

**RE 23 178/09.99**

Replaces: 08.96



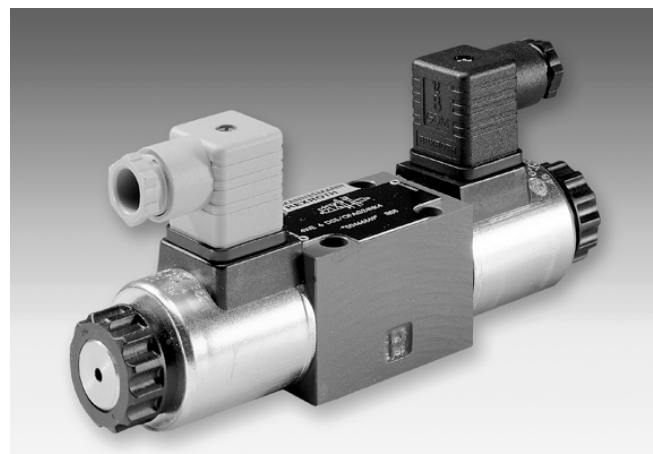
## 4/3, 4/2 and 3/2 directional valves with wet pin DC or AC solenoids, Type WE 6 ../E

Nominal size 6

Series 6X

Maximum operating pressure 350 bar

Maximum flow 80 L/min



HAD5909

Type 4WE 6 E6X/EG24N9K4 with plug-in connector

### Overview of contents

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### Features

– Direct solenoid actuated directional spool valve high performance version	
– Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H, For subplates see catalogue sheet RE 45 052 (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 23 183	
– Inductive limit switch (contact or inductive), see RE 24 830	

### Ordering details

	2	3	4	6	7	9	10	11	12	15	19	22	23
		WE	6		6X		E						*
3 service ports	= 3												
4 service ports	= 4												
Nominal size 6	= 6												
Symbol e.g. C, E, EA, EB etc. for possible designs see below													
Series 60 to 69 (60 to 69: unchanged installation and connection dimensions)	= 6X												
Spring return	= No code												
Without spring return	= 0												
Without spring return but with detent	= OF												
High power solenoid	= E												
Wet pin (oil immersed) with removable coil													
24 V DC	= G24												
230 V AC 50/60 Hz	= W230												
205 V DC	= G205 <sup>2)</sup>												
For the ordering details of other voltages and frequencies see page 4													
With protected hand override (standard)	= N9												
With hand override	= N												
Without hand override	= No code												

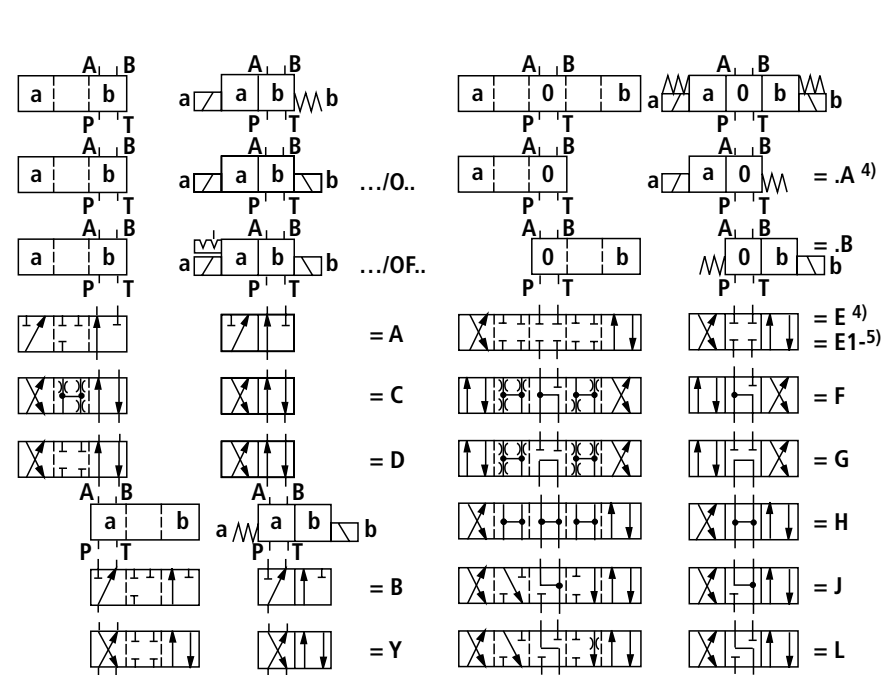
AC supply voltage (permissible voltage tolerance ± 10%)	Nominal voltage of DC solenoids when used with an AC supply	Ordering details
110 V - 50/60 Hz	96 V	G96
230 V - 50/60 Hz	205 V	G205

