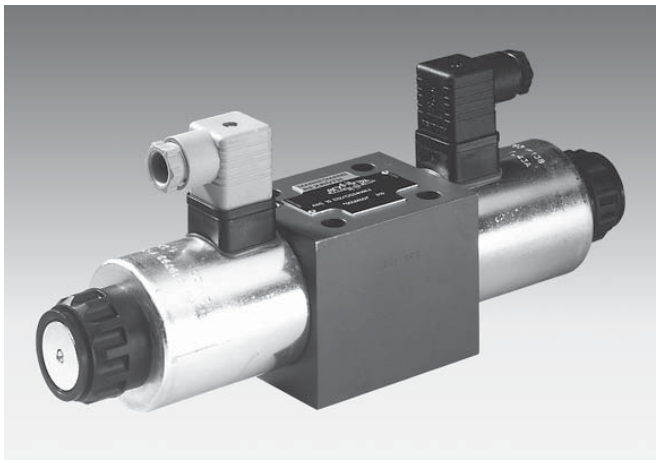
RE 23 351/02.03
Replaces: 03.02

4/3-, 4/2- and 3/2-way directional valves with switching time adjustment, Type 5-.WE 10 (5-chamber version)

Nominal size 10
Series 3X
Maximum operating pressure 315 bar
Maximum flow 120 L/min



HA 5960/98

Type 5-.WE 10 E3X/CG24N9K4 with plug-in connector (separate order)

Overview of contents

Features

- Direct operated directional spool valve with solenoid operation
- Porting pattern to DIN 24 340 Form A, ISO 4401 and CETOP–RP 121 H,
  subplates to catalogue sheet RE 45 054
  (separate order)
- Wet pin DC solenoids with
  removable coil
  (AC voltages possible via a rectifier)
- Solenoid coil can be rotated through 90°
- The coil can be replaced without opening the pressure-tight chamber
- Individual electrical connections
- Hand override, optional
- Adjustable spool switching time, optional

Ordering details

1 2	3	4 6	7 9	10	11	12	15 18	19	22	24
5 –	WE	10	3X/	C			K4/			*

3 actuator ports = **3**
4 actuator ports = **4**

Nominal size 10 = **10**

Symbol e.g. C, E, EA, EB etc. – for possible versions, see page 3

Series 30 to 39 = **3X**
(30 to 39: unchanged installation and connection dimensions)

With spring return = **No code**
Without spring return with detent = **OF**
Without spring return = **O**

Wet pin solenoid (oil immersed) with removable coil = **C**

24 V DC = **G24**
205 V DC = **G205** [1]
For further ordering details regarding other voltages and frequencies, see page 6.

With protected hand override (standard) = **N9**
Without hand override = **No code**
Hand override with protective cap = **N**

Electrical connections
Without plug-in connector
Individual connection; with component plug DIN EN 175 301-803 = **K4** [2]

Without switching time adjustment = **No code**
With throttle screw = **C**
Orifice Ø 0.6 mm = **A06**
Orifice Ø 0.7 mm = **A07**
Orifice Ø 0.8 mm = **A08**

Without throttle insert = **No code**
Throttle Ø 0.8 mm = **B08**
Throttle Ø 1.0 mm = **B10**
Throttle Ø 1.2 mm = **B12**
Throttle Ø 1.5 mm = **B15**
Throttle Ø 3.0 mm = **B30**
Used with flows > performance limits of the valve, effective in the P port

NBR seals = **No code**
FKM seals = **V**
(other seals on request)

⚠ **Attention!** The compatibility of the seals and pressure fluid has to be taken into account!

Further details in clear text

AC supply (permissible voltage tolerance ± 10%)	**Nominal voltage of the DC solenoid when used with an AC voltage**	**Ordering details**
110 V - 50/60 Hz	96 V	**G96**
120 V - 60 Hz	110 V	**G110**
230 V - 50/60 Hz	205 V	**G205**

[1] When connecting to an AC supply a DC solenoid **must** be used which is controlled via a rectifier (see table on the left).

For individual connections a large plug-in connector with integrated rectifier can be used (separate order, see page 3).

