Rexroth
Bosch Group

Proportional pressure relief valve, pilot operated, with on-board electronics (OBE) and position feedback

RE 29163/07.05 1/12

Type DBEBE10Z

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

List of Contents

Features

- Pilot operated valves with position feedback and on-board electronics for limiting system pressure (pilot oil internal only)
- Adjustable through the position of the armature against the compression spring
- With position control, minimal hysteresis <1 %, rapid response times, see Technical Data
- 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 43563-AM6, see catalog sheet RE 08008 (order separately)
- Data for the on-board trigger electronics
  Complies with CE, EMC directives EN 61000-6-2: 2002-08 and EN 61000-6-3: 2002-08
  - $U_B = 24\ V_{nom}$ DC
  - Electrical connection 6P+PE
  - Signal actuation
    - Standard 0...+10 V (A1)
    - Version 4...20 mA (F1)
  - Valve curve calibrated at the factory

Ordering data

DBEB	E	10	Z – 1X /	XY	G24	K31	A1	M	*

Proportional pressure relief valve with inductive position transducer on the cone

With on-board electronics **= E**

Nominal size **= 10**

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
Pilot oil port Y **= XY**

* Variant “F1” (4...20 mA version) available on request

G24 = Voltage supply of trigger electronics 24 V DC

K31 = **Electrical connection without** plug-in connector, with unit plug to DIN 43563-AM6
Order plug-in connector separately

A1 = **Interface for trigger electronics*** Setpoint input 0...+10 V

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

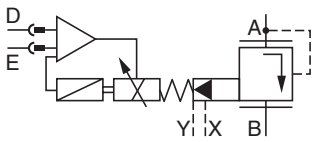
Further information in plain text

Preferred types

Type....A1 (0... +10 V)	Material Number
DBEBE10Z–1X/180XYG24K31A1M	0 811 402 115
DBEBE10Z–1X/315XYG24K31A1M	0 811 402 116

Symbol

For on-board electronics



Function, sectional diagram

General

Type DBEBE10Z proportional pressure relief valves are pilot operated and are used to limit system pressure.
They are actuated by means of a position-controlled proportional solenoid with on-board electronics.
The valve body contains a logic element (poppet valve) of the "normally closed" type. This is pilot operated and is in conical seat design.

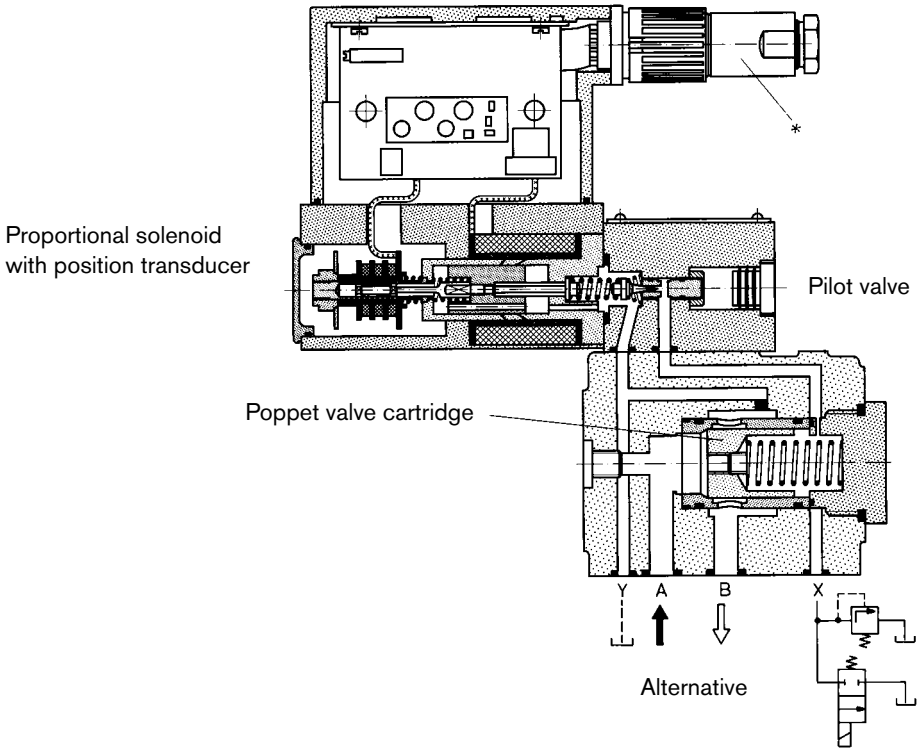
CE EN 61000-6-2: 2002-08
EN 61000-6-3: 2002-08

