

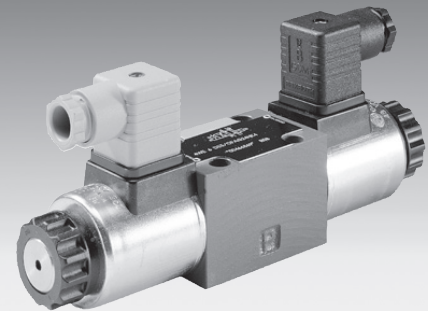
# 4/3, 4/2 and 3/2 directional valves with wet pin DC or AC solenoids

RA 23178/04.04  
Replaces 08.99

1/12

## Model WE 6 ../E

Nominal size 6  
Series 6X  
Maximum operating pressure 350 bar (5100 PSI)  
Maximum flow 80 L/min (21 GPM) – DC  
Maximum flow 60 L/min (16 GPM) – AC



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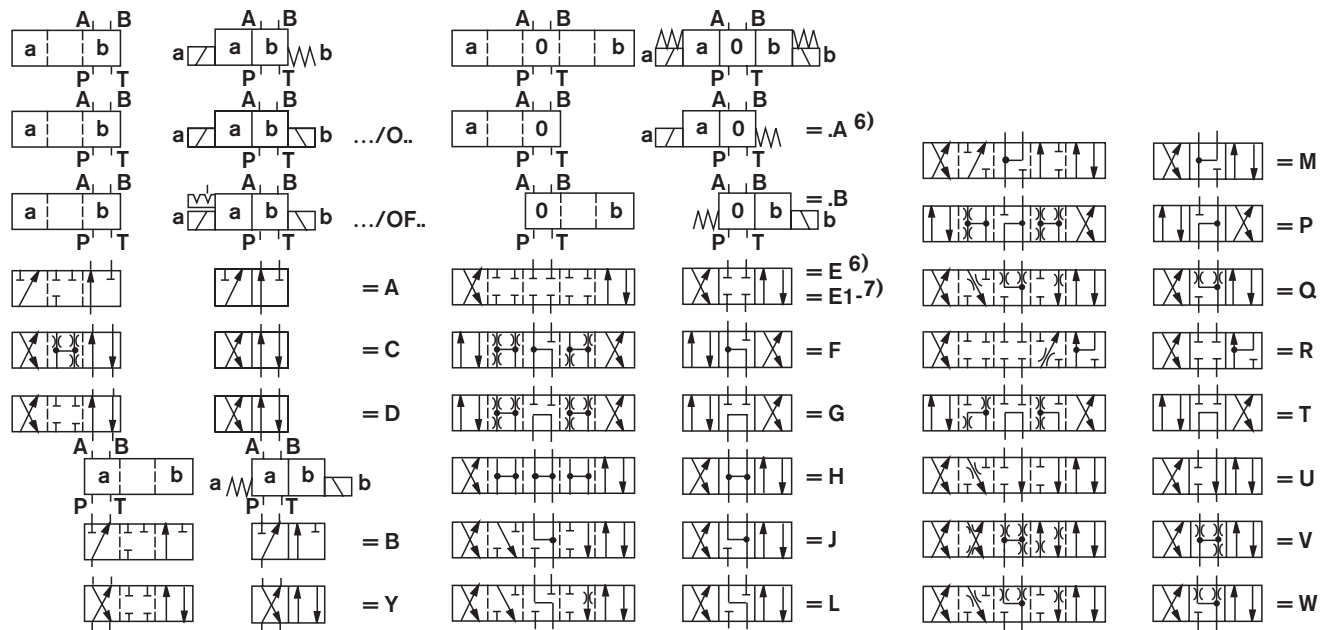
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## Features

- Direct solenoid operated directional spool valve, high performance version
- Porting pattern to DIN 24340 form A, **without** locating pin hole (standard); NFPA T3.5.1 MR1 and ANSI B93.7 D03
- Porting pattern to ISO 4401, **with** locating pin hole, (ordering code ../60 at the end of the valve type code); NFPA T3.5.1 MR1 and ANSI B93.7 D03
- For subplates see catalogue sheet RE 45052 (separate order)
- Wet pin DC or AC solenoids with removable coil
- Solenoid coil can be rotated through 90°
- It is not necessary to open the pressure tight chamber when changing the coil
- Electrical connections either as individual or central connections
- Hand override, optional
- Soft switching version, see RE 23183
- Inductive limit switch (contact or inductive), see RE 24830



### Symbols



6) Example: Spool E with switched position "a" ordering code ..EA..

7) Symbol E1-: P – A/B pre-opening, Attention: Take pressure intensification with differential cylinders into account!

