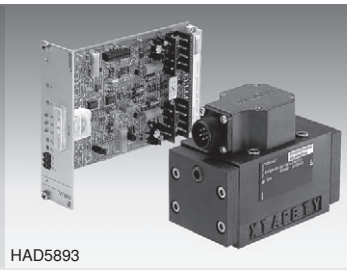
Directional servo-valve in 4-way design

RE 29583/05.11 1/20
Replaces: 07.03

Type 4WS.2E...

Type 4WSE2ED 10-5X/...B...K31EV



Type 4WS2EM 10-5X/...B...K31EV

Size 10
Component series 5X
Maximum operating pressure 315 bar
Maximum flow 180 l/min

Table of contents

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

Features

- Valve to control position, force, pressure or velocity
- 2-stage servo valve with mechanical or mechanical and electric return
- 1st stage as nozzle flapper plate amplifier
- Subplate mounting:
  Porting pattern according to ISO 4401
- Dry control motor, no pollution of the solenoid gaps by the hydraulic fluid
- Can also be used as 3-way version
- Wear-free control spool return element
- Control
  - External control electronics in Eurocard format or in modular design (separate order), see page 8
  - Or control electronics integrated in the valve (OBE)
- Valve and integrated control electronics are adjusted and tested
- Control spool with flow force compensation
- Control sleeve centrically fixed; thus low susceptibility to temperature and pressure
- Pressure chambers at the control sleeve with gap seal, no wear of the seal ring
- Filter for 1st stage externally accessible, see pages 16, 17 and 18

Ordering code

		10	5X	B				K31	E	V	*

Directional servo-valve in 4-way design for **external** control electronics **= 4WS2E**
with **integrated** control electronics **= 4WSE2E**

Mechanical return **= M**

Mechanical and electric return **= D**
(only available with integrated electronics)

Size 10 **= 10**

Component series 50 to 59 **= 5X**
(50 to 59: Unchanged installation and connection dimensions)

Rated flow [1]
with valve pressure differential Δp = 70 bar

5 l/min	**= 5**
10 l/min	**= 10**
20 l/min	**= 20**
30 l/min	**= 30**
45 l/min	**= 45**
60 l/min	**= 60**
75 l/min	**= 75**
90 l/min	**= 90**

Pilot oil supply and return [3]

– =	Supply external, return external
E =	Supply internal, return external
T =	Supply external, return internal
ET =	Supply internal, return internal

Valves for **external** control electronics: [2]
11 = Coil no. 11 (30 mA / 85 Ω per coil)

Valves with **integrated** control electronics:

	Command value	Actual value (only available with 4WSE2ED…)
9 =	±10 V	±10 V
13 =	±10 mA	±10 mA

Inlet pressure range [4]

210 =	10 to 210 bar
315 =	10 to 315 bar

Electrical connection

K31 = **Without** mating connector with connector according to EN 175201-804
Mating connector - separate order see page 7

Spool overlap [5]

E = 0 to 0.5 % negative

Seal material [6]

V = FKM seals suitable for mineral oil (HL, HLP) according to DIN 51524

Further details in the plain text [7]

Rated flow [1]

The rated flow refers to a 100 % command value signal at 70 bar valve pressure differential (35 bar per control edge). The valve pressure differential must be regarded as reference. Other values result in the flow being changed.

A possible rated flow tolerance of ±10 % must be taken into account (see flow signal function page 9).

Electrical control data [2]

Valves for **external** control electronics:
The actuating signal must be formed by a current-controlled output stage. Servo amplifier see page 7.

Valves with **integrated** control electronics:
With the integrated electronics, the command value can be fed in as voltage (ordering code "9") or - with larger distances (> 25 m between control and valve) as current (ordering code "13").

Pilot oil [3]

Care should be taken that the pilot pressure is as constant as possible. An external pilot control via port X is thus often advantageous. The valve can be operated with a higher pressure at X than at P in order to influence the dynamics in a positive form.

The ports X and Y are also pressurized in case of "Internal" pilot oil supply.

Inlet pressure range [4]

Care should be taken that the system pressure is as constant as possible.

Pilot pressure range: 10 to 210 bar or 10 to 315 bar

With regard to the dynamics, the frequency response dependency must be observed within the admissible pressure range.

Spool overlap [5]

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

Other control spool overlaps upon request!

Seal material [6]

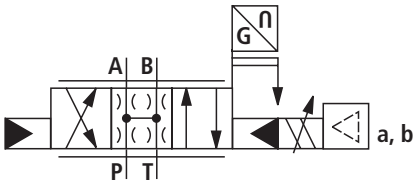
If you need any other sealing material, please contact us!

Details in the plain text [7]

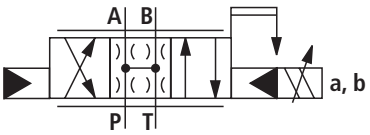
Here, special requests are to be specified in the plain text. After receipt of the order, they are checked by the plant and the type designation is amended with a related number.

Symbols

Valves with electric and mechanical return, with OBE
(example: 4WS**E**2ED 10-5X…ET…)



Valves with mechanical return, without OBE
(example: 4WS2EM 10-5X…ET…)



Function, section

4WS(E)2EM10-5X/...

Valves of type 4WS(E)2EM10-5X/... are electrically operated, 2-stage directional servo-valves. They are mainly used to control position, force and velocity.

These valves consist of an electro-mechanical converter (torque motor) (1), a hydraulic amplifier (nozzle flapper plate principle) (2) and a control spool (3) in a sleeve (2nd stage), which is connected to the torque motor via a mechanical return.

An electrical input signal at the coils (4) of the torque motor generates a force by means of a permanent magnet which acts on the armature (5), and in connection with a torque tube (6) results in a torque. This causes the flapper plate (7) which is connected to the torque tube (6) via a pin to move from the central position between the two control nozzles (8), and a pressure differential is created across the front faces of the control spool. This pressure differential results in the control spool changing its position, which results in the pressure port being connected to one actuator port and, at the same time, the other actuator port being connected to the return flow port.

The control spool is connected to the flapper plate or the torque motor by means of a bending spring (mechanical return) (9). The position of the control spool is changed until the feedback torque across the bending spring and the electromagnetic torque of the torque motor are balanced and the pressure differential at the nozzle flapper plate system becomes zero.

The stroke of the control spool and consequently the flow of the servo valve are controlled in proportion to the electrical input signal. It must be noted that the flow depends on the valve pressure drop.

External control electronics, type 4WS2EM10-5X/... (separate order)

External control electronics (servo amplifier) serve the actuation of the valve, amplifying an analog input signal (command value) so that with the output signal, the servo valve is actuated in a flow-controlled form.

Integrated control electronics, type 4WSE2EM10-5X/... and 4WSE2ED10-5X/...

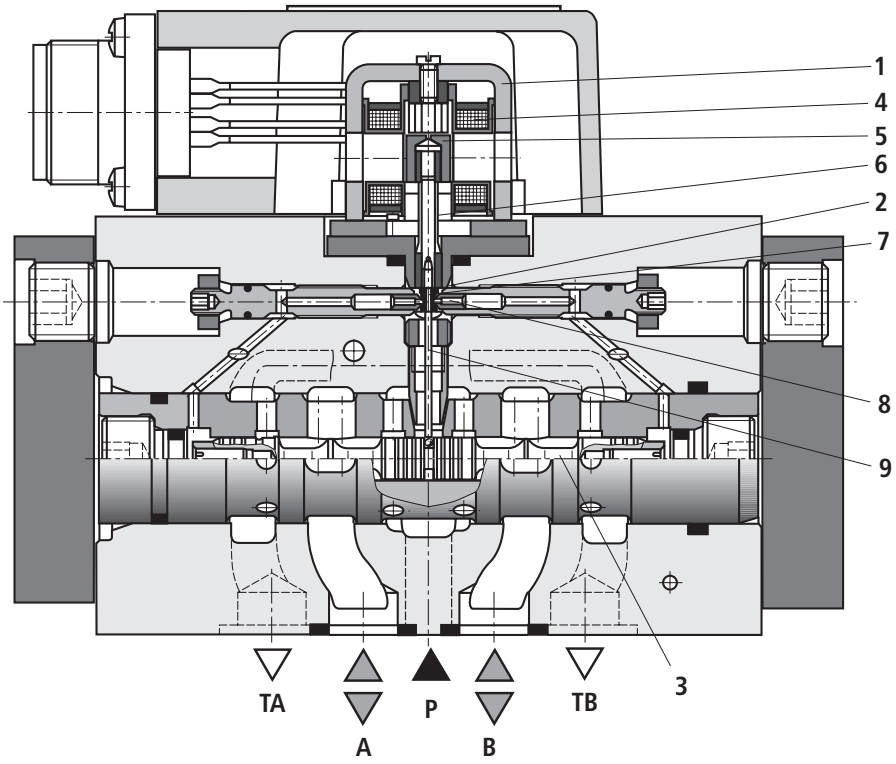
To amplify the analog input signal, control electronics (10) especially adjusted to this valve type are integrated. They are located in the torque motor cover cap. The valve zero point can be adjusted by means of an externally accessible potentiometer.

4WSE2ED10-5X/...

In addition to the mechanical control by the return spring, valves of this types are equipped with the electric spool position detection and control. The control spool position is determined by an inductive position transducer (11). The position transducer signal is compared to the command value by integrated control electronics (10). Any possible control deviation is amplified electrically and fed to the torque motor as control signal. With the additional electric return, higher dynamical values can be achieved by the electric controller gain in the small signal range than with the purely mechanical version. The additionally available mechanical return ensures that in case the electric voltage supply fails, the valve spool is positioned in the zero range.

The valve is only available with integrated control electronics. The valve zero point can be adjusted by means of an externally accessible potentiometer.

