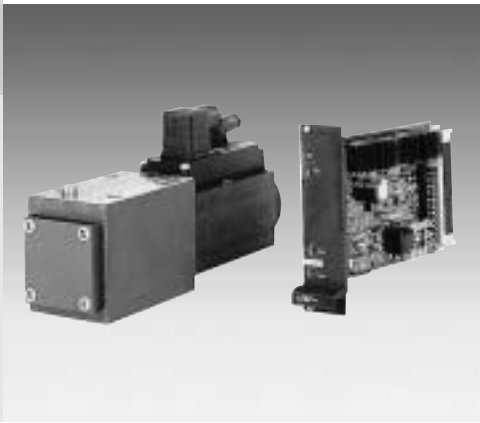
Servo solenoid valves with electrical position feedback (Lvdt DC/DC ±10 V)

RE 29043/01.05 1/10
Replaces: 09.03

Type 5WRP 10



Size 10
Unit series 2X
Maximum working pressure P_1, P_2, A, B 210 bar, T 50 bar
Nominal flow rate 70 l/min (Δp 11 bar)

List of contents

Features

- Directly operated servo solenoid valve NG10, with p/Q 5/3 directional control symbol in servo quality
- Actuated on one side, A-T 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 43563-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” 0 811 405 062, see catalogue section RE 30041
  - Electric amplifier with p/Q compensator 0 811 405 154, see catalogue section RE 30058

Important

The 5 hydraulic connections are required for the function “Dual flow-through”, $P_1 \rightarrow A$ and $P_2 \rightarrow B$, see hole pattern on page 8. With external trigger electronics (“standard”), closed-loop control of p/Q is achieved with an external pressure compensator (accessory).

Ordering data and scope of delivery

5WRP			10	F	B	70	L	–2X/	G24	Z4/	M	*

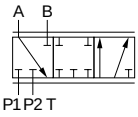
For **external** trigger electronics **= no desig.**

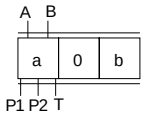
Without sleeve **= no designation**

Size 10 **=10**

Symbols

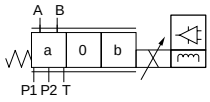
5/3-way version





=F

Side of inductive position transducer



(Standard) **= B**

Further information in plain text

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

Electrical connection

Z4 = with line socket, with plug to DIN 43563-AM2
Line socket included 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

Nominal flow rate at 11 bar valve pressure difference (11 bar/metering notch)

Size 10

70 = 70 l/min

Preferred types (available at short notice)

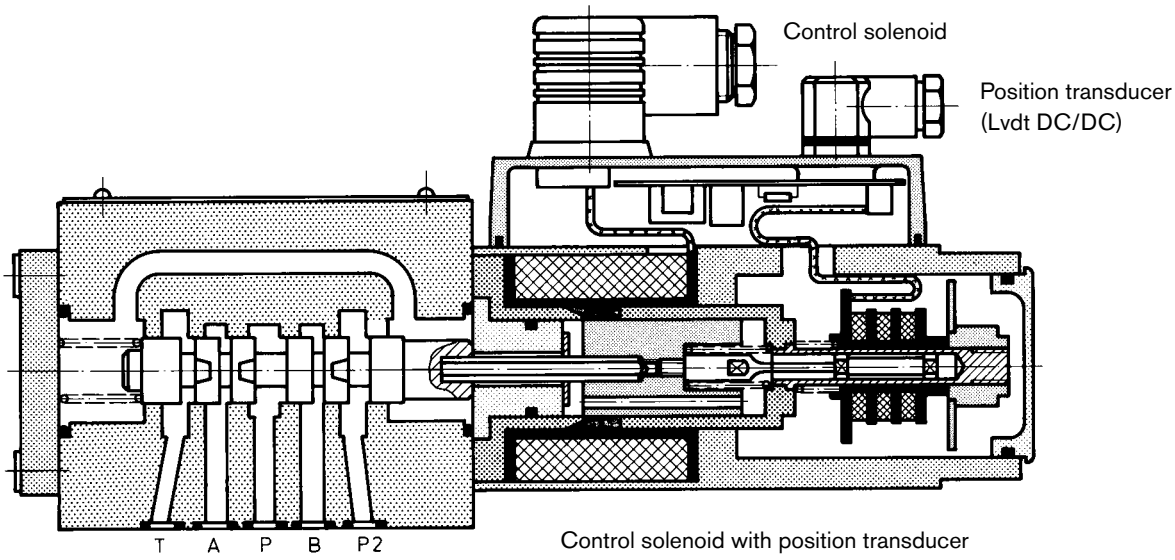
Type 5WRP 10	**Material No.**
F	
5WRP 10 FB70L–2X/G24 Z4 / M	**0 811 402 113**

