

**RE 29 067/02.03**

Replaces: 12.01

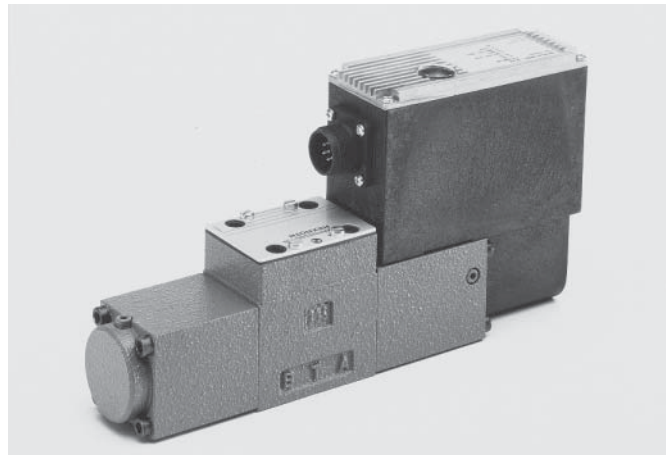
**4/3-way high response directional valve  
direct actuated,  
with electrical position feedback  
Type 4WRSE**

Nominal sizes 6 and 10

Series 3X

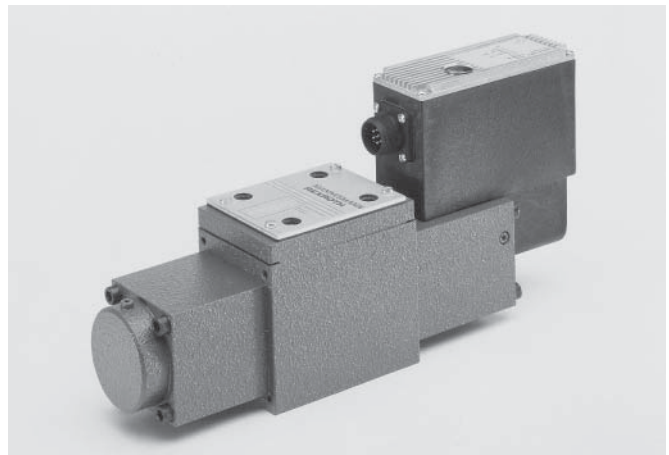
Maximum operating pressure 315 bar

Maximum flow 180 L/min



H/A 5276/95

Type 4WRSE 6 -...-3X/... with integrated control electronics



H/A 5279/95

Type 4WRSE 10 -...-3X/... with integrated control electronics

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**Features**

- Direct actuated high response directional valve for the control of the size and direction of a flow
- Suitable for closed loop position and speed control
- Actuated via high response solenoids
- Electrical position feedback
- High response sensitivity and low hysteresis
- Integrated control electronics with interface A1 or F1
- For subplate mounting:  
Porting pattern to DIN 24 340 form A,  
ISO 4401 and CETOP-RP 121 H  
Subplates to catalogue sheets RE 45 052 and RE 45 054  
(separate order), see pages 12 and 13



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## Ordering details

**4WRS E** **-3X /G24 K0 / V \***

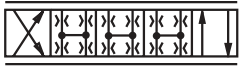
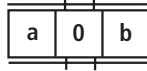
Integrated control electronics = E

Without sleeve = No code

Nominal size 6 = 6

Nominal size 10 = 10

### Symbols



= V  
V1-



= Q2-

### With symbol V1-:

P → A:  $q_V$  B → T:  $q_V/2$

P → B:  $q_V/2$  A → T:  $q_V$

### With symbol Q2-:

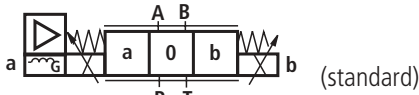
P → A:  $q_V$  B → T:  $q_V$

P → B:  $q_V/3$  A → T:  $q_V$

### Note:

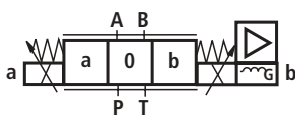
For the V and V1 spools there is an overlap of -1.0 % to + 1.0 %.

### Inductive position transducer location



(standard)

= No code



= C

Further details  
in clear text

V = FKM seals,  
suitable for mineral oils  
(HL, HLP) to DIN 51 524  
and phosphate ester  
(HFD-R)

### Control electronics interface

A1 = Command value input ± 10 V

F1 = Command value input 4 to 20 mA

### Electrical connections

K0 = Without plug-in connector  
with component plug to  
E DIN 43 563-AM6

Plug-in connector – separate order  
see page 5

### Control electronics power supply

G24 = 24 V DC

3X = Series 30 to 39  
(30 to 39: unchanged installation and connection dimensions)

### Nominal flow at 10 bar valve pressure differential

#### Nominal size 6

04 = 4 L/min (only for symbol V)

10 = 10 L/min

20 = 20 L/min

35 = 35 L/min

#### Nominal size 10

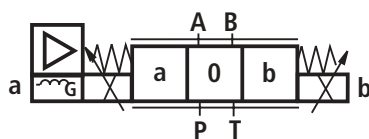
25 = 25 L/min

50 = 50 L/min

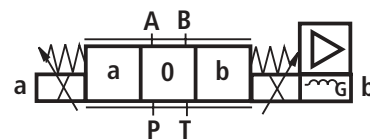
80 = 75 L/min

## Symbols

Type 4WRSE... (standard)



Type 4WRSE...C...



## Preferred types

### NS 6

Material no.	Type
00938307	4WRSE 6 V04-3X/G24K0/A1V
00909078	4WRSE 6 V1-10-3X/G24K0/A1V
00906155	4WRSE 6 V1-20-3X/G24K0/A1V
00904794	4WRSE 6 V1-35-3X/G24K0/A1V
00558830	4WRSE 6 V10-3X/G24K0/A1V
00576060	4WRSE 6 V20-3X/G24K0/A1V
00579447	4WRSE 6 V35-3X/G24K0/A1V

### NS 10

Material no.	Type
00916872	4WRSE 10 Q2-50-3X/G24K0/A1V
00556812	4WRSE 10 V1-80-3X/G24K0/A1V
00922997	4WRSE 10 V1-25-3X/G24K0/A1V
00579140	4WRSE 10 V1-50-3X/G24K0/A1V
00579637	4WRSE 10 V25-3X/G24K0/A1V
00579943	4WRSE 10 V50-3X/G24K0/A1V
00579286	4WRSE 10 V80-3X/G24K0/A1V

## Function, section

The 4/3-way high response directional valves are designed as direct actuated units of subplate mounting design. They are actuated by high response solenoids. The solenoids are controlled via the integrated control electronics.

