

IndraControl XM42

Controls

Operating Instructions
R911345566

Edition 03



Change Record

Edition 03, 2019-11

Refer to [tab. 1-1 "Change Record" on page 1](#)

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Editorial Department

Development Automation Systems Control Platform HaPf (MaKo/MePe)

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1 About this documentation

Editions of this documentation

Edition	Release Date	Note
01	2018-09	First edition
02	2019-06	Notes on an earth-free setup
03	2019-11	Initial firmware update, general updates

Tab. 1-1: Change Record

1.1 Overview on target groups and product phases

In the following illustration, the framed activities, product phases and target groups refer to the present documentation.

Example: In the product phase "Mounting (assembly/installation)", the target group "mechanic/electrician" can execute the activity "install" using this documentation.

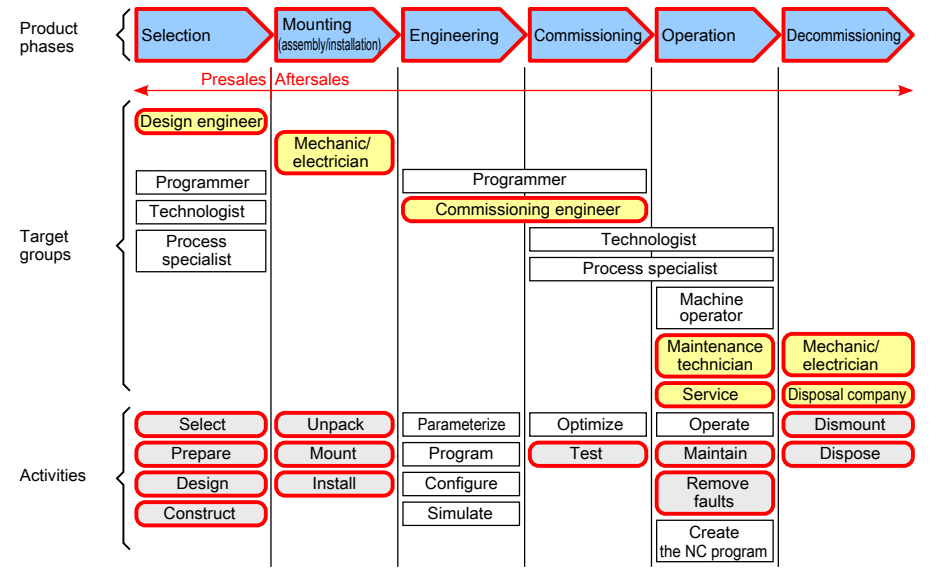


Fig. 1-1: Assigning the present documentation to the target groups, product phases and activities of the target group

This document instructs the technical staff of the machine manufacturer on how to safely perform the mechanical and electrical installation and on how to commission the device.

Required qualification: Individual who is able to assess the tasks assigned and to identify possible safety risks owing to qualification in the subject, knowledge and experience. The individual should also be familiar with the standards and regulations.

1.2 Scope

This operating instructions is valid for all variants of the control, whose type codes start with:

XM42...

The type code specifications are located on the type plate of the device, also refer to [chapter 2 "Product identification and scope of delivery" on page 3](#).

1.3 Related documents

Title	Part number and document type
IndraControl S20: System and Installation	R911335988 Application Description
IndraControl S20: Diagnostic Tabs and Error Messages	R911344826 Application Description
IndraControl XFE 01.1 Extension Modules Profibus, RT-Ethernet, Sercos, CAN	R911345570 Operating Instructions

Tab. 1-2: Related documents

The XM4x controls are provided as function package with the systems IndraMotion MLC and IndraMotion MTX. The ordering data (type code, part number) differ according to the selected function package (system functions). The hardware characteristics described in this document apply to all available function packages. For more information on the function packages, refer to the respective system descriptions.

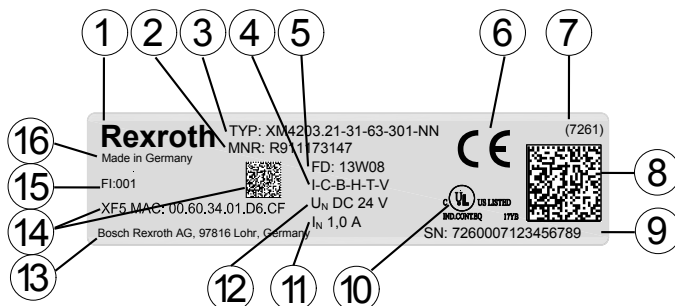
For related documents, go to the "Rexroth Media Directory" at <http://www.boschrexroth.com> and enter the specified part number.

1.4 Customer feedback

Customer requests, comments or suggestions for improvement are of great importance to us. Please email your feedback on the documentations to Feedback.Documentation@boschrexroth.de. Directly insert comments in the electronic PDF document and send the PDF file to Bosch Rexroth.

2 Product identification and scope of delivery

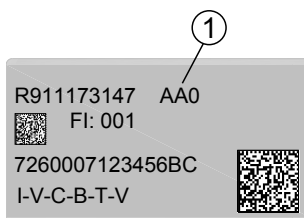
2.1 Product identification



- | | |
|-------------------------------|--|
| 1 Word mark | 9 Serial number |
| 2 Part number | 10 Underwriters Laboratories Inc. mark |
| 3 Type name (type code) | 11 Nominal current |
| 4 Check digit | 12 Nominal voltage |
| 5 Date of manufacture (yyWww) | 13 Company address |
| 6 CE conformity marking | 14 MAC address, MAC address as barcode |
| 7 Plant number | 15 Functional index |
| 8 QR code | 16 Manufacturing country |

Fig. 2-1: Exemplary type plate

2.2 Additional plate



- ① Hardware state of revision

Fig. 2-2: Additional plate

2.3 Scope of delivery

- Control IndraControl XM4
- 24 V power connector XA-CN01
- Bus base:
 - XA-BS03 (for S20 connection right and extension modules left)

3 Using safety instructions

3.1 Structure of the safety instructions

The safety instructions are structured as follows:

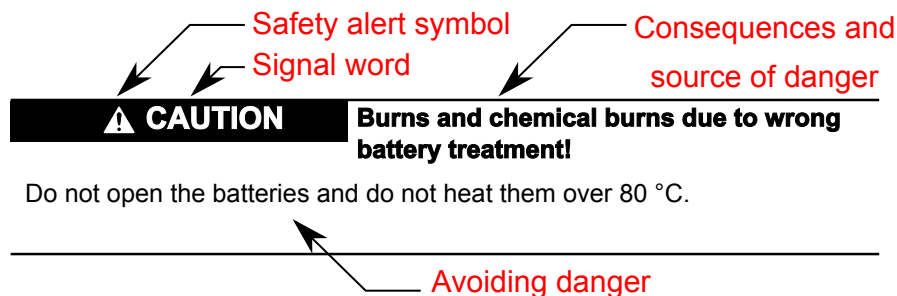


Fig. 3-1: Structure of the safety instructions

3.2 Explaining signal words and safety alert symbol

The safety instructions in this documentation contain specific signal words (danger, warning, caution, notice) and, if necessary, a safety alert symbol (according to ANSI Z535.6-2006).

The signal word draws attention to the safety instruction and indicates the risk potential.

The safety alert symbol (triangular safety reflector with exclamation marks), preceding the signal words Danger, Warning, Caution indicates hazards for persons.

DANGER

In case of non-compliance with this safety instruction, death or serious injury **will** occur.

WARNING

In case of non-compliance with this safety instruction, death or serious injury **can** occur.

⚠ CAUTION

In case of non-compliance with this safety instruction, minor or moderate injury can occur.

NOTICE

In case of non-compliance with this safety instruction, material damage can occur.

3.3 Symbols used

Pointers are displayed as follows:



This is a note.

Tips are displayed as follows:



This is a tip.

3.4 Explaining the signal alert symbol on the device



If this symbol is on your device, you have to observe the documentation on the device. The respective documentation informs on the type of hazard as well as the steps required to avoid this hazard.

4 Intended use

NOTICE

Risk of damaging the device if not expressly stated accessories, mounting parts and other components, cables, lines and software and firmware are used.

The IndraControl XM42 control may only be used with the accessories and mounting parts which are listed in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same applies to cables and lines.

Only to be operated with the component configurations and combinations expressly defined and with the software and firmware specified in the corresponding functional description.

Typical areas of application of the control IndraControl XM42 are:

- Handling and assembly systems
- Packaging and food processing machines
- Printing and paper converting machines
- Machine tools
- Wood working machines

The IndraControl XM42 control may only be operated under the mounting and installation conditions, in the position of application and under the ambient conditions (temperature, degree of protection, humidity, EMC, etc.) specified in this documentation.

5 Spare parts, accessories and wear parts

5.1 Power connectors, 24 V

Ordering code	Part number	Description
XA-CN01	R911173741	24 V plug

Tab. 5-1: Power connectors, 24 V

5.2 Bus bases for IndraControl XM42

Ordering code	Part number	Description
XA-BS03	R911174841	Bus bases for IndraControl S20 connection (right) and extension modules (left)

Tab. 5-2: Bus bases for IndraControl XM42

5.3 Bus bases for IndraControl S20 I/O

Ordering code	Part number	Description
S20-BS	R911172540	Bus bases for wide IndraControl S20 I/O modules
S20-BS-S	R911173203	Bus bases for narrow IndraControl S20 I/O modules

Tab. 5-3: Bus bases for S20 I/O

5.4 SD card

Ordering code	Part number	Description
XA-SD02	R911175017	SD card 4 GB

Tab. 5-4: SD card

5.5 End clamp

Ordering code	Part number	Description
SUP-M01-ENDHALTER	R911170685	2 pieces of snap-on end brackets for 35 mm NS 35/7.5 or NS 35/15 carrier plate; width: 9.5 mm

Tab. 5-5: End clamp

5.6 Wear parts

There are no wear parts in the control IndraControl XM4.

6 Ambient conditions

Ambient temperature during operation without fan	Up to 2,000 m: -25 °C to +50 °C 2,000 m to 3,000 m: max. +45 °C
Ambient temperature during storage and transport	-25°C to +70°C
Air pressure	55 kPa to 106 kPa (up to 4,500 m above sea level)
Air humidity	5 % to 95 % acc. to DIN EN 61131-2, no condensation
Degree of protection	IP20 acc. to DIN EN 60 529
Protection class	III, DIN EN 61010-2-201
Overvoltage category	2
Contamination level	2, no condensation allowed

Mechanical tests

Vibration resistance acc. to DIN EN 60068-2-6 ¹⁾	Oscillations, sinusoidal in all three axes 5 Hz - 8.4 Hz with 3.5 mm amplitude 8.4 Hz -150 Hz with 1 g peak acceleration
Shock test acc. to DIN EN 60068-2-27	Shock stress: Shock resistance in all three axes, 11 ms semi-sinusoidal 15 g
Broadband noise acc. to DIN EN 60068-2-64	20-500 Hz with 1.22 g rms ¹⁾ per axis

1) *Root Mean Square*

Electrostatic discharge

ESD resistance acc. to DIN EN 61131-2	Criterion B
• Test voltage	6 kV for contact discharge
	8 kV for air discharge

- ① The vibration stress specifications assume the use of industrial-suited RJ-45 plug connections. The "Industrial RJ-45 plug" of the company Yamaichi is recommended (Y-Con-Plug-41). The cables are available as accessories (RKB0020). To avoid vibration, secure the cables using a short distance (< 20 cm). The USB interfaces XF30 and XF31 may only be used up to a vibration stress of 1 g.

Tab. 6-1: Ambient conditions

NOTICE

Failure of the product due to contaminated air

- The ambient air must not contain acids, alkaline solutions, corrosive agents, salts, metal vapors and other electrically conductive contaminants in high concentrations
- The devices to be installed into the housing and installation compartments must at least comply with the degree of protection IP 54 according to DIN EN 60529.
- The device shall be provided in a suitable fire enclosure in the end-use application.

NOTICE

Defective product due to gases jeopardizing functions

Due to the risk of corrosion, avoid sulphurous gases (e.g. sulphur dioxide (SO₂) and hydrogen sulphide (H₂S)). The product is not resistant against these gases.

NOTICE

Failure of the product due to overheating

To avoid overheating and to ensure a smooth operation of the product according to the minimum distances specified in [chapter 10.1 "Installation notes" on page 16](#), air has to circulate.



This is a product that corresponds to the limit values of the emitted interference of class A (industrial environments), but not of class B (residential area and small enterprises).

When using the product in residential areas or small enterprises, the operator has to take actions to prevent radio interferences (also refer to DIN EN 55022).

