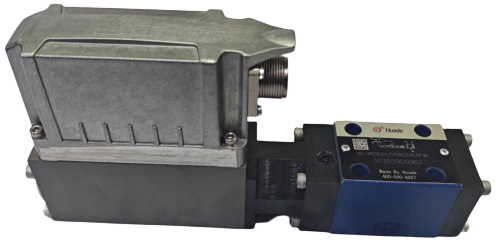
Proportional pressure reducing valve, pilot operated, with on-board electronics (OBE) and position feedback

Type DREBE6X

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



List of Contents

Features

- Pilot operated valves with position feedback and on-board electronics for reducing system pressure in the consumer (pilot oil internal only)
- 3-way version (P– A/A– T),pmin = pT
- Adjustable through the position of the armature against the compression spring
- Position-controlled, minimal hysteresis < 1 %,rapid response times, see Technical data
- Pressure limitation to a safe level even with faulty electronics (solenoid current I > Imax)
- For subplate attachment, mounting hole configuration to ISO 4401-03-02-0-05. Subplates as per catalog sheet RE 45053 (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
? UB = 24 Vnom 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

HD	DREB	E	6	X	1X		M	G24	K31		M	*

Proportional 3-way pressure reducing valve with inductive position transducer, pilot operated

With on-board electronics = **E**

Nominal size = **6**

Mounting hole configuration to ISO 4401-03-02-0-05 = **X**

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

Max. pressure stage

up to 75 bar = **75**

up to 175 bar = **175**

up to 310 bar = **310**

Without non-return valve = **M**

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

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

A1 = Setpoint input 0...+10 V
F1 = Setpoint input 4...20 mA
Interface for trigger electronics

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

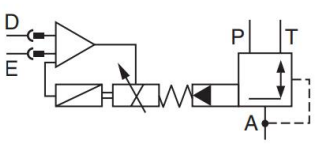
Further information in plain text

Preferred types

Type....A1 (0...+10 V)	Material Number	Type....F1 (4...20 mA)	Material Number
DREBE6X–1X/75MG24K31A1M	0 811 402 082	DREBE6X–1X/175MG24K31F1M	0 811 402 083
DREBE6X–1X/175MG24K31A1M	0 811 402 080	DREBE6X–1X/310MG24K31F1M	0 811 402 085
DREBE6X–1X/310MG24K31A1M	0 811 402 081		

Symbol

For on-board electronics



Function, sectional diagram

General

Type DREBE6X proportional pressure reducing valves are pilot operated with a 3-way main stage.
The pilot valve (pressure relief valve pilot stage) is supplied internally with a controlled flow of pilot oil via P.
The valves are actuated by means of a position-controlled proportional solenoid with on-board electronics.
With these valves, the pressure in A (consumer) can be infinitely adjusted and reduced in relation to the setpoint.

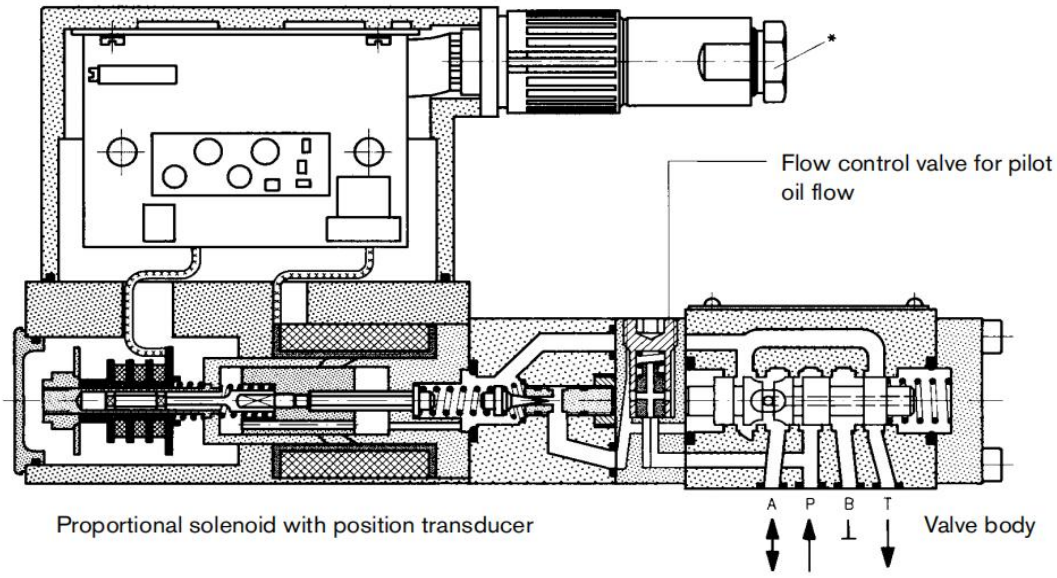
CE EN 61000-6-2: 2002-08
EN 61000-6-3: 2002-08

