Directional control valves, pilot-operated, with electrical position feedback and integrated electronics (OBE)

Type 4WRTE

RE 29083
Edition: 2017-03
Replaces: 08.13



H7809

- Size 10 ... 35
- Component series 4X
- Maximum operating pressure 350 bar
- Rated flow 25 ... 1000 l/min

Features

- Reliable – proven and robust design
- Safe
  - Automatic pressure compensation in the control chambers of the main stage by the pilot control valve
  - Control spool of the main stage in the spring-centered central position and/or in the offset position
  - Optionally with spool position monitoring
- Flexible – suitable for position, speed and pressure control
- Precise – high response sensitivity and little hysteresis

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Ordering code

01	02	03	04	05	06	07	08		09		10	11	12	13		14	15	16	17
4	**WRT**	**E**						**–**	**4X**	**/**	**6E**	**G24**		**K31**	**/**				*****

01	4 main ports	**4**
02	Directional control valve, pilot-operated	**WRT**
03	With integrated electronics	**E**
04	**Without** spool position monitoring	**no code**
	With spool position monitoring (NG16 ... NG35 only)	**M**
05	Size 10	**10**
	Size 16	**16**
	Size 25	**25**
	Size 27	**27**
	Size 32	**32**
	Size 35	**35**
06	Symbols e. g. E, E1-, W6- etc.; possible version see page 3	

Rated flow (***Δp*** = 5 bar/control edge)

07	**– Size 10**	
	25 l/min (symbol E, W6-, W8- and V only with flow characteristic "L")	**25**
	50 l/min (symbol E1-, W8- and V1 only with flow characteristic "L")	**50**
	90 l/min	**100**
	– Size 16	
	150 l/min (symbol V1 only with flow characteristic "L")	**150**
	220 l/min	**220**
	– Size 25	
	220 l/min	**220**
	350 l/min	**350**
	– Size 27	
	500 l/min	**500**
	– Size 32	
	400 l/min	**400**
	600 l/min	**600**
	– Size 35	
	1000 l/min	**1000**

Flow characteristic

08	Linear	**L**
	Linear with fine control range	**P**
09	Component series 40 ... 49 (40 ... 49: unchanged installation and mounting dimensions)	**4X**

Pilot control valve

10	Proportional solenoid with detachable coil (NG6)	**6E**
11	Direct voltage 24 V	**G24**

Pilot oil flow

12	External pilot oil supply, external pilot oil return	**no code**
	Internal pilot oil supply, external pilot oil return	**E**
	External pilot oil supply, internal pilot oil return	**T**
	Internal pilot oil supply, internal pilot oil return	**ET**

Electrical connection

13	**Without** mating connector; connector DIN EN 175201-804	**K31** [1)]

Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
4	**WRT**	**E**						**–** **4X**	**/**	**6E**	**G24**		**K31**	**/**				*****

Interfaces of the control electronics

14	Command value/actual value ± 10 V	**A1**
	Command value/actual value 4 ... 20 mA	**F1**
	Command value/actual value ± 10 V, enable signal (pin C)	**A5** [2]

Seal material

15	NBR seals	**M**
	FKM seals	**V**
	Observe compatibility of seals with hydraulic fluid used.	

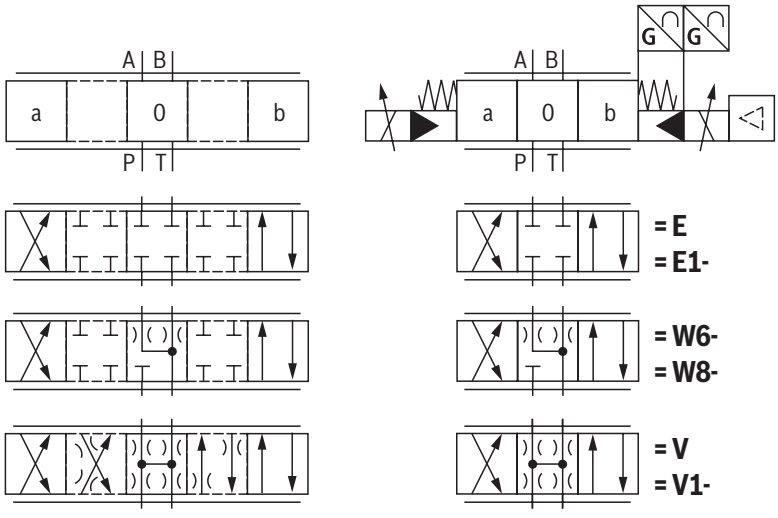
16	**Without** electronics protection membrane	**no code**
	With electronics protection membrane	**-967**

17	Further details in the plain text	*****

[1] Mating connectors, separate order, see page 28 and data sheet 08006.

[2] When replacing the component series 3X by component series 4X, the electronics interface is to be defined with A5 (enable signal at pin C).

Symbols



With symbol E1–, V1– and W8–:

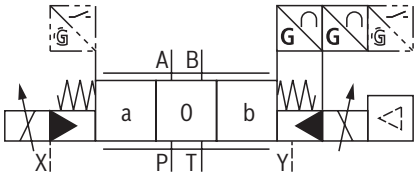
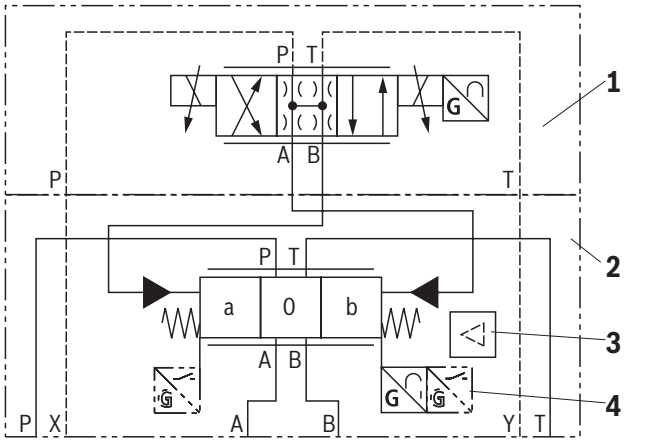
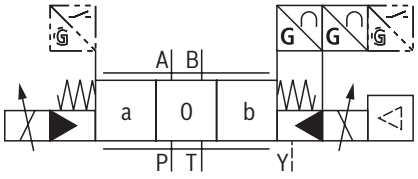
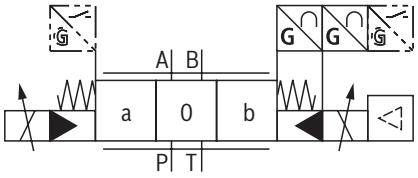
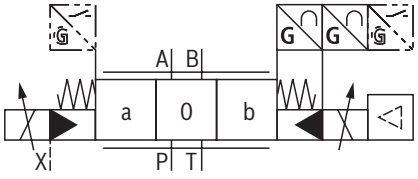
P → A: $q_{V\,max}$ B → T: $q_V/2$

P → B: $q_V/2$ A → T: $q_{V\,max}$

Notices:

- Representation according to DIN ISO 1219-1. Hydraulic interim positions are shown by dashes.

Symbols

Design	simple	detailed
"no code"		
"E"		
"ET"		
"T"		

1 Pilot control valve
2 Main valve
3 Integrated electronics (OBE)
4 Design with spool position monitoring "M"

Notice:
Representation according to DIN ISO 1219-1.

Function, section

Valves of type 4WRTE are pilot-operated directional control valves with electrical position feedback, integrated electronics (OBE) and optional spool position monitoring.

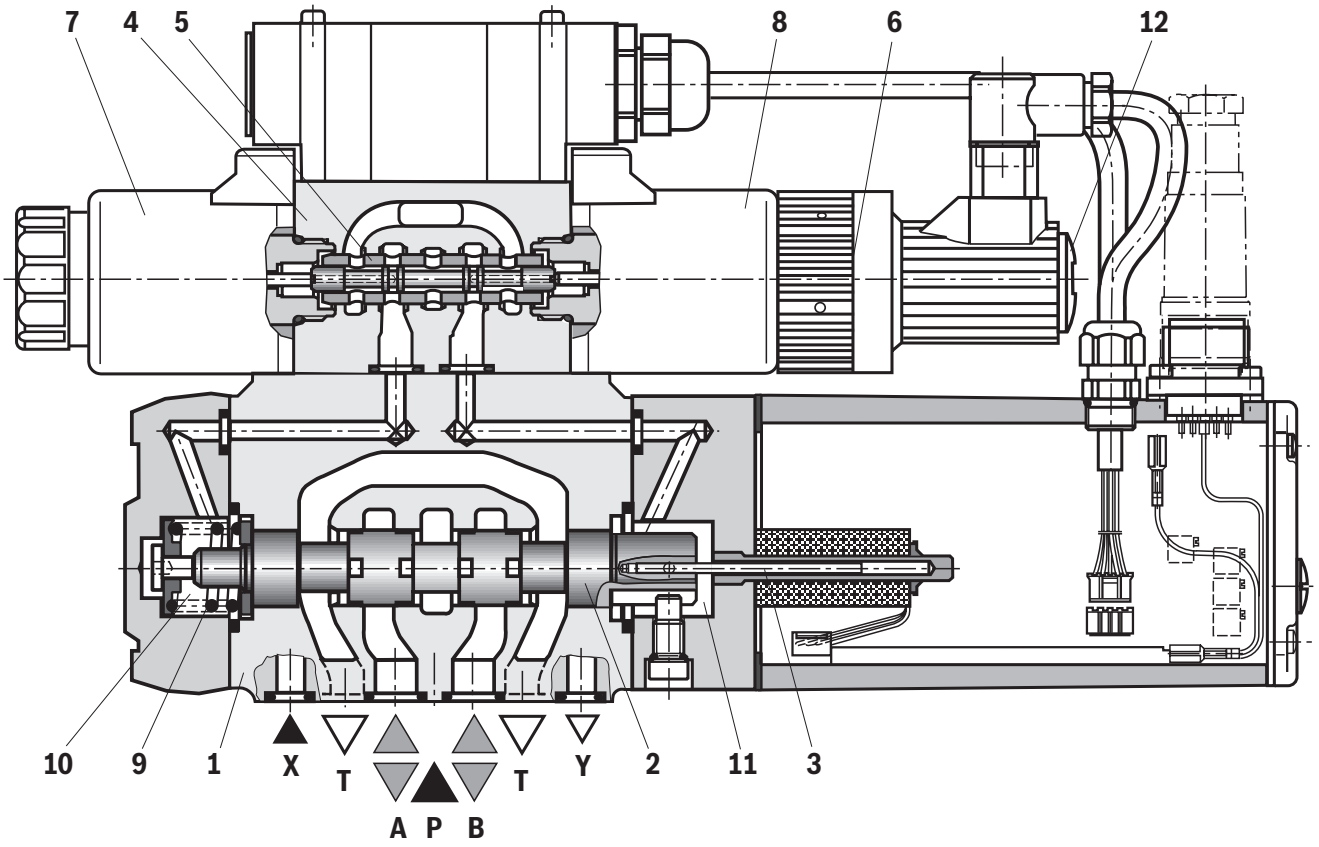
Set-up

The valve basically consists of 3 main assemblies:

- Housing (1) with main stage control spool (2) and optional spool position monitoring (13)
- Integrated electronics (optionally with electronics protection membrane (14)) with inductive position transducer (3) of the main stage
- Pilot control valve (4) with control spool/socket unit (5), inductive position transducer (6) and pressure feed back for central position of the main stage control spool (2)

Function

- With de-energized proportional solenoids (7; 8) central position of the main stage control spool (2) due to centering spring (9) and pressure feed back
- Control of the main stage control spool (2) via the pilot control valve (4) → the main stage control spool (2) is positioned in a regulated manner
- Controlling the control spool of the pilot control valve (4) by changing the solenoid force of the proportional solenoids (7; 8)
- Connection of the command and actual values in the integrated electronics
- Pilot oil supply to the pilot control valve internally via port P or externally via port X
  Pilot oil return internally via port T or externally via Y to the tank
- With a command value of 0 V, the electronics control the main stage control spool (2) in central position



Function, section

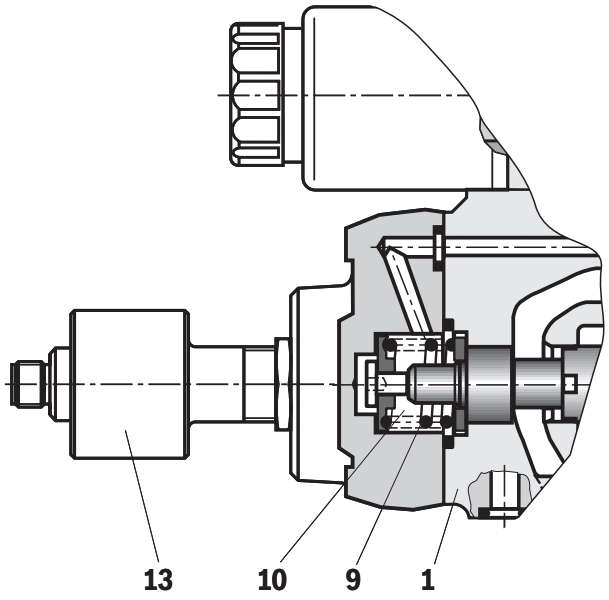
Spool position monitoring
The spool positions of the main stage control spool (2) are detected by the inductive position switch (13) and displayed via two switching outputs with a preset logic. If the fixedly set switching points are exceeded, the deviation from the zero position is monitored within the control spool overlap (see page 27).
The switching signals can be used in a superior control for monitoring functions. The electrical connection is implemented separately via a 4-pole connector M12x1 with two pins for signal output and two pins for voltage supply.

