

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

Type 4WRPE



- ▶ Size 10
- ▶ Component series 3X
- ▶ Maximum operating pressure 350 bar
- ▶ Rated flow 50, 80 l/min
- ▶ Digital interface, IO link for I4.0



Features

- ▶ Reliable – proven and robust design
- ▶ Energy-efficient – no pilot oil demand, high flows with low pressure differential
- ▶ Flexible – suitable for position and velocity control
- ▶ Precise – high response sensitivity and little hysteresis
- ▶ Safe – shut-off of the second solenoid by means of ISA adapter possible
- ▶ IO-Link interface, optional

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Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
4	WRP	E	10			S	J	-	3X	/	/	24	/	*

01	4 main ports	4
02	Directional control valve, direct operated	WRP
03	With integrated electronics	E
04	Size 10	10
05	Symbols e.g. E, E1, W6 etc.; possible version see page 3	

Rated flow ($\Delta p = 5$ bar/control edge)

06	50 l/min (only with symbols E, E1-, V and W6-)	50
	80 l/min	80

Flow characteristic

07	Progressive	S
08	Overlap jump (opening point 5 command value with symbols E, E1-, EA, W6- and W8-)	J
09	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	3X

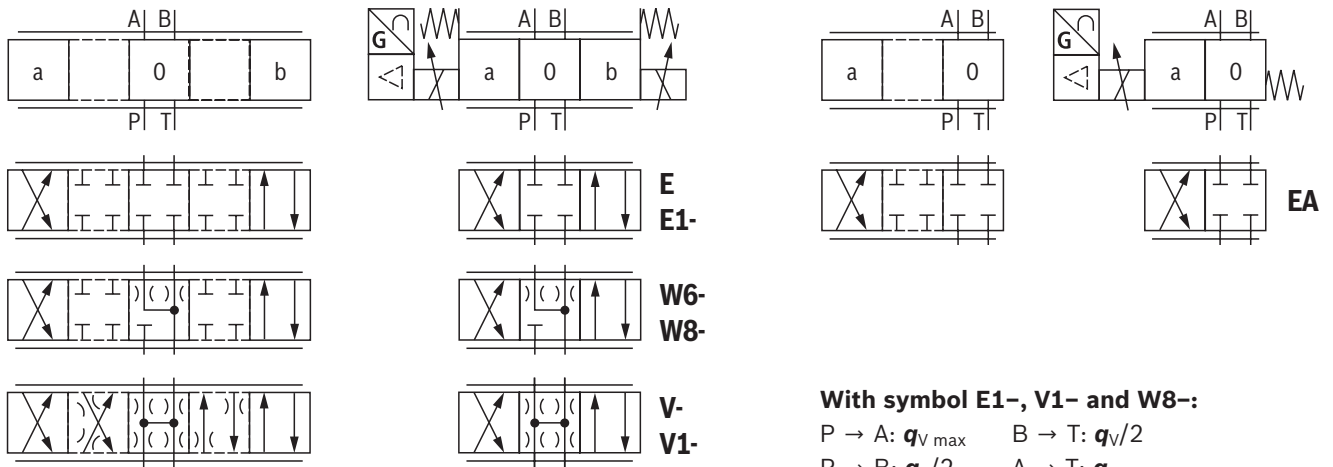
Seal material (observe compatibility of seals with hydraulic fluid used, see page 7)

10	NBR seals	M
	FKM seals	V
11	Without damping plate	without designation
	With damping plate	D
12	Supply voltage 24 V	24

Interfaces of the control electronics

13	Command value input ± 10 V	A1
	Command value input 4 ... 20 mA	F1
	IO-Link interface	L1
	Command value ± 10 mA, actual value 4 ... 20 mA, release (connector 6+PE)	C6
14	Without electronics protection membrane	without designation
	With electronics protection membrane	-967
15	For further details, see the plain text	

Symbols



With symbol E1-, V1- and W8--:

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

Notice:

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

Function, section (4/3 directional valve)

The valve type 4WRPE is a direct operated directional control valve with electric position feedback and integrated electronics (OBE).

Set-up

The valve basically consists of:

- ▶ Valve housing (1)
- ▶ Control spool (2) with compression springs (3.1 and 3.2)
- ▶ Control solenoid with position transducer (4) (optional with electronics protection membrane (8))
- ▶ Stroke solenoid (7)
- ▶ On-board electronics (OBE) (5) with analog (6) or IO-Link interface (optionally with damping plate (9))

Function

The integrated electronics (OBE) compares the specified command value to the position actual value. In case of control deviations, the relevant solenoid will be activated. Due to the changed magnetic force, the control spool (2) is adjusted against the corresponding spring. The stroke/control spool cross-section is regulated proportionally to the command value. In case of a command value presetting of 0 V, the electronics adjust the control spool (2) to central position.

Error detection

In the following cases of error, the electronics will de-energize the control solenoids:

- ▶ Falling below the minimum supply voltage ≤ 15 V (restarting ≥ 17.5 V).

- ▶ Only at interface "F1":
 - Falling below the minimum current command value of 2 mA (includes cable break of the command value line (current loop)).
- ▶ Only at interface "L1":
 - Enable inactive, communication interruption (watchdog)
 - In case of internal IO-Link error
- ▶ Only at interface "C6":
 - Additionally, release inactive

The control spool (2) is kept in the mechanical central position by the compression springs (3.1 and 3.2) (with symbol V, this does not correspond to the hydraulic central position).

Damping plate "D"

The damping plate (9) reduces the acceleration amplitudes on the on-board electronics (frequencies >300 Hz).

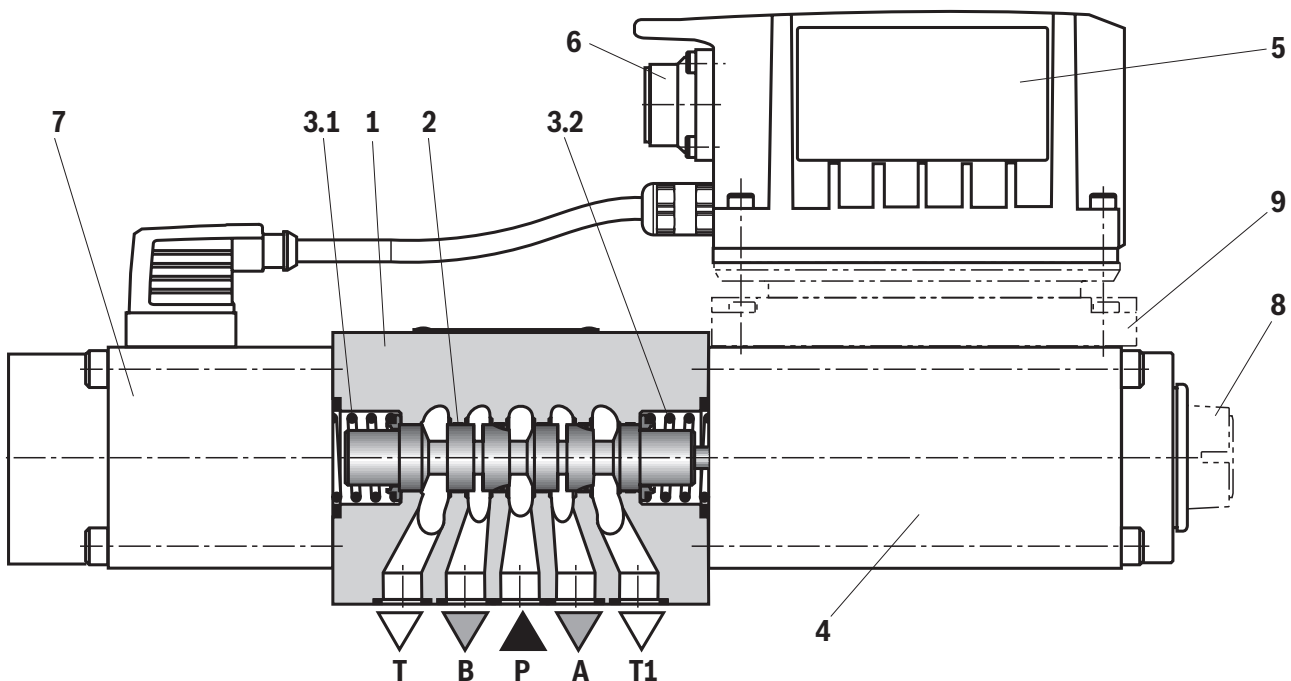
Notice:

Using the damping plate is not recommended for applications with mainly low-frequency excitation <300 Hz.

Electronics protection membrane "-967"

To prevent condensate formation in the housing of the integrated electronics (OBE), an electronics protection membrane (8) can be used.

Recommended for use outside industry-standard conditions with high ambient air humidity and significant cyclic temperature changes (e.g. outdoors).



Function, section (4/2 directional valve)

The valve type 4WRPE is a direct operated directional control valve with electric position feedback and integrated electronics (OBE).

Set-up

The valve basically consists of:

- ▶ Valve housing (1)
- ▶ Control spool (2) with compression springs (3)
- ▶ Control solenoid with position transducer (4) (optional with electronics protection membrane (8))
- ▶ On-board electronics (OBE) (5) with analog (6) or IO-Link interface (optionally with damping plate (9))

Function

The integrated electronics (OBE) compares the specified command value to the position actual value. In case of control deviations, the control solenoid will be activated. Due to the changed magnetic force, the control spool (2) is adjusted against the control spring. The stroke/control spool cross-section is regulated proportionally to the command value. With a positive command value presetting, the valve opens from P to B or A to T. Negative command values lead to no change in the control spool position.

Error detection

In the following cases of error, the electronics will de-energize the control solenoid:

- ▶ Falling below the minimum supply voltage ≤ 15 V (restarting ≥ 17.5 V).

