rexroth
A Bosch Company

Operating Instructions

# Hydraulic valves ...XE...

Type of protection "Structural safety c, EX h"

RE22100-XE-B, 2023-04

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# Table of contents

# 1 About this documentation

## 1.1 Validity of the documentation

This documentation contains important information on the safe and proper transport, assembly, commissioning, operation, maintenance, disassembly and simple troubleshooting of the product.

- Read this documentation completely before working with the product.

The documentation version with which the product was supplied is valid.

## 1.2 Required and amending documentation

The product must not be commissioned until you have been provided with the marked applicable documentation is available marked with the book symbol 🕮 and you have understood and observed it.

| | Title | Document number | Document type |
|---|---|---|---|
| 🕮 | Directional seat valves, direct operated, with solenoid actuation type SED6 ..1X/...XE... | 22049-XE | Data sheet |
| 🕮 | Directional spool valves, direct operated, with solenoid actuation, type WE6..6X/...XE... | 23178-XE | Data sheet |
| 🕮 | Directional seat valves, direct operated, with solenoid actuation, type SEW6..3X/...XE... | 22058-XE | Data sheet |
| 🕮 | Directional seat valves, direct operated, with solenoid actuation, type SEW10..1X/...XE... | 22075-XE | Data sheet |
| 🕮 | 4/2 and 4/3 directional control valves, internally pilot-operated, externally pilot-operated type H-4WEH...XE... | 24751-XE | Data sheet |
| 🕮 | Proportional directional control valves, pilot-operated, without electrical position feedback type 4WRZ..7X/...XE... | 29115-XE | Data sheet |
| 🕮 | Proportional directional valve, direct operated, without electrical position feedback type 4WRA6..2X/...XE... | 29055-XE | Data sheet |
| 🕮 | Proportional pressure reducing valve, direct operated type 3DREP6..2X/...XE... | 29184-XE | Data sheet |
| | General product information on hydraulic products | 07008 | Data sheet |

## 1.3 Representation of information

This documentation uses common safety instructions as explained in the following section.

### 1.3.1 Safety instructions

#### Safety instructions

The measures described for hazard avoidance must be observed.

Safety instructions are set out as follows:

| | |
|---|---|
| ⚠ WARNING | **Type and source of danger!**<br>Consequences in case of non-compliance<br>– Hazard avoidance measures |

- **Warning sign:** draws attention to the danger
- **Signal word:** identifies the degree of danger
- **Type and source of danger:** specifies the type and source of danger
- **Consequences**: describes the consequences of non-compliance
- **Precautions**: specifies how the danger can be prevented

| | |
|---|---|
| ⚠ DANGER | Indicates a dangerous situation which will cause death or severe injury if not avoided. |
| ⚠ WARNING | Indicates a dangerous situation which may cause death or severe personal injuries if not avoided. |
| ⚠ CAUTION | Indicates a dangerous situation which may cause minor or medium personal injuries if not avoided. |
| *NOTICE* | Damage to property: The product or the environment could be damaged. |

# 2 Safety instructions

## 2.1 About this chapter

The product has been manufactured according to the generally accepted codes of practice. However, there is still the danger of personal injury and damage to property if you do not observe this chapter and the safety instructions in this documentation.

- Read this documentation completely and thoroughly before working with the product.
- Keep this documentation in a location where it is accessible to all users at all times.
- Always include the required documentation when you pass the product on to third parties.

## 2.2 Intended use

The product is a hydraulic valve for intended use in an explosive atmosphere.

The product is only intended for professional use and not for private use.

Intended use includes having read and understood this documentation.

Information on the admissible areas of application can be found in the "data sheet".

The hydraulic valve may only be operated in a technically perfect condition and used as described in these operating instructions. The connection conditions, application conditions and performance data defined in these operating instructions must not be changed.

## 2.3 Improper use

Any use deviating from the intended use is improper and thus inadmissible.

Bosch Rexroth AG does not assume any liability for damage caused by improper use. The user assumes responsibility for all risks surrounding improper use.

## 2.4 Qualification of personnel

The activities described in this documentation require basic knowledge of mechanics, electrics, hydraulics and pneumatics as well as knowledge of explosion protection. For transporting and handling the product, additional knowledge of how to handle lifting gear and the necessary attachment devices is required. In order to ensure safe use, these activities may only be carried out by an expert in the respective field or an instructed person under the direction and supervision of an expert.

## 2.5 Product-specific safety instructions

The following safety instructions apply to chapters 6 to 14.

| | |
|---|---|
| ⚠ WARNING | **Explosion hazard due to ignitable atmosphere during all work on the hydraulic valve!**<br>During all work on the hydraulic valve (assembly, disassembly etc.), there must not be an explosive atmosphere. Otherwise, an ignition may be triggered which may lead to an explosion.<br>– Before working with the hydraulic valve, ensure that no explosive atmosphere can occur during the work. |
| ⚠ WARNING | **Easily inflammable liquid!**<br>In connection with an explosive atmosphere or other heat sources, the use of liquids (e.g. hydraulic fluids, coolants, cleaning agents) may lead to explosions.<br>– Only use the hydraulic valve in the intended explosion protection area.<br>– The ignition temperature of the liquid used must be 50 K higher than the maximum surface temperature of the hydraulic valve. |
| ⚠ WARNING | **Exceeding of maximum temperatures!**<br>Use of the hydraulic valve outside the approved temperature ranges may lead to functional failures like overheating of the solenoid coil. Explosion protection is therefore no longer ensured.<br>– Only use the hydraulic valve within the intended environmental and hydraulic fluid temperature range. |

**⚠ WARNING**

**Hot hydraulic valve surface!**

Risk of burning!

