

# 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 ( $\Delta p$  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  $\pm 10$  V, or interface F1 4...20 mA ( $R_S$  200  $\Omega$ )
- 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.








## 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 <sup>2</sup> /s   | 20 ... 100 |      |      |      |      |      |
|   | max. permitted  | mm <sup>2</sup> /s   | 10 ... 800 |      |      |      |      |      |
| Pressure fluid temperature range  | °C  | -20 ... +70          |            |      |      |      |      |      |
| Maximum permissible degree of contamination of pressure fluid<br>Purity class to ISO 4406 (c) | Class 18/16/13 <sup>1)</sup>  |                      |            |      |      |      |      |      |
| Flow direction  | See symbol  |                      |            |      |      |      |      |      |
| Nominal flow at<br>$\Delta p = 35$ bar per notch <sup>2)</sup>                                | 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 $\Delta p$<br>Pressure drop at valve                                      |  | bar                  | 315        | 315  | 315  | 315  | 315  | 160  |
| $q_{Vnom} > q_N$ valves   |  | bar                  | 315        | 315  | 315  | 280  | 250  | 100  |
| Leakage<br>at 100 bar   |  | cm <sup>3</sup> /min | <150       | <180 | <300 | -    | <500 | <900 |
|   |   | cm <sup>3</sup> /min | -          | -    | -    | <180 | <300 | <450 |

### Static/Dynamic

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

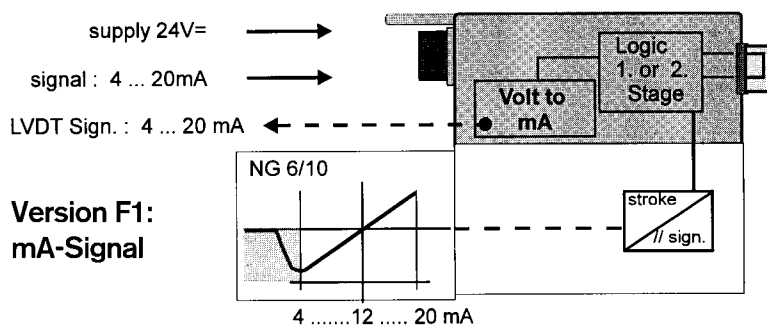
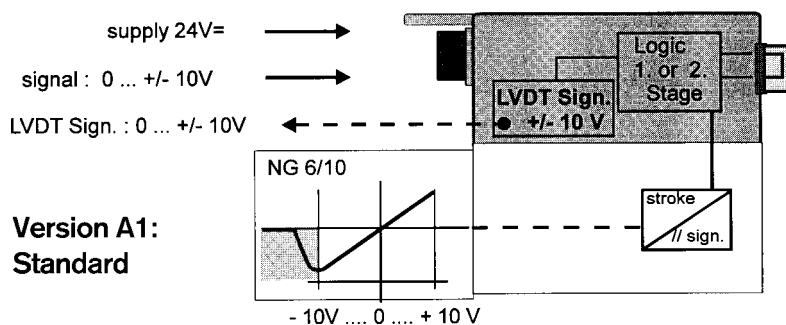
<sup>1)</sup> The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components. For a selection of filters, see catalogue sections RE 50070, RE 50076 and RE 50081.

<sup>2)</sup> Flow rate at a different  $\Delta p$   $q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{35}}$