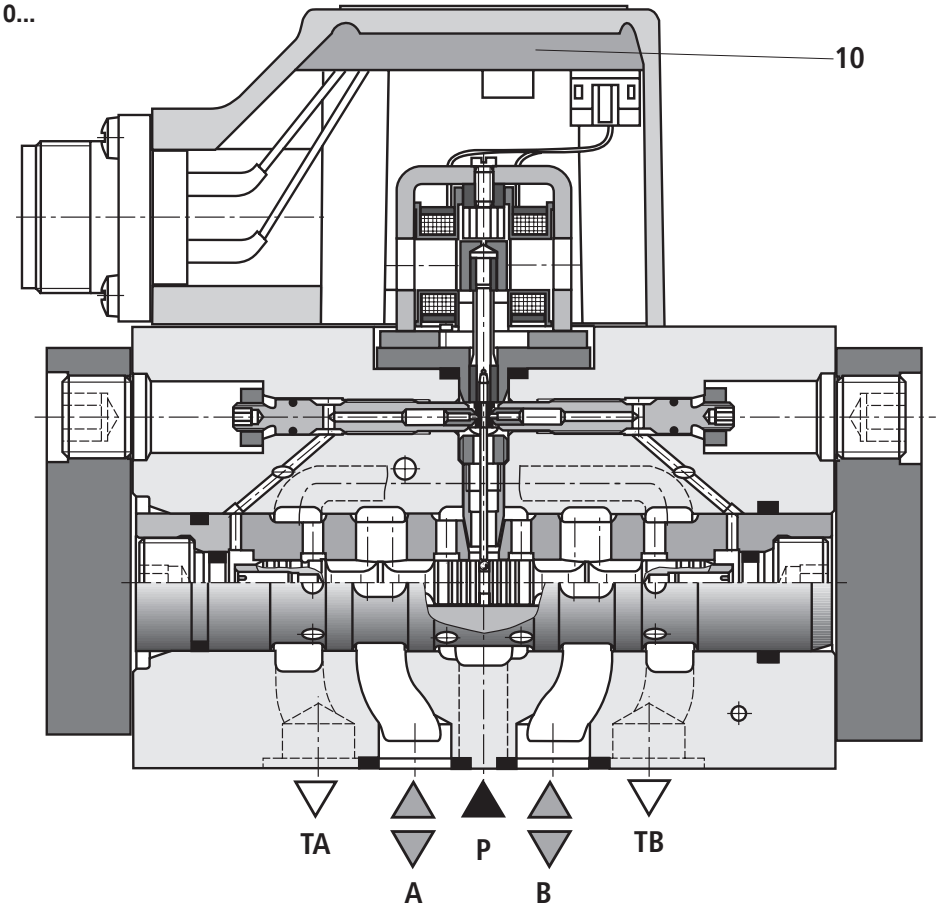
Note:
Changes in the zero point may result in damage to the system and may only be implemented by instructed specialists.



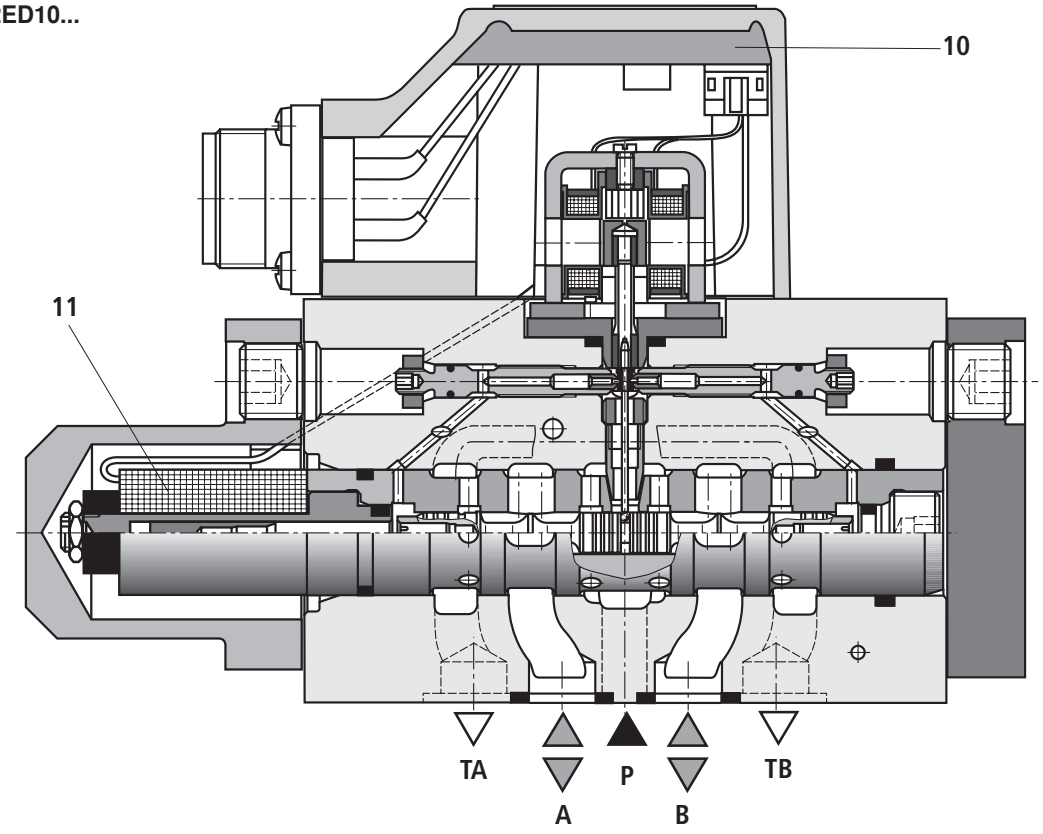
Type 4WS2EM10...

Section

Type 4WSE2EM10...



Type 4WSE2ED10...



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

general

Weight	with mechanical return	kg	3.56
	with mechanical and electric return and integrated control electronics	kg	3.65
Installation position			Optional, if it is ensured that during start-up of the system the pilot control is supplied with sufficient pressure (≥ 10 bar).
Storage temperature range		°C	–20 to +80
Ambient temperature range		°C	–20 to +60 valve with OBE
			–30 to +100 valve without OBE

hydraulic (measured with HLP 32, ϑ_{oil} = 40 °C ± 5 °C)

Operating pressure	Pilot control stage, pilot oil supply	bar	10 to 210 or 10 to 315
	Main valve, port P, A, B	bar	Up to 315
Return flow pressure	Port T		
	Pilot oil return internal	bar	Pressure peaks < 100 permitted, static < 10
	Pilot oil return external	bar	Up to 315
	Port Y	bar	Pressure peaks < 100 permitted, static < 10
Hydraulic fluid			See table page 7
Hydraulic fluid temperature range		°C	–15 to +80, preferably +40 to +50
Viscosity range		mm^2/s	15 to 380, preferably 30 to 45
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)			Class 18/16/13 [1]

Zero flow $Q_{V,L}$ [2] measured without dither signal	l/min	$\sqrt{\frac{p_P}{70\ bar}}$ [4] •0.7 l/min	$\sqrt{\frac{p_P}{70\ bar}}$ [4] •0.9 l/min	$\sqrt{\frac{p_P}{70\ bar}}$ [4] •1.2 l/min			$\sqrt{\frac{p_P}{70\ bar}}$ [4] •1.5 l/min		$\sqrt{\frac{p_P}{70\ bar}}$ [4] •1.7 l/min
Rated flow $Q_{V\ rated}$ [3], tolerance ±10 % with valve differential pressure Δp = 70 bar	l/min	5	10	20	30	45	60	75	90
Maximum control spool stroke possible with mechanical end position (in case of error) related to nominal stroke	%	120 to 170				120 to 150			
Pressure gain with 1 % spool stroke change (from the hydraulic zero point)	% of p_P [4]	≥ 30					≥ 60		≥ 80
Return system		Mechanical "M"					Mechanical and electric "D"		
Hysteresis (dither-optimized)	%	≤ 1.5					≤ 0.8		
Range of inversion (dither-optimized)	%	≤ 0.3					≤ 0.2		
Response sensitivity (dither-optimized)	%	≤ 0.2					≤ 0.1		
Zero adjustment flow over the entire operating pressure range	%	≤ 3, long-term ≤ 5					≤ 2		
Zero shift upon change of:									
Hydraulic fluid temperature	% / 20 °C	≤ 1					≤ 2		
Ambient temperature	% / 20 °C	≤ 1					≤ 2		
Operating pressure 80 to 120 % of p_P [4]	% / 100 bar	≤ 2					≤ 2		
Return flow pressure 0 to 10 % p_P [4]	% / bar	≤ 1					≤ 1		

[1] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see www.boschrexroth.com/filter

[2] $Q_{V,L}$ = Zero flow in l/min

[3] $Q_{V\ rated}$ = Rated flow (complete valve) in l/min

[4] p_P = Operating pressure in bar

Technical Data (For applications outside these parameters, please consult us!)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons	HL, HLP	NBR, FKM	DIN 51524
Flame-resistant – Water-containing	HFC	NBR	ISO 12922

☞ **Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.
- **Flame-resistant – water-containing**: Maximum pressure difference per control edge 175 bar, otherwise, increased cavitation erosion!
  Tank pre-loading < 1 bar or > 20 % of the pressure difference. The pressure peaks should not exceed the maximum operating pressures!

electric

Return system			Mechanical "M"	Mechanical and electric "D"
Protection class of the valve according to EN 60529			IP 65 with mating connector mounted and locked	
Type of signal			Analog	
Rated current per coil		mA	30	
Resistance per coil		Ω	85	
Inductivity with 60 Hz and 100 % rated current	Connection in series	H	1.0	
	Connection in parallel	H	0.25	
In case of actuation using non-Rexroth amplifiers, we recommend a superimposed dither signal				

electric, external control electronics (only version "M")

Amplifier (separate order)	Eurocard format	Analog	Type VT-SR2-1X/... according to data sheet 29980
	Modular design	Analog	Type VT 11021 according to data sheet 29743

Important: Information on the **environment simulation testing** for the areas EMC (electromagnetic compatibility), climate and mechanical load see data sheet 29583-U (declaration on environmental compatibility).