Basic principle

To adjust the system pressure in A, a setpoint is set in the trigger electronics. Based on this setpoint, the electronics control the position of the solenoid against the spring force. The proportional solenoid is positioned precisely on the spring characteristic curve. The pilot stage is supplied with oil from P at a flow rate of < 0.6 l/min via a flow control valve. The pilot pressure is compared with the consumer pressure (plus spring) in A and regulated.
The spring results in $p_{Amin} = p$ in T.

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.



Technical data

General			
Construction	Pilot stage		Poppet valve
	Main stage		Spool valve
Actuation			Proportional solenoid with position control and OBE
Connection type			Subplate, mounting hole configuration NG6 (ISO 4401-03-02-0-05)
Mounting position			Optional
Ambient temperature range		°C	−20...+50
Weight		kg	3.3
Vibration resistance, test condition			Max. 25 g, shaken in 3 dimensions (24 h)

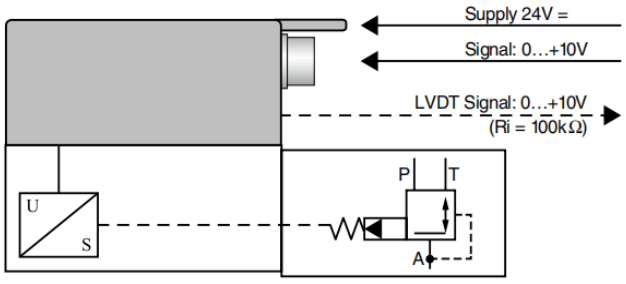
Hydraulic (measured with HLP 46, $\vartheta_{oil} = 40\,°C \pm 5\,°C$)					
Pressure fluid			Hydraulic oil to DIN 51524...535, other fluids after prior consultation		
Viscosity range	recommended	mm^2/s	20...100		
	max. permitted	mm^2/s	10...800		
Pressure fluid temperature range		°C	−20...+70		
Maximum 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 in A (at $Q_{min} = 1$ l/min)		bar	75	175	310
Minimum pressure in A		bar	0 (relative) or pressure in T		
Min. inlet pressure in P		bar	$p_P = p_A + \geq 5$		
Max. working pressure		bar	Port P: 315		
Max. pressure		bar	Port T: 250 (B sealed)		
Internal pilot oil flow		l/min	approx. 0.6 (with closed-loop control)		
Max. flow		l/min	40		

Static/Dynamic			
Hysteresis		%	≦ 1 of max. set pressure
Manufacturing tolerance		%	≦ ±5 of max. set pressure
Response time	100 % signal change	ms	50
	10 % signal change	ms	20
Thermal drift			<1 % at $\Delta T = 40\,°C$
Conformity			CE EN 61000-6-2: 2002-08 EN 61000-6-3: 2002-08