### Standard types

Type	Material number
4WE 6 J6X/EG12N9K4	R900567496
3WE 6 A6X/EG24N9K4	R900561180
3WE 6 B6X/EG24N9K4	R900561270
4WE 6 C6X/EG24N9K4	R900561272
4WE 6 C6X/OFEG24N9K4	R900564107
4WE 6 D6X/EG24N9K4	R900561274
4WE 6 D6X/OFEG24N9K4	R900567512
4WE 6 E6X/EG24N9K4	R900561278
4WE 6 EA6X/EG24N9K4	R900561280
4WE 6 EB6X/EG24N9K4	R900561281
4WE 6 G6X/EG24N9K4	R900561282
4WE 6 H6X/EG24N9K4	R900561286
4WE 6 HA6X/EG24N9K4	R900549534
4WE 6 J6X/EG24N9K4	R900561288
4WE 6 M6X/EG24N9K4	R900577475
4WE 6 Q6X/EG24N9K4	R900561292
4WE 6 R6X/EG24N9K4	R900571012
4WE 6 T6X/EG24N9K4	R900934414
4WE 6 U6X/EG24N9K4	R900572785
4WE 6 W6X/EG24N9K4	R900568233
4WE 6 Y6X/EG24N9K4	R900561276

Type	Material number
4WE 6 D6X/EW110N9K4	R900551704
4WE 6 D6X/OFEW110N9K4	R900552321
4WE 6 E6X/EW110N9K4	R900558641
4WE 6 J6X/EW110N9K4	R900551703
3WE 6 A6X/EW230N9K4	R900915672
4WE 6 C6X/EW230N9K4	R900913132
4WE 6 D6X/EW230N9K4	R900909559
4WE 6 D6X/OFEW230N9K4	R900915095
4WE 6 E6X/EW230N9K4	R900912492
4WE 6 H6X/EW230N9K4	R900912494
4WE 6 J6X/EW230N9K4	R900911762
4WE 6 Y6X/EW230N9K4	R900909415

## Function, section

Type WE directional valves are solenoid operated directional spool valves. They control the start, stop and direction of flow.

Essentially the directional control valves consist of housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).

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

**To guarantee satisfactory operation care should be taken to ensure that the solenoid pressure chamber is filled with oil.**

The force of the solenoids (2) acts via the plunger (5) on the control spool (3) and pushes this from its neutral position into the required end position. This permits flow from P to A and B to T or P to B and A to T.

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

An optional hand override (6), allows movement of the control spool (3) without energising the solenoid.

**Type 4WE 6.. 6X/O...** (only possible for symbols A, C and D)

This version is for directional control valves with two switched positions and two solenoids without detent. There is no definable switched position when the solenoids are de-energised.

**Type 4WE 6.. 6X/OF...** (impulse spool, only for symbols A, C and D)

This version is for directional control valves with two switched positions, two solenoids and a detent. Both switched positions are thus fixed alternately and there is no need to continually energise the solenoid.

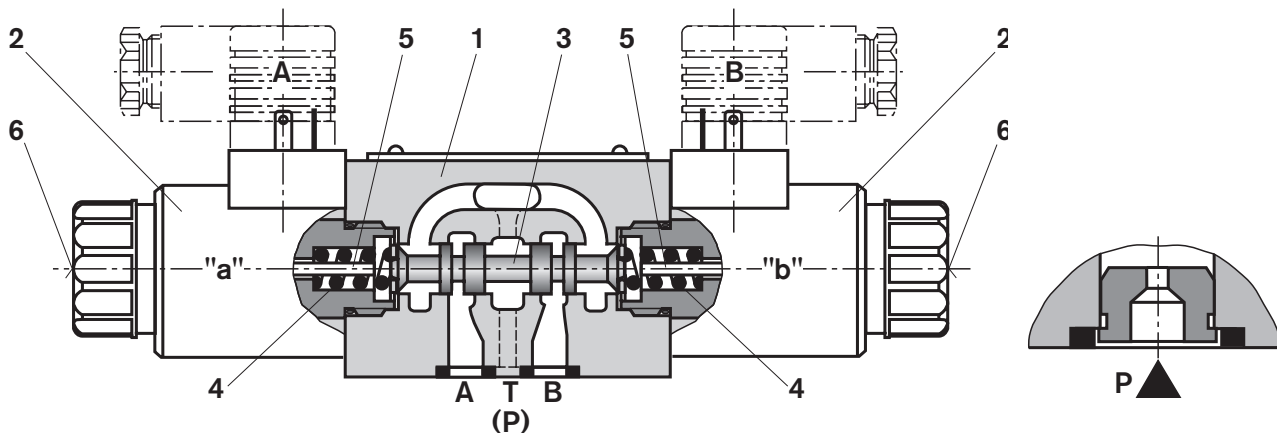
**Note:**

**Pressure peaks in the tank line to two or more valves can, with valves with detents, lead to unintended spool movements! It is therefore, recommended that a separate tank line is used or that a check valve is fitted into the tank line.**

**Cartridge throttle** (type 4WE 6..6X/.../B..)

If, due to particular operating conditions during the switching sequences, flows can occur which are larger than the valve performance curves allow, then it is necessary to fit a cartridge throttle.

This is inserted in the P channel of the directional control valve.



Model 4WE 6 E6X/...E...

