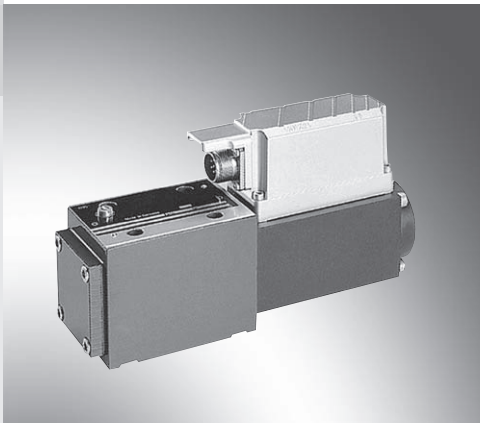
Rexroth
Bosch Group

4/4 controlled directional valve, directly operated, with electric position feedback and integrated electronics (OBE)

RE 29037/11.13 1/12
Replaces: 03.10

Type 4WRPEH10

Size 10
Component series 2X
Maximum operating pressure P, A, B 315 bar, T 250 bar
Rated flow 50...100 l/min (Δ*p* 70 bar)



Type 4WRPEH10

Table of contents

Features

- Directly actuated controlled directional valve, with control spool and sleeve in servo quality
- Single-side operated, 4/4 fail-safe position in deactivated state
- Electric position feedback and integrated electronics (OBE), calibrated in the factory
- Electric port 6P+PE
  Signal input of differential amplifier with interface A1 ±10 V or interface F1 4...20 mA (R_{sh} = 200 Ω)
- Used for electro-hydraulic control systems in production and test plants

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

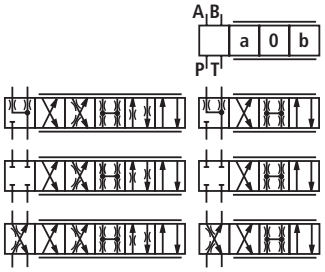
4WRP	E	H	10		B		– 2X/	G24	K0/		M	*

With **integrated** electronics **= E**

Control piston/sleeve **= H**

Size **= 10**

Control spool symbol
4/4 way design



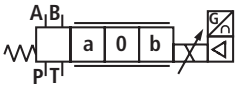
= C3, C5

= C4, C1

= C

With symbols C5 and C1:
P → A: q_V B → T: q_V/2
P → B: q_V/2 A → T: q_V

Installation side of the inductive position transducer



(standard) **= B**

Further details in the plain text

Seal material
M = NBR seals, suitable for mineral oils (HL, HLP) according to DIN 51524

Interface of the control electronics
A1 = Command value input ±10 V
F1 = Command value input 4...20 mA

Electric port
K0 = **Without** mating connector, With connector according to DIN 43563-AM6
Mating connector– separate order

Supply voltage of the control electronics
G24 = +24 V direct current

2X = Component series 20 to 29 (identical installation and connection dimensions)

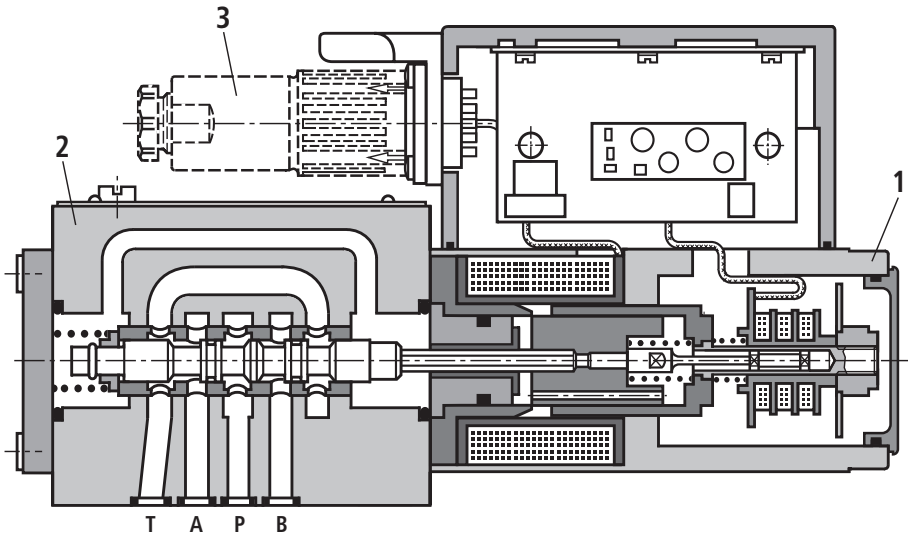
Flow characteristics
L = Linear
P = Inflected characteristic curve

Rated flow
at 70 bar valve pressure difference (35 bar/control edge)
50 = 50 l/min
100 = 100 l/min

Function, section

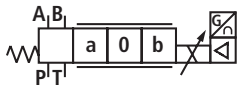
General
In the field of integrated electronics, the specified command value is compared with the actual position value. In case of deviations from the standard, the lifting solenoid is activated. Due to the changed magnetic force, the lifting solenoid adjusts the control valve against the spring.
Lifting/control cross-section are adjusted proportionally to the command value. In case of a command value provision of 0 V, the electronics adjusts the control valve against the spring to center position. In deactivated condition, the spring is unloaded to a maximum and the valve is in fail-safe position.

