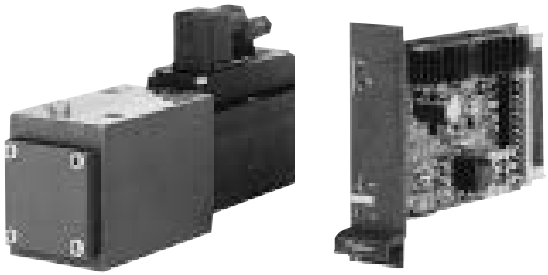
Servo solenoid valves with electrical position feedback (Lvdt DC/DC ±10 V)

Type 4WRPH 10



Size 10
Unit series 2X
Maximum working pressure P, A, B 315 bar, T 250 bar
Nominal flow rate 50...100 l/min (Δp 70 bar)

List of contents

Contents	Page
Features	1
Ordering data and scope of delivery	2
Preferred types	2
Function, sectional diagram	3
Symbols	3
Technical data	4
Valve with external trigger electronics	5 and 6
Performance curves	7 and 8
Unit dimensions	9

Features

- Directly operated servo solenoid valve NG10, 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 4401-05-04-0-94
- Subplates as per catalogue section RE 45055 (order separately)
- Line sockets to DIN 43560-AM2
  Solenoid 2P+PE/M16 x 1.5, position transducer 4P/Pg7 in scope of delivery
- External trigger electronics (order separately)

Variants on request

- For standard applications
- Special symbols for plastic injection-moulding 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	10		B		– 2X / G24	Z4 / M	*

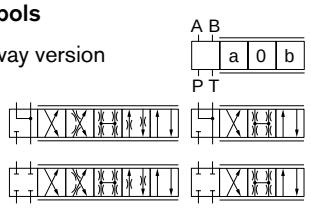
For **external** trigger electronics **= no desig.**

Control piston/sleeve **= H**

Size 10 **= 10**

Symbols

4/4-way version



= C3, C5

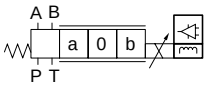
= C4, C1

With symbols C5 and C1:

P → A: q_v B → T: q_v/2

P → B: q_v/2 A → T: q_v

Side of inductive position transducer



(Standard) **= B**

Size 10

50 = 50 l/min

100 = 100 l/min

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

L = Linear

P = Non-linear curve

Flow characteristic

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

G24 = +24 V DC

Voltage supply of trigger electronics

Z4 = with line socket, with plug to DIN 43560-AM2
Line socket included in scope of delivery

Electrical connection

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

Further information in plain text

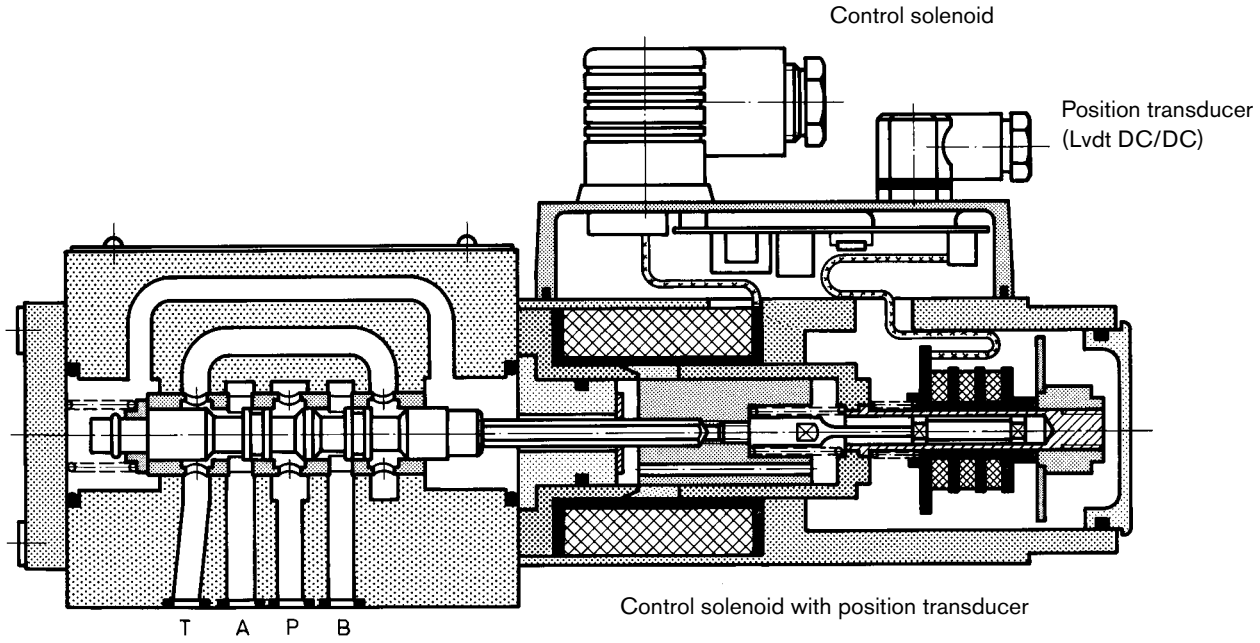
Preferred types (available at short notice)

