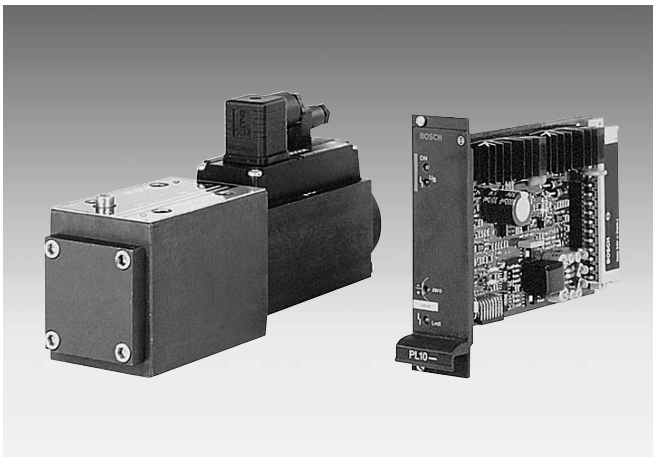
RE 29 032/11.02

Servo solenoid valves with electrical position feedback (Lvdt DC/DC ±10 V) Type 4WRPH 10

Size 10
Series 2X
Maximum working pressure 315 bar
Maximum flow rate 100 l/min (Δp 70 bar)



Type 4WRPH 10 ..B..-2X/G24...

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Features

- Directly operated servo solenoid valve NG 10, 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 DIN 24 340 Form A, ISO 4401 and CETOP-RP 121 H
- Subplates as per catalogue section RE 45 055 (order separately)
- Line sockets to DIN 43 560-AM2
  Solenoid 2P + PE/Pg 11, position transducer 4P/Pg 7 in scope of delivery, see catalogue section RE 08 008
- External trigger electronics (order separately)
  - Electric amplifier for standard curve "L"
    0 811 405 061, see catalogue section RE 30 041
  - Electric amplifier for non-linear curve "P"
    40 % – 0 811 405 067, see catalogue section RE 30 040

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).

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Ordering data

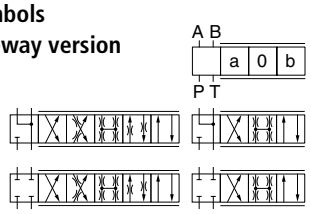
4WRP | | H | 10 | | B | | | -2X/G24 | Z4/ | M | *

For **external** trigger electronics = **no desig.**

Control piston/sleeve = **H**

Size 10 = **10**

Symbols
4/4-way version

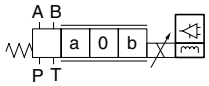


= **C3, C5**

= **C4, C1**

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**

50 = 50 l/min **100** = 100 l/min

Nominal flow rate at 70 bar valve pressure difference (35 bar / metering notch) **Size 10**

L = Linear
P = Non-linear curve

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

G24 = **Voltage supply of trigger electronics** +24 V DC

Z4 = with line socket, with plug to DIN 43 560-AM2
Line socket included in scope of delivery

