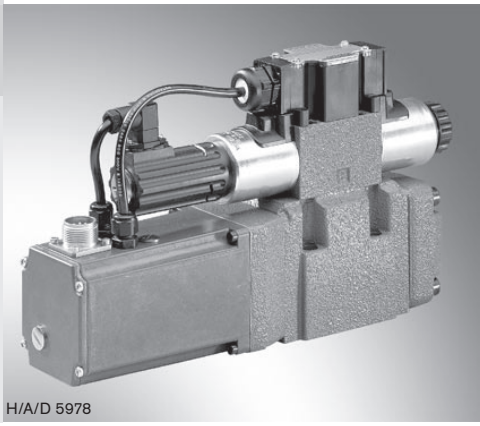
Rexroth
Bosch Group

# 4/3-way high response valve pilot operated with electrical position feedback and integrated electronics (OBE)

**RE 29083/09.06** 1/24
Replaces: 08.04

**Type 4WRTE**

Nominal size 10 to 35
Component series 4X
Maximum operating pressure 350 bar
Maximum flow 3000 l/min


H/A/D 5978

## Overview of contents



Information on available spare parts:
www.boschrexroth.com/spc

## Features

- Pilot operated 2-stage high response directional control valve with electrical position feedback of the main spool and integrated electronics (OBE)
- Suitable for closed loop control of position, velocity, pressure and force
- Closed loop control of the direction and rate of a flow
- Pilot control valve:
  Direct actuated, closed loop position control with pressure feedback of the control pressures
- Main stage:
  Self-centering, closed loop position controlled
- Integrated control and closed loop electronics
- Subplate mounting:
  Porting pattern to ISO 4401 (NS10 to 35)
  Subplates to catalogue sheets RE 45054 to RE 45060 (separate order), see pages 16 and 20

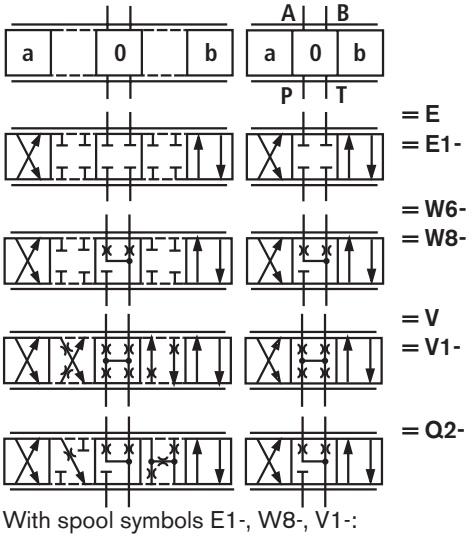
## Ordering details

**4WRTE** | | | | **–4X/6E** | **G24** | | **K31/** | | **M** | *

Electrically actuated
2-stage high response valve
of 4-way design with integrated electronics (OBE)

Nominal size 10 = **10**
Nominal size 16 = **16**
Nominal size 25 = **25**
Nominal size 27 = **27**
Nominal size 32 = **32**
Nominal size 35 = **35**

**Spool symbols**




= **E**
= **E1-**
= **W6-**
= **W8-**
= **V**
= **V1-**
= **Q2-**

With spool symbols E1-, W8-, V1-:

P → A : $q_{Vmax}$ B → T: $q_V/2$
P → B: $q_V/2$ A → T: $q_{Vmax}$

**Note:**
With spools symbols W6-, W8- there is, in the neutral position, a connection from A to T and B to T with approx. 2 % of the relevant nominal cross-section.

Further details in clear text

**M** = [5] NBR-seals

[4] **Electronic interfaces**

**A1** = Com./act. value ±10 V

**F1** = Com./act. value 4 to 20 mA

**Electrical connections**

**K31** = Without plug-in connector with component plut to DIN EN 175201-804

Plug-in connector – separate order, see page 7

**Pilot oil supply and drain**

**No code** = External pilot oil supply, external pilot oil drain

**E** = Internal pilot oil supply, external pilot oil drain

**T** = External pilot oil supply, internal pilot oil drain

**ET** = Internal pilot oil supply, internal pilot oil drain

**Supply voltage**

**G24** = +24 V DC

**6E** = Pilot control valve size 6, Proportional solenoid with removable coil

**4X** = Component series 40 to 49
(40 to 49: unchanged installation and connection dimensions)

**Characteristic curve form**

**L** = Linear

**P** = Linear with fine control range

**Ordering details: Nominal flow – see pages 11 to 15**

| | | | | | |
|---|---|---|---|---|---|
| **25** = [1] | or | **50** = [2] | or | **100** = | For nominal size 10 |
| **125** = [3] | or | **200** = | | | For nominal size 16 |
| **220** = | or | **350** = | | | For nominal size 25 |
| **500** = | | | | | For nominal size 27 |
| **400** = | or | **600** = | | | For nominal size 32 |
| **1000** = | | | | | For nominal size 35 |

[1] E, W6-, V, Q2- only available with characteristic curve form **L** (linear)

[2] E1-, W8-, V1- only available with characteristic curve form **L** (linear)

[3] V1-125 only available with characteristic curve form **L** (linear)

[4] When replacing the component series 3X with component series 4X the electronic interface is to be defined with **A5** (enable signal at Pin C).

[5] Suitable for mineral oil (HL, HLP) to DIN 51524

## Preferred types

| Type – NS10 | Material No. |
|---|---|
| 4WRTE 10 E100L-4X/6EG24ETK31/A1M | R900954239 |
| 4WRTE 10 E100L-4X/6EG24K31/A1M | R900954240 |
| 4WRTE 10 E50L-4X/6EG24ETK31/A1M | R900954241 |
| 4WRTE 10 E50L-4X/6EG24K31/A1M | R900954253 |
| 4WRTE 10 V1-100L-4X/6EG24ETK31/A1M | R900954254 |
| 4WRTE 10 V1-100L-4X/6EG24K31/A1M | R900954255 |
| 4WRTE 10 V1-50L-4X/6EG24ETK31/A1M | R900954256 |
| 4WRTE 10 V100L-4X/6EG24ETK31/A1M | R900954257 |
| 4WRTE 10 V100L-4X/6EG24K31/A1M | R900954258 |
| 4WRTE 10 V25L-4X/6EG24K31/A1M | R900954259 |
| 4WRTE 10 V50L-4X/6EG24ETK31/A1M | R900954260 |
| 4WRTE 10 V50L-4X/6EG24K31/A1M | R900954261 |
| 4WRTE 10 W8-100L-4X/6EG24K31/A1M | R900954262 |
| 4WRTE 10 W8-50L-4X/6EG24K31/A1M | R900954263 |
| 4WRTE 10 W6-100L-4X/6EG24K31/A1M | R900954264 |
| 4WRTE 10 W6-50L-4X/6EG24K31/A1M | R900954265 |

| Type – NS16 | Material No. |
|---|---|
| 4WRTE 16 E1-125L-4X/6EG24K31/A1M | R900954266 |
| 4WRTE 16 E1-200L-4X/6EG24ETK31/A1M | R900954267 |
| 4WRTE 16 E1-200L-4X/6EG24K31/A1M | R900954268 |
| 4WRTE 16 E125L-4X/6EG24ETK31/A1M | R900954269 |
| 4WRTE 16 E125L-4X/6EG24K31/A1M | R900954270 |
| 4WRTE 16 E200L-4X/6EG24K31/A1M | R900954271 |
| 4WRTE 16 V1-125L-4X/6EG24ETK31/A1M | R900954272 |
| 4WRTE 16 V1-125L-4X/6EG24K31/A1M | R900954273 |
| 4WRTE 16 V1-200L-4X/6EG24K31/A1M | R900954274 |
| 4WRTE 16 V125L-4X/6EG24K31/A1M | R900954275 |
| 4WRTE 16 V200L-4X/6EG24ETK31/A1M | R900954276 |
| 4WRTE 16 V200L-4X/6EG24K31/A1M | R900954277 |
| 4WRTE 16 W8-200L-4X/6EG24K31/A1M | R900954278 |
| 4WRTE 16 W6-200L-4X/6EG24K31/A1M | R900954279 |

| Typs – NS25 | Material No. |
|---|---|
| 4WRTE 25 E1-350L-4X/6EG24K31/A1M | R900954280 |
| 4WRTE 25 E220L-4X/6EG24K31/A1M | R900954281 |
| 4WRTE 25 E350L-4X/6EG24ETK31/A1M | R900954282 |
| 4WRTE 25 E350L-4X/6EG24K31/A1M | R900954283 |
| 4WRTE 25 V1-220L-4X/6EG24K31/A1M | R900954287 |
| 4WRTE 25 V1-350L-4X/6EG24TK31/A1M | R900954293 |
| 4WRTE 25 V220-4X/6EG24K31/A1M | R900954294 |
| 4WRTE 25 V350L-4X/6EG24ETK31/A1M | R900954295 |
| 4WRTE 25 V350L-4X/6EG24K31/A1M | R900954296 |
| 4WRTE 25 W8-220L-4X/6EG24ETK31/A1M | R900954297 |
| 4WRTE 25 W6-350L-4X/6EG24ETK31/A1M | R900954298 |
| 4WRTE 25 W6-350L-4X/6EG24K31/A1M | R900954299 |

| Type – NS32 | Material No. |
|---|---|
| 4WRTE 32 E1-600L-4X/6EG24EK31/A1M | R900954300 |
| 4WRTE 32 E600L-4X/6EG24ETK31/A1M | R900954301 |
| 4WRTE 32 E600L-4X/6EG24K31/A1M | R900954302 |
| 4WRTE 32 V600L-4X/6EG24K31/A1M | R900954303 |
| 4WRTE 32 W6-600L-4X/6EG24K31/A1M | R900954304 |

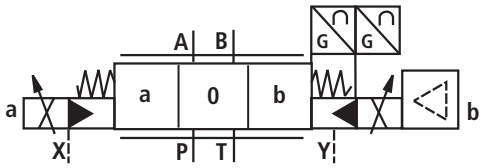
**Further standard types and components can be found in the EPS (standard price list).**

## Symbols

simplified

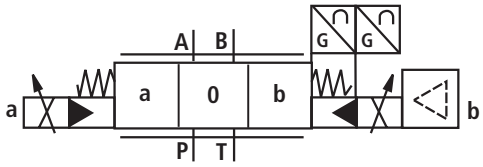
**Typ 4WRTE…–4X…**

**External pilot oil supply**



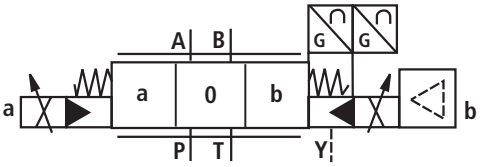

**Typ 4WRTE…–4X…ET…**

**Internal pilot oil supply**



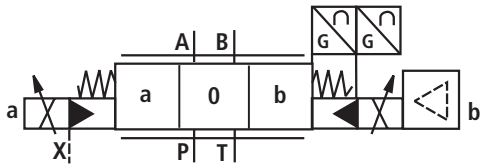

**Typ 4WRTE…–4X…E…**

**Internal pilot oil supply; external pilot oil drain**

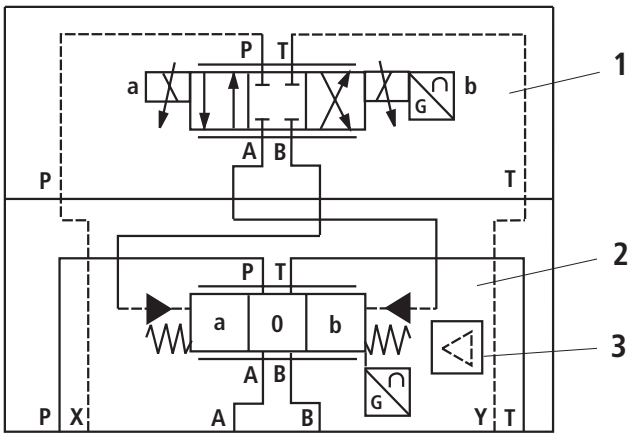



**Typ 4WRTE . –4X…T…**

**External pilot oil supply; internal pilot oil drain**




detailed




**Example:**

**1** Pilot control valve

**2** Main valve

**3** Integrated control electronics (OBE)

External pilot oil supply
External pilot oil drain

## Function, section, valve features

The 4/3-way high response valve is designed as a subplate mounting valve with closed loop position control and integrated control electronics.

**Design:**

The valve comprises of 3 main assemblies:

- Housing (1) with main spool (2)
- Integrated control electronics with inductive position transducer (3) for the main stage
- Pilot control valve (4) with spool bush unit (5), inductive transducer (6) and pressure feedback of the centre position of the main spool (2)

**Function:**

- With the proportional solenoids de-energised (7; 8) the centre position of the main spool (2) is via the centering spring (9) and the pressure feedback
- Control of the main spool (2) is via the pilot control valve (4) → The main spool is closed loop position controlled
- Control of the pilot control valve spool (4) by changing the solenoid force of the proportional solenoids (7; 8)
- Integration of the command and actual values within the integrated control electronics
- Pilot oil supply to the pilot control valve internally via port P or externally via port X
  Pilot oil drain internally via port T or externally via port Y to tank
- With a command value of 0 V the control electronics closed loop control moves the main spool (2) into the centre position.

