rexroth
A Bosch Company

Operating instructions

Plug-in switching amplifier

Type VT-SSV-1, component series 2X

RE 30262-B Edition: 05.2022

The data specified only serve to describe the product. If information on the use of the product is given, it is only to be regarded as application examples and recommendations. Catalog specifications do not constitute assured characteristics. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

The cover shows an example configuration. The product delivered may differ from the image on the cover.

Translation of the original operating instructions. The original operating instructions were prepared in German language.

Content

1 About this documentation

1.1 VALIDITY OF THE DOCUMENTATION

This documentation is valid for plug-in switching amplifier VT-SSV from Bosch Rexroth.

This documentation is intended for fitters, operators, service technicians, system operators and machine manufacturers.

This documentation contains important information on the safe and appropriate installation, transport, commissioning, operation, use, maintenance, and removal of the product.

- ▶ Read this documentation thoroughly, especially Chapter 2 “Safety instructions“ and Chapter 3 “General notes on damage to property and damage to the product“, before working with the product.

1.2 REQUIRED AND SUPPLEMENTARY 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. The documentations can be found on the product site or at `www.boschrexroth.com/mediadirectory`.

Tabelle 1: Required and supplementary documentation

	Title	Document number	Document type
🕮	Order confirmation		
🕮	Plug-in switching amplifier type VT-SSV-1-2X/	30262	Data sheet

1.3 REPRESENTATION OF INFORMATION

In order that this documentation allows you to work directly and safely with your product, standardized safety notes, symbols, terms, and abbreviations are used. For a better understanding, they are explained in the following sections.

1.3.1 Safety instructions

In this documentation, safety instructions precede a sequence of activities whenever there is a risk of personal injury or damage to equipment. The hazard avoidance measures described must be observed.

Safety instructions are structured as follows:

⚠ SIGNAL WORD

Type and source of danger

Consequences in case of non-compliance

- ▶ Hazard avoidance measures
- ▶ <Enumeration>

- **Warning symbol:** draws attention to a hazard
- **Signal word:** identifies the degree of hazard
- **Type and source of danger:** Specifies the type and source of danger

- **Consequences**: describes the consequences in case of non-compliance
- **Precautions**: states, how the hazard can be avoided

Tabelle 2: Hazard classifications according to ANSI Z535.6-2011

Warning sign, signal word	Meaning
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will certainly result in death or serious injury.
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
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.

Tabelle 3: Meaning of the symbols

Symbol	Meaning
	If this information is disregarded, the product cannot be used or operated in an optimum manner.
▶	Individual, independent action
1. **2.** **3.**	Numbered instruction: The numbers indicate that the actions must be carried out one after the other.

1.3.3 Designations

The following terms are used in this documentation:

Tabelle 4: Designations

Designation	Meaning
RE xxxxx	Rexroth document in English language
VT-SSV-1	Plug-in switching amplifier

1.3.4 Abbreviations

The following abbreviations are used in this documentation:

Tabelle 5: Abbreviations

Abbreviation	Meaning
ANSI	American National Standards Institute
EMC	**E**lectro**m**agnetic **c**ompatibility
PELV	**P**rotective **E**xtra **L**ow **V**oltage

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 a risk 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 an electronic component.

You may use the product as follows:

- For activating on/off valves with a voltage of 24 V DC
- For applications as specified in technical data sheet RE 30262
- While adhering to the operating and ambient conditions according to data sheet RE 30262
- While adhering to the given performance limits
- In the original condition, without damage
- Repairs by customers are not permitted

The product is intended exclusively for professional use and not for private usage.

Operation according to the intended use also implies that you have read and understood this documentation completely, especially chapter 2 “Safety instructions“.

2.3 IMPROPER USE

Any use other than described in the section “Intended use” is considered as improper and is therefore not permitted.