Basic principle

To adjust the system pressure, a setpoint is set in the trigger electronics. Based on this setpoint, the electronics control the position-controlled solenoid.
The proportional solenoid maintains its position against a spring force, which is proportionate to the system pressure.
The pilot stage is supplied with pilot oil at a flow rate of <0.8 l/min through a bore. 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-M10x80-10.9	Cheese-head bolts		2 910 151 309
* 	Plug-in connectors 6P+PE, see also RE 08008	KS	1 834 482 022
		KS	1 834 482 026
		MS	1 834 482 023
		MS	1 834 482 024
		KS 90°	1 834 484 252

Testing and service equipment

Test box type VT-PE-TB3, see RE 30065
Measuring adapter 6P+PE type VT-PA-2, see RE 30068

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 with position control and OBE
Connection type			Subplate, mounting hole configuration NG10 (ISO 5781-AG-06-2-A)
Mounting position			Optional
Ambient temperature range		°C	–20...+50
Weight		kg	7.8
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	mm^2/s	20...100	
	max. permitted	mm^2/s	10...800	
Pressure fluid temperature range		°C	–20...+70	
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	

Static/Dynamic

Hysteresis	%	≦ 1
Manufacturing tolerance for p_{max}	%	≦ ±5, see Characteristic Curves
Response time 100 % signal change	ms	≈ 80 dependent on dead volume or system volume
Thermal drift		<1 % at $\Delta T = 40$ °C
Conformity		CE EN 61000-6-2: 2002-08 EN 61000-6-3: 2002-08

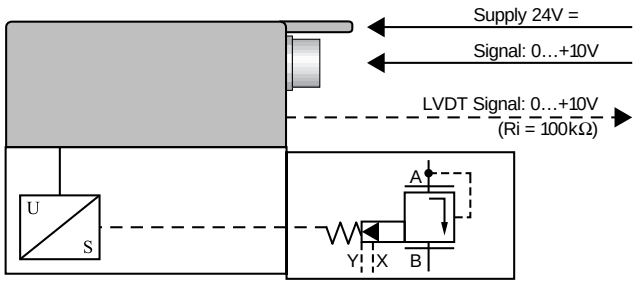
[1] The purity classes stated for the components must be complied with in hydraulic systems.
Effective filtration prevents problems and also extends the service life of components.
For a selection of filters, see catalog sheets RE 50070, RE 50076 and RE 50081 .

Technical data

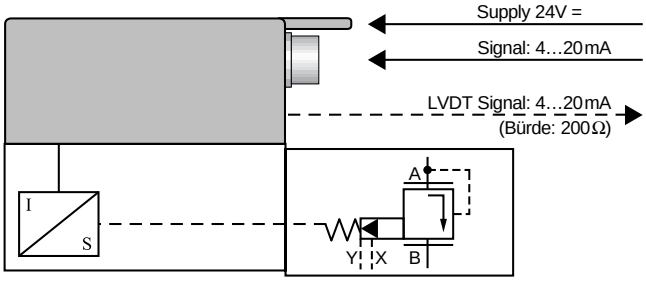
Electrical, trigger electronics integrated in valve		
Cyclic duration factor	%	100 %
Degree of protection		IP 65 to DIN 40050 and IEC 14434/5
Connection		Plug-in connector 6P+PE, DIN 43563
Supply voltage Terminal A: Terminal B: 0 V		24 V DC_{nom} Min. 21 V DC/max. 40 V DC Ripple max. 2 V DC
Power consumption		Solenoid ⧄ 45 mm = 40 VA max.
External fuse		2.5 A_F
Input, “standard” version Terminal D: U_E Terminal E:	A1	Differential amplifier, R_i = 100 kΩ 0...+10 V 0 V
Input, “mA signal” version Terminal D: I_{D-E} Terminal E: I_{D-E}	F1*	Burden, R_{sh} = 200 Ω 4...20 mA Current loop I_{D-E} feedback
Max. voltage to differential inputs over 0 V		D → B E → B } max. 18 V DC
Test signal, “standard” version Terminal F: U_{Test} Terminal C:	A1	LVDT 0...+10 V Reference 0 V
Test signal, “mA signal” version Terminal F: I_{F-C} Terminal C: I_{F-C}	F1*	LVDT signal 4...20 mA at external load 200...500 Ω max. 4...20 mA output Current loop I_{F-C} feedback
Safety earth conductor and shield		See pin assignment (installation in conformity with CE)
Recommended cable		See pin assignment up to 20 m 7 x 0.75 mm^2 up to 40 m 7 x 1 mm^2
Calibration		Calibrated at the factory, see valve curve