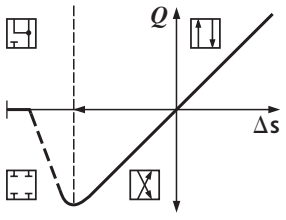
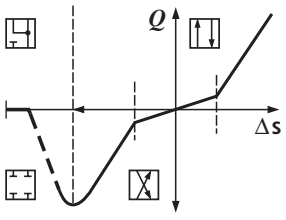
Switch-off behavior
If the electronics is switched off, the valve immediately moves to the secured basic position (fail safe).
In this process, the P-B/A-T position is passed which might cause movements at the controlled component. This must be taken into account when designing the plant.



1 Control solenoid with position transducer
2 Valve bodies
3 Mating connectors

Symbols



	L: Linear	P: Inflection 40 %
C3, C5		
C4, C1		
C		

Test and service device

- Service case Type VT-VETSY-1 with test device, see RE 29685
- Measuring adapter 6P+PE Type VT-PA-2, see RE 30068

Technical data

general						
Type			Gate valve, directly operated, with steel sleeve			
Actuation			Proportional solenoid with position control, OBE			
Type of connection			Plate port, porting pattern (ISO 4401-05-04-0-05)			
Installation position			Any			
Ambient temperature range		°C	–20...+50			
Weight		kg	7,1			
Vibration resistance, test condition			Max. 25 *g*, space vibration test in all directions (24 h)			
hydraulic (measured with HLP 46, ϑ_{oil} = 40 °C ±5 °C)						
Hydraulic fluid			Hydraulic oil according to DIN 51524…535, other media upon request			
Viscosity range	Recommended	mm^2/s	20...100			
	Max admissible	mm^2/s	10...800			
Hydraulic fluid temperature range		°C	–20...+70			
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)			Class 18/16/13 [1]			
Flow direction			According to symbol			
Rated flow at Δp = 35 bar per edge [2]		l/min	50 (1:1)	50 (2:1)	100 (1:1)	100 (2:1)
Max operating pressure	Port P, A, B	bar	315			
	Orifice T	bar	250			
Limitation of use Δp pressure loss at the valve	C, C3, C5	bar	315	315	160	160
q_{Vnom}: > q_N valves	C4, C1	bar	250	250	100	100
Zero flow at 100 bar	Linear characteristic curve L	cm^3/min	< 1200	< 1200	< 1500	< 1000
	Inflected characteristic curve P	cm^3/min	< 600	< 500	< 600	< 600
Fail-safe position						
C Flow at Δp = 35 bar per edge		l/min	50	50	100	100
C3, C5		cm^3/min	50 P–A			
Zero flow at 100 bar		cm^3/min	70 P–B			
C3, C5		l/min	10...100 A–T			
Flow at Δp = 35 bar per edge		l/min	10...25 B–T			
C4, C1		cm^3/min	50 P–A			
Zero flow at 100 bar		cm^3/min	70 P–B			
		cm^3/min	70 A–T			
		cm^3/min	50 B–T			
Reaching the fail-safe position		0 bar	12 ms			
		100 bar	16 ms			

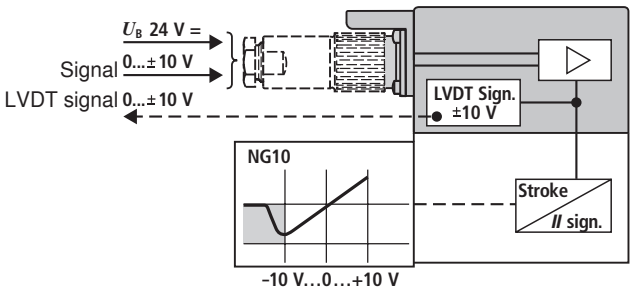
[1] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.
For the selection of the filters see www.boschrexroth.com/filter

[2] Flow at different Δp $q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{35}}$