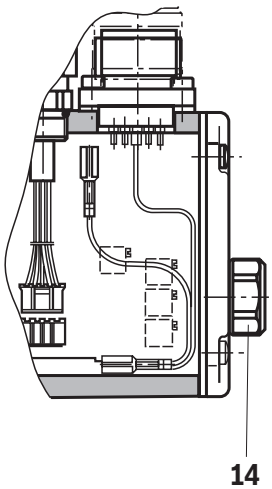
Area of application
The valve can be used in safety-related two-channel applications (category 3, PL d and category 4, PL e according to EN 13849-1) as switch-off element for one channel. The valve meets the requirements of a secure start inhibitor according to EN 60204, stop category 0.
If safety requirements are needed, the supply voltage of the valve must be safely disconnected based on the required safety level (category PL).
Depending on the application and the requirements of work equipment-specific standards according to EN 13849-1, the user must provide appropriate monitoring/ plausibility checks which comply with the required diagnostic coverage DCavg using a superior control.

Electronics protection membrane "-967"
To prevent condensate formation in the housing of the integrated electronics (OBE), an electronics protection membrane (14) can be used.
Recommended for use outside industry-standard conditions with high ambient air humidity and significant cyclic temperature changes (e. g. outdoors).

Failure of supply voltage
- Integrated electronics de-energize the solenoid in case of supply voltage failure or cable break
- Automatic pressure control on the same level in the control chambers (10 and 11) by the pilot control valve
- In case of pressure supply failure, centering of the main stage control spool by centering spring (9)
- Central position of the main stage control spool (2)

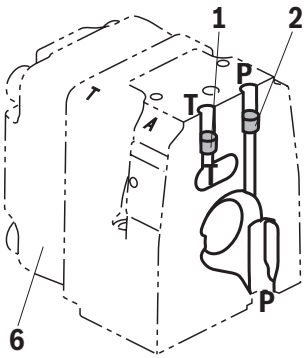
☞ **Notices:**
- Failure of the supply voltage will lead to an abrupt standstill of the control axis. The acceleration forces occurring in this connection may cause machine damage.
  With control spool symbols E, E1-, W6- and W8-, the centering spring (9) sets the main stage control spool (2) in central position, control spools V- and V1 are switched to the preferred direction P to B and A to T in a tolerance range of 1% to a maximum of 11% of the control spool stroke.
- The PG fitting (12) must not be opened. Mechanical adjustment of the adjustment nut located below is prohibited and damages the valve.
- The zero point has been adjusted at the factory. Changes in the zero point may result in damage to the system and may only be implemented by instructed specialists.
- If the pilot control valve or the electronics are exchanged, the zero point has to be adjusted once again by instructed specialists.



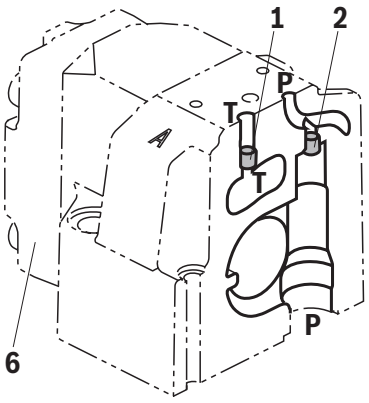


Pilot oil supply (schematic illustration)

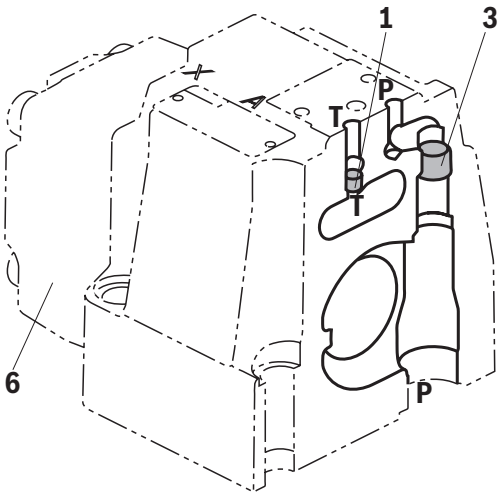
NG10



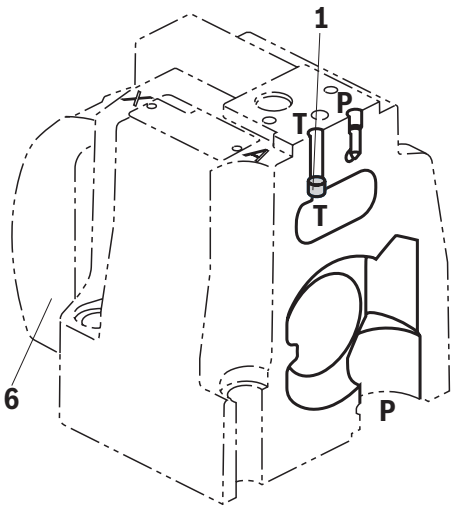
NG16



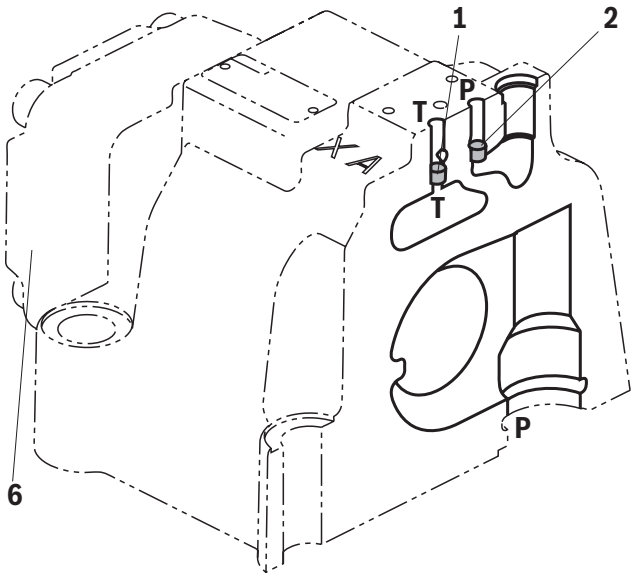
NG25



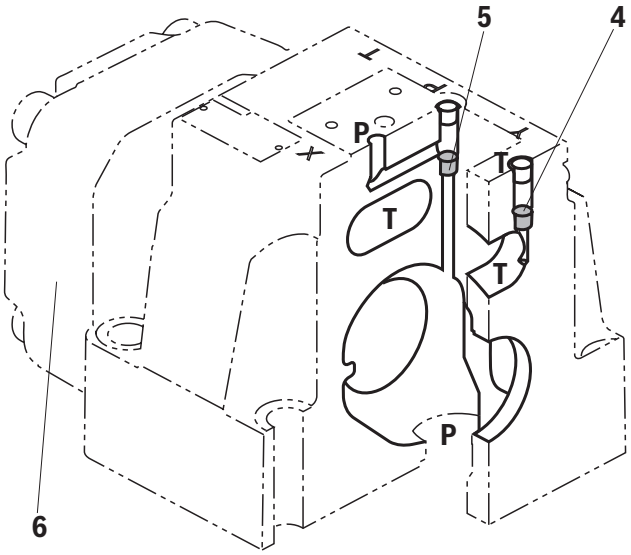
NG27



NG32



NG35



1 Plug screw M6 according to DIN 906, wrench size 3 – pilot oil return

2 Plug screw M6 according to DIN 906, wrench size 3 – pilot oil supply

3 Plug screw M12 x 1.5 according DIN 906, wrench size 6 – pilot oil supply

4 Plug screw M10 x 1 according to DIN 906, wrench size 5 – pilot oil return

5 Plug screw M10 x 1 according DIN 906, wrench size 5 – pilot oil supply

6 Main stage housing cover (opposite the OBE)

Pilot oil supply		**Pilot oil return**	
external	internal	external	internal
2, 3, 5 closed	**2, 3, 5** open	**1, 4** closed	**1, 4** open

Further explanations on page 8.

Pilot oil supply

"No code" version
External pilot oil supply
External pilot oil return
In this version, the pilot oil is supplied from a separate control circuit (external).
The pilot oil return is not directed into channel T of the main valve, but is separately directed to the tank via port Y (external).

Version "E"
Internal pilot oil supply
External pilot oil return
With this version, the pilot oil is supplied from channel P of the main valve (internally).
The pilot oil return is not directed into channel T of the main valve, but is separately directed to the tank via port Y (external).
In the subplate, port X is to be closed.

Version "ET"
Internal pilot oil supply
Internal pilot oil return
With this version, the pilot oil is supplied from channel P of the main valve (internally).
The pilot oil is directly returned to channel T of the main valve (internally).
In the subplate, ports X and Y are to be closed.

Version "T"
External pilot oil supply
Internal pilot oil return
In this version, the pilot oil is supplied from a separate control circuit (external).
The pilot oil is directly returned to channel T of the main valve (internally).
In the subplate, port Y is to be closed.

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

general							
Sizes	NG	10	16	25	27	32	35
Weight	kg	8.7	11.2	16.8	17	31.5	34
Installation position and commissioning information		Preferably horizontal, see data sheet 07700					
Ambient temperature range	°C	–20 ... +50					
Maximum storage time	Years	1 (if the storage conditions are observed; refer to the operating instructions 07600-B)					
$MTTF_D$ values according to EN ISO 13849	Years	150 [1] (for more information see data sheet 08012)					
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 shocks / 3 axes					
Damp heat, cyclic, according to DIN EN 60068-2-30		Variant 2 +25 °C ... +55 °C, 90% ... 97% relative humidity, 2 cycles of 24 hours					

[1] With symbol E, E1, W6 and W8: in longitudinal control spool direction, there is sufficient positive overlap without shock/vibration load; observe the installation orientation with regard to the main direction of acceleration.

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

hydraulic									
Sizes			NG	10	16	25	27	32	35
Maximum operating pressure	▶ Pilot control valve	Pilot oil supply [2]	bar	25 ... 315					
	▶ Main valve	Port P, A, B	bar	350	350	350	270	350	350
Maximum return flow pressure	▶ Port T	Internal pilot oil return	bar	Static < 10					
		External pilot oil return	bar	315	250	250	210	250	250
	▶ Port Y		bar	Static < 10					
Rated flow q_{Vnom} ±10% [3] with Δp = 5 bar/control edge			l/min	25 50 100	150 – 220	– 220 350	– – 500	– 400 600	– – 1000
Maximum flow (recommended)			l/min	170	460	870	1000	1600	3000
Pilot oil flow at port X or Y with stepped input signal from 0 to 100% (315 bar)			l/min	7	14	20	20	27	29
Pilot oil volume 0 ... 100%			cm^3	1.1	2.9	6.8	6.8	17.7	33.9
Hydraulic fluid				See table below					
Hydraulic fluid temperature range (at the valve working ports)			°C	–20 ... +80; preferably +40 ... +80					
Viscosity range			mm^2/s	20 ... 380; preferably 30 ... 45					
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)				Class 18/16/13 [4]					
Hysteresis			%	≤ 0.1					
Response sensitivity			%	≤ 0.05					
Zero point calibration (ex works) [5]			%	≤ 1					
Temperature drift			%/10 °C	Zero shift < 0.3					

Hydraulic fluid		**Classification**	**Suitable sealing materials**	**Standards**	**Data sheet**
Mineral oils		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ Insoluble in water	HETG	NBR, FKM	ISO 15380	90221
		HEES	FKM		
	▶ Soluble in water	HEPG	FKM	ISO 15380	
Flame-resistant	▶ Water-free	HFDU, HFDR	FKM	ISO 12922	90222
	▶ Containing water	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	NBR	ISO 12922	90223

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 40 K higher than the maximum solenoid surface temperature.
- **Flame-resistant – containing water**:
  - Maximum operating pressure 210 bar
  - Maximum pressure differential per control edge 175 bar
  - Pressure pre-loading at the tank port >20% of the pressure differential, otherwise increased cavitation erosion
  - Life cycle as compared to operation with mineral oil HL, HLP 50 ... 100%
  - Maximum hydraulic fluid temperature 50 °C

[2] For perfect system behavior, we recommend an external pilot oil supply for pressures above 210 bar.

