

INTERBUS Devices of the Rexroth Fieldline Product Range

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Edition 01

Application Description



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of the Rexroth Fieldline
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Purpose of Documentation This document describes the INTERBUS devices of the Rexroth Inline product range.

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1 Fieldline on INTERBUS

1.1 Fieldline Product Range

The input and output devices in the Fieldline product range are designed for distributed automation tasks in harsh environmental conditions. The devices meet the requirements for IP65/IP67 protection. They enable direct connection of sensors and actuators in an environment close to the station.

The Fieldline product range includes the Fieldline Stand Alone (FLS) and Fieldline Modular (FLM) product groups.

Fieldline Stand Alone devices cannot be extended and have a directly integrated fieldbus connection and I/O level. They are used for distribution in the field when only a few digital I/O points are required.

Fieldline Modular devices consist of a bus coupler (gateway) and I/O devices that can be connected. They are used for special functions, primarily for applications with a high I/O node density and complex functions.

Fieldline on INTERBUS

1.2 Documentation for Fieldline Devices

The documentation for Fieldline devices is modular, providing you with the optimum information for your specific bus system.



This application description describes only the INTERBUS-specific features of the devices.

The following documentation is also required:

Installing Devices of the Rexroth Fieldline Product Range DOK-CONTRL-FLSYSINS*-AW..-EN-P (MNR R911317026)**

This application description describes the devices for all bus systems.
This includes:

- The device properties, which are the same for all bus systems
- Mounting
- The power supply concept and connection