## Technical data

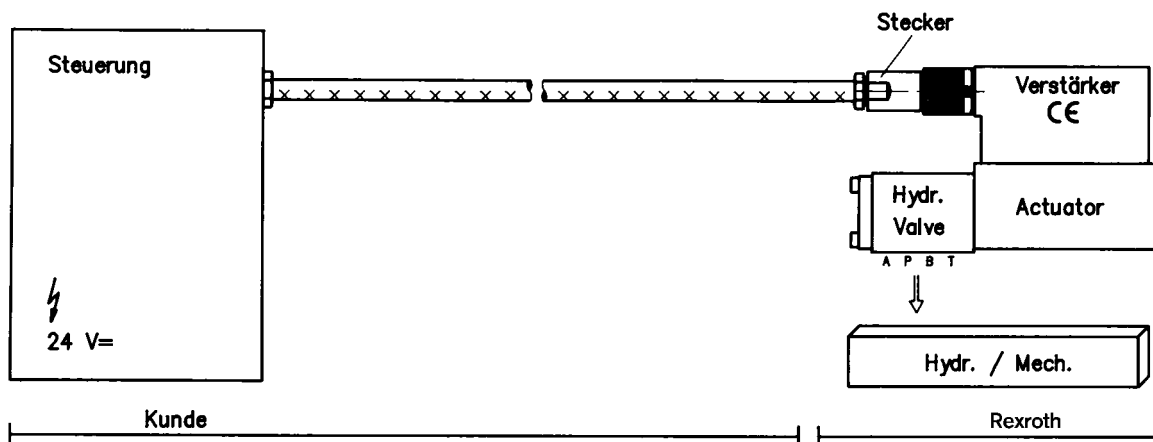
### Electrical, trigger electronics integrated in the valve

|  |   |  |
|--|---|--|
| 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 <sub>nom</sub>   |
| 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 <sub>F</sub>   |
| 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 |   | $\left. \begin{array}{l} D \rightarrow B \\ E \rightarrow B \end{array} \right\} \text{max. } 18 \text{ DC}$ |
| Test signal, "Standard" version        |   | LVDT   |
| Terminal F: $U_{\text{Test}}$          |   | 0 ... +10 V  |
