

Servo solenoid valves with on-board electronics (OBE)

RE 29035/01.05
Replaces 11.03

1/12

Type 4WRPEH 6

Size 6
Unit series 2X
Maximum working pressure P, A, B 315 bar, T 250 bar
Nominal flow rate 2...40 l/min (Δp 70 bar)



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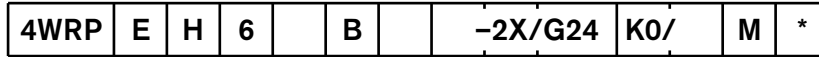
Features

- Directly operated servo solenoid valve NG6, 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 4401-03-02-0-94
- Subplates as per catalogue section RE 45053 (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.

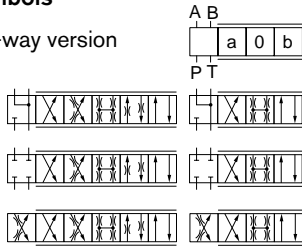
Ordering data and scope of delivery



With on-board trigger electronics = E
 Control piston/sleeve = H
 Size 6 = 6

Symbols

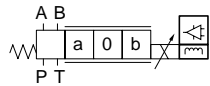
4/4-way version



With symbols C5 and C1: ³⁾

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

- ¹⁾ Only in connection with flow characteristic "p"
- ²⁾ Kink 60% for NG6 with nominal flow rate "15" and "25", otherwise kink 40
- ³⁾ q_v 2:1 only with nominal flow rate = 40 l/min

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

Electrical connection

K0 = 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 curve²⁾

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

Size 6	02 = 2 l/min	12 = 12 l/min	24 = 24 l/min	40 ³⁾ = 40 l/min
	04 = 4 l/min	15 ¹⁾ = 15 l/min	25 ¹⁾ = 25 l/min	

Preferred types (available at short notice)

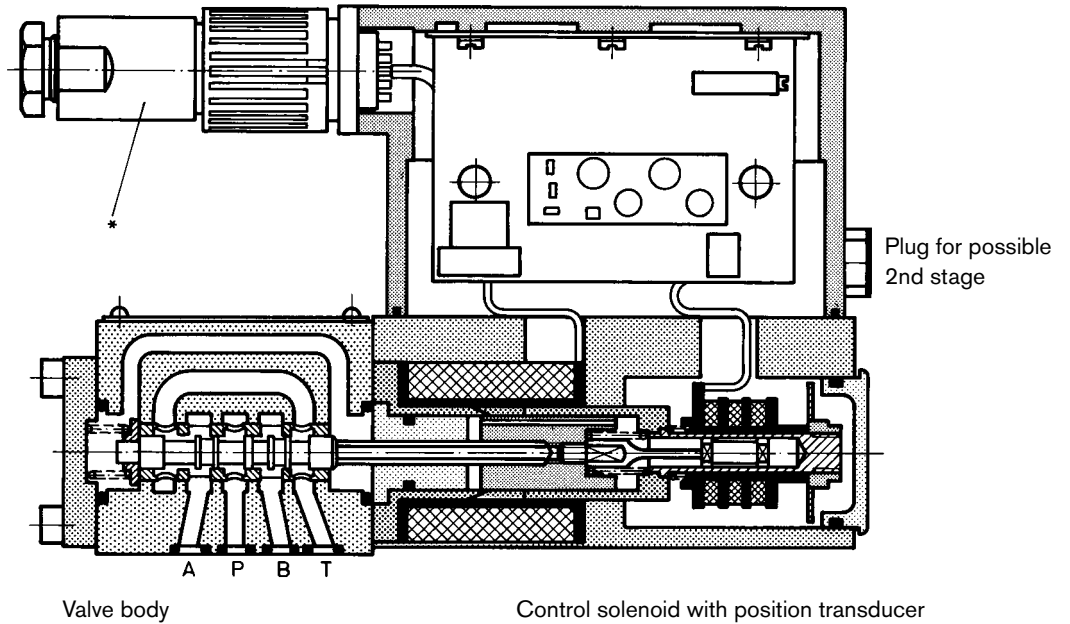
Type 4WRPEH 6	Material No.
C3 / C5	
4WRPEH 6 C3B02L -2X/G24K0 / A1M	0 811 404 744
4WRPEH 6 C3B04L -2X/G24K0 / A1M	0 811 404 600
4WRPEH 6 C3B12L -2X/G24K0 / A1M	0 811 404 601
4WRPEH 6 C3B24L -2X/G24K0 / A1M	0 811 404 602
4WRPEH 6 C3B40L -2X/G24K0 / A1M	0 811 404 603
4WRPEH 6 C5B40L -2X/G24K0 / A1M	0 811 404 746
4WRPEH 6 C3B15P -2X/G24K0 / A1M	0 811 404 642
4WRPEH 6 C3B25P -2X/G24K0 / A1M	0 811 404 643
4WRPEH 6 C3B40P -2X/G24K0 / A1M	0 811 404 644
4WRPEH 6 C5B40P -2X/G24K0 / A1M	0 811 404 648
4WRPEH 6 C3B04L -2X/G24K0 / F1M	0 811 404 631
4WRPEH 6 C3B12L -2X/G24K0 / F1M	0 811 404 632
4WRPEH 6 C3B24L -2X/G24K0 / F1M	0 811 404 633
4WRPEH 6 C3B40L -2X/G24K0 / F1M	0 811 404 634
4WRPEH 6 C5B40L -2X/G24K0 / F1M	0 811 404 749

