

Characteristics

**Direct Operated Proportional DC Valve
Series D3FP**

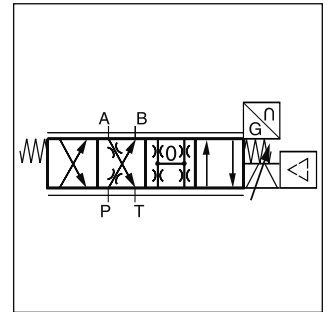
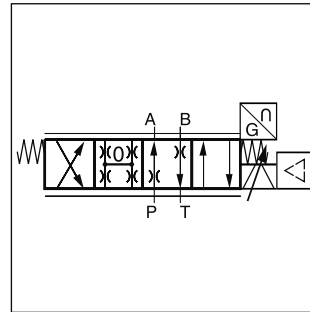
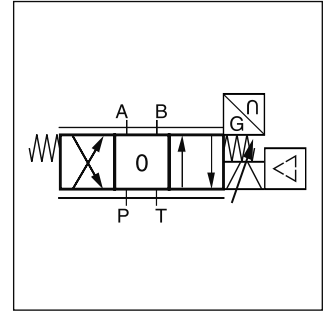
The direct operated control valve D3FP of the nominal size NG10 (CETOP05) shows extremely high dynamics combined with high flow. First of all it is used for highest accuracy in positioning of hydraulic axis and controlling of pressure and velocity.

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

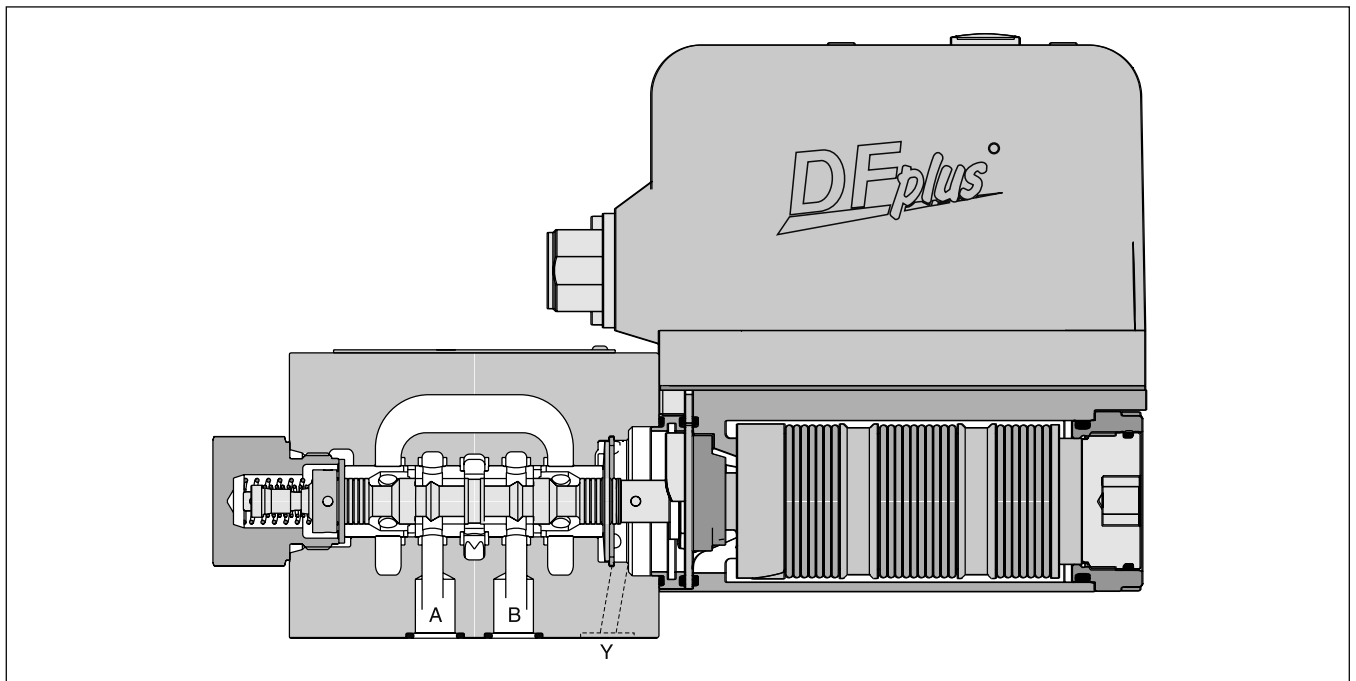
At power-down the spool moves in a defined position. All common input signals are available.