| Terminal C:                            |   | Reference 0 V  |
| Test signal, "mA-Signal" version       |   | LVDT signal 4 ... 20 mA at external load 200 ... 500 $\Omega$ 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<br>up to 20 m $7 \times 0.75 \text{ mm}^2$<br>up to 40 m $7 \times 1 \text{ mm}^2$        |
| 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 mm<sup>2</sup> up to 20 m length
  - 1.0 mm<sup>2</sup> 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

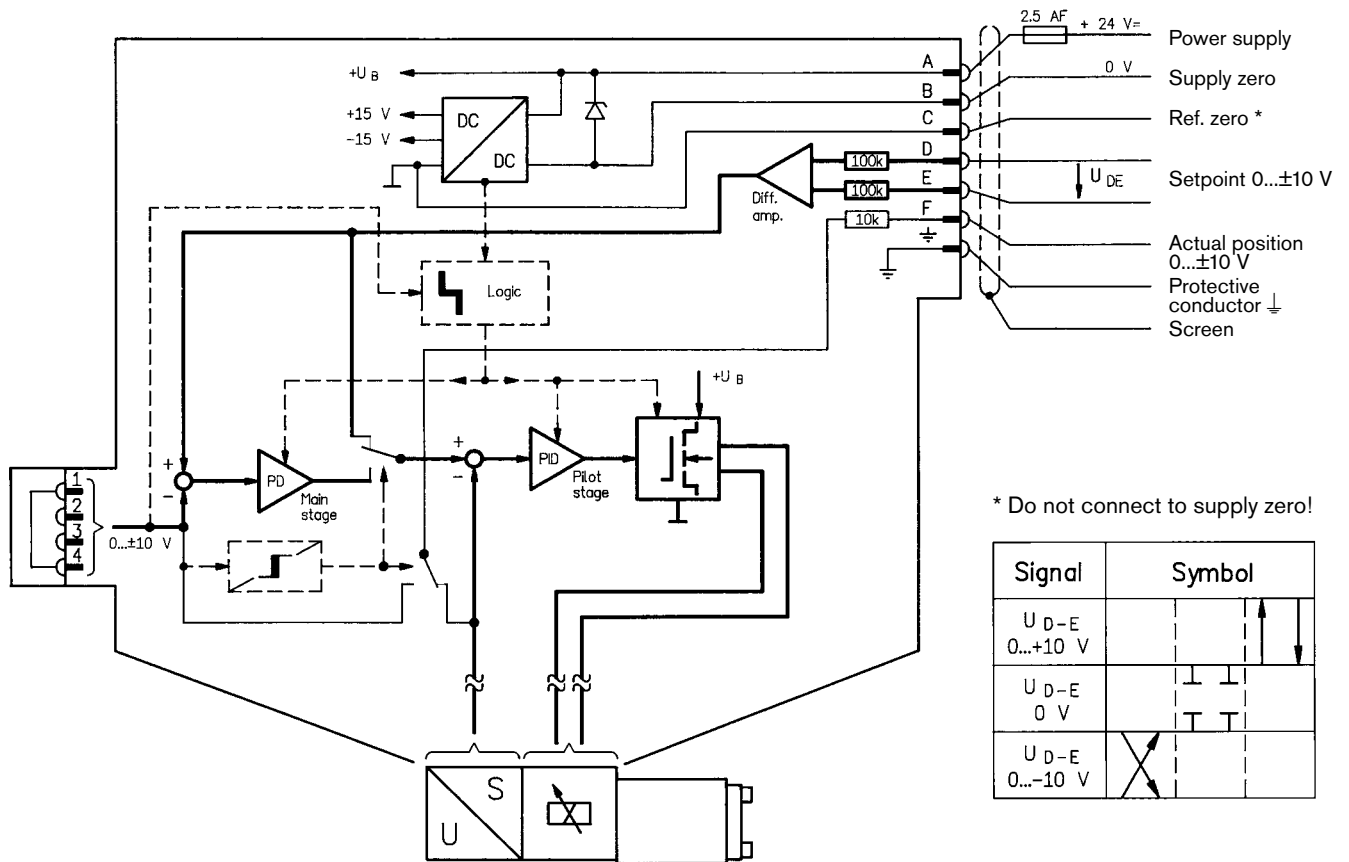
$I_{D-E} \leq 2 \text{ mA}$  – valve is deactivated.

