# Bosch Rexroth 4WE6J6X/EW110N9K4 directional spool valve

Manufacturer: Bosch Rexroth

Manufacturer part number / published order designation: R900551703

Published model: 4WE6J6X/EW110N9K4

## About this compilation

Prepared by Hydmaster from selected manufacturer documentation. Original technical pages follow without cropped drawings, rewritten data or altered units. This cover and index are Hydmaster editorial material, not a manufacturer-issued exact-execution datasheet.

Coverage: applicable family/component reference. Exact execution documentation remains incomplete. Do not treat standard component or stage drawings as approval of the complete custom assembly.

## Execution notes and conditions

Execution-specific W110 performance-limit chart: current series page17 plots W230 at50 Hz. Do not substitute its limit curve for this110 V article.

K4 means individual electrical connection. Central-connection dimensions and wiring are omitted. Neighbouring coil or manual-override options are not assigned.

## Source-page index

Source page numbers below are physical pages of each complete original PDF. The original printed page labels and technical content remain unchanged. Compiled page numbers count this cover/index.

## Source A: Rexroth Directional Spool Valves Direct Operated With Solenoid Actuation Re23178


| Original pages | Compiled pages | Relevant content |
|---|---|---|
| 2-4 | 2-4 | Existing WE6 series, actuation, spring/detent and solenoid coding. Published execution: 4WE6J6X/EW110N9K4.; N9 concealed override, K4 connection, 73/A12 definitions and applicable detail coding.; Coding compatibility footnotes and electrical-option restrictions. |
| 7 | 5 | Actual W110/W230 AC individual K4 connection, voltage/frequency availability. |
| 9-14 | 6-11 | Actual spool circuit symbol, including the 73 variation where coded.; Actuation, spring/detent and A12 smooth-switching principle; OF only where coded.; Hydraulic/general operating limits and installation conditions.; Fluid/seal, viscosity and cleanliness restrictions.; Actual DC/AC electric data: duty, voltage tolerance, frequency, coil temperature and switching restrictions.; Exact standard or 73 spool flow-path pressure-drop curves and test conditions. |
| 21 | 12 | Actual AC individual K4 body/solenoid installation dimensions. |
| 23-24 | 13-14 | Dimension legend, N9 override, port seals, coil removal, ISO4401 mounting and screws.; Actual K4 individual connector pin/PE assignments and wiring requirements. |
| 28 | 15 | Low-temperature pressure derating and planning conditions. |

## Ordering code

| 01 | 02 | 03 | 04 | 05 | | 06 | 07 | 08 | 09 | 10 | 11 | 12 | | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **WE** | **6** | | **6X** | **/** | | **E** | | | | | | **/** | | | | | | | | | ***** |

| | | |
|---|---|---|
| 01 | 3 main ports | **3** |
| | 4 main ports | **4** |
| 02 | Directional valve | **WE** |
| 03 | Size 6 | **6** |
| 04 | Symbols; possible version see page 9 | |
| 05 | Component series 60 ... 69 (60 ... 69: unchanged installation and connection dimensions) | **6X** |
| 06 | **With** spring return | **no code** |
| | **Without** spring return | **O** |
| | **Without** spring return with detent | **OF** |
| 07 | High-power wet-pin solenoid with detachable coil | **E** |

**Electrical voltages**

| | | |
|---|---|---|
| 08 | For ordering code see page 5 ... 8 | e.g. **G24** |

**Manual override** [1] (see page 20)

| | | |
|---|---|---|
| 09 | **Without** manual override | **no code** |
| | **With** manual override | **N** [3] |
| | **With** manual override "mushroom button" (small) | **N2** [3] |
| | **With** lockable manual override "mushroom button" (small) | **N4** [2; 3] |
| | **With** lockable manual override "mushroom button" (large) | **N5** [2; 3; 4] |
| | **With** manual override "mushroom button" (large), not lockable | **N6** [3; 4] |
| | **With** lockable manual override "nut" | **N7** [2; 3] |
| | **With** concealed manual override (standard) | **N9** |

**Corrosion resistance** (outside) (for the availability, refer to the following table)

| | | |
|---|---|---|
| 10 | None (valve housing primed) | **no code** |
| | Improved corrosion protection (240 h salt spray test according to EN ISO 9227) | **J3** |
| | High corrosion protection (720 h salt spray test according to EN ISO 9227) | **J5** |

**Electrical connection**

| | | |
|---|---|---|
| 11 | **Individual connection or central connection** | |
| | For ordering code see page 5 ... 8 | e.g. **K4** |

1) Operation of the manual override only possible up to 50 bar *[725 psi]* tank pressure. Avoid damage to the bore of the manual override. (Special tool for the operation, separate order, material no. **R900024943**). If the manual override is blocked, operation of the opposite solenoid is to be excluded.
The manual override cannot be allocated a safety function.

2) With tank pressures higher than 50 bar, it is not guaranteed that the valve remains in the position into which it was switched by the lockable manual override ("N4", "N5", "N7").

3) Only direct voltage; not for version "= UR"

4) Only direct voltage; not for version "SO407"

### Available corrosion resistance

| | Electrical connection | | | | | | | Manual override | |
|---|---|---|---|---|---|---|---|---|---|
| | "K4" | | "DL" | | "K40", "C4" | | | | |
| | "G12" | "G24" | "G24" | "G48" | "G12" | "G24" | "G26" | Without | "N" |
| **"J3"** | ✓ | ✓ | ✓ | ✓ | – | – | – | ✓ | ✓ |
| **"J5"** | – | – | – | – | ✓ | ✓ | ✓ | ✓ | ✓ |

## Ordering code

| 01 | 02 | 03 | 04 | 05 | | 06 | 07 | 08 | 09 | 10 | 11 | 12 | | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **WE** | **6** | | **6X** | **/** | | **E** | | | | | | **/** | | | | | | | | | ***** |

**Spool position monitoring** (For more information, see data sheet 24830)

| | | |
|---|---|---|
| 12 | **Without** position switch | **no code** |
| | **– Inductive position switch type QM** (valves with 2 spool positions) | |
| | Monitored spool position "a" | **QMAG24** |
| | Monitored spool position "b" | **QMBG24** |
| | Monitored rest position | **QM0G24** |
| | **– Inductive position switch type QR** (valves with 3 spool positions) | |
| | Monitored rest position | **QR0G24S** |
| | Monitored spool position "a" and "b" | **QRABG24E** |
| | **– Inductive position switch type QS** | |
| | Monitored spool position "a" | **QSAG24W** |
| | Monitored spool position "b" | **QSBG24W** |
| | Monitored spool position "0" | **QS0G24W** |
| | Monitored spool position "0" and "a" | **QS0AG24W** |
| | Monitored spool position "0" and "b" | **QS0BG24W** |
| | Monitored spool position "a" and "b" | **QSABG24W** |