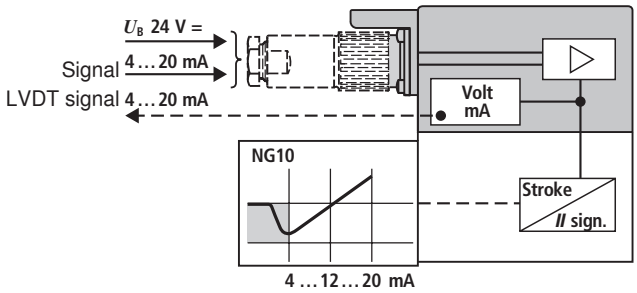
Technical data

static / **dynamic**		
Hysteresis	%	≦ 0,2
Manufacturing tolerance q_{max}	%	< 10
Actuating time for signal step 0...100 %	ms	≦ 25
Temperature drift		Zero shift < 1 % at ΔT = 40 °C
Zero compensation		ex factory ±1 %
electric, control electronics integrated in the valve		
Relative duty cycle	%	100 ED
Protection class		IP 65 according to DIN 40050 and IEC 14434/5
Port		Mating connector 6P+PE, DIN 43563
Supply voltage Terminal A: Terminal B: 0 V		24 V = $_{nom}$ min. 21 V = / max. 40 V = Ripple max. 2 V =
Max. power consumption		60 VA
Fuse protection, external		2.5 A_F
Input, version A1 Terminal D: U_E Terminal E:		Differential amplifier, R_i = 100 kΩ 0...±10 V 0 V
Input, version F1 Terminal D: I_{D-E} Terminal E: I_{D-E}		Load, R_{sh} = 200 Ω 4...(12)...20 mA Current loop I_{D-E} feedback
Max. voltage of the differential inputs almost 0 V		D → B E → B } max. 18 V =
Test signal, version A1 Terminal F: U_{test} Terminal C:		LVDT 0...±10 V Reference 0 V
Test signal, version F1 Terminal F: I_{F-C} Terminal C: I_{F-C}		LVDT signal 4...20 mA, at external load 200...500 Ω max. 4...20 mA output Current loop I_{F-C} feedback
Protective earthing conductor and shielding		See pin assignment (CE-compliant installation)
Adjustment		Calibrated in the factory, see characteristic curve of the valve
Electromagnetic compatibility tested according to		EN 61000-6-2: 2005-08 EN 61000-6-3: 2007-01

Version A1:
Standard

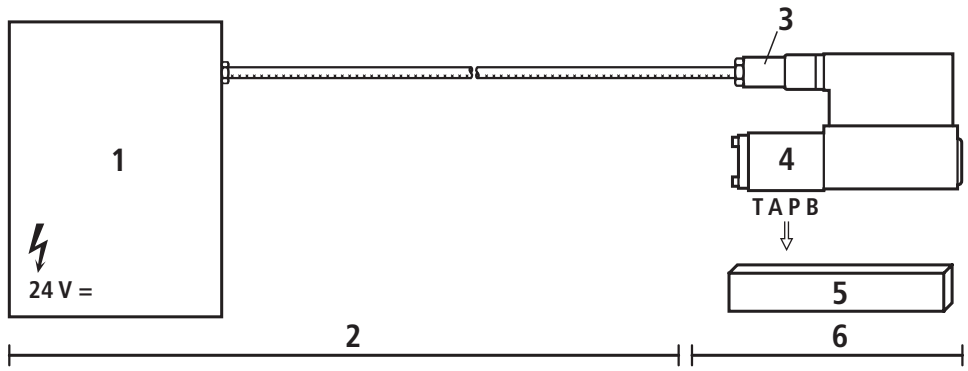


Version F1:
mA signal



Electrical connection

Electrical data, see page 5



1 Control
2 On the customer side
3 Mating connector
4 Valve
5 Contact surface
6 On Rexroth side

Technical notes with regard to cable

Version:
- Multi-core wire
- Litz wire structure, extra fine wire according to VDE 0295, class 6
- Protective earthing conductor, green-yellow
- Cu shielding braid

Type:
- e.g. Oilflex-FD 855 CP (Company Lappkabel)

Number of wires:
- Determined by the valve type, connector type and signal configuration