Type 4WRPH 10	
C3/C5	
4WRPH 10 C3B50L –2X/G24Z4 / M	
4WRPH 10 C3B100L –2X/G24Z4 / M	
4WRPH 10 C5B100L –2X/G24Z4 / M	
4WRPH 10 C3B50P –2X/G24Z4 / M	
4WRPH 10 C3B100P –2X/G24Z4 / M	
4WRPH 10 C5B100P –2X/G24Z4 / M	

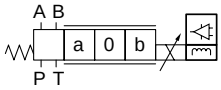
Type 4WRPH 10	
C1/C4	
4WRPH 10 C4B50L –2X/G24Z4 / M	
4WRPH 10 C4B100L –2X/G24Z4 / M	
4WRPH 10 C1B100L –2X/G24Z4 / M	
4WRPH 10 C4B50P –2X/G24Z4 / M	
4WRPH 10 C4B100P –2X/G24Z4 / M	
4WRPH 10 C1B50P –2X/G24Z4 / M	
4WRPH 10 C1B100P –2X/G24Z4 / M	

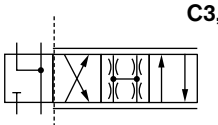
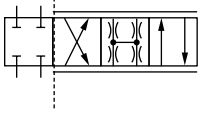
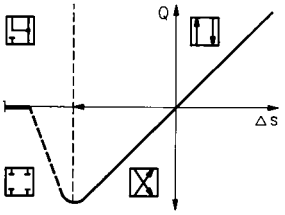
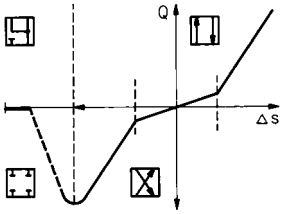
Function, sectional diagram

Servo solenoid valve 4WRPH 10



Symbols



Linear	p: kink 40 %
C3, C5  **C4, C1**  	
C3, C4, C5, C1	

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 NG10 (ISO 4401-05-04-0-94)
Installation position		Optional
Ambient temperature range	°C	–20 … +50
Weight	kg	6.8
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	50 (1:1)	50 (2:1)	100 (1:1)	100 (2:1)
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	160	160
q_{Vnom}: > q_N valves		bar	250	250	100	100
Leakage at 100 bar		cm³/min	<1200	<1200	<1500	<1000
		cm³/min	<600	<500	<600	<600

Electrical

Cyclic duration factor	%	100	
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		Connector Pg7 (4P)	
Max. solenoid current	A	3.7	
Coil resistance R_{20}	Ω	2.4	
Max. power consumption at 100 % load and operational temperature	VA	60	
Position transducer DC/DC technology		Supply: +15 V/35 mA –15 V/25 mA	Signal: 0...±10 V ($R_L \geqq 10$ kΩ)