- ▶ Only at interface "F1":
 - Falling below the minimum current command value of 2 mA (includes cable break of the command value line (current loop)).
- ▶ Only at interface "L1":
 - Enable inactive, communication interruption (watchdog)
 - In case of internal IO-Link error
- ▶ Only at interface "C6":
 - Additionally, release inactive

Damping plate "D"

The damping plate (9) reduces the acceleration amplitudes on the on-board electronics (frequencies >300 Hz).



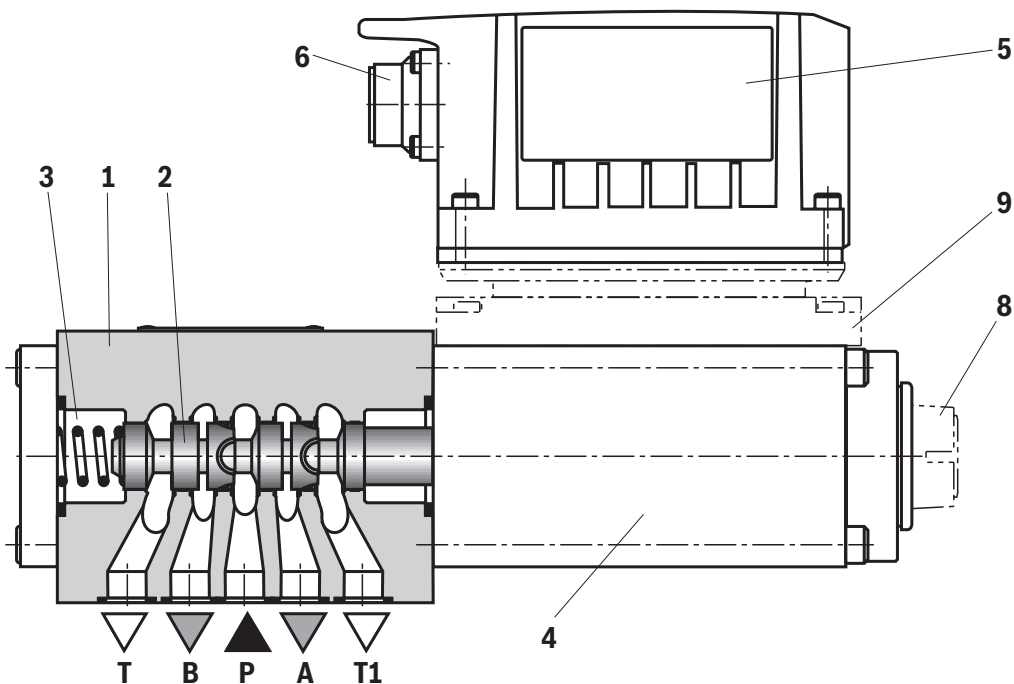
Notice:

Using the damping plate is not recommended for applications with mainly low-frequency excitation <300 Hz.

Electronics protection membrane "-967"

To prevent condensate formation in the housing of the integrated electronics (OBE), an electronics protection membrane (8) can be used.

Recommended for use outside industry-standard conditions with high ambient air humidity and significant cyclic temperature changes (e.g. outdoors).



Technical data

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

General		
Installation position	Any	
Ambient temperature range	°C -20 ... +60	
Storage temperature range with UV protection	°C +10 ... +40	
Transport temperature	°C -30 ... +80	
Maximum storage time	years 1 (if the storage conditions are observed; refer to the operating instructions 07600-B)	
Sine test according to DIN EN 60068-2-6	▶ Without damping plate	10 ... 2000 Hz / maximum of 10 g / 10 cycles / 3 axes
	▶ With damping plate ¹⁾	10 ... 2000 Hz / maximum of 10 g / 10 cycles / 3 axes
Noise test according to DIN EN 60068-2-64	▶ Without damping plate	20 ... 2000 Hz / 10 g _{RMS} / 30 g peak / 30 min. / 3 axes
	▶ With damping plate ¹⁾	20 ... 2000 Hz / 10 g _{RMS} / 30 g peak / 24 h / 3 axes
Transport shock according to DIN EN 60068-2-27	▶ Without damping plate	15 g / 11 ms / 3 shocks / 3 axes
	▶ With damping plate ¹⁾	15 g / 11 ms / 3 shocks / 3 axes
Shock according to DIN EN 60068-2-27	▶ With damping plate ¹⁾	35 g / 6 ms / 1000 shocks / 3 axes
Weight	▶ 4/3-way version	kg 7.6
	▶ 4/2-way version	kg 6.0
Maximum relative humidity (no condensation)	% 95	
Maximum solenoid surface temperature	°C 150 (individual operation)	
MTTF _d value according to EN ISO 13849	years 150 (for further details see data sheet 08012)	
Conformity	<ul style="list-style-type: none"> ▶ CE according to EMC directive 2014/30/EU, tested according to EN 61000-6-2 and EN 61000-6-3 ▶ RoHS directive 2015/65/EU ▶ REACH ordinance (EC) no. 1907/2006 	

Hydraulic						
Maximum operating pressure	▶ Ports A, B, P	bar 350				
	▶ Port T	bar 200				
Rated flow ($\Delta p = 5$ bar/control edge ²⁾)	l/min	50	80			
Flow unloading central position ($\Delta p = 5$ bar/control edge)	▶ Symbol W6-	l/min	A – T	B – T	A – T	B – T
		l/min	0.7	0.7	0.7	0.7
		l/min	–	–	0.7	0.7
Hydraulic fluid		See table page 7				
Viscosity range	▶ Recommended	mm ² /s	20 ... 100			
	▶ Maximum admissible	mm ² /s	10 ... 800			
Hydraulic fluid temperature range (flown-through)	°C	-20 ... +70				
Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c)		Class 18/16/13 ³⁾				

¹⁾ Not recommended for applications with mainly low-frequency excitation < 300 Hz

²⁾ Flow for deviating Δp (control edge):

$$q_x = q_{Vnom} \cdot \sqrt{\frac{\Delta p_x}{5}}$$

³⁾ 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.

Available filters can be found at www.boschrexroth.com/filter.

Notice:

The specified technical data were measured with HLP46 and $\vartheta_{oil} = 40 \pm 5$ °C.

Technical data

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

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	ISO 15380	90221
		HEES		
	▶ Soluble in water	HEPG	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	ISO 12922	90222
		HFDU (ester base)		
		HFDR		
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	ISO 12922	90223



Important notices 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.
- ▶ **Bio-degradable and flame-resistant – containing water:**
If components with galvanic zinc coating (e.g. version "J3" or "J5") or parts containing zinc are used, small amounts of dissolved zinc may get into the hydraulic system and cause accelerated aging of the hydraulic fluid. Zinc soap may form as a chemical reaction product, which may clog filters, nozzles and solenoid valves - particularly in connection with local heat input.

▶ Flame-resistant – containing water:

- Due to the increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30 % as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended - if possible specific to the installation - to back up the return flow pressure in ports T to approx. 20 % of the pressure differential at the component.
- Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, the command value profile is to be adjusted for proportional and high-response valves.

Static/dynamic		
Hysteresis	%	< 0.25
Range of inversion	%	< 0.05
Response sensitivity	%	< 0.05
Manufacturing tolerance q_{Vmax}	%	< 10
Temperature drift (temperature range 20 °C ... 80 °C)		Zero shift < 0.2
Pressure drift	%/100 bar	Zero shift < 0.2
Zero compensation		ex plant ±1 %

Technical data

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

Electrical, integrated electronics (OBE) – Interface “A1” and “F1”		
Relative duty cycle	%	100 (continuous operation)
Protection class according to EN 60529		IP 65 with mounted and locked plug-in connectors
Supply voltage	VDC	24
▶ Terminal A	VDC	min. 19 / max. 36
▶ Terminal B	VDC	0
Maximum admissible residual ripple	V _{pp}	2.5
Maximum power consumption	VA	60
Fuse protection, external	A _T	3.15 (time-lag)
Input, version "A1"		Differential amplifier, R_i = 100 kΩ
▶ Terminal D (U_E)	VDC	0 ... ±10 (4/3-way version) 0 ... +10 (4/2-way version)
▶ Terminal E	VDC	0
Input, version "F1"		Load, R_{sh} = 200 Ω
▶ Terminal D (I_{D-E})	mA	4 ... (12) ... 20 (4/3-way version) 4 ... 20 (4/2-way version)
▶ Terminal E (I_{D-E})		Current loop I_{D-E} feedback
Maximum voltage of the differential inputs against 0 V		D → B; E → B (max. 18 V)
Test signal, version "A1"		LVDT
▶ Terminal F (U_{Test})	V	0 ... ±10 (4/3-way version) 0 ... +10 (4/2-way version)
▶ Terminal C		Reference 0 V
Test signal, version "F1"		LVDT signal 4 ... 20 mA on external load 200 ... 500 Ω maximum
▶ Terminal F (I_{F-C})	mA	4 ... (12) ... 20 (4/3-way version) 4 ... 20 (4/2-way version)
▶ Terminal C (I_{F-C})		Current loop I_{F-C} feedback
Functional ground and screening		See page 10 (CE-compliant installation)
Adjustment		Calibrated in the plant, see valve characteristic curves page 13 ... 21
Conformity		CE according to EMC Directive 2014/30/EU tested according to EN 61000-6-2 and EN 61000-6-3

