

Servo solenoid valves with electrical position feedback (LvdT DC/DC ± 10 V)

RE 29032/01.05

1/10

Replaces: 09.03

Type 4WRPH 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)

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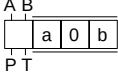
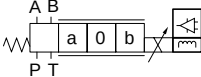
Features

- 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 electronics for position transducer (LvdT DC/DC)
- 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 43560-AM2
Solenoid 2P+PE/M16 x 1.5, position transducer 4P/Pg7 in scope of delivery, see catalogue section RE 08008
- External trigger electronics (order separately)
 - Electric amplifier for standard curve "L"
0 811 405 061, see catalogue section RE 30041
 - Electric amplifier for non-linear curve "P"
40 % – 0 811 405 067, see catalogue section RE 30040

Variants on request

- For standard applications
- Special symbols for plastic injection-moulding machines
- Sturdy "ruggedized" version for applications up to 40 g, valve with metal cap and central plug (7P).

Ordering data and scope of delivery

4WRP H 10 B - 2X / G24 Z4 / M *									
For external trigger electronics = no desg.				Further information in plain text					
Control piston/sleeve = H				M = NBR seals, suitable for mineral oils (HL, HLP) to DIN 51524					
Size 10 = 10				Electrical connection					
Symbols				Z4 = with line socket, with plug to DIN 43560-AM2 Line socket included in scope of delivery					
4/4-way version				Voltage supply of trigger electronics					
				G24 = +24 V DC					
				2X = Unit series 20 to 29 (installation and connection dimensions unchanged)					
				Flow characteristic					
= C3, C5				L = Linear					
= C4, C1				P = Non-linear curve					
With symbols C5 and C1:				Nominal flow rate at 70 bar valve pressure difference (35 bar/metering notch)					
P → A: q_v B → T: $q_v/2$				Size 10					
P → B: $q_v/2$ A → T: q_v				50 = 50 l/min					
Side of inductive position transducer				100 = 100 l/min					
									
(Standard) = B									

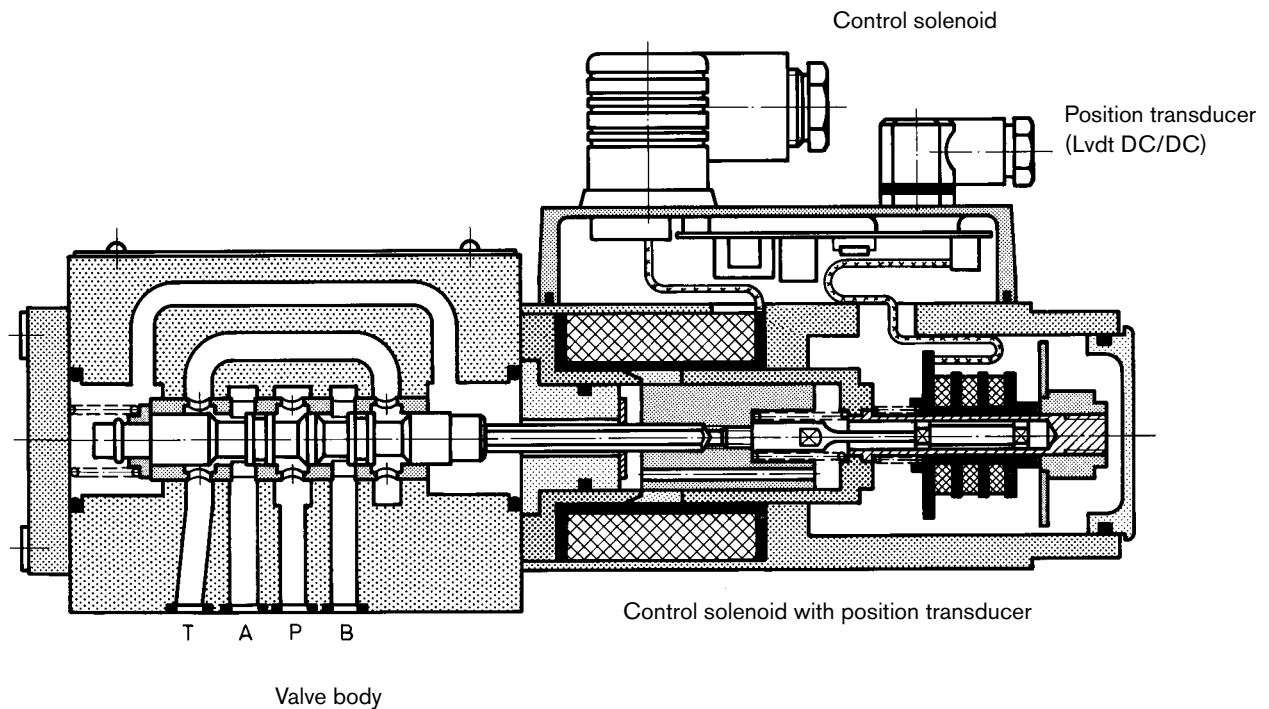
Preferred types (available at short notice)