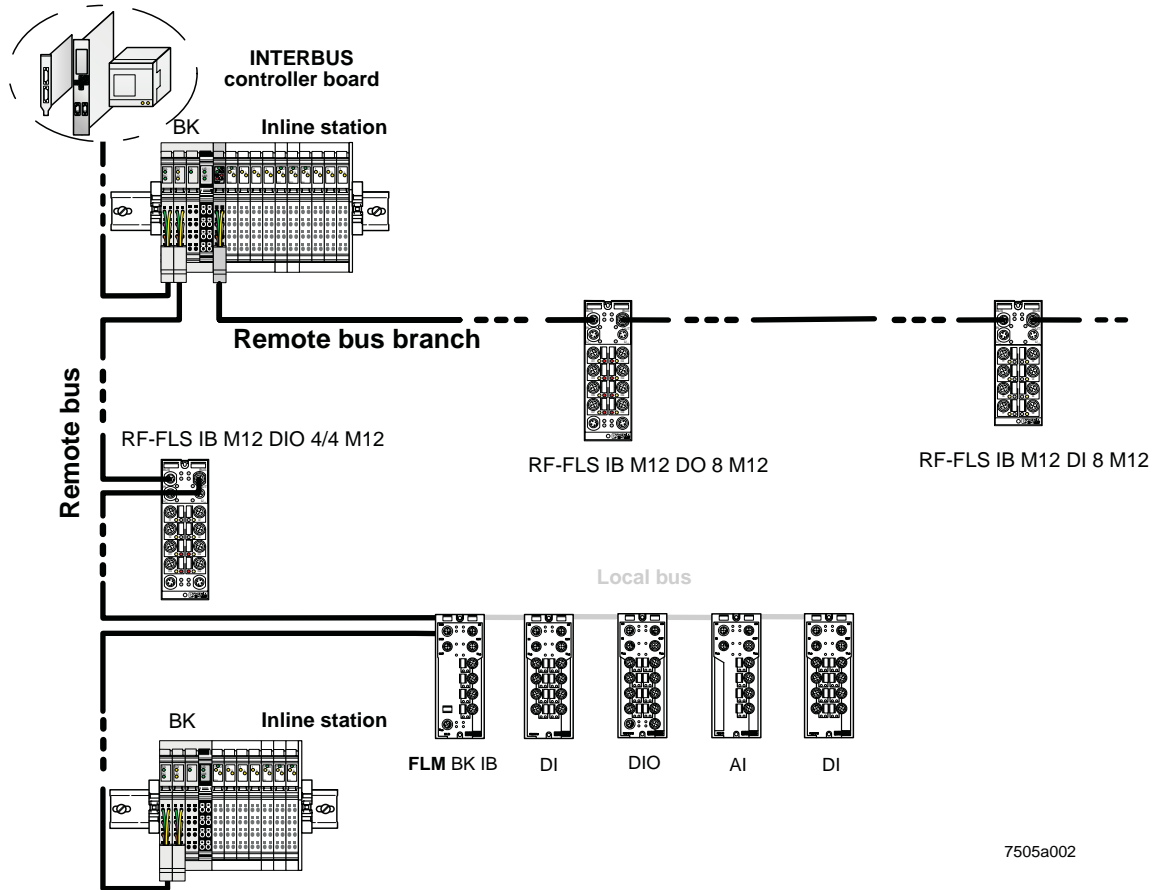
Device-Specific Data Sheet

The data sheet describes the specific properties of a device.
This includes:

- Function description
- Local diagnostic and status indicators
- Connector pin assignment and connection example
- Programming data
- Technical data

1.3 INTERBUS

INTERBUS is a fieldbus standardized according to IEC 61158 for the serial transmission of data on the sensor/actuator level.



7505a002

Fig. 1-1 Typical structure of an INTERBUS system with remote bus and local

Fieldline on INTERBUS

1.4 Fieldline Modular Local Bus

A Fieldline Modular local bus is a bus connection that branches off from a remote bus via a bus coupler (FLM BK IB) and connects the Fieldline Modular local bus devices with each other. The bus coupler opens a powerful local bus, which can be used to connect up to 16 additional devices. Devices are Fieldline Modular local bus devices used to implement a local bus station. The bus coupler provides the power supply.

The maximum total length of a local bus is 20 m. The transmission speed can be switched from 500 kbaud to 2 Mbaud.

The bus coupler can also be connected to up to eight digital sensors via M12 connectors, which are double-assigned. It supplies the sensors with the required voltage and reads the available signals.

1.5 Compatibility Test

All Rexroth controllers and drives are developed and tested in accordance with the latest state of the art.

However, as it is impossible to track the continuous further development of all materials with which our controllers and drives might come into contact (e.g., lubricants at machine tools), reactions with materials that we use cannot always be prevented.

Therefore, you should carry out a compatibility test of new lubricants, cleaning agents, etc. and our housings/housing materials, before they are used.

2 Important Directions for Use

2.1 Appropriate Use

2.1.1 Introduction

Rexroth products represent state-of-the-art developments and manufacturing. They are tested prior to delivery to ensure operating safety and reliability.

The products may only be used in the manner that is defined as appropriate. If they are used in an inappropriate manner, then situations can develop that may lead to property damage or injury to personnel.



Bosch Rexroth, as manufacturer, is not liable for any damages resulting from inappropriate use. In such cases, the guarantee and the right to payment of damages resulting from inappropriate use are forfeited. The user alone carries all responsibility of the risks.

Before using Rexroth products, make sure that all the pre-requisites for appropriate use of the products are satisfied:

- Personnel that in any way, shape or form uses our products must first read and understand the relevant safety instructions and be familiar with appropriate use.
- If the product takes the form of hardware, then they must remain in their original state, in other words, no structural changes are permitted. It is not permitted to decompile software products or alter source codes.
- Do not mount damaged or faulty products or use them in operation.
- Make sure that the products have been installed in the manner described in the relevant documentation.

Important Directions for Use

2.1.2 Areas of Use and Application

The Inline system of Rexroth is a modular and flexibly scalable input/output system in the degree of protection IP 20. It can be operated locally at the IndraControl L or peripherally via a field bus coupler.



The Rexroth Inline system may only be used with the accessories and parts specified in this document. If a component has not been specifically named, then it may not be either mounted or connected. The same applies to cables and lines.

Operation is only permitted in the specified configurations and combinations of components using the software and firmware as specified in the relevant function descriptions.

Typical applications of the Rexroth Inline system are:

- Handling and assembly systems,
- Packaging and foodstuff machines,
- Printing and paper processing machines and
- Machine tools.

