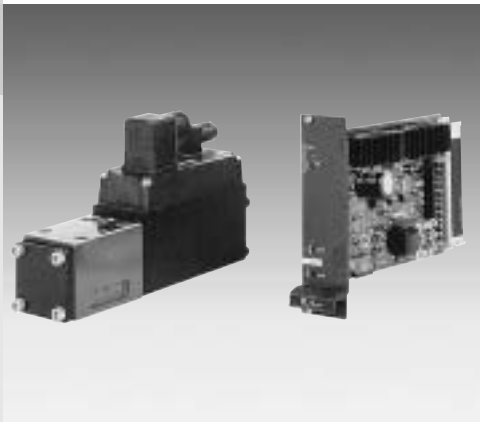
Servo solenoid valves with electrical position feedback (Lvdt DC/DC ±10 V)

RE 29028/01.05 1/10
Replaces: 09.03

Type 4WRPH 6



Size 6
Unit series 2X
Maximum working pressure P, A, B 315 bar, T 250 bar
Nominal flow rate 2...40 l/min (Δp 70 bar)

List of contents

Features

- Directly operated servo solenoid valve NG6, with control piston and sleeve in servo quality
- Actuated on one side, 4/4 fail-safe position when switched off
- Control solenoid with integral position feedback and electronics for position transducer (Lvdt DC/DC)
- Suitable for electrohydraulic controllers in production and testing systems
- For subplate attachment, mounting hole configuration to ISO 4401-03-02-0-94
- Subplates as per catalogue section RE 45053 (order separately)
- Line sockets to DIN 43560-AM2
  Solenoid 2P+PE/M16 x 1.5, position transducer 4P/Pg7 in scope of delivery, see catalogue section RE 08008
- External trigger electronics (order separately)
  - Electric amplifier for standard curve “L” 0 811 405 060, see catalogue section RE 30041
  - Electric amplifier for non-linear curve “P” 40 % – 0 811 405 065 and 60 % – 0 811 405 066, see catalogue section RE 30040

Variants on request

- For standard applications
- Special symbols for plastic machines
- Sturdy “ruggedized” version for applications up to 40 g, valve with metal cap and central plug (7P).

Ordering data and scope of delivery

4WRP		H	6		B		–2X/G24	Z4/ M	*

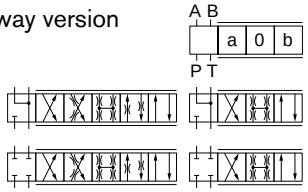
For **external** trigger eletronics **= no desig.**

Control piston/sleeve **= H**

Size 6 **= 6**

Symbols

4/4-way version



= C3, C5

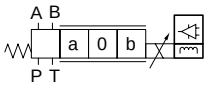
= C4, C1

With symbols C5 and C1: [3]

P → A: q_v B → T: q_v/2

P → B: q_v/2 A → T: q_v

Side of inductive position tranducer



(Standard) **= B**

[1] Only in connection with flow characteristic “p”

[2] Kink 60 % for NG6 with nominal flow rate “15” and “25”, otherwise kink 40 %

[3] q_v 2:1 only with nominal flow rate = 40 l/min

Further information in plain text

M = NBR seals, suitable for mineral oils (HL, HLP) to DIN 51524

Electronical connection

Z4 = with line socket, with plug to DIN 43560-AM2

Line socket in scope of delivery

Voltage supply of trigger electronics

G24 = +24 V DC

2X = Unit series 20 to 29 (installation and connection dimensions unchanged)

Flow characteristic

L = Linear

P = Non-linear curve [2]

Nominal flow rate at 70 bar valve pressure difference (35 bar /metering notch)

