Proportional pressure relief valve with position feedback (Lvdt AC/AC)

RE 29150/07.05 1/10

Type DBETBX

Nominal size 6
Unit series 1X
Maximum working pressure P 315 bar, T 2 bar
Nominal flow rate Q_{nom} 1 l/min

List of contents

Features

- Directly operated valves with position feedback for limiting system pressure
- Adjustable through the position of the armature against the compression spring
- Position-controlled at a high magnetic force, minimal hysteresis <0.3 %, see Technical data and Characteristic curve
- 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 for solenoid to DIN 43650-AM2 and plug-in connector for position transducer, included in scope of delivery
- Data for the external trigger electronics
  - $U_B = 24\ V_{nom}$ DC
  - Adjustment of valve curve Np and gain
  - With and without ramp generator
  - Europe card format, setpoint 0...+10 V
    (order separately)

Ordering data

DBETB	X	-1X/	G24	-37	Z4	M	*

Proportional pressure relief valve with position control and inductive position transducer on the cone

Mounting hole configuration to ISO 4401-03-02-0-94 **= X**

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

Max. pressure stage
- up to 28 bar **= 28**
- up to 80 bar **= 80**
- up to 180 bar **= 180**
- up to 250 bar **= 250**
- up to 315 bar **= 315**

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

37 = Solenoid current 3.7 A max. **Solenoid type (current)**

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

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

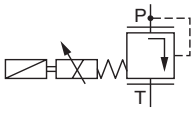
2 = Sealed seat adjustment[1] Further information in plain text

Preferred types

Type	Material Number
DBETBX–1X/28G24–37Z4M	0 811 402 013
DBETBX–1X/80G24–37Z4M2 [1]	0 811 402 007
DBETBX–1X/180G24–37Z4M	0 811 402 003
DBETBX–1X/250G24–37Z4M2 [1]	0 811 402 001
DBETBX–1X/315G24–37Z4M	0 811 402 004

Symbol

For external trigger electronics



Function, sectional diagram

General

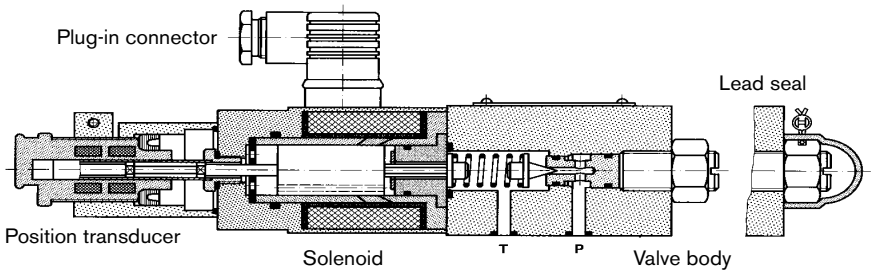
Type DBETBX proportional pressure relief valves are remote-controlled (pilot) valves in conical seat design. They are used to limit system pressure.
The valves are actuated by means of a position-controlled proportional solenoid.
With these valves, the system pressure that needs to be limited can be infinitely adjusted in relation to the position of the solenoid by means of external trigger electronics.

Basic principle

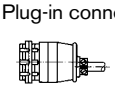
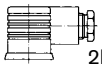
To adjust the system pressure, a setpoint is set in the trigger electronics. Based on this setpoint, the electronics control the position of the armature on the compression spring by means of the signal from the position transducer.
The position control ensures extremely low hysteresis: the position is maintained even in the event of external disturbances.
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-M5x50-10.9	Cheese-head bolts		2 910 151 174
Europe card  	VT-VRPA1-537-10/V0/PV	RE 30052	0 811 405 097
Europe card  	VT-VRPA1-537-10/V0/PV-RTP	RE 30054	0 811 405 102
Europe card  	VT-VRPA1-537-10/V0/PV-RTS	RE 30056	0 811 405 179
Plug-in connectors   2P+PE	Plug-in connector 2P+PE (M16x1.5) for the solenoid and plug-in connector for the position transducer, included in scope of delivery, see also RE 08008.		