**Preferred types, see page 6, are readily available!**

Further details in clear text	
No code =	NBR seals
V =	FKM seals (other seals on request)
<b>⚠ Attention!</b>	
The compatibility of the seals and pressure fluid has to be taken into account!	
No code =	Without cartridge throttle
B08 =	Throttle Ø 0.8 mm
B10 =	Throttle Ø 1.0 mm
B12 =	Throttle Ø 1.2 mm
Used where the flow is > than the performance limit of valve, active in the P line	
<b>Electrical connections</b>	
<b>Individual connections</b>	
K4 <sup>1)</sup> =	Individual connection; with component plug DIN 43 650-AM2, without plug-in connector
<b>Central connections</b>	
DL =	Terminal box with cable connector, with indicator light
DKL <sup>3)</sup> =	Central connection on cover with indicator light (without angled plug-in connector)

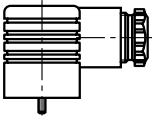
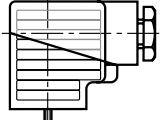
- 1) Plug-in connectors must be ordered separately (see page 3).
- 2) When connecting to an AC supply a DC solenoid **must** be used which is controlled via a rectifier (see table left).  
With an individual connection a large plug-in connector with built-in rectifier can be used (separate order, see page 3).
- 3) Angled plug-in connector (Material no. 00005538) must be ordered separately.

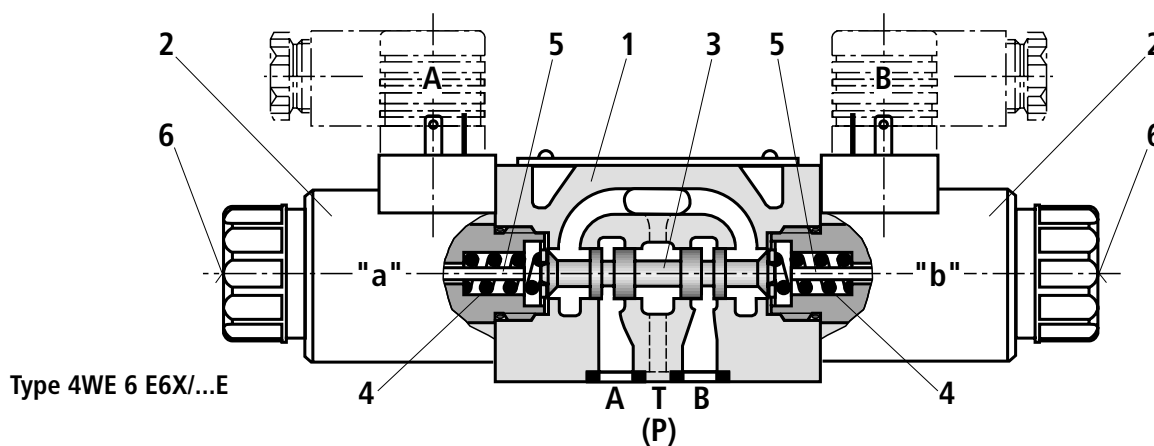
### Symbols



- 4) **Example:** Spool E with switching position "a" ordering details..EA..
- 5) Symbol E1-: P – A/B pre-opening  
**Attention: Regarding pressure intensification with differential cylinders!**

**Ordering details:** plug-in connectors to DIN 43 650 A and ISO 4400 for component plug "K4"

For further plug-in connectors see RE 08 006					
		<b>Material no.</b>			
<b>Valve side</b>	<b>Colour</b>	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>00074683</b>	–	–	–
b	black	<b>00074684</b>	–	–	–
a/b	black	–	<b>00057292</b>	<b>00313933</b>	<b>00310995</b>

**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 actuated 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 to the required end position. This gives free-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 design is for directional control valves with 2 switched positions and 2 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 design is for directional control valves with 2 switched positions, 2 solenoids and a detent. Both switched positions are thus fixed alternately and there is no need to continually energise the solenoid.

