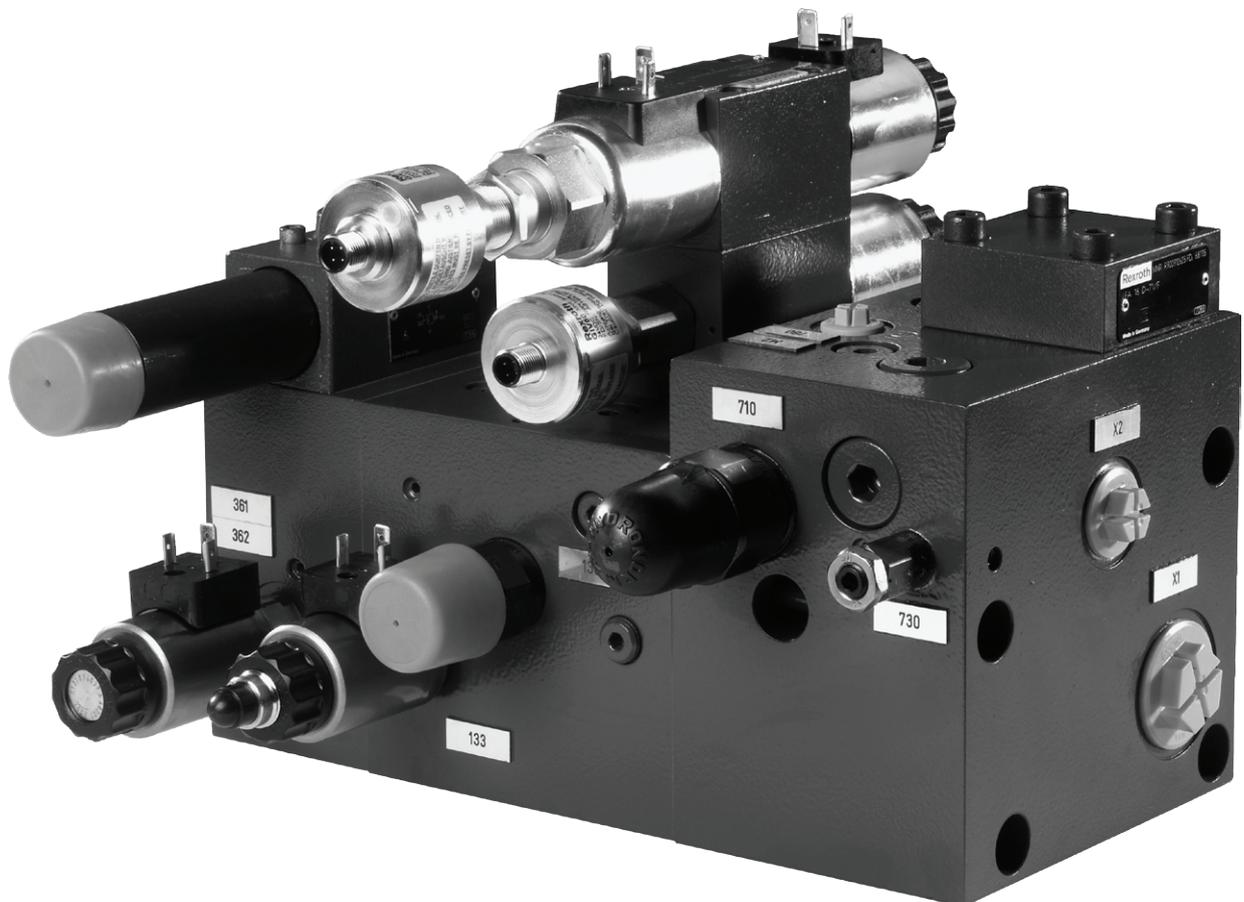


Manifolds and modules

Operating instructions
RE 07601-B/12.2013

English



The data specified above serve to describe the product. If there is also information on the use, it is only to be regarded as application examples and proposals. Catalogue information does not constitute warranted properties. The information given does not release the user from the obligation of own judgment and verification. Our products are subject to a natural process of wear and aging.

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The cover shows an example configuration. The product supplied may therefore differ from the photo shown.

The original operating instructions were prepared in German.

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1 About this documentation

1.1 Validity of the documentation

This documentation applies to:

- Manifolds and modules for industrial applications

This documentation is intended for assemblers, system end-users, machine and system manufacturers.

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

- ▶ Read this documentation completely and particularly chapter 2 "Safety instructions" and chapter 3 "General information on damage to property and damage to the product" before working with manifolds or modules.

1.2 Required and amending documentation

- ▶ The product must not be commissioned until you have been provided with the documentation marked with the book symbol  and you have understood and observed it.

Table 1: Required and amending documentation

Title	Document number	Document type
 Order confirmation		
 Installation drawing with parts list		Drawing
Hydraulic valves for industrial applications	RE 07600	Operating instructions

1.3 Representation of information

Consistent safety instructions, symbols, terms and abbreviations are used so that you can quickly and safely work with your product. For a better understanding, they are explained in the following sections.

1.3.1 Safety instructions

In this documentation, safety instructions are given in chapter 2.6 "Product-specific safety instructions" and chapter 3 "General information on damage to property and damage to the product" and whenever sequences of actions or instructions are explained which bear the danger of personal injury or damage to property. The measures described for preventing these hazards must be observed.

