ROBOTICS

Product manual

OmniCore C30 Type A

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Product manual

OmniCore C30 Type A

OmniCore

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Original instructions.

Table of contents

Overview of this manual

About this manual

This manual contains instructions for:

- mechanical and electrical installation of the OmniCore C30 Type A
- maintenance of the OmniCore C30 Type A
- mechanical and electrical repair of the OmniCore C30 Type A

The robot described in this manual has the following protection types:

Product manual scope

The manual covers all variants and designs of the OmniCore C30 Type A. Some variants and designs may have been removed from the business offer and are no longer available for purchase.

Usage

This manual shall 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 shall:

- 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.

Continues on next page

References

Tip

All documents can be found via myABB Business Portal, *www.abb.com/myABB*.

Document name	Document ID
Product specification - OmniCore C line	*3HAC065034-001*
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*
User manual - FlexPendant	*3HAC093167-001*
Operating manual - RobotStudio	*3HAC032104-001*
Operating manual - OmniCore	*3HAC065036-001*
Operating manual - Integrator's guide OmniCore	*3HAC065037-001*
Application manual - Force control Standard	*3HAC090251-001*
Technical reference manual - System parameters	*3HAC065041-001*
Application manual - Functional safety and SafeMove	*3HAC066559-001*
Application manual - Connected Services	*3HAC028879-001*
Application manual - Conveyor tracking	*3HAC066561-001*
Safety manual for robot - Manipulator and IRC5 or OmniCore controller	*3HAC031045-001*
Safety manual for robot - Manipulator and IRC5 or OmniCore controller	*3HAC031045-001*

Revisions

Revision	Description
A	First edition.
B	Published in release 24D. The following updates are made in this revision: • Information added for IRB 1600 CPCS floor cable in *Manipulator cables on page 488*. • Supported IRB 1200-7/0.9. • Updated the drive system information in section *Protection classes on page 42*.
C	Published in release 25A. The following updates are made in this revision: • Added airflow direction in section *On-site installation*. • Minor corrections.

Product documentation

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*.

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.

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

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.

1.1.2 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 C30 Type A on page 46*.

1.1.3 Requirements on personnel

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.

1.2 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.

1.2.2 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.

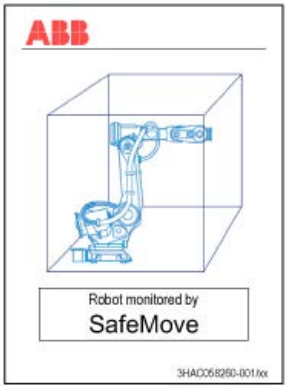
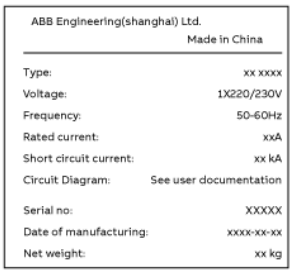
Symbols and information on labels

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
 xx2300000978	SGS certified (robot with controller)
 xx2300000979	Safety SGS label (together with UL mark)
 xx1700000353	Safety UL label (for the *Functional Safety* solution together with UL mark).
 xx1700000355	SafeMove label (for *SafeMove Basic* and *SafeMove Pro* software).
 xx1900001805	Rating label (example)
 xx1400001151	Electrical shock

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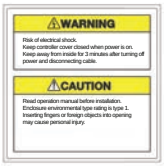
1.2.2 Safety symbols on controller labels

Continued

Label	Description
 xx1800000836	Warning & caution label
 xx1400001156	High voltage inside the module even if the main switch is in the OFF position.
 xx1400001162	ESD sensitive components inside the controller.
 xx2300001438	SRRC label for WIFI (only for Chinese market)
 xx2300001441	SRRC label for 3G (only for Chinese market)

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[i]	Stop category reconfigurable
Emergency Stop (ES)	Input to initiate the emergency stop function. The *Emergency Stop* function is initiated in both automatic and manual mode.	Stop category 0 For deviations, see the product manual for the manipulator.	Yes
Automatic Stop and General Stop (AS/GS)	Input to initiate the protective stop function, which can be configured to be either *Automatic Stop* or *General Stop*. When configured as *Automatic Stop*, the protective stop function is only initiated in automatic mode. When configured as *General Stop*, the protective stop function is initiated in both manual mode and automatic mode.	Stop category 1	Yes

i 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*.

Note

For OmniCore, the default configuration for the protective stop function triggered by the protective stop input is *Automatic Stop*.

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

Continues on next page

1.3.1 Protective stop and emergency stop
Continued

when the protective stop function is configured as Automatic Stop (AS) initiate the protective stop function in automatic mode only.

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

1.4.1 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.

1.5 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.

Allergenic material

See *Environmental information on page 452* 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_2) 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

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

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.

1.7 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.

1.9 Safety during decommissioning

General

See section *Decommissioning on page 451*.

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

2 Controller description

2.1 OmniCore C30 Type A

About OmniCore C30 Type A

The OmniCore C30 Type A is one of OmniCore C line compact controllers. The OmniCore C30 Type A controller offers a compact solution suitable for most applications where there is less need for additional equipment inside.

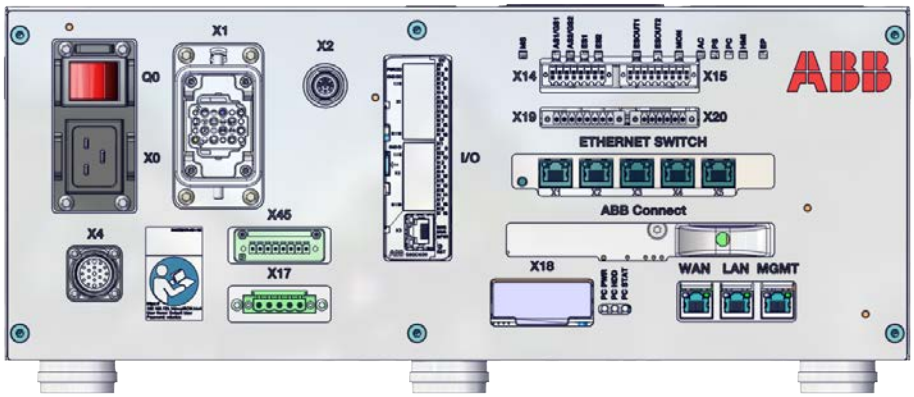
It is used to control an ABB manipulator used in industrial applications such as material handling and machine tending.

In general, the name OmniCore C30 Type A represents all versions.

2.2 Technical data for OmniCore C30 Type A controller

Overview of the controller

OmniCore C30 Type A is intended to be used in industrial environment.



xx2300001430

xx2300001431

Continues on next page

xx2300001432

	Reference to circuit diagram	OmniCore C30	OmniCore C30 for CRB 15000
Power inlet switch	Q0	Baseline	Baseline
Power inlet connector	X0	Baseline	Baseline
Motor connector	X1	Baseline	Baseline
Manipulator signal connector (SMB) [1] / Customer flange interface [2]	X2	Baseline	Baseline
HMI connector (TPU)	X4	Baseline	Baseline
IP20 DeviceNet	X17	Option	Option
IP20 Power outlet	X45	Option	Option
Robot signal exchange proxy	K2	Baseline	Baseline
Ethernet switch	K4	Option	Option
Scalable I/O	K5.1	Option	Baseline, can be deselected

1 Not available for CRB 15000 controller.

2 Only available for CRB 15000 controller.

Continues on next page

2.2 Technical data for OmniCore C30 Type A controller
Continued

	Reference to circuit diagram	OmniCore C30	OmniCore C30 for CRB 15000
Connected Services Gateway (with antenna for 3G and WiFi)	K7	Baseline[i]	Baseline
Power supply	T5	Option	Option
Drive unit	T4	Baseline	N/A
Power unit	A1	Baseline	Baseline
Main computer	A2	Baseline	Baseline
Standard fan	G1	Baseline	Baseline
Small fan	G2	Baseline	Baseline

[i] Baseline is 3G. Wired or WiFi available as option.

Type label

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

xx2300001754

Dimensions

Parameter	Value
Width	Base version: 449 mm Desktop version: 509 mm
Depth	Base version: 443.5 mm Desktop version: 513.5 mm
Height	Base version: 191 mm (With foot) Base version: 175 mm (Without foot) Desktop version: 193 mm (With foot) Desktop version: 177 mm (Without foot)

Weight

Controller	Weight
OmniCore C30 Type A	25 kg 20 kg[i]

[i] For CRB 15000 controller.

Continues on next page

Note

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

Transportation and storage conditions

Parameter	Value
Minimum ambient temperature	-40°C (-40°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^2 (X & Y axis), Grms = 12.8 m/s^2 (Z axis)
Bumps	Max. 5 g = 50 m/s^2 (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 (IP20), 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
Vibration	Max. Grms = 2.86 m/s^2 (X, Y, Z axis)
Bumps	Max. 5 g = 50 m/s2 (11 ms)

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^3.

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.

Continues on next page

Protection classes

	Protection class
Controller cabinet, inner compartment for electronics	IP20
FlexPendant	IP65

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: < 58.6 dB(A) Leq Controller in Standby Mode: < 58.6 dB(A) Leq

Power supply

Mains	Value
Voltage for OmniCore C30 Type A	220/230 VAC, 1 phase 100-230 VAC, 1 phase[i]
Voltage tolerance	+10%, -15% +10%, -10%[i]
Frequency	50/60 Hz
Frequency tolerance	±3%
Short circuit current rating	According to rating label.

[i] For CRB 15000 controller.

Note

The 2 phases (180-degree phase shift, with grounded neutral), also called Single-phase three-wire system in North America, can be supported by this controller.

Line fusing

There is no integrated fuse inside the OmniCore C30 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 15000	100-230 VAC, 1 phase	10 A in 100 VAC 6 A in 230 VAC
IRB 1010	100-230 VAC, 1 phase	10 A
IRB 1200-7/0.9[i]	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
IRB 1600	220/230 VAC, 1 phase	10 A

Continues on next page

Robot	Current (A)	Description
IRB 1660ID	220/230 VAC, 1 phase	10 A

i IRB 1200-5/0.9 and IRB 1200-7/0.7 are supported by OmniCore C30. IRB 1200-7/0.9 is supported by OmniCore C30 Type 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 15000	< 3.5 mA
IRB 1010	< 30 mA
IRB 1200-7/0.9[i]	< 30 mA
IRB 1510	< 30 mA
IRB 1520	< 30 mA
IRB 1600	< 30 mA
IRB 1660ID	< 30 mA

i IRB 1200-5/0.9 and IRB 1200-7/0.7 are supported by OmniCore C30. IRB 1200-7/0.9 is supported by OmniCore C30 Type A

Note

The integrator is responsible to address local electrical requirements.

Cooling

The cooling fan on OmniCore C30 Type A will work on reduced speed or shut off while the controller is in motors off state to lower the sound level. This is called fan control functionality. The fan will run with full cooling capacity when the controller is in motors on state. When changing to motors off, the fan will shut off if the temperature on the incoming air is low enough, or run in reduced speed if the temperature is too high. When the controller state is changed to motors off, the fan will shut off after 60 seconds if the temperature on the incoming air is low enough. If the temperature is too high, then the fan will continue at reduced capacity until the temperature is low enough and then turn off the fan.

The heat loss from the OmniCore C30 Type A controller needs to be cooled when the OmniCore C30 Type A controller is located in a closed cabinet, eg. 19” rack cabinet. The heat loss is highly depending on the use case and options installed. The temperature needs to be below max ambient temperature inside the closed cabinet.

The heat loss data below shall be used as guiding.

Controller	Maximum	Recommended cooling capacity
OmniCore C30 Type A	143.6 W[i] 91.6 W[ii]	180 W

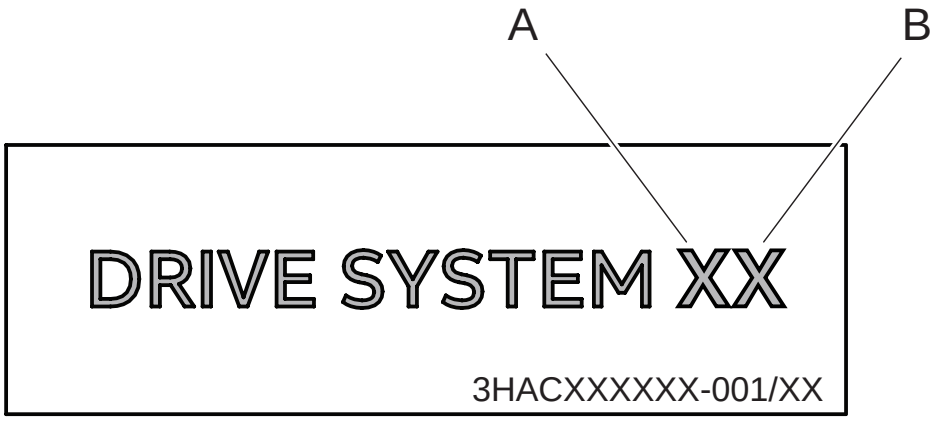
i Not valid for CRB15000.
ii Valid for CRB15000.

Continues on next page

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:



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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
B*	Drive unit LV DSQC3084	-
D*	Drive unit for CRB 15000[i]	
*3	-	Power unit LVHP DSQC 3066
*7	-	Power unit ULVLP DSQC3083
*10	-	Power unit ULVLP DSQC3105

[i] 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.

Product		Power									
Manipulator	**Controller**	2.5kVA-310V	2.5kVA-370V	3.0kVA-370V	7.0kVA-370V	3.0kVA-370V	480VA-24V	1.2kVA-48V	1.5kVA-48V	13kVA-650V	7.5kVA-650V
IRB 1010, IRB 1200-7/0.9, IRB 1510, IRB 1520, IRB 1600, IRB 1660ID	C30 Type A			B3							
CRB 15000 (5 kg)	C30 Type A							D7			
CRB 15000 (10 kg or 12 kg)	C30 Type A								D10		

Continues on next page

Tip

The drive system type can be found as a separate label on top of the controller. If there is no label for the drive system on the CRB 15000 controller, it contains a D7 drive system.

Note

Controllers with different drive systems are not interchangeable.

2.3 Safety functions and safety related data for OmniCore C30 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 C30 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 PFH for the Basic Safety Function and Extended Safety Functions do not exceed 1.3 * 10^-7 [1/hour].

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

> **Note**
>
> When additional drive units are installed, the PFH 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

- Protective stop function, is a safety function initiated by the three-position enabling device on the FlexPendant.
- Automatic stop function, is a protective stop function initiated by external protective stop device attached to automatic stop inputs of the controller.
- General stop function, is a protective stop function initiated by external protective stop device attached to general stop inputs of the controller.
- Safe Disable of Drive Unit, is a 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.
- Emergency stop function, initiated by the emergency stop device on the FlexPendant.
- Emergency stop function, initiated by an external emergency stop device attached to emergency stop inputs of the controller.
- Mirror emergency stop state, an interface which mirrors the emergency stop state of the robot through emergency status output of the controller.

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.

- Emergency stop function which can be initiated through a safety protocol
- Protective stop function which can be initiated through a safety protocol
- Axis position supervision
- Axis speed supervision
- Tool position supervision
- Tool speed supervision
- Tool orientation supervision
- Stand still supervision

Related information

Safety data on page 16

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

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.

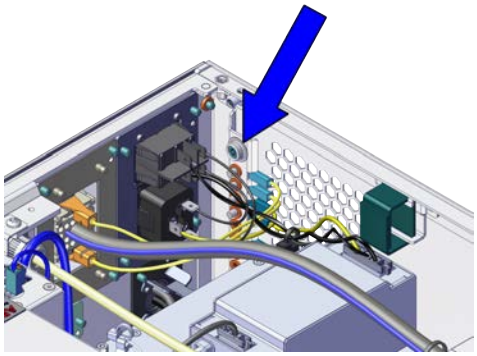
  Wrist straps must be tested frequently to ensure that they are not damaged and are operating correctly.
- Use an ESD protective floor mat.

  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.

Wrist strap button

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



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There is an additional wrist strap button on the main computer.

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

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.

Continues on next page

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,
- (2) this device must accept any interference received, including interference that may cause undesired operation.

The product contains RFID function:

- FCC ID: 2BE510UC20

For radio regulation compliance in other regions, please contact your domestic sales agency.

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

2.6 Network security

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.

2.7 Open source and 3rd party components

Open source and 3rd party components

ABB products use software provided by third parties, including open source software. The following copyright statements and licenses apply to various components that are distributed inside the ABB software. Each ABB product does not necessarily use all of the listed third party software components. Licensee must fully agree and comply with these license terms or the user is not entitled to use the product. Start using the ABB software means accepting also referred license terms. The third party license terms apply only to the respective software to which the license pertains, and the third party license terms do not apply to ABB products. With regard to programs provided under the GNU general public license and the GNU lesser general public license licensor will provide licensee on demand, a machine-readable copy of the corresponding source code. This offer is valid for a period of three years after delivery of the product.

ABB software is licensed under the ABB end user license agreement, which is provided separately.

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 (eay@cryptsoft.com).

This product includes software written by Tim Hudson (tjh@cryptsoft.com).

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

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 3G option contains FCC ID: XMR201510UC20 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) prevent-ing, 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.

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 C30 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 C30 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 C30 Type A and the robot to protective earth and residual current device (RCD) before connecting to power and starting any installation work.

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.	*Unpacking the controller on page 59*.
2	Place the controller in position and bolt it to the ground.	*On-site installation on page 61*.
3	Connect the manipulator to the controller.	*Connecting the manipulator to the controller on page 98*.
4	Attach the FlexPendant to the controller.	*Attaching the FlexPendant on page 106*
5	Install an external circuit breaker or fuse.	*Connecting incoming mains and protective earth to the controller on page 100*
6	Connect the cabinet to protective earth.	*Connecting incoming mains and protective earth to the controller on page 100*
7	Install a residual current device (RCD).	*Connecting incoming mains and protective earth to the controller on page 100*
8	Connect incoming mains to the controller.	*Connecting incoming mains and protective earth to the controller on page 100*
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 *Ethernet networks on OmniCore on page 107*. See also *Operating manual - RobotStudio*. See also *Descriptions for connectors on page 109*.
11	Install options and add-ons (optional).	
12	Initial test before commissioning.	*Initial test before commissioning on page 179*.

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 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.  **Note** 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 *Transportation and storage conditions on page 41*.
7	Make sure that the expected operating environment of the controller conforms to the specifications as described in *Operating conditions on page 41*.
8	The controller can be taken to its installation site as described in section *On-site installation on page 61*.

3.3.2 Storing

Storing the controller

For storing, see *Transportation and storage conditions on page 41*.

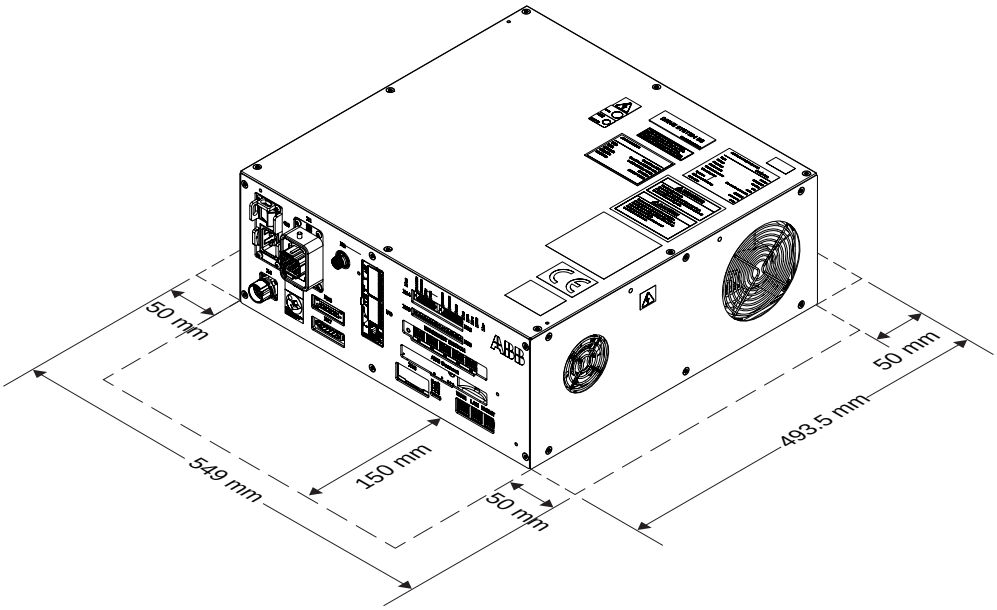
3.4 On-site installation

3.4.1 Required installation space

Dimensions

The following illustration shows the required installation space for the OmniCore C30 Type A controller. A free space is required for connecting ABB cables. Do not place any cables over the left and right covers (top cover for the vertical-mounted version) as it leads to inefficient cooling.

Base-mounted and Rack-mounted version



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Free space	Front	Back	Left	Right
Base-mounted	150 mm	50 mm	50 mm	50 mm
Rack-mounted	150 mm	50 mm	50 mm	50 mm

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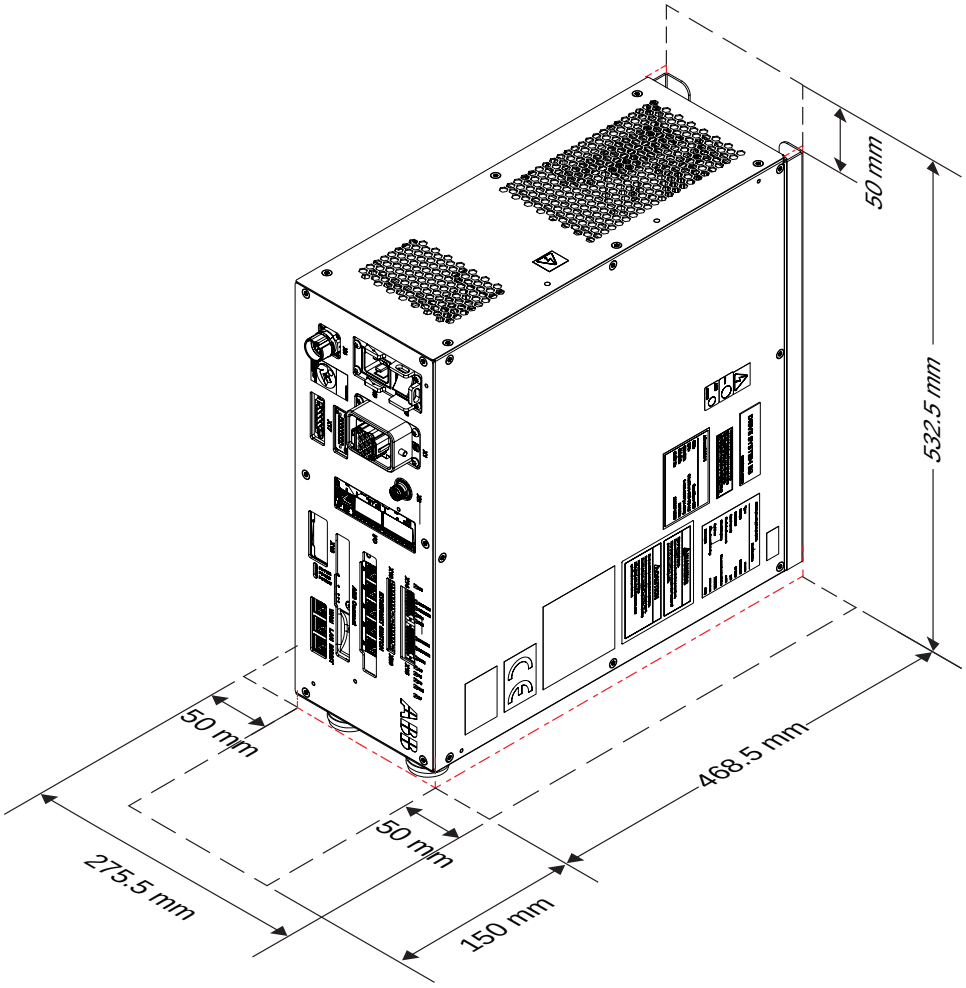
3.4.1 Required installation space
Continued

Vertical-mounted version



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The installation dimension on the back of the vertical mounted version is shown as below. M8 screw is suggested to use when secure the vertical-mounted version.

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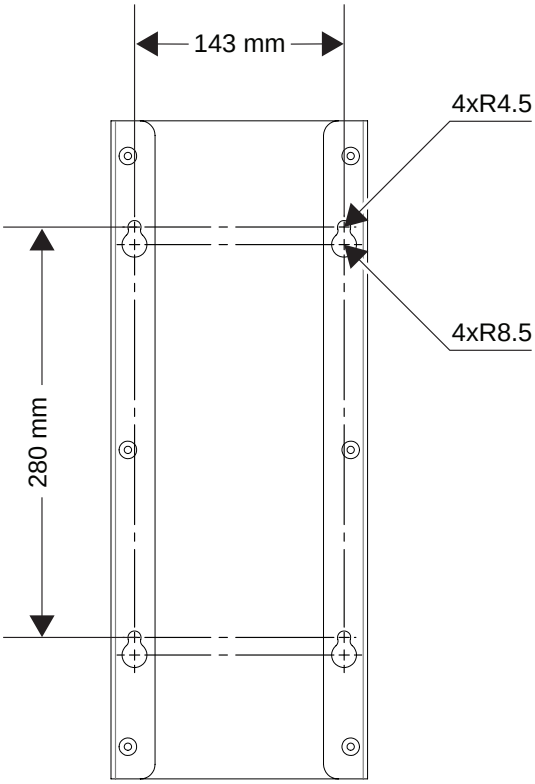

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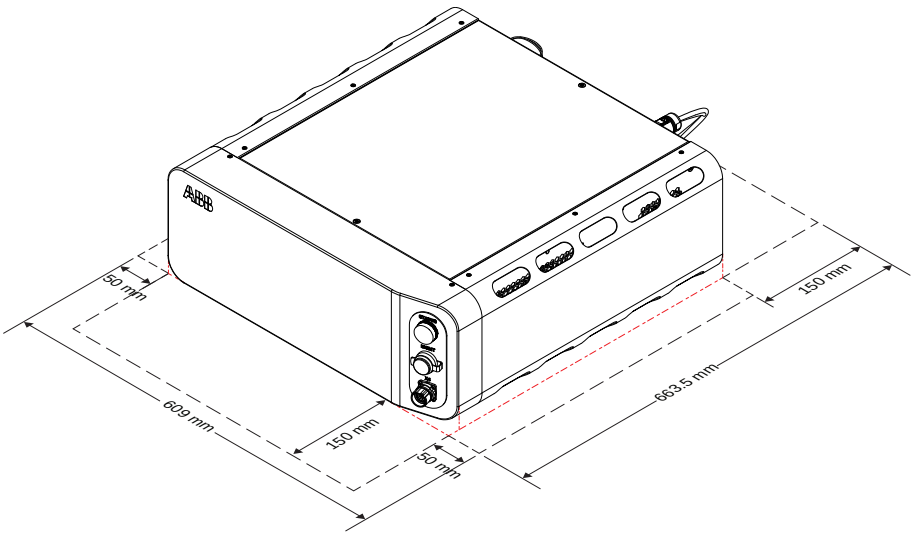
Desktop-mounted version



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Free space	Front	Back	Left	Right
Desktop-mounted	150 mm	150 mm	50 mm	50 mm

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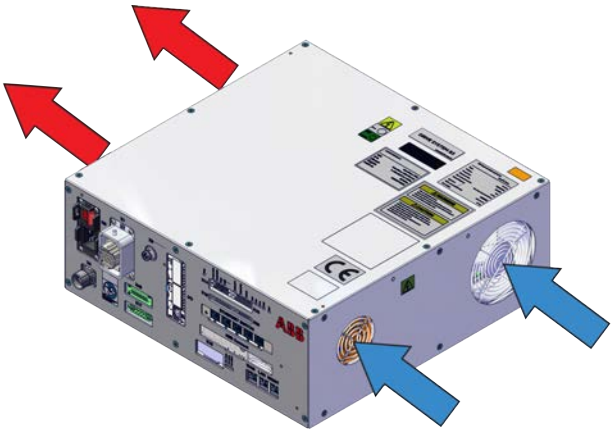
3.4.1 Required installation space
Continued

Airflow direction

This section describes the airflow directions of the fans in the controller.

Type of fan	Airflow direction
External fans	

Foot dimensions

The following illustration shows the dimensions between the feet of the OmniCore C30 Type A controller, as seen from below.

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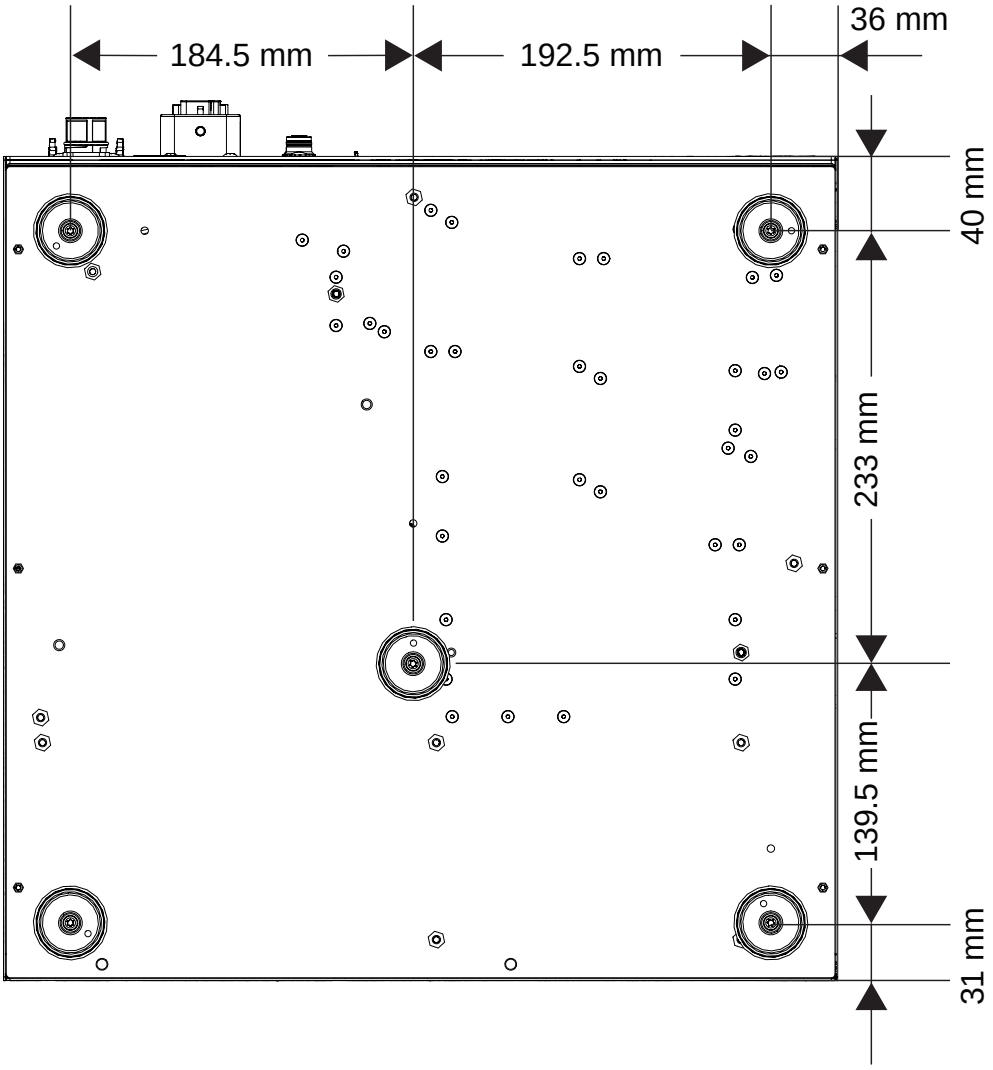

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- The feet should only be used for positioning, not for mounting or fastening.

3.4.2 Mounting the controller with 19" rack mounting kit [3002-1]

General

The OmniCore C30 Type A controller is designed to fit in a 19" cabinet.

xx2400000084

Note

If the controller is installed in a rack (cabinet), it must be fastened in a way that prevents distortion of the controller cabinet. Preferably with angle bars along the entire side edges of the controller.

Note

If the 19" rack mounting kit and vertical mounting kit are purchased at the same time, the controller will be mounted with vertical mounting kit when delivered to the customer from ABB. The 19" rack mounting kit will be delivered as a spare part at the same time.

For detail information on replacing the vertical mounting kit to 19" rack mounting kit, see *Replacing the controller from vertical mounting kit to19" rack mounting kit on page 73*.

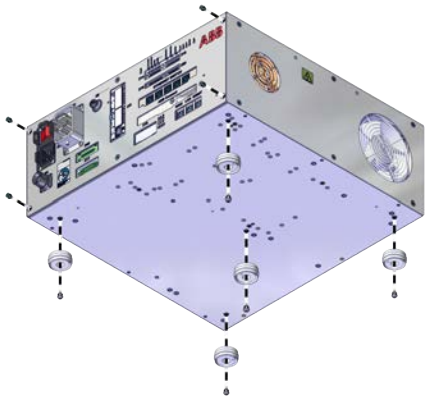
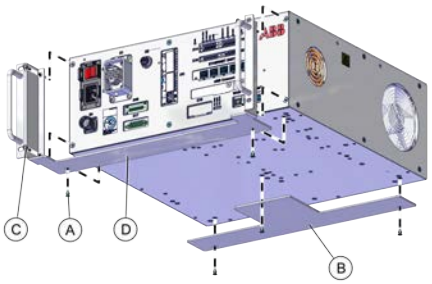
Required equipment

Equipment	Information
Mounting kit	3HAC063918-001
Standard toolkit	See *Standard toolkit for controller on page 458*.

Continues on next page

Installing the 19" rack mounting kit to the controller

Use this procedure to install the controller in a 19" cabinet.

	Action	Information
1	Remove the screws on the front panel and the five feet from the bottom.	 xx2400000086
2	Assemble the front and the back mounting kit.	 xx2400000686 A – Front mounting kit B – Back mounting kit C – Torx pan head screw M4x12 (4 pcs) Tightening torque: 1.7-1.8 Nm D – Torx countersunk screw M4x10 (5 pcs) Tightening torque: 1.7-1.8 Nm

Continues on next page

3.4.2 Mounting the controller with 19" rack mounting kit [3002-1]

Continued

	Action	Information
3	Place the controller into the 19" cabinet and fasten it with the screws.	 xx2400000085 Torx pan head screw M6x16 (4 pcs) Tightening torque: 1.7-1.8 Nm
4	Connect the antenna for Connected Services Gateway (3G or WiFi).	The antenna is preferably placed on top of the cabinet. **Note** For best performance in a closed cabinet, use the option *Connected Services Gateway wired* (DSQC1041) with external Internet gateway.

3.4.3 Mounting the controller with vertical mounting kit [3002-2]

General

The OmniCore C30 Type A controller is designed to fit with a vertical mounting kit.

xx2400000087

Note

The side with the fans should be downward when installing the controller in vertical position.

Continues on next page

3.4.3 Mounting the controller with vertical mounting kit [3002-2]
Continued

Note

If the 19" rack mounting kit and vertical mounting kit are purchased at the same time, the controller will be mounted with vertical mounting kit when delivered to the customer from ABB. The 19" rack mounting kit will be delivered as a spare part at the same time.

For detail information on replacing the vertical mounting kit to 19" rack mounting kit, see *Replacing the controller from vertical mounting kit to19" rack mounting kit on page 73*.

Required equipment

Equipment	Information
Mounting kit	3HAC063920-001
Standard toolkit	See *Standard toolkit for controller on page 458*.

Installing the vertical mounting kit to the controller

Use this procedure to install the controller in vertical position.

	Action	Info/illustration
1	Remove the left side cover screws. **Note** The left side is the side without fans.	 xx2400000687
2	Install the side cover unit.	 xx2400000688 A: Side cover unit B: Torx counterink screw M4x10 (6 pcs) Tightening torque: 1.7-1.8 Nm

Continues on next page

	Action	Info/illustration
3	Remove the screws on the back.	 xx2400000689
4	Install the back hanging bracket.	 xx2400000690 A: Back hanging bracket B: Torx countersunk screw M4x10 (6 pcs) Tightening torque: 1.7-1.8 Nm
5	Remove the right side cover screws. **Note** The right side is the side with fans.	 xx2400000088

Continues on next page

3.4.3 Mounting the controller with vertical mounting kit [3002-2]

Continued

	Action	Info/illustration
6	Install the support foot units.	 xx2400000089
7	Remove the five feet on the bottom.	 xx2400000691 Torx countersunk screw M4x10 (5 pcs) Tightening torque: 1.7-1.8 Nm
8	Connect the antenna for Connected Services Gateway (3G or WiFi).	The antenna can be placed on top of the controller.

3.4.4 Replacing the controller from vertical mounting kit to19" rack mounting kit

General

If the 19" rack mounting kit and vertical mounting kit are purchased at the same time, the controller will be mounted with vertical mounting kit when delivered to the customer from ABB. The vertical mounting kit can be removed and replaced with the 19" rack mounting kit.

Required equipment

Equipment	Information
Mounting kit	3HAC063918-001
Standard toolkit	See *Standard toolkit for controller on page 458*.

Removing the vertical mounting kit

Use this procedure to remove the vertical mounting kit from the controller.

	Action	Info/illustration
1	Remove the screws.	 xx2400000089
2	Remove the support foot units.	
3	Refit the screws.	
4	Remove the screws.	 xx2400000690
5	Remove the back hanging bracket.	
6	Refit the screws.	

A	Back hanging bracket
B	Torx countersunk screw M4x10 (6 pcs) Tightening torque: 1.7-1.8 Nm

Continues on next page

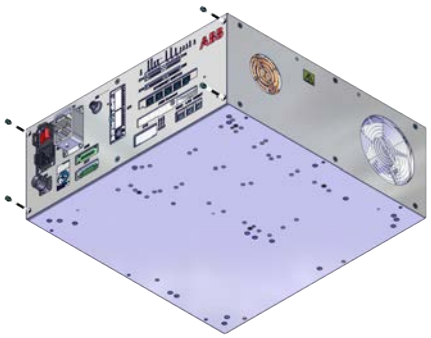
3.4.4 Replacing the controller from vertical mounting kit to19" rack mounting kit
Continued

	Action	Info/illustration
7	Remove the screws.	 xx2400000688
8	Remove the side cover unit.	
9	Refit the screws.	

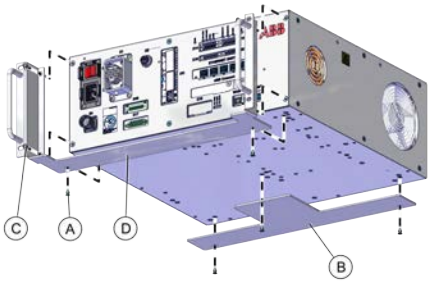
A	Side cover unit
B	Torx counterink screw M4x10 (6 pcs) Tightening torque: 1.7-1.8 Nm

Installing the 19" rack mounting kit

Use this procedure to install the controller in a 19" cabinet.

	Action	Information
1	Remove the screws on the front panel.	 xx2400000090

Continues on next page

	Action	Information
2	Assemble the front and the back mounting kit.	 xx2400000686 A: Front mounting kit B: Back mounting kit C: Torx pan head screw M4x12 (4 pcs) Tightening torque: 1.7-1.8 Nm D: Torx countersunk screw M4x10 (5 pcs) Tightening torque: 1.7-1.8 Nm
3	Place the controller into the 19" cabinet and fasten it with the screws.	 xx2400000085 Torx pan head screw M6x16 (4 pcs) Tightening torque: 1.7-1.8 Nm
4	Connect the antenna for Connected Services Gateway (3G or WiFi).	The antenna is preferably placed on top of the cabinet. **Note** For best performance in a closed cabinet, use the option *Connected Services Gateway wired* (DSQC1041) with external Internet gateway.

3.4.5 Mounting the controller with desktop mounting kit [3001-2]

General

The OmniCore C30 Type A controller is designed to fit as a desk version, that can have a desktop mounting kit.

xx2400000091

xx2400000692

Continues on next page

Note

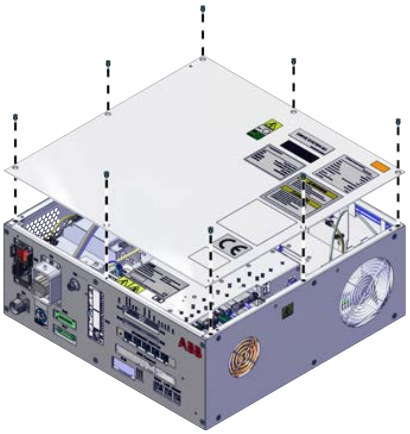
If the desktop mounting kit is mounted to the controller, do not hold the TPU connector (X4) during any moving or transporting of the controller.

Required equipment

Equipment	Information
Mounting kit	3HAC063919-001
Standard toolkit	See *Standard toolkit for controller on page 458*.

Procedure

Use this procedure to install the desktop mounting kit on the controller.

	Action	Info/illustration
1	Remove the top cover from the controller.	 xx2400000035

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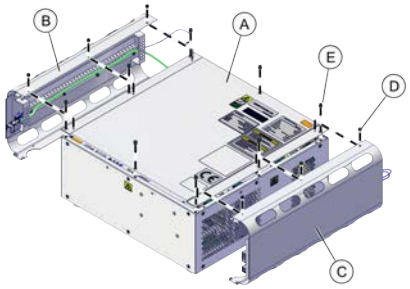
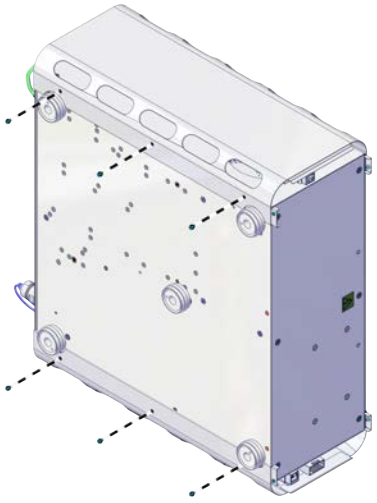
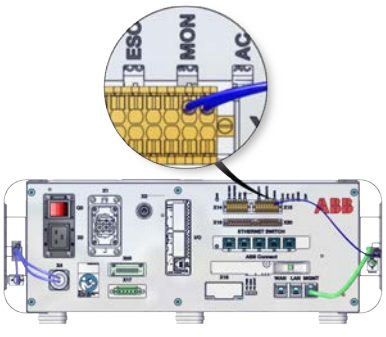
3.4.5 Mounting the controller with desktop mounting kit [3001-2]

Continued

	Action	Info/illustration
2	Assemble the desktop mounting kit top cover.	 xx2400000693
3	Assemble the side covers with adapter cables and fasten them with screws on the top.	
4	Place the controller upright and install the right and left cover unit. Lock them with screws on the bottom side and connect the cables. • K2.X15.3 • K2.X15.4 • X4 **Note** Do not hold the TPU connector (X4) during any moving or transporting of the controller. • MGMT	 xx2400000694  xx2400000695

A	Desktop mounting kit top cover
B	Left side cover unit
C	Right side cover unit
D	Torx countersunk screw M3x6 (6 pcs) Tightening torque: 0.6-0.8 Nm
E	Torx countersunk screw M4x10 (8 pcs) Tightening torque: 1.7-1.8 Nm

Continues on next page

	Action	Info/illustration
5	Keep the controller upright. Connect the adapter cables to the front cover unit, and install the front cover unit.	 xx2400000696
6	Connect the antenna for Connected Services Gateway (3G or WiFi).	The antenna can be placed on top of the controller.
7	Place the controller in desired place.	

3.4.6 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 *Standard toolkit for controller on page 458*.
TPU Holder asm	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.

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.

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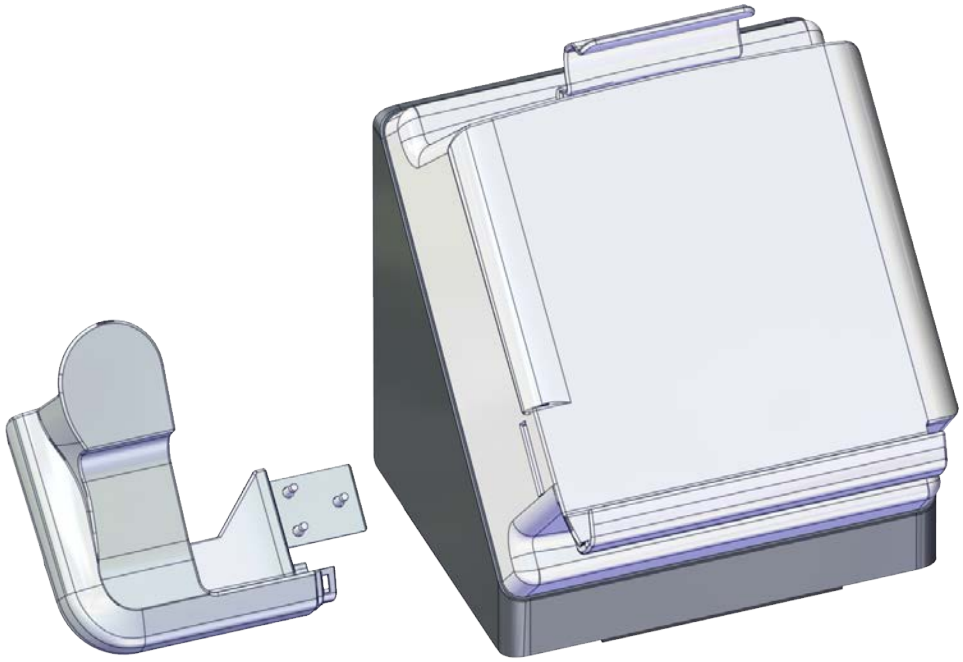


xx2100000767

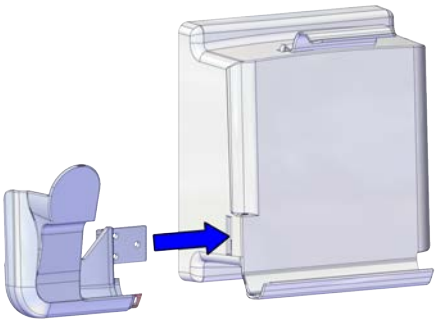
Use this procedure to mount the bracket for the emergency stop to the FlexPendant holder.

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

Continues on next page

3.4.6 Mounting the FlexPendant holder

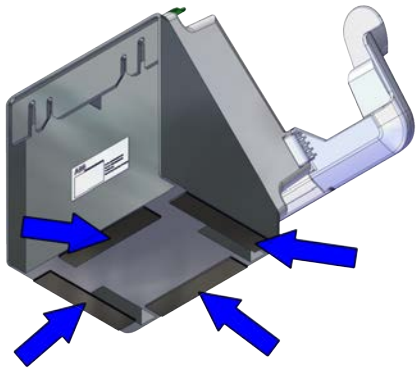
Continued

	Action	Note/illustration
3	Insert the bracket into the FlexPendant holder.	 xx2100000765
4	Secure with the screws.	Screws: BN33 Phillips pan head tapping screw ST2.9x13 (3 pcs) Tightening torque: 6 Nm-7.8 Nm  xx2100000766
5	Refit the rear part and secure with the screws.	Screws: BN33 Phillips pan head tapping screw ST3.5x16 (4 pcs) Tightening torque: 9.4 Nm-12.2 Nm  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.	 xx2000002352
3	Press the holder onto the desired place.	 xx2000002353

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.

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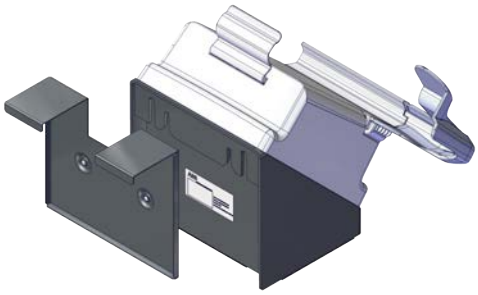
3.4.6 Mounting the FlexPendant holder
Continued

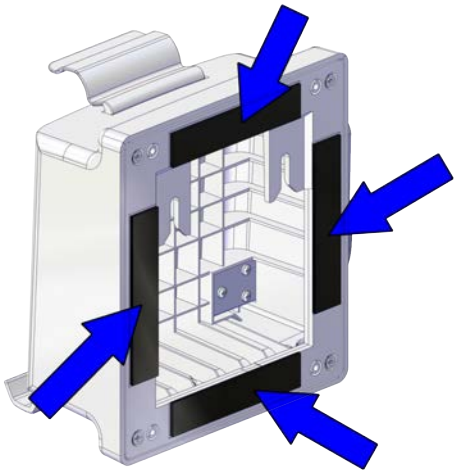
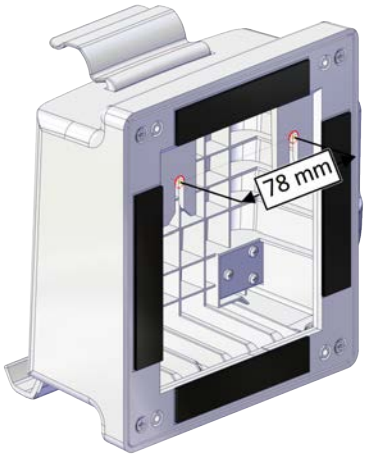
	Action	Note/illustration
1	Hang the FlexPendant holder to the bracket according to the screws on the bracket.	 xx2000002354
2	Hang the holder with the bracket to the desired place.	

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.	

Continues on next page

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

3.4.7 Changing the fan control functionality

General

The cooling fan on OmniCore C30 controllers will work on reduced speed or shut off while the controller is in motors off state to lower the sound level. This is called fan control functionality.

The fan will run with full cooling capacity when the controller is in motors on state. When changing to motors off, the fan will shut off if the temperature on the incoming air is low enough, or run in reduced speed if the temperature is too high.

When the controller state is changed to motors off, the fan will shut off after 60 seconds if the temperature on the incoming air is low enough. If the temperature is too high, then the fan will continue at reduced capacity until the temperature is low enough and then turn off the fan.

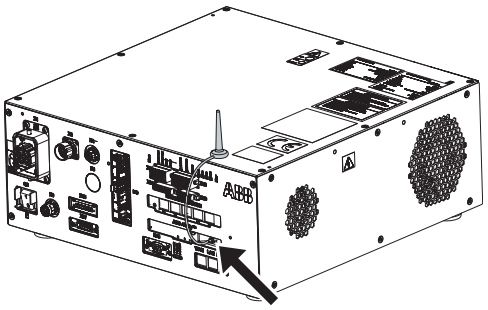
Changing the fan control functionality

Use this procedure to change the fan control functionality.

	Action	Note
1	Open the configuration editor in RobotStudio.	
2	In the topic **Controller**, navigate to the type **Fan Control**.	
3	Set the parameter *Turn off fan* to *NO* if the fan should not shut off in motors off state. The default setting is *YES*.	For more information about system parameters, see *Technical reference manual - System parameters*

3.4.8 Connecting the Connected Services antenna

Connect the connected services antenna

	Action	Note/Illustration
1	Place the magnet part of the antenna on the top of the cabinet.	**Note** The operating conditions must be such that there is a minimum separation distance of 20 cm between the dedicated antenna and nearby persons.
2	Connect the antenna cable to the connected services gateway by rotating the connector.	 xx2200001303

3.5 Electrical connections

3.5.1 Connectors on the OmniCore C30 Type A controller

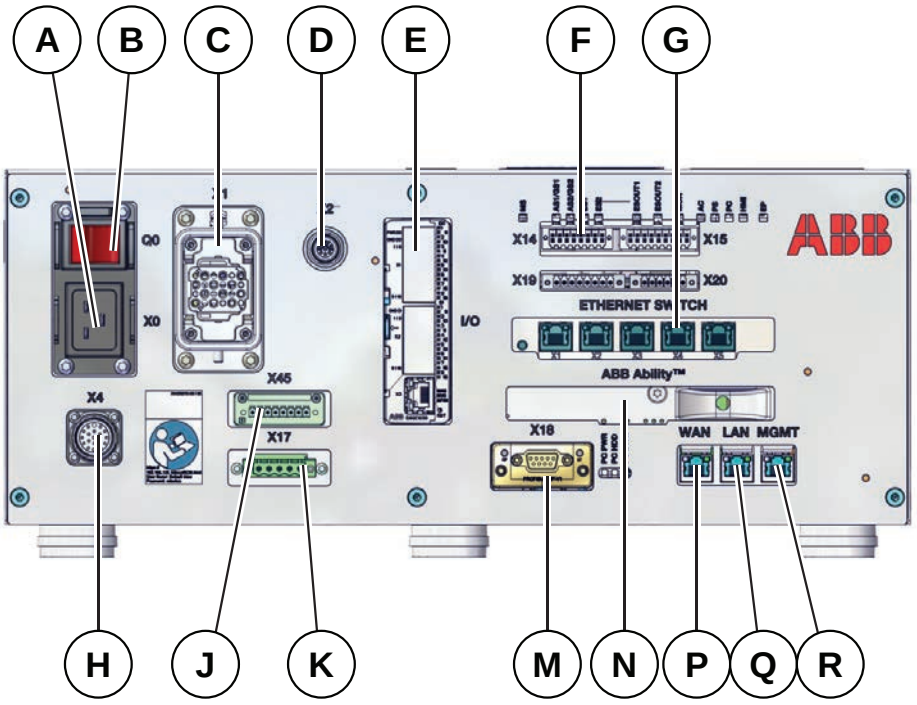
General

The following section describes the connectors on the front panel of the OmniCore C30 Type A controller.

> **CAUTION**
>
> Always inspect connectors for dirt or damage before connecting them to the controller. Clean or replace any damaged parts.

Connectors

The following illustration shows the connection interface on the controller.



xx2300001651

	Description	Label	Reference on the circuit diagram
A	Power inlet connector	X0	X0
B	Power inlet switch	Q0	Q0
C	Motor connector	X1	X1
D	Manipulator signal connector (SMB)[i] / Customer flange interface(CFI) connector[ii]	X2	X2
E	Scalable I/O connection	I/O	K5.1

Continues on next page

	Description	Label	Reference on the circuit diagram
F	Robot signal exchange proxy, customer interface connection	X14/X15/X19/X20	K2-X14, K2-X15, K2-X19, K2-X20
G	Ethernet switch connection	ETHERNET SWITCH	K4
H	FlexPendant connector (TPU)	X4	X4
J	IP20 power outlet connector	X45	X45
K	IP20 DeviceNet connector	X17	X17
M	Fieldbus adapter slave	X18	A2.K2-X1
N	Connected Services Gateway, with Ability port (option wired) or antenna connector (options 3G or WiFi)	ABB Ability™	K7
P	WAN port	WAN	A2-X23
Q	LAN port	LAN	A2-X2
R	Management port	MGMT	A2-X3

i Not available for CRB 15000 controller.
ii Only available for CRB 15000 controller.

Power inlet switch

Use the power inlet switch to turn on and off power to the controller. It also possible to restart the controller using the FlexPendant.

Note

When restarting the controller, wait until the LED PC STAT has turned off before turning on power again.

Safety lock for power inlet switch

The following illustration shows the location of the safety lock for the power inlet switch.

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3.5.1 Connectors on the OmniCore C30 Type A controller
Continued

xx2400000092

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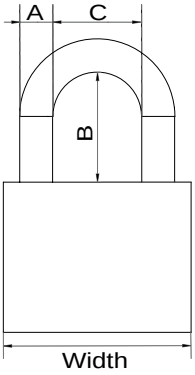

xx2400000160

Width	1-1/2" (38 mm) or ≥ 38 mm
Shackle Diameter (A)	1/4" (6 mm)
Shackle Length (B)	1-1/2" (38 mm)
Shackle Width (C)	25/32" (20 mm)

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 1.5 mm² or AWG 16.
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

3.5.2 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^2//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

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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	• These signals generate a lot of interference and must be laid separate from control, measurement, and communication signals. • 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. • The manipulator power cables are routed on the floor and along the left side of the controller cabinet. • 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.
Control signals	• These signals are very sensitive to interference. To protect these signals they should not be laid along with the power signals. • In the cable, each signal must be twisted with a neutral wire. • The shielding must be connected directly to the chassis at both ends of the cable.
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.

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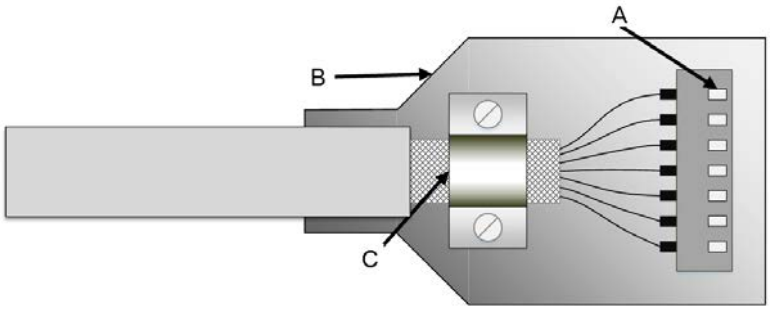
3.5.2 Connecting cables to the controller
Continued

- 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:



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A A dimpled connector body makes multiple bonds to the mating connector body all around its periphery, 360° bonding.

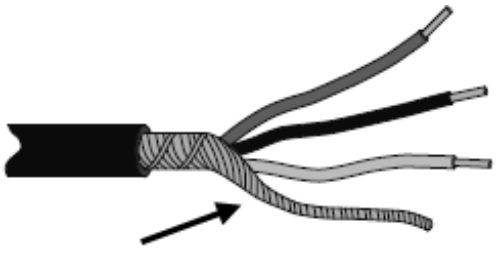
B Metal, or metallized, back shell makes 360° bond to the connector body.

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.



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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 100*.

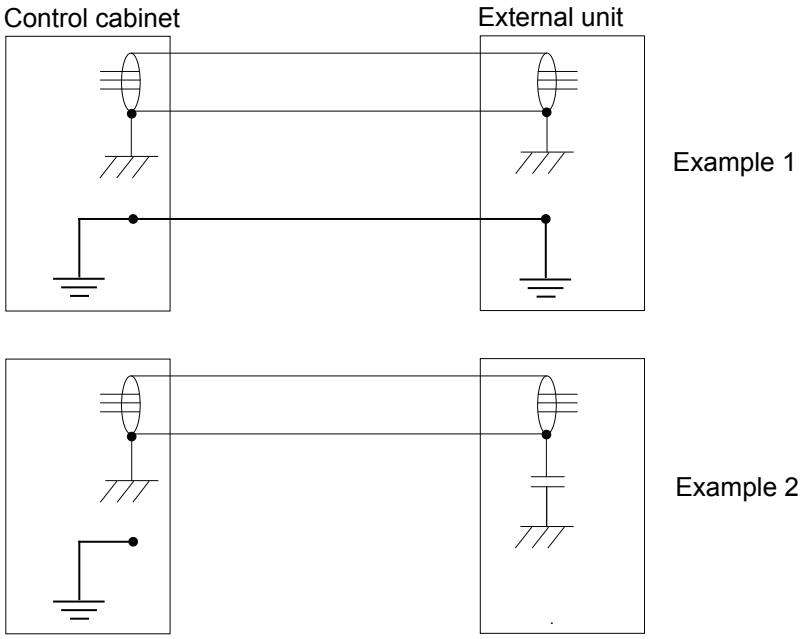
For information on how to connect protective earth for the manipulator, see the corresponding product manual.

Examples

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

Continues on next page

3.5.2 Connecting cables to the controller
Continued



xx1200000960

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:

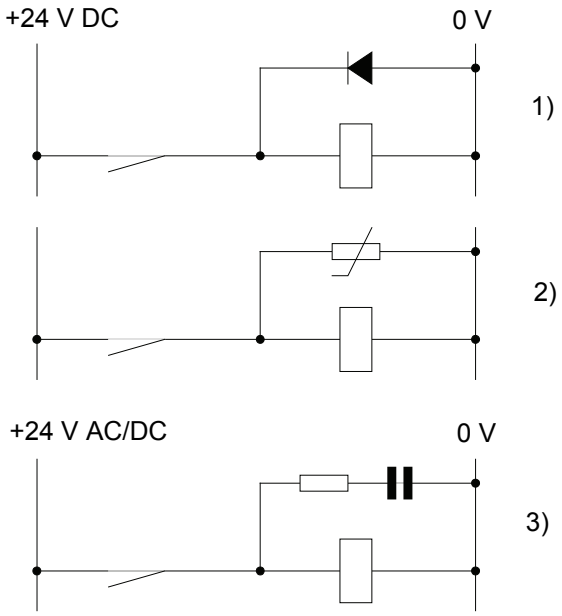
- If the cable is terminated where a good earth connection is not available a noise suppression capacitor can be used. The screens of the 2 cables must be connected as shown in the figure, but not connected to the chassis of the unit.

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.

Continues on next page



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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 needs to be dimensioned for >500 V max voltage and 125 V nominal voltage.

   The resistor should be 100 Ω, and the capacitor should be 1W 0.1 - 1 µF (typically 0.47 µF).

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 C30 Type A controller on page 88*.

> **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 488*.

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

Connector	Connector article number	Description
Connector AC power inlet	3HAC085566-001	IEC 60320 C19 connector As this is a standard connector, it is suggested to use the normal method to fit the connector.

Specifications

The following describes the cable requirements for the incoming mains connection to the OmniCore C30 Type A controller.

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

Included parts

The following parts are included in the delivery.

Procedure

Use the following procedure to fit the connectors.

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 99*.

DANGER

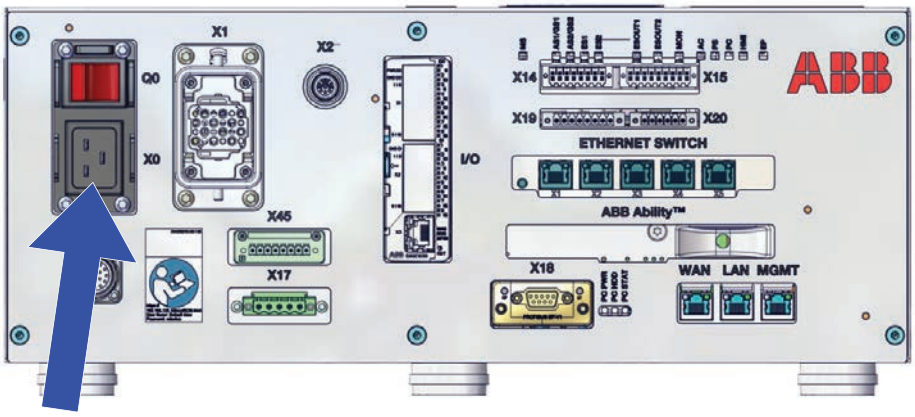
A residual current device (RCD) must be installed. See *Residual current on page 43*.

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 102*.
- The cabinet must be connected to protective earth. See *Connection of protective earth on page 100*.
- A residual current device (RCD) must be installed. See *Residual current on page 43*.

Location of incoming mains connection



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Connection of protective earth

Note

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

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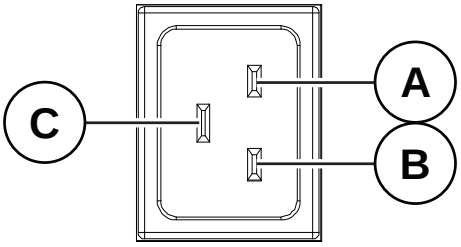

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	Description
A	Live (L1)
B	Neutral (N) or Live (L2)
C	Protective Earth (PE), grounding

Required equipment

Equipment	Note
Main connection cable (single phase)	L, N, PE Details see *Fitting the connector for incoming mains on page 99*.
External earth fault protection (residual current device, RCD)	30 mA
Standard toolkit	See *Standard toolkit for controller on page 458*.
Circuit diagram	*Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*, *3HAC086302-010*, *3HAC089111-009*

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.

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

Continues on next page

3.5.5 Connecting incoming mains and protective earth to the controller
Continued

Line fusing

There is no integrated fuse in side OmniCore C30 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 42*.

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.

Location of FlexPendant connector

OmniCore C30 Type A

Continues on next page

3.5.6 Detaching and attaching a FlexPendant
Continued

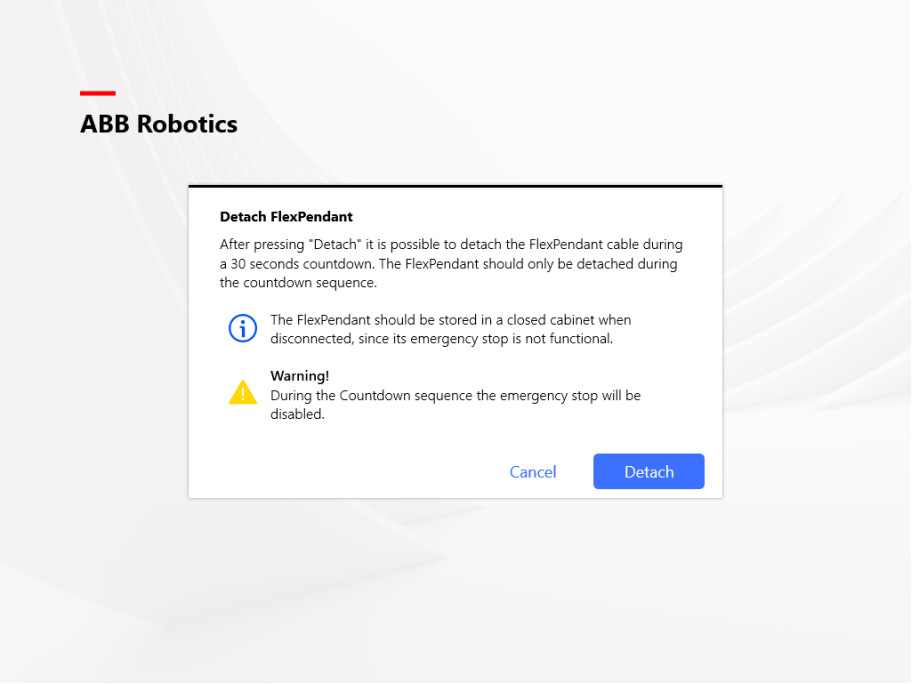
xx2400000022

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**.
   The **Detach FlexPendant** window is displayed.

Continues on next page



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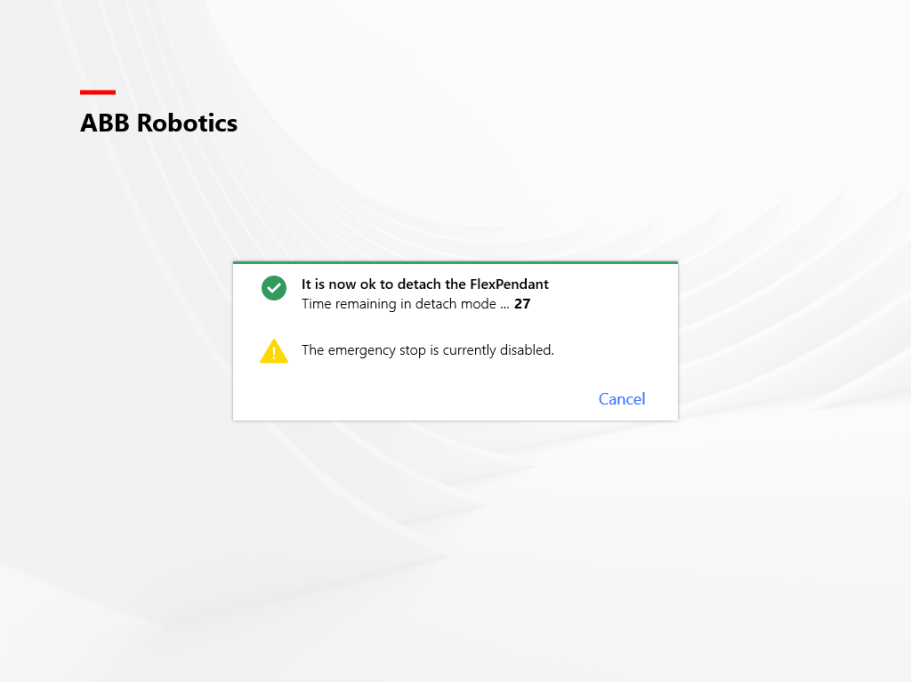
4 Tap **Detach**.

A popup window with 30 seconds countdown timer is displayed.



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5 When the countdown is progressing, detach the FlexPendant.

When detached, the FlexPendant will shut down.

Continues on next page

3.5.6 Detaching and attaching a FlexPendant
Continued

Note

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

WARNING

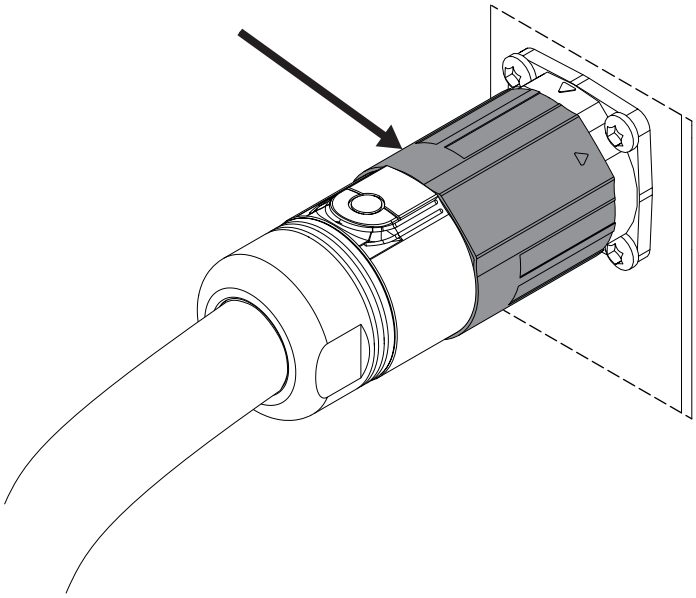
If the FlexPendant is detached after the 30 seconds countdown has passed, the controller will enter emergency stop state.

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.



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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	I/O (Scalable I/O) ETHERNET SWITCH	Process equipment local to this specific robot.
	MGMT (Management)	ABB service personnel.
	HMI (FlexPendant)	FlexPendant connection.
Ability Network	ABB Ability™	ABB Ability™ connection.
Public Network	WAN	Public/factory network.
I/O Network	LAN	Secondary public/factory network. Isolated from WAN.

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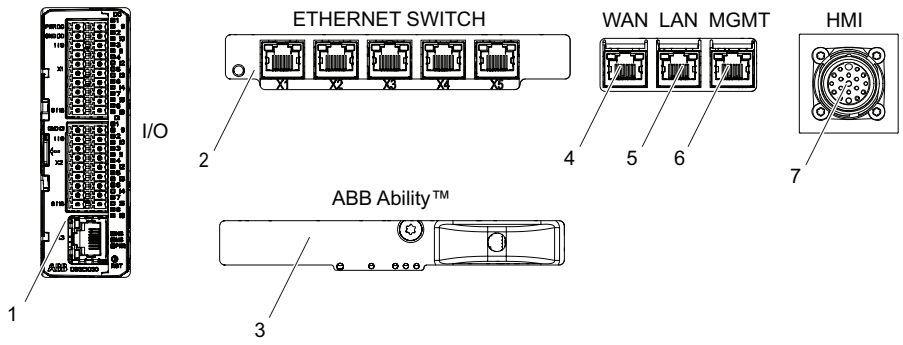
3.5.7 Ethernet networks on OmniCore
Continued

Connectors



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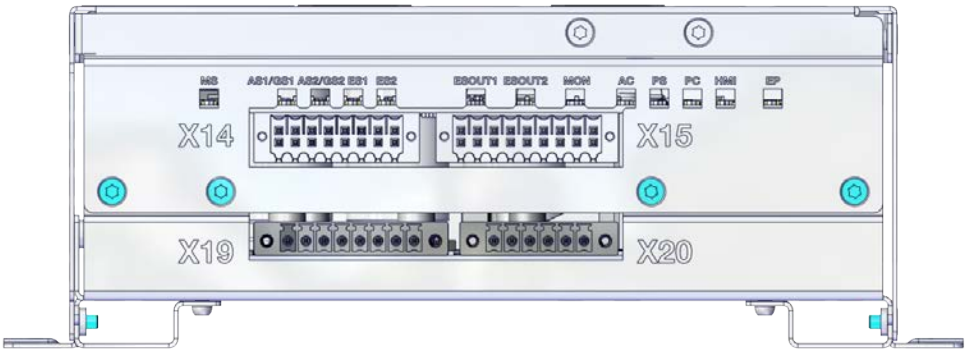
	C line/V line controller label	Description
1	I/O	ABB Scalable I/O. Connected to the controller's Private Network. Intended for chaining more ABB Scalable I/O units.
2	ETHERNET SWITCH	Connected to the controller's Private Network. Intended for connecting ABB Scalable I/O units and network based process equipment local to the controller.
3	ABB Ability™	Intended for connecting the controller to internet/ABB Ability™.
4	WAN	Connected to the controller's Public Network. Intended for connecting the robot controller to a factory wide industrial network.
5	LAN (C30) LAN3 (C90XT and V line)	Connected to the controller's I/O Network. Intended for connecting the robot controller to a factory wide industrial network isolated from WAN.
6	MGMT (Management)	Connected to the controller's Private Network. The MGMT port shall be used by service personnel in close proximity to the controller, with a single client connected to the controller. **Note** 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.
7	HMI (FlexPendant)	Specific connector for connecting the FlexPendant.