The Rexroth Inline system may only be operated under the assembly, installation and ambient conditions as described here (temperature, system of protection, humidity, EMC requirements, etc.) and in the position specified.

In residential areas as well as in business and commercial areas Class A devices may be used with the following note:



This is a Class A device. In a residential area, this device may cause radio interferences. In such a case, the user may be required to introduce suitable countermeasures at his own cost.

2.2 Inappropriate Use

Using the Rexroth Inline system outside of the above-referenced areas of application or under operating conditions other than described in the document and the technical data specified is defined as "inappropriate use".

The Rexroth Inline system may not be used if

- they are subject to operating conditions that do not meet the above specified ambient conditions. This includes, for example, operation under water, in the case of extreme temperature fluctuations or extremely high maximum temperatures or if
- Bosch Rexroth has not specifically released them for that intended purpose. Please note the specifications outlined in the general Safety Guidelines!

3 Safety Instructions for Electric Drives and Controls

3.1 Safety Instructions - General Information

3.1.1 Using the Safety Instructions and Passing them on to Others

Do not attempt to install or commission this device without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation prior to working with the device. If you do not have the user documentation for the device, contact your responsible Bosch Rexroth sales representative. Ask for these documents to be sent immediately to the person or persons responsible for the safe operation of the device.

If the device is resold, rented and/or passed on to others in any other form, these safety instructions must be delivered with the device in the official language of the user's country.



Improper use of these devices, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, may result in material damage, bodily harm, electric shock or even death!

Observe the safety instructions!

3.1.2 How to Employ the Safety Instructions

Read these instructions before initial commissioning of the equipment in order to eliminate the risk of bodily harm and/or material damage. Follow these safety instructions at all times.

- Bosch Rexroth AG is not liable for damages resulting from failure to observe the warnings provided in this documentation.
- Read the operating, maintenance and safety instructions in your language before commissioning the machine. If you find that you cannot completely understand the documentation for your product, please ask your supplier to clarify.
- Proper and correct transport, storage, assembly and installation, as well as care in operation and maintenance, are prerequisites for optimal and safe operation of this device.
- Only assign trained and qualified persons to work with electrical installations:
 - Only persons who are trained and qualified for the use and operation of the device may work on this device or within its proximity. The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the product, as well as an understanding of all warnings and precautionary measures noted in these instructions.
 - Furthermore, they must be trained, instructed and qualified to switch electrical circuits and devices on and off in accordance with technical safety regulations, to ground them and to mark them according to the requirements of safe work practices. They must have adequate safety equipment and be trained in first aid.
- Only use spare parts and accessories approved by the manufacturer.

Safety Instructions for Electric Drives and Controls

- Follow all safety regulations and requirements for the specific application as practiced in the country of use.
- The devices have been designed for installation in industrial machinery.
- The ambient conditions given in the product documentation must be observed.
- Only use safety-relevant applications that are clearly and explicitly approved in the Project Planning Manual. If this is not the case, they are excluded. Safety-relevant are all such applications which can cause danger to persons and material damage.
- The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.
- The machine and installation manufacturer must
 - make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,
 - make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.
- Commissioning of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards of the application.
- Operation is only permitted if the national EMC regulations for the application are met.
- The instructions for installation in accordance with EMC requirements can be found in the section on EMC in the respective documentation (Project Planning Manuals of components and system).
The machine or installation manufacturer is responsible for compliance with the limiting values as prescribed in the national regulations.
- Technical data, connection and installation conditions are specified in the product documentation and must be followed at all times.

National regulations which the user must take into account

- European countries: according to European EN standards
- United States of America (USA):
 - National Electrical Code (NEC)
 - National Electrical Manufacturers Association (NEMA), as well as local engineering regulations
 - regulations of the National Fire Protection Association (NFPA)
- Canada: Canadian Standards Association (CSA)
- Other countries:
 - International Organization for Standardization (ISO)
 - International Electrotechnical Commission (IEC)

3.1.3 Warning Symbols and Degrees of Hazard Seriousness

The safety instructions describe the following degrees of hazard seriousness. The degree of hazard seriousness informs about the consequences resulting from non-compliance with the safety instructions:




Warning symbol	Signal word	Degree of hazard seriousness acc. to ANSI Z 535.4-2002
	Danger	Death or severe bodily harm will occur.
	Warning	Death or severe bodily harm may occur.
	Caution	Minor or moderate bodily harm or material damage may occur.

