Proportional pressure relief valve

RE 29161/07.05 1/10

Type DBETX

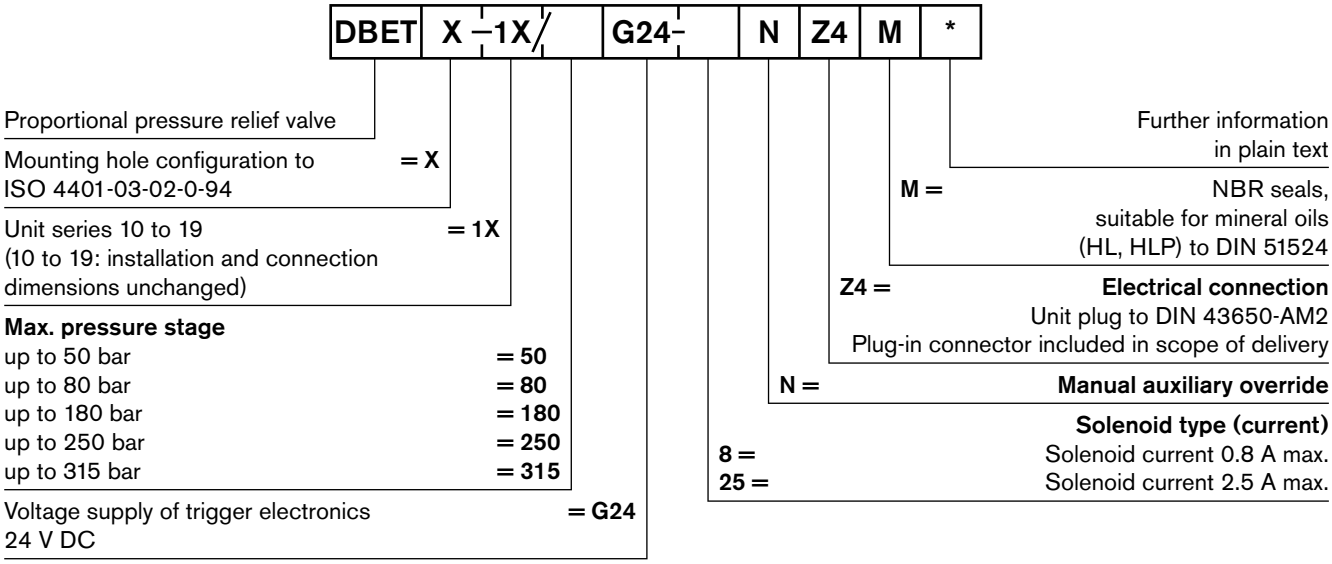
Nominal size 6
Unit series 1X
Maximum working pressure P 315 bar, T 250 bar
Nominal flow rate Q_{nom} 1 l/min

List of contents

Features

- Directly operated valves (pilot valves) for limiting system pressure
- Adjustable by means of the solenoid current, see Characteristic curve, Technical data and selected valve electronics
- Solenoid versions $I_{max} = 0.8$ A or $I_{max} = 2.5$ A
- Pressure limitation to a safe level even with faulty electronics (solenoid current $I > I_{max}$)
- For subplate attachment, mounting hole configuration to ISO 4401-03-02-0-94
  Subplates as per catalog sheet RE 45053 (order separately)
- Plug-in connector to DIN 43650-AM2 included in scope of delivery
- External trigger electronics with ramps and valve calibration in the following versions/designs (order separately)
  - Plug, setpoint 0...+10 V or 4...20 mA, RE 30264
  - Module, setpoint 0...+10 V, RE 30222
  - Europe card, setpoint 0...+10 V, RE 30109

