Proportional pressure relief valve, pilot operated

RE 29140/07.05 1/10

Type DBE10Z

Nominal size 10
Unit series 1X
Maximum working pressure A, B, X 315 bar, Y 2 bar
Maximum flow rate Q_{nom} 120 l/min

Overview of Contents

Features

- Pilot operated valves for limiting system pressure (pilot oil internal only, with relief port X)
- Adjustable by means of the solenoid current, see Characteristic Curve, Technical Data and selected valve electronics
- Solenoid version $I_{max} = 0.8$ A
- Pressure limitation to a safe level even with faulty electronics (solenoid current $I > I_{max}$)
- For subplate attachment, mounting hole configuration to ISO 5781-AG-06-2-A
  Subplates as per catalog sheet RE 45055
  (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

DBE10	Z – 1X /	XY	G24 –	8	N	Z4	M	*

Proportional pressure relief valve NG10, pilot operated

Mounting hole configuration to ISO 5781-AG-06-2-A **= Z**

Unit series 10 to 19 (10 to 19: installation and connection dimensions unchanged) **= 1X**

Max. pressure stage
up to 180 bar **= 180**
up to 315 bar **= 315**

Relief port X
External pilot oil discharge Y **= XY**

Voltage supply of trigger electronics 24 V DC **= G24**

Further information in plain text

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

Z4 = **Electrical connection**
Unit plug to DIN 43650-AM2
Plug-in connector included in scope of delivery

N = **Manual auxiliary override**

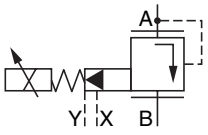
Solenoid type (current)
8 = Solenoid current 0.8 A max.

Preferred types

Solenoid 0.8 A	
Type	**Material Number**
DBE10Z–1X/180XYG24–8NZ4M	0 811 402 117
DBE10Z–1X/315XYG24–8NZ4M	0 811 402 118

Symbol

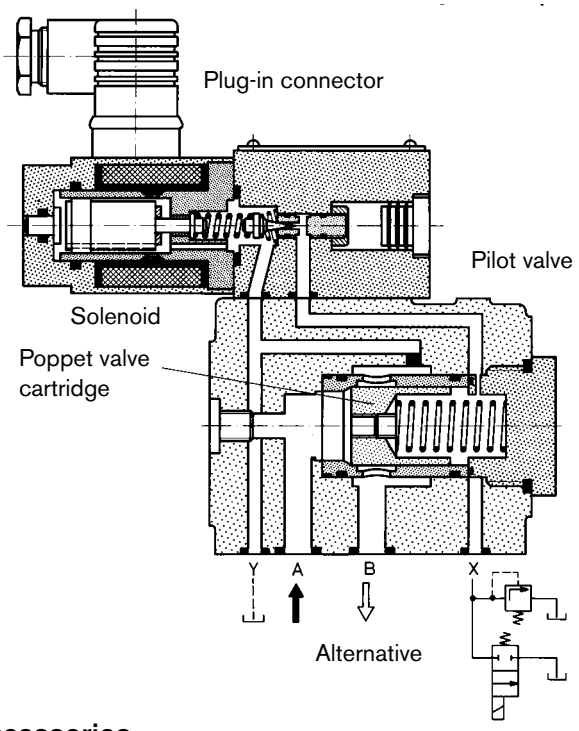
For external trigger electronics



Function, sectional diagram

General

Type DBE10Z proportional pressure relief valves are pilot operated pressure relief valves used to limit system pressure.
The valves are actuated by means of a proportional solenoid without position control, acting against a spring force at the cone. The valve body contains a logic element (poppet valve) of the "normally closed" type. This is pilot operated and is in conical seat design.



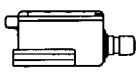
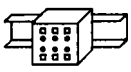
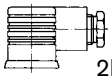
Basic principle

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 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 valve by means of the armature plunger. The pilot valve is supplied with pilot oil at a flow rate of < 0.8 l/min via a bore in the main stage. The "p_{max}" pressure stage is determined by the cone and seating bore configuration in the pilot valve.