Type 4WRPH 10	Material No.
C3/C5	
4WRPH 10 C3B50L -2X/G24Z4 /M	0 811 404 058
4WRPH 10 C3B100L -2X/G24Z4 /M	0 811 404 059
4WRPH 10 C5B100L -2X/G24Z4 /M	0 811 404 077
4WRPH 10 C3B50P -2X/G24Z4 /M	0 811 404 062
4WRPH 10 C3B100P -2X/G24Z4 /M	0 811 404 063
4WRPH 10 C5B100P -2X/G24Z4 /M	0 811 404 079

Type 4WRPH 10	Material No.
C1/C4	
4WRPH 10 C4B50L -2X/G24Z4 /M	0 811 404 060
4WRPH 10 C4B100L -2X/G24Z4 /M	0 811 404 061
4WRPH 10 C1B100L -2X/G24Z4 /M	0 811 404 076
4WRPH 10 C4B50P -2X/G24Z4 /M	0 811 404 064
4WRPH 10 C4B100P -2X/G24Z4 /M	0 811 404 065
4WRPH 10 C1B50P -2X/G24Z4 /M	0 811 404 067
4WRPH 10 C1B100P -2X/G24Z4 /M	0 811 404 078

Function, sectional diagram

Servo solenoid valve 4WRPH 10



Symbols

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

Accessories, not included in scope of delivery

(4 x) M6 x 40 DIN 912-10.9	Fastening screws	2910151 209
	VT-VRRA1-537-20/V0, see RE 30041	0811 405 061
	VT-VRRA1-537-20/V0/K40-AGC, see RE 30040	0811 405 067
2P+PE 4P	Line sockets 2P+PE (M16x1.5) and 4P (Pg7) included in scope of delivery, see also RE 08008	

Application

– Valve amplifier with pressure compensator (p/Q), see RE 30058.

Testing and service equipment

- Test box type VT-PE-TB2, see RE 30064.
- Test adapter type VT-PA-3, see RE 30070.

Technical data

General

Construction	Spool type valve, operated directly, with steel sleeve	
Actuation	Proportional solenoid with position control, external amplifier	
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	6.8
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	mm²/s	20 ... 100			
	max. permitted	mm²/s	10 ... 800			
Pressure fluid temperature range		°C	−20 ... +80			
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		 cm³/min	<1200	<1200	<1500	<1000
		 cm³/min	<600	<500	<600	<600

Electrical

Cyclic duration factor	%	100	
Power supply		24 V _{nom} (external amplifier)	
Degree of protection		IP 65 to DIN 40050	
Solenoid connector		Connector DIN 43650/ISO 4400 M16 x1.5 (2P+PE)	
Position transducer connector		Connector Pg7 (4P)	
Max. solenoid current	A	3.7	
Coil resistance R_{20}	Ω	2.4	
Max. power consumption at 100 % load and operational temperature	VA	60	
Position transducer DC/DC technology		Supply: +15 V/35 mA -15 V/25 mA	Signal: 0...±10 V ($R_L \geq 10\text{ k}\Omega$)

