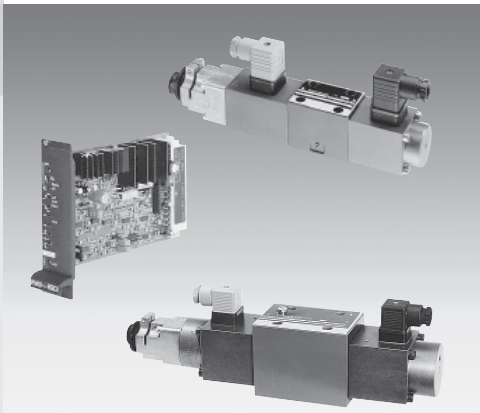
4/2 servo solenoid valves with positive overlap and position feedback (Lvdt AC/AC)

RA 29022/01.05 1/14

Model 4WRP ..E.. / ..W..



Size 6, 10
Unit series 1X
Maximum working pressure of P, A, B 315 bar (4568 PSI),
Nominal flow rate 6...28 l/min (1.6...7.4 GPM) [NG6],
32...63 l/min (8.5...16.6 GPM) [NG10]

Table of contents

Features

- Directly operated NG6 and 10 valves with positive overlap and external valve electronics
- Actuated on both sides, symbol E or W
- Control solenoids with A-side position feedback (Lvdt AC/AC)
- Suitable for use in electrohydraulic controls in production plants
- For subplate attachment, mounting hole configuration NG6 to ISO 4401-03-02-0-94 and NG10 with additional “L” port to ISO 4401-05-06-0-94
- External trigger electronics (order separately), see catalog section RE 30048 and RE 30047
- Solenoid and position transducer connectors included in scope of delivery
- Subplates as per catalog section RE 45053 and RE 45055 (order separately)

Variants on request

- For standard applications
- Special symbols and characteristic curves

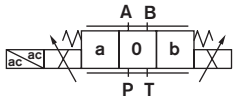
Ordering data and scope of delivery

4WRP					S –	1X /	G24	Z4 /	M	*

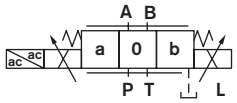
For **external** trigger electronics **= no code**

Size 6 **= 6**
Size 10 **= 10**

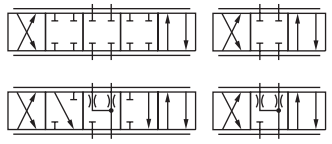
Symbols
4/3-way version



NG6



NG10 [1]



= E
E1
= W
W1

[1] Type 4WRP 10
Mounting hole configuration with additional “L” port

With symbol E1- and W1-

$P \rightarrow A = q_v max$ $B \rightarrow T = q_{v/2}$

$P \rightarrow B = q_{v/2}$ $A \rightarrow T = q_v max$

Further information in plain text

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

Electrical connection
Z4 = with plug to DIN 43560-AM2 **with** line socket, line socket included in scope of delivery

Voltage supply of trigger electronics
G24 = +24 V DC

1X = Unit series (installation and connection dimensions unchanged)

Flow characteristic
S = Progressive

Nominal flow rate at 10 bar valve pressure difference (5 bar per metering notch)

Size 6	Size 10
06 = 6 l/min (1.59 GPM)	**32 =** 32 l/min (8.45 GPM)
08 = 8 l/min (2.11 GPM)	**63 =** 63 l/min (16.64 GPM)
14 = 14 l/min (3.70 GPM)	
16 = 16 l/min (4.23 GPM)	
28 = 28 l/min (7.40 GPM)	

Standard types (available at short notice)

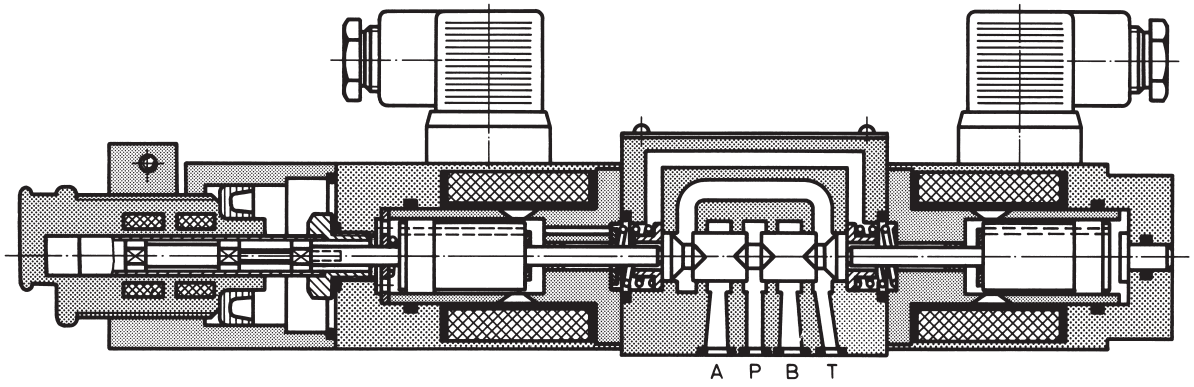
Type 4WRP 6	Material No.
Symbol E	
4WRP 6 E 08S –1X/G24Z4/M 755 *)	**0 811 404 101**
4WRP 6 E 16S –1X/G24Z4/M 755 *)	**0 811 404 100**
4WRP 6 E 28S –1X/G24Z4/M	**0 811 404 119**
Symbol W	
4WRP 6 W 06S –1X/G24Z4/M	**0 811 404 126**
4WRP 6 W 14S –1X/G24Z4/M	**0 811 404 120**
4WRP 6 W 28S –1X/G24Z4/M	**0 811 404 121**

*) Progressive characteristic curve, with triangular notch (standard = semicircular notch)

Type 4WRP 10	Material No.
Symbol E, E1	
4WRP 10 E 32S –1X/G24Z4/M	**0 811 404 003**
4WRP 10 E 63S –1X/G24Z4/M	**0 811 404 001**
4WRP 10 E1 63S –1X/G24Z4/M	**0 811 404 086**
Symbol W, W1	
4WRP 10 W 32S –1X/G24Z4/M	**0 811 404 081**
4WRP 10 W 63S –1X/G24Z4/M	**0 811 404 080**
4WRP 10 W1 63S –1X/G24Z4/M	**0 811 404 087**

Function, sectional diagram

Type 4WRP 6 ..