Fig. 3-1 Hazard classification (according to ANSI Z 535)

3.1.4 Hazards by Improper Use



DANGER

High electric voltage and high working current! Risk of death or severe bodily injury by electric shock!

Observe the safety instructions!



DANGER

Dangerous movements! Danger to life, severe bodily harm or material damage by unintentional motor movements!

Observe the safety instructions!



WARNING

High electric voltage because of incorrect connection! Risk of death or bodily injury by electric shock!

Observe the safety instructions!



WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!

Observe the safety instructions!



CAUTION

Hot surfaces on device housing! Danger of injury! Danger of burns!

Observe the safety instructions!

Safety Instructions for Electric Drives and Controls



CAUTION

Risk of injury by improper handling! Risk of bodily injury by bruising, shearing, cutting, hitting or improper handling of pressurized lines!

Observe the safety instructions!



CAUTION

Risk of injury by improper handling of batteries!

Observe the safety instructions!

3.2 Instructions with Regard to Specific Dangers

3.2.1 Protection Against Contact with Electrical Parts and Housings



This section concerns devices and drive components with voltages of more than **50 volts**.

Contact with parts conducting voltages above 50 volts can cause personal danger and electric shock. When operating electrical equipment, it is unavoidable that some parts of the units conduct dangerous voltage.

**DANGER**

High electrical voltage! Danger to life, electric shock and severe bodily injury!

- Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain and repair this equipment.
- Follow general construction and safety regulations when working on electrical power installations.
- Before switching on the device, the equipment grounding conductor must have been permanently connected to all electrical equipment in accordance with the connection diagram.
- Do not operate electrical equipment at any time, even for brief measurements or tests, if the equipment grounding conductor is not permanently connected to the mounting points of the components provided for this purpose.
- Before working with electrical parts with voltage potentials higher than 50 V, the device must be disconnected from the mains voltage or power supply unit. Provide a safeguard to prevent reconnection.
- For electrical drive and filter components, observe the following: Wait **30 minutes** after switching off power to **allow capacitors to discharge** before beginning to work. Measure the electrical voltage on the capacitors before beginning to work to make sure that the equipment is safe to touch.
- Never touch the electrical connection points of a component while power is turned on.
- Install the covers and guards provided with the equipment properly before switching the device on. Before switching the equipment on, cover and safeguard live parts safely to prevent contact with those parts.
- A residual-current-operated circuit-breaker or r.c.d. cannot be used for electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device according to the relevant standards.
- Secure built-in devices from direct touching of electrical parts by providing an external housing, for example a control cabinet.



For electrical drive and filter components with voltages of **more than 50 volts**, observe the following additional safety instructions.

**DANGER**

High housing voltage and high leakage current! Risk of death or bodily injury by electric shock!

- Before switching on, the housings of all electrical equipment and motors must be connected or grounded with the equipment grounding conductor to the grounding points. This is also applicable before short tests.
 - The equipment grounding conductor of the electrical equipment and the devices must be non-detachably and permanently connected to the power supply unit at all times. The leakage current is greater than 3.5 mA.
 - Over the total length, use copper wire of a cross section of a minimum of 10 mm² for this equipment grounding connection!
 - Before commissioning, also in trial runs, always attach the equipment grounding conductor or connect to the ground wire. Otherwise, high voltages may occur at the housing causing electric
-

3.2.2 Protection Against Electric Shock by Protective Extra-Low Voltage

Protective extra-low voltage is used to allow connecting devices with basic insulation to extra-low voltage circuits.

All connections and terminals with voltages between 5 and 50 volts at Rexroth products are PELV systems¹. It is therefore allowed to connect devices equipped with basic insulation (such as programming devices, PCs, notebooks, display units) to these connections and terminals.



High electric voltage by incorrect connection! Risk of death or bodily injury by electric shock!