Electrical connection

M = NBR seals, suitable for mineral oils (HL, HLP) to DIN 51 524

Further information in plain text

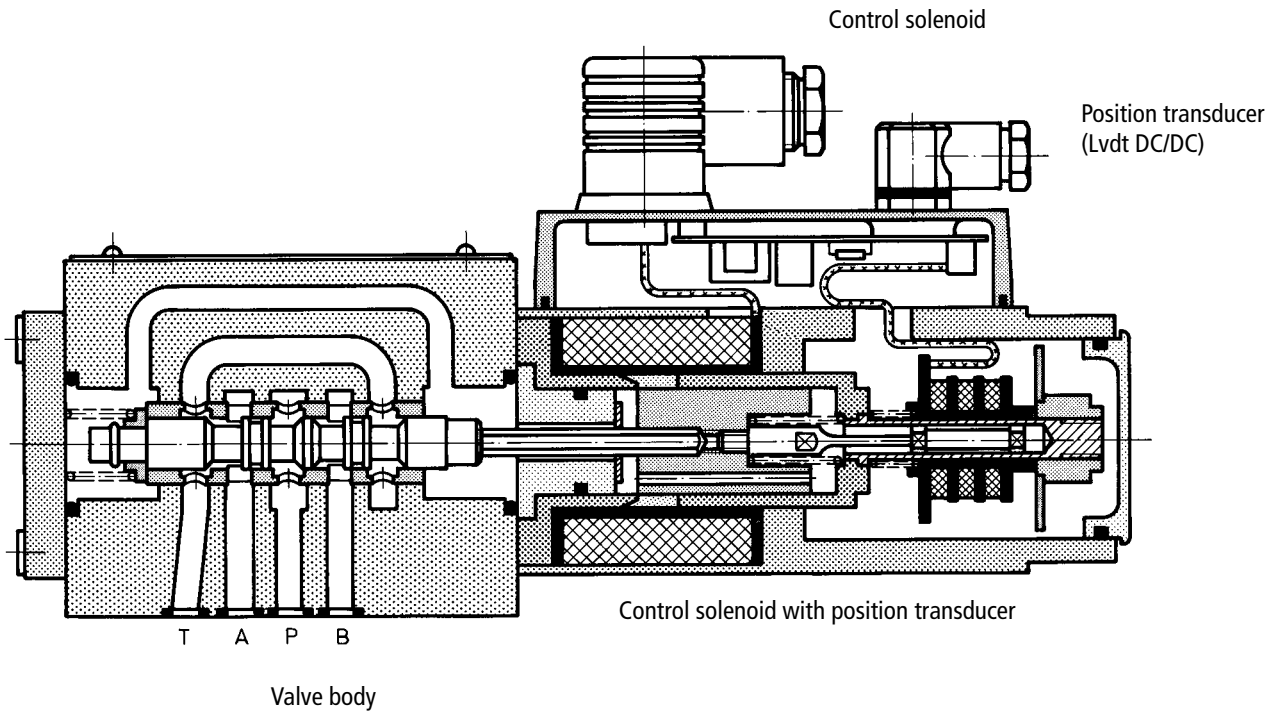
Preferred types (available at short notice)

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

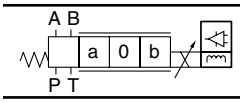
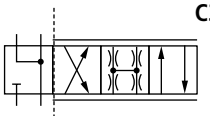
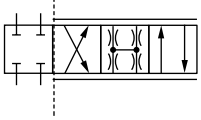
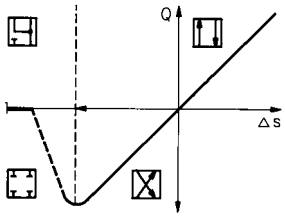
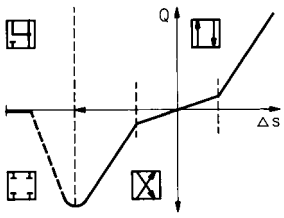
Material no.	Type 4WRPH 10
	C1 / C4
0 811 404 060	4WRPH 10 C4B50L –2X/G24Z4 / M
0 811 404 061	4WRPH 10 C4B100L –2X/G24Z4 / M
0 811 404 076	4WRPH 10 C1B100L –2X/G24Z4 / M
0 811 404 064	4WRPH 10 C4B50P –2X/G24Z4 / M
0 811 404 065	4WRPH 10 C4B100P –2X/G24Z4 / M
0 811 404 067	4WRPH 10 C1B50P –2X/G24Z4 /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

Function, sectional diagram

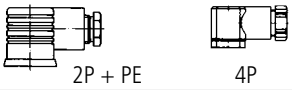
Servo solenoid valve 4WRPH 6



Symbols

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

Accessories, not included in scope of delivery

(4 x) M 6 x 40 DIN 912–10.9	Fastening screws	2 910 151 209
	VT-VRRA1-537-20 / V0, see RE 30 041	0 811 405 061
	VT-VRRA1-537-20 / V0 / K40-AGC, see RE 30 040	0 811 405 067
	Line sockets 2P + PE (Pg 11) and 4P (Pg 7) included in scope of delivery, also see RE 08 008	

Application

– Valve amplifier with pressure compensator (p/Q), see RE 30 058.