7 Technical data

Processor	IndraControl XM4: Intel® Core™ i Dual Core 6th generation
RAM	4 GByte DRAM DDR4
Connection for extension modules	Via the bus base XA-BS03
Extension bus	
Number of possible modules	3
Connection for S20 I/O	Via the bus base XA-BS03
S20 bus parameters	
Transmission rate	100 MBit/s
Number of connectable modules	Max. 63 (per station) 2 A
Max. current for the S20 bus (U_{Bus})	
Communication interfaces	RJ-45 connections: • 1 × Ethernet connection (10 MB, 100 MB, 1 GB) • 2 × Sercos III master-slave interfaces • 2 × Ethernet field bus master-slave interfaces USB ports: • 1 × USB host, maximum cable length 3 m (for the functionality, refer to the system description of the respective system). The USB memory sticks with the file systems FAT16 and FAT32 are supported.



Plugging in and removing the USB memory medium at runtime is generally possible. However, it can cause a temporarily increased runtime behavior and motion cycle time exceedances or PLC and hardware watchdogs in case of a high control load. Thus, plug in or remove a USB memory medium only in an uncritical machine state (e.g. home position)!

- 1 × USB device, maximum cable length 3 m (for the functionality, refer to the system description of the respective system).

SD card	Slot for SD card	
		Only the Rexroth SD card XA-SD02 (part no. R911175017) is approved as memory medium for the XG10 slot of XM42.
		Plugging in and removing the SD card at runtime is generally possible. However, it can cause a temporarily increased runtime behavior and motion cycle time exceedances or PLC and hardware watchdogs in case of a high control load. Thus, plug in or remove the SD card only in an uncritical machine state (e.g. home position)!
Weight	1.2 kg (incl. bus base)	
Dimensions	Refer to the housing dimensions (IndraControl XM42 operating instructions)	

Tab. 7-1: Technical data

7.1 Voltage supply and current consumption

The following values apply to the operating voltage acc. to DIN EN 61131-2:

Nominal voltage at U_{LS}	24 V DC SELV/PELV
Maximum voltage range of the supply voltage allowed U_{LS}	18 V DC to 31.2 V DC (incl. all tolerances and ripple)
Current consumption of the control incl. the connected S20 I/O modules from U_{LS} at nominal voltage	Maximum 1.5 A
Current consumption of the control without the connected S20 I/O modules from U_{LS} at nominal voltage	Typically 1.0 A
Power consumption of the control incl. the connected S20 I/O modules from U_{LS} at nominal voltage	36 W max.
Power consumption of the control without the connected S20 I/O modules from U_{LS} at nominal voltage	Typically 24 W
Reverse voltage protection of the supply voltage	Diode
Fuse protection	Internal protective fuse, 4.0 A
Transient protection	Present, suppressor diodes
Pulse load up to 1,500 W	

Voltage dips at current supply interfaces	PS2 < 10 ms, evaluation criterion A
Electrical isolation	Separation between 0 V of the U _{LS} and FE (housing)
24 V supply (U _{LS}) to the functional earth	

Tab. 7-2: Operating voltage and current consumption

NOTICE

Electronic damage due to polarity reversal or due to a nominal current that is too low

The power supply unit has to be able to deliver the quadruple nominal current of the protective fuse to ensure that the fuse reliably triggers in case of an error.

8 Standards

The products have been developed according to the German edition of the standards published at the time of product engineering.

8.1 Standards used

Norm Standard Norme	Bedeutung Meaning Signification	Ausgabe Edition Édition
DIN EN 60204-1	Sicherheit von Maschinen Elektrische Ausrüstung von Maschinen – Safety of machinery Electrical equipment of machines – Sécurité des machines Équipement électrique des machines	2007
DIN EN 61131-2	Speicherprogrammierbare Steuerungen Teil 2: Betriebsmittelanforderungen und Prüfungen – Programmable controllers Part 2: Equipment requirements and tests – Automates programmables Partie 2: Spécifications et essais des équipements	2008

Norm Standard Norme	Bedeutung Meaning Signification	Ausgabe Edition Édition
DIN EN 60529	Schutzarten durch Gehäuse (IP-Code) – Degrees of protection provided by enclosures (IP Code) – Degrés de protection procurés par les enveloppes (Code IP)	2014
DIN EN 61010-2-201	Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte Teil 2-201: Besondere Anforderungen für Steuer- und Regelgeräte – Safety requirements for electrical equipment for measurement, control and laboratory use Part 2-201: Particular requirements for control equipment – Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire Partie 2-201: Exigences particulières pour les équipements de commande	2014
UL 61010-2-201	UL Standard for Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 2-201: Particular Requirements for Control Equipment	2014

Tab. 8-1: Angewandte Normen – Standards used – Normes appliquées

8.2 CE marking

8.2.1 Declaration of conformity



The electronic products described in the present operating instructions comply with the requirements and the target of the following EU directive and with the following harmonized European standards:

EMC directive 2014/30/EC

The electronic products described in the present operating instructions are intended for use in industrial environments and comply with the following requirements:

Norm Standard Norme	Bedeutung Meaning Signification	Ausgabe Edition Édition
DIN EN 61000-6-2	Elektromagnetische Verträglichkeit (EMV) Teil: 6-2: Fachgrundnormen – Störfestigkeit für Industrie- bereiche Normes génériques – Immunité pour les environnements in- dustriels	März 2006
DIN EN 61000-6-4	Elektromagnetische Verträglichkeit (EMV) Teil: 6-4: Fachgrundnormen – Störaussendung für Industrie- bereiche Normes génériques – Norme sur l'émission pour les environ- nements industriels	September 2011

Tab. 8-2: Normen zur elektromagnetischen Verträglichkeit (EMV) – Standards for electro-magnetic compatibility (EMC) – Normes sur la compatibilité électromagnétique (CEM)



Loss of CE conformity due to modifications at the device.

CE marking applies only to the device upon delivery. After modifying the device, verify the CE conformity.

8.3 UL/CSA certified



The devices are certified acc. to

- **UL 61010-2-201** (Industrial Control Equipment) and
- **CSA22.2 No. 61010-2-201** (CSA)

However, there can be combinations or extension stages with a limited or missing certification. Thus, verify the registration according to the UL marking on the device.



Loss of UL/CSA conformity due to modifications at the device.

UL and CSA marking applies only to the device upon delivery. After modifying the device, verify the UL and the CSA conformity.



To guarantee an UL/CSA-compliant operation, the following conditions have to be fulfilled:

- Use only insulated copper wire suitable for at least 60/75°C

9 Interfaces

9.1 Connection position

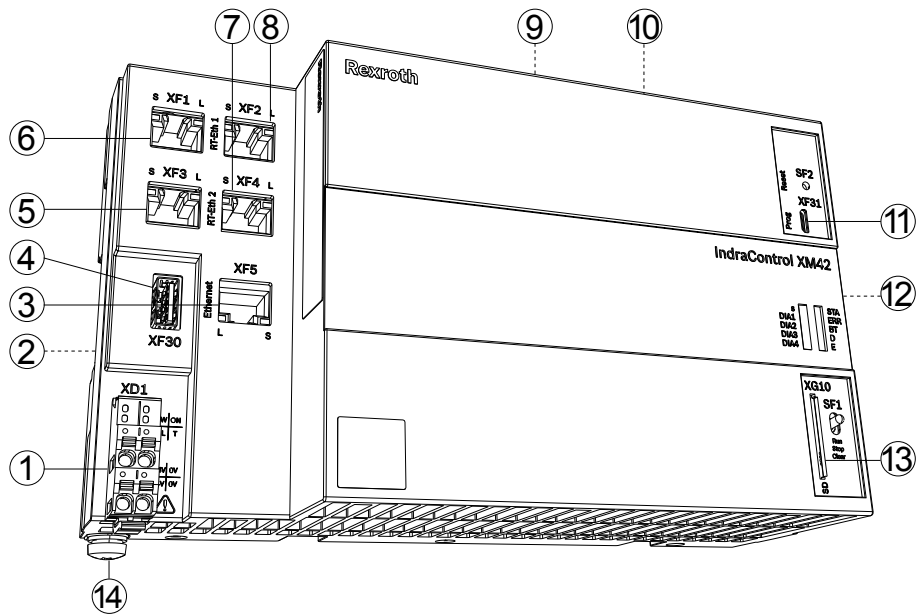


Fig. 9-1: Interfaces

NOTICE

Attaching and detaching connections under voltage can damage the control!

Switch off the supply voltage before attaching or detaching any connections!

No.	Name	Connection type	Connector type (Integrated)	Mating connector and cable (From outside)
①	XD1	24 V plug U_{LS}	4-pin	(4-wire)
②	-	Extension bus	Bus base 32-pin	Bus base for extension modules 32-pin
③	XF5	Ethernet (TCP/IP, RT Ethernet)	RJ-45 socket 8-pin	RJ-45 plug (twisted pair, 4-/8-wire)

No.	Name	Connection type	Connector type (Integrated)	Mating connector and cable (From outside)
④	XF30	USB host USB 2.0	USB TYPE A-socket 4-pin	USB TYPE A-plug (4-wire)
⑤	XF3	Ethernet Profinet, Ethernet IP, etc.	RJ-45 socket 8-pin	RJ-45 plug (twisted pair, 8-wire)
⑥	XF1	Ethernet (Sercos)	RJ-45 socket 8-pin	RJ-45 plug (twisted pair, 8-wire)
⑦	XF4	Ethernet Profinet, Ethernet IP, etc.	RJ-45 socket 8-pin	RJ-45 plug (twisted pair, 8-wire)
⑧	XF2	Ethernet (Sercos)	RJ-45 socket 8-pin	RJ-45 plug (twisted pair, 8-wire)
⑨	XBAT	Battery case	–	–
⑩	XFAN	Fan connection	–	–
⑪	XF31	USB device USB 2.0	Micro USB socket 4-pin	Micro USB plug (4-wire)
⑫	–	S20 bus	Bus base 32-pin	Bus base for S20 I/O modules 32-pin
⑬	SG10	Slot for SD card	–	SD card
⑭	–	Grounding screw	–	–

Tab. 9-1: Control interfaces

9.2 Extension bus

Up to three extension modules can be freely connected at the left of the control. The extension modules have to be attached without any gaps via the bus bases on the left side of the IndraControl XM42 and supplied with the same 24 V supply voltage. Switch on and off the 24 V supply voltage of the extension modules synchronously with the IndraControl XM42.

9.3 S20 interface

Up to 63 S20 modules can be connected to the S20 interface on the right of the IndraControl XM42 via S20 bus bases. The number of connectable modules depends on the total current consumption of the S20 modules. The IndraControl XM42 can provide up to 2 A for the power supply of the S20 modules.



Overloading the U_{BUS} for the S20 bus can cause a control failure.

9.4 Bus bases

The IndraControl XM42 is attached to the bus base XA-BS03. The bus base XA-BS03 connects the IndraControl XM42 to the S20 modules on the right control side and to the extension modules on the left control side. The bus base XA-BS03 is provided upon delivery.

10 Mounting, demounting and electric installation

10.1 Installation notes

NOTICE

Module destruction due to electrostatic discharge

The XM42 control contains components that can be damaged or destroyed by electrostatic discharge. Comply with the required safety measures against electrostatic discharge (ESD) acc. to EN 61340-5-1 when operating the control.

- Mounting location

The XM42 control has the degree of protection IP20 and is thus intended for the use in a closed control cabinet or control box (terminal box) of the degree of protection IP54 or higher.

- Mounting rail

Mount the XM42 control on a 35 mm standard mounting rail. The preferred overall height of the mounting rail is 7.5 mm (corresponds to TH 35-7.5 acc. to EN 60715).

Mount the control and the bus base as described in the following.

The fastening distance of the mounting rails may not exceed 200 mm. This distance is required to ensure stability while mounting and demounting the control or the S20 I/O modules.

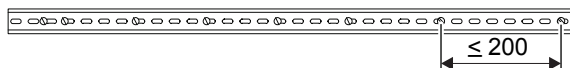


Fig. 10-1: Mounting rail fastening (in mm)

NOTICE

**Electronic damage due to fastening elements
Danger of malfunction**

If the fastening elements (screws, rivets,...) are too high, the bus bases do not correctly engage on the mounting rail. Use only elements with a structural height of up to 3 mm to fasten the mounting rail.

- End clamp

Fasten end clamps on both sides of the IndraControl XM station (control, extension modules, S20 I/O modules).

End clamps guarantee the correct fastening of the XM42 control and the S20 I/O modules connected to them on the mounting rail and they are used as lateral end elements.