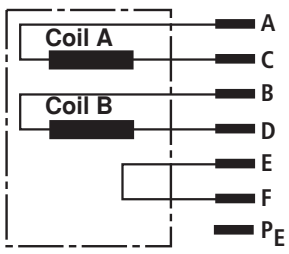
Available accessories

Service case with test device for continuous valves with integrated electronics type VT-VETSY-1 according to data sheet 29685.

Service case with test device for servo valves for external electronics type VT-SVTSY-1 according to data sheet 29681.

Electrical connection, external control electronics

Type 4WS2EM 10-5X...



The electrical connection can be designed as parallel or serial connection. For reasons of operational safety and the resulting lower coil inductivity, we recommend the connection in parallel.

The E-F bridge can be used for the electrical determination of the correct connection of the plug-in connector and/or for the identification of cable break.

Connection in parallel:
In the mating connector, connect contact A with B and C with D.

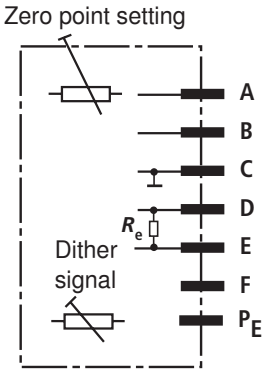
Connection in series:
In the mating connector, connect contact B with C.

Electrical control from A (+) to D (–) results in the flow direction P to A and B to T. Inverted electrical control results in the flow direction P to B and A to T.

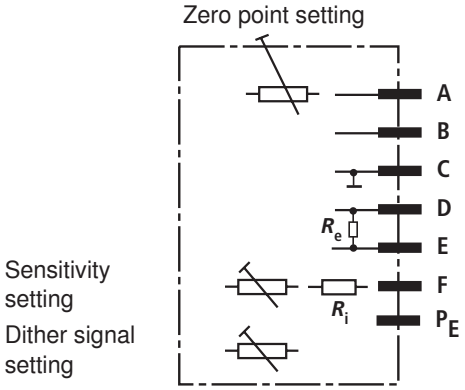
E → F = bridge

Electrical connection, integrated control electronics

Type 4WSE2EM 10-5X...



Type 4WSE2ED 10-5X...



	Mating connector assignment	Current control	Voltage control
		Control "**13**"	Control "**9**"
Supply voltage	A	+15 V	+15 V
	B	–15 V	–15 V
	C	⊥	⊥
Command value	D	±10 mA	±10 V
	E	R_e = 100 Ω	R_e ≥ 50 kΩ
Measuring output for control spool	F [1]	±10 mA [2] Load max. 1 kΩ	+10 V against ⊥ [2] R_i ≈ 4.7 kΩ

[1] In valves with mechanical return, part F is not used.
[2] With nominal spool stroke

Current consumption at the mating connector port	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 %

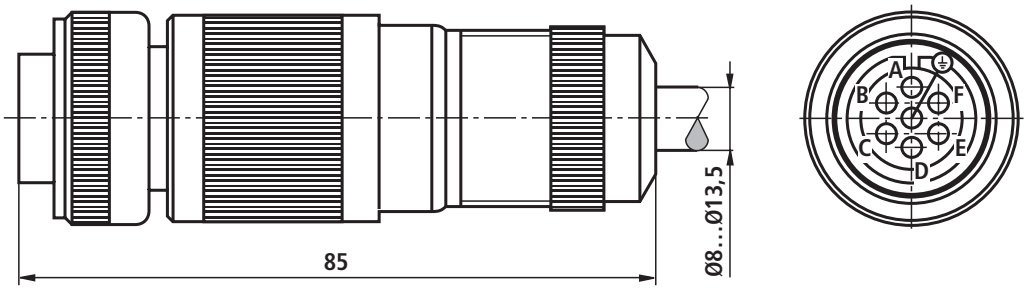
Command value: Command value at the mating connector port D = positive against mating connector port E results in flow from P to A and B to T.
Measuring output F has positive signal against ⊥.
Command value at the mating connector port D = negative against mating connector port E results in flow from P to B and A to T.
Measuring output F has negative signal against ⊥.

Measuring output: The voltage or current signal is proportional to the control spool stroke.

Important: Electric signals taken out via control electronics (e.g. actual value) must not be used for switching off safety-relevant machine functions!

Electrical connection, mating connector

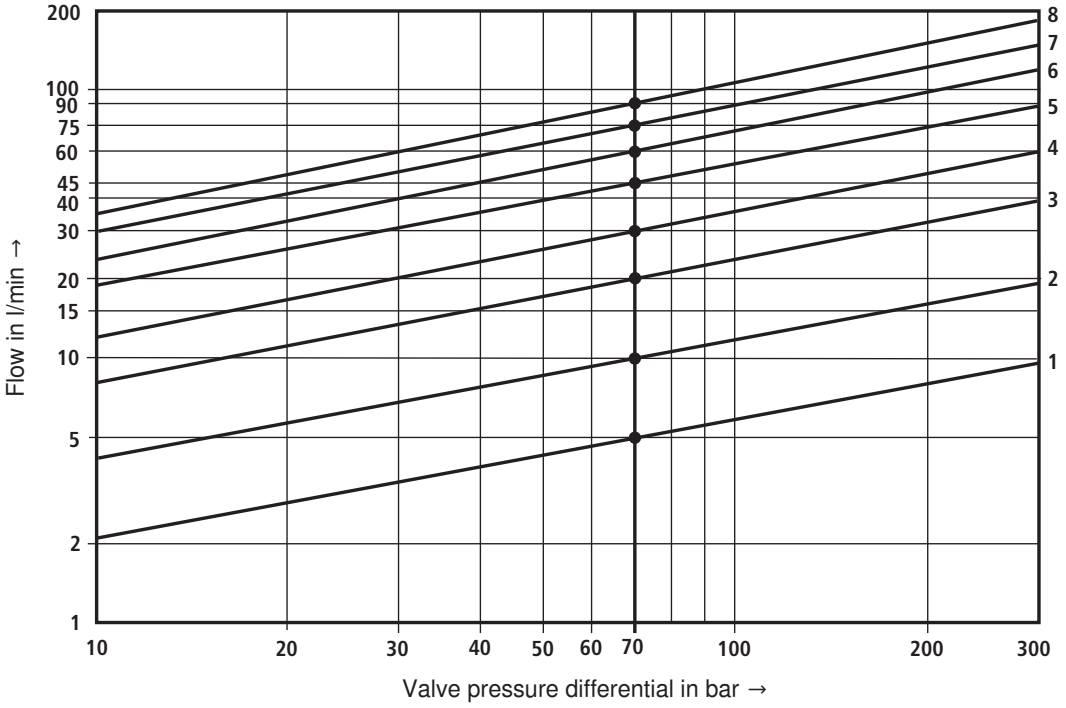
Mating connector according to DIN EN 175.201-804
separate order under Material no. **R900223890**
(metal version)



Characteristic curves (measured with HLP 32, ϑ_{oil} = 40 °C ± 5 °C)

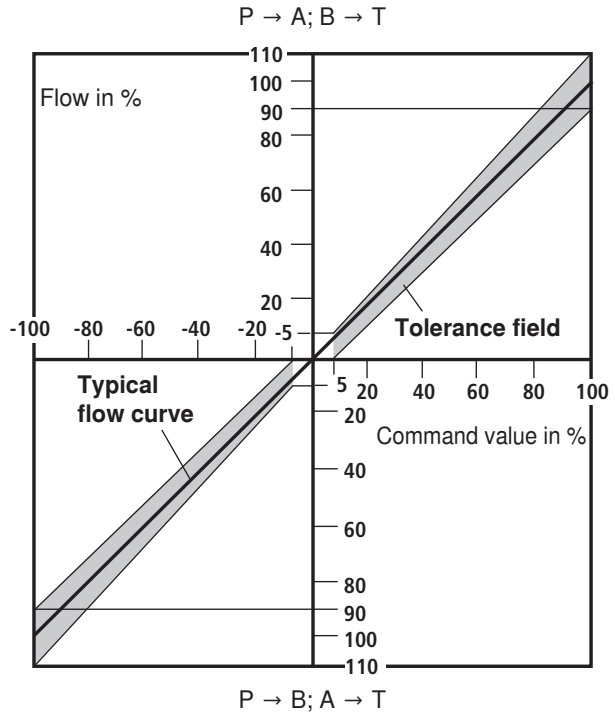
Flow/load function (tolerance ±10 %)
with 100 % command value signal

Rated flow					
5 l/min	=	Curve **1**	45 l/min	=	Curve **5**
10 l/min	=	Curve **2**	60 l/min	=	Curve **6**
20 l/min	=	Curve **3**	75 l/min	=	Curve **7**
30 l/min	=	Curve **4**	90 l/min	=	Curve **8**



Δ***p*** = Valve pressure differential (inlet pressure p_P minus load pressure p_L and minus return flow pressure p_T)

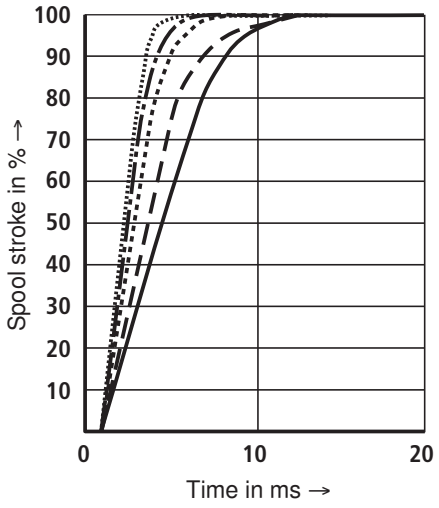
Tolerance field of the flow command value function
at constant valve pressure differential



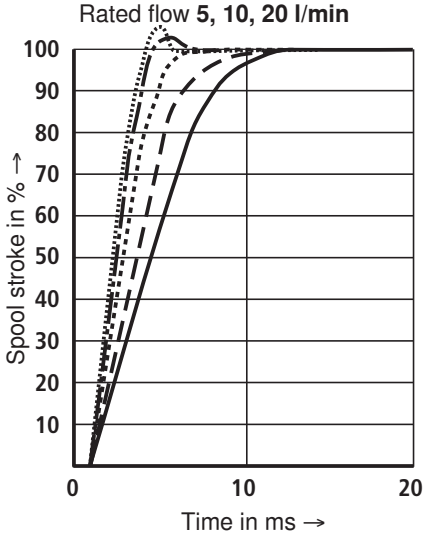
Characteristic curves: Type 4WS.2EM 10 and 4WSE2ED 10 (measured with HLP 32, ϑ_{oil} = 40 °C ± 5 °C)