Static/Dynamic

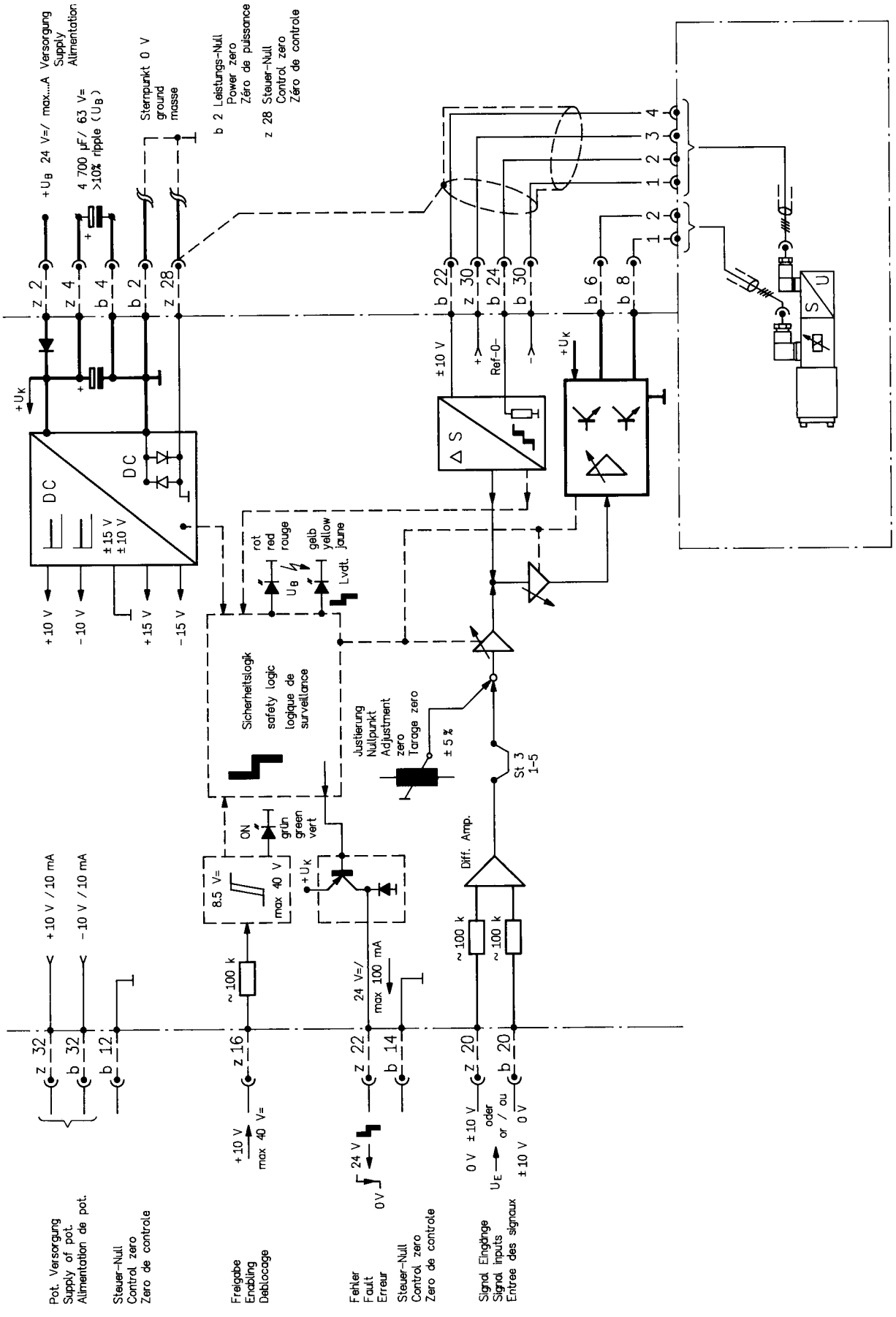
Hysteresis	%	≦ 0.2
Manufacturing tolerance for $q_{max.}$	%	< 10
Response time for signal change 0 … 100 %	ms	< 25
Thermal drift		Zero point displacement <1 % at $\Delta T = 40\,°C$

[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.

