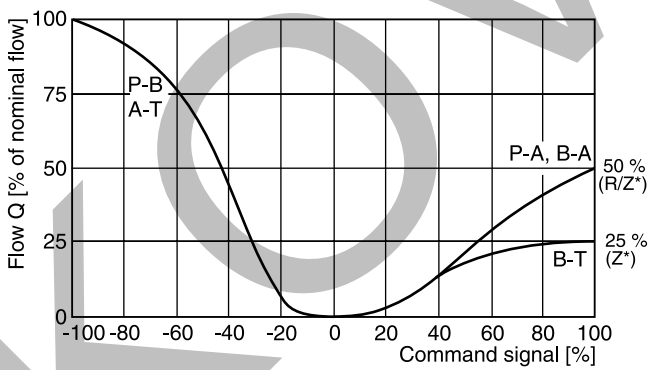


1) with 2 tank ports

D41FP
Spool type R/Z 31/32/61

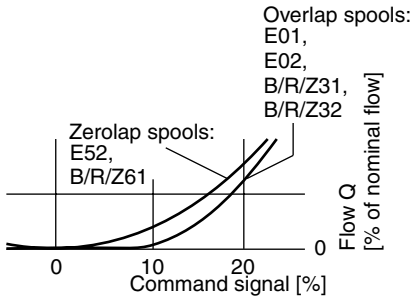


D91FP spool type R/Z 31/32/61



D111FP
spool type R/Z* on request

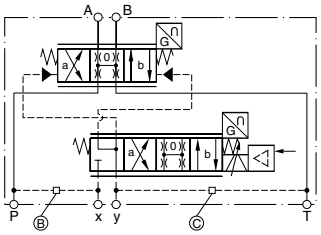
Detail:
Standard, regenerative and hybrid flow curves



Pilot oil inlet (supply) and outlet (drain)

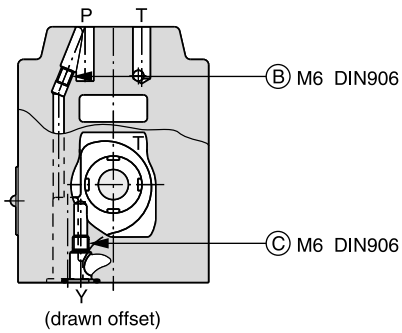
○ **open,** ● **closed**

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



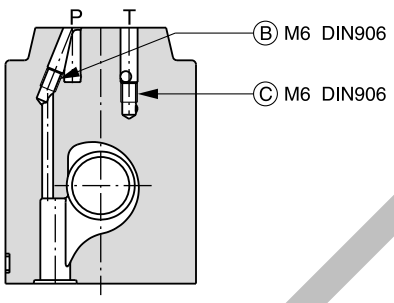
3

D31FPB/E

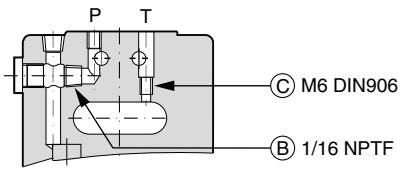


(drawn offset)