Size 6

02 = 2 l/min

04 = 4 l/min

12 = 12 l/min

15 [1] = 15 l/min

24 = 24 l/min

25 [1] = 25 l/min

40 [3] = 40 l/min

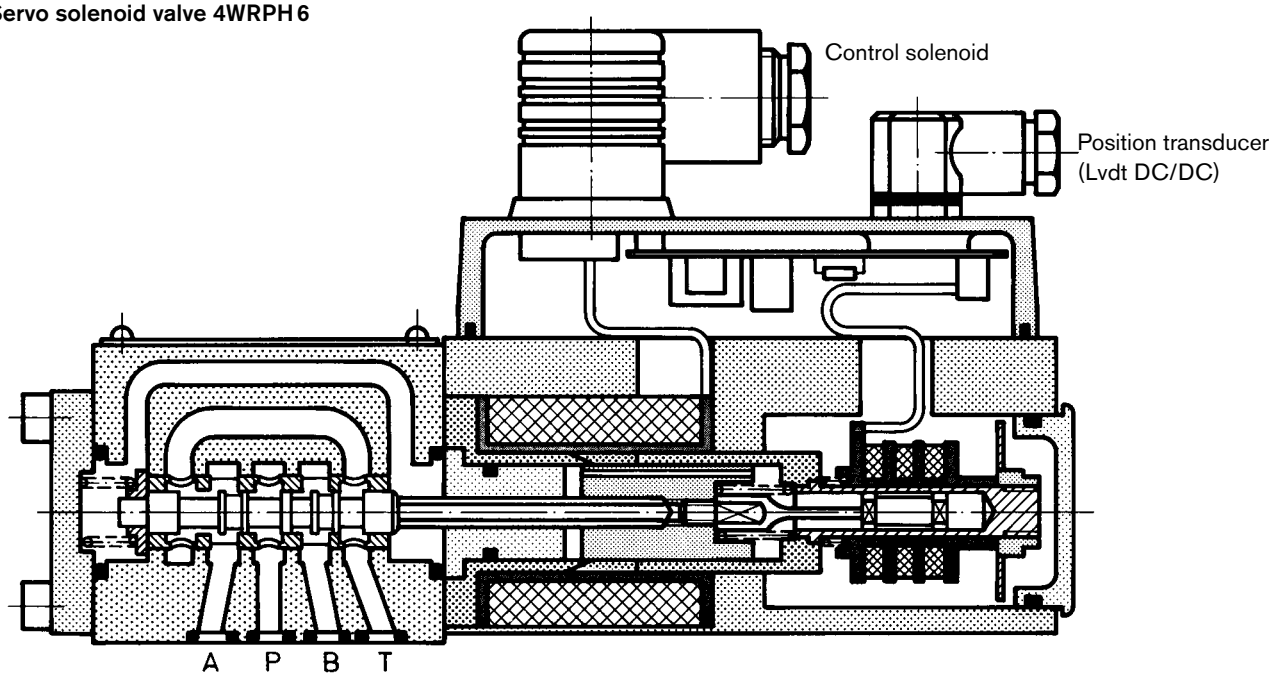
Preferred types (available at short notice)

Type 4WRPH 6	Material no.
C3/C5	
4WRPH 6 C3B02L –2X/G24Z4 /M	**0 811 404 041**
4WRPH 6 C3B04L –2X/G24Z4 /M	**0 811 404 033**
4WRPH 6 C3B12L –2X/G24Z4 /M	**0 811 404 034**
4WRPH 6 C3B24L –2X/G24Z4 /M	**0 811 404 035**
4WRPH 6 C3B40L –2X/G24Z4 /M	**0 811 404 036**
4WRPH 6 C5B40L –2X/G24Z4 /M	**0 811 404 510**
4WRPH 6 C3B15P –2X/G24Z4 /M	**0 811 404 047**
4WRPH 6 C3B25P –2X/G24Z4 /M	**0 811 404 043**
4WRPH 6 C3B40P –2X/G24Z4 /M	**0 811 404 044**
4WRPH 6 C5B40P –2X/G24Z4 /M	**0 811 404 511**

Type 4WRPH 6	Material no.
C1/C4	
4WRPH 6 C4B02L –2X/G24Z4 /M	**0 811 404 512**
4WRPH 6 C4B04L –2X/G24Z4 /M	**0 811 404 160**
4WRPH 6 C4B12L –2X/G24Z4 /M	**0 811 404 037**
4WRPH 6 C4B24L –2X/G24Z4 /M	**0 811 404 038**
4WRPH 6 C4B40L –2X/G24Z4 /M	**0 811 404 039**
4WRPH 6 C1B40L –2X/G24Z4 /M	**0 811 404 513**
4WRPH 6 C4B15P –2X/G24Z4 /M	**0 811 404 048**
4WRPH 6 C4B25P –2X/G24Z4 /M	**0 811 404 045**
4WRPH 6 C4B40P –2X/G24Z4 /M	**0 811 404 046**
4WRPH 6 C1B40P –2X/G24Z4 /M	**0 811 404 162**

Function, sectional diagram

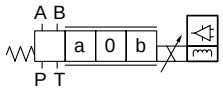
Servo solenoid valve 4WRPH 6

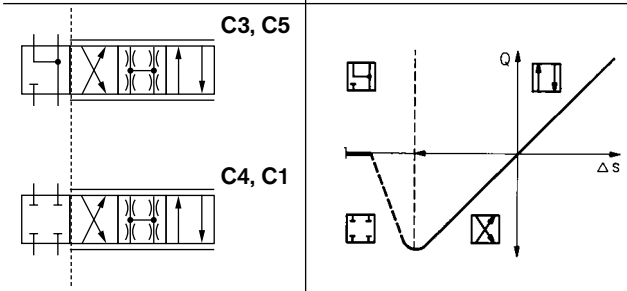
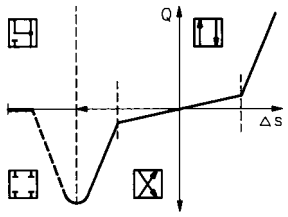
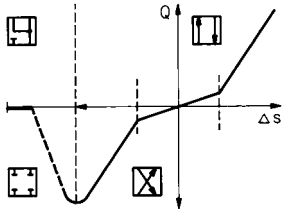


