The Drive & Control Company

Rexroth
Bosch Group

Proportional directional valve, pilot-operated, with integrated electronics (OBE)

Type 2WFCE

RE 29403
Edition: 2017-01
Replaces: 2016-02

H8069

- Size 16 ... 50
- Component series 1X
- Maximum operating pressure 420 bar
- Maximum flow 1500 l/min (***Δp*** = 5 bar)

CE

Features

- 2/2-way version
- Cartridge valve
- Robust
  - Pressure resistance up to 420 bar
  - High vibration resistance (acc. to DIN EN60068-2)
  - Ambient temperature up to +60 °C
- Precise
  - High response sensitivity and little hysteresis
- Reliable
  - High-quality and proven design
- Normalized
  - Installation dimensions according to ISO 7368
- Flexible
  - In connection with a pressure compensator pressure-compensated flow control possible
- Safe
  - Fail-safe position of the main stage in case of power failure, cable break or disconnected enable

Contents

Ordering code

01	02	03	04	05	06	07		08		09		10	11	12
2	**WFC**	**E**		**S**		**L**	**–**	**1X**	**/**		**/**	**24**		*****

01	2 main ports	**2**
02	Pilot-operated proportional directional valve (cartridge valve)	**WFC**
03	With integrated electronics (OBE)	**E**
04	Size 16	**16**
	Size 25	**25**
	Size 32	**32**
	Size 40	**40**
	Size 50	**50**
05	Seat control spool	**S**

Rated flow at 5 bar pressure differential

06	**– Size 16**	
	125 l/min	**125**
	160 l/min	**160**
	– Size 25	
	220 l/min	**220**
	330 l/min	**330**
	– Size 32	
	320 l/min	**320**
	650 l/min	**650**
	– Size 40	
	500 l/min	**500**
	940 l/min	**940**
	– Size 50	
	1000 l/min	**1000**
	1500 l/min	**1500**

Flow characteristic

07	Linear	**L**
08	Component series 10 ... 19 (10 ... 19: unchanged installation and connection dimensions)	**1X**

Seal material

09	NBR seals	**M**
	FKM seals	**V**
	Observe compatibility of seals with hydraulic fluid used. (Other seals upon request)	
10	Supply voltage 24 V	**24**

Electrical interface

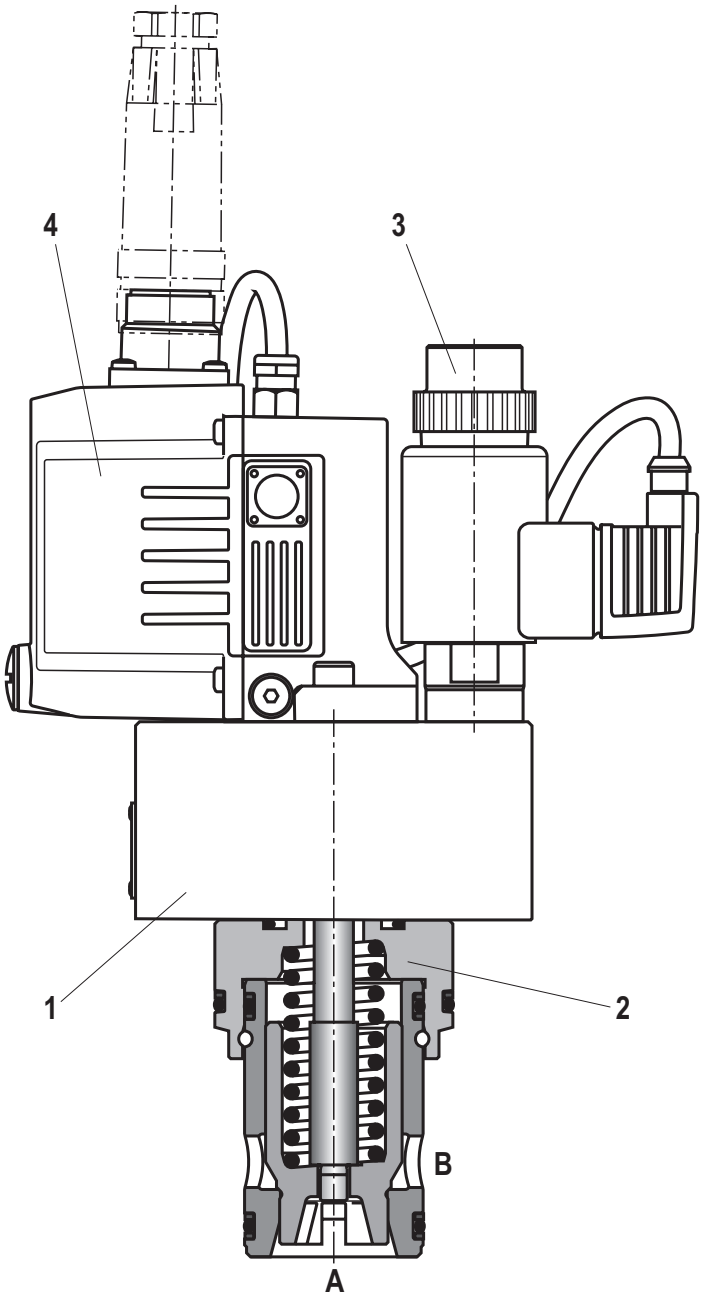
11	0 ... 10 V DC (connector 6+PE)	**A1**
	0 ... 10 V DC (connector 11+PE)	**B1**
	4 ... 20 mA (connector 11+PE)	**G1**
12	Further details in the plain text	*****

Function, section, symbol

Set-up

The pilot-operated proportional directional valve type 2WFCE basically consists of:

- Cover (1)
- Main stage (2)
- Pilot control valve with proportional solenoid (3)
- Integrated electronics with position transducer and analog interface (4)



The integrated electronics (OBE) compare the specified command value to the position actual value of the control spool of the main stage (2). In case of control deviations, the solenoid of the pilot control valve (3) is activated. In this way, the control spool is adjusted. Depending on the control deviation, the control chamber of the main stage (2) is either pressurized with pilot oil (the main stage closes) or unloaded (the main stage opens). Stroke and orifice cross-section are controlled proportionally to the command value until the control deviation is remedied.

For proper function, the following has to be observed:

- Direction of flow A → B (X connected to A)
- Direction of flow B → A (X connected to B)

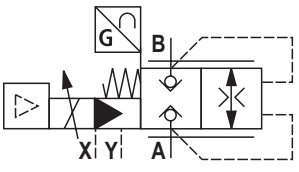
Failure of supply voltage

If the minimum supply voltage fails or is fallen below, the enable is disconnected (only interfaces B1 and G1) and in case of a cable break of the solenoid conductor, the integrated electronics (OBE) will de-energize the solenoid of the pilot control valve (3). The control spool of the main stage (2) moves securely to its seat using the pressure available at port X and the force of the main stage spring and blocks the flow between A and B.

Flow control function

In connection with a pressure compensator, the pilot-operated proportional directional valve can be used for the pressure-compensated control of a flow.

Symbol



☞ **Notices:**

- Representation according to DIN ISO 1219-1.
- Direction of flow
  - A → B (X connected to A)
  - B → A (X connected to B)

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

general							
Size		NG	16	25	32	40	50
Weight		kg	3.5	4.6	5.8	7.9	10.5
Installation position			Any				
Ambient temperature range		°C	–30 ... +60 (NBR seals) –20 ... +60 (FKM seals)				
Maximum storage time		Years	1 (if the storage conditions are observed; refer to the operating instructions 07600-B)				
Vibration resistance	▶ Sine test according to DIN EN 60068-2-6		10 ... 2000 Hz / maximum of 10 g / 10 cycles / 3 axes				
	▶ Noise test according to DIN EN 60068-2-64		20 ... 2000 Hz / 10 g_{RMS} / 30 g peak / 30 min. / 3 axes				
	▶ Transport shock according to DIN EN 60068-2-27		15 g / 11 ms / 3 axes				
Maximum relative humidity (no condensation)		%	95				
Maximum surface temperature		°C	150				
MTTFd value according to EN ISO 13849		Years	75 (for further details see data sheet 08012)				

hydraulic							
Maximum operating pressure	▶ Port A, B	bar	420				
Minimum operating pressure	▶ Port A (A → B)	bar	12				
	▶ Port B (B → A)	bar	20				
Maximum pilot pressure	▶ Port X	bar	420				
Maximum return flow pressure	▶ Port Y	bar	100				
Rated flow (***Δp*** = 5 bar) [1])		l/min	125, 160	220, 330	320, 650	500, 940	1000, 1500
Maximum pilot flow [2]		l/min	3	5	7	9	9
Leakage flow	▶ Pilot control valve (at 100 bar)	cm^3/min	< 150	< 200	< 200	< 400	< 400
	▶ Main stage						
	– Interface A1 (0 V)	cm^3/min	A → B and B → A blocked in a leakage-free manner (valve in seat position)				
	– Interface B1 (0 V)	cm^3/min	Depending on ***Δp***, see characteristic curves on page 9 ...18				
	– Interface G1 (4 mA)	cm^3/min	Depending on ***Δp***, see characteristic curves on page 9 ...18				
	– Interface B1, G1 [3; 4; 5]	cm^3/min	A → B and B → A blocked in a leakage-free manner (valve in seat position)				
Pilot volume	▶ Main stage [2]	cm^3	1	2.7	6.4	12.6	24.5
Direction of flow	▶ Internal pilot oil supply						
	– A → B		A connected to X				
	– B → A		B connected to X				
	▶ External pilot oil supply						
	– A → B		Pressure in X ≥ pressure in A				
	– B → A		Pressure in X ≥ pressure in B				
Hydraulic fluid			See table page 5				
Viscosity range	▶ Recommended	mm^2/s	20 ... 100				
	▶ Maximum admissible	mm^2/s	15 ... 380				
Hydraulic fluid temperature range (flown-through)		°C	-20 ... +60				
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)			Class 18/16/13 [5])				

1) Flow for deviating ***Δp:***

$$q_x = q_{V\,nom} \times \sqrt{\frac{\Delta p_x}{5}}$$

2) Stepped input signal (seat position at 100%, pilot pressure 100 bar)

3) Pin 3: 0 V

4) Internal pilot oil supply: Observe leakage flow A → X or B → X via pilot control valve to Y (see technical data leakage flow – pilot control valve)

5) External pilot oil supply: Leakage flow from A or B via the pilot control valve is avoided; a minimum leakage flow X → B is, however, possible

6) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.
For the selection of the filters, see www.boschrexroth.com/filter.