Testing and service equipment

– Test box type VT-PE-TB2, see RE 30 064.
– Test adapter type VT-PA-3, see RE 30 070.

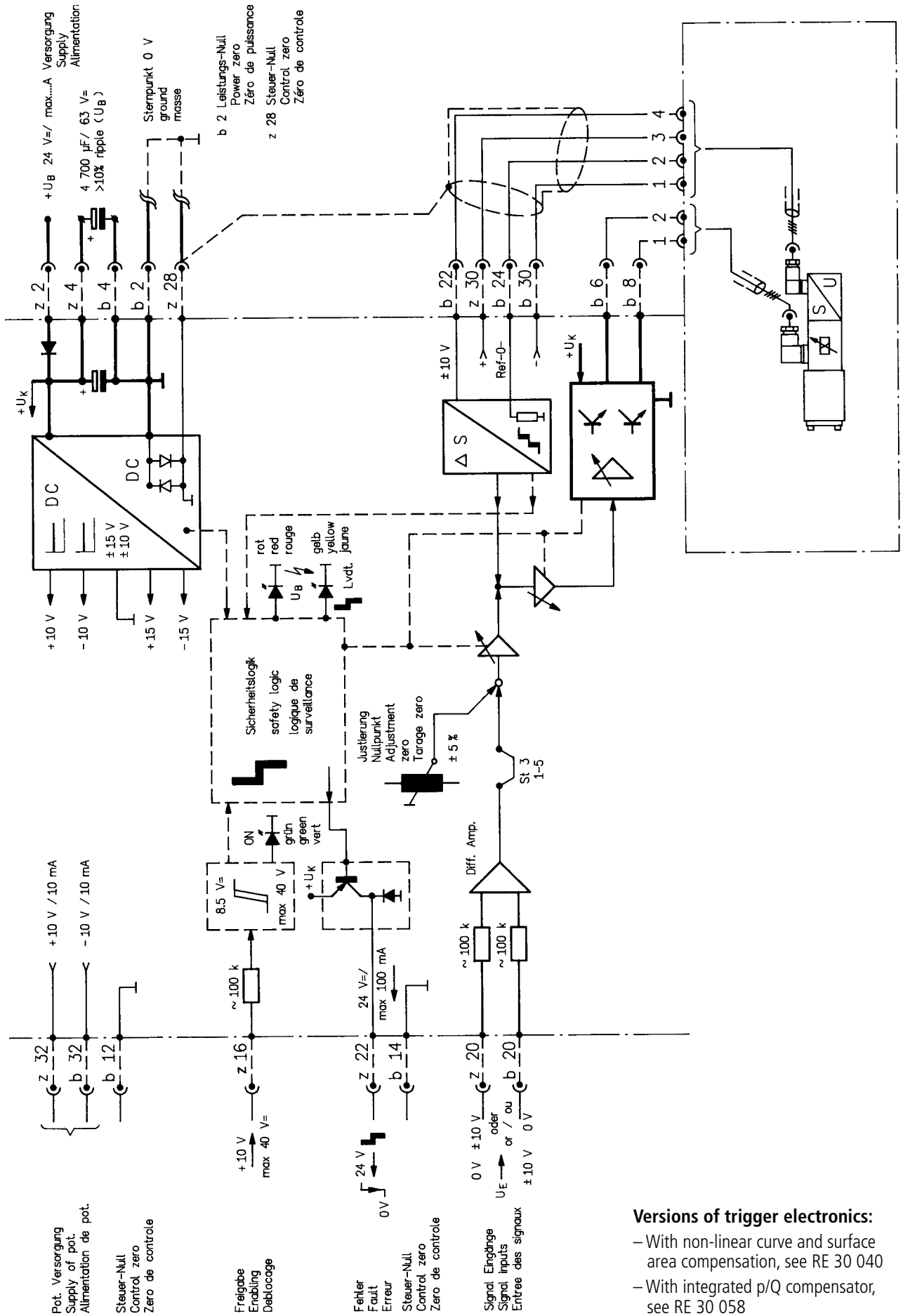
Technical data (For device applications beyond the stated values, please consult us!)