Static/Dynamic

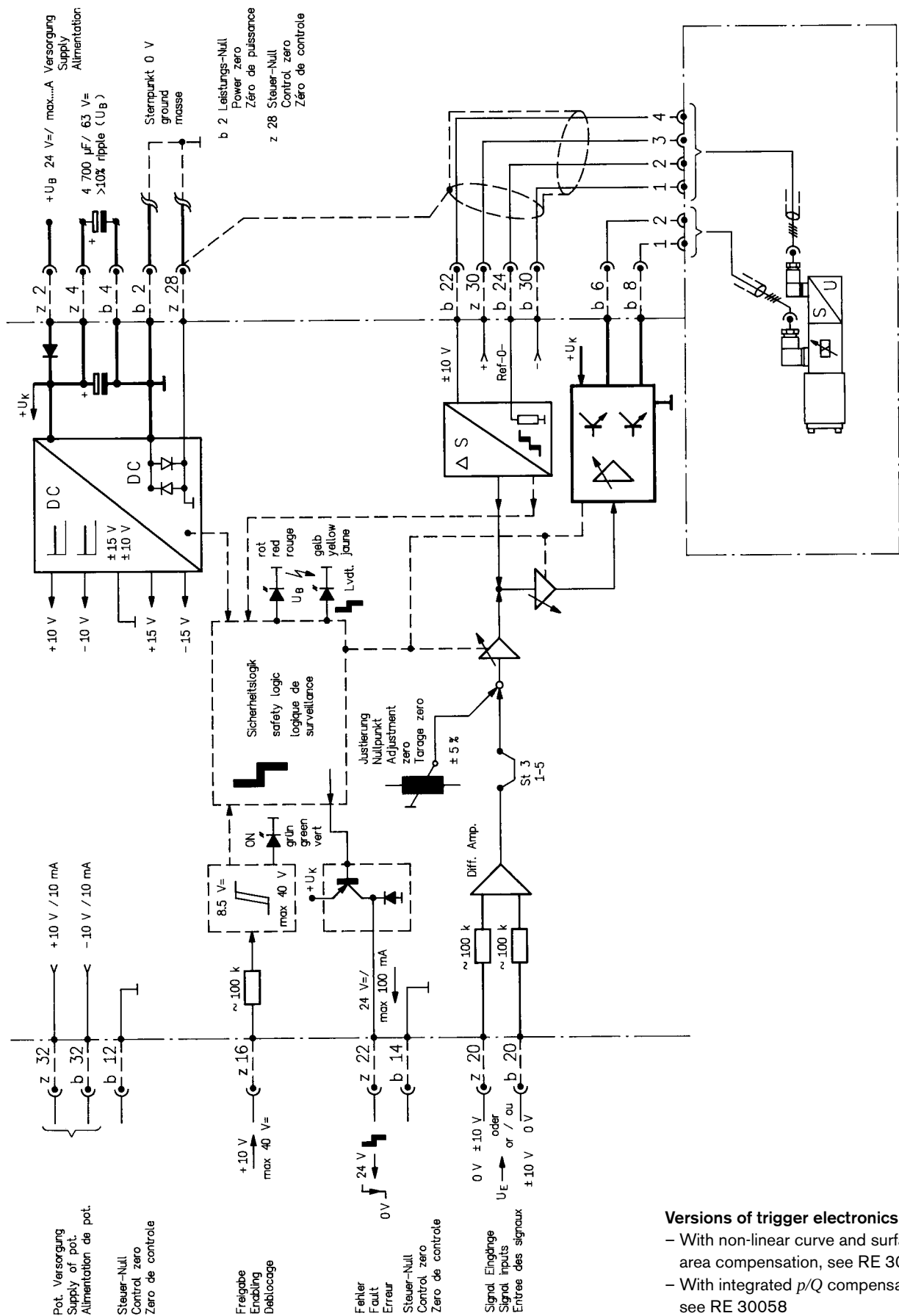
Hysteresis	%	≤ 0.2
Manufacturing tolerance for q_{max}	%	< 10
Response time for signal change 0 ... 100 %	ms	< 25
Thermal drift	Zero point displacement < 1 % at $\Delta T = 40^\circ\text{C}$	

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 $q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{35}}$