[2] Plug-in connectors must be ordered separately (see page 3).

⚠ **Attention!**
The performance limits on page 7 must be taken into account!

Preferred types (readily available)

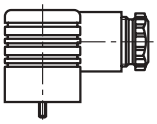
Type	Material No.
5-3WE 10 A3X/CG24N9K4	R900507735
5-3WE 10 B3X/CG24N9K4	R900507380
5-4WE 10 C3X/CG24N9K4	R900598389
5-4WE 10 D3X/CG24N9K4	R900592969
5-4WE 10 D3X/OFCG24N9K4	R900510351
5-4WE 10 E3X/CG24N9K4	R900592442
5-4WE 10 G3X/CG24N9K4	R900592396
5-4WE 10 H3X/CG24N9K4	R900500134
5-4WE 10 J3X/CG24N9K4	R900595823

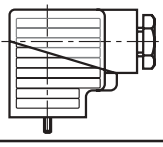
Type	Material No.
5-4WE 10 M3X/CG24N9K4	R900526073
5-4WE 10 Q3X/CG24N9K4	R900955203
5-4WE 10 R3X/CG24N9K4	R900595683
5-4WE 10 W3X/CG24N9K4	R900563805
5-4WE 10 Y3X/CG24N9K4	R900555499

Further preferred types and components can be found in the EPS (Standard Price List).

Ordering details: plug-in connectors to DIN EN 175 301-803 and ISO 4400 for component plug "K4"

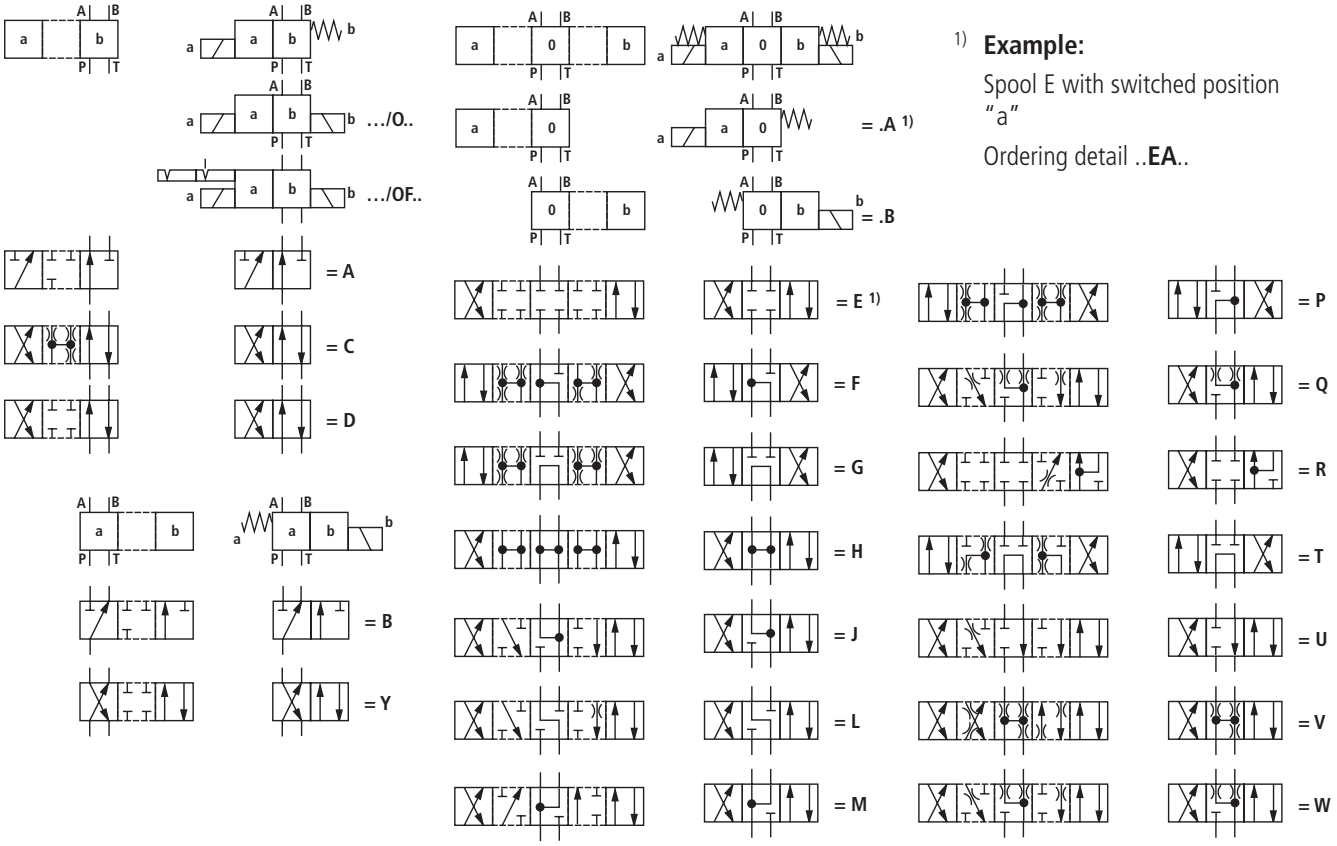
For further plug-in connectors, see RE 08 006