If extra-low voltage circuits of devices containing voltages and circuits of more than 50 volts (e.g. the mains connection) are connected to Rexroth products, the connected extra-low voltage circuits must comply with the requirements for PELV¹.

3.2.3 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of connected motors. Some common examples are:

- improper or wrong wiring of cable connections
- incorrect operation of the equipment components
- wrong input of parameters before operation
- malfunction of sensors, encoders and monitoring devices
- defective components
- software or firmware errors

These errors can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

The monitoring in the drive components will normally be sufficient to avoid faulty operation in the connected drives. Regarding personal safety, especially the danger of bodily harm and/or material damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

1) "Protective Extra-Low Voltage"



Dangerous movements! Danger to life, risk of injury, severe bodily harm or material damage!

- For the above reasons, ensure personal safety by means of qualified and tested higher-level monitoring devices or measures integrated in the installation.

They have to be provided for by the user according to the specific conditions within the installation and a hazard and fault analysis. The safety regulations applicable for the installation have to be taken into consideration. Unintended machine motion or other malfunction is possible if safety devices are disabled, bypassed or not activated.

To avoid accidents, bodily harm and/or material damage

- Keep free and clear of the machine's range of motion and moving parts. Possible measures to prevent people from accidentally entering the machine's range of motion:
 - use safety fences
 - use safety guards
 - use protective coverings
 - install light curtains or light barriers
 - Fences and coverings must be strong enough to resist maximum possible momentum.
 - Mount the emergency stop switch in the immediate reach of the operator. Verify that the emergency stop works before commissioning. Do not operate the device if the emergency stop switch is not working.
 - Isolate the drive power connection by means of an emergency stop circuit or use a safety related starting lockout to prevent unintentional start.
 - Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone.
 - Additionally secure vertical axes against falling or dropping after switching off the motor power by, for example:
 - mechanically securing the vertical axes,
 - adding an external braking/arrester/clamping mechanism or
 - ensuring sufficient equilibration of the vertical axes.
 - The standard equipment motor brake or an external brake controlled by the drive controller are **not sufficient to guarantee personal safety!**
 - Disconnect electrical power to the equipment using a master switch and secure the switch against reconnection for:
 - maintenance and repair work
 - cleaning of equipment
 - long periods of discontinued equipment use
 - Prevent the operation of high-frequency, remote control and radio equipment near electronics circuits and supply leads. If the use of such devices cannot be avoided, verify the system and the installation for possible malfunctions in all possible positions of normal use before initial commissioning. If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.
-

3.2.4 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated by current-carrying conductors and permanent magnets in motors represent a serious personal danger to those with heart pacemakers, metal implants and hearing aids.



WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!

- Persons with heart pacemakers and metal implants are not permitted to enter following areas:
 - Areas in which electrical equipment and parts are mounted, being operated or commissioned.
 - Areas in which parts of motors with permanent magnets are being stored, repaired or mounted.
- If it is necessary for somebody with a pacemaker to enter such an area, a doctor must be consulted prior to doing so. The noise immunity of present or future implanted heart pacemakers differs greatly so that no general rules can be given.
- Those with metal implants or metal pieces, as well as with hearing aids, must consult a doctor before they enter the areas described above. Otherwise health hazards may occur.

3.2.5 Protection Against Contact with Hot Parts



CAUTION

Hot surfaces at motor housings, on drive controllers or chokes! Danger of injury!
Danger of burns!

- Do not touch surfaces of device housings and chokes in the proximity of heat sources! Danger of burns!
- Do not touch housing surfaces of motors! Danger of burns!
- According to the operating conditions, temperatures can be **higher than 60 °C, 140 °F** during or after operation.
- Before accessing motors after having switched them off, let them cool down for a sufficiently long time. Cooling down can require **up to 140 minutes!** Roughly estimated, the time required for cooling down is five times the thermal time constant specified in the Technical Data.
- After switching drive controllers or chokes off, wait 15 minutes to allow them to cool down before touching them.
- Wear safety gloves or do not work at hot surfaces.
- For certain applications, the manufacturer of the end product, machine or installation, according to the respective safety regulations, has to take measures to avoid injuries caused by burns in the end application. These measures can be, for example: warnings, guards (shielding or barrier), technical documentation.

