Rexroth
Bosch Group

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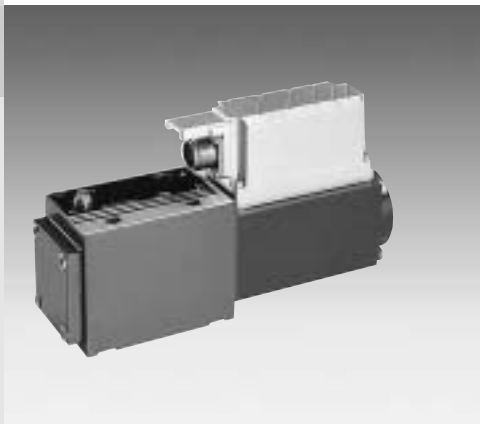
Servo solenoid valves with on-board electronics (OBE)

RE 29037/10.05 1/12
Replaces: 01.05

Type 4WRPEH 10



Size 10
Unit series 2X
Maximum working pressure P, A, B 315 bar, T 250 bar
Nominal flow rate 50...100 l/min (Δp 70 bar)

List of contents

Features

- Directly operated servo solenoid valve NG10, with control piston and sleeve in servo quality
- Actuated on one side, 4/4 fail-safe position when switched off
- Control solenoid with integral position feedback and on-board electronics (OBE), calibrated at the factory
- Electrical connection 6P+PE
  Signal input difference amplifier with interface A1 ±10 V, or interface F1 4...20 mA (R_S 200 Ω)
- Suitable for electrohydraulic controllers in production and testing systems
- For subplate attachment, mounting hole configuration to ISO 4401-05-04-0-94
- Subplates as per catalogue section RE 45055 (order separately)
- Line sockets to DIN 43563-AM6, see catalogue section RE 08008 (order separately)

Variants on request

- For standard applications
- Special symbols for plastic machines
- Possible valve electronics with 11P+PE line socket and extension of module.

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Ordering data

4WRP | E | H | 10 | | B | | – 2X / G24 | K0 / | | M | *

Further information in plain text

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

Interface for trigger electronics
A1 = Setpoint input ±10 V
F1 = Setpoint input 4...20 mA

K0 = **Electrical connection without** line socket, with plug to DIN 43563-AM6
Order line socket separately

Voltage supply of trigger electronics
G24 = +24 V DC

2X = Unit series 20 to 29
(installation and connection dimensions unchanged)

Flow characteristic
L = Linear
P = Non-linear curve

Nominal flow rate at 70 bar valve pressure difference (35 bar/metering notch)

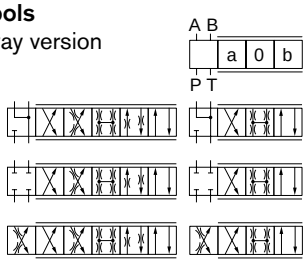
Size 10
50 = 50 l/min **100 =** 100 l/min

With **on-board** trigger electronics **= E**

Control piston/sleeve **= H**

Size 10 **= 10**

Symbols
4/4-way version



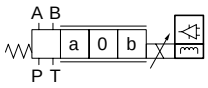
= C3, C5

= 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

Side of inductive position transducer



(Standard) **= B**

Preferred types

Type 4WRPEH 10...C3/C5	Material no.
4WRPEH10C3B50L–2X/G24K0/A1M	0 811 404 800
4WRPEH10C3B100L–2X/G24K0/A1M	0 811 404 801
4WRPEH10C5B50L–2X/G24K0/A1M	0 811 404 756
4WRPEH10C5B100L–2X/G24K0/A1M	0 811 404 757
4WRPEH10C3B50P–2X/G24K0/A1M	0 811 404 822
4WRPEH10C3B100P–2X/G24K0/A1M	0 811 404 823
4WRPEH10C5B50P–2X/G24K0/A1M	0 811 404 826
4WRPEH10C5B100P–2X/G24K0/A1M	0 811 404 827
4WRPEH10C3B50L–2X/G24K0/F1M	0 811 404 819
4WRPEH10C3B100L–2X/G24K0/F1M	0 811 404 817
4WRPEH10C5B50L–2X/G24K0/F1M	0 811 404 758
4WRPEH10C5B100L–2X/G24K0/F1M	0 811 404 759

Type 4WRPEH 10...C1/C4	Material no.
4WRPEH10C4B50L–2X/G24K0/A1M	0 811 404 802
4WRPEH10C4B100L–2X/G24K0/A1M	0 811 404 803
4WRPEH10C1B50L–2X/G24K0/A1M	0 811 404 820
4WRPEH10C1B100L–2X/G24K0/A1M	0 811 404 821
4WRPEH10C4B50P–2X/G24K0/A1M	0 811 404 824
4WRPEH10C4B100P–2X/G24K0/A1M	0 811 404 825
4WRPEH10C1B50P–2X/G24K0/A1M	0 811 404 828
4WRPEH10C1B100P–2X/G24K0/A1M	0 811 404 829
4WRPEH10C4B50L–2X/G24K0/F1M	0 811 404 760
4WRPEH10C4B100L–2X/G24K0/F1M	0 811 404 761
4WRPEH10C1B50L–2X/G24K0/F1M	0 811 404 762
4WRPEH10C1B100L–2X/G24K0/F1M	0 811 404 763
Type 4WRPEH 10...C	
4WRPEH10CB50L–2X/G24K0/A1M	0 811 404 764
4WRPEH10CB100L–2X/G24K0/A1M	0 811 404 809
4WRPEH10CB50L–2X/G24K0/F1M	0 811 404 765
4WRPEH10CB100L–2X/G24K0/F1M	0 811 404 806

