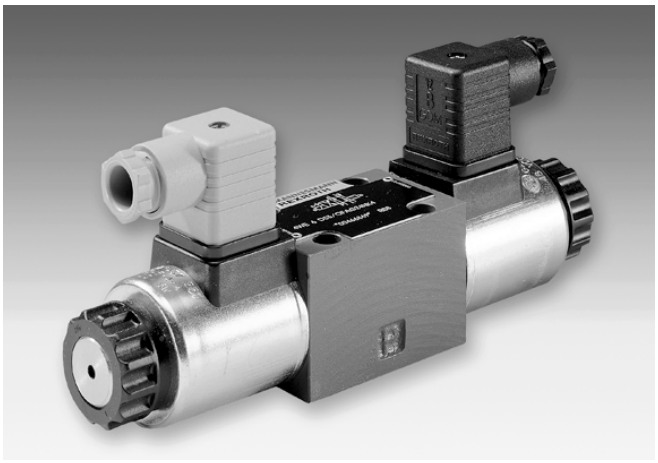
**RE 23 178/03.02**
Replaces: 04.01

# 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




Type 4WE 6 E6X/EG24N9K4 with plug-in connector (separate order)

## Overview of contents



## Features

- Direct solenoid operated directional spool valve, high performance version
- Porting pattern to DIN 24 340 form A, **without** locating pin hole (standard)
- Porting pattern to ISO 4401 and CETOP–RP 121 H, **with** locating pin hole, (ordering code ...**/60** at the end of the valve type code)
- 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 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 **= 6X**
(60 to 69: unchanged installation and connection dimensions)

Spring return **= No code**
Without spring return **= O**
Without spring return 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** 2)
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**

Further details in clear text

**No code =** **Without** locating pin hole
**/60** 4) **=** **With** locating pin hole

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

**⚠ Attention!**
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 > than the performance limit of the valve, active in the P line

**Electrical connections**

**Individual connections**
**K4** 1) **=** **Without** plug-in connector with component plug DIN EN 175 301-803

**Central connections**
**DL =** Cable entry in cover, with indicator light
**DKL** 3) **=** Central connection on cover, with indicator light (without angled plug-in connector)

| 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 7, are readily available!**

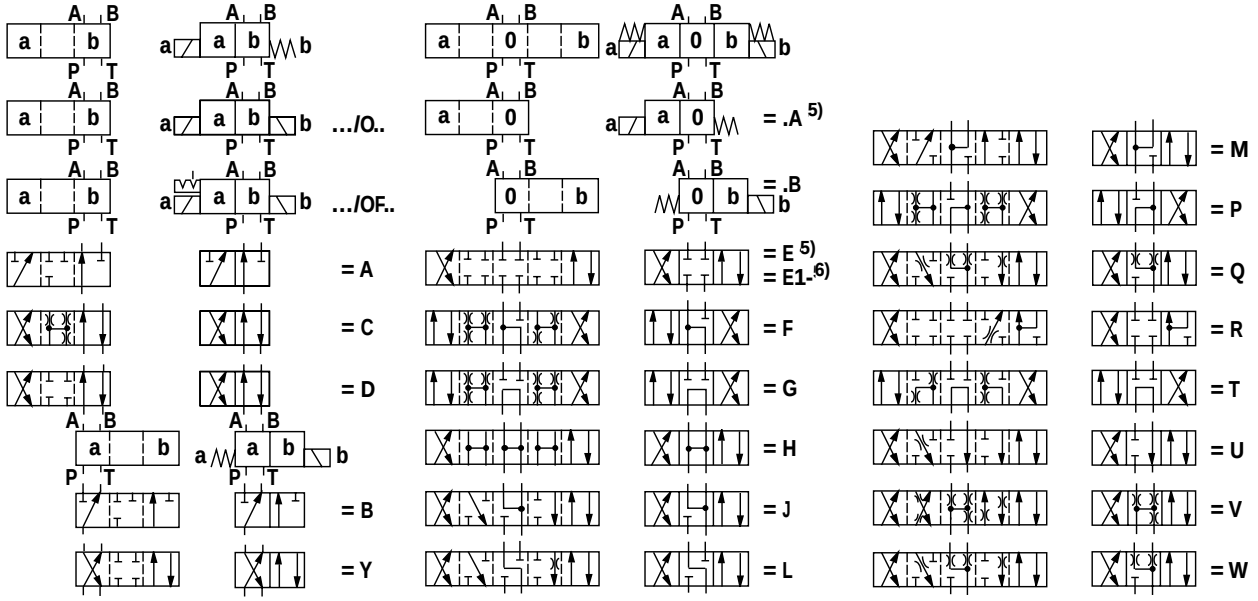
1) Plug-in connectors must be ordered separately (see page 3).