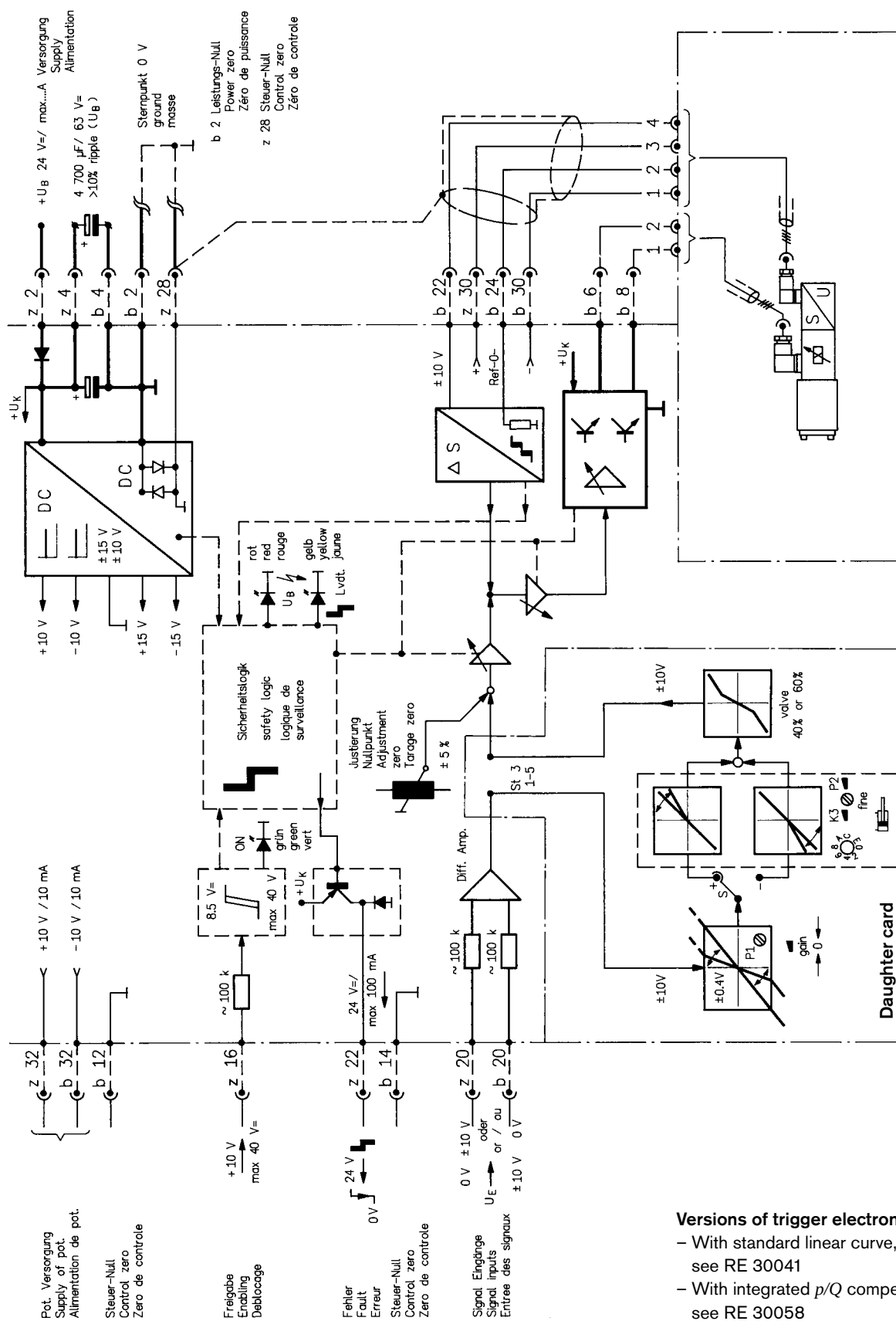
Valve with external trigger electronics (standard linear curve: L)

Block diagram/pin assignment



Valve with external trigger electronics (standard non-linear curve: P)

