**RE 29 595/10.02**

Replaces: 11.99

# Servo valve, 4-way version
# Type 4WSE3EE

Nominal size 16 – series 1X,
Nominal size 25 – series 2X,
Nominal size 32 – series 4X
Maximum operating pressures 210 / 315 bar
Maximum flow 460 L/min (NS 16)
Maximum flow 800 L/min (NS 25)
Maximum flow 1600 L/min (NS 32)

H/A/D 6043/98

Type 4WSE3EE…, NS 16, 25 and 32 with electrical feedback and integrated control electronics

## Overview of contents



## Features

- Valve for the closed loop control of pressure, force or pressure and velocity
- 3-stage servo valve with electrical closed loop position control of the 3rd stage control spool
  Control spool position acquisition via an inductive position transducer
- 2-stage nominal size 6 pilot valve with high dynamics
- 1st stage as an orifice-flapper plate amplifier
- For subplate mounting, porting pattern to DIN 24 340 form A
- Can also be used as a 3-way version
- Valve and integrated control electronics are adjusted and tested
- Optimised closed loop valve control circuit
- High response sensitivity, very low hysteresis and zero point drift
- Pilot oil supply and drain internal/external can be changed without dismantling the valve
- Exchangeable control bush
- Pressure chambers in the control bush have gap seals, no O-ring wear
- The filter for the 1st stage is externally accessible

## Ordering details

| 4WSE3E | E | – | / | B | | | | K9 | E | V | * |
|---|---|---|---|---|---|---|---|---|---|---|---|

Electrically actuated 3-stage servo valve of 4-way design with integrated control electronics

Electrical feedback (3rd stage) **= E**

Nominal size 16 **= 16**
Nominal size 25 **= 25**
Nominal size 32 **= 32**

Series 10 to 19 (NS 16) **= 1X**
(10 to 19: unchanged installation and connection dimensions)
Series 20 to 29 (NS 25) **= 2X**
(20 to 29: unchnaged installation and connection dimensions)
Series 40 to 49 (NS 32) **= 4X**
(40 to 49: unchanged installation and connection dimensions)

**Nominal flow** in L/min ❶
For NS 16 **= 100** or **= 150** or **= 200** or **= 300**
For NS 25 **= 300** or **= 400** or **= 500**
For NS 32 **= 500** or **= 700** or **= 1000**
(The tolerance field of the flow signal function on page 7 has to be taken into account)

Valves with integrated control electronics ❷
Control: Command value ± 10 mA / 1 kΩ **= 8**
Command value ± 10 V / ≥ 50 kΩ **= 9**

❸ **Pilot oil supply and drain**
**– =** External pilot oil supply, external drain
**E =** Internal pilot oil supply, external drain
**T =** External pilot oil supply, internal drain
**ET =** Internal pilot oil supply, internal drain (standard)

❹ **Input pressure range to the pilot control**
**210 =** 10 to 210 bar
**315 =** 10 to 315 bar

**Electrical connections**
**K9 =** **Without** plug-in connector, with component plug to E DIN 43 563-AM6-3
Plug-in connector – separate order, see page 7

❺ **Spool overlap**
**E =** 0 to 0.5 %, negative

❻
**V =** FKM seals, suitabel for mineral oil (HL, HLP) to DIN 51 524

❼ Further details in clear text

### ❶ Nominal flow

The nominal flow relates to a 100 % command value signal at a 70 bar valve pressure differential (per land 35 bar).

This valve pressure differential is to be regarded as a reference value. Other values will give a change in the flow.

A possible ± 10 % nominal flow tolerance and a saturation influence must be taken into consideration (see flow signal function on page 8).

### ❷ Electronic control data

The integrated control electronics must be provided with a regulated supply voltage of ± 15 V ± 3 %.

The command value can be either a voltage signal, ordering code "**9**", or where there is extensive cabling (> 25 m between the control and valve) a current signal, ordering code "**8**".

### ❸ Pilot oil

Care is to be taken to ensure that the pilot control pressure is held as constant as possible. It is therefore often advantageous to use an external pilot oil supply via port X.

### ❹ Input pressure range

The system pressure should be as constant as possible.

Pilot control pressure range: 10 to 210 bar, or 10 to 315 bar.

With regard to the dynamics, within the permissible pressure range, the frequency relationship must be taken into account.

The pilot control pressure should not be less than 60 % of the system pressure as, otherwise the flow forces at the control spool of the 3rd stage can affect the controlability.

With an inlet pressure of ≤ 40 bar it is advantageous to work with the same pressure at P and X.

### ❺ Spool overlap

The spool overlap given in % refers to the nominal control spool stroke.

Other spool overlaps are available on request!

### ❻ Seal material

Other seal materials are available on request!

### ❼ Details in clear text

Here special requirements should be specified in clear text. Following receipt of an order these will be checked at the factory and valve code supplemented by an additional number.

**Test unit for proportional and servo valves that are fitted with integrated control electronics, type VT-VET-1, series 1X** to catalogue sheet RE 29 685.

The test unit is used to control and functionally test proportional and servo valves with integrated control electronics. It is suitable for testing valves that have an operating voltage ± 15 V or 24 V.

**The following operating modes are possible:**

- External operation → passing on the operating voltage and command values from the control cabinet to the valve
- Internal/external operation → command value via the test unit; operating voltage from the control cabinet
- Internal operation → operating avoltage via a separate power supply; command value via the test unit
- Command values via the BNC socket → optional operational voltage.

## **Preferred types** (readily available)

**NS16**

| Material No. | Type |
|---|---|
| **00949290** | 4WSE3EE 16-1X/100B9-315K9EV |
| **00949292** | 4WSE3EE 16-1X/150B9-315K9EV |
| **00949293** | 4WSE3EE 16-1X/200B9-315K9EV |
| **00949295** | 4WSE3EE 16-1X/300B9-315K9EV |

**NS25**

| Material No. | Type |
|---|---|
| **00949297** | 4WSE3EE 25-2X/300B9-315K9EV |
| **00949298** | 4WSE3EE 25-2X/400B9-315K9EV |
| **00949299** | 4WSE3EE 25-2X/500B9-315K9EV |

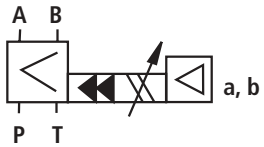
**NS32**

| Material No. | Type |
|---|---|
| **00949300** | 4WSE3EE 32-4X/500B9-315K9EV |
| **00949301** | 4WSE3EE 32-4X/700B9-315K9EV |
| **00949302** | 4WSE3EE 32-4X/1000B9-315K9EV |

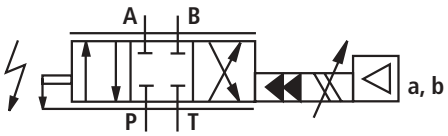
**Further preferred types and standard units are to be found in the EPS (Standard Price list).**

## Symbols

**Simplified**




**Detailed**



## Function, section

Type 4WSE3EE... valves are electrically operated, 3-stage directional servo valves with a porting pattern to DIN 24 340 form A16, A25 or A32. They are used primarily for the closed loop control of position, force or pressure and velocity.

These valves comprise of a 2-stage pilot valve type 4WS2EM 6, a main stage with a main control spool in a bush (3rd stage), an inductive position transducer and integrated control electronics.

The pilot valve (2nd stage) comprises of an electro-mechanical convertor (torque motor) (1), a hydraulic amplifier (flapper jet principle) (2) and a pilot control spool (3) in a bush that is connected to the torque motor via a mechanical feedback.

Via an electrical input signal at the coils (4) of the torque motor, a force is generated via a permanent magnet at the armature (5), that in conjunction with a torque tube (6) generates a torque. Due to this the flapper plate (7), which is connected with the torque tube (6) via a rod, is moved out of the central position between the two control orifices (8) a pressure differential now results which acts on the front face of the control spool (3). This pressure differential causes the spool to move, whereby the pressure connection is connected to an actuator connection and at the same time the other actuator connection is connected to the return connection.