Position feedback (Lvdt AC/AC)

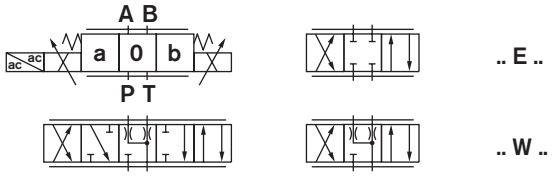
Control solenoid with position transducer

Valve body

Control solenoid

Symbols

Position transducer: A-side



.. E ..

.. W ..

Accessories

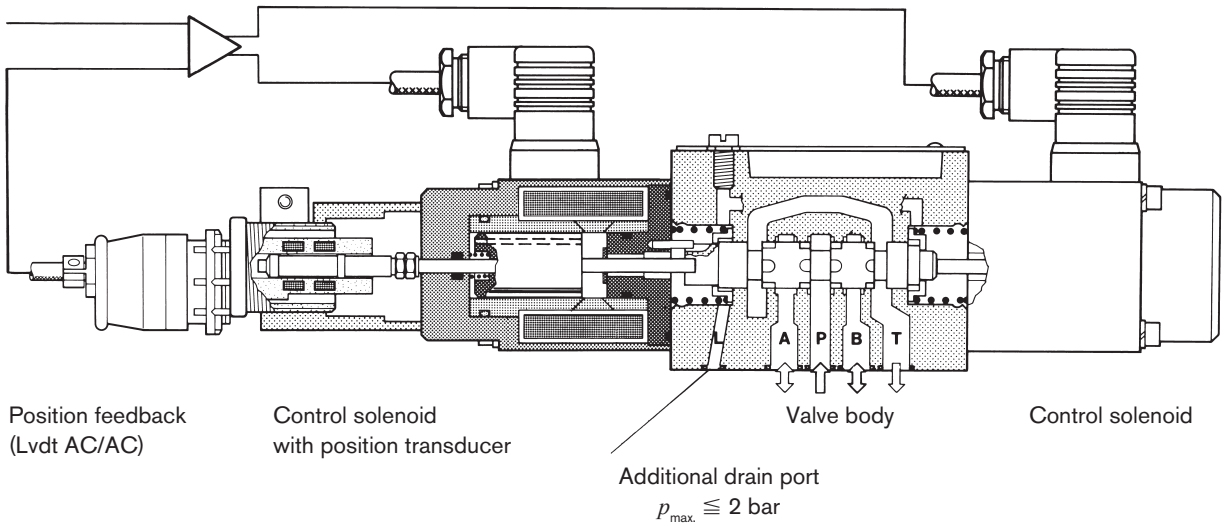
(4 x) ⊟ M5 x 30 DIN 912–10.9	Fastening bolts	**2 910 151 166**
	VT-VRPA2-527-10 / V0 / RTP, see RE 30048	**0 811 405 119**
	VT-VRPA2-527-10 / V0 / RTS, see RE 30047	**0 811 405 137**
	Line socket 2P+PE (M16 x 1.5) and 3P (Pg7) included in scope of delivery, see also RE 08008	

Testing and service equipment

– Test box type VT-PE-TB1, see RE 30063
– Test adapter type VT-PA-3, see RE 30070

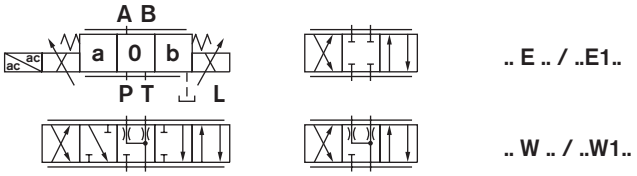
Function, sectional diagram

Type 4WRP 10 ..



Symbols

Position transducer: A-side



.. E .. / ..E1..

.. W .. / ..W1..

Accessories

(4 x) ⊟ M6 x 35 DIN 912–10.9	Fastening bolts	**2 910 151 207**
	VT-VRPA2-537-10 / V0 / RTP, see RE 30048	**0 811 405 120**
	VT-VRPA2-537-10 / V0 / RTS, see RE 30047	**0 811 405 138**
 2P+PE 3P	Line socket 2P+PE (M16 x 1.5) and 3P (Pg7) included in scope of delivery, see also RE 08008	

Testing and service equipment

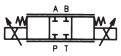
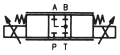
– Test box type VT-PE-TB1, see RE 30063
– Test adapter type VT-PA-3, see RE 30070

Technical data (type 4WRP 6 ..)

General

Construction		Spool type valve
Actuation		Proportional solenoid with position control, external amplifier
Connection type		Subplate, mounting hole configuration NG6 (ISO 4401-03-02-0-94)
Mounting position		Optional
Ambient temperature range	°C (°F)	–20…+50 (–4...122)
Weight	kg (lbs)	2.8 (6.17)
Vibration resistance, test condition		max. 25 g, shaken in 3 dimensions (24 h)

Hydraulic [measured with HLP 46, $\vartheta_{oil} = 40°C \pm 5°C$ (104°F ± 41°F)]

