

# 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  $Q_{\text{nom}}$  1 l/min



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## 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  $I_{\text{max}} = 0.8 \text{ A}$  or  $I_{\text{max}} = 2.5 \text{ A}$
- Pressure limitation to a safe level even with faulty electronics (solenoid current  $I > I_{\text{max}}$ )
- 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

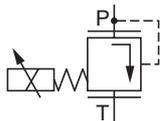
DBET	X - 1X/	G24-	N	Z4	M	*
Proportional pressure relief valve						Further information in plain text
Mounting hole configuration to ISO 4401-03-02-0-94	= X				M =	NBR seals, suitable for mineral oils (HL, HLP) to DIN 51524
Unit series 10 to 19 (10 to 19: installation and connection dimensions unchanged)	= 1X			Z4 =		<b>Electrical connection</b> Unit plug to DIN 43650-AM2 Plug-in connector included in scope of delivery
<b>Max. pressure stage</b>				N =		<b>Manual auxiliary override</b>
up to 50 bar	= 50					<b>Solenoid type (current)</b>
up to 80 bar	= 80					Solenoid current 0.8 A max.
up to 180 bar	= 180					Solenoid current 2.5 A max.
up to 250 bar	= 250					
up to 315 bar	= 315					
Voltage supply of trigger electronics 24 V DC		= G24				
			8 =			
			25 =			

## 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.

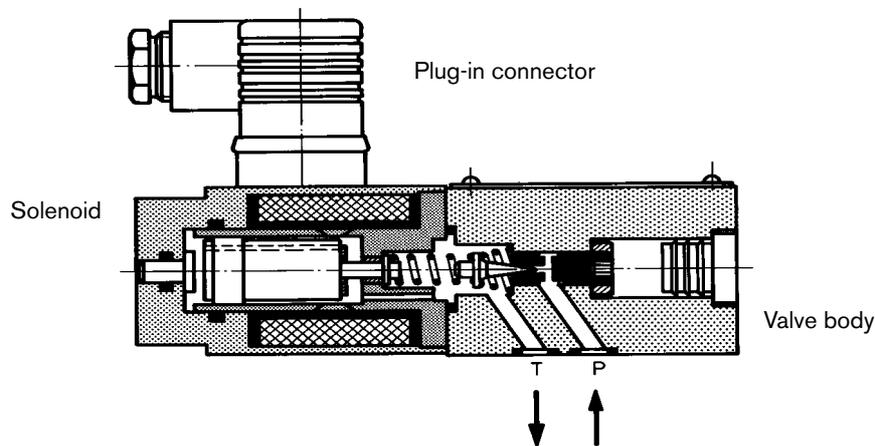
With these valves, the system pressure that needs to be limited can be infinitely adjusted by the valve amplifier electronics in relation to the solenoid current, at an oil flow  $\leq 1$  l that is as close as possible to constant.

### Basic principle

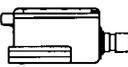
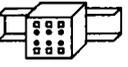
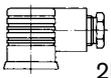
To adjust the system pressure, a setpoint is set in the trigger electronics. Based on this setpoint, the electronics control the solenoid coil with regulated PWM (pulse-width-modulated) current. The proportional solenoid converts the current to a mechanical force, which acts on a main spring by means 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 	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, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ )

Pressure fluid	Hydraulic oil to DIN 51524...535, other fluids after prior consultation					
Viscosity range	recommended	mm <sup>2</sup> /s	20...100			
	max. permitted	mm <sup>2</sup> /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 <sup>1)</sup>					
Direction of flow	See symbol					
Max. set pressure (at $Q = 1\text{ l/min}$ )	bar	50	80	180	250	315
Minimum pressure (at $Q = 1\text{ l/min}$ )	bar	2	3	4	5	8
Note: At $Q_{max} = 1.5\text{ l/min}$ 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 $Q = 1\text{ l/min}$ )	bar	Port P: 315 <sup>2)</sup>				
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 $R_{20}$	$\Omega$	22	3		
Max. power consumption at 100 % load and operating temperature	VA	25	30		

