

RE 29 083/10.00

Replaces: 07.99



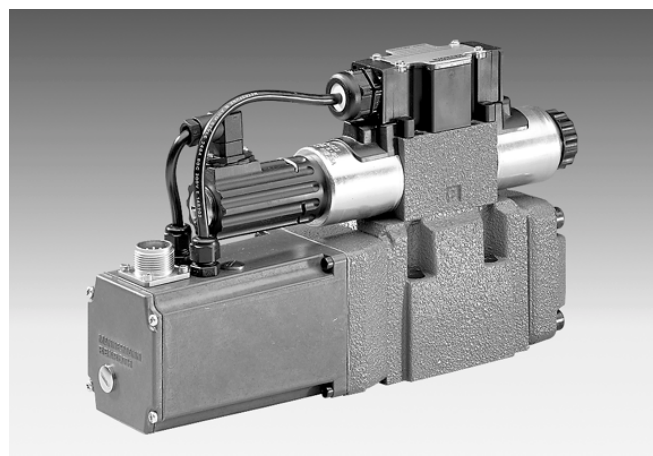
4/3-way fast response valve Type 4WRTE

Nominal sizes 10, 16, 25, 32, 35

Series 4X

Maximum operating pressure 350 bar

Maximum flow 3000 L/min



H/A/D 5978/98

Type 4WRTE 10...-4X/6EG24.K31/...

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Features

- Suitable for closed loop control of position, velocity, pressure and force
- Pilot operated 2-stage fast response valve
- Closed loop control of the direction and size of a flow
- Pilot control valve:
Direct actuated, closed loop position control with pressure feedback of the control pressures
- Main stage:
Self-centering, closed loop position controlled
- Integrated control and closed loop electronics
- Subplate mounting:
Porting pattern to DIN 24 340 form A
Subplates to catalogue sheets RE 45 054 to RE 45 060 (separate order), see pages 15 and 18

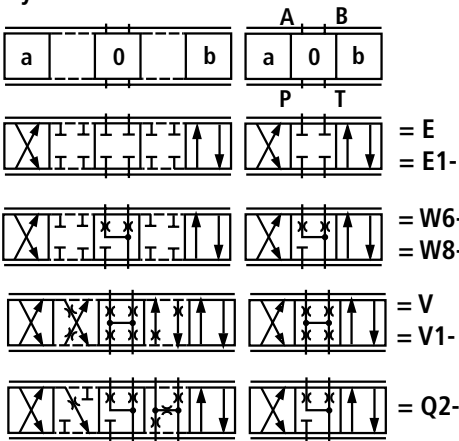
Ordering details

4WRTE				-4X	/6E	G24	K31/	M	*
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Electrically actuated
2-stage fast response valve
of 4-way design with
integrated electronics

Nominal size 10	= 10
Nominal size 16	= 16
Nominal size 25	= 25
Nominal size 32	= 32
Nominal size 35	= 35

Symbols



With symbol E1-, W8-, V1-:

$P \rightarrow A : q_{Vmax}$ $B \rightarrow T : q_V/2$
 $P \rightarrow B : q_V/2$ $A \rightarrow T : q_{Vmax}$

Note:

With spools W6 and W8 there is, in the neutral position, a connection from A to T and B to T with approx. 2 % of the relevant nominal cross-section.

Further details
in clear text

M = ¹⁾ NBR seals

⁶⁾

Interfaces

A1 = Com./act. value ± 10 V
F1 = Com./act. value 4 to 20 mA

Electrical connections

K31 = With component plug
to E DIN 43 563-AM6
Without plug-in connector
Plug-in connector – separate order
see page 6

Pilot oil supply and drain

No code = Pilot oil supply external,
Pilot oil drain external
E = Pilot oil supply internal,
Pilot oil drain external
ET = Pilot oil supply internal,
Pilot oil drain internal
T = Pilot oil supply external,
Pilot oil drain internal

Supply voltage

G24 = + 24 V DC

6E = Proportional solenoid with removable coil

H = High flow design
Only with NS 25 and with a nominal flow of 500 L/min

4X = Series 40 to 49
(40 to 49: unchanged installation and connection dimensions)

Type of characteristic curve

L = Linear
P = Linear with fine control range

Nominal flow in L/min at a 10 bar valve pressure differential

25 = ²⁾ or	50 = ³⁾ or	100 =	with nominal size 10
125 = ⁴⁾ or	200 =		with nominal size 16
220 = ³⁾ or	350 = or	500 = ⁵⁾	with nominal size 25
600 = or	400 =		with nominal size 32
1000 =			with nominal size 35

- 1) Suitable for mineral oil (HL, HLP) to DIN 51 524
- 2) E, W6-, V, Q2- only available with characteristic curve **L** (linear)
- 3) E1-, W8-, V1- only available with characteristic curve **L** (linear)
- 4) V1-125 only available with characteristic curve **L** (linear)
- 5) High flow design (only with NS 25)
- 6) When replacing the series 3X by series 4X the electrical interface is to be defined with **A5**

Preferred types

NS 10

Material no.	Type
00954239	4WRTE 10 E100L-4X/6EG24ETK31/A1M
00954240	4WRTE 10 E100L-4X/6EG24K31/A1M
00954241	4WRTE 10 E50L-4X/6EG24ETK31/A1M
00954253	4WRTE 10 E50L-4X/6EG24K31/A1M
00954254	4WRTE 10 V1-100L-4X/6EG24ETK31/A1M
00954255	4WRTE 10 V1-100L-4X/6EG24K31/A1M
00954256	4WRTE 10 V1-50L-4X/6EG24ETK31/A1M
00954257	4WRTE 10 V100L-4X/6EG24ETK31/A1M
00954258	4WRTE 10 V100L-4X/6EG24K31/A1M
00954259	4WRTE 10 V25L-4X/6EG24K31/A1M
00954260	4WRTE 10 V50L-4X/6EG24ETK31/A1M
00954261	4WRTE 10 V50L-4X/6EG24K31/A1M
00954262	4WRTE 10 W8-100L-4X/6EG24K31/A1M
00954263	4WRTE 10 W8-50L-4X/6EG24K31/A1M
00954264	4WRTE 10 W6-100L-4X/6EG24K31/A1M
00954265	4WRTE 10 W6-50L-4X/6EG24K31/A1M

NS 25

Material no.	Type
00954280	4WRTE 25 E1-350L-4X/6EG24K31/A1M
00954281	4WRTE 25 E220L-4X/6EG24K31/A1M
00954282	4WRTE 25 E350L-4X/6EG24ETK31/A1M
00954283	4WRTE 25 E350L-4X/6EG24K31/A1M
00954287	4WRTE 25 V1-220L-4X/6EG24K31/A1M
00954293	4WRTE 25 V1-350L-4X/6EG24K31/A1M
00954294	4WRTE 25 V220-4X/6EG24K31/A1M
00954295	4WRTE 25 V350L-4X/6EG24ETK31/A1M
00954296	4WRTE 25 V350L-4X/6EG24K31/A1M
00954297	4WRTE 25 W8-220L-4X/6EG24ETK31/A1M
00954298	4WRTE 25 W6-350L-4X/6EG24ETK31/A1M
00954299	4WRTE 25 W6-350L-4X/6EG24K31/A1M

NS 16

Material-Nr.	Type
00954266	4WRTE 16 E1-125L-4X/6EG24K31/A1M
00954267	4WRTE 16 E1-200L-4X/6EG24ETK31/A1M
00954268	4WRTE 16 E1-200L-4X/6EG24K31/A1M
00954269	4WRTE 16 E125L-4X/6EG24ETK31/A1M
00954270	4WRTE 16 E125L-4X/6EG24K31/A1M
00954271	4WRTE 16 E200L-4X/6EG24K31/A1M
00954272	4WRTE 16 V1-125L-4X/6EG24ETK31/A1M
00954273	4WRTE 16 V1-125L-4X/6EG24K31/A1M
00954274	4WRTE 16 V1-200L-4X/6EG24K31/A1M
00954275	4WRTE 16 V125L-4X/6EG24K31/A1M
00954276	4WRTE 16 V200L-4X/6EG24ETK31/A1M
00954277	4WRTE 16 V200L-4X/6EG24K31/A1M
00954278	4WRTE 16 W8-200L-4X/6EG24K31/A1M
00954279	4WRTE 16 W6-200L-4X/6EG24K31/A1M

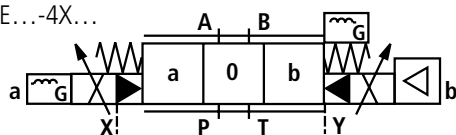
NS 32

Material no.	Type
00954300	4WRTE 32 E1-600L-4X/6EG24K31/A1M
00954301	4WRTE 32 E600L-4X/6EG24ETK31/A1M
00954302	4WRTE 32 E600L-4X/6EG24K31/A1M
00954303	4WRTE 32 V600L-4X/6EG24K31/A1M
00954304	4WRTE 32 W6-600L-4X/6EG24K31/A1M

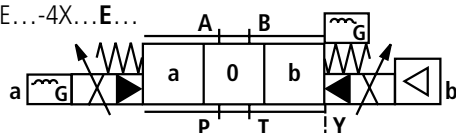
Symbols

Simplified

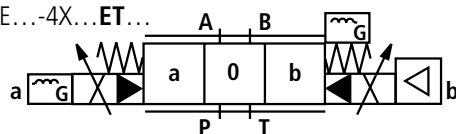
Type 4WRTE...-4X...



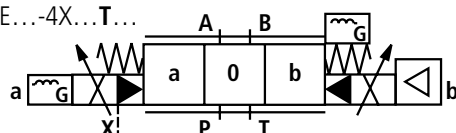
Type 4WRTE...-4X...E...



Type 4WRTE...-4X...ET...

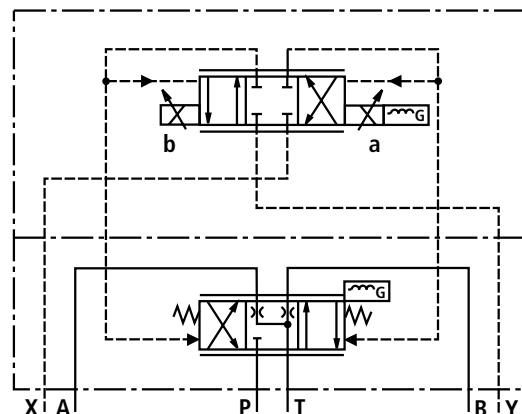


Type 4WRTE...-4X...T...



Detailed

E.g. type 4WRTE.W...-4X...



Function, section

The 4/3-way fast response valve is designed as a subplate mounting valve with closed loop position control and integrated control electronics.