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

<b>General</b>			
Installation		Optional	
Ambient temperature		°C (°F)	–30 to +50 (–22 to +122) – NBR seals –20 to +50 (–4 to +122) – FKM seals
Weight	Valve with 1 solenoid	kg (lbs.)	1.45 (3.2)
	Valve with 2 solenoids	kg (lbs.)	1.95 (4.3)
<b>Hydraulic</b>			
Max. operating pressure	Ports A, B, P	bar (PSI)	350 (5100)
	Ports T	bar (PSI)	210 (3050) – DC; 160 (2320) – AC With symbols A and B, port T must be used as a drain port if the operating pressure is above the permitted tank pressure.
Max. flow		L/min (GPM)	80 (21) – DC; 60 (15.8) – AC
Flow cross-section (switched position 0)	For symbol Q	mm <sup>2</sup> (in <sup>2</sup> )	Approx. 6% of the nominal cross-section
	For symbol W	mm <sup>2</sup> (in <sup>2</sup> )	Approx. 3% of the nominal cross-section
Pressure fluid		Mineral oil (HL, HLP) to DIN 51524 <sup>1)</sup> ; Fast bio-degradable pressure fluids to VDMA 24568 (also see RE 90221); HETG (rape seed oil) <sup>1)</sup> ; HEPG (polyglycols) <sup>2)</sup> ; HEES (synthetic ester) <sup>2)</sup> ; Other pressure fluids on request	
Pressure fluid temperature range		°C (°F)	–30 to +80 (–22 to +176) – NBR seals –20 to +80 (–4 to +176) – FKM seals
Viscosity range		mm <sup>2</sup> /s (SUS)	2.8 to 500 (35 to 2320)
ISO code cleanliness class		Maximum permissible degree of contamination of fluid to ISO 4406 (c) class 20/18/15 <sup>3)</sup>	
<b>Electrical</b>			
Voltage type		DC	AC 50/60 Hz
Available voltages <sup>4)</sup> (for ordering details of AC solenoids see below)		V	12, 24, 96, 205
Voltage tolerance (nominal voltage)		%	± 10
Power consumption		W	30
Holding power		VA	–
Switch-on power		VA	220
Duty		Continuous	
Switching time to ISO 6403	ON	ms	25 to 45
	OFF	ms	10 to 2
Switching frequencies		Cycles/h	UP to 15000
Protection to DIN EN 60529 <sup>5)</sup>		IP 65	
Max. coil temperature <sup>6)</sup>		°C (°F)	150 (302)

<sup>1)</sup> Suitable for NBR and FKM seals

<sup>2)</sup> Only suitable for FKM seals

<sup>3)</sup> Adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, increases the service life of components.

For the selection of filters, see data sheets: RE 50070, RE 50076 and RE 50081.

<sup>4)</sup> Other voltages on request

<sup>5)</sup> With fitted and locked plug-in connector

<sup>6)</sup> Due to the occurring surface temperatures of the solenoid coils, the European standards EN563 and EN982 must be taken into account!

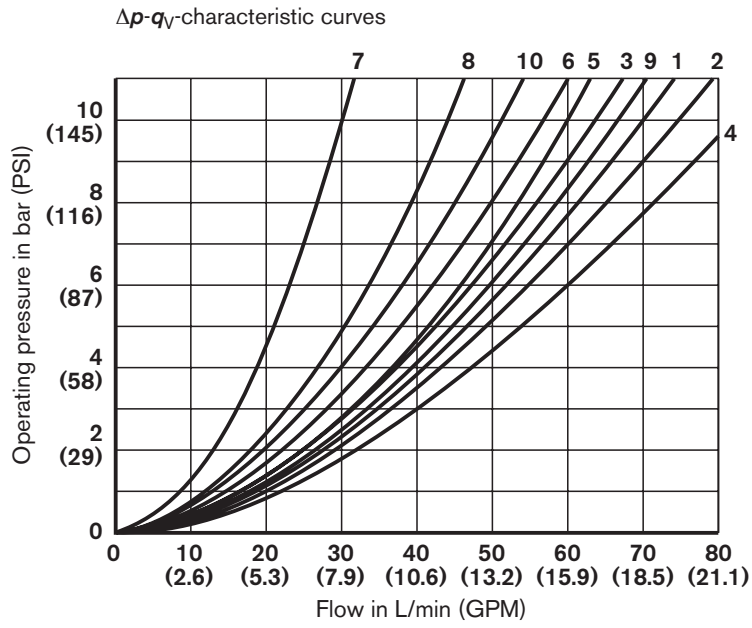
**Note:**

**AC solenoids** may be used for 2 or 3 types of supply; e.g. solenoid type **W110** for: 110 V, 50 Hz; 110 V, 60 Hz; 120 V, 60 Hz

Ordering details	
<b>W110</b>	110 V, 50 Hz 110 V, 60 Hz 120 V, 60 Hz
<b>W230</b>	230 V, 50 Hz 230 V, 60 Hz

With electrical connections the protective conductor (PE  $\frac{1}{2}$ ) must be connected according to the relevant regulations.