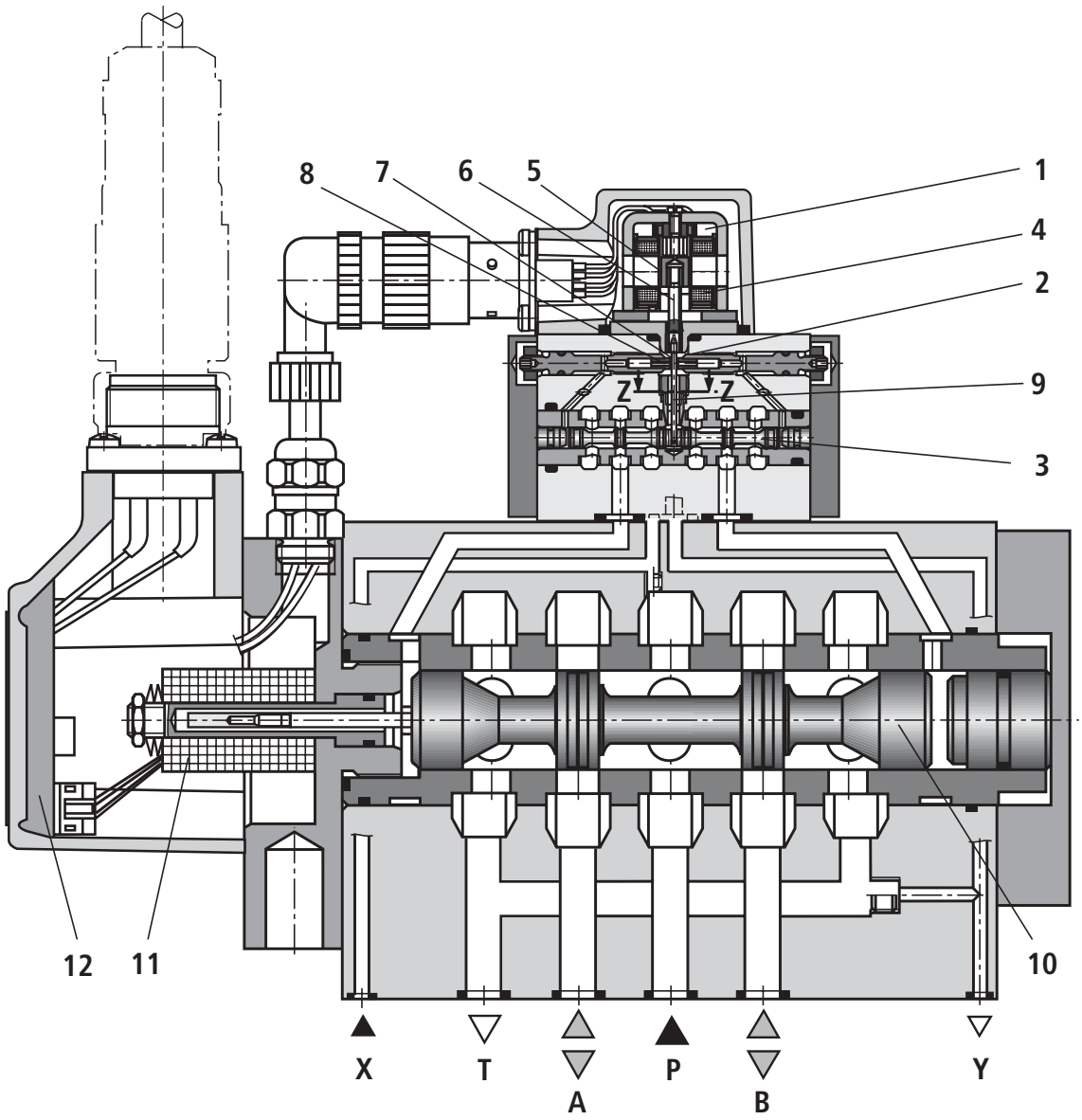
The pilot control spool is connected via a feedback spring (mechanical feedback) (9) to the flapper plate and torque motor. The spool continues to change position until the torque feedback, via the feedback spring and the electro-magnetic torque of the torque motor are balanced, and the pressure differential at the flapper jet system becomes zero.

The stroke of the pilot control spool and thus the flow through the pilot control valve is closed loop controlled proportional to the electrical input signal.

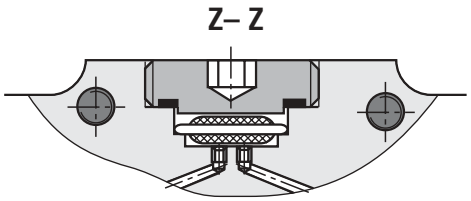
In the main stage the main control spool (10) is actuated via the pilot control valve and its position is acquired by an inductive position transducer (11). The position transducer signal is compared with the command value within the integrated control electronics (12). Any control deviations are electrically amplified and are then passed to the pilot control valve as a control signal. The pilot control valve moves. The main control spool is repositioned.

The stroke of the main spool and thereby the flow of the servo valve are therefore proportionally controlled in relation to the command value. It has, however to be taken into account that the flow is dependent on the valve pressure drop.

The valve zero point can be adjusted by an externally accessible potentiometer.




**Type 4WSE3EE 16-1X/.B…K9EV**



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

### General

| | | | | |
|---|---|---|---|---|
| Porting pattern | | DIN 24 340 form A | | |
| Installation | | Optional, provided that it can be ensured that during start-up the system is supplied with adequate pressure (≥ 10 bar). If the pressure supply is insufficient then the servo valve spool can stop in any position. It could therefore occur that port P is connected to the actuator and that pressure build-up is thereby delayed. This can be prevented by using an external pressure supply at port X or for NS 16 and NS 25 by use of an isolator valve types Z4WEH 16… (see RE 24 761) Z4WEH 22… (see RE 24 768). | | |
| Storage temperature range | °C | – 20 to + 80 | | |
| Ambient temperature range | °C | – 20 to + 60 | | |
| Weight | NS | **16** | **25** | **32** |
| | kg | 9.0 | 20.0 | 60.0 |

### **Hydraulic** (measured with HLP 32, $\vartheta_{oil}$ = 40 °C ± 5 °C)

| | | | | |
|---|---|---|---|---|
| Operating pressure: | Pilot control stage | | bar | 10 to 210 or 10 to 315 |
| | Main valve, ports P, A, B | | bar | Up to 315 |
| Return pressure: | Port T | Internal drain | bar | Pressure peaks < 100 are permissible |
| | | External drain | bar | Up to 315 |
| | Port Y | | bar | Pressure peaks < 100 are permissible |
| Pressure fluid | | | | Mineral oil (HL, HLP) to DIN 51 524, phosphate ester (HFD-R) further pressure fluids on request! |
| Pressure fluid temperature range | | | °C | – 20 to + 80; preferably + 40 to + 50 |
| Viscosity range | | | mm²/s | 20 to 380; preferably 30 to 45 |
| Cleanliness class to ISO codes | | | | Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 18/16/13 [1] |
| Zero flow | 2-stage pilot $q_{V,\,L2}$ [2] | | L/min | $\leq \sqrt{\frac{p_p}{70\ bar}}$ [4] • x **NS 16:** x = 0.5 **NS 25:** x = 0.55 **NS 32:** x = 0.8 |
| | Total valve $q_{V,\,L3}$ [2] | | L/min | $\leq q_{V,\,L2} + \sqrt{\frac{p_p}{70\ bar}}$ [4] • 0.02 • $q_{V\,nom}$ [3] |

| | | | |
|---|---|---|---|
| Nominal size | NS | **16** | **25** | **32** |
| Nominal flow $q_{V\,nom}$ ± 10 % [3] at $\Delta p$ = 70 bar [5] | L/min | 100, 150, 200, 300 | 300, 400, 500 | 500, 700, 1000 |
| Pilot control valve with a nominal flow of | L/min | 3.3 | 6.6 | 19.0 |
| Control spool stroke (3rd stage) | mm | ± 1.6 | ± 2.0 | ± 3.0 |
| Control spool frontal area (3rd stage) | mm² | 314 (Ø 20 mm) | 573 (Ø 27 mm) | 942 (Ø 20 / Ø 40 mm) |
| Hysteresis | % | ≤ 0.2 | | |
| Reversal span | % | ≤ 0.1 | | |
| Response sensitivity | % | ≤ 0.1 | | |
| Pressure amplification | | ≥ 90 % of $p$ at 1 % spool stroke change (from the hydraulic zero point) | | |

[1] The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occuring and at the same time increases the component service life.
For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50 081.

[2] $q_{V,L\,.}$ = Zero flow in L/min
[3] $q_{V\,nom}$ = Nominal flow (entire value) in L/min
[4] $p_P$ = Operating pressure in bar
[5] $\Delta p$ = Valve pressure differential in bar

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

### Hydraulic (measured with HLP 32, $\vartheta_{oil}$ = 40 °C ± 5 °C)

| | | | |
|---|---|---|---|
| Balance current | | % | ≤ 2 |
| Zero displacement with changes to: | | | |
| | Pressure fluid temperature | % / 20 °C | ≤ 0.5 |
| | Ambient temperature | % / 20 °C | ≤ 1.0 |
| | Operating pressure | % / 100 bar | NS16: ≤ 0.5, NS25 and NS32: ≤ 0.7 |
| | Return pressure 0 to 10 % of $p_P$ | % / bar | ≤ 0.2 |

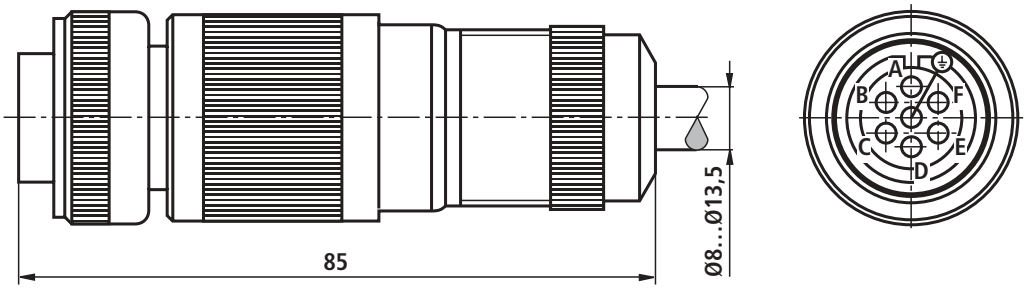
### Electrical

| | |
|---|---|
| Valve protection to DIN 40 050 | IP 65 with mounted and fixed plug-in connector |
| Signal type | Analogue |

☞ **Note:** For details regarding the **environmental simulation test** covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29 595-U (declaration regarding environmental compatibility).

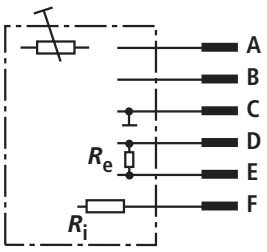
## Plug-in connector

Plug-in connector to E DIN 43 563-BF6-3/Pg11, separate order under Material No. **00223890**




## Electrical connections

Integrated control electronics
Zero point adjustment




| | Pin | Current input signal | Voltage input signal |
|---|---|---|---|
| | | Version "**8**" | Version "**9**" |
| Supply voltage (± 3 %) | A | + 15 V | + 15 V |
| | B | – 15 V | – 15 V |
| | C | ⊥ | ⊥ |
| Command value | D | ± 10 mA; $R_e$ = 1 kΩ | ± 10 V $R_e$ ≥ 50 kΩ |
| | E | | |
| Measurement output for control spool | F | Nominal stroke relates to approx. ± 10 V against ⊥; $R_i$ = 1 kΩ | |
| Current consumption at the plug-in connector | A | Max. 150 mA | Max. 150 mA |
| | B | | |
| | D | 0 to ± 10 mA | ≤ 0.2 mA |
| | E | | |

**Supply voltage:** ± 15 V ± 3 %, residual ripple < 1 %

**Command value:** Command value at plug-in connector terminal D = negative against plug-in connector, terminal E results in a flow from P to B and A to T. Measurement output F has a negative signal against ⊥.
Command value at plug-in connector terminal D = positive against plug-in connector, terminal E results in a flow from P to A and B to T.
Measurement output F has a positive signal against ⊥.