Technical data

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

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP	NBR, FKM	DIN 51524	90220
Flame-resistant ▶ Water-free	HFDU based on glycol	FKM	ISO 12922	90222

☞ **Important information on hydraulic fluids:**

- ▶ For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- ▶ The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.

static / dynamic		
Hysteresis	%	< 0.2
Range of inversion	%	< 0.1
Response sensitivity	%	< 0.1
Manufacturing tolerance q_{Vmax}	%	≤ 10
Temperature drift	%/40 K	< 1
Zero compensation		Ex plant ±1%

electrical, integrated electronics (OBE)			
Relative duty cycle		%	100 (continuous operation)
Protection class according to EN 60529			IP 65 with mating connector mounted and locked
Supply voltage	▶ Nominal voltage	VDC	24
	▶ Lower limit value	VDC	18
	▶ Upper limit value	VDC	36
	▶ Maximum admissible residual ripple	Vss	2.5 (Comply with absolute supply voltage limit value)
Current consumption	▶ Maximum	A	2
	▶ Impulse current	A	3
Maximum power consumption		W	50
Functional earth and screening			See connector pin assignment (CE-compliant installation) page 8
Required fuse protection, external		A	2.5 time-lag
Adjustment			Calibrated in the plant, see characteristic curves page 9 ... 18
Conformity			CE according to EMC Directive 2004/108/EC tested according to EN 61000-6-2 and EN 61000-6-3

Integrated electronics (OBE)

Function

1. Switch-on procedure/Fault behavior

After applying the supply voltage of 24 V, the electronics are ready for operation provided that the following conditions are met:

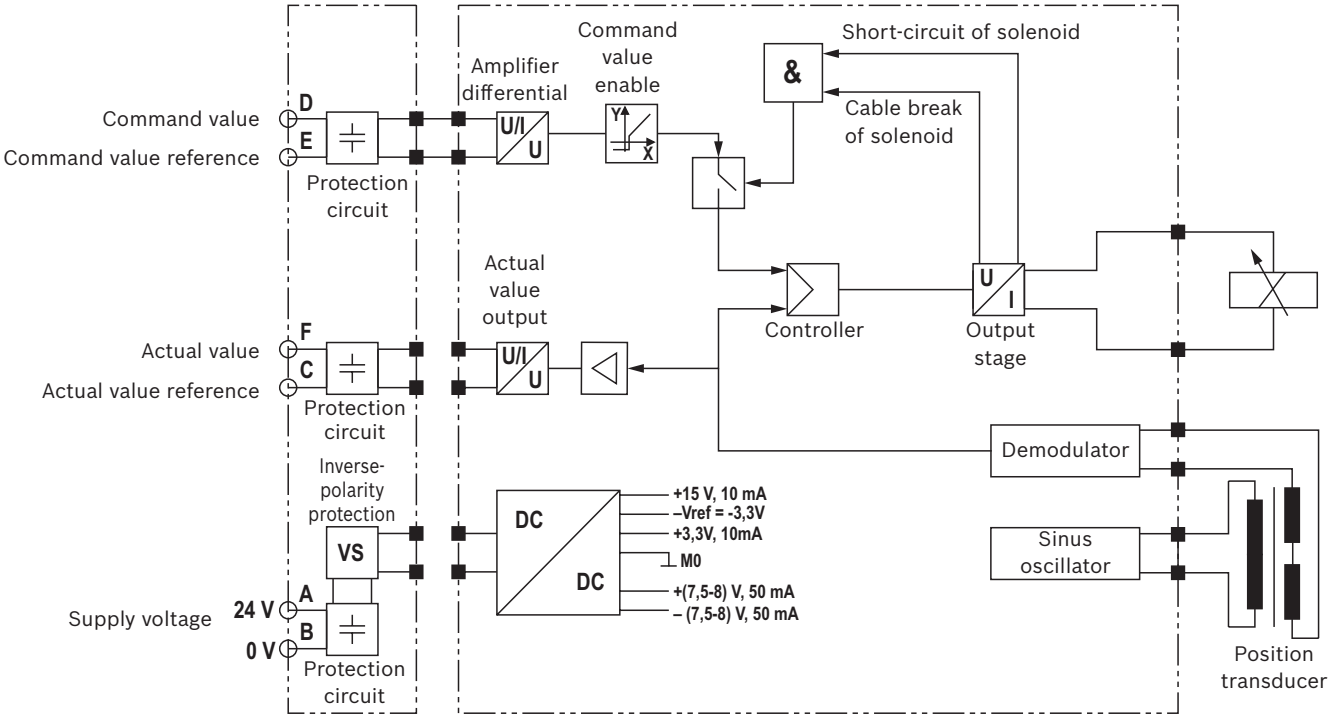
- Supply voltage U_B > 18 V DC
- Connection to solenoid not interrupted
- Command value line not interrupted and command value > 2.7 mA (interface "G1" only)

If one of the conditions is not met, the controllers and the output stage will be blocked and the ready for operation signal to pin 11 (interface "B1" and "G1" only) will be set to 0 V.

2. Actual value output signals

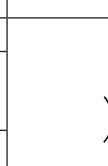
- Electrical interfaces "A1" (pin F) and "B1" (pin 6)
  - "A1": 0.35 V ... +10 V corresponds to 0% ... 100% valve opening; orifice spool in seat position if actual value < -2.5 V
  - "B1": 0 V ... +10 V corresponds to 0% ... 100% valve opening; orifice spool in seat position if actual value < -1.5 V
- Electrical interface "G1" (pin 6)
  - 4 mA ... +20 mA corresponds to 0% ... 100% valve opening; orifice spool in seat position if actual value < 2.7 mA

Block diagram/controller function block: Version 6 + PE

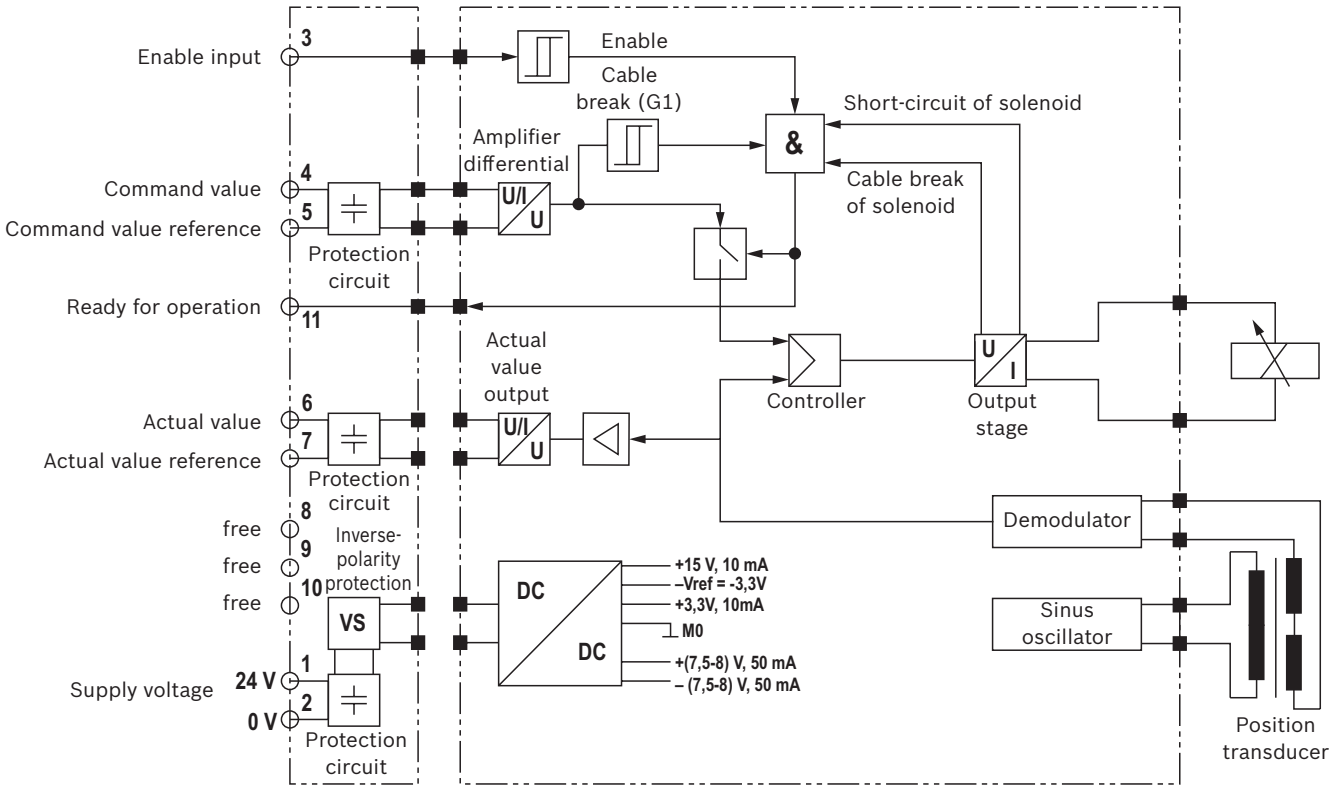


Notices:

- Electrical interface "A1"
  - in opening direction: Valve active if command value ≥ 0.5 V
  - in closing direction: Valve deactivated if command value ≤ 0.3 V ("on seat")
- Electrical interfaces "B1" and "G1"
  - in opening direction: Valve active if enable pin 3 is set, command value > -1 V ("B1") or > 2 mA ("G1")
  - in closing direction: Valve deactivated if enable pin 3 is not set, command value < -1 V ("B1") or < 2 mA ("G1") ("on seat")

Command value	"B1" and "G1"	"A1"
Without enable		–
0 V		
>0 V ... 0.35 V		
>0.35 V ... <0.5 V		
>0.5 V		

Block diagram/controller function block: Version 11 + PE



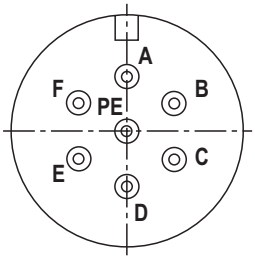
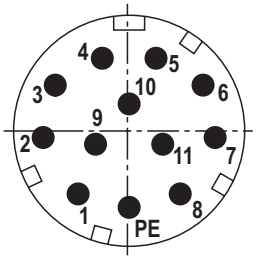
☞ **Notices:**

- ▶ Electrical interface "A1"
  - – in opening direction: Valve active if command value ≥ 0.5 V
  - – in closing direction: Valve deactivated if command value ≤ 0.3 V ("on seat")
- ▶ Electrical interfaces "B1" and "G1"
  - – in opening direction: Valve active if enable pin 3 is set, command value > -1 V ("B1") or > 2 mA ("G1")
  - – in closing direction: Valve deactivated if enable pin 3 is not set, command value < -1 V ("B1") or < 2 mA ("G1") ("on seat")

Command value	**"B1"** and **"G1"**	**"A1"**
Without enable		–
0 V		
>0 V ... 0.35 V		
>0.35 V ... <0.5 V		
>0.5 V		