* Variant “F1” (4...20 mA version) available on request

Version A1: Standard

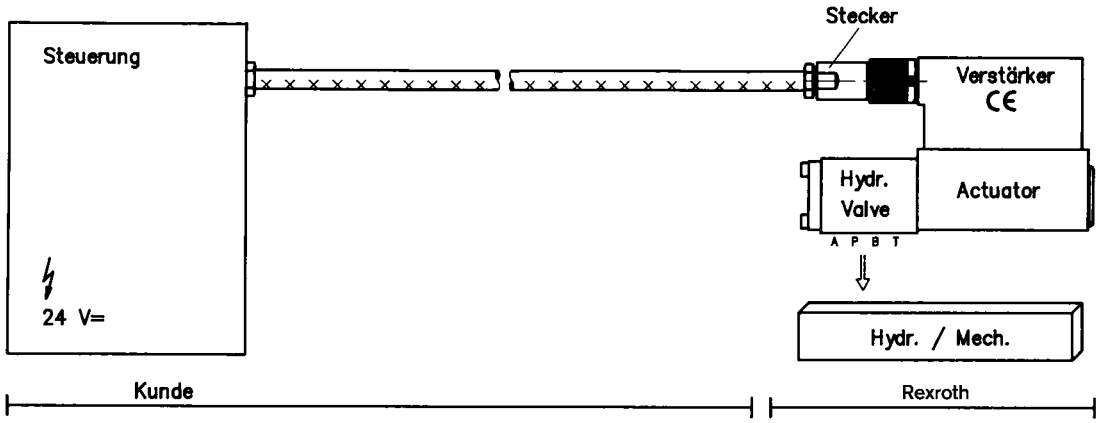


* Version F1: mA signal



Connection

For electrical data, see page 5 and
Operating Instructions **1 819 929 083**



Technical notes for the cable

Version:
- Multi-wire cable
- Extra-finely stranded wire to VDE 0295, Class 6
- Safety earth conductor, green/yellow
- Cu braided shield

Type:
- e.g. Ölflex-FD 855 CP (from Lappkabel company)

