

ROBOTICS

# Product manual

## OmniCore C90XT Type A



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**Product manual**  
**OmniCore C90XT Type A**

OmniCore

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# Overview of this manual

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## About this manual

This manual contains instructions for:

- mechanical and electrical installation of the controller
- maintenance of the controller
- mechanical and electrical repair of the controller

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## Usage

This manual should be used during:

- installation and commissioning, from lifting the product to its work site and securing it to the foundation, to making it ready for operation
- maintenance work
- repair work
- decommissioning work



### Note

It is the responsibility of the integrator to conduct a risk assessment of the final application.

It is the responsibility of the integrator to provide safety and user guides for the robot system.

---

## Who should read this manual?

This manual is intended for:

- installation personnel
- maintenance personnel
- repair personnel.

---

## Prerequisites

A maintenance/repair/installation craftsman working with an ABB robot must:

- be trained by ABB and have the required knowledge of mechanical and electrical installation/repair/maintenance work.
- be trained to respond to emergencies or abnormal situations.

---

## Product manual scope

The manual covers all variants and designs of the OmniCore C90XT Type A. Some variants and designs may have been removed from the business offer and are no longer available for purchase.

*Continues on next page*

## References



### Tip

All documents can be found via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Document name	Document ID
<i>Product specification - OmniCore C line</i>	3HAC065034-001
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010
<i>User manual - FlexPendant</i>	3HAC093167-001
<i>Operating manual - RobotStudio</i>	3HAC032104-001
<i>Operating manual - OmniCore</i>	3HAC065036-001
<i>Operating manual - Integrator's guide OmniCore</i>	3HAC065037-001
<i>Technical reference manual - System parameters</i>	3HAC065041-001
<i>Application manual - Functional safety and SafeMove</i>	3HAC066559-001
<i>Application manual - Connected Services</i>	3HAC028879-001
<i>Application manual - Conveyor tracking</i>	3HAC066561-001
<i>Safety manual for robot - Manipulator and IRC5 or OmniCore controller</i>	3HAC031045-001
<i>Application manual - Additional axes</i>	3HAC082287-001
<i>Application manual - MultiMove</i>	3HAC089689-001

## Revisions

Revision	Description
A	First edition.

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# Product documentation

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## Categories for user documentation from ABB Robotics

The user documentation from ABB Robotics is divided into a number of categories. This listing is based on the type of information in the documents, regardless of whether the products are standard or optional.



### Tip

All documents can be found via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

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## Product manuals

Manipulators, controllers, DressPack, and most other hardware is delivered with a **Product manual** that generally contains:

- Safety information.
- Installation and commissioning (descriptions of mechanical installation or electrical connections).
- Maintenance (descriptions of all required preventive maintenance procedures including intervals and expected life time of parts).
- Repair (descriptions of all recommended repair procedures including spare parts).
- Calibration.
- Troubleshooting.
- Decommissioning.
- Reference information (safety standards, unit conversions, screw joints, lists of tools).
- Spare parts list with corresponding figures (or references to separate spare parts lists).
- References to circuit diagrams.

---

## Technical reference manuals

The technical reference manuals describe reference information for robotics products, for example lubrication, the RAPID language, and system parameters.

---

## Application manuals

Specific applications (for example software or hardware options) are described in **Application manuals**. An application manual can describe one or several applications.

An application manual generally contains information about:

- The purpose of the application (what it does and when it is useful).
- What is included (for example cables, I/O boards, RAPID instructions, system parameters, software).
- How to install included or required hardware.
- How to use the application.

*Continues on next page*

*Continued*

- Examples of how to use the application.

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### Operating manuals

The operating manuals describe hands-on handling of the products. The manuals are aimed at those having first-hand operational contact with the product, that is production cell operators, programmers, and troubleshooters.

# How to read the product manual

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## Reading the procedures

The procedures contain all information required for the installation or service activity and can be printed out separately when needed for a certain service procedure.

## Safety information

The manual includes a separate safety chapter that must be read through before proceeding with any service or installation procedures. All procedures also include specific safety information when dangerous steps are to be performed.

Read more in the chapter [Safety on page 15](#).

## Illustrations

The product is illustrated with general figures that does not take painting or protection type in consideration.

Likewise, certain work methods or general information that is valid for several product models, can be illustrated with illustrations that show a different product model than the one that is described in the current manual.

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# 1 Safety

## 1.1 Safety information

### 1.1.1 Limitation of liability

---

#### Limitation of liability

Any information given in this manual regarding safety must not be construed as a warranty by ABB that the industrial robot will not cause injury or damage even if all safety instructions are complied with.

The information does not cover how to design, install and operate a robot system, nor does it cover all peripheral equipment that can influence the safety of the robot system.

In particular, liability cannot be accepted if injury or damage has been caused for any of the following reasons:

- Use of the robot in other ways than intended.
- Incorrect operation or maintenance.
- Operation of the robot when the safety devices are defective, not in their intended location or in any other way not working.
- When instructions for operation and maintenance are not followed as intended.
- Non-authorized design modifications of the robot.
- Repairs on the robot and its spare parts carried out by in-experienced or non-qualified personnel.
- Foreign objects.
- Force majeure.

---

#### Spare parts and equipment

ABB supplies original spare parts and equipment which have been tested and approved for their intended use. The installation and/or use of non-original spare parts and equipment can negatively affect the safety, function, performance, and structural properties of the robot. ABB is not liable for damages caused by the use of non-original spare parts and equipment.

# 1 Safety

---

## 1.1.2 Safety data

### 1.1.2 Safety data

---

#### Prevailing standards and directives

For the use of industrial robots, regulations must be fulfilled as described in the following standards and directives:

- EN ISO 10218-1:2011
- Machinery Directive 2006/42/EC

---

#### Performance level and category

EN ISO 10218-1 requires structure category 3 and performance level *PL d* on the robot, see EN ISO 13849-1.

---

#### Risk assessment

The results of a risk assessment performed on the robot and its intended application may determine that a safety-related control system performance other than that stated in ISO 10218 is warranted for the application.

The SISTEMA/ABB FSDT libraries contains details for the safety functions.



#### Note

The safety functions are divided into two types called *Basic Safety Functions* and *Extended Safety Functions*.

---

#### Performance level data

The performance level data for the respective controller variant is presented in section [Safety functions and safety related data for OmniCore C90XT Type A on page 46](#).



### 1.1.3 Requirements on personnel

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#### General

Only personnel with appropriate training are allowed to install, maintain, service, repair, and use the robot. This includes electrical, mechanical, hydraulics, pneumatics, and other hazards identified in the risk assessment.

Persons who are under the influence of alcohol, drugs or any other intoxicating substances are not allowed to install, maintain, service, repair, or use the robot.

The plant liable must make sure that the personnel is trained on the robot, and on responding to emergency or abnormal situations.

---

#### Personal protective equipment

Use personal protective equipment, as stated in the instructions.

# 1 Safety

## 1.2.1 Safety signals in the manual

## 1.2 Safety signals and symbols

### 1.2.1 Safety signals in the manual







#### Introduction to safety signals

This section specifies all safety signals used in the user manuals. Each signal consists of:


- A caption specifying the hazard level (DANGER, WARNING, or CAUTION) and the type of hazard.
- Instruction about how to reduce the hazard to an acceptable level.
- A brief description of remaining hazards, if not adequately reduced.

#### Hazard levels

The table below defines the captions specifying the hazard levels used throughout this manual.

Symbol	Designation	Significance
	DANGER	Signal word used to indicate an imminently hazardous situation which, if not avoided, will result in serious injury.
	WARNING	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in serious injury.
	ELECTRICAL SHOCK	Signal word used to indicate a potentially hazardous situation related to electrical hazards which, if not avoided, could result in serious injury.
	CAUTION	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in slight injury.
	ELECTROSTATIC DISCHARGE (ESD)	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in severe damage to the product.
	NOTE	Signal word used to indicate important facts and conditions.

*Continues on next page*

Symbol	Designation	Significance
	TIP	Signal word used to indicate where to find additional information or how to do an operation in an easier way.

# 1 Safety

## 1.2.2 Safety symbols on controller labels

### 1.2.2 Safety symbols on controller labels

#### Introduction to safety symbols

Both the manipulator and the controller are marked with labels containing safety symbols and important information about the product. The purpose of the labels is to ensure personal safety for all personnel handling the robot, for example during installation, service, or operation.

The safety symbols are language independent, they only use graphics. The information labels contain information in text. See [Symbols and information on labels on page 20](#).



#### Note




The safety and information labels on the product must be observed.

#### Symbols and information on labels


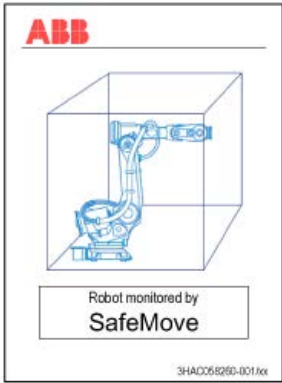
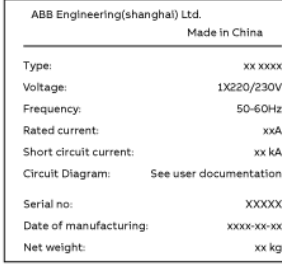





#### Note

The descriptions in this section are generic, the labels can contain additional information such as values.

Label	Description
 xx1400001152	Read the user manual before use.
 xx1800000835	CE label
 xx1400002061	UL certified (robot with controller)



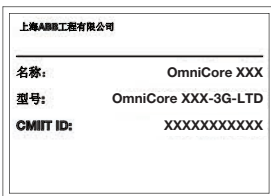
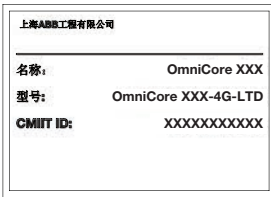
Continues on next page

Label	Description
 <p>xx1700000353</p>	<p>Safety UL label (for the <i>Functional Safety</i> solution together with UL mark).</p>
 <p>xx1700000355</p>	<p>SafeMove label (for <i>SafeMove Basic</i> and <i>SafeMove Pro</i> software).</p>
 <p>xx1900001805</p>	<p>Rating label (example)</p>
 <p>xx1400001151</p>	<p>Electrical shock</p>
 <p>xx1800000836</p>	<p>Warning &amp; caution label</p>
 <p>xx1400001156</p>	<p>High voltage inside the module even if the main switch is in the OFF position.</p>

# 1 Safety

## 1.2.2 Safety symbols on controller labels

Continued

Label	Description
 <p>xx1400001162</p>	<p>ESD sensitive components inside the controller.</p>
 <p>xx2300001438</p>	<p>SRRC label for WIFI (only for Chinese market)</p>
 <p>xx2300001441</p>	<p>SRRC label for 3G (only for Chinese market)</p>
 <p>xx2400001217</p>	<p>SRRC label for 4G (only for Chinese market)</p>

## 1.3 Robot stopping functions

### 1.3.1 Protective stop and emergency stop

#### Robot stopping functions

The robot has protective and emergency stop functions (stop category 0 or 1, in accordance with IEC 60204-1).

Stop category 0	As defined in IEC 60204-1, stopping by immediate removal of power to the machine actuators.
Stop category 1	As defined in IEC 60204-1, a controlled stop with power available to the machine actuators to achieve the stop and then removal of power when the stop is achieved.

A stop function, protective or emergency stop, has a default setting for the stop category, see [Inputs to initiate a protective stop or an emergency stop on page 23](#).

The default stop category for a protective or emergency stop can be re-configured. Activation of external safety rated devices, connected to the robot controller through dedicated discrete safety inputs or safety protocols, will initiate these stop functions.

#### Inputs to initiate a protective stop or an emergency stop

Inputs to initiate a stop function	Description	Default stop category <sup>i</sup>	Stop category reconfigurable
Emergency Stop (ES)	Input to initiate the emergency stop function. The <i>Emergency Stop</i> function is initiated in both automatic and manual mode.	Stop category 0 For deviations, see the product manual for the manipulator.	Yes
Automatic Stop (AS)	Input to initiate the protective stop function. <i>Automatic Stop</i> is only initiated in automatic mode.	Stop category 1 For deviations, see the product manual for the manipulator.	Yes
General Stop (GS)	Input to initiate the protective stop function. <i>General Stop</i> is initiated in both manual mode and automatic mode.	Stop category 1 For deviations, see the product manual for the manipulator.	Yes

<sup>i</sup> Stop category 1 is deactivated by responsive jogging in manual reduced speed mode by default. Stop category 1 can be deactivated by changing the parameter Jog Mode from *Responsive to Standard*.

For more information about Responsive jogging, see *AM Functional safety and SafeMove 3HAC066559-001*.

For example, a safety rated output from a presence sensing device, connected to AS / GS, a dedicated discrete protective stop input on the robot controller, will when the protective stop function is configured as Automatic Stop (AS) initiate the protective stop function in automatic mode only.

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# 1 Safety

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## 1.3.1 Protective stop and emergency stop

*Continued*

The emergency stop function is a complementary protective measure and shall not be applied as a substitute for safeguarding measures or safety functions.



### Note

For OmniCore, a safety input used to initiate a protective stop must remain active for at least 100 ms.

### Stop category configuration for OmniCore

The stop category configuration is done in RobotStudio, in the tool **Visual SafeMove**.



### 1.3.2 About emergency stop

#### The emergency stop

The purpose of the emergency stop function is to avert actual or impending emergency situations arising from the behavior of persons or from an unexpected hazardous event.

The emergency stop function is to be initiated by a single human action.

The emergency stop function is a complementary protective measure and shall not be applied as a substitute for safeguarding measures and other functions or safety functions.

The effect of an activated emergency stop device is sustained until the actuator of the emergency stop device has been disengaged. This disengagement is only possible by an intentional human action on the device where the command has been initiated. The disengagement of the emergency stop device shall not restart the machinery but only permit restarting.



#### Note

The emergency stop device on the FlexPendant is operational when the robot is powered. Indicators to be used to verify that the robot is powered are the main switch on the cabinet or the LED indicator on the cabinet when robot is in Motors On Mode.

#### Recover from emergency stop

- 1 Inspect the machinery in order to detect the reason for the emergency stop device actuation.
- 2 Locate and disengage the emergency stop device or devices that initiated the emergency stop function.

### 1.3.3 Enabling device and hold-to-run functionality

---

#### Three-position enabling device



#### CAUTION

The person using the three-position enabling device is responsible to observe the safeguarded space for hazards due to robot motion and any other hazards related to the robot.

The three-position enabling device is located on the FlexPendant. When continuously held in center-enabled position, the three-position enabling device will permit robot motion and any hazards controlled by the robot. Release of or compression past the center-enabled position will stop the robot motion.



#### CAUTION

For safe use of the three-position enabling device, the following must be implemented:

- The three-position enabling device must never be rendered inoperational in any way.
- If there is a need to enter safeguarded space, always bring the FlexPendant. This is to enforce single point of control.

---

#### Hold-to-run function in manual high speed mode

The hold-to-run function for manual high speed allows movement in conjunction with the three-position enabling device when the button connected to the function is actuated manually. This hold-to-run function can only be used in manual high speed mode. In case of hazard, release or compress the three-position enabling device.

How to use the hold-to-run function for manual high speed mode is described in the operating manual for the controller.

## 1.4 Robot operating modes

### 1.4.1 About the manual mode

#### The manual mode

Manual mode is a control state that allows for the direct control by an operator. The operator will through positioning the three-position enabling device to the center-position allow for movement of the manipulator.

There are two manual modes:

- Manual reduced speed
- Manual high speed (optional)

#### Safeguard mechanisms

Protective stop function initiated by

- Three-position enabling device (release of or compression past the center-enabled position)
- General Stop, GS (the dedicated input, GS, or the dedicated input AS/GS configured to GS, see actual controller)

#### The mode manual reduced speed

The mode manual reduced speed, is used for jogging, teaching, programming and program verification of the robot; it may be the mode selected when performing some maintenance tasks.

In manual reduced speed mode the movement of the TCP is limited to 250 mm/s. In addition, there is a limitation on the maximum allowed speed for each axis.

Manual control of the robot from inside the safeguarded space shall be performed through the FlexPendant.



#### WARNING

Wherever possible, the manual mode of operation shall be performed with all persons outside the safeguarded space.

#### Tasks normally performed in mode manual reduced speed

The following tasks are normally performed in manual reduced speed mode.

- Set or reset I/O signals
- Creating and editing RAPID programs
- Modify system parameter values
- Starting, stepping, and stopping program execution
- Jog the manipulator
- Teach or tune programmed manipulator positions

#### The mode manual high speed

The mode manual high speed, is used for program verification only.

*Continues on next page*

# 1 Safety

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## 1.4.1 About the manual mode

*Continued*

The three-position enabling switch must be pressed to the center-position and the hold-to-run button must be pressed to allow start of program execution, for example, execute movement instructions.

In manual high speed, the initial speed of the movement, does not exceed 250 mm/s, that is limited to a percentage of the programmed speed. The speed can be manually adjusted in steps up to the programmed speed.

When the three-position enabling device is released or fully compressed, the speed is reset to the initial speed, that is, not exceeding 250 mm/s.



### **WARNING**

Wherever possible, the manual mode of operation shall be performed with all persons outside the safeguarded space.



### **Note**

The restricted space shall be provided when the robot is foreseen to be used in manual high speed.

### Tasks normally performed in mode manual high speed

The following tasks are normally performed in manual high speed mode.

- Program verification
- Setting program pointer (to Main, to routine, to cursor, to service routine, etc.)
- Starting and stopping program execution
- Stepping program execution
- Manually adjusting speed (0–100%)

### 1.4.2 About the automatic mode

---

#### The automatic mode

Automatic mode is an operating mode in which the robot operates in accordance with the task program(s).

#### Tasks normally performed in automatic mode

The following tasks are typically performed in automatic mode:

- Start and stop of program execution.
- Increase or decrease the speed in between zero and programmed speed.
- Restore backups. Only possible when robot is at stop.
- Load, start, stop, and modify RAPID programs through remote clients.

---

#### Safeguard mechanisms

Protective stop function initiated by

- Automatic Stop, AS (the dedicated input, AS, or the dedicated input AS/GS configured to AS, see actual controller)
- General Stop, GS (the dedicated input, GS, or the dedicated input AS/GS configured to GS, see actual controller)



#### Note

Prior to allowing the robot to operate in automatic mode, ensure that any suspended safeguards, are returned to full functionality.

# 1 Safety

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## 1.5 Safety during installation and commissioning

### 1.5 Safety during installation and commissioning

---

#### National or regional regulations

The integrator of the robot system is responsible for the safety of the robot system.

The integrator is responsible that the robot system is designed and installed in accordance with the safety requirements set forth in the applicable national and regional standards and regulations.

The integrator of the robot system is required to perform a risk assessment.

---

#### Layout

The robot integrated to a robot system shall be designed to allow safe access to all spaces during installation, operation, maintenance, and repair.

If robot movement can be initiated from an external control panel then an emergency stop must also be available.

If the manipulator is delivered with mechanical stops, these can be used for reducing the working space.

A perimeter safeguarding, for example a fence, shall be dimensioned to withstand the following:

- The force of the manipulator.
- The force of the load handled by the robot if dropped or released at maximum speed.
- The maximum possible impact caused by a breaking or malfunctioning rotating tool or other device fitted to the robot.

The maximum TCP speed and the maximum velocity of the robot axes are detailed in the section *Robot motion* in the product specification for the respective manipulator.

Consider exposure to hazards, such as slipping, tripping, and falling.

Hazards due to the working position and posture for a person working with or near the robot shall be considered.

Hazards due to noise emission from the robot needs to be considered.

Consider hazards from other equipment in the robot system, for example, that guards remain active until identified hazards are reduced to an acceptable level.

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#### Allergenic material

See [Environmental information on page 370](#) for specification of allergenic materials in the product, if any.

---

#### Securing the robot to the foundation

The robot must be properly fixed to its foundation/support, as described in the respective product manual.

When the robot is installed at a height, hanging, or other than mounted directly on the floor, there will be additional hazards.

---

*Continues on next page*

### Using lifting accessories and other external equipment

Ensure that all equipment used during installation, service and all handling of the robot are in correct condition for the intended use.

### Electrical safety

Incoming mains must be installed to fulfill national regulations.

The power supply wiring to the robot must be sufficiently fused and if necessary, it must be possible to disconnect it manually from the mains power.

The power to the robot must be turned off with the main switch and the mains power disconnected when performing work inside the controller cabinet. Lock and tag shall be considered.

Hazards due to stored electrical energy in the controller must be considered.

Harnesses between controller and manipulator shall be fixed and protected to avoid tripping and wear.

Wherever possible, power on/off or rebooting the robot controller shall be performed with all persons outside the safeguarded space.



#### Note

Use a CARBON DIOXIDE (CO<sub>2</sub>) extinguisher in the event of a fire in the robot.

### Safety devices

The integrator is responsible for that the safety devices necessary to protect people working with the robot system are designed and installed correctly.

When integrating the robot with external devices to a robot system:

- The integrator of the robot system must ensure that emergency stop functions are interlocked in accordance with applicable standards.
- The integrator of the robot system must ensure that safety functions are interlocked in accordance with applicable standards.

### Other hazards

A robot may perform unexpected limited movement.



#### WARNING

Manipulator movements can cause serious injuries on users and may damage equipment.

The risk assessment should also consider other hazards arising from the application, such as, but not limited to:

- Water
- Compressed air
- Hydraulics

End-effector hazards require particular attention for applications which involve close human collaboration with the robot.

*Continues on next page*

# 1 Safety

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## 1.5 Safety during installation and commissioning

*Continued*

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### **Verify the safety functions**

Before the robot system is put into operation, verify that the safety functions are working as intended and that any remaining hazards identified in the risk assessment are mitigated to an acceptable level.



### 1.6 Safety during operation

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#### Automatic operation

Verify the application in the operating mode manual reduced speed, before changing mode to automatic and initiating automatic operation.

---

#### Lock and change of operating mode

To prevent hazard, it is the responsibility of the integrator to make sure that keys used to lock or change the operating mode are handled only by authorized personnel.

---

#### Safety devices not in use

Safety devices that are not connected to the robot or robot system cannot initiate a protective or emergency stop. These must be stored out of sight so that they cannot be mistaken for being in use.

# 1 Safety

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## 1.7 Safety during maintenance and repair

### 1.7 Safety during maintenance and repair

---

#### General

Corrective maintenance must only be carried out by personnel trained on the robot. Maintenance or repair must be done with all electrical, pneumatic, and hydraulic power switched off, that is, no remaining hazards.

Never use the robot as a ladder, which means, do not climb on the controller, manipulator, including motors, or other parts. There are hazards of slipping and falling. The robot might be damaged.

Make sure that there are no tools, loose screws, turnings, or other unexpected parts remaining after maintenance or repair work.

When the work is completed, verify that the safety functions are working as intended.

---

#### Hot surfaces

Surfaces can be hot after running the robot, and touching these may result in burns. Allow the surfaces to cool down before maintenance or repair.

---

#### Hazards related to batteries

Under rated conditions, the electrode materials and liquid electrolyte in the batteries are sealed and not exposed to the outside.

There is a hazard in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery container. As a result under certain circumstances, electrolyte leakage, electrode materials reaction with moisture/water or battery vent/explosion/fire may follow.

Do not short circuit, recharge, puncture, incinerate, crush, immerse, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion.

Operating temperatures are listed in [Operating conditions on page 41](#).

See safety instructions for the batteries in *Material/product safety data sheet - Battery pack (3HAC043118-001)*.

---

#### Related information

See also the safety information related to installation and operation.

### 1.8 Safety during troubleshooting

#### General

When troubleshooting requires work with power switched on, special considerations must be taken:

- Safety circuits might be muted or disconnected.
- Electrical parts must be considered as *live*.
- The manipulator can move unexpectedly at any time.



#### **DANGER**

Troubleshooting on the controller while powered on must be performed by personnel trained by ABB or by ABB field engineers.

A risk assessment must be done to address both robot and robot system specific hazards.

#### Related information

See also the safety information related to installation, operation, maintenance, and repair.

# 1 Safety

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## 1.9 Safety during decommissioning

### 1.9 Safety during decommissioning

---

#### General

See section [Decommissioning on page 369](#).

If the robot is decommissioned for storage, take extra precaution to reset safety devices to delivery status.

## 2 Controller description

### 2.1 OmniCore C90XT Type A

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#### About OmniCore C90XT Type A

The OmniCore C90XT Type A is one of OmniCore C line compact controllers. The OmniCore C90XT Type A controller offers a compact solution suitable for most applications with room for some additional equipment inside.

It is used to control an ABB manipulator used in industrial applications such as material handling and machine tending.

## 2 Controller description

### 2.2 Technical data for OmniCore C90XT Type A controller

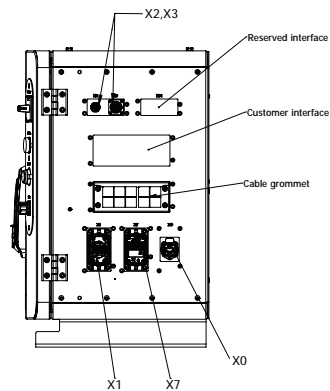
### 2.2 Technical data for OmniCore C90XT Type A controller

#### Overview of the controller

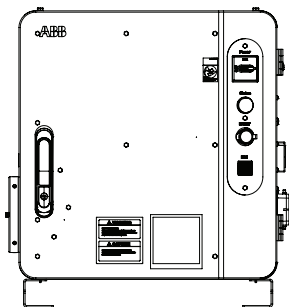
OmniCore C90XT Type A is intended to be used in industrial environment.



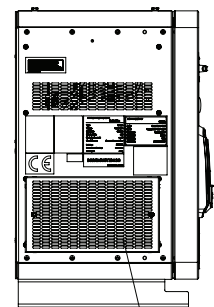
xx2400001212



Right view



Front view



Left view

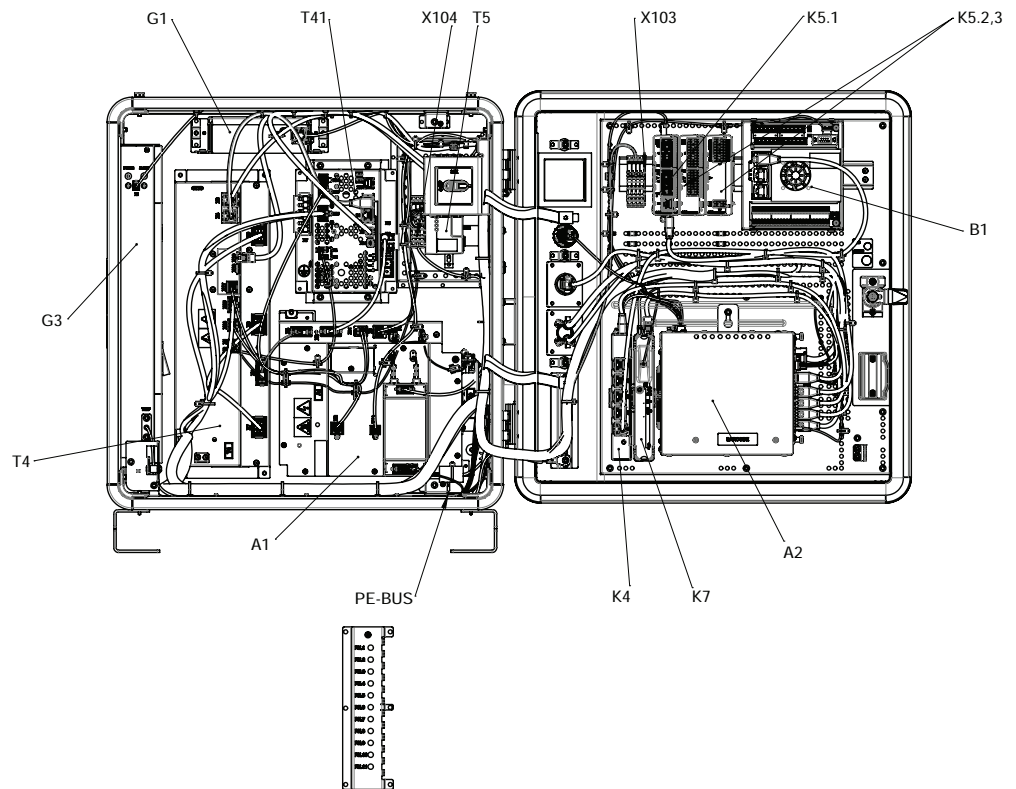
xx2400001318

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## 2 Controller description

### 2.2 Technical data for OmniCore C90XT Type A controller

*Continued*



xx2400001319

	Reference to circuit diagram	OmniCore C90XT Type A
Basic box		Baseline
Extension box		Option
Drive unit	T4	Baseline
Power unit	A1	Baseline
SMB connector	X2	Baseline
SMB connector	X3	Option
Force control connector	X3	NA
HMI connector (TPU)	X4	Baseline
Motor connector	X1	Baseline
Scalable I/O	K5.1	Option
Additional I/O	K5.2/K5.3	Option
Conveyor tracker module	B1	Option
Motion Safety	A2.K3	Baseline
Connected Services Gateway (with antenna for 3G/4G and WiFi)	K7	Option
Ethernet switch	K4	Option
Standard fan	G1	Baseline
Heat exchanger	G2	Baseline

*Continues on next page*

## 2 Controller description

### 2.2 Technical data for OmniCore C90XT Type A controller

Continued

	Reference to circuit diagram	OmniCore C90XT Type A
Heat exchanger	G3	Baseline
Axis computer	K6	NA
Main computer	A2	Baseline
DeviceNet	A2.K2	Option
Power supply	T2	NA
Power supply	T5	NA
DSQC 609 power supply	T5	Option
DSQC 634 Power Supply	T5	Option
Fieldbus adapter slave	X18	NA
Process Connector	X81	Option
Power inlet switch	Q0	Baseline
Power inlet connector	X0	Baseline
Robot signal exchange proxy	K2	NA
24VDC terminal block	X103	Baseline
AC terminal block	X104	Baseline
Additional drive unit	T41	Option
Harness local MGMT port unit	X24	Baseline
Filter		Option
Network connectors-Cable Grommet unit		Baseline

#### Type label

The type label shows the type designation of this specific OmniCore controller:



xx2300001754

#### Dimensions

Parameter	Value
Width	500 mm
Depth	355 mm
Height	520 mm

Continues on next page



## 2 Controller description

### 2.2 Technical data for OmniCore C90XT Type A controller *Continued*

#### Extension box

Parameter	Value
Width	500 mm
Depth	355 mm
Height	295 mm

#### Weight

Controller	Weight
OmniCore C90XT Type A	46 kg (not including the extension box)
Extension Box	25 kg



#### Note

The weight does not include any mounting kits fitted on the controller.

#### Transportation and storage conditions

Parameter	Value
Minimum ambient temperature	-25 °C (-13 °F)
Maximum ambient temperature	+55 °C (+131 °F)
Maximum ambient temperature (less than 24 hrs)	+70 °C (+158 °F)
Vibration	Max. Grms = 4 m/s <sup>2</sup> (X & Y axis), Grms = 12.8 m/s <sup>2</sup> (Z axis)
Bumps	Max. 5 g = 50 m/s <sup>2</sup> (11 ms)

After storage, the operating conditions inside the controller must be met for at least 6 hours before switching on the controller (see [Operating conditions on page 41](#)).

The robot controller shall be stored according to its IP classification (IP54), that is, indoors, in an environment that is dry and dust-free. In addition, wind, temperature fluctuations, and condensation shall be avoided.

See also *Product specification - OmniCore C line*.

#### Operating conditions

The table shows the allowed operating conditions for the controller.

Parameter	Value
Minimum ambient temperature	+5 °C (+41 °F)
Maximum ambient temperature	+45 °C (+113 °F)
Maximum ambient altitude	2,000 m

*Continues on next page*

## 2 Controller description

### 2.2 Technical data for OmniCore C90XT Type A controller

Continued



#### Note

The humidity conditions shall apply with the environmental conditions EN 60721-3-3, climatic class 3K3. For temperatures 0-30 °C, the relative humidity must not exceed 85%. For temperatures exceeding 30 °C, the absolute humidity must not exceed 25g/m<sup>3</sup>.

If the environmental conditions in EN 60721-3-3, climatic class 3K3, are not possible to meet at the installation site, desiccant bags can be placed inside the controller to achieve corresponding conditions. The desiccant bags must be replaced regularly to maintain approved operating conditions.

### Protection classes

	Protection class
Controller cabinet, inner compartment for electronics	IP54
Extension box cabinet	IP54
FlexPendant	IP65

The cabinet must be closed and sealed when no internal access is required.

If the cabinet is not properly closed and sealed (door and cable grommets), it does not comply with the protection class (IP54) and may affect the following:

- The electromagnetic compatibility (EMC) is affected
- Units inside the cabinet are exposed to dust or moisture. Especially important in cases with high heat and humidity, or much pollution.



#### Note

To comply with IP54, all openings to the controller cabinet must be sealed. This includes unconnected connectors which must be fitted with covers.

### Airborne noise level

Data	Description	Note
Airborne noise level	The sound pressure level one meter away from each surface of the controller.	Controller in Motors On Mode: < 63 dB(A) Leq Controller in Standby Mode: < 59 dB(A) Leq

### Power supply

Mains	Value
Voltage for OmniCore C90XT Type A	220/230 VAC, 1 phase
Voltage tolerance	+10%, -15%
Frequency	50/60 Hz
Frequency tolerance	±3%
Short circuit current rating	According to rating label.

Continues on next page

## 2 Controller description

### 2.2 Technical data for OmniCore C90XT Type A controller *Continued*

#### Line fusing

There is no integrated fuse inside the OmniCore C90XT Type A controller. Add an external fuse (time-delay) or circuit breaker (class K) according to full load current, as marked on the controller nameplate. The following table shows the recommended rating for an external fuse or circuit breaker.

Robot	Current (A)	Description
CRB 1300	220/230 VAC, 1 phase	10 A
IRB 910INV	220/230 VAC, 1 phase	10 A
IRB 920	220/230 VAC, 1 phase	10 A
IRB 930	220/230 VAC, 1 phase	10 A
IRB 1010	100-230 VAC, 1 phase	10 A
IRB 1100	220/230 VAC, 1 phase	10 A
IRB 1200	220/230 VAC, 1 phase	10 A
IRB 1300	220/230 VAC, 1 phase	10 A
IRB 1510	220/230 VAC, 1 phase	10 A
IRB 1520	220/230 VAC, 1 phase	10 A

#### Residual current

An external earth fault protection (residual current device, RCD) is required based on the following residual current data in controller:

Robot	Residual Current in controller (mA)
CRB 1300	< 30 mA
IRB 910INV	< 30 mA
IRB 920	< 30 mA
IRB 930	< 30 mA
IRB 1010	< 30 mA
IRB 1100	< 30 mA
IRB 1200	< 30 mA
IRB 1300	< 30 mA
IRB 1510	< 30 mA
IRB 1520	< 30 mA



#### Note

The integrator is responsible to address local electrical requirements.

*Continues on next page*

## 2 Controller description

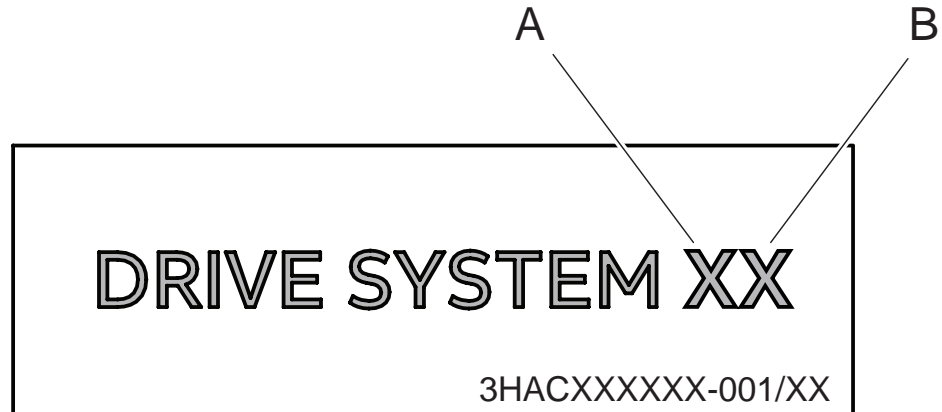
### 2.2 Technical data for OmniCore C90XT Type A controller

Continued

#### Drive system

The drive system provides motion power and absorbs excess braking energy when the robot is running.

The drive system label, which is placed on the top of the controller, contains information about the drive system type for this specific controller:



xx240000408

The drive system type (letter and number) indicates the combination of drive unit (A) and power unit (B) that may be used for this controller:

Type reference	Drive unit	Power unit
A*	Drive unit LV DSQC3041	-
B*	Drive unit LV DSQC3084	-
D*	Drive unit for CRB 15000 <sup>i</sup>	
*1	-	Power unit LV DSQC3044
*3	-	Power unit LVHP DSQC 3066
*7	-	Power unit ULVLP DSQC3083
*10	-	Power unit ULVLP DSQC3105

<sup>i</sup> This drive unit is specifically designed for CRB 15000 and is located inside the manipulator.

The controller drive system shall only be used with specified manipulator variant.

The following table shows the mapping list.

Manipulator	Controller	Drive system type
IRB 1090, IRB 1100, IRB 1200, IRB 1300, IRB 910INV, IRB 920, IRB 930, IRB 360, IRB 365, CRB 1100, CRB 1300	OmniCore C30	A1
	OmniCore C90XT	
IRB 1010, IRB1510, IRB1520, IRB 1600, IRB1660ID	OmniCore C30 Type A	B3
	OmniCore C90XT Type A	
CRB 15000-5/0.95	OmniCore C30	D7
CRB 15000-5/0.95	OmniCore C30 Type A	

Continues on next page

## 2 Controller description

### 2.2 Technical data for OmniCore C90XT Type A controller *Continued*

Manipulator	Controller	Drive system type
CRB 15000-10/1.52	OmniCore C30	D10
CRB 15000-10/1.52	OmniCore C30 Type A	
CRB 15000-12/1.27	OmniCore C30	
CRB 15000-12/1.27	OmniCore C30 Type A	



#### Note

Controllers with different drive systems are not interchangeable.

## 2 Controller description

### 2.3 Safety functions and safety related data for OmniCore C90XT Type A

### 2.3 Safety functions and safety related data for OmniCore C90XT Type A



#### Note

During the mission time, the three-position enabling device on the FlexPendant can handle a maximum demand rate of 10 x 7d x 52w x 20y operations; the emergency stop on the FlexPendant can handle a maximum demand rate of 4 x 7d x 52w x 20y operations.

#### Overview

The OmniCore C90XT Type A provides safety with structure *category 3* with performance level *d* according to EN ISO 13849-1. This fulfils the safety performance requirement as stated in the robot safety standard EN ISO 10218-1.

The safety data is valid for the Basic Safety Functions and extended safety functions for applicable ABB manipulators. The supported manipulators are listed in *Product specification - OmniCore C line*.

For configuration of basic safety functions, see *Application manual - Functional safety and SafeMove, 3HAC066559-001*.



#### Note

When additional drive units are installed, the PFH<sub>D</sub> value shall be increased by 4.29E-08 for each drive.

For detailed information, see [Basic Safety Functions on page 46](#) and [Extended Safety Functions on page 47](#).

#### Basic Safety Functions

Description	PFH <sub>D</sub> [1/hour]
Emergency stop function of the robot initiated by emergency stop device on the FlexPendant	1.73E-07
Protective stop function of the robot initiated by three-position enabling device on the FlexPendant	1.73E-07
Mirror emergency stop state of the robot through emergency status output of the controller	4.29E-07
Emergency stop function of the robot initiated by external emergency stop device attached to emergency stop inputs of the controller	1.73E-07
Automatic stop function of the robot initiated by external protective stop device attached to automatic stop inputs of the controller	1.73E-07
General stop function of the robot initiated by external protective stop device attached to general stop inputs of the controller	1.73E-07
Safe Disable of Drive Unit, safety function which can be initiated when the robot is in any mode, resulting in the removal of power to actuator(s) and brake(s) attached to the selected drive unit. Initiation is through a dedicated command on a Safe Protocol.	1.73E-07

*Continues on next page*

#### Extended Safety Functions

For extended safety functions, see *Application manual - Functional safety and SafeMove, 3HAC066559-001* and the corresponding application manual for protocols PROFINET/PROFIsafe and EtherNet/IP, CIP safety.

Description	PFH <sub>D</sub> [1/hour]
Emergency stop which can be initiated through a safety protocol.	1.73E-07
Protective stops which can be initiated through a safety protocol.	1.73E-07
Axis position supervision	2.16E-07
Axis speed supervision	2.16E-07
Tool position supervision	2.16E-07
Tool speed supervision	2.16E-07
Tool orientation supervision	2.16E-07
Stand still supervision	2.16E-07

#### Related information

[Safety data on page 16](#)

## 2 Controller description

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### 2.4 The unit is sensitive to ESD

### 2.4 The unit is sensitive to ESD

---

#### Description

ESD (electrostatic discharge) is the transfer of electrical static charge between two bodies at different potentials, either through direct contact or through an induced electrical field. When handling parts or their containers, personnel not grounded may potentially transfer high static charges. This discharge may destroy sensitive electronics.

#### Safe handling

Use one of the following alternatives:

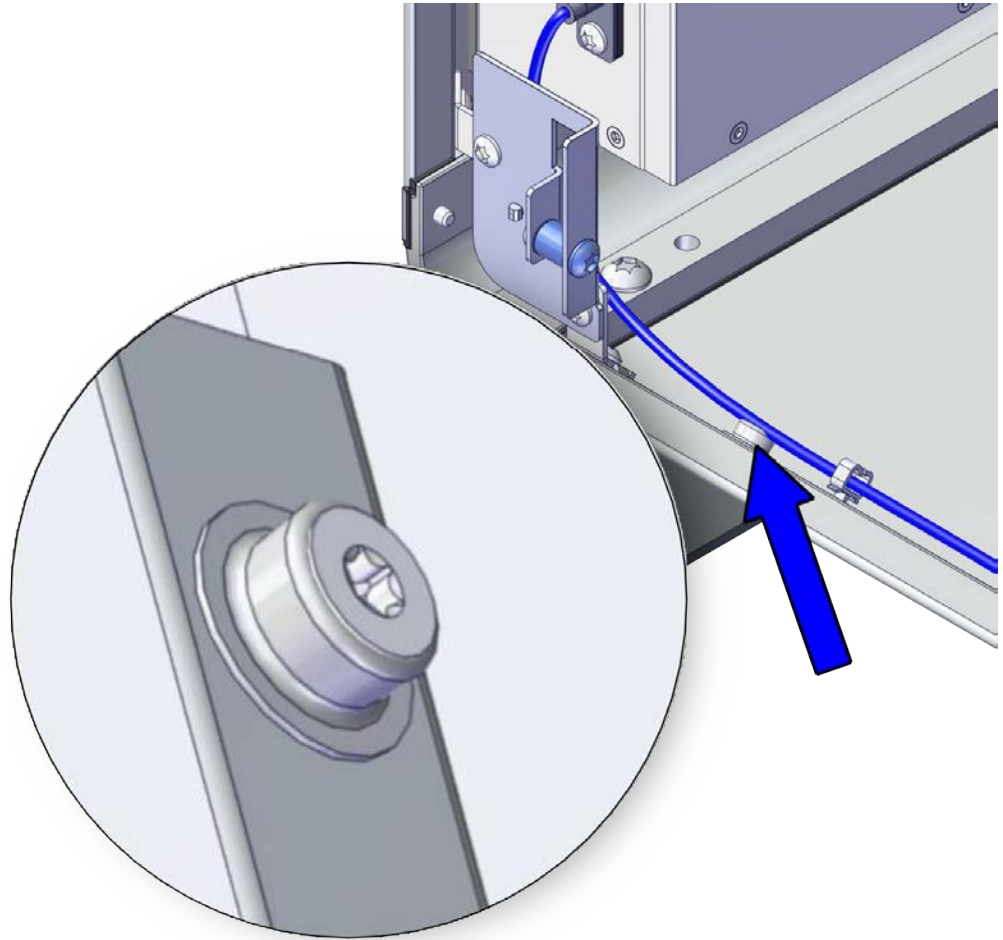
- Use a wrist strap. The wrist strap button is located inside the controller.  
Wrist straps must be tested frequently to ensure that they are not damaged and are operating correctly.
- Use an ESD protective floor mat.  
The mat must be grounded through a current-limiting resistor.
- Use a dissipative table mat.  
The mat should provide a controlled discharge of static voltages and must be grounded.

*Continues on next page*



### Wrist strap button

The location of the wrist strap button is shown in the following illustration.



xx1900001446

## 2 Controller description

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### 2.5 Handling of FlexPendant

## 2.5 Handling of FlexPendant

---

### Detached FlexPendant

A FlexPendant that is not connected to the robot must be stored out of sight so that it cannot be mistaken for being in use.

---

### Handling and cleaning

- The FlexPendant may only be used for the purposes mentioned in this manual.
- Always use the hand-strap while holding the FlexPendant.
- Handle with care. Do not drop, throw, or give the FlexPendant strong shock. It can cause breakage or failure.
- If the FlexPendant is subjected to shock, always verify that the safety functions (three-position enabling device and emergency stop) work and are not damaged.
- Always use and store the FlexPendant in such a way that the cable does not become a tripping hazard.
- When not using the device, place it in its holder.
- Never use sharp objects (such as screwdriver or pen) for operating the touch screen. This could damage the touch screen. Instead use your finger or a stylus.
- Never clean the FlexPendant with solvents, scouring agent, or scrubbing sponges.  
See the product manual for the robot controller, section *Cleaning the FlexPendant*.
- Always close the protective cap on the USB port when no USB device is connected. The port can break or malfunction if exposed to dirt or dust.
- Do not squeeze and thus damage the cable.
- Do not lay the cable over sharp edges.



#### CAUTION

The FlexPendant touch screen is made of glass. If the device is dropped on a hard surface or receives a significant impact the glass could break. To reduce the risk of cuts if the glass chips or cracks, do not touch or attempt to remove the broken glass.

---

### FCC statement

Changes or modification to the FlexPendant not expressly approved by ABB will void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1 This device may not cause harmful interference, and
- 2 This device must accept any interference received, including interference that may cause undesired operation.

## 2.6 Network security

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### Network security

This product is designed to be connected to and to communicate information and data via a network interface. It is your sole responsibility to provide, and continuously ensure, a secure connection between the product and to your network or any other network (as the case may be).

You shall establish and maintain any appropriate measures (such as, but not limited to, the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB Ltd and its entities are not liable for damage and/or loss related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

## 2 Controller description

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### 2.7 Open source and 3rd party components

### 2.7 Open source and 3rd party components

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#### Open source and 3rd party components

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#### RobotWare

For RobotWare, there is license information in the folder \licenses in the RobotWare distribution package.

#### OpenSSL

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<http://www.openssl.org/>)

This product includes cryptographic software written by Eric Young ([ey@cryptsoft.com](mailto:ey@cryptsoft.com)).

This product includes software written by Tim Hudson ([tjh@cryptsoft.com](mailto:tjh@cryptsoft.com)).

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#### CTM

For OleOS, the Linux based operating system used on the conveyor tracking module (CTM), a list of copyright statements and licenses is available in the file `/etc/licenses.txt` located on the CTM board and accessible via the console port or by downloading the file over SFTP.

For the CTM application, a list of copyright statements and licenses is available in the file `/opt/ABB.com/ctm/licenses.txt` located on the CTM board and accessible via the console port or by downloading the file over SFTP.

## 2.8 ABB Connected Services



#### Note

The content of this section is only available in English.



#### Note

ABB Connected Services is the new name for the functionality previously known as ABB Ability. During a period of time, both names will appear in and on our products.

The OmniCore™ controller hardware is delivered with a standard mobile connection (Cellular data connection), or WIFI modem and/or Ethernet connection.

### Cellular data connection

If the ABB Connected Services™ OmniCore™ controller hardware is delivered together with a standard, free of charge (machine-to-machine or M2M) cellular data connection, it will automatically establish a connection to the ABB Connected Services™ digital platform once the power switch of the ABB Connected Services™ OmniCore™ controller hardware has been turned on and has been connected. After the establishment of the connection there will be a data flow from the OmniCore™ controller hardware to the ABB Connected Services™ digital platform.

ABB does not warrant or guarantee an available, stable, uninterrupted, and interference free connection through the standard cellular data connection. This is dependent on the availability and quality of the cellular data signal as provided by the telecommunications carrier on the location where the ABB Connected Services™ OmniCore™ hardware is installed. The cellular data connection is to be used solely in connection with the ABB Connected Services™ OmniCore™ controller hardware and excludes, without limitation, voice services, web browsing, music downloading and other services that are not traditionally considered as machine to machine (M2M), but human-oriented telecommunication services.

ABB has established and maintains a formal information and cybersecurity procedures which includes commercially reasonable technical and organizational measures, in order to protect the data against security breaches, accidental or unlawful destruction, loss, alteration, and unauthorized disclosure of, or access to the data.

The cellular data connection is not required for the operation of the hardware and the connectivity settings can be adjusted and turned off at any given time. Detailed information on the mobile connection is further described in the service description that can be downloaded from the following web location:

<https://share.library.abb.com/api/v4?cid=9AAC910011&dk=Manual>

*Continues on next page*

## 2 Controller description

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### 2.8 ABB Connected Services

*Continued*

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#### FCC statement



#### Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Operation is subject to the following conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by ABB could void the user's authority to operate the equipment under FCC rules. When the optional connectivity module is installed, the operating conditions must be such that there is a minimum separation distance of 20 cm between the dedicated antenna and nearby persons or other antennas. An intentional radiator may be operated only with the antenna which it is authorized for and accepted by ABB.

The product may be equipped with a connectivity module for 3G or for Wi-Fi as an option.

The product may be equipped with a connectivity module for 4G or for Wi-Fi as an option.

- The 3G option contains FCC ID: XMR201510UC20 by courtesy of Quectel
- The 4G option contains FCC ID: XMR201909EC21AUX by courtesy of Quectel
- The Wi-Fi option contains FCC ID: Z64-WL18SBMOD by courtesy of Texas Instruments

ABB legal contacts for FCC:

John Bubnikovich, ABB Robotics, 1250 Brown Road, Auburn Hills, MI 48326 USA,  
john.bubnikovich1@us.abb.com

Ed Marchese, ABB Robotics, 1250 Brown Road, Auburn Hills, MI 48326 USA,  
ed.marchese@us.abb.com

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#### Data

ABB will not acquire any right, title and interest in the data other than the rights granted by Customer to ABB, but ABB will have the right to collect, store, aggregate, analyze or otherwise use the data for (i) providing and maintaining the hardware, services and/or the ABB software to Customer; (ii) preventing, detecting and repairing problems related to the security and/or the operation of the hardware, the platform, software; (iii) improving and developing existing services, technologies, products and/or software and developing new services, technologies, products and/or software, and all improvements and developments (including all resulting intellectual property Rights) are exclusively owned by us. In addition, we have the right to use the data for benchmarking purposes if and to the extent it is anonymized or non-confidential.

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#### ABB Connected Services™

For as far as the robot installation includes ABB Connected Services™, this agreement is entered pursuant to and governed by the ABB Connected Services™ General Terms and Conditions.

ABB Connected Services™ Terms and Conditions:

<https://ability.abb.com/terms>

Special Terms and Conditions for ABB Connected Services™:

<https://new.abb.com/products/robotics/service/robot-registration>

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## 3 Installation and commissioning

### 3.1 Introduction to installation and commissioning

#### General

This chapter contains assembly instructions and information for installing the OmniCore C90XT Type A at the working site.

See also the product manual for the manipulator.

The installation must be done by qualified installation personnel in accordance with the safety requirements set forth in the applicable national and regional standards and regulations.

The technical data is detailed in section [Technical data for OmniCore C90XT Type A controller on page 38](#).

#### Safety information

Before any installation work is commenced, all safety information must be observed. There are general safety aspects that must be read through, as well as more specific safety information that describes the danger and safety risks when performing the procedures. Read the chapter [Safety on page 15](#) before performing any installation work.



#### Note

Always connect the OmniCore C90XT Type A and the robot to protective earth and residual current device (RCD) before connecting to power and starting any installation work.

## 3 Installation and commissioning

### 3.2 Installation activities

### 3.2 Installation activities

#### Main steps for installing the controller

Use the following main steps to install and connect the controller.

	Action	Described in
1	Unpack the controller.	<a href="#">Unpacking the controller on page 61.</a>
2	Place the controller in position and bolt it to the ground.	<a href="#">On-site installation on page 63.</a>
3	Connect the manipulator to the controller.	<a href="#">Connecting the manipulator to the controller on page 84.</a>
4	Attach the FlexPendant to the controller.	<a href="#">Attaching the FlexPendant on page 94</a>
5	Install an external circuit breaker or fuse.	<a href="#">Connecting incoming mains and protective earth to the controller on page 88</a>
6	Connect the cabinet to protective earth.	<a href="#">Connecting incoming mains and protective earth to the controller on page 88</a>
7	Install a residual current device (RCD).	<a href="#">Connecting incoming mains and protective earth to the controller on page 88</a>
8	Connect incoming mains to the controller.	<a href="#">Connecting incoming mains and protective earth to the controller on page 88</a>
9	Connect safeguards to the controller.	
10	Connect, for example, Ethernet, PC, and other connections.	How to connect industrial networks, for example PROFINET, is described in the respective application manual. How to connect to a network and a PC is described in section <a href="#">Ethernet networks on OmniCore on page 95</a> . See also <i>Operating manual - RobotStudio</i> . See also <a href="#">Descriptions for connectors on page 96</a> .
11	Connect the antenna for Connected Services.	<a href="#">Connecting the Connected Services antenna on page 74.</a>
12	Install options and add-ons (optional).	
13	Initial test before commissioning.	<a href="#">Initial test before commissioning on page 171.</a>



#### Note

If the controller replaces another OmniCore controller, see *Operating manual - Integrator's guide OmniCore* for descriptions of how to transfer software configurations (controller software recovery).

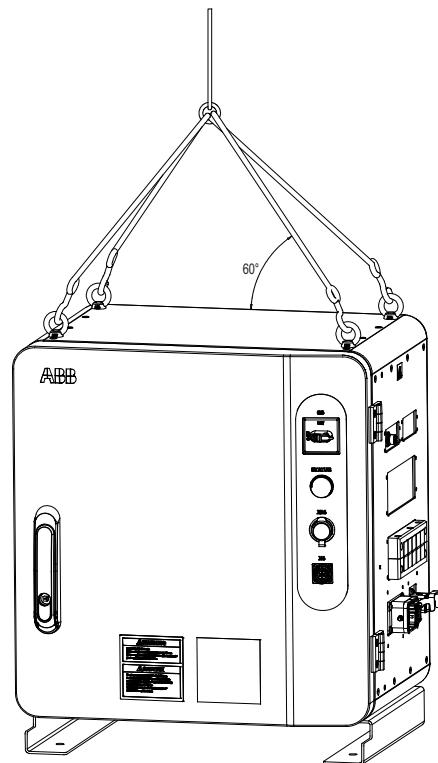
## 3.3 Transporting and handling

### 3.3.1 Lifting the controller cabinet

#### Lifting device

Use the four lifting eyes M8 (Torque: 11.3 Nm-12.6 Nm) or a forklift when lifting the controller, as shown below.

The following figure shows the maximum angle between the lifting straps when lifting the controller. The weight of the controller module is detailed in section [Weight on page 41](#).



xx1900001445



#### Note

After removing the lifting lock, tighten the plastic screws (Torque: 0.8 Nm-1 Nm) for the controller cabinet.



#### WARNING

When lifting and transporting the cabinet using a forklift, the cabinet door must be closed to avoid tilting.

*Continues on next page*

## 3 Installation and commissioning

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### 3.3.1 Lifting the controller cabinet

*Continued*




#### **WARNING**

Stacked cabinets must be lifted separately. Use a suitable lifting accessory to avoid injury to personnel!

### 3.3.2 Unpacking

#### Unpacking the controller

	Action
1	Make a visual inspection of the packaging and make sure that nothing is damaged.
2	Remove the packaging.
3	Check for any visible transport damage.  <b>Note</b> Stop unpacking and contact ABB if transport damage is found.
4	Clean the unit with a lint-free cloth, if necessary.
5	Make sure that the lifting accessory used (if applicable) is suitable to handle the weight of the controller.
6	If the controller is not installed directly, it must be stored as described in <a href="#">Transportation and storage conditions on page 41</a> .
7	Make sure that the expected operating environment of the controller conforms to the specifications as described in <a href="#">Operating conditions on page 41</a> .
8	The controller can be taken to its installation site as described in section <a href="#">On-site installation on page 63</a> .

## 3 Installation and commissioning

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### 3.3.3 Storing

### 3.3.3 Storing

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#### Storing the controller

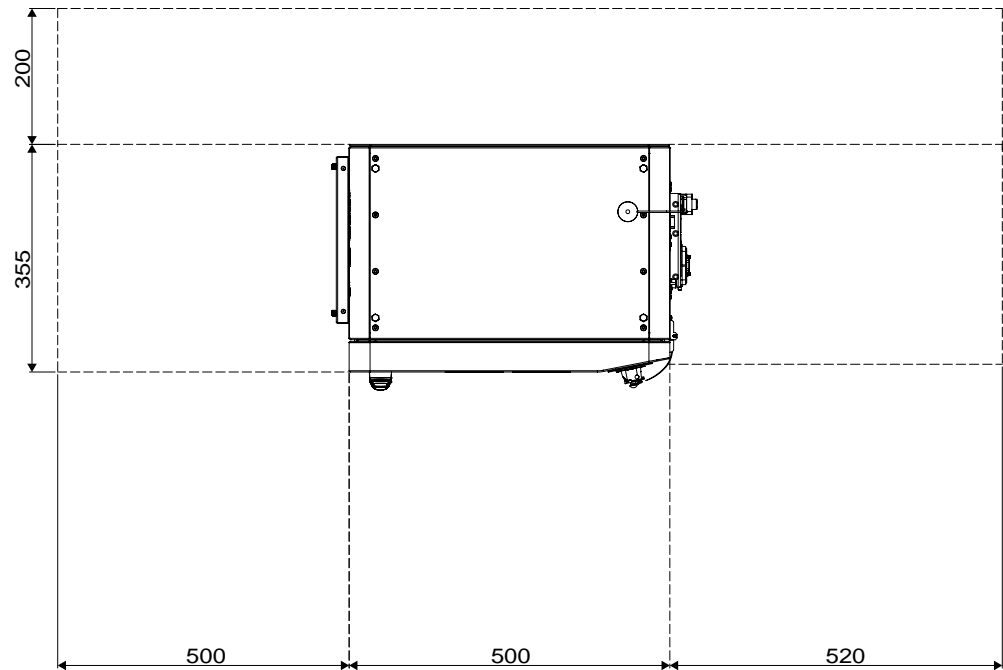
For storing, see [Transportation and storage conditions on page 41](#).

## 3.4 On-site installation

### 3.4.1 Required installation space

#### Dimensions

The following illustration shows the required installation space for the OmniCore C90XT Type A controller.



xx1900001448

a)	Not required if the controller is rack-mounted
----	--

- A free space of 500 mm on the front of the controller is required if the controller is mounted on a desk (not rack-mounted).
- A free space of 200 mm on the back of the controller is required if the controller is mounted on a desk (not rack-mounted).
- A free space of 500 mm on the left side of the controller is required if the controller is mounted on a desk (not rack-mounted). Do not place any cables over the left cover as it leads to inefficient cooling.
- A free space of 520 mm on the right sides of the controller is required if the controller is mounted on a desk (not rack-mounted). Do not place any cables over the right covers as it leads to inefficient cooling.

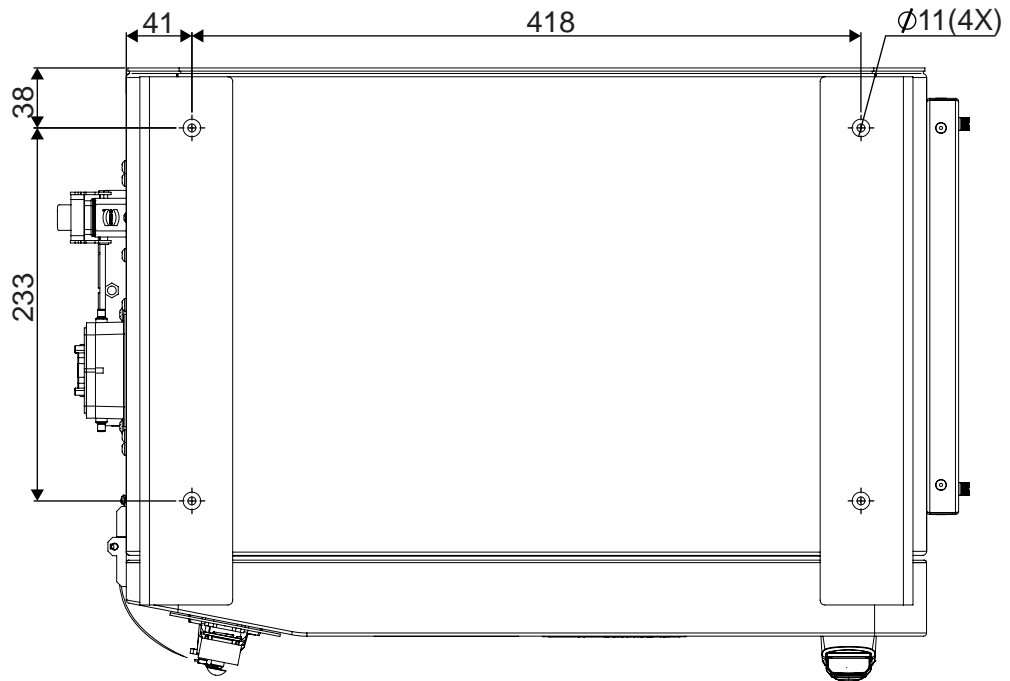
*Continues on next page*

## 3 Installation and commissioning

### 3.4.1 Required installation space

Continued

The following illustration shows the dimensions between the feet of the OmniCore C90XT Type A controller, as seen from below.



xx1900001449

The feet will be used for positioning and fastening.

Mounting requirements:

- Anchor bolts: M8 X 4
- Tightening torque: 11.3 Nm-12.6 Nm
- Maximum flatness deviation of the installation plane: 8 mm



#### Note

Fix the controller to a concrete foundation or steel platform with anchor bolts during stacking.



#### Note

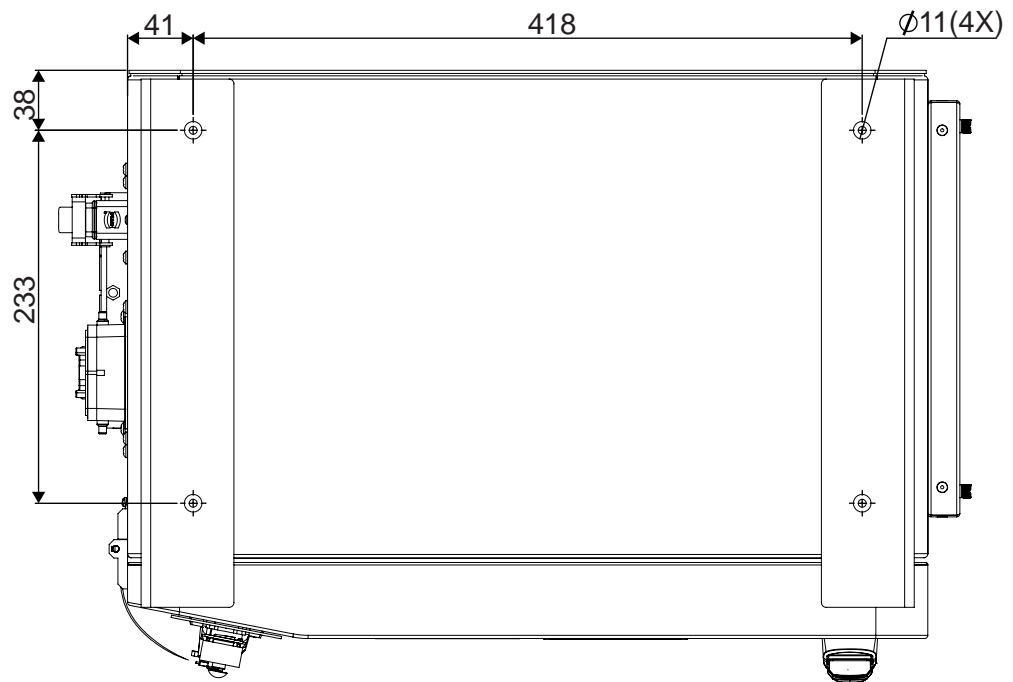
According to IEC60204-1, when the power inlet switch is used as the power supply disconnecting device, the cabinet shall be installed in a manner that the power inlet switch is easily accessible and located between 600 mm and 1,900 mm above the servicing level. An upper limit of 1,700 mm is recommended.



#### 3.4.2 Securing and stacking the controller cabinet

##### Securing the controller

The controller can be secured to the ground. The figure below shows the bolt pattern for the OmniCore C90XT Type A controller. The diameter of the four bolt holes are 14 mm.



xx1900001449

##### Stacking the controller

The OmniCore C90XT Type A controller is designed so that a maximum of three controllers can be stacked on top of each other. The controllers must be safely fixed to each other, and it must be assured that the opened door on the upper controller does not cause imbalance.



##### CAUTION

The stacked cabinets must be secured to the floor accordingly.



##### CAUTION

The stacked cabinets must not tilt more than 10 degrees.



##### Note

For lifting restrictions regarding stacked cabinets, see [Lifting the controller cabinet on page 59](#).

*Continues on next page*

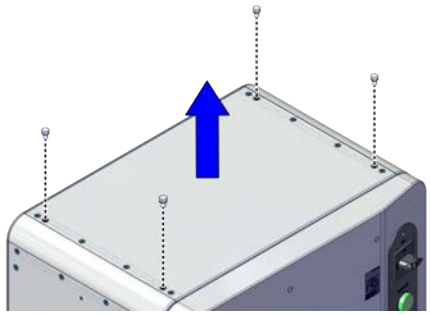
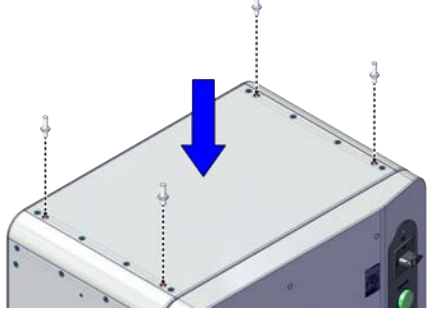
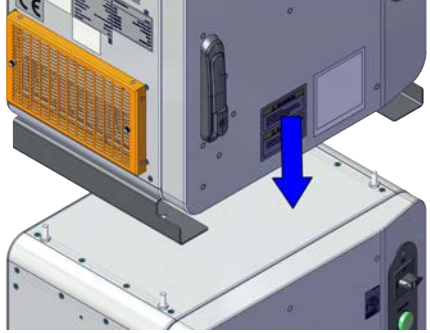
### 3 Installation and commissioning

#### 3.4.2 Securing and stacking the controller cabinet

*Continued*

#### Procedure

Use this procedure to stack the a controller onto another controller.


	Action	Info/illustration
1	Remove the four screws on top of the controller.	 xx2200002032
2	Install the mounting bolts.	 xx2200002033
3	Place the upper controller with locating on the bolts.	 xx2200002034

*Continues on next page*

### 3 Installation and commissioning

#### 3.4.2 Securing and stacking the controller cabinet

*Continued*

	Action	Info/illustration
4	Tighten and lock the controllers with the bolts and nuts.	 <p data-bbox="986 719 1098 741">xx2200002035</p> <p data-bbox="986 757 1353 790">Tightening torque: 5.5 Nm±10%.</p>

## 3 Installation and commissioning

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### 3.4.3 Mounting the FlexPendant holder

### 3.4.3 Mounting the FlexPendant holder



#### Note

To avoid dropping the FlexPendant from height, the holder should be placed in a comfortable working height.

Always use and store the FlexPendant in such a way that the cable does not become a tripping hazard.

When not using the device, place it so it does not accidentally fall.

---

#### Required equipment

Equipment	Spare part number	Note
Standard toolkit		See <a href="#">Standard toolkit for controller on page 430</a> .
FlexPendant Holder w/t E-stop cover	3HAC064927-001	



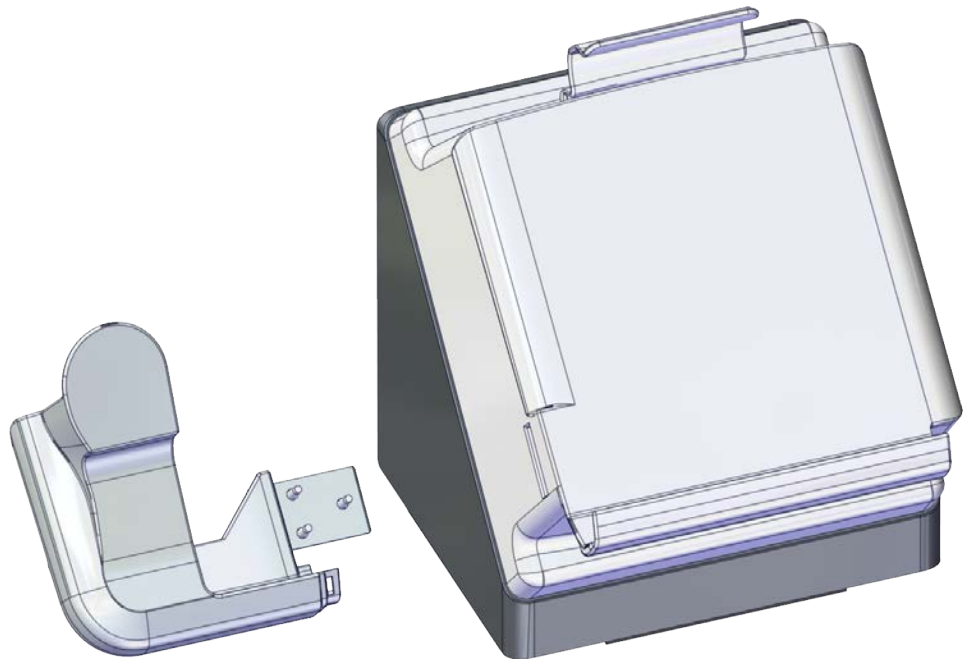
#### Note

The FlexPendant should always be placed in the holder when it is not used and it is not allowed to use by unauthorized person.

*Continues on next page*

#### Mounting the bracket for the emergency stop on the FlexPendant holder

The FlexPendant holder is shipped without the bracket for the emergency stop assembled to the holder. They are separated as two parts. To avoid confusion between active and inactive emergency stop devices, this manually-applied covering should be used when the FlexPendant is detached.



xx2100000767

Use this procedure to mount the bracket for the emergency stop to the FlexPendant holder.

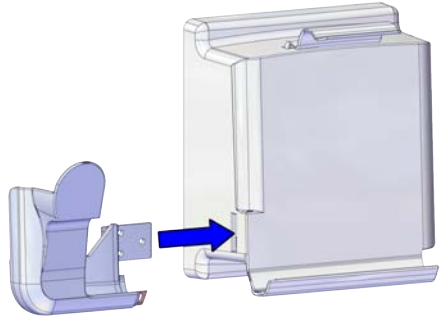


	Action	Note/illustration
1	Remove the four screws.	<p>xx2000002356</p>
2	Separate the rear part from the FlexPendant holder.	

*Continues on next page*

### 3 Installation and commissioning

#### 3.4.3 Mounting the FlexPendant holder

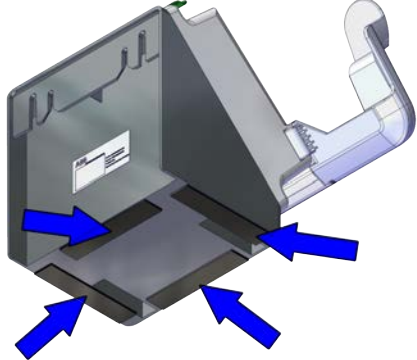

Continued

	Action	Note/illustration
3	Insert the bracket into the FlexPendant holder.	 xx2100000765
4	Secure with the screws.	<p>Screws: BN33 Phillips pan head tapping screw ST2.9x13 (3 pcs) Tightening torque: 6 Nm-7.8 Nm</p>  xx2100000766
5	Refit the rear part and secure with the screws.	<p>Screws: BN33 Phillips pan head tapping screw ST3.5x16 (4 pcs) Tightening torque: 9.4 Nm-12.2 Nm</p>  xx2000002356

Continues on next page

#### Mounting the FlexPendant holder onto a flat surface (Horizontally)

Use this procedure to mount the FlexPendant holder onto a flat surface, like the top of the controller or a desktop.

	Action	Note/illustration
1	Clean the surface and make sure it is dry.	
2	Remove the protective liner from the tape.	 <p>xx2000002352</p>
3	Press the holder onto the desired place.	 <p>xx2000002353</p>

#### Hanging the FlexPendant holder with the bracket

Use this procedure to hang the FlexPendant holder on any place that can hold the bracket, like the door of the equipment.



**Tip**

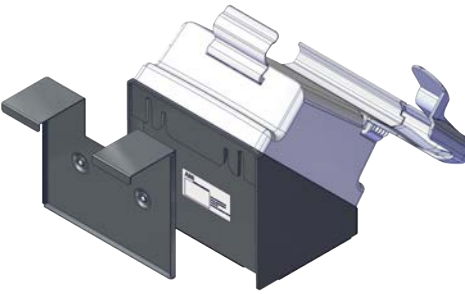
The bracket is included on delivery.

*Continues on next page*

### 3 Installation and commissioning


#### 3.4.3 Mounting the FlexPendant holder

*Continued*

	Action	Note/illustration
1	Hang the FlexPendant holder to the bracket according to the screws on the bracket.	 xx2000002354
2	Hang the holder with the bracket to the desired place.	

#### Hanging the front part of the FlexPendant holder with screws (Vertically)

Use this procedure to hang the front part of the FlexPendant holder to the desired place.

	Action	Note/illustration
1	Remove the four screws.	 xx2000002356
2	Separate the rear part from the FlexPendant holder.	
3	Clean the surface and make sure it is dry.	

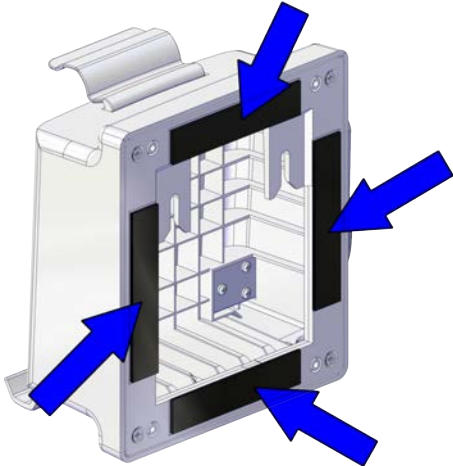
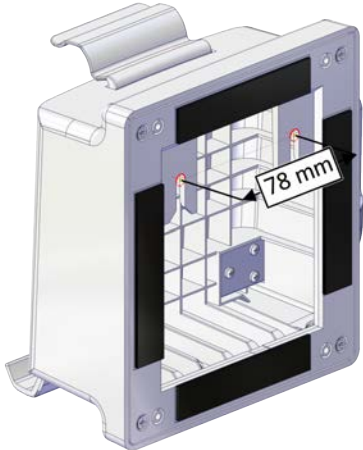
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### 3 Installation and commissioning

#### 3.4.3 Mounting the FlexPendant holder

*Continued*


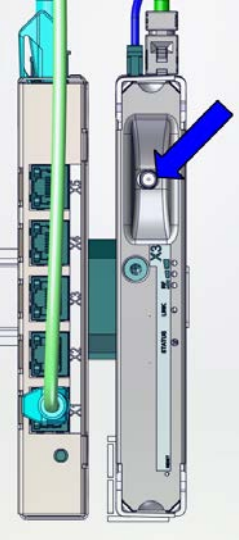
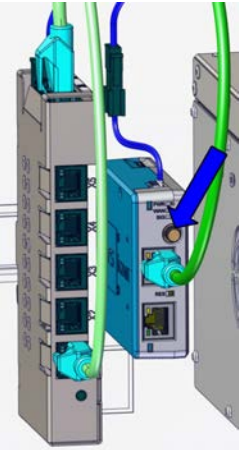
	Action	Note/illustration
4	Remove the protective liner from the tape.	 <p>xx2000002357</p>
5	Press the holder onto the desired place.	
6	Use two M5 screws to secure the holder.	 <p>xx2000002358</p>

### 3 Installation and commissioning

#### 3.4.4 Connecting the Connected Services antenna

#### 3.4.4 Connecting the Connected Services antenna

##### Connect the Connected Services antenna

	Action	Note/Illustration
1	Place the magnet part of the antenna on the outside of the cabinet.	 <b>Note</b> The operating conditions must be such that there is a minimum separation distance of 20 cm between the dedicated antenna and nearby persons.
2	Apply cable ties and suitable cable protection to ensure that the cable may not be damaged by the door.	
3	Connect the antenna cable to the Connected Services gateway by rotating the connector.	 xx2300001642  xx2300000672

## 3.5 Electrical connections

### 3.5.1 Connectors on the OmniCore C90XT Type A controller

#### General

The following section describes the connectors on the covers of the OmniCore C90XT Type A controller.

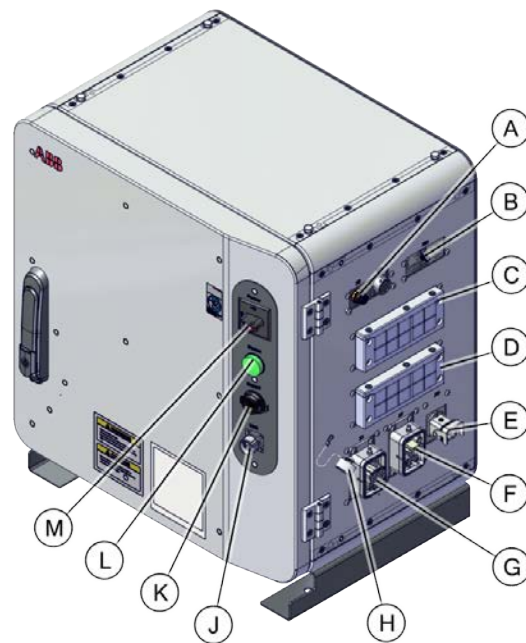


#### CAUTION

Always inspect the connector for dirt or damage before connecting it to the controller. Clean or replace any damaged parts.

#### Connectors

The following details the connection interface on the OmniCore C90XT Type A controller.



xx2400001320

	Description
A	Manipulator signal connector
B	Antenna connector
C	Cable grommet assembly (option)
D	Cable grommet assembly
E	Power inlet connector
F	ADU connector
G	Motor connector

*Continues on next page*

### 3 Installation and commissioning

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#### 3.5.1 Connectors on the OmniCore C90XT Type A controller

*Continued*

	Description
H	TPU cover
J	FlexPendant connection (TPU connector)
K	ETH outlet connector
L	Motors on lamp
M	Power inlet switch

### 3.5.2 Connecting cables to the controller

#### General

A good and proper electrical installation of the robot system is necessary to ensure the best performance and prolong the lifetime of the whole robot system.

This section includes important information on how to connect cables and signals to the controller.

#### Signal classes

Different rules apply to the different classes when selecting and laying cables. Signals from different classes must not be mixed.

Signal class	Description
Power signals Class 4 (noisy)	Supplies external motors and brakes. Applies to the cables associated with the power inputs and outputs of variable speed drives. Cables carrying strongly interfering signals such as motor cables, DC-link load sharing, unsuppressed inductive loads, DC motors, welding equipment, etc.
Control signals Class 3 (slightly noisy)	Digital operating and data signals (digital I/O, protective stop, etc.). Applies to cables carrying slightly interfering signals: AC power supply (<1 kV), DC power (24 V), power to equipment with RFI/EMI filters, control circuits with resistive or suppressed inductive loads (such as contactors and solenoids), direct-on-line induction motors, etc.
Measurement signals Class 2 (slightly sensitive)	Analog measurement and control signals (resolver and analog I/O). This class covers ordinary analogue signals such as analogue signals (4-20 mA, 0-10V, or signals below 1 MHz), low-speed digital signals (RS232, RS485), digital (on/off) signals, limit switches, encoders, etc.
Data communication signals Class 1 (sensitive)	Gateway (fieldbus) connection, computer link. Applies to cables carrying very sensitive signals. Signals with a full-scale range less than 1 V or 1 mA, and/or a source impedance >1 kOhm, and/or a signal frequency >1 Mhz. For example high-speed digital communication (Ethernet), thermocouples, thermistors, strain gauges and flowmeters.

#### Selecting cables

All cables laid in the control cabinet must be capable of withstanding 70 °C. In addition, the following rules apply to the cables of certain signal classes:

Signal class	Cable type
Power signals	Shielded cable with an area of at least 0.75 mm <sup>2</sup> or AWG 18.
Control signals	Shielded cable.
Measurement signals	Shielded cable with twisted pair conductors.
Data communication signals	Shielded cable with twisted pair conductors. A specific cable should be used for field bus connections and Ethernet, according to the standard specification of the respective bus.

*Continues on next page*

### 3 Installation and commissioning

#### 3.5.2 Connecting cables to the controller

Continued



#### Note

Any local standards and regulations concerning insulation and area must always be complied with.

#### AC current in CP/CS

For specific applications where the correct cable dimensioning can depend on the relationship between the period of the duty cycle and the thermal time constant of the cable (for example, starting against high-inertia load, intermittent duty), the cable manufacturer can provide information.

Country specific norms have to be included.

The wire is not dimensioned to take care of starting motors or transformers.

The following table shows how much AC current can be supplied with a specific temperature, and the wire size.

Wire size (mm <sup>2</sup> //AWG)	AC current			
	40° C//104F	45° C//113F	50° C//122F	52° C//125.6F
Single wire 0.2//24	4.5	4.1	3.7	3.2
Multi wire 2 pair 0.2//24	3.6	3.3	3.0	2.6
Multi wire 4 pair 0.2//24	2.9	2.7	2.4	2.1
Multi wire 6 pair 0.2//24	2.6	2.3	2.1	1.8
Multi wire 9 pair 0.2//24	2.3	2.0	1.8	1.6
Single wire 0.5//20	7.9	7.2	6.5	5.6
Multi wire 2 pair 0.5//20	6.3	5.8	5.2	4.5
Multi wire 4 pair 0.5//20	5.1	4.7	4.2	3.6
Multi wire 6 pair 0.5//20	4.5	4.1	3.7	3.2
Multi wire 9 pair 0.5//20	4.0	3.6	3.2	2.8
Single wire 0.75//18	9.5	8.6	7.8	6.7
Multi wire 2 pair 0.75//18	7.6	6.9	6.2	5.4
Multi wire 4 pair 0.75//18	6.2	5.6	5.1	4.4
Multi wire 6 pair 0.75//18	5.4	4.9	4.4	3.8
Multi wire 9 pair 0.75//18	4.8	4.3	3.9	3.4
Single wire 1.0//17	11.0	10.0	9.0	7.8
Multi wire 2 pair 1.0//17	8.8	8.0	7.2	6.2
Multi wire 4 pair 1.0//17	7.2	6.5	5.9	5.1
Multi wire 6 pair 1.0//17	6.3	5.7	5.1	4.5
Multi wire 9 pair 1.0//17	5.5	5.0	4.5	3.9
0.75//18 three phase	8.6	7.8	7.1	5.6
1.0//17 three phase	10.3	9.4	8.4	6.7

Continues on next page

#### Route the cables

Routing of cables shall be done in a professional way.