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 includes, but is not limited to:

- operating the electronics outside the specified performance limits and operating conditions, especially the prescribed ambient conditions;
- the use as safety-related part of controls in the sense of DIN EN ISO 13849. Functional safety must be realized by means of appropriate, additional components.
- the use in potentially explosive atmospheres
- improper handling and transport
- improper storage
- lack of cleanliness during storage and assembly
- incorrect installation

2.4 QUALIFICATION OF PERSONNEL

The activities described in this documentation require basic knowledge of electrics and hydraulics as well as knowledge of the associated technical terms. 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 requirements pertaining to the work to be undertaken. An expert must observe the relevant specific professional rules and have the necessary expert knowledge.

With regard to electronic products, expertise means, for example:

- the ability to read and completely understand circuit diagrams, in particular, completely understanding the correlations regarding safety equipment and
- knowledge of the function and structure of electrical and electronic components.

Bosch Rexroth offers training courses that support your qualification in specific fields. You can find an overview of training contents on the Internet at: `http://www.boschrexroth.com`

2.5 GENERAL SAFETY INSTRUCTIONS

- Observe the valid regulations on accident prevention and environmental protection.
- Observe the safety regulations and provisions of the country in which the product is used/applied.
- Exclusively use Rexroth products in technically perfect condition.
- Observe all notices on the product.
- Persons who install, commission, operate, demount or maintain Rexroth products must not consume any alcohol, drugs or pharmaceuticals that may affect their ability to respond.
- Only use accessory and spare parts released by the manufacturer in order to rule out personnel hazards arising from unsuitable spare parts.
- Comply with the technical data and ambient conditions specified in the product documentation.
- If unsuitable products are installed or used in safety-relevant applications, unintended operational states can occur in these applications, which can cause personal injury and damage to property. Therefore, use the product only in safety-relevant applications, if this use is expressly specified and permitted in the documentation of the product, for example, in explosion-protection areas or in safety-related parts of a control (functional safety).
- You may commission the product only when it has been established that the final product (for example, a machine or system), in which the Rexroth product is installed, complies with national regulations, safety regulations and standards relevant for the application.

2.6 PRODUCT- AND TECHNOLOGY-RELATED SAFETY INSTRUCTIONS

⚠ WARNING

Hazardous movements!

Risk of injury due to incorrect connection or incorrect activation of electrical and electronic devices and resulting unforeseeable machine movements.

- Observe safety according to EN ISO 13849 or IEC 62061.
- If persons have to enter the hazard zone while the control is active, provide superordinate monitoring functions or measures for personal safety. These measures must be provided according to the specific data of the system and on the basis of the risk and error analysis of the system manufacturer/user. In this connection, the safety provisions applied for the system must be taken into account.
- Failures and defects in the control current or the energy supply can result in uncontrolled machine movements.
- Electronics emit interference to other electronics within the permitted limit values and also react to interference. This can cause malfunction in the control process. Only use electronics below EMC limit values or provide appropriate shielding.
- Electrostatic processes, an inadequate grounding concept or missing equipotential bonding can lead to damage to the electronics and hence cause malfunction or uncontrolled movements of the machine. Ensure proper grounding and provide equipotential bonding.
- Using the product outside the specified IP protection class can result in short-circuit and malfunction and hence in uncontrolled machine movements. Therefore, use the product only within the IP protection class and in environments as specified in the data sheet.
- Provide safety functions for personal safety separately. Amplifiers, command value processing cards and control electronics themselves do not include safety functions for personal safety and are no safety-related components.
- Avoid contact with salt-laden environments and adhere to the ambient temperature given in the data sheet.
- In the event of an emergency, fault or other abnormalities, switch the system off and secure it against being switched on again.

High electrical voltage due to incorrect connection!

Danger to life, risk of injury due to electric shock.

- When carrying out any work, disconnect the relevant machine section from the power supply and protect it against being switched on again.
- Only connect devices, electrical components and cables which feature protective extra low voltage (PELV) to connections or terminals having voltages from 0 to 50 Volt.
- Only connect voltages and power circuits that feature safe isolation from dangerous voltages. Safe isolation can be achieved with isolation transformers, safe optocouplers or mains-free battery operation.
- Always connect all cables to the provided connections. Avoid open cables or contacts.