Design:

The valve comprises of 3 main assemblies:

- Housing (1) with main spool (2)
- Integrated control electronics with inductive position transducer (3) for the main stage
- Pilot control valve (4) with spool bush unit (5), inductive position transducer (6) and pressure feedback of the centre position of the main spool (2)

Function:

- With the proportional solenoids de-energised (7; 8) the centre position of the main spool (2) is via the return spring (9) and the pressure feedback
- Control of the main spool (2) is via the pilot control valve (4)
→ The main spool is closed loop position controlled
- Control of the pilot control valve spool (4) by changing the solenoid force of the proportional solenoids (7; 8)
- Integration of the command and actual values within the integrated control electronics

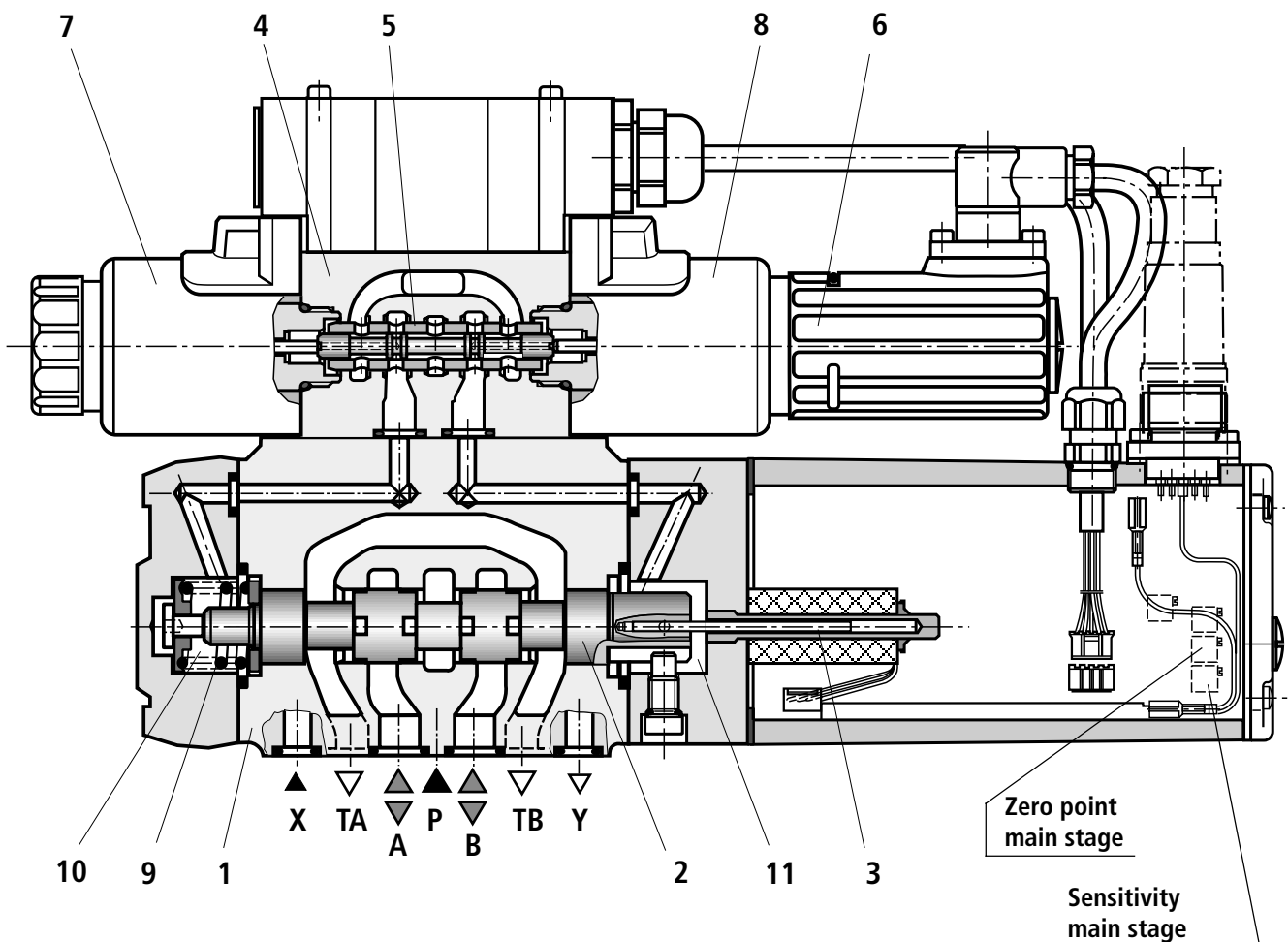
- Pilot oil supply to the pilot control valve internally via port P or externally via port X
- Pilot oil drain internally via port T or externally via port Y to tank
- With a command value of 0 V the control electronics closed loop control the main spool (2) into the centre position.

Failure of the supply voltage:

- The integrated control electronics de-energise the solenoids if the supply voltage fails or if there is a cable break
- Independent pressure control to the same level in the control chambers (10 and 11) via the pilot control valve
- If the supply pressure fails then the main spool is centred via the centering spring (9)
- Central position of the main spools (2)

Attention: The interruption of the supply voltage leads to the abrupt standstill of the control axis. The accelerations occurring may cause machine damage.

With spool types E, E1, W6, W8 and Q2 the centering spring (9) positions the main spool (2) in the mid position, V and V1 spools are switched to the preferred direction of P to B and A to T within a tolerance band of 1 % to a max. of 11 % of the spool stroke.



Type 4 WRTE 10...-4X/...

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

General		NS 10	NS 16	NS 25	NS 25¹⁾	NS 32	NS 35
Installation and commissioning guidelines		optional, preferably horizontal, to RE 07 700					
Storage temperature range	°C	− 20 ... + 80					
Ambient temperature range	°C	0 ... + 50					
Weight	kg	8.7	11.2	16.8	17	31.5	34
Hydraulic (measured with HLP 46 at 40 °C ± 5 °C and $p = 100$ bar)							
Operating pressure Pilot control valve Pilot oil supply ²⁾		bar					
Main valve, ports P, A, B		bar	up to 315	up to 350	up to 350	up to 210	up to 350
Return pressure	Port T	Pilot oil drain, internal	bar				
		Pilot oil drain, external	bar	up to 315	up to 250	up to 250	up to 210
Port Y		bar					
Nominal flow $q_{Vnom} \pm 10\%$ at $\Delta p = 10$ bar		L/min	25	–	–	–	–
$\Delta p =$ valve pressure differential			50	125	220	–	400
			100	200	350	500	1000
Main valve flow (max. permissible)	L/min	170	460	870	1000	1600	3000
Control spool stroke (3rd stage)	mm	± 3.5	± 5	± 6	± 6	± 9	± 12
Pilot oil flow at ports X or Y with a stepped form of input signal from 0 to 100 % (315 bar)		L/min	7	14	20	20	27
Pressure fluid		Mineral oil (HL, HLP) to DIN 51 524 further pressure fluids on request!					
Degree of contamination		Max. permissible degree of contamination of the pressure fluid is to NAS 1638				A filter with a minimum retention rate of $\beta_x \geq 75$ is recommended	
Pilot control valve		class 7				x = 5	
Main valve		class 9				x = 15	
Pressure fluid temperature range	°C	10 to + 80, preferably 40 to 50					
Viscosity range	mm ² /s	20 to 380, preferably 30 to 45					
Hysteresis	%	≤ 0.1					
Response sensitivity	%	≤ 0.05					
Electrical							
Valve protection to DIN 40 050		IP 65 with fitted and secured plug-in connector					
Voltage type		DC					
Signal type		analogue					
Power, max.	W	72 (average value = 24 W)					
Electrical connections:		with component plug to E DIN 43 563-AM6					
separate order, see page 6		plug-in connector to E DIN 43 563-BF6-3-Pg11					
		plug-in connector to E DIN 43 563-BF6-3-Pg13,5					
Control electronics		VT 13060 (integrated in the valve, see page 7)					

¹⁾ Type 4WRTE 25 ...500.-4XH/... (High-flow design)

²⁾ For optimum system behaviour we recommend, for pressures above 210 bar, an external pilot oil supply.

Note: For details regarding the **environmental simulation test** covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29 083-U (declaration regarding environmental compatibility).

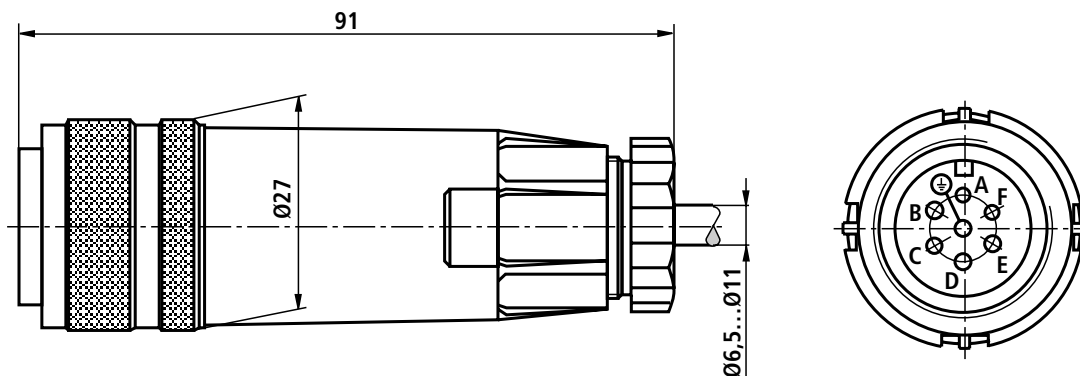
Electrical connections, plug-in connector

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 7

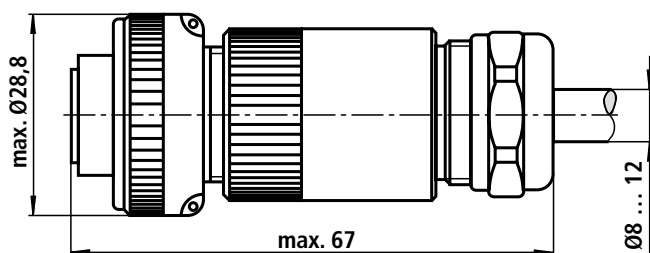


Plug-in connector

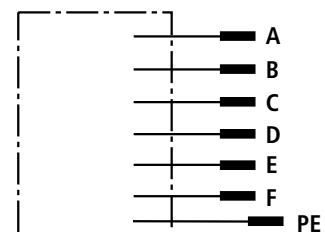
Plug-in connector to E DIN 43 563-BF6-3-Pg13.5

Separate order under material no. **00223890** (metal version)

For pin allocation see block circuit diagram on page 7



Component plug allocation



Integrated control electronics
(see page 7)

	Contact	Signal
Supply voltage	A	24 VDC (18 to 35 VDC); $I_{\max} = 3 \text{ A}$; impulse load = 4 A
	B	0 V
Ref. (actual value)	C	ref. potential for actual value (contact F)
Differential amplifier input (command value)	D	$\pm 10 \text{ V}$ or 4 – 20 mA
	E	0 V ref. potential
Measurement output (act. value)	F	$\pm 10 \text{ V}$ or 4 – 20 mA
	PE	connect to cooling body and valve housing

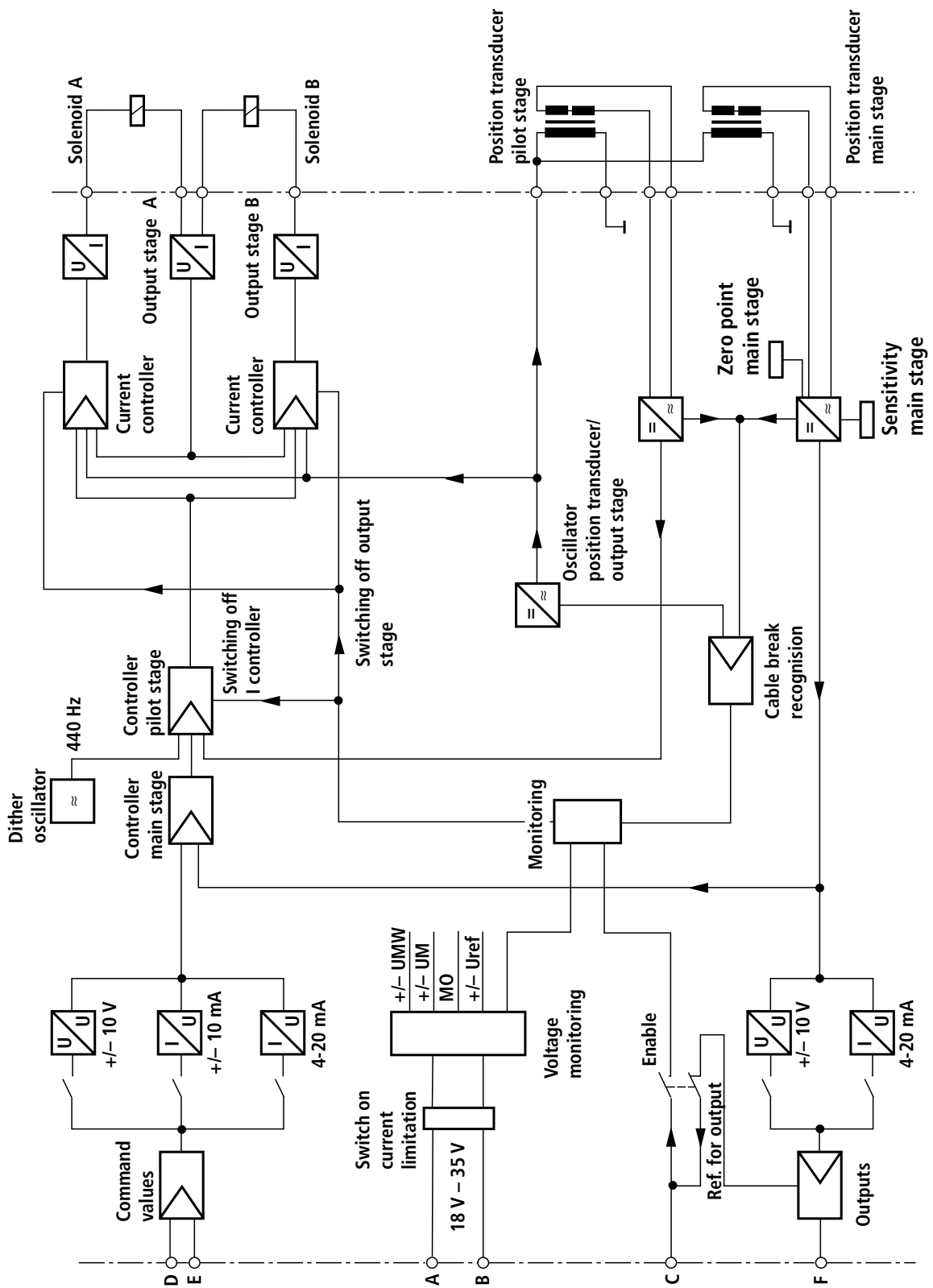
Command value: Ref. potential at E and a positive command value at D results in flow from P to A and B to T
Ref. potential at E and a negative command value at D results in flow from P to B and A to T

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
Outside diameter: – 6.5 to 11 mm (plastic plug-in connector)
– 8 to 12 mm (metal plug-in connector)

Only attach the screen to \perp on the supply side.