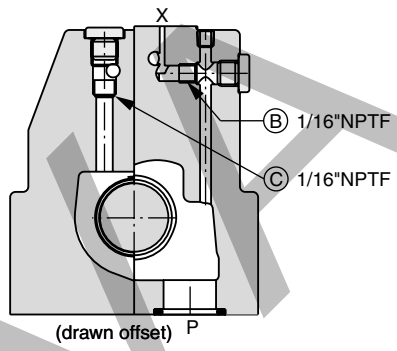
D31FPR



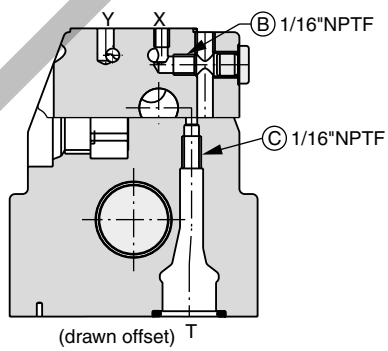
D41FPB/E



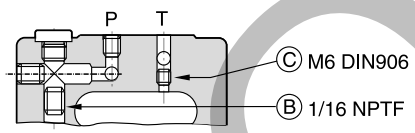
D41FPR



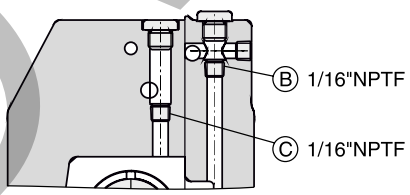
D41FPZ



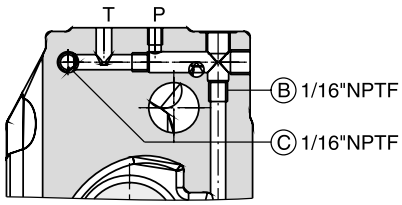
D91FPB/E



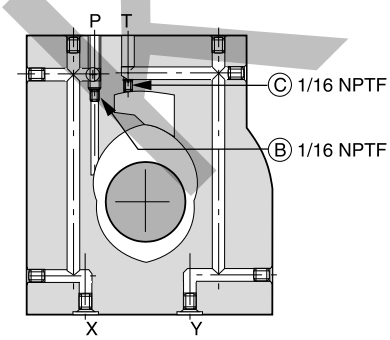
D91FPR



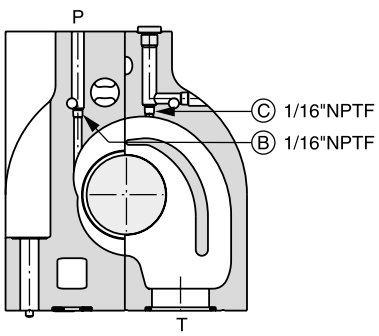
D91FPZ



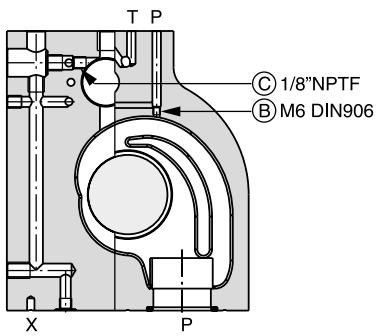
D111FPB/E



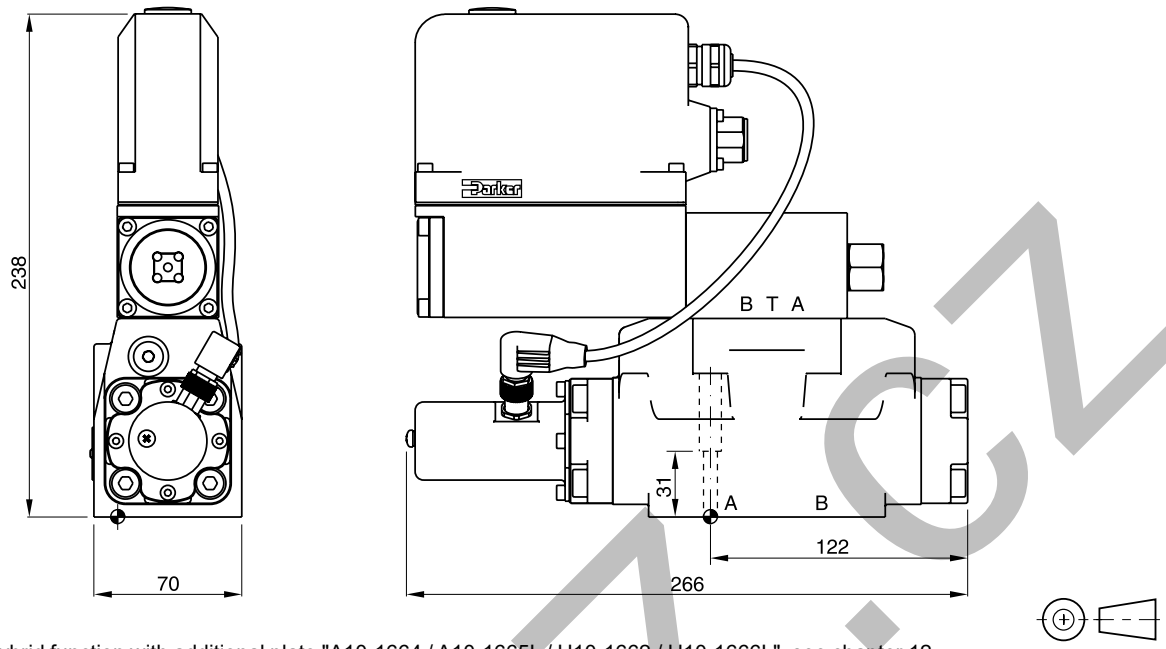
D111FPR



D111FPZ



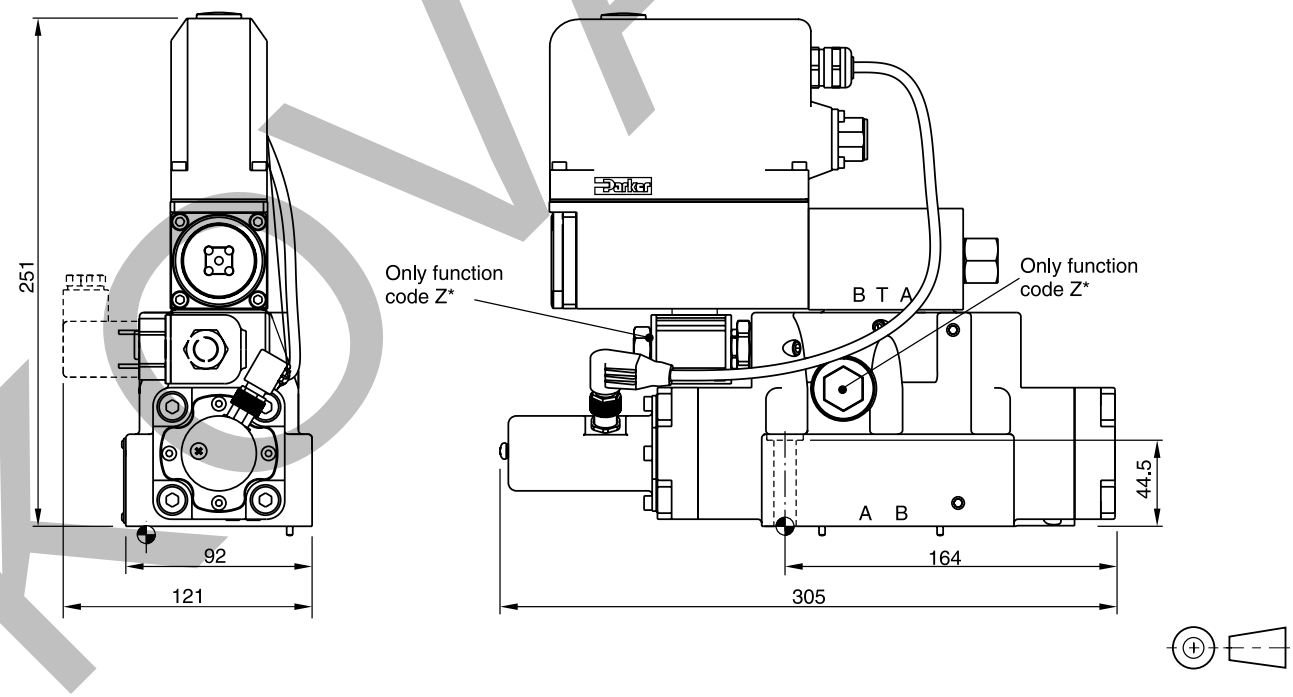
D31FP



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

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