### Design:

The valve basically comprises of:

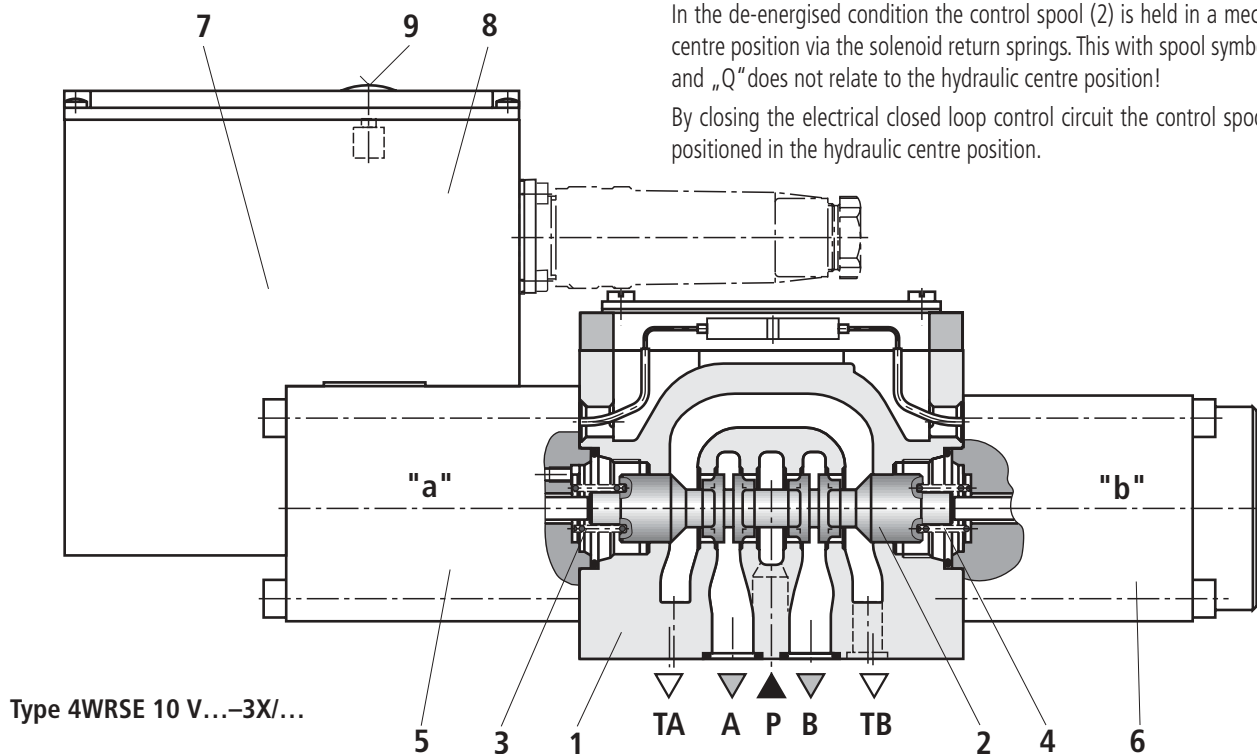
- Housing (1) with mounting surface
- Control spool (2) with compression springs (3 and 4)
- Solenoids (5 and 6)
- Position transducer (7)
- Integrated control electronics (8)
- Zero point adjustment accessible (9) via Pg 9

### Functional description:

- With solenoids (5 and 6), de-energised, then the control spool (2) is held in its centre position by the compression springs (3 and 4)
- Direct actuation of the control spool (2) by the energisation of one of the high response solenoids  
E.g. control of solenoid "b" (6)  
→ Moves the control spool (2) to the left in proportion to the electrical input signal  
→ Connection from P to A and B to T via orifice type cross-sections with linear flow characteristics
- By de-energising the solenoid (6) → control spool (2) is returned to its centre position via the compression spring (3)

In the de-energised condition the control spool (2) is held in a mechanical centre position via the solenoid return springs. This with spool symbols „V“ and „Q“ does not relate to the hydraulic centre position!

By closing the electrical closed loop control circuit the control spool (2) is positioned in the hydraulic centre position.



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

General		NS 6	NS 10
Installation		optional, preferably horizontal	
Ambient temperature range	°C	- 20 to + 50	
Storage temperature range	°C	- 20 to + 80	
Weight	kg	3.0	7.3


### Hydraulic (measured with HLP 46, $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$ and $p = 100 \text{ bar}$ )

Operating pressure	Ports A, B, P	bar	up to 315	up to 315
	Port T	bar	up to 315	up to 315
Nominal flow $q_{V \text{ nom}} \pm 10 \%$ at $\Delta p = 10 \text{ bar}$	$\Delta p = \text{valve pressure differential}$	L/min	4	25
			10	50
			20	75
			35	–
Max. permissible flow		L/min	80	180
Pressure fluid	Mineral oils (HL, HLP) to DIN 51 524 and phosphate ester (HFD-R), further pressure fluids on request			
Degree of contamination			Max. permissible degree of pressure fluid contamination is to NAS 1638	A filter is recommended with a minimum retention rate of $\beta_x \geq 75$
			class 7	$x = 10$
Pressure fluid temperature range		°C	- 20 to + 80	
Viscosity range		mm <sup>2</sup> /s	20 to 380, preferably 30 to 46	
Hysteresis		%	≤ 0.05	
Reversal error		%	≤ 0.03	
Response sensitivity		%	≤ 0.03	
Zero point alignment		%	≤ 1	
Zero point displacement with changes to:			<b>NS 6</b>	<b>NS 10</b>
	Pressure fluid temperature	%/10 K	< 0.1	< 0.1
	Operating pressure	%/100 bar	< 0.5	< 0.3

### Electrical

Command value signal	Voltage input „A1“	V	± 10
Actual value signal	Voltage output	V	± 10
Command value signal	Current input „F1“	mA	4 to 20
Actual value signal	Current output	mA	4 to 20
Duty		%	100
Coil temperature <sup>1)</sup>		°C	up to 150
Electrical connection	with component plug to E DIN 43 563 AM6		
separate order, see page 5	plug-in connector to E DIN 43 563-BF6-3/Pg11		
Valve insulation to DIN 40 050	IP 65 with fitted and secured plug-in connector		
Control electronics	integrated into the valve, see pages 5 and 6		

<sup>1)</sup> Due to the occurring surface temperature of the solenoid coils, the European Standards EN 563 and EN 982 must be taken into account!

 **Note:** For details regarding **the environmental simulation test** covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29 067-U (declaration regarding environmental

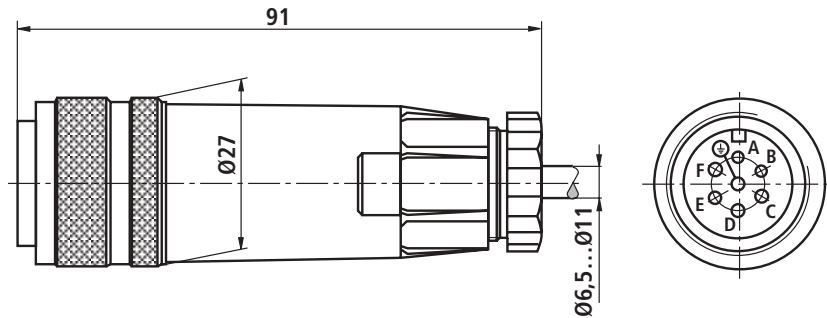
## Electrical connections

### Plug-in connector

Plug-in connector to E DIN 43 563-BF6-3/Pg11

Separate order under material no. **00021267** (plastic version)

For pin allocation see block circuit diagram on page 6

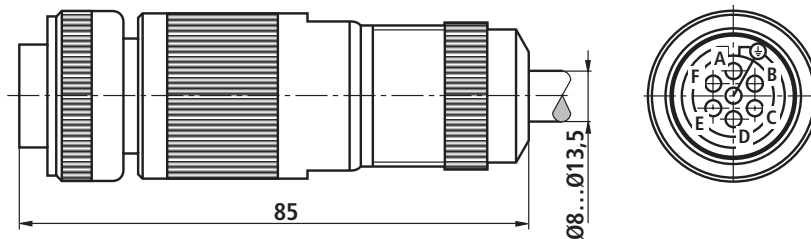


### Plug-in connector

Plug-in connector to E DIN 43 563-BF6-3-Pg13,5

Separate order under Material No. **000223890** (metal version)

