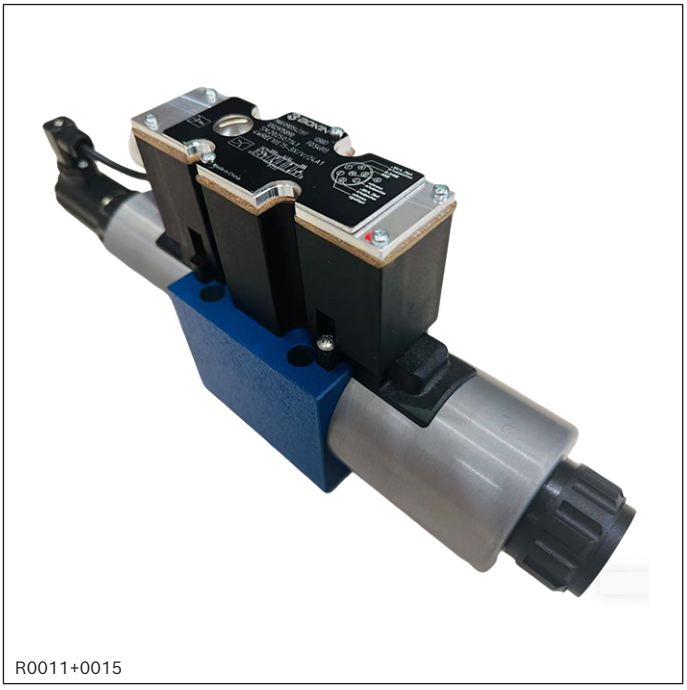
Proportional directional valves, direct operated, with electrical position feedback and integrated electronics (OBE)

Type 4WREE



R0011+0015

- Size 10
- Component series 3X
- Maximum operating pressure 350 bar
- Maximum flow 180 l/min
- Rated flow 25 ... 75 l/min (***Δp*** = 10 bar)

CE

Features

- 4/2 or 4/3-way version
- For subplate mounting
- Porting pattern according to ISO 4401-05-04-0-05
- Control of flow direction and size
- Operation by means of proportional solenoids with central thread
- Spring-centered control spool
- Integrated electronics (OBE) with voltage or current input ("A1", "A7" or "F1", "F7")
- CE conformity according to EMC Directive 2014/30/EU.

Contents

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Ordering code

01	02	03	04	05	06		07		08	09		10	11		12	13
4	**WRE**	**E**	**10**			**–**	**3X**	**/**			**/**	**24**		**/**		*****

01	4 main ports	**4**
02	Proportional directional valve, direct operated, with electrical position feedback	**WRE**
03	With integrated electronics (OBE)	**E**
04	Size 10	**10**
05	Symbols; possible version see page 3	

Nominal flow (***Δp*** = 5 bar per control edge)

06	25 l/min (only symbol E, V, E1- and V1-)	**25**
	50 l/min (only symbol E, E1-, V1-, Q2-, Q3- and Q5-)	**50**
	75 l/min (only symbol E, E1-, E3-, V, V1-, W, W1-, R, R3- and Q2-)	**75**
07	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	**3X**

Seal material (observe compatibility of seals with hydraulic fluid used, see page 6)

08	FKM seals	**V**
	NBR seals	**M** ◇

Corrosion resistance (outside)

09	None (valve housing with standard painting)	**no code** ◇
	High corrosion protection (720 h salt spray test according to EN ISO 9227)	**J5**

Supply voltage

10	Direct voltage 24 V	**24**

Electrical interface

11	Command value input ±10 V; actual value output ±10 V	**A1** ◇
	Command value input 4 ... 20 mA; actual value output 4 ... 20 mA	**F1**
	Command value input ±10 V; actual value output 4 ... 20 mA	**A7**
	Command value input 4 ... 20 mA; actual value output ±10 V	**F7**

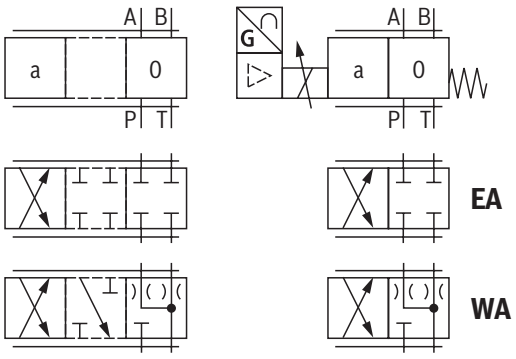
Test certificates

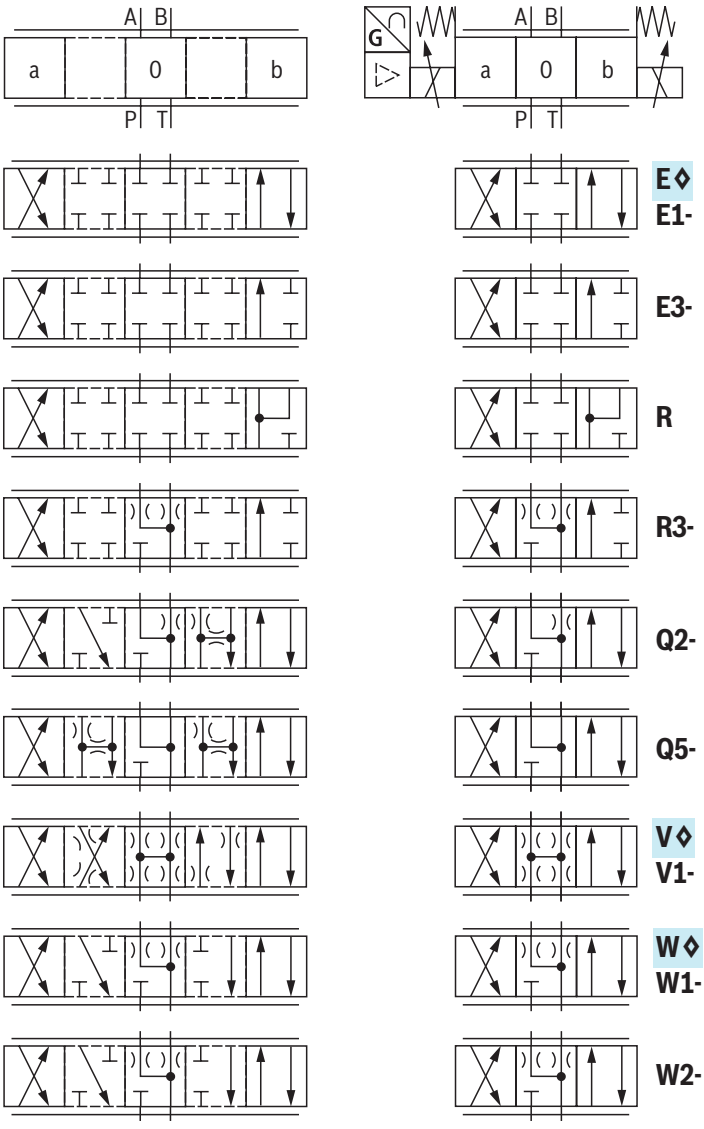
12	None	**no code** ◇
	With acceptance test certificate 3.1 according to EN 10204 [1)]	**3**
13	For further information, see the plain text	

[1)] When ordering, the functional certificate material number must be specified in addition to the valve material number:
- ▶ Acceptance test certificate 3.1: **R900259791**

☞ **Notice:** ◇ = Preferred type

Symbols





With symbol E1-, V1-, W1-:
P→A: $q_{V\,max}$ B→T: $q_V/2$
P→B: $q_V/2$ A→T: $q_{V\,max}$

With symbol E3-:
P→A: $q_{V\,max}$ B→T: blocked
P→B: $q_V/2$ A→T: $q_{V\,max}$

With symbol W2-:
P→A: $q_V/2$ B→T: $q_{V\,max}$
P→B: $q_{V\,max}$ A→T: $q_V/2$

E, E1-, E3-, EA	Control spool with overlap
Q2-, Q5-	Control spool for injection control (plastics processing machines)
R, R3-	Control spool with overlap for hydraulic fluid feedback to port P
V, V1-	Control spool with zero overlap
W, W1-, W2-, WA	Control spool with overlap to relieve the pressure on ports A and B after port T in the central position

☞ **Notice:**
Representation according to ISO 1219-1.
Hydraulic interim positions are shown by dashes.

☞ **Notice:** ◊ = Preferred type

Function, section

The type 4WREE valves are direct operated proportional directional valves with electrical position feedback and integrated electronics (OBE).

Set-up

The valves basically comprise:

- Housing (1) with connection surface
- Control spool (2) with compression springs (3 and 4) and spring plate (5 and 6)
- Solenoids (7 and 8) with central thread
- Position transducer (9)
- Integrated electronics (13)
- Electric zero point adjustment (12) accessible via the rubber plug

Function

- With de-energized solenoids (7 and 8), central position of the control spool (2) by compression springs (3 and 4) between spring plates (5 and 6)
- Direct operation of the control spool (2) by controlling a proportional solenoid, e.g. solenoid "b" (8)
  - Displacement of the control spool (2) to the left proportional to the electric input signal
  - This opens the connection from P to A and B to T via orifice-type cross-sections with progressive flow characteristic

In the unactuated state, the control spool (2) is held in a mechanical central position by the return springs of the solenoids. This position does not correspond to the hydraulic central position for symbol V. When the electric valve control loop is closed, the control spool is positioned in the hydraulic central position.

Control solenoid shut-off

In case of the following errors, the control solenoids are de-energized by the integrated electronics (OBE):

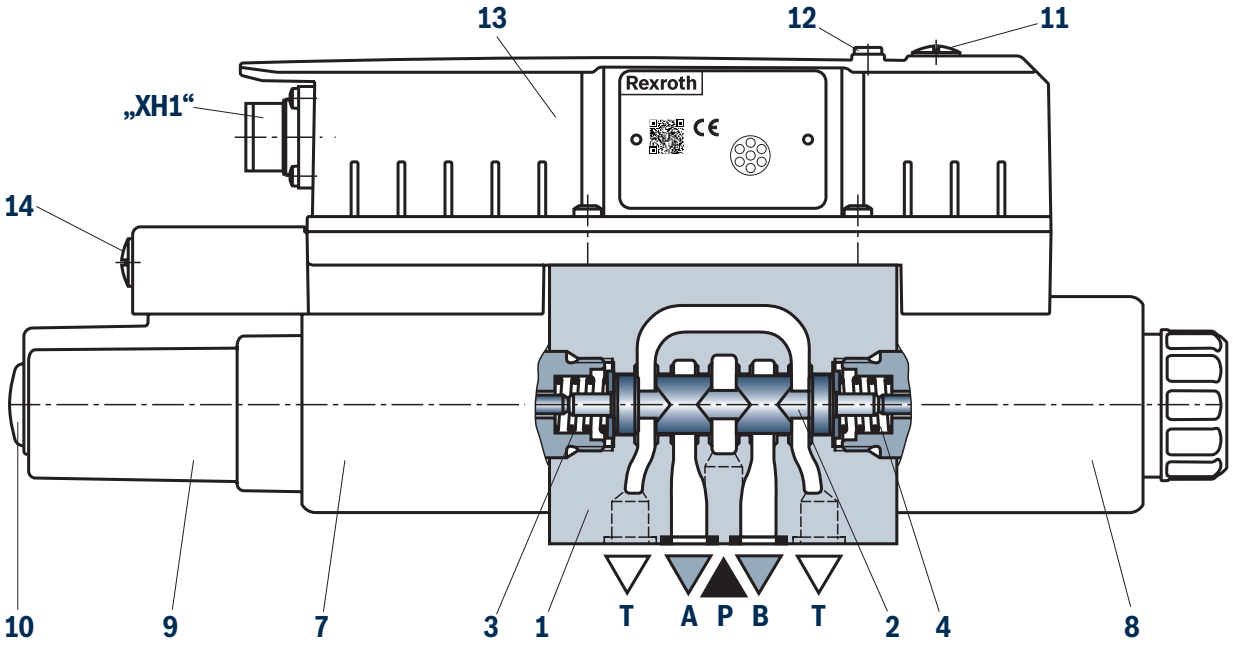
- Falling below the minimum supply voltage
- Only at interface "F1" and "F7":
  - Falling below the minimum current command value of 1.5 mA (includes cable break of the command value line (current loop))

Pressure compensation element

Prevents condensate formation in the housing of the integrated electronics (OBE) for use outside industry-standard conditions with high ambient air humidity and significant cyclic temperature changes (e.g. outdoors).

Notice:

- Due to the design principle, internal leakage is inherent to the valves, which may increase over the life cycle.
- The tank line must not be allowed to run empty. With corresponding installation conditions, a preload valve (preload pressure approx. 2 bar) must be installed.
- The PG fitting (10, 11, 14) must not be opened.
- Interface "F1": "cable break monitoring" (<1.5 mA) with shut-off of the output stage is integrated in the command value input of the controller. The output stage is reactivated by switching the controller off and on. The command value input is limited at input current >21 mA, without shutting off the output stage.



