

Hydrostatic Pump Repair

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Bosch Group

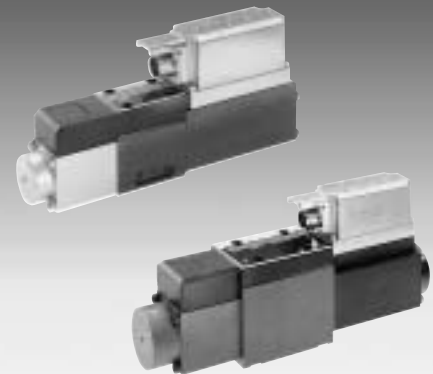
4/3 servo solenoid valves with on-board electronics (OBE), positive overlap and position feedback

RE 29025/01.05
Replaces: 05.04

1/16

Type 4WRPE ..E.. / ..W..

Size 6, 10
Unit series 2X
Maximum working pressure of P, A, B 315 bar, T 200 bar
Nominal flow rate 8...32 l/min (NG6), 50...80 l/min (NG10)



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Features

- Directly operated NG6 and 10 valves with positive overlap, actuated on both sides and position-controlled, symbol E or W
- Control solenoid with on-board electronics (OBE), deadband compensation and gain calibrated at the factory
- Electrical connection 6P+PE (standard), signal input: differential amplifier with interface A1 = ± 10 V (F1 on request)
- For subplate attachment, mounting hole configuration NG6 to ISO 4401-03-02-0-94 and NG10 to ISO 4401-05-04-0-94
- Plug-in connectors to DIN 43563-AM6, see catalog section RE 08008 (order separately)
- Subplates as per catalog section RE 45053 and RE 45055 (order separately)

Variants on request

- For standard applications, such as e.g.
 - Valve electronics 11P+PE (plug-in connector)

Ordering data and scope of delivery

4WRP	E				S	J	-2X/	G24	K0/	M	*
------	---	--	--	--	---	---	------	-----	-----	---	---

With on-board trigger electronics

= E

Size 6

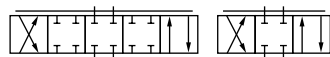
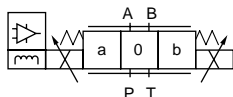
= 6

Size 10

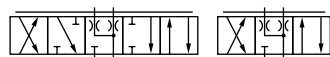
= 10

Symbols

4/3-way version



= E, E1



= W, W1

¹⁾ F1 = 4...12...20 mA on request

²⁾ Valve electronics 11P+PE on request

Further information in plain text

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

Interface for trigger electronics

A1 = setpoint input ±10 V
F1 = setpoint input 4...12...20 mA¹⁾

Electrical connection

K0 = without plug-in connector, with unit plug to DIN 43563-AM6 ²⁾
Order plug-in connector separately

Voltage supply of trigger electronics

G24 = +24 V DC

2X = Unit series (installation and connection dimensions unchanged)

Overlap compensating signal

J = See curve range 0...+0.5

Flow characteristic

S = Progressive

Nominal flow rate at 5 bar valve pressure difference per metering notch

Size 6	Size 10
08 = 8 l/min	50 = 50 l/min
18 = 18 l/min	80 = 80 l/min
32 = 32 l/min	

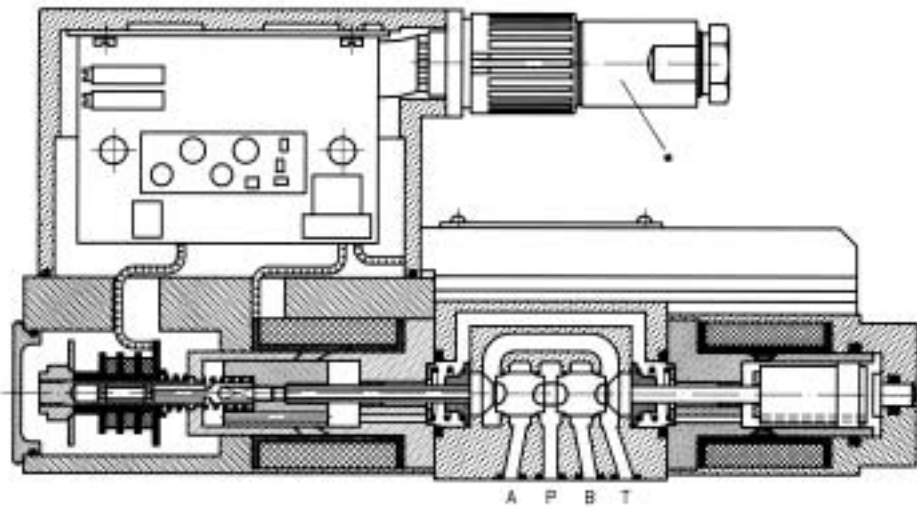
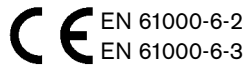
Preferred types (available at short notice)

Type 4WRPE 6	Material No.
Symbol E	
4WRPE 6 E 08SJ-2X/G24K0/A1M	0 811 404 148
4WRPE 6 E 18SJ-2X/G24K0/A1M	0 811 404 140
4WRPE 6 E 32SJ-2X/G24K0/A1M	0 811 404 141
Symbol W	
4WRPE 6 W 08SJ-2X/G24K0/A1M	0 811 404 145
4WRPE 6 W 18SJ-2X/G24K0/A1M	0 811 404 142
4WRPE 6 W 18SJ-2X/G24K0/F1M	0 811 404 146
4WRPE 6 W 32SJ-2X/G24K0/A1M	0 811 404 143
4WRPE 6 W 32SJ-2X/G24K0/F1M	0 811 404 147

Type 4WRPE 10	Material No.
Symbol E, E1	
4WRPE 10 E 50SJ-2X/G24K0/A1M	0 811 404 770
4WRPE 10 E 80SJ-2X/G24K0/A1M	0 811 404 771
4WRPE 10 E1 80SJ-2X/G24K0/A1M	0 811 404 774
Symbol W, W1	
4WRPE 10 W 50SJ-2X/G24K0/A1M	0 811 404 772
4WRPE 10 W 50SJ-2X/G24K0/F1M	0 811 404 778
4WRPE 10 W 80SJ-2X/G24K0/A1M	0 811 404 773
4WRPE 10 W1 80SJ-2X/G24K0/A1M	0 811 404 777

Function, sectional diagram

Type 4WRPE 6..