[3] Flow for deviating Δp (valve pressure differential):

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

[4] 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

[5] Related to the pressure-signal characteristic curve (symbol V)

Notice:
Technical data (hydraulic) measured with HLP46,
ϑ_{Oil} = 40 °C ±5 °C

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

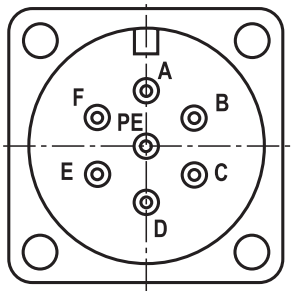
electrical, integrated electronics (OBE)			
Relative duty cycle		%	100 (continuous operation)
Protection class according to EN 60529			IP 65 with mounted and locked plug-in connectors
Supply voltage	▶ Nominal voltage	VDC	24
	▶ Lower limit value	VDC	18
	▶ Upper limit value	VDC	35
Maximum admissible residual ripple		Vpp	2.5 (Comply with absolute supply voltage limit value)
Current consumption	▶ Maximum	A	1.6
	▶ Impulse current	A	2.7
Maximum power consumption		VA	72 (average 24)
Required fuse protection, external		A_T	4 (time-lag)
Voltage input "A1" (differential input)	▶ Measurement range	VDC	–10 ... +10
	▶ Input resistance	kΩ	100
Current input "F1"	▶ Input current	mA	4 ... (12) ... 20
	▶ Input resistance	Ω	100
Enable input "A5"	▶ Low level	VDC	0 ... 2
	▶ High level	VDC	11 ... $\boldsymbol{U}_B$
Maximum coil temperature [6]		°C	150

[6] Due to the temperatures occurring at the surfaces of the solenoid coils, the European standards ISO 13732-1 and EN ISO 4413 need to be adhered to.

Electrical connections and assignment

Connector pin assignment

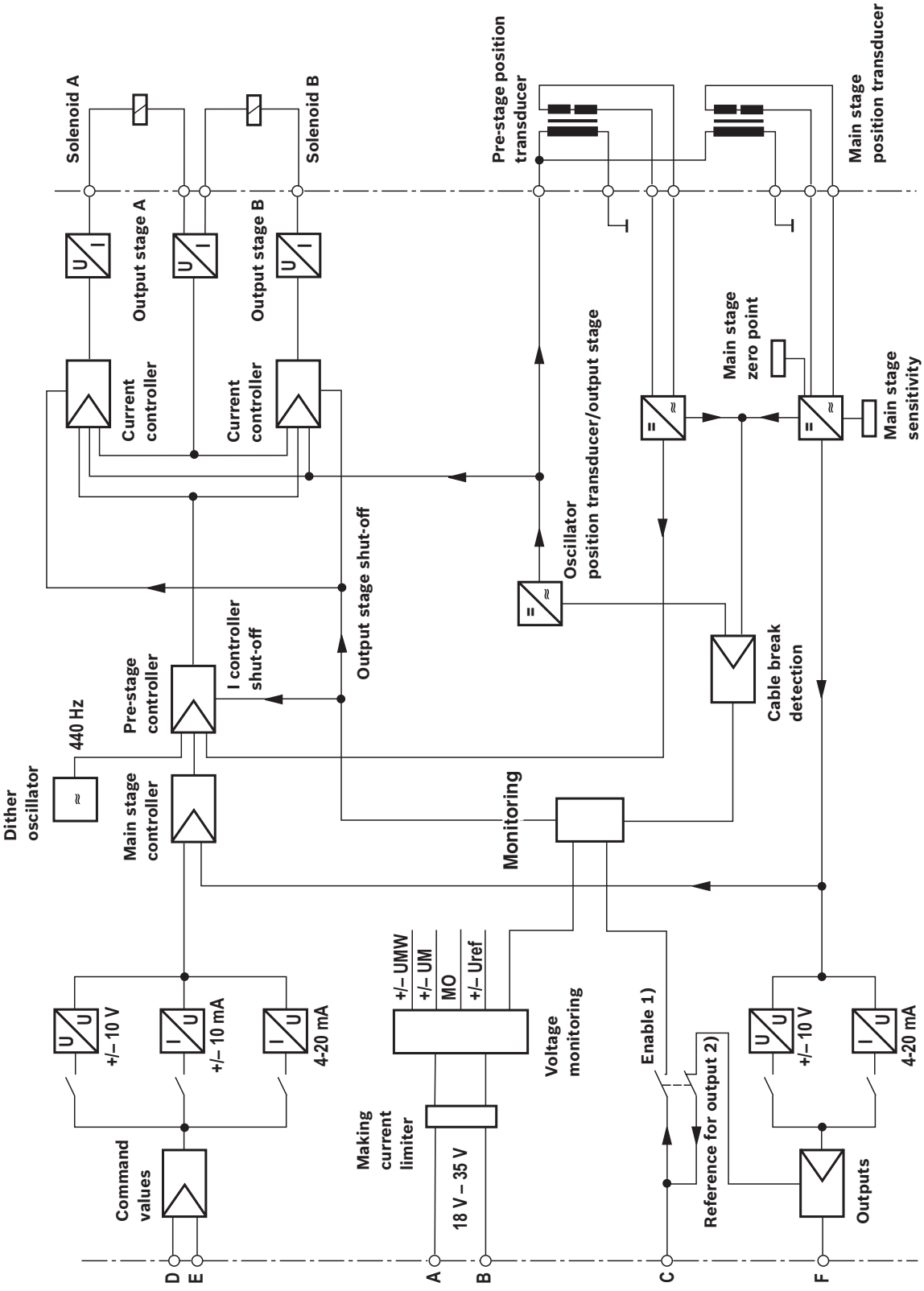
Pin	Signal	Interface A1	Interface F1	Interface A5
A	Supply voltage	24 V DC		
B		0 V		
C	Reference potential (actual value)/enable signal	Reference potential for actual value (pin F)		Enable signal 11 ... $\boldsymbol{U}_B$ V DC
D	Differential amplifier input (command value)	±10 V	4 ... 20 mA	±10 V
E		0 V reference potential (pin D)		0 V reference potential for pin D and F
F	Measuring output (actual value)	±10 V	4 ... 20 mA	±10 V
PE		Functional ground (directly connected to the valve housing)		



Command value:	▶ Reference potential at E and positive command value at D result in flow from P → A and B → T.
	▶ Reference potential at E and negative command value at D result in flow from P → B and A → T.
Connection cable (recommendation)**:**	▶ Up to 25 m cable length type LiYCY 7 x 0.75 mm²
	▶ Up to 50 m cable length type LiYCY 7 x 1.0 mm²
	▶ Connect shield on PE only on the supply side

☞ **Notices:**
- ▶ Electrical signals provided via valve electronics (e.g. actual value) must not be used to switch off safety-relevant machine functions.
- ▶ Mating connectors, separate order, see page 28 and data sheet 08006.

Block diagram: Integrated electronics (OBE)



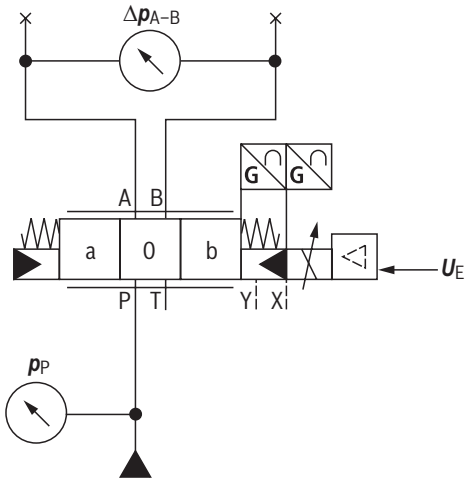
1) Only with electronics interface "A5"

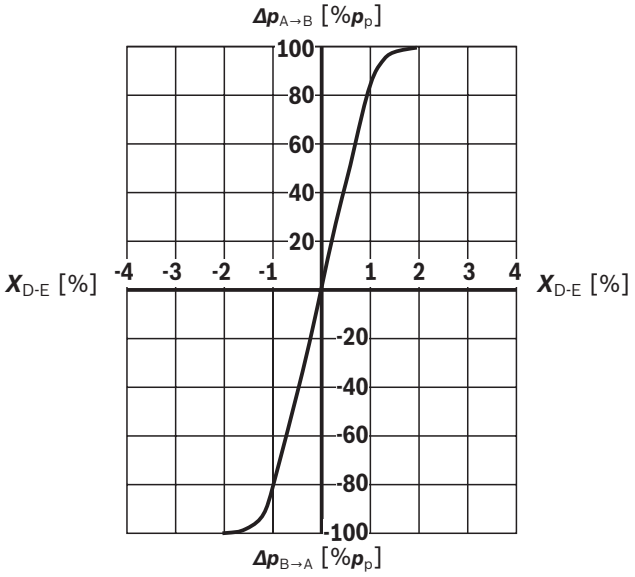
2) Only with electronics interfaces "A1" and "F1"

Characteristic curves

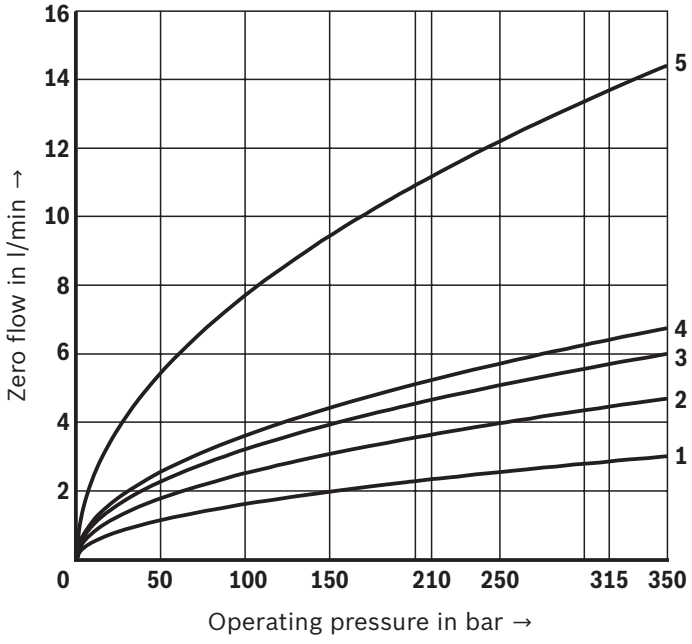
(measured with HLP46, ϑ_{Oil} = 40 °C ±5 °C and p = 100 bar)

Pressure amplification

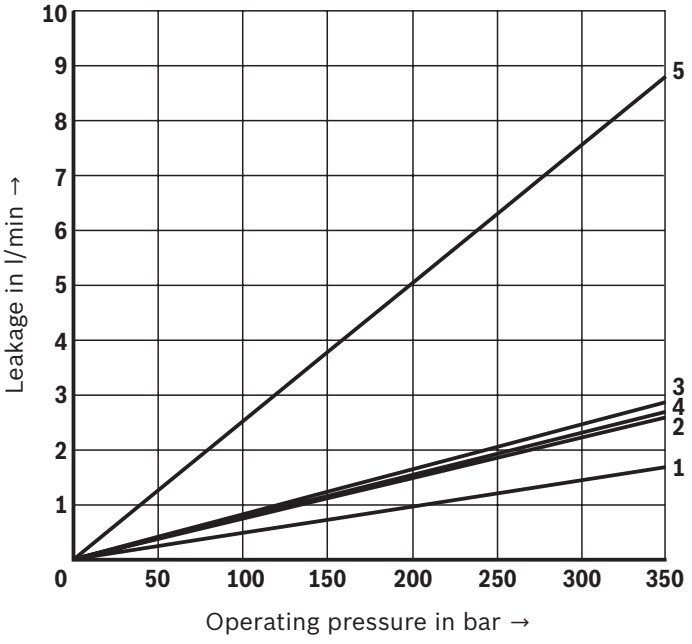




Maximum zero flow of the main stage
(symbol V) **with pilot control valve**



Maximum internal leakage of the main stage
(symbol W) **with pilot control valve**