3.2.6 Protection During Handling and Mounting

In unfavorable conditions, handling and mounting certain parts and components in an improper way can cause injuries.



Risk of injury by improper handling! Bodily injury by bruising, shearing, cutting, hitting!

- Observe the general construction and safety regulations on handling and mounting.
 - Use suitable devices for mounting and transport.
 - Avoid jamming and bruising by appropriate measures.
 - Always use suitable tools. Use special tools if specified.
 - Use lifting equipment and tools in the correct manner.
 - If necessary, use suitable protective equipment (for example safety goggles, safety shoes, safety gloves).
 - Do not stand under hanging loads.
 - Immediately clean up any spilled liquids because of the danger of skidding.
-

3.2.7 Battery Safety

Batteries consist of active chemicals enclosed in a solid housing. Therefore, improper handling can cause injury or material damage.



Risk of injury by improper handling!

- Do not attempt to reactivate low batteries by heating or other methods (risk of explosion and cauterization).
 - Do not recharge the batteries as this may cause leakage or explosion.
 - Do not throw batteries into open flames.
 - Do not dismantle batteries.
 - When replacing the battery/batteries do not damage electrical parts installed in the devices.
 - Only use the battery types specified by the manufacturer.
-



Environmental protection and disposal! The batteries contained in the product are considered dangerous goods during land, air, and sea transport (risk of explosion) in the sense of the legal regulations. Dispose of used batteries separate from other waste. Observe the local regulations in the country of assembly.

Safety Instructions for Electric Drives and Controls

3.2.8 Protection Against Pressurized Systems

According to the information given in the Project Planning Manuals, motors cooled with liquid and compressed air, as well as drive controllers, can be partially supplied with externally fed, pressurized media, such as compressed air, hydraulics oil, cooling liquids and cooling lubricating agents. Improper handling of the connected supply systems, supply lines or connections can cause injuries or material damage.



CAUTION

Risk of injury by improper handling of pressurized lines!

- Do not attempt to disconnect, open or cut pressurized lines (risk of explosion).
 - Observe the respective manufacturer's operating instructions.
 - Before dismantling lines, relieve pressure and empty medium.
 - Use suitable protective equipment (for example safety goggles, safety shoes, safety gloves).
 - Immediately clean up any spilled liquids from the floor.
-



Environmental protection and disposal! The agents used to operate the product might not be economically friendly. Dispose of ecologically harmful agents separately from other waste. Observe the local regulations in the country of assembly.

4 Connecting Bus Cables



In the following, a cable that conforms to the INTERBUS specification must be used to connect INTERBUS.

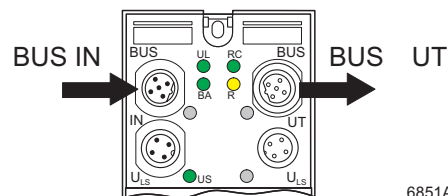
Use shielded M12 connectors to connect the bus. The thread of the M12 connector is used to connect the shielding to functional earth ground.



Bosch Rexroth recommends the use of pre-assembled bus cables (accessories can be found in the product catalog at www.boschrexroth.com).

If you assemble the cables yourself, please follow the instructions provided in the Fieldline application description DOK-CONTRL-FLSYSINS***-AW..-EN-P (MNR R911317026) and the device-specific data sheet.

BUS IN / BUS OUT Connect the incoming bus to the BUS IN socket and the outgoing bus to the BUS OUT socket.