No. of wires:
- Determined by type of valve, plug type and signal assignment

Cable Ø:
- 0.75 mm^2 up to 20 m long
- 1.0 mm^2 up to 40 m long

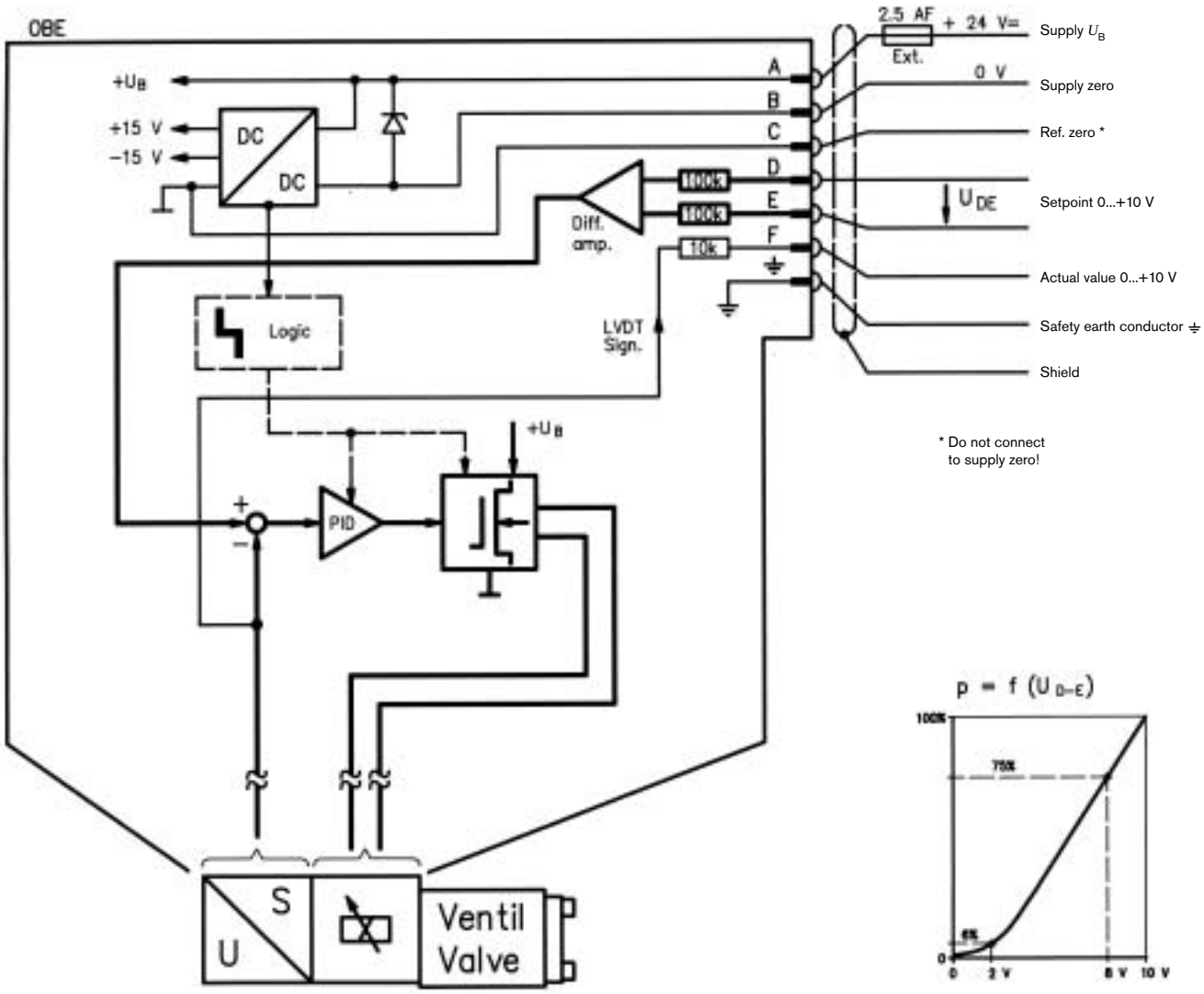
Outside Ø:
- 9.4...11.8 mm – Pg11
- 12.7...13.5 mm – Pg16