**Characteristic curves** – measured with HLP46,  $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$  (104 °F  $\pm$  41 °F)



- 7 Symbol "R" in switched position B – A
- 8 Symbol "G" and "T" in mid position P – T
- 9 Symbol "H" in mid position P – T

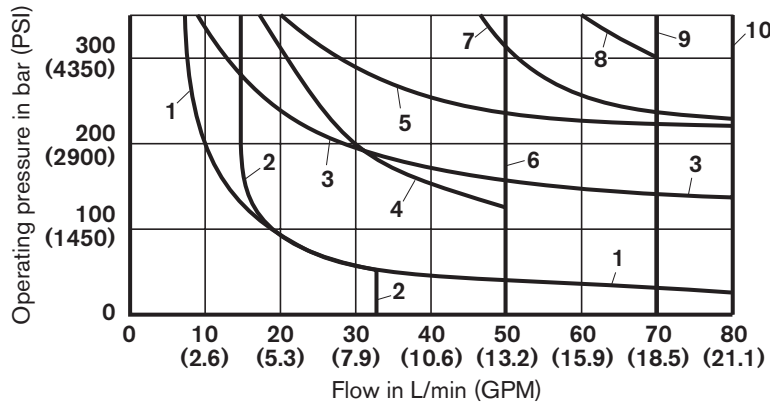
Symbols	Flow direction			
	P – A	P – B	A – T	B – T
A; B	3	3	–	–
C	1	1	3	1
D; Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J; Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	–
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

**Performance limits** – measured with HLP46,  $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$  (104 °F  $\pm$  41°F)

**⚠ Attention!**

The given switching power limits are for applications with two flow directions (e.g. from P to A and simultaneous return flow from B to T). Due to the flow forces active within the valves the permissible switching power limit may be significantly less if there is only one direction of flow (e.g. from P to A and port B blocked)! (Please consult us for applications of this kind.)

The switching power limits were measured with the solenoids at operating temperature, 10% under voltage and without tank back pressure.



DC solenoid	
Characteristic curve	Solenoid voltage
1 to 10	12; 24; 48; 96; 125; 205 V

(for other voltages, see pages 9)

DC solenoid	
Characteristic curve	Symbol
1	A; B <sup>1)</sup>
2	V
3	A; B
4	F; P
5	J
6	G; H; T
7	A/O; A/OF; L; U
8	C; D; Y
9	M
10	E; E1- <sup>2)</sup> ; R <sup>3)</sup> ; C/O; C/OF; D/O; D/OF; Q; W

<sup>1)</sup> With hand override

<sup>2)</sup> P – A/B pre-opening

<sup>3)</sup> Return flow from actuator to tank

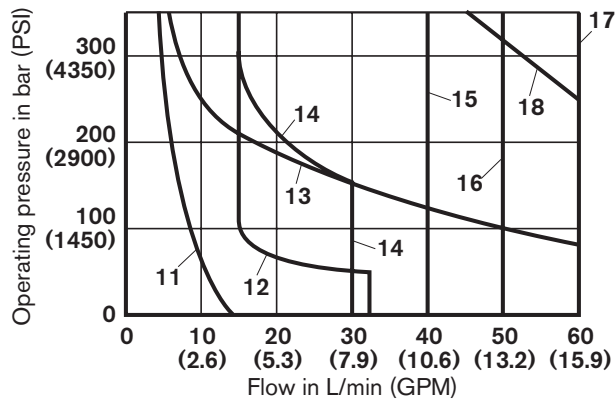
**Performance limits** – measured with HLP46,  $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$  (104 °F  $\pm$  41 °F)

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Due to the flow forces active within the valves the permissible switching power limit may be significantly less if there is only one direction of flow (e.g. from P to A and port B blocked)! (Please consult us for applications of this kind.)

The switching power limits were measured with the solenoids at operating temperature, 10% under voltage and without tank back pressure.



AC solenoid – 50 Hz	
Characteristic curve	Symbol
11	A; B1)
12	V
13	A; B
14	F; P
15	G; T
16	H
17	A/O; A/OF; C/O; C/OF D/O; D/OF; E; E1-2); J; L; M; Q; R3); U; W
18	C; D; Y

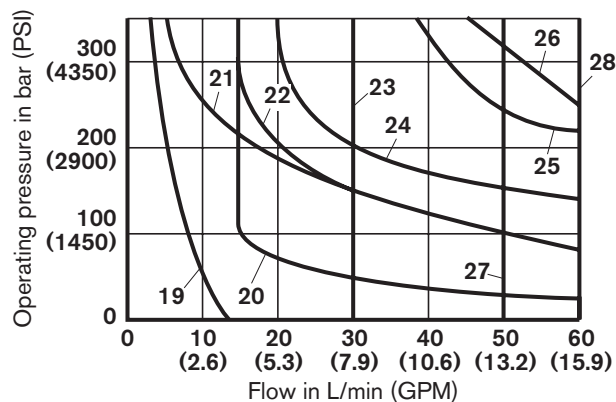
AC solenoid		
Characteristic curve	Solenoid voltage	
11 to 18	W110	110 V; 50 Hz
		120 V; 60 Hz
	W230	230 V; 50 Hz

