

ROBOTICS

Operating manual

Robot Control Mate



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Operating manual
Robot Control Mate

RobotWare 7.5

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Overview of this manual

About this manual

This manual contains basic instructions for OmniCore based robot systems using the Robot Control Mate. This manual describes basic aspects for moving, position modification, controlling and calibration.

Usage

This manual should be used during operation.

Who should read this manual?

This manual is intended for:

- operators
- product technicians
- service technicians
- robot programmers

Prerequisites

The reader should:

- Be trained in robot operation.
- Have basic knowledge of RAPID programming language.
- Be familiar with RobotStudio.

References

Reference	Document ID
<i>Operating manual - RobotStudio</i>	3HAC032104-001
<i>Product manual - OmniCore C30</i>	3HAC060860-001
<i>Product manual - OmniCore C90XT</i>	3HAC073706-001
<i>Product manual - OmniCore E10</i>	3HAC079399-001
<i>Product specification - OmniCore C line</i>	3HAC065034-001
<i>Product specification - OmniCore E line</i>	3HAC079823-001
<i>Operating manual - OmniCore</i>	3HAC065036-001
<i>Operating manual - Integrator's guide OmniCore</i>	3HAC065037-001
<i>Technical reference manual - System parameters</i>	3HAC065041-001

Revisions

Revision	Description
A	Released with RobotWare 7.0.
B	The following updates are made in this revision: <ul style="list-style-type: none"> • Added a new installation method. • Updated the user interface figures of Jog tab page and Calibrate tab page. • Updated the calibration step.

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Revision	Description
C	The following updates are made in this revision: <ul style="list-style-type: none"> Updated the installation, uninstallation and upgrade procedures.
D	The following updates are made in this revision: <ul style="list-style-type: none"> Updated safety related information. Updated the installation and upgrade method. Added new functions to Jog and Control tab pages. Added resolver data transfer function between robot memory and controller to Calibrate group. Updated the procedure of working with the PC Jogging add-in. Added warning before starting revolution counter update process.
E	Released with RobotWare 7.0.2. The following updates are made in this revision: <ul style="list-style-type: none"> Renamed the product as Robot Control Mate from PC Jogging. Restructured the manual to provide step-by-step procedures on controlling and jogging functions. Added a note reminding users to disconnect the FlexPendant from the FlexPendant UI. Updated the installation, uninstallation and upgrade procedures.
F	The following updates are made in this revision: <ul style="list-style-type: none"> Removed the limitation requiring only one task exists. Added the step of task selection when program executions are performed in multitask scenarios.
G	Released with RobotWare 7.1. The following updates are made in this revision: <ul style="list-style-type: none"> Added steps to activate operator safety function AllowMoveRobAuto for controllers in RobotWare 7.1. Updated steps for disconnecting the FlexPendant.
H	Released with RobotWare 7.2. The following updates are made in this revision: <ul style="list-style-type: none"> Wording change from "jog" to "auto-jog". Updated supported RobotWare and RobotStudio versions, and related descriptions. Supported IRB 1100, IRB 1300 and IRB 14050. Added IRB 14050-specific functions, such as LeadThrough and auto-jogging in arm mode, are added. Added interface to use part of Authenticate functionalities in Robot Control Mate. Added steps to edit user grants to make sure control and auto-jogging functions are available to use. Updated the safety related information.
J	Released with RobotWare 7.5. The following updates are made in this revision: <ul style="list-style-type: none"> Supported web-based Robot Control Mate. Supported CRB 1100, IRB 920 and IRB 1200. Wording change from "auto-jog" to "move". Modified the UAS-related descriptions for the Robot Control Mate add-in in RobotStudio.

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/SpotPack, 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.
 - 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.
- Examples of how to use the application.

Continues on next page

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.

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.

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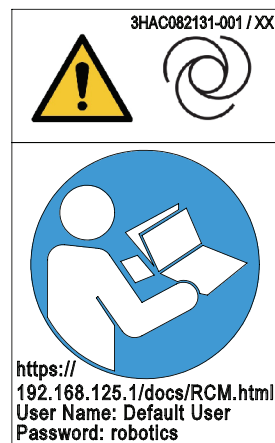
1 Introduction

About the Robot Control Mate

Overview

The Robot Control Mate provides basic instructions for OmniCore-based robot systems. In cases where a FlexPendant is unavailable, the Robot Control Mate together with RobotStudio features allow users to control the robot from a connected PC.

Controllers supporting the Robot Control Mate (option 3065-1 Robot Control Mate) are attached with a safety warning label. This label indicates that the controller is delivered and can start in automatic mode, and use Robot Control Mate to control the robot in scenarios without a FlexPendant.