2) When connecting to an AC supply a DC solenoid **must** be used which is controlled via a rectifier (see table on the left ).
With an individual connection a large plug-in connector with built-in rectifier can be used (separate order).

3) Angled plug-in connector (Mat. No. 00005538) must be ordered separately.

4) Locating pin 3 x 8 DIN EN ISO 8752, Material No.00005694 (separate order)

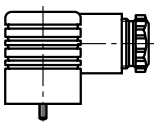
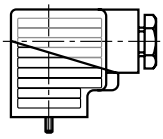
## Symbols



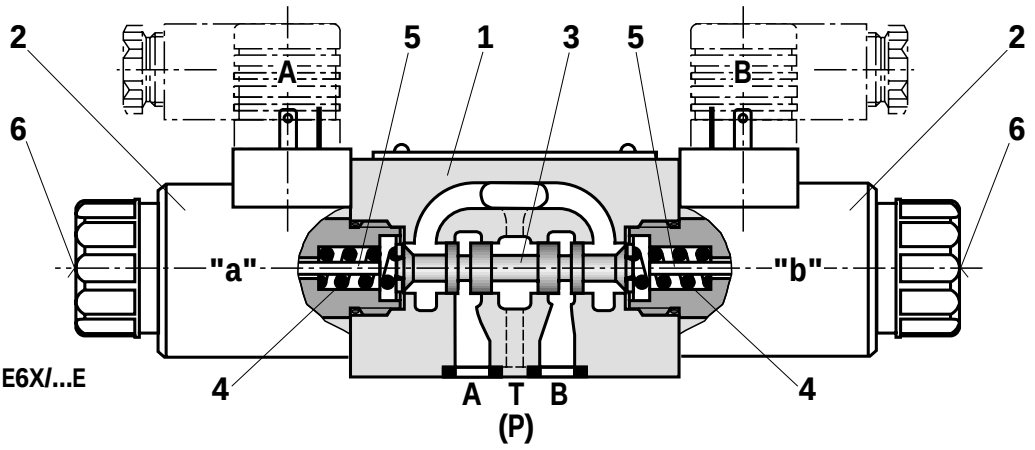

5) **Example:** Spool E with switched position "a" ordering code ..**EA**..

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

**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 | |  |  | | |
|---|---|---|---|---|---|
| | | **Material No.** | | | |
| **Valve side** | **Colour** | 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 | **00074683** | **–** | **–** | **–** |
| b | black | **00074684** | **–** | **–** | **–** |
| a/b | black | **–** | **00057292** | **00313933** | **00310995** |

## Function, section




**Type 4WE 6 E6X/...E**

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 swtiched positions are thus fixed alternately and there is no need to continually energise the solenoid.