**Switching time increase**

| | | |
|---|---|---|
| 13 | **Without** switching time increase | **no code** |
| | **With** switching time increase (only with direct voltage and only with version "N9" and symbol "73") | **A12** |

**Throttle insert**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 14 | **Without** throttle insert (standard) | | | | | | | | **no code** |
| | **With** throttle insert (when the admissible valve performance limit is exceeded, refer to page 15 ... 17): | | | | | | | | |
| | Port | Throttle Ø in mm *[inch]* | | | | | | | |
| | | 0.6 *[0.024]* | 0.8 *[0.031]* | 1.0 *[0.039]* | 1.2 *[0.047]* | 1.5 *[0.059]* | 2.0 *[0.079]* | 2.5 *[0.098]* | 3.0 *[0.120]* | 4.0 *[0.160]* |
| | P | **= B06** | **= B08** | **= B10** | **= B12** | **= B15** | **= B20** | **= B25** | **= B30** | **= B40** |
| | A | **= H06** | **= H08** | **= H10** | **= H12** | **= H15** | **= H20** | **= H25** | **= H30** | **= H40** |
| | B | **= R06** | **= R08** | **= R10** | **= R12** | **= R15** | **= R20** | **= R25** | **= R30** | **= R40** |
| | A and B | **= N06** | **= N08** | **= N10** | **= N12** | **= N15** | **= N20** | **= N25** | **= N30** | **= N40** |
| | T | **= X06** | **= X08** | **= X10** | **= X12** | **= X15** | **= X20** | **= X25** | **= X30** | **= X40** |

**Clamping length**

| | | |
|---|---|---|
| 15 | 42 mm *[1.65 inch]* (standard) | **no code** |
| | 22 mm *[0.87 inch]* | **Z** |

**Control spool play**

| | | |
|---|---|---|
| 16 | Standard (recommended) | **no code** |
| | Minimum (selection for reduced leakage values; higher oil cleanliness required) | **T06** |
| | Increased (selection with high temperature difference hydraulic fluid/environment; leads to higher internal leakage values) | **T12** |

**Seal material** (observe compatibility of seals with hydraulic fluid used, see page 12)

| | | |
|---|---|---|
| 17 | NBR seals | **no code** |
| | FKM seals | **V** |
| | Recommended for operation with HFC hydraulic fluids together with high temperatures | **MH** |
| | Low-temperature version (only with version "Without manual override") | **MT** |

## Ordering code

| 01 | 02 | 03 | 04 | 05 | | 06 | 07 | 08 | 09 | 10 | 11 | 12 | | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **WE** | **6** | | **6X** | **/** | | **E** | | | | | | **/** | | | | | | | | | ***** |

| | | |
|---|---|---|
| 18 | Standard | **no code** |
| | Solenoid coil as approved component with UR marking according to UL 906, edition 1982 [5] | **= UR** |
| | Approval according to CSA C22.2 No. 139-1982 | **= CSA** |
| | Porting pattern according to ANSI B93.9 [6] | **= AN** |

| | | |
|---|---|---|
| 19 | **Without** locating hole | **no code** |
| | **With** locating hole and locking pin ISO 8752-3x8-St | **/62** |

| | | |
|---|---|---|
| 20 | Standard | **no code** |
| | With reduced electric power consumption (only versions "G24" as well as "K4", "DL" and "DKL") | **SO407** |

| | | |
|---|---|---|
| 21 | Further details in the plain text | ***** |

[5] Only for version "K4" with "G12", "G24" and "W110"

[6] With power supply to

- solenoid "a", channel P is connected to a
- solenoid "b", channel P is connected to B

# **Ordering code:** Alternating voltage – individual connection

## Electrical connections and available voltages

(special voltages upon request)

| Connector | | Ordering code | Electrical voltages: 100 V 50/60 Hz | 100 V 50/60 Hz | 110 V 50/60 Hz | 110 V 50/60 Hz | 120 V 60 Hz | 120 V 60 Hz | 200 V 50 Hz | 200 V 50 Hz | 230 V 50/60 Hz | 230 V 50/60 Hz | Protection class according to DIN EN 60529 [1] | Protection class according to VDE 0580 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ordering code: G96 | W100 | G96 | W110 | G110 | W110 | G180 | W200 | G205 | W230 | | |
| Connector 3-pole (2 + PE) according to DIN EN 175301-803 | ▶ Standard | **K4** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | IP65 | I [2] |
| Rectifier required (see page 27) | | | ✓ | – | ✓ | – | ✓ | – | ✓ | – | ✓ | – | | |
| **Maximum admissible overvoltages according to DIN EN 60664-1:2008-01 (VDE 0110-1) (overvoltage category II):** | | | | | | | | | | | | | | |
| Nominal voltage $U_{Nom}$ | | in V | 100 | 100 | 110 | 110 | 120 | 120 | 200 | 200 | 230 | 230 | | |
| Rated current $I_{Nom}$ | ▶ 50 Hz | in A | 0.31 | 0.56 | 0.34 | 0.52 | – | – | 0.18 | 0.29 | 0.16 | 023 | | |
| | ▶ 60 Hz | in A | 0.31 | 0.44 | 0.34 | 0.39 | 0.30 | 0.45 | – | – | 0.16 | 017 | | |
| Lower rated current $I_1$ | ▶ 50 Hz | in A | – | 0.65 | – | 0.6 | – | – | – | 0.33 | – | 0.27 | | |
| | ▶ 60 Hz | in A | – | 0.51 | – | 0.45 | – | 0.52 | – | – | – | 0.2 | | |
| Upper rated current $I_2$ | ▶ 50 Hz | in A | – | 0.9 | – | 0.9 | – | – | – | 0.6 | – | 0.36 | | |
| | ▶ 60 Hz | in A | – | 0.9 | – | 0.6 | – | 0.9 | – | – | – | 0.36 | | |
| Maximum admissible switch-off overvoltage according to VDE 0580 | | in V | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | | |
| Recommended interference protection circuit with 2 x mains voltage | | in V | 200 | 200 | 220 | 220 | 240 | 240 | 400 | 400 | 460 | 460 | | |