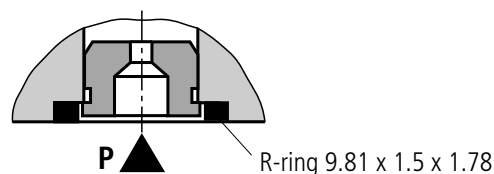
**Note:**

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

**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 will be necessary to fit a cartridge throttle.

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



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

Installation			optional
Max. ambient temperature	°C		50
Weight	Valve with 1 solenoid	kg	1.45
	Valve with 2 solenoids	kg	1.95

**Hydraulic**

Max. operating pressure	Ports A, B, P	bar	350
	Port T	bar	210 (=) ; 160 (~) 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	80 (=); 60 (~)
Flow cross-section (switched position 0):	For symbol Q	mm <sup>2</sup>	approx. 6 % of the nominal cross-section
	For symbol W	mm <sup>2</sup>	approx. 3 % of the nominal cross-section
Pressure fluid	mineral oil (HL, HLP) to DIN 51 524 <sup>1)</sup> ; fast bio degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) <sup>1)</sup> ; HEPG (polyglycol) <sup>2)</sup> ; HEES (synthetic ester) <sup>2)</sup> ; other pressure fluids on request		
Pressure fluid temperature range			– 30 to + 80 (NBR seals)
			– 20 to + 80 (FKM seals)
Viscosity range		mm <sup>2</sup> /s	2.8 to 500
Degree of contamination	maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$ .		

**Electrical**

Voltage type			DC	AC 50/60 Hz
Available voltages <sup>3)</sup> (for ordering details of AC solenoids see below)	V		12, 24, 96, 205	110, 230
Voltage tolerance (nominal voltage)	%		±10	
Power consumption	W		30	–
Holding power	VA		–	50
Switch-on power	VA		–	220
Duty			continuous	continuous
Switching time to ISO 6403	ON	ms	25 to 45	10 to 20
	OFF	ms	10 to 25	15 to 40
Switching frequency		cycles/h	up to 15000	up to 7200
Protection to DIN 40 050			IP 65	IP 65
Max. coil temperature <sup>4)</sup>	°C		150	180

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

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

<sup>3)</sup> Special voltages on request

<sup>4)</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.**

**Performance limits** (measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $\vartheta = 50 \text{ }^\circ\text{C}$ )

**⚠ Attention!**

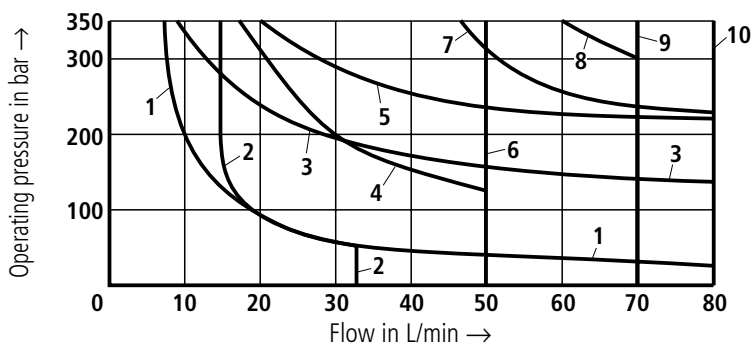
The given switching power limits are for applications with two flow directions (e. g. from P to A and simultaneous return flow from B to T).

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.**

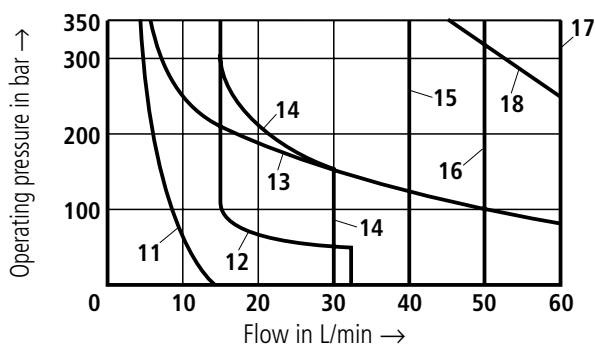
DC solenoid		AC solenoid – 50 Hz		AC solenoid – 60 Hz	
Char. curve	Symbol	Char. curve	Symbol	Char. curve	Symbol
1	A, B <sup>1)</sup>	11	A, B <sup>1)</sup>	19	A, B <sup>1)</sup>
2	V	12	V	20	V
3	A, B	13	A, B	21	A, B
4	F, P	14	F, P	22	F, P
5	J	15	G, T	23	G, T
6	G, H, T	16	H	24	J, L, U
7	A/O, A/OF, L, U	17	A/O, A/OF, C/O, C/OF	25	A/O, A/OF, Q, W
8	C, D, Y		D/O, D/OF, E, E1– <sup>2)</sup> , J, L	26	C, D, Y
9	M		M, Q, R <sup>3)</sup> , U, W	27	H
10	E, E1– <sup>2)</sup> , R <sup>3)</sup> , C/O, C/OF D/O, D/OF, Q, W	18	C, D, Y	28	C/O, C/OF, D/O, D/OF, E, E1– <sup>2)</sup> , M, R <sup>3)</sup>