For pin allocation see block circuit diagram on page 6



### Component plug allocation

	Contact	Signal
Supply voltage	A	24 VDC ( $u(t) = 19,4 \text{ V to } 35 \text{ V}$ ); $I_{\text{max}} = 2 \text{ A}$ (NS 6) $I_{\text{max}} = 2,8 \text{ A}$ (NS 10); impulse load = 4 A
	B	0 V
Reference potential actual value	C	reference contact F; A1: $R_e > 50 \text{ k}\Omega$ F1: $R_e < 10 \Omega$
Differential amplifier input command value	D E	A1: $\pm 10 \text{ V}$ command value, $R_e > 50 \text{ k}\Omega$ or F1: 4...20 mA, $R_e > 100 \Omega$ reference potential
Measurement output (act. value)	F	$\pm 10 \text{ V}$ actual value (limiting load 2 mA); or F1: 4...20 mA, max. load impedance 500 $\Omega$
	PE	connect with cooling body and valve housing

**Actual value:** Interface A1: A positive signal at F and the reference potential at C results in a flow from P to A.

**Note for A1:** Connect pin C on the control side (star form) with  $\perp$ .

Interface F1: 12...20 mA results in flow from P to A.

**Command value:** A positive command value at D (Interface A1) or 12...20 mA (Interface F1) and the reference potential at E results in a flow from P to A and B to T.

A negative command value at D (Interface A1) or 12...4 mA (Interface F1) and the reference potential at E results in a flow from P to B and A to T.

**Connection cable:** Recommendation: – up to 25 m cable length type LiYCY 7 x 0.75 mm<sup>2</sup>

– up to 50 m cable length type LiYCY 7 x 1.0 mm<sup>2</sup>

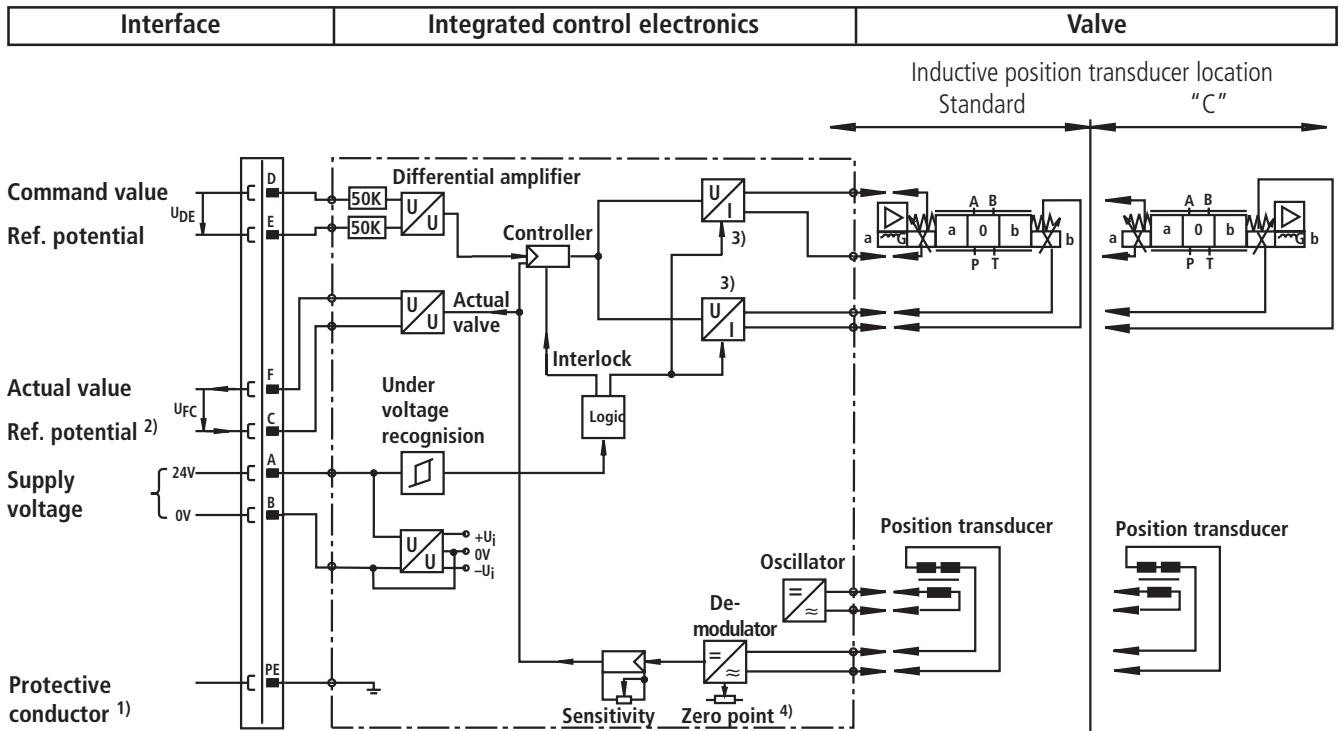
Outside diameter 6.5 to 11 mm

Only connect the screen to  $\perp$  on the supply side.