Ordering data

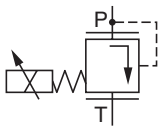


Preferred types

Solenoid 0.8 A		Solenoid 2.5 A	
Type	**Material Number**	**Type**	**Material Number**
DBETX–1X/50G24–8NZ4M	0 811 402 036	DBETX–1X/50G24–25NZ4M	0 811 402 034
DBETX–1X/80G24–8NZ4M	0 811 402 018	DBETX–1X/80G24–25NZ4M	0 811 402 030
DBETX–1X/180G24–8NZ4M	0 811 402 017	DBETX–1X/180G24–25NZ4M	0 811 402 031
DBETX–1X/250G24–8NZ4M	0 811 402 019	DBETX–1X/250G24–25NZ4M	0 811 402 035
DBETX–1X/315G24–8NZ4M	0 811 402 016	DBETX–1X/315G24–25Z4M	0 811 402 032

Symbol

For external trigger electronics



Function, sectional diagram

General

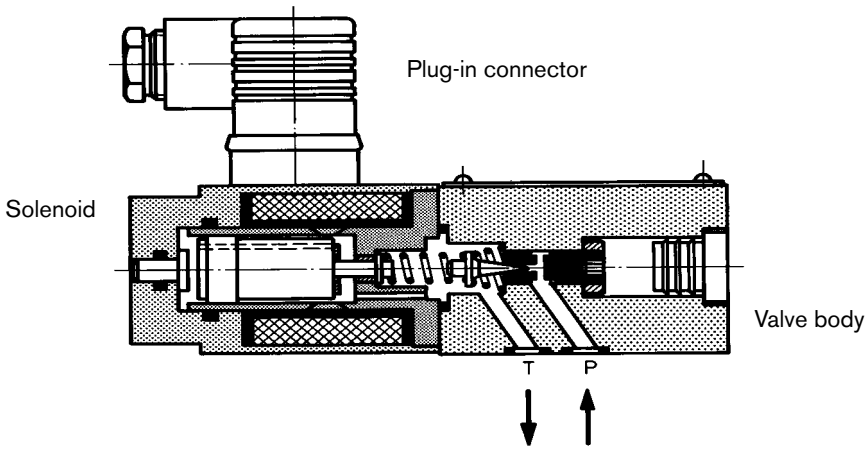
Type DBETX proportional pressure relief valves are remote-controlled (pilot) valves in conical seat design. They are used to limit system pressure.
The valves are actuated by means of a proportional solenoid. The interior of the solenoid is connected to port T and is filled with pressure fluid.
With these valves, the system pressure that needs to be limited can be infinitely adjusted by the valve amplifier electronics in relation to the solenoid current, at an oil flow ≤ 1 l that is as close as possible to constant.

Basic principle

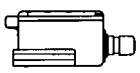
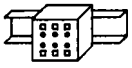
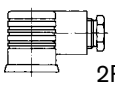
To adjust the system pressure, a setpoint is set in the trigger electronics. Based on this setpoint, the electronics control the solenoid coil with regulated PWM (pulse-width-modulated) current. The proportional solenoid converts the current to a mechanical force, which acts on a main spring by means of the armature plunger. An "additional" spring between the cone and the seat contributes to stability and a minimal residual pressure. The spring force acting on the cone and the pressure in the valve seat balance one another at a constant oil flow (0.7...1 l/min). The "p_{max}" pressure stage is determined by the cone and seating bore configuration.

Pressure limitation for maximum safety

If a fault occurs in the electronics, so that the solenoid current (I_{max}) would exceed its specified level in an uncontrolled manner, the pressure cannot rise above the level determined by the maximum spring force.