3.5.8 Descriptions for connectors

Robot signal exchange proxy mating connectors



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CAUTION

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

Connector X14

	Description
Connection	Customer Safety Interface: Automatic Stop/General Stop and external Emergency Stop
Type	Weidmüller B2CF 3.50/16/180F B2CF 3.50/16/180F SN OR BX 2*8 pins
Article number	3HAC064736-001

The connector X14 allows for connecting *protective stop* and *emergency stop* devices.

The input for protective stop can either be configured as *Automatic Stop* (AS) or *General Stop* (GS). *Automatic Stop* is only operational in automatic mode. *General Stop* is operational in both manual mode and automatic mode. See *Protective stop and emergency stop on page 23*.

The default configuration for the protective stop function is *Automatic Stop* (AS). That is, active in automatic mode only.

Changes to the default configuration for the protective stop function, that is from *Automatic Stop* (automatic mode) to *General Stop* (both manual and automatic mode), are done in RobotStudio, **Visual SafeMove**. See *Configuring robot stopping functions on page 124*. 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.

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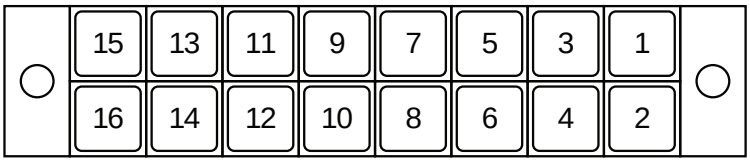
3.5.8 Descriptions for connectors
Continued

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



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Pin	Name	Description
1	0V_CH1_CH2	Reference ground towards 24 V.
2	24V_CH2	24 V power, provided by robot controller, for ES channel 2 only.
3	ES2-	Negative side of external emergency stop input, channel 2.
4	ES2+	Positive side of external emergency stop input, channel 2.
5	ES1-	Negative side of external emergency stop input, channel 1.
6	ES1+	Positive side of external emergency stop input, channel 1.
7	0V_CH1_CH2	Reference ground towards 24 V.
8	24V_CH1	24 V power, provided by robot controller, for ES channel 1 only.
9	0V_CH1_CH2	Reference ground towards 24 V.
10	24V_CH2	24 V power, provided by robot controller, for AS/GS channel 2 only.
11	AS2/GS2-	Negative side of AS/GS input, channel 2. Customer needs to connect these pins to the reference ground of 24 V power.
12	AS2/GS2+	Positive side of AS/GS input, channel 2. Customer needs to connect these pins to a 24 V power.
13	AS1/GS1-	Negative side of AS/GS input, channel 1. Customer needs to connect these pins to the reference ground of 24 V power.
14	AS1/GS1+	Positive side of AS/GS input, channel 1. Customer needs to connect these pins to a 24 V power.
15	0V_CH1_CH2	Reference ground towards 24 V.
16	24V_CH1	24 V power, provided by robot controller, for AS/GS channel 1 only.

Note

The emergency stop and protective stop will activate when the voltage is between 11.4 V and 21.5 V.

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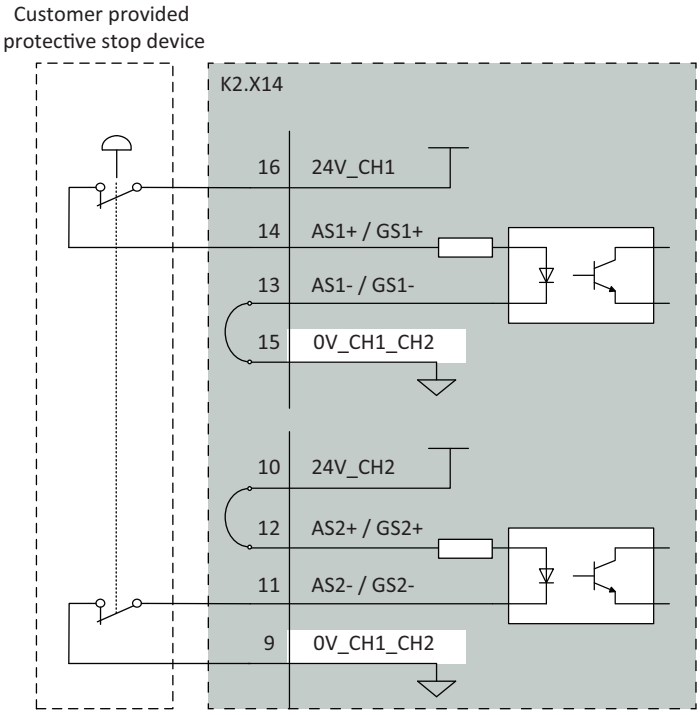
A protective stop device needs to be connected to the protective stop input. See example below.



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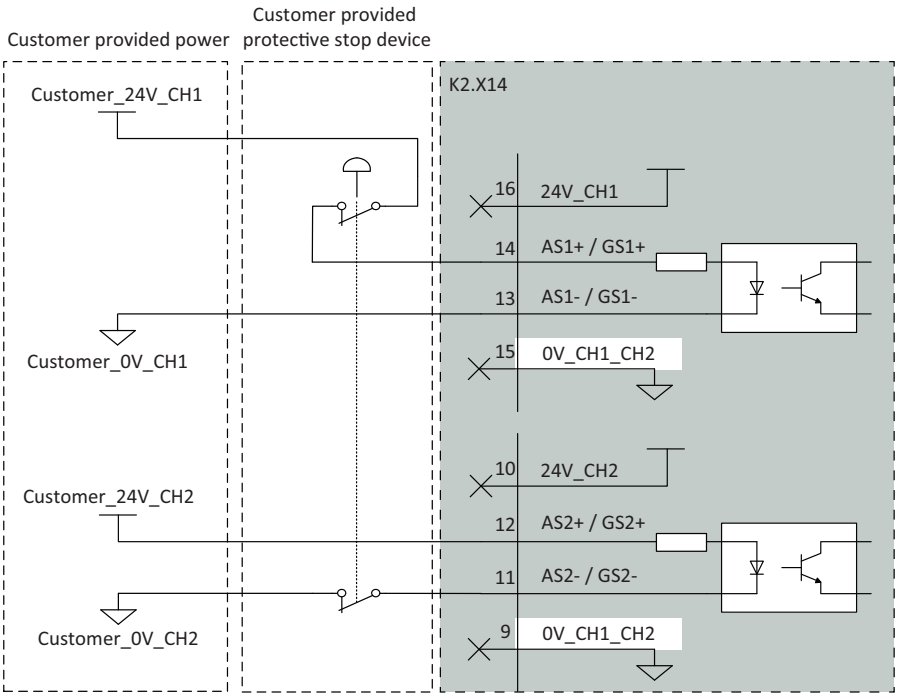
The protective stop input can be powered from an external power supply:



xx2100002264

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

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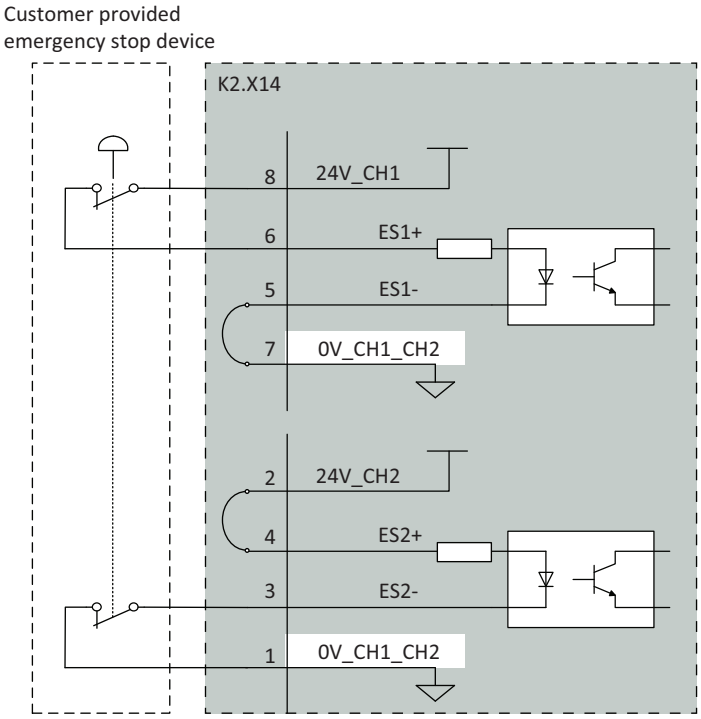
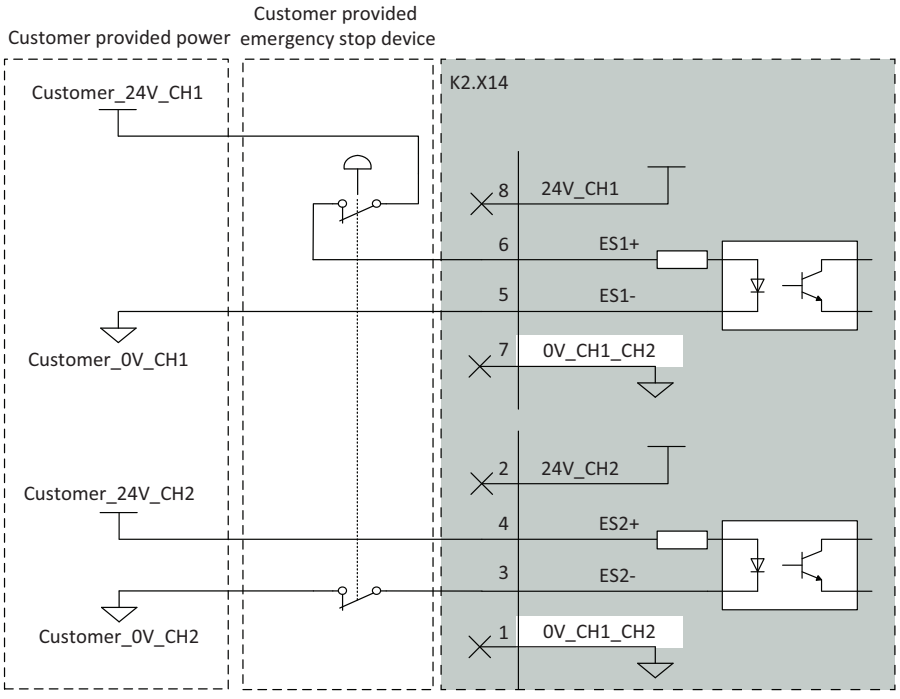
3.5.8 Descriptions for connectors
Continued



xx2100002261

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



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

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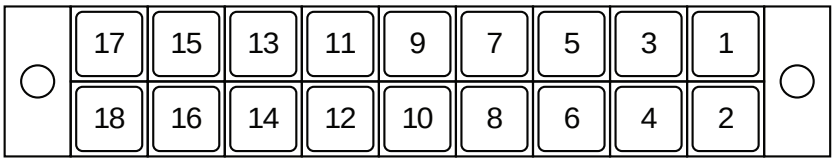
Connector X15

	Description
Connection	Customer Optional Interface
Type	Weidmüller B2CF 3.50/18/180F B2CF 3.50/18/180F SN OR BX 2*9 pins
Article number	3HAC064737-001



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Note

NC means those pins are reserved. They cannot be electrically connected to any external signal, ground, or voltage.

Pin	Name	Description
1	MON_PB	Motors on push button input interface.
2	24V_MON	24 V power supplied by robot controller for motors on lamp and motors on push button use only. It must not be used for any other functions.
3	MON_LAMP	Motors on lamp output interface. The max sink current is 50mA.
4	24V_MON	24 V power supplied by robot controller for motors on lamp and motors on push button use only. It must not be used for any other functions.
5	NC	Reserved
6	NC	Reserved
7	NC	Reserved
8	NC	Reserved
9	NC	Reserved
10	NC	Reserved
11	ESOUT2-	Negative side of emergency stop output, channel 2.
12	ESOUT2+	Positive side of emergency stop output, channel 2.
13	ESOUT1-	Negative side of emergency stop output, channel 1.
14	ESOUT1+	Positive side of emergency stop output, channel 1.
15	NC	Reserved
16	NC	Reserved

Continues on next page

3.5.8 Descriptions for connectors
Continued

Pin	Name	Description
17	NC	Reserved
18	NC	Reserved

Note

The ESOUT1 and ESOUT2 fulfill the IEC 61131-2 current-sourcing digital output Type 0,25.

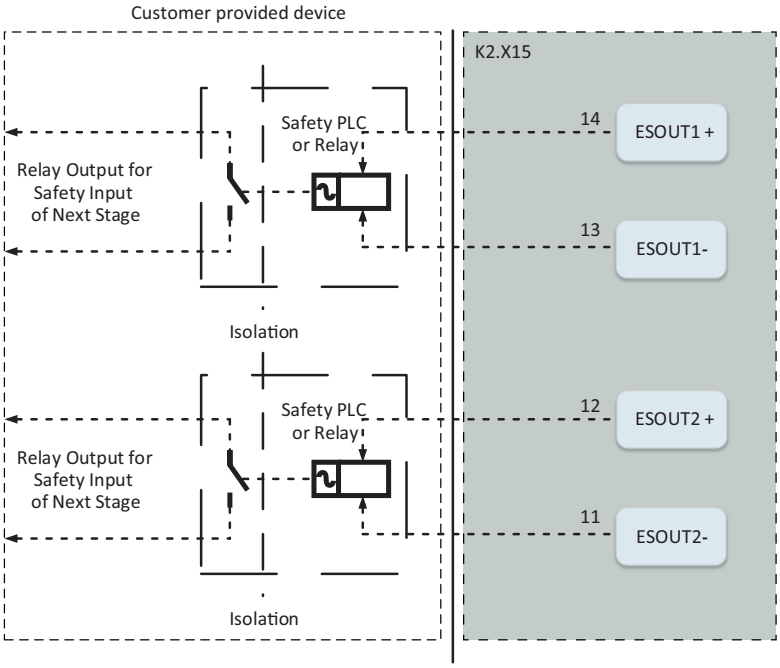
0V DC as nominal state 0. State 0 shall be recognized as Emergency stop triggered. 24V DC as nominal state 1. State 1 shall be recognized as normal status.

It is not allowed to connect these power sourcing discrete digital outputs to any external power sources.

Note

The device connected to the ESOUT pins shall fulfill the IEC 61131-2 Type 1 Input.

If the device cannot meet the requirement, a safety PLC or relay is needed.



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Note

The maximum length of the cable connected to the ESOUT pins shall be 10 m.

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Note

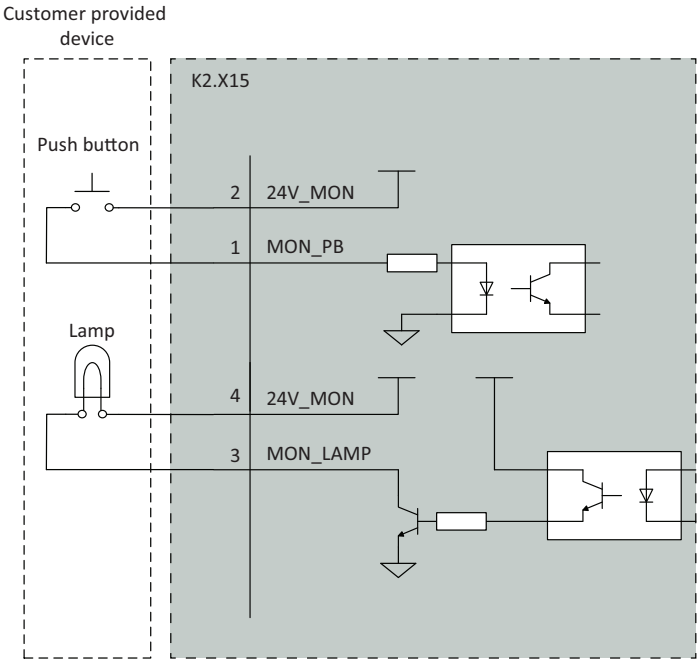
The cable shall be protected from external EM disturbance, suggested to use separate multicore cables.

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, when using RobotWare 7.6 or later. On controllers running RobotWare releases prior to 7.6, it is not recommended to directly connect ESOUT pins to the ES pins on another OmniCore controller. See *Configuring robot stopping functions on page 124*.

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.



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Connector X19

	Description
Connection	Connector for 24V_IO_EXT output
Type	Weidmüller BCF 3.81/08/180F BCF 3.81/08/180F SN BK BX 8 Pins
Article number	3HAC064739-001

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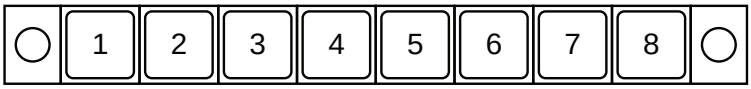
3.5.8 Descriptions for connectors
Continued



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Pin	Name	Description
1	24V_IO_EXT_1	24V_IO_EXT
2	0V_IO_EXT_1	0V_IO_EXT
3	24V_IO_EXT_2	24V_IO_EXT
4	0V_IO_EXT_2	0V_IO_EXT
5	24V_IO_EXT_3	24V_IO_EXT
6	0V_IO_EXT_3	0V_IO_EXT
7	24V_IO_EXT_4	24V_IO_EXT
8	0V_IO_EXT_4	0V_IO_EXT

24V_IO_EXT provides the 24 V power supply for the customer. The characteristics are shown in the following table.

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

Connector X20

	Description
Connection	Connector for 24V_EXT input (Not available)
Type	Weidmüller BCF 3.81/06/180F BCF 3.81/06/180F SN BK BX 6 Pins
Article number	3HAC064738-001

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 61*.

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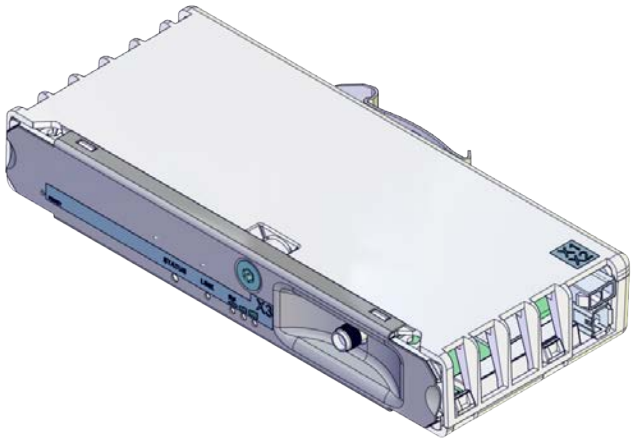

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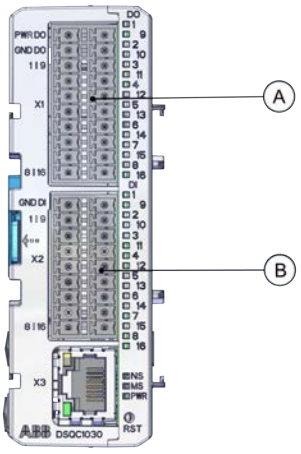
I/O connectors - Scalable I/O (option)



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A	Scalable I/O output connectors
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 C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*, *3HAC086302-010*, *3HAC089111-009* and *Application manual - Scalable I/O*, *3HAC070208-001*.

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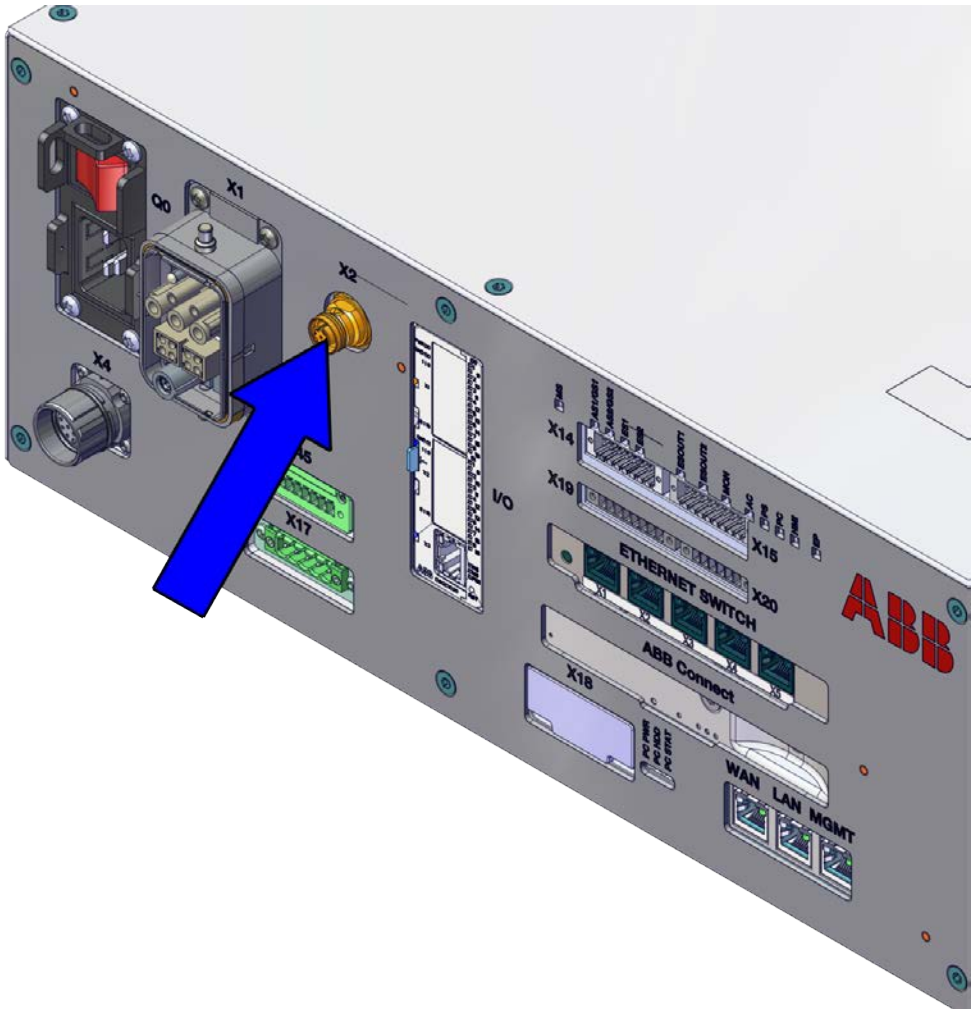
3.5.8 Descriptions for connectors
Continued

X2 harness CFI connection[3]



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The X2 is provided for CP/CS connection with the robot for the customer. It is only valid for the CRB 15000 robot. There is no voltage and current protection inside the CFI connection harness. An external fuse or certified limited power supply is recommended for protection purpose with the characteristics in the following table.

Description	Data
Max input voltage	30 VDC
Max input current (CP pins 7,8)	3 A
Max input current (CS pins 1,2,3,4)	0.5 A
CS twist pairs	Yes (pair connection pin 1 and 2, 3 and 4)
Connector type	M12 A-code female 8 pole according to IEC 61076-2-101 **Note** The CFI mating connection harness is an option (3067-1) in OmniCore controller.

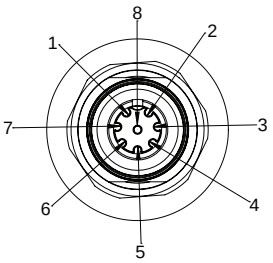
3 **Only valid for CRB 15000 robot**

Continues on next page

Note

The voltage drop may exceed 5% when using a 15 m-length hybrid floor cable. The voltage drop can be compensated by increasing input voltage (max.30V).

The pins definition for the harness CFI connection is described in the following illustration.



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Pin	Definition	Wire color of CFI mating connection harness
1	CS pair1+	White-Blue
2	CS pair1-	Blue
3	CS pair2+	White-Orange
4	CS pair2-	Orange
5	Not used	White-Green
6	Not used	Green
7	CP+	White-Brown
8	CP-	Brown

For connection details, see *Circuit diagram - OmniCore C30 Type A for CRB 15000, 3HAC089111-009*.

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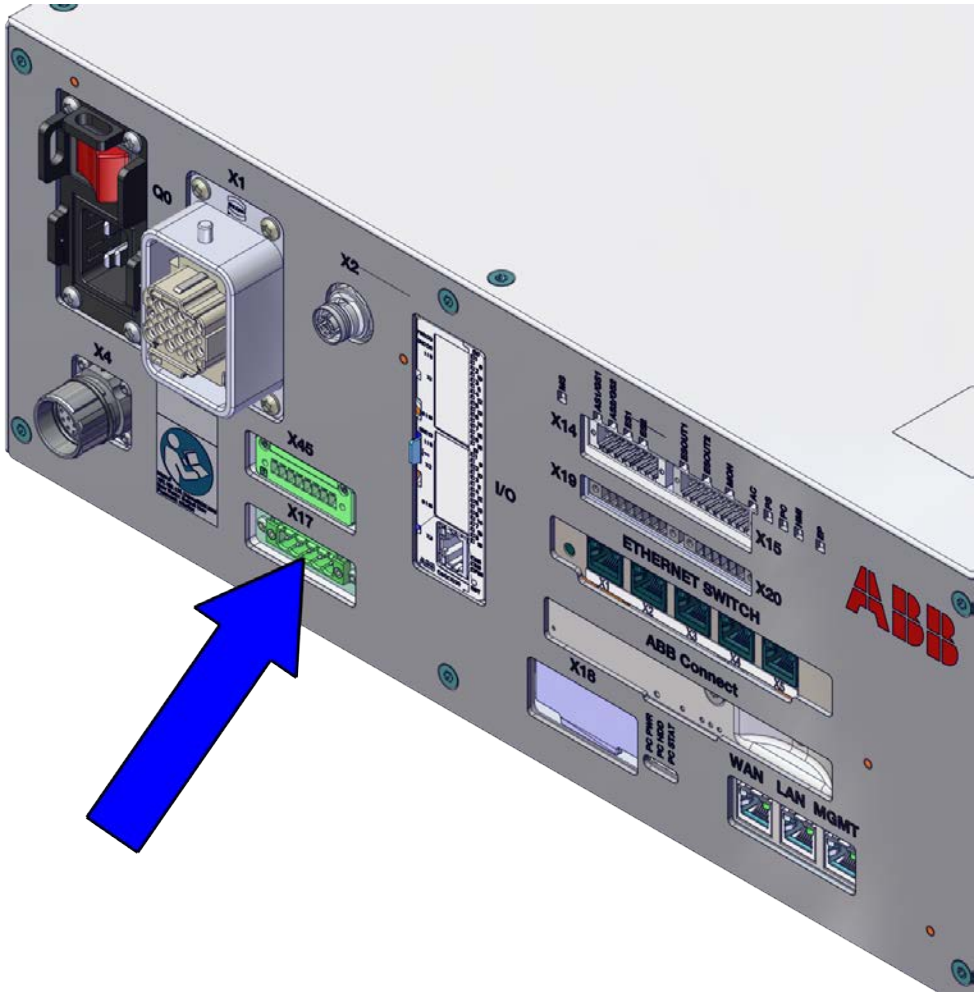
3.5.8 Descriptions for connectors
Continued

DeviceNet board connector (option)



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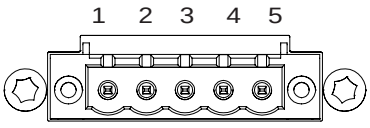

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The following table shows the connections to the DeviceNet connector:

I/O pin	Signal name	Wire color	Function
1	V-	black	DeviceNet network negative power (0 V)
2	CANL	blue	DeviceNet communication network terminal (low)
3	Shield	bare	Network cable shield
4	CANH	white	DeviceNet communication network terminal (high)
5	V+	red	DeviceNet network positive power (24 V DC)

Continues on next page

This connector is internally connected with the optional DeviceNet board (DSQC1006). The X17 is the predefined connection to the DeviceNet board in main computer for the customer.

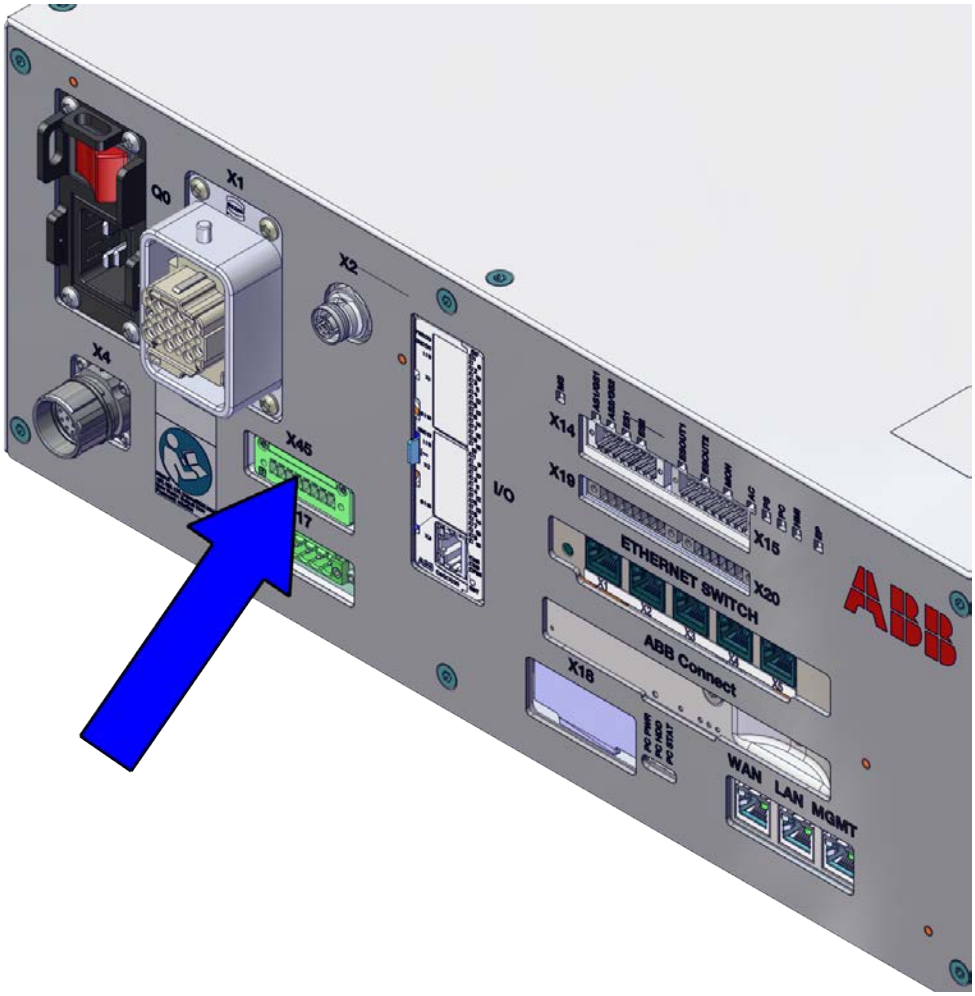
Tip

The DeviceNet network needs to be powered by a separate 24 V power supply, or the DeviceNet function will not work.

See *Application manual - DeviceNet Master/Slave*, *3HAC066562-001*, section "Hardware overview" for more information on how to connect 24 V to the DeviceNet network.

For connection details, see *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*, *3HAC086302-010*, *3HAC089111-009*.

X45 - IP20 power outlet connector (option)



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3.5.8 Descriptions for connectors
Continued

This connector is internally connected with the optional power supply (DSQC3035). The X45 is the 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	8 A

Note

The 24 V power supply from the X45 is isolated from the controller internal logical circuit.

The 24 V power supply from the X45 is neither monitored, or on/off controlled by the controller. Residual voltage may remain shortly o X45 after turning-off the controller.

For connection details, see *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*, *3HAC086302-010*, *3HAC089111-009*.

Note

Connector Single-row female is delivered with the controller.

Conveyor tracking module (option)

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

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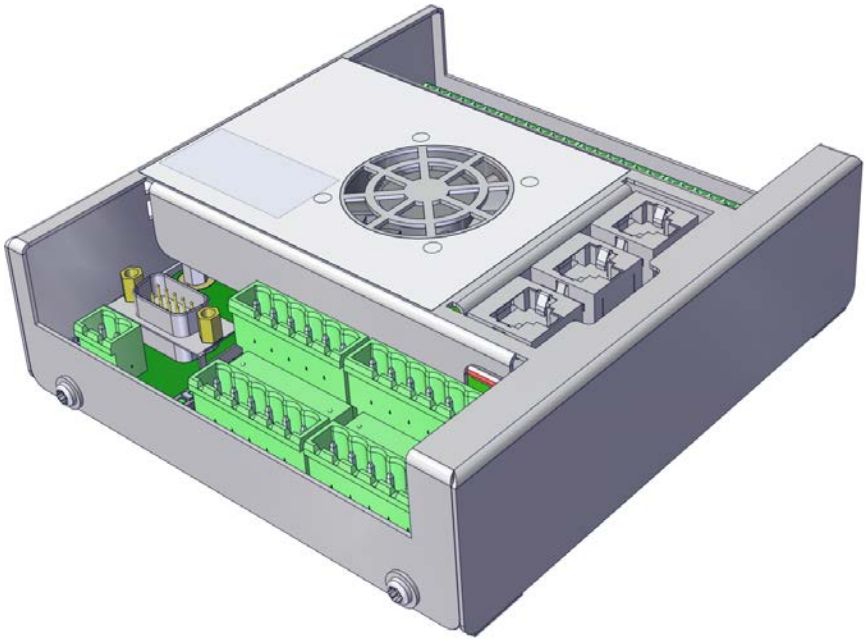

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Customer cable layout

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.

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 can be configured to be either an *Automatic Stop* (AS) or a *General Stop* (GS). When the protective stop function is configured as *General Stop* (GS), the activation of the protective stop device will initiate the protective stop in any operating mode. When the protective stop function is configured as *Automatic Stop* (AS), the activation of the protective stop device will initiate the protective stop in automatic mode only.

Note

It is not possible to configure both *Automatic Stop* and *General Stop* on the OmniCore C30 Type A without the use of a safe fieldbus.

Note

The dedicated discrete safety input to activate the protective stop function can be configured as either *Automatic Stop* (AS) or *General Stop* (GS). For simultaneous use of AS and GS, support for a safety protocol is required. See option SafeMove.

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**.

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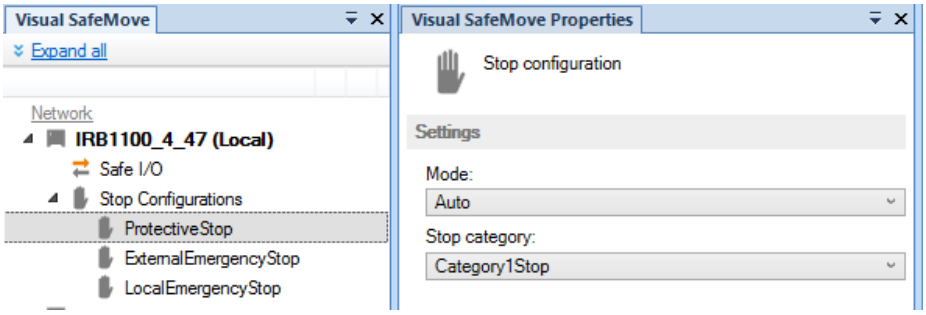


xx2100000737

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
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).
   - *ProtectiveStop* is the AS/GS input
   - *ExternalEmergencyStop* is the ES input

     To avoid dead-lock in an emergency stop chain, the *ExternalEmergencyStop* input can be decoupled from the ES output.
   - *LocalEmergencyStop* is the emergency stop device on the FlexPendant
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.

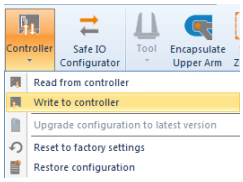
Tip

See also the circuit diagram, *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*.

Continues on next page

3.5.9 Configuring robot stopping functions
Continued

Apply the configuration to the controller

	Action	Note/illustration
1	In the **Visual SafeMove** ribbon, click on **Controller** and then select **Write to controller**.	 xx1500000801
2	A report of the safety configuration is shown. The report can be printed by clicking on **Print** (it is recommended to print the report since it should be used when validating the configuration). Click OK to close the report.	
3	Answer **Yes** 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 *Validate the configuration of robot stopping functions on page 126*.

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: • **Auto**: Automatic mode • **General**: All modes • **EmergencyStop**: All modes	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.

Continues on next page

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.

RobotWare prior to 7.6

In RobotWare releases prior to 7.6, the ES input cannot be decoupled from the ES output.

The *LocalEmergencyStop* was named *InternalEmergencyStop* prior to RobotWare 7.6.

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 I/O signals. See *Application manual - Controller software OmniCore*.

The RAPID program cannot be started when any of the system input signals is high.

Pre-defined system input	Description
SoftStop	The RAPID program execution is stopped, and the manipulator is stopped on path with no deviation. This stop is similar to a normal program stop using stop button on the FlexPendant.
QuickStop	This is a faster stop of the manipulator than *SoftStop*. This stop is more stressing for the mechanics than *SoftStop*, therefore there might be a deviation on path.
Stop at End of Cycle	Stops the RAPID program when the complete program is executed, that means when the last instruction in the main routine has been completed.
Stop at End of Instruction	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 if the stop signal is set low.

Note

Only safety rated input signals are allowed to be used for safety.

Continues on next page

Stop with RAPID instructions

There are several RAPID instructions available that stops the robot.

Instruction	Description	Arguments
`SystemStopAction`	Stops all robots in all tasks immediately.	`\Stop`: similar to a normal program stop with stop button. `\StopBlock`: as above, but to restart the PP has to be moved. `\Halt`: this is like a category 0 stop, i.e. 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.
`Stop`	The current move instruction will be finished before the robot stops. A restart will continue the program execution.	`\NoRegain`: the robot will not return to the stop point when restarted, e.g. after having been jogged away. `\AllMoveTasks`: all robots will be stopped.
`StopMove`	The current move instruction will be stopped immediately as a normal program stop but the program execution will continue with the next instruction. `StartMove` must be executed to get the robot moving again.	`\AllMotionTasks`: all robots will be stopped.
`DebugBreak`	The current move instruction and the program execution will be stopped immediately as a normal program stop. A restart of the program 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 is lost and has to be reset to Main.	
`EXITCYCLE`	The current move instruction and program execution will be stopped immediately. The Program Pointer will be moved to Main and if running mode is continuous, the program will be restarted.	

Continues on next page

3.5.10 Programmable stop functions
Continued

Instruction	Description	Arguments
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.	\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. \SStop: the robot will stop on path but quicker than a normal program stop. This is similar to a system input *SoftStop*. \Sup: the robot will continue to the ToPoint. If more than one search hit is found, an error will be reported.

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.
Power fail	In the control system there is a monitoring function that can detect power failure. In such cases a stop will be initiated.
Stop at collision	In the control system there is a monitoring function that can detect collisions. In such cases a stop will be initiated.  **WARNING** Special care must be taken when restarting a machine that is stopped due to a collision. The robot might make a limited move when restarted.  **WARNING** The revolution counters might need to be updated after a collision to ensure path accuracy.

3.6 I/O system

3.6.1 Available industrial networks

General

The controller can be fitted with a number of different fieldbus adapters, fieldbus boards, and software based fieldbuses. The software based fieldbuses do not require any hardware.

The controller can be fitted with a number of different boards and software based industrial networks. The software based industrial networks do not require any hardware.

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 one slot available for installing a fieldbus board (PCIe) on the main computer, with process connectors on the front panel, and one slot for installing a fieldbus adapter (slave).

There is a slot available for installing a fieldbus board (PCIe) on the main computer, with process connectors on the front panel.

The industrial networks are connected directly to one of the Ethernet ports. See *Ethernet networks on OmniCore on page 107*.

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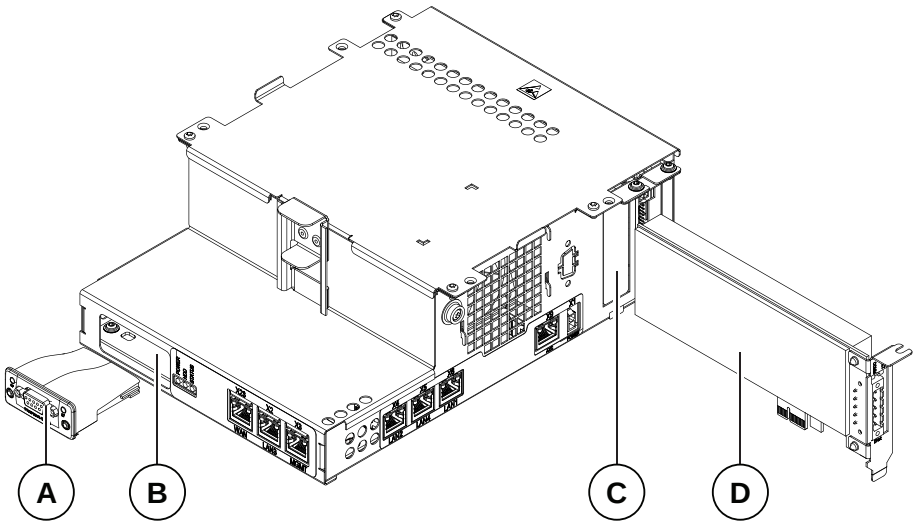
3.6.1 Available industrial networks

Continued



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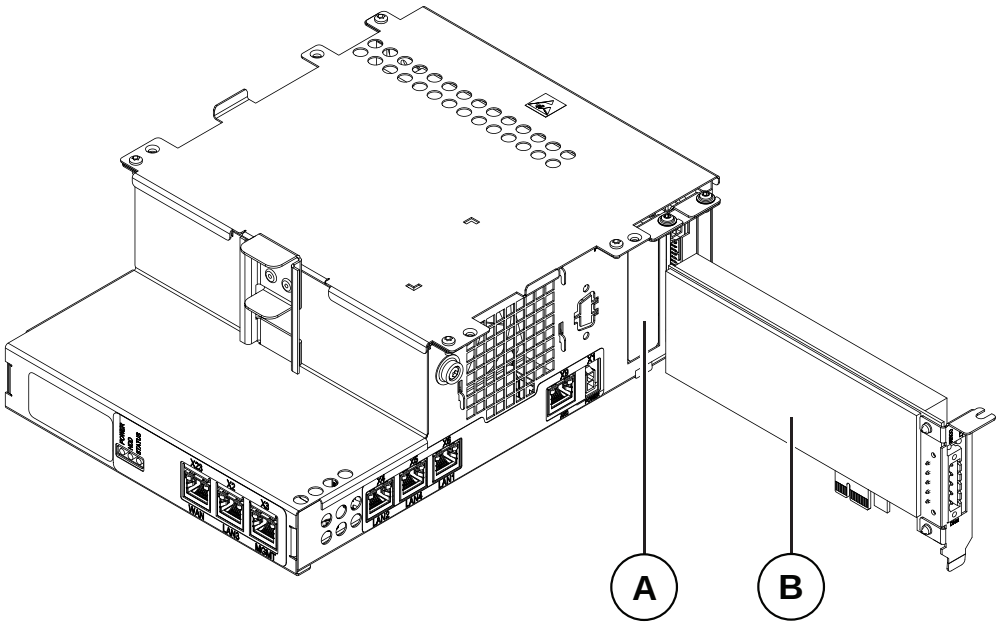
A	Fieldbus adapter (slave)
B	Slot for fieldbus adapters
C	Slot for fieldbus, PCI express card
D	Fieldbus board (master)



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A	Slot for fieldbus, PCI express card
B	Fieldbus board (master)

Available board

The following master board is available.

Description	Article number	Type designation
DeviceNet Board	3HAC043383-001	DSQC1006

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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]

Available adapter

The following fieldbus adapter slave is available.

Description	Article number	Type designation
DeviceNet Slave Fieldbus Adapter	3HAC045973-001	DSQC1004

References

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

Manual title	Article number
Application manual - I/O Engineering	*3HAC082346-001*
Application manual - DeviceNet Master/Slave	*3HAC066562-001*
Application manual - EtherNet/IP Scanner/Adapter	*3HAC066565-001*
Application manual - PROFINET Controller/Device	*3HAC066558-001*

3.6.2 Scalable I/O, internal and external

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*.

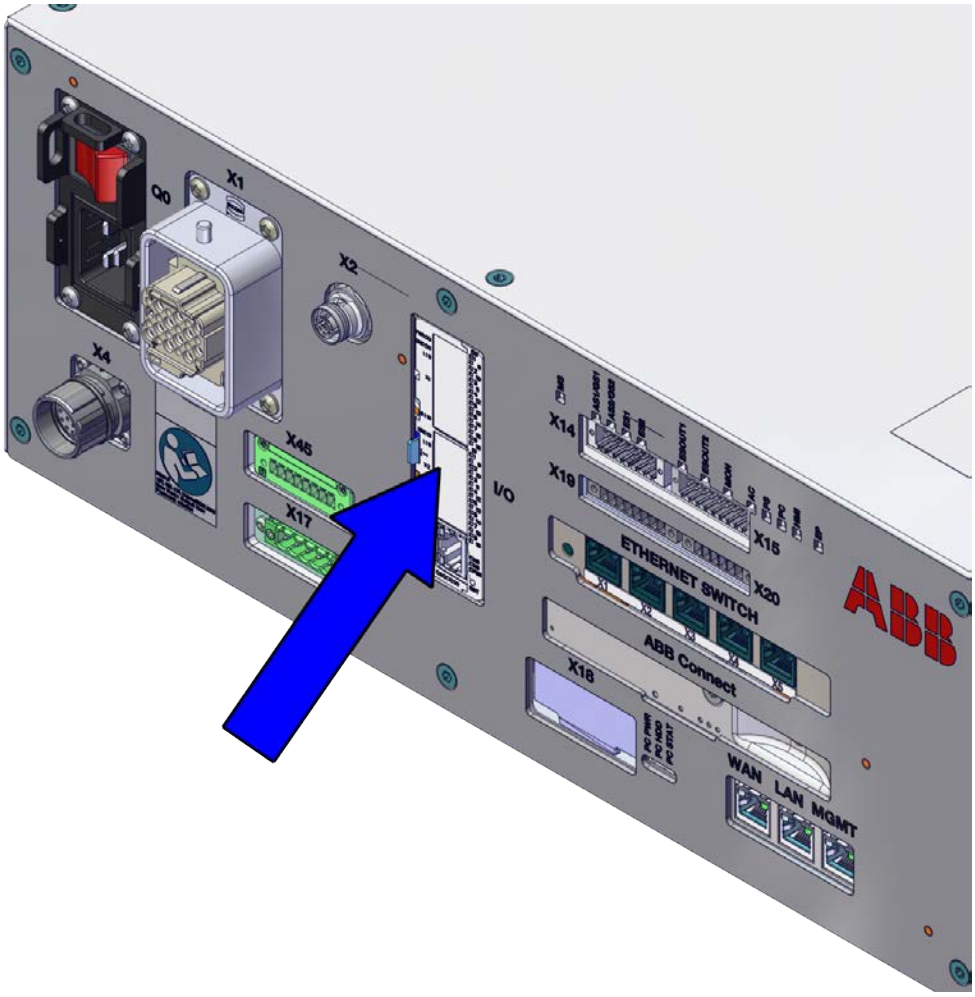
For information about installing the scalable I/O devices, see *Installing the scalable I/O devices on page 135*.

3.7 Installing options

3.7.1 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.



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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
DSQC1030 Digital slot cover	3HAC065147-001	DSQC1030
Local I/O Digital base	3HAC058663-001	DSQC1030
Connectors digital base/add on	3HAC060919-001	

Continues on next page

3.7.1 Installing the scalable I/O devices
Continued

Part	Article number	Note
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	

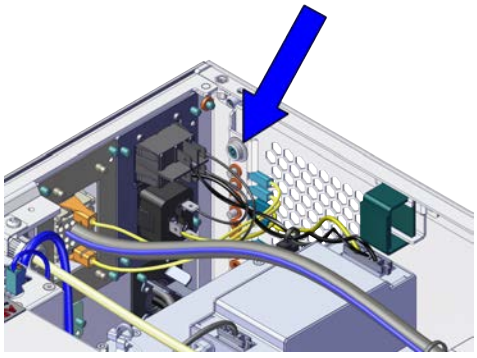
Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	
Application manual - Scalable I/O	*3HAC070208-001*	

Removing the digital slot cover (baseline)

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

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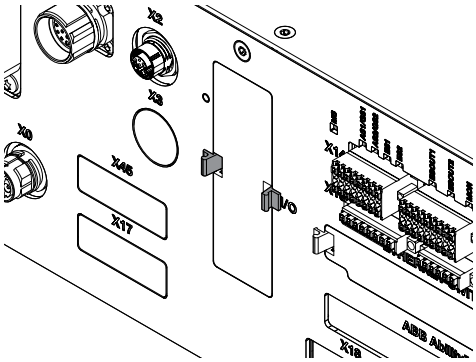
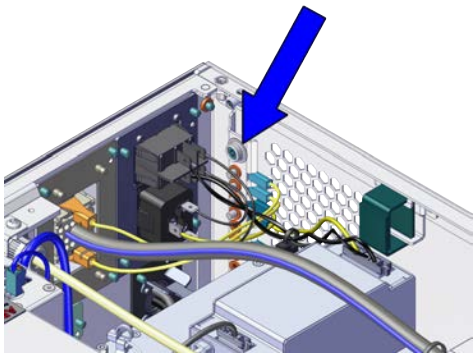
	Action	Note/Illustration
3	Press the hooks and remove the digital slot cover.	 xx1800000723
4	Remove the front panel and top cover of the controller.	*Removing the controller covers on page 200*.

Installing the scalable I/O internal base device

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

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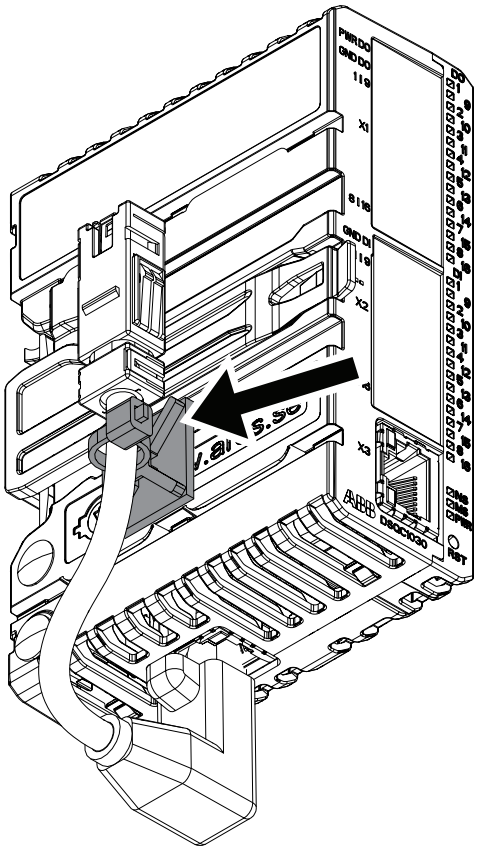
3.7.1 Installing the scalable I/O devices
Continued

	Action	Note/Illustration
3	Connect the adapter cable to the digital base. • K5.1.X5 - Harness adapter(X110) Stick the other connector onto the side of the digital base with the self-adhesive part.	 xx1800000938
4	Connect the connectors between the adapter cable (K5.1.X5 - X110) and the adaptor cable (X110 - A2.X4/K4.X7). **Note** If the Ethernet extension switch is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from K4.X7. If the Ethernet extension unit slot cover is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from A2.X4.	
5	Push the digital base into the bracket until you hear a clear clicking sound.	

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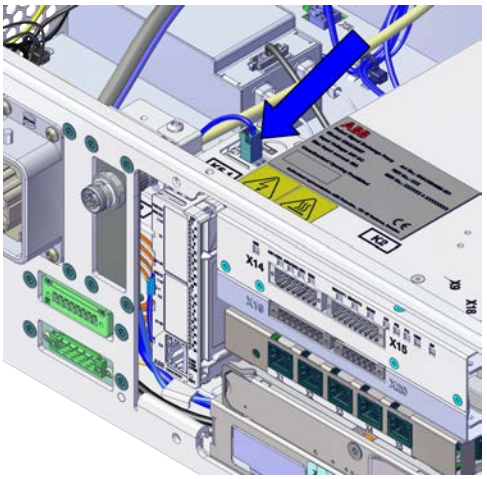
	Action	Note/Illustration
6	Connect the power cable connector: • K5.1.X4 - K2.X3	 xx2400000056

Installing scalable I/O external devices

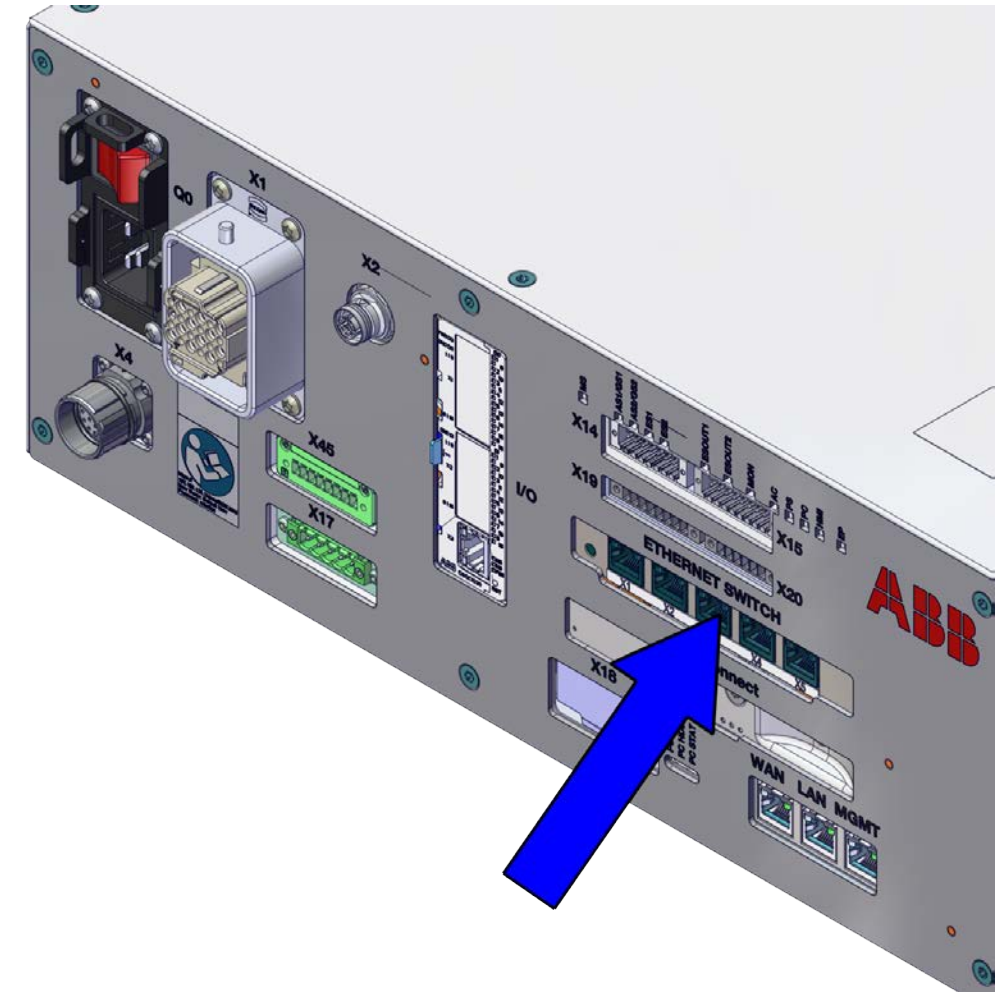
For more information about installing, configuring, and using the scalable I/O units, see *Application manual - Scalable I/O*.

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	
3	Prepare the scalable I/O units for external mounting as described in *Application manual - Scalable I/O*.	
4	Connect the external base device to the internal base device (X3) or the Ethernet switch, using an Ethernet cable.	
5	Connect an external power supply to the external base units, connector X4.	Each base device requires its own power supply.
6	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

3.7.2 Installing the Ethernet extension switch

Location

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



xx2400000028

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Ethernet Extension unit slot cover	3HAC065126-001	
Ethernet Extension switch [3014-1]	3HAC059187-001	DSQC1035
Ethernet Harness	3HAC076473-001	Harness A2.X4 - K4.X6

Continues on next page

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

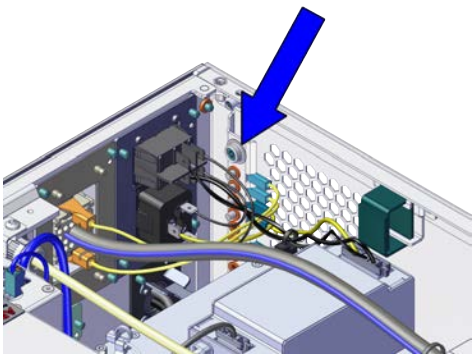
Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Installing the Ethernet extension switch

Removing the Ethernet extension unit slot cover (baseline)

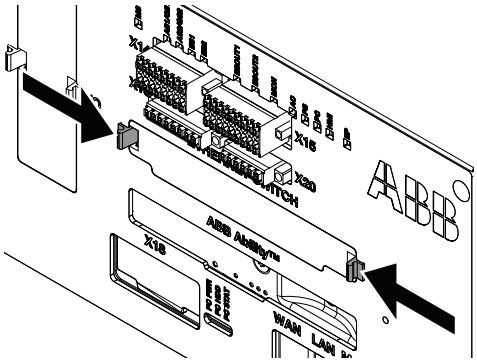
Use this procedure to remove the Ethernet extension unit slot cover.

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

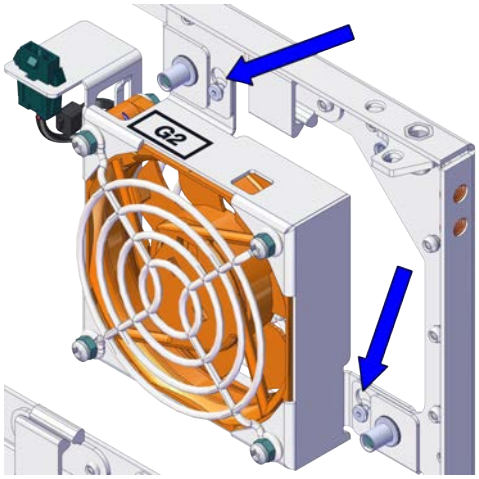
Continues on next page

3.7.2 Installing the Ethernet extension switch

Continued

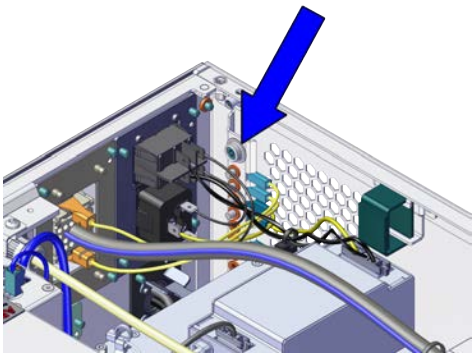
	Action	Note/Illustration
3	Press the hooks and remove the Ethernet extension unit slot cover.	 xx1800000725
4	Remove the front panel, top and right covers of the controller.	*Removing the controller covers on page 200*

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

Continues on next page

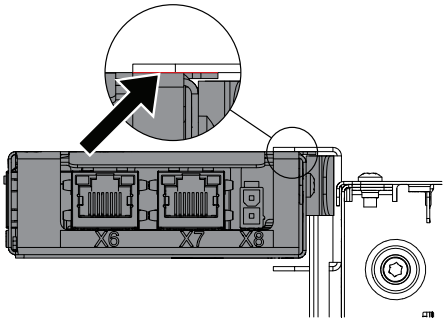
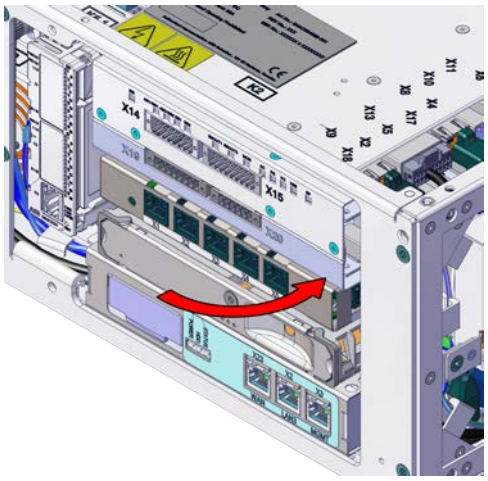
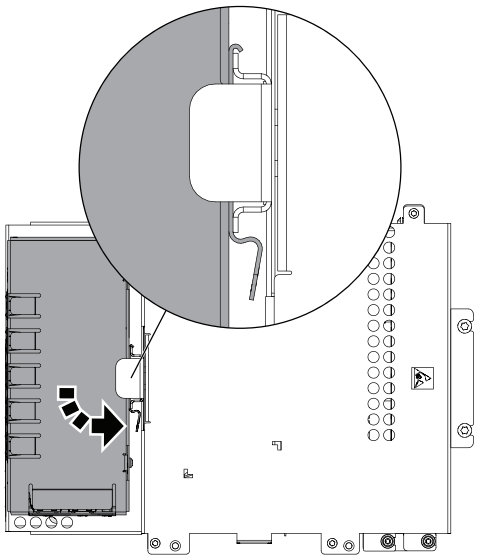
Refitting the Ethernet extension switch (option)

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

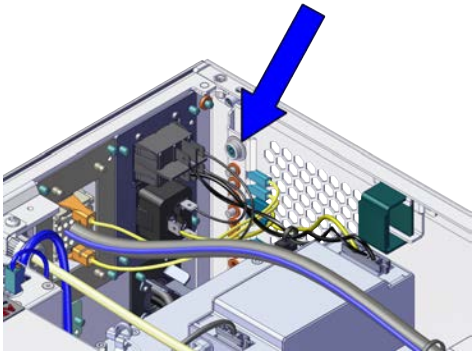
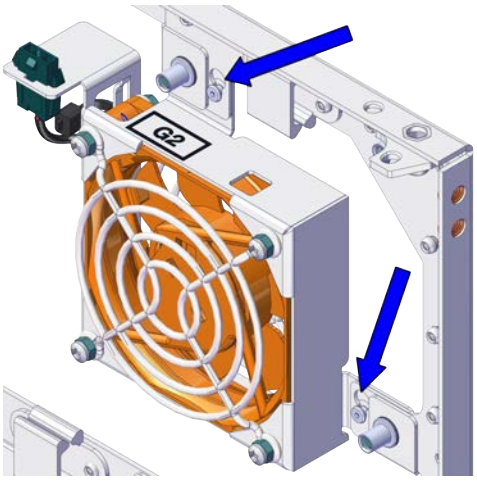
3.7.2 Installing the Ethernet extension switch

Continued

	Action	Note/Illustration
3	Hook up the Ethernet extension switch to the bracket and then push the switch into position. **Note** 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.  xx1800000972	 xx2400000051  xx1800000493
4	Reconnect: • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • (Option) Harness adapter - K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter) to/from K4.X7.	

Continues on next page

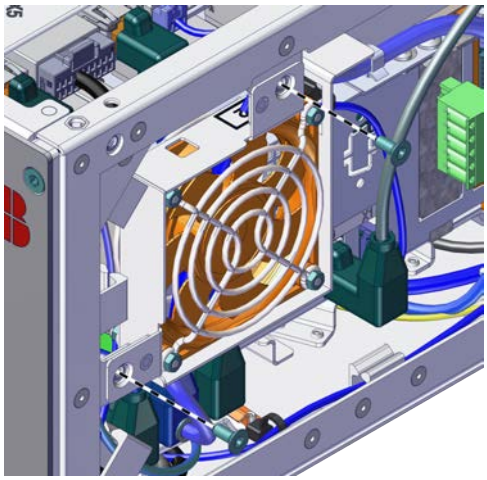
Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	
4	Refit the fan bracket into the cabinet.	 xx2400000045

Continues on next page

3.7.2 Installing the Ethernet extension switch

Continued

	Action	Note/Illustration
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

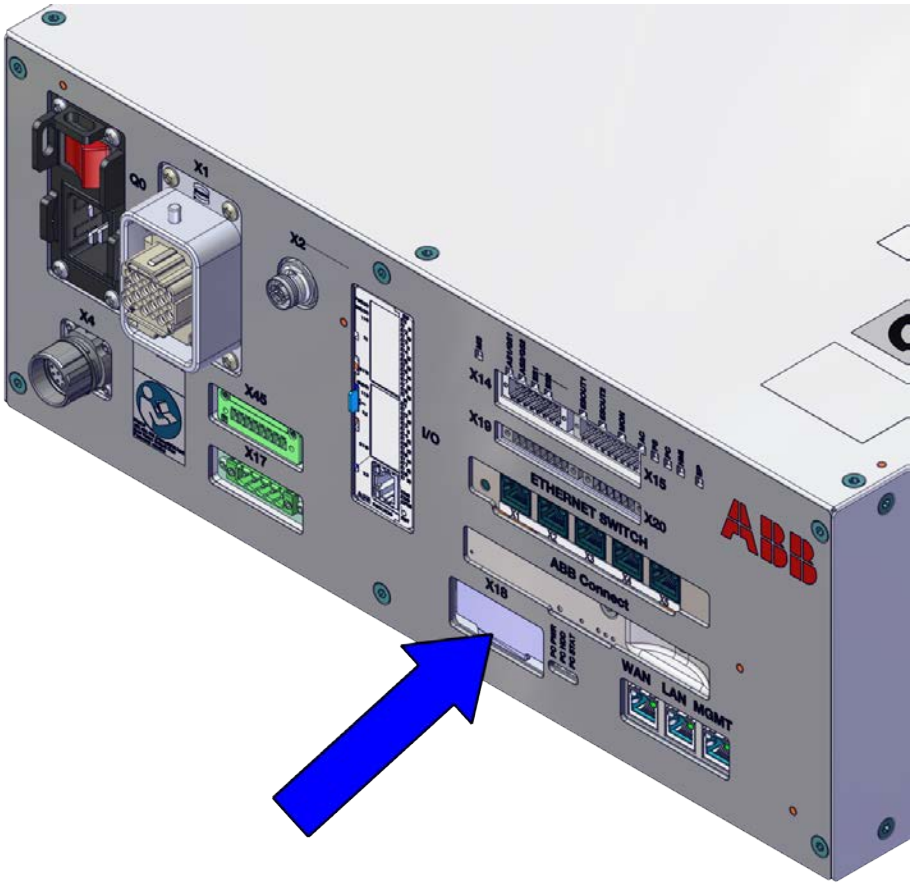
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

3.7.3 Installing the fieldbus adapter slave device

Location

The illustration shows the location of the fieldbus adapter slave devices in the controller.



xx2400000073

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Fieldbus slot cover	3HAC062390-001	

Continues on next page

3.7.3 Installing the fieldbus adapter slave device
Continued

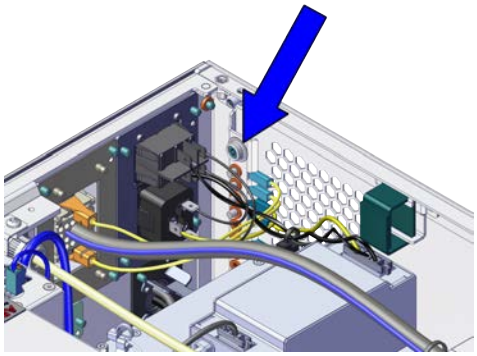
Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

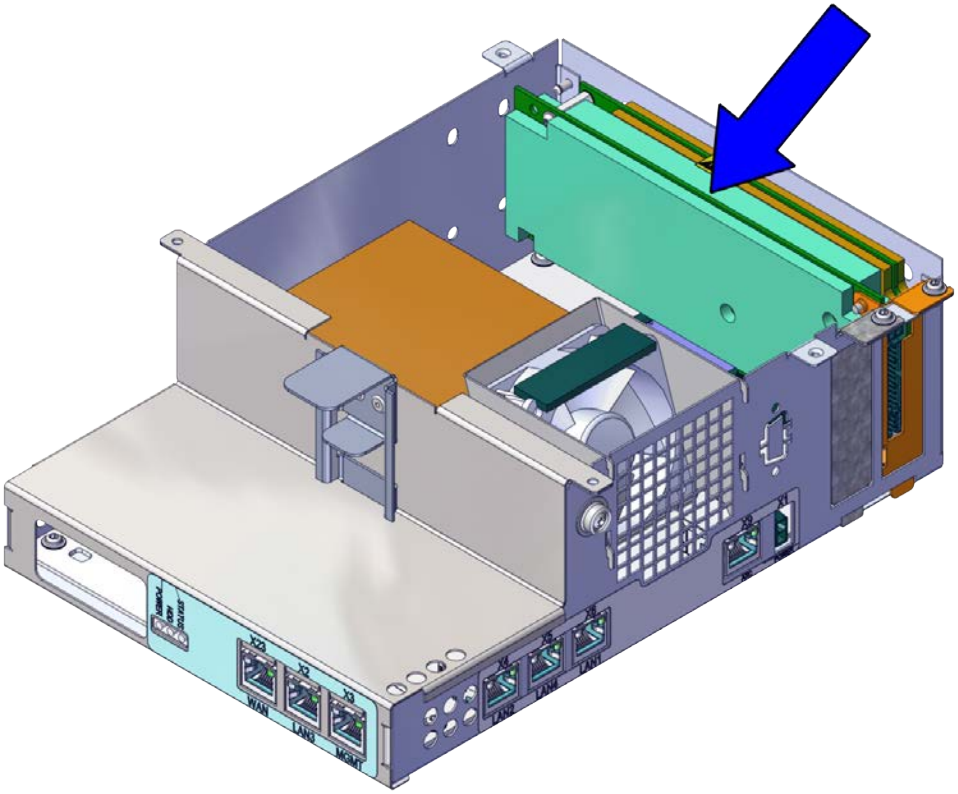
Installing the fieldbus adapter slave variants

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the fieldbus slot cover with a screwdriver.	
4	Insert the fieldbus adapter slave and secure the screws.	
5	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

3.7.4 Installing the fieldbus master and the DeviceNet harness

Location

The illustration shows the location of the fieldbus master in the main computer.