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

General			
Type of connection			Subplate mounting
Porting pattern			ISO 4401-05-04-0-05
Weight	▶ Valve with one solenoid	kg	5.8
	▶ Valve with two solenoids	kg	7.4
Installation position			Any, preferably horizontal
Ambient temperature range		°C	–20 ... +60
Storage temperature range (with UV protection)		°C	+5 ... +40
Transport temperature range		°C	-30 ... +80
Maximum storage time		Years	1 (if the storage conditions are observed, refer to the operating instructions 07600-B)
Maximum relative humidity (no condensation)		%	95
Protection class according to EN 60529			IP65 (if suitable and correctly mounted mating connectors are used)
Maximum surface temperature		°C	150 (individual operation)
$MTTF_D$ values according to EN ISO 13849		Years	150 (for further details see data sheet 08012)
Sine test according to DIN EN 60068-2-6			10 ... 2000 Hz / maximum 10 g / 10 cycles / 3 axes
Noise test according to DIN EN 60068-2-64			20 ... 2000 Hz / 10 g_{RMS} / 30 g peak / 24 h / 3 axes
Transport shock according to DIN EN 60068-2-27			15 g / 11 ms / 3 shocks / 3 axes
Environmental compatibility	▶ Climate		Environmental audit according to EN 60068-2
Conformity	▶ CE according to EMC Directive 2014/30/EU, tested according to		EN 61000-6-2 and EN 61000-6-3
	▶ RoHS Directive		2011/65/EU [1]

Hydraulic			
Maximum operating pressure	▶ Ports A, B, P	bar	350
	▶ Port T	bar	210
Hydraulic fluid			See table, page 6
Hydraulic fluid temperature range		°C	–20 ... +70
Viscosity range		mm^2/s	20 ... 380
Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c)			Class 20/18/15 [2]
Rated flow (Δp = 5 bar per control edge) [3]		l/min	25; 50; 75
Maximum flow (recommended)		l/min	180

1) The product fulfills the substance requirements of the RoHS Directive 2011/65/EU.

2) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

3) Flow for deviating Δp (per control edge):

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

Notice:
The specified technical data were measured with HLP46 and ϑ_{oil} = 40±5 °C.

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

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524
Bio-degradable	▶ Insoluble in water	HETG	FKM	ISO 15380
		HEES	FKM	
	▶ Soluble in water	HEPG	FKM	ISO 15380
Flame-resistant	▶ Water-free	HFDU (glycol base)	FKM	ISO 12922
		HFDU (ester base)	FKM	
		HFDR	FKM	
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR	ISO 12922

☞ **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.
- ▶ **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 an increased cavitation tendency with the use of HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to use with HLP mineral oil. 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		%	<0.1
Range of inversion		%	<0.05
Response sensitivity		%	<0.05
Temperature drift when changing	▶ Hydraulic fluid temperature	%/10 K	≤0.15
	▶ Operating pressure	%/100 bar	≤0.1

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

Electrical, integrated electronics (OBE) – interface "A1"				
Supply voltage	▶ Nominal value		VDC	24
	▶ Minimum		VDC	19
	▶ Maximum		VDC	36
	▶ Maximum residual ripple		Vpp	2.5
	▶ Maximum power consumption		VA	60
	▶ Current consumption during operation [4]	Rated current	A_{eff}	<2
		Impulse current	A	<2.5
	▶ Fuse protection, external		A_T	3.15 (time-lag)
Charging capacity (externally effective)			µF	<1000
Relative duty cycle time according to VDE 0580				S1 (continuous operation)
Functional ground and screening				See pin assignment, page 10
Maximum voltage of the differential inputs against 0 V				D→B; E→B (max. 18 V)
Command value (differential amplifier)	▶ Measurement range		V	±10
	▶ Input resistance		kΩ	>100
Actual value (test signal)	▶ Output range		V	±10
	▶ Minimum load impedance		kΩ	>1

Electrical, integrated electronics (OBE) – interface "F1"				
Supply voltage	▶ Nominal value		VDC	24
	▶ Minimum		VDC	19
	▶ Maximum		VDC	36
	▶ Maximum residual ripple		Vpp	2.5
	▶ Maximum power consumption		VA	60
	▶ Current consumption during operation [4]	Rated current	A_{eff}	<2
		Impulse current	A	<2.5
	▶ Fuse protection, external		A_T	3.15 (time-lag)
Charging capacity (externally effective)			µF	<1000
Relative duty cycle time according to VDE 0580				S1 (continuous operation)
Functional ground and screening				See pin assignment, page 10
Maximum voltage of the differential inputs against 0 V				D→B; E→B (max. 18 V)
Command value	▶ Input current range		mA	4 ... 20
	▶ Input resistance		Ω	200
Actual value (test signal)	▶ Output range		mA	4 ... 20
	▶ Maximum load		Ω	500

[4] The making current peak is usually higher (depending on power supply unit, supply line, and capacities).

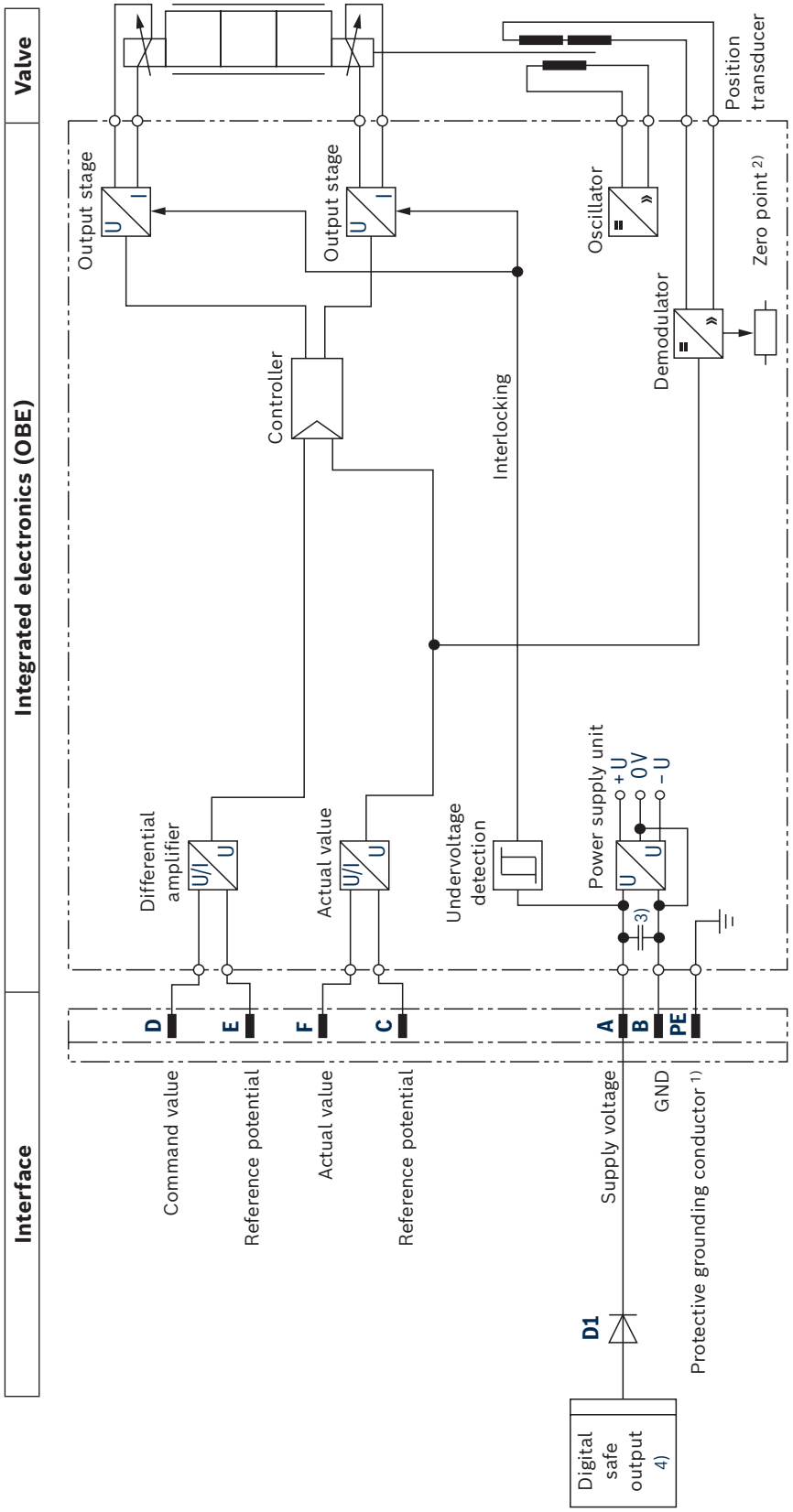
Technical data
(For applications outside these values, please consult us!)

Electrical, integrated electronics (OBE) – interface "A7"				
Supply voltage	▶ Nominal value		VDC	24
	▶ Minimum		VDC	19
	▶ Maximum		VDC	36
	▶ Maximum residual ripple		Vpp	2.5
	▶ Maximum power consumption		VA	60
	▶ Current consumption during operation [4]	Rated current	A_{eff}	<2
		Impulse current	A	<2.5
	▶ Fuse protection, external		A_T	3.15 (time-lag)
Charging capacity (externally effective)			µF	<1000
Relative duty cycle time according to VDE 0580				S1 (continuous operation)
Functional ground and screening				See pin assignment, page 10
Maximum voltage of the differential inputs against 0 V				D→B; E→B (max. 18 V)
Command value (differential amplifier)	▶ Measurement range		V	±10
	▶ Input resistance		Ω	>100
Actual value (test signal)	▶ Output range		mA	4 ... 20
	▶ Maximum load		Ω	500

Electrical, integrated electronics (OBE) – interface "F7"				
Supply voltage	▶ Nominal value		VDC	24
	▶ Minimum		VDC	19
	▶ Maximum		VDC	36
	▶ Maximum residual ripple		Vpp	2.5
	▶ Maximum power consumption		VA	60
	▶ Current consumption during operation [4]	Rated current	A_{eff}	<2
		Impulse current	A	<2.5
	▶ Fuse protection, external		A_T	3.15 (time-lag)
Charging capacity (externally effective)			µF	<1000
Relative duty cycle time according to VDE 0580				S1 (continuous operation)
Functional ground and screening				See pin assignment, page 10
Maximum voltage of the differential inputs against 0 V				D→B; E→B (max. 18 V)
Command value	▶ Input current range		mA	4 ... 20
	▶ Input resistance		Ω	200
Actual value (test signal)	▶ Output range		V	±10
	▶ Minimum load impedance		kΩ	>1

[4] The making current peak is usually higher (depending on power supply unit, supply line, and capacities).

Block diagram/pin assignment



1) The protective grounding conductor (PE) is connected to the valve housing.
2) Zero point can be adjusted from the outside
3) Charging the capacitor when the supply voltage is connected results in a current peak (depending on the power supply).
4) If the supply voltage of the proportional valve is realized via the digital safe output of the PLC (safety shut-down).

Notice:

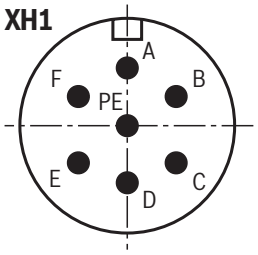
- ▲ Electrical signals provided via control electronics (e. g. actual value) must not be used to switch off safety-relevant machine functions.
- ▲ Only one output stage for symbols EA and WA.
- ▲ ▲ Supply of the valve electronics via a safe output (safety module):
  - After shut-off of the supply voltage, a voltage remains present in the valve electronics for a certain time (in the range of seconds) without the diode **D1**. This can impair the monitoring function of the switching output.
  - The monitoring function of the switching output can be ensured by installing the external diode **D1** (min. 75 V; 3 A).
  - The charge stored in the valve electronics is in no way sufficient to move the control spool into the open position after the supply voltage is shut off.

Electrical connections and assignment

Connector pin assignment XH1, 6-pole + PE according to DIN 43563

Pin	Interface assignment			
	"A1"	"F1"	"A7"	"F7"
A	Supply voltage	Supply voltage	Supply voltage	Supply voltage
B	GND	GND	GND	GND
C	Reference potential actual value	Reference potential actual value	Reference potential actual value	Reference potential actual value
D	Command value	Command value	Command value	Command value
E	Reference potential command value	Reference potential command value	Reference potential command value	Reference potential command value
F	Actual value	Actual value	Actual value	Actual value
FE	Functional ground (directly connected to the valve housing)			

XH1



3 spool positions

		Command value	Actual value	Spool position "a"; "b"
Positive	"A1"	0 ... +10 V	0 ... +10 V	P→A; B→T
	"F1"	12 ... 20 mA	12 ... 20 mA	
	"A7"	0 ... +10 V	12 ... 20 mA	
	"F7"	12 ... 20 mA	0 ... +10 V	
Negative	"A1"	0 ... −10 V	0 ... −10 V	P→B; A→T
	"F1"	12 ... 4 mA	12 ... 4 mA	
	"A7"	0 ... −10 V	12 ... 4 mA	
	"F7"	12 ... 4 mA	0 ... −10 V	

2 spool positions

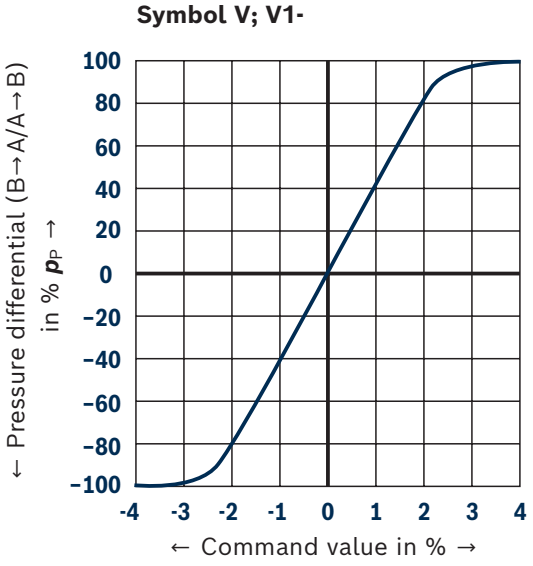
		Command value	Actual value	Spool position "a"	"b"
Positive	"A1"	0 ... +10 V	0 ... +10 V	P→B; A→T	P→A; B→T
	"F1"	4 ... 20 mA	4 ... 20 mA		

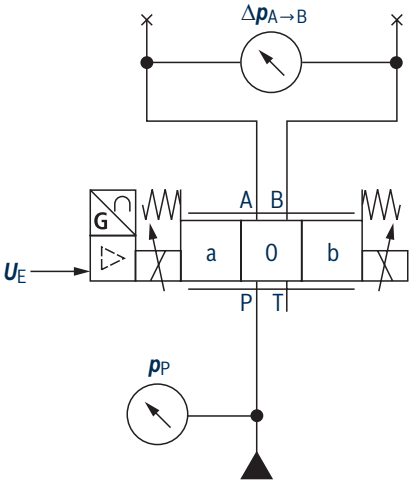
☞ **Notice:**
Mating connectors, separate order, see page 33 and data sheet 08006.