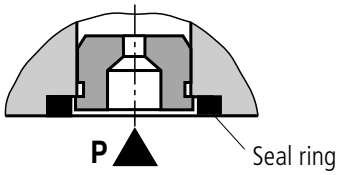
**Note:**

**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 that 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.



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

### General

| | | | |
|---|---|---|---|
| Installation | | | Optional |
| Ambient temperature | | °C | – 30 to + 50 (NBR seals) |
| | | | – 20 to + 50 (FKM seals) |
| 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 (~)<br>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 | For symbol Q | $mm^2$ | Approx. 6 % of the nominal cross-section |
| (switched position 0) | For symbol W | $mm^2$ | Approx. 3 % of the nominal cross-section |
| Pressure fluid | | | Mineral oil (HL, HLP) to DIN 51 524 [1];<br>Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) [1];<br>HEPG (polyglycols) [2]; HEES (synthetic ester) [2];<br>Other pressure fluids on request |
| Pressure fluid temperature range | | °C | – 30 to + 80 (NBR seals) |
| | | | – 20 to + 80 (FKM seals) |
| Viscosity range | | $mm^2/s$ | 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 [3]<br>(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 frequencies | | Cycles/h | UP to 15000 | UP to 7200 |
| Protection to DIN 40 050 [4] | | | IP 65 | IP 65 |
| Max. coil temperature [5] | | °C | 150 | 180 |

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

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

[3] Other voltages on request

[4] With fitted and locked plug-in connector

[5] Due to the occuring 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 | |
|---|---|
| **W110** | 110 V, 50 Hz<br>110 V, 60 Hz<br>120 V, 60 Hz |
| **W230** | 230 V, 50 Hz<br>230 V, 60 Hz |

**With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.**

## **Performance limits** (measured with HLP46, $\vartheta_{oil}$ = 40 °C ± 5 °C)

**⚠ Attention!**

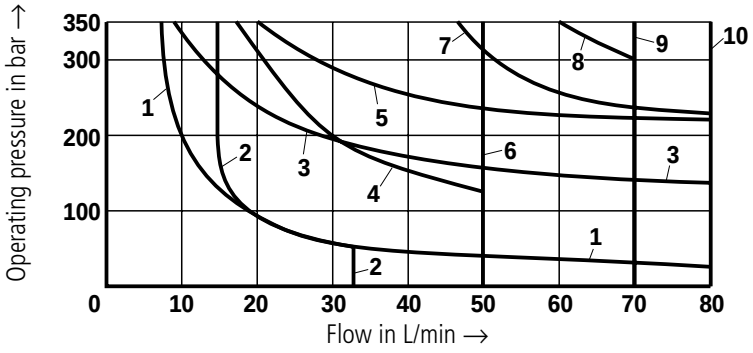
The given switching power limits are for applications with two flow directions (e.g. from P to A and simultaneous return flow from B to T).

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 – 60Hz | |
|---|---|---|---|---|---|
| **Char. curve** | **Symbol** | **Char. curve** | **Symbol** | **Char. curve** | **Symbol** |
| **1** | A, B[1)] | **11** | A, B[1)] | **19** | A, B[1)] |
| **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–[2)], J, L | **26** | C, D, Y |
| **9** | M | | M, Q, R[3)], U, W | **27** | H |
| **10** | E,E1–[2)], R[3)], 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–[2)], M, R[3)] |



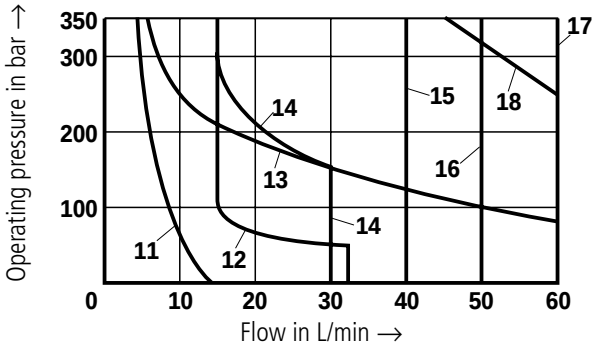

[1)] With hand override

[2)] P – A/B pre-opening

[3)] Return flow from actuator to tank

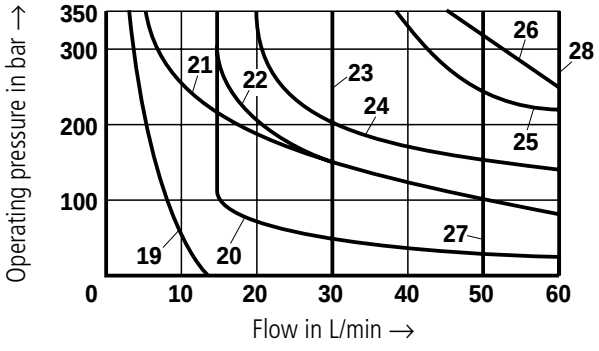
| DC solenoid | |
|---|---|
| **Char. curve** | **Solenoid voltage** |
| **1 to 10** | 12, 24, 48, 96, 125, 205 V |