Type 4WRPEH 6	Material No.
C1 / C4	
4WRPEH 6 C4B02L -2X/G24K0 / A1M	0 811 404 641
4WRPEH 6 C4B04L -2X/G24K0 / A1M	0 811 404 610
4WRPEH 6 C4B12L -2X/G24K0 / A1M	0 811 404 611
4WRPEH 6 C4B24L -2X/G24K0 / A1M	0 811 404 612
4WRPEH 6 C4B40L -2X/G24K0 / A1M	0 811 404 613
4WRPEH 6 C1B40L -2X/G24K0 / A1M	0 811 404 738
4WRPEH 6 C4B15P -2X/G24K0 / A1M	0 811 404 645
4WRPEH 6 C4B25P -2X/G24K0 / A1M	0 811 404 646
4WRPEH 6 C4B40P -2X/G24K0 / A1M	0 811 404 647
4WRPEH 6 C1B40P -2X/G24K0 / A1M	0 811 404 649
4WRPEH 6 C4B04L -2X/G24K0 / F1M	0 811 404 350
4WRPEH 6 C4B12L -2X/G24K0 / F1M	0 811 404 351
4WRPEH 6 C4B24L -2X/G24K0 / F1M	0 811 404 352
4WRPEH 6 C4B40L -2X/G24K0 / F1M	0 811 404 353
4WRPEH 6 C1B40L -2X/G24K0 / F1M	0 811 404 354
C..	
4WRPEH 6 C B04L -2X/G24K0 / A1M	0 811 404 741
4WRPEH 6 C B24L -2X/G24K0 / A1M	0 811 404 355
4WRPEH 6 C B40L -2X/G24K0 / A1M	0 811 404 639
4WRPEH 6 C B40L -2X/G24K0 / F1M	0 811 404 640

Function, sectional diagram

Servo solenoid valve 4WRPEH 6

CE EN 61000-6-2
EN 61000-6-3



Symbols

	Linear	p: kink 60% [q_n 15,25 l/min]	p: kink 40% [q_n 40 l/min]
	C3, C5, C4, C1, C	C3, C5, C4, C1	C3, C5, C4, C1
Standard = 1:1, from q_n 40 l/min also 2:1			

Accessories, not included in scope of delivery

(4x) M5x30 DIN 912-10.9	Fastening screws	2910151166
	Line sockets 6P+PE, see also RE 08008	KS 1834482022
		KS 1834482026
		MS 1834482023
		MS 1834482024
		KS 90° 1834484252

Testing and service equipment




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

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 NG6 (ISO 4401-03-02-0-94)					
Installation position	Optional					
Ambient temperature range	°C	-20 ... +50				
Weight	kg	2.7				
Vibration resistance, test condition	max. 25 g, shaken in 3 dimensions (24 h)					

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

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	2	4	12	15	24	40	
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	315	315	315	160
$q_{Vnom} > q_N$ valves		bar	315	315	315	280	250	100
Leakage at 100 bar		cm ³ /min	<150	<180	<300	-	<500	<900
		cm ³ /min	-	-	-	<180	<300	<450

Static/Dynamic

Hysteresis	%	≤ 0.2
Manufacturing tolerance for q_{max}	%	< 10
Response time for signal change 0 ... 100%	ms	≤ 10
Thermal drift	Zero point displacement <1 % at $\Delta T = 40^\circ\text{C}$	
Zero adjustment	Factory-set $\pm 1\%$	
Conformity	 EN 61000-6-2 EN 61000-6-3	

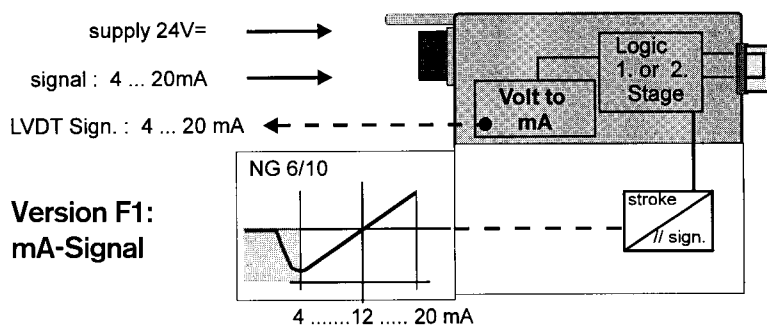
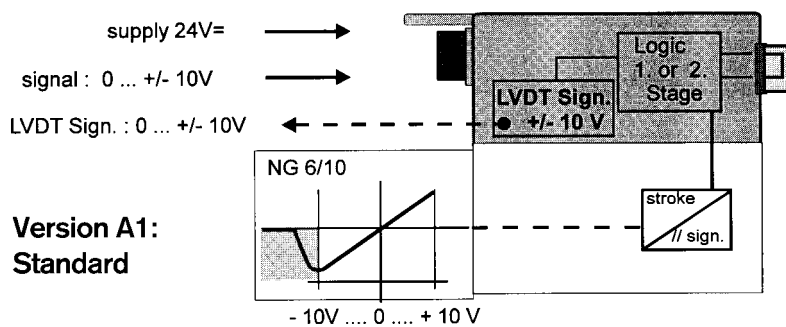
¹⁾ The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components. For a selection of filters, see catalogue sections RE 50070, RE 50076 and RE 50081.