Connection cable:
- 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:
  - Apply screening to both line ends
  - Use metal mating connector (see page 33)
- Alternatively up to 30 m cable length admissible
  - Apply screening on supply side
  - Plastic mating connector (see page 33) can be used

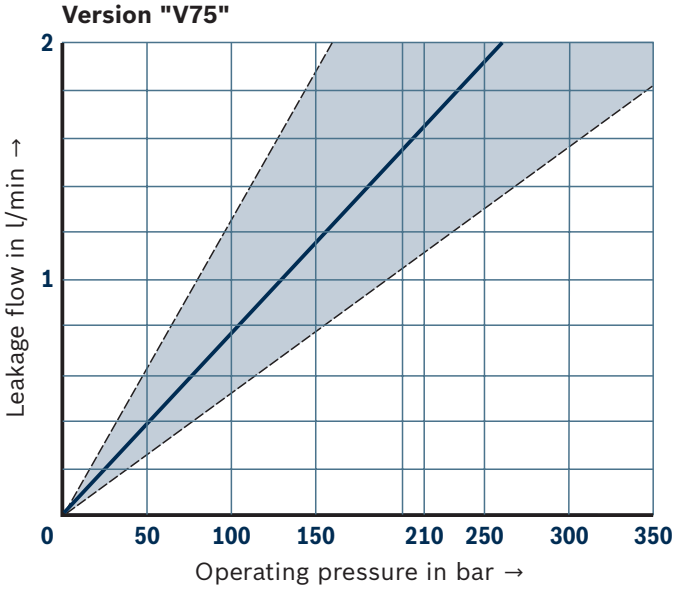
Characteristic curves
(measured with HLP46, ϑ_{oil} = 40±5 °C)

Pressure signal function (p_s = 100 bar)





Leakage flow (with central control spool position)



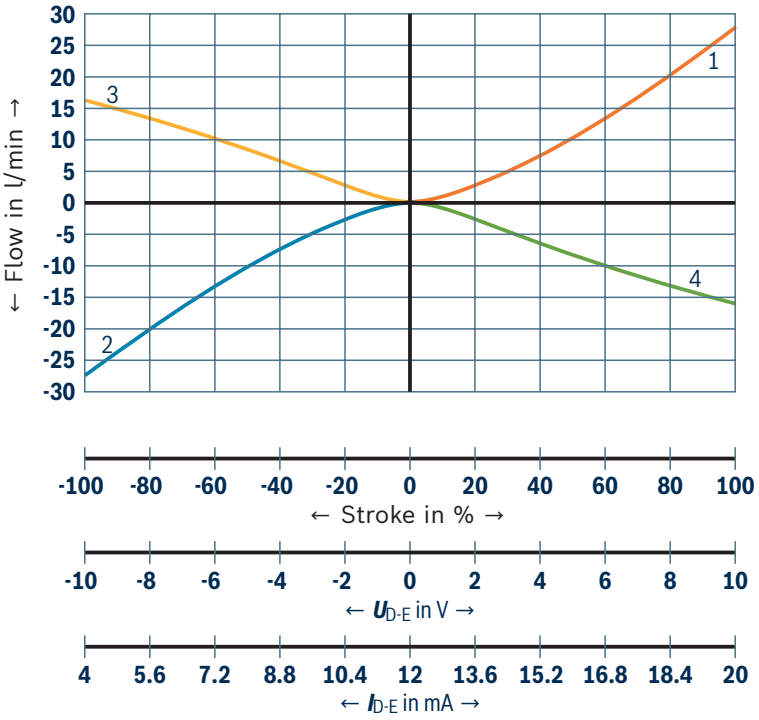
Tolerance-related variation

Notice:
Typical characteristic curves which are subject to tolerance variations.

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

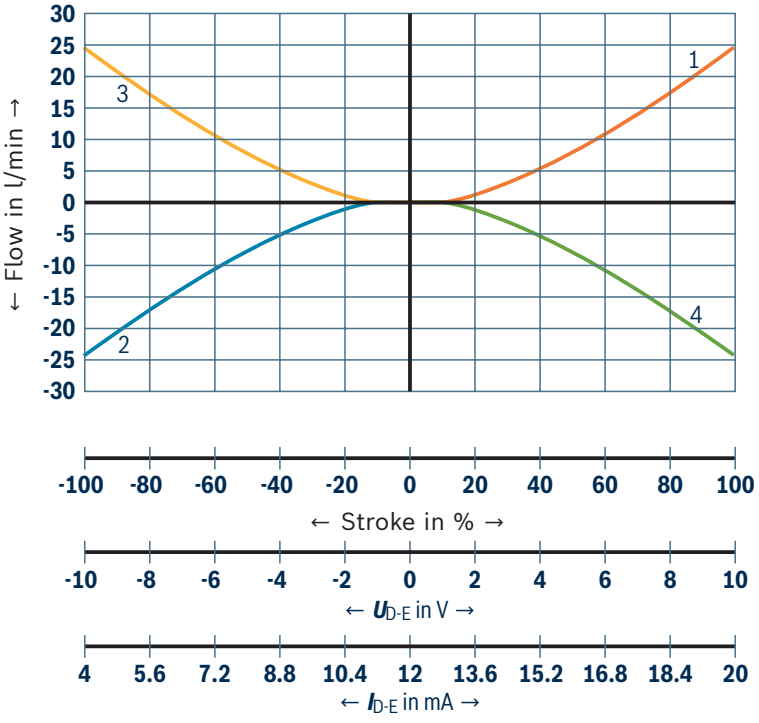
Volume flow signal function (rated flow **25** l/min with Δp = 5 bar/control edge)

Symbol V



1 P→A
2 A→T
3 P→B
4 B→T

Symbol E



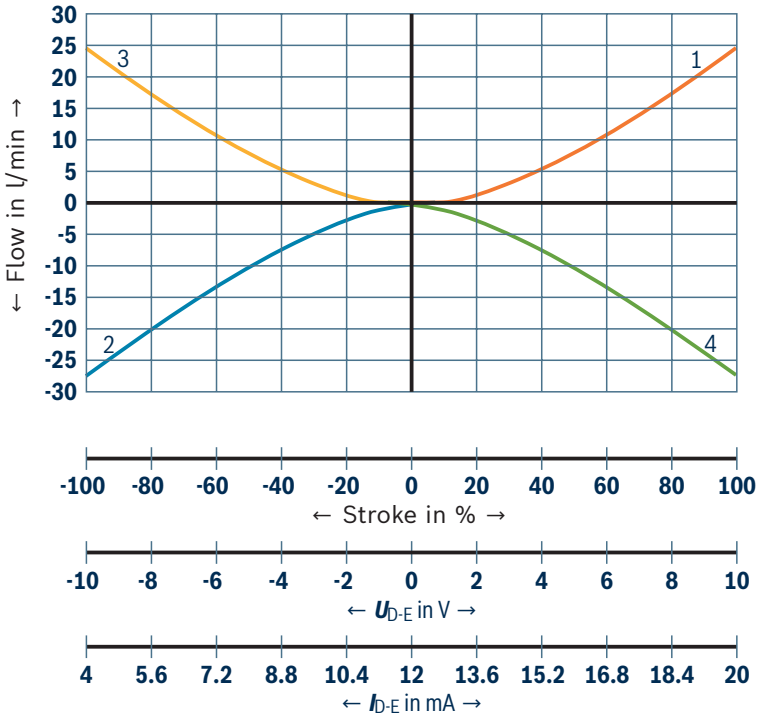
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

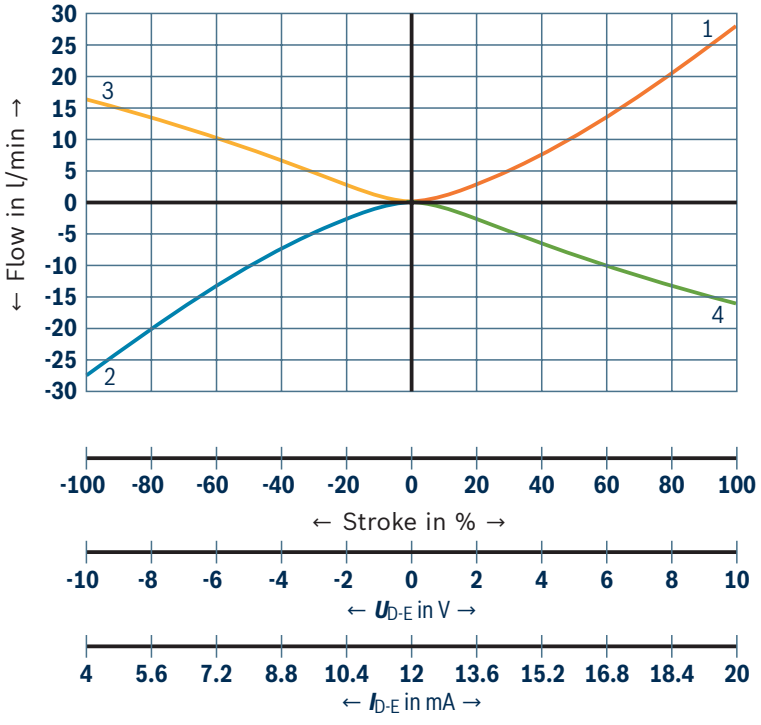
Volume flow signal function (rated flow **25** l/min with Δp = 5 bar/control edge)

Symbol W



1 P→A
2 A→T
3 P→B
4 B→T

Symbol V1-



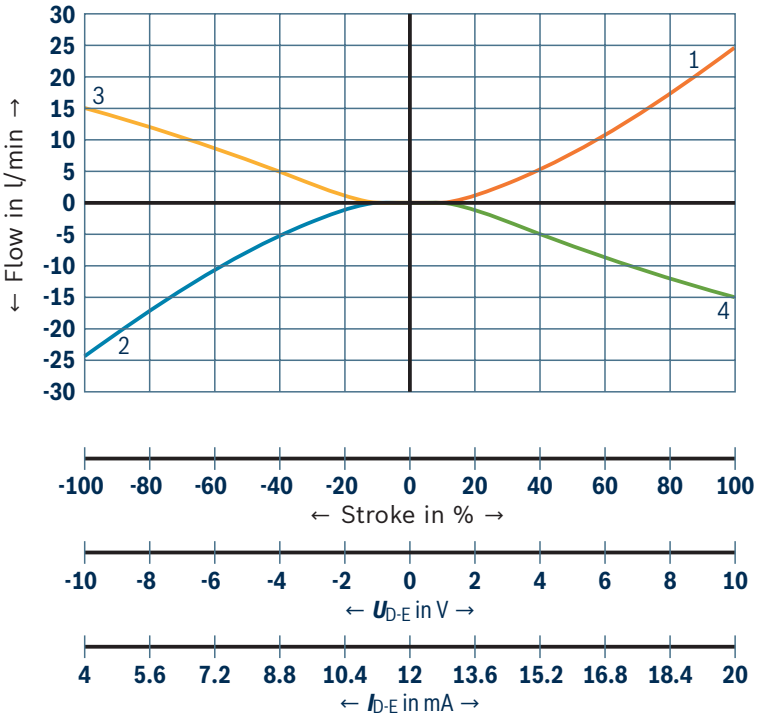
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

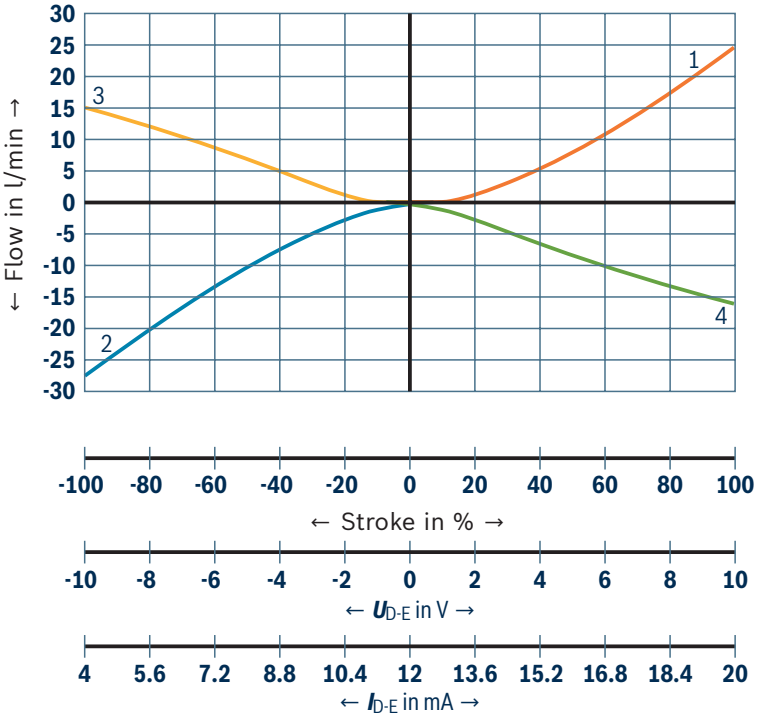
Volume flow signal function (rated flow **25** l/min with Δp = 5 bar/control edge)