(for other voltages see pages 6 and 7)




| AC solenoid | | |
|---|---|---|
| **Char. curve** | **Solenoid voltage** | |
| **11 to 18** | W110 | 110 V, 50 Hz<br>120 V, 60 Hz |
| | W230 | 230 V, 50 Hz |

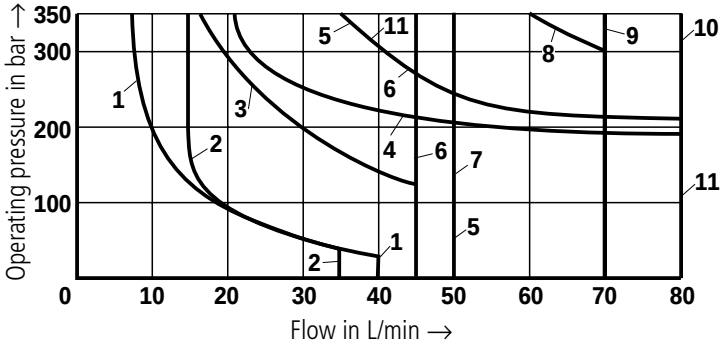
(other voltages on request)




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

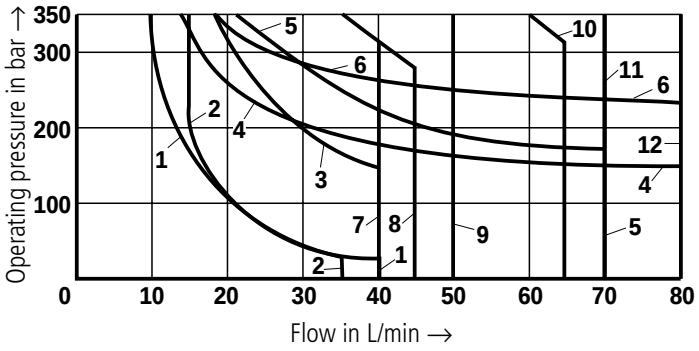
(other voltages on request)

## **Performance limits** (measured with HLP46, $\vartheta_{oil}$ = 40 °C ± 5 °C)




| | DC solenoid |
|---|---|
| **Char. curve** | **Solenoid voltage** |
| **1 to 10** | 110; 180 |

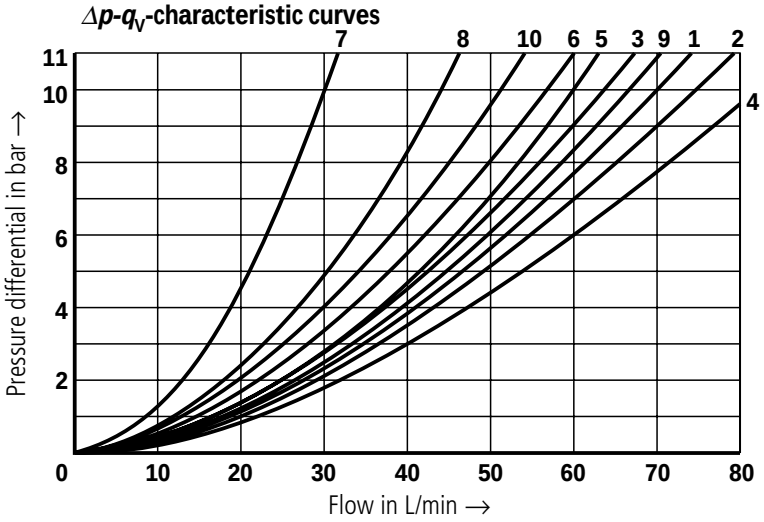
| DC solenoid | |
|---|---|
| **Char. curve** | **Symbol** |
| **1** | A, B |
| 2 | V |
| 3 | F, P |
| 4 | J, L, U |
| 5 | G |
| 6 | T |
| 7 | H |
| 8 | D, C |
| 9 | M |
| 10 | C/O, C/OF, D/O, D/OF, E, E1, R, Q, W |
| 11 | A/O, A/OF |




| | DC solenoid |
|---|---|
| **Char. curve** | **Solenoid voltage** |
| **1 to 12** | 42; 80; 220 |

| DC solenoid | |
|---|---|
| **Char. 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 |