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 NG 10 (ISO 4401 and CETOP-RP 121 H)			
Installation position	Optional			
Ambient temperature range	–20 … +50 °C			
Weight	6.8 kg			
Vibration resistance, test condition	Max. 25 *g*, shaken in 3 dimensions (24 h)			
Hydraulic (measured with HLP 46, ϑ_{oil} = 40 °C ±5 °C)				
Pressure fluid	Hydraulic oil to DIN 51 524 … 535, other fluids after prior consultation			
Viscosity range, recommended max. permitted	20 … 100 mm^2/s 10 … 800 mm^2/s			
Pressure fluid temperature range	–20 … +80 °C			
Purity class to ISO code	Maximum permitted degree of contamination of pressure fluid to ISO 4406 (C) Class 18/16/13 [1])			
Flow direction	See symbol			
Nominal flow [l/min] at Δp = 35 bar per notch*	50 (1:1)	50 (2:1)	100 (1:1)	100 (2:1)
Max. working pressure	Port P, A, B: 315 bar			
Max. pressure	Port T: 250 bar			
Operating limits at Δp [bar] Pressure drop at valve	315	315	160	160
$q_{vnom.}$: > q_N valves	250	250	100	100
Leakage [cm^3/min] at 100 bar	< 1200	< 1200	< 1500	< 1000
	< 600	< 500	< 600	< 600
Electrical				
Cyclic duration factor	100 %			
Power supply	24 $V_{nom.}$ (external amplifier)			
Degree of protection	IP 65 to DIN 40 050			
Solenoid connector	Connector DIN 43 650/ISO 4400 Pg 11 (2P + PE)			
Position transducer connector	Connector Pg 7 (4P)			
Solenoid current	3.7 A max.			
Coil resistance R_{20}	2.4 Ω			
Max. power consumption at 100 % load and operational temperature	60 VA max.			
Position transducer DC/DC technology	Supply: +15 V/35 mA –15 V/25 mA	Signal: 0...±10 V (R_L ≧ 10 kΩ)		
Static/Dynamic				
Hysteresis	≦ 0.2 %			
Manufacturing tolerance for $q_{max.}$	<10 %			
Response time for signal change 0 … 100 %	< 25 ms			
Thermal drift	Zero point displacement <1 % at ΔT= 40 °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 50 070, RE 50 076 and RE 50 081.