Accessories

Type				Material Number
(4 x) ISO 4762-M5x30-10.9	Cheese-head bolts			2 910 151 166
Plug  	VT-SSPA1-525-20/V0	(2.5 A)	RE 30264	0 811 405 143
	VT-SSPA1-508-20/V0	(0.8 A)		0 811 405 144
	VT-SSPA1-525-20/V0/I	(2.5 A)		0 811 405 145
	VT-SSPA1-508-20/V0/I	(0.8 A)		0 811 405 162
Module  	VT-MSPA1-525-10/V0	(2.5 A)	RE 30222	0 811 405 127
	VT-MSPA1-508-10/V0	(0.8 A)		0 811 405 126
Europe card  	VT-VSPA1-525-10/V0/RTP	(2.5 A)	RE 30109	0 811 405 079
	VT-VSPA1-508-10/V0/RTP	(0.8 A)		0 811 405 081
Plug-in connector  2P+PE	Plug-in connector 2P+PE (M16x1.5) included in scope of delivery, see also RE 08008.			

Testing and service equipment

Test box type VT-PE-TB1, see RE 30063
Current measuring adapter type VT-PA-5, see RE 30073

Technical data

General

Construction		Spool valve
Actuation		Proportional solenoid without position control, external amplifier
Connection type		Subplate, mounting hole configuration NG6 (ISO 4401-03-02-0-94)
Mounting position		Optional
Ambient temperature range	°C	–20...+50
Weight	kg	1.9
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	mm^2/s	20...100			
	max. permitted	mm^2/s	10...800			
Pressure fluid temperature range		°C	–20...+80			
Maximum permitted degree of contamination of pressure fluid Purity class to ISO 4406 (c)			Class 18/16/13 [1]			
Direction of flow			See symbol			
Max. set pressure (at $Q = 1$ l/min)		bar	50	80	180	250	315
Minimum pressure (at $Q = 1$ l/min)		bar	2	3	4	5	8
			Note: At $Q_{max} = 1.5$ l/min the pressure levels stated here increase				
Max. mechanical pressure limitation level, e.g. when solenoid current $I > I_{max}$		bar	<55	<85	<186	<258	<325
Max. working press. (at $Q = 1$ l/min)		bar	Port P: 315 [2]				
Max. pressure		bar	Port T: 250				

Electrical

Cyclic duration factor	%	100	
Degree of protection		IP 65 to DIN 40050 and IEC 14434/5	
Solenoid connection		Unit plug DIN 43650/ISO 4400, M16x1.5 (2P+PE)	
Valve with solenoid type		0.8 A	2.5 A
Max. solenoid current	I_{max}	0.8 A	2.5 A
Coil resistance R_{20}	Ω	22	3
Max. power consumption at 100 % load and operating temperature	VA	25	30

Static/Dynamic [3]

Hysteresis	%	≤ 4
Range of inversion	%	≤ 3
Manufacturing tolerance	%	≤ 10
Response time 100% signal change	ms	On < 60 / Off < 70