Accessory, pressure compensator

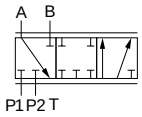
		kg	Material No.
	See pressure compensator on pages 9 and 10	6	**0811401219**

Function, sectional diagram

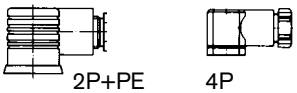
Servo solenoid valve 5WRP 10



Symbol



Accessories, not included in scope of delivery

(4 x) ⊨ M6 x 40 DIN 912–10.9	Fastening screws	**2 910 151 209**
	VT-VRPA1-537-10 / V0, see RE 30041	**0 811 405 062**
	VT-VARAP1-537-20 / V0 / 5/3V, see RE 30058	**0 811 405 154**
	Line sockets 2P+PE (M16 x 1.5) and 4P (Pg7) included in scope of delivery, see also RE 08008	

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
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	l/min	$P_1 \rightarrow A$	70
$\Delta p = 11$ bar per notch [2]		$P_1 \rightarrow A + P_2 \rightarrow B$	70 + 70
		$A \rightarrow T$	65
Max. working pressure	bar	Port P_1, P_2, A, B: 210	
Max. pressure	bar	Port T: 50	
Operating limits at Δp	bar	See diagram	
Leakage at 100 bar	cm³/min	<1.200	

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 tranducer DC/DC technology		Supply: +15 V/35 mA –15 V/25 mA	Signal: 0...±10 V ($R_L \geqq 10$ kΩ)

Static/Dynamic

Hysteresis	%	≦ 0.3
Manufacturing tolerance for $q_{max.}$	%	< 10
Response time for signal change 0 … 100 %	ms	< 25
Thermal drift		Zero point displacement <1 % at $\Delta T = 40\,°C$