²⁾ Flow rate at a different Δp $q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{35}}$

Technical data

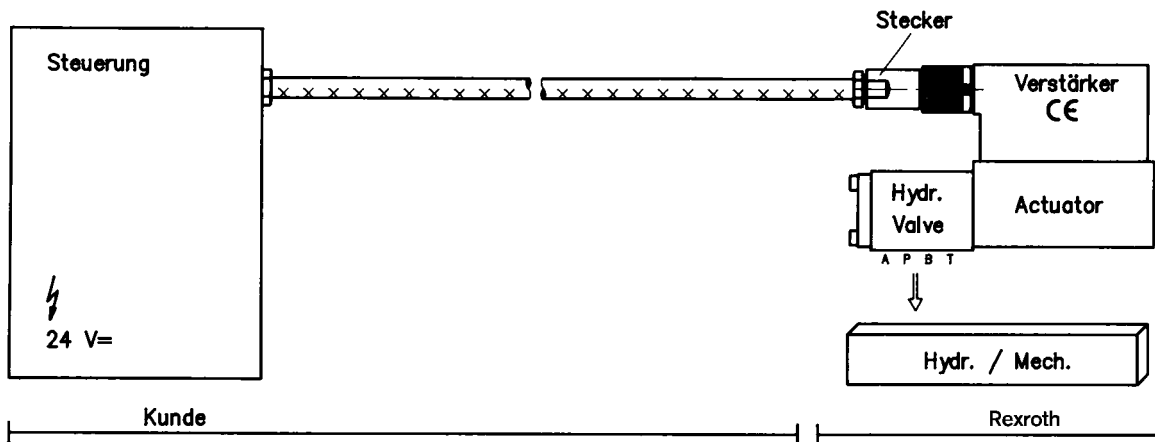
Electrical, trigger electronics integrated in the valve

Cyclic duration factor	%	100
Degree of protection		IP 65 to DIN 40050 and IEC 14434/5
Connection		Line socket 6P+PE, DIN 43563
Power supply		24 DC _{nom}
Terminal A:		min. 21 V DC/max. 40 V DC
Terminal B: 0 V		Ripple max. 2 V DC
Power consumption		Solenoid \square 45 mm = 40 VA max.
External fuse		2.5 A _F
Input, "Standard" version		Difference amplifier, $R_i = 100 \text{ k}\Omega$
Terminal D: U_E		0 ... $\pm 10 \text{ V}$
Terminal E:		0 V
Input, "mA-Signal" version		Burden, $R_{sh} = 200 \Omega$
Terminal D: I_{D-E}		4 ... (12) ... 20 mA
Terminal E: I_{D-E}		Current loop I_{D-E} feedback
Max. differential input voltage at 0 V		$D \rightarrow B$ } max. 18 DC $E \rightarrow B$ }
Test signal, "Standard" version		LVDT
Terminal F: U_{Test}		0 ... +10 V
Terminal C:		Reference 0 V
Test signal, "mA-Signal" version		LVDT signal 4 ... 20 mA at external load 200 ... 500 Ω max.
Terminal F: I_{F-C}		4 ... 20 mA output
Terminal C: I_{F-C}		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



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 mm² up to 20 m length
 - 1.0 mm² 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:

$I_{D-E} \geq 3 \text{ mA}$ – valve is active

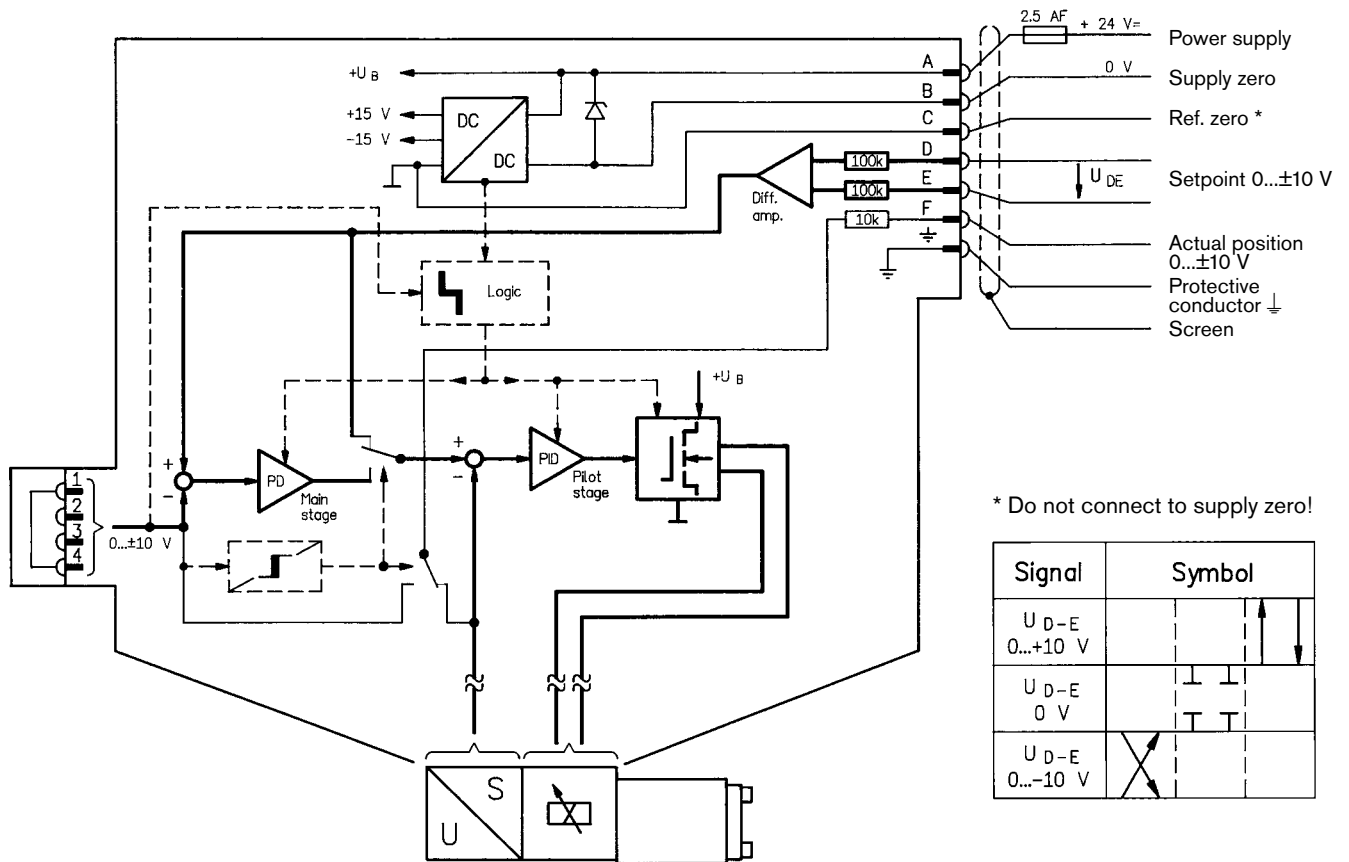
$I_{D-E} \leq 2 \text{ mA}$ – valve is deactivated.

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).