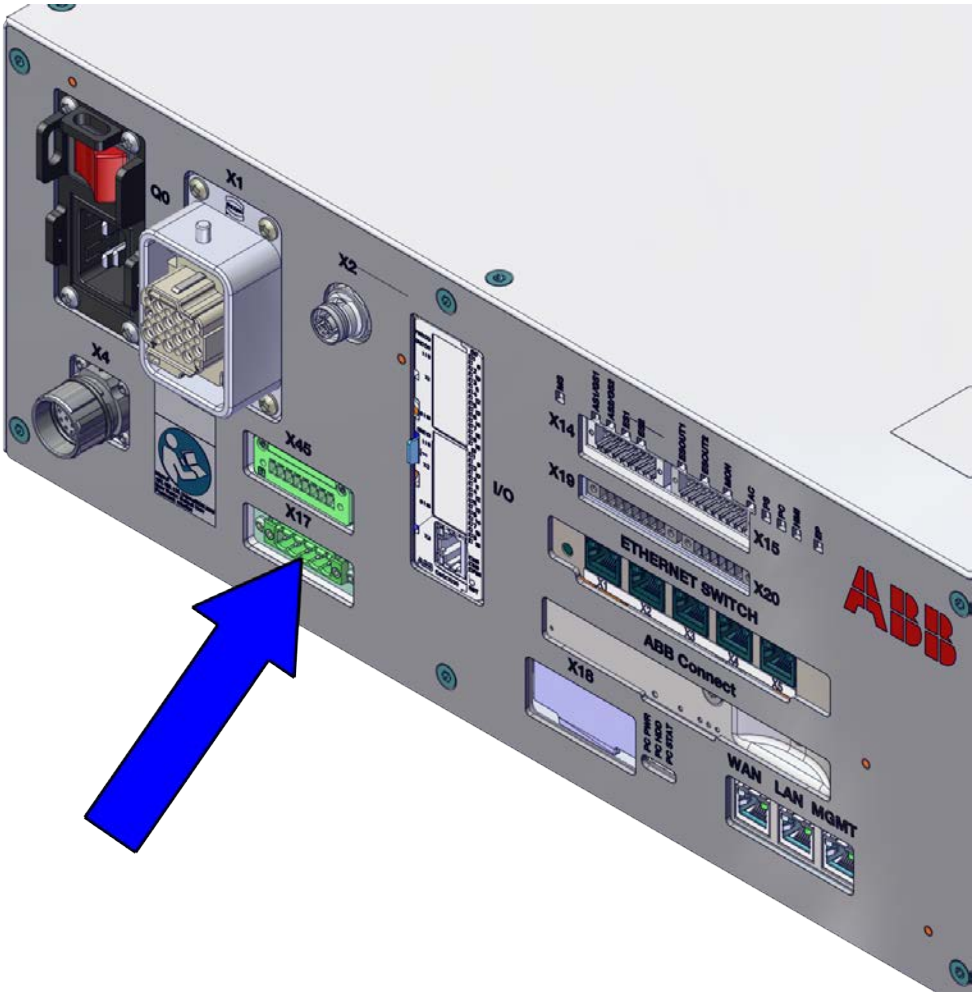
xx2400000030

Harness DeviceNet is an option of process connector.

The illustration shows the location of the harness DeviceNet in the controller.

Continues on next page

3.7.4 Installing the fieldbus master and the DeviceNet harness
Continued



xx2400000024

Note

The DeviceNet board and the DeviceNet harness must be installed at the same time.

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
DeviceNet Board	3HAC043383-001	DSQC1006
Harness DeviceNet/Harness 24V ext. cover plate	3HAC063601-001	
Harness DeviceNet connection	3HAC062150-001	DSQC1004

Continues on next page

Spare part	Article number	Note
Connector assembly Single-row female	3HAC064901-001	Mating CONN for IP20 DeviceNet connector

Required tools and equipment

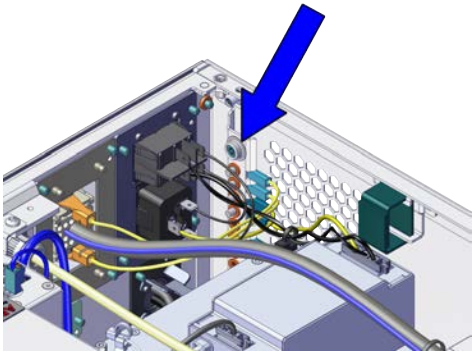
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Installing the DeviceNet board and the DeviceNet harness

Preparations

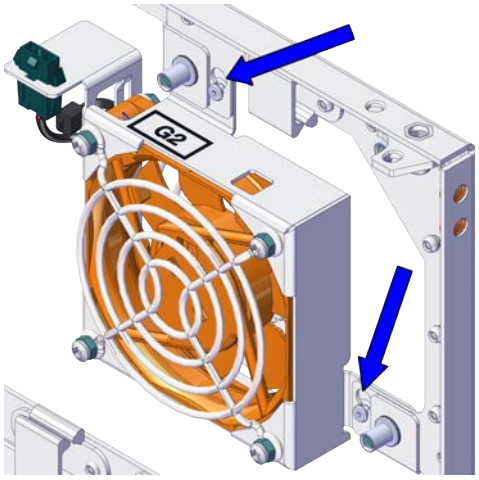
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the top and right covers, and the front panel of the controller.	*Removing the controller covers on page 200*

Continues on next page

3.7.4 Installing the fieldbus master and the DeviceNet harness

Continued

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

Removing the axis computer from the cabinet

	Action	Note/Illustration
1	Disconnect: • K6.X11 - A1.X3 • K6.X2 - A2.X9 • K6.X1 - K2.X3.	
2	Loosen the screw and disconnect: • K6.X4, K6.X5 - SMB.	

Continues on next page

Removing the main computer assembly with process plate

	Action	Note/Illustration
1	Disconnect all the connectors on the assembly group of the robot signal exchange proxy, Ethernet switch (option), connected services gateway, scalable I/O (option), and main computer.	
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - T4.X1 • K2.X3 - A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - A1.X6[4] • K2.X1 - X107[5] • K2.X17 - G2.X1, G1.X2 • K2.X9 & X13 - FlexPendant (X4)	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3[6] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

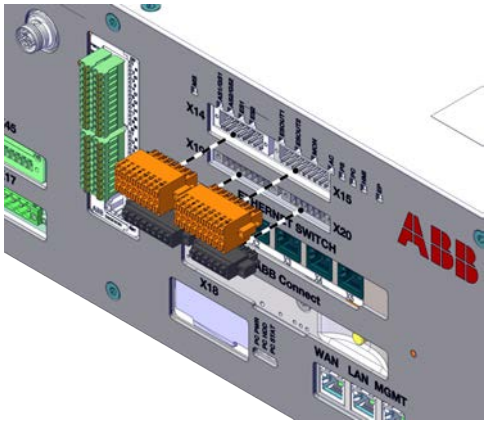
4 Not available for CRB 15000 controller.

5 Only available for CRB 15000 controller.

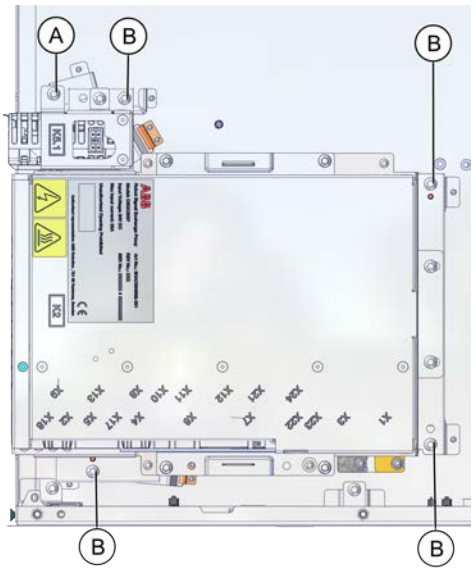
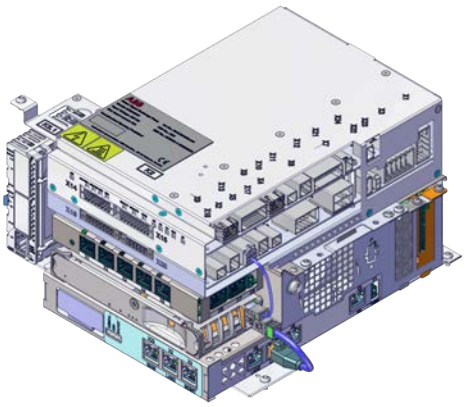
6 For connected services gateway wired, there is no power cable.

Continues on next page

3.7.4 Installing the fieldbus master and the DeviceNet harness
Continued

	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X9 - T4.X3 • A2.X9 - X1[5] • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	
2	Remove the mating connectors from the front side by loosening their attachment screws.	 xx2400000093

Continues on next page

	Action	Note/Illustration
3	Remove the screws holding the process plate and the screws holding the scalable I/O bracket.	 xx2400000094 A — Screws holding the scalable I/O bracket (1 pcs) B — Screws holding the process plate (4 pcs)
4	Pull out the process plate with the assembly from the two guide pins on the mounting plate. **Note** Avoid colliding with the frame when removing the unit.	 xx2400000095

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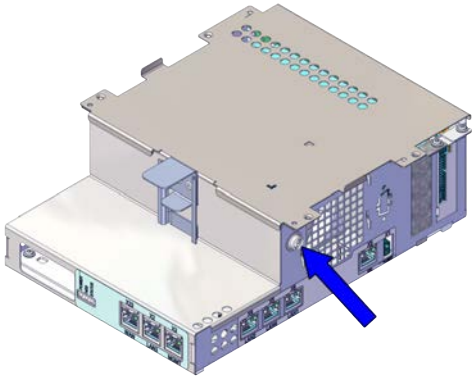
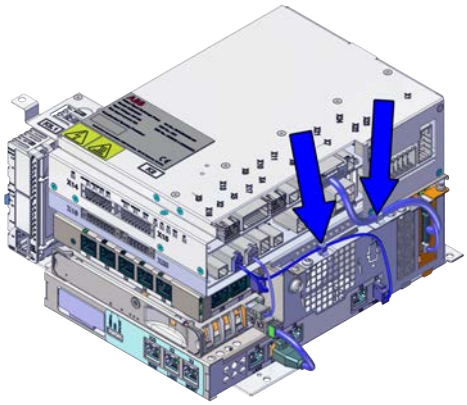
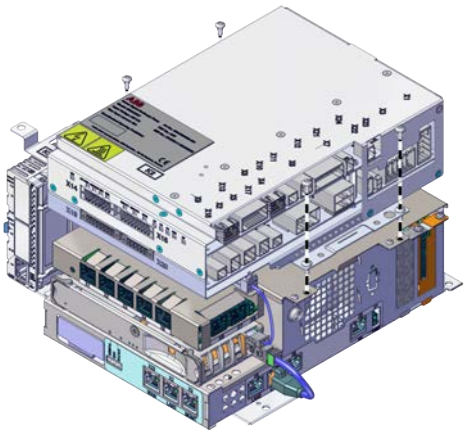
3.7.4 Installing the fieldbus master and the DeviceNet harness

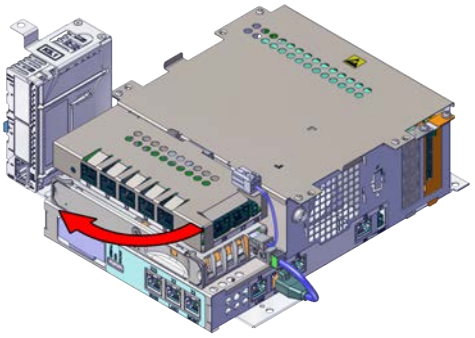
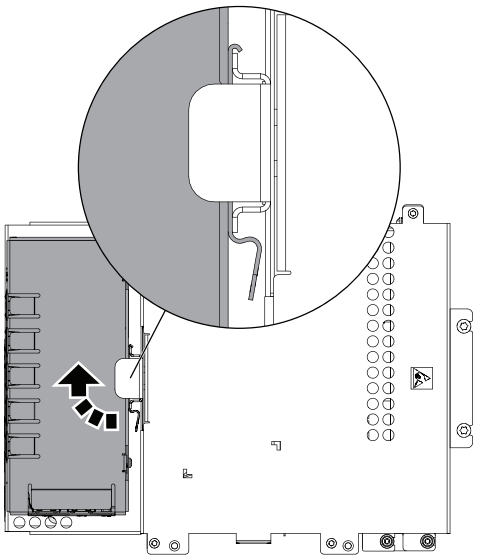
Continued

Removing the robot signal exchange proxy

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2000000419
2	Pull the cable ties out from the locking holes.	 xx2400000096
3	Remove the screws and lift out the robot signal exchange proxy. **Note** Avoid colliding with the frame of the controller.	 xx2400000097

Continues on next page

Removing the Ethernet extension switch (option)

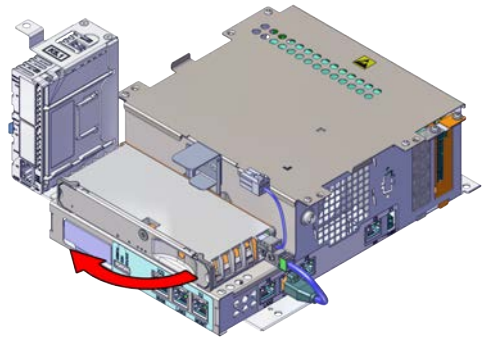
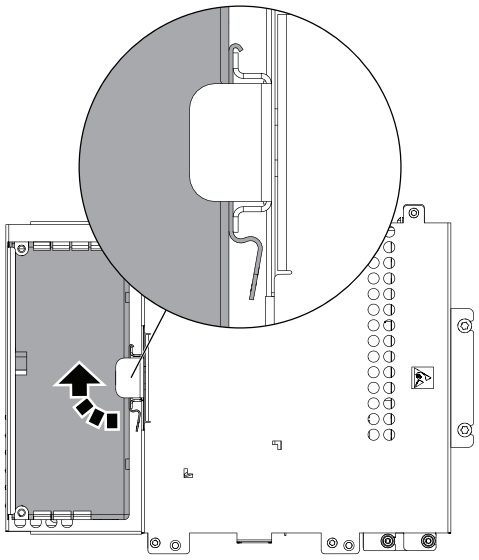
	Action	Note/Illustration
1	Carefully pull the side of the Ethernet extension switch and rotate it tightly to take it out from the bracket.	 xx2400000098  xx1800000491

Continues on next page

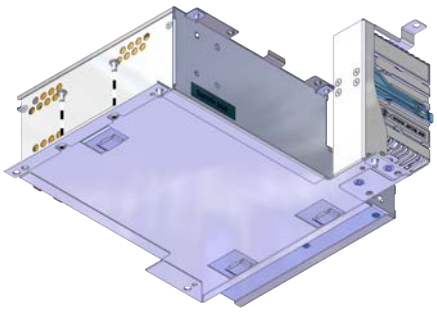
3.7.4 Installing the fieldbus master and the DeviceNet harness

Continued

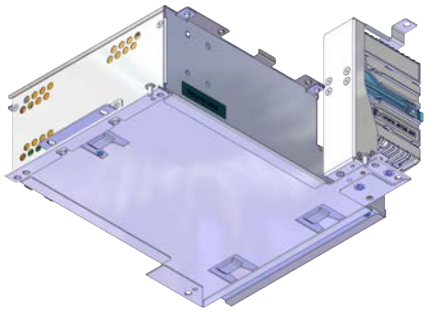
Removing the connected services gateway

	Action	Note/Illustration
1	Carefully pull the side of the connected services gateway and rotate it tightly to take it out from the bracket.	 xx2400000099  xx1800000495 TOP VIEW

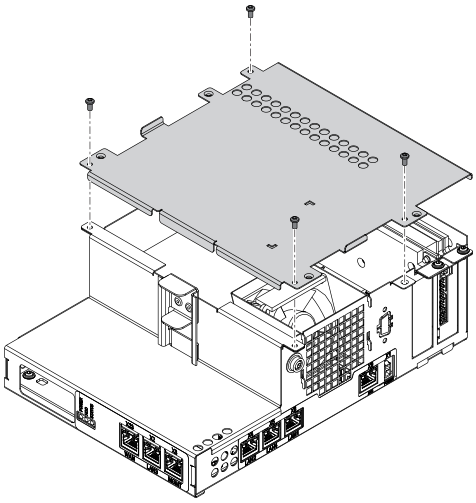
Removing the main computer

	Action	Note/Illustration
1	Remove the screws holding the main computer.	 xx2400000100

Continues on next page

	Action	Note/Illustration
2	Remove the main computer. **ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	 xx2400000154

Installing the DeviceNet board

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	
2	Remove the screws on top of the main computer and take the cover off.	 xx1800003415

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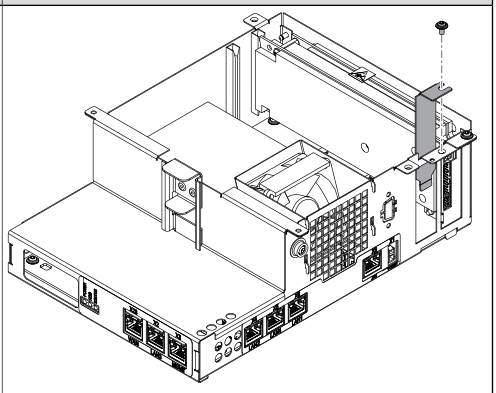
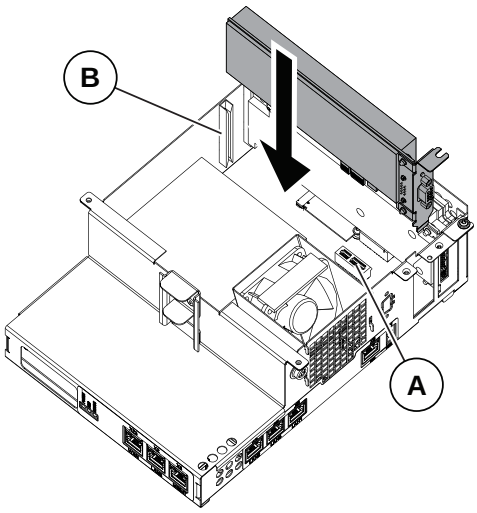
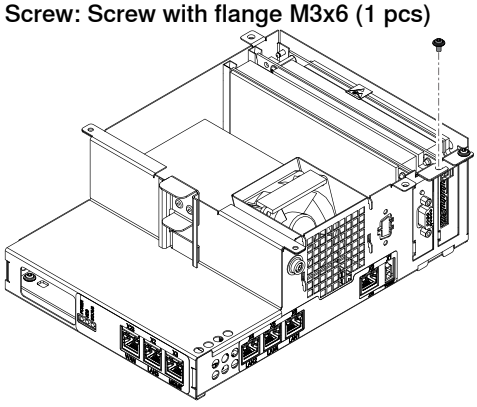
3.7.4 Installing the fieldbus master and the DeviceNet harness
Continued

	Action	Note/Illustration
3	Remove the attachment screw on the cover of the fieldbus master and take out the cover.	 xx1800003414
4	Insert the DeviceNet board into the card slots along the guide rail in the main computer.	 xx1800003417 A: Card slots B: Guide rail
5	Secure the DeviceNet board with the screw.	Screw: Screw with flange M3x6 (1 pcs)  xx1800003416

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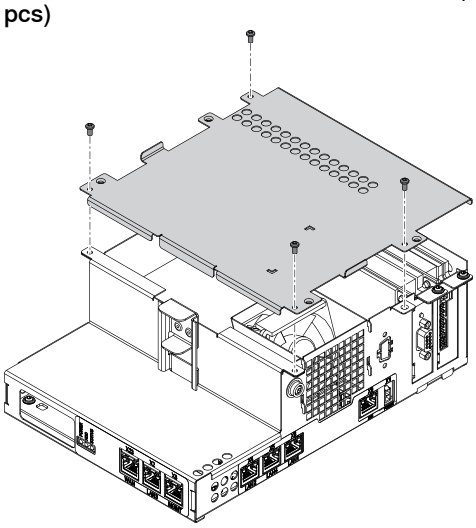
	Action	Note/Illustration
6	Refit the cover on the main computer and secure the screws.	Screws: Torx, countersunk screw M4x10 (4 pcs)  xx1800003418

Installing the harness for DeviceNet

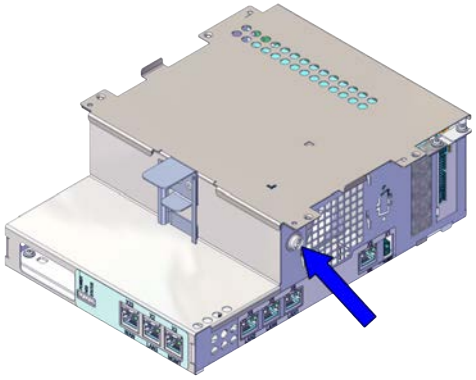
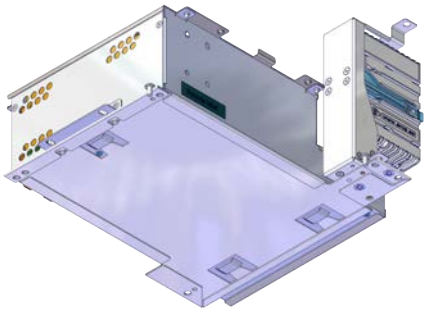
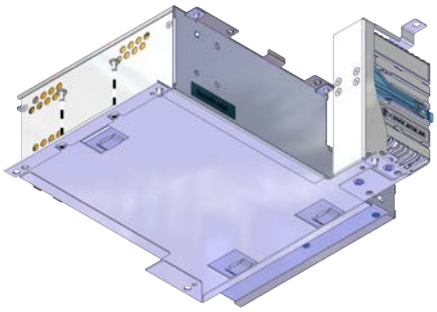
	Action	Note/Illustration
1	Remove the screws for the cover plate on the front panel.	
2	Press the cover plate into the cabinet, and lift it out.	
3	Insert the harness into the front panel from inside of the cabinet and secure the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs)
4	Insert the cables into the clips on the bottom of the cabinet.	

Refitting the main computer

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

3.7.4 Installing the fieldbus master and the DeviceNet harness
Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419
3	Fit the main computer to the process plate.	 xx2400000154
4	Fasten the main computer with the screws.	Screws: Torx pan head screw M4x8 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000100

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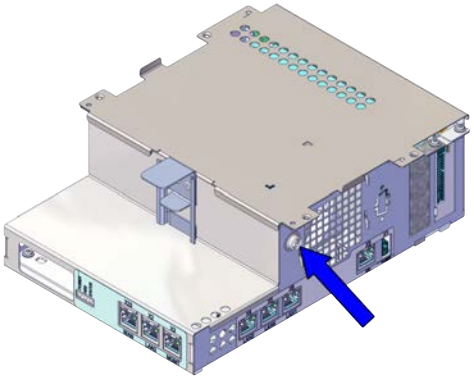
Refitting the connected services gateway

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419

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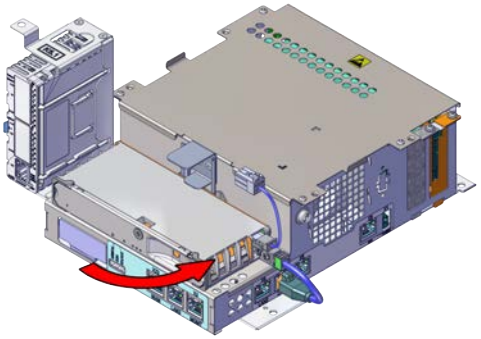
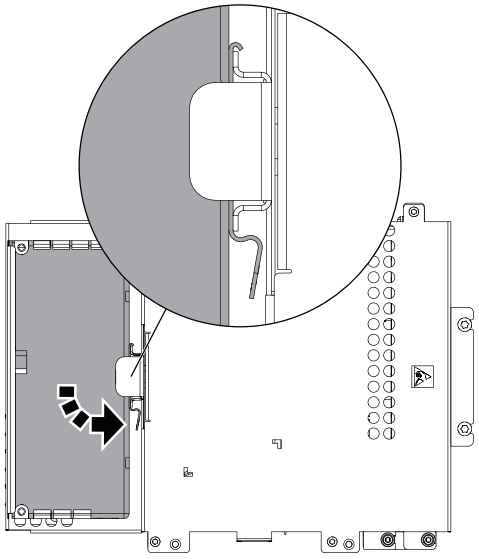
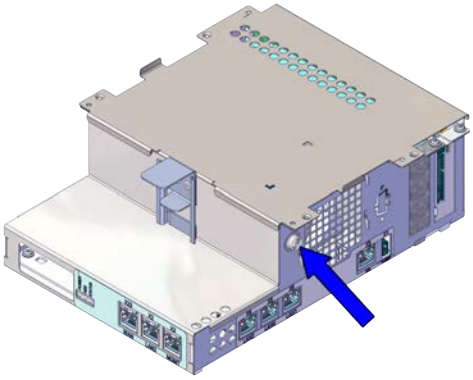
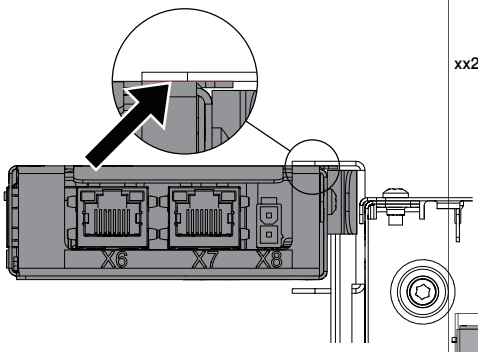
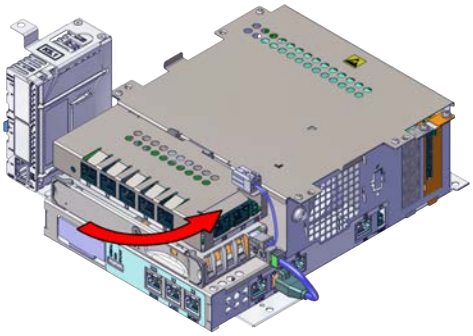
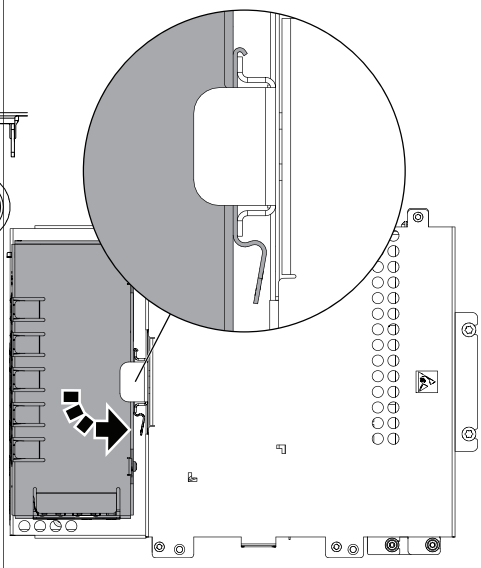
3.7.4 Installing the fieldbus master and the DeviceNet harness
Continued

	Action	Note/Illustration
3	Hook up the connected services gateway to the bracket and push carefully into position. **Note** During the installation, the gap between the lower surface of the connected services gateway and the upper surface of the main computer should be zero.	 xx2400000155  xx1800000497 TOP VIEW

Refitting the Ethernet extension switch (option)

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419
3	Hook up the Ethernet extension switch to the bracket and then push the switch into position. **Note** 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.  xx1800000972	 xx2400000156  xx1800000493

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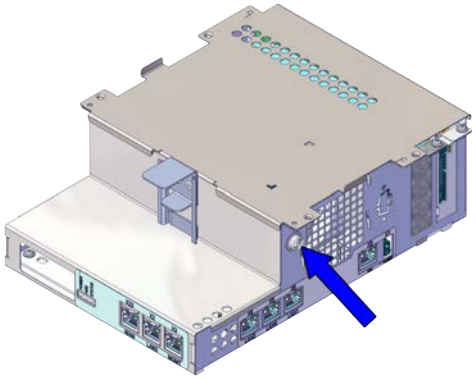
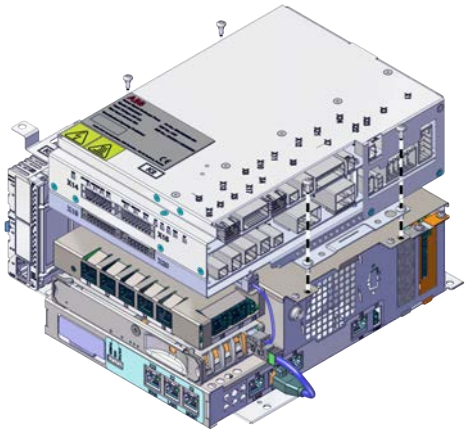
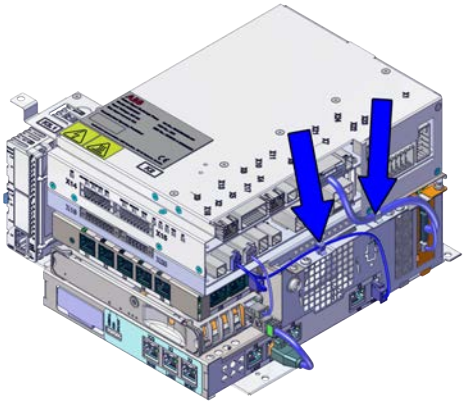
3.7.4 Installing the fieldbus master and the DeviceNet harness
Continued

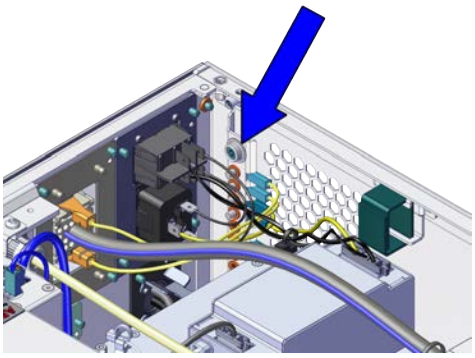
Refitting the robot signal exchange proxy

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419
3	Fit the robot signal exchange proxy and secure the screws. **Note** Avoid colliding with the frame of the controller.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000097

Continues on next page

	Action	Note/Illustration
4	Insert the cable ties into the locking holes.	 xx2400000096

Refitting the main computer assembly with process plate to the cabinet

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2400000021
3	Use the two guide pins to locate the assembly onto the mounting plate.	**Note** Be careful with the frame of the controller when refitting the unit.

Continues on next page

3.7.4 Installing the fieldbus master and the DeviceNet harness
Continued

	Action	Note/Illustration
4	Fasten the assembly with the screws.  **WARNING** Be careful with the cables installed below the process plate.	
5	Reconnect all the connectors on assembly of the robot signal exchange proxy, ethernet extension-seven port switch (option), ABB ability™ connected services, scalable I/O digital base (option), and main computer.	
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - A1.X9 • K2.X3 - K6.X1, A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - T2.X2[25] • K2.X17 - G2.X1, G1.X2 • K2.X6, K2.X11 - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power • K2.X9 & X13 - FlexPendant	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6  **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • Harness adapter - A2.X4/K4.X7.  **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	

Continues on next page

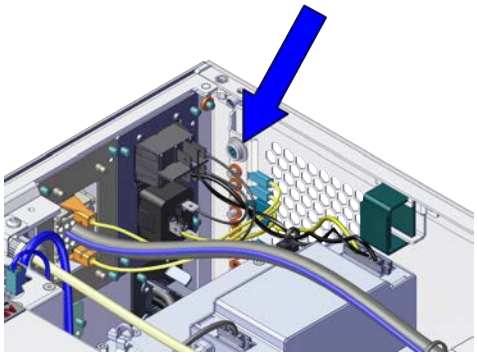
	Action	Note/Illustration
	For the connected services gateway: • K7.X1 - K2.X3[i] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	

i For connected services gateway wired, there is no power cable.

Continues on next page

3.7.4 Installing the fieldbus master and the DeviceNet harness
Continued

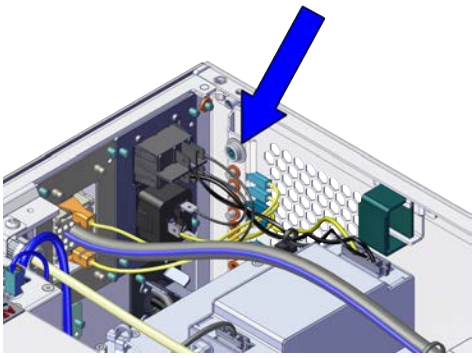
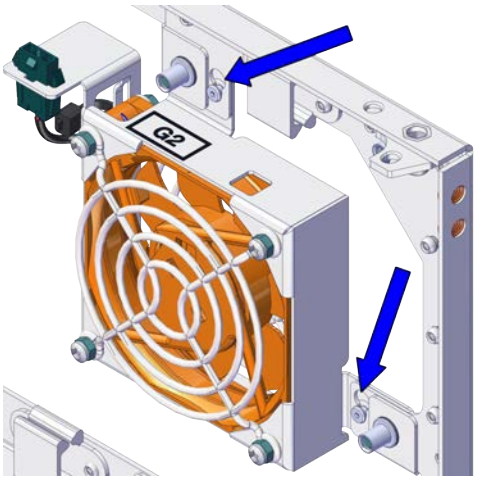
Refitting the axis computer to the frame

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • K6.X11 - A1.X3 • K6.X2 - A2.X9 • K6.X1 - K2.X3	

Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

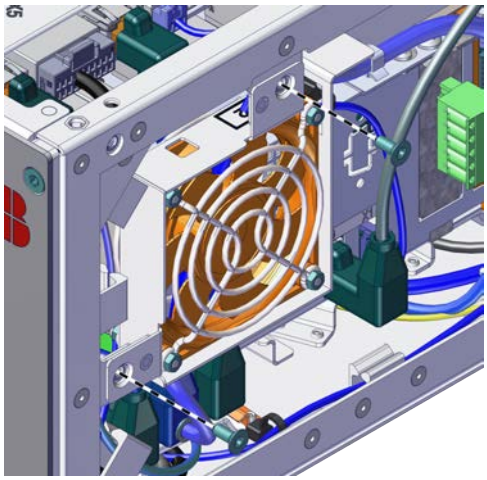
Continues on next page

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	
4	Refit the fan bracket into the cabinet.	 xx2400000045

Continues on next page

3.7.4 Installing the fieldbus master and the DeviceNet harness

Continued

	Action	Note/Illustration
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

3.8 Installing add-on devices

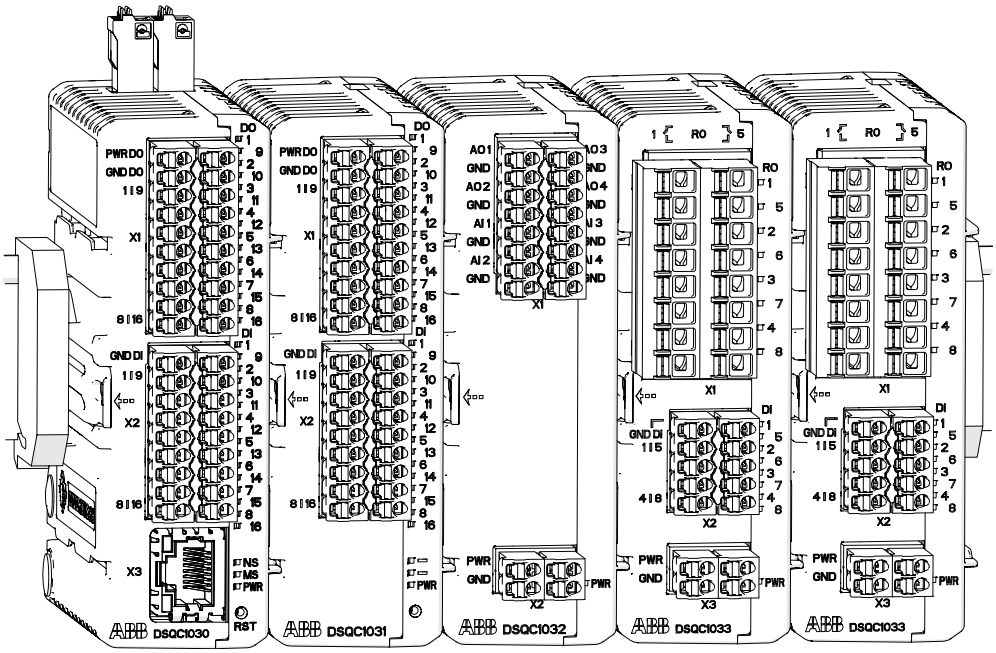
3.8.1 Installing the scalable I/O add-on devices

Overview

To install the scalable I/O add-on devices, the digital base DSQC 1030 must be installed as an external unit.

How to install the add-on devices is described in *Application manual - Scalable I/O*.

The scalable I/O add-on devices are shown in the following illustration.

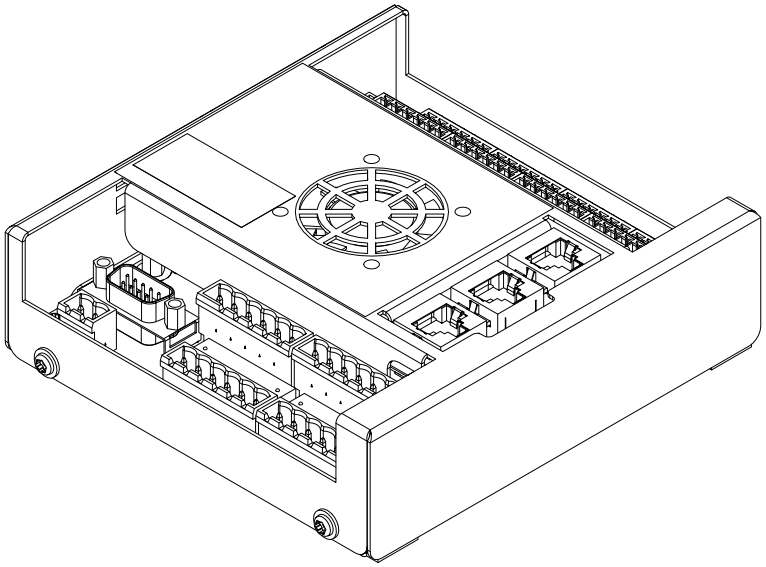


xx1600002032

3.8.2 Installing the conveyor tracking module

Overview

The CTM-01 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 C30 Type A via myABB Business Portal, *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	3HAC069618-001	Power cable of CTM

Required tools and equipment

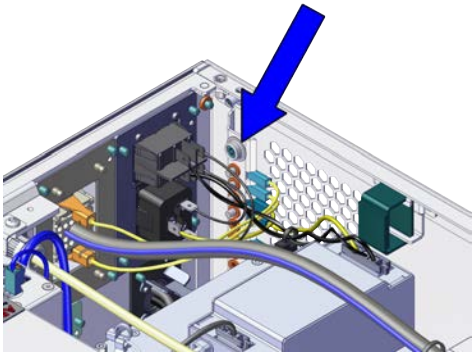
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Continues on next page

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	
Application manual - Conveyor tracking	*3HAC066561-001*	

Installing the conveyor tracking module

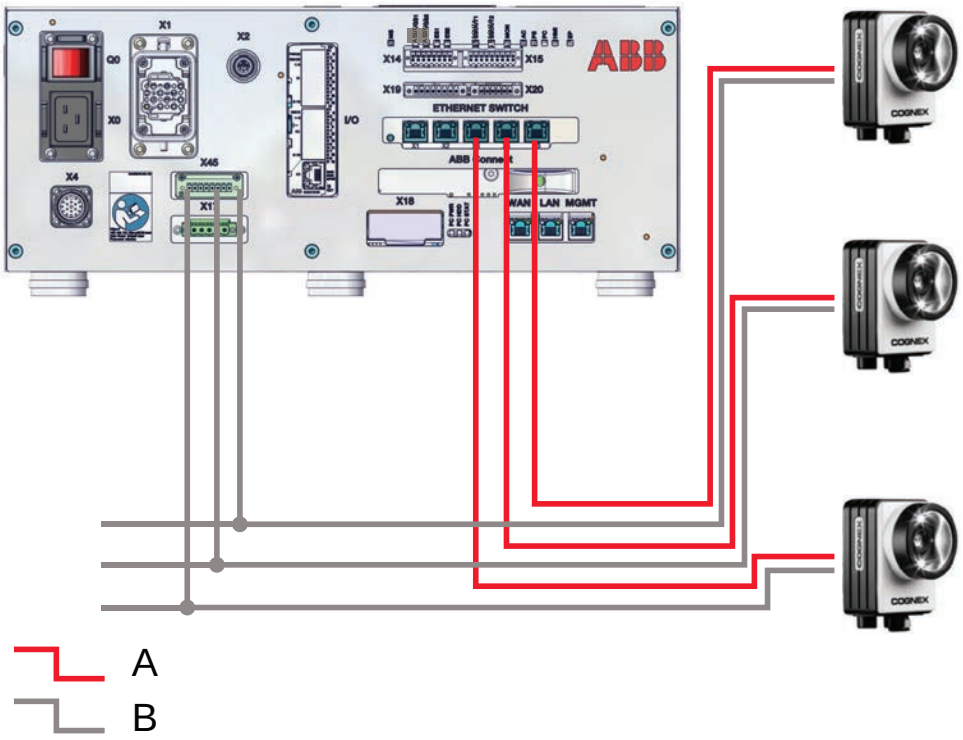
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Fit the conveyor tracking module by snapping it onto the mounting rail (not supplied from ABB).	
4	Connect the 24V power supply to the conveyor tracking module from the IP20 power outlet or other power supply.	
5	The CTM must be connected to Ethernet. There are three main installation methods for the Ethernet communication.	For more detail, see *Application manual - Conveyor tracking* chapter *Connecting the CTM to the robot controller*.
6	Connect wires to the input and output connectors as required.	See *Application manual - Conveyor tracking*.

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

3.8.3 Installing Integrated Vision

Overview

The Integrated Vision is installed as shown in the following illustration.



xx2400000031

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
8 mm camera lens, LTC-08F	3HAC053944-001	
12.5 mm camera lens, LFC-12.5F	3HAC053944-002	
16 mm camera lens, LFC-16F1	3HAC053944-003	
25 mm camera lens, LFC-25F1	3HAC053944-004	
Integrated Vision camera medium res	3HAC075182-001	DSQC1063
Integrated Vision camera high res	3HAC075207-001	DSQC1064
Integr Vision power cable 10 m	3HAC051753-003	
Integr Vision ethernet cable 10 m	3HAC075443-002	

Continues on next page

Spare part	Article number	Note
8 mm camera lens, LMC-ML-M0822UR	3HAC087266-001	
12.5 mm camera lens, LMC-ML-M1218UR	3HAC087267-001	
16 mm camera lens, LMC-ML-M1616UR	3HAC087268-001	
25 mm camera lens, LMC-ML-M2516UR	3HAC087269-001	

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

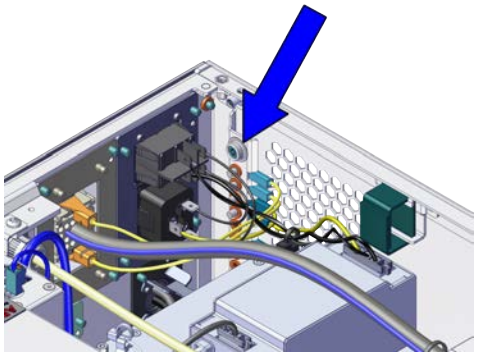
Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	
Application manual - Integrated Vision	*3HAC067707-001*	

Installing Integrated Vision camera connections

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

3.8.3 Installing Integrated Vision
Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Fit the cameras to the mounting rail (not supplied from ABB).	
4	Connect the Ethernet cable from the camera to any of the LAN connectors on the main computer or the Ethernet switch.	
5	Connect the 24V power supply to the cameras from the IP20 power outlet connector or other power supply.	
6	Connect wires to the inputs and output connectors as required.	See *Application manual - Integrated Vision*.

For more information about the option *Integrated Vision*, see *Application manual - Integrated Vision*.

3.9 Initial test before commissioning

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 100*.

Function tests

Before commissioning, perform the function tests in section *Function tests on page 189* to verify that the safety features work properly.

Jogging

Before commissioning, individually jog each mechanical unit to ensure proper installation. Perform the jog test on the manipulator last.

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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 [i]	*Inspecting the OmniCore C30 Type A controller on page 182*
Air filter element	Replacement	24 months	*Replacement of air filter element for the controller with vertical mounting kit on page 186*
System fans	Inspection	6 months [i]	*Inspecting the OmniCore C30 Type A controller on page 182*
Control cabinet	Cleaning		*Cleaning of the controller cabinet on page 183*
FlexPendant	Cleaning	When needed	*Cleaning the FlexPendant on page 184*
Emergency stop (FlexPendant)	Function test	12 months	*Function test of emergency stop on page 189*
Manual, auto and manual full speed mode with FlexPendant	Function test	12 months	*Function test of manual, auto, and manual full speed mode with FlexPendant on page 190*
Enabling device	Function test	12 months	*Function test of three-position enabling device on page 191*
Auto stop (tested if used)	Function test	12 months	*Function test of Automatic Stop on page 193*
General stop (tested if used)	Function test	12 months	*Function test of General Stop on page 194*
External emergency stop (tested if used)	Function test	12 months	*Function test of external emergency stop on page 195*
ESTOP_STATUS output (tested if used)	Function test	12 months	*Function test of ESTOP_STATUS output on page 196*
Reduced speed control	Function test	During commissioning	*Function test of reduced speed control on page 197*.

[i] The interval depends on the working environment of the equipment: a cleaner environment may extend the maintenance interval and vice versa.

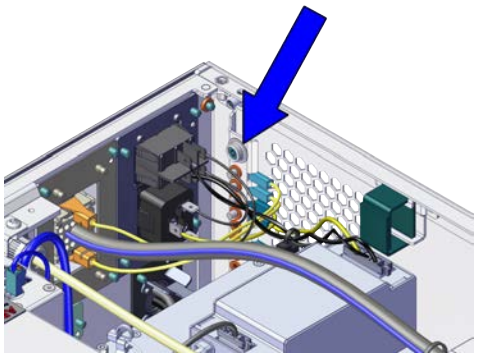
Function test after replacement of component

After replacing a component in the controller, the function tests should be performed. See *Function tests on page 189*.

4.2 Inspection activities

4.2.1 Inspection of controller

Inspecting the OmniCore C30 Type A controller

	Action	Note/illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Inspect all sealing joints and cable glands to make sure they are airtight in order to prevent dust and dirt from penetrating into the controller cabinet.	
4	Inspect connectors and cabling to make sure they are securely fastened and cabling not damaged.	
5	Inspect the fans and ventilation holes to make sure they are clean.	
6	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 of the controller cabinet

Required equipment

Equipment, etc.	Note
Vacuum cleaner	ESD protected

Cleaning considerations

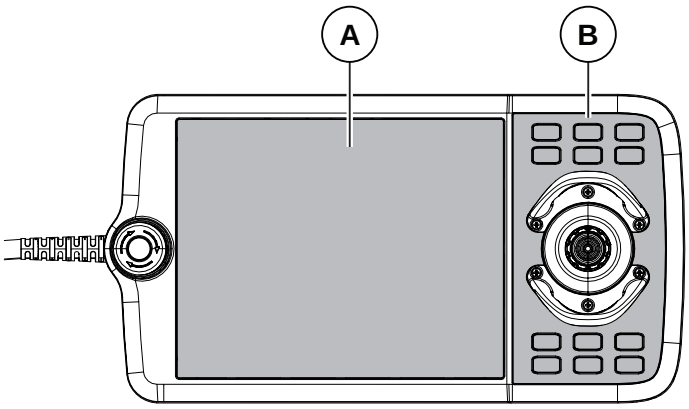
This section specifies some special considerations when cleaning the controller.

- 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.

4.3.2 Cleaning the FlexPendant

Location

The surfaces to clean are shown in the illustration below.



xx1800000128

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

- 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 element for the controller with vertical mounting kit

Location

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

xx2400000032

Required equipment

Equipment	Note
Air filter element	3HAC064792-001
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.

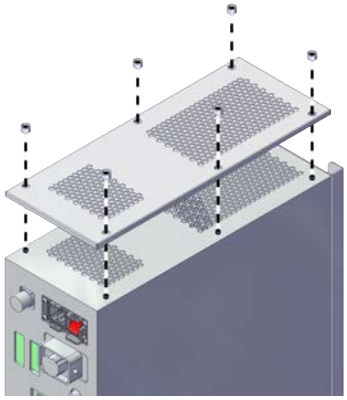
Continues on next page

Removing the air filter element

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Removing the left cover unit

	Action	Note/Illustration
1	Loosen the attachment screws on left cover unit.	 xx2400000033
2	Remove the left cover unit.	

Removing the polymeric filter element

	Action	Note/Illustration
1	Take out the polymeric filter element from the inner side of the left cover unit.	 xx2400000034

Continues on next page

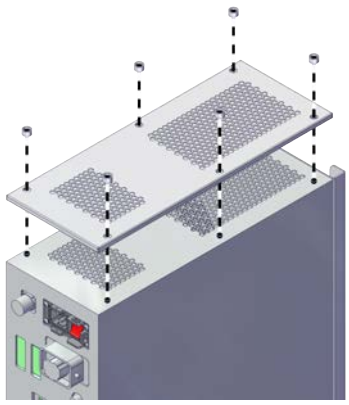
4.4.1 Replacement of air filter element for the controller with vertical mounting kit
Continued

Refitting the air filter element

Refitting the polymeric filter element

	Action	Note/Illustration
1	Insert the polymeric filter element to the inner side of the left cover unit.	 xx2400000034

Refitting the left cover unit

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	Refit the left cover unit to the cabinet. Secure it with the screws.	 xx2400000033

Concluding procedure

	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

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. **Note** If the event message **20223 Emergency stop conflict** appears in the event log, or the event message **10013 Emergency stop state** (and **90518 Safety controller Emergency stop triggered** 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 **10013 Emergency stop state** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **10013 Emergency stop state** does not appear • if the event message **90780 Two-channel fault in Safety Controller** appears **Note** For robots prepared for collaborative applications, the event message **90518 Safety controller Emergency stop triggered** appears by default. The message **10013 Emergency stop state** is also available in the event log.
5	Release the emergency stop device to reset the emergency stop state.	

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.	
2	Change to **Manual** reduced speed operating mode and **Motors ON** state, and then run the mechanical unit 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.
3	Change to **Manual Full Speed** mode and **Motors ON** state, and then run the mechanical unit in manual full speed mode. **Note** 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	Change to **Automatic** operating mode and **Motors ON** state, and then run the mechanical unit 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.

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.	This test is passed if the event message **10011 Motors ON state** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **10011 Motors ON state** does not appear • if the event message **90780 Two-channel fault in Safety Controller** appears
3	While still holding the three-position enabling device pressed, press the enabling device harder to the enable the device's third position.	This test is passed if the event message **10012 Safety guard stop state** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **10012 Safety guard stop state** does not appear • if the event message **90780 Two-channel fault in Safety Controller** appears

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 **10011 Motors ON state** appears in the event log. If the event message **37001 Motor on activation error** 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 **10012 Safety guard stop state** appears in the event log. If the event message **90227 Motor contactor conflict** 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 **50056 Joint collision** 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 **10012 Safety guard stop state** appears in the event log. If the event message **37101 Brake Failure** 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.	The test is passed if the event message **90523 Safety Controller Protective Stop triggered** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **90523 Safety Controller Protective Stop triggered** does not appear • if the event message **90780 Two-channel fault in Safety Controller** appears

4.5.6 Function test of General Stop

Performing the function test

	Action	Note
1	Start the robot system.	
2	Activate the General Stop.	The test is passed if the event message **90523 Safety Controller Protective Stop triggered** appears in the event log. If either of the following happens, then the test is failed and the root cause must be found: • if the event message **90523 Safety Controller Protective Stop triggered** does not appear • if the event message **90780 Two-channel fault in Safety Controller** appears

4.5.7 Function test of external emergency stop

Overview

Perform this test on all external emergency stop devices.

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	Pull and rotate the button on the external emergency stop device clockwise to verify that it is not pressed in. **Note** 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 **10013 Emergency stop state** appears in the event log. If the event message **90780 Two-channel fault in Safety Controller** appears in the event log, or the event message **10013 Emergency stop state** does not appear, then the test has failed and the root cause of the failure must be found. **Note** The event message **90518 Safety controller Emergency stop triggered** appears by default.
5	Release the external emergency stop device to reset the external emergency stop state.	

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. **Note** 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 **10013 Emergency stop state** appears in the event log. If the event message **90780 Two-channel fault in Safety Controller** appears in the event log, or the event message **10013 Emergency stop state** does not appear, then the test has failed and the root cause of the failure must be found. **Note** The event message **90518 Safety controller Emergency stop triggered** appears by default.
5	Make sure that the accessory device is in emergence 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 emergence 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	Start the program in manual mode and measure the time it takes for the robot to travel the distance.  **Tip** To get accurate results, use sensors or I/O signals to measure the time.	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 C30 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 C30 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.

5.2 Replacing parts inside the controller

5.2.1 Opening the robot controller

Required tools and equipment

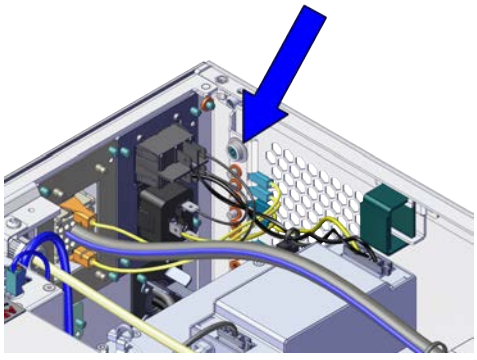
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

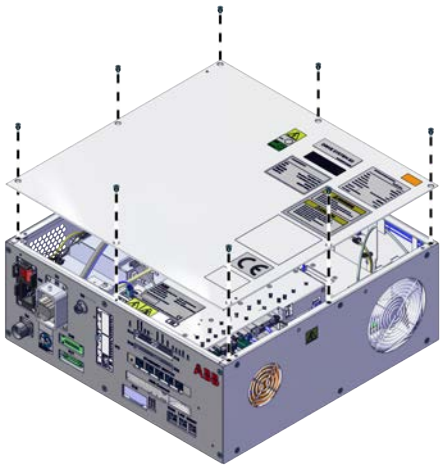
Removing the controller covers

Preparations

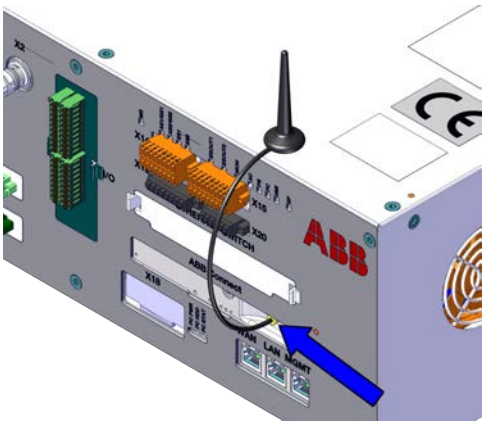
	Action	Info/illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

Removing the top cover

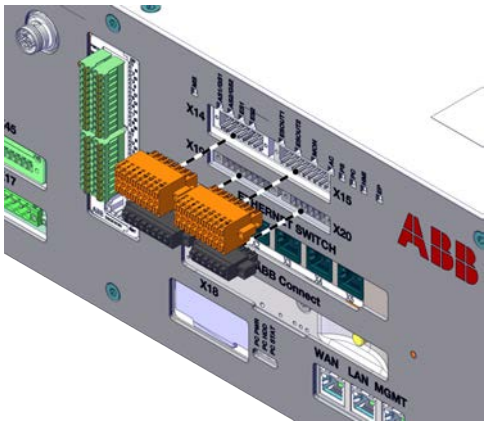
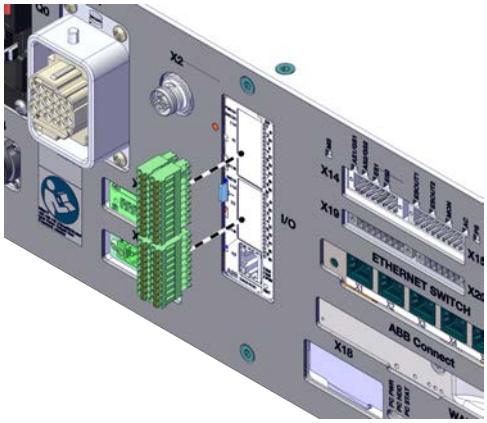
	Action	Info/illustration
1	Remove the attachment screws.	 xx2400000035
2	Remove the top cover.	

Removing the front panel

	Action	Info/illustration
1	Disconnect all the cables from the front panel.	
2	Disconnect the antenna cable from the Connected Services gateway by rotating the connector.	 xx2400000162

Continues on next page

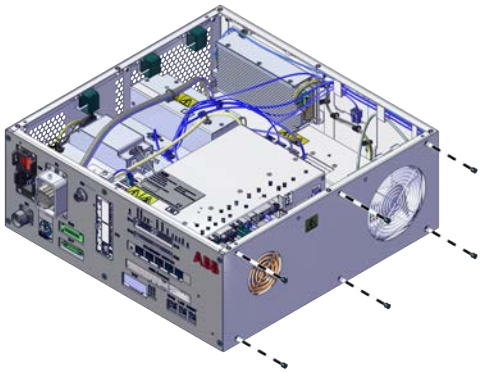
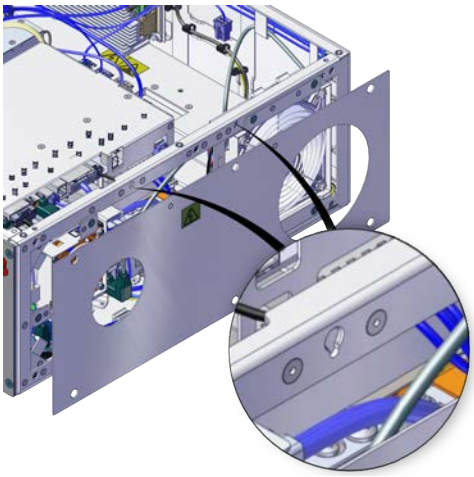
5.2.1 Opening the robot controller
Continued

	Action	Info/illustration
3	Remove the robot signal exchange proxy connectors by removing the screws.	 xx2400000093
4	Remove the scalable I/O digital base connectors by removing the screws. (option)	 xx2400000161
5	Remove the screws and the front panel.	 xx2400000036

Removing the right side cover

	Action	Info/illustration
1	Remove the top cover.	*Removing the top cover on page 201*.

Continues on next page

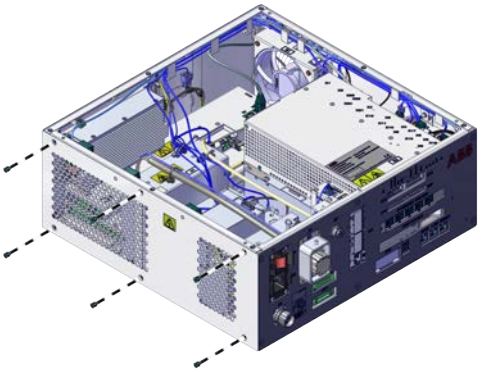
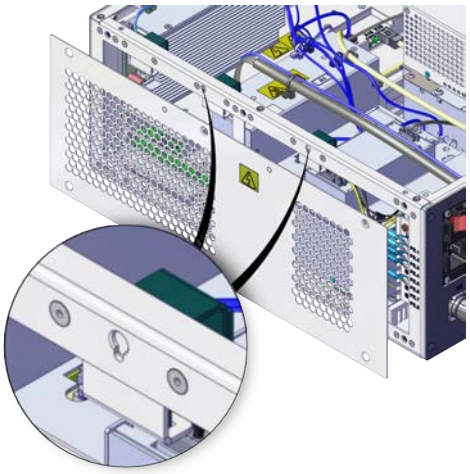
	Action	Info/illustration
2	Remove the screws.	 xx2400000037
3	Lift the right side cover slightly to make it leave the guide holes on the upper frame.	 xx2400000038
4	Remove the right side cover.	

Removing the left side cover

	Action	Info/illustration
1	Remove the top cover.	*Removing the top cover on page 201*.

Continues on next page

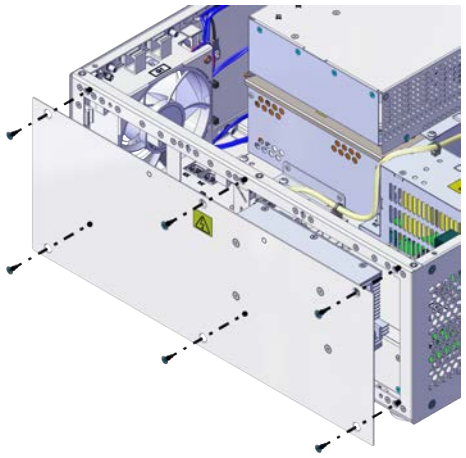
5.2.1 Opening the robot controller
Continued

	Action	Info/illustration
2	Remove the screws.	 xx2400000039
3	Lift the left side cover slightly to make it leave the guide holes on the upper frame.	 xx2400000040
4	Remove the left side cover.	

Removing the rear cover

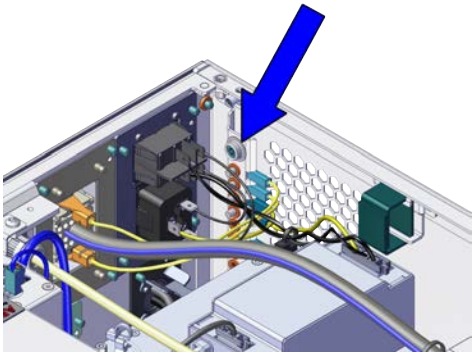
	Action	Info/illustration
1	Remove the top cover.	*Removing the top cover on page 201*.
2	Open the cable straps for the cables and release them.	

Continues on next page

	Action	Info/illustration
3	Remove the screws.	 xx2400000066
4	Remove the rear cover with the power supply.	

Refitting the controller covers

Preparations

	Action	Info/illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

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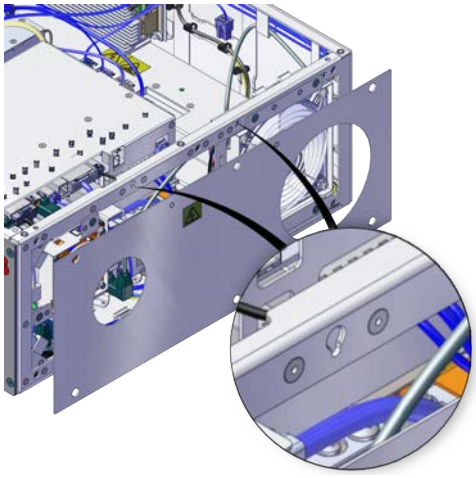
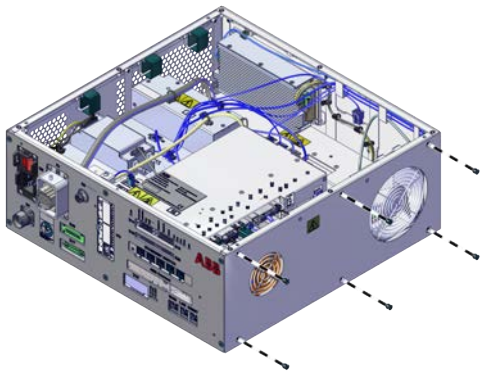
5.2.1 Opening the robot controller

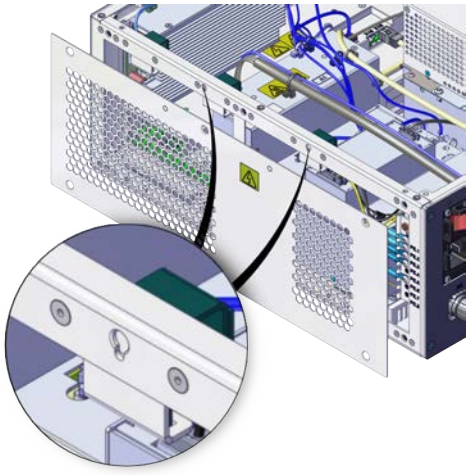
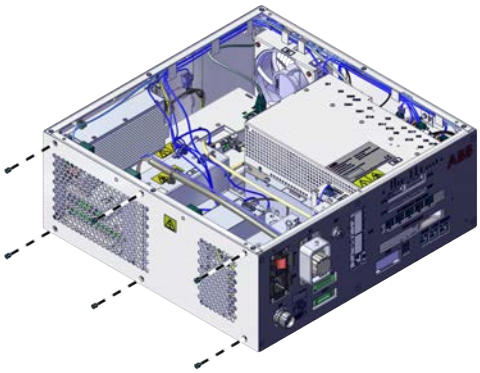
Continued

Refitting the right side cover

	Action	Info/illustration
1	Place the right side cover into the guide holes and press it into the locking position.	 xx2400000038
2	Fasten with screws.	Screws: Torx, countersunk screw M4x10 (6 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000037
3	Refit the top cover.	*Refitting the top cover on page 209*

Continues on next page

Refitting the left side cover

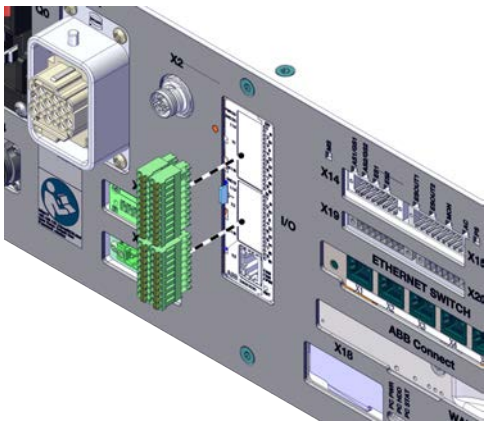
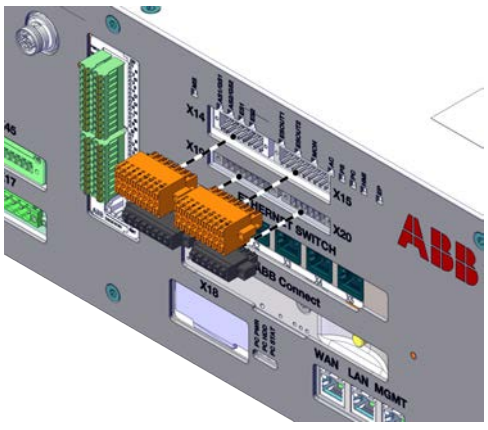
	Action	Info/illustration
1	Place the left side cover into the guide holes and press it into the locking position.	 xx2400000040
2	Fasten with screws.	Screws: Torx, countersunk screw M4x10 (6 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000039
3	Refit the top cover.	*Refitting the top cover on page 209*

Refitting the front panel

	Action	Info/illustration
1	Refit the front panel using the location pins.	

Continues on next page

5.2.1 Opening the robot controller
Continued

	Action	Info/illustration
2	Secure with screws.	Screws: Torx, countersunk screw M4x10 (5 pcs) Tightening torque: 1.3 Nm±10% (1 pcs top center screw). Tightening torque: 1.7 Nm±10% (4 pcs corner screws).  xx2400000036
3	Refit the scalable I/O digital base connectors (option) and tighten the screws.	 xx2400000161
4	Refit the robot signal exchange proxy connectors and tighten the screws.	 xx2400000093

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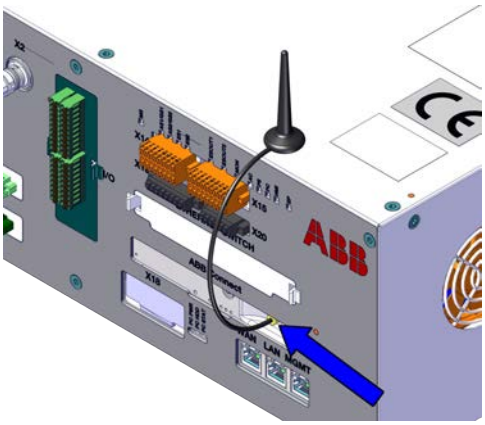
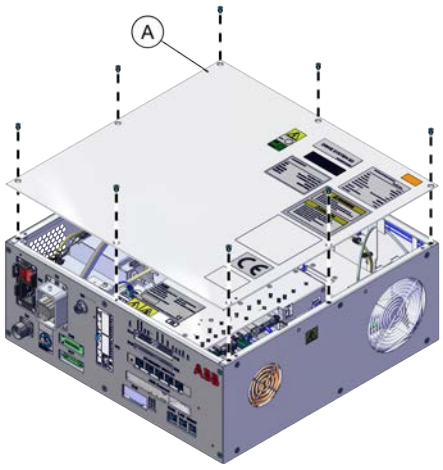
	Action	Info/illustration
5	Connect the antenna cable to the Connected Services gateway by rotating the connector.	 xx2400000162
6	Reconnect all the cables on the front panel.	

Refitting the top cover

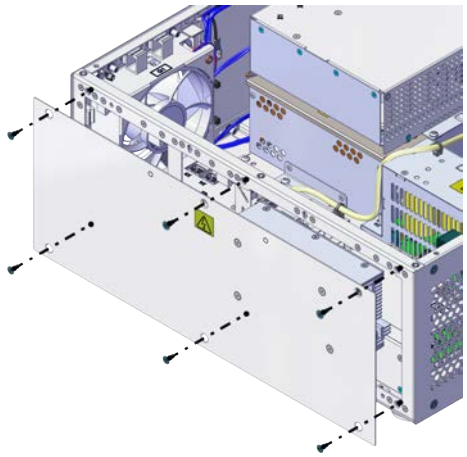
	Action	Info/illustration
1	Refit the top cover using the location pins.	Screws: Torx, countersunk screw M4x10 (8 pcs) Tightening torque: 1.3 Nm±10% (1 pcs front center screw). Tightening torque: 1.7 Nm±10% (7 pcs other screws).  xx2400000083
2	Secure it with the screws.	

A	Location pins

Continues on next page

5.2.1 Opening the robot controller
Continued

Refitting the rear cover

	Action	Info/illustration
1	Refit the the rear cover with the power supply.	Screws: Torx, countersunk screw M4x10 (6 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000066
2	Secure it with the screws.	
3	Fasten the cables back with the cable straps.	
4	Refit the top cover.	*Refitting the top cover on page 209*

5.2.2 Replacing the fans

Location

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

xx2400000041

A	Small fan
B	Standard size silent fan unit

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Small size silent fan	3HAC077006-001	
Standard size silent fan	3HAC077005-001	

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.

