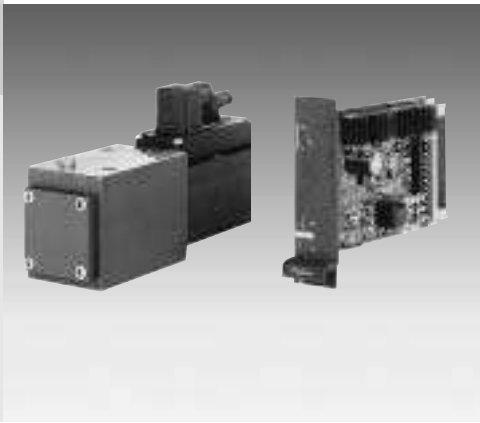
# Servo solenoid valves with electrical position feedback (Lvdt DC/DC ±10 V)

**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 ($\Delta p$ 70 bar)

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| Performance curves | 7 and 8 |
| Unit dimensions | 9 |


## 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 | * |
|---|---|---|---|---|---|---|---|---|---|

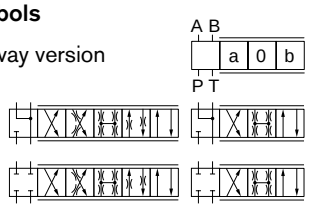
For **external** trigger electronics **= no desig.**

Control piston/sleeve **= H**

Size 10 **= 10**

**Symbols**

4/4-way version




**= C3, C5**

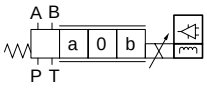
**= C4, C1**

**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**

**Size 10**

**50** = 50 l/min

**100** = 100 l/min

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

**L =** Linear

**P =** Non-linear curve

**Flow characteristic**

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

**G24 =** +24 V DC

**Voltage supply of trigger electronics**

**Z4 = with** line socket, with plug to DIN 43560-AM2 Line socket included in scope of delivery

**Electrical connection**

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

Further information in plain text

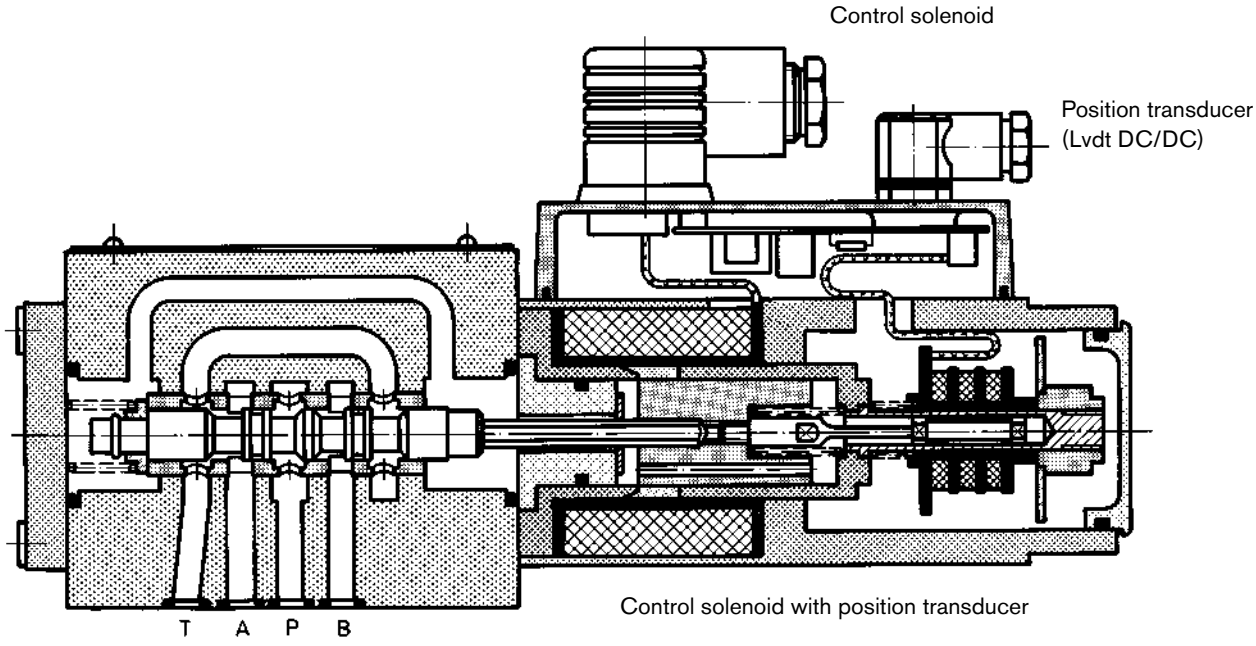
## **Preferred types** (available at short notice)