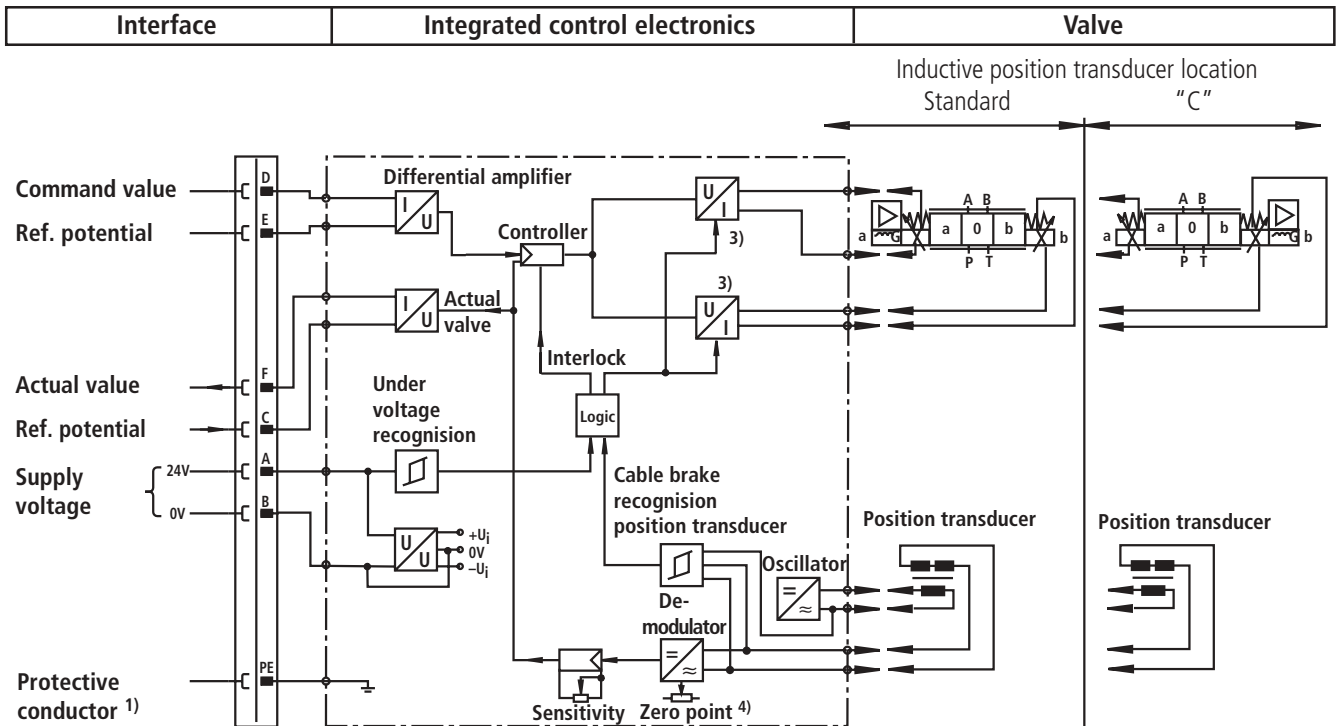
# Integrated control electronics

## Block circuit diagram / connection allocation for the integrated control electronics

### Interface A1



### Interface F1



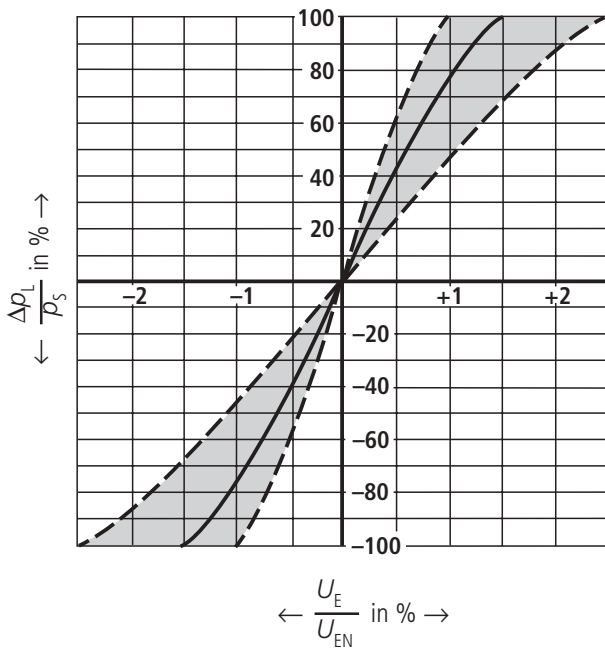
**Note:** Electrical signals (e.g. actual value) taken via valve electronics must not be used to switch off the machine safety functions! (This is in accordance with the regulations to the European standard "Safety requirements of fluid technology systems and components – hydraulics", EN 982!)

- 1) Connection PE is connected with the cooling body and the valve housing
- 2) Connect pin C to  $\perp$  on the control side
- 3) Output stage, current controlled
- 4) Zero point externally ad

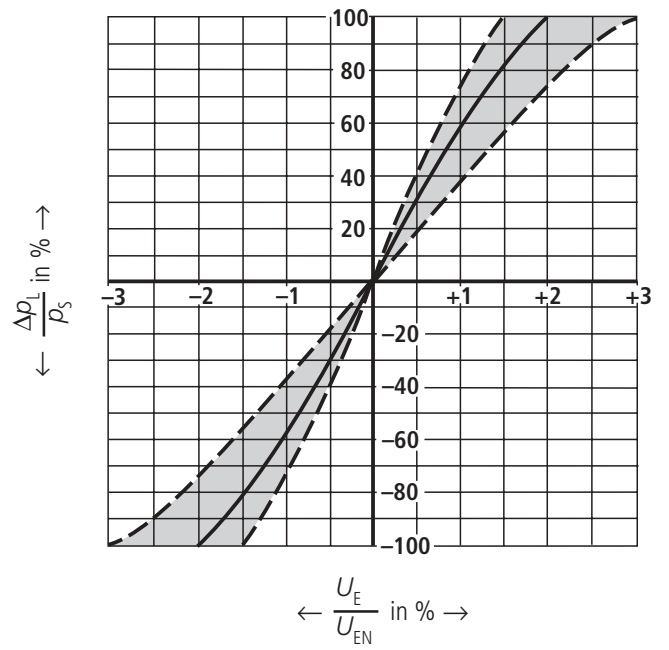


Pressure signal characteristic curve (V spool)  $p_s = 100 \text{ bar}$

NS 6 Type 4WRSE 6 V...

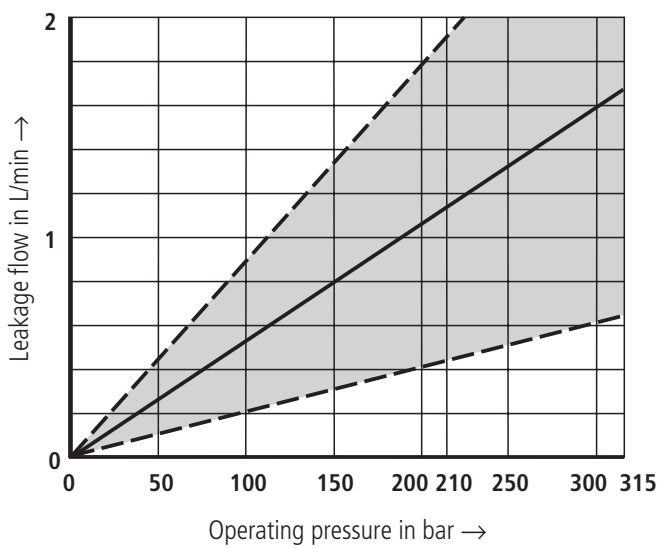


NS 10 Type 4WRSE 10 V...

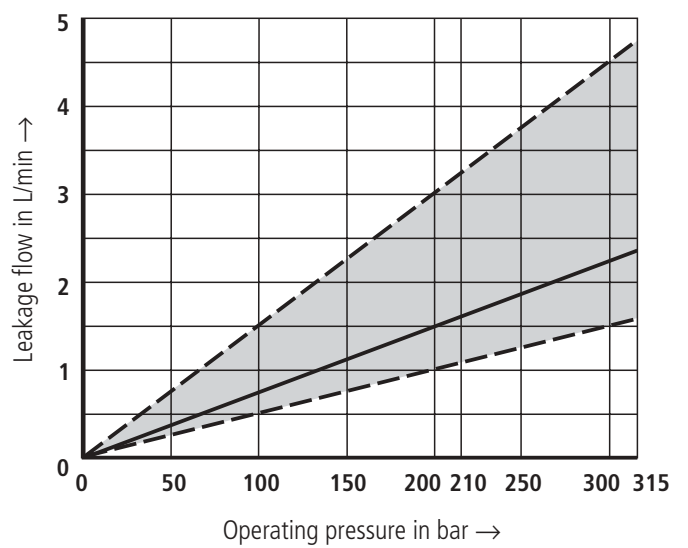


Leakage flow (typical)

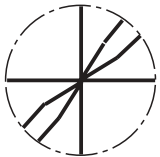
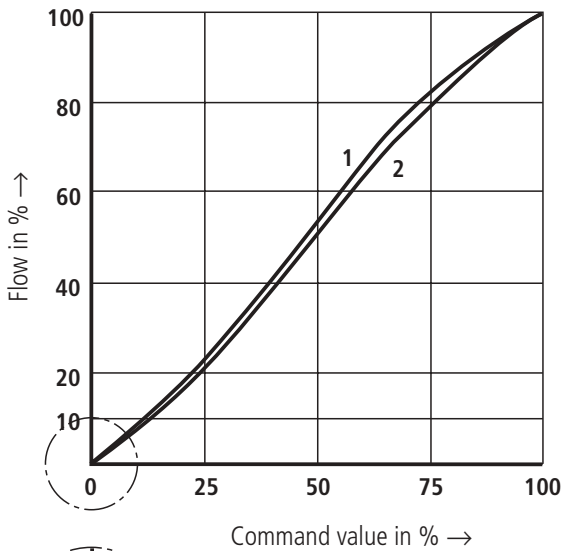
NS 6 Type 4WRSE 6 V35...