Block diagram/pin assignment



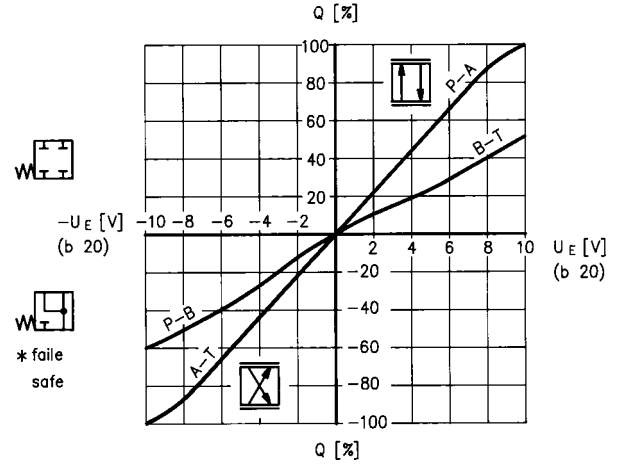
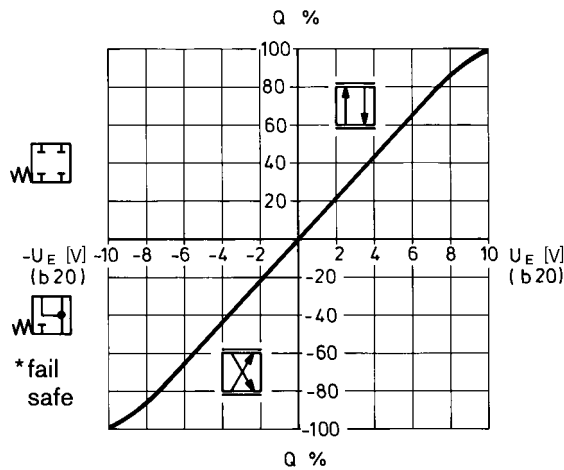
Performance curves (measured with HLP 46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$)

Flow rate/Signal function

$$Q = f(U_E)$$

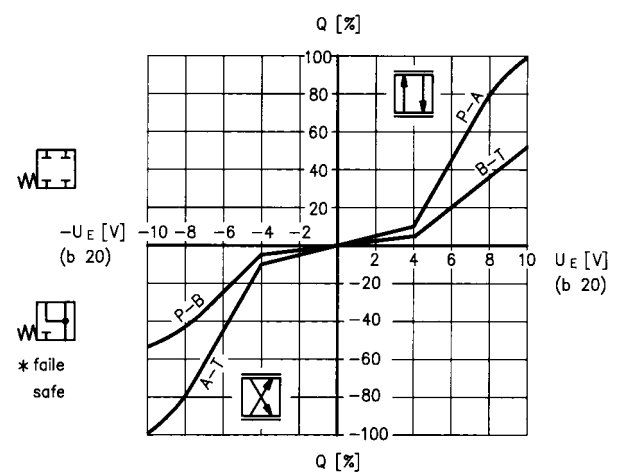
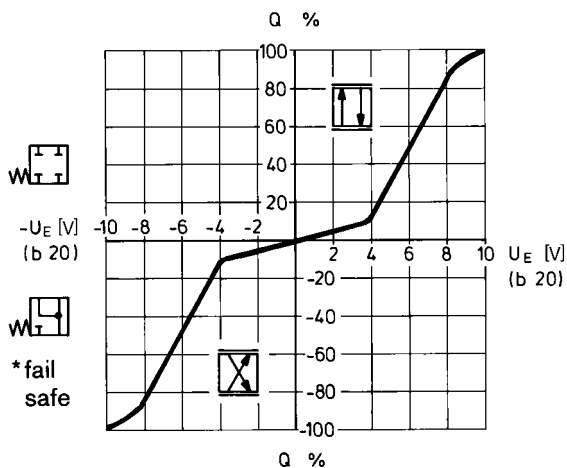
L: Linear