- 1) With hand override
- 2) P – A/B pre-opening
- 3) Return flow from actuator to tank

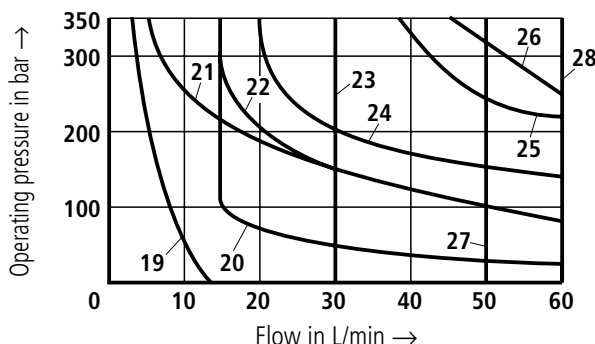
DC solenoid	
Char. curve	Solenoid voltage
1 to 10	12, 24, 96, 205 V

(other voltages on request)



AC solenoid		
Char. curve	Solenoid voltage	
11 to 18	W110	110 V, 50 Hz
		120 V, 60 Hz
	W230	230 V, 50 Hz

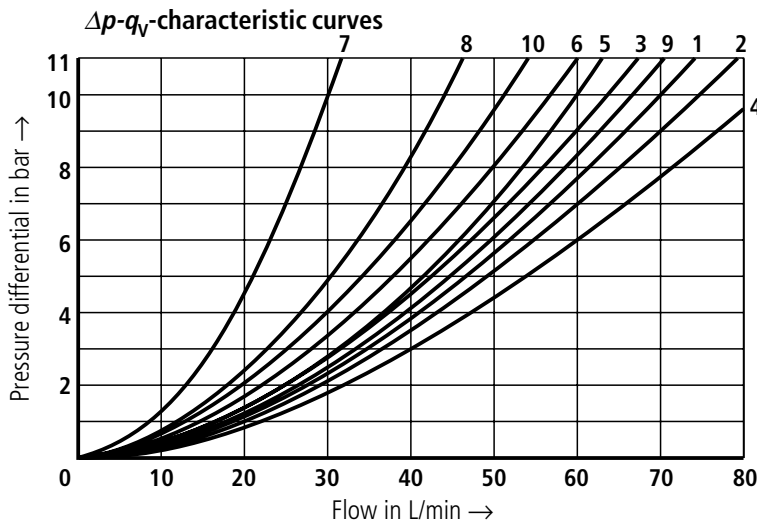
(other voltages on request)



AC solenoid		
Char. curve	Solenoid voltage	
19 to 28	W110	110 V, 60 Hz
		230 V, 60 Hz
	W230	230 V, 60 Hz

(other voltages on request)

**Characteristic curves** (measured at  $v = 41 \text{ mm}^2/\text{s}$  and  $\vartheta = 50 \text{ }^\circ\text{C}$ )



- 7 Symbol "R" in switched position A – B
- 8 Symbols "G" and "T" 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