- Provide a suitable touch guard.
- During operation, only touch the hydraulic valve with heat-protective gloves. Allow the hydraulic valve to cool down to room temperature before touching it directly with your hands during maintenance works.

**⚠ WARNING**

**Explosion hazard caused by electrical voltage!**

- Explosion hazard by opening the cover while the valve is applied to electrical voltage.
- Do not open the cover of the terminal box until the valve is de-energized and depressurized and there is no explosive atmosphere.

**⚠ WARNING**

**Pressurized system parts and leaking hydraulic fluid!**

When working at hydraulic systems with stored energy (accumulator or cylinders working under gravity), the hydraulic valve may even be pressurized after the pressure supply has been switched off. During assembly and disassembly works, the hydraulic valve or parts may fly around and cause personal injuries and/or damage to property. There is moreover the danger of serious injury caused by a leaking hydraulic fluid jet.

- Ensure before working at the hydraulic valve that the hydraulic system is depressurized and the electrical control de-energized.
- Completely unload the pressure at machines and systems before working at the hydraulic valve.

**⚠ WARNING**

**Non-compliance with functional safety!**

The hydraulic valve controls movements in machines or systems. In case of mechanical and electric faults, e.g. failure of the energy supply, persons may be caught by the system, slung away or bruised.

- During set-up of your circuit, observe functional safety e.g. according to EN ISO 13849.

**⚠ WARNING**

**Penetrating water and humidity!**

In case of use in humid or wet environments, water or humidity may penetrate electrical connections or the valve electronics. In this case, malfunctions may occur at the hydraulic valve.

- Only use the hydraulic valve within the intended IP protection class or lower.
- Ensure before the assembly that all seals and caps of the plug-in connections are tight and intact.

| ⚠ CAUTION | **Contaminated hydraulic fluid!** |
|---|---|
| | Contamination in the hydraulic fluid may cause functional failures e.g. jamming or blocking of nozzles of the hydraulic valve. In the worst case, this can result in unexpected hydraulic functions.<br>– Ensure adequate hydraulic fluid cleanliness according to the specifications in the "data sheet" over the entire operating range. |

| ⚠ CAUTION | **Leakage in case of incorrect working temperatures!** |
|---|---|
| | Use of the hydraulic valve outside the approved temperature range may lead to permanent leakage.<br>– Only use the hydraulic valve within the intended environmental and hydraulic fluid temperature range.<br>– In case of leakage of hydraulic fluid, immediately exchange damaged seal rings or the hydraulic valve. |

| ⚠ CAUTION | **Corrosion!** |
|---|---|
| | The hydraulic valve has a surface protection, see "data sheet". Use of the hydraulic valve in humid environments still holds the danger of corrosion on the hydraulic valve and on the valve mounting screws and thus a reduction of the preload force of the screw connection. To avoid loosening of the hydraulic valve and mitigate the associated risk:<br>– Replace hydraulic valves with corrosion damage early.<br>– Check the surface protection on the hydraulic valve and the valve mounting screws at regular intervals. |

Contact with salt water leads to increased corrosion at the hydraulic valve. This can lead to chemical corrosion of individual components of the hydraulic valve. Take suitable corrosion protection measures.

## 2.6 Notes on the valve use

The hydraulic valve must always be filled with hydraulic fluid.

## 2.7 Obligations of the machine end-user

The machine end-user of the Bosch Rexroth product is responsible for ensuring that the applicable provisions, rules and directives for explosion protection are observed.

### IT security

The operation of installations, systems and machines basically requires the implementation of a holistic IT security concept which is state-of-the-art in terms of technology. Accordingly, Bosch Rexroth products and their properties have to be considered as components of installations, systems and machines for their holistic IT security concept. Unless otherwise documented, Bosch Rexroth products are designed for operation in local, physically and logically secured networks with access restrictions for authorized persons, and they are not classified according to IEC 62443-4-2.

# 3 General information on damage to property and damage to product

The warranty only applies to the delivered configuration.

- The claim to warranty expires if the product is assembled, commissioned and operated incorrectly, not used as intended and/or handled improperly.
- The following safety instructions apply to chapters 6 to 14.

| NOTICE | **Inadmissible mechanical load!** |
|---|---|
| | Impact or shock forces on the hydraulic valve may damage or even destroy it. |
| | – Never use the hydraulic valve as handle or step. Do not place/put any objects on top of it. |

| NOTICE | **Dirt and foreign particles in the hydraulic valve!** |
|---|---|
| | Penetrating dirt and foreign particles in the hydraulic valve lead to wear and malfunctions. Safe function of the hydraulic valve can no longer be ensured. |
| | – During installation, ensure utmost cleanliness.<br>– Before commissioning, ensure that all hydraulic connections are tight and that all seals and caps of the plug-in connections are correctly installed and undamaged.<br>– Do not use linting fabric for cleaning.<br>– Ensure that no cleaning agents are able to penetrate the hydraulic system. |

| NOTICE | **Environmentally harmful hydraulic fluid!** |
|---|---|
| | Leaking hydraulic fluid leads to environmental pollution. |
| | – Immediately remedy possible leakage.<br>– Dispose of the hydraulic fluid in accordance with the currently applicable national regulations in your country. |

# 4 Scope of delivery

The scope of delivery includes:

- Hydraulic valve
- Product documentation

1. Check the scope of delivery for completeness.
2. Check the scope of delivery for possible transport damage and report it to your responsible contact person in the sales department within one week.

In case of complaints, please contact Bosch Rexroth AG, see ➦ Chapter 16.1 “List of addresses” on page 31.

# 5 About this product

For information on the performance and product description please refer to the "data sheet".