On-board trigger electronics

Block diagram/pin assignment

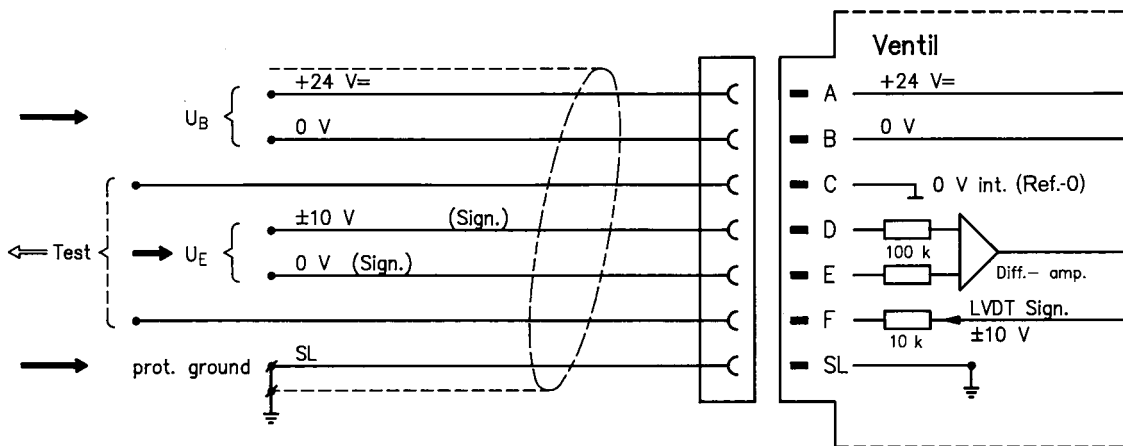
Version A1: $U_{D-E} \pm 10V$



Pin assignment 6P + PE

Version A1: $U_{D-E} \pm 10 V$

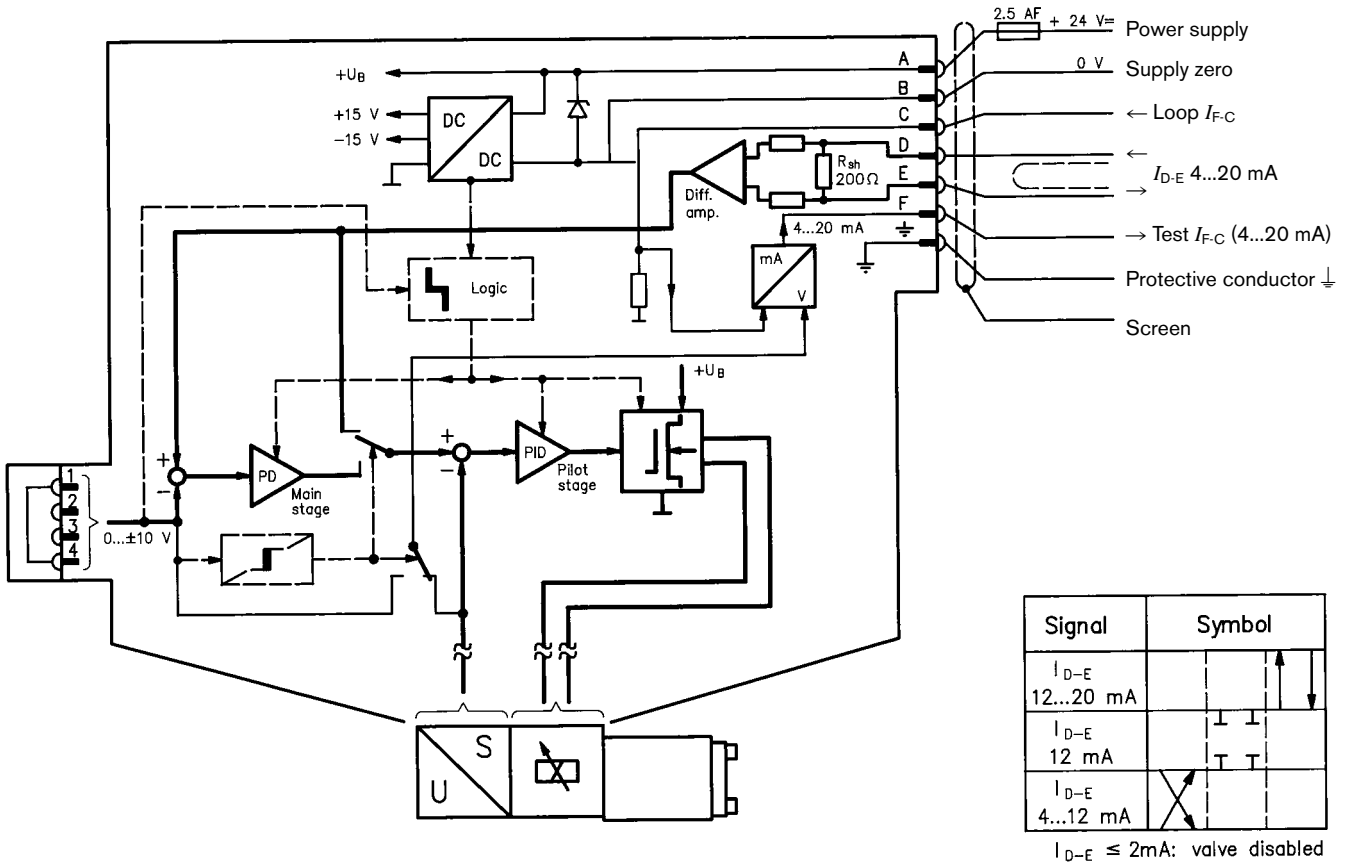
($R_i = 100 k\Omega$)