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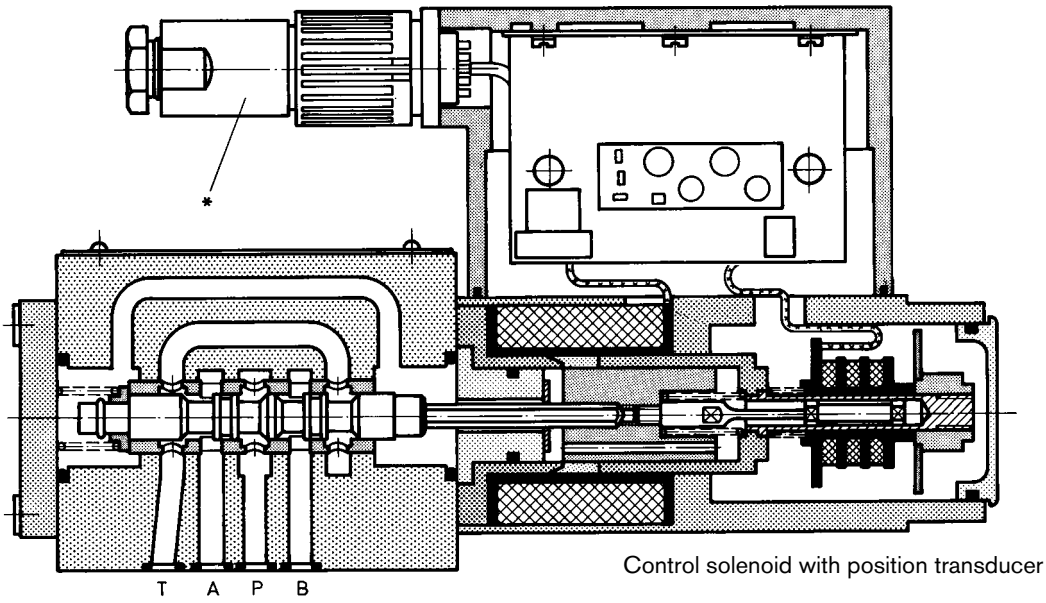
Function, sectional diagram

Servo solenoid valve 4WRPEH 10

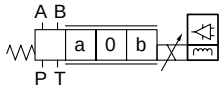
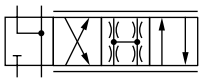
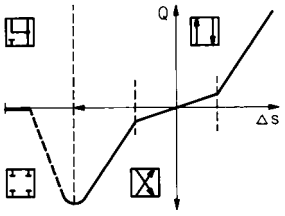
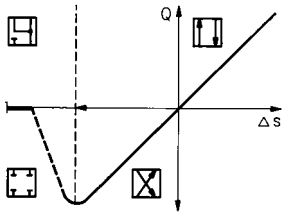
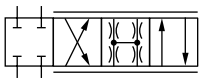
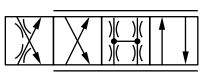
CE EN 61000-6-2: 2002-08
EN 61000-6-3: 2002-08



Control solenoid with position transducer

Valve body

Symbols

		Linear	*p*: kink 40 %
	**C3, C5**		
	**C4, C1**		
	**C**	C3, C5, C4, C1, C	C3, C5, C4, C1

Accessories, not included in scope of delivery

(4x) ISO 4762-M6x40-10.9	Fastening screws		2 910 151 209
* 	Line sockets 6P+PE, see also RE 08008	KS	1 834 482 022
		KS	1 834 482 026
		MS	1 834 482 023
		MS	1 834 482 024
		KS 90°	1 834 484 252

Testing and service equipment

– Test box type VT-PE-TB3, see RE 30065
– Test adapter 6P+PE type VT-PA-2, see RE 30068

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Technical data

General

Construction		Spool type valve, operated directly, with steel sleeve
Actuation		Proportional solenoid with position control, OBE
Type of mounting		Subplate, mounting hole configuration NG10 (ISO 4401-05-04-0-94)
Installation position		Optional
Ambient temperature range	°C	–20...+50
Weight	kg	7.1
Vibration resistance, test condition		max. 25 g, shaken in 3 dimensions (24 h)

Hydraulic (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

Pressure fluid			Hydraulic oil to DIN 51524...535, other fluids after prior consultation		
Viscosity range	recommended	mm^2/s	20...100		
	max. permitted	mm^2/s	10...800		
Pressure fluid temperature range		°C	–20...+70		
Maximum permissible degree of contamination of pressure fluid Purity class to ISO 4406 (c)			Class 18/16/13 [1]		
Flow direction			See symbol		
Nominal flow at $\Delta p = 35$ bar per notch [2]		l/min	50 (1:1)	50 (2:1)	100 (1:1)	100 (2:1)
Max. working pressure		bar	Port P, A, B: 315		
Max. pressure		bar	Port T: 250		
Operating limits at Δp Pressure drop at valve		bar	315	315	160	160
Q_{Vnom}: $> Q_N$ valves		bar	250	250	100	100
Leakage at 100 bar		cm^3/min	< 1,200	< 1,200	< 1,500	< 1,000
		cm^3/min	< 600	< 500	< 600	< 600

Static/Dynamic

Hysteresis	%	≦ 0.2
Manufacturing tolerance for q_{max}	%	< 10
Response time for signal change 0...100 %	ms	≦ 25
Thermal drift		Zero point displacement < 1 % at $\Delta T = 40$ °C
Zero adjustment		Factory-set ±1 %
Conformity		CE EN 61000-6-2: 2002-08 EN 61000-6-3: 2002-08

[1] The purity classes stated for the components must be complied with in hydraulic systems.
Effective filtration prevents problems and also extends the service life of components.
For a selection of filters, see catalogue sections RE 50070, RE 50076 and RE 50081.