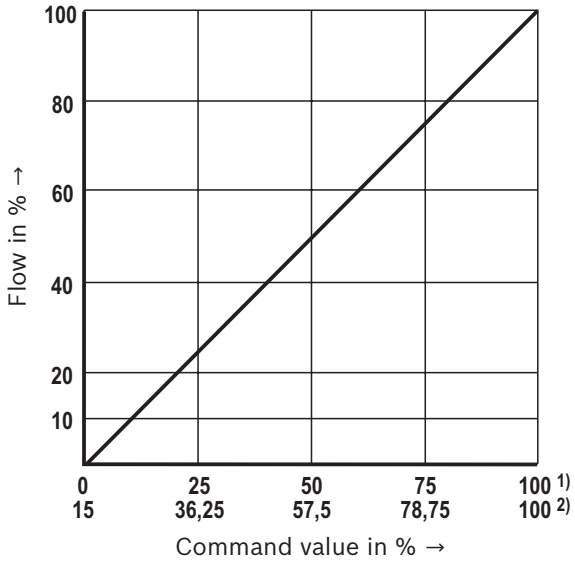
1 Size 10
2 Size 16
3 Sizes 25, 27
4 Size 32
5 Size 35

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

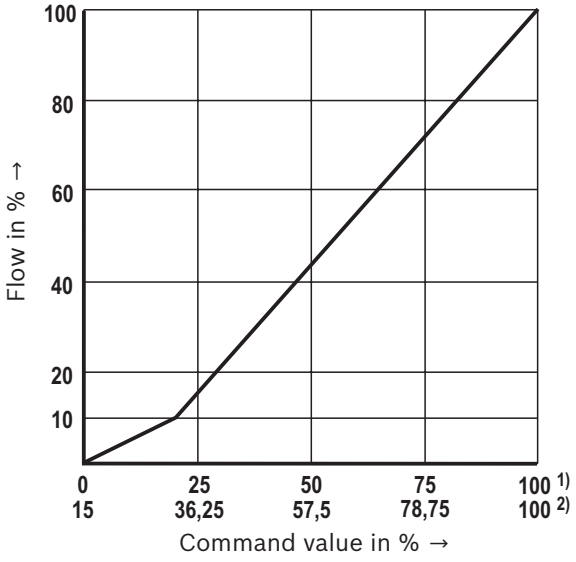
Flow command value function
(***Δp*** = 5 bar/control edge)

Symbol E, W, and V

Version "L"



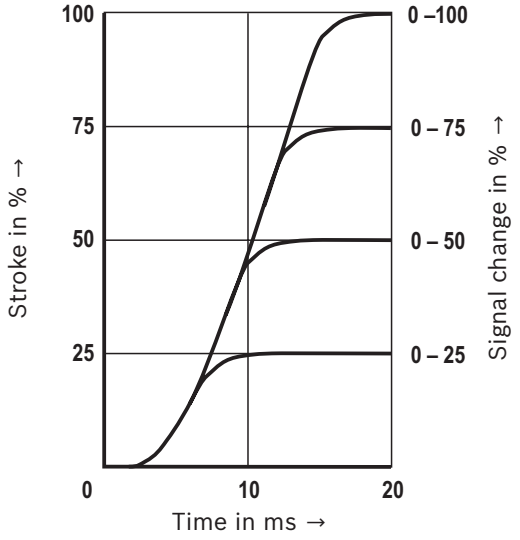
Version "P"



1) Positive overlap 0 ... 0.5% at symbol V
2) Positive overlap 15% at symbol E and W

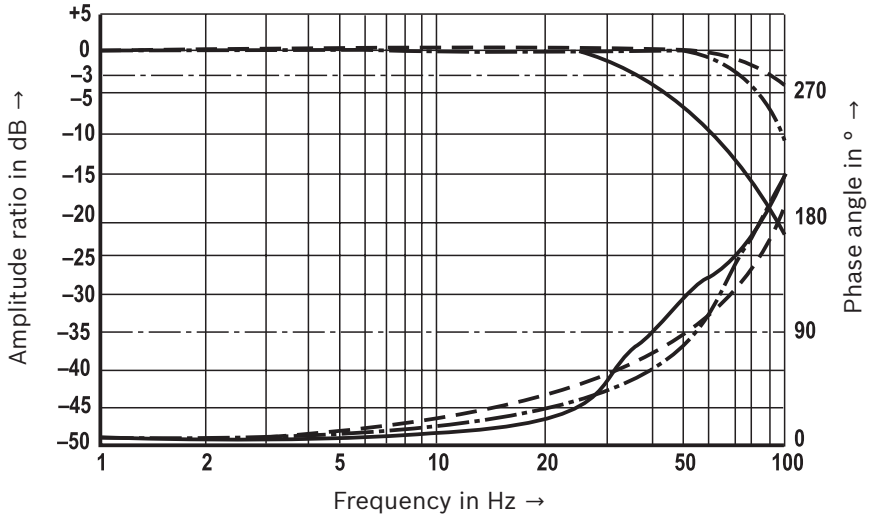
Characteristic curves: Size 10
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Transition function with stepped electric input signals



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

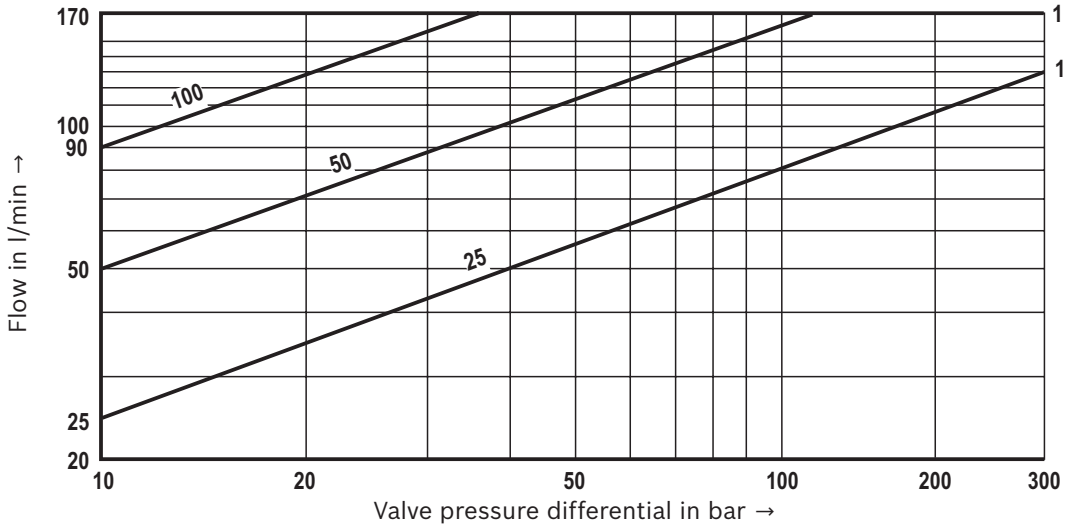
Frequency response characteristic curves



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

Signal ±100%
Signal ±25%
Signal ±5%

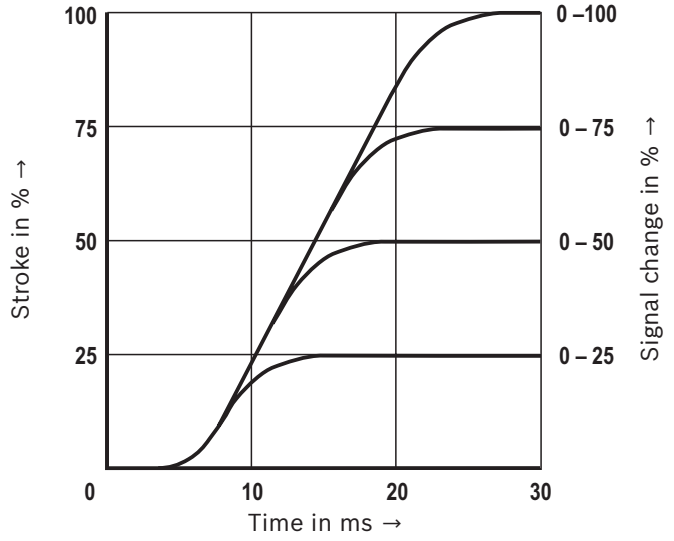
Flow/load function with maximum valve opening (tolerance ±10%)



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

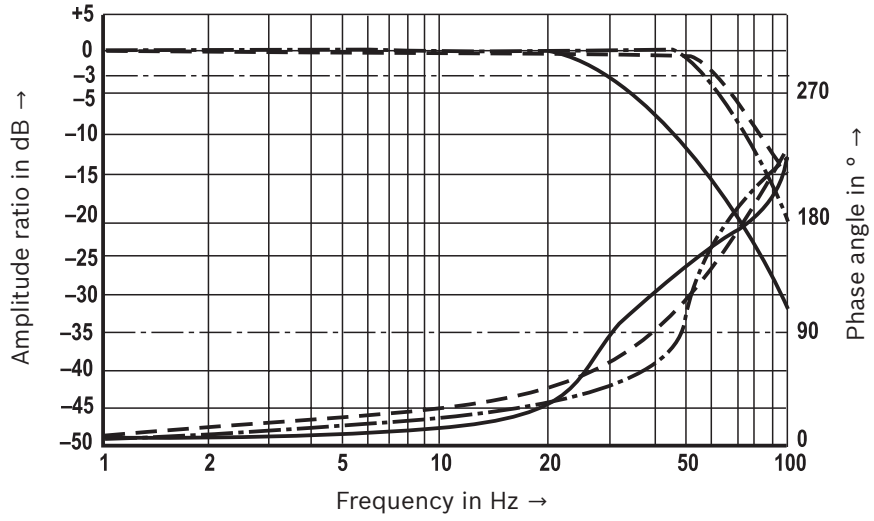
Characteristic curves: Size 16
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Transition function with stepped electric input signals



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

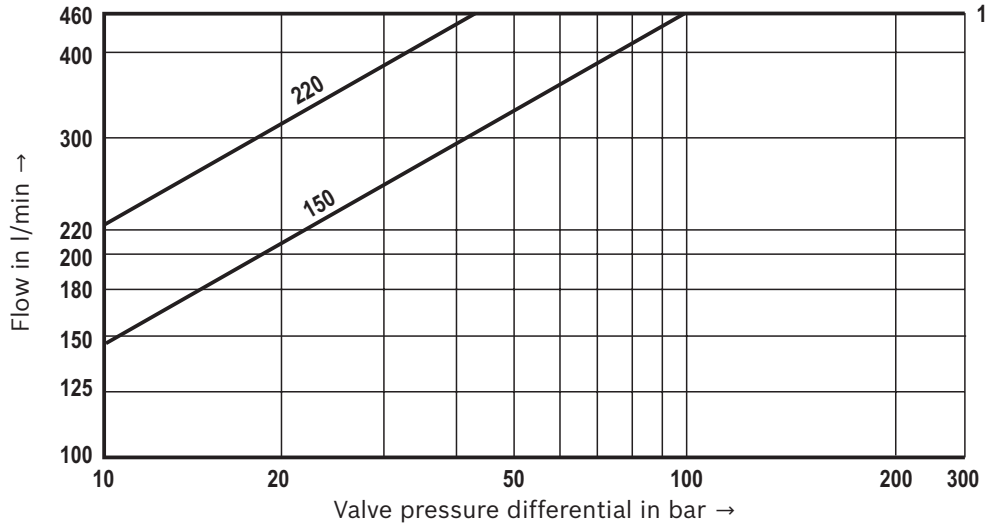
Frequency response characteristic curves



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

Signal ±100%
Signal ±25%
Signal ±5%

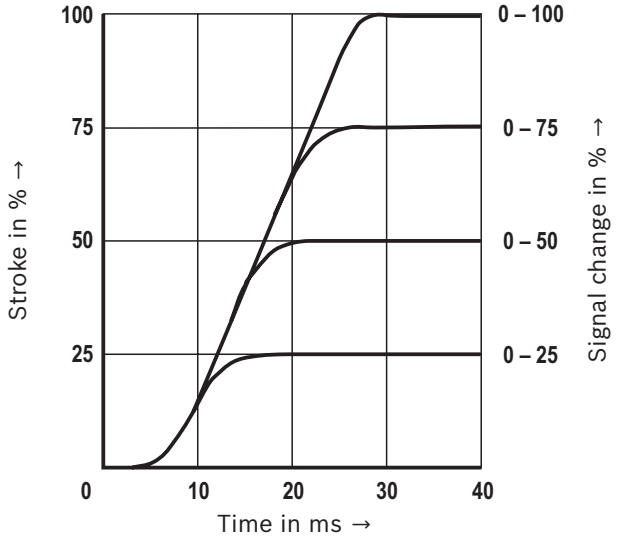
Flow/load function with maximum valve opening (tolerance ±10%)