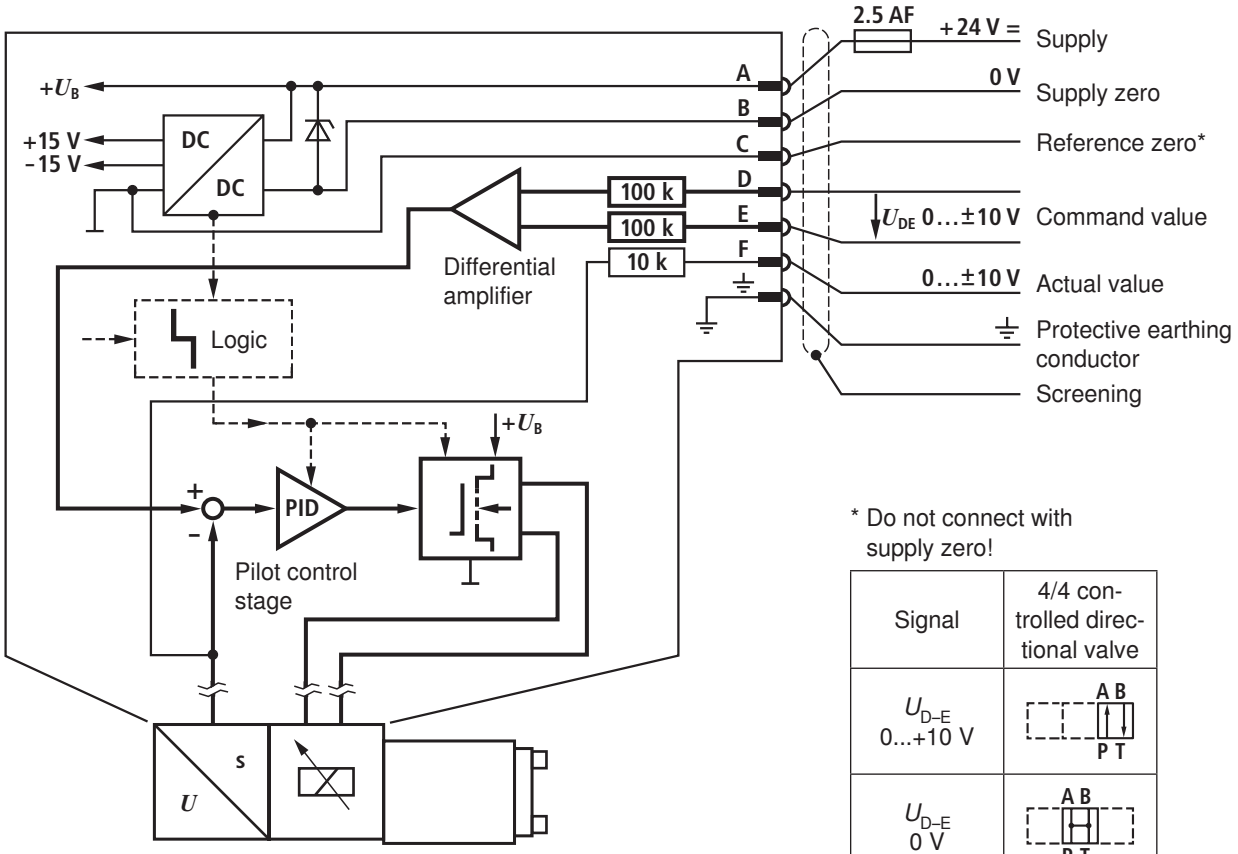
Line Ø:
- 0.75 mm^2 to 20 m of length
  1.0 mm^2 to 40 m of length

OuterØ:
- 9.4...11.8 mm – Pg11
  12.7...13.5 mm – Pg16

Note
Supply voltage 24 V = $_{nom}$,
if the value falls below 18 V = an internal fast switch-off is effected which can be compared with “Release OFF”.
Additionally for version F1:
$I_{D-E} \geqq 3$ mA – valve is active
$I_{D-E} \leqq 2$ mA – valve is deactivated.
Electric signals taken out via control electronics (e.g. actual value) may not be used for the switch-off of safety-relevant machine functions! (See also the European standard “Safety requirements for fluid power systems and their components - Hydraulics”, EN 982.)

Integrated electronics

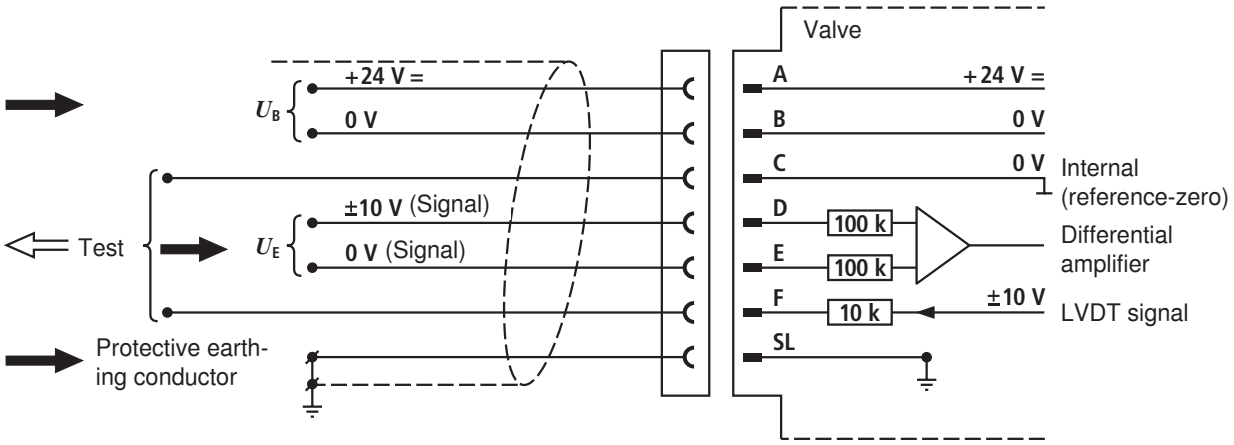
Block diagram/Pinout
Version A1: U_{D-E} ±10 V



* Do not connect with supply zero!