<sup>1)</sup> With hand override

<sup>2)</sup> P – A/B pre-opening

<sup>3)</sup> Return flow from actuator to tank

(other voltages on request)



AC solenoid – 60 Hz	
Characteristic curve	Symbol
19	A; B <sup>1)</sup>
20	V
21	A; B
22	F; P
23	G; T
24	J; L; U
25	A/O; A/OF; Q; W
26	C; D; Y
27	H
28	C/O; C/OF; D/O; D/OF; E E1-2); M; R <sup>3)</sup>

AC solenoid		
Characteristic curve	Solenoid voltage	
19 to 28	W110	110 V; 60 Hz
	W230	230 V; 60 Hz

<sup>1)</sup> With hand override

<sup>2)</sup> P – A/B pre-opening

<sup>3)</sup> Return flow from actuator to tank

(other voltages on request)

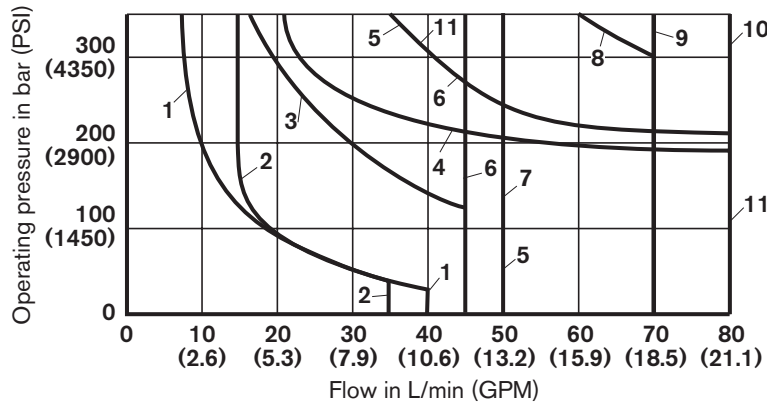


**Performance limits** – measured with HLP46,  $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$  (104 °F  $\pm$  41 °F)

**⚠ Attention!**

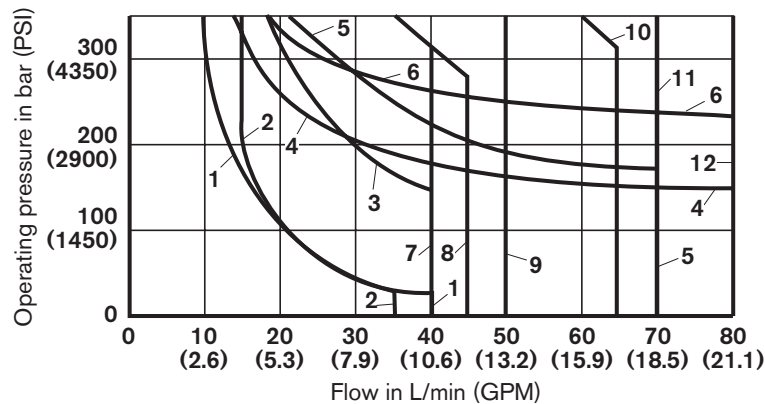
The given switching power limits are for applications with two flow directions (e.g. from P to A and simultaneous return flow from B to T). Due to the flow forces active within the valves the permissible switching power limit may be significantly less if there is only one direction of flow (e.g. from P to A and port B blocked)! (Please consult us for applications of this kind.)

The switching power limits were measured with the solenoids at operating temperature, 10% under voltage and without tank back pressure.



DC solenoid	
Characteristic curve	Solenoid voltage
1 to 11	110; 180 V

DC solenoid	
Characteristic curve	Symbol
1	A; B
2	V
3	F; P
4	J; L; U
5	G
6	T
7	H
8	D; C
9	M
10	C/O; C/OF; D/O; D/OF; E; E1-; R, Q; W
11	A/O; A/OF