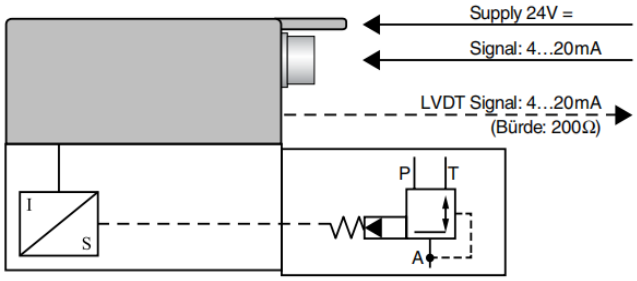
[1] The purity classes stated for the components must be complied with in hydraulic systems.
Effective filtration prevents problems and also extends the service life of components.

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

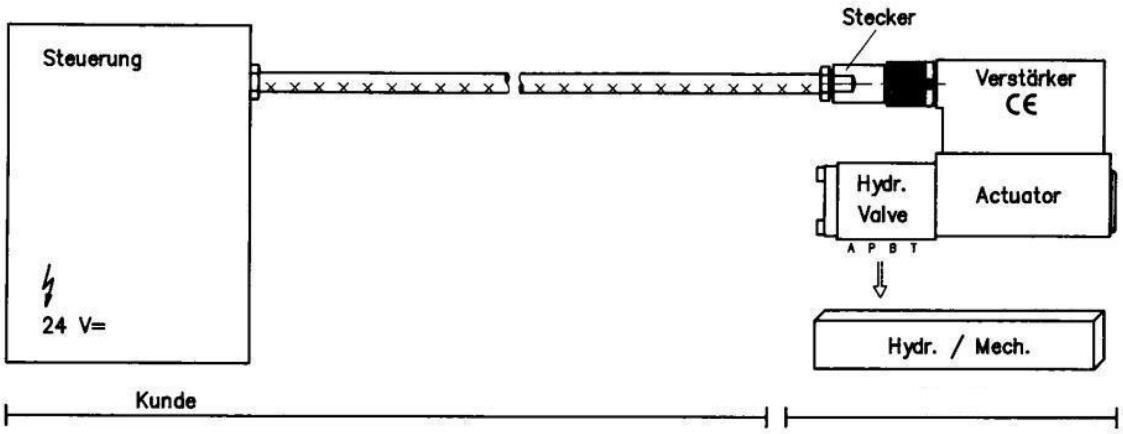
Version A1:
Standard



Version F1:
mA signal



Connection



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 – Pg 11
- 12.7...13.5 mm – Pg 16