NS 10 Type 4WRSE 10 V80...



Spool symbol V, V1-



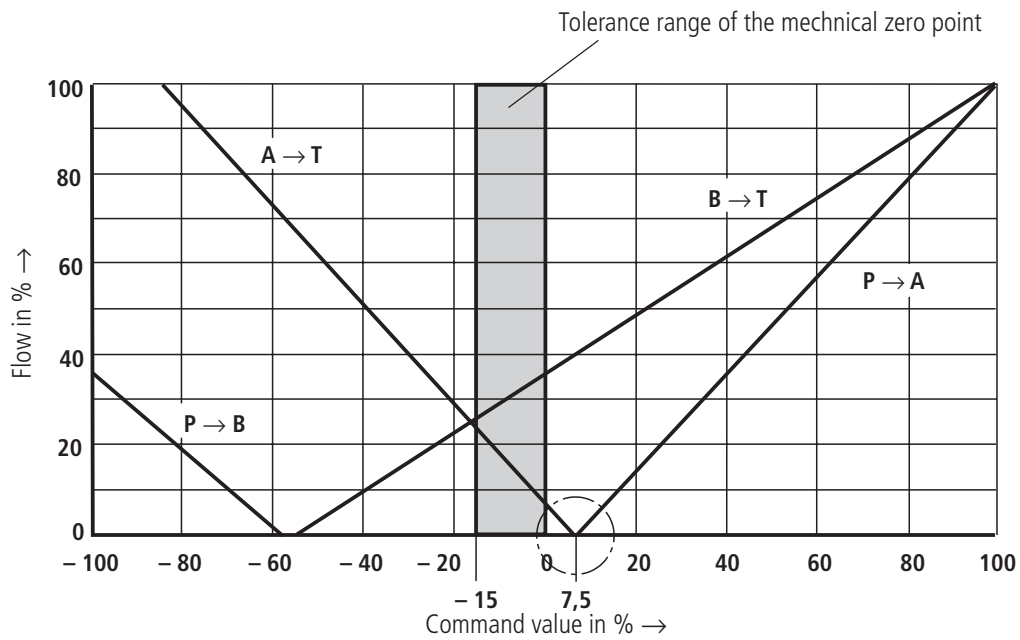
Zero travel dependent on series variations  
Valve overlap - 1 % ... + 1 %

1 = Nominal flow 35 L/min

2 = Nominal flow 10 L/min

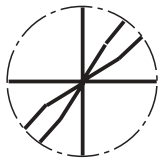
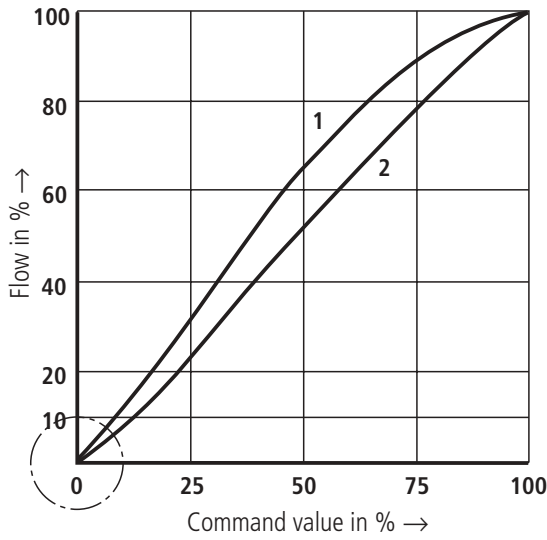
Spool ... 20 lies between characteristic curves 1 and 2

Spool symbol Q2-





Spool symbol V, V1-



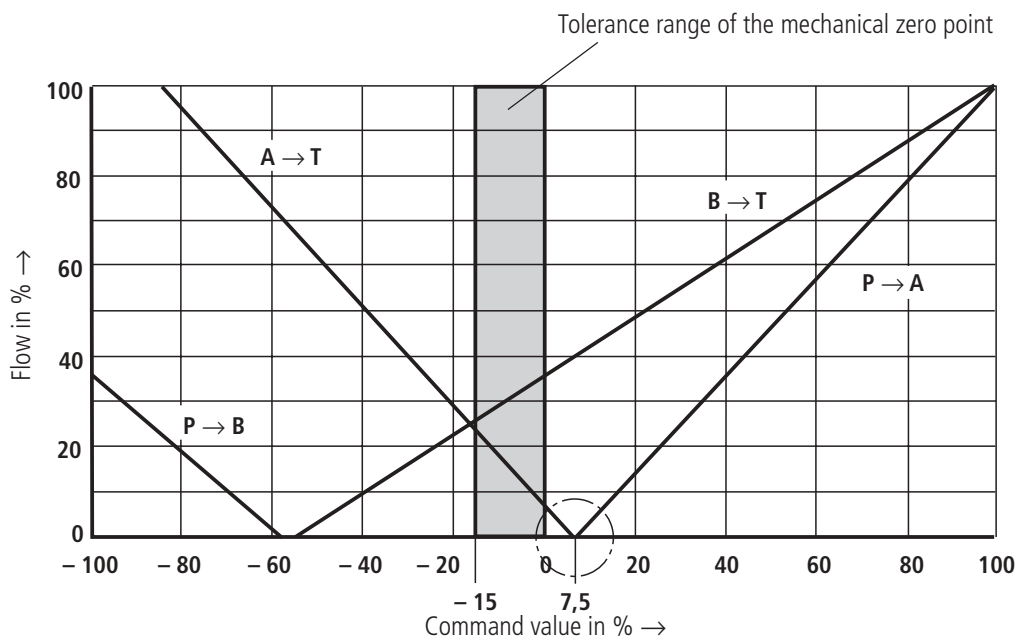
Zero travel dependent on series variations  
Valve overlap - 1 % ... + 1 %