Valve side	Colour	Material No. Without circuitry	With indicator light 12 … 240 V	With rectifier 12 … 240 V	With indicator light and Z-diode protective circuit 24 V
a	Grey	**R900074683**	**–**	**–**	**–**
b	Black	**R900074684**	**–**	**–**	**–**
a/b	Black	**–**	**R900057292**	**R900313933**	**R900310995**

Symbols



1) **Example:**
Spool E with switched position "a"
Ordering detail ..**EA**..

Function, section

5-chamber directional valves of type 5-.WE are solenoid operated directional spool valves. They control the start, stop and direction of flow with the additional option of adjusting the spool switching time.

These directional valves basically consist of the housing (1), one or two solenoids (2), the control spool (3), as well as one or two return springs (4).

The two spring chambers (5) are connected by a connecting passage. As the spool switches, the flow is displaced from one spring chamber to the other via this passage. If the cross-sectional area of this connecting passage is reduced by a throttle then the switching time changes accordingly.

The T channels are isolated from the spring chambers. This means that switching pulses do not affect the control spool (3) and thus soft switching of the spool can be achieved.

In the de-energised condition, the control spool (3) is held in the central or initial position by return springs (4) (except for impulse spools). The control spool (3) is operated by wet pin solenoids (2).

In order to ensure correct functioning, care must be taken to ensure that the pressure chamber of the solenoid is filled with oil.

The force of the solenoid (2) acts on the control spool (3) and pushes it from its neutral position to the required end position. Thus, the required flow direction from P to A and B to T or P to B and A to T is achieved.

When the solenoid (2) is de-energised the control spool (3) is returned to its neutral position by the return spring (4).