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-M10x80-10.9	Cheese-head bolts			2 910 151 309
Plug  	VT-SSPA1-508-20/V0	(0.8 A)	RE 30264	0 811 405 144
	VT-SSPA1-508-20/V0/I	(0.8 A)		0 811 405 162
Module  	VT-MSPA1-508-10/V0	(0.8 A)	RE 30222	0 811 405 126
Europe card  	VT-VSPA1-508-10/V0/RTP	(0.8 A)	RE 30109	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	Pilot stage		Poppet valve
	Main stage		Pressure relief valve
	Valve cartridge		Poppet valve, normally closed, with pilot oil bore
Actuation			Proportional solenoid without position control, external amplifier
Connection type			Subplate, mounting hole configuration NG10 (ISO 5781-AG-06-2-A)
Mounting position			Optional
Ambient temperature range		°C	–20...+50
Weight		kg	7
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 $Q_{min} = 1$ l/min)		bar	180	315
Minimum pressure (at $Q_{min} = 1$ l/min)		bar	6	8
Max. mechanical pressure limitation level, e.g. when solenoid current $I > I_{max}$		bar	<190	<325
Max. working pressure		bar	Port A, B: 315	
			Port Y: ≤ 2 external pilot oil drain	
			Port X: 315 relief port	
Internal pilot oil flow		l/min	≤ 0.8	
Max. flow		l/min	120 for Q_{max}, see Characteristic Curves	

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)
Max. solenoid current	I_{max}	0.8 A
Coil resistance R_{20}	Ω	22
Max. power consumption at 100 % load and operating temperature	VA	25

Static/Dynamic [2]

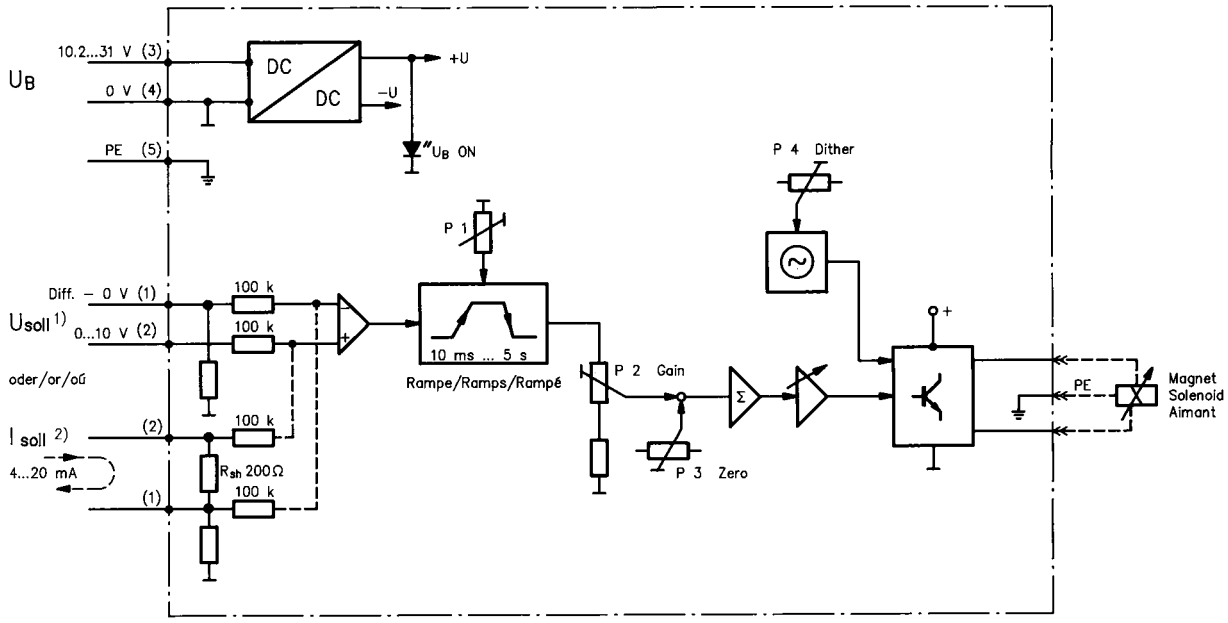
Hysteresis	%	≤ 5
Manufacturing tolerance for $p_{max.}$	%	≤ 10
Response time 100 % signal change	ms	≈ 90 dependent on dead volume or system volume

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

Valve with external trigger electronics (plug, RE 30264)