Symbol E1-



1 P→A
2 A→T
3 P→B
4 B→T

Symbol W1-



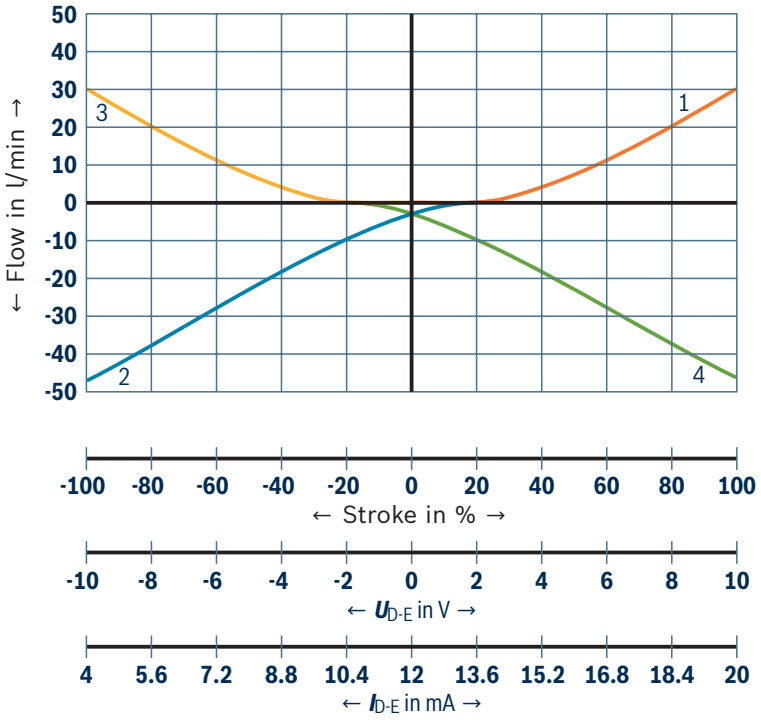
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

Volume flow signal function (rated flow **25** l/min with Δp = 5 bar/control edge)

Symbol Q5-



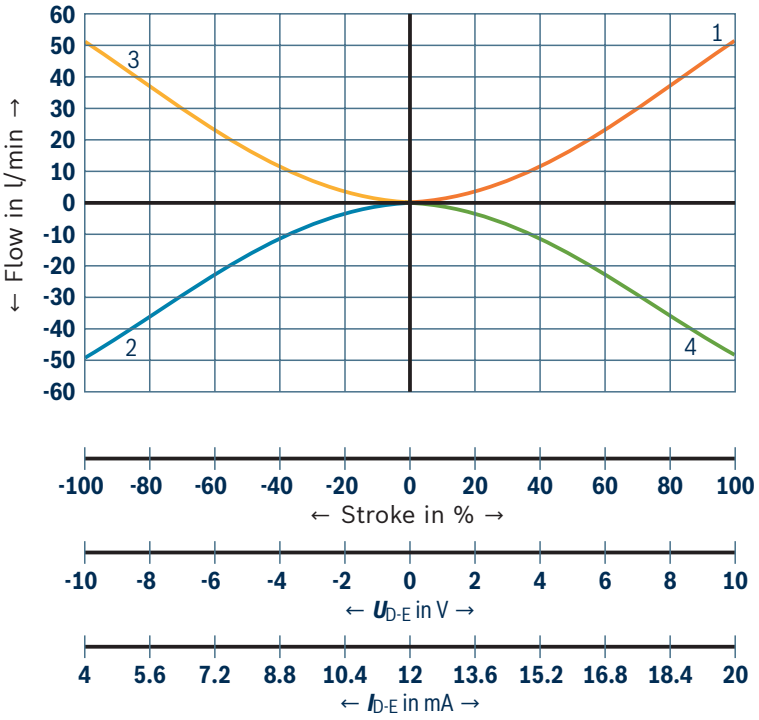
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

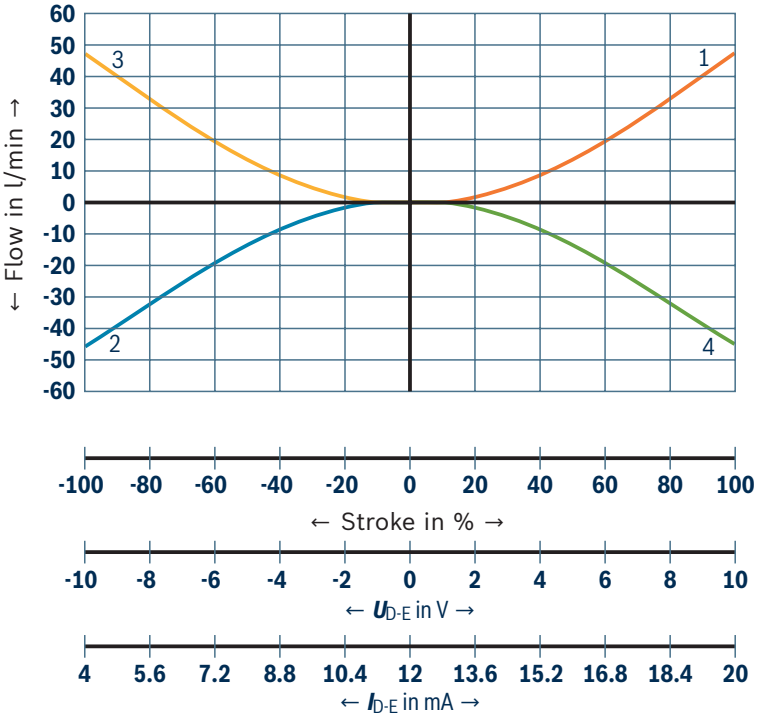
Volume flow signal function (rated flow **50** l/min with Δp = 5 bar/control edge)

Symbol V



1 P→A
2 A→T
3 P→B
4 B→T

Symbol E



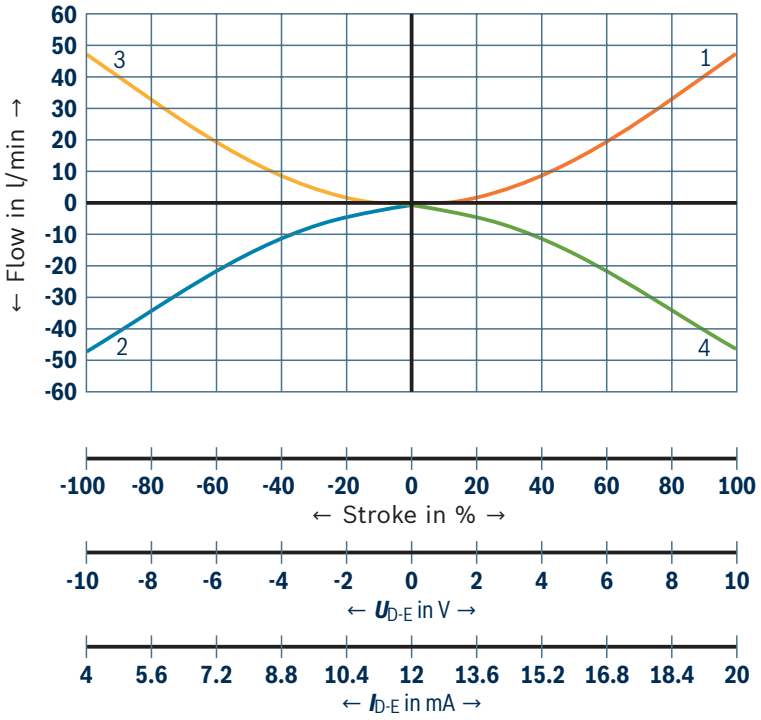
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

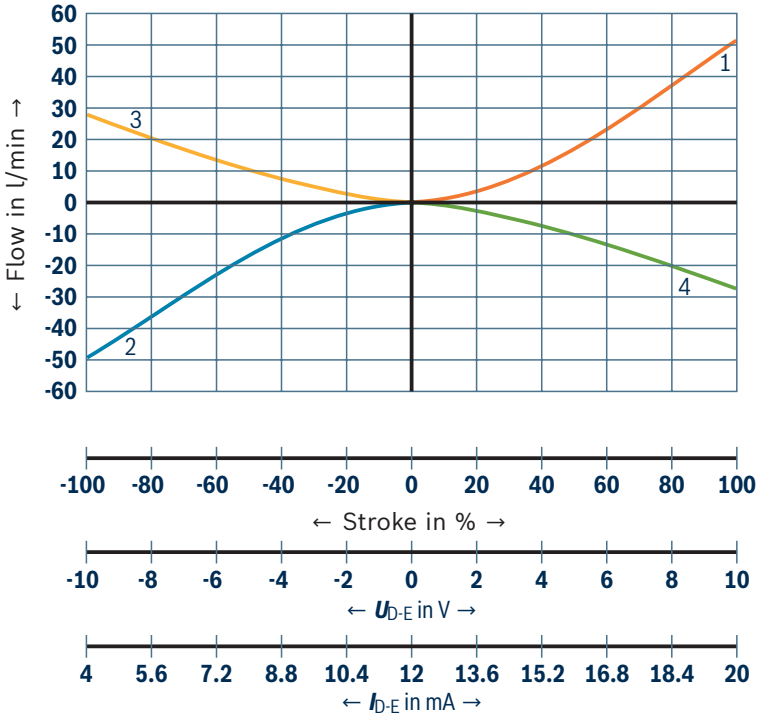
Volume flow signal function (rated flow **50** l/min with Δp = 5 bar/control edge)

Symbol W



1 P→A
2 A→T
3 P→B
4 B→T

Symbol V1-



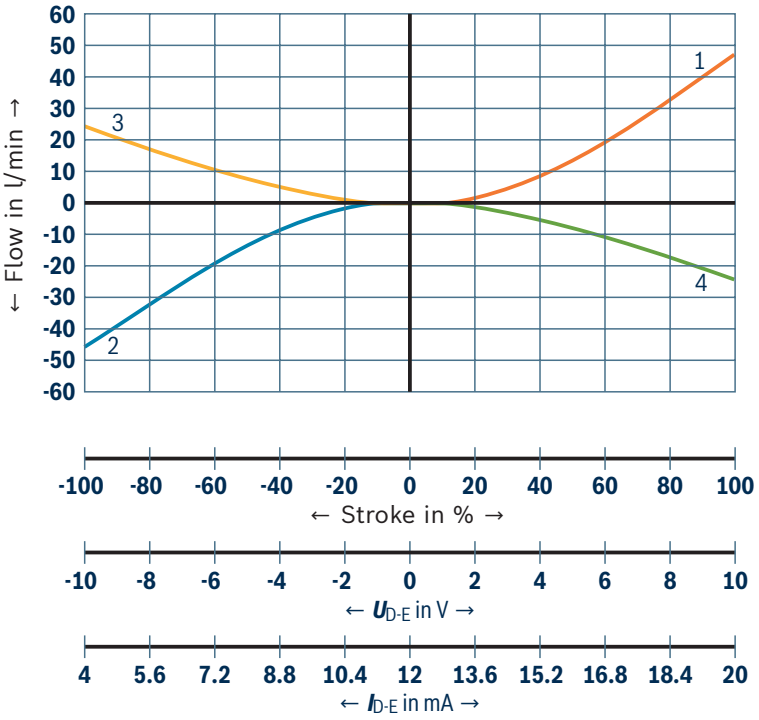
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

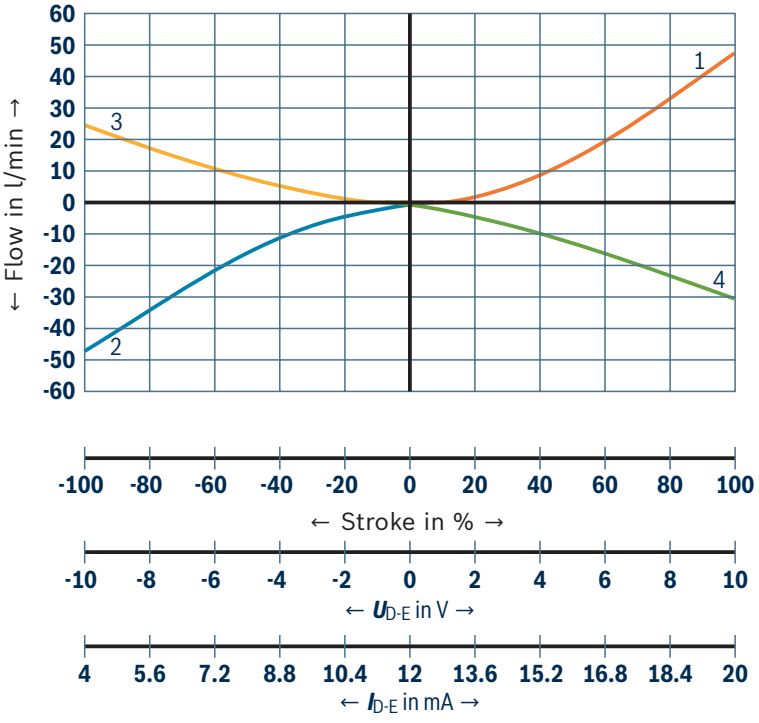
Volume flow signal function (rated flow **50** l/min with Δp = 5 bar/control edge)