## 5.1 Identification of the hydraulic valve

Some important name plate information are listed in the following table:

| | |
|---|---|
| **Trade mark** | Rexroth |
| **Name of the manufacturer** | Bosch Rexroth AG |
| **Address of the manufacturer** | 97816 Lohr am Main, Germany |
| **Mark** | CE |
| **Valve type** | see "data sheet" |
| **Date of production (year and week)** | e.g. 23W01 = 1st calendar week 2023 |
| **EX marking** | Ex II 2G |
| | Ex II 2D |

## 5.2 Explosion protection marking

### Zones, device groups and categories

The product must only be used in the areas corresponding to the device group and category. During use, also observe the other information on explosion protection in the "data sheet".

Table 1: Device groups and categories

| Device group and category according to 2014/34/EU | Area of application, properties (excerpt from the directives) |
|---|---|
| I M1 | Firedamp areas (= device group I), i.e. underground parts of mines and their overground systems. In case of an explosive atmosphere, further operation is possible. Very high safety level. |
| I M2 | Firedamp areas (= device group I), i.e. underground parts of mines and their overground systems. In case of an explosive atmosphere, the device must be deactivated. High safety level. |
| II 1G | Potentially explosive areas where explosive gases, mists or vapors (= device group II) are continually, long-term or often present. Very high safety level. |
| II 2G | Potentially explosive areas where explosive gases, mists or vapors (= device group II) are occasionally present. High safety level. |
| II 3G | Potentially explosive areas where explosive gases, mists or vapors (= device group II) are normally not present or occur only rarely or short-time. Normal safety level. |
| II 1D | Potentially explosive areas where explosive dust/air mixtures (= device group II) are continually, long-term or often present. Very high safety level. |
| II 2D | Potentially explosive areas where explosive dust/air mixtures (= device group II) are occasionally present. High safety level. |

| Device group and category according to 2014/34/EU | Area of application, properties (excerpt from the directives) |
|---|---|
| II 3D | Potentially explosive areas where an explosive atmosphere due to stirred dust (= device group II) is normally not present or occurs only rarely or short-time. Normal safety level. |



# 6 Transport and storage

## 6.1 Transporting the hydraulic valve

**⚠ CAUTION**

**Danger of damage to property and personal injuries!**

The hydraulic valve can fall down during improper transportation and lead to damage and/or injuries.

- Use personal protective equipment (such as gloves, working shoes, safety goggles, working clothes, etc.).
- Comply with the national laws and regulations regarding occupational health and safety and transport.
- Do not transport the hydraulic valve using components with low stability, e.g. valve solenoids, connectors or cables.

**⚠ CAUTION**

**Sharp edges!**

Danger of cut injuries!

- Wear suitable protective equipment for the transport of the hydraulic valve.

Further information regarding the transport is available from Bosch Rexroth, see ➦ Chapter 16.1 “List of addresses” on page 31.

## 6.2 Storing the hydraulic valve

Hydraulic valves can be stored for up to 12 months under the following conditions:

- Hold the storage temperature range as specified in the "data sheet".
- The relative air humidity must not exceed 65%.
- The storage rooms must provide 100% UV protection.
- The hydraulic valve must not be exposed to ozone.
- The storage facilities must be free from etching substances and gases.
- Do not store the hydraulic valve outdoors but in a well-ventilated room.
- Protect the hydraulic valve against humidity.
- Store the hydraulic valve protected against impacts and sliding and do not stack it.
- Protect the hydraulic valve from dust and dirt.
- All connections at the hydraulic valve must be closed with cap elements.

### Procedure after the expiration of the maximum storage time of 12 months

1. Check the complete hydraulic valve for damage and corrosion prior to installation.
2. In a test run, check the hydraulic valve for correct function and leak-tightness.

After expiry of the maximum storage time, we recommend having the hydraulic valve checked by your competent Bosch Rexroth service. In case of questions regarding spare parts, please contact local Bosch Rexroth service responsible for your hydraulic valve.

### After disassembly

If a dismounted hydraulic valve is to be stored, it has to be preserved for protection against corrosion for the duration of storage.

Bosch Rexroth recommends the following procedure:

1. Proceed as described in chapter 10.1 "Cleaning and care".
2. Pack the hydraulic valve with a desiccant air-tightly in corrosion protection film.

In each case, please observe any applicable provisions and laws regarding the handling of substances hazardous to water or to health.

# 7 Assembly

## 7.1 Changes at the surface protection of the hydraulic valve

| ⚠ WARNING | **Explosion hazard due to modifications on the hydraulic valve!** |
|---|---|
| | In the event of changes to the surface protection of the hydraulic valve, the following points must be observed:<br>– The valve solenoid must not be painted or otherwise coated with non-conductive substances. This leads to a loss of the explosion protection.<br>– Painting of the hydraulic valve housing may only be applied according to the provisions of EN 80079-36, section 6.7; otherwise, explosion protection can no longer be ensured. |

## 7.2 Before the assembly

| ⚠ CAUTION | **High pressure!** |
|---|---|
| | Risk of injury!<br>– Carry out any work at the hydraulic valve only after the system has been depressurized. |

| ⚠ WARNING | **Explosion hazard due to wrong area of application!** |
|---|---|
| | A hydraulic valve which is not approved for the area of application can cause explosions!<br>– Please check if you have the right valve type by means of the type designation on the name plate of the hydraulic valve. |

- Transport protection elements (e.g. cover plates, protective plugs) must be removed prior to use in an explosive atmosphere.

## 7.3 Required accessories

### Valve mounting screws

The information regarding the valve mounting screws can be found in the "data sheet".

### Subplates

The information regarding the subplates can be found in the "data sheet".

### Special tool (only relevant for type ...N9...)

The special tool is used for operation of the manual override.