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Robot Control Mate works in two ways, RobotStudio add-in and web-based HMI. Key functions provided in two ways are the same.

Key functions

- **Moving**
With combined selection of the motion mode and coordinate system, the robot can be moved to a specific position.
- **Position modification**
You can define a desired target point in the RAPID instruction and use the target point to modify the robot position.
- **Controlling**
It allows you to make the motors on and off. It also displays the program control buttons.
- **Calibration**
It allows you to update the revolution counter of one or all axes for the robot, as well as memory data transfer between robot and controller.
- **Status display**

Continues on next page

1 Introduction

Continued

You can have a quick view on the controller status, such as operating mode, speed, motor state and program execution state.

Prerequisites

To work with Robot Control Mate, the followings are required.

Item	Requirement	Required by...	
		Robot Control Mate	Robot Control Mate Web
Controller	OmniCore controller with RobotWare 7.5 or later	X	X
RobotStudio	RobotStudio 2021	X	X
PC	<ul style="list-style-type: none">OS: Windows 10, 64-bitCPU: 2GHz or faster processor, more cores recommendedRAM: 4GB at minimumResolution: 1024 x 768 PixelsAn account with administrator's privileges	X	X
Browser	Google Chrome is recommended.		X



Note

The latest version of Robot Control Mate does not compatible with RobotWare and RobotStudio versions earlier than the specified ones. Always update RobotWare and RobotStudio to the required versions to use the latest Robot Control Mate.

Limitation

The Robot Control Mate,

- Supports IRB 910INV, IRB 920, IRB 1100, IRB 1200, IRB 1300, IRB 14050 and CRB 1100.
- Supports to enable of the lead-through function for IRB 14050 only.
- Can only be used in automatic mode.

Safety related

The OmniCore controller provides safety functions to ensure the safe operation with robots. Robot Control Mate is allowed to work in automatic mode only with all safety means in place.

During work with Robot Control Mate, make sure no obstacle blocking operators' view on robot movement. Operators should continuously observe and pay attention to robot movement.



Note

Make sure to read through safety instructions before starting work.

Continues on next page



Note

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

The integrator is responsible for the safety of the final application.

Using an emergency stop switch

An emergency stop switch must be connected to the external emergency stop input interface to make sure the emergency stop function is enabled. The emergency stop switch must be positioned in easily accessible places so that the robot can be stopped quickly.

For details about how to connect an external emergency stop switch, see the product manual of the controller.



Note

ABB provides only the emergency stop function. Users have to prepare the emergency stop switch by their own.

Leaving enabling device connection open

The enabling device connection must be left open if there is no teach pendant connected to the controller. Then, the robot can only work in automatic mode.

For details about how to configure the enabling device connection, see the product manual of the controller.

Activating a safety guard device

A safety guard device (such as a safety fence) must be active in automatic mode. When the system is powered on, entering the robot working area is not allowed. A safety fence is recommended. In case the fence is opened, the automatic stop is enabled and the robot can be stopped.

For details about how to connect an automatic stop, see the product manual of the controller.

Using FlexPendant reducing risks

The FlexPendant is always the optimum solution to reduce risks in some specific applications. Before using Robot Control Mate, working environment and applications in use must be fully assessed. The integrator is responsible to make sure the environment and application are applicable to use Robot Control Mate in automatic mode. If any potential risk exists, use FlexPendant in manual mode to reduce risks.

Body protection

- Sensitive body parts, such as the eyes and the larynx, must be protected by personal protective equipment (PPE).
- Operators working with the Robot Control Mate must be trained and have the required knowledge.

Continues on next page

Continued

Cybersecurity

Robot Control Mate functions work based on the connection to the OmniCore controllers and communication via a network interface. Security aspects must always be concerned. For more details about the OmniCore Cybersecurity, see *Operating manual - Integrator's guide OmniCore*.

2 Getting started

2.1 Getting started with the Robot Control Mate add-in in RobotStudio

Preparation

Before using the Robot Control Mate, make sure:

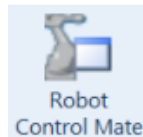
- 1 RobotStudio has been downloaded, installed and activated on the PC.
Download RobotStudio from <http://new.abb.com/products/robotics/robotstudio/downloads>. For more information about how to install and run the RobotStudio, see *Operating manual - RobotStudio*.
- 2 The PC is connected to the controller via the MGMT port (management port) and that the controller is powered on.
For more information about the PC connection to the controller, see section *Connecting a PC to the controller* in *Operating manual - RobotStudio*.

Installing the Robot Control Mate add-in

Use the following procedure to install the Robot Control Mate:

- 1 Open RobotStudio.
- 2 In the **Add-Ins** tab page, click **RobotApps** in the **Community** group.
- 3 In the displayed **RobotApps** window, enter **Robot Control Mate** in the **Search** text box.