Safety instructions are set out as follows:

 SIGNAL WORD
Type and source of danger!
Consequences in case of non-compliance
▶ Hazard avoidance measures
▶ <Enumeration>

- **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 in case of non-compliance
- **Precaution:** Specifies how the danger can be prevented

Table 2: Risk classes according to ANSI Z535.6-2006

Warning sign, signal word	Meaning
 DANGER	Indicates a dangerous situation which will cause death or severe personal injuries 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.

1.3.2 Symbols

The following symbols indicate notices which are not safety-relevant but increase the comprehensibility of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product cannot be used and/or operated optimally.
	Individual, independent action.
1.	Numbered instruction: The numbers indicate that the actions must be carried out one after the other.
2.	
3.	

1.3.3 Abbreviations

The following abbreviations are used in this documentation:

Table 4: Abbreviations

Abbreviation	Meaning
ANSI	American National Standards Institute
EMC	Electro-magnetic Compatibility
PE	Protective Earth (protective earthing conductor)

2 Safety instructions

2.1 General information on this chapter

Bosch Rexroth manifolds and modules are manufactured according to the generally accepted code of practice. However, there is still the risk of personal injury and damage to property. You must therefore observe this chapter and the safety instructions in this documentation.

- ▶ Read this documentation completely and thoroughly before working with the manifolds and modules.
- ▶ 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 system component. It is intended for use in industrial machines and systems.

You may use the product as follows:

- To control the movement at machines and systems
- Complying with the application and environmental conditions according to the data sheet.
- Complying with the specified performance limits.
- Use in the original condition, without damage.
- Repair by customers is not admissible.

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

Intended use includes having read and understood this documentation completely, especially the chapter 2 "Safety instructions".

2.3 Improper use

Any use deviating from the intended use is improper and thus not admissible.

Bosch Rexroth AG does not assume any liability for damage caused by improper use.

The user assumes all risks involved with improper use.

Improper use of the manifold or module includes:

- Use in explosive environments
- Incorrect transport
- Incorrect storage
- Lack of cleanliness during storage and assembly
- Incorrect installation
- Use of inappropriate/non-admissible media
- Exceedance of the specified maximum pressures
- Operation outside the approved temperature range

2.4 Qualification of personnel

The activities described in this documentation require basic knowledge of mechanics, electrics and hydraulics as well as knowledge of the appropriate technical terms. For transporting and handling the product, additional knowledge of how to handle lifting tools 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.

Experts are those who are able to recognize potential hazards and apply the appropriate safety measures due to their professional training, knowledge and experience, as well as their understanding of the relevant conditions pertaining to the work to be undertaken. An expert must observe the relevant specific professional rules and have the necessary expert knowledge.

Expert knowledge means for example for hydraulic products:

- Reading and completely understanding hydraulic schemes,
- In particular, completely understanding the correlations regarding the safety equipment and
- Having knowledge of the function and set-up of hydraulic components.



Bosch Rexroth offers training measures in specific fields. An overview of the training contents can be found online at: <http://www.boschrexroth.com>

2.5 General safety instructions

- Observe the valid regulations on accident prevention and for environmental protection.
- Observe the safety regulations and provisions of the country where the product is implemented/used.
- Exclusively use Rexroth products in technically perfect condition.
- Observe all notices on the product.
- Persons assembling, operating, disassembling or maintaining Rexroth products must not be under the influence of alcohol, other drugs or medications influencing the ability to react.
- Only use original Rexroth accessories and spare parts in order to exclude hazards to persons due to unsuitable spare parts.
- Comply with the technical data and environmental conditions specified in the product documentation.
- The installation or use of inappropriate products in safety-relevant applications could result in unintended operating conditions when being used which in turn could cause personal injuries and/or damage to property. Therefore, only use a product for safety-relevant applications if this use is expressly specified and permitted in the documentation of the product, e.g. in explosion protection zones or in safety-related parts of control systems (functional safety).
- Do not commission the product until you can be sure that the end product (for example a machine or system) where the Rexroth product is installed complies with the country-specific provisions, safety regulations and standards of the application.

2.6 Product-specific safety instructions

WARNING

Non-compliance with functional safety!

Hydraulic manifolds and modules control 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, kicked away or bruised due to incorrect control and unexpected start-up.

- ▶ When setting up your circuit, observe functional safety e.g. according to EN ISO 13849.
- ▶ Install light barriers or protective grids, if necessary.
- ▶ Immediately exchange defective components.

Pressurized system parts and leaking hydraulic fluid!

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

- ▶ Ensure before working at the hydraulic product that the hydraulic system is depressurized and the electrical control de-energized.
- ▶ Completely unload the pressure at machines and systems before working at hydraulic products.
- ▶ Secure the system against restarting.

Faulty fastening!

Mounting of the manifold/module using mounting bolts of reduced stability, insufficient mounting or insufficient stability of the mounting surfaces may cause the product to become loose and fall down. Manifolds/modules with high weight may bruise or kill persons.

- ▶ Completely assemble the manifold/module according to the assembly specifications by means of suitable assembly aids.
- ▶ Mount the manifold/module only at suitable mounting surfaces.
- ▶ Comply with tightening torques and screw stabilities.

Easily inflammable hydraulic fluid!

Fire and risk of fire due to hydraulic fluid and leaking oil mist.