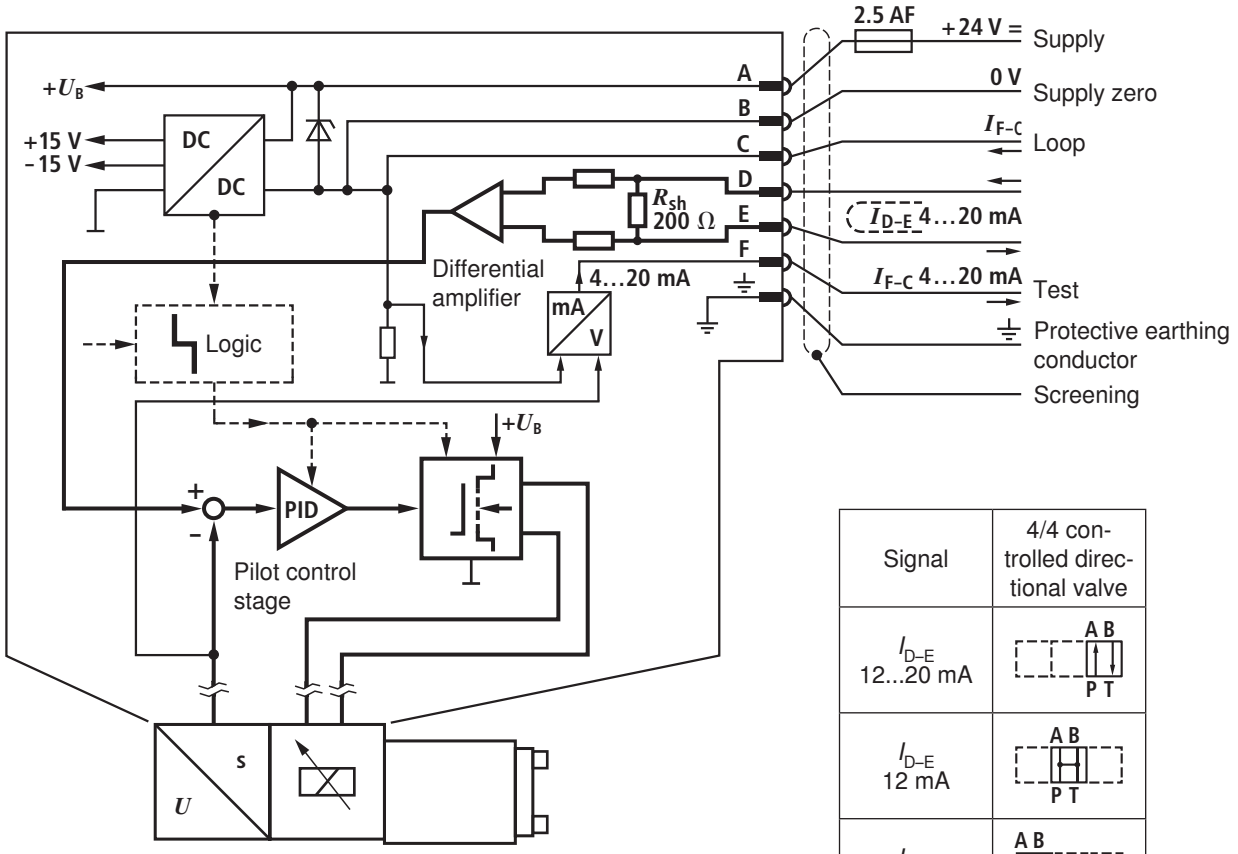
Signal	4/4 controlled directional valve
U_{D-E} 0...+10 V	
U_{D-E} 0 V	
U_{D-E} 0...–10 V	

Pin assignment 6P+PE
Version A1: U_{D-E} ±10 V
(R_i = 100 kΩ)



Integrated electronics

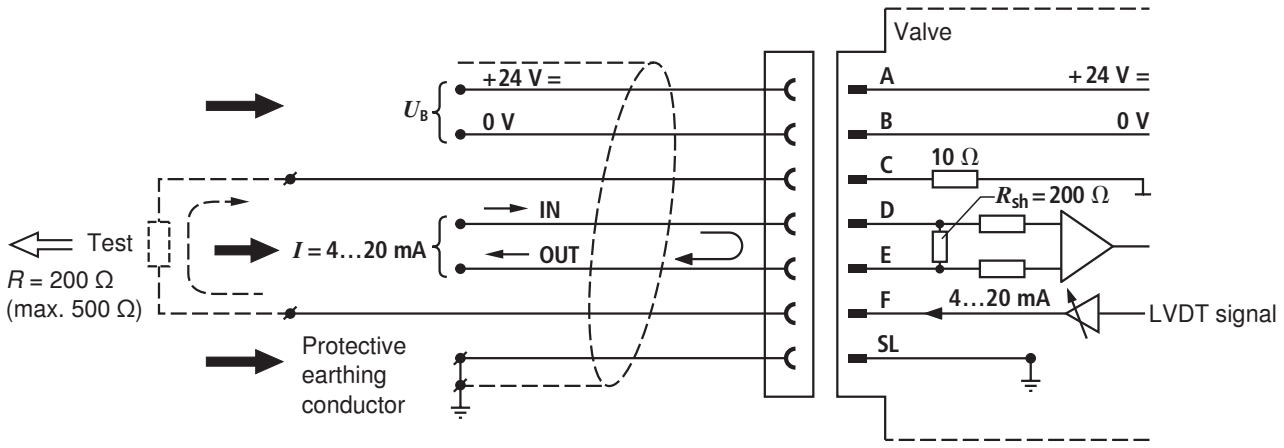
Block diagram/Pinout
Version F1: I_{D-E} 4...12...20 mA