Electrical, integrated electronics (OBE) – Interface “L1”		
Relative duty cycle	%	100 (continuous operation)
Protection class according to EN 60529		IP 65 with mounted and locked plug-in connectors
Supply voltage	VDC	24
▶ Valve amplifier	VDC	min. 18 / max. 30
– Pin 2	VDC	min. 18 / max. 30
– Pin 5	VDC	0
▶ IO-Link interface	VDC	24
– Pin 1	VDC	min. 18 / max. 30
– Pin 3	VDC	0
Maximum current consumption	A	3
▶ Valve amplifier	A	3
▶ IO-Link interface	mA	50
Maximum residual ripple	V _{pp}	1.3
Maximum current consumption	mA	50
Minimum process cycle time	ms	0.6
Bit rate COM3	kBaud (kbit/s)	230.4
Required master port class		Class B
Resolution	bit	12 (110% valve opening)
▶ A/D transformer	bit	12 (110% valve opening)
▶ D/A transformer	bit	12 (110% valve opening)
Functional ground		Provide via valve block
Adjustment		Calibrated in the plant
Directive		IO-Link Interface and System Specification Version 1.1.2

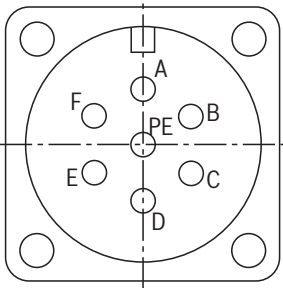
Technical data

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

Electrical, integrated control electronics (OBE) – Interface “C6”		
Relative duty cycle	%	100 (continuous operation)
Protection class according to EN 60529		IP 65 with mounted and locked plug-in connectors
Supply voltage	VDC	24
▶ Terminal A	VDC	min. 19 / max. 36
▶ Terminal B	VDC	0
Maximum admissible residual ripple	V _{pp}	2.5
Maximum power consumption	VA	60
Fuse protection, external	A _T	3.15 (time-lag)
Input		Load, $R_{sh} = 200 \Omega$
▶ Terminal D (I_{D-E})	mA	0 ... ±10
▶ Terminal E (I_{D-E})		Current loop I_{D-E} feedback
Test signal		LVDT signal 4 ... 20 mA on external load 200 ... 500 Ω maximum
▶ Terminal F (I_{F-B})	mA	4 ... 20
▶ Terminal B (I_{F-B})		Current loop I_{F-B} feedback
Functional ground and screening		See page 10 (EMC-compliant installation)
Adjustment		Calibrated in the plant, see valve characteristic curves page 13 ... 21

Electrical connections and assignment

Contact	Interface assignment		
	"A1" (6 + PE)	"F1" (6 + PE)	"C6" (6 + PE)
A	24 VDC supply voltage		
B	GND		GND, reference potential actual value/enable
C	Reference potential actual value	Reference potential actual value	Enable input 24 VDC (high ≥ 11 V, low ≤ 5 V)
D	Command value ± 10 V ($R_e > 100$ k Ω)	Command value 4 ... 20 mA ($R_e = 200$ Ω)	Command value ± 10 mA ($R_e = 200$ Ω)
E	Reference potential command value	Reference potential command value	Reference potential command value
F	Actual value ± 10 V ($R_i \approx 1$ k Ω)	Actual value 4 ... 20 mA (Load max. 500 Ω)	Actual value 4 ... 20 mA (Load max. 500 Ω)
FE	Functional ground (directly connected to the valve housing)		

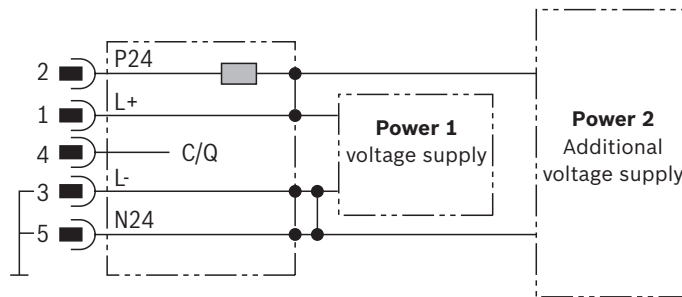
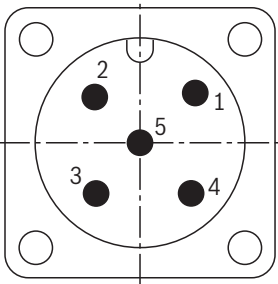


Command value:	<ul style="list-style-type: none"> ▶ Positive command value (0 ... 10 V or 12 ... 20 mA) at D and reference potential at E cause flow from P → A and B → T. ▶ Negative command value (0 ... -10 V or 12 ... 4 mA) at D and reference potential at E cause flow from P → B and A → T.
Connection cable:	<ul style="list-style-type: none"> ▶ Up to 20 m cable length type LiYCY 7 x 0.75 mm² ▶ Up to 40 m cable length type LiYCY 7 x 1.0 mm² ▶ EMC-compliant installation: <ul style="list-style-type: none"> - Apply screening to both line ends - Use metal mating connector (see page 25) ▶ Alternatively up to 30 m cable length admissible <ul style="list-style-type: none"> - Apply screening on supply side - Plastic mating connector (see page 25) can be used

Notice:

Mating connectors, separate order, see page 25 and data sheet 08006.

Connector pin assignment "L1" (M12-5, A-coded, class B)



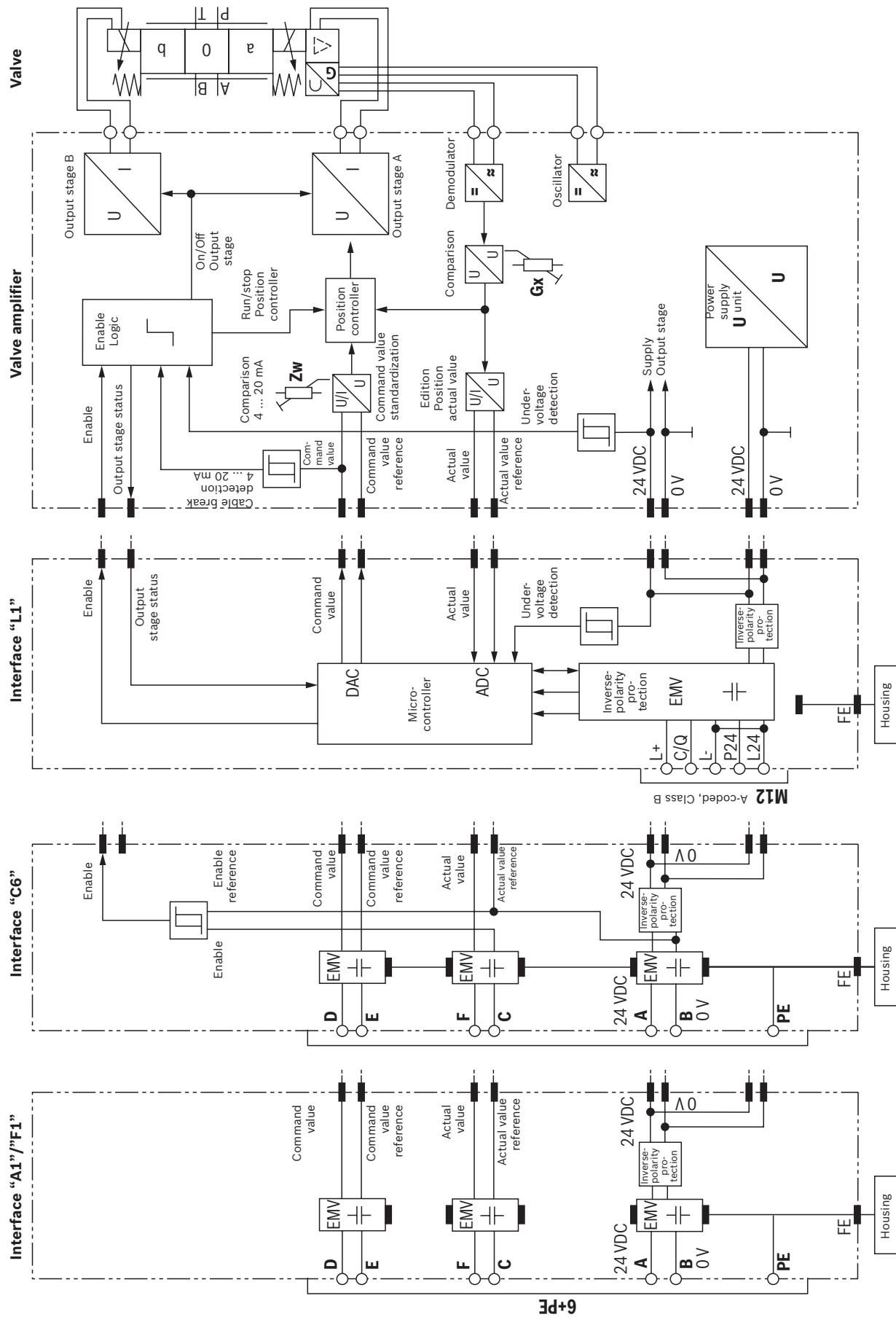
Notices:

- ▶ M12 sensor/actuator connection line, 5-pole; M12 connector/bush, A-coded, without shield, maximum cable length 20 m. Observe the voltage drop over the cable. Wire cross-section at least 0.34 mm².
- ▶ Mating connectors, separate order, see page 25 and data sheet 08006.
- ▶ Communication and parameter description see data sheet 29400-PA
- ▶ With a wire cross-section of 0.34 mm² (standard line), a maximum cable length of 10 m is possible. For a maximum cable length of 20 m, the cross-section must be doubled.

Pin	Signal	Allocation interface L1
1	L+	Voltage supply IO-Link
2	P24	Voltage supply valve electronics and power part (current consumption 3 A)
3	L-	Reference potential pin 1 ¹⁾
4	C/Q	Data line IO-Link (SDCI)
5	N24	Reference potential pin 2 ¹⁾

¹⁾ Pin 3 and 5 are linked with each other in the valve electronics. The reference potentials L- and N24 of the two supply voltages must also be linked with each other on the power supply unit side.