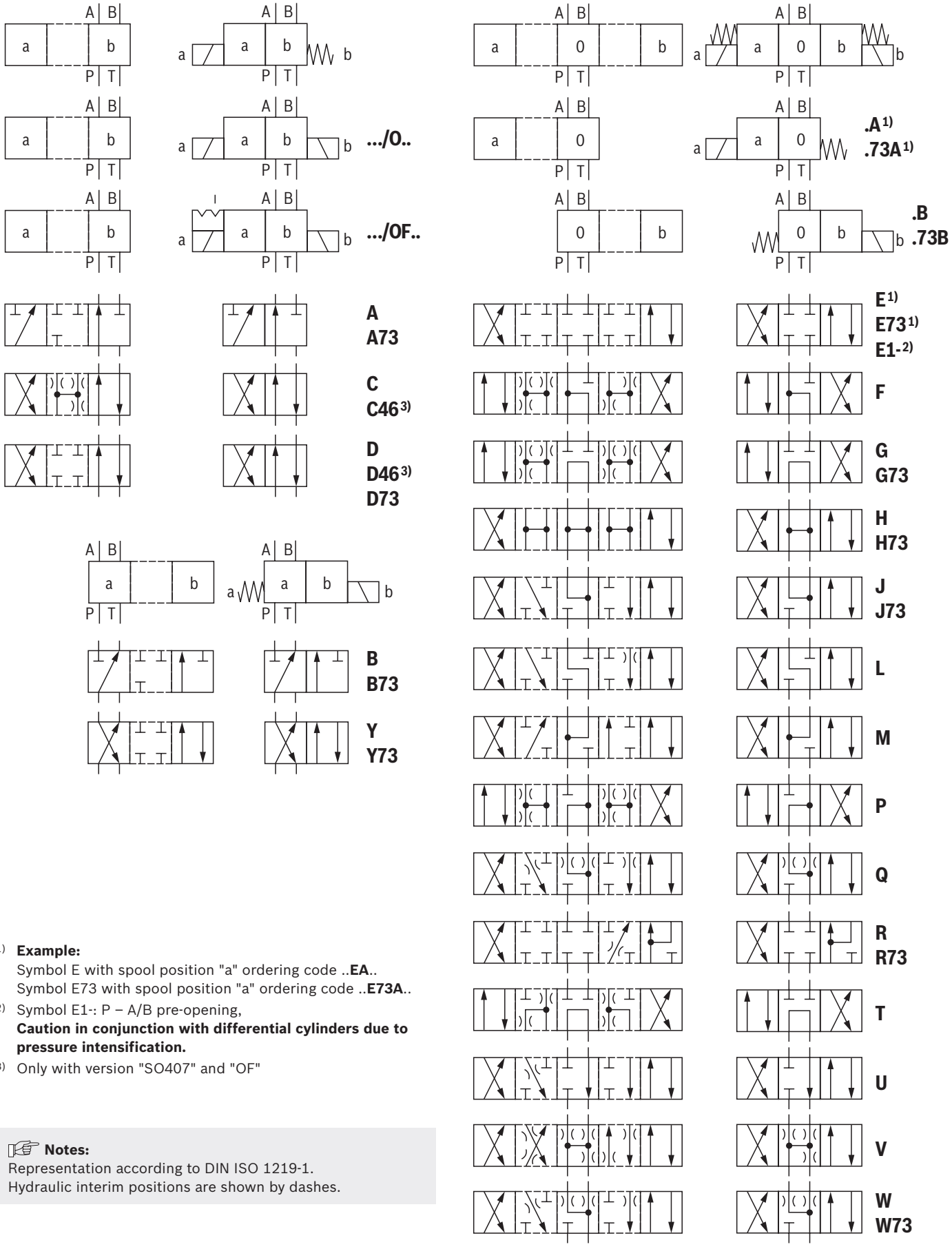
1) Only with correctly mounted valve with a mating connector suitable for the protection class.

2) Protection class I with properly connected protective grounding conductor (PE) and valve mounting surface connected to the protective grounding conductor system.

☞ **Notes:**

- Solenoid valves induce voltage peaks during switch-off. In order to prevent electro-magnetic interference at the system and damage to the valve control, an interference protection circuit has to be provided on the system side. Alternatively, you can also select a connector with integrated interference protection circuit.
- Depending on the rated current $I_{Nom}$, circuit breakers according to tripping characteristic "K" are to be provided. The tripping current must lie within a time interval of 0.6 s with 8 to 10 times the nominal power supply. The required non-tripping current of the fuse must not fall below the "lower rated current" value $I_1$ (see preceding table). The maximum tripping current must not exceed the "upper rated current" value $I_2$ (see preceding table). The temperature dependence of the tripping behavior of the circuit breakers has to be considered according to the manufacturer's specifications.

## Symbols




1) **Example:**
Symbol E with spool position "a" ordering code ..**EA**..
Symbol E73 with spool position "a" ordering code ..**E73A**..

2) Symbol E1-: P – A/B pre-opening,
**Caution in conjunction with differential cylinders due to pressure intensification.**

3) Only with version "SO407" and "OF"

☞ **Notes:**
Representation according to DIN ISO 1219-1.
Hydraulic interim positions are shown by dashes.