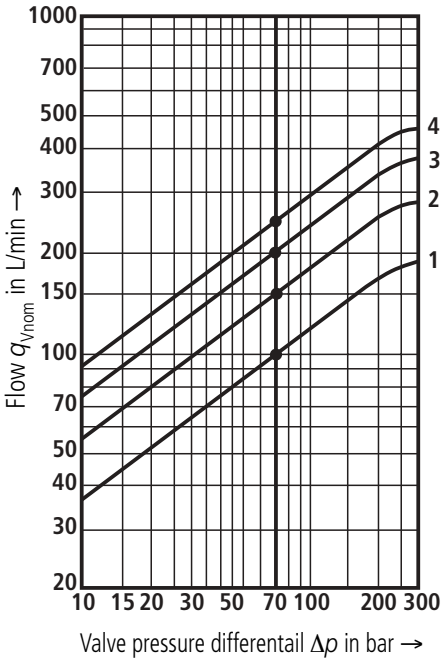
**Measurement output:** The voltage signal $U_F$ is proportional to the control spool stroke.

**Note: Electrical signal (e.g. actual value) taken via valve electronics must not be used to switch off the machine safety functions!**
**(This is in accordance with the regulation to the European Standard "Safety requirements of fluid technology – hydraulics", EN 982!)**

## **Characteristic curves** (measured with HLP 32, $\vartheta_{oil}$ = 40 °C ± 5 °C )

**Flow-load function (tolerance ± 10 %) at a 100 % command value signal**

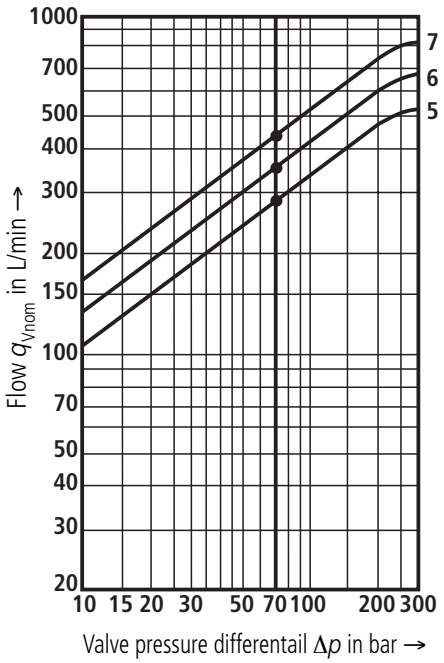
**NS 16**




Nominal flow

| | | |
|---|---|---|
| 100 L/min | = | Curve 1 |
| 150 L/min | = | Curve 2 |
| 200 L/min | = | Curve 3 |
| 300 L/min | = | Curve 4 |

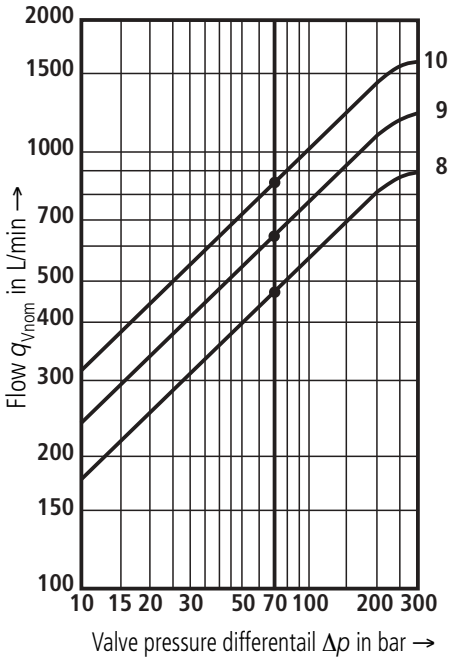
**NS 25**




Nominal flow

| | | |
|---|---|---|
| 300 L/min | = | Curve 5 |
| 400 L/min | = | Curve 6 |
| 500 L/min | = | Curve 7 |

**NS 32**

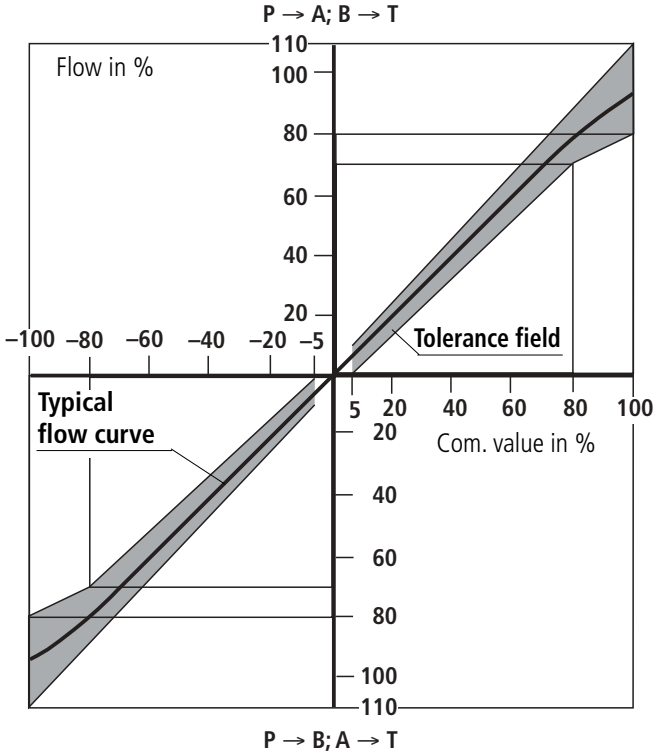



Nominal flow

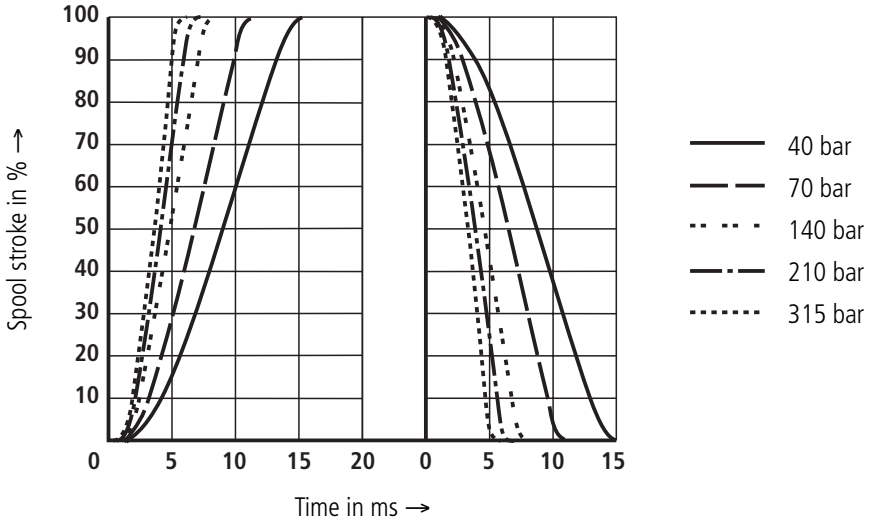
| | | |
|---|---|---|
| 500 L/min | = | Curve 8 |
| 700 L/min | = | Curve 9 |
| 1000 L/min | = | Curve 10 |

$\Delta p$ = Valve pressure differential (inlet pressure $p_P$ minus load pressure $p_L$ minus return pressure $p_T$)

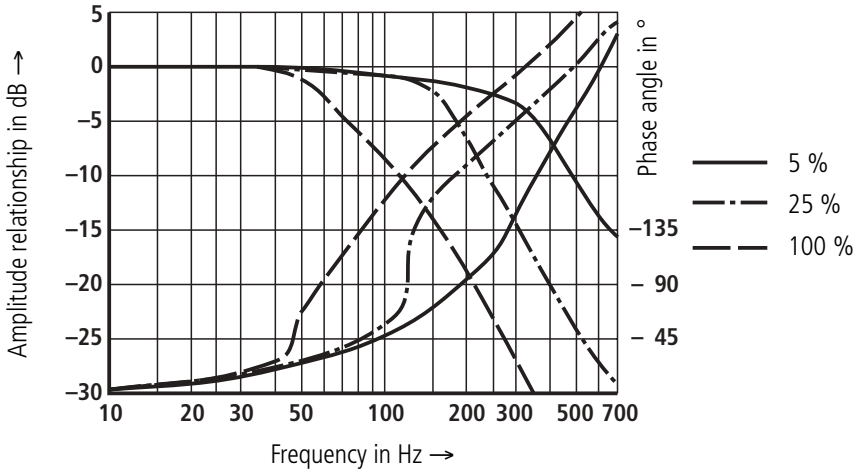
**The flow-signal function tolerance field** with a constant valve pressure differential