Testing and service equipment

Test box type VT-PE-TB1, see RE 30063
Test adapter for Europe cards type VT-PA-3, see RE 30070

Technical data

General		
Construction		Poppet valve
Actuation		Proportional solenoid with position control, external amplifier
Connection type		Subplate, mounting hole configuration NG6 (ISO 4401-03-02-0-94)
Mounting position		Horizontal, vertical with solenoid at top
Ambient temperature range	°C	–20...+50
Weight	kg	4.5
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 $Q = 1$ l/min)		bar	28	80	180	250	315
Minimum pressure (at $Q = 1$ l/min)		bar	1.5	3	4	5	6
			Note: At $Q_{max} = 3$ l/min the pressure levels stated here increase				
Max. mechanical pressure limitation level, e.g. when solenoid current $I > I_{max}$		bar	<29	<85	<186	<258	<325
Max. working pressure (at $Q = 1$ l/min)		bar	Port P: 315				
Max. pressure		bar	Port T: ≦ 2				

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)
Position transducer connection		Special plug
Max. solenoid current	I_{max}	3.7
Coil resistance R_{20}	Ω	2.5
Max. power consumption at 100 % load and operating temperature	VA	60

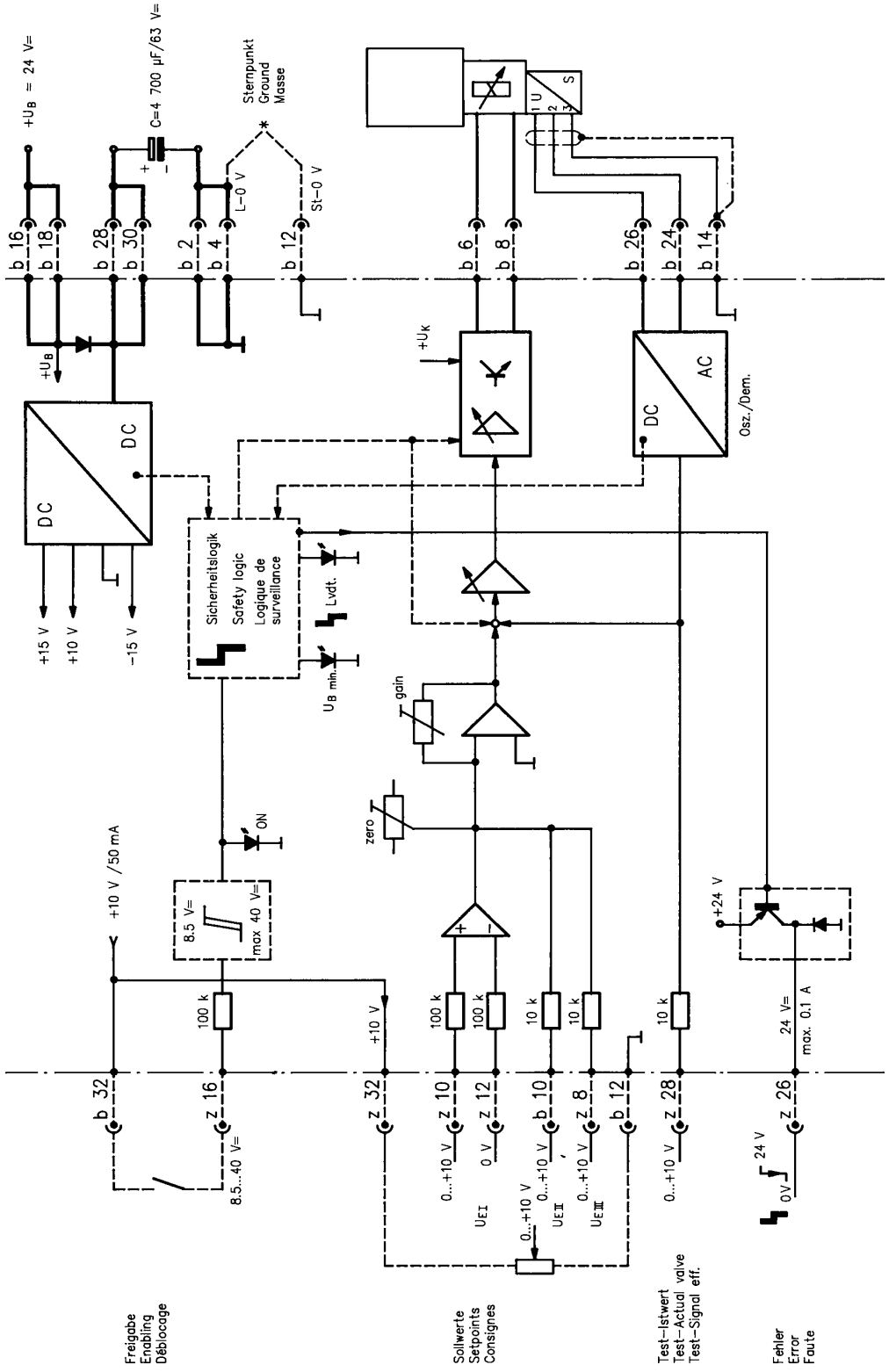
Static/Dynamic [2]		
Hysteresis	%	≤ 0.3
Range of inversion	%	≤ 0.2
Manufacturing tolerance for Q_{max}	%	≈ 6
Response time 100 % signal change	ms	On <45 / Off <25