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

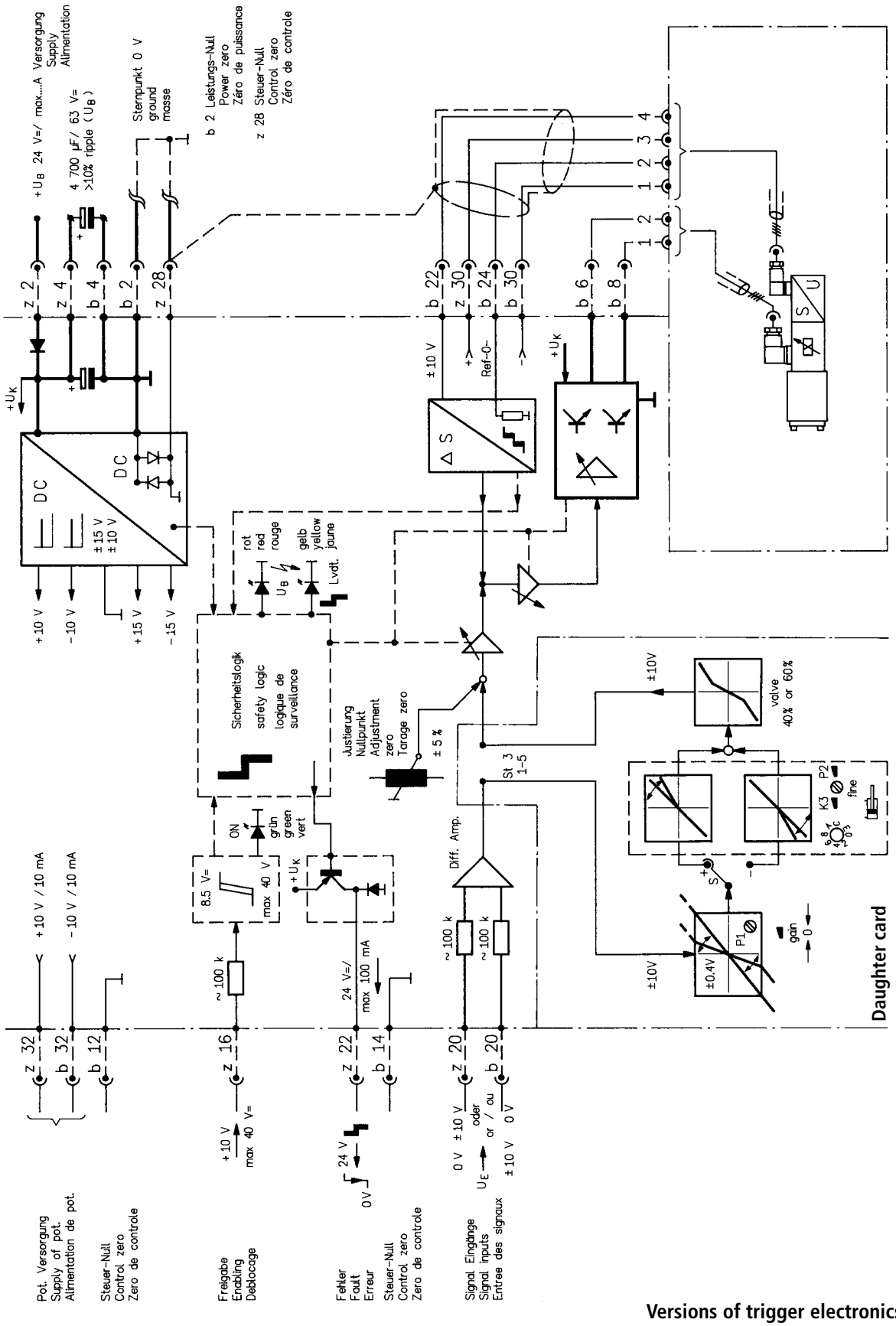
Block diagram / pin assignment



Versions of trigger electronics:

- With non-linear curve and surface area compensation, see RE 30 040
- With integrated p/Q compensator, see RE 30 058

Block diagram / pin assignment



Versions of trigger electronics:

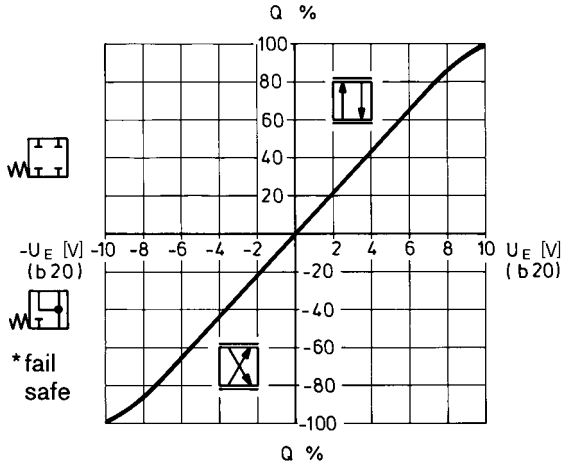
– With standard linear curve, see RE 30 041