**Preferred types** (readily available)

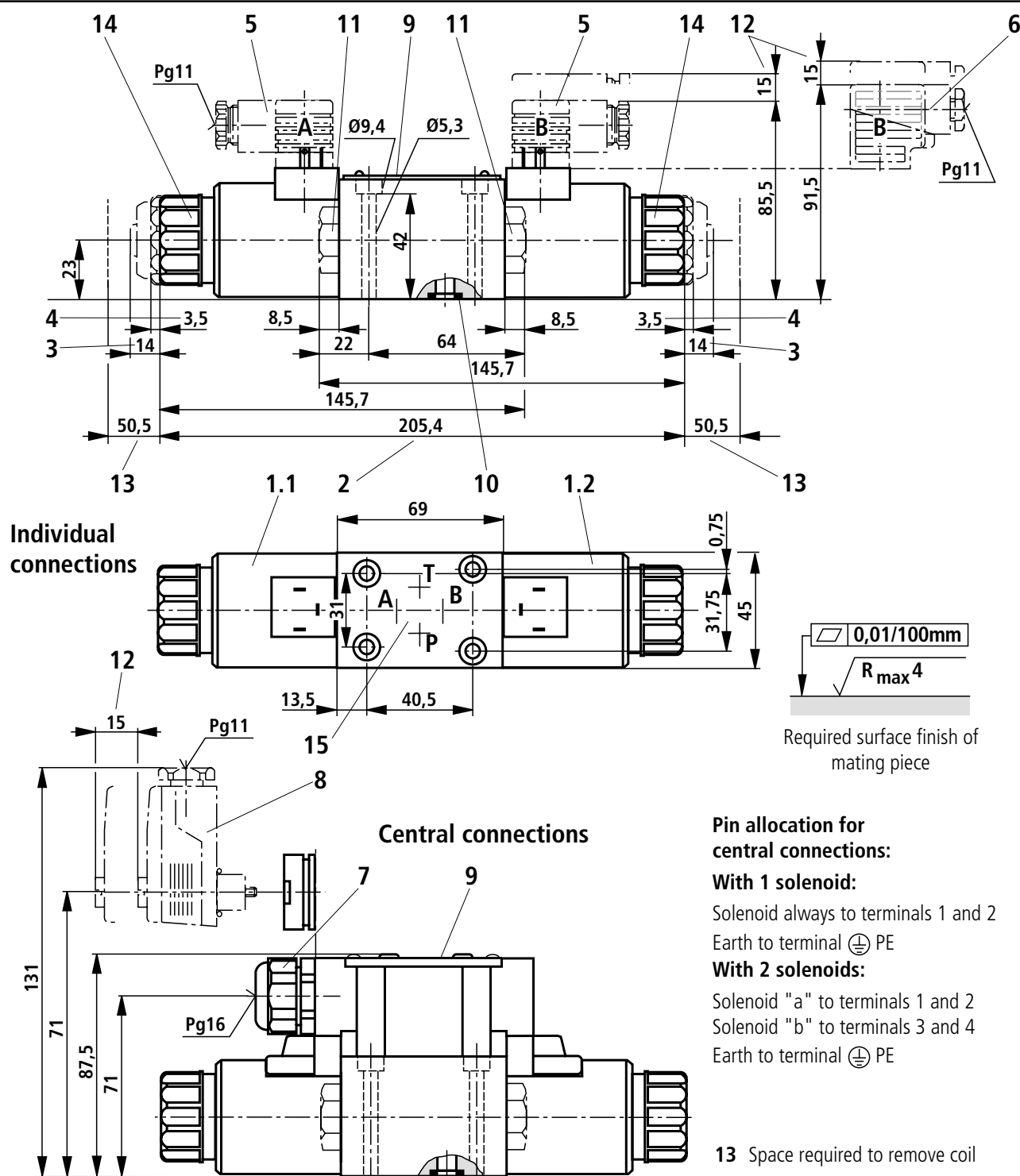
Type	Material number
4WE 6 J6X/EG12N9K4	00567496
3WE 6 A6X/EG24N9K4	00561180
3WE 6 B6X/EG24N9K4	00561270
4WE 6 C6X/EG24N9K4	00561272
4WE 6 C6X/OFEG24N9K4	00564107
4WE 6 D6X/EG24N9K4	00561274
4WE 6 D6X/OFEG24N9K4	00567512
4WE 6 E6X/EG24N9K4	00561278
4WE 6 G6X/EG24N9K4	00561282
4WE 6 H6X/EG24N9K4	00561286
4WE 6 HA6X/EG24N9K4	00549534
4WE 6 J6X/EG24N9K4	00561288
4WE 6 M6X/EG24N9K4	00577475
4WE 6 Q6X/EG24N9K4	00561292
4WE 6 R6X/EG24N9K4	00571012
4WE 6 T6X/EG24N9K4	00934414
4WE 6 U6X/EG24N9K4	00572785
4WE 6 W6X/EG24N9K4	00568233
4WE 6 Y6X/EG24N9K4	00561276