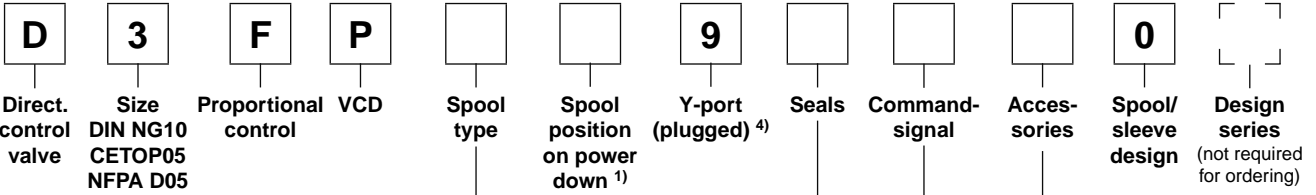
Technical features

- Real servovalve dynamics (-3dB/350Hz at ±5% input signal)
- Max. tank pressure 350 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



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Code	Spool type	Flow [l/min] at Δp 35bar per metering edge
Zerolap		
E50Y		100
E50P		50
B60Y	$Q_B = Q_A / 2$ 	100
B60P	$Q_B = Q_A / 2$ 	50
Underlap approx. -0.5%		
E55Y		100
E55P		50
Overlap 18%		
E01Y E01P		100 50
E02Y E02P		100 50
B31Y B31P	$Q_B = Q_A / 2$ 	100 / 50 50 / 25
B32Y B32P	$Q_B = Q_A / 2$ 	100 / 50 50 / 25

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

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

Code	Seals
N	NBR
V	FPM
H	for HFC fluid

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

- 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) needs to be removed at tank pressure >35 bar

Please order connector separately.
 See chapter 3 accessories.

**Bold letters =
 Short-term availability**

General			
Design	Direct operated proportional DC valve		
Actuation	VCD [®] actuator		
Size	NG10/CETOP05/NFPA D05		
Mounting interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA		
Mounting position	unrestricted		
Ambient temperature	[°C]	-20...+50	
MTTF _D value	[years]	75	
Weight	[kg]	6.5	
Vibration resistance	[g]	10 Sinus 5...2000 Hz acc. IEC 68-2-6 30 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	
	[bar]	Port T max. 35, port Y max. 35 ¹⁾	
Fluid	Hydraulic oil as per DIN 51524...535, other on request		
Fluid temperature	[°C]	-20...+60	
Viscosity	permitted [cSt] / [mm ² /s]	20...380	
	recommended [cSt] / [mm ² /s]	30...80	
Filtration	ISO 4406 (1999) 18/16/13 (meet NAS 1638: 7)		
Flow nominal		50 / 100	
at Δp=35bar per control edge ²⁾	[l/min]	50 / 100	
Flow maximum	[l/min]	150	
Leakage at 100 bar	[ml/min]	<400 (Zerolap spool); <100 (Overlap spool)	
Static / Dynamic			
Step response at 100% step ³⁾	[ms]	<6	
Frequency response (±5% signal) ³⁾	[Hz]	200 (amplitude ratio -3dB), 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, ripple <5% eff., surge free	
Current consumption max.	[A]	3.5	
Pre-fusing	[A]	4.0 medium lag	
Input signal			
Voltage	[V]	10...0...-10, ripple <0.01% eff., surge free, 0...+10V P->A	
Impedance	[kOhm]	100	
Current	[mA]	20...0...-20, ripple <0.01% eff., surge free, 0...+20mA P->A	
Impedance	[Ohm]	250	
Current	[mA]	4...12...20, ripple <0.01% eff., surge free, 12...20mA P->A	
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 = 9 kOhm	
Diagnostic signal	[V]	+10...0...-10 / +Ub, rated max. 5mA	
EMC		EN 61000-6-2, EN 61000-6-4	
Electrical connection	Code 0/7	6 + PE acc. EN 175201-804	
	Code 5	11 + PE acc. EN 175201-804	
Wiring min.	Code 0/7	7 x 1.0 (AWG 18) overall braid shield	
	Code 5	8 x 1.0 (AWG 18) overall braid shield	
Wiring length max.	[m]	50	