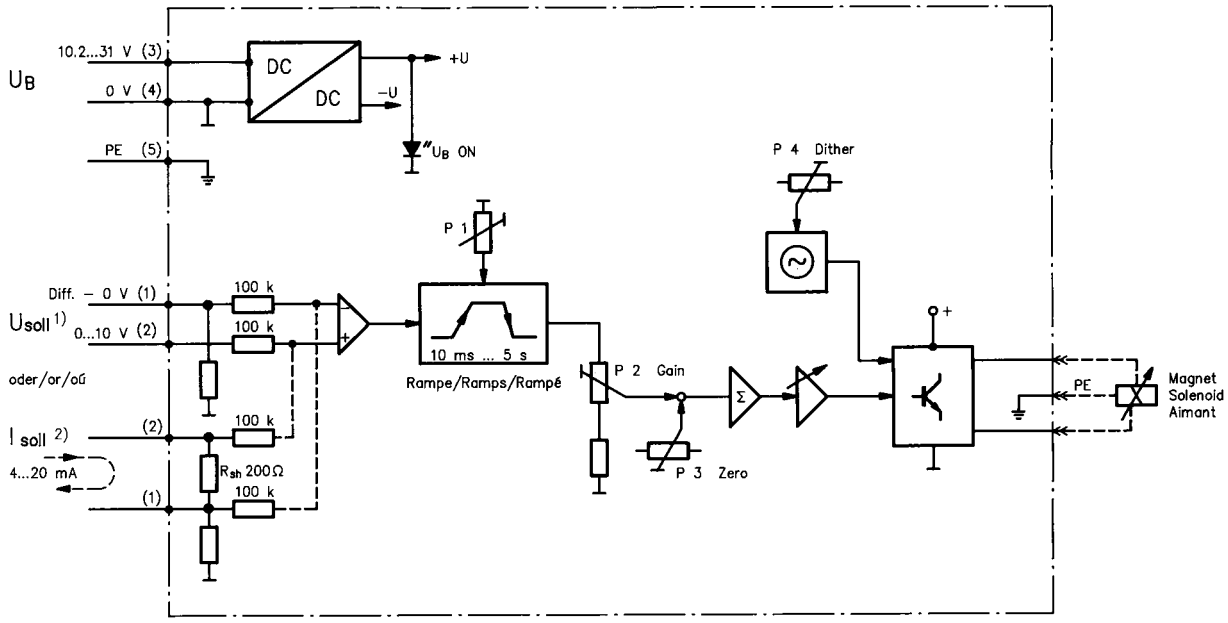
[1] The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components. For a selection of filters, see catalog sheets RE 50070, RE 50076 and RE 50081.

[2] The maximum pressure in P is 315 bar in the standard version. 350 bar is available on request.

[3] All characteristic values ascertained using amplifier 0 811 405 079 for the 2.5 A solenoid and 0 811 405 081 for the 0.8 A solenoid.

Valve with external trigger electronics (plug, RE 30264)