Transition function with pressure rating 315 bar, step response without flow

4WS.2EM 10
Rated flow **5, 10, 20 l/min**



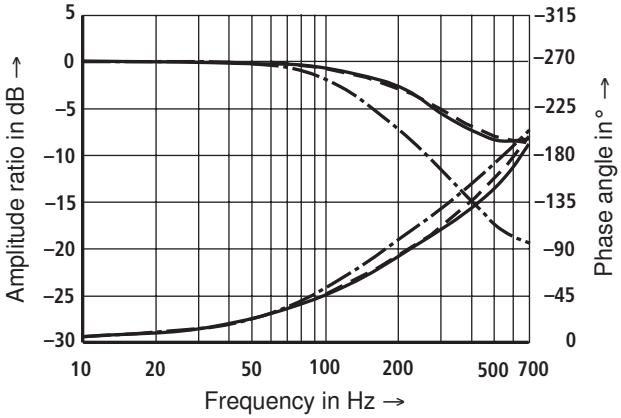
4WSE2ED 10
Rated flow **5, 10, 20 l/min**



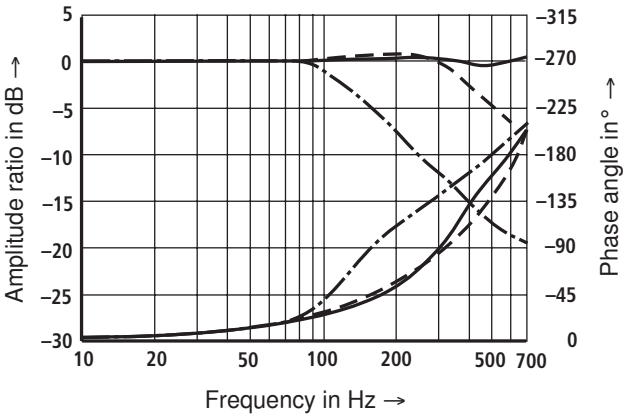
40 bar — 70 bar ····· 140 bar —·— 210 bar ····· 315 bar

Frequency response with pressure rating 315 bar, stroke frequency without flow

4WS.2EM 10
Rated flow **5, 10, 20 l/min**



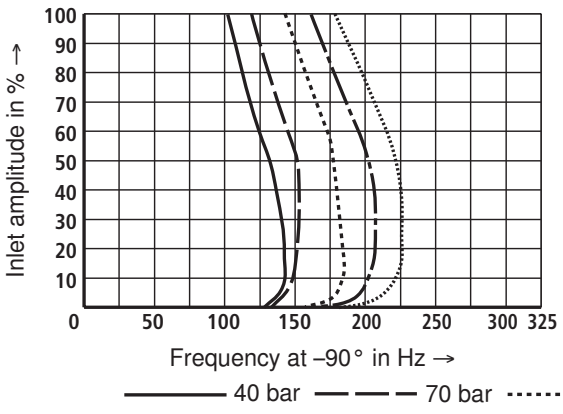
4WSE2ED 10
Rated flow **5, 10, 20 l/min**



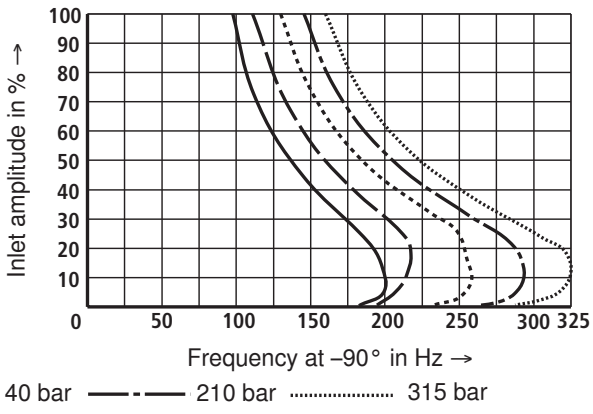
5 % — — — 25 % —·—·— 100 %

Dependency of the frequency *f* at –90° on the operating pressure *p* and the inlet amplitude

4WS.2EM 10
Rated flow **5, 10, 20 l/min**



4WSE2ED 10
Rated flow **5, 10, 20 l/min**

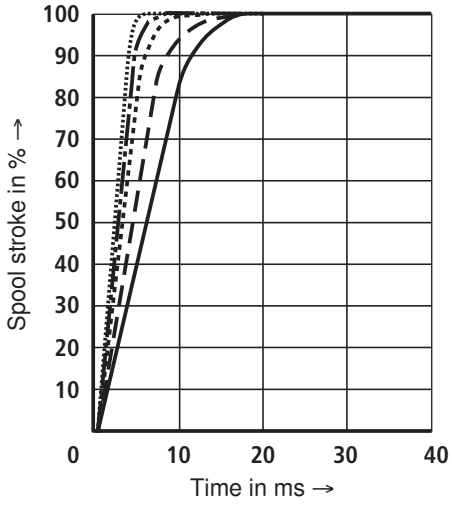


40 bar — — — 70 bar ····· 140 bar —·— 210 bar ····· 315 bar

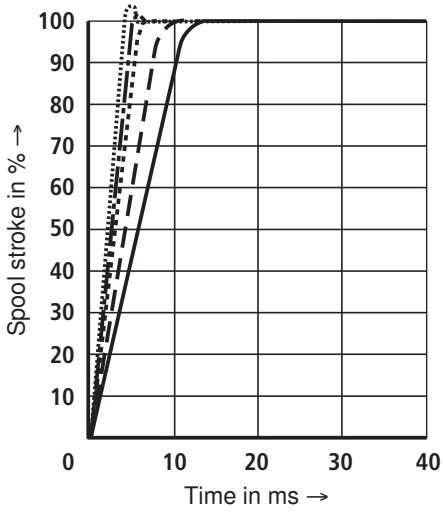
Characteristic curves: Type 4WS.2EM 10 and 4WSE2ED 10 (measured with HLP 32, ϑ_{oil} = 40 °C ± 5 °C)

Transition function with pressure rating 315 bar, step response without flow

4WS.2EM 10
Rated flow **30 l/min**



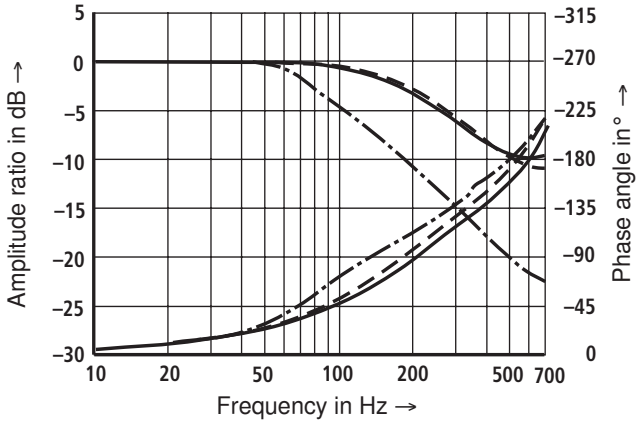
4WSE2ED 10
Rated flow **30 l/min**



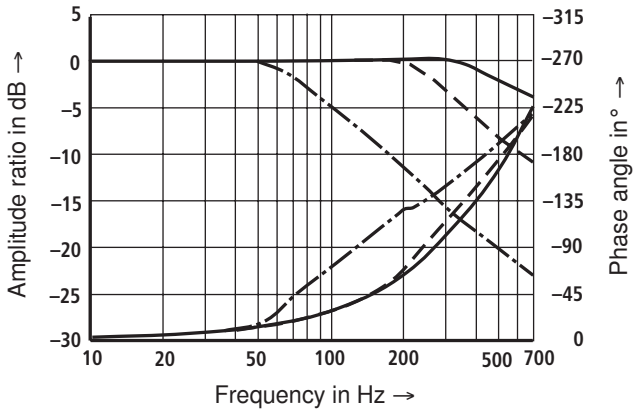
40 bar — 70 bar ····· 140 bar —·— 210 bar ····· 315 bar

Frequency response with pressure rating 315 bar, stroke frequency without flow

4WS.2EM 10
Rated flow **30 l/min**



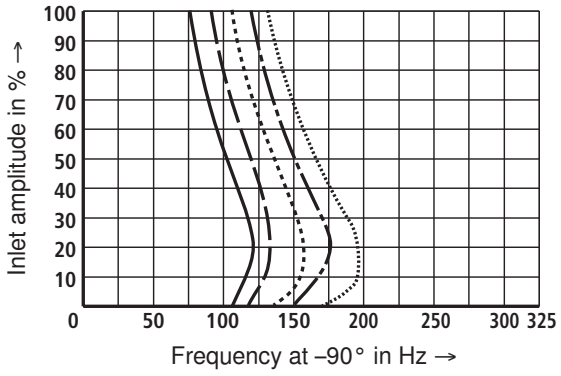
4WSE2ED 10
Rated flow **30 l/min**



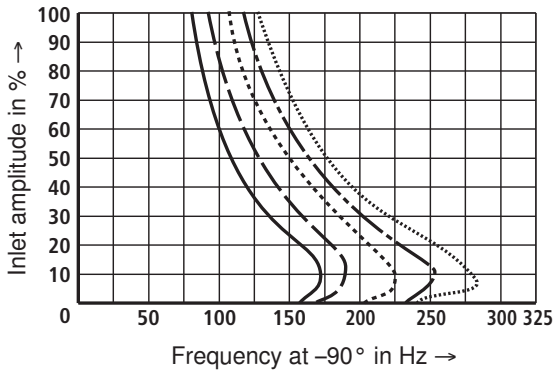
5 % — — — 25 % —·—·— 100 %

Dependency of the frequency *f* at –90° on the operating pressure *p* and the inlet amplitude