Always fasten the left end clamp of the station before mounting the control. This ensures the following:

- It impedes the shifting of the control.
 - The installation place for the end clamps is guaranteed.
 - If the control has to be replaced, there is sufficient space to separate the control from the S20 bus base.
 - They have a counterpressure against the engaging forces when mounting the S20 bus bases in series to the control.
- Do not route cables parallel to motor cables or other strong interference sources to avoid coupling of interferences
 - The cabling of the Ethernet wires may not leave the building
 - The LED displays on the operating panel must not be covered
 - Observe the bending radius of the cables used when laying the connecting lines
 - Use strain reliefs for all cables
 - Install the control only horizontally on a mounting rail attached to a wall
 - Keep the maximum distance possible from interference sources
 - Provide the following minimum distances for sufficient cooling:

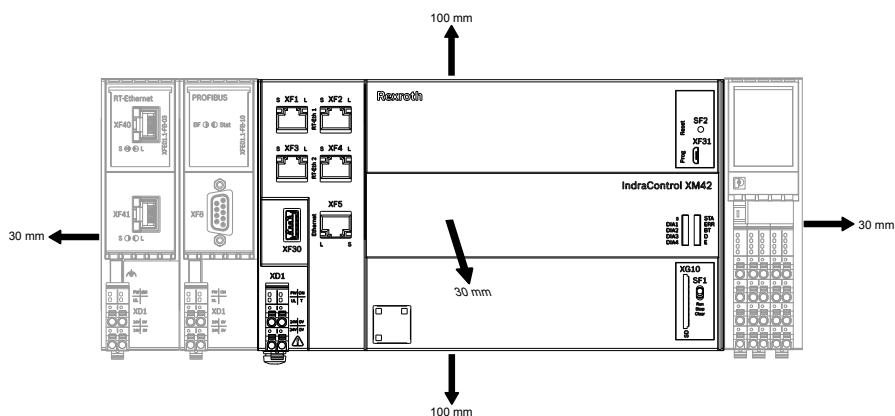


Fig. 10-2: Minimum distances for the circulation of ambient air

In case of a several line design, the supply air has to be measured under each line and its limit value has to be observed. Also note the values given in the chapter "Ambient condition".

- Additionally, provide sufficient distance for mounting, demounting, plugs and cables

For more information on mounting, demounting and connecting lines, refer to the application description "IndraControl S20: System and Installation", part no. [R911335988](#).

10.2 Housing dimensions

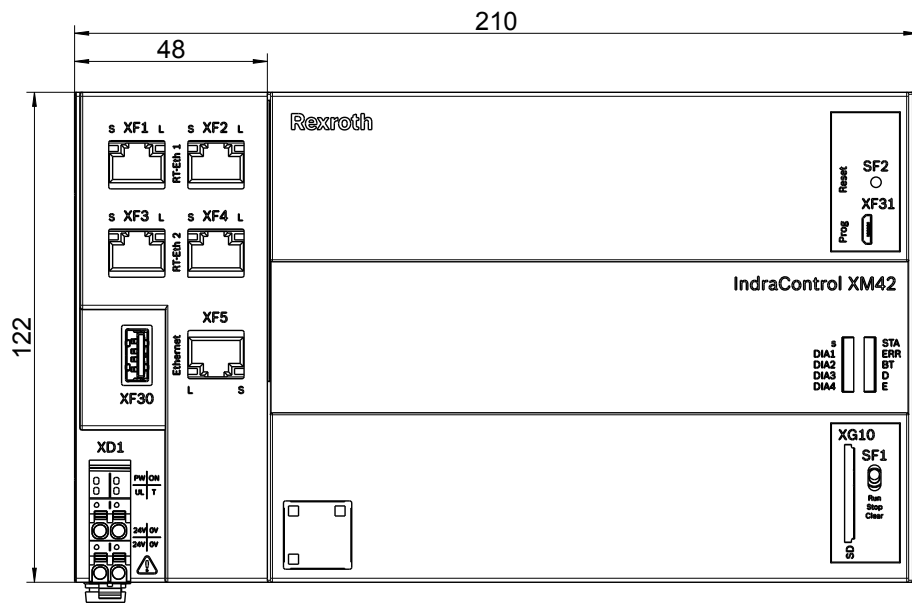


Fig. 10-3: Front view

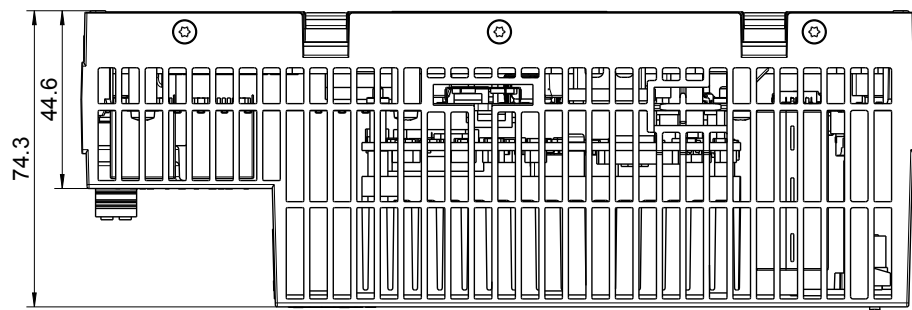


Fig. 10-4: Bottom view

10.3 Mounting the control

NOTICE**Damages at the contacts by tilting the modules**

Attach the modules vertically on the bus base and remove them vertically from the bus base.

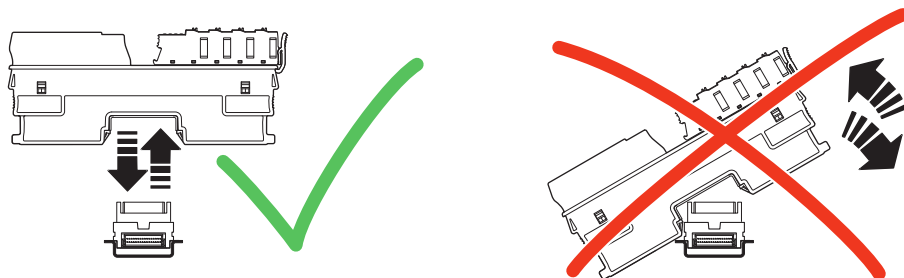


Fig. 10-5: Positioning and removing modules only vertically

NOTICE**Component destruction due to plug mounting under voltage!**

- Before mounting or demounting components, disconnect the control - including its components - from voltage
- Connect the voltage only after the control and its components have been set up

NOTICE**Possible damage to property due to improper top-hat rail mounting**

- Fasten the top-hat rail adequately.
- Connect the top-hat rail to a functional earth.
- Mount the control on the top-hat rail.
- Install the control in a control cabinet or an appropriate housing.

Mounting the control bus base

1. Correctly position the bus base as per the descriptions "Right Side" and "Left Side".

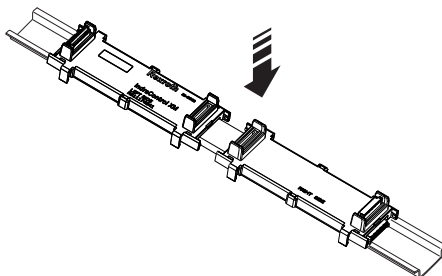


Fig. 10-6: Control bus base

2. Press the bus base on the top-hat rail until all latching are safely closed.
3. Mount the S20 bus bases and the bus bases for the extension modules, refer to [fig. 10-8 "Interconnect S20 bus bases and to the control bus base"](#) on page 21 and [fig. 10-10 "Interconnect extension bus bases and connect them to the control bus base"](#) on page 23.

Mounting the control on the control bus base



Before mounting the control on the top-hat rail, mount the bus bases for the modules to the right and to the left of the control.

1. Press the control on the premounted control bus base until all latching are safely closed.

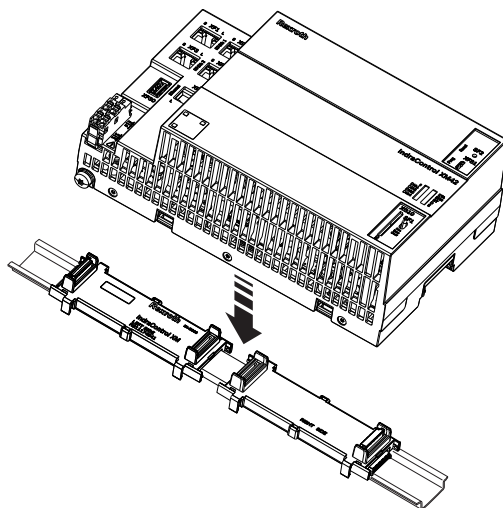


Fig. 10-7: Snapping the control



Note the minimum distances for control cooling (see [chapter 10.1 "Installation notes" on page 16](#)).

10.4 Mounting S20 I/O modules



The S20 bus bases can only be mounted if the control is not attached to the bus base.

Mounting S20 bus bases

1. Press the S20 bus bases for the S20 modules on the top-hat rail on the right next to the control bus base until all latching are safely closed, see "A" in the following figure.
2. Move the first S20 bus base (see "B") to the left and connect the S20 bus base to the bus base of the control, see "D" in the following figure.
3. Move the other S20 bus bases to the left until all bus bases are interconnected, see "C" in the following figure.

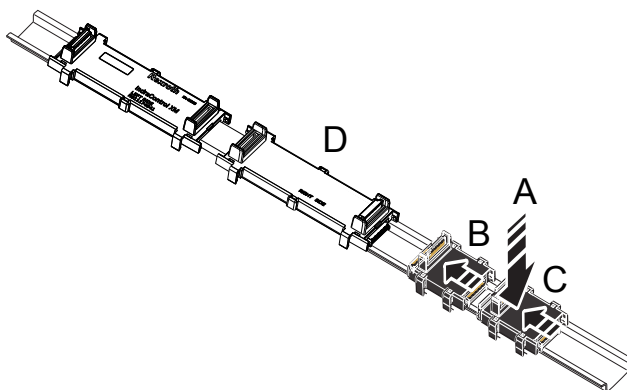


Fig. 10-8: Interconnect S20 bus bases and to the control bus base

Mounting S20 module to the S20 bus base

1. Press the S20 modules on the premounted bus bases.

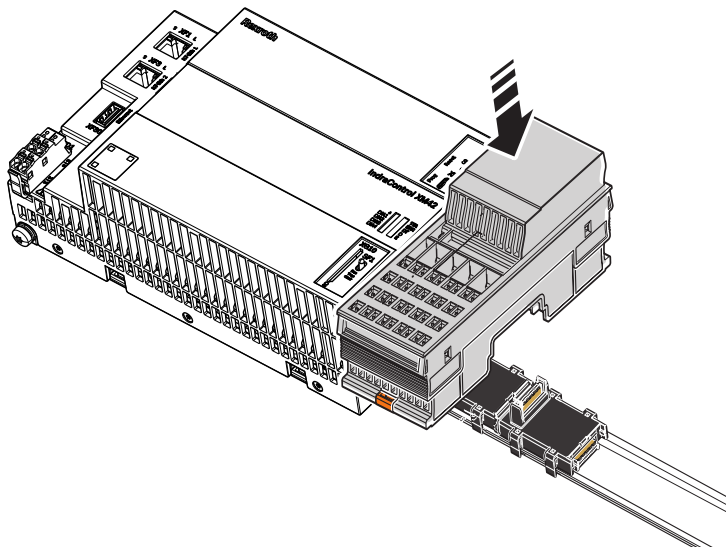


Fig. 10-9: Positioning S20 modules

10.5 Mounting extension modules



The extension bus bases can only be mounted if the control is not attached to the control bus base.

Mounting extension bus bases

1. Press the extension bus base for the extension modules on the top-hat rail on the left next to the control bus base until all latchings are safely closed, see "A" in the following figure.
2. Move the first extension bus base (see "B" to the right) and connect the extension bus base to the bus base module of the control, see "D" in the following figure.
3. Move the other extension bus base to the right until all bus bases are connected to each other, see "C" in the following figure.

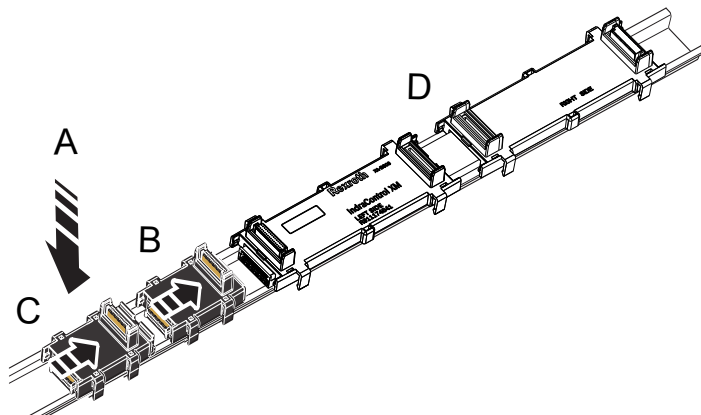


Fig. 10-10: Interconnect extension bus bases and connect them to the control bus base

Mounting extension modules to the extension bus bases

1. Press the extension modules on the premounted extension bus bases.

10.6 Demounting the control and the control bus base



To demount, use a common tool such a slotted screwdriver with a 2.5 mm blade.