## Function, section

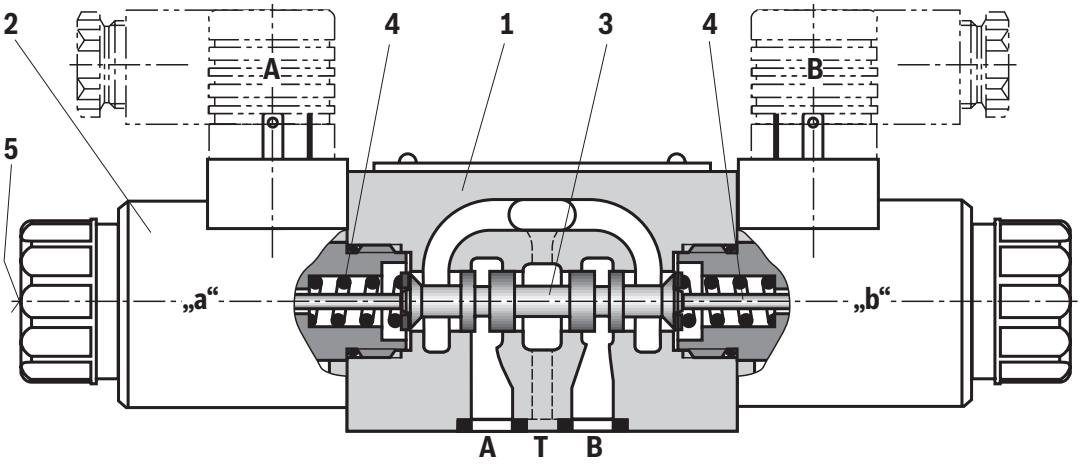
The directional valves of type WE are solenoid-actuated directional spool valves that can be used as electro-magnetic component. They control start, stop and direction of a flow.
The directional valves basically consist of the housing (1), one or two electronic solenoids (2), the control spool (3), and the return springs (4).
In the de-energized condition, the control spool (3) is held in the central position or in the initial position by the return springs (4) (except for version "O").
If the wet-pin electronic solenoid (2) is supplied with power, the control spool (3) moves out of its rest position into the required end position. In this way, the required direction of flow according to the selected symbol is released.
After the electronic solenoid (2) has been switched off, the control spool (3) is pushed back into its central position or into its initial position (except for valves with "OF" detent and valves without type "O" spring).
A manual override (5) allows for the manual switching of the valve without solenoid energization.
**For unobjectionable functioning, the hydraulic system has to be bled properly.**

**Without spring return "O"** (only possible with symbols A, C and D)
This version is a directional valve with two spool positions and two electronic solenoids **without** detent. The valve without spring return at the control spool (3) has no defined basic position in the de-energized condition.

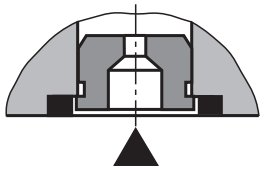
**Without spring return with "OF" detent** (only possible with symbols A, C and D)
This version is a directional valve with two spool positions and two electronic solenoids **with** detent. The detents are used to fix the control spool (3) in the relevant spool position. During operation, continuous application of current to the electronic solenoid can thus be omitted which contributes to energy-efficient operation.

**Version ".73...A12"** (smooth switching behavior)
By means of structural design of the control spools and solenoids, switching shocks occurring when activating and deactivating the valves are significantly reduced.
The switching shocks, measured as acceleration values ***a***, can be reduced by up to approx. 85% when compared to the standard valve depending on the design of the control spool (for this, see "Acceleration values" on page 13).

☞ **Notes:**
Pressure peaks in the tank line to two or several valves can result in unintended movements of the control spool in the case of version with detent. We therefore recommend that separate return lines be provided or a check valve installed in the tank line.
Due to the design principle, internal leakage is inherent to the valves, which may increase over the life cycle.




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



**Throttle insert**
The use of a throttle insert is required when, due to prevailing operating conditions, flows occur during the switching processes which exceed the performance limit of the valve.

## Technical data

(For applications outside the stated values, please ask us!)

| **general** | | | |
|---|---|---|---|
| Weight | ▶ Valve with one solenoid | kg *[lbs]* | 1.45 *[3.2]* |
| | ▶ Valve with two solenoids | kg *[lbs]* | 1.95 *[4.3]* |
| Installation position | | | any |
| Ambient temperature range | ▶ Standard version | °C *[°F]* | –20 ... +50 *[–4 ... +122]* (NBR seals)<br>–15 ... +50 *[+5 ... +122]* (FKM seals) |
| | ▶ Version for HFC hydraulic fluid | °C *[°F]* | –20 ... +50 *[–4 ... +122]* |
| | ▶ Low-temperature version [1] | °C *[°F]* | –40 ... +50 *[–40 ... +122]* |
| Storage temperature range | | °C *[°F]* | +5 ... +40 *[41 ... +104]* |
| $MTTF_D$ values according to EN ISO 13849 | | Years | 300 (for further details see data sheet 08012) |

| **hydraulic** | | | |
|---|---|---|---|
| Maximum operating pressure | ▶ Port A, B, P | | |
| | – Standard version | bar *[psi]* | 350 *[5076]* |
| | – Version "SO407" | bar *[psi]* | 315 *[4550]* |
| | ▶ Port T | bar *[psi]* | 210 *[3050]* (DC); 160 *[2320]* (AC)<br>With symbols A and B, port T must be used as leakage oil connection if the operating pressure exceeds the maximum admissible tank pressure. |
| Maximum flow | ▶ Direct voltage DC | | |
| | – Standard version | l/min *[US gpm]* | 80 *[21]* |
| | – Version "SO407" | l/min *[US gpm]* | 60 *[15.8]* |
| | ▶ Alternating voltage AC | l/min *[US gpm]* | 60 *[15.8]* |
| Flow cross-section (spool position 0) | ▶ Symbol Q | $mm^2$ | approx. 6% of nominal cross-section |
| | ▶ Symbol W | $mm^2$ | approx. 3% of nominal cross-section |
| Hydraulic fluid | | | see table page 12 |
| Hydraulic fluid temperature range (at the valve working ports) | | °C *[°F]* | –20 ... +80 *[–4 ... +176]* (NBR seals)<br>–15 ... +80 *[+5 ... +176]* (FKM seals)<br>–20 ... +50 *[–4 ... +122]* (HFC hydraulic fluid)<br>–40 ... +50 *[–40 ... +122]* (low-temperature version) |
| Viscosity range | | $mm^2/s$ *[SUS]* | 2.8 ... 500 *[35 ... 2320]* |
| Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c) | | | Class 20/18/15 [2] |

[1] In case of use at low temperatures, see project planning information on page 28.

[2] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.
Available filters can be found at www.boschrexroth.com/filter.