L: (linear) 2:1



P: (kink 40%)**

P: (kink 40%) 2:1**



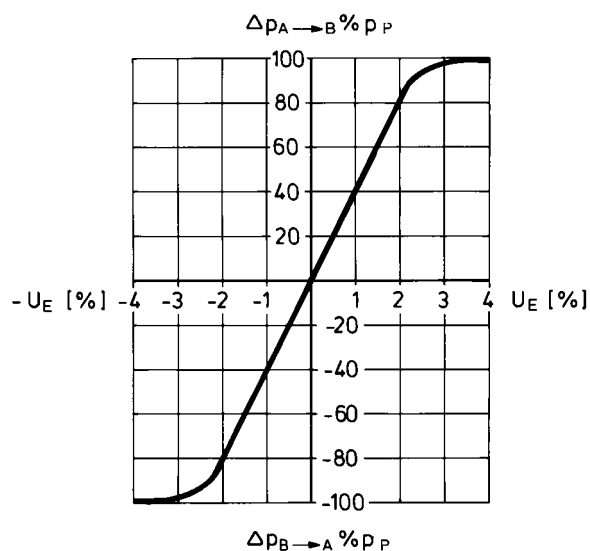
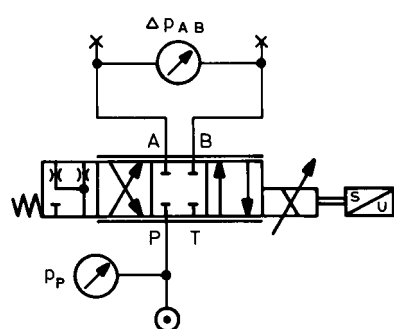
*Fail-safe when enabling is not released.

** $Q_{N-kink} = 10\% Q_N$.

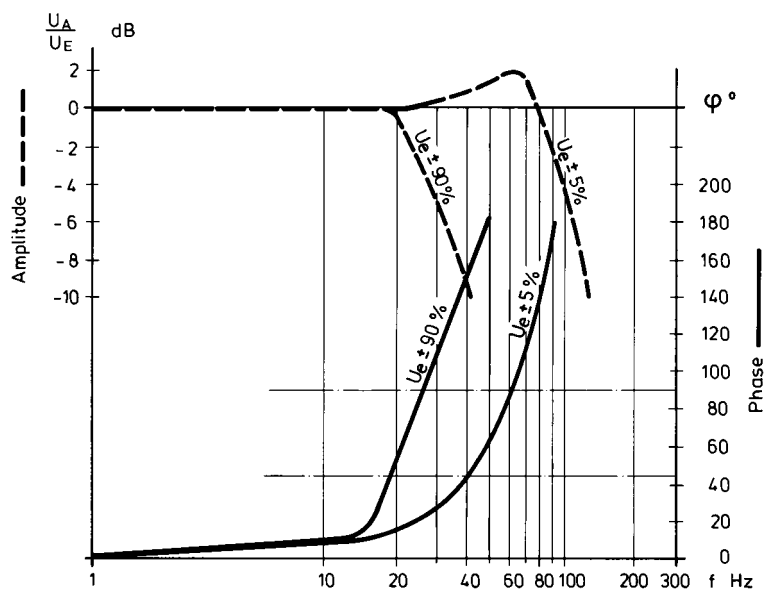
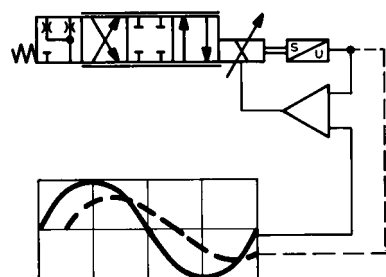
Fail-safe position				
	Leakage at	100 bar	P-A	50 cm ³ /min
			P-B	70 cm ³ /min
	Flow at	$\Delta p = 35 \text{ bar}$ $q_N 50/100 \text{ l/min}$	A-T	10 ... 100 l/min
			B-T	10 ... 25 l/min
	Leakage at	100 bar	P-A	50 cm ³ /min
			P-B	70 cm ³ /min
			A-T	70 cm ³ /min
			B-T	50 cm ³ /min
	Fail-safe	$p = 0 \text{ bar} \rightarrow 12 \text{ ms}$	Enable off	
		$p = 100 \text{ bar} \rightarrow 16 \text{ ms}$		

