

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

RE 29032/01.05
Replaces: 09.03

1/10

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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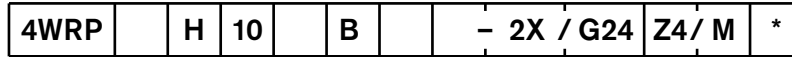
Features

- 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



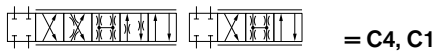
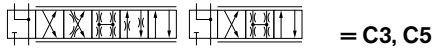
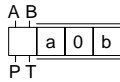
For external trigger electronics = no desig.

Control piston/sleeve = H

Size 10 = 10

Symbols

4/4-way version

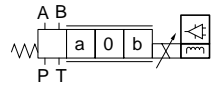


With symbols C5 and C1:

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

Further information in plain text

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

Electrical connection

Z4 = with line socket, with plug to DIN 43560-AM2

Line socket included in scope of delivery

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

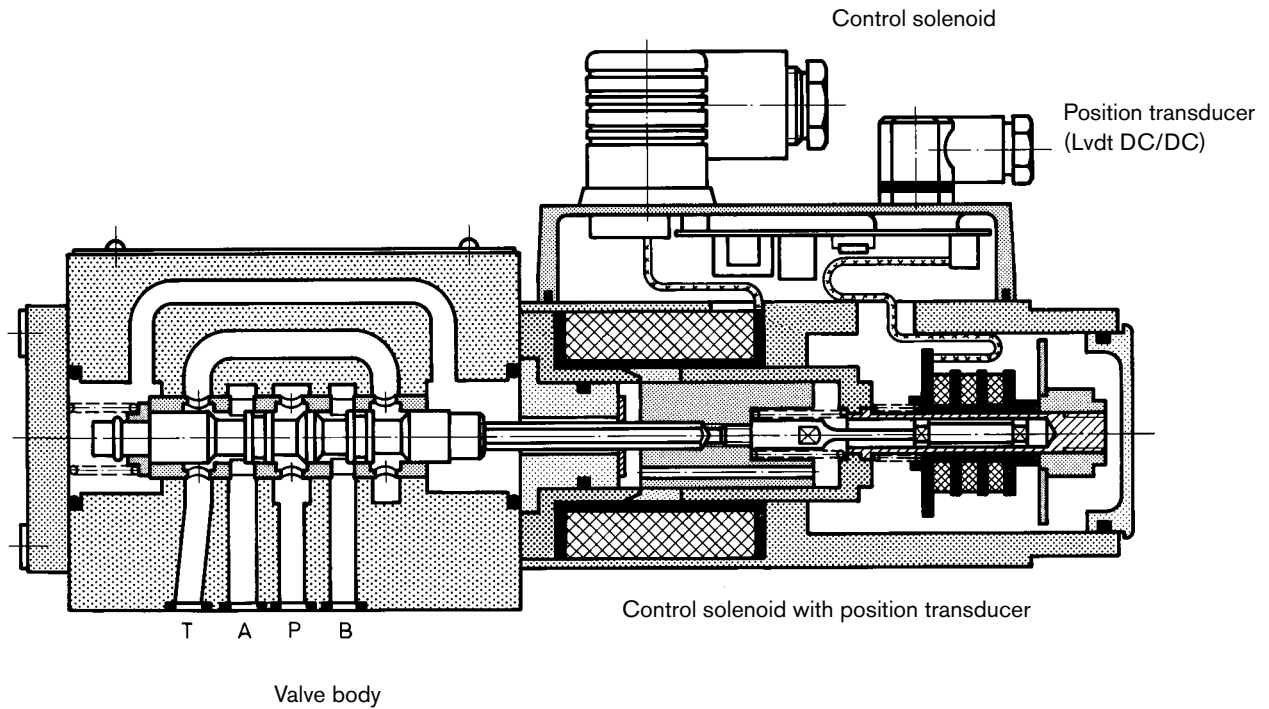
Preferred types (available at short notice)

| 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 4WRPH10



Symbols

| | | |
|---|---------------|--------------------|
| | <p>Linear</p> | <p>p: kink 40%</p> |
| <p>C3, C5</p> <p>C4, C1</p> | | |
| <p>C3, C4, C5, C1</p> | | |