### Static/Dynamic<sup>3)</sup>

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

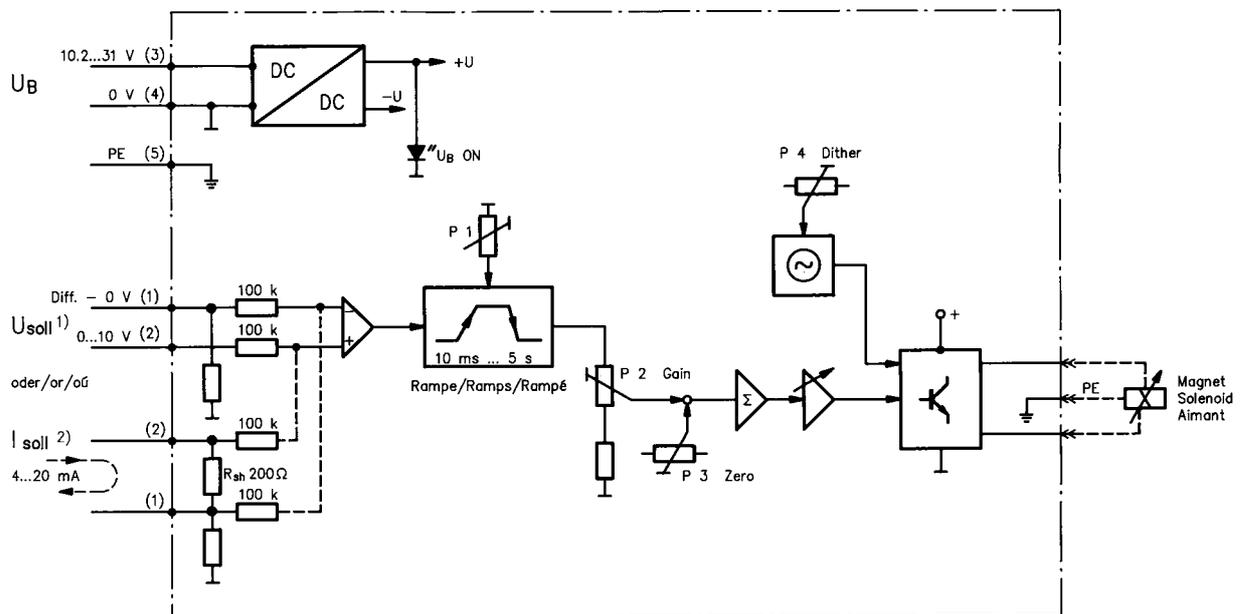
<sup>1)</sup> The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components. For a selection of filters, see catalog sheets RE 50070, RE 50076 and RE 50081.

<sup>2)</sup> The maximum pressure in P is 315 bar in the standard version. 350 bar is available on request.