10.6.1 Demounting steps

NOTICE

Component destruction due to demounting under voltage!

Before mounting or demounting components, disconnect the control - including its components - from voltage.

Removing the control from the top-hat rail

1. Remove the left end clamp.
2. Use a suitable tool (e.g. slotted screwdriver) and put it first into the upper and then into the lower disengaging mechanism (base latch) of the control and disengage the control, see "A" in the following figure. The base latches are locked in the open position.
3. Remove the control vertically to the mounting rail, see "B" in the following figure. The base latches engage again in idle position.

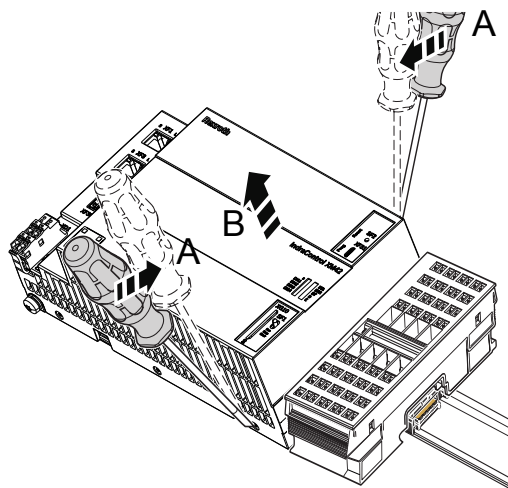


Fig. 10-11: Removing the control from the top-hat rail
The control bus base remains on the mounting rail.

Demounting the control bus base

1. Separate the bus base module of the control from the connection of the first S20 bus base by moving the bus base of the control to the left by approximately 5 mm, see "A" in the following figure.
2. Separate the bus base of the control from the connection of the first extension bus base by moving the bus base of the control to the right by approximately 5 mm.
3. Use a suitable tool (e.g. slotted screwdriver) to enter into the latchings on one side, see "B", "B1" and "B2" in the following figure.
4. Lift up the bus base and remove it, see "C" in the following figure.

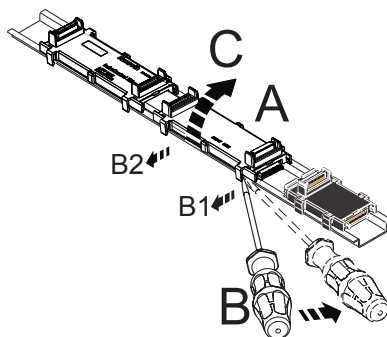


Fig. 10-12: Removing the control bus base from the top-hat rail

10.7 Electric installation

WARNING

Danger of personal injury due to incorrect mounting or electric installation!

- Any dangerous system states, which might cause personal injury, must be prevented!
- Protection upon direct and indirect contact must be ensured by the specified measures (connection to protective conductor, insulation, etc.).

NOTICE

Danger of material damage due to incorrect mounting or electric installation!

- Any dangerous system states, which might cause material damage, must be prevented!
- Protection upon direct and indirect contact must be ensured by the specified measures (connection to protective conductor, insulation, etc.).

10.7.1 External power supply unit

DANGER

Danger of lethal injury due to hazardous electric voltage

- Connect power supply units generating protective extra-low voltage (24 V) only to supply voltages designed for these power supply units. Note the over-voltage categories (refer to the documentation of the power supply unit)
- Do not apply the supply voltage to the protective extra-low voltage

All control components are supplied from 24 V voltage supplies (SELV/PELV).

Use the Bosch Rexroth power supply unit VAP01.1H-W23-024-010-NN, part number R911171065, for the logic supply. For further information on the external power supply unit and on the creation of overvoltage categories, refer to the documentation of the power supply unit.

All lines of the 24 V voltage supply have to be routed separately from lines carrying higher voltages.

All peripherals, such as digital sensors or actuators connected to the interfaces of the control, also have to comply with the criteria of safety-separated circuits.



The same external power supply unit has to supply the 24 V voltage supply of the XMx control and the extension modules. Connect the voltage supply to the XD1 plugs of the XMx control and then bridge the cables to the power connectors XD1 of the extension modules.



The 24 V voltage supply of the S20 I/O modules may not be branched off from the XD1 plug of the XMx control, but with an own connecting cable to the external power supply unit instead.



The 24 V voltage supply has to be grounded. For more detailed information, refer to the documentation of the power supply unit.

10.7.2 Voltage supply for the control

The control is supplied via the XD1 plug on the lower left.



Connect the power connector with cables with a conductor cross-section of AWG 16 (1.5 mm²).



Use only copper wires to connect the connection terminals.



Use only cables approved for temperatures of at least 60°C. In case of ambient temperatures above 55°C, use cables approved for temperatures of at least 75°C.



Observe the color-coding of the plugs.



Only the "XA-CN01" power connector is approved to connect the 24 V supply voltage for the XM42 control.



If multiple XMxx controls (24 V supply voltage U_{LS}) are connected parallelly to a central 24 voltage supply, ensure that the 0 V connection of the U_{LS} is wired without interruption to all XMx controls.

If this is not observed, XMx controls might become defective.

Power connector XD1

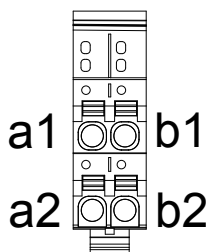


Fig. 10-13: Power connector XD1

Plug contact	Signal	Function
a1, a2	24 V	+24 V DC supply voltage (U_{LS})
b1, b2	0 V	GND (U_{LS}) (ground supply voltage)

Tab. 10-1: Pin assignment of the power connector XD1



In the power connector, the contact a1 is bridged with a2 and the contact b1 is bridged with b2.

10.7.3 24 V voltage supply

The voltage of 24 V can be supplied with or without electrical isolation.

Setup with potential binding between internal logic and periphery supply

An easy connection method is the setup with an electrical isolation between the internal logic and the peripheral supply.

In this case, a power supply unit is sufficient to supply the control.



In the device, the 0 V connection (U_{LS}) is electrically isolated to the ground connection.

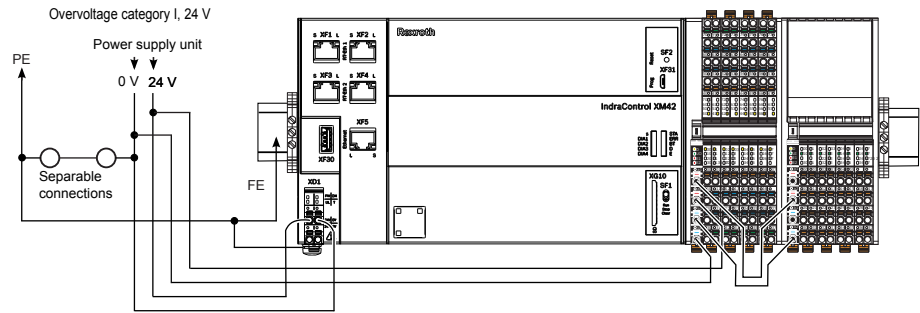


Fig. 10-14: Setup with power supply unit



Control does not start in case of reverse input voltage

The feeding of 24 V at the XD1 connector is protected against polarity reversal. A polarity reversal of the 24 V and 0 V feeding (U_{LS}) does not damage the device. However, the control does not start and the U_L LED is not on.

Reference conductor connected to the protective conductor and set up with electrical isolation

Provide electrical isolation between the logic of the central processing unit and the I/O interfaces of the peripheral component groups according to DIN EN 60204-1. Accordingly, the voltage U_{LS} (24 V logic voltage) at the control is electrically isolated from the supply voltage for the I/O modules.

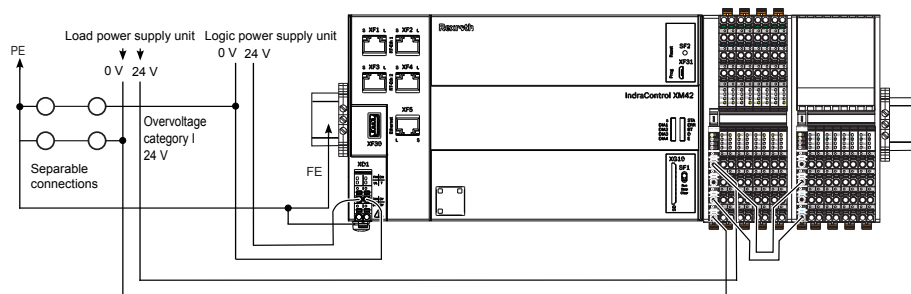


Fig. 10-15: Setup with two power supply units

Dimensioning the voltage supply

Observe the maximum currents when dimensioning the voltage supply. The operating voltage allowed has to be applied directly to the device.

The voltage must also not be exceeded if:

- there are variations in line voltage, e.g. caused by different loads of the mains
- there are varying load states, such as short-circuit, normal load, lamp load or no load

Connecting the reference conductor to the protective conductor

If the reference conductor 0 V (U_{LS}) is connected to the protective conductor system, this connection has to be arranged at a central place (e.g. at the load power supply unit). Hence, the supply current circuit is a PELV circuit.

Floating setup

For a floating setup, disconnect the reference conductor 0 V (U_{LS}) from PE and FE, refer to "separable connection" in the previously mentioned routing images (fig. 10-14 "Setup with power supply unit" on page 27 and fig. 10-15 "Setup with two power supply units" on page 28). The control is connected with 0 V (U_{LS}) and the ground connection. Thus, ground connection monitoring devices can be used.

NOTICE

Due to an earth-free setup, the Safety module XFE01.1-SY-01 might fail.

Do not use the Safety module XFE01.1-SY-01 with an earth-free setup.

10.7.4 Grounding

NOTICE

Control failure due to insufficient grounding

An optimum grounding is required to keep away possible interferences from the control and to discharge them to the ground.

Functional earth

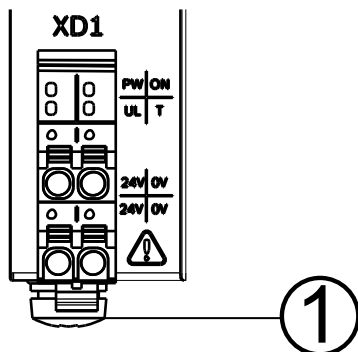


Only the functional earth (FE) is used for the XMx controls, extension modules and the S20 components. The functional earth is only used to discharge disturbances. For individuals, the functional earth is not intended as protection against electric shock.

The top-hat rail, on which the control is mounted, has to be mounted to a grounded metal carrier, e. g. the rear panel of the control cabinet.

Grounding screw

A functional grounding via the grounding screw is required to ensure optimum noise immunity. The grounding screw is positioned under the control, see [fig. 10-16 "Position of the grounding screw" on page 30](#). Connect the functional earthing a cable, which is as short as possible or, preferably, even via a ground strap. The maximum cable or ground strap length is 1 m with a cross-section of 6 mm².



① Grounding screw

Fig. 10-16: Position of the grounding screw

Potential equalization

Potential equalization acc. to DIN VDE 0100 part 540 has to be provided between the system parts and the voltage supply.

10.7.5 Shielding

NOTICE

Control failure due to insufficient shielding

Provide sufficient shielding.

The shielding reduces any effects of interferences on the system.

Observe the following when shielding:

- Fasten the shielding as extensively as possible
- Ensure proper contact between connector and terminal
- Avoid damaging or squeezing conductors
- Note the wire specifications when connecting the shielding
- Shield the closest possible to the signal terminal points



Route all power cables and data cables in separate cable channels.

10.8 Battery



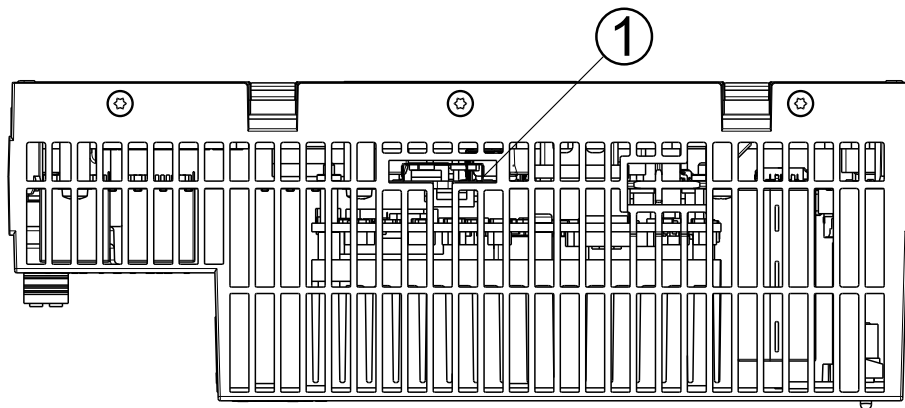
A battery is included in the device upon delivery. Battery name: Lithium battery 3.0 V CR1632 (120 mAh), manufacturer: Renata.