Accessories, not included in scope of delivery

| | | |
|-----------------------------------|---|----------------------------|
| <p>(4x) M6 x 40 DIN 912-10.9</p> | <p>Fastening screws</p> | <p>2910151 209</p> |
| | <p>VT-VVRA1-537-20/V0, see RE 30041</p> | <p>0811 405 061</p> |
| | <p>VT-VVRA1-537-20/V0/K40-AGC, see RE 30040</p> | <p>0811 405 067</p> |
| 2P+PE 4P | <p>Line sockets 2P+PE (M16 x 1.5) and 4P (Pg7) included in scope of delivery, see also RE 08008</p> | |

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 | mm ² /s | 20 ... 100 | | |
| | max. permitted | mm ² /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 |  cm ³ /min | <1200 | <1200 | <1500 | <1000 |
| |  cm ³ /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 x 1.5 (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 ($R_L \geq 10$ kΩ) | |

Static/Dynamic

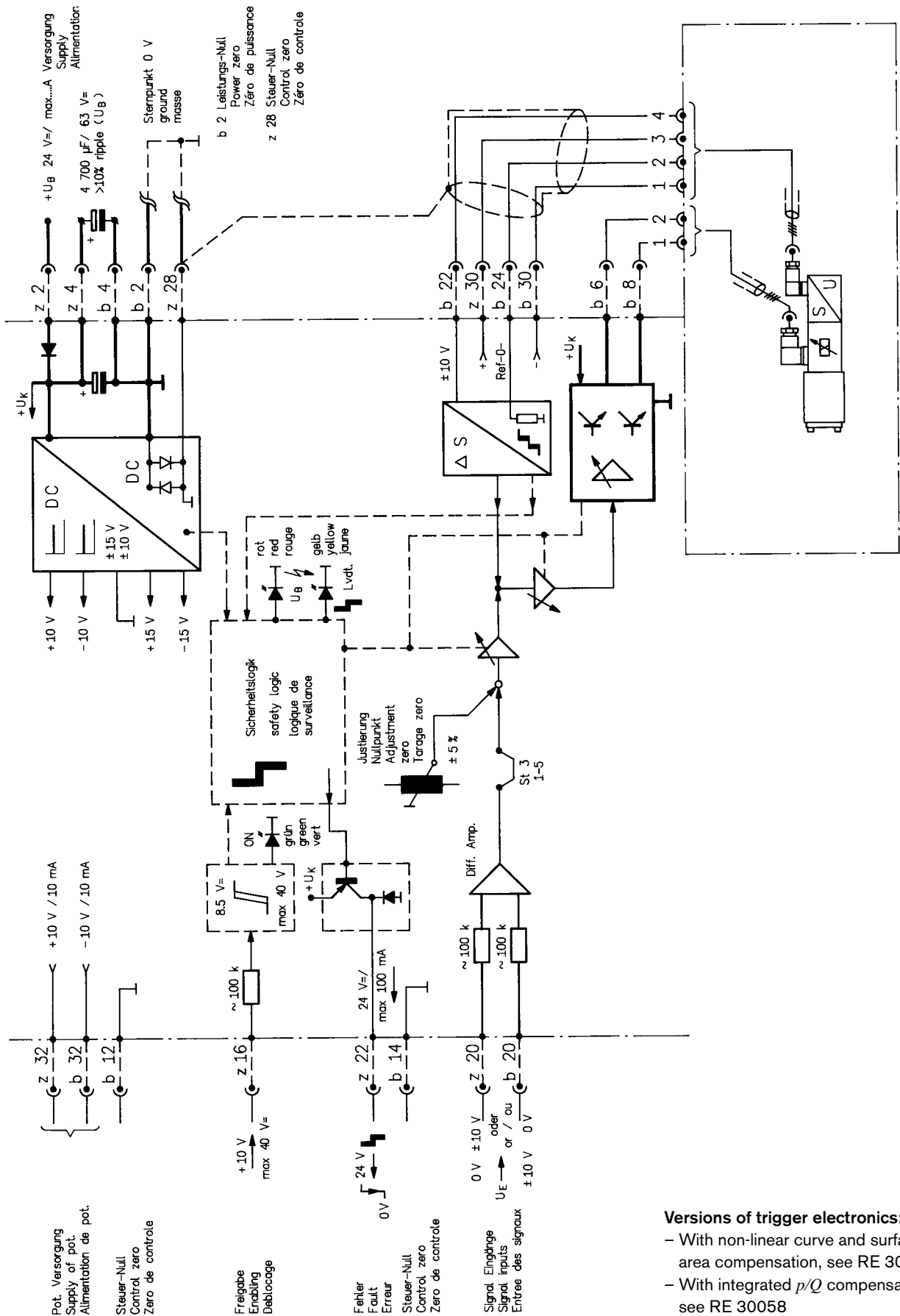
| | | |
|--|--|-------|
| Hysteresis | % | ≤ 0.2 |
| Manufacturing tolerance for q_{max} | % | < 10 |
| Response time for signal change 0 ... 100 % | ms | < 25 |
| Thermal drift | Zero point displacement < 1 % at $\Delta T = 40^\circ\text{C}$ | |