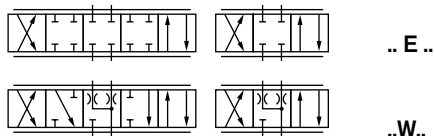
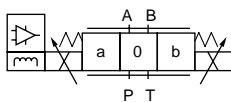
Control solenoid with position transducer

Valve body



Control solenoid

Symbols

Position transducer: A-side



Accessories, not included in scope of delivery

(4 x)  M5 x 30 DIN 912-10.9	Fastening bolts		2 910 151 166
* 	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

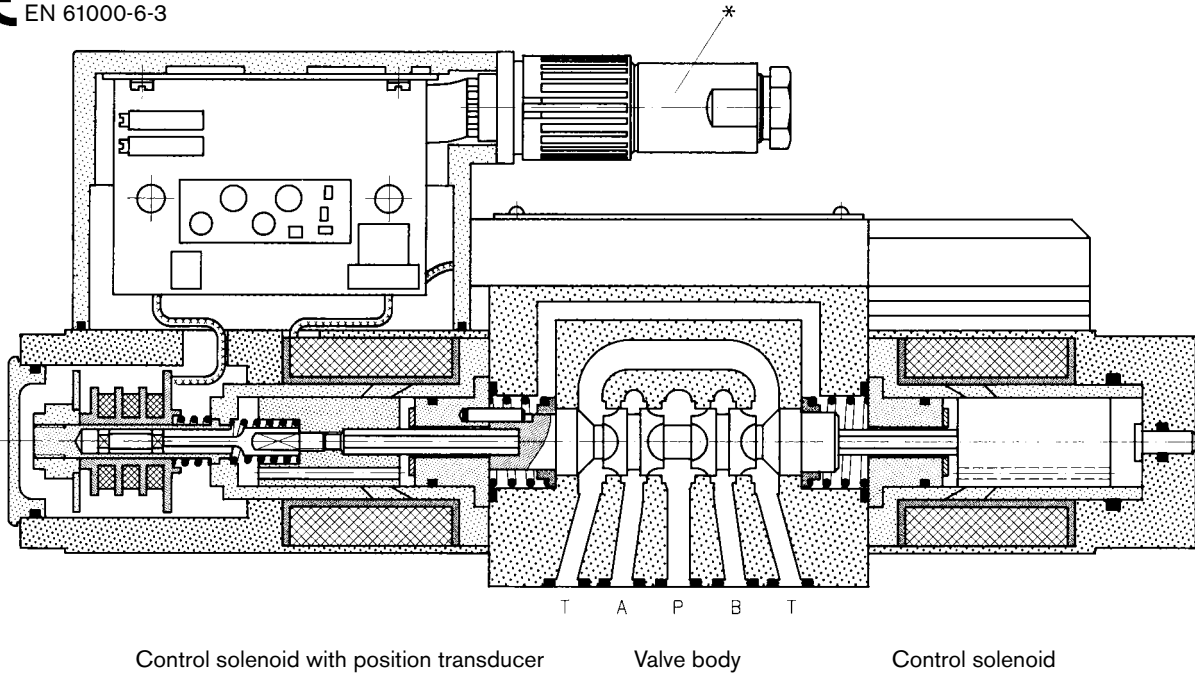
Testing and service equipment

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

Function, sectional diagram

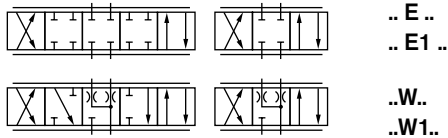
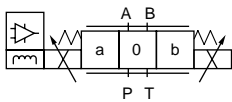
Type 4WRPE 10..

CE EN 61000-6-2
EN 61000-6-3



Symbols

Position transducer: A-side



Accessories, not included in scope of delivery

(4 x) M6 x 40 DIN 912-10.9

*



Fastening bolts

2 910 151 209

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

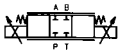
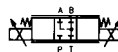
Testing and service equipment

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


Technical data (type 4WRPE 6 ..)**General**

Construction	Spool type valve, directly operated, without steel sleeve		
Actuation	Proportional solenoid with position control, OBE		
Connection type	Subplate, mounting hole configuration NG6 (ISO 4401-03-02-0-94)		
Mounting position	Optional		
Ambient temperature range	°C	-20 ... +50	
Weight	kg	3.9	
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 ² /s	20 ... 100	
	max. permitted	mm ² /s	10 ... 800	
Pressure fluid temperature range	°C	-20 ... +70		
Maximum permissible degree of contamination of pressure fluid Purity class to ISO 4406 (c)	Class 18/16/13 ¹⁾			
Direction of flow	See symbol			
Nominal flow at	l/min	8	18	32
		Q_A at 8 V	5.5 ±3 %	13 ±3 %
$\Delta p = 5 \text{ bar}$ per notch ²⁾	bar	Port P, A, B: 315		
Max. working pressure	bar	Port T: 200		
Max. pressure	bar	Port T: 200		
Operating limits	See chart			
Leakage per metering edge ($\Delta p = 100 \text{ bar}$)			A → T = 80 cm ³ /min B → T = 80 cm ³ /min	
Leakage drain ($\Delta p = 5 \text{ bar}$)			A → T = 0.8...1.6 l/min B → T = 0.8...1.6 l/min	

Static/Dynamic

Hysteresis	%	≤ 0.3	
Range of inversion	%	< 0.2	
Manufacturing tolerance	%	≤ ±3	
Response time	100 % signal change	ms	20
	10 % signal change	ms	5
Thermal drift	< 1% at $\Delta T = 40 \text{ °C}$		
Conformity	 EN 61000-6-2 EN 61000-6-3		

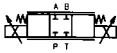
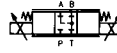
¹⁾ The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components. For a selection of filters, see catalog sections RE 50070, RE 50076 and RE 50081.

²⁾ Flow rate at a different Δp $q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{5}}$


Technical data (type 4WRPE 10 ..)**General**

Construction	Spool type valve, directly operated, without steel sleeve	
Actuation	Proportional solenoid with position control, OBE	
Connection type	Subplate, mounting hole configuration NG10 (ISO 4401-05-04-0-94)	
Mounting position	Optional	
Ambient temperature range	°C	-20 ... +50
Weight	kg	8.3
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 ² /s	20 ... 100
	max. permitted	mm ² /s	10 ... 800
Pressure fluid temperature range	°C	-20 ... +70	
Maximum permissible degree of contamination of pressure fluid Purity class to ISO 4406 (c)	Class 18/16/13 ¹⁾		
Direction of flow	See symbol		
Nominal flow at $\Delta p = 5 \text{ bar per notch}^2)$	l/min	50	80
		Q_A at 8 V	40 ± 3 %
Max. working pressure	bar	Port P, A, B: 315	
Max. pressure	bar	Port T: 200	
Operating limits	See chart		
Leakage per metering edge ($\Delta p = 100 \text{ bar}$)		A → T = 80 cm ³ /min	
		B → T = 80 cm ³ /min	
Leakage drain ($\Delta p = 5 \text{ bar}$)		A → T = 0.8...1.6 l/min	
		B → T = 0.8...1.6 l/min	