4WS.2EM 10
Rated flow **30 l/min**



4WSE2ED 10
Rated flow **30 l/min**

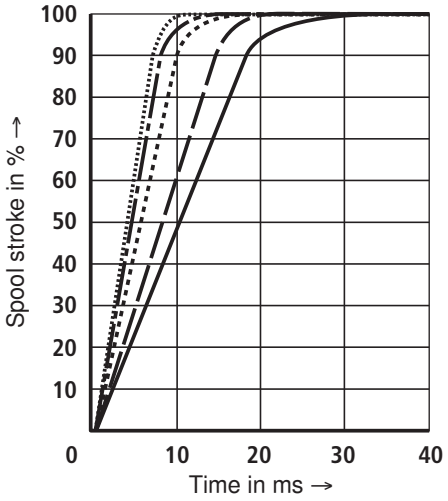


40 bar — 70 bar ····· 140 bar —·— 210 bar ····· 315 bar

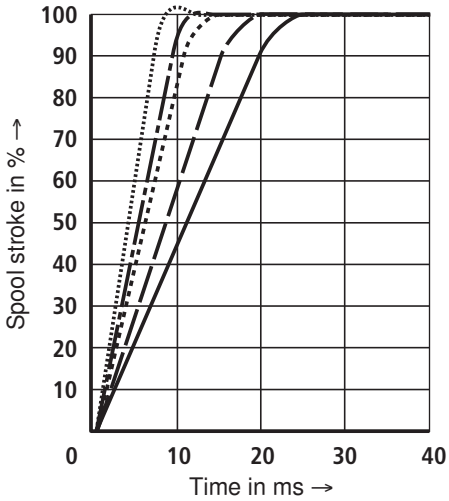
Characteristic curves: Type 4WS.2EM 10 and 4WSE2ED 10 (measured with HLP 32, ϑ_{oil} = 40 °C ± 5 °C)

Transition function with pressure rating 315 bar, step response without flow

4WS.2EM 10
Rated flow **45 l/min**



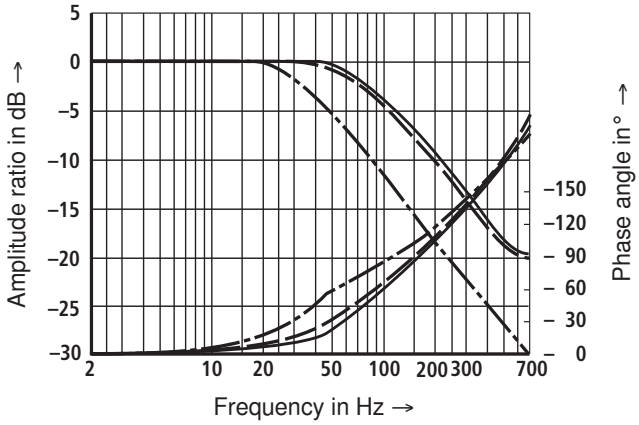
4WSE2ED 10
Rated flow **45 l/min**



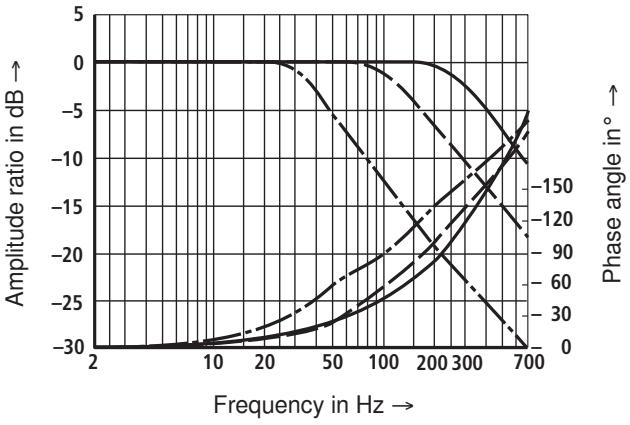
40 bar — 70 bar ---------- 140 bar — · — 210 bar ····· 315 bar

Frequency response with pressure rating 315 bar, stroke frequency without flow

4WS.2EM 10
Rated flow **45 l/min**



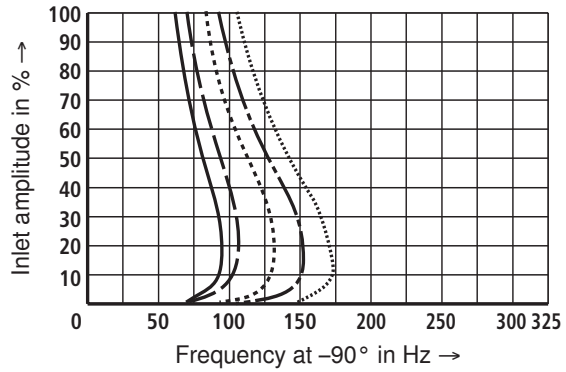
4WSE2ED 10
Rated flow **45 l/min**



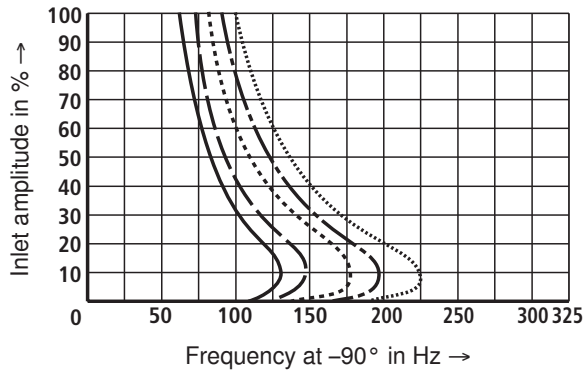
5 % — — — 25 % — · — 100 %

Dependency of the frequency *f* at –90° on the operating pressure *p* and the inlet amplitude

4WS.2EM 10
Rated flow **45 l/min**



4WSE2ED 10
Rated flow **45 l/min**

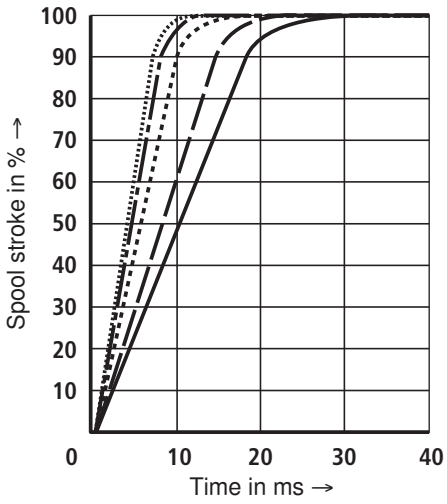


40 bar — 70 bar ---------- 140 bar — · — 210 bar ····· 315 bar

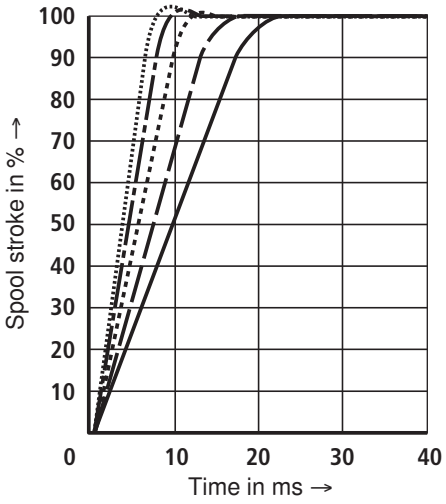
Characteristic curves: Type 4WS.2EM 10 and 4WSE2ED 10 (measured with HLP 32, ϑ_{oil} = 40 °C ± 5 °C)

Transition function with pressure rating 315 bar, step response without flow

4WS.2EM 10
Rated flow **60 l/min**



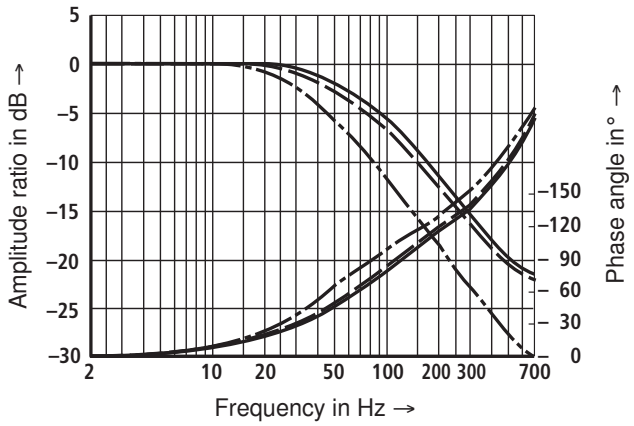
4WSE2ED 10
Rated flow **60 l/min**



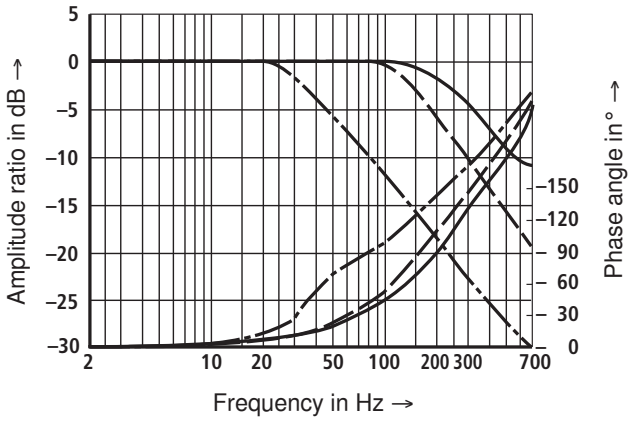
40 bar — 70 bar - - - 140 bar — · — 210 bar ····· 315 bar