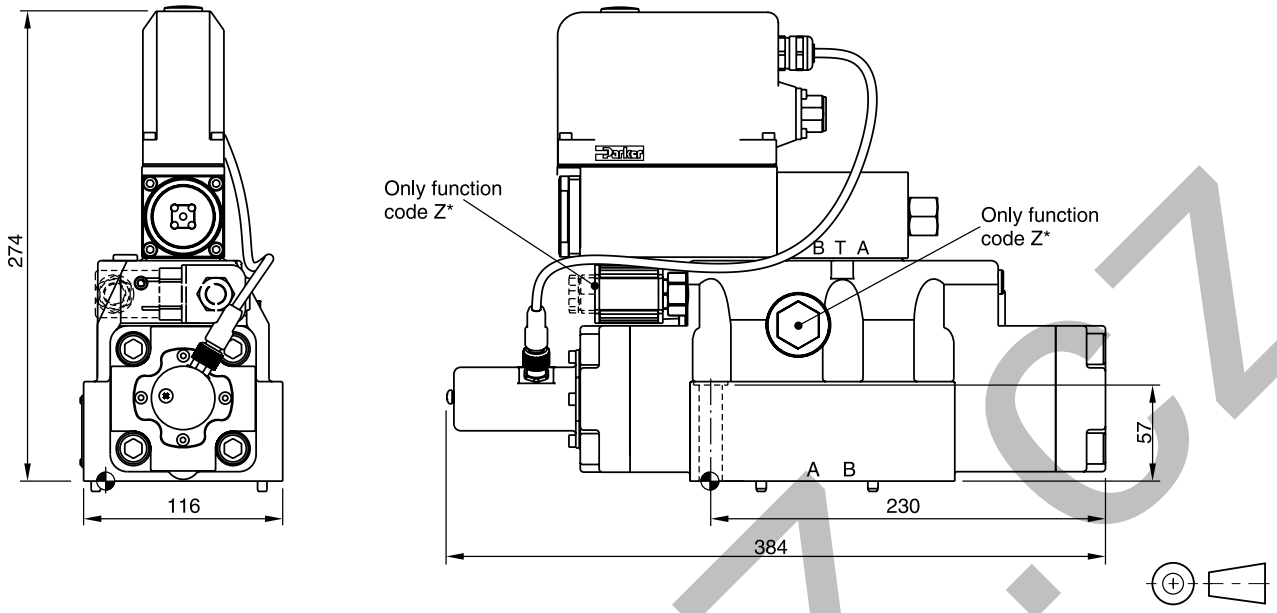
D41FP



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK320	2x M6x55 4x M10x60 ISO 4762-12.9	13.2 Nm ±15 % 63 Nm ±15 %	NBR: SK-D41FP FPM: SK-D41FP-V

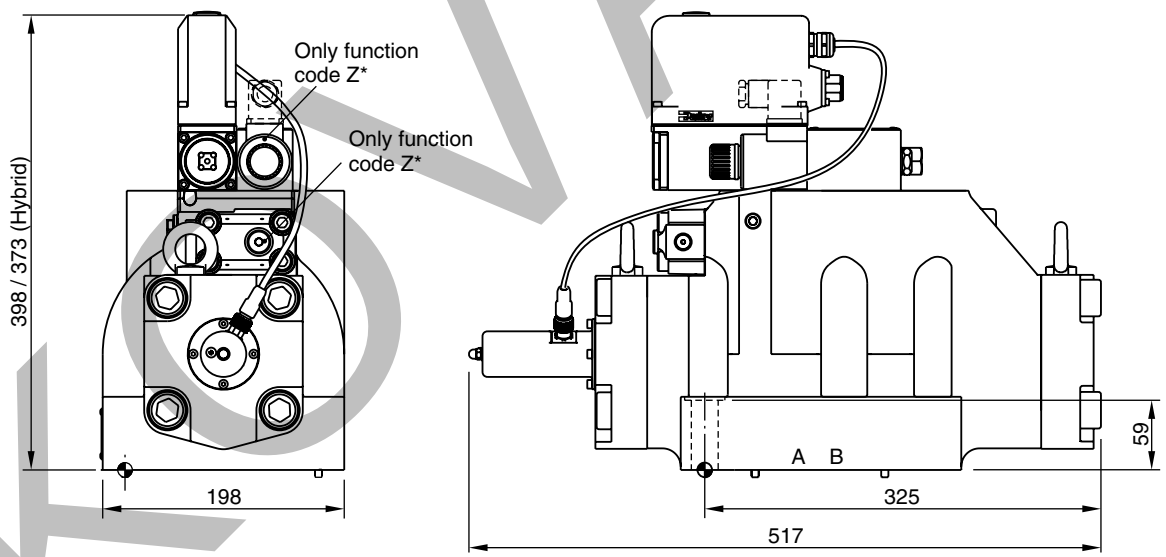
3

D81/91FP



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

Introduction

DFplus valves with EtherCAT interface fulfill the requirements of modern communication between valve and main control. Due to high data transmission speed and short cycle times, the high dynamics of the DFplus valves can be also utilized within the fieldbus system.