## Technical data
(For applications outside the stated values, please ask us!)

| Hydraulic fluid | | Classification | Suitable sealing materials | Standards | Data sheet |
|---|---|---|---|---|---|
| Mineral oils | | HL, HLP, HLPD, HVLP, HVLPD | NBR, FKM | DIN 51524 | 90220 |
| Bio-degradable | ▶ Insoluble in water | HETG | FKM | ISO 15380 | 90221 |
| | | HEES | FKM | | |
| | ▶ Soluble in water | HEPG | FKM | ISO 15380 | |
| Flame-resistant | ▶ Water-free | HFDU (glycol base) | FKM | ISO 12922 | 90222 |
| | | HFDU (ester base) | FKM | | |
| | | HFDR | FKM | | |
| | ▶ Containing water | HFC (Fuchs: Hydrotherm 46M, Fuchs Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046) | NBR | ISO 12922 | 90223 |

☞ **Important notices on hydraulic fluids:**
- For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.
- **Bio-degradable and flame-resistant – containing water:** If this hydraulic fluid is used, small amounts of dissolved zinc may get into the hydraulic system.
- **Flame-resistant – containing water:**
  - Due to increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended - if possible specific to the installation - to back up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.
  - Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, a maximum duty cycle of 50% in continuous operation has to be set for on/off valves (measuring period 300 s). If this is not possible due to the function, an energy-reducing control of these components is recommended, e.g. via a PWM plug-in amplifier.

| **electric** | | | | | |
|---|---|---|---|---|---|
| Voltage type | | | | Direct voltage | Alternating voltage 50/60 Hz |
| Nominal voltages according to VDE 0580 | | | V | see page 5 and 6 | see page 7 and 8 |
| Voltage tolerance (nominal voltage) | | | % | ±10 | |
| Nominal power according to VDE 0580 | ▶ Standard version | | W | 30 | – |
| | ▶ Version "SO407" | | | 8 | – |
| | ▶ Version "= UR" | | | 34 | – |
| Holding power | | | VA | – | 50 |
| Switch-on power | | | VA | – | 220 |
| Duty cycle (ED) | | | % | 100 (S1 according to VDE 0580) | |
| Switching time according to ISO 6403 [3] | ▶ ON | | ms | 25 ... 45 | 10 ... 20 |
| | ▶ OFF | | ms | 10 ... 25 | 15 ... 40 |
| Maximum switching frequency [4] | ▶ Standard version | | 1/s | 4.2 | 2 |
| | ▶ Version "SO407" | | 1/s | 2 | – |

[3] Measured without flow.
The **switching times** were determined for a hydraulic fluid temperature of 40 °C *[104 °F]* and a viscosity of 46 cSt. Switching times change dependent on hydraulic fluid temperatures, operating time and application conditions.

[4] In order to prevent damage to the interference protection diode, the admissible switching frequency has to be limited to 1 Hz for valves with interference protection circuit ("K72L", "K73L", "DL1", "DAL1", "DK24L1", "DK35L").

## Technical data
(For applications outside the stated values, please ask us!)

| **electric** | | | | |
|---|---|---|---|---|
| Voltage type | | | Direct voltage | Alternating voltage 50/60 Hz |
| Maximum surface temperature of the coil [5] | ▶ Standard version | °C *[°F]* | 120 *[248]* | 120 *[248]* |
| | ▶ Version "SO407" | °C *[°F]* | 85 *[185]* | – |
| | ▶ Version "= UR" | °C *[°F]* | 120 *[248]* | – |
| Insulation class VDE 0580 | ▶ Standard | | | |
| | – Direct voltage | | F | |
| | – AC voltage | | H | |
| | ▶ Version "= UR" | | | |
| | – Version "G12", "G24" | | H | |
| | – Version "G110", "W120R" | | F | |
| Protection class according to DIN EN 60529 | | | see page 5 ... 8 | |
| Protection class according to VDE 0580 | | | see page 5 ... 8 | |
| Electrical protection | | | Maximum admissible switch-off overvoltage<br>see page 5 ... 8<br>Every solenoid must be protected individually, using a suitable fuse with tripping characteristics K (inductive loads). | |
| Protective grounding conductor and screening | | | The valve must be installed on a surface that is included in the equipotential bonding.<br>Connector pin assignment (CE-compliant installation)<br>see page 24 ... 26 | |
| Conformity | | | CE according to Low-Voltage Directive 2014/35/EU checked according to EN 60204-1:2006-01 and DIN VDE 0580, classified as component | |

[5] Due to the **temperatures occurring at the surfaces** of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!
The specified surface temperature in AC solenoids is valid for fault-free operation. In the error case (e.g. blocking of the control spool), the surface temperature may increase above 180 °C *[356 °F]*. Thus, the system must be checked for possible dangers considering the ignition temperature of the hydraulic fluid used. As fuse protection, circuit breakers (see table on page 5 ... 8) must be used, unless the creation of an ignitable atmosphere can be excluded in a different way. In this way, the surface temperature in an error case can be limited to a maximum of 220 °C *[428 °F]*.
You have to use cables that have been approved of for a working temperature of more than 50 °C *[122 °F]* (individual connection) and/or 90 °C *[194 °F]* (central connection).

☞ **Notes:**
- The solenoid coils must not be painted.
- Any simultaneous actuation of 2 solenoids of one valve must be ruled out
- **Fast switch-on**
  For accelerated switching on the solenoid side, valves with individual connection and a nominal voltage of 12 V or 24 V can be controlled with two times the voltage for a maximum of 100 ms (pulse width modulation see data sheet 30362). In this connection, the maximum admissible switching frequency is reduced to 3 1/s.
- **Dampened switching**
  With valves of version "A12", damping of the switch-on and switch-off process is possible (smoothly switching). In this way, switching shocks in the system are considerably reduced.



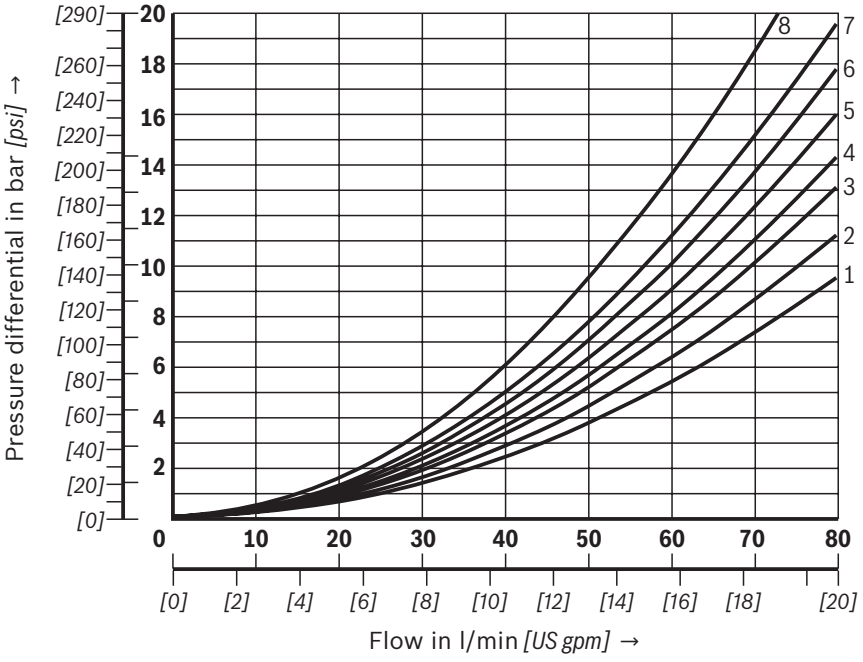

**1** Solenoid
**2** Spring

**Electrical connections** and **available voltages** see page 5 ... 8.

## Characteristic curves

(measured with HLP46, $\vartheta_{oil}$ = 40 ±5 °C *[104 ±9 °F]*)