Circuit diagram/pin assignment

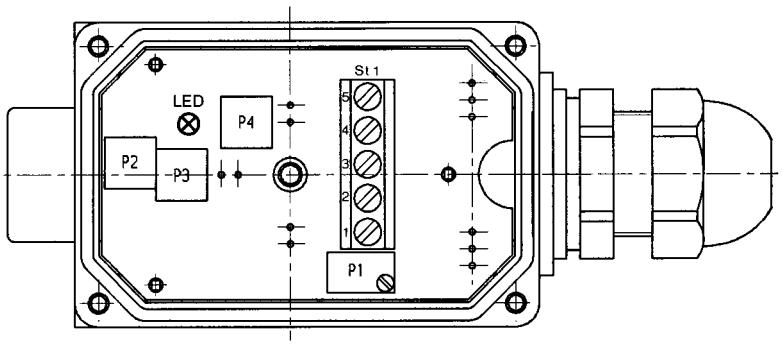


1) Version with 0...+10 V signal

2) Version with 4...20 mA signal

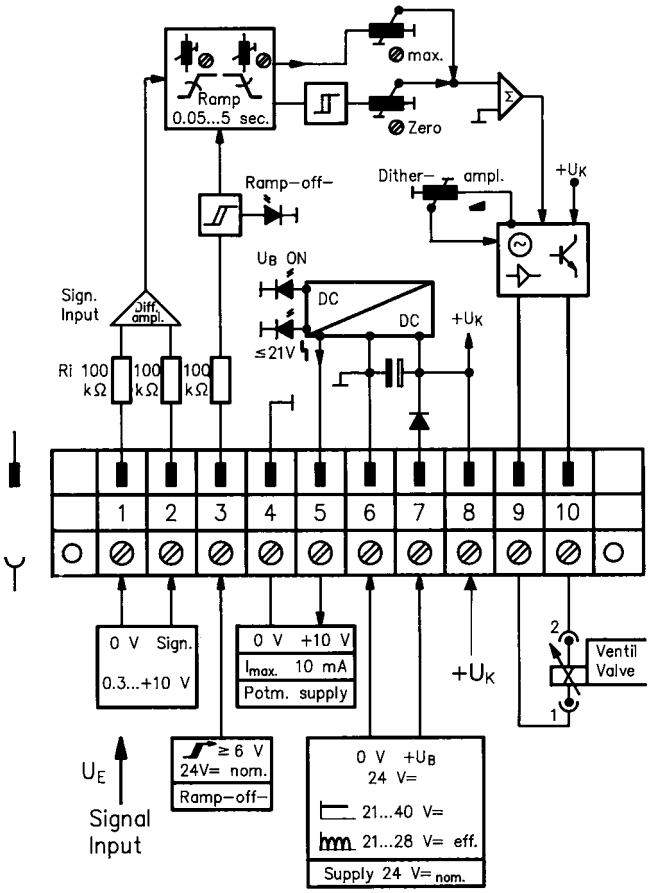
Connection/calibration

P1 – Ramp time
P2 – Sensitivity
P3 – Zero
P4 – Dither frequency
St1 – Terminal
LED – U_B display

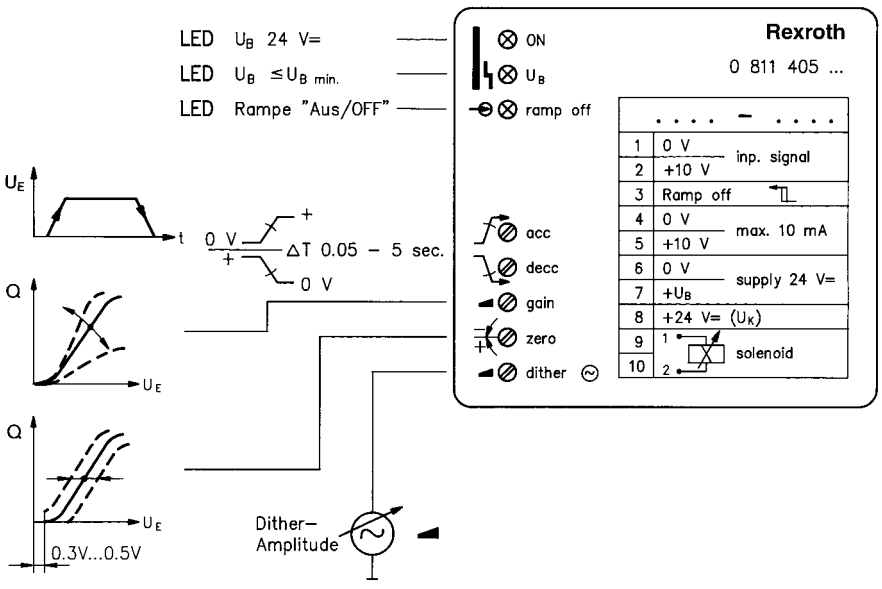


Valve with external trigger electronics (module, RE 30222)