## **Characteristic curves** (measured with HLP46, $\vartheta_{oil}$ = 40 °C ± 5 °C)




**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 |

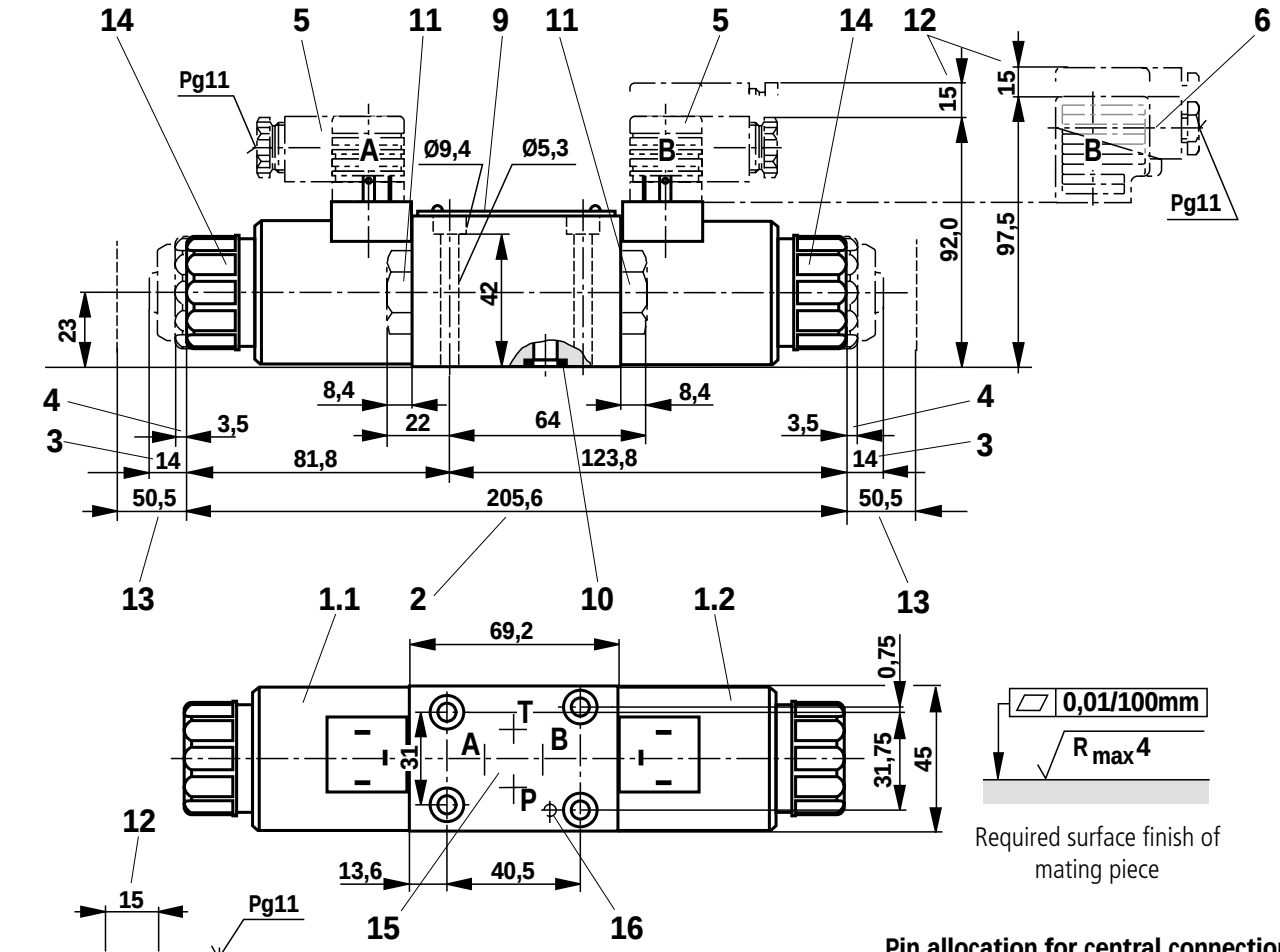
## **Preferred types** (readily available)