Static/Dynamic

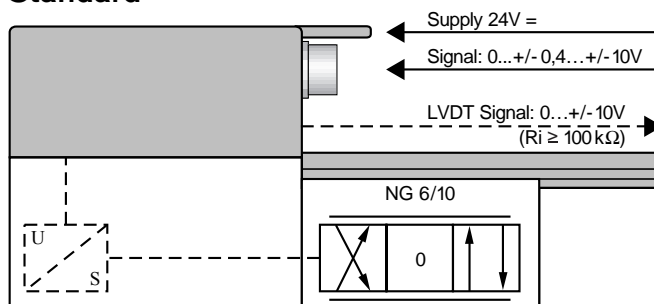
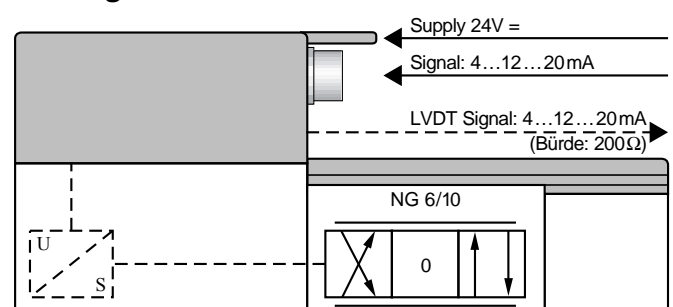
Hysteresis	%	≤ 0.3	
Range of inversion	%	< 0.2	
Manufacturing tolerance	%	≤ ±3	
Response time	100 % signal change	ms	40
	10 % signal change	ms	10
Thermal drift	< 1% at $\Delta T = 40 \text{ °C}$		
Conformity	 EN 61000-6-2 EN 61000-6-3		

- 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 sections RE 50070, RE 50076 and RE 50081.

²⁾ Flow rate at a different Δp $q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{5}}$

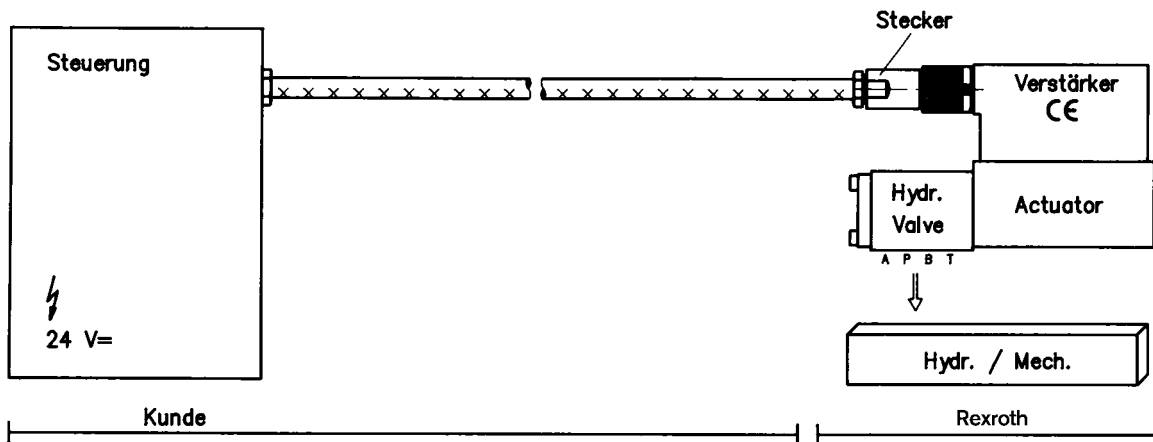
Technical data (type 4WRPE ..E.. / ..W..)**Electrical**, trigger electronics integrated in the valve

Cyclic duration factor	%	100
Degree of protection		IP 65 to DIN 40050 and IEC 14434/5
Connection		Plug-in connector 6P+PE, DIN 43563
Power supply		24 V DC _{nom}
Terminal A:		min. 21 V DC/max. 40 V DC
Terminal B: 0 V		Ripple max. 2 V DC
Power consumption	NG6	Solenoid \square 45 mm = 40 VA max.
	NG10	Solenoid \square 60 mm = 60 VA max.
External fuse		2.5 A _F
Input, "Standard" version	A1	Differential amplifier, $R_i = 100 \text{ k}\Omega$
Terminal D: U_E		0 ... ± 0.4 ... $\pm 10 \text{ V}$
Terminal E:		0 V
Input, "mA signal" version	F1	Burden, $R_{sh} = 200 \Omega$
Terminal D: I_{D-E}		4 ... 12 ... 20 mA
Terminal E: I_{D-E}		Current loop I_{D-E} feedback
Max. differential input voltage at 0 V		$\left. \begin{array}{l} D \rightarrow B \\ E \rightarrow B \end{array} \right\} \text{max. } 18 \text{ V DC}$
Test signal, "Standard" version	A1	LVDT
Terminal F: U_{Test}		0 ... ± 0.4 ... $\pm 10 \text{ V}$
Terminal C:		Reference 0 V
Test signal, "mA signal" version	F1	LVDT signal 4 ... 12 ... 20 mA at external load 200 ... 500 Ω max.
Terminal F: I_{F-C}		4 ... 20 mA output
Terminal C: I_{F-C}		Current loop I_{F-C} feedback
Safety earth conductor and shield		See pin assignment (installation conforms to 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

For electrical data see page 7 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
- Types:**
- e.g. Ölflex-FD 855 CP (from Lappkabel company)
- No. of wires:**
- Determined by type of valve, plug types and signal assignment
- Cable Ø:**
- 0.75 mm² up to 20 m length
 - 1.0 mm² up to 40 m length
- Outside Ø:**
- 9.4 ... 11.8 mm – Pg11
 - 12.7 ... 13.5 mm – Pg16

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:

$I_{D-E} \geq 3 \text{ mA}$ – valve is active

$I_{D-E} \leq 2 \text{ mA}$ – valve is deactivated.