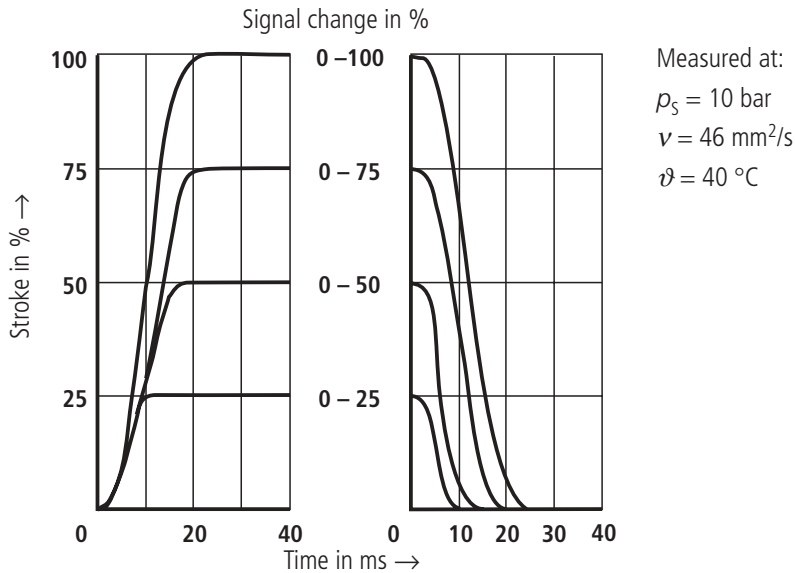
1 = Nominal flow 75 L/min

2 = Nominal flow 25 L/min

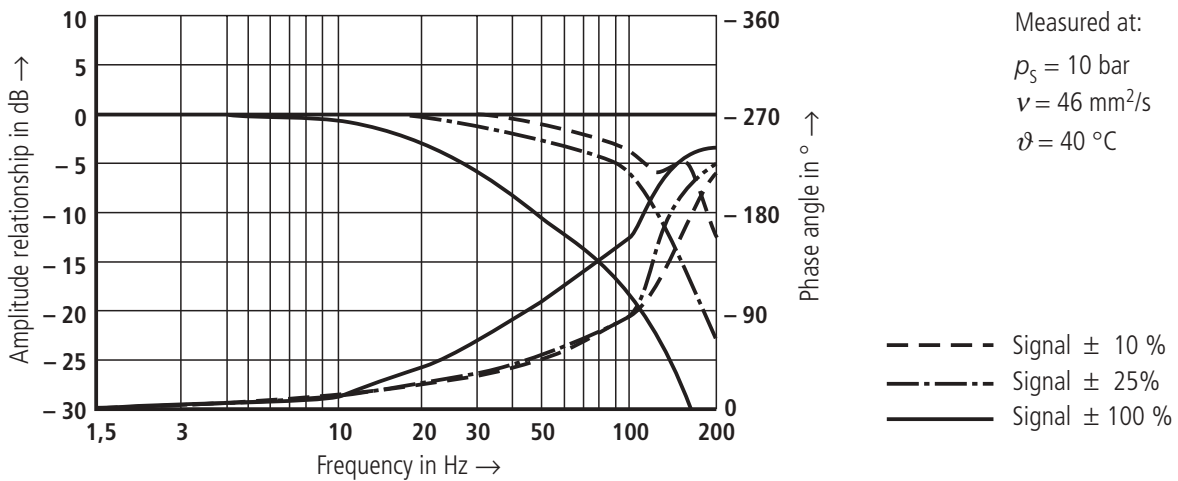
Spool ... 50 lies between characteristic curves 1 and 2

Spool symbol Q2-

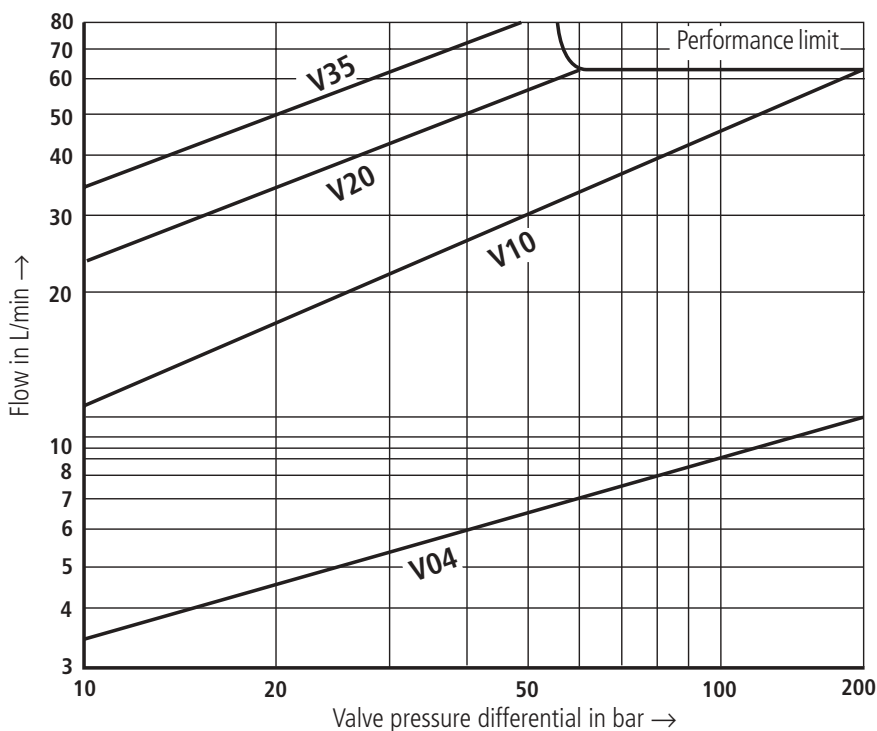


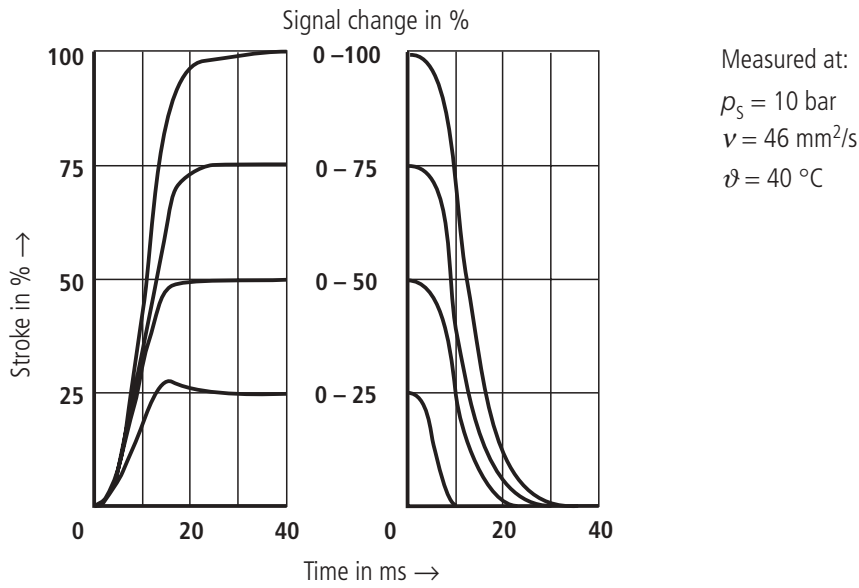


Frequency response characteristic curves

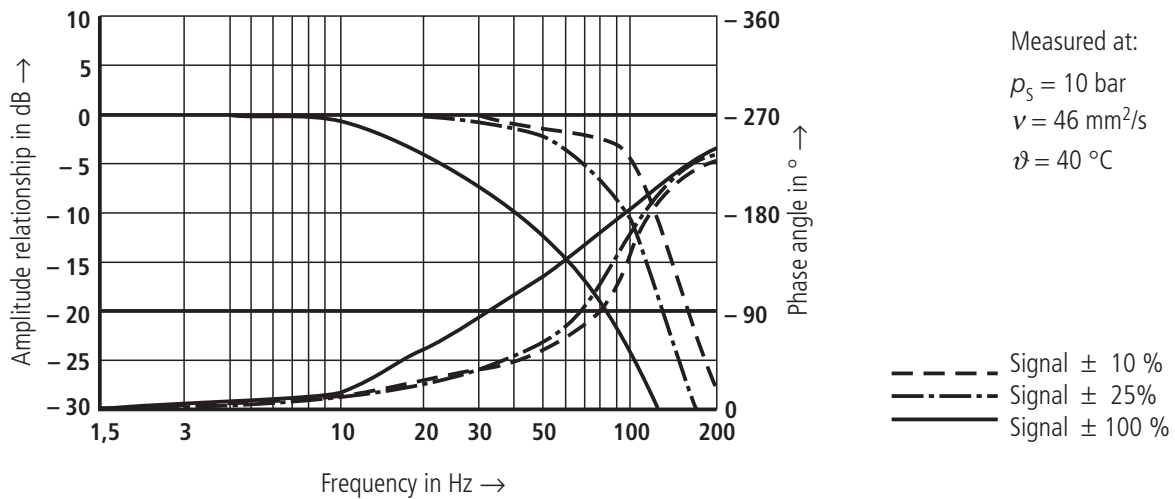


Flow load function at the max. valve opening (tolerance  $\pm 10\%$ )