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

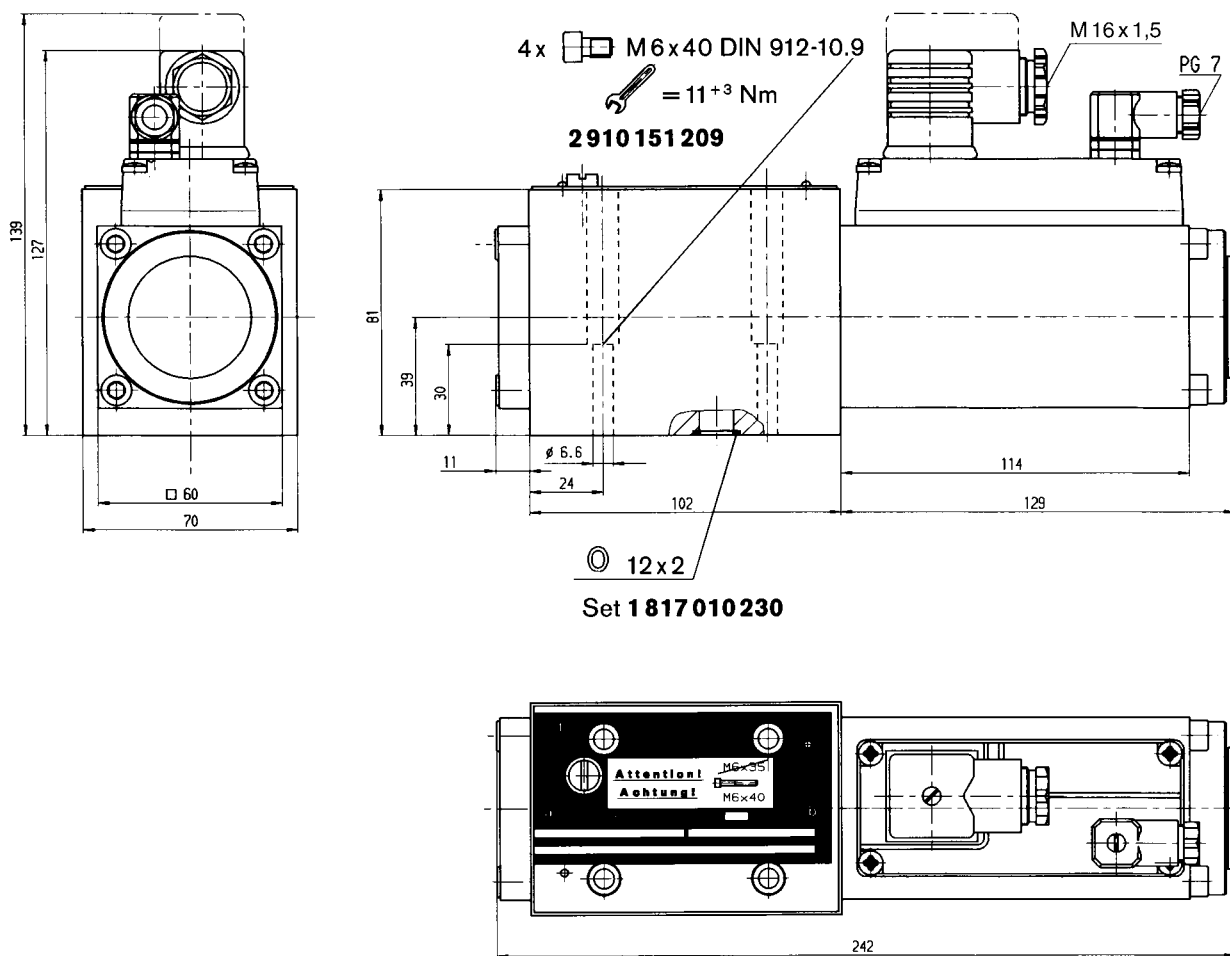
Pressure gain



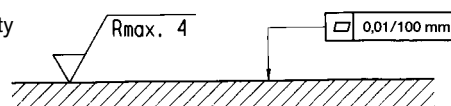
Bode diagram



Unit dimensions (nominal dimensions in mm)



Required surface quality
of mating component



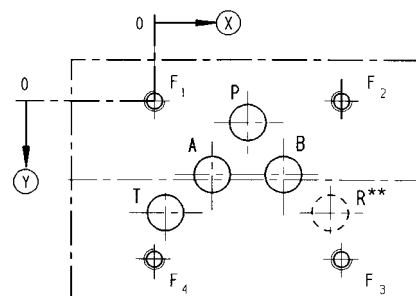
Mounting hole configuration: NG10

(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
* (NG10 min. 10.5 mm)

** 5/3 – NG10
R = P₂



	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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