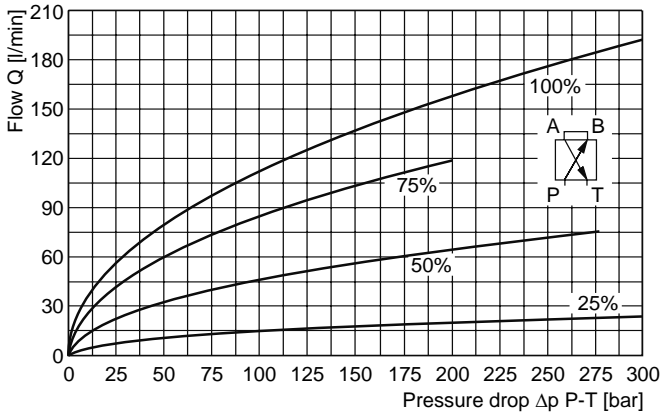
¹⁾ For applications with p_r>35 bar the Y-port has to be connected and the plug in the Y-port has to be removed.

²⁾ Flow rate for different Δp per control edge:

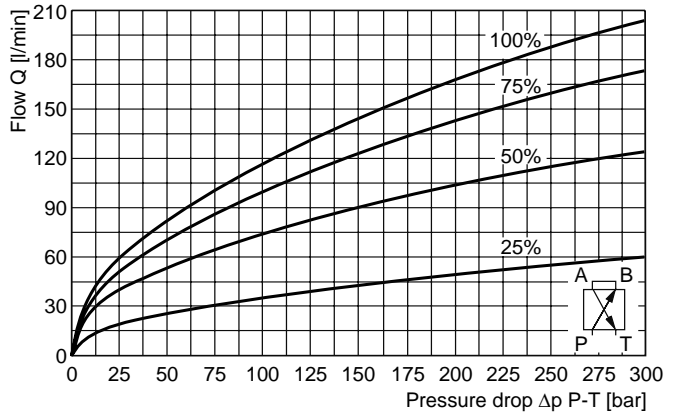
$$Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$$

³⁾ Measured with load (100 bar pressure drop/two control edges)

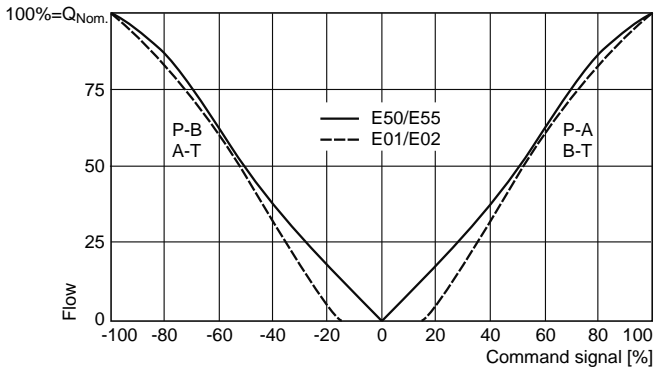
Functional limits*
 at 25%, 50%, 75% and 100% command signal
 Spool type **E01/E02**



Functional limits*
 at 25%, 50%, 75% and 100% command signal
 Spool type **E50/E55**

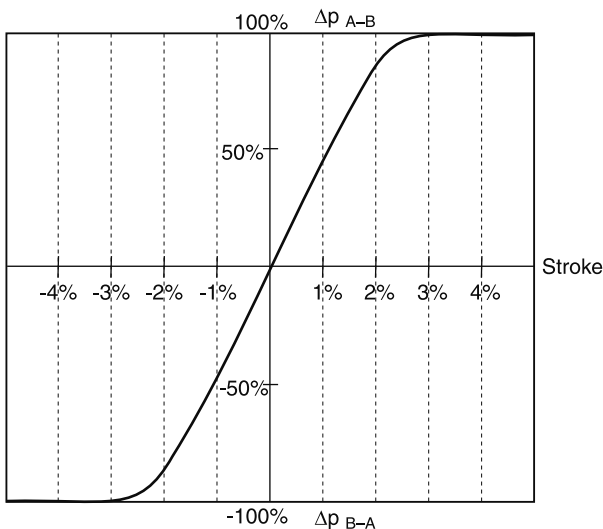


Flow curves
 at $\Delta p = 35$ bar per metering edge
 Spool type **E50/E55, E01/E02**