### $\Delta p$-$q_V$ characteristic curves

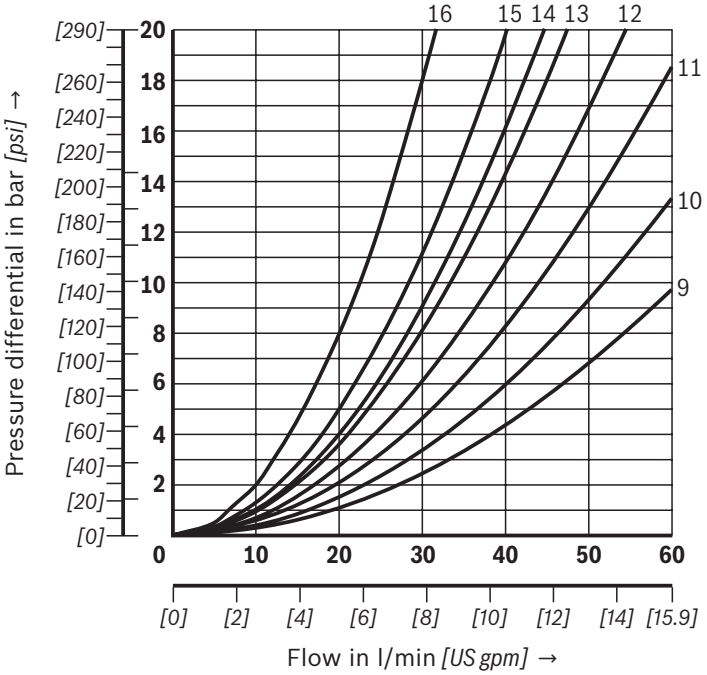



| Symbol | Direction of flow | | | |
|---|---|---|---|---|
| | P – A | P – B | A – T | B – T |
| **A; B** | 5 | 5 | – | – |
| **C; C46** | 3 | 3 | 5 | 3 |
| **D; D46; Y** | 6 | 6 | 5 | 5 |
| **E** | 5 | 5 | 3 | 3 |
| **F** | 3 | 5 | 3 | 3 |
| **T** | 8 | 8 | 4 | 4 |
| **H** | 2 | 1 | 2 | 2 |
| **J; Q** | 3 | 3 | 2 | 3 |
| **L** | 5 | 5 | 1 | 4 |
| **M** | 2 | 1 | 5 | 5 |
| **P** | 5 | 3 | 3 | 3 |
| **R** | 6 | 6 | 1 | – |
| **V** | 3 | 2 | 3 | 3 |
| **W** | 3 | 3 | 2 | 2 |
| **U** | 5 | 5 | 4 | 1 |
| **G** | 7 | 7 | 4 | 4 |

**4** Symbol "H" in central position P – T

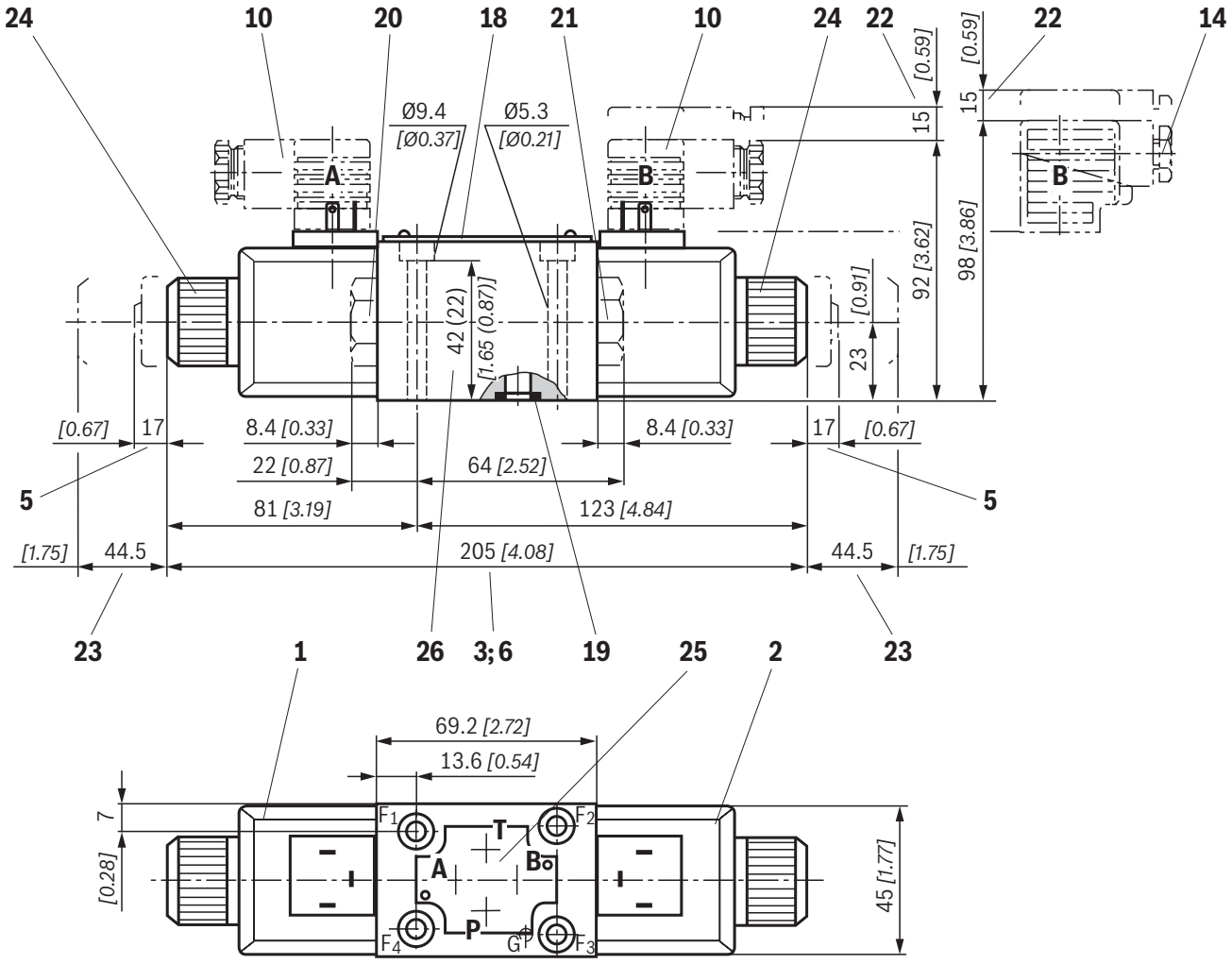
**7** Symbol "R" in spool position B – A