- Cables of different classes, such as signal cables and power cables, must not be routed together as the power cables may introduce noise in the signal cables. The greater the separation distance, the lesser the risk for interference between the cables.
- Robot controller mains supply input cable and robot power cable should be separated even though they belong to the same class.
- If crossing cables from different classes, cables should cross at an angle close to 90 degrees.
- All external cables that are to be connected inside the controller must be shielded in the chassis before entering the cabinet.

Separation distances can be reduced if e.g. dividers are used between cables classes. Manufacturers of cable duct systems can provide information on how reduced separation distances can be achieved using their specific products.

Signal class	Cable type
Power signals	<ul style="list-style-type: none"> <li>• These signals generate a lot of interference and must be laid separate from control, measurement, and communication signals.</li> <li>• The shielding must be connected to a paint-free part of the panel chassis of the cabinet at both ends of the cable. Any unshielded cable must be as short as possible.</li> <li>• The manipulator power cables are routed on the floor and along the left side of the controller cabinet.</li> <li>• Cables should not be wound up like coils. This could cause an magnetic field disturbing the signals. There will also be a risk of overheating depending on the load.</li> </ul>
Control signals	<ul style="list-style-type: none"> <li>• These signals are very sensitive to interference. To protect these signals they should not be laid along with the power signals.</li> <li>• In the cable, each signal must be twisted with a neutral wire.</li> <li>• The shielding must be connected directly to the chassis at both ends of the cable.</li> </ul>
Measurement signals	
Data communication signals	

#### Shielding cables

When peripheral devices are connected to the robot system, a shielded cable is necessary to reduce coupling of the inner cable conductors to the environment they pass through.

#### Shielding cable requirements

- The best method for shielding is to ground the shield at both ends of the cable, provided the ends grounding are at the same potential.
- If the grounding points have different electric potentials - grounding both ends will create a ground loop allowing unwanted current to flow in the shield. In such cases one end grounding may be used. The grounding point should then be at the robot controller side.
- Cables carrying analog low-level signals is another exception where the shield should be grounded at only one end.

*Continues on next page*

## 3 Installation and commissioning

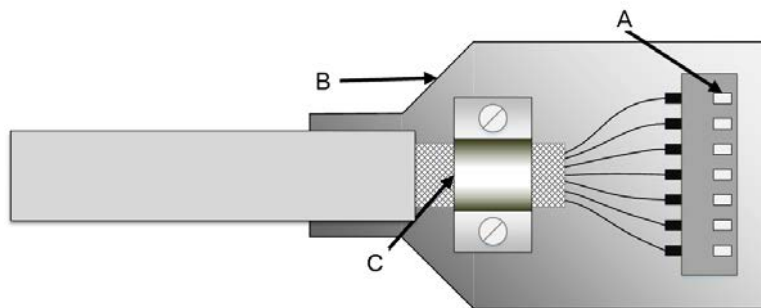
### 3.5.2 Connecting cables to the controller

*Continued*

- Most data network and field bus types have defined grounding topologies. If such grounding schemes exist, they should be followed.
- In complex interference environments, two-layer shielding may be required. The inner shield should be grounded at the controller side only end and the outer shield should be grounded at both ends. The optimum shielding is a combination of foil and braid screens.
- The best connection is one in which the shielding is extended up to and makes a solid 360° connection (shown below) with the ground plane or chassis.

#### Shielding example

The below example shows the shielding of a d-type connector:



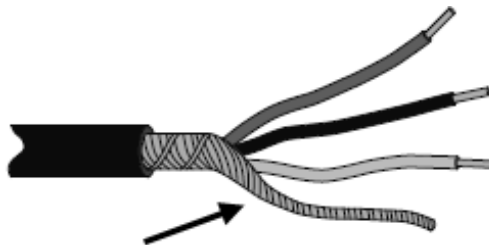
xx1700001320

- A A dimpled connector body makes multiple bonds to the mating connector body all around its periphery, 360° bonding.
- B Metal, or metallized, back shell makes 360° bond to the connector body.
- C The cable shield is exposed and 360° clamped to the back shell. A tight fit is a must.

Many other 360° bonding methods and types of 360° shielded connectors are also acceptable.

#### Shield pigtail termination

Shield pigtail termination, as shown below, shall be avoided. If a pigtail connection cannot be avoided, make it as short as possible.



xx1700001321

*Continues on next page*



#### Ground and screen connections

The task of the grounding system is twofold - protective and functional. The primary task is to serve as protective earth (PE) for personal and equipment safety. The secondary task is to serve as a return path for common mode current.

For further information refer to EN 60204-1 and UL 1740.

#### Grounding requirements

The controller cabinet ground must come from the mains power supply PE.

- The grounding cable color shall be green-yellow.
- The ground for the controller cabinet, robot manipulator and peripheral devices must be the same, preferably an equipotential ground grid (mesh).
- Ground connection points must have stable inter-metallic bonding, like screw fixation. Paint, dirt, rust, and other insulating material must be removed from the contacting surfaces.

For requirements on the marking of the supply ground connection inside the control cabinet refer to UL 508C. For further details on how grounding systems should be designed refer to IEC 61000-5-2. For details of cross-sectional area of PE refer to IEC 60204-1.

#### Grounding installation

For information on how to connect protective earth to the OmniCore controller cabinet, see [Connecting incoming mains and protective earth to the controller on page 88](#).

For information on how to connect protective earth for the manipulator, see the corresponding product manual.

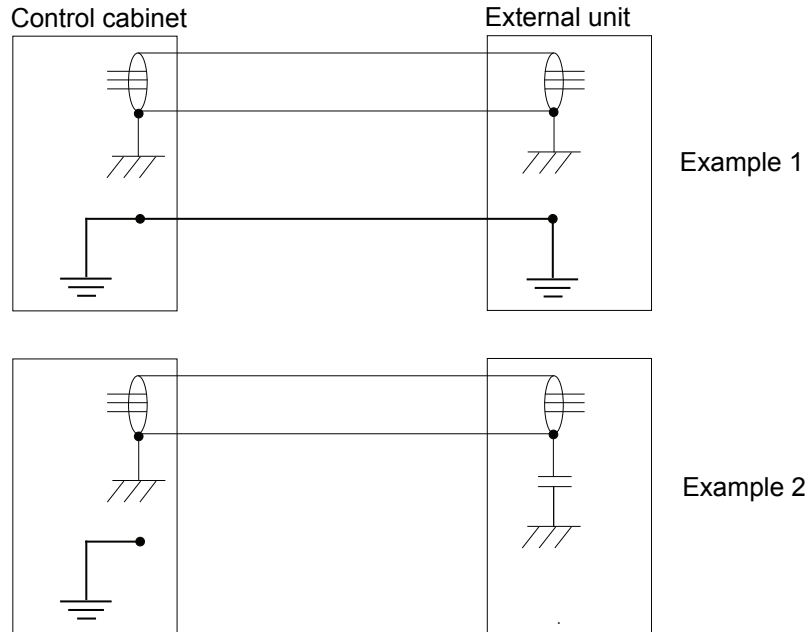
### 3 Installation and commissioning

#### 3.5.2 Connecting cables to the controller

*Continued*

#### Examples

The following figure shows 2 examples on how protective earth and the signal cable screens can be connected:



xx120000960

#### Example 1:

- Where a good earth connection is available on all units, the best shielding is obtained by grounding all screens at both ends on all units.

#### Example 2:

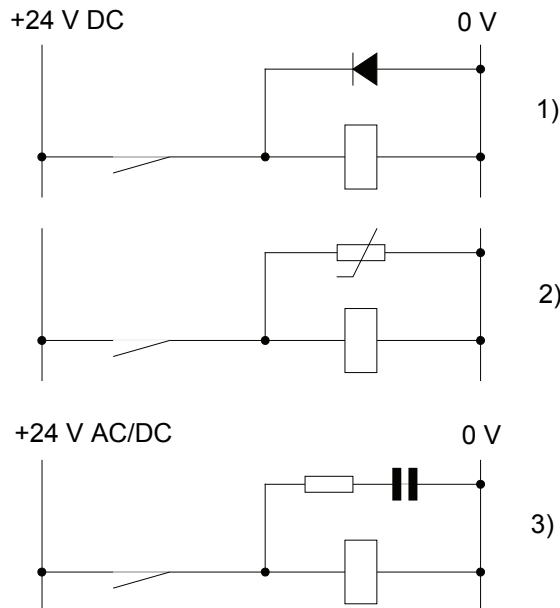
- If the cable is terminated where a good earth connection is not available a noise suppression capacitor can be used. The screens of the 2 cables must be connected as shown in the figure, but not connected to the chassis of the unit.

*Continues on next page*

#### Interference elimination

Internal relay coils and other units that can generate interference inside the control cabinet are neutralized. External relay coils, solenoids and other units must be clamped in a similar way. The illustration below shows how this can be done.

Note that the turn-off time for DC relays increases after neutralization, especially if a diode is connected across the coil. Varistors give shorter turn-off times. Neutralizing the coils lengthens the life of the switches that control them.



xx120000961

- 1 The diode should be dimensioned for the same current as the relay coil, and a voltage of twice the supply voltage.
- 2 The varistor should be dimensioned for the same energy as the relay coil, and a voltage of twice the supply voltage.
- 3 When AC voltage is used, the components need to be dimensioned for >500 V max voltage and 125 V nominal voltage.

The resistor should be 100  $\Omega$ , and the capacitor should be 1W 0.1 - 1  $\mu\text{F}$  (typically 0.47  $\mu\text{F}$ ).

## 3 Installation and commissioning

### 3.5.3 Connecting the manipulator to the controller

### 3.5.3 Connecting the manipulator to the controller

#### General

Connect the manipulator and the controller to each other after installing them. The lists below specify which cables to be used in each application.

All connectors on the controller are shown in section [Connectors on the OmniCore C90XT Type A controller on page 75](#).



#### CAUTION

Verify that the serial number is according to the number(s) in the *Declaration of Incorporation (DoI)*.

#### Main cable categories

All cables between the manipulator and the controller are divided into the following categories:

Cable category	Description
Manipulator cable	Handles power supply to and control of the manipulator's motors as well as feedback from the serial measurement board.
Position switch cables (option)	Handles supply to and feedback from any position switches.
Customer cables (option)	Handles communication with equipment fitted on the manipulator by the customer.
Additional axes cables (option)	Handles power supply to and control of the external axes motors as well as feedback from the servo system.

These categories above are divided into sub-categories which are specified in spare part manual. See [Manipulator cables on page 463](#).

#### Connecting the cables from the manipulator to the controller

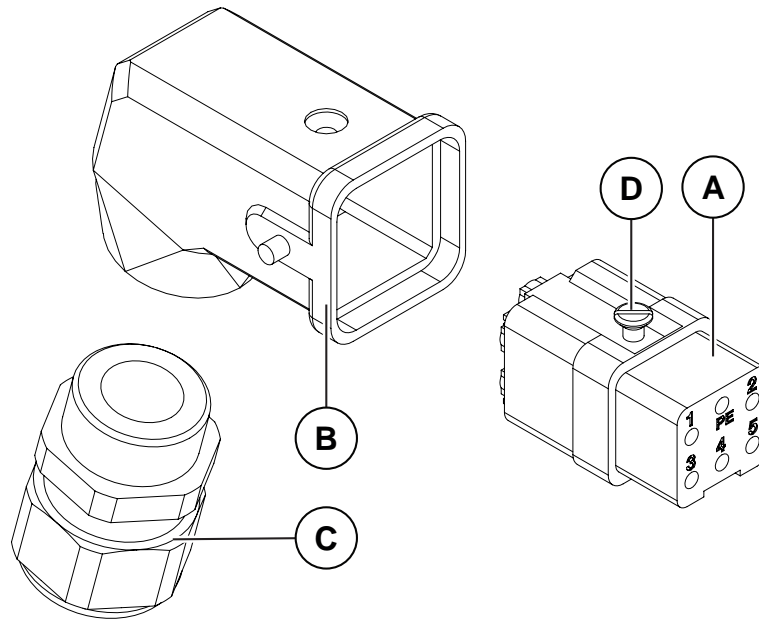
	Action
1	Connect the manipulator cable to the connector X1.
2	Lock the connector with the lever.
3	Secure the cables to avoid tripping or wear.

#### 3.5.4 Fitting the connector for incoming mains

##### General

This section describes how to manufacture a cable for connecting the main power to the controller.

##### Detailed view



xx1900001457

	Description
A	Female insert, quick lock
B	Angle hood M20
C	Cable gland M20
D	Sealing screw

##### Specifications

The following describes the cable requirements for the incoming mains connection to the OmniCore C90XT Type A controller.

Component	Description
Cable type	Flexible oil resistant rubber
Cable area	3C x 2.5 mm <sup>2</sup> or AWG14
Protective earth	PE1 and PE2 points on X0 (incoming mains connector).

##### Included parts

The following parts are included in the delivery.

Part	Order number	Quantity
Power connector	3HAC070308-001	1

*Continues on next page*

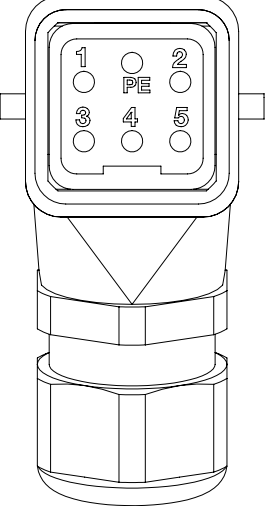
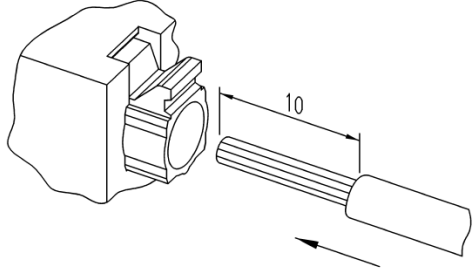
### 3 Installation and commissioning

#### 3.5.4 Fitting the connector for incoming mains

*Continued*

#### Procedure

Use the following procedure to fit the connectors.

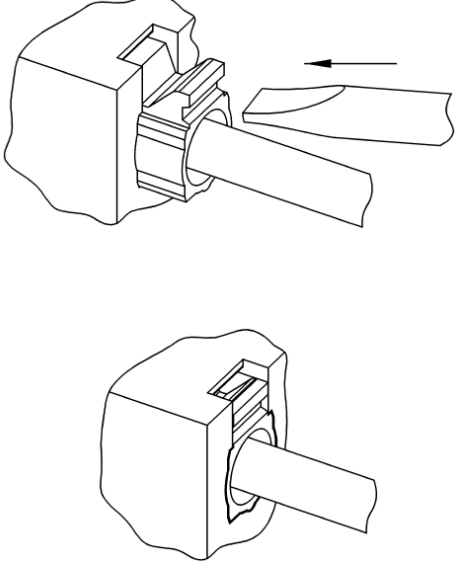
	Action	Note/illustration
1	Cut the cable to desired length.	
2	Connect the wires according to the illustration.	 <p>xx1900001454</p> <p>For single phase:</p> <ul style="list-style-type: none"><li>1 Live (L1)</li><li>2 Neutral (N) or Live (L2)</li><li>3 Not used</li><li>4 Not used</li><li>5 Not used</li></ul> <p>PE, Protective Earth, grounding</p>
3	Remove cable jacket and strip the fine stranded wires about 10 mm if needed.	 <p>xx1900001458</p>

*Continues on next page*

### 3 Installation and commissioning

#### 3.5.4 Fitting the connector for incoming mains

*Continued*

	Action	Note/illustration
4	Push fine stranded wires into the Han-Quick Lock contact and push the slide with a screw driver until it comes to a stop.	 <p data-bbox="954 900 1061 918">xx1900001459</p>

## 3 Installation and commissioning

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### 3.5.5 Connecting incoming mains and protective earth to the controller

### 3.5.5 Connecting incoming mains and protective earth to the controller

---

#### Introduction



#### Note

How to manufacture a cable with connector is described in section [Fitting the connector for incoming mains on page 85](#).



#### DANGER

A residual current device (RCD) must be installed. See [Residual current on page 43](#).

#### Prerequisites

Before incoming mains is connected to the controller, the following prerequisites must be fulfilled:

- An external circuit breaker or fuse must be installed. See [Line fusing on page 90](#).
- The cabinet must be connected to protective earth. See [Connection of protective earth on page 88](#).
- A residual current device (RCD) must be installed. See [Residual current on page 43](#).

#### Connection of protective earth

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#### Note

The whole cabinet ground is connected to the X0.PE point.

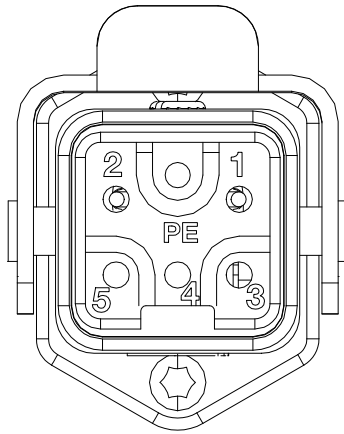
*Continues on next page*



## 3 Installation and commissioning

### 3.5.5 Connecting incoming mains and protective earth to the controller

*Continued*



xx1900001455

	Description
1	Live (L1)
2	Neutral (N) or Live (L2)
3	Not used
4	Not used
5	Not used
PE	Protective Earth, grounding

#### Required equipment

Equipment	Note
Main connection cable (single phase)	L, N, PE Details see <a href="#">Fitting the connector for incoming mains on page 85</a> .
External earth fault protection (residual current device, RCD)	30 mA
Standard toolkit	See <a href="#">Standard toolkit for controller on page 430</a> .
Circuit diagram	<a href="#">Circuit diagram - OmniCore C90XT Type A, 3HAC086305-010</a>

#### Connecting the power

The following procedure describes how to connect the main power to the controller.



#### CAUTION

Always inspect the connector for dirt or damage before connecting it to the controller. Clean or replace any damaged parts.


*Continues on next page*

### 3 Installation and commissioning

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#### 3.5.5 Connecting incoming mains and protective earth to the controller

*Continued*

	Action	
1	<p>Connect the main power cable to the incoming mains connector X0 and lock it by pressing the locking levers.</p> <p> <b>Tip</b></p> <p>When you hear a clear clicking sound, it is locked.</p>	

---

#### Line fusing

There is no integrated fuse in side OmniCore C90XT Type A controller. An external fuse or circuit breaker must be added by the integrator, according to the full load current rating. The full load current for the robot is marked on the controller name plate, and is also displayed in section [Line fusing on page 43](#).

### 3.5.6 Detaching and attaching a FlexPendant

#### Introduction

With the option *Hot swappable FlexPendant [3018-1]* it is possible to detach and attach the FlexPendant from an OmniCore controller in automatic mode, without interrupting the ongoing process.

Detaching the FlexPendant in manual mode will always result in an emergency stop.



#### Note

Detaching the FlexPendant is possible only if the logged in user has the **Detach the FlexPendant** grant.



#### CAUTION

Before detaching the FlexPendant, another emergency stop shall be available.



#### CAUTION

When FlexPendant is detached, the status of other actuating controls shall be indicated clearly, for example, power on, fault detected, automatic operation.



#### CAUTION

A FlexPendant that is not connected to the robot must be stored out of sight so that it cannot be mistaken for being in use.



#### CAUTION

The FlexPendant connector shall only be used to connect the FlexPendant.

*Continues on next page*

### 3 Installation and commissioning

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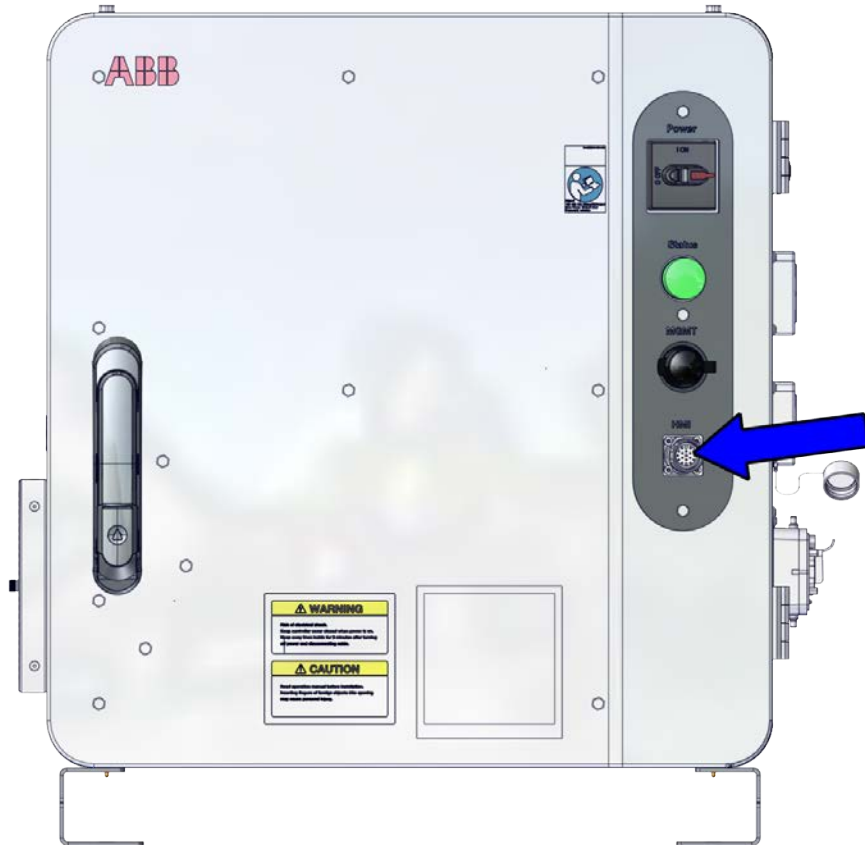
#### 3.5.6 Detaching and attaching a FlexPendant

*Continued*

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#### Location of FlexPendant connector

The FlexPendant connector is located on the cabinet door.



xx2400001357

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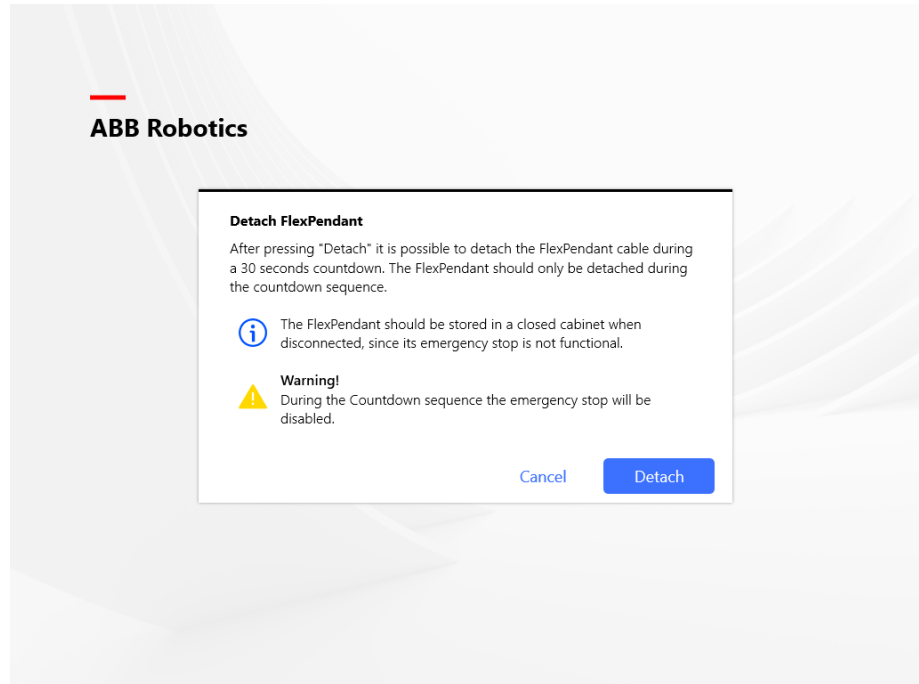
#### Detaching the FlexPendant in automatic mode

Use the following procedure to detach the FlexPendant in automatic mode:

- 1 On the status bar, tap the **QuickSet** button.
- 2 Tap the **Logout/Restart** tab.
- 3 In the **FlexPendant** section, tap **Detach FlexPendant**.

*Continues on next page*

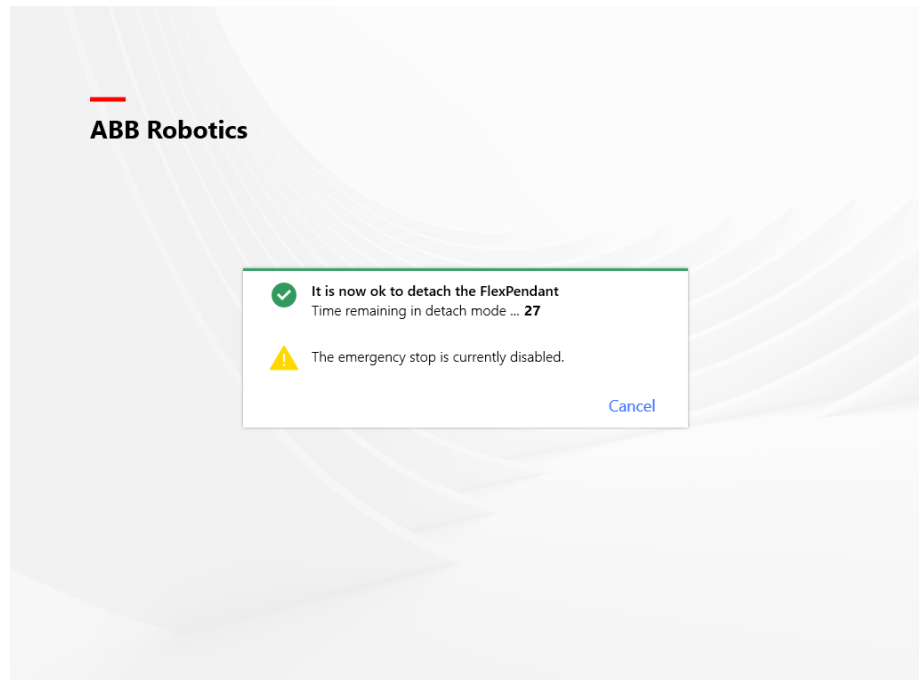
The Detach FlexPendant window is displayed.



xx1900000403

#### 4 Tap Detach.

A popup window with 30 seconds countdown timer is displayed.



xx1900000404

#### 5 When the countdown is progressing, detach the FlexPendant.

*Continues on next page*

## 3 Installation and commissioning

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### 3.5.6 Detaching and attaching a FlexPendant

*Continued*

When detached, the FlexPendant will shut down.



#### Note

If the FlexPendant is not detached within 30 seconds, the process for detach of the FlexPendant is aborted.



#### WARNING

If the FlexPendant is detached after the 30 seconds countdown has passed, the controller will enter emergency stop state.

---

### Attaching the FlexPendant



#### CAUTION

Always inspect the connector for dirt or damage before attaching. Clean or replace any damaged parts.

Attach the connector to the controller and tighten the locking ring or screws.




#### CAUTION

Make sure that the emergency stop device is not pressed in before attaching the FlexPendant.

### 3.5.7 Ethernet networks on OmniCore

#### Network segment overview

The Ethernet networks used by OmniCore are distributed into the following segments:

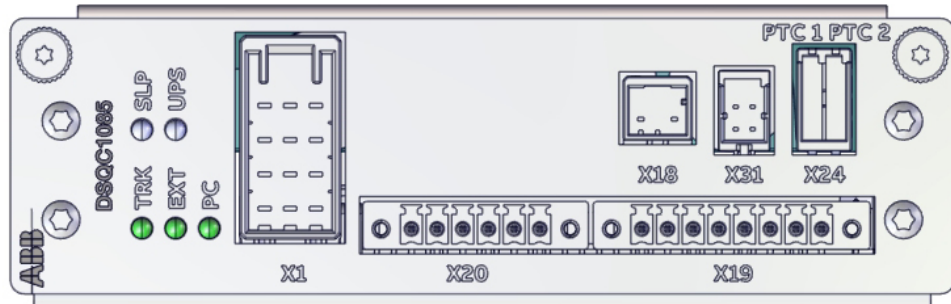
Network segment	Controller ports	Usage
Private Network	DEV	Process equipment local to this specific robot.
	MGMT (Management)	<p>ABB service personnel in close proximity to the controller, with a single client connected to the controller.</p> <p> <b>Note</b></p> <p>The management port shall never be used for more than one client at a time. ABB Robotics assumes no responsibility for any errors/hazards that may appear when more than one client is used.</p>
	TPU	FlexPendant connection.
ABB Connect Network	ABB Connect	ABB Connect connection.
Public Network	WAN 1	Public/factory network.
	WAN 2	Intended for connecting the robot controller to a factory wide industrial network.
I/O Network	LAN	Intended for connecting the robot controller to a factory wide industrial network isolated from WAN.

### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

#### 3.5.8 Descriptions for connectors

##### Power distribution board front panel connectors



xx2300000434

##### Connector X1

	Description
Connection	Connector for 24V_TRUNK input
Type	Dynamic D-3400F Tyco Electronics
Article number	178216-2

Pin	Name	Description
A1	0V	
A2	0V	
A3	0V	
B1	0V	
B2	0V	
B3	0V	
C1	24V_TRUNK	
C2	24V_TRUNK	
C3	24V_TRUNK	
D1	24V_TRUNK	
D2	24V_TRUNK	
D3	24V_TRUNK	

##### Connector X19

	Description
Connection	Connector for 24V_IO_EXT output
Type	SC 3.81 90F Weidmüller
Article number	1793380000

*Continues on next page*



### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

*Continued*

Pin	Name	Description
1	24V_IO_EXT	
2	0V_IO_EXT	
3	24V_IO_EXT	
4	0V_IO_EXT	
5	24V_IO_EXT	
6	0V_IO_EXT	
7	24V_IO_EXT	
8	0V_IO_EXT	

#### Connector X20

	Description
Connection	Connector for 24V_EXT input
Type	SC 3.81 90F Weidmüller
Article number	1793370000

Pin	Name	Description
1	24V_EXT	
2	24V_EXT	
3	24V_EXT	
4	0V_EXT	
5	0V_EXT	
6	0V_EXT	

#### Connector X18

	Description
Connection	Connector for MS_ON/OFF 24V digital output
Type	Dynamic D-2100S Tyco Electronics
Article number	1376135-3

Pin	Name	Description
1	MS_ONOFF	
3	0V	

#### Connector X31

	Description
Connection	Connector for system power mode control
Type	Dynamic D-1200D Tyco Electronics
Article number	2-1827876-2

*Continues on next page*


### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

Continued

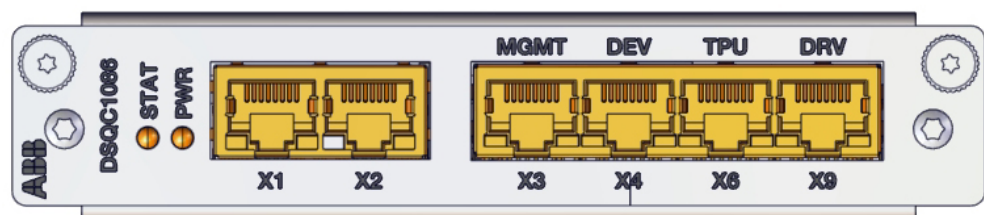
Pin	Name	Description
A1	24V_STDBY	24V standby power input
A2	0V	
B1	PWR_ON_BTN	Optional Power on button input
B2	PWR_EN	Digital 24V output

#### Connector X24

	Description
Connection	Connector for inputs from resistor (PTC2) used for thermal protection of external axes.  <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;"></div> <div> <p><b>Note</b></p> <p>A high resistance or open circuit indicates that the temperature of the motor exceeds the rated level.</p> <p>For information about PTC resistors and thermal protection, see <i>Application manual - Additional axes</i>.</p> </div> </div>
Type	Dynamic D-1500T Tyco Electronics
Article number	1-1827583-2

Pin	Name	Description
A1	0V_CHASSI	
A2	0V_CHASSI	
B1	PTC1-	Not used
B2	PTC2-	Used for external axes
C1	PTC1+	Not used
C2	PTC2+	Used for external axes

#### Processor board front panel connectors



xx2300000440

#### Connector X1, X2, X3, X4, X6, X9

	Description
Connection	Connectors for ECAT, MGMT, DEV, TPU and DRV (Motion Link)
Type	RJ45
Article number	

Continues on next page

### 3 Installation and commissioning

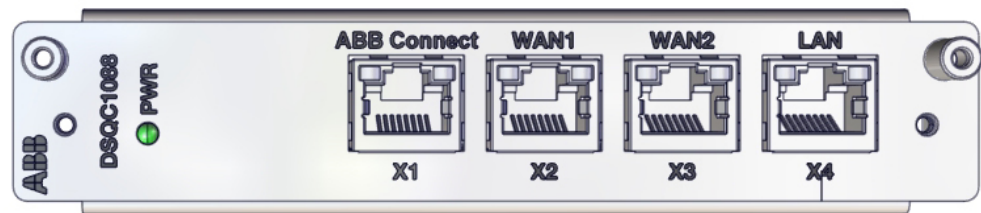
#### 3.5.8 Descriptions for connectors

*Continued*

	Description	
Label	X1	ECAT IN
	X2	ECAT OUT
	X3	MGMT
	X4	DEV
	X6	TPU
	X9	DRV

Pin	Name	Description
1	BI_DA+	
2	BI_DA-	
3	BI_DB+	
4	N.A	
5	N.A	
6	BI_DB-	
7	N.A	
8	N.A	

#### Ethernet switch front panel connectors



xx2300001768

#### Connector X1, X2, X3, X4

	Description	
Connection	Connectors for ABB Connect, WAN1, WAN2 and LAN.	
Type	RJ45	
Article number		
Label	X1	ABB Connect
	X2	WAN1
	X3	WAN2
	X4	LAN

Pin	Name	Description
1	BI_DA+	
2	BI_DA-	
3	BI_DB+	

*Continues on next page*

### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

Continued

Pin	Name	Description
4	BI_DC+	
5	BI_DC-	
6	BI_DB-	
7	BI_DD+	
8	BI_DD-	

#### Safety board front panel connectors



xx2300000501



#### CAUTION

Safety functions must be verified before use. Safety functions must be tested regularly.

#### Connector X13

	Description
Connection	Connector for HMI signals
Type	Dynamic D-2100D Tyco Electronics
Article number	1376137-1

Pin	Name	Pin	Name
A1	24V_CH1_HMI	B1	ENABLE_CH1
A2	HMI_ESTOP_CH1	B2	0V_IO_HMI
A3	HMI_ESTOP_CH2	B3	ENABLE_CH2
A4	0V_IO_HMI	B4	24V_CH2_HMI
A5	24V_TPU	B5	0V_TPU
A6	MON_LAMP	B6	24V_MON
A7	MON_PB	B7	24V_MON
A8	-	B8	-
A9	-	B9	-
A10	-	B10	-

Continues on next page

#### Connector X14

	Description
Connection	Connector for Safety IO signals
Type	S2L 3.50 90F Weidmüller
Article number	1728680000

The connector X14 allows for connecting *general stop* and *emergency stop* devices. *General Stop* is operational in both manual mode and automatic mode. See [Protective stop and emergency stop on page 23](#).

More information is also available in *Application manual - Functional safety and SafeMove*.

External emergency stop devices can for example be required in the following cases:

- FlexPendant is detached.
- FlexPendant is placed in its holder with the emergency stop device hidden behind the emergency stop device cover.



xx1800000553

Pin	Name	Pin	Name
1	0V_IO_EXT	2	24V_CH2_EXT
3	EXT_ESTOP_CH2_N	4	EXT_ESTOP_CH2_P
5	EXT_ESTOP_CH1_N	6	EXT_ESTOP_CH1_P
7	0V_IO_EXT	8	24V_CH1_EXT
9	0V_IO_EXT	10	24V_CH2_EXT
11	GS_CH2_N	12	GS_CH2_P
13	GS_CH1_N	14	GS_CH1_P
15	0V_IO_EXT	16	24V_CH1_EXT

*Continues on next page*

### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

Continued



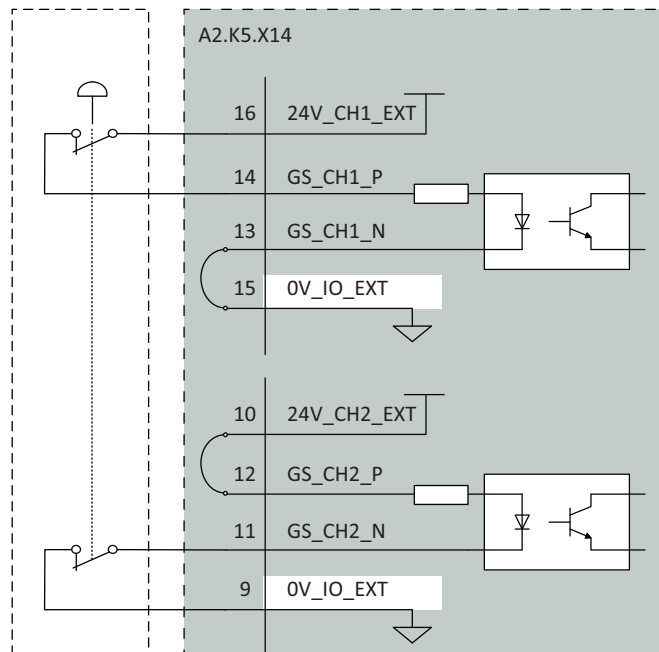
#### Note

The following operating regions are defined according to IEC 61131-2:2017 clause 6.4.4.2:

- The emergency stop function is activated (open loop) when the voltage is below 5 V.  
The protective stop function is activated (open loop) when the voltage is below 5 V.
- The transition region is between 5 V and 15 V.
- The emergency stop function is not activated (closed loop) when the voltage is above 15 V.  
The protective stop function is not activated (closed loop) when the voltage is above 15 V.

A protective stop device needs to be connected to the protective stop input. See example below.

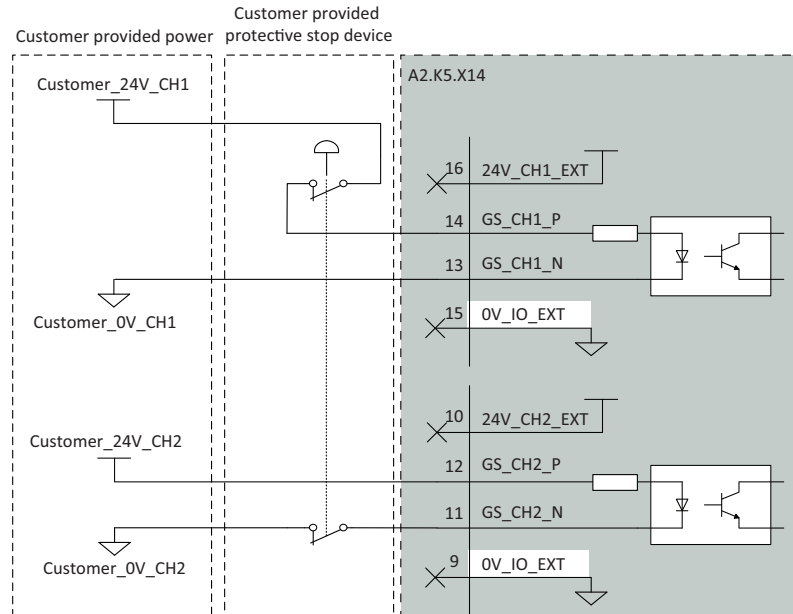
Customer provided protective stop device



xx2300000995

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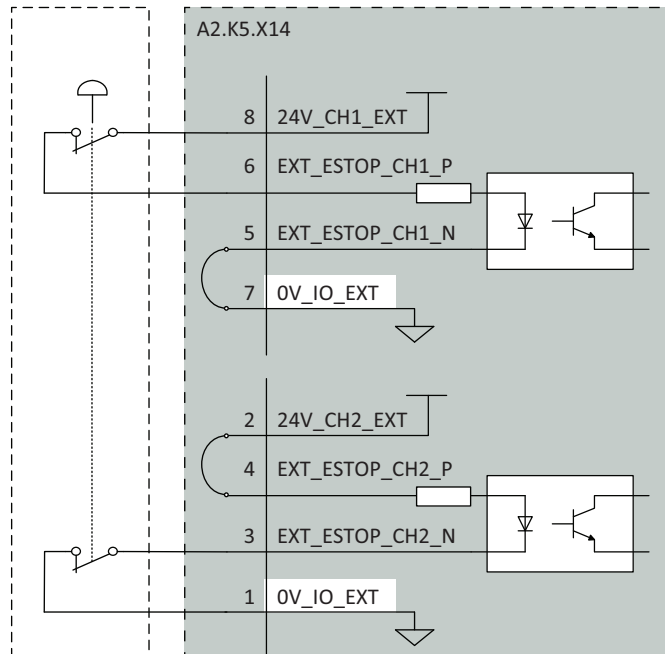
The protective stop input can be powered from an external power supply:



xx230000996

The emergency stop input needs to be connected to an emergency stop device. This to allow operation in both automatic and manual mode:

Customer provided emergency stop device



xx230000997

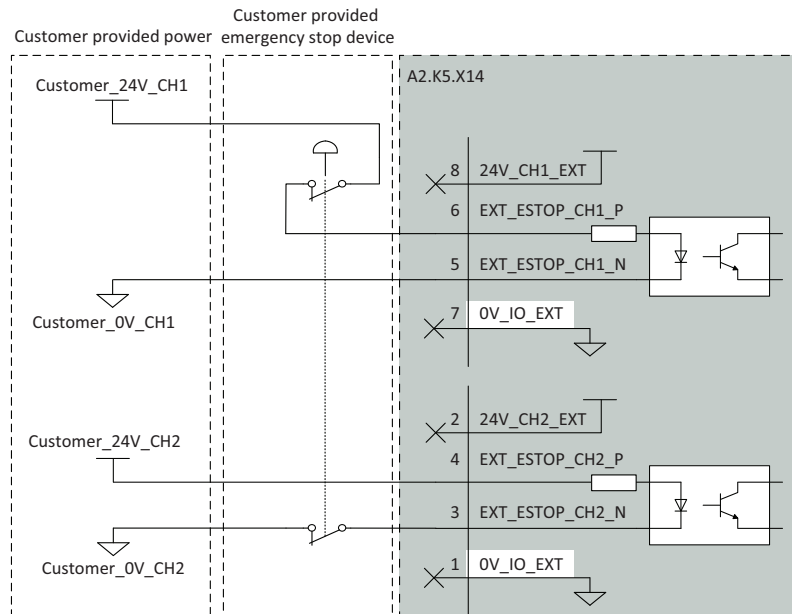
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### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

Continued

The emergency stop input can be powered from an external power supply:



xx2300000998

The digital inputs comply with the requirements of current sinking inputs type 1 for rated voltage 24 VDC according to IEC 61131-2:2017 clause 6.4.4.2.



#### Note

If external power supplies are used, they must have over-current protection. A recommendation is to have separate fuses (0.5A) for each channel (Ch1, Ch2) to increase diagnostic coverage on inputs.



#### Note

If separate power supplies are used for each channel (Ch1, Ch2) they must have common ground.

For more connections other than those illustrated above, carefully assess the risk before use and contact your local ABB for support.

#### Connector X15

	Description
Connection	Connector for Safety IO signals
Type	S2L 3.50 90F Weidmüller
Article number	1728690000

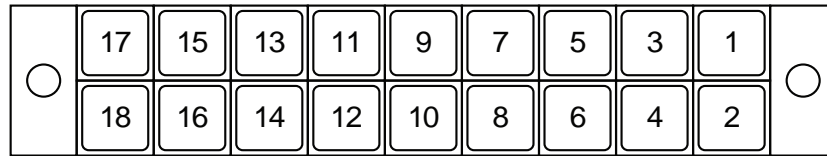
Continues on next page



### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

Continued



xx180000555

Pin	Name	Pin	Name
1	MON_PB1	2	24V_MON
3	MON_LAMP1	4	24V_MON
5	-	6	-
7	0V_IO_EXT	8	24V_CH2_EXT
9	AS_CH2_N	10	AS_CH2_P
11	ESOUT2_N	12	ESOUT2_P
13	ESOUT1_N	14	ESOUT1_P
15	AS_CH1_N	16	AS_CH1_P
17	0V_IO_EXT	18	24V_CH1_EXT

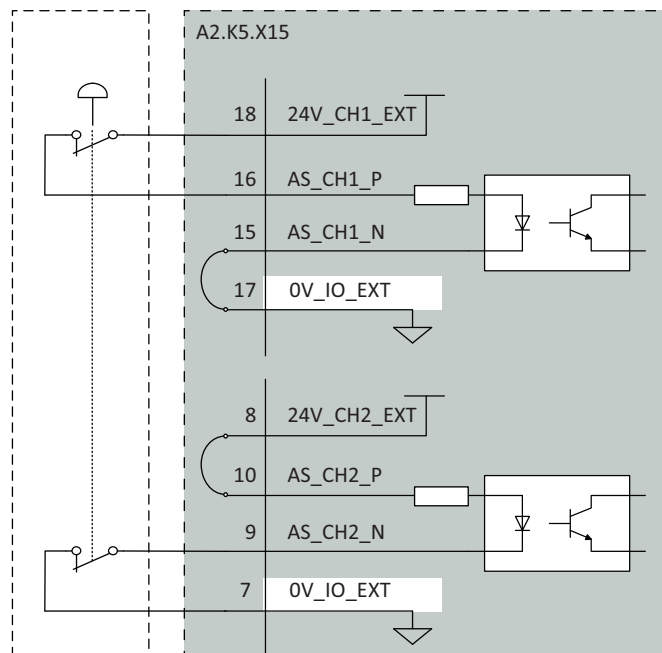
The connector X15 allows for connecting *automatic stop* devices.

*Automatic Stop* is only operational in automatic mode. See [Protective stop and emergency stop on page 23](#).

More information is also available in *Application manual - Functional safety and SafeMove*.

A protective stop device needs to be connected to the protective stop input. See example below.

Customer provided protective stop device



xx230000993

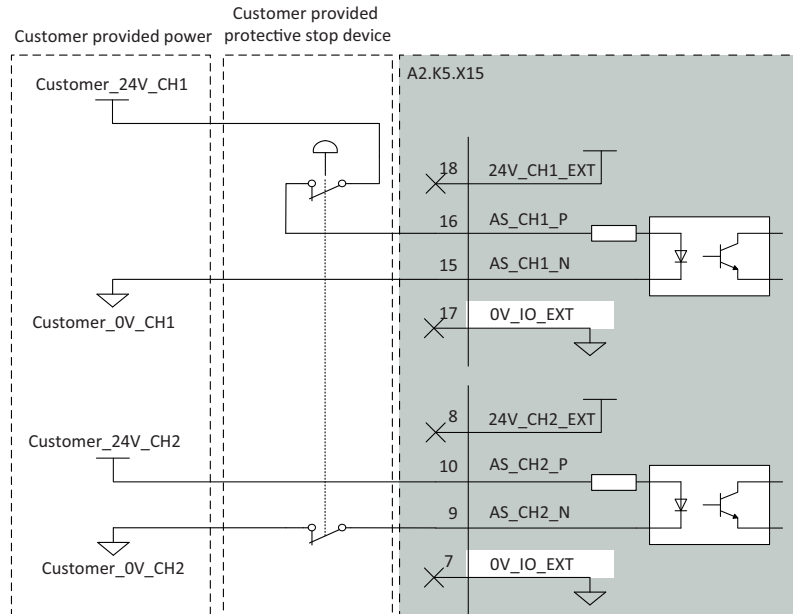
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### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

Continued

The protective stop input can be powered from an external power supply:



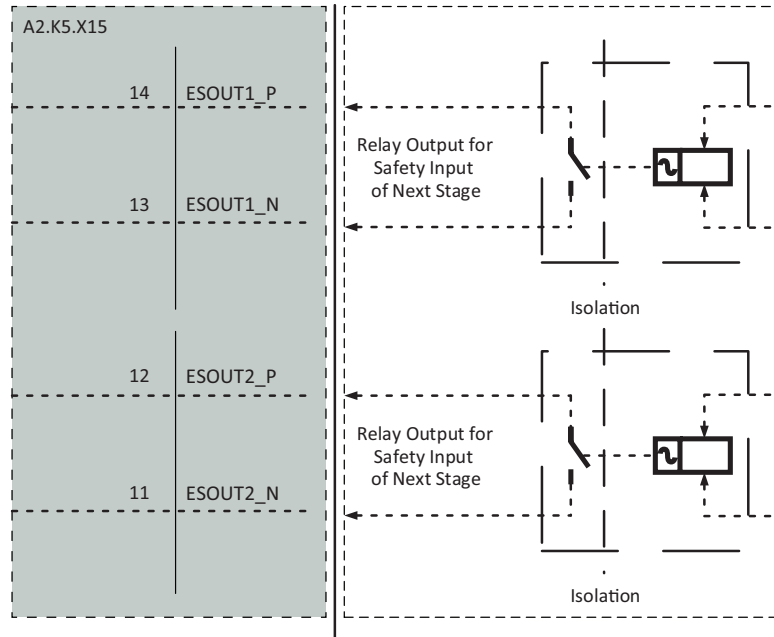
xx2300000994



#### Note

The relay channels are able to switch 2A rated current at 24 VDC rated voltage according to IEC 61131-2:2017 clause 6.4.6.1, 24VDC outputs, Type 2, non-protected output.

Over-current protection must be provided by customer.



xx2300000999

Continues on next page



**Note**

State 0 of Emergency stop output shall be recognized as Emergency stop triggered.



**Note**

The cable shall be protected from external EM disturbance, suggested to use separate multicore cables.



**Note**

The ESOUT pins reflect the emergency status of the controller.  
ESOUT can be decoupled from ES input to avoid dead-lock in an emergency stop chain. See [Configuring robot stopping functions on page 111](#).

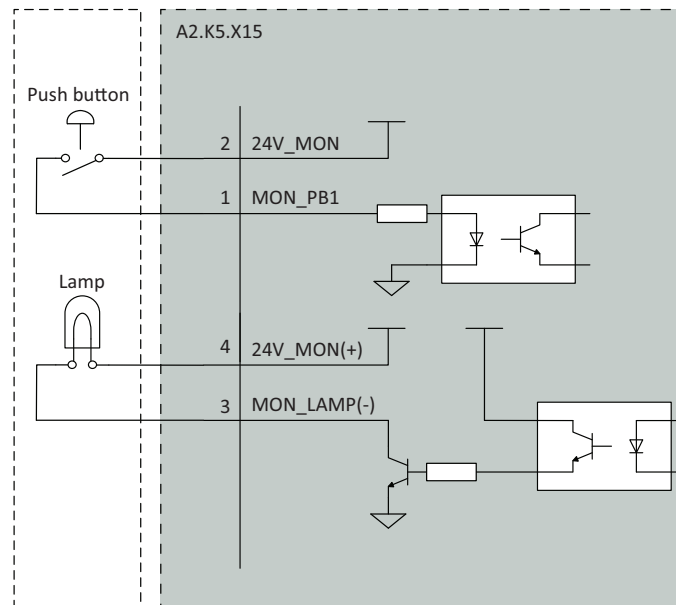


**Note**

To increase diagnostic cover on Emergency Stop output suitable diagnostics measures on the relay interfacing device could be added, such as antivalence or pulse testing by external interfacing safety device.

Although the Motors On function is available on the FlexPendant, an interface is provided in X15 for an optional Motors On push button and an indication lamp.

Customer provided device



xx2300001000

*Continues on next page*

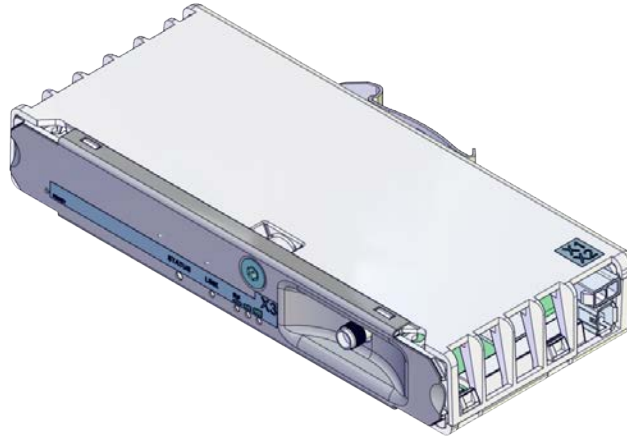
### 3 Installation and commissioning

#### 3.5.8 Descriptions for connectors

*Continued*

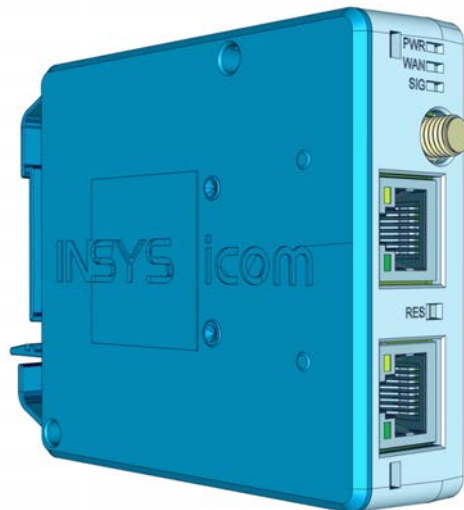
##### Antenna connector

The Connected Services Gateway unit has either an ABB Connect port or an antenna connector on the front. See installation procedures in section [On-site installation on page 63](#).



xx1900002450

The 4G Connected Services Gateway unit has an antenna connector on the front. See installation procedures in section [On-site installation on page 63](#).



xx2300000668

##### I/O connectors - Scalable I/O (option)

A	Scalable I/O output connectors
---	--------------------------------

*Continues on next page*

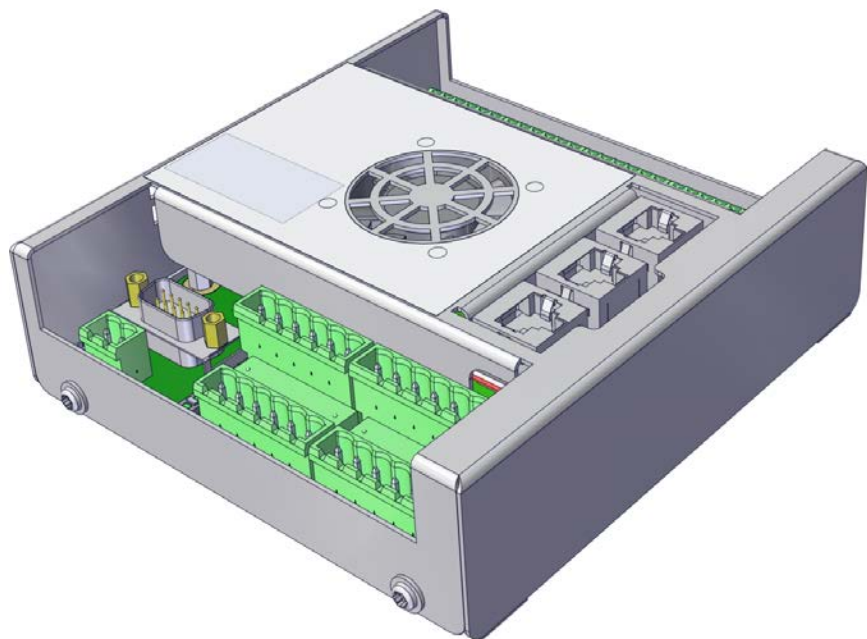
B	Scalable I/O input connectors
---	-------------------------------

The connectors contain 16 digital input signals, 16 digital output signals, 24 V and 0 V for the outputs.

For connection details, see *Circuit diagram - OmniCore C90XT Type A*, 3HAC086305-010 and *Application manual - Scalable I/O*, 3HAC070208-001.

#### Conveyor tracking module (option)

For detail information on customer connections to conveyor tracking module, see *Application manual - Conveyor tracking*, 3HAC066561-001.



xx2100002526

#### Customer cable layout

It is recommended to use multicore cable for the customer connection.

The cables connected by customer to the conveyor tracking module should go through the cable grommet and fasten on the cabinet.



#### Note

The end user needs to install proper grommets according to the diameter of the cables which need to go through the grommet.

Incorrect use of grommets will affect ingress protection, EMI/EMC and temperature.

It is recommended to use icotek KT grommet.

The cable layout is recommended as the following illustration.

*Continues on next page*

## 3 Installation and commissioning

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### 3.5.8 Descriptions for connectors

*Continued*

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#### 24V terminal block (option)

This connector is internally connected with the optional power supply. It is a 24 V power supply for the customer. The characteristics are shown in the following table.

Parameter	Value
Voltage	24 V DC
Voltage tolerance	-3% ~ +10%
Max output current	4 A



#### Note

The 24 V terminal block power supply is isolated from the internal logical circuit of the controller.

For connection details, see *Circuit diagram - OmniCore C90XT Type A, 3HAC086305-010*.

#### Customer cable layout

It is recommended to use multicore cable for the customer connection.

The cables connected by customer to the 24 V terminal block should go through the cable grommet and fasten on the cabinet.



#### Note

The diameter of the cables must match the diameter of the grommet.

Incorrect installation will affect the ingress protection.

It is recommended to use icotek KT grommet.

### 3.5.9 Configuring robot stopping functions

#### Introduction

The robot stopping functions, protective and emergency stop, are configured using the *Visual SafeMove* functionality in RobotStudio. This includes the emergency stop device on the FlexPendant, and external stop functions.

The protective stop function is configured with a *General Stop* (*G\_GeneralStop*) and an *Automatic Stop* (*A\_AutoStop*).

For the *General Stop*, the activation of the protective stop device will initiate the protective stop in any operating mode. For the *Automatic Stop*, the activation of the protective stop device will initiate the protective stop in automatic mode only.

For more information about safety configurations, see *Application manual - Functional safety and SafeMove*.

#### Configure the robot stopping functions in Visual SafeMove



#### WARNING

The new settings must be verified by test before the robot is used.



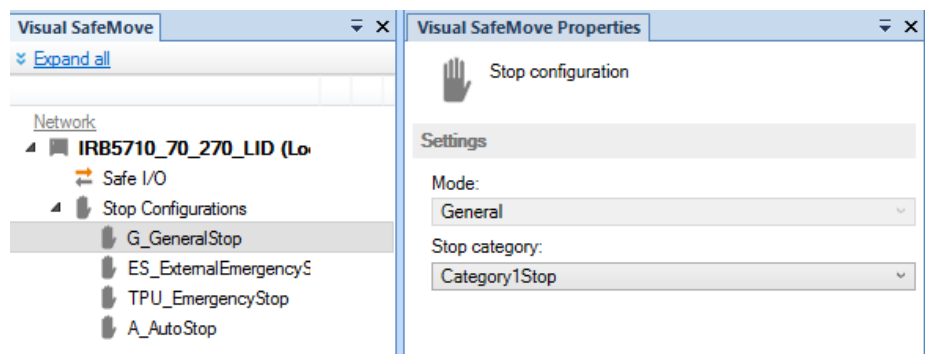
#### Note

Depending on the controller variant and RobotWare version, the configuration options are different.

Not all configurations can be modified.

Use this procedure to configure the robot stopping functions in Visual SafeMove.

- 1 In *Visual SafeMove*, select **Stop Configuration**.



xx2300001717

- 2 Select a stop configuration or right-click to create a new configuration.
- 3 For user-created stop configurations, select the signal that should trigger the stop in the **Trigger signal** dropdown menu.
  - 0 = activate stop
  - 1 = deactivate stop

*Continues on next page*

### 3 Installation and commissioning

#### 3.5.9 Configuring robot stopping functions

Continued

- 4 For user-created stop configurations, if a status signal should be set when the functionality is active, select the signal to use in **Stop trigger status** dropdown menu.

If no output signal should be used, select **No signal**.

- 0 = stop triggered
- 1 = stop not triggered

- 5 Define the mode (automatic or manual).

- *G\_GeneralStop* is the *General Stop* input
- *ES\_ExternalEmergencyStop* is the *Emergency Stop* input

To avoid dead-lock in an emergency stop chain, the *ES\_ExternalEmergencyStop* input can be decoupled from the ES output.

- *TPU\_EmergencyStop* is the emergency stop device on the FlexPendant
- *A\_AutoStop* is the *Automatic Stop* input

- 6 Select the stop category.

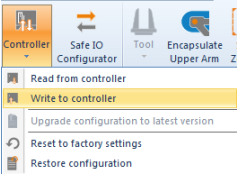
- 7 After the configuration is done, the safety configuration must be transferred to the controller and then a restart of the controller is required.



**Tip**

See also the circuit diagram, *Circuit diagram - OmniCore C90XT Type A*.

#### Apply the configuration to the controller

	Action	Note/illustration
1	In the <b>Visual SafeMove</b> ribbon, click on <b>Controller</b> and then select <b>Write to controller</b> .	 Read from controller <b>Write to controller</b> Upgrade configuration to latest version Reset to factory settings Restore configuration xx1500000801
2	A report of the safety configuration is shown. The report can be printed by clicking on <b>Print</b> (it is recommended to print the report since it should be used when validating the configuration). Click OK to close the report.	
3	Answer <b>Yes</b> when asked if you want to restart the controller.	After the restart, the downloaded configuration is active. Before running in auto mode, the configuration should be validated and locked, see <a href="#">Validate the configuration of robot stopping functions on page 113</a> .

Continues on next page



#### Validate the configuration of robot stopping functions



#### DANGER

A stop configuration must always be validated to verify that the desired safety is achieved.

	Action	Expected result
1	Deactivate any supervision functions that are signal activated.	
2	Move the robot, for example with a move instruction.	
3	Set the signal configured to stop the robot in relevant operating modes. Relevant operating modes are: <ul style="list-style-type: none"><li>• <b>Auto</b>: Automatic mode</li><li>• <b>General</b>: All modes</li><li>• <b>EmergencyStop</b>: All modes</li></ul>	The robot will stop.

#### Set the configuration to validated

When the stop configuration is validated the configuration, the status of the configuration shall be changed to **Validated** on the FlexPendant.

- 1 Log in as a user with the grant **Safety Services**.
- 2 In the **Settings** app, select the **Safety Controller**, and then **Configuration**.
- 3 Select the check box **Validated**.

#### Set the configuration to locked

When the stop configuration is approved, the status of the configuration should be changed to **Locked** on the FlexPendant.

Running the robot in auto mode with the configuration unlocked will result in a warning message.

- 1 Log in as a user with the grant **Lock Safety Controller Configuration**.
- 2 In the **Settings** app, select the **Safety Controller**, and then **Configuration**.
- 3 Select the check box **Locked**.

#### Upgrading RobotWare

When upgrading RobotWare there can be differences in functionality, also when configuring the robot stopping functions. Always read the RobotWare release notes and verify the robot stopping functions by test after an upgrade. Contact your local ABB office for guidance.

## 3 Installation and commissioning

### 3.5.10 Programmable stop functions

#### 3.5.10 Programmable stop functions

##### Stopping functions

There are different methods to stop the robot, in addition to manually initiated stops.

- Stop with system input signals
- Stop with RAPID instructions
- Other stops

##### Stop with system input signals

In the control system, it is possible to define system input signals to be set/reset through different interactions, for example, through networks, I/O blocks, RobAPI, etc.

Pre-defined system input	Description
<i>Stop</i>	The manipulator is stopped on the path with no deviation.
<i>QuickStop</i>	This is a faster stop of the manipulator than <i>SoftStop</i> . This stop is more stressing for the mechanics than <i>SoftStop</i> . <i>QuickStop</i> ignores torque and acceleration limits.
<i>Stop at End of Cycle</i>	Stops the RAPID program when the complete program is executed, that means when the last instruction in the main routine has been completed.
<i>Stop at End of Instruction</i>	Stops program execution after the current instruction is completed.

All of these stops are performed without using the brakes, and the power is never disconnected. The program execution can be continued directly, for example by activating a start signal.

##### Stop with RAPID instructions

There are several RAPID instructions available that stops the robot.

Instruction	Description	Arguments
<code>SystemStopAction</code>	Stops all robots in all tasks immediately.	<code>\Stop</code> : similar to a normal program stop with stop button. <code>\StopBlock</code> : as above, but to restart the PP has to be moved. <code>\Halt</code> : this is like a stop category 0, that is, it will result in motors off state, stop of program execution and robot movements in all motion tasks. The Motors on button must be pressed before the program execution can be restarted.
<code>Stop</code>	The current move instruction will be finished before the robot stops. A restart will continue the program execution.	<code>\NoRegain</code> : the robot will not return to the stop point when restarted, e.g. after having been jogged away. <code>\AllMoveTasks</code> : all robots will be stopped.

*Continues on next page*

Instruction	Description	Arguments
StopMove	The current move instruction will be stopped immediately as a soft stop but the program execution will continue with the next instruction. This is often used in for example trap routines.	\AllMotionTasks: all robots will be stopped.
BREAK	The current move instruction and the program execution will be stopped immediately as a normal program stop. A restart will continue the program execution.	
EXIT	The current move instruction and the program execution will be stopped immediately as a normal program stop. After stop the Program Pointer has to be reset to Main.	
EXITCYCLE	The current move instruction and program execution will be stopped immediately. The Program Pointer will be reset to Main and if running mode is continuous, the program will be restarted.	
SearchX	Search instructions can be programmed with arguments to stop the robot movement close to the point where a search hit was noticed. The program execution will continue with the next instruction.	<p>\Stop: Stiff stop - the robot will stop as fast as possible. This stop is performed by ramping down motion in each motor separate from each other, and as fast as possible. Since it will be without any coordination, the robot may slide off path fairly much.</p> <p>\SStop: Soft stop - the robot will stop on path.</p> <p>\Sup: the robot will continue to the ToPoint. If more than one search hit is found, an error will be reported.</p>

RAPID instructions are described in *Technical reference manual - RAPID Instructions, Functions and Data types*.

#### Other unexpected stops

Type of stop	Description
SysFail	In the control system there is a surveillance and monitoring function that can detect abnormal situations. In such cases a stop will be initiated. The robot controller must be restarted, and the configuration may have to be changed.
Power fail	In the control system there is a monitoring function that can detect power failure. At power fail, all execution will be stopped. After powerOn/motorsOn, it is possible to restart and continue the execution where it stopped.



*Continues on next page*

## 3 Installation and commissioning

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### 3.5.10 Programmable stop functions

*Continued*

Type of stop	Description
Stop at collision	<p>In the control system there is a monitoring function that can detect collisions. When a collision is detected, a stop will be initiated.</p> <p>This functionality can be switched on/off using the system parameters for Motion/Motion Supervision.</p> <p> <b>WARNING</b></p> <p>Special care must be taken when restarting a machine that is stopped due to a collision. The robot might make a limited movement when restarted.</p> <p> <b>WARNING</b></p> <p>The revolution counters might need to be updated after a collision to ensure path accuracy.</p>

---

#### Stopping time/distance

Stopping time and distance metric for stop category 0 and stop category 1 are detailed in the product specification for the respective manipulator.

The data is valid for floor mounted manipulators, without any tilting.

## 3.6 I/O system

### 3.6.1 Available industrial networks

#### General

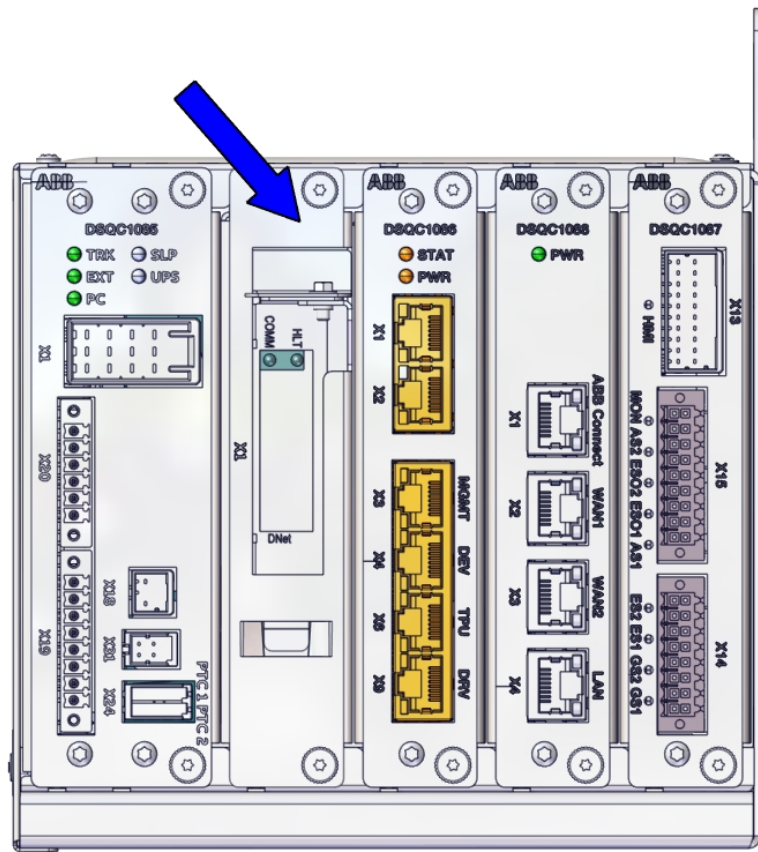


#### Note

Two industrial network masters can be run in parallel on the OmniCore controller. It is the responsibility of the integrator to verify the behavior when two masters are used in one OmniCore.

#### Industrial network connections

There is a slot available for installing a DeviceNet M/S board on the main computer. The industrial networks are connected directly to one of the Ethernet ports. See [Ethernet networks on OmniCore on page 95](#).



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#### Available board

The following master board is available.

Description	Article number	Type designation
DeviceNet M/S	3HAC085254-001	DSQC1096

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## 3 Installation and commissioning

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### 3.6.1 Available industrial networks

*Continued*

#### Available industrial networks

The following industrial networks are available as RobotWare options for this OmniCore controller:

- EtherNet/IP Scanner [3024-1]
- EtherNet/IP Adapter [3024-2]
- PROFINET Controller [3020-1]
- PROFINET Device [3020-2]
- PROFIenergy [3021-1]
- CC-Link IE Field Basic Master [3066-1]
- CC-Link IE Field Basic Device [3066-2]
- EtherCAT Device [3075-2]
- Safety over EtherCAT Device [3076-2]

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#### References

For more information on how to install and configure the industrial networks, see the respective application manual.

Manual title	Article number
<i>Application manual - I/O Engineering</i>	<i>3HAC082346-001</i>
<i>Application manual - EtherNet/IP Scanner/Adapter</i>	<i>3HAC066565-001</i>
<i>Application manual - PROFINET Controller/Device</i>	<i>3HAC066558-001</i>
<i>Application manual - CC-Link IE Field Basic</i>	<i>3HAC082295-001</i>

### 3.6.2 Scalable I/O, internal and external

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#### General

The controller can be fitted with an I/O base device, DSQC1030, providing 16 digital inputs and 16 digital outputs. If more I/O is needed, additional I/O devices can be attached to the I/O base device.

---

#### Scalable I/O devices

The I/O device *DSQC1030 Digital Base* belongs to the ABB Scalable I/O system, which is a modular, compact, and scalable I/O system that consists of a base device (minimum configuration), and add-on devices.

The *DSQC1042 Safety Digital Base* is a device that can be used to control and monitor machine safety equipment. The device can be used together with the scalable I/O devices.

For information about configuring and using the scalable I/O devices, see *Application manual - Scalable I/O*.

For information about installing the scalable I/O devices, see [Installing the scalable I/O devices on page 124](#).

### 3 Installation and commissioning

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#### 3.7.1 Installing the harness for double SMB

### 3.7 Installing options

#### 3.7.1 Installing the harness for double SMB

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##### Location

The illustration shows the location of the harness double SMB in the controller.



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#### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Harness Single SMB connection	3HAC088742-001	Harness single hybrid SMB
Harness Double SMB connection	3HAC089436-001	Harn. double hybrid SMB unit

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### 3 Installation and commissioning

#### 3.7.1 Installing the harness for double SMB

*Continued*

#### Required tools and equipment



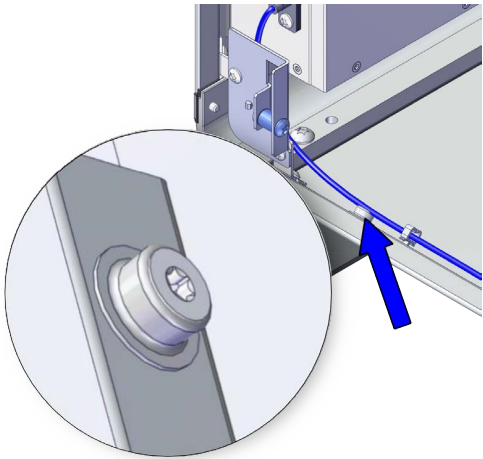
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Installing the harness double SMB

##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  <p>xx1900001446</p>

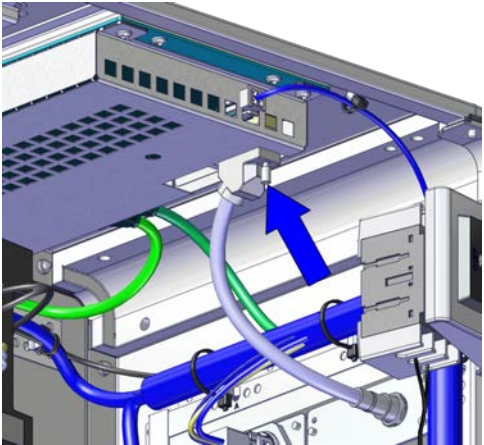
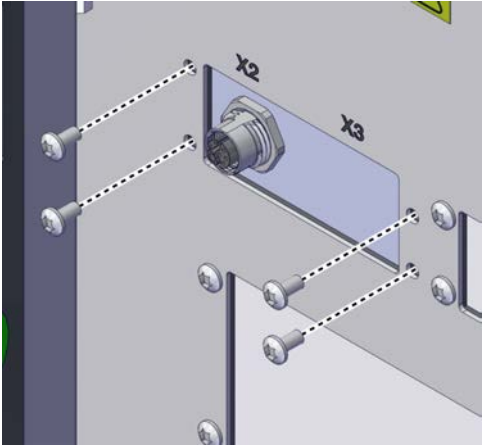
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### 3 Installation and commissioning


#### 3.7.1 Installing the harness for double SMB

Continued

#### Removing the harness for signal SMB

	Action	Note/Illustration
1	Loosen the screw and disconnect: <ul style="list-style-type: none"> <li>SMB - K6.X4</li> </ul>	 <p>xx1900001914</p>
2	Remove the attachment screws on the cover.	 <p>xx1900001915</p>
3	Push the manipulator signal connector into the cabinet.	
4	Take the manipulator signal connector out.	

#### Refitting the harness for double SMB


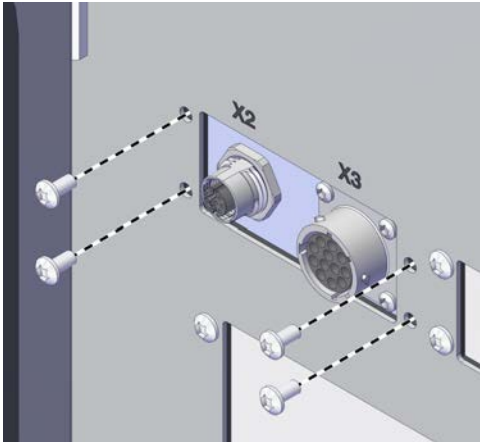
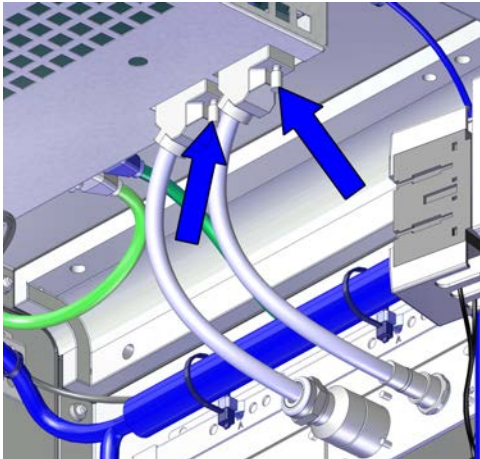
	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

Continues on next page

### 3 Installation and commissioning

#### 3.7.1 Installing the harness for double SMB

*Continued*

	Action	Note/Illustration
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	
3	Insert the manipulator signal connector into the cover from inner side of the cabinet.	
4	Secure it with the attachment screws.	Screws: Torx pan head screw M4x8 (4 pcs)  xx2000000440
5	Reconnect and secure: <ul style="list-style-type: none"> <li>• K6.X4, K6.X5 - SMB.</li> </ul>	 xx2000000439

#### Concluding procedure

	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

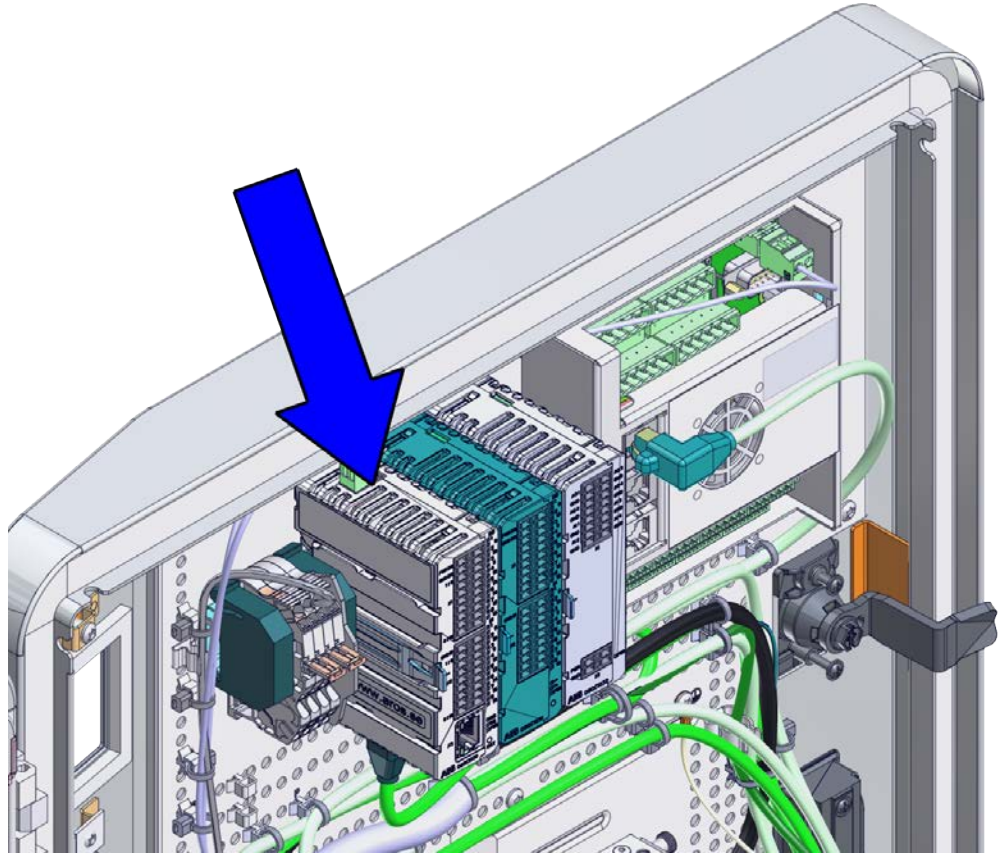
## 3 Installation and commissioning

### 3.7.2 Installing the scalable I/O devices

#### 3.7.2 Installing the scalable I/O devices

##### Location

The location of the base unit used as a scalable I/O internal unit is shown in the following illustration.



xx2400001345

The base unit can also be used as a scalable I/O external unit, with or without add-on devices.

For more information about installing, configuring, and using the scalable I/O units, see *Application manual - Scalable I/O*.

##### Required parts

Part	Article number	Note
Scalable I/O Digital base [3032-1]	3HAC058663-001	DSQC1030
Connectors digital base/add on	3HAC060919-001	
Digital add-on [3033-2]	3HAC058664-001	DSQC1031
Analog add-on [3034-2]	3HAC058665-001	DSQC1032
Connectors I/O Analog	3HAC060925-001	
Relay add-on [3035-2]	3HAC058666-001	DSQC1033
Connectors I/O Relay	3HAC060926-001	

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### 3 Installation and commissioning

#### 3.7.2 Installing the scalable I/O devices

*Continued*



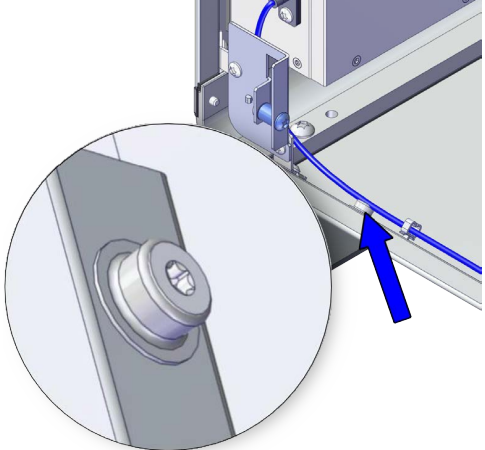
#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	
<i>Application manual - Scalable I/O</i>	3HAC070208-001	

#### Installing the scalable I/O internal base device

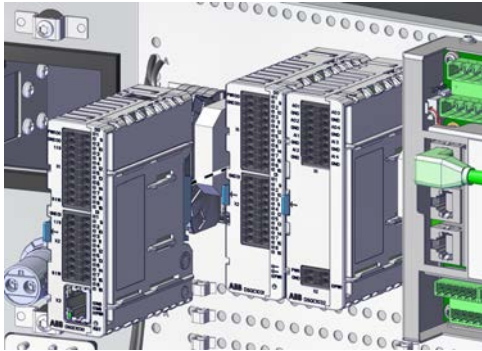

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

*Continues on next page*

### 3 Installation and commissioning



#### 3.7.2 Installing the scalable I/O devices

Continued

	Action	Note/Illustration
3	Push the digital base into the bracket until you hear a clear clicking sound.	 <p>xx1900002447</p>
4	Connect the adapter cable to the digital base. <ul style="list-style-type: none"> <li>• K5.1.X5/K3.1.X5 - A2.X4/K4.X7</li> </ul> <div style="display: flex; align-items: center; margin-top: 10px;">  <div> <p><b>Note</b></p> <p>If the Ethernet extension switch is installed, connect and disconnect the connector K5.1.X5/K3.1.X5 to/from K4.X7.</p> <p>If the Ethernet extension switch is not installed, connect and disconnect the connector K5.1.X5/K3.1.X5 to/from A2.X4.</p> </div> </div> <ul style="list-style-type: none"> <li>• K5.1.X4 - A2.X3</li> <li>• The harness connected to I/O unit by customer</li> </ul>	

#### Installing scalable I/O external devices

For more information about installing, configuring, and using the scalable I/O units, see *Application manual - Scalable I/O*.