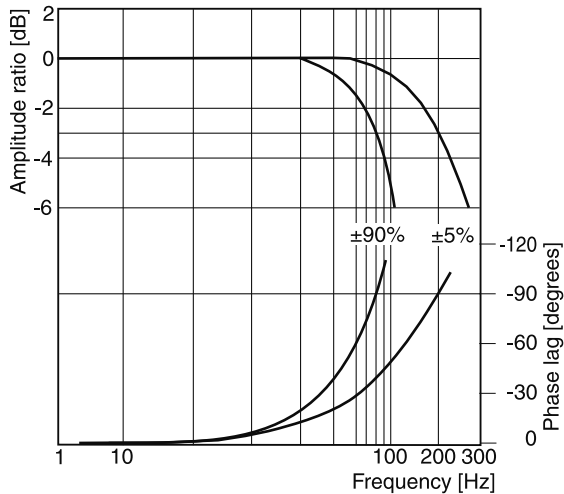
*** When exceeding the functional limits, for a period of time the valve will go into fail safe and power supply needs to be switched off/on to re-enable the valve.**

Pressure gain

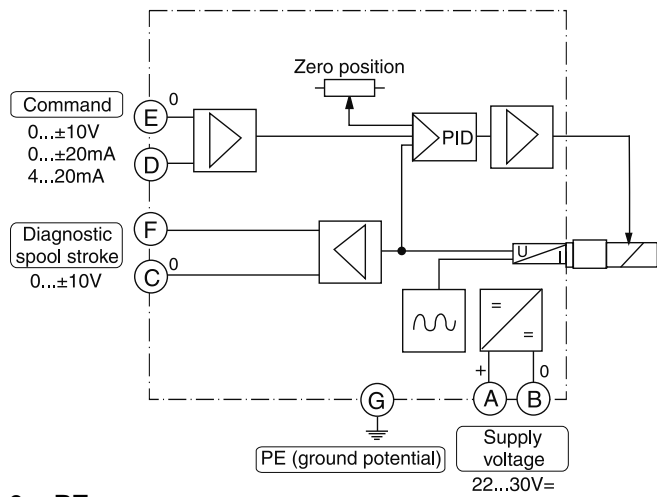


Frequency response

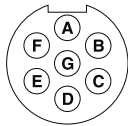
$\pm 5\%$ command signal
 $\pm 90\%$ command signal