Table 2: Special tool

| | Material number |
|---|---|
| Special tool | R900024943 |

### Ordering address for accessories and hydraulic valves

The address of our responsible sales organizations can be found on the Internet at www.boschrexroth.com and in the ➦ Chapter 16.1 “List of addresses” on page 31.

## 7.4 Assembling the valve

### 7.4.1 Installing the hydraulic valve in the system

1. **Action 1 is only relevant for type SEW6..3X/...XE... and SEW10..1X/...XE...:**
   Loosen the mounting nut of the solenoid coil on the pole tube (hexagon nut, SW 32).
2. **Action 2 is only relevant for type SEW6..3X/...XE... and SEW10..1X/...XE...:**
   Remove the solenoid coil and O-ring from the hydraulic valve.
3. Check the seal rings on all sealing surfaces for completeness and intactness. Other sealants are not admissible.
4. Place the hydraulic valve on the mounting surface.

5. Tighten all valve mounting screws. The following tightening torques apply to installation on cast iron or steel.

| Type | Size | Tightening torque with admissible tolerance | Number of valve mounting screws |
|---|---|---|---|
| SED6 ..1X/...XE... | NG6 | 7 Nm ±10% | 4 |
| WE6..6X/...XE... | NG6 | 7 Nm ±10% | 4 |
| SEW6..3X/...XE... | NG6 | 7 Nm ±10% | 4 |
| SEW10..1X/...XE... | NG10 | 12.5 Nm ±10% | 4 |
| H-4WEH...XE... | NG10 | 12.5 Nm ±10% | 4 |
| | NG16 (M10x60) | 58.0 Nm ±10% | 4 |
| | NG16 (M6x60) | 12.5 Nm ±10% | 2 |
| | NG25 | 100.0 Nm ±10% | 6 |
| | NG32 | 340.0 Nm ±10% | 6 |
| 4WRZ..7X/...XE... | NG10 | 13.5 Nm ±10% | 4 |
| | NG16 (10x60) | 58.0 Nm ±20% | 4 |
| | NG16 (M6x60) | 12.2 Nm ±20% | 2 |
| | NG25 | 100.0 Nm ±20% | 6 |
| | NG32 | 340.0 Nm ±20% | 6 |
| 4WRA6..2X/...XE... | NG6 | 7 Nm ±10% | 4 |
| 3DREP6..2X/...XE... | NG6 | 7 Nm ±10% | 4 |

ℹ If the hydraulic valve is to be mounted on mounting surfaces of a different material, it might be necessary to use a lower tightening torque in order to exclude any damage.

6. **Action 6 is only relevant for type SEW6..3X/...XE... and SEW10..1X/...XE...:**

Replace the solenoid coil so that the coil pin snaps into the bore of the hydraulic valve housing.

ℹ Ensure that each solenoid coil is reassigned to the original hydraulic valve.

7. **Action 7 is only relevant for type SEW6..3X/...XE... and SEW10..1X/...XE...:**

Assemble the O-ring onto the pole tube and push it to the solenoid coil.

8. **Action 8 is only relevant for type SEW6..3X/...XE... and SEW10..1X/...XE...:**

Tighten the mounting nut of the solenoid coil (hexagon nut, SW 32, tightening torque 4+1 Nm). There must not be any visible gap between solenoid coil and hydraulic valve housing.

## 7.4.2 Establishing the electrical connection

**⚠ WARNING**

**High electrical voltage!**

Danger to life, risk of injury caused by electric shock due to incorrect connection and faulty pin assignment.

- Provide for proper, safe PE connection.
- Before switching on, check whether the protective grounding conductors at all electric devices are firmly connected according to the connection diagram.
- Close the terminal box according to the guidelines in these operating instructions.

**⚠ WARNING**

**Explosion hazard due to missing equipotential bonding!**

Electrostatic processes, an incorrect grounding concept or missing equipotential bonding may lead to an explosion. Moreover, this can cause hydraulic malfunctions!

- Provide for correct grounding and provide for proper equipotential bonding.
- The base plate and/or subplate on which the hydraulic valve is fitted must be electrically conductive and included in the equipotential bonding according to EN 60079-14 and IEC 60364-4-41.

**⚠ WARNING**

**Explosion hazard caused by overheating!**

A wrongly dimensioned fuse protection may lead to overheating and thus explosion!

- Technical design of the fuse protection, "data sheet"
- This fuse may only be installed outside the potentially explosive area or must be of an explosion-proof design.

For information on the prescribed pre-fuse, see "data sheet".

**⚠ WARNING**

**Explosion hazard due to improper installation!**

No precautions are taken for safe connection of the shielding or sheathing in the terminal box of the solenoid coil and on the cable and line entry. The use of connection lines with shielding or sheathing can lead to potential backfeeding and is thus an explosion hazard!

- Only use connection lines without shielding or sheathing.

**⚠ CAUTION**

**Danger of damage to property and personal injuries!**

A faulty energy supply can lead to uncontrolled switching processes. These could result in possible malfunctions or failure of the hydraulic valve.