The battery is used to extend the buffer time of the real-time clock.



The charging condition of the battery is not monitored. Change the battery every five years. A discharged battery causes an incorrect system time.



① Battery case

Fig. 10-17: Position of the battery

Proceed as follows to exchange the battery:

1. Switch off the control.
2. Remove the control from the bus base.
3. Use a slot screwdriver to open the battery case at the opening at the XBAT connection.
4. Insert the battery and note the polarity (stamping on the housing).

11 Commissioning

11.1 IT security

The operation of installations, systems and machines requires the implementation of an integral concept for state-of-the-art IT security. Bosch Rexroth products are part of this integral concept. Bosch Rexroth product characteristics have to be taken into consideration in an integral IT security concept. The relevant characteristics are documented in the IT security guideline ([R911342562](#)).

11.2 Commissioning steps

To commission the device, proceed as follows:

1. Mount the control.

For details, refer to [chapter 10 "Mounting, demounting and electric installation" on page 16](#).

2. Connect the voltage supply to the XD1 connection of the control.

Refer to [chapter 10.7.2 "Voltage supply for the control" on page 26](#).

3. The XM4x control is available in the following firmware variants

- 3.1 XM4x with initial firmware, (XM4x00.01-...)

For more information on how to commission the XM4x control with the initial firmware, refer to [chapter 12.2 "XM4x initial firmware" on page 40](#).

NOTICE

Control malfunction due to control switch-off during initialization

Note that hardware is initialized after switching on the control and after installing the system firmware with subsequent reboot. An internally programmable function block is loaded. After loading, the LED display "ON" at the voltage plug is green.

Wait till completion. Do not switch off the control. This procedure has to be completed. Subsequently, continue the commissioning.

11.3 Establishing a connection to the engineering PC via the USB device interface "XF31"

Instead of using the Ethernet interface "XF5" to commission the control or to use the commissioning tool "IndraControl First Touch", use the connection **XF31**. Connect the USB interface of your computer to the USB device connection "XF31" via a common USB data and charging cable. Upon the initial connection, the respective device driver (USB Remote NDIS) is installed on the PC.

Even though the computer and the control communicate via Ethernet, it is only a point-to-point connection.



The IP address of the connection "XF31" on the control is 192.168.234.234.

The IP address cannot be changed.

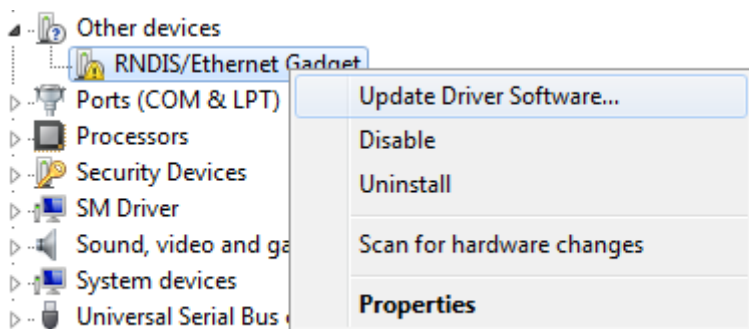


To connect a PC to the USB interface XF31, use a floating laptop or a galvanically isolating USB adapter.

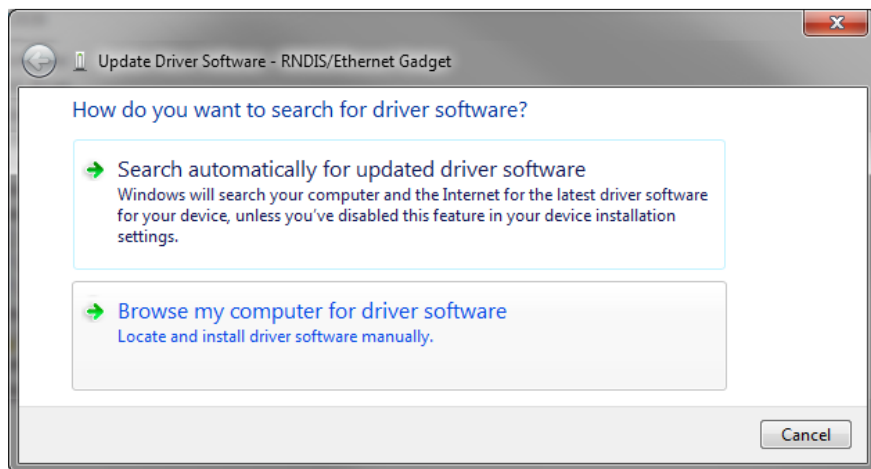
If the PC is connected to the ground (logic GND of the XM42 control is connected to the ground potential and another interface connects the PC to the ground potential) and if the 0V connection of the XM42 is missing or interrupted, it is possible that the reverse current of the XM42 flows back to the power supply unit using the interface. Damages at the XM42 in the PC can thus be caused.

If the RNDIS device driver is not installed automatically, install it manually:

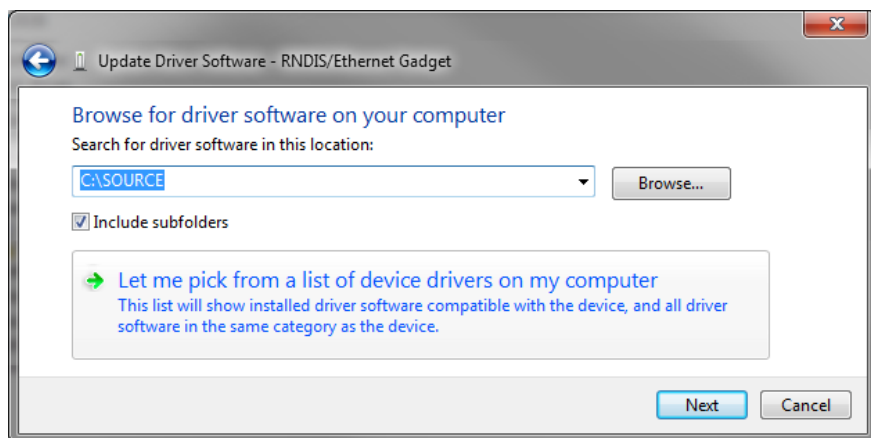
1. Open the "Device manager" in the Windows "System control" (under **System and security** ► **System** ► **Device manager**).
2. The entry "RNDIS/Ethernet gadget" is displayed in the list under "Other devices".
3. Select "Update driver software..." in the context menu of "RNDIS/Ethernet gadget".



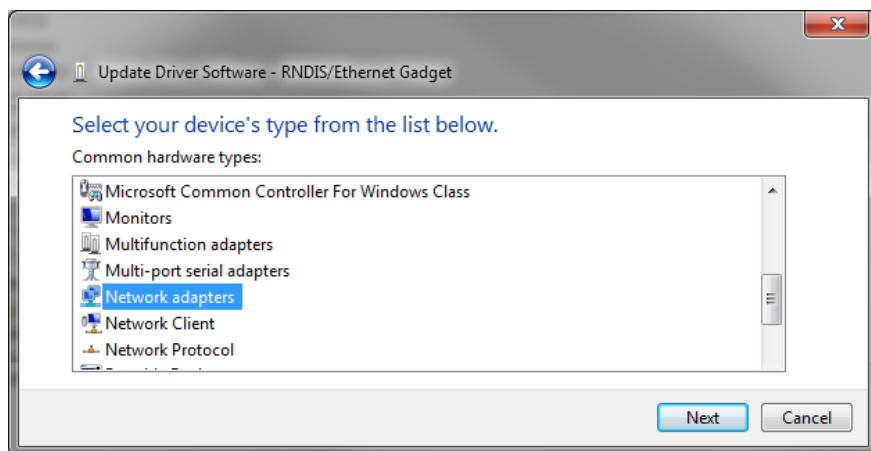
4. In the dialog, select the entry: "Browse my computer for driver software".



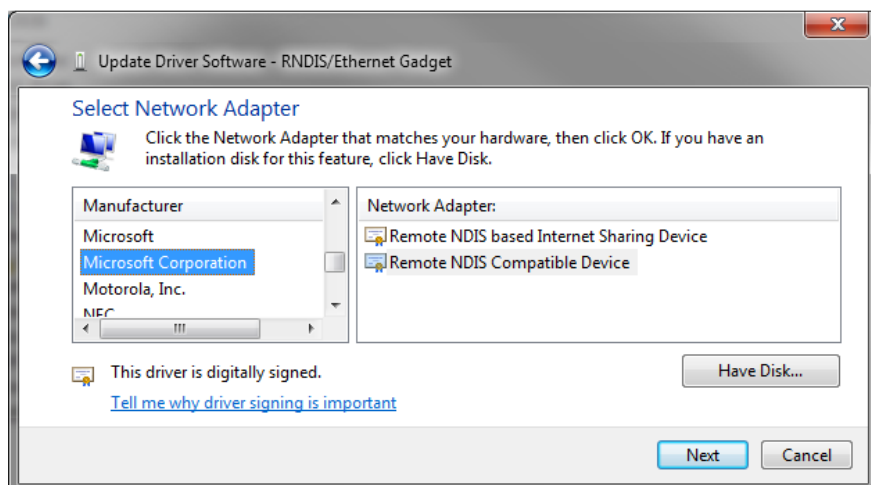
5. In the dialog, select the entry: "Let me pick from a list of device drivers in my computer".



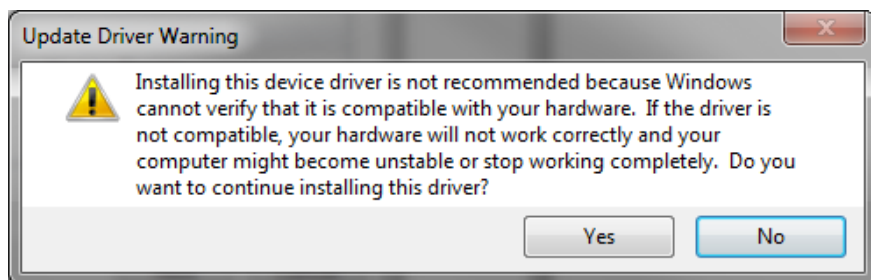
6. In the dialog, select the entry: "Network adapters".



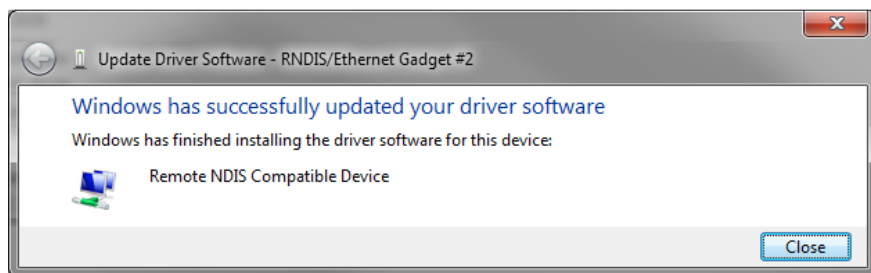
7. Select the entry "Microsoft corporation" under "Manufacturer". Then, select "Remote NDIS compatible device" under "Network adapter".



8. To confirm the installation, click on "Yes".



9. After a successful installation, the following message is displayed:



12 Device description

The XM4x controls are compact controls in the medium-performance range with integrated interfaces of Ethernet, Sercos and S20 local bus.

The XM4x controls are designed for a fast processing of control tasks. The XM4x controls can be networked via the Ethernet interface and connected to the drive modules via the Sercos interface. The XM4x controls can be extended for various control tasks using S20 modules and extension modules.

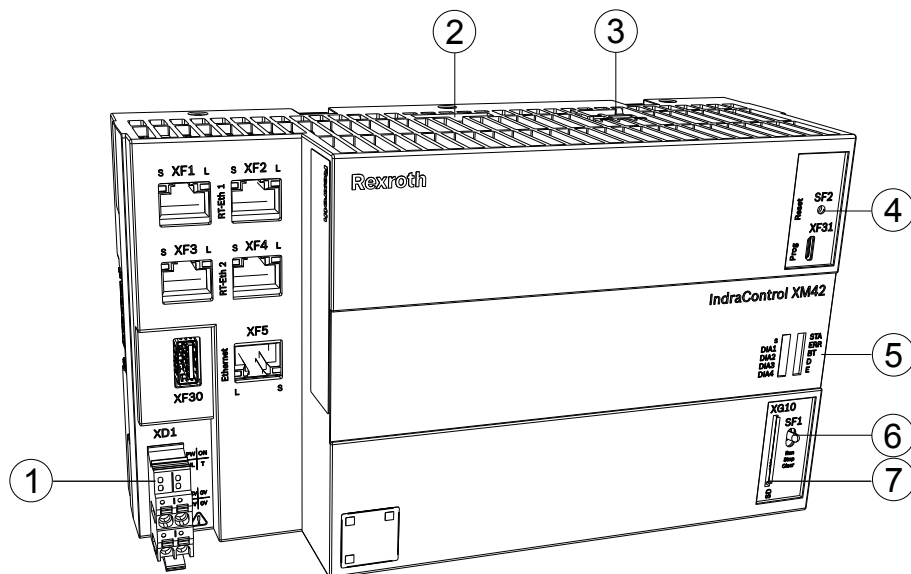
The XM4x controls are available in the following firmware variant:

1. XM4x with initial firmware

Type code: XM4x00.01

12.1 LEDs and operating elements

To operate and for the error diagnostics, there are multiple PEDs, an operation mode switch and a "Reset" button on the front side of the IndraControl XM42 control.