- ▶ Keep open fire and ignition sources away from the manifold/module.
- ▶ Do not use manifolds and modules in areas with open fire and only at sufficient distance to hot heat sources.
- ▶ Immediately remove leaked hydraulic fluid and dispose of it properly.

WARNING

High pressure!

Risk of injury caused by pressurized leaking oil jet and parts shooting out due to a broken system component.

- ▶ In case of a leaking oil jet, decommission the system and exchange the damaged components.
- ▶ Secure the pressure in the system by means of overpressure equipment.
- ▶ Lead the tank line to the tank freely, without reduction of the cross-section and blocking.
- ▶ Use hydraulic lines and connections according to the max. operating pressure.
- ▶ Do not separate, open or disconnect pressurized lines and do not disassemble pressurized components!
- ▶ Depressurize the system before the assembly and any other works at the manifolds/modules.

CAUTION

Leaking hydraulic fluid!

Hydraulic fluid may leak during assembly and disassembly of hydraulic components. Consequently, persons may slip or fall!

- ▶ Only remove the protective caps at hydraulic manifolds/modules directly before the assembly.
- ▶ After the disassembly, provide the bores containing the hydraulic fluid with suitable closing elements.
- ▶ Immediately remove leaked hydraulic fluid and dispose of it properly.

Harmful hydraulic fluid!

Health hazard due to contact with hydraulic oil (e.g. eye injuries, skin lesions, poisoning when inhaled and ingested).

- ▶ Check the hydraulic components and lines for wear and damage on a regular basis.
- ▶ Wear protective gloves, safety goggles and suitable working clothes when working with hydraulic oil.
- ▶ If nevertheless hydraulic fluid comes into contact with the eyes or penetrates the skin, please consult a doctor immediately.
- ▶ When dealing with hydraulic fluids, you must imperatively observe the safety instructions of the hydraulic fluid manufacturer.

Resonance or fluid noises!

Hearing damage and possible damage at hydraulic valves! In case of an unfavorable arrangement of hydraulic manifolds and modules in the system, resonance or fluid noises e.g. whistling may result.

- ▶ In this case, contact a service engineer.

With hydraulic manifolds/modules with electrically controlled valves **WARNING****High electrical voltage!**

With manifold blocks/modules with installation or attachment components with a supply voltage > 50 VDC or 75 VAC, touching an electric part at the device may lead to a fatal electric shock.

- ▶ Manifolds/modules may only be electrically connected by or under the supervision of a specialized electrician.
- ▶ Use suitable plug-in connectors and cables.
- ▶ Switch off the voltage supply before all maintenance, repair or installation works and secure it against restarting.
- ▶ Provide for proper, safe PE connection.
- ▶ Only use power supply units with safe voltage separation. Safe separation can for example be achieved by means of isolation transformers, safe optocouplers or mains-free battery operation.

Missing equipotential bonding!

Electrostatic processes, an incorrect earthing concept or missing equipotential bonding may lead to malfunctions or uncontrolled movements at the machine and thus cause injuries.

- ▶ Provide for correct earthing and provide for proper equipotential bonding.

Penetrating water and humidity!

In case of use in humid or wet environments, water or humidity may penetrate at electrical plug-in connectors or the valve electronics. This may lead to malfunctions at the valve and to unexpected movements in the hydraulic system which may result in personal injury and damage to property.

- ▶ Only use the manifold/module 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.

EMC interference!

Uncontrolled machine movements due to electro-magnetic radiation of unshielded connection lines.

- ▶ Observe the EMC limit values.
- ▶ Only use recommended electrical connection lines according to the EMC Directive and shield the valve electronics from the source of interference, if necessary.
- ▶ Provide for proper earthing.

WARNING

Exceedance of the maximum temperatures!

Use of the manifolds/modules outside the temperature intended for that purpose may lead to functional failures like e.g. overheating of the valve solenoids. In the worst case, this may result in unexpected system movements and thus constitute a risk of injury for persons.

- ▶ Only use the hydraulic valves within the environmental and fluid temperatures intended for that purpose.

Leakage in case of incorrect working temperatures!

Use of the manifolds/modules outside the temperature intended for that purpose may lead to permanent leakage at the hydraulic valves. Thus, hydraulic fluid in the form of a leaking hydraulic fluid jet may injure persons, lead to damage to property and endanger the environment.

- ▶ Only use the manifolds/modules within the environmental and fluid temperatures intended for that purpose.
- ▶ In case of leakage, immediately exchange damaged seal rings and/or the hydraulic valve.

CAUTION

Hot surfaces!

Hydraulic valves and valve solenoids may heat up considerably during operation. This may lead to burns in case of skin contact.

- ▶ Avoid contact with hydraulic valves and their solenoids during operation.
- ▶ Allow hydraulic valves to cool down before touching them or wear protective gloves.
- ▶ If necessary, attach protective covers.

Contaminated hydraulic fluid!

Contamination in the hydraulic fluid may cause functional failures e.g. jamming or blocking of nozzles or components on the manifold/module. In the worst case, this may result in unexpected system movements and thus constitute a risk of injury for persons.

- ▶ Ensure adequate hydraulic fluid cleanliness according to the cleanliness classes of the hydraulic valve over the entire operating range.
- ▶ If necessary, flush the hydraulic system.

Improperly laid lines and cables!