Continues on next page

5.2.2 Replacing the fans
Continued

Equipment	Article number	Note
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

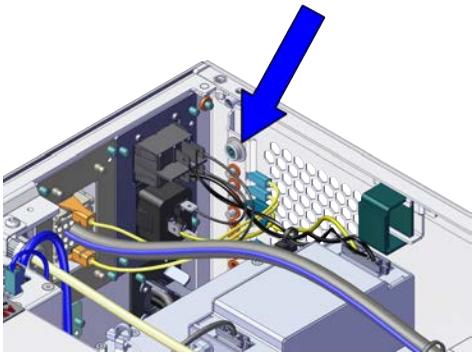
Continues on next page

5.2.2.1 Replacing the standard fans

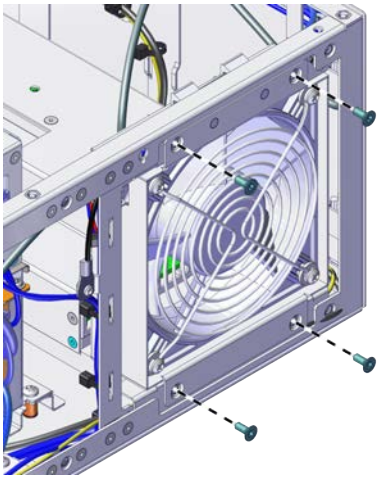
5.2.2.1.1 Replacing the standard fan

Removing the standard fan

Preparations

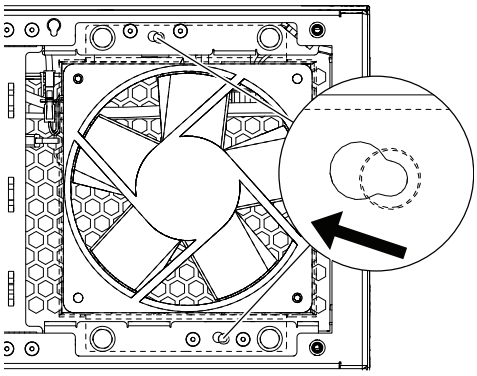
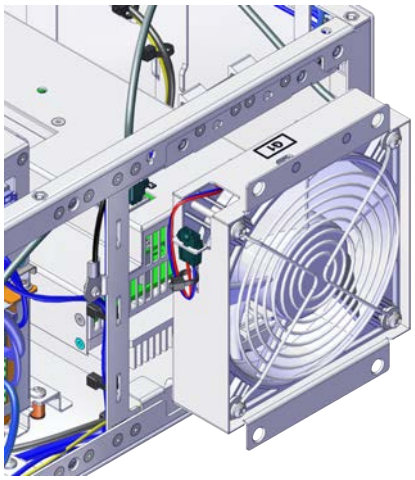
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Removing the standard fan

	Action	Note/Illustration
1	Disconnect standard fan: • G1.X2-K2.X17	
2	Remove the fan bracket screws.	 xx2400000042

Continues on next page

5.2.2.1.1 Replacing the standard fan
Continued

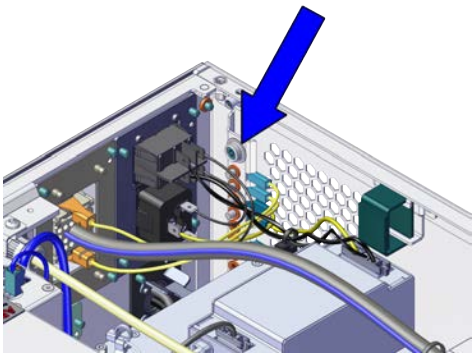
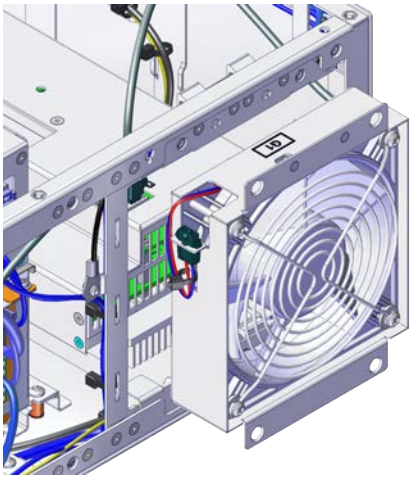
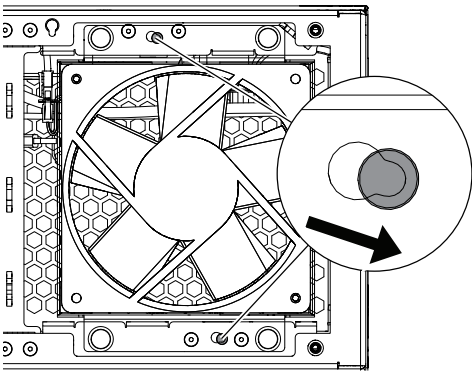
	Action	Note/Illustration
3	Slide the fan bracket a little to the left and remove it.	 xx1800000714  xx2400000043

Refitting the standard fan

Refitting the standard fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

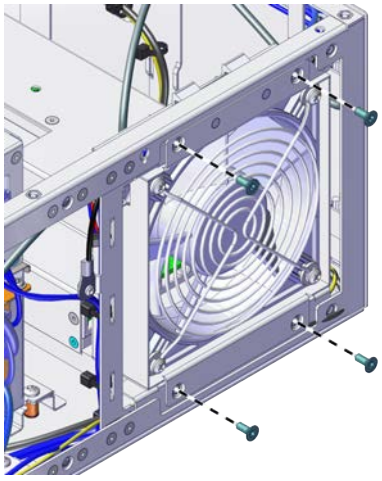
Continues on next page

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Refit the standard fan with the bracket. Push and slide the bracket into position.	 xx2400000043  xx1800000715

Continues on next page

5.2.2.1.1 Replacing the standard fan

Continued

	Action	Note/Illustration
4	Secure the screws.	Tightening torque: 1.7 Nm±10%.  xx2400000042
5	Reconnect: • G1.X2-K2.X17	

Concluding procedure

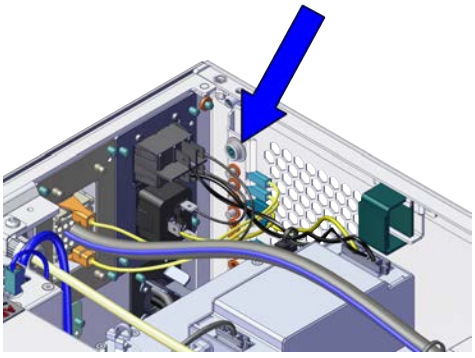
	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.2.2 Replacing the small fans

5.2.2.2.1 Replacing the small fan

Removing the small fan

Preparations

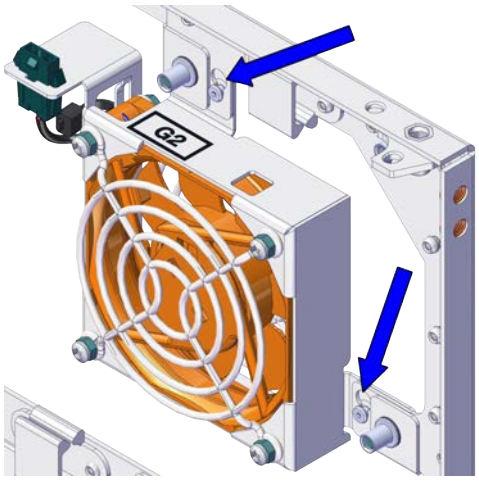
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044

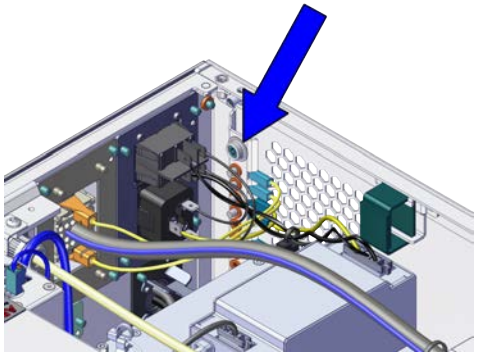
Continues on next page

5.2.2.2.1 Replacing the small fan
Continued

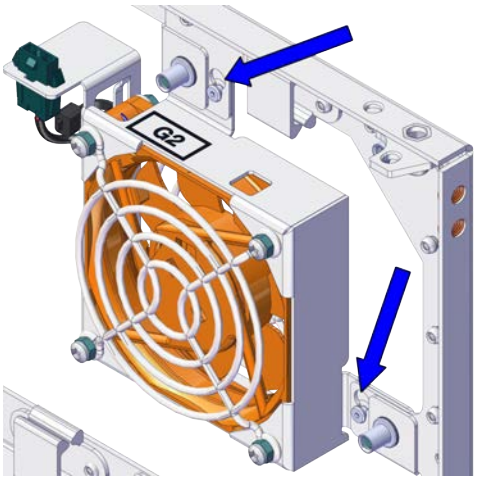
	Action	Note/Illustration
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

Refitting the small fan

Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	

Continues on next page

	Action	Note/Illustration
4	Refit the fan bracket into the cabinet.	 xx2400000045
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

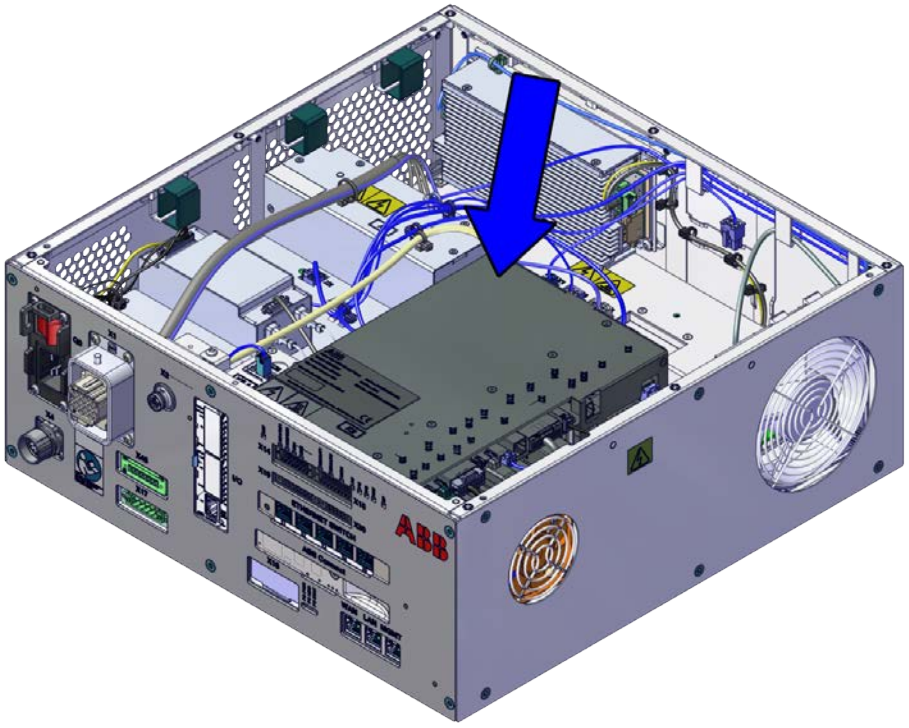
Concluding procedure

	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.3 Replacing the robot signal exchange proxy

Location

The illustration shows the location of the robot signal exchange proxy in the controller.



xx2400000046

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Robot signal exchange proxy	3HAC064662-001	DSQC3037
Customer interface mating connectors	3HAC079051-001	Mating connector for robot signal exchange proxy.
Extra cable jumpers	3HAC079124-001	Jumper cabels for robot signal exchange proxy.
Harness 24_PC	3HAC064091-001	Harness K2.X2 - K4.X8, A2.X1
Harness dual channel safety	3HAC059273-001	Harness K2.X12 - K3.X6, K3.X7

Continues on next page

WARNING

NEVER open the robot signal exchange proxy.

There is residual voltage in the robot signal exchange proxy even the controller is power off in a short time.

Required tools and equipment

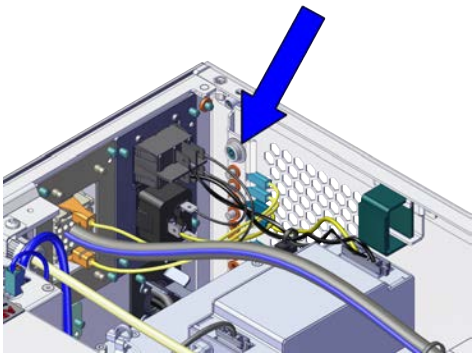
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the robot signal exchange proxy

Preparations

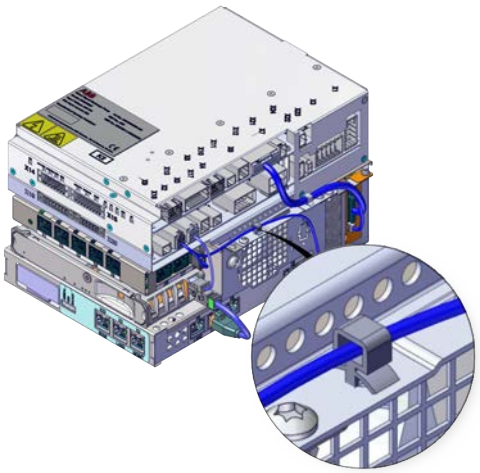
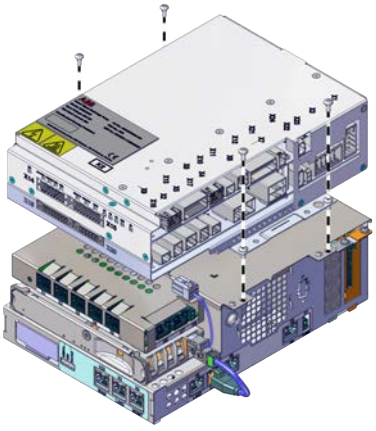
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

5.2.3 Replacing the robot signal exchange proxy

Continued

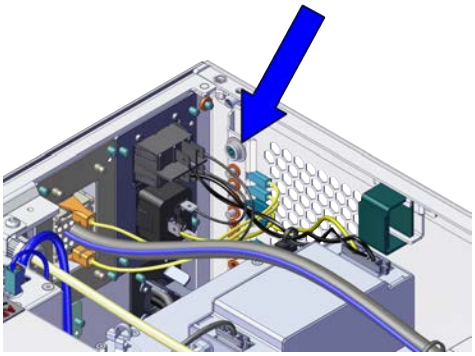
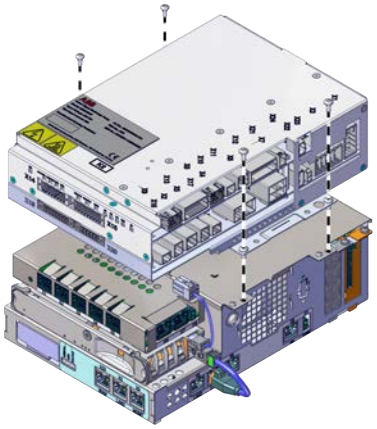
Removing the robot signal exchange proxy

	Action	Note/Illustration
1	Disconnect: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X4 - A1.X9 • - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power (X1) • K2.X9 & X13 - FlexPendant (X4)	
2	Pull the cable ties out from the locking holes.	 xx2400000047
3	Remove the screws and lift out the robot signal exchange proxy.	 xx2400000048

Continues on next page

Refitting the robot signal exchange proxy

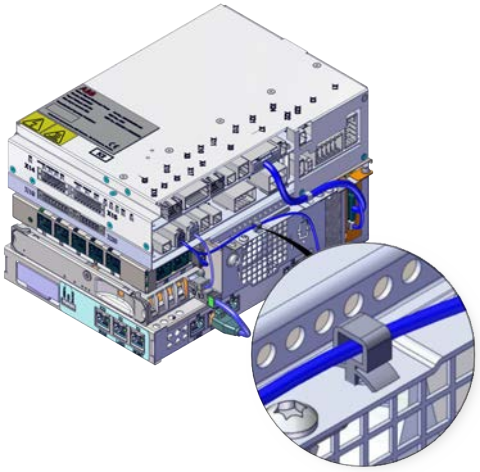
Refitting the robot signal exchange proxy

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Fit the robot signal exchange proxy and secure the screws.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000048

Continues on next page

5.2.3 Replacing the robot signal exchange proxy

Continued

	Action	Note/Illustration
4	Insert the cable ties into the locking holes.	 xx2400000047
5	Reconnect: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X4 - A1.X9 • - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power (X1) • K2.X9 & X13 - FlexPendant (X4)	

Concluding procedure

	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.4 Replacing the Ethernet switch (DSQC1035)

Location

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

xx2400000049

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Ethernet Extension unit slot cover	3HAC065126-001	
Ethernet Extension switch [3014-1]	3HAC059187-001	DSQC1035
Ethernet Harness	3HAC076473-001	Harness A2.X4 - K4.X6

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.

Continues on next page

5.2.4 Replacing the Ethernet switch (DSQC1035)
Continued

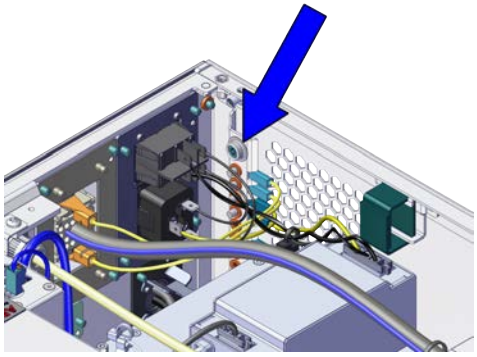
Equipment	Article number	Note
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

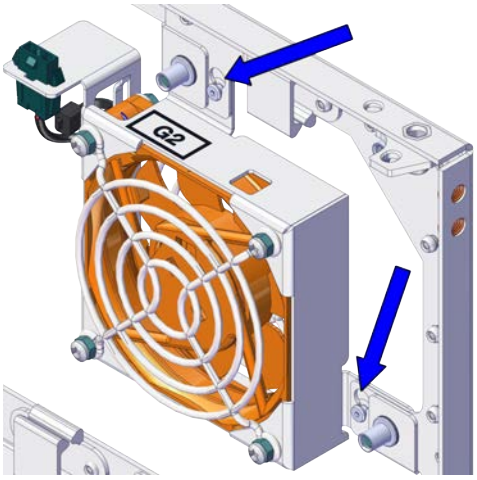
Removing the Ethernet extension switch (option)

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the front panel, top and right covers of the controller.	*Removing the controller covers on page 200*.

Continues on next page

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

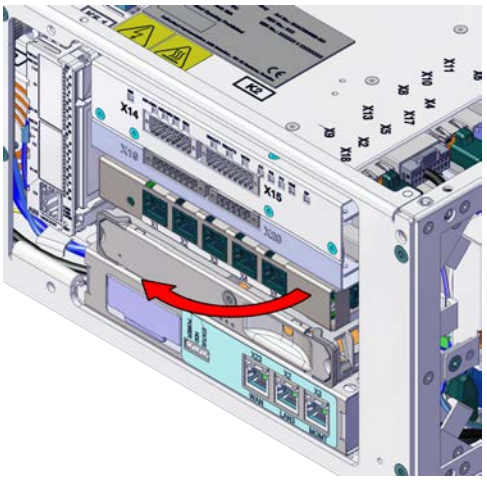
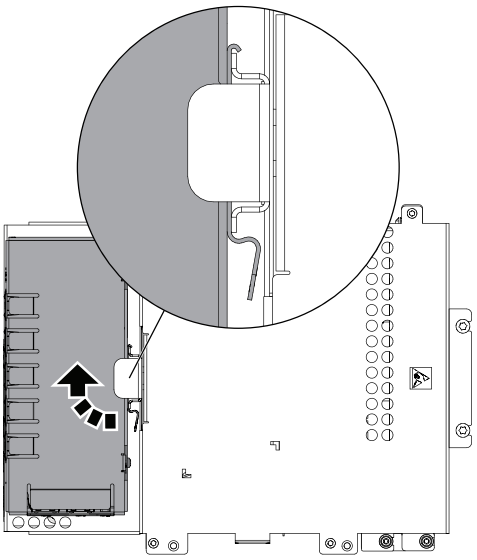
Continues on next page

5.2.4 Replacing the Ethernet switch (DSQC1035)
Continued

Removing the Ethernet extension switch (option)

	Action	Note/Illustration
1	Disconnect: • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • Harness adapter - K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter) to/from K4.X7.	

Continues on next page

	Action	Note/Illustration
2	Carefully pull the side of the Ethernet extension switch and rotate it tightly to take it out from the bracket.	 xx2400000050  xx1800000491

Refitting the Ethernet extension switch (option)

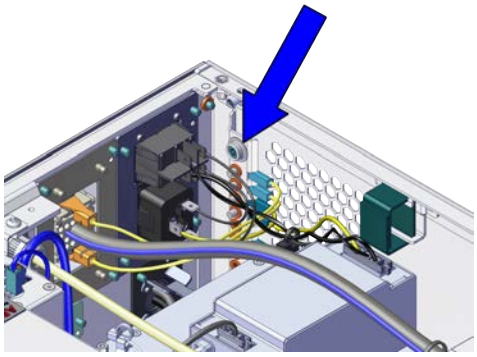
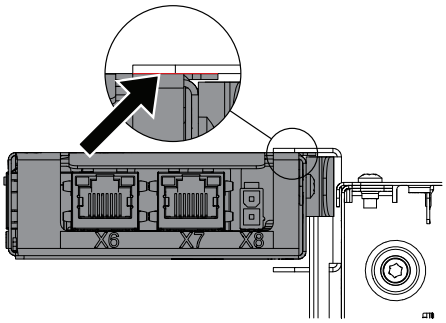
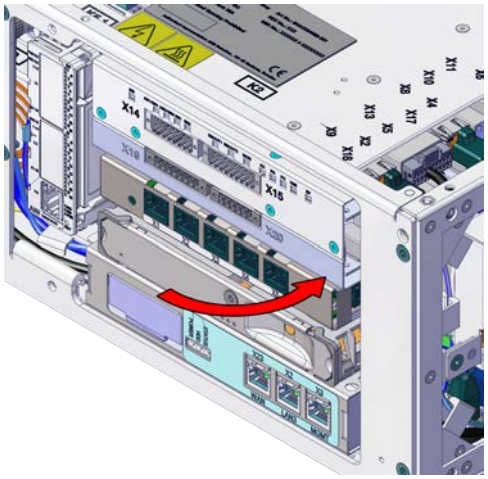
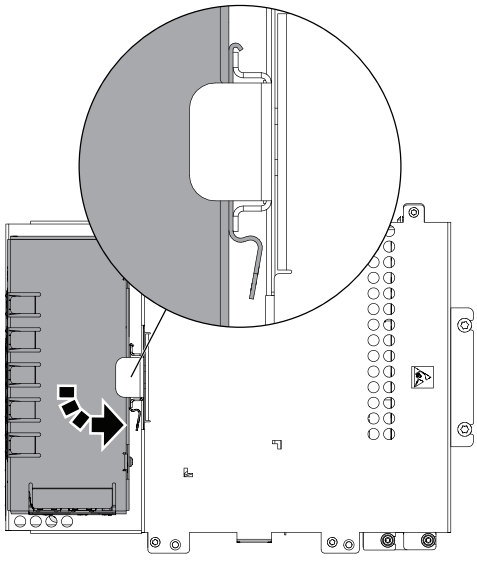
Refitting the Ethernet extension switch (option)

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.2.4 Replacing the Ethernet switch (DSQC1035)

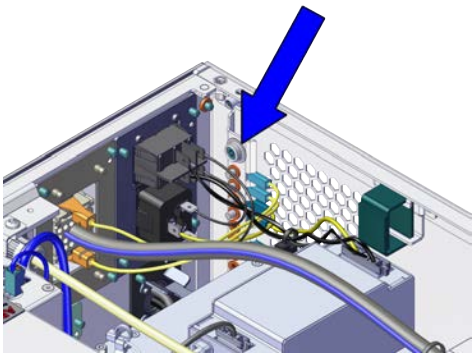
Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Hook up the Ethernet extension switch to the bracket and then push the switch into position. **Note** 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.  xx1800000972	 xx2400000051  xx1800000493

Continues on next page

	Action	Note/Illustration
4	Reconnect: • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • (Option) Harness adapter - K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter) to/from K4.X7.	

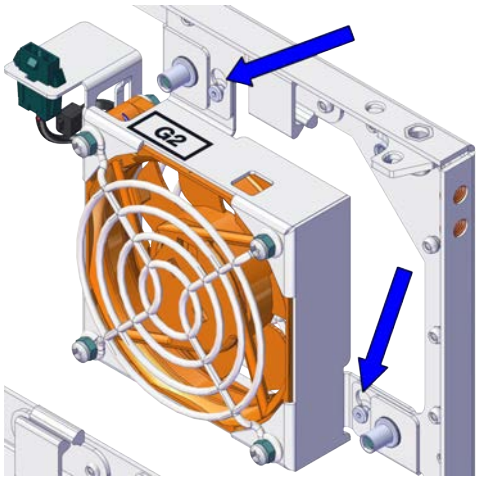
Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	

Continues on next page

5.2.4 Replacing the Ethernet switch (DSQC1035)

Continued

	Action	Note/Illustration
4	Refit the fan bracket into the cabinet.	 xx2400000045
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.5 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.

xx2400000052

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 C30 Type A via myABB Business Portal, *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
Harness Ethernet with Mini-IO	3HAC061136-001	Harness A2.X5 - K7.X2

Continues on next page

5.2.5 Replacing the 3G Connected Services gateway
Continued

Required tools and equipment

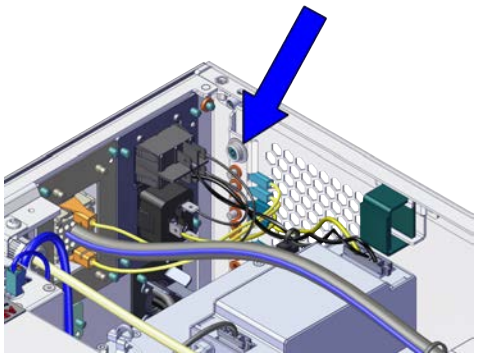
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

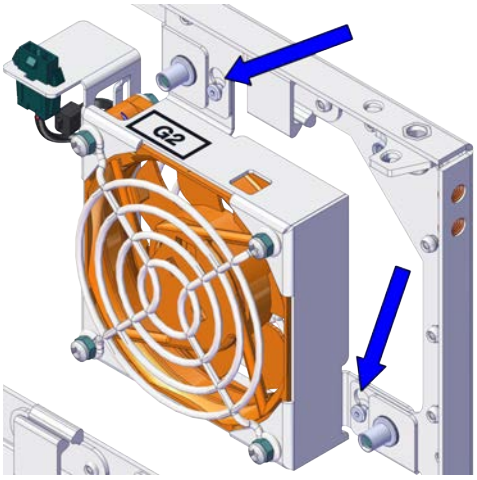
Removing the Connected Services gateway

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the front panel, top and right covers of the controller.	*Removing the controller covers on page 200*.

Continues on next page

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

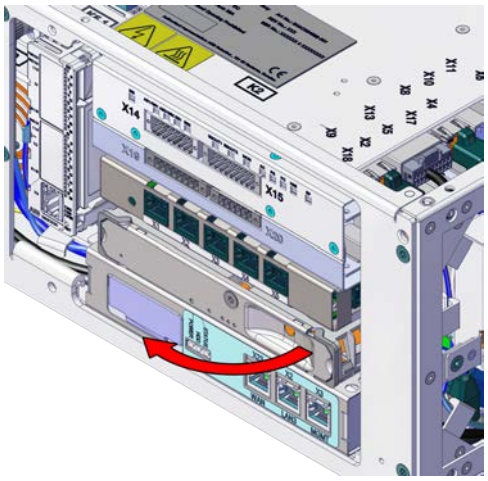
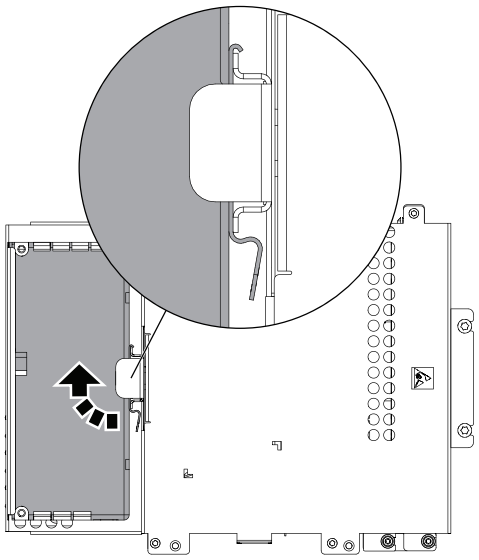
Removing the Connected Services gateway

	Action	Note/Illustration
1	Disconnect: • K7.X1 - K2.X3[i] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

Continues on next page

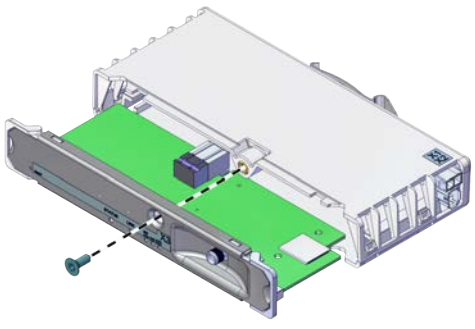
5.2.5 Replacing the 3G Connected Services gateway

Continued

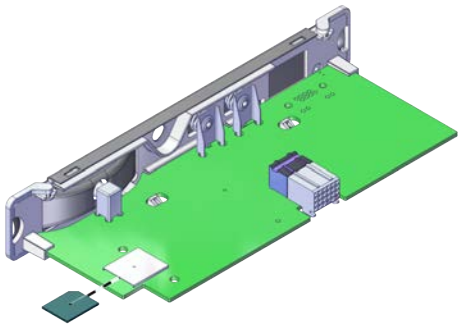
	Action	Note/Illustration
2	Carefully pull the side of the Connected Services gateway and rotate it tightly to take it out from the bracket.	 xx2400000053  xx1800000495 TOP VIEW

i For connected services gateway wired, there is no power cable.

Removing the sim card

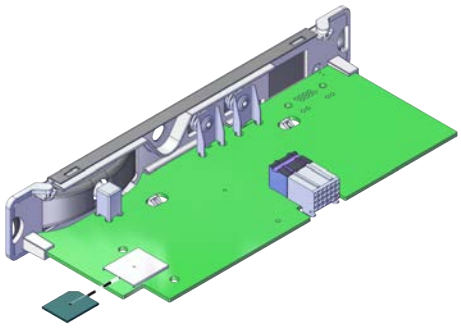
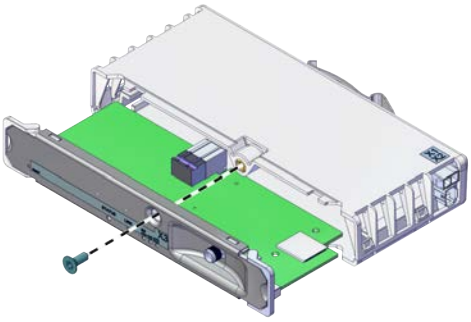
	Action	Note/Illustration
1	Remove the attachment screws and pull out the front cover of the Connected Services-3G.	 xx2400000163

Continues on next page

	Action	Note/Illustration
2	Carefully pull out the sim card from its holder.	 xx2400000164

Refitting the Connected Services gateway

Refitting the sim card

	Action	Note/Illustration
1	Carefully place the sim card in its holder.	 xx2400000164
2	Refit the front cover of the Connected Services-3G and secure the screws.	 xx2400000163

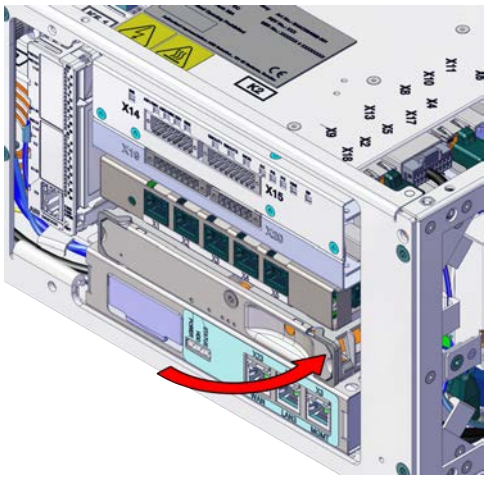
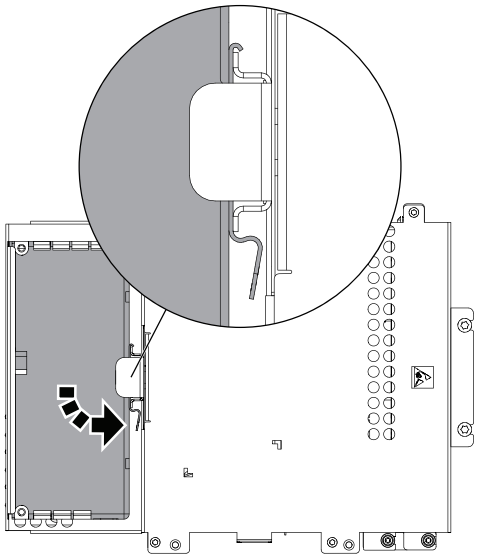
Refitting the Connected Services gateway

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

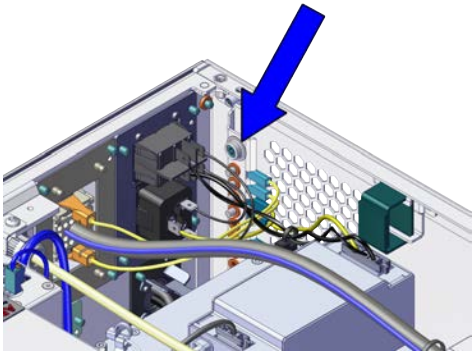
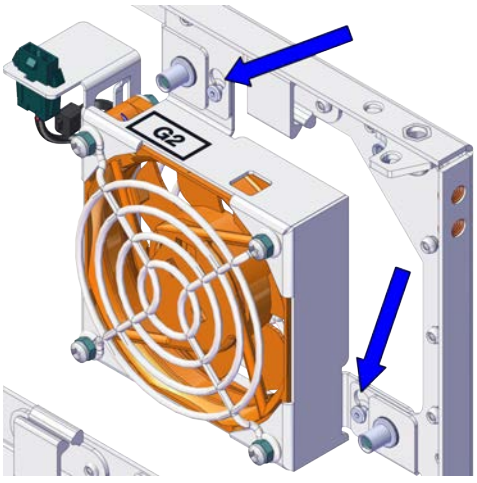
5.2.5 Replacing the 3G Connected Services gateway

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	
3	Hook up the Connected Services gateway to the bracket and push carefully into position. **Note** During the installation, the gap between the lower surface of the connected services gateway and the upper surface of the main computer should be zero.	 xx2400000054  xx1800000497 TOP VIEW
4	Reconnect any connectors disconnected at removal.	

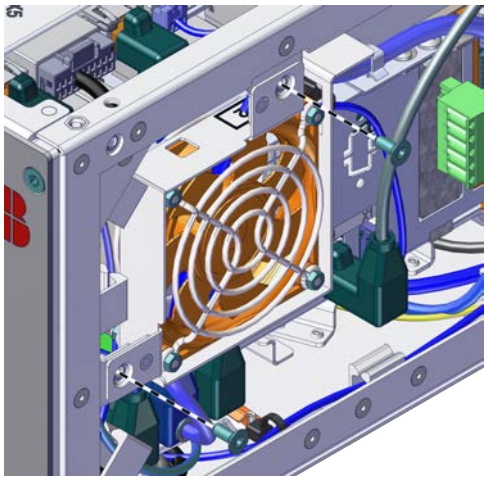
Continues on next page

Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	
4	Refit the fan bracket into the cabinet.	 xx2400000045

Continues on next page

5.2.5 Replacing the 3G Connected Services gateway
Continued

	Action	Note/Illustration
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

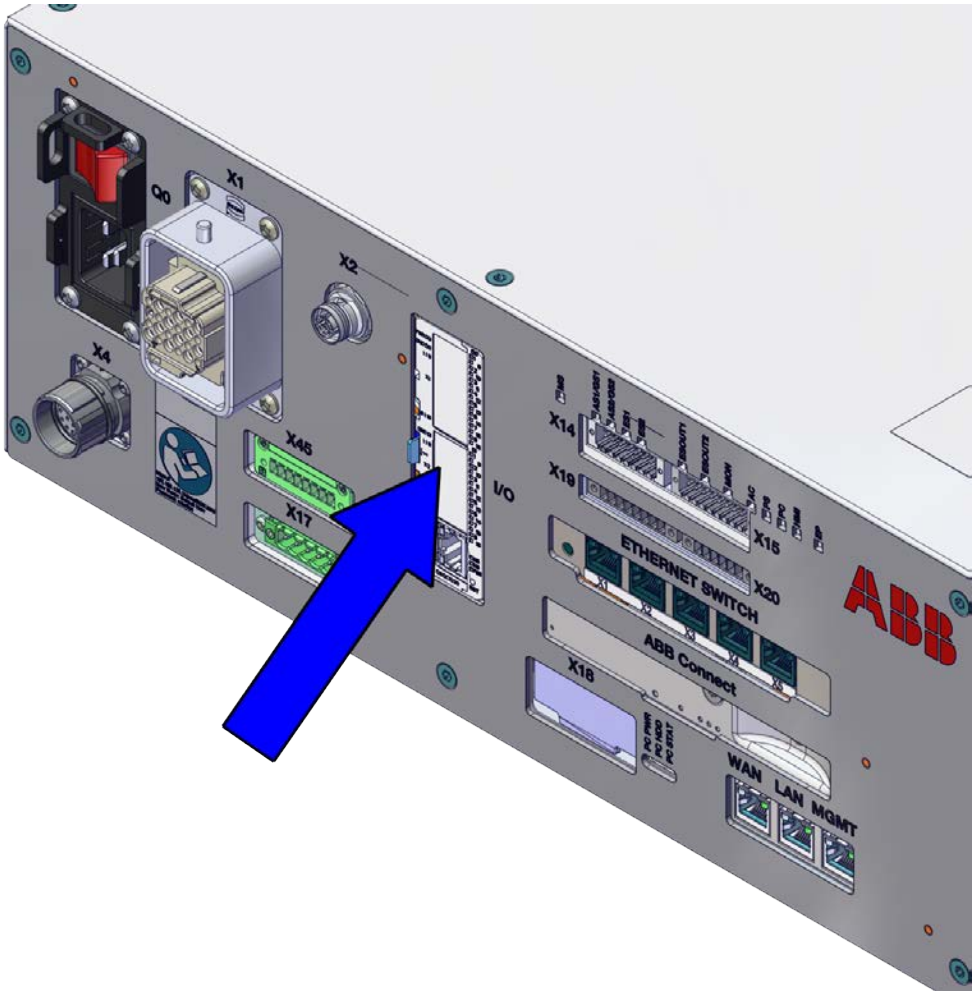
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.6 Replacing the scalable I/O unit

Location

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



xx2400000026

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
DSQC1030 Digital slot cover	3HAC065147-001	DSQC1030
Local I/O Digital base	3HAC058663-001	DSQC1030
Connectors digital base/add on	3HAC060919-001	
Digital add-on [3033-2]	3HAC058664-001	DSQC1031

Continues on next page

5.2.6 Replacing the scalable I/O unit
Continued

Spare part	Article number	Note
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	

Required tools and equipment

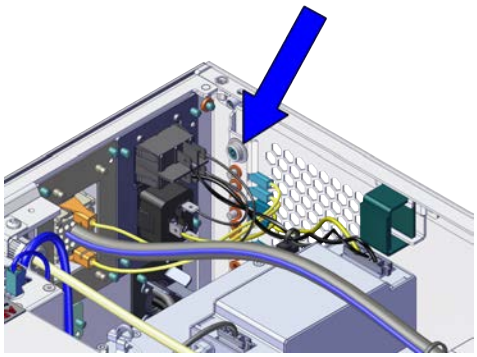
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, Circuit diagram - OmniCore C30 Type A for CRB 15000	*3HAC086302-010, 3HAC089111-009*	
Application manual - Scalable I/O	*3HAC070208-001*	

Removing the digital base (option)

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

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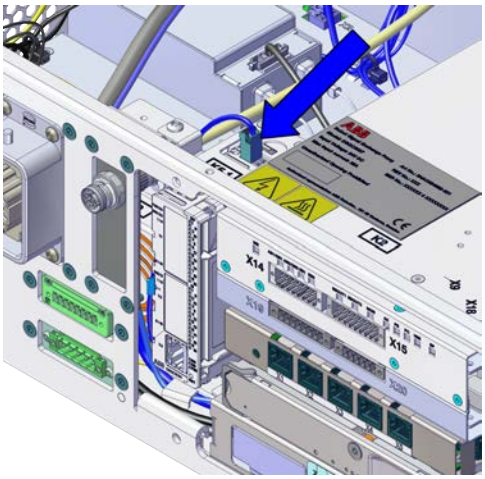
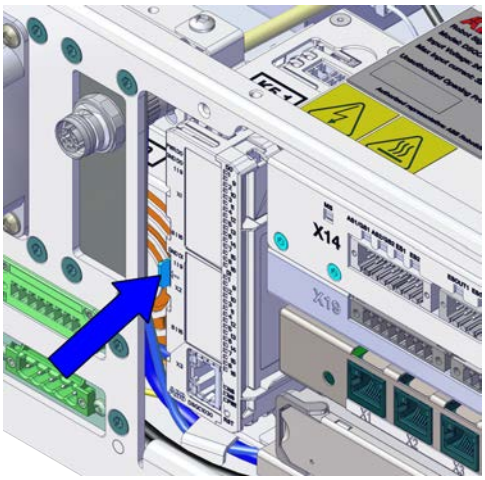
Removing the digital base (option)

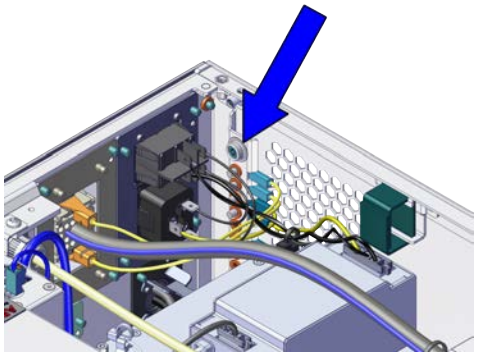
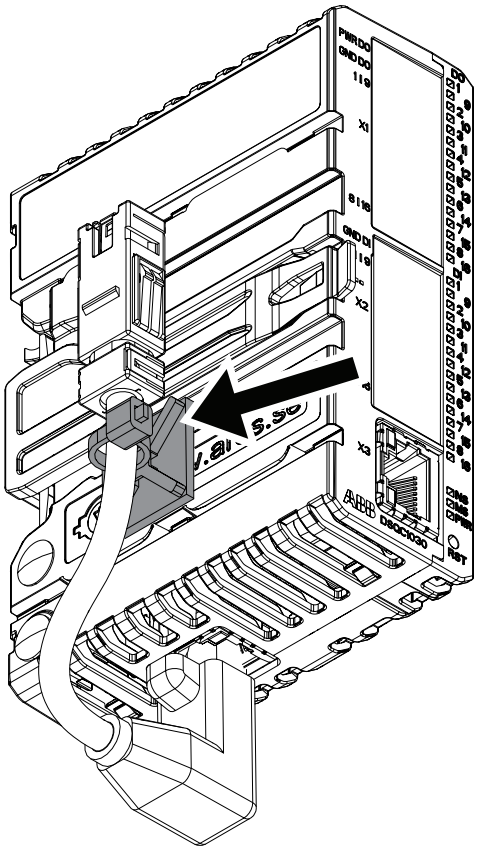
	Action	Note/Illustration
1	Disconnect: • K5.1.X4 - K2.X3	 xx2400000056
2	Push the buckle of the digital base slightly and pull out the digital base.	 xx2400000057
3	Disconnect the connectors between the adapter cable (K5.1.X5 - X110) and the adaptor cable (X110 - A2.X4/K4.X7). **Note** If the Ethernet extension switch is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from K4.X7. If the Ethernet extension unit slot cover is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from A2.X4.	
4	Disconnect: • K5.1.X5 - Harness adapter	

Continues on next page

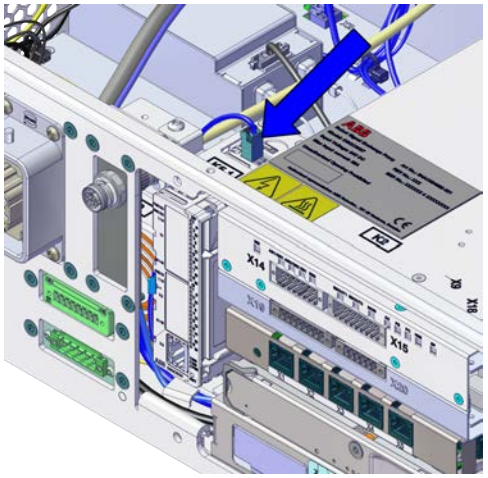
5.2.6 Replacing the scalable I/O unit
Continued

Refitting the digital base (option)

Refitting the digital base (option)

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Connect the adapter cable to the digital base. • K5.1.X5 - Harness adapter(X110) Stick the other connector onto the side of the digital base with the self-adhesive part.	 xx1800000938

Continues on next page

	Action	Note/Illustration
4	Connect the connectors between the adapter cable (K5.1.X5 - X110) and the adaptor cable (X110 - A2.X4/K4.X7). **Note** If the Ethernet extension switch is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from K4.X7. If the Ethernet extension unit slot cover is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from A2.X4.	
5	Push the digital base into the bracket until you hear a clear clicking sound.	
6	Connect the power cable connector: • K5.1.X4 - K2.X3	 xx2400000056

Concluding procedure

	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

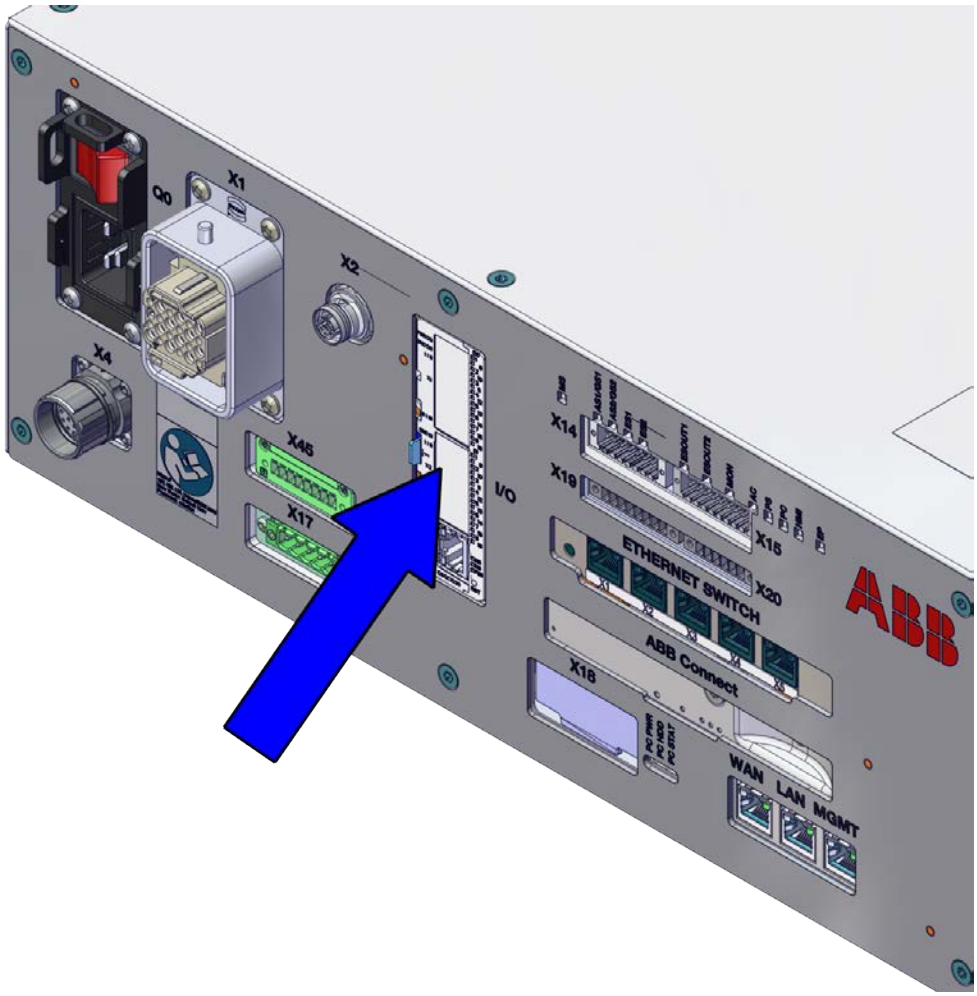
Replacing scalable I/O external units

To replace scalable I/O external units, see *Application manual - Scalable I/O*, and *Installing scalable I/O external devices on page 139*.

5.2.7 Replacing the safety digital base device

Location

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



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xx2400000055

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 C30 Type A via myABB Business Portal, *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 *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Continues on next page

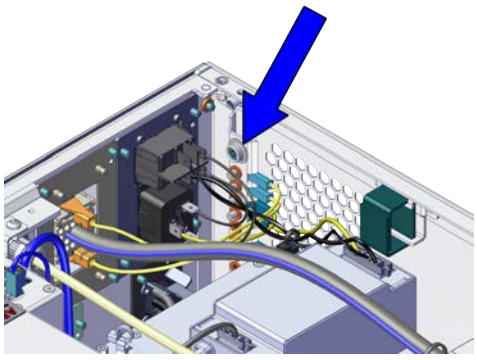
5.2.7 Replacing the safety digital base device
Continued

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

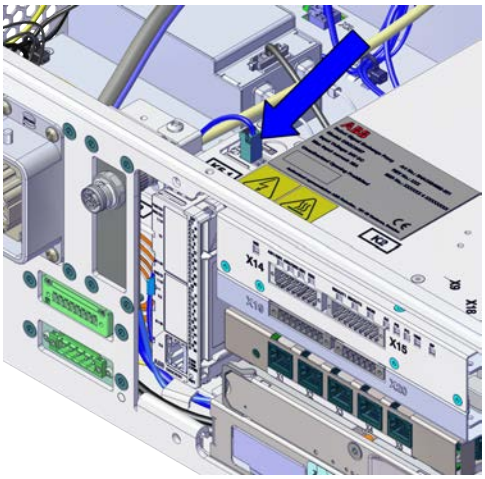
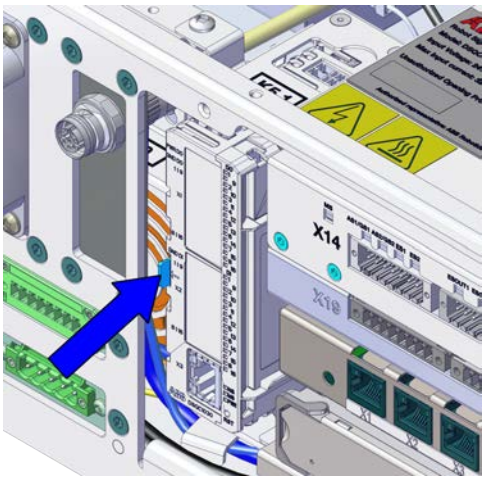
Removing the safety digital base device

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	Remove the front panel and top cover of the controller.	*Removing the controller covers on page 200*.
3	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

Removing the safety digital base device

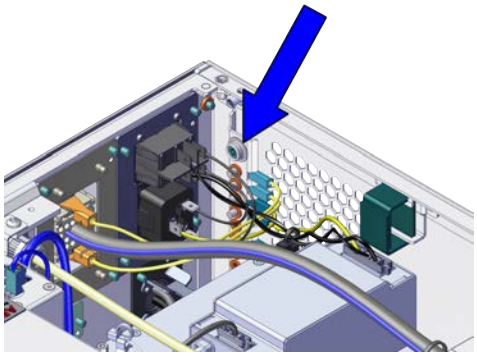
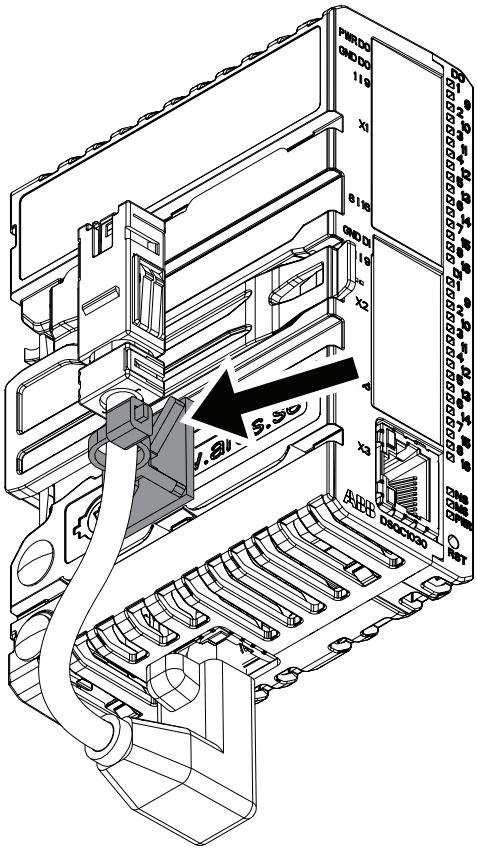
	Action	Note/Illustration
1	Disconnect: • K3.1.X4 - K2.X3	 xx2400000056
2	Push the buckle of the digital base slightly and pull out the digital base.	 xx2400000057
3	Disconnect the connectors between the adapter cable (K3.1.X5 - X110) and the adaptor cable (X110 - A2.X4/K4.X7). **Note** If the Ethernet extension switch is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from K4.X7. If the Ethernet extension unit slot cover is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from A2.X4.	
4	Disconnect: • K3.1.X5 - Harness adapter (X110)	

Continues on next page

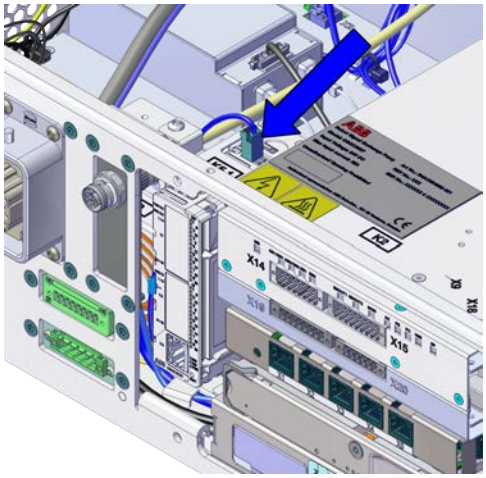
5.2.7 Replacing the safety digital base device
Continued

Refitting the safety digital base device

Refitting the safety digital base device

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Connect the adapter cable to the digital base. • K3.1.X5 - Harness adapter (X110) Stick the other connector onto the side of the digital base with the self-adhesive part.	 xx1800000938

Continues on next page

	Action	Note/Illustration
4	Connect the connectors between the adapter cable (K3.1.X5 - X110) and the adaptor cable (X110 - A2.X4/K4.X7). **Note** If the Ethernet extension switch is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from K4.X7. If the Ethernet extension unit slot cover is installed, connect and disconnect the adapter cable (A2.X4/K4.X7) to/from A2.X4.	
5	Push the digital base into the bracket until you hear a clear clicking sound.	
6	Connect the power cable connector: • K3.1.X4 - K2.X3	 xx2400000056

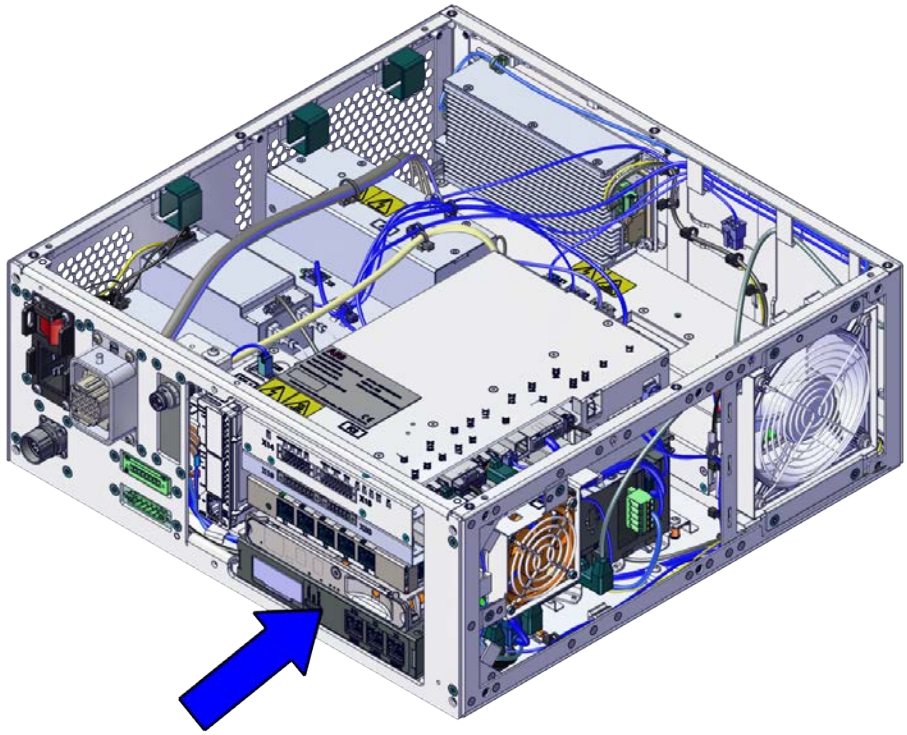
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.8 Replacing the main computer

Location

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



xx2400000058

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Main computer module assembly	3HAC063061-001	

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Continues on next page

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Note

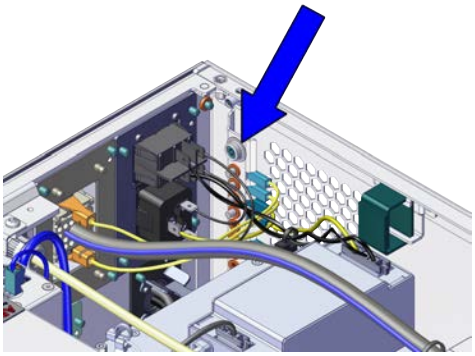
The main computer is part of an assembly group, secured on a process plate. To remove the computer, either lift out the assembly group and then remove the computer, or take out the parts on top of the computer and then the computer itself.

To remove the assembly group, see *Removing the main computer by assembly group on page 253*.

To remove the modules on the top of the computer, see *Removing the main computer by parts on page 271*.

Removing the main computer by assembly group

Preparations

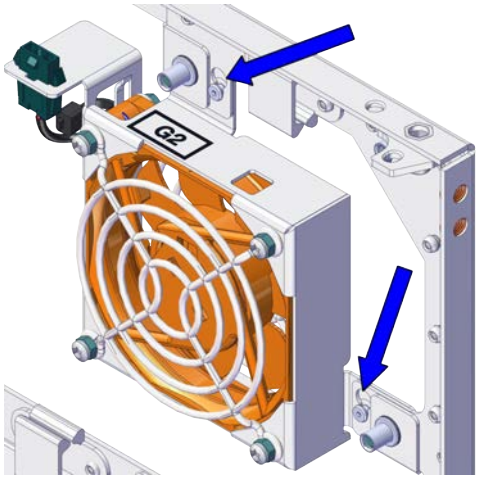
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

5.2.8 Replacing the main computer

Continued

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

Removing the main computer assembly with process plate

	Action	Note/Illustration
1	Disconnect all the connectors on the assembly group of the robot signal exchange proxy, Ethernet switch (option), connected services gateway, scalable I/O (option), and main computer.	

Continues on next page

	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - T4.X1 • K2.X3 - A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - A1.X6[7] • K2.X1 - X107[8] • K2.X17 - G2.X1, G1.X2 • K2.X9 & X13 - FlexPendant (X4)	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3[9] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

7 Not available for CRB 15000 controller.

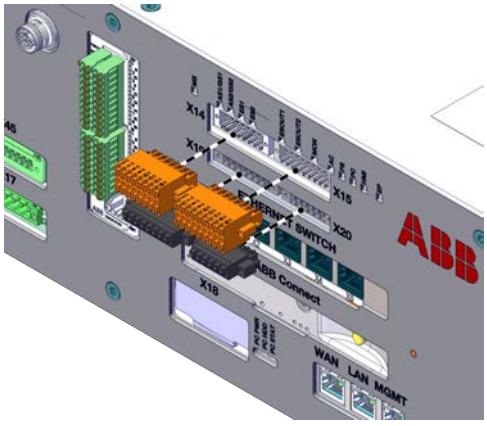
8 Only available for CRB 15000 controller.

9 For connected services gateway wired, there is no power cable.

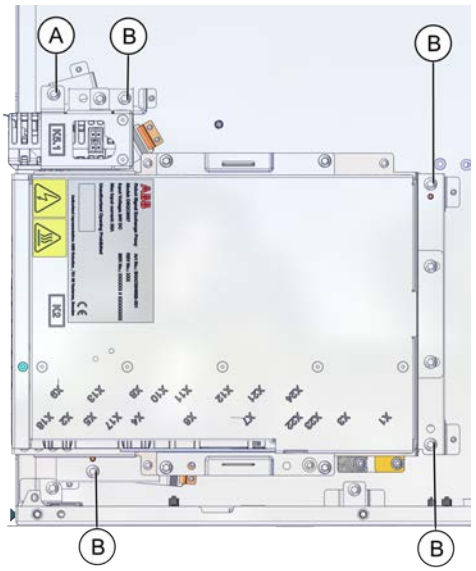
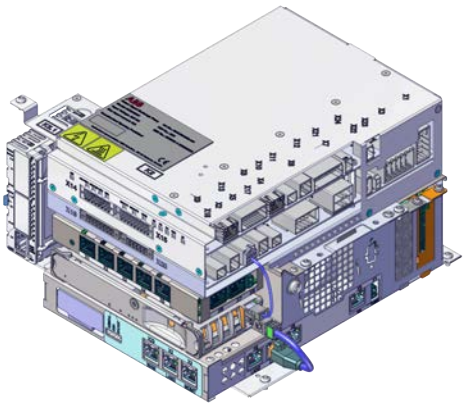
Continues on next page

5.2.8 Replacing the main computer

Continued

	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X9 - T4.X3 • A2.X9 - X1[8] • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	
2	Remove the mating connectors from the front side by loosening their attachment screws.	 xx2400000093

Continues on next page

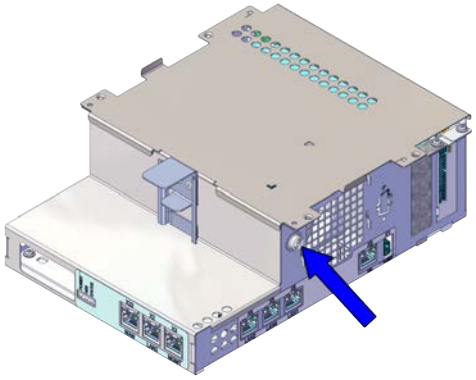
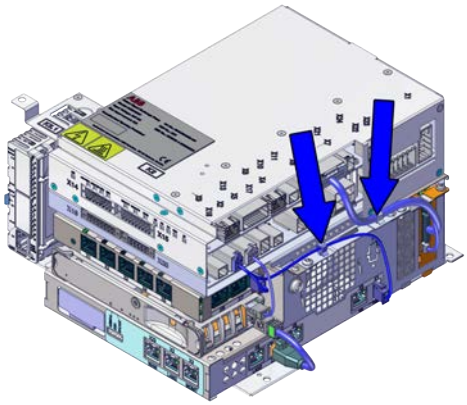
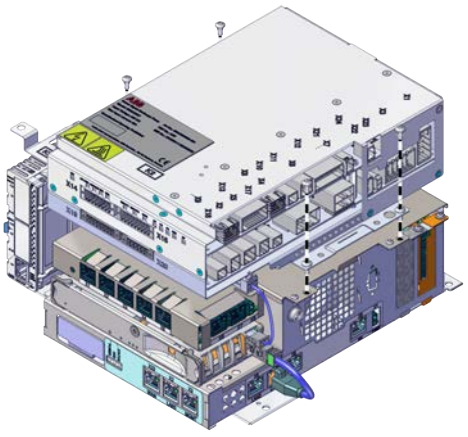
	Action	Note/Illustration
3	Remove the screws holding the process plate and the screws holding the scalable I/O bracket.	 xx2400000094 A — Screws holding the scalable I/O bracket (1 pcs) B — Screws holding the process plate (4 pcs)
4	Pull out the process plate with the assembly from the two guide pins on the mounting plate. **Note** Avoid colliding with the frame when removing the unit.	 xx2400000095

Continues on next page

5.2.8 Replacing the main computer

Continued

Removing the robot signal exchange proxy

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2000000419
2	Pull the cable ties out from the locking holes.	 xx2400000096
3	Remove the screws and lift out the robot signal exchange proxy. **Note** Avoid colliding with the frame of the controller.	 xx2400000097

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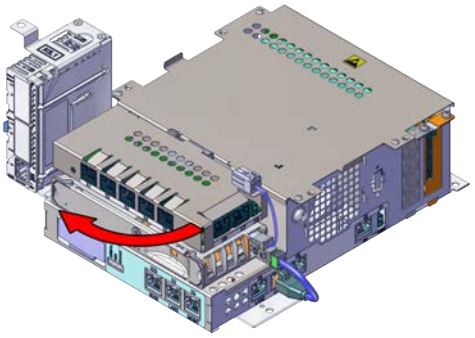
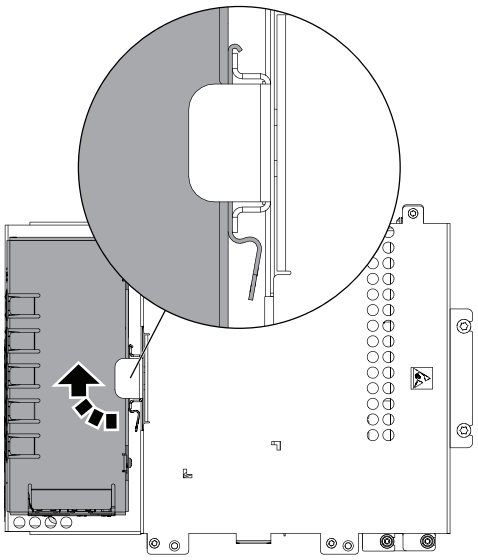
Removing the Ethernet extension switch (option)

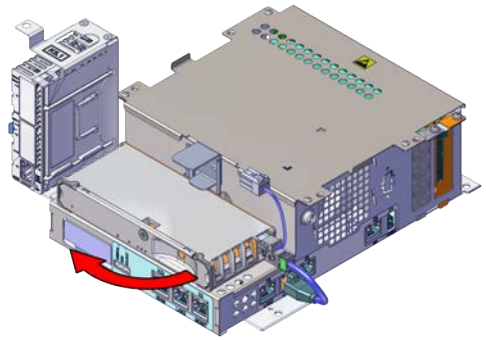
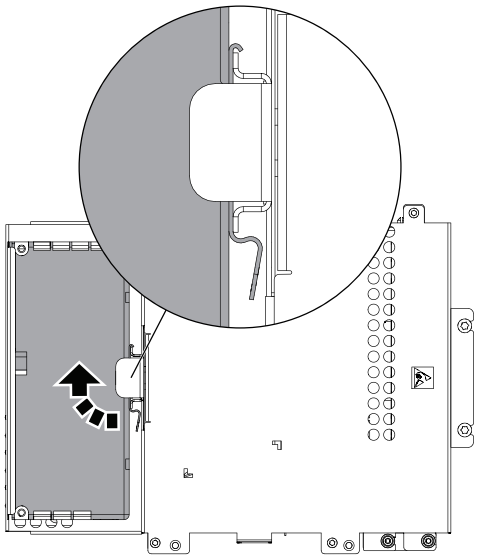
	Action	Note/Illustration
1	Carefully pull the side of the Ethernet extension switch and rotate it tightly to take it out from the bracket.	 xx2400000098  xx1800000491

Continues on next page

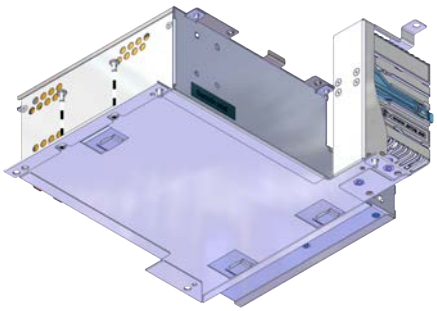
5.2.8 Replacing the main computer

Continued

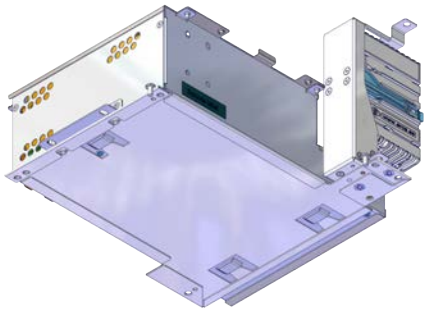
Removing the connected services gateway

	Action	Note/Illustration
1	Carefully pull the side of the connected services gateway and rotate it tightly to take it out from the bracket.	 xx2400000099  xx1800000495 TOP VIEW

Removing the main computer

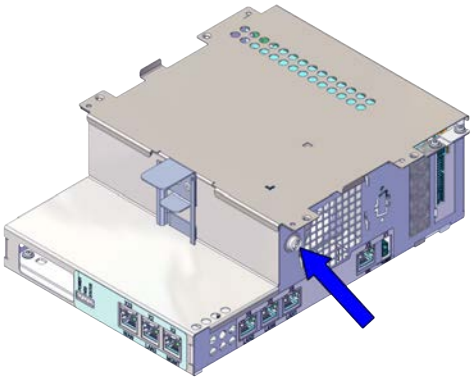
	Action	Note/Illustration
1	Remove the screws holding the main computer.	 xx2400000100

Continues on next page

	Action	Note/Illustration
2	Remove the main computer. **ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	 xx2400000154

Refitting the main computer by assembly group

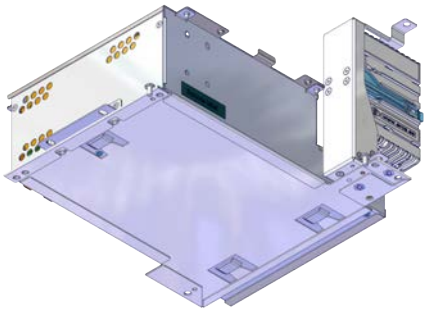
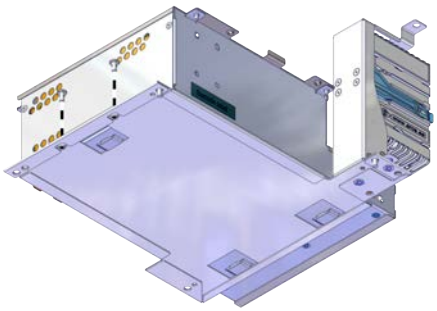
Refitting the main computer

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419

Continues on next page

5.2.8 Replacing the main computer

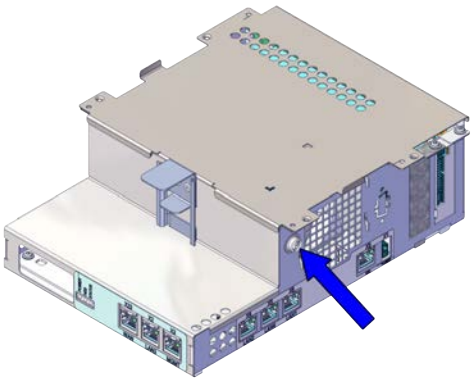
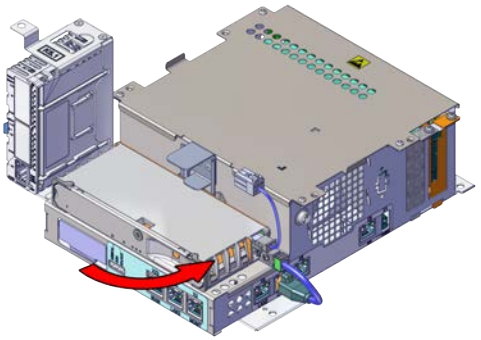
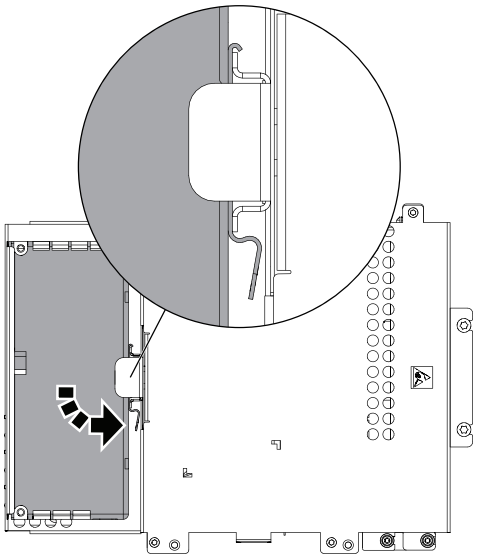
Continued

	Action	Note/Illustration
3	Fit the main computer to the process plate.	 xx2400000154
4	Fasten the main computer with the screws.	Screws: Torx pan head screw M4x8 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000100

Refitting the connected services gateway

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

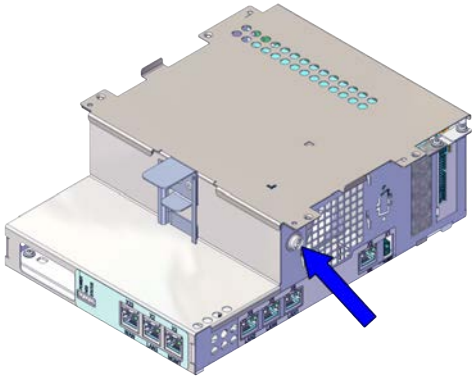
	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419
3	Hook up the connected services gateway to the bracket and push carefully into position. **Note** During the installation, the gap between the lower surface of the connected services gateway and the upper surface of the main computer should be zero.	 xx2400000155  xx1800000497 TOP VIEW

Continues on next page

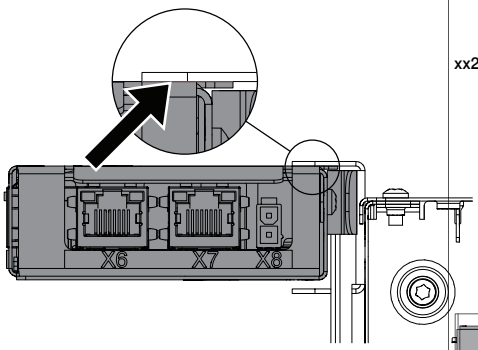
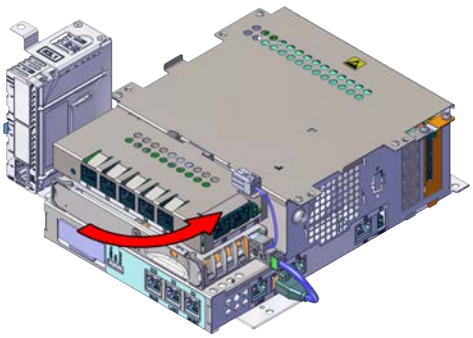
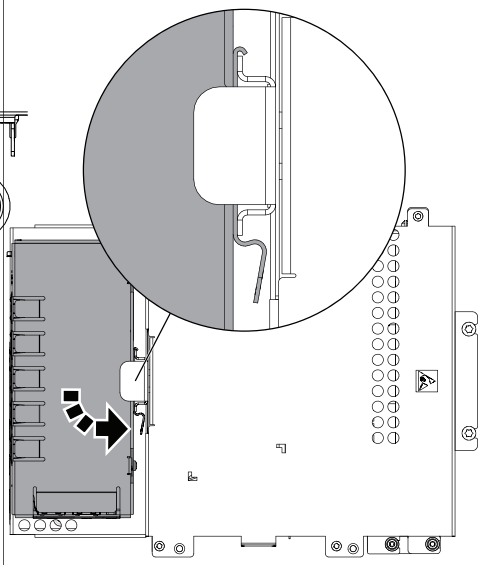
5.2.8 Replacing the main computer

Continued

Refitting the Ethernet extension switch (option)

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419

Continues on next page

	Action	Note/Illustration
3	Hook up the Ethernet extension switch to the bracket and then push the switch into position. **Note** 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.  xx1800000972	 xx2400000156  xx1800000493

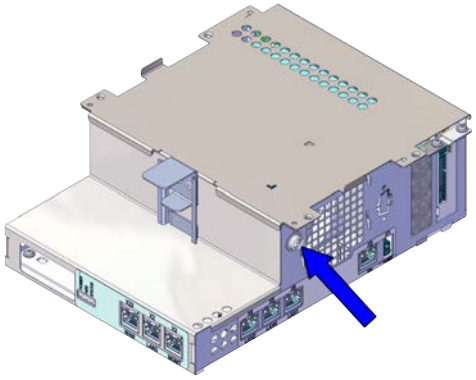
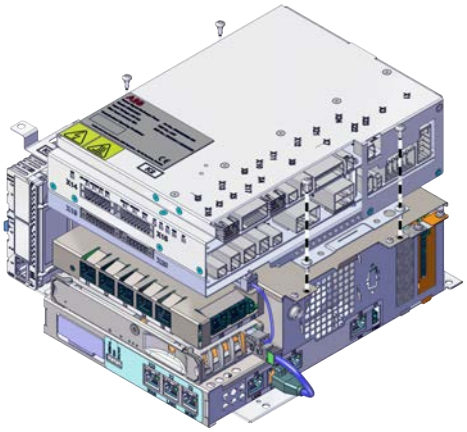
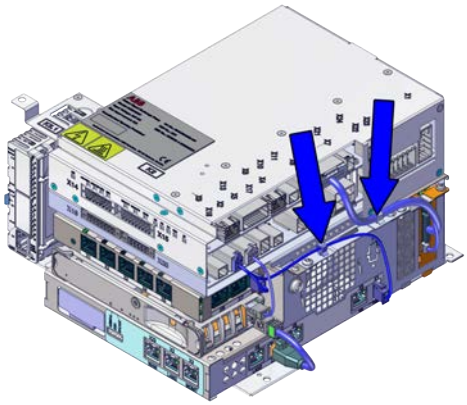
Refitting the robot signal exchange proxy

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.2.8 Replacing the main computer

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419
3	Fit the robot signal exchange proxy and secure the screws. **Note** Avoid colliding with the frame of the controller.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000097
4	Insert the cable ties into the locking holes.	 xx2400000096

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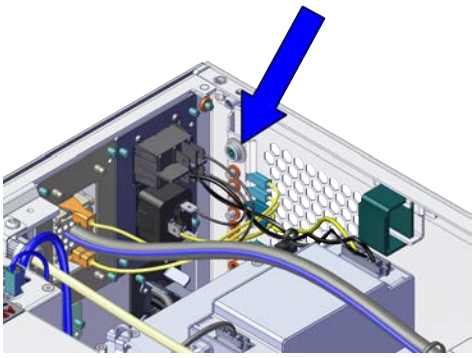
Refitting the main computer assembly with process plate to the cabinet

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2400000021
3	Use the two guide pins to locate the assembly onto the mounting plate.	**Note** Be careful with the frame of the controller when refitting the unit.
4	Fasten the assembly with the screws. **WARNING** Be careful with the cables installed below the process plate.	
5	Reconnect all the connectors on assembly of the robot signal exchange proxy, ethernet extension-seven port switch (option), ABB ability™ connected services, scalable I/O digital base (option), and main computer.	