⚠ WARNING

Lightning

Risk of uncontrolled machine movements.

- An inadequate grounding concept or missing equipotential bonding can lead to damage to the electronics. Provide for equipotential bonding of the device

⚠ CAUTION

Fault currents and short-circuits!

Impairment of safety and malfunction.

- Keep the surroundings free from electrically conductive contamination (acids, bases, corrosive agents, salts, metal vapors, etc.) and do not expose the device to these substances. Generally rule out any deposits according to protection class IP.

2.7 PERSONAL PROTECTIVE EQUIPMENT

Check determined personal protective equipment for completeness and protective effect and wear it (observe customer regulations and list of personal protective equipment).

2.8 OBLIGATIONS OF THE MACHINE END-USER

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 must 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 notes on damage to property and damage to the product

NOTICE

High voltage!

The electronics may be damaged.

- Wire electronics from Bosch Rexroth only when these are disconnected from the power supply.

Wrong cables! Power loss, scorching of cable!

Risk of damage to the product!

- Only use the cables specified in the data sheet with the respective cable cross-sections for electronic devices from Bosch Rexroth!

External electromagnetic interference!

Risk of malfunction.

- The distance to radio sources must be sufficiently large (>> 1 m).
- In the case of strongly fluctuating operating voltage, it may be necessary to use an external smoothing capacitor in individual cases.

Emitted interference!

Risk of affecting other devices.

- Use shielded signal and solenoids cables in order that EMC requirements are fulfilled.

Overloading!

Risk of overloading and damage to the supply cable in the case of insufficient dimensioning and/or operation with several electrical devices.

- Provide current limitation by overload protection.
- Select an appropriate rating of power supply units and cables.

Short-circuit!

Risk of overloading and damage of the supply cable in the case of defects of the electrical device.

- Provide current limitation by overload protection.

Impermissible temperature range!

Risk of overheating. The devices can be thermally destroyed.

- Adhere to the specification in the data sheet.

Cables lying around!

Risk of stumbling!

- Lay cables and lines so that they cannot be damaged and no one can trip over them.

The warranty only applies to the delivered configuration.

Warranty claims will be rejected in the case of improper installation, commissioning and operation as well as in the case of use not in accordance with the intended purpose and/or improper handling.

4 Scope of delivery

Information on the scope of delivery of your Bosch Rexroth Product can be found in the shipping documents and data sheet RE 30262 of your Bosch Rexroth product:

- Check the scope of delivery for completeness and possible transport damage.

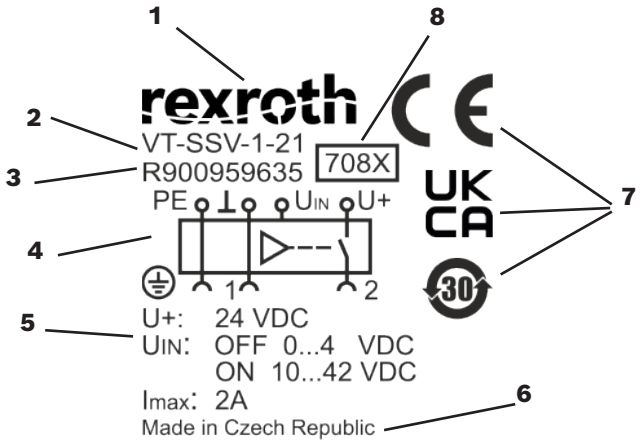
In case of complaints, please contact Bosch Rexroth AG, see chapter 16.1 “List of addresses“ on page 21.

5 About this product

You can find information on the product and its performance in the data sheet of your electronics.

5.1 IDENTIFICATION OF THE PRODUCT

The most important data of the product are printed directly on the product.