Pressure fluid			Hydraulic oil to DIN 51524 ... 535, other fluids after prior consultation			
Viscosity range	recommended	mm²/s (SUS)	20…100 (93...464)			
	max. permitted	mm²/s (SUS)	10…800 (46...3708)			
Pressure fluid temperature range		°C (°F)	–20…+80 (–4...+176)			
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 $\Delta p = 5$ bar per notch [2]		l/min (GPM)	6 (1.59)	8 (2.12)	14 (3.70)	16 (4.23)	28 (7.4)
Max. working pressure		bar (PSI)	Port P, A, B: 315 (4569)			
Max. pressure		bar (PSI)	Port T: 250 (3626)			
Leakage per metering edge ($\Delta p = 100$ bar)	$I_m = 0$			A → T = 80 cm³/min (4.88 in³/min) B → T = 80 cm³/min (4.88 in³/min)			
Leakage drain ($\Delta p = 5$ bar)				A → T = 0.8...1.6 l/min (0.21...0.42 GPM) B → T = 0.8...1.6 l/min (0.21...0.42 GPM)			

Electrical

Cyclic duration factor	%	100
Power supply		24 V_{nom} (external amplifier)
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		Unit plug Pg7 (4P)
Max. solenoid current	A	2.7
Coil resistance R_{20}	Ω	3
Max. power consumption at 100 % load and operating temperature	VA	40

Static/Dynamic [3]

Hysteresis		%	≦ 0.3
Range of inversion		%	≦ 0.2
Manufacturing tolerance for $Q_{max.}$		%	≈ 5
Response time	100 % signal change	ms	≈ 30
	10 % signal change	ms	≈ 15

[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 $q_x = q_{nom} \cdot \sqrt{\frac{\Delta p_x}{5}}$

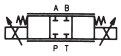
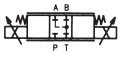
[3] All specifications achieved in conjunction with proportional amplifier: **0 811 405 119**

Technical data (type 4WRP 10 ..)

General

Construction			Spool type valve
Actuation			Proportional solenoid with position control, external amplifier
Connection type			Subplate, mounting hole configuration NG10 (ISO 4401-05-06-0-94)
Mounting position			Optional
Ambient temperature range		°C (°F)	–20…+50 (–4...122)
Weight		kg (lbs)	8.0 (17.63)
Vibration resistance, test condition			max. 25 g, shaken in 3 dimensions (24 h)

Hydraulic [measured with HLP 46, $\vartheta_{oil} = 40°C \pm 5°C$ (104°F ± 41°F)]

Pressure fluid			Hydraulic oil to DIN 51524 ... 535, other fluids after prior consultation	
Viscosity range	recommended	mm²/s (SUS)	20…100 (93...464)	
	max. permitted	mm²/s (SUS)	10…800 (46...3708)	
Pressure fluid temperature range		°C (°F)	–20…+80 (–4...+176)	
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 $\Delta p = 5$ bar per notch [2]		l/min (GPM)	32 (8.45)	63 (16.64)
Max. working pressure		bar (PSI)	Port P, A, B: 315 (4569)	
Max. pressure		bar (PSI)	Port T: 250 (3626)	
		bar (PSI)	Port L: 2 (29)	
Leakage per metering edge ($\Delta p = 100$ bar)	$I_m = 0$			A → T = 80 cm³/min (4.88 in³/min) B → T = 80 cm³/min (4.88 in³/min)
Leakage drain ($\Delta p = 5$ bar)				A → T = 0.4...0.8 l/min (0.11...0.21 GPM) B → T = 0.4...0.8 l/min (0.11...0.21 GPM)

Electrical

Cyclic duration factor	%	100
Power supply		24 V_{nom} (external amplifier)
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		Unit plug Pg7 (4P)
Max. solenoid current	A	3.7
Coil resistance R_{20}	Ω	2.5
Max. power consumption at 100 % load and operating temperature	VA	60

Static/Dynamic [3]

Hysteresis		%	≦ 0.75
Range of inversion		%	≦ 0.5
Manufacturing tolerance for $Q_{max.}$		%	≈ 10
Response time	100 % signal change	ms	≈ 50
	10 % signal change	ms	≈ 20

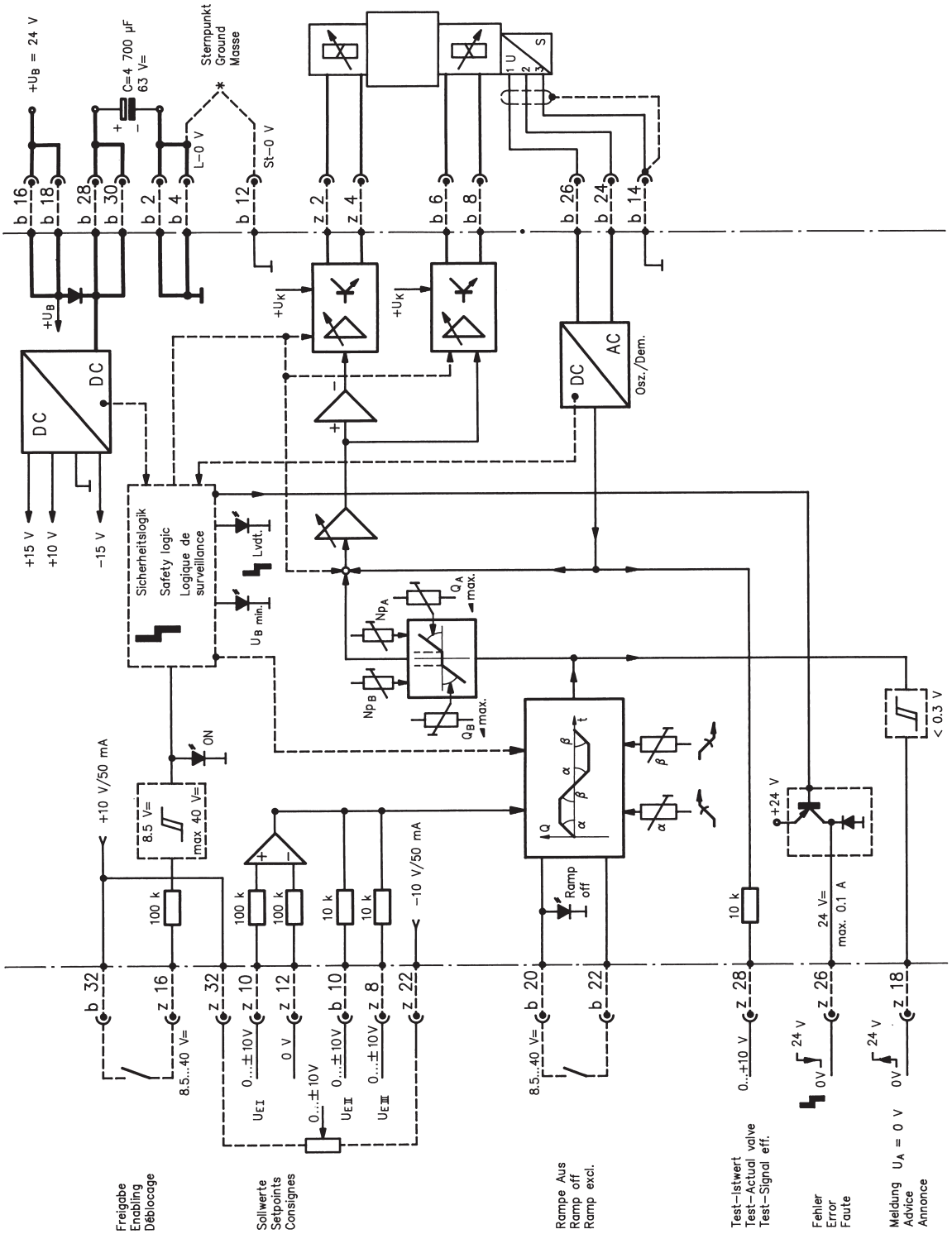
[1] The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components. For a selection of filters, see catalog sections RE 50070, RE 50076 and RE 50081.