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

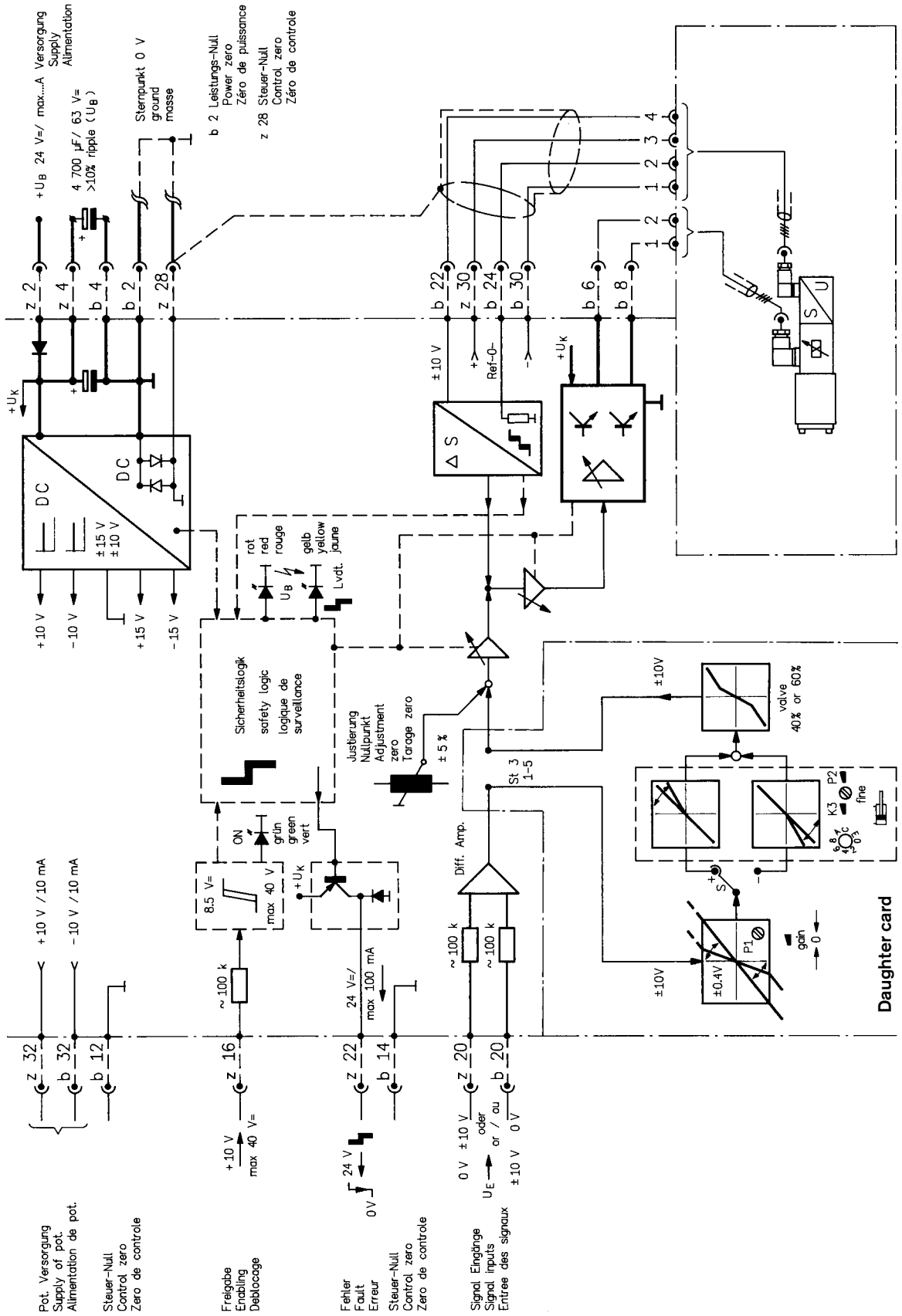
Valve with external trigger electronics (standard linear curve: L)