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

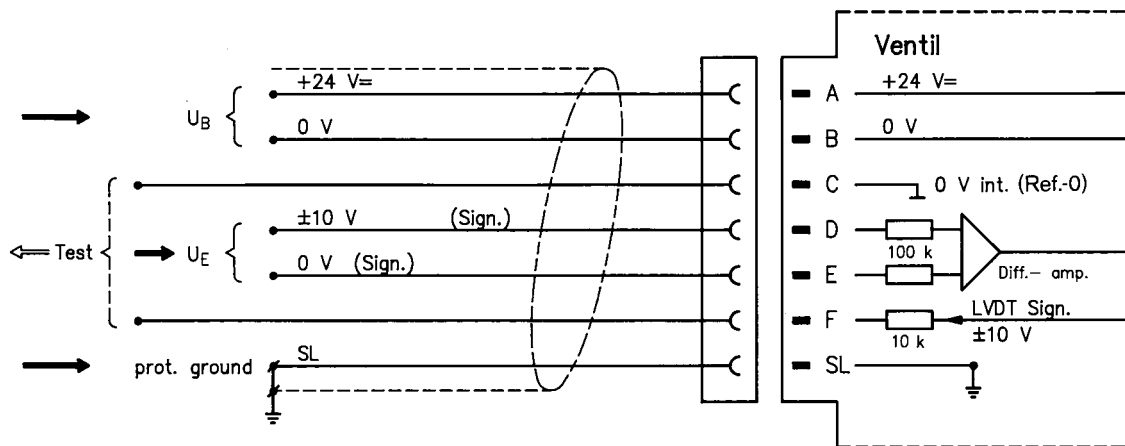
Version A1:  $U_{D-E} \pm 10V$



#### Pin assignment 6P + PE

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

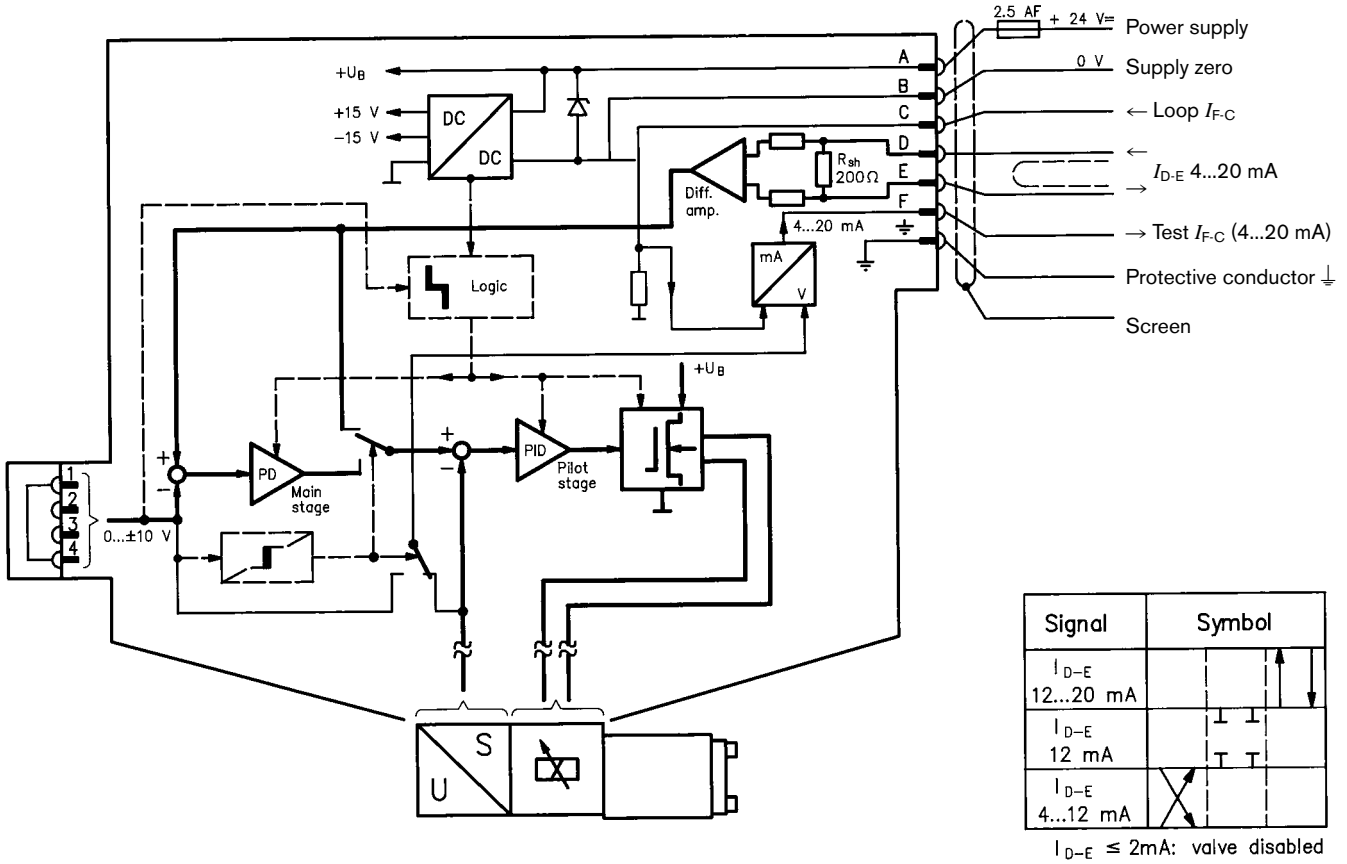
( $R_i = 100 k\Omega$ )