Frequency response with pressure rating 315 bar, stroke frequency without flow

4WS.2EM 10
Rated flow **60 l/min**



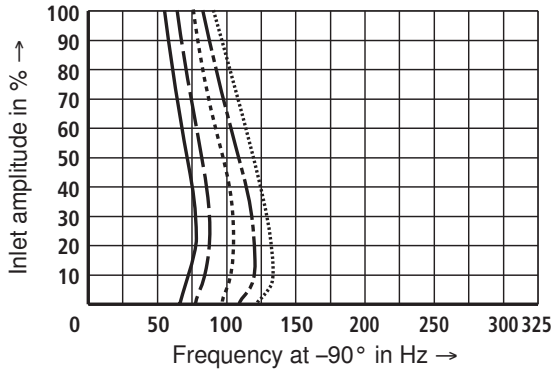
4WSE2ED 10
Rated flow **60 l/min**



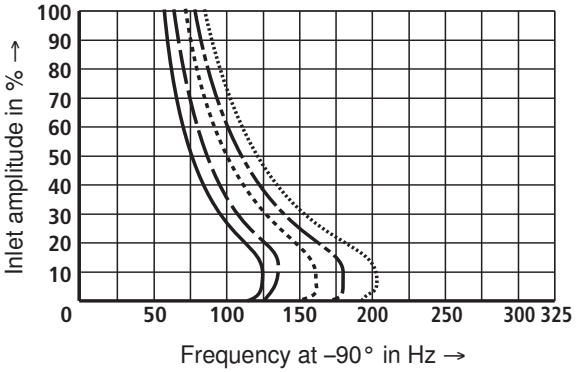
5 % — — — 25 % — · — 100 %

Dependency of the frequency *f* at –90° on the operating pressure *p* and the inlet amplitude

4WS.2EM 10
Rated flow **60 l/min**



4WSE2ED 10
Rated flow **60 l/min**

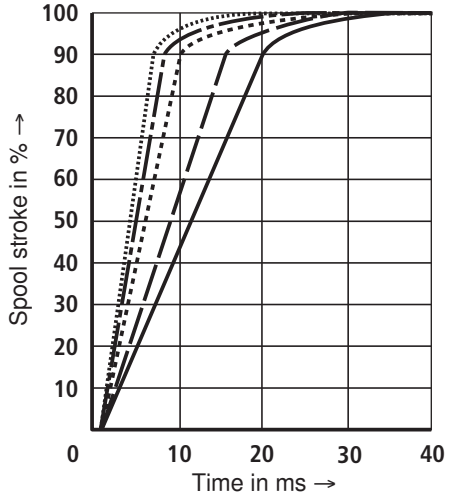


40 bar — 70 bar - - - 140 bar — · — 210 bar ····· 315 bar

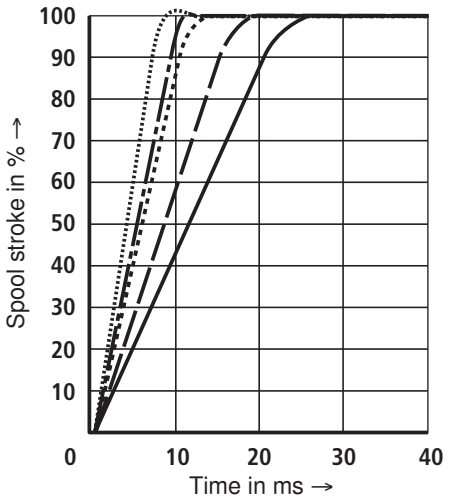
Characteristic curves: Type 4WS.2EM 10 and 4WSE2ED 10 (measured with HLP 32, ϑ_{oil} = 40 °C ± 5 °C)

Transition function with pressure rating 315 bar, step response without flow

4WS.2EM 10
Rated flow **75 l/min**



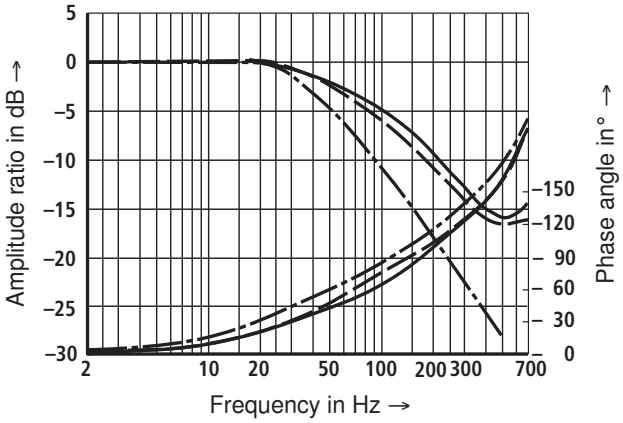
4WSE2ED 10
Rated flow **75 l/min**



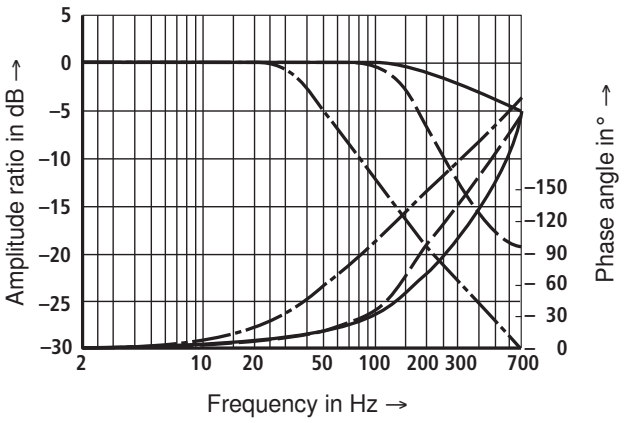
40 bar — 70 bar ---------- 140 bar — · — 210 bar ····· 315 bar

Frequency response with pressure rating 315 bar, stroke frequency without flow

4WS.2EM 10
Rated flow **75 l/min**



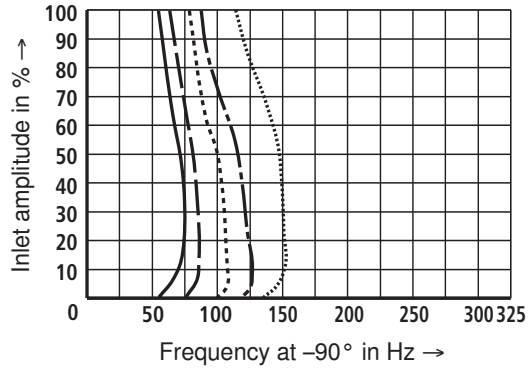
4WSE2ED 10
Rated flow **75 l/min**



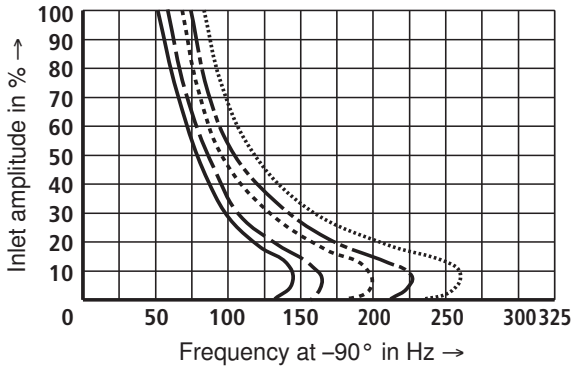
5 % — — — 25 % — · — 100 %

Dependency of the frequency *f* at –90° on the operating pressure *p* and the inlet amplitude

4WS.2EM 10
Rated flow **75 l/min**



4WSE2ED 10
Rated flow **75 l/min**

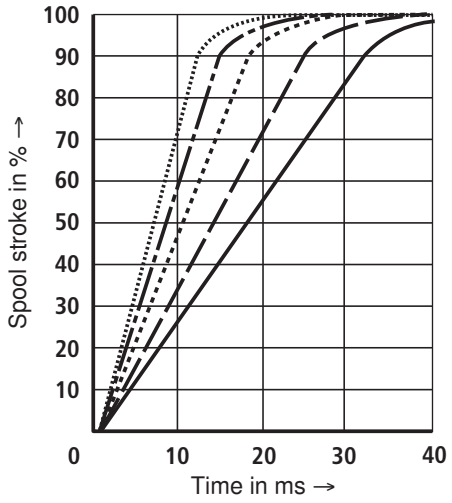


40 bar — 70 bar ---------- 140 bar — · — 210 bar ····· 315 bar

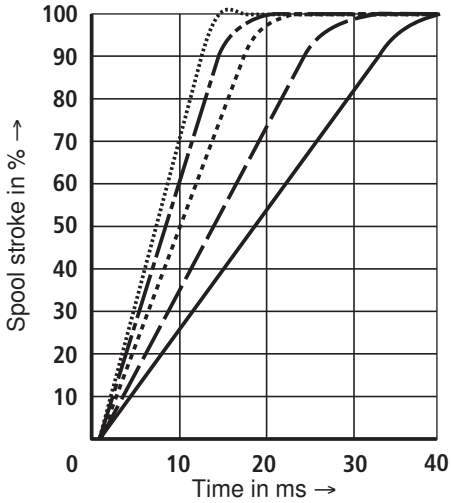
Characteristic curves: Type 4WS.2EM 10 and 4WSE2ED 10 (measured with HLP 32, ϑ_{oil} = 40 °C ± 5 °C)

Transition function with pressure rating 315 bar, step response without flow

4WS.2EM 10
Rated flow **90 l/min**



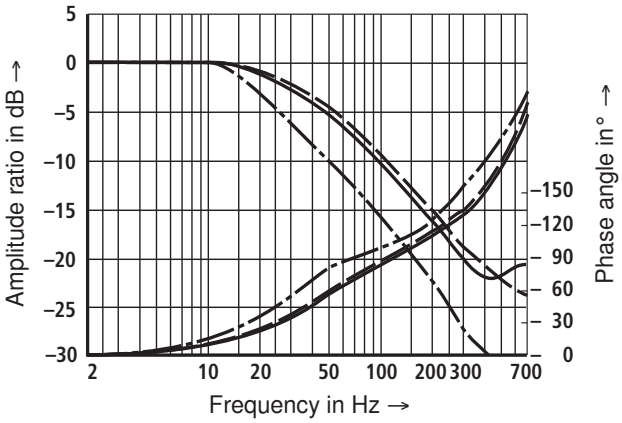
4WSE2ED 10
Rated flow **90 l/min**



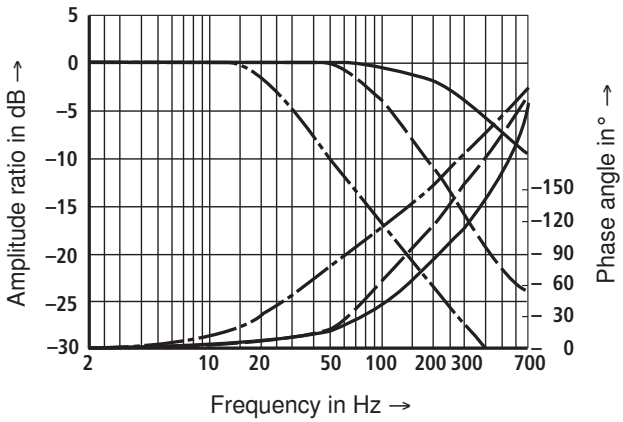
40 bar — 70 bar ---------- 140 bar — · — 210 bar ..... 315 bar