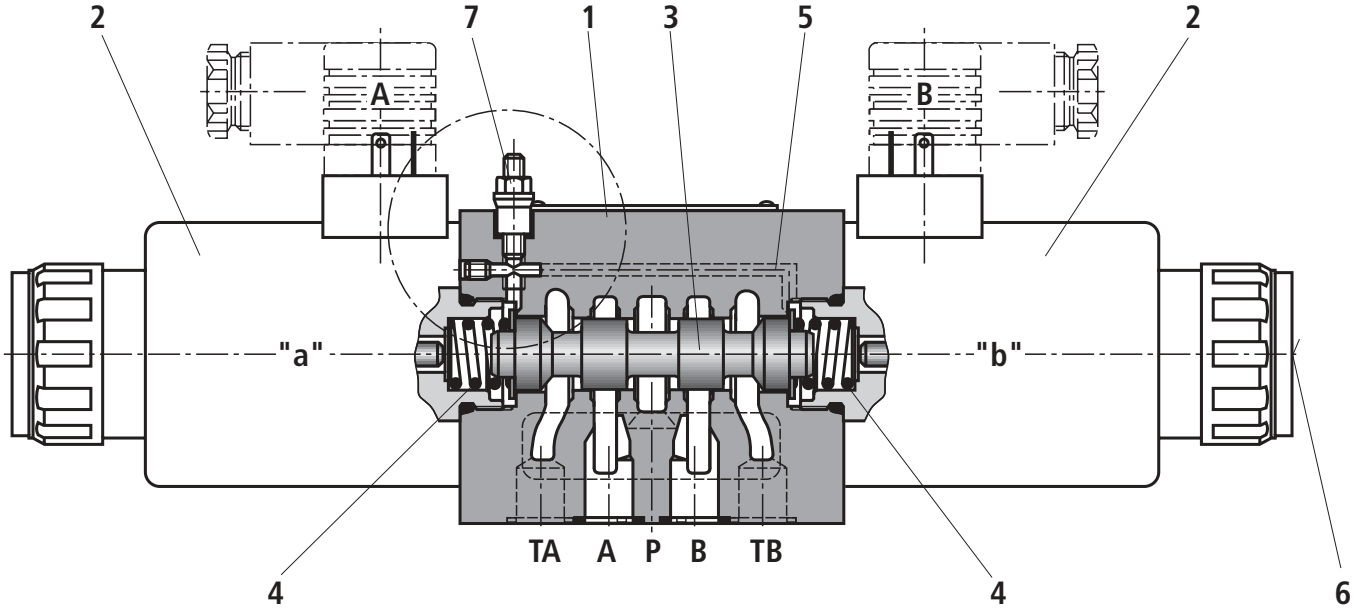
A hand override (6), optional, enables the control spool (3) to be moved without energisation of the solenoids.

Adjustable spool switching time (only with DC solenoids)

The optional installation of a throttle screw (7) or orifice (8) - see below - offers the possibility of increasing the switching time

– With throttle screw type 5-.WE 10 ../..CG../**C**..

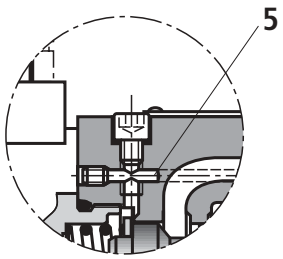
– With throttle type 5-.WE 10 ../..CG../**A**..



Type 5-4WE 10 E3X/CG24N9K4/C..

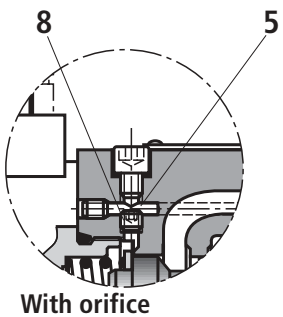
With the use of orifices switching times of 100 ms and above are possible. The actual time is dependent upon the individual system (e.g. pressure, flow and viscosity).

When rectro fitting or modifying a throttling system, care must be taken that the fluid volume in the spring chambers and the connecting bore (5) is retained, as this is a prerequisite for the smooth operation of the switching time adjustment.



Without throttle screw/ without orifice

Type 5-.WE 10../..CG../..



With orifice

Type 5-.WE 10../..CG../**A**..

Type 5-.WE 10.3X/OC....