On-board trigger electronics

Block diagram/pin assignment

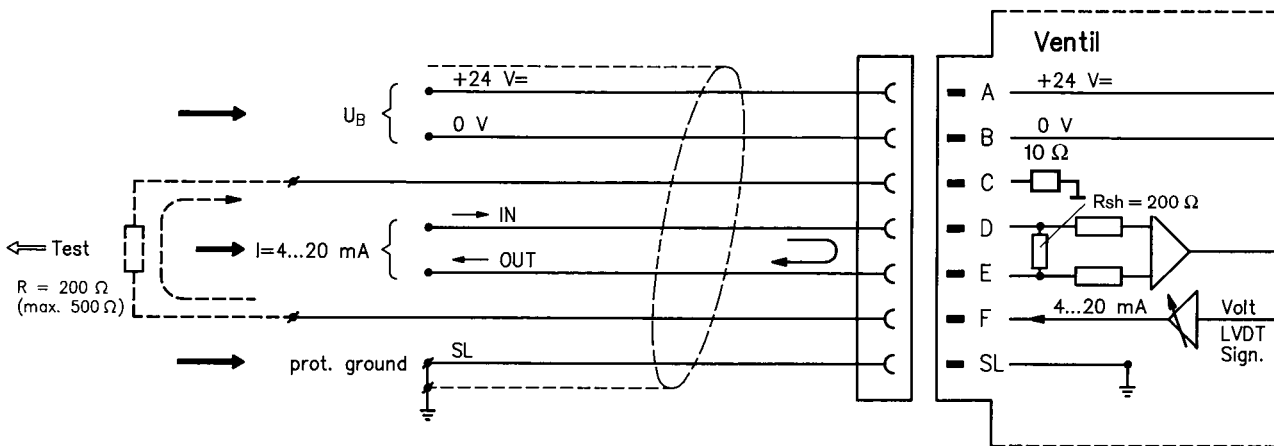
Version F1: I_{D-E} 4...12...20 mA



Pin assignment 6P + PE

Version F1: I_{D-E} 4...12...20 mA

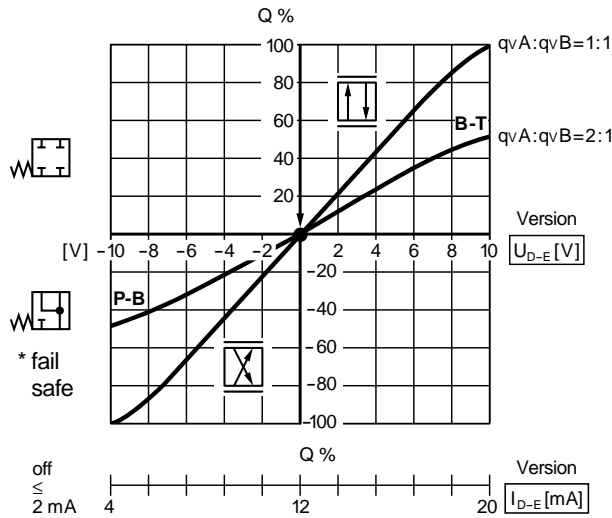
($R_{sh} = 200 \Omega$)



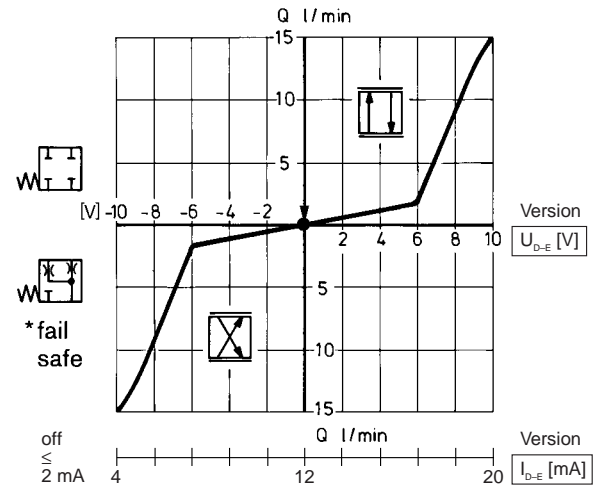
Performance curves (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$)

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

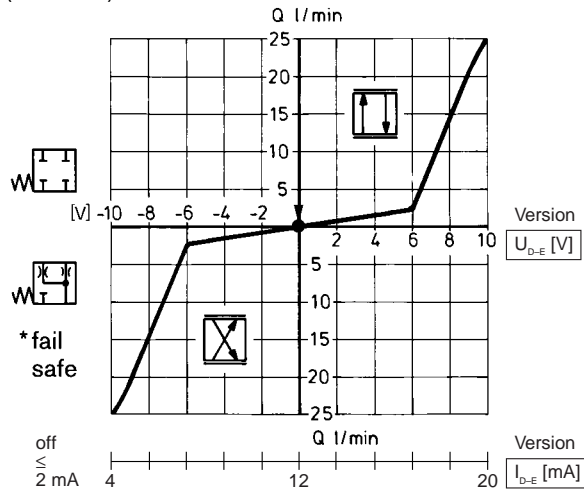
L: Linear



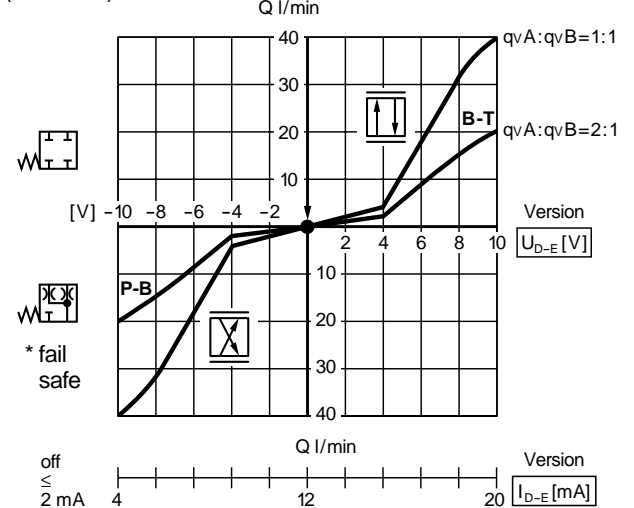
P: (kink 60%)



P: (kink 60%)



P: (kink 40%)