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

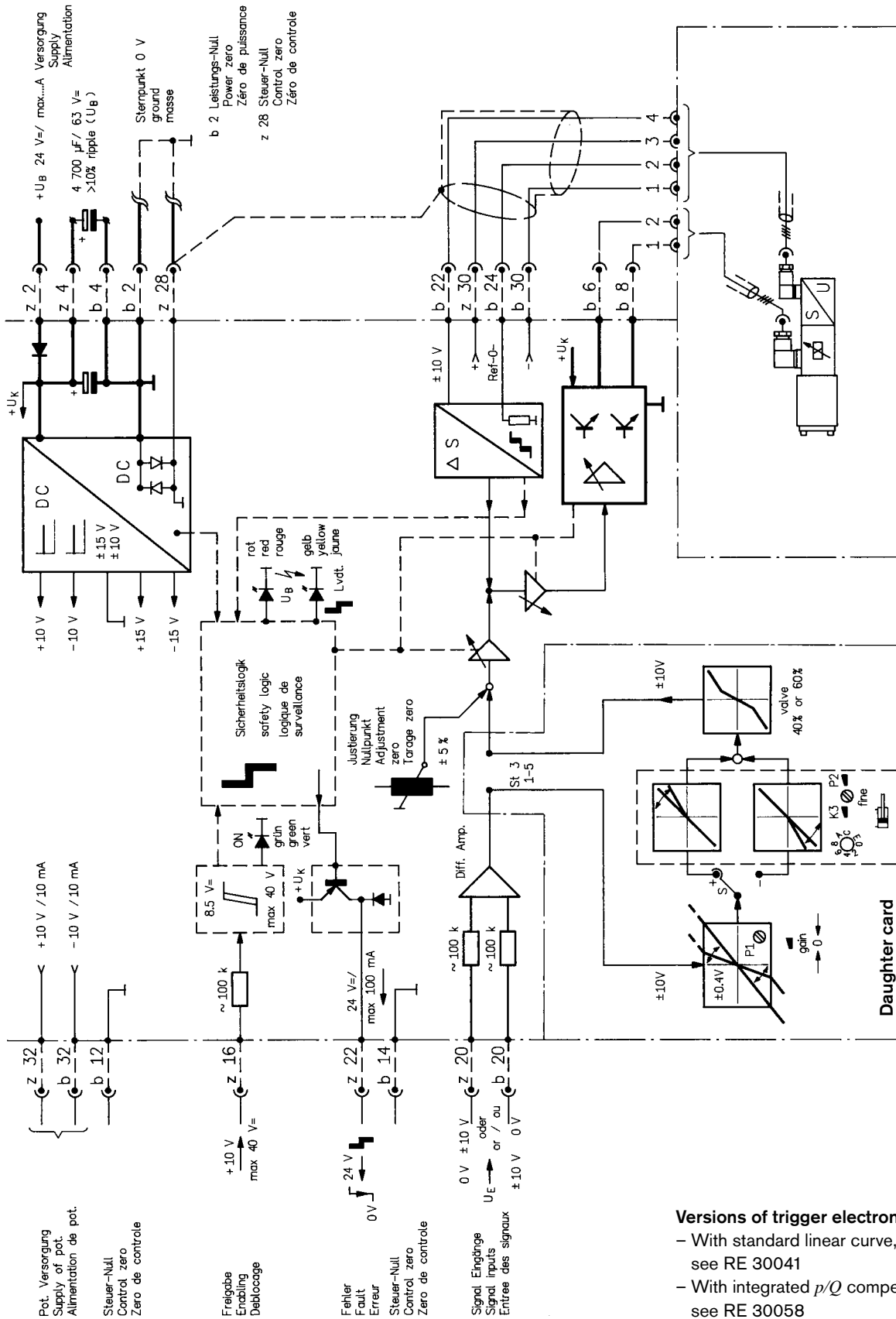
Valve with external trigger electronics (standard linear curve: L)