| 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** |

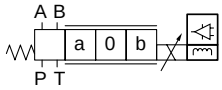
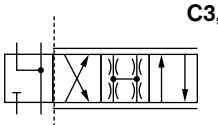
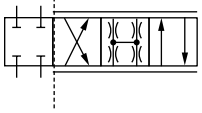
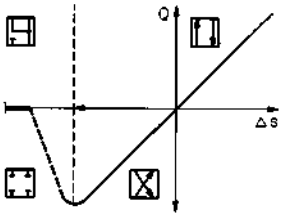
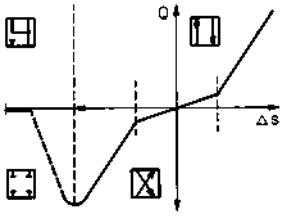
| Type 4WRPH 10 | Material No. |
|---|---|
| **C1/C4** | |
| 4WRPH 10 C4B50L –2X/G24Z4 / M | **0 811 404 060** |
| 4WRPH 10 C4B100L –2X/G24Z4 / M | **0 811 404 061** |
| 4WRPH 10 C1B100L –2X/G24Z4 / M | **0 811 404 076** |
| 4WRPH 10 C4B50P –2X/G24Z4 / M | **0 811 404 064** |
| 4WRPH 10 C4B100P –2X/G24Z4 / 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 | **2910151209** |
|   | VT-VRRA1-537-20/V0, see RE 30041 | **0811405061** |
| | VT-VRRA1-537-20/V0/K40-AGC, see RE 30040 | **0811405067** |
|   | Line sockets 2P+PE (M16 x 1.5) 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, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 $\Delta p$ 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 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<br>–15 V/25 mA | Signal: 0...±10 V ($R_L \geqq 10$ kΩ) |