### On-board trigger electronics

#### Block diagram/pin assignment

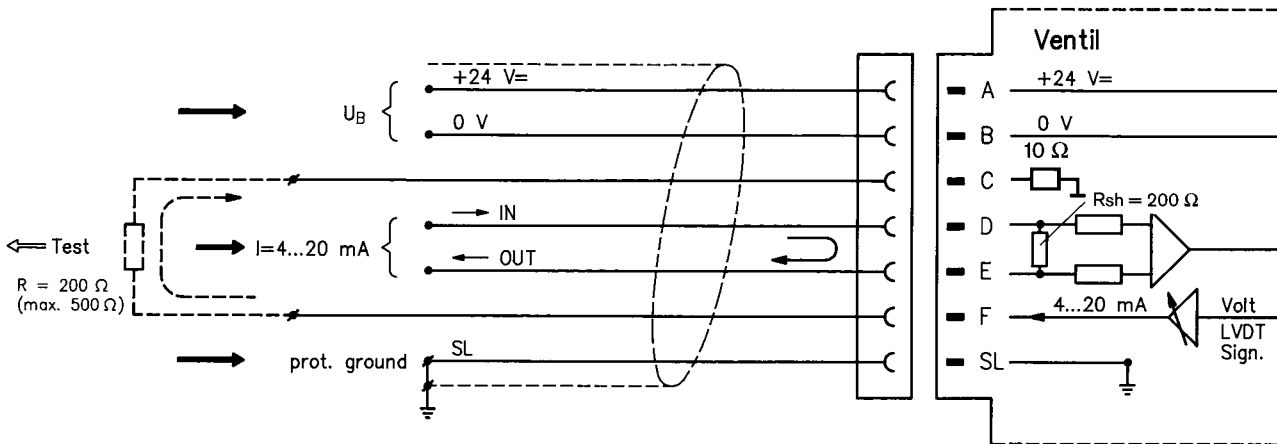
Version F1:  $I_{D-E}$  4...12...20 mA



#### Pin assignment 6P + PE

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

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

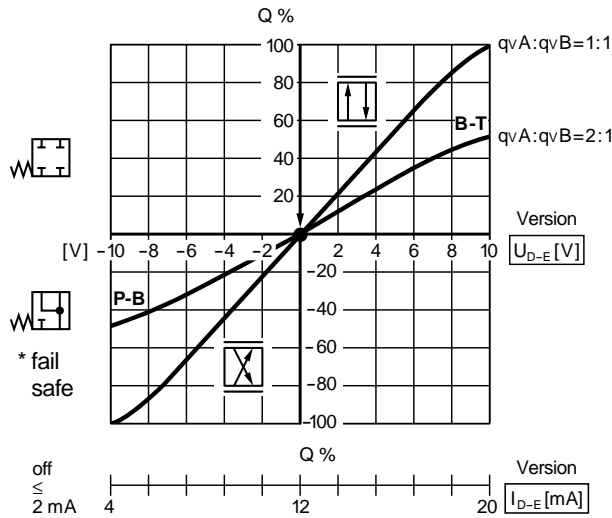




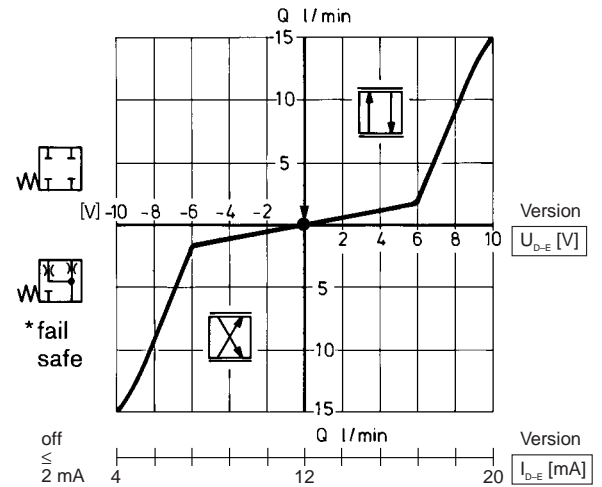
**Performance curves** (measured with HLP46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ )

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

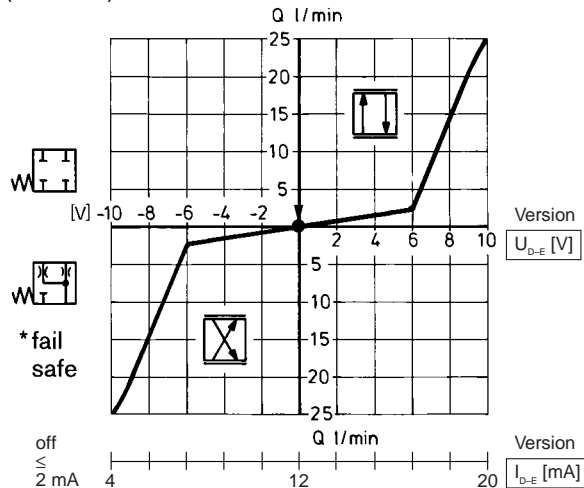
L: Linear



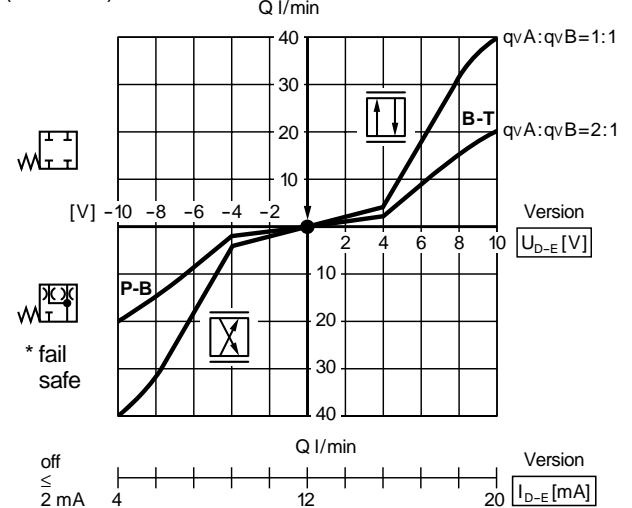
P: (kink 60%)



P: (kink 60%)



P: (kink 40%)



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

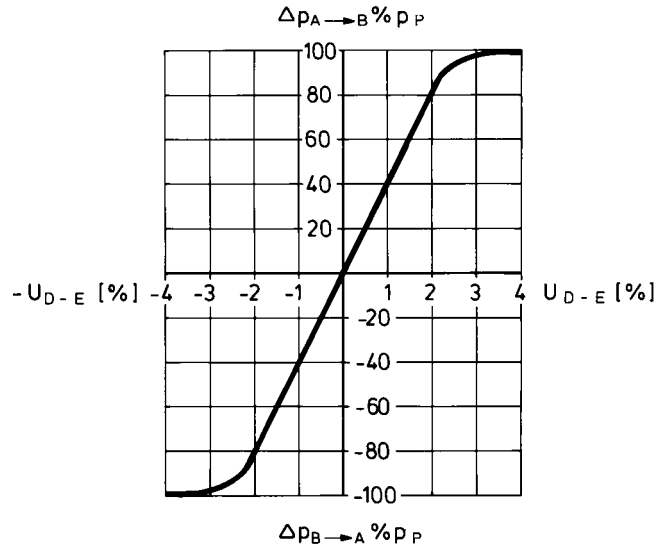
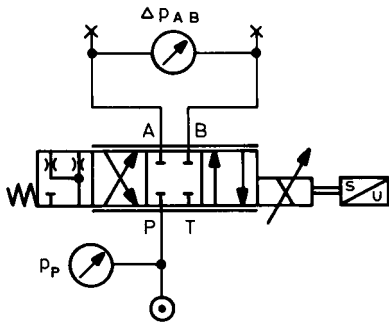
\* Fail-safe:  $U_B \leq 18 \text{ V DC} / I_{D-E} \leq 2 \text{ mA}$   
(version  $I_{D-E} 4 \dots 20 \text{ mA}$ )