Block diagram/pin assignment



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

Block diagram/pin assignment



Versions of trigger electronics:

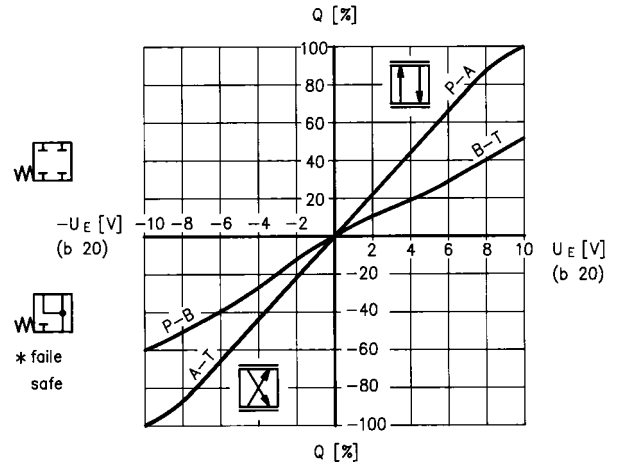
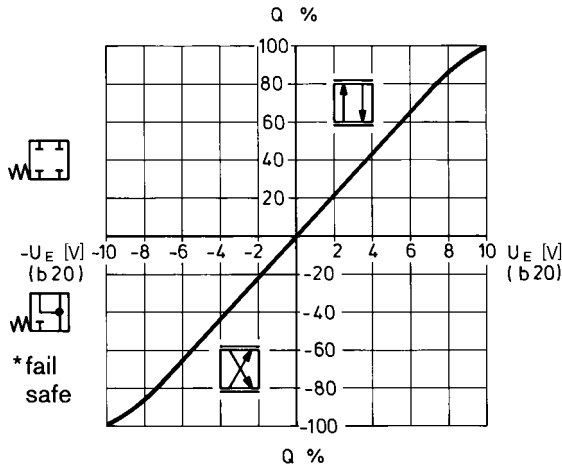
- With standard linear curve, see RE 30041
- With integrated p/Q compensator, see RE 30058

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

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

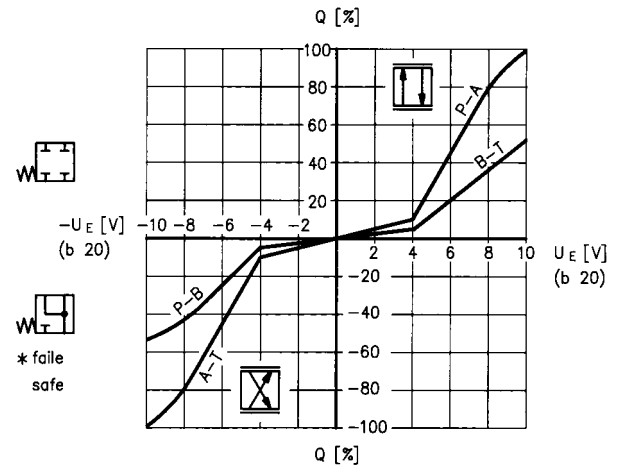
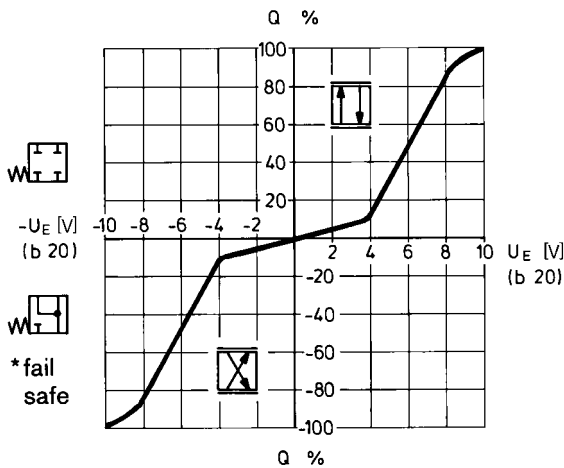
L: Linear