Signal	4/4 controlled directional valve
I_{D-E} 12...20 mA	A B / P T
I_{D-E} 12 mA	A B / P T
I_{D-E} 4..0.12 mA	A B / P T

$I_{D-E} \leqq 2$ mA: Valve inactive

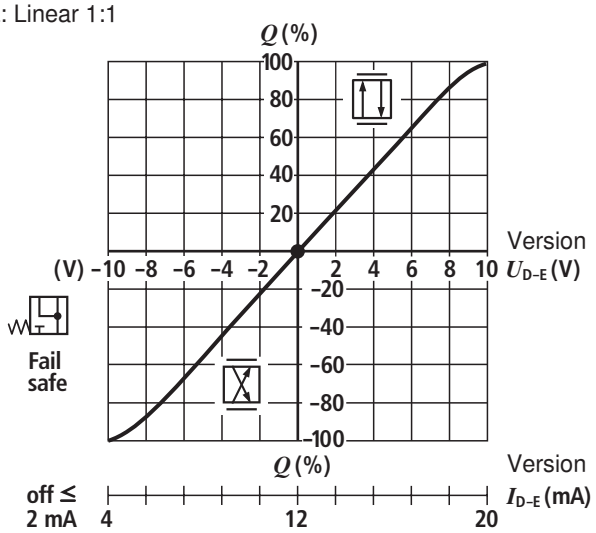
Pin assignment 6P+PE
Version F1: I_{D-E} 4...12...20 mA
(R_{sh} = 200 Ω)



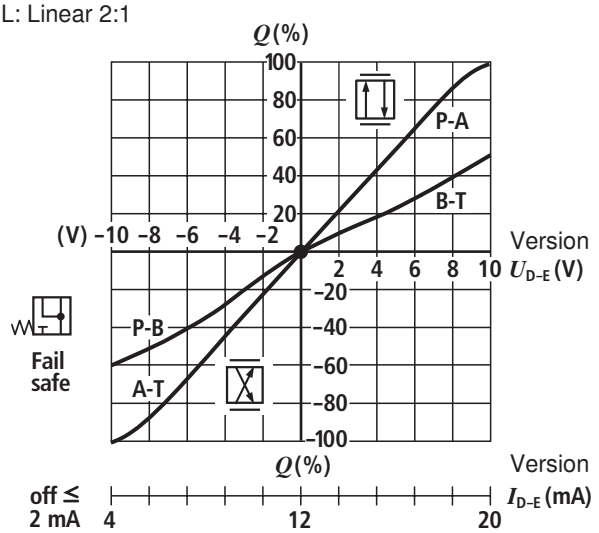
Characteristic curves (measured with HLP 46, ϑ_{oil} = 40 °C ±5 °C)