[2] Flow rate at a different Δp $\quad Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_X}{35}}$

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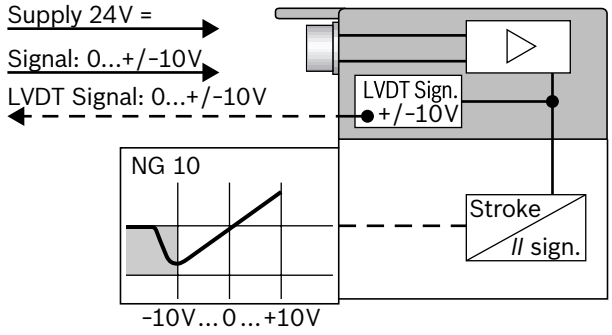
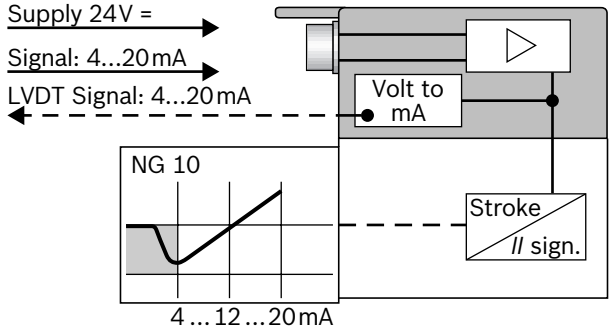
Technical data

Electrical, trigger electronics integrated in the valve	
Cyclic duration factor %	100 ED
Degree of protection	IP 65 to DIN 40050 and IEC 14434/5
Connection	Line socket 6P+PE, DIN 43563
Power supply Terminal A: Terminal B: 0 V	24 V DC_{nom} min. 21 V DC/max. 40 V DC Ripple max. 2 V DC
Power consumption	Solenoid ⍁ 60 mm = 60 VA max.
External fuse	2.5 A_F
Input, “Standard” version Terminal D: U_E Terminal E:	Difference amplifier, R_i = 100 kΩ 0...±10 V 0 V
Input, “mA-Signal” version Terminal D: I_{D-E} Terminal E: I_{D-E}	Burden, R_{sh} = 200 Ω 4...(12)...20 mA Current loop I_{D-E} feedback
Max. differential input voltage at 0 V	D → B E → B } max. 18 V DC
Test signal, “Standard” version Terminal F: U_{Test} Terminal C:	LVDT 0...±10 V Reference 0 V
Test signal, “mA-Signal” version 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 conductor and screen	See pin assignment (installation conforms to CE)
Recommended cable	See pin assignment up to 20 m 7x0.75 mm^2 up to 40 m 7x1 mm^2
Calibration	Calibrated at the factory, see valve performance curve

Version A1: Standard



Version F1: mA-Signal



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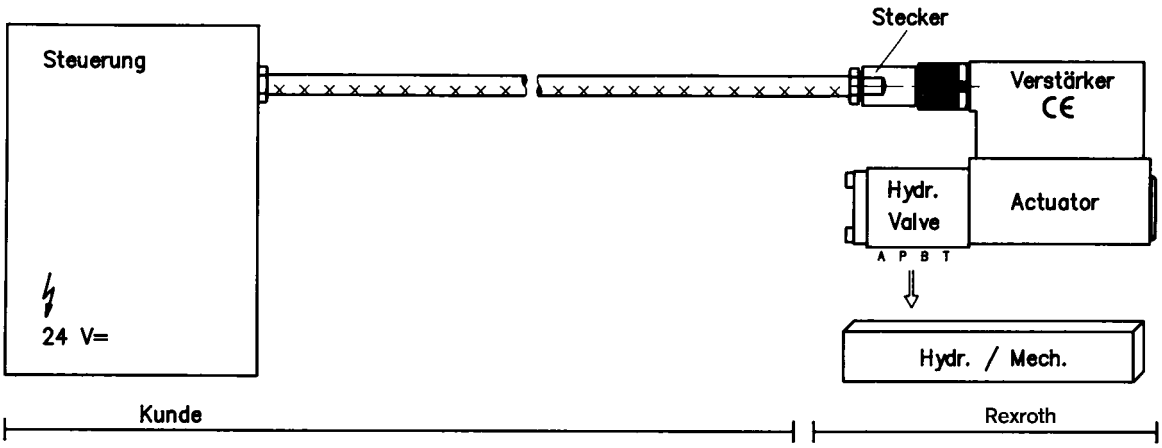
Connection

For electrical data, see page 5 and
Operating Instructions **1 819 929 083**



Technical notes on the cable

Version:
- Multi-wire cable
- Extra-finely stranded wire to VDE 0295, Class 6
- Protective conductor, green/yellow
- Cu braided screen

Types:
- e.g. Ölflex-FD 855 CP (from Lappkabel company)

No. of wires:
- Determined by type of valve, plug types and signal assignment

Cable Ø:
- 0.75 mm^2 up to 20 m length
- 1.0 mm^2 up to 40 m length

Outside Ø:
- 9.4...11.8 mm – Pg11
- 12.7...13.5 mm – Pg16

Note

Voltage supply 24 V DC nom.,
if voltage drops below 18 V DC, rapid shutdown resembling "Enable OFF" takes place internally.
In addition, with the "mA signal" version:
$I_{D-E} \geqq 3$ mA – valve is active
$I_{D-E} \leqq 2$ mA – valve is deactivated.
Electrical signals emitted via the trigger electronics (e.g. actual values) must not be used to shut down safety-relevant machine functions! (See European Standard, "Technical Safety Requirements for Fluid-Powered Systems and Components – Hydraulics", EN 982.)