Important

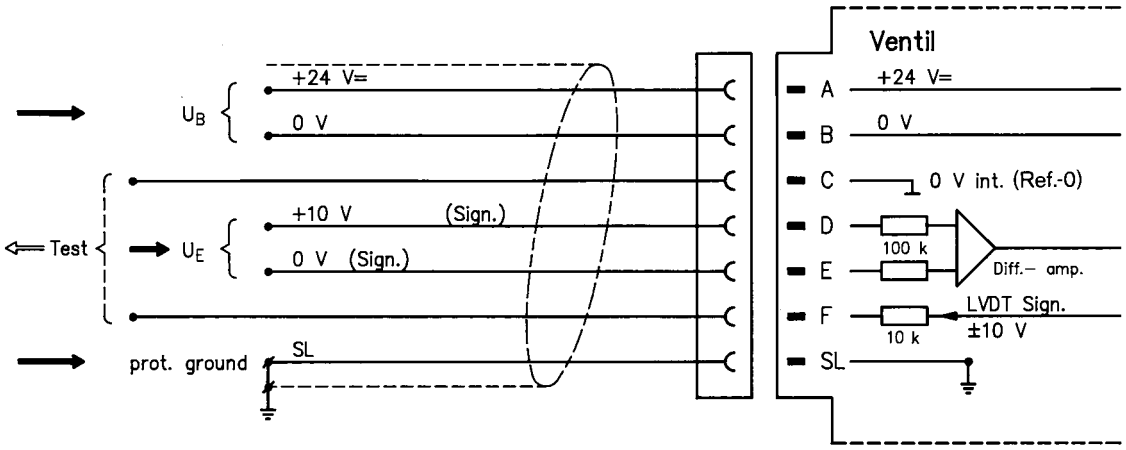
Power supply 24 V DC nom.,
if voltage drops below 18 V DC, rapid shutdown resembling “Enable OFF” takes place internally.
In addition, with the “mA signal” version:
$I_{D-E} \geqq 3$ mA – valve is active
$I_{D-E} \leqq 2$ mA – valve is deactivated.
Electrical signals emitted via the trigger electronics (e.g. actual values) must not be used to shut down safety-relevant machine functions!
(See also European Standard, “Technical Safety Requirements for Fluid-Powered Systems and Components – Hydraulics”, EN 982.