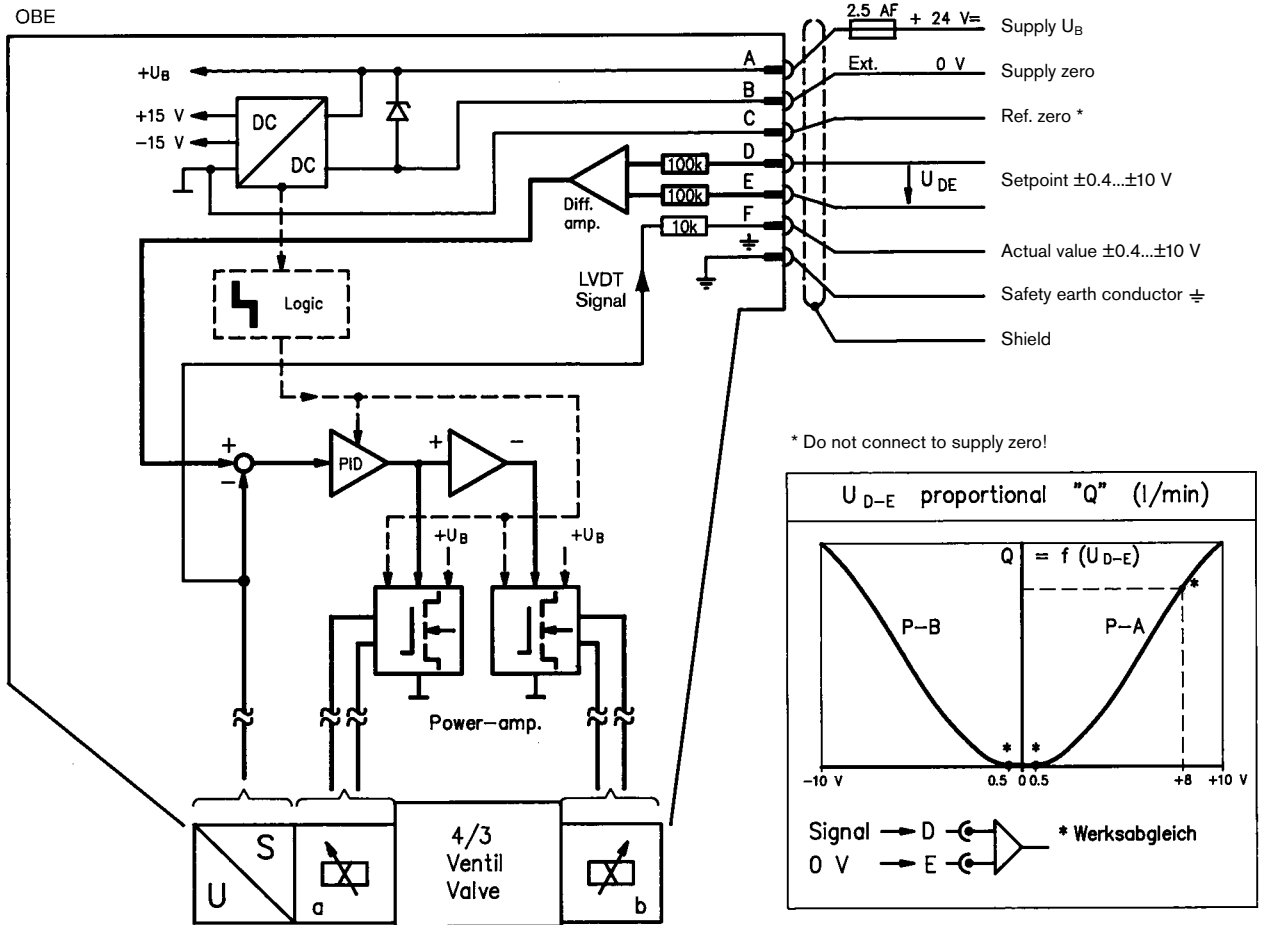
Electrical signals emitted via the trigger electronics
(e.g. actual values) must not be used to shut down safety-
relevant machine functions!

(Also see European Standard, “Technical Safety Requirements
for Fluid-Powered Systems and Components – Hydraulics”,
EN 982!)