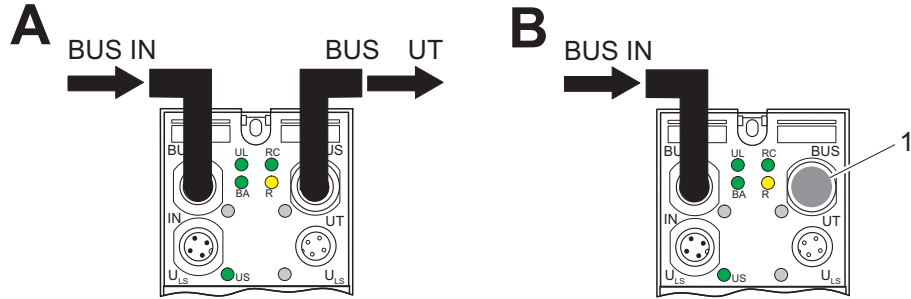
6851A003

Fig. 4-1 Bus connection

Accessories: Two M12 connectors

Connecting Bus Cables

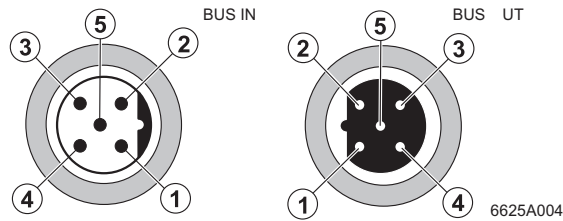
For a device that is followed by another device, the incoming and outgoing bus must be connected (Fig. 4-2, A). For the last device of a remote bus, only the incoming bus is connected (Fig. 4-2, B). To ensure IP65/IP67 protection, cover the unused BUS OUT connection with a protective cap (1).



6851A009

Fig. 4-2 Connecting INTERBUS

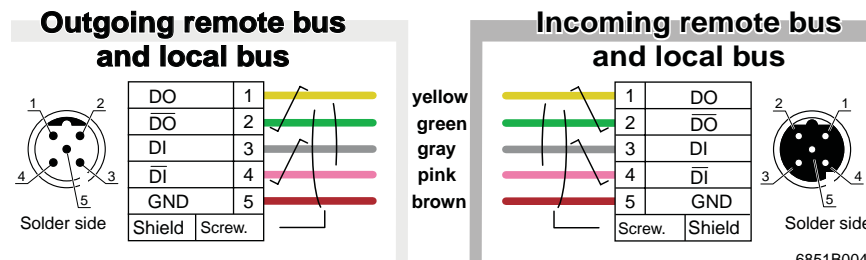
Connecting the bus Connect the bus via BUS IN/BUS OUT.



6625A004

Fig. 4-3 INTERBUS pin assignment (connections on the device)

Pin	IN	OUT
1	DO	DO
2	\overline{DO}	\overline{DO}
3	DI	DI
4	\overline{DI}	\overline{DI}
5	GND	GND



6851B004

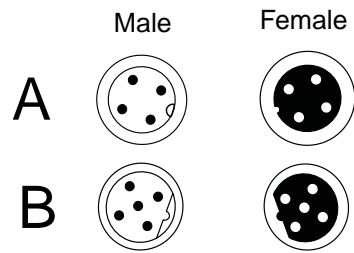
Fig. 4-4 Connector pin assignment of the M12 connector (INTERBUS) (connector on the cable)



The thread is used for shielding.

Connecting Bus Cables

Encoding of the connections In the INTERBUS system, the connections for the bus are B-encoded and the connections for the supply voltage are A-encoded. In this way, the bus and supply voltage cannot be mixed up.



6851A005

Fig. 4-5

*Difference between A and B-encoding
(connections on the device)*

Connecting Bus Cables

5 Configuration and Startup

5.1 Configuring the INTERBUS System



The INTERBUS system must be operated with a controller board with firmware version 4.40 (G4) or later to ensure optimum use of all system and diagnostic functions.

To configure your system, proceed as follows:

- Describe and define the task
 - Specify the device range for the I/O devices
 - Specify the type and number of input and output signals
- Select the devices required
 - Specify the devices to be installed according to the input and output signals
- Consider the system restrictions
 - Take into account the basic system specifications
- Select the power supply
 - Please refer to the information on the power supply in the DOK-CONTRL-FLSYSINS***-AW..-EN-P application description (MNR R911317026)
 - The selection of suitable power supplies always depends on the individual system. The following criteria should always be met for the 24 V DC voltage supply:

Nominal value:	24 V
Tolerance:	±25% (complies with EN 61131-2: -15%/+20%)
Incl. ripple:	±5%

This corresponds to a range of 18 V to 30 V (ripple included)
- Select INTERBUS cables



For interference-free transmission, Bosch Rexroth recommends a 6-wire, twisted pair and shielded cable.