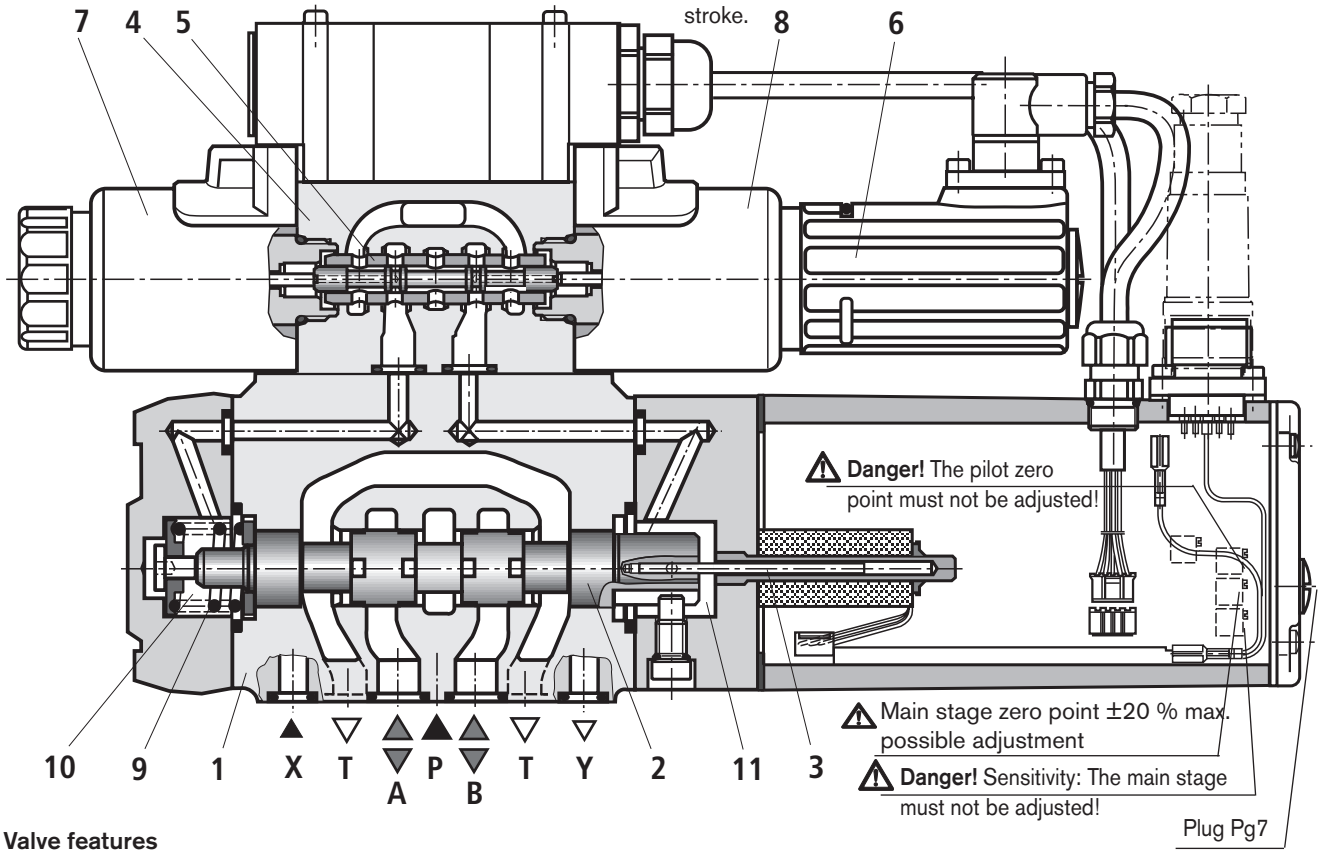
Failure of the supply voltage:

- The integrated control electronics de-energise the solenoids if the supply voltage fails or if there is a cable break
- Independent pressrue control to the same level in the control chambers (10 and 11) via the pilot control valve
- If the supply pressure fails then the main spool is centred via the centering spring (9)
- Central position of the main spools (2)

**Attention:**

The interruption of the supply voltage leads to the abrupt standstill of the control axis. The accelerations occurring may cause machine damage.

With spool types E, E1-, W6-, W8- and Q2- the centering spring (9) positions, the main spool (2) in the mid position, V- and V1-spools are switched to the preferred direction of P to B and A to T within a tolerance band of 1 % to a max. of 11 % of the spool stroke.




**Valve features**

- The 2nd stage basically comprises of components from our proportional valves.
- The zero point adjustment at the **„main stage zero point“** is factory pre-set and can, via a potentiometer in the control electronics, be adjusted within a range of ±20 % of the zero stroke. The integrated control electronics can be accessed by removeing a plug in the housing.
- If the pilot control valve or the control electronics are exchanged then these have to be recalibrated. All calibrations must only be carried out by trained personnel.

⚠ **Changing the zero point can lead to damage to the system and must only be carried out by trained personnel!**

## **Technical data** (for applications outside these parameters, please consult us!)

### General

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nominal sizes | | | NS | 10 | 16 | 25 | 27 | 32 | 35 |
| Installation and commissioning guidelines | | | | Preferably horizontal, see RE 07700 | | | | | |
| Storage temperature range | | | °C | –20 to +80 | | | | | |
| Ambient temperature range | | | °C | –20 to +50 | | | | | |
| Weight | | | kg | 8,7 | 11,2 | 16,8 | 17 | 31,5 | 34 |

### **hydraulisch** (measured with HLP 46, $\vartheta_{Öl} = 40$ °C ±5 °C)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Operating pressure | Pilot control valve | Pilot oil supply [1] | bar | 25 to 315 | | | | | |
| | Main valve, ports P, A, B | | bar | Up to 315 | Up to 350 | Up to 350 | Up to 210 | Up to 350 | Up to 350 |
| Return pressure | Port T | Pilot oil drain, internal | bar | Static < 10 | | | | | |
| | | Pilot oil drain, external | bar | Up to 315 | Up to 250 | Up to 250 | Up to 210 | Up to 250 | Up to 250 |
| | Port Y | | bar | Static < 10 | | | | | |
| Nominal flow $q_{Vnom}$ ±10% at $\Delta p = 10$ bar<br>$\Delta p$ = valve pressure differential | | | l/min | 25<br>50<br>100 | –<br>125<br>200 | –<br>220<br>350 | –<br>–<br>500 | –<br>400<br>600 | –<br>–<br>1000 |
| Main valve flow (max. permissible) | | | l/min | 170 | 460 | 870 | 1000 | 1600 | 3000 |
| Control spool stroke (3rd stage) | | | mm | ±3,5 | ±5 | ±6 | ±6 | ±9 | ±12 |
| Pilot oil flow at ports X or Y with a stepped form of input signal from 0 to 100 % (315 bar) | | | l/min | 7 | 14 | 20 | 20 | 27 | 29 |
| Pressure fluid | | | | Mineral oil (HL, HLP) to DIN 51524; Other pressure fluids on request! | | | | | |
| Max. permissible degree of pressure fluid contamination, cleanliness class to ISO 4406 (c) | Pilot control valve | | | Class 17/15/12 [2] | | | | | |
| | Main valve | | | Class 20/18/15 [2] | | | | | |
| Pressure fluid temperature range | | | °C | –20 to +80, preferably +40 to +50 | | | | | |
| Viscosity range | | | $mm^2/s$ | 20 to 380, preferably 30 to 45 | | | | | |
| Hysteresis | | | % | ≤ 0,1 | | | | | |
| Response sensitivity | | | % | ≤ 0,05 | | | | | |
| Zero point calibration (factory pre-set) [3] | | | % | ≤ 1 | | | | | |

### Electrical

| | | | | |
|---|---|---|---|---|
| Voltage type | | | | DC |
| Supply voltage | | | V | 24 |
| Com. value signal | Voltage input | „A1“ | V | ±10 |
| Act. value signal | Voltage output | | V | ±10 |
| Com. value signal | Current input | „F1“ | mA | 4 to 20 |
| Act. value signal | Current output | | mA | 4 to 20 |
| Duty | | | % | 100 |
| Coil temperature [4] | | | °C | up to 150 |
| Power, max. | | | W | 72 (average value = 24 W) |

[1] For optimum system behaviour we recommend, for pressures above 210 bar, an external pilot oil supply.

[2] The cleanliness class staed for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.
For the selection of filters see catalogue sheets RE 50070, RE 50076 RE 50081, RE 50086 and RE 50088.

[3] Referring to the pressure-signal characteristic curve (V-spool)

[4] Due to the occurring surface temperature of the solenoid coils, the European Standards EN 563 and EN 982 must be taken into account!

## Technical data (for applications outside these parameters, please consult us!)

### Electrical

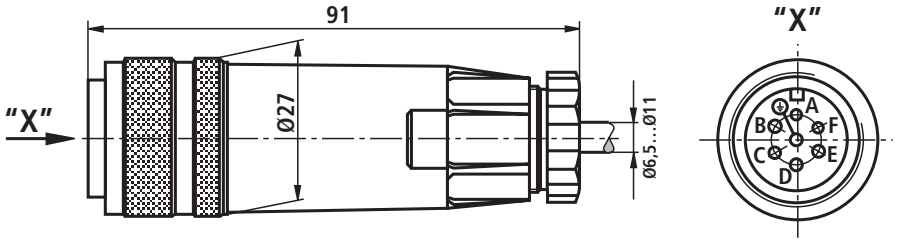
| | |
|---|---|
| Electrical connections | With component plug to DIN EN 175201-804 |
| Separate order, see below | Plug-in connector to DIN EN 175201-804 |
| Valve protection to EN 60529 | IP65 with mounted and fixed plug-in connector |
| Control electronics | Integrated in the valve, see page 8 |

**Note:** For details regarding the **environmental siumulation test** covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29083-U (declaration regarding environmental compatibility).

## Electrical connections, plug-in connector

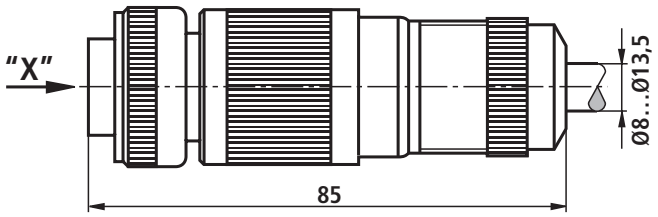
**Plug-in connector**

Plug-in connecto to DIN EN 175201-804
Separate order under Material No. **R900021267** (plastic version)
For pin allocation see block circuit diagram on page 8




**Plug-in connector**

Plug-in connector to DIN EN 175201-804
Separate order under Material No. **R900223890** (metal version)
For pin allocation see block circuit diagram on page 8




| Component plug allocation | Contact | Signal at A1 | Signal at F1 | Signal at A5 |
|---|---|---|---|---|
| Supply voltage | A | 24 VDC (18 to 35 VDC); $I_{max}$ = 3 A; Impulse load = 4 A | | |
| | B | 0 V | | |
| Ref. (act. value) | C | Ref. potential for act. value (contact „F“) | | Enable 4 to 24 V |
| Differential amplifier input | D | ±10 V | 4 to 20 mA | ±10 V |
| (com. value) | E | 0 V ref. potentional (contact „D“) | | 0 V ref. potential for pins D and F |
| Measurement output (act. valve) | F | ±10 V | 4 to 20 mA | ±10 V |
| | PE | Connect to cooling body and valve housing | | |

**Command value:** Ref. potential at E and a positive command value at D results in flow from P to A and B to T
Ref. potential at E and a negative command value at D results in flow from P to B and A to T

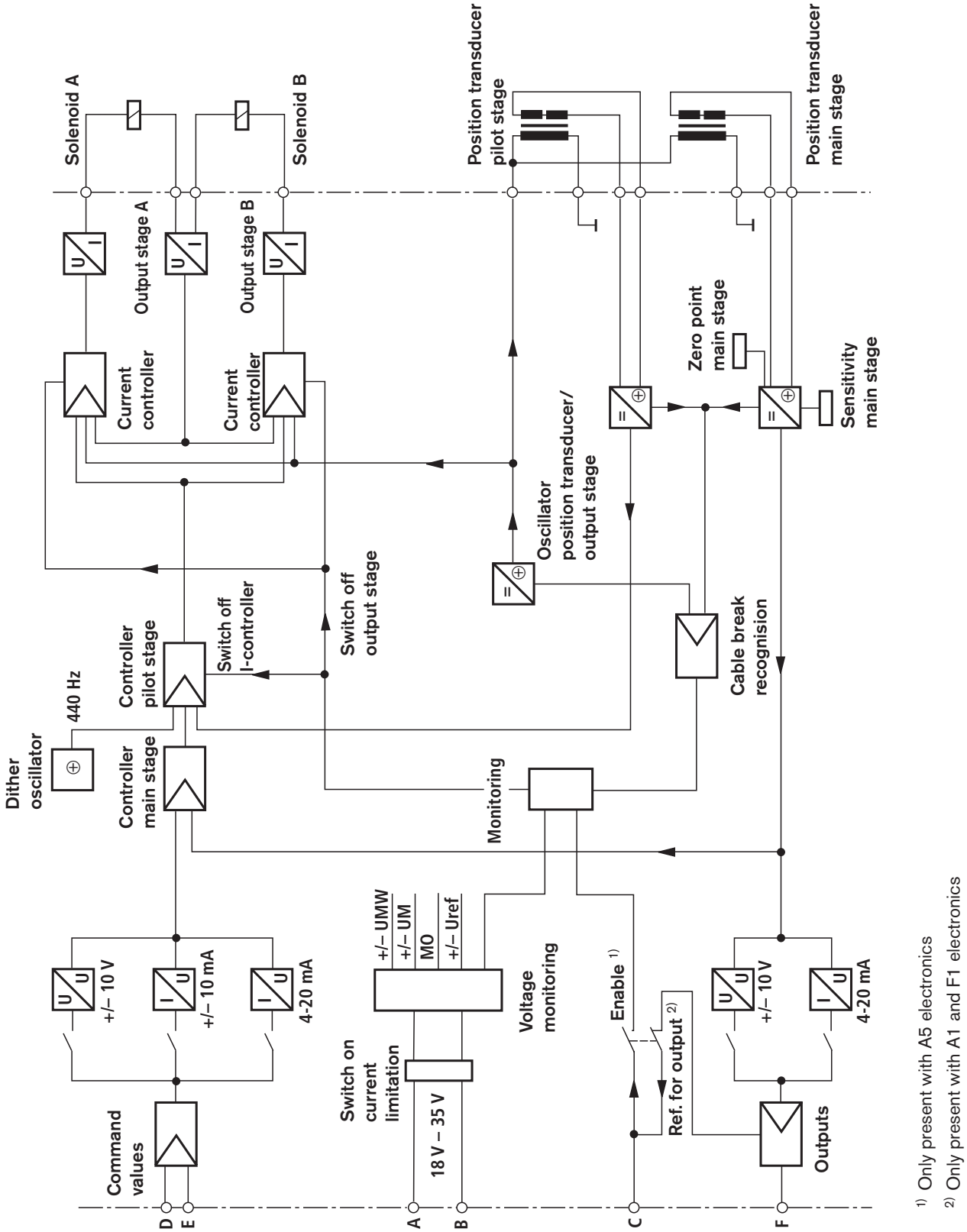
**Connection cable:** Recommendation: – Up to 25 m cable length type LiYCY 7 x 0.75 mm²
– Up to 50 m cable length type LiYCY 7 x 1.0 mm²

Outside diameter: – 6.5 to 11 mm (plastic plug-in connector)
– 8 to 13.5 mm (metal plug-in connector)

Only attach the screen to ⊥ on the supply side.