On-board trigger electronics

Circuit diagram/pin assignment

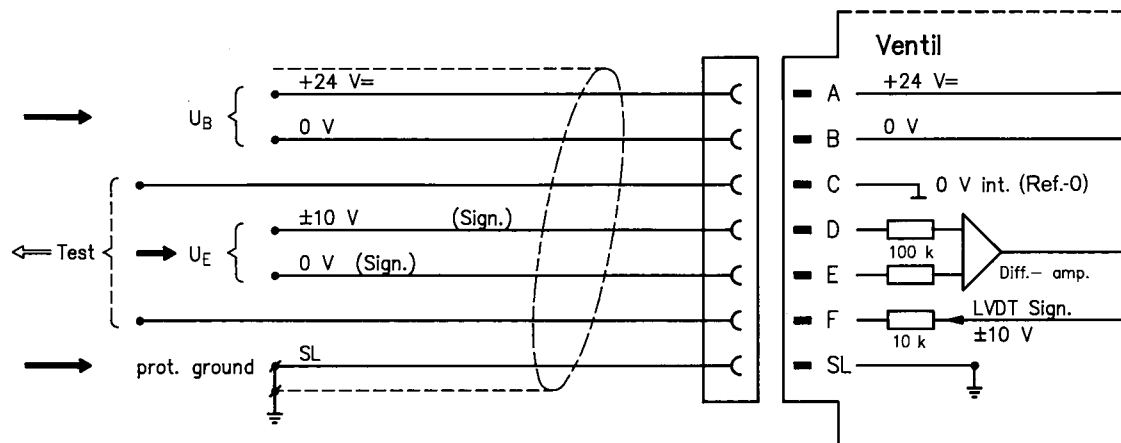
Version A1: $U_{D-E} 0...±0.4...±10 V$



Pin assignment 6P+PE

Version A1: $U_{D-E} 0...±0.4...±10 V$

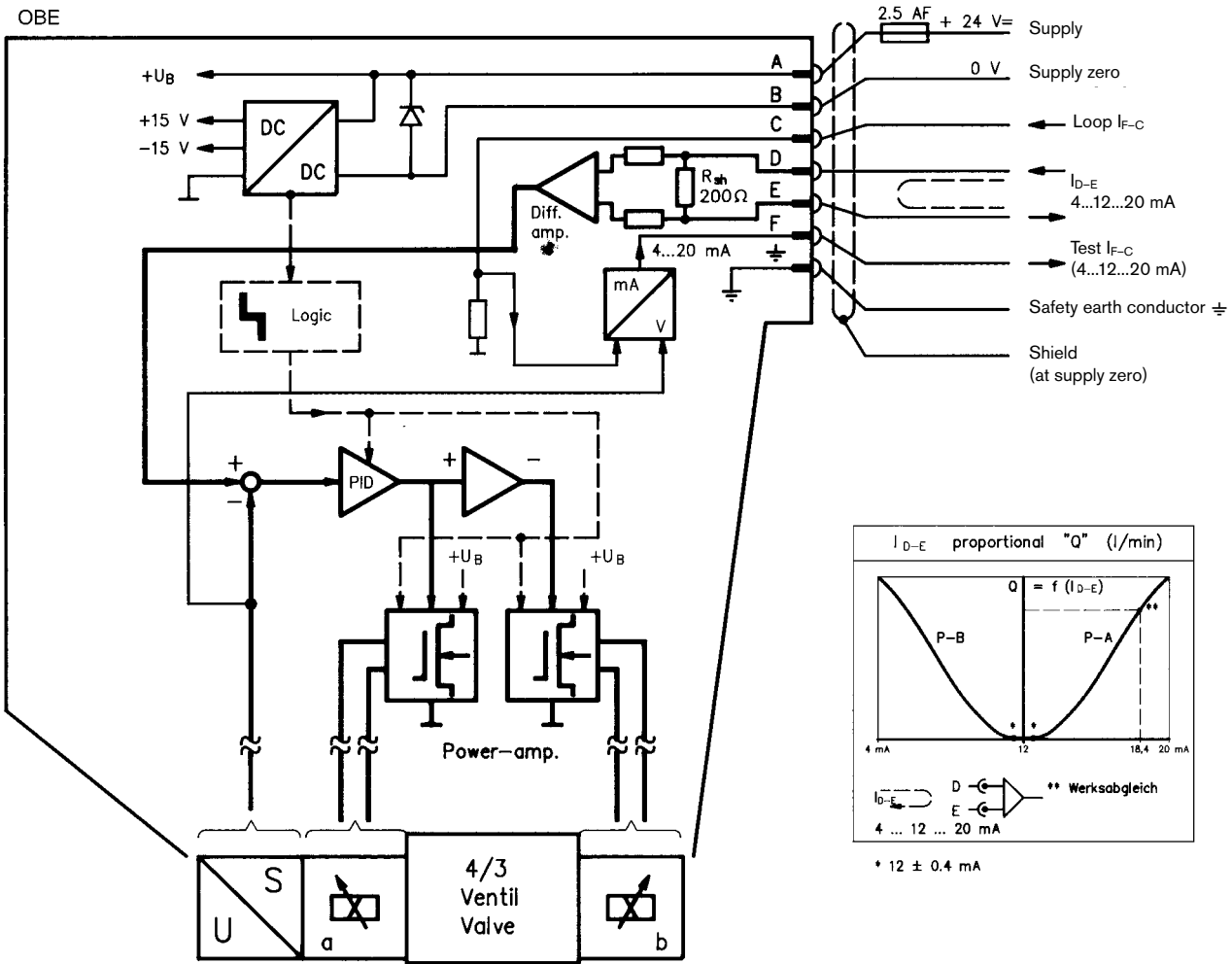
($R_i = 100 k\Omega$)



On-board trigger electronics

Circuit diagram/pin assignment

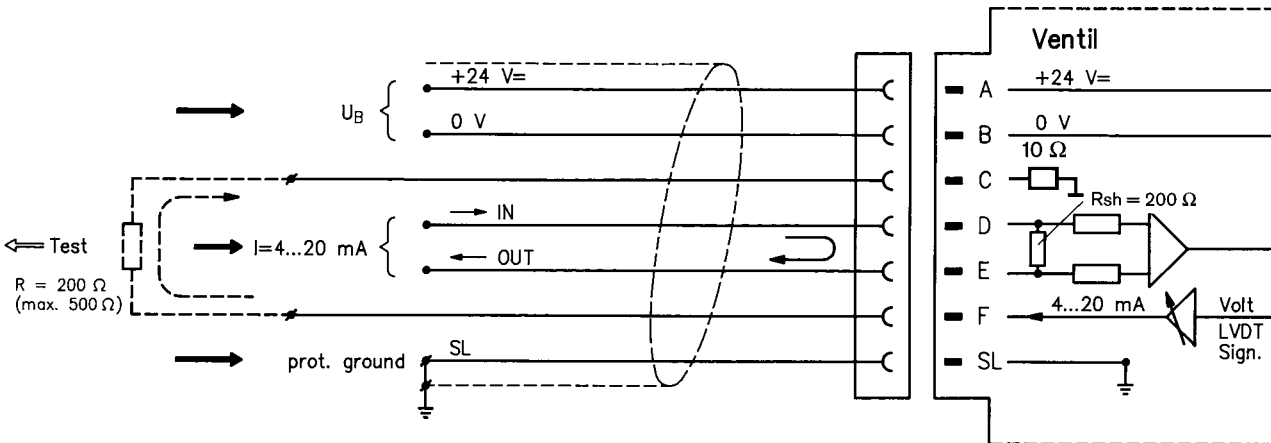
Version F1: I_{D-E} 4...12...20 mA



Pin assignment 6P+PE

Version F1: I_{D-E} 4...12...20 mA

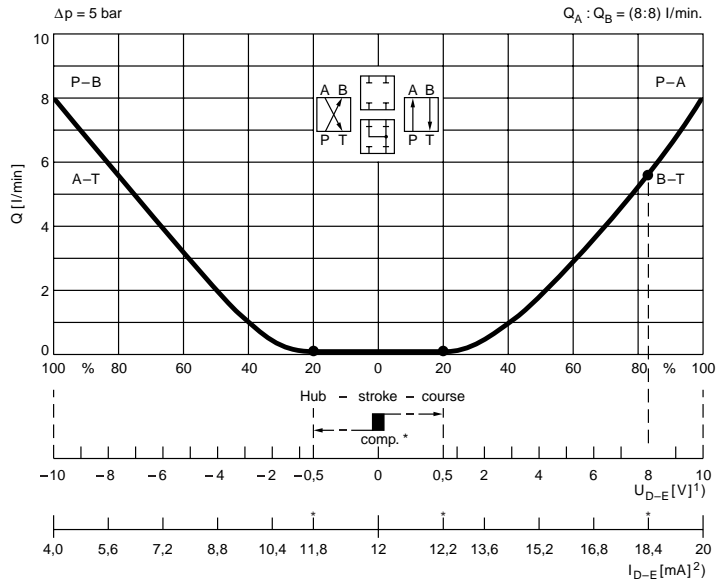
($R_{sh} = 200 \text{ k}\Omega$)