Block diagram/pin assignment



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

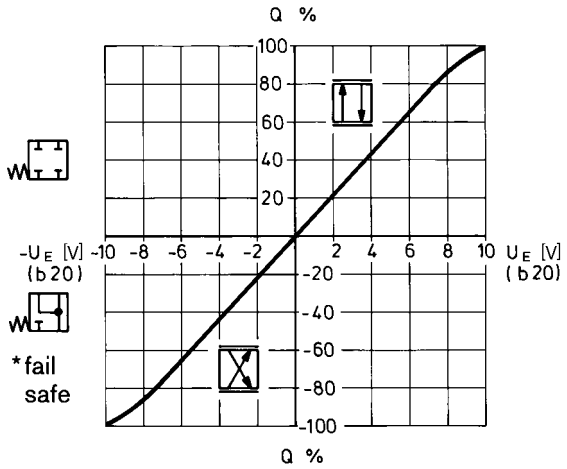
Block diagram/pin assignment



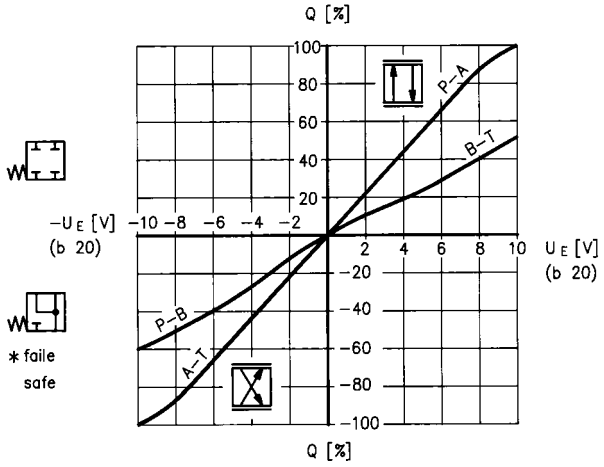
Performance curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

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

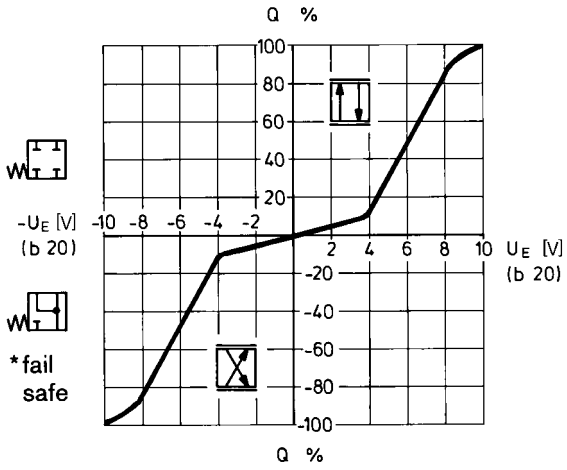
L: Linear



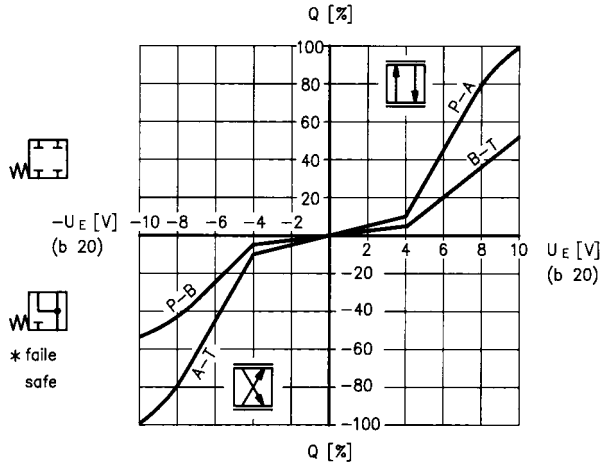
L: (linear) 2:1



P: (kink 40 %)**

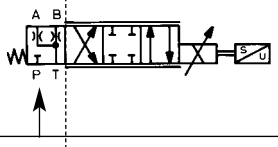


P: (kink 40 %) 2:1**

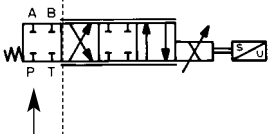


*Fail-safe when enabling is not released.
**Q_N-kink = 10 % Q_N.