Circuit diagram/pin assignment

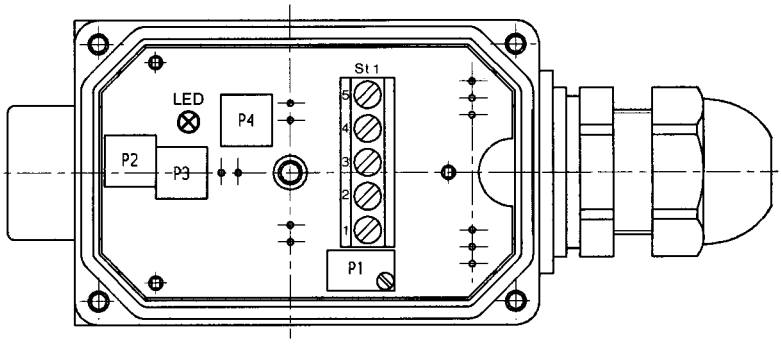


1) Version with 0...+10 V signal

2) Version with 4...20 mA signal

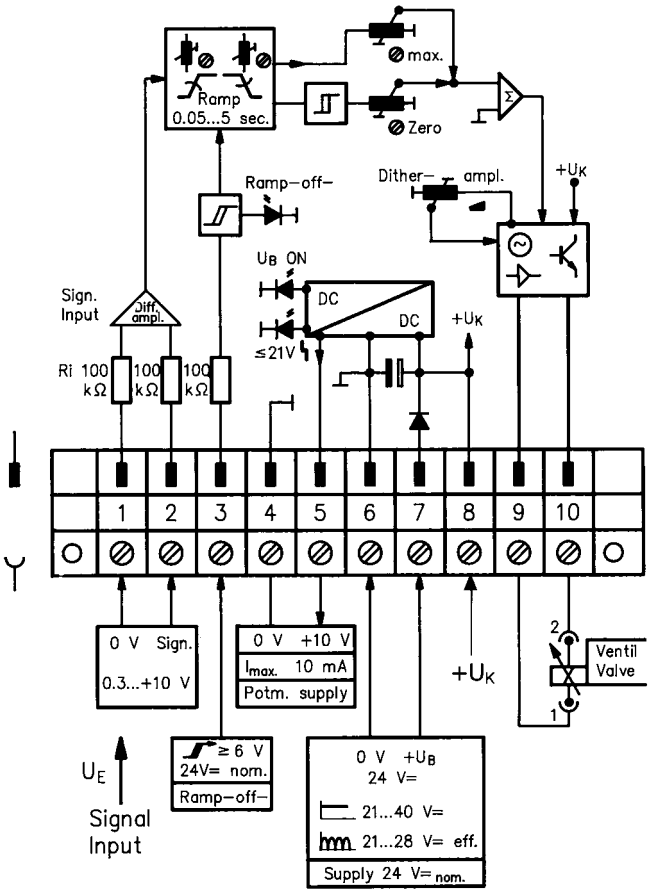
Connection/calibration

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

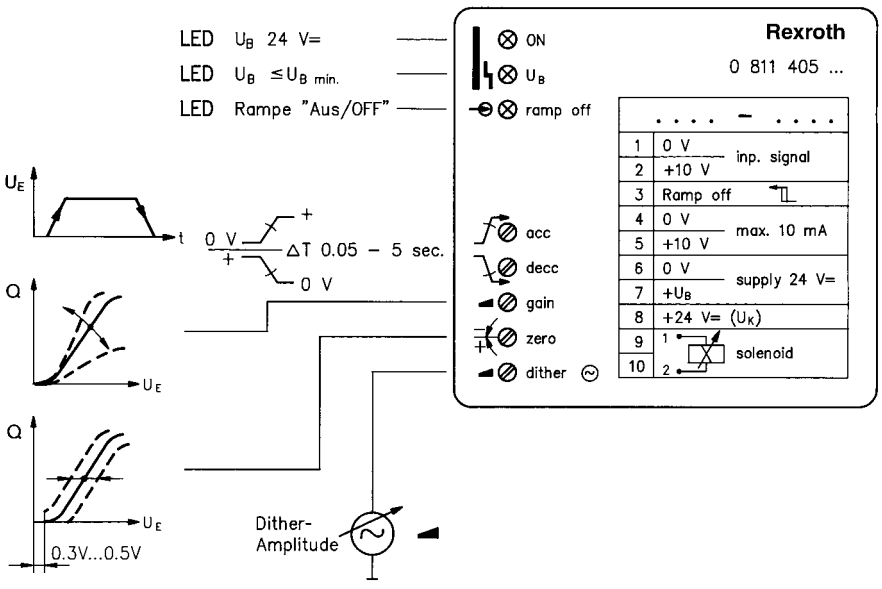


Valve with external trigger electronics (module, RE 30222)