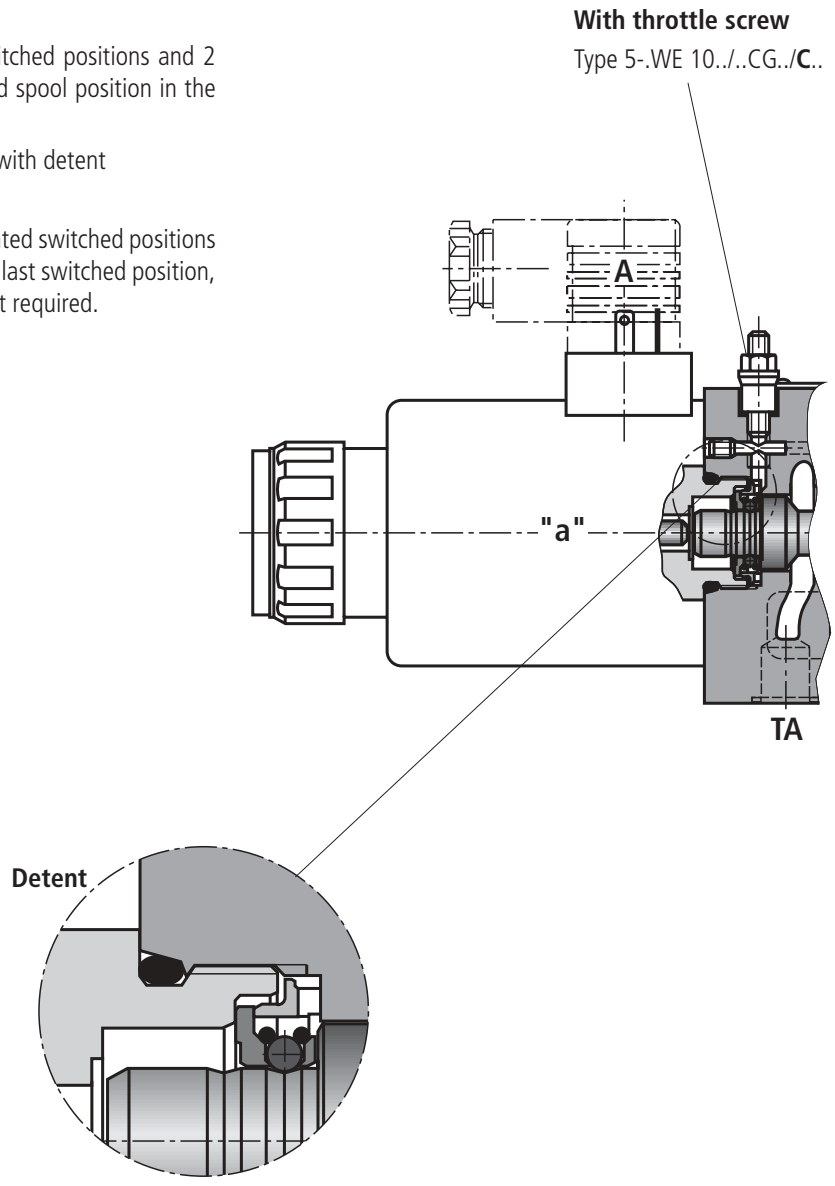
(only possible with symbols A, C and D)

This version is a directional valve with 2 switched positions and 2 solenoids without detent. There is **no** defined spool position in the de-energised condition.

Type 5-.WE 10.3X/OFC... (impulse spool), with detent

(only possible with symbols A, C and D)

This version is a directional valve with 2 detented switched positions and 2 solenoids. Thus, the spool is held in the last switched position, permanent energisation of the solenoid is not required.

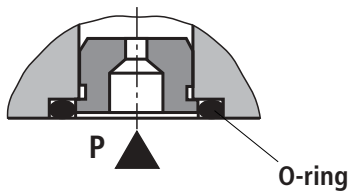


Type 5-.WE 10 E3X/OFC
(impulse spool)

Throttle insert (type 5-.WE 10.3X/.../**B**..)

The use of a throttle insert is required if, due to the operating conditions, flows can occur during the switching process which are larger than the performance limits of the valve allow.

The orifice is to be inserted into the P channel of the directional valve.



Technical data (for applications outside these parameters, please consult us!)

General

Installation			Optional
Ambient temperature range		°C	– 30 to + 50 (with NBR seals)
			– 20 to + 50 (with FKM seals)
Weight	Valve with 1 solenoid	kg	4.7
	Valve with 2 solenoids	kg	6.3

Hydraulic

Maximum operating pressure	Ports A, B, P	bar	315
	Port T	bar	210 With symbols A and B, port T must be used as a drain port, if the operating pressure is higher than the permissible tank pressure.
Maximum flow		L/min	120
flow cross-section	For symbol V	mm^2	11 (A/B → T); 10.3 (P → A/B)
(switched position 0)	For symbol W	mm^2	2.5 (A/B → T)
	For symbol Q	mm^2	5.5 (A/B → T)
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 [1]; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) [1]; HEPG (polyglycols) [2]; HEES (synthetic ester) [2]; Other pressure fluids on request
Pressure fluid temperature range		°C	– 30 to + 80 (with NBR seals)
			– 20 to + 80 (with FKM seals)
Viscosity range		mm^2/s	2.8 to 500
ISO code cleanliness class			Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 20/18/15 [5]