- Only use a power supply unit with safe separation.
- Always comply with the country-specific regulations.

| ⚠ CAUTION | **Danger of short circuit due to missing seals and caps!**<br>Fluids may enter the hydraulic valve and cause a short-circuit.<br>– Before commissioning, ensure that all seals and caps of the plug-in connections are leak-proof. |
|---|---|

| NOTICE | **Risk of short-circuit!**<br>Condensed water can build up in the terminal box and cause a short-circuit!<br>– Allow the hydraulic valve to acclimatize for a few hours before establishing the electrical connection. |
|---|---|

- Only the cable and line entry installed in the scope of delivery and the installed blind plug may be used.
- When selecting the connection line, please observe the requirements regarding the temperature rating and avoid contact of the connection line with the solenoid coil surface. For selection and installation, observe the requirements of EN 60079-14.
- Ensure that there are no bends in the connection line and braided wires to avoid short-circuits and interruptions.
- Only assemble the cable and line entries according to the assembly instructions. Before assembly, check whether the individual components of the cable and line entry are complete and that the sealing elements are undamaged.
- The sealing elements of the cable and line entry are only intended for single use.
- Use finely stranded conductors only if they have pressed-on wire end ferrules.
- Use only lines satisfying the requirements on the terminal areas of the connection terminals and the cable and line entry, refer to "data sheet".
- During installation, ensure that the sealing elements are correctly seated to warrant the leak-tightness of terminal box and cable and line entry.
- Route the connection line in a strain-relieved form. The first mounting point must be within 15 cm of the cable and line entry.
- The wires of the connection line are connected to the 2-pole operating voltage connection and to the connection for protective grounding conductor. Connect the separate equipotential bonding conductor to the connection for potential equalization conductor.

The connection of the solenoid coil is polarity-independent. With solenoid coils for connection to alternating voltage, a bridge rectifier is integrated in the solenoid coil.

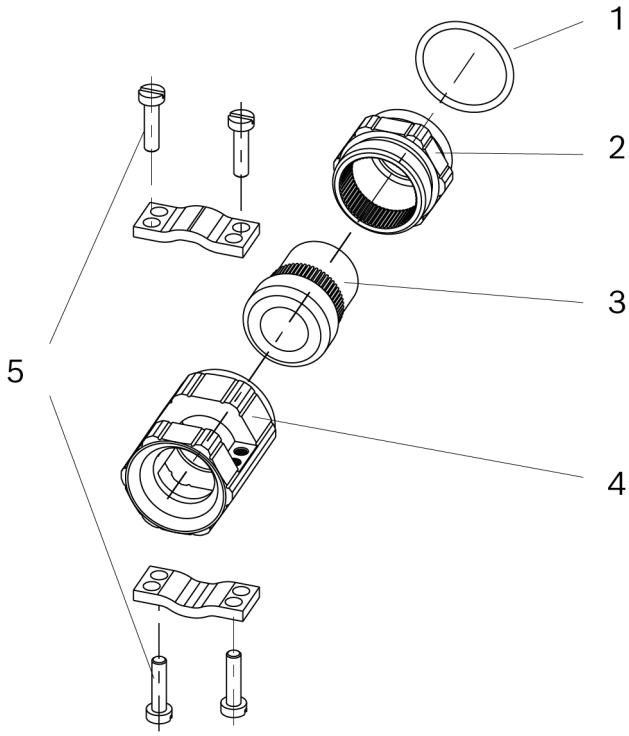


Fig. 1: Cable and line entry
1 O-ring
2 Double nipple
3 Seal insert
4 Pressure nut (with clamping collar)
5 Clamping screws for strain relief

1. De-energize and depressurize the relevant system part.
2. Open the terminal box (internal hexagon, SW 3)
3. Remove the outer sheath of the connection line and the insulation of the individual conductors.
   ℹ The stripping lengths can be taken from ➦ "Stripping lengths" on page 22.
4. Disassemble the pressure nut (with clamping collar) **(4)** and the clamping screws for strain relief.
5. Ensure the correct seat of the seal insert in the double nipple.

6. Assemble the pressure nut (with clamping collar) **(4)** on the connection line and lead it through the seal insert **(3)** and the double nipple **(2)** into the terminal box.

   The outer sheath of the connection line must lie in the seal insert **(3)**. Otherwise, the explosion protection and the IP protection are not ensured.

7. Screw the pressure nut (with clamping collar) **(4)** onto the double nipple **(2)** and tighten it with a torque of 10...12 Nm (hexagon nut, SW 22). When tightening the pressure nut (with clamping collar) **(4)**, the solenoid coil must be suitably supported or stabilized at the double nipple **(2)** using an open-end wrench (SW 22).

8. Tighten the clamping screws of the strain relief **(5)** firmly. The required tightening torque depends on the line diameter.

9. Guide the individual conductor into the connection terminal and screw this into place with the clamping screws.

   Tightening torques for the clamping screws:

   Table 3: Tightening torques

| | |
|---|---|
| Operating voltage connection | 0.4...0.5 Nm |
| Connection for protective grounding conductor | 1.0...1.2 Nm |
| Connection for potential equalization conductor | 2.0...2.4 Nm |

   For the position of the clamping screws, see "data sheet" under chapter "Electrical connection"

10. Assemble the cover with the seal underneath. Tighten the mounting screws with their spring washers diagonally, one after the other; tightening torque of the cover screws: 1...1.1 Nm.

## Stripping lengths

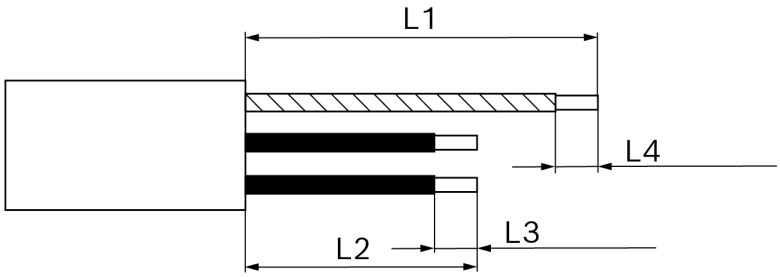


Fig. 2: Stripping lengths

L1 Cable sheath stripping length and, at the same time, resulting length of the individual conductor for connecting the protective grounding conductor
L2 Length for the individual conductors of the voltage supply
L3 Stripping length of the individual conductor insulation for inserting the wire end ferrules
L4 Stripping length of the individual conductor for the protective equipotential bonding (PE) (internal)

Table 4: Stripping lengths

| Cable and line entry position | Length L1 in mm | Length L2 in mm | Length L3 in mm | Length L4 in mm |
|---|---|---|---|---|
| Central nut side | ≥ 44 | 24 | 5 +1 | 5.5 ± 0.5 |
| Hydraulic valve housing side | ≥ 84 | 64 | 5 +1 | 5.5 ± 0.5 |

### 7.4.3 Assembling the cable and line entry on the opposite side of the terminal box (not admissible for type SEW6..3X/...XE..., SEW10..1X/...XE...)

