

# Proportional pressure relief valve, pilot operated

RE 29156/07.05

1/10

## Type DBE6X

Nominal size 6  
Unit series 1X  
Maximum working pressure P 315 bar, T 250 bar  
Maximum flow rate 40 l/min



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## Features

- Pilot operated valves (pilot valves) for limiting system pressure (pilot oil internal only)
- Adjustable by means of the solenoid current, see Characteristic curve, Technical data and selected valve electronics
- Solenoid versions  $I_{\max} = 0.8 \text{ A}$  or  $I_{\max} = 2.5 \text{ A}$
- 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

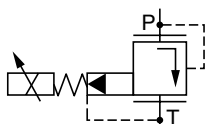
DBE6	X - 1X/	G24-	N	Z4	M	*
Proportional pressure relief valve NG6, pilot operated						Further information in plain text
Mounting hole configuration to ISO 4401-03-02-0-94	= X				M =	NBR seals, suitable for mineral oils (HL, HLP) to DIN 51524
Unit series 10 to 19 (10 to 19: installation and connection 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 80 bar	= 80					<b>Solenoid type (current)</b>
up to 180 bar	= 180					Solenoid current 0.8 A max.
up to 315 bar	= 315					Solenoid current 2.5 A max.
Voltage supply of trigger electronics 24 V DC		= G24				

## Preferred types

Solenoid 0.8 A		Solenoid 2.5 A	
Type	Material Number	Type	Material Number
DBE6X-1X/80G24-8NZ4M	0 811 402 045	DBE6X-1X/80G24-25NZ4M	0 811 402 040
DBE6X-1X/180G24-8NZ4M	0 811 402 044	DBE6X-1X/180G24-25NZ4M	0 811 402 041
DBE6X-1X/315G24-8NZ4M	0 811 402 043	DBE6X-1X/315G24-25NZ4M	0 811 402 042

## Symbol

For external trigger electronics



## Function, sectional diagram

### General

Type DBE6X proportional pressure relief valves are pilot operated pressure relief valves.

The internal pilot stage in the conical seat version and the main stage in the spool version are located in the valve body.

The valves are actuated by means of a proportional solenoid.

The solenoid is cushioned by restrictors in the armature to aid dynamic stability. The interior of the solenoid is connected to port T and is filled with pressure fluid. Bleeding is achieved by means of a screw plug.

With these valves, the system pressure that needs to be limited can be infinitely adjusted in relation to the solenoid current.

### 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.

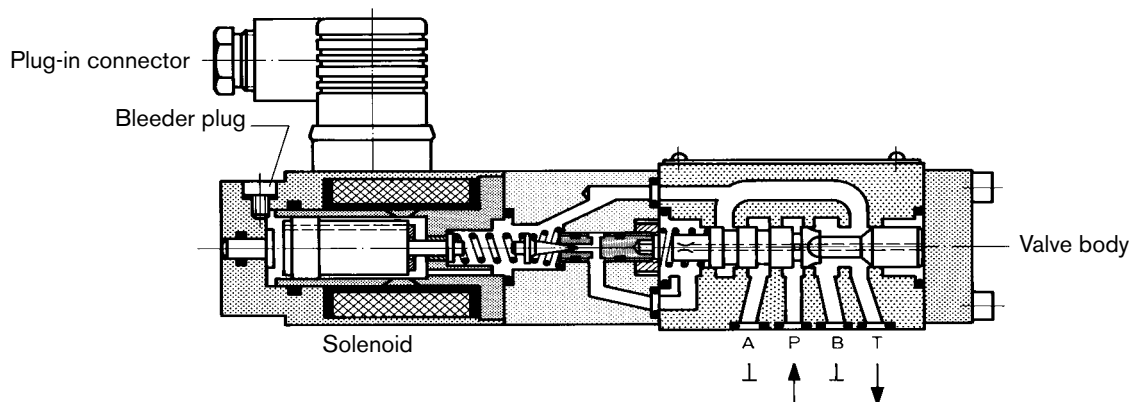
The regulated current is additionally modulated with a dither, ensuring low hysteresis.