Continues on next page

5.2.8 Replacing the main computer
Continued

	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - A1.X9 • K2.X3 - K6.X1, A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - T2.X2[7] • K2.X17 - G2.X1, G1.X2 • K2.X6, K2.X11 - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power • K2.X9 & X13 - FlexPendant	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3[i] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

Continues on next page

	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	

i For connected services gateway wired, there is no power cable.

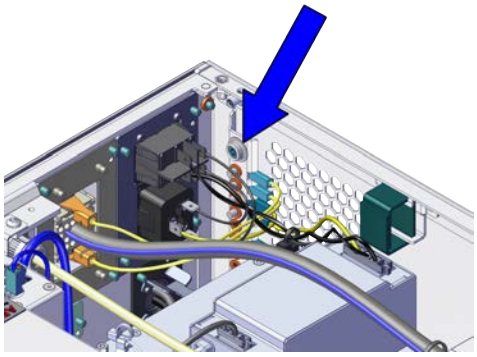
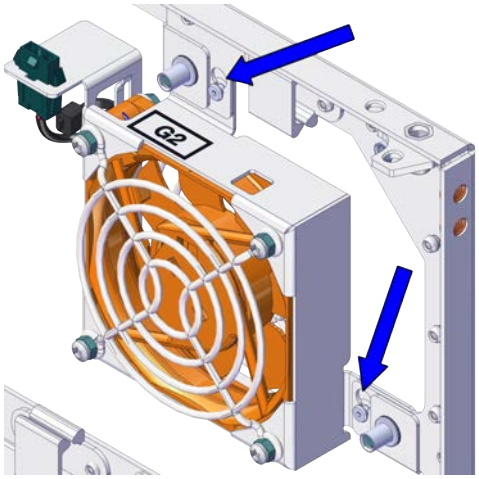
Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

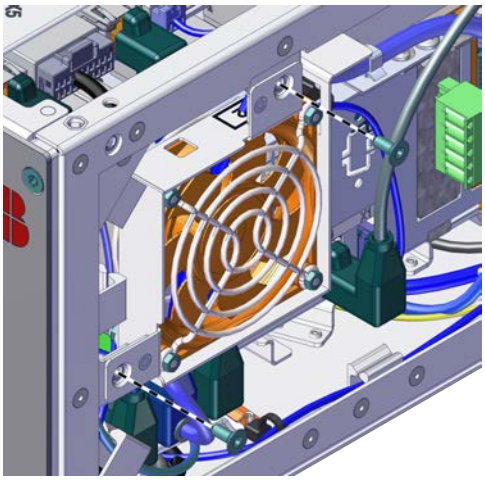
Continues on next page

5.2.8 Replacing the main computer

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	
4	Refit the fan bracket into the cabinet.	 xx2400000045

Continues on next page

	Action	Note/Illustration
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

Concluding procedure

	Action	Note/Illustration
1	Restore the hardware settings.	*Restoring the hardware settings on page 285*.
2	Create an installation package based on a local backup to restore the RobotWare system.	*Operating manual - Integrator's guide OmniCore*, section *Installing a new RobotWare system*.
3	Restore user configuration and RAPID programs from the backup.	*Operating manual - Integrator's guide OmniCore*, section *Backup and restore systems*.
4	Perform the function tests to verify that the safety features work properly.	*Function tests on page 189*.

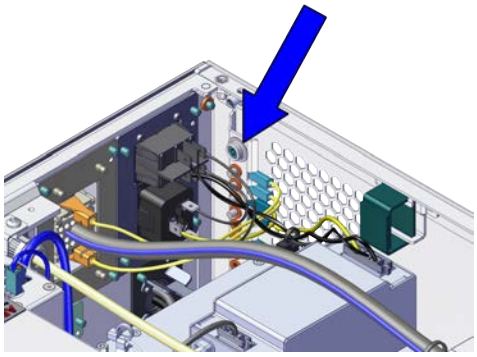
Removing the main computer by parts

Preparations

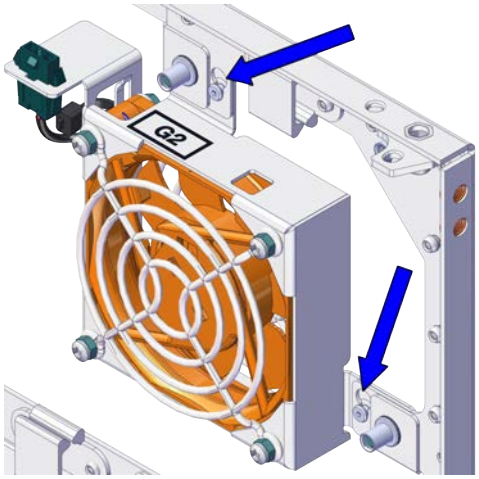
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.2.8 Replacing the main computer
Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045

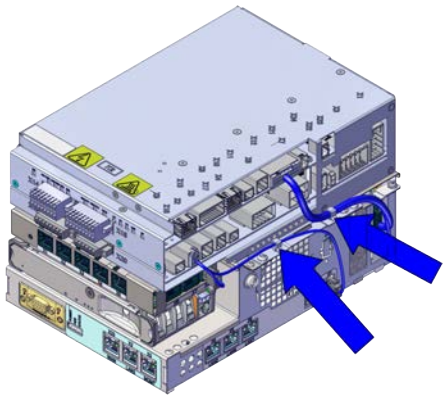
Continues on next page

	Action	Note/Illustration
3	Disconnect: • G2.X1-K2.X17	

Disconnecting the connectors to the main computer assembly

	Action	Note/Illustration
1	Disconnect all the connectors on the assembly group of the robot signal exchange proxy, Ethernet switch (option), connected services gateway, scalable I/O (option), and main computer.	
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X4 - A1.X9 • - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power (X1) • K2.X9 & X13 - FlexPendant (X4)	
	For the connected services gateway: • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

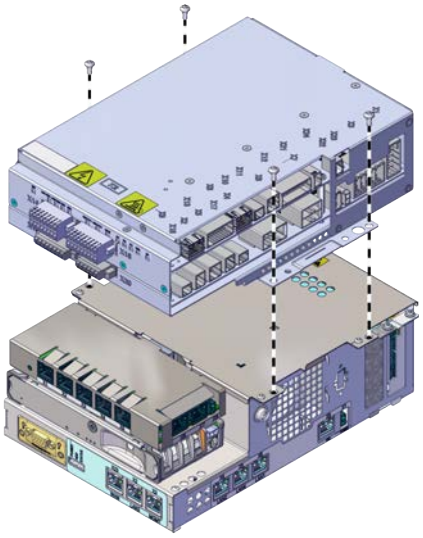
Removing the robot signal exchange proxy

	Action	Note/Illustration
1	Pull the cable ties out from the locking holes.	 xx1900001879

Continues on next page

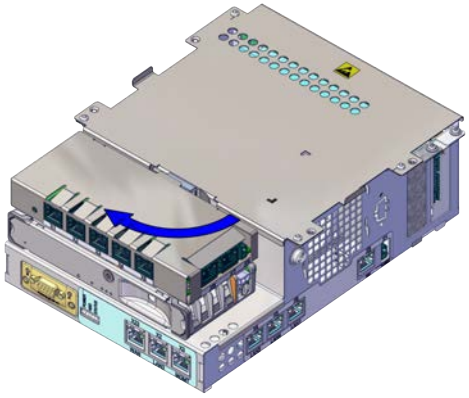
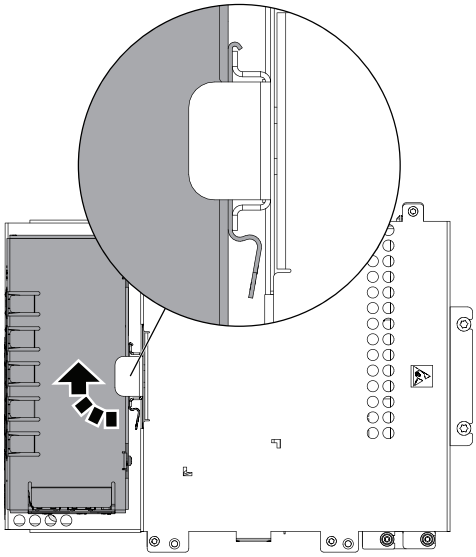
5.2.8 Replacing the main computer

Continued

	Action	Note/Illustration
2	Remove the screws and lift out the robot signal exchange proxy. **Note** Avoid colliding with the frame of the controller.	 xx1900001880

Continues on next page

Removing the Ethernet extension switch (option)

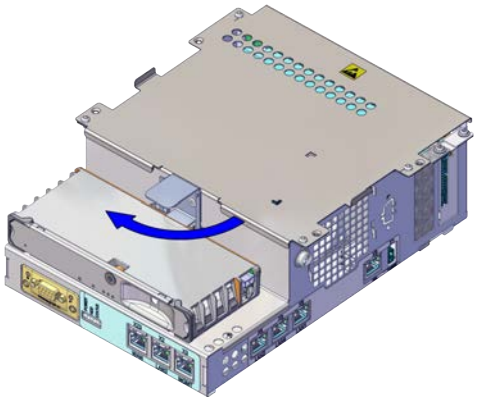
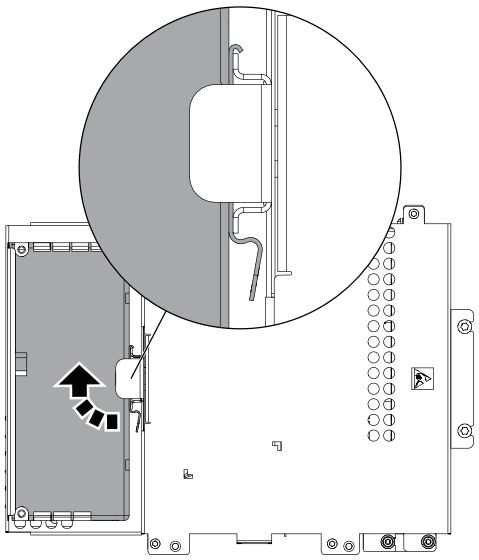
	Action	Note/Illustration
1	Carefully pull the side of the Ethernet extension switch and rotate it tightly to take it out from the bracket.	 xx1900001881  xx1800000491

Continues on next page

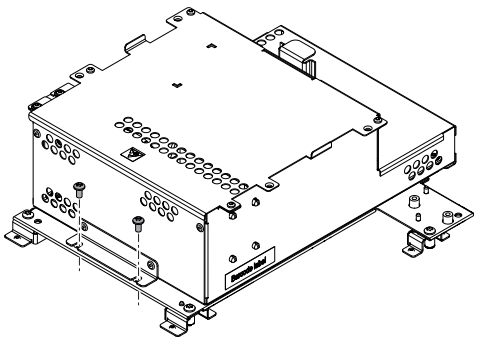
5.2.8 Replacing the main computer

Continued

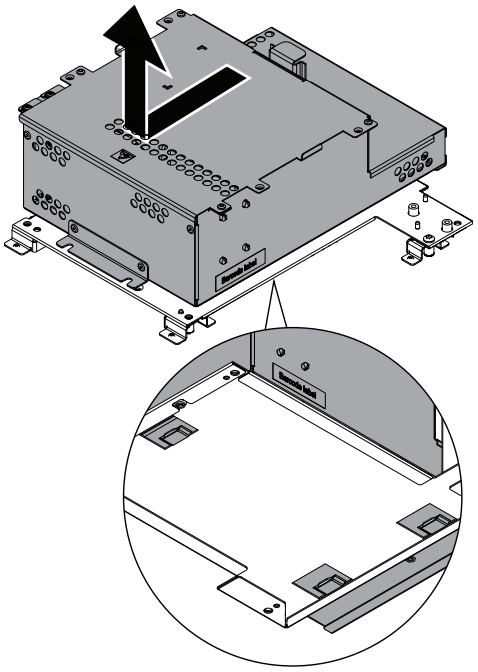
Removing the connected services gateway

	Action	Note/Illustration
1	Carefully pull the side of the connected services gateway and rotate it tightly to take it out from the bracket.	 xx1900001883  xx1800000495 TOP VIEW

Removing the main computer

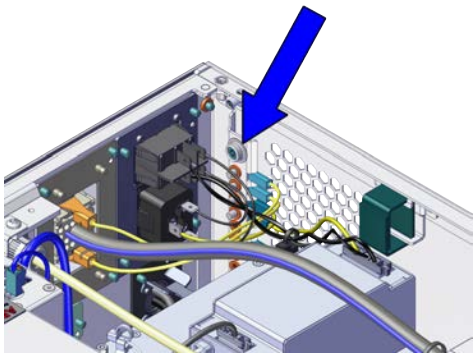
	Action	Note/Illustration
1	Remove the screws holding the main computer.	 xx1900001194

Continues on next page

	Action	Note/Illustration
2	Remove the main computer. **ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	 xx1900001195

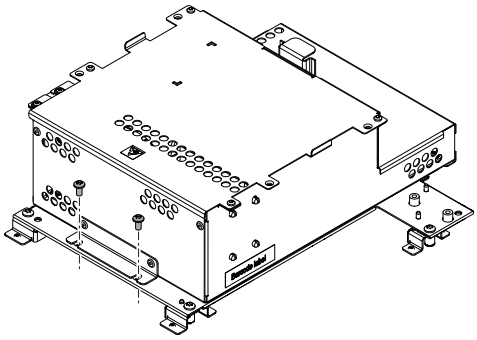
Refitting the main computer by parts

Refitting the main computer

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

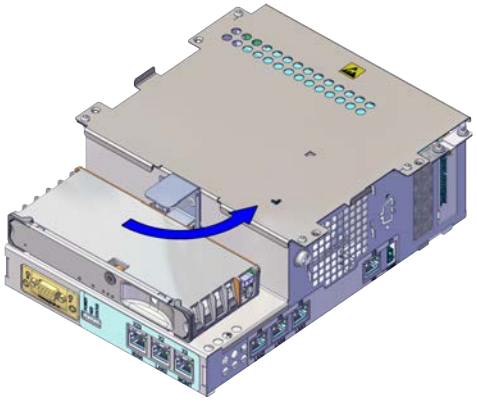
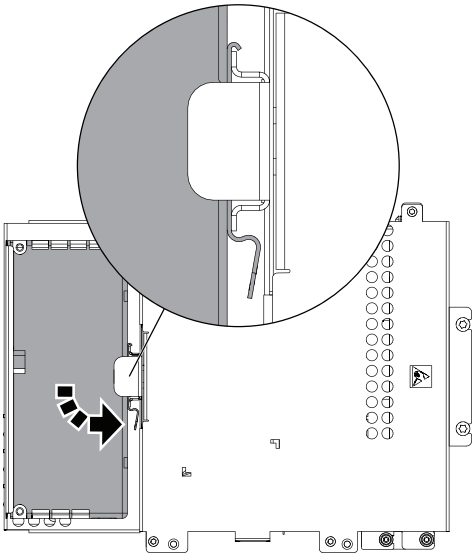
5.2.8 Replacing the main computer
Continued

	Action	Note/Illustration
3	Fasten the main computer with the screws.	Screws: Torx pan head screw M4x8 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx1900001196

Refitting the connected services gateway

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	

Continues on next page

	Action	Note/Illustration
3	Hook up the connected services gateway to the bracket and push carefully into position. **Note** During the installation, the gap between the lower surface of the Connected Services Gateway and the upper surface of the main computer should be zero.	 xx1900001884  xx1800000497

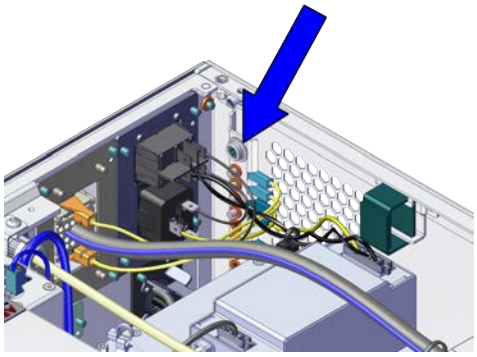
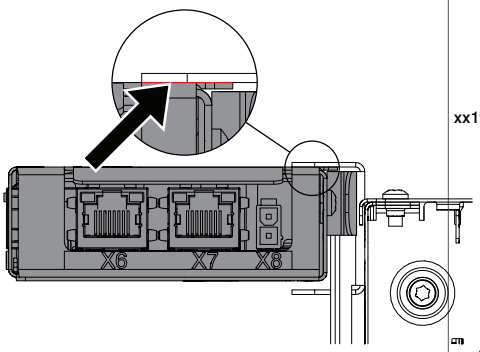
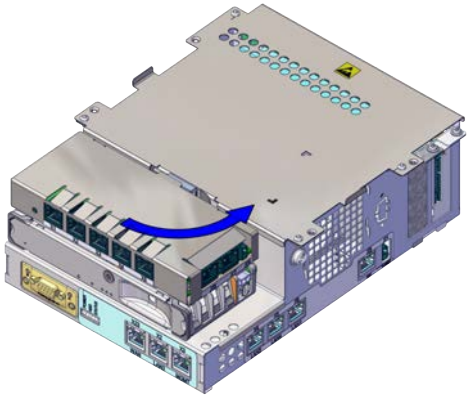
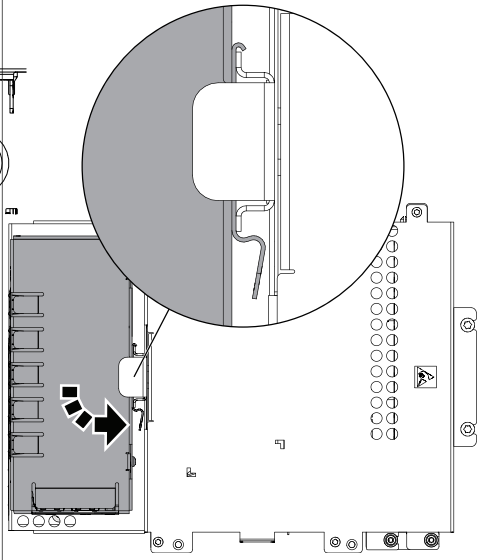
Refitting the Ethernet extension switch (option)

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.2.8 Replacing the main computer

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Hook up the Ethernet extension switch to the bracket and then push the switch into position. **Note** 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.  xx1800000972	 xx1900001882  xx1800000493

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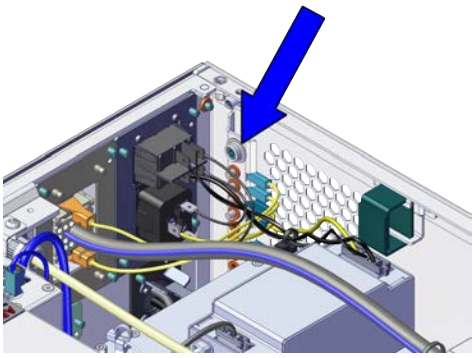
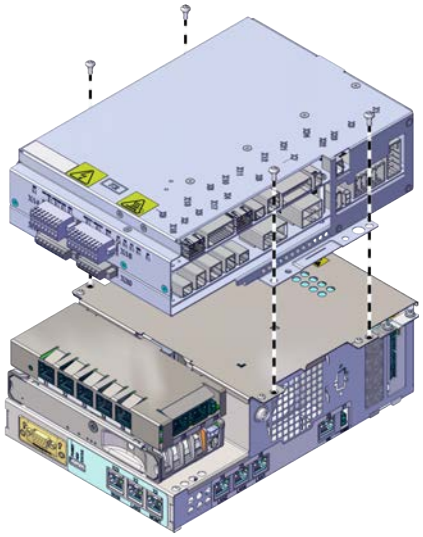
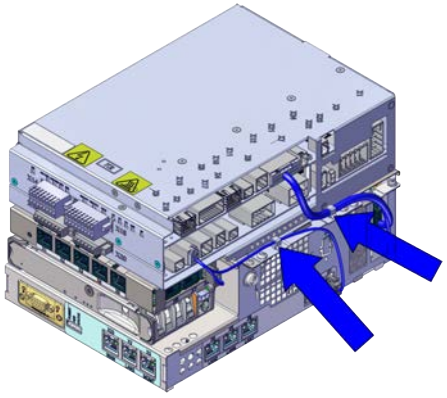
Refitting the robot signal exchange proxy

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Fit the robot signal exchange proxy and secure the screws. **Note** Avoid colliding with the frame of the controller.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx1900001880

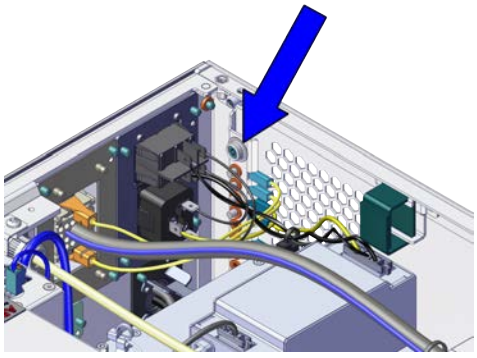
Continues on next page

5.2.8 Replacing the main computer

Continued

	Action	Note/Illustration
4	Insert the cable ties into the locking holes.	 xx1900001879

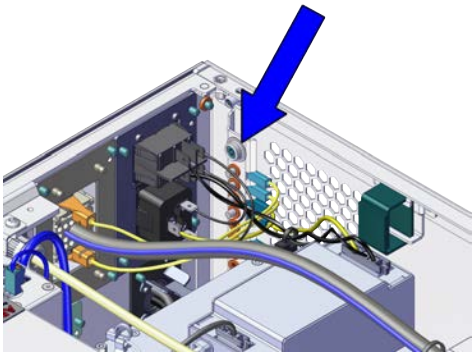
Reconnecting the connectors to the main computer assembly

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2400000021
3	Reconnect all the connectors on assembly of the robot signal exchange proxy, ethernet extension-seven port switch (option), ABB ability™ connected services, scalable I/O digital base (option), and main computer.	

Continues on next page

	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X4 - A1.X9 • - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power (X1) • K2.X9 & X13 - FlexPendant (X4)	
	For the connected services gateway: • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

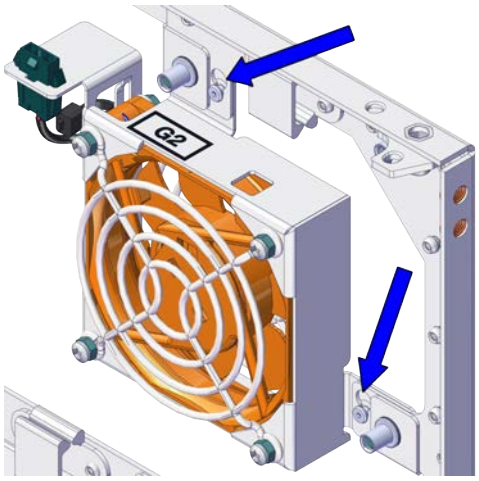
Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	

Continues on next page

5.2.8 Replacing the main computer

Continued

	Action	Note/Illustration
4	Refit the fan bracket into the cabinet.	 xx2400000045
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

Concluding procedure

	Action	Note/Illustration
1	Restore the hardware settings.	*Restoring the hardware settings on page 285*.
2	Create an installation package based on a local backup to restore the RobotWare system.	*Operating manual - Integrator's guide OmniCore*, section *Installing a new RobotWare system*.
3	Restore user configuration and RAPID programs from the backup.	*Operating manual - Integrator's guide OmniCore*, section *Backup and restore systems*.
4	Perform the function tests to verify that the safety features work properly.	*Function tests on page 189*.

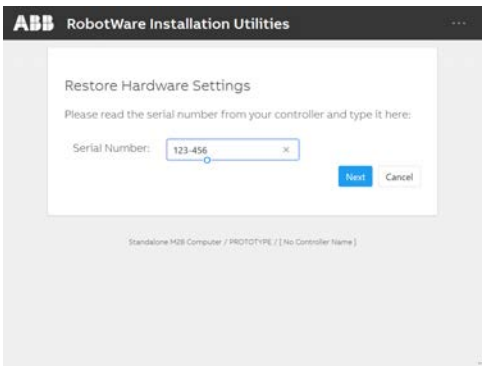
Continues on next page

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

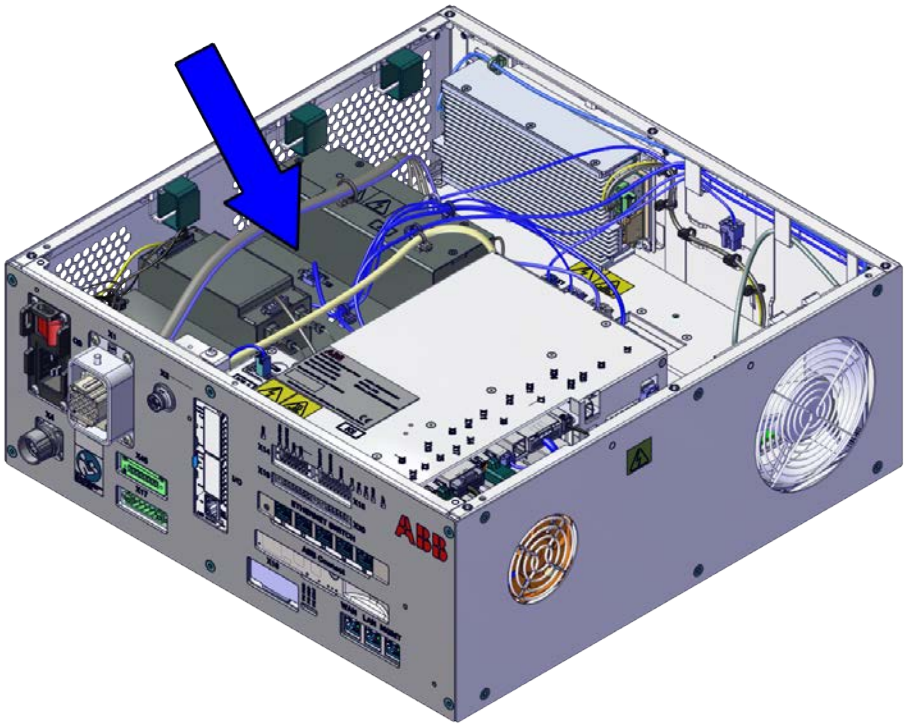
When replacing the main computer, both the serial number and licences are lost. The serial number must be restored as described below. Licences however, can either be restored automatically when the RobotWare system is installed, or manually through **Manage Licences** in RobotWare Installation Utilities.

	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.	 xx1900000110
3	Tap **Advanced**, and then **Restore Hardware Settings**.	
4	The **Restore Hardware Settings** window is displayed. Follow the instructions and tap **Next** to proceed.	
5	Carefully read the information and then check all boxes to confirm that you agree with the ABB conditions. Tap **Next** to proceed.	
6	Read the serial number on the front of the controller and type it in field **Serial Number**. Tap **Next**.	 xx2000000007
7	Tap **Browse** to open the hardware information file from its location. The restoration of the serial number is completed.	The system compares the downloaded file and the manually entered serial number to ensure that there is a match.

5.2.9 Replacing the power unit

Location

The illustration shows the location of the power unit in the controller.



xx2400000059

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Power unit	3HAC084667-001	DSQC3066 for OmniCore Type A
Power unit for CRB 15000 controller	3HAC072227-001	DSQC3083 When used for CRB 15000-10/12Kg, bleeder box is needed.
Bleeder box	3HAC084171-001	DSQC3112 For CRB 15000-10/12Kg.

Continues on next page

Tip

When replacing the bleeder box for CRB 15000-10/12Kg, see *Replacing the bleeder box on page 291*.

Required tools and equipment

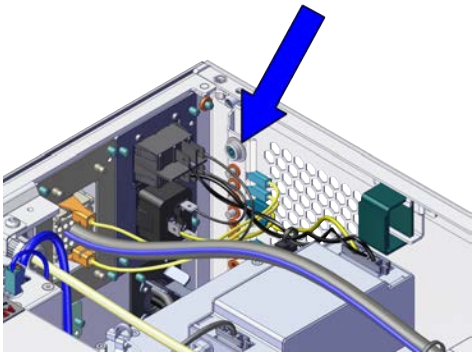
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the power unit

Preparations

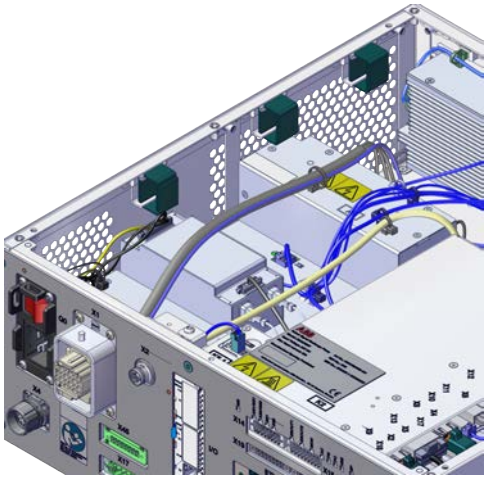
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

5.2.9 Replacing the power unit

Continued

Removing the power unit

	Action	Note/Illustration
1	Pull the cable ties out from the locking holes. **Tip** Take photos of the cable ties and locking holes before pulling out, to have as a reference when refitting the cable ties.	 xx2400000061
2	Disconnect: • A1.X13 - K2.X10 • A1.X4 - T4.X5 [10] • A1.X4 - X1/A1.R1.X1 [11] If used for CRB 15000 5Kg controller, connect from X1 to A1.X4. If used for CRB 15000 10/12Kg controller, connect from A1.X4 to A1.R1.X1. • A1.X1 - Incoming mains (X0) • A1.X6 - K2.X1 [12] • A1.X6 - X107 [13]	
3	Remove the screws and pull the power unit out from the two snaps on the mounting plate. **CAUTION** Only the sheet metal on the power unit can be used for holding. Do not touch the connectors or the filter on the power unit.	 xx2400000060

[10] Not available for CRB 15000 controller.

[11] Only used for CRB 15000 controller.

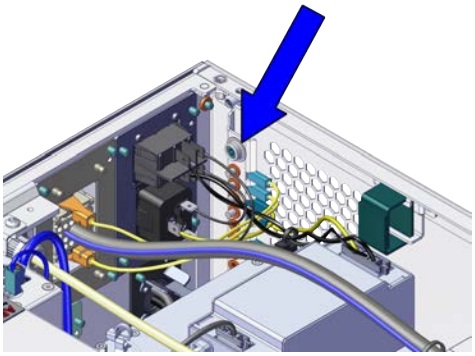
[12] Not available for CRB 15000 controller.

[13] Only used for CRB 15000 controller.

Continues on next page

Refitting the power unit

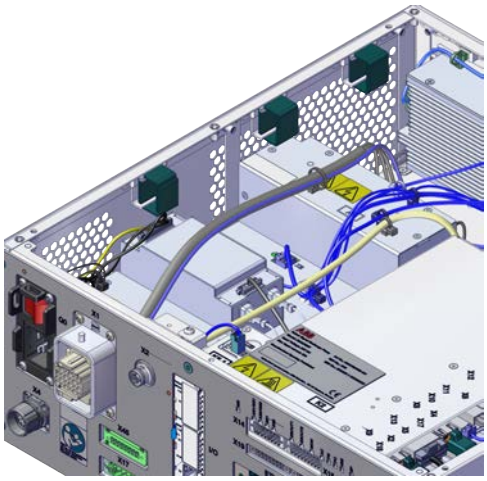
Refitting the power unit

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Push the power unit until it snaps on the mounting plate and secure the screws.	Screws: Torx pan head screw M4x8 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000060
4	Reconnect: • A1.X13 - K2.X10 • A1.X9 - K2.X4 • A1.X5 - T4.X1 • A1.X12 - T4.X3 • A1.X1 - Incoming mains (X0)	

Continues on next page

5.2.9 Replacing the power unit

Continued

	Action	Note/Illustration
5	Insert the cable ties back to the locking holes. **Tip** Refit the cable ties according to the photo.	 xx2400000061

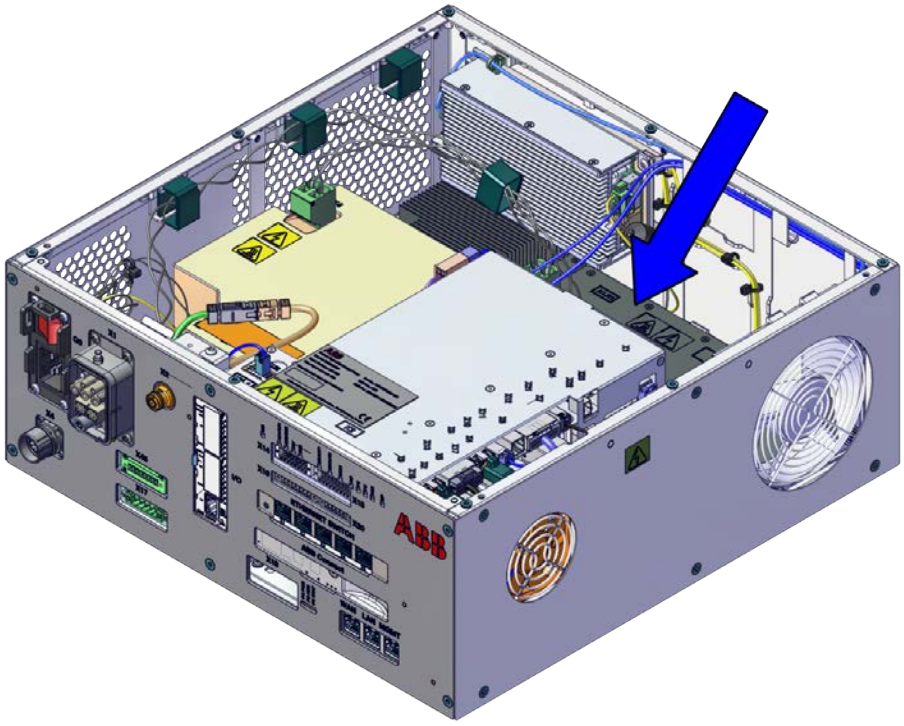
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.10 Replacing the bleeder box

Location

The illustration shows the location of the bleeder box in the CRB 15000-10/12 controller.



xx2400000157

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Power unit for CRB 15000 controller	3HAC084171-001	DSQC3112 For CRB 15000-10/12Kg.

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Continues on next page

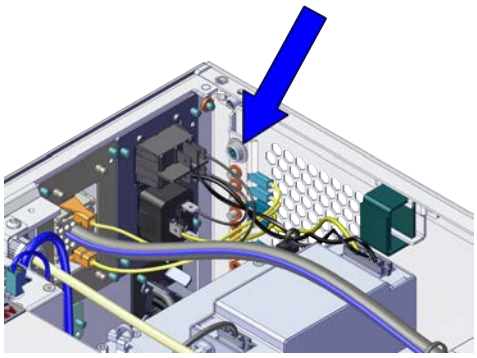
5.2.10 Replacing the bleeder box
Continued

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the bleeder box

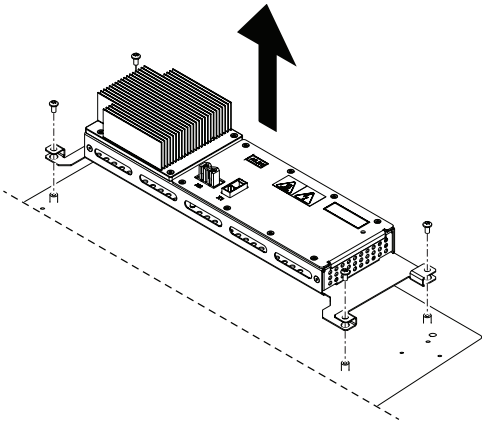
Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the top and rear covers.	*Removing the controller covers on page 200*.

Removing the bleeder box

	Action	Note/Illustration
1	Disconnect: • A1.R1.X1 - A1.X4 • A1.R1.X2 - X1	
2	Open the cable straps for the motor connector cable .	

Continues on next page

	Action	Note/Illustration
3	Remove the screws and pull the bleeder box out from the bottom.	Lengthened screwdriver  xx2400000158  xx2300000945

Refitting the bleeder box

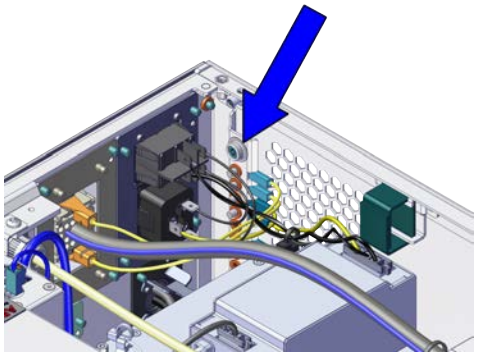
Refitting the bleeder box

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

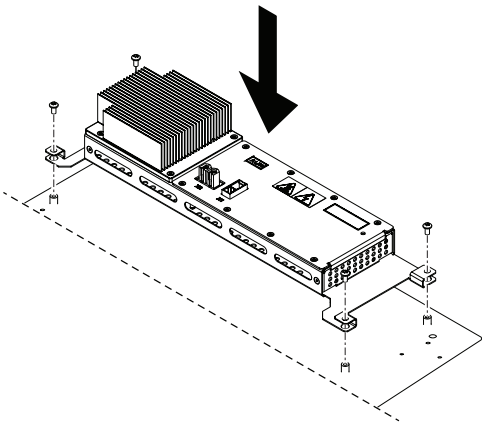
Continues on next page

5.2.10 Replacing the bleeder box

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

	Action	Note/Illustration
3	Refit the bleeder box and secure with the screws.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%  xx2400000158  xx2300000946
4	Fasten the cable with the cable straps.	
5	Reconnect: • A1.R1.X1 - A1.X4 • A1.R1.X2 - X1	

Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.

Continues on next page

5.2.10 Replacing the bleeder box

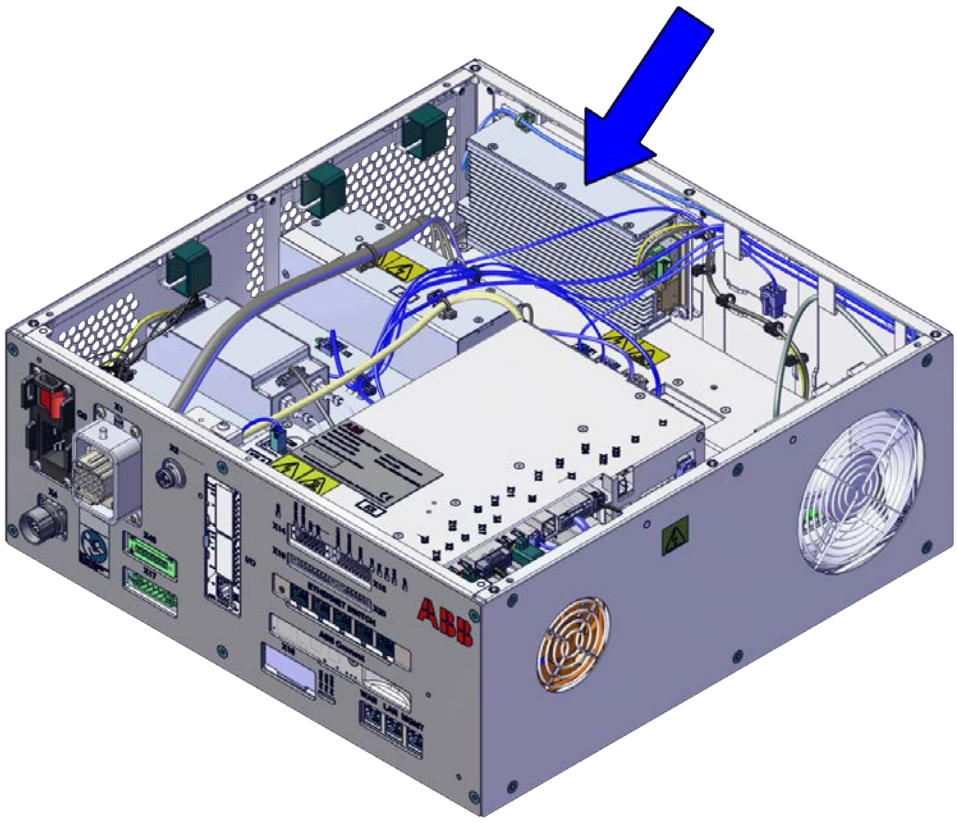
Continued

	Action	Note/Illustration
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.11 Replacing the power supply

Location

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



xx2400000029

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Power supply	3HAC071301-001	DSQC3035
End clamp	3HAB7983-1	

Continues on next page

5.2.11 Replacing the power supply
Continued

Required tools and equipment

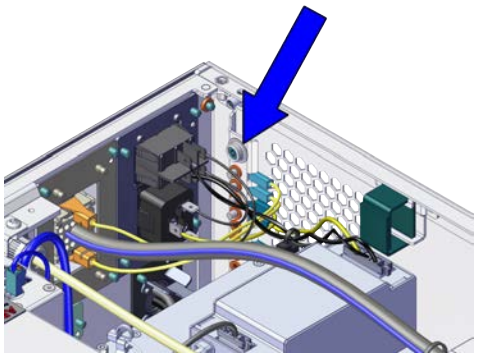
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

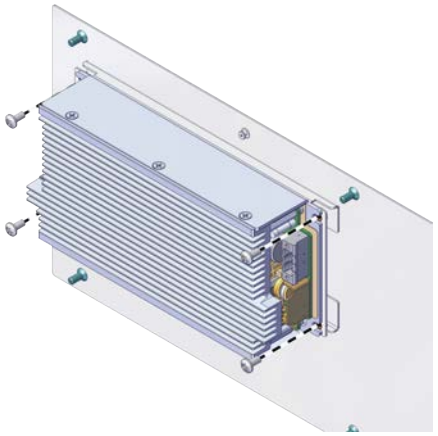
Removing the power supply baseline

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the top and rear covers.	*Removing the controller covers on page 200*.

Continues on next page

Removing the power supply baseline

	Action	Note/Illustration
1	Pull the cable ties out from the locking holes. **Tip** Take photos of the cable ties and locking holes before pulling out, to have as a reference when refitting the cable ties.	
2	Disconnect: • T2.X1 - A1.X6 • T2.X2 - K2.X1	
3	Remove the screws and the power supply.	 xx2400000062

Refitting the power supply baseline

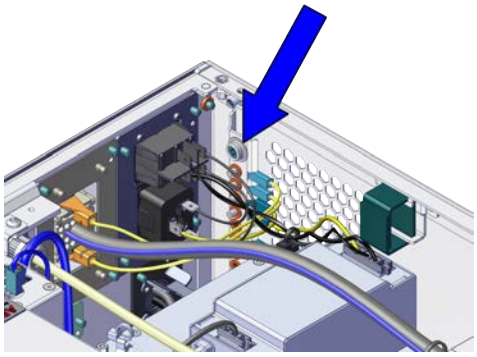
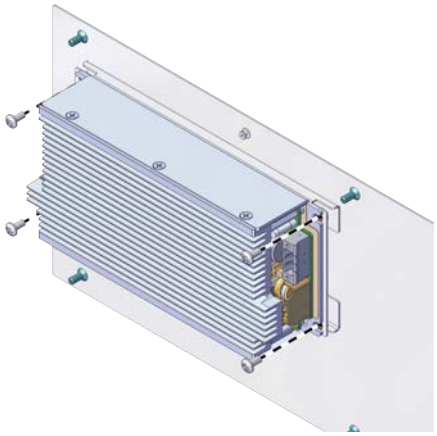
Refitting the power supply

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.2.11 Replacing the power supply

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Fit the power supply and fasten it with screws.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000062
4	Reconnect and secure: • T2.X1 - A1.X6 • T2.X2 - K2.X1.	
5	Insert the cable ties back to the locking holes. **Tip** Refit the cable ties according to the photo.	

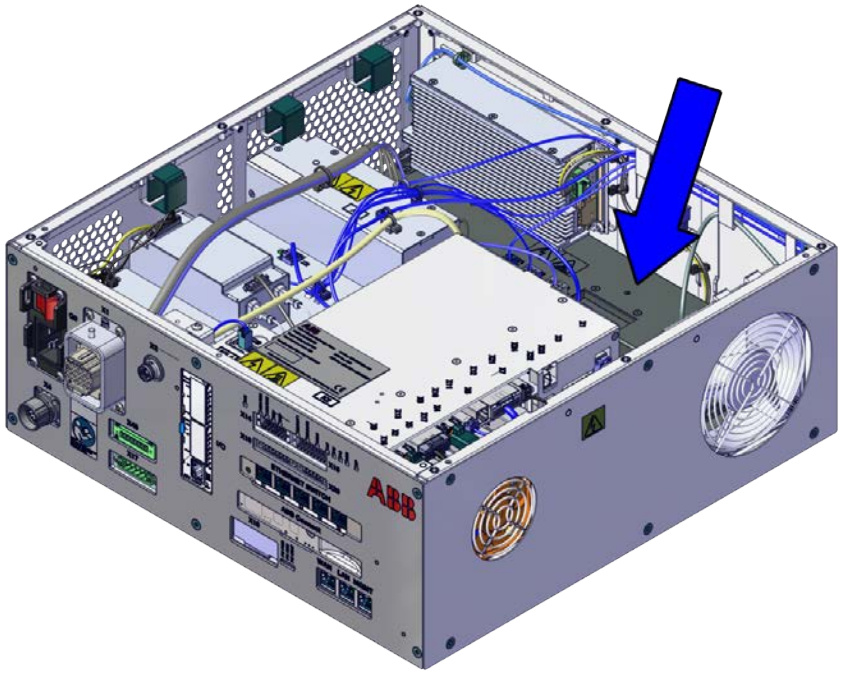
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.12 Replacing the drive unit

Location

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



xx2400000063

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Drive	3HAC074966-001	DSQC3084
Harness DC-bus	3HAC085041-001	Harness A1.X4 - T4.X5
Harness 24_SYS_DRV	3HAC085042-001	Harness K2.X4 - T4.X1
Harness EtherCAT	3HAC085043-001	Harness A2.X9 - T4.X3

Continues on next page

5.2.12 Replacing the drive unit
Continued

Required tools and equipment

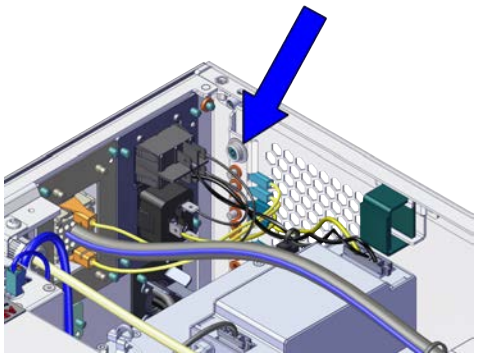
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

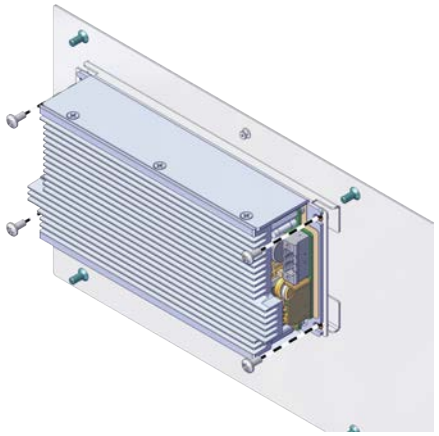
Removing the drive unit

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the top and rear covers.	*Removing the controller covers on page 200*.

Continues on next page

Removing the power supply baseline

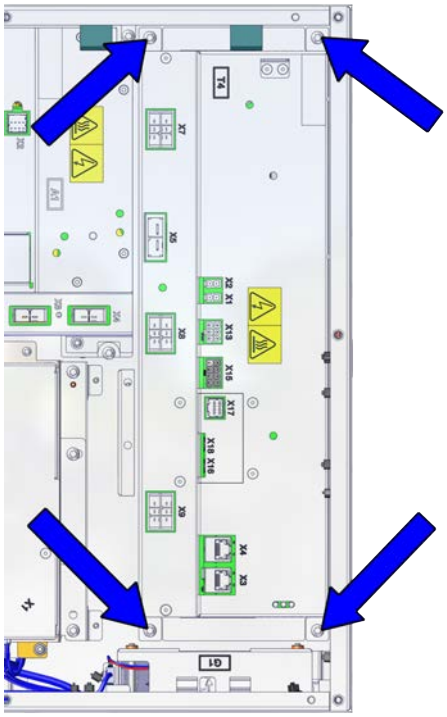
	Action	Note/Illustration
1	Pull the cable ties out from the locking holes. **Tip** Take photos of the cable ties and locking holes before pulling out, to have as a reference when refitting the cable ties.	
2	Disconnect: • T2.X1 - A1.X6 • T2.X2 - K2.X1	
3	Remove the screws and the power supply.	 xx2400000062

Removing the drive unit

	Action	Note/Illustration
1	Disconnect: • X1 - T4.X7, T4.X8, T4.X9 X1 - T4.X7, T4.X8, T4.X9, T4.X15 • X2 - T4.X16 • A1.X2 - T4.X17 • A1.X11 - T4.X13 • T4.X5 - A1.X4 • T4.X3 - A2.X9 • T4.X1 - K2.X4	

Continues on next page

5.2.12 Replacing the drive unit
Continued

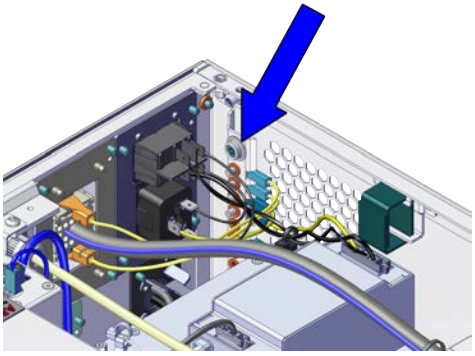
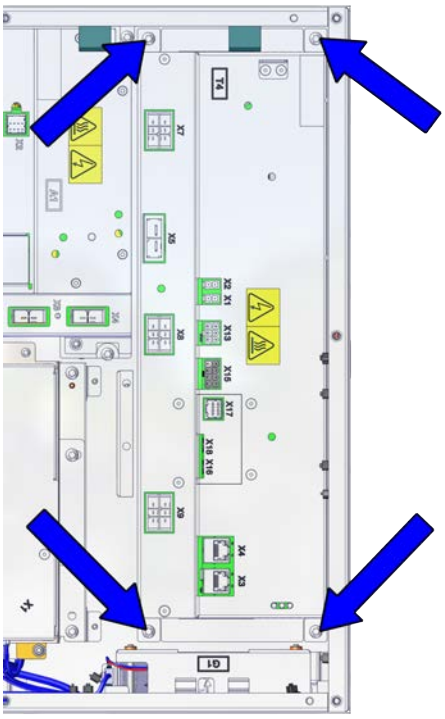
	Action	Note/Illustration
2	Remove the screws and pull the drive unit out from the bottom.	Lengthened screwdriver  xx2400000064

Refitting the drive unit

Refitting the drive unit

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

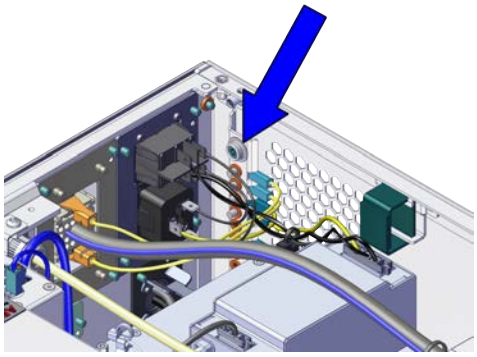
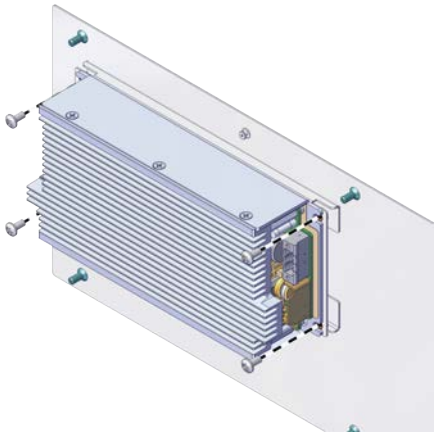
Continues on next page

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Refit the drive unit and secure with the screws.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%  xx2400000064
4	Reconnect: • T4.X5 - A1.X4 • T4.X3 - A1.X12 • T4.X1 - A1.X5	

Continues on next page

5.2.12 Replacing the drive unit
Continued

Refitting the power supply

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Fit the power supply and fasten it with screws.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000062
4	Reconnect and secure: • T2.X1 - A1.X6 • T2.X2 - K2.X1.	
5	Insert the cable ties back to the locking holes. **Tip** Refit the cable ties according to the photo.	

Continues on next page

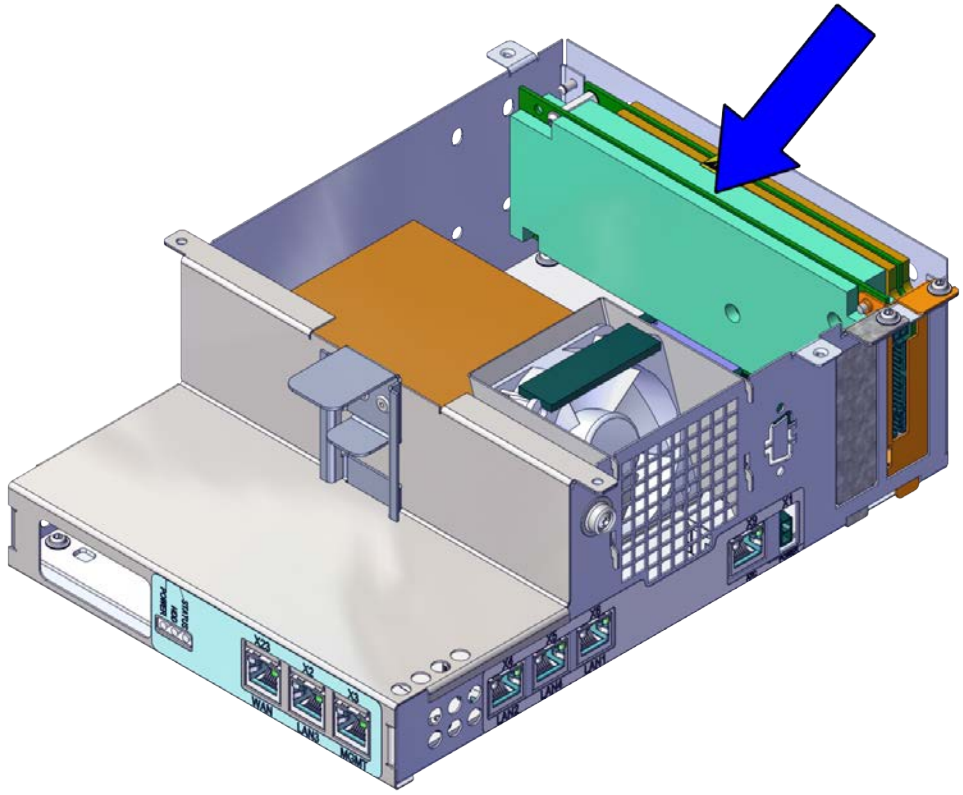
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.2.13 Replacing the fieldbus master

Location

The illustration shows the location of the fieldbus master in the controller.



xx2400000030

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
DeviceNet Board	3HAC043383-001	DSQC1006

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Continues on next page

Required documents

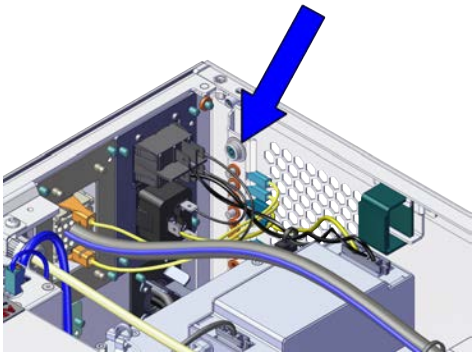
Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the fieldbus master

Note

The fieldbus master is part of an assembly group, secured on a process plate. To remove the fieldbus master, either lift out the assembly group and then remove the fieldbus master, or take out the parts on top of the main computer and then remove the fieldbus master.

Preparations

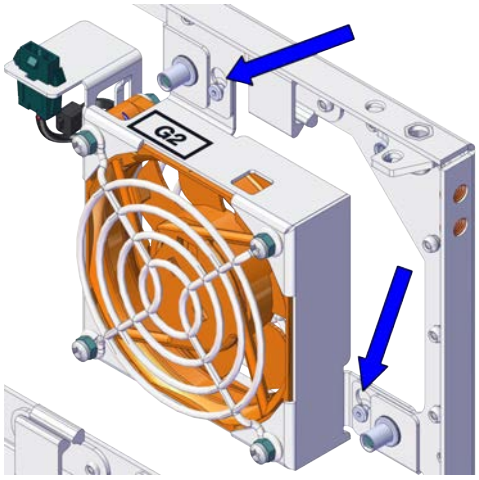
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

5.2.13 Replacing the fieldbus master

Continued

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

Removing the main computer assembly with process plate

	Action	Note/Illustration
1	Disconnect all the connectors on the assembly group of the robot signal exchange proxy, Ethernet switch (option), connected services gateway, scalable I/O (option), and main computer.	

Continues on next page

	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - T4.X1 • K2.X3 - A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - A1.X6 [14] • K2.X1 - X107 [15] • K2.X17 - G2.X1, G1.X2 • K2.X9 & X13 - FlexPendant (X4)	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3 [16] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

14 Not available for CRB 15000 controller.

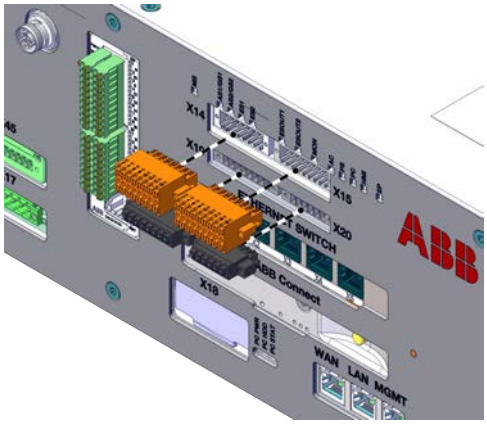
15 Only available for CRB 15000 controller.