1. Disassemble the solenoid coil, see ➦ Chapter 7.4.4 “Rotating the solenoid coil by ± 90°” on page 23.
2. Remove the blind plug (hexagon, SW 22).
3. Remove the cable and line entry. To do this, unscrew the cable and line entry from the double nipple **(2)**. Make sure not to lose the O-ring **(1)** between the housing and double nipple.
4. Assemble the cable and line entry on the opposite side of the terminal box. Tightening torque of the double nipple **(2)**: 10...12 Nm
5. Assemble the blind plug. Tightening torque of the blind plug 7...9 Nm
6. Assemble the solenoid coil, see ➦ Chapter 7.4.4 “Rotating the solenoid coil by ± 90°” on page 23.

### 7.4.4 Rotating the solenoid coil by ± 90°

**⚠ WARNING**

**Explosion hazard due to improper installation!**

Improper assembly will result in loss of the explosion protection!

- Strictly observe the following modification instructions for rotating the solenoid coil.
- When rotating the solenoid coil, make sure that it does not project over the valve connection surface of the hydraulic valve.
- Make sure that the solenoid coil moves freely and does under no circumstance rest on the base plate.
- A gap between the hydraulic valve housing and the solenoid coil is not admissible.
- Ensure that each solenoid coil is reassigned to the original hydraulic valve.
- After rotating the solenoid coil, the coil pin must engage in the bore of the hydraulic valve housing.

Solenoid coils can be rotated around the pole tube by ±90°.

The pole tube of the solenoid coil is completely sealed off from the oil circuit. The solenoid coil can therefore still be twisted if the hydraulic valve has already been installed.

1. Loosen the mounting nut of the solenoid coil on the pole tube (hexagon nut, SW 32).
2. Remove the solenoid coil and the O-ring from the hydraulic valve and rotate it by 90° in the desired direction.

3. Reattach the solenoid coil in the desired position. After rotating the solenoid coil, the coil pin must engage in the bore of the hydraulic valve housing.
4. Assemble the O-ring onto the pole tube and push it to the solenoid coil.
5. Tighten the mounting nut of the solenoid coil (hexagon nut, SW 32, tightening torque 4 + 1 Nm). There must not be any visible gap between solenoid coil and hydraulic valve housing.

# 8 Commissioning

| ⚠ WARNING | **Faulty assembly!** |
|---|---|
| | If the hydraulic valve is not correctly mounted, persons might be injured and the hydraulic valve or system could be damaged when commissioning the hydraulic valve. |
| | – The solenoid coil must only be started with connected protective grounding conductor and connection for potential equalization conductor. |

In order to commission the hydraulic valve, proceed as described in the sections below:

## Check electrical connections

- Check the inside of the terminal box for corrosion. In case of visible corrosion, do not install the hydraulic valve.
- The electrical connections in the terminal box must be checked for proper condition before re-commissioning or initial operation.
- Seals are subject to a natural process of aging and for this reason, check seals for damages every time the terminal box is opened and replace them if required.

## Bleeding the hydraulic system

Observe the operating instructions of the device and/or system into which the hydraulic valve is installed.

- Before the actual operation, switch the hydraulic valve several times with reduced pressure. As a result, residual air is forced out of the hydraulic valve.
- You can also achieve the switching movement of the valve control spool necessary for the bleeding procedure by manually actuating the manual override **(relevant for type ...N... and ...N9...)**.

## Set switching time (only relevant for type H-4WEH...XE...)

With hydraulic valves, which have been equipped with a twin throttle check valve ex factory **(type ...S... or ...S2...)**, see "data sheet", you can adjust the switching time yourself.

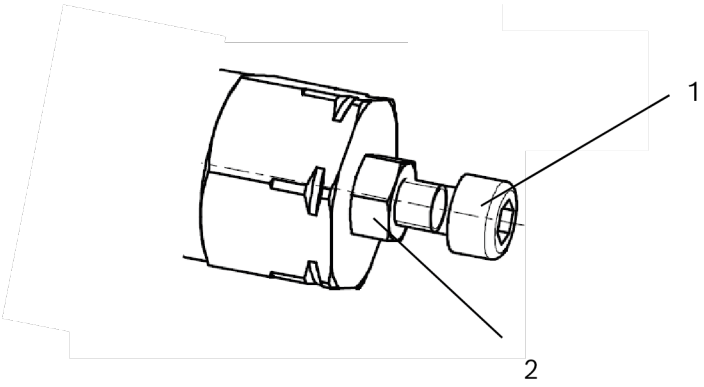


Fig. 3: Adjustment unit for switching time adjustment

1. Loosen the lock nut **(2)** (SW 10).
2. Change the switching time by rotating the set screw **(1)** (internal hexagon, SW 5).

   **Clockwise** rotation extends the switching time.
   **Counterclockwise** rotation shortens the switching time.
3. Hold the set screw **(1)** in position with the hexagon socket wrench and tighten the lock nut **(2)** with a tightening torque of 8 Nm ±25%.