The proportional solenoid converts the current to a mechanical force, which acts on a main spring in the pilot stage by means of the armature plunger. The pilot stage is supplied with pilot oil via a bore at  $< 0.6$  l/min.



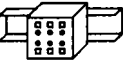

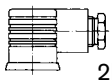
The " $p_{max}$ " pressure stage is determined by the cone and seating bore configuration.

### 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
	VT-SSPA1-508-20/V0 (0.8 A)	
	VT-SSPA1-525-20/V0/I (2.5 A)	
	VT-SSPA1-508-20/V0/I (0.8 A)	
Module 	VT-MSPA1-525-10/V0 (2.5 A)	RE 30222
	VT-MSPA1-508-10/V0 (0.8 A)	
Europe card 	VT-VSPA1-525-10/V0/RTP (2.5 A)	RE 30109
	VT-VSPA1-508-10/V0/RTP (0.8 A)	
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	Pilot stage	Poppet valve
	Main stage	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	2.2
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	80      180      315
Minimum pressure (at $Q_{min} = 1\text{ l/min}$ )	bar	7      8      10
Max. mechanical pressure limitation level, e.g. when solenoid current $I > I_{max}$	bar	<90      <190      <325
Max. working pressure	bar	Port P: 315
Max. pressure	bar	Port T: 250
Pilot oil flow	l/min	approx. 0.6
Max. flow	l/min	40

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, M16 x 1.5 (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

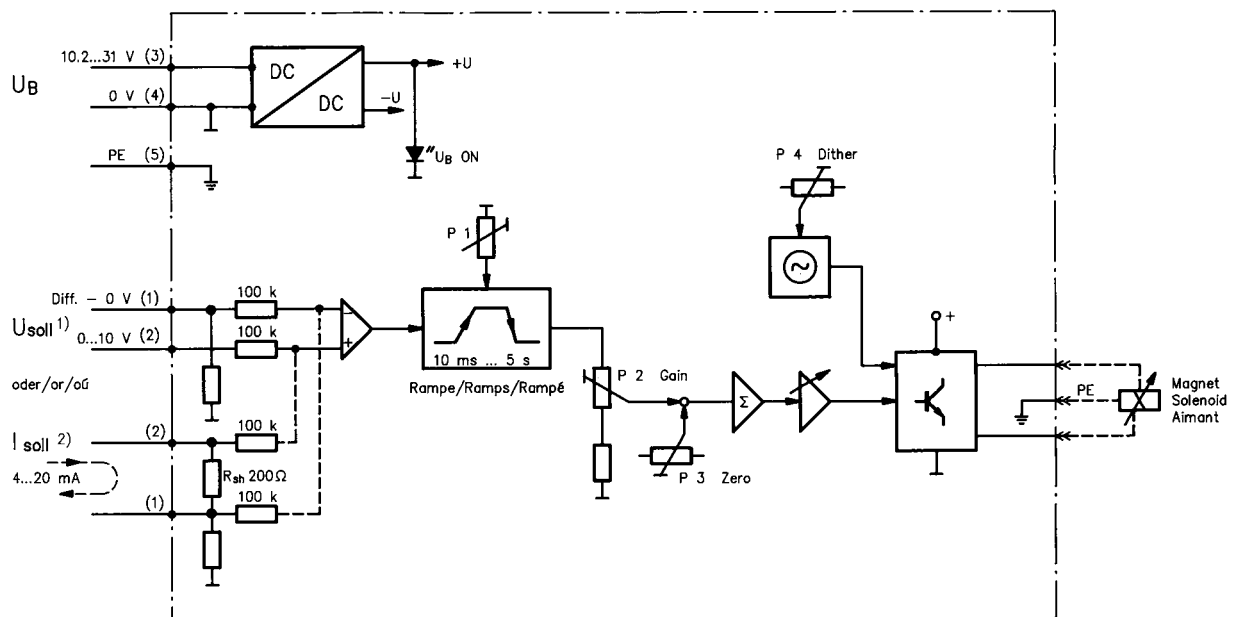
Static/Dynamic <sup>2)</sup>		
Hysteresis	%	≤ 4
Range of inversion	%	≤ 3
Manufacturing tolerance for $p_{max}$	%	≤ 10
Response time 100% signal change	ms	On 200 / Off < 250