16 For connected services gateway wired, there is no power cable.

Continues on next page

5.2.13 Replacing the fieldbus master

Continued

	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X9 - T4.X3 • A2.X9 - X1 [15] • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	
2	Remove the mating connectors from the front side by loosening their attachment screws.	 xx2400000093

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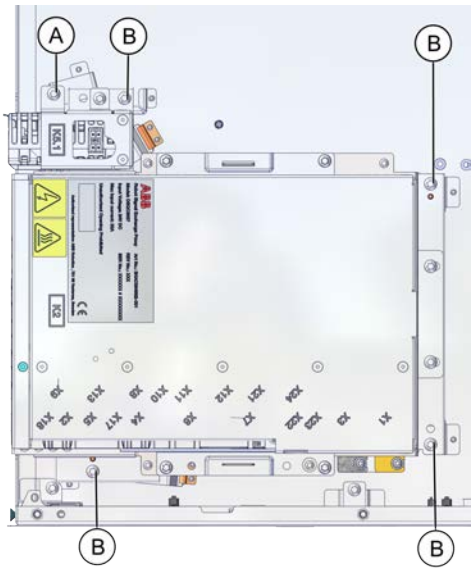
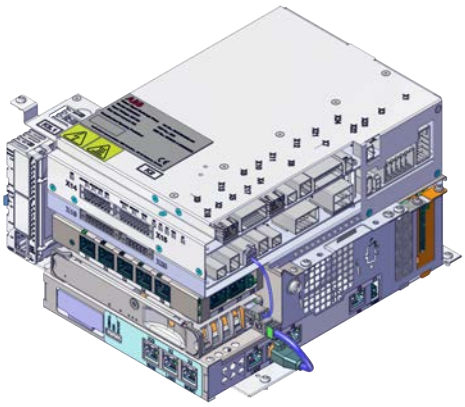
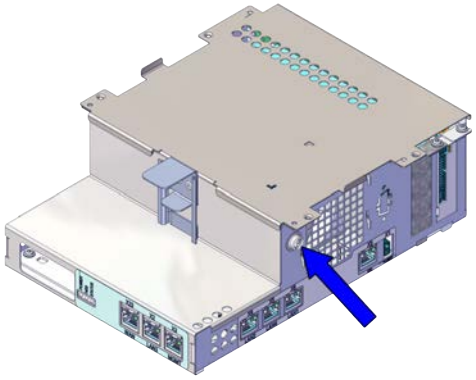
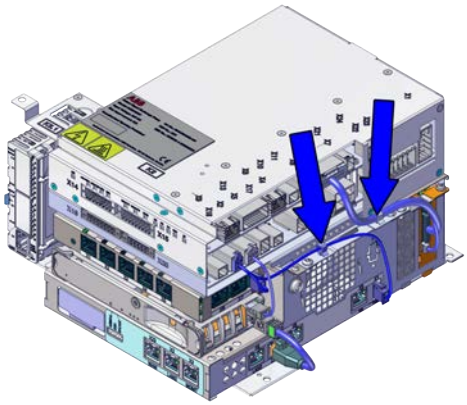
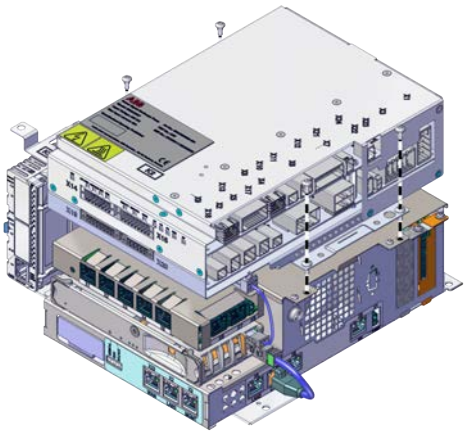
	Action	Note/Illustration
3	Remove the screws holding the process plate and the screws holding the scalable I/O bracket.	 xx2400000094 A — Screws holding the scalable I/O bracket (1 pcs) B — Screws holding the process plate (4 pcs)
4	Pull out the process plate with the assembly from the two guide pins on the mounting plate. **Note** Avoid colliding with the frame when removing the unit.	 xx2400000095

Continues on next page

5.2.13 Replacing the fieldbus master

Continued

Removing the robot signal exchange proxy

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2000000419
2	Pull the cable ties out from the locking holes.	 xx2400000096
3	Remove the screws and lift out the robot signal exchange proxy. **Note** Avoid colliding with the frame of the controller.	 xx2400000097

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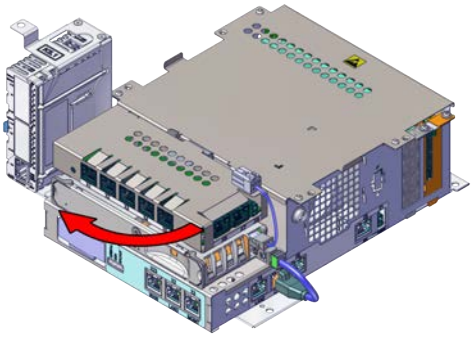
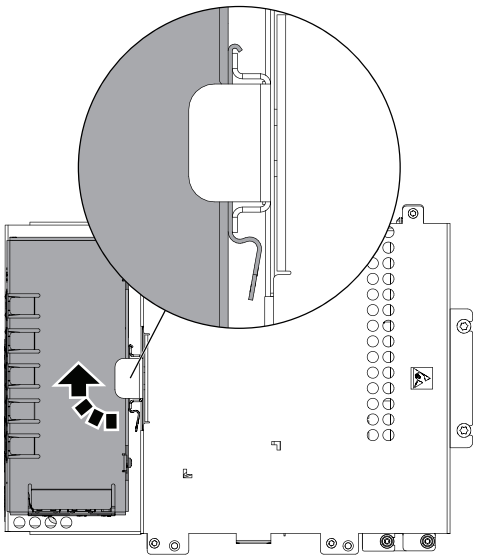
Removing the Ethernet extension switch (option)

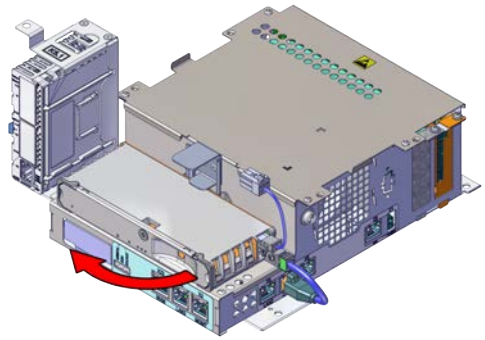
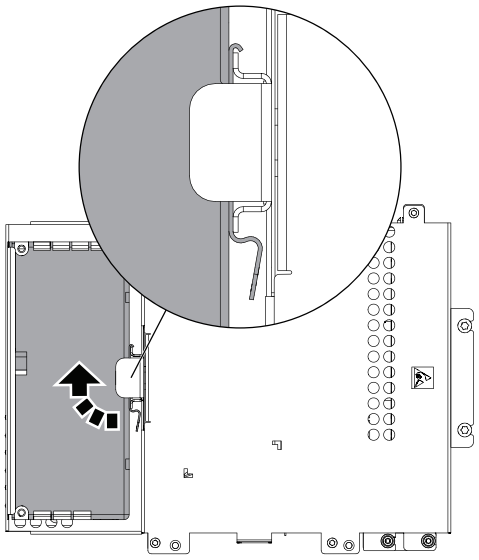
	Action	Note/Illustration
1	Carefully pull the side of the Ethernet extension switch and rotate it tightly to take it out from the bracket.	 xx2400000098  xx1800000491

Continues on next page

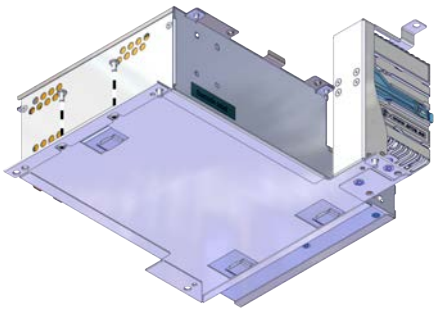
5.2.13 Replacing the fieldbus master

Continued

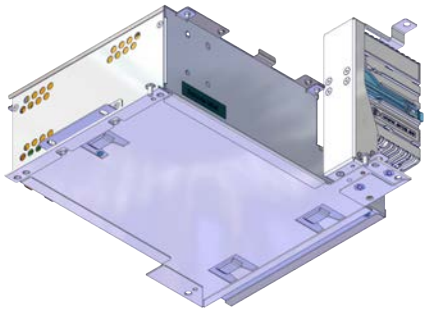
Removing the connected services gateway

	Action	Note/Illustration
1	Carefully pull the side of the connected services gateway and rotate it tightly to take it out from the bracket.	 xx2400000099  xx1800000495 TOP VIEW

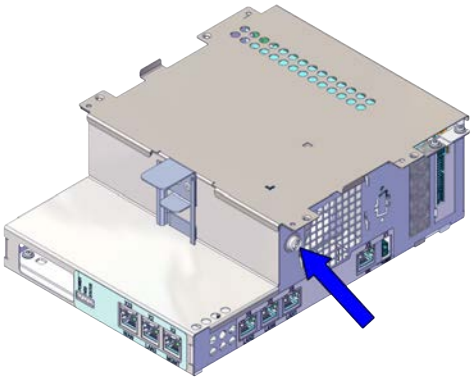
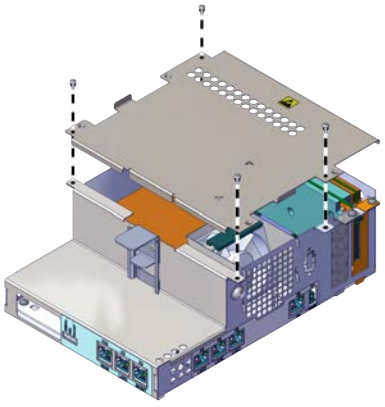
Removing the main computer

	Action	Note/Illustration
1	Remove the screws holding the main computer.	 xx2400000100

Continues on next page

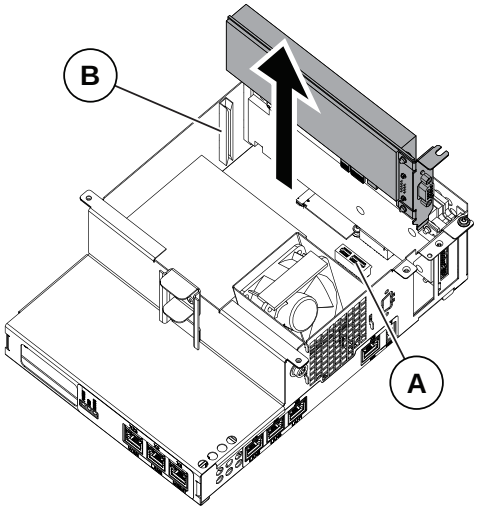
	Action	Note/Illustration
2	Remove the main computer. **ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	 xx2400000154

Removing the fieldbus master

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2000000419
2	Remove the attachment screws and take the cover off.	 xx2400000065

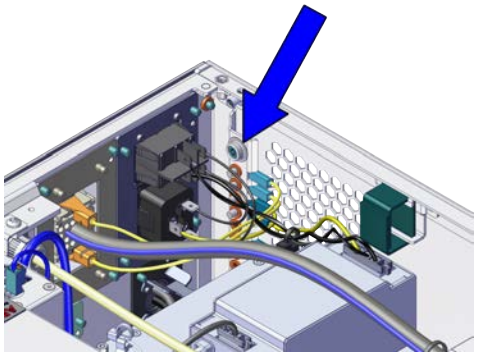
Continues on next page

5.2.13 Replacing the fieldbus master
Continued

	Action	Note/Illustration
3	Remove the attachment screw on the fieldbus master and take out the fieldbus master. **Note** Be careful when you pull it out from the card slot.	 xx1800003419 A – Card slots B – Guide rail

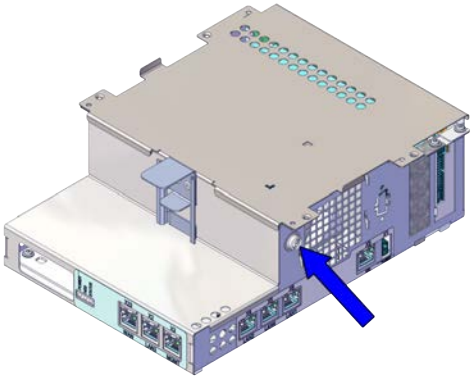
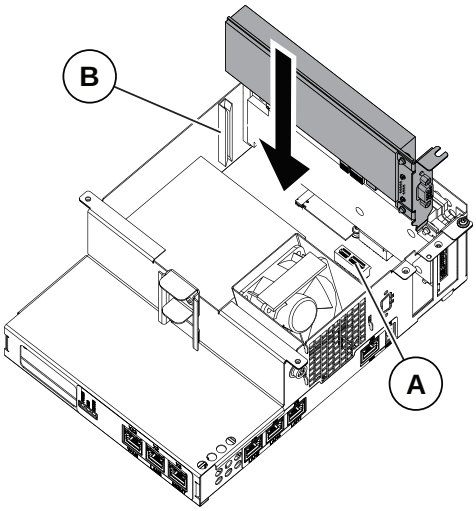
Refitting the fieldbus master

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	 xx2400000021

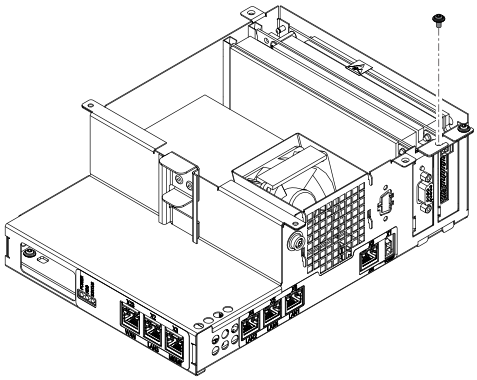
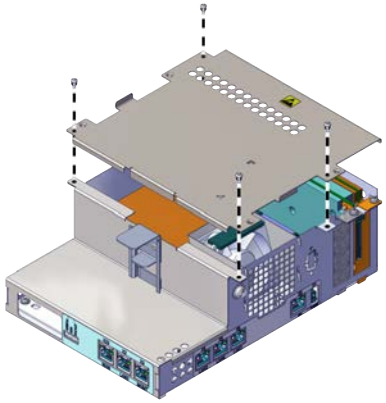
Continues on next page

Refitting the fieldbus master

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2000000419
2	Insert the fieldbus master straight into the card slots along the guide rail.	 xx1800003417 A – Card slots B – Guide rail

Continues on next page

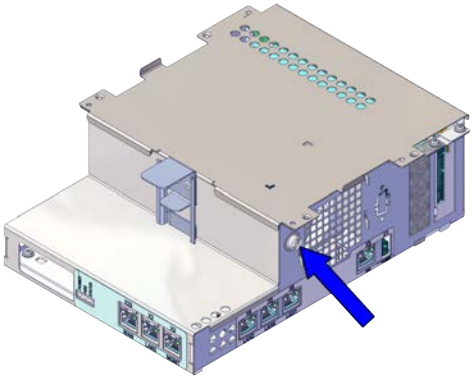
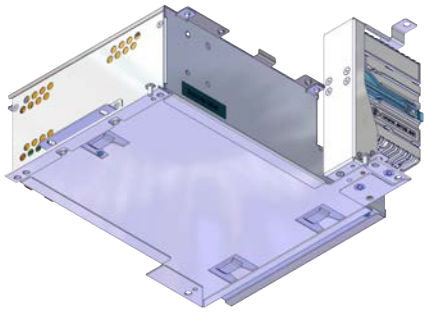
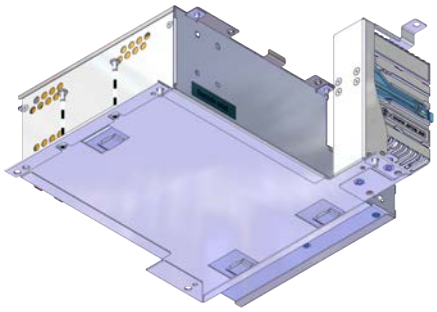
5.2.13 Replacing the fieldbus master
Continued

	Action	Note/Illustration
3	Secure the fieldbus adapter with the screw.	Screws: Screw with flange M3x6 (1 pcs) Tightening torque: 1.7 Nm±10%.  xx1800003416
4	Refit the cover of the main computer and secure the screws.	Screws: Hexalobular socket pan head screw M3x6 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000065

Refitting the main computer

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

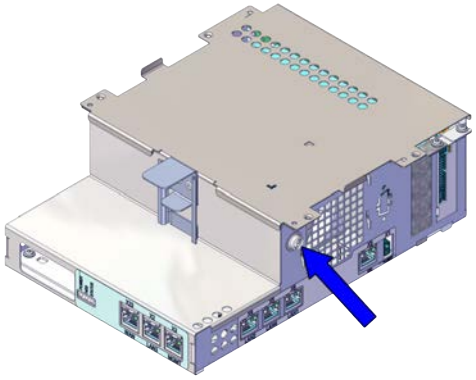
Continues on next page

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419
3	Fit the main computer to the process plate.	 xx2400000154
4	Fasten the main computer with the screws.	Screws: Torx pan head screw M4x8 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000100

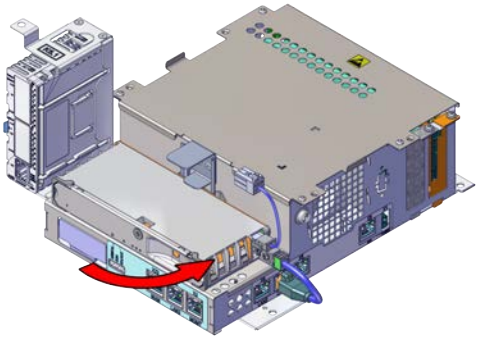
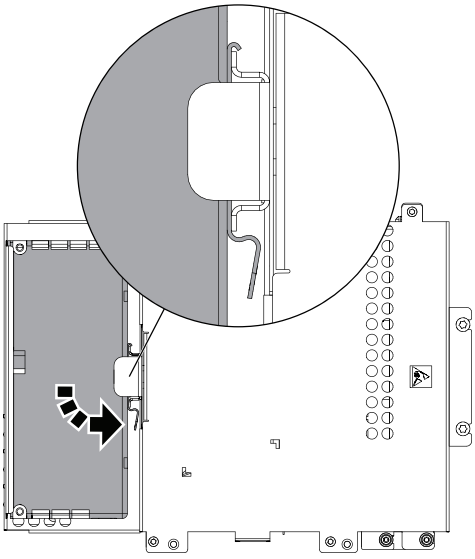
Continues on next page

5.2.13 Replacing the fieldbus master
Continued

Refitting the connected services gateway

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419

Continues on next page

	Action	Note/Illustration
3	Hook up the connected services gateway to the bracket and push carefully into position. **Note** During the installation, the gap between the lower surface of the connected services gateway and the upper surface of the main computer should be zero.	 xx2400000155  xx1800000497 TOP VIEW

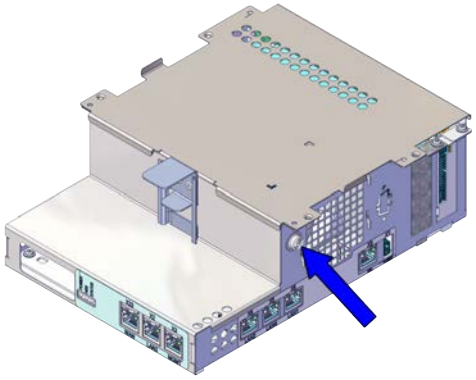
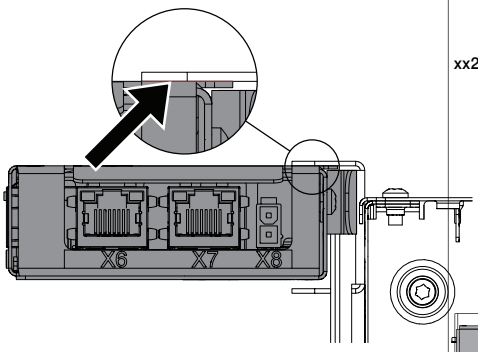
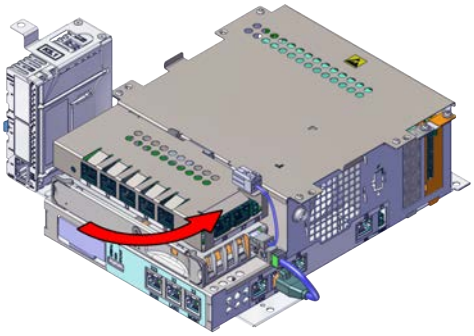
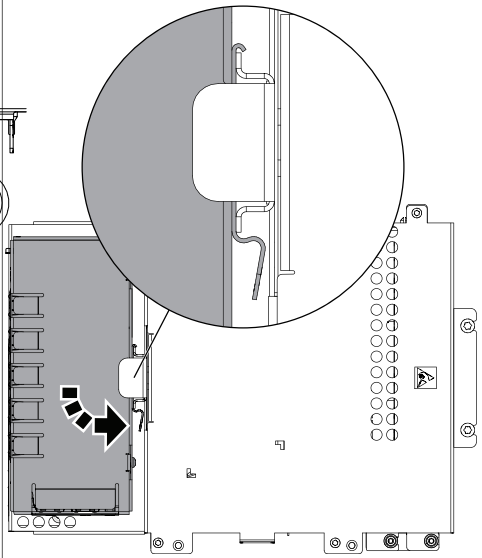
Refitting the Ethernet extension switch (option)

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.2.13 Replacing the fieldbus master

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419
3	Hook up the Ethernet extension switch to the bracket and then push the switch into position. **Note** 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.  xx1800000972	 xx2400000156  xx1800000493

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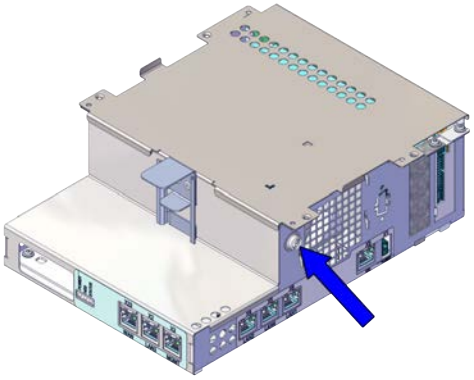
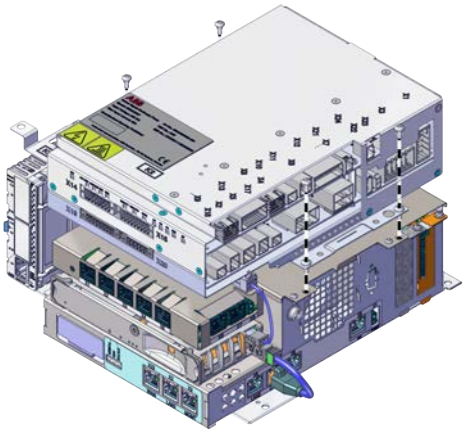
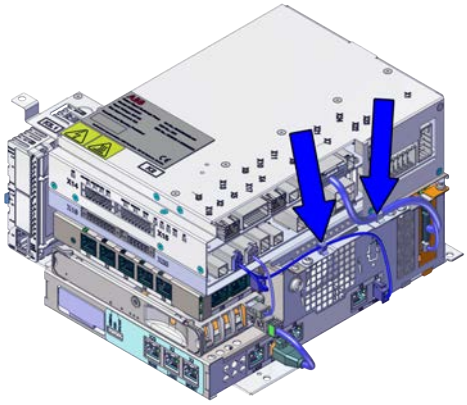
Refitting the robot signal exchange proxy

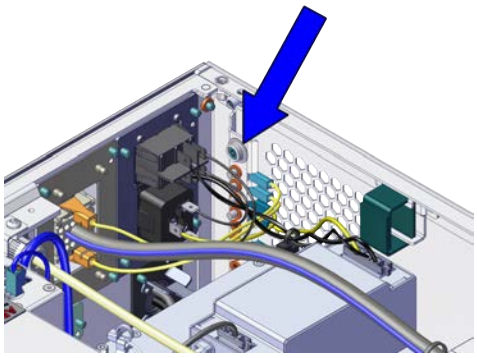
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2000000419
3	Fit the robot signal exchange proxy and secure the screws. **Note** Avoid colliding with the frame of the controller.	Screws: Torx pan head screw M4x8 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000097

Continues on next page

5.2.13 Replacing the fieldbus master
Continued

	Action	Note/Illustration
4	Insert the cable ties into the locking holes.	 xx2400000096

Refitting the main computer assembly with process plate to the cabinet

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2400000021
3	Use the two guide pins to locate the assembly onto the mounting plate.	**Note** Be careful with the frame of the controller when refitting the unit.

Continues on next page

	Action	Note/Illustration
4	Fasten the assembly with the screws.  **WARNING** Be careful with the cables installed below the process plate.	
5	Reconnect all the connectors on assembly of the robot signal exchange proxy, ethernet extension-seven port switch (option), ABB ability™ connected services, scalable I/O digital base (option), and main computer.	
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - A1.X9 • K2.X3 - K6.X1, A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - T2.X2[25] • K2.X17 - G2.X1, G1.X2 • K2.X6, K2.X11 - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power • K2.X9 & X13 - FlexPendant	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6  **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • Harness adapter - A2.X4/K4.X7.  **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	

Continues on next page

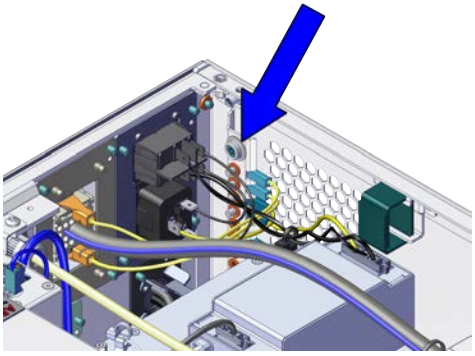
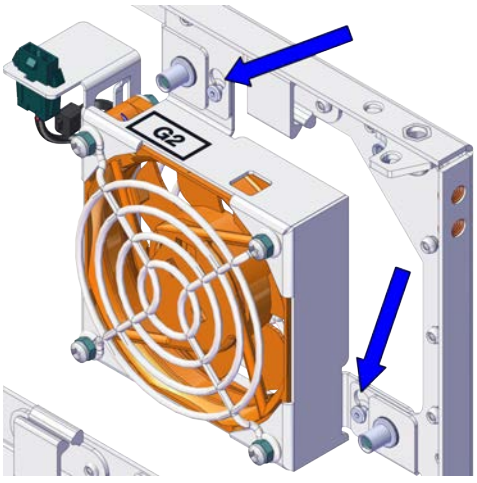
5.2.13 Replacing the fieldbus master
Continued

	Action	Note/Illustration
	For the connected services gateway: • K7.X1 - K2.X3[i] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	

i For connected services gateway wired, there is no power cable.

Continues on next page

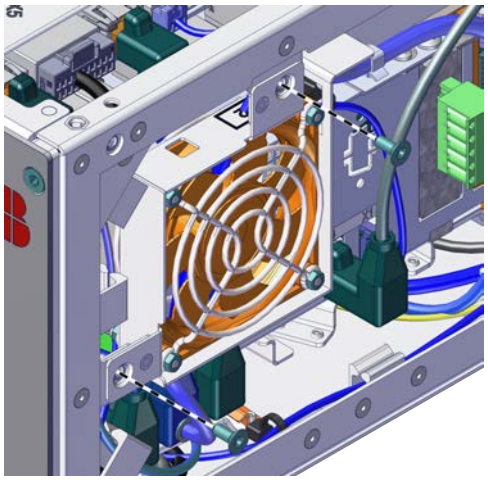
Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	
4	Refit the fan bracket into the cabinet.	 xx2400000045

Continues on next page

5.2.13 Replacing the fieldbus master

Continued

	Action	Note/Illustration
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

Concluding procedure

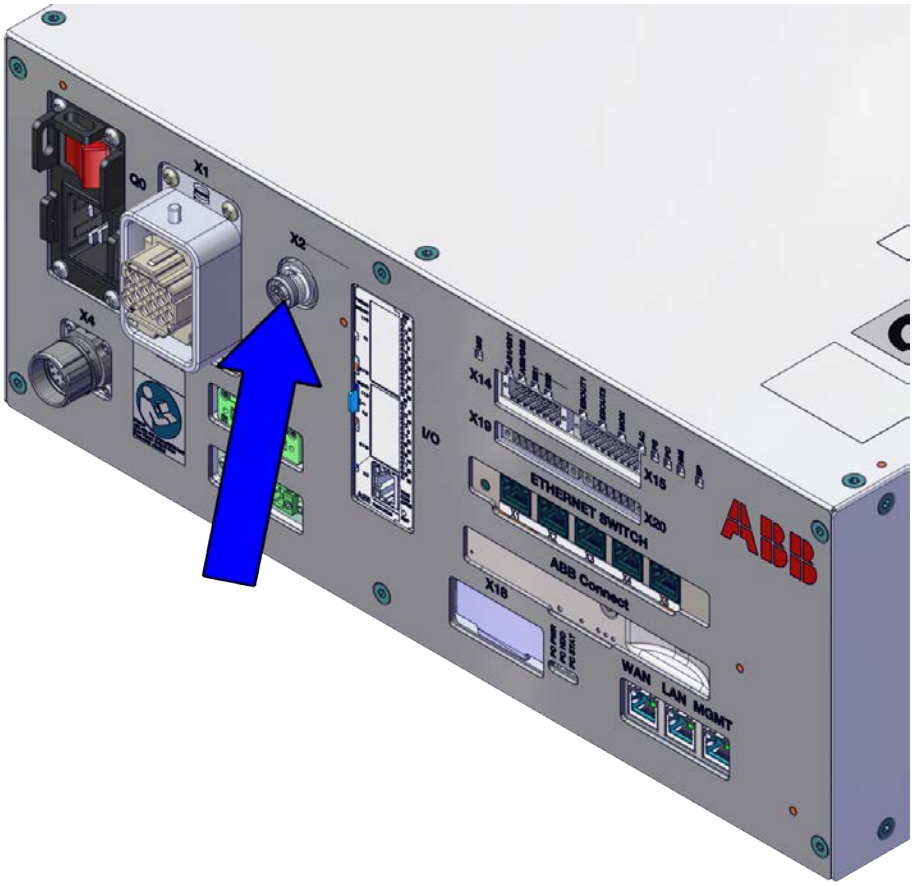
	Action	Note/Illustration
1	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.3 Replacing parts on the front panel

5.3.1 Replacing the manipulator signal connector (SMB)

Location

The illustration shows the location of the manipulator signal connector.



xx2400000067

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Harness SMB connection	3HAC081735-001	Harness 1xSMB

Continues on next page

5.3.1 Replacing the manipulator signal connector (SMB)

Continued

Required tools and equipment

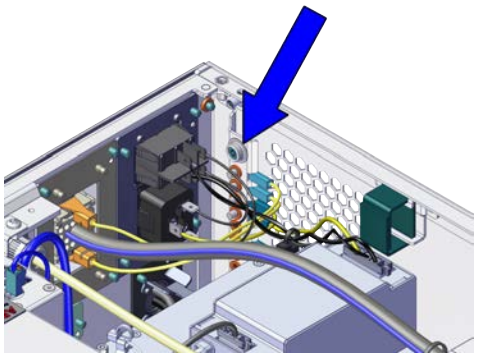
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the manipulator signal connector

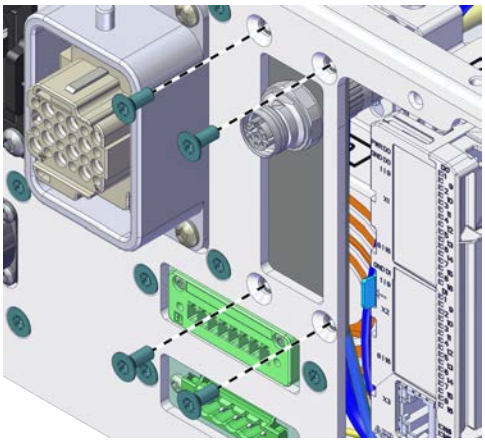
Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the front panel and top cover of the controller.	*Removing the controller covers on page 200*.

Removing the manipulator signal connector

	Action	Note/Illustration
1	Loosen the screw and disconnect: • K6.X4, K6.X5 - SMB.	

Continues on next page

	Action	Note/Illustration
2	Remove the attachment screws on the cover.	 xx2400000068
3	Push the manipulator signal connector into the cabinet.	
4	Take the manipulator signal connector out from the upper side.	

Refitting the manipulator signal connector

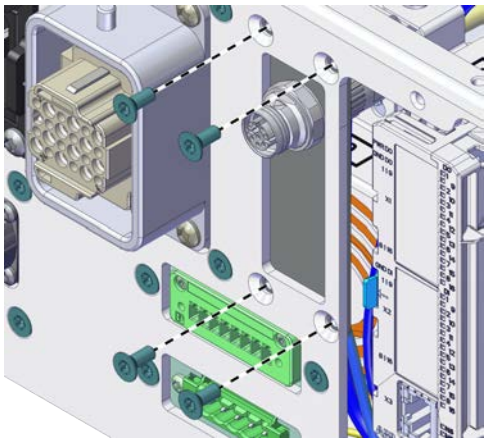
Refitting the manipulator signal connector

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	

Continues on next page

5.3.1 Replacing the manipulator signal connector (SMB)

Continued

	Action	Note/Illustration
3	Secure it with the attachment screws.	 xx2400000068

Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.3.2 Replacing the motor connector

Location

The illustration shows the location of the motor connector in the controller.

xx2400000069

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Harness Motors power LV 6-axis	3HAC085045-001	Harness LV robot power
Harness Motors power ULV	3HAC085059-001	Only used for CRB 15000 controller.

Continues on next page

5.3.2 Replacing the motor connector
Continued

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

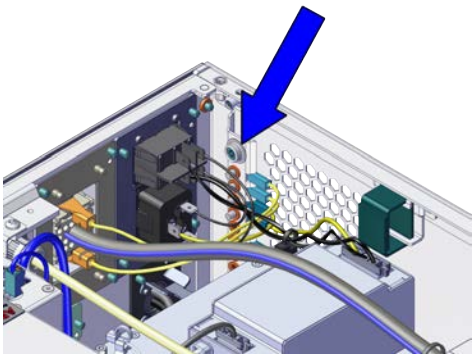
Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Continues on next page

5.3.2.1 Replacing the motor connector

Removing the motor connector[17]

Preparations

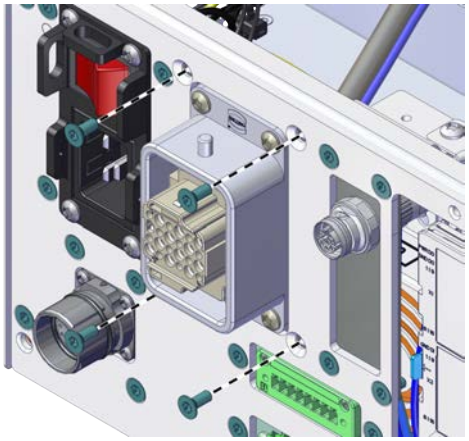
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the front panel and top cover of the controller.	*Removing the controller covers on page 200*.
4	Make records about the sequence that cables are removed. The cables need to be installed in the same position.	

[17] **This procedure is not available for the CRB 15000 controllers.**

Continues on next page

5.3.2.1 Replacing the motor connector
Continued

Removing the motor connector

	Action	Note/Illustration
1	Remove the attachment screws on the front panel.	 xx2400000070
2	Push the motor connector into the cabinet.	
3	Take the motor connector cable out from the velcro in the cabinet.	
4	Take the motor connector out from the upper side.	

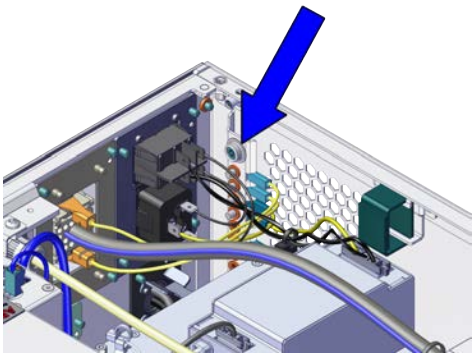
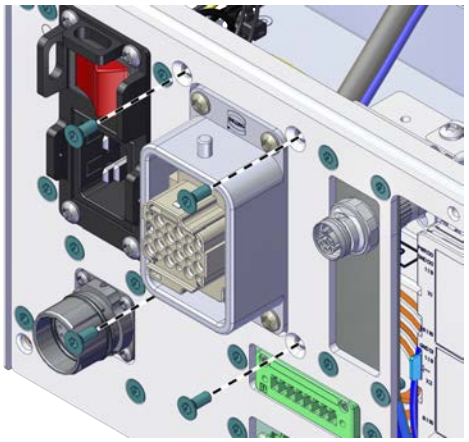
Refitting the motor connector [18]

Refitting the motor connector

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

[18] **This procedure is not available for the CRB 15000 controllers.**

Continues on next page

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Insert the motor connector into the front panel from inner side of the cabinet and fasten it with the screws.	Screws: Torx, countersunk screw M4x10 (4 pcs)  xx2400000070
4	Secure the motor connector cables with the velcro on the frame of the cabinet. **Tip** Use the same position as from removing the motor connector.	

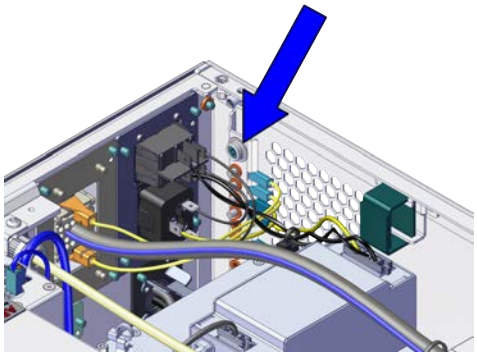
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.3.2.2 Replacing the motor connector for CRB 15000 controller

Removing the motor connector for CRB 15000 controller

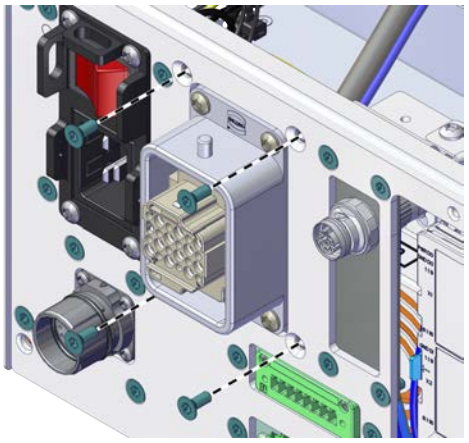
Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the front panel and top cover of the controller.	*Removing the controller covers on page 200*.

Removing the motor connector

	Action	Note/Illustration
1	Disconnect the following connectors for the motor connector: • X1 - X105 • X1 - X106 • X1 - A1.X4/A1.R1.X2 If used for CRB 15000 5Kg controller, connect from X1 to A1.X4. If used for CRB 15000 10/12Kg controller, connect from X1 to A1.R1.X2. • X1 - A2.X9 • Two ground cables which connects on the left side of the cabinet frame.	

Continues on next page

	Action	Note/Illustration
2	Remove the attachment screws on the front panel.	 xx2400000070
3	Push the motor connector into the cabinet.	
4	Take the motor connector cable out from the velcro in the cabinet. **Note** Make records about the sequence that cables are removed. The cables need to be installed in the same position.	
5	Take the motor connector out from the upper side.	

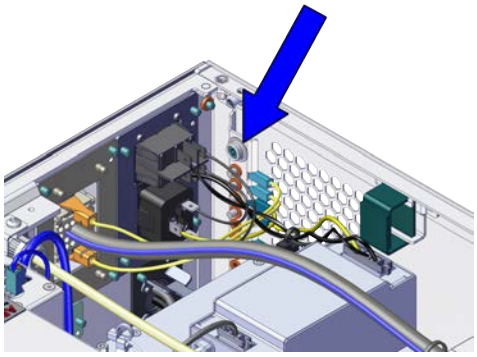
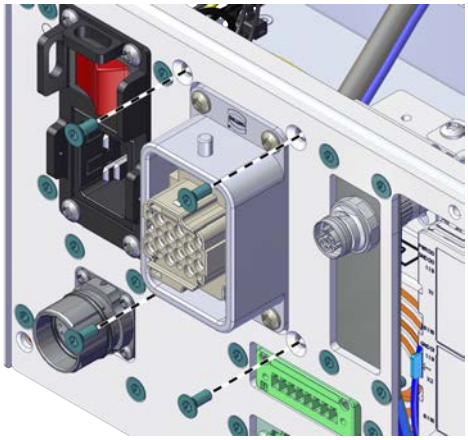
Refitting the motor connector for CRB 15000 controller

Refitting the motor connector

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.3.2.2 Replacing the motor connector for CRB 15000 controller
Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Insert the motor connector into the front panel from inner side of the cabinet and fasten it with the screws.	Screws: Torx, countersunk screw M4x10 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000070
4	Reconnect: • X1 - X105 • X1 - X106 • X1 - A1.X4/A1.R1.X2 If used for CRB 15000 5Kg controller, connect from X1 to A1.X4. If used for CRB 15000 10/12Kg controller, connect from X1 to A1.R1.X2. • X1 - A2.X9 • Two ground cables which connects on the left side of the cabinet frame.	
5	Insert the cables on motor connector into the clips in the bottom of the cabinet. **Tip** Use the same position as from removing the motor connector.	

Continues on next page

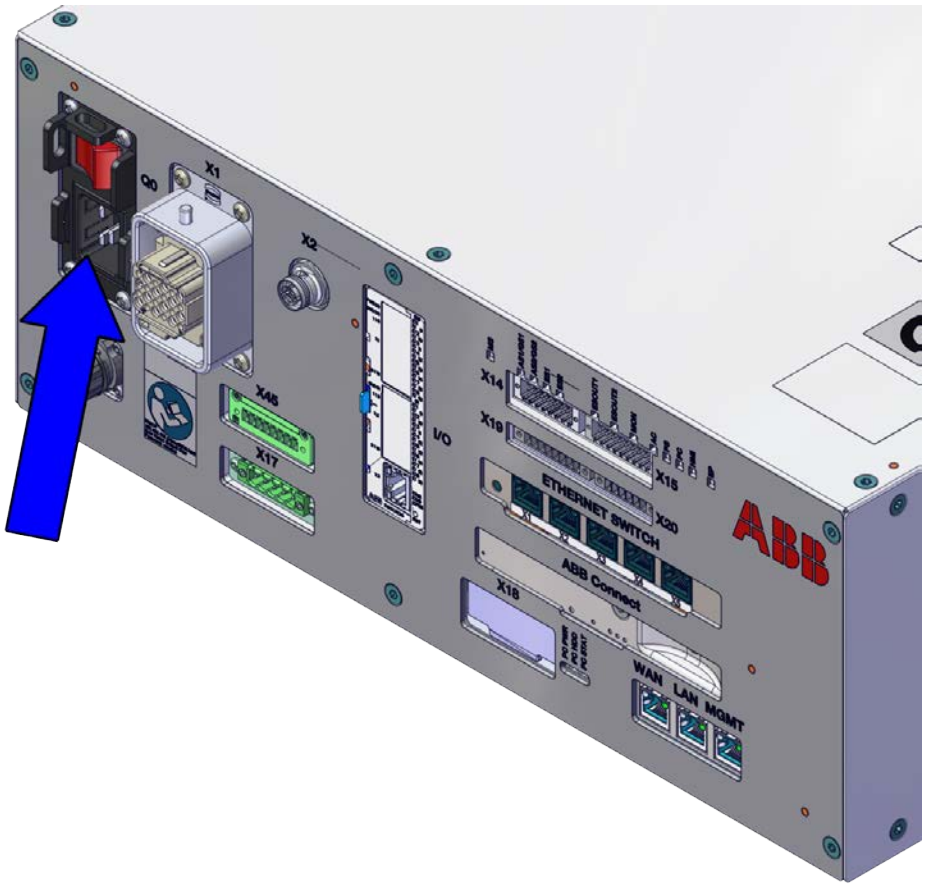
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.3.3 Replacing the incoming mains connector

Location

The illustration shows the location of the incoming mains connector in the controller.



xx2400000071

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Harness AC input with SW	3HAC085035-001	Harness-Mains connection
Harness AC input with SW	3HAC085053-001	Harness-Mains connection for CRB 15000 controller
Connector AC power inlet	3HAC085566-001	Mating connector for Power inlet

Continues on next page

Required tools and equipment

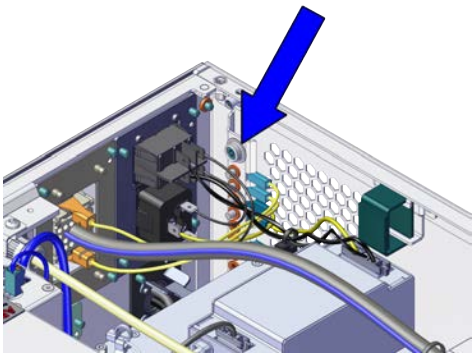
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the incoming mains connector

Preparations

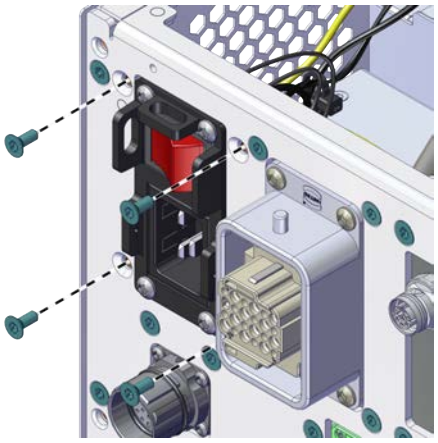
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the front panel and top cover of the controller.	*Removing the controller covers on page 200*.

Removing the incoming mains connector

	Action	Note/Illustration
	Disconnect all connectors.	
1	Disconnect: • Q0 - A1.X1. • Two ground cables which connects to the left cabinet frame.	

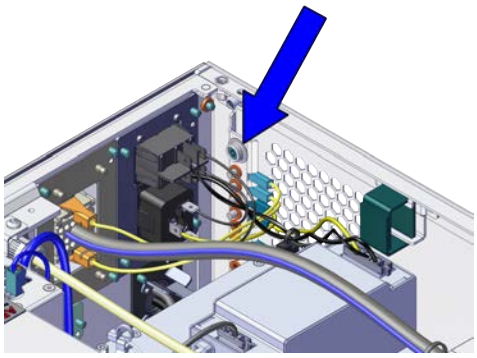
Continues on next page

5.3.3 Replacing the incoming mains connector
Continued

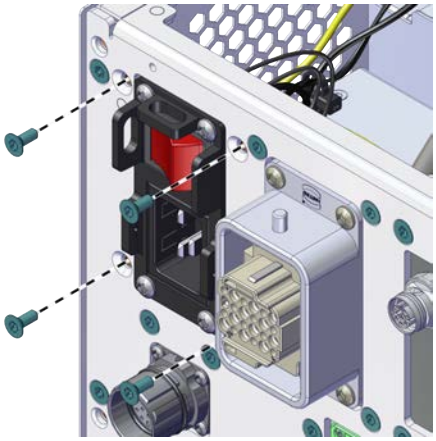
	Action	Note/Illustration
2	Remove the attachment screws on the front panel.	 xx2400000072
3	Push the incoming mains connector into the cabinet.	
4	Take out the incoming mains connector.	

Refitting the incoming mains connector

Refitting the incoming mains connector

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Insert the incoming mains connector into the front panel from inner side of the cabinet.	

Continues on next page

	Action	Note/Illustration
4	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (4 pcs)  xx2400000072
5	Reconnect: • Q0 - A1.X1. • Two ground cables which connects to the left cabinet frame.	
	Reconnect all connectors.	

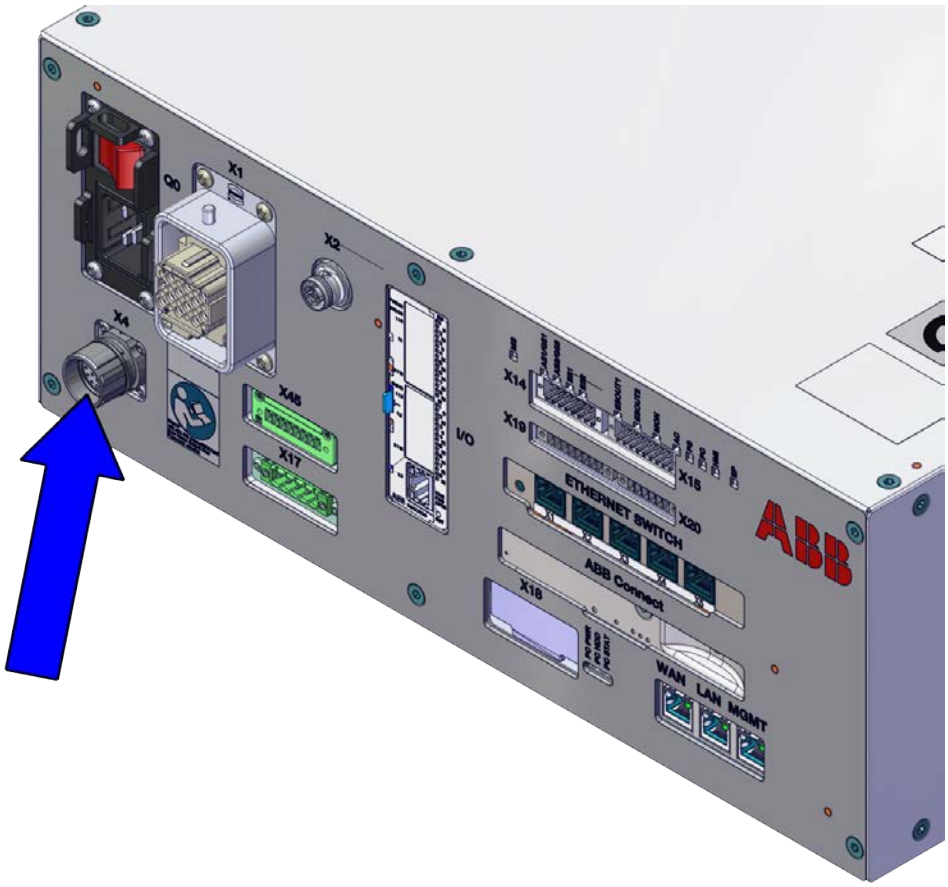
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.3.4 Replacing the HMI signal (FlexPendant) connector

Location

The illustration shows the location of the HMI signal connector in the controller.



xx2400000074

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Harness TPU connection	3HAC086188-001	Harness-TPU

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.

Continues on next page

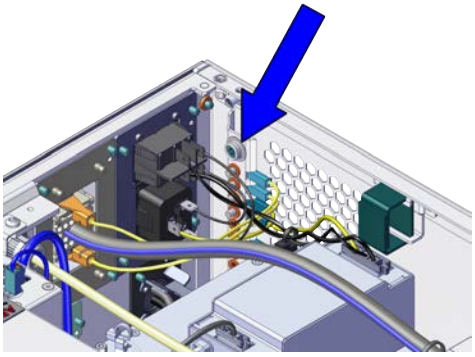
Equipment	Article number	Note
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the HMI signal connector

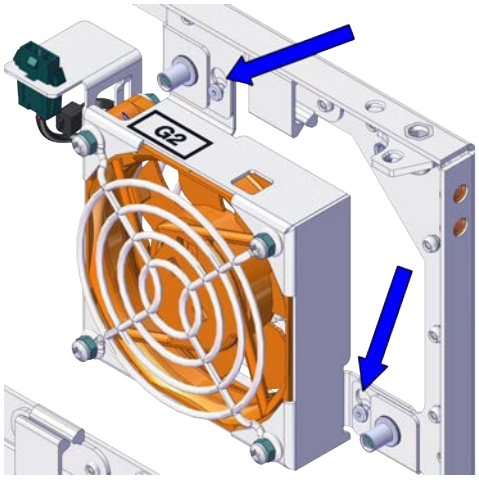
Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the top and right covers and the front panel of the controller.	*Removing the controller covers on page 200*.

Continues on next page

5.3.4 Replacing the HMI signal (FlexPendant) connector
Continued

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

Removing the main computer assembly with process plate

	Action	Note/Illustration
1	Disconnect all the connectors on the assembly group of the robot signal exchange proxy, Ethernet switch (option), connected services gateway, scalable I/O (option), and main computer.	

Continues on next page

	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - T4.X1 • K2.X3 - A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - A1.X6 [19] • K2.X1 - X107 [20] • K2.X17 - G2.X1, G1.X2 • K2.X9 & X13 - FlexPendant (X4)	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3 [21] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

19 Not available for CRB 15000 controller.

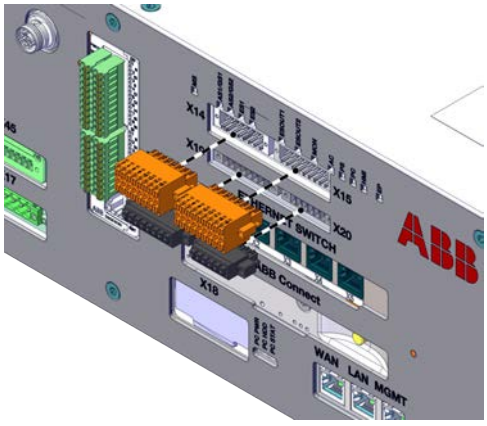
20 Only available for CRB 15000 controller.

21 For connected services gateway wired, there is no power cable.

Continues on next page

5.3.4 Replacing the HMI signal (FlexPendant) connector

Continued

	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X9 - T4.X3 • A2.X9 - X1 [20] • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	
2	Remove the mating connectors from the front side by loosening their attachment screws.	 xx2400000093

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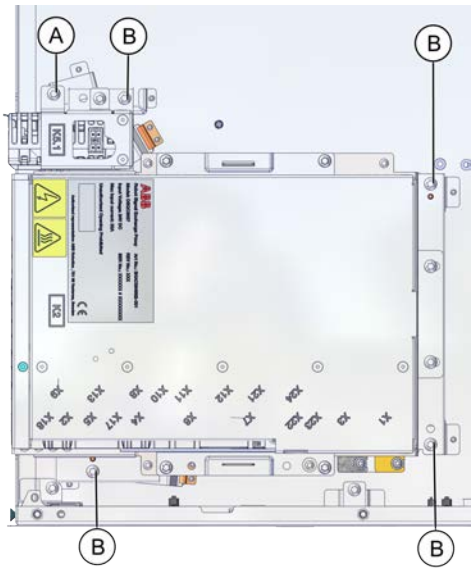
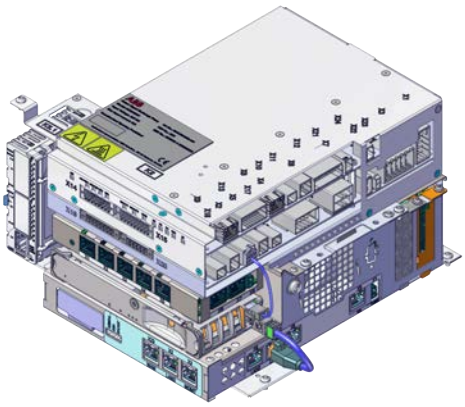
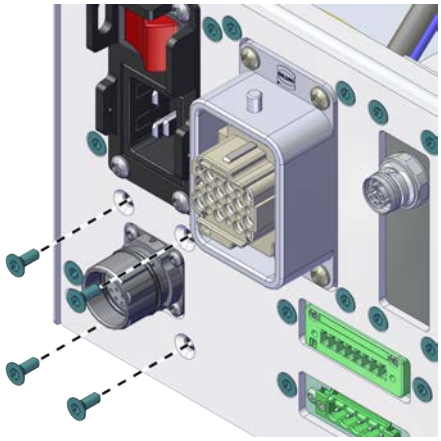
	Action	Note/Illustration
3	Remove the screws holding the process plate and the screws holding the scalable I/O bracket.	 xx2400000094 A — Screws holding the scalable I/O bracket (1 pcs) B — Screws holding the process plate (4 pcs)
4	Pull out the process plate with the assembly from the two guide pins on the mounting plate. **Note** Avoid colliding with the frame when removing the unit.	 xx2400000095

Continues on next page

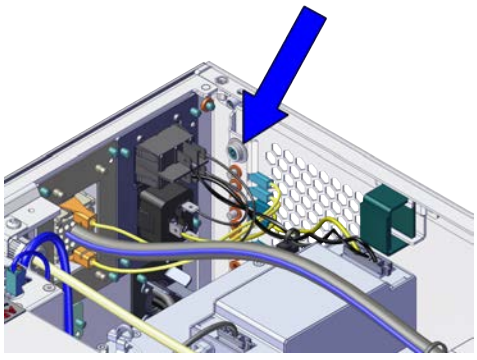
5.3.4 Replacing the HMI signal (FlexPendant) connector
Continued

Removing the HMI signal connector

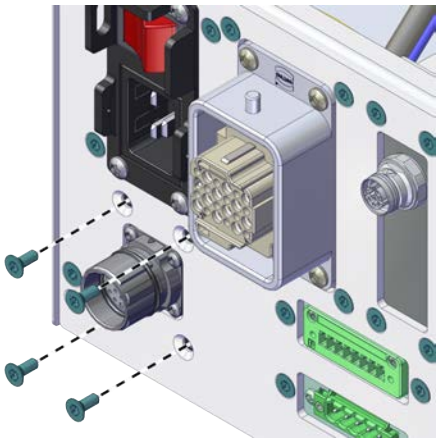
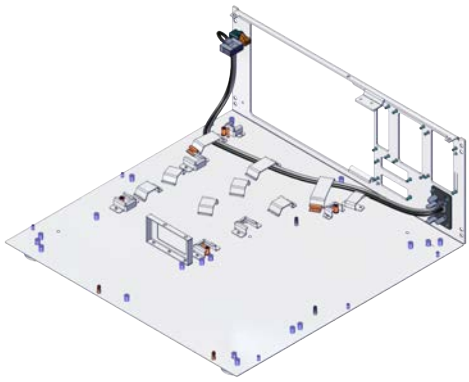
	Action	Note/Illustration
1	Remove the attachment screws on the front panel.	 xx2400000075
2	Push the HMI signal connector into the cabinet.	
3	Push the cables on HMI signal connector out from the clips on the bottom of the cabinet.	
4	Take the HMI signal connector out from the upper side.	

Refitting the HMI signal connector

Refitting the HMI signal connector

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021

Continues on next page

	Action	Note/Illustration
3	Insert the HMI signal connector into the front panel from inside the cabinet. Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (4 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000075
4	Insert the cables on HMI signal connector into the clips on the bottom of the cabinet. **Tip** Use the same position as from removing HMI connector.	 xx2400000076

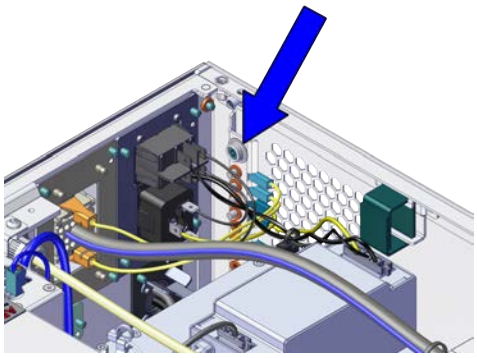
Refitting the main computer assembly with process plate to the cabinet

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.3.4 Replacing the HMI signal (FlexPendant) connector

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2400000021
3	Use the two guide pins to locate the assembly onto the mounting plate.	**Note** Be careful with the frame of the controller when refitting the unit.
4	Fasten the assembly with the screws. **WARNING** Be careful with the cables installed below the process plate.	
5	Reconnect all the connectors on assembly of the robot signal exchange proxy, ethernet extension-seven port switch (option), ABB ability™ connected services, scalable I/O digital base (option), and main computer.	
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - A1.X9 • K2.X3 - K6.X1, A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - T2.X2[25] • K2.X17 - G2.X1, G1.X2 • K2.X6, K2.X11 - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power • K2.X9 & X13 - FlexPendant	

Continues on next page

	Action	Note/Illustration
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3[i] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

Continues on next page

5.3.4 Replacing the HMI signal (FlexPendant) connector
Continued

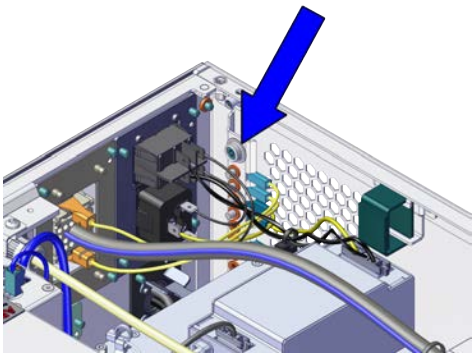
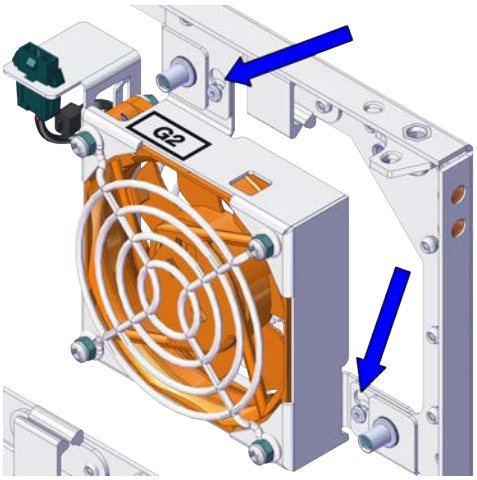
	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	

i For connected services gateway wired, there is no power cable.

Refitting the small fan

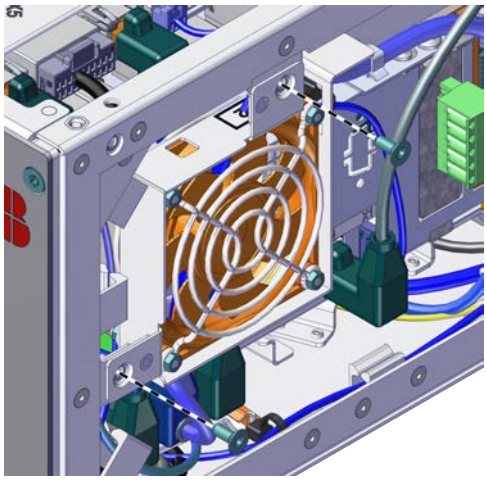
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	
4	Refit the fan bracket into the cabinet.	 xx2400000045

Continues on next page

5.3.4 Replacing the HMI signal (FlexPendant) connector
Continued

	Action	Note/Illustration
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

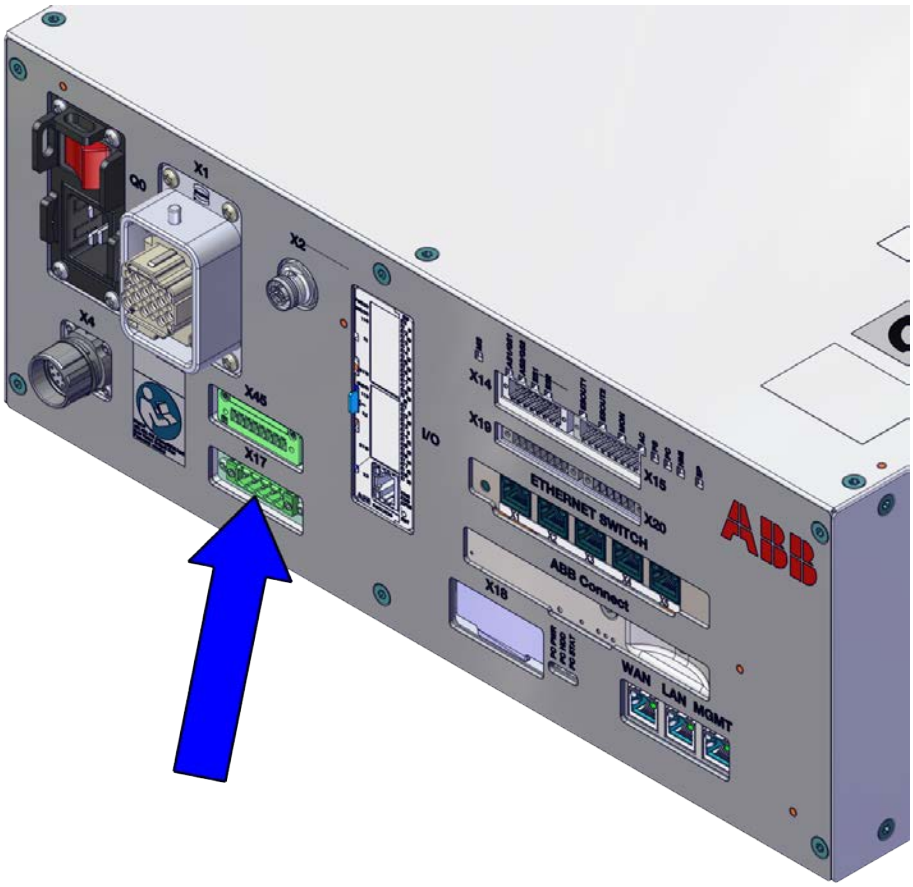
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.3.5 Replacing the process connectors

Location

The illustration shows the location of the process connectors in the controller.



xx2400000077

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Harness CPCS	3HAC082587-001	
Cable grommet asm	3HAC066396-001	
Blind plate	3HAC069954-001	
Harness DeviceNet	3HAC070918-001	

Continues on next page

5.3.5 Replacing the process connectors
Continued

Required tools and equipment

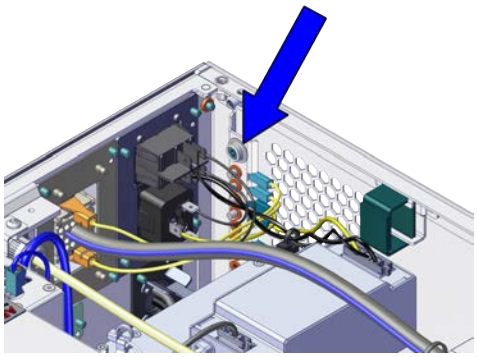
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

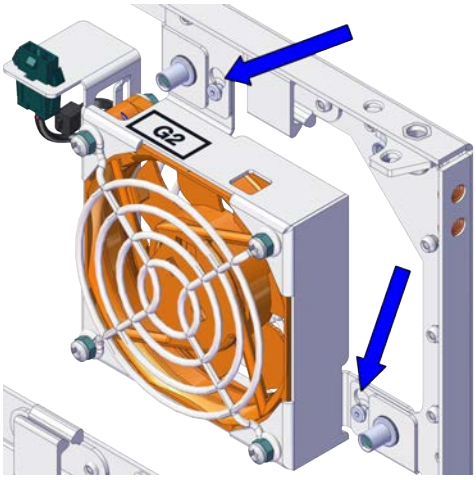
Removing the process connectors

Preparations

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the top and right covers and the front panel of the controller.	*Removing the controller covers on page 200*

Continues on next page

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

Removing the main computer assembly with process plate

	Action	Note/Illustration
1	Disconnect all the connectors on the assembly group of the robot signal exchange proxy, Ethernet switch (option), connected services gateway, scalable I/O (option), and main computer.	

Continues on next page

5.3.5 Replacing the process connectors
Continued

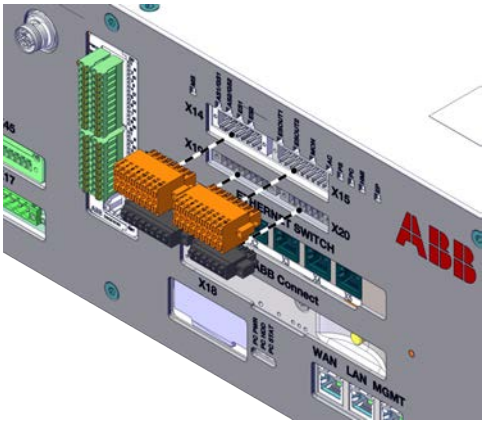
	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - T4.X1 • K2.X3 - A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - A1.X6[22] • K2.X1 - X107[23] • K2.X17 - G2.X1, G1.X2 • K2.X9 & X13 - FlexPendant (X4)	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3[24] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

22 Not available for CRB 15000 controller.

23 Only available for CRB 15000 controller.

24 For connected services gateway wired, there is no power cable.

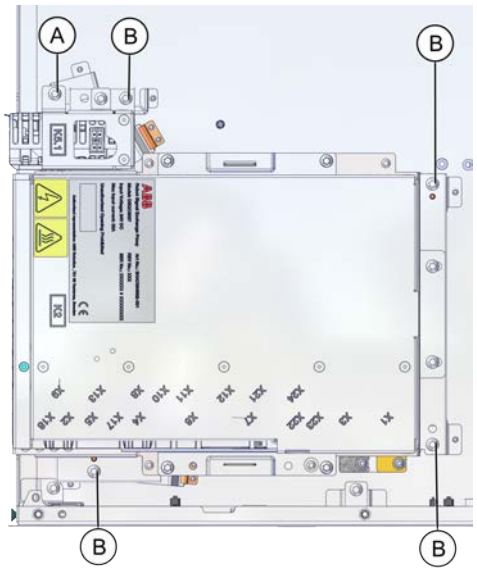
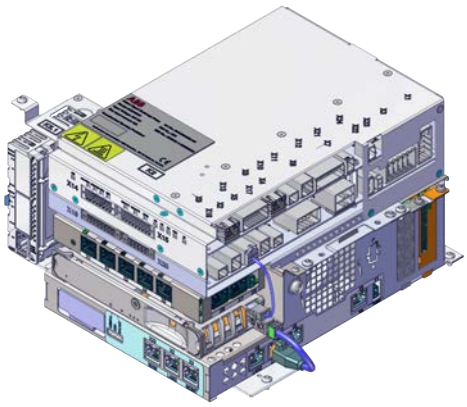
Continues on next page

	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X9 - T4.X3 • A2.X9 - X1 [23] • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	
2	Remove the mating connectors from the front side by loosening their attachment screws.	 xx2400000093

Continues on next page

5.3.5 Replacing the process connectors

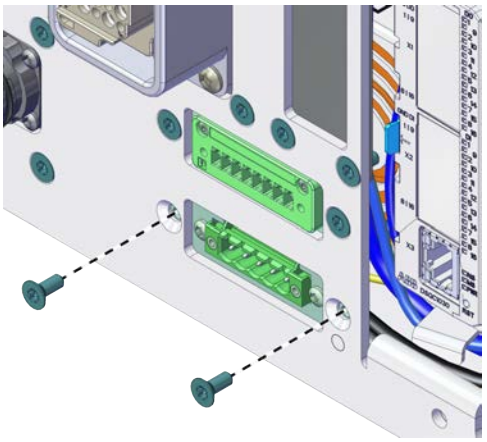
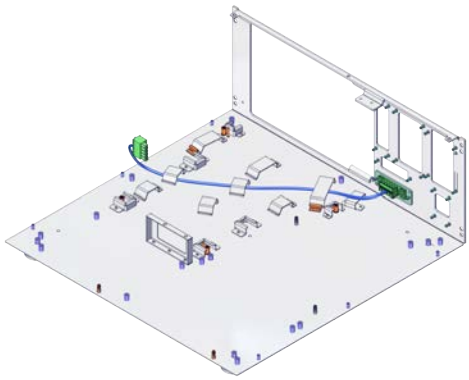
Continued

	Action	Note/Illustration
3	Remove the screws holding the process plate and the screws holding the scalable I/O bracket.	 xx2400000094 A — Screws holding the scalable I/O bracket (1 pcs) B — Screws holding the process plate (4 pcs)
4	Pull out the process plate with the assembly from the two guide pins on the mounting plate. **Note** Avoid colliding with the frame when removing the unit.	 xx2400000095

Removing the process connectors

	Action	Note/Illustration
1	Push the cables out from the clips in the bottom of the controller carefully. **Note** Make records about the sequence that cables are removed. The cables need to be installed in the same position.	

Continues on next page

	Action	Note/Illustration
2	Remove the attachment screws on the front panel.	 xx2400000078
3	Push the process connectors into the cabinet.	
4	Push the cables on process connectors out from the clips on the bottom of the cabinet.	 xx2400000079
5	Take the process connectors out from the upper side.	

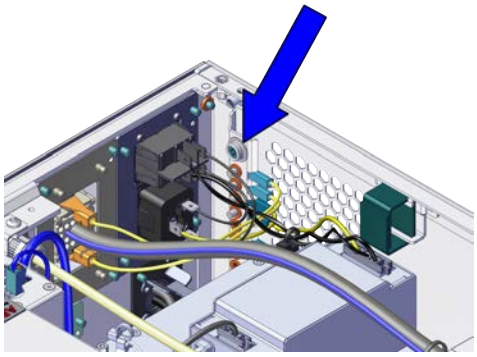
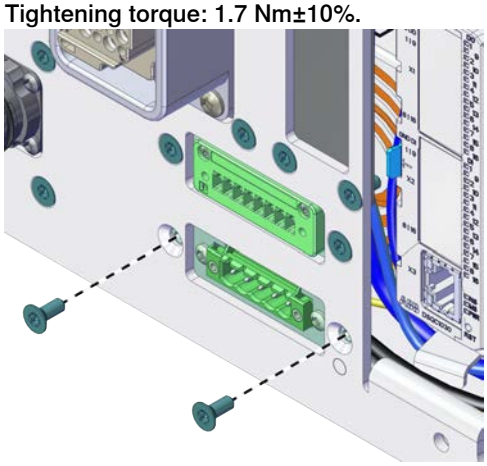
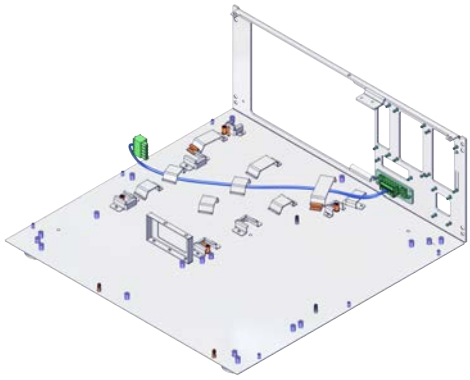
Refitting the process connectors

Refitting the process connectors

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

5.3.5 Replacing the process connectors
Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Insert the process connectors into the front panel from inside the cabinet.	
4	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000078
5	Insert the cables on process connectors into the clips in the bottom of the cabinet. **Tip** Use the same position as from removing process connectors.	 xx2400000079

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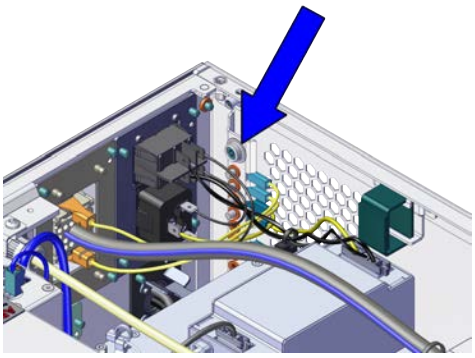
Refitting the main computer assembly with process plate to the cabinet

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2400000021
3	Use the two guide pins to locate the assembly onto the mounting plate.	**Note** Be careful with the frame of the controller when refitting the unit.
4	Fasten the assembly with the screws. **WARNING** Be careful with the cables installed below the process plate.	
5	Reconnect all the connectors on assembly of the robot signal exchange proxy, ethernet extension-seven port switch (option), ABB ability™ connected services, scalable I/O digital base (option), and main computer.	

Continues on next page

5.3.5 Replacing the process connectors
Continued

	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - A1.X9 • K2.X3 - K6.X1, A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - T2.X2[25] • K2.X17 - G2.X1, G1.X2 • K2.X6, K2.X11 - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power • K2.X9 & X13 - FlexPendant	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3[i] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

Continues on next page

	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	

i For connected services gateway wired, there is no power cable.

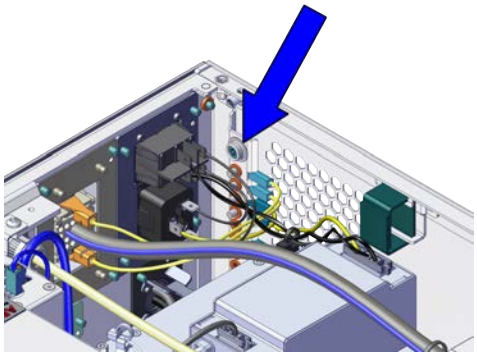
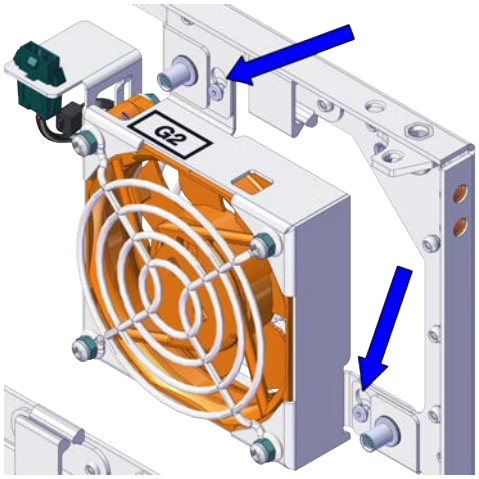
Refitting the small fan

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

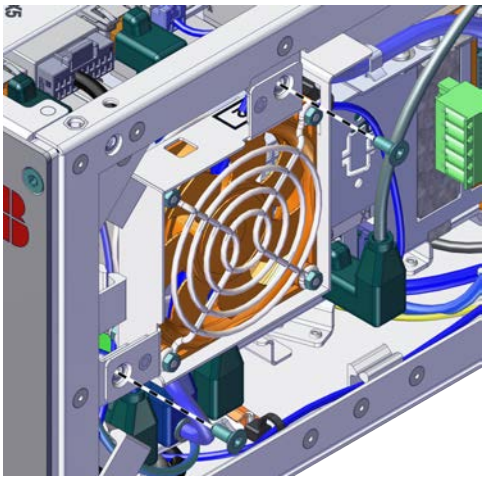
Continues on next page

5.3.5 Replacing the process connectors

Continued

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	
4	Refit the fan bracket into the cabinet.	 xx2400000045

Continues on next page

	Action	Note/Illustration
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

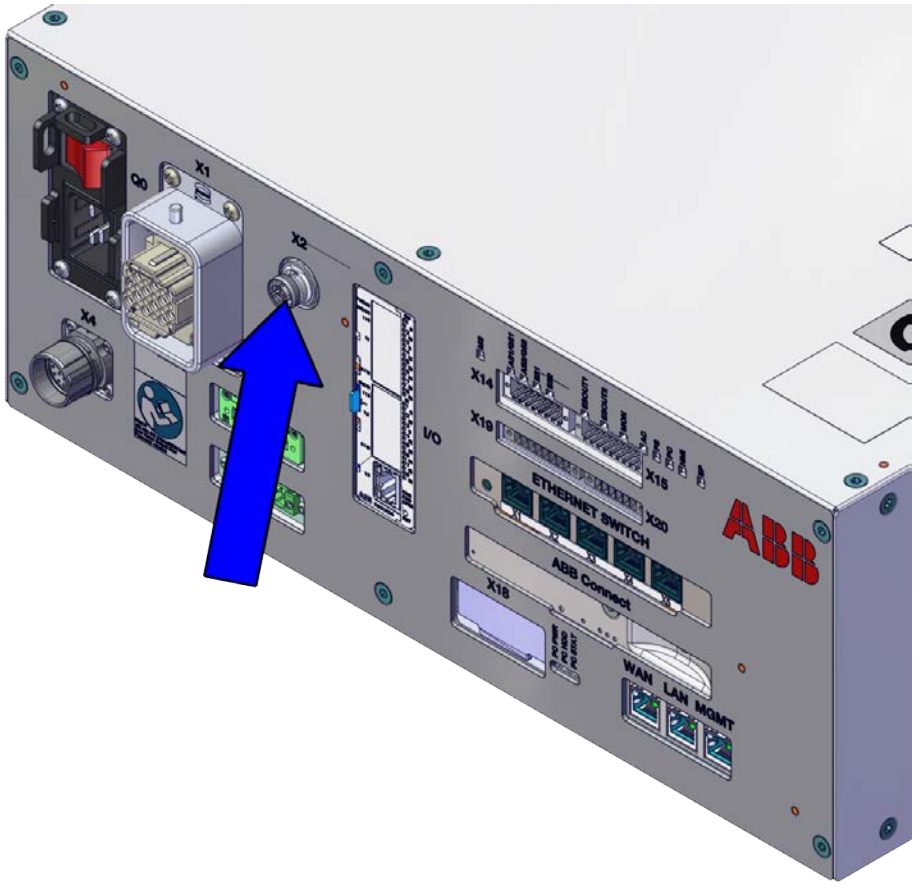
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.3.6 Replacing the harness CFI connection

Location

The illustration shows the location of the harness CFI connection which is only available for the CRB 15000 controller.



xx2400000067

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Harness CFI connection	3HAC085057-001	Only used for CRB 15000 OmniCore Type A controller.
Harness CFI mating connection	3HAC085058-001	Only used for CRB 15000 controller.

Continues on next page

Required tools and equipment

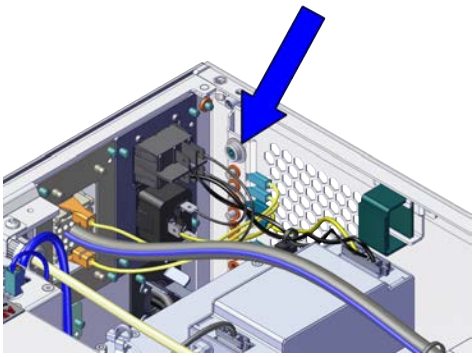
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the harness CFI connection

Preparations

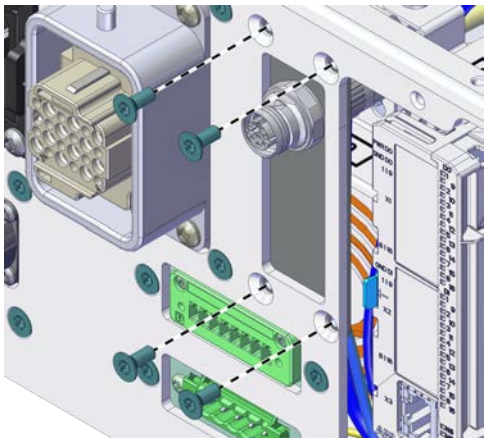
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the front panel and top cover of the controller.	*Removing the controller covers on page 200*.

Removing the harness CFI connection

	Action	Note/Illustration
1	Loosen the screw and disconnect: • X2 - X105. • X2 - X106.	