Risk of stumbling!

- ▶ Lay cables and lines so that no-one can trip over them.
- ▶ Fasten cables and lines in order to prevent them from getting loose during vibrations.

2.7 Personal protective equipment

The personal protective equipment for users of the product consists of:

- Safety goggles, protective gloves and safety shoes for transporting the manifold/module.

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

The warranty only applies to the supplied manifolds/modules.

- The claim to warranty expires if the product is incorrectly assembled, commissioned and operated, not used as intended and/or handled improperly.

NOTICE

Inadmissible mechanical load!

Impact or shock forces on attached valves and components may damage or even destroy them.

- ▶ Do not place/put the manifold/module onto the attachment parts.
- ▶ Never use attachment parts as handle or step. Do not place/put any objects on top of them.

Dirt and foreign particles!

Risk of damage, wear and malfunctions due to ingress of dirt and foreign particles. Contamination and metal particles may damage valves and cause leakage.

- ▶ During installation, ensure utmost cleanliness in order to prevent foreign particles such as welding beads or metal chips from getting into the hydraulic lines.
- ▶ Check before commissioning whether all hydraulic connections are tight and that all the seals and caps of the plug-in connections are correctly installed and undamaged.
- ▶ Ensure that no cleaning agents are able to penetrate the hydraulic system.
- ▶ Do not use linting fabric for cleaning.

Hydraulic fluid harmful to the environment!

Leaking hydraulic fluid leads to environmental pollution.

- ▶ Immediately remedy possible leakage.
- ▶ Dispose of the hydraulic fluid in accordance with the currently applicable national regulations in your country.

ONLY FOR ELECTRIC COMPONENTS!

Uncontrolled disconnection and connection of plug-in connectors!

Device might be destroyed!

- ▶ Before installation works, separate the device from the mains or from the voltage source or de-energize it.
- ▶ Do not plug in or pull the electric plug-in connector as long as the voltage supply is activated.



Contact with salt water leads to increased corrosion at the manifold/module and may damage the product. So take suitable corrosion protection measures.

4 Scope of delivery



For information on the scope of delivery please refer to the delivery documents and/or the data sheet or the installation drawing of your manifold and/or module.

- ▶ Check the scope of delivery for completeness.
- ▶ Check the scope of delivery for possible transport damage, see chapter 6 "Transport and storage" on page 16.



In case of complaints, please contact Bosch Rexroth AG, see chapter 16.1 "List of addresses" on page 32.

5 Information on this product

Depending on the version, manifolds/modules perform different functions. For the functional and performance and product description of your manifold, please refer to the installation drawing and the hydraulic circuit diagram.



For more information on the attached and installed components, please refer to the related data sheets at

www.boschrexroth.com/medienverzeichnis

5.1 Product identification

The following is an exemplary schematic name plate.

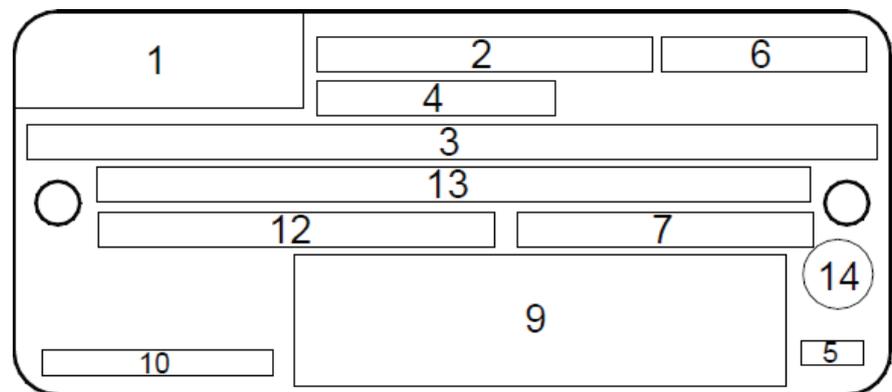


Fig. 1: Name plate

- | | |
|--|--|
| 1 Rexroth word mark | 2 Material number |
| 3 Material short text | 4 Serial number |
| 5 Producing plant | 6 Date of production |
| 7 Characteristic performance values | 9 Symbol according to ISO 1219 |
| 10 Designation of origin | 12 Customer, production, repair order or project number |
| 13 Customer's material number or additional information | |



In case of questions regarding your manifold or module, always specify the material number and the serial number. You should preferably take a picture of the name plate and transmit it to Bosch Rexroth.

6 Transport and storage

For transporting and storing the product always observe the environmental conditions specified in the technical data (see installation drawing).



Bosch Rexroth manifolds/modules are high-quality products. In order to prevent damage at these products, transport the manifolds/modules in the original packaging or with equivalent transport protection.

6.1 Transporting the manifold/module

WARNING

Unsecured manifolds and modules toppling over or falling down!

Unsecured manifold blocks/modules may topple over or fall down and bruise or kill persons if they are heavy and lead to serious injuries and/or crush injuries.

- ▶ Use the original packaging for transport.
- ▶ Provide for a stable position during transport to the place of installation.
- ▶ Transport and secure the manifold block/module at the intended lifting eyes and attachment points and not at parts with little stability, e.g. valves, solenoids, connectors and cables.
- ▶ Transport the manifold complying with the safety instructions and using a forklift or suitable lifting tools. Make sure that the lifting capacity of the lifting tool is sufficient.
- ▶ Wear your personal protective equipment.
- ▶ Comply with the national laws and regulations regarding occupational health and safety and transport.