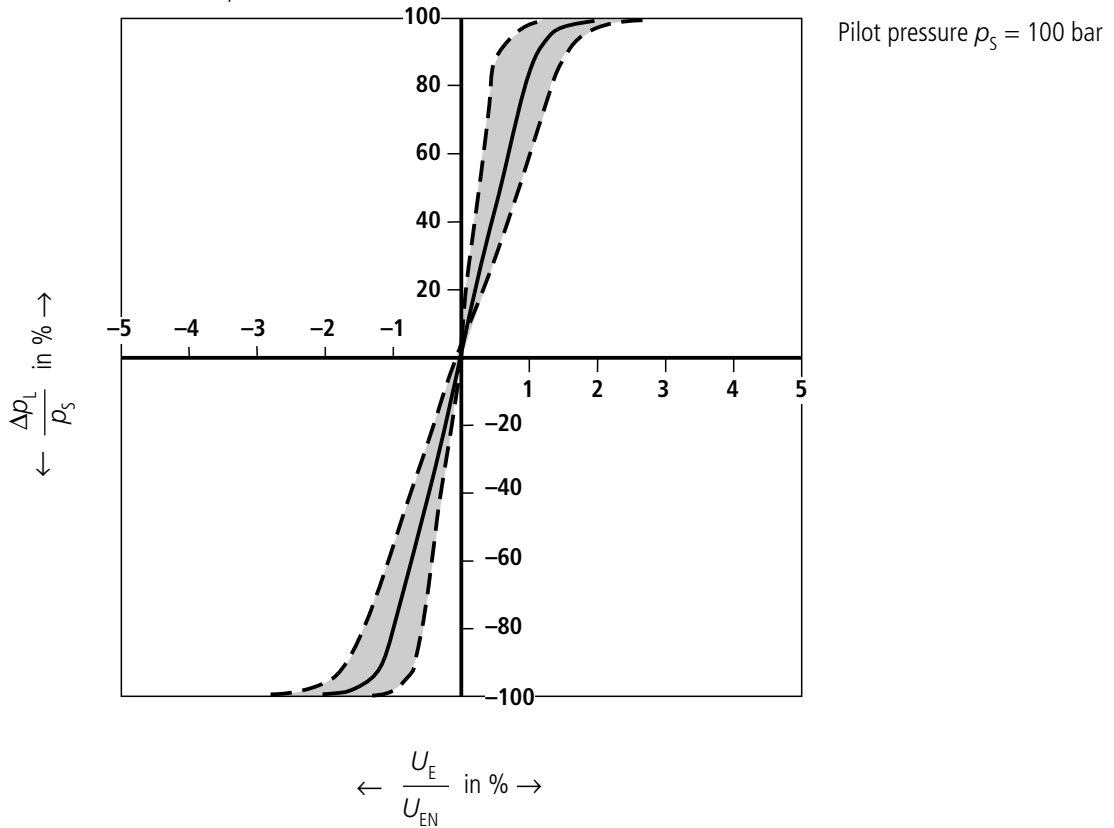
Note: **Electrical signals (e.g. actual value) taken via valve electronics must not be used to switch off the machine safety functions!**
(This is in accordance with the regulations to the European Standard „Safety requirements of fluid technology systems and components – hydraulics“, EN 982!)

Connection allocation and block circuit diagram for the integrated control electronics type VT 13060

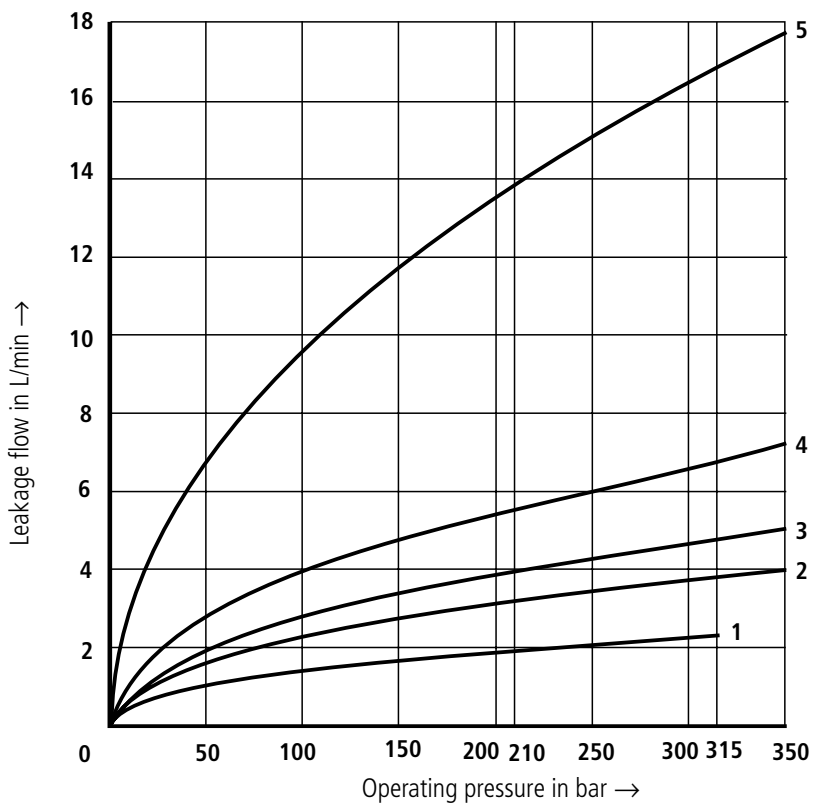


Characteristic curves (measured with HLP 46 at 40 °C ± 5 °C and $p = 100$ bar)

Pressure-signal-characteristic curve (V spool)



Leakage flow of the main stage (V spool) with pilot control valve

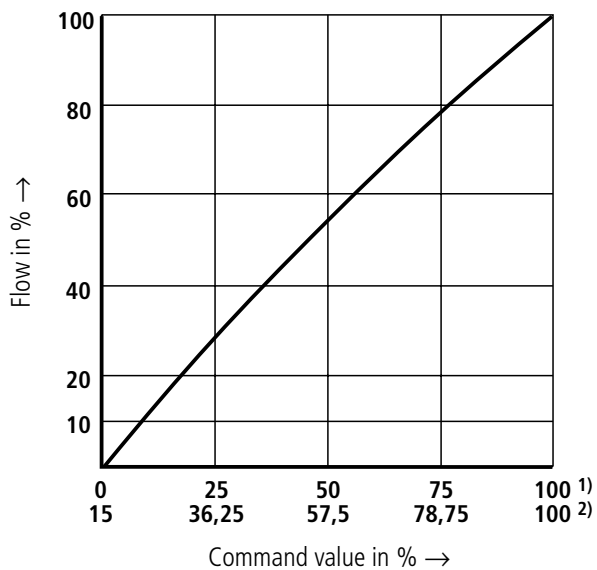


- 1 = Nominal size 10
- 2 = Nominal size 16
- 3 = Nominal size 25
- 4 = Nominal size 32
- 5 = Nominal size 35
- Nominal size 25 (High-flow design)

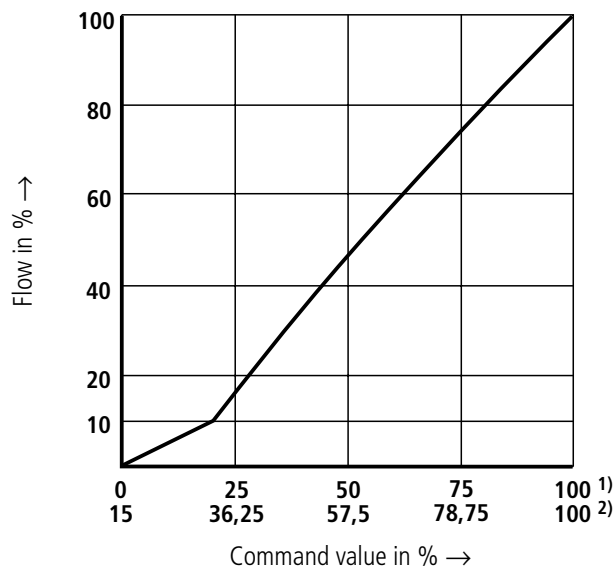
Characteristic curves (measured at 10 bar valve pressure differential or 5 bar per control land)

Spool symbols E, W6 and V

Spools with characteristic curve **L**

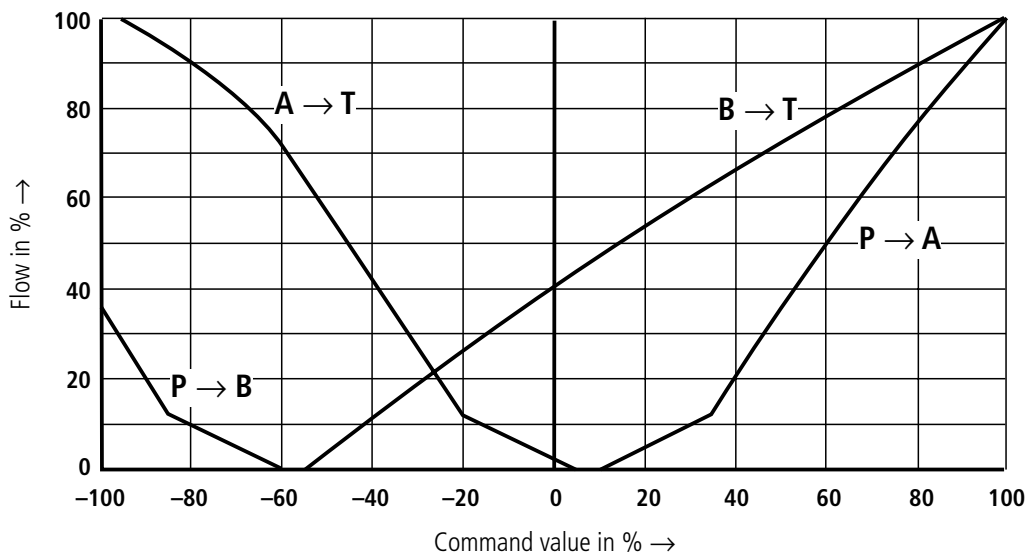


Spools with characteristic curve **P**

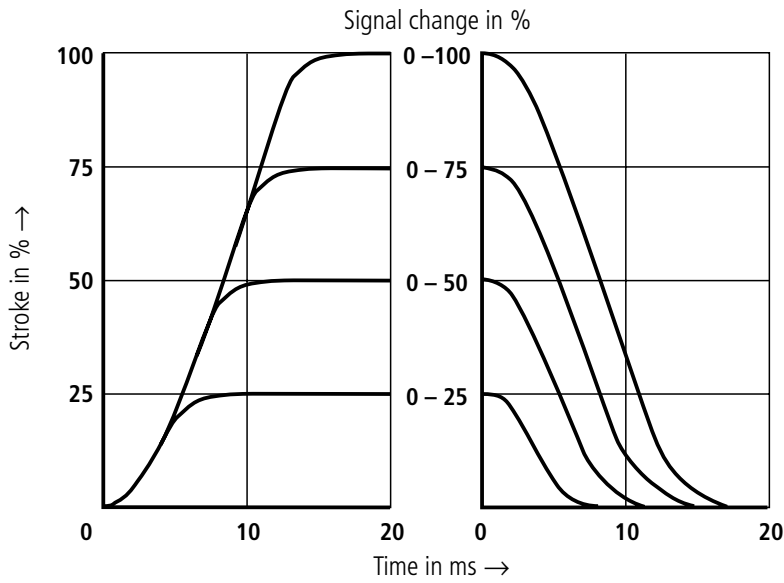


- 1) Positive overlap 0 to 0.5 % for spool symbol **V**,
- 2) Positive overlap 15 % for spool symbols **E** and **W6**