Flow – signal function $q = f(U_{D-E})$
$q = f(I_{D-E})$

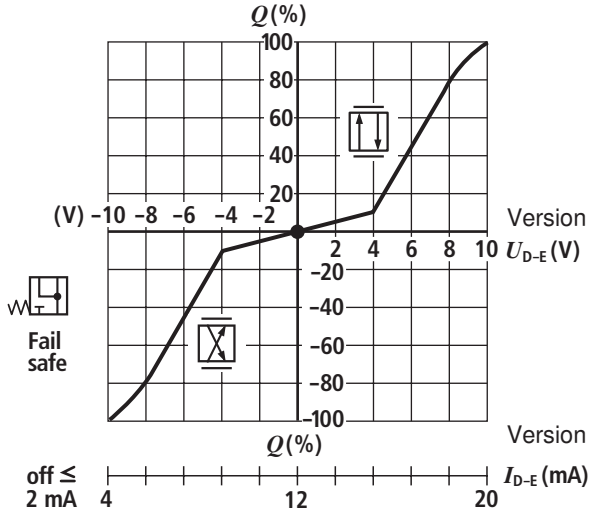
Flow characteristics
L: Linear 1:1



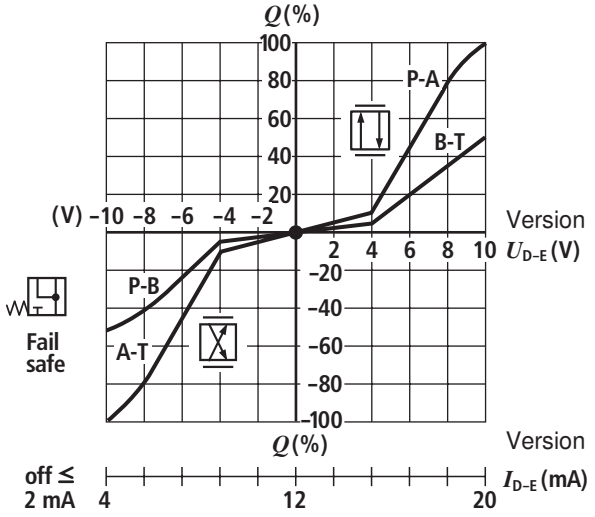
Flow characteristics
L: Linear 2:1



Flow characteristics
P: (Inflection 40%) 1:1

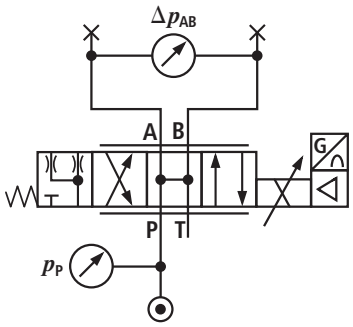


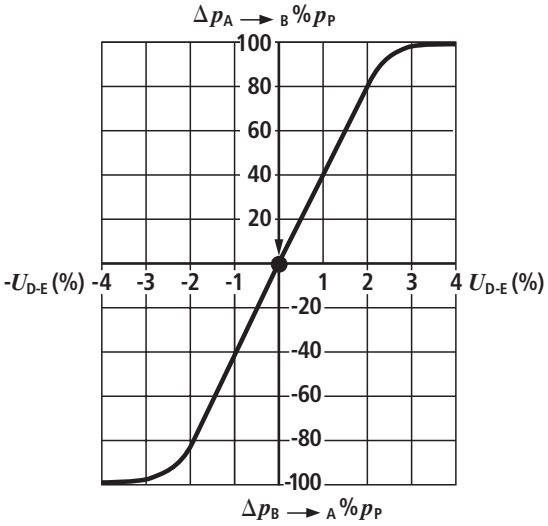
Flow characteristics
P: (Inflection 40%) 2:1



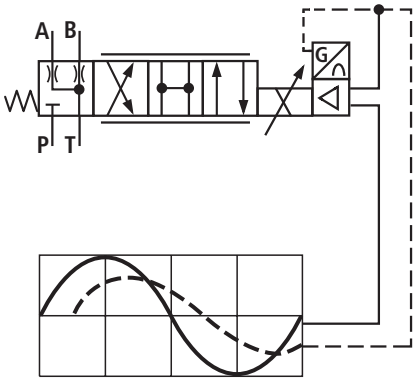
Characteristic curves (measured with HLP 46, ϑ_{oil} = 40 °C ±5 °C)