CAUTION

Heavy components!

When lifting a manifold/module with a high weight of more than 15 kg, there is the risk of health hazards.

- ▶ Use a suitable lifting, putting down and moving technique.
- ▶ Use suitable lifting tools for transporting heavy manifolds/modules.
- ▶ During transport, secure the manifold/module against toppling over.
- ▶ Put the manifold/module carefully onto the contact surface in order not to damage it.

6.1.1 Transport using lifting tools

In transport, consider the following aspects:

- Properties of the load (e.g. weight, center of gravity, mounting and attachment points).
- Type of attachment or pick-up of the load.

- Ensure that the lifting capacity of the lifting tool is sufficient to transport the manifold/module without risk.
- Use textile attachment devices according to DIN EN 1492-2.

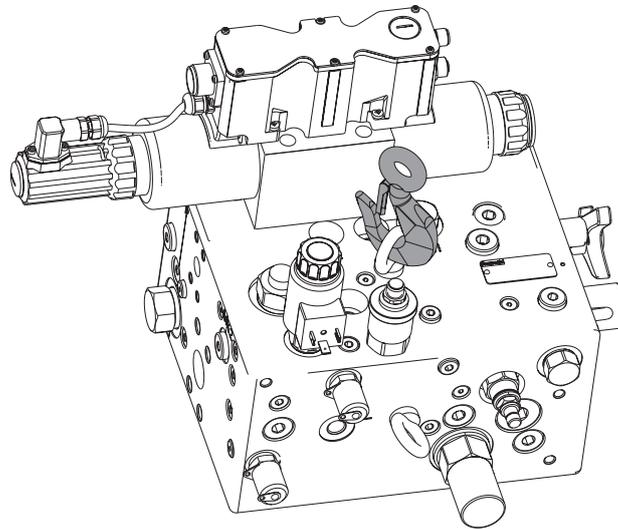


Fig. 2: Lifting the manifold (exemplary representation)

6.2 Storing the manifold/module

Hydraulic components are delivered in an unobjectionable state.



Improper storage may damage the hydraulic product.

If there is no separate information in the data sheet or in the installation drawing, comply with a storage temperature of -20 °C to $+50\text{ °C}$.

Hydraulic components are suitable for storage for up to 6 months under the following conditions:

- ▶ Do not store the hydraulic component outdoors but in a well-ventilated room. Avoid high light irradiation.
- ▶ Protect the hydraulic component against humidity, particularly ground humidity. Store the hydraulic component in the shelf or on a pallet.
- ▶ Manifolds/modules may be very heavy. In this connection observe the admissible load-bearing capacities of your storage system.
- ▶ Store the hydraulic component in the original packaging or comparable packaging in order to protect it from dust and dirt.
- ▶ All ports at the manifold block and/or the module must be closed with closing elements.
- ▶ After opening the transport packaging, it must be closed properly again for the storage. Use the original packaging for storage.
- ▶ Remove the covers at the hydraulic connections of the manifold block and/or module only before the assembly.



In case of storage of more than six months or in case sea transport is necessary, please consult Bosch Rexroth.



After expiry of the maximum storage time, we recommend having the manifold/module checked by your competent Rexroth service.

7 Assembly

7.1 Unpacking



Parts falling out!

Risk of injury! If the packaging is opened improperly, parts may fall out and cause injuries or damage of the parts.

- ▶ Put the packaging on level, bearing ground.
- ▶ Only open the packaging from the top.

The manifold/module is delivered packed in a suitable protective packing.

- ▶ Dispose of the packaging in accordance with the currently applicable national provisions in your country.

7.2 Prior to assembly

1. Before assembling the manifold/module check compliance of the type designation on the name plate with your order or job number.
2. Observe the information on the maximum operating pressure on the name plate.



If the material number of the manifold/module does not match the number in the order confirmation, contact the Rexroth service for clarification; for the address see chapter 10.3 "Spare parts" on page 26.

3. Check the scope of delivery for completeness and transport damage.
4. Make sure that all required seals are available and have been properly installed.

7.3 Installation conditions

- ▶ For installing the product always observe the environmental conditions specified in the data sheet/installation drawing.
- ▶ It is imperative to provide for absolute cleanliness. Hydraulic components must be protected from dirt during installation. Contamination of the hydraulic fluid may considerably impair the life cycle of the hydraulic component.
- ▶ Observe the installation position specified in the data sheet and/or in the installation drawing.

7.4 Necessary tools

In order to assemble the manifold/module, you need standard tools only.

7.5 Assembling the manifold/module

WARNING

Faulty fastening!

Incomplete fastening of the manifold/module or mounting using mounting bolts of reduced stability may cause the product to become loose and fall down and lead to personal injuries and/or damage to property.

- ▶ Completely assemble the manifold/module according to the assembly specifications by means of suitable assembly aids.
- ▶ Mount the manifold/module only at suitable mounting surfaces.
- ▶ Use only mounting bolts according to the dimensions and property classes specified in the installation drawing.
- ▶ Comply with tightening torques and screw stabilities.

Faulty assembly of plug screws and lines!

Improperly fastened plug screws and lines may become loose during subsequent operation and fly around due to the pressure and thus cause serious injuries.