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

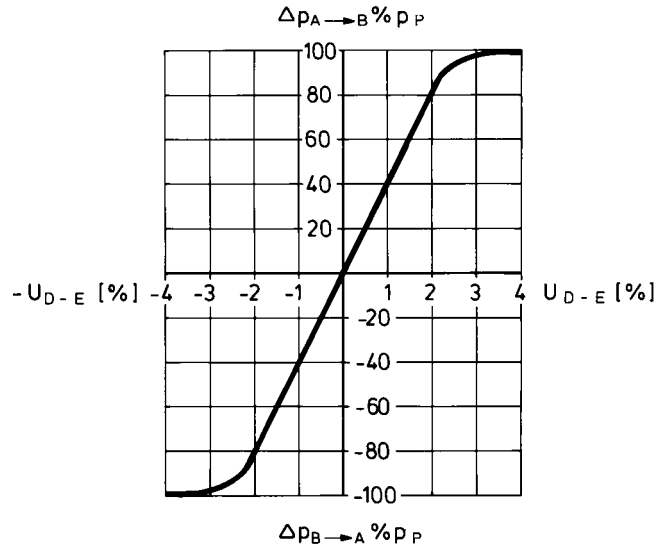
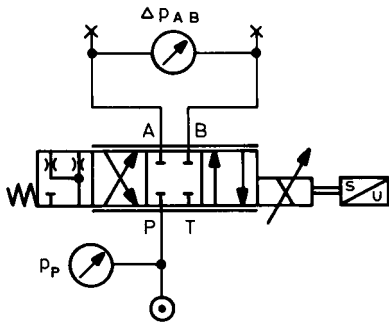
* Fail-safe: $U_B \leq 18\text{ V DC} / I_{D-E} \leq 2\text{ mA}$
(version $I_{D-E} 4 \dots 20\text{ mA}$)

Calibrated $\pm 1\%$

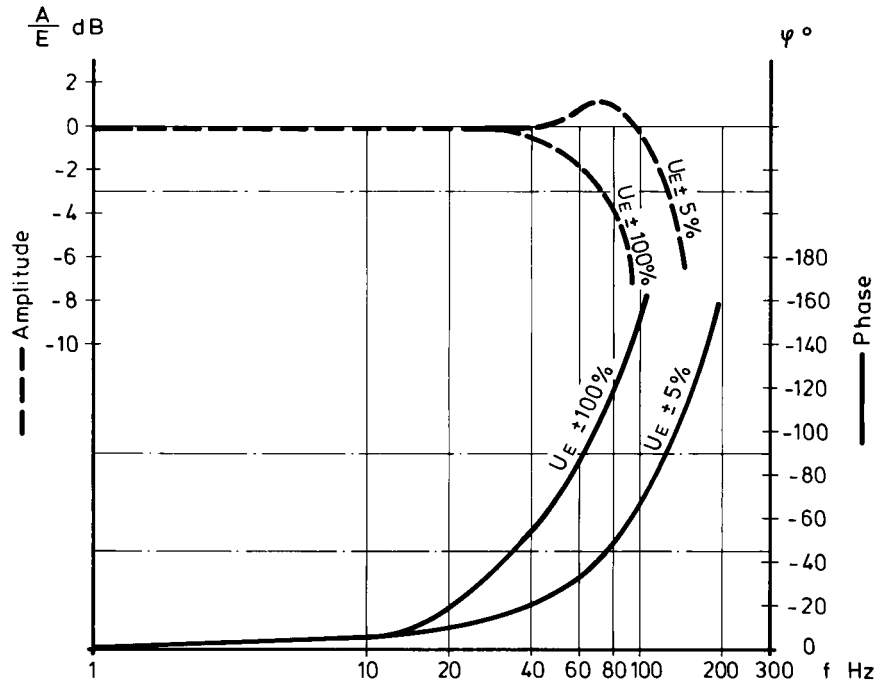
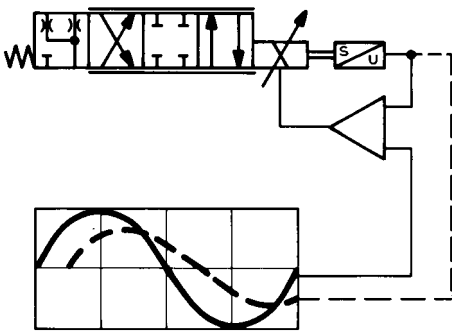
Fail-safe-Position			
	Leakage at	100 bar	P-A 50 cm ³ /min P-B 70 cm ³ /min
	Flow rate at	$\Delta p = 35\text{ bar}$	A-T 10 ... 20 l/min B-T 7 ... 20 l/min
	Leakage at	100 bar	P-A 50 cm ³ /min P-B 70 cm ³ /min A-T 70 cm ³ /min B-T 50 cm ³ /min
	Fail-safe	$p = 0\text{ bar} \rightarrow 7\text{ ms}$ $p = 100\text{ bar} \rightarrow 10\text{ ms}$	Internal enable off $U_B \leq 18\text{ V DC}$ ($I_{D-E} \leq 2\text{ mA}$)