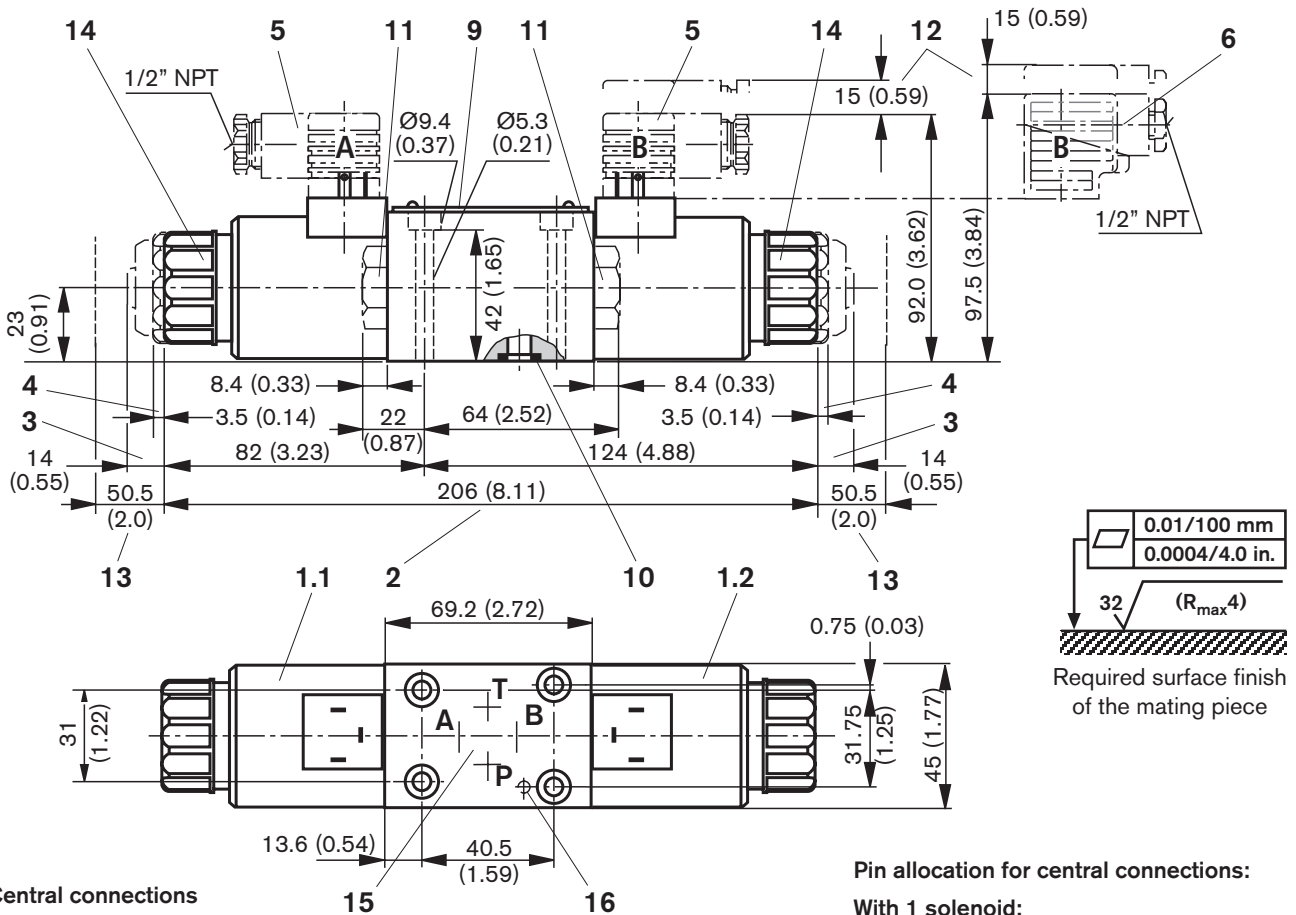


DC solenoid	
Characteristic curve	Solenoid voltage
1 to 12	42; 80; 220 V

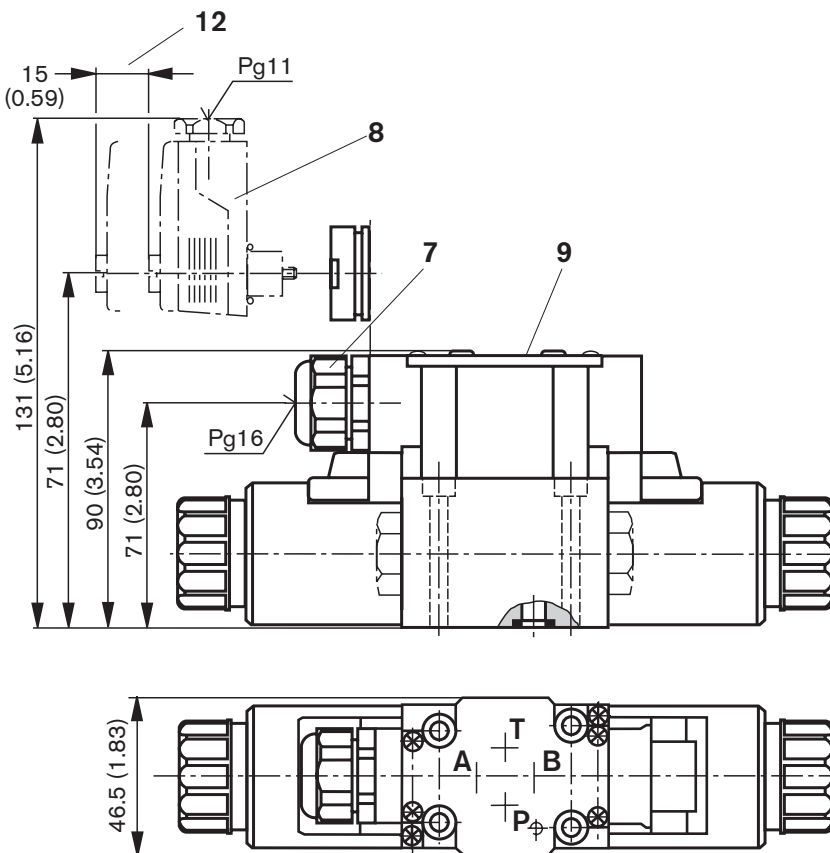
DC solenoid	
Characteristic curve	Symbol
1	A; B
2	V
3	F; P
4	J; L; U
5	A/O; A/OF
6	E
7	T
8	G
9	H
10	D; C
11	M
12	C/O; C/OF; D/O; D/OF; E1-; R, Q; W