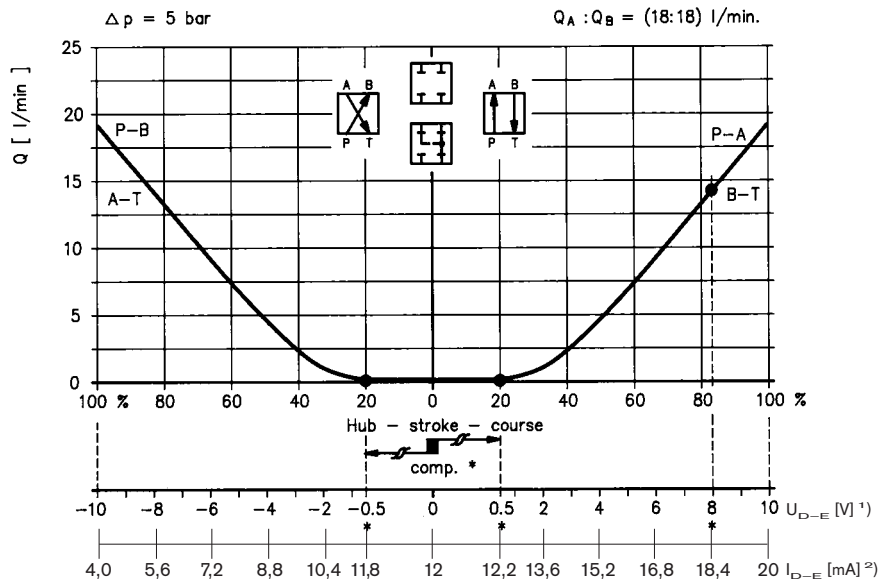
Characteristic curves type 4WRPE 6 .. (measured with HLP 46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)

Flow rate/Signal function (at $\Delta p = 5\text{ bar}$ per notch)

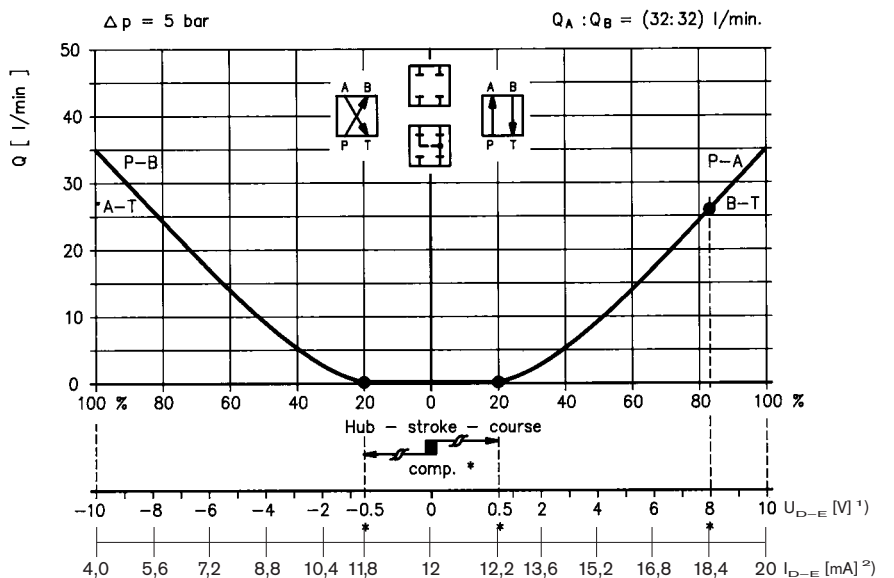
$Q_{nom} = 8\text{ l/min}$



$Q_{nom} = 18\text{ l/min}$



$Q_{nom} = 32\text{ l/min}$



* Factory setting $\cong \pm 3\%$

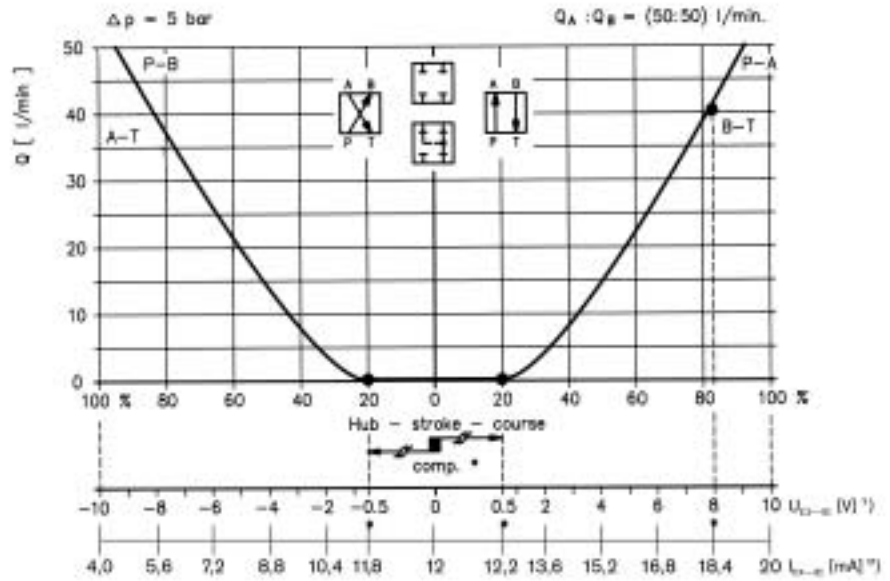
1) Version: $U_E = \pm 0.4 \dots \pm 10\text{ V}$

2) Version: $I_E = 4 \dots 12 \dots 20\text{ mA}$

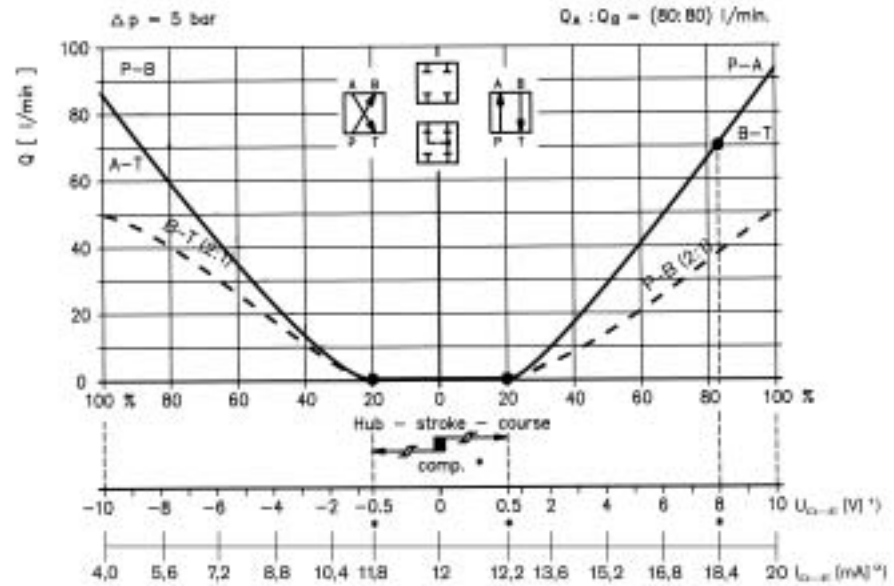
Characteristic curves type 4WRPE 10 .. (measured with HLP 46, $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$)