**Note:** **Electrical signals (e.g. actual valve) taken via valve electronics must not be used to switch off the machine safety functions!**
**(Also see the European Standard regulations „Safety requirements of fluid technology systems and components – hydraulics“, EN 982!)**

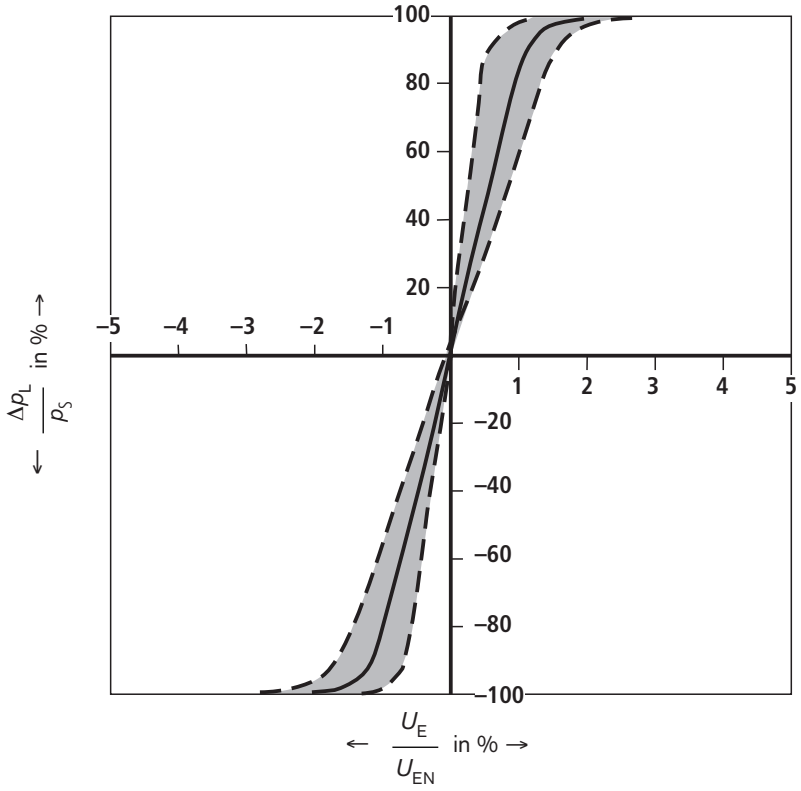
## Connection allocation / Block circuit diagram for the integrated control electronics (OBE) type VT 13060-3X/…




1) Only present with A5 electronics
2) Only present with A1 and F1 electronics

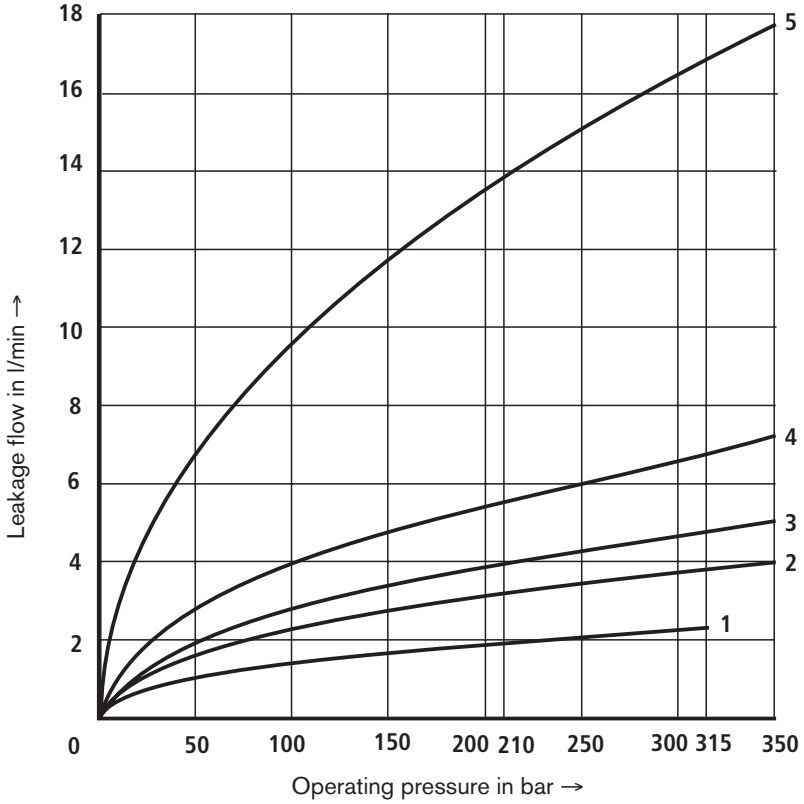
## Characteristic curves (measured with HLP 46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$ and $p = 100$ bar)

**Pressure-signal characteristic curve (V spool)**




Pilot pressure $p_S = 100$ bar

**Leakage flow** of the main stage (V spool) with pilot control valve



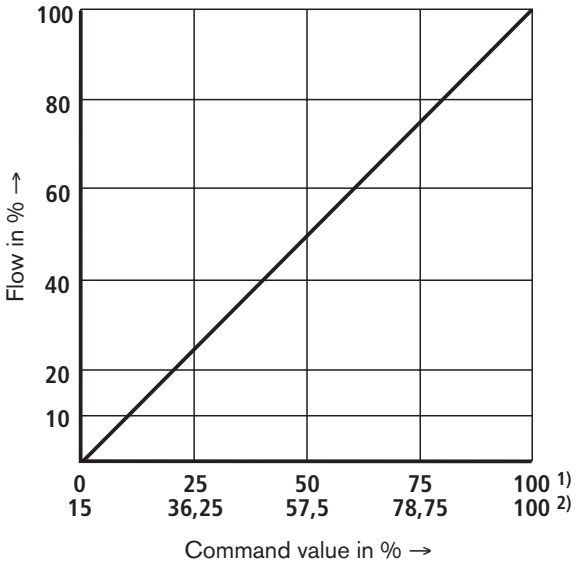

**1 =** Nominal size 10
**2 =** Nominal size 16
**3 =** Nominal sizes 25, 27
**4 =** Nominal size 32
**5 =** Nominal size 35

## **Characteristic curves** (measured with HLP46 at 40 °C ±5 °C)

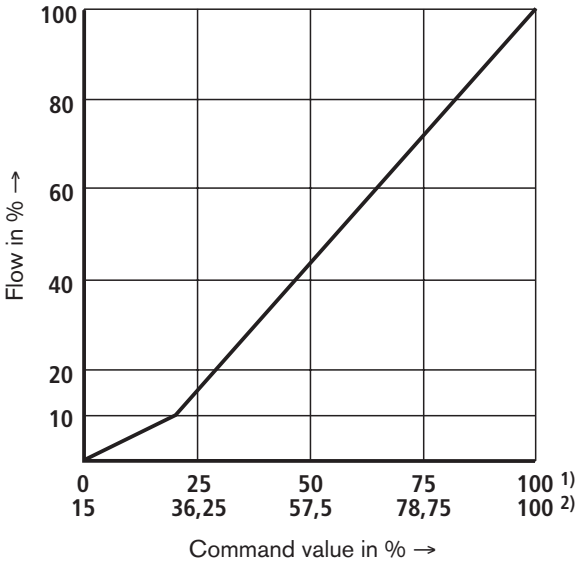
**Flow-command value function at e.g.**
**P → A / B → T 10 bar valve pressure differential or**
**P → A oder A → T 5 bar per control land**

**Spool symbols E, W6- and V**

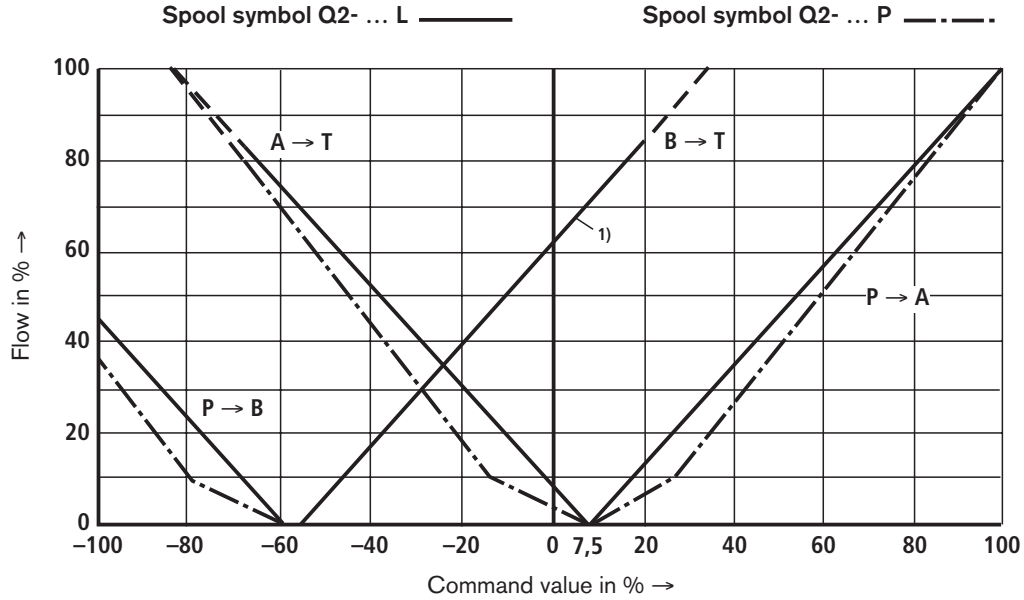
Spools with characteristic curve **L**




Spools with characteristic curve **P**



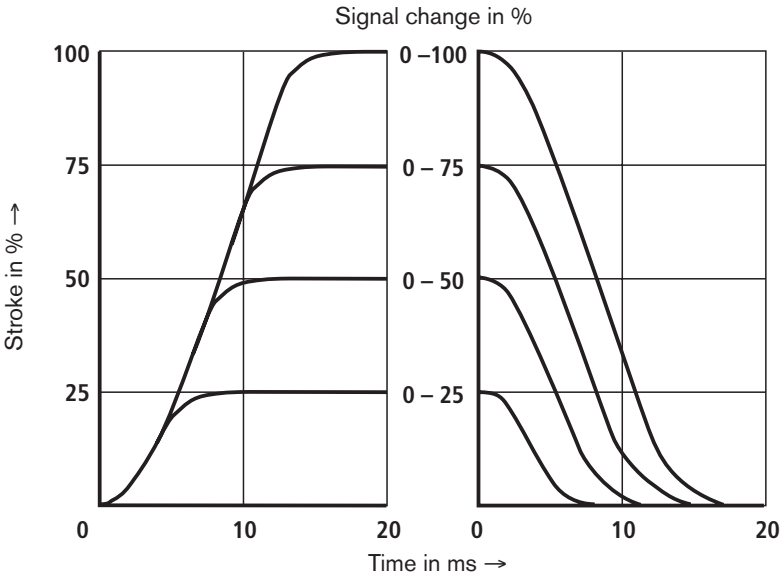

1) Positive overlap 0 to 0.5 % for spool symbol **V**,
2) Positive overlap 15 % for spool symbols **E** and **W6-**