[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 0 811 405 097 for the position-controlled 3.7 A solenoid.

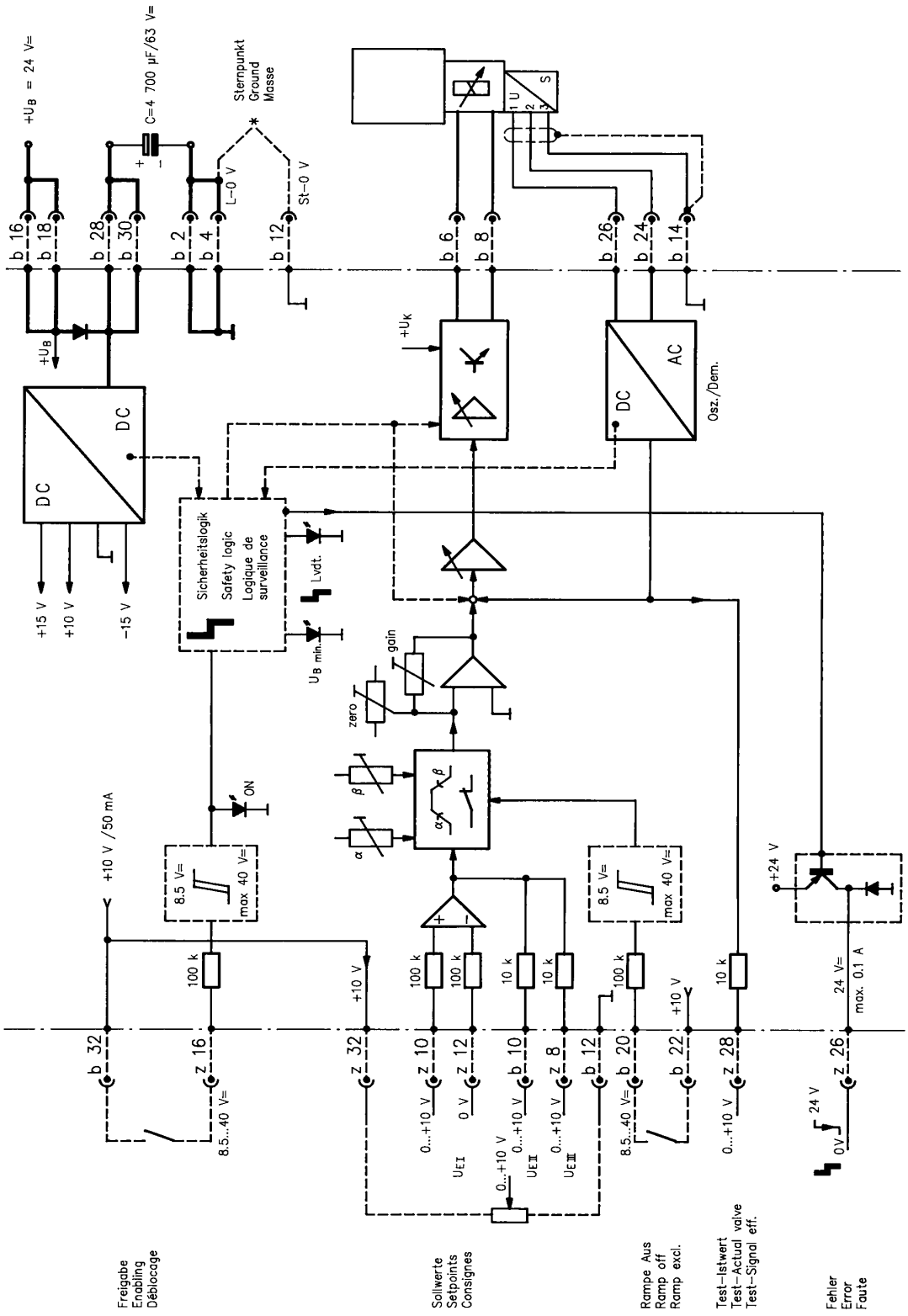
Valve with external trigger electronics (europe card without ramp, RE 30052)