- ① LEDs on power connector XD1
- ② Battery case
- ③ Connection for an optional fan
- ④ Reset button SF2
- ⑤ LED display, block of 10
- ⑥ Operation mode switch SF1
- ⑦ Slot for SD card

Fig. 12-1: LED and operating element positions

12.1.1 LEDs on the XD1 plug

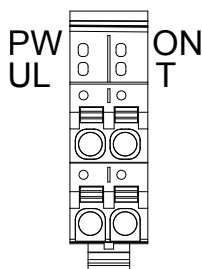


Fig. 12-2: LEDs on the XD1 plug

The following functions are assigned to the LEDs on the XD1 plug:

LED	Color	Function
U _L	Green	24 V supply voltage connected and within the permitted range
PW	Green	The internal voltages are within the permitted range

LED	Color	Function
ON	Green	Green: All internally programmed function blocks are loaded. These also include internally programmed function blocks of connected modules.
	Red	Red: Loading for internally programmed functions block of an extension module or of the control failed. In this case, initiate a fallback. Refer to chapter 12.5 "Fallback and recovery" on page 56 . The "ON" LED of the extension module indicates whether a fault is present at the extension module.
T	Red	• The temperature is critical • If the control cannot be operated anymore, the maximum temperature was exceeded and the control was switched off. The control can only be operated when interrupting the voltage.

Tab. 12-1: LED functions on the XD1 plug

12.1.2 LED block of 10

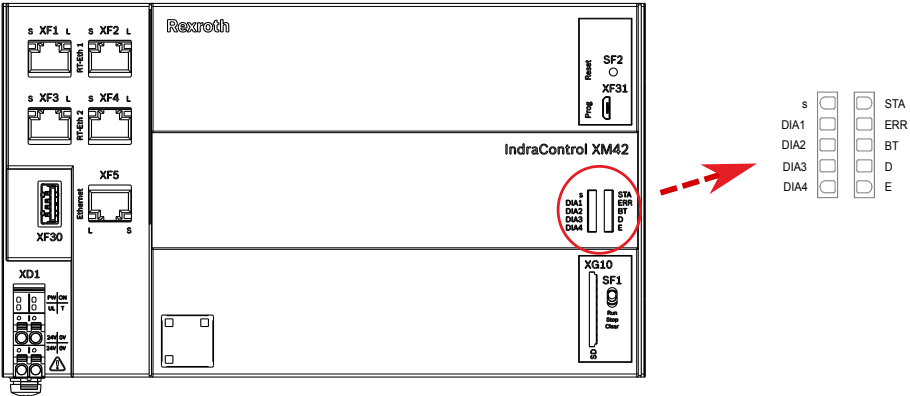


Fig. 12-3: LED block of 10

The LED block of 10 is positioned on the higher located area of the control housing.

The following functions are assigned to the LEDs at running system firmware:

LED	Color	Function
s	Red/orange/green	Sercos status
DIA1	Red/orange/green	Used as feedback for the operation mode switch
DIA2	Red/orange/green	Basic diagnostics by the system
DIA3	Red	Currently booting
DIA4	Red	Currently booting

LED	Color	Function
STA	Red/orange/green	STOP/READY/RUN
ERR	Red/orange/green	Error status (warning, error)
BT	Red/orange/green	Boot status
D	Red/orange/green	Onboard S20: Diagnostics S20 bus
E	Red/orange/green	Onboard S20: Error or warning of S20 devices

Tab. 12-2: LED block of 10



The displayed device states are firmware-dependent and described in the functional description of the respective control system (Rexroth IndraLogic XLC IndraMotion MLC 14 VRS, Functional Description, [R911341700](#)).

12.1.3 Operation mode switches

The operation mode switch is positioned on the higher located area of the control housing.

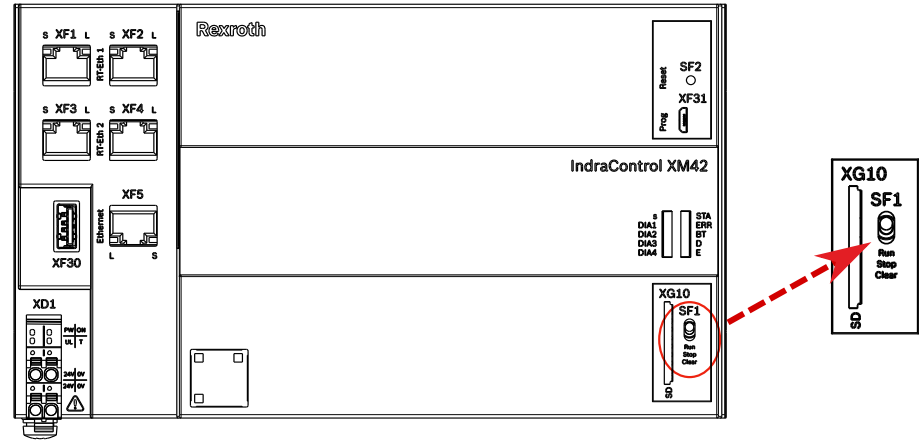


Fig. 12-4: Operation mode switch

The operation mode switch has three positions:

Switch position	Function ^①	Property
Up	Run	Engaged
Center	Stop	Engaged
Down	Clear	Sampling

① Refer to the functional description of the respective control system (Rexroth IndraLogic XLC IndraMotion MLC 14 VRS, Functional Description, [R911341700](#))

Tab. 12-3: Operation mode switch

12.1.4 Reset button

The "Reset" button is positioned on the higher located area of the control housing.

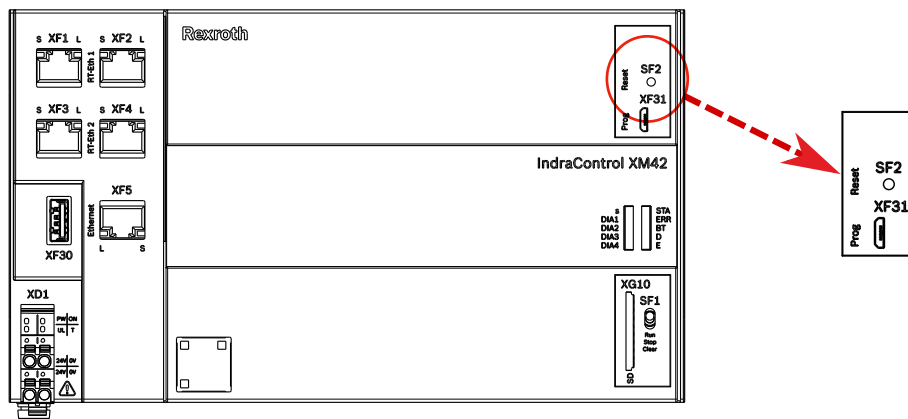


Fig. 12-5: Reset button

Press the "Reset" button at running control to trigger a voltage cycle (reset).

The "Reset" button is provided with two functions triggered when the reset button is pressed while applying the supply voltage:

- Press the "Reset" button < 5 seconds: Triggering the fallback mode (see [chapter 12.5 "Fallback and recovery" on page 56](#)).
- Press the "Reset" button > 5 seconds until the LEDs DIA3 and DIA4 flash alternately: Triggering the initial firmware (see [chapter 12.2 "XM4x initial firmware" on page 40](#)).



The "Reset" button can only be actuated with a sharp tool (e. g. pencil).

12.2 XM4x initial firmware

The control variant "XM4x00.01" is delivered with initial firmware.

The initial firmware provides commissioning and maintenance functions. Basic functions can be activated manually without any additional tools, see [chapter 12.2.3 "Starting and opening the initial firmware" on page 42](#). The XM4x provides a simple interface with its operation mode switch SF1 and the LED display panel.

The commissioning tool "IndraControl First Touch" (see [chapter 12.3 "IndraControl First Touch" on page 45](#)) provides a more comfortable operation and more functions. If connected to a PC, it can be opened with a web browser. The comprehensive mechanisms for commissioning with the IndraWorks Suite are also supported by the XM4x control.

12.2.1 License information

To open the license conditions, select the directory "/INITFW/Licenses/" in the file manager of the web application "First Touch".

This product contains software components that are licensed by the holder of the rights under GNU General Public License (GPL), GNU Lesser General Public License (LGPL) or any other Open Source Software license, which requires that source code be made available.

The source code of these software components is already delivered together with this product. You can obtain the source code for these software components on a physical medium (CD or DVD) by submitting a written request to our open source office address listed below or by sending an email to email>open.source@boschrexroth.de. When sending such a request, please name the relevant product and the date of purchase of the same.

Bosch Rexroth AG

Open Source Office

Zum Eisengießer 1

97816 Lohr am Main

Germany

We may charge you a fee (up to max. 20,- €) to cover the cost of physical media and processing.

You may send your request (i) within three (3) years from the date you received the product that included the binary that is the subject of your request or (ii) in the case of code licensed under the GPL v3 for as long as Bosch Rexroth offers spare parts or customer support for that product.

12.2.2 LED states

For the initial firmware, the LEDs indicate the following function states:

LED	Function	Color	Status
DIA2	Store CoreDump on SD card or USB (for diagnostic purposes)	Green/orange flashing	In process
		Green	Done
		Red	Errors
DIA3, DIA4	Operating system state	Alternatingly red flashing	Initial firmware is active
ERR	Reset to delivery state	Red	Function is selected, processed
		Flashing red	Confirm selection
BT	Reset user name and password	Red	Function is selected, processed
		Flashing red	Confirm selection

LED	Function	Color	Status
D	Delete network configuration	Red	Function is selected, processed
		Flashing red	Confirm selection
E	Start First Touch	Red	Function is selected, processed
		Flashing red	Confirm selection
		Green	First Touch running

Tab. 12-4: LED states



The LED states described are only valid together with the initial firmware.

For more information on the LED states in operation, refer to the functional description of the respective control system (IndraMotion MLC, IndraMotion MTX).

12.2.3 Starting and opening the initial firmware

No system firmware is yet installed on the XM4x control upon delivery. Apply the supply voltage and the control starts the initial firmware and the commissioning tool "IndraControl First Touch" automatically. To manually execute the basic functions of the initial firmware, press the "Reset" button when switching on the 24 V supply voltage until the LEDs DIA3 and DIA4 flash alternately in red. Subsequently, one of the following functions can be opened via a menu structure:

Menu item number	Functions	LED	Color
1	Start First Touch	E	Red
2	Start First Touch, delete network configuration	E	Red
		D	Red
3	Start First Touch, delete network configuration, reset user name and password	E	Red
		D	Red
		BT	Red
4	Start First Touch, delete network configuration, reset user name and password, delete files, restore state upon delivery	E	Red
		D	Red
		BT	Red
		ERR	Red

Tab. 12-5: Menu items of the initial firmware



If the function was executed successfully, the LED "E" changes from red to green after some seconds.

The control must not be switched off during this time.

The operation mode switch SF1 provides the following options to open the menu items:

1. Press SF1 < 3 seconds to the position "Clear": Menu item navigation and selection.
Whenever SF1 is pressed, the next menu item is selected. (1 > 2 > 3 > 4 > 1 ...)
2. Press SF1 > 3 seconds to the position "Clear": Triggering the menu item function.

The LED "E" changes from red to green.

Triggering the function is displayed by a brief switch-off and switch-on of the respective LEDs.

3. To confirm the "Factory reset" (menu item no. 4), the operation mode switch SF1 has to be set to the "Run" position.

The left column is flashing until the additional confirmation of the operation mode switch is on the "Run" position. The process of restoring the state upon delivery is displayed by a running down of the right LED column. The completion of the restoration is displayed with a green LED "E". The device must not be separated from the voltage supply during that time.



When selecting menu item 4 "Factory reset", all files on the XM4x control installed since the commissioning are deleted. We recommend to create a system firmware backup (see [chapter 12.3.3 "Firmware management" on page 47](#)) before using this function. The initial firmware is part of the hardware and not deleted.