# 9 Operation

## 9.1 General information

| | |
|---|---|
| ⚠ WARNING | **Explosion hazard caused by overheating!**<br>Loss of explosion protection due to overheating!<br>– In case of hydraulic valves with two solenoid coils, maximally one of the solenoid coils may be energized at a time!<br>**Only admissible for type WE6..6X/...XE...., SED6 ..1X/...XE..., SEW6..3X/...XE..., SEW10..1X/...XE...:**<br>– Simultaneous power supply of several hydraulic valves in bank assembly is possible if the ambient temperature does not exceed 60 °C.<br>– In case of bank assembly, if only one of the solenoid coils is energized at a time, and during individual operation, the maximum ambient temperature may not exceed 70 °C.<br>**Only admissible for type 4WRZ..7X/...XE..., 4WRA6..2X/...XE..., 3DREP6..2X/...XE...:**<br>– In the case of bank assembly, only one solenoid coil may be energized at any time for all hydraulic valves.<br>– In case of bank assembly and during individual operation, the maximum ambient temperature may not exceed 60 °C. |
| ⚠ WARNING | **Explosion hazard by the ignition of dust accumulation!**<br>If the maximum dust thickness exceeds 5 mm there is an explosion hazard!<br>– Ensure that the maximum dust thickness is not exceeded.<br>– Periodically remove dust accumulations. |

## 9.2 Operating the manual override (relevant for type ...N..., ...N9...)

The valves are equipped with a manual override. Using this manual override, the switching function of the hydraulic valve can also be triggered if the solenoid is not electrically energized.

| | |
|---|---|
| *NOTICE* | **Incorrect operation of the manual override!**<br>There is a danger of damage to the manual override as well as the sealing surfaces at the solenoid.<br>– Operate the manual override using your hand or only using the special tool provided for that purpose (with type ...N9...), see accessories. |

The manual override is only intended for short-time manual operation and must not be brought into a certain spool position by means of mechanical devices. The manual override is located at the side of the solenoid coil facing away from the solenoid coil.

With hydraulic valves, the manual override is only useful if the pressure in the tank channel of the hydraulic valve does not exceed 50 bar. Above this pressure value, the actuating force to be applied is relatively large.

# 10 Maintenance and repair

## 10.1 Cleaning and care

**NOTICE**

**Solvents and aggressive, highly inflammable cleaning agents!**

Aggressive cleaning agents may damage the seals and the surface of the hydraulic components and let the product age faster.

– Do not use solvents or aggressive, easily inflammable cleaning agents.

**NOTICE**

**Water jet!**

A high-pressure washer's water pressure could damage the hydraulic system and the seals of hydraulic components.

– Do not use a high-pressure washer for cleaning.

- Close all openings with appropriate protective caps.
- Only clean hydraulic components using a damp, non-linting cloth. Only use water and, if necessary, a mild cleaning agent.
- Remove dust and dirt accumulations on the hydraulic valve at regular intervals.

## 10.2 Inspection and maintenance

The following inspection, testing and maintenance works are to be carried out regularly. The intervals for the same have to be selected in a way – also dependent on the operating conditions – that deficiencies that have to be anticipated are identified timely. The check must, however, at least be carried out every **three years from the date of manufacture of the hydraulic valve**. The date of manufacture of the hydraulic valve can be seen from the name plate.

1. De-energize and depressurize the relevant system part.
2. Check all external fittings for completeness and tight seat.
3. Check cable and line entry, blind plug, external grounding connection and connection line for tight seat.
4. Check hydraulic valve for external leakage and replace seals, if required, see ➦ Chapter 10.3 “Repair” on page 28.
5. Open the terminal box and replace any damaged seals.
6. Check the inside of the terminal box for corrosion. Corrosion is an indication of leakage. In case of visible corrosion, remove the hydraulic valve and have it repaired.
7. Check the potting compound of the solenoid coil, internal lines and braided wires of the solenoid coil for visible damage. In case of visible damage, remove the hydraulic valve and have it repaired.
8. Check all screws and connections for tight seat.

9. Check all connection lines for damage. Replace the connection line if there is any visible damage.
10. The sealing elements of the cable and line entry are only intended for single use only use. Renew the cable and line entry and blind plug after each loosening; for spare parts, see ➦ Chapter 10.4 “Spare parts” on page 28.
11. Re-assemble the cover of the terminal box with the seal beneath it. Tighten the mounting screws with the spring washers diagonally, one after the other. Tightening torque of the cover screws: 1...1.1 Nm.

## 10.3 Repair

| ⚠ WARNING | **Explosion hazard due to improper repair!** |
|---|---|
| | Improper repair will void the explosion protection! |
| | – Defective seals may only be replaced by new interchangeable seals in original equipment quality. |

The machine end-user can repair external leakage of the valve connection surface.
Other repair work must be carried out by Bosch Rexroth.

### Rectifying leakage at the valve connection surface

1. Remove the hydraulic valve, see ➦ Chapter 11 “Disassembly and replacement” on page 29.
2. Replace the seals.
3. Assemble the hydraulic valve back to the mounting surface.