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

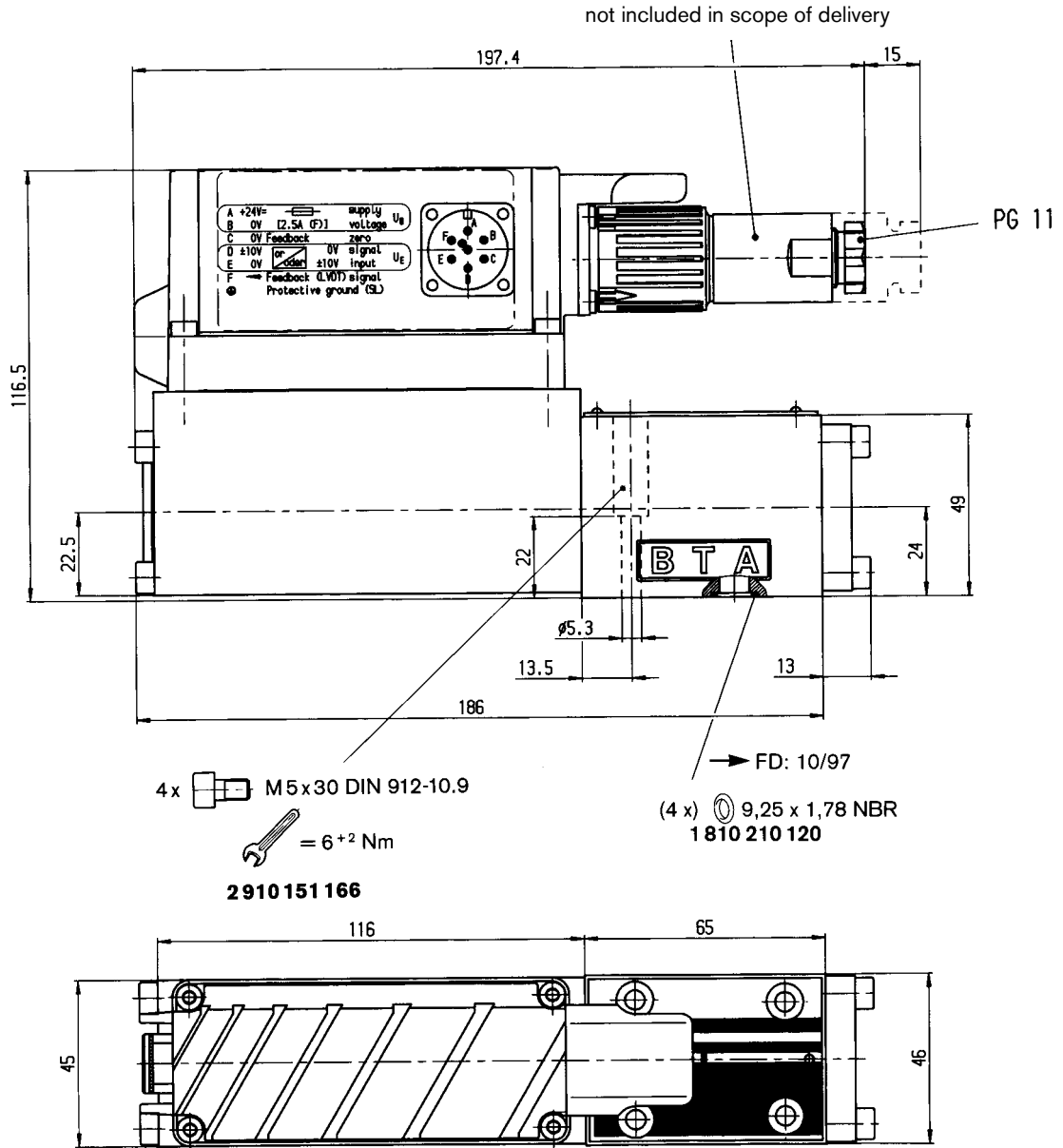
Pressure gain



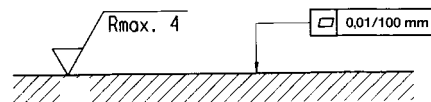
Bode diagram



Unit dimensions (Nominal dimensions in mm)



Required surface quality of mating component



Mounting hole configuration: NG6

(ISO 4401-03-02-0-94)

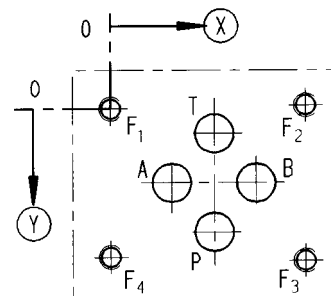
For subplates, see catalogue section RE 45053

¹⁾ Deviates from standard

²⁾ Thread depth:

Ferrous metal 1.5xØ

Non-ferrous 2 xØ



	P	A	T	B	F ₁	F ₂	F ₃	F ₄
⊗	21.5	12.5	21.5	30.2	0	40.5	40.5	0
⊙	25.9	15.5	5.1	15.5	0	-0.75	31.75	31
∅	8 ¹⁾	8 ¹⁾	8 ¹⁾	8 ¹⁾	M5 ²⁾	M5 ²⁾	M5 ²⁾	M5 ²⁾