<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> All characteristic values ascertained using amplifier 0811 405 079 for the 2.5 A solenoid and 0811 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

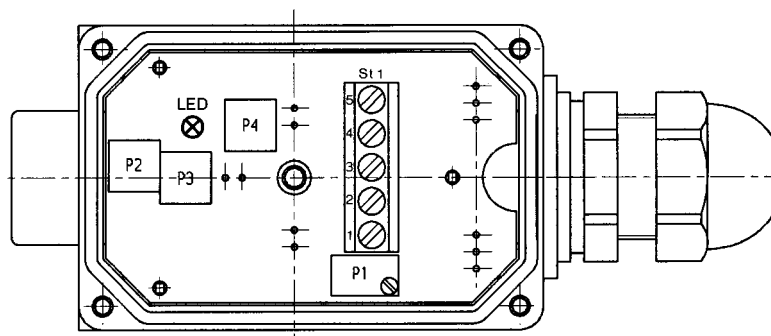
P2 – Sensitivity

P3 – Zero

P4 – Dither frequency

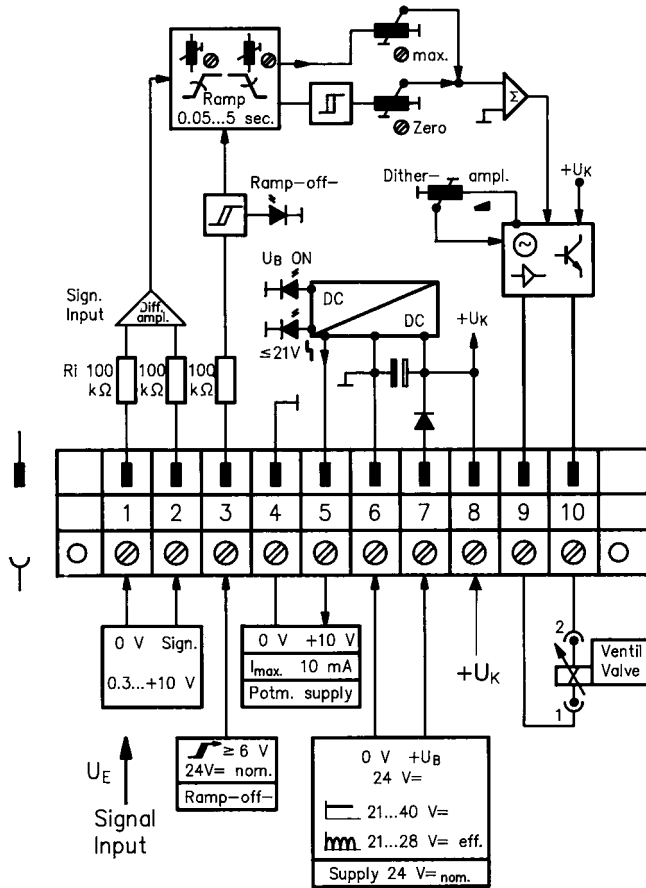
St1 – Terminal

LED –  $U_B$  display

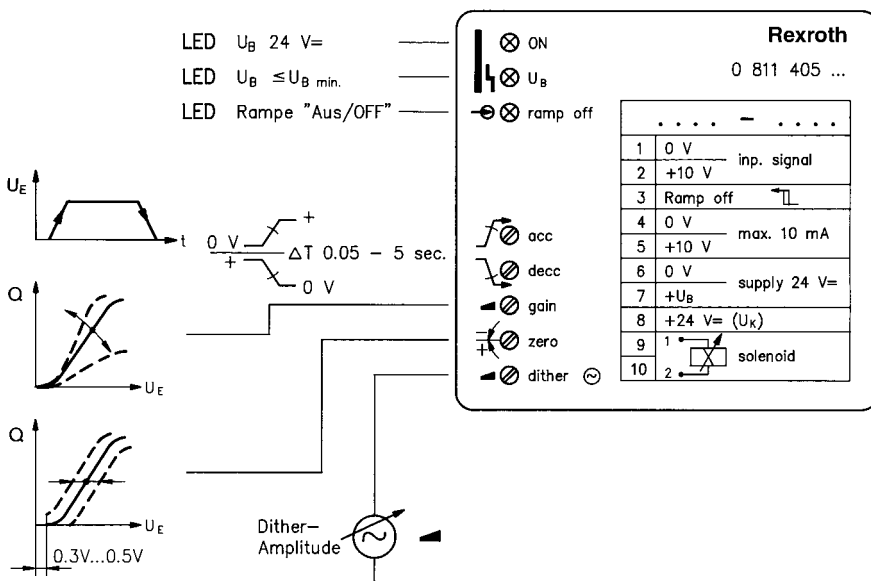


# Valve with external trigger electronics (module, RE 30222)

## Circuit diagram/pin assignment

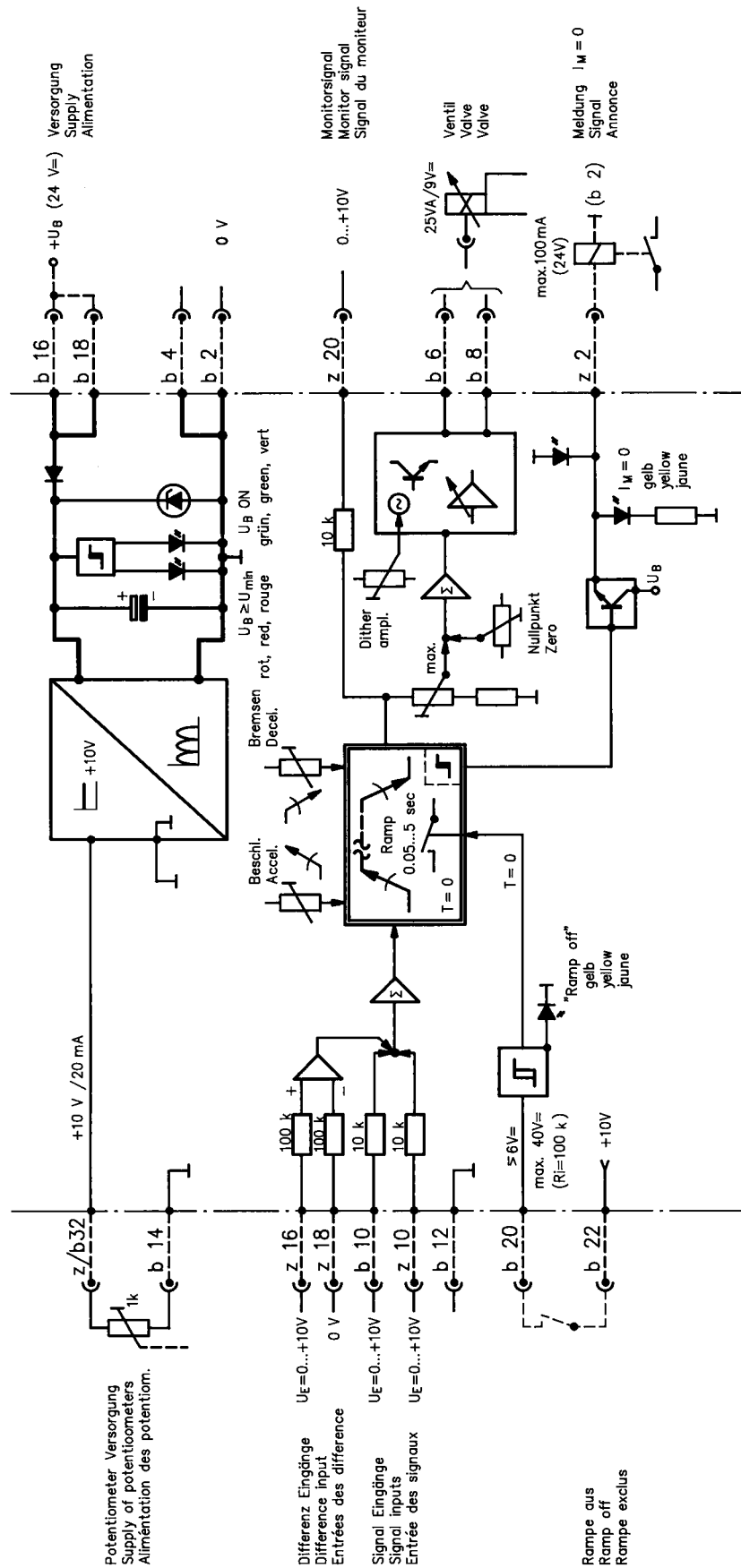