Continues on next page

5.3.6 Replacing the harness CFI connection
Continued

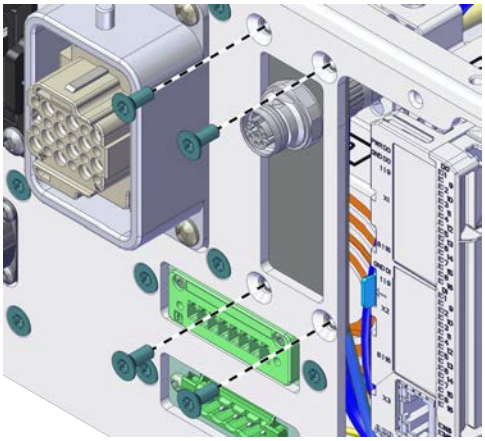
	Action	Note/Illustration
2	Remove the attachment screws on the cover.	 xx2400000068
3	Push the CFI connector into the cabinet.	
4	Take the harness CFI connection out from the upper side.	

Refitting the harness CFI connection

Refitting the harness CFI connection

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	
3	Insert the harness CFI connection into the front panel from inner side of the cabinet.	

Continues on next page

	Action	Note/Illustration
4	Secure it with the attachment screws.	Tightening torque: 1.7 Nm±10%.  xx2400000068
5	Reconnect and secure: • X2 - X105. • X2 - X106.	

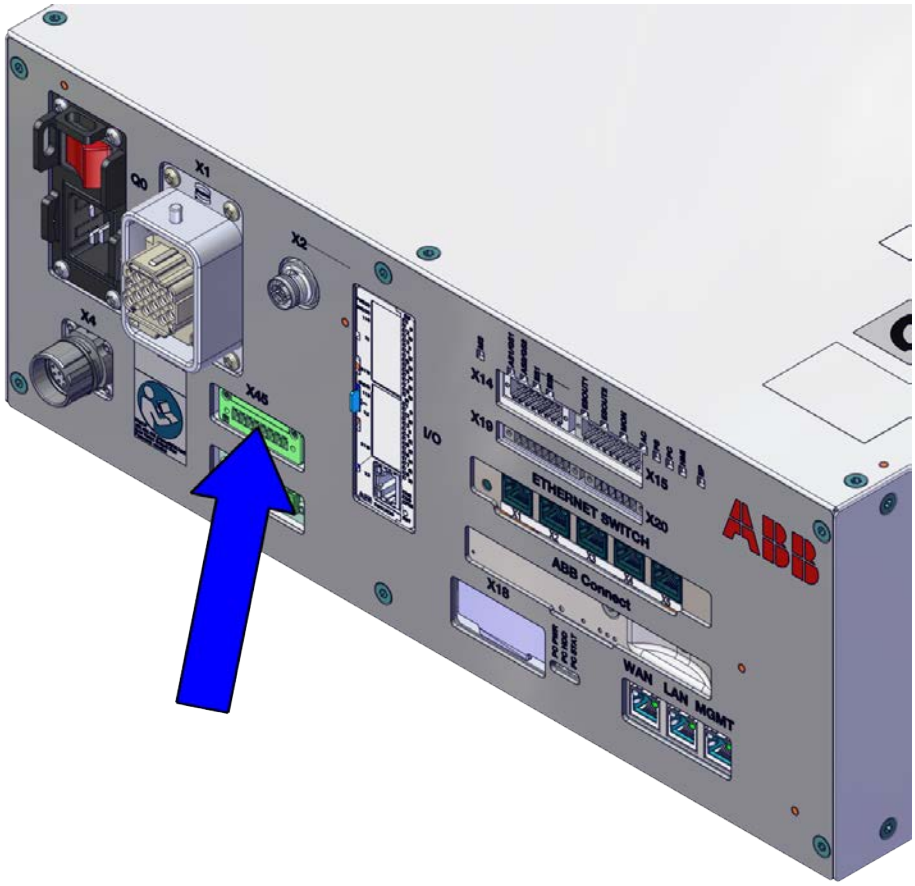
Concluding procedure

	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*.
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

5.3.7 Replacing the IP20 power outlet connector

Location

The illustration shows the location of the IP20 power outlet connector in the controller.



xx2400000080

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Harness DeviceNet/Harness 24V ext. cover plate	3HAC063601-001	
Harness 24V_Process output	3HAC087401-001	DSQC 688
Connector Single-row female	3HAC064743-001	Mating connector for IP20 power outlet connector

Continues on next page

Required tools and equipment

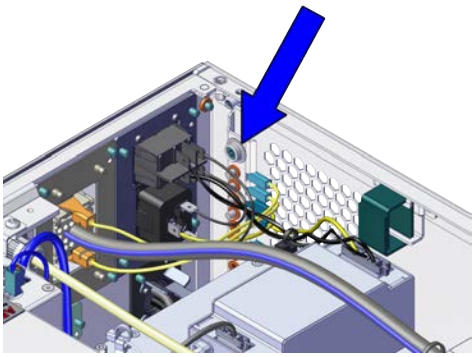
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the IP20 power outlet connector

Preparations

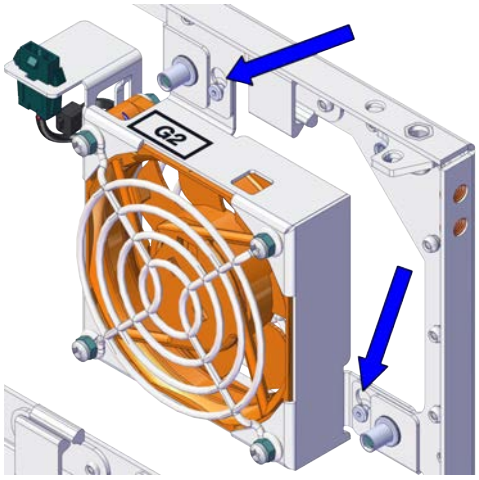
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Remove the top and right covers and the front panel of the controller.	*Removing the controller covers on page 200*

Continues on next page

5.3.7 Replacing the IP20 power outlet connector

Continued

Removing the small fan

	Action	Note/Illustration
1	Remove the screws holding the fan.	 xx2400000044
2	Push and slide the fan bracket and lift it out.	 xx2400000045
3	Disconnect: • G2.X1-K2.X17	

Removing the main computer assembly with process plate

	Action	Note/Illustration
1	Disconnect all the connectors on the assembly group of the robot signal exchange proxy, Ethernet switch (option), connected services gateway, scalable I/O (option), and main computer.	

Continues on next page

	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - T4.X1 • K2.X3 - A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - A1.X6[25] • K2.X1 - X107[26] • K2.X17 - G2.X1, G1.X2 • K2.X9 & X13 - FlexPendant (X4)	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3[27] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

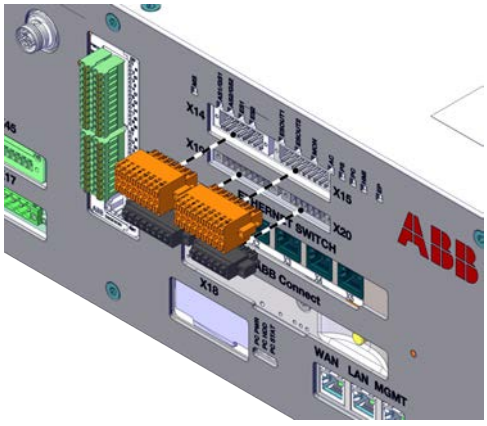
25 Not available for CRB 15000 controller.

26 Only available for CRB 15000 controller.

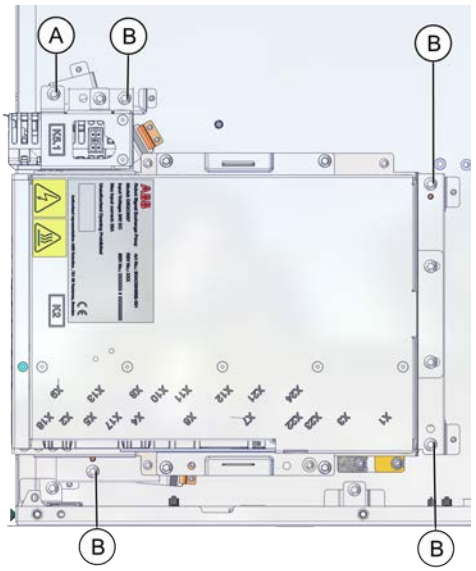
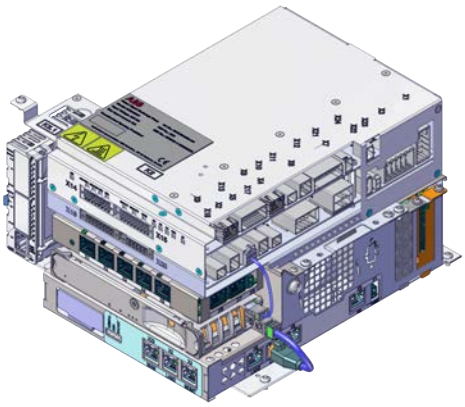
27 For connected services gateway wired, there is no power cable.

Continues on next page

5.3.7 Replacing the IP20 power outlet connector
Continued

	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X9 - T4.X3 • A2.X9 - X1 [26] • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4 to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	
2	Remove the mating connectors from the front side by loosening their attachment screws.	 xx2400000093

Continues on next page

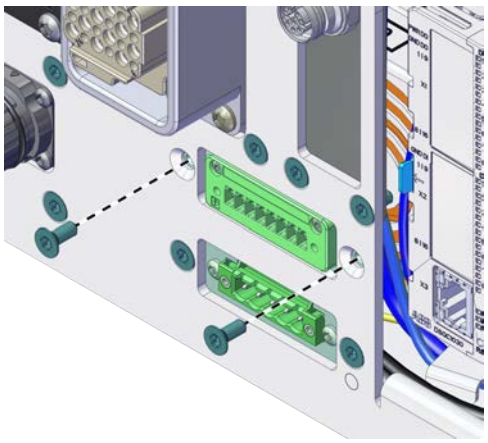
	Action	Note/Illustration
3	Remove the screws holding the process plate and the screws holding the scalable I/O bracket.	 xx2400000094 A — Screws holding the scalable I/O bracket (1 pcs) B — Screws holding the process plate (4 pcs)
4	Pull out the process plate with the assembly from the two guide pins on the mounting plate. **Note** Avoid colliding with the frame when removing the unit.	 xx2400000095

Removing the IP20 power outlet connector

	Action	Note/Illustration
1	Disconnect: • X45 - T5.X2.	

Continues on next page

5.3.7 Replacing the IP20 power outlet connector
Continued

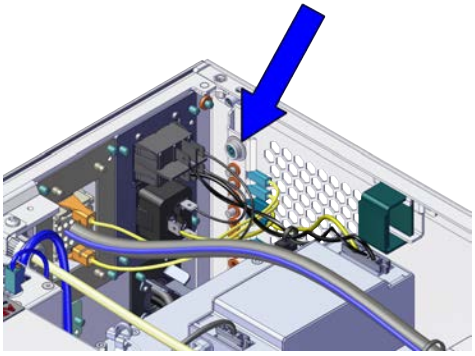
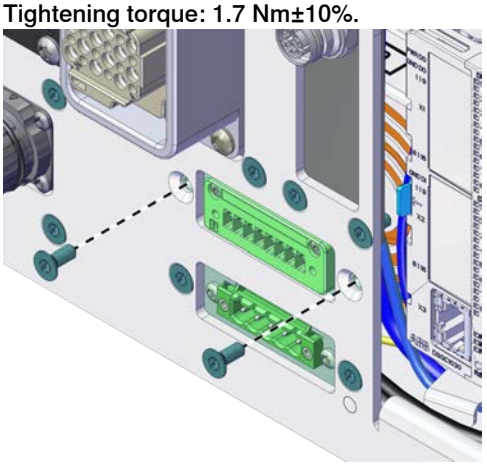
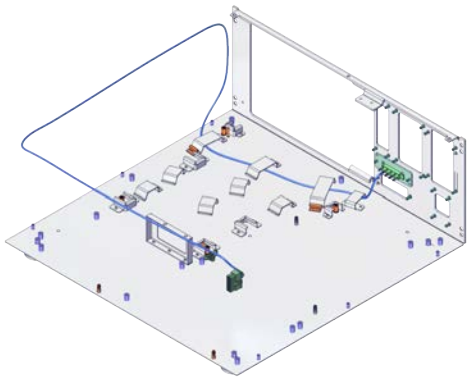
	Action	Note/Illustration
2	Push the cables out from the clips in the bottom of the controller carefully. **Note** Make records about the sequence that cables are removed. The cables need to be installed in the same position.	
3	Disconnect the power supply optional.	
4	Remove the attachment screws on the front panel.	 xx2400000081
5	Push the IP20 power outlet connector into the cabinet.	
6	Push the cables on IP20 power outlet connector out from the clips on the bottom of the cabinet.	
7	Take the IP20 power outlet connector out from the upper side.	

Refitting the IP20 power outlet connector

Refitting the IP20 power outlet connector

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

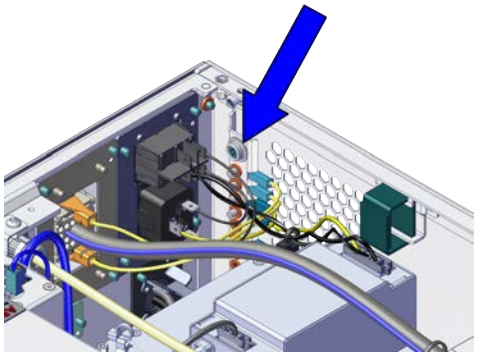
	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Insert the IP20 power outlet connector into the front panel from inside the cabinet.	
4	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000081
5	Reconnect the power supply optional.	
6	Insert the cables on IP20 power outlet connector into the clips in the bottom of the cabinet. **Tip** Use the same position as from removing IP20 power outlet connector.	 xx2400000082

Continues on next page

5.3.7 Replacing the IP20 power outlet connector
Continued

	Action	Note/Illustration
7	Reconnect: • X45 - T5.X2.	

Refitting the main computer assembly with process plate to the cabinet

	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	
2	**ELECTROSTATIC DISCHARGE (ESD)** When handling the computer outside of the controller, use the wrist strap button located on the side of the computer.	Location of wrist strap button:  xx2400000021
3	Use the two guide pins to locate the assembly onto the mounting plate.	**Note** Be careful with the frame of the controller when refitting the unit.
4	Fasten the assembly with the screws. **WARNING** Be careful with the cables installed below the process plate.	
5	Reconnect all the connectors on assembly of the robot signal exchange proxy, ethernet extension-seven port switch (option), ABB ability™ connected services, scalable I/O digital base (option), and main computer.	

Continues on next page

	Action	Note/Illustration
	For the robot signal exchange proxy: • K2.X8 - A2.X6 • (option): K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • K2.X10 - A1.X13 • K2.X21 - TempSensor • K2.X4 - A1.X9 • K2.X3 - K6.X1, A2.K3.X1, K5.1.X4, K7.X1 • K2.X1 - T2.X2[25] • K2.X17 - G2.X1, G1.X2 • K2.X6, K2.X11 - A1.X2 • K2.X7, K2.X22 - Harn. LV robot power • K2.X9 & X13 - FlexPendant	
	For the Ethernet extension switch (option): • K2.X2 - K4.X8, A2.X1 • A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • Harness adapter - A2.X4/K4.X7. **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7.	
	For the connected services gateway: • K7.X1 - K2.X3[i] • K7.X2 - A2.X5 **Note** The connector K7.X2 is locked; grab the connector, push it in to release it and then remove the connector.	

Continues on next page

5.3.7 Replacing the IP20 power outlet connector
Continued

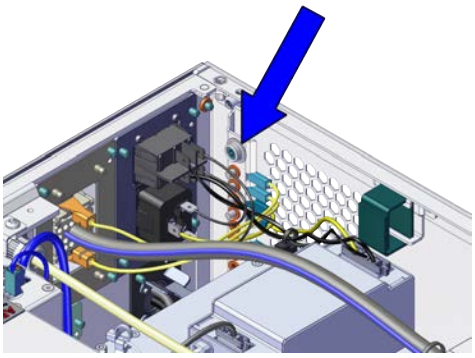
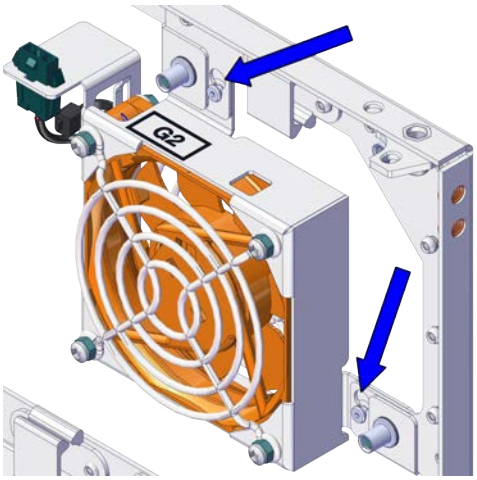
	Action	Note/Illustration
	For the main computer: • K2.X8 - A2.X6 • K2.X2 - K4.X8, A2.X1 • K2.X12 - A2.K3.X6, A2.K3.X7 • A2.X5 - K7.X2 • (Option) A2.K1 - X17 **Note** This cable is available when the fieldbus master and DeviceNet harness are installed. • (Option) A2.X4 - K4.X6 **Note** When Ethernet extension switch is selected, connect and disconnect the connector A2.X4) to/from K4.X6. • (Option) Harness adapter - A2.X4/K4.X7 **Note** When Ethernet extension switch is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from K4.X7. When Ethernet extension unit slot cover is selected, connect and disconnect the adapter cable (Adapter - A2.X4/K4.X7) to/from A2.X4.	
	For the digital base (option): • K5.1.X4 - K2.X3 • K5.1.X5 - Harness adapter	

i For connected services gateway wired, there is no power cable.

Refitting the small fan

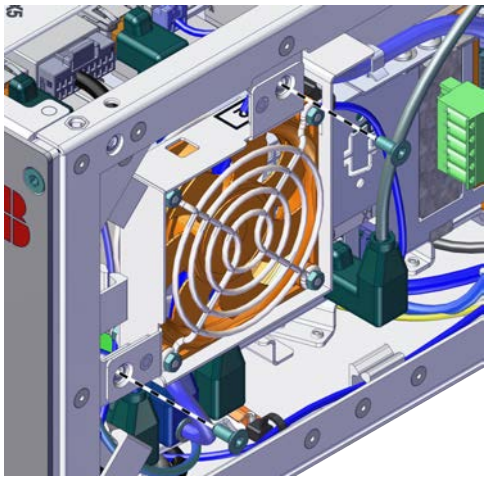
	Action	Note/Illustration
1	**DANGER** Before doing any work inside the cabinet, disconnect the mains power. For more information, see *Electrical safety on page 31*.	

Continues on next page

	Action	Note/Illustration
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	Location of wrist strap button:  xx2400000021
3	Reconnect: • G2.X1-K2.X17	
4	Refit the fan bracket into the cabinet.	 xx2400000045

Continues on next page

5.3.7 Replacing the IP20 power outlet connector
Continued

	Action	Note/Illustration
5	Secure it with the screws.	Screws: Torx, countersunk screw M4x10 (2 pcs) Tightening torque: 1.7 Nm±10%.  xx2400000044

Concluding procedure

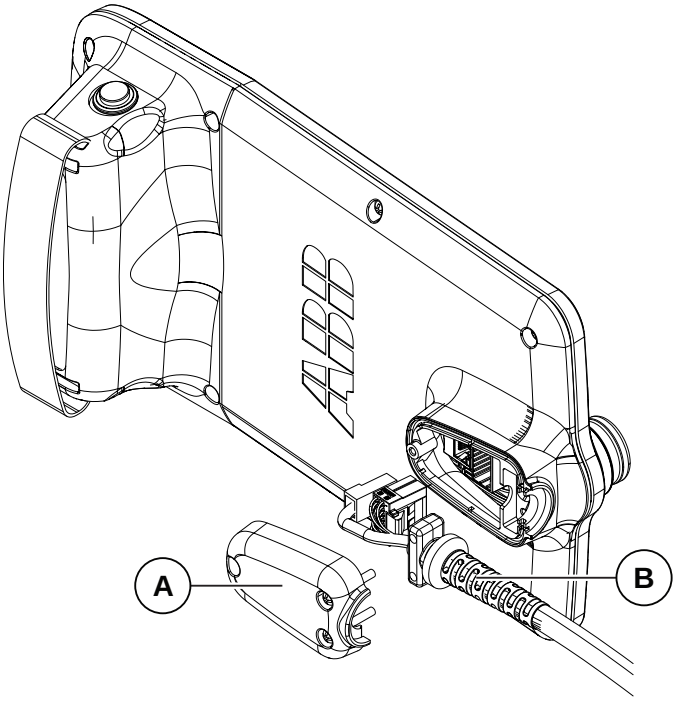
	Action	Note/Illustration
1	Refit the covers.	*Refitting the controller covers on page 205*
2	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
FlexPendant	3HAC064211-001	DSQC3060
Power cable cover	3HAC065401-001	
FlexPendant power cable 3 m	3HAC064448-002	
FlexPendant power cable 10 m	3HAC064448-001	

Continues on next page

5.4.1 Replacing the power cable and power cable cover

Continued

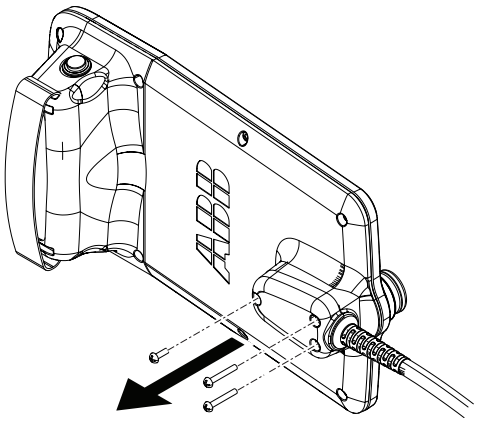
Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.
ESD protective wrist band	-	

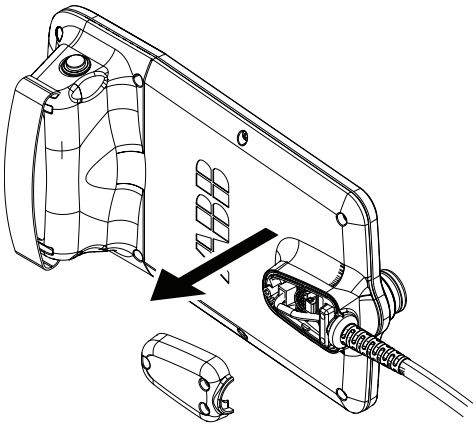
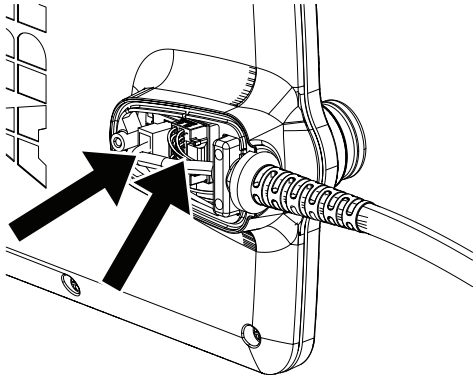
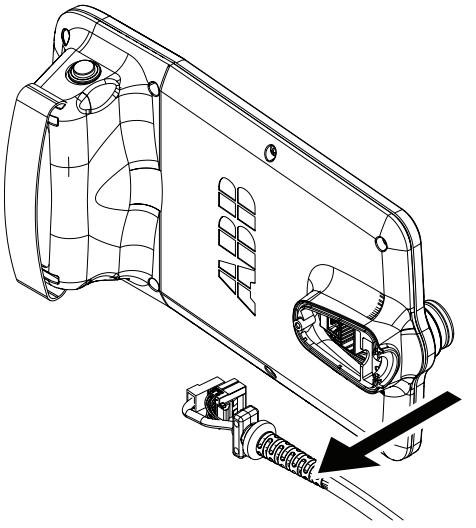
Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Removing the power cable and power cable cover

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	
2	Disconnect the FlexPendant from the controller.	
3	Remove the attachment screws for the power cable cover.	 xx1800001189

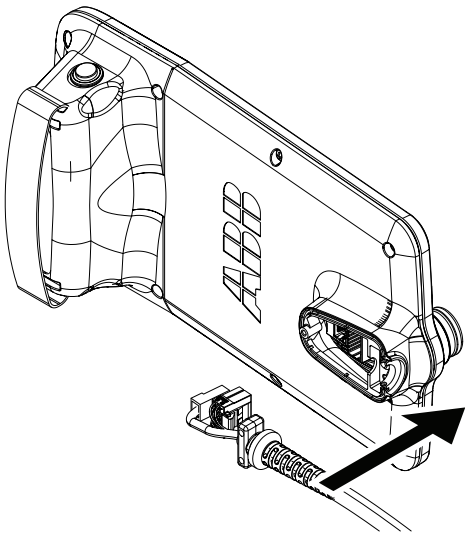
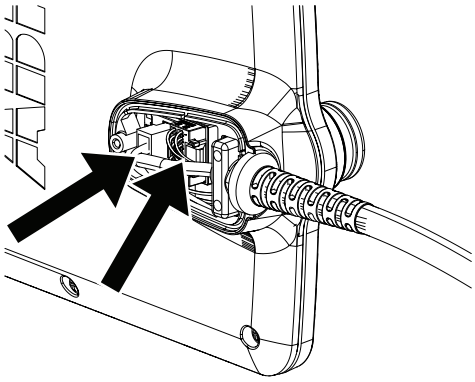
Continues on next page

	Action	Note/Illustration
4	Remove the power cable cover.	 xx1800001190
5	Disconnect two connectors to the FlexPendant.	 xx1800001748
6	Remove the power cable.	 xx1800001192

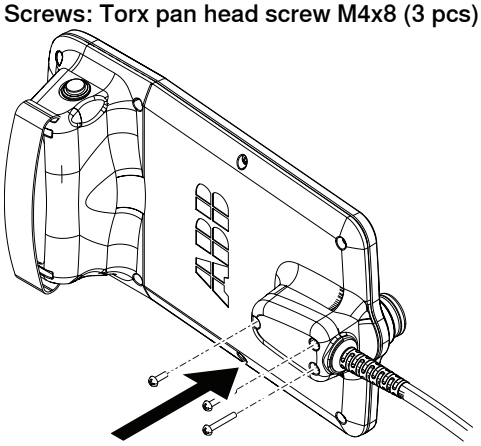
Continues on next page

5.4.1 Replacing the power cable and power cable cover
Continued

Refitting the power cable and power cable cover

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	
2	Refit the power cable.	 xx1800001193
3	Reconnect the power cable to the FlexPendant.	 xx1800001748

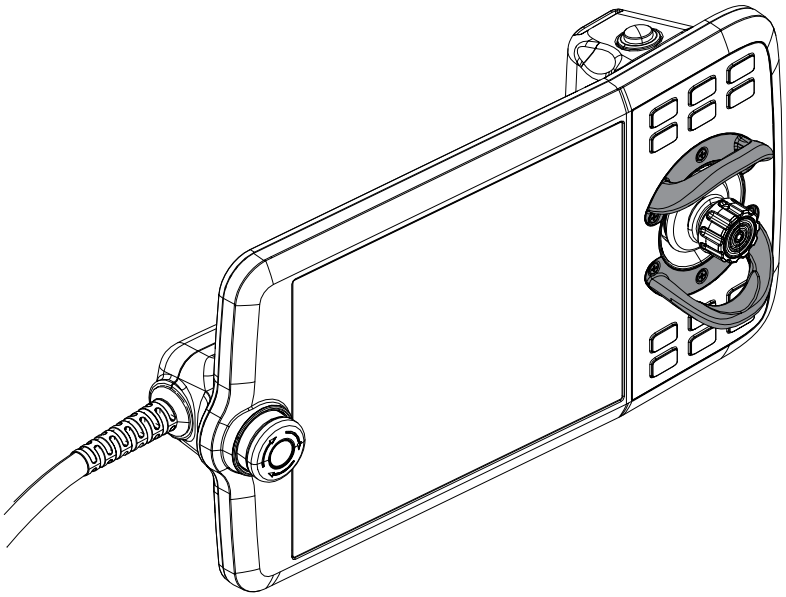
Continues on next page

	Action	Note/Illustration
4	Refit the power cable cover and tighten the screws.	Screws: Torx pan head screw M4x8 (3 pcs)  xx1800001196
5	Perform the function tests to verify that the safety features work properly, see *Function tests on page 189*.	

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 C30 Type A via myABB Business Portal, *www.abb.com/myABB*.

Spare part	Article number	Note
Joystick guard	3HAC065408-001	

Required tools and equipment

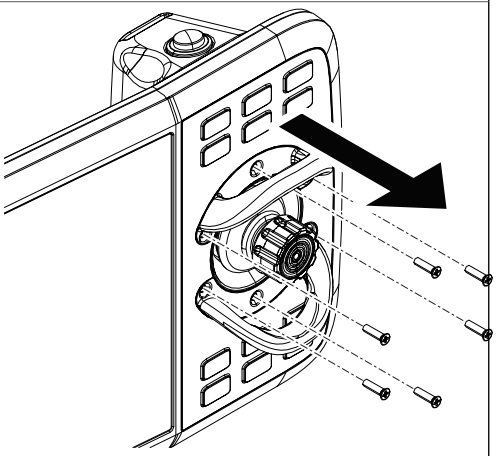
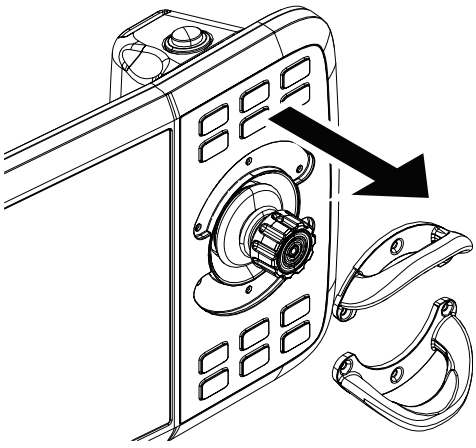
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit for controller on page 458*.

Required documents

Document	Article number	Note
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*	

Continues on next page

Removing the joystick protection

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	
2	Disconnect the FlexPendant from the controller.	
3	Remove the attachment screws.	 xx1800001198
4	Remove the joystick protection.	 xx1800001199

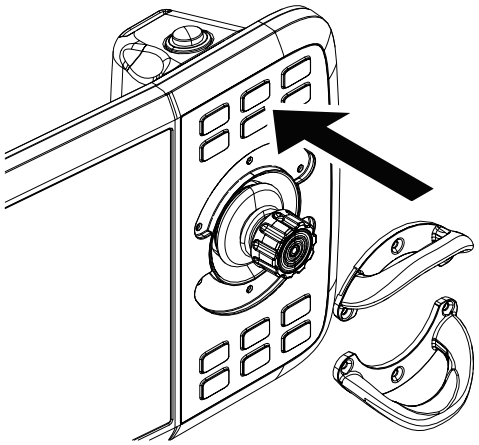
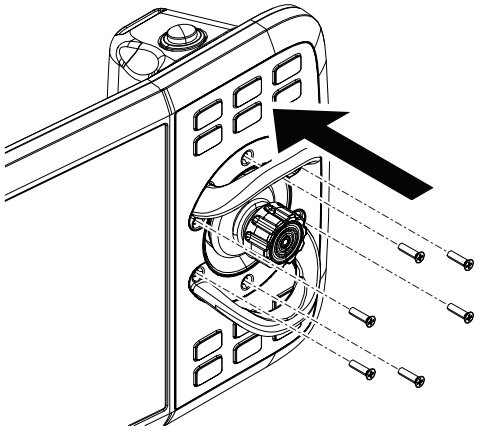
Refitting the joystick protection

	Action	Note/Illustration
1	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit read the safety information in section *The unit is sensitive to ESD on page 48*.	

Continues on next page

5.4.2 Replacing the joystick protection

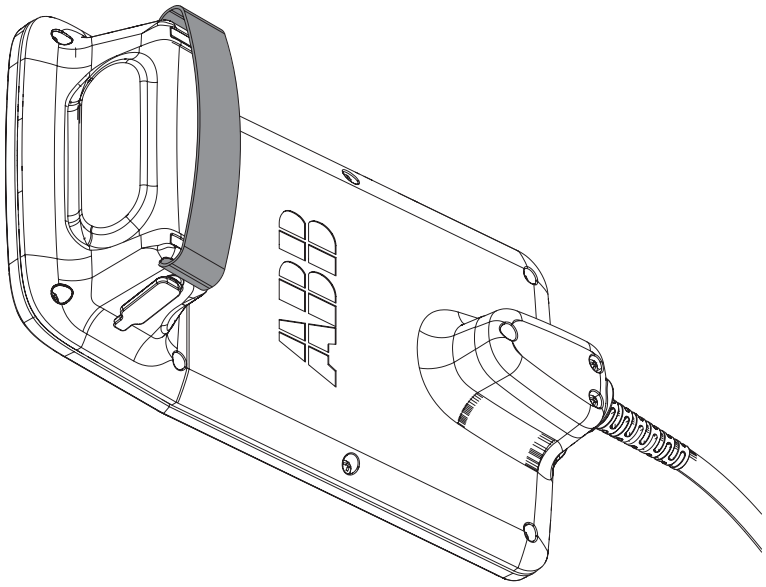
Continued

	Action	Note/Illustration
2	Refit the joystick protection.	 xx1800001200
3	Secure the screws.	 xx1800001206 Countersunk head screw: ST2.9 X 10 (6 pcs)

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 C30 Type A via myABB Business Portal, *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.	

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6 Troubleshooting

6.1 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: • the configuration files • connectors • options and their configuration • changes in the robot working space/movements.

Continues on next page

The robot has recently been repaired	Check: • all connections to the replaced part • power supplies • that the correct part has been fitted • the last repair documents.
The robot recently had a software upgrade	Check: • software versions • compatibilities between hardware and software • options and their configuration
The robot has recently been moved from one site to another (an already working robot)	Check: • connections • software versions

6.2 Troubleshooting fault symptoms

Fault symptoms described in this manual

This manual describes how to troubleshoot the following fault symptoms:

Continues on next page

6.2.1 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.
	DANGER 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. • Measure incoming mains voltage and make sure the voltage is within the normal range.	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. **Tip** For more details, see *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*.	

6.2.2 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 C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*

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.
	DANGER 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	Look at the LED PS.	LED PS should be green. • If the power unit is ok, check that the power inlet is properly connected and the power inlet switch is turned on. For more details about the LEDs, see *Troubleshooting the robot signal exchange proxy on page 446*.

Continues on next page

6.2.2 Start-up failure
Continued

	Action	Note
2	Look at the LED MS.	LED MS should be green. • If not, see *Troubleshooting the robot signal exchange proxy on page 446*.
3	Look at the LEDs PC and HMI.	LED PC and LED HMI should be green. • If not, see *Troubleshooting the robot signal exchange proxy on page 446*
4	Look at the LEDs PC PWR, PC HDD, and PC STAT.	For more details about the LEDs, see *Troubleshooting the main computer on page 437*.
5	If the problem remains, contact ABB.	

Tip

For more details, see *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*.

6.2.3 System update failure

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 407*.

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 407*.

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.

6.2.4 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	
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*

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.
	DANGER 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. **Tip** For more details, see *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*.	• If the cable is damaged, replace to a new cable and go to step *5*. • If the cable is not connected, repair the connection and go to step *5*. • If the cable is ok, go to the next step.

Continues on next page

	Action	Note
2		• If it is not, repair the connection and go to step 5. • If it is ok, go to the next step.
3		• If it is not, repair the connection and go to step 5. • If it is ok, go to the next step.
4	Try jogging the robot.	• If it is not working properly, the brake release board on the manipulator might be broken. Contact your local ABB for more information. • Go to step 5.
5	Check that the brake release function is ok.	For more details on how to release the brakes, see the robot's product manual. • If it is not ok, contact your local ABB.

6.2.5 Problem starting or connecting the FlexPendant

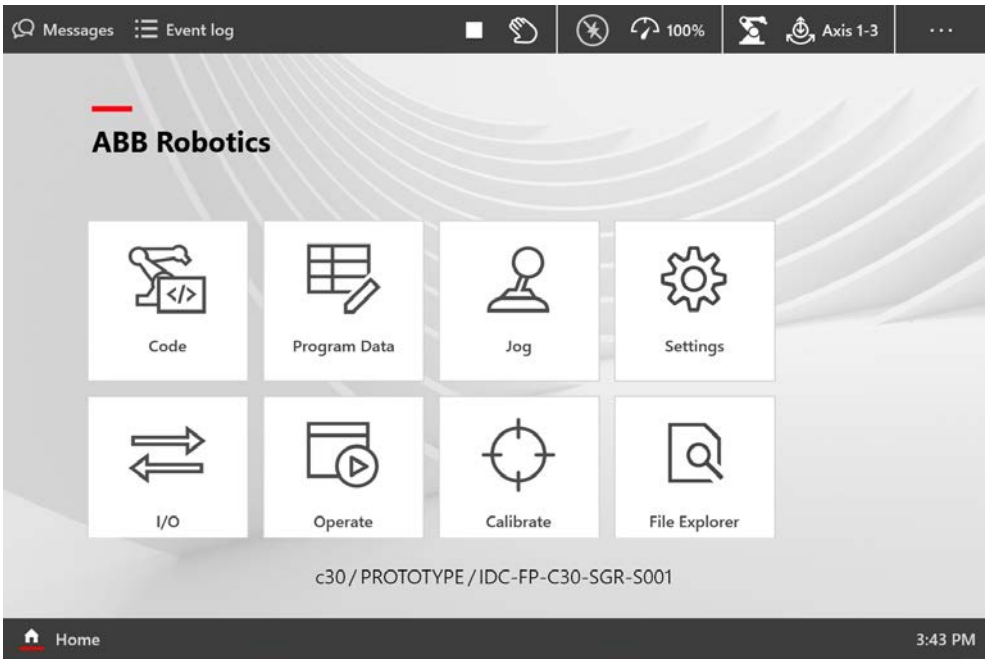
Description

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 C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*

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
	DANGER 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 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 *Operating manual - OmniCore*.
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.	• If damage is found, replace the FlexPendant cable and go to step six. • If it is ok, go to the next step.
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	Check that the FlexPendant works normally. **Tip** This is detailed in section *Troubleshooting the FlexPendant on page 419*.	If it is not ok, contact your local ABB.

6.2.6 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 *Operating manual - OmniCore*.
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. **Note** The reset button only resets the FlexPendant, not the system on the controller.	If the joystick is still not working, then replace the FlexPendant.

6.2.7 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.

> **Note**
>
> The PC STAT LED should be in flashing red state.

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.

See also *Troubleshooting the main computer on page 437*.

How to install systems is described in *Operating manual - Integrator's guide OmniCore*.

6.2.8 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.	

6.2.9 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 *Operating manual - OmniCore*.
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

6.2.9 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 *Operating manual - Integrator's guide OmniCore*.
9	Make sure the robot brakes work properly.	Proceed as detailed in section *Problem releasing the robot brakes on page 408*.
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.

6.2.10 Controller is overheated

Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*

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.
	DANGER 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 *Replacing the standard fan on page 213*
2	If the problem remains, troubleshoot the power unit and/or the drive unit.	See *Troubleshooting the power unit on page 422* and *Troubleshooting the drive unit on page 420*.

6.3 Troubleshooting units

6.3.1 Troubleshooting LEDs in the controller

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

Drive unit	*Troubleshooting the drive unit on page 420*
Power unit	*Troubleshooting the power unit on page 422*
Scalable I/O	*Troubleshooting industrial networks and I/O devices on page 428*
3G Connected Services gateway	*Troubleshooting the 3G Connected Services gateway on page 429*
Ethernet switch	*Troubleshooting the Ethernet switch (DSQC1035) on page 435*
Main computer	*Troubleshooting the main computer on page 437*
Power supply	
Fieldbus adapter slave	*Troubleshooting the fieldbus adapter slave on page 444*
Robot signal exchange proxy	*Troubleshooting the robot signal exchange proxy on page 446*

6.3.2 Troubleshooting the FlexPendant

Description

The FlexPendant communicates with the main computer. The FlexPendant is physically connected to the panel board. The cable contains the +24 V supply, two enabling device chains and emergency stop.

Procedure

The procedure below describes what to do if the FlexPendant does not work correctly.

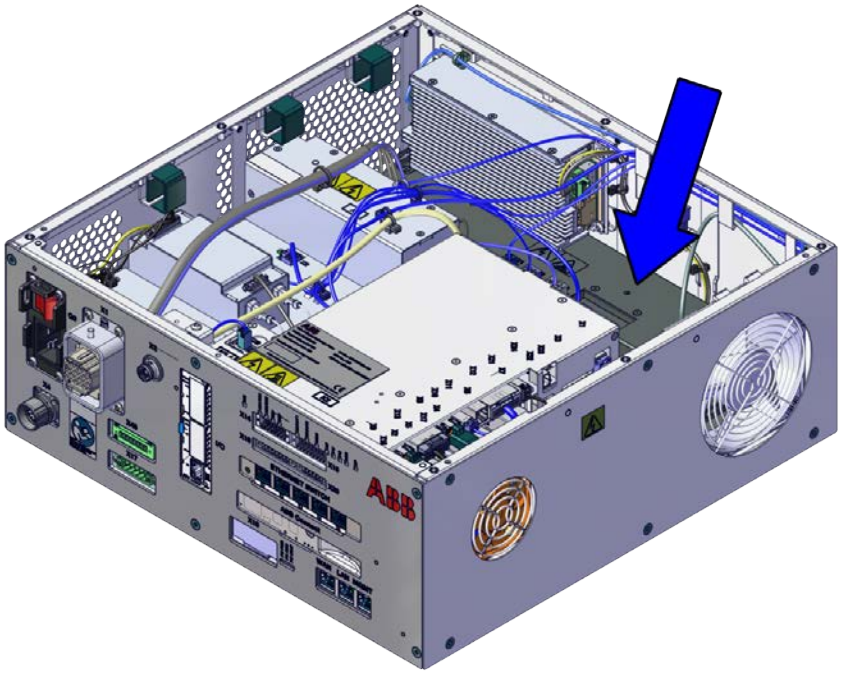
	Action	Note
1	Try resetting the FlexPendant using the reset button located next to the USB port.	See *Operating manual - OmniCore*.
2	If the FlexPendant is not responding or does not operate correctly, see *Problem starting or connecting the FlexPendant on page 410*.	**Note** If protective gloves are 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*.

6.3.3 Troubleshooting the drive unit

Location

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



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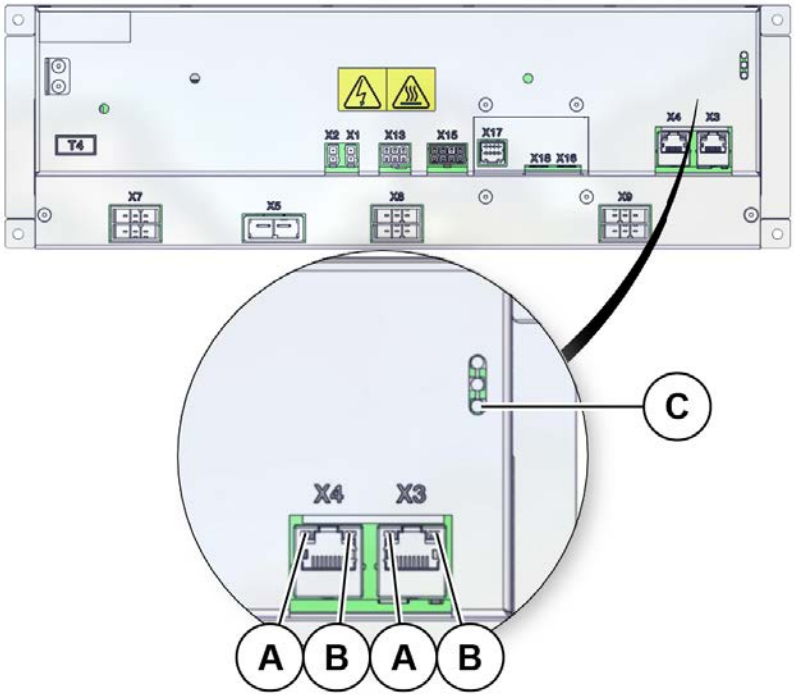
LEDs

The illustration below shows the indication LEDs on the drive unit.

Continues on next page



xx2100001560

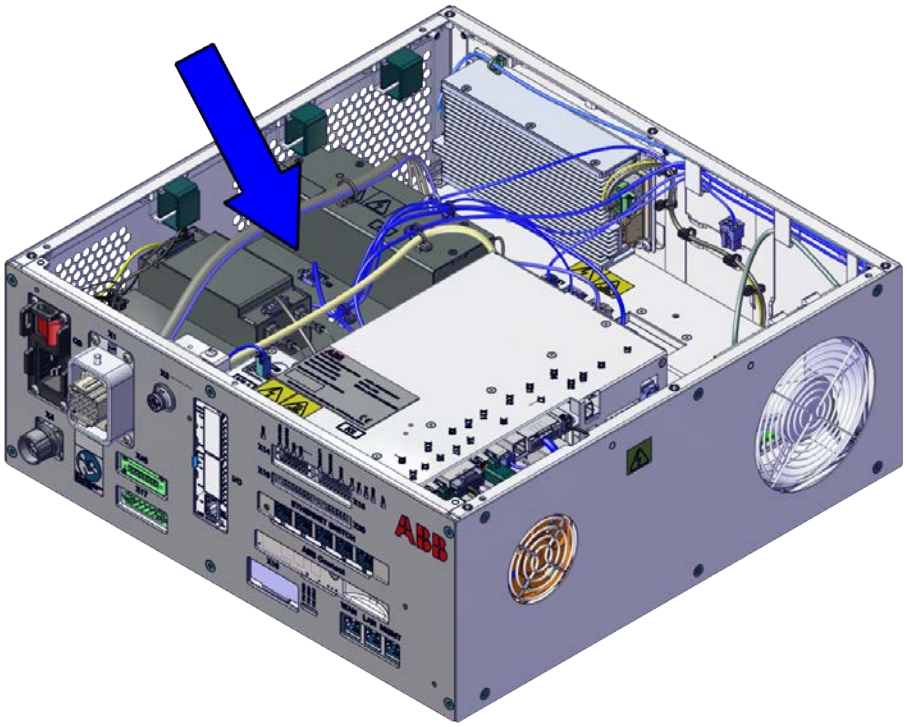
A	Ethernet LEDs (yellow)
B	Ethernet LEDs (green)
C	Status LED

Description	Significance
Ethernet LEDs	Shows the status of Ethernet communication between the drive unit and the power unit. Green: • Off: 10 Mbps data rate is selected. • On: 100 Mbps data rate is selected. Yellow: • Flashing: The two units are communicating on the Ethernet channel. • Steady: A LAN link is established. • Off: A LAN link is *not* established.
Drive unit status LED	The status indicator LED can be used to identify the following status during startup/power on: 1 Red, steady: Default when power is available. 2 Red, flashing: Power is on, self-test is ongoing, operating system is loading. 3 Green, flashing: Application is loaded and waiting for communication. 4 Green, steady: Drive unit is operational. If the LED does not turn steady green after 30-60 sec, the status indicator LED can be used to identify the following issues: • No color: Power to the drive unit is missing. • Red, steady: Internal error. • Red, flashing: Firmware error or self-test failure. • Green, flashing: Communication error to another module.

6.3.4 Troubleshooting the power unit

Location

The illustration below shows the location of the power unit in the controller.

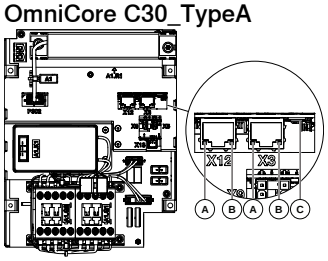


xx2400000059

LEDs

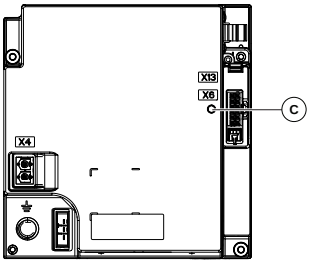
The illustration below shows the LEDs on the power unit.

OmniCore C30_TypeA



xx1800000576

OmniCore C30 TypeA for CRB 15000



xx2100000460

If the controller is for CRB 15000-10/12, a bleeder box is also included in the controller. The illustration below shows the LED on the bleeder box.

A	Ethernet LEDs (yellow)
B	Ethernet LEDs (green)
C	Status LED

Continues on next page

D[i]	Bleeder failure LED

[i] Only valid for CRB 15000-10/12 controller.

Description	
Power unit status LED	The status indicator LED can be used to identify the following status during startup/power on: 1 Red, steady: Default when power is available. 2 Red, flashing: Power is on, self-test is ongoing, operating system is loading. 3 Green, flashing: Application is loaded and waiting for communication. 4 Green, steady: Power unit is operational. If the LED does not turn steady green after 30-60sec, then the status indicator LED can be used to identify the following issues: • No color: Power to the power unit is missing. • Red, steady: Internal error. • Red, flashing: Firmware error or self-test failure. • Green, flashing: Communication error to another module.
Bleeder failure LED[i]	The failure indicator LED can be used to identify the bleeder's status: • No color: Bleeder is work normally. • • Red, steady: Bleeder is abnormal.

[i] Only included in CRB 15000-10/12 controller.

Note

When troubleshooting the power unit for an CRB 15000 controller, there is only two status:

- Red, the power unit is broken. Replace it.
- Green, the power unit is ok.

Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*

Preparations

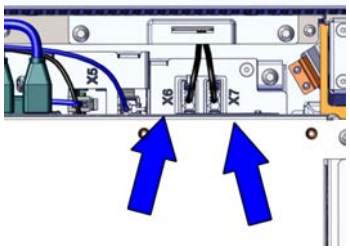
	Action
1	Check the FlexPendant for errors and warnings.
2	Power the controller off. Wait one minute, power the controller on.
3	Wait 30-60 seconds after power-on. Make sure that the control system power is in run-time mode.

Continues on next page

6.3.4 Troubleshooting the power unit
Continued

Troubleshooting procedure

The troubleshooting table is supposed to be used as a detailed instruction together with the troubleshooting flowchart.

	Action	Note
1	Power on the controller. Check the indicator LED MS on the power unit.	Make sure that the controller power supply is in run-time mode. Wait at least 1 min after power-on. If the LED MS is: • Green, proceed with step *8*. • Flashing red/green: a firmware upgrade error has occurred. This is not supposed to happen during runtime mode, proceed with step *12*. • Pulsing red: replace the power unit, step *12*. • Not lit or red: The controller does not have sufficient DC input voltage. Proceed with step *3*.
2	Measure the 24 V_TRUNK DC voltage. • X6	Use a multimeter and insulating gloves. Measeure the voltage of A1.X6.1-A1.X6.4. The 24 V_TRUNK voltage should be within 24 V - 26.4 V. • If the 24 V_TRUNK voltage is normal, proceed with step *8*. • If the 24 V_TRUNK voltage is abnormal, proceed with step *12*.
3	Measure the 24 V DC input voltage to the power unit. • X5 • X9	Use a multimeter and insulating gloves. The input voltage should be 24 V. Make sure that connectors X5, X9 are connected properly on both ends. • If the 24 V DC input voltage is normal, proceed with step *8*. • If the 24 V DC input voltage is abnormal, proceed with the next step.
4	Check connection to the robot signal exchange proxy. • A1.X9 (Power unit) - K2.X4	If the connection is OK, proceed with the next step. If there is a problem with the connection, repair the connection and go to step *1*.
5	Measure the AC output voltage.  xx1900000043	Use a multimeter and insulating gloves. Make sure that connectors X6, X7 are connected properly on both ends. • If the output voltage is abnormal, proceed with step *6*.

Continues on next page

	Action	Note
6	Measure the AC input voltage. • A1.X1 - A1.K1	Use a multimeter and insulating gloves. Make sure that connector X1 is connected properly on both ends. • If the input voltage is normal, proceed with step *12*. • If the input voltage is abnormal, proceed with the next step.
7	Check the connection from the power inlet to the power unit.	• If the connection is OK, troubleshoot *No LEDs are lit on the controller on page 404*. • If there is a problem with the connection, repair the connection and start over.
8	Check the LEDs of the Ethernet ports X3, X12 on the power unit.	• If the LEDs are normal, proceed with step *10*. • If the LEDs are abnormal, proceed with the next step.
9	Check the connection of the Ethernet cables.	• If the connection is OK, proceed with step *12*. • If there is a problem with the connection, repair the connection and go to step *8*.
10	Measure the AC OK signal.	Use a multimeter and insulating gloves. The AC OK should be 0 V. Make sure that connector X13 is connected properly on both ends. • If the AC OK signal is 24 V, proceed with step *12*. • If the AC OK signal is 0 V, proceed with the next step.
11	Check event log if there is a message about DC-link voltage.	If message numbers 34401/34402, proceed with step *12*. If not, power unit is ok.
12	The power unit may be faulty, replace it and verify that the fault has been fixed.	How to replace the unit is detailed in *Replacing the power unit on page 286*.

Note

If the controller is for CRB 15000-10/12, troubleshoot the bleeder box if the power unit is fine.

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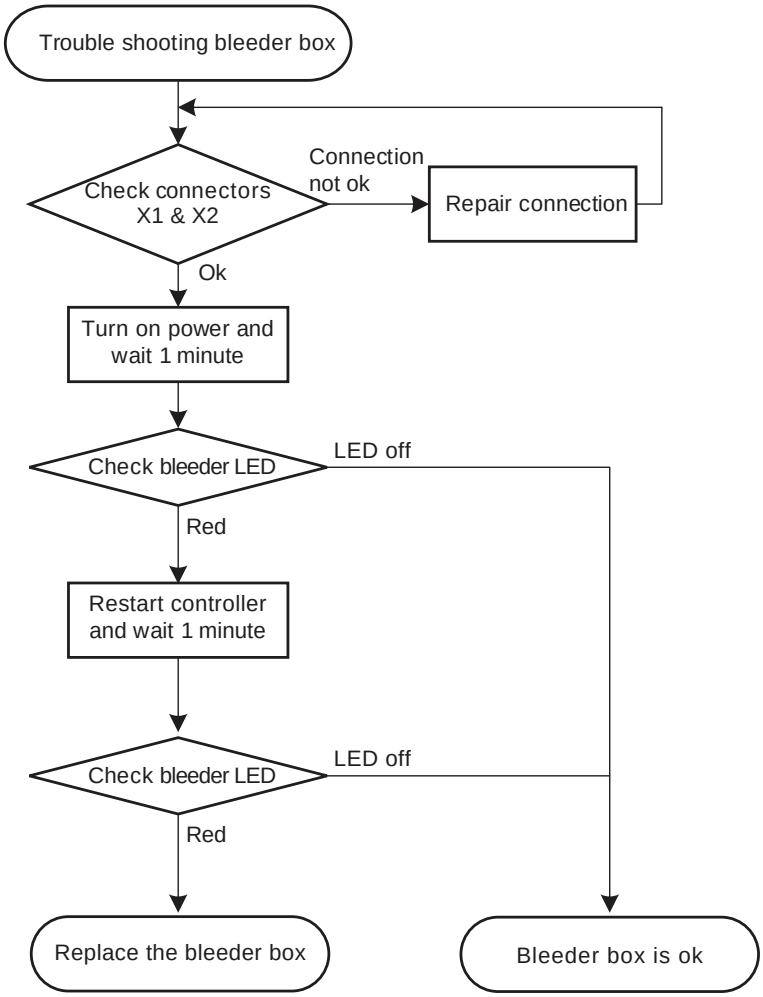
6.3.4 Troubleshooting the power unit
Continued

Troubleshooting flowchart for bleeder box



xx2300000967

Troubleshooting procedure for bleeder box

The troubleshooting table is supposed to be used as a detailed instruction together with the troubleshooting flowchart.

	Action	Note
1	Make sure that the controller is powered off before open the controller.	
2	Power on the controller. Check the bleeder failure LED on the bleeder box.	Make sure that the controller power supply is in run-time mode. Wait at least 1 min after power-on. If the bleeder failure LED is: • No color: the bleeder box is ok. • Red: some error may happen, proceed with step *3*.
3	Restart the controller.	Wait at least 1 min after power-off.

Continues on next page

	Action	Note
4	Check the bleeder failure LED on the bleeder box for the second time.	Make sure that the controller power supply is in run-time mode. Wait at least 1 min after power-on. If the bleeder failure LED is: • No color: the bleeder box is ok. • Red: some error may happen.
5	The bleeder box may be faulty, replace it and verify that the fault has been fixed.	How to replace the unit is detailed in *Replacing the bleeder box on page 291*.

6.3.5 Troubleshooting industrial networks and I/O devices

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*.

6.3.6 Troubleshooting the 3G Connected Services gateway

Location

The illustration shows the location of the Connected Services gateway in the controller.

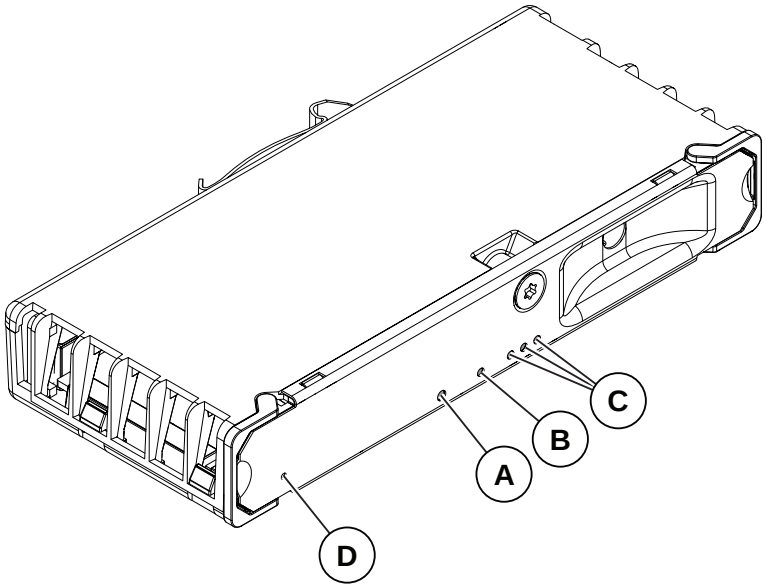
xx2400000052

LEDs for options 3G or WiFi

The illustration below shows the LEDs on the Connected Services gateway (3G or WiFi).

Continues on next page

6.3.6 Troubleshooting the 3G Connected Services gateway
Continued



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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)	Startup sequence: 1 Red continuously: Default at power up. 2 Red, flashing: Power on self-test ongoing, operating system is loading. 3 Green flashing: Loading application. 4 Green solid: Startup completed OK. If the LED does not turn steady green after 30-60sec, it can be used to identify the following issues: Fault indication: • No color: Power to the unit is missing. • Red, solid or flashing for more than 120s: Internal error. Try a pin reset, if problem persists replace the unit. • Green, flashing continuously: Communication error to another module, view error messages.
LINK	For the Connected Services 3G, an orange LED indicator, externally visible on the front, indicates the status of the 3G connection. Orange: • ON, flashing: 3G modem on, searching network. • ON, solid: 3G modem on and connected to network.
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: • ON, flashing: Wi-Fi transceiver on, searching network. • ON, solid: Wi-Fi transceiver on and connected to network.
RF, signal strength status LEDs	Three (3) LEDs indicating the Wi-Fi or 3G signal level. • ON: The unit is connected to the network and working ok. • OFF: Problem with connector, antenna, or sim card.

Continues on next page

Description	Significance
Reset pin hole	The reset pin hole can be used as follows: • Short press (less than 5s): The module will reboot to reinitiate communication. • Long press (more than 5s): The module will be reset to factory status before restarting.

Required test equipment

Equipment needed for troubleshooting:

Equipment	Note
Multimeter	
Insulating gloves	

Preparations

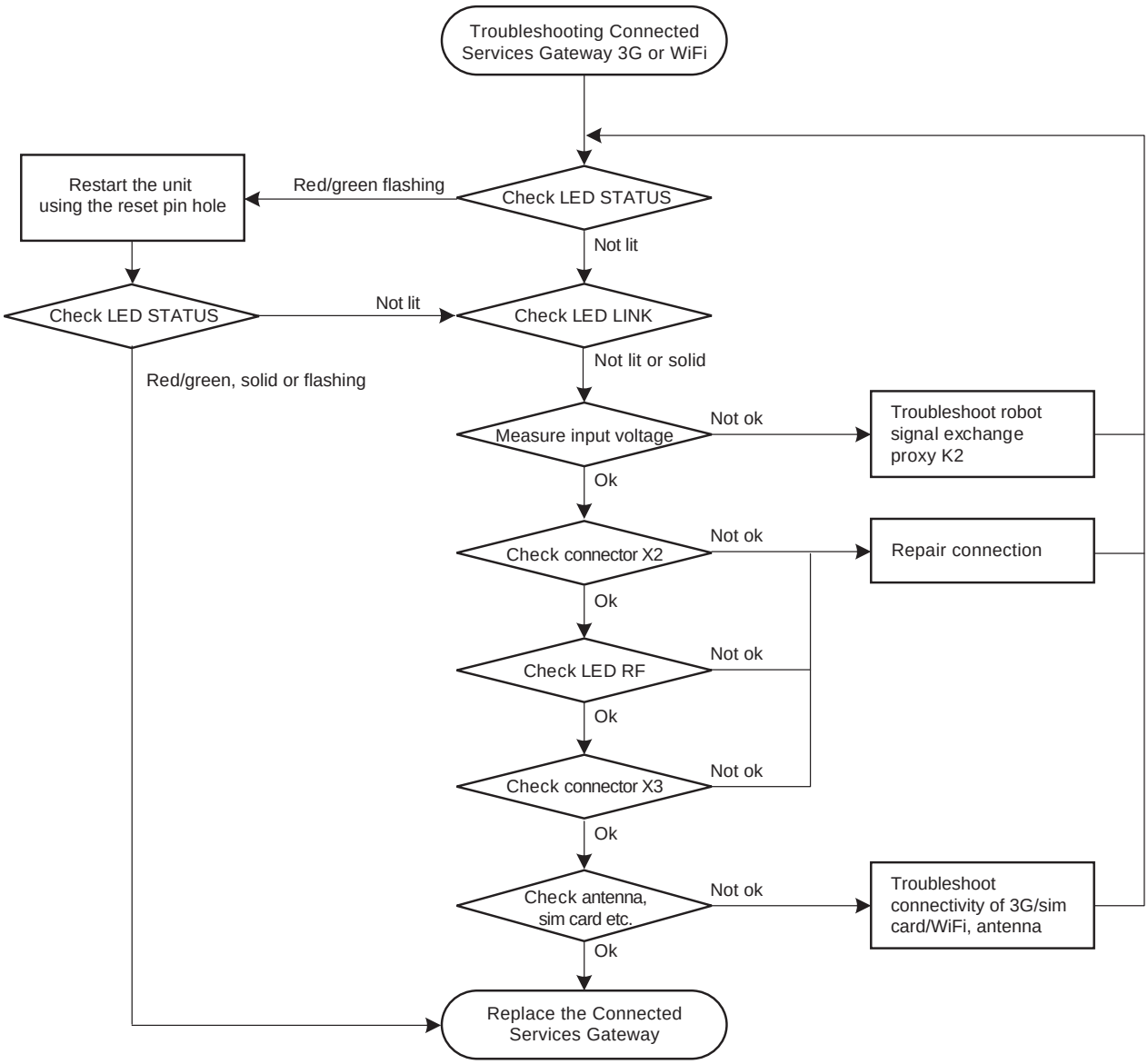
	Action
1	Check the FlexPendant for errors and warnings.
2	Power the controller off. Wait one minute, power the controller on.
3	Wait 30-60 seconds after power-on. Make sure that the control system power is in run-time mode.

Continues on next page

6.3.6 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: • Red/green, flashing: proceed with step *2*. • 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*.
2	Reset the module to factory using the reset pin hole for more than 5s, and restart the controller.	Proceed with step *3*.

Continues on next page

	Action	Note
3	Check the STATUS LED on the Connected Services Gateway.	If the LED is: • Red/green, flashing: An internal error has occurred, proceed with step *13*. • 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*.
4	Check the LINK LED on the Connected Services Gateway.	If the LED is: • 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*. • Flashing: An internal error has occurred, proceed with step *13*.
5	Measure the input voltage to the Connected Services Gateway.	Use a multimeter and insulating gloves. The input voltage should be 24 V. Make sure that connector X1 is connected properly on both ends. • If the input voltage is normal, proceed with step *6*. • If the input voltage is abnormal, *Troubleshooting the robot signal exchange proxy on page 446*. **Tip** For more details, see *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*.
6	Check that the connector X2 is well connected and the network connection properties are available.	Make sure that connector X2 is connected properly on both ends. • If the connection is OK, proceed with step *7*. • If there is a problem with the connection, repair the connection and go back to step *3*.
7	Check the indicator RF LEDs on the Connected Services Gateway.	If the RF LEDs are: • ON, the Connected Services Gateway is connected to network and works well. • OFF, the Connected Services Gateway is faulty or the connection of the connector X3 is not ok. Proceed with step *8*.
8	Check that the connector X3 is well connected.	Make sure that connector X3 is connected properly on both ends. • If the connection is OK, proceed with step *9*. • If there is a problem with the connection, repair the connection and go back to step *7*.

Continues on next page

6.3.6 Troubleshooting the 3G Connected Services gateway
Continued

	Action	Note
9	Check that the right type of the antenna is connected properly.  **Tip** Try moving the antenna to different locations if the RF signal level is low.	• If the antenna is not working, repair the connection or move the antenna to a location with better RF signal. • If the antenna is ok, proceed with step *13*.
10	On the FlexPendant, check the connection log in **Backup and Restore**.	Verify that the configuration is done correctly. Verify that the mobile operator is detected (for 3G).
11	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.  **Note** When testing with a cell phone, use the same configuration on the cell phone.	See the Connected Services Gateway configuration in *Operating manual - Integrator's guide OmniCore*.
12	For 3G and WiFi, check the antenna connectivity.	
13	The Connected Services Gateway may be faulty, replace it and verify that the problem is resolved.	How to replace the unit is described in *Replacing the 3G Connected Services gateway on page 233*.

Related information

All documents can be found via myABB Business Portal, *www.abb.com/myABB*.

The approval code CMIIT ID is displayed on the nameplate of the product.

6.3.7 Troubleshooting the Ethernet switch (DSQC1035)

Location

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

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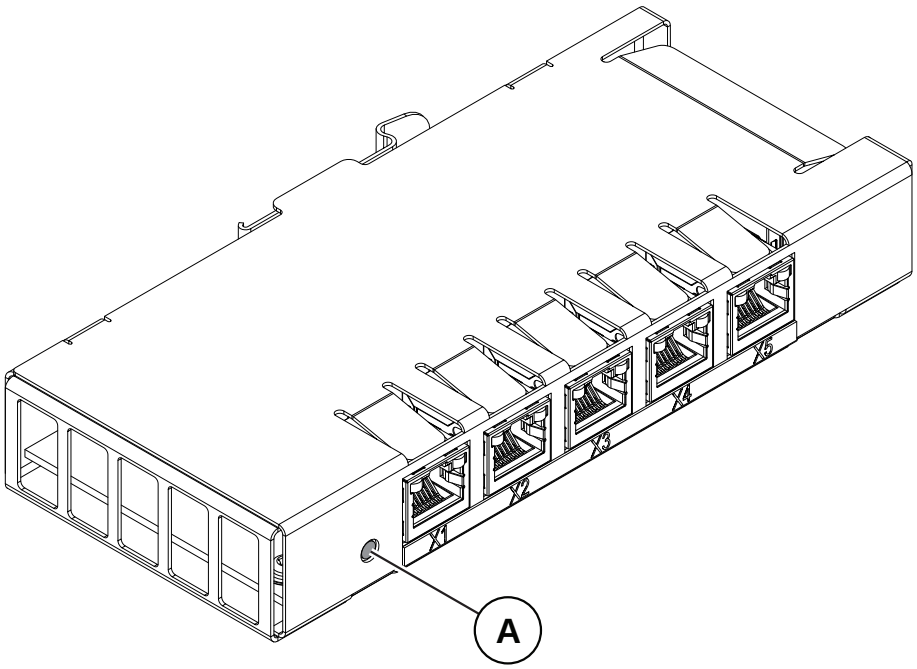
LEDs

The illustration below shows the indication LEDs on the Ethernet switch.

Continues on next page

6.3.7 Troubleshooting the Ethernet switch (DSQC1035)

Continued



xx1800000584

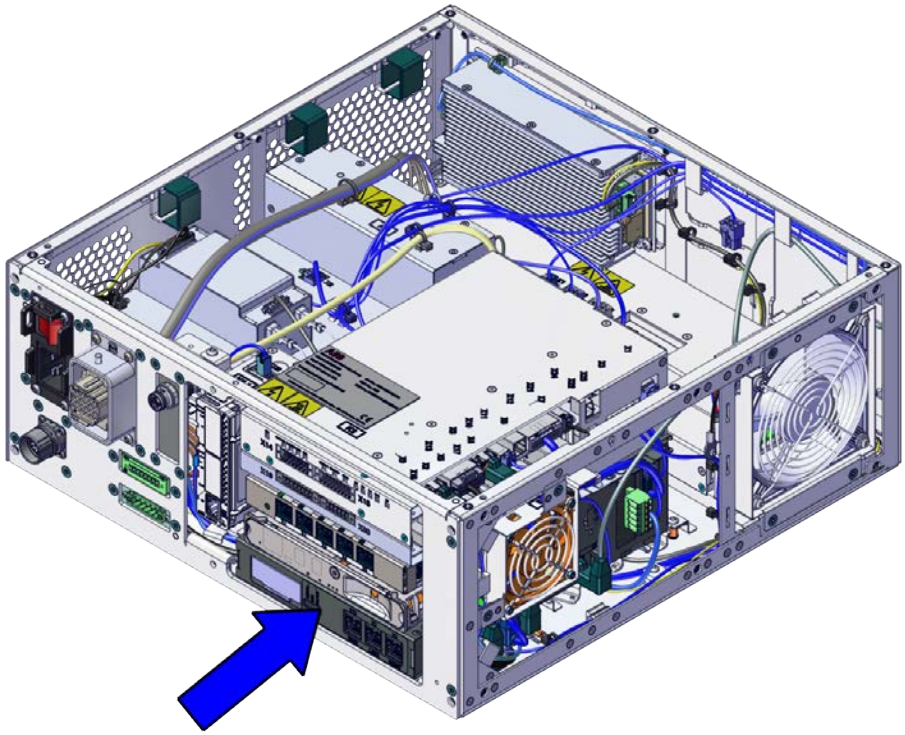
A	Status LED

Description	Significance
Status LED	Startup sequence: 1 No color: Input voltage is outside specified voltage or internal fault in the switch. 2 Green, solid: The switch is operational. If the LED does not turn steady green, the status indicator LED can be used to identify the following issues: Fault indication: • No color: If input voltage is within specified voltage limits and the LED is not lit then replace the switch.
Ethernet LEDs	Shows the status of Ethernet links. Green: • Off:10 Mbps data rate is selected. • On:100/1000 Mbps data rate is selected. Yellow: • Flashing: The Ethernet is active on link. • Solid: A LAN link is established. • Off: A LAN link is *not* established.