1) For spool symbols Q2- … L and Q2- … P

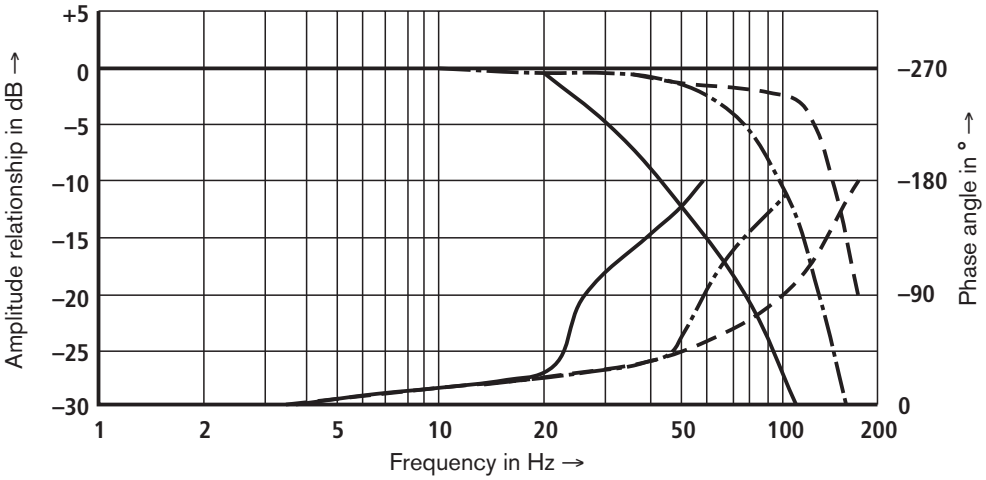
## Characteristic curves (measured with HLP 46, $\vartheta_{oil}$ = 40 °C ±5 °C) NS10

**Transient function with a stepped form of electrical input signal**




Measured at:
- Pilot control valve Port „X“ = 100 bar
- Main valve Port „P“ = 10 bar

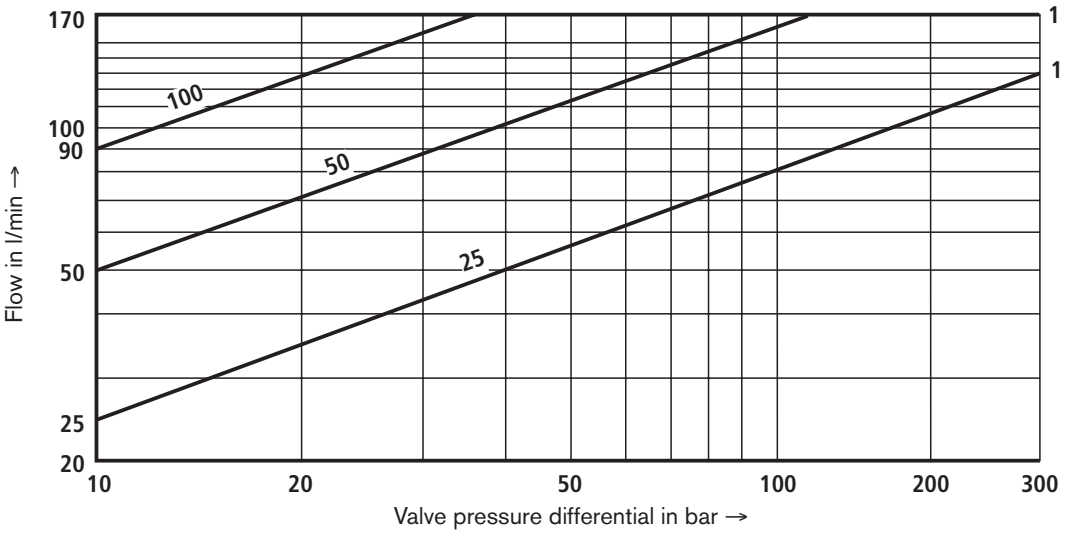
**Frequency response characteristic curves**




Measured at:
- Pilot control valve Port „X“ = 100 bar
- Main valve Port „P“ = 10 bar

Signal ±10 %
Signal ±25 %
Signal ±100 %

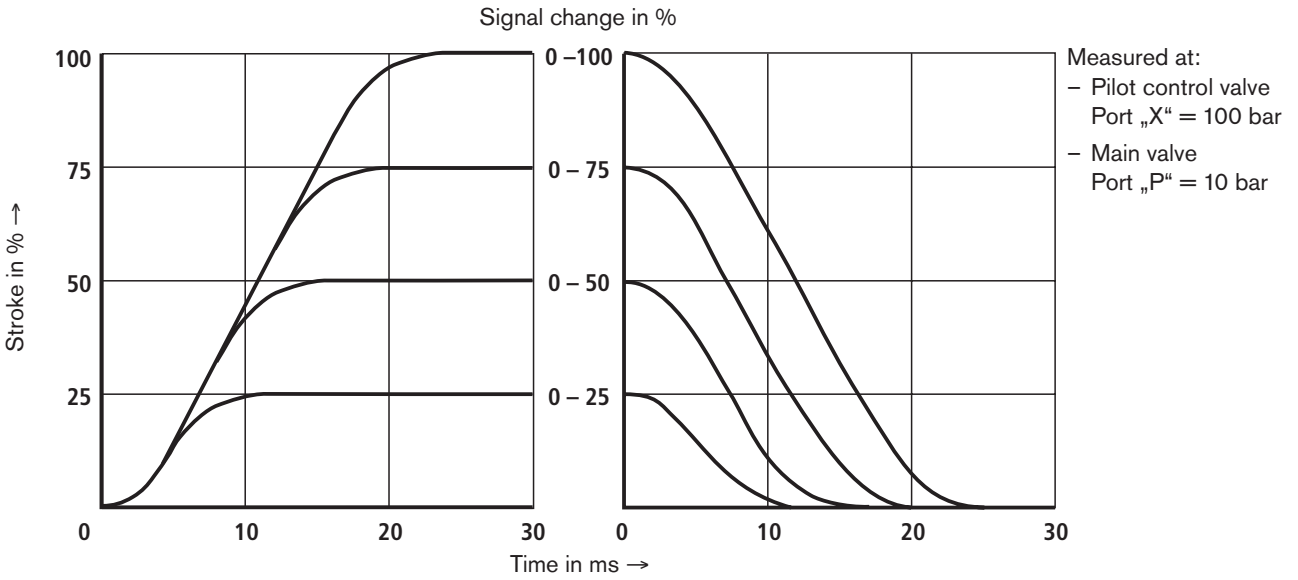
**Flow-load function at max. valve opening** (tolerance ±10 %)



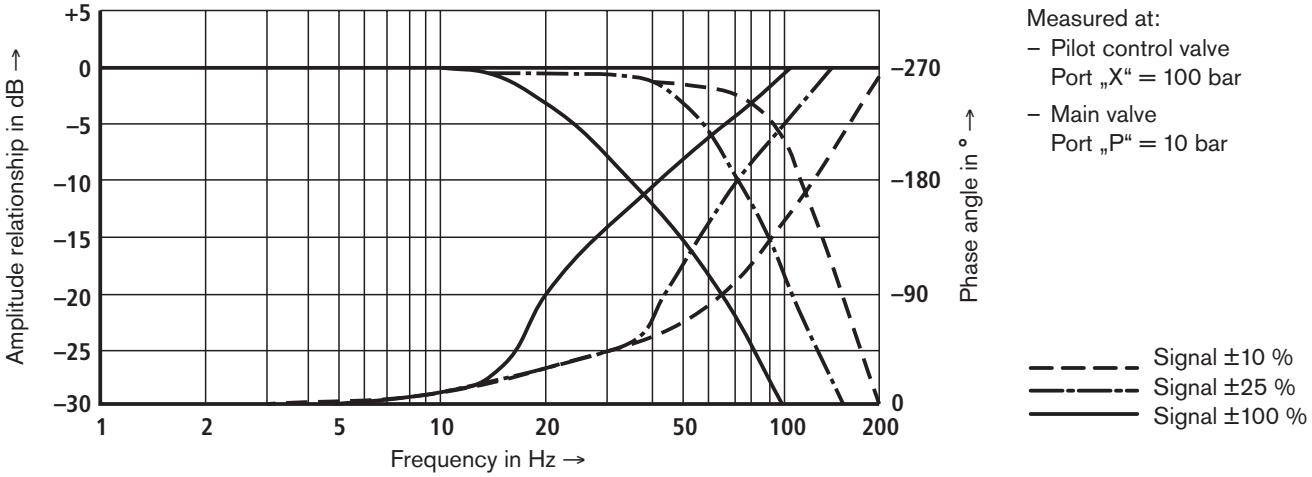

**1** = Recommended flow limitation (flow velocity 30 m/s)

## **Characteristic curves** (measured with HLP 46, $\vartheta_{oil}$ = 40 °C ±5 °C) **NS16**

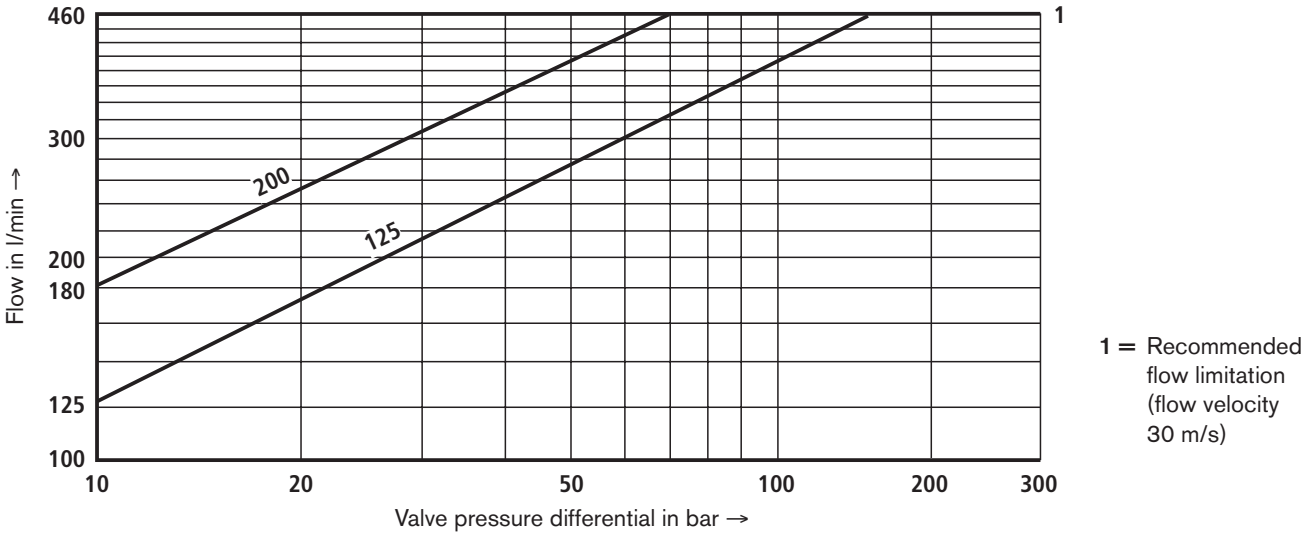
**Transient function with a stepped form of electrical input signal**




**Frequency response characteristic curves**

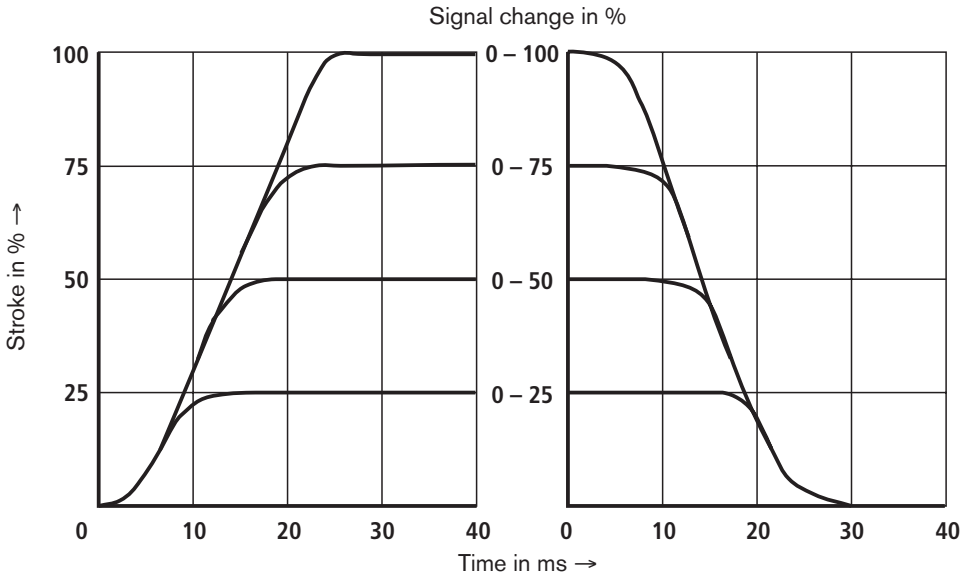



**Flow-load function at max. valve opening** (tolerance ±10 %)



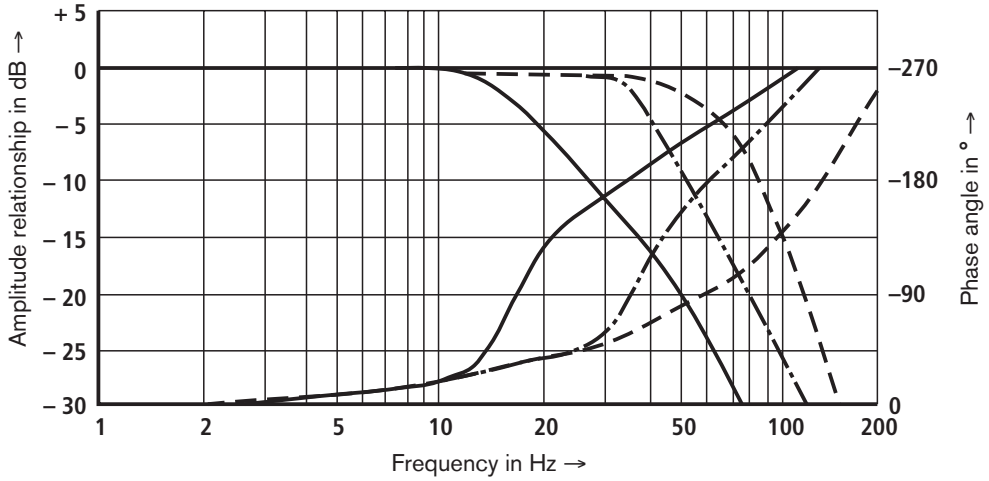
## Characteristic curves (measured with HLP 46, $\vartheta_{oil}$ = 40 °C ±5 °C) NS25 and 27