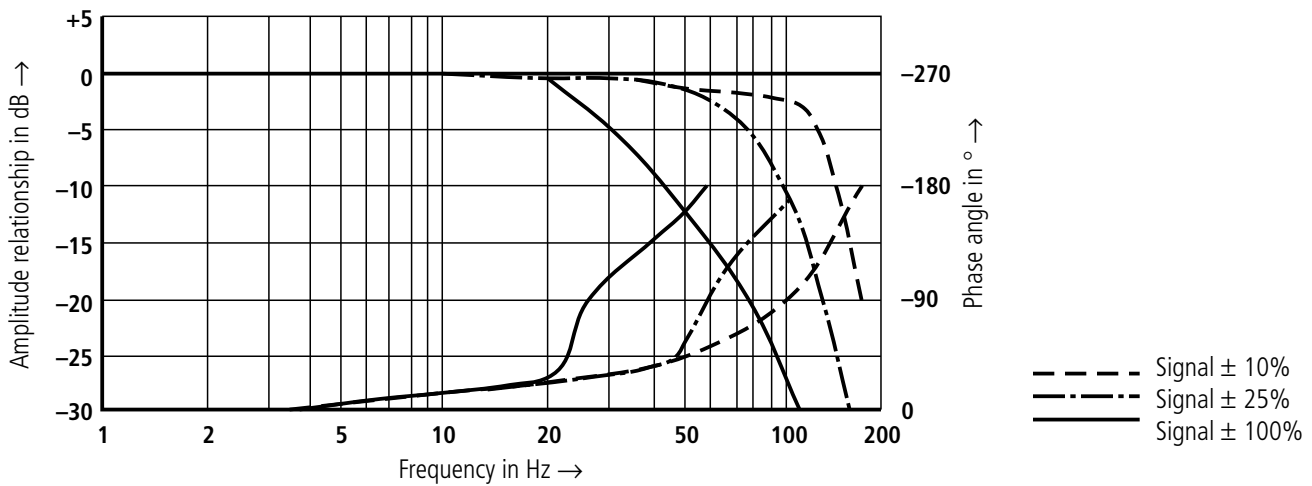
Spool symbols Q2



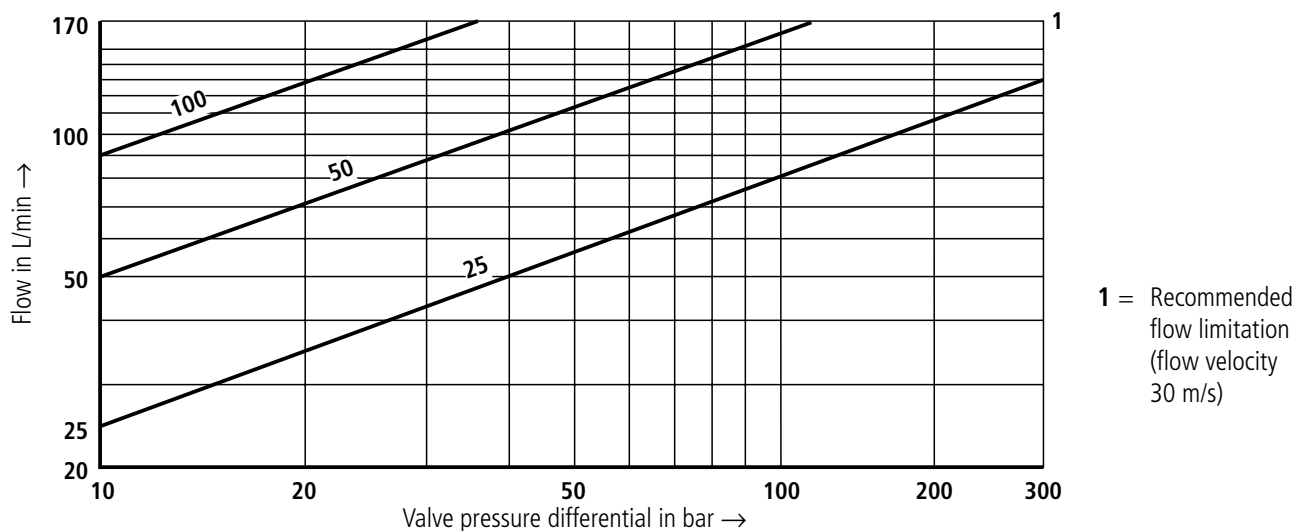
Transient function with a stepped form of electrical input signal



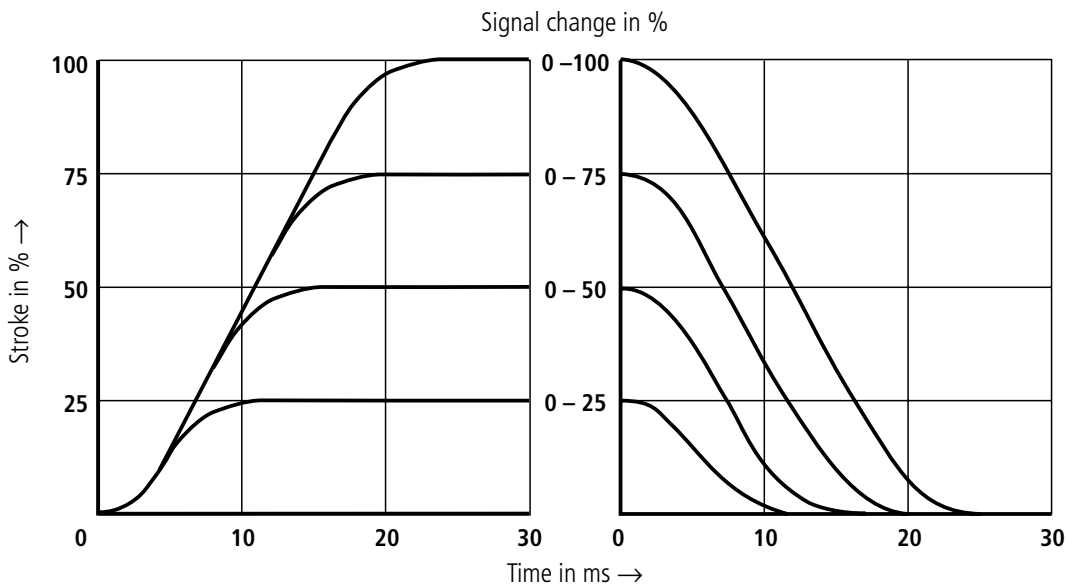
Frequency response characteristic curves



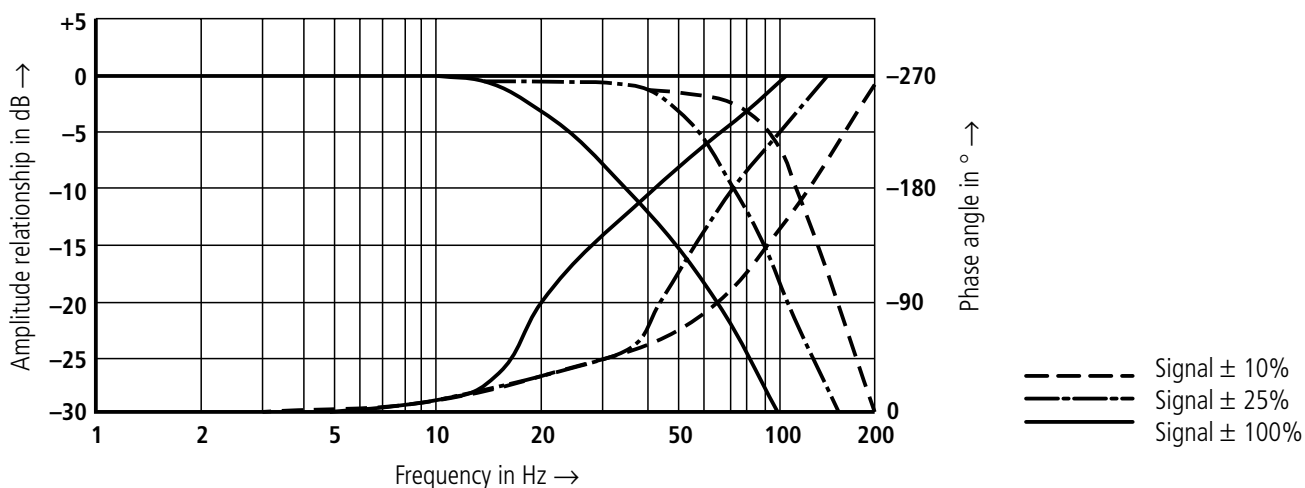
Flow-load function at max. valve opening (tolerance $\pm 10\%$)