**Unit dimensions:** valve with a DC solenoid – dimensions in millimeters (inches)

**Individual connections**



**Central connections**



**Pin allocation for central connections:**

**With 1 solenoid:**

Solenoid always to terminals 1 and 2 Earth to terminal  $\oplus$  PE

**With 2 solenoids:**

Solenoid "a" to terminals 1 and 2  
 solenoid "b" to terminals 3 and 4  
 Earth to terminal  $\oplus$  PE

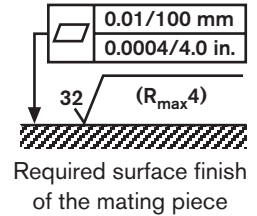
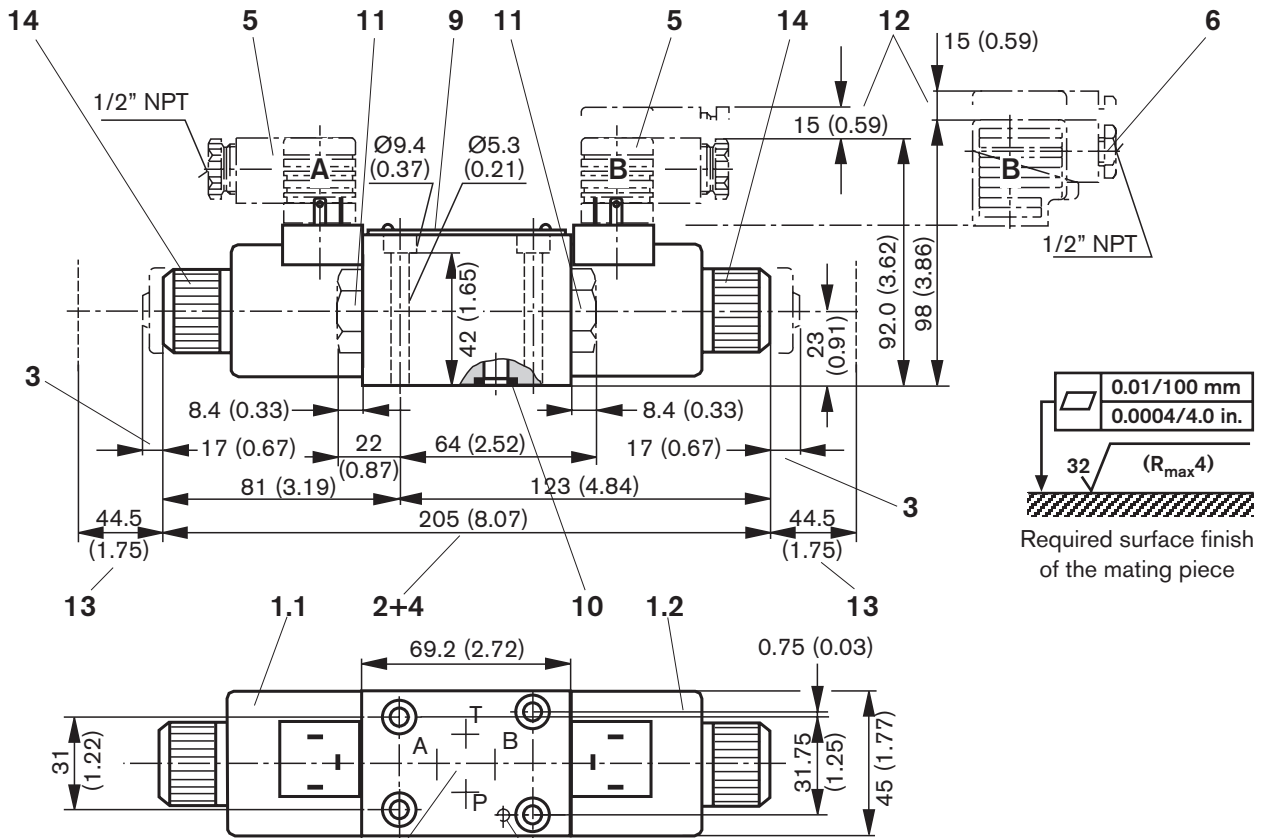
- 1.1 Solenoid "a"  
(plug-in connector color grey)
- 1.2 Solenoid "b"  
(plug-in connector color black)
- 2 Dim. for solenoid **with protected** hand override "N9" (standard) – The hand override can only be actuated up to a tank pressure of approx. 50 bar (725 PSI).  
 Avoid damage to hand override pin bore!
- 3 Dim. for solenoid **with** hand override "N"
- 4 Dim. for solenoid **without** hand override
- 5 Plug-in connector **without** circuitry <sup>1)</sup>
- 6 Plug-in connector **with** circuitry <sup>1)</sup>