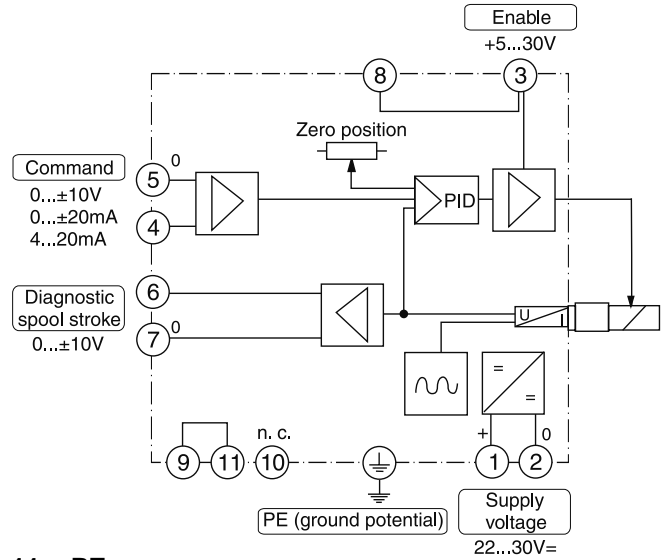
Code 0



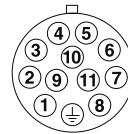
6 + PE



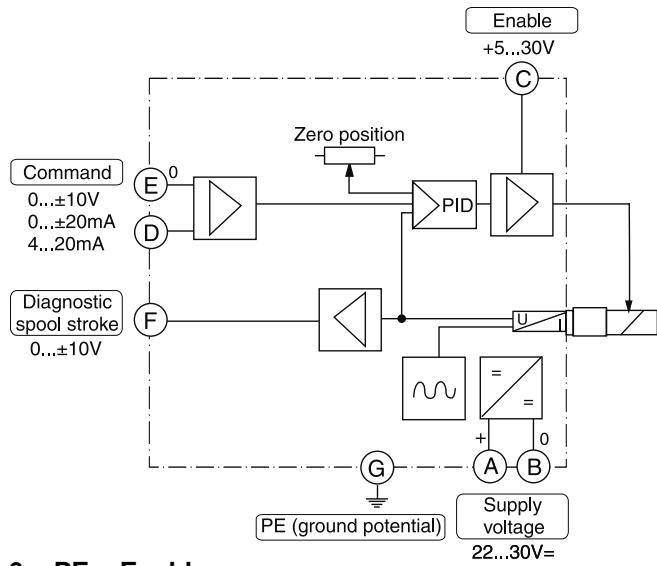
Code 5



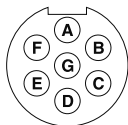
11 + PE



Code 7

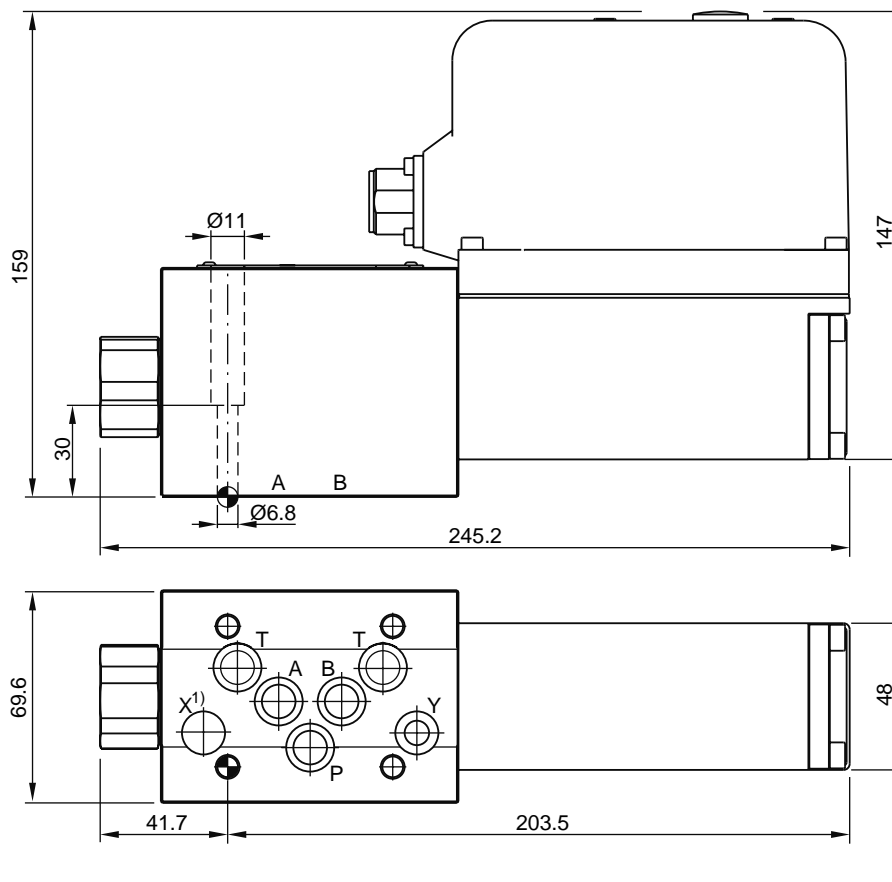


6 + PE + Enable





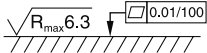


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1) O-ring recess diameter on valve body.

Surface finish	 Kit	 Kit	 Kit	 Kit
	BK385	4xM6x40 DIN 912 12.9	13.2 Nm ±15%	NBR: SK-D3FP FPM: SK-D3FP-V HFC: SK-D3FP-H