## Static/Dynamic

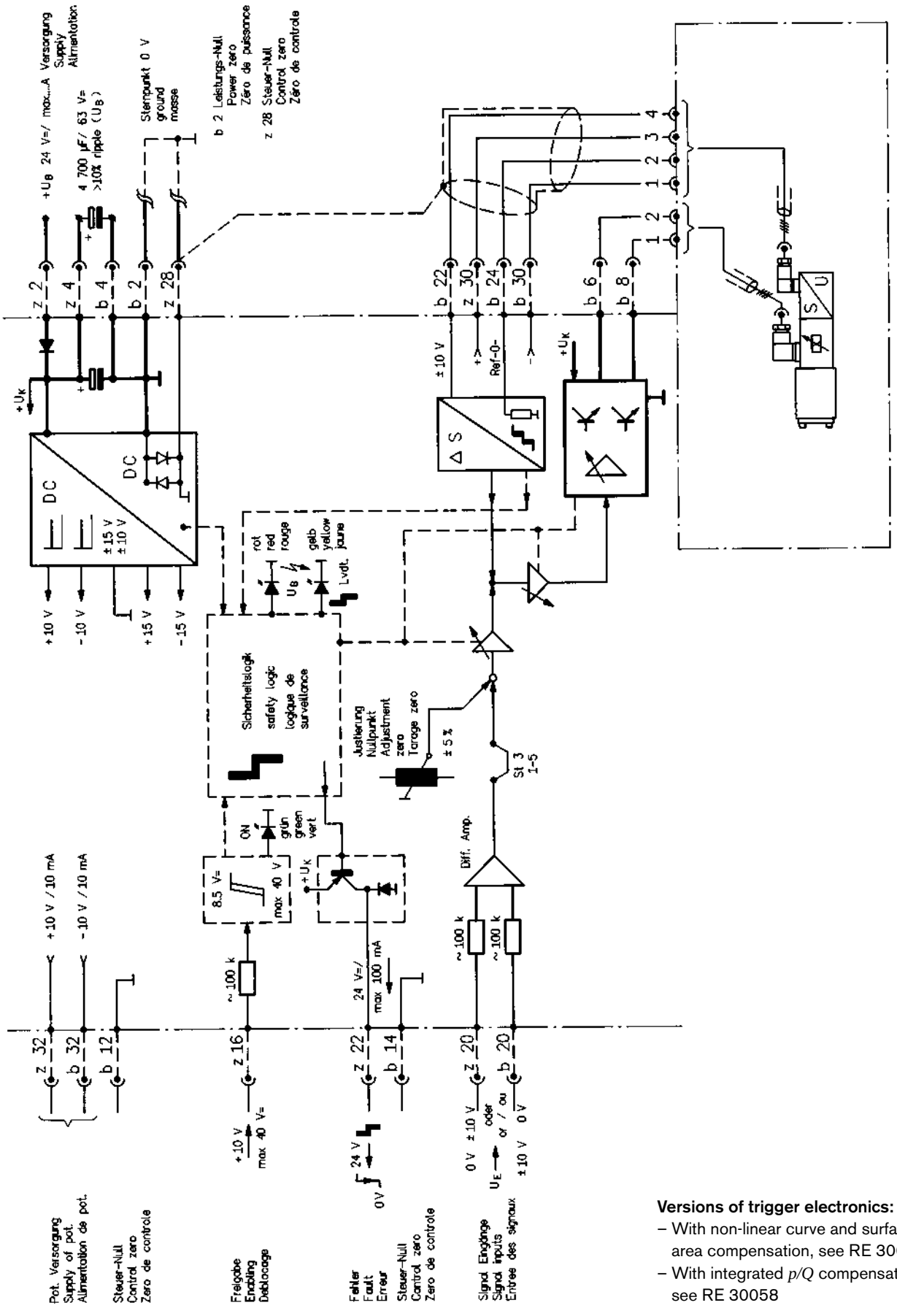
| | | |
|---|---|---|
| Hysteresis | % | ≦ 0.2 |
| Manufacturing tolerance for $q_{max.}$ | % | < 10 |
| Response time for signal change 0 … 100 % | ms | < 25 |
| Thermal drift | | Zero point displacement <1 % at $\Delta T = 40\,°C$ |