L: (linear) 2:1



P: (kink 40%)**

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



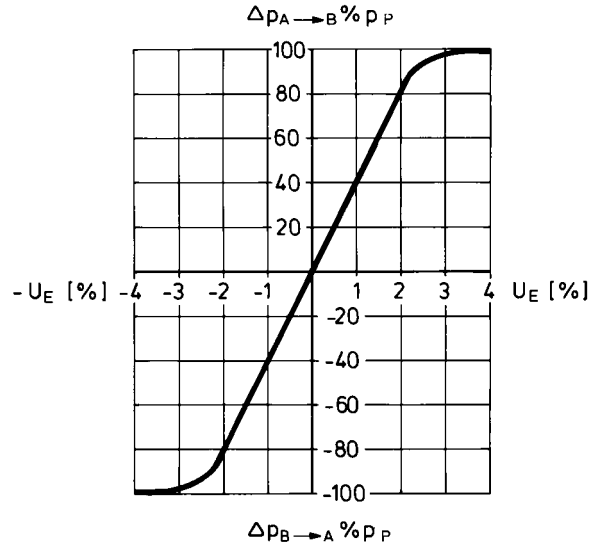
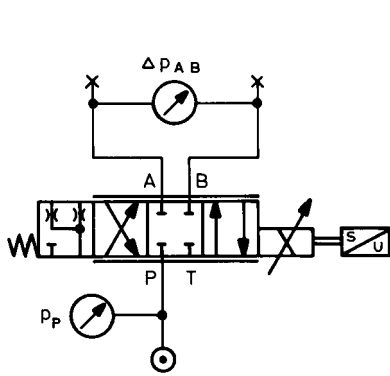
*Fail-safe when enabling is not released.

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

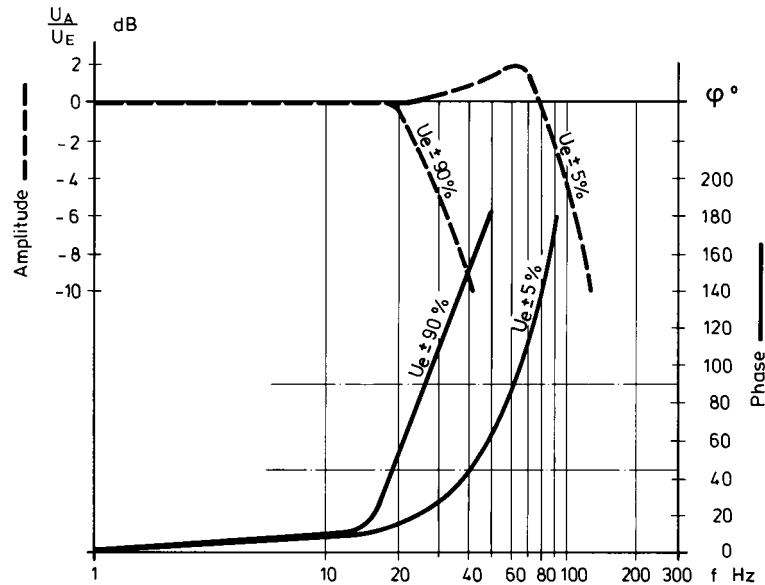
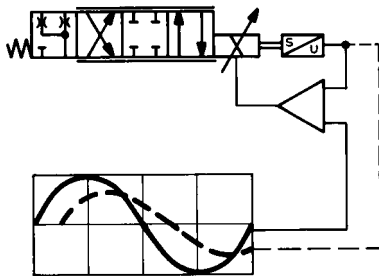
| | | Fail-safe position | | | | |
|--|------------|---|------------|-------------------------|-----|-------------------------|
| | Leakage at | 100 bar | P-A | 50 cm ³ /min | P-B | 70 cm ³ /min |
| | Flow at | $\Delta p = 35$ bar $q_N 50/100$ l/min | A-T | 10 ... 100 l/min | B-T | 10 ... 25 l/min |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