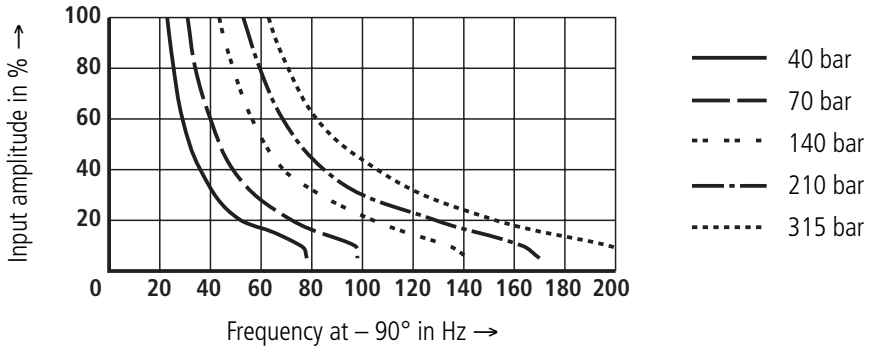
**Transient function**




**Frequency response at $p_p$ = 315 bar**

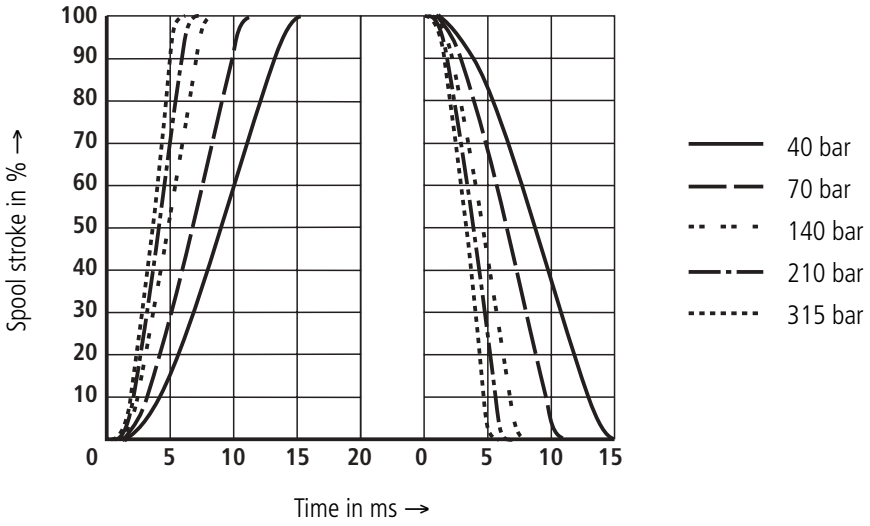



**Relationship of the – 90° frequency to the operating pressure**

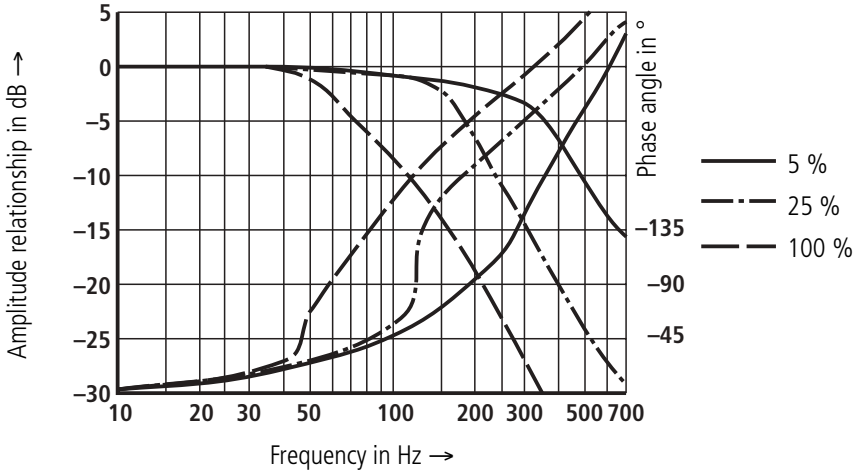



Output signal ≙ spool stroke without flow

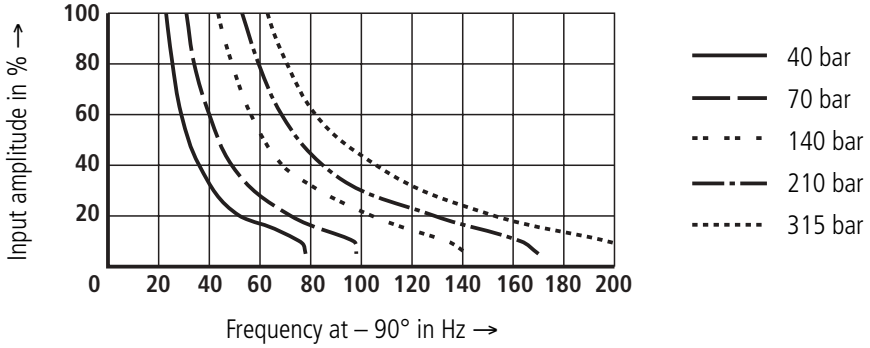
**Transient function**




**Frequency response at $p_p$ = 315 bar**

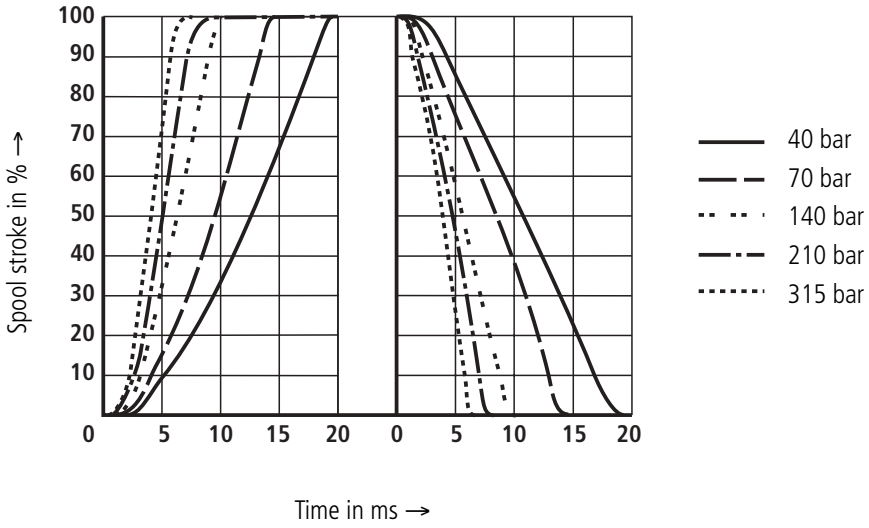



**Relationship of the – 90° frequency to the operating pressure**

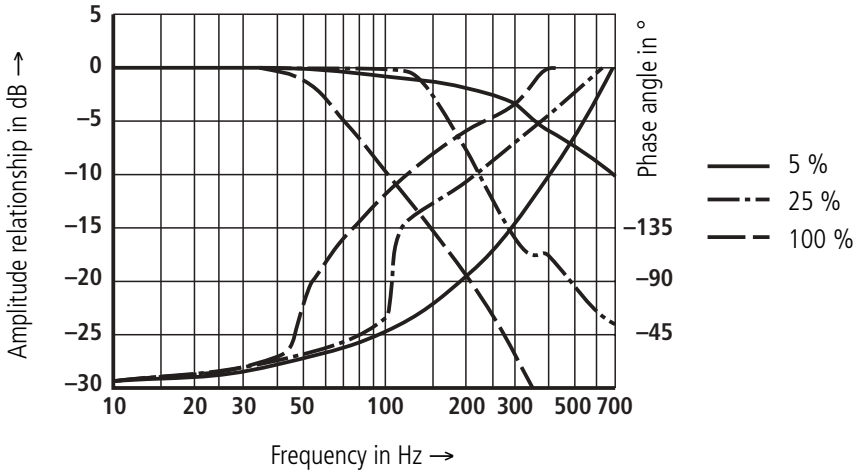



Output signal ≙ spool stroke without flow

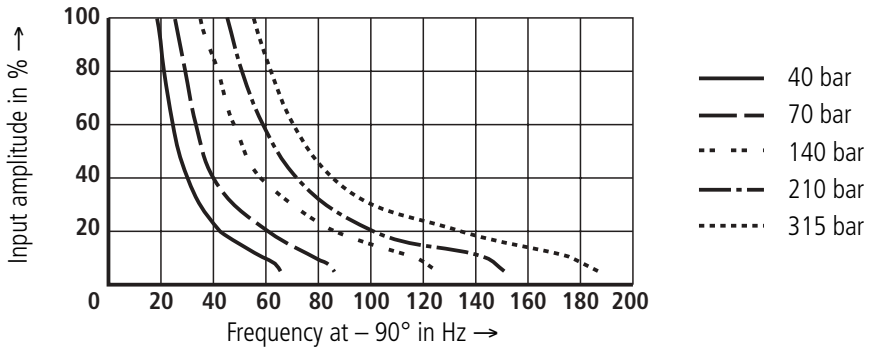
**Transient function**



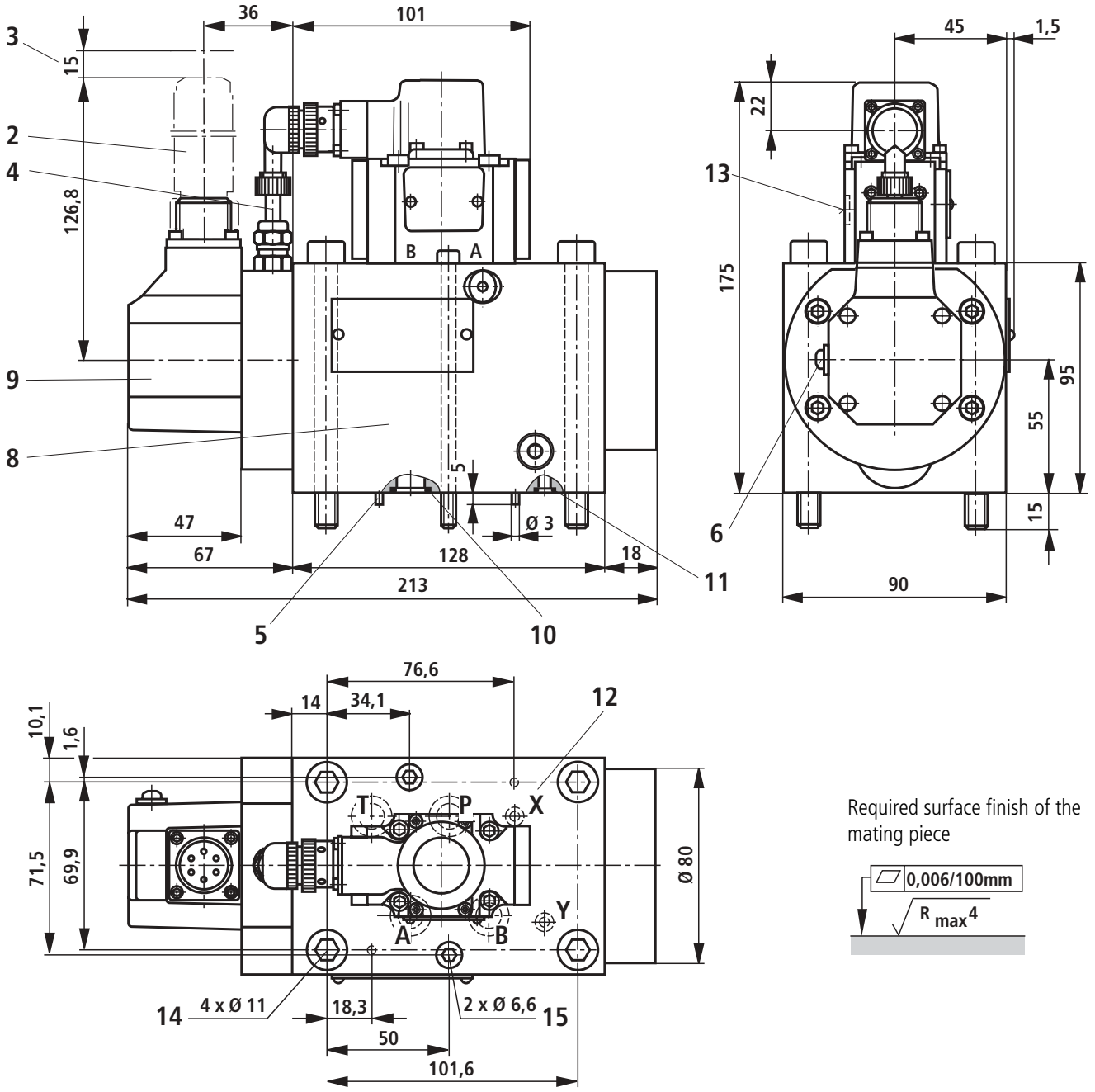

**Frequency response at $p_p$ = 315 bar**




**Relationship of the – 90° frequency to the operating pressure**




Output signal ≙ spool stroke without flow




Required surface finish of the mating piece




**1** Name plate

**2** Plug-in connector to E DIN 43 563-BF6-3/Pg11 (separate order, see page 7)

**3** Space required to remove the plug-in connector, take the connection cable into account!

**4** PVC cable is not compatible with HFD-R fluids

**5** Locating pin (2 off)

**6** Electrical zero point adjustment:
After removing the 2.5A/F plug it is possible, via a potentiometer, to adjust the zero point.