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

[3] All specifications achieved in conjunction with proportional amplifier: **0 811 405 120**

Valve with external trigger electronics (standard with ramps, RE 30048)

Circuit diagram/pin assignment

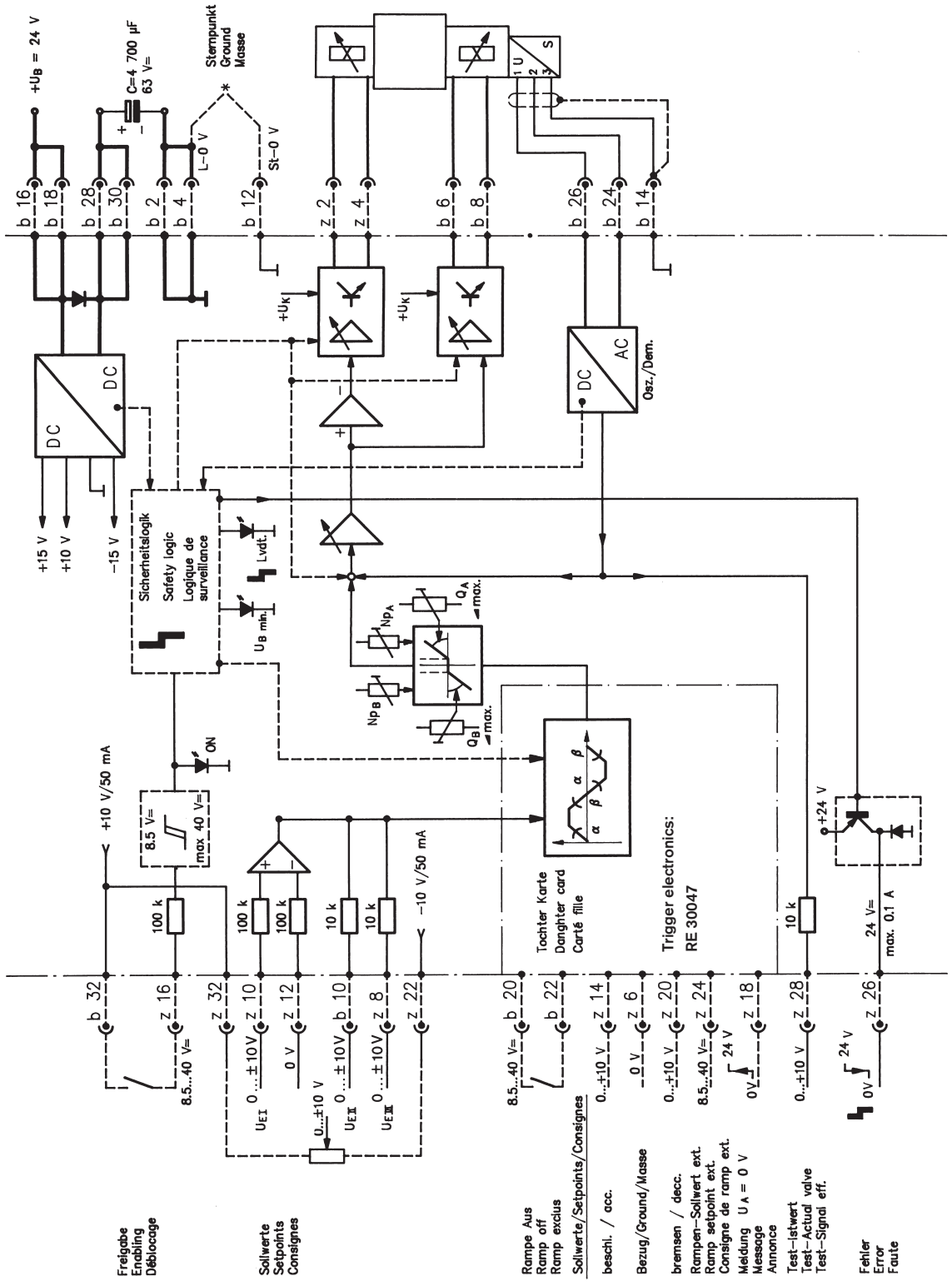


Versions of trigger electronics:

– With voltage-controlled ramps, see page 8 and RE 30047

Valve with external trigger electronics (with voltage-controlled ramps, RE 30047)

Circuit diagram/pin assignment



Versions of trigger electronics:

– With ramps, see page 7 and RE 30048

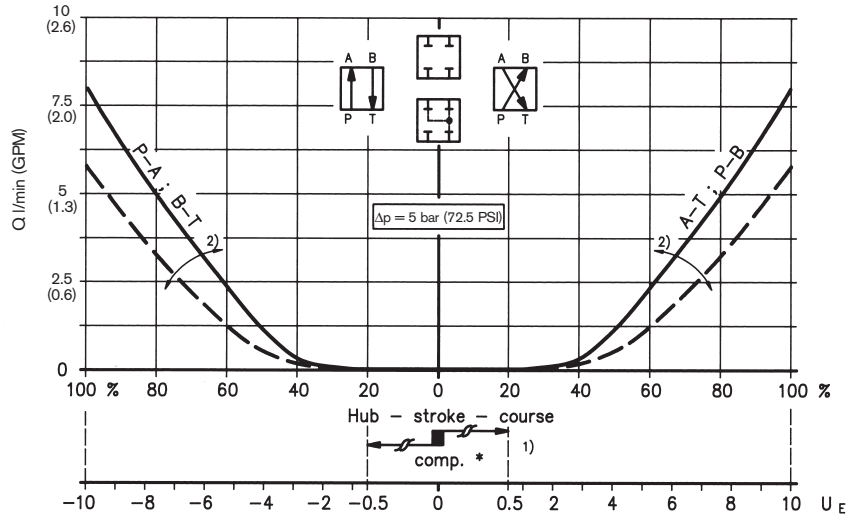
Characteristic curves type 4WRP 6 E .. / W.. - measured with HLP 46, ϑ_{oil} = 40°C ±5°C (104°F ±41°F)

Flow rate/Signal function (at Δp = 5 bar per notch)

Q_{nom} = 5.8/8 l/min (1.53/2.12 GPM)

——— Q_N = 8 l/min (2.12 GPM)

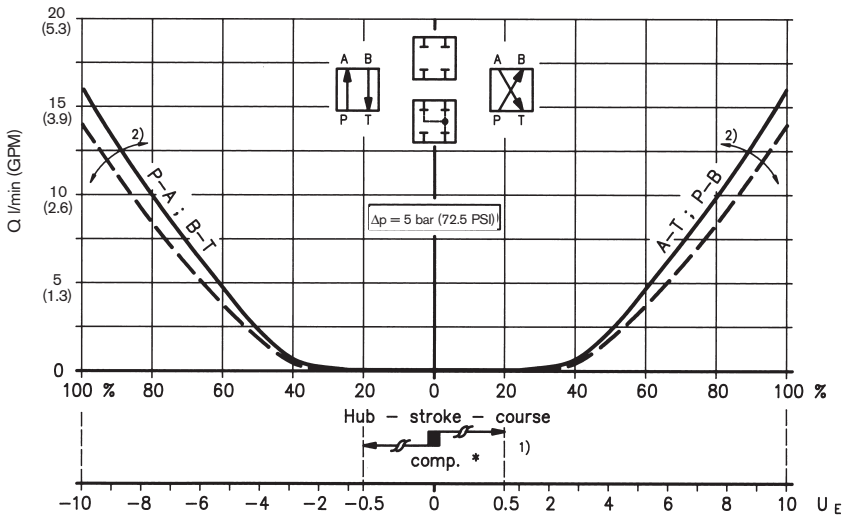
– – – Q_N = 5.8 l/min (1.53 GPM)



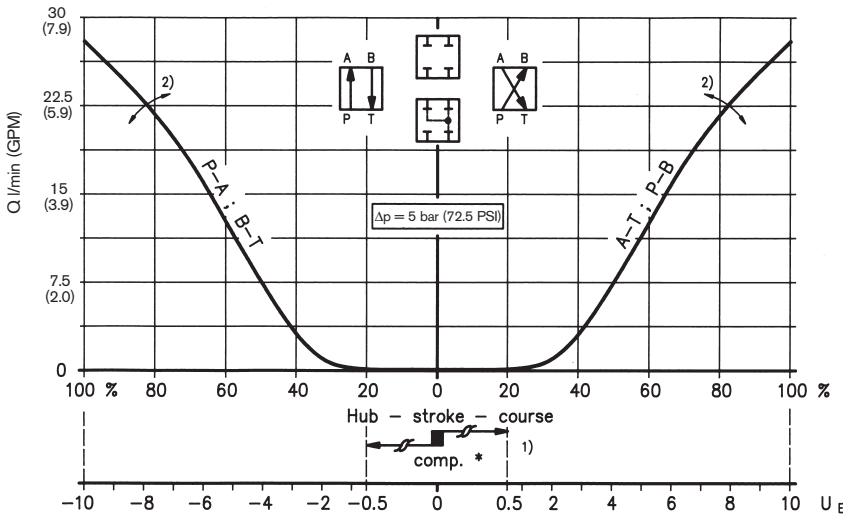
Q_{nom} = 14/16 l/min (3.70/4.23 GPM)

——— Q_N = 16 l/min (4.23 GPM)

- - - - - Q_N = 14 l/min (3.70 GPM)



Q_{nom} = 28 l/min (7.40 GPM)