<sup>3)</sup> 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

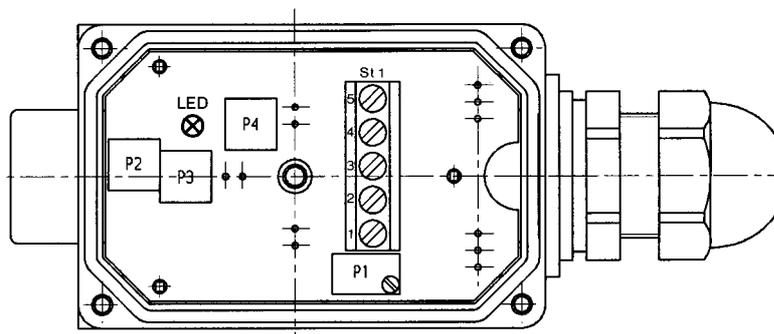
P2 – Sensitivity

P3 – Zero

P4 – Dither frequency

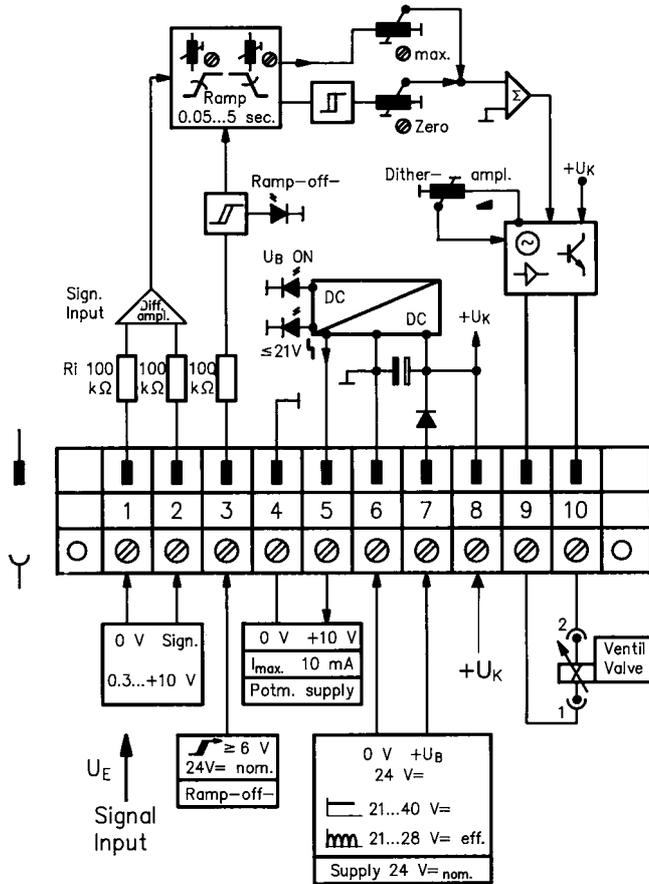
St1 – Terminal

LED –  $U_B$  display

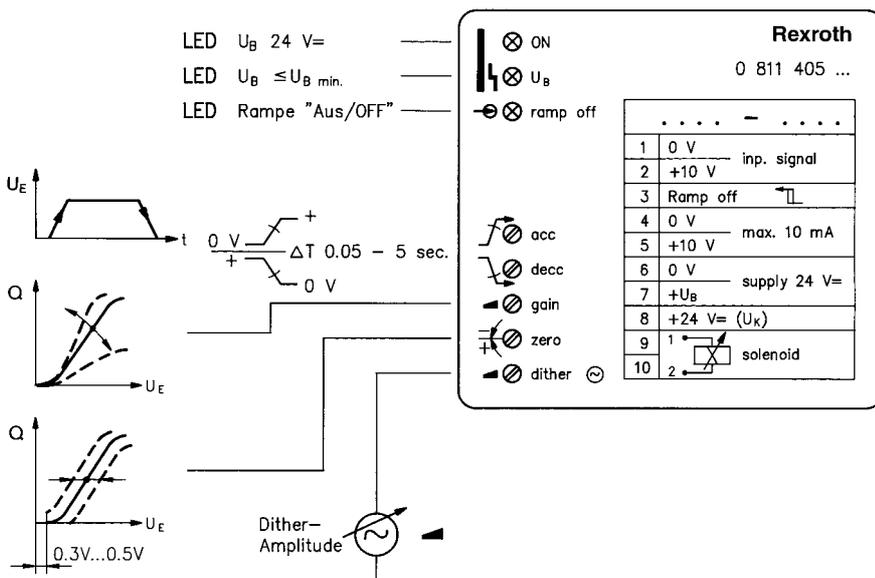