**Transient function with a stepped form of electrical input signal**




Measured at:
- Pilot control valve Port „X“ = 100 bar
- Main valve Port „P“ = 10 bar

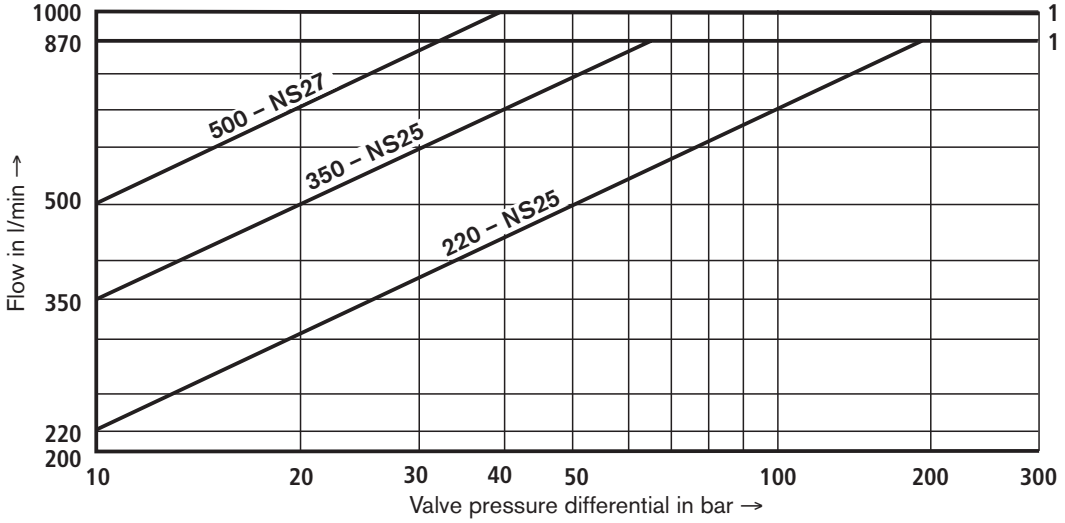
**Frequency response characteristic curves**




Measured at:
- Pilot control valve Port „X“ = 100 bar
- Main valve Port „P“ = 10 bar

Signal ±10 %
Signal ±25 %
Signal ±100 %

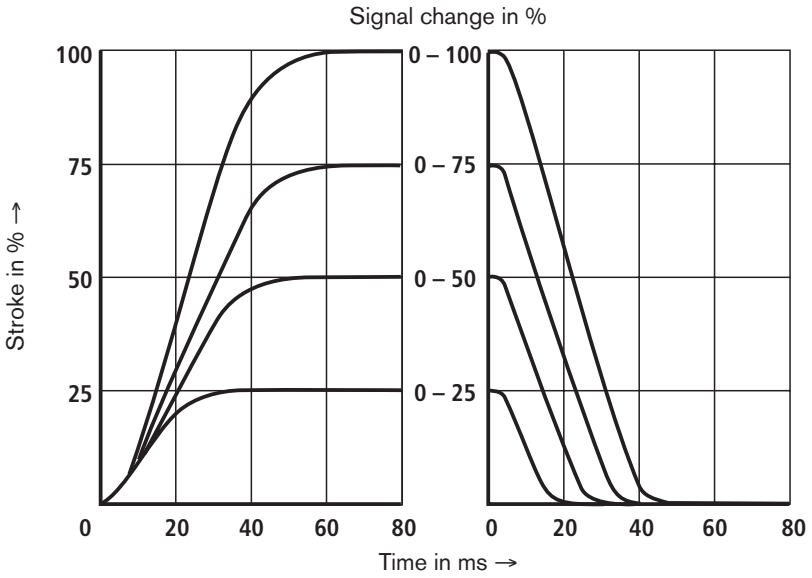
**Flow-load function at max. valve opening** (tolerance ±10 %)




1 = Recommended flow limitation (flow velocity 30 m/s)

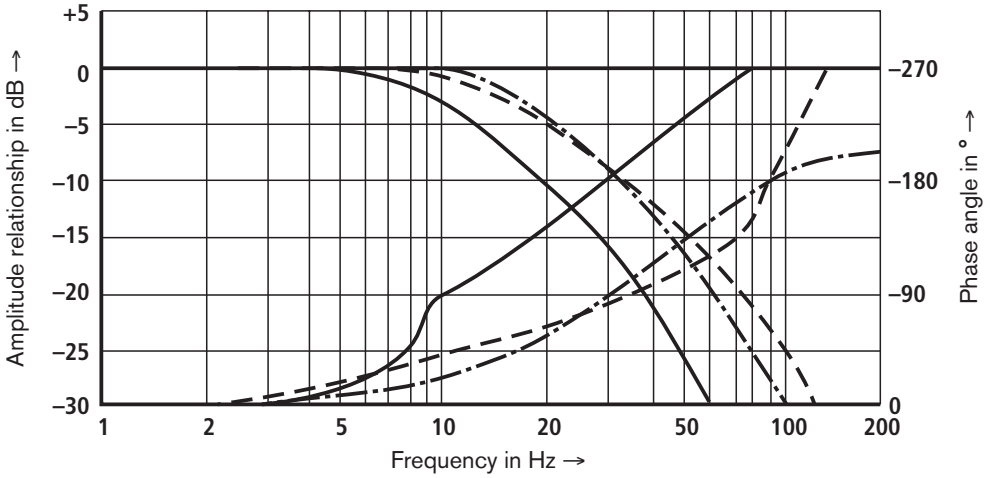
## **Characteristic curves** (measured with HLP 46, $\vartheta_{oil}$ = 40 °C ±5 °C) **NS32**

**Transient function with a stepped form of electrical input signal**




Measured at:
- Pilot control valve
  Port „X“ = 100 bar
- Main valve
  Port „P“ = 10 bar

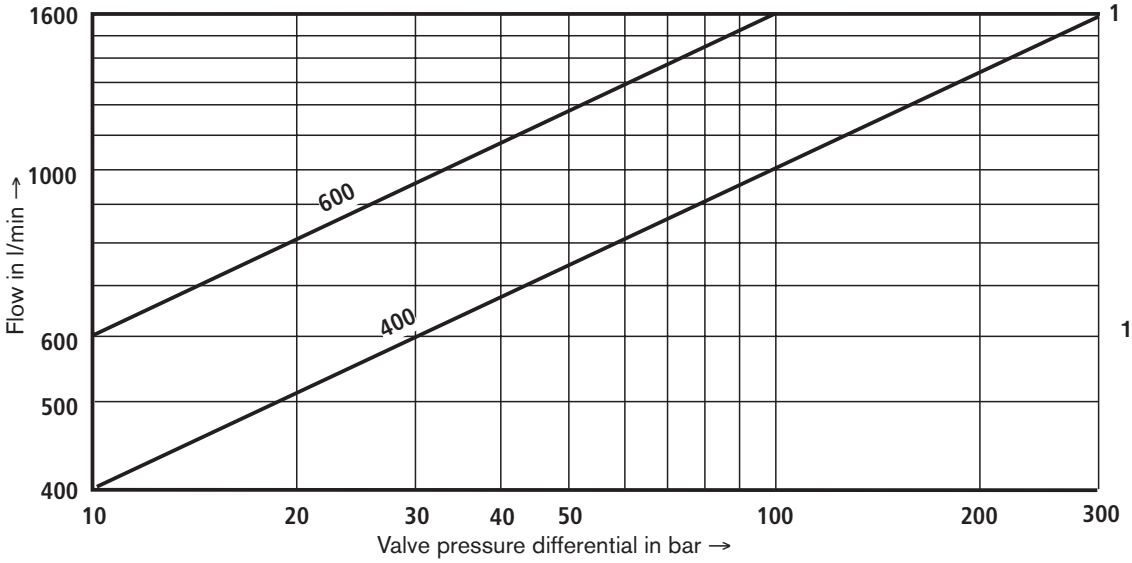
**Frequency response characteristic curves**




Measured at:
- Pilot control valve
  Port „X“ = 100 bar
- Main valve
  Port „P“ = 10 bar

Signal ±10 %
Signal ±25 %
Signal ±100 %

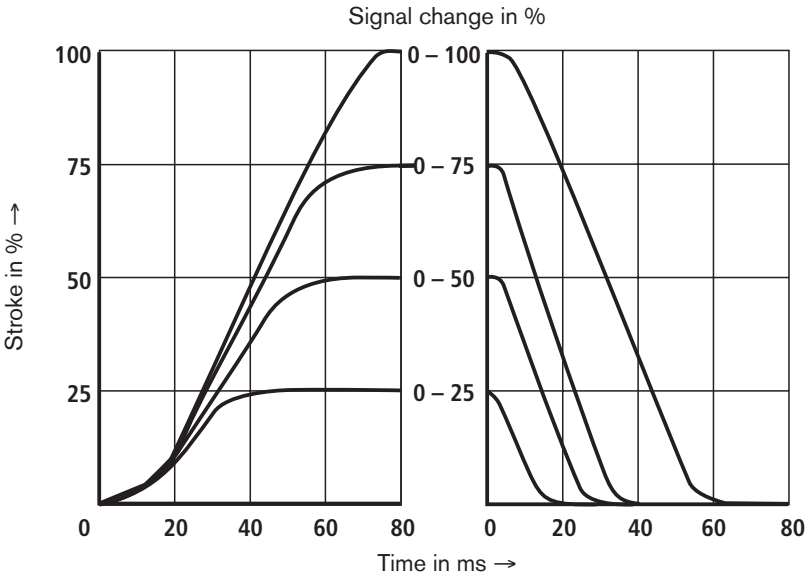
**Flow-load function at max. valve opening** (tolerance ±10 %)




1 = Recommended flow limitation (flow velocity 30 m/s)

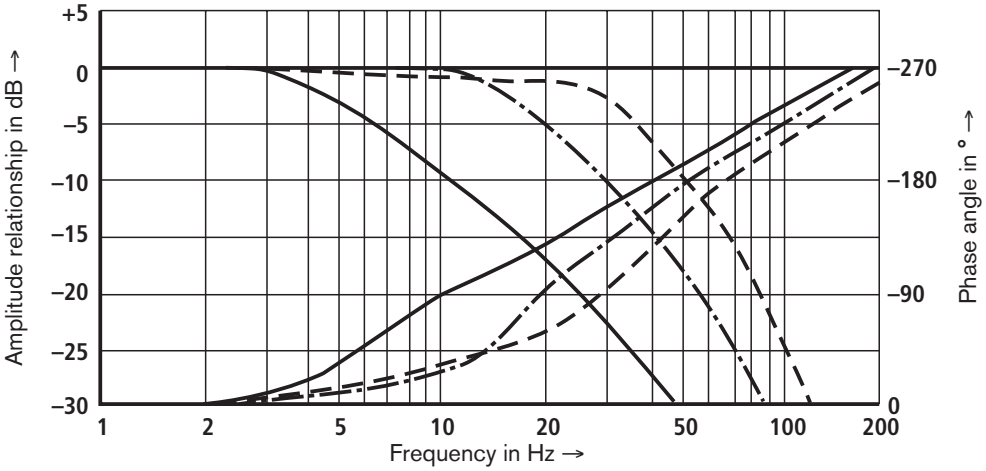
## Characteristic curves (measured with HLP 46, $\vartheta_{oil}$ = 40 °C ±5 °C) NS35

**Transient function with a stepped form of electrical input signal**




Measured at:
- Pilot control valve Port „X“ = 100 bar
- Main valve Port „P“ = 10 bar

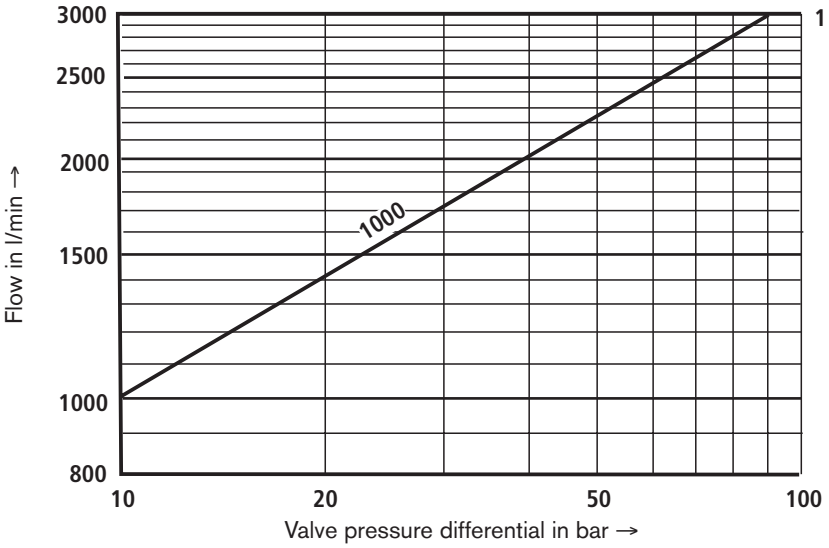
**Frequency response characteristic curves**