1	Word mark	**5**	Electrical data
2	Material short text	**6**	Country of origin
3	Material number	**7**	Markings of conformity
4	Circuit diagram	**8**	Plant

6 Transport and storage

There are no special instructions for transporting electronic products. You must, however, observe the notes in Chapter 2 “Safety instructions” and comply with the ambient conditions for storage and transport which are detailed in the technical data sheet RE 30262.

6.1 STORING THE VT-SSV-1-2X

Proceed as follows in order to prepare electronics from Bosch Rexroth for storage and further use:

- Whenever possible, use the original packaging for storage.
- Observe the permissible storage temperature range specified in the data sheet.
- Protect the electronics from dust and humidity and UV radiation.

7 Installation

NOTICE

Risk of short-circuit!

In the case of electronics with housing, water may condense within the housing!

- Let the electronics acclimate itself for several hours, as otherwise water may condense in the housing.
- When installing the product, use the seals provided for that purpose.
- When working on electronics, observe strictest cleanliness and make sure that no fluids will enter the housing.

Major potential differences!

Risk of destruction of electronics by plugging or unplugging connectors under voltage.

- Switch off power supply to the relevant system part before installing the products or plugging or unplugging connectors.

External electromagnetic interference!

Risk of malfunction.

- The distance to radio sources must be sufficiently large (>> 1 m).
- Do not lay solenoid or signal cables near power cables.
- Shield command and actual value cables. Connect the shield to system ground on both ends.

7.1 REQUIRED TOOLS

To connect flexible cables to the terminals of the VT-SSV-1-2X you require a screwdriver (flat head 3.0 x 0.5 mm, and for the flat head screw 5.5 x 1.0 mm). Further tools are not required.

7.2 INSTALLATION CONDITIONS

- When installing the amplifier, strictly adhere to the ambient conditions specified in data sheet RE 30262.
- The housing of the VT-SSV-1-2X features protection class IP65. Requirements that exceed type of protection IP65 have to be ruled out. Avoid contact of the VT-SSV-1-2X with hydraulic fluids, acids, bases, corrosive agents, salts, metal vapors, solvents, etc.

7.2.1 Place of installation

Electronics from Bosch Rexroth are intended for mounting on on/off valves in hydraulic systems and machines.

7.3 INSTALLING UND CONNECTING THE VT-SSV-1-2X

The dimensions of plug-in switching amplifier VT-SSV-1-2X are given in data sheet RE 30262.

Assemble the unit using a plastic cable gland PG11 with inserted seal. The clamping range is 7.6 ... 11.5 mm

The required tightening torque for flat head screw M3 is 0.5 Nm, for clamping screw M2,6 max. 0.4 Nm.

Proceed as follows to assemble the VT-SSV-1-2X:

1. Loosen the flat head screw and open the cover.
2. Lead the connection cable through the plastic cable gland PG11.
3. Fasten the connection cable with the help of the clamping screws.
4. Tighten plastic cable gland PG11.
5. Close the cover and tighten the flat head screw to the specified tightening torque.

7.4 CONNECTING THE SUPPLY VOLTAGE

1. Disconnect the relevant system part from the power supply.
2. Inspect all cables for intactness.
3. Connect the signal and solenoid cables according to your circuit diagram to the relevant terminals of the VT-SSV-1-2X.
4. Connect the supply voltage and check the presence of voltage by switching on.

Tabelle 6: Cable variant

Connection cable	Cross-section
Single-wire	2.5 mm²
Ultrafine-wire	1.5 mm²
With wire end ferrule	1.5 mm²

For cable gland PG11 the hole in the cover is expanded to ⌀ 12.

The stripped length is 5 mm.

7.4.1 Suppressing interference of the system

Should interference occur in conjunction with signals of the VT-SSV-1-2X, check the interference suppression of other electrical components, e.g. as follows:

Tabelle 7: Suppressing interference

Possible causes of faults	
Switched inductance	DC: antiparallel free-wheeling diode over actuator winding
	AC: type-related R/C combination over actuator winding.
Electric motors	R/C combination from each motor winding to earth.
Frequency converter	Inlet filter in the voltage supply of the frequency converter
	Motor control lines shielded and installed separately from other cables and/or output filter for motor cables.
	Large-area contact of the frequency converter housing to the rear wall of the control cabinet

8 Commissioning

NOTICE

Uncontrolled plugging and unplugging of connectors!