<sup>1)</sup> Must be ordered separately, see page 4

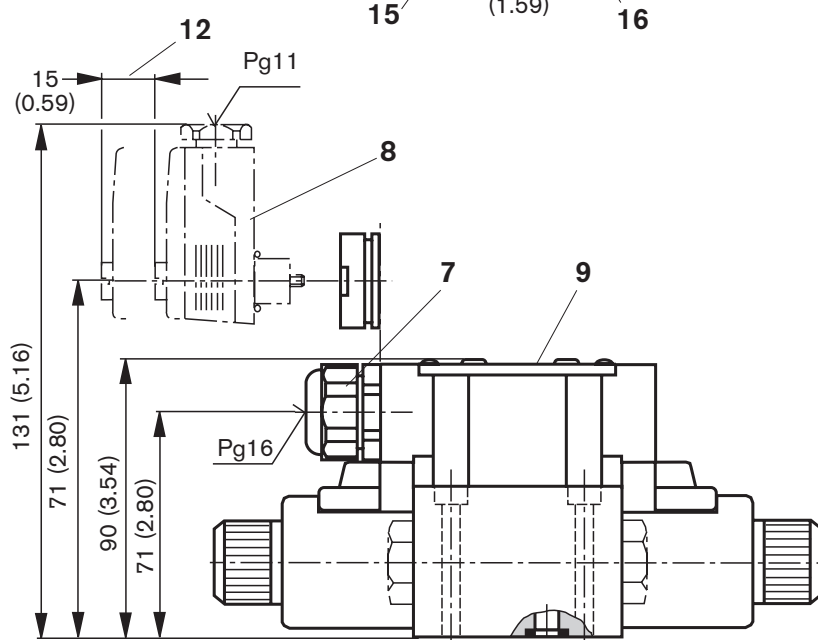
Item no. explanation continued on page 11

**Unit dimensions:** valve with a AC solenoid – dimension in millimeters (inches)

**Individual connections**



**Central connections**



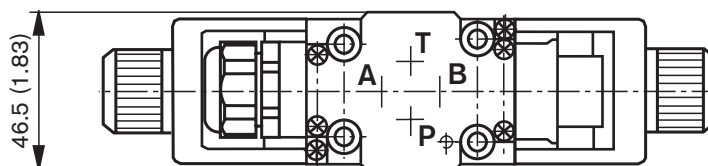
- 7 Cable glande Pg 16 "DL"
- 8 Angled plug (color red, must be ordered separately, Material No. **R900005538**)
- 9 Name plate
- 10 Same sealing rings for ports A, B, P, T
- 11 Plug for valves with one solenoid
- 12 Space required to remove the plug-in connector
- 13 Space required to remove the coil
- 14 Securing nut, tightening torque  $M_A = 4 \text{ Nm}$  (2.95 lb-ft)
- 15 Porting pattern to DIN 24340 form A, **without** locating pin hole
- 16 Porting pattern to ISO 4401 **with** locating pin hole

**Subplates**

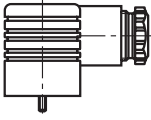
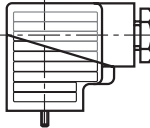
(without locating pin hole)	G 341/01/(12), G 1/4 (SAE-4; 7/16-20)
	G 342/01/(12), G 3/8 (SAE-6; 9/16-18)
	G 502/01/(12), G 1/2 (SAE-8; 3/4-16)
(with locating pin hole)	G 341/60, G 1/4
	G 342/60, G 3/8
	G 502/60, G 1/2

to catalog sheet RE 45052 and

**Valve fixing screws**  
4 screws DIN EN ISO 4762 – M5 x 50 - 10.9 (10 -24 UNC x 2");  
Surface coating to DIN EN ISO 10683 afIZn - 240h - L (friction value 0.09–0.14 to VDA 235-102) must be ordered separately.  
 $M_A = 7 \text{ Nm}$  (5.16 lb-ft), tighten using a torque wrench with an accuracy of  $\pm 10 \%$ .  
**Note:** The tightening torque relates to the maximum operating pressure.



## Plug-in connectors to DIN EN 175 301-803 for component plug "K4"

For further plug-in connectors see RE 08006					
Material No.					
Valve side	Color	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	<b>R901017010</b>	—	—	—
b	black	<b>R901017011</b>	—	—	—
a/b	black	—	<b>R901017022</b>	<b>R901017025</b>	<b>R901017026</b>

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