Circuit diagram/pin assignment

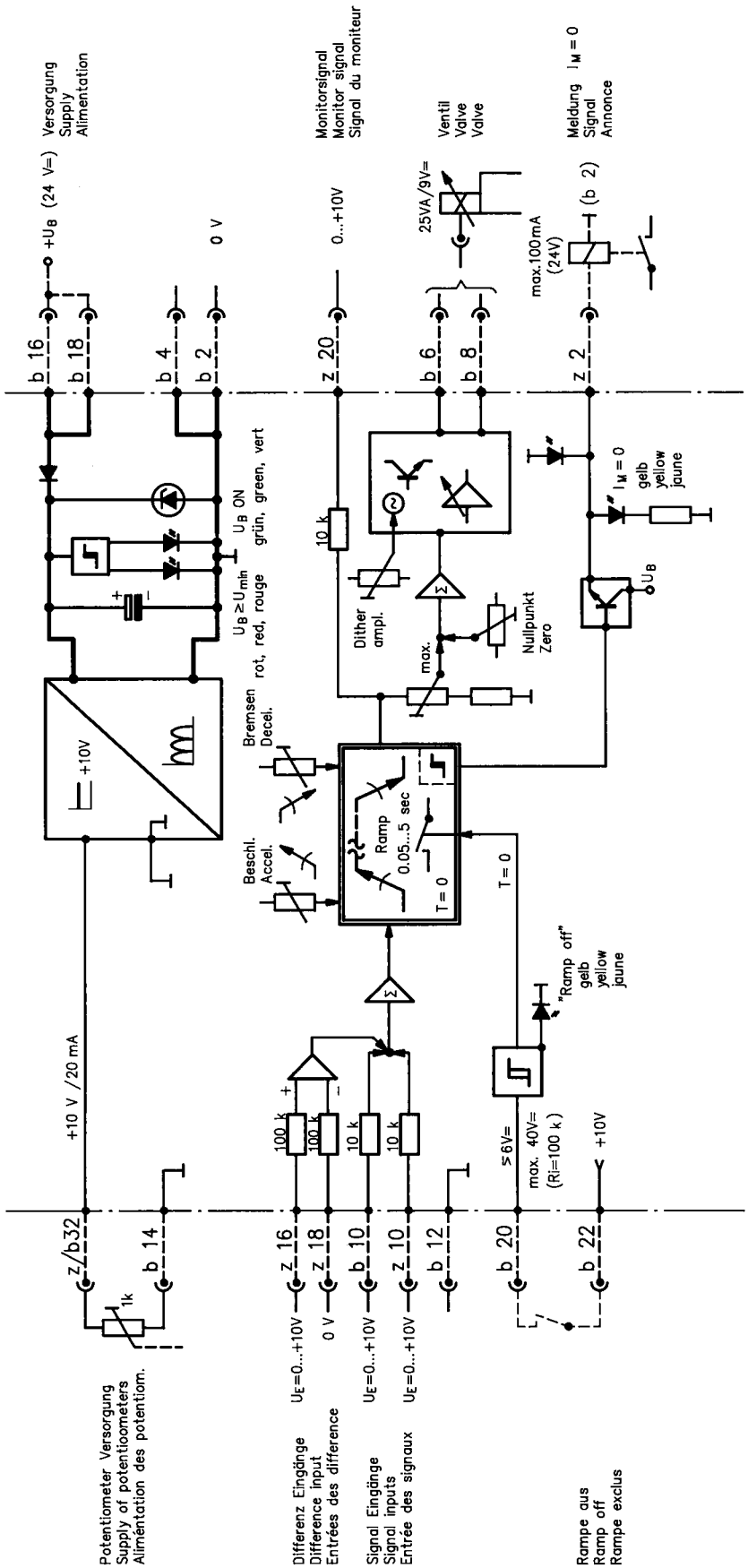


Front view/calibration



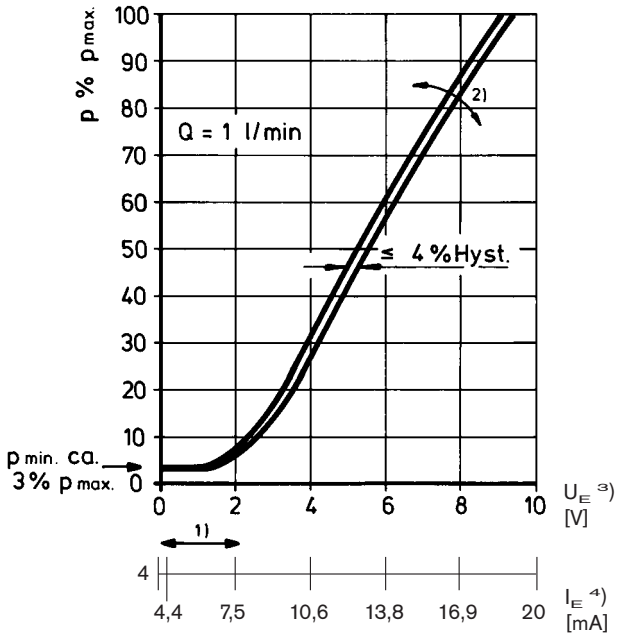
Valve with external trigger electronics (europe card, RE 30109)