**7** Pilot control valve (2-stage)

**8** 3rd stage

**9** Integrated control electronics

**10** Identical seal rings for ports A, B, P and T

**11** Identical seal rings for ports X and Y
Ports X and Y are subjected to pressure even with „internal" pilot oil supply

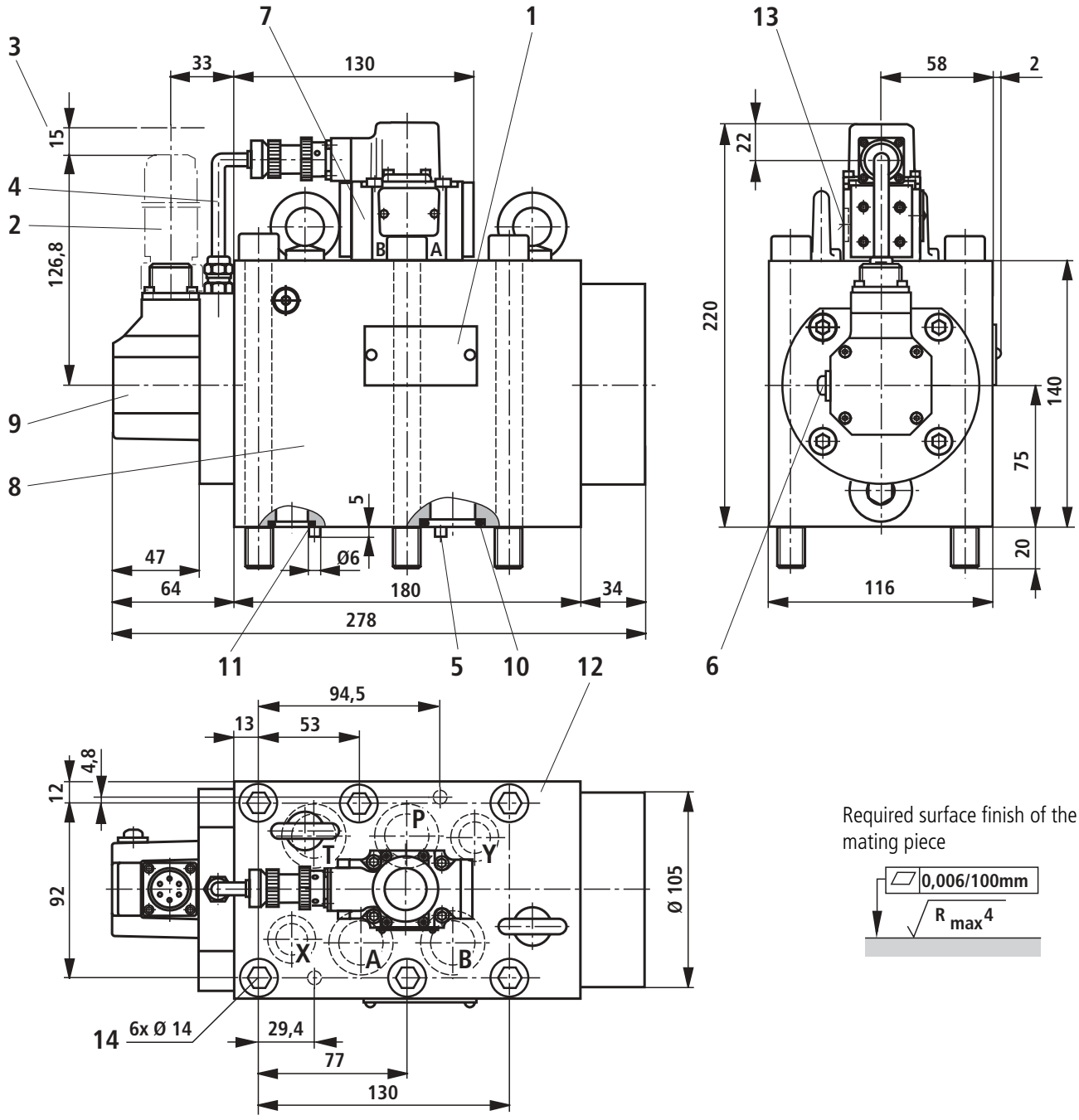
**12** Porting pattern to DIN 24 340, form A 16

**13** Filter, Material No. **00218621**
Seal, Material No. **00012505**
] Valid from series 15

**14** Valve fixing screws
4 off M10 x 110 DIN 912–8.8 A3C; $M_A$ = 46 Nm
(are included within the scope of supply)

**15** Valve fixing screws
2 off M6 x 110 DIN 912–10.9; $M_A$ = 15.5 Nm
(are included within the scope of supply)

**Subplates:** G 172/01 (G 3/4)
G 174/01 (G1), G 174/08 (flange)
to catalogue sheet RE 45 056 must be ordered separately.




Required surface finish of the mating piece




**1** Name plate

**2** Porting pattern to E DIN 43 563-BF6-3/Pg11 (separate order, see page 7)

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**4** PVC cable is not compatible with HFD-R fluids

**5** Locating pins (2 off)

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After removing the 2.5A/F plug it is possible, via a potentiometer, to adjust the zero point.