Valve amplifier

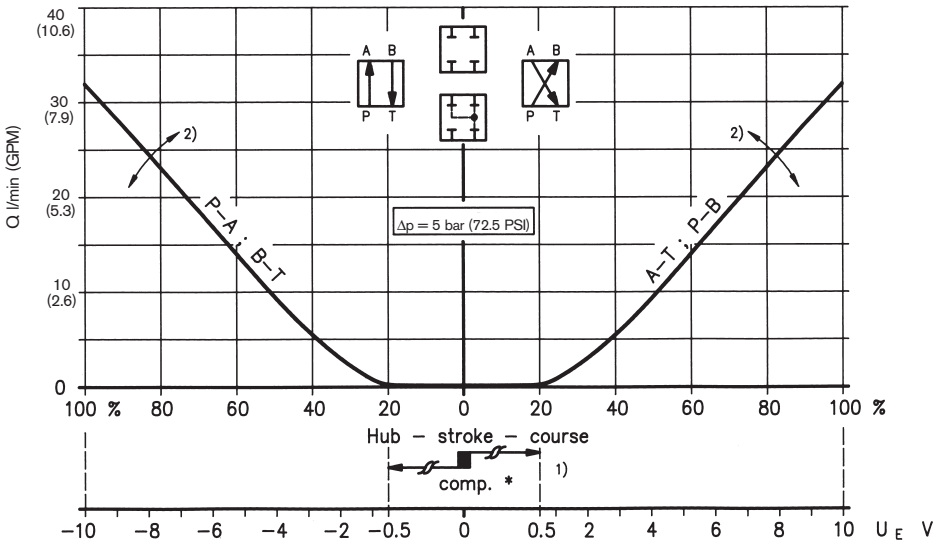
[1] Zero adjustment → ±0.5 V

[2] Sensitivity adjustment

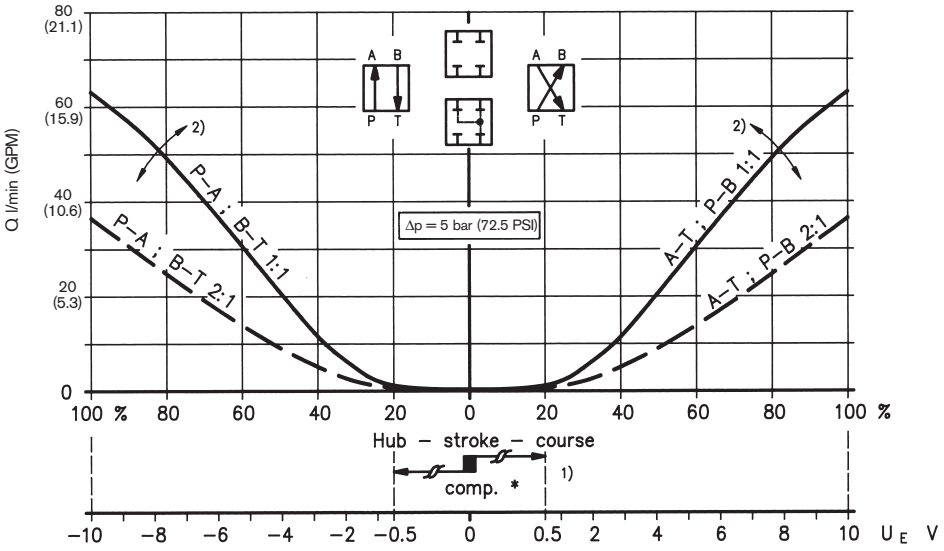
Characteristic curves type 4WRP 10 E .. / W.. - measured with HLP 46, ϑ_{oil} = 40°C ±5°C (104°F ±41°F)

Flow rate/Signal function (at Δp = 5 bar per notch)

Q_{nom} = 32 l/min (8.45 GPM)



Q_{nom} = 63 l/min (16.64 GPM)



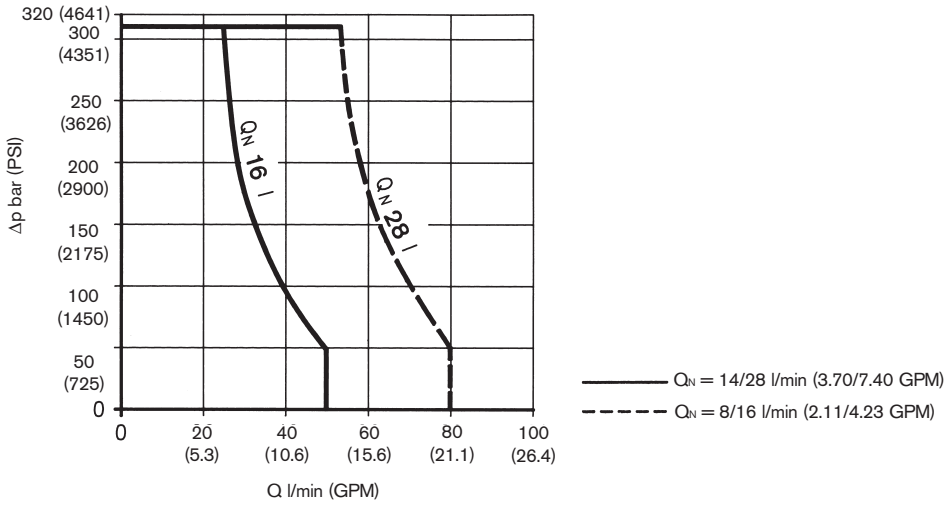
Valve amplifier

[1] Zero adjustment → ±0.5 V

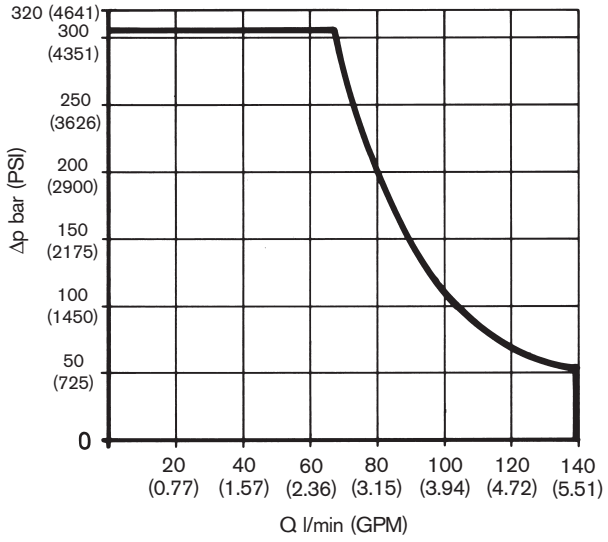
[2] Sensitivity adjustment

Operating limits - measured with HLP 46, ϑ_{oil} = 40°C ±5°C (104°F ±41°F)