On-board trigger electronics

Circuit diagram/pin assignment
Version A1: U_{D-E} 0...+10 V

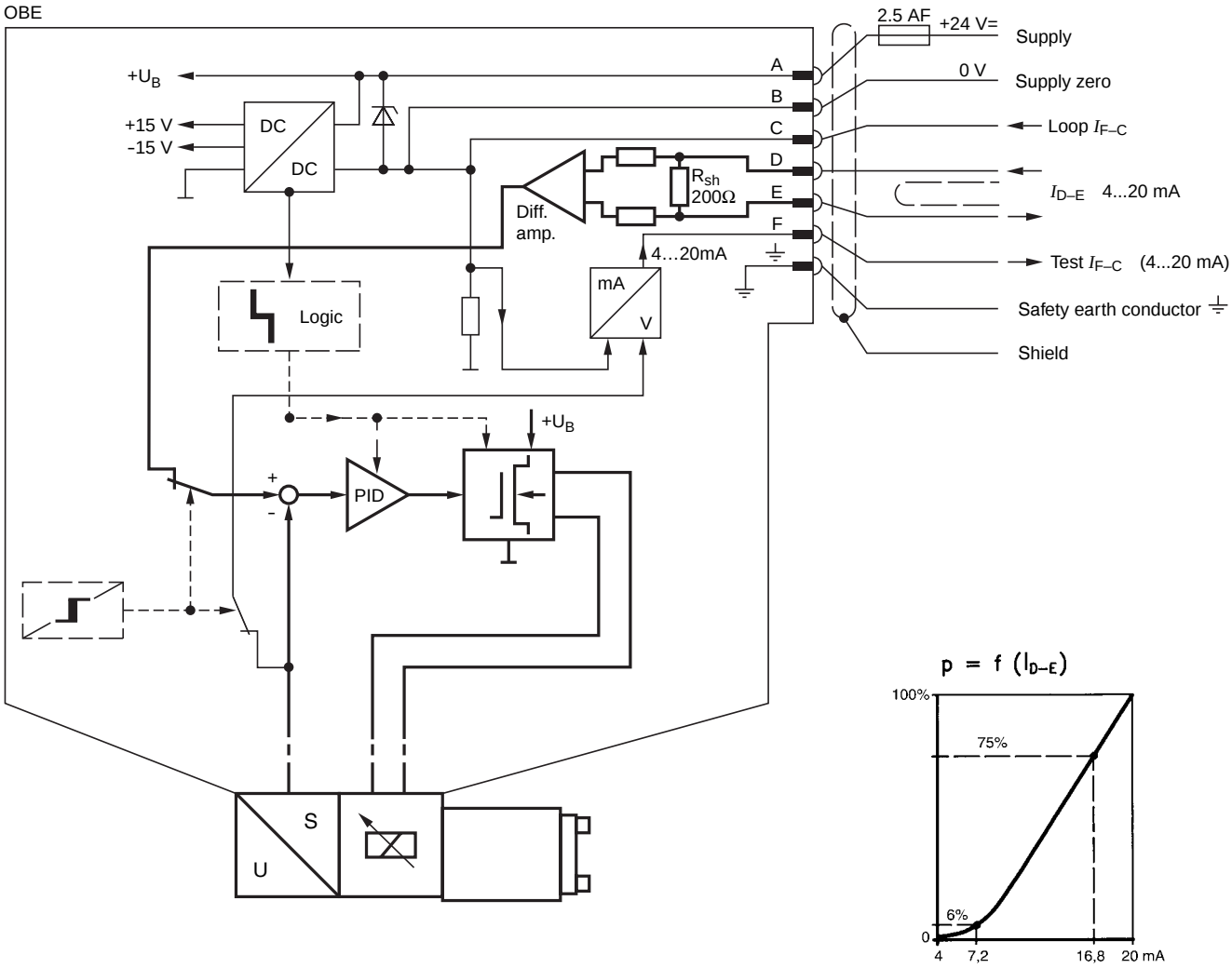


Pin assignment
Version A1: U_{D-E} 0...+10 V
(R_i = 100 kΩ)