Symbol E1-



1 P→A
2 A→T
3 P→B
4 B→T

Symbol W1-



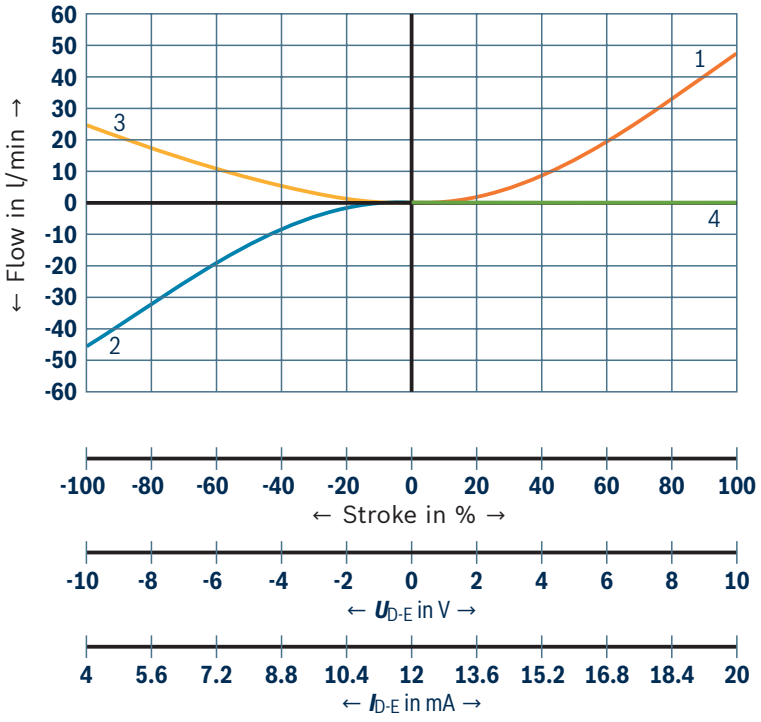
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

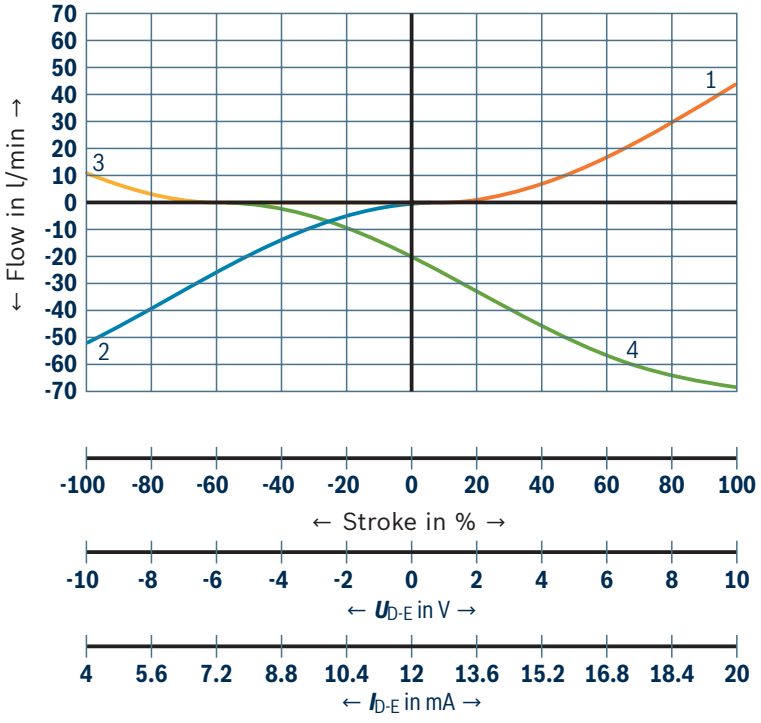
Volume flow signal function (rated flow **50** l/min with Δp = 5 bar/control edge)

Symbol E3-



1 P→A
2 A→T
3 P→B
4 B→T

Symbol Q2-



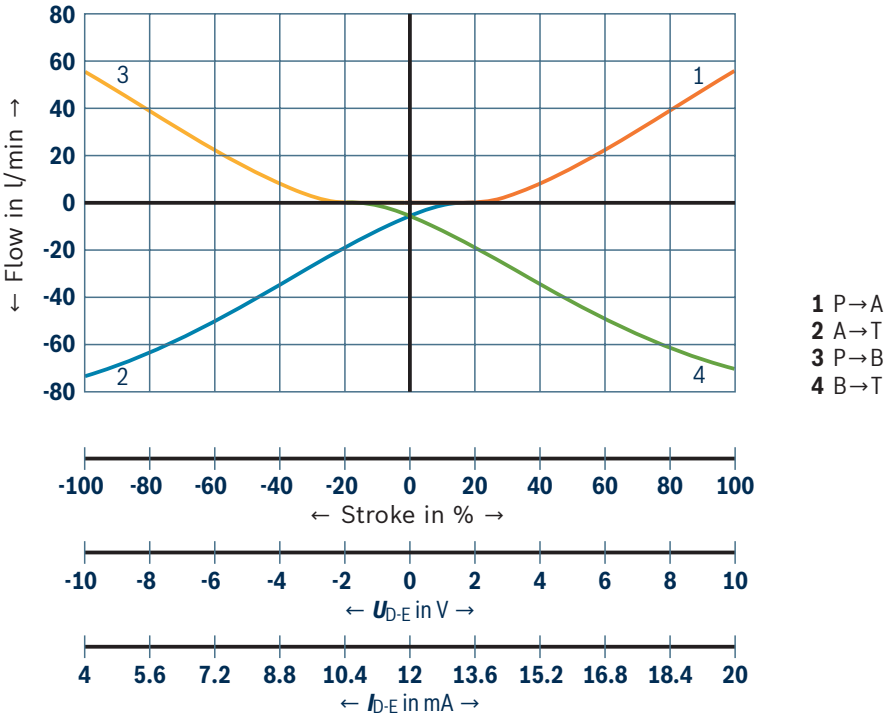
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

Volume flow signal function (rated flow **50** l/min with Δp = 5 bar/control edge)

Symbol Q5-



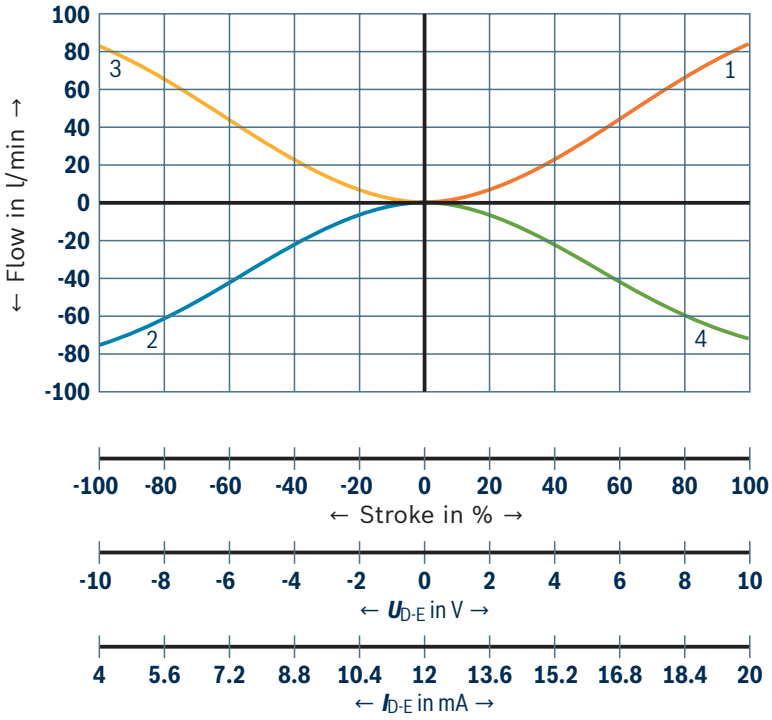
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

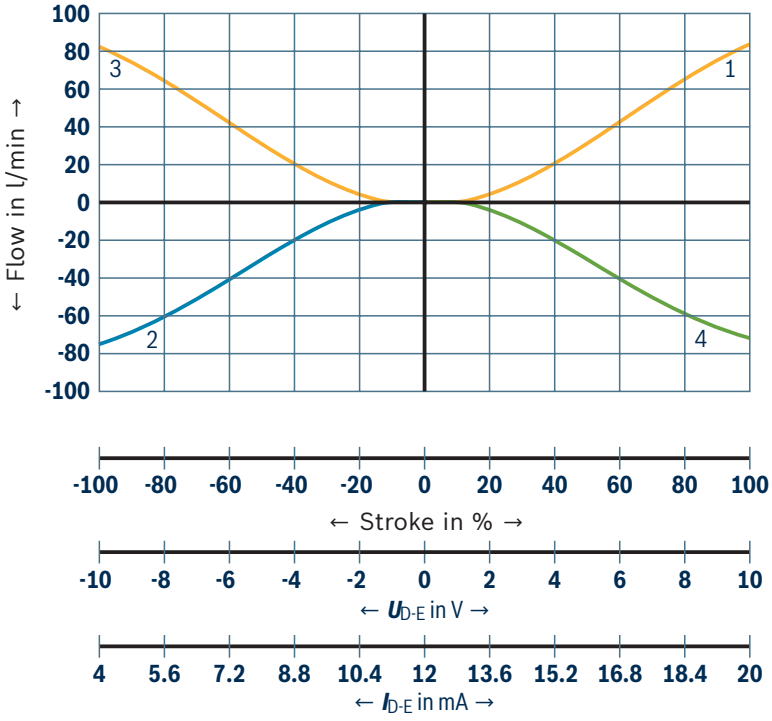
Volume flow signal function (rated flow **75** l/min with Δp = 5 bar/control edge)

Symbol V



1 P→A
2 A→T
3 P→B
4 B→T

Symbol E



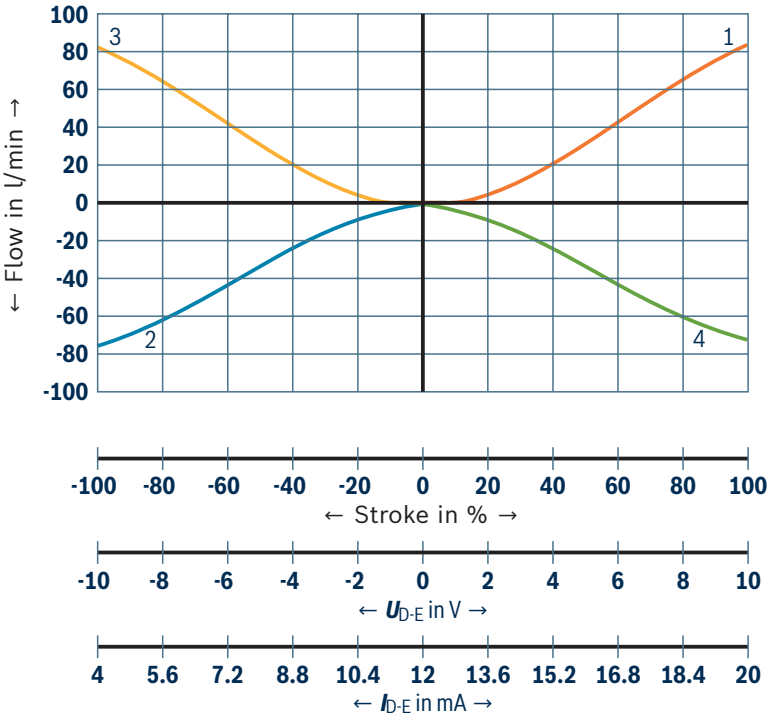
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

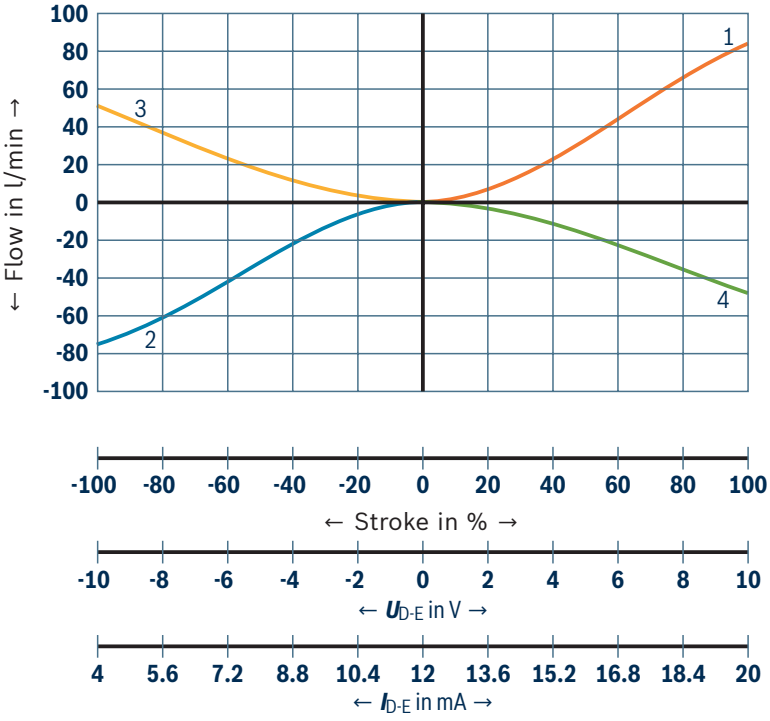
Volume flow signal function (rated flow **75** l/min with Δp = 5 bar/control edge)