Electrical connections and assignment

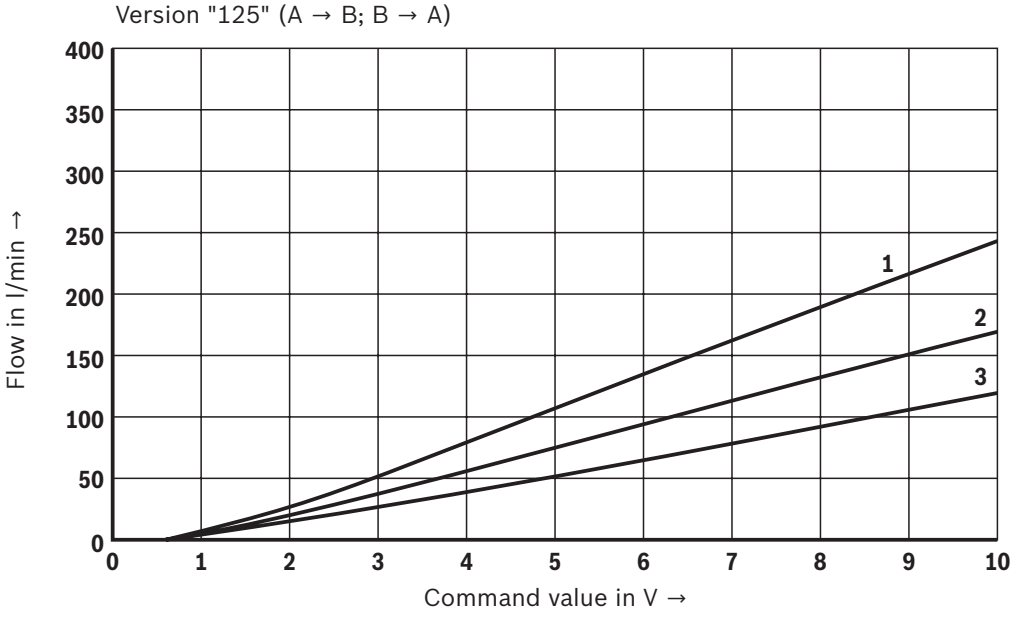
Connector pin assignment

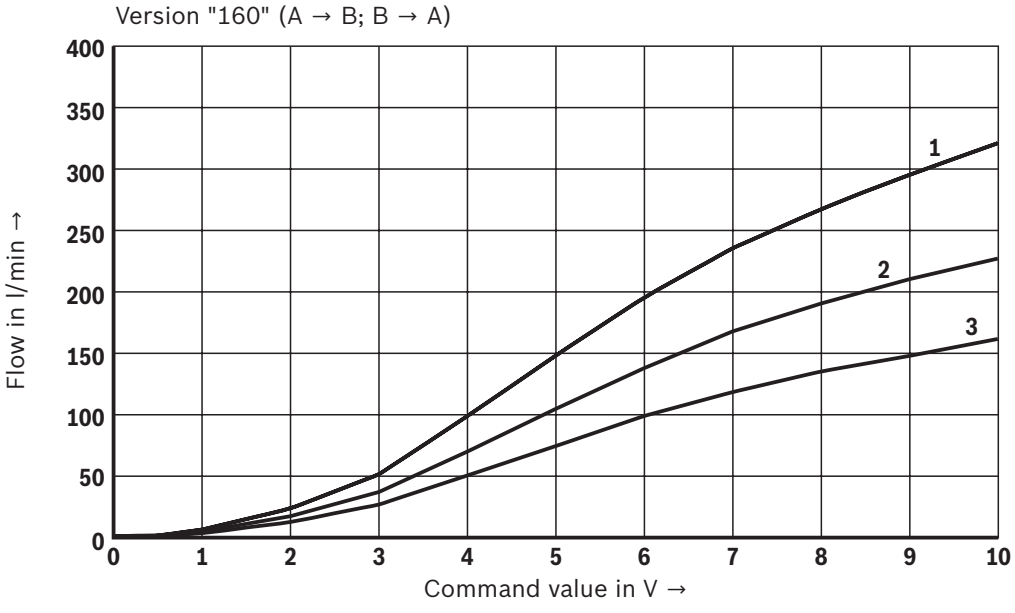
Pin		Core marking [1]	Interface assignment		
6 + PE	**11 + PE**		**"A1"** (6 + PE)	**"B1"**(11 + PE)	**"G1"**(11 + PE)
A	1	1	Supply voltage 24 VDC		
B	2	2	GND		
C	3	3	Reference potential actual value	Enable input 24 VDC (high ≥ 12 V; low ≤5 V)	
D	4	4	Command value 0 ... 10 V		Command value 4 ...20 mA
E	5	5	Reference potential command value		
F	6	6	Actual value 0 ... 10 V		Actual value 4 ... 20 mA
	7	7		Reference potential actual value	
	8	8	–		
	9	9	–		
	10	10	–		
	11	11	–	Switching output 24 V – fault-free operation (supply voltage -1 V)/fault (0 V) or power circuit signal), maximum 50 mA	
PE	PE	green-yellow	Functional earth (directly connected to the valve housing)		
					

[1] Core marking of the connection lines for mating connector with cable set, see accessories, page 26 and 27

Characteristic curves: Size 16
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Flow/signal function

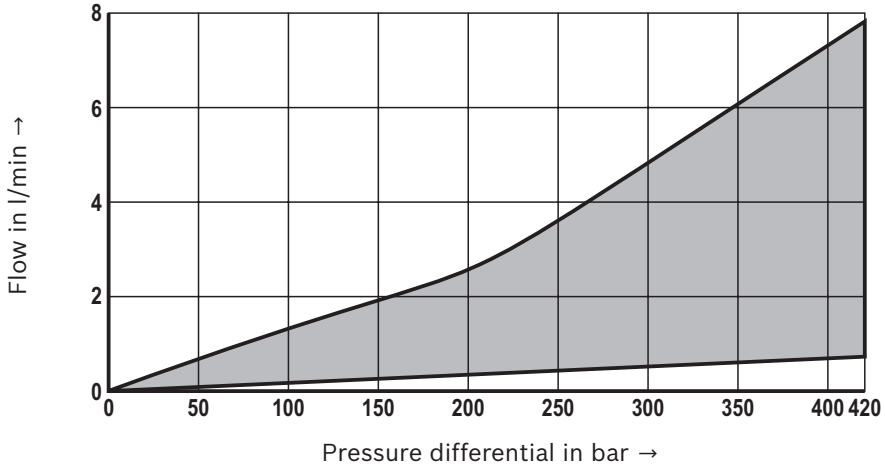




1 Pressure differential 20 bar
2 Pressure differential 10 bar
3 Pressure differential 5 bar

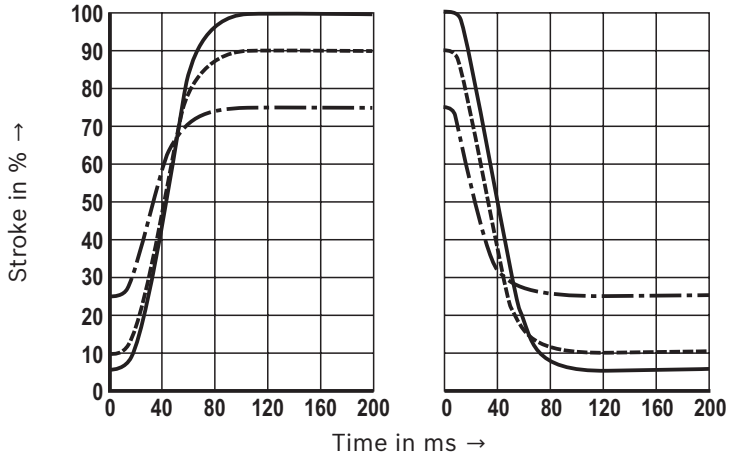
Characteristic curves: Size 16
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Leakage as a function of the pressure differential
(Command value: A1 – 0.5 V; B1 – 0 V; G1 – 4 mA)



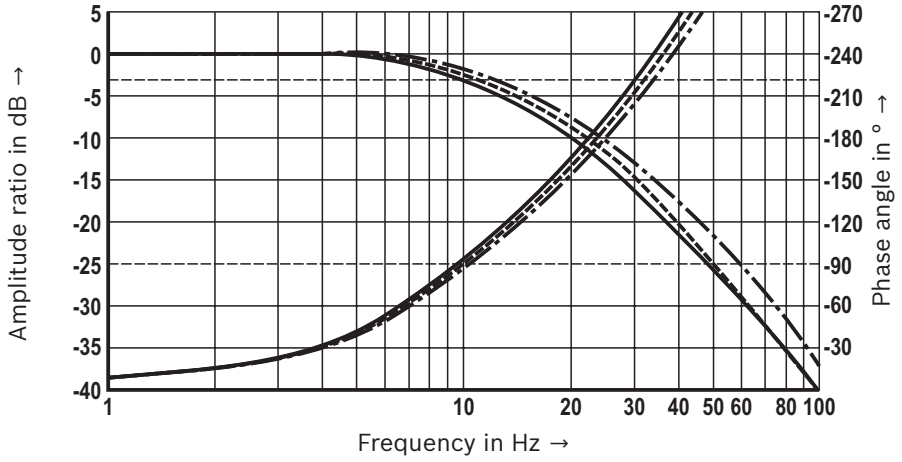
Scatter range

Transition function with stepped electric input signals
(p_A = 100 bar)



Step responses in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

Frequency response (p_A= 100 bar)

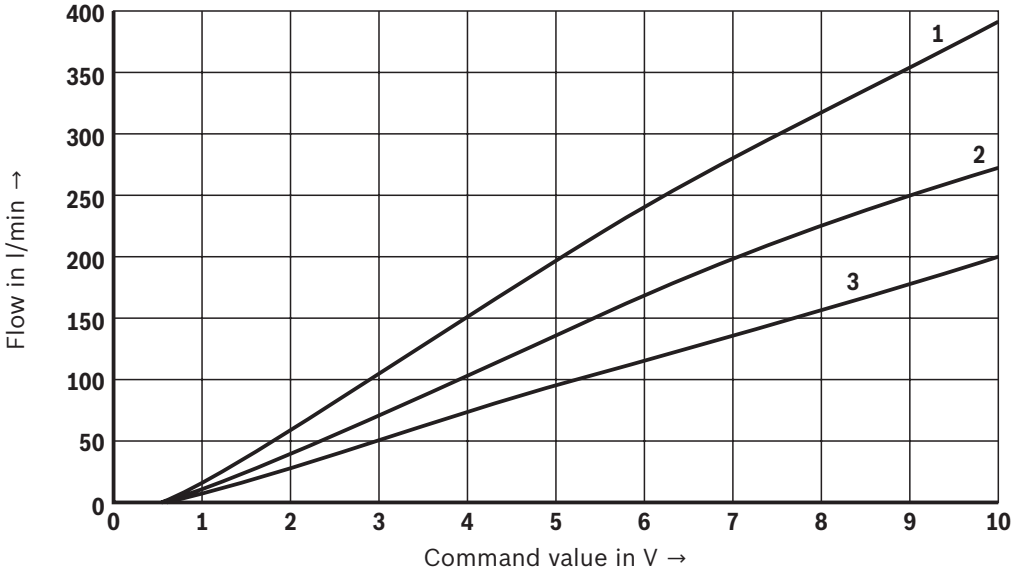


Signals in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

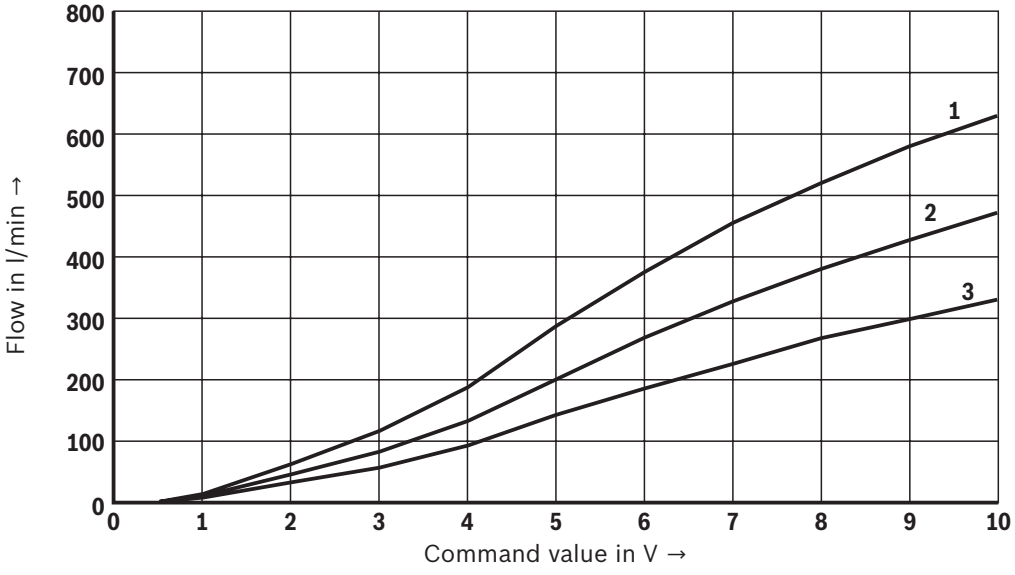
Characteristic curves: Size 25
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Flow/signal function

Version "220" (A → B; B → A)



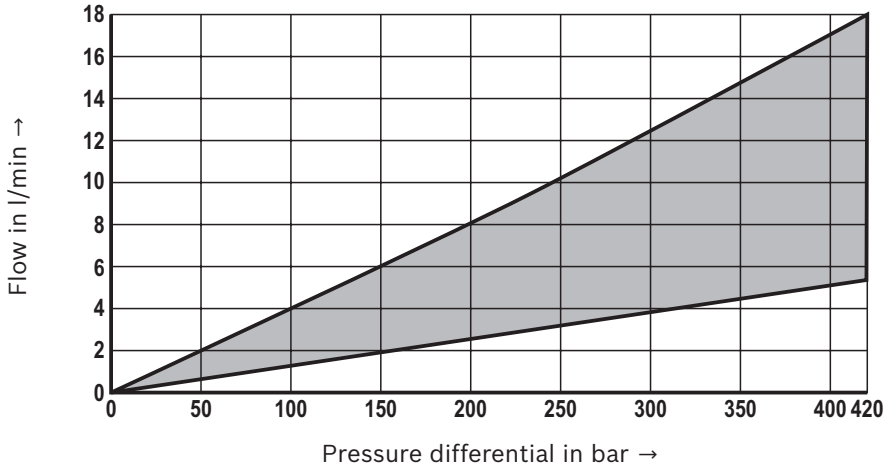
Version "330" (A → B; B → A)