# Valve with external trigger electronics (module, RE 30222)

## Circuit diagram/pin assignment

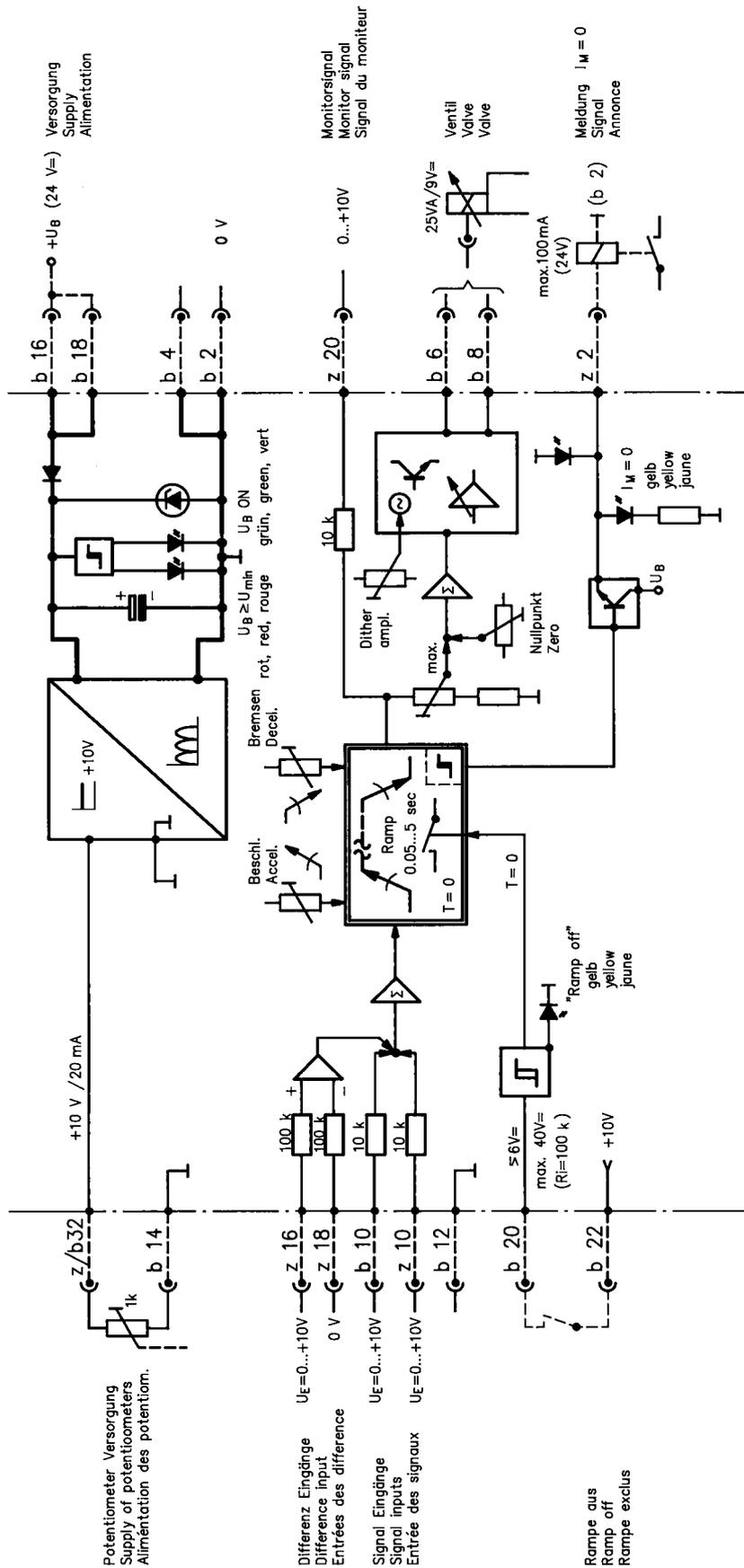


## Front view/calibration



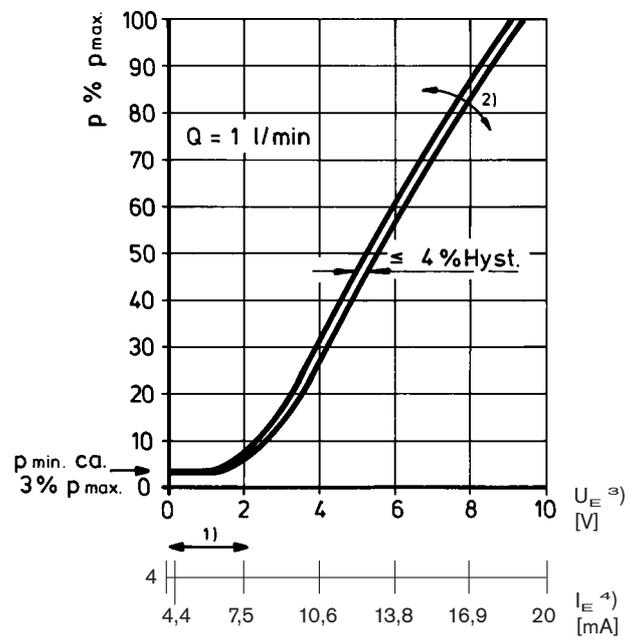
# Valve with external trigger electronics (europe card, RE 30109)