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	
3	Prepare the scalable I/O units for external mounting as described in <i>Application manual - Scalable I/O</i> .	

Continues on next page

### 3 Installation and commissioning

#### 3.7.2 Installing the scalable I/O devices

*Continued*

	Action	Note/Illustration
4	Open the door.	<a href="#">Opening the door on page 196.</a>
5	Connect the external base device to the internal base device (X3) or the Ethernet switch, using an Ethernet cable.	
6	Connect an external power supply to the external base units, connector X4.	Each base device requires its own power supply.
7	Close the door.	<a href="#">Closing the door on page 196.</a>
8	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

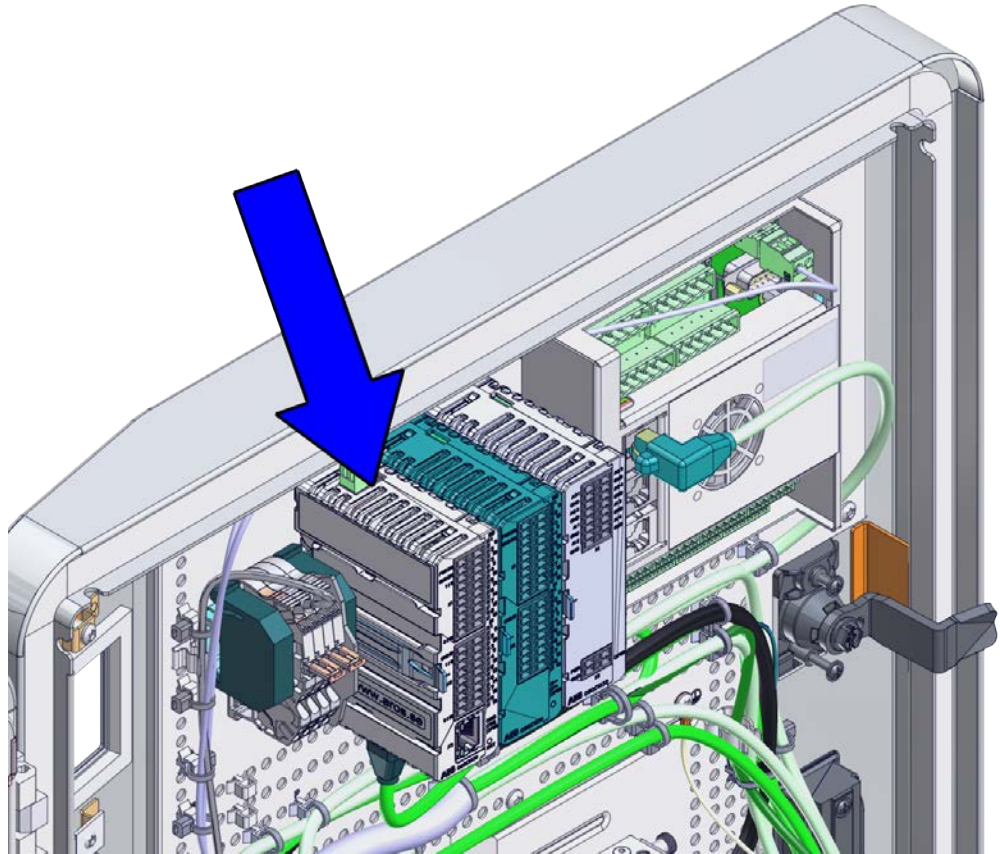
### 3 Installation and commissioning

#### 3.7.3 Installing the safety digital base device

#### 3.7.3 Installing the safety digital base device

##### Location

The illustration shows the location of the safety digital base device in the controller.



xx2400001347

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
DSQC1042 Extended safety	3HAC062908-001	DSQC1042
Connectors Safety I/O	3HAC069538-001	

##### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .

Continues on next page



### 3 Installation and commissioning

#### 3.7.3 Installing the safety digital base device

*Continued*



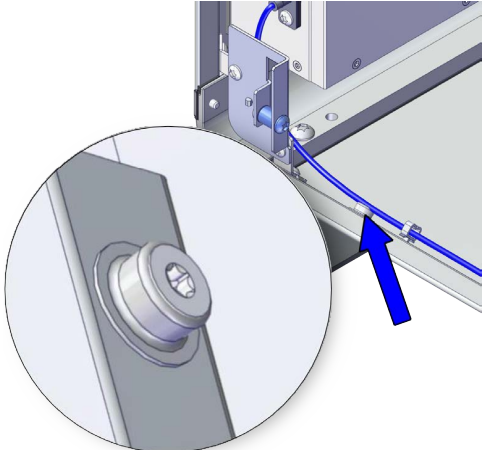

Equipment	Article number	Note
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	
Application manual - Scalable I/O	3HAC070208-001	

#### Installing the safety digital base device

##### Fitting the safety digital base device


	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Push the digital base into the bracket until you hear a clear clicking sound.</p>	 <p>xx2200001972</p>

*Continues on next page*

### 3 Installation and commissioning

#### 3.7.3 Installing the safety digital base device

Continued

	Action	Note/Illustration
4	<p>Connect the adapter cable to the digital base.</p> <ul style="list-style-type: none"><li>• K5.1.X5/K3.1.X5 - A2.X4/K4.X7</li></ul> <p> <b>Note</b></p> <p>If the Ethernet extension switch is installed, connect and disconnect the connector K5.1.X5/K3.1.X5 to/from K4.X7.</p> <p>If the Ethernet extension switch is not installed, connect and disconnect the connector K5.1.X5/K3.1.X5 to/from A2.X4.</p> <ul style="list-style-type: none"><li>• K5.1.X4 - A2.X3</li><li>• The harness connected to I/O unit by customer</li></ul>	

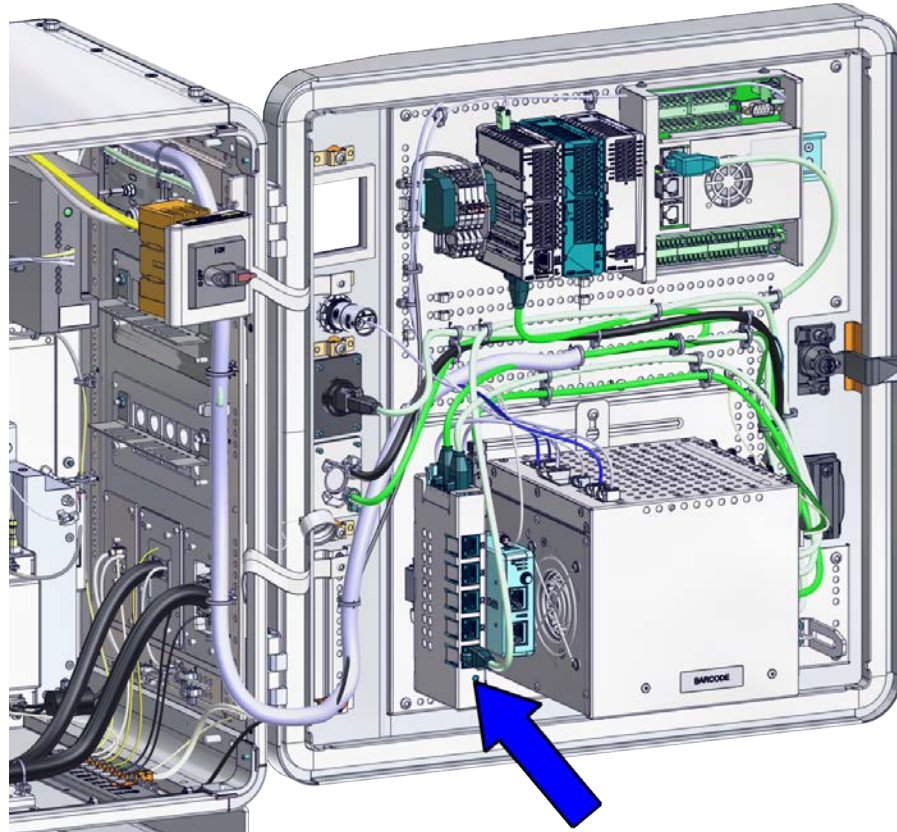
#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

#### 3.7.4 Installing the Ethernet extension switch

##### Location

The illustration shows the location of the Ethernet extension switch in the controller.



xx2400001358

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Ethernet Extension switch [3014-1]	3HAC059187-001	DSQC1035
Harness 24V_SYS	3HAC090414-001	

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### 3 Installation and commissioning

#### 3.7.4 Installing the Ethernet extension switch

*Continued*

##### Required tools and equipment



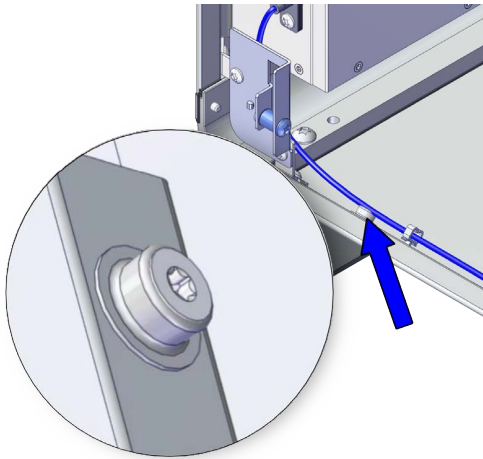
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

##### Required documents


Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Installing the Ethernet extension switch

##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

##### Refitting the Ethernet extension switch (option)


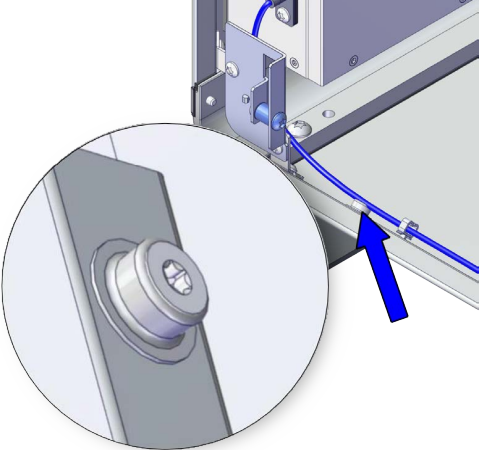

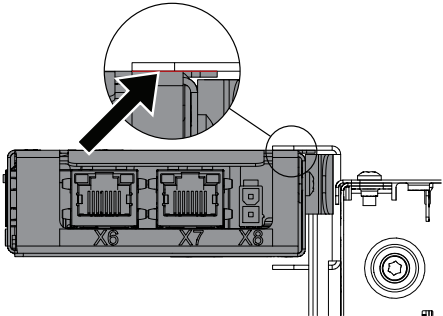
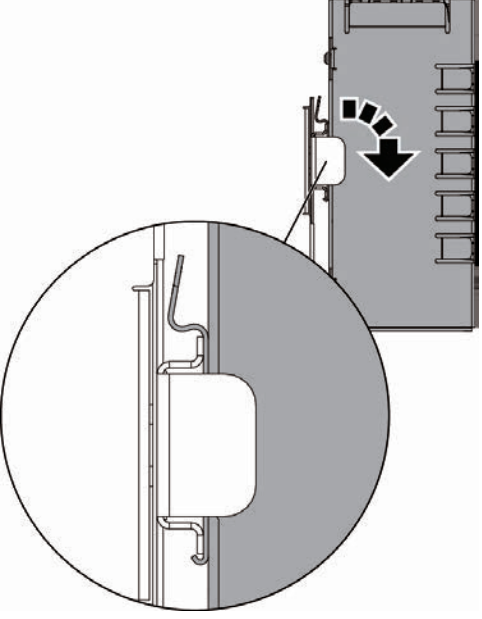
	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	

*Continues on next page*

### 3 Installation and commissioning

#### 3.7.4 Installing the Ethernet extension switch

Continued

	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Hook up the Ethernet extension switch to the bracket and then push the switch into position.</p> <p> <b>Note</b></p> <p>During the installation, there should be no gap between the upper surface of the Ethernet extension switch and the lower surface of highest bracket on the main computer.</p>  <p>xx1800000972</p>	 <p>xx2300001835</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	

#### Concluding procedure

	Action	Note/Illustration
1	<p>Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a>.</p>	

## 3 Installation and commissioning

### 3.7.5 Installing additional drive units

### 3.7.5 Installing additional drive units

#### General

The following sections describe the standard installation of additional drive units. For more complex configurations please contact ABB.

For information about additional axes, see *Application manual - Additional axes*.



#### Note

Make sure the robot software is configured to reflect the drive functions installed.

#### Additional axis brake snubber

Each time a motor brake is engaged, there will be an inductive kickback, that is a rapid change in voltage across the brake terminals. This is a result of the inherent inductance of the brake circuit.

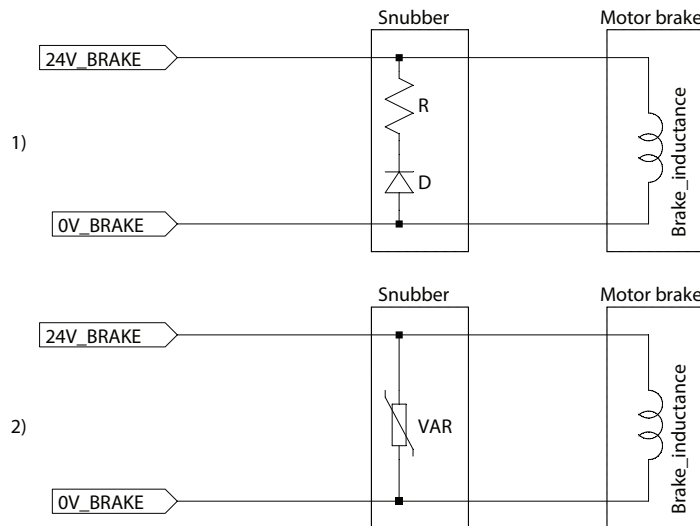
For robots, this inductive kickback is handled by individual snubbers at each motor and at the brake release board in the robot.

ABB products such as Track Motion, Positioners, Motor Units, Gear Units are equipped with integrated brake snubbers.

When integrating a motor not delivered by ABB, it is of great importance that the motor has a snubber fitted across the brake terminals, at the motor. Failure to do so will void warranty and may result in drive unit failure.

The maximum allowed voltage across the brake terminals is 65V.

The following illustration shows possible implementations of snubber circuits:



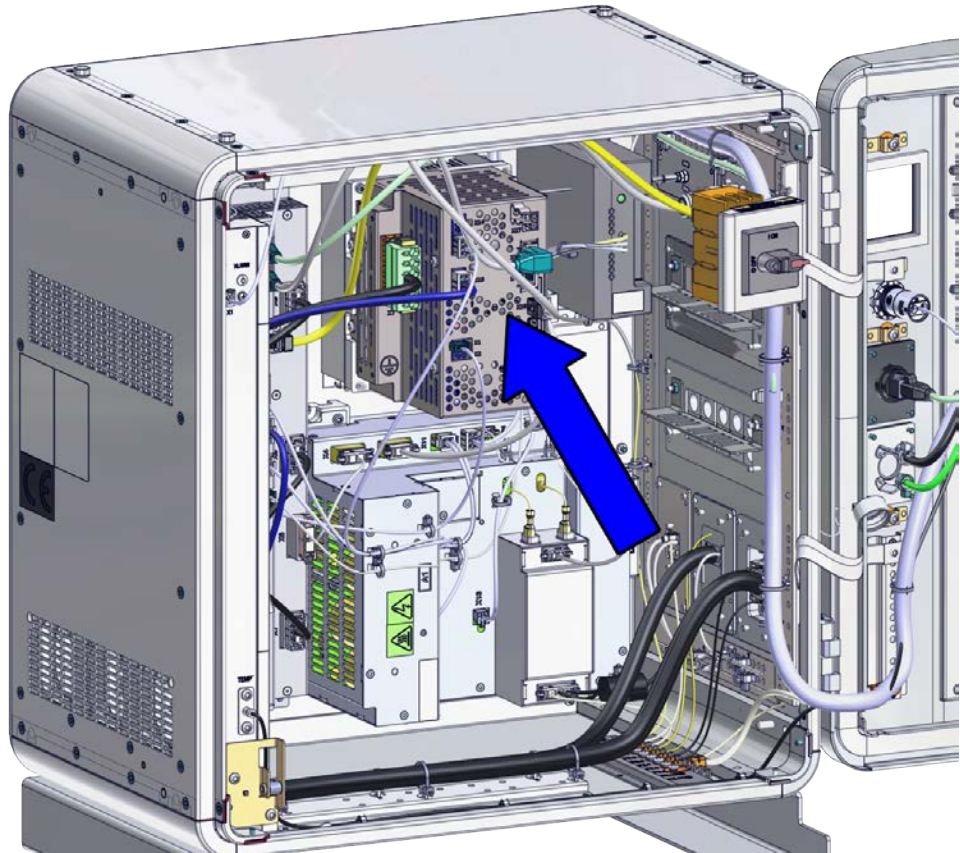
xx2200001374

1	The resistor in this snubber circuit may be omitted. The diode should be dimensioned for the same current as the relay coil, and a voltage of at least twice the brake release voltage.
2	The varistor should be dimensioned for the same energy as the brake coil.

*Continues on next page*

#### Location

The illustration shows the location of the additional drive unit in the controller.



xx2400001349



#### WARNING

Do not touch the drive unit when the **DC-BUS High Voltage LED** is on. There is residual voltage in the drive unit even if the main switch is in the OFF position.

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Drive unit	3HAC064983-001	DSQC 3065
Harness DC-BUS	3HAC089433-001	
Ethernet harness	3HAC089278-001	
Harness 24V_SYS_DRV	3HAC089430-001	

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### 3 Installation and commissioning

#### 3.7.5 Installing additional drive units

*Continued*

#### Required tools and equipment



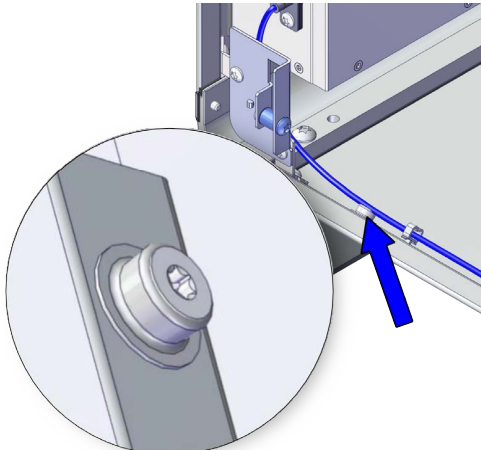
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Installing the additional drive unit

##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

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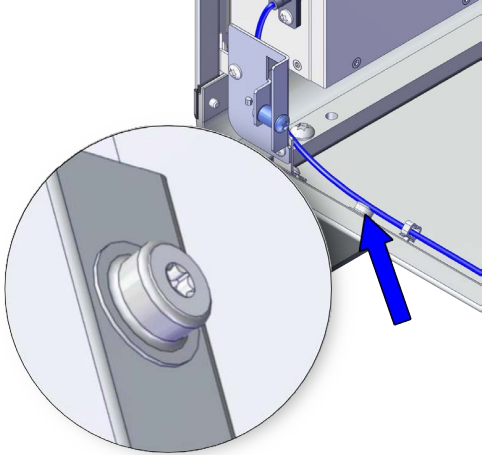
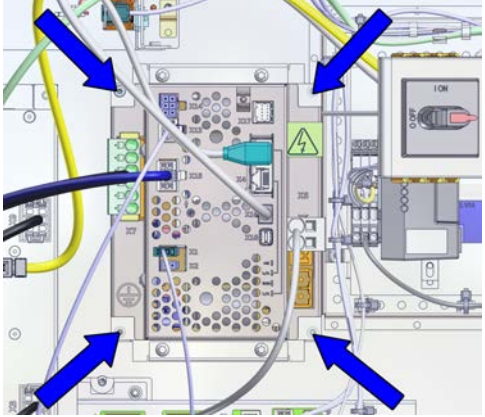


### 3 Installation and commissioning

#### 3.7.5 Installing additional drive units

*Continued*

#### Installing the additional drive unit

	Action	Note/Illustration
1	<p> <b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Fit the additional drive unit and secure with the screws.</p>	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2 Nm</p>  <p>xx2400001350</p>
4	<p>Connect:</p> <ul style="list-style-type: none"> <li>• T4.X7 - X12, T4.X15</li> <li>• T4.X17 - A1.X2</li> <li>• T4.X13 - A1.X11</li> <li>• T4.X5 - A1.X4</li> <li>• T4.X3 - A1.X12</li> <li>• T4.X1 - A1.X5</li> </ul>	

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### 3 Installation and commissioning

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#### 3.7.5 Installing additional drive units

*Continued*

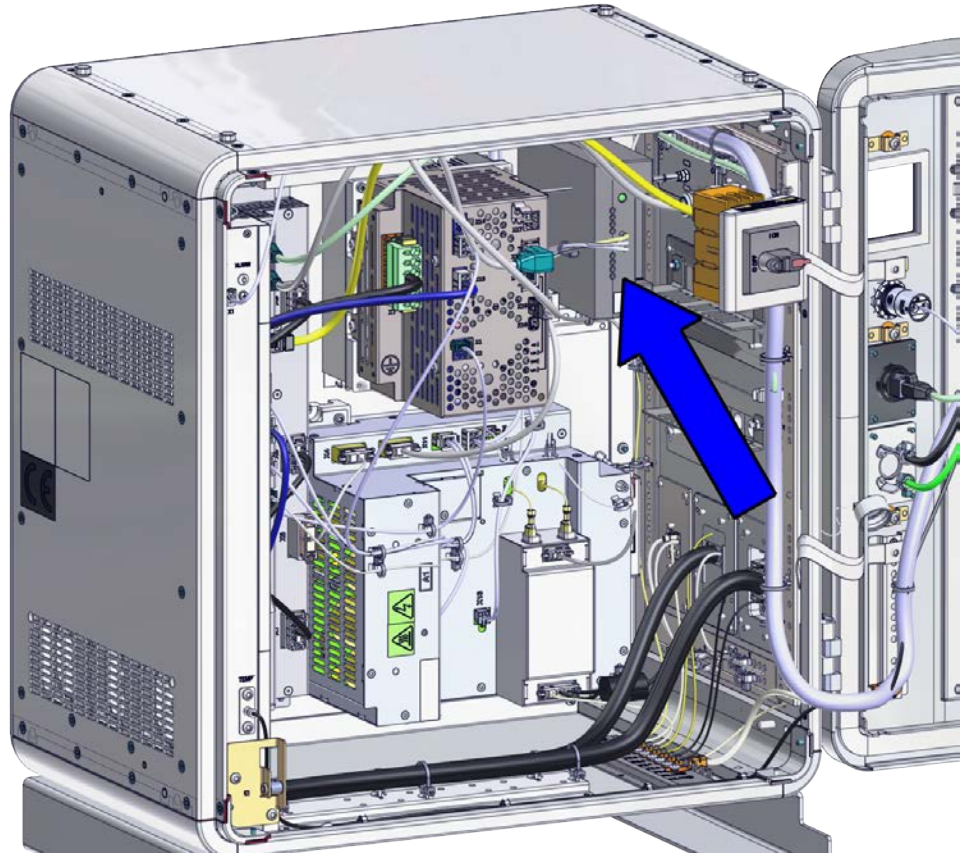
Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

#### 3.7.6 Installing the power supply optional device

##### Location

The illustration shows the location of the power supply optional device in the controller.



xx240001351

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
DSQC 609 power supply	3HAC14178-1	DSQC 609
DSQC 634 power supply	3HAC13398-2	DSQC 634
Harness AC input of power supply	3HAC069617-001	
Harness Terminal with cable	3HAC088876-001	
End clamp	3HAB7983-1	

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### 3 Installation and commissioning

#### 3.7.6 Installing the power supply optional device

*Continued*

#### Required tools and equipment



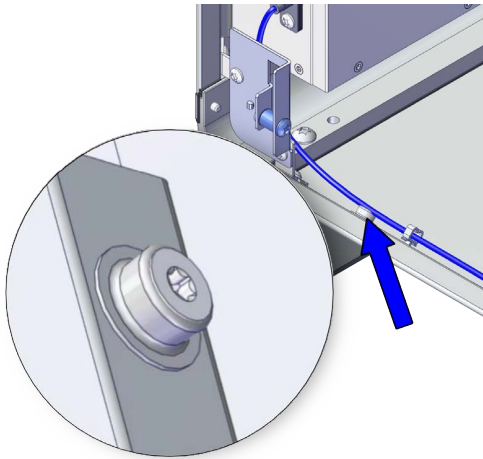
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Installing the optional power supply

##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

##### Installing the 24V terminal block

	Action	Note/Illustration
1	Hang the 24V terminal block to the bracket and push the lower part until you hear a clear clicking sound.	


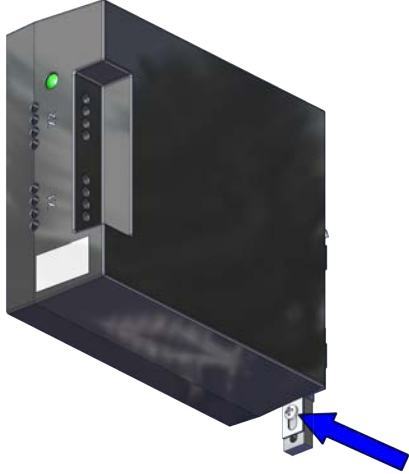
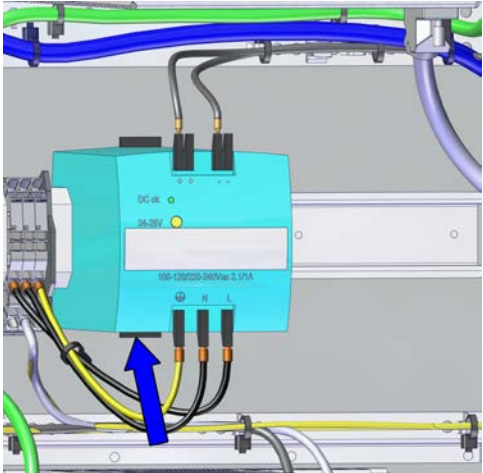
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### 3 Installation and commissioning

#### 3.7.6 Installing the power supply optional device

*Continued*

#### Fitting the optional power supply

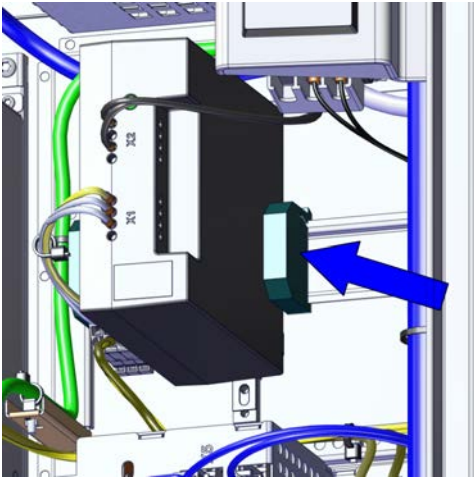

	Action	Note/Illustration
1	<p>Fit the power supply to the bracket.</p> <p> <b>Note</b></p> <p>For DSQC 609: Hang the power supply to the bracket and secure the power supply with the attached screw.</p> <p>For DSQC 634: Hang the power supply to the bracket and push the lower part until you hear a clear clicking sound.</p>	<p>For DSQC 609: Screws: Cross recessed cheese head screw M4x8 (1 pcs)</p>  <p>xx1900001908</p> <p>For DSQC 634:</p>  <p>xx1900001950</p>

*Continues on next page*

### 3 Installation and commissioning

#### 3.7.6 Installing the power supply optional device

Continued

	Action	Note/Illustration
2	Refit the end clamp besides the power supply.	<p>For DSQC 609:</p>  <p>xx1900001907</p>
3	<p>Connect:</p> <ul style="list-style-type: none"> <li>• T5.X1-AC Terminal block</li> <li>• T5.X2-24V Terminal block</li> </ul> <p> <b>Note</b></p> <p>The connector on the AC_in cable (3HAC061099-001) is fastened to the cable clip in the illustration when the power supply optional is not selected.</p>	

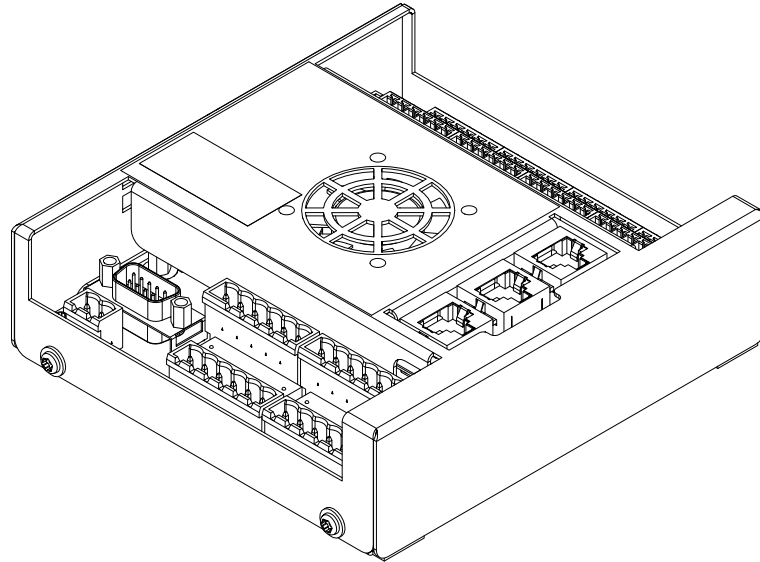
#### Concluding procedure

	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

### 3.7.7 Installing the conveyor tracking module

#### Overview

The conveyor tracking module uses network communication to share conveyor speed and position data with one or more robot controllers. It contains a WAN port, which is used to connect to the robot controllers and two LAN ports that can be used for installation and service purposes.



xx1800000941

#### Required parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Conveyor tracking module [3103-1]	3HNA027579-001	DSQC2000
CONNECTOR KIT - DSQC2000	3HNA029345-001	

#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

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### 3 Installation and commissioning



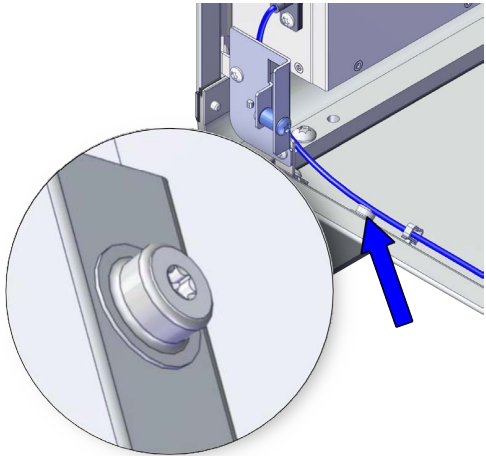
#### 3.7.7 Installing the conveyor tracking module

*Continued*

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	
<i>Application manual - Conveyor tracking</i>	3HAC066561-001	

#### Installing the conveyor tracking module

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  <small>xx1900001446</small>
3	Open the door.	<a href="#">Opening the door on page 196</a> .

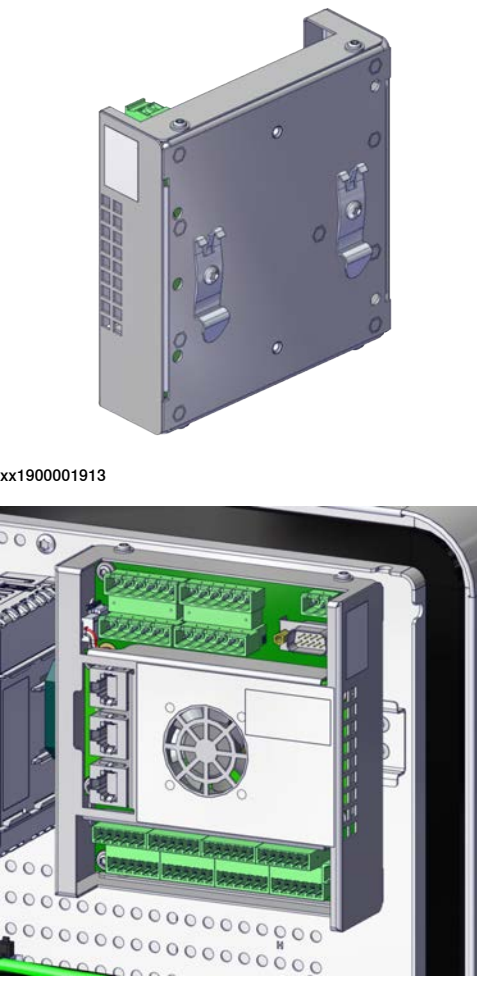
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### 3 Installation and commissioning

#### 3.7.7 Installing the conveyor tracking module

*Continued*

	Action	Note/Illustration
4	Fit the conveyor tracking module and push the lower part until you hear a clear clicking sound.	 <p>The illustration shows the conveyor tracking module (xx1900001913) being inserted into the chassis (xx1900001912). The top part shows the module from an external perspective, and the bottom part shows it being pushed into the chassis, with green terminal blocks visible inside.</p>
5	Connect: <ul style="list-style-type: none"> <li>• B1.X1 - K2.X19.1, K2.X19.2 (Power cable)</li> <li>• B1.X7 - K4.X1-5 (Ethernet cable)</li> </ul>	
6	Connect wires to the input and output connectors as required.	See <i>Application manual - Conveyor tracking</i> .
7	Close the door.	<a href="#">Closing the door on page 196.</a>
8	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

For more information about the option *Conveyor Tracking*, see *Application manual - Conveyor tracking*.

### 3 Installation and commissioning

#### 3.7.8 Installing the cable grommet assembly

#### 3.7.8 Installing the cable grommet assembly

##### Location

The illustration shows the location of the cable grommet assembly on the controller.



xx2400001352



##### Note

The end user need to buy proper grommets according to the diameter of the cables which need to go through the grommet.

This will affect the protection level of the cabinet if it's not executed correctly.

It is recommended to use icotek KT grommet.

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Cable grommet asm	3HAC066396-001	

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### 3 Installation and commissioning

#### 3.7.8 Installing the cable grommet assembly

*Continued*

#### Required tools and equipment



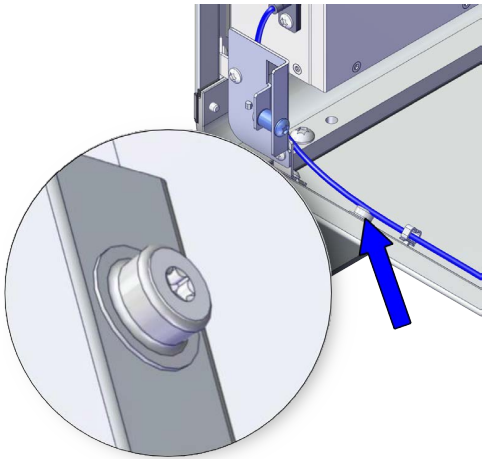
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Installing cables with the cable grommet assembly

#### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

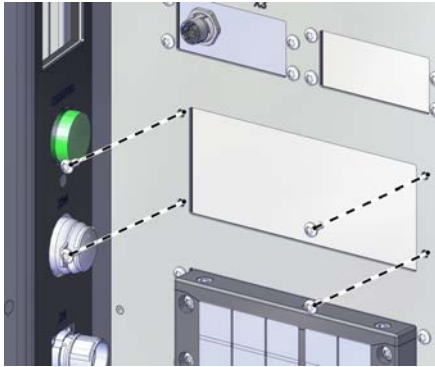
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### 3 Installation and commissioning

#### 3.7.8 Installing the cable grommet assembly


*Continued*

##### Removing the slot cover (baseline)

	Action	Note/Illustration
1	Remove the attachment screws.	 xx1900002444
2	Take out the cover from the inside of the controller.	

##### Refitting the cable grommet assembly

##### Refitting the cables to the cable grommet assembly



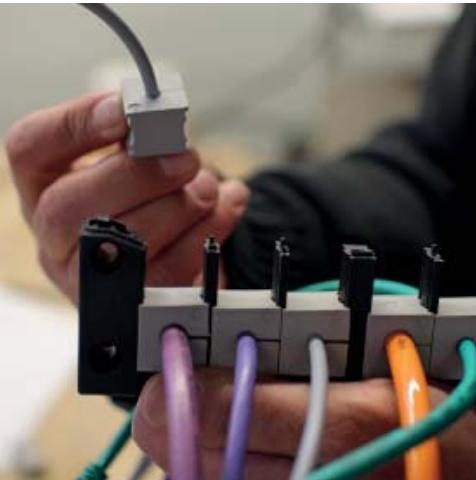
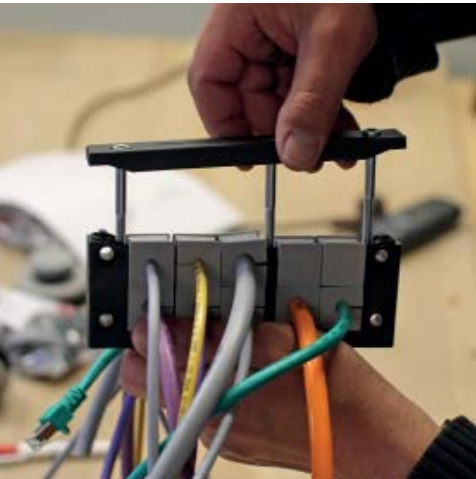
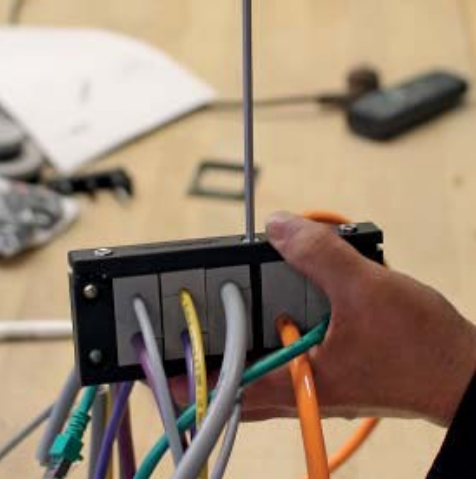
	Action	Note/Illustration
1	Insert and equip the cable to the corresponding KT grommet.	 xx1900002337

*Continues on next page*

### 3 Installation and commissioning

#### 3.7.8 Installing the cable grommet assembly

*Continued*



	Action	Note/Illustration
2	<p>Slide the grommets into the frame halves.</p> <p> <b>Note</b></p> <p>It must be ensured that the flat side of the grommets in the lower row are pointing to the open side of the frame half (flat sides pointing upwards).</p> <p> <b>Note</b></p> <p>The flat side of the grommets in the upper row have to point downwards so that all flat sides rest on each other. When using single row frames the flat side has to point towards the cover strip.</p>	 <p>xx1900002336</p>
3	<p>Refit the cover strip onto the frame.</p>	 <p>xx1900002335</p>
4	<p>Secure the frame and cover strip with the screws.</p>	<p>Screws: Hex socket head cap screw M5x50 12.9 Lafre 2C2B/FC6.9 (3 pcs) Tightening torque: 2 Nm - 3 Nm.</p>  <p>xx1900002334</p>

*Continues on next page*


### 3 Installation and commissioning

#### 3.7.8 Installing the cable grommet assembly

Continued

	Action	Note/Illustration
5	Route the cables through the cut-out.	 <p>xx1900002333</p>
6	Refit the cable entry frame to the enclosure wall and secure with the screws.	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.5 Nm.</p>  <p>xx1900002332</p>

#### Refitting the cable grommet assembly


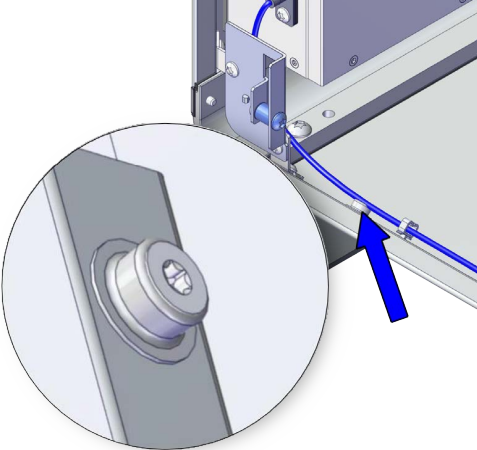
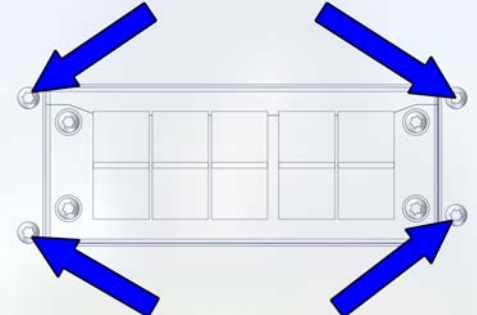
	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

Continues on next page

### 3 Installation and commissioning

#### 3.7.8 Installing the cable grommet assembly

*Continued*

	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Insert the cable grommet assembly into the cover of the cabinet. Secure it with the screws.</p>	<p>Screws: Torx pan head screw M4x8 (4 pcs)</p>  <p>xx2400001381</p>

#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<i>Closing the door on page 196.</i>
2	Perform the function tests to verify that the safety features work properly, see <i>Function tests on page 185</i> .	

### 3 Installation and commissioning

#### 3.7.9 Installing the air filter

#### 3.7.9 Installing the air filter

##### Location

The illustration shows the location of the air filter on the controller.



xx2400001353

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Air filter-coarse filter	3HAC080919-001	
Air filter-Fine filter	3HAC080920-001	
Air filter (Polymeric)	3HAC068543-001	Filter element of fine filter

*Continues on next page*





#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Installing the air filter

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	<p>Fit the air filter to the cabinet. Secure it with the screws.</p>	 <p>xx1900001492</p>
3	<p>Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a>.</p>	

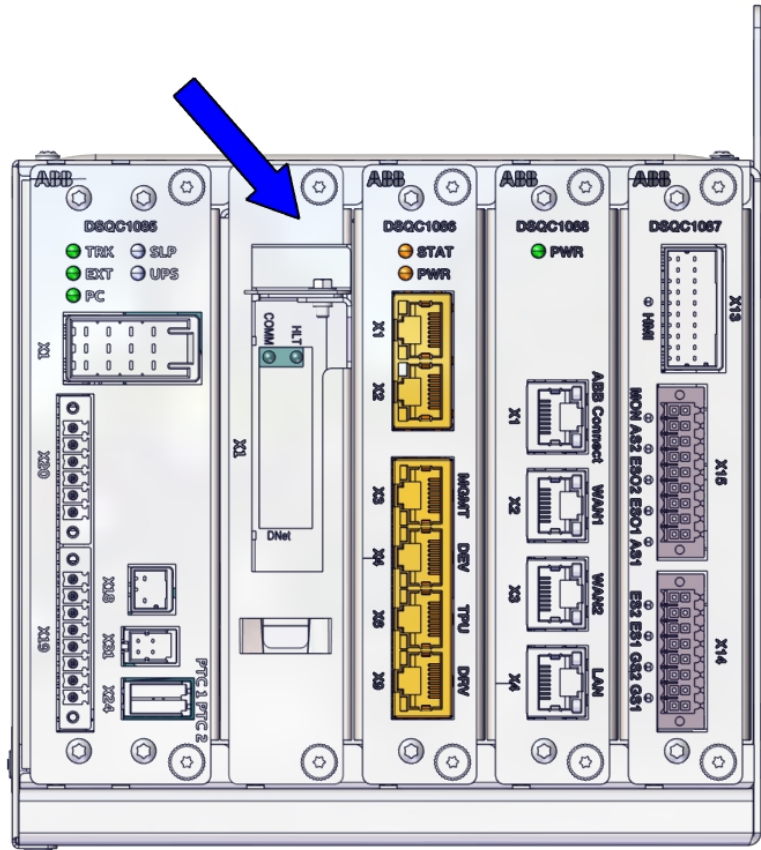
### 3 Installation and commissioning

#### 3.7.10 Installing the DeviceNet board

#### 3.7.10 Installing the DeviceNet board

##### Location

The illustration shows the location of the DeviceNet board DSQC1096 in the main computer.



xx2300001738

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
DeviceNet M/S [3029-1]	3HAC085254-001	DSQC1096
Connector assembly Single-row female	3HAC064901-001	Mating CONN for IP20 DeviceNet connector

Continues on next page

#### Required tools and equipment



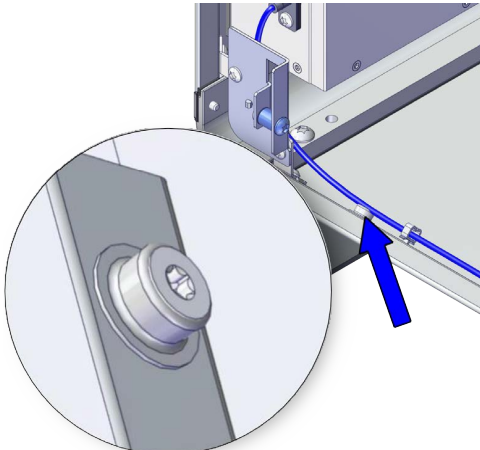
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Installing the DeviceNet board

##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

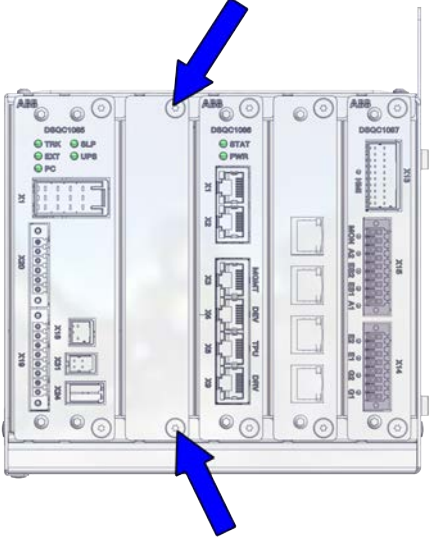
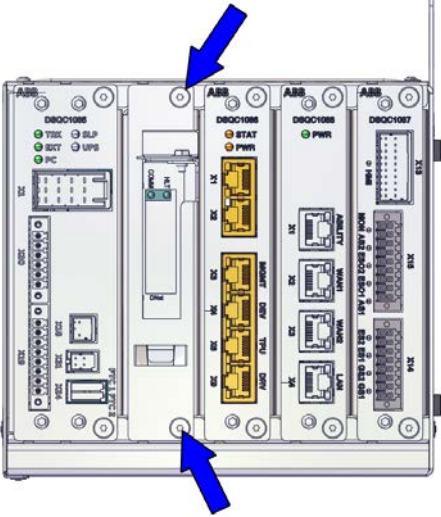
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### 3 Installation and commissioning

#### 3.7.10 Installing the DeviceNet board

Continued

#### Installing the DeviceNet board

	Action	Note/Illustration
1	Loosen the screws that hold the cover plate.	 <p>xx2400001355</p>
2	Remove the cover plate from the main computer assembly.	
3	Insert the DeviceNet board into the slot in the main computer assembly.	
4	Secure the screws that hold the DeviceNet board unit.	 <p>xx2300000921</p>

#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

#### 3.7.11 Installing the motor connection box

##### Location

The motor connection box location is decided by the customer.

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Motor Connection Box	3HAC087717-001	3-axis
Motor Connection Box	3HAC087718-001	3-axis, BRB

##### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	



##### Note

It is the responsibility of the integrator to install a quenching circuit when connecting third party motors.

##### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

##### Installing the motor connection box


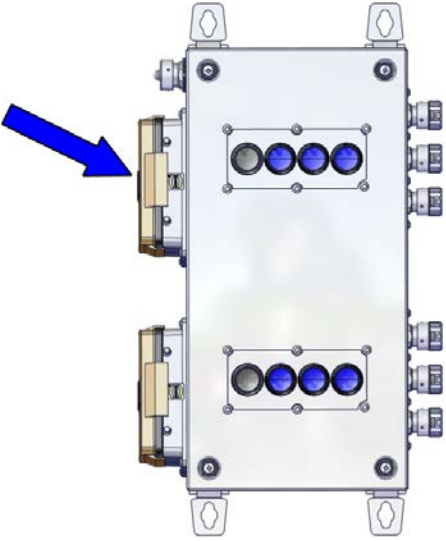
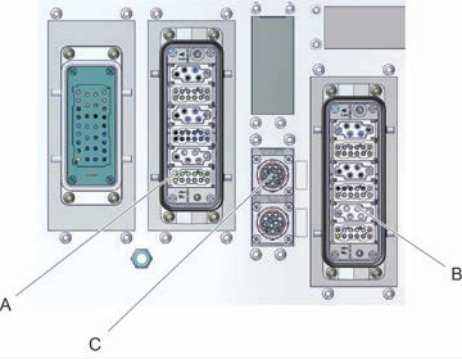
	Action	Note/Illustration
1	<b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	

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### 3 Installation and commissioning

#### 3.7.11 Installing the motor connection box

Continued

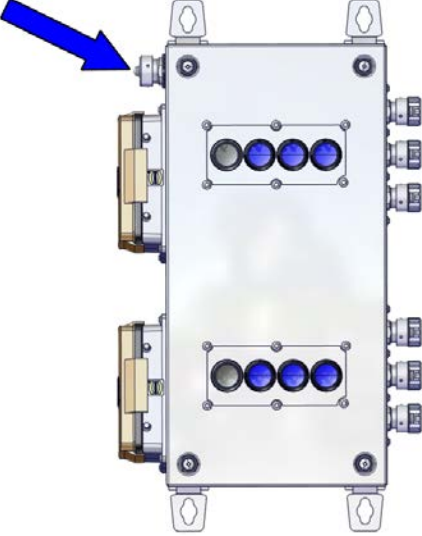
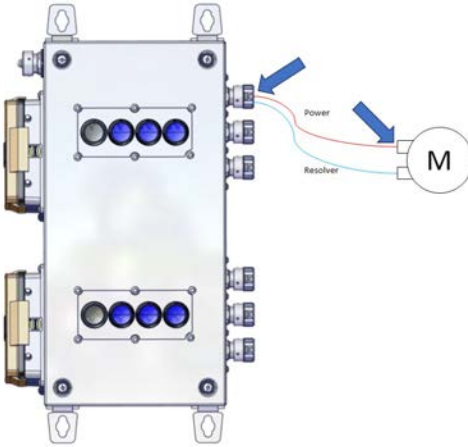
	Action	Note/Illustration
2	Fit the motor connection box in its location. Secure with screws.	 <b>Note</b> Due to the stiffness of the floor cables, the minimum required space beside the motor connection box is 330 on the left side and 180 on the right side.
3	If third party motors are to be connected, install a quenching circuit.	
4	Connect the motor cable to the motor connection box.	 xx2300001746
5	Connect the cables from the motor connection box to the connectors for ADU 1-3 (A) and ADU 4-6 (B) on the cabinet.	 xx2300001919
6	Connect the SMB cable to the SMB connector for ADU 1-6 (C) on the cabinet.	

Continues on next page

### 3 Installation and commissioning

#### 3.7.11 Installing the motor connection box

*Continued*

Action	Note/Illustration
7	<p>Connect the SMB cable to the motor connection box.</p>  <p>xx2300001747</p>
8	<p>Connect motor cables and resolver cables to the auxiliary equipment motor.</p>
9	<p>Connect motor cables and resolver cables to the motor connection box.</p>  <p>xx2300001850</p>
10	<p>Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a>.</p>

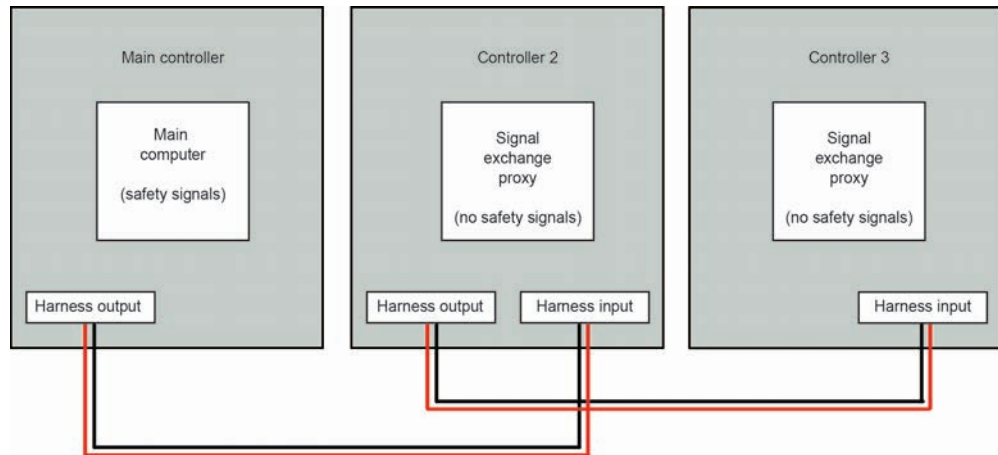
## 3 Installation and commissioning

### 3.7.12 Installing MultiMove controllers

#### 3.7.12 Installing MultiMove controllers

##### Main robot and additional robot

A MultiMove controller that handles several robots uses an additional controller per robot, that is, a MultiMove installation consists of one main controller and up to two additional controllers.



xx240000971

The main computer in the main controller is used for all robots in the MultiMove configuration. The secondary controller does not have a main computer, but a robot signal proxy that handles the communication with the main computer in the main controller.

The communication between the controllers is handled with Ethernet and EtherCAT cables, combined in one harness. Ethernet is used for auxiliary functions, while EtherCAT is used for the drive system and safety signals.

This manual only describes the principles for installation and commissioning of the MultiMove controller. For detailed information about the MultiMove functionality, software installation and configuration, see *Application manual - MultiMove*.

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Harness MultiMove 4 m	3HAC088555-001	[3102-3] Additional Robot

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### 3 Installation and commissioning

#### 3.7.12 Installing MultiMove controllers

*Continued*


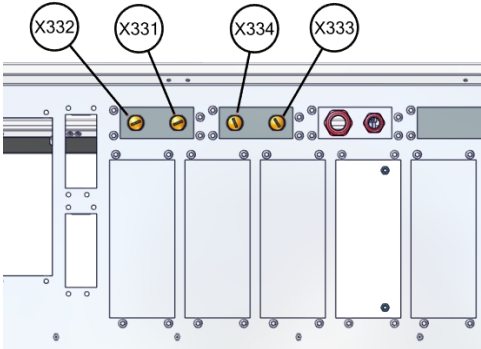


#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<a href="#">Circuit diagram - OmniCore C90XT Type A</a>	3HAC086305-010	

#### Installing MultiMove controllers


	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	Remove the dust caps from the harness output and input connectors.	
4	Connect the MultiMove harness between the main controller and controller 2: <ul style="list-style-type: none"> <li>X331 and X332 (main controller) - X333 and X334 (controller 2)</li> </ul>	 <p>xx2400000997</p> <p> <b>Note</b>            Make sure that the arrows on the cable and the connector are aligned.</p>
5	Connect the MultiMove harness between controller 2 and 3: <ul style="list-style-type: none"> <li>X331 and X332 (controller 2) - X333 and X334 (controller 3)</li> </ul>	<p> <b>Note</b>            Make sure that the arrows on the cable and the connector are aligned.</p>

*Continues on next page*

### 3 Installation and commissioning

#### 3.7.12 Installing MultiMove controllers

*Continued*

	Action	Note/Illustration
6	Ensure that all safety equipment is connected to the main computer in the main controller.	 <b>DANGER</b> Protective and emergency stop functions must not be connected to the robot signal exchange unit in controller 2 and/or 3.
7	Connect the manipulators to the controllers.	<a href="#">Connecting the manipulator to the controller on page 84.</a>
8	Connect all controllers to incoming mains.	<a href="#">Connecting incoming mains and protective earth to the controller on page 88</a>
9	Close the door.	<a href="#">Closing the door on page 196.</a>
10	Perform software installation and configuration.	See <i>Application manual - MultiMove 3HAC089689-001</i> .
11	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

## 3.8 Installing add-on devices

### 3.8.1 Installing the extension box

#### General

As an option an empty extension box can be purchased, to use for custom equipment. The extension box can be installed on the basic box or anywhere else as a standalone equipment.



xx2400001356



#### Note

Connect PE19 as grounding for the extension box in any use case.

#### Required equipment

Equipment	Information
Standard toolkit	See <a href="#">Standard toolkit for controller on page 430</a> .

#### Specifications

It is recommended to use multicore cable for the customer connection. The following describes the cable requirements for the X106 connection in the extension box.

Component	Description
Cable type	Flexible oil resistant rubber

*Continues on next page*

### 3 Installation and commissioning

#### 3.8.1 Installing the extension box

*Continued*

Component	Description
Cable area	4C x 0.5 mm <sup>2</sup> or AWG20


#### Included parts

The following parts are included in the delivery when the extension box is selected.

Part	Order number	Quantity
Connector ext.box 24V_fan	3HAC074661-001	1
Harness ext.box fan power adapter	3HAC069229-001	1

#### Procedure

Use this procedure to stack an extension box to a basic box.


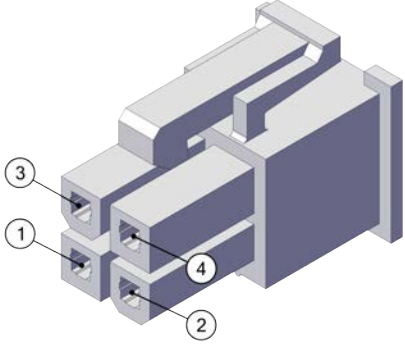
	Action	Info/illustration
1	Place the controller in desired place.	
2	Fix the basic box to a concrete foundation or steel platform with anchor bolts.	Anchor bolts: M8 X 4 Tighten torque: 11.3 Nm-12.6 Nm
3	Remove the four plastic screw.	 xx2400001413

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### 3 Installation and commissioning

#### 3.8.1 Installing the extension box

*Continued*

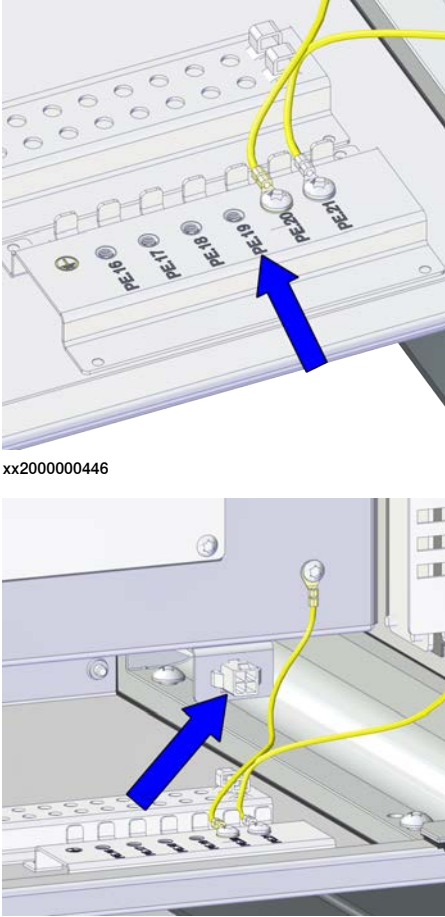

	Action	Info/illustration								
4	Assemble the hexalobular socket pan head screws onto the cabinet.	 <p>xx2400001414</p>								
5	Place the extension box upright the basic box with lifting accessory. Lock them with screws.									
6	Open the door of the extension box.	<a href="#">Opening the door on page 196.</a>								
7	Fit the connector (3HAC074661-001) for X106.	 <p>xx2000000690</p> <table data-bbox="1023 1541 1114 1666"><tr><td>1</td><td>24 V</td></tr><tr><td>2</td><td>0 V</td></tr><tr><td>3</td><td>24 V</td></tr><tr><td>4</td><td>0 V</td></tr></table>	1	24 V	2	0 V	3	24 V	4	0 V
1	24 V									
2	0 V									
3	24 V									
4	0 V									

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### 3 Installation and commissioning

#### 3.8.1 Installing the extension box

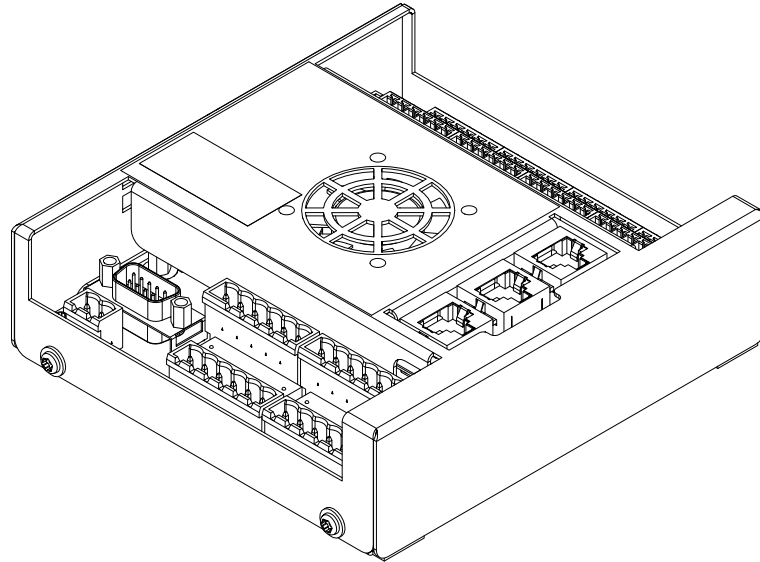
Continued

	Action	Info/illustration
8	<p>Connect through the cable grommet:</p> <ul style="list-style-type: none"><li>• PE19</li><li>• X106</li></ul>	<p>How to insert cable through cable grommet, see <a href="#">Releasing the cables from the cable grommet assembly on page 313</a> and <a href="#">Refitting the cables to the cable grommet assembly on page 316</a>.</p>  <p>xx2000000446</p> <p>xx2000000689</p>
9	<p>Install the equipment to the extension box according to your requirements.</p> <p> <b>WARNING</b></p> <p>ABB only offers the extension box as an encapsulation for customer installing external devices.</p> <p>It is the system builder's responsibly to ensure the complacence with electrical safety, for example the Low Voltage Directive.</p>	

### 3.8.2 Installing the conveyor tracking module to extension box

#### Overview

The conveyor tracking module uses network communication to share conveyor speed and position data with one or more robot controllers. It contains a WAN port, which is used to connect to the robot controllers and two LAN ports that can be used for installation and service purposes.



xx180000941

#### Required parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Conveyor tracking module [3103-1]	3HNA027579-001	DSQC2000
CONNECTOR KIT - DSQC2000	3HNA029345-001	

#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

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### 3 Installation and commissioning



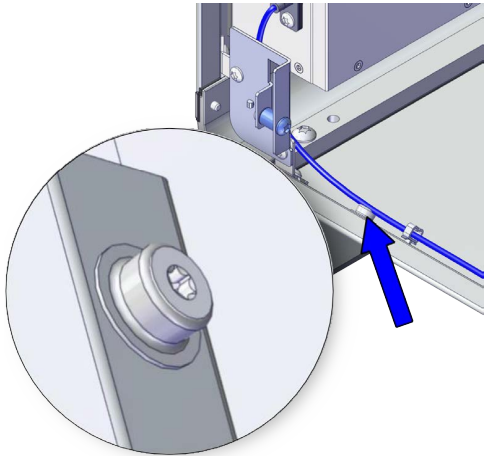
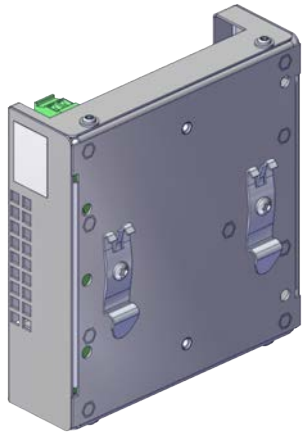
#### 3.8.2 Installing the conveyor tracking module to extension box

Continued

#### Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	
Application manual - Conveyor tracking	3HAC066561-001	

#### Installing the conveyor tracking module

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446
3	Open the door of the extension box.	<a href="#">Opening the door on page 196</a> .
4	Fit the conveyor tracking module by snapping it onto the mounting rail.	 xx1900001913

Continues on next page



### 3 Installation and commissioning

#### 3.8.2 Installing the conveyor tracking module to extension box

*Continued*

	Action	Note/Illustration
5	Connect the 24V power supply to the conveyor tracking module from the basic box or other power supply.	How to insert cable through cable grommet, see <a href="#">Releasing the cables from the cable grommet assembly on page 313</a> and <a href="#">Refitting the cables to the cable grommet assembly on page 316</a> .
6	Connected to Ethernet through the cable grommet: <ul style="list-style-type: none"><li>• B1.X7 - K4.X1-5</li></ul>	For details on connecting wires to the conveyor tracking module, see <i>Application manual - Conveyor tracking</i> .
7	Connect wires to the input and output connectors as required.	
8	Close the door.	<a href="#">Closing the door on page 196</a> .
9	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

For more information about the option *Conveyor Tracking*, see *Application manual - Conveyor tracking*.

## 3 Installation and commissioning

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### 3.9 Installing external devices

### 3.9 Installing external devices

---

#### General



#### **WARNING**

Only LVD<sup>1</sup> equipments can be installed on the door of the controller.



#### **WARNING**

ABB only offers the extension box as an encapsulation for customer installing external devices.

It is the system builder's responsibly to ensure the complacence with electrical safety, for example the Low Voltage Directive.

<sup>1</sup> Low Voltage Directive

### 3.10 Initial test before commissioning

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#### Protective earth

Before supplying power to the robot and commissioning, verify that the cabinet is connected to protective earth according to [Connecting incoming mains and protective earth to the controller on page 88](#).

---

#### Function tests

Before commissioning, perform the function tests in section [Function tests on page 185](#) to verify that the safety features work properly.

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## 4 Maintenance

### 4.1 Maintenance schedule for the OmniCore controller

#### General

The controller must be maintained at regular intervals to ensure its function. The activities and intervals are described in this section.

#### Activities and intervals

Equipment	Maintenance activity	Interval	Detailed in section:
Complete controller	Inspection	12 months <sup>i</sup>	<a href="#">Inspecting the OmniCore C90XT Type A controller on page 174</a>
Air filter	Cleaning		<a href="#">Cleaning air filter on page 175</a>
Air filter	Replacement	24 months	<a href="#">Replacement of air filter on page 181</a>
Air filter element	Replacement	24 months	<a href="#">Replacement of air filter on page 181</a>
System fans	Inspection	6 months <sup>i</sup>	<a href="#">Inspecting the OmniCore C90XT Type A controller on page 174</a>
Control cabinet	Cleaning		<a href="#">Cleaning of the controller cabinet on page 178</a>
FlexPendant	Cleaning	When needed	<a href="#">Cleaning the FlexPendant on page 179</a>
Emergency stop (FlexPendant)	Function test	12 months	<a href="#">Function test of emergency stop on page 185</a>
Manual, auto and manual full speed mode with FlexPendant	Function test	12 months	<a href="#">Function test of manual, auto, and manual full speed mode with FlexPendant on page 186</a>
Enabling device	Function test	12 months	<a href="#">Function test of three-position enabling device on page 187</a>
Auto stop (tested if used)	Function test	12 months	<a href="#">Function test of Automatic Stop on page 189</a>
General stop (tested if used)	Function test	12 months	<a href="#">Function test of General Stop on page 190</a>
External emergency stop (tested if used)	Function test	12 months	<a href="#">Function test of external emergency stop on page 191</a>
ESTOP_STATUS output (tested if used)	Function test	12 months	<a href="#">Function test of ESTOP_STATUS output on page 192</a>
Reduced speed control	Function test	During commissioning	<a href="#">Function test of reduced speed control on page 193.</a>

<sup>i</sup> The interval depends on the working environment of the equipment: a cleaner environment may extend the maintenance interval and vice versa.

#### Function test after replacement of component

After replacing a component in the controller, the function tests should be performed. See [Function tests on page 185](#).



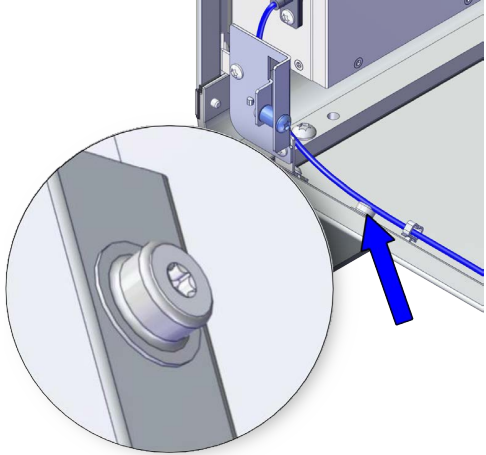
## 4 Maintenance

### 4.2.1 Inspection of controller

## 4.2 Inspection activities

### 4.2.1 Inspection of controller

#### Inspecting the OmniCore C90XT Type A controller

	Action	Note/illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446
3	Inspect connectors and cabling to make sure they are securely fastened and cabling not damaged.	
4	Inspect the fans and ventilation holes to make sure they are clean.	
5	After inspection: Temporarily turn the power supply on. Inspect the fans to make sure they function correctly. Switch the power off.	

4.3 Cleaning activities

4.3.1 Cleaning air filter



**Note**

When cleaning or replacing the air filter, there may be a dust hazard. Appropriate personal protective equipment is required.

**Location**

The air filter is located as shown in the illustration below.



xx2400001353

**Required equipment**

Equipment	Note
Cleaning agent	Water 30-40 °C with cleansing liquid or detergent.
Vacuum cleaner	

*Continues on next page*

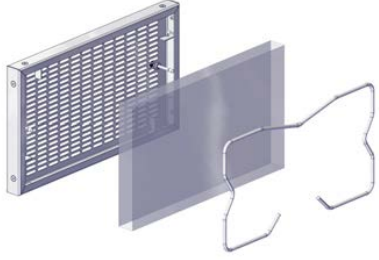

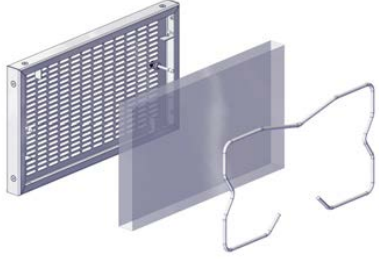
## 4 Maintenance

### 4.3.1 Cleaning air filter

*Continued*

#### Cleaning the fine filter (polymeric filter)

The procedure below details how to clean the fine filter, that is option *3005-2 Moist dust filter*.

	Action	Note/Illustration
1	Remove the air filter unit.	
2	Remove the polymeric filter element.	 xx2000000421
3	Clean the filter three or four times.	
4	Allow the filter to dry in one of these ways: <ul style="list-style-type: none"><li>• Lying flat on a flat surface</li><li>• Use a vacuum cleaner to suck in the opposite direction of the filter airflow.</li></ul>	 <b>Note</b> Do not wring the filter to press out water.
5	Insert the polymeric filter element to the filter and secure with the metallic line.	 xx2000000421
6	Refit the air filter unit to the cabinet.	

#### Cleaning the coarse filter (metal mesh)

The procedure below details how to clean the coarse filter, that is option *3005-1 Moist particle filter*.




#### Note

The coarse filter cannot be separated from the filter assembly.

*Continues on next page*



	Action	Note/Illustration
1	Remove the air filter unit.	 <p data-bbox="1002 719 1107 741">xx1900001492</p>
2	Clean the metal mesh filter with compressed air.	
3	Refit the air filter unit to the cabinet.	

## 4 Maintenance

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### 4.3.2 Cleaning of the controller cabinet

### 4.3.2 Cleaning of the controller cabinet

---

#### Required equipment

Equipment, etc.	Note
Vacuum cleaner	ESD protected

---

#### Cleaning considerations

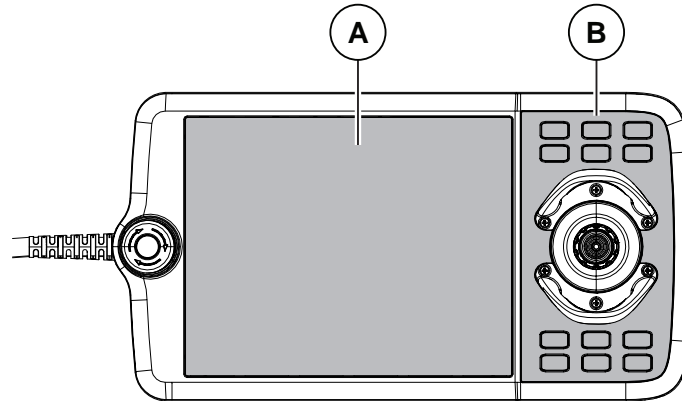
This section specifies some special considerations when cleaning the controller.

- Always use ESD protection.
- Always use cleaning equipment as specified above. Any other cleaning equipment may shorten the life of paint work, rust inhibitors, signs, or labels.
- Always make sure that all protective covers are fitted to the controller before cleaning.
- Never remove any covers or other protective devices when cleaning the outside of the controller.
- Never use compressed air or spray with a high pressure cleaner.
- Never leave the door open when cleaning the exterior.

### 4.3.3 Cleaning the FlexPendant

#### Location

The surfaces to clean are shown in the illustration below.



xx180000128

A	Touch screen
B	Hard buttons

#### Required equipment

Equipment, etc.	Note
Soft cloth	ESD protected
Water/Mild cleaning agent	

#### Clean the touch screen

This section describes how to clean the touch screen.

	Action	Info/Illustration
1	Lock the screen.	
2	It is safe to clean the FlexPendant when the Lock screen appears.	
3	Clean the touch screen and hardware buttons using a soft cloth and water or a mild cleaning agent.	
4	Unlock the screen, by tapping the buttons.	

#### Cleaning considerations

The section below specifies some special considerations when cleaning the FlexPendant:

- Use ESD Protection
- Use cleaning equipment as specified above. Any other cleaning equipment may shorten the life time of the touch screen.
- Check that all protective covers are fitted to the device before cleaning.
- Make sure that no foreign objects or liquids can penetrate into the device.

*Continues on next page*

## 4 Maintenance

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### 4.3.3 Cleaning the FlexPendant

*Continued*

- Do not remove any covers before cleaning the FlexPendant.
- Do not spray with a high pressure cleaner.
- Do not clean the device, operating panel and operating elements with compressed air, solvents, scouring agent or scrubbing sponges.

4.4 Changing/replacing activities

4.4.1 Replacement of air filter

Location

The air filter is located as shown in the illustration below.



xx2400001353

Required equipment

Equipment	Note
Air filter	
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.

Continues on next page


## 4 Maintenance

### 4.4.1 Replacement of air filter

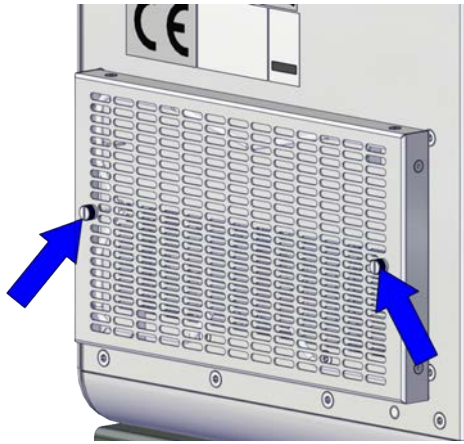

*Continued*

#### Removing the air filter

##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	

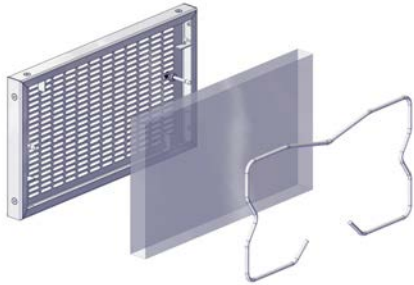
#### Removing the air filter

	Action	Note/Illustration
1	Loosen the attachment screws on the air filter.	 xx1900001491
2	Remove the air filter unit.	 xx1900001492

*Continues on next page*

#### Removing the polymeric filter element

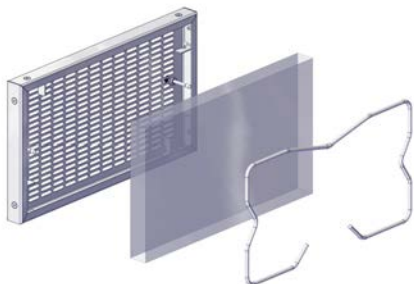
The procedure below details how to remove the polymeric filter element (option *3005-2 Moist dust filter*).

	Action	Note/Illustration
1	Take out the polymeric filter element from the filter.	 <p>xx2000000421</p>


#### Refitting the air filter

##### Refitting the polymeric filter element

The procedure below details how to refit the polymeric filter element (option *3005-2 Moist dust filter*).

	Action	Note/Illustration
1	Insert the polymeric filter element to the filter and secure with the metallic line.	 <p>xx2000000421</p>

##### Refitting the air filter


	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Refit the air filter unit to the cabinet.	

*Continues on next page*

## 4 Maintenance

### 4.4.1 Replacement of air filter

*Continued*

	Action	Note/Illustration
3	Secure it with the screws.	 <p>xx1900001492</p>

#### Concluding procedure

	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	



## 4.5 Function tests

### 4.5.1 Function test of emergency stop

#### Overview

Validate the function of the FlexPendant emergency stop device.



#### Note

Also perform the test for any additional emergency stop devices.

#### Performing the function test

	Action	Note
1	Make a visual inspection of the emergency stop device to make sure it is not physically damaged.	If any damage is found on the emergency stop device, it must be replaced.
2	Pull and rotate the emergency stop device clockwise to verify that it is not pressed in.	
3	Power on the robot.	
4	Press the emergency stop device on the FlexPendant.  <b>Note</b> If the event message <b>20223 Emergency stop conflict</b> appears in the event log, or the event message <b>10013 Emergency stop state</b> (and <b>90518 Safety controller Emergency stop triggered</b> for robots prepared for collaborative applications) does not appear, then the test has failed and the root cause of the failure must be found.	The test is passed if the event message <b>10013 Emergency stop state</b> appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: <ul style="list-style-type: none"> <li>• if the event message <b>10013 Emergency stop state</b> does not appear</li> <li>• if the event message <b>90780 Two-channel fault in Safety Controller</b> appears</li> </ul> <b>Note</b> For robots prepared for collaborative applications, the event message <b>90518 Safety controller Emergency stop triggered</b> appears by default. The message <b>10013 Emergency stop state</b> is also available in the event log.
5	Release the emergency stop device to reset the emergency stop state.	

## 4 Maintenance

### 4.5.2 Function test of manual, auto, and manual full speed mode with FlexPendant

### 4.5.2 Function test of manual, auto, and manual full speed mode with FlexPendant


#### Overview

Perform this function test to change the mode on the FlexPendant using the following operation:

- **Status bar > Common Settings > Operating Mode (Auto/Manual/Man FS).**

For more detailed information, see *Operating manual - OmniCore, 3HAC065036-001*.

#### Performing the function test

	Action	Note
1	Start the robot system.	
2	Change to <b>Automatic</b> operating mode and <b>Motors ON</b> state, and then run the robot in auto mode.	This test is passed if it is possible to run the robot program in auto mode. If it is not possible to run the robot program, this test is failed and the root cause of the failure must be found.
3	Change to <b>Manual</b> operating mode and <b>Motors ON</b> state, and then run the robot in manual mode.	This test is passed if it is possible to run the robot program in manual mode. If it is not possible to run the robot program, this test is failed and the root cause of the failure must be found.
4	Change to <b>Manual Full Speed</b> mode and <b>Motors ON</b> state, and then run the robot in manual full speed mode.   <b>Note</b> Manual full speed mode is not available in USA or Canada.	This test is passed if it is possible to run the robot program in manual full speed mode. If it is not possible to run the robot program, this test is failed and the root cause of the failure must be found.

### 4.5.3 Function test of three-position enabling device

#### Performing the function test

	Action	Note
1	Start the robot system and turn the mode switch to manual mode.	
2	Press the three-position enabling device to the middle position and then hold the enabling device in this position.	<p>This test is passed if the event message <b>10011 Motors ON state</b> appears in the event log.</p> <p>If either of the following happens, then the test is failed and the root cause must be found:</p> <ul style="list-style-type: none"> <li>• if the event message <b>10011 Motors ON state</b> does not appear</li> <li>• if the event message <b>90780 Two-channel fault in Safety Controller</b> appears</li> </ul>
3	While still holding the three-position enabling device pressed, press the enabling device harder to enable the device's third position.	<p>This test is passed if the event message <b>10012 Safety guard stop state</b> appears in the event log.</p> <p>If either of the following happens, then the test is failed and the root cause must be found:</p> <ul style="list-style-type: none"> <li>• if the event message <b>10012 Safety guard stop state</b> does not appear</li> <li>• if the event message <b>90780 Two-channel fault in Safety Controller</b> appears</li> </ul>

## 4 Maintenance

### 4.5.4 Function test of safety switches

#### 4.5.4 Function test of safety switches

##### Performing the motor function test

	Action	Note
1	Start the robot system and change the operating mode to manual.	
2	Press the three-position enabling device to the middle position and then hold the enabling device in this position.	This test is passed if the event message <b>10011 Motors ON state</b> appears in the event log. If the event message <b>37001 Motor on activation error</b> appears in the event log, then the test has failed and the root cause of the failure must be found.
3	Release the three-position enabling device.	This test is passed if the event message <b>10012 Safety guard stop state</b> appears in the event log. If the event message <b>90227 Motor contact or conflict</b> appears in the event log, then the test has failed and the root cause of the failure must be found.

##### Performing the brake function test

	Action	Note
1	Start the robot system and change the operating mode to manual.	
2	Press the three-position enabling device to the middle position and then hold the enabling device in this position. While having eye contact with the manipulator, move the joystick slightly in any direction to disengage the brakes.	This test is passed if the brakes are disengaged and the manipulator can be moved. If the event message <b>50056 Joint collision</b> appears in the event log, then the test has failed and the root cause of the failure must be found.
3	Release the three-position enabling device to engage the brakes.	This test is passed if the event message <b>10012 Safety guard stop state</b> appears in the event log. If the event message <b>37101 Brake Failure</b> appears in the event log, then the test has failed and the root cause of the failure must be found.