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

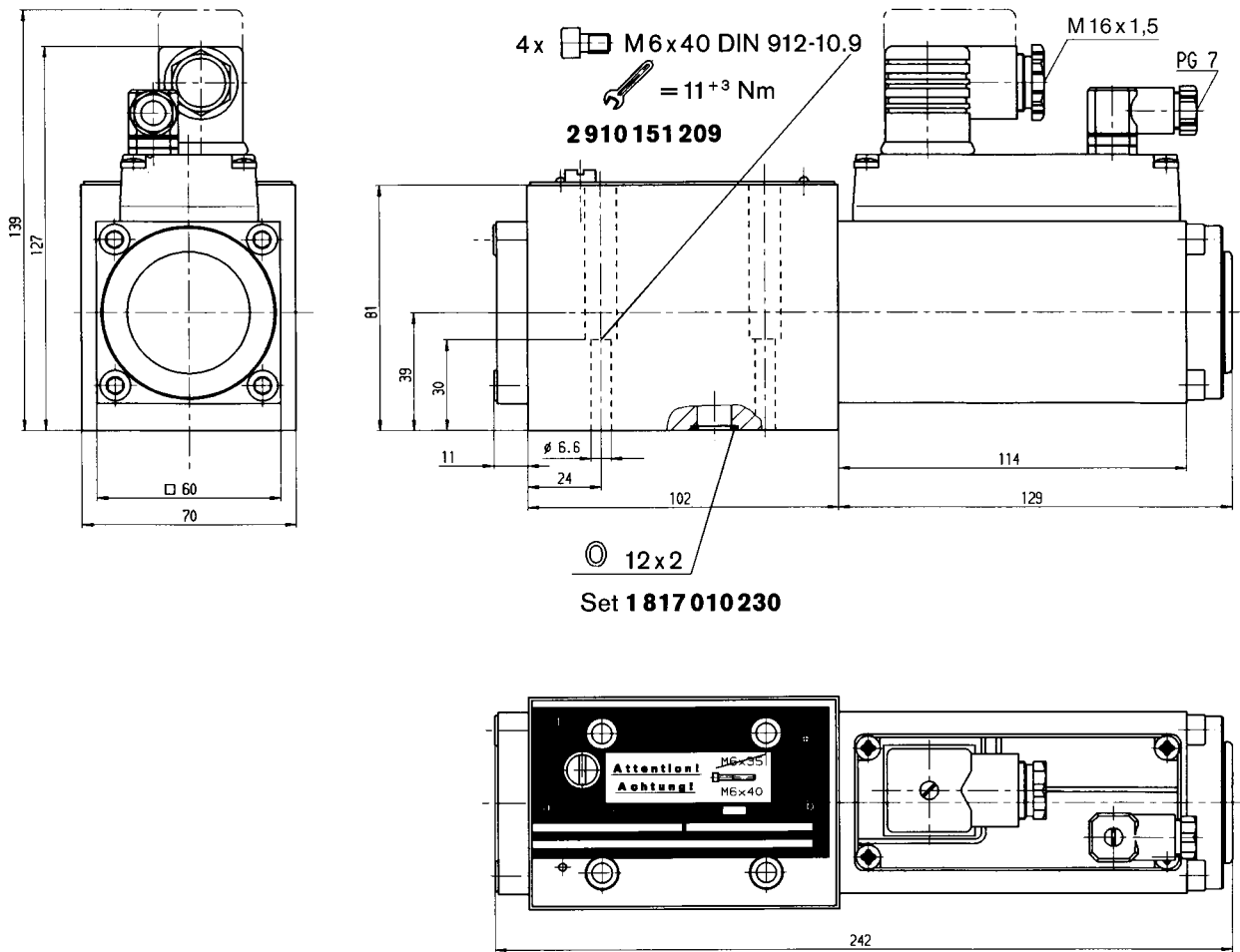
Pressure gain



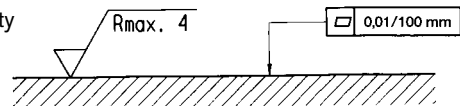
Bode diagram



Unit dimensions (nominal dimensions in mm)



Required surface quality of mating component



Mounting hole configuration: NG10

(ISO 4401-05-04-0-94)

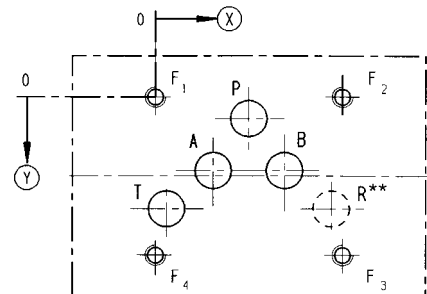
For subplates, see catalogue section RE 45055

¹⁾ Deviates from standard

²⁾ Thread depth:
Ferrous metal 1.5xØ*
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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