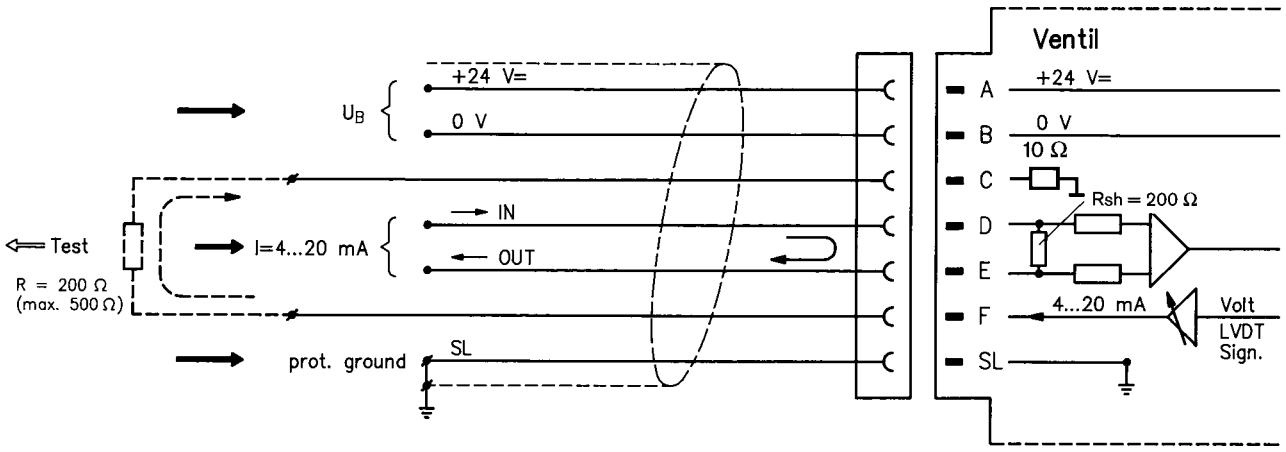


On-board trigger electronics

Circuit diagram/pin assignment
Version F1: I_{D-E} 4...20 mA

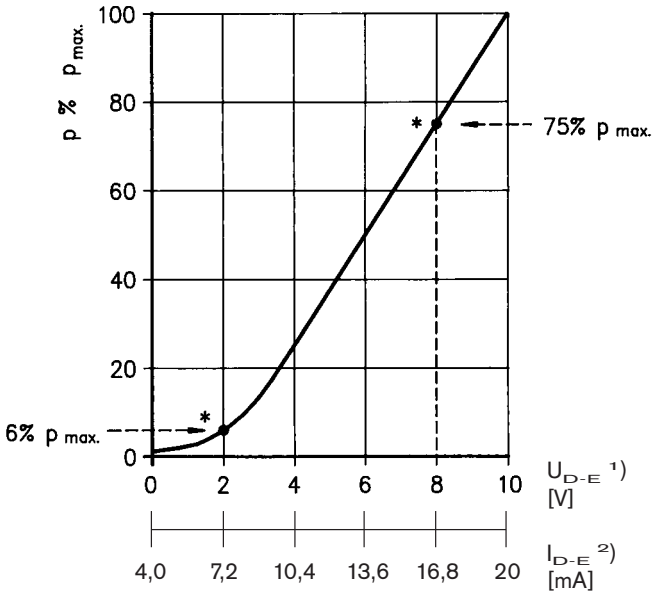


Pin assignment 6P+PE
Version F1: I_{D-E} 4...20 mA
(R_{sh} = 200 kΩ)



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

Pressure in port A as a function of the setpoint



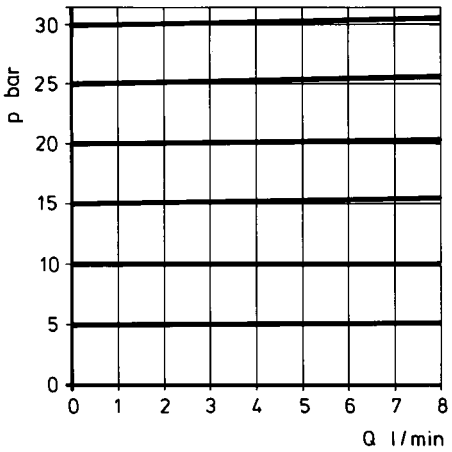
* Factory setting at $Q = 1$ l/min ±5 % manufacturing tolerance

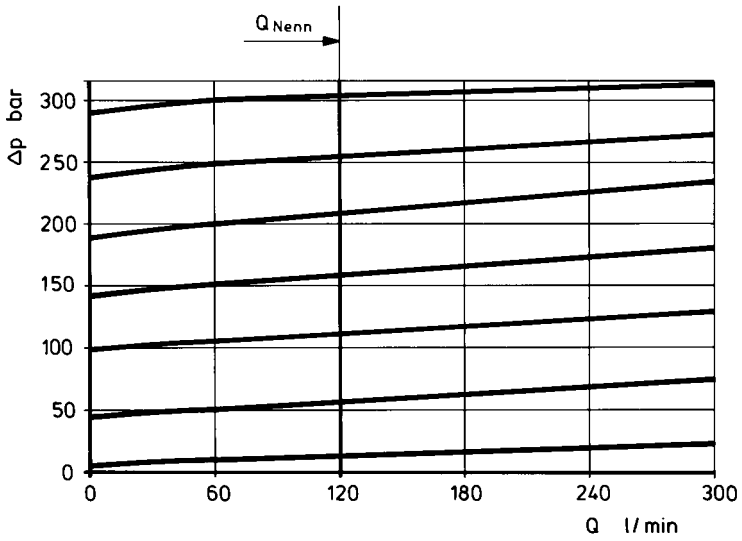
1) Version: $U_{D-E} = 0...+10$ V

2) Version: $I_{D-E} = 4...20$ mA

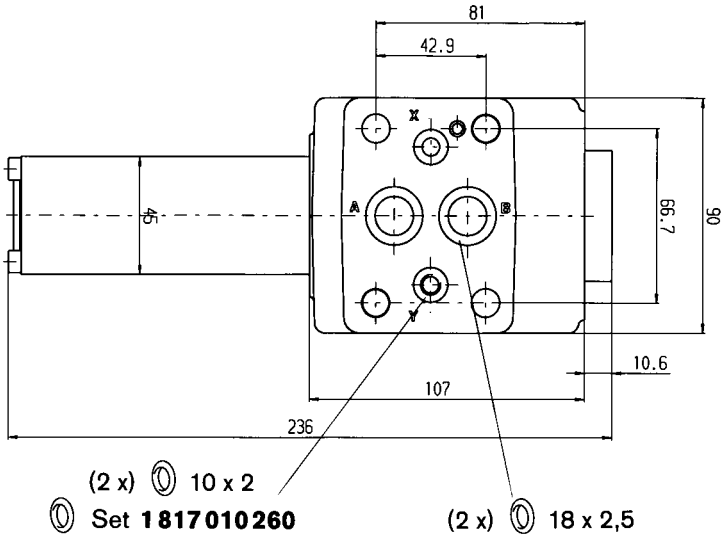
Pressure in port A as a function of the main stage nominal flow rate