| 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/0FEG24N9K4 | **00567512** |
| 4WE 6 E6X/EG24N9K4 | **00561278** |
| 4WE 6 EA6X/EG24N9K4 | **00561280** |
| 4WE 6 EB6X/EG24N9K4 | **00561281** |
| 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** |
| 3WE 6 A6X/EW230N9K4 | **00915672** |
| 4WE 6 C6X/EW230N9K4 | **00913132** |
| 4WE 6 D6X/EW230N9K4 | **00909559** |
| 4WE 6 D6X/OFEW230N9K4 | **00915095** |
| 4WE 6 E6X/EW230N9K4 | **00912492** |
| 4WE 6 H6X/EW230N9K4 | **00912494** |
| 4WE 6 J6X/EW230N9K4 | **00911762** |
| 4WE 6 Y6X/EW230N9K4 | **00909415** |

**Further preferred types and standard components are shown in the EPS (standard price list).**

## Individual connections







Required surface finish of mating piece

## Central connections

**Pin allocation for central connections:**

**With 1 solenoid:**

Solenoid always to termainals 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 [1)]

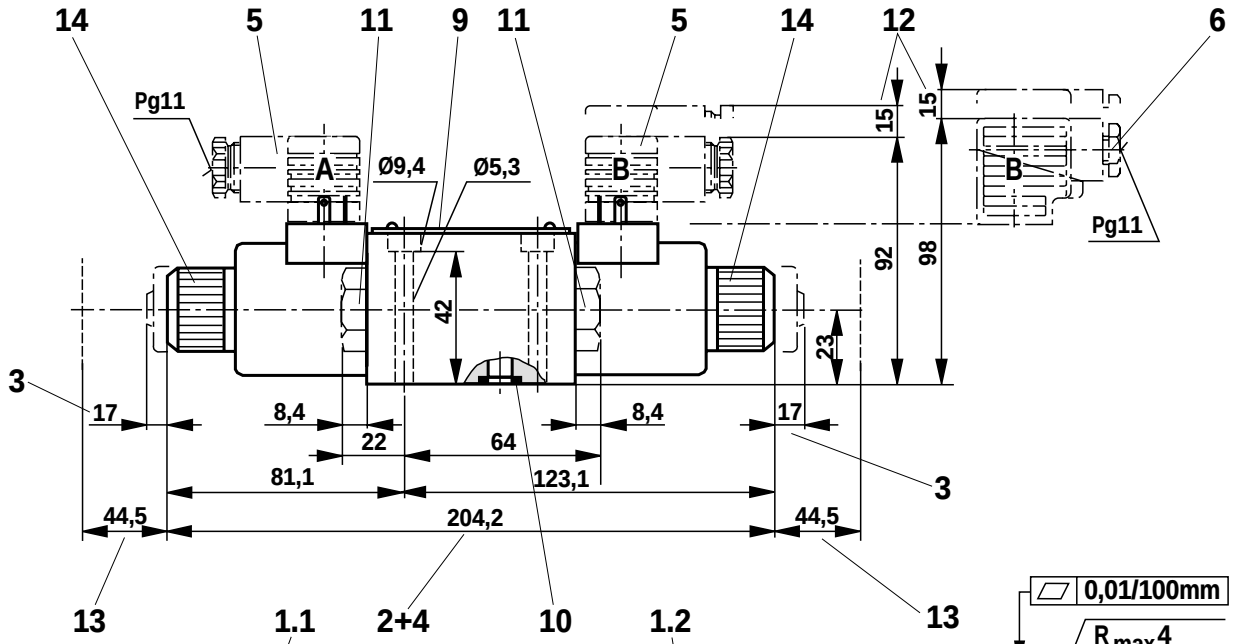
**6** Plug-in connector **with** circuitry [1)]