Electrical

Voltage type			DC
Available voltages [3]		V	12, 24, 96, 205
Voltage tolerance (nominal voltage)		%	±10
Power consumption		W	35
Duty			Continuous
Switching time to ISO 6403	ON	ms	45 to 70
(without switching time adjustment)	OFF	ms	35 to 45
Switching frequency		cycles/h	Up to 15000
Protection to DIN 40 050			IP 65 with mounted and fixed plug-in connector
Insulation class VDE 0580			F
Maximum coil temperature [4]		°C	150

[1] Suitable for NBR **and** FKM seals

[2] **Only** suitable for FKM seals

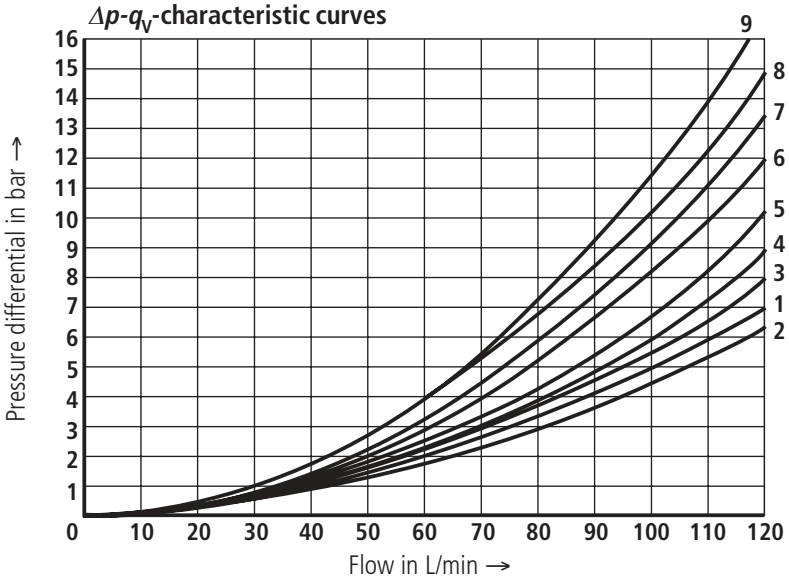
[3] Other voltages on request

[4] Due to the surface temperatures which occur on the solenoid coils, the European standards EN563 and EN982 must be taken into account!

When connecting the electrics, the protective conductor (PE ⏚) must be connected according to the relevant regulations.

[5] The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.
For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50 081.

Characteristic curves (measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C)



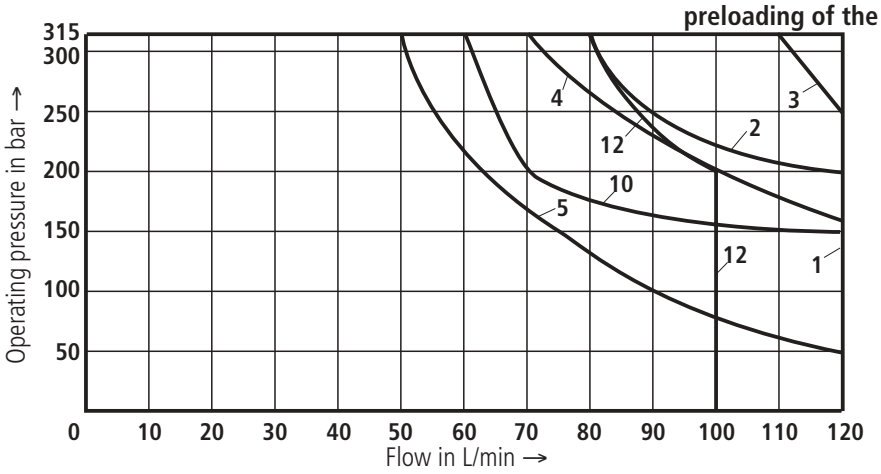
Symbols	Flow direction			
	P – A	P – B	A – T	B – T
A, B	1	1	–	–
C	1	3	1	3
D, Y	2	2	1	3
E	2	2	3	4
F	2	1	4	7
G	4	4	6	8
H	2	2	1	3
J, L	1	1	4	4
M	2	2	3	4
P	2	1	1	7
Q, V	1	1	3	4
R	1	4	3	–
T	4	4	5	7
U	1	1	3	3
W	1	1	3	5
Switch pos.		**B – A**		
R	–	9	–	–
Centre pos.		**B – T**	**A – T**	**P – T**
F	–	–	4	4
G, T	–	–	–	8
P	–	8	–	6