## 4.5.5 Function test of Automatic Stop

### Performing the function test

	Action	Note
1	Start the robot system and change the operating mode to auto mode.	
2	Activate the Automatic Stop, for example by opening the connected robot cell door, which has interlock connection with Automatic Stop.	<p>The test is passed if the event message <b>90523 Safety Controller Protective Stop triggered</b> appears in the event log.</p> <p>If either of the following happens, then the test is failed and the root cause must be found:</p> <ul style="list-style-type: none"><li>• if the event message <b>90523 Safety Controller Protective Stop triggered</b> does not appear</li><li>• if the event message <b>90780 Two-channel fault in Safety Controller</b> appears</li></ul>

## 4 Maintenance

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### 4.5.6 Function test of General Stop

### 4.5.6 Function test of General Stop

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#### Performing the function test



	Action	Note
1	Start the robot system.	
2	Activate the General Stop.	<p>The test is passed if the event message <b>90523 Safety Controller Protective Stop triggered</b> appears in the event log.</p> <p>If either of the following happens, then the test is failed and the root cause must be found:</p> <ul style="list-style-type: none"><li>• if the event message <b>90523 Safety Controller Protective Stop triggered</b> does not appear</li><li>• if the event message <b>90780 Two-channel fault in Safety Controller</b> appears</li></ul>

## 4.5.7 Function test of external emergency stop

### Overview

Perform this test on the external emergency stop device.

### Performing the function test

	Action	Note
1	Make a visual inspection of the external emergency stop device and the connection harness to make sure they are not physically damaged.	If any damage is found on the external emergency stop device or the connection harness, it must be replaced.
2	<p>Pull and rotate the button on the external emergency stop device clockwise to verify that it is not pressed in.</p> <p> <b>Note</b></p> <p>If the external emergency stop device is not controlled by a push-button, make sure to verify that it is not activated.</p>	
3	Start the robot system.	
4	Press the emergency stop device.	<p>The test is passed if the event message <b>10013 Emergency stop state</b> appears in the event log.</p> <p>If the event message <b>90780 Two-channel fault in Safety Controller</b> appears in the event log, or the event message <b>10013 Emergency stop state</b> does not appear, then the test has failed and the root cause of the failure must be found.</p> <p> <b>Note</b></p> <p>The event message <b>90518 Safety controller Emergency stop triggered</b> appears by default.</p>
5	Release the external emergency stop device to reset the external emergency stop state.	

## 4 Maintenance



### 4.5.8 Function test of ESTOP\_STATUS output

### 4.5.8 Function test of ESTOP\_STATUS output

#### Overview

Perform this test on the FlexPendant emergency stop device or the external emergency stop device, with the accessory device.


#### Performing the function test

	Action	Note
1	Make a visual inspection of the emergency stop device, external emergency stop device, accessory device and the connection harness to make sure they are not physically damaged.	If any damage is found, it must be replaced.
2	Pull and rotate the emergency stop device clockwise to verify that it is not pressed in.  <b>Note</b> If the external emergency stop device is not controlled by a push-button, make sure to verify that it is not activated.	
3	Start the robot system.	
4	Press the emergency stop device.	The test is passed if the event message <b>10013 Emergency stop state</b> appears in the event log. If the event message <b>90780 Two-channel fault in Safety Controller</b> appears in the event log, or the event message <b>10013 Emergency stop state</b> does not appear, then the test has failed and the root cause of the failure must be found.  <b>Note</b> The event message <b>90518 Safety controller Emergency stop triggered</b> appears by default.
5	Make sure that the accessory device is in emergency stop status.	
6	Release the emergency stop device or the external emergency stop device to reset the emergency stop state.	
7	Make sure that the accessory device is not in emergency stop status any more and can be reset.	



## 4.5.9 Function test of reduced speed control

### Performing the function test

	Action	Note
1	Start the robot system and change the operating mode to manual.	
2	Create a test program where the robot moves along a known distance with a programmed speed higher than 250 mm/s.	The distance and speed must be adapted to the current installation and robot model.
3	<p>Start the program in manual mode and measure the time it takes for the robot to travel the distance.</p> <p> <b>Tip</b></p> <p>To get accurate results, use sensors or I/O signals to measure the time.</p>	This test is passed if the speed of the robot does not exceed 250 mm/s, otherwise the test is failed and the root cause of the failure must be found.

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# 5 Repair

## 5.1 Introduction to repair

### Structure of this chapter

This chapter describes all repair activities recommended for the OmniCore C90XT Type A and any external unit.

It is made up of separate procedures, each describing a specific repair activity. Each procedure contains all the information required to perform the activity, for example spare parts numbers, required special tools, and materials.

All procedures assume that the controller is easy to access from all sides and that no additional covers or equipment are fitted.



#### WARNING

Repair activities not described in this chapter must only be carried out by ABB. Otherwise damage to the mechanics and electronics may occur.

### Required equipment

The details of the equipment required to perform a specific repair activity are listed in the respective procedures.

### Safety information

Read chapter [Safety on page 15](#) before commencing any service work.



#### WARNING

Wait at least three minutes after powering off the controller before opening it and at least fifteen minutes until all LED indicators are off before replacing modules. Allow the surfaces to cool down before maintenance or repair.



#### Note

When replacing a part on the OmniCore C90XT Type A, report to your local ABB the serial number, the article number, and the revision of both the replaced unit and the replacement unit.

This is particularly important for safety equipment to maintain the safety integrity of the installation.

## 5 Repair

### 5.2.1 Opening the robot controller

## 5.2 Replacement of controller parts

### 5.2.1 Opening the robot controller

#### Required tools and equipment


Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Opening the door

##### Preparations

	Action	Info/illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	

##### Opening the door

	Action	Info/illustration
1	Insert the key to the door and turn it anti-clockwise.	
2	Pull out the handle and turn it anti-clockwise.	
3	Pull out the door with the handle.	

#### Closing the door

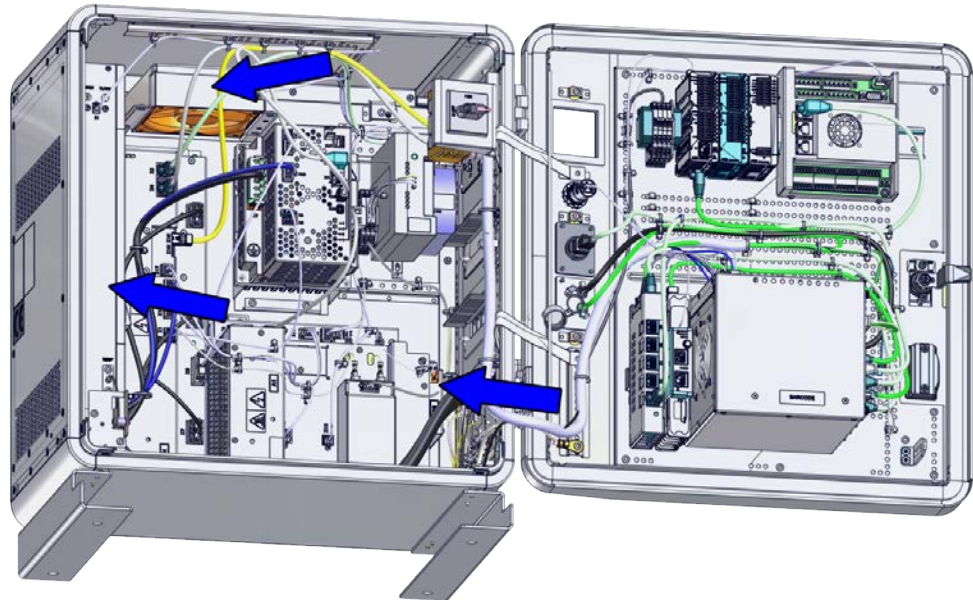
##### Closing the door

	Action	Info/illustration
	If door stop has been used during maintenance, place the door stop in its original position.	
1	Push the door back.	
2	Turn the handle clockwise and push it back into the lock.	
3	Turn the key back and take it out.	

## 5.2.2 Replacing the fans

### Location

The illustration shows the location of the fans in the controller.



xx2400001410

### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Standard fan	3HAC077005-001	
Heat exchanger	3HAC065526-001	
Small fan	3HAC063917-001	

### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

*Continues on next page*

## 5 Repair

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### 5.2.2 Replacing the fans

*Continued*

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#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	<i>3HAC086305-010</i>	



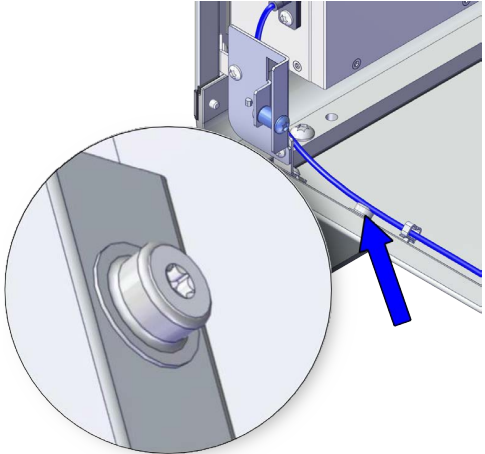
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5.2.2.1 Replacing the standard fans

5.2.2.1.1 Replacing the standard fan

Removing the standard fan

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

Removing the standard fan

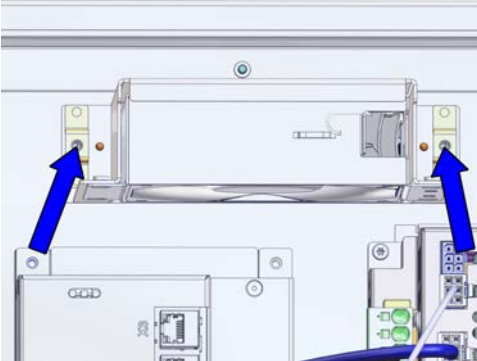
	Action	Note/Illustration
1	Disconnect standard fan: <ul style="list-style-type: none"> <li>G1.X2-K2.X17</li> </ul>	

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## 5 Repair



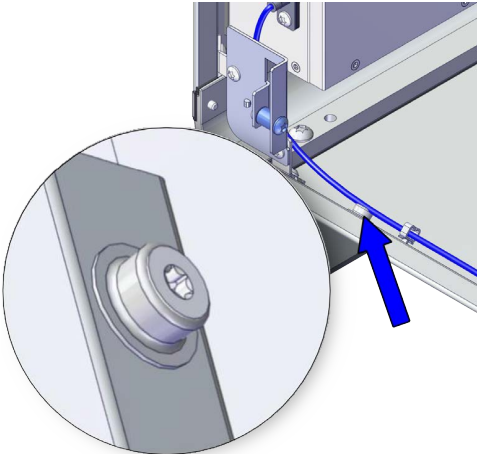
### 5.2.2.1.1 Replacing the standard fan

Continued

	Action	Note/Illustration
2	Remove the fan bracket screws.	 <p data-bbox="925 734 1029 757">xx2400001357</p>
3	Take out the fan with the bracket.	

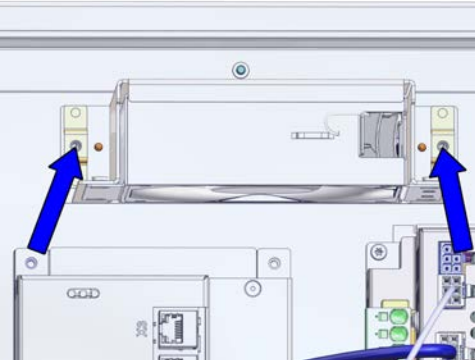
### Refitting the standard fan

#### Refitting the standard fan

	Action	Note/Illustration
1	 <p data-bbox="563 1048 671 1077"><b>DANGER</b></p> <p data-bbox="469 1111 916 1218">Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p data-bbox="563 1279 916 1332"><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p data-bbox="469 1352 916 1460">The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p data-bbox="925 1256 1257 1285">Location of wrist strap button:</p>  <p data-bbox="925 1753 1029 1776">xx1900001446</p>
3	Refit the standard fan with the bracket into position according to the location pin.	

Continues on next page



	Action	Note/Illustration
4	Secure the screws.	<p>Tightening torque: 1.7 Nm±10%.</p>  <p>xx2400001357</p>
5	Reconnect: <ul style="list-style-type: none"> <li>• G1.X2-K2.X17</li> </ul>	

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	



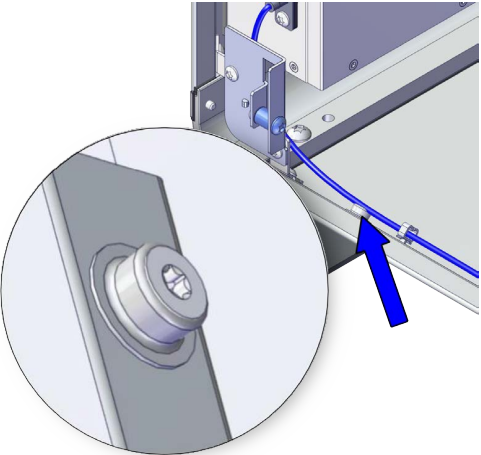
## 5 Repair

### 5.2.2.2 Replacing the heat exchanger

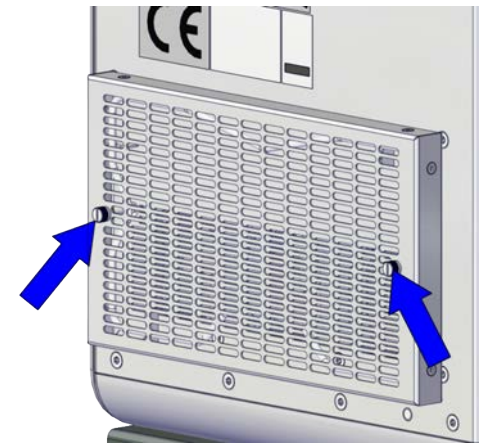
#### 5.2.2.2 Replacing the heat exchanger

##### Removing the heat exchanger


###### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

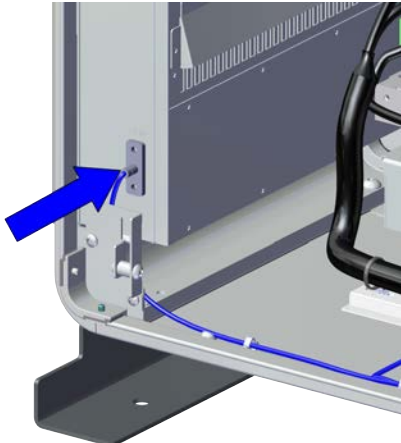
##### Removing the air filter

	Action	Note/Illustration
1	Loosen the attachment screws on the air filter.	 xx1900001491

*Continues on next page*

	Action	Note/Illustration
2	Remove the air filter unit.	 <p data-bbox="954 757 1061 779">xx1900001492</p>

Removing the heat exchanger

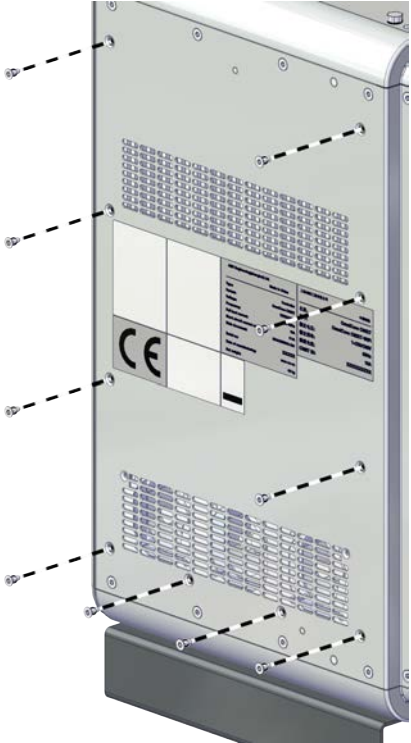
	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	
2	Remove the screws locking the sensor and pull out the sensor.	 <p data-bbox="954 1473 1061 1496">xx1900001490</p>

*Continues on next page*

## 5 Repair


### 5.2.2.2 Replacing the heat exchanger

Continued


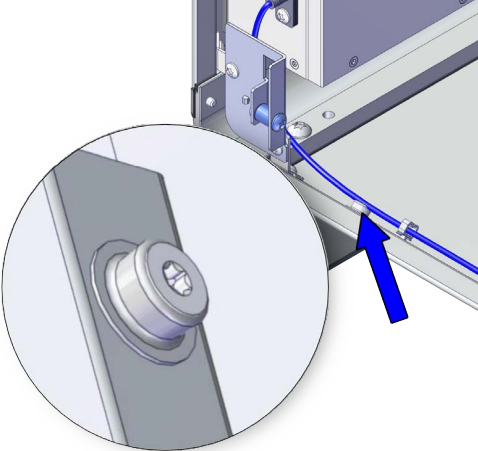

	Action	Note/Illustration
3	Remove the heat exchanger attachment screws.	 <p>xx1900001493</p>
4	Take out the heat exchanger.	

### Refitting the heat exchanger

#### Refitting the heat exchanger

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

Continues on next page

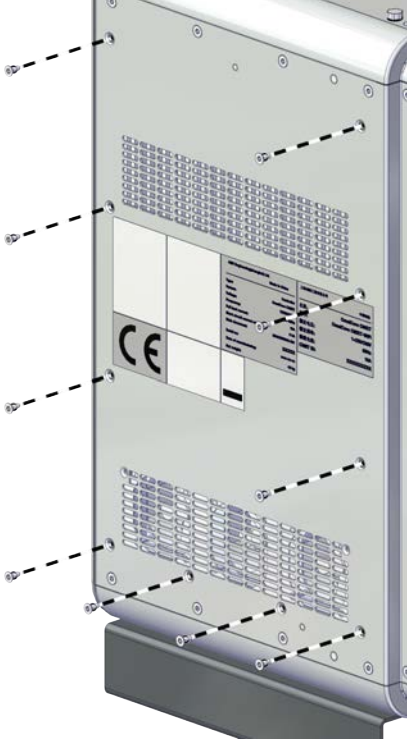
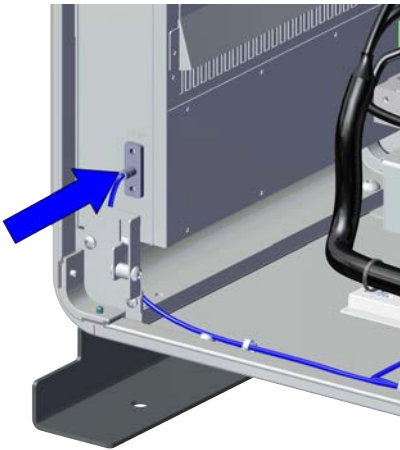
	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Refit the heat exchanger into position according to the location pin.</p>	 <p>xx1900001494</p>

Continues on next page

## 5 Repair



### 5.2.2.2 Replacing the heat exchanger

Continued

	Action	Note/Illustration
4	Secure the attachment screws.	<p>Screws: Torx, countersunk screw M4x10 (10 pcs) Tightening torque: 1.7 Nm±10%.</p>  <p>xx1900001493</p>
5	Reconnect any connectors disconnected at removal.	
6	Refit the sensor cable and secure with screws.	<p>Screws: Torx pan head screw M4x8 (2 pcs) Tightening torque: 1.7 Nm±10%.</p>  <p>xx1900001490</p>

Continues on next page

Refitting the air filter

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	Refit the air filter unit to the cabinet.	
3	Secure it with the screws.	 <p>xx1900001492</p>

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196</a> .
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

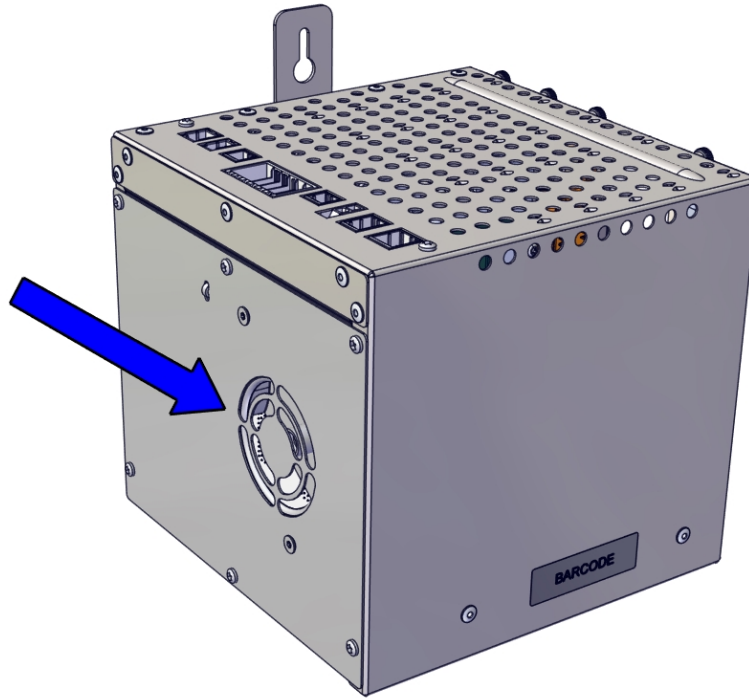
## 5 Repair

### 5.2.2.3 Replacing the main computer fan

#### 5.2.2.3 Replacing the main computer fan

##### Location

The illustration shows the location of the main computer fan in the controller.



xx2300001552

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Fan w/ contact	3HAC084390-001	Main computer fan

##### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

*Continues on next page*



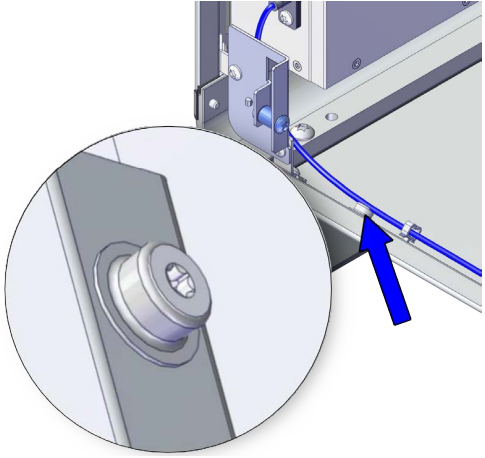


Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

Removing the main computer fan

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446
4	If necessary, remove the Connected Services gateway and the Ethernet switch.	<a href="#">Removing the Connected Services gateway on page 217</a> and <a href="#">Replacing the Ethernet switch (DSQC1035) on page 212</a> .

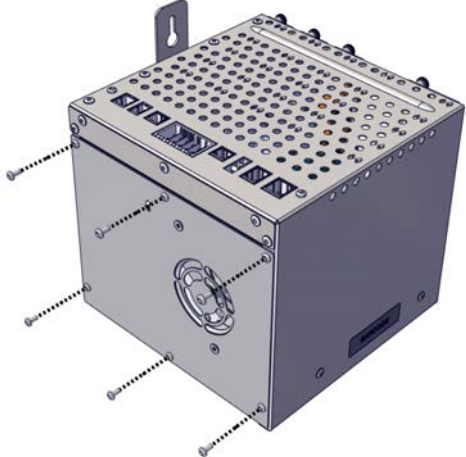
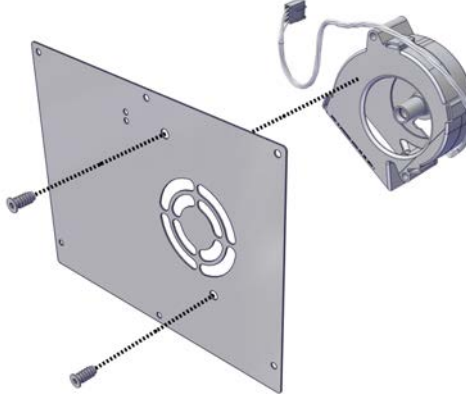
Continues on next page

## 5 Repair

### 5.2.2.3 Replacing the main computer fan


*Continued*

#### Removing the main computer fan

	Action	Note/Illustration
1	Remove the screws that hold the fan bracket.	 <p>xx2300001551</p>
2	Remove the fan bracket from the main computer.	
3	Disconnect all connectors from the unit to be replaced.	
4	Remove any cable ties.	
5	Remove the fan from the bracket.	 <p>xx2200001090</p>

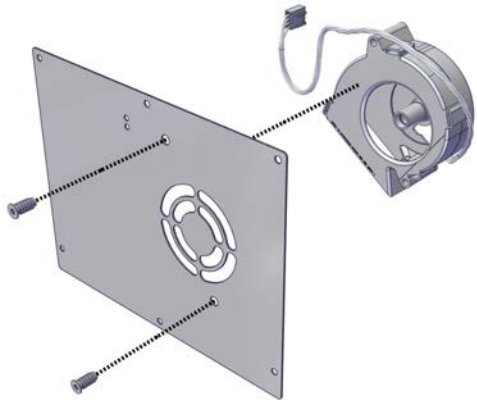
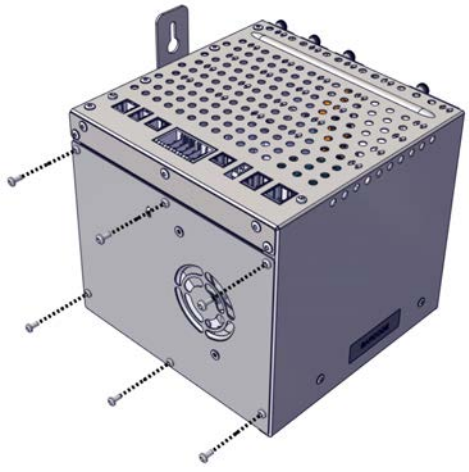
#### Refitting the main computer fan

##### Preparations

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

*Continues on next page*

Refitting the main computer fan

	Action	Note/Illustration
1	Place the main computer fan in the bracket and secure with the screws and cable ties.	 <p>xx2200001090</p> <p>Screws: Torx T10 (2 pcs) Tightening torque: 0.7 Nm</p>
2	Reconnect any connectors disconnected at removal.	
3	Refit the fan bracket in the main computer and secure the screws.	 <p>xx2300001551</p> <p>Screws: Torx T10 (6 pcs) Tightening torque: 0.7 Nm</p>

Concluding procedure

	Action	Note/Illustration
1	If necessary, refit the Connected Services gateway.	<a href="#">Refitting the Connected Services gateway on page 221.</a>
2	Close the door.	<a href="#">Closing the door on page 196.</a>
3	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

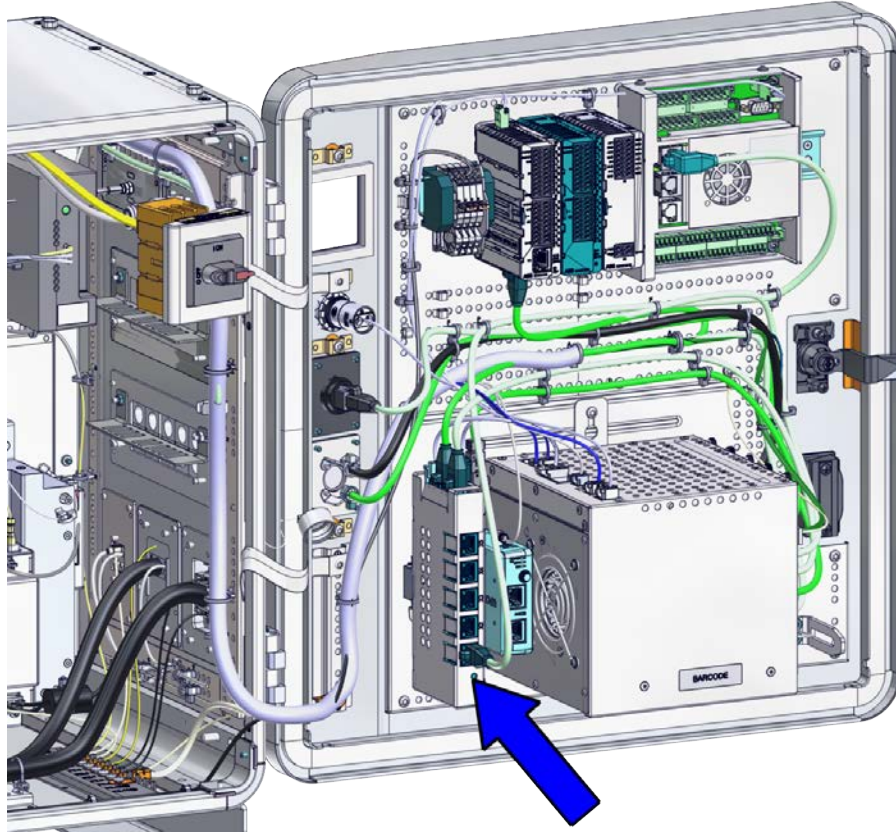
## 5 Repair

### 5.2.3 Replacing the Ethernet switch (DSQC1035)

### 5.2.3 Replacing the Ethernet switch (DSQC1035)

#### Location

The illustration shows the location of the Ethernet switch in the controller.



xx2400001358

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Ethernet Extension switch [3014-1]	3HAC059187-001	DSQC1035
Harness 24V_SYS	3HAC090414-001	

*Continues on next page*

## Required tools and equipment



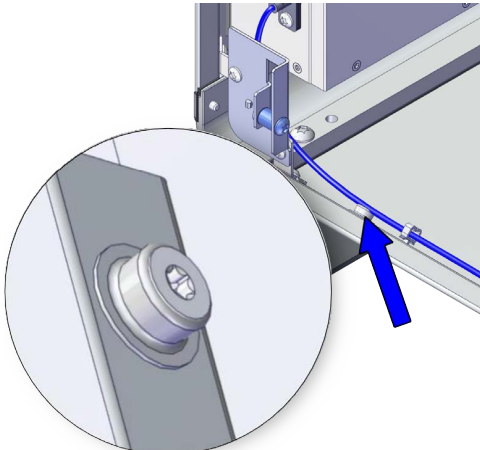
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

## Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

## Removing the Ethernet extension switch (option)

## Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

## Removing the Ethernet extension switch (option)

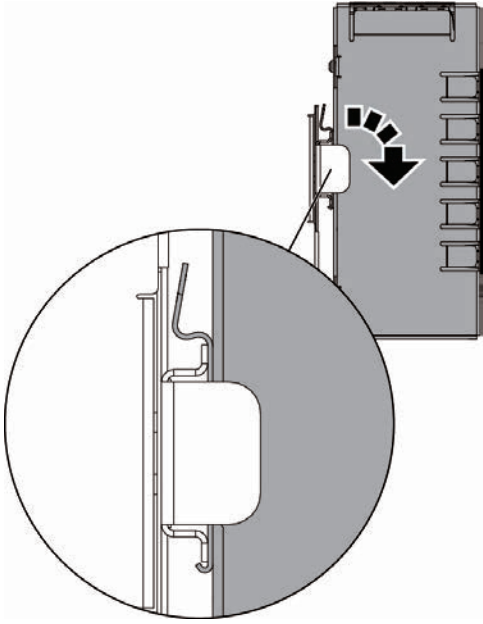
	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

Continues on next page

## 5 Repair



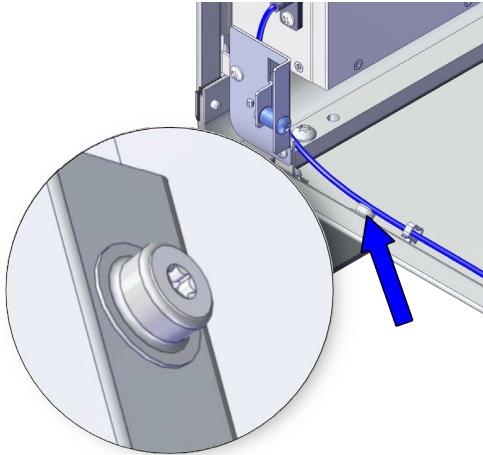
### 5.2.3 Replacing the Ethernet switch (DSQC1035)

Continued


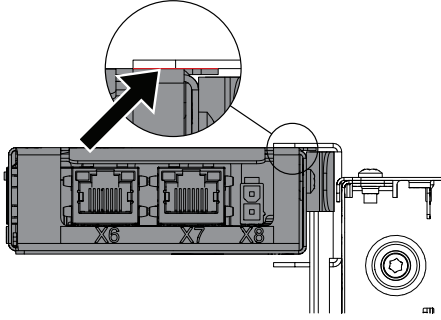
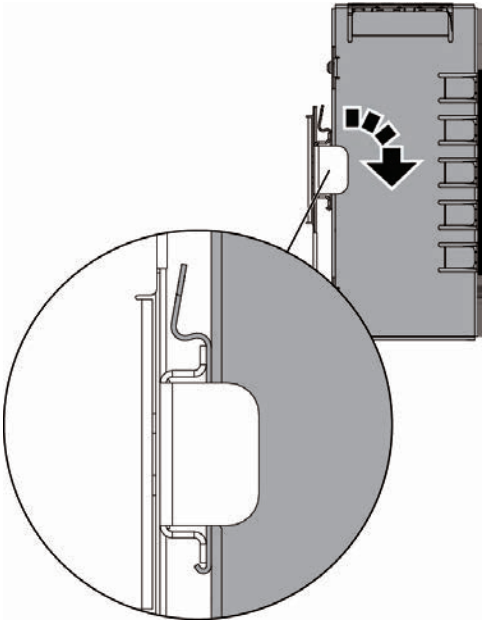
	Action	Note/Illustration
2	Carefully pull the side of the Ethernet extension switch and rotate it tightly to take it out from the bracket.	 <p>xx2300001835</p>

### Refitting the Ethernet extension switch (option)

Refitting the Ethernet extension switch (option)

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

Continues on next page

	Action	Note/Illustration
3	<p>Hook up the Ethernet extension switch to the bracket and then push the switch into position.</p> <p> <b>Note</b></p> <p>During the installation, there should be no gap between the upper surface of the Ethernet extension switch and the lower surface of highest bracket on the main computer.</p> 	
4	<p>Reconnect any connectors disconnected at removal.</p>	

Concluding procedure

	Action	Note/Illustration
1	<p>Close the door.</p>	<p><a href="#">Closing the door on page 196.</a></p>
2	<p>Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a></p>	

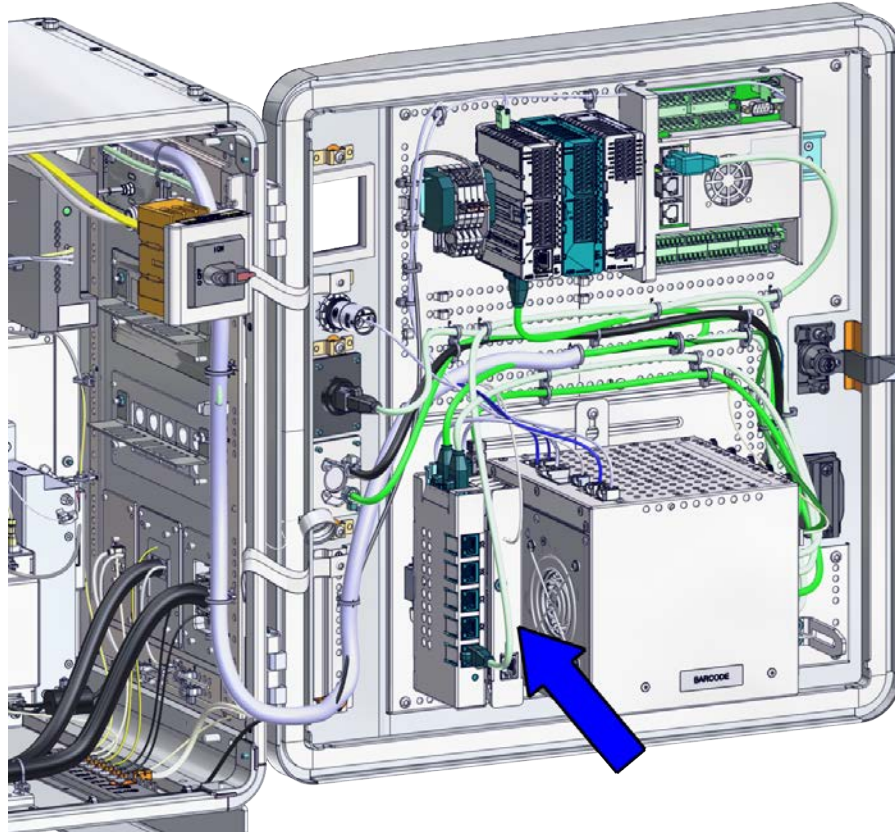
## 5 Repair

### 5.2.4 Replacing the 3G Connected Services gateway

### 5.2.4 Replacing the 3G Connected Services gateway

#### Location

The illustration shows the location of the Connected Services gateway in the controller. For the 3G variant, there is a sim card inside the unit.



xx2400001359

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Connected Services-3G [3013-3]	3HAC060960-001	DSQC1039
Magnetic roof antenna, 3G	3HAC028459-001	
Connected Services-WiFi [3013-2]	3HAC060962-001	DSQC1040
Magnetic roof antenna, WiFi	3HAC059424-001	
Connected Services-Wired [3013-1]	3HAC061701-001	DSQC1041

*Continues on next page*



5.2.4 Replacing the 3G Connected Services gateway  
Continued

Spare part	Article number	Note
Connected Services 4G US [3013-6]	3HAC086678-001	DSQC1093A
Connected Services 4G CN [3013-7]	3HAC089073-001	DSQC1101
RF antenna conn. SMA	3HAC086767-001	Used for 3G/4G
RF antenna conn. RP-SMA	3HAC086710-001	Used for WiFi
Harn. network conn. 1xM12	3HAC084103-001	Used for Wired
Ethernet harness	3HAC085903-001	Harness A2.K4.X1 - K7.ETH2
24V Adapter harness	3HAC085904-001	

## Required tools and equipment


Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

## Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

## Removing the Connected Services gateway

## Preparations


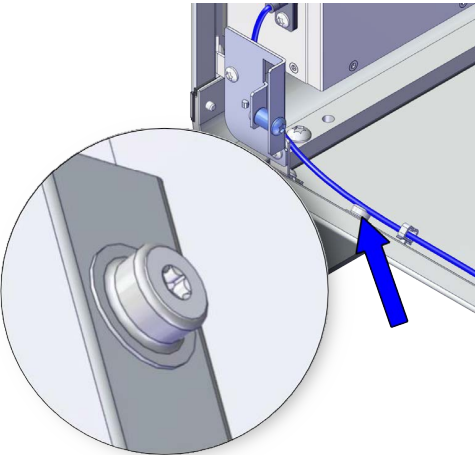
	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .

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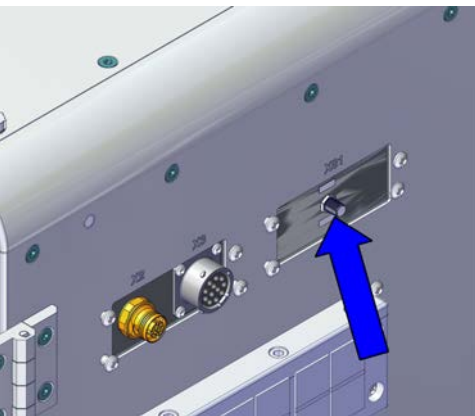
## 5 Repair

### 5.2.4 Replacing the 3G Connected Services gateway

Continued

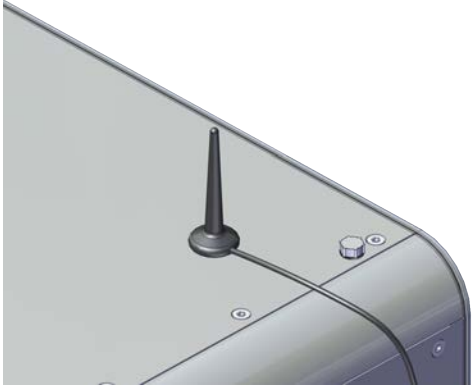
	Action	Note/Illustration
3	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

#### Disconnecting the antenna


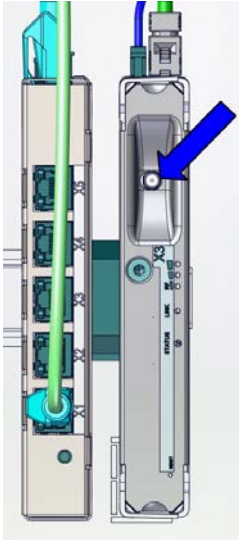
	Action	Note/Illustration
1	Record the cable routing when you remove the antenna cable from the cabinet.	 <p><b>Note</b></p> <p>The Connected Services antenna is installed by the customer, and the cable routing can therefore differ.</p>
2	Remove any cable ties and protection.	
3	Disconnect the antenna from the connector on the fixed installation panel.	 <p>xx2400001361</p>

Continues on next page

5.2.4 Replacing the 3G Connected Services gateway  
Continued

	Action	Note/Illustration
4	Remove the magnet part of the antenna from the cabinet.	 <p>xx1900001949</p>

Disconnecting the RF antenna connection

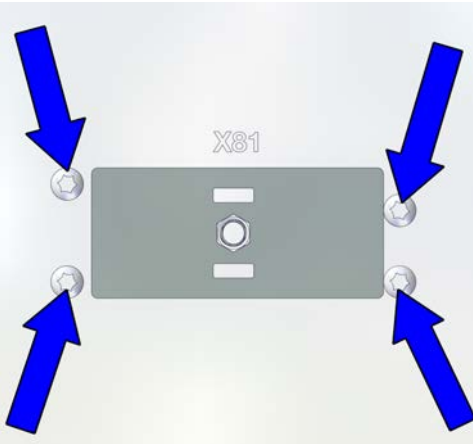
	Action	Note/Illustration
1	Record the cable routing when you remove the RF antenna connection cable from the cabinet.	 <b>Note</b> The Connected Services antenna is installed by the customer, and the cable routing can therefore differ.
2	Disconnect the RF antenna connection cable from the Connected Services gateway.	 <p>xx2300001642</p>
3	Remove any cable ties and protection.	

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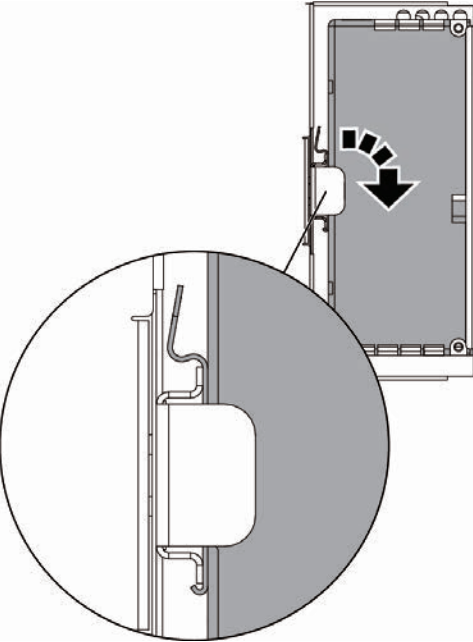
## 5 Repair

### 5.2.4 Replacing the 3G Connected Services gateway

*Continued*

	Action	Note/Illustration
4	Remove the attachment screws on the cover.	 <p>xx2400001576</p>
5	Push the RF antenna connection into the cabinet.	
6	Take out the RF antenna connection cable.	

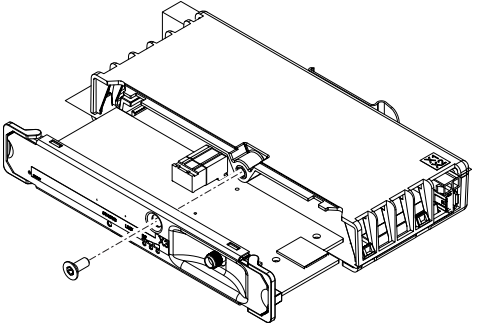
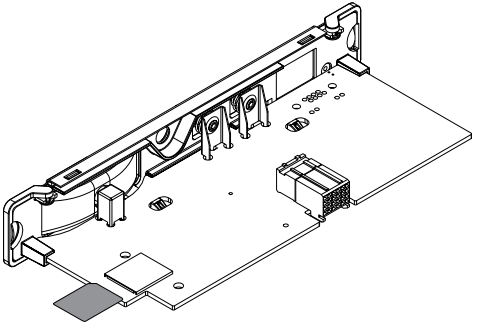
### Removing the Connected Services gateway

	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	
2	Carefully pull the side of the Connected Services gateway and rotate it tightly to take it out from the bracket.	 <p>xx2300001836</p>

*Continues on next page*

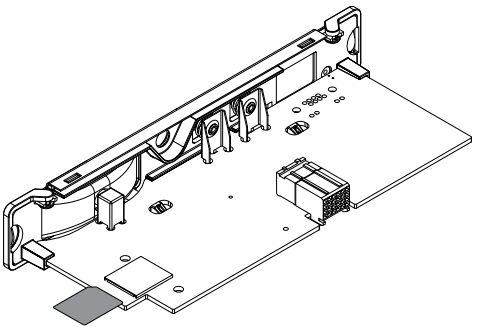
5.2.4 Replacing the 3G Connected Services gateway  
Continued

Removing the sim card

	Action	Note/Illustration
1	Remove the attachment screws and pull out the front cover of the Connected Services-3G.	 <p>xx1900000971</p>
2	Carefully pull out the sim card from its holder.	 <p>xx1900000972</p>

Refitting the Connected Services gateway

Refitting the sim card

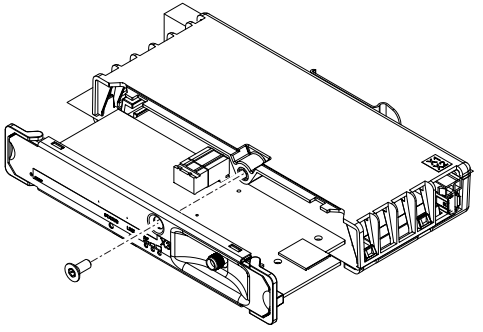
	Action	Note/Illustration
1	Carefully place the sim card in its holder.	 <p>xx1900000972</p>

Continues on next page



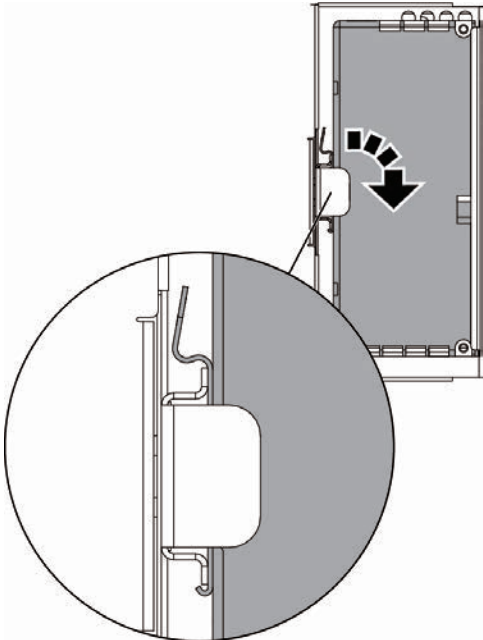
## 5 Repair

### 5.2.4 Replacing the 3G Connected Services gateway

Continued



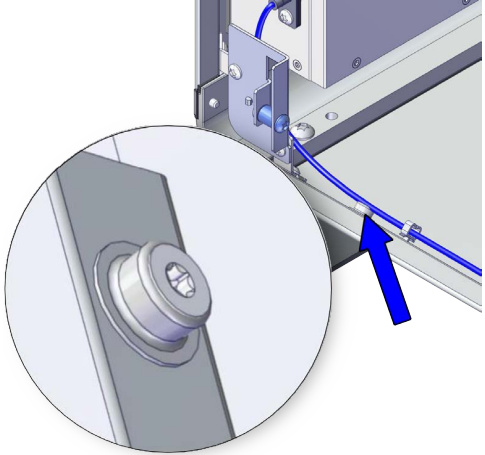
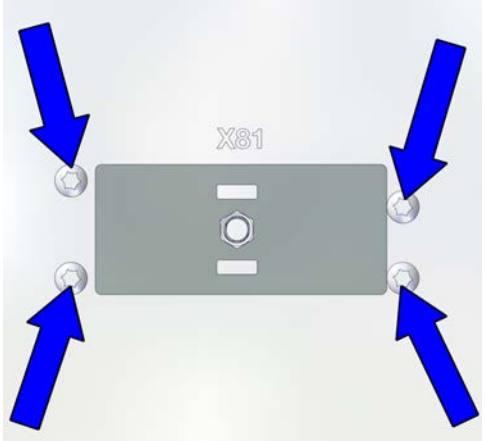

	Action	Note/Illustration
2	Refit the front cover of the Connected Services-3G and secure the screws.	 <p>xx1900000971</p>

#### Refitting the Connected Services gateway

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	
3	Hook up the Connected Services gateway to the bracket and push carefully into position.	 <p>xx2300001836</p>

Continues on next page

Reconnecting the RF antenna connection

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Insert the RF antenna connection into the cover from inner side of the cabinet and fasten it with the screws.</p>	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2.7 Nm±10%.</p>  <p>xx2400001576</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	
5	<p>Secure the RF antenna connection with the velcro on the frame of the cabinet.</p>  <p><b>Tip</b></p> <p>Use the same position as from removing the RF antenna connection.</p>	

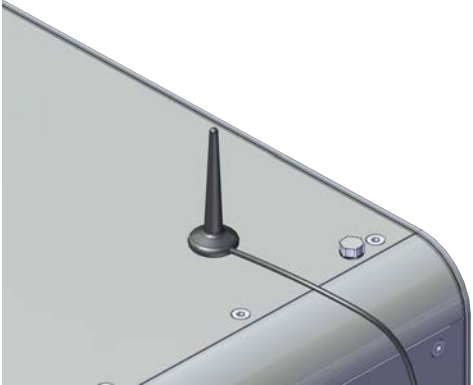


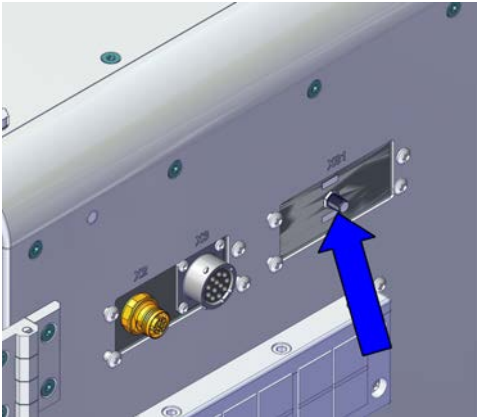
Continues on next page

## 5 Repair

### 5.2.4 Replacing the 3G Connected Services gateway

*Continued*

#### Reconnecting the antenna

	Action	Note/Illustration
1	Place the magnet part of the antenna on the outside of the cabinet.	 <p>xx1900001949</p> <p> <b>Note</b></p> <p>The operating conditions must be such that there is a minimum separation distance of 20 cm between the dedicated antenna and nearby persons.</p>
2	Follow the cable routing recorded during the disassembly when you reconnect the antenna cable.	<p> <b>Note</b></p> <p>The Connected Services antenna is installed by the customer, and the cable routing can therefore differ.</p>
3	Attach the antenna to the connector on the fixed installation panel.	 <p>xx2400001361</p>
4	Apply cable ties and suitable cable protection to ensure that the cable may not be damaged by the door.	

#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>

*Continues on next page*



### 5.2.4 Replacing the 3G Connected Services gateway

*Continued*

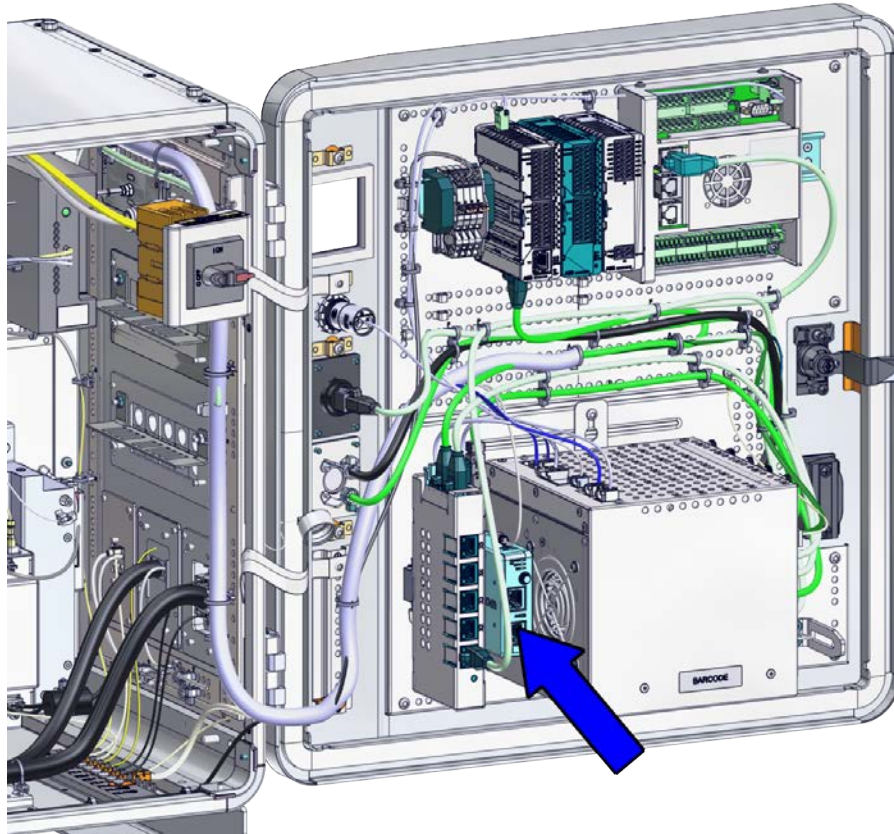
	Action	Note/Illustration
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

## 5 Repair

### 5.2.5 Replacing the 4G Connected Services gateway

### 5.2.5 Replacing the 4G Connected Services gateway

#### Location



xx2400001360

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Connected Services 4G EU [3013-5]	3HAC086677-001	DSQC1093
Magnetic roof antenna 4G	3HAC086604-001	
RF antenna conn. SMA	3HAC086767-001	Used for 3G/4G
Ethernet harness	3HAC085903-001	Harness A2.K4.X1 - K7.ETH2
24V Adapter harness	3HAC085904-001	

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5.2.5 Replacing the 4G Connected Services gateway  
Continued

Required tools and equipment



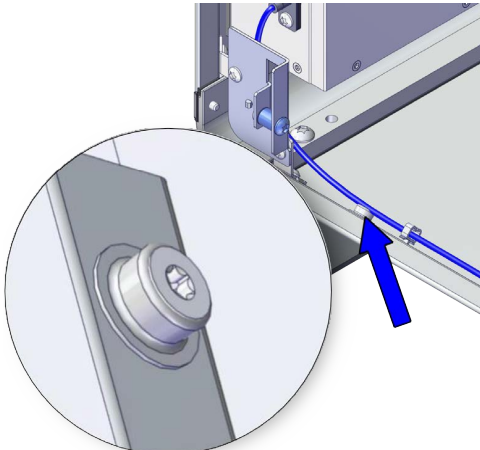
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

Required documents


Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

Removing the Connected Services gateway

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

Disconnecting the antenna

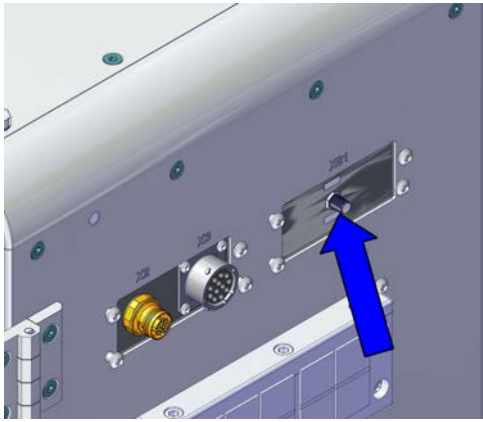
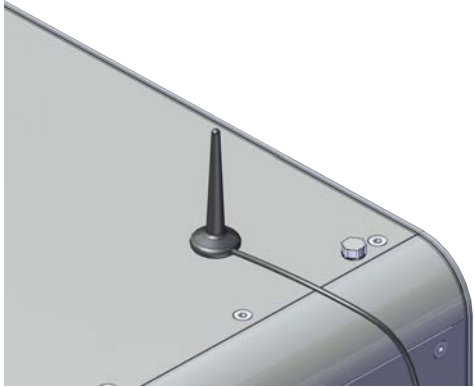
	Action	Note/Illustration
1	Record the cable routing when you remove the antenna cable from the cabinet.	 <b>Note</b> The Connected Services antenna is installed by the customer, and the cable routing can therefore differ.

Continues on next page


## 5 Repair

### 5.2.5 Replacing the 4G Connected Services gateway

*Continued*

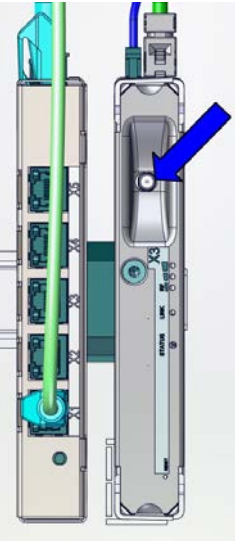
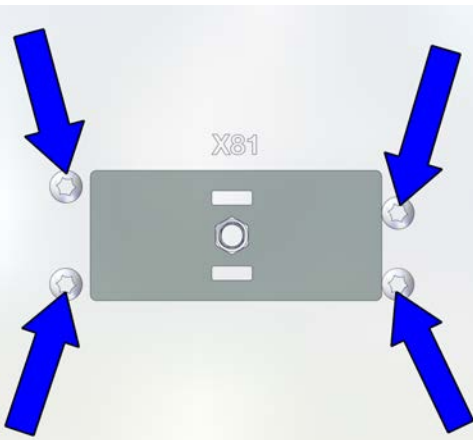
	Action	Note/Illustration
2	Remove any cable ties and protection.	
3	Disconnect the antenna from the connector on the fixed installation panel.	 <p>xx2400001361</p>
4	Remove the magnet part of the antenna from the cabinet.	 <p>xx1900001949</p>

#### Disconnecting the RF antenna connection

	Action	Note/Illustration
1	Record the cable routing when you remove the RF antenna connection cable from the cabinet.	 <b>Note</b> The Connected Services antenna is installed by the customer, and the cable routing can therefore differ.

*Continues on next page*

5.2.5 Replacing the 4G Connected Services gateway  
Continued

	Action	Note/Illustration
2	Disconnect the RF antenna connection cable from the Connected Services gateway.	 <p>xx2300001642</p>
3	Remove any cable ties and protection.	
4	Remove the attachment screws on the cover.	 <p>xx2400001576</p>
5	Push the RF antenna connection into the cabinet.	
6	Take out the RF antenna connection cable.	

Removing the Connected Services gateway

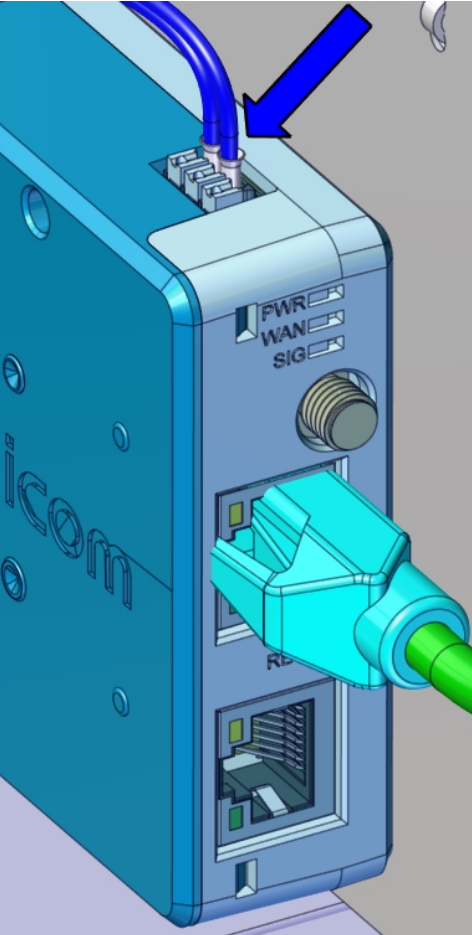

	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

Continues on next page

## 5 Repair


### 5.2.5 Replacing the 4G Connected Services gateway

*Continued*

	Action	Note/Illustration
2	Disconnect the free ends of the 24V adapter harness: <ul style="list-style-type: none"> <li>• Wire K7-W201 from the 24V (V+) connection on the Connected Services gateway.</li> <li>• Wire K7-W202 from the 0V (V-) connection on the Connected Services gateway.</li> </ul>	 <p data-bbox="927 1249 1034 1272">xx230000753</p> <p data-bbox="927 1294 986 1350"> <b>Note</b></p> <p data-bbox="927 1361 1385 1417">Press down the white button with a sharp object while pulling out the wire.</p>
3	Carefully lift the Connected Services gateway slightly and then pull it out from the bracket.	


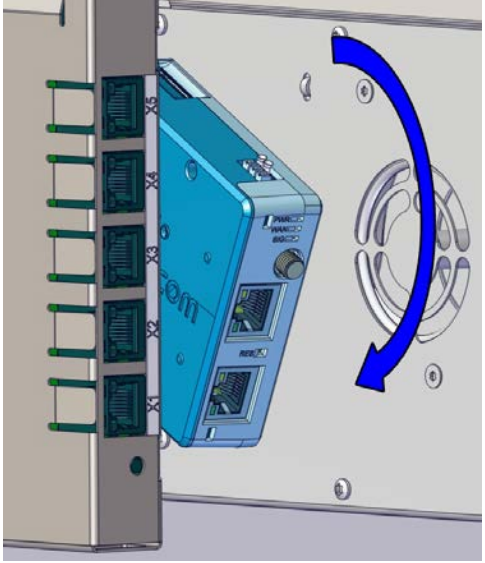
### Refitting the Connected Services gateway

#### Refitting the Connected Services gateway

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	

*Continues on next page*

5.2.5 Replacing the 4G Connected Services gateway  
Continued

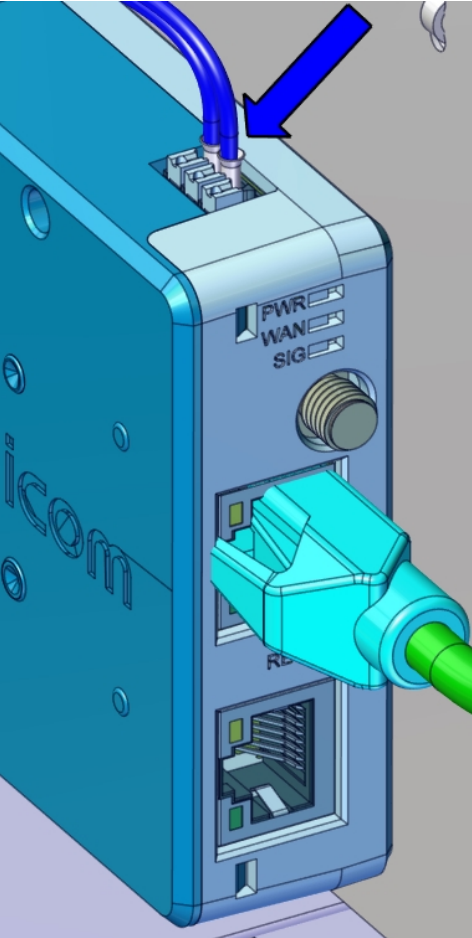
	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	
3	<p>Hook up the Connected Services gateway to the bracket and push carefully into position.</p>	 <p>xx230000673</p>

Continues on next page


## 5 Repair

### 5.2.5 Replacing the 4G Connected Services gateway

Continued

	Action	Note/Illustration
4	Reconnect the free ends of the 24V adapter harness: <ul style="list-style-type: none"> <li>• Wire K7-W201 to the 24V (V+) connection on the Connected Services gateway.</li> <li>• Wire K7-W202 to the 0V (V-) connection on the Connected Services gateway.</li> </ul>	 <p>xx2300000753</p>
5	Reconnect any connectors disconnected at removal.	


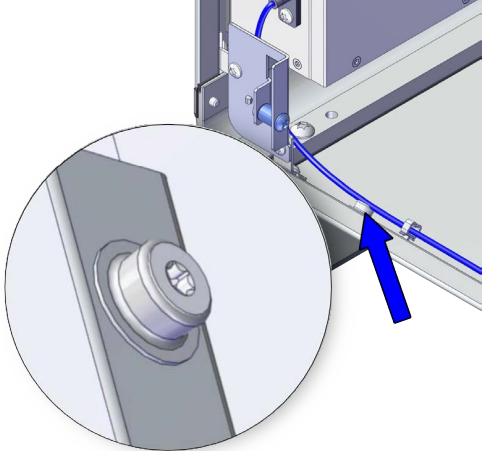
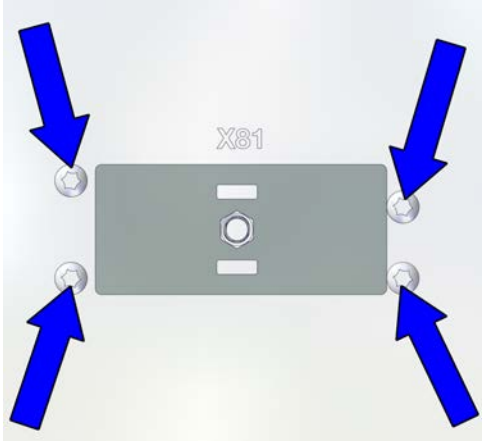

#### Reconnecting the RF antenna connection

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	

Continues on next page



5.2.5 Replacing the 4G Connected Services gateway  
Continued

	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Insert the RF antenna connection into the cover from inner side of the cabinet and fasten it with the screws.</p>	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2.7 Nm±10%.</p>  <p>xx2400001576</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	
5	<p>Secure the RF antenna connection with the velcro on the frame of the cabinet.</p> <p> <b>Tip</b></p> <p>Use the same position as from removing the RF antenna connection.</p>	




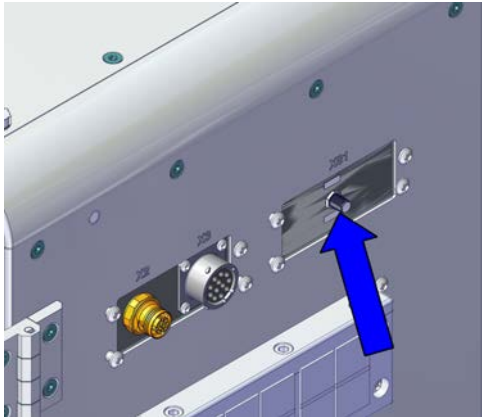
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## 5 Repair

### 5.2.5 Replacing the 4G Connected Services gateway

*Continued*

#### Reconnecting the antenna

	Action	Note/Illustration
1	Place the magnet part of the antenna on the outside of the cabinet.	 <p data-bbox="922 842 1031 860">xx1900001949</p> <p data-bbox="927 887 983 943"> <b>Note</b></p> <p data-bbox="922 954 1409 1061">The operating conditions must be such that there is a minimum separation distance of 20 cm between the dedicated antenna and nearby persons.</p>
2	Follow the cable routing recorded during the disassembly when you reconnect the antenna cable.	<p data-bbox="927 1111 983 1167"> <b>Note</b></p> <p data-bbox="922 1178 1409 1256">The Connected Services antenna is installed by the customer, and the cable routing can therefore differ.</p>
3	Attach the antenna to the connector on the fixed installation panel.	 <p data-bbox="922 1718 1031 1736">xx2400001361</p>
4	Apply cable ties and suitable cable protection to ensure that the cable may not be damaged by the door.	

#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>

*Continues on next page*

	Action	Note/Illustration
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

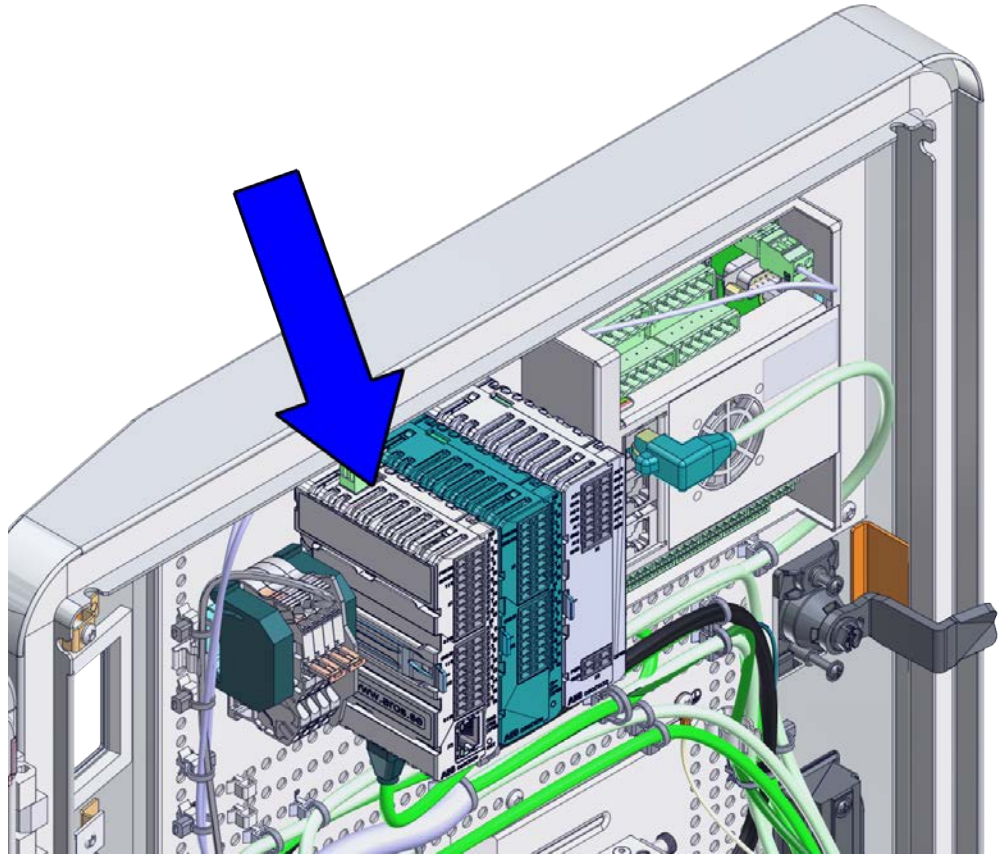
## 5 Repair

### 5.2.6 Replacing the scalable I/O unit

### 5.2.6 Replacing the scalable I/O unit

#### Location

The illustration shows the location of the scalable I/O in the controller.



xx2400001345

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Scalable I/O Digital base [3032-1]	3HAC058663-001	DSQC1030
Connectors digital base/add on	3HAC060919-001	
Digital add-on [3033-2]	3HAC058664-001	DSQC1031
Analog add-on [3034-2]	3HAC058665-001	DSQC1032
Connectors I/O Analog	3HAC060925-001	
Relay add-on [3035-2]	3HAC058666-001	DSQC1033
Connectors I/O Relay	3HAC060926-001	

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Required tools and equipment



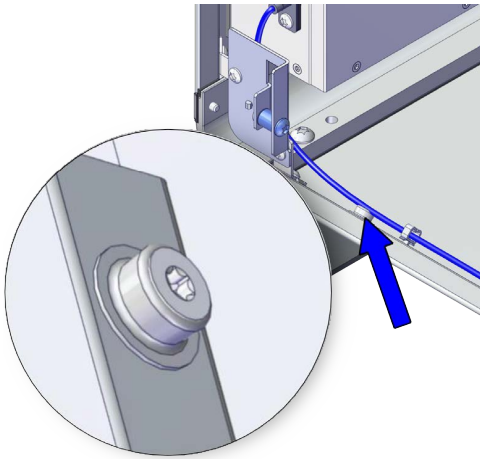
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	
<i>Application manual - Scalable I/O</i>	3HAC070208-001	

Removing the digital base (option)

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

Removing the digital base (option)

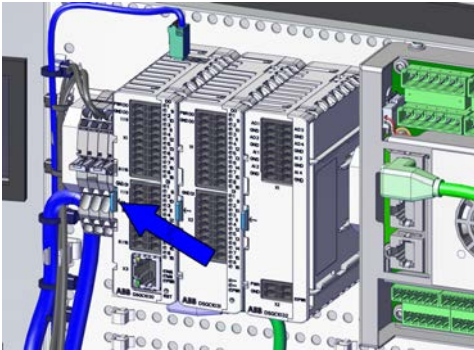
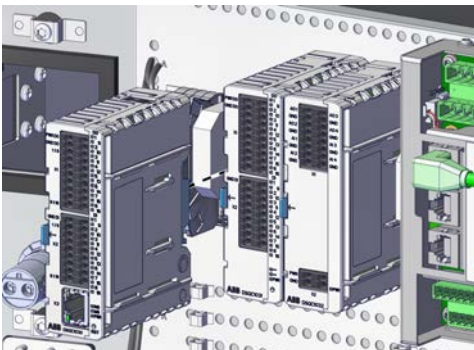
	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

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## 5 Repair


### 5.2.6 Replacing the scalable I/O unit

Continued


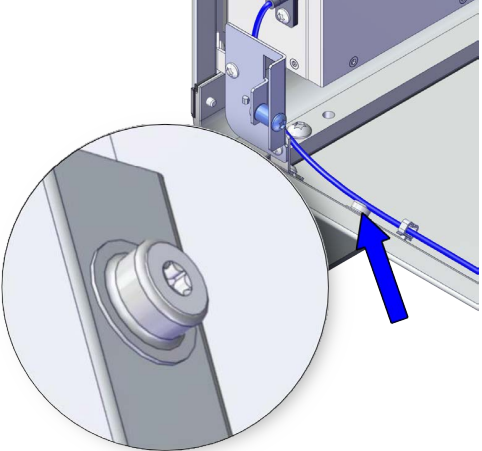
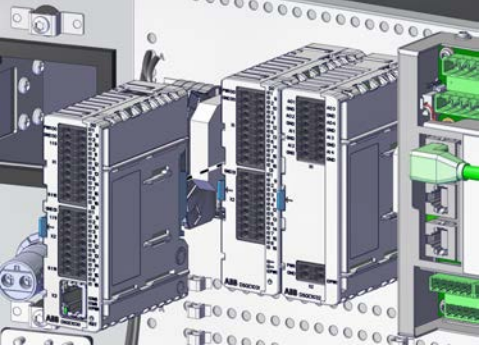

	Action	Note/Illustration
2	Push the buckle of the digital base slightly and take out the digital base.	 <p>xx1900002446</p>  <p>xx1900002447</p>

### Refitting the digital base (option)

### Refitting the digital base (option)

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	

Continues on next page

	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Push the digital base into the bracket until you hear a clear clicking sound.</p>	 <p>xx1900002447</p>
4	<p>Connect the adapter cable to the digital base.</p> <ul style="list-style-type: none"> <li>• K5.1.X5/K3.1.X5 - A2.X4/K4.X7</li> </ul> <p> <b>Note</b></p> <p>If the Ethernet extension switch is installed, connect and disconnect the connector K5.1.X5/K3.1.X5 to/from K4.X7.</p> <p>If the Ethernet extension switch is not installed, connect and disconnect the connector K5.1.X5/K3.1.X5 to/from A2.X4.</p> <ul style="list-style-type: none"> <li>• K5.1.X4 - A2.X3</li> <li>• The harness connected to I/O unit by customer</li> </ul>	

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196</a> .

Continues on next page

## 5 Repair

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### 5.2.6 Replacing the scalable I/O unit

*Continued*

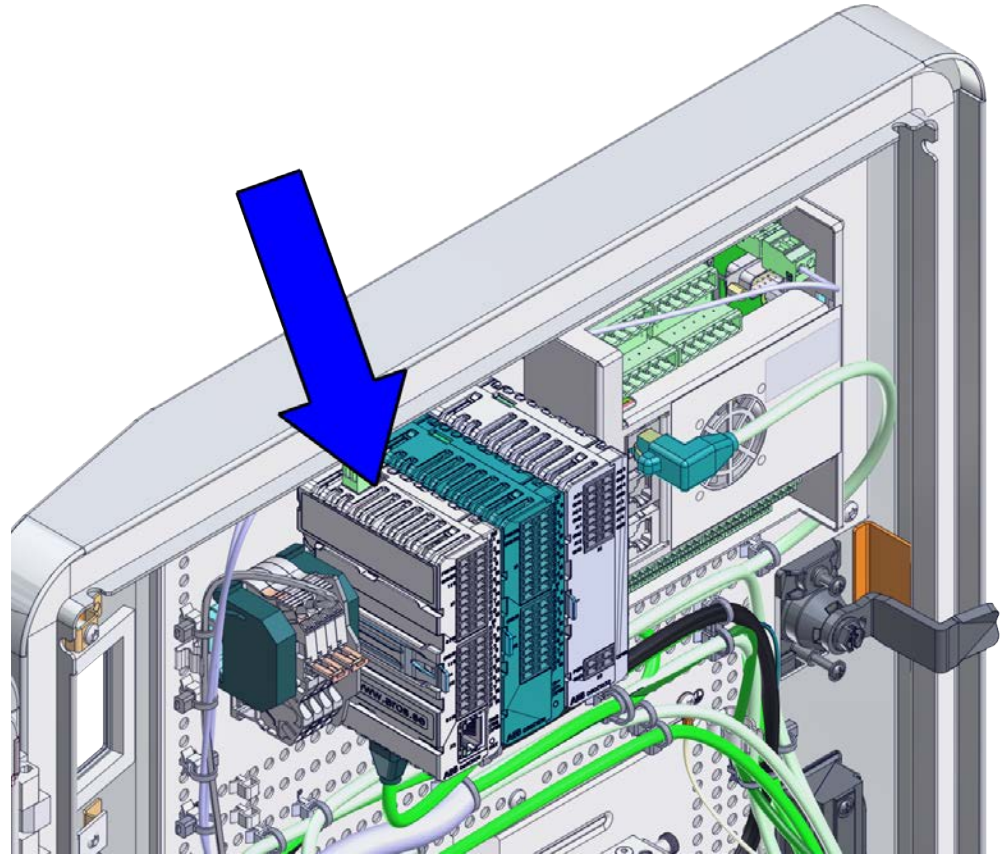
	Action	Note/Illustration
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	



## 5.2.7 Replacing the safety digital base device

### Location

The illustration shows the location of the safety digital base device in the controller.



xx2400001347

### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
DSQC1042 Extended safety	3HAC062908-001	DSQC1042
Connectors Safety I/O	3HAC069538-001	

### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .

*Continues on next page*

## 5 Repair

### 5.2.7 Replacing the safety digital base device

Continued



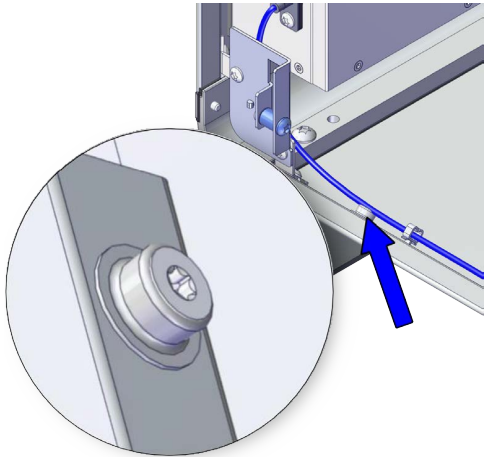
Equipment	Article number	Note
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	
Application manual - Scalable I/O	3HAC070208-001	

#### Removing the safety digital base device

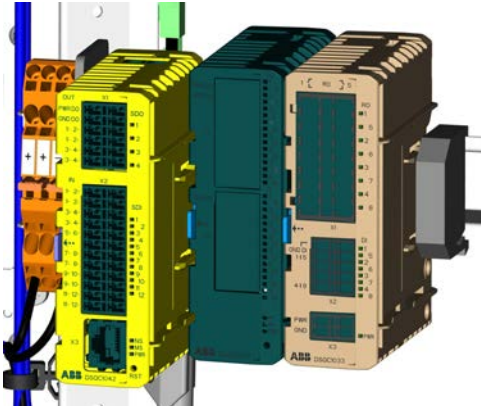
##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

#### Removing the safety digital base device



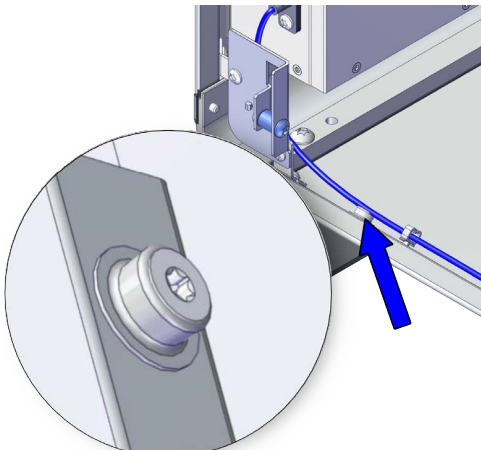
	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

Continues on next page

	Action	Note/Illustration
2	Push the buckle of the digital base slightly and take out the digital base.	 <p>xx2200001972</p>

Refitting the safety digital base device

Refitting the safety digital base device

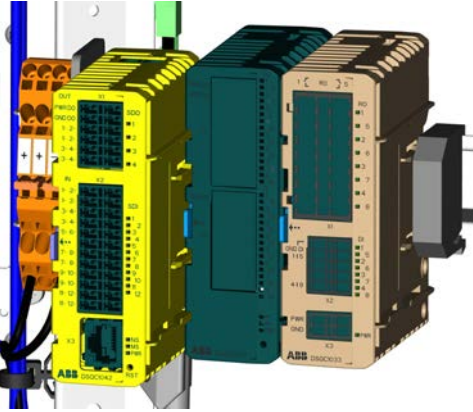
	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

Continues on next page

## 5 Repair

### 5.2.7 Replacing the safety digital base device

*Continued*

	Action	Note/Illustration
3	Push the digital base into the bracket until you hear a clear clicking sound.	 xx2200001972
4	Reconnect any connectors disconnected at removal.	