– With integrated p/Q compensator, see RE 30 058

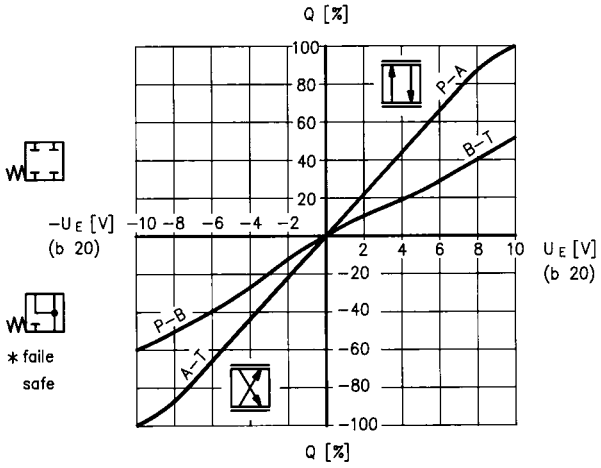
Performance curves (measured with HLP 46, ϑ_{oil} = 40 °C ±5 °C)

Flow rate/Signal function $Q = f(U_E)$

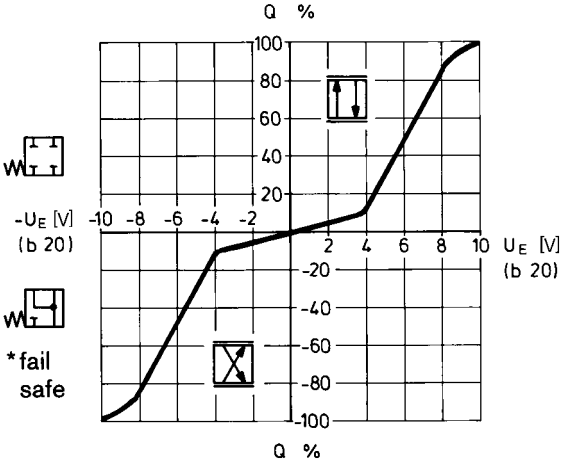
L: Linear



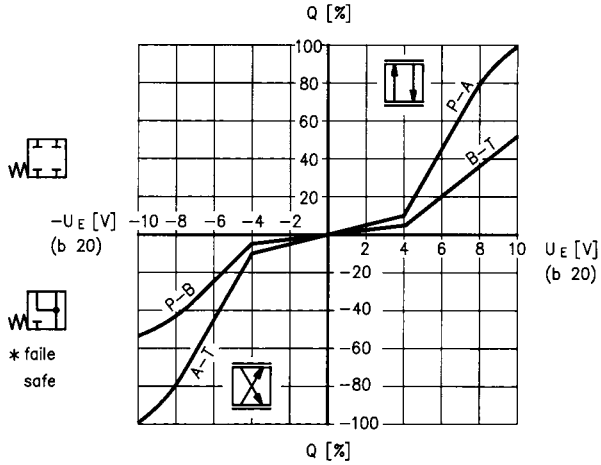
L: (linear) 2:1



P: (kink 40 %)**

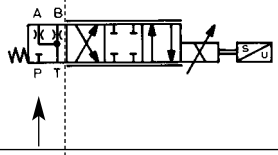
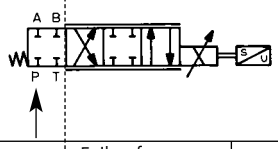


P: (kink 60 %)**



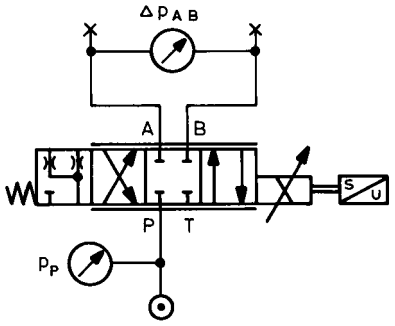
*Fail-safe when enabling is not released.
**Q-kink = 10 % Q_N.