## Front view/calibration



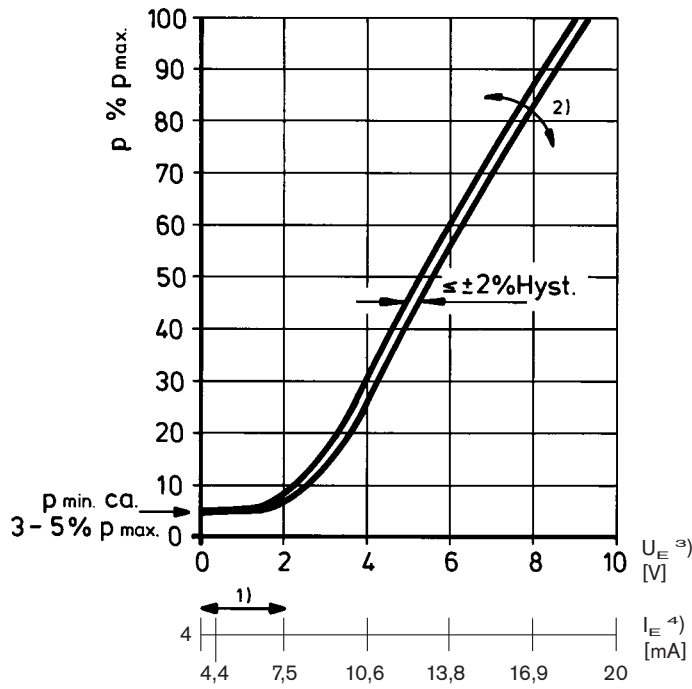
# Valve with external trigger electronics (europe card, RE 30109)

## Circuit diagram/pin assignment



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

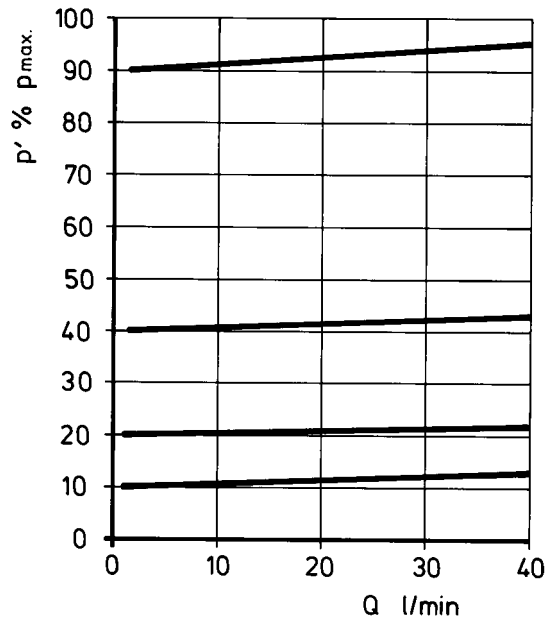
Pressure in port P as a function of the setpoint