1 Pressure differential 20 bar
2 Pressure differential 10 bar
3 Pressure differential 5 bar

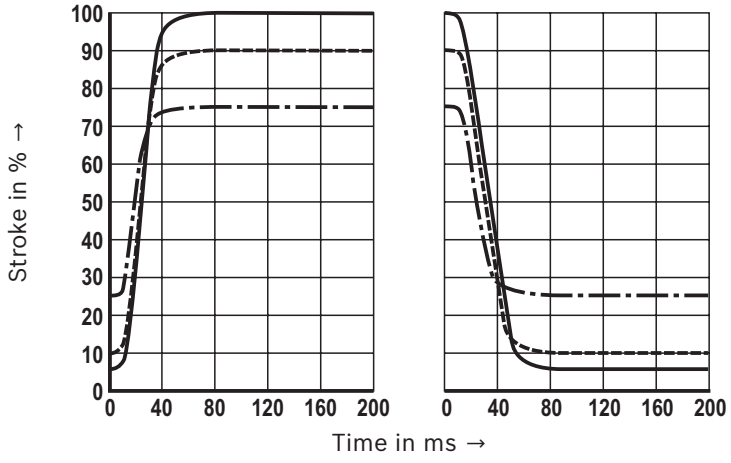
Characteristic curves: Size 25
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Leakage as a function of the pressure differential
(Command value: A1 – 0.5 V; B1 – 0 V; G1 – 4 mA)



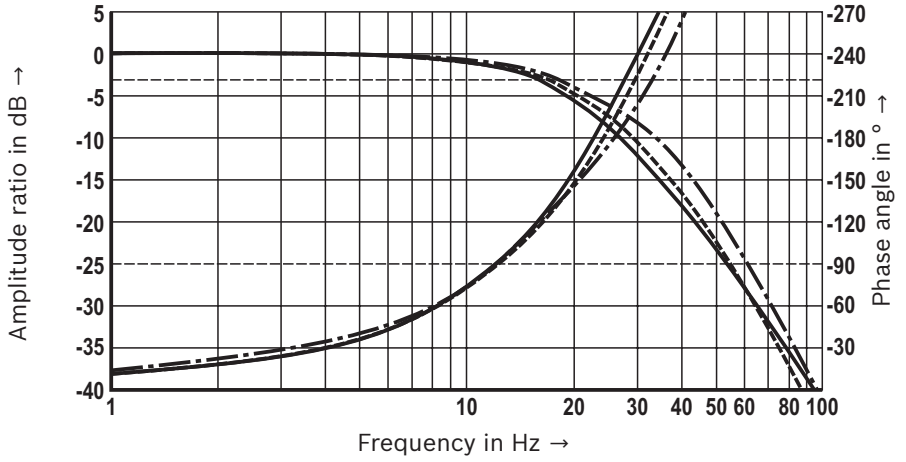
Scatter range

Transition function with stepped electric input signals
(p_A = 100 bar)



Step responses in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

Frequency response (p_A= 100 bar)

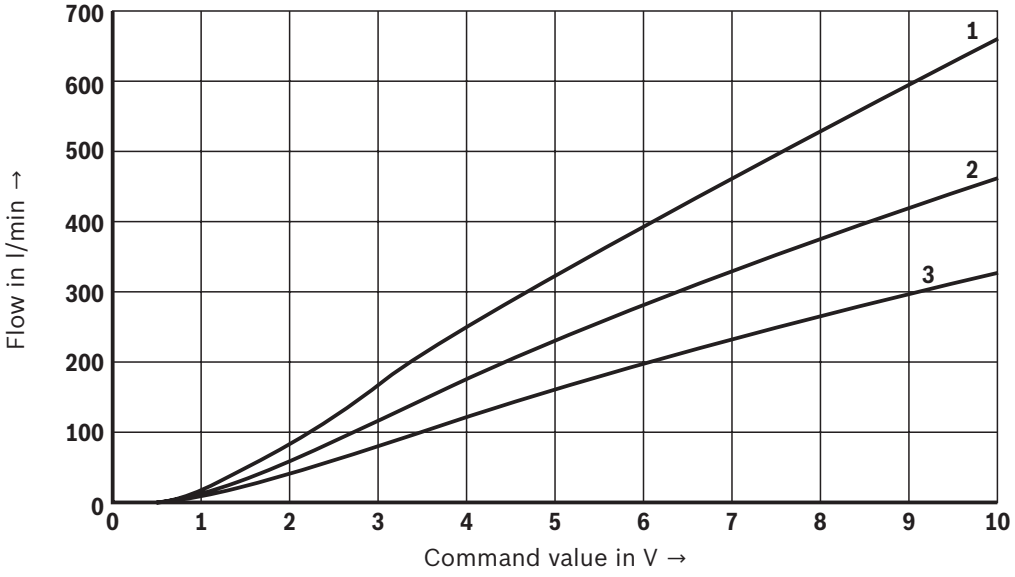


Signals in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

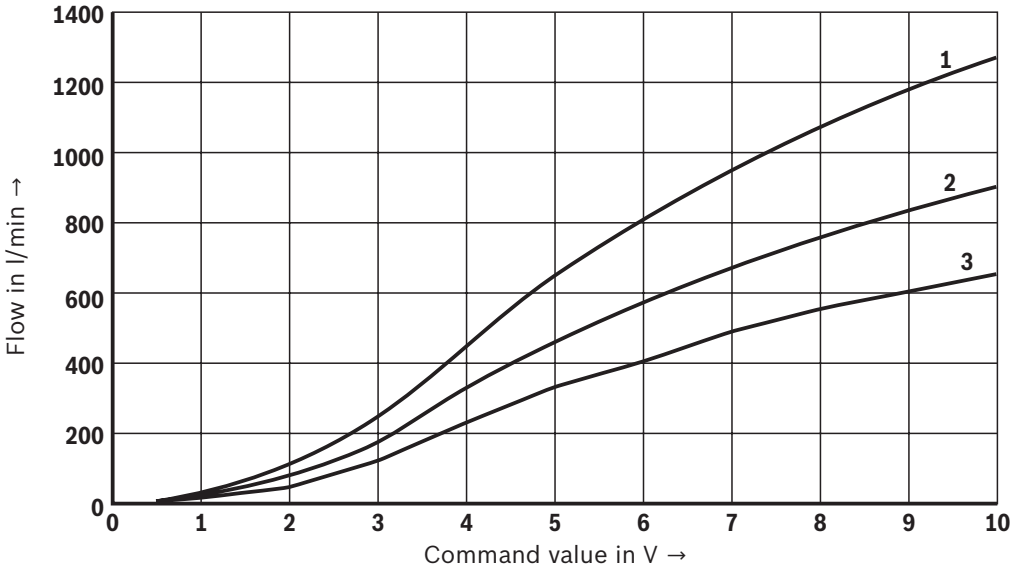
Characteristic curves: Size 32
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Flow/signal function

Version "320" (A → B; B → A)



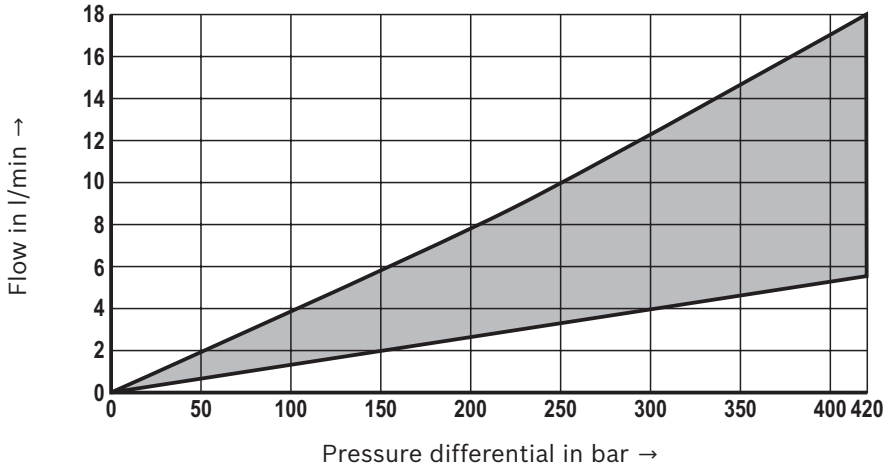
Version "650" (A → B; B → A)



1 Pressure differential 20 bar
2 Pressure differential 10 bar
3 Pressure differential 5 bar

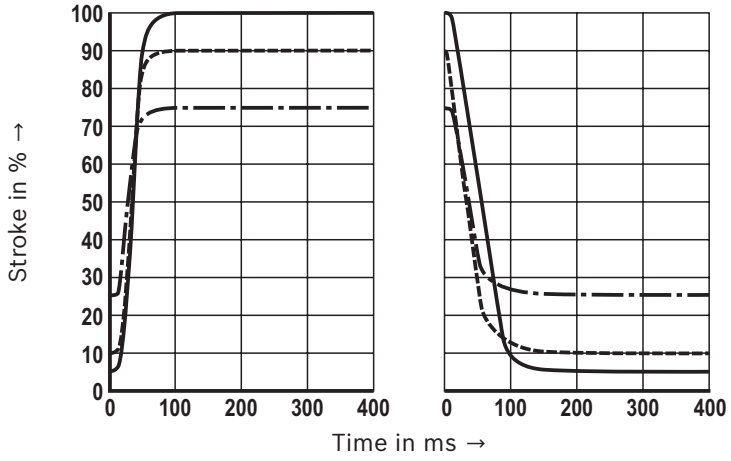
Characteristic curves: Size 32
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Leakage as a function of the pressure differential
(Command value: A1 – 0.5 V; B1 – 0 V; G1 – 4 mA)



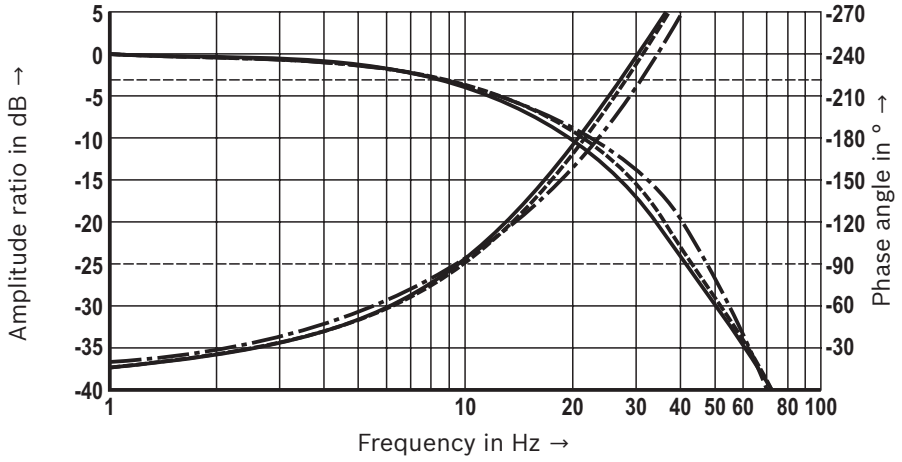
Scatter range

Transition function with stepped electric input signals
(p_A = 100 bar)



Step responses in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

Frequency response (p_A= 100 bar)