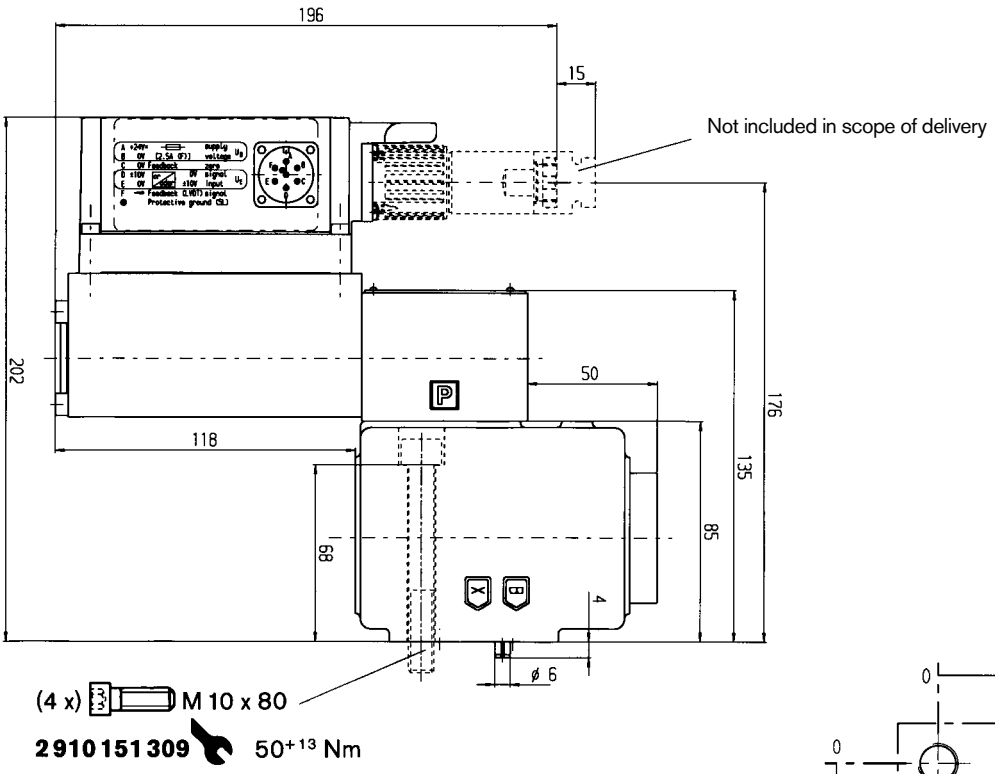
$p = f(Q)$

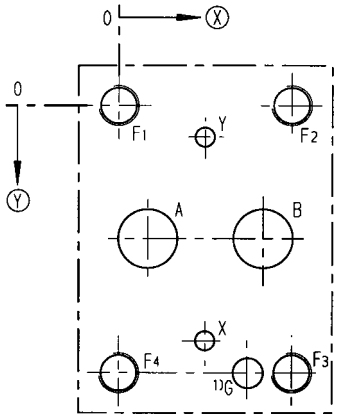




Unit dimensions (nominal dimensions in mm)



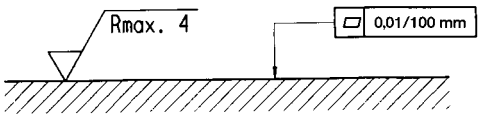




Mounting hole configuration: NG10 (ISO 5781-AG-06-2-A)
For subplates see catalog sheet RE 45055

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)