Valve body

Control solenoid with position transducer

Symbols



	Linear	p: kink 60 % [q_n 15,25 l/min]	p: kink 40 % [q_n 40 l/min]
C3, C5 **C4, C1**			
	C3, C5, C4, C1		
	Standard = 1:1, from q_n 40 l/min also 2:1		

Accessories, not included in scope of delivery

(4 x) M5 x 30 DIN 912–10.9	Fastening screws	**2910151166**
	VT-VRRA1-527-20/V0, see RE 30041	**0811405060**
	VT-VRRA1-527-20/V0/K60-AGC, see RE 30040	**0811405066**
	VT-VRRA1-527-20/V0/K40-AGC, see RE 30040	**0811405065**
 2P+PE 4P	2P+PE (M16 x 1.5) and 4P (Pg7) included in scope of delivery, see also RE 08008	

Application

– Valve amplifier with pressure compensator (p/Q), see RE 30058.

Testing and service equipment

– Test box type VT-PE-TB2, see RE 30064.
– Test adapter type VT-PA-3, see RE 30070.

Technical Data

General

Construction		Spool type valve, operated directly, with steel sleeve
Actuation		Proportional solenoid with position control, external amplifier
Type of mounting		Subplate, mounting hole configuration NG6 (ISO 4401-03-02-0-94)
Installation position		Optional
Ambient temperature range	°C	–20 … +50
Weight	kg	2.3
Vibration resistance, test condition		Max. 25 g, shaken in 3 dimensions (24 h)

Hydraulic (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

Pressure fluid			Hydraulic oil to DIN 51524 … 535, other fluids after prior consultation					
Viscosity range	recommended	mm²/s	20 … 100					
	max. permitted	mm²/s	10 … 800					
Pressure fluid temperature range		°C	–20 … +80					
Maximum permissible degree of contamination of pressure fluid Purity class to ISO 4406 (c)			Class 18/16/13[1]					
Flow direction			See symbol					
Nominal flow at $\Delta p = 35$ bar per notch[2]		l/min	2	4	12	15	24	40
Max. working pressure		bar	Port P, A, B: 315					
Max. pressure		bar	Port T: 250					
Operating limits at Δp Pressure drop at valve		bar	315	315	315	315	315	160
q_{Vnom}: > q_N valves		bar	315	315	315	280	250	100
Leakage at 100 bar		cm³/min	<150	<180	<300	–	<500	<900
		cm³/min	–	–	–	<180	<300	< 450

Electrical

Cyclic duration factor		%	100 ED
Power supply			24 V_{nom} (external amplifier)
Degree of protection			IP 65 to DIN 40050
Solenoid connector			Connector DIN 43650/ISO 4400 M16 x 1.5 (2P + PE)
Position transducer connector			Special Connector Pg7 (4P)
Max. solenoid current		A	2.7
Coil restistance R_{20}		Ω	2.5
Max. power consumption at 100 % load and operational temperature		VA	40
Position transducer DC/DC technology			Supply: +15 V/35 mA –15 V/35 mA Signal: 0...±10 V ($R_L \geqq 10$ kΩ)