Transient function with a stepped form of electrical input signal

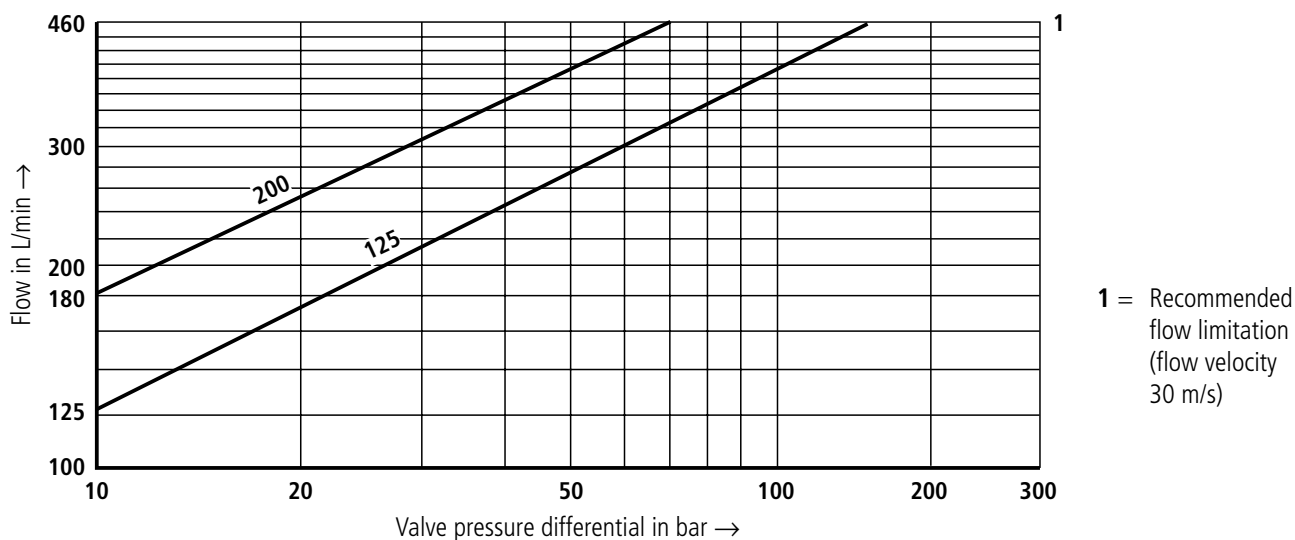


Frequency response characteristic curves

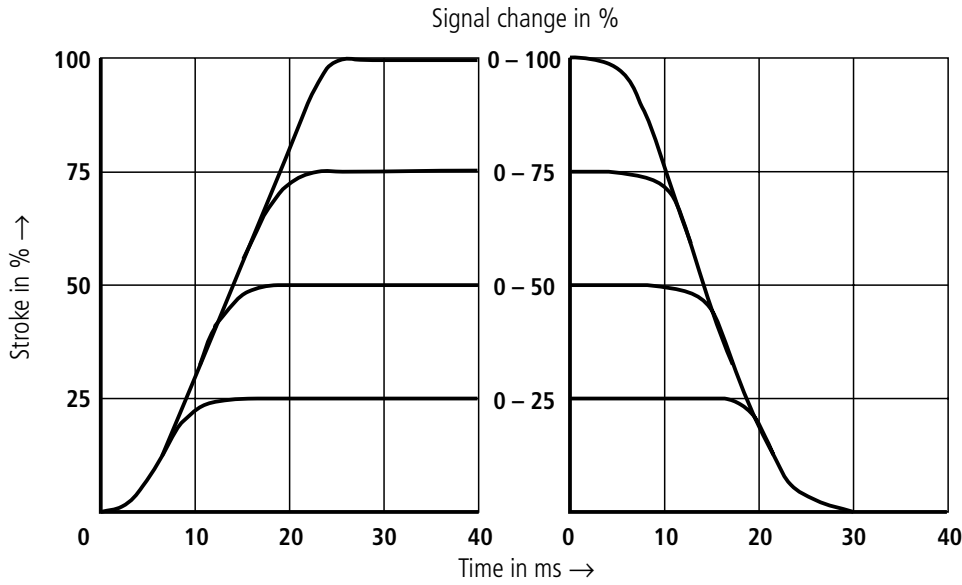


Flow-load function at max. valve opening

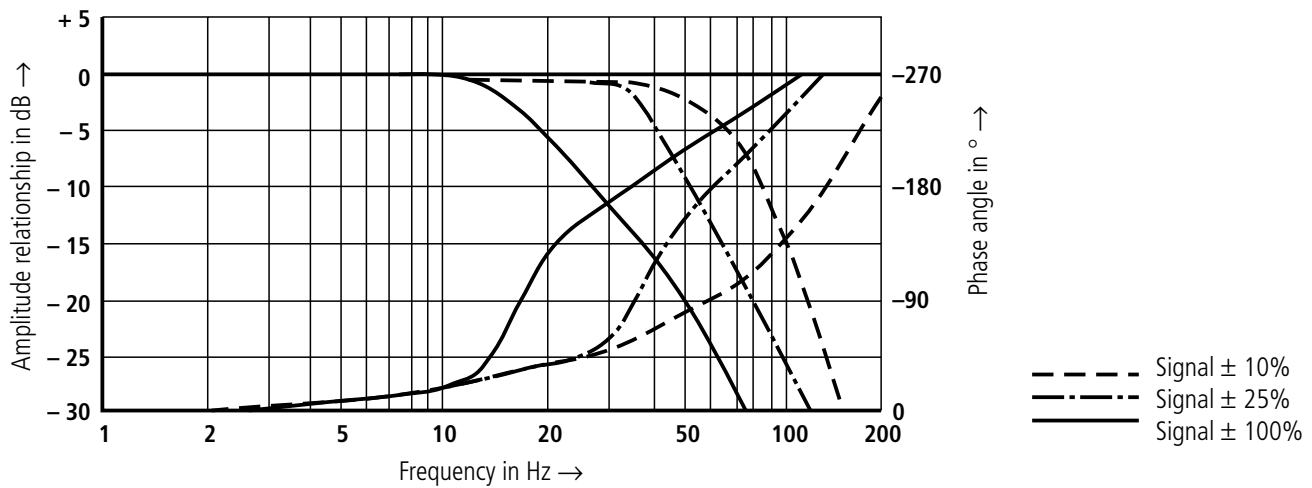
(tolerance ± 10 %)



Transient function with a stepped form of electrical input signal

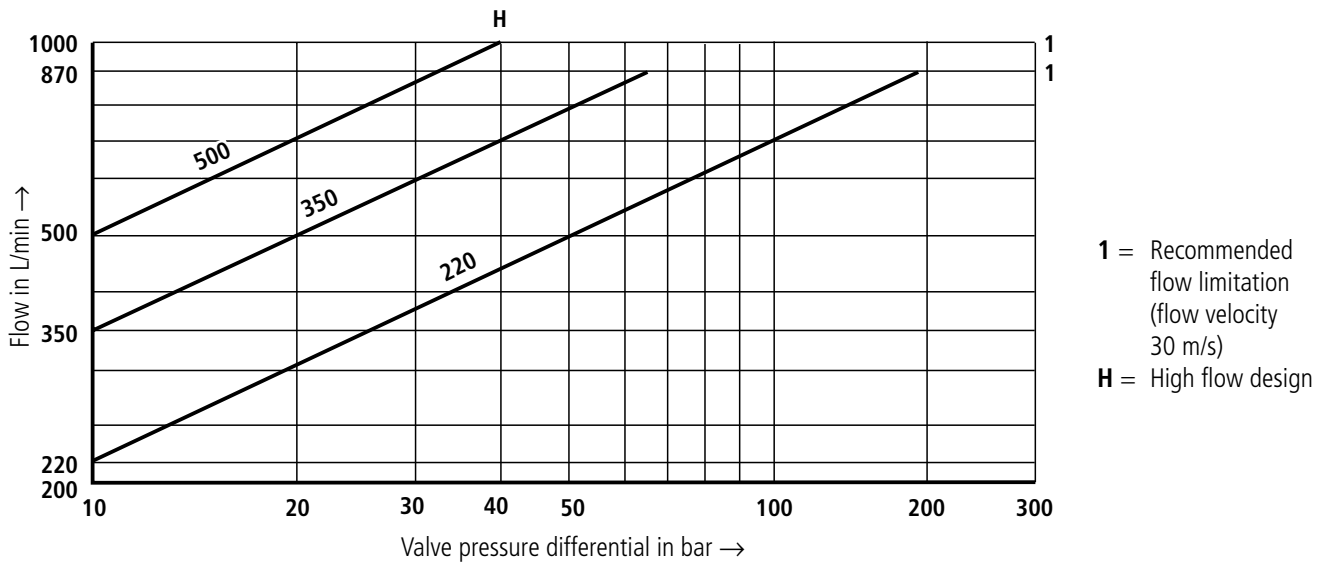


Frequency response characteristic curves



Flow-load function at max. valve opening

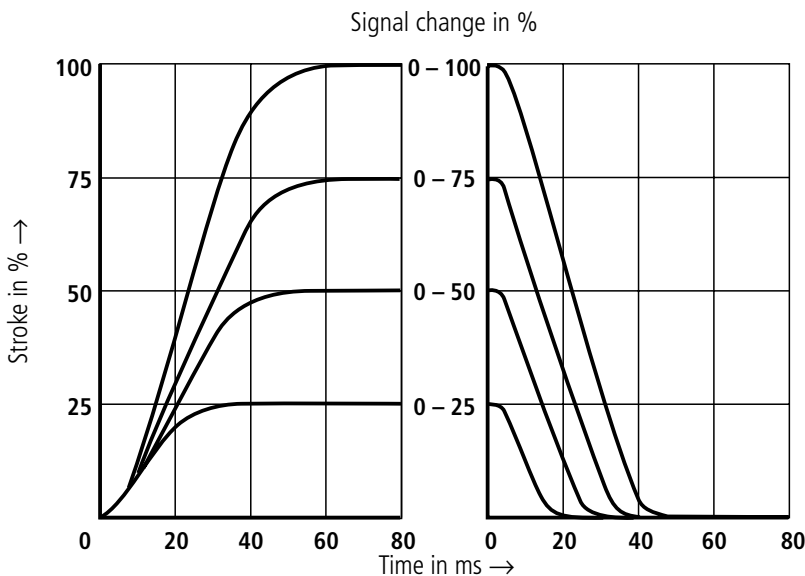
(tolerance ± 10 %)



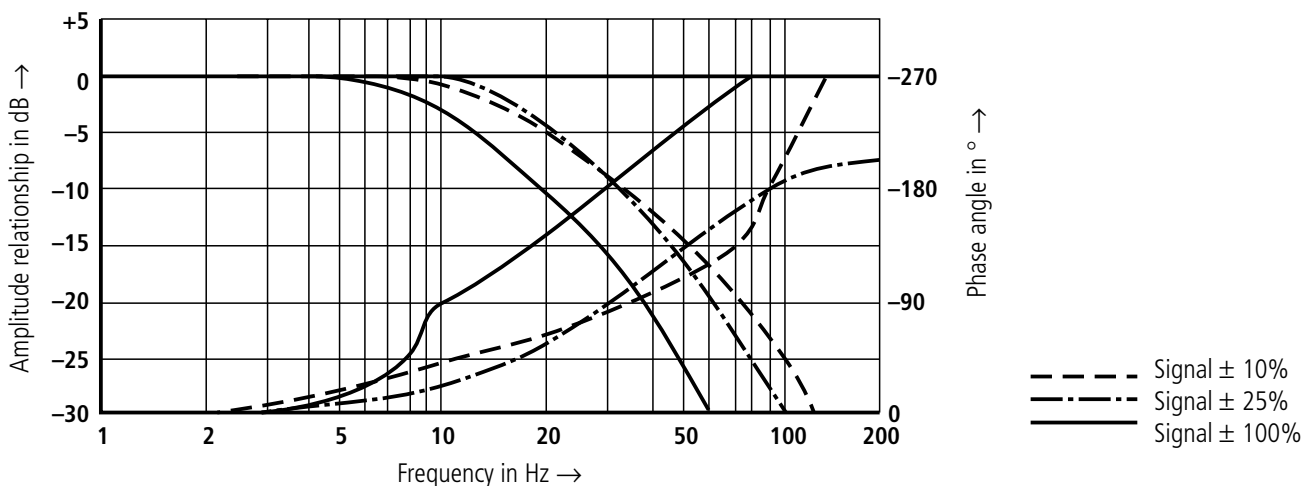
Characteristic curves (measured with HLP 46 at 40 °C ± 5 °C and $p = 100$ bar)