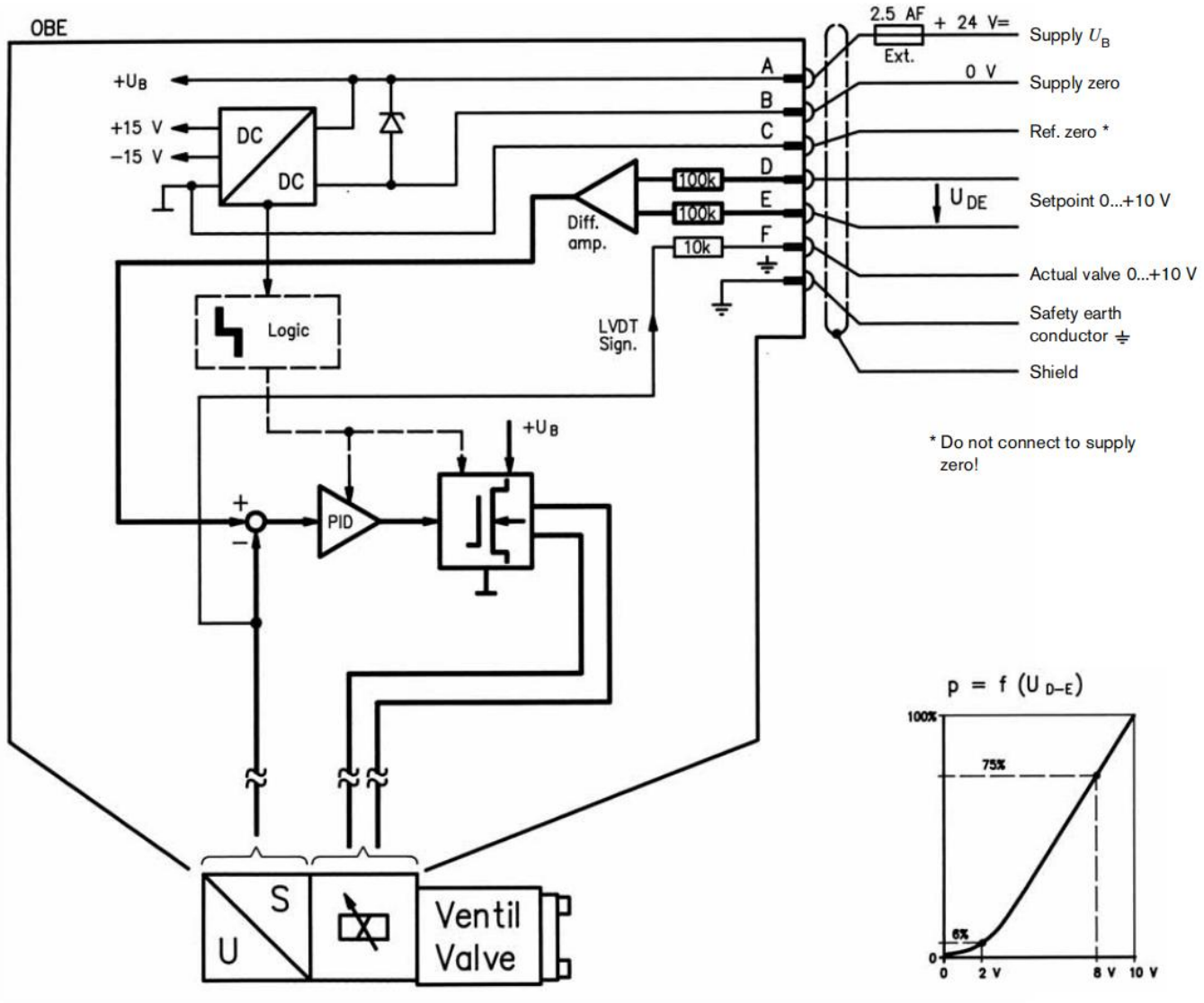
Important

Voltage 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

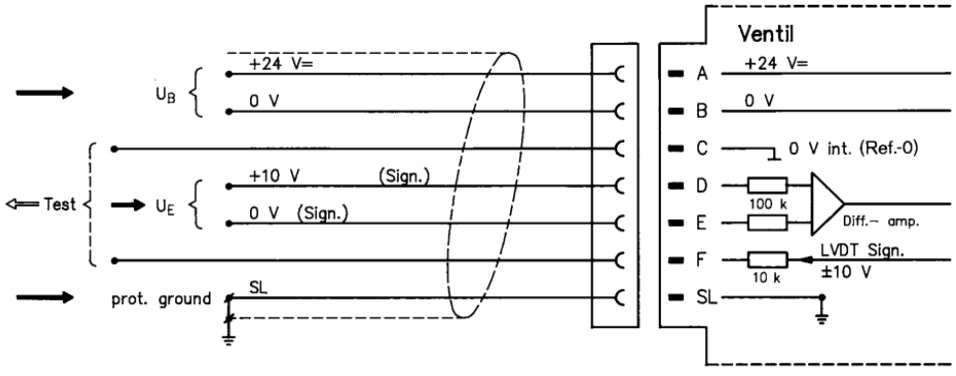