Static/Dynamic

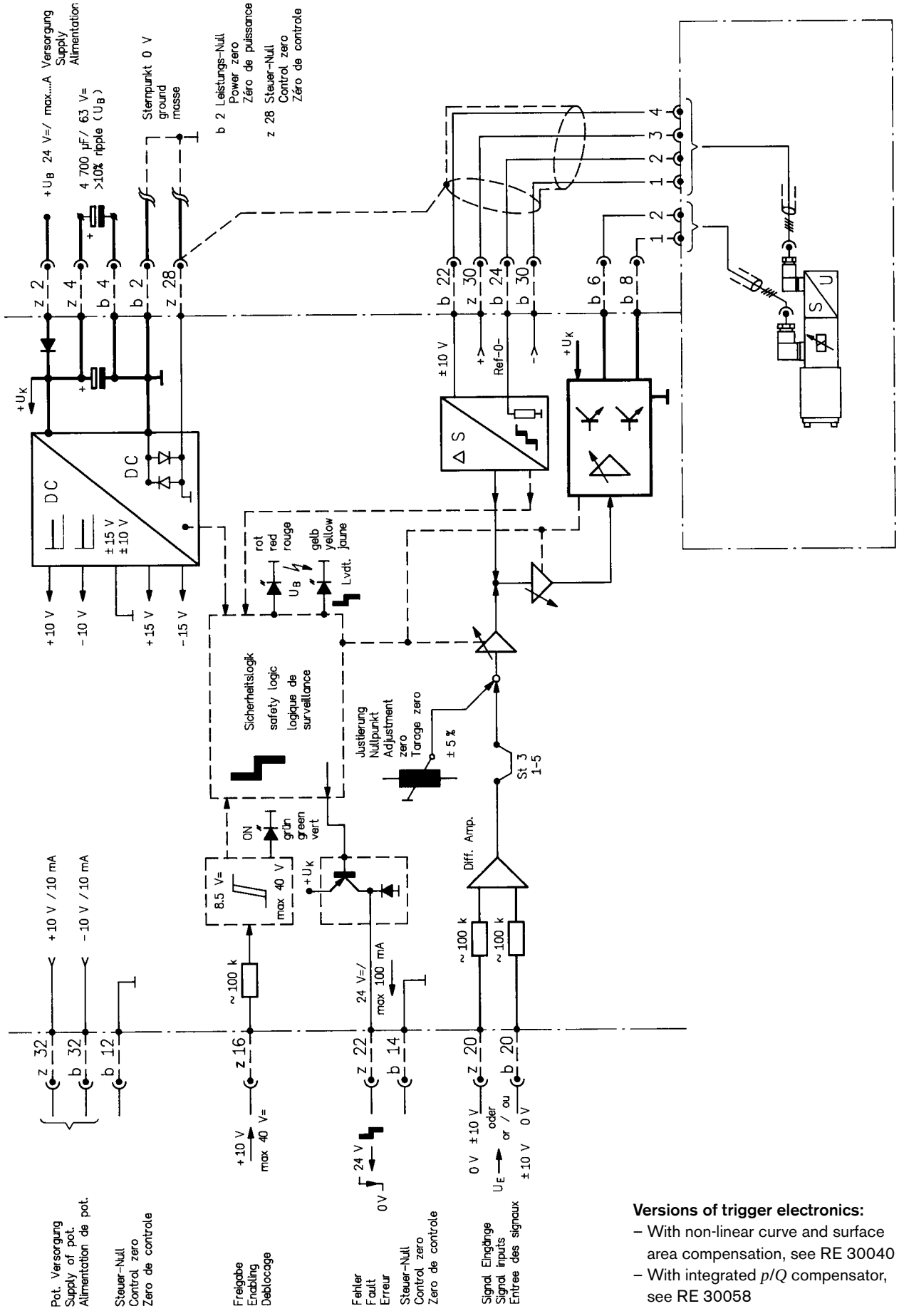
Hysteresis	%	≦ 0.2
Manufacturing tolerance for $q_{max.}$	%	< 10
Response time for signal change 0 … 100 %	ms	< 10
Thermal drift		Zero point displacement < 1 % at $\Delta T = 40\,°C$

[1] The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components. For a selection of filters, see catalogue sections RE 50070, RE 50076 and RE 50081.

[2] Flow rate at a different Δp $\quad q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{35}}$

Valve with external trigger electronics (standard linear curve: L)