- ▶ Only pressurize your system after all plug screws and lines have been completely and properly mounted according to the specifications.

CAUTION

Insufficient assembly space!

Risk of jamming and bruising! Insufficient installation space may lead to jamming or abrasions in case of actuation or adjustment works at components of the manifold block/module.

- ▶ Make sure that the assembly space is sufficient and that actuation and adjustment elements as well as plug-in connectors are easily accessible.

Leaking hydraulic fluid!

Hydraulic fluid may leak during assembly and disassembly of hydraulic components. Consequently, persons may slip or fall!

- ▶ Only remove the protective caps at hydraulic manifolds/modules directly before the assembly.
- ▶ Immediately remove leaked hydraulic fluid and dispose of it properly.

NOTICE

Incorrect connection of electric components!

Risk of short-circuit and damage!

- ▶ Connect the electric components according to the electric circuit diagram and the pin assignment.

Missing seals and caps!

Liquids and foreign particles may penetrate and damage the product.

- ▶ Ensure before the assembly that all seals and caps of the connections are tight.

NOTICE

Hydraulic lines and hoses installed under tension stress!

Damage to the manifold/module! Lines and hoses installed under tension stress create additional mechanical forces during operation, which reduces the life cycle of the manifold/module and the entire system.

- ▶ Assemble lines and hoses without stress.

7.5.1 Mechanically assembling the manifold/module

Completely fasten the manifold/module at the provided mounting bores and tighten the screws applying the tightening torque specified in the installation drawing.

7.5.2 Hydraulically connecting the manifold/module

1. Depressurize the relevant system part.
2. Establish all connections observing the hydraulic circuit diagrams of the system.
3. Make sure that pipes and/or hoses are connected to all ports and/or that the ports are closed with plug screws.
4. Carry out a special check to make sure that the cap nuts and flanges are correctly tightened at the pipe fittings and flanges.
5. Make sure that all pipes and hose lines and every combination of connection pieces, couplings or connection points with hoses or pipes are checked for their operational safety by a person with appropriate knowledge and experience.

With manifolds/modules with electric components:

7.5.3 Connecting the power supply

WARNING

High electrical voltage!

With manifold blocks/modules with installation or attachment components with a supply voltage > 50 VDC or 75 VAC, touching an electric part at the device may lead to a fatal electric shock.

- ▶ Manifolds/modules may only be electrically connected by or under the supervision of a specialized electrician.
- ▶ Use suitable plug-in connectors and cables.
- ▶ Switch off the voltage supply before all maintenance, repair or installation works and secure it against restarting.
- ▶ Provide for proper, safe PE connection.
- ▶ Only use power supply units with safe voltage separation. Safe separation can for example be achieved by means of isolation transformers, safe optocouplers or mains-free battery operation.
- ▶ Apart from that, always observe the country-specific provisions.

- ▶ The manifold/module may only be connected by a specialized electrician or under supervision of the same.
- ▶ The lines used have to be suitable for operating temperatures from $-20\text{ °C}...+100\text{ °C}$.
- ▶ De-energize the connection line before the assembly.
- ▶ Correctly connect the protective earthing conductor and the earthing.
- ▶ Ensure that there are no sharp bends in the connection line and litz wires to avoid short-circuits and interruptions.
- ▶ Only assemble the cable and line entries according to the assembly instructions. Check before the assembly whether the individual components of the cable and line entry are complete and whether the sealing elements are undamaged.
- ▶ During the assembly, ensure leak-tightness between cable and cable and line entry.
- ▶ Route the connection line(s) in a pull-relieved form. The first mounting point must be within 15 cm of the cable entry.
- ▶ Use finely stranded conductors only if they have pressed-on wire end ferrules.

Solenoid coils can be connected in a polarity-independent way.

Only the mating connectors specified in the technical data sheet or the installation drawing or mating connectors of the same type may be used.

Observe the assembly instructions printed onto the packaging of the mating connector and the tightening torques specified there.

7.6 Painting the manifold/module

NOTICE

Painting works!

Risk of damage at the contact surfaces! Risk of overheating due to insufficient heat radiation and impaired functionality of measurement systems. Damage and destruction of the manifold/module due to painted solenoids.

- ▶ Never paint measurement systems, cooling and contact surfaces.
- ▶ Protect the surface of valve solenoids against paint application.
- ▶ Close the hydraulic connections completely before the paint application.
- ▶ Protect the fixing holes and surfaces against paint application.
- ▶ Mask the name plate and information signs that might exist so that they are still readable after painting.
- ▶ Mask the connectors of the electrical connections with protective foil and make sure not to cause any damage to the connector.
- ▶ When removing the paint protection and the covers make sure that no paint chips or other foreign particles enter the manifold/module.

8 Commissioning

WARNING

Incorrectly mounted manifold/module!

A powerful fluid jet may leak at incompletely mounted hydraulic connections and connection lines and cause serious injuries.

- ▶ Only commission your system after all hydraulic connections and the manifold and/or the module have been completely and properly mounted according to the specifications.
- ▶ Look out for defective sealing points and exchange defective seal rings immediately.
- ▶ Wear personal protective equipment during the initial commissioning.

Inadmissibly high operating pressure!

Thus, the manifolds and/or the modules may burst or the closing elements may fly around and cause serious injuries.