Block diagram/controller function block (4/3-way version)

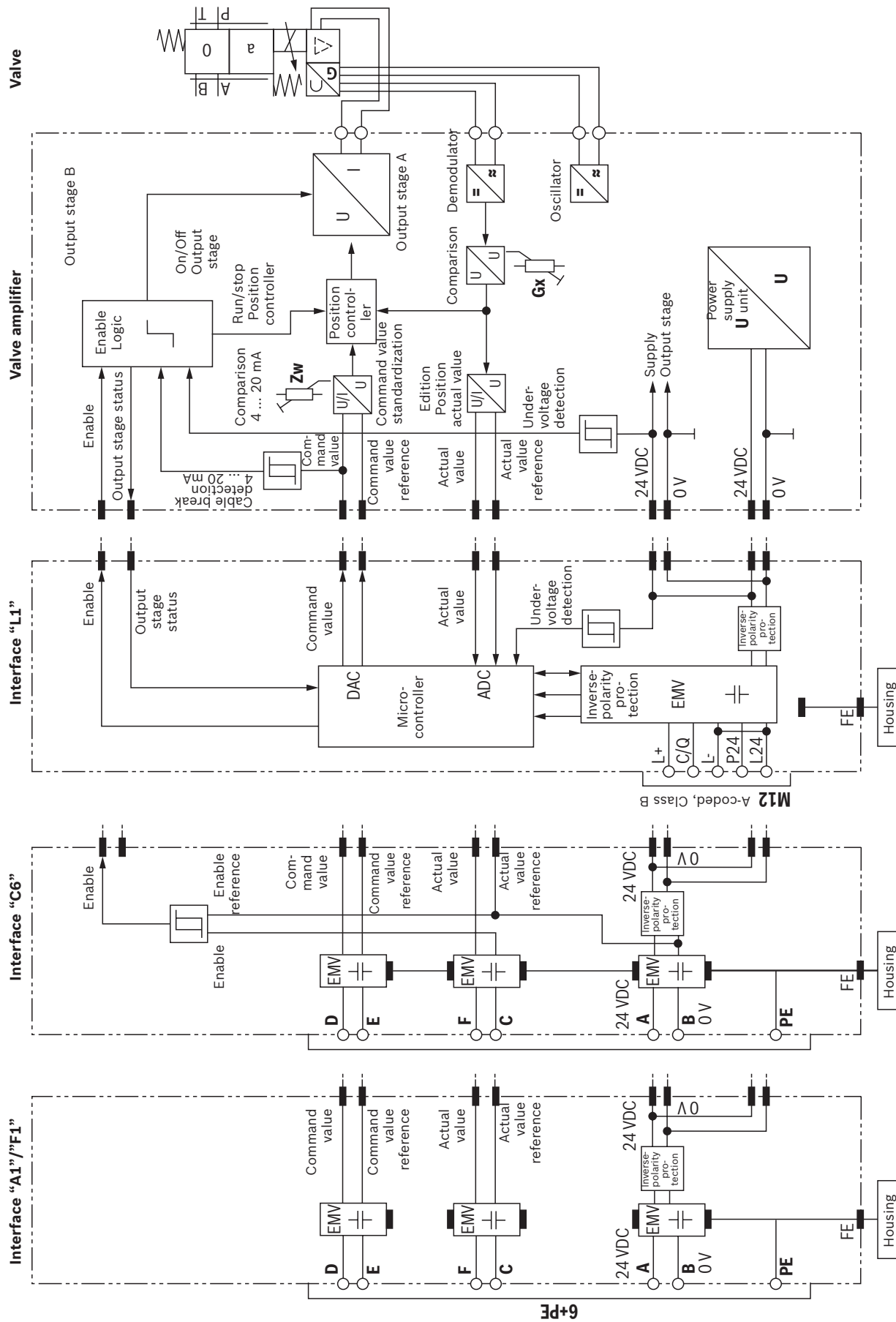


Notices:

▶ Electrical signals provided via control electronics (e.g. actual value) must not be used for switching off safety-relevant machine functions.

▶ The setting of the potentiometer at the factory must not be changed.

Block diagram/controller function block (4/2-way version)



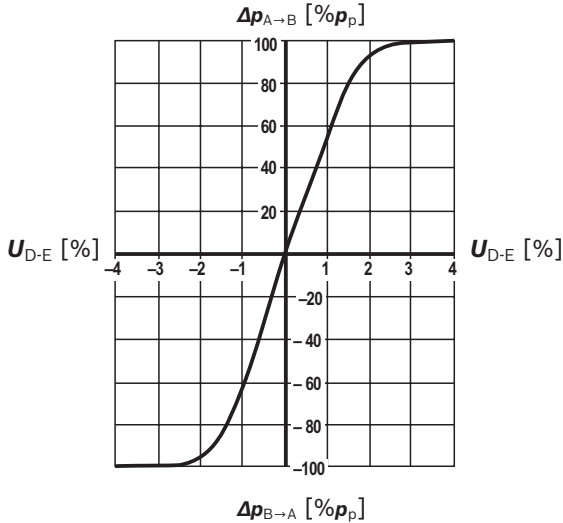
Notices:

- ▶ Electrical signals provided via control electronics (e.g. actual value) must not be used for switching off safety-relevant machine functions.
- ▶ The setting of the potentiometer at the factory must not be changed.

Characteristic curves

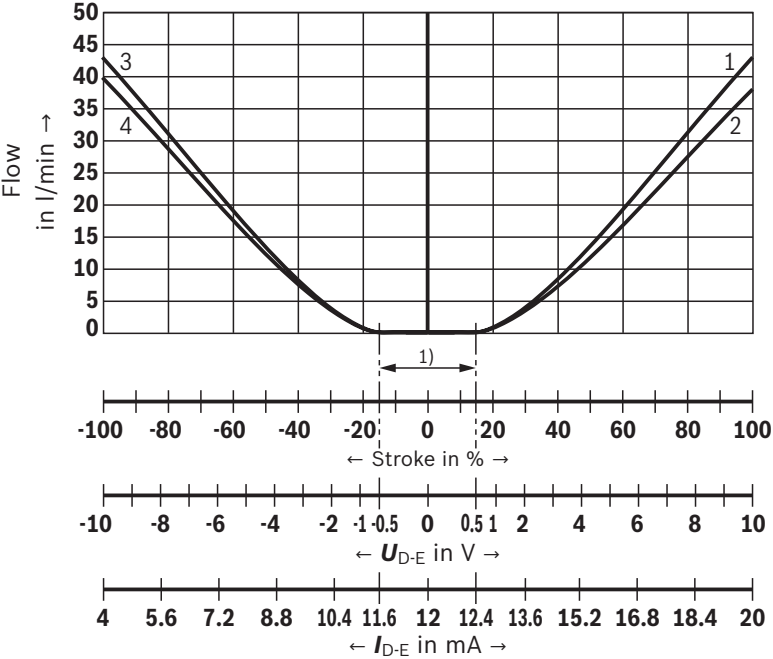
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

Pressure/signal characteristic curve (symbol V)



Flow/signal function (rated flow 50 l/min with $\Delta p = 5 \text{ bar/control edge}$)

Symbol E



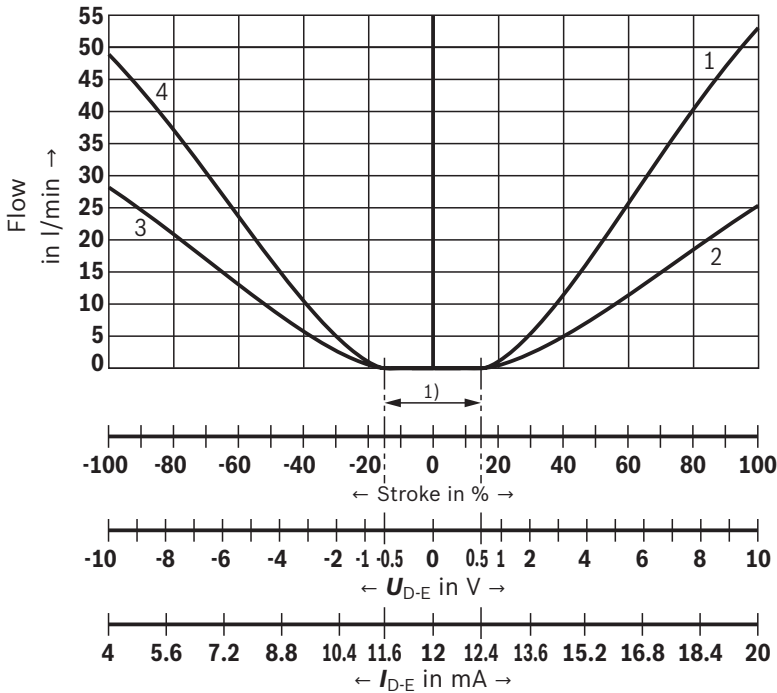
- 1) Step compensation
- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T

Characteristic curves

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

Flow/signal function (rated flow 50 l/min with $\Delta p = 5 \text{ bar}$ /control edge)