Block diagram/pin assignment

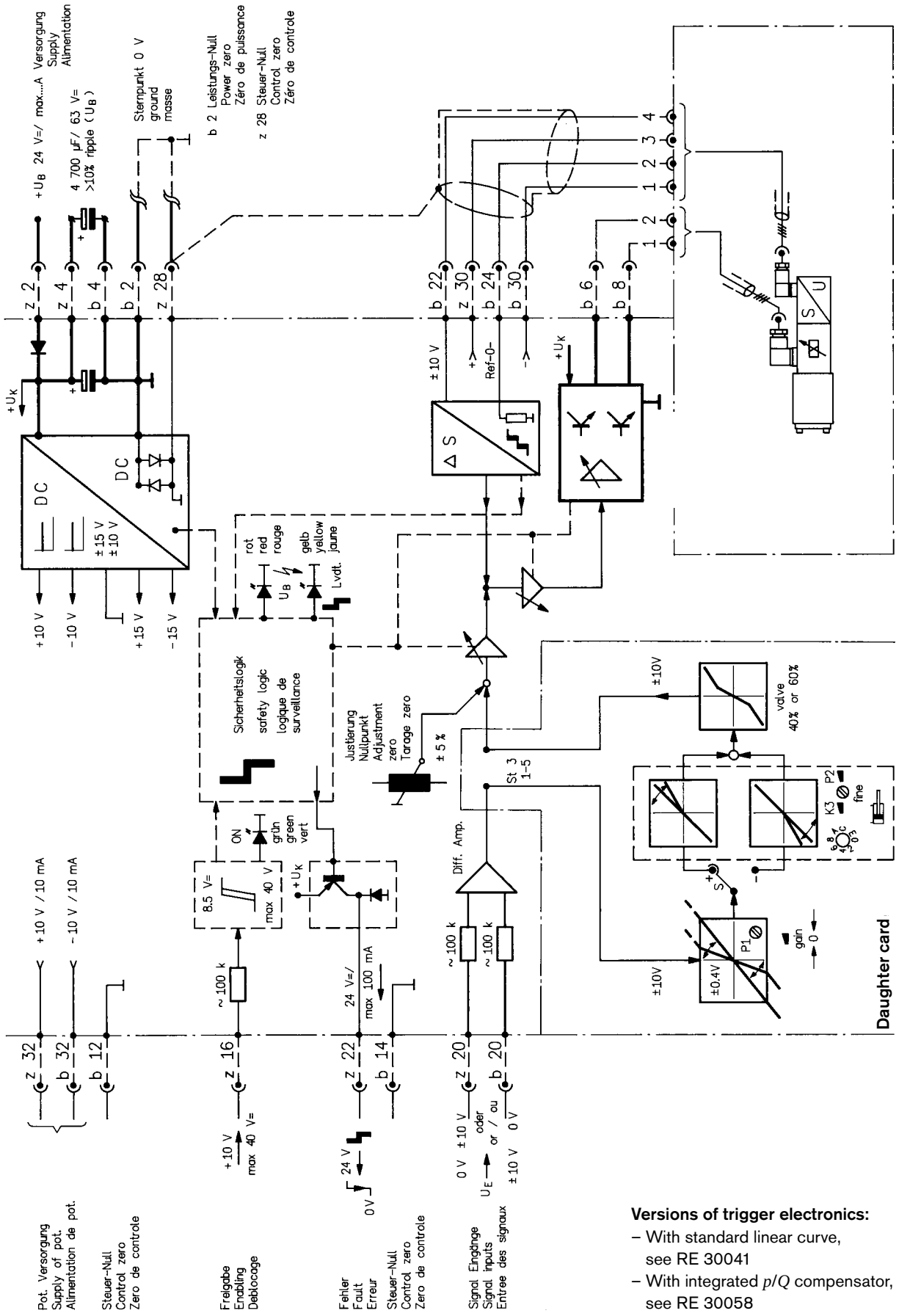


Versions of trigger electronics:

- With non-linear curve and surface area compensation, see RE 30040
- With integrated *p*/*Q* compensator, see RE 30058

Valve with external trigger electronics (non-linear curve: P)

Block diagram/pin assignment



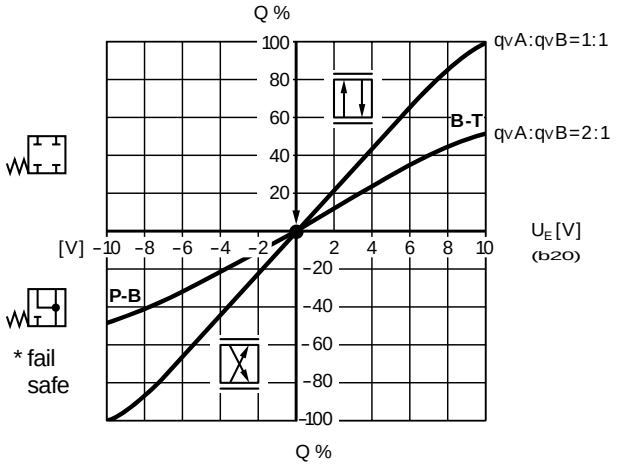
Versions of trigger electronics:

- With standard linear curve, see RE 30041
- With integrated *p*/*Q* compensator, see RE 30058

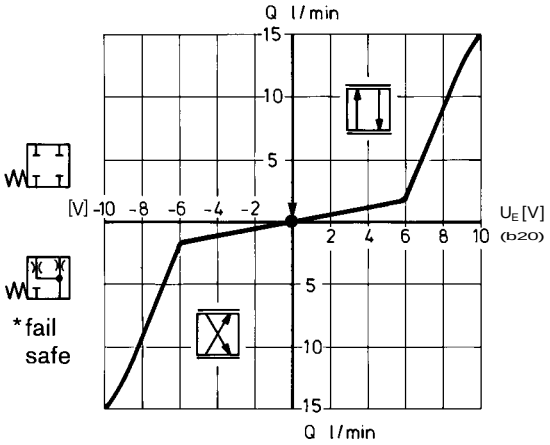
Performance curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