NS 32

Transient function with a stepped form of electrical input signal

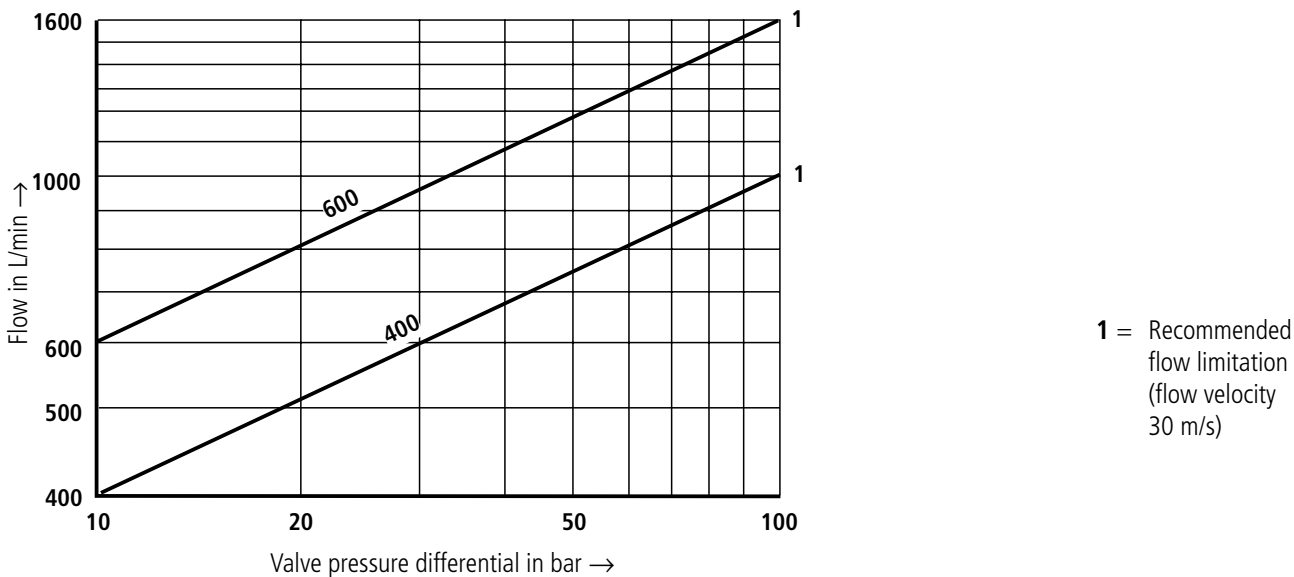


Frequency response characteristic curves

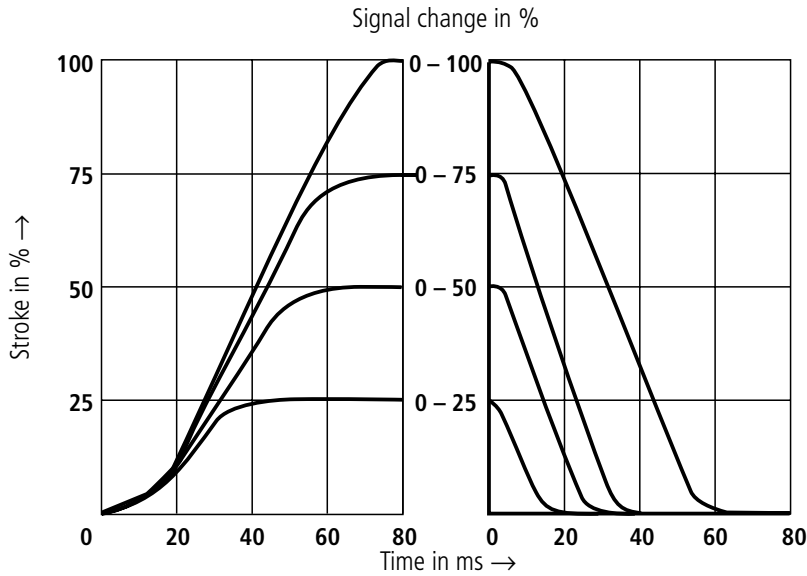


Flow-load function at max. valve opening

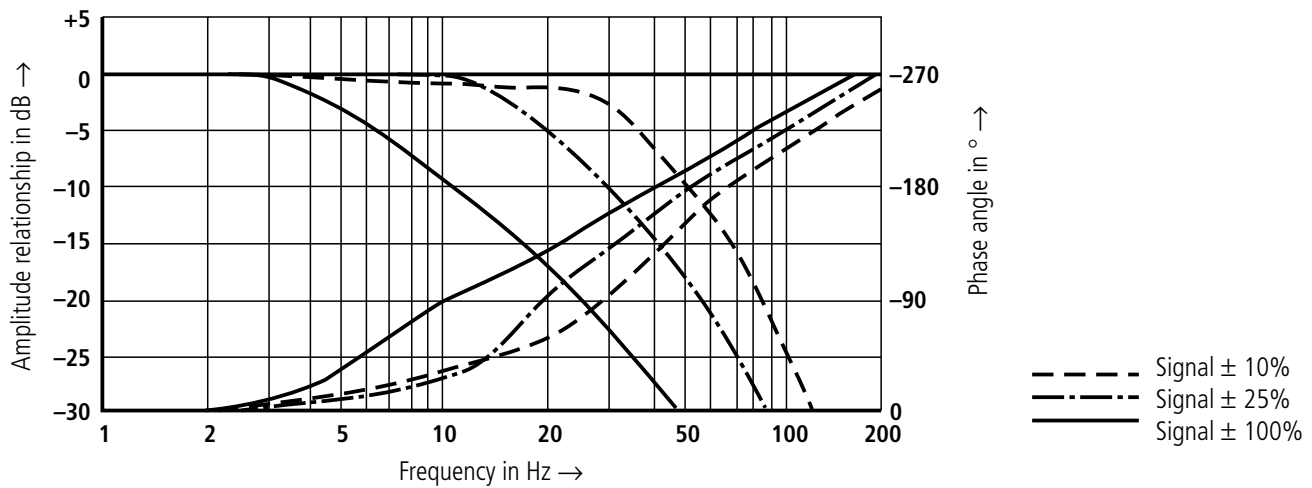
(tolerance ± 10 %)



Transient function with a stepped form of electrical input signal

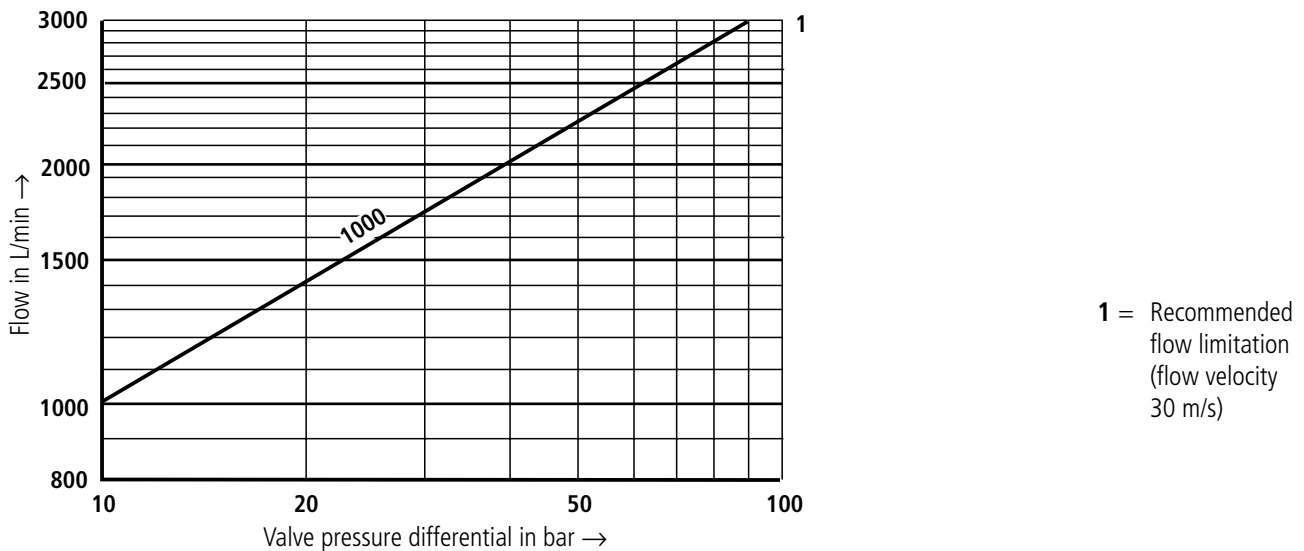


Frequency response characteristic curves



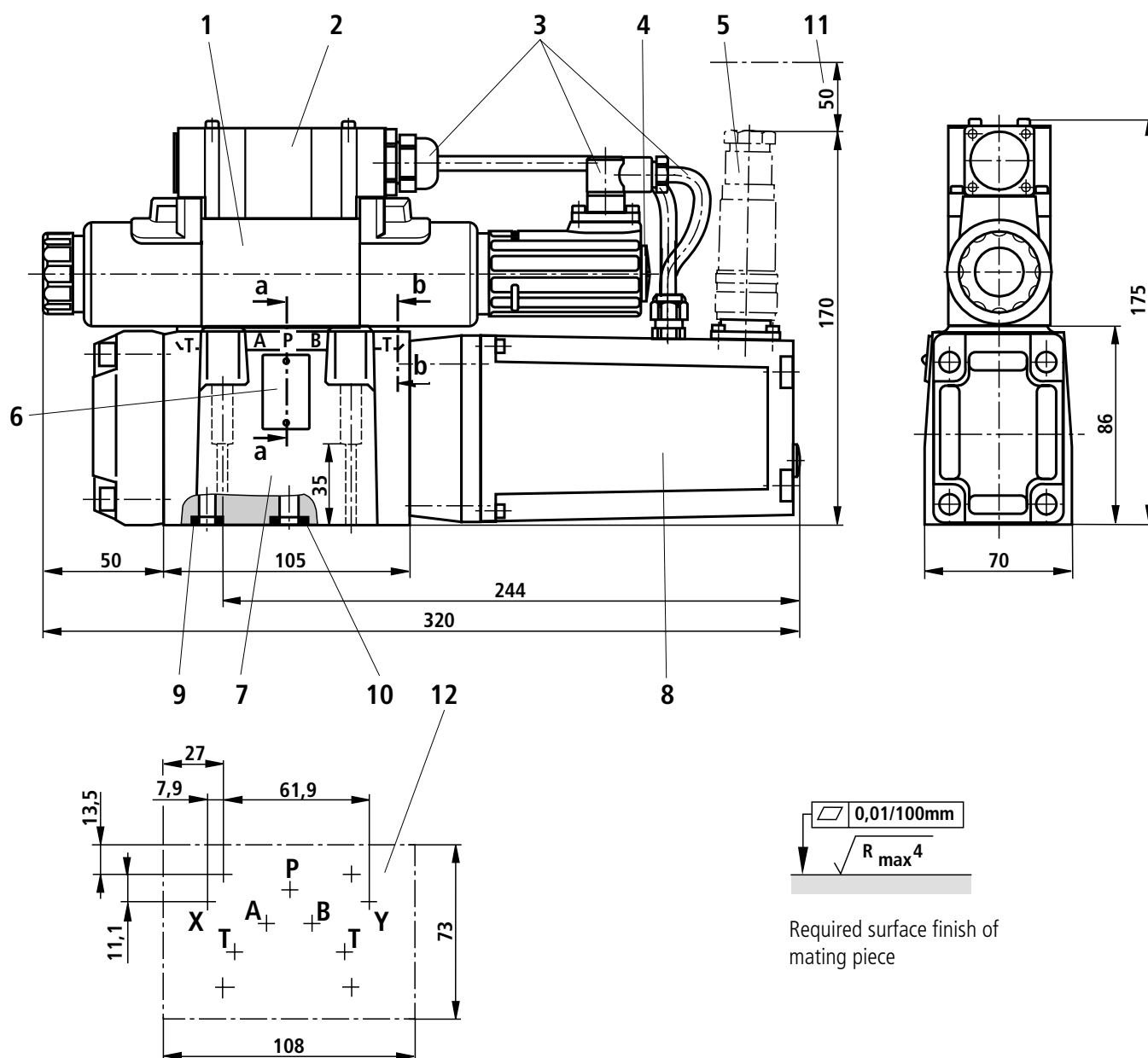
Flow-load function at max. valve opening

(tolerance ± 10 %)



Unit dimensions: NS 10

(Dimensions in mm)



- 1 Pilot control valve
- 2 Electrical connections
- 3 Cabling and plug-in connector
- 4 Inductive position transducer (pilot control valve)
- 5 Plug-in connector 6-pin (plastic version) + PE to DIN 43 563 separate order, see page 6
- 6 Name plate
- 7 Main valve
- 8 Control electronics and inductive position transducer (main valve)
- 9 R-ring 11.18 x 1.6 x 1.78 (O-ring 10.82 x 1.78) ports X, Y
- 10 R-ring 13 x 1.6 x 2.0 (O-ring 12 x 2) ports A, B, P, T
- 11 Space required for the connection cable and to remove the plug-in connector

- 12 Machined valve mounting surface, position of ports to DIN 24 340 form A (ports X, Y as required)