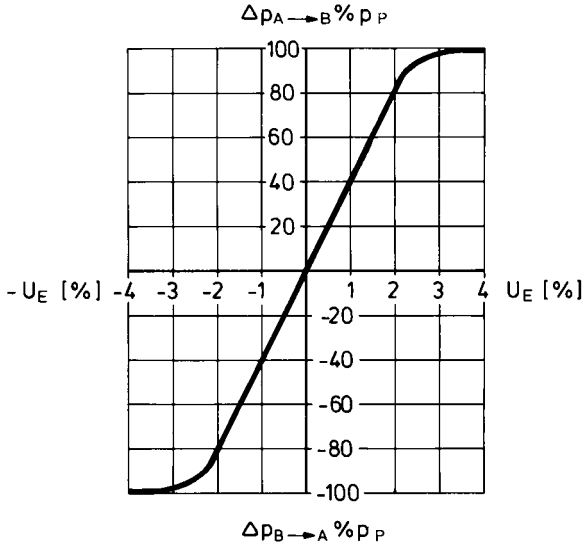
Fail-safe position

	Leakage at	100 bar	P–A	50 cm³/min
			P–B	70 cm³/min
	Flow at	Δp = 35 bar	A–T	10 … 100 l/min
		q_N 50/100 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

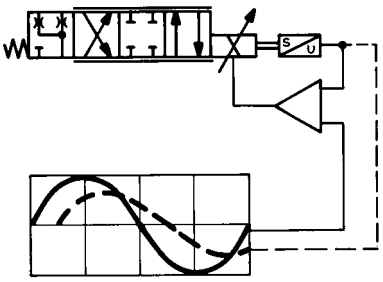
Fail-safe	p = 0 bar →	12 ms	Enable off
	p = 100 bar →	16 ms	