Symbol W



1 P→A
2 A→T
3 P→B
4 B→T

Symbol V1-



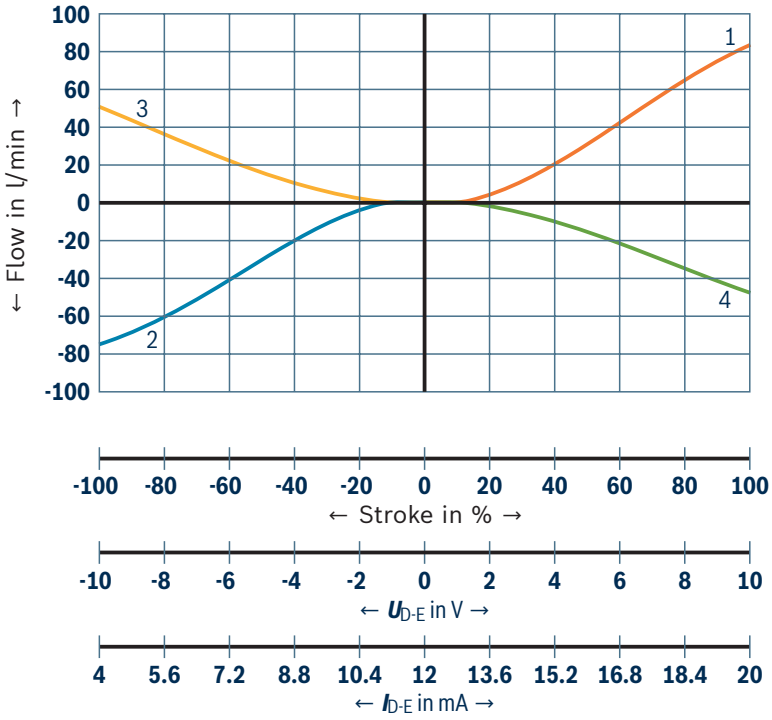
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

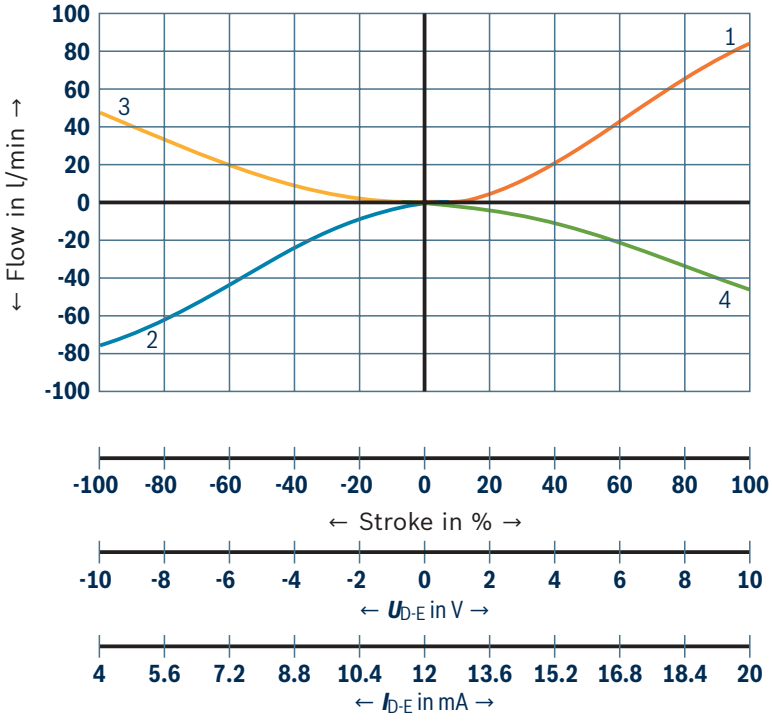
Volume flow signal function (rated flow **75** l/min with Δp = 5 bar/control edge)

Symbol E1-



1 P→A
2 A→T
3 P→B
4 B→T

Symbol W1-



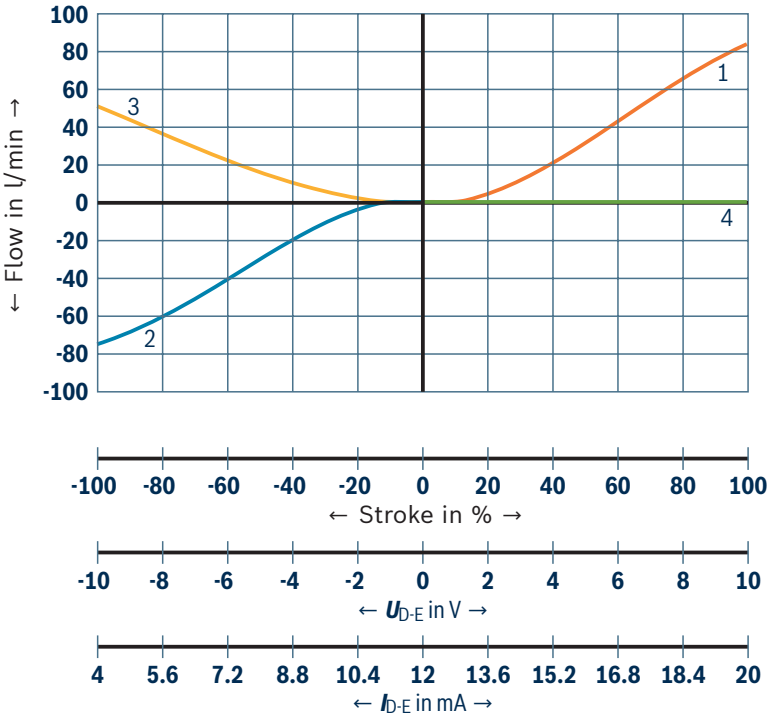
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

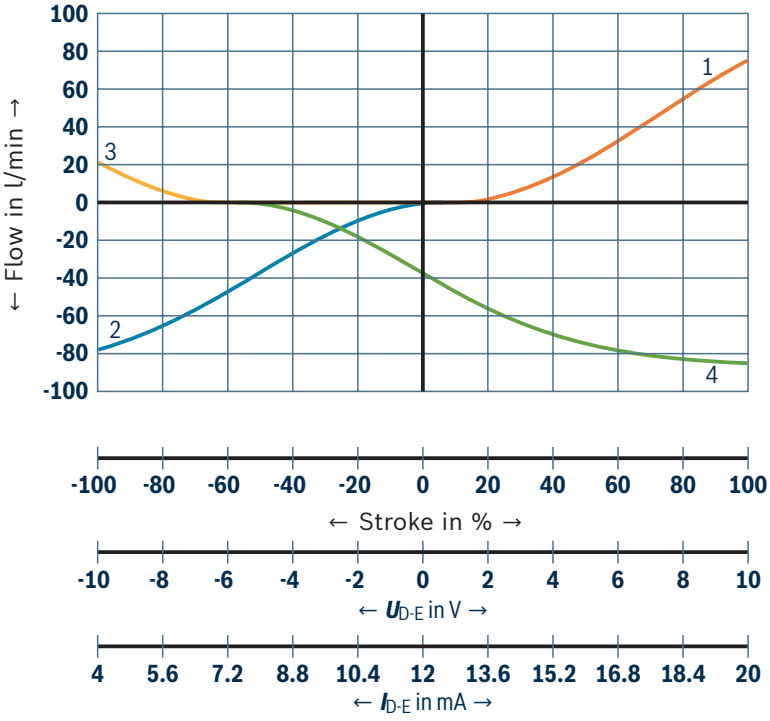
Volume flow signal function (rated flow **75** l/min with Δp = 5 bar/control edge)

Symbol E3-



1 P→A
2 A→T
3 P→B
4 B→T

Symbol Q2-



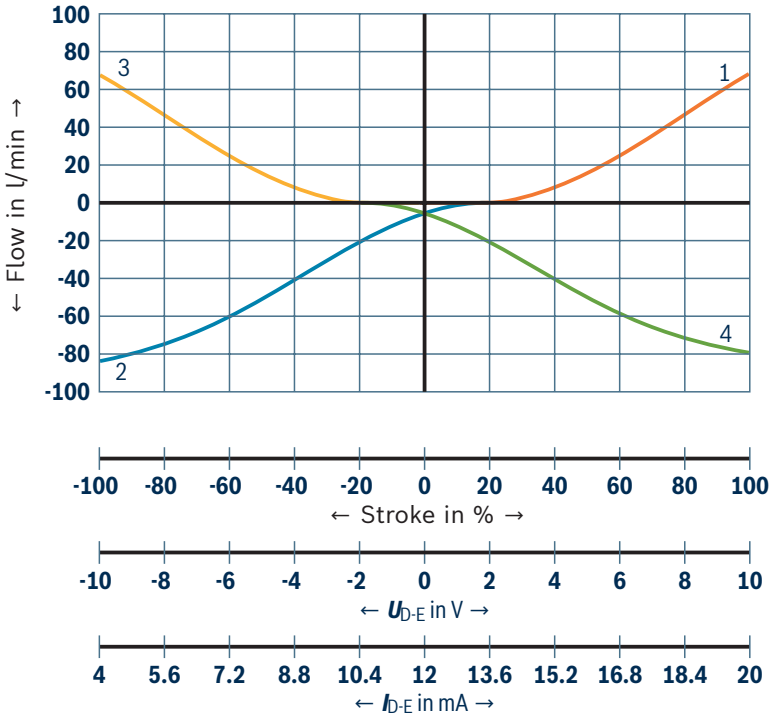
1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

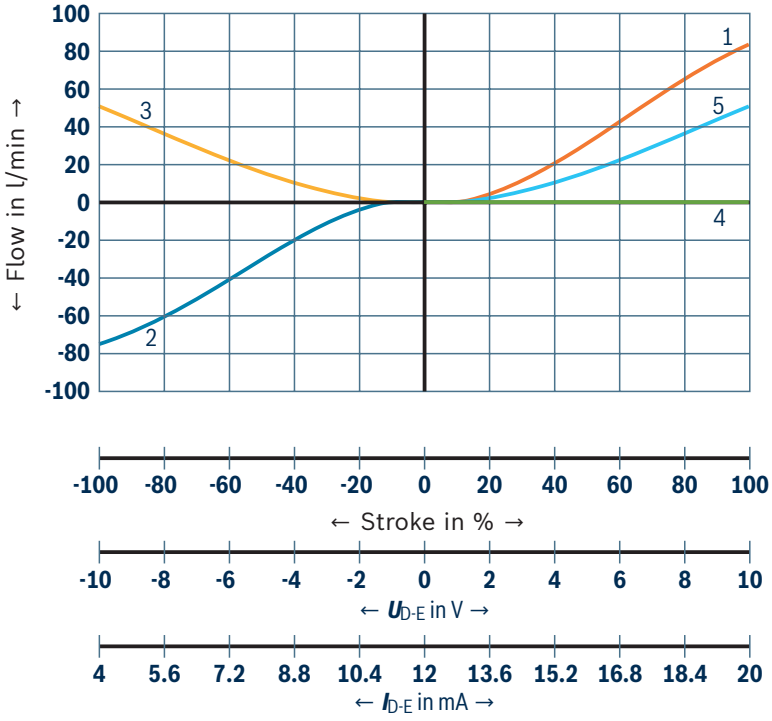
Volume flow signal function (rated flow **75** l/min with Δp = 5 bar/control edge)

Symbol Q5-



1 P→A
2 A→T
3 P→B
4 B→T

Symbol R



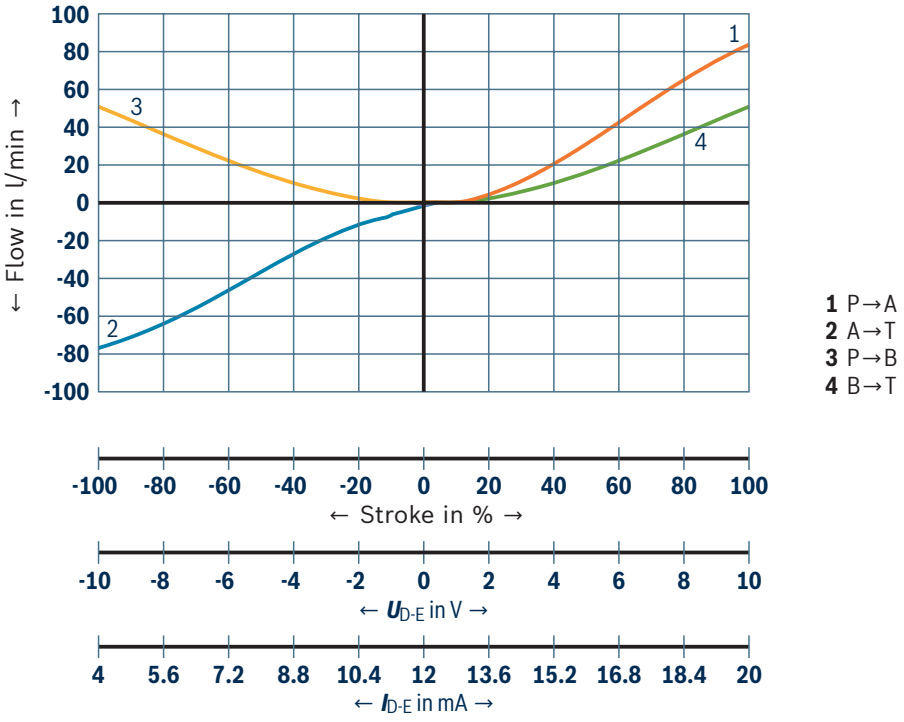
1 P→A
2 A→T
3 P→B
4 B→T
5 B→P

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

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

Volume flow signal function (rated flow **75** l/min with Δp = 5 bar/control edge)

Symbol R3-

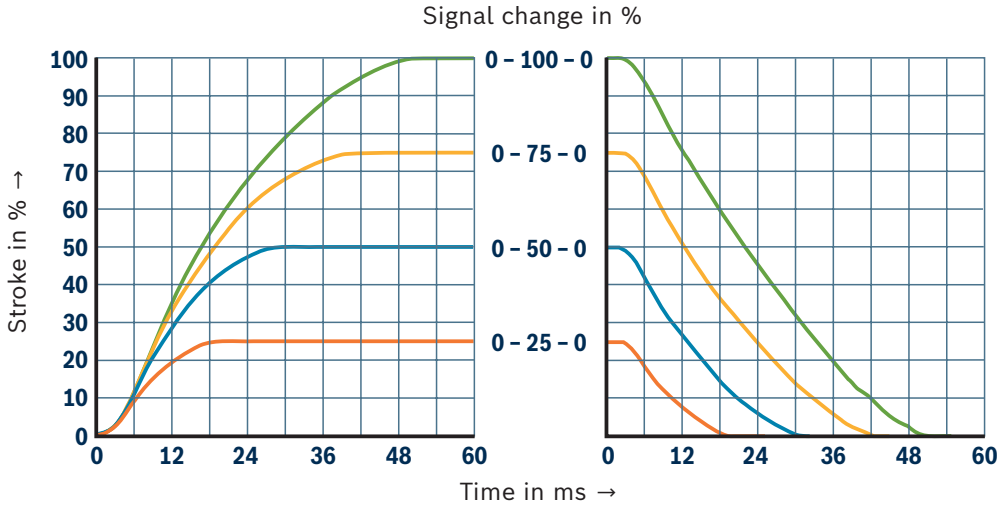


1 P→A
2 A→T
3 P→B
4 B→T

Notice:
- Typical characteristic curves which are subject to tolerance variations.
- Volume flow with different Δp, see page 5.