**8** Symbol "G" and "T" in central position P – T

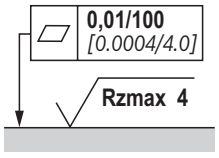



| Symbol | Direction of flow | | | | | |
|---|---|---|---|---|---|---|
| | P – A | P – B | A – T | B – T | P – T | B – A |
| **E73** | 11 | 11 | 11 | 11 | – | – |
| **J73** | 13 | 13 | 9 | 9 | – | – |
| **H73** | 11 | 11 | 11 | 11 | 12 | – |
| **A73; B73** | 15 | 15 | – | – | – | – |
| **D73; Y73** | 14 | 14 | 14 | 14 | – | – |
| **G73** | 16 | 16 | 16 | 16 | 12 | |
| **R73** | 10 | 15 | 10 | – | – | 15 |
| **W73** | 10 | 10 | 10 | 10 | – | – |

**Dimensions:** Alternating voltage – **individual connection**
(dimensions in mm *[inch]*)




For **item explanations, valve mounting screws** and **subplates** see page 23.




Required surface quality of the valve contact surface

☞ **Notice:**
The dimensions are nominal dimensions which are subject to tolerances.

## Dimensions

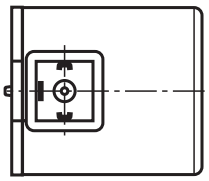
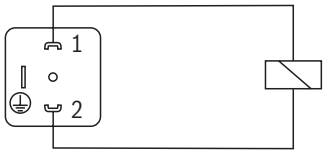
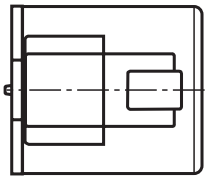
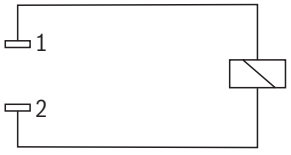
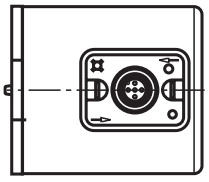
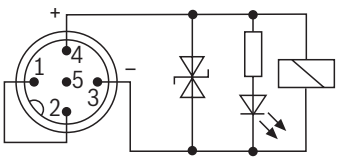
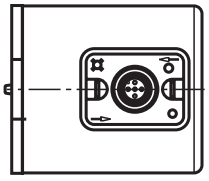
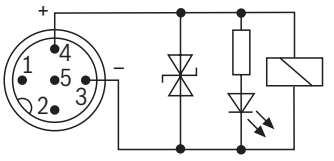
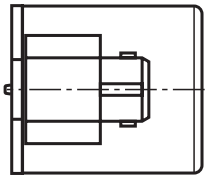
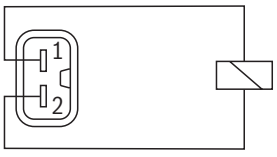
**1** Solenoid "a"
**2** Solenoid "b"
**3** **Without** manual override
**4** **Concealed** manual override **"N9"** (standard); dimensions () version "= UR"
**5** Manual override **"N"**
**6** Lockable manual override "mushroom button" (small) **"N4"**
**7** Lockable manual override "nut" **"N7"**
**8** Lockable manual override "mushroom button" (large) **"N5"**
**9** Manual override "mushroom button" (large), not lockable **"N6"**
**10** Mating connector **without** circuitry for connector "K4", tightening torque M3 maximum $M_{A\ max}$ = 0.5 Nm *[0.37 ft-lbs]* (separate order, see page 27 and data sheet 08006)
**11** Mating connector (AMP Junior Timer) with connector "C4"(separate order, see page 27 and data sheet 08006)
**12** Mating connector DT 04-2PA (Deutsch plug) with connector "K40" (separate order, see page 27 and data sheet 08006)
**13** Mating connector angled with M12x1 plug-in connection with status LED "K72L" (separate order, see page 27 and data sheet 08006)
**14** Mating connector **with** circuitry for connector "K4" (separate order, see page 27 and data sheet 08006)
**15** Cable gland "DL"
**16** Central plug-in connection "DK6L"
**17** Mating connectors for valves with central connection with connector "DK6L" (separate order, see page 27 and data sheet 08006)
**18** Name plate
**19** Identical seal rings for ports A, B, P, T
☞ **Notice:** The ports are clearly determined according to their tasks and must not be arbitrarily interchanged or closed.
**20** Plug screw for valves with one solenoid on B side
**21** Plug screw for valves with one solenoid on A side
**22** Space required to remove the mating connector/angled socket
**23** Space required to remove the coil; dimensions () version "= UR"
**24** Mounting nut, tightening torque $M_A = 4^{+1}$ Nm *[2.95$^{+0.74}$ ft-lbs]*
**25** Porting pattern according to ISO 4401-03-02-0-05 (with or without locating hole) and NFPA T3.5.1 R2-2002 D03 (with locating hole for locking pin ISO 8752-3x8-St, material no. **R900005694**, separate order)
**26** Alternative clamping length (): 22mm *[0.87 inch]*
**27** Cover
**Notice:**
The valve may only be operated with properly mounted cover.

**Subplates** (separate order) with porting pattern according to ISO 4401-03-02-0-05 and NFPA T3.5.1 R2-2002 D03 see data sheet 45100.