After the system firmware has been loaded successfully, the control does not boot the initial firmware anymore. To call the initial firmware again, press the "Reset" button when switching on the 24 V supply voltage until the LEDs DIA3 and DIA4 flash alternately in red.

12.2.4 Installing a backup from an external SD card

If the control is as in delivery state, a backup can also be loaded to the control without PC. Proceed as follows:

1. Copy a valid control backup to a Bosch Rexroth SD card (part no: R911175017). Create a control backup using a PC with an SD card reader or use the file manager of the First Touch commissioning tool.
2. Rename the image file to "system.fw".
3. Plug in the SD card to the base of the XM4x control labeled with "SD".
4. Switch off the 24 V supply voltage.
5. The initial firmware automatically starts the installation of the backup on the control. While installing, the "ERR" LED is orange. After successful installation, the "ERR" LED is off and the "E" LED is green.

6. Use the "Reset" button to execute a reboot required to start the control with system firmware.

The installation can be facilitated together with the "Backup system firmware" function (see [chapter 12.3.3 "Firmware management" on page 47](#)).

12.2.5 Updating the initial firmware

Preparing data carriers

The initial firmware can be updated using either a USB stick or an SD card. Format the data carrier as FAT or FAT32. Store the firmware file (R911390383_XX_FWL-XM4200_INIT_-02VRS-_-_.fw) in the root directory of the external data carrier.

Updating the initial firmware



Do not switch off the control while the update is running!

1. Plug the prepared data carrier (USB stick or SD card) into the switched-off control (USB stick at the XF30, SD card at the XG10).
2. Switch on the 24 V supply voltage of the control. There are two different variants:
 1. If no system firmware is on the control upon delivery, the control directly boots the initial firmware and the commissioning tool "IndraControl First Touch".
 2. If there is a system firmware on the control, proceed as follows to go the boot menu of the initial firmware:
 - 2.1 Press the reset button SF2 when switching on the control and release the button only after the LEDs DIA3 and DIA4 flash alternatingly in red. The LED "E" is red.
 - 2.2 Press "SF1" more than three seconds into the "Clear" position to trigger the "Start FirstTouch" function. The LED "E" changes from red to green.
3. The initial firmware updates automatically if a respective firmware file (*.fw) is found on the external data carrier.



The control is restarted during the update.

The progress of the update is shown by the flashing of the LEDs "STA" or "ERR".

4. The update is successfully completed if the right LED row is green.
5. Remove the external data carrier (USB stick or SD card) from the control.
6. Restart the control using the reset button "SF2" or interrupt the 24 V voltage supply briefly.

7. If the right LED row is red, the update was not successful. Start the update again.

12.3 IndraControl First Touch

The "IndraControl First Touch" commissioning application interactively commissions and maintains controls of the IndraControl XM generation. The commissioning application can be reached via the IP address of the control and can run on most of the current web browsers. To open the setup application, enter the following IP addresses:

- The IP address of the connection XF1 (Ethernet interface) on the control is 192.168.1.1 upon delivery. This IP address can be changed.
- The IP address of the connection XF31 (USB device interface) on the control is 192.168.234.234. This IP address cannot be changed.



The "IndraControl First Touch" commissioning tool is only available in English.

Supported web browsers:

- Chrome 3+
- Firefox 9+
- Internet Explorer 10+

The First Touch website communicates via the encrypted https protocol. Enter the URL (<https://192.168.1.1/> or <https://192.168.234.234/>), confirm the respective security certificate and add an exception rule. The website can then be loaded.

After loading the First Touch website, a "Welcome" page is displayed. To navigate to another First Touch site, a user login is required. To log in, enter user name and password into both the form fields of the navigation bar.

The default user ID is:

- User name: boschrexroth
- Password: boschrexroth

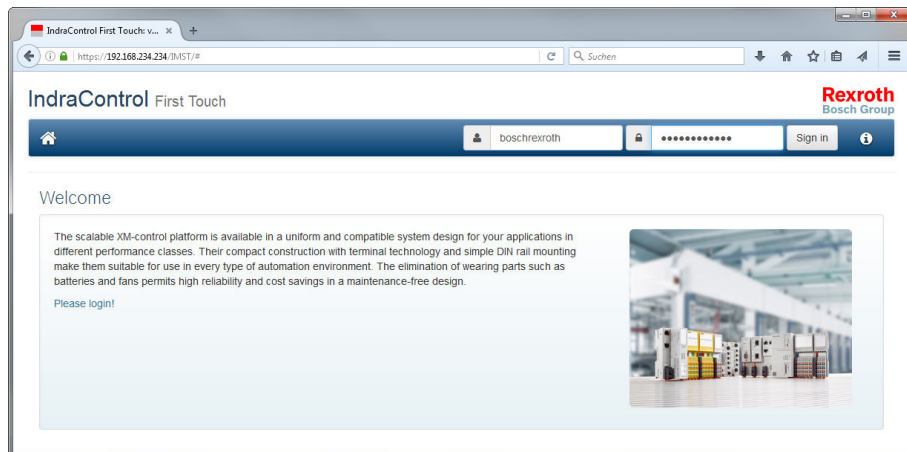


Fig. 12-6: "Welcome" dialog

12.3.1 Hardware data

The "Hardware" site of the IndraControl First Touch lists all device-specific data of the XM4x control in a table.

- Material index
- Hardware type plate
- Serial number
- Part number

12.3.2 Network settings

The "Network" site of the IndraControl First Touch is used to configure the network settings during the initial commissioning. The currently configured network settings are shown in the following three fields and can also be changed using these fields:

- IP address
- Gateway
- Subnet mask

Enter a valid network setting and write that setting to the control (press the **Write configuration** button). If writing the network settings is completed successfully, a note is displayed in the header area of the site. The **Reboot control** button is additionally displayed. It is used to restart the control and thus applies the network setting.

IndraControl First Touch

Home Welcome Hardware **Network** Firmware File Manager

Write Success
IP: 10.52.244.104, Gateway: 10.52.244.1,
Subnet Mask: 255.255.255.0

Network Configuration

IP-Address: 10.52.244.104
Gateway: 10.52.244.1
Subnet Mask: 255.255.255.0

Write Configuration Reboot Control

Fig. 12-7: "Network configuration" dialog



The network settings are only applied after a control restart.

12.3.3 Firmware management

The "Firmware management" site of the IndraControl First Touch provides the following information:

IndraControl First Touch

Welcome Hardware Network **Firmware** File Manager Core Dump Logout

Rexroth
Bosch Group

Firmware Management

Control Status: **INITIAL MODE**

Version of Initial Firmware: R911390383 FVL-XM4200_INIT ____-02V00-_____- (p1474ef)

Installed System Firmware
None

Available Actions

Reboot into Initial Mode Reboot into System Mode Archive SYSTEM\OEM\USER Restore SYSTEM\OEM\USER Factory Reset

Fig. 12-8: "Firmware management" dialog

- Current control mode:
 - "Initial Mode": The initial firmware is loaded or active (initial firmware version is shown).
 - "System Mode": Control was started with the previously installed system firmware.

- Installed system firmware version ("none" if no system firmware was installed).

Press the buttons for the following actions:

- "Reboot into Initial Mode": Reboots the system and restarts the initial mode.
- "Reboot into System Mode": Boots an installed system firmware.
- "Archive SYSTEM|OEM|USER": Backs up the complete directory structure of all partitions to a firmware archive (.fw file), also refer to [chapter "Archive SYSTEM|OEM|USER" on page 48](#).
- "Restore SYSTEM|OEM|USER": Restores a system installation from a backup file, also refer to [chapter "Restore SYSTEM|OEM|USER" on page 50](#).
- "Factory Reset": Restores the delivery state of the control. The complete directory structure is reset.



Caution: Loss of data!

An existing system firmware installation is deleted. The network settings are reset to its delivery state.

Archive SYSTEM|OEM|USER

This function is used to archive the internal storage medium. This includes all partitions and their file and directory structure as well as all remanent data. A ".fw" file is stored on the user partition of the control after the process. This file can be loaded to a local PC at a later point in time (see [chapter 12.3.4 "File manager" on page 53](#)).



The file name of a system archive can consist of 4-16 alphanumerical characters and has to have the file extension ".fw".

The backup can only be started if the selected file name corresponds to the archive rules. During as well as after the backup, a corresponding message is displayed.



Archive SYSTEM|OEM|USER

Select Target Directory

/USER/

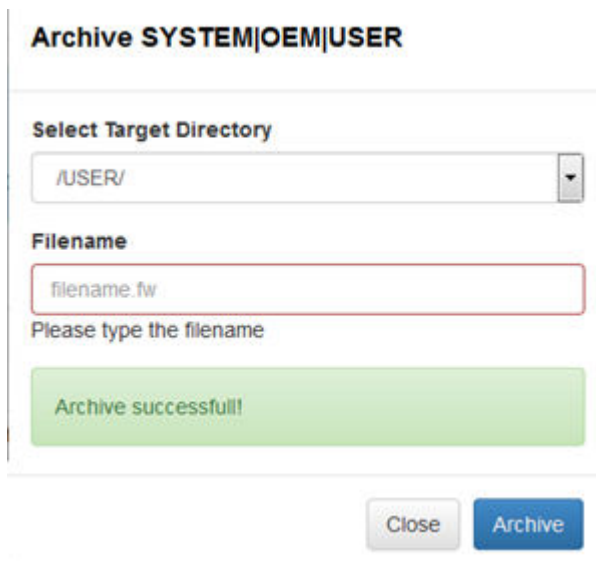
Filename

mySystemArchive.fw

Archive SYSTEM|OEM|USER Please wait...

Close Archive

Fig. 12-9: Dialog "Archive SYSTEM|OEM|USER"



Archive SYSTEM|OEM|USER

Select Target Directory

/USER/

Filename

filename.fw

Please type the filename

Archive successfull!

Close Archive

Fig. 12-10: Dialog "Archive SYSTEM|OEM|USER" – Successfully completed

Restore SYSTEM|OEM|USER

If "Restore SYSTEM|OEM|USER" is selected, a dialog opens to select a system archive file. The system archive file can either be selected from the local file system or from the file system of the control. If the system archive file is selected from the local file system, the archive is installed in two steps:

1. Transferring the system archive file to the control
2. Installing the archive

Restore SYSTEM|OEM|USER

Use Local File

Browse Filesystem

Info! Firmware files are available in the IndraWorks installation directory. ✕

- <IndraWorksInstallationDir>/MLC/Firmware/
- <IndraWorksInstallationDir>/MTX/xm42sw/

my_archive.fw

Change

☒ Delete Firmware file after installation

File Upload! Please wait...

Close

Restore

Fig. 12-11: Dialog "Restore SYSTEM|OEM|USER" – Upload

Restore SYSTEM|OEM|USER

Use Local File

Browse Filesystem

Info! Firmware files are available in the IndraWorks installation directory. ×

- <IndraWorksInstallationDir>/MLC/Firmware/
- <IndraWorksInstallationDir>/MTX/xm42sw/

 my_archive.fw

Change

☒ Delete Firmware file after installation

Restore in progress Please wait...

Close

Restore

Fig. 12-12: Dialog "Restore SYSTEM|OEM|USER" – Installation running

Restore SYSTEM|OEM|USER

Use Local File

Browse Filesystem

Info! Firmware files are available in the IndraWorks installation directory.

- <IndraWorksInstallationDir>/MLC/Firmware/
- <IndraWorksInstallationDir>/MTX/xm42sw/

my_archive.fw

Change

Remove

☒ Delete Firmware file after installation

Restore successfull!

Close

Restore

Fig. 12-13: Dialog "Restore SYSTEM|OEM|USER" – Successfully completed
Go to the "Browse file system" tab to restore archive files on the file system of the control or on external storage media. For restoration, select the respective archive file. Click on the "Restore" button to start the restoration.