6.3.8 Troubleshooting the main computer

Location

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



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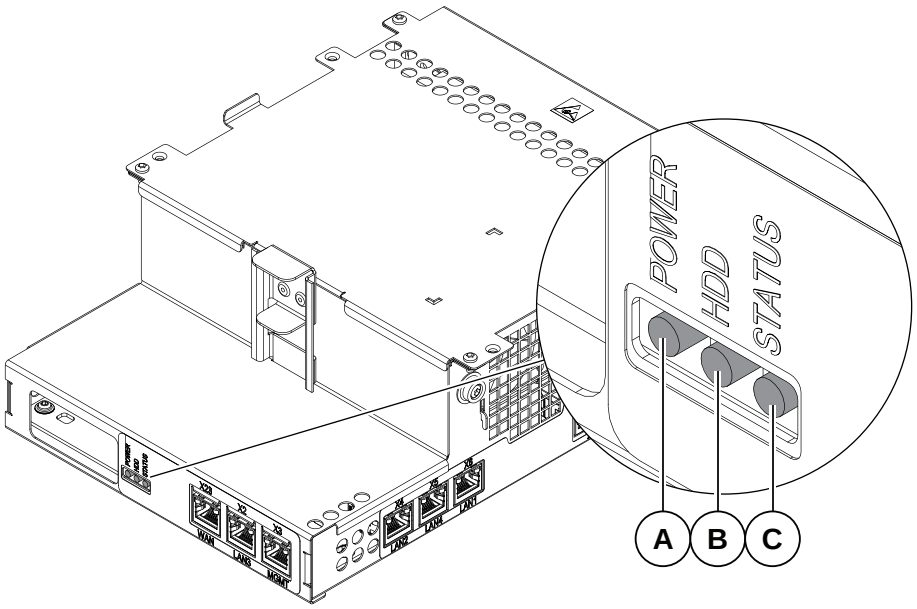
LEDs

The illustration below shows the LEDs on the main computer:

Continues on next page

6.3.8 Troubleshooting the main computer

Continued



xx1800000585

A	Power status LED
B	HDD status LED
C	Status LED

Description	Significance
Power status, PC PWR (green)	The power status LED indicates the status of the power supply and the main computer hardware and firmware. Normal behavior: • Off: During a normal startup the LED is off, until the COM Express module inside the computer unit is started. • On solid: After completion of startup the LED is steady on. After start-up phase (30-60 seconds): • Off: Power input voltage is not in normal range. Failure during startup (off between blinks). One to four short blinks, one second off. This is repeated until power off. • Internal fail of power, FPGA, and/or the COM Express module. • Replace the computer unit. Power failure during runtime (fast flashing between blinks). One to five blinks, 20 fast flashing blinks. This is repeated until power off. • Temporary voltage drop, cycle the power to the controller. • Check the power supply voltage to the computer unit. • Replace the computer unit.
Disk status, PC HDD	The disk status LED indicates access to the main computer persistent memory. Normal behavior: • No color at power on: R34 FPGA is loaded on the main board. • Yellow: Access (read/write) to internal mass memory.

Continues on next page

Description	Significance
Computer status, PC STAT (red/green)	The computer status LED indicates the startup progress of RobotWare on the main computer. Normal behavior: 1 Red, solid: Default when turning on the power. 2 Red, flashing: Initial self-test is ongoing and the operating system is loading. 3 Green, even flashing (~1Hz): The operating system is loaded and RobotWare is initializing. 4 Green, uneven flashing: The RobotWare system failed to load or is not installed. 5 Green, solid: The computer is operational and the RobotWare system is fully loaded. If the LED does not turn steady green after approximately 5 minutes then the LED can be used to identify the following issues: • No color: The internal power initialization failed. Restart the controller. Replace the main computer if the problem remains. • Red, solid: Internal error. Restart the controller. Replace the main computer if the problem remains. • Red, flashing continuously: Failed to load the operating system. Restart the controller. See *Controller fails to start on page 413*. Replace the main computer if the problem remains. • Green, even flashing continuously (~1Hz): Failure during start up. Check error messages on FlexPendant. See *Controller fails to start on page 413*. • Green, uneven flashing: RobotWare Installation Utilities mode.

For information about the LEDs on the AnybusCC slave fieldbus adapter and the PCIExpress master/slave fieldbus board, see the corresponding fieldbus manual.

Troubleshooting procedure

	Action	Note
1	If the LEDs do not turn steady after approximately 5 minutes then restart the controller and check the LEDs again.	See *LEDs on page 437*.
2	Force start the RobotWare Installation Utilities mode, see *Controller fails to start on page 413*.	
3	Re-install RobotWare, if possible.	
4	The main computer may be faulty, replace it and verify that the fault has been fixed.	See *Replacing the main computer on page 252*.

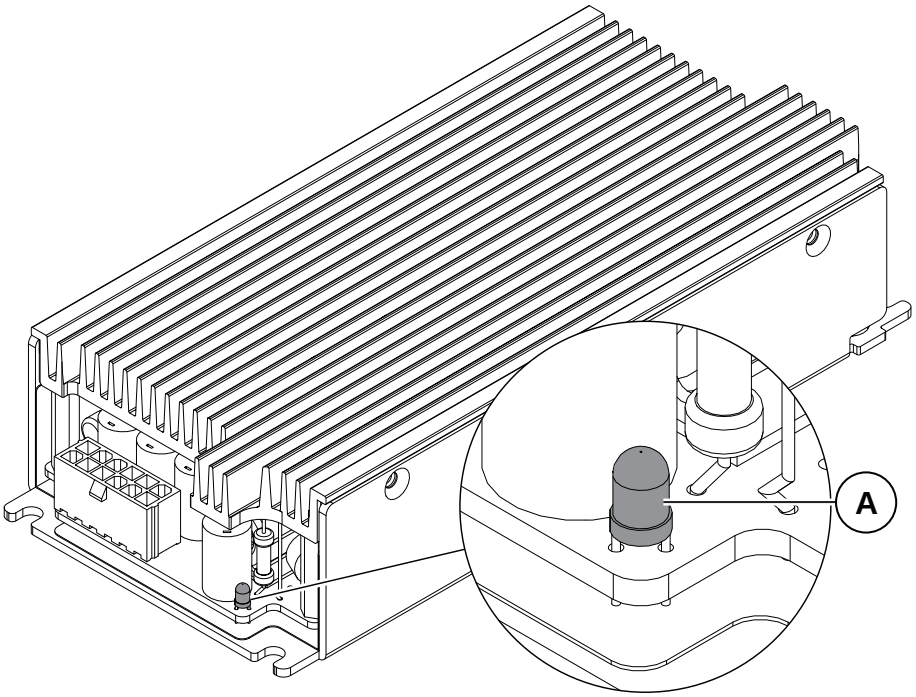
6.3.9 Troubleshooting the power supply

Location

The illustration below shows the location of the system power supply in the controller.

LEDs

The illustration below shows the LEDs on the power supply.



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A	DC OK LED

Description	Significance
DC OK LED	Green: All DC outputs are above the specified minimum levels. Off: One or more DC outputs are below the specified minimum level.

Required test equipment

Equipment needed for troubleshooting.

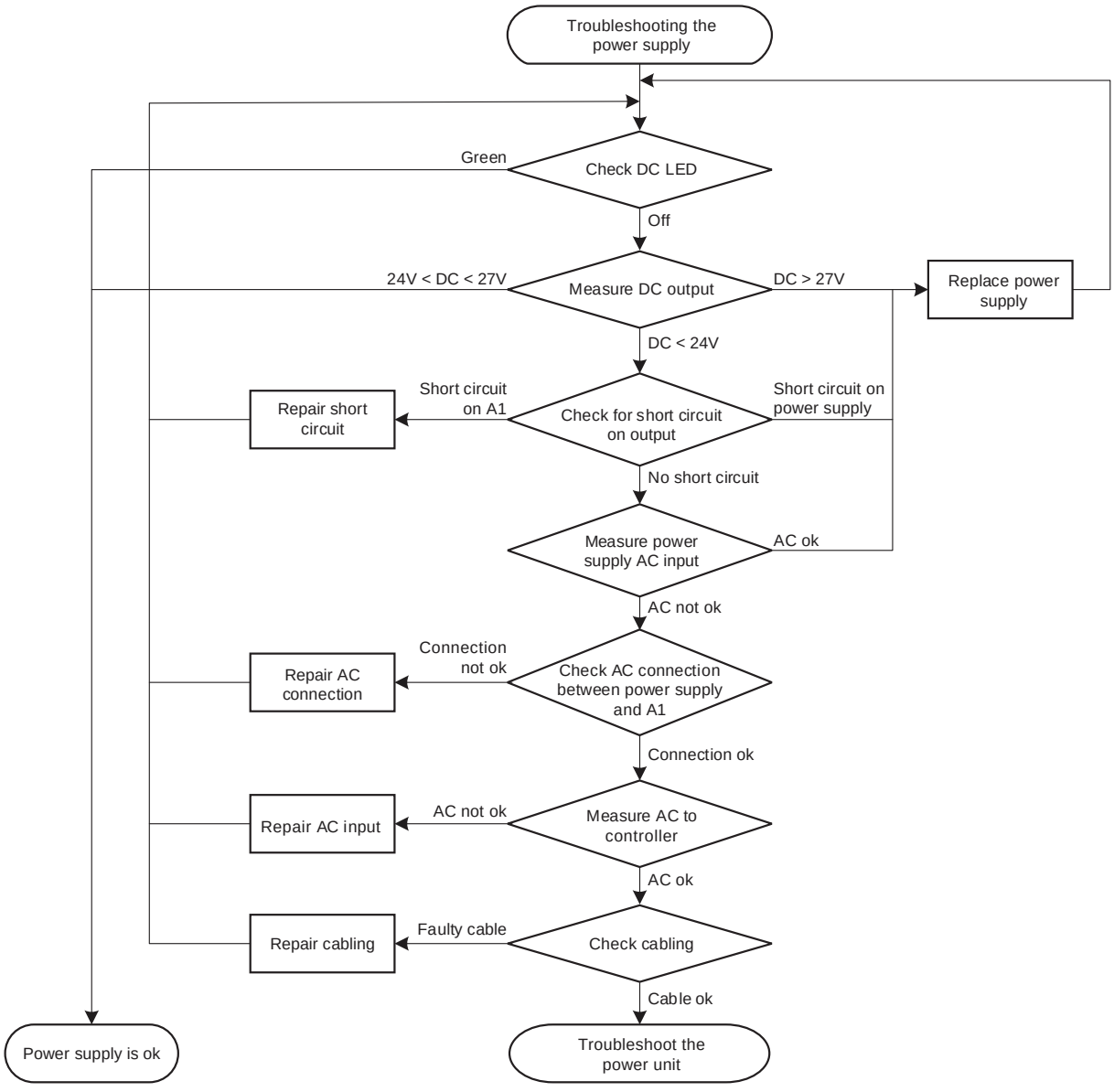
Equipment	Note
Multimeter	
Insulating gloves	
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*

Continues on next page

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



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6.3.9 Troubleshooting the power supply
Continued

Troubleshooting procedure

The troubleshooting table is supposed to be used as a detailed instruction together with the troubleshooting flowchart.

	Test	Note
1	Check the LED (labelled DC OK) on the power supply.	If the LED is: • Green: the power supply should be working properly. • Off: either the power supply is faulty or it does not have sufficient input voltage. Proceed with step *2*.
2	Measure the DC voltage while the output is connected to the robot signal exchange proxy or some other load.	Use a multimeter and insulating gloves. Measure at the DC output connector X2. The voltage should be: +24 V < U < +27 V. • If the voltage measured at the load falls below +24 V, voltage drops in the cables and connectors. • If the correct voltage is detected and the DC OK LED is green, the power supply is working properly. • If the correct voltage is detected and the DC OK LED is off, the power supply is regarded as faulty but does not have to be replaced instantly. • If the DC OK voltage is higher than 27 V, proceed with step *10*. • If the DC OK voltage is below 24 V, proceed with step *3*.
3	Power the controller OFF and measure the resistance.	Use a multimeter and insulating gloves.
4	Check for short circuit on DC output. Check both the DC output connector X2 on the power supply and the input connector X1 on the robot signal exchange proxy.	Measure the resistance between voltage pins and ground. The resistance should not be less than 10 ohm. **Note** Do not measure the resistance between pins. Dual pins are used for both power supply and ground. • If no short circuit is found, proceed with step *6*. • If a short circuit is found on the power supply, proceed with step *10*. • If a short circuit is found on the robot signal exchange proxy, get that unit working. Verify that the fault has been fixed and restart this guide if necessary.
5	Switch on power to the controller.	
6	Measure the input voltage on the power supply.	Use a multimeter and insulating gloves. Voltage should be: 172 V < U < 276 V for a 230 V system. • If the input voltage is correct, proceed with step *10*. • If no or the wrong input voltage is detected, proceed with step *7*.

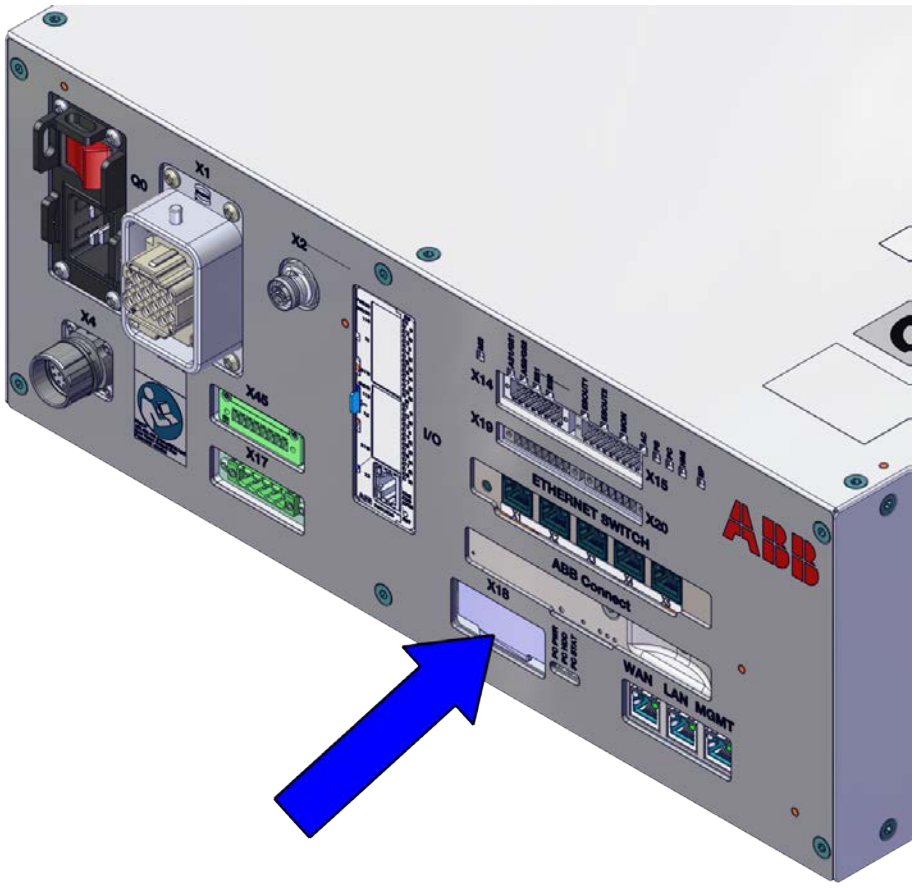
Continues on next page

	Test	Note
7	Make sure that the connection between the power supply and the power unit is ok.	• If the connection is OK, proceed with step *8*. • If the connection is faulty, repair the connection. Verify that the fault has been fixed and restart this guide if necessary.
8	Make sure that the supplied input voltage to the controller is correct.	• If the input voltage is correct, proceed with step *9*. • If the input voltage is faulty, correct it. Verify that the fault has been fixed and restart this guide if necessary.
9	Check the cabling.	Make sure that the cabling is correctly connected and not faulty. • If the cabling is OK, see *Troubleshooting the power unit on page 422*. Verify that the fault has been fixed and restart this guide if necessary. • If the cabling is found unconnected or faulty, connect/replace it. Verify that the fault has been fixed and restart this guide if necessary.
10	The power supply may be faulty, replace it and verify that the fault has been fixed.	See *Replacing the power supply on page 297*.

6.3.10 Troubleshooting the fieldbus adapter slave

Location

The illustration shows the location of the fieldbus adapter slave in the controller.



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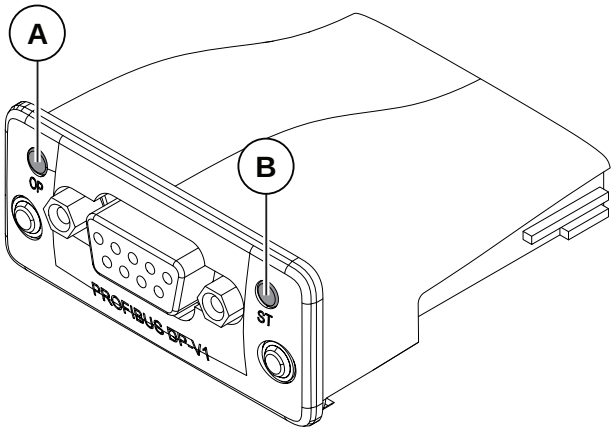
LEDs

The illustration below shows the indication LEDs on the fieldbus adapter slave.



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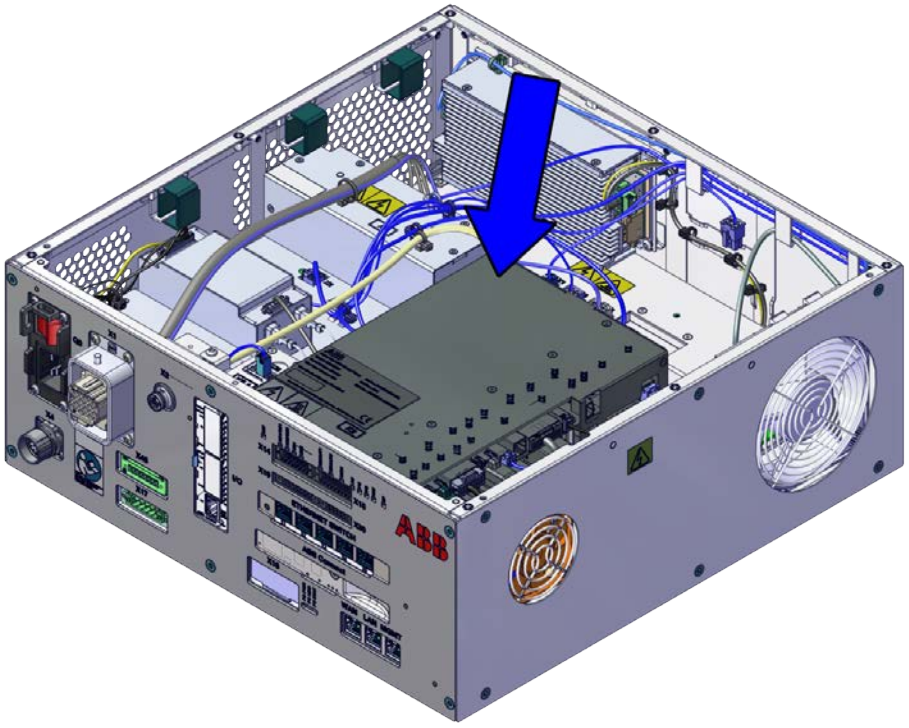
A	Power LED
B	Status LED

Description	Significance
Power LED	Fault indication: • No color: Input voltage is outside of the specified voltage limits. • Green, solid: Input voltage is within the specified limit.
Fieldbus adapter slave status LED (red/green)	Startup sequence: Red: 1 Red, solid: Loading bootloader. 2 Red, flashing: Power on self-test is ongoing, loading operating system. 3 Green, flashing: Loading RobotWare and waiting for communication. 4 Green, solid: System ready. If the LED does not turn steady green after 30-60 sec, the status indicator LED can be used to identify the following issues: Fault indication: • No color: Power to the fieldbus adapter slave is missing. • Red, solid: Internal error. • Red, flashing continuously: Firmware error or self-test failure. • Green, flashing continuously: Communication error to another module. Check the messages on the FlexPendant.

6.3.11 Troubleshooting the robot signal exchange proxy

Location

The illustration below shows the location of the robot signal exchange proxy in the controller.



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LEDs

The illustration below shows the LEDs on the robot signal exchange proxy:

	Description	Significance
MS	Status LED (bi-colored green/red) for the robot signal exchange proxy. **Note** The status LED light stays on for a long time after power to the controller is gone. This is due to the capacitors in the robot signal exchange proxy.	The status indicator LED can be used to identify the following status during start-up/power on: • Red, solid: Default when power is available. • Red, flashing: Power on self-test ongoing, operating system is loading. • Green, flashing: Application is loaded and waiting for communication. • Green, solid: Module is operational. If the LED does not turn steady green after 30-60 sec, the status LED can be used to identify the following issues: • No color: Power to the robot signal exchange proxy is missing. • Red, solid: Internal error. • Red, flashing: Firmware error or self-test failure. • Green, flashing: Communication error to another module.
AS1/GS1 & AS2/GS2	Automatic Stop/General Stop LEDs (green) AS1/GS1 : Automatic Stop/General Stop LED channel 1 AS2/GS2 : Automatic Stop/General Stop LED channel 2	Automatic Stop/General Stop LED can be used to identify the following status: • No color (not lit): Automatic Stop/General Stop input loop is open. • Green, solid: Automatic Stop/General Stop input loop is closed.
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: • No color (not lit): External emergency stop input loop is open. • Green, solid: External emergency stop input loop is closed.
ES-OUT1 & ES-OUT2	Emergency stop output LEDs (green) ES1 : Emergency stop output LED channel 1 ES2 : Emergency stop output LED channel 2	Emergency stop output LED can be used to identify the following status: • No color (not lit): Emergency stop output is in State 0 (0V) status. • Green, solid: Emergency stop output is in State 1 (24V) status.
MON	Motors_ON LED (white)	Motors_ON LED can be used to identify the following status: • No color: Motors_ON function is off. • White, solid: Motors_ON function is on. • White, flashing: safety loop is open, for example after an emergency stop.

Continues on next page

6.3.11 Troubleshooting the robot signal exchange proxy
Continued

	Description	Significance
AC	ACOK LED (green)	ACOK LED can be used to identify the following status: • No color: AC OK signal is de-active or logic power failure. • Green, solid: AC OK signal is active and logic power available.
PS	Internal power (24 V power supply) input LED (green)	Internal power input LED can be used to identify the following status: • No color: Internal power input voltage is not in normal range. • Green, solid: Internal power input voltage is in normal range.
PC	Main computer power output LED (green)	Main computer power output LED can be used to identify the following status: • No color: Main computer power output voltage is not in normal range. • Green, solid: Main computer power output voltage is in normal range.
HMI	FlexPendant power output LED (green)	FlexPendant power output LED can be used to identify the following status: • No color: FlexPendant power output voltage is not in normal range. • Green, solid: FlexPendant power output voltage is in normal range.
EP	External power input LED (green)	External power input LED can be used to identify the following status: • No color: External power input voltage is not in normal range. • Green, solid: External power input voltage is in normal range.

Required test equipment

Equipment needed for troubleshooting.

Equipment	Note
Multimeter	
Insulating gloves	
Circuit diagram - OmniCore C30 Type A, *Circuit diagram - OmniCore C30 Type A for CRB 15000*	*3HAC086302-010*, *3HAC089111-009*

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.

Continues on next page

Troubleshooting procedure

The troubleshooting table is supposed to be used as a detailed instruction together with the troubleshooting flowchart.

	Test	Action
1	Turn off power until all LEDs (except MS, which is solid red) are off. Then turn on power and wait 1 minute.	
2	Check the indicator LED MS.	If the LED_MS is: • Green, proceed with step *5*. • Flashing red/green, a firmware upgrade error has occurred. This is not supposed to happen during runtime mode, proceed with step *10*. • OFF, either the robot signal exchange proxy is faulty or it does not have sufficient input voltage. Proceed with step *3*.
3	Measure the input voltage to the robot signal exchange proxy. **Tip** For more details, see *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*.	Use a multimeter and insulating gloves. The input voltage should be 24 V. Make sure that connector X1 is connected properly on both ends. • If the input voltage is normal, proceed with step *5*.
4		• If there is a problem with the connection, repair the connection and start over.
5	Measure the 24 V DC outputs voltage.	Use a multimeter and insulating gloves. The output voltage should be 24 V. Make sure that connectors X2, X3, X4, X5, X17 and X19 are connected properly on both ends. • If the output voltage is normal, proceed with step *6*. • If the output voltage is abnormal, proceed with step *10*.
6	Check the indicator LEDs AS1, AS2, ES1, ES2.	The indicator LEDs are labelled AS1, AS2, ES1, ES2. If the LEDs LED_AS1, AS2, ES1, ES2 are: • On (solid green), the robot signal exchange proxy works well. • Off, either the robot signal exchange proxy is faulty or it does not have sufficient input voltage. Proceed with step *7*.
7	Check that the customer interface connectors are connected to X14 and X15. **Tip** For more details, see *Circuit diagram - OmniCore C30 Type A*, *Circuit diagram - OmniCore C30 Type A for CRB 15000*.	If the customer interface connectors are not properly connected to X14 and X15, the signals to and from the robot signal exchange proxy will be interpreted incorrectly. • If the connection is OK, proceed with step *8*. • If there is a problem with the connection, repair the connection and go to step *6*.

Continues on next page

6.3.11 Troubleshooting the robot signal exchange proxy

Continued

	Test	Action
8	Check external safety accessories.	Use a multimeter and insulating gloves. Measure the continuity in the connector. If there is resistance, troubleshoot the external equipment.
9	Measure the AC OK signal.	Use a multimeter and insulating gloves. The AC OK should be 0 V. Make sure that connector X10 is connected properly on both ends. • If the AC OK signal is 16 V, see *Troubleshooting the power unit on page 422*. • If the AC OK signal is 0 V, proceed with step *10*.
10	The robot signal exchange proxy may be faulty, replace it and verify that the fault has been fixed.	How to replace the unit is detailed in *Replacing the robot signal exchange proxy on page 220*.

7 Decommissioning

7.1 Introduction to decommissioning

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.

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 452*.

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*.

Transportation

Prepare the robot or parts before transport, this to avoid hazards.

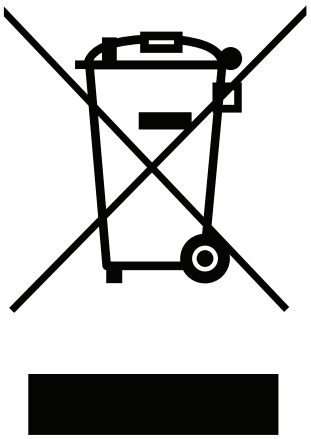
7.2 Environmental information

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).



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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.
Steel	Cabinet structure, plates, screws, etc.

Continues on next page

China RoHS symbol

The following symbol shows the information to hazardous substances and the environmental protection use period of OmniCore C30 Type A according to "Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products (SJ/T 11364-2014) ".

xx1900000804

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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8 Reference information

8.1 Introduction

General

This chapter includes general information, complementing the more specific information in the different procedures in the manual.

8.2 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	

8.4 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

8.6 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

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

Spare part level

ABB spare parts are categorized into three levels, L1, L2 and L3. 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.

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9.1 Controller parts

Note

Removed parts and spare parts must not be disassembled or opened.

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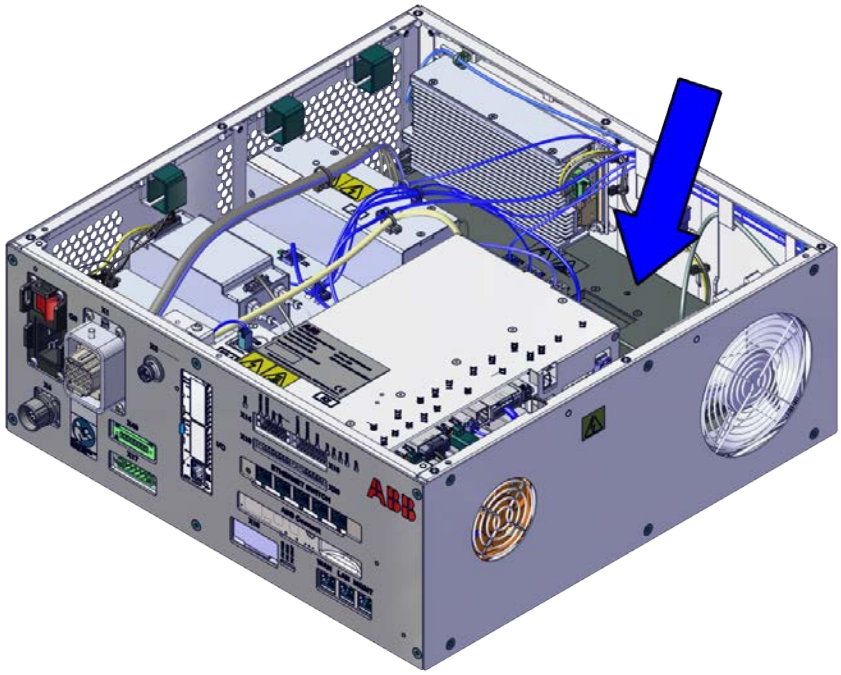
9.1.1 Controller system parts

Drive units



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	Spare part number	Description	Type	Spare part level
-	3HAC074966-001	Drive	DSQC3084	L1

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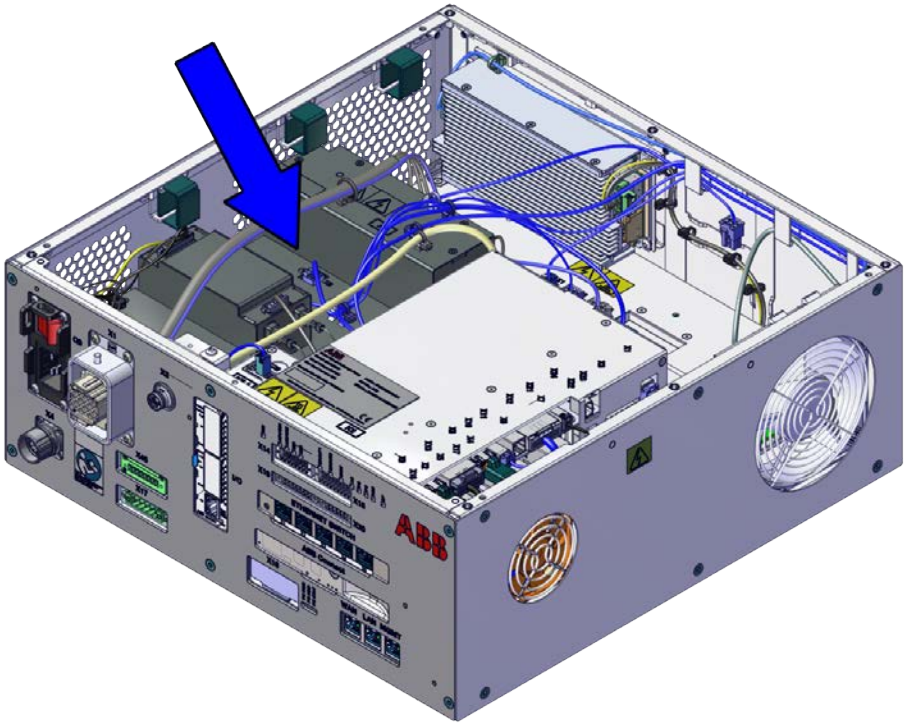
9.1.1 Controller system parts
Continued

Power units



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	Spare part number	Description	Type	Spare part level
A	3HAC084667-001	Power unit	DSQC3066 for OmniCore Type A	L1
B	3HAC072227-001	Power unit for CRB 15000 controller	DSQC3083 When used for CRB 15000-10/12Kg, bleeder box is needed.	L1

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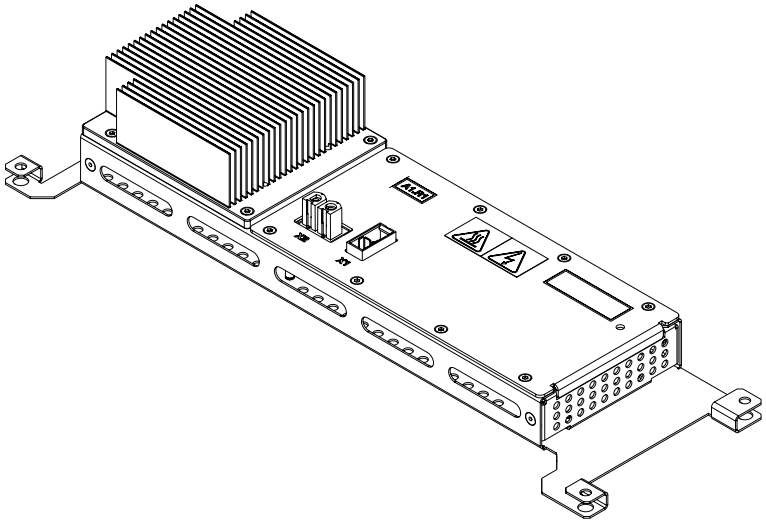
Bleeder box



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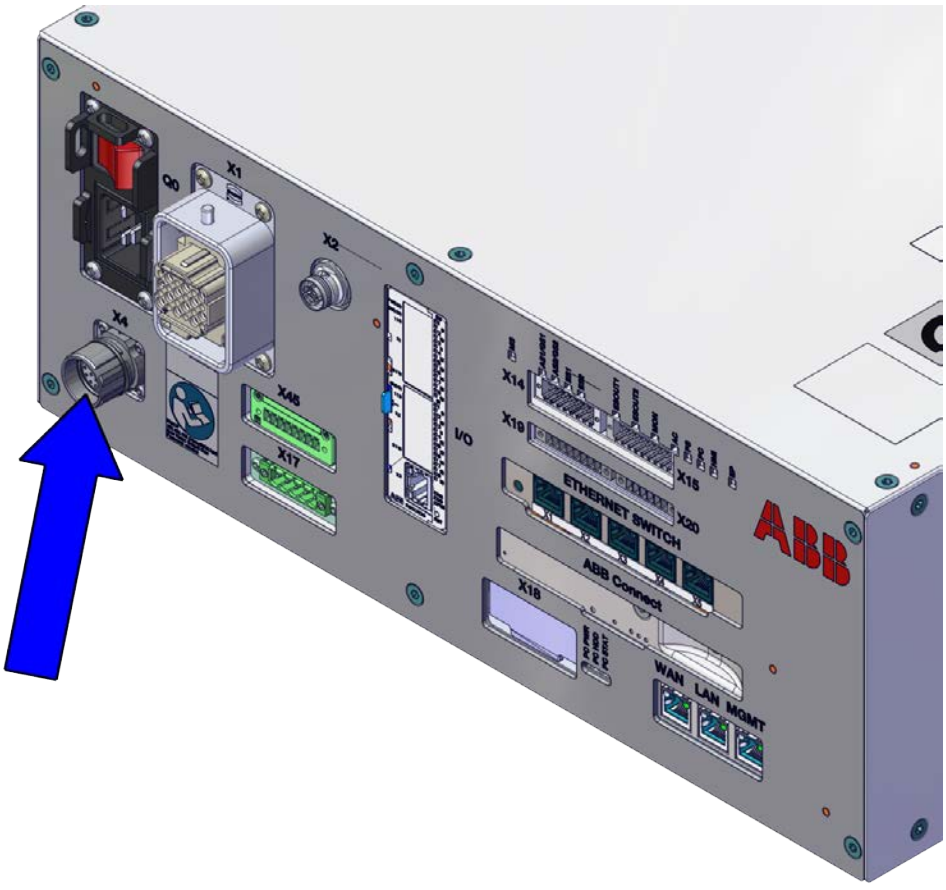
	Spare part number	Description	Type	Spare part level
A	3HAC084171-001	Bleeder box		L1

Harness TPU connection



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9.1.1 Controller system parts
Continued

	Spare part number	Description	Type	Spare part level
-	3HAC086188-001	Harness TPU connection		L1

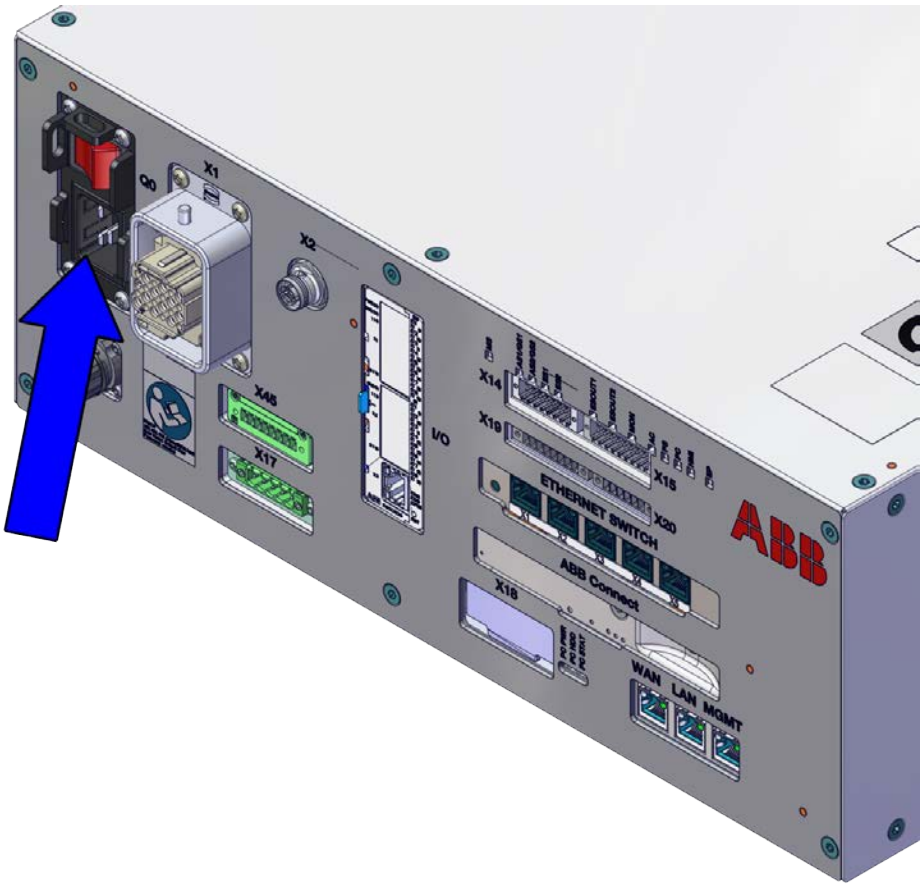
Harness motors power

xx2400000069

	Spare part number	Description	Type	Spare part level
A	3HAC085045-001	Harness Motors power LV 6-axis		L1
B	3HAC085059-001	Harness Motors power ULV	Only used for CRB 15000 controller.	L1

9.1.2 Mains connection parts

Mains power connection

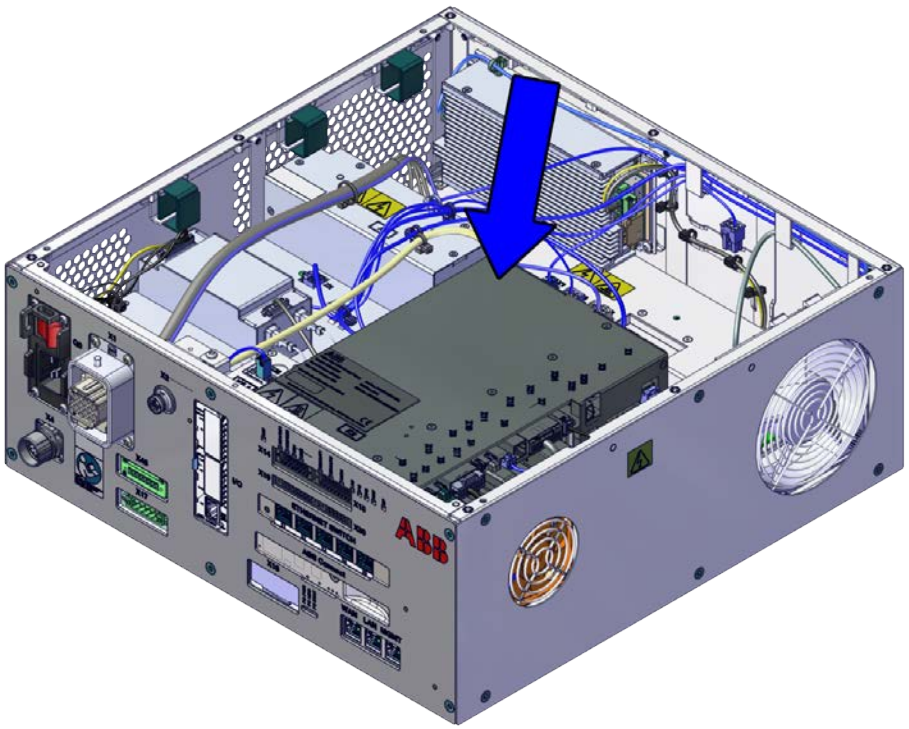


xx2400000071

	Spare part number	Description	Type	Spare part level
A	3HAC085035-001	Harness AC input with SW	Harness-Mains connection	L1
B	3HAC085566-001	Connector AC power inlet	Mating connector for Power inlet	L1
C	3HAC085053-001	Harness AC input with SW	Harness-Mains connection for CRB 15000 controller	L1

9.1.3 Logic parts

Robot signal exchange proxy



xx2400000046

	Spare part number	Description	Type	Spare part level
A	3HAC064662-001	Robot signal exchange proxy	DSQC3037	L1
B	3HAC079051-001	Customer interface mating connectors	Mating connector for robot signal exchange proxy.	L1
C	3HAC079124-001	Extra cable jumpers	Jumper cabels for robot signal exchange proxy.	L1

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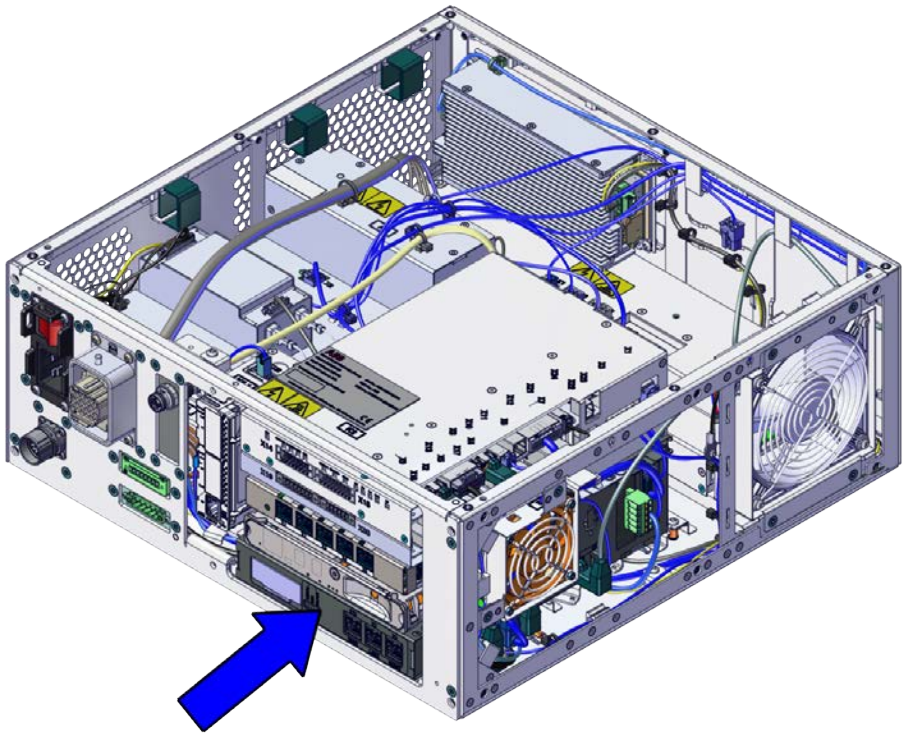
Main computer



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	Spare part number	Description	Type	Spare part level
A	3HAC063061-001	Main computer module assembly		L1

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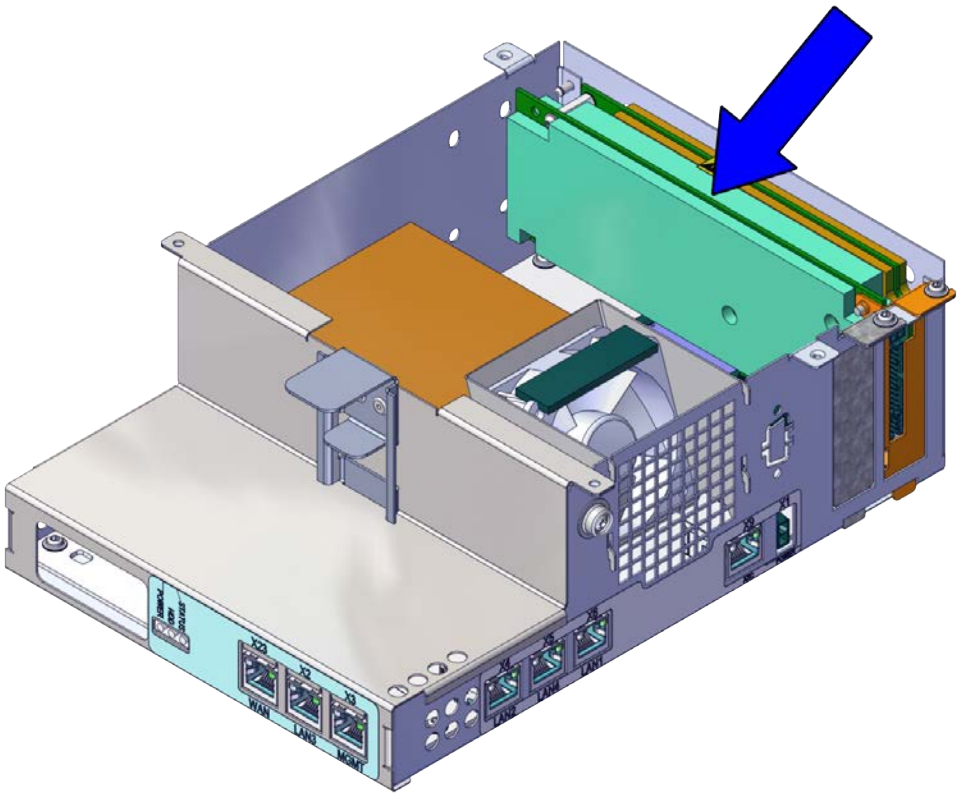
9.1.3 Logic parts
Continued

DeviceNet board



xx2400000030

	Spare part number	Description	Type	Spare part level
A	3HAC043383-001	DeviceNet Board (option)	DSQC1006	L1

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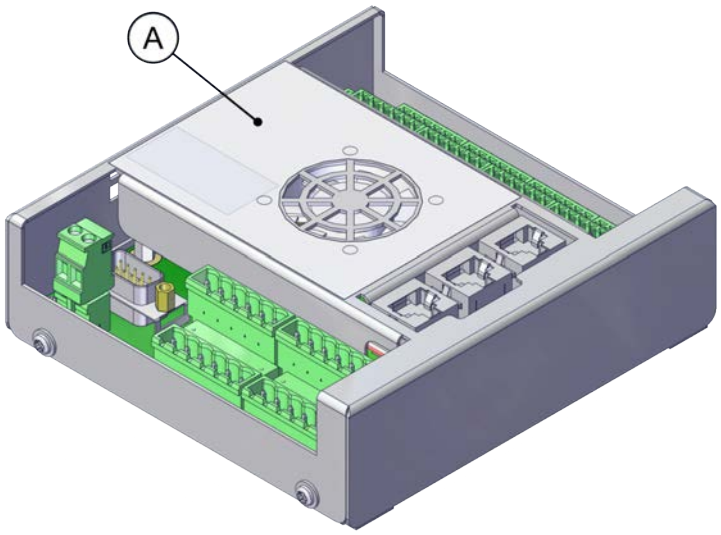
Connected Services gateway

xx2400000052

	Spare part number	Description	Type	Spare part level
A	3HAC060960-001	Connected Services-3G [3013-3] (baseline)	DSQC1039	L1
B	3HAC028459-001	Magnetic roof antenna, 3G (baseline)		L1
C	3HAC060962-001	Connected Services-WiFi [3013-2] (option)	DSQC1040	L1
D	3HAC059424-001	Magnetic roof antenna, WiFi (option)		L1
E	3HAC061701-001	Connected Services-Wired [3013-1] (option)	DSQC1041	L1
-	3HAC066742-001	Sim card		L2

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
-	3HAC069618-001	Harness 24V_CTM	Power cable of CTM	L1

Continues on next page

Ethernet switches

xx2400000049

	Spare part number	Description	Type	Spare part level
A	3HAC065126-001	Ethernet Extension unit slot cover (baseline)		L1
B	3HAC059187-001	Ethernet Extension switch [3014-1] (option)	DSQC1035	L1

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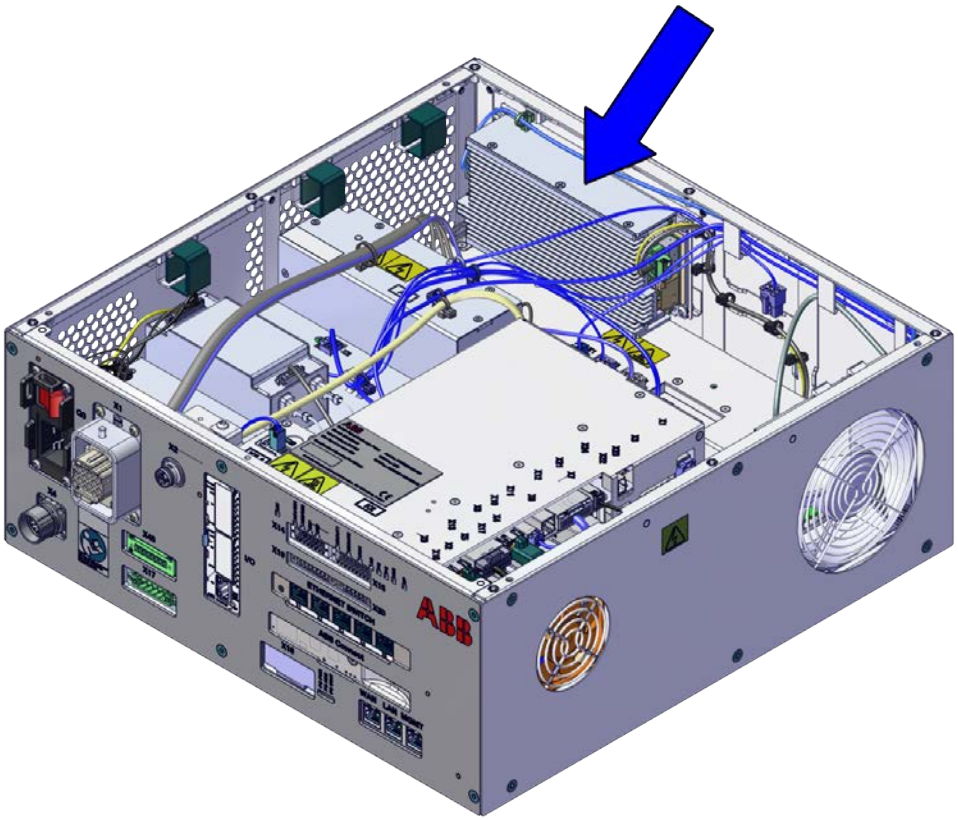
9.1.4 Application parts
Continued

Power supply device



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	Spare part number	Description	Type	Spare part level
A	3HAC071301-001	Power supply	DSQC3035	L1

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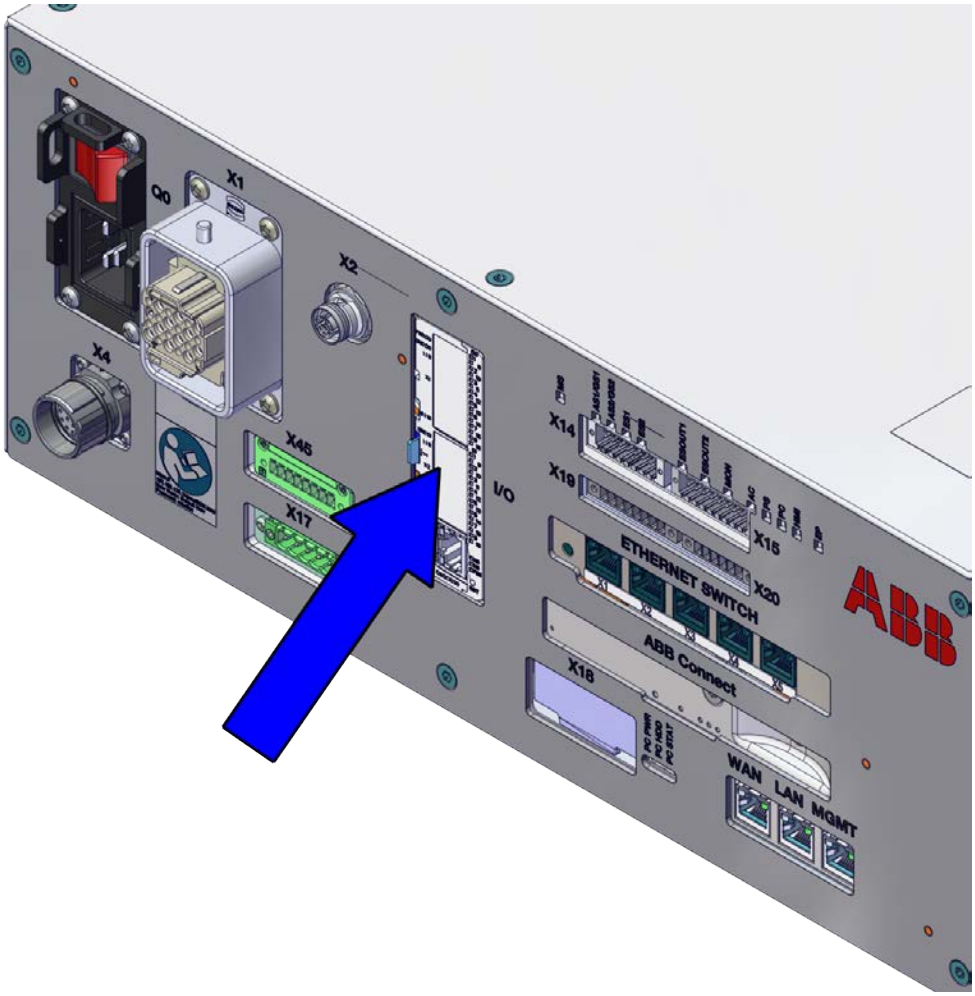
Scalable I/O devices



xx2400000026

	Spare part number	Description	Type	Spare part level
A	3HAC065147-001	DSQC1030 Digital slot cover (baseline)		L1
B	3HAC058663-001	Local I/O Digital base (option) [i]	DSQC1030	L1
C	3HAC060919-001	Connectors digital base/add on		L1
D	3HAC058664-001	Digital add-on [3033-2] (Add-on)	DSQC1031	L1
E	3HAC058665-001	Analog add-on [3034-2] (Add-on)	DSQC1032	L1
-	3HAC060925-001	Connectors I/O Analog (Add-on)		L1
F	3HAC058666-001	Relay add-on [3035-2] (Add-on)	DSQC1033	L1
-	3HAC060926-001	Connectors I/O Relay (Add-on)		L1

[i] Select 3HAC064092-001 when Local I/O Digital base is selected.

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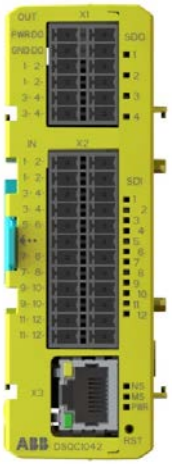
9.1.4 Application parts
Continued

Safety digital base device



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	Spare part number	Description	Type	Spare part level
-	3HAC062908-001	DSQC1042 Extended safety	DSQC1042	L1
-	3HAC069538-001	Connectors Safety I/O		L1

9.1.5 Cabinet parts

Fans

xx2400000041

	Spare part number	Description	Type	Spare part level
A	3HAC077006-001	Small size silent fan		L1
B	3HAC077005-001	Standard size silent fan		L1

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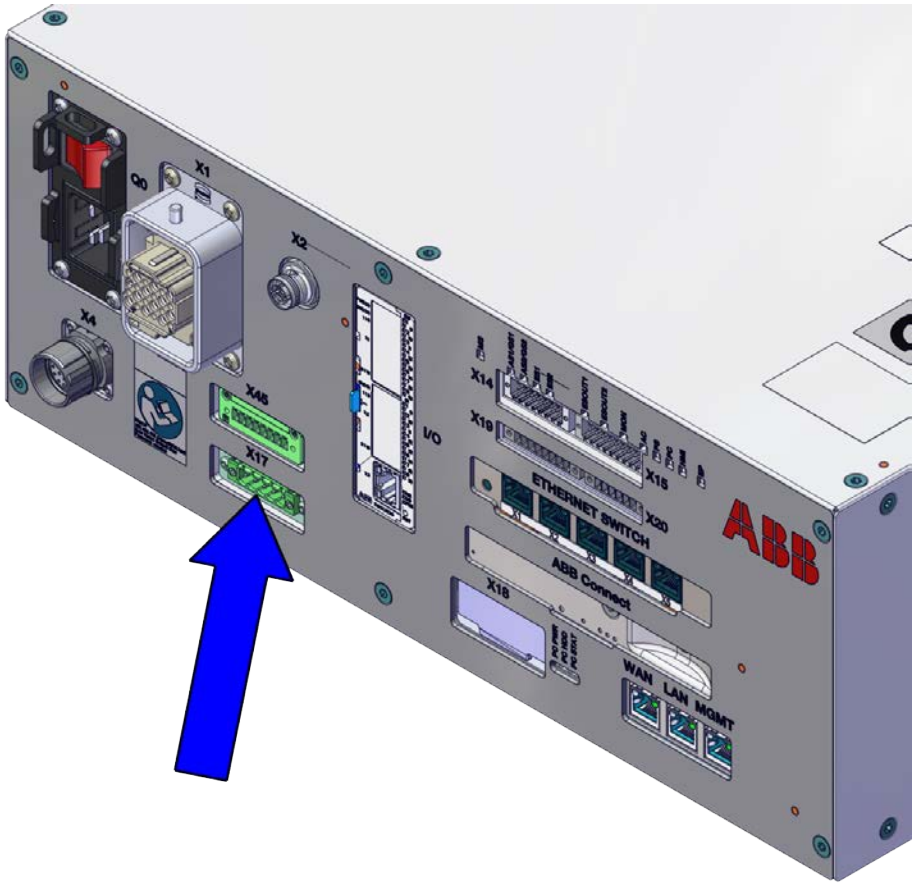
9.1.5 Cabinet parts
Continued

Process, fieldbus and I/O connectors

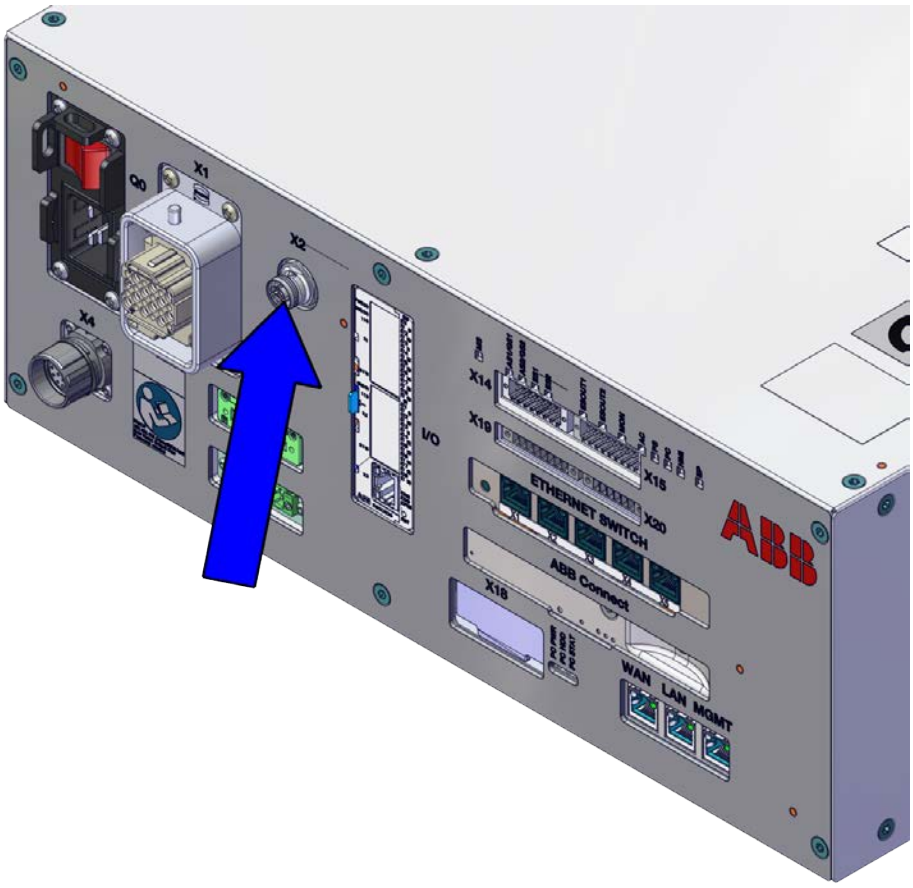


xx2400000077

	Spare part number	Description	Type	Spare part level
A	3HAC063601-001	Harness DeviceNet/Harness 24V ext. cover plate (baseline)		L1
B	3HAC062150-001	Harness DeviceNet connection (option)	DSQC1004	L1
C	3HAC064901-001	Connector assembly Single-row female (option)	Mating CONN for IP20 DeviceNet connector	L1

9.1.6 Miscellaneous parts

Customer flange interface (CFI)



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	Spare part number	Description	Type	Spare part level
A	3HAC085057-001	Harness CFI connection	Only used for CRB 15000 OmniCore Type A controller.	L1
-	3HAC085058-001	Harness CFI mating connection	Only used for CRB 15000 controller.	L1

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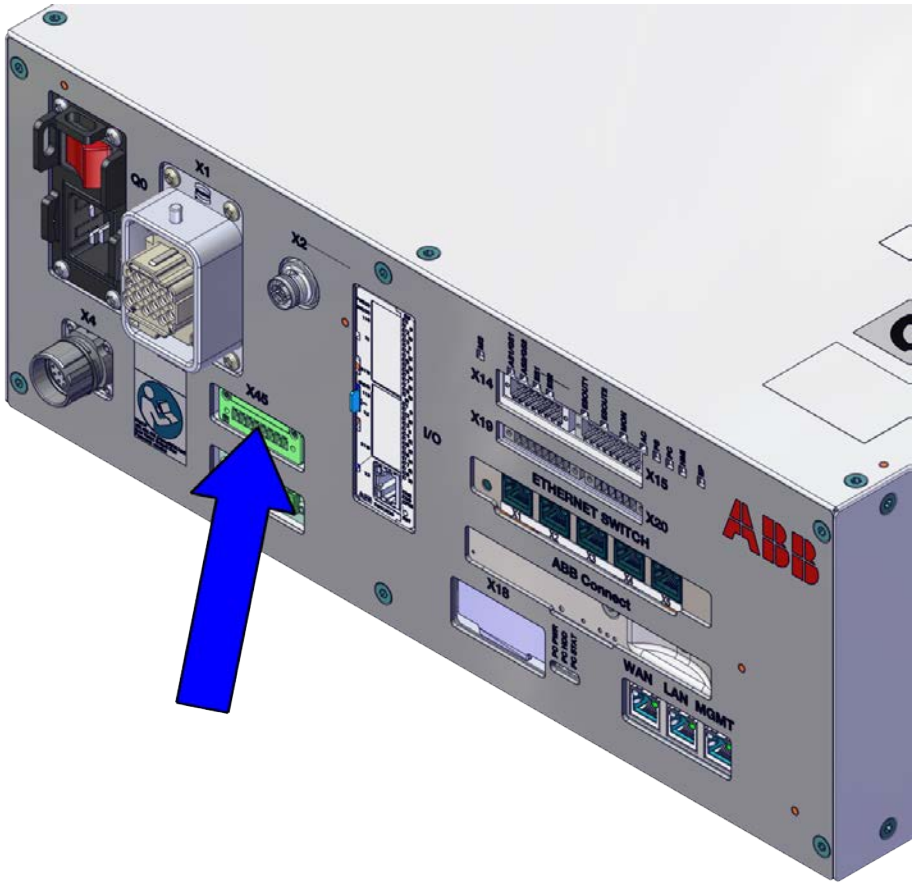
9.1.6 Miscellaneous parts
Continued

IP20 Power outlet connectors



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	Spare part number	Description	Type	Spare part level
A	3HAC063601-001	Harness DeviceNet/Harness 24V ext. cover plate (baseline)		L1
B	3HAC087401-001	Harness 24V_Process output (option)		L1
C	3HAC064743-001	Connector Single-row female (option)		L1

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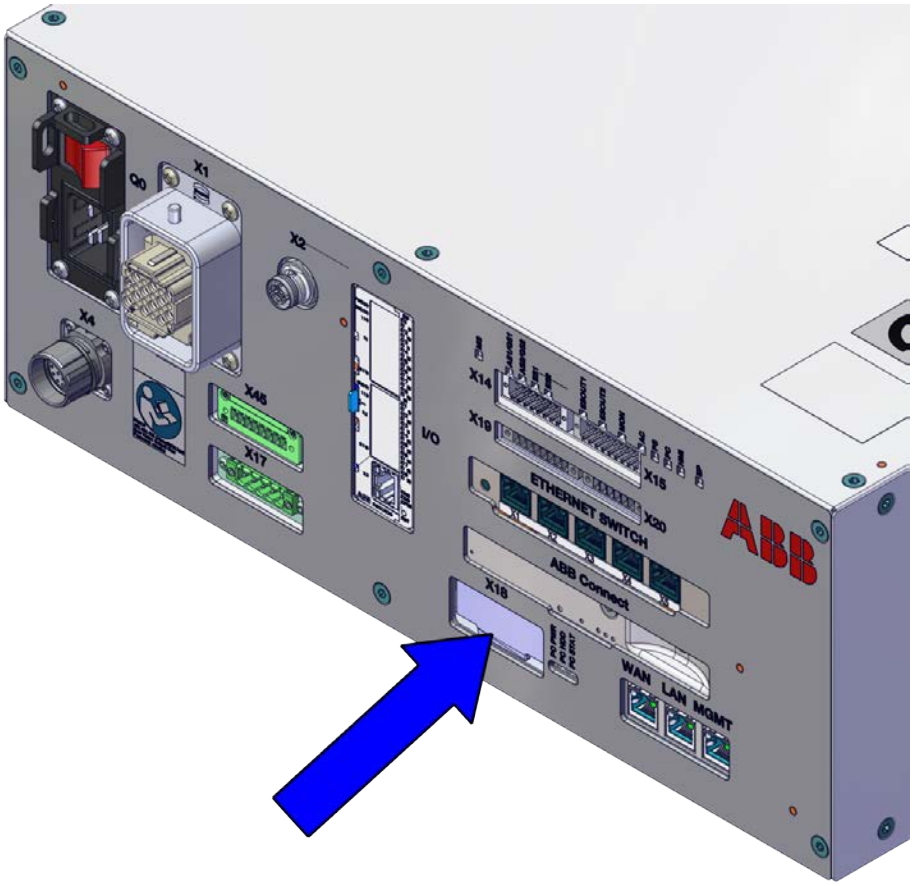
Fieldbus adapter slaves



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	Spare part number	Description	Type	Spare part level
A	3HAC062390-001	Fieldbus slot cover (baseline)		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	Integrated Vision camera medium res	DSQC1063	L1

Continues on next page

9.1.6 Miscellaneous parts
Continued

Spare part number	Description	Type	Spare part level
3HAC075207-001	Integrated 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

9.1.7 Cables

Cables

Cables on the frame

	Spare part number	Description	Type	Spare part level
-	3HAC061075-001	Harness Ethernet with Mini-IO	Harness A2.X4/K4.X7 - X110	L1
-	3HAC085036-001	Harness AC_OK signal	Harness K2.X10 - A1.X13	L1
-	3HAC064019-001	Harness Temp Sensor	Harness K2.X21 - TempSensor	L1
-	3HAC085040-001	Harness 24_SYS	Harness K2.X3 - K3.X1, K5.1.X4/ K3.1.X4, K7.X1	L1
-	3HAC085039-001	Harness AC out	Harness A1.X7 - T5.X1	L1
-	3HAC085278-001	Harness 24_Cooling	Harness K2.X17 - Cooling	L1
-	3HAC085046-001	Harness 24_Trunk	Harness K2.X1 - A1.X6	L1
-	3HAC064092-001	Harness Ethernet with Mini-IO	Harness K5.1.X5/K3.1.X5 - X110	L1
-	3HAC087427-001	Harness signal assembly	A1.X2 - T4.X17 A1.X11 - T4.X13(Contains Harness CTRL_FB and Harness 24_BRAKE)	L1
-	3HAC085054-001	Harness 24V_Trunk extension	Harness A1.X6 - X107	L1

Cables on the drive unit

	Spare part number	Description	Type	Spare part level
-	3HAC085041-001	Harness DC-bus	Harness A1.X4 - T4.X5	L1
-	3HAC085042-001	Harness 24_SYS_DRV	Harness K2.X4 - T4.X1	L1
-	3HAC085043-001	Harness EtherCAT	Harness A2.X9 - T4.X3	L1

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9.1.7 Cables
Continued

Cable on the power unit

	Spare part number	Description	Type	Spare part level
-	3HAC073524-001	Harness 24_Trunk extension	Harness X107 - A1.X6 Only used for CRB 15000 controller.	L1
-	3HAC085060-001	Harness DC BUS Jump cable	Harness A1.X4-A1.R1.X1 Only used for CRB 15000-10/12 controller.	L1

Cables on the Connected Services unit

	Spare part number	Description	Type	Spare part level
-	3HAC061136-001	Harness Ethernet with Mini-IO	Harness A2.X5 - K7.X2	L1

Cables on the Ethernet Extension unit

C19 mains cable with locking system

	Spare part number	Description	Type	Spare part level
-	3HAC086652-001	C19 mains cable with locking system, EU		L1
-	3HAC086652-002	C19 mains cable with locking system, UK		L1
-	3HAC086652-003	C19 mains cable with locking system, US		L1
-	3HAC086652-004	C19 mains cable with locking system, JP		L1
-	3HAC086652-005	C19 mains cable with locking system, CN		L1
-	3HAC086652-006	C19 mains cable with locking system, AU		L1
-	3HAC086652-007	C19 mains cable with locking system, SE		L1

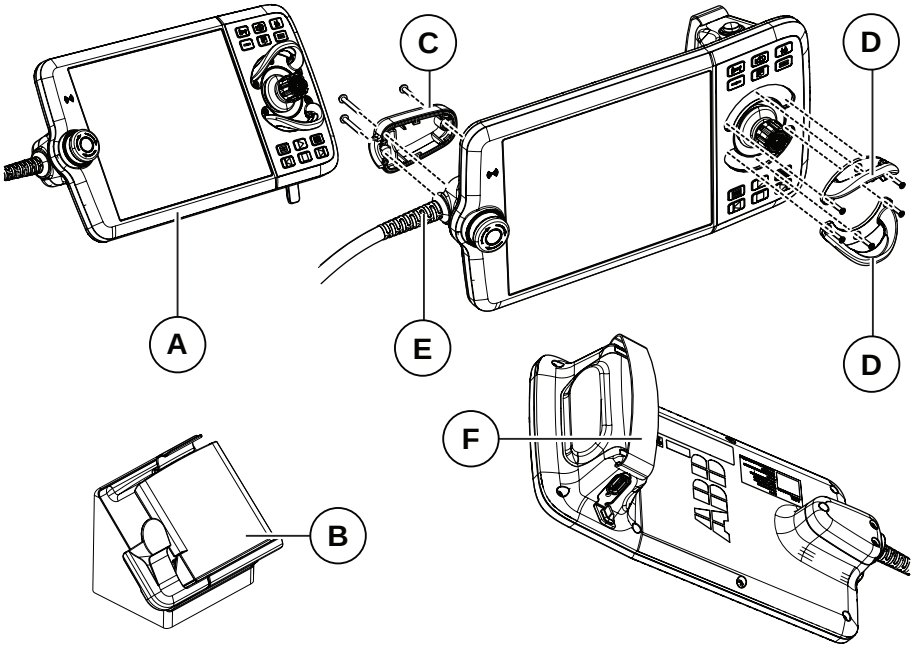
Cables on the robot signal exchange proxy

	Spare part number	Description	Type	Spare part level
-	3HAC064091-001	Harness 24_PC	Harness K2.X2 - K4.X8, A2.X1	L1
-	3HAC059273-001	Harness dual channel safety	Harness K2.X12 - K3.X6, K3.X7	L1

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	3HAC064211-001	FlexPendant	DSQC3060	L1
B	3HAC064927-001	TPU Holder asm		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 1010, 1200, 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

Control cable, CRB 15000

Power cable length	Article number	Spare part level
Control cable hybrid power 3 m	3HAC073212-001	L1
Control cable hybrid power 7 m	3HAC073212-002	L1
Control cable hybrid power 15 m	3HAC073212-003	L1
Drag chain cable 15 m	3HAC073212-003	L1

Signal cables, IRB 1010, 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 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, 22 m	3HAC061420-003	L1
IRB 1600 CPCS Floor Cable, 30 m	3HAC061420-004	L1

CP/CS cables, IRB 1010

CP/CS cable length	Article number	Spare part level
3 m	3HAC067449-001	L1
7 m	3HAC067449-002	L1

9.3.3 Customer cables - Ethernet floor cables

Ethernet floor cables, IRB 1010 (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

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