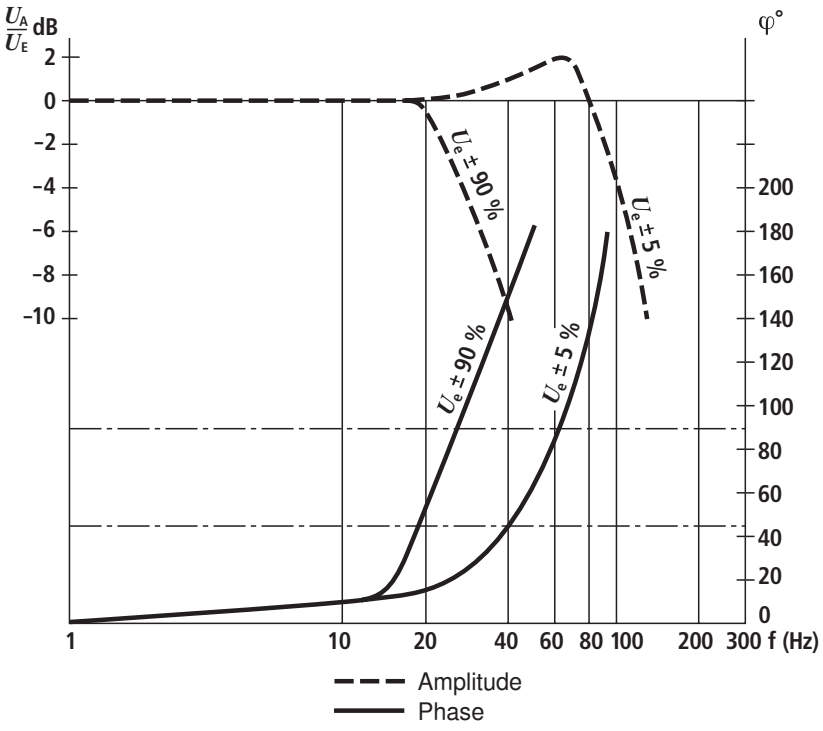
Pressure gain



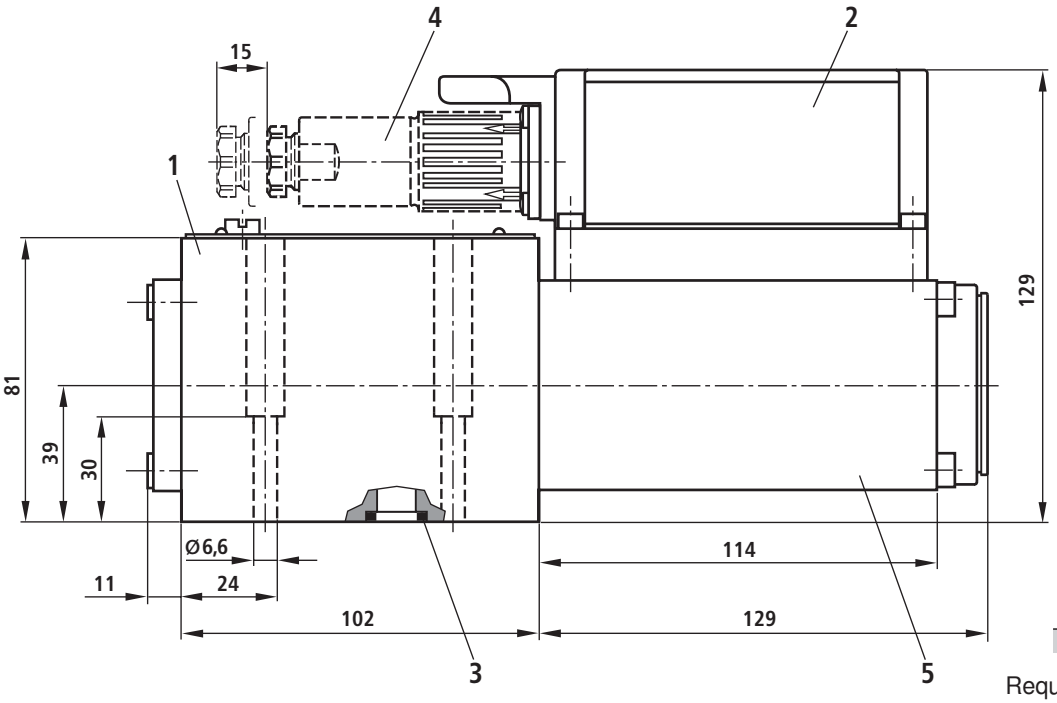


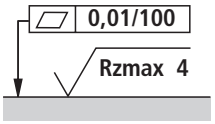
Bode diagram



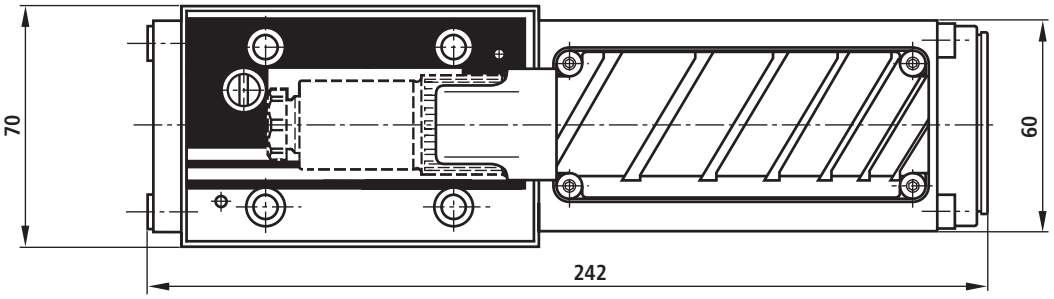


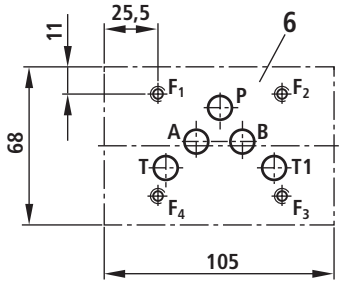
Dimensions (dimensions in mm)





Required surface quality of the valve mounting face





1 Valve housing

2 Integrated electronics

3 O-rings Ø 12x2 (ports P, A, B, T, T1)

4 Mating connector
see technical data sheet RE 08008
(separate order)

5 Control solenoids with position transducer

6 Machined valve mounting face, porting pattern according to ISO 4401-05-04-0-05
Deviating from the standard:
Ports P, A, B, T, T1 Ø 10.5 mm

Subplates, see data sheet 45055
(separate order)

Valve mounting screws (separate order)
The following valve mounting screws are recommended:
4 hexagon socket head cap screws
ISO 4762-M6x40-10.9-N67F82170
(galvanized according to N67F82170)
Tightening torque M_A = 11+3 Nm
Mat. no. 2910151209
or
4 hexagon socket head cap screws ISO 4762-M6x40-10.9
(friction rate μ_{total} = 0.12–0.17)

Notes

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