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

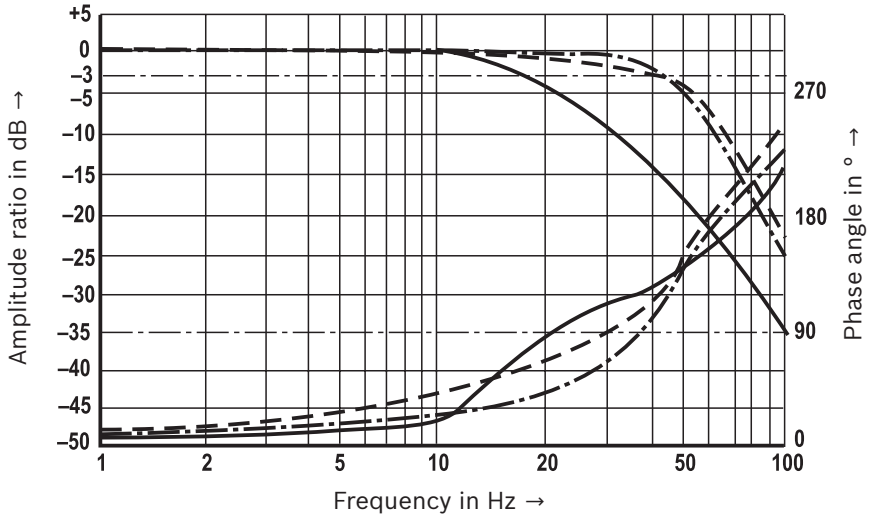
Characteristic curves: Size 25 and 27
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Transition function with stepped electric input signals



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

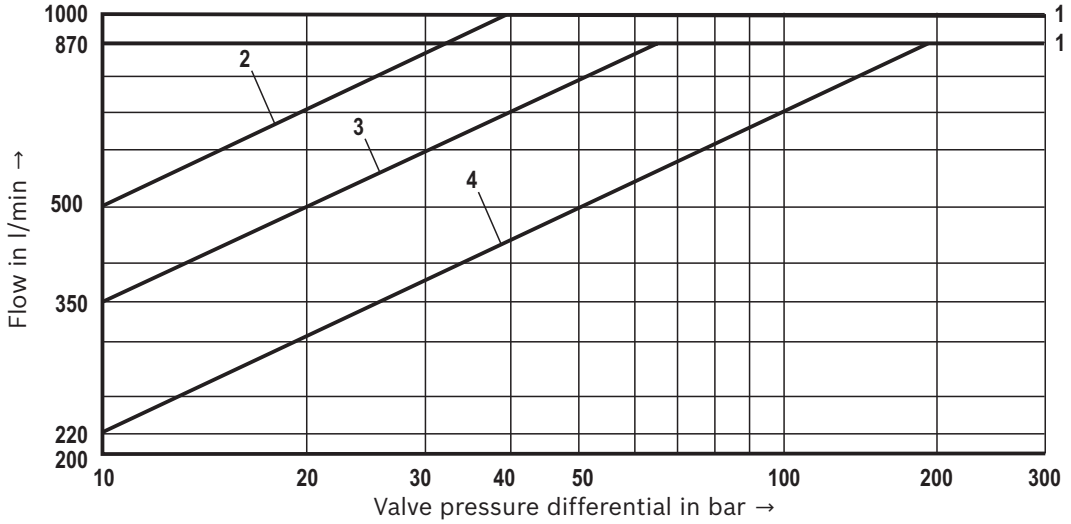
Frequency response characteristic curves



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

Signal ±100%
Signal ±25%
Signal ±5%

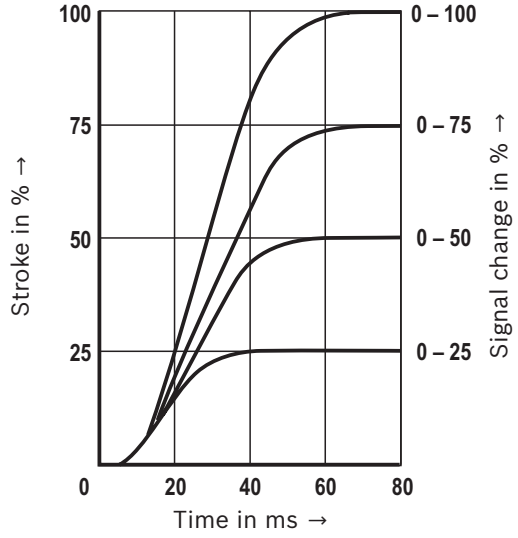
Flow/load function with maximum valve opening (tolerance ±10%)



1 Recommended flow limitation (flow velocity 30 m/s)
2 500 – NG27
3 350 – NG25
4 220 – NG25

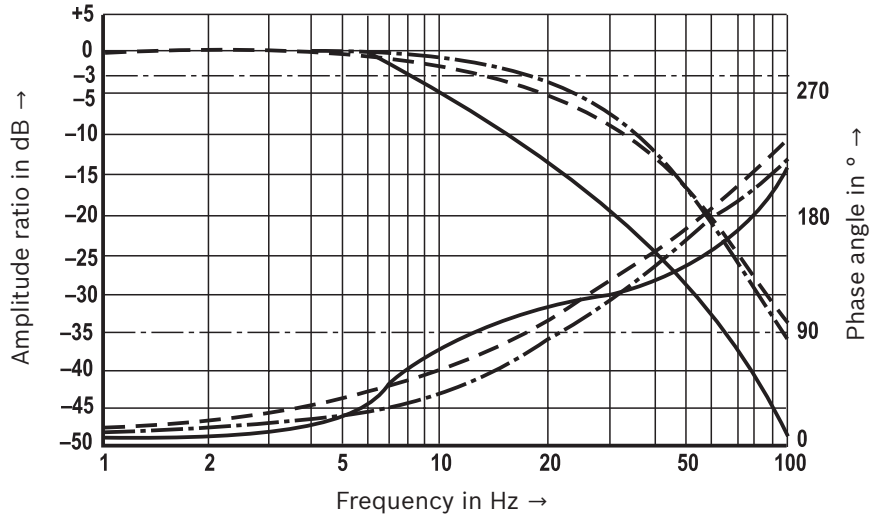
Characteristic curves: Size 32
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Transition function with stepped electric input signals



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

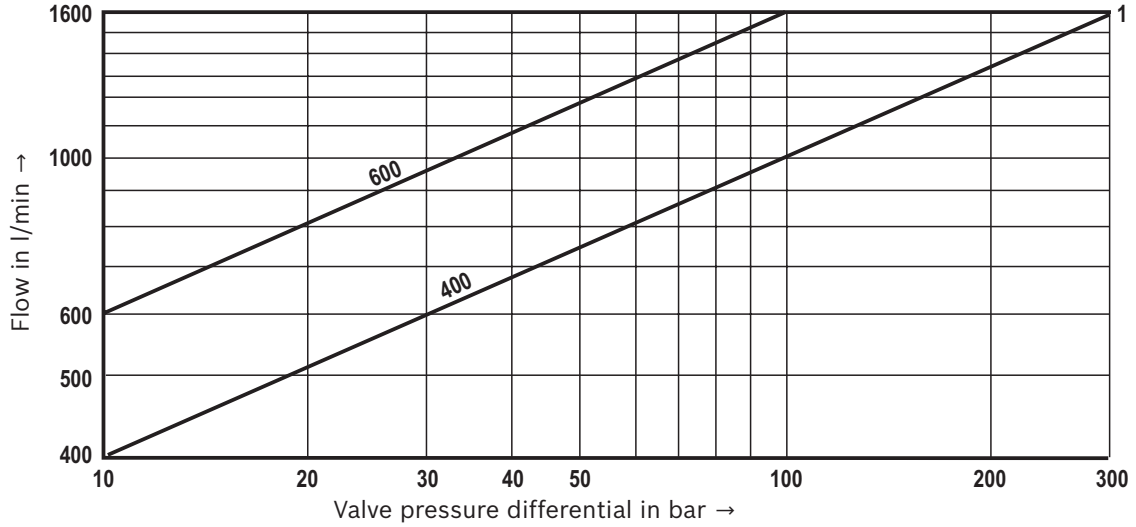
Frequency response characteristic curves



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

Signal ±100%
Signal ±25%
Signal ±5%

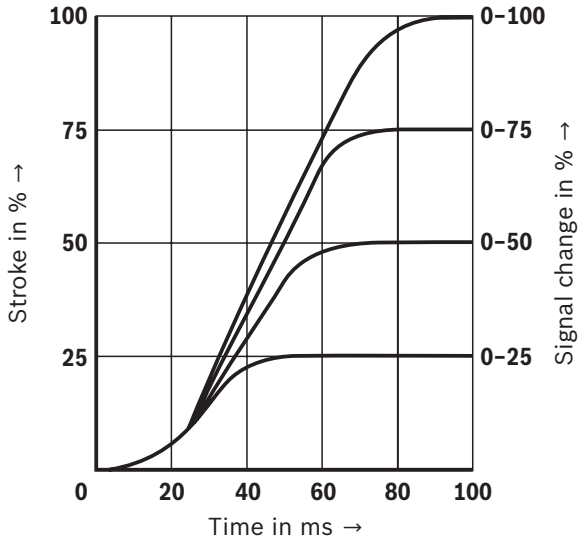
Flow/load function with maximum valve opening (tolerance ±10%)



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

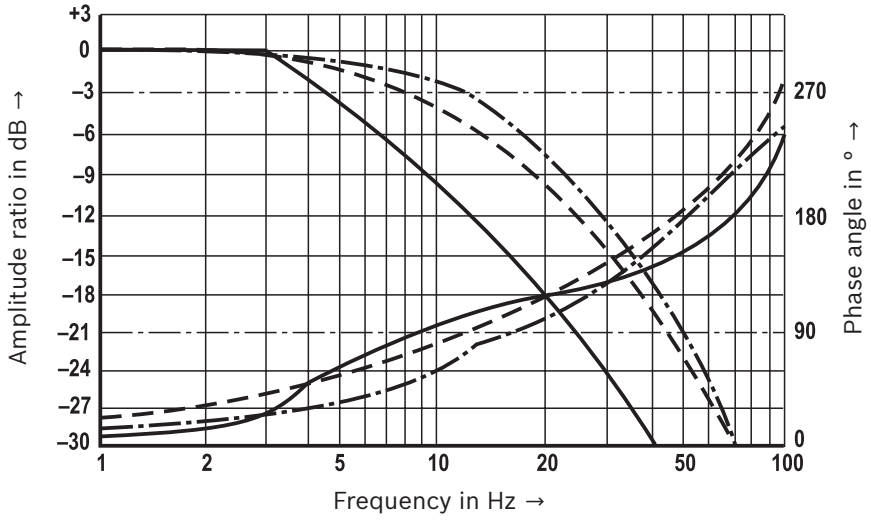
Characteristic curves: Size 35
(measured with HLP46, ϑ_{Oil} = 40 ±5 °C)

Transition function with stepped electric input signals



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

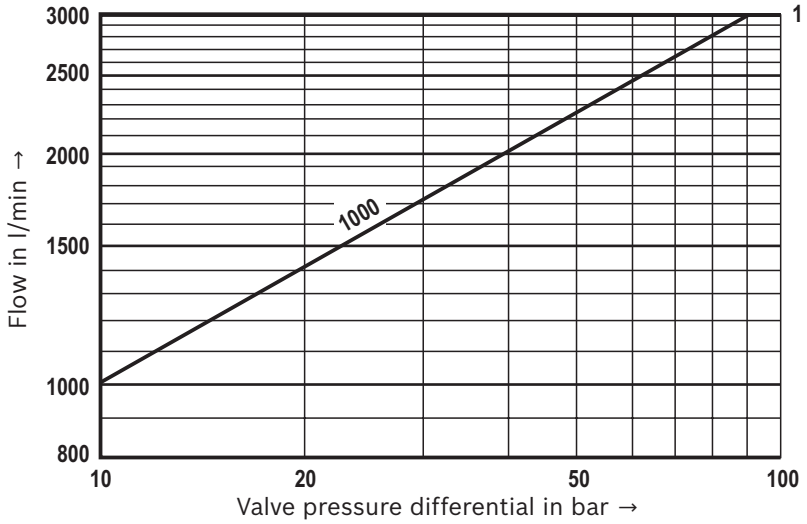
Frequency response characteristic curves



Measured with:
- Pilot control valve: Port X = 100 bar
- Main stage: Port P = 10 bar