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

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

**Block diagram/pin assignment**

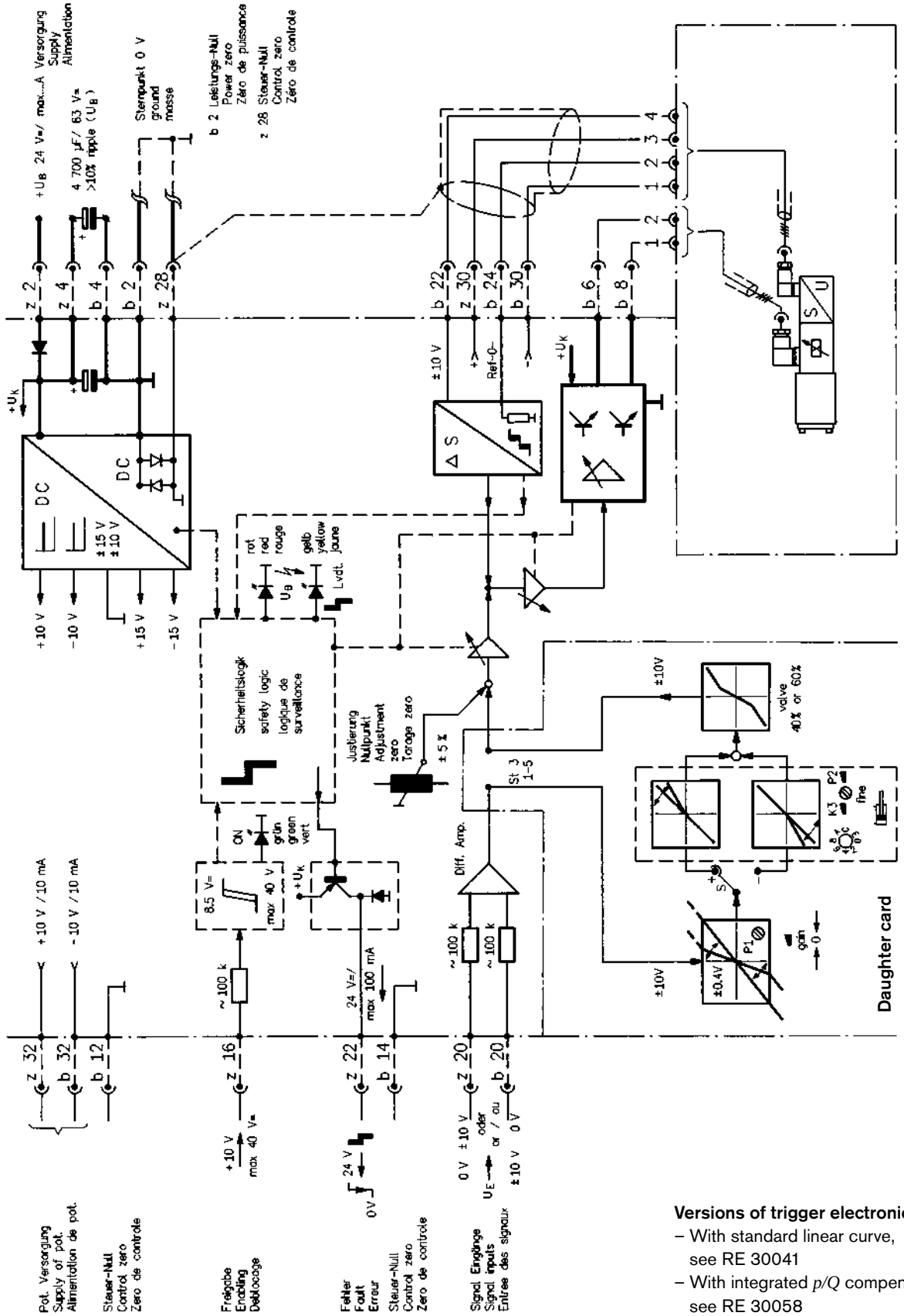



**Versions of trigger electronics:**

- With non-linear curve and surface area compensation, see RE 30040
- With integrated *p/Q* compensator, see RE 30058

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

**Block diagram/pin assignment**




**Versions of trigger electronics:**

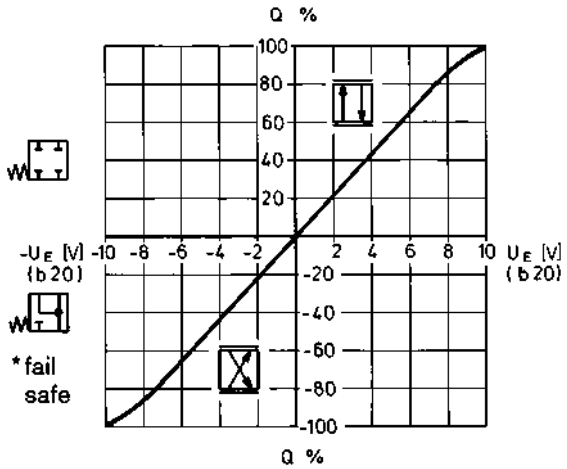
– With standard linear curve, see RE 30041