## Circuit diagram/pin assignment



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

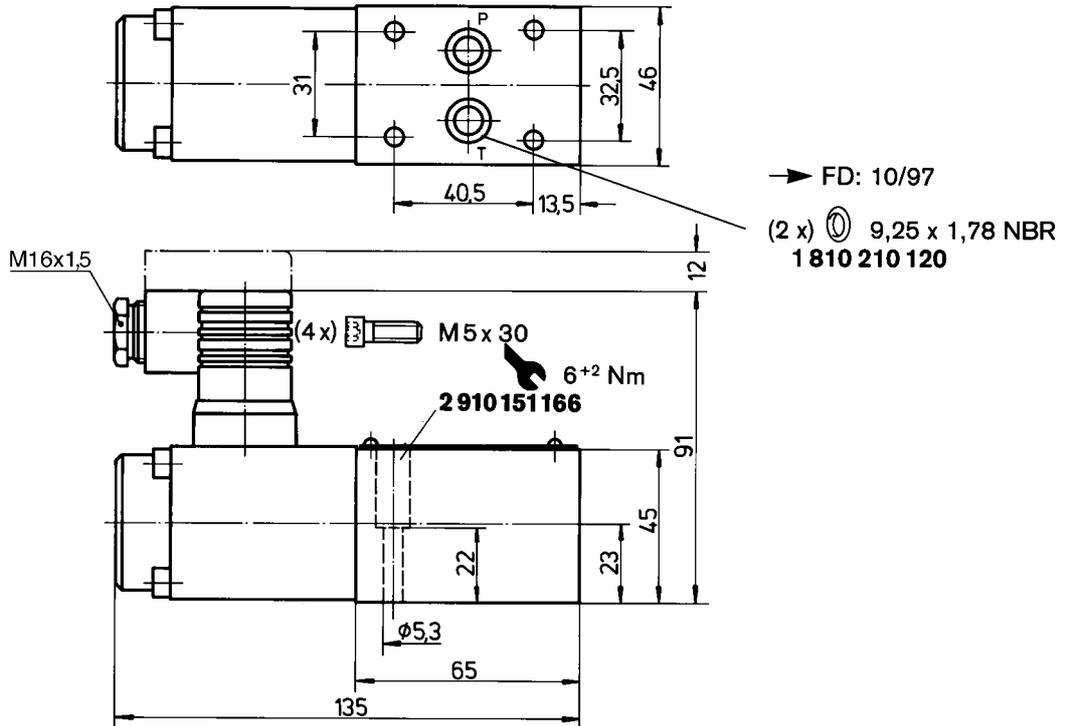
Pressure in port P as a function of the setpoint  
Nominal flow rate = 1 l/min



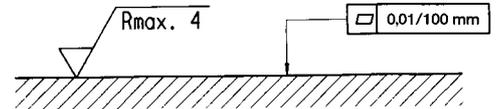
### Valve amplifier

- 1) Zero adjustment
- 2) Sensitivity adjustment
- 3) Version:  $U_E = 0 \dots +10 \text{ V}$
- 4) Version:  $I_E = 4 \dots 20 \text{ mA}$

**Unit dimensions** (nominal dimensions in mm)



Required surface quality of mating component

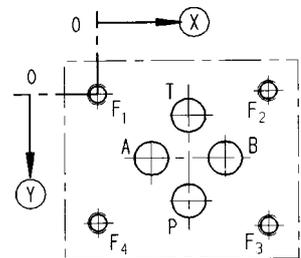


**Mounting hole configuration: NG6** (ISO 4401-03-02-0-94)

For subplates, see catalog sheet RE 45053

1) Deviates from standard

2) Thread depth:  
 Ferrous metal 1.5 x  $\phi$   
 Non-ferrous 2 x  $\phi$



	P	A	T	B	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>
$\textcircled{X}$	21.5	12.5	21.5	30.2	0	40.5	40.5	0
$\textcircled{Y}$	25.9	15.5	5.1	15.5	0	-0.75	31.75	31
$\textcircled{\phi}$	8 <sup>1)</sup>	8 <sup>1)</sup>	8 <sup>1)</sup>	8 <sup>1)</sup>	M5 <sup>2)</sup>	M5 <sup>2)</sup>	M5 <sup>2)</sup>	M5 <sup>2)</sup>