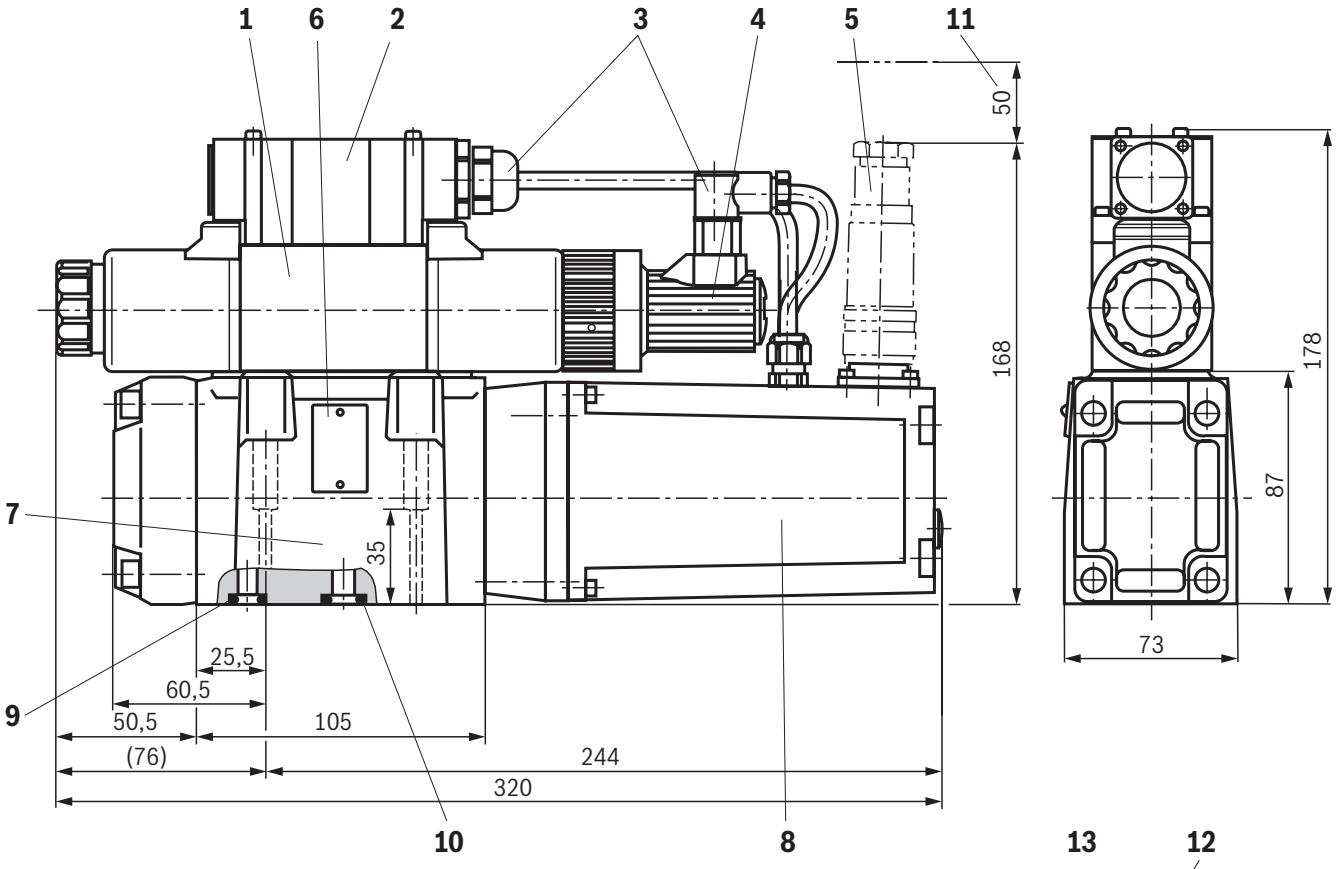
Signal ±100%
Signal ±25%
Signal ±5%

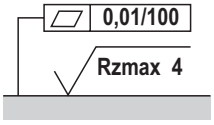
Flow/load function with maximum valve opening (tolerance ±10%)



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

Dimensions: Size 10
(dimensions in mm)





Required surface quality of the valve contact surface

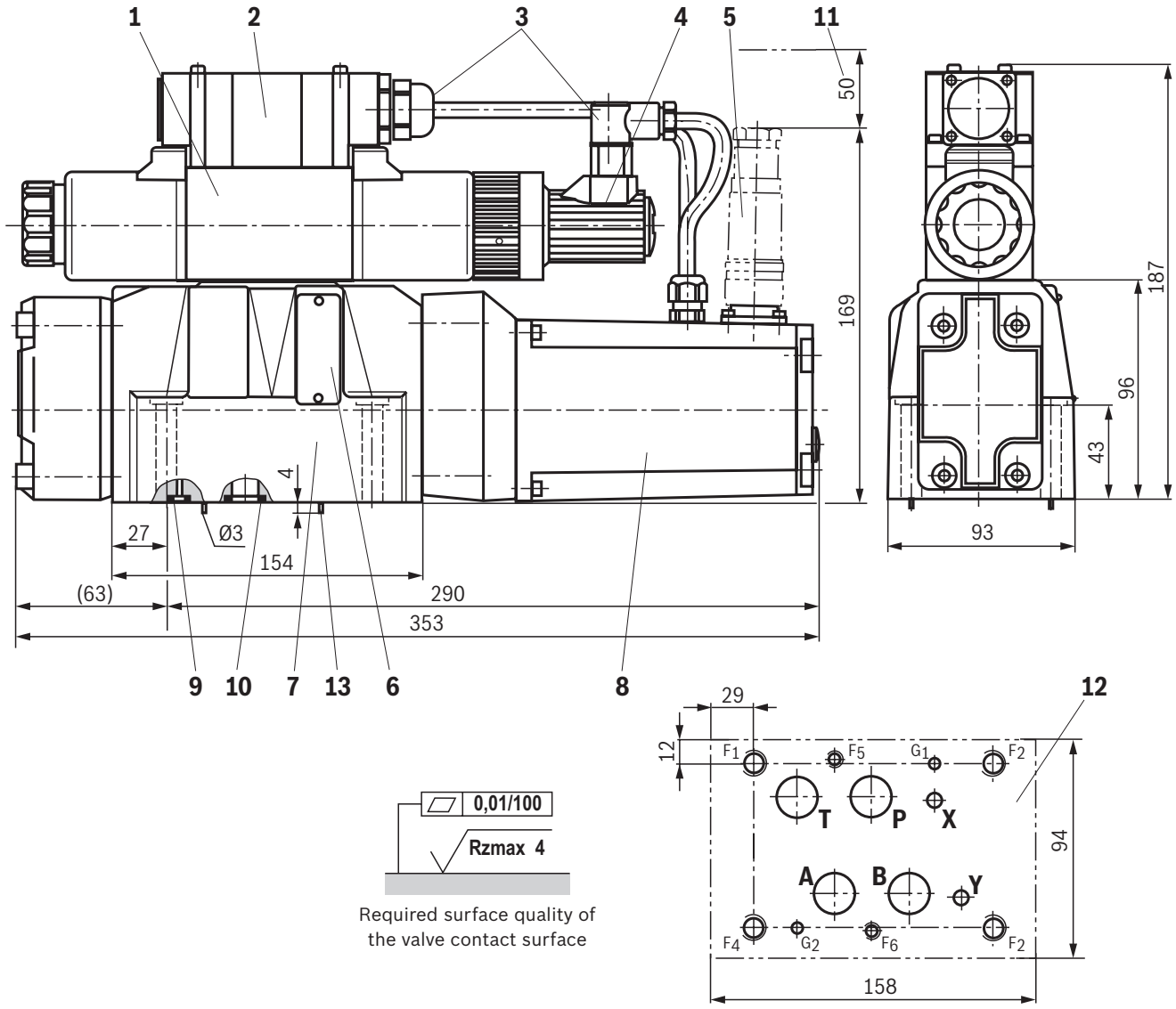
1 Pilot control valve
2 Electrical connection
3 Wiring and mating connector
4 Inductive position transducer (pilot control valve)
5 Mating connector 6-pole + PE (separate order, see page 28 and data sheet 08006)
6 Name plate
7 Main valve
8 Integrated electronics (OBE) and inductive position transducer (main valve)
9 Identical seal rings for ports X, Y
10 Identical seal rings for ports A, B, P, T, T1
11 Space required for connection cable and to remove the mating connector
12 Machined valve contact surface, porting pattern according to ISO 4401-05-05-0-05 (ports X, Y as required)

Subplates (separate order) with porting pattern according to ISO 4401-05-05-0-05 see data sheet 45100.

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

Dimensions for **electronics protection membrane "-967"** see page 25**.**
Valve mounting screws see page 26.

Dimensions: Size 16
(dimensions in mm)



Required surface quality of the valve contact surface

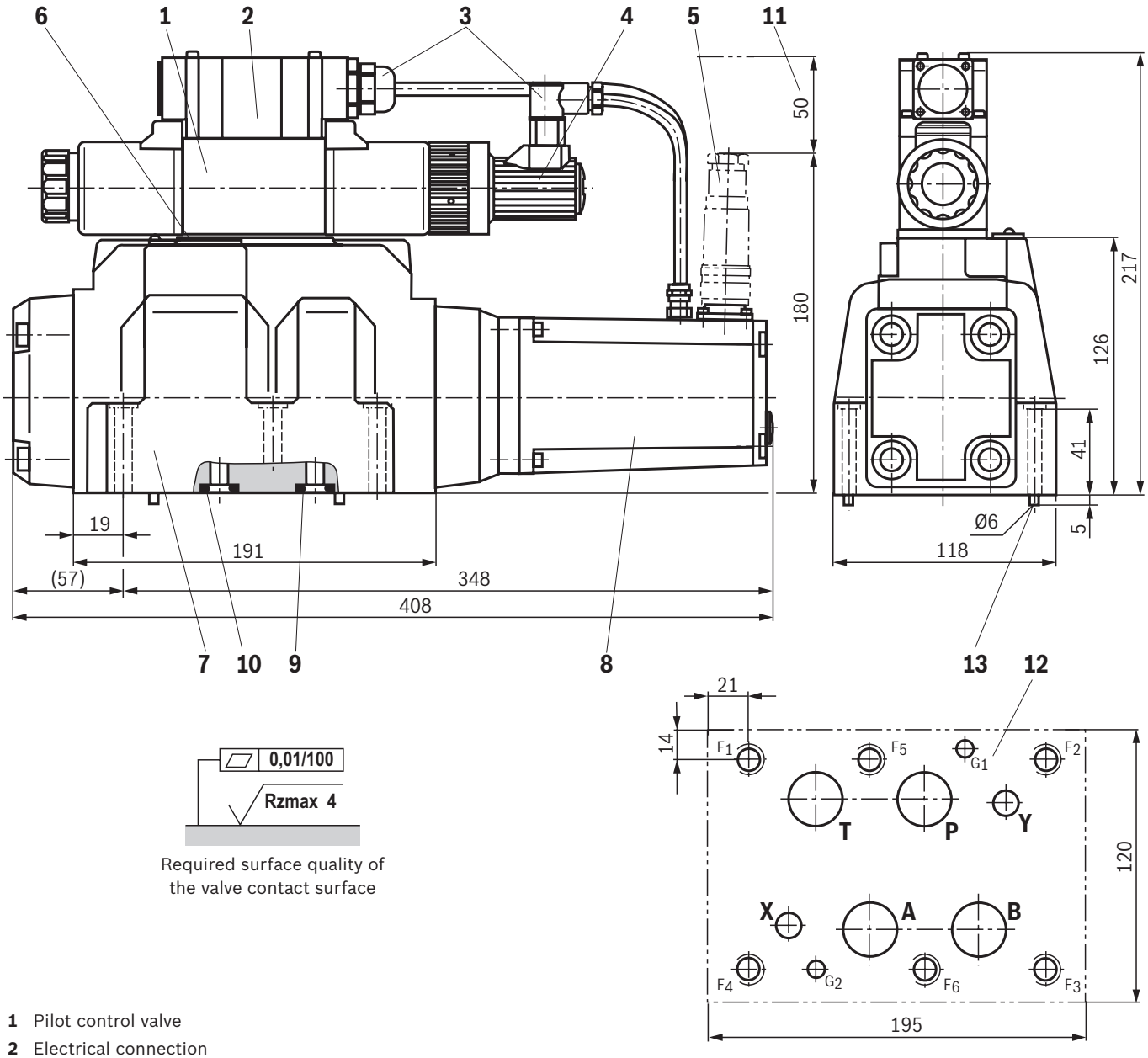
1 Pilot control valve
2 Electrical connection
3 Wiring and mating connector
4 Inductive position transducer (pilot control valve)
5 Mating connector 6-pole + PE (separate order, see page 28 and data sheet 08006)
6 Name plate
7 Main valve
8 Integrated electronics (OBE) and inductive position transducer (main valve)
9 Identical seal rings for ports X, Y
10 Identical seal rings for ports A, B, P, T
11 Space required for connection cable and to remove the mating connector
12 Machined valve contact surface, porting pattern according to ISO 4401-07-07-0-05 (ports X, Y as required)
Deviating from the standard: ports A, B, P, T – Ø20 mm
13 Locking pin

Subplates (separate order) with porting pattern according to ISO 4401-07-07-0-05 see data sheet 45100.