Flow rate/Signal function (at $\Delta p = 5 \text{ bar}$ per notch)

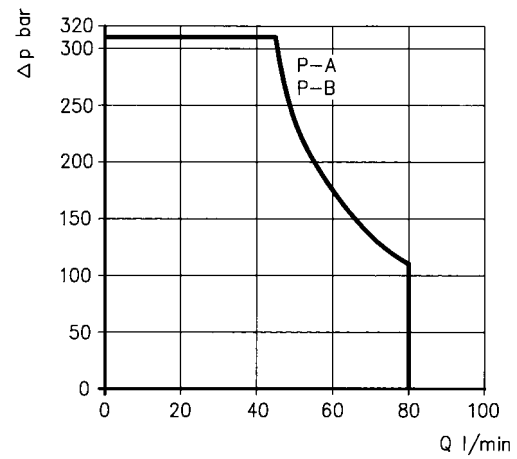
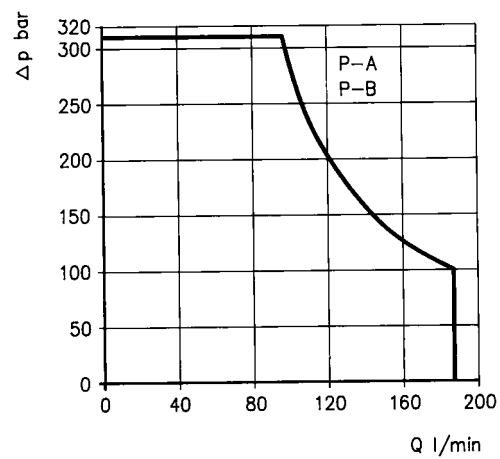
$Q_{nom} = 50 \text{ l/min}$



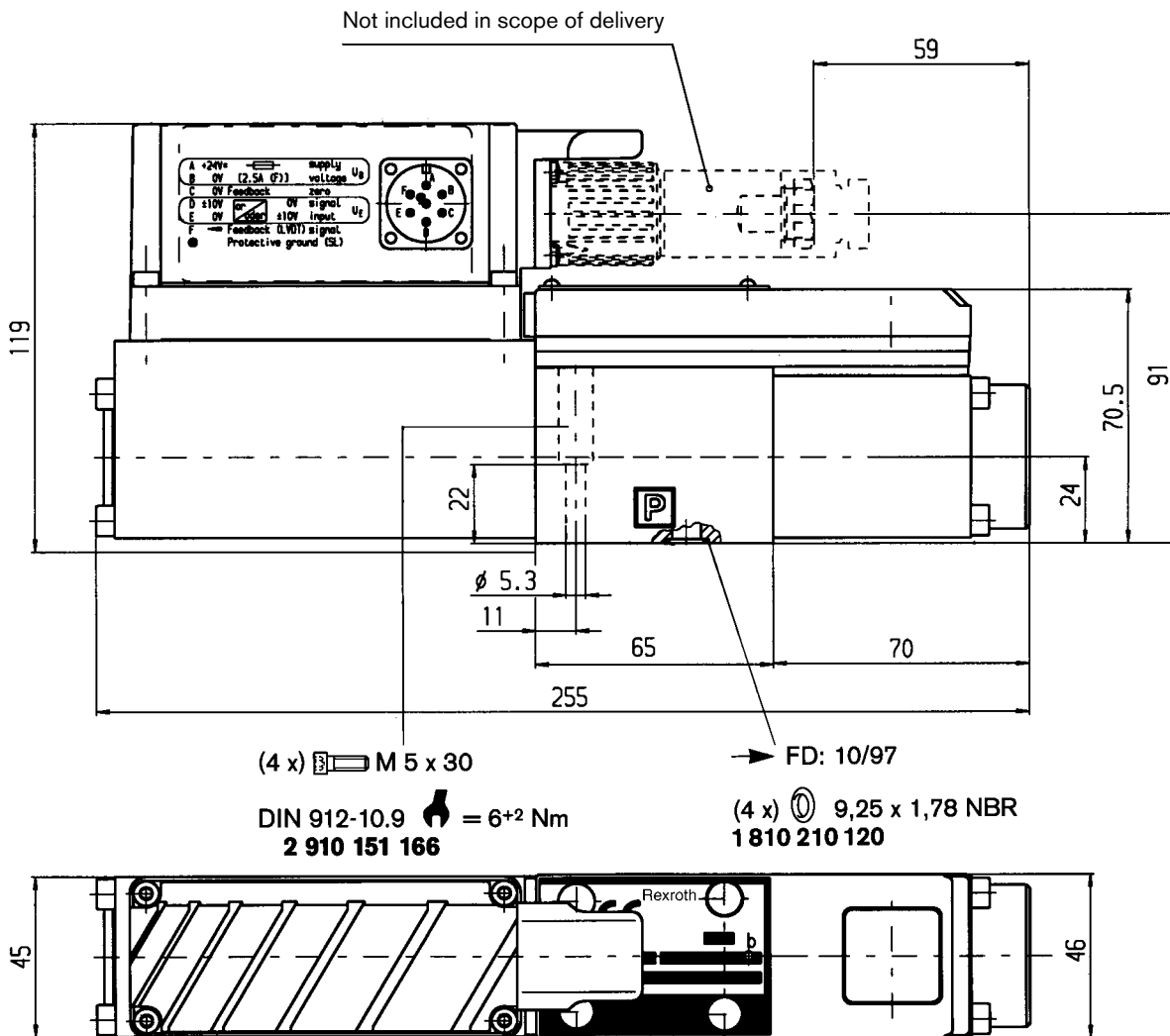
$Q_{nom} = 80 \text{ l/min}$



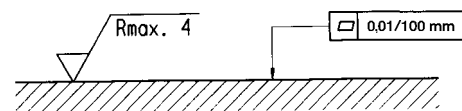
- * Factory setting $\leq \pm 3 \%$
- 1) Version: $U_E = \pm 0.4 \dots \pm 10 \text{ V}$
- 2) Version: $I_E = 4 \dots 12 \dots 20 \text{ mA}$