The **Robot Control Mate** icon is displayed.



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- 4 Click the icon and then click **Add** on the right pane.
- 5 Click **Accept** in the displayed disclaimer window.
The package will be downloaded and installed automatically. The installed package can be observed in the **RobotStudio Add-Ins** navigation tree in the left pane of the window.

- 6 Close and reopen RobotStudio.

The **Robot Control Mate** icon is displayed in the **Controller** ribbon tab.

Starting the Robot Control Mate add-in

Use this procedure to open the Robot Control Mate:

- 1 Open RobotStudio.
- 2 In the **Controller** ribbon tab, click **Robot Control Mate** in the **Robot Tools** group.

Continues on next page

2 Getting started

2.1 Getting started with the Robot Control Mate add-in in RobotStudio

Continued

The **Robot Control Mate** ribbon tab is displayed.



Note

To close the **Robot Control Mate** tab, click **Close**.

3 Start working with the Robot Control Mate after connecting to a controller.



Note

If there is no controller is connected, **Unknown** will be displayed in the **Controller Status** group, and the control and move functions are unavailable to use.

If it is a virtual controller connected, you have to open a new RobotStudio program, add the virtual controller by clicking **Add Controller** from the **Controller** tab and then log in using the Default User to activate the Robot Control Mate functions.

Uninstalling the Robot Control Mate add-in

Use the following procedure to uninstall the Robot Control Mate.

- 1 Open RobotStudio and click the **Add-Ins** tab.
- 2 In the **Add-Ins** window on the left pane, right-click the **Robot Control Mate** package under the **Installed Packages** navigation tree.
- 3 Choose **Uninstall Package** from the shortcut menu.
- 4 Click **Yes** to proceed.

The uninstallation procedure starts automatically.

- 5 Close and reopen RobotStudio.

The **Robot Control Mate** is removed from the navigation tree on the left pane.

Upgrading the Robot Control Mate add-in

If a new version of the Robot Control Mate is available, uninstall the earlier versions as instructed in [Uninstalling the Robot Control Mate add-in on page 18](#) and then reinstall as instructed in [Installing the Robot Control Mate add-in on page 17](#).



Note

If RobotStudio is in a version earlier than 2021, upgrade RobotStudio to the latest version first and then install the Robot Control Mate in **RobotApps** as instructed in [Installing the Robot Control Mate add-in on page 17](#).

2.2 Getting started with the web-based Robot Control Mate

Preparation

Before working with the Robot Control Mate Web, make sure the PC opening the Robot Control Mate Web has connected to the required controller via the MGMT port (management port) and works in the same local subnet of the controller.

Installing the Robot Control Mate Web

Generally, Robot Control Mate Web is integrated in the controller system at delivery. It is also available to be downloaded from RobotApps in RobotStudio and then installed to the controller. If you need to newly add it to an existing controller system or requires an update, follow the following procedure to install:

- 1 Open RobotStudio.
- 2 In the **Add-Ins** tab page, click **RobotApps** in the **Community** group.
- 3 In the displayed **RobotApps** window, enter **Robot Control Mate Web** in the **Search** text box.

The **Robot Control Mate Web** icon is displayed.



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- 4 Click the icon and then click **Add** on the right pane.
The package is automatically installed and listed in the **RobotWare Add-Ins** navigation tree in the left pane of the window.
- 5 In the **Controller** tab page, choose **Installation Manager 7** from the **Installation Manager** list in the **Configuration** group.
- 6 In the **Installation Manager** window, connect to a real controller or select/create a virtual controller.
- 7 Follow the instructions in the installation wizard and add the Robot Control Mate Web (3065-1 Robot Control Mate) to the controller.

The Robot Control Mate Web is displayed in the controller overview if it is successfully added to the controller.

Logging in the Robot Control Mate Web

Use the following procedure to log in the Robot Control Mate Web:

- 1 Start the browser.
Google Chrome is recommended.
- 2 Enter the IP address of the connected controller in the address bar.
 - If a virtual controller is connected, enter **https://127.0.0.1:80/docs/RCM.html**.
 - If a real controller is connected, enter **https://192.168.125.1/docs/RCM.html**.

Continues on next page

2 Getting started

2.2 Getting started with the web-based Robot Control Mate

Continued



Tip

You may experience a certificate failure after entering the IP address, see [What should I do if I experience a certificate failure when opening Robot Control Mate Web? on page 43](#) for solution.

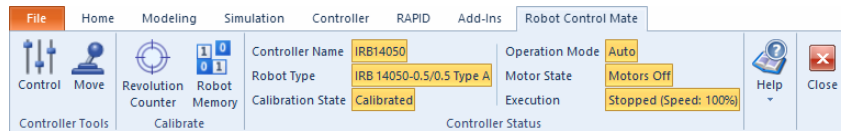
- 3 In the displayed window, enter the user name and password.