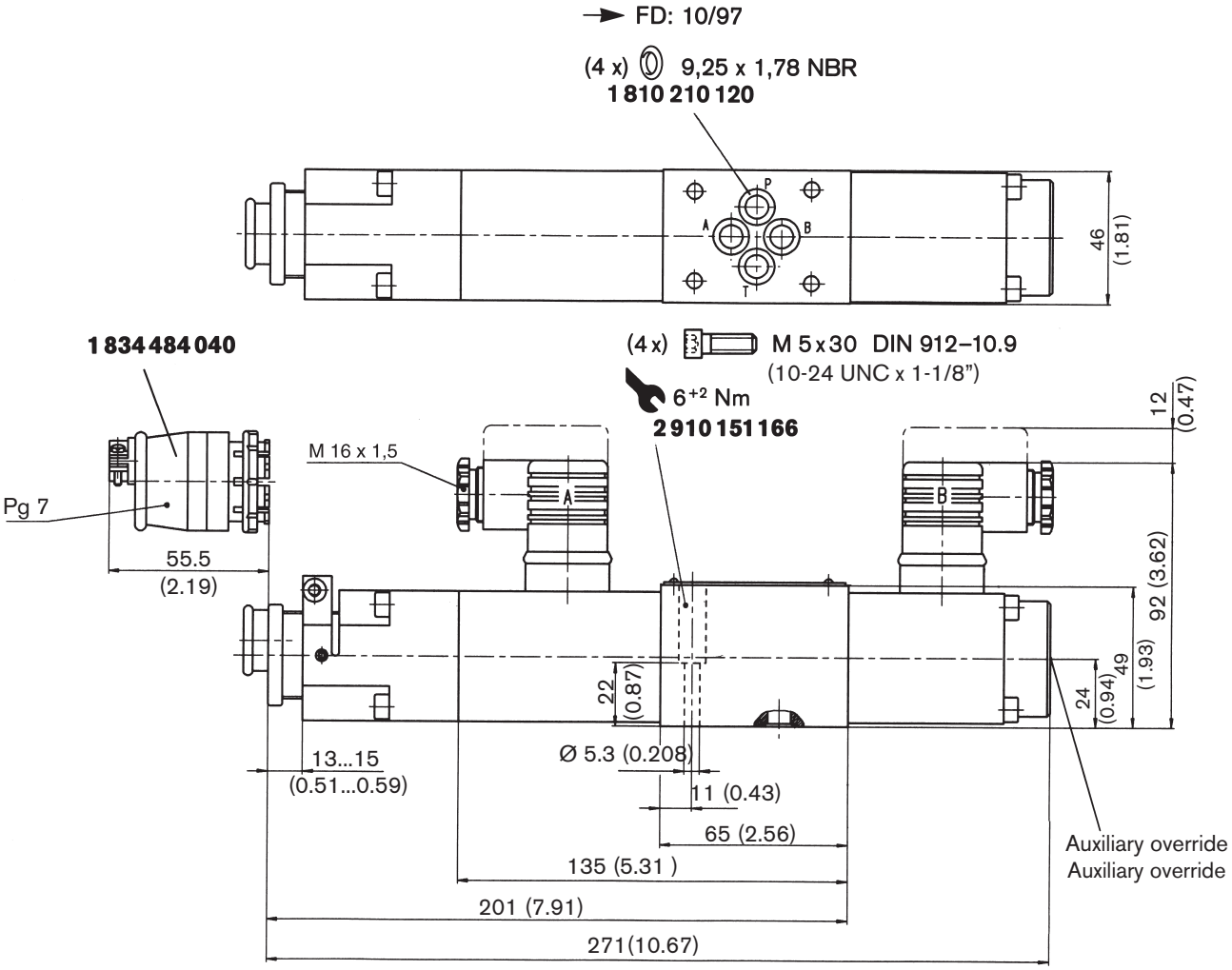
Type 4WRP 6 E .. / W..



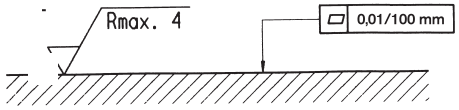
Type 4WRP 10 E .. / W..

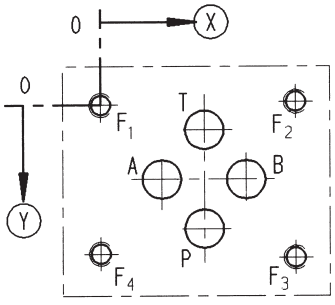


Unit dimensions type 4WRP 6 E .. / W.. - nominal dimensions in mm (inches)