The device might be destroyed.

- Before plugging or unplugging connectors into or from the device, disconnect the device from the power supply or de-energize it reliably!
  Damage to the device caused by incorrect handling is not covered by the warranty!
- Observe the protection class, the voltage supply and the environmental conditions according to data sheet RE 30262.

For commissioning we recommend using a multimeter.

8.1 BLOCK CIRCUIT DIAGRAM OF THE VT-SSV-1-2X

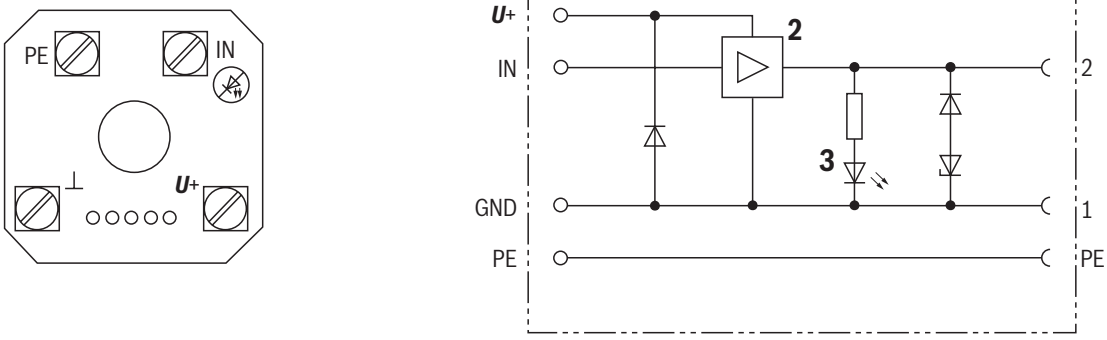


Abb. 1: Block diagram

1 Connection terminals

- Operating voltage “U+” +24 V
- Enable “IN”
- Operating voltage “GND”
- Equipment grounding conductor “PE”
- Clamping screw M2,6; tightening torque Ma max = 0.4 Nm

2 Electronic switch

3 LED status indicator lamp

4 Electrical connections

9 Operation

Should a fault occur during operation, e.g. a power failure, the VT-SSV-1-2X can simply be switched on again without requiring further measures and it is then ready for operation again.

10 Maintenance and repair

10.1 CLEANING AND CARE

NOTICE

Ingress of contaminants and humidity!

Malfunction and loss of function.

- When working on electronics observe strictest cleanliness.
- Only use a dry and dust-free cloth for cleaning.

Solvents and aggressive cleaning agents!

Damage and accelerated aging of electronics.

- Do not use aggressive cleaning agents for cleaning, but only a dry and dust-free cloth.

Proceed as follow for cleaning and care:

- Carry out a visual inspection and check that all screws are tightened and hoses fit properly.
- Check all plug-in and clamped connections at least once a year for correct fit and damage.
- Inspect cables for rupture and crushes. Have damaged or defective cables replaced immediately!
- Clean housing parts with a dry and dust-free cloth.

10.2 INSPECTION AND MAINTENANCE

Maintenance of Bosch Rexroth electronics is restricted to the points described under chapter 10.1“Cleaning and care” above.

10.3 REPAIR

Bosch Rexroth electronics can only be replaced as a complete unit. Unauthorized modifications to devices are not permitted for safety reasons! Repairs may only be carried out by Bosch Rexroth AG. For repairs send the device to the service address given in chapter 16.1.

Please return the devices to us in their original packaging.

Repaired devices are returned with factory settings.

In the case of parameterized devices, user-specific settings are not maintained. The operator has to transmit the relevant user parameters again.