Circuit diagram/pin assignment

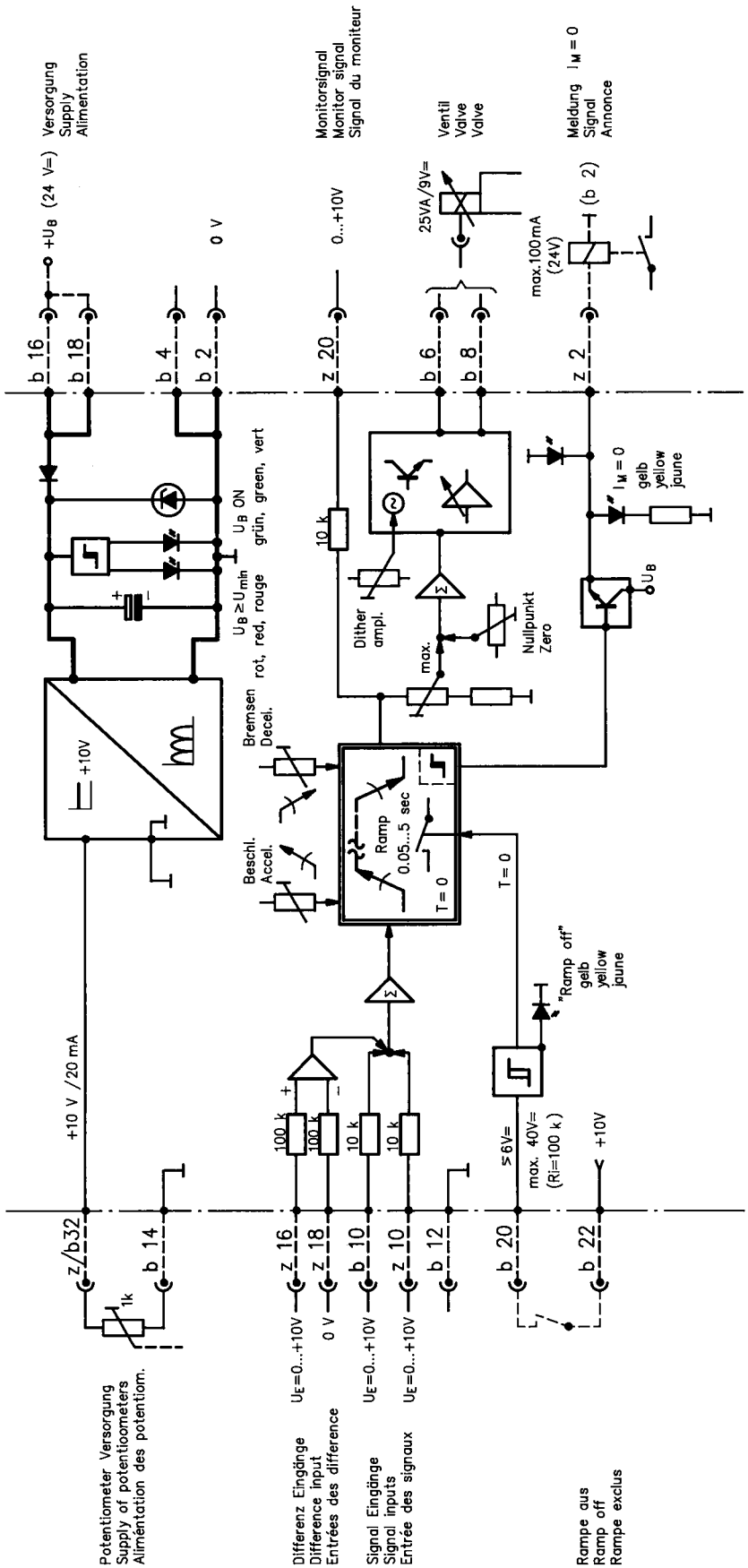


Front view/calibration



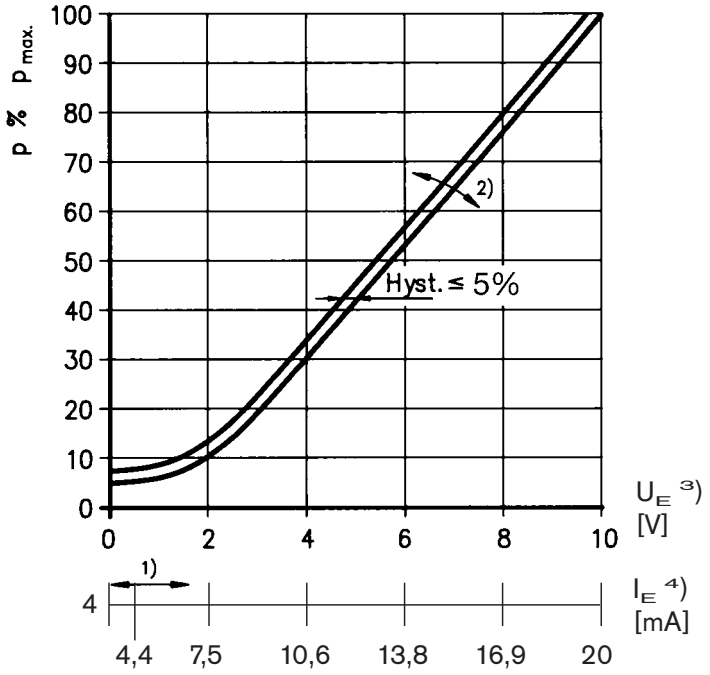
Valve with external trigger electronics (europe card, RE 30109)