Type	Material number
4WE 6 D6X/EW110N9K4	00551704
4WE 6 D6X/OFEW110N9K4	00552321
4WE 6 E6X/EW110N9K4	00558641
4WE 6 J6X/EW110N9K4	00551703
4WE 6 A6X/EW230N9K4	00915672
4WE 6 B6X/EW230N9K4	00915674
4WE 6 C6X/EW230N9K4	00913132
4WE 6 D6X/EW230N9K4	00909559
4WE 6 D6X/OFEW230N9K4	00915095
4WE 6 E6X/EW230N9K4	00912492
4WE 6 G6X/EW230N9K4	00912493
4WE 6 H6X/EW230N9K4	00912494
4WE 6 HA6X/EW230N9K4	00912495
4WE 6 J6X/EW230N9K4	00911762
4WE 6 Y6X/EW230N9K4	00909415

Preferred types and standard components are shown in the EPS price list (RDE 00 165).

## Unit dimensions: valve with DC solenoid

(Dimensions in mm)

**Pin allocation for central connections:****With 1 solenoid:**

Solenoid always to terminals 1 and 2  
Earth to terminal ⊕ PE

**With 2 solenoids:**

Solenoid "a" to terminals 1 and 2  
Solenoid "b" to terminals 3 and 4  
Earth to terminal ⊕ PE

- 1.1** Solenoid "a" (plug-in connector colour grey)
- 1.2** Solenoid "b" (plug-in connector colour 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  
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 to DIN 43 650 <sup>1)</sup>
- 6** Plug-in connector **with** circuitry to DIN 43 650 <sup>1)</sup>
- 7** Cable gland Pg 16 "DL"
- 8** Angled plug (colour red, must be ordered separately, Material no. 00005538)
- 9** Name plate
- 10** R-ring 9.81 x 1.5 x 1.78
- 11** Plug for valves with one solenoid
- 12** Space required to remove plug-in connector

**13** Space required to remove coil**14** Securing nut, tightening torque  $M_A = 4 \text{ Nm}$ **15** Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H