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

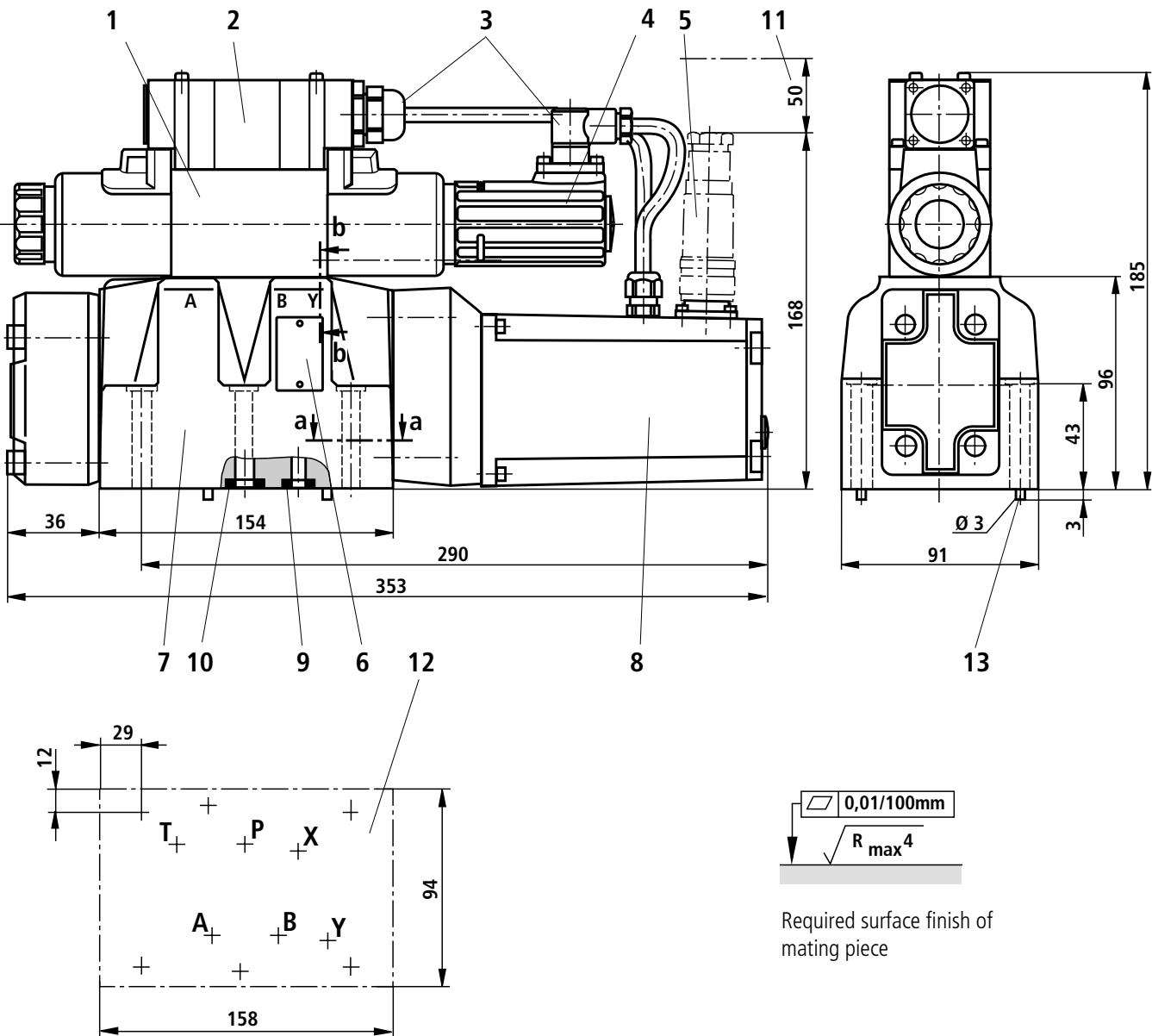
Subplates: G 534/01 (G 3/4)
G 535/01 (G 3/4) with ports X and Y
G 536/01 (G 1) with ports X and Y

Valve fixing screws:
4 off M6 x 45 DIN 912-10.9; $M_A = 15.5 \text{ Nm}$

For sectional view see page 20

Unit dimensions: NS 16

(Dimensions in mm)



- 1 Pilot control valve
- 2 Electrical connections
- 3 Cabling and plug-in connector
- 4 Inductive position transducer (pilot control valve)
- 5 Plug-in connector 6-pin (plastic version) + PE to DIN 43 563 separate order, see page 6
- 6 Name plate
- 7 Main valve
- 8 Control electronics and inductive position transducer (main valve)
- 9 R-ring 10 x 2 x 2, ports X, Y
- 10 R-ring 22.53 x 2.3 x 2.62, ports A, B, P, T
- 11 Space required for the connection cable and to remove the plug-in connector
- 12 Machined valve mounting surface, position of ports to DIN 24 340 form A (ports X, Y as required)
- 13 Locating pin

Subplates to catalogue sheet RE 45 056 and valve fixing screws must be ordered separately.

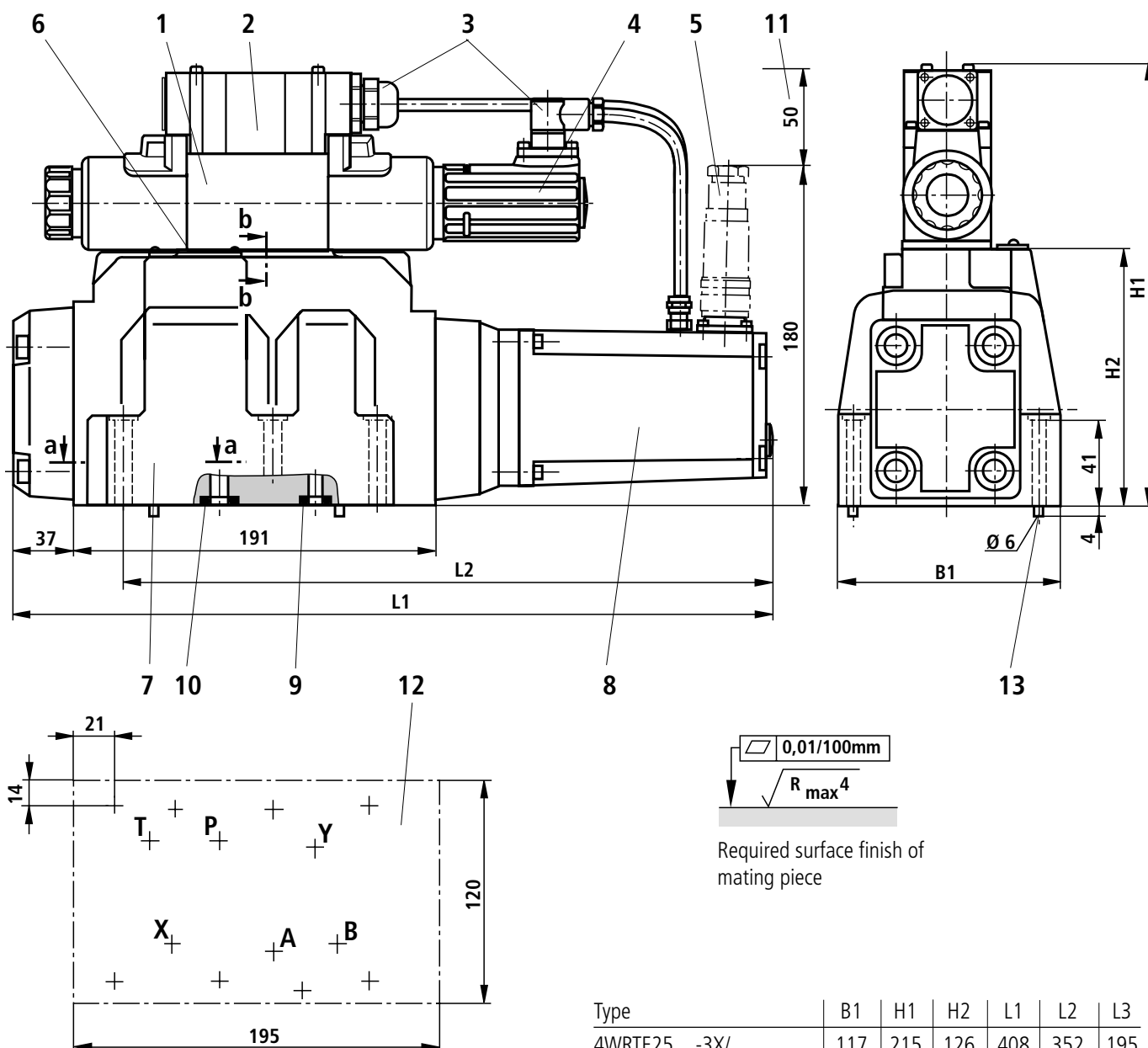
- Subplates:**
- G 172/01 (G 3/4)
 - G 172/02 (M27 x 2)
 - G 174/01 (G 1)
 - G 174/02 (M33 x 2)

- Valve fixing screws:**
- 2 off M6 x 60 DIN 912-10.9; $M_A = 15.5 \text{ Nm}$
 - 4 off M10 x 60 DIN 912-10.9; $M_A = 75 \text{ Nm}$

For sectional view see page 20

Unit dimensions: NS 25

(Dimensions in mm)



Required surface finish of mating piece

- 1 Pilot control valve
- 2 Electrical connections
- 3 Cabling and plug-in connector
- 4 Inductive position transducer (pilot control valve)
- 5 Plug-in connector 6-pin (plastic version) + PE to DIN 43 563 separate order, see page 6
- 6 Name plate
- 7 Main valve
- 8 Control electronics and inductive position transducer (main valve)
- 9 R-ring 19 x 3 x 3 (O-ring 19 x 3), ports X, Y
- 10 R-ring 27.8 x 2.6 x 3 (O-ring 27 x 3), ports A, B, P, T
- 11 Space required for the connection cable and to remove the plug-in connector
- 12 Machined valve mounting surface, position of ports to DIN 24 340 form A (ports X, Y as required)
- 13 Locating pin

Type	B1	H1	H2	L1	L2	L3
4WRTE25...-3X/...	117	215	126	408	352	195
4WRTE25... 500 .-3XH/...	120	229	140	415	357.5	200

4WRTE25...**500**.-3XH/...

Special connection holes for ports P, T, A and B with $d = 32$ mm

Subplates to catalogue sheet RE 45 058 and valve fixing screws must be ordered separately.

Subplates:
 G 151/01 (G 1)
 G 154/01 (G 1 1/4)
 G 156/01 (G 1 1/2)

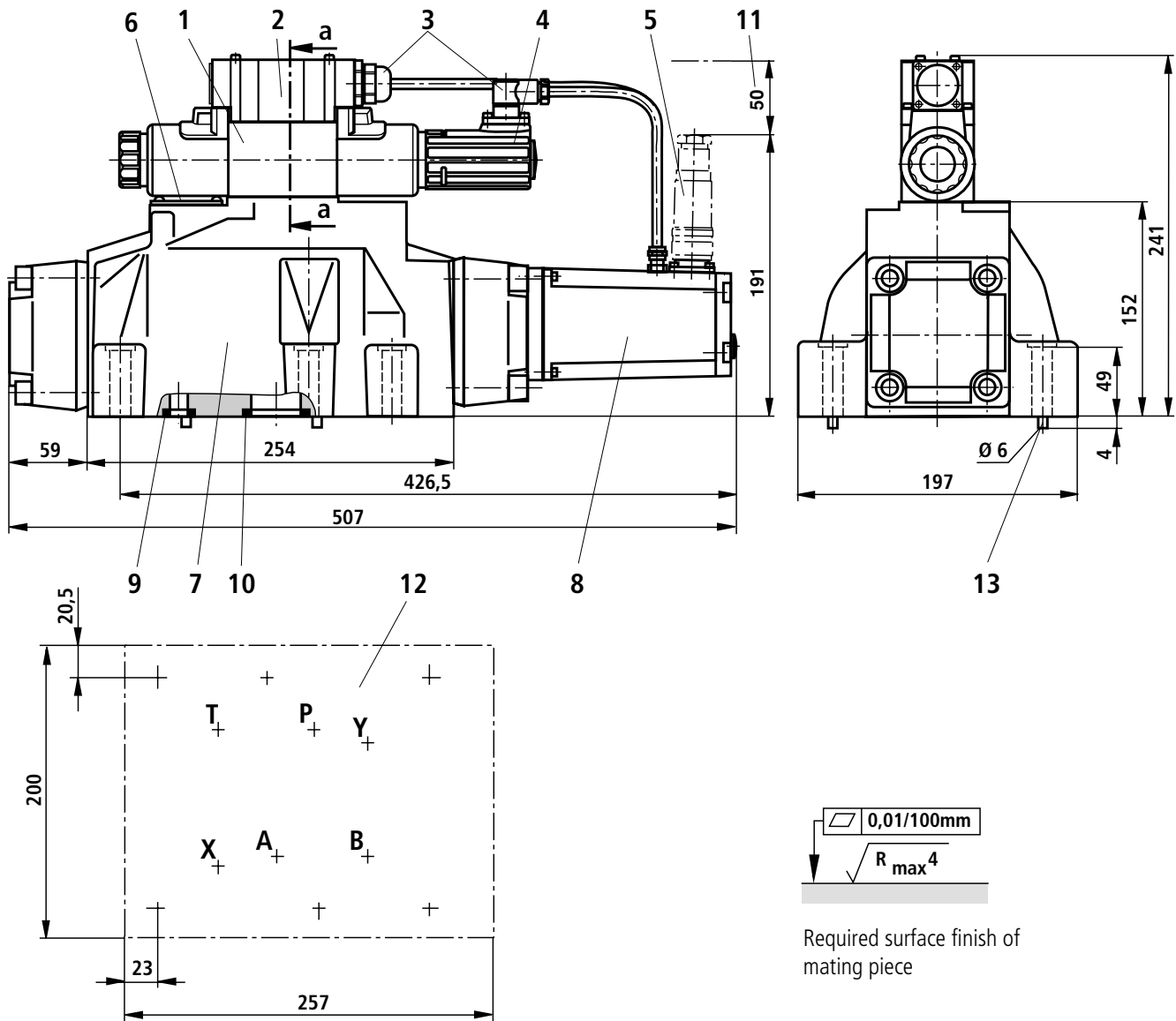
Valve fixing screws:

6 off M12 x 60 DIN 912-10.9; $M_A = 130$ Nm

For sectional view see page 20

Unit dimensions: NS 32

(Dimensions in mm)



- 1 Pilot control valve
- 2 Electrical connections
- 3 Cabling and plug-in connector
- 4 Inductive position transducer (pilot control valve)
- 5 Plug-in connector 6-pin (plastic version) + PE to DIN 43 563 separate order, see page 6
- 6 Name plate
- 7 Main valve
- 8 Control electronics and inductive position transducer (main valve)
- 9 R-ring 19 x 3 x 3 (O-ring 19 x 3), ports X, Y
- 10 R-ring 42.5 x 3 x 3 (O-ring 42 x 3), ports A, B, P, T
- 11 Space required for the connection cable and to remove the plug-in connector
- 12 Machined valve mounting surface, position of ports to DIN 24 340 form A (ports X, Y as required)
- 13 Locating pin

Subplates to catalogue sheet RE 45 058 and valve fixing screws must be ordered separately.