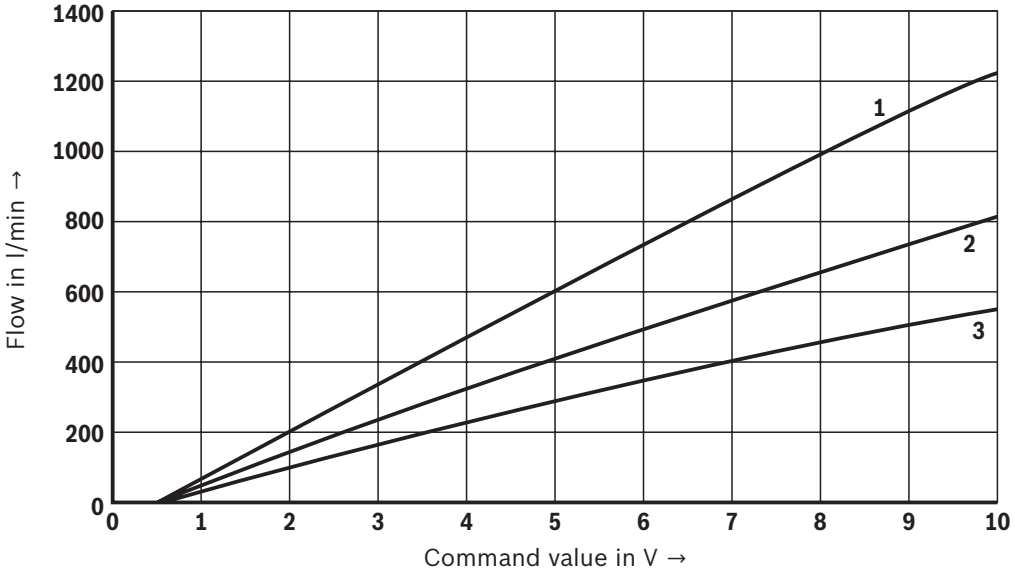


Signals in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

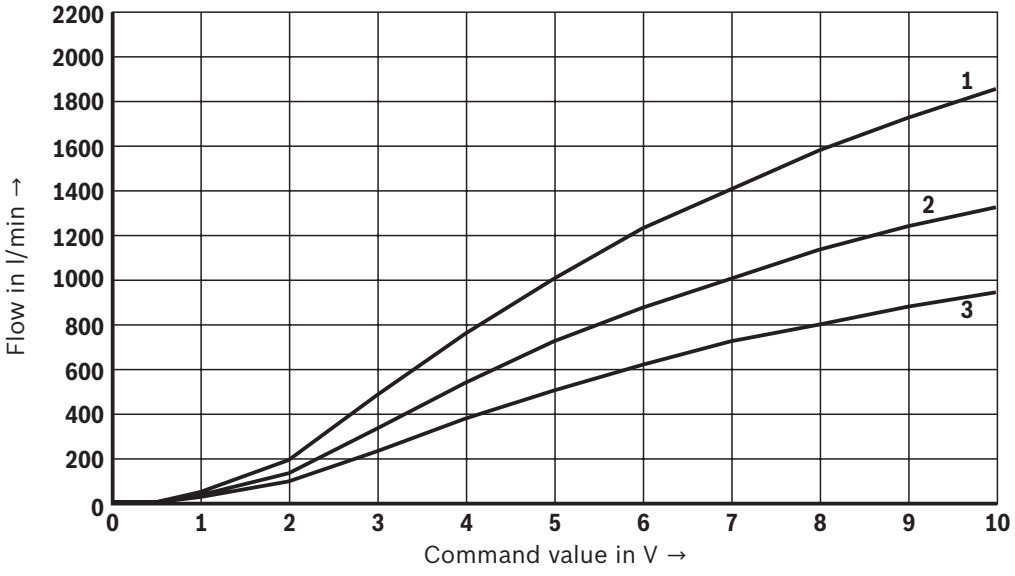
Characteristic curves: Size 40
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Flow/signal function

Version "500" (A → B; B → A)



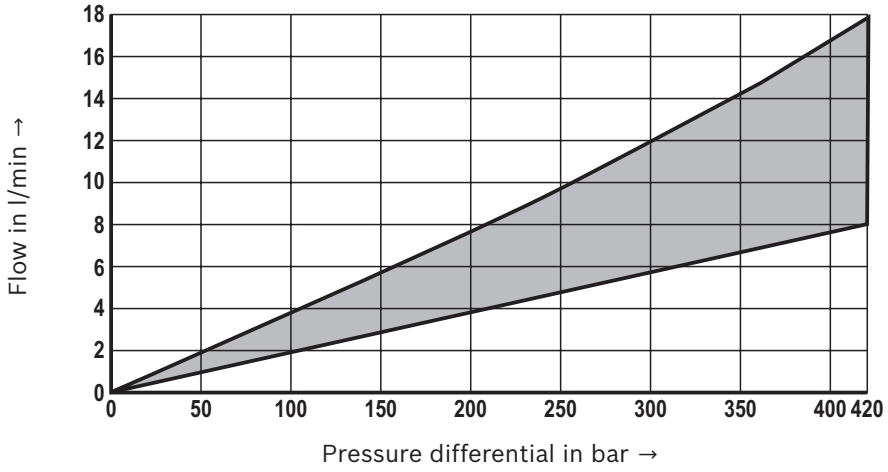
Version "940" (A → B; B → A)



1 Pressure differential 20 bar
2 Pressure differential 10 bar
3 Pressure differential 5 bar

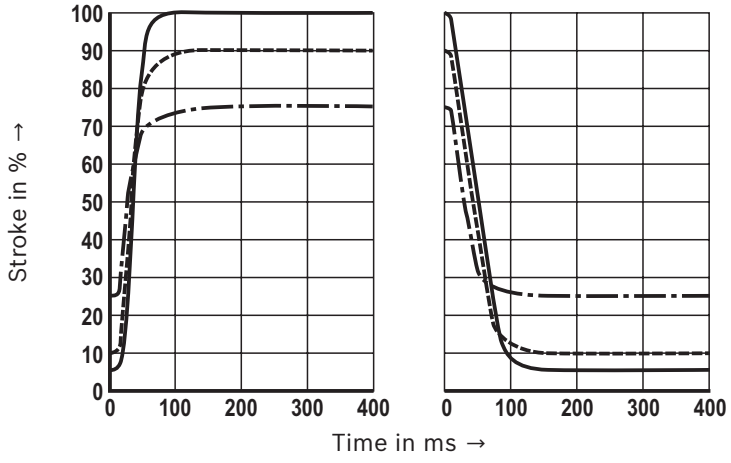
Characteristic curves: Size 40
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Leakage as a function of the pressure differential
(Command value: A1 – 0.5 V; B1 – 0 V; G1 – 4 mA)



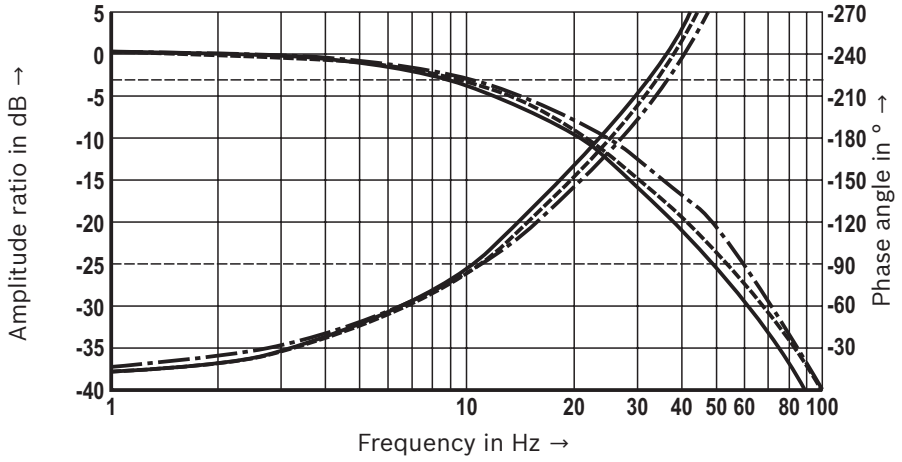
Scatter range

Transition function with stepped electric input signals
(p_A = 100 bar)



Step responses in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

Frequency response (p_A= 100 bar)

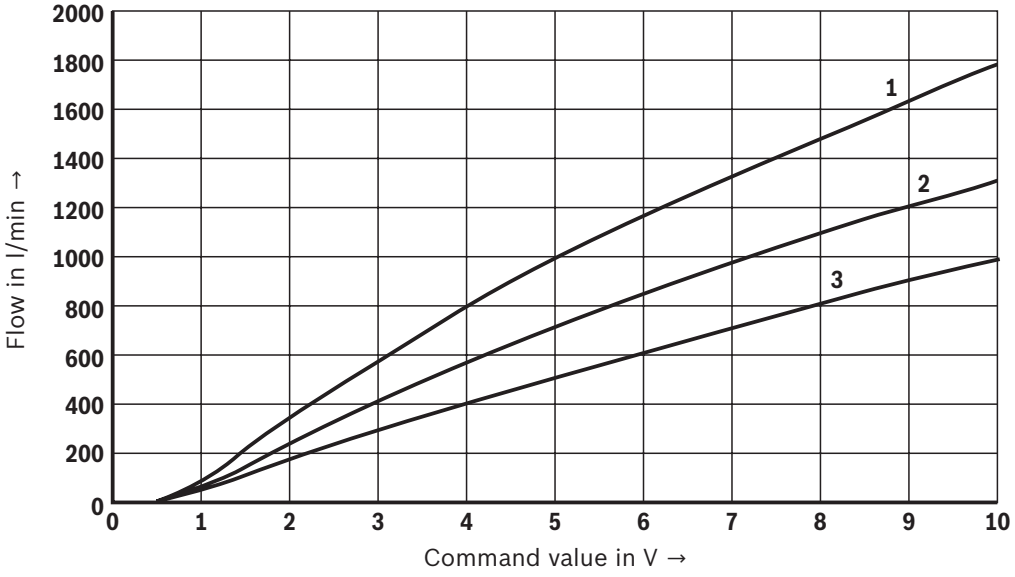


Signals in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

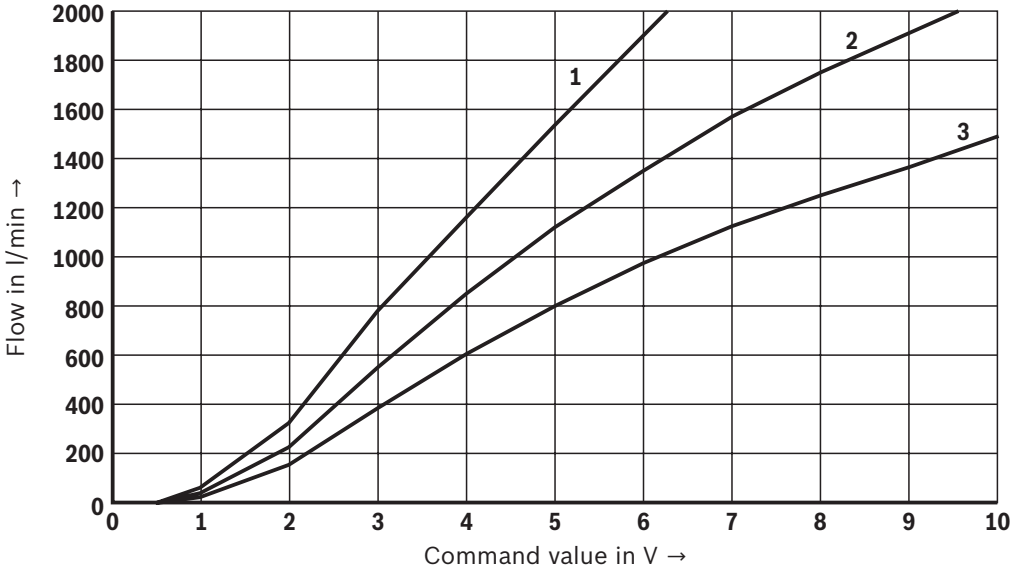
Characteristic curves: Size 50
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Flow/signal function

Version "1000" (A → B; B → A)



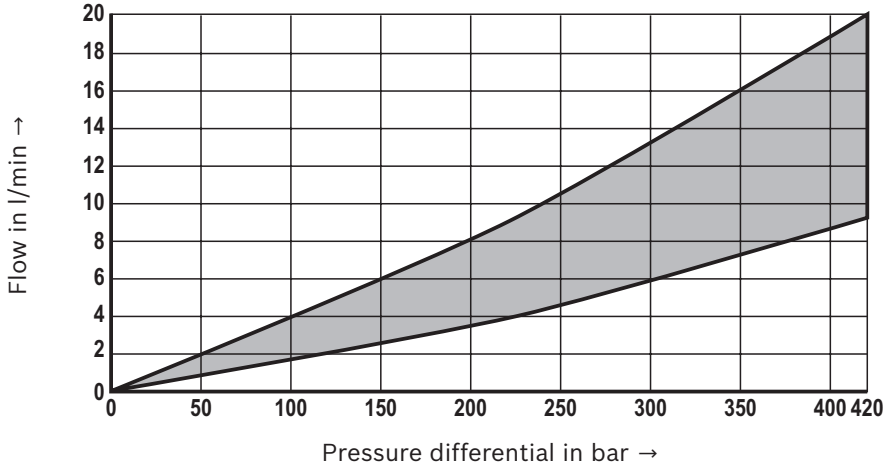
Version "1500" (A → B; B → A)