Flow rate/Signal function $Q = f(U_E)$

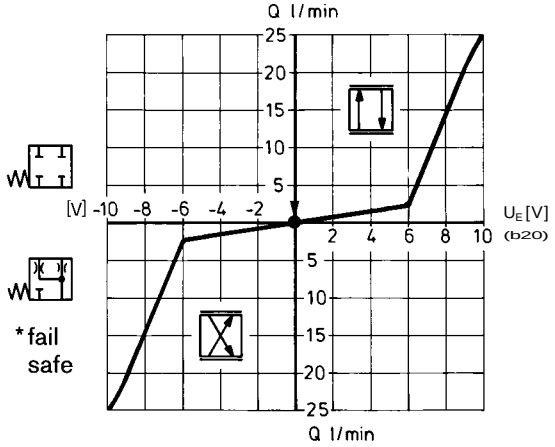
L: Linear



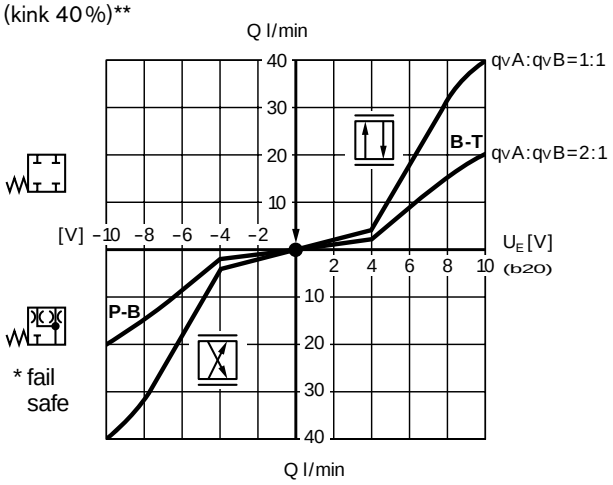
P: (kink 60 %)**



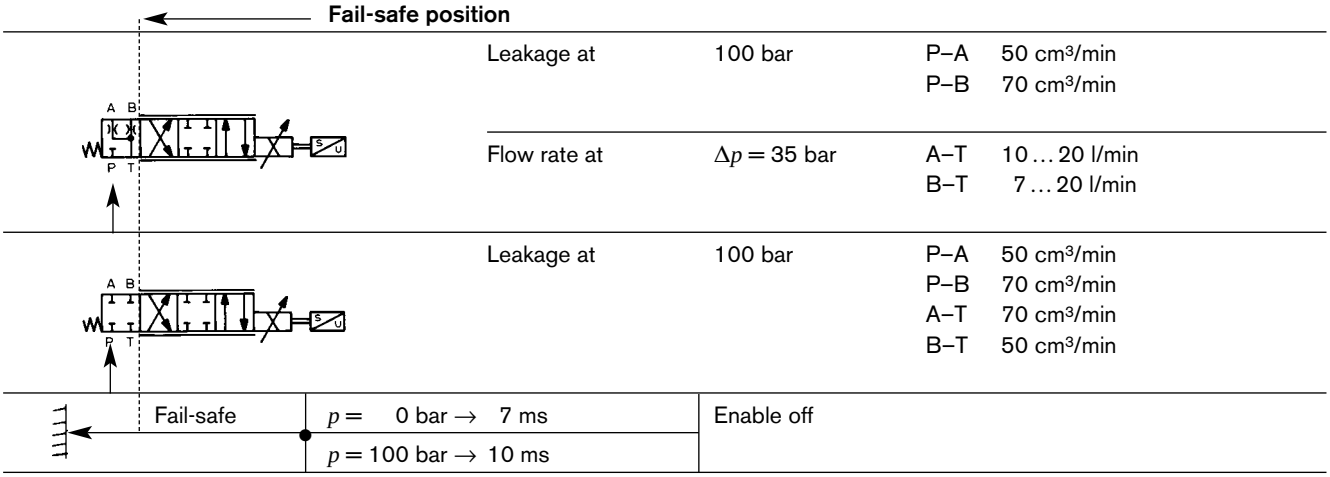
P: (kink 60 %)