Measured at:
- Pilot control valve Port „X“ = 100 bar
- Main valve Port „P“ = 10 bar

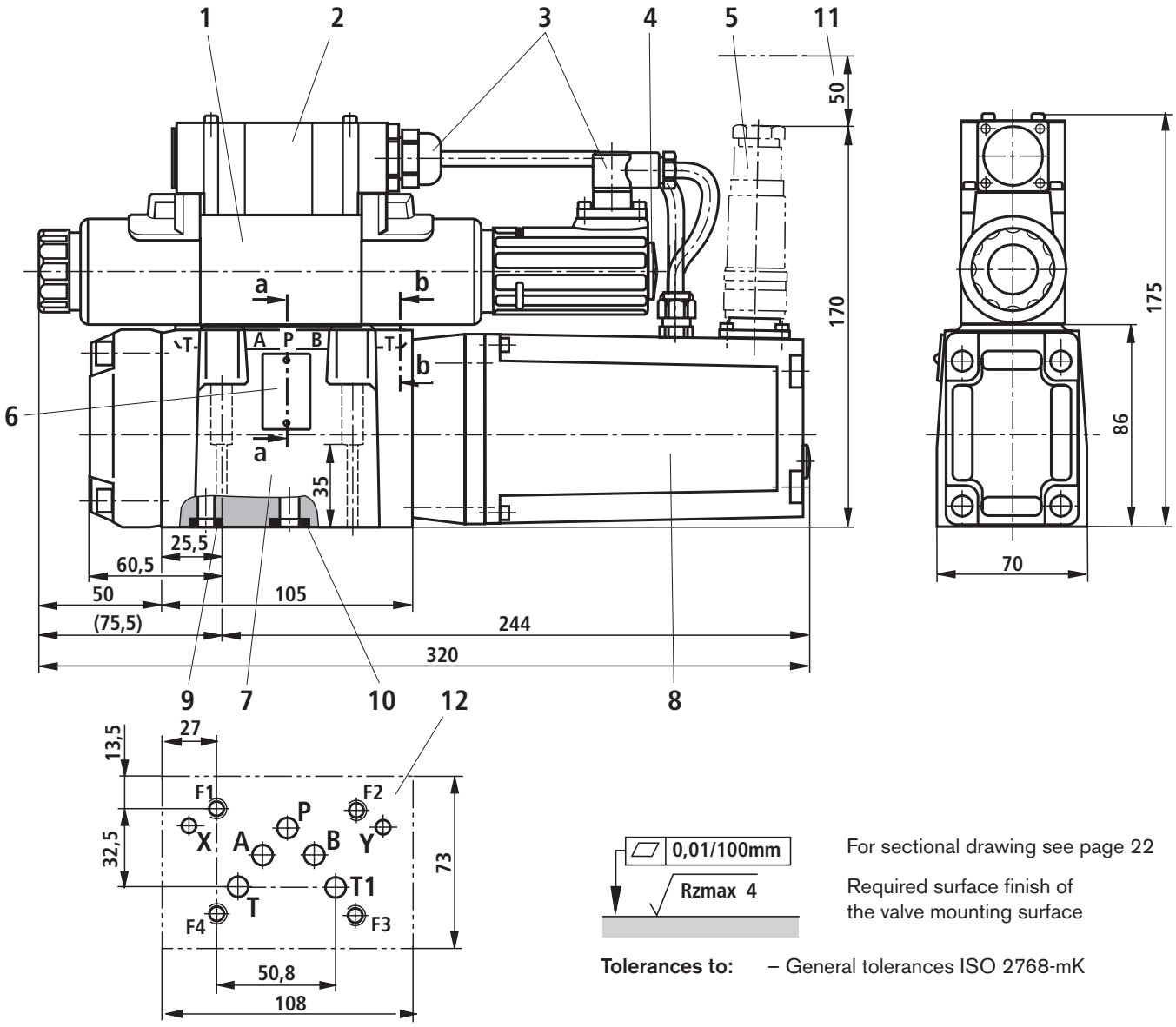
Signal ±10 %
Signal ±25 %
Signal ±100 %

**Flow-load function at max. valve opening** (tolerance ±10 %)




1 = Recommended flow limitation (flow velocity 30 m/s)

## **Unit dimensions** (nominal dimensions in mm) **NS10**










For sectional drawing see page 22

Required surface finish of the valve mounting surface

**Tolerances to:** – General tolerances ISO 2768-mK

**1** Pilot control valve
**2** Electrical connections
**3** Cabling and plug-in connector
**4** Inductive position transducer (pilot control valve)
**5** Plug-in connector 6-pin + PE
separate order, see page 7
**6** Name plate
**7** Main valve
**8** Control electronics (OBE) and inductive position transducer (main valve)
**9** Identical seal rings for ports X, Y
**10** Identical seal rings for ports A, B, P, T, T1
**11** Space required for the connection cable and to remove the plug-in connector
**12** Machined valve mounting surface,
position of the ports to ISO 4401-05-05-0-94
(ports X, Y as required)
Deviation from the standard:
– Ports A, B, T, T1 and P Ø11 mm

Subplates to catalogue sheet RE 45054 and valve fixing screws must be ordered separately.

**Subplates:** G 534/01 (G3/4) without ports X, Y
G 535/01 (G3/4) with ports X, Y
G 536/01 (G1) with ports X, Y

**Valve fixing screws**
The following valve fixing screws are recommended:

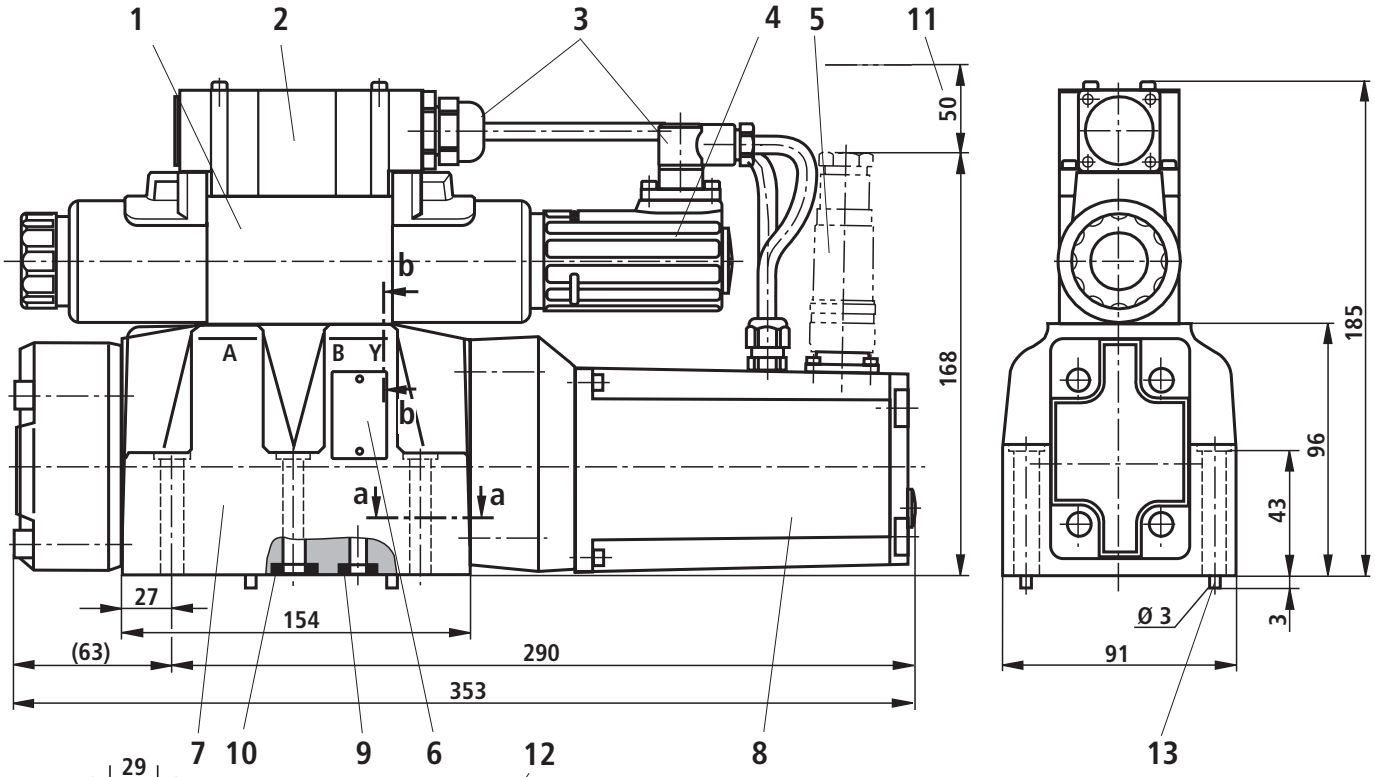
**4 S.H.C.S. ISO 4762 – M6 x 45 -10.9-flZn-240h-L**
(friction value $\mu_{total} = 0.09$ to 0.14)
Tightening torque $M_A = 13.5$ Nm ±10 %
Material No. **R913000258**

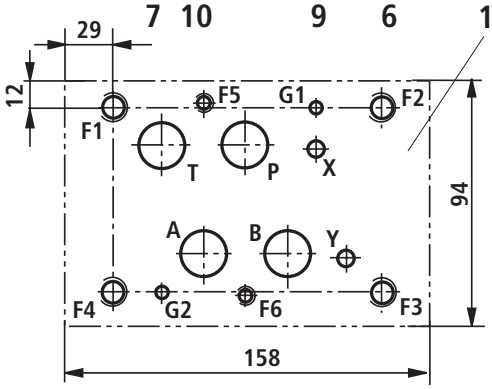
or

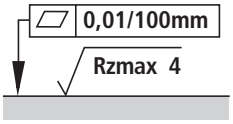
**4 S.H.C.S. ISO 4762 – M6 x 45 -10.9**
(friction value $\mu_{total} = 0.12$ to 0.17)
Tightening torque $M_A = 15.5$ Nm ±10 %

**Note:**
The tightening torque relates to the maximum operating pressure!

## Unit dimensions (nominal dimensions in mm) NS16




For sectional drawing see page 22

Required surface finish of the valve mounting surface

**Tolerances to:** – General tolerances ISO 2768-mK

Subplates to catalogue sheet RE 45056 and valve fixing screws must be ordered separately.

**Subplates:** G 172/01 (G3/4)
G 172/02 (M27 x 2)
G 174/01 (G1)
G 174/02 (M33 x 2)

**Valve fixing screws**
The following valve fixing screws are recommended:

**2 S.H.C.S. ISO 4762 – M6 x 60 -10.9-flZn-240h-L**
(friction value $\mu_{total}$ = 0.09 to 0.14)
Tightening torque $M_A$ = 12.2 Nm ±10 %
Material No. **R913000115**

**4 S.H.C.S. ISO 4762 – M10 x 60 -10.9-flZn-240h-L**
(friction value $\mu_{total}$ = 0.09 to 0.14)
Tightening torque $M_A$ = 58 Nm ±20 %
Material No. **R913000116**
or

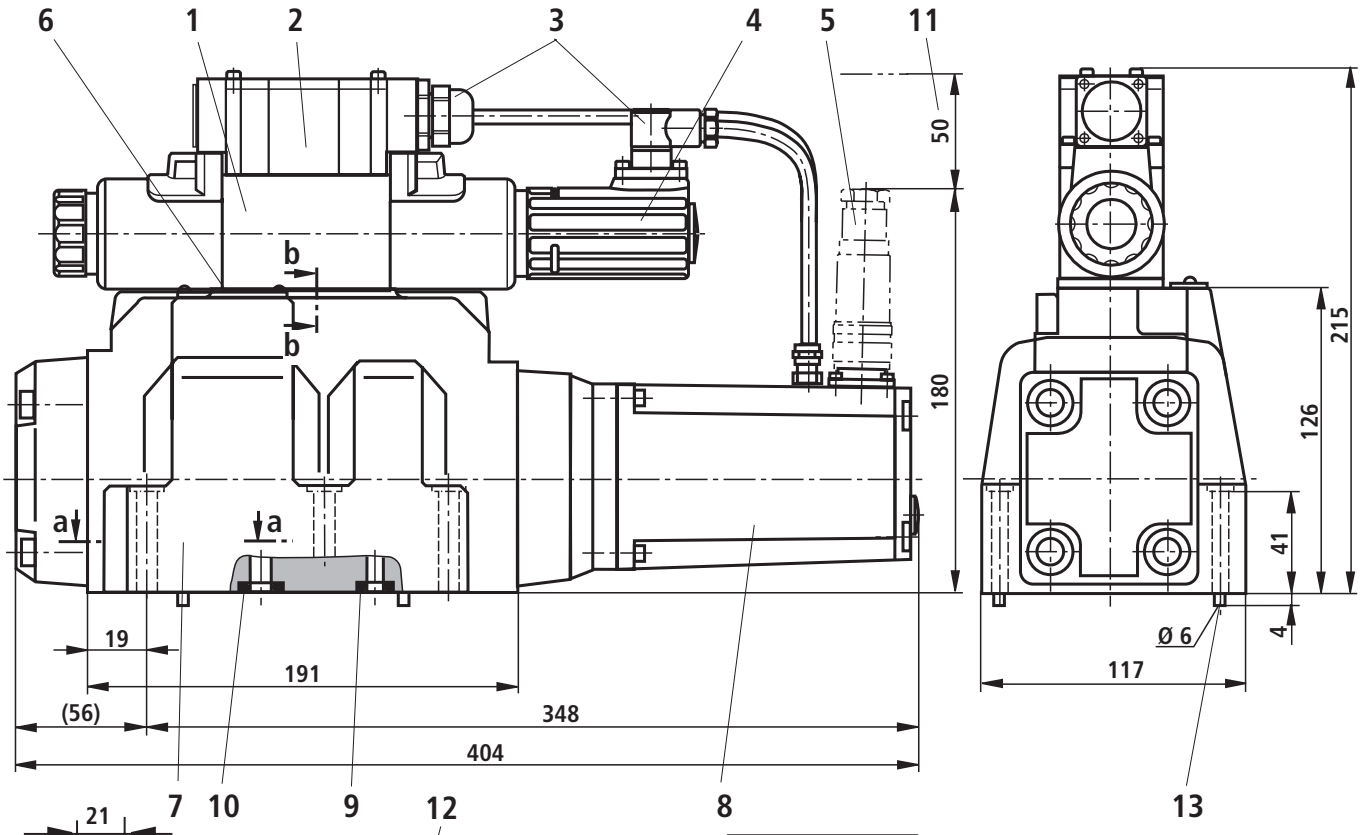
**2 S.H.C.S. ISO 4762 – M6 x 60 -10.9**
(friction value $\mu_{total}$ = 0.12 to 0.17)
Tightening torque $M_A$ = 15.5 Nm ±10 %