1 Pressure differential 20 bar
2 Pressure differential 10 bar
3 Pressure differential 5 bar

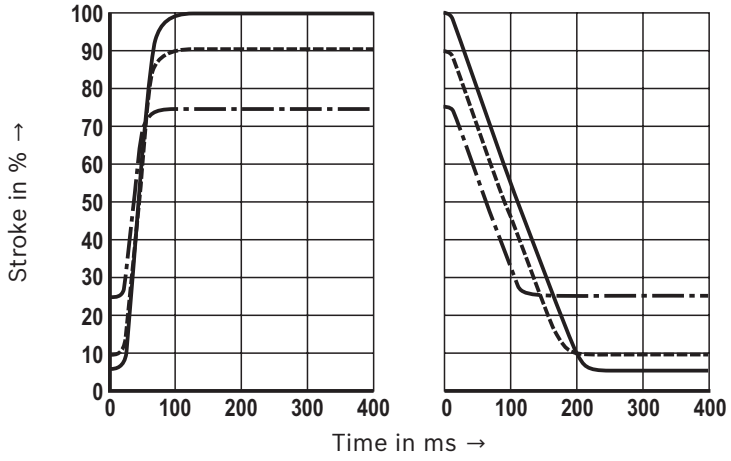
Characteristic curves: Size 50
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Leakage as a function of the pressure differential
(Command value: A1 – 0.5 V; B1 – 0 V; G1 – 4 mA)



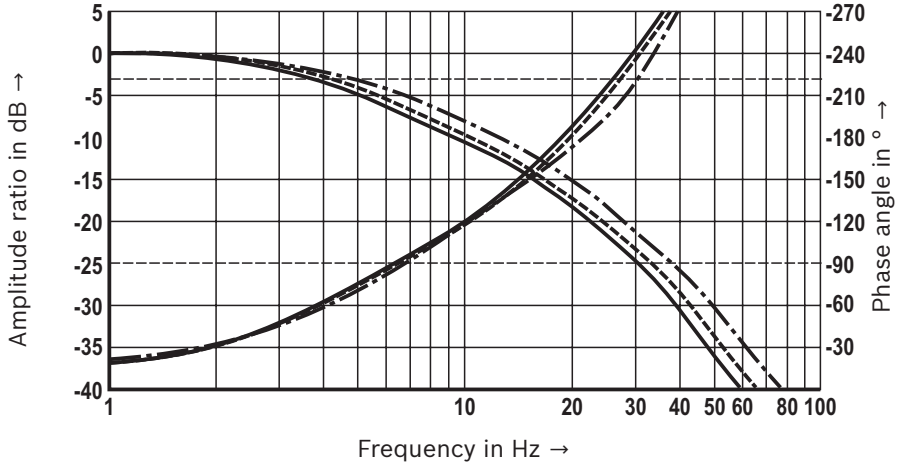
Scatter range

Transition function with stepped electric input signals
(p_A = 100 bar)



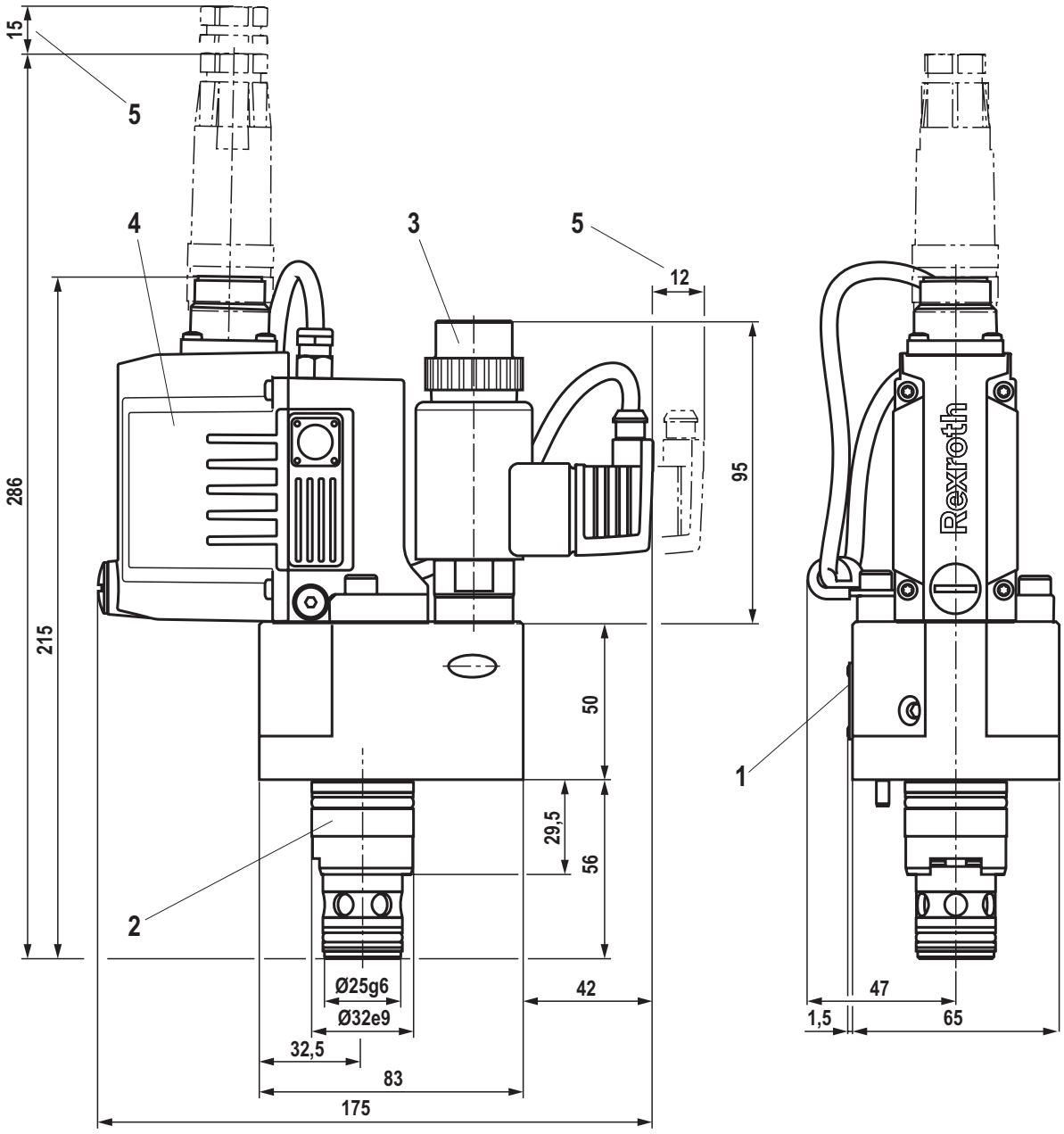
Step responses in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

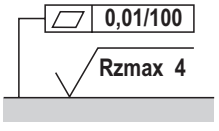
Frequency response (p_A= 100 bar)



Signals in %:
- 5 – 100 – 5
- 10 – 90 – 10
- 25 – 75 – 25

Dimensions: Size 16
(dimensions in mm)



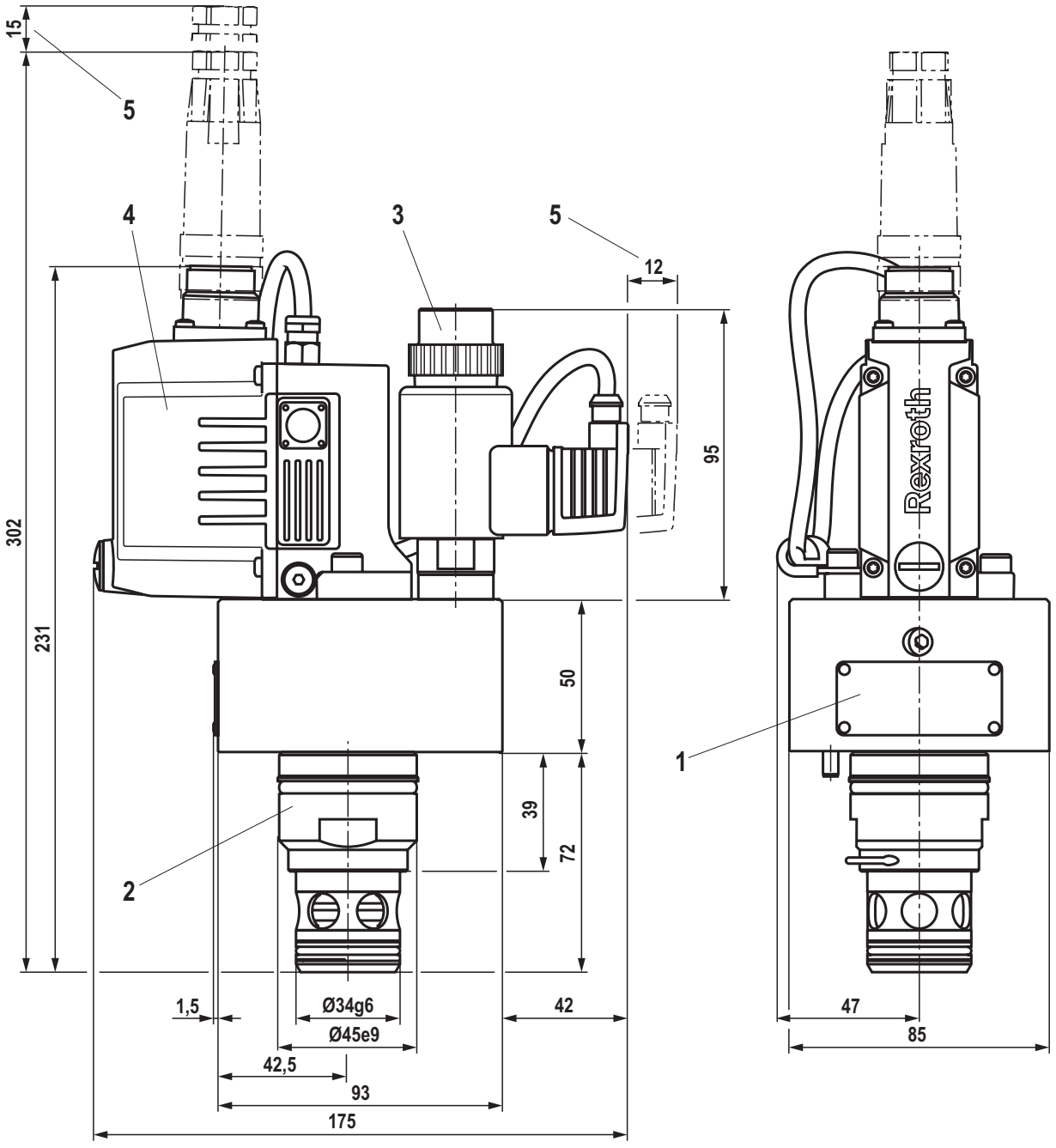


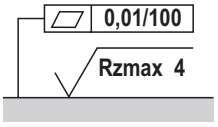
Required surface quality of the valve contact surface

☞ **Notice:**
The dimensions are nominal dimensions which are subject to tolerances.

Item explanations and **valve mounting screws** see page 25.