Circuit diagram/pin assignment



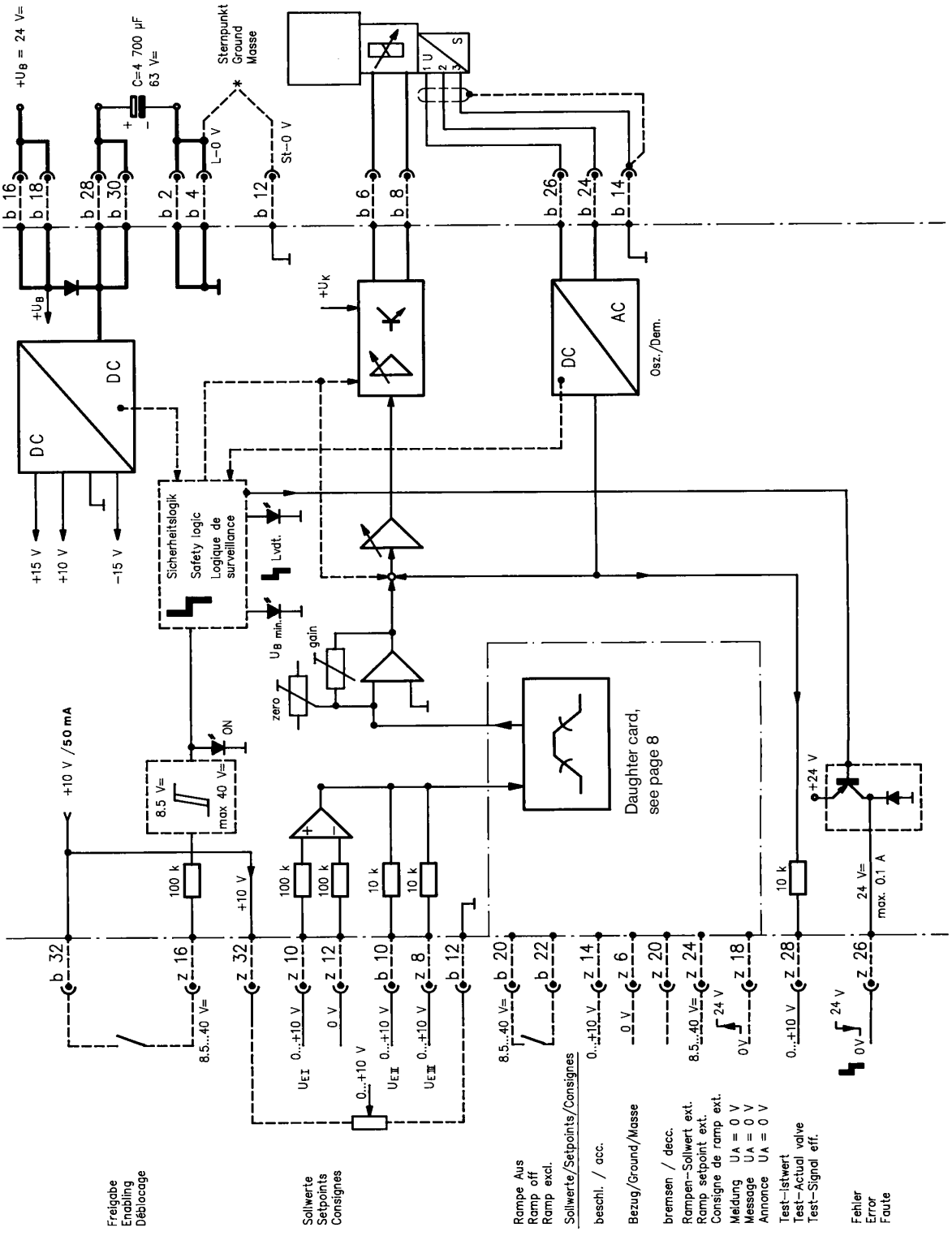
Valve with external trigger electronics (europe card with ramp, RE 30054)