**7** Pilot control valve (2-stage)

**8** 3rd stage

**9** Integrated control electronics

**10** Identical seal rings for ports A, B, P and T

**11** Identical seal rings for ports X and Y
Ports X and Y are subjected to pressure even with „internal" pilot oil supply

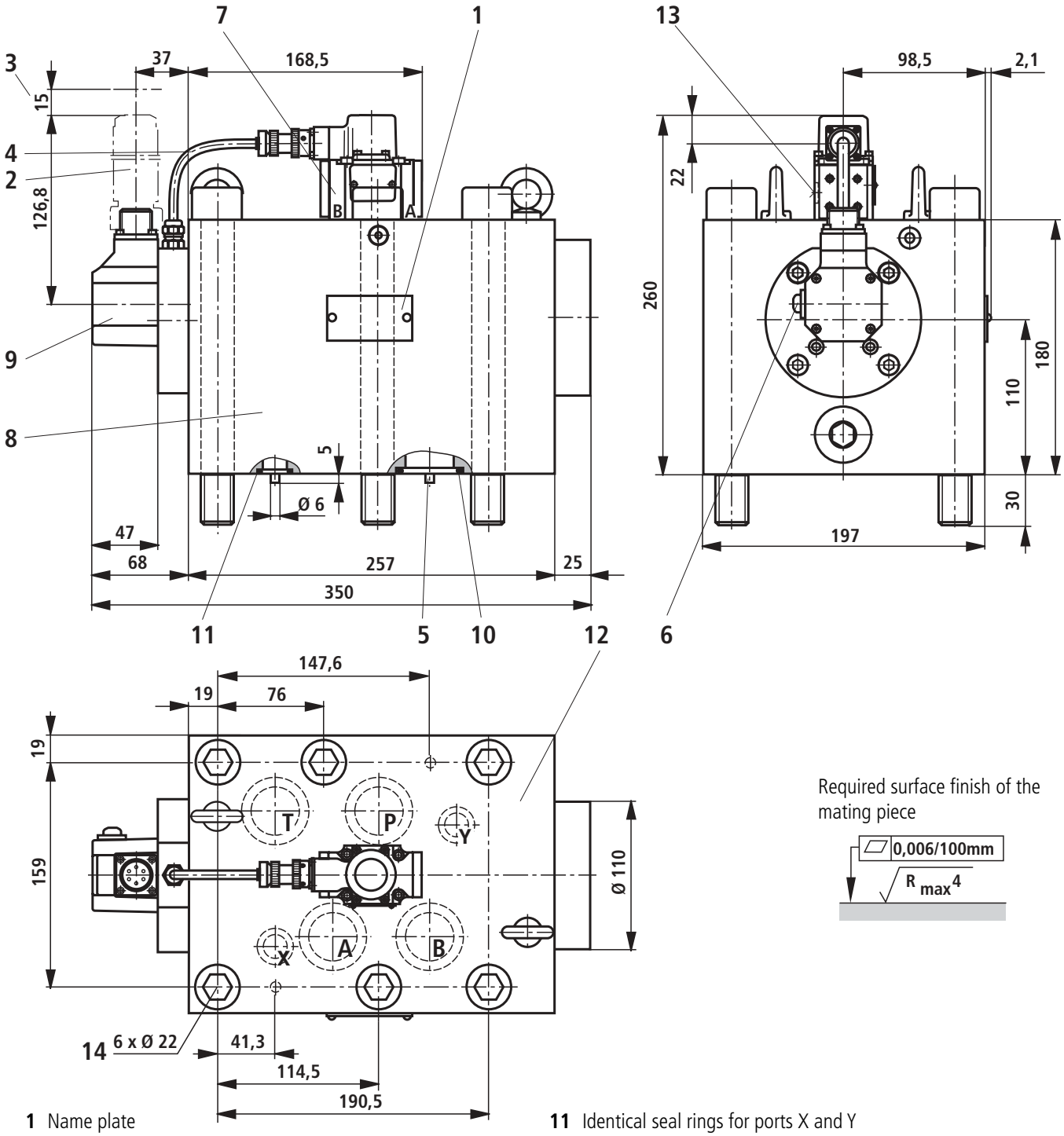
**12** Porting pattern to DIN 24 340, form A 25

**13** Filter, Material No. **00218621**
Seal, Material No. **00012505**
] Valid from series 24

**14** Valve fixing screws
6 off M12 x 160 DIN 912–10.9 A3C; $M_A$ = 117 Nm
(are included within the scope of supply)

**Subplates:** G 151/01 (G 1)
G 154/01 (G1 1/4), G 154/08 (flange)
G 156/01 (G1 1/2)

to catalogue sheet RE 45 058 must be ordered separately.




Required surface finish of the mating piece




**1** Name plate

**2** Plug-in connector to E DIN 43 563-BF6-3/Pg11 (separate order, see page 7)

**3** Space required to remove the plug-in connector, take the connection cable into account!

**4** PVC cable is not compatible with HFD-R fluids

**5** Locating pin (2 off)

**6** Electrical zero point adjustment:
After removing the 2.5A/F plug it is possible, via a potentiometer, to adjust the zero point.

**7** Pilot control valve (2-stage)

**8** 3rd stage

**9** Integrated control electronics

**10** Identical seal rings for ports A, B, P and T

**11** Identical seal rings for ports X and Y
Ports X and Y are subjected to pressure even with „internal" pilot oil supply

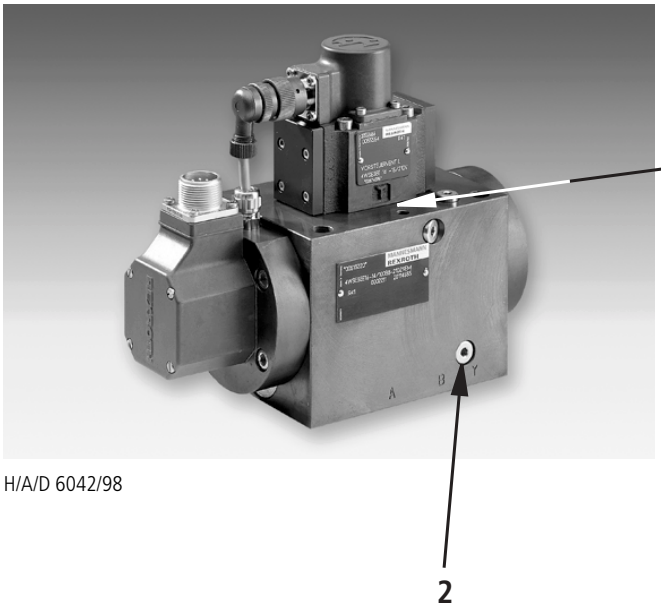
**12** Porting pattern to DIN 24 340, form A 32

**13** Filter, Material No. **00218621**
Seal, Material No. **00012505**
] Valid from series 44

**14** Valve fixing screws
6 off M20 x 210 DIN 912–10.9; $M_A$ = 620 Nm
(are included within the scope of supply)

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

to catalogue sheet RE 45 060 must be ordered separately.