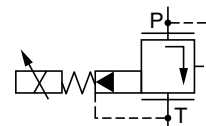
**Valve amplifier**

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

Pressure in port P proportionate to the maximum flow of the main stage

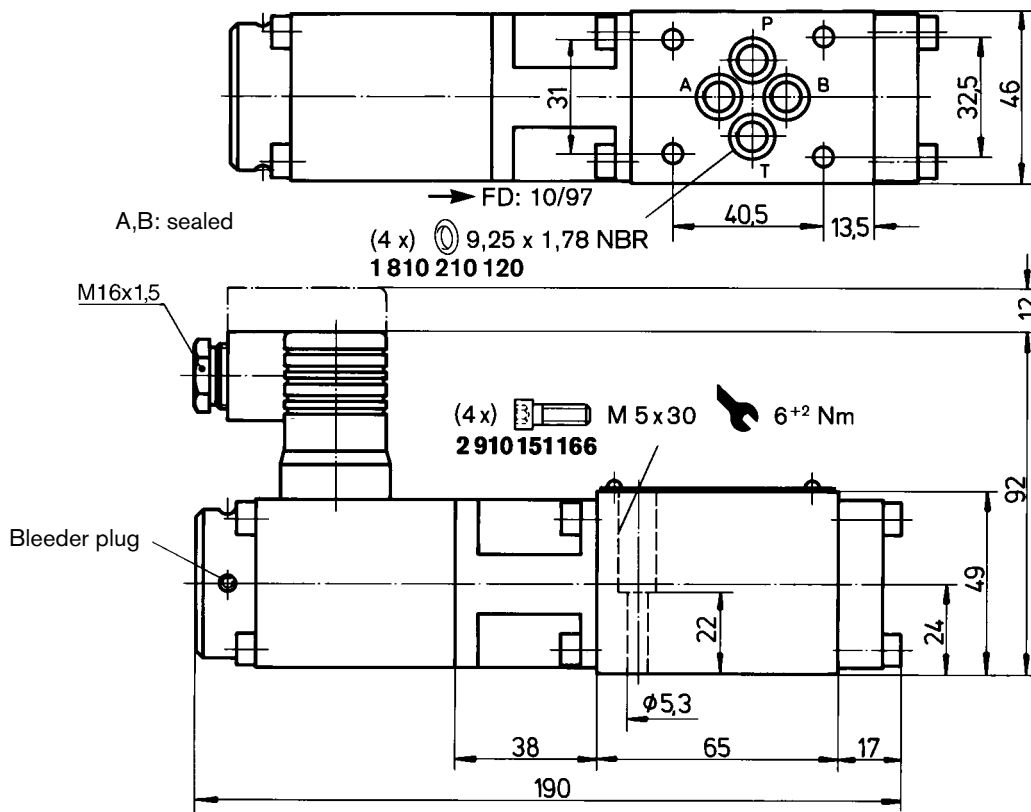


Set pressure  
 $p' = f(Q_{P-T})$

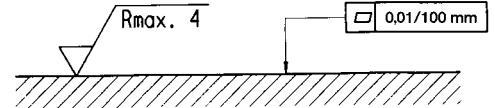




**Unit dimensions** (nominal dimensions in mm)



Required surface quality of mating component



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

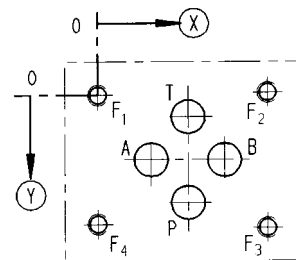
For subplates see catalog sheet RE 45053

1) Deviates from standard

2) Thread depth:

Ferrous metal 1.5 x Ø

Non-ferrous 2 x Ø



	P	A	T	B	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>
⊗	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 <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>