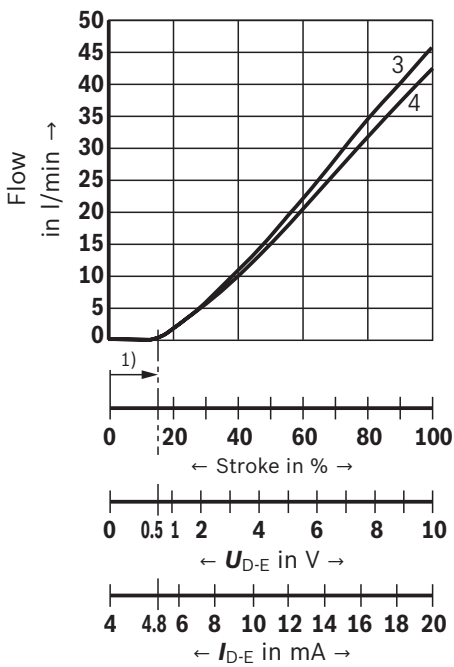
Symbol E1-



1) Step compensation

- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T

Symbol EA



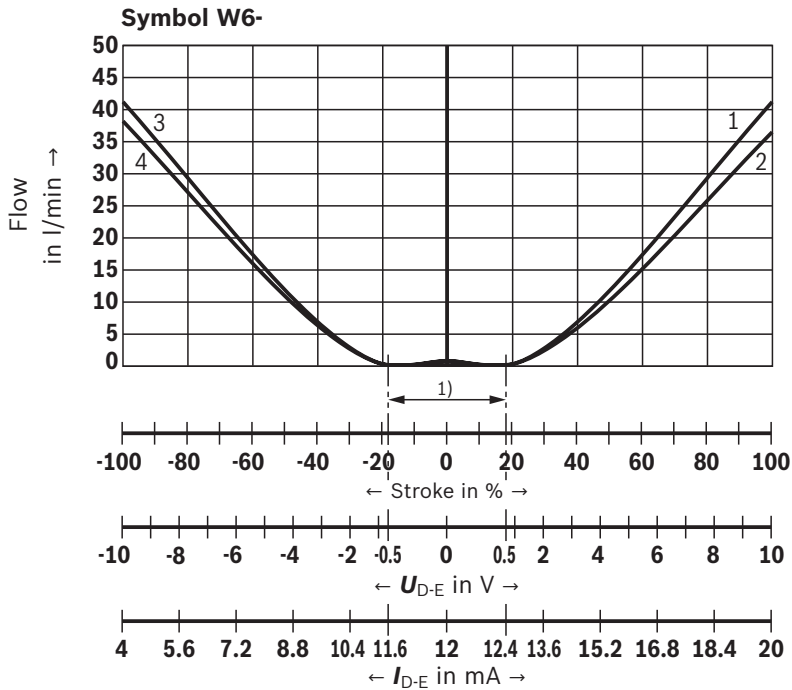
1) Step compensation

- 3 P-B
- 4 A-T

Characteristic curves

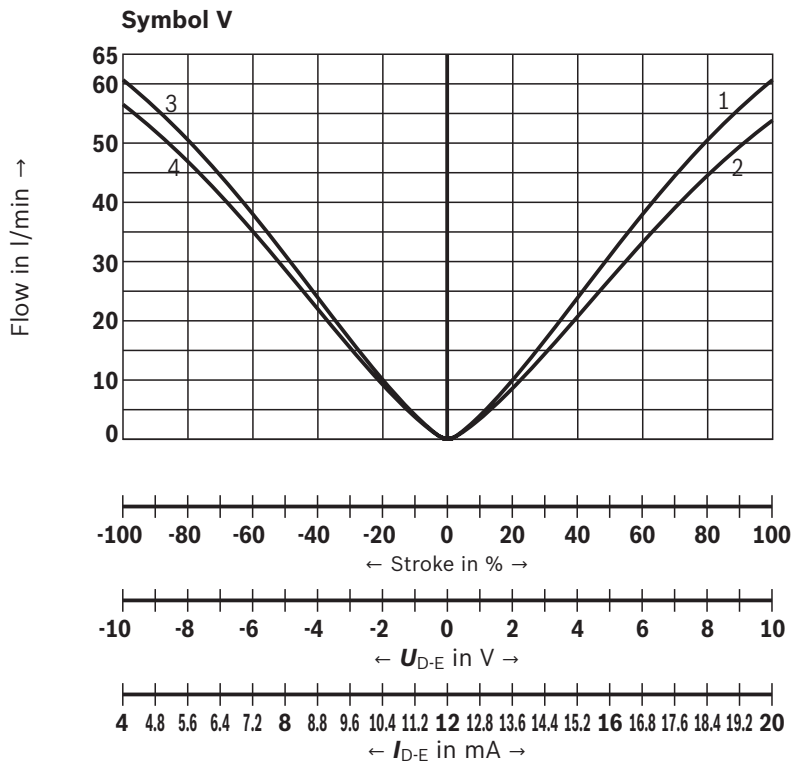
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

Flow/signal function (rated flow 50 l/min with $\Delta p = 5 \text{ bar/control edge}$)



1) Step compensation

- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T

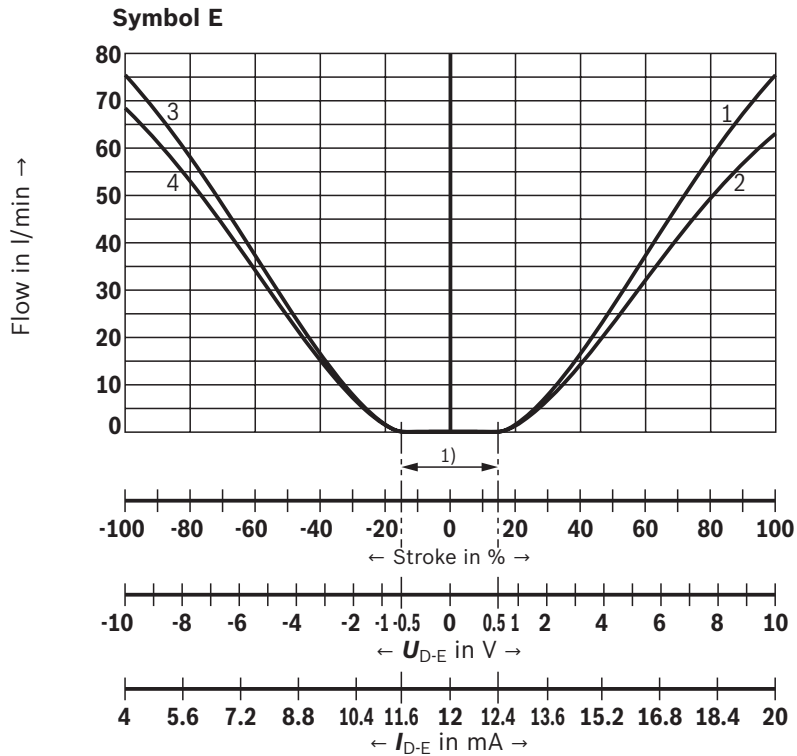


- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T

Characteristic curves

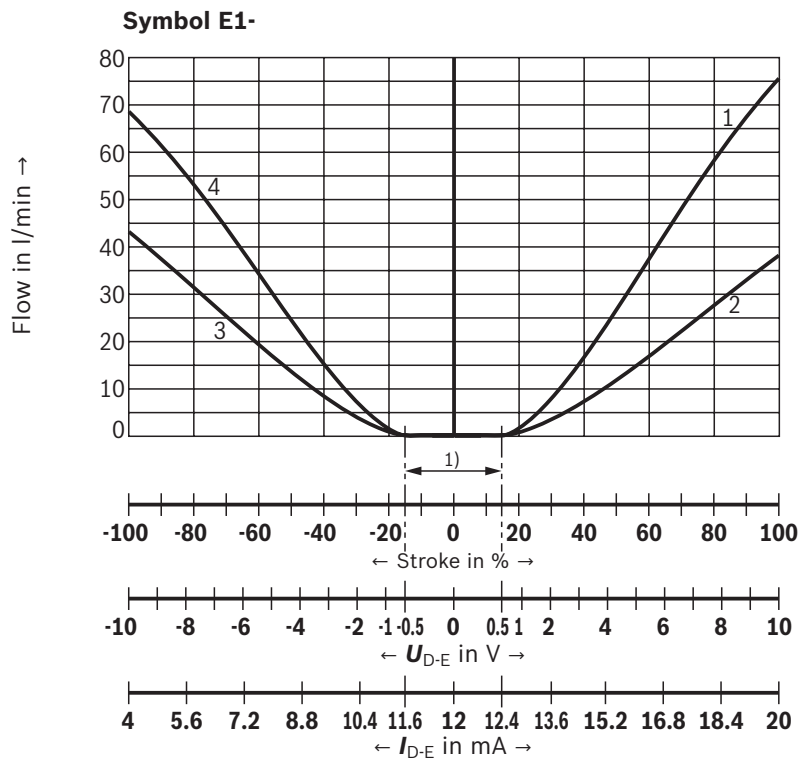
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

Flow/signal function (rated flow 80 l/min with $\Delta p = 5 \text{ bar/control edge}$)



1) Step compensation

- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T



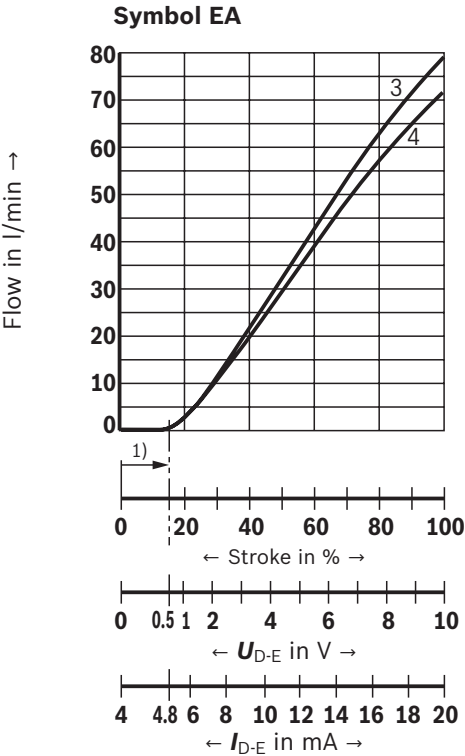
1) Step compensation

- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T

Characteristic curves

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

Flow/signal function (rated flow 80 l/min with $\Delta p = 5 \text{ bar}$ /control edge)