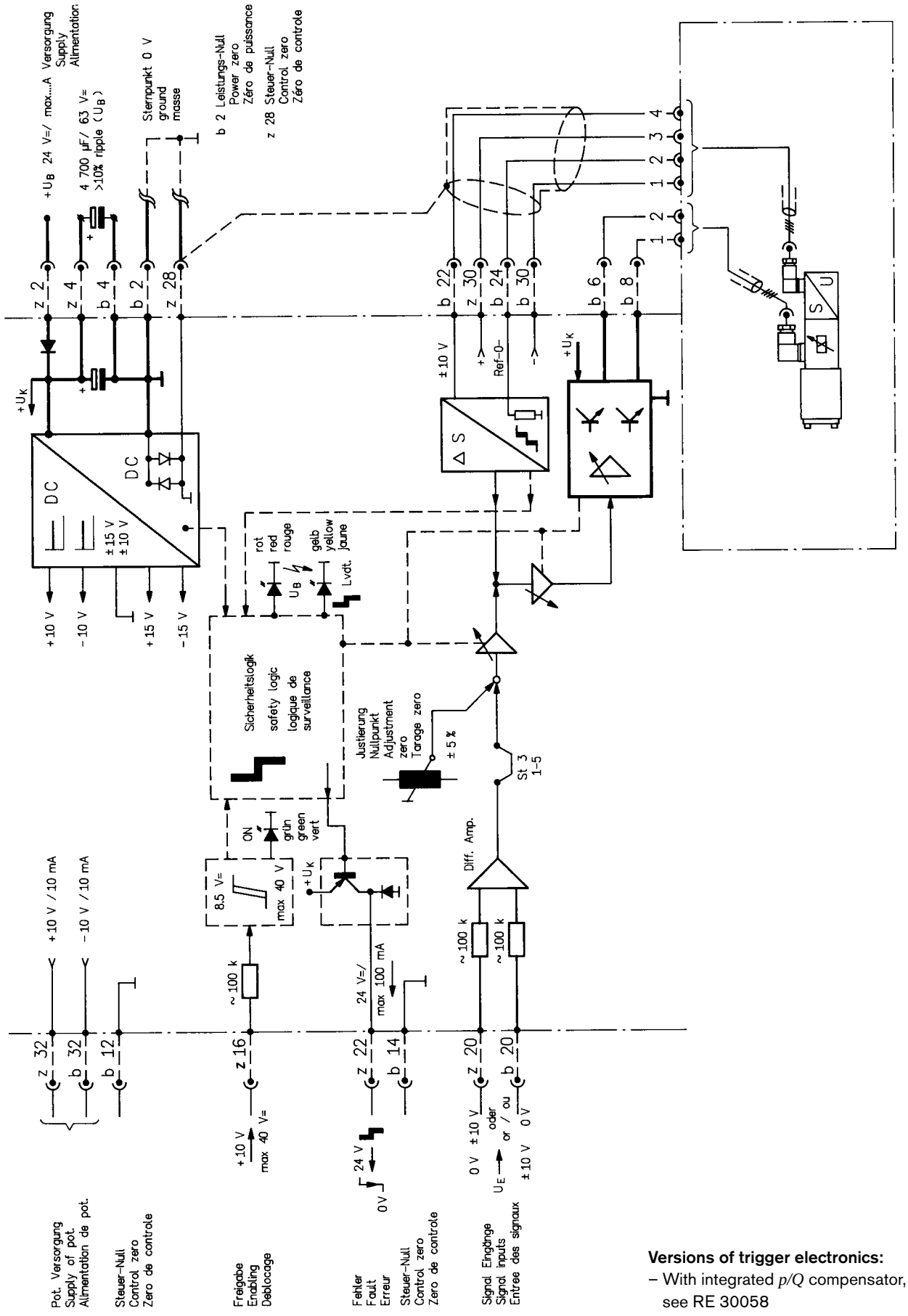
All characteristics in connection with electric amplifier 0 811 405 062.

[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 $\quad q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{11}}$