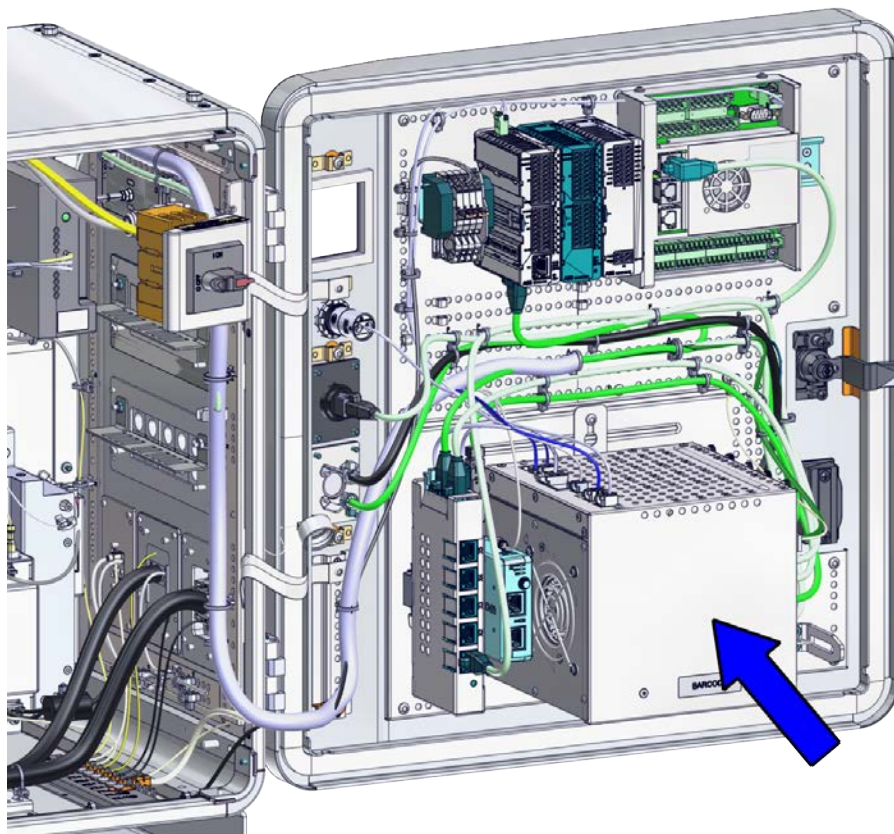
#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

## 5.2.8 Replacing the main computer

### Location

The illustration shows the location of the main computer in the controller.



xx2400001362

### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Main computer Standard	3HAC085504-001	DSQC1095

### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

*Continues on next page*

## 5 Repair

### 5.2.8 Replacing the main computer



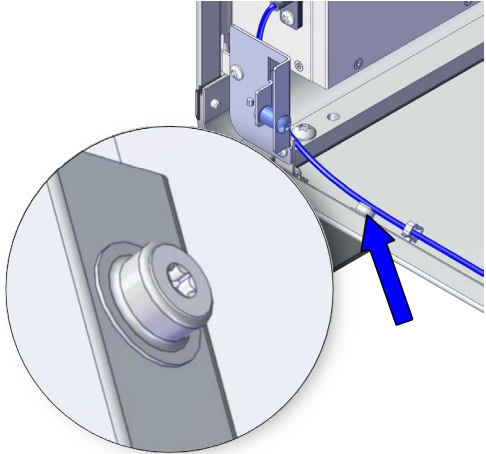
*Continued*

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Removing the main computer assembly


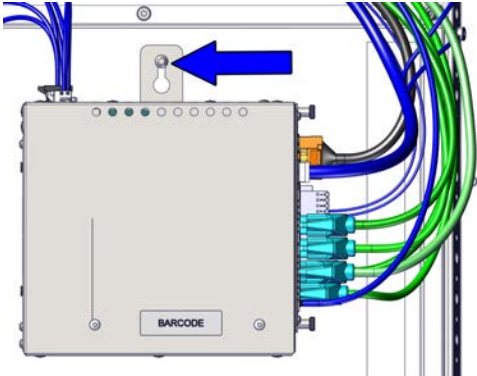
##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

#### Removing the main computer assembly

	Action	Note/Illustration
1	Remove any cable ties.	
2	Disconnect all connectors from the unit to be replaced.	

*Continues on next page*

	Action	Note/Illustration
3	<p>Remove the main computer assembly from the mounting plate.</p> <p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit must be maintained in an ESD-safe environment.</p>	 <p>xx2200001089</p>

**Refitting the main computer assembly**

Refitting the main computer assembly

	Action	Note/Illustration
1	<p> <b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit must be maintained in an ESD-safe environment.</p>	
3	<p>Refit the assembly onto the mounting plate and tighten the screw.</p>	 <p>xx2200001089</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	
5	<p>Apply cable ties and suitable cable protection to ensure that the cables may not be damaged by the door.</p>	

Continues on next page

## 5 Repair

### 5.2.8 Replacing the main computer

*Continued*

#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Restore the hardware settings.	<a href="#">Restoring the hardware settings on page 248.</a>
3	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

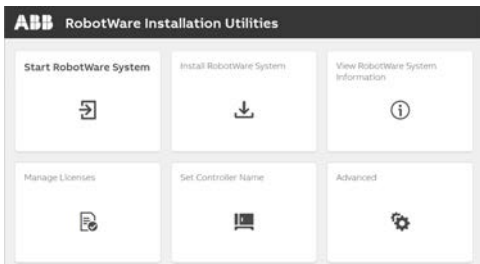
#### Restoring the hardware settings

The controller hardware settings include information such as controller type and serial number. When the main computer has been replaced, the serial number must be restored before any software can be installed, or any licences can be imported.




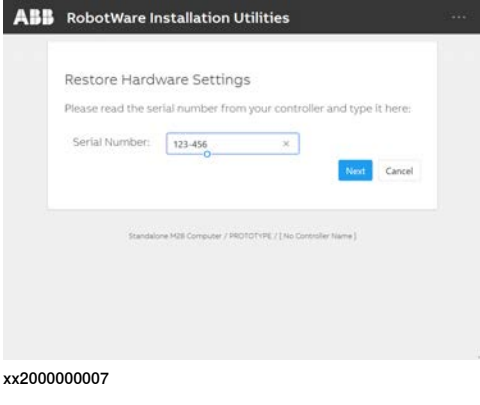
#### Note

When replacing the computer and logic unit, both the serial number and licences are lost. The serial number must be restored as described below. Licences however, can either be restored automatically when the RobotWare system is installed, or manually through **Manage Licences** in RobotWare Installation Utilities.

	Action	Note/Illustration
1	Download the hardware information file (hwsettings.rsf) from MyABB, or from a previous system backup.	
2	Access the RobotWare Installation Utilities.	 xx190000110
3	Tap <b>Advanced</b> , and then <b>Restore Hardware Settings</b> .	
4	The <b>Restore Hardware Settings</b> window is displayed. Follow the instructions and tap <b>Next</b> to proceed.	
5	Carefully read the information and then check all boxes to confirm that you agree with the ABB conditions. Tap <b>Next</b> to proceed.	

*Continues on next page*



	Action	Note/Illustration
6	<p>Enter the controller serial number in field <b>Serial Number</b>. Tap <b>Next</b>.</p> <p> <b>Note</b></p> <p>The serial number is found on the silver label.</p>	
7	<p>Tap <b>Browse</b> to open the hardware information file from its location. The restoration of the serial number is completed.</p>	<p>The system compares the downloaded file and the manually entered serial number to ensure that there is a match.</p>

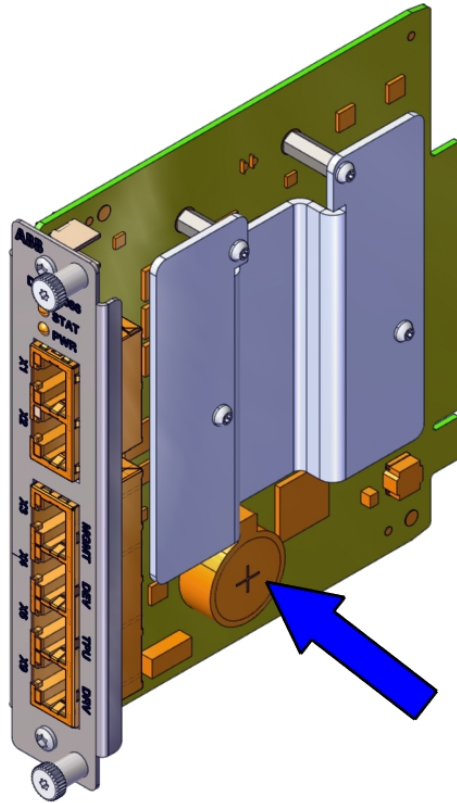
## 5 Repair

### 5.2.9 Replacing the main computer battery

### 5.2.9 Replacing the main computer battery

#### Location

The illustration shows the location of the main computer in the controller.



xx2300001945

#### Required spare parts



#### Note

This is a standard battery. It is not a registered spare part.

Spare part	Article number	Note
Standard Coin Cell Battery	N/A	CR2032

#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	



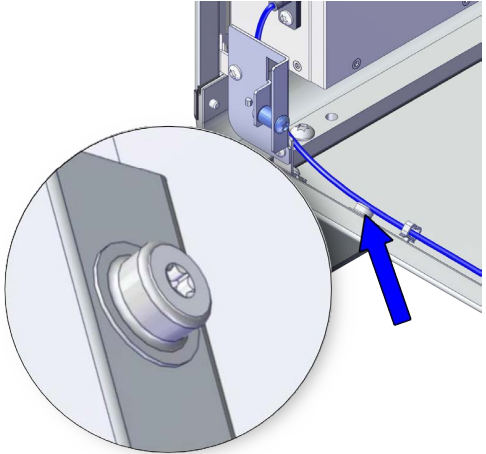
*Continues on next page*

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

Removing the main computer battery

Preparations

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

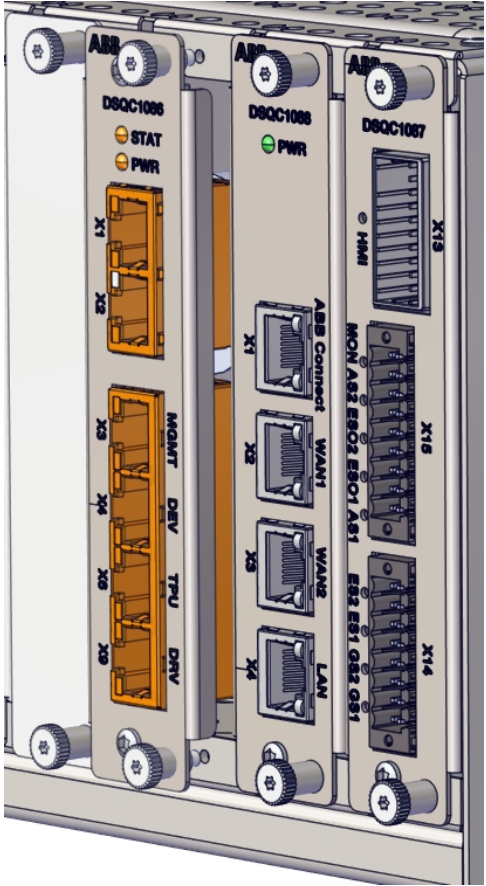
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## 5 Repair

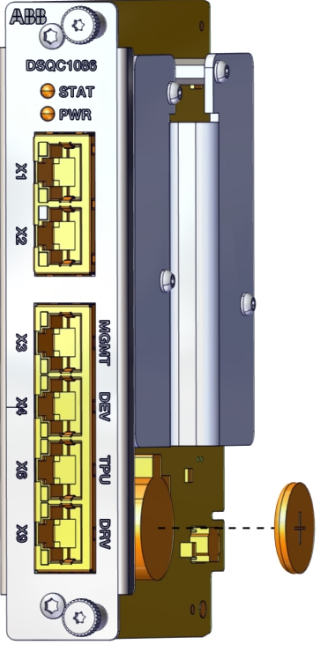
### 5.2.9 Replacing the main computer battery

*Continued*

#### Removing the main computer battery



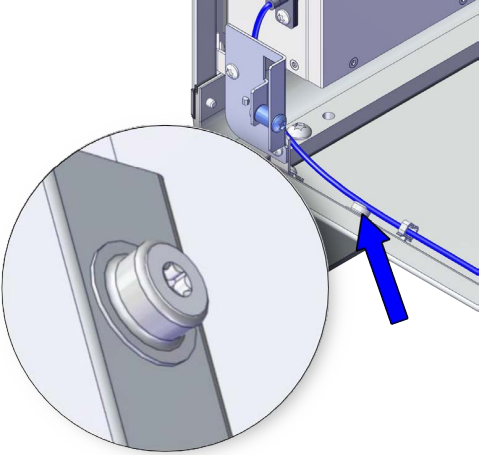
	Action	Note/Illustration
1	Loosen the screws that hold the processor board unit, DSQC1086.	 <p>The illustration shows a close-up of the processor board unit (DSQC1086) installed in a slot. Three screws are visible, one on each side of the board. Labels include 'ABB', 'DSQC1086', 'STAT', 'PWR', 'X1', 'X2', 'X3', 'X4', 'X5', 'X6', 'X7', 'X8', 'X9', 'MOUNT DEV TPU DRV', 'ABB Connect WANI', 'WAN1', 'WAN2', 'LAN', 'X10', 'X11', 'X12', 'X13', 'X14', 'X15', 'MON AS2 ES02 ES01 AS1', 'ES1 ES1 GSA GSA', and 'HMI'. The board is shown in a perspective view, highlighting the screws and the various ports and connectors.</p> <p>xx230000941</p>
2	Remove the processor board unit from the slot in the main computer assembly.	

*Continues on next page*

	Action	Note/Illustration
3	Remove the battery.	 <p>xx2300000942</p>

Refitting the main computer battery

Preparations

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	 <p>xx1900001446</p>

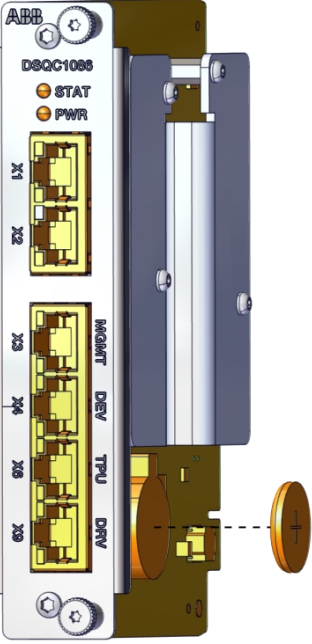
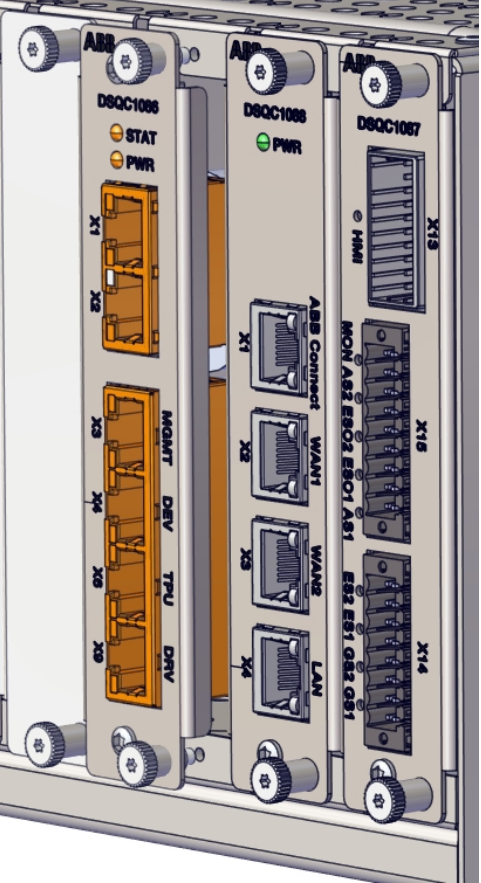
Continues on next page

## 5 Repair

### 5.2.9 Replacing the main computer battery

*Continued*

#### Refitting the battery

	Action	Note/Illustration
1	Insert the battery into the slot in the processor board unit.	 <p>xx2300000942</p>
2	Insert the processor board unit into the slot in the main computer assembly.	 <p>xx2300000941</p>

*Continues on next page*

	Action	Note/Illustration
3	Secure the screws that hold the processor board unit.	

## Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

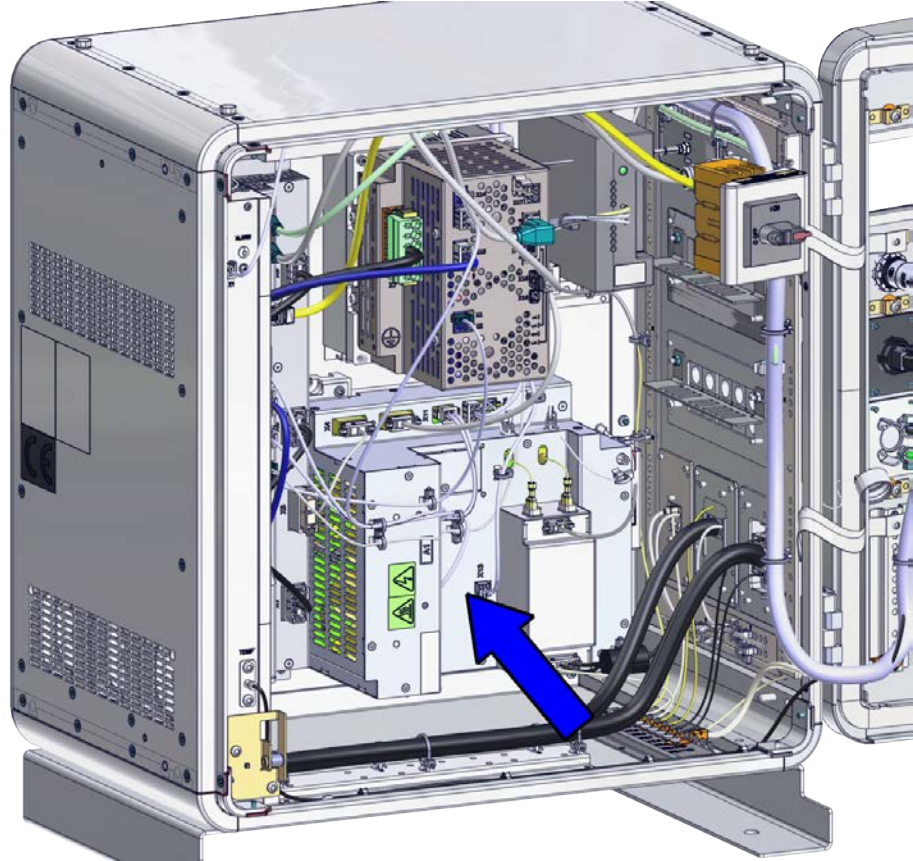
## 5 Repair

### 5.2.10 Replacing the power unit

### 5.2.10 Replacing the power unit

#### Location

The illustration shows the location of the power unit in the controller.



xx2400001363

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Power unit	3HAC084667-001	DSQC3066

#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

*Continues on next page*



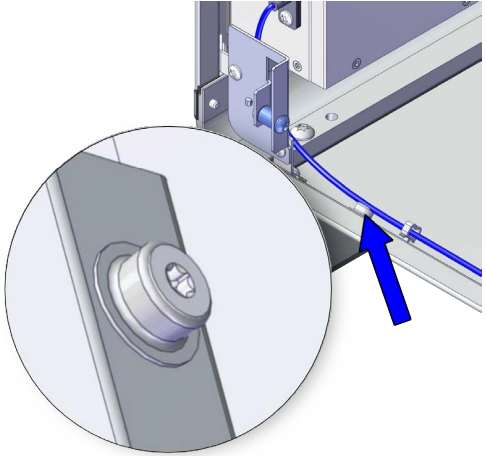


Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

Removing the power unit

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

Removing the power unit



	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

Continues on next page

## 5 Repair



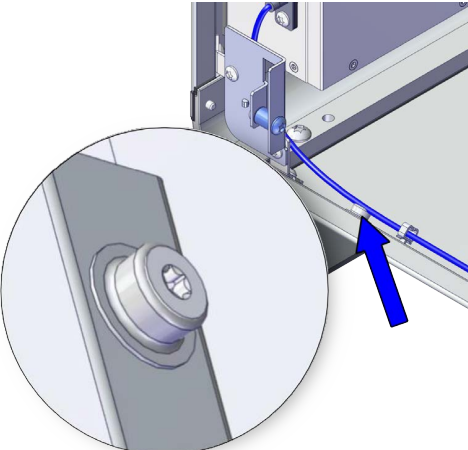
### 5.2.10 Replacing the power unit

Continued


	Action	Note/Illustration
2	<p>Remove the screws and pull the power unit out from the two guiding pins on the mounting plate.</p> <p> <b>CAUTION</b></p> <p>Only the sheet metal on the power unit can be used for holding.</p> <p>Do not touch the connectors or the filter on the power unit.</p>	 <p>xx2400001364</p>

### Refitting the power unit

Refitting the power unit

	Action	Note/Illustration
1	<p> <b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

Continues on next page

	Action	Note/Illustration
3	Position the power unit on the lower guiding pin on the mounting plate, and then tip the unit upwards against the upper guiding pin. Secure the screws.	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2 Nm</p>  <p>xx2400001364</p>
4	Reconnect any connectors disconnected at removal.	

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

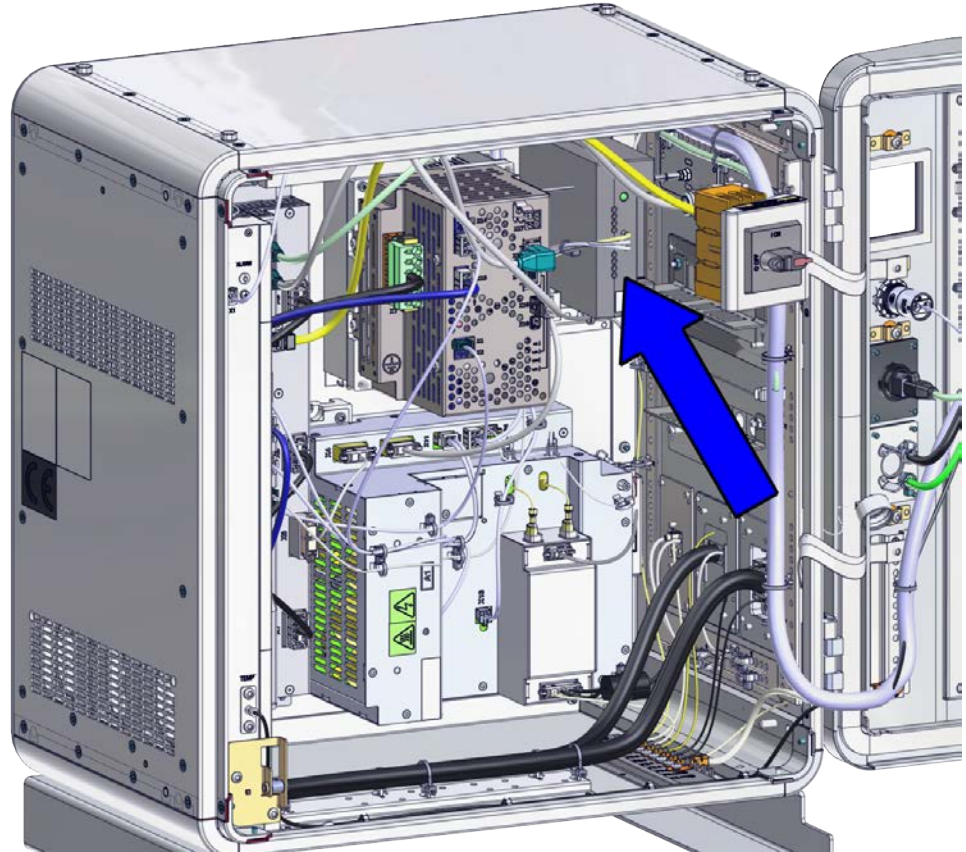
## 5 Repair

### 5.2.11 Replacing the power supply

#### 5.2.11 Replacing the power supply

##### Location

The illustration shows the location of the power supply in the controller.



xx2400001351



#### WARNING

Do not touch the power supply when the DC OK LED is on.

There is residual voltage in the power supply even if the main switch is in the OFF position.

##### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
DSQC 609 power supply	3HAC14178-1	DSQC 609
DSQC 634 power supply	3HAC13398-2	DSQC 634

*Continues on next page*

Spare part	Article number	Note
Harness AC input of power supply	3HAC069617-001	
Harness Terminal with cable	3HAC088876-001	
End clamp	3HAB7983-1	

Required tools and equipment



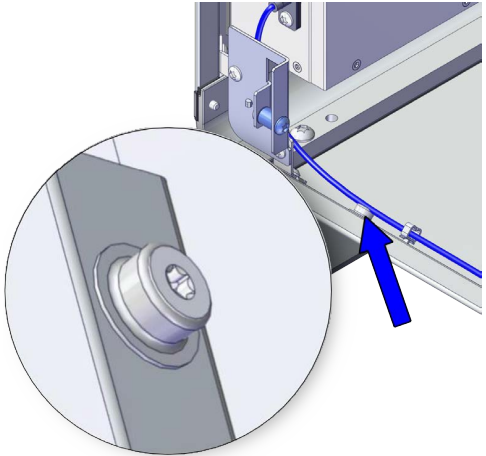
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

Removing the DSQC 609 power supply

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

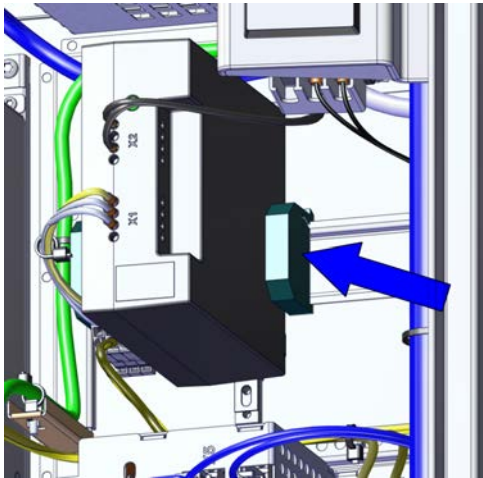
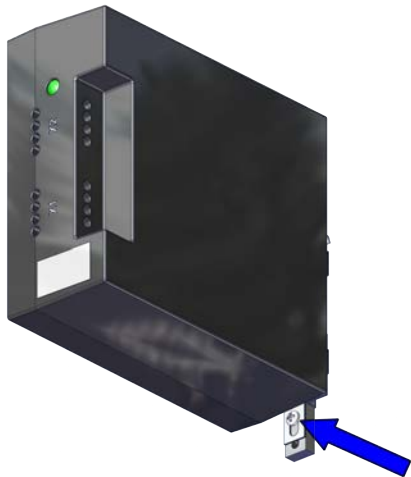
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## 5 Repair

### 5.2.11 Replacing the power supply


*Continued*

#### Removing the power supply


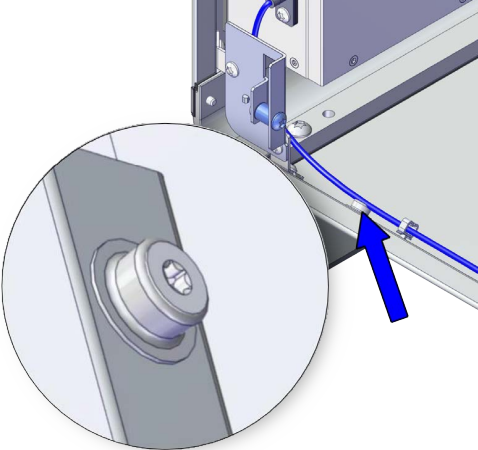
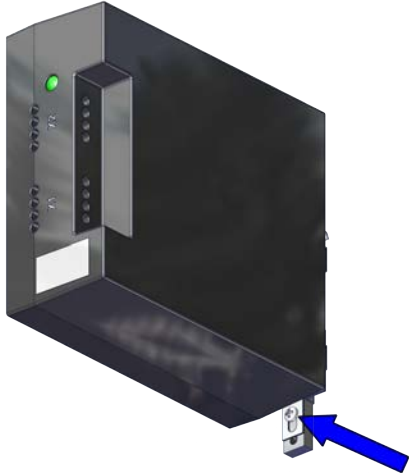
	Action	Note/Illustration
1	Remove the end clamp besides the power supply with a screwdriver.	 <p>xx1900001907</p>
2	Disconnect all connectors from the unit to be replaced.	 <p>xx1900001908</p>
3	Remove the screw and the power supply.	

#### Refitting the DSQC 609 power supply

##### Refitting the power supply

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

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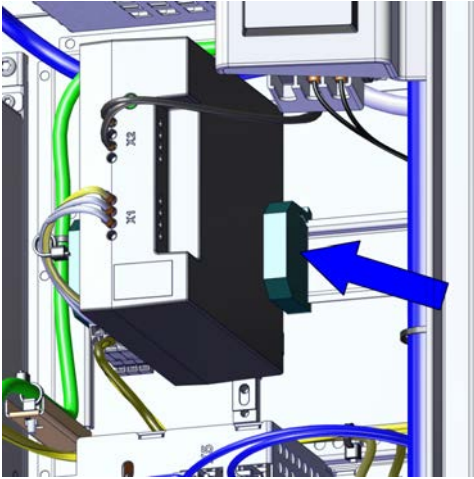
	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48.</i></p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Fit the power supply to the bracket and fasten it with screw.</p>	<p>Screws: Cross recessed cheese head screw M4x8 (1 pcs) Tightening torque: 1.7 Nm±10%.</p>  <p>xx1900001908</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	

Continues on next page

## 5 Repair

### 5.2.11 Replacing the power supply

*Continued*


	Action	Note/Illustration
5	Refit the end clamp besides the power supply.	 <p>xx1900001907</p>

#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	


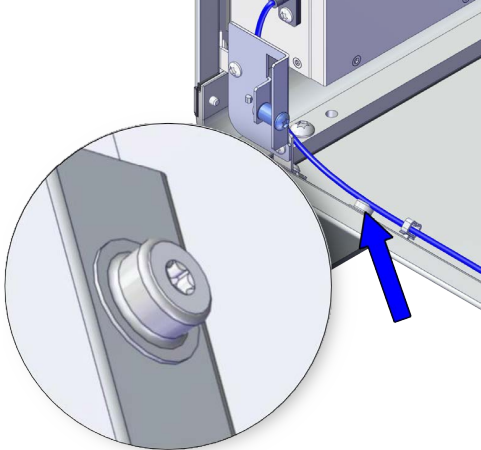
### Removing the DSQC 634 power supply

#### Preparations

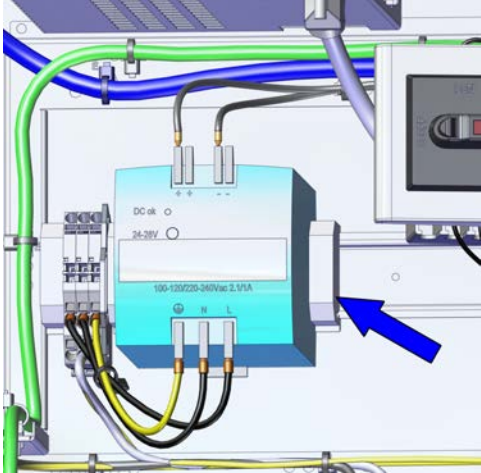
	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31.</a></p>	
2	Open the door.	<a href="#">Opening the door on page 196.</a>

*Continues on next page*



	Action	Note/Illustration
3	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48.</i></p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

Removing the power supply

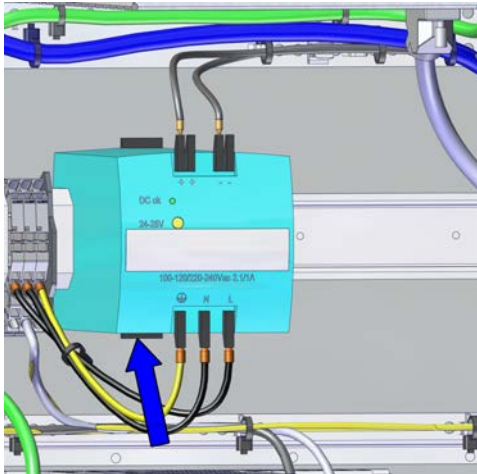
	Action	Note/Illustration
1	<p>Remove the end clamp beside the power supply with a screwdriver.</p>	 <p>xx1900002443</p>
2	<p>Disconnect all connectors from the unit to be replaced.</p>	

Continues on next page

## 5 Repair



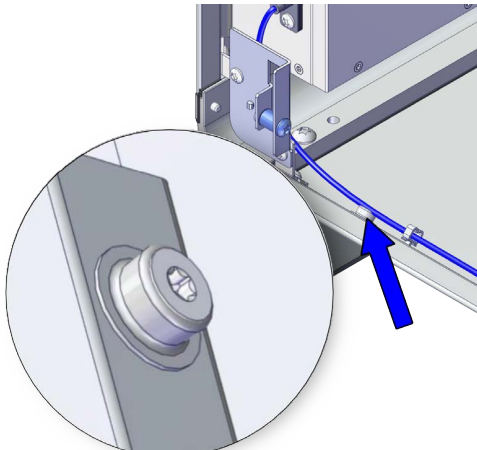
### 5.2.11 Replacing the power supply

Continued

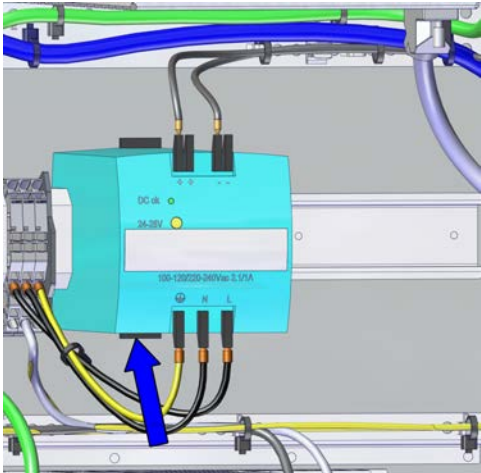
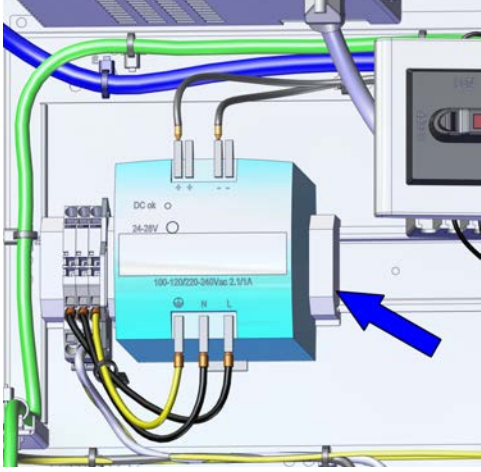
	Action	Note/Illustration
3	Press the lower buckle to release and remove the power supply.	 <p>xx1900001950</p>

### Refitting the DSQC 634 power supply

Refitting the power supply

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

Continues on next page

	Action	Note/Illustration
3	Hang the power supply into the bracket and push the lower of it until you hear a clear clicking sound.	 <p>xx1900001950</p>
4	Reconnect any connectors disconnected at removal.	
5	Refit the end clamp besides the power supply.	 <p>xx1900002443</p>

#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

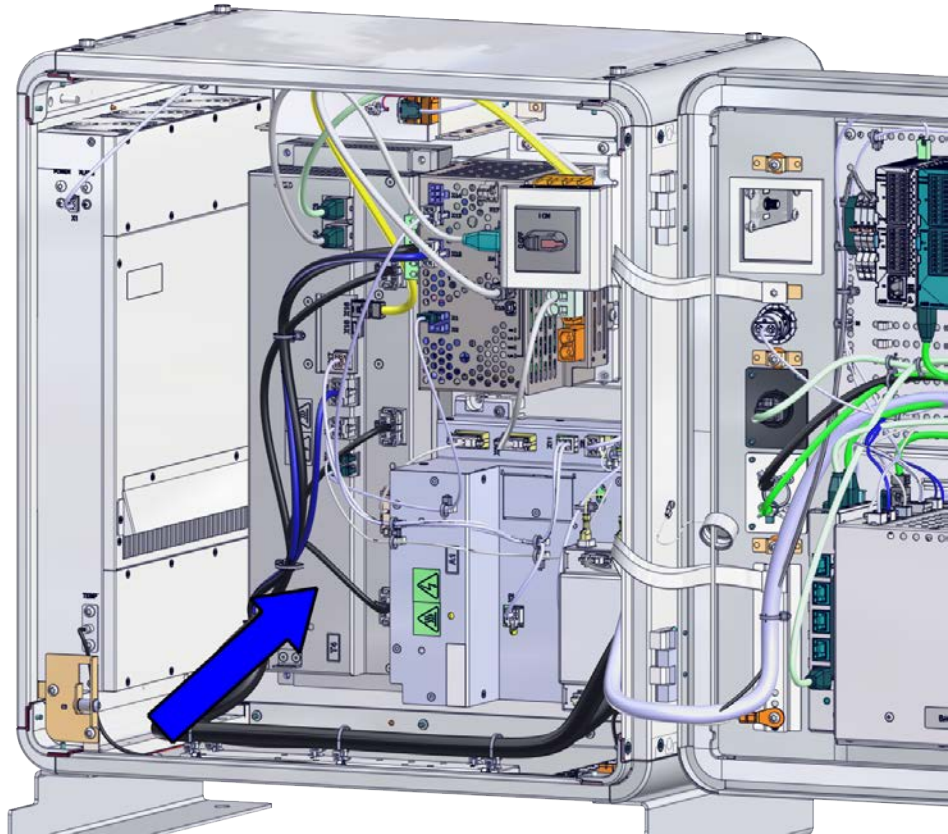
## 5 Repair

### 5.2.12 Replacing the drive unit

#### 5.2.12 Replacing the drive unit

##### Location

The illustration shows the location of the drive unit in the controller.



xx2400001365

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Drive unit, Low Voltage	3HAC074966-001	DSQC3084
Harness DC-BUS	3HAC091496-001	Harness A1.X4 - T4.X5
Harness 24_SYS_DRV	3HAC088731-001	Harness A1.X5 - T4.X1
Ethernet harness	3HAC088740-001	Harness A1.X12 - T4.X3

*Continues on next page*

Required tools and equipment



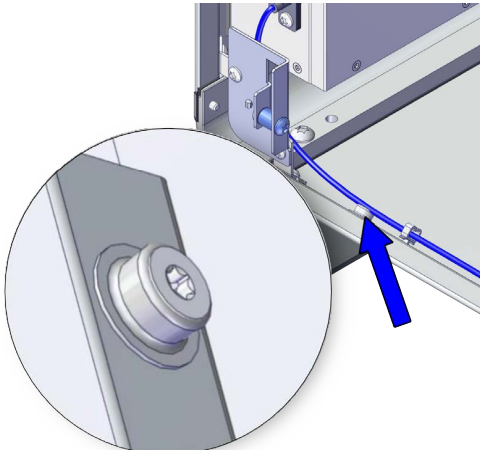
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

Removing the drive unit

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

Removing the drive unit

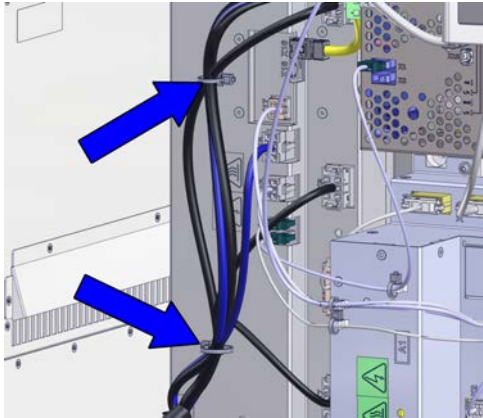
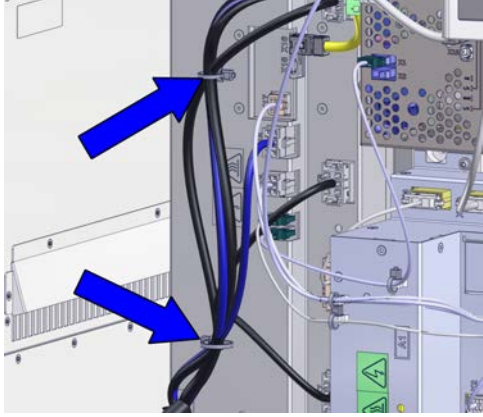
	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

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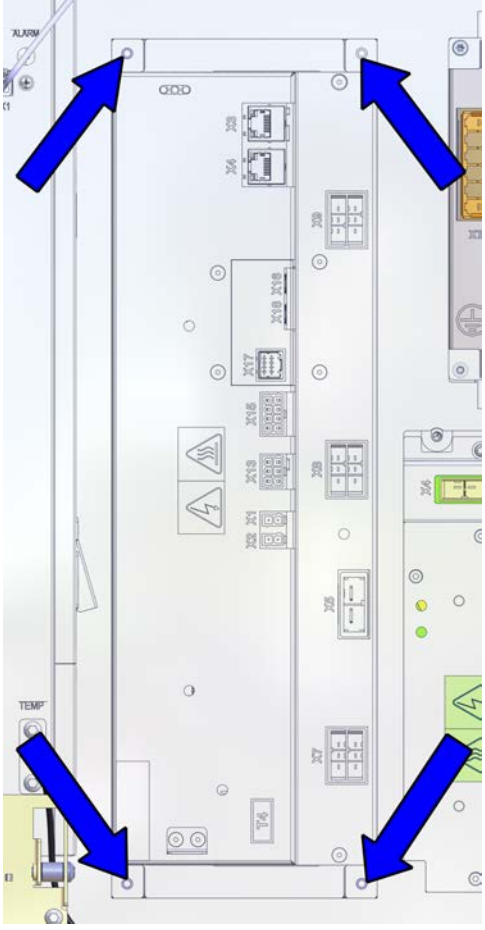
## 5 Repair

### 5.2.12 Replacing the drive unit

*Continued*


	Action	Note/Illustration
2	Cut the cable tie for the DC-bus cable and move it to the other side.	 <p>xx2400001366</p>
3	Cut the cable tie for the EtherCAT cable.	 <p>xx2400001366</p>

*Continues on next page*

	Action	Note/Illustration
4	Remove the attachment screws and pull the drive unit out from the two snaps.	<p>Lengthened screwdriver</p>  <p>xx2400001367</p>

Refitting the drive unit

Refitting the drive unit


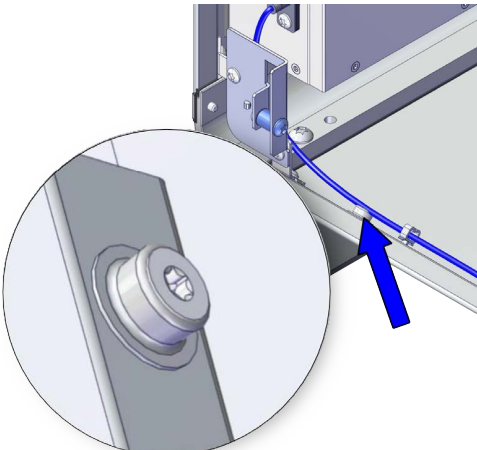

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

Continues on next page

## 5 Repair

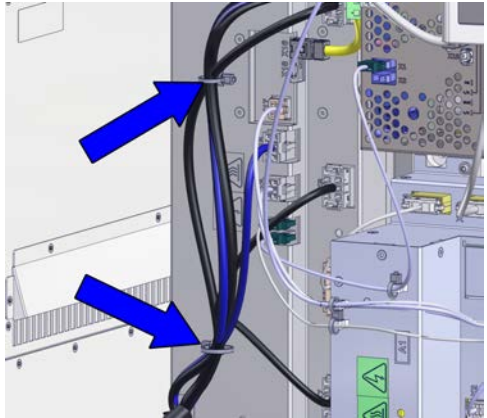
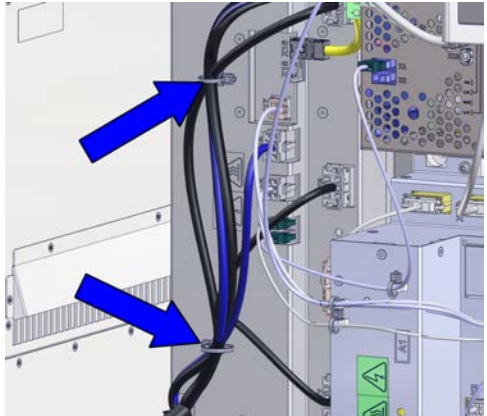
### 5.2.12 Replacing the drive unit

Continued

	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Push the drive unit into the snaps on the mounting plate and secure the screws.</p>	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%.</p>  <p>xx2400001367</p>

Continues on next page



	Action	Note/Illustration
4	Fasten the DC-bus cable with a new cable tie to the drive unit.	 <p>xx2400001366</p>
5	Fasten the EtherCAT cable with a new cable tie to the drive unit.	 <p>xx2400001366</p>
6	Reconnect any connectors disconnected at removal.	

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

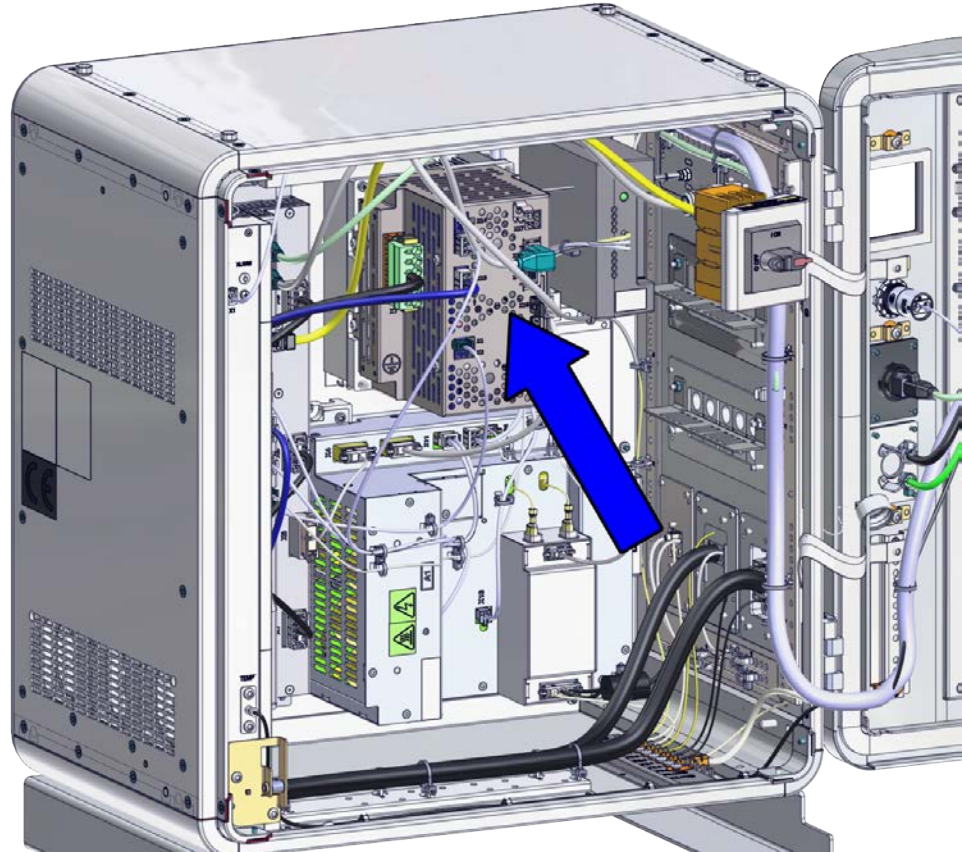
## 5 Repair

### 5.2.13 Replacing the additional drive unit (DSQC3065)

### 5.2.13 Replacing the additional drive unit (DSQC3065)

#### Location

The illustration shows the location of the additional drive unit in the controller.



xx2400001349



#### WARNING

Do not touch the drive unit when the **DC-BUS High Voltage LED** is on.  
There is residual voltage in the drive unit even if the main switch is in the OFF position.

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Drive unit	3HAC064983-001	DSQC 3065
Harness DC-BUS	3HAC089433-001	

*Continues on next page*

Spare part	Article number	Note
Ethernet harness	3HAC089278-001	
Harness 24V_SYS_DRV	3HAC089430-001	

**Required tools and equipment**



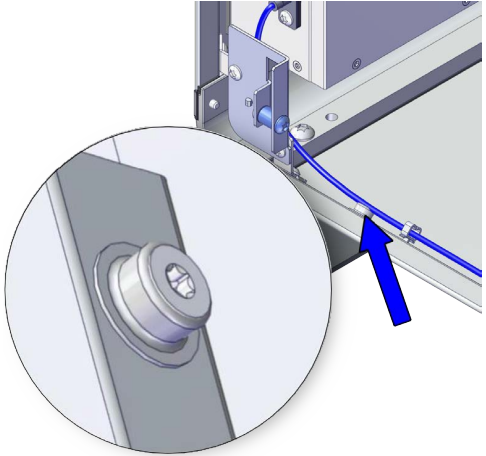
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

**Required documents**

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

**Removing the additional drive unit**

Preparations

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>



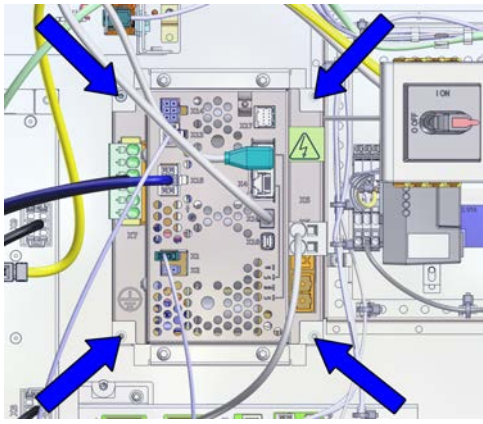
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## 5 Repair

### 5.2.13 Replacing the additional drive unit (DSQC3065)


Continued

#### Removing the drive unit


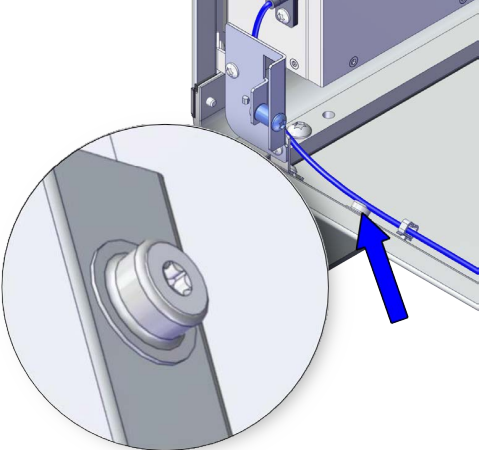
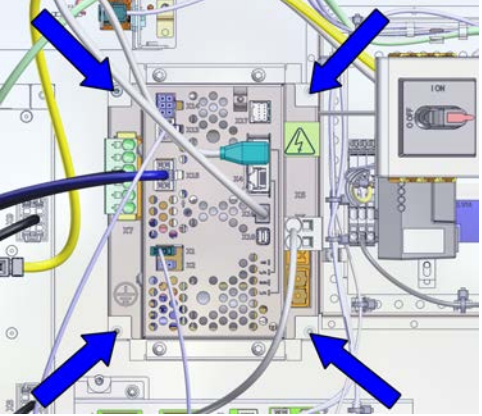
	Action	Note/Illustration
1	<p>Pull the cable ties out from the locking holes.</p> <p> <b>Tip</b></p> <p>Take photos of the cable ties and locking holes before pulling out, to have as a reference when refitting the cable ties.</p>	
2	<p>Disconnect all connectors from the unit to be replaced.</p>	
3	<p>Remove the screws and pull the drive unit out from the two guiding pins on the mounting plate.</p> <p> <b>CAUTION</b></p> <p>The cabling is sensitive to mechanical damage. Handle it with care to avoid damage to the cabling or the connector, avoid any kind of tilt or skew.</p>	<p>Lengthened screwdriver</p>  <p>xx2400001350</p>

#### Refitting the additional drive unit

#### Refitting the additional drive unit

	Action	Note/Illustration
1	<p> <b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

Continues on next page

	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Refit the additional drive unit and secure with the screws.</p>	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2 Nm</p>  <p>xx2400001350</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	

Concluding procedure

	Action	Note/Illustration
1	<p>Close the door.</p>	<p><i>Closing the door on page 196.</i></p>
2	<p>Perform the function tests to verify that the safety features work properly, see <i>Function tests on page 185</i>.</p>	

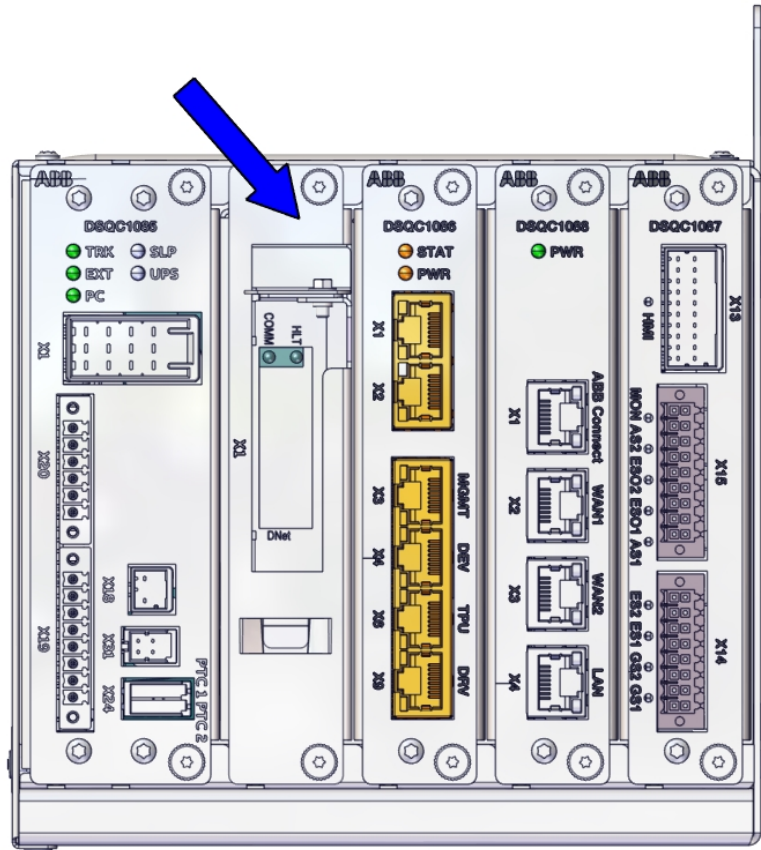
## 5 Repair

### 5.2.14 Replacing the DeviceNet board

#### 5.2.14 Replacing the DeviceNet board

##### Location

The illustration shows the location of the DeviceNet board DSQC1096 in the main computer.



xx2300001738

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
DeviceNet M/S [3029-1]	3HAC085254-001	DSQC1096
Connector assembly Single-row female	3HAC064901-001	Mating CONN for IP20 DeviceNet connector

Continues on next page

Required tools and equipment



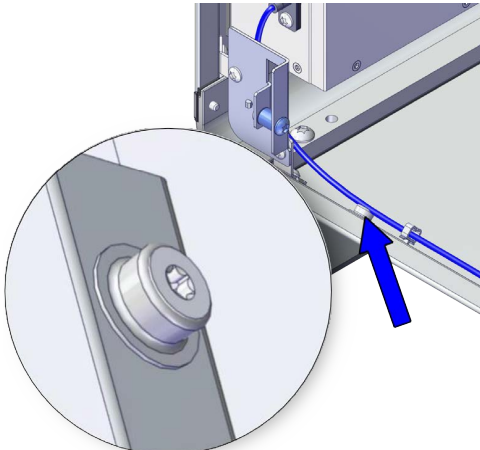
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

Removing the DeviceNet board

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

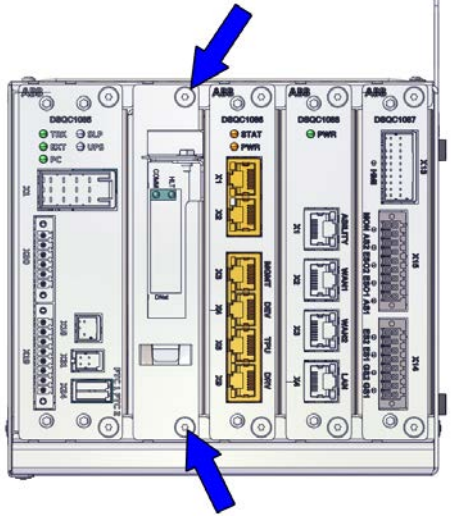
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## 5 Repair

### 5.2.14 Replacing the DeviceNet board



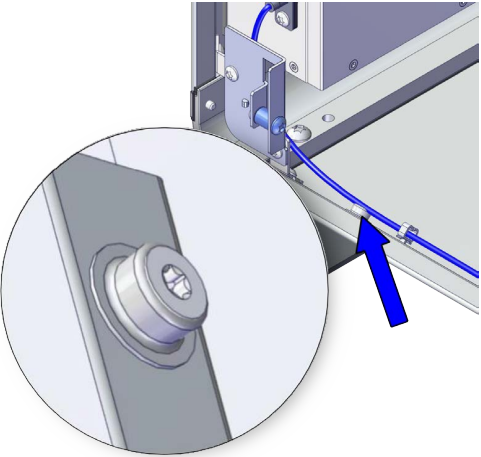
*Continued*

#### Removing the DeviceNet board

	Action	Note/Illustration
1	Loosen the screws that hold the DeviceNet board unit.	 <p>xx230000921</p>
2	Remove the DeviceNet board unit from the slot in the main computer assembly.	

#### Refitting the DeviceNet board

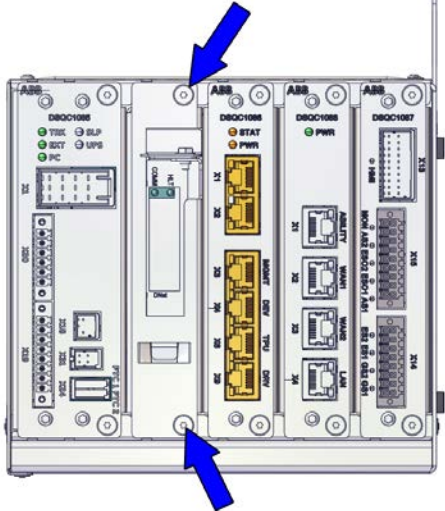
##### Preparations

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

*Continues on next page*



Refitting the DeviceNet board

	Action	Note/Illustration
1	Insert the DeviceNet board into the slot in the main computer assembly.	
2	Secure the screws that hold the DeviceNet board unit.	 <p>xx230000921</p>

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

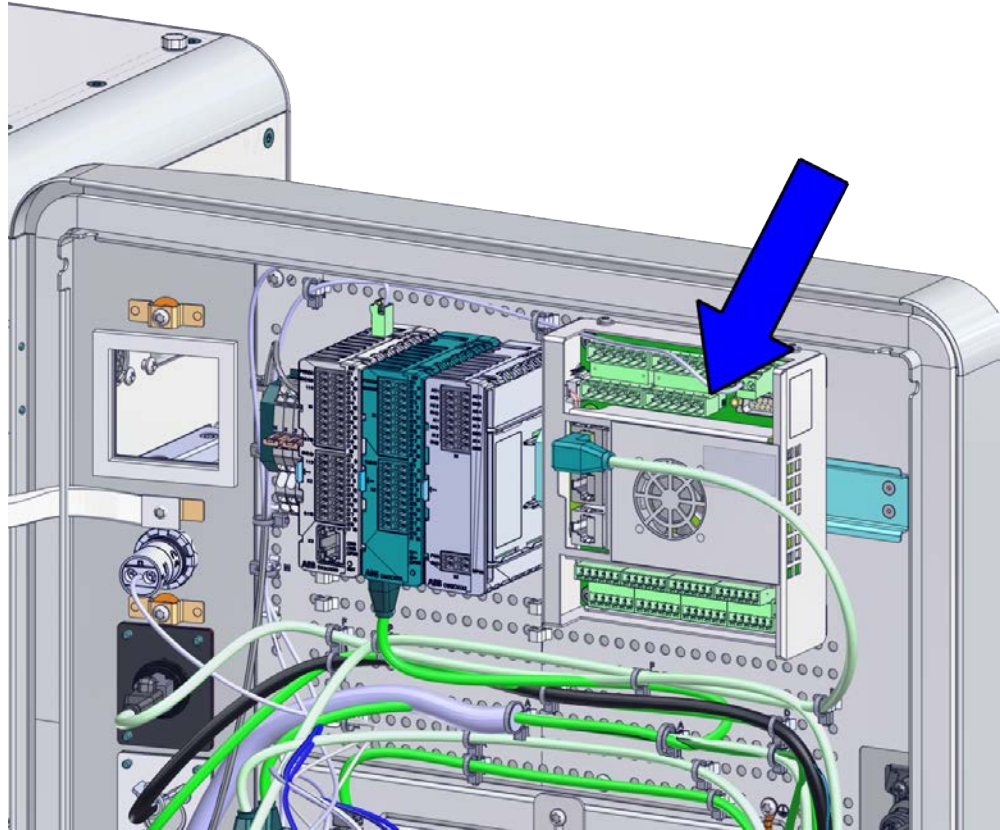
## 5 Repair

### 5.2.15 Replacing the conveyor tracking module (CTM)

#### 5.2.15 Replacing the conveyor tracking module (CTM)

##### Location

The illustration shows the location of the conveyor tracking module in the controller.



xx2400001368

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Conveyor tracking module [3103-1]	3HNA027579-001	DSQC2000
CONNECTOR KIT - DSQC2000	3HNA029345-001	
Harness 24V_CTM	3HAC088744-001	Power cable of CTM

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Required tools and equipment



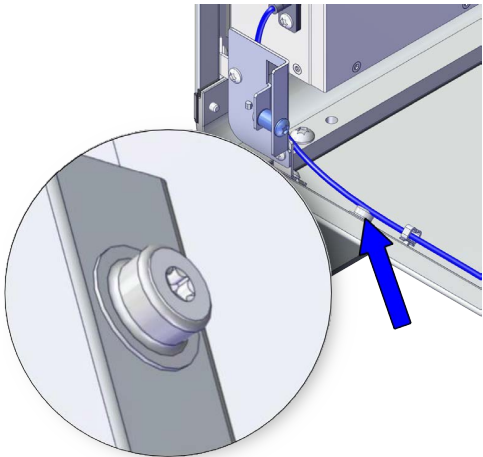
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	
<i>Application manual - Conveyor tracking</i>	3HAC066561-001	

Removing the conveyor tracking module (option)

Preparations

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

Removing the conveyor tracking module (option)



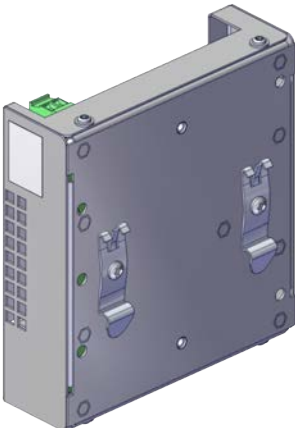
	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

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## 5 Repair


### 5.2.15 Replacing the conveyor tracking module (CTM)

Continued


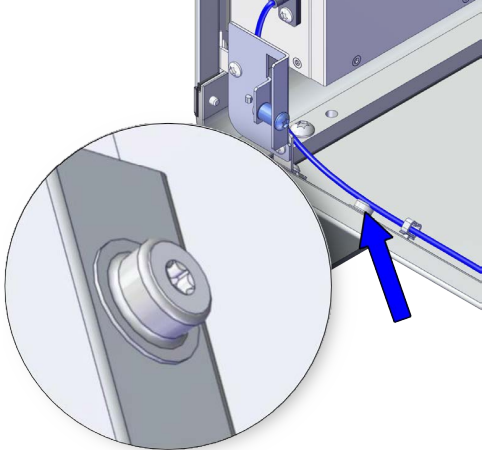
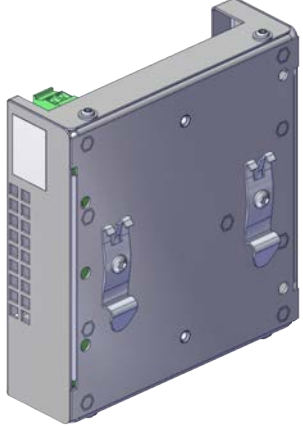
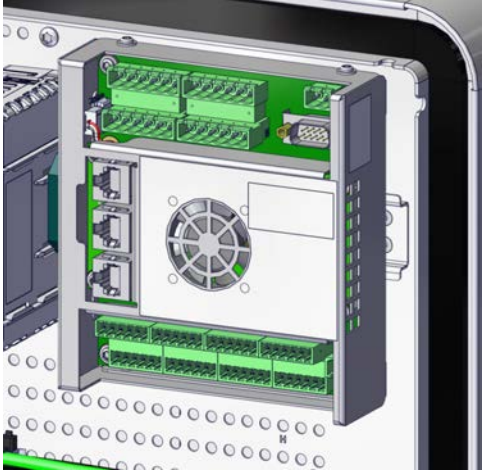
	Action	Note/Illustration
2	<p>Pull on the lower side of the conveyor tracking module slightly and take out the conveyor tracking module.</p> <p> <b>Note</b></p> <p>The conveyor tracking module is secured by the buckles.</p> <p>Be careful with the direction of the buckles when doing assembling/disassembling work.</p>	 <p>xx1900001912</p>  <p>xx1900001913</p>

### Refitting the conveyor tracking module (option)

Refitting the conveyor tracking module (option)

	Action	Note/Illustration
1	<p> <b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

Continues on next page

	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Hang the conveyor tracking module into the bracket and push the lower of it until you hear a clear clicking sound.</p>	 <p>xx1900001913</p>  <p>xx1900001912</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	

Continues on next page

## 5 Repair

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### 5.2.15 Replacing the conveyor tracking module (CTM)

*Continued*

	Action	Note/Illustration
5	Stick the other connector onto the side of the digital base with the self-adhesive part.	

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

## 5.2.16 Replacing the air filter

### Location

The illustration shows the location of the air filter on the controller.



xx2400001353

### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Air filter-coarse filter	3HAC080919-001	
Air filter-Fine filter	3HAC080920-001	
Air filter (Polymeric)	3HAC068543-001	Filter element of fine filter

*Continues on next page*

## 5 Repair

### 5.2.16 Replacing the air filter

*Continued*

#### Required tools and equipment


Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

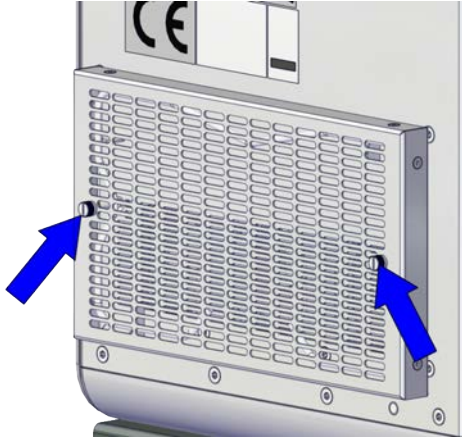
Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Removing the air filter

##### Preparations


	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	

##### Removing the air filter

	Action	Note/Illustration
1	Loosen the attachment screws on the air filter.	 xx1900001491

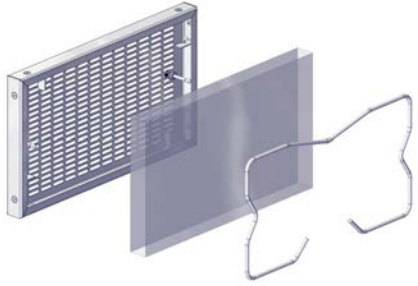
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	Action	Note/Illustration
2	Remove the air filter unit.	 <p data-bbox="954 757 1061 779">xx1900001492</p>

**Removing the polymeric filter element**

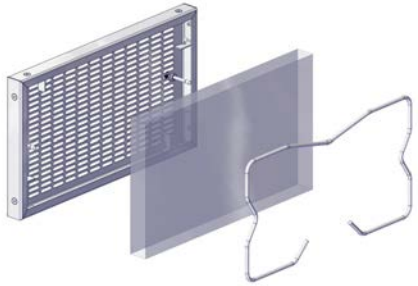
The procedure below details how to remove the polymeric filter element (option 3005-2 Moist dust filter).

	Action	Note/Illustration
1	Take out the polymeric filter element from the filter.	 <p data-bbox="954 1346 1061 1368">xx2000000421</p>

**Refitting the air filter**

**Refitting the polymeric filter element**

The procedure below details how to refit the polymeric filter element (option 3005-2 Moist dust filter).

	Action	Note/Illustration
1	Insert the polymeric filter element to the filter and secure with the metallic line.	 <p data-bbox="954 1998 1061 2020">xx2000000421</p>



Continues on next page

## 5 Repair

### 5.2.16 Replacing the air filter

*Continued*

#### Refitting the air filter

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Refit the air filter unit to the cabinet.	
3	Secure it with the screws.	 <p>xx1900001492</p>

#### Concluding procedure

	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

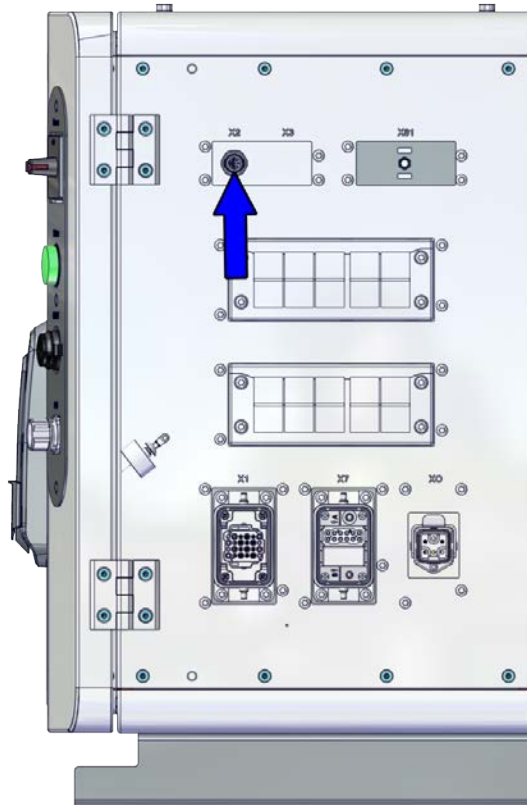
## 5.3.1 Replacing the manipulator signal connector (SMB)

## 5.3 Replacing parts on the panels

## 5.3.1 Replacing the manipulator signal connector (SMB)

## Location

The illustration shows the location of the manipulator signal connector.



xx2400001369

## Required spare parts

**Note**

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Harness Single SMB connection	3HAC088742-001	Harness single hybrid SMB
Harness Double SMB connection	3HAC089436-001	Harn. double hybrid SMB unit

*Continues on next page*

## 5 Repair

### 5.3.1 Replacing the manipulator signal connector (SMB)

*Continued*

#### Required tools and equipment



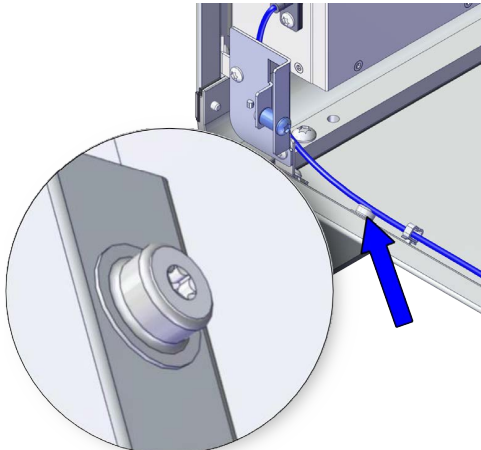
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Removing the manipulator signal connector

##### Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

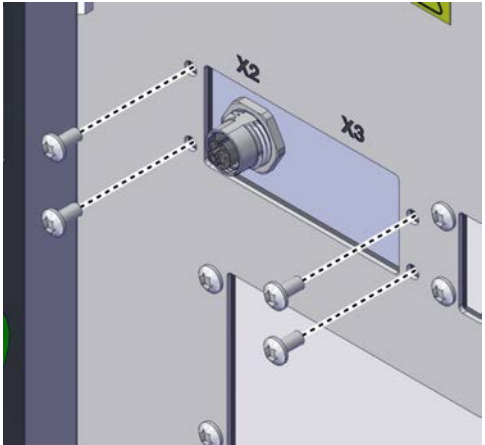
#### Removing the manipulator signal connector

	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

*Continues on next page*



5.3.1 Replacing the manipulator signal connector (SMB)

Continued

	Action	Note/Illustration
2	Remove the attachment screws on the cover.	 <p>xx1900001915</p>
3	Push the manipulator signal connector into the cabinet.	
4	Take the manipulator signal connector out.	

Refitting the manipulator signal connector

Refitting the manipulator signal connector

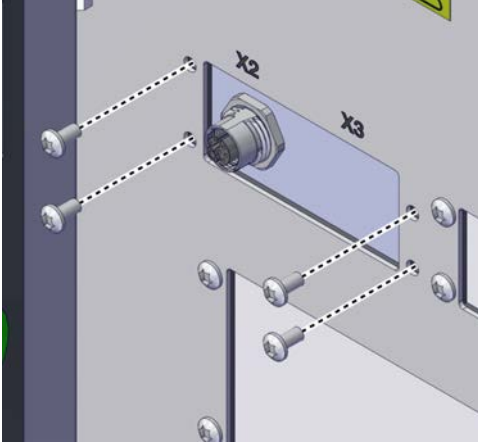
	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	
3	Insert the manipulator signal connector into the cover from inner side of the cabinet.	

Continues on next page

## 5 Repair

### 5.3.1 Replacing the manipulator signal connector (SMB)

*Continued*

	Action	Note/Illustration
4	Secure it with the attachment screws.	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2.7 Nm±10%.</p>  <p>xx1900001915</p>
5	Reconnect any connectors disconnected at removal.	

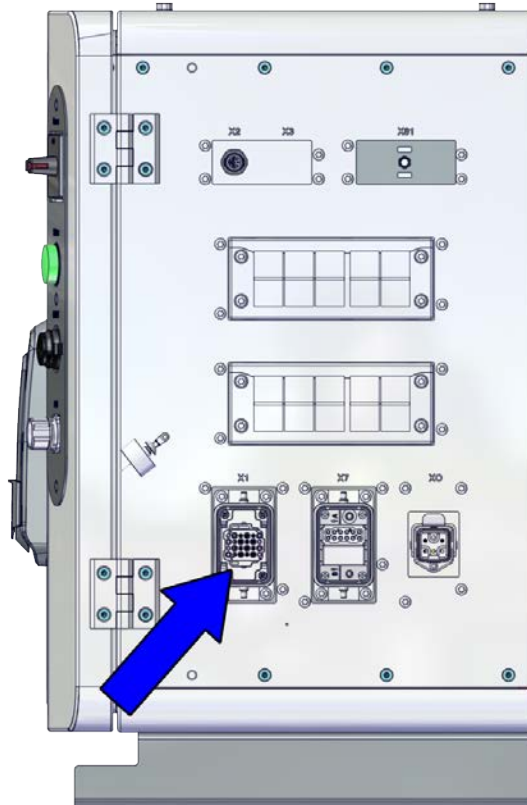
#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

5.3.2 Replacing the motor connector

Location

The illustration shows the location of the motor connector in the controller.



xx2400001370

Required spare parts



Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Harness Motors power LV 6-axis	3HAC088745-001	

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

Continues on next page

## 5 Repair

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### 5.3.2 Replacing the motor connector

*Continued*

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#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	<i>3HAC086305-010</i>	



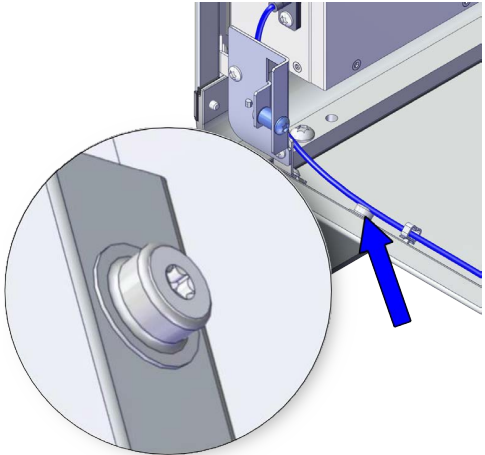
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5.3.2.1 Replacing the motor connector

Removing the motor connector

Preparations

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
4	Make records about the sequence that cables are removed. The cables need to be installed in the same position.	

Removing the motor connector

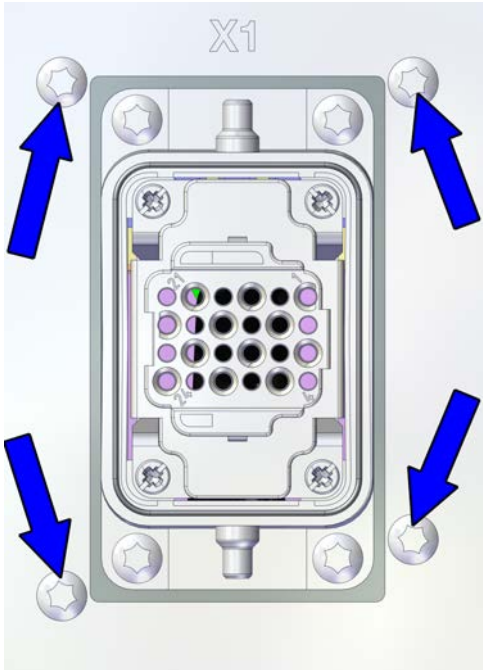
	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	

Continues on next page

## 5 Repair


### 5.3.2.1 Replacing the motor connector

Continued

	Action	Note/Illustration
2	Remove the attachment screws on the cover.	 <p>xx2400001373</p>
3	Push the motor connector into the cabinet.	
4	Take the motor connector cable out from the velcro in the cabinet.	
5	Take out the motor connector.	


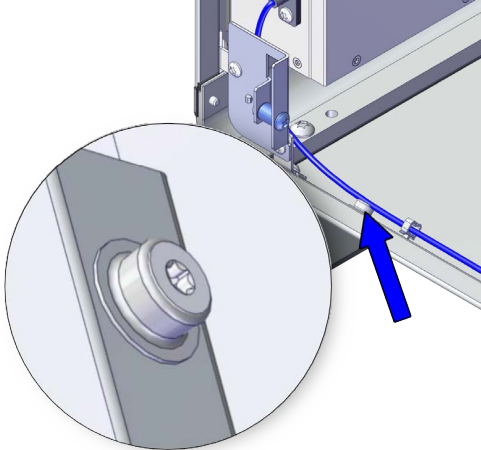
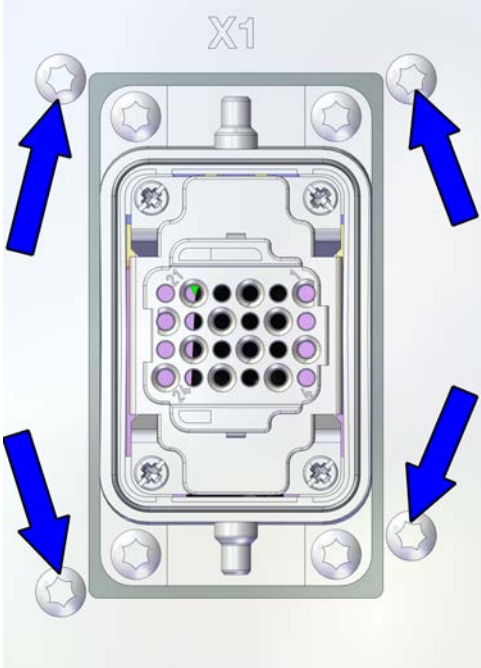

### Refitting the motor connector

#### Refitting the motor connector

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

Continues on next page

5.3.2.1 Replacing the motor connector  
Continued

	Action	Note/Illustration
2	<p> <b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Insert the motor connector into the cover from inner side of the cabinet and fasten it with the screws.</p>	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2.7 Nm±10%.</p>  <p>xx2400001373</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	
5	<p>Secure the motor connector cables with the velcro on the frame of the cabinet.</p> <p> <b>Tip</b></p> <p>Use the same position as from removing the motor connector.</p>	

Continues on next page

## 5 Repair

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### 5.3.2.1 Replacing the motor connector

*Continued*

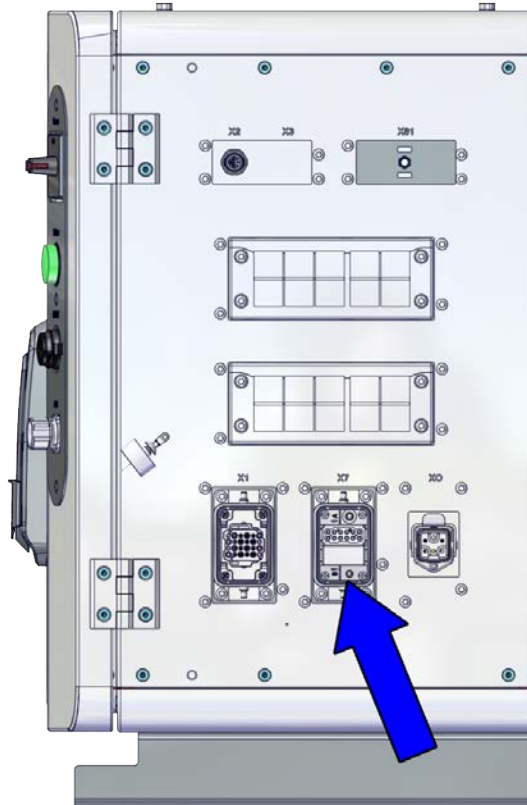
#### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

5.3.3 Replacing the harness ADU motor power

Location

The illustration shows the location of the motor connector in the controller.



xx2400001371

Required spare parts



Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Harness ADU Motor Power unit	3HAC089428-001	Option

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

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## 5 Repair

### 5.3.3 Replacing the harness ADU motor power



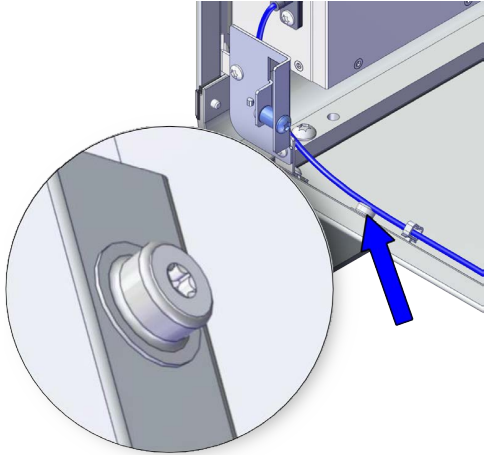
*Continued*

#### Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

#### Removing the motor connector

##### Preparations

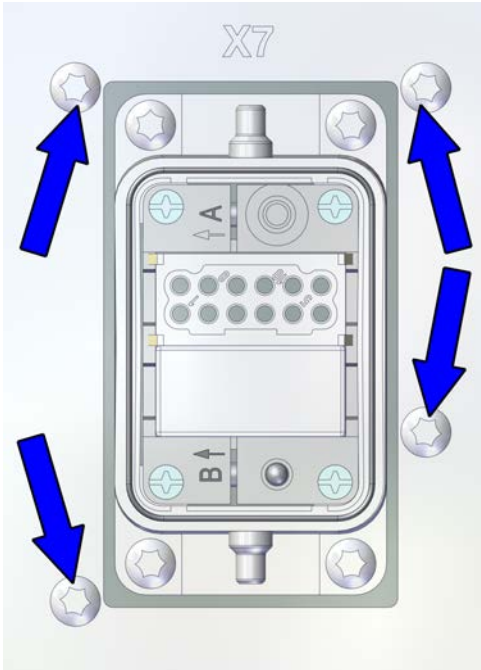
	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446
4	Make records about the sequence that cables are removed. The cables need to be installed in the same position.	

#### Removing the motor connector

	Action	Note/Illustration
1	Disconnect all connectors from the unit to be replaced.	


*Continues on next page*

5.3.3 Replacing the harness ADU motor power  
Continued

	Action	Note/Illustration
2	Remove the attachment screws on the cover.	 <p>xx2400001374</p>
3	Push the motor connector into the cabinet.	
4	Take the motor connector cable out from the velcro in the cabinet.	
5	Take out the motor connector.	