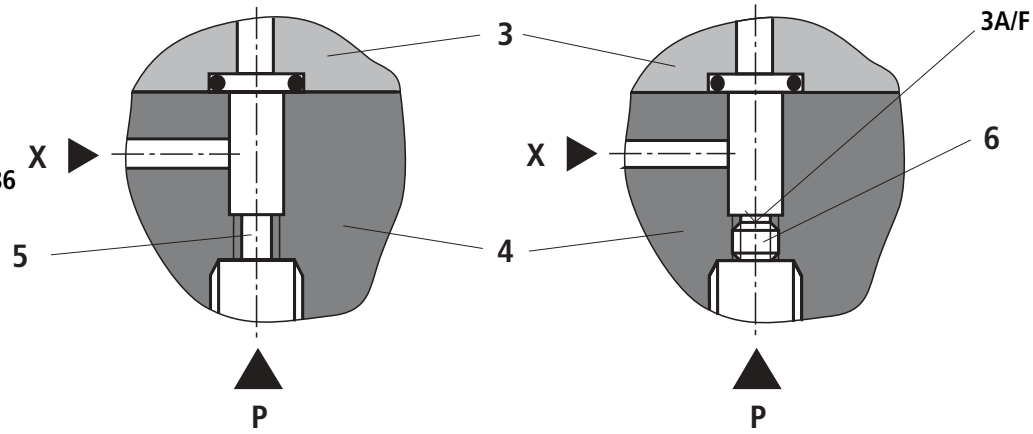



H/A/D 6042/98

**1** This is where the pilot oil supply is changed
**2** This is where the pilot oil drain is changed

**Pilot oil supply**

**3** Pilot control valve
**4** Main valve
**5** Open
**6** Plug M6 similar to DIN 906; Material No. **00023986**

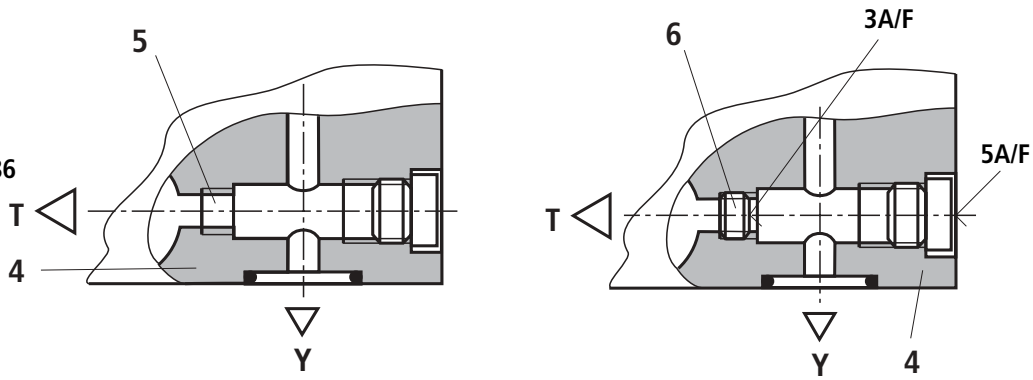



**Internal pilot oil supply**
(Versions **"E"** and **"ET"**)

**External pilot oil supply**
(Versions **"–"** and **"T"**)

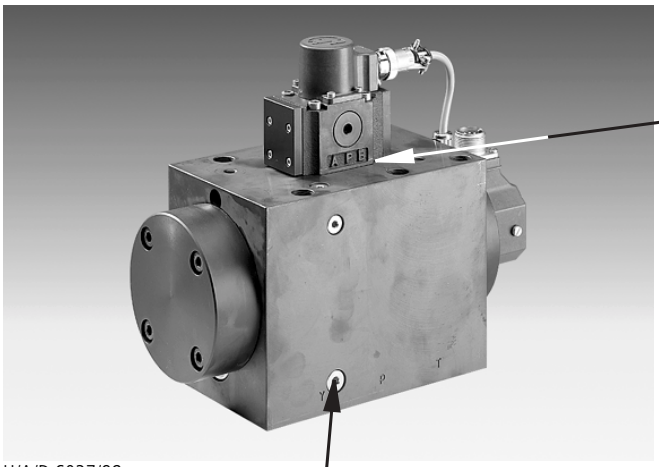
**Pilot oil drain**

**4** Main valve
**5** Open
**6** Plug M6 similar to DIN 906; Material No. **00023986**




**Internal pilot oil drain**
(Versions **"T"** and **"ET"**)

**External pilot oil drain**
(Versions **"–"** and **"E"**)




H/A/D 6037/98

**1** This is where the pilot oil supply is changed

**2** This is where the pilot oil drain is changed

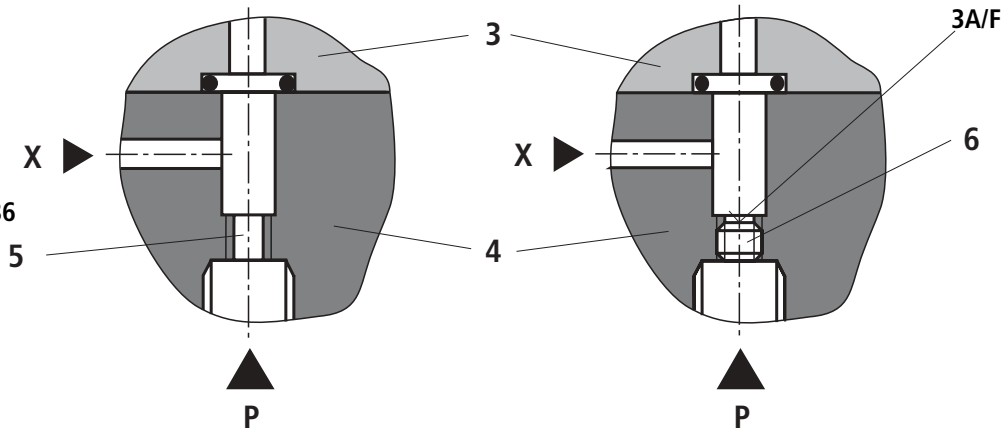
**Pilot oil supply**

**3** Pilot control valve

**4** Main valve

**5** Open

**6** Plug M6 similar to DIN 906;
Material No. **00023986**




**Internal pilot oil supply**
(Versions **"E"** and **"ET"**)

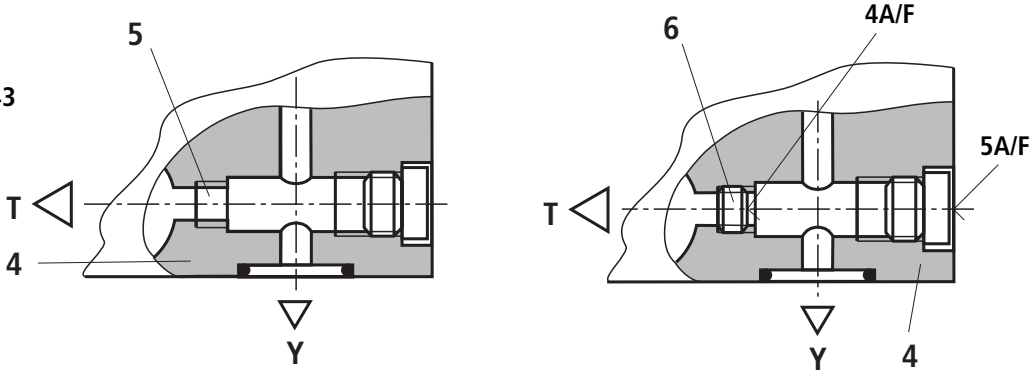
**External pilot oil supply**
(Versions **"–"** and **"T"**)