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

Block diagram/pin assignment

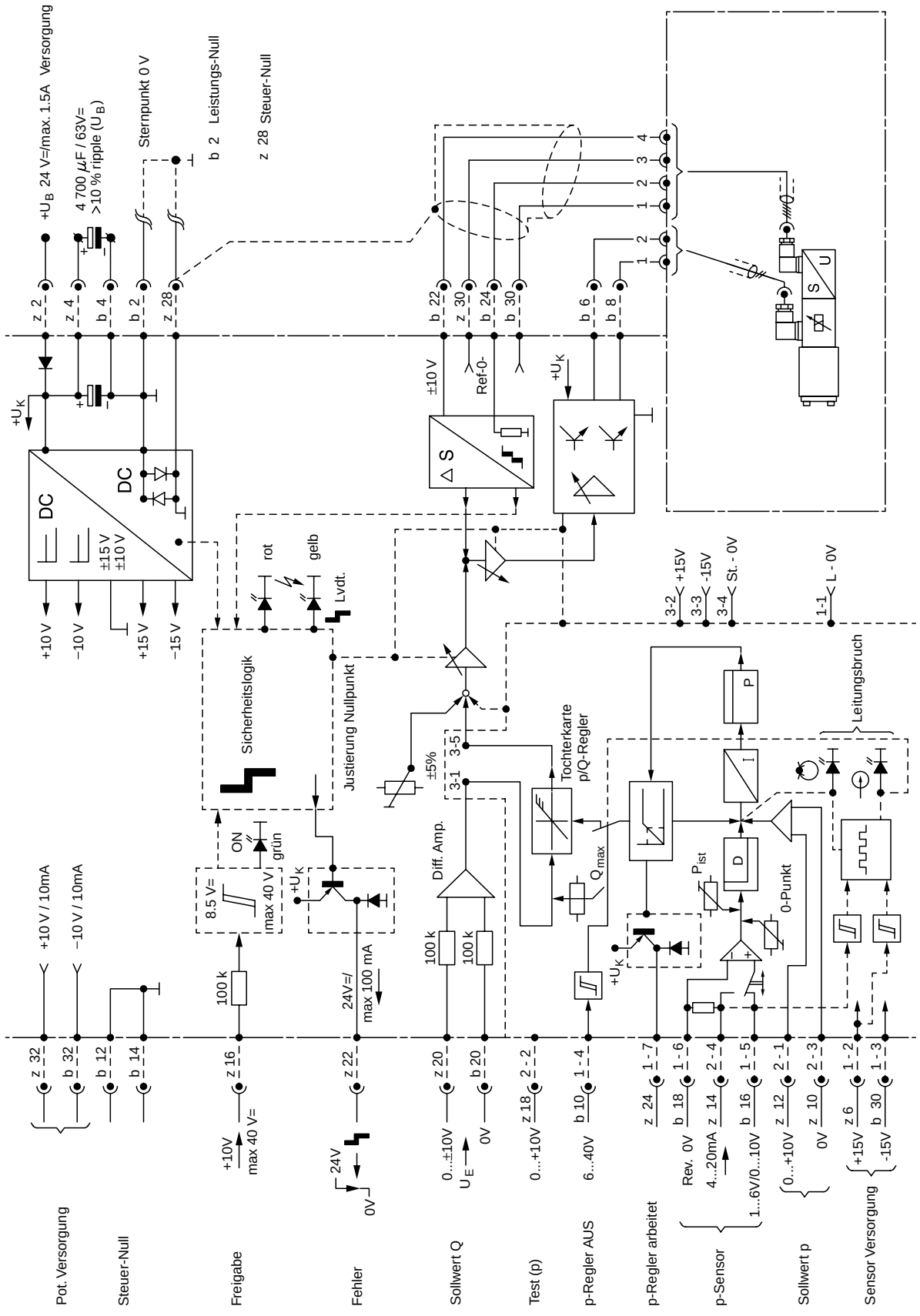


Versions of trigger electronics:

– With integrated *p/Q* compensator, see RE 30058

Valve with external trigger electronics (with *p/Q* compensator and linear amplifier)

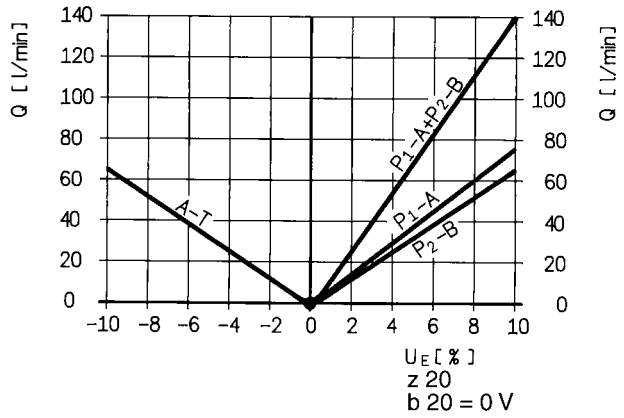
Block diagram/pin assignment



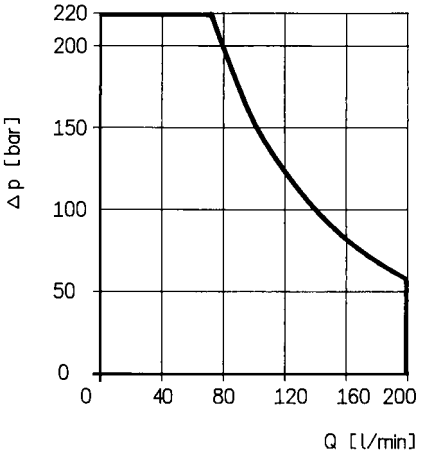
Versions of trigger electronics: – with standard linear curve, see RE 30041