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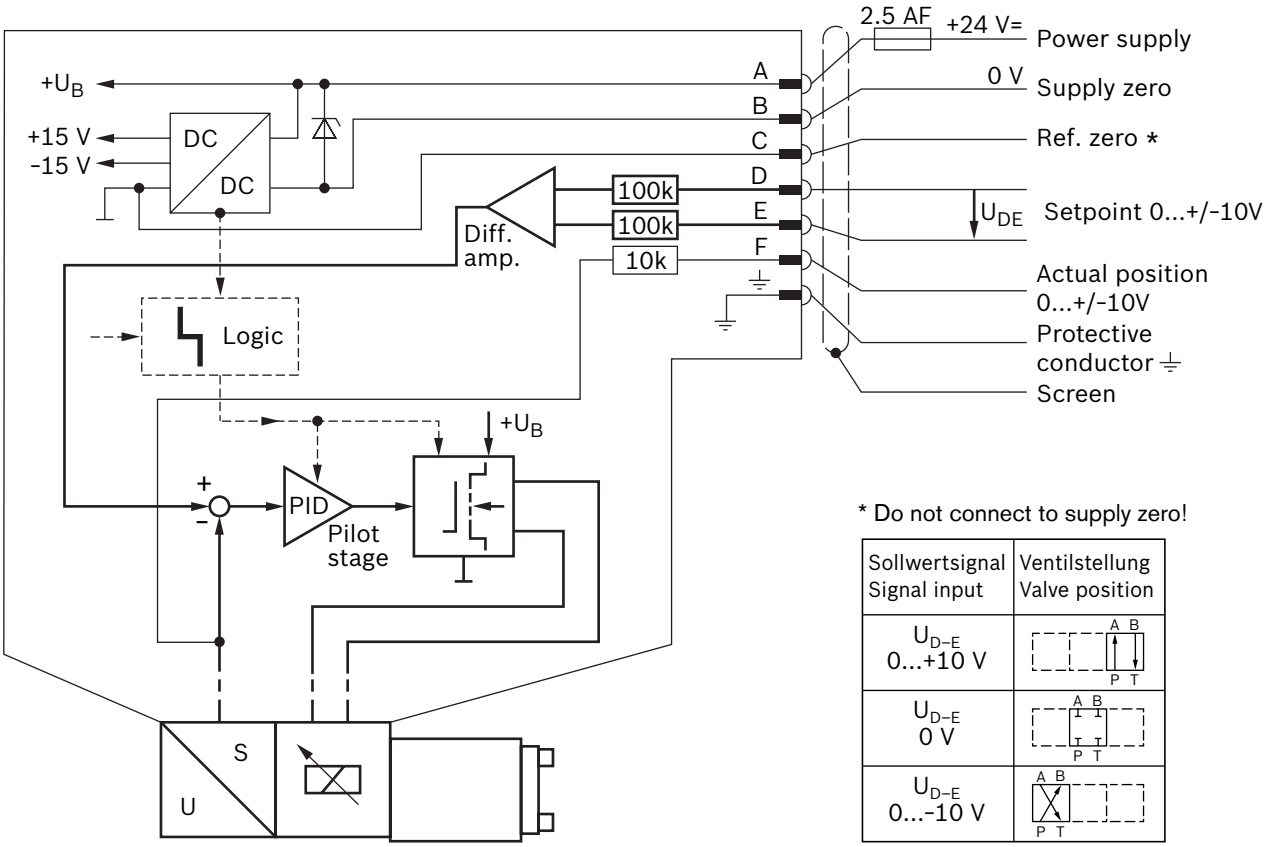
On-board trigger electronics

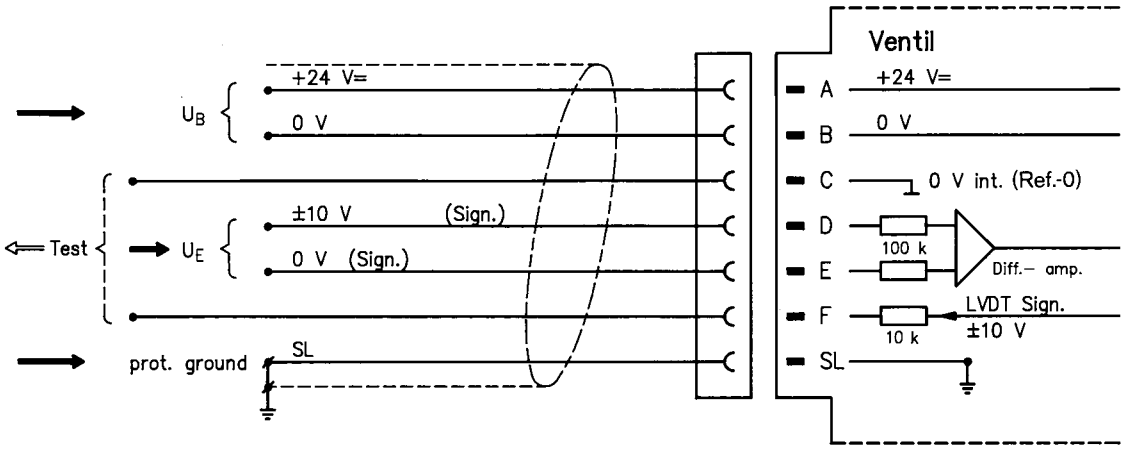
Block diagram/pin assignment
Version A1: U_{D-E} 0...±10 V



* Do not connect to supply zero!