Operating limits (measured with HLP 46, $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$)**Type 4WRPE 6 ..****Type 4WRPE 10 ..**

Unit dimensions type 4WRPE 6 .. (nominal dimensions in mm)



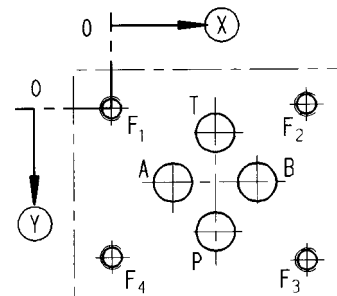
Required surface quality of mating component



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

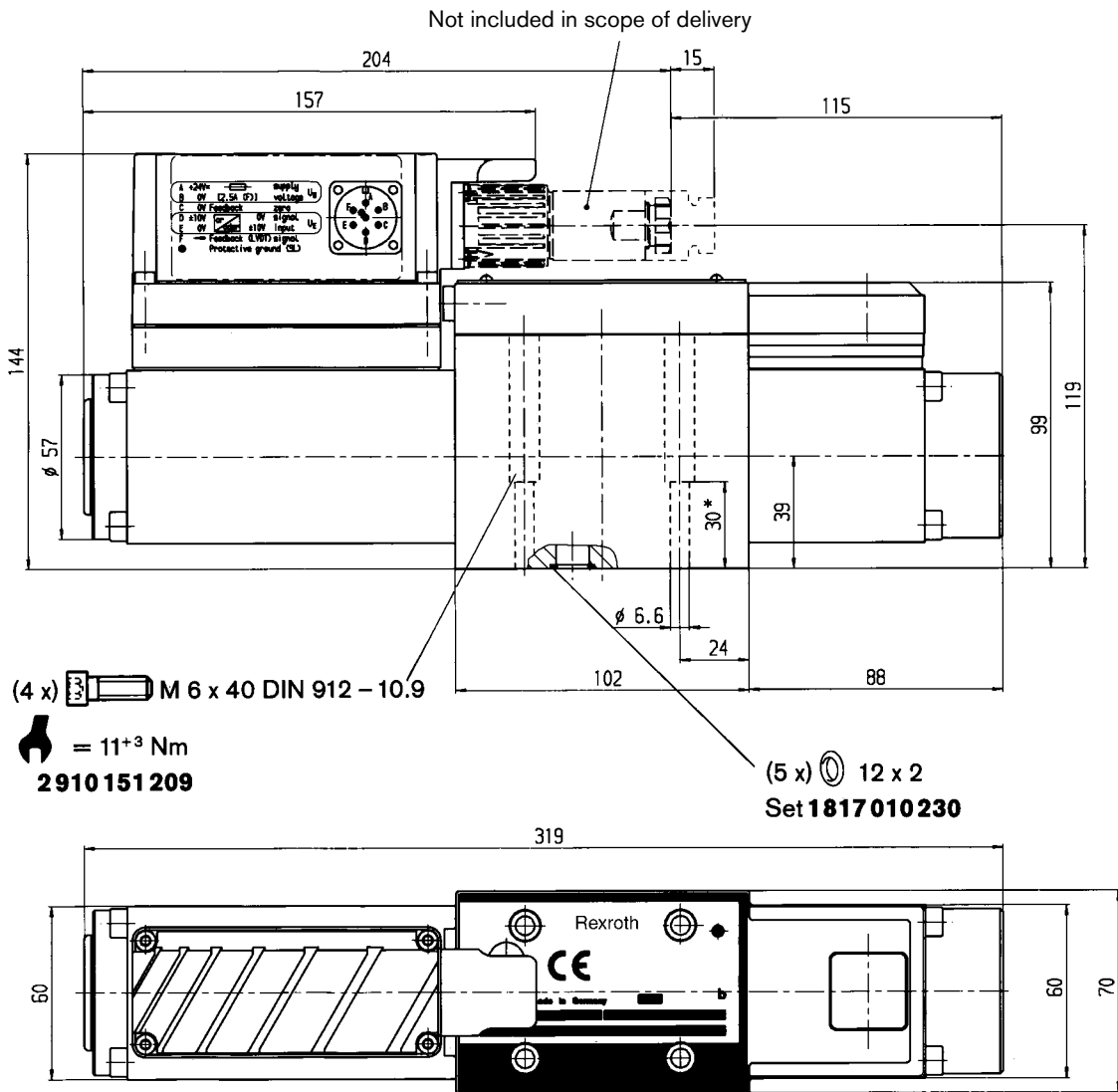
For subplates, see catalog section RE 45053

- 1) Deviates from standard
- 2) Thread depth:
Ferrous metal 1.5 x ∅
Non-ferrous 2 x ∅

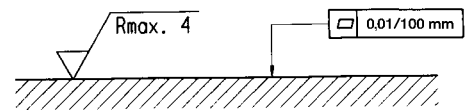


	P	A	T	B	F ₁	F ₂	F ₃	F ₄
⊗	21.5	12.5	21.5	30.2	0	40.5	40.5	0
⊙	25.9	15.5	5.1	15.5	0	-0.75	31.75	31
∅	8 ¹⁾	8 ¹⁾	8 ¹⁾	8 ¹⁾	M5 ²⁾	M5 ²⁾	M5 ²⁾	M5 ²⁾

Unit dimensions type 4WRPE 10 .. (nominal dimensions in mm)

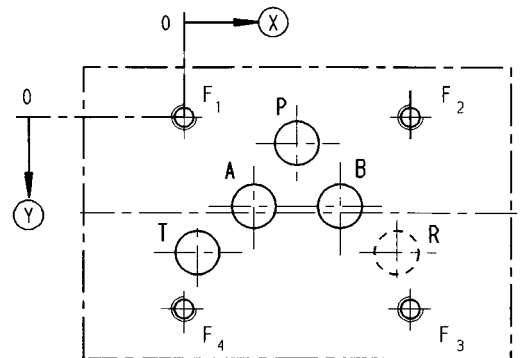


Required surface quality of mating component



Mounting hole configuration: NG10 (ISO 4401-05-04-0-94)
 For subplates, see catalog section 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)



	P	A	T	B	F ₁	F ₂	F ₃	F ₄	R
⊗	27	16.7	3.2	37.3	0	54	54	0	50.8
⊙	6.3	21.4	32.5	21.4	0	0	46	46	32.5
∅	10.5 ¹⁾	10.5 ¹⁾	10.5 ¹⁾	10.5 ¹⁾	M6 ²⁾	M6 ²⁾	M6 ²⁾	M6 ²⁾	10.5 ¹⁾

Notes