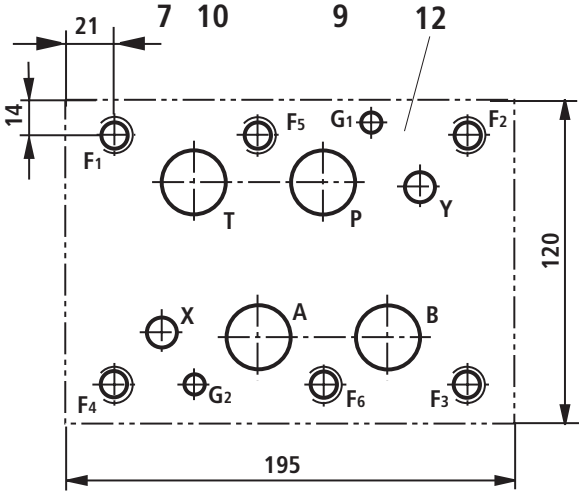
**4 S.H.C.S. ISO 4762 – M10 x 60 -10.9**
(friction value $\mu_{total}$ = 0.12 to 0.17)
Tightening torque $M_A$ = 75 Nm ±20 %

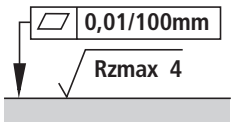
**Note:**
The tightening torque relates to the maximum operating pressure!

**1** Pilot control valve
**2** Electrical connections
**3** Cabling and plug-in connector
**4** Inductive position transducer (pilot control valve)
**5** Plug-in connector 6-pin + PE
separate order, see page 7
**6** Name plate
**7** Main valve
**8** Control electronics (OBE) and inductive position transducer (main valve)
**9** Identical seal rings for ports X, Y
**10** Identical seal rings for ports A, B, P, T
**11** Space required for the connection cable and to remove the plug-in connector
**12** Machined valve mounting surface,
position of the ports to ISO 4401-07-06-0-94
(ports X, Y as required)
Deviation from the standard:
– Ports A, B, T and P Ø20 mm
**13** Locating pin

## **Unit dimensions** (nominal dimensions in mm) **NS25**




For sectional drawing see page 23

Required surface finish of the valve mounting surface

**Tolerances to:** – General tolerances ISO 2768-mK

**1** Pilot control valve
**2** Electrical connections
**3** Cabling and plug-in connector
**4** Inductive position transducer (pilot control valve)
**5** Plug-in connector 6-pin + PE
separate order, see page 7
**6** Name plate
**7** Main valve
**8** Control electronics and inductive position transducer (main valve)
**9** Identical seal rings for portss X, Y
**10** Identical seal rings for ports A, B, P, T
**11** Space required for the connection cable and to remove plug-in connector

**12** Machined valve mounting surface,
position of the ports to ISO 4401-08-07-0-94
(ports X, Y as required)
Deviations from the standard:
– Ports A, B and T deviates from DIN Ø25 mm
– Port P deviates from DIN and ISO Ø24 mm

**13** Locating pin

Subplates to catalogue sheet RE 45058 and valve fixing screws must be ordered separately.

**Subplates:** G 151/01 (G1)
G 154/01 (G1 1/4)
G 156/01 (G1 1/2)

**Valve fixing screws**
The following valve fixing screws are recommended:

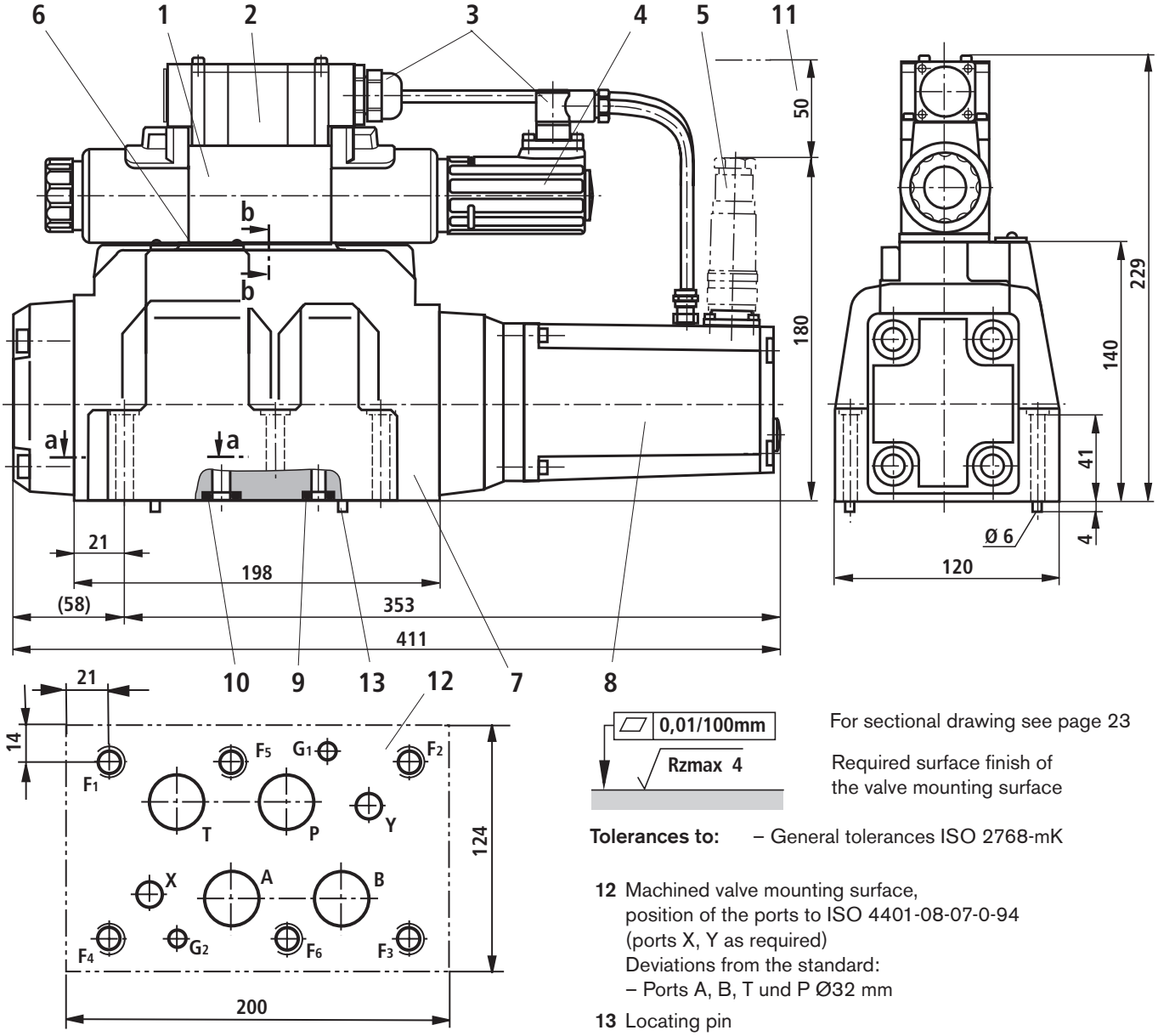
**6 S.H.C.S. ISO 4762 – M12 x 60 -10.9-flZn-240h-L**
(friction value $\mu_{total}$ = 0.09 to 0.14)
Tightening torque $M_A$ = 100 Nm ±20 %
Material No. **R913000121**

or

**6 S.H.C.S. ISO 4762 – M12 x 60 -10.9**
(friction value $\mu_{total}$ = 0.12 to 0.17)
Tightening torque $M_A$ = 130 Nm ±20 %

**Note:**
The tightening torque relates to the maximum operating pressure!

## Unit dimensions (nominal dimensions in mm) NS27










For sectional drawing see page 23

Required surface finish of the valve mounting surface

**Tolerances to:** – General tolerances ISO 2768-mK

**1** Pilot control valve
**2** Electrical connections
**3** Cabling and plug-in connector
**4** Inductive position transducer (pilot control valve)
**5** Plug-in connector 6-pin + PE
separate order, see page 7
**6** Name plate
**7** Main valve
**8** Control electronics (OBE) and inductive position transducer (main valve)
**9** Identical seal rings for ports X, Y
**10** Identical seal rings for ports A, B, P, T
**11** Space required for the connection cable and to remove the plug-in connector
**12** Machined valve mounting surface,
position of the ports to ISO 4401-08-07-0-94
(ports X, Y as required)
Deviations from the standard:
– Ports A, B, T und P Ø32 mm
**13** Locating pin

Subplates to catalogue sheet RE 45058 and valve fixing screws must be ordered separately.

**Subplates:** G 151/01 (G1)
G 154/01 (G1 1/4)
G 156/01 (G1 1/2)

**Valve fixing screws**
The following valve fixing screws are recommended:

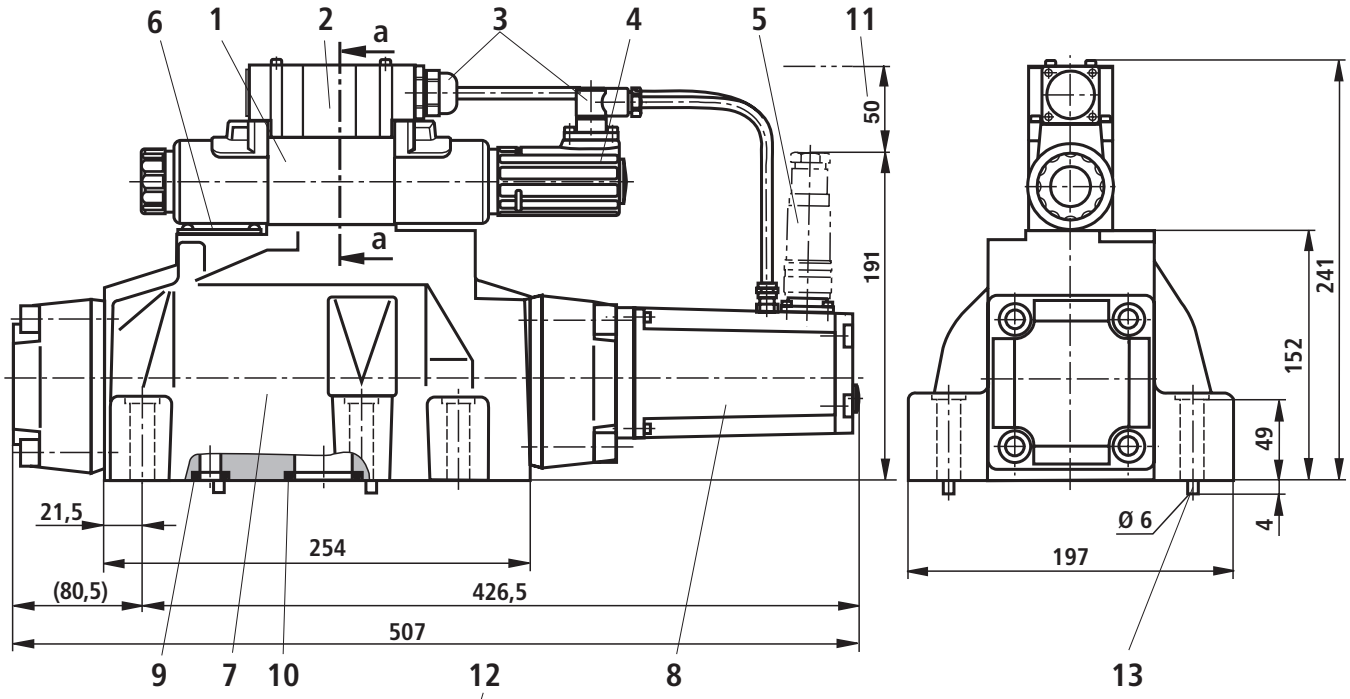
**6 S.H.C.S. ISO 4762 – M12 x 60 -10.9-flZn-240h-L**
(friction value $\mu_{total}$ = 0.09 to 0.14)
Tightening torque $M_A$ = 100 Nm ±20 %
Material No. **R913000121**