Circuit diagram/pin assignment

Version A1: U_{D-E} 0...+10 V



Pin assignment

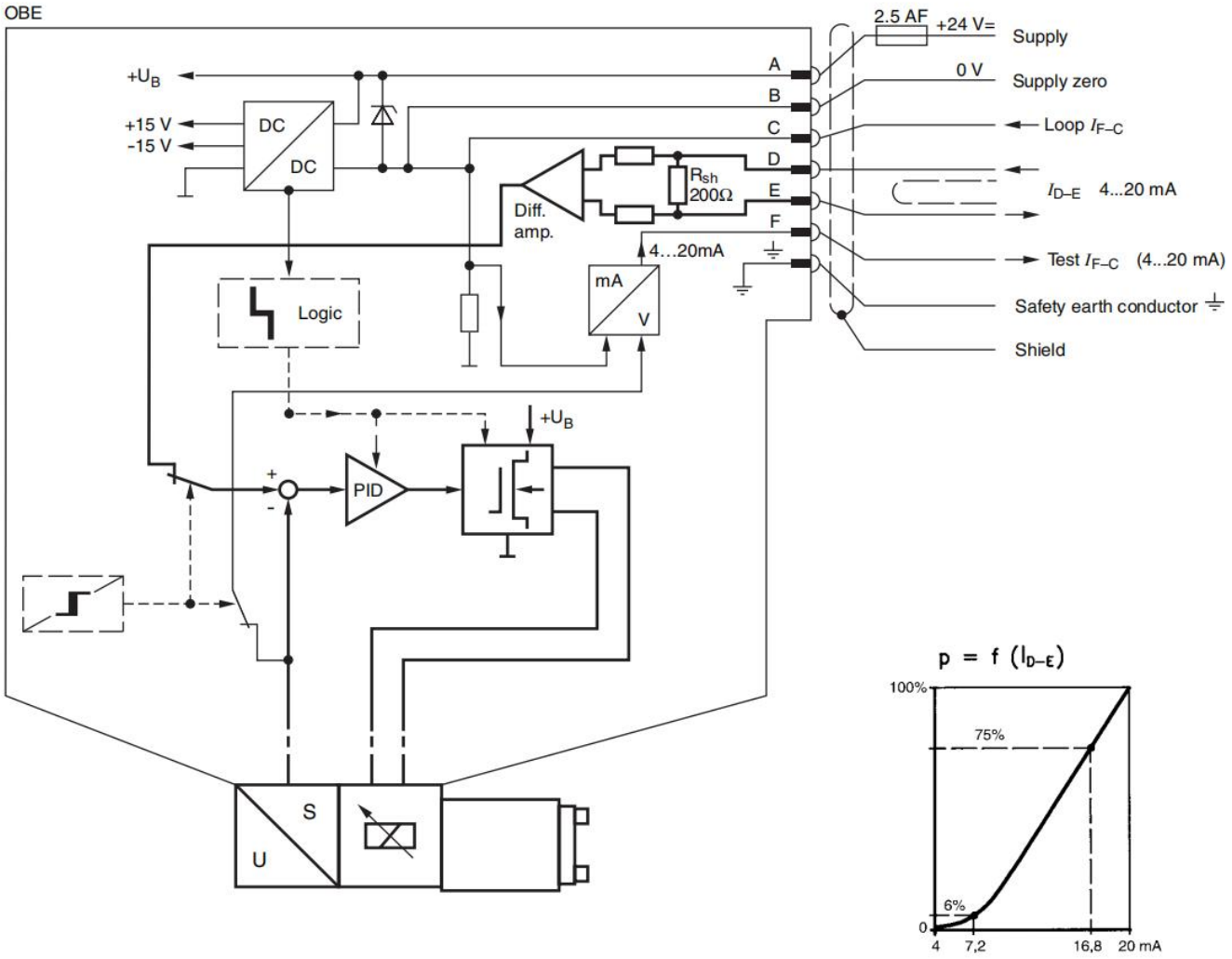
Version A1: U_{D-E} 0...+10 V
(R_i = 100 kΩ)