The valve is actuated and monitored by the EtherCAT interface. Actual value (spool position), temperature, operating hours and different error messages are available as diagnostic signals. The valve parameters are factory set and can be adapted with the Parker ProPxD software via the parametrizing interface.

In addition to the fieldbus communication, the valves provide the range of functions of the standard version including analogue command signal and diagnostic spare stroke. Thus they can be operated independent of the fieldbus control, particularly during commissioning and maintenance.

D1FP with EtherCAT

The option with EtherCAT is available for the series:

- D1FP, D3FP
- D30FP
- D31FP, D41FP, D81FP, D91FP, D111FP

as well as for cartridge valves TDP, TEP and TPQ in chapter 8.

Features EtherCAT interface

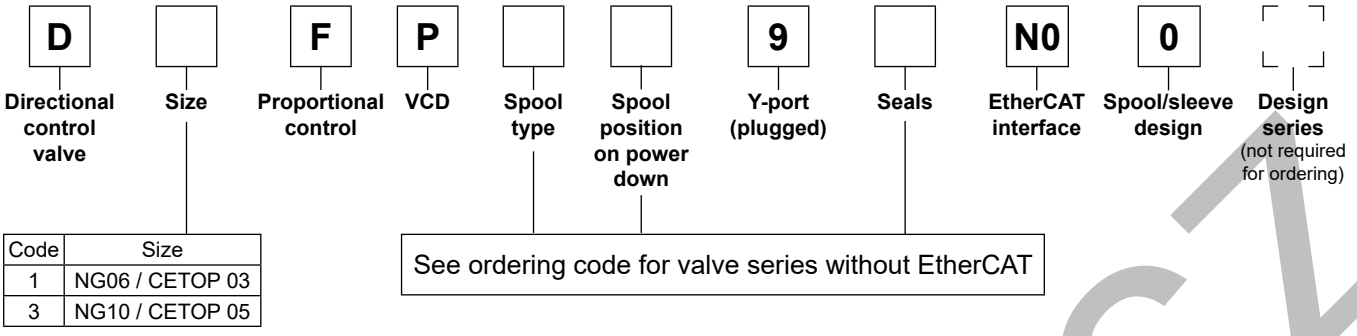
- EtherCAT interface, 2x M12x1, connector 4-Pin (EtherCAT In and EtherCAT Out)
- High dynamics
- High flow capacity
- Onboard electronics

Technical Data

Electrical			
Duty ratio		[%]	100
Protection class			IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply voltage/ripple		[V]	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
Differential input		[V]	30 for terminal D and E against PE (terminal G)
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			6 + PE acc. to EN 175201-804
EtherCAT interface			2 x socket M12x1: 5p acc. to IEC61076-2-101
Wiring min.		[mm²]	3 x 1.0 (AWG16) overall braid shield
Wiring length max.		[m]	50
Wiring EtherCAT			acc. to CiA DS-301 Version 4 / Twisted pair cable acc. to ISO11898
EtherCAT profiles			Communication Layer IEC 61158-x-12, 301 Version 4 Device Profile in accordance with CIA DS - 408 Version 1.5.2 CANopen over EtherCAT (object dictionary)
Functionality			One PDO (Receive) One PDO (Transmit) BUS-cycle time down to 0.250 mSec.
Parameterization			
Interface			RS 232, parametrizing cable order code 40982923
Interface program			ProPxD (see www.parker.com/propxd)
Adjustment ranges	Min	[%]	0...50
	Max	[%]	50...100
	Ramp	[%]	0...32.5

The EtherCAT option is also available for the cartridge valves in chapter 8, series TDP, TEP and TPQ