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

Dimensions for **electronics protection membrane "-967"** and **spool position monitoring "M"** see page 25**.**
Valve mounting screws see page 26.

Dimensions: Size 25
(dimensions in mm)



Required surface quality of
the valve contact surface

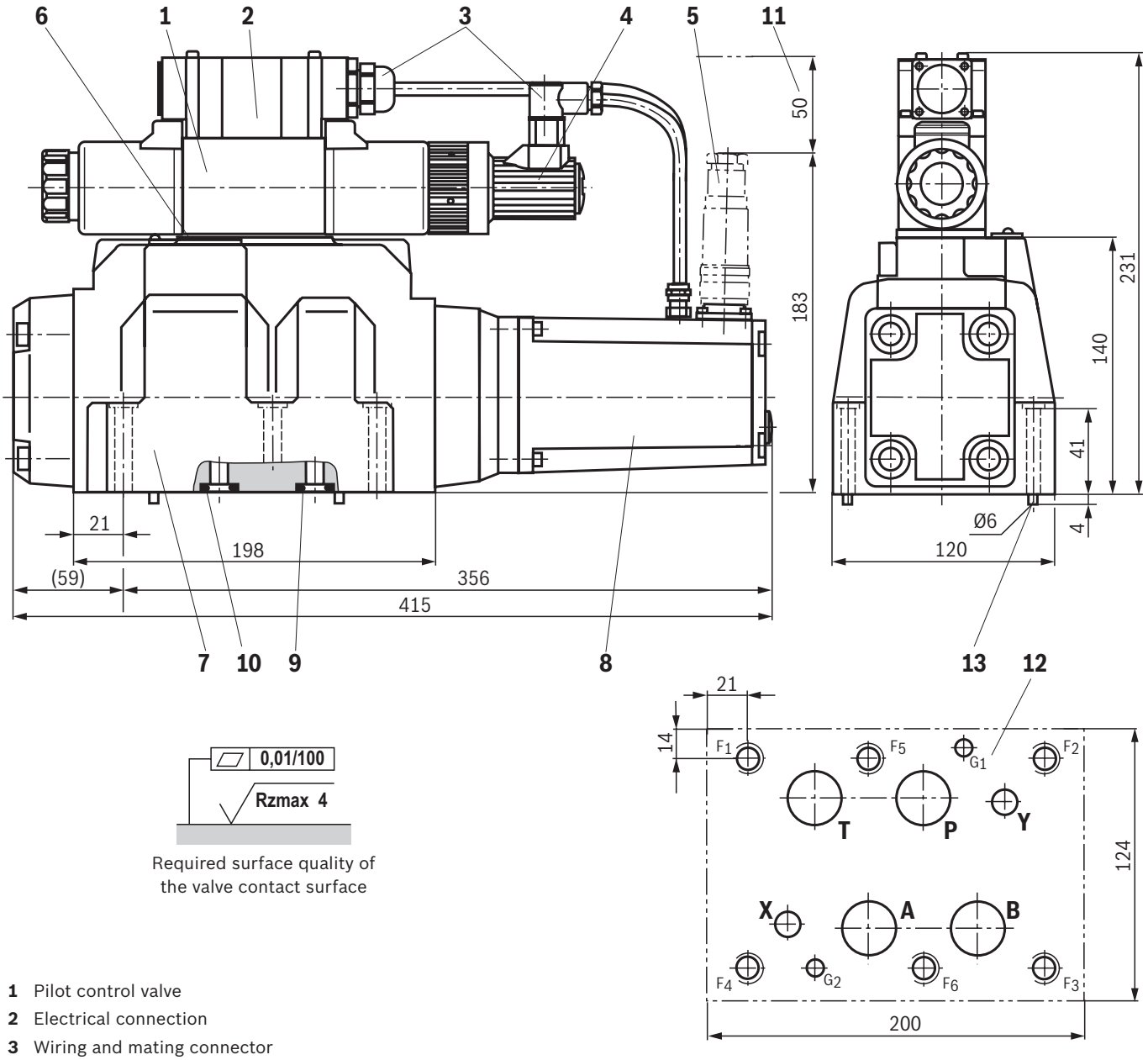
1 Pilot control valve
2 Electrical connection
3 Wiring and mating connector
4 Inductive position transducer (pilot control valve)
5 Mating connector 6-pole + PE (separate order, see page 28 and data sheet 08006)
6 Name plate
7 Main valve
8 Integrated electronics (OBE) and inductive position transducer (main valve)
9 Identical seal rings for ports X, Y
10 Identical seal rings for ports A, B, P, T
11 Space required for connection cable and to remove the mating connector
12 Machined valve contact surface; porting pattern according to ISO 4401-08-08-0-05 (ports X, Y as required)
13 Locking pin

Subplates (separate order) with porting pattern according to ISO 4401-08-08-0-05 see data sheet 45100.

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

Dimensions for **electronics protection membrane "-967"** and **spool position monitoring "M"** see page 25**.**
Valve mounting screws see page 26.

Dimensions: Size 27
(dimensions in mm)



Required surface quality of the valve contact surface

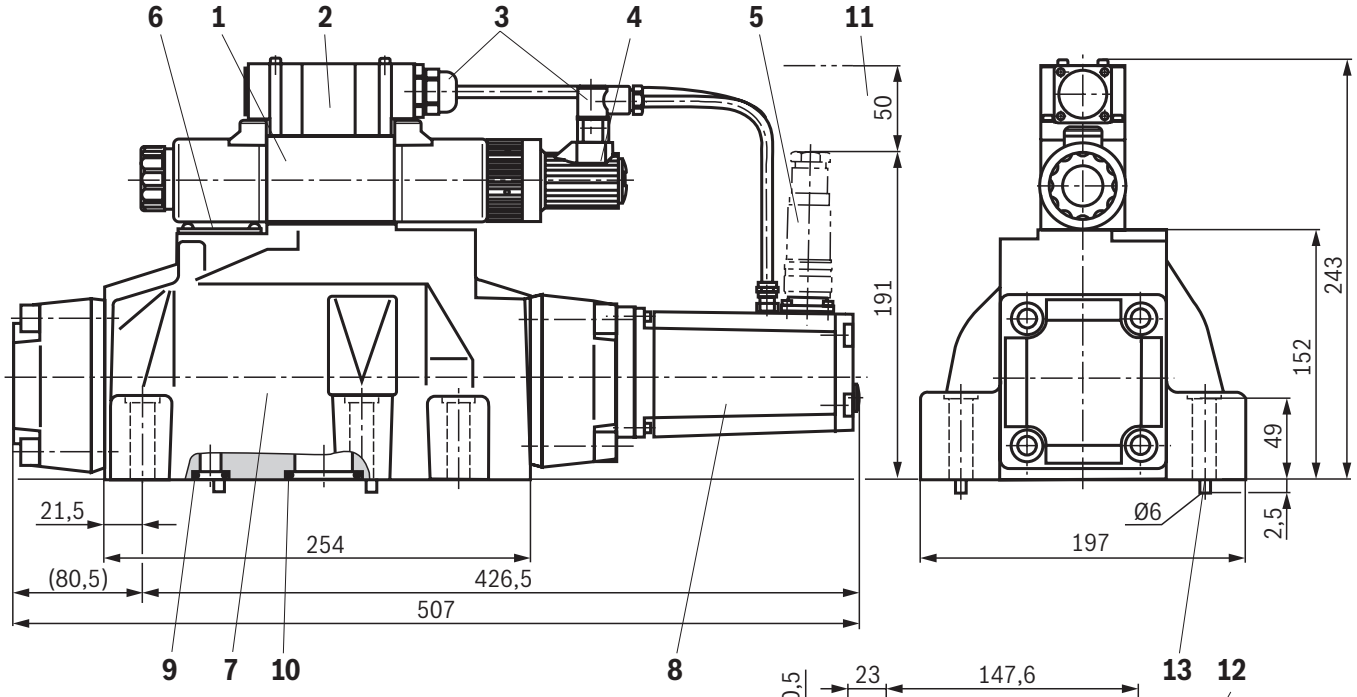
1 Pilot control valve
2 Electrical connection
3 Wiring and mating connector
4 Inductive position transducer (pilot control valve)
5 Mating connector 6-pole + PE (separate order, see page 28 and data sheet 08006)
6 Name plate
7 Main valve
8 Integrated electronics (OBE) and inductive position transducer (main valve)
9 Identical seal rings for ports X, Y
10 Identical seal rings for ports A, B, P, T
11 Space required for connection cable and to remove the mating connector
12 Machined valve contact surface; porting pattern according to ISO 4401-08-08-0-05 (ports X, Y as required)
Deviating from the standard: ports A, B, P, T – Ø32 mm
13 Locking pin

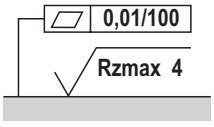
Subplates (separate order) with porting pattern according to ISO 4401-08-08-0-05 see data sheet 45100.

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

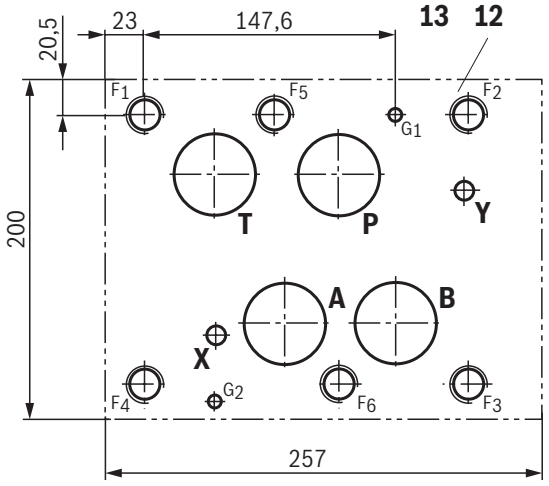
Dimensions for **electronics protection membrane "-967"** and **spool position monitoring "M"** see page 25**.**
Valve mounting screws see page 26.

Dimensions: Size 32
(dimensions in mm)





Required surface quality of
the valve contact surface



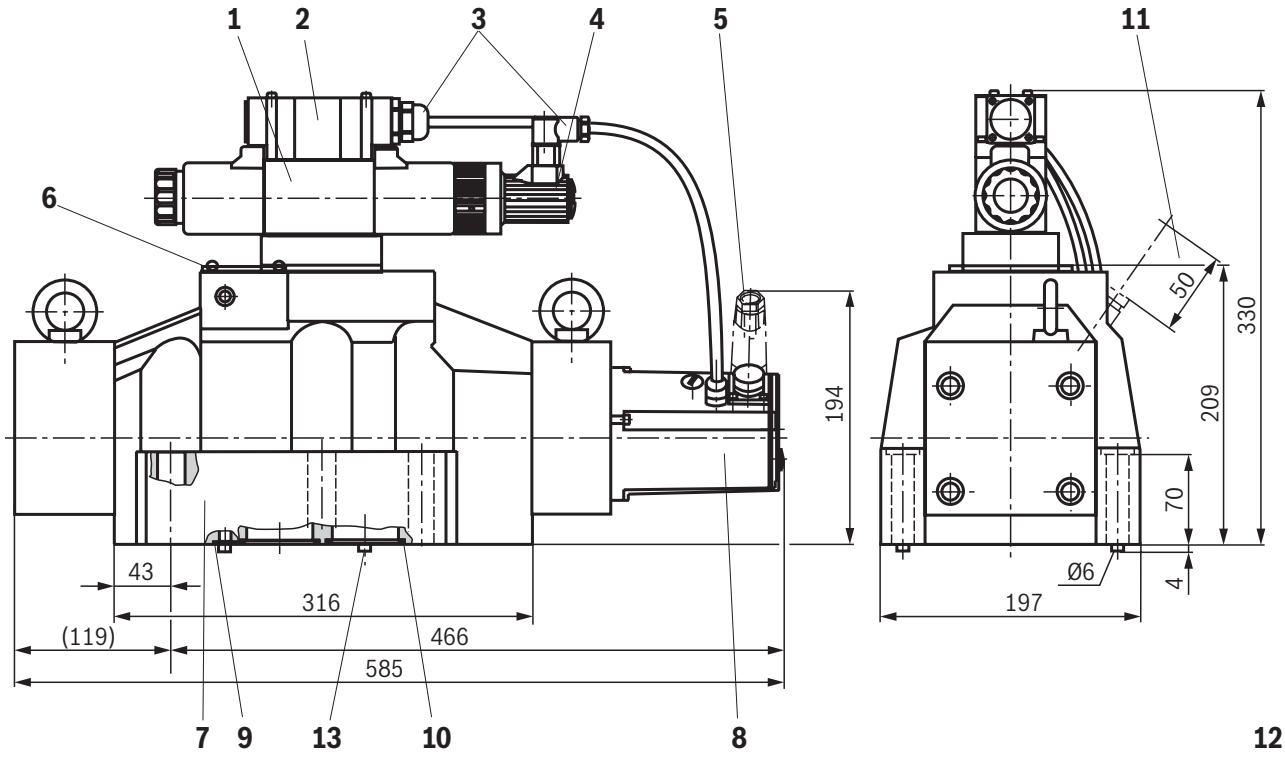
1 Pilot control valve
2 Electrical connection
3 Wiring and mating connector
4 Inductive position transducer (pilot control valve)
5 Mating connector 6-pole + PE (separate order, see page 28 and data sheet 08006)
6 Name plate
7 Main valve
8 Integrated electronics (OBE) and inductive position transducer (main valve)
9 Identical seal rings for ports X, Y
10 Identical seal rings for ports A, B, P, T
11 Space required for connection cable and to remove the mating connector
12 Machined valve contact surface; porting pattern according to ISO 4401-10-09-0-05 (ports X, Y as required)
Deviating from the standard:
▶ Ports A, B, P, T – Ø38 mm
▶ Dimension G_1 according to DIN 24340 Form A
13 Locking pin

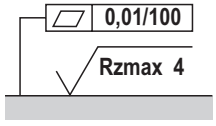
Subplates (separate order) with porting pattern according to ISO 4401-10-09-0-05 see data sheet 45100.