11 Demounting and replacement

11.1 REQUIRED TOOLS

For replacement, a screwdriver is necessary.

11.2 PREPARING DEMOUNTING

⚠ WARNING

Risk of injury by demounting parts under pressure and electric voltage!

If you do not de-pressurize and de-energize the system before starting demounting, you may get injured and the product or system parts may be damaged!

- ▶ Decommission the entire system as described in the general instructions for the system.
- ▶ The system and all connected components must be brought to a safe state. In addition, the components must be switched off, de-pressurized, de-energized and secured against restarting.

Decommission the entire system as described in the general instructions for the system. In any case, bring the system to a safe state, shut it down, depressurize and disconnect it from the power supply and secure it against being switched on again.

11.3 DEMOUNTING

NOTICE

Electric arc and short-circuit!

Risk of destruction of system components.

- ▶ Put plug-in connectors down in a way that no short-circuit fault can occur.

Proceed as follows to demount the VT-SSV-1-2X:

1. Loosen the flat head screw and remove the connector.
2. Loosen the plastic cable gland PG11.
3. Open the cover and loosen the clamping screws.
4. Remove the connection cable.

11.4 PREPARING THE COMPONENTS FOR STORAGE OR FURTHER USE

Proceed as follows in order to prepare electronics from Bosch Rexroth for storage and further use:

- ▶ Whenever possible, use the original packaging for storage.
- ▶ Observe the permissible storage temperature range specified in data sheet RE 30262.
- ▶ Protect the Product from dust and humidity.

12 Disposal

12.1 ENVIRONMENTAL PROTECTION

Careless disposal of the devices can lead to pollution of the environment.

- ▶ Therefore, dispose of the products according to the national regulations in your country.
- ▶ Observe the following notes for an environmentally friendly disposal of the devices.

12.2 RETURN TO BOSCH REXROTH AG

Products manufactured by us can be returned to us free of charge for disposal. When returned, the products must not contain any inappropriate foreign substances or third-party components. The components have to be sent carriage paid to the following address:

Bosch Rexroth AG

Service Industriehydraulik

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. For ecological reasons, disposable packaging should not be used for returning products to Bosch Rexroth.

12.4 MATERIALS USED

Electronic components from Bosch Rexroth do not contain any hazardous substances that could be released during intended use. In the normal case, no negative effects on human beings and on the environment have to be expected.

Electronics from Bosch Rexroth mainly consist of:

- Plastics, electronics components and assemblies as well as copper

12.5 RECYCLING

Due to the high share of metals the material of the products can mostly be recycled. In order to achieve an ideal metal recovery, disassembly into individual assemblies is required. The metals contained in electrical and electronic assemblies can also be recovered by means of special separation procedures. If the products contain batteries or accumulators, they have to be removed before recycling and furnished to the battery recycling, if possible.

13 Extension and modification

The VT-SSV-1-2X must be neither extended nor converted.

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 obtain a general overview of how your product works in conjunction with the entire system.
- Try to find out whether the product has functioned properly in conjunction with the overall system before the fault occurred.
- Try to determine any changes of the overall system in which the product is integrated:
  - Were there any changes to the product's operating conditions or operating range?
  - Were there any changes (e.g. retrofit) or repairs carried out on the complete system (machine/system, electrics, control) or on 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 error. If possible, ask the direct (machine) operator.

If you cannot rectify the error, contact one of the contact addresses which can be found at `www.boschrexroth.com` or in the address directory in chapter 16.1.

15 Technical data

You can find the technical data of your device in data sheet RE 30262.

16 Annex

16.1 LIST OF ADDRESSES

Contact for service and spare parts

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

Telephone +49 (0) 9352/40 50 60
E-mail service@boschrexroth.de

Outside Germany you will find service subsidiaries in your vicinity on the Internet at `www.boschrexroth.com`

Headquarters

Bosch Rexroth AG
Zum Eisengießer 1
97816 Lohr am Main
Germany

Telephone +49 (0) 9352/18-0
Email my.support@boschrexroth.com

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

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