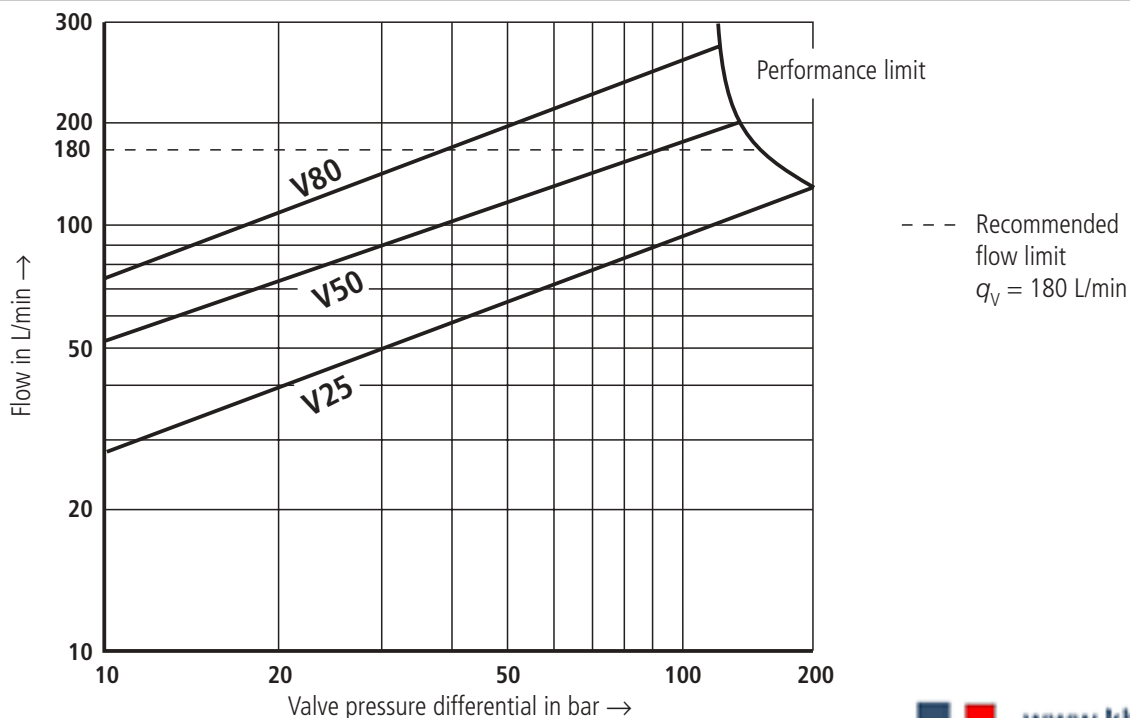




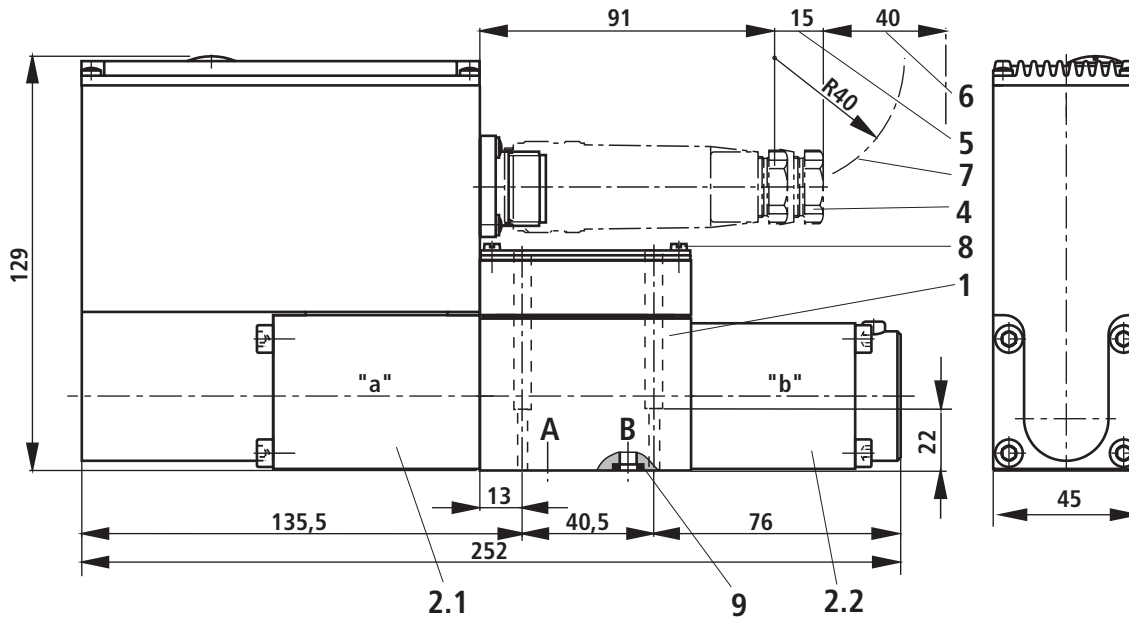
Frequency response characteristic curves



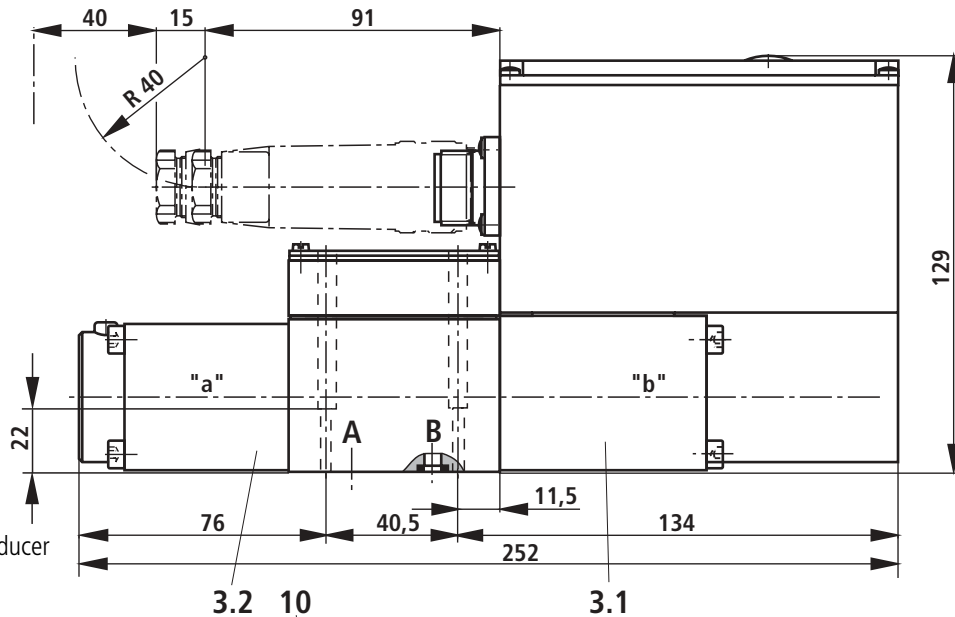
Flow load function at the max. valve opening (tolerance  $\pm 10\%$ )



Type 4WRSE 6 ... (standard)



Type 4WRSE 6 C...