1) Step compensation

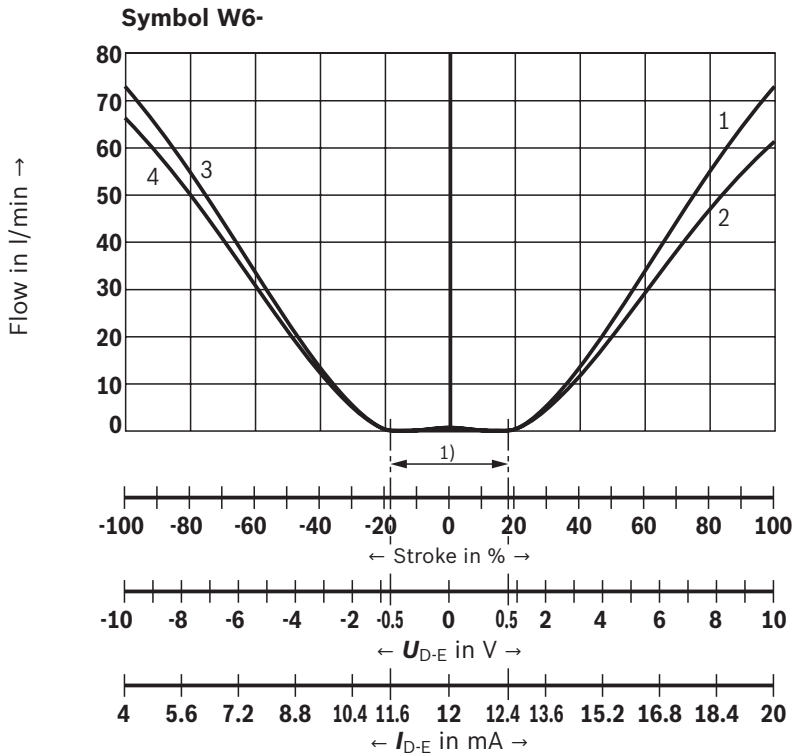
3 P-B

4 A-T

Characteristic curves

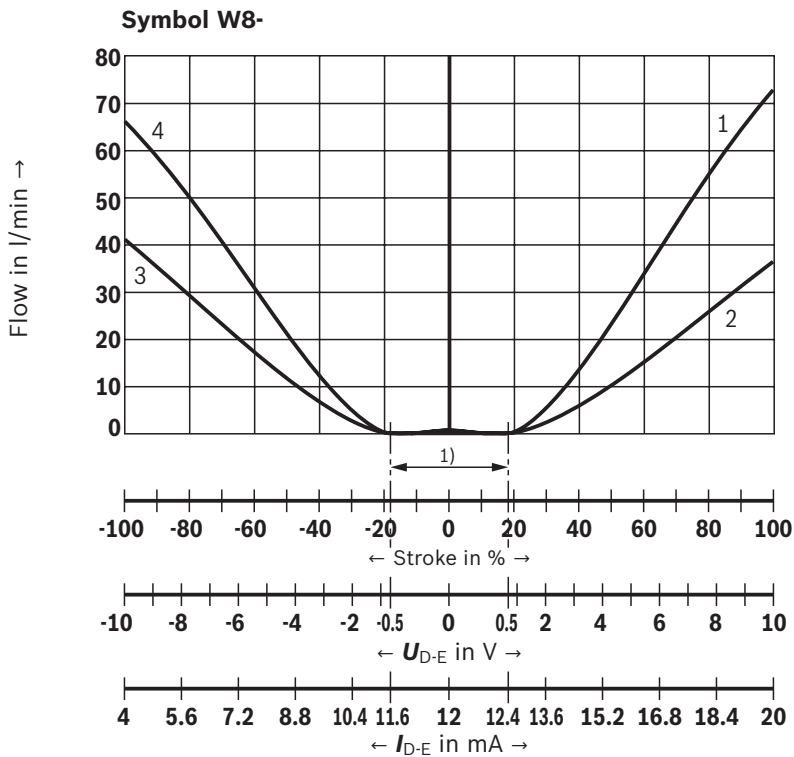
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

Flow/signal function (rated flow 80 l/min with $\Delta p = 5 \text{ bar/control edge}$)



1) Step compensation

- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T



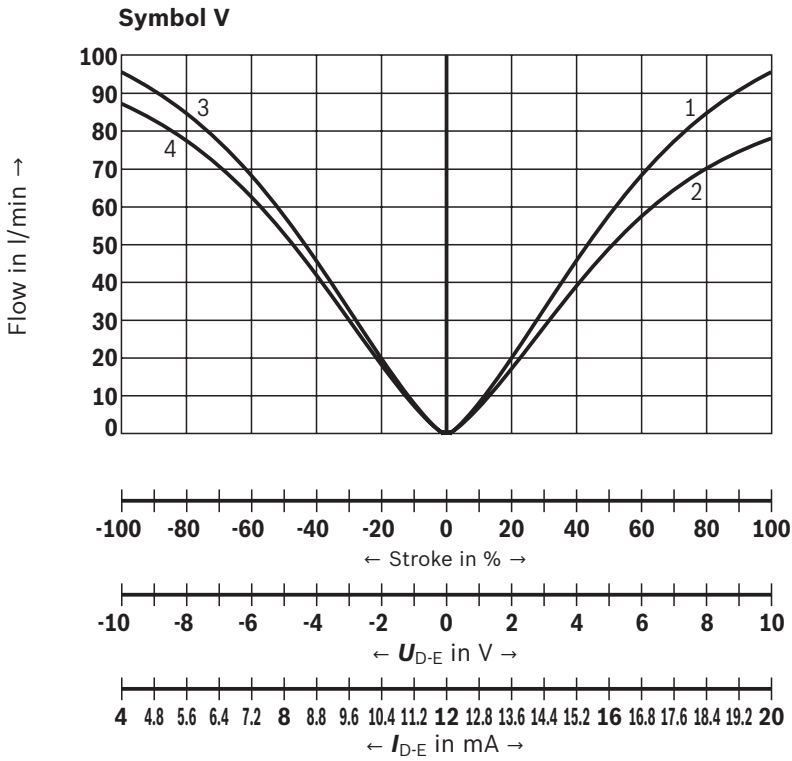
1) Step compensation

- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T

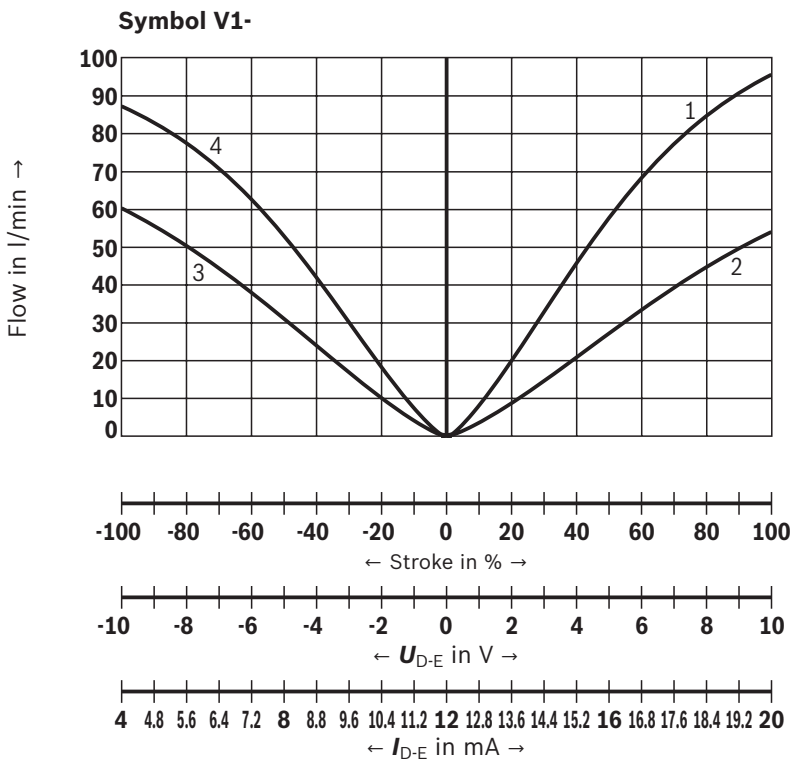
Characteristic curves

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

Flow/signal function (rated flow 80 l/min with $\Delta p = 5 \text{ bar/control edge}$)



- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T

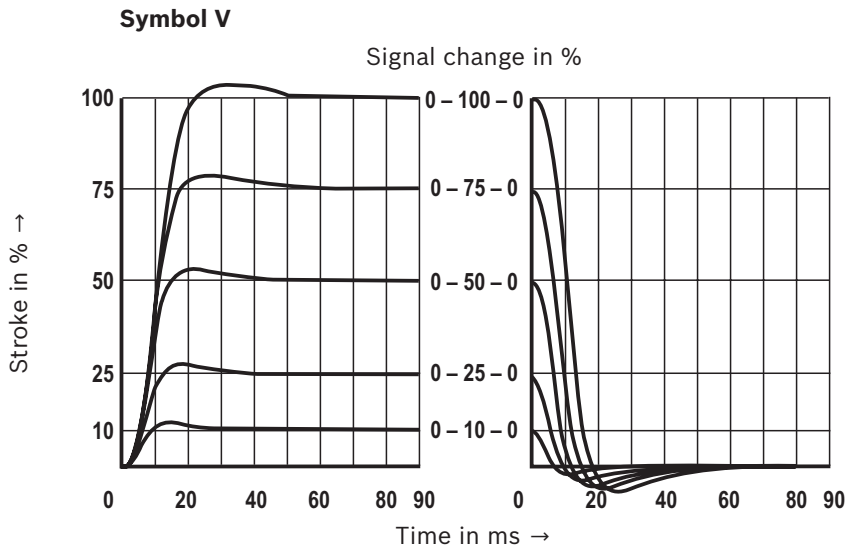


- 1 P-A
- 2 B-T
- 3 P-B
- 4 A-T

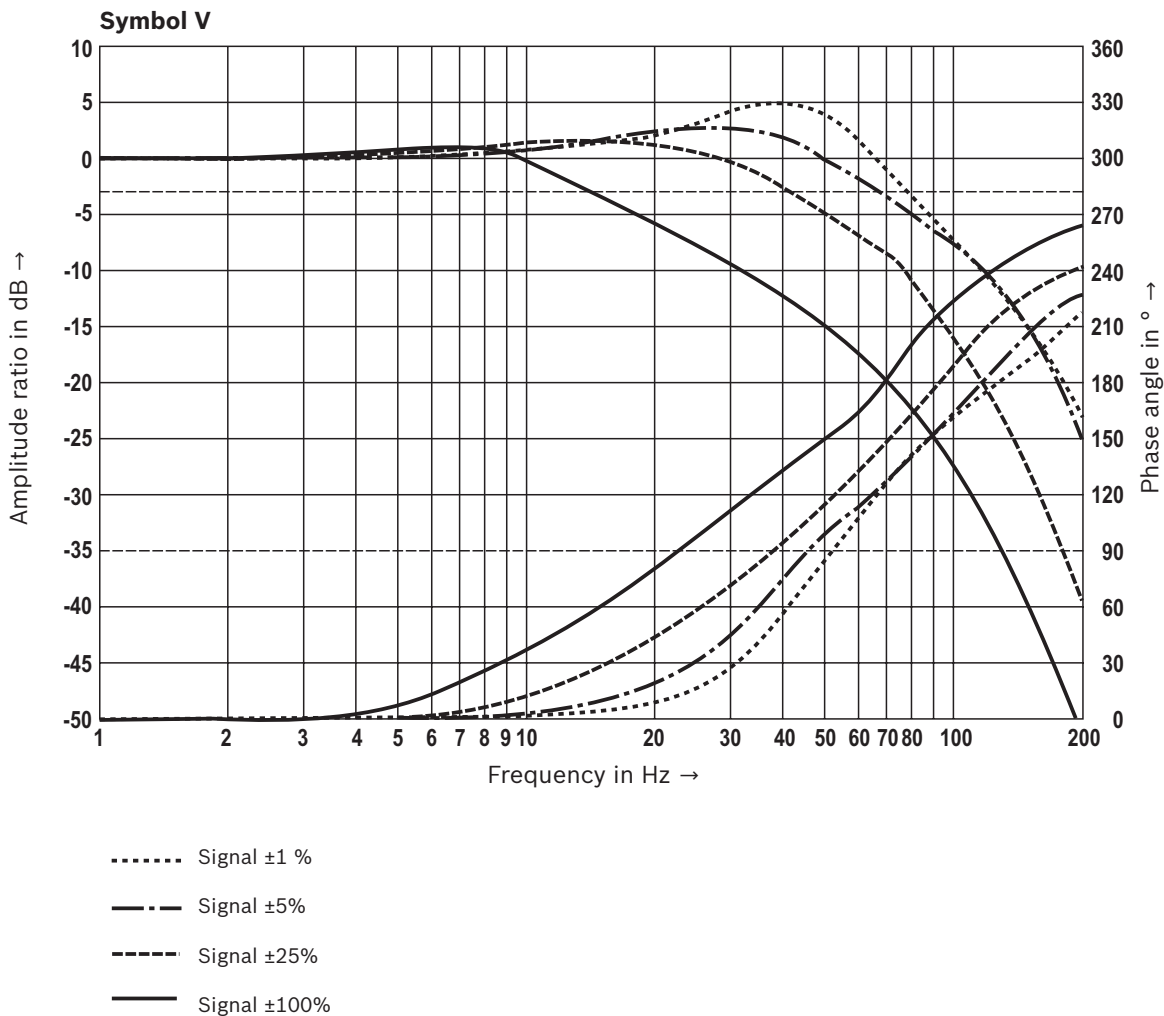
Characteristic curves

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

Transition function with stepped electric input signals (4/3-way version)



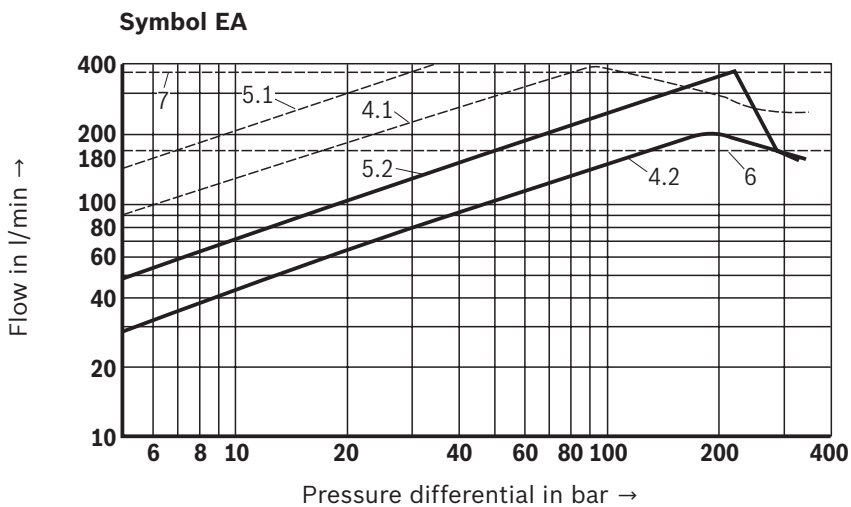
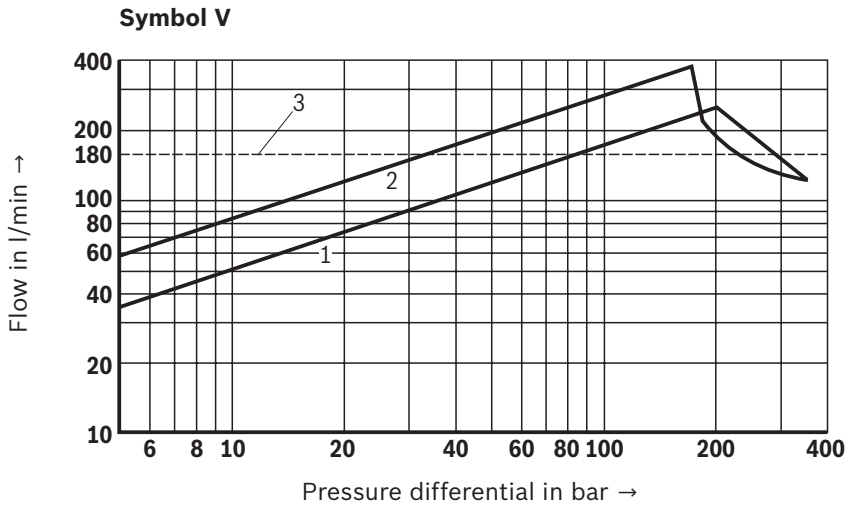
Frequency response characteristic curves



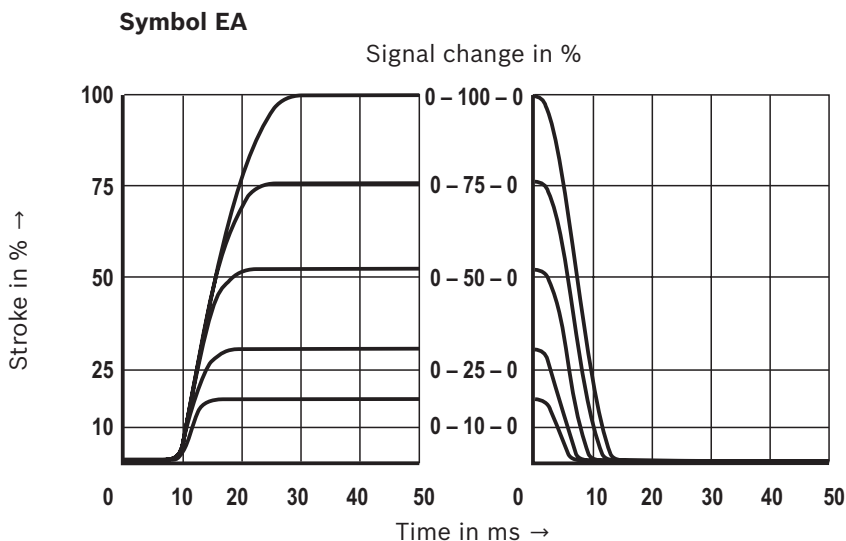
Characteristic curves

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$)