Calibrated  $\pm 1\%$

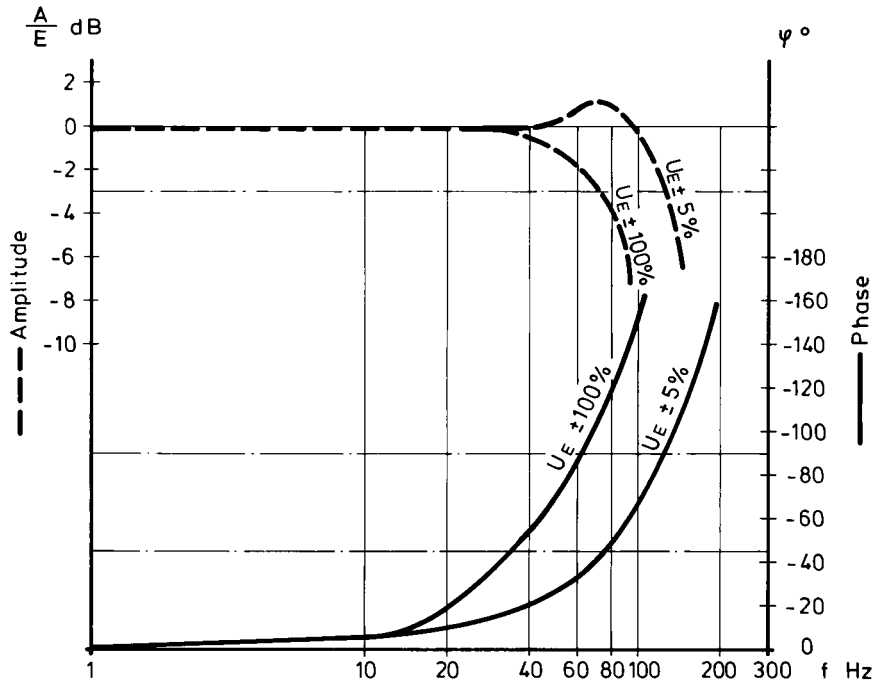
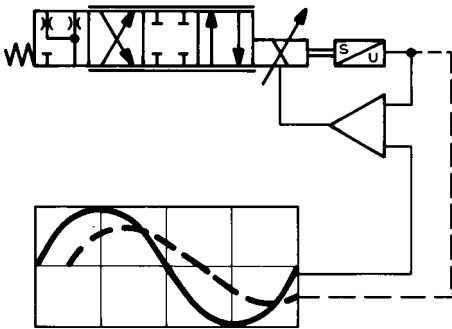
| Fail-safe-Position |              |   |  |
|--------------------|--------------|---|--|
|                    | Leakage at   | 100 bar   | P-A 50 cm <sup>3</sup> /min<br>P-B 70 cm <sup>3</sup> /min   |
|                    | Flow rate at | $\Delta p = 35 \text{ bar}$   | A-T 10 ... 20 l/min<br>B-T 7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