Refitting the motor connector

Refitting the motor connector


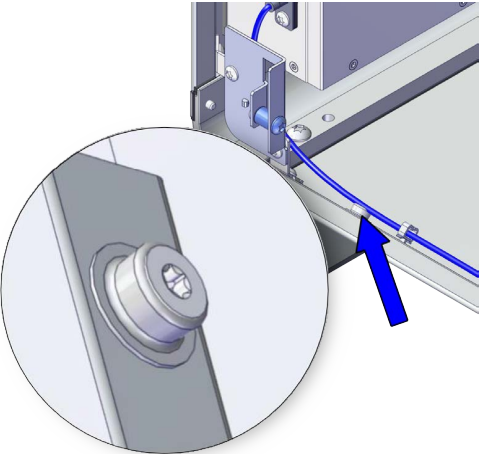
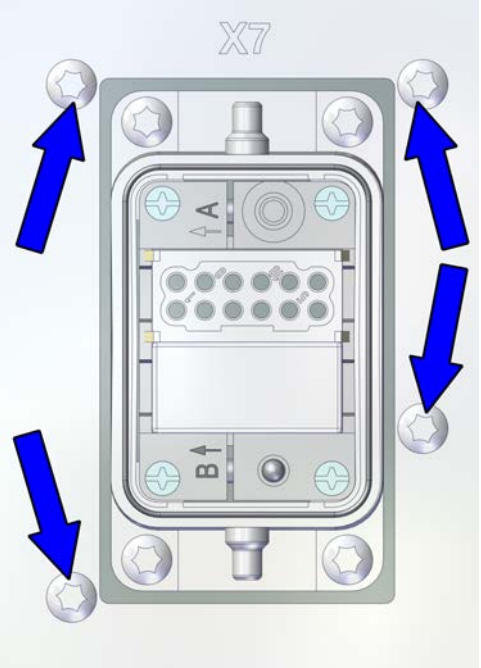

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	

Continues on next page

## 5 Repair

### 5.3.3 Replacing the harness ADU motor power

Continued

	Action	Note/Illustration
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Insert the motor connector into the cover from inner side of the cabinet and fasten it with the screws.</p>	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2.7 Nm±10%.</p>  <p>xx2400001374</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	
5	<p>Secure the motor connector cables with the velcro on the frame of the cabinet.</p>  <p><b>Tip</b></p> <p>Use the same position as from removing the motor connector.</p>	

Continues on next page



## Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

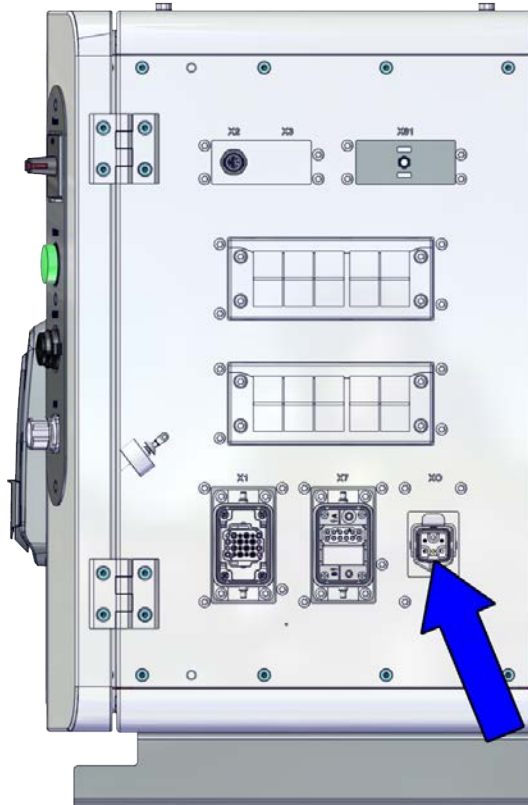
## 5 Repair

### 5.3.4 Replacing the incoming mains connector

### 5.3.4 Replacing the incoming mains connector

#### Location

The illustration shows the location of the incoming mains connector in the controller.



xx2400001372

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Harness Power inlet	3HAC089431-001	Harness-Mains connection
Connector AC power inlet	3HAC070308-001	
Handle for 6 mm switch	3HAC037699-001	

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Required tools and equipment



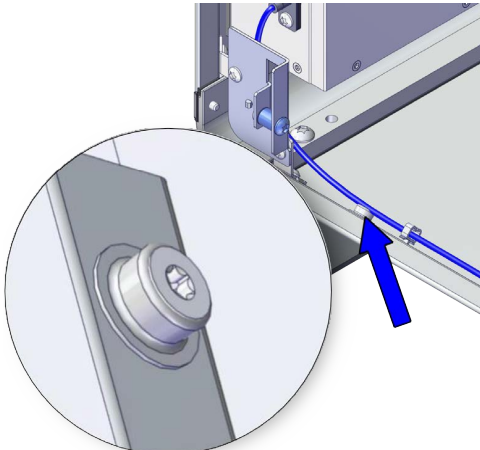
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

Removing the incoming mains connector

Preparations

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

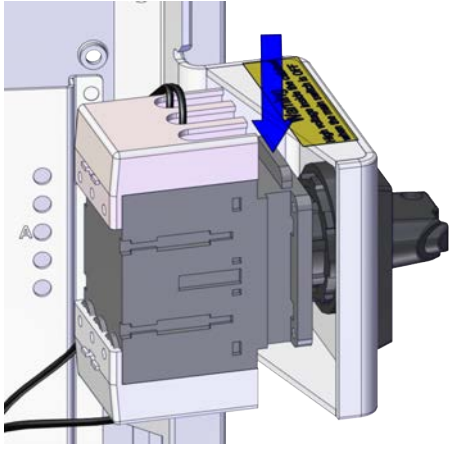
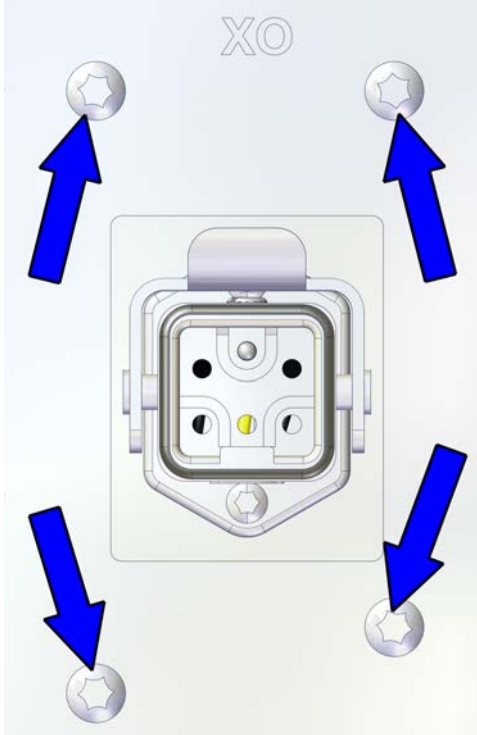
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## 5 Repair

### 5.3.4 Replacing the incoming mains connector

*Continued*



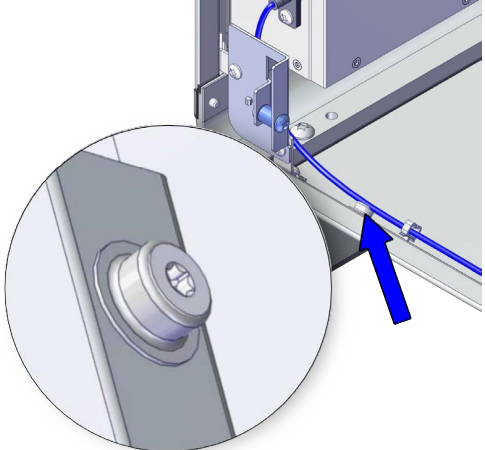
#### Removing the incoming mains connector

	Action	Note/Illustration
1	Disconnect the mains switch from the handle for 6 switch by pressing the push hook.	 <p>xx1900001919</p>
2	Disconnect all connectors.	
3	Remove the attachment screws.	 <p>xx2400001375</p>
4	Push the incoming mains connector into the cabinet.	
5	Take out the incoming mains connector.	

*Continues on next page*

Refitting the incoming mains connector

Refitting the incoming mains connector

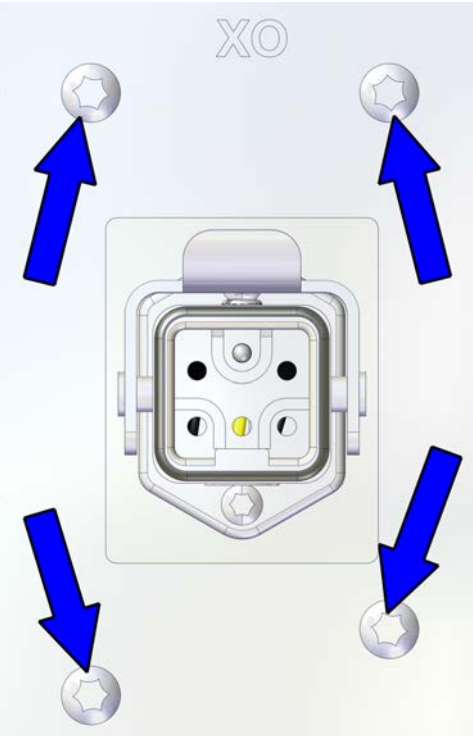
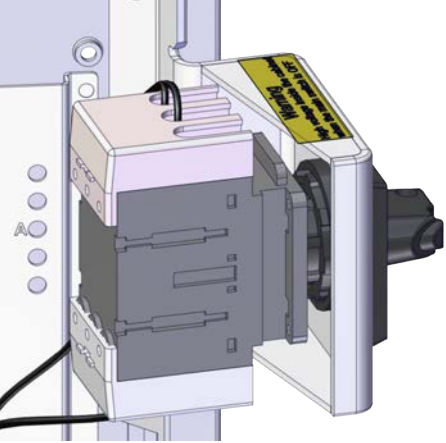
	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>
3	<p>Insert the incoming mains connector into the cover of the cabinet.</p>	

Continues on next page

## 5 Repair

### 5.3.4 Replacing the incoming mains connector

*Continued*

	Action	Note/Illustration
4	Secure it with the screws.	 <p>xx2400001375</p>
5	Reconnect all connectors.	
6	Reconnect the mains switch to the handle for 6 switch.	 <p>xx1900001920</p>

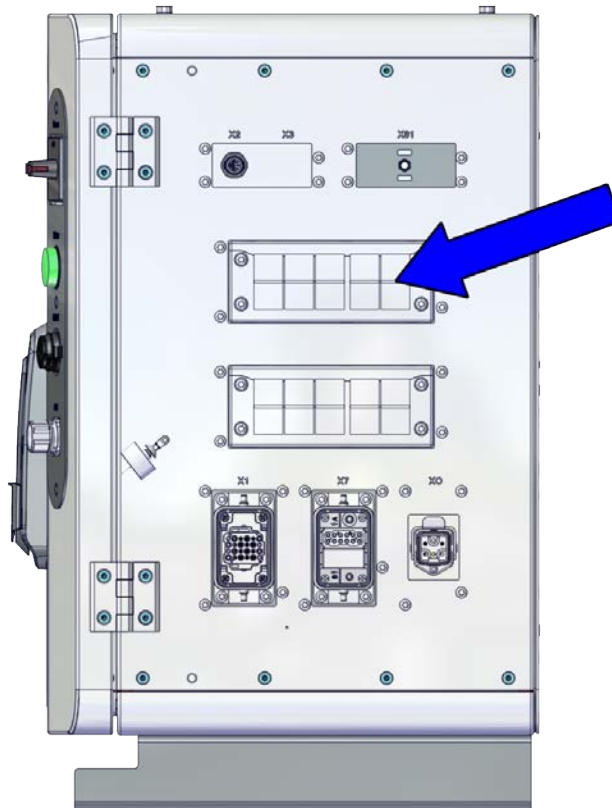
### Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

### 5.3.5 Replacing the cable grommet assembly

#### Location

The illustration shows the location of the cable grommet assembly on the controller.



xx2400001380



#### Note

The end user needs to install proper grommets according to the diameter of the cables which need to go through the grommet.

Incorrect use of grommets will affect ingress protection, EMI/EMC and temperature.

It is recommended to use icotek KT grommet.

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

*Continues on next page*

## 5 Repair

### 5.3.5 Replacing the cable grommet assembly

*Continued*

Spare part	Article number	Note
Cable grommet asm	3HAC066396-001	

#### Required tools and equipment



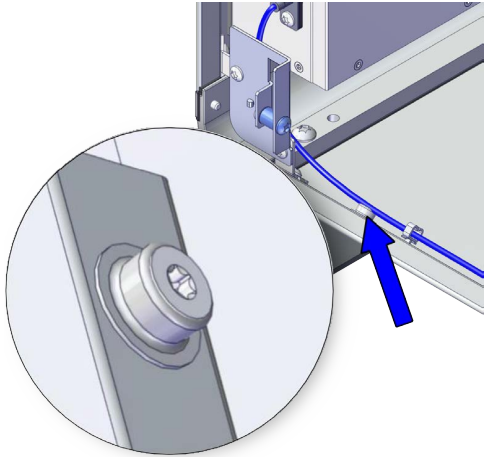
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Removing the cable grommet assembly

##### Preparations

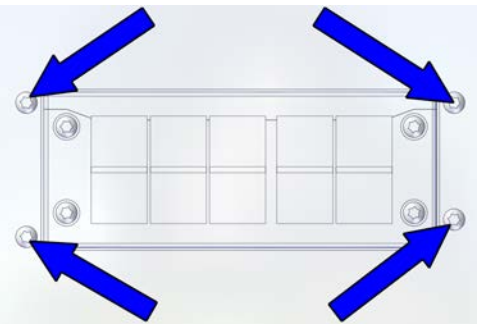
Action	Note/Illustration
<p>1</p>  <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
<p>2</p> <p>Open the door.</p>	<a href="#">Opening the door on page 196</a> .
<p>3</p>  <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

*Continues on next page*




5.3.5 Replacing the cable grommet assembly  
Continued

Removing the cable grommet assembly

	Action	Note/Illustration
1	Remove the attachment screws on the cover.	 <p>xx2400001381</p>
2	Push the cable grommet assembly into the cabinet.	
3	Take the cable grommet assembly out.	

Releasing the cables from the cable grommet assembly


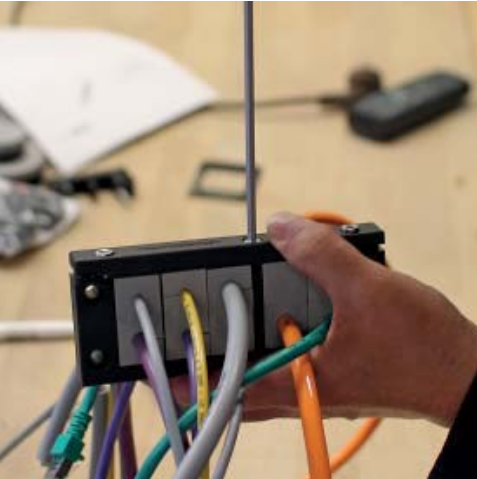
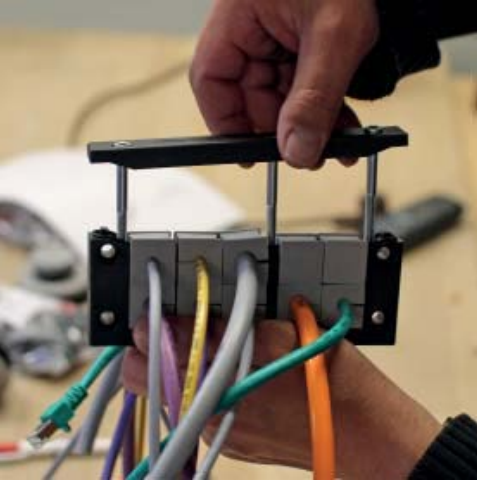
	Action	Note/Illustration
1	Unscrew the cable entry frame from the enclosure wall.	 <p>xx1900002332</p>

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## 5 Repair


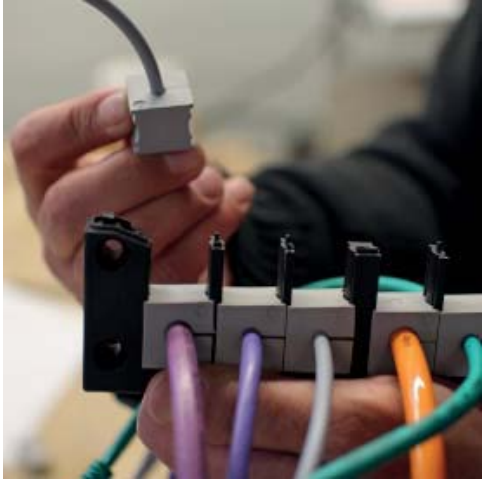

### 5.3.5 Replacing the cable grommet assembly

*Continued*

	Action	Note/Illustration
2	Take out the cables with the cable entry frame through the cut-out.	 xx1900002333
3	Remove the attachment screws on the frame and cover strip.	 xx1900002334
4	Remove the cover strip from the frame.	 xx1900002335

*Continues on next page*

5.3.5 Replacing the cable grommet assembly  
Continued

	Action	Note/Illustration
5	<p>Take out the grommets with the cables that need to be removed one by one.</p> <p> <b>Tip</b></p> <p>Remove the grommets in the upper row first and then the second row.</p>	 <p>xx1900002336</p>
6	<p>Remove the cable from the corresponding KT grommet.</p>	 <p>xx1900002337</p>

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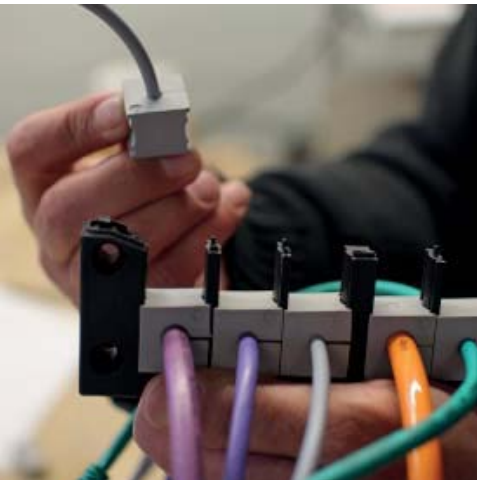
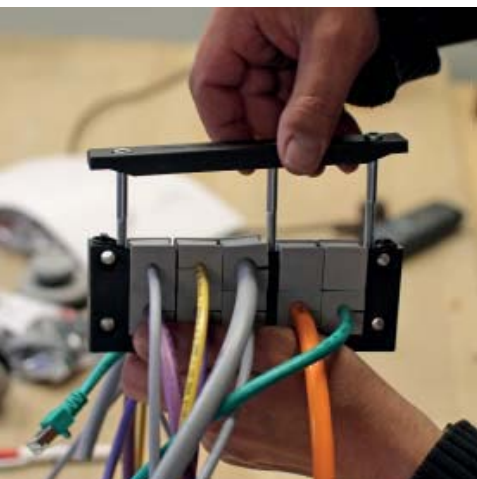
## 5 Repair

### 5.3.5 Replacing the cable grommet assembly

*Continued*

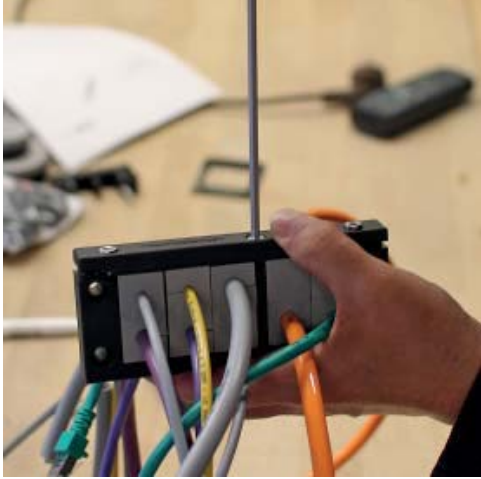

#### Refitting the cable grommet assembly

#### Refitting the cables to the cable grommet assembly

	Action	Note/Illustration
1	Insert and equip the cable to the corresponding KT grommet.	 <p data-bbox="927 909 1034 927">xx1900002337</p>
2	<p data-bbox="475 965 911 994">Slide the grommets into the frame halves.</p> <p data-bbox="475 1010 533 1066"> <b>Note</b></p> <p data-bbox="475 1081 911 1189">It must be ensured that the flat side of the grommets in the lower row are pointing to the open side of the frame half (flat sides pointing upwards).</p> <p data-bbox="475 1205 533 1261"> <b>Note</b></p> <p data-bbox="475 1276 911 1413">The fl at side of the grommets in the upper row have to point downwards so that all flat sides rest on each other. When using single row frames the fl at side has to point towards the cover strip.</p>	 <p data-bbox="927 1453 1034 1471">xx1900002336</p>
3	Refit the cover strip onto the frame.	 <p data-bbox="927 1995 1034 2013">xx1900002335</p>

*Continues on next page*

5.3.5 Replacing the cable grommet assembly  
Continued


	Action	Note/Illustration
4	Secure the frame and cover strip with the screws.	<p>Screws: Hex socket head cap screw M5x50 12.9 Lafre 2C2B/FC6.9 (3 pcs) Tightening torque: 2 Nm - 3 Nm.</p>  <p>xx1900002334</p>
5	Route the cables through the cut-out.	 <p>xx1900002333</p>

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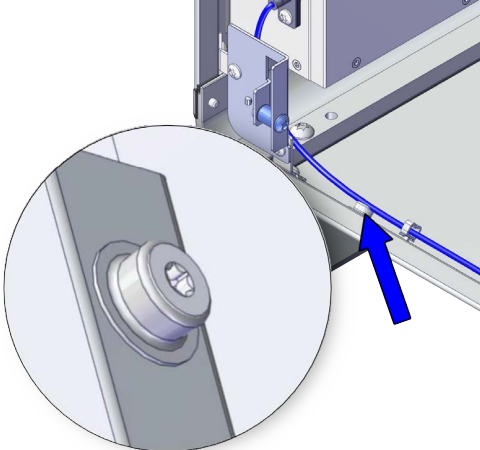
## 5 Repair

### 5.3.5 Replacing the cable grommet assembly

*Continued*

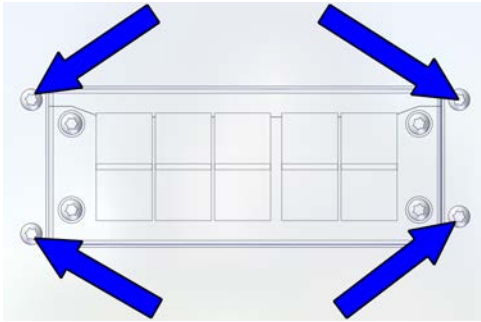
	Action	Note/Illustration
6	Refit the cable entry frame to the enclosure wall and secure with the screws.	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.5 Nm.</p>  <p>xx1900002332</p>

### Refitting the cable grommet assembly

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

*Continues on next page*

5.3.5 Replacing the cable grommet assembly  
Continued

	Action	Note/Illustration
3	Insert the cable grommet assembly into the cover of the cabinet. Secure it with the screws.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 2.7 Nm±10%.  xx2400001381

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

## 5 Repair

### 5.3.6 Replacing the cable grommet assembly

### 5.3.6 Replacing the cable grommet assembly

#### Location

The illustration shows the location of the cable grommet assembly on the controller.



xx2400001352



#### Note

The end user needs to install proper grommets according to the diameter of the cables which need to go through the grommet.

Incorrect use of grommets will affect ingress protection, EMI/EMC and temperature.

It is recommended to use icotek KT grommet.

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

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5.3.6 Replacing the cable grommet assembly  
Continued

Spare part	Article number	Note
Blind plate	3HAC069954-001	
Cable grommet asm	3HAC066396-001	

## Required tools and equipment



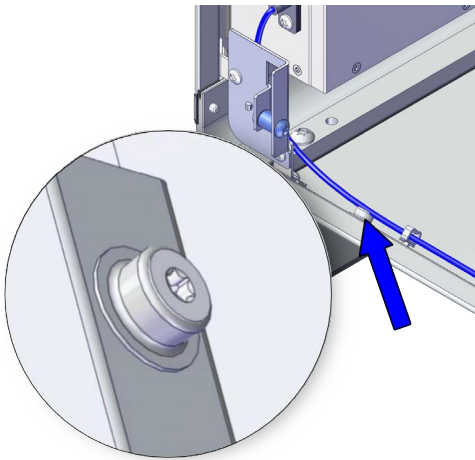
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

## Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

## Removing the cable grommet assembly

## Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

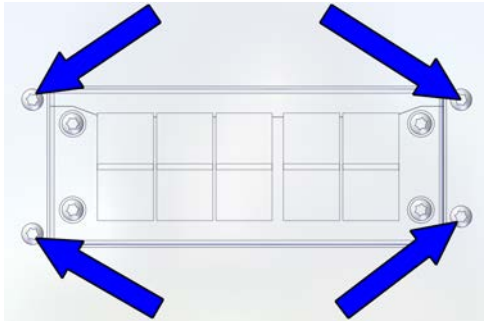
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## 5 Repair


### 5.3.6 Replacing the cable grommet assembly

*Continued*

#### Removing the cable grommet assembly


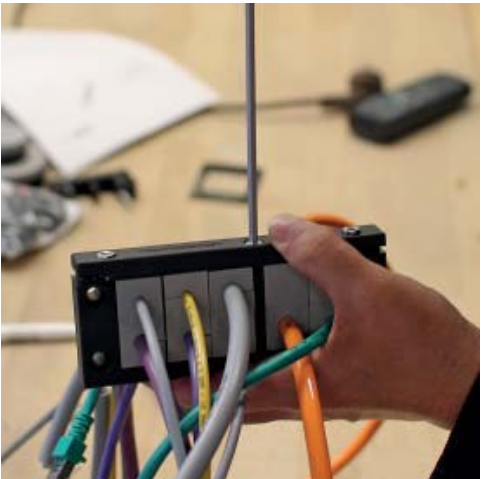
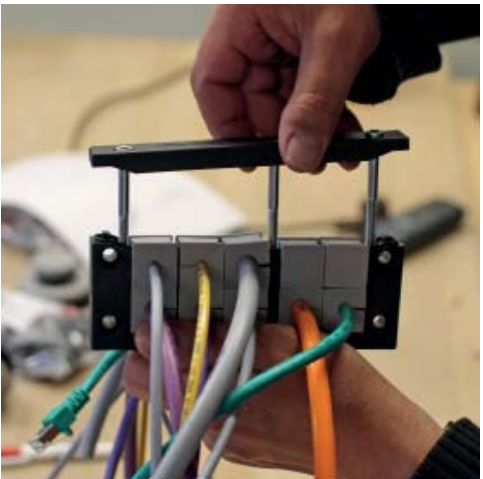
	Action	Note/Illustration
1	Remove the cables out from the clips in the cabinet carefully.	
2	Remove the attachment screws on the cover.	 xx2400001381
3	Push the cable grommet assembly into the cabinet.	
4	Take the cable grommet assembly out.	

#### Releasing the cables from the cable grommet assembly

	Action	Note/Illustration
1	Unscrew the cable entry frame from the enclosure wall.	 xx1900002332

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5.3.6 Replacing the cable grommet assembly  
Continued


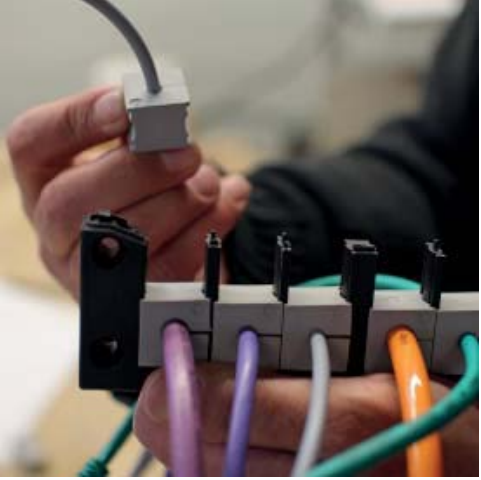

	Action	Note/Illustration
2	Take out the cables with the cable entry frame through the cut-out.	 <p>xx1900002333</p>
3	Remove the attachment screws on the frame and cover strip together.	 <p>xx1900002334</p>
4	Remove the cover strip from the frame.	 <p>xx1900002335</p>

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## 5 Repair

### 5.3.6 Replacing the cable grommet assembly




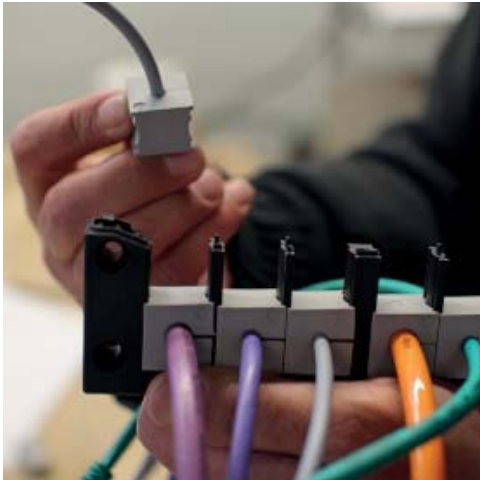
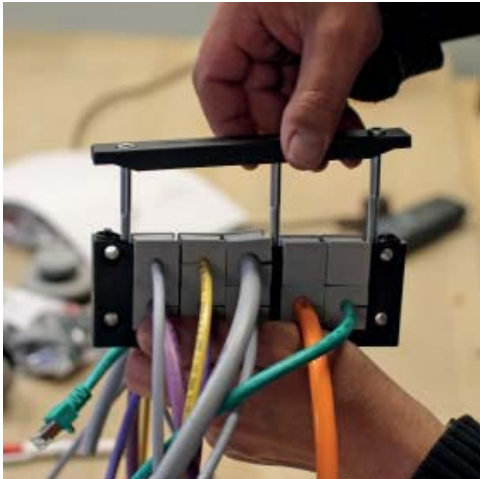
*Continued*

	Action	Note/Illustration
5	<p>Take out the grommets with the cables that need to be removed one by one.</p> <p> <b>Tip</b></p> <p>Remove the grommets in the upper row first and then the second row.</p>	 <p>xx1900002336</p>
6	<p>Remove the cable from the corresponding KT grommet.</p>	 <p>xx1900002337</p>

*Continues on next page*

Refitting the cable grommet assembly

Refitting the cables to the cable grommet assembly

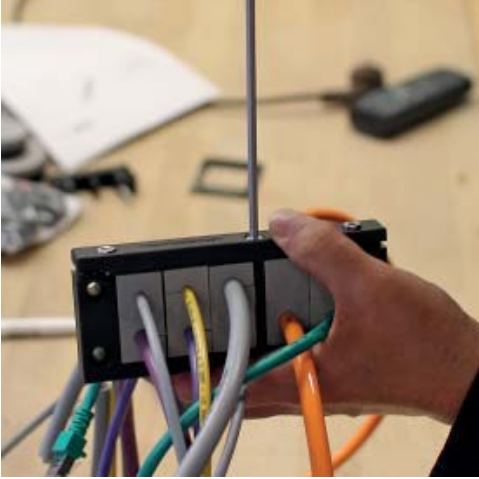

	Action	Note/Illustration
1	Insert and equip the cable to the corresponding KT grommet.	 <p>xx1900002337</p>
2	Slide the grommets into the frame halves.   <b>Note</b> It must be ensured that the flat side of the grommets in the lower row are pointing to the open side of the frame half (flat sides pointing upwards).   <b>Note</b> The flat side of the grommets in the upper row have to point downwards so that all flat sides rest on each other. When using single row frames the flat side has to point towards the cover strip.	 <p>xx1900002336</p>
3	Refit the cover strip onto the frame.	 <p>xx1900002335</p>

Continues on next page

## 5 Repair


### 5.3.6 Replacing the cable grommet assembly

*Continued*



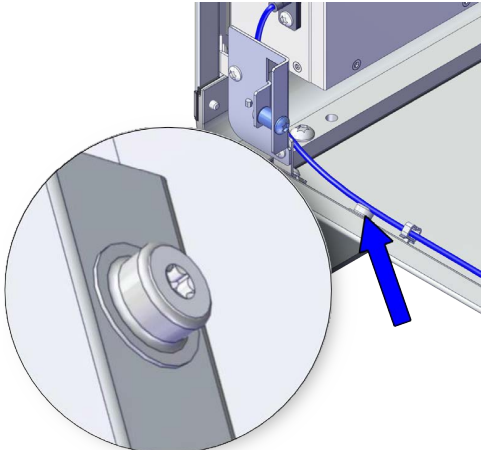
	Action	Note/Illustration
4	Secure the frame and cover strip with the screws.	<p data-bbox="925 315 1399 405">Screws: Hex socket head cap screw M5x50 12.9 Lafre 2C2B/FC6.9 (3 pcs) Tightening torque: 2 Nm - 3 Nm.</p>  <p data-bbox="925 898 1034 920">xx1900002334</p>
5	Route the cables through the cut-out.	 <p data-bbox="925 1442 1034 1464">xx1900002333</p>

*Continues on next page*

5.3.6 Replacing the cable grommet assembly  
Continued

	Action	Note/Illustration
6	Refit the cable entry frame to the enclosure wall and secure with the screws.	<p>Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.5 Nm.</p>  <p>xx1900002332</p>

Refitting the cable grommet assembly

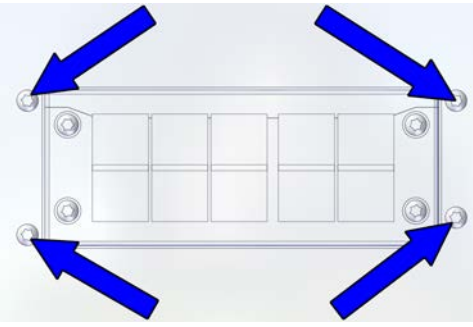
	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

Continues on next page

## 5 Repair

### 5.3.6 Replacing the cable grommet assembly

*Continued*

	Action	Note/Illustration
3	Insert the cable grommet assembly into the cover of the cabinet. Secure it with the screws.	Screws: Torx pan head screw M4x8 (4 pcs)  xx2400001381

#### Concluding procedure

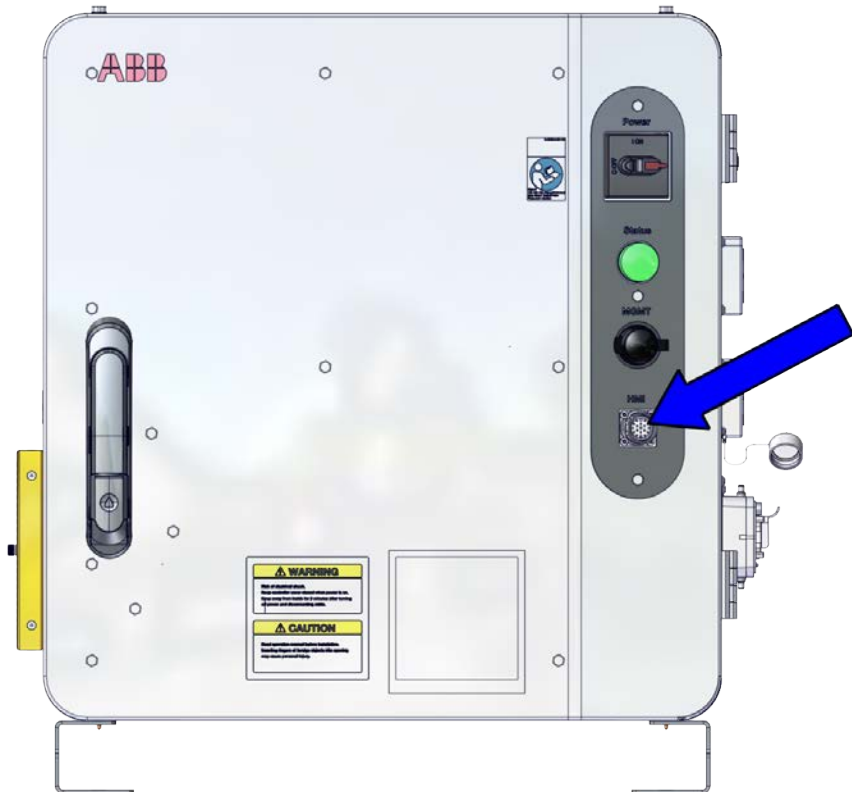
	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	



### 5.3.7 Replacing the HMI signal (FlexPendant) connector

#### Location

The illustration shows the location of the HMI signal connector in the controller.



xx2400001376

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Harness TPU connection	3HAC088739-001	Harness-TPU

#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

*Continues on next page*

## 5 Repair

### 5.3.7 Replacing the HMI signal (FlexPendant) connector



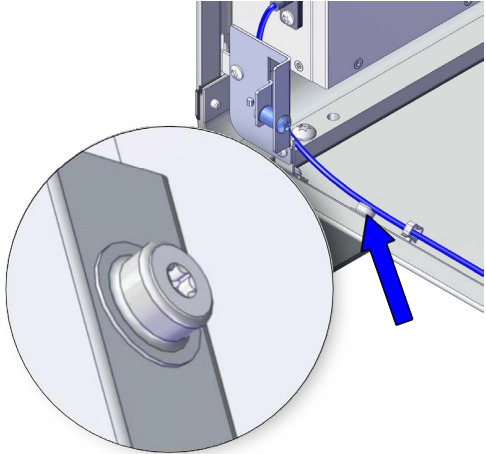
*Continued*

#### Required documents


Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

#### Removing the HMI signal connector

##### Preparations

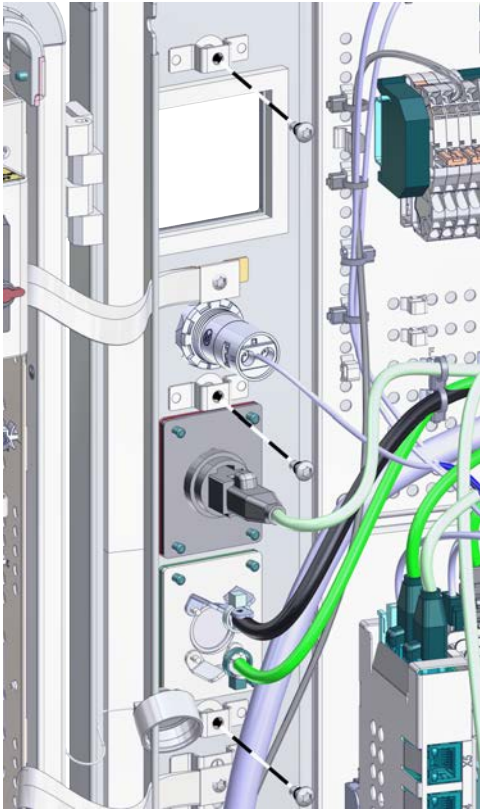

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

#### Removing the HMI signal connector

	Action	Note/Illustration
1	Remove the cables out from the clips in the cabinet carefully.   <b>Note</b> Make records about the sequence that cables are removed. The cables need to be installed in the same position.	
2	Disconnect all connectors from the unit to be replaced.	

*Continues on next page*

5.3.7 Replacing the HMI signal (FlexPendant) connector  
*Continued*

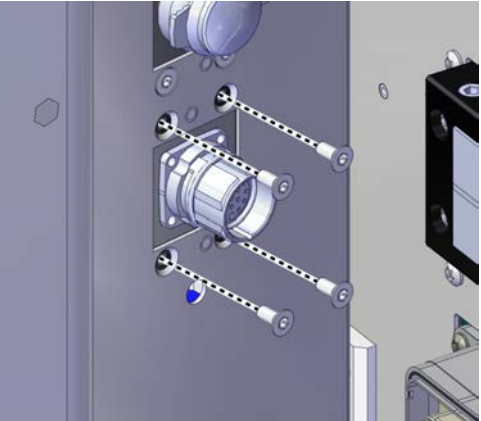
	Action	Note/Illustration
3	Remove the screws.	 <p>xx2400001377</p>
4	Remove the cover plate.	 <p>xx2400001378</p>

*Continues on next page*

## 5 Repair



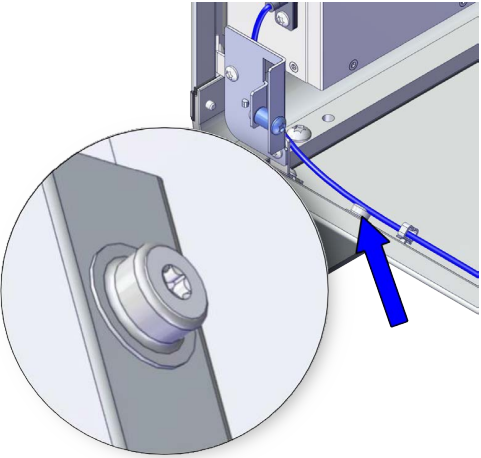
### 5.3.7 Replacing the HMI signal (FlexPendant) connector

*Continued*

	Action	Note/Illustration
5	Remove the attachment screws on the door.	 <p>xx1900001923</p>
6	Push the HMI signal connector into the cabinet.	
7	Take out the HMI signal connector.	

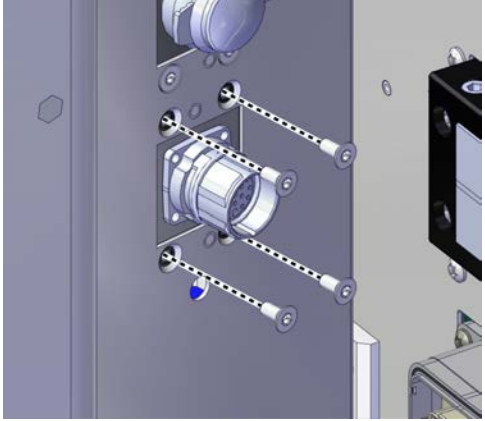

### Refitting the HMI signal connector

Refitting the HMI signal connector

	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	<p>Location of wrist strap button:</p>  <p>xx1900001446</p>

*Continues on next page*

5.3.7 Replacing the HMI signal (FlexPendant) connector  
Continued


	Action	Note/Illustration
3	<p>Insert the HMI signal connector into the cover from inside the cabinet. Secure it with the screws.</p>	<p>Screws: Torx, countersunk screw M4x10 (4 pcs) Tightening torque: 1.7 Nm±10%.</p>  <p>xx1900001923</p>
4	<p>Reconnect any connectors disconnected at removal.</p>	
5	<p>Secure the cables on HMI signal connector into the clips on the cabinet.</p> <p> <b>Tip</b> Use the same position as from removing the HMI signal connector.</p>	

Continues on next page

## 5 Repair

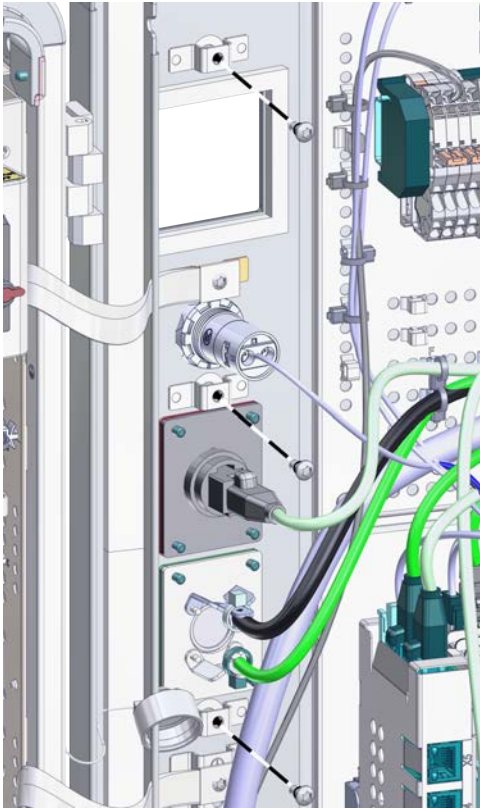
### 5.3.7 Replacing the HMI signal (FlexPendant) connector

*Continued*

	Action	Note/Illustration
6	Refit the cover plate.	 <p>xx2400001378</p>

*Continues on next page*

5.3.7 Replacing the HMI signal (FlexPendant) connector  
*Continued*

	Action	Note/Illustration
7	Secure it with the screws.	<p>Screws: Torx pan head screw M4x8 (8 pcs)                      Tightening torque: 1.7 Nm±10%.</p>  <p>xx2400001377</p>

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

## 5 Repair

### 5.3.8 Replacing the Ethernet outlet connector with cable

### 5.3.8 Replacing the Ethernet outlet connector with cable

#### Location

The illustration shows the location of the Ethernet outlet connector with cable.



xx2400001411

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Harness ETH outlet with cable	3HAC088738-001	

#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

*Continues on next page*





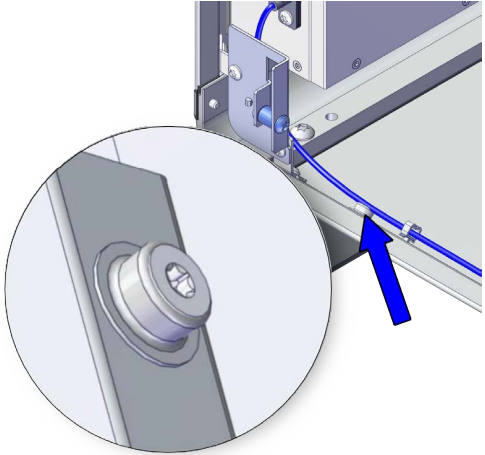
5.3.8 Replacing the Ethernet outlet connector with cable  
Continued

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

Removing the Ethernet outlet connector with cable

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446
4	Make records about the sequence that cables are removed. The cables need to be installed in the same position.	

Removing the Ethernet outlet connector with cable

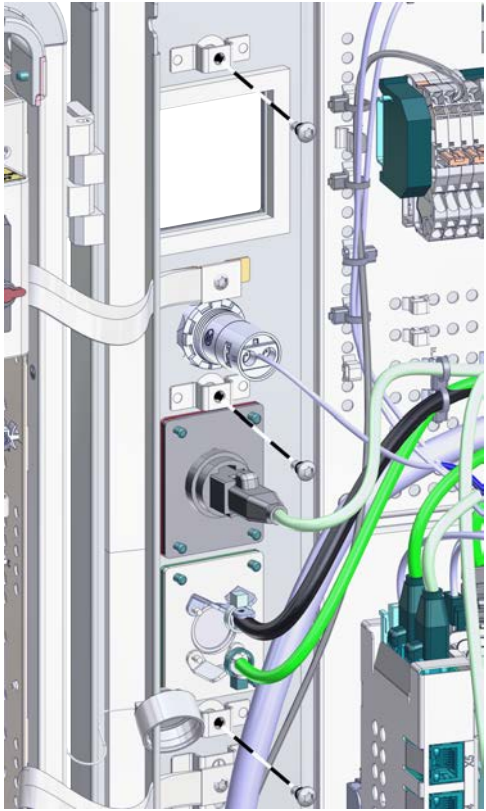

	Action	Note/Illustration
1	Remove any cable ties from the harness carefully.	

Continues on next page

## 5 Repair


### 5.3.8 Replacing the Ethernet outlet connector with cable

*Continued*

	Action	Note/Illustration
2	Remove the screws.	 <p>The illustration shows a close-up of the internal components of the device. A metal cover plate is being removed from the Ethernet outlet connector area. Two screws are shown being removed from the cover plate. The connector is a circular, multi-pin connector. The cover plate is a rectangular metal plate with a central cutout for the connector. The connector is connected to a cable. The cover plate is being removed to access the connector. The illustration is labeled with the reference number xx2400001377.</p>
3	Remove the cover plate.	 <p>The illustration shows a close-up of the internal components of the device. The cover plate is being removed from the Ethernet outlet connector area. The cover plate is a rectangular metal plate with a central cutout for the connector. The connector is a circular, multi-pin connector. The cover plate is being removed to access the connector. The illustration is labeled with the reference number xx2400001378.</p>



*Continues on next page*

5.3.8 Replacing the Ethernet outlet connector with cable  
Continued

	Action	Note/Illustration
4	Remove the attachment screws on the door.	 <p>xx1900001924</p>
5	Take the Ethernet outlet connector with cable out from the upper side.	
6	Push the Ethernet outlet connector with cable into the cabinet.	
7	Disconnect the Ethernet harness.	

Refitting the Ethernet outlet connector with cable

Refitting the Ethernet outlet connector with cable




	Action	Note/Illustration
1	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a>.</p>	
2	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a>.</p>	
3	Insert the Ethernet outlet connector with cable into the cover from inner side of the cabinet.	

Continues on next page

## 5 Repair

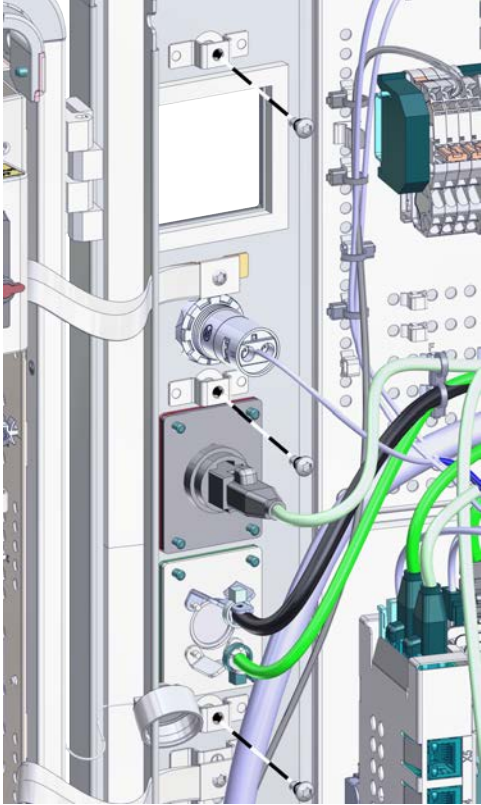
### 5.3.8 Replacing the Ethernet outlet connector with cable

*Continued*

	Action	Note/Illustration
4	Secure it with the attachment screws.	<p>Screws: Torx, countersunk screw M4x10 (4 pcs)</p>  <p>xx1900001924</p>
5	Reconnect the Ethernet harness.	
6	Secure the harness with cable ties.  <b>Tip</b> Use the same position as from removing the harness.	
7	Refit the cover plate.	 <p>xx2400001378</p>

*Continues on next page*

5.3.8 Replacing the Ethernet outlet connector with cable  
*Continued*

	Action	Note/Illustration
8	Secure it with the screws.	<p>Screws: Torx pan head screw M4x8 (3 pcs)</p>  <p>xx2400001377</p>

Concluding procedure

	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

## 5 Repair

### 5.3.9 Replacing the LED indicator

### 5.3.9 Replacing the LED indicator

#### Location

The illustration shows the location of the LED indicator.



xx2400001412

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
LED indicator	3HAC065549-001	

#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	



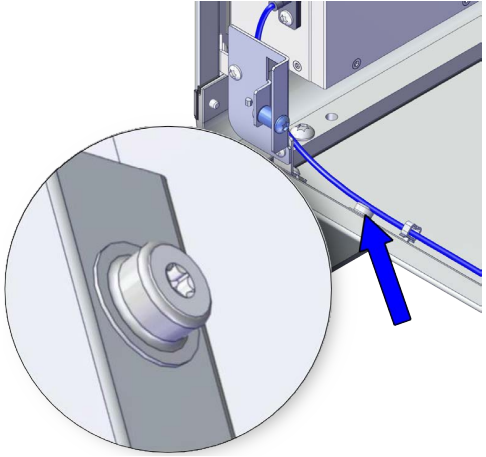
*Continues on next page*

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

Removing the LED indicator

Preparations

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Open the door.	<a href="#">Opening the door on page 196</a> .
3	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	Location of wrist strap button:  xx1900001446

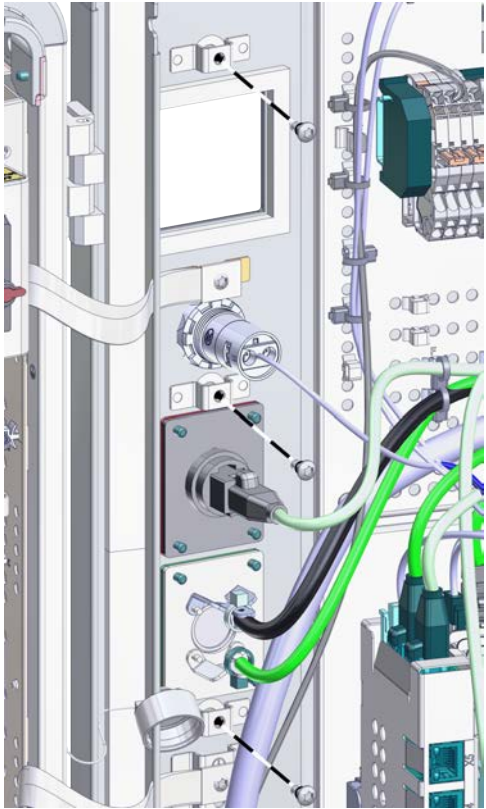
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## 5 Repair

### 5.3.9 Replacing the LED indicator


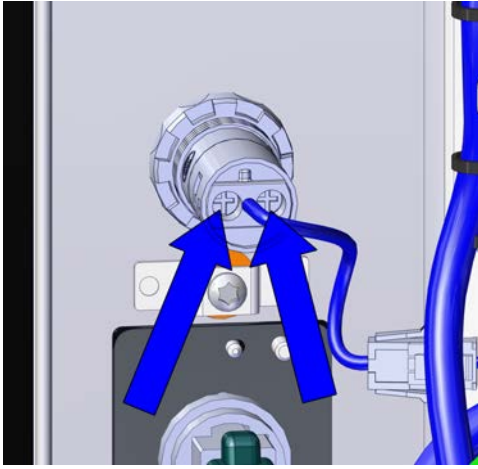
*Continued*

#### Removing the LED indicator

	Action	Note/Illustration
1	Remove the screws.	 <p>The illustration shows a close-up of a control panel with several screws being removed. A screwdriver is shown in the process of removing a screw from a circular component. The panel is populated with various electrical components, including a terminal block with green and blue wires, and a blue component. The screws are being removed from the panel's surface.</p> <p>xx2400001377</p>

*Continues on next page*



	Action	Note/Illustration
2	Remove the cover plate.	 <p>xx2400001378</p>
3	Loose the attachment screws locking the cable.	 <p>xx1900001926</p>
4	Remove the terminals (X1&X2) of the cable from the lamp.	
5	Turn the MON_LAMP screw anti-clockwise to remove the screw.	
6	Take the LED indicator out.	

Continues on next page



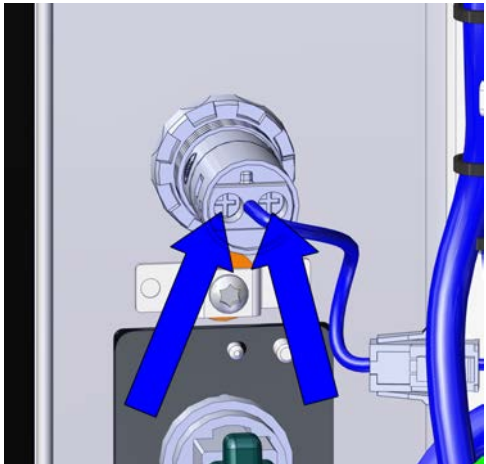
## 5 Repair

### 5.3.9 Replacing the LED indicator


*Continued*

#### Refitting the LED indicator

#### Refitting the LED indicator

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	
3	Insert the LED indicator into the cover from outer side of the door and the screw from inner side and screw them up.	
4	Insert the terminals (X1 & X2) of cables into the lamp and secure with the screws.	 xx1900001926

*Continues on next page*

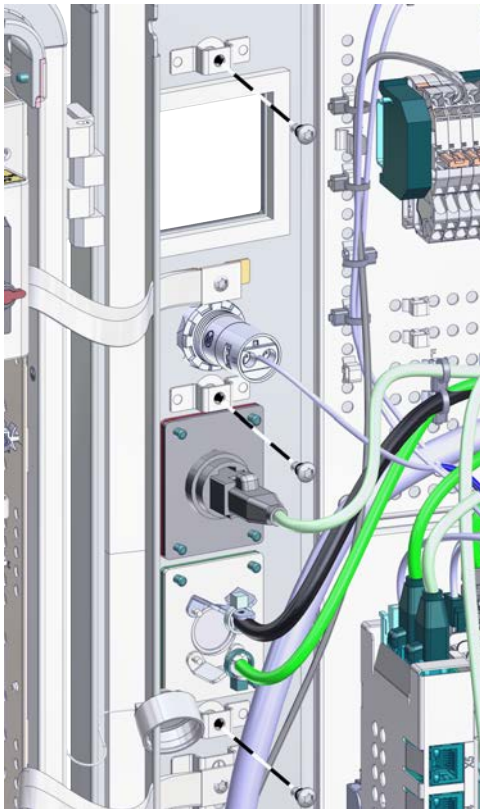
	Action	Note/Illustration
5	Refit the cover plate.	 <p>xx2400001378</p>

Continues on next page

## 5 Repair

### 5.3.9 Replacing the LED indicator

*Continued*

	Action	Note/Illustration
6	Secure it with the screws.	<p>Screws: Torx pan head screw M4x8 (3 pcs)</p>  <p>xx2400001377</p>

#### Concluding procedure

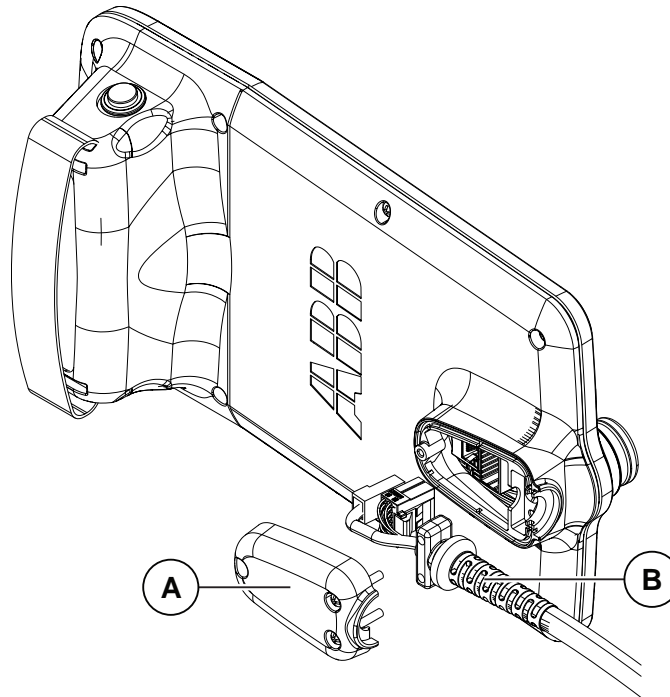
	Action	Note/Illustration
1	Close the door.	<a href="#">Closing the door on page 196.</a>
2	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185.</a>	

## 5.4 Replacing parts on the FlexPendant

### 5.4.1 Replacing the power cable and power cable cover

#### Location

The illustration shows the location of the power cable, power cable gasket, and power cable cover in the FlexPendant.



xx1800001154

A	Power cable cover
B	Power cable

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
FlexPendant	3HAC086996-001	DSQC3124
Power cable cover	3HAC065401-001	
FlexPendant power cable 3 m	3HAC064448-002	
FlexPendant power cable 10 m	3HAC064448-001	

*Continues on next page*

## 5 Repair

### 5.4.1 Replacing the power cable and power cable cover

*Continued*


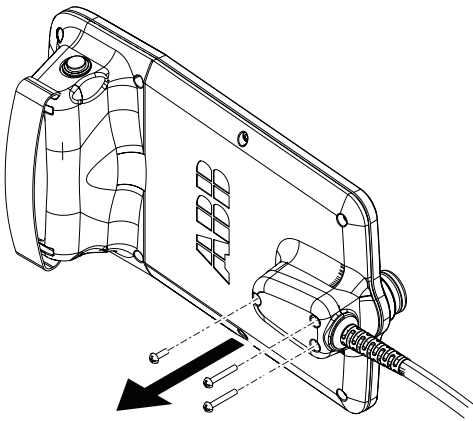
#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

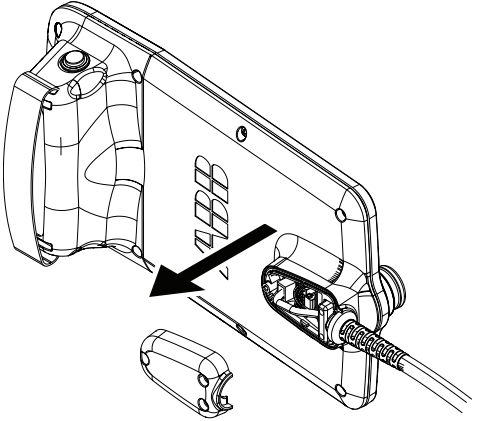
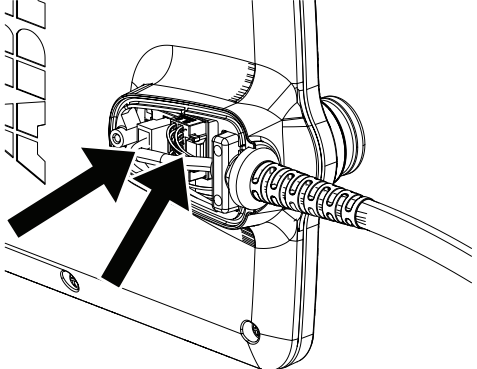
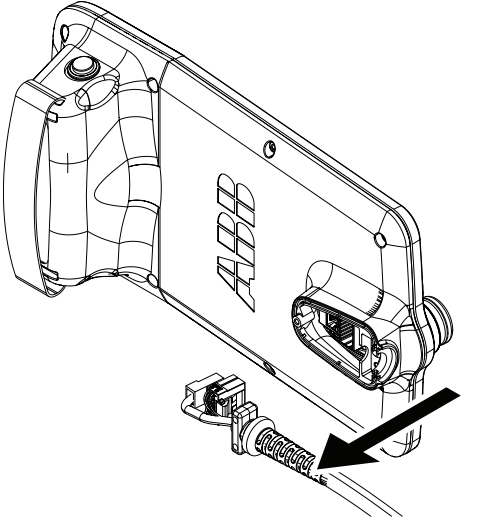
#### Removing the power cable and power cable cover

	Action	Note/Illustration
1	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <a href="#">The unit is sensitive to ESD on page 48</a> .	
2	Disconnect the FlexPendant from the controller.	
3	Remove the attachment screws for the power cable cover.	 xx1800001189

*Continues on next page*

5.4.1 Replacing the power cable and power cable cover

*Continued*

	Action	Note/Illustration
4	Remove the power cable cover.	 <p>xx1800001190</p>
5	Disconnect two connectors to the FlexPendant.	 <p>xx1800001748</p>
6	Remove the power cable.	 <p>xx1800001192</p>


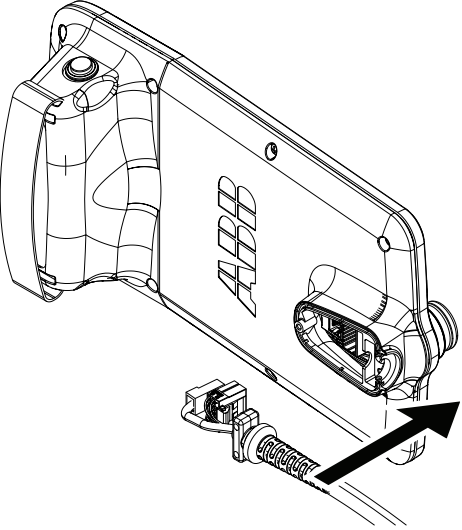
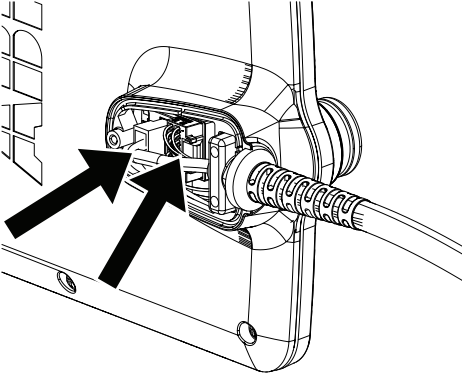
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## 5 Repair

### 5.4.1 Replacing the power cable and power cable cover

*Continued*

#### Refitting the power cable and power cable cover

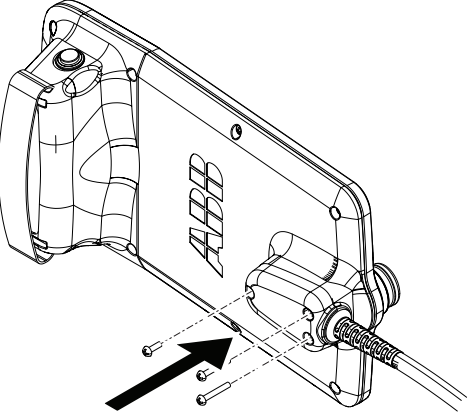
	Action	Note/Illustration
1	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i> .	
2	Refit the power cable.	 xx1800001193
3	Reconnect the power cable to the Flex-Pendant.	 xx1800001748

*Continues on next page*



## 5.4.1 Replacing the power cable and power cable cover

*Continued*

	Action	Note/Illustration
4	Refit the power cable cover and tighten the screws.	<p data-bbox="959 315 1436 344">Screws: Torx pan head screw M4x8 (3 pcs)</p>  <p data-bbox="959 770 1062 786">xx1800001196</p>
5	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

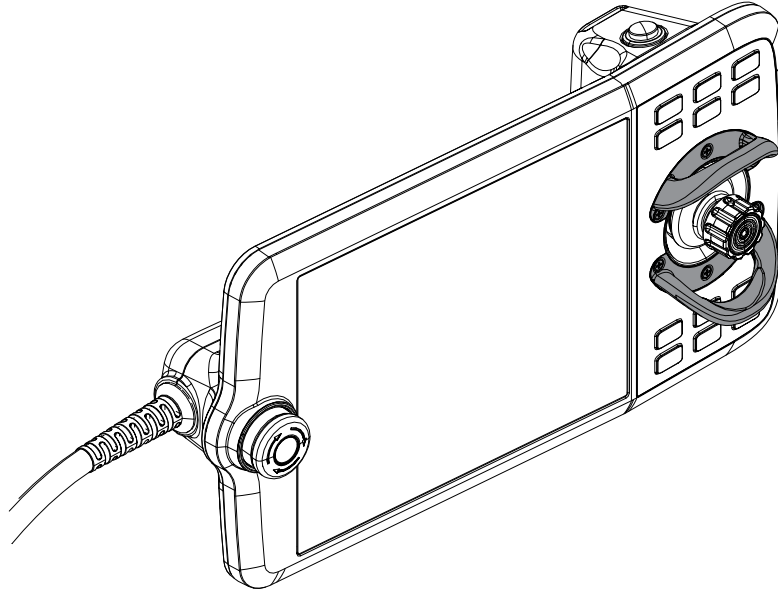
## 5 Repair

### 5.4.2 Replacing the joystick protection

### 5.4.2 Replacing the joystick protection

#### Location

The illustration shows the location of the joystick protection on the FlexPendant.



xx1800001197

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Joystick guard	3HAC065408-001	

#### Required tools and equipment


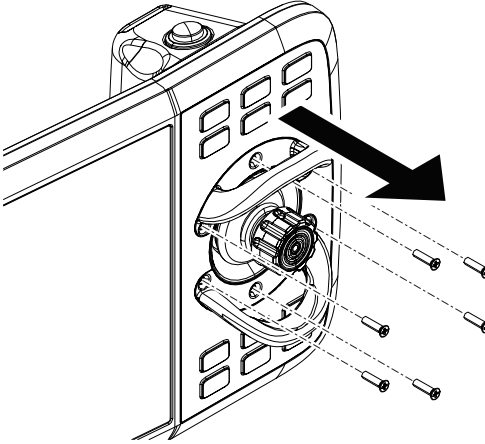
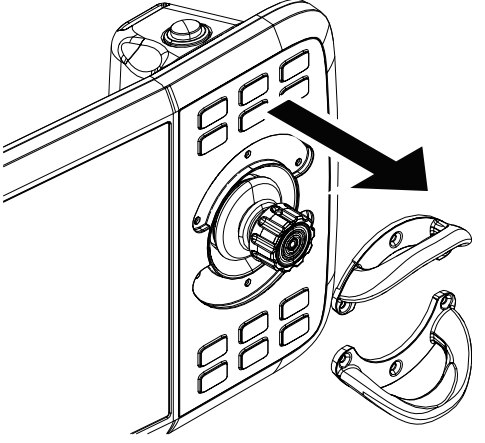
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .

#### Required documents


Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

*Continues on next page*

Removing the joystick protection

	Action	Note/Illustration
1	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i> .	
2	Disconnect the FlexPendant from the controller.	
3	Remove the attachment screws.	 <p>xx1800001198</p>
4	Remove the joystick protection.	 <p>xx1800001199</p>

Refitting the joystick protection

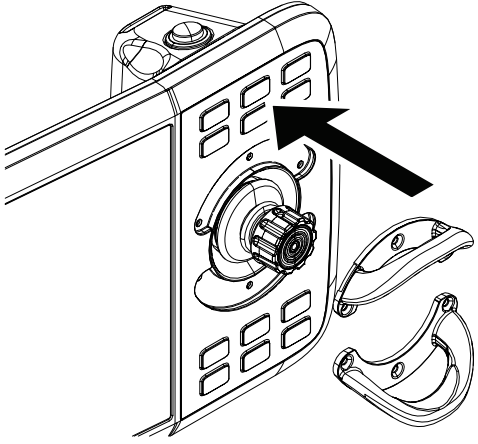
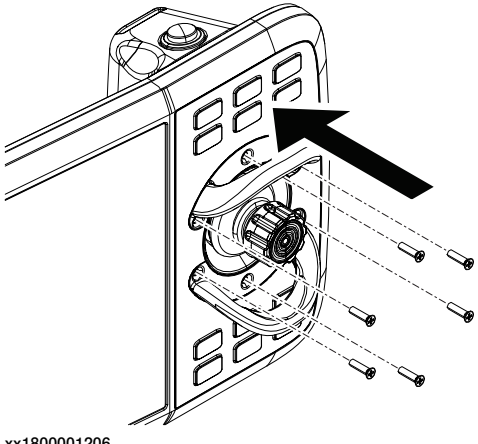
	Action	Note/Illustration
1	 <b>ELECTROSTATIC DISCHARGE (ESD)</b> The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i> .	

Continues on next page

## 5 Repair

### 5.4.2 Replacing the joystick protection

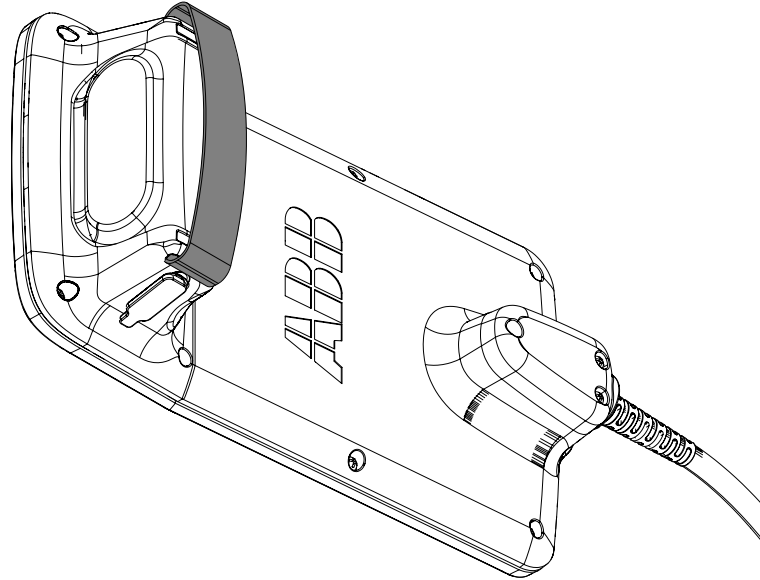
Continued

	Action	Note/Illustration
2	Refit the joystick protection.	 <p>xx1800001200</p>
3	Secure the screws.	 <p>xx1800001206</p> <p>Countersunk head screw: ST2.9 X 10 (6 pcs)</p>

### 5.4.3 Replacing the fasten strip

#### Location

The illustration shows the location of the fasten strip on the FlexPendant.



xx1900000771

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Fasten strip	3HAC065419-001	

#### Replacing the fasten strip

	Action	Note/Illustration
1	Open the velcro on the fasten strip.	
2	Take the fasten strip out from the holes.	
3	Insert the new fasten strip into the holes one by one.	
4	Secure the velcro in a suitable length.	

## 5 Repair

### 5.5.1 Replacing the motor connection box

## 5.5 Replacing other parts

### 5.5.1 Replacing the motor connection box

#### Location

The motor connection box location is decided by the customer.

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Motor Connection Box	3HAC087717-001	3-axis
Motor Connection Box	3HAC087718-001	3-axis, BRB


#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

#### Required documents


Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Removing the motor connection box

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Disconnect all connectors from the unit to be replaced.	

Continues on next page

## Refitting the motor connection box

	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Reconnect any connectors disconnected at removal.	
3	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

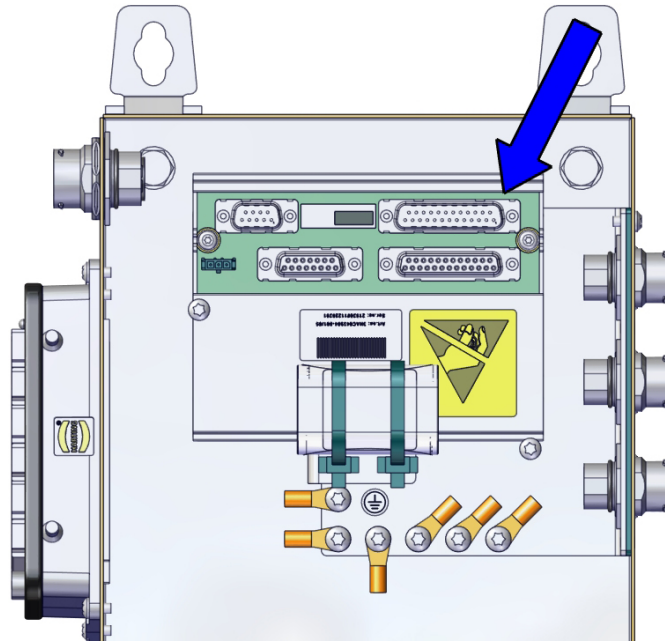
## 5 Repair

### 5.5.2 Replacing the measurement unit

#### 5.5.2 Replacing the measurement unit

##### Location

The illustration shows the location of the measurement unit in the motor connection box.



xx2300001700

##### Required spare parts



##### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Measurement Unit	3HAC043904-001	DSQC633C

##### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	




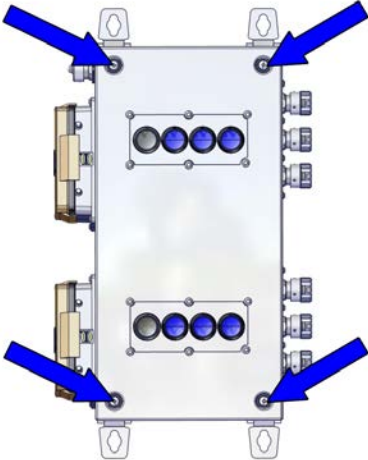
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Required documents

Document	Article number	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010	

Removing the measurement unit


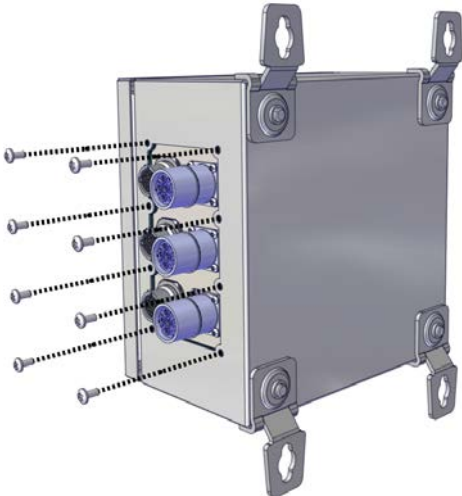
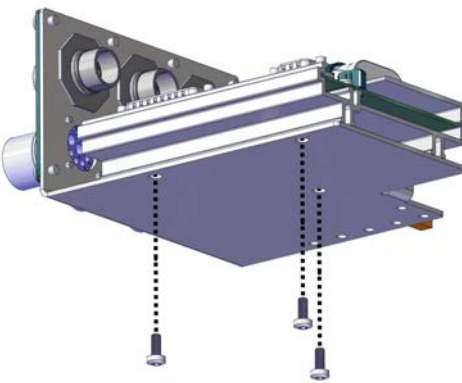
	Action	Note/Illustration
1	 <p><b>ELECTROSTATIC DISCHARGE (ESD)</b></p> <p>The unit is sensitive to ESD. Before handling the unit read the safety information in section <i>The unit is sensitive to ESD on page 48</i>.</p>	
2	 <p><b>DANGER</b></p> <p>Turn off all:</p> <ul style="list-style-type: none"> <li>• electric power supply</li> <li>• hydraulic pressure supply</li> <li>• air pressure supply</li> </ul> <p>to the robot, before entering the safe-guarded space.</p>	
3	 <p><b>DANGER</b></p> <p>Before doing any work inside the cabinet, disconnect the mains power. For more information, see <i>Electrical safety on page 31</i>.</p>	
4	Remove the screws holding the cover.	 <p>xx2300001703</p>

Continues on next page

## 5 Repair

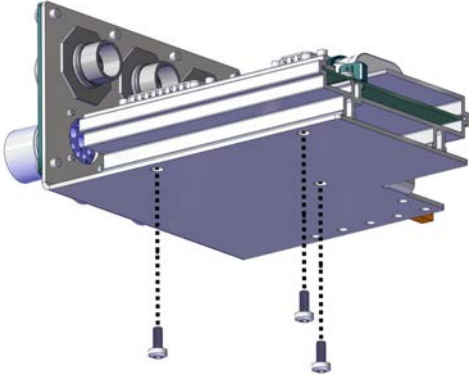
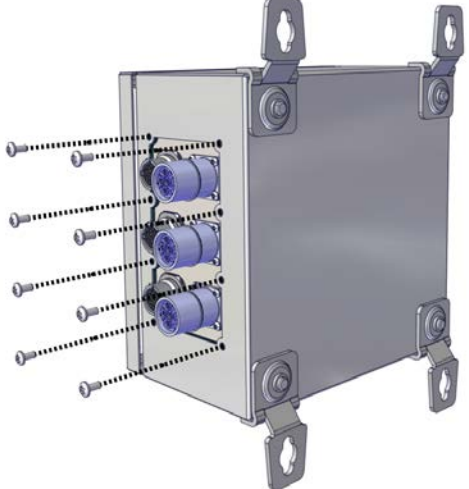
### 5.5.2 Replacing the measurement unit

Continued

	Action	Note/Illustration
5	<p>Open the cover.</p> <p> <b>CAUTION</b></p> <p>Clean cover from metal residues before opening.</p> <p>Metal residues can cause shortage on the boards which can result in hazardous failures.</p>	
6	<p>Disconnect all connectors from the unit to be replaced.</p>	
7	<p>Remove the screws at the front of the box.</p>	 <p>xx2300001705</p>
8	<p>Push the measurement unit inwards and lift out of the box.</p>	
9	<p>Remove the attachment screws from the mounting plate.</p>	 <p>xx2300001706</p>
10	<p>Pull out the measurement unit.</p>	

Continues on next page

Refitting the measurement unit

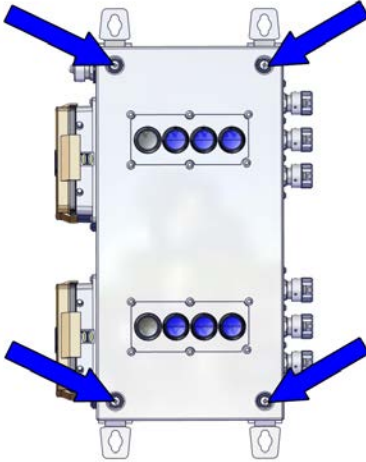
	Action	Note/Illustration
1	Refit the measurement unit on the mounting plate and tighten the screws.	 <p>xx2300001706</p>
2	Put the measurement unit and mounting plate in the box.	
3	Refit the screws at the front of the box.	 <p>xx2300001705</p>
4	Reconnect any connectors disconnected at removal.	

Continues on next page

## 5 Repair

### 5.5.2 Replacing the measurement unit

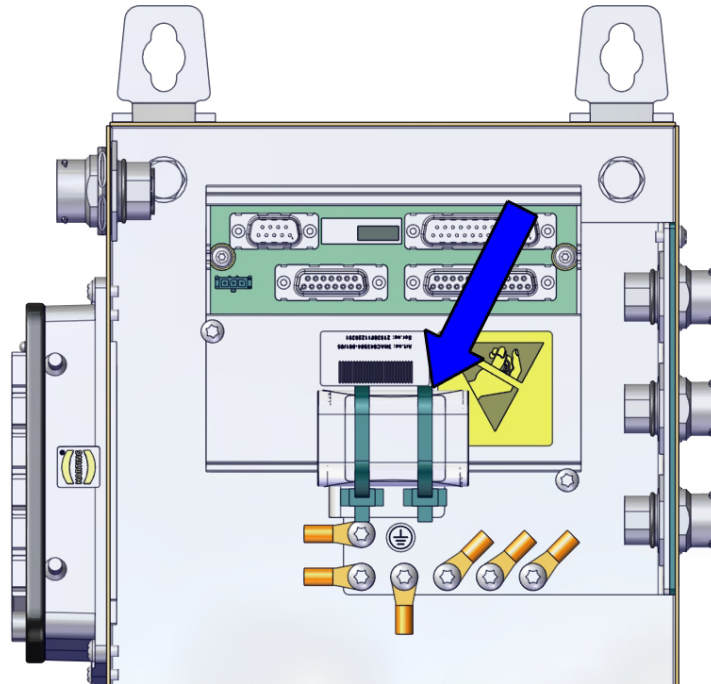
*Continued*

	Action	Note/Illustration
5	Refit the cover.	 <p>xx2300001703</p>
6	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

### 5.5.3 Replacing the motor connection box battery

#### Location

The illustration shows the location of the main computer in the motor connection box.



xx2300001707

#### Required spare parts



#### Note

The spare part numbers that are listed in the table can be out of date. See the latest spare parts of the OmniCore C90XT Type A via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

Spare part	Article number	Note
Battery Unit	3HAC044075-001	

#### Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section <a href="#">Standard toolkit for controller on page 430</a> .
ESD protective wrist band	-	

*Continues on next page*

## 5 Repair


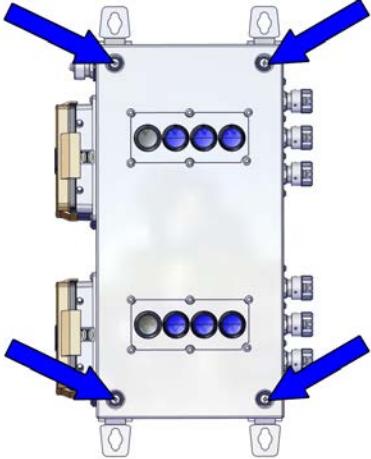
### 5.5.3 Replacing the motor connection box battery

*Continued*

#### Required documents

Document	Article number	Note
<i>Circuit diagram - OmniCore C90XT Type A</i>	3HAC086305-010	

#### Removing the motor connection box battery

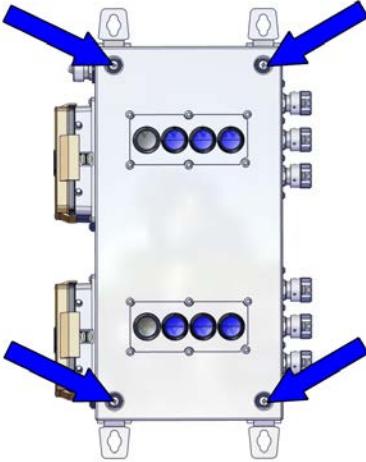
	Action	Note/Illustration
1	 <b>DANGER</b> Before doing any work inside the cabinet, disconnect the mains power. For more information, see <a href="#">Electrical safety on page 31</a> .	
2	Remove the screws holding the cover.	 xx2300001703
3	Remove cable ties from battery.	
4	Disconnect all connectors from the unit to be replaced.	
5	Remove the battery.	