Sollwertsignal Signal input	Ventilstellung Valve position
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)



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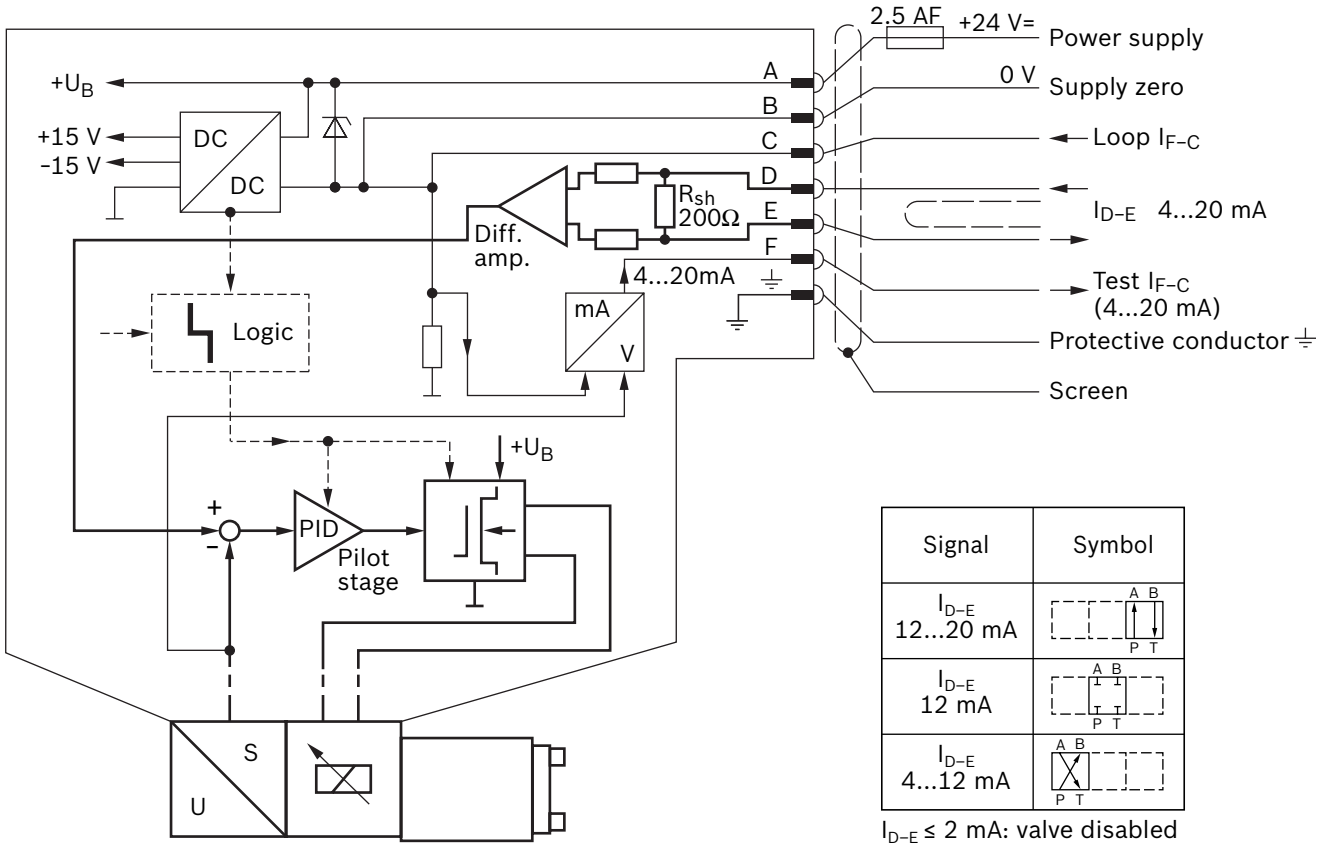
On-board trigger electronics