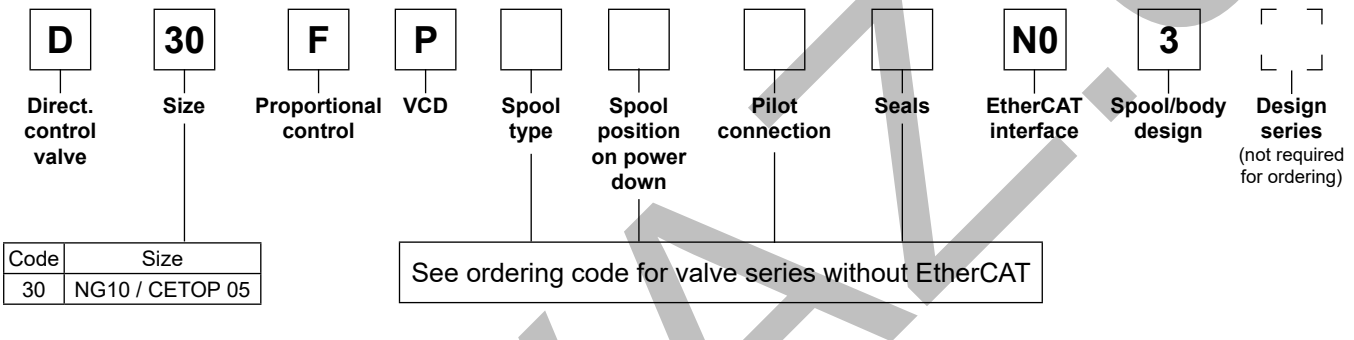
Direct operated proportional DC valve



Code	Size
1	NG06 / CETOP 03
3	NG10 / CETOP 05

See ordering code for valve series without EtherCAT

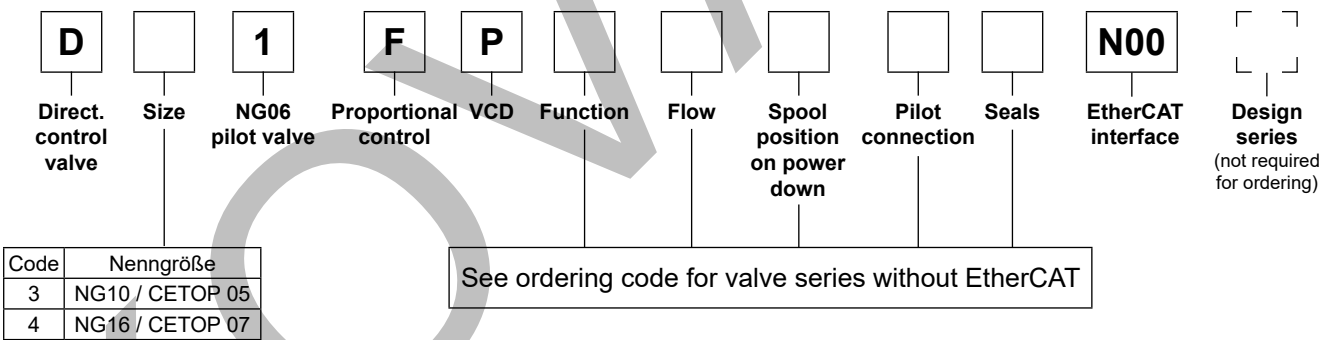
Pilot operated proportional DC valve



Code	Size
30	NG10 / CETOP 05

See ordering code for valve series without EtherCAT

Pilot operated proportional DC valve

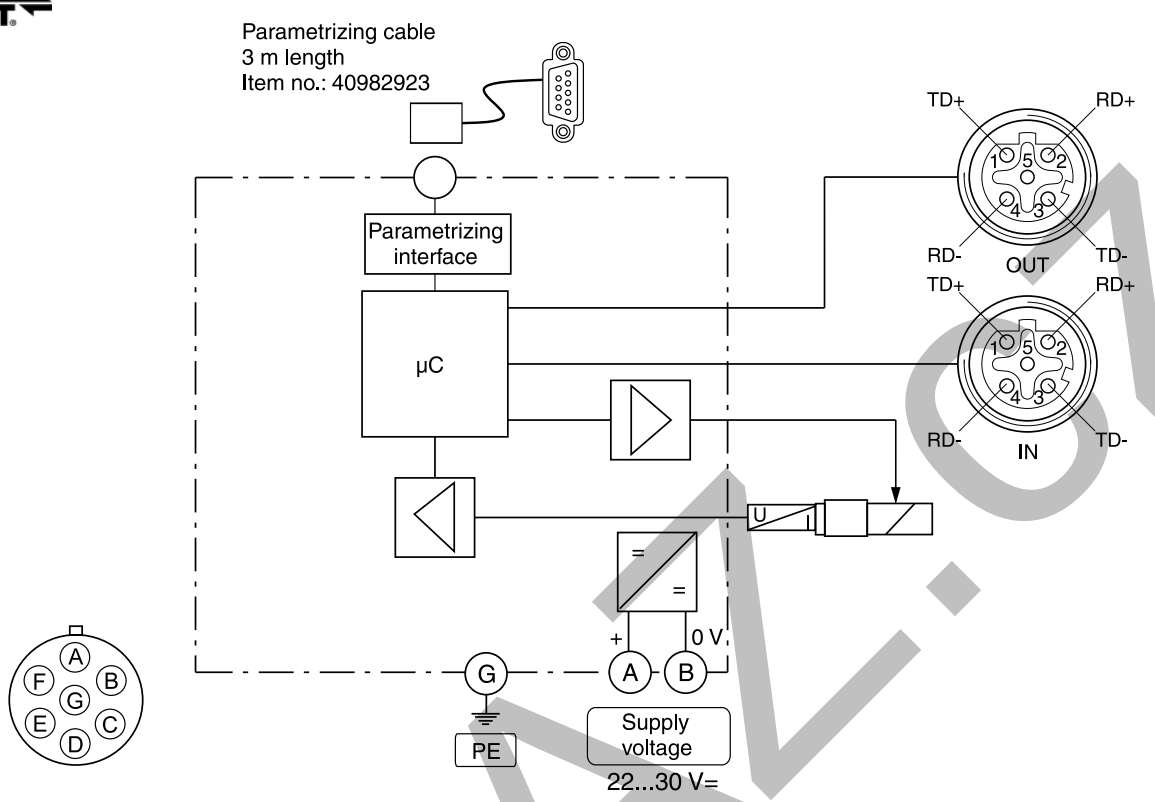


Code	Nenngröße
3	NG10 / CETOP 05
4	NG16 / CETOP 07
8	NG25 / CETOP 08
9	NG25 / CETOP 08
11	NG32 / CETOP 10