**Valve mounting screws** (separate order)

| Clamping length | Quantity | Hexagon socket head cap screws | Material number |
|---|---|---|---|
| **42 mm** *[1.65 inch]* | 4 | **ISO 4762 - M5 x 50 - 10.9-flZn-240h-L**<br>Friction coefficient $\mu_{total}$ = 0.09 ... 0.14; tightening torque $M_A$ = 7 Nm *[5.2 ft-lbs]* ±10 % | **R913043758** |
| | or | | |
| | 4 | **ISO 4762 - M5 x 50 - 10.9**<br>Friction coefficient $\mu_{total}$ = 0.12 ... 0.17; tightening torque $M_A$ = 8.1 Nm *[6 ft-lbs]* ±10 % | Not included in the Rexroth delivery range |
| | or | | |
| | 4 | **UNC 10-24 UNC x 2" ASTM-A574**<br>Friction coefficient $\mu_{total}$ = 0.19 to 0.24; tightening torque $M_A$ = 11 Nm *[8.2 ft-lbs]* ±15%<br>Friction coefficient $\mu_{total}$ = 0.12 to 0.17; tightening torque $M_A$ = 8 Nm *[5.9 ft-lbs]* ±10% | **R978800693** |
| **22 mm** *[0.87 inch]* | 4 | **ISO 4762 - M5 x 30 - 10.9-flZn-240h-L**<br>Friction coefficient $\mu_{total}$ = 0.09 ... 0.14; tightening torque $M_A$ = 7 Nm *[5.2 ft-lbs]* ±10 % | **R913048086** |
| | or | | |
| | 4 | **ISO 4762 - M5 x 30 - 10.9**<br>Friction coefficient $\mu_{total}$ = 0.12 ... 0.17; tightening torque $M_A$ = 8.1 Nm *[6 ft-lbs]* ±10 % | Not included in the Rexroth delivery range |
| | or | | |
| | 4 | **UNC 10-24 UNC x 1 1/4"**<br>Friction coefficient $\mu_{total}$ = 0.19 ... 0.24; tightening torque $M_A$ = 11 Nm *[8.2 ft-lbs]* ±15 %<br>Friction coefficient $\mu_{total}$ = 0.12 ... 0.17; tightening torque $M_A$ = 8 Nm *[5.9 ft-lbs]* ±10 % | **R978802879** |

## **Electrical connections, assignment** – individual connection

| Ordering code connector | | Top view | Circuit diagram | Pin | Connections, assignment |
|---|---|---|---|---|---|
| Connector 3-pole (2 + PE) according to DIN EN 175301-803 | **K4** |  |  | 1 | Solenoid coil, polarity-independent |
| | | | | 2 | |
| | | | | ⏚ | Grounding |
| Connector 3-pole (2 + PE) according to DIN EN 175301-803 (with potted-in plug base and sealing element) | **K4K**[1] | | | | |
| Connector 2-pole, DT04-2PA (Deutsch type) | **K40**[2] |  |  | 1 | Solenoid coil, polarity-independent |
| | | | | 2 | |
| Connector, 4-pole, M12x1 according to DIN EN 61076-2-101 with suppressor diode, pin assignment according to DESINA | **K72L** |  |  | 1 | Internal bridge |
| | | | | 2 | |
| | | | | 3 | Solenoid coil GND |
| | | | | 4 | Solenoid coil 24 V DC supply voltage |
| | | | | 5 | Without function |
| Connector, 4-pole, M12x1 according to DIN EN 61076-2-101 with suppressor diode | **K73L** |  |  | 1 | Without function |
| | | | | 2 | |
| | | | | 3 | Solenoid coil GND |
| | | | | 4 | Solenoid coil 24 V DC supply voltage |
| | | | | 5 | Without function |
| Connector 2-pole, parallel to the valve axis (Junior-Timer type) | **C4**[2] |  |  | 1 | Solenoid coil, polarity-independent |
| | | | | 2 | |

1) Coil with potted-in connector base and sealing element to valve housing (IP67)

2) Plug-in system suitable for mobile applications

**When establishing the electrical connection, the protective grounding conductor (PE ⏚) must be connected correctly.**

☞ **Notes:**

- Electric lines must be routed in a strain-relieved manner.
- Cable glands are only suitable for permanently installed cables.
- Connectors are to be locked during operation. Not intended to be plugged in or disconnected during normal operation under load.
- Use of finely stranded conductors with cross-section 0.75 mm² (AWG 20), 1 mm² (AWG 18), 1.5 mm² (AWG16) with suitable wire end ferrules without flange with a length of 8 mm *[0.31 inch]* based on DIN 46228-1.
- Crimping after stripping $9^{+1}$ mm *[0.35 ... 0.039 inch]* by means of tool, e.g. "PZ 6/5", company Weidmüller.
- Proper connection of the protective grounding conductor at ⏚.
- Protective grounding conductor cross-section equal to or greater than the line cross-section of the voltage supply.
- The valve mounting surface must be connected to the protective grounding conductor system.

## Project planning information

**Temperature range and maximum operating pressure in case of use at low temperatures**

| Port | Pressure | **Temperature range** in °C *[°F]* |
|---|---|---|
| – P, A, B, T | static 100 bar *[1450 psi]* | –40 ... –35 *[–40 ... –31]* |
| – P, A, B | dynamic from 100 bar *[1450 psi]* to 350 bar *[5076 psi]* in linear form as a function of the temperature | –35 ... –30 *[–31 ... –22]* |
| – T | dynamic from 100 bar *[1450 psi]* to 210 bar *[3050 psi]* in linear form as a function of the temperature | –35 ... –30 *[–31 ... –22]* |
| – P, A, B, T | Maximum operating pressure | –30 ... +50 *[–22 ... 122]* |

## Further information

| | |
|---|---|
| ▶ Subplates | Data sheet 45100 |
| ▶ Inductive position switch and proximity sensors (contactless) | Data sheet 24830 |
| ▶ Hydraulic fluids on mineral oil basis | Data sheet 90220 |
| ▶ Environmentally compatible hydraulic fluids | Data sheet 90221 |
| ▶ Flame-resistant, water-free hydraulic fluids | Data sheet 90222 |
| ▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC) | Data sheet 90223 |
| ▶ Reliability characteristics according to EN ISO 13849 | Data sheet 08012 |
| ▶ Connector switching amplifier with pulse width modulation (PWM) | Data sheet 30362 |
| ▶ Hydraulic valves for industrial applications | Data sheet 07600-B |
| ▶ CE declaration of conformity according to Low-Voltage Directive 2014/35/EU | upon request |
| ▶ Selection of filters | www.boschrexroth.com/filter |
| ▶ Information on available spare parts | www.boschrexroth.com/spc |

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