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

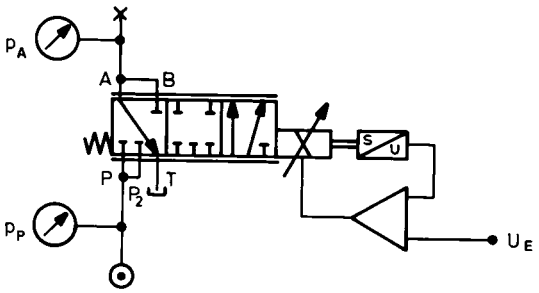
Flow rate/Signal function

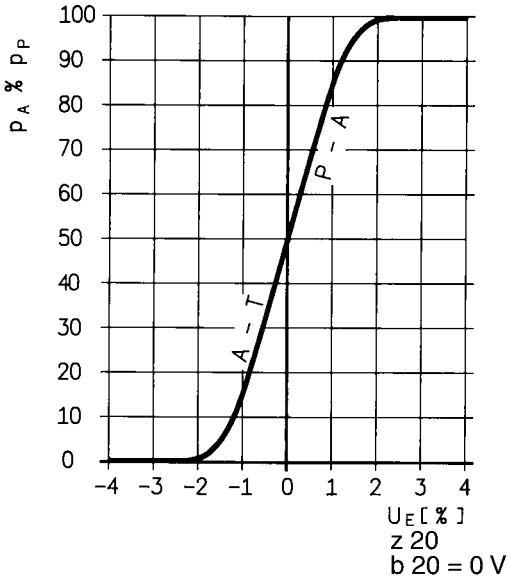


Operating limits

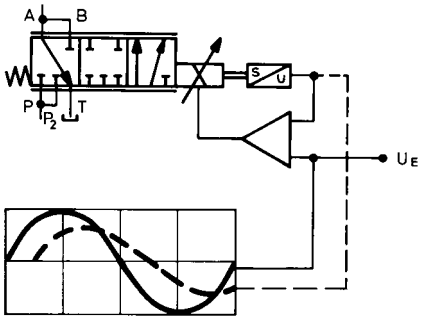


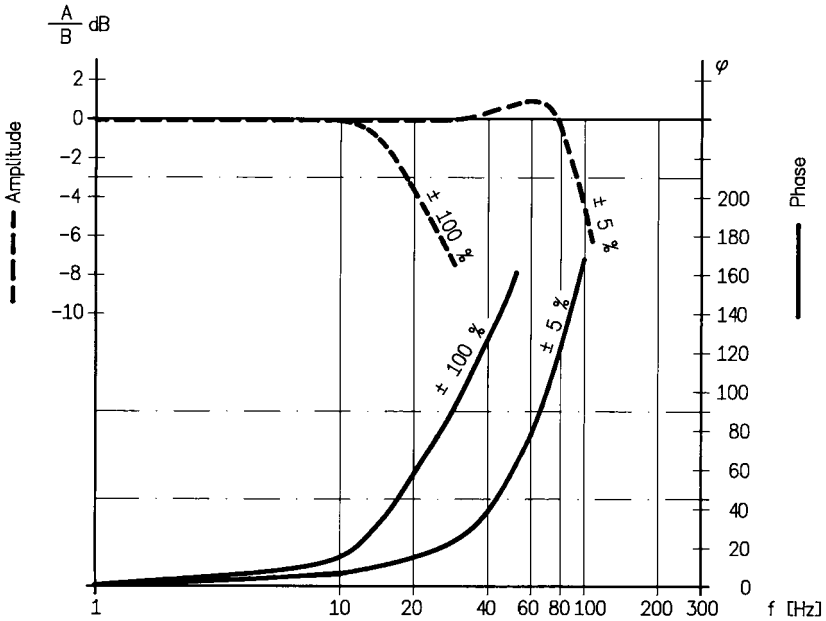
Pressure gain



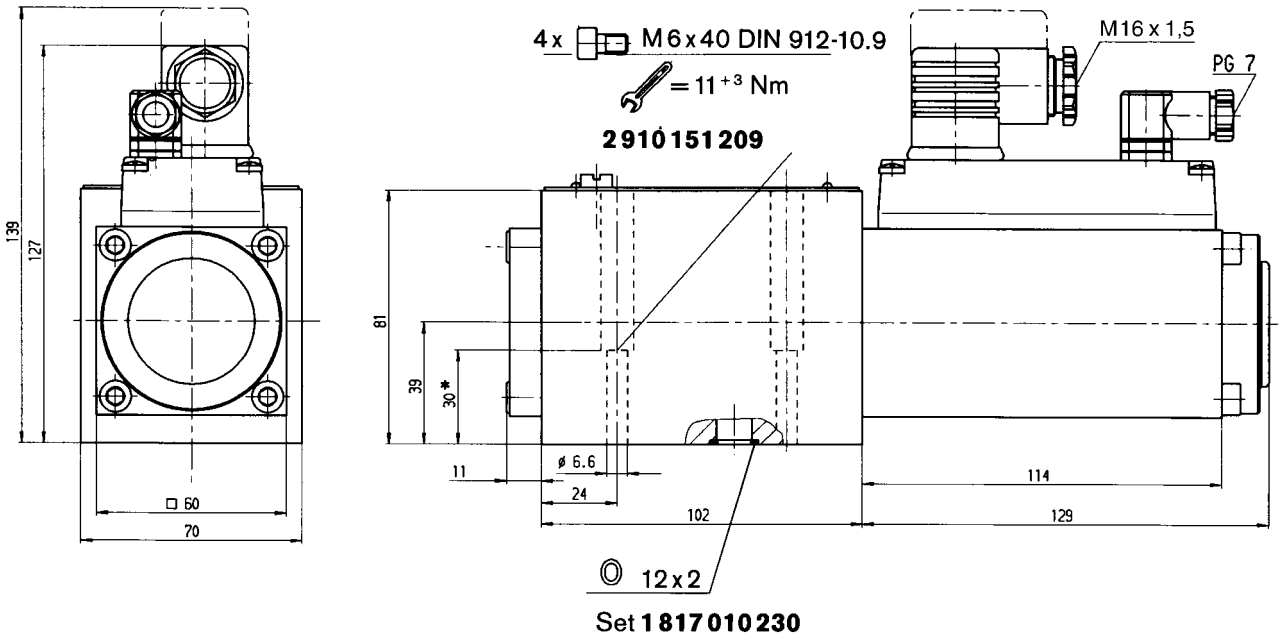


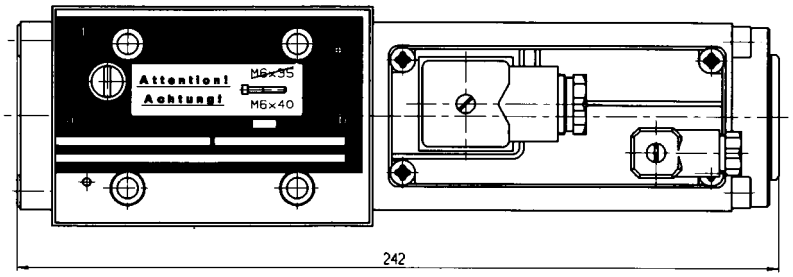
Bode diagram



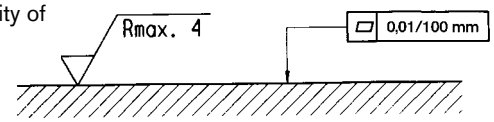


Unit dimensions (nominal dimensions in mm)

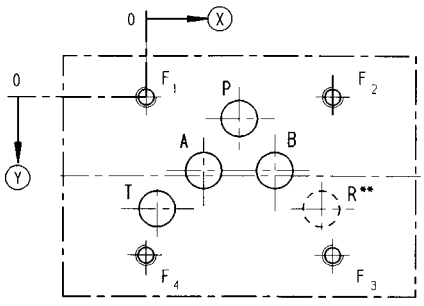




Required surface quality of mating component



Mounting hole configuration: NG10 (ISO 4401-05-04-0-94)
For subplates, see catalogue section RE 45055



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
∅	10.5 1)	10.5 1)	10.5 1)	10.5 1)	M6 2)	M6 2)	M6 2)	M6 2)	10.5 1)

Pressure compensator

Size 10

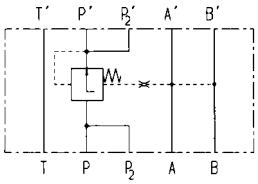
Application

A combination of flow rate control and pressure compensation. The **flow rate** Q is determined by the throttle cross-sections P_1, R, A and P_2, R, B. Either a single or a double flow may be selected. In many applications, the valve is combined with a variable-displacement pump. The pressure/flow compensator keeps the pressure drops through the valve at a constant level (see Fig. 1 on page 10).
The same function is achieved in constant-displacement pumps, too, by means of a pressure compensator. Here, $Q_{max.}$ is determined by the control springs of the pressure compensator (see Fig. 2 on page 10).