– With integrated *p/Q* compensator, see RE 30058

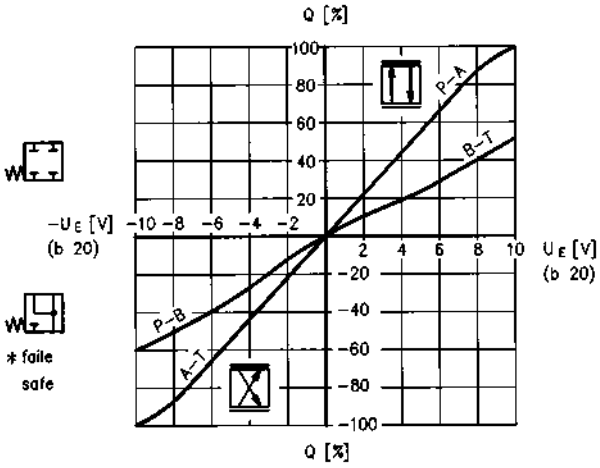
## Performance curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

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

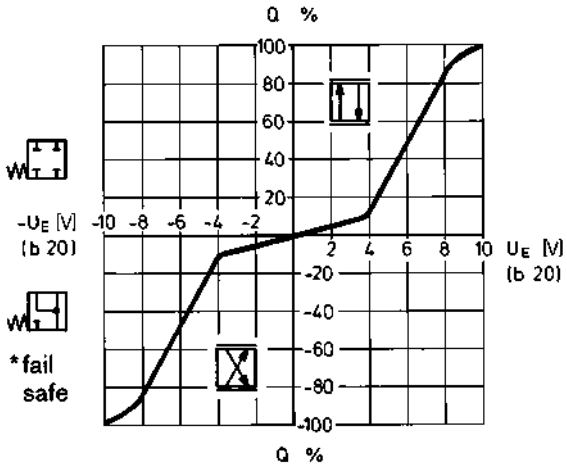
L: Linear



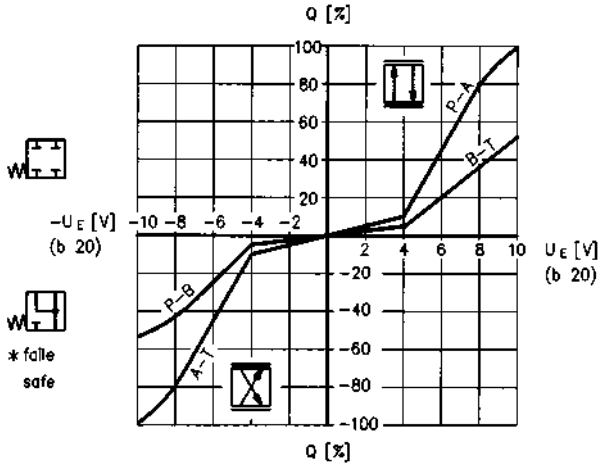

L: (linear) 2:1




P: (kink 40 %)**

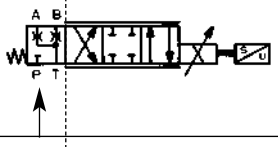



P: (kink 40 %) 2:1**

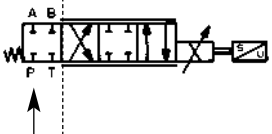



*Fail-safe when enabling is not released.
**$Q_N$-kink = 10 % $Q_N$.

**Fail-safe position**




| | | | |
|---|---|---|---|
| Leakage at | 100 bar | P–A | 50 cm³/min |
| | | P–B | 70 cm³/min |
| Flow at | $\Delta p = 35$ bar | A–T | 10 … 100 l/min |
| | $q_N$ 50/100 l/min | B–T | 10 … 25 l/min |



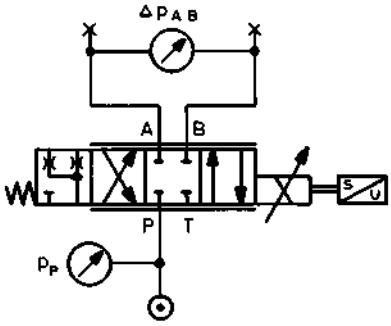

| | | | |
|---|---|---|---|
| Leakage at | 100 bar | P–A | 50 cm³/min |
| | | P–B | 70 cm³/min |
| | | A–T | 70 cm³/min |
| | | B–T | 50 cm³/min |