**Subplates** G 341/01 (G 1/4)  
G 342/01 (G 3/8)  
G 502/01 (G 1/2)

to catalogue sheet RE 45 052 and

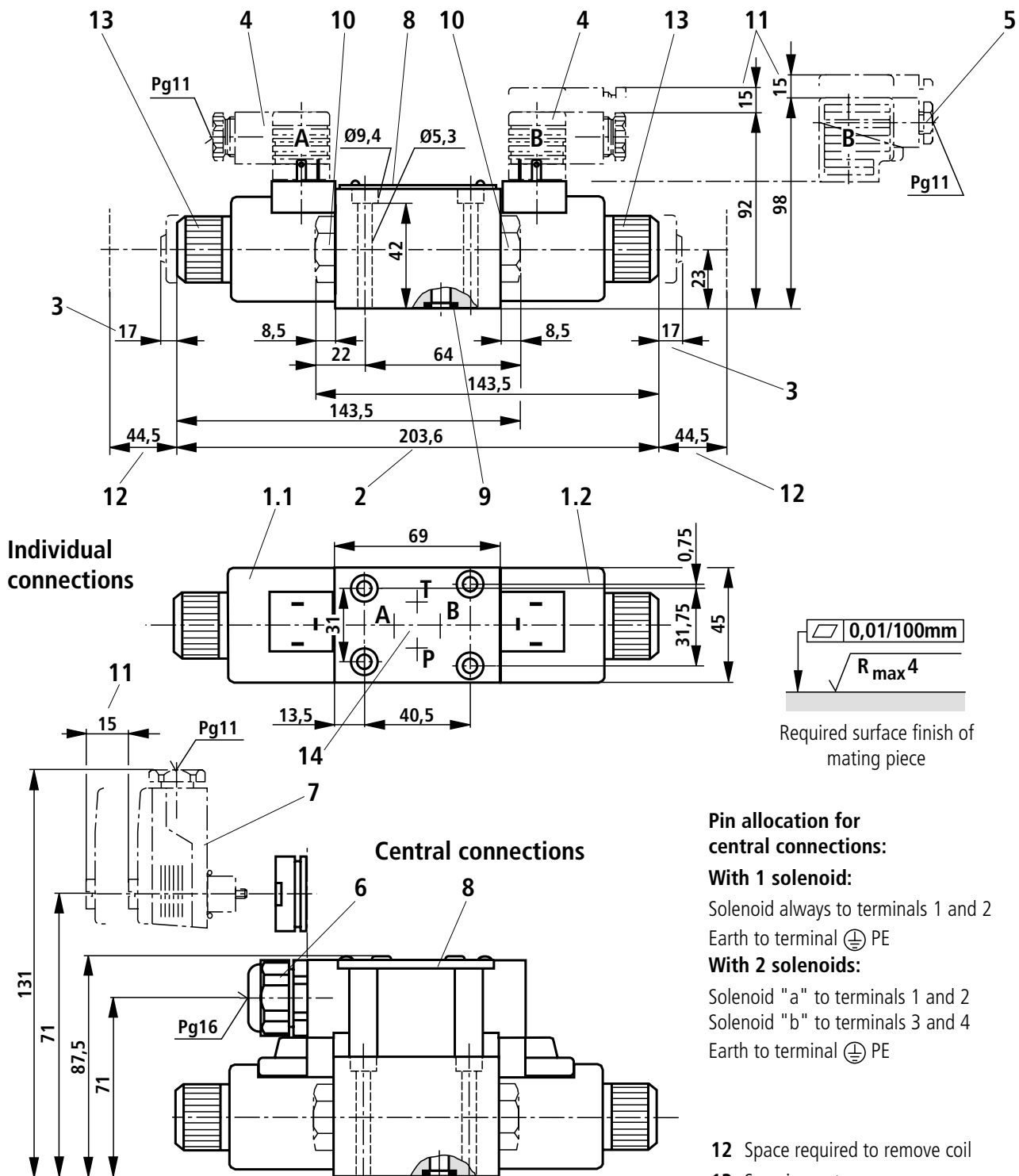
**Valve fixing screws**

M5 x 50 DIN 912-10.9,  $M_A = 8.9 \text{ Nm}$ , must be ordered separately.

<sup>1)</sup> Must be ordered separately, see page 3.

**Unit dimensions:** valve with AC solenoid

(Dimensions in mm)



**Pin allocation for central connections:**

**With 1 solenoid:**

Solenoid always to terminals 1 and 2  
Earth to terminal ⊕ PE

**With 2 solenoids:**

Solenoid "a" to terminals 1 and 2  
Solenoid "b" to terminals 3 and 4  
Earth to terminal ⊕ PE

**12** Space required to remove coil

**13** Securing nut, tightening torque  $M_A = 4 \text{ Nm}$

**14** Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H

**Subplates** G 341/01 (G 1/4)  
G 342/01 (G 3/8)  
G 502/01 (G 1/2)

to catalogue sheet RE 45 052 and

**Valve fixing screws**

M5 x 50 DIN 912-10.9,  $M_A = 8.9 \text{ Nm}$ , must be ordered separately.

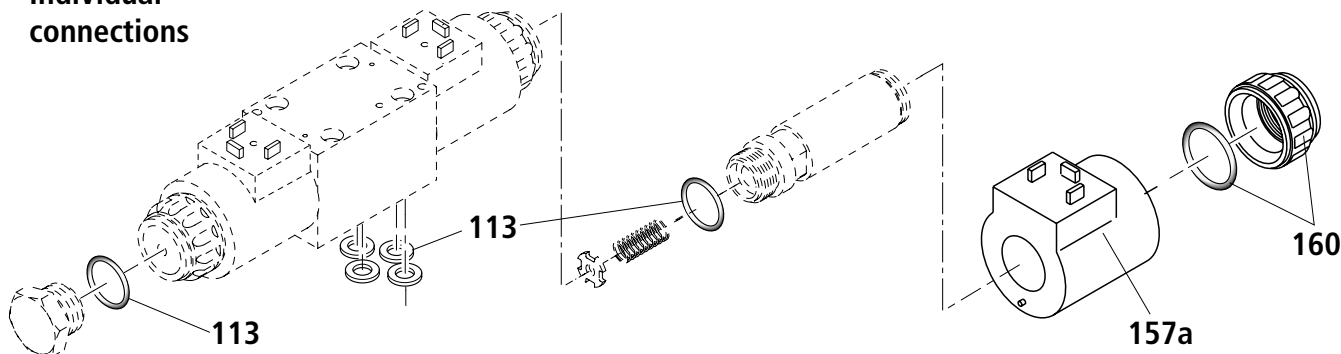
<sup>1)</sup> Must be ordered separately, see page 3.