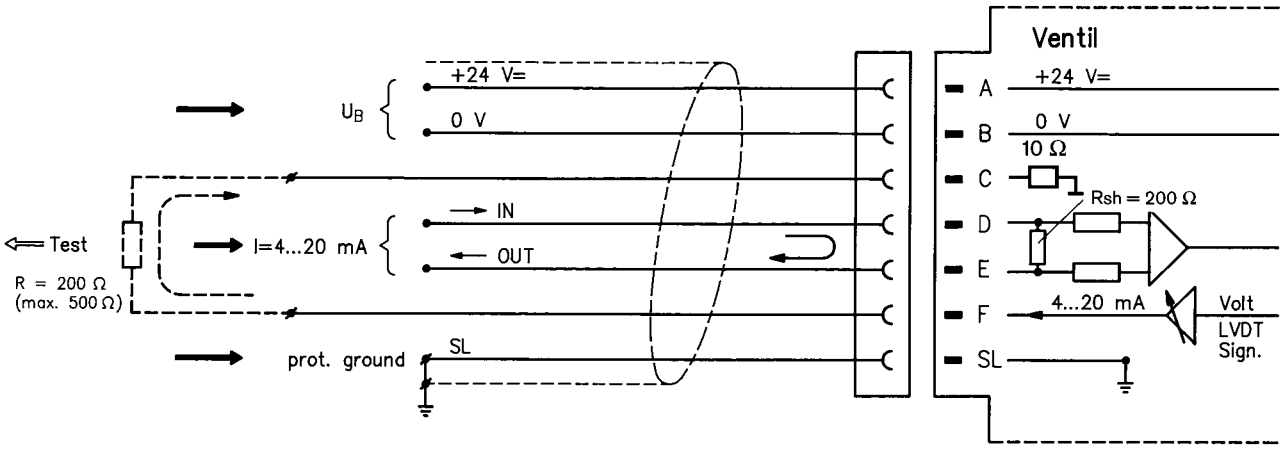
Block diagram/pin assignment
Version F1: I_{D-E} 4...12...20 mA



Signal	Symbol
I_{D-E} 12...20 mA	
I_{D-E} 12 mA	
I_{D-E} 4...12 mA	

I_{D-E} ≤ 2 mA: valve disabled

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



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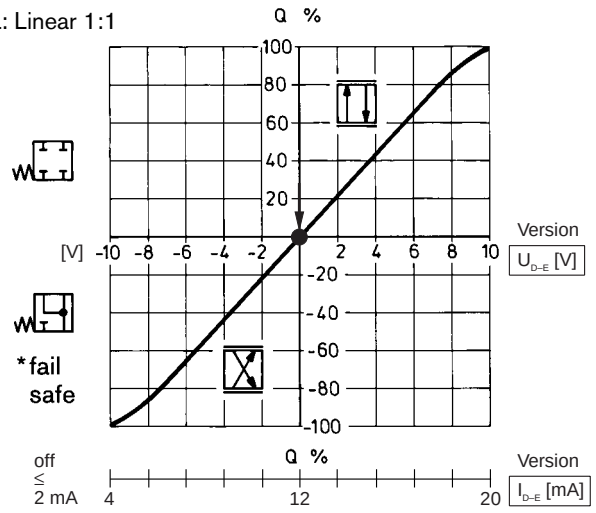
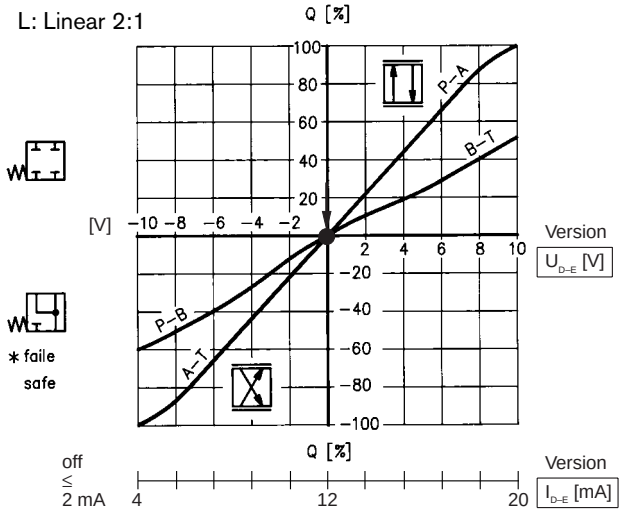
Performance curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

Flow rate/Signal function $Q = f\,(U_{D-E})$
$Q = f\,(I_{D-E})$

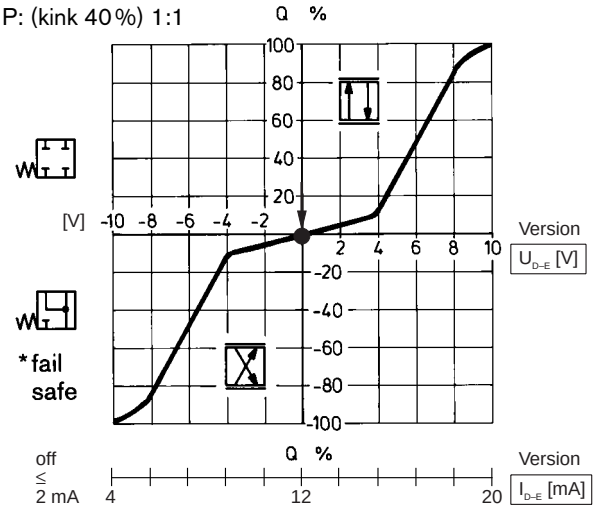
L: Linear 1:1



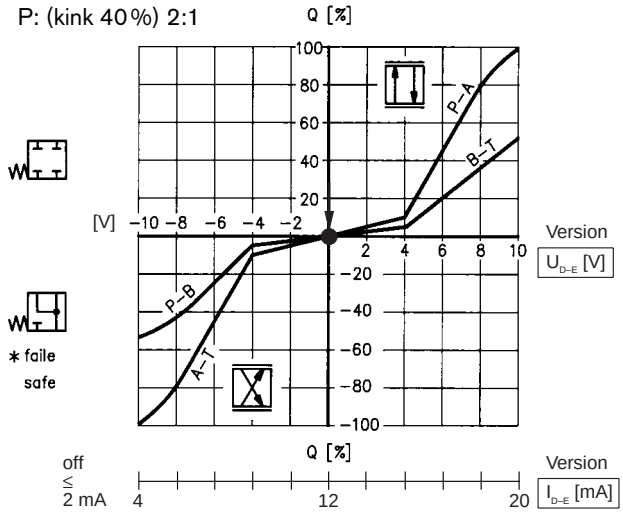
L: Linear 2:1



P: (kink 40 %) 1:1



P: (kink 40 %) 2:1

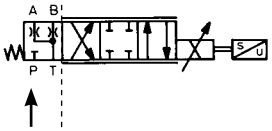
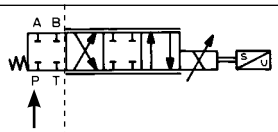
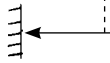