1 Valve housing  
2.1 Solenoid "a" with inductive position transducer

2.2 Solenoid "b"

3.1 Solenoid "b" with inductive position transducer

3.2 Solenoid "a"

4 Plug-in connector to E DIN 43 563 BF6-3/Pg11 (separate order, see page 5)

5 Space required to remove the plug-in connector

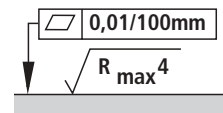
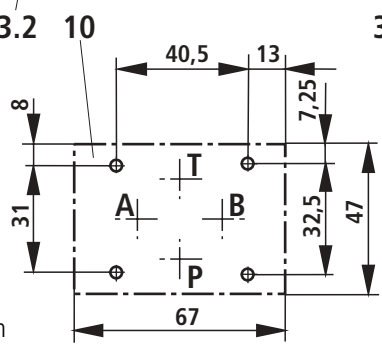
6 Space required for the cable bend radius when removing the plug-in connector

7 Cable bend radius

8 Name plate

9 R-ring 9.81 x 1.5 x 1.78 (ports A, B, P, T)

10 Machined valve mounting surface, position of ports to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H



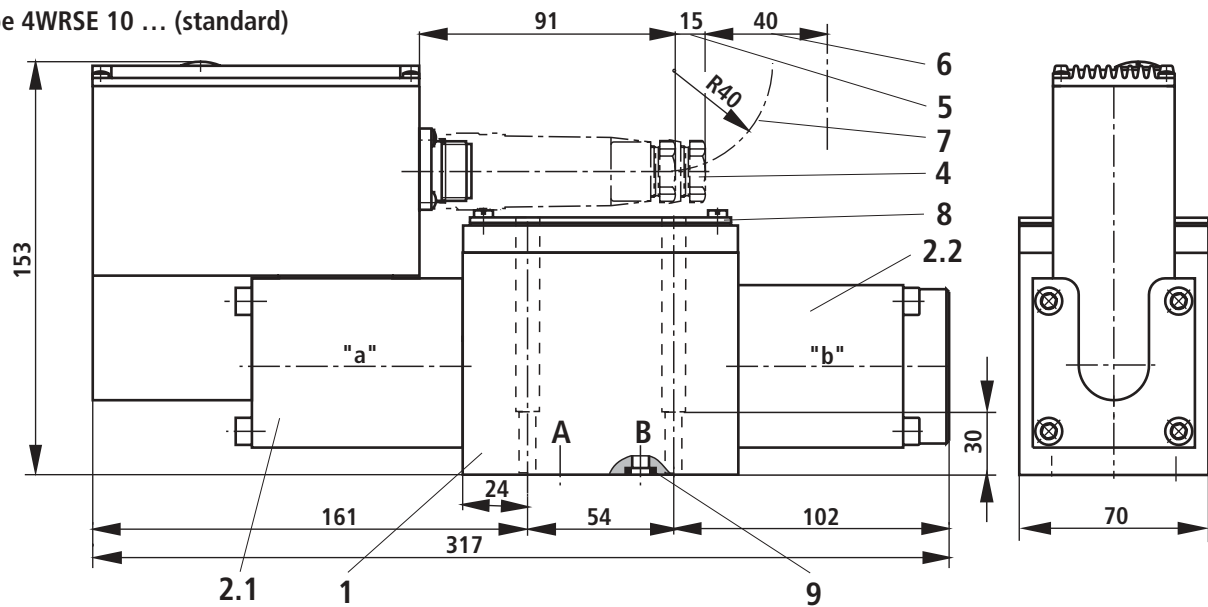
Required surface finish of mating piece

Subplates to catalogue sheet RE 45 052 and valve fixing screws must be ordered separately.

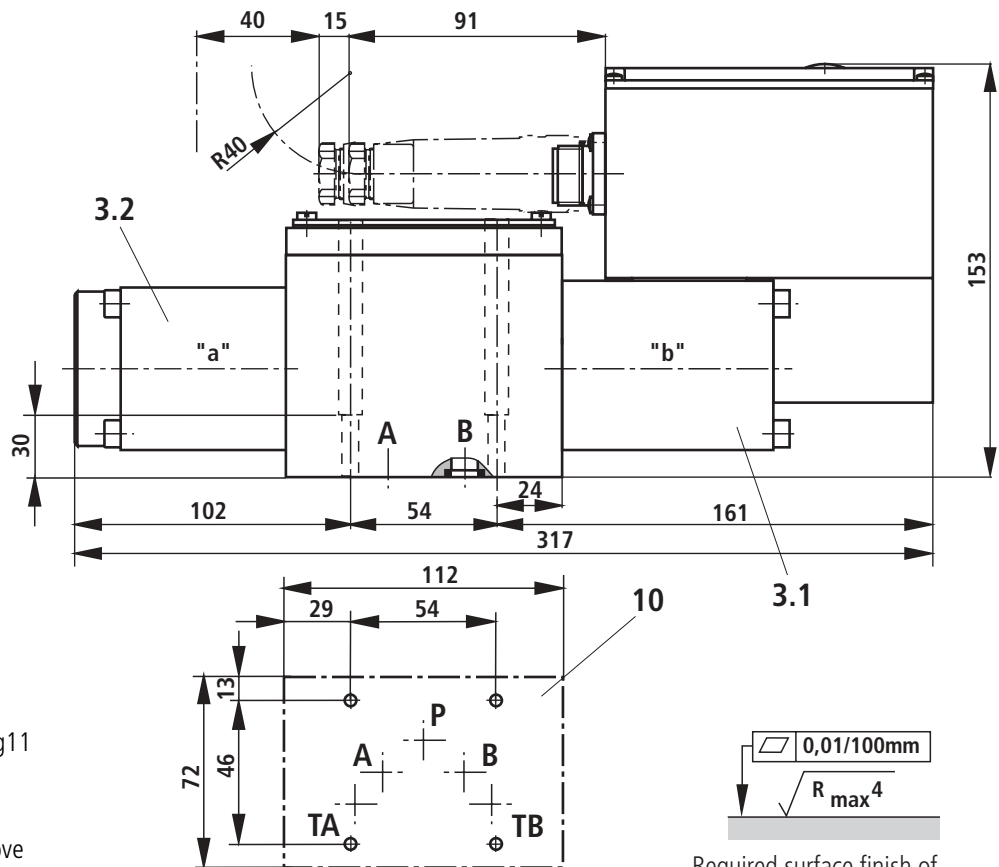
**Subplates:** G 341/01 (G 1/4)  
G 342/01 (G 3/8)  
G 502/01 (G 1/2)

**Valve fixing screws:** 4 off M5 x 30 DIN 912-10.9;  $M - 2 \text{ Nm}$

Type 4WRSE 10 ... (standard)



Type 4WRSE 10 C...



- 1 Valve housing
- 2.1 Solenoid "a" with inductive position transducer
- 2.2 Solenoid "b"
- 3.1 Solenoid "b" with inductive position transducer
- 3.2 Solenoid "a"

4 Plug-in connector to E DIN 43 563-BF6-3/Pg11 (separate order, see page 5)

5 Space required to remove the plug-in connector

6 Space required for the cable bend radius when removing the plug-in connector

7 Cable bend radius

8 Name plate

9 R-ring 13.0 x 1.6 x 2.0 (ports A, B, P, T)

10 Machined valve mounting surface, position of ports to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H

Subplates to catalogue sheet RE 45 054 and valve fixing screws must be ordered separately.

**Subplates:**  
 G 66/01 (G 3/8)  
 G 67/01 (G 1/2)  
 G 534/01 (G 3/4)

**Valve fixing screws:**  
 4 off M6 x 40 DIN 912-10.9;  $M_A = 15.5 \text{ Nm}$

Required surface finish of mating piece

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