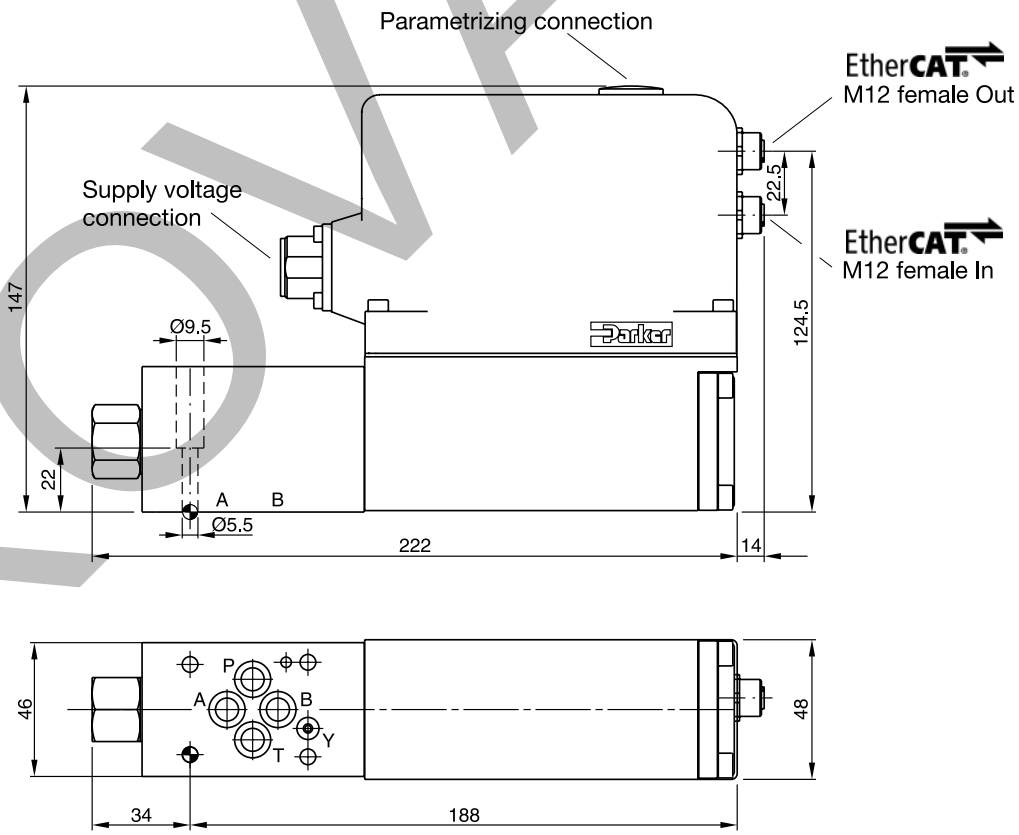
See ordering code for valve series without EtherCAT

Please order connector separately, see chapter 3 accessories.
Parametrizing cable OBE → RS232, item no. 40982923

Block diagram

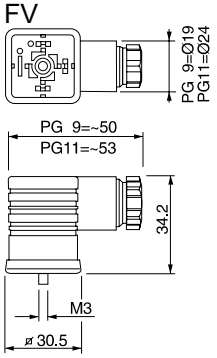


Dimensions D1FP with EtherCAT



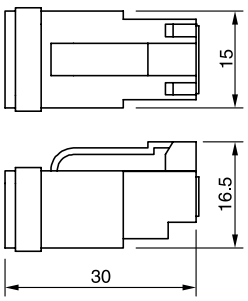
3

Solenoid connector
D*FB, D*1FB, D1FV



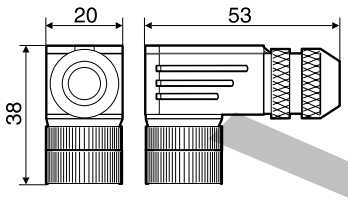
Description	Variation	Order no.
EN 175301-803 2+PE	PG 9 black B	5001710
EN 175301-803 2+PE	PG 9 grey A	5001711
EN 175301-803 2+PE	PG 11 black B	5001716
EN 175301-803 2+PE	PG 11 grey A	5001717

Plug kit DT04-2P “Deutsch“
D1FB, D*1FB, D1FV



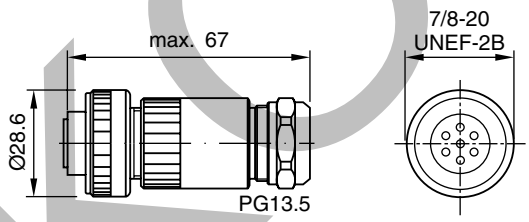
Description	Order no.
Connector DT04-2P “Deutsch“	45216087

Monitor switch connector
D*1FB, D*1FC



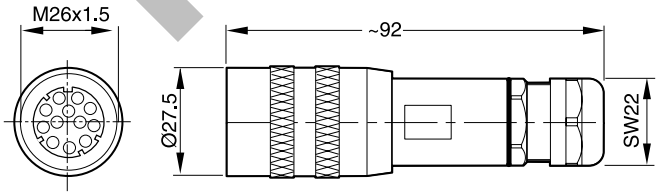
Description	Order no.
IEC 61076-2-101 M12 / 4 + PE	5004109

Central connector
D*FB*0 OBE, D*1FB*0 OBE, D1FV*0 OBE, D*FC*0, D*1FC*0/7, D*FP*0/7, D*1FP*0/7



Description	Order no.
EN 175201-804 6 + PE	5004072

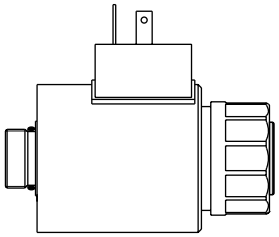
Central connector
D*FB*5 OBE, D*1FB*5 OBE, D1FV*5 OBE, D*FC*5, D*FP*5, D*1FP*5

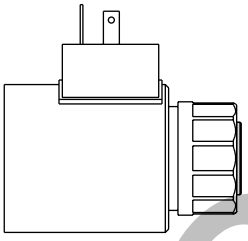


Description	Order no.
EN 175201-804 11 + PE	5004711

Solenoid kit
A solenoid kit contains tube, coil, retainer and seals for the solenoid.

Coil kit
A coil kit contains coil, retainer and seals for the coil.