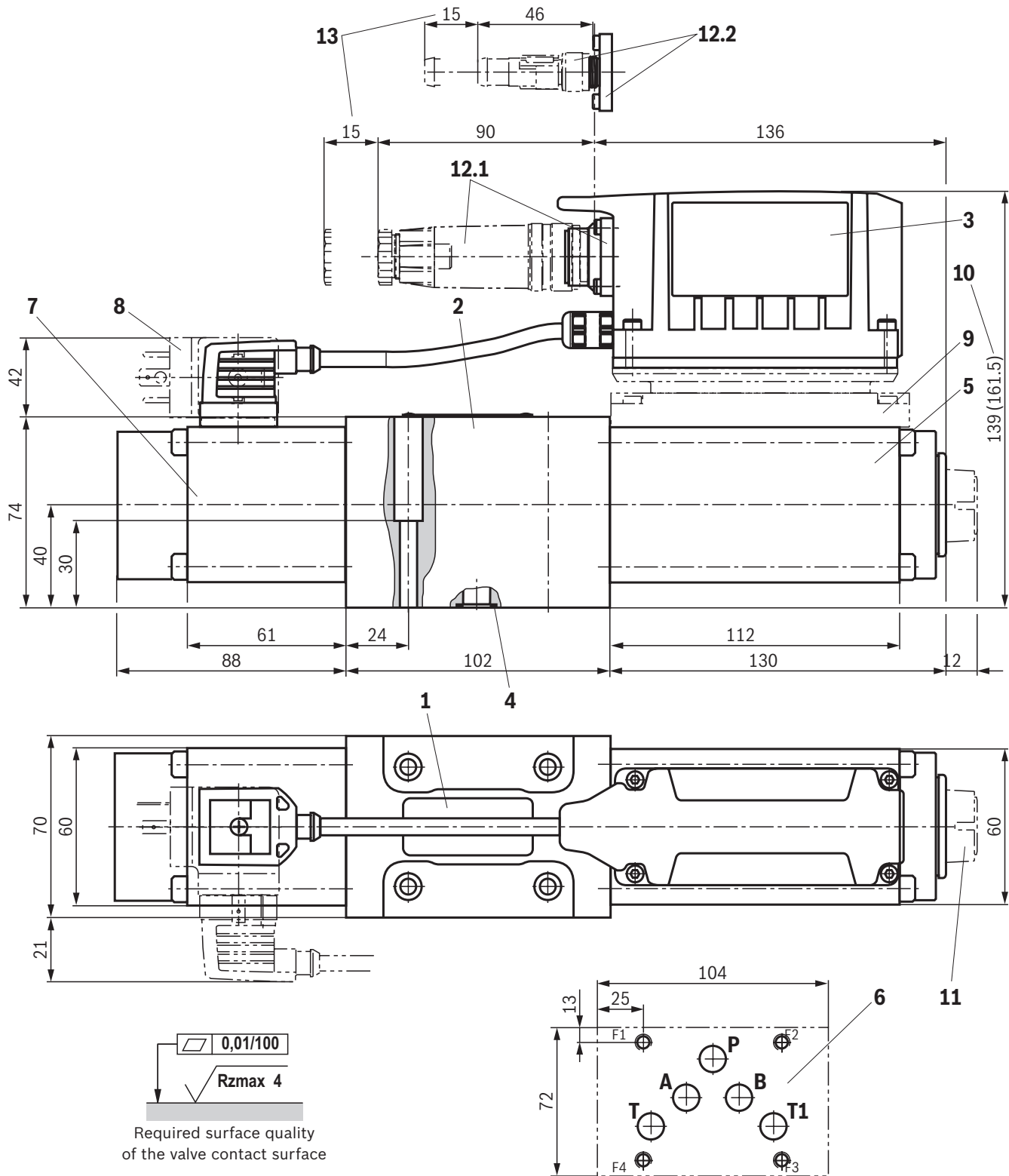
Flow/load function with maximum valve opening (tolerance $\pm 10 \%$) (4/3-way version)



Transition function with stepped electric input signals (4/2-way version)



Dimensions (4/3-way version)
(dimensions in mm)

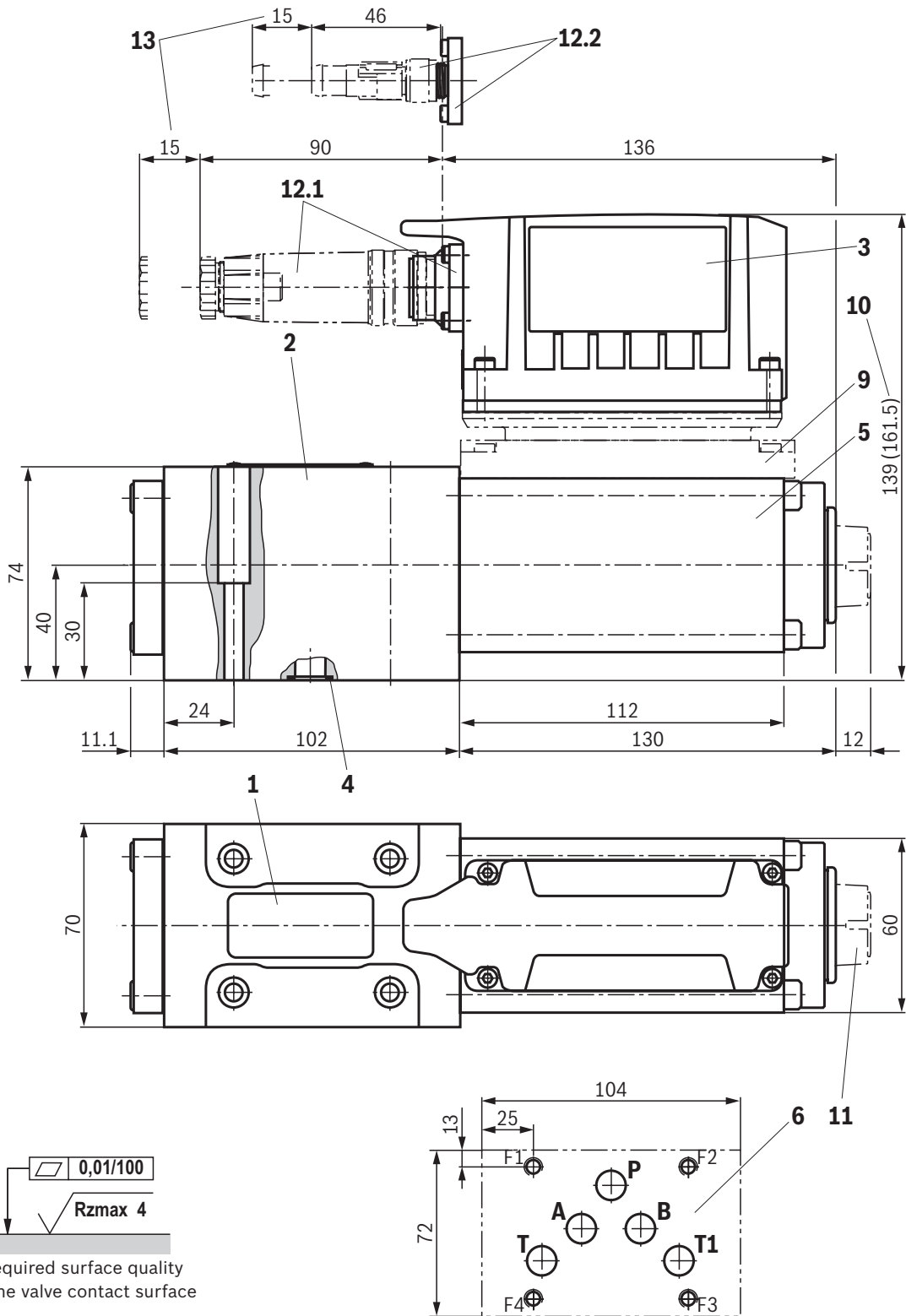


Notices:

- ▶ The dimensions are nominal dimensions which are subject to tolerances.
- ▶ Mating connectors, separate order, see page 25 and data sheet 08006.

For item explanations, valve mounting screws and subplates, see page 24.

Dimensions (4/2-way version)
(dimensions in mm)



0,01/100
 Rzmax 4
 Required surface quality
 of the valve contact surface

Notices:

- The dimensions are nominal dimensions which are subject to tolerances.
- Mating connectors, separate order, see page 25 and data sheet 08006.

For **item explanations, valve mounting screws and subplates**, see page 24.

Dimensions

- 1 Name plate
- 2 Valve housing
- 3 Integrated electronics (OBE)
- 4 Identical seal rings for ports A, B, P, T, T1
- 5 Control solenoid with position transducer
- 6 Machined valve contact surface, porting pattern according to ISO 4401-05-04-0-05
- 7 Stroke solenoid
- 8 ISA adapter, separate order, see page 25
- 9 Damping plate "D"
- 10 Dimension in () for version with damping plate "D"
- 11 Electronics protection membrane "-967"
- 12.1 Mating connectors for version "A1", "F1" and "C6", separate order, see page 25 and data sheet 08006.
- 12.2 Mating connectors for version "L1", separate order, see page 25 and data sheet 08006.
- 13 Space required for removing the mating connector

Valve mounting screws (separate order)

Size	Quantity	Hexagon socket head cap screws	Material number
10	4	ISO 4762 - M6 x 40 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B (Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$) Tightening torque $M_A = 12.5 \text{ Nm} \pm 10 \%$	R913051533
	or		
	4	ISO 4762 - M6 x 40 - 10.9 Tightening torque $M_A = 15.5 \text{ Nm} \pm 10\%$	Not included in the Rexroth delivery range
or			
	4	ASME B18.3 - 1/4-20 UNC x 1 3/4" - ASTM-A574 Tightening torque $M_A = 15 \text{ Nm}$ [<i>11 ft-lbs</i>] $\pm 10 \%$	Not included in the Rexroth delivery range



Notice:

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

Subplates (separate order) with porting pattern according to ISO 4401-05-04-0-05 see data sheet 45100.

Accessories (separate order)**Valves with integrated electronics**

Mating connectors 6-pole + PE	Design	Version	Material number	Data sheet
For the connection of valves with integrated electronics, round connector 6+PE, line cross-section 0.5 ... 1.5 mm ²	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 mm ²	3.0	R901420483	08006
	5.0	R901420491	08006
	10.0	R901420496	08006
	20.0	R901448068	–

Test and service devices

	Material number	Data sheet
Service case with test device for proportional servo valves with integrated electronics (OBE)	R901049737	29685

	Material number	Data sheet
ISA adapter ISA adapter for external shut-off of the second solenoid (tightening torque $M_A = 0.5^{+0.1}$ Nm)	1834484245	–

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
▶ Installation, commissioning and maintenance of servo valves and high-response valves	Data sheet 07700
▶ General product information on hydraulic products	Data sheet 07008
▶ Hydraulic valves for industrial applications	Data sheet 07600-B
▶ Assembly, commissioning and maintenance of hydraulic systems	Data sheet 07900
▶ Directional control valves, direct operated, with electrical position feedback and IO-Link interface	Data sheet 29400-PA
▶ Selection of filters	www.boschrexroth.com/filter
▶ Information on available spare parts	www.boschrexroth.com/spc
▶ Link hydraulics via IO-Link	www.boschrexroth.com/io-link

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