P: (kink 40 %)**

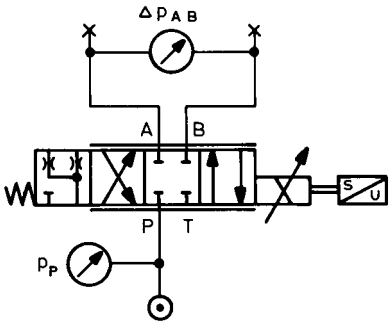


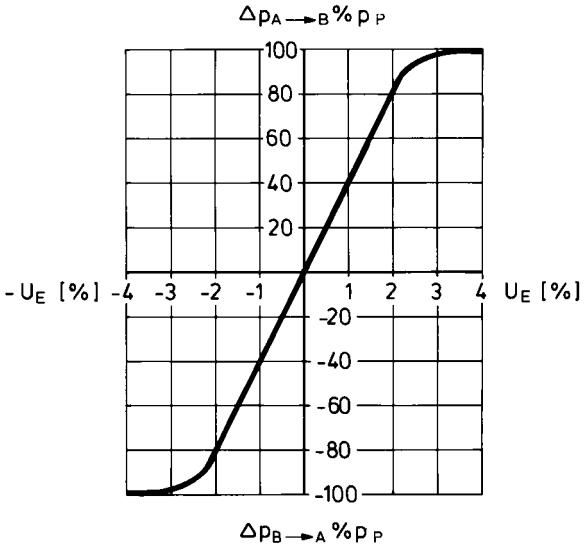
*Fail-safe when enabling is not released.
**Q-kink = 10 % Q_N.



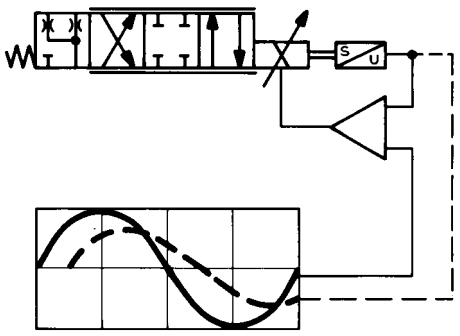
Performance curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