Required surface quality of mating component



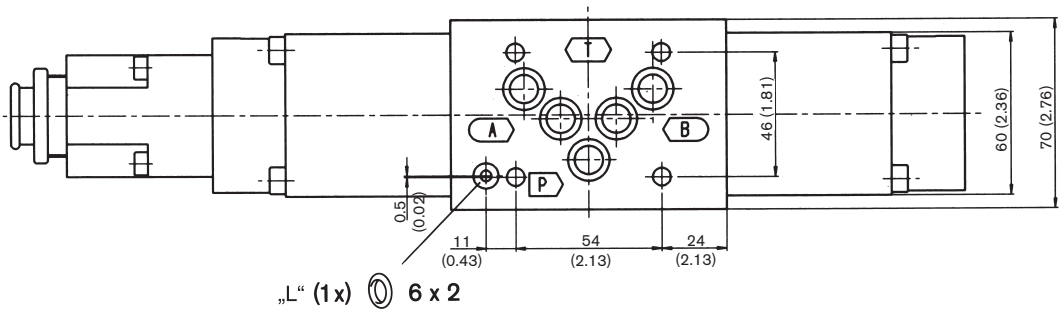


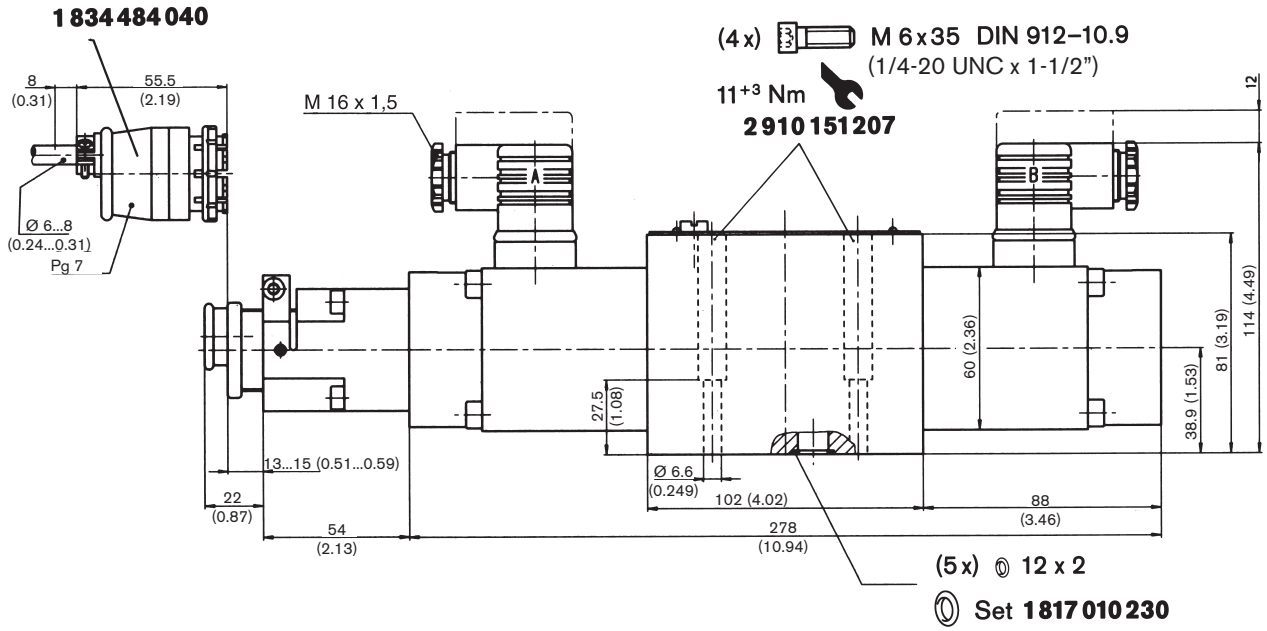
Mounting hole configuration: NG6 (ISO 4401-03-02-0-94)
For subplates see catalog section RE 45053

[1] Deviates from standard
[2] Thread depth:
Ferrous metal 1.5 x Ø
Non-ferrous 2 x Ø

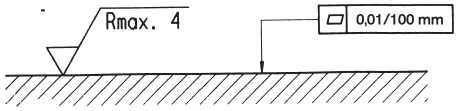
	P	A	T	B	F_1	F_2	F_3	F_4
Ⓧ	21.5 (0.85)	12.5 (0.49)	21.5 (0.85)	30.2 (1.19)	0	40.5 (1.59)	40.5 (1.59)	0
Ⓨ	25.9 (1.02)	15.5 (0.61)	5.1 (0.20)	15.5 (0.61)	0	–0.75 (-0.03)	31.75 (1.25)	31 (1.22)
∅	8[1]	8[1]	8[1]	8[1]	M5[2]	M5[2]	M5[2]	M5[2]

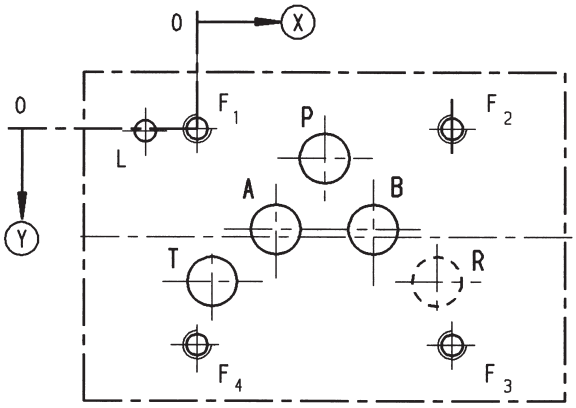
Unit dimensions type 4WRP 10 E .. / W.. - nominal dimensions in mm (inches)





Required surface quality of mating component





Mounting hole configuration: NG10 (ISO 4401-05-06-0-94)
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	L
Ⓧ	27 (1.06)	16.7 (0.66)	3.2 (0.13)	37.3 (1.47)	0	54 (2.13)	54 (2.13)	0	50.8 (2.00)	–11 (-0.43)
Ⓨ	6.3 (0.25)	21.4 (0.84)	32.5 (1.28)	21.4 (0.84)	0	0	46 (1.81)	46 (1.81)	32.5 (1.28)	0.5 (0.02)
∅	10.5 1)	10.5 1)	10.5 1)	10.5 1)	M6 2)	M6 2)	M6 2)	M6 2)	10.5 1)	4.5

Notes

Bosch Rexroth Corp.
Industrial Hydraulics
2315 City Line Road
Bethlehem, PA 18017-2131
USA
Telephone (610) 684-8300
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www.boschrexroth-us.com

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