On-board trigger electronics

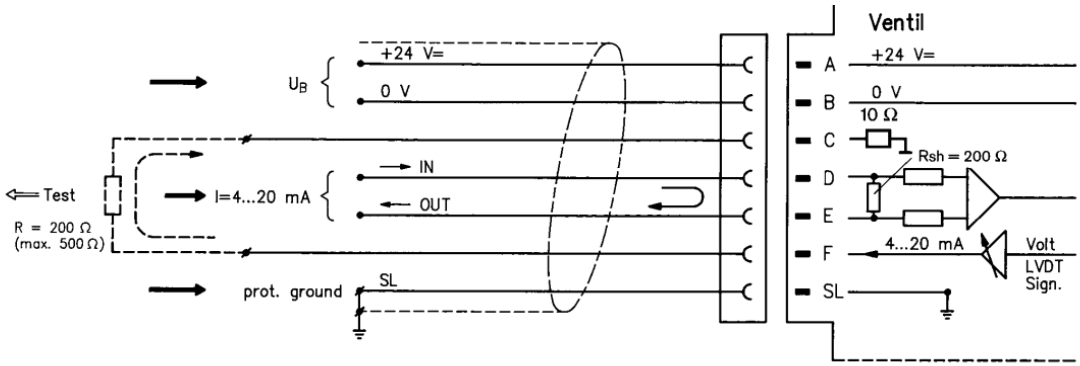
Circuit diagram/pin assignment

Version F1: I_{D-E} 4...20 mA



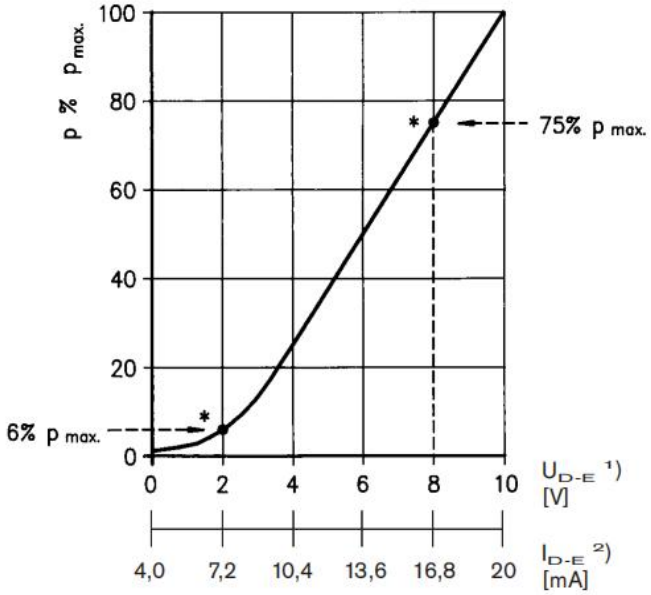
Pin assignment 6P+PE

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

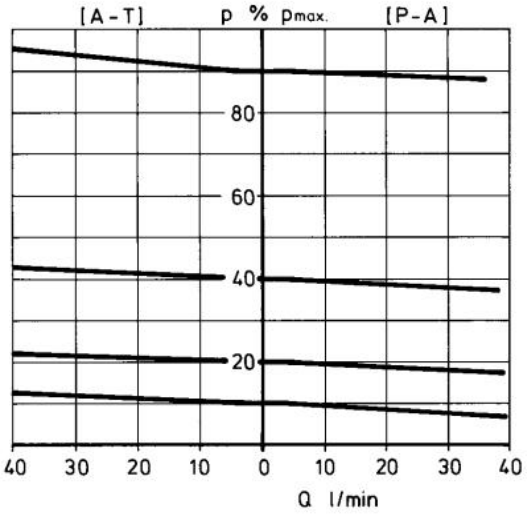


* Factory setting at $Q = 1$ l/min
+5 % manufacturing tolerance
(of max. set pressure)