Dimensions: Size 25
(dimensions in mm)



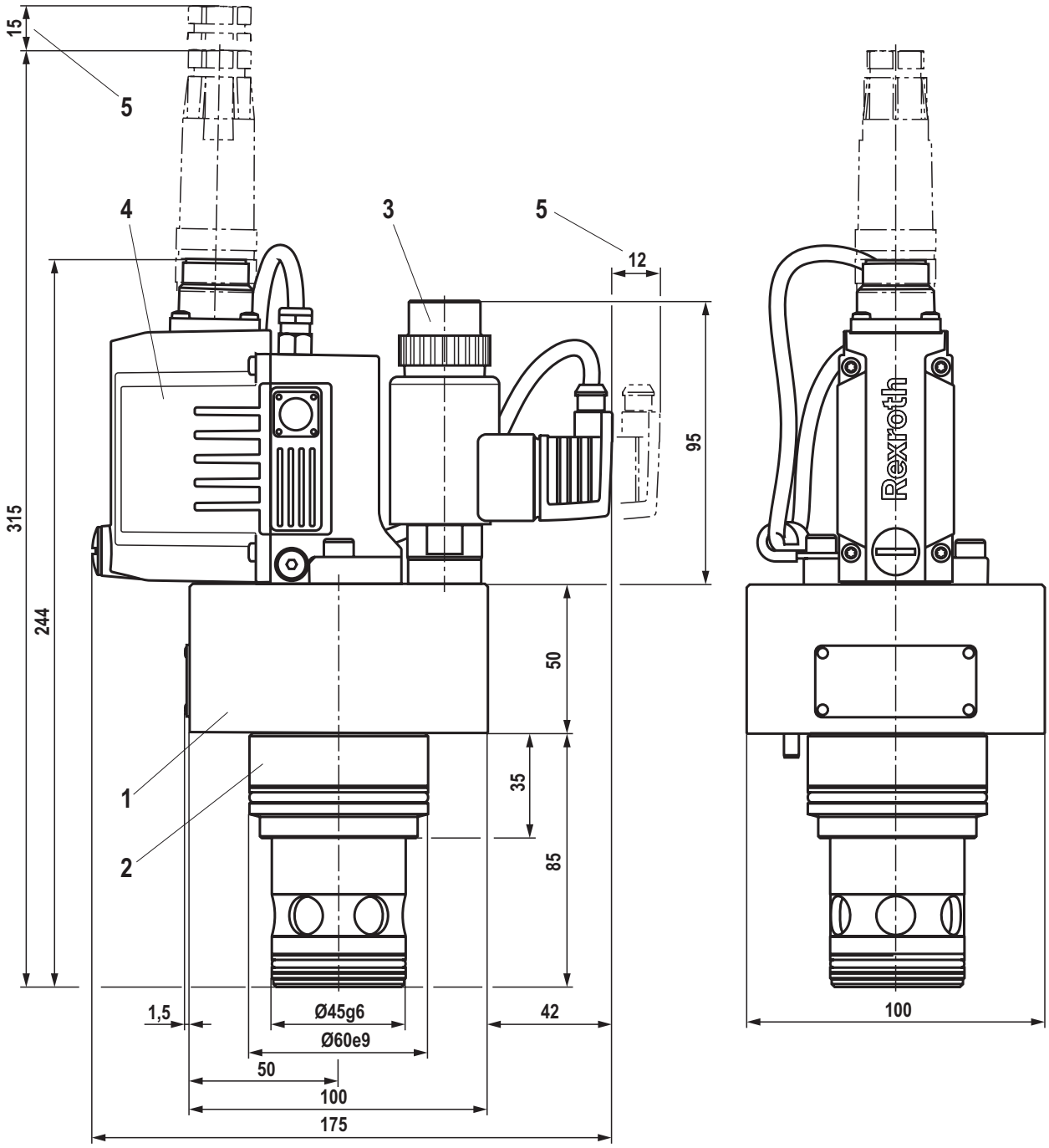


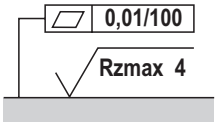
Required surface quality of
the valve contact surface

☞ **Notice:**
The dimensions are nominal dimensions which are subject to tolerances.

Item explanations and **valve mounting screws**
see page 25.

Dimensions: Size 32
(dimensions in mm)



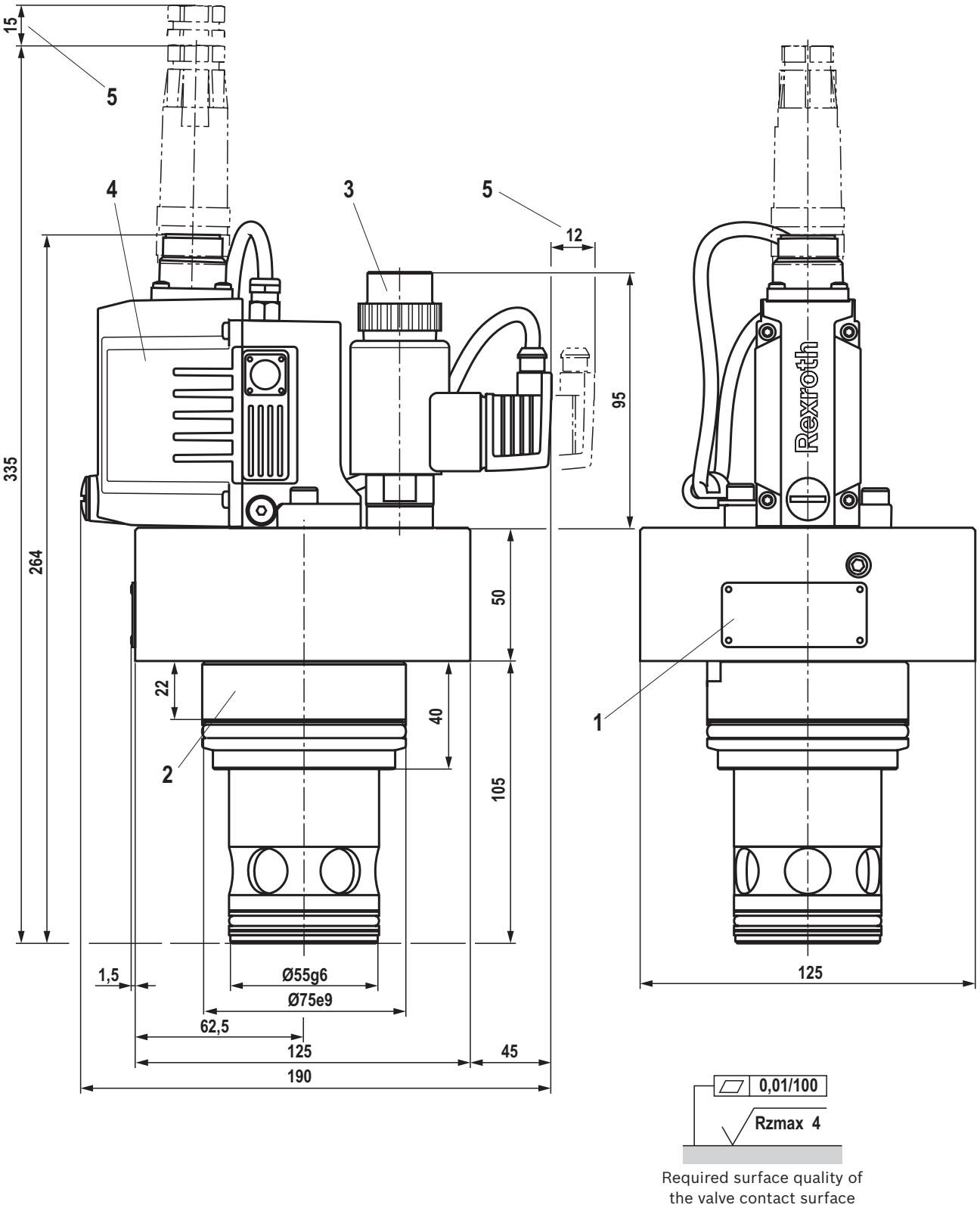


Required surface quality of the valve contact surface

☞ **Notice:**
The dimensions are nominal dimensions which are subject to tolerances.

Item explanations and **valve mounting screws** see page 25.

Dimensions: Size 40
(dimensions in mm)

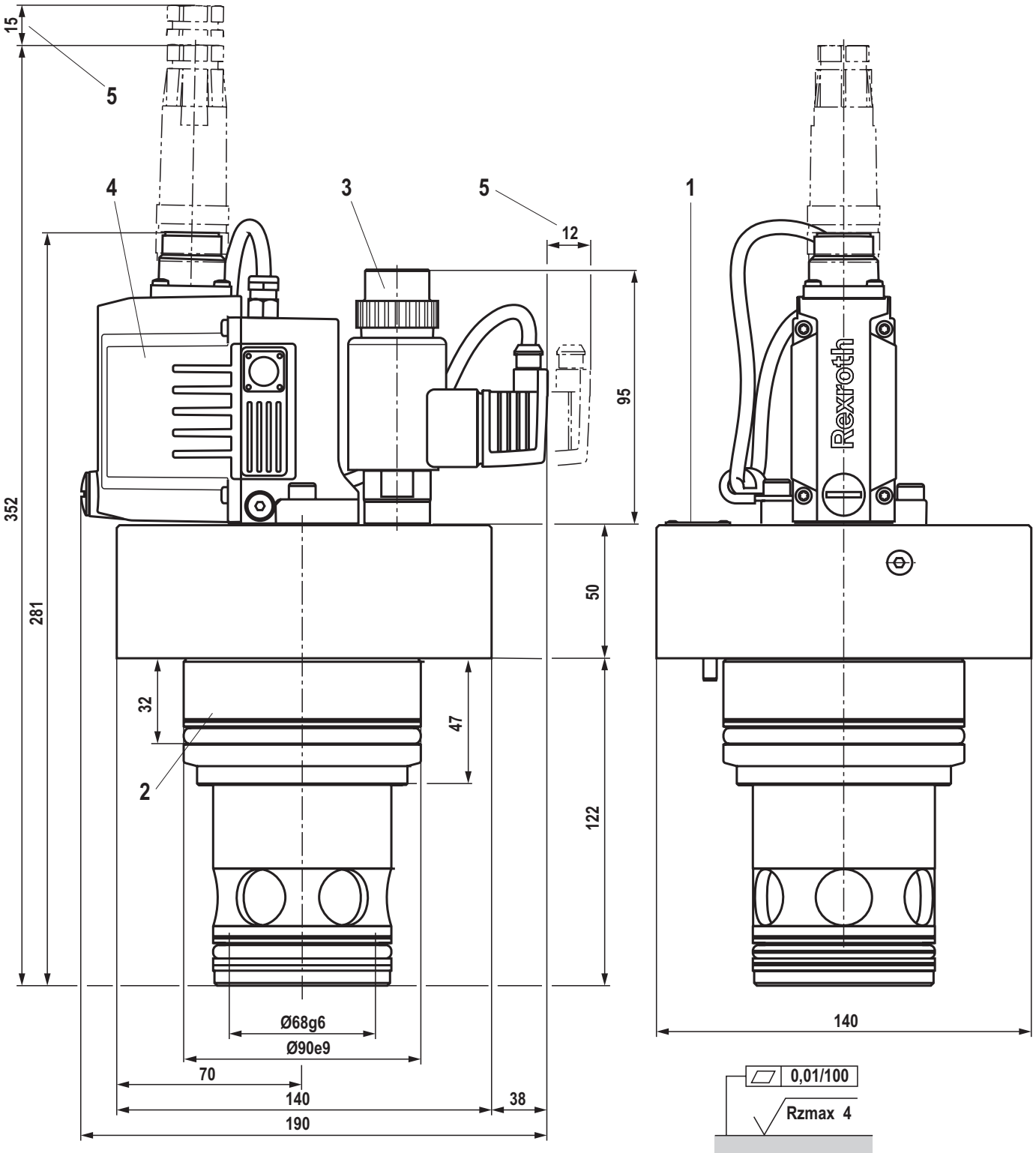


Required surface quality of the valve contact surface

☞ **Notice:**
The dimensions are nominal dimensions which are subject to tolerances.

Item explanations and **valve mounting screws** see page 25.