Circuit diagram/pin assignment



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

Pressure in port A as a function of the setpoint



Valve amplifier

1) Zero adjustment

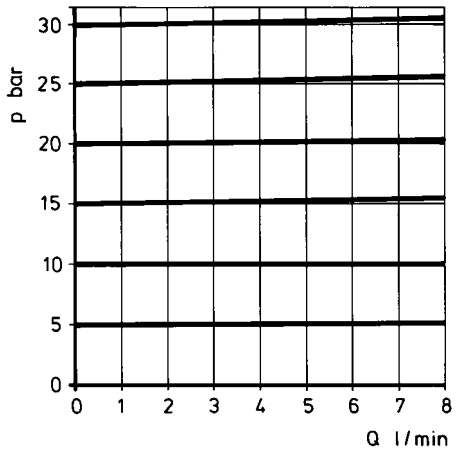
2) Sensitivity adjustment

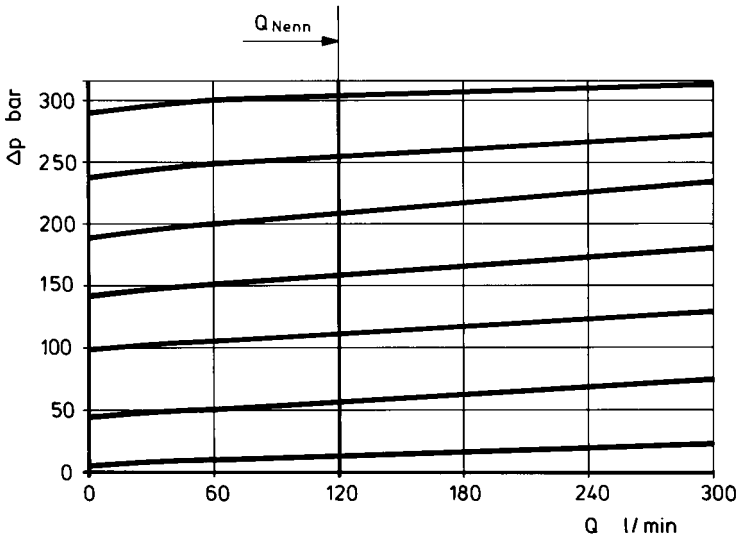
3) Version: $U_E = 0...+10$ V

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

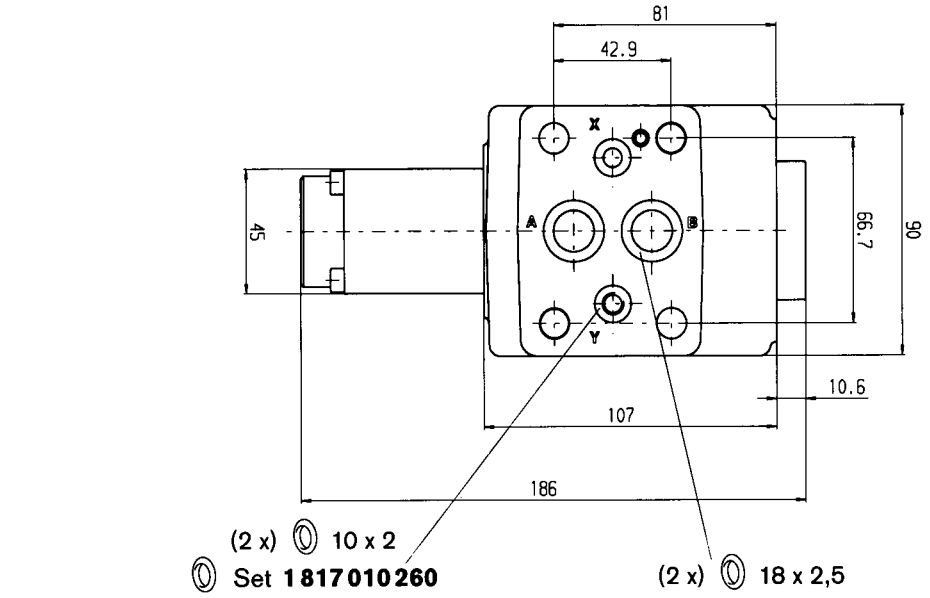
Pressure in port A as a function of the main stage nominal flow rate

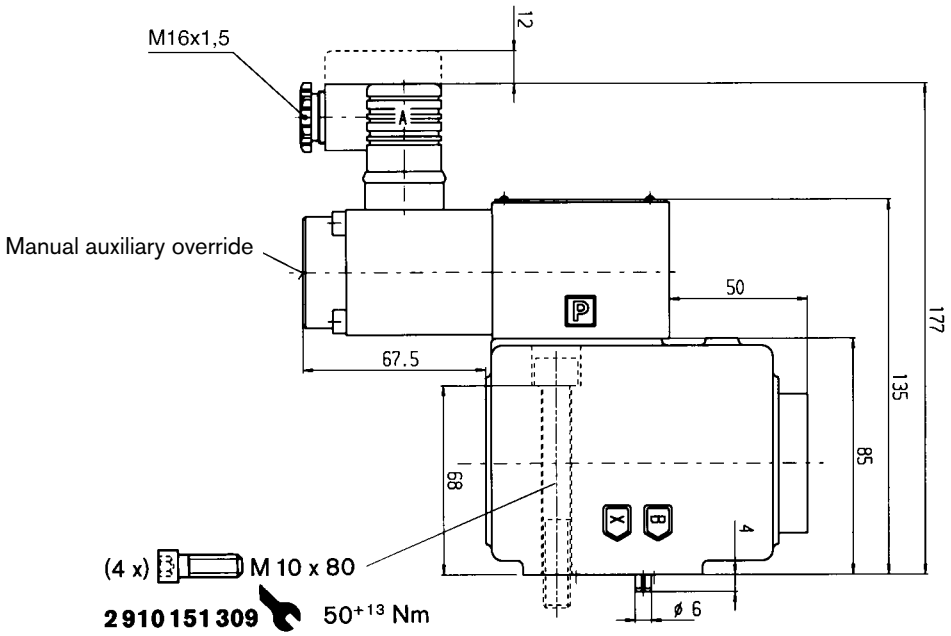
$p = f(Q)$