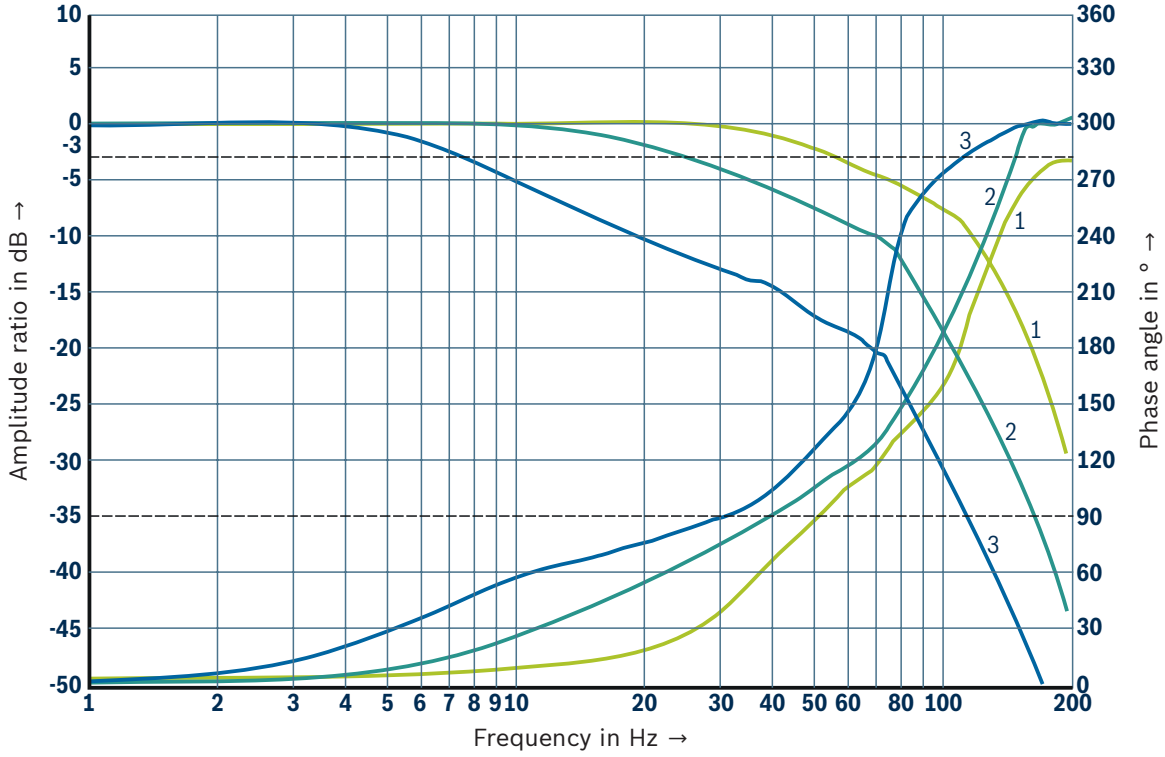
Characteristic curves
(measured with HLP46, ϑ_{oil} = 40±5 °C)

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



Frequency response

Symbol V



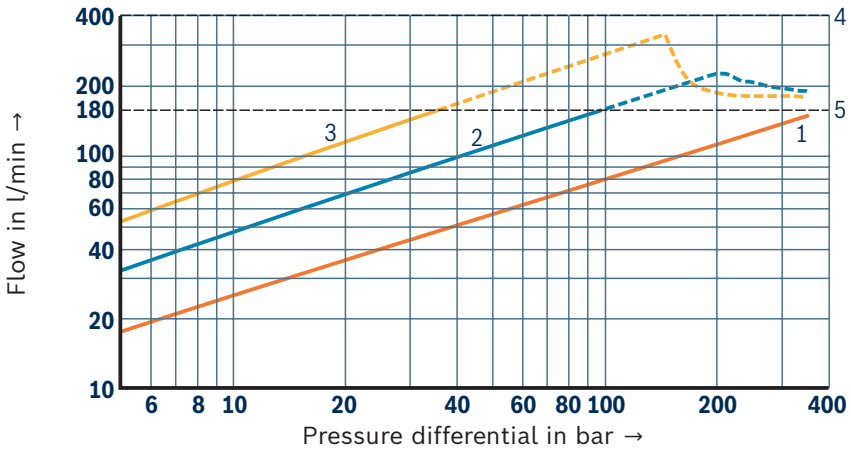
1 Signal ±5 %
2 Signal ±25 %
3 Signal ±100 %

Notice:
Typical characteristic curves which are subject to tolerance variations.

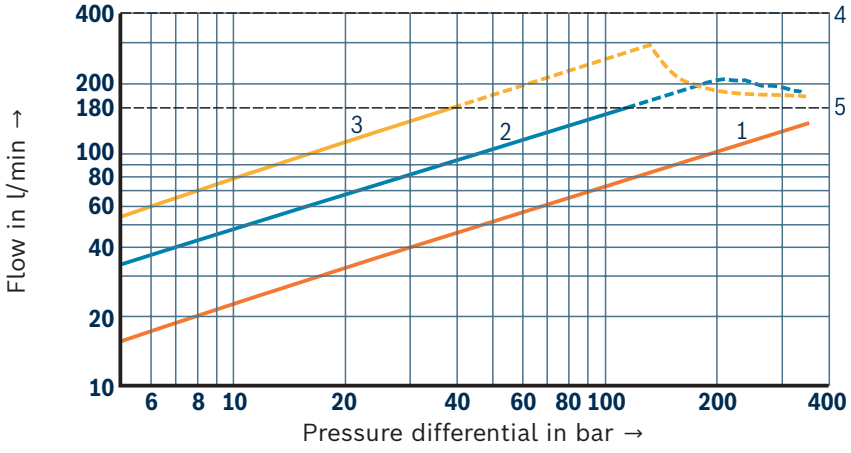
Characteristic curves
(measured with HLP46, ϑ_{oil} = 40±5 °C)

Volume load flow function (at maximum valve opening; P→A; B→T or P→B; A→T)

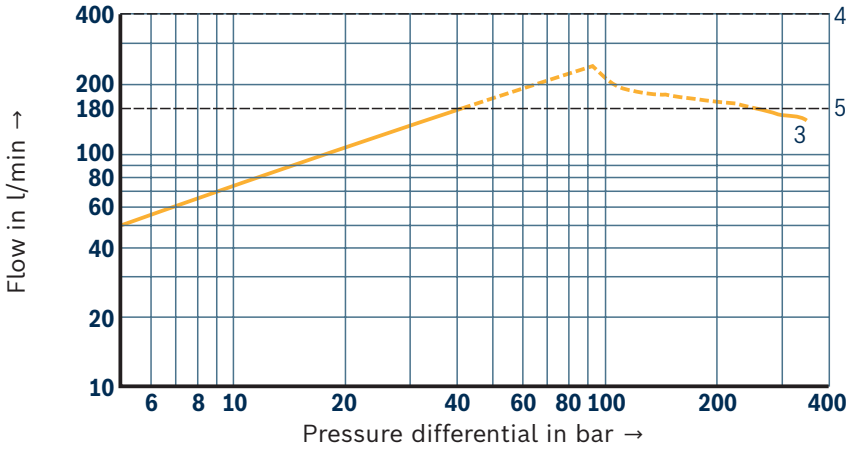
Symbol V



Symbol E



Symbol W



Nominal flow

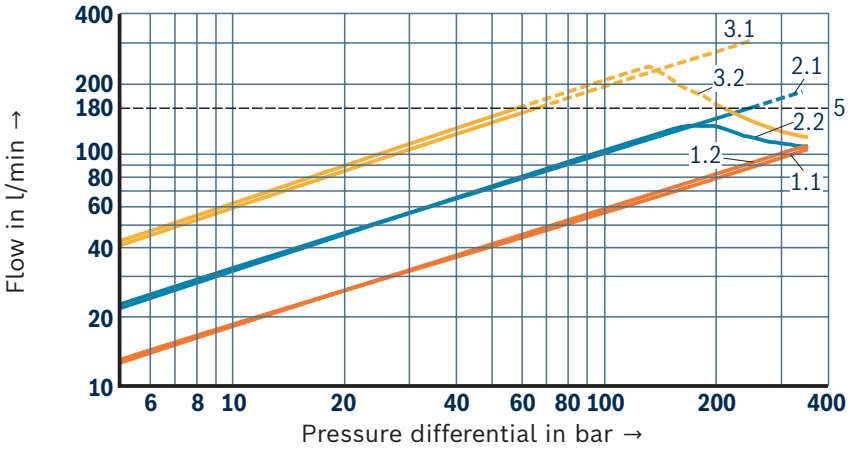
- **1** 25 l/min
- **2** 50 l/min
- **3** 75 l/min
- **4** Maximum admissible flow
- **5** Recommended flow (flow velocity 30 m/s)

Notice:
Typical characteristic curves which are subject to tolerance variations.

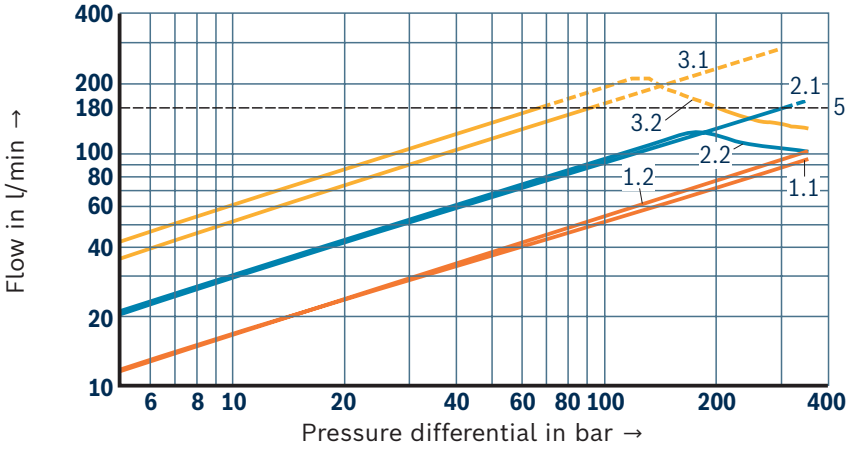
Characteristic curves
(measured with HLP46, ϑ_{oil} = 40±5 °C)

Volume flow load function (at maximum valve opening)

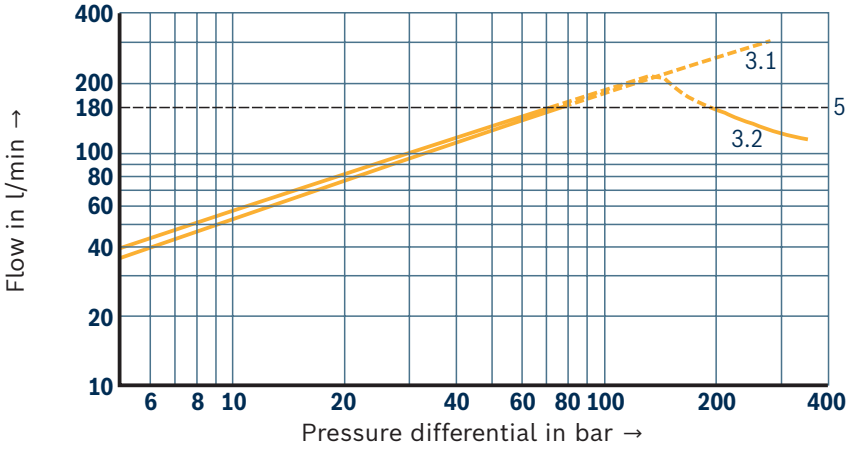
Symbol V1-



Symbol E1-



Symbol W1-



Nominal flow

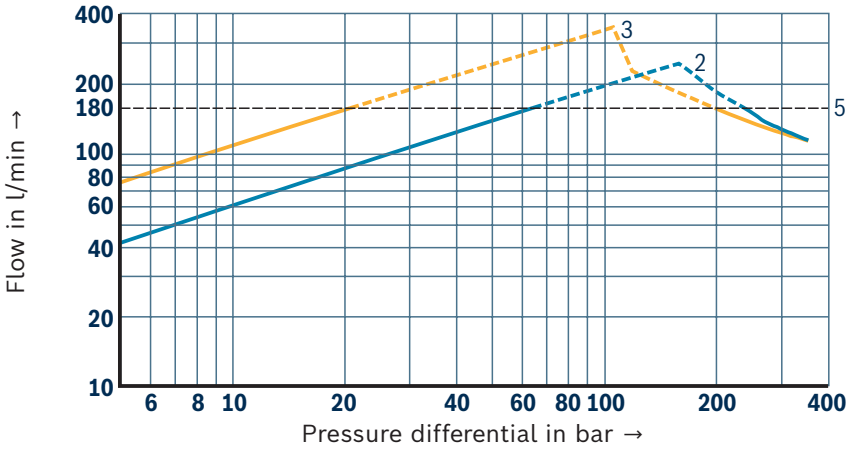
1.1	25 l/min (P→A; B→T)
1.2	25 l/min (P→B; A→T)
2.1	50 l/min (P→A; B→T)
2.2	50 l/min (P→B; A→T)
3.1	75 l/min (P→A; B→T)
3.2	75 l/min (P→B; A→T)
5	Recommended flow (flow velocity 30 m/s)

Notice:
Typical characteristic curves which are subject to tolerance variations.