Circuit diagram/pin assignment



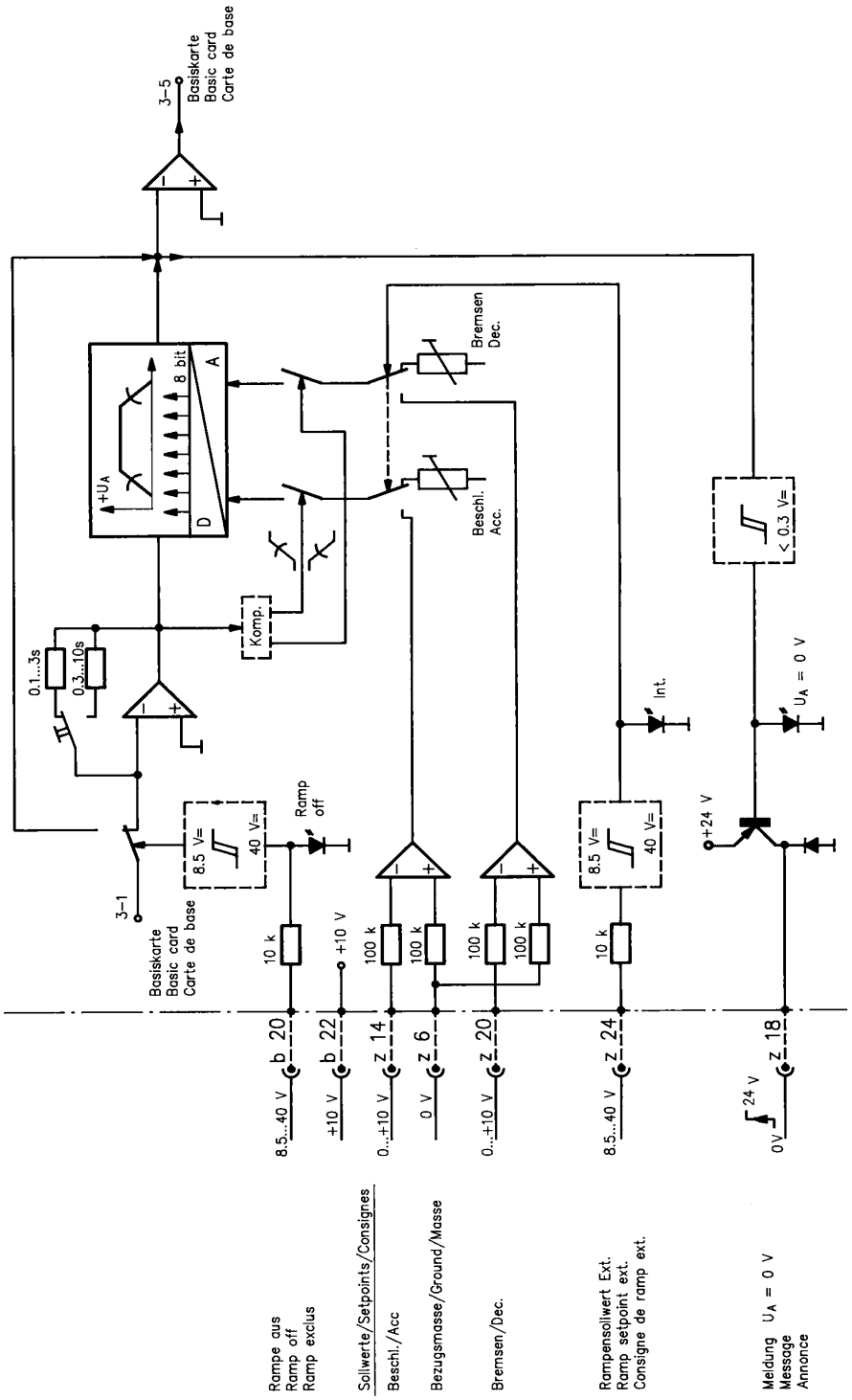
Valve with external trigger electronics (europe card with ramp, RE 30056)