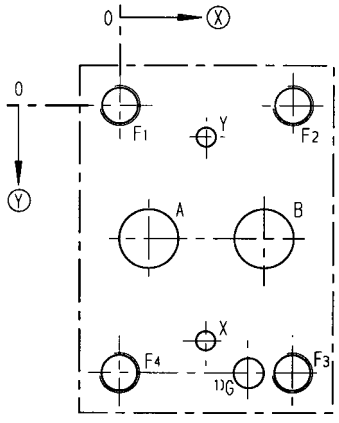




Unit dimensions (nominal dimensions in mm)



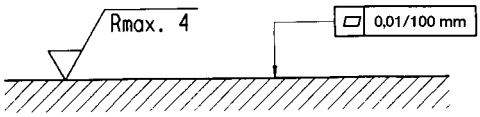




Mounting hole configuration: NG10 (ISO 5781-AG-06-2-A)
For subplates see catalog sheet RE 45055

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

Required surface quality of mating component



	A	B	X	Y	G	F_1	F_2	F_3	F_4
Ⓧ	7.2	35.8	21.4	21.4	31,8	0	42,9	42,9	0
Ⓨ	33.35	33.35	58.7	7.9	66,7	0	0	66,7	66,7
∅	14.7	14.7	4.8	4.8	7,5	M10 2)	M10 2)	M10 2)	M10 2)

Notes

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