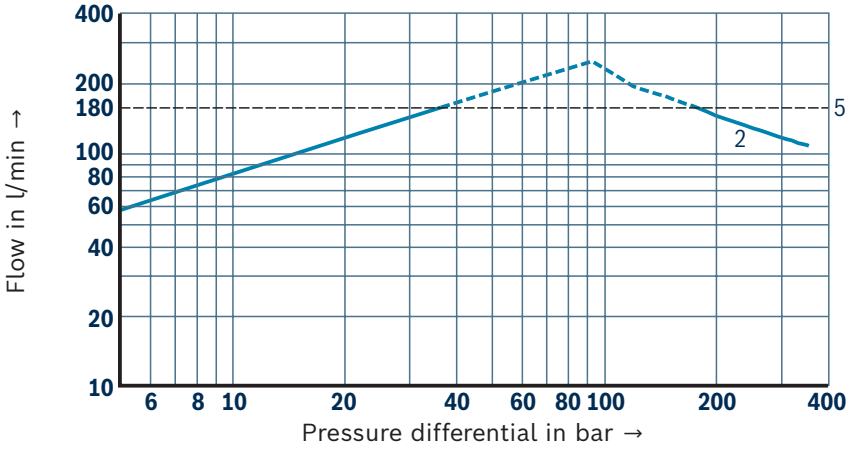
Characteristic curves
(measured with HLP46, ϑ_{oil} = 40±5 °C)

Volume flow load function (at maximum valve opening)

Symbol Q2-



Symbol Q5-



Nominal flow

- **2** 50 l/min
- **3** 75 l/min
- **5** Recommended flow (flow velocity 30 m/s)

Notice:

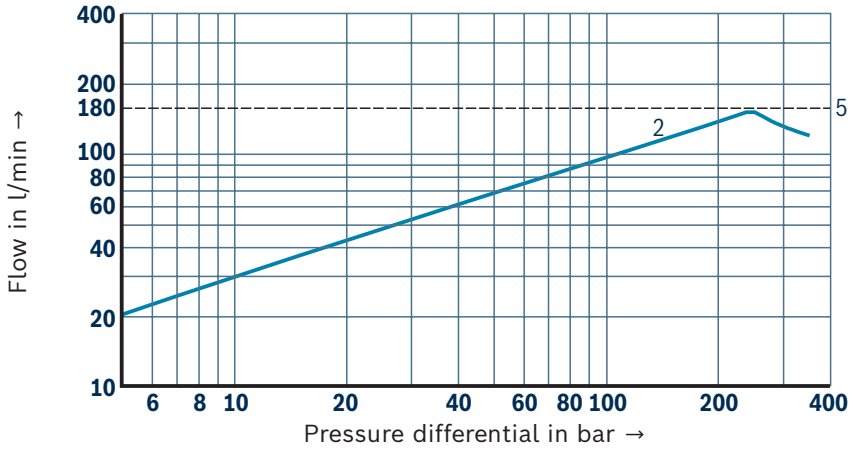
- ▶ Symbol Q2 and Q5
  For flow P→A; B→T or P→B; A→T the following permitted operating limitations of use apply to avoid unforeseen valve behavior:
  - Nominal flow 50 l/min: Maximum pressure differential 110 bar
  - Nominal flow 75 l/min: Maximum pressure differential 70 bar

  If higher system pressures are used, please contact us.
- ▶ Typical characteristic curves which are subject to tolerance variations.

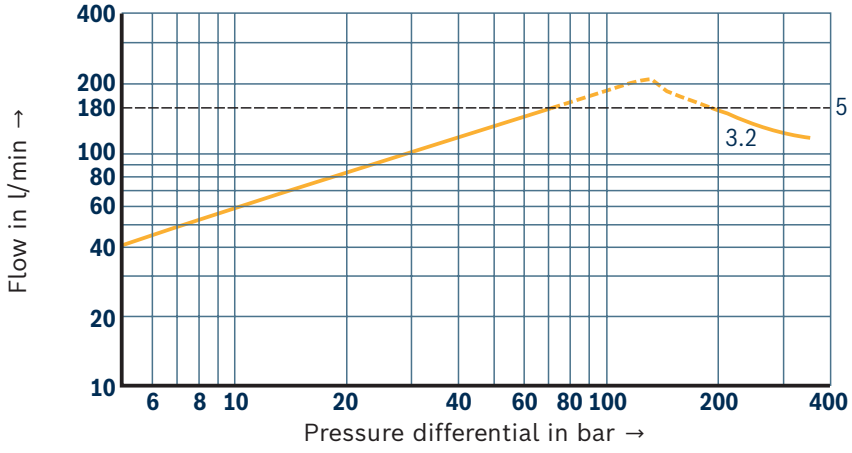
Characteristic curves
(measured with HLP46, ϑ_{oil} = 40±5 °C)

Volume flow load function (at maximum valve opening)

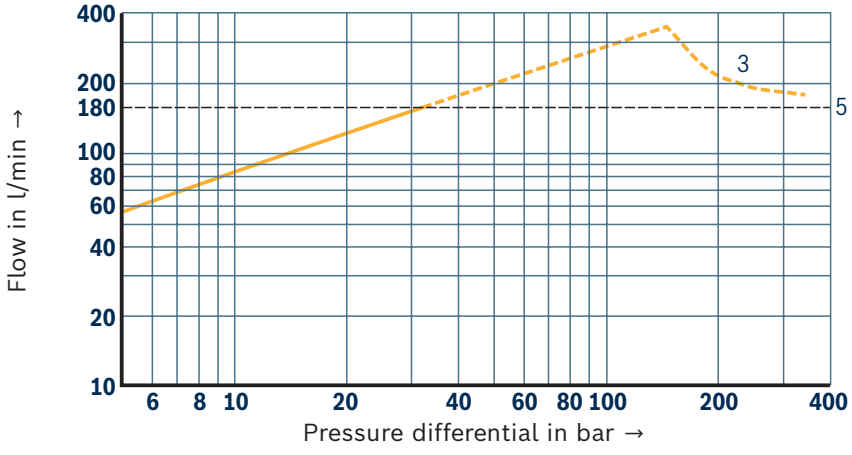
Symbol E3-



Symbol R; R3-



Symbol EA

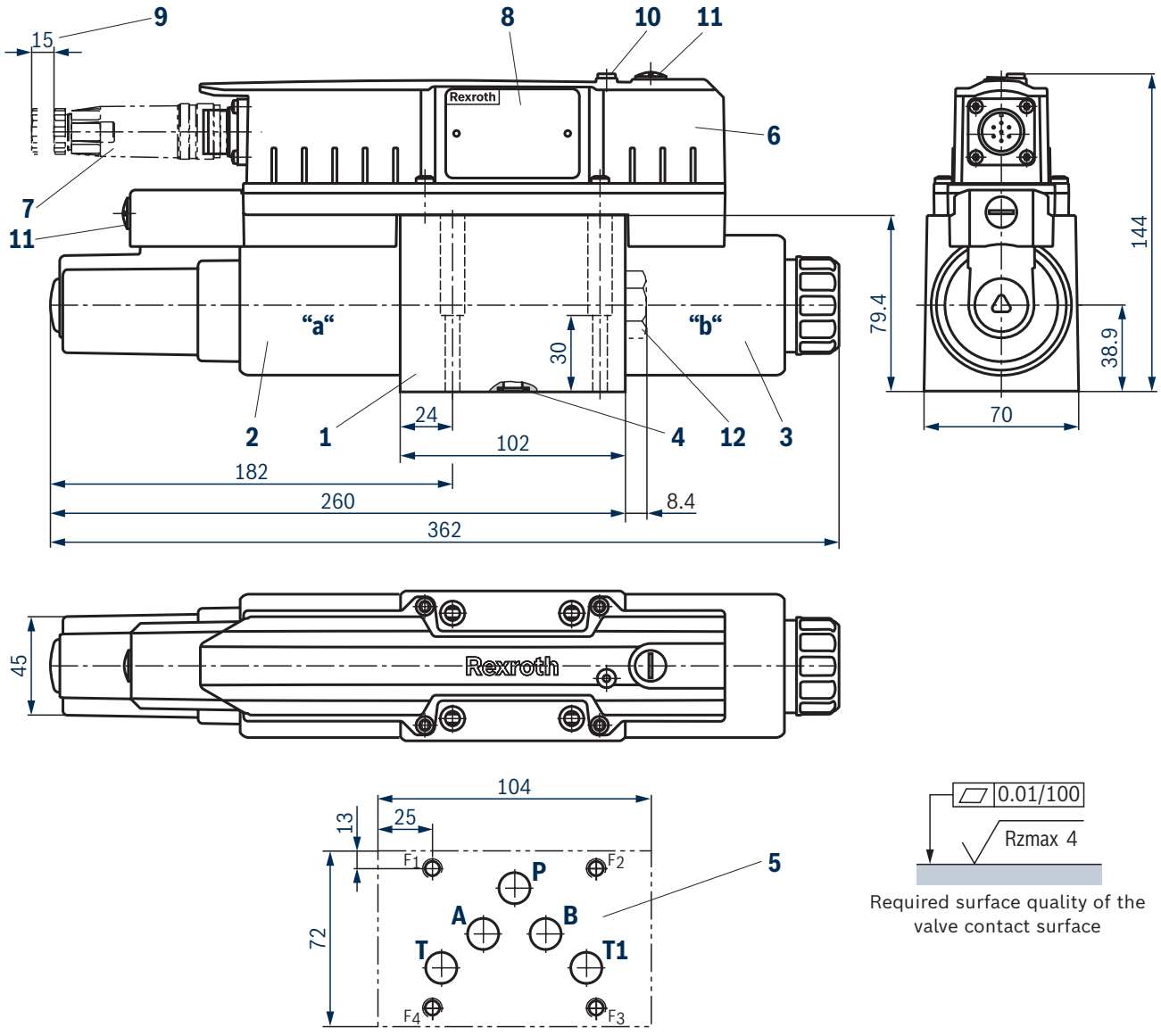


Nominal flow

- **2** 50 l/min
- **3** 75 l/min
- **3.2** 75 l/min (P→B; A→T)
- **5** Recommended flow (flow velocity 30 m/s)

☞ **Notice:**
Typical characteristic curves which are subject to tolerance variations.

Dimensions
(dimensions in mm)



Required surface quality of the valve contact surface

1 Valve housing
2 Proportional solenoid "a" with inductive position transducer
3 Proportional solenoid "b"
4 Identical seal rings for ports A, B, P, and T1
5 Machined valve contact surface; porting pattern according to ISO 4401-05-04-0-05
6 Integrated electronics (OBE)
7 Mating connector, (separate order, see page 33 data sheet 08006)
8 Name plate
9 Space required for removing the mating connector
10 Zero point adjustable from outside (see "Project planning information" on page 34)
11 PG screw fitting (with sealing wax)
12 Plug screw for valve with one solenoid (2 spool positions, version "EA" or "WA")

Valve mounting screws see page 33.

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

Dimensions

Valve mounting screws (separate order)

Size	Version	Quantity	Hexagon socket head cap screws
10	Standard	4	**ISO 4762 - M6 x 40 - 10.9** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque M_A = 12.5 Nm ±10%
	High corrosion protection	4	**ISO 4762 - M6 x 40 - 10.9** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque M_A = 12.5 Nm ±10%
	or		
	–	4	**ISO 4762 - M6 x 40 - 10.9** Tightening torque M_A = 15.5 Nm ±10%

☞ **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)

Mating connectors and cable sets

Item [1]	Designation	Version	Short designation
7	Mating connector; for valves with round connector, 6-pole + PE	Straight, metal, PG11	7PZ31...M
		Straight, plastic, PG11	7PZ31...K
		Angled, plastic, PG11	7PZ31...K
	Cable sets; for valves with round connector, 6-pole + PE	Plastic, 3.0 m	7PZ31 BF6
		Plastic, 5.0 m	
		Plastic, 10.0 m	
		Plastic, 20.0 m	

[1] See dimensions on page 32.

Test and service devices

Service case with test device for proportional servo valves with integrated electronics (OBE); type VT-HDT-1

Control electronics

		Type
Command value module	Analog	VT- SWMA-1-1X/...

Project planning information

Setting ramp function/ramp time:

- Via PLC control of the system
- Amplifier module type VT-SWMA-1, analog command value module, data sheet 29902

Zero point setting:

- To set the zero point (page 32, item 10) the protective plug (material no. **R901476527**) must be removed.
- After the zero point setting, ensure that the rubber plug is correctly installed and seated.
- Without the protective plug or if the protective plug is damaged, the protection class IP65 is no longer given.

Notes

Notes