Frequency response with pressure rating 315 bar, stroke frequency without flow

4WS.2EM 10
Rated flow **90 l/min**



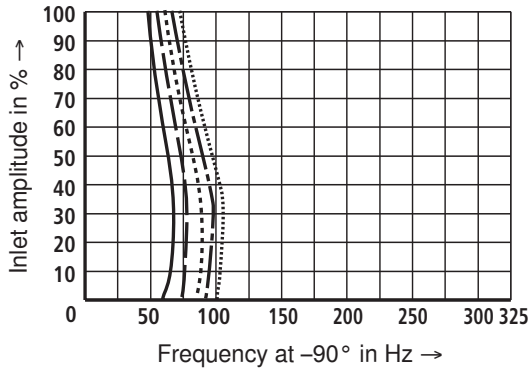
4WSE2ED 10
Rated flow **90 l/min**



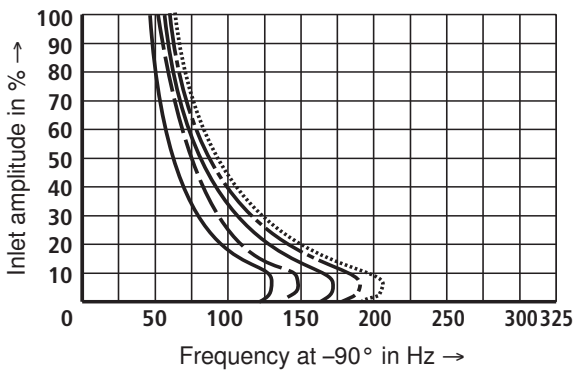
5 % — — — 25 % — · — 100 %

Dependency of the frequency *f* at –90° on the operating pressure *p* and the inlet amplitude

4WS.2EM 10
Rated flow **90 l/min**



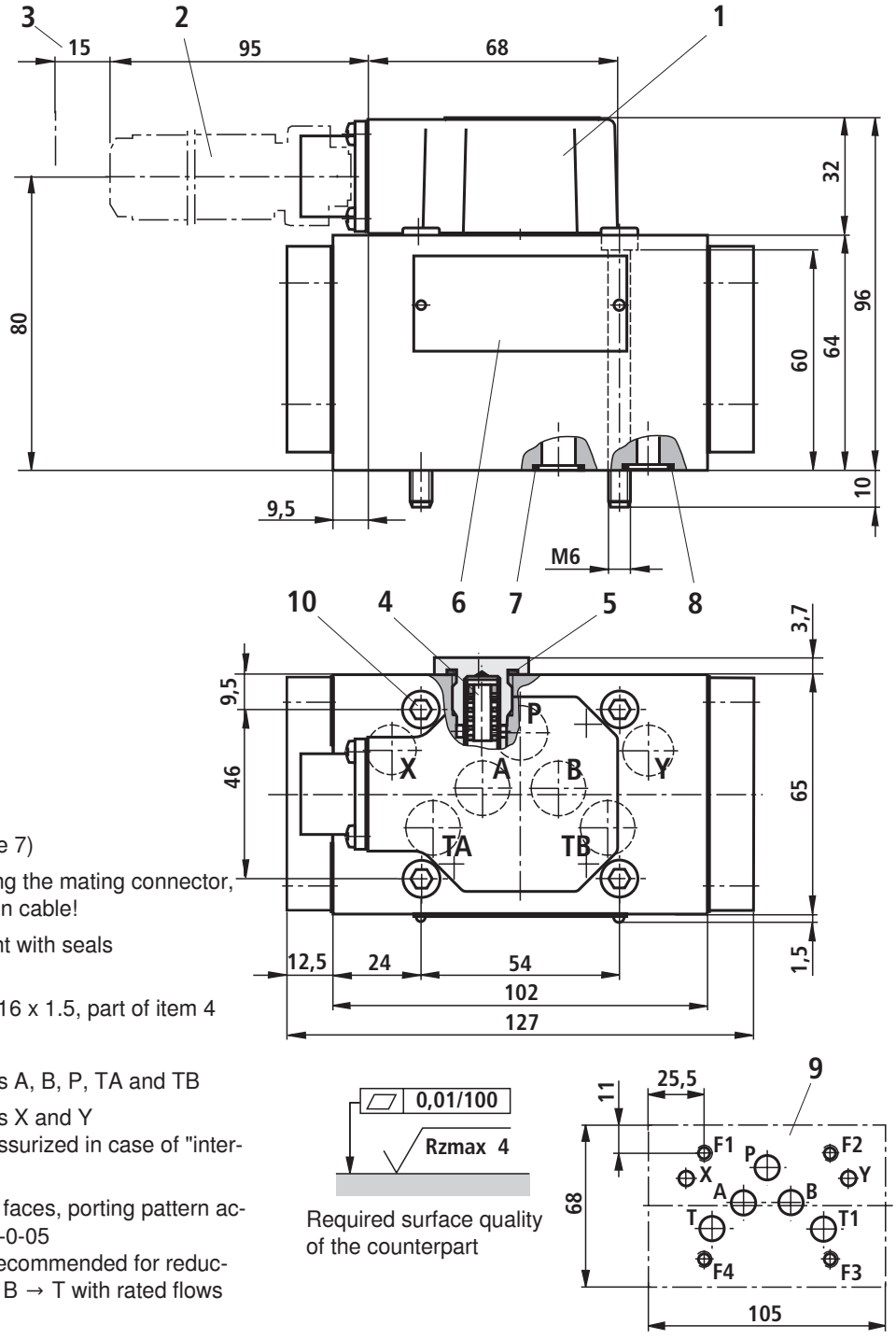
4WSE2ED 10
Rated flow **90 l/min**



40 bar — 70 bar ---------- 140 bar — · — 210 bar ..... 315 bar

Unit dimensions: Type 4WS2EM 10 (dimensions in mm)

Mechanical return / external control electronics, type 4WS2EM 10-5X/…



Required surface quality of the counterpart

1 Cap

2 Mating connector
(order separately, see page 7)

3 Space required for removing the mating connector, also take care of connection cable!

4 Exchangeable filter element with seals
Material no.: **R961001950**

5 Profile seal for filter screw 16 x 1.5, part of item 4

6 Name plate

7 Identical seal rings for ports A, B, P, TA and TB

8 Identical seal rings for ports X and Y
Ports X and Y are also pressurized in case of "internal" pilot oil supply.

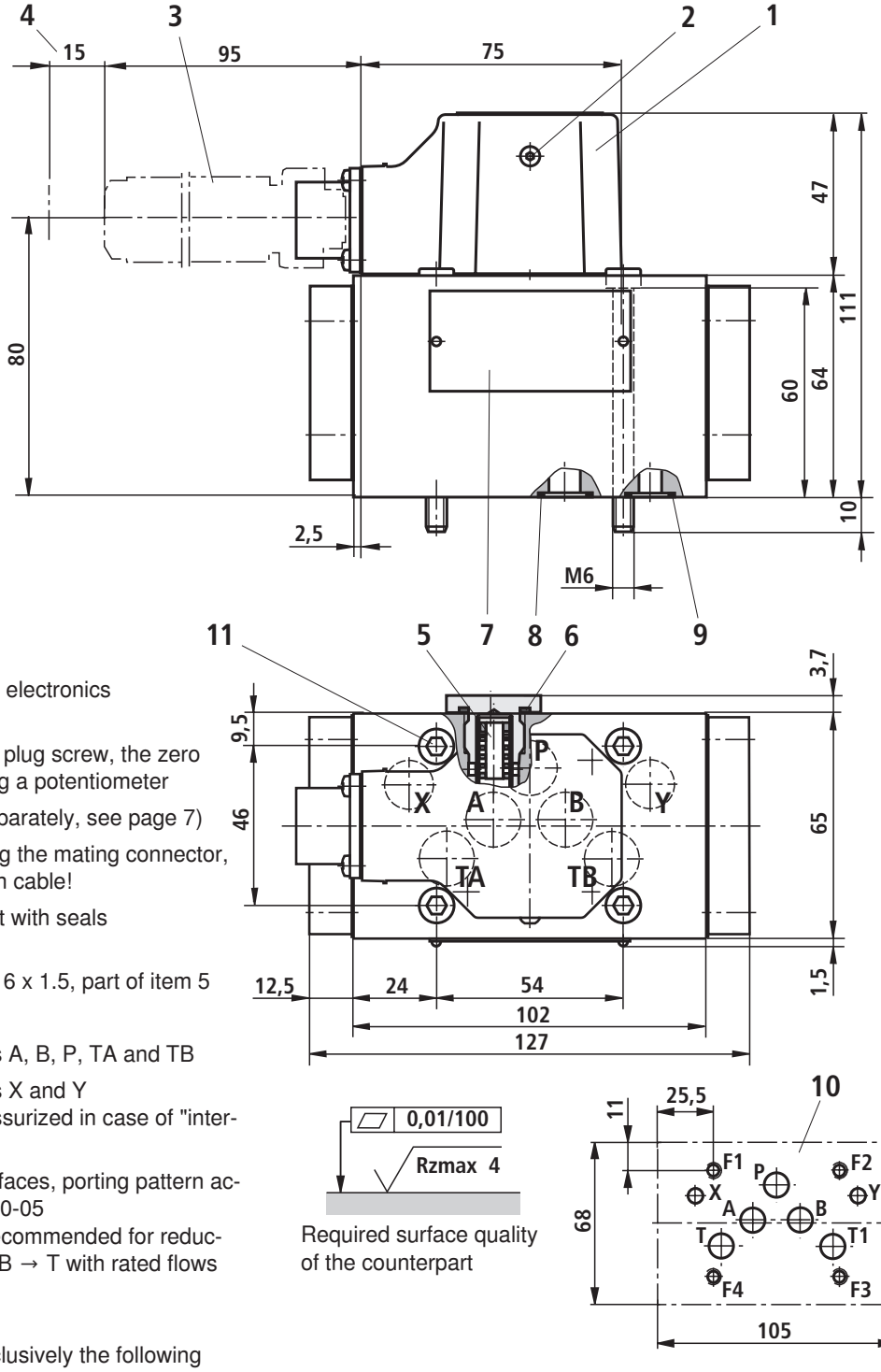
9 Processed valve mounting faces, porting pattern according to ISO 4401-05-05-0-05
Port T1 is optional and is recommended for reducing the pressure drop from B → T with rated flows > 45 l/min.