Fail-safe position



Leakage at	100 bar	P–A	50 cm³/min
		P–B	70 cm³/min
Flow at	$\Delta p = 35$ bar	A–T	10 … 100 l/min
	q_N 50/100 l/min	B–T	10 … 25 l/min

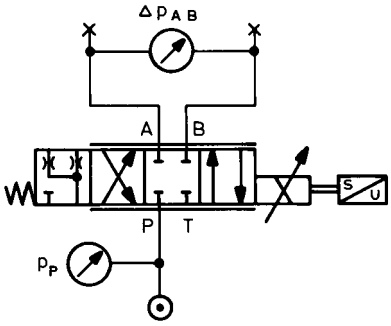


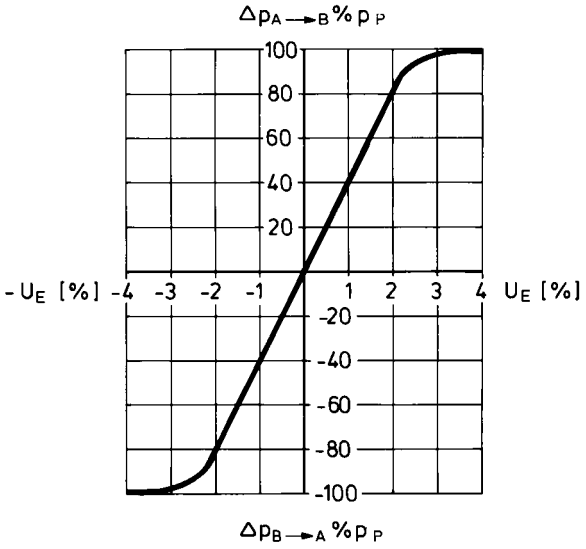
Leakage at	100 bar	P–A	50 cm³/min
		P–B	70 cm³/min
		A–T	70 cm³/min
		B–T	50 cm³/min

Fail-safe	$p =$ 0 bar → 12 ms	Enable off
	$p =$ 100 bar → 16 ms	

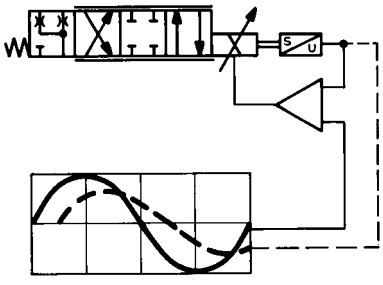
Performance curves (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)