- 1.1** Solenoid "a" (plug-in connector colour grey)
- 1.2** Solenoid "b" (plug-in connector colour black)
- 2** Dim. for solenoid **with protected** hand override "**N9**" (standard) and **without** hand override
  - The hand override can only be actuated up to a tank pressure of approx. 50 bar.
  - Avoid damage to the hand override pin bore!
- 3** Dim. for solenoid **with** hand override "**N**"

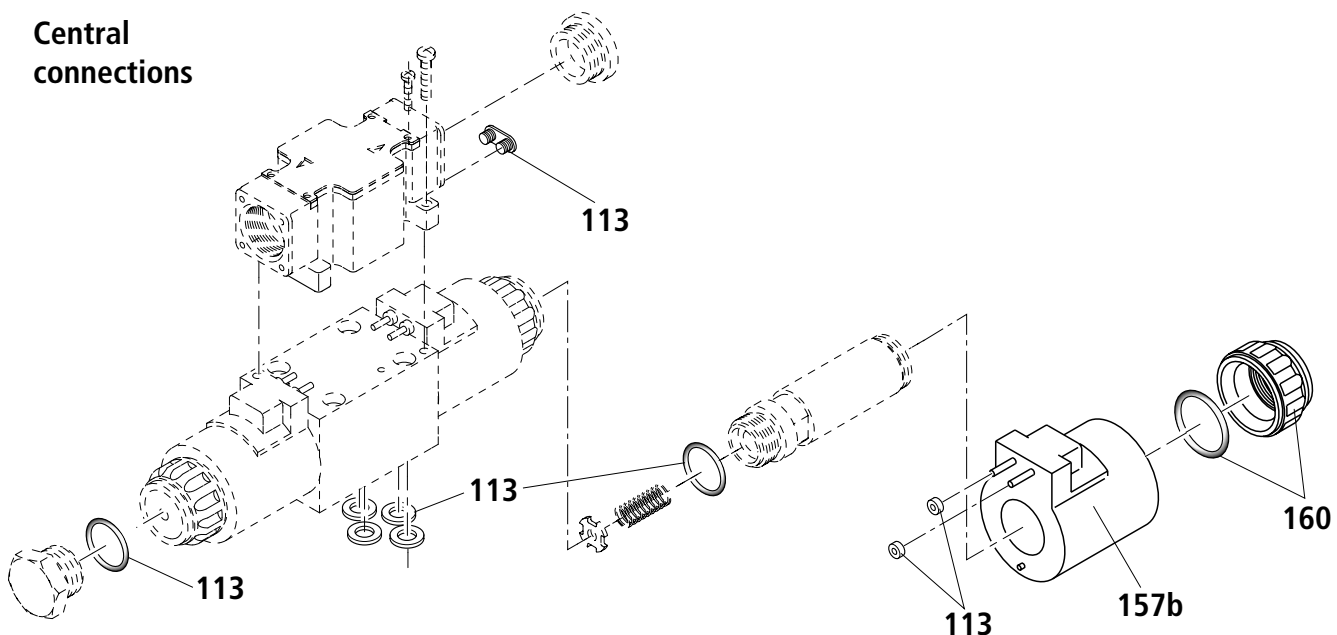
- 4** Plug-in connector **without** circuitry to DIN 43 650 <sup>1)</sup>
- 5** Plug-in connector **with** circuitry to DIN 43 650 <sup>1)</sup>
- 6** Cable gland Pg 16 "DL"
- 7** Angled plug (colour red, must be ordered separately, Material no. 00005538)
- 8** Name plate
- 9** R-ring 9.81 x 1.5 x 1.78
- 10** Plug for valves with one solenoid
- 11** Space required to remove plug-in connector

**Ordering details:** available spare parts and seals

**Individual connections**



**Central connections**



**Seal kit – valve:** individual connection

Item	Seal material	Material number
113	NBR seals	00313162
	FKM seals	00313163

**Seal kit – valve:** central connection

Item	Seal material	Material number
113	NBR seal	00833687
	FKM seal	00833689

**Spare parts – solenoid**

Item	Description	DC		AC	
		Voltage	Material number	Voltage	Material number
157a	Coil for individual connections	12 V	00021388	110 V, 50/60 Hz	00020175
		24 V	00021389	230 V, 50/60 Hz	00071030
157b	Coil for central connections	12 V	00021462	110 V, 50/60 Hz	00021464
		24 V	00021463	230 V, 50/60 Hz	00071035
160	Nut: <b>with protected</b> hand override „N9“		00068604		00833831
	Nut: <b>with</b> hand override „N“		00227435		00833808
	Nut: <b>without</b> hand override		00227433		00833831

## Notes

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