**Pilot oil drain**

**4** Main valve

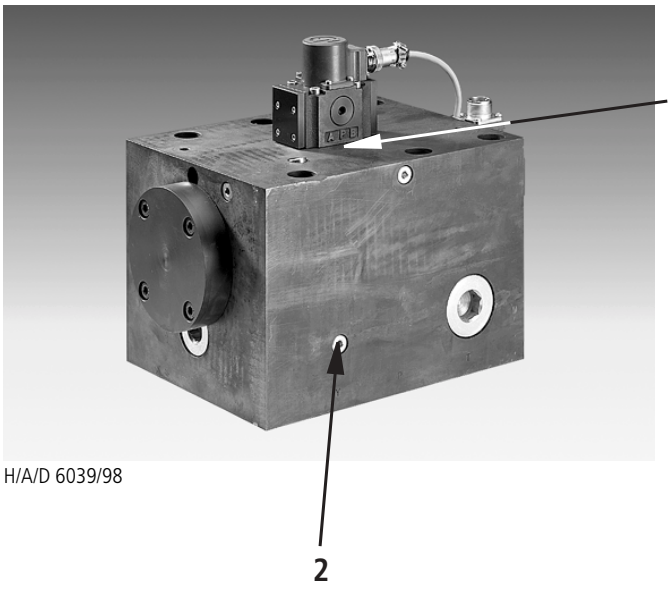
**5** Open

**6** Plug M8 x 1 similar to DIN 906;
Material No. **00003443**




**Internal pilot oil drain**
(Versions **"T"** and **"ET"**)

**External pilot oil drain**
(Versions **"–"** and **"E"**)

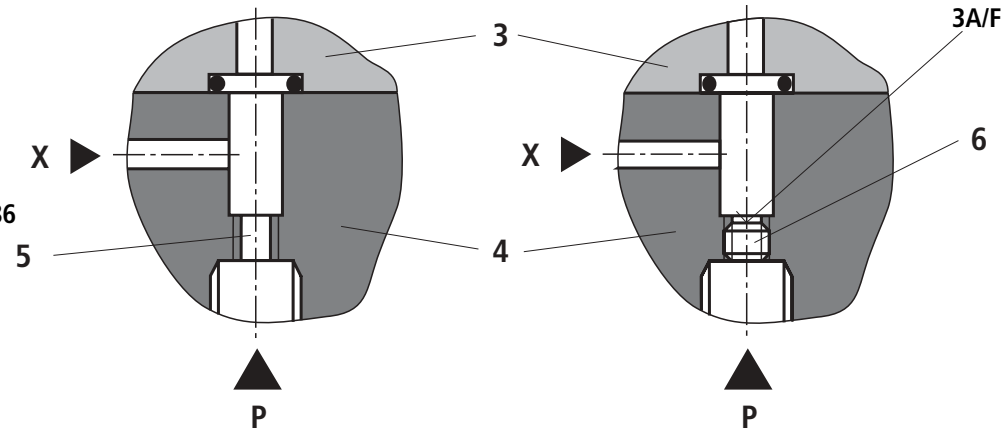



H/A/D 6039/98

**1** This is where the pilot oil supply is changed
**2** This is where the pilot oil drain is changed

**Pilot oil supply**

**3** Pilot control valve
**4** Main valve
**5** Open
**6** Plug M6 similar to DIN 906; Material No. **00023986**

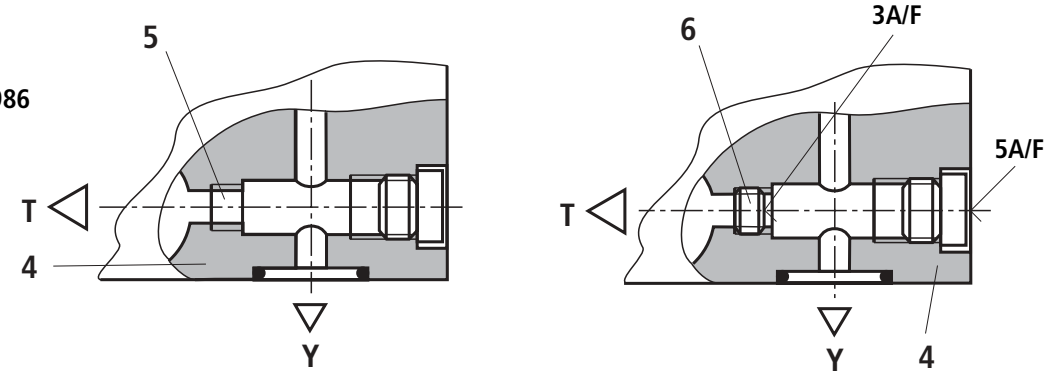



**Internal pilot oil supply**
(Versions **"E"** and **"ET"**)

**External pilot oil supply**
(Versions **"–"** and **"T"**)

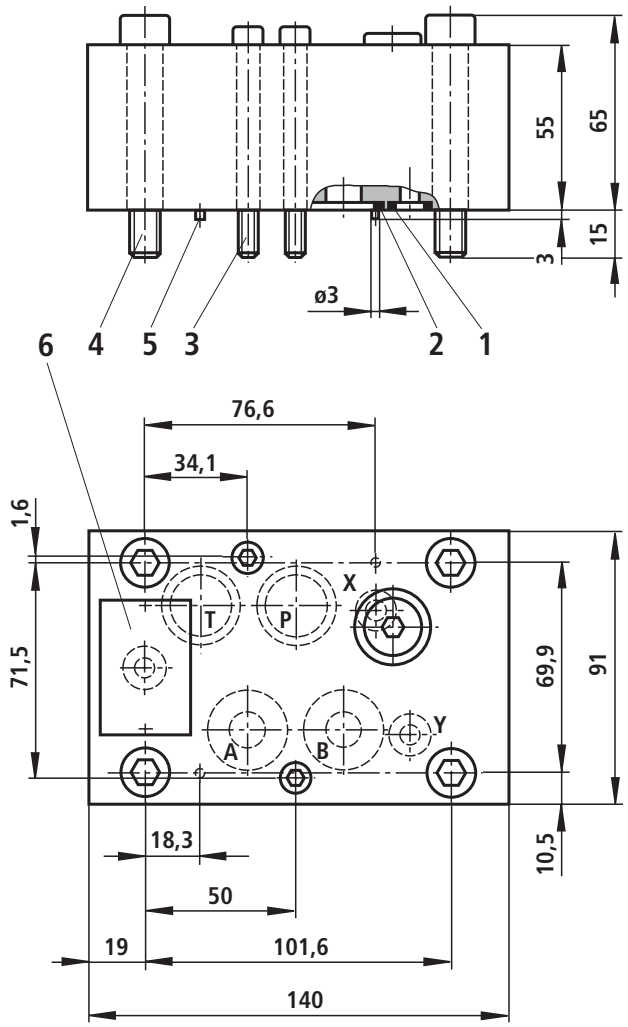
**Pilot oil drain**

**4** Main valve
**5** Open
**6** Plug M6 similar to DIN 906; Material No. **00023986**



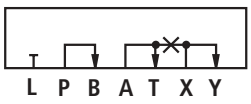

**Internal pilot oil drain**
(Versions**"T"** and **"ET"**)

**External pilot oil drain**
(Versions **"–"** and **"E"**)




**Symbols**


With FKM seals
Material No. **00904218**
Weight: 5 kg




With FKM seals
Material No. **00959376**
(not illustrated)
Masse: 5 kg

**1** R-ring 10 x 2 x 2 (L, X, Y)

**2** R-ring 22.53 x 2.30 x 2.62 (P, T, A, B)

**3** 2 off S.H.C.S. M6 x 70 DIN 912–10.9 (are included within the scope of supply); $M_A$ = 15,5 Nm

**4** 4 off S.H.C.S. M10 x 70 DIN 912–10.9 (are included within the scope of supply); $M_A$ = 75 Nm

**5** 2 off locating pins 3 x 8 –A2C DIN EN 28 741

**6** Name plate

In order to guarantee that the servo valves function correctly, it is absolutely necessary to flush the installation before commissioning.

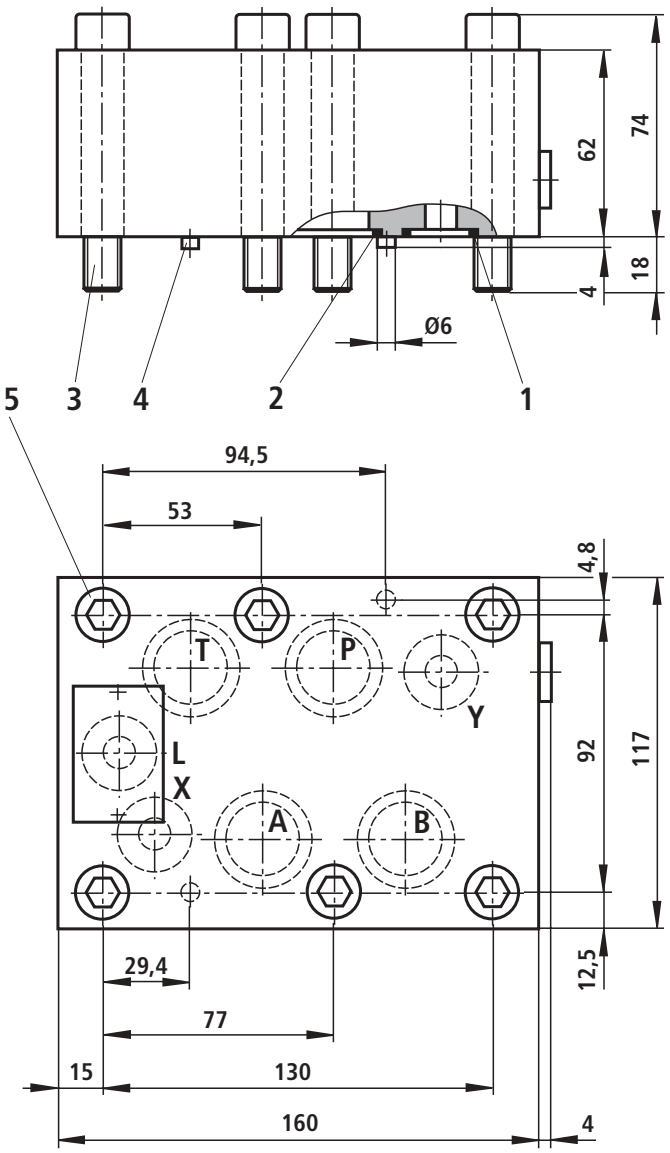
The following is a guide to the flushing time necessary for the installation:

$$t \geq \frac{V}{q_v} \bullet 5$$

$t$ = Flushing time in hours
$V$ = Tank contents in litres
$q_v$ = Pump flow in litres per minute

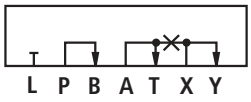
If the tank needs to be refilled with more than 10 % of its capacity it will be necessary to reflush the system.

A directional control valve with a porting pattern to DIN 24 340 form A 16 is more suited than a flushing plate for the flushing operation, as the actuator lines can also be flushed.




**Symbols**


With FKM seals
Material No. **00959384**
Weight: 8.4 kg




With FKM seals
Material No. **00959377**
(not illustrated)
Weight: 8.4 kg

**1** R-ring 19 x 3 x 3 (L, X, Y)

**2** R-ring 27.8 x 2.60 x 3 (P, T, A, B)

**3** 6 off S.H.C.S. M12 x 80 DIN 912–10.9 (are included within the scope of supply); $M_A$ = 130 Nm

**4** 2 off locating pins 6 x 12 –6.8 DIN EN 28 741

**5** Name plate

In order to guarantee that the servo valves function correctly, it is absolutely necessary to flush the installation before commissioning.

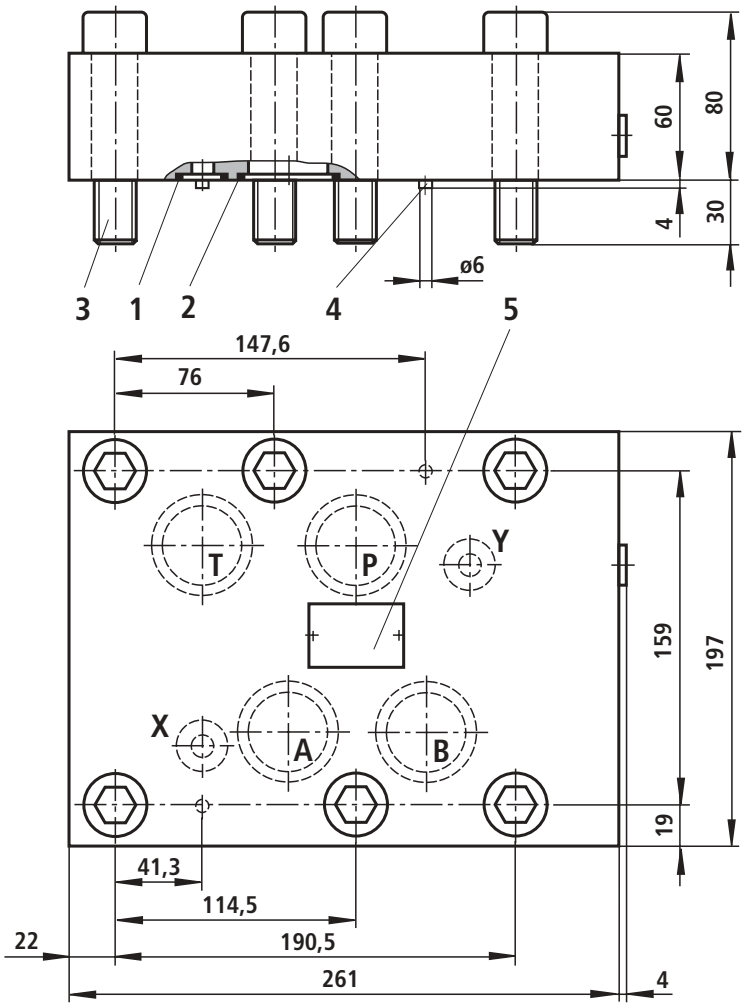
The following is a guide to the flushing time necessary for the installation:

$$t \geq \frac{V}{q_v} \bullet 5$$

$t$ = Flushing time in hours
$V$ = Tank contents in litres
$q_v$ = Pump flow in litres per minute

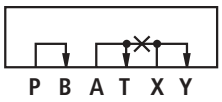
If the tank needs to be refilled with more than 10 % of its capacity it will be necessary to reflush the system.

A directional control valve with a porting pattern to DIN 24 340 form A 25 is more suited than a flushing plate for the flushing operation, as the actuator lines can also be flushed.




**Symbols**


With FKM seals
Material No. **00550597**
Weight: 22.3 kg




With FKM seals
Material No. **00959396**
(not illustrated)
Weight: 22.3 kg

**1** R-ring 42.5 x 3 x 3 (L, X, Y)

**2** R-ring 19 x 3 x 3 (P, T, A, B)

**3** 6 off S.H.C.S. M20 x 90 DIN 912–10.9 (are included within the scope of supply); $M_A$ = 620 Nm

**4** 2 off locating pins 6 x 12 –6.8 DIN EN 28 741

**5** Name plate

In order to guarantee that the servo valves function correctly, it is absolutely necessary to flush the installation before commissioning.

The following is a guide to the flushing time necessary for the installation:

$$t \geq \frac{V}{q_v} \bullet 5$$

$t$ = Flushing time in hours
$V$ = Tank contents in litres
$q_v$ = Pump flow in litres per minute

If the tank needs to be refilled with more than 10 % of its capacity it will be necessary to reflush the system.

A directional control valve with a porting pattern to DIN 24 340 form A 32 is more suited than a flushing plate for the flushing operation, as the actuator lines can also be flushed.

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