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

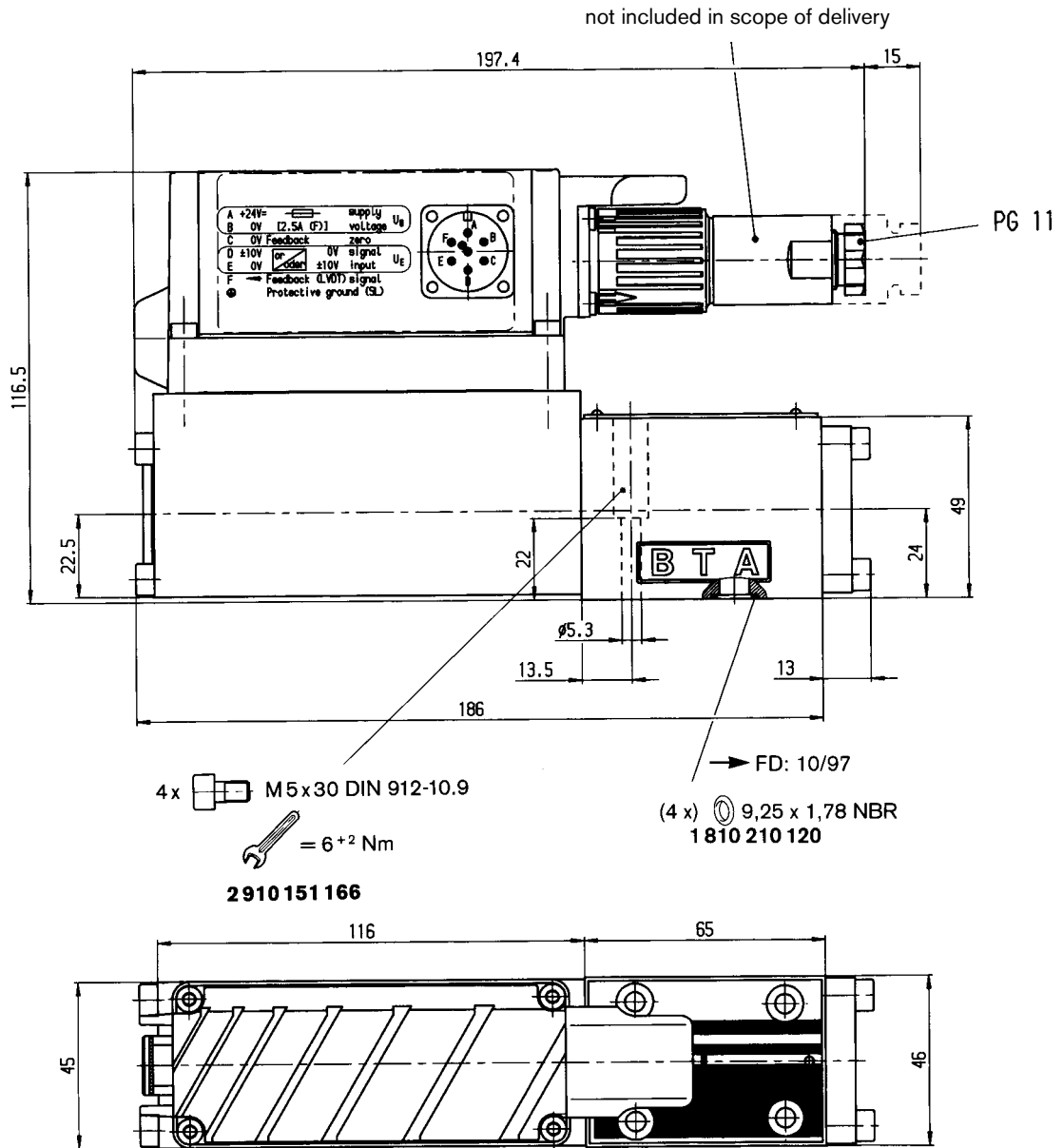
Pressure gain



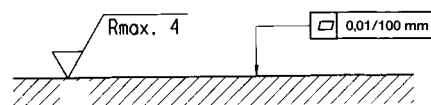
Bode diagram



**Unit dimensions** (Nominal dimensions in mm)



Required surface quality of mating component



**Mounting hole configuration: NG6**

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

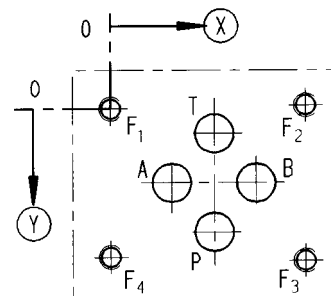
For subplates, see catalogue section RE 45053

<sup>1)</sup> Deviates from standard

<sup>2)</sup> Thread depth:

Ferrous metal 1.5xØ

Non-ferrous 2 xØ



|   | P               | A               | T               | B               | F <sub>1</sub>   | F <sub>2</sub>   | F <sub>3</sub>   | F <sub>4</sub>   |
|---|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
| ⊗ | 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 <sup>1)</sup> | 8 <sup>1)</sup> | 8 <sup>1)</sup> | 8 <sup>1)</sup> | M5 <sup>2)</sup> | M5 <sup>2)</sup> | M5 <sup>2)</sup> | M5 <sup>2)</sup> |