* **Fail-safe:** $U_B \leqq 18$ V DC (version U_{D-E})

* **Fail-safe:** $U_B \leqq 18$ V DC / $I_{D-E} \leqq 2$ mA (version I_{D-E} 4...20 mA)

Calibrated ±1 %

Fail-safe-position

	Leakage at	100 bar	P – A 50 cm³/min P – B 70 cm³/min
	Flow rate at	$\Delta p = 35$ bar q_n 50/100 l/min	A – T 110...100 l/min B – T 10/25 l/min
	Leakage at	100 bar	P – A 50 cm³/min P – B 70 cm³/min A – T 70 cm³/min B – T 50 cm³/min
 Fail-safe	$p =$ 0 bar → 12 ms $p =$ 100 bar → 16 ms	Internal enable off	$U_B \leq 18$ V DC ($I_{D-E} \leq 2$ mA)

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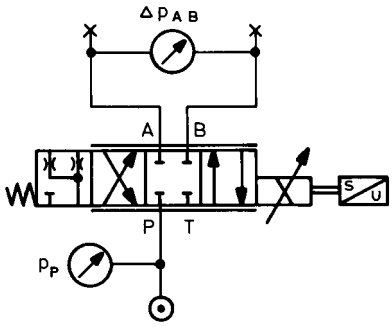
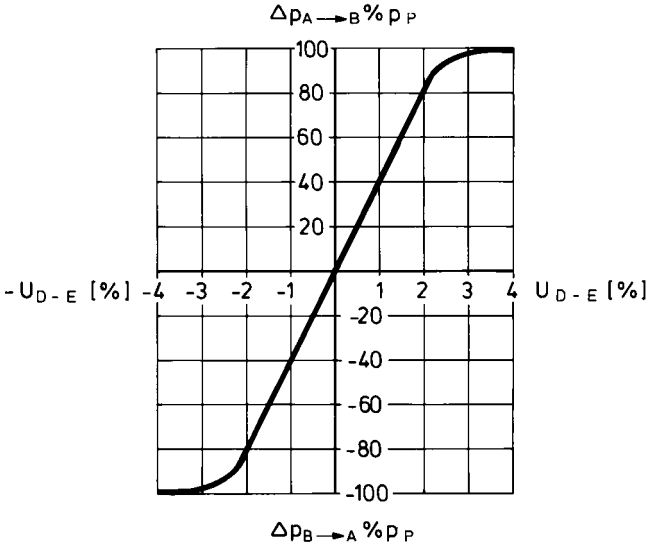
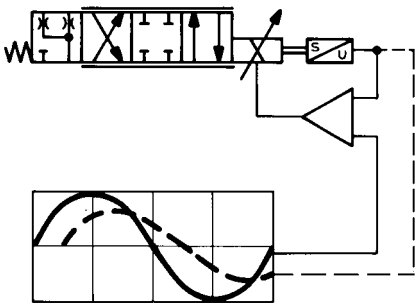
Performances curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