[1)] Must be ordered separately, see page 3

Item no. explanation continued on page 9

**Unit dimensions:** valve with a DC solenoid (Dimensions in mm)

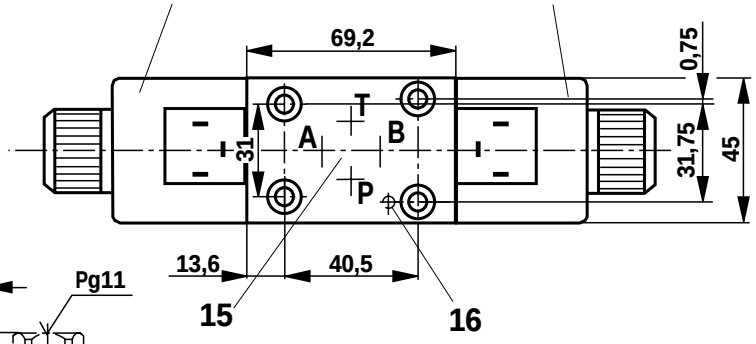
## Individual connections

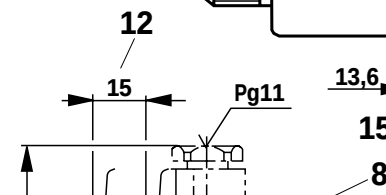




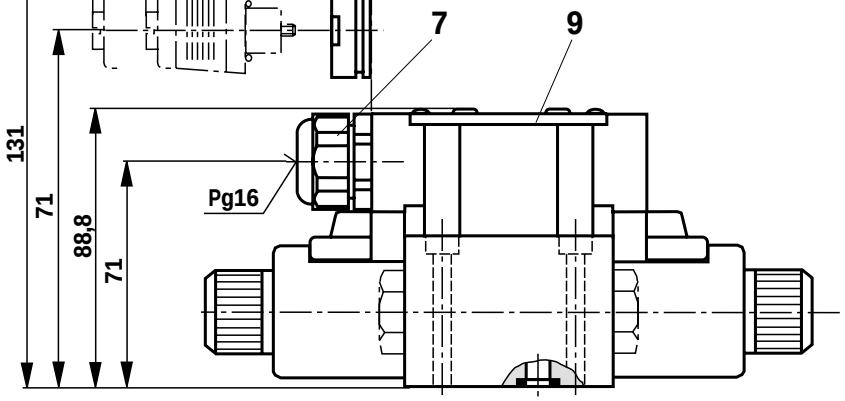


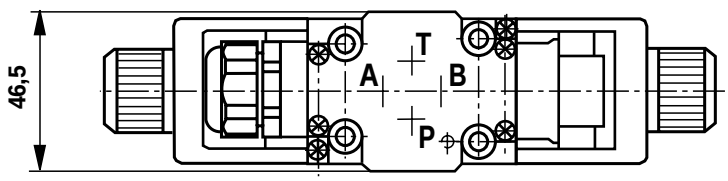
Required surface finish of mating piece




## Central connections




**7** Cable glande Pg 16 "DL"

**8** Angled plug (colour red, must be ordered separately, Material No. 00005538)

**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 Nm

**15** Porting pattern to DIN 24 340 form A, **without** locating pin hole

**16** Porting pattern to ISO 4401 and CETOP–RP 121 H **with** locating pin hole

**Subplates**

| | |
|---|---|
| (**without** locating pin hole) | G 341/01 (G 1/4) |
| | G 342/01 (G 3/8) |
| | G 502/01 (G 1/2) |
| (**with** locating pin hole) | G 341/60 (G 1/4) |
| | G 342/60 (G 3/8) |
| | G 502/60 (G 1/2) |

to catalogue sheet RE 45 052 and

**Valve fixing screws**

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

## Notes

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