10 Valve mounting screws
For reasons of stability, exclusively the following valve mounting screws may be used:
4 hexagon socket head cap screws ISO 4762-M6x70-10.9-flZn-240h-L (friction coefficient 0.09 – 0.14 according to VDA 235-101) (included in the delivery)

Subplates according to data sheet 45054 must be ordered separately.

Unit dimensions: Type 4WSE2EM 10 (dimensions in mm)

Mechanical return / integrated control electronics, type 4WSE2EM 10-5X/…



Required surface quality of the counterpart

1 Cap **with** integrated control electronics

2 Electric zero point setting:
After removal of the SW2.5 plug screw, the zero point can be corrected using a potentiometer

3 Mating connector (order separately, see page 7)

4 Space required for removing the mating connector, also take care of connection cable!

5 Exchangeable filter element with seals
Material no.: **R961001950**

6 Profile seal for filter screw 16 x 1.5, part of item 5

7 Name plate

8 Identical seal rings for ports A, B, P, TA and TB

9 Identical seal rings for ports X and Y
Ports X and Y are also pressurized in case of "internal" pilot oil supply.

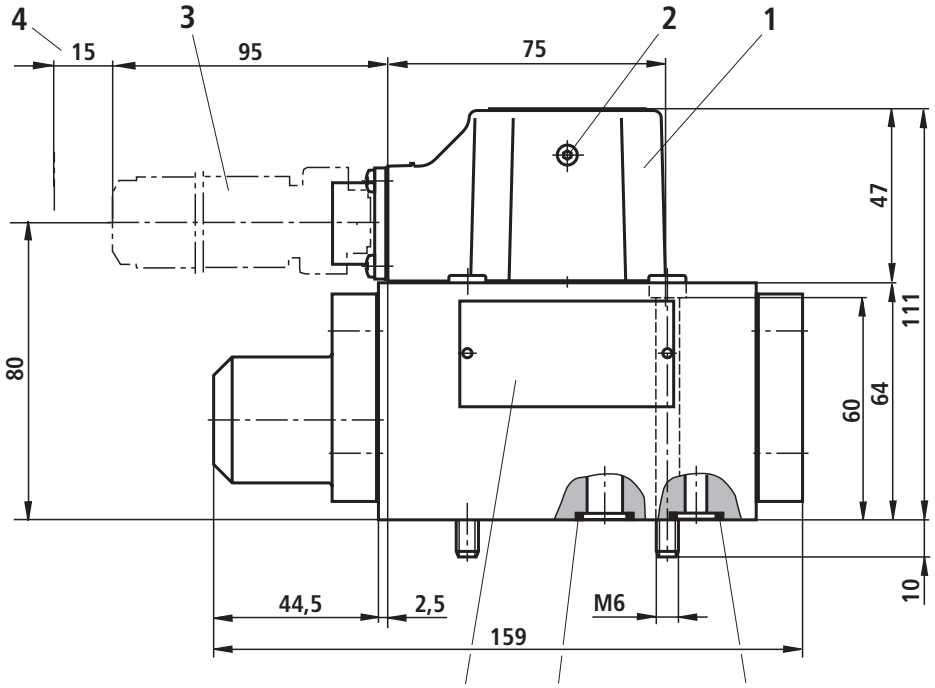
10 Processed valve mounting faces, porting pattern according to ISO 4401-05-05-0-05
Port T1 is optional and is recommended for reducing the pressure drop from B → T with rated flows > 45 l/min.

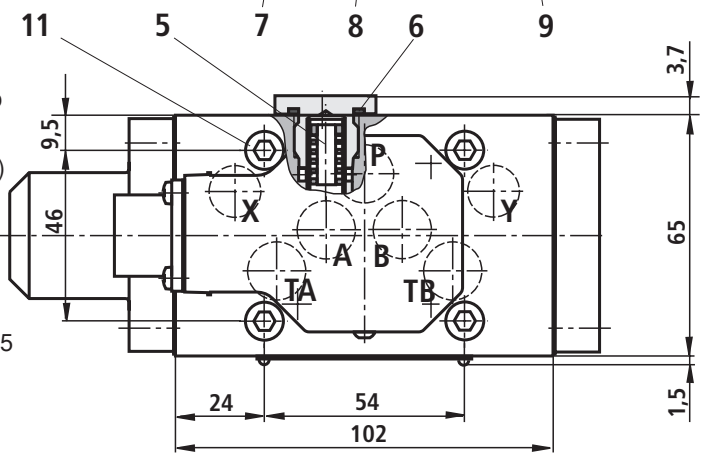
11 Valve mounting screws
For reasons of stability, exclusively the following valve mounting screws may be used:
4 hexagon socket head cap screws ISO 4762-M6x70-10.9-flZn-240h-L (friction coefficient 0.09 – 0.14 according to VDA 235-101) (included in the delivery)

Subplates according to data sheet 45054 must be ordered separately.

Unit dimensions: Type 4WSE2ED 10 (dimensions in mm)

Electric and mechanical return / integrated control electronics, type 4WSE2ED 10-5X/…





1 Cap **with** integrated control electronics

2 Electric zero point setting:
After removal of the SW2.5 plug screw, the zero point can be corrected using a potentiometer

3 Mating connector (order separately, see page 7)

4 Space required for removing the mating connector, also take care of connection cable!

5 Exchangeable filter element with seals
Material no.: **R961001950**

6 Profile seal for filter screw 16 x 1.5, part of item 5

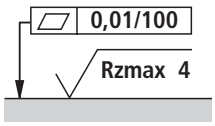
7 Name plate

8 Identical seal rings for ports A, B, P, TA and TB

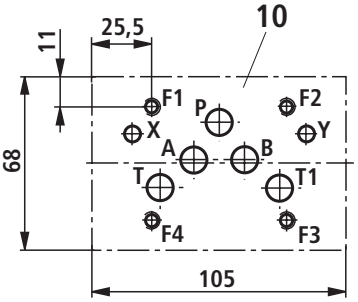
9 Identical seal rings for ports X and Y
Ports X and Y are also pressurized in case of "internal" pilot oil supply.

10 Processed valve mounting faces, porting pattern according to ISO 4401-05-05-0-05
Port T1 is optional and is recommended for reducing the pressure drop from B → T with rated flows > 45 l/min.

11 Valve mounting screws
For reasons of stability, exclusively the following valve mounting screws may be used:
4 hexagon socket head cap screws ISO 4762-M6x70-10.9-flZn-240h-L (friction coefficient 0.09 – 0.14 according to VDA 235-101) (included in the delivery)



Required surface quality of the counterpart

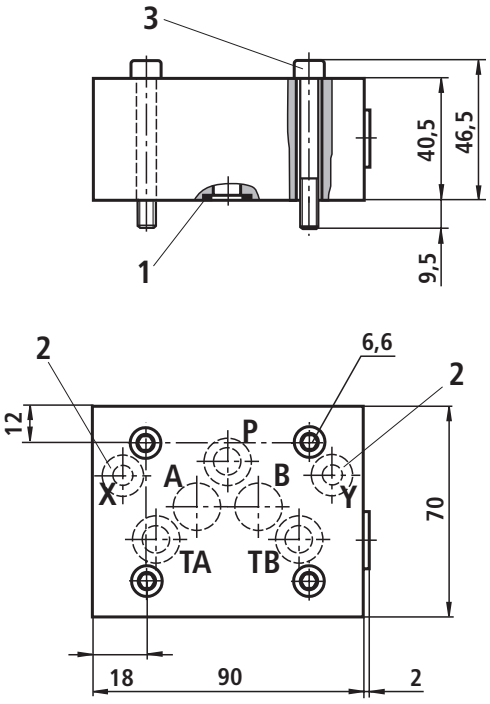


Subplates according to data sheet 45054 must be ordered separately.

Flushing plate with porting pattern according to ISO 4401-05-05-0-05 (dimensions in mm)

Symbol

with FKM seals,
Material no. **R900912450**, weight: 2 kg



1 R-ring 13 x 1.6 x 2 (A, B, P, TA and TB)

2 R-ring 11.18 x 1.6 x 1.78 (X, Y)

3 Mounting screws
For reasons of stability, exclusively the following mounting screws may be used:
4 hexagon socket head cap screws ISO 4762-M6x50-10.9-flZn-240h-L (friction coefficient 0.09 - 0.14 according to VDA 235-101) (included in the delivery)

To ensure proper operation of the servo-valves, it is necessary to flush the system before commissioning.

The following values are guidelines for the flushing time per system:

$$t \geq \frac{V}{Q_V} \cdot 5$$

t = Flushing time in h
V = Tank capacity in l
Q_V = Pump flow in l/min

When topping up more than 10 % of the tank capacity, flushing must be repeated.

The use of a directional valve with port in accordance with ISO 4401-05-05-0-05 is suited better than a flushing plate. This valve can also be used for flushing the actuator ports. Also refer to catalog sheet RE 07700.

Notes

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