A selection of suitable bus cables can be found in the product catalog at www.boschrexroth.com.

Configuration and Startup

5.2 Installation



CAUTION

Disconnect the power supply before installing the devices.

-
- Installing devices
See DOK-CONTRL-FLSYSINS***-AW..-EN-P application description.
 - Connecting the bus
See [Chapter "Connecting Bus Cables" on page 17](#).
 - Connecting the supply voltage
See DOK-CONTRL-FLSYSINS***-AW..-EN-P application description.



Further measures are not necessary for installation. It is **not necessary** to set an address or the baud rate or to use termination resistors for INTERBUS.

5.3 Configuration and Startup

For configuration, parameterization, and visualization of the system, the IndraWorks software is available for standard controller boards.

Please refer to the relevant documentation of software used for the configuration and startup of Fieldline devices.

6 Appendix: Ordering Information



Further information on all Fieldline products, Fieldline devices and their accessories as well as the complete documentation on Fieldline devices can be found at www.boschrexroth.com.

This includes:

- Fieldline devices
- Bus cables
- Shielded bus connectors
- Unshielded connectors
- Assembly systems
- Termination resistors
- Other accessories

Appendix: Ordering Information

7 Disposal and Environmental Protection

7.1 Disposal

7.1.1 Products

Our products can be returned to us free of charge for disposal. However, it is a precondition that the products are free of oil, grease or other dirt.

Furthermore, the products returned for disposal must not contain any undue foreign matter or foreign component.

Please send the products free domicile to the following address:

Bosch Rexroth AG

Electric Drives and Controls

Bürgermeister-Dr.-Nebel-Straße 2

D-97816 Lohr am Main

7.1.2 Packaging Materials

The packaging materials consist of cardboard, wood and polystyrene. These materials can be easily recycled in any municipal recycling system. For ecological reasons, please refrain from returning the empty packages to us.

7.2 Environmental Protection

7.2.1 No Release of Hazardous Substances

Our products do not contain any hazardous substances which may be released in the case of appropriate use. Accordingly, our products will normally not have any negative effect on the environment.

7.2.2 Materials Contained in the Products

Electronic devices

Electronic devices mainly contain:

- steel
- aluminium
- copper
- synthetic materials
- electronic components and modules

Motors

Motors mainly contain:

- steel
- aluminium
- copper
- brass
- magnetic materials
- electronic components and modules

Disposal and Environmental Protection

7.2.3 Recycling

Due to their high content of metal most of the product components can be recycled. In order to recycle the metal in the best possible way, the products must be disassembled into individual modules.

Metals contained in electric and electronic modules can also be recycled by means of special separation processes. The synthetic materials remaining after these processes can be thermally recycled.

If the products contain batteries or rechargeable batteries, these batteries are to be removed and disposed before they are recycled.

8 Service & Support

8.1 Helpdesk

Our service helpdesk at our headquarters in Lohr, Germany, will assist you with all kinds of enquiries.

Contact us:

- By phone through the Service Call Entry Center,
Mo - Fr 7:00 am - 6:00 pm CET
+49 (0) 9352 40 50 60
- By Fax
+49 (0) 9352 40 49 41
- By email: service.svc@boschrexroth.de

8.2 Service Hotline

Out of helpdesk hours please contact our German service department directly:

+49 (0) 171 333 88 26

or

+49 (0) 172 660 04 06

Hotline numbers for other countries can be found in the addresses of each region (see below).

8.3 Internet

Additional notes regarding service, maintenance and training, as well as the current addresses of our sales and service offices can be found on

<http://www.boschrexroth.com>

Outwith Germany please contact our sales/service office in your area first.

8.4 Helpful Information

For quick and efficient help please have the following information ready:

- detailed description of the fault and the circumstances
- information on the type plate of the affected products, especially type codes and serial numbers
- your phone / fax numbers and e-mail address so we can contact you in case of questions

Service & Support

Notes

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