D1FB

Solenoid kits: D1FBS...		(Example: AK-D1FBSJW014)		
Voltage	**Voltage code**	**Connector as per EN 175301-803**	**Design**	**Design series**
9 V / 2.7 A	M	W	0	14
12 V / 2.2 A	K	W	3	14
24 V / 0.8 A	J	W	0	14
24 V / 1.1 A	J	W	3	14

Coil kits: D1FBC...		(Example: AK-D1FBCJW313)		
Voltage	**Voltage code**	**Connector as per EN 175301-803**	**Design**	**Design series**
9 V / 2.7 A	M	W	0	14
12 V / 2.2 A	K	W	3	10
24 V / 0.8 A	J	W	0	14
24 V / 1.1 A	J	W	3	13

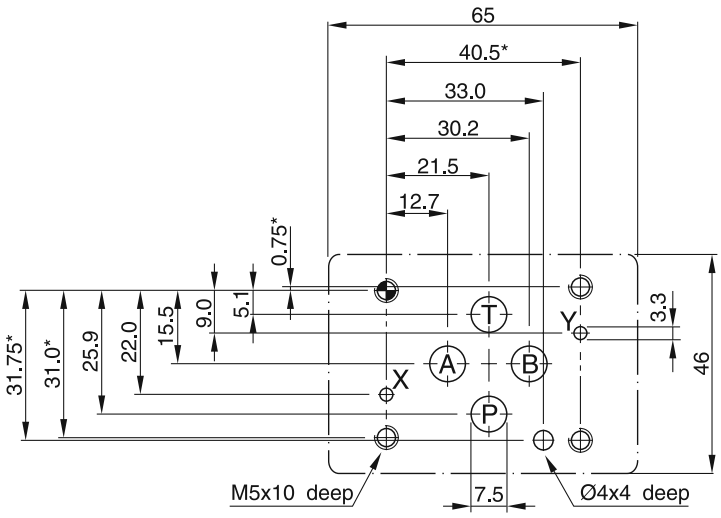
D3FB

Solenoid kits: D3FBS...		(Example: AK-D3FBSKW12)	
Voltage	**Voltage code**	**Connector as per EN 175301-803**	**Design series**
12 V / 2.95 A	K	W	12
24 V / 1.5 A	J	W	12

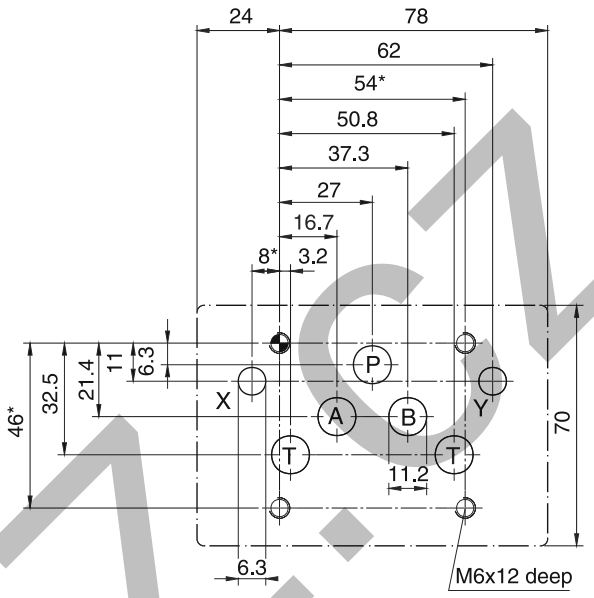
Coil kits: D3FBC...		(Example: AK-D3FBCKW12)	
Voltage	**Voltage code**	**Connector as per EN 175301-803**	**Design series**
12 V / 2.95 A	K	W	12
24 V / 1.5 A	J	W	12

3

Size 6, mounting pattern to ISO 4401-03-03-0-05

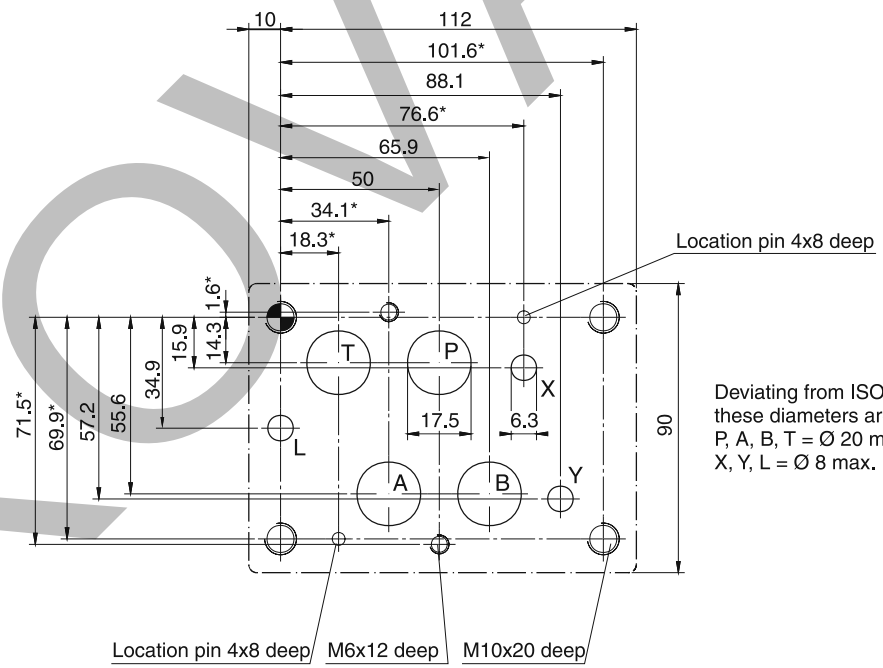


Size 10, mounting pattern to ISO 4401-05-05-0-05



Deviating from ISO 4401
these diameters are possible:
X, Y = Ø 8 max.