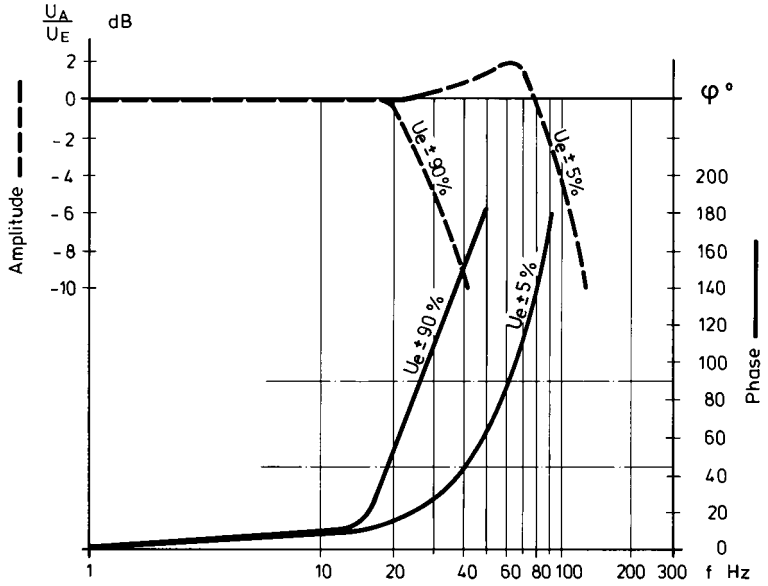
Pressure gain



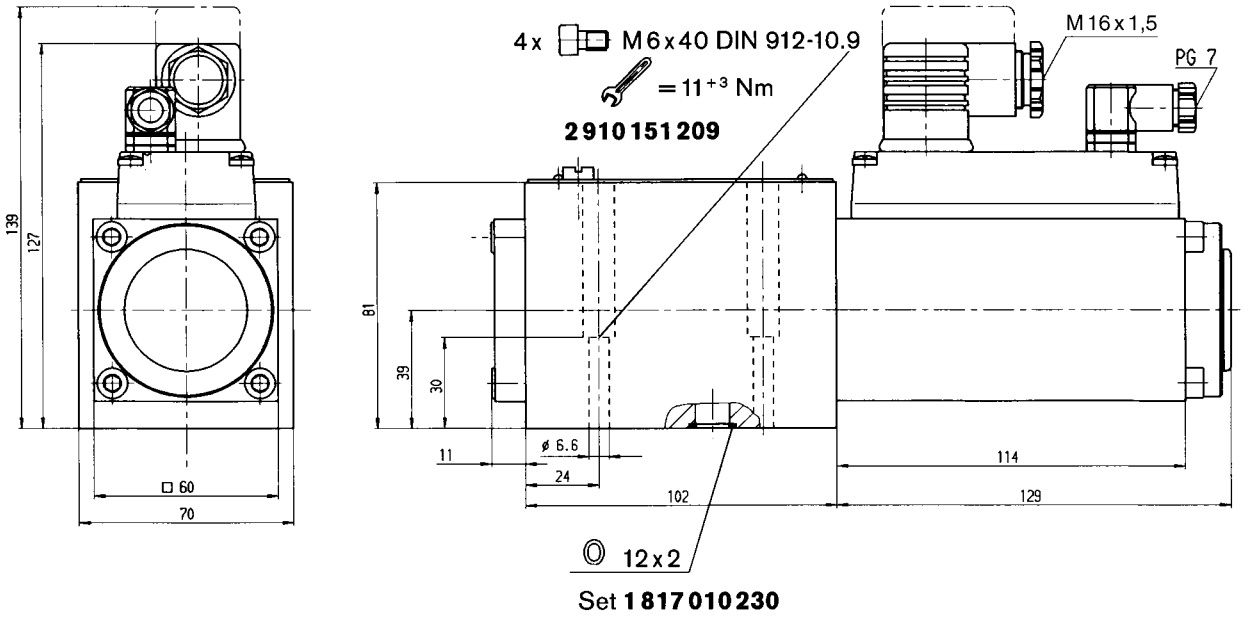


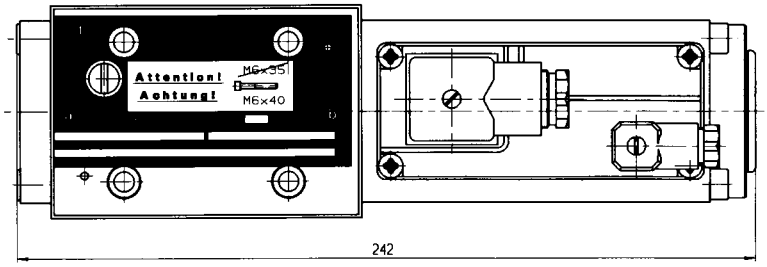
Bode diagram



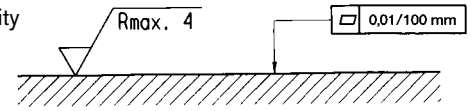


Unit dimensions (nominal dimensions in mm)

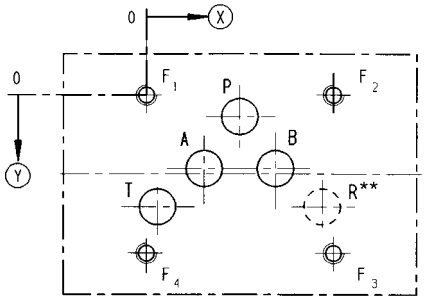




Required surface quality of mating component



Mounting hole configuration: NG10
(ISO 4401-05-04-0-94)



1) Deviates from standard
2) Thread depth:
Ferrous metal 1.5 x Ø*
Non-ferrous 2 x Ø
* (NG10 min. 10.5 mm)

** 5/3 – NG10
R = P_2

	P	A	T	B	F_1	F_2	F_3	F_4	R
Ⓧ	27	16.7	3.2	37.3	0	54	54	0	50.8
Ⓨ	6.3	21.4	32.5	21.4	0	0	46	46	32.5
Ø	10.5 1)	10.5 1)	10.5 1)	10.5 1)	M6 2)	M6 2)	M6 2)	M6 2)	10.5 1)