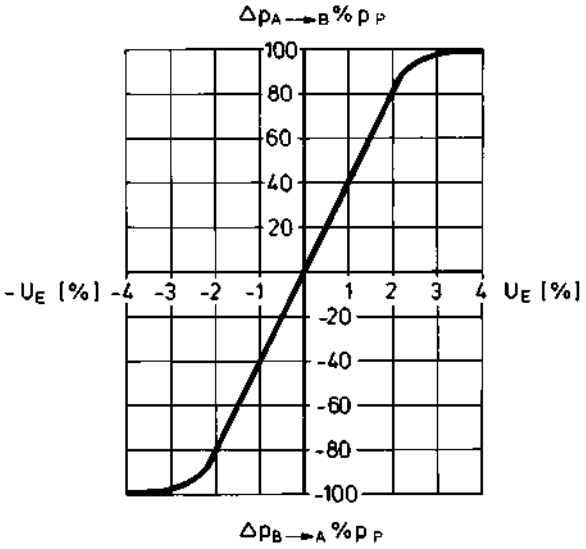


| | | |
|---|---|---|
| Fail-safe | $p =$ 0 bar → 12 ms | Enable off |
| | $p =$ 100 bar → 16 ms | |

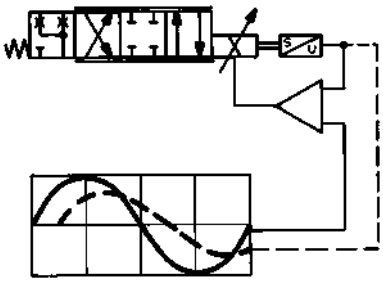
## **Performance curves** (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