Circuit diagram/pin assignment



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

Pressure in port P as a function of the setpoint
Nominal flow rate = 1 l/min



Valve amplifier

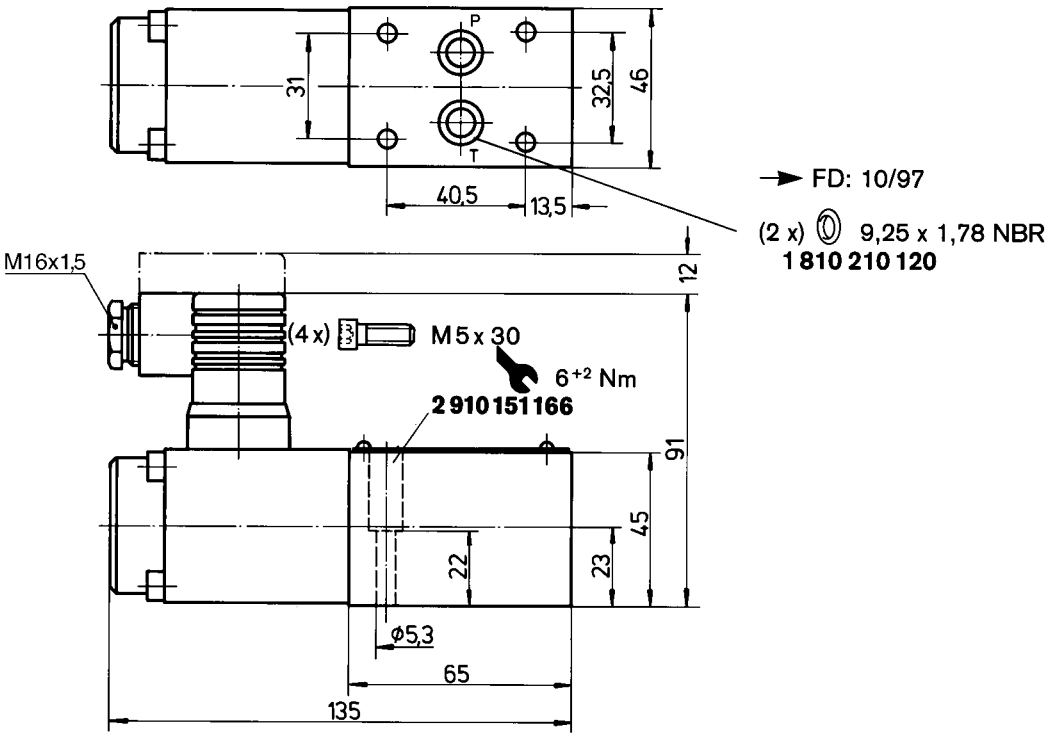
1) Zero adjustment

2) Sensitivity adjustment

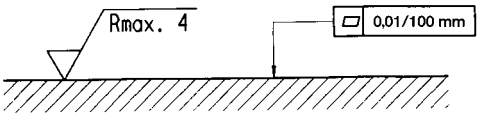
3) Version: $U_E = 0...+10$ V

4) Version: $I_E = 4...20$ mA

Unit dimensions (nominal dimensions in mm)



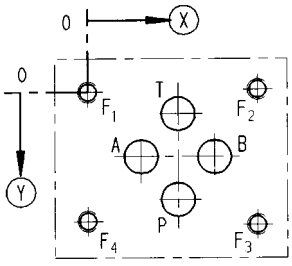
Required surface quality of mating component



Mounting hole configuration: NG6 (ISO 4401-03-02-0-94)
For subplates, see catalog sheet 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

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