Dimensions: Size 50
(dimensions in mm)

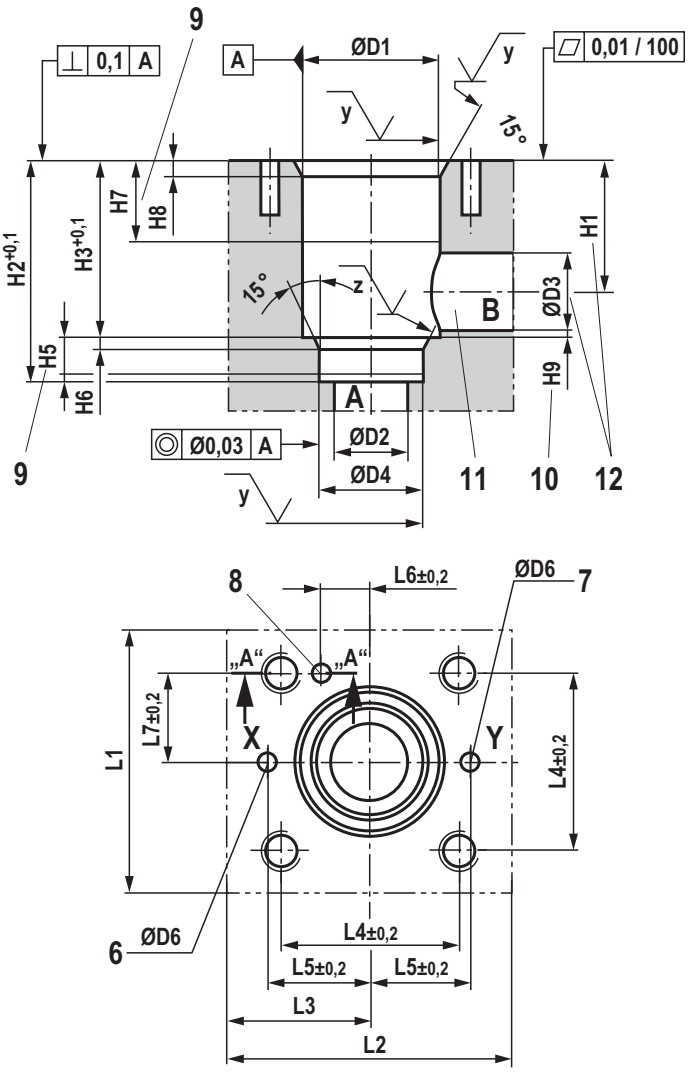


Required surface quality of the valve contact surface

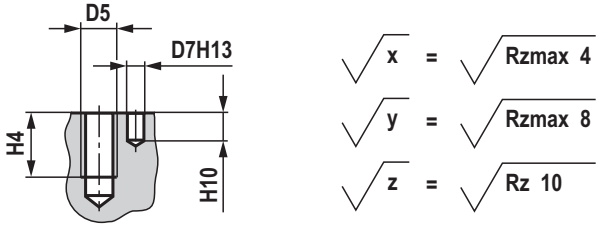
☞ **Notice:**
The dimensions are nominal dimensions which are subject to tolerances.

Item explanations and **valve mounting screws** see page 25.

Installation bore
(dimensions in mm)



Section A – A



1) Bore center at ØD3 max.

2) Control dimension

Installation dimensions according to DIN ISO 7368

NG	16	25	32	40	50
ØD1H7	32	45	60	75	90
ØD2	16	25	32	40	50
ØD3	16	25	32	40	50
max. ØD3	25	32	40	50	63
ØD4H7	25	34	45	55	68
D5	M8	M12	M16	M20	M20
max. ØD6	4	6	8	8	10
ØD7H13	4	6	6	6	8
H1	34	44	52	64	72
H1 [1]	29.5	40.5	48	59	65.5
H2	56	72	85	105	122
H3	43	58	70	87	100
H4	20	25	35	45	45
H5	11	12	13	15	17
H6	2	2.5	2.5	3	3
H7	20	30	30	30	35
H8	2	2.5	2.5	3	4
min. H9 [2]	0.5	1	1.5	2.5	2.5
min. H10	8	8	8	8	8
L1	65	85	100	125	140
L2	83	93	100	125	140
L3	32.5	42.5	50	62.5	70
L4	46	58	70	85	100
L5	25	33	41	50	58
L6	10.5	16	17	23	30
L7	23	29	35	42.5	50

NG	Installation dimensions according to DIN ISO 7368
16	ISO 7368-BA-06-2-A
25	ISO 7368-BB-08-2-A
32	ISO 7368-BC-09-2-A
40	ISO 7368-BD-10-2-A
50	ISO 7368-BE-11-2-A

Tolerances according to: General tolerances ISO 2768-mK

Item explanations and **valve mounting screws**
see page 25.

Dimensions

1 Cover
2 Main stage
3 Pilot control valve with proportional solenoid
4 Integrated electronics with position transducer and analog interface
5 Space required to remove the mating connectors
6 Port X
7 Port Y
8 Locating hole for locking pin
9 Depth of fit
10 Control dimension
11 Port B may be at any position around the central axis of port A. However, it must be observed that the mounting bores and the control bores are not damaged.
12 If a different diameter is used for port B than indicated in the dimensional table, the distance from the cover support surface to the bore center must be calculated.

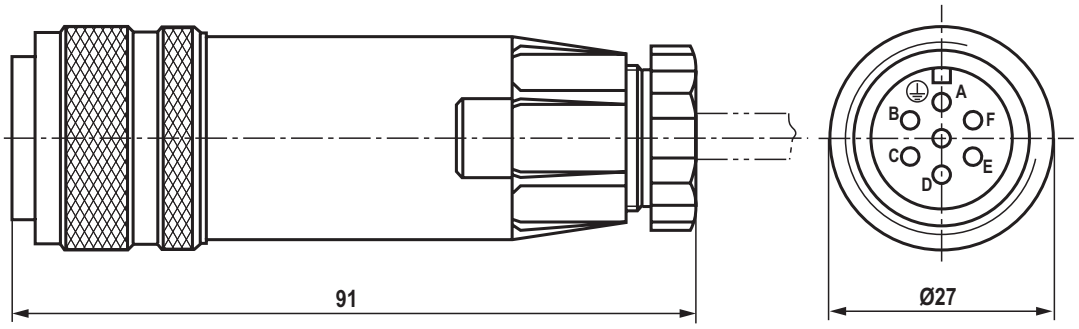
Valve mounting screws (separate order)

Size	Hexagon socket head cap screws	Material number
16	**4 hexagon socket head cap screws ISO 4762 - M8 x 30 - 10.9 - N67F 821 70** (galvanized according to Bosch standard N67F821 70) Tightening torque M_A = 35 ±5 Nm	**2910151246**
25	**4 hexagon socket head cap screws ISO 4762 - M12 x 40 - 10.9 - N67F 821 70** (galvanized according to Bosch standard N67F821 70) Tightening torque M_A = 105 ±15 Nm	**2910151346**
32	**4 hexagon socket head cap screws ISO 4762 - M16 x 50 - 10.9 - N67F 821 70** (galvanized according to Bosch standard N67F821 70) Tightening torque M_A = 265 ±25 Nm	**2910151442**
40 **50**	**4 hexagon socket head cap screws ISO 4762 - M20 x 60 - 10.9 - N67F 821 70** (galvanized according to Bosch standard N67F821 70) Tightening torque M_A = 500 ±50 Nm	**2910151526**

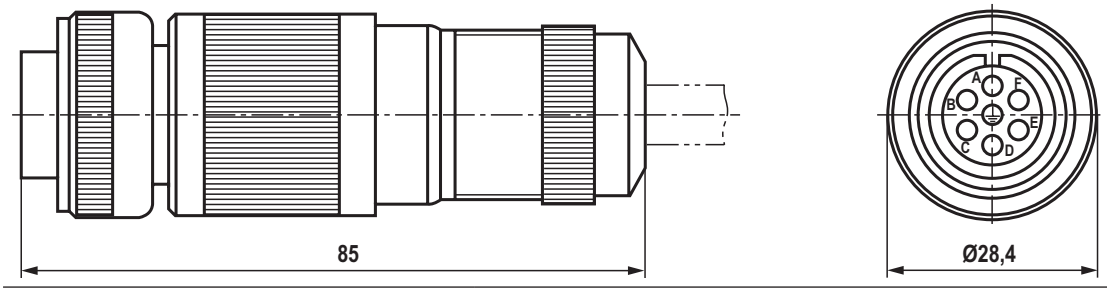
Accessories (separate order)

Connector connection, version 6 + PE

Mating connector	Version	Material number
Round connector according to EN 175201-804 (7-pole, plastic variant)	Mating connector (assembly kit) for a cable diameter of 6.5 ... 11 mm	**R900021267**
	Mating connector with 3 m cable, 7 x 0.75 mm², assembled	**R901420483**
	Mating connector with 5 m cable, 7 x 0.75 mm², assembled	**R901420491**
	Mating connector with 10 m cable, 7 x 0.75 mm², assembled	**R901420496**



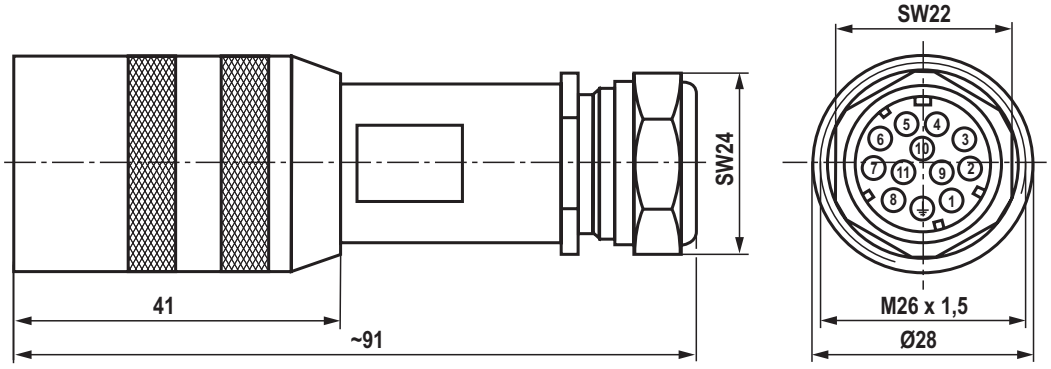
Round connector according to EN 175201-804 (7-pole, metal design)	Mating connector (assembly kit) for a cable diameter of 8.0 ... 13.5 mm	**R900223890**



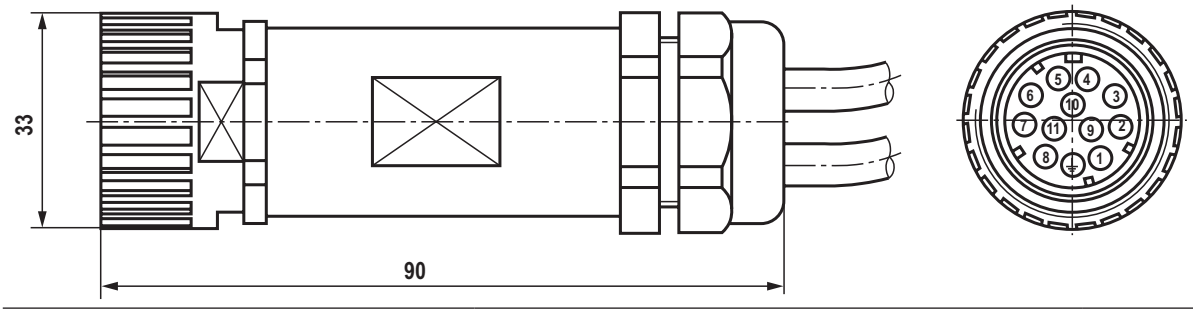
Accessories (separate order)

Connector connection, version 11 + PE

Mating connector	Version	Material number
Mating connector according to DIN EN 175201-804 (12-pole, metal design)	Mating connector (assembly kit) for a cable diameter of 12 ... 15 mm	**R901268000**
	Mating connector with 5 m cable, 12 x 0.75 mm² with cable shield, assembled	**R901272854**
	Mating connector with 20 m cable, 12 x 0.75 mm² with cable shield, assembled	**R901272852**



Mating connector according to DIN EN 175201-804 (12 pole, plastic variant)	Mating connector (assembly kit)	**R900884671**
	Mating connector with 2 x 5 m cable, supply line (3 x 1.0 mm²) and signal line (10 x 0.14 mm²) separated, with cable shield, assembled	**R900032356**
	Mating connector with 2 x 20 m cable, supply line (3 x 1.0 mm²) and signal line (10 x 0.14 mm²) separated, with cable shield, assembled	**R900860399**



Further information

▶ Hydraulic fluids on mineral oil basis	Data sheet 90220
▶ Environmentally compatible hydraulic fluids	Data sheet 90221
▶ Flame-resistant, water-free hydraulic fluids	Data sheet 90222
▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC)	Data sheet 90223
▶ Reliability characteristics according to EN ISO 13849	Data sheet 08012
▶ Hydraulic valves for industrial applications	Operating instructions 07600-B
▶ Selection of filters	www.boschrexroth.com/filter
▶ Information on available spare parts	www.boschrexroth.com/spc

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