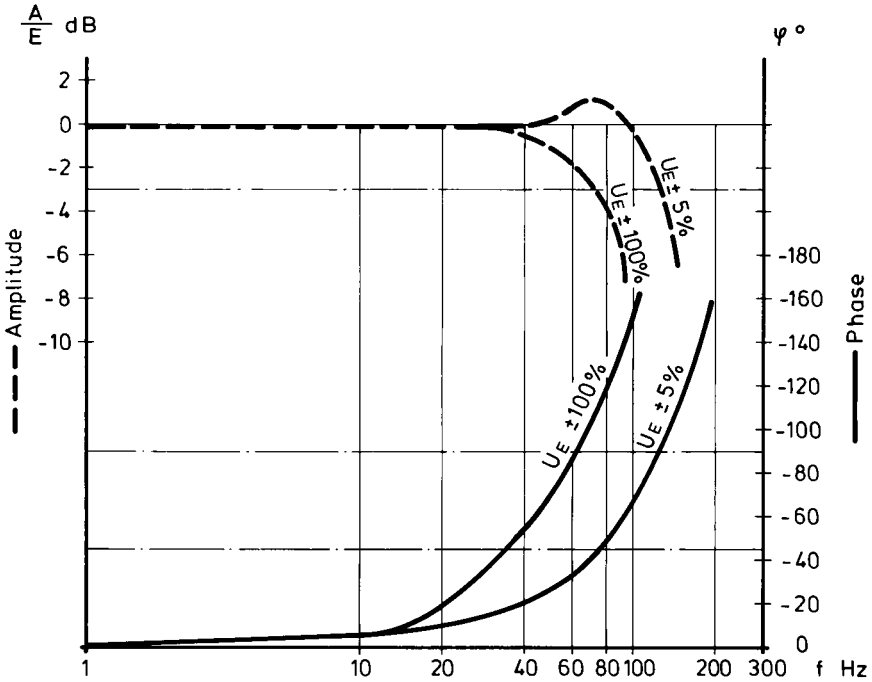
Pressure gain



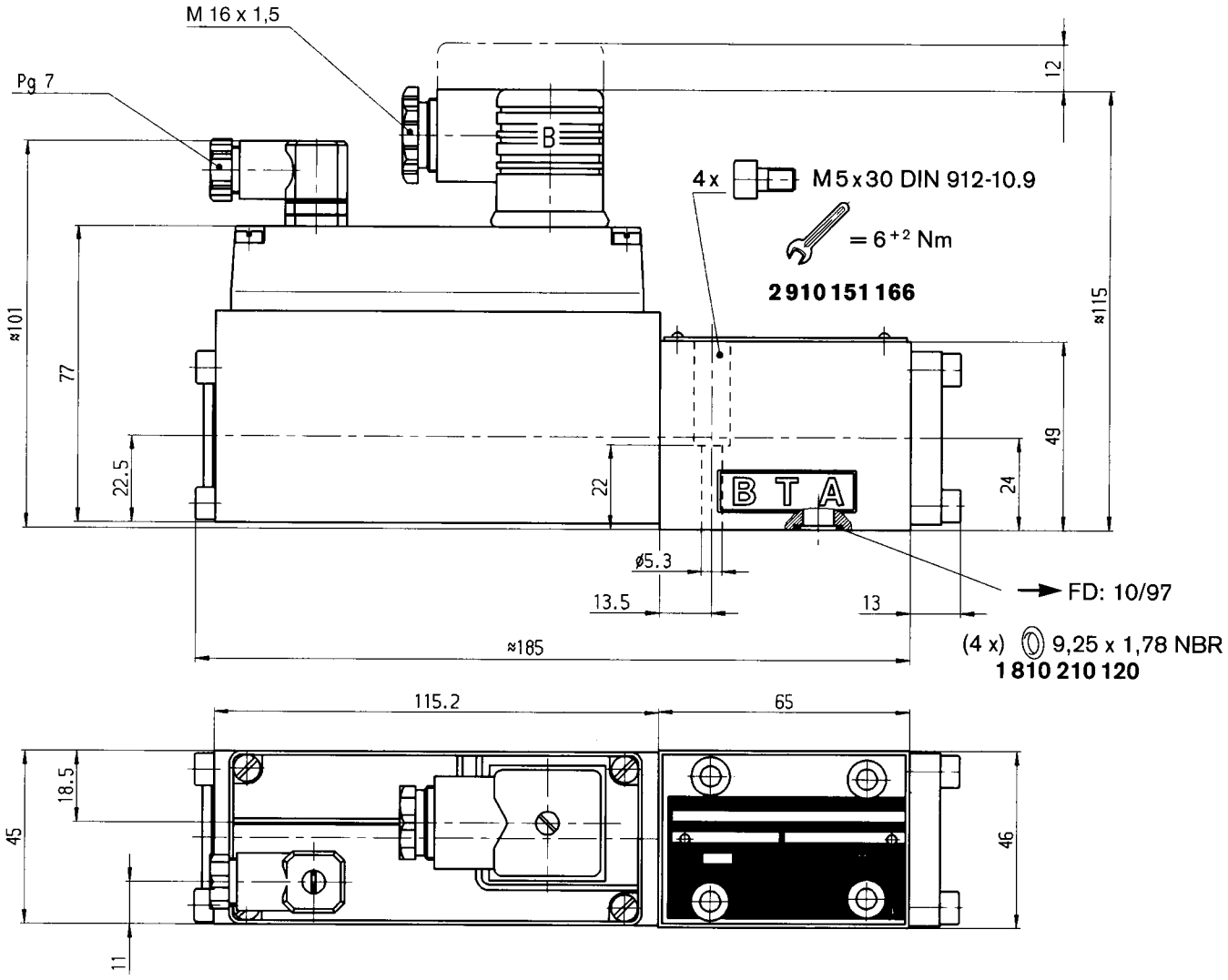


Bode diagram

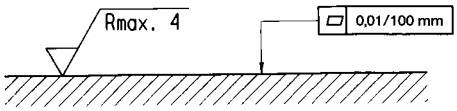




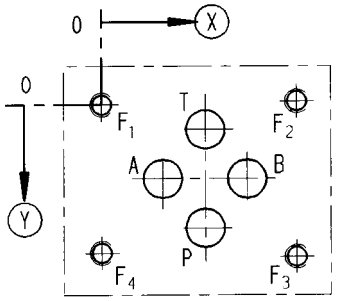
Unit dimensions (nominal dimensions in mm)



Required surface quality of mating component



Mounting hole configuration: NG6 (ISO 4401-03-02-0-94)
For subplates, see catalogue section RE 45053



1) Deviates from standard
2) Thread depth:
Ferrous metal 1.5 x Ø
Non-ferrous 2 x Ø

	P	A	T	B	F_1	F_2	F_3	F_4
Ⓧ	21.5	12.5	21.5	30.2	0	40.5	40.5	0
Ⓨ	25.9	15.5	5.1	15.5	0	–0.75	31.75	31
∅	8 1)	8 1)	8 1)	8 1)	M5 2)	M5 2)	M5 2)	M5 2)

Notes

Bosch Rexroth AG
Industrial Hydraulics
Zum Eisengießer 1
D-97816 Lohr am Main, Germany
Telefon +49 (0) 93 52 / 18-0
Telefax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

Notes

Bosch Rexroth AG
Industrial Hydraulics
Zum Eisengießer 1
D-97816 Lohr am Main, Germany
Telefon +49 (0) 93 52 / 18-0
Telefax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

Notes

Bosch Rexroth AG
Industrial Hydraulics
Zum Eisengießer 1
D-97816 Lohr am Main, Germany
Telefon +49 (0) 93 52 / 18-0
Telefax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de