Performance limits: DC (measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C)

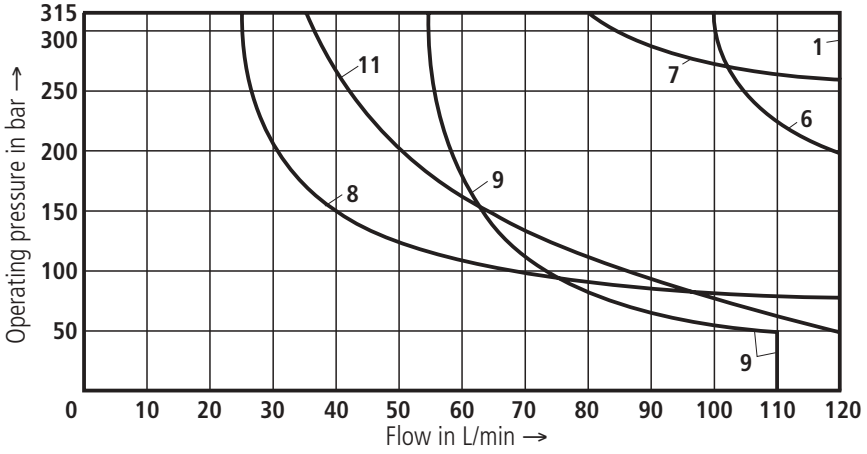
The performance limits shown are valid when the valve is used with two flow directions (e.g. from P to A with simultaneous return flow from B to T).

Due to the flow forces occurring within the valves, the permissible switching performance limits can be significantly lower with only one flow direction (e.g from P to A and with port B blocked)! (For these applications, please consult us.)

The performance limits were determined with the solenoid at operating temperature, 10 % under voltage and with no preloading of the tank.