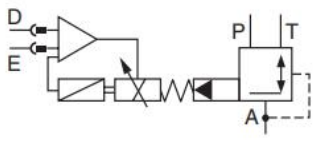
1) Version: $U_{D-E} = 0...+10$ V

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

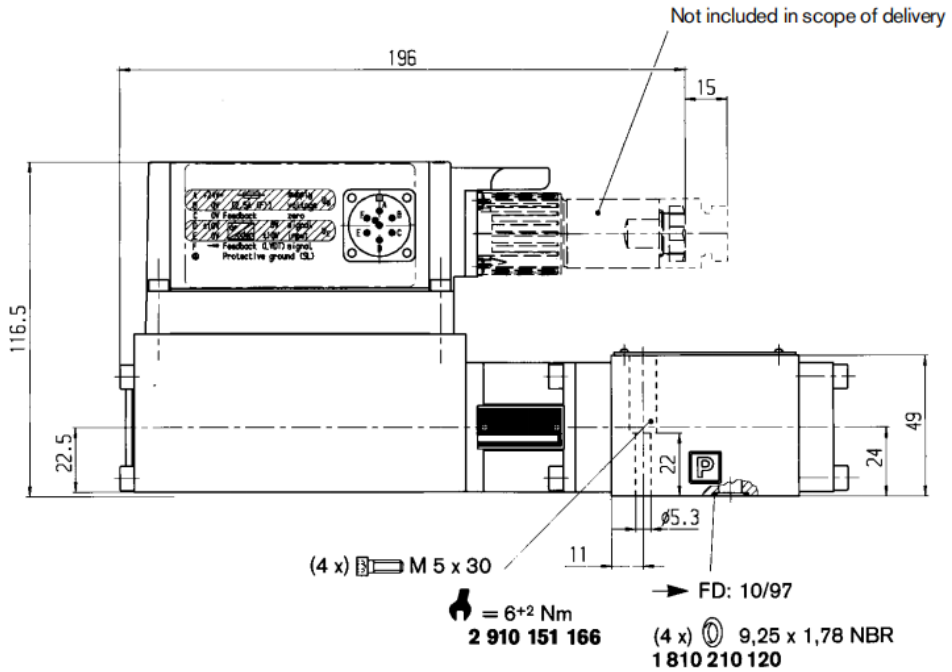
Pressure in port A proportionate to the
maximum flow rate of the main stage

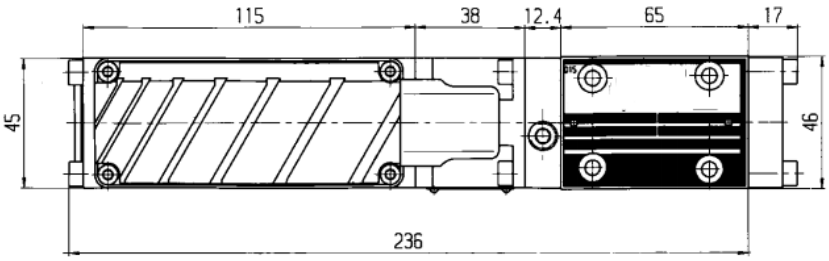


Set pressure
$p\,\%\,p_{max} = f\,(Q_{P-A}/Q_{A-T})$



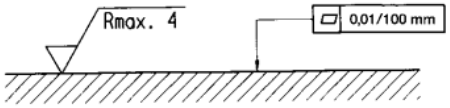
Unit dimensions (nominal dimensions in mm)

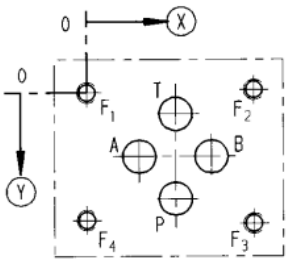




Mounting hole configuration: NG6
(ISO 4401-03-02-0-05)

Required surface quality of mating component





[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]