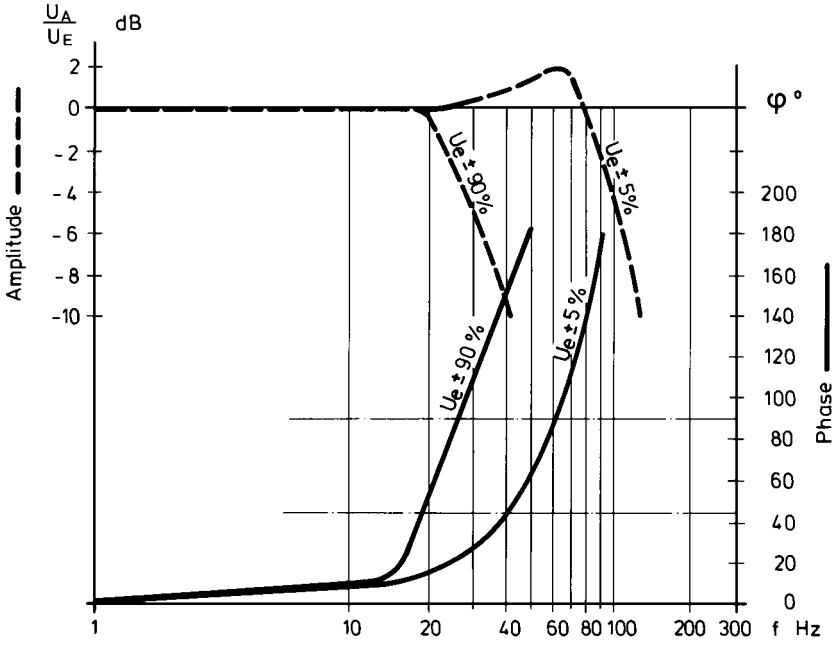
Pressure gain





Bode diagram





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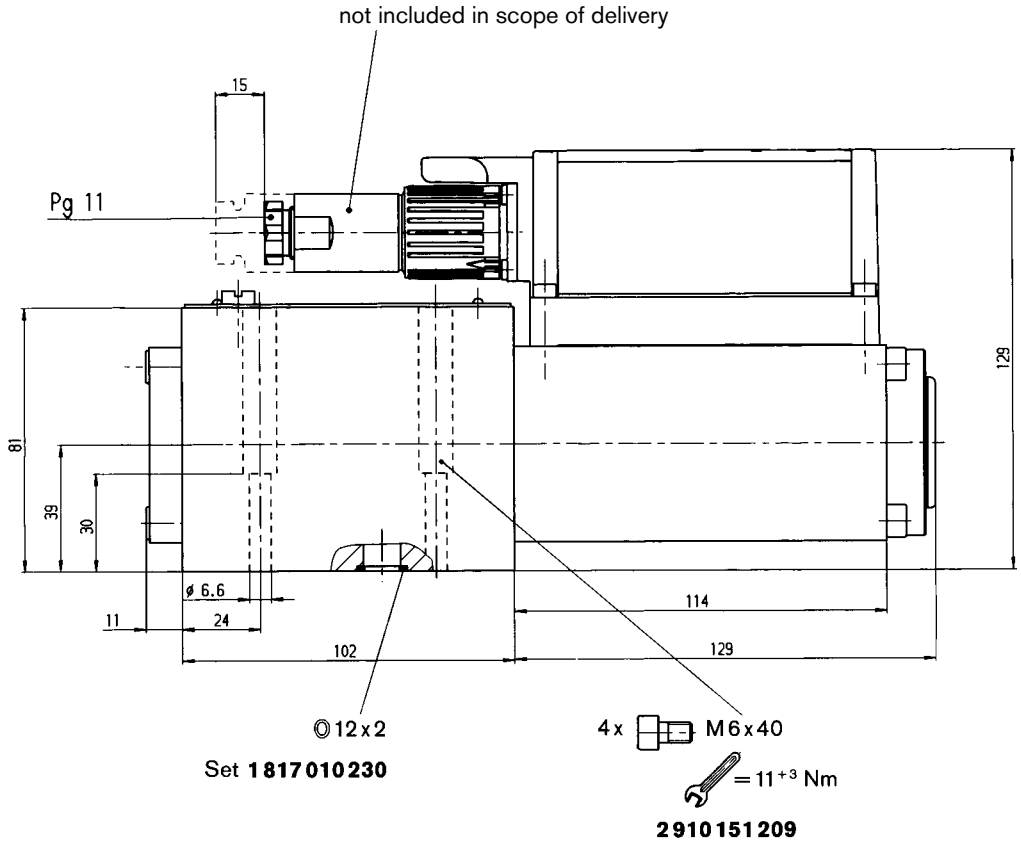
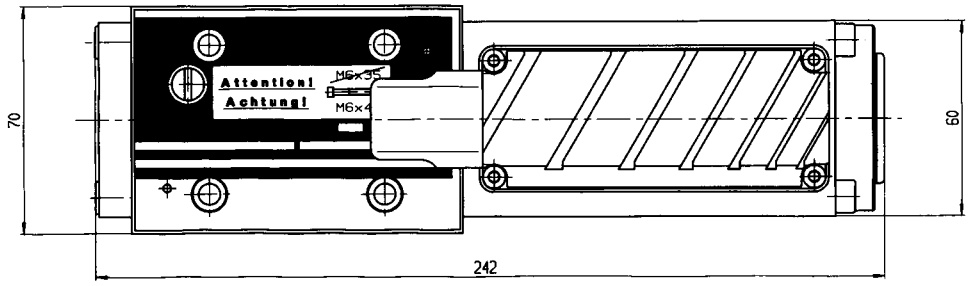
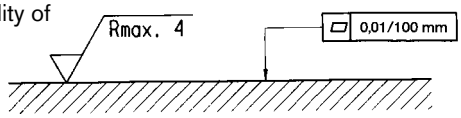
Unit dimensions (nominal dimensions in mm)



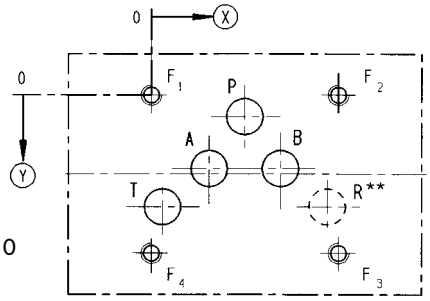


Required surface quality of mating component



Mounting hole configuration: NG10 (ISO 4401-05-04-0-94)
For subplates, see catalogue section RE 45055

1) Deviates from standard
2) Thread depth:
Ferrous metal 1.5 x Ø*
Non-ferrous 2 x Ø
* (NG 10 min. 10.5 mm)



** 5/3 – NG10
R = P_2

	P	A	T	B	F_1	F_2	F_3	F_4	R
Ⓧ	27	16.7	3.2	37.3	0	54	54	0	50.8
Ⓨ	6.3	21.4	32.5	21.4	0	0	46	46	32.5
∅	10.5 1)	10.5 1)	10.5 1)	10.5 1)	M6 2)	M6 2)	M6 2)	M6 2)	10.5 1)

Notes

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