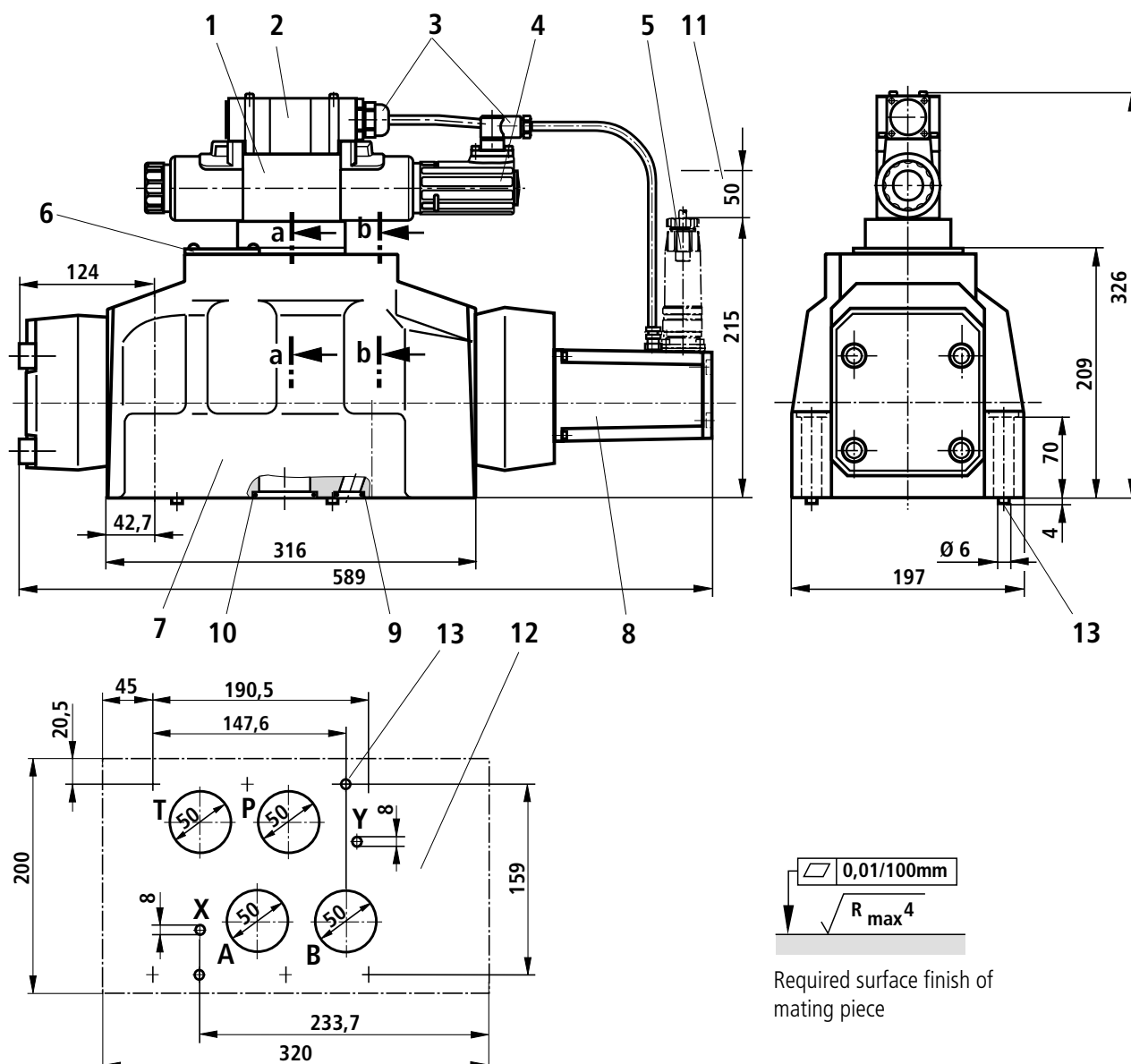
- Subplates:**
- G 157/01 (G 1 1/4)
 - G 157/02 (M48 x 2)
 - G 156/01 (flange)

Valve fixing screws:
6 off M20 x 80 DIN 912-10.9; $M_A = 430 \text{ Nm}$

For sectional view see page 20

Unit dimensions: NS 35

(Dimensions in mm)



- 1 Pilot control valve
- 2 Electrical connections
- 3 Cabling and plug-in connector
- 4 Inductive position transducer (pilot control valve)
- 5 Plug-in connector 6-pin (plastic version) + PE to DIN 43 563 separate order, see page 6
- 6 Name plate
- 7 Main valve
- 8 Control electronics and inductive position transducer (main valve)
- 9 R-ring 12.81 x 2.4 x 2.62 (O-ring 12.37 x 2.62), ports X, Y
- 10 R-ring 54.5 x 3.53 x 3.53 (O-ring 53.57 x 3.53), ports A, B, P, T
- 11 Space required for the connection cable and to remove the plug-in connector
- 12 Machined valve mounting surface, position of ports to DIN 24 340 form A, ISO 4401 and CETOP-RP121H
- 13 Locating pin

Valve fixing screws

6 off M20 x 100 DIN 912-10.9; $M_A = 430$ Nm must be ordered separately.

For sectional view see page 20

Pilot oil supply

Type 4WRTE...-4X/...

External pilot oil supply
External pilot oil drain

With this version the pilot oil supply is from a separate control circuit (external).

The pilot oil drain is not passed into the T port of the main valve but separately into the tank via port Y (external).

Type 4WRTE...-4X/...E...

Internal pilot oil supply
External pilot oil drain

With this version the pilot oil supply is from the P port of the main valve (internal).

The pilot oil drain is not passed into the T port of the main valve but separately into the tank via port Y (external).

Port X has to be plugged on the subplate.

Type 4WRTE...-4X/...ET...

Internal pilot oil supply
Internal pilot oil drain

With this version the pilot oil supply is from the P port of the main valve (internal).

The pilot oil drain is passed directly into the T port of the main valve (internal).

The port Y has to be plugged on the subplate.

Type 4WRTE...-4X/...T...

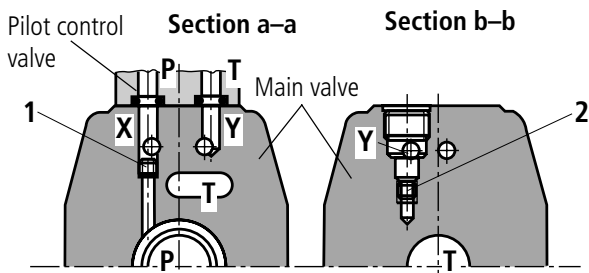
External pilot oil supply
Internal pilot oil drain

With this version the pilot oil supply is from a separate control circuit (external).

The pilot oil drain is passed directly into the T port of the main valve (internal). The port Y has to be plugged on the subplate.

Pos. 1 and 2: Plug M6 DIN 906-8.8 3A/F

NS 10 For cross-section see page 15

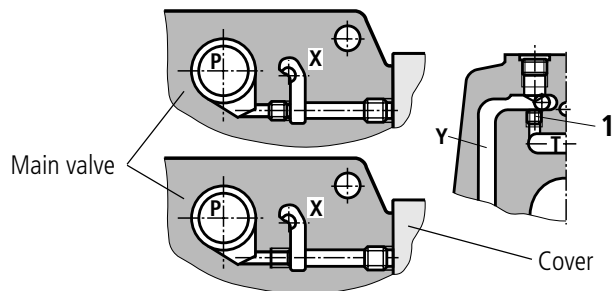


Pilot oil supply (section a-a)	external:	1	closed
	internal:	1	open
Pilot oil drain (section b-b)	external:	2	closed
	internal:	2	open

NS 16 For cross-section see page 16

Section a-a

Section b-b

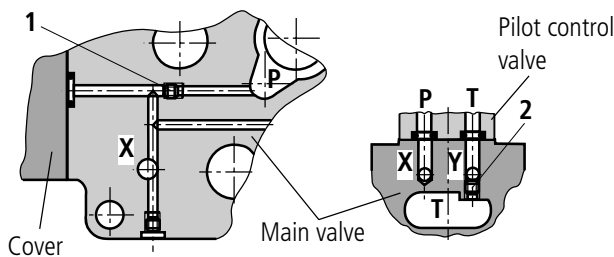


Pilot oil supply (section a-a)	external:	P	closed
	internal:	P	open
Pilot oil drain (section b-b)	external:	1	closed
	internal:	1	open

NS 25 For cross-section see page 17

Section a-a

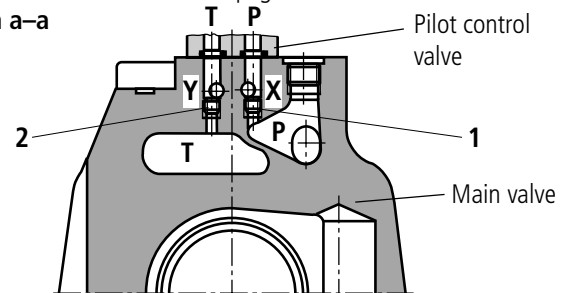
Section b-b



Pilot oil supply (section a-a)	external:	1	closed
	internal:	1	open
Pilot oil drain (section b-b)	external:	2	closed
	internal:	2	open

NS 32 For cross-section see page 18

Section a-a

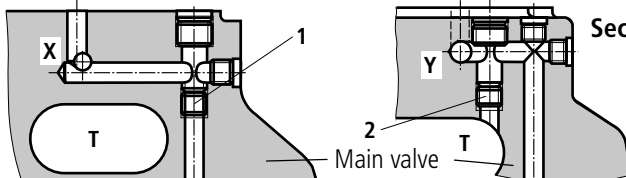


Pilot oil supply	external:	1	closed
	internal:	1	open
Pilot oil drain	external:	2	closed
	internal:	2	open

NS 35 For cross-section see page 19

Section a-a

Section b-b



Pilot oil supply (section a-a)	external:	1	closed
	internal:	1	open
Pilot oil drain (section b-b)	external:	2	closed
	internal:	2	open

Mannemann Rexroth AG
Rexroth Hydraulics

D-97813 Lohr am Main
Jahnstraße 3-5 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0
Telefax 0 93 52 / 18-23 58 • Telex 6 89 418-0
eMail documentation@rexroth.de
Internet www.rexroth-hydraulics.com

Mannemann Rexroth Limited

Cromwell Road, St Neots,
Cambs, PE19 2ES
Tel: 0 14 80/22 32 56
Fax: 0 14 80/21 90 52
E-mail: info@rexroth.co.uk

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