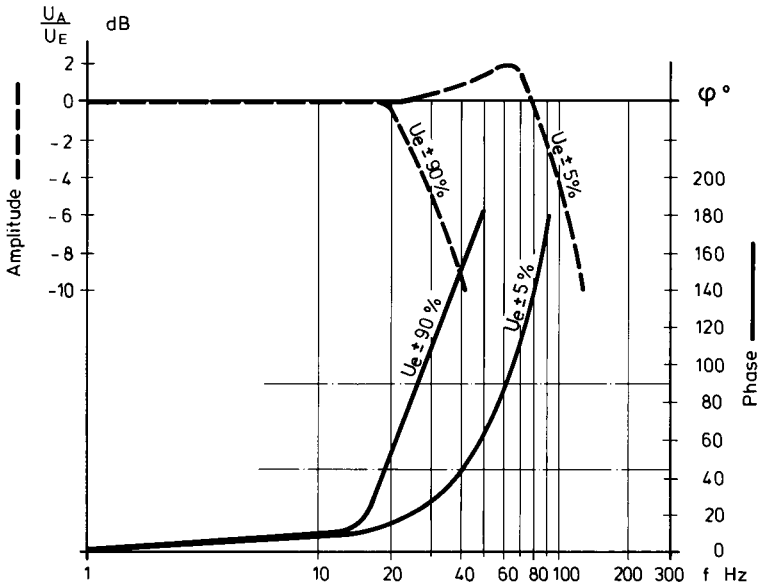
Pressure gain

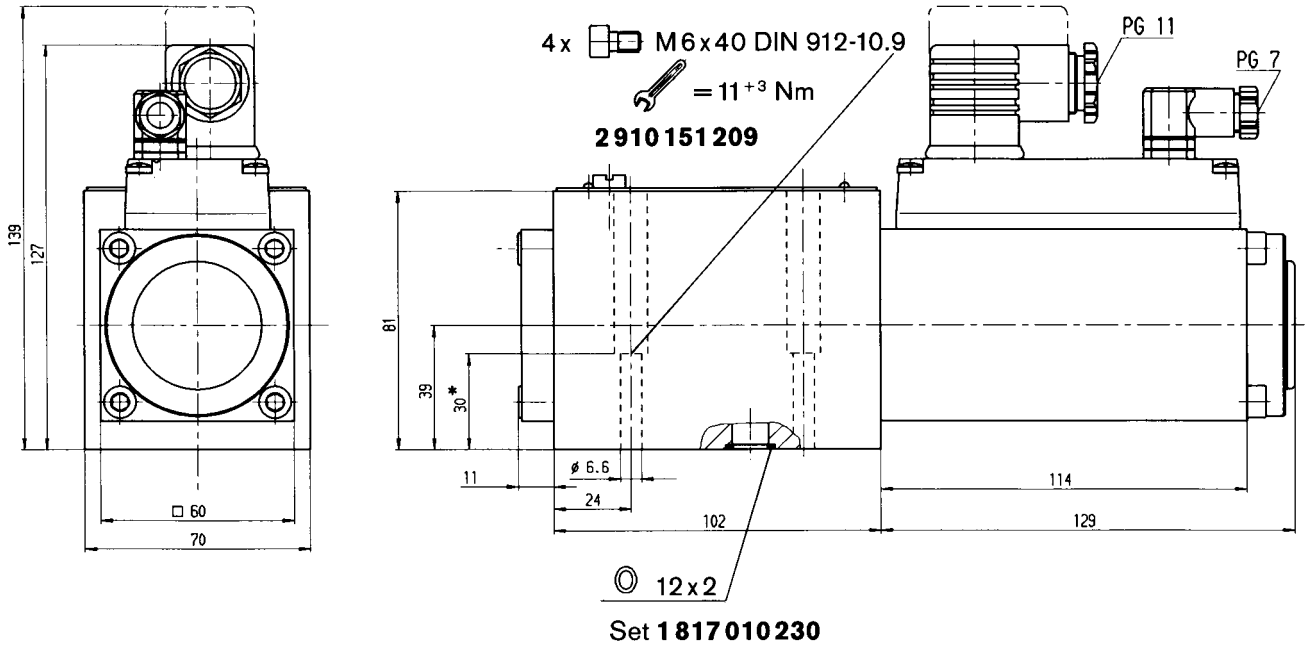


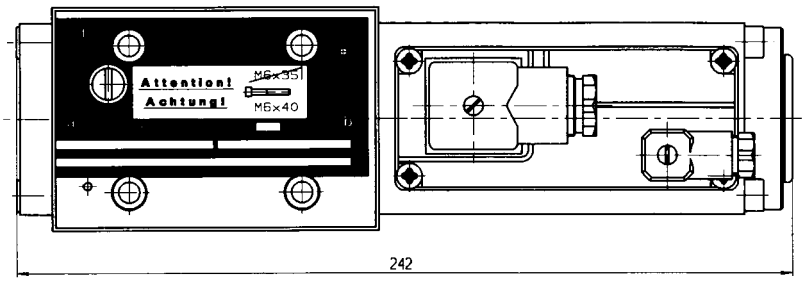


Bode diagram

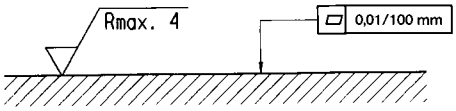






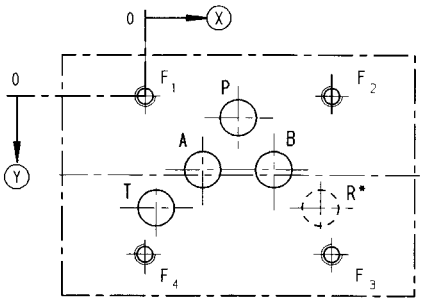


Required surface quality of mating component



Mounting hole configuration: NG 10 (DIN 24 340 Form A, ISO 4401 and CETOP-RP 121 H)

For subplates, see catalogue section RE 45 055



*5/3 – NG 10
R = P_2

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

	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)]	M 6[2)]	M 6[2)]	M 6[2)]	M 6[2)]	10.5[1)]

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