#### Refitting the motor connection box battery

	Action	Note/Illustration
1	Refit the battery and secure with cable ties.	
2	Reconnect any connectors disconnected at removal.	

*Continues on next page*

5.5.3 Replacing the motor connection box battery  
Continued

	Action	Note/Illustration
3	Refit the cover.	 <p>xx2300001703</p>
4	Perform the function tests to verify that the safety features work properly, see <a href="#">Function tests on page 185</a> .	

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## 6 Decommissioning

### 6.1 Introduction to decommissioning

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#### Introduction

This section contains information to consider when taking a product, robot or controller, out of operation.

It deals with how to handle potentially dangerous components and potentially hazardous materials.



#### Note

The decommissioning process shall be preceded by a risk assessment.

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#### Disposal of materials used in the robot

All used grease/oils and dead batteries **must** be disposed of in accordance with the current legislation of the country in which the robot and the control unit are installed.

If the robot or the control unit is partially or completely disposed of, the various parts **must** be grouped together according to their nature (which is all iron together and all plastic together), and disposed of accordingly. These parts **must** also be disposed of in accordance with the current legislation of the country in which the robot and control unit are installed.

See also [Environmental information on page 370](#).

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#### Disposal of storage media

Before disposal of any storage equipment (anything from an SD card to a complete controller), make sure that all sensitive information has been deleted.



#### Tip

To remove all data from the OmniCore controller, use the **Delete user data** function (part of **Delete RobotWare system** function) in RobotWare. See *Operating manual - Integrator's guide OmniCore*.

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#### Transportation

Prepare the robot or parts before transport, this to avoid hazards.

## 6 Decommissioning

### 6.2 Environmental information

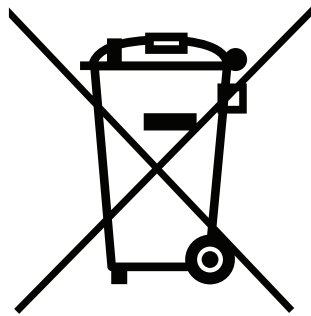
## 6.2 Environmental information

### Introduction

ABB robots contain components in different materials. During decommissioning, all materials shall be dismantled, recycled, or reused responsibly, according to the relevant laws and industrial standards. Robots or parts that can be reused or upcycled helps to reduce the usage of natural resources.

### Disposal symbol

The following symbol indicates that the product must not be disposed of as common garbage. Handle each product according to local regulations for the respective content (see table below).



xx180000058

### Materials used in the product

The table specifies some of the materials in the product and their respective use throughout the product.

Dispose components properly according to local regulations to prevent health or environmental hazards.

Material	Example application
Aluminium	Heat sinks on power supplies and drive units
Batteries, Lithium	Main computer
Brominated flame retardants	Electronics
Copper	Cables
Lead	Electronics
Plastic/rubber	Cables, connectors, etc.
Silicone	Power supply <sup>i</sup>
Steel	Cabinet structure, plates, screws, etc.

<sup>i</sup> The product does not contain silicone by design but there might be a minimal risk of contamination during production.

*Continues on next page*

#### China RoHS symbol

The following symbol shows the information to hazardous substances and the environmental protection use period of OmniCore C90XT Type A according to "Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products (SJ/T 11364-2014)".



xx190000804

Orange symbol with a number in it: The product contains certain hazardous substances and can be used safely during its environmental protection use period (as indicated by the number in the center) which should enter into the recycling system after its environmental protection use period.



#### Note

This form and environmental protection use period label are based on the regulation in China. These are not necessary to be concerned in other countries.

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# 7 Troubleshooting

## 7.1 Introduction to troubleshooting

### Introduction

The product manual and the circuit diagram contains information that can be good when troubleshooting.

For OmniCore, all event logs from the software can be seen on the FlexPendant, or in *Technical reference manual - Event logs for RobotWare 7*.

Make sure to read through the section [Safety on page 15](#) before starting.

### Troubleshooting strategies

- 1 Isolate the fault to pinpoint the cause of the problem from consequential problems.
- 2 Divide the fault chain in two.
- 3 Check communication parameters and cables.
- 4 Check that the software version is compatible with the hardware.

### Work systematically

- 1 Take a look around to make sure that all screws, connectors, and cables are secured, and that the robot and other parts are clean, not damaged, and correctly fitted.
- 2 Replace one thing at a time.
- 3 Do not replace units randomly.
- 4 Make sure that there are no loose screws, turnings, or other unexpected parts remaining after work has been performed.
- 5 When the work is completed, verify that the safety functions are working as intended.

### Keep a track of history

- Make a historical fault log to keep track of problems over time.
- Consult those working with the robot when the problem occurred.

### Basic scenarios

What to look for during troubleshooting depends on when the fault occurred. Was the robot recently installed or was it recently repaired? The following table gives hints on what to look for in specific situations.

The robot has recently been installed	Check: <ul style="list-style-type: none"> <li>• the configuration files</li> <li>• connectors</li> <li>• options and their configuration</li> <li>• changes in the robot working space/movements.</li> </ul>
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*Continues on next page*

## 7 Troubleshooting

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### 7.1 Introduction to troubleshooting

*Continued*

The robot has recently been repaired	Check: <ul style="list-style-type: none"><li>• all connections to the replaced part</li><li>• power supplies</li><li>• that the correct part has been fitted</li><li>• the last repair documents.</li></ul>
The robot recently had a software upgrade	Check: <ul style="list-style-type: none"><li>• software versions</li><li>• compatibilities between hardware and software</li><li>• options and their configuration</li></ul>
The robot has recently been moved from one site to another (an already working robot)	Check: <ul style="list-style-type: none"><li>• connections</li><li>• software versions</li></ul>

## 7.2 Troubleshooting fault symptoms

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### Fault symptoms described in this manual

This manual describes how to troubleshoot the following fault symptoms:

- *No LEDs are lit on the controller on page 376*
- *Start-up failure on page 377*
- *Problem releasing the robot brakes on page 380*
- *Problem starting or connecting the FlexPendant on page 382*
- *Problem using the joystick on page 384*
- *Controller fails to start on page 385*
- *Reflashing firmware failure on page 386*
- *Inconsistent path accuracy on page 387*
- *Controller is overheated on page 389*

*Continues on next page*

## 7 Troubleshooting

### 7.2.1 No LEDs are lit on the controller

### 7.2.1 No LEDs are lit on the controller

#### Description


No LEDs at all are lit in the controller.

#### Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	

#### Preparations


	Action
1	Make sure that the controller is switched on. Wait 30 s - 1 min to enable start-up sequence.
2	Check the FlexPendant for errors and warnings.
	 <b>DANGER</b> Troubleshooting on the controller while powered on must be performed by personnel trained by ABB or by ABB field engineers.

#### Recommended working procedure

If no LEDs are lit on the controller during start-up, use this procedure to troubleshoot what might cause the problem.

Look at the following block diagram to understand how power is connected from incoming and forward.

#### Detailed working procedure

	Action	Note
1		
2	Make sure that the system is supplied with power. <ul style="list-style-type: none"><li>Measure incoming mains voltage and make sure the voltage is within the normal range.</li></ul>	Use a multimeter and insulating gloves. If incoming mains is not ok, the problem is not in the robot controller. Troubleshoot incoming mains.
3	Check that the mains connection (X0) is properly connected.  <b>Tip</b> For more details, see <i>Circuit diagram - OmniCore C90XT Type A</i> .	



## 7.2.2 Start-up failure

### Description

The following are possible symptoms of a start-up failure:


- 1 The LEDs are not lit on some units.
- 2 Unable to load the system software.

### Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010

### Preparations

	Action
1	Make sure that the controller is switched on. Wait 30 s - 1 min to enable start-up sequence.
2	Check the FlexPendant for errors and warnings.
	 <b>DANGER</b> Troubleshooting on the controller while powered on must be performed by personnel trained by ABB or by ABB field engineers.

### Recommended working procedure

If there seems to be a power failure during start-up, use this procedure to troubleshoot what might cause the problem.

### Block diagram

Look at the following block diagram to understand how power is connected from incoming and forward.

### Detailed working procedure

	Action	Note
1	Check <b>Module status</b> LED on power unit A1.	LED Module status should be green. <ul style="list-style-type: none"> <li>• If not, see <a href="#">Troubleshooting the power unit on page 399</a>.</li> <li>• If the power unit is ok, check that incoming mains is well connected and that the incoming mains switch is turned on.</li> </ul>

*Continues on next page*

## 7 Troubleshooting

### 7.2.2 Start-up failure

Continued

	Action	Note
2	Check LED TRK on the main computer (Power distribution board, DSQC1085).	<ul style="list-style-type: none"><li>• If LED TRK is green, proceed with <a href="#">5</a>.</li><li>• If LED TRK is not green, proceed with <a href="#">3</a>.</li></ul>
3	Measure the 24VDC_TRUNK at connector A2.K1.X1.	Verify that the input to A2.K1.X1 is 25.2 VDC +/- 5%. <ul style="list-style-type: none"><li>• If the measured voltage is normal, troubleshoot the main computer. See <a href="#">Troubleshooting the main computer on page 420</a>.</li><li>• If the measured voltage is abnormal, proceed with step <a href="#">4</a>.</li></ul>
4	Measure the 24VDC_TRUNK at connector A1.X6.	Verify that the input to A1.X6 is 25.2 VDC +/- 5%. <ul style="list-style-type: none"><li>• If the measured voltage is normal, check and replace the cable if necessary.</li><li>• If the measured voltage is abnormal, troubleshoot the power unit. See <a href="#">Troubleshooting the power unit on page 399</a>.</li></ul>
5	Check LEDs PC (Power distribution board, DSQC1085) and HMI (Safety board, DSQC1087).	<ul style="list-style-type: none"><li>• LED PC and/or LED HMI are green, proceed with <a href="#">6</a>.</li><li>• LED PC and/or LED HMI are not green,, troubleshoot the main computer. See <a href="#">Troubleshooting the main computer on page 420</a>.</li></ul>
6	Check the drive unit status LED.	If the drive unit status LED is not lit, see <a href="#">Troubleshooting the drive unit on page 392</a> .
7	If the problem remains, contact ABB.	



#### Tip

For more details, see *Circuit diagram - OmniCore C90XT Type A*.

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## 7.2.3 System update failure

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### Description

In certain scenarios, such as removing or adding certain optional features or major upgrades of installed software products versions, the previous backup may be incompatible with the newly re-configured system. Automatically reloading backup can therefore fail, resulting in system failure state after the update.

For more information about system update, see *Operating manual - Integrator's guide OmniCore*.

---

### Recommended working procedure

To remove system failure resulting from system updates, there are two main strategies:

- A Go forward with the new system configuration and correct the errors, see [New system configuration on page 379](#).
- B Rollback all changes in the system and bring the system to the same state as it was before the update, see [Rollback all changes in the system on page 379](#).

### New system configuration

- 1 Reset the RobotWare system.  
The RAPID program and system parameters will be removed, and the system will be set to default state, but without system failure.
- 2 Re-implement your programs or configuration changes, or
- 3 Selectively load contents from the previous system backup and correct possible errors when loading.

### Rollback all changes in the system

The previous system state can be restored through the RobotWare Installation Utilities in one of the following ways:

- 1 Restore all installed software, user and system internal data with a selected snapshot (backup copy) of the previous system state. This is the simplest way.
- 2 Perform a complete re-installation of the RobotWare system using RobotWare Installation Utilities, start the RobotWare system and then reload the previous backup.

## 7 Troubleshooting

### 7.2.4 Problem releasing the robot brakes

### 7.2.4 Problem releasing the robot brakes

#### Description


When starting robot operation or jogging the robot, the internal robot brakes must release in order to allow movement.

#### Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	
<i>Circuit diagram - OmniCore C90XT Type A</i>	<i>3HAC086305-010</i>

#### Preparations


	Action
1	Make sure that the controller is switched on. Wait 30 s - 1 min to enable start-up sequence.
2	Check the FlexPendant for errors and warnings.
	 <b>DANGER</b> Troubleshooting on the controller while powered on must be performed by personnel trained by ABB or by ABB field engineers.

#### Recommended working procedure

If the brakes do not release, no robot movement is possible and a number of error log messages can occur. Use this procedure to troubleshoot what might cause the problem.

Look at the following block diagram to understand how power is connected from incoming and forward.

#### Detailed working procedure

	Action	Note
1	Check that the floor cable is connected from the manipulator to the motor connector X1. Visually inspect the cable for damage or extensive bending marks.  <b>Tip</b> For more details, see <i>Circuit diagram - OmniCore C90XT Type A</i> .	<ul style="list-style-type: none"><li>If the cable is damaged, replace to a new cable and go to step 5.</li><li>If the cable is not connected, repair the connection and go to step 5.</li><li>If the cable is ok, go to the next step.</li></ul>
2		<ul style="list-style-type: none"><li>If it is not, repair the connection and go to step 5.</li><li>If it is ok, go to the next step.</li></ul>

*Continues on next page*

	Action	Note
3		<ul style="list-style-type: none"><li>• If it is not, repair the connection and go to step 5.</li><li>• If it is ok, go to the next step.</li></ul>
4	Try jogging the robot.	<ul style="list-style-type: none"><li>• If it is not working properly, the brake release board on the manipulator might be broken. Contact your local ABB for more information.</li><li>• Go to step 5.</li></ul>
5	Check that the brake release function is ok.	For more details on how to release the brakes, see the robot's product manual. <ul style="list-style-type: none"><li>• If it is not ok, contact your local ABB.</li></ul>

## 7 Troubleshooting

### 7.2.5 Problem starting or connecting the FlexPendant

### 7.2.5 Problem starting or connecting the FlexPendant

#### Description

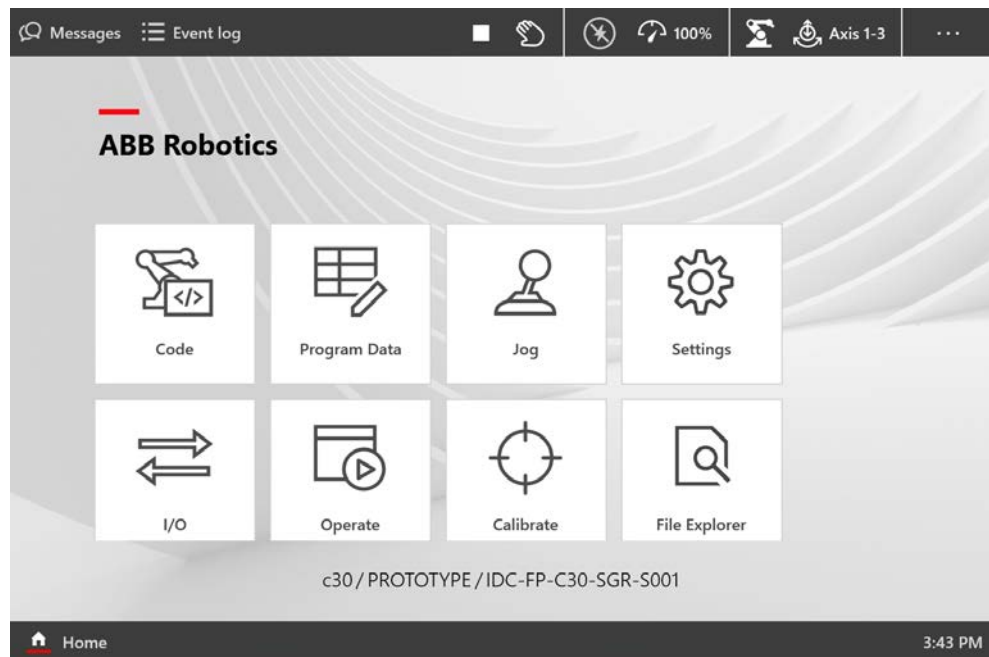
The FlexPendant is not responding, either completely or intermittently. No entries are possible, and no functions are available.



#### Note

If protective gloves are used, these must be compatible with touchscreens when using the FlexPendant.

The FlexPendant starts but does not display the main interface.



xx1900000917

#### Required test equipment


Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010

#### Preparations

	Action
1	Make sure that the controller is switched on. Wait 30 s - 1 min to enable start-up sequence.
2	Check the FlexPendant for errors and warnings.

Continues on next page


Action	
	<p><b>DANGER</b></p> <p>Troubleshooting on the controller while powered on must be performed by personnel trained by ABB or by ABB field engineers.</p>

#### Recommended working procedure

If the FlexPendant starts but does not display the main interface during the start-up, use this procedure to troubleshoot what might cause the problem.

Look at the following block diagram to understand how power is connected from incoming and forward.

#### Detailed working procedure

	Action	Note
1	Try resetting the FlexPendant using the reset button located next to the USB port.	See <i>Operating manual - OmniCore</i> .
2	Check that the FlexPendant cable is correctly connected to the controller through the HMI signal connector, X4.	If it is not connected, repair the connection and go to step six. Check the pins in the connector. If it is ok, go to the next step.
3	Check the FlexPendant cable for any damage.	<ul style="list-style-type: none"> <li>• If damage is found, replace the FlexPendant cable and go to step six.</li> <li>• If it is ok, go to the next step.</li> </ul>
4	If possible, test by connecting another FlexPendant. This is to eliminate the FlexPendant and cable as error sources; Test the FlexPendant with a different controller to eliminate the controller as error source.	
5	<p>Check that the FlexPendant works normally.</p> <p> <b>Tip</b></p> <p>This is detailed in section <a href="#">Troubleshooting the FlexPendant on page 391</a>.</p>	If it is not ok, contact your local ABB.

## 7 Troubleshooting

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### 7.2.6 Problem using the joystick

### 7.2.6 Problem using the joystick


---

#### Description

The FlexPendant is started and responds when you push the buttons or tap on the touchscreen. However, the joystick does not work and no warnings or messages show up. It is therefore not possible to jog the robot.

---

#### Recommended working procedure

	Action	Information
1	Make sure that the joystick lock is not activated.	See <i>Operating manual - OmniCore</i> .
2	Make sure the controller is in manual mode.	
3	Make sure the FlexPendant is connected correctly to the controller.	
4	Press the reset button located next to the USB port on the back of the FlexPendant.   <b>Note</b> The reset button only resets the FlexPendant, not the system on the controller.	If the joystick is still not working, then replace the FlexPendant.



---

## 7.2.7 Controller fails to start

---

### Description

If the controller fails to start, the FlexPendant is not operational.

---

### Function description

The robot controller always runs in one of the following two modes:

- Normal operation mode (a user-created system is selected to run)
- RobotWare Installation Utilities mode (advanced maintenance mode)

In rare occasions, a serious error (in the software or the configuration of the installed system), may prevent the controller from starting properly in the normal operation mode. A typical case is when a controller is restarted after a network configuration change, causing the controller to be non-responsive from FlexPendant, RobotStudio, or FTP. To restore the robot controller from this situation, the controller can be forced to start in RobotWare Installation Utilities mode.

---

### Forcing startup of the RobotWare Installation Utilities mode

Repeat the following action two times in a row:

- 1 Turn on the main power switch.
- 2 Wait for approximately 15 seconds.
- 3 Turn off the main power switch.

In the next startup (third time), the installed system is de-selected and the RobotWare Installation Utilities mode is started.

This has no effect if the controller is already in RobotWare Installation Utilities mode.



#### Note

Force starting the RobotWare Installation Utilities mode will not affect the files in the directories belonging to the installed system.

How to install systems is described in *Operating manual - Integrator's guide OmniCore*.

## 7 Troubleshooting

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### 7.2.8 Reflashing firmware failure

### 7.2.8 Reflashing firmware failure

---

#### Description

When reflashing firmware, the automatic process can fail which will stop the system. A message is generated in the event log.

This fault usually occurs due to a lack of compatibility between hardware and software.

---

#### Recommended working procedure

If the controller stops with a message about firmware failure, use this procedure to troubleshoot what might cause the problem.

	Action	Note
1	Read the message to see which unit has failed.	
2	If the relevant unit has been replaced recently, make sure that the versions of the old and the new unit are identical.	
3	Check the software versions.	
4	If RobotWare has been updated recently, make sure that the versions of the old and the new unit are identical.	
5	If the problem remains, contact your local ABB for information about which firmware version is compatible with your hardware.	

## 7.2.9 Inconsistent path accuracy

### Description

The path of the robot TCP is not consistent. It varies from time to time, and is sometimes accompanied by noise emerging from bearings, gearboxes, or other locations.

### Possible causes

The symptom can be caused by (the causes are listed in order of probability):

- Robot not calibrated correctly.
- Robot TCP not correctly defined.
- Parallel bar damaged (applies to robots fitted with parallel bars only).
- Mechanical joint between motor and gearbox damaged. This often causes noise to be emitted from the faulty motor.
- Bearings damaged or worn (especially if the path inconsistency is coupled with clicking or grinding noises from one or more bearings).
- The wrong robot type may be connected to the controller.
- The brakes may not be releasing correctly.

### Recommended working procedure

The path accuracy depends on many factors. The following table describes the most common causes of problems with the path accuracy. Depending on your installation, the recommended working procedure is to work step by step, starting with the step that seems most plausible given your circumstances.

	Action	Note
1	Study the path of the robot in motion, to find if an external force, for example, an external cable package, is colliding with or restricting the movement of the robot.	Remove the obstacles.
2	In high temperature environments, the material in the robot can expand, thereby causing inconsistent path accuracy.	Improve the ventilation around the robot.
3	Make sure the robot tool and work object are correctly defined.	How to define these are described in <i>Operating manual - OmniCore</i> .
4	Check the positions of the revolution counters.	Update if required.
5	If required, re-calibrate the robot axes.	How to calibrate the robot is described in the product manual for the robot.
6	If you hear noise that has not been there before, locate the source to define if a motor or bearing is faulty.  Study the path of the robot TCP to establish which axis, and thus which motor, may be faulty.	Replace the faulty motor, gearbox, or bearing as specified in the product manual for the robot.
7	Check the trueness of the parallel bar (applies to robots fitted with parallel bars only).	Replace the faulty parallel bar as specified in the product manual for the robot.

*Continues on next page*

## 7 Troubleshooting

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### 7.2.9 Inconsistent path accuracy

*Continued*

	Action	Note
8	Make sure the correct robot type is connected as specified in the system.	Update the system with the correct robot type, see <i>Operating manual - Integrator's guide OmniCore</i> .
9	Make sure the robot brakes work properly.	Proceed as detailed in section <a href="#">Problem releasing the robot brakes on page 380</a> .
10	If applicable: Check the setting for the swivel.	The swivel has an in-built resistance that needs to be set in the system parameters.


## 7.2.10 Controller is overheated

### Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010

### Preparations

	Action
1	Make sure that the controller is switched on. Wait 30 s - 1 min to enable start-up sequence.
2	Check the FlexPendant for errors and warnings.
	 <b>DANGER</b> Troubleshooting on the controller while powered on must be performed by personnel trained by ABB or by ABB field engineers.

### Recommended working procedure

If the controller seems to be overheated, use this procedure to troubleshoot what might cause the problem.

### Detailed working procedure

	Action	Note
1	Check that the standard fans are working.	Replace malfunctioning fans, see <a href="#">Replacing the standard fan on page 199</a>
2	Inspect the air filters to make sure they are clean.	If air filters are not clean, see <a href="#">Cleaning air filter on page 175</a> If air filters need to be replaced, see <a href="#">Replacing the air filter on page 287</a> .
3	If the problem remains, troubleshoot the power unit and/or the drive unit.	See <a href="#">Troubleshooting the power unit on page 399</a> and <a href="#">Troubleshooting the drive unit on page 392</a> .

## 7 Troubleshooting

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### 7.3.1 Troubleshooting LEDs in the controller

## 7.3 Troubleshooting units

### 7.3.1 Troubleshooting LEDs in the controller

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#### Description

The controller features a number of indication LEDs, which provide important information for troubleshooting purposes. If no LEDs light up at all when switching the system on, troubleshoot as detailed in this section.

All LEDs on the respective units, and their significance, are described in the following sections.

#### Units with LEDs in the controller


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Drive unit	<a href="#">Troubleshooting the drive unit on page 392</a>
Additional drive unit	<a href="#">Troubleshooting the additional drive unit (DSQC3065) on page 393</a>
Power unit	<a href="#">Troubleshooting the power unit on page 399</a>
Scalable I/O	<a href="#">Troubleshooting industrial networks and I/O devices on page 400</a>
3G Connected Services gateway	<a href="#">Troubleshooting the 3G Connected Services gateway on page 401</a>
4G Connected Services gateway	<a href="#">Troubleshooting the 4G Connected Services gateway on page 407</a>
Ethernet switch	<a href="#">Troubleshooting the Ethernet switch (DSQC1035) on page 418</a>
Main computer	<a href="#">Troubleshooting the main computer on page 420</a>
Power supply	

## 7.3.2 Troubleshooting the FlexPendant

### Procedure

The procedure below describes what to do if the FlexPendant does not work correctly.

	Action	Note
1	Try resetting the FlexPendant using the reset button located next to the USB port.	See <i>Operating manual - OmniCore</i> .
2	If the FlexPendant is not responding or does not operate correctly, see <a href="#">Problem starting or connecting the FlexPendant on page 382</a> .	 <b>Note</b> If protective gloves are used, these must be compatible with touchscreens when using the FlexPendant.
3	Check the cable for connections and integrity.	
4	Check the 24 V power supply.	
5	Read the error event log message and follow any instructions of references.	

For more information on the FlexPendant, see *Operating manual - OmniCore*.

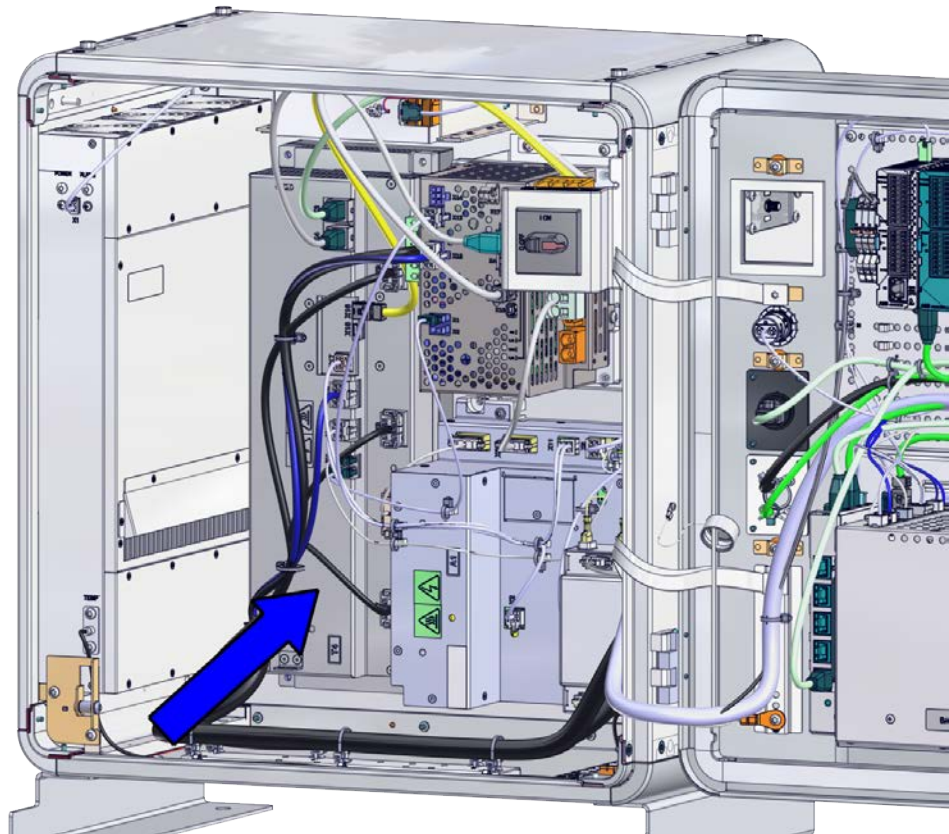
## 7 Troubleshooting

### 7.3.3 Troubleshooting the drive unit

### 7.3.3 Troubleshooting the drive unit

#### Location

The illustration shows the location of the drive unit in the controller.



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#### LEDs

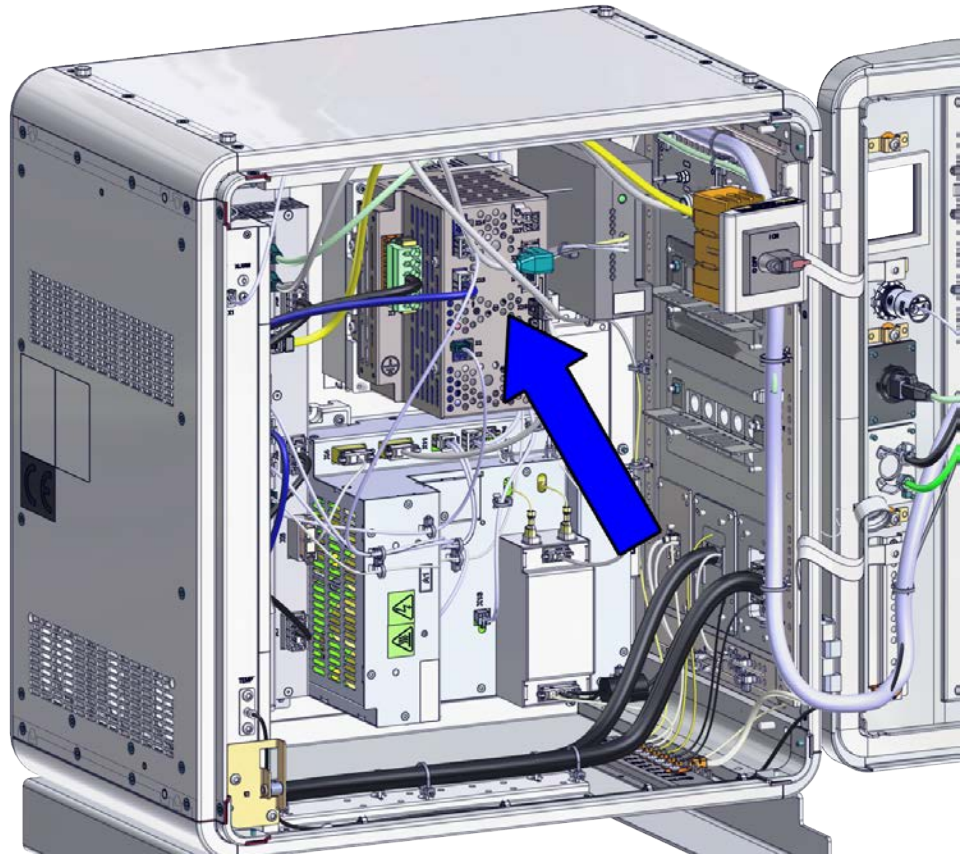
The illustration below shows the indication LEDs on the drive unit.



#### 7.3.4 Troubleshooting the additional drive unit (DSQC3065)

##### Location

The illustration shows the location of the drive unit in the controller.



xx2400001349

##### Positions

The power unit, drive unit, and additional drive units can be placed in the following positions in the controller:

See also *Application manual - Additional axes 3HAC082287-001*.

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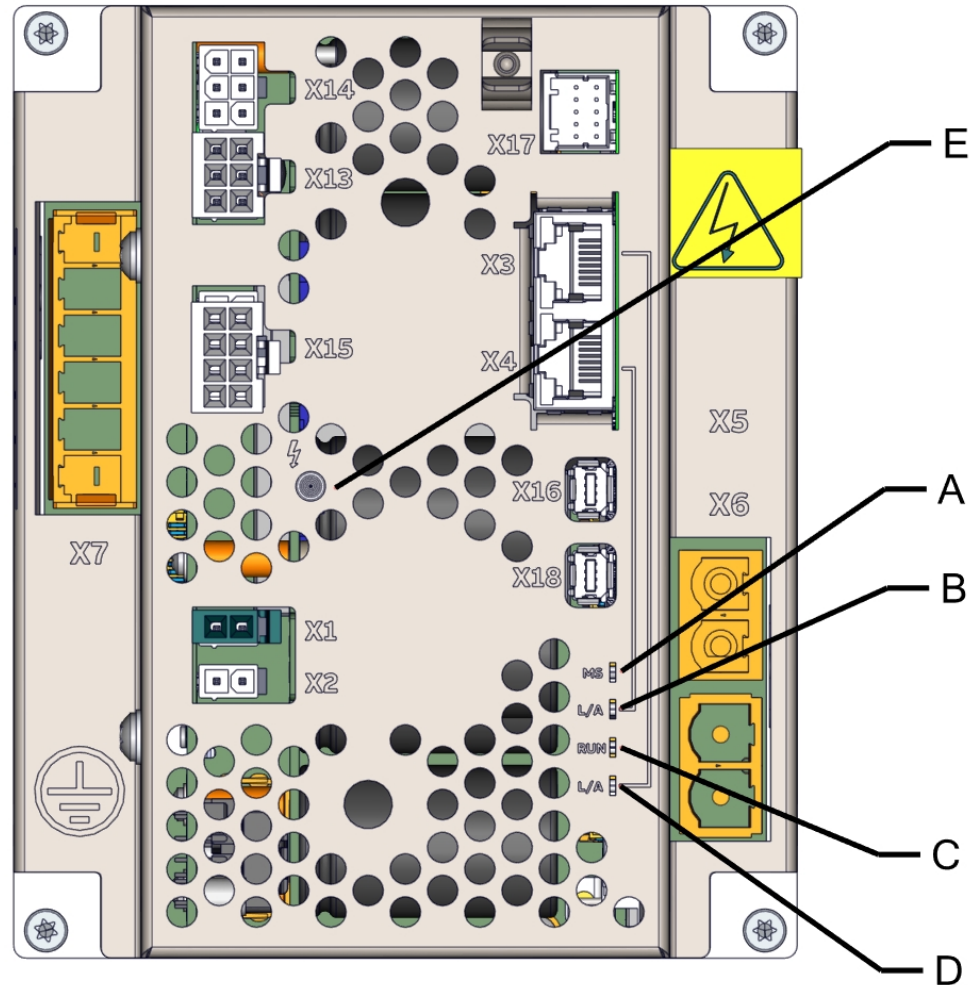
## 7 Troubleshooting

### 7.3.4 Troubleshooting the additional drive unit (DSQC3065)

Continued

#### LEDs

The illustration below shows the indication LEDs on the additional drive unit.



xx2200001052

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	Name	Description
A	MS (Module Status) LED	<p>The status indicator LED can be used to identify the following status during start-up/power on:</p> <ul style="list-style-type: none"> <li>• Red, steady: Default when power is available.</li> <li>• Red, flashing (~1Hz): Power is on, self-test is ongoing, operating system is loading.</li> <li>• Green, flashing (~1Hz): Application is loaded and waiting for communication.</li> <li>• Green, steady: Drive unit is operational.</li> </ul> <p>If the LED does not turn steady green after 30-60 sec, the status indicator LED can be used to identify the following issues:</p> <ul style="list-style-type: none"> <li>• No color: Power to the drive unit is missing.</li> <li>• Red, steady: Internal error.</li> <li>• Red, flashing (~1Hz): Firmware error or self-test failure.</li> <li>• Green, flashing (~1Hz): Communication error to another module.</li> </ul>
B	LA (Link Activity [0]) LED	<p>Shows the Link activity of the EtherCAT slave port 0.</p> <ul style="list-style-type: none"> <li>• Off: No link</li> <li>• Yellow flashing: Link and activity.</li> <li>• Yellow steady: Link without activity.</li> </ul>
C	RUN (EtherCAT RUN) LED	<p>Shows the actual state of the device state machine:</p> <ul style="list-style-type: none"> <li>• Off: Drive unit is in state INIT.</li> <li>• Green flashing (slow): Drive unit is in state PRE-OPERATIONAL.</li> <li>• Green single flash: Drive unit is in state SAFE-OPERATIONAL.</li> <li>• Green steady: Drive unit is in state OPERATIONAL.</li> <li>• Green flickering (fast): Drive unit is in state BOOTSTRAP.</li> </ul>
D	LA (Link Activity [1]) LED	<p>Shows the Link activity of the EtherCAT slave port 1.</p> <ul style="list-style-type: none"> <li>• Off: No link</li> <li>• Yellow flashing: Link and activity.</li> <li>• Yellow steady: Link without activity.</li> </ul>
E	DC-BUS High Voltage LED	<ul style="list-style-type: none"> <li>• No color: Voltage between DC+ - DC- &lt; 60 VDC</li> <li>• Yellow: Voltage between DC+ - DC- &gt; 60 VDC</li> </ul>

### Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	

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## 7 Troubleshooting

### 7.3.4 Troubleshooting the additional drive unit (DSQC3065)

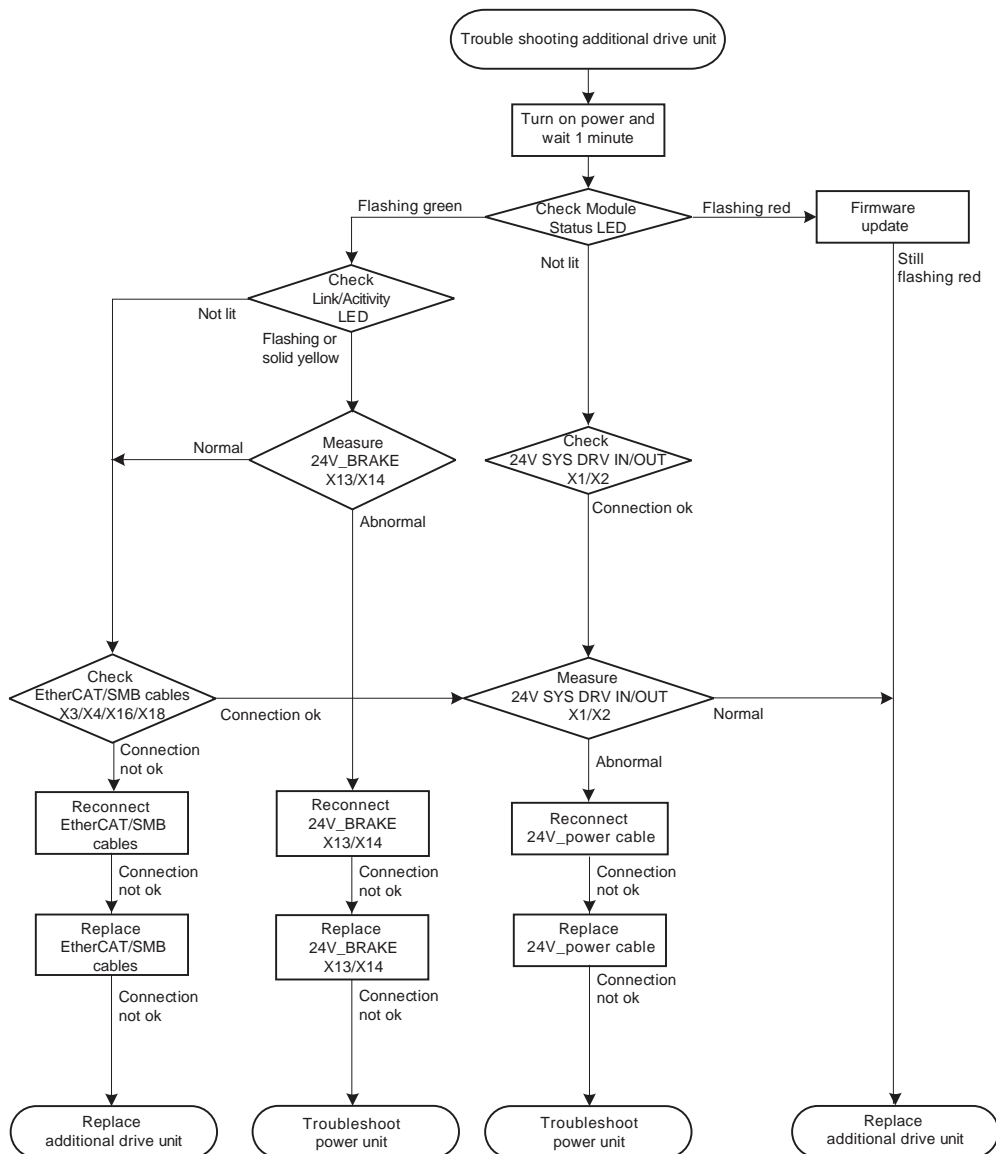
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Equipment	Note
Circuit diagram - OmniCore C90XT Type A	3HAC086305-010

#### Preparations

	Action
1	Check the FlexPendant for errors and warnings.
2	Power the controller off. Wait one minute, power the controller on.
3	Wait 30-60 seconds after power-on. Make sure that the control system power is in run-time mode.

#### Troubleshooting flowchart



xx2200001226

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### Troubleshooting procedure


The troubleshooting table is supposed to be used as a detailed instruction together with the troubleshooting flowchart.



#### Tip

In setups with several additional drive units:

- Measure voltage on the last unit in the chain first, and then work your way backwards.
- Check if the FlexPendant indicates which unit is faulty. If not, replace one unit at a time.

	Action	Note
1	Power on the controller. Check the Module Status LED (A) on the additional drive unit.	<p>Make sure that the additional drive unit is operational.</p> <p>Wait at least 1 min after power-on.</p> <p>If the Module Status LED is:</p> <ul style="list-style-type: none"> <li>• Off: The additional drive unit is in the power off state. Proceed with step 4.</li> <li>• Flashing red (~ 1Hz): Firmware error or self-test failure.</li> </ul> <p>Upgrade the firmware. If the problem persists, the additional drive unit may be faulty, see <a href="#">Replacing the additional drive unit (DSQC3065) on page 274</a>.</p> <ul style="list-style-type: none"> <li>• Flashing green (~ 1Hz): Communication error to another module. Proceed with step 3.</li> </ul>
2	Measure the 24V_BRAKE input at connector X13/X14.   <b>Note</b> The brake current is displayed on the FlexPendant, in the <b>Settings</b> app under <b>Hardware Devices -&gt; Runtime Information</b> .	<p>Verify that the input to X13/X14 is 24 VDC <math>\pm</math> 10%.</p> <ul style="list-style-type: none"> <li>• If the measured voltage is normal, proceed with step 5.</li> <li>• If the measured voltage is abnormal, proceed with step 11.</li> </ul>
3	Check the two Link/Activity LEDs (B & D). These LEDs indicate the communication status of the module.	<p>Make sure that the drive unit is operational.</p> <p>If the Link/Activity LED is:</p> <ul style="list-style-type: none"> <li>• Yellow, steady: The communication link is established. The drive unit may be faulty, see <a href="#">Replacing the additional drive unit (DSQC3065) on page 274</a>.</li> <li>• Flashing yellow: The communication link is established and data is transferred through the port. Proceed with step 2.</li> <li>• Off: The EtherCAT link is not established. Proceed with step 5.</li> </ul>
4	Check the connectors at T41.X1 (24V SYS DRV IN) and T41.X2 (24V SYS DRV OUT). Make sure that the power cables are connected properly at both ends.	<p>If the connection and cable seem OK, proceed with step 6.</p> <p>If there is a problem with the connection, proceed with step 7.</p>

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## 7 Troubleshooting

### 7.3.4 Troubleshooting the additional drive unit (DSQC3065)

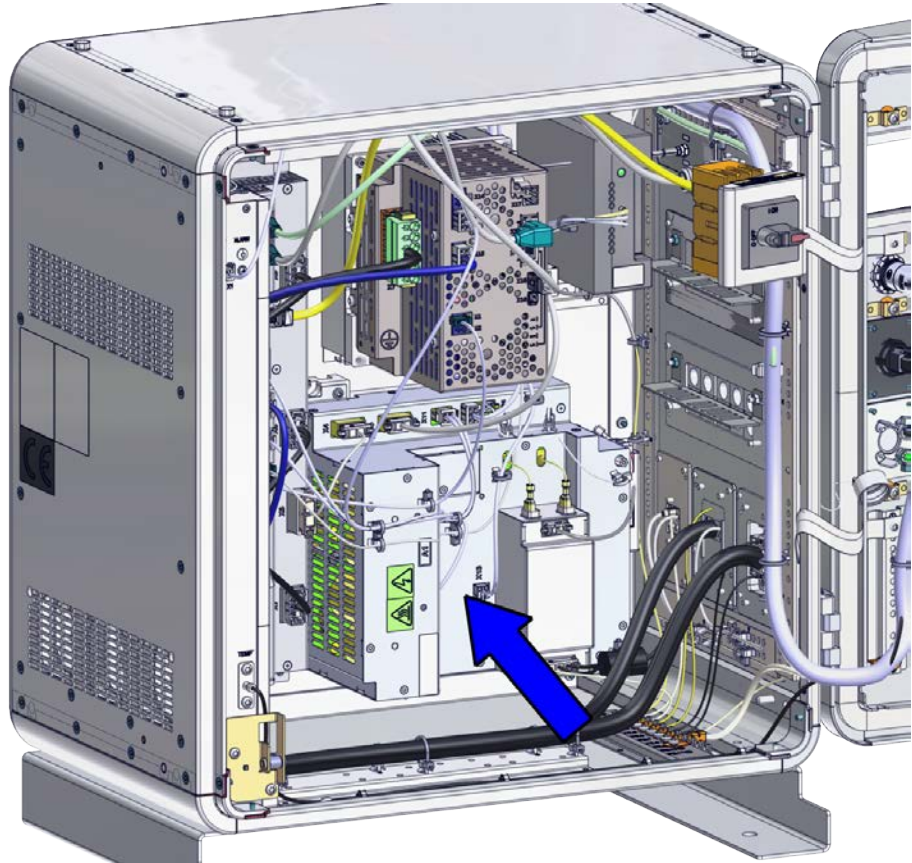
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	Action	Note
5	Check the EtherCAT/SMB cables X3/X4/X16/X18. Make sure that the cables are connected properly at both ends.	If the connection seems OK, proceed with step 6. If there is a problem with the connection, proceed with step 9.
6	Measure the 24VDC SYS DRV input at connector X1/X2.	Verify that the input to X1/X2 is 24 VDC $\pm$ 10%. <ul style="list-style-type: none"> <li>If the measured voltage is normal, replace the drive unit. See <a href="#">Replacing the additional drive unit (DSQC3065) on page 274</a>.</li> <li>If the measured voltage is abnormal, proceed with step 7.</li> </ul>
7	Restore the power connection between the drive unit and the power unit by reconnecting the 24V_power cable.	Make sure that the 24V_power cable is connected properly at both ends. <ul style="list-style-type: none"> <li>If the Module Status LED is green, the fault has been fixed. Proceed with step 1.</li> <li>If the Module Status LED is off, the fault remains. Proceed with step 8.</li> </ul>
8	Replace the the 24V_power cable between the drive unit and the power unit.	<ul style="list-style-type: none"> <li>If the Module Status LED is green, the fault has been fixed. Proceed with step 1.</li> <li>If the Module Status LED is off, there is an issue with the 24 VDC supply from the power unit. See <a href="#">Troubleshooting the power unit on page 399</a>.</li> </ul>
9	Restore the communication between the modules by reconnecting the EtherCAT/SMB cables.	Make sure the EtherCAT cables are connected properly on both ends. <ul style="list-style-type: none"> <li>If the Link/Activity LED is yellow, the fault has been fixed. Proceed with step 1.</li> <li>If the Link/Activity LED is off, the fault remains. Proceed with step 10.</li> </ul>
10	Replace the EtherCAT/SMB cables.	<ul style="list-style-type: none"> <li>If the Link/Activity LED is yellow, the fault has been fixed. Proceed with step 1.</li> <li>If the Link/Activity LED is off, the fault remains. Replace the drive unit, see <a href="#">Replacing the additional drive unit (DSQC3065) on page 274</a>.</li> </ul>
11	Restore the communication by reconnecting the 24V_BRAKE cables X13/X14.	Make sure that the cables are connected properly on both ends. <ul style="list-style-type: none"> <li>If the connection seems OK, the fault has been fixed. Proceed with step 1.</li> <li>If there is a problem with the connection, proceed with step 12.</li> </ul>
12	Replace the 24V_BRAKE cables X13/X14.	<ul style="list-style-type: none"> <li>If the connection seems OK, the fault has been fixed. Proceed with step 1.</li> <li>If the fault remains, see <a href="#">Troubleshooting the power unit on page 399</a>.</li> </ul>

#### 7.3.5 Troubleshooting the power unit

##### Location

The illustration below shows the location of the power unit in the controller.



xx240001363

##### LEDs

The illustration below shows the LEDs on the power unit.

## 7 Troubleshooting

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### 7.3.6 Troubleshooting industrial networks and I/O devices

### 7.3.6 Troubleshooting industrial networks and I/O devices

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#### Further information

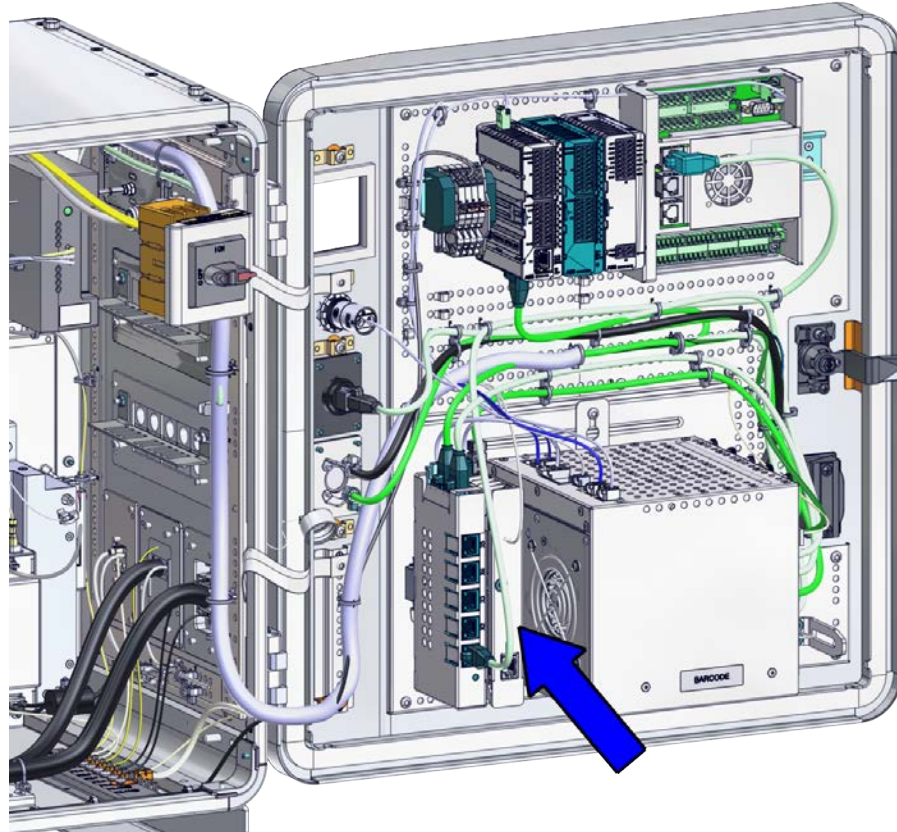
Information about how to troubleshoot fieldbuses, industrial networks and I/O devices can be found in the respective application manual. See [References on page 10](#).



### 7.3.7 Troubleshooting the 3G Connected Services gateway

#### Location

The illustration shows the location of the Connected Services gateway in the controller.



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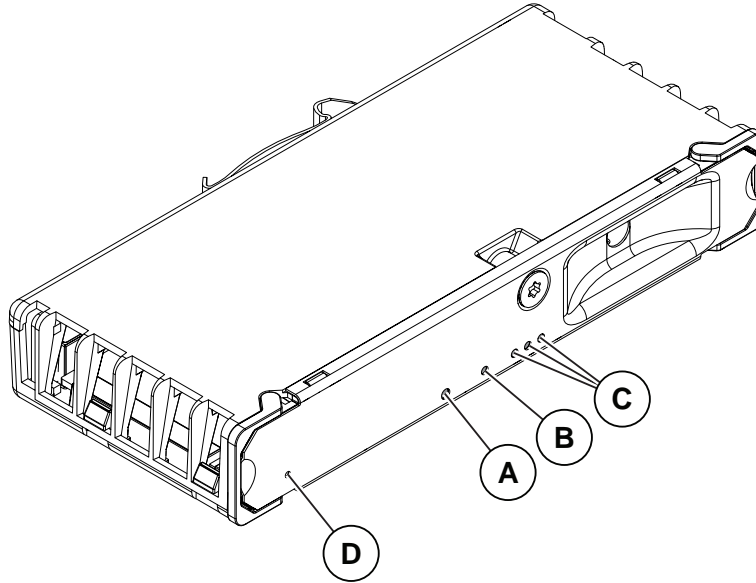
## 7 Troubleshooting

### 7.3.7 Troubleshooting the 3G Connected Services gateway

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#### LEDs for options 3G or WiFi

The illustration below shows the LEDs on the Connected Services gateway (3G or WiFi).



xx180000634

A	STATUS LED
B	LINK, 3G status or WiFi status LED
C	RF, signal strength status LEDs
D	Factory reset pin hole

Description	Significance
STATUS LED (red/green)	<p>Startup sequence:</p> <ol style="list-style-type: none"> <li>1 Red continuously: Default at power up.</li> <li>2 Red, flashing: Power on self-test ongoing, operating system is loading.</li> <li>3 Green flashing: Loading application.</li> <li>4 Green solid: Startup completed OK.</li> </ol> <p>If the LED does not turn steady green after 30-60sec, it can be used to identify the following issues:</p> <p>Fault indication:</p> <ul style="list-style-type: none"> <li>• No color: Power to the unit is missing.</li> <li>• Red, solid or flashing for more than 120s: Internal error. Try a pin reset, if problem persists replace the unit.</li> <li>• Green, flashing continuously: Communication error to another module, view error messages.</li> </ul>
LINK	<p>For the Connected Services 3G, an orange LED indicator, externally visible on the front, indicates the status of the 3G connection.</p> <p>Orange:</p> <ul style="list-style-type: none"> <li>• ON, flashing: 3G modem on, searching network.</li> <li>• ON, solid: 3G modem on and connected to network.</li> </ul>

*Continues on next page*

Description	Significance
LINK	For the connected services Wi-Fi, an orange LED indicator, externally visible on the front, indicates the status of the Wi-Fi connection. Orange: <ul style="list-style-type: none"> <li>ON, flashing: Wi-Fi transceiver on, searching network.</li> <li>ON, solid: Wi-Fi transceiver on and connected to network.</li> </ul>
RF, signal strength status LEDs	Three (3) LEDs indicating the Wi-Fi or 3G signal level. <ul style="list-style-type: none"> <li>ON: The unit is connected to the network and working ok.</li> <li>OFF: Problem with connector, antenna, or sim card.</li> </ul>
Reset pin hole	The reset pin hole can be used as follows: <ul style="list-style-type: none"> <li>Short press (less than 5s): The module will reboot to reinitiate communication.</li> <li>Long press (more than 5s): The module will be reset to factory status before restarting.</li> </ul>

#### Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	

#### Preparations

	Action
1	Check the FlexPendant for errors and warnings.
2	Power the controller off. Wait one minute, power the controller on.
3	Wait 30-60 seconds after power-on. Make sure that the control system power is in run-time mode.

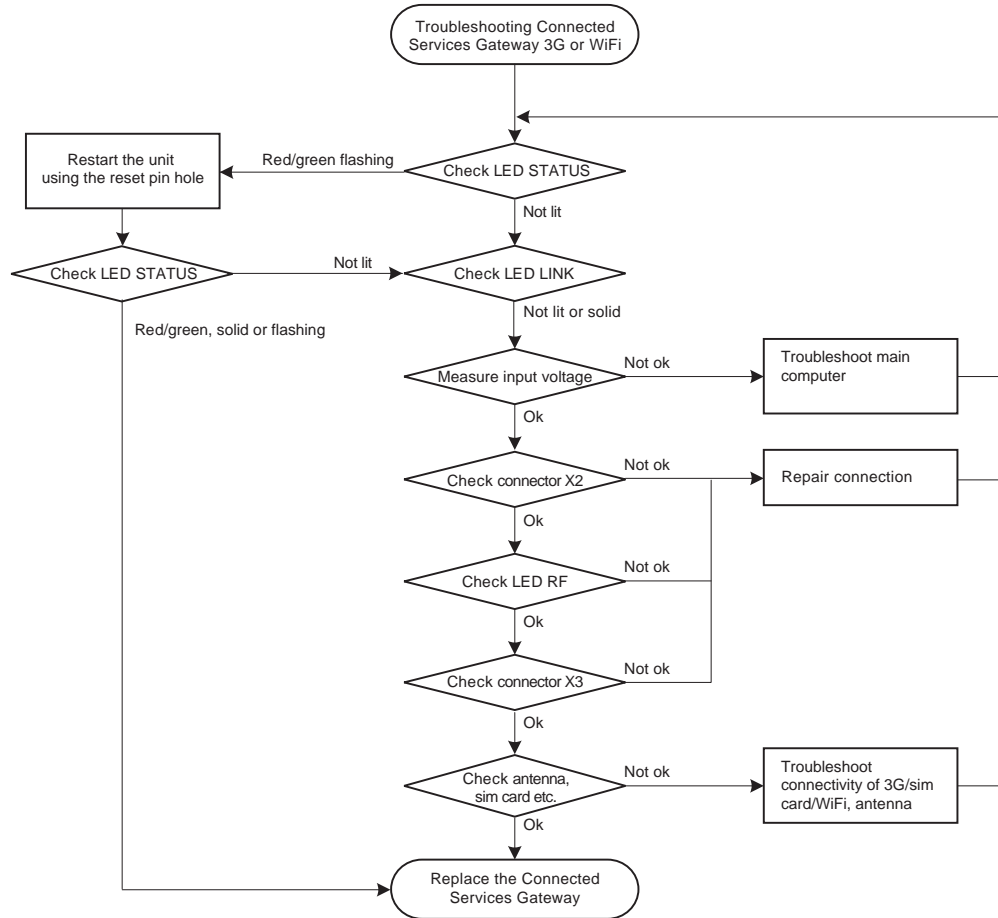
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## 7 Troubleshooting

### 7.3.7 Troubleshooting the 3G Connected Services gateway

Continued

#### Troubleshooting flowchart for options 3G or WiFi



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#### Troubleshooting procedure for options 3G or WiFi

The troubleshooting table is supposed to be used as a detailed instruction together with the troubleshooting flowchart.

	Action	Note
1	Check the STATUS LED on the Connected Services Gateway.	If the LED is: <ul style="list-style-type: none"> <li>Red/green, flashing: proceed with step 2.</li> <li>OFF, the unit is faulty, or it does not have sufficient input voltage, or the connection of the connector X2 is not ok. Proceed with step 5.</li> </ul>
2	Reset the module to factory using the reset pin hole for more than 5s, and restart the controller.	Proceed with step 3.
3	Check the STATUS LED on the Connected Services Gateway.	If the LED is: <ul style="list-style-type: none"> <li>Red/green, flashing: An internal error has occurred, proceed with step 13.</li> <li>OFF, the unit is faulty, or it does not have sufficient input voltage, or the connection of the connector X2 is not ok. Proceed with step 5.</li> </ul>

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7.3.7 Troubleshooting the 3G Connected Services gateway  
Continued

	Action	Note
4	Check the LINK LED on the Connected Services Gateway.	<p>If the LED is:</p> <ul style="list-style-type: none"> <li>• OFF, the unit is faulty, or it does not have sufficient input voltage, or the connection of the connector X2 is not ok. Proceed with step 5.</li> <li>• Flashing: An internal error has occurred, proceed with step 13.</li> </ul>
5	Measure the input voltage to the Connected Services Gateway.	<p>Use a multimeter and insulating gloves. The input voltage should be 24 V. Make sure that connector X1 is connected properly on both ends.</p> <ul style="list-style-type: none"> <li>• If the input voltage is normal, proceed with step 6.</li> <li>• If the input voltage is abnormal, <a href="#">Troubleshooting the main computer on page 420</a>.</li> </ul> <p> <b>Tip</b></p> <p>For more details, see <i>Circuit diagram - OmniCore C90XT Type A</i>.</p>
6	Check that the connector X2 is well connected and the network connection properties are available.	<p>Make sure that connector X2 is connected properly on both ends.</p> <ul style="list-style-type: none"> <li>• If the connection is OK, proceed with step 7.</li> <li>• If there is a problem with the connection, repair the connection and go back to step 3.</li> </ul>
7	Check the indicator RF LEDs on the Connected Services Gateway.	<p>If the RF LEDs are:</p> <ul style="list-style-type: none"> <li>• ON, the Connected Services Gateway is connected to network and works well.</li> <li>• OFF, the Connected Services Gateway is faulty or the connection of the connector X3 is not ok. Proceed with step 8.</li> </ul>
8	Check that the connector X3 is well connected.	<p>Make sure that connector X3 is connected properly on both ends.</p> <ul style="list-style-type: none"> <li>• If the connection is OK, proceed with step 9.</li> <li>• If there is a problem with the connection, repair the connection and go back to step 7.</li> </ul>
9	<p>Check that the right type of the antenna is connected properly.</p> <p> <b>Tip</b></p> <p>Try moving the antenna to different locations if the RF signal level is low.</p>	<ul style="list-style-type: none"> <li>• If the antenna is not working, repair the connection or move the antenna to a location with better RF signal.</li> <li>• If the antenna is ok, proceed with step 13.</li> </ul>
10	On the FlexPendant, check the connection log in <b>Backup and Restore</b> .	<p>Verify that the configuration is done correctly.</p> <p>Verify that the mobile operator is detected (for 3G).</p>


Continues on next page

## 7 Troubleshooting

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### 7.3.7 Troubleshooting the 3G Connected Services gateway

*Continued*

	Action	Note
11	<p>For 3G, use a cell phone to test that the sim card is working. For WiFi, use a cell phone to verify the WiFi access.</p> <p> <b>Note</b></p> <p>When testing with a cell phone, use the same configuration on the cell phone.</p>	<p>See the Connected Services Gateway configuration in <i>Operating manual - Integrator's guide OmniCore</i>.</p>
12	<p>For 3G and WiFi, check the antenna connectivity.</p>	
13	<p>The Connected Services Gateway may be faulty, replace it and verify that the problem is resolved.</p>	<p>How to replace the unit is described in <a href="#">Replacing the 3G Connected Services gateway on page 216</a>.</p>

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#### Related information

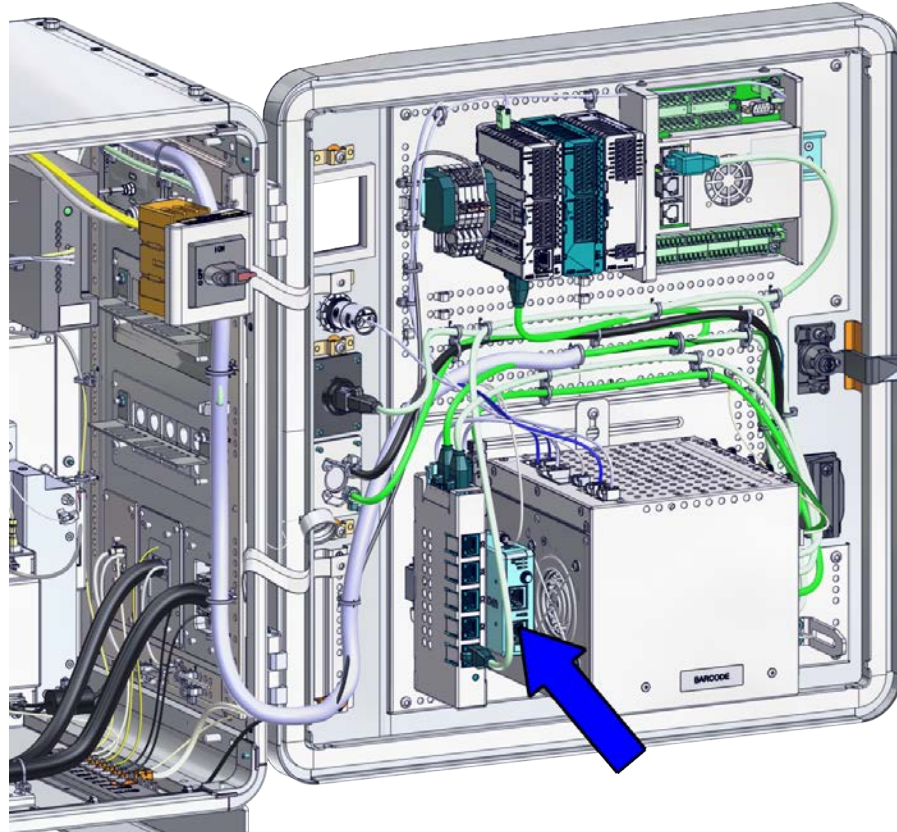
All documents can be found via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

The approval code CMIIT ID is displayed on the nameplate of the product.

### 7.3.8 Troubleshooting the 4G Connected Services gateway

#### Location

The illustration shows the location of the Connected Services gateway in the controller.



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*Continues on next page*

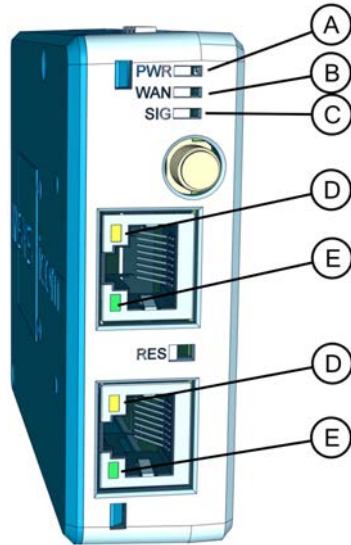
## 7 Troubleshooting

### 7.3.8 Troubleshooting the 4G Connected Services gateway

*Continued*

#### LEDs and buttons on the 4G Connected Services gateway

The illustration below shows the LEDs and the buttons on the 4G Connected Services gateway.



xx2300000756

A	PWR LED
B	WAN LED
C	SIG LED
D	ETH yellow LED
E	ETH green LED

#### LED description

LED	Colour	Function	off	blinking	on
PWR	green	Supply	not available		present
WAN	green	WAN chain	inactive	establishing	established
SIG	green	Signal	no signal or logged out	logged in (field strength, see table below)	
ETH	green	Link/activity	not connected	data traffic	connected
	yellow	data rate	10 Mbit/s		100 Mbit/s

Blinking interval LED SIG	Signal quality
900 ms on, 100 ms off	Very good
200 ms on, 200 ms off	Good
100 ms on, 900 ms off	Poor
off	No signal or logged out

*Continues on next page*



Required test equipment

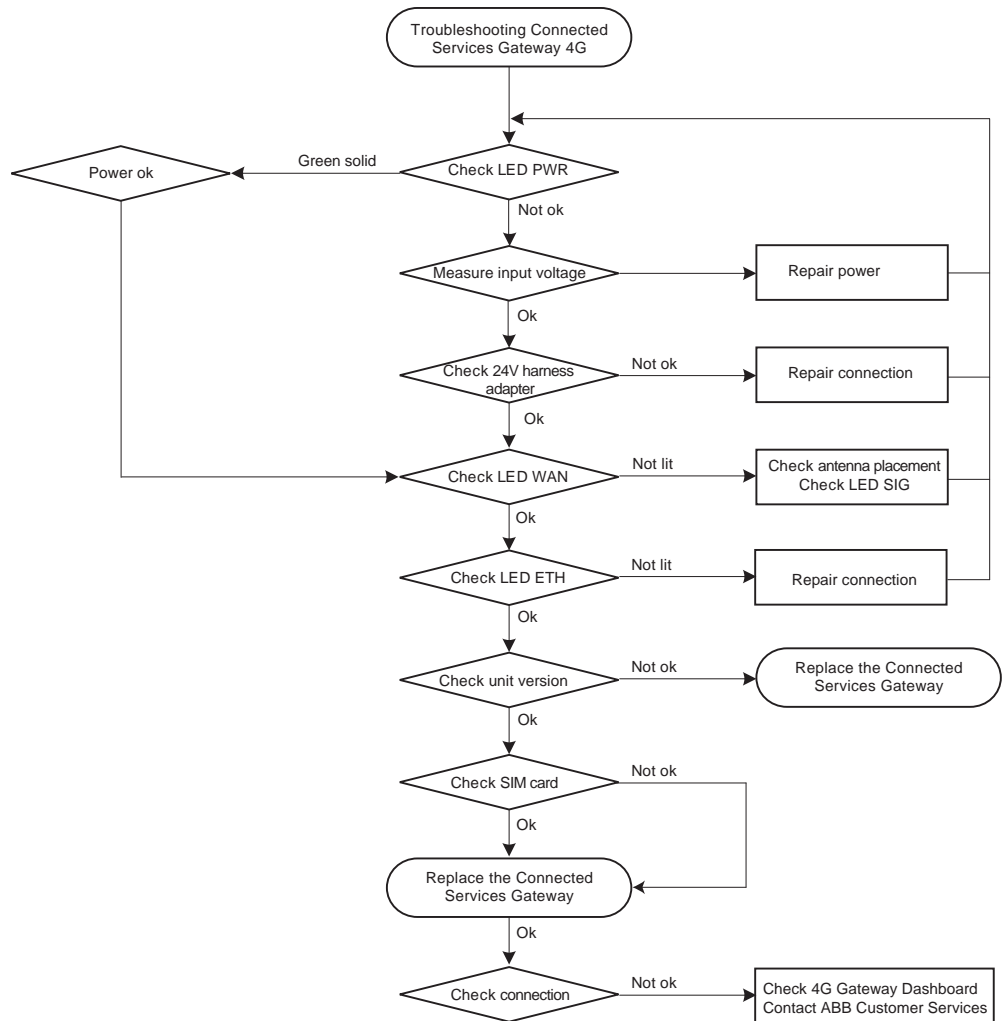
Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	

Preparations

	Action
1	Check the FlexPendant for errors and warnings.
2	Power the controller off. Wait one minute, power the controller on.
3	Wait 30-60 seconds after power-on. Make sure that the control system power is in run-time mode.

Troubleshooting flowchart for 4G Connected Services gateway



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Continues on next page

## 7 Troubleshooting

### 7.3.8 Troubleshooting the 4G Connected Services gateway

*Continued*

#### Troubleshooting procedures for 4G Connected Services gateway

Troubleshooting the 4G gateway can be made either by looking at the LEDs, or by connecting a PC to get status information.



#### Note

If the 4G gateway is faulty, a warranty order should be initiated. Follow the standard procedure.



#### Note

Never open the gateway. Never remove the warranty stickers. The warranty would be void. Return with ABB SIM card pre-installed.




#### CAUTION

The ABB 4G gateway has been preconfigured in factory. Resetting the gateway will make it unusable and warranty is lost. Contact ABB if reset is required.



#### Troubleshooting procedures

The troubleshooting table is supposed to be used as a detailed instruction together with the troubleshooting flowchart.

	Action	Note
1	Check the PWR LED on the Connected Services gateway.	If the LED is: <ul style="list-style-type: none"><li>• Green solid: proceed with step 4.</li><li>• OFF, proceed with step 2.</li></ul>
2	Measure the input voltage to the Connected Services Gateway.	Use a multimeter and insulating gloves. The input voltage should be 24 V. <ul style="list-style-type: none"><li>• If the input voltage is normal, proceed with step 3.</li><li>• If the input voltage is abnormal, repair power.</li></ul>  <b>Tip</b> For more details, see <i>Circuit diagram - OmniCore C90XT Type A</i> .

*Continues on next page*

7.3.8 Troubleshooting the 4G Connected Services gateway  
Continued

	Action	Note
3	<p>Check 24V harness adapter.</p> <p>Make sure that the wires of the 24V harness adapter are connected properly:</p> <ul style="list-style-type: none"> <li>• Wire K7-W201 to the 24V (V+) connection on the Connected Services gateway.</li> <li>• Wire K7-W202 to the 0V (V-) connection on the Connected Services gateway.</li> </ul>	<ul style="list-style-type: none"> <li>• If the harness adapter connection is ok, proceed with step 4.</li> <li>• If the harness adapter connection is not ok, repair the connection.</li> </ul> <p>If PWR LED is still OFF, verify the cables.</p> <p> <b>Note</b></p> <p>The unit is able to withstand that the polarity on 24V in case the cable connection between 0 and 24V is not correct (reversed). The unit is protected against short circuit and overload to avoid fire. However, in case of a short circuit, the unit must be replaced.</p>
4	Check the WAN LED on the Connected Services gateway.	<p>If the LED is:</p> <ul style="list-style-type: none"> <li>• Green: proceed with step 5.</li> <li>• OFF, proceed with step 6.</li> </ul>
5	Check the ETH LED on the Connected Services gateway.	<p>If the LED is:</p> <ul style="list-style-type: none"> <li>• Green: proceed with step 8.</li> <li>• OFF, repair the connection.</li> </ul>
6	<p>Check that the right type of the antenna is connected properly.</p> <p> <b>Tip</b></p> <p>Try moving the antenna to different locations if the SIG signal level is low.</p>	<ul style="list-style-type: none"> <li>• If the antenna is not working, repair the connection or move the antenna to a location with better SIG signal.</li> <li>• If the antenna is ok, proceed with step 1.</li> </ul>
7	<p>Check that the correct module version is used for this region:</p> <ul style="list-style-type: none"> <li>• Check that gateway DSQC 1093 is used in Europe.</li> <li>• Check that gateway DSQC 1093A is used in USA.</li> </ul>	<ul style="list-style-type: none"> <li>• If the correct unit version is used, proceed with step 8.</li> <li>• If the correct unit version is not used, replace with the correct unit. How to replace the unit is described in <a href="#">Replacing the 4G Connected Services gateway on page 226</a>.</li> </ul>
8	Check the sim card and tampering stickers.	<ul style="list-style-type: none"> <li>• Check sim card presence. If not ok, proceed with step 9.</li> <li>• Check the sim tampering sticker. If not ok, proceed with step 9.</li> <li>• Check the Reset tampering sticker. If not ok, proceed with step 9.</li> <li>• If the SIM card is ok, proceed with step 9.</li> </ul>
9	The Connected Services Gateway may be faulty, replace it and verify that the problem is resolved.	How to replace the unit is described in <a href="#">Replacing the 4G Connected Services gateway on page 226</a> .
10	Check 4G Gateway Dashboard and Contact ABB Customer Services.	See <a href="#">Troubleshooting the unit by connecting a PC on page 411</a> .

## Troubleshooting the unit by connecting a PC

## 1 Connect a PC to the port ETH 1.

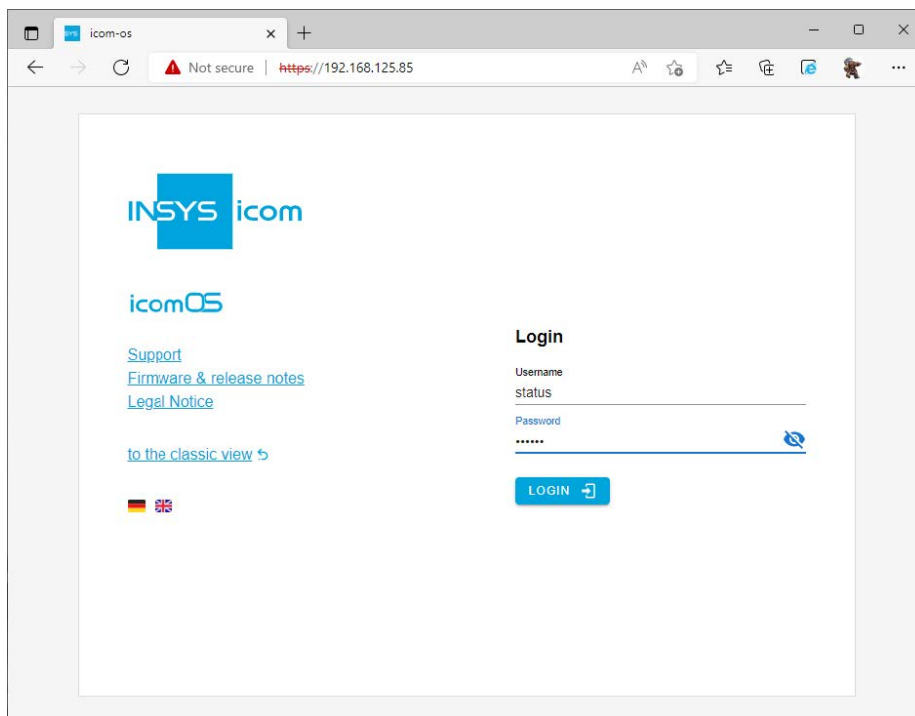
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## 7 Troubleshooting

### 7.3.8 Troubleshooting the 4G Connected Services gateway

*Continued*

- 2 Configure the PC Address with IP 192.168.125.100/24 (Mask 255.255.255.0).
- 3 Open a browser with <https://192.168.125.85/>.
- 4 The INSYS login page is displayed:



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#### Note

Enter the following to access this page:

**User (status)**


**Password (status)**

*Continues on next page*



**Note**

If the browser indicates that the connection is not private, click **Proceed**. This is a local connection which cannot validate the 4G gateway server certificate.



Your connection is not private

Attackers might be trying to steal your information from **192.168.125.85** (for example, passwords, messages, or credit cards). [Learn more](#)

NET::ERR\_CERT\_AUTHORITY\_INVALID

Hide advanced
Back to safety

This server could not prove that it is **192.168.125.85**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

[Proceed to 192.168.125.85 \(unsafe\)](#)

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- 5 The following menus can be accessed from which further troubleshooting can be made:

Menu	Description	Further information
<b>Dashboard</b>	The status dashboard displays detailed information about the device.	<a href="#">Checking the gateway status on page 414</a> <a href="#">Checking the profile version on page 416</a> <a href="#">Checking the firmware version and serial number on page 417</a>
<b>Log view</b>	The log view displays all current logs.	<a href="#">Troubleshoot the unit using the log page on page 414</a>
<b>Log download</b>	Download a package with all logs, archives and current status. The logs can be saved as a file and be sent to ABB L3/L4 Support for analysis.	<a href="#">Troubleshoot the unit using the log page on page 414</a>
<b>Support Packet</b>	Download a support packet that includes the status of the running router and the complete configuration. The support packet can be saved as a file and be sent to ABB L3/L4 Support for analysis.	<a href="#">Troubleshoot the unit using the log page on page 414</a>

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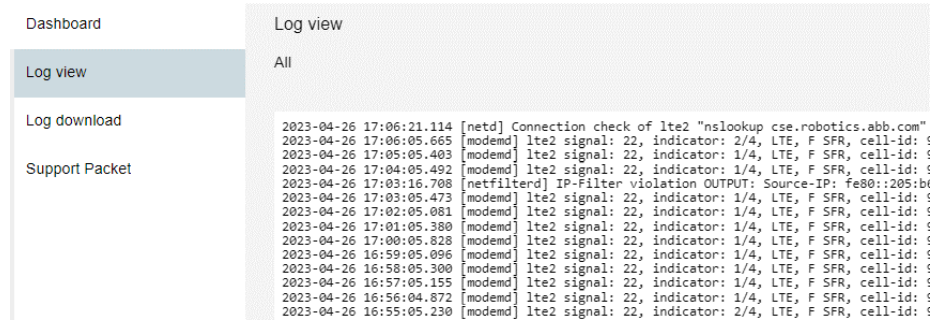
## 7 Troubleshooting

### 7.3.8 Troubleshooting the 4G Connected Services gateway

Continued

Troubleshoot the unit using the log page

- 1 Connect a PC. See [Troubleshooting the unit by connecting a PC on page 411](#).
- 2 Connect to the **Log** pages of the 4G gateway.
- 3 The **Log view** displays all current logs:

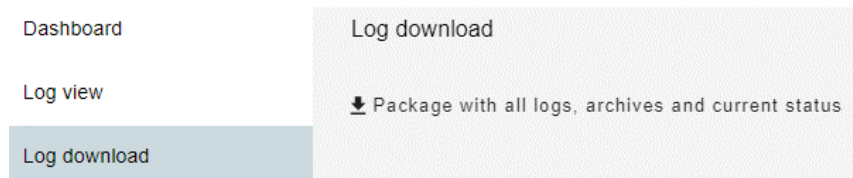


The screenshot shows a web interface with a sidebar on the left containing 'Dashboard', 'Log view', 'Log download', and 'Support Packet'. The 'Log view' option is selected. The main content area is titled 'Log view' and 'All'. It displays a list of log entries with columns for date, time, and log message. The messages include connection checks and signal status reports.

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- 4 The **Log download** and **Support Packet** pages allow saving logs for ABB troubleshooting. These logs can be saved as a file and be sent to ABB L3/L4 Support for analysis.


- **Log download:**



The screenshot shows a web interface with a sidebar on the left containing 'Dashboard', 'Log view', and 'Log download'. The 'Log download' option is selected. The main content area is titled 'Log download' and contains a button with a download icon and the text 'Package with all logs, archives and current status'.

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- **Support Packet:**



The screenshot shows a web interface with a sidebar on the left containing 'Dashboard', 'Log view', 'Log download', and 'Support Packet'. The 'Support Packet' option is selected. The main content area is titled 'Support Packet' and contains text explaining the status of the running router and the complete configuration. It also includes a button labeled 'CREATE SUPPORT PACKET' and a section for the file name 'support-2023-04-13\_16\_14\_36.bin' with a download icon.

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Checking the gateway status

- 1 Connect a PC. See [Troubleshooting the unit by connecting a PC on page 411](#).