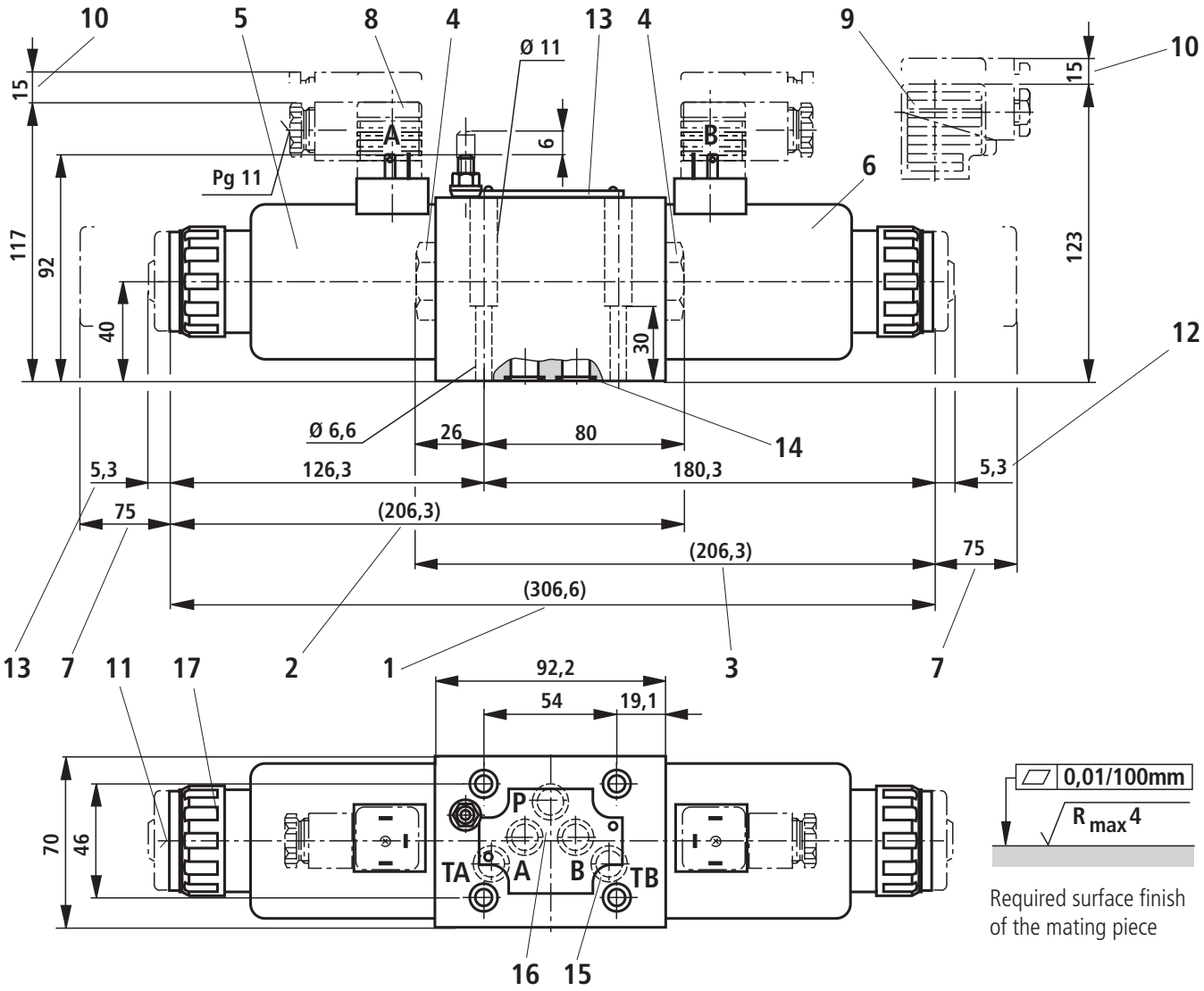


Char. curve	Symbols
With orifice Ø 0.6 mm („A06")	
3	D, Y
12	C
With and **without** orifice	
1	C/O, C/OF, D/O, D/OF, M
2	A/O, A/OF, E, J, L, U, Q, W
4	G
5	F, P
10	H



Char. curve	Symbols
Without orifice	
1	D, Y
6	C
7	R
8	T
9	V
11	A, B

Unit dimensions (dimensions in mm)



Required surface finish of the mating piece

1 3-position valve [1)]

2 2-position valve with 1 solenoid (A, C, D, EA...) [1)]

3 2-position valve with 1 solenoid (B, Y, EB...) [1)]

4 Plug for valve with 1 solenoid

5 Solenoid "a" (plug-in connector colour grey)

6 Solenoid "b" (plug-in connector colour black)

7 Space required to remove the coil

8 Plug-in connector **without** circuitry [2)]

9 Plug-in connector **with** circuitry [2)]

10 Space required to remove the plug-in connector

11 Hand override "N9" (standard) – Operation of the hand override is only possible up to a max. tank pressure of 50 bar – Avoid damage to the hand override pin bore!

12 Dim. for hand override "N"

13 Name plate

14 R-ring (for valve with throttle insert: O-ring)

15 Additional T port (TB) may be optionally used in conjunction with drilled blocks.

16 Porting pattern to DIN 24 340 Form A, ISO 4401 and CETOP–RP 121 H

Subplates G 66/01 (G 3/8), G 67/01 (G 1/2), G 534/01 (G 3/4)

to catalogue sheet RE 45 054 and

Valve fixing screws

M6 x 40 DIN 912-10.9, M_A = 15.5 Nm, must be ordered separately.

17 Tightening torque M_A = 6 + 2 Nm

[1)] Dimension without hand override and with protected hand override "N9"

[2)] Must be ordered separately, see page 3.

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