## 10.4 Spare parts

### Seal kit for the valve connection surface

Table 5: Seal kit for the valve connection surface

| Type | Spare part | Material number |
|---|---|---|
| SED6 ..1X/...XE... | NBR seal kit | **R900075699** |
| | FKM seal kit | **R900075700** |
| WE6..6X/...XE... | NBR seal kit | **R961000837** |
| | FKM seal kit | **R961000838** |
| SEW6..3X/...XE... | NBR seal kit | **R900075699** |
| | FKM seal kit | **R900075700** |
| SEW10..1X/...XE... | NBR seal kit | **R900074153** |
| | FKM seal kit | **R900074157** |
| H-4WEH10...XE... | NBR seal kit | **R961001132** |
| | FKM seal kit | **R961001131** |
| H-4WEH16...XE... | NBR seal kit | **R961001255** |
| | FKM seal kit | **R961001256** |
| H-4WEH25...XE... | NBR seal kit | **R961001257** |

| Type | Spare part | Material number |
|---|---|---|
| | FKM seal kit | **R961001258** |
| H-4WEH32...XE... | NBR seal kit | **R961001259** |
| | FKM seal kit | **R961001260** |
| 4WRZ10...XE... | NBR seal kit | **R961001132** |
| | FKM seal kit | **R961001131** |
| 4WRZ16...XE... | NBR seal kit | **R961009510** |
| | FKM seal kit | **R961009511** |
| 4WRZ25...XE... | NBR seal kit | **R961001257** |
| | FKM seal kit | **R961001258** |
| 4WRZ32...XE... | NBR seal kit | **R961001259** |
| | FKM seal kit | **R961001260** |
| 4WRA6..2X/...XE... | NBR seal kit | **R961000837** |
| | FKM seal kit | **R961000838** |
| 3DREP6..2X/...XE... | NBR seal kit | **R961000837** |
| | FKM seal kit | **R961000838** |

Ensure the suitability of the sealing materials for the hydraulic fluid used! See "data sheet".

### Terminal box spare part kit

Table 6: Terminal box spare part kit

| Spare part | Material number |
|---|---|
| Spare parts kit terminal box contains:<br>• 1 x complete cable and line entry<br>• 1 x blind plug with O-ring<br>• 4 x hexagon socket head cap screws M4 for terminal box<br>• 4 x spring washers for terminal box<br>• 1 x flat seal | **upon request** |

The spare parts can be obtained at the address given in ➥ Chapter 16 “Appendix” on page 31.

# 11 Disassembly and replacement

**⚠ CAUTION** **Falling of an incompletely disassembled hydraulic valve!**

An incompletely disassembled hydraulic valve may fall and cause injuries.

– During disassembly, secure the hydraulic valve against falling.

Have sufficiently dimensioned collecting containers, sufficient cleaning cloths and medium-binding materials ready in order to collect or bind leaking hydraulic fluid.

1. De-energize and depressurize the relevant system part.
2. Disconnect the electrical connections professionally.

3. Remove the hydraulic valve mounting screws and remove the valve from the mounting surface.
4. Close the valve connection surface.

When replacing the hydraulic valve, all further steps are analogous to the assembly.

# 12 Disposal

## 12.1 Environmental protection

Careless disposal of the product and the hydraulic fluid could lead to environmental pollution.

- Thus, dispose of the product and the hydraulic fluid in accordance with the currently applicable national regulations in your country.
- Dispose of hydraulic fluid residues according to the applicable safety data sheets for these hydraulic fluids.

## 12.2 Recycling

Due to the high metal share, hydraulic products can mostly be recycled.

# 13 Extension and modification

| ⚠ WARNING | **Explosion hazard due to impermissible extension or modification!** |
|---|---|
| | Every non-permitted extension or modification will void the explosion protection. |
| | – No extensions or modifications may be made which are not described in these operating instructions. |

# 14 Troubleshooting

## 14.1 Fault table

The hydraulic valve is usually not sensitive to faults if the prescribed application conditions and hydraulic fluid quality are complied with.

Table 7: Fault table

| Error | Possible cause(s) | Remedy |
|---|---|---|
| Product does not switch | Electrical connection interrupted, no current continuity | |
| | • Cable break | Replace connection line |
| | • Electrical defect in the solenoid coil | Remove product and have it repaired |
| | • No pressure at P | Check and/or reapply pressure at port P |

| Error | Possible cause(s) | Remedy |
|---|---|---|
| | • Control spool is jammed due to contamination | If possible, try to release the control spool by manually actuating the manual override, see ➦ Chapter 9.2 “Operating the manual override (relevant for type ...N..., ...N9...)” on page 26. In case of failure: Remove product and replace with new product. |
| | • **Only relevant for type H-4WEH...XE..., 4WRZ..7X/...XE...:** Required minimum pilot pressure is not achieved | Check whether the pressure at port X with external pilot oil supply or at port P with internal pilot oil supply achieves the value for the minimum pilot pressure specified in the "data sheet, technical data, hydraulic". Restoring/ establishing the minimum pilot pressure. |
| | • **Only relevant for type H-4WEH...XE...:** Pilot pressure too high | Reduce the pilot pressure or use a product with a pressure reducing valve already installed. |
| | • Contact problems on the connection terminals | Check the mounting screws of the connection terminals and tighten using a manual torque wrench. Observe ➦ Chapter 7.4.2 “Establishing the electrical connection” on page 19. |
| External leakage | Seal defective | |
| | • Seal at the connection surface is defective | Removing the product and replacing the seals |

Following faults due to contamination, it is – in addition to the repair – essential to check the oil quality and improve it, if necessary, by suitable measures such as flushing or the additional installation of filters.

# 15 Technical data

For the technical data of your product please refer to the "data sheet".

# 16 Appendix

## 16.1 List of addresses

### Contacts for service and spare parts

Bosch Rexroth AG

Bürgermeister-Dr.-Nebel-Straße 8
97816 Lohr am Main, Germany
Phone +49 (0) 9352/40 50 60
Email: service@boschrexroth.de

## Headquarters

Bosch Rexroth AG
Zum Eisengiesser 1
97816 Lohr am Main, Germany
Phone +49 (0) 9352/18-0

## For questions about the product

Phone +49 (0) 9352/40 30 20
Email my.support@boschrexroth.de

The addresses of our sales and service network and sales organizations can be found at www.boschrexroth.com/adressen

# Index

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