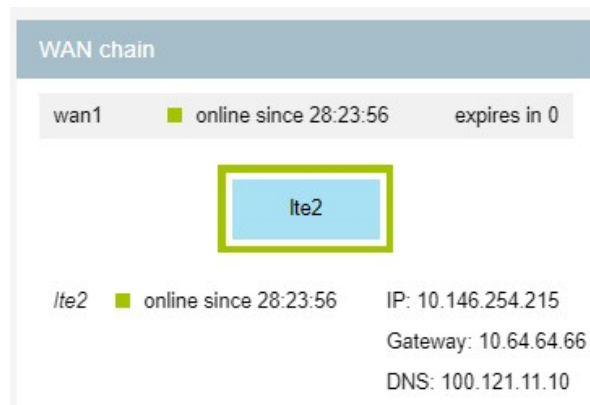
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### 2 Connect to the Dashboard of the 4G gateway.



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- 3 On the **Dashboard**, verify the following:
  - Verify that the WAN chain is online.



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*Continues on next page*

## 7 Troubleshooting

### 7.3.8 Troubleshooting the 4G Connected Services gateway

Continued

- Verify that LTE2 is online and registered.

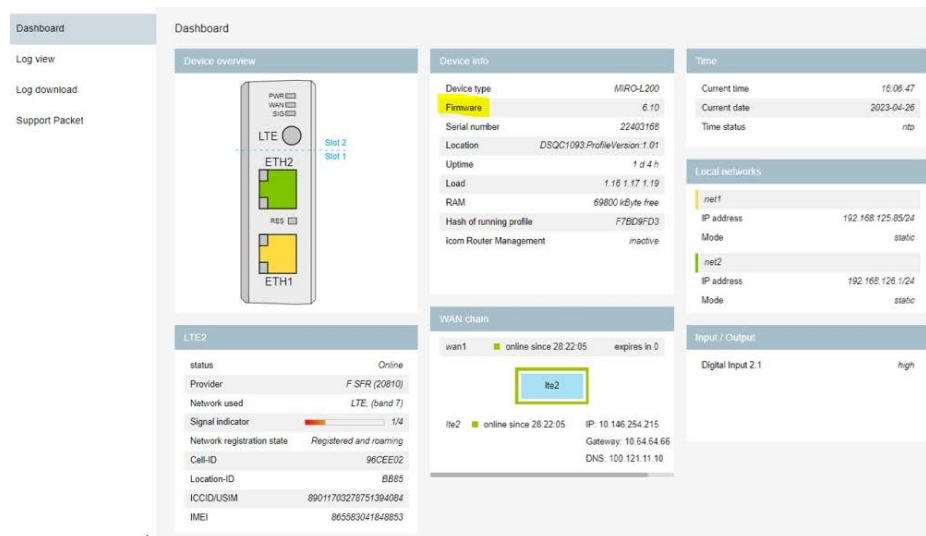
LTE2	
status	Online
Provider	F SFR (20810)
Network used	LTE, (band 7)
Signal indicator	 1/4
Network registration state	Registered and roaming
Cell-ID	96CEE02
Location-ID	BB85
ICCID/USIM	89011703278751394084
IMEI	865583041848853

xx2300000910

- Network registration state is registered

Checking the profile version

- 1 Connect a PC. See [Troubleshooting the unit by connecting a PC on page 411](#).
- 2 Connect to the **Dashboard** of the 4G gateway.
- 3 On the **Dashboard**, the field **Hash of running profile** displays the profile version.



The screenshot shows the dashboard of a 4G gateway. The 'Device overview' section displays a physical diagram of the device with ports labeled ETH1, ETH2, LTE, Slot 1, and Slot 2. The 'Device info' section includes fields for Device type (MIRO-L200), Firmware (6.10), Serial number (22403168), Location (DSQC1093.ProfileVersion:1.01), Uptime (1 d 4 h), Load (1.16 1.17 1.19), RAM (69800 kByte free), Hash of running profile (F7BD9FD3), and Icom Router Management (inactive). The 'WAN chain' section shows wan1 (online since 28 22:05, expires in 0) and ita2 (online since 28 22:05, IP: 10.146.254.215, Gateway: 10.54.54.66, DNS: 100.121.11.10). The 'Local networks' section shows net1 and net2 with IP addresses and static modes. The 'Input / Output' section shows Digital Input 2.1 (high). The 'Time' section shows Current time (15:06:47), Current date (2023-04-26), and Time status (ntp). The 'LTE2' status section is expanded, showing status (Online), Provider (F SFR (20810)), Network used (LTE, (band 7)), Signal indicator (1/4), Network registration state (Registered and roaming), Cell-ID (96CEE02), Location-ID (BB85), ICCID/USIM (89011703278751394084), and IMEI (865583041848853).

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It is recommended to store the profile version for reference. This can be used later to verify that the unit has not been reset or tampered with.



#### CAUTION

Contact ABB if the profile version has changed or if the box has been reset.

Continues on next page



7.3.8 Troubleshooting the 4G Connected Services gateway  
*Continued*

## Checking the firmware version and serial number

- 1 Connect a PC. See [Troubleshooting the unit by connecting a PC on page 411](#).
- 2 Connect to the **Dashboard** of the 4G gateway.
- 3 On the **Dashboard**, the field **Firmware** displays the firmware version. The minimal firmware required is FW 6.11.

The screenshot shows the dashboard of a 4G gateway. The 'Device info' section is highlighted, showing the following details:

Field	Value
Device type	MRO-L200
Firmware	6.10
Serial number	2240168
Location	DSQC1993 Profile/Version 1.01
Uptime	1 d 4 h
Load	1.16 1.17 1.19
RAM	69800 kByte free
Hash of running profile	F7B09FD3
Icom Router Management	inactive

The 'WAN chain' section shows the following details:

WAN Chain	Status	Expires
wan1	online since 28.22.05	expires in 0
Ita2	online since 28.22.05	IP: 10.146.254.215 Gateway: 10.64.64.66 DNS: 100.121.11.10

The 'LTE2' section shows the following details:

Field	Value
status	Online
Provider	F-SFR (20810)
Network used	LTE, (band 7)
Signal indicator	1/4
Network registration state	Registered and roaming
Cell-ID	9CCE02
Location-ID	B885
ICCID/USIM	89011703278751394084
IMEI	865583041848853

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## Related information

All documents can be found via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

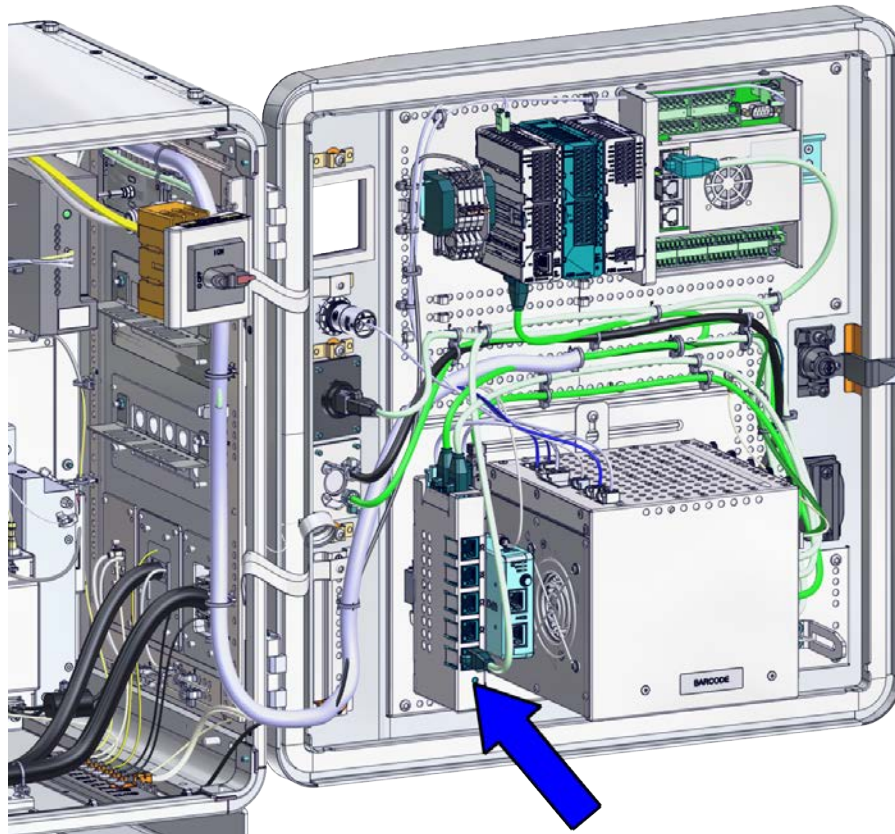
## 7 Troubleshooting

### 7.3.9 Troubleshooting the Ethernet switch (DSQC1035)

### 7.3.9 Troubleshooting the Ethernet switch (DSQC1035)

#### Location

The illustration shows the location of the Ethernet switch in the controller.

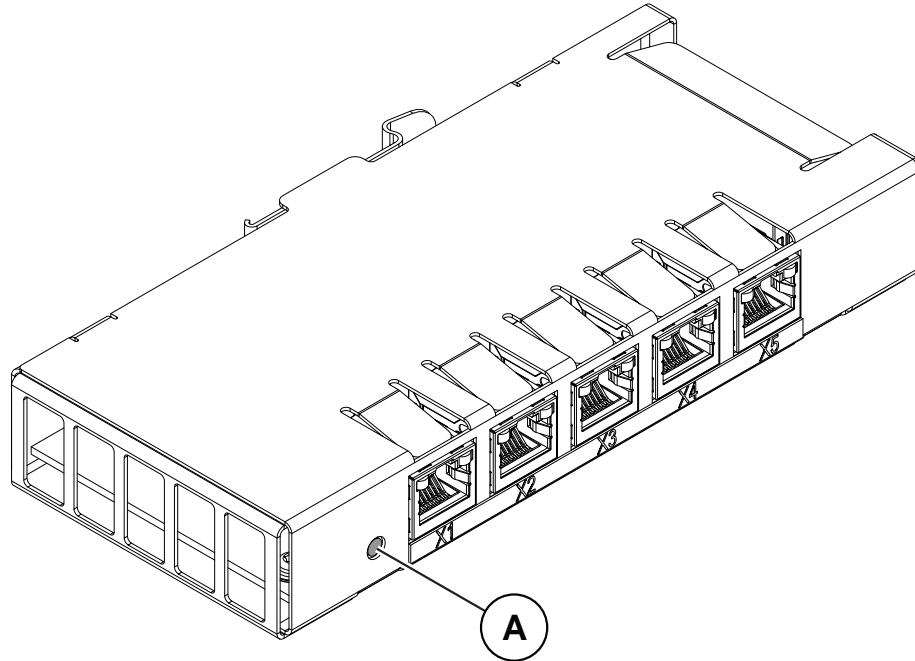


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## LEDs

The illustration below shows the indication LEDs on the Ethernet switch.



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A	Status LED
Description	Significance
Status LED	<p>Startup sequence:</p> <ol style="list-style-type: none"> <li>1 No color: Input voltage is outside specified voltage or internal fault in the switch.</li> <li>2 Green, solid: The switch is operational.</li> </ol> <p>If the LED does not turn steady green, the status indicator LED can be used to identify the following issues:</p> <p>Fault indication:</p> <ul style="list-style-type: none"> <li>• No color: If input voltage is within specified voltage limits and the LED is not lit then replace the switch.</li> </ul>
Ethernet LEDs	<p>Shows the status of Ethernet links.</p> <p>Green:</p> <ul style="list-style-type: none"> <li>• Off: 10 Mbps data rate is selected.</li> <li>• On: 100/1000 Mbps data rate is selected.</li> </ul> <p>Yellow:</p> <ul style="list-style-type: none"> <li>• Flashing: The Ethernet is active on link.</li> <li>• Solid: A LAN link is established.</li> <li>• Off: A LAN link is <i>not</i> established.</li> </ul>

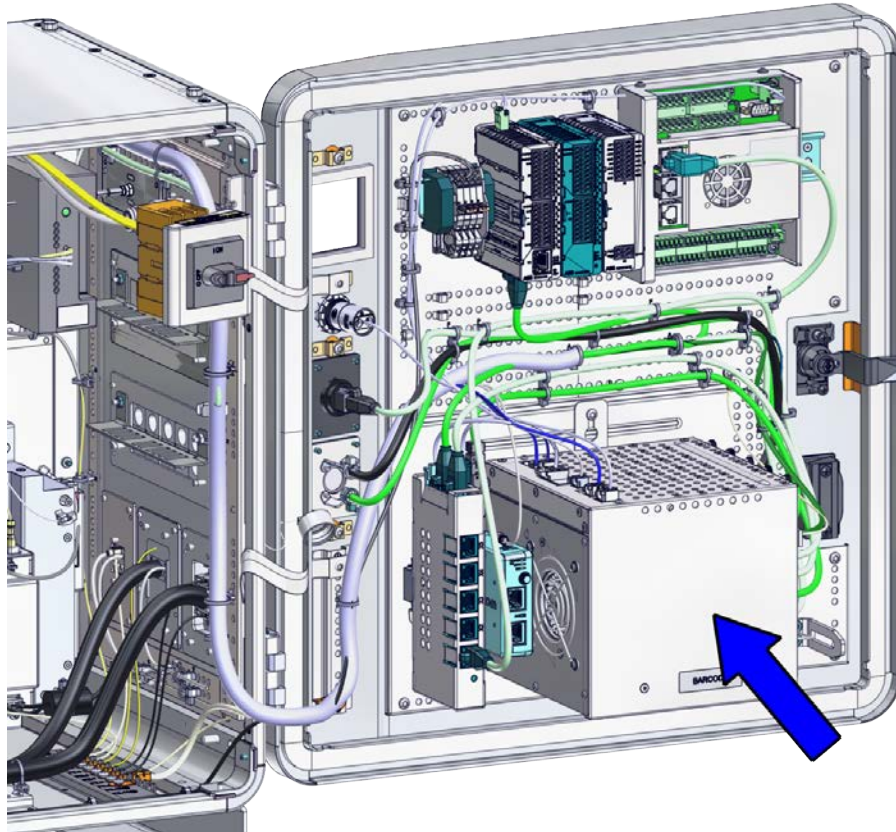
## 7 Troubleshooting

### 7.3.10 Troubleshooting the main computer

#### 7.3.10 Troubleshooting the main computer

##### Location

The illustration shows the location of the main computer in the controller.

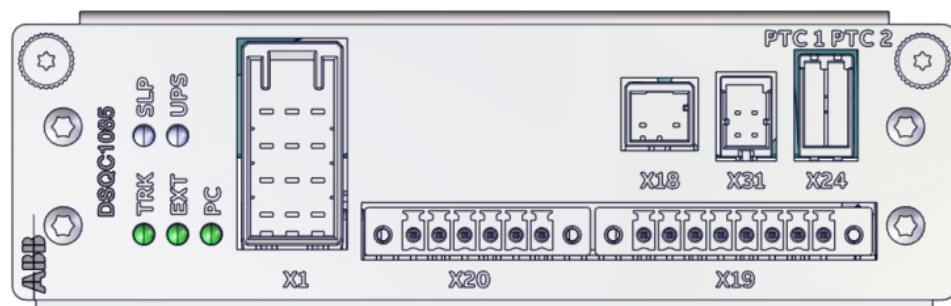


xx2400001362

##### LEDs

The following sections display the LEDs on the main computer units.

Power distribution board, DSQC1085

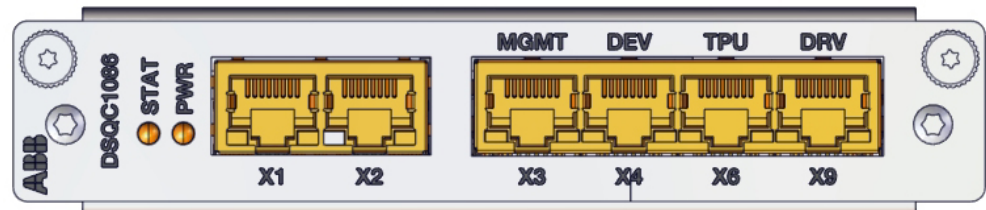


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Name	Description
TRK LED	Shows the TRUNK input status: <ul style="list-style-type: none"> <li>Green: 24V TRUNK input voltage (X1) &gt; 21V</li> </ul>
SLP LED	Shows the sleep status: <ul style="list-style-type: none"> <li>Green: Unit placed in sleep state (Low power mode)</li> </ul>
EXT LED	Shows the external 24V input status: <ul style="list-style-type: none"> <li>Green: 24V External 24V input (X20) &gt; 21V</li> </ul>
UPS LED	Shows the charge status: <ul style="list-style-type: none"> <li>Green: Capacitors are fully charged.</li> <li>Red: Capacitors are not fully charged/discharged. Warning sign to not unplug PDB.</li> <li>Off: Capacitors empty. Safe to unplug PDB.</li> </ul>
PC LED	Shows the 5V_PC status: <ul style="list-style-type: none"> <li>Green (steady): 5V_PC is available.</li> </ul>

#### Processor board, DSQC1086



xx230000440

Name	Description
STAT Status (Red/Green)	Shows the unit status: <ul style="list-style-type: none"> <li>Red (steady): Default when power is available</li> <li>Red (flashing ~1Hz): Power on self-test ongoing / OS loading</li> <li>Green (flashing ~1Hz): Base Application loading and initializing</li> <li>Green (uneven flashing ~1Hz): Installation Utility Application loaded and ready for recovery operation</li> <li>Green (steady): Application is ready and unit is operational</li> </ul>
PWR Power (Red/Green)	Shows the Signal exchange proxy status: <ul style="list-style-type: none"> <li>Red (steady): Default when power is available</li> <li>Green (flashing ~1Hz): Application loaded and waiting for communication with Base Application</li> <li>Green (steady): Signal exchange proxy is operational</li> </ul> <p>If the LED does not turn steady green after 30-60 sec, the PWR LED can be used to identify the following issues:</p> <ul style="list-style-type: none"> <li>No color: Power to module is missing</li> <li>Red (steady): Internal Error</li> <li>Green (pulsing ~1Hz): Communication error to Base Application</li> </ul> <p> <b>Note</b></p> <p>PWR LED will continue flashing until STAT LED is solid green.</p>

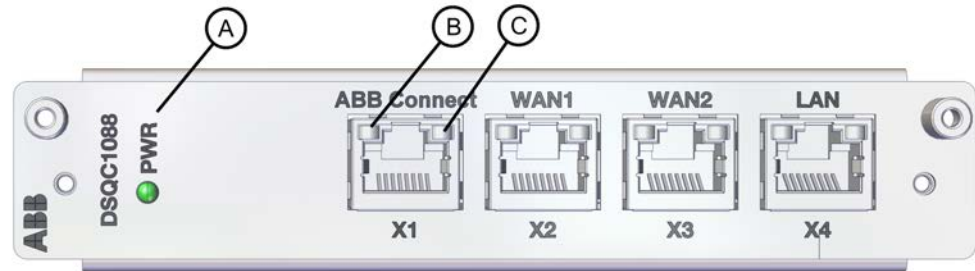
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## 7 Troubleshooting

### 7.3.10 Troubleshooting the main computer

Continued

Ethernet switch, DSQC1088



xx230000968

	Name	Description
A	PWR (Power) LED	Shows the Ethernet switch board status: <ul style="list-style-type: none"> <li>Off: All Ethernet ports in Power Off state.</li> <li>Green: Ethernet ports are configured and enabled.</li> </ul>
B	Link/activity LED (Yellow):	<ul style="list-style-type: none"> <li>Flashing: The Ethernet is active on link.</li> <li>Solid: A LAN link is established.</li> <li>Off: A LAN link is <i>not</i> established.</li> </ul>
C	Speed LED (Green):	<ul style="list-style-type: none"> <li>Off: 10 Mbps data rate is selected.</li> <li>On: 100/1000 Mbps data rate is selected.</li> </ul>

Safety board, DSQC1087



xx230000501

Name	Description	
HMI	FlexPendant power output LED (green)	FlexPendant power output LED can be used to identify the following status: <ul style="list-style-type: none"> <li>No color: FlexPendant power output voltage is not in normal range.</li> <li>Green, solid: FlexPendant power output voltage is in normal range.</li> </ul>
MON	Motors_ON LED (white)	Motors_ON LED can be used to identify the following status: <ul style="list-style-type: none"> <li>No color: Motors_ON function is off.</li> <li>White, solid: Motors_ON function is on.</li> <li>White, flashing: safety loop is open, for example after an emergency stop.</li> </ul>

Continues on next page

Name	Description	
AS1 & AS2	Automatic Stop LEDs (green) AS1 : Automatic Stop LED channel 1 AS2 : Automatic Stop LED channel 2	Automatic Stop LED can be used to identify the following status: <ul style="list-style-type: none"> <li>No color (not lit): Automatic Stop input loop is open.</li> <li>Green, solid: Automatic Stop input loop is closed.</li> </ul>
GS1 & GS2	General Stop LEDs (green) GS1 : General Stop LED channel 1 GS2 : General Stop LED channel 2	General Stop LED can be used to identify the following status: <ul style="list-style-type: none"> <li>No color (not lit): General Stop input loop is open.</li> <li>Green, solid: General Stop input loop is closed.</li> </ul>
ESO1 & ESO2	Emergency stop output LEDs (green) ESO1 : Emergency stop output LED channel 1 ESO2 : Emergency stop output LED channel 2	Emergency stop output LED can be used to identify the following status: <ul style="list-style-type: none"> <li>No color (not lit): Emergency stop output is in State 0 (0V) status.</li> <li>Green, solid: Emergency stop output is in State 1 (24V) status.</li> </ul>
ES1 & ES2	External emergency stop LEDs (green) ES1 : External emergency stop LED channel 1 ES2 : External emergency stop LED channel 2	External emergency stop LED can be used to identify the following status: <ul style="list-style-type: none"> <li>No color (not lit): External emergency stop input loop is open.</li> <li>Green, solid: External emergency stop input loop is closed.</li> </ul>

#### Troubleshooting procedure

	Action	Note
1	Make sure the power has been off for more than 10 seconds. Power on the controller.	Wait at least 1 min after power-on.
2	Check LED TRK on Power distribution board, DSQC1085.	<ul style="list-style-type: none"> <li>If LED TRK is green, proceed with <a href="#">3</a>.</li> <li>If LED TRK is not green, proceed with <a href="#">6</a>.</li> </ul>
3	Check LEDs PC (Power distribution board, DSQC1085) and HMI (Safety board, DSQC1087).	<ul style="list-style-type: none"> <li>LED PC and LED HMI are green, proceed with <a href="#">4</a>.</li> <li>LED PC and LED HMI are not green, proceed with <a href="#">13</a>.</li> </ul>
4	Check the STAT LED on the processor board (DQSC1086).	<p>If the STAT LED is:</p> <ul style="list-style-type: none"> <li>Green, steady: Application is ready and unit is operational. Proceed with step <a href="#">5</a>.</li> <li>Green (uneven flashing ~1Hz): Installation Utility Application loaded and ready for recovery operation. Proceed with step <a href="#">5</a>.</li> <li>Off or red flashing: The unit is faulty and needs to be replaced. Proceed with step <a href="#">13</a>.</li> </ul>
5	Check LED PWR on Processor board, DSQC1086.	<p>If the PWR LED is:</p> <ul style="list-style-type: none"> <li>Green, steady: Unit is operational. Proceed with step <a href="#">9</a>.</li> <li>Green (pulsing ~1Hz): Communication error to PS-side application. Proceed with step <a href="#">12</a>.</li> <li>Off or red: Proceed with step <a href="#">13</a>.</li> </ul>

*Continues on next page*

## 7 Troubleshooting

### 7.3.10 Troubleshooting the main computer

*Continued*

	Action	Note
6	Measure the 24V_TRUNK at connector A2.K1.X1.	Verify that the input to A2.K1.X1 is 25.2 VDC +/- 5%. <ul style="list-style-type: none"><li>• If the measured voltage is normal, proceed with step <a href="#">13</a>.</li><li>• If the measured voltage is abnormal, proceed with step <a href="#">7</a>.</li></ul>
7	Make sure that the cables are connected properly at 24V_TRUNK (A2.K1.X1).	If the connection and cables seem OK, proceed with step <a href="#">8</a> .
8	Measure the 24VDC_TRUNK at connector A1.X6.	Verify that the input to A1.X6 is 25.2 VDC +/- 5%. <ul style="list-style-type: none"><li>• If the measured voltage is normal, proceed with step <a href="#">9</a>.</li><li>• If the measured voltage is abnormal, troubleshoot the power unit. See <a href="#">Troubleshooting the power unit on page 399</a>.</li></ul>
9	Check the UPS LED on the power distribution board (DSQC1085).	If the UPS LED is: <ul style="list-style-type: none"><li>• Steady green: Proceed with step <a href="#">11</a>.</li><li>• Off: Proceed with step <a href="#">10</a>.</li></ul>
10	Check error message on FlexPendant and take appropriate action.	<ul style="list-style-type: none"><li>• If the error message is insufficient, proceed with step <a href="#">11</a>.</li><li>• If an error was resolved, restart from step <a href="#">4</a>.</li></ul>
11	Force start the RobotWare Installation Utilities mode, see <a href="#">Controller fails to start on page 385</a> .	
12	Install/re-install RobotWare, if possible.	
13	The main computer may be faulty, replace it and verify that the fault has been fixed.	See <a href="#">Replacing the main computer on page 245</a> .



### 7.3.11 Troubleshooting the process power supply

#### Location

The process power supply, DSQC 609, is located as shown in the figure below.



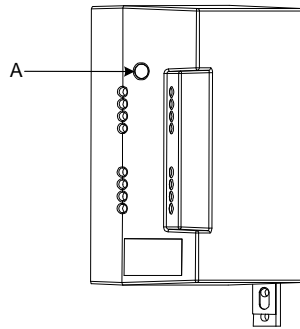
#### CAUTION

If there are two or more power supply units mounted in a row and too close to each other, there will be a heating problem and the units can be damaged.

To avoid damaging the power supply units, the units must be separated with 3 pcs of exterior support.

#### LEDs

The illustration below shows the LEDs on the process power supply module:



en100000037

	Description	Significance
A	DC OK	<p>GREEN: When all DC outputs are within the specified output voltage levels.</p> <p>OFF: When DC output voltage is outside the specified voltage levels or turned off due to short circuit or overload.</p>

## 7 Troubleshooting

### 7.3.12 Troubleshooting the power supply, ODVA

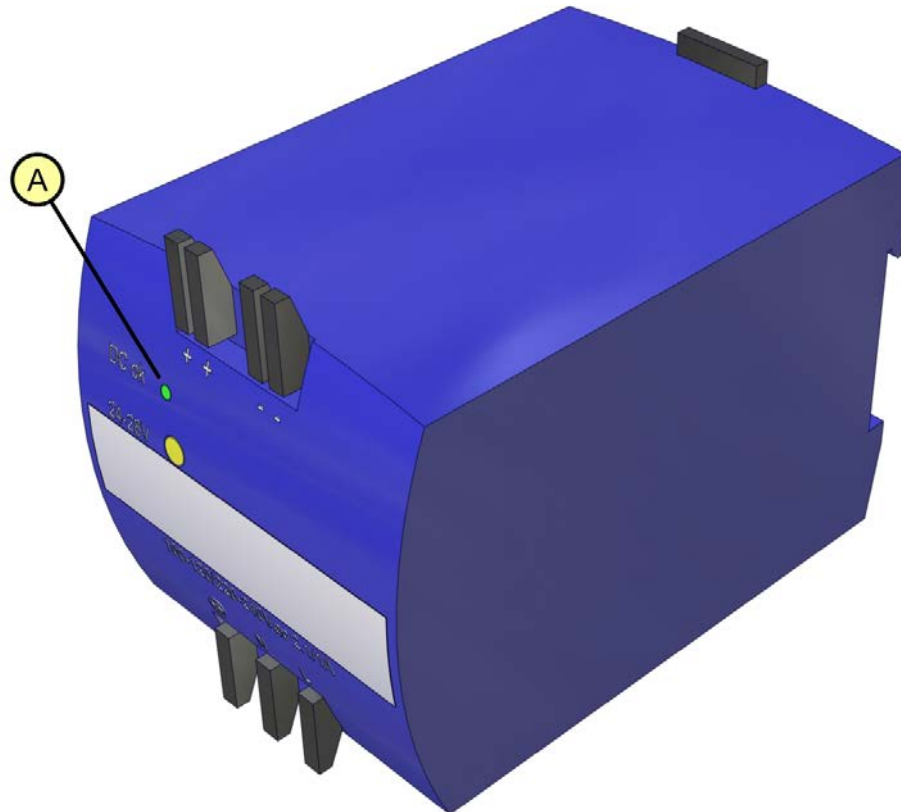
#### 7.3.12 Troubleshooting the power supply, ODVA

##### Location

The ODVA power supply, DSQC 634, is located as shown in the figure below.

##### LEDs

The illustration below shows the LEDs on the ODVA power supply module:



xx2100001077

	Description	Significance
A	DC OK	GREEN: When all DC outputs are within the specified output voltage levels. OFF: When DC output voltage is outside the specified voltage levels or turned off due to short circuit or overload.

# 8 Reference information

## 8.1 Introduction

---

### General

This chapter includes general information, complementing the more specific information in the different procedures in the manual.

## 8 Reference information

---

### 8.2 Applicable standards

### 8.2 Applicable standards

---

#### General

The product is compliant with ISO 10218-1:2011, *Robots for industrial environments - Safety requirements - Part 1 Robots*, and applicable parts in the normative references, as referred to from ISO 10218-1:2011. In case of deviation from ISO 10218-1:2011, these are listed in the declaration of incorporation. The declaration of incorporation is part of the delivery.

---

#### Robot standards

Standard	Description
ISO 9283	Manipulating industrial robots – Performance criteria and related test methods
ISO 9787	Robots and robotic devices – Coordinate systems and motion nomenclatures
ISO 9946	Manipulating industrial robots – Presentation of characteristics

---

#### Other standards used in design

Standard	Description
IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements, normative reference from ISO 10218-1
IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments
IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
ISO 13849-1:2006	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design, normative reference from ISO 10218-1
UL 1740 (option) CSA Z434 (option)	Standards For Safety - Robots and Robotic Equipment Industrial robots and robot Systems - General safety requirements Valid for USA and Canada.

## 8.3 Unit conversion

### Converter table

Use the following table to convert units used in this manual.

Quantity	Units		
Length	1 m	3.28 ft.	39.37 in
Weight	1 kg	2.21 lb.	
Weight	1 g	0.035 ounces	
Pressure	1 bar	100 kPa	14.5 psi
Force	1 N	0.225 lbf	
Moment	1 Nm	0.738 lbf-ft	
Volume	1 L	0.264 US gal	

## 8 Reference information

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### 8.4 Standard toolkit for controller

### 8.4 Standard toolkit for controller

---

#### General

All service (repair, maintenance and installation) instructions contain lists of tools required to perform the specified activity. All special tools, that is, all tools that are not considered as standard tools as defined below, are listed in their instructions respectively.

This way, the tools required are the sum of the standard toolkit and any tools listed in the instructions.

---

#### Standard toolkit for controller

Tool	Description
Screw driver, Torx	Tx10
Screw driver, Torx	Tx20
Screw driver, Torx	Tx25
Ball tipped screw driver, Torx	Tx25
Screw driver, flat blade	4 mm
Screw driver, flat blade	8 mm
Screw driver, flat blade	12 mm
Screw driver	Phillips-1
Box spanner	8 mm

---

#### Toolkit recommended for troubleshooting

Tool	Note
Normal shop tools	Contents as specified above.
Multimeter	-
Camera	To document problems or procedures

## 8.5 Screw joints

### General

This section details how to tighten the various types of screw joints on the controller. The instructions and torque values are valid for screw joints comprised of metallic materials and do *not* apply to soft or brittle materials.

### Tightening torque

Before tightening any screw, note the following:

- Determine whether a standard tightening torque or special torque is to be applied. The standard torques are specified in the tables below. Any special torques are specified in the Repair, Maintenance or Installation procedure description. Any special torque specified overrides the standard value.
- Use the *correct tightening torque* for each type of screw joint.
- Only use *correctly calibrated* torque keys.
- Always *tighten the joint by hand*, and never use pneumatical tools.
- Use the *correct tightening technique*, i.e. *do not* jerk. Tighten the screw in a slow, flowing motion.
- Maximum allowed total deviation from the specified value is **10%**!

The table below specifies the recommended standard tightening torque for *oil-lubricated screws with slotted or cross-recess heads*.

Dimension	Tightening torque (Nm) Class 4.8, oil-lubricated
M2.5	0.25
M3	0.5
M4	1.2
M5	2.5
M6	5.0

## 8 Reference information

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### 8.6 Weight specifications

### 8.6 Weight specifications

---

#### Definition

In all repair and maintenance instructions, weights of the components handled are sometimes specified. All components exceeding 22 kg (50 lbs) are high-lighted in this way.

To avoid injury, ABB recommends the use of lifting equipment when handling components with a weight exceeding 22 kg.

---

#### Example

Below is an example of how a weight specification is presented:



#### **CAUTION**

The transformer weighs 55 kg! All lifting equipment used must be sized accordingly!



## 8.7 Lifting accessories and lifting instructions

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### General

Many repair and maintenance activities require different pieces of lifting accessories, which are specified in each procedure.

The use of each piece of lifting accessories is *not* detailed in the activity procedure, but in the instruction delivered with each piece of lifting accessories.

The instructions delivered with the lifting accessories should be stored for later reference.

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## 9 Spare parts

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### Spare part level

ABB spare parts are categorized into two levels, L1 and L2. Always check the part level before conducting a service work on a spare part.

- L1 spare parts

The L1 parts can be replaced in the field. The maintenance and replacement instructions given in the related product manuals must be strictly followed. If there are any problems, contact your local ABB for support.

- L2 spare parts

To replace the L2 parts require specialized training and might need special tools. Only ABB field service personnel or qualified personnel trained by ABB can replace L2 parts.

- L3 spare parts

L3 spare parts shall only be replaced or repaired by qualified ABB service technician with knowledge of the application due to reduce risk of injury or damage to equipment. Improper installation may void warranty.

*Continues on next page*

## 9 Spare parts

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### 9.1 Controller parts

### 9.1 Controller parts



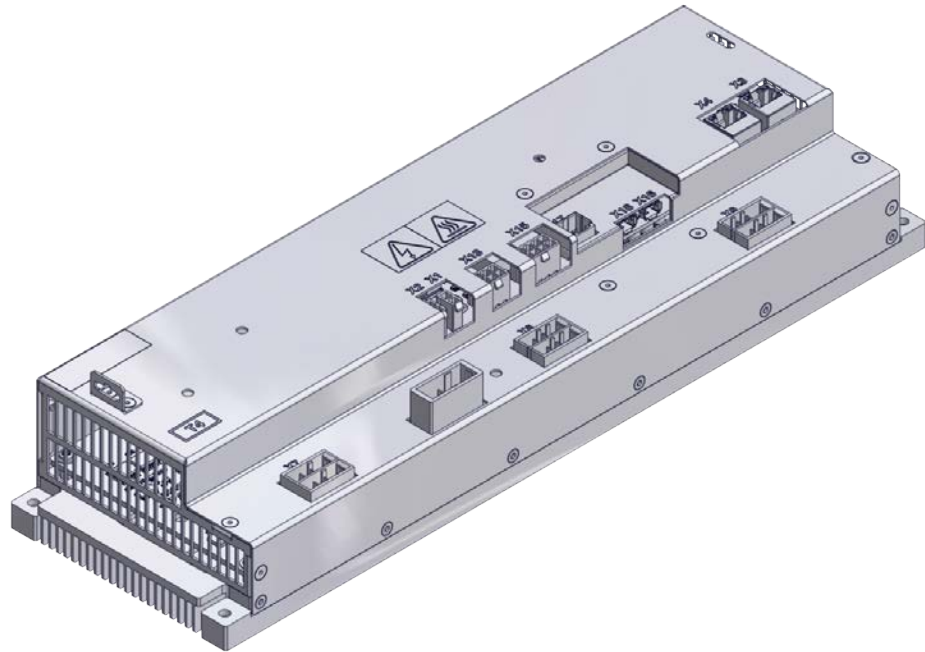
#### Note

Removed parts and spare parts must not be disassembled or opened.

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9.1.1 Controller system parts

Drive units



xx2400001382

	Spare part number	Description	Type	Spare part level
-	3HAC074966-001	Drive unit, Low Voltage	DSQC3084	L1

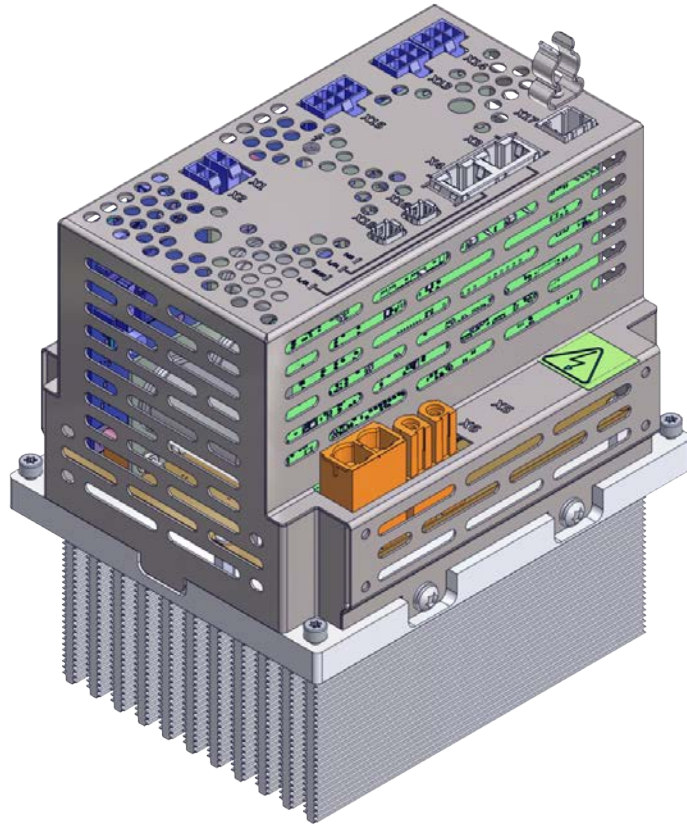
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## 9 Spare parts

### 9.1.1 Controller system parts

*Continued*

#### Additional drive units

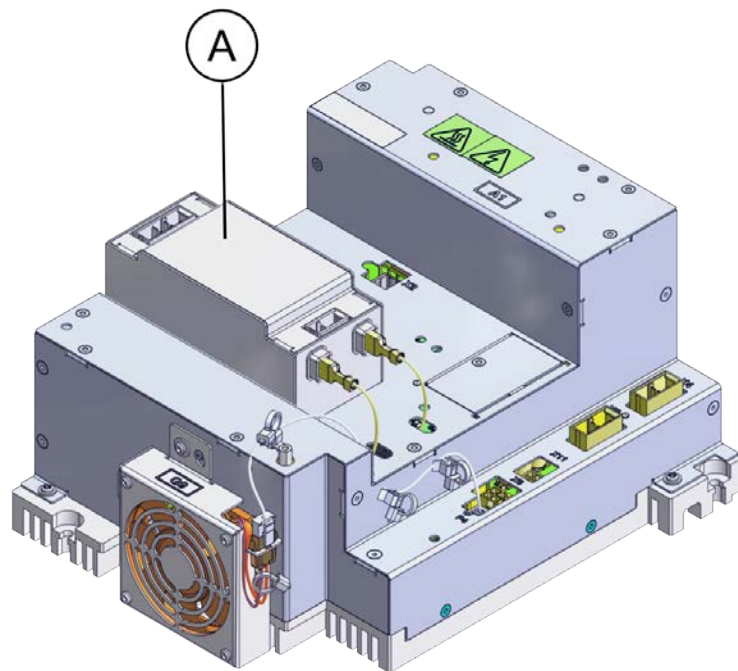


xx2400001383

	Spare part number	Description	Type	Spare part level
-	3HAC064983-001	Drive unit	DSQC 3065	L1

*Continues on next page*

#### Power units



xx2400001384

	Spare part number	Description	Type	Spare part level
A	3HAC084667-001	Power unit	DSQC3066	L1

*Continues on next page*

## 9 Spare parts

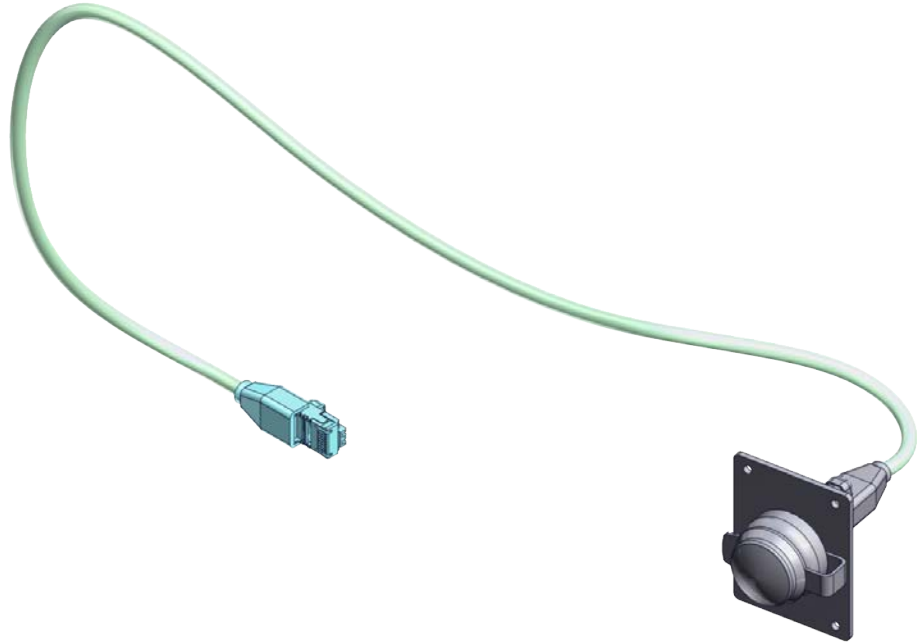
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### 9.1.1 Controller system parts

*Continued*

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#### Harness ETH outlet connection



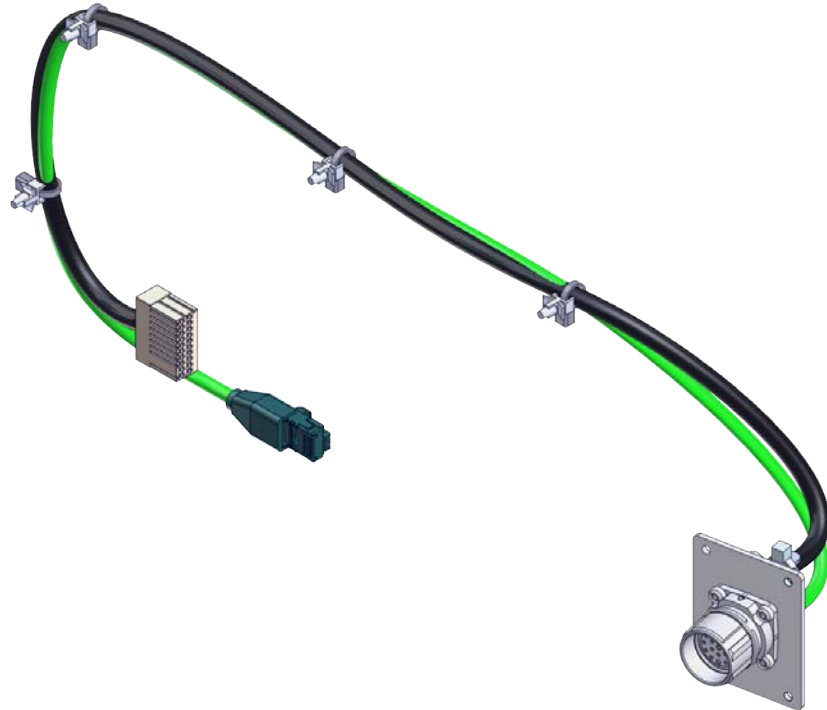
xx2400001385

	Spare part number	Description	Type	Spare part level
-	3HAC088738-001	Harness ETH outlet with cable		L1

*Continues on next page*



Harness TPU connection



xx2400001386

	Spare part number	Description	Type	Spare part level
-	3HAC088739-001	Harness TPU connection		L1

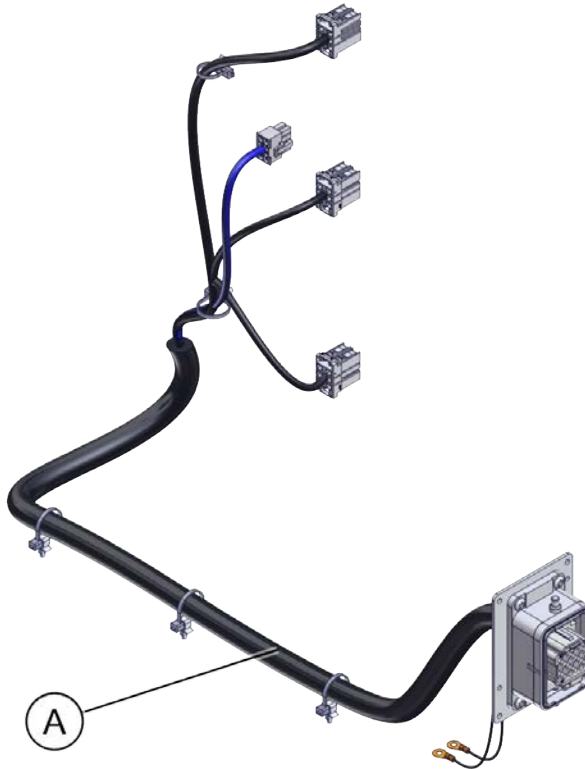
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## 9 Spare parts

### 9.1.1 Controller system parts

*Continued*

#### Harness motors power



xx2400001387

	Spare part number	Description	Type	Spare part level
A	3HAC088745-001	Harness Motors power LV 6-axis		L1

*Continues on next page*

**Harness ADU motors**



xx2400001388

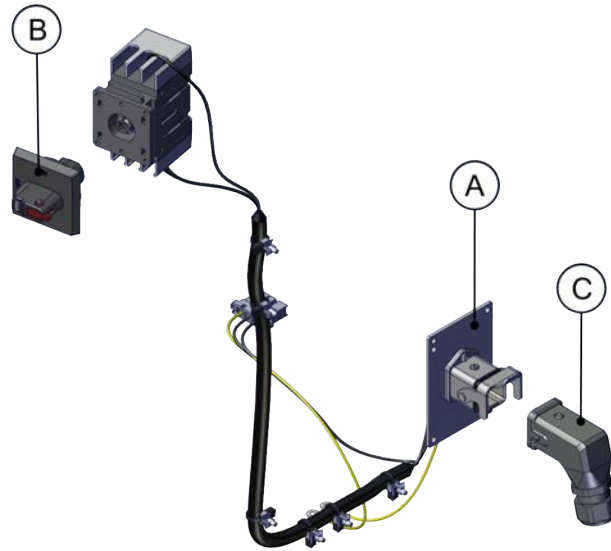
	Spare part number	Description	Type	Spare part level
-	3HAC089428-001	Harness ADU Motor Power unit	Option	L1

## 9 Spare parts

### 9.1.2 Mains connection parts

### 9.1.2 Mains connection parts

#### Mains power connection

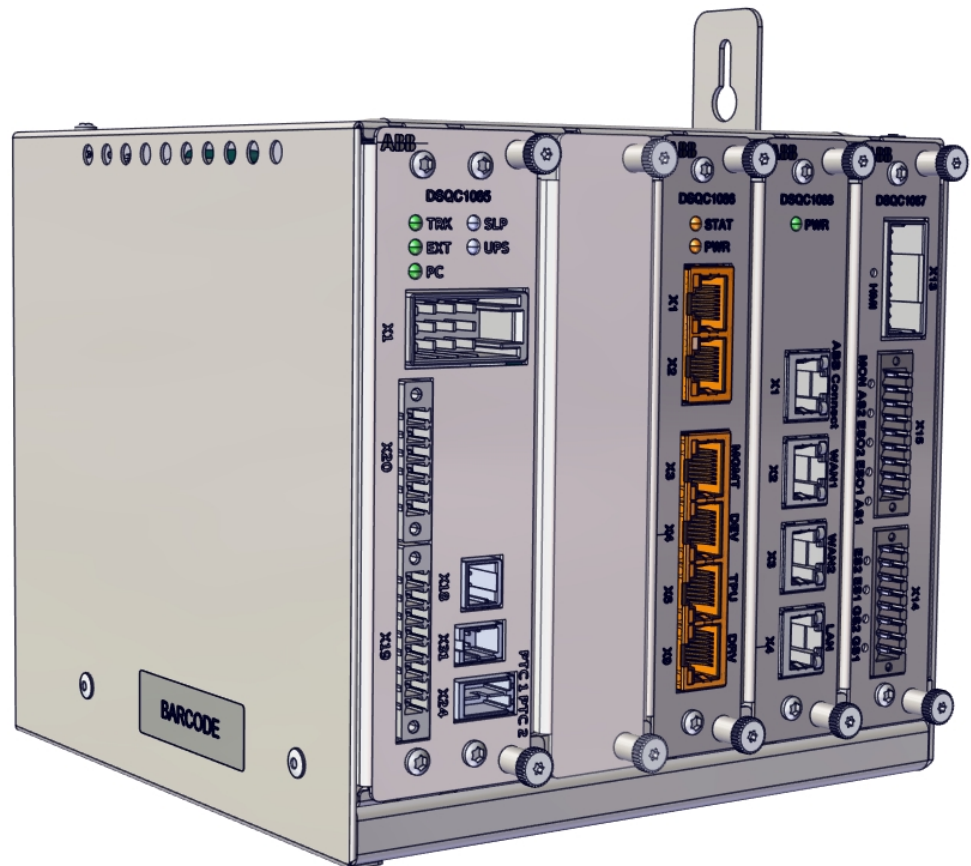


xx1900001946

	Spare part number	Description	Type	Spare part level
A	3HAC089431-001	Harness Power inlet	Harness-Mains connection	L1
B	3HAC037699-001	Handle for 6 mm switch		L1
C	3HAC070308-001	Connector AC power inlet		L1

9.1.3 Logic parts

Main computer



xx230000669

	Spare part number	Description	Type	Spare part level
-	3HAC085504-001	Main computer Standard	DSQC1095	L1

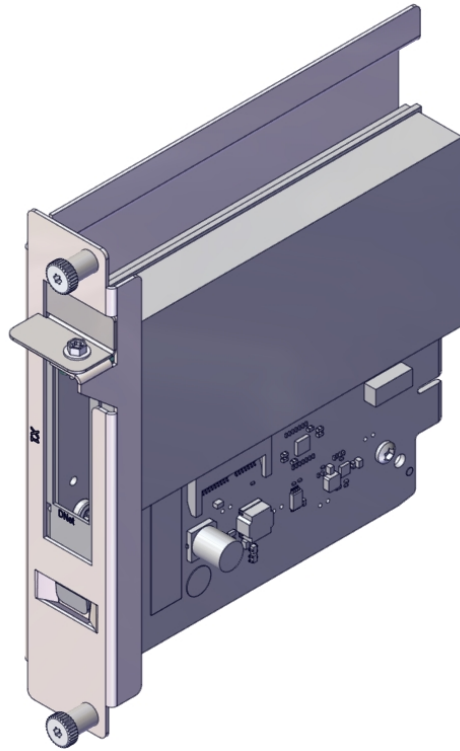
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## 9 Spare parts

### 9.1.3 Logic parts

*Continued*

#### DeviceNet board

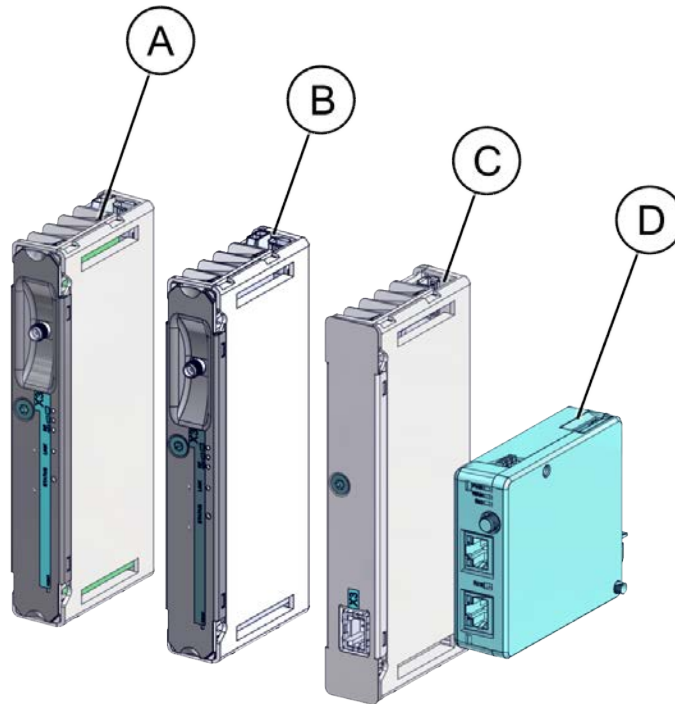


xx2300000926

	Spare part number	Description	Type	Spare part level
A	3HAC085254-001	DeviceNet M/S [3029-1] (option)	DSQC1096	L1
-	3HAC064901-001	Connector assembly Single-row female (option)	Mating CONN for IP20 DeviceNet connector	L1

*Continues on next page*

Connected Services gateway



xx2400001389

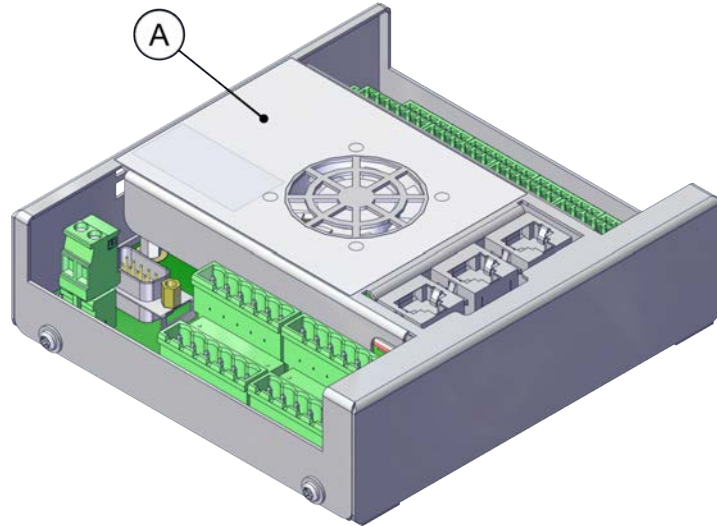
	Spare part number	Description	Type	Spare part level
A	3HAC060960-001	Connected Services-3G [3013-3] (baseline)	DSQC1039	L1
-	3HAC028459-001	Magnetic roof antenna, 3G (baseline)		L1
B	3HAC060962-001	Connected Services-WiFi [3013-2] (option)	DSQC1040	L1
-	3HAC059424-001	Magnetic roof antenna, WiFi (option)		L1
C	3HAC061701-001	Connected Services-Wired [3013-1] (option)	DSQC1041	L1
D	3HAC086677-001	Connected Services 4G EU [3013-5] (option)	DSQC1093	L1
-	3HAC086678-001	Connected Services 4G US [3013-6] (option)	DSQC1093A	L1
-	3HAC089073-001	Connected Services 4G CN [3013-7] (option)	DSQC1101	L1
-	3HAC086604-001	Magnetic roof antenna 4G (option)		L1

## 9 Spare parts

### 9.1.4 Application parts

#### 9.1.4 Application parts

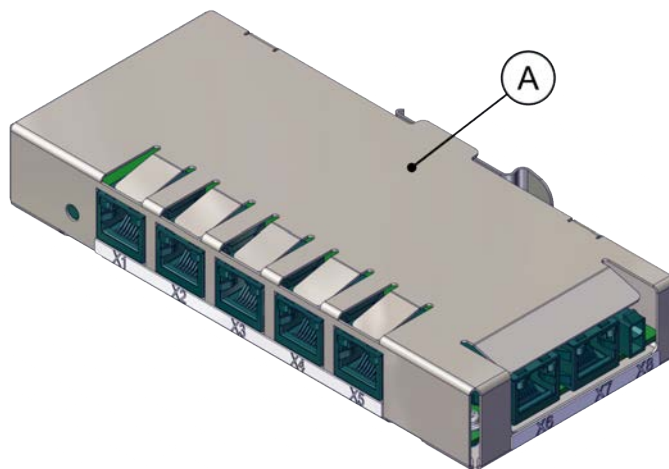
##### CTM-01



xx1900001938

	Spare part number	Description	Type	Spare part level
A	3HNA027579-001	Conveyor tracking module [3103-1]	DSQC2000	L1
-	3HNA029345-001	CONNECTOR KIT - DSQC2000		L1
-	3HAC088744-001	Harness 24V_CTM	Power cable of CTM	L1

##### Ethernet switches



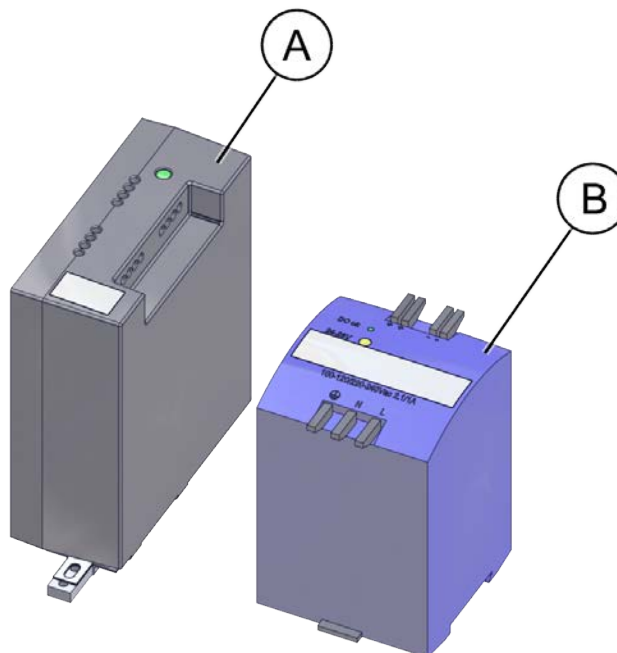
xx1900001935

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	Spare part number	Description	Type	Spare part level
A	3HAC059187-001	Ethernet Extension switch [3014-1] (option)	DSQC1035	L1

### Power supply device



xx2400001390

	Spare part number	Description	Type	Spare part level
A	3HAC14178-1	DSQC 609 power supply	DSQC 609	L1
B	3HAC13398-2	DSQC 634 power supply	DSQC 634	L1

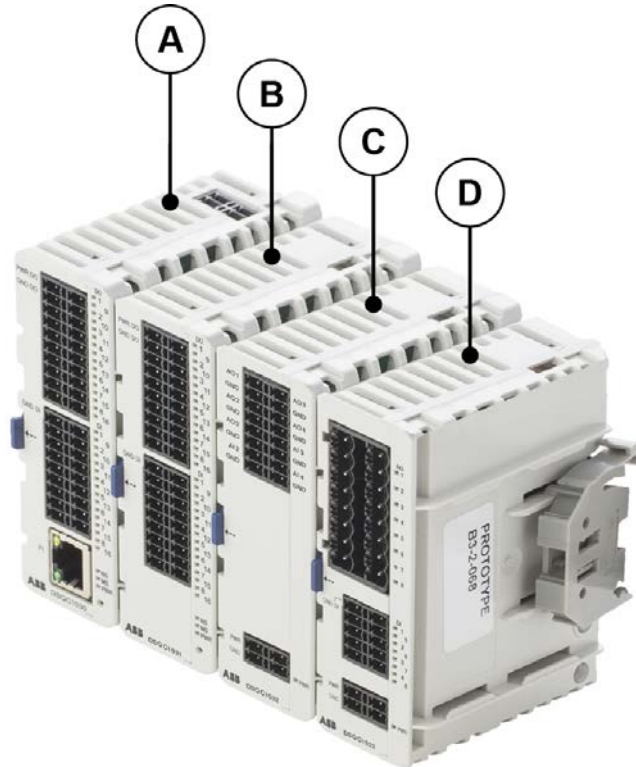
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## 9 Spare parts

### 9.1.4 Application parts

Continued

#### Scalable I/O devices

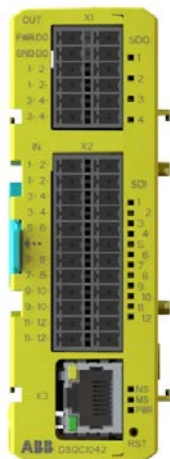


xx1900001939

	Spare part number	Description	Type	Spare part level
A	3HAC058663-001	Scalable I/O Digital base [3032-1] (option)	DSQC1030	L1
-	3HAC060919-001	Connectors digital base/add on		L1
B	3HAC058664-001	Digital add-on [3033-2] (Add-on)	DSQC1031	L1
C	3HAC058665-001	Analog add-on [3034-2] (Add-on)	DSQC1032	L1
-	3HAC060925-001	Connectors I/O Analog (Add-on)		L1
D	3HAC058666-001	Relay add-on [3035-2] (Add-on)	DSQC1033	L1
-	3HAC060926-001	Connectors I/O Relay (Add-on)		L1

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Safety digital base device



xx210000990

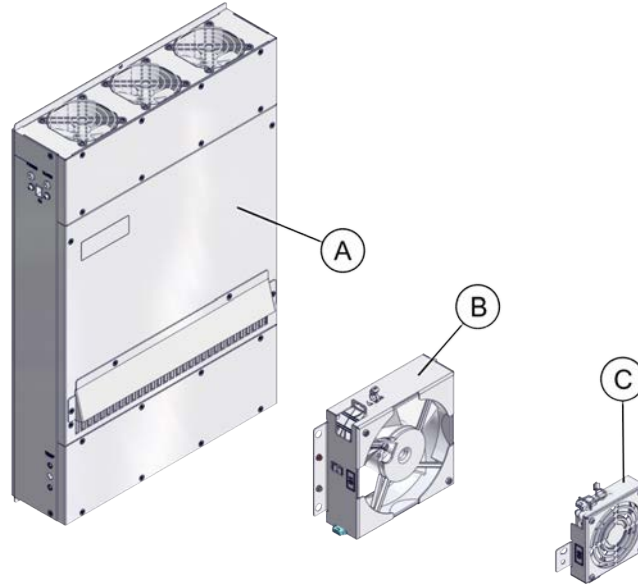
	Spare part number	Description	Type	Spare part level
-	3HAC062908-001	DSQC1042 Extended safety		L1
-	3HAC069538-001	Connectors Safety I/O		L1

## 9 Spare parts

### 9.1.5 Cabinet parts

### 9.1.5 Cabinet parts

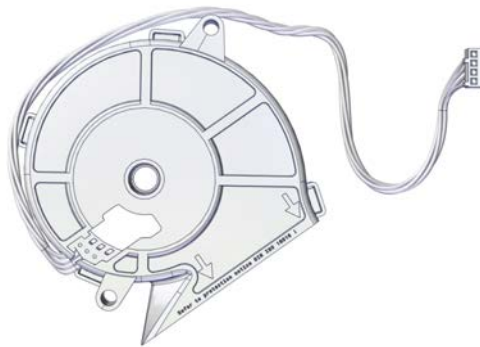
#### Fans



xx2400001415

	Spare part number	Description	Type	Spare part level
A	3HAC065526-001	Heat exchanger		L1
B	3HAC077005-001	Standard fan		L1
C	3HAC077006-001	Small fan		L1

#### Main computer fan

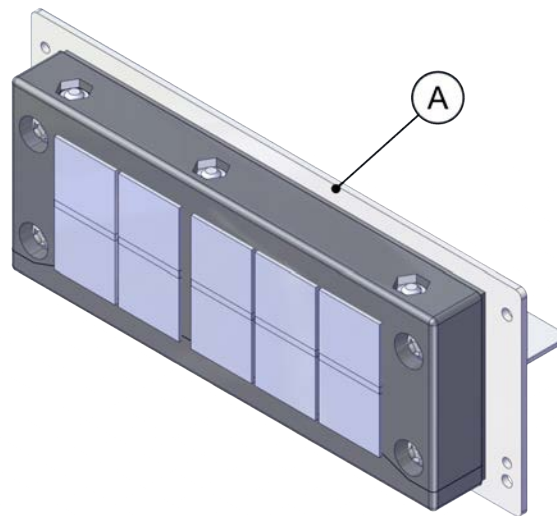


xx2300000925

	Spare part number	Description	Type	Spare part level
-	3HAC084390-001	Fan w/ contact	Main computer fan	L1

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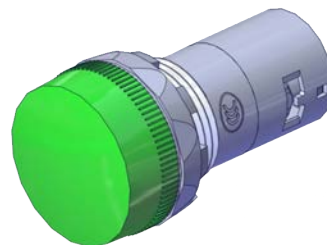
Process, fieldbus and I/O connectors



xx1900001928

	Spare part number	Description	Type	Spare part level
A	3HAC066396-001	Cable grommet asm (option)		L1

LED indicator



xx1900002451

	Spare part number	Description	Type	Spare part level
-	3HAC065549-001	LED indicator		L1

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## 9 Spare parts

### 9.1.5 Cabinet parts

Continued

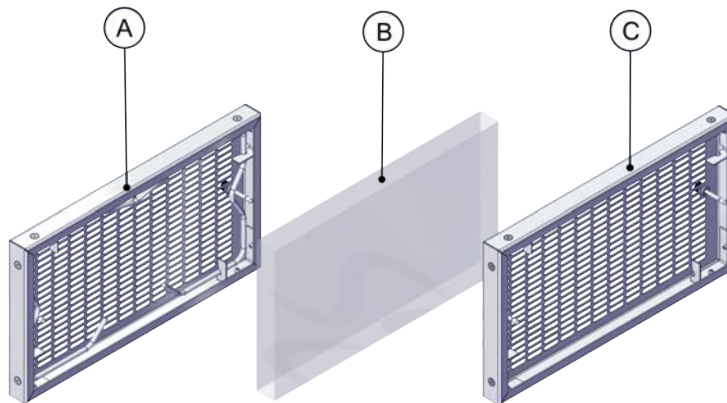
#### TPU cover



xx1900002452

	Spare part number	Description	Type	Spare part level
-	3HAC067213-001	TPU cover		L1

#### Air filter

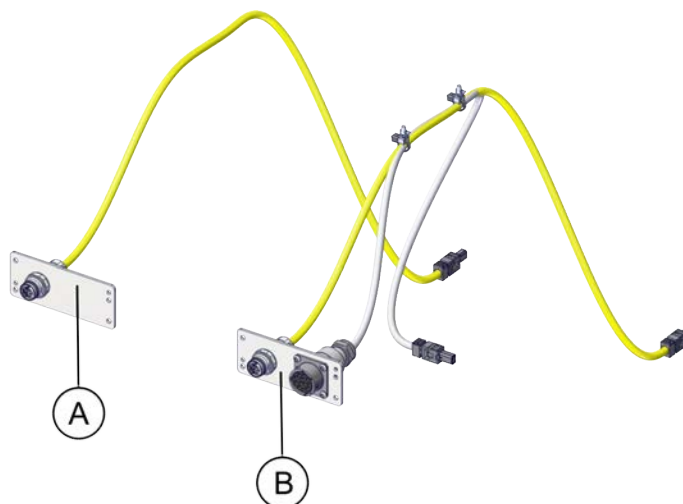


xx1900001945

	Spare part number	Description	Type	Spare part level
A	3HAC080920-001	Air filter-Fine filter		L1
B	3HAC068543-001	Air filter (Polymeric)		L1
C	3HAC080919-001	Air filter-coarse filter		L1

## 9.1.6 Miscellaneous parts

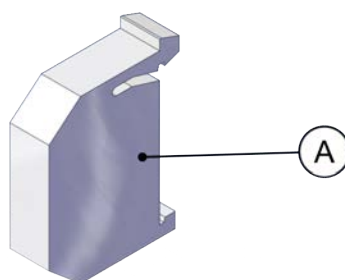
## Manipulator signal connectors (SMB)



xx2400001400

	Spare part number	Description	Type	Spare part level
A	3HAC088742-001	Harness Single SMB connection	Harness single hybrid SMB	L1
B	3HAC089436-001	Harness Double SMB connection	Harn. double hybrid SMB unit	L1

## End clamp



xx1900001940

	Spare part number	Description	Type	Spare part level
A	3HAB7983-1	End clamp		L1

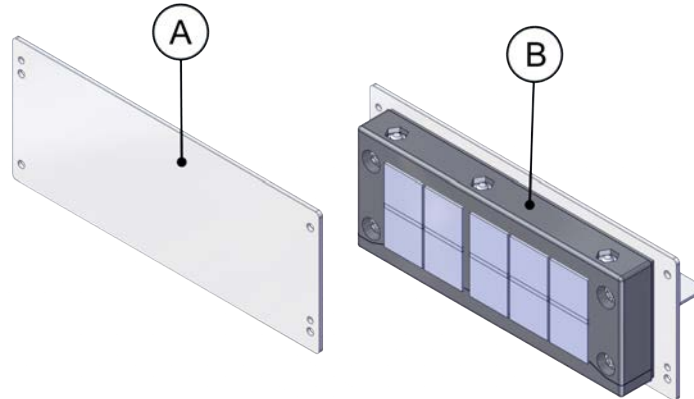
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## 9 Spare parts

### 9.1.6 Miscellaneous parts

Continued

#### Cable grommet asm



xx1900001947

	Spare part number	Description	Type	Spare part level
A	3HAC069954-001	Blind plate (baseline)		L1
B	3HAC066396-001	Cable grommet asm		L1

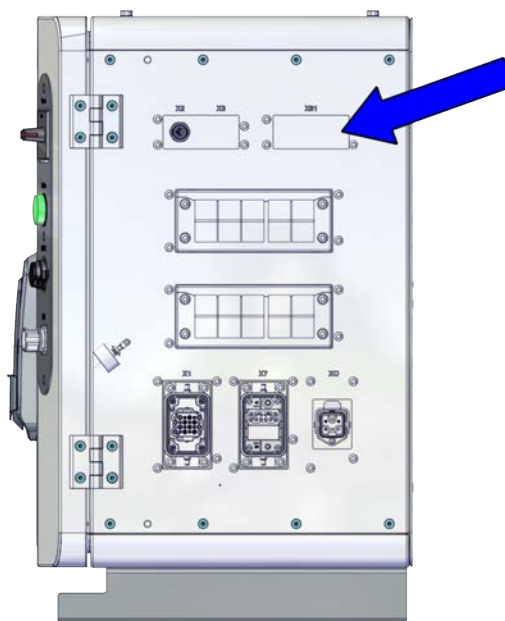
#### Vision parts

Spare part number	Description	Type	Spare part level
3HAC053944-001	8 mm camera lens, LTC-08F		L1
3HAC053944-002	12.5 mm camera lens, LFC-12.5F		L1
3HAC053944-003	16 mm camera lens, LFC-16F1		L1
3HAC053944-004	25 mm camera lens, LFC-25F1		L1
3HAC087266-001	8 mm camera lens, LMC-ML-M0822UR		L1
3HAC087267-001	12.5 mm camera lens, LMC-ML-M1218UR		L1
3HAC087268-001	16 mm camera lens, LMC-ML-M1616UR		L1
3HAC087269-001	25 mm camera lens, LMC-ML-M2516UR		L1
3HAC075182-001	Integr Vision camera med. Res	DSQC1063	L1
3HAC075207-001	Integr Vision camera high res	DSQC1064	L1
3HAC087074-001	Integrated vision camera 2MPx	DSQC1098	L1
3HAC087075-001	Integrated vision camera 5MPx	DSQC1099	L1
3HAC051753-003	Integr Vision power cable 10 m		L1
3HAC075443-002	Integr Vision ethernet cable 10 m		L1
3HAC051753-004	Integr Vision power cable 15 m		L1
3HAC075443-003	Integr Vision ethernet cable 15 m		L1

Continues on next page



#### Blind plate



xx2400001402

	Spare part number	Description	Type	Spare part level
-	3HAC069953-001	Blind plate		L1
-	3HAC086767-001	RF antenna conn. SMA	Used for 3G/4G	L1
-	3HAC086710-001	RF antenna conn. RP-SMA	Used for WiFi	L1
-	3HAC084103-001	Harn. network conn. 1xM12	Used for Wired	L1

#### Service port connector

Spare part number	Description	Type	Spare part level
3HAC064848-001	Service port connector		L1

#### Motor connection box



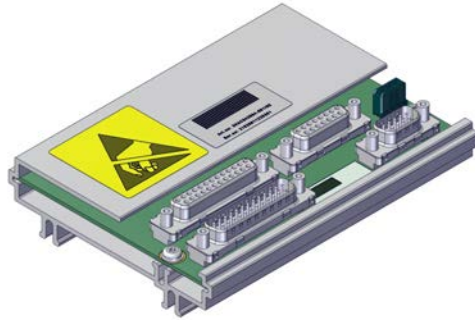
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## 9 Spare parts

### 9.1.6 Miscellaneous parts

Continued



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	Spare part number	Description	Type	Spare part level
-	3HAC087717-001	Motor Connection Box	3-axis	L1
-	3HAC087718-001	Motor Connection Box	3-axis, BRB	L1
-	3HAC043904-001	Measurement Unit		L1
-	3HAC044075-001	Battery Unit		L1
-	3HAC078370-001	Ext. axis power harn._7m		L1
-	3HAC078370-002	Ext. axis power harn._15m		L1
-	3HAC078370-007	Ext. axis power harn._22m		L1
-	3HAC078370-003	Ext. axis power harn._30m		L1
-	3HAC087715-001	Jumper plug PTC		L1

#### Harness Short-circuit connector

Spare part number	Description	Type	Spare part level
3HAC079051-001	Harness Short-circuit connector		L1

#### Extra cable jumpers

Spare part number	Description	Type	Spare part level
3HAC084243-001	Extra cable jumpers		L1

#### Aluminum foil tubes

Spare part number	Description	Type	Spare part level
3HAC092204-001	Aluminum foil tubes		L1

#### Harness Earth braid

Spare part number	Description	Type	Spare part level
3HAC090583-001	Harness Earth braid		L1

Continues on next page

#### Extension box parts

Spare part number	Description	Type	Spare part level
3HAC074661-001	Connector ext.box 24V_fan		L1
3HAC069229-001	Harness ext.box fan power adapter		L1

## 9 Spare parts

### 9.1.7 Cables

#### 9.1.7 Cables

##### Cables

###### Cables on the frame

	Spare part number	Description	Type	Spare part level
-	3HAC090346-001	Harness package asm	Contains seven cables on the frame	L1
-	3HAC088746-001	Harness AC OUT		L1
-	3HAC087427-001	Harness signal assembly		L1

###### Cables on the additional drive unit

Spare part number	Description	Type	Spare part level
3HAC089433-001	Harness DC-BUS		L1
3HAC089278-001	Ethernet harness		L1
3HAC089430-001	Harness 24V_SYS_DRV		L1

###### Additional drive unit control cables

Spare part number	Description	Type	Spare part level
3HAC090752-001	Power Motor Cable ADU control cable power,3 mm		L1
3HAC090752-011	Power Motor Cable ADU control cable power,7 mm		L1
3HAC090752-012	Power Motor Cable ADU control cable power,15 mm		L1
3HAC092140-001	Control Signal Floor Cable Control Cable Signal,3 mm		L1

###### Cables on the drive unit

	Spare part number	Description	Type	Spare part level
-	3HAC091496-001	Harness DC-BUS	Harness A1.X4 - T4.X5	L1
-	3HAC088731-001	Harness 24_SYS_DRV	Harness A1.X5 - T4.X1	L1
-	3HAC088740-001	Ethernet harness	Harness A1.X12 - T4.X3	L1

###### Cables on the Connected Services unit

	Spare part number	Description	Type	Spare part level
-	3HAC085903-001	Ethernet harness	Harness A2.K4.X1 - K7.ETH2	L1

*Continues on next page*

	Spare part number	Description	Type	Spare part level
-	3HAC085904-001	24V Adapter harness		L1

#### Cables on the Ethernet Extension unit

	Spare part number	Description	Type	Spare part level
-	3HAC090414-001	Harness 24V_SYS		L1

#### Cables on the power supply

	Spare part number	Description	Type	Spare part level
-	3HAC069617-001	Harness AC input of power supply		L1
-	3HAC088876-001	Harness Terminal with cable		L1

#### Harness MultiMove

Spare part number	Description	Type	Spare part level
3HAC088555-001	Harness MultiMove 4 mm		L1

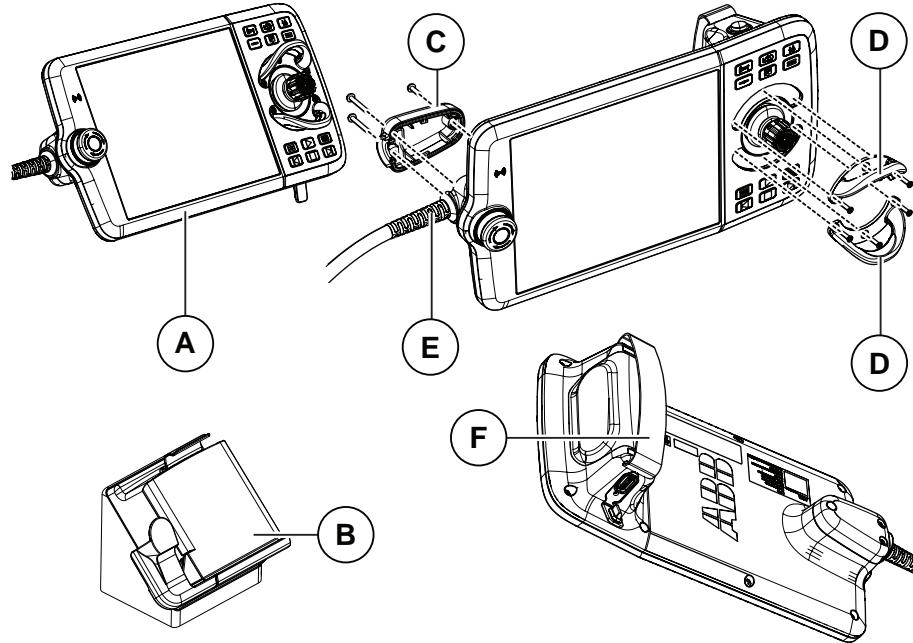
## 9 Spare parts

### 9.2 FlexPendant parts

### 9.2 FlexPendant parts

#### FlexPendant parts

The illustration below shows the placement of the parts in the recommended spare part list.



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	Spare part number	Description	Type	Spare part level
A	3HAC086996-001	FlexPendant	DSQC3124	L1
B	3HAC064927-001	FlexPendant Holder w/t E-stop cover		L1
C	3HAC065401-001	Power cable cover		L1
D	3HAC065408-001	Joystick guard		L1
E	3HAC064448-002	FlexPendant power cable 3 m		L1
	3HAC064448-001	FlexPendant power cable 10 m		L1
	3HAC064448-003	FlexPendant power cable 30 m		L1
F	3HAC065419-001	Fasten strip		L1
-	3HAC068915-001	FlexPendant extension cable, 15 m		L1
-	3HAC068915-002	FlexPendant extension cable, 22 m		L1
-	3HAC068915-005	FlexPendant extension cable, 30 m		L1

## 9.3 Manipulator cables

### 9.3.1 Manipulator cables

#### Power cables, IRB 1100, 1300, 910INV, 920, 930, CRB 1300

Power cable length	Article number	Spare part level
Power cable, straight connector, 3 m	3HAC077245-001	L1
Power cable, straight connector, 7 m	3HAC077245-002	L1
Power cable, straight connector, 15 m	3HAC077245-003	L1
Power cable, angled connector, 3 m	3HAC077247-001	L1
Power cable, angled connector, 7 m	3HAC077247-002	L1
Power cable, angled connector, 15 m	3HAC077247-003	L1

#### Power cables, IRB 1200

Power cable length	Article number	Spare part level
Power cable, straight connector, 3 m	3HAC077245-001	L1
Power cable, straight connector, 7 m	3HAC077245-002	L1
Power cable, straight connector, 15 m	3HAC077245-003	L1

#### Power cables, IRB 1510, 1520

Power cable length	Article number	Spare part level
Power cable 3 m	3HAC061139-001	L1
Power cable 7 m	3HAC061139-002	L1
Power cable 15 m	3HAC061139-003	L1

#### Power cables, IRB 1600

Power cable length	Article number	Spare part level
Power cable 3 m	3HAC085790-001	L1
Power cable 7 m	3HAC085790-002	L1
Power cable 15 m	3HAC085790-003	L1

#### Signal cables, IRB 1100, 1300, 910INV, 920, 930, CRB 1300

Signal cable length	Article number	Spare part level
Signal cable, shielded: 3 m	3HAC084767-001	L1

*Continues on next page*

## 9 Spare parts

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### 9.3.1 Manipulator cables

*Continued*

Signal cable length	Article number	Spare part level
Signal cable, shielded: 7 m	3HAC084767-002	L1
Signal cable, shielded: 15 m	3HAC084767-003	L1

---

### Signal cables, IRB 1200, 1510, 1520, 1600

Signal cable length	Article number	Spare part level
3 m	3HAC080671-001	L1
7 m	3HAC080671-002	L1
15 m	3HAC080671-003	L1



## 9.3.2 Customer cables - CP/CS connectors (option)

## CP/CS cables, IRB 1100, 1300, 910INV, 920, 930

CP/CS cable length	Article number	Spare part level
3 m	3HAC067449-001	L1
7 m	3HAC067449-002	L1
15 m	3HAC067449-003	L1

## CP/CS cables, IRB 1600

CP/CS cable length	Article number	Spare part level
IRB 1600 CPCS Floor Cable, 7 m	3HAC061420-001	L1
IRB 1600 CPCS Floor Cable, 15 m	3HAC061420-002	L1
IRB 1600 CPCS Floor Cable, 30 m	3HAC078069-004	L1

## CP/CS cables, CRB 1300

CP/CS cable length	Article number	Spare part level
3 m, with lamp unit cabling	3HAC078069-001	L1
7 m, with lamp unit cabling	3HAC078069-002	L1
15 m, with lamp unit cabling	3HAC078069-003	L1

## 9 Spare parts

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### 9.3.3 Customer cables - Ethernet floor cables

### 9.3.3 Customer cables - Ethernet floor cables

---

#### Ethernet floor cables, IRB 1100, 1300, 910INV, 920, 930 (option)

One end is RJ45, one end is X-code.

Ethernet floor cable length	Article number	Spare part level
Eth.RJ45_X floor cable, 7 m	3HAC067447-002	L1
Eth.RJ45_X floor cable, 15 m	3HAC067447-003	L1

---

#### Ethernet floor cables, CRB 1300 (option)

Ethernet floor cable length	Article number	Spare part level
7 m, with lead-through device cabling	3HAC077020-001	L1

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