- ▶ Before commissioning the hydraulic system, ensure that the maximum admissible pressure of the hydraulic components in the system is not exceeded by no means.
- ▶ Ensure that in your system, the maximum admissible operating pressure is secured by means of pressure limitation equipment.

NOTICE

Uncontrolled connection or disconnection of plug-in connectors!

Electric components may be damaged.

- ▶ Before installation works, separate the device from the mains or from the voltage source or de-energize it.
- ▶ Do not plug in or pull the electric plug-in connector as long as the voltage supply is activated.

- ▶ Make sure that all hydraulic connections are covered and all electrical connections are allocated.
- ▶ Immediately depressurize the system if hydraulic fluid still leaks despite proper assembly.
- ▶ Commission hydraulic components only if they are completely installed.
- ▶ Allow manifolds/modules with integrated electronics to acclimatize for some time prior to commissioning as the electronics might be damaged by the generation of condensed water.
- ▶ Electrical connections must be checked for proper condition by or under the guidance and supervision of a specialized electrician before the initial or any re-commissioning.
- ▶ Check before switch-on whether the protective earthing conductor at all electric devices is firmly connected according to the connection diagram.



When commissioning the manifold/module at a system, first of all commission the electronics that might exist and then the hydraulics. When commissioning the electronics, the hydraulics (power unit, valve etc.) must be switched off in order to prevent damage at the hydraulic components caused by incorrect wiring and malfunctions of the electronics.

8.6.1 Bleeding the hydraulic system

For bleeding the overall system, observe the operating instructions of the device and/or system into which the manifold is installed.

Switch the manifold/module several times under 50 % of the operating pressure before placing it into full operation so that air which has remained in the manifold/module can exit. Thus, mechanical damage being caused by inadmissibly high acceleration of the fluid and the valve spools is avoided and the life cycle of the manifold/module is extended.

9 Operation

CAUTION

Moving actuation elements!

Hand lever, actuation rollers or other actuation elements at mechanically operated hydraulic valves perform movements during operation. This may lead to the jamming or bruising of parts of the body.

- ▶ When switching the hydraulic valves, pay attention to moving actuation elements.

Loud noise!

Hearing damage and possible damage at hydraulic valves! In case of an unfavorable arrangement of hydraulic manifolds and modules in the system, resonance or fluid noises e.g. whistling may result.

- ▶ In this case, contact a service engineer.



For more information on the operation, please refer to the operating instructions for the hydraulic system into which the manifold or the module is installed.

10 Maintenance and repair

WARNING

Dangerous movement due to high pressure!

Risk of injury due to the sudden movement of system parts and storage of potential energy in elastic parts, liquids or gases.

- ▶ De-energize all valves of the manifold/module before maintenance works.

Rexroth manifolds and modules are usually maintenance-free.

The seals of the attached and installed hydraulic components are subject to a natural process of wear and aging. We therefore recommend exchanging them at reasonable time intervals. The intervals are mainly determined by the operating conditions and the cleanliness of the hydraulic fluid.

- ▶ Regularly check the product and the mounting surfaces for leak-tightness!
- ▶ As a precaution, exchange seals at reasonable time intervals.



Preventative maintenance (e.g. hydraulic fluid care) as well as compliance with the pressure and temperature specifications extend the life cycle of the system and/or the hydraulic valve.

10.1 Cleaning and care

NOTICE

Solvents and aggressive cleaning agents!

Aggressive cleaning agents may damage the surfaces and seals of the manifold/module and accelerate their aging.

- ▶ Never use solvents or aggressive cleaning agents.

Penetrating dirt and liquids!

Safe function of the manifold/module is therefore no longer ensured.

- ▶ Do not use a high-pressure washer.

For cleaning and care of the manifold/module, observe the following:

- ▶ Ensure that all seals and caps of the plug-in connections are firmly attached so that no humidity can penetrate the manifold/module during cleaning.
- ▶ Remove external coarse dirt and keep sensitive and important parts like solenoids, valves and indicators clean.
- ▶ For the cleaning, use a damp, non-linting cloth.

10.2 Repair



Rexroth offers a wide range of repair services for components. Partly tested and pre-assembled original Rexroth assemblies allow for successful repair requiring only little time.

The repair may only be carried out by authorized, trained and instructed personnel.

- ▶ Only use original Rexroth spare parts for repairing Rexroth manifolds/modules.

10.3 Spare parts

When ordering spare parts, please indicate the material number of the parts or components to be replaced. It is usually indicated on a name plate or label or attached to the product.

In case of questions regarding spare parts, please contact your local Rexroth service, see chapter 16.1 "List of addresses" on page 32.

For the addresses of our sales and service network, please refer to

www.boschrexroth.com/adressen

11 Disassembly and exchange

WARNING

Pressurized and energized system parts!

When working on pressurized and energized system parts, there is the risk of injury by leaking hydraulic fluid or electric shock.

- ▶ Ensure that the hydraulic system is depressurized and the electrical control de-energized before the disassembly.

CAUTION

Incompletely mounted manifolds, modules or attachment parts falling down!

Incompletely disassembled components may fall down and cause injuries.

- ▶ Secure parts to be disassembled against falling down.

Leaking hydraulic fluid!

Hydraulic fluid may leak during assembly and disassembly of hydraulic components. Consequently, persons may slip or fall!