The **pressure** p is measured by an external pressure sensor and transmitted to an electronic pressure compensator as an actual value. Just as the build-up of pressure in the consumer takes place and approaches the setpoint value, the valve function is determined by the pressure compensator. Even in situations where the pressure is decreasing, the valve can regulate the oil as necessary via the A-T metering notch.
Pressure compensation can be achieved both by means of electronics provided by the customer and using a Rexroth pressure compensator.

Important

You will find more detailed information in the RE data sheets:
- Pressure sensors RE 30271
- p/Q regulator RE 30058

Symbol		$p_{max.}$ [bar]	Δp [bar]	Q_{nom} [l/min]	[kg]	
	p/Q-NG10	210	8	120	6.0	**0811401219**
	M6x115 DIN 912–10.9					–
	M6x120 DIN 912–10.9					**2910151227**

Application

Figure 1: with variable-displacement pump

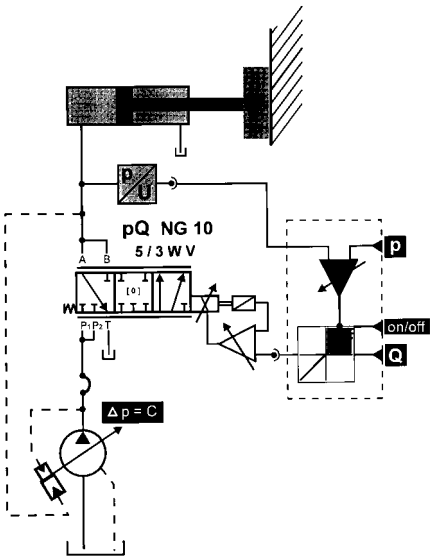
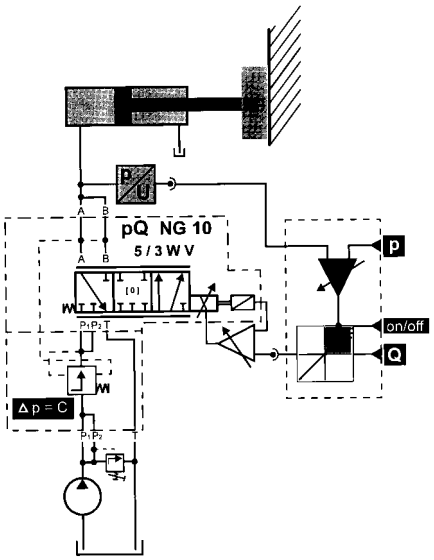
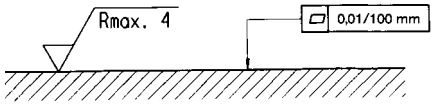


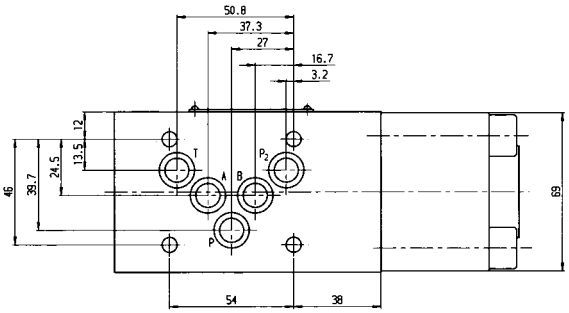
Figure 2: with pressure compensator 0 811 401 219

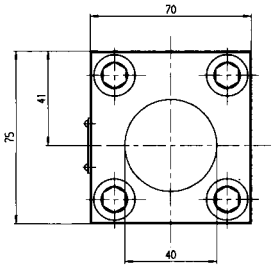


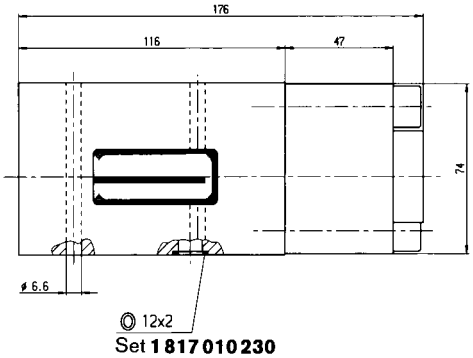
Unit dimensions (nominal dimensions in mm)

Required surface quality
of mating component









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