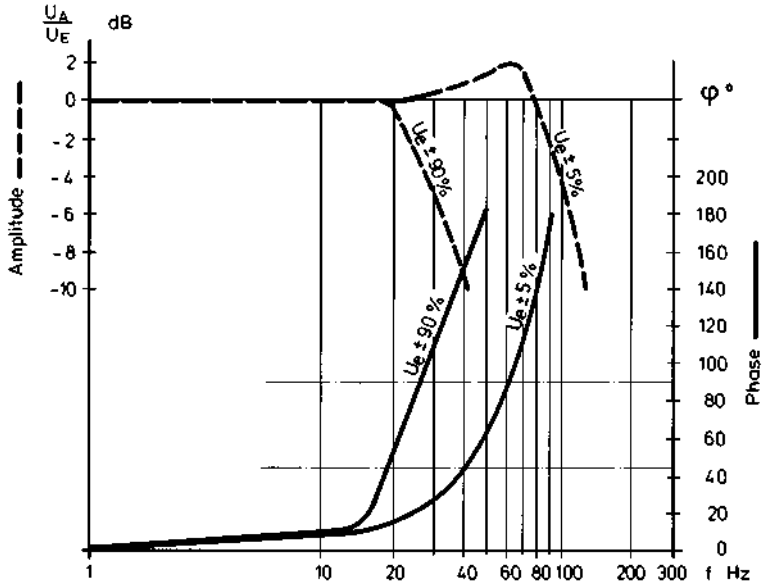
**Pressure gain**



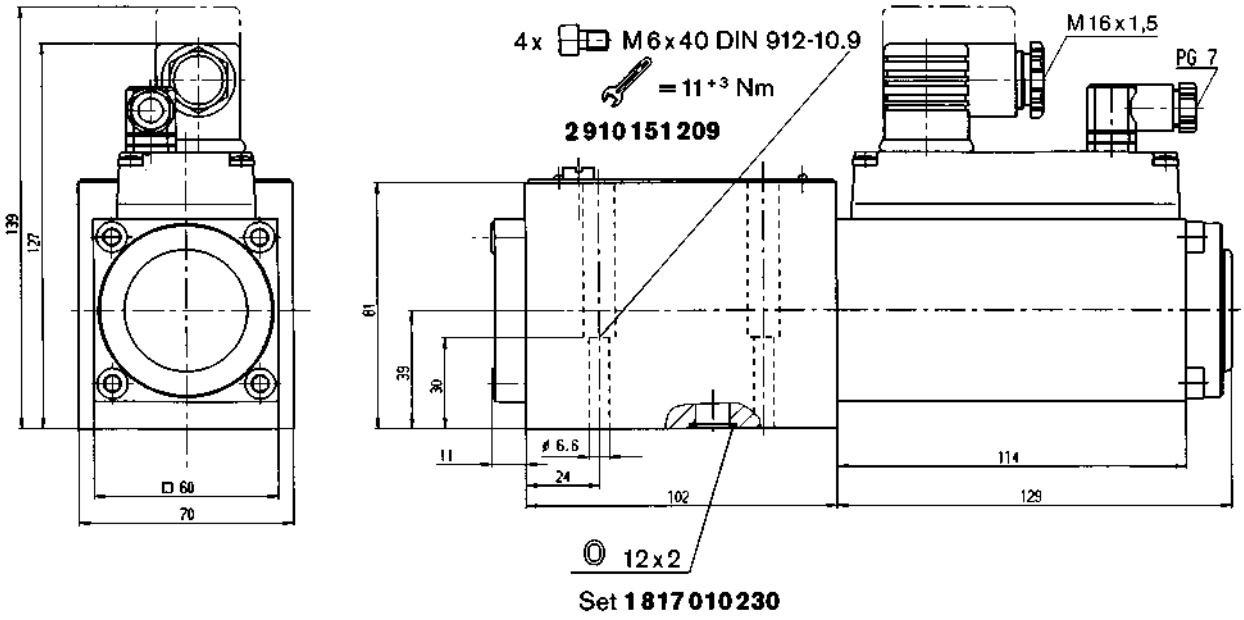



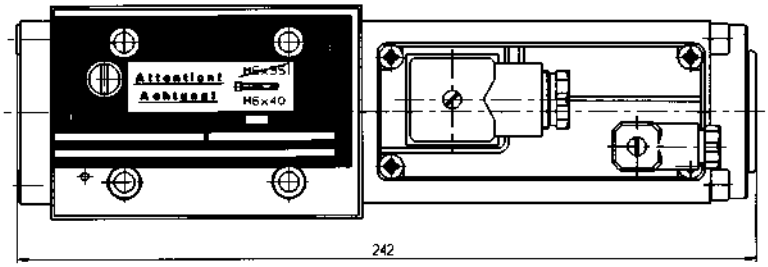

**Bode diagram**



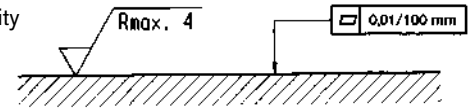


## Unit dimensions (nominal dimensions in mm)

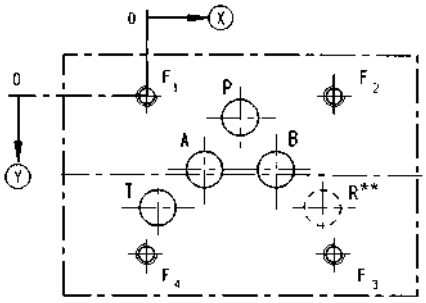



Required surface quality of mating component




**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 = $P_2$

| | 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 |
| Ø | 10.5 1) | 10.5 1) | 10.5 1) | 10.5 1) | M6 2) | M6 2) | M6 2) | M6 2) | 10.5 1) |

## Notes

Bosch Rexroth AG
Industrial Hydraulics
Zum Eisengießer 1
D-97816 Lohr am Main, Germany
Telefon +49 (0) 93 52 / 18-0
Telefax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

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D-97816 Lohr am Main, Germany
Telefon +49 (0) 93 52 / 18-0
Telefax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
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Telefon +49 (0) 93 52 / 18-0
Telefax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

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