- ▶ After the disassembly, provide the bores containing the hydraulic fluid with suitable closing elements.
- ▶ Immediately remove leaked hydraulic fluid and dispose of it properly.



Have sufficiently dimensioned collecting containers, non-linting cloth and medium-binding materials ready in order to collect or bind leaking hydraulic fluid.

11.1 Necessary tools

The disassembly can usually be carried out with standard tools. Special tools are not required.

11.2 Preparing for disassembly

1. Decommission the overall system as described in the overall machine or system instructions.
2. Discharge the pressure of the hydraulic system according to the specifications of the machine or system manufacturer.

11.3 Disassembling the product

Proceed as follows to disassemble the manifold/module:

1. Observe the safety instructions applicable to the assembly.
2. Ensure that the hydraulic system is depressurized.
3. Check whether the manifold/module has cooled down sufficiently so that it can be disassembled in a risk-free manner.
4. De-energize the system.

5. Loosen and/or separate the electric connectors and connections.

NOTICE! Spilt or leaked hydraulic fluid!

Environmental pollution and pollution of the ground water!

- ▶ When draining the hydraulic fluid, always put a collecting pan under the manifold/module.
 - ▶ Observe the information in the safety data sheet of the hydraulic fluid and the system manufacturer's provisions.
6. Disconnect the lines and collect any escaping hydraulic fluid in the provided tank.
 7. Remove the manifold/module. If necessary, use suitable lifting tools to do so.
 8. Empty the manifold/module completely.
 9. Close all openings.
- ▶ Ensure during all these steps that no dirt gets into the openings.

12 Disposal

12.1 Environmental protection

Careless disposal of the hydraulic components 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.
- ▶ Please observe the following notes for the environmentally-friendly disposal of the hydraulic component.

12.2 Return to Bosch Rexroth AG

The hydraulic products manufactured by us can be returned to us for disposal purposes at no costs. There must be no inappropriate foreign substances or third-party components when products are returned. Hydraulic valves have to be drained before being returned. The components have to be sent free to the door to the following address:

Bosch Rexroth AG
Service Industriehydraulik [Industrial hydraulics]
Bürgermeister-Dr.-Nebel-Straße 8
97816 Lohr am Main
Germany

12.3 Packaging

Upon request, reusable systems can be used for regular deliveries.

The materials for disposable packaging are mostly cardboard, wood, and expanded polystyrene. They can be recycled without any problems. Due to ecological reasons, disposable packaging should not be used for returning products to Bosch Rexroth.

12.4 Materials used

Hydraulic components from Bosch Rexroth do not contain any hazardous materials that could be released during intended use. Normally, no adverse effects on human beings and on the environment have to be expected.

The hydraulic valves basically consist of:

- Cast iron
- Steel
- Aluminum
- Copper
- Plastic materials
- Electronic components and assemblies
- Elastomers

12.5 Recycling

Due to the high metal share, hydraulic products can mostly be recycled. In order to achieve an ideal metal recovery, disassembly into individual assemblies is required. The metals contained in electric and electronic assemblies can be recovered by means of special separation procedures as well.

13 Extension and modification

Bosch Rexroth manifolds and modules must not be extended or modified.

14 Troubleshooting

14.1 How to proceed for troubleshooting

- ▶ Always work systematically and purposefully, even when under time pressure. Random and imprudent disassembly and readjustment of settings can, in the worst-case scenario, result in the inability to determine the original cause of error.
- ▶ First, get a general overview of how your product functions in conjunction with the overall system.
- ▶ Try to find out whether the product has worked properly in conjunction with the overall system before the error occurred first.
- ▶ Try to determine any changes of the overall system in which the product is integrated:
 - Were there any changes to the product's application conditions or area of application?
 - Were there any changes (e.g. refittings) or have repairs been carried out at the overall system (machine/system, electrical systems, control) or at the product?
If yes: What were they?
 - Was the product or machine used as intended?
 - How did the fault become apparent?
- ▶ Try to get a clear idea of the cause of the error.
- ▶ If you could not remedy the occurred error, please contact one of the addresses you find at
<http://www.boschrexroth.com/adressen>.

14.2 Fault table

Manifolds and modules are usually not sensitive to faults if the prescribed application conditions and hydraulic fluid quality are complied with.

Fault	Possible causes	Remedy
External leakage	Seals at connection surface damaged	Remove the hydraulic component and replace the seals.
	Other leakage	Replace leaky hydraulic valves.
No function	Electrical connection interrupted	Check whether the electrical plug-in connectors are correctly and completely mounted.
	Cable break	Replace connection cable.
	Replace connection cable.	Replace the connector.

In case of faults in individual components, please consult the product description or operating instructions of the components.

15 Technical data

The technical data is contained in the relevant installation drawing of your manifold/ the individual valves.

16 Appendix

16.1 List of addresses

Please refer to <http://www.boschrexroth.com> for addresses of our sales and service network and responsible sales organizations.

Ordering address

Headquarters:
Bosch Rexroth AG
Zum Eisengießer 1
97816 Lohr am Main
Germany
Phone +49 (0) 93 52-18-0
info@boschrexroth.de
or the responsible sales organizations

Service contact person
Rexroth Service
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr am Main
Phone: +49 (0) 9352 - 40 50 60
service@boschrexroth.de

<http://www.boschrexroth.com/service>

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