Circuit diagram/pin assignment



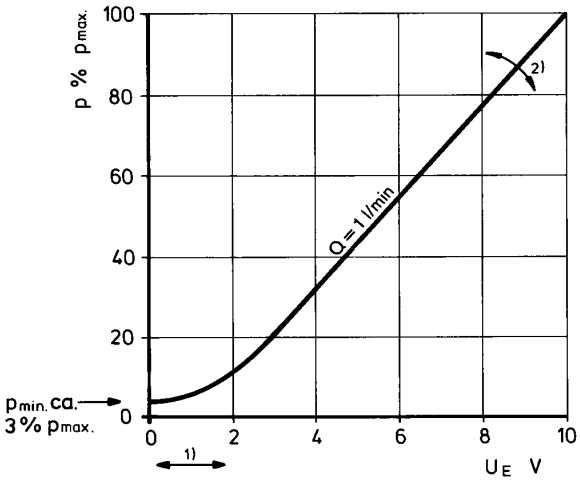
Valve with external trigger electronics (europe card with ramp, RE 30056)

Circuit diagram/pin assignment **Daughter card**



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

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

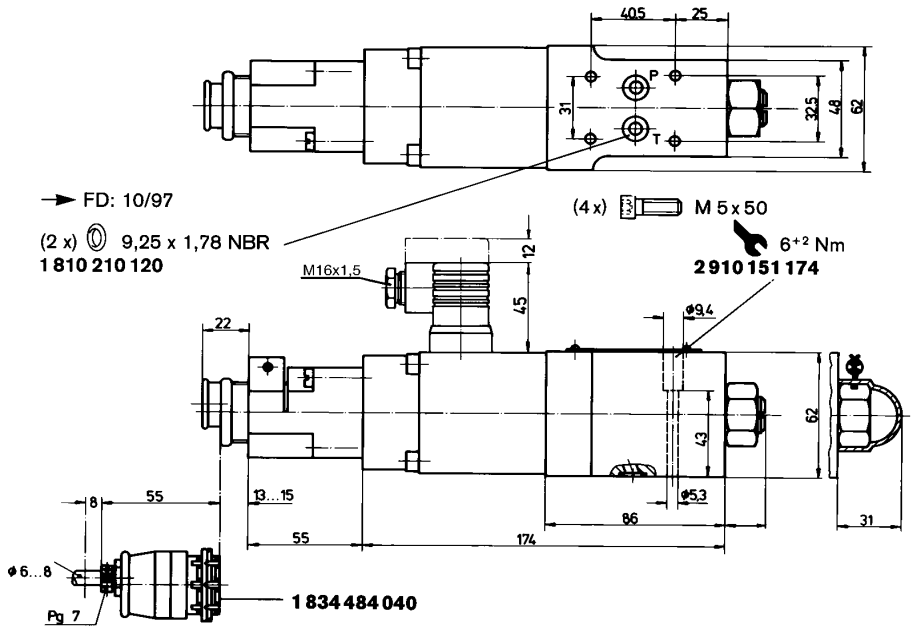


Valve amplifier

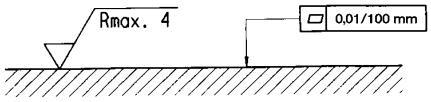
1) Zero adjustment

2) Sensitivity adjustment

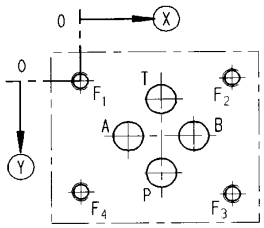
Unit dimensions (nominal dimensions in mm)



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_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]