Restore SYSTEM|OEM|USER

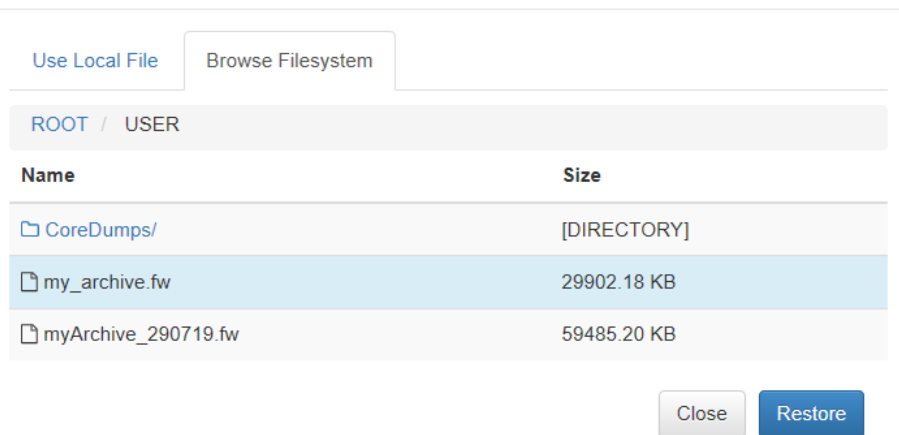


Fig. 12-14: Dialog "Restore SYSTEM|OEM|USER" – From the user partition

12.3.4 File manager

The following actions can be executed using the file manager of the IndraControl First Touch:

- Browse through the directory structure (click on a directory name)
- Transfer files from the control to the client (click on a file name)
- Transfer files from the client to the control (action: Upload file)
- Create directories (action: Create directory)
- Delete (empty) directories (click on the "Delete" icon in the table row)
- Delete files (click on the "Delete" icon in the table row)

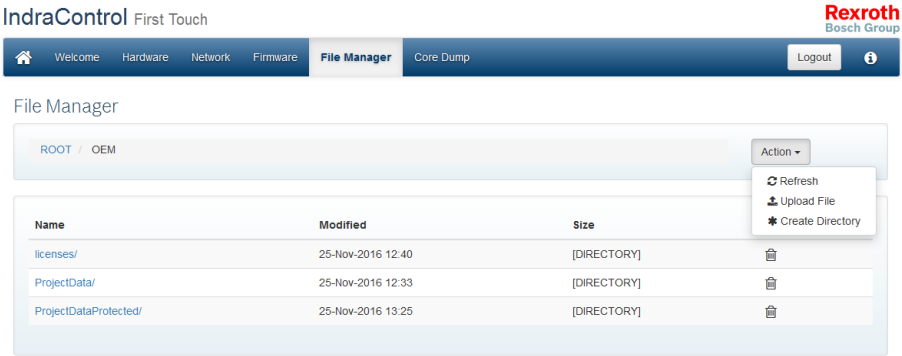


Fig. 12-15: "File manager" dialog

12.3.5 Core dump

In case of a system error, the control can create a complete core dump of the system that can be provided for an error analysis. IndraControl First Touch supports two use cases with this functionality:

- 1. Transfer of the active core dump from the control to the user PC.

All files assigned to the active core dump are displayed with name and file size in the "Core dump" menu item. Click on the file name to transfer the files to the user PC via the browser-specific download dialog.

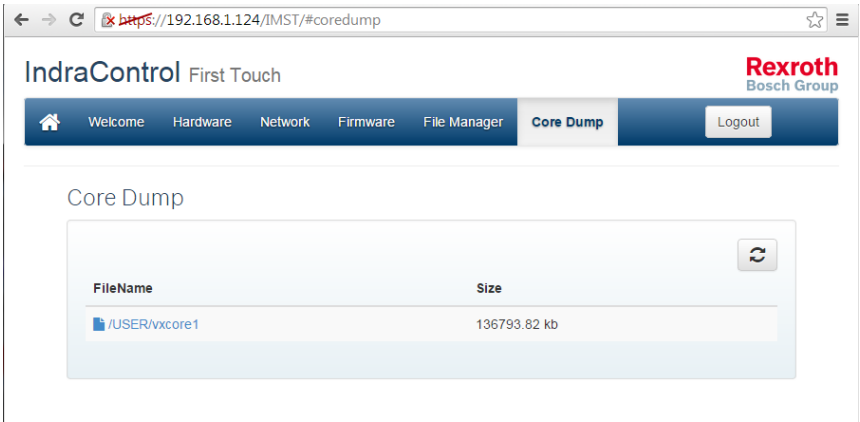


Fig. 12-16: Displaying the active core dump in IndraControl First Touch

- 2. Support of the user if the core dump could not be saved in the file system of the control (e.g. not sufficient free memory space available).

Un this case, storage space can be released in the default target directory for core dump files (/USER/). Use the "File manager" menu item. An addi-

tional data carrier (e.g. USB stick) can also be connected to the control. In both cases, saving the core dump has to be restarted. First Touch provides a dialog in the "Core dump" menu item. This dialog allows to select the target directory if unsaved core dump files are available in the RAM of the control.

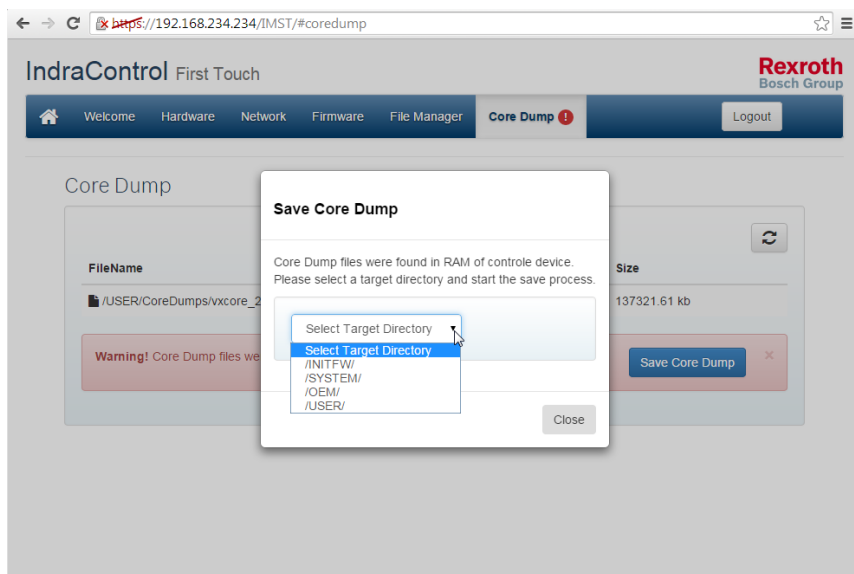


Fig. 12-17: Selecting the target directory to save the core dump

After selecting a valid target directory, press **Save** to start saving the core dump. If saving was successful, a corresponding status message is shown. After closing the dialog, the core dump is displayed with its respective data.

12.4 Booting

The control starts booting after switching on the 24 V voltage supply. Booting can be monitored and checked using different LEDs.

The following boot sequence is defined:

1. The LED "U_L" at the 24 V plug is green if 24 V is connected.
2. The LED "ON" at the 24 V plug is green if the programmable logic is properly loaded.
3. The LEDs "DIA3" and "DIA4" in the LED block of 10 flash alternately in red while booting.
4. The LEDs "DIA3" and "DIA4" in the LED block of 10 go off after booting and when the operating system is running.



If it is not booted in this sequence, an error is present (see [chapter 13 "Error causes and troubleshooting" on page 57](#)).

12.5 Fallback and recovery

The hardware is initialized after switching on the control and after installing the system firmware with subsequent reboot. Internally programmable function blocks are loaded. These also include internally programmed function blocks of connected modules. After the loading, the display LED "ON" at the voltage plug is green.

Wait till completion. Do not switch off the control. This procedure has to be completed.

If this display LED "ON" is red, loading for internally programmed functions block of an extension module or of the control failed. The display LED "ON" of the control is a collective display for all connected modules and the control.

In this case, trigger the "Fallback mode":

1. Switch off the 24 V voltage supply for the XMx control and for the extension modules.
2. Keep the "Reset" button "SF2" at the XMx control pressed and switch on the 24 V voltage supply. If either the display LED DIA3 or DIA4 is on at the XMx control, release the "Reset" button "SF2".

If the display LED "ON" is on at the XMx control, the error is recovered.

If the display LED "ON" is off at the XMx control, trigger the "Fallback mode" for the extension modules, whose display LED "ON" is off.

3. Keep the "Fallback" pushbutton of the respective module pressed using a plastic pen until the display LED "ON" is on at the extension module. This loads a backup data set. Release the "Fallback" pushbutton. Perform this step subsequently for all extension modules. First at those, whose display LED "ON" was not on. After completing that for all extension modules, the display LED "ON" of the XMxx control has to be on.



The XMx control can only start if all connected extension modules started without any errors. If the LED "ON" of a connected extension module is not green, initiate the "Fallback" mode for this extension module.

12.6 Backing up remanent data

Remanent data is automatically backed up in an internal flash memory after a 24 V supply voltage failure and restored during the start.

12.7 Real-time clock

The real-time clock of the control is buffered in the switched-off state. The buffer capacitor loses efficiency when operated permanently at high tempera-

tures. The buffer time of the real-time clock depends on the ambient temperature and the operating time of the control.

Operating time of the control at ambient temperature	Buffer time of the clock ^①
5 years at 50 °C permanent	Typ. 10 days
7 years at 50 °C permanent	Typ. 7 days
10 years at 50 °C permanent	Typ. 4 days
2.5 years at 60 °C permanent	Typ. 10 days
3.5 years at 60 °C permanent	Typ. 7 days
5 years at 60 °C permanent	Typ. 4 days

① Accuracy of ± 1 s/d at 25 °C

Tab. 12-6: Buffer time of the real-time clock depends on the ambient temperature and on the operating time of the control
It is recommended to set the time via SNTP.



Use a battery for longer buffer times. A battery can increase the buffer time of the real-time clock by approximately five years. See also [chapter 10.8 "Battery" on page 30](#).

13 Error causes and troubleshooting

The following table describes the LEDs on the power connector.

LED	LED display	Error causes and troubleshooting
U _L	LED is off	24 V voltage errors: • 24 V supply voltage is not connected • 24 V supply voltage is connected with reverse polarity
U _{INT}	LED is off	Internal voltage error; XM4 defective
ON	LED red	Error when loading the programmable logic. • Initiate fallback mode (see chapter 12.5 "Fallback and recovery" on page 56)
TEMP	LED is red	Temperature error. Control was switched off due to overheating. • Ensure a lower ambient temperature • Check the control installation • Avoid heat accumulation impeding the natural convection

Tab. 13-1: LEDs in the voltage power connector

Further operating displays and error displays are located on the individual modules and terminals. For information on the other displays, refer to the manual of the IndraControl S20 component (see also [chapter 1.3 "Related documents" on page 2](#)).

Errors	Actions for troubleshooting
The engineering PC cannot reach the XM4x control via the USB device interface "XF31"	● Check whether the device driver was correctly installed in the "Device manager" of the system control. The entry "RNDIS" is displayed under "Network adapters". If the entry is not displayed, install the driver manually, refer to chapter 11.3 "Establishing a connection to the engineering PC via the USB device interface XF31" on page 32 ● Check whether the operating system assigned a valid IP address and a subnet mask to the network adapter "RNDIS" (e.g. via the command "ipconfig"). If this is not the case, configure the IP address and the subnet mask manually.

Tab. 13-2: Error causes and troubleshooting



Repairs at the device by the customer are not permitted. Exceptions are maintenance works listed in the chapter "Maintenance".

For further information in the event of repair, please contact the Bosch Rexroth Service.

14 Maintenance

NOTICE

Maintenance work in the device is only permissible by skilled staff!

If hardware or software components have to be exchanged, please contact the Bosch Rexroth Service or ensure that only skilled staff changes the respective components.

14.1 Scheduled maintenance tasks

Include the following tasks into the maintenance schedule:

- Check all plug and terminal connections of the components for proper tightness and possible damage at least once a year
- Ensure that cables are not broken or crushed
- Replace damaged parts immediately

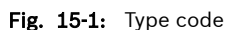
14.2 Battery change

Change the battery every five years, refer to [chapter 10.8 "Battery" on page 30](#). The battery name is: Lithium battery 3.0 V CR1632 (120 mAh), company Renata.

15 Ordering information

The XM4x controls can be delivered including the Motion Logic functions. The function packages are implemented into the control according to the system functions required in the application. Thus, variants with individual ordering in-

formation result from the required functional scope. Please contact the corresponding marketing organization and ask for the ordering information of the control variant optimized for your application.



15.2 Accessories and spare parts

For ordering information on accessories and spare parts, refer to [chapter 5 "Spare parts, accessories and wear parts"](#) on page 6.

16 Disposal

16.1 General information

Dispose the products according to the respective valid national standards.

16.2 Return

For disposal, our products can be returned free of charge. However, the products must be free from remains such as oil, grease or other impurities.

Furthermore, the products returned for disposal must not contain any undue foreign substances or external components.

Send the products free of charge to the following address:

Bosch Rexroth AG
Electric Drives and Controls
Bürgermeister-Dr.-Nebel-Straße 2
97816 Lohr am Main, Germany

16.3 Packaging

The packaging material consists of cardboard, plastics, wood or styrofoam. Packaging material can be recycled anywhere.

For ecological reasons, please do not return empty packages.

17 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

Service Germany

Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Hotline** and **Service Helpdesk** under:

Phone: **+49 9352 40 5060**
Fax: **+49 9352 18 4941**
E-mail: service.svc@boschrexroth.de
Internet: <http://www.boschrexroth.com>

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

Service worldwide

Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

Preparing information

To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances
- Type plate specifications of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your e-mail address)

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Notes

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