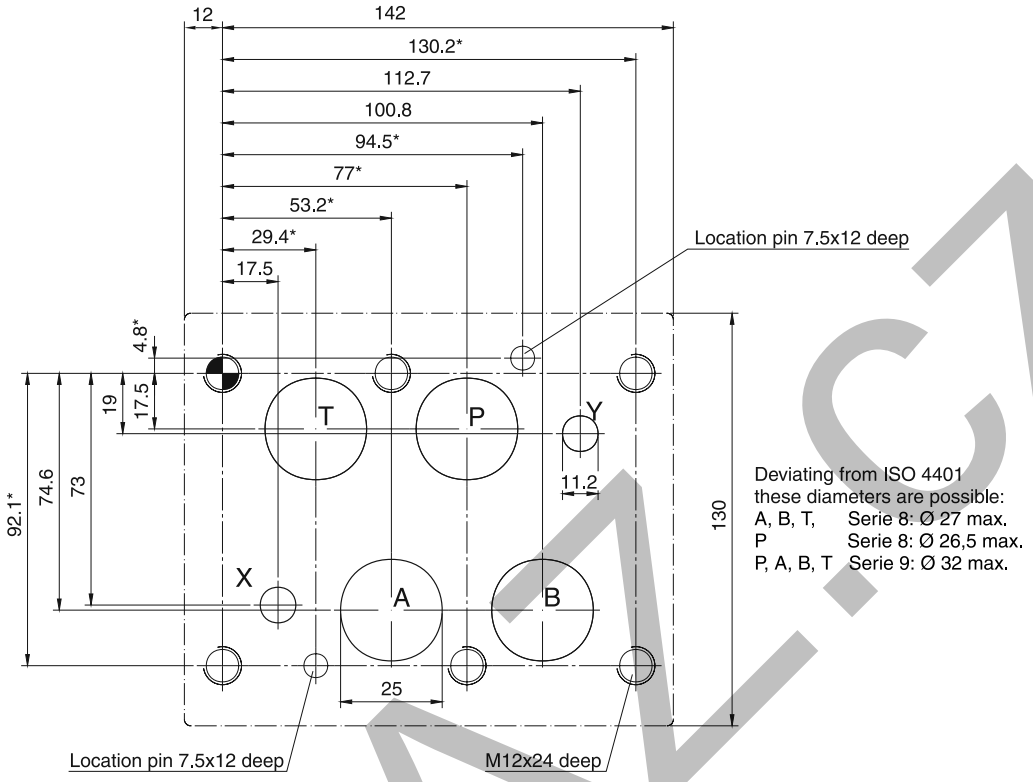
Size 16, mounting pattern to ISO 4401-07-07-0-05



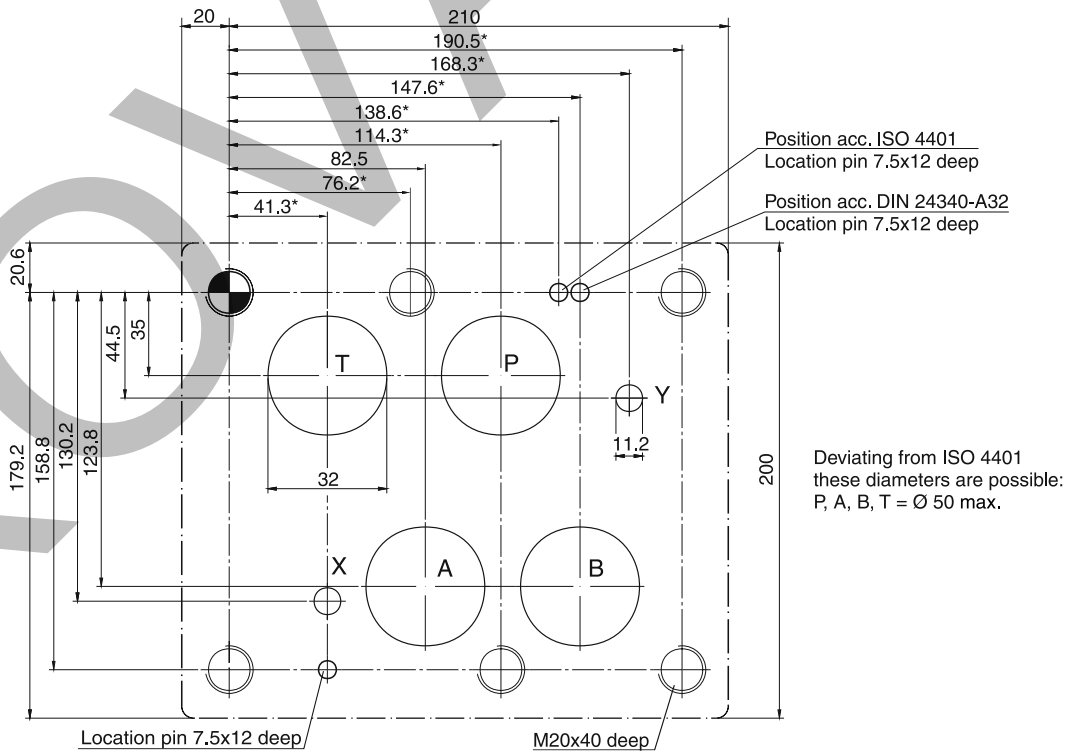
Deviating from ISO 4401
these diameters are possible:
P, A, B, T = Ø 20 max.
X, Y, L = Ø 8 max.

With * marked dimensions ± 0.1mm. All other dimensions ± 0.2mm.
Subplates and manifolds see chapter 12.

Size 25, mounting pattern to ISO 4401-08-08-0-05



Size 32, mounting pattern to ISO 4401-10-09-0-05



With * marked dimensions ± 0.1mm. All other dimensions ± 0.2mm.
Subplates and manifolds see chapter 12.