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

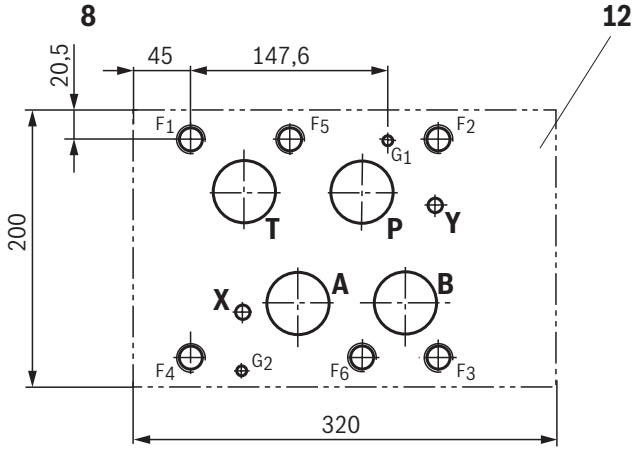
Dimensions for **electronics protection membrane "-967"** and **spool position monitoring "M"** see page 25**.**
Valve mounting screws see page 26.

Dimensions: Size 35
(dimensions in mm)





Required surface quality of the valve contact surface



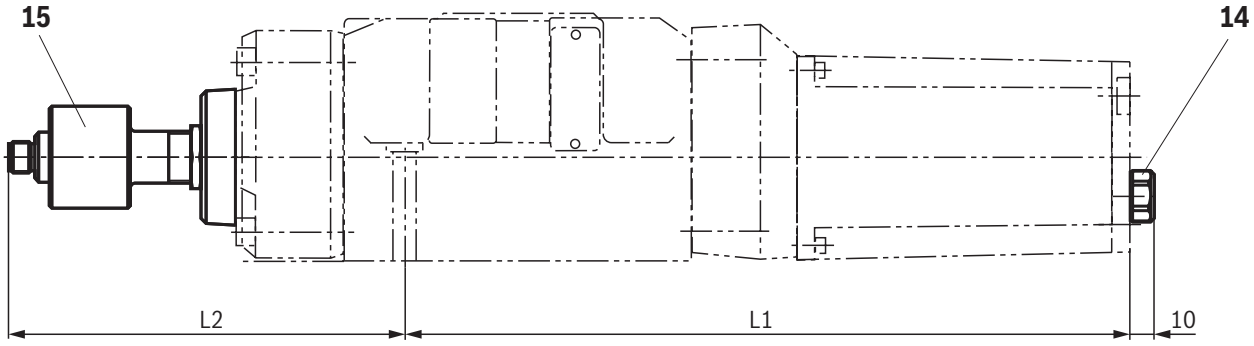
1 Pilot control valve
2 Electrical connection
3 Wiring and mating connector
4 Inductive position transducer (pilot control valve)
5 Mating connector 6-pole + PE (separate order, see page 28 and data sheet 08006)
6 Name plate
7 Main valve
8 Integrated electronics (OBE) and inductive position transducer (main valve)
9 Identical seal rings for ports X, Y
10 Identical seal rings for ports A, B, P, T
11 Space required for connection cable and to remove the mating connector
12 Machined valve contact surface; porting pattern according to ISO 4401-10-09-0-05 (ports X, Y as required)
Deviating from the standard:
▶ Ports A, B, P, T – Ø50 mm
▶ [1] Dimension G_1 according to DIN 24340 Form A
13 Locking pin

Subplates (separate order) with porting pattern according to ISO 4401-10-09-0-05 see data sheet 45100.

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

Dimensions for **electronics protection membrane "-967"** and **spool position monitoring "M"** see page 25**.**
Valve mounting screws see page 26.

Dimensions: Spool position monitoring "M" and electronics protection membrane "-967" (dimensions in mm)



NG	L1	L2
10	240	–
16	286	151
25	347	143
27	353	144
32	422	168
35	463	201

14 Electronics protection membrane "-967"

15 Spool position monitoring "M", optional

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

Dimensions

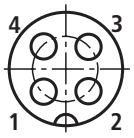
Valve mounting screws (separate order)

Size	Quantity	Hexagon socket head cap screws	Material number
10	4	**ISO 4762 - M6 x 45 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B** tightening torque M_A = 13.5 Nm ±10%	**R913043777**
	or		
	4	**ISO 4762 - M6 x 45 - 10.9** tightening torque M_A = 15.5 Nm ±10%	Not included in the Rexroth delivery range
16	2	**ISO 4762 - M6 x 60 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B** tightening torque M_A = 12.2 Nm ±10%	**R913043410**
	4	**ISO 4762 - M10 x 60 - 10.9-flZn/nc/480h/C** tightening torque M_A = 58 Nm ±20%	**R913014770**
	or		
	2	**ISO 4762 - M6 x 60 - 10.9** tightening torque M_A = 15.5 Nm ±10%	Not included in the Rexroth delivery range
	4	**ISO 4762 - M10 x 60 - 10.9** tightening torque M_A = 75 Nm ±20%	
25, 27	6	**ISO 4762 - M12 x 60 - 10.9-flZn/nc/480h/C** tightening torque M_A = 100 Nm ±20%	**R913015613**
	or		
	6	**ISO 4762 - M12 x 60** tightening torque M_A = 130 Nm ±20%	Not included in the Rexroth delivery range
32	6	**ISO 4762 - M20 x 80 - 10.9-flZn/nc/480h/C** tightening torque M_A = 340 Nm ±20%	**R913008472**
	or		
	6	**ISO 4762 - M20 x 80 - 10.9** tightening torque M_A = 430 Nm ±20%	Not included in the Rexroth delivery range
35	6	**ISO 4762 - M20 x 100 - 10.9-flZn/nc/480h/C** tightening torque M_A = 465 Nm ±20%	**R913015670**
	or		
	6	**ISO 4762 - M20 x 100 - 10.9** tightening torque M_A = 610 Nm ±20%	Not included in the Rexroth delivery range

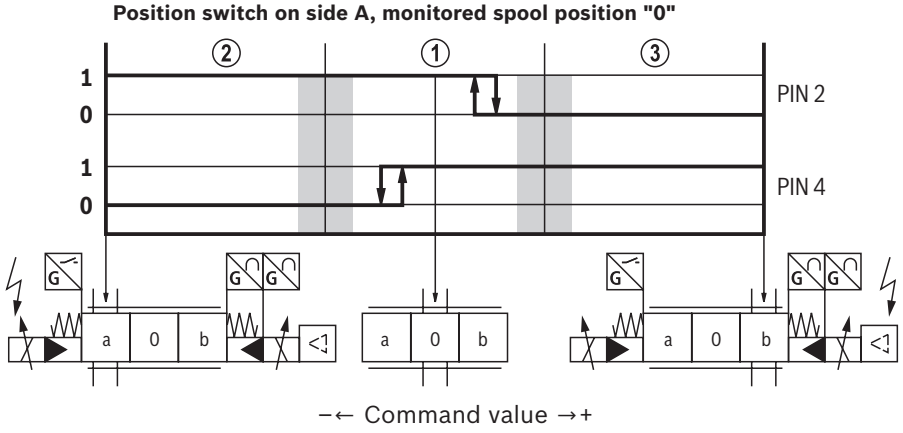
☞ **Notice:**
The tightening torque of the hexagon socket head cap screws refers to maximum operating pressure.

Inductive position switch: Electrical connection

The electrical connection is realized via a 4-pole mating connector (separate order, see page 28) with connection thread M12 x 1.

Switching point	Within positive valve overlap
Supply voltage	20...32 V DC
Admissible residual ripple	≤ 10%
Current consumption	approx. 25 mA (no load)
Outputs	2
Output function	PNP
Low level "0"	< 0.5 V DC
High level "1"	U_B–2 V DC
Current carrying capacity	≤ 400 mA
Signal delay time	≤ 15 ms (electrical, without switching time of valve)
Reference potential	GND
Pinout: 	**1** +24 V **2** Switching output: 400 mA (valve opening P→A) **3** 0 V, GND **4** Switching output: 400 mA (valve opening P→B)

Inductive position switch: Switching logics



① Central position (mechanical control spool overlap)
② Valve opening P→B
③ Valve opening P→A

Accessories: Mating connectors and cable sets (separate order)

Valve with integrated electronics

Mating connectors 6-pole + PE	**Design**	**Design**	**Material number**	**Data sheet**
For the connection of valves with integrated electronics, round connector 6+PE, line cross-section 0.5 ... 1.5 mm²	straight	Metal	**R900223890**	08006
	straight	Plastic	**R900021267**	08006
	angled	Plastic	**R900217845**	–

Cable sets 6-pole + PE	**Length** in m	**Material number**	**Data sheet**
For the connection of valves with integrated electronics, round connector 6+PE, straight connector, shielded, potted-in mating connector, line cross-section 0.75 mm²	3.0	**R901420483**	08006
	5.0	**R901420491**	08006
	10.0	**R901420496**	08006
	20.0	**R901448068**	–

Sensors

Mating connectors 4-pole	**Design**	**Line fitting**	**Material number**	**Data sheet**
For the connection of sensors with connector "K24", "K35" and "K72", line cross-section 0.75 mm²	straight	PG7	**R900773042**	08006
	straight	PG9	**R900031155**	08006
	angled	PG7	**R900779509**	08006
	angled	PG9	**R900082899**	08006

Cable sets 4-pole	**Design**	**Screening**	**Length** in m	**Material number**	**Data sheet**
For the connection of sensors with connector "K24", "K35" and "K72", line cross-section 0.34 mm²	straight	yes	2.0	**R900773031**	08006
	straight	no	3.0	**R900064381**	08006
	straight	yes	5.0	**R900779498**	08006
	straight	no	10.0	**R913005668**	08006
	angled	yes	2.0	**R900779504**	08006
	angled	yes	5.0	**R900779503**	08006
	angled	no	10.0	**R913011722**	08006

Project planning, installation and commissioning

- When designing safety-related controls, observe the applicable industry-specific standards and regulations.
- Due to the flexible use of valves in systems, the user has to check and ensure that the product properties comply with all functional and safety requirements of the overall system.
- Make sure that there are no switching shocks and that the valve control spool does not vibrate.
- Valves with spool position indicator may only be installed, adjusted, commissioned and maintained by specialists trained in hydraulics and electronics.
- Improper work at safety-related parts of controls may result in personal injury and damage to property.

The following applies to all work carried out at the valve:

- Valves with spool position indicator must not be disassembled.
- The parts of the valves must not be exchanged.
- Integrated throttles must not be removed or modified.
- The spool position indicator may only be adjusted by the valve manufacturer.

Further information

▶ Subplates	Data sheet 45100
▶ 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
▶ Hexagon socket head cap screw, metric/UNC	Data sheet 08936
▶ General product information on hydraulic products	Data sheet 07008
▶ Installation, commissioning and maintenance of servo valves and high-response valves	Data sheet 07700
▶ Hydraulic valves for industrial applications	Data sheet 07600-B
▶ Assembly, commissioning and maintenance of hydraulic systems	Data sheet 07900
▶ Selection of filters	www.boschrexroth.com/filter
▶ Information on available spare parts	www.boschrexroth.com/spc

Notes

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