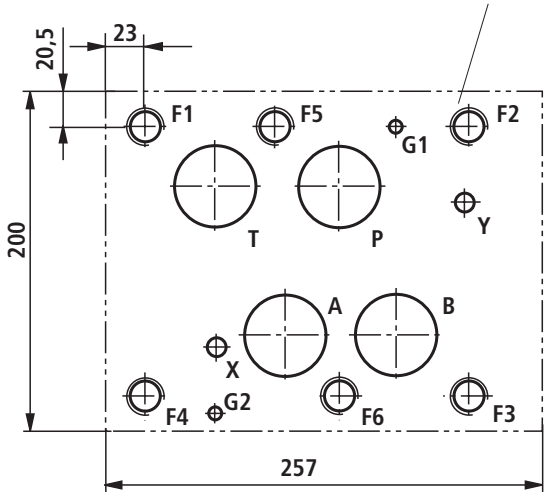
or

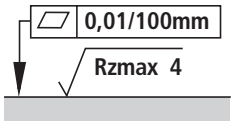
**6 S.H.C.S. ISO 4762 – M12 x 60 -10.9**
(friction value $\mu_{total}$ = 0.12 to 0.17)
Tightening torque $M_A$ = 130 Nm ±20 %

**Note:**
The tightening torque relates to the maximum operating pressure!

## **Unit dimensions** (nominal dimensions in mm) **NS32**




For sectional drawing see page 23

Required surface finish of the valve mounting surface

**Tolerances to:** – General tolerances ISO 2768-mK

**12** Machined valve mounting surface, position of the ports to ISO 4401-10-08-0-94 (ports X, Y as required)
Deviations from the standard:
– Ports A, B, T und P Ø38 mm

**13** Locating pin

**1** Pilot control valve
**2** Electrical connections
**3** Cabling and plug-in connector
**4** Inductive position transducer (pilot control valve)
**5** Plug-in connector 6-pin + PE
separate order, see page 7
**6** Name plate
**7** Main valve
**8** Control electronics (OBE) and inductive position transducer (main valve)
**9** Identical seal rings for ports X, Y
**10** Identical seal rings for ports A, B, P, T
**11** Space required for the connection cable and to remove the plug-in connector

Subplates to catalogue sheet RE 45060 and valve fixing screws must be ordered separately.

**Subplates:** G 157/01 (G1 1/2)
G 157/02 (M48 x 2)
G 158/10 (Flansch)

**Valve fixing screws**
The following valve fixing screws are recommended:

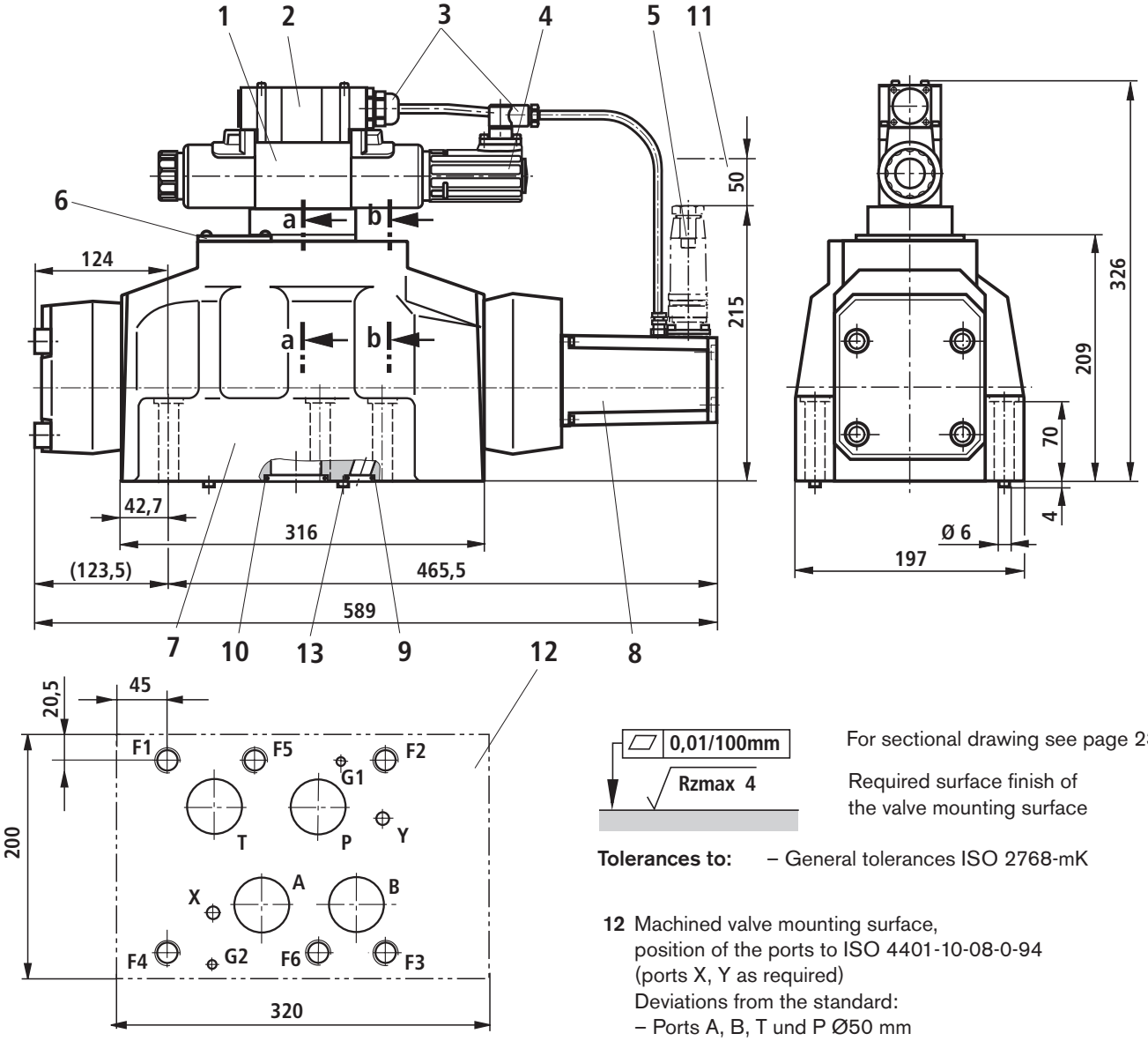
**6 S.H.C.S. ISO 4762 – M20 x 80 -10.9-flZn-240h-L**
(friction value $\mu_{total}$ = 0.09 to 0.14)
Tightening torque $M_A$ = 340 Nm ±20 %
Material No. **R901035246**

or

**6 S.H.C.S. ISO 4762 – M20 x 80 -10.9**
(friction value $\mu_{total}$ = 0.12 to 0.17)
Tightening torque $M_A$ = 430 Nm ±20 %

**Note:**
The tightening torque relates to the maximum operating pressure!

## **Unit dimensions** (nominal dimensions in mm) **NS35**










For sectional drawing see page 23

Required surface finish of the valve mounting surface

**Tolerances to:** – General tolerances ISO 2768-mK

**1** Pilot control valve
**2** Electrical connections
**3** Cabling and plug-in connector
**4** Inductive position transducer (pilot control valve)
**5** Plug-in connector 6-pin + PE
separate order, see page 7
**6** Name plate
**7** Main valve
**8** Control electronics (OBE) and inductive position transducer (main valve)
**9** Identical seal rings for ports X, Y
**10** Identical seal rings for ports A, B, P, T
**11** Space required for the connection cable and to remove the plug-in connector
**12** Machined valve mounting surface,
position of the ports to ISO 4401-10-08-0-94
(ports X, Y as required)
Deviations from the standard:
– Ports A, B, T und P Ø50 mm
**13** Locating pin

**Valve fixing screws**
must be ordered separately
The following valve fixing screws are recommended:

**6 S.H.C.S. ISO 4762 – M20 x 100 -10.9-flZn-240h-L**
(friction value $\mu_{total}$ = 0.09 to 0.14)
Tightening torque $M_A$ = 465 Nm ±20 %
Material No. **R913000386**

or

**6 S.H.C.S. ISO 4762 – M20 x 100 -10.9**
(friction value $\mu_{total}$ = 0.12 to 0.17)
Tightening torque $M_A$ = 610 Nm ±20 %

**Hinweis:**
**Note:**
The tightening torque relates to the maximum operating pressure!

## Pilot oil supply

**Type 4WRTE…-4X/… External pilot oil supply**
**External pilot oil drain**

With this version the pilot oil supply is from a separate control circuit (external).
The pilot oil drain is not passed into the T port of the main valve but separately into the tank via port Y (external).

**Type 4WRTE…-4X/…E… Internal pilot oil supply**
**External pilot oil drain**

With this version the pilot oil supply is from the P port of the main valve (internal).
The pilot oil drain is not passed into the T port of the main valve but separately into the tank via port Y (external).
Port X must be plugged on the subplate.

**Type 4WRTE…-4X/…ET… Internal pilot oil supply**
**Internal pilot oil drain**

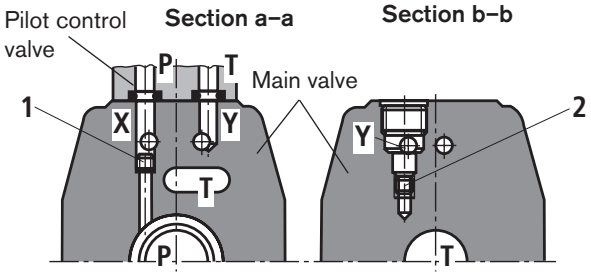
With the version the pilot oil supply is from the P port of the main valve (internal).
The pilot oil drain is passed directly into the T port of the main valve (internal).
Port Y must be plugged on the subplate.

**Type 4WRTE…-4X/…T… External pilot oil supply**
**Internal pilot oil drain**

With this version the pilot oil supply is from a separate control circuit (external).
The pilot oil drain is passed directly into the T port of the main valve (internal).
Port Y must be plugged on the subplate.

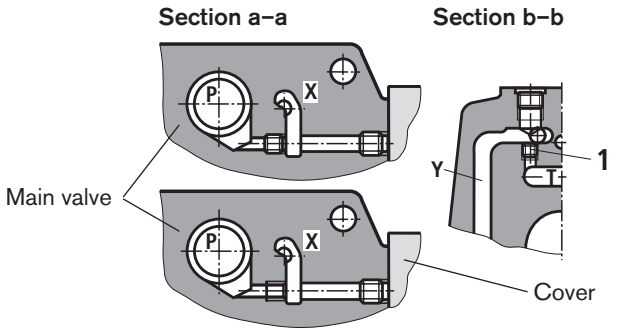
Pos. **1** and **2**: Plug M6 DIN 906-8.8 3A/F

**NS10** For cross-section see page 16




| | | | |
|---|---|---|---|
| Pilot oil supply (section a–a) | external: | **1** | closed |
| | internal: | **1** | open |
| Pilot oil drain (section b–b) | external: | **2** | closed |
| | internal: | **2** | open |

**NS16** For cross-section see page 17

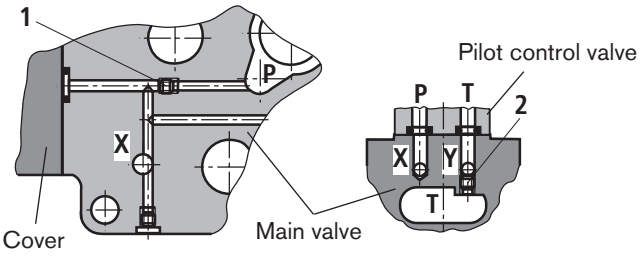



| | | | |
|---|---|---|---|
| Pilot oil supply (section a–a) | external: | **P** | closed |
| | internal: | **P** | open |
| Pilot oil drain (section b–b) | external: | **1** | closed |
| | internal: | **1** | open |

## Pilot oil supply

**NS25 and 27** For cross-section see pages 18 and 19

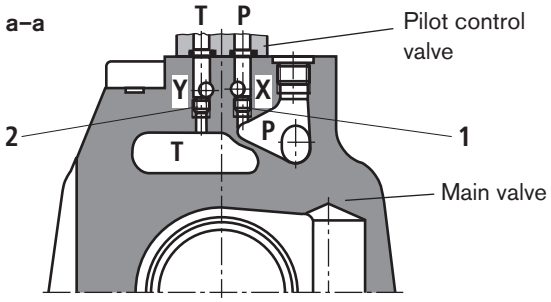
**Section a–a** **Section b–b**




| | | | |
|---|---|---|---|
| Pilot oil supply (section a–a) | external: | **1** | closed |
| | internal: | **1** | open |
| Pilot oil supply (section b–b) | external: | **2** | closed |
| | internal: | **2** | open |

**NS32** For cross-section see page 20

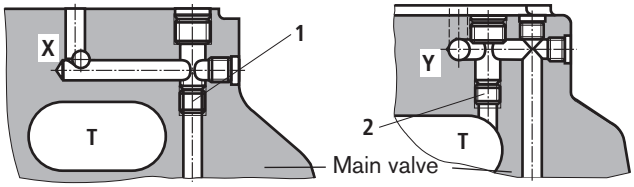
**Section a–a**




| | | | |
|---|---|---|---|
| Pilot oil supply | external: | **1** | closed |
| | internal: | **1** | open |
| Pilot oil supply | external: | **2** | closed |
| | internal: | **2** | open |

**NS35** For cross-section see page 21

**Section a–a** **Section b–b**




| | | | |
|---|---|---|---|
| Pilot oil supply (section a–a) | external: | **1** | closed |
| | internal: | **1** | open |
| Pilot oil supply (section b–b) | external: | **2** | closed |
| | internal: | **2** | open |

## Notes

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