You can log in using user account but make sure the account has the access permission to the connected controller. You can also enter as the Default User.

3 Working with the Robot Control Mate add-in in RobotStudio

3.1 Overview

The user interface of the Robot Control Mate add-in



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Group	Description
Controller Tools	Provides controlling and moving functions, such as motor status switching, program execution and robot movement.
Calibrate	Provides calibration functions to update revolution counters and to transfer robot memory between robot and controller.
Controller Status	Displays the basic information of the controller and robot.
Help	Displays the help documentation.
Close	Closes the Robot Control Mate tab.

3 Working with the Robot Control Mate add-in in RobotStudio

3.2 Procedure

3.2 Procedure

Introduction

Use the following procedures to operate a robot system using the Robot Control Mate add-in together with RobotStudio features.

Connecting to a controller

- 1 Switch on the main power on the controller.
- 2 Open RobotStudio.
- 3 Add a controller by choosing **One Click Connect** from the **Add Controller** category in the **Controller** ribbon tab.



Note

You can also choose **Add Controller** or **Add Controller from Device List** and then select the desired controller from the list.

- 4 Log in the controller using the user name and password.
Only the Default User is allowed for using the Robot Control Mate add-in.
- 5 The controller is loaded and displayed in the navigation tree.
- 6 Activate the AllowMoveRobAuto function.
 - On the **Controller** ribbon tab, click **Request Write Access**.
 - In the **Controller** navigation tree, choose **Configuration > Controller**.
 - Click **Operator Safety** to display the settings.
 - Set **AllowMoveRobAuto** to **Active**.
 - Restart the controller.
- 7 Open the Robot Control Mate.

Enabling necessary user grants

Enabling functions in Control window

Current user (Default User) must be granted with the Remote Start and Stop right to enable the functions in **Control** window. Otherwise, the control functions are unavailable to use and a warning message is displayed when opening the **Control** window.

Perform the following procedure to edit user grants:

- 1 In the **Controller** ribbon tab, click **Authenticate** and then click **Edit User Accounts**.
- 2 In the **Edit User Accounts** window, click the **Roles** tab.
- 3 On the **Roles** tab, select the role to which the user belongs and then click **Edit User**.
- 4 Select the **Remote Start and Stop in Auto** checkbox.
- 5 Click **Apply**.

More details about how to manage user rights in the UAS system, see *Operating manual - RobotStudio*.

Continues on next page

Enabling functions in Move window

If users are not logged in as local client when a real controller is connected, the moving functions are unavailable to use and a warning message will be displayed when opening the **Move** window. Users have to login as local client to enable the functions.

Login as local client in the following two ways:

- With a powered-on FlexPendant but in logged-out state
 - 1 Open the Robot Control Mate and then open the **Move** window.
 - 2 Press the enabling button twice.
 - 3 Check whether functions are enabled in the **Move** window.
- Without a FlexPendant
 - 1 Create a physical DI signal.
 - 2 In the **Controller** ribbon tab, click **Configuration** and then click **I/O system**.
 - 3 In the **Type** pane of the **Configuration - I/O system** window, right-click **System Input** and choose **New System Input**.
 - 4 Choose the created physical DI signal from the **Signal Name** drop-down list.
 - 5 Choose **Verify Local Presence** from the **Action** drop-down list.
 - 6 Save the change and restart the controller.
 - 7 Open the Robot Control Mate and then open the **Move** window.
 - 8 Change the DI signal value twice using the physical device for whom the signal created.

The warning message is removed and the moving functions are available to use.

Performing the program executions

- 1 Check the calibration status of the robot in the **Controller Status** group in the **Robot Control Mate** tab page.

If the robot is uncalibrated, calibrate the robot as instructed in [Calibrating the robot on page 25](#).
- 2 In the **Robot Control Mate** tab page, click **Control** in the **Controller Tools** group.

The **Control** window is displayed.
- 3 Turn the motors on.
- 4 Select a task from the **Selected Tasks** drop-down list.

If there are multiple tasks, the program executes for the selected task.
- 5 Set the speed of program execution by dragging the scroll bar.

The speed of 100% indicates that the program is running at full speed.
- 6 Perform program executions.
 - **Play**: starts the program execution.
 - **Pause**: pauses a program execution.

Continues on next page

3 Working with the Robot Control Mate add-in in RobotStudio

3.2 Procedure

Continued

- **Prev:** executes one instruction backward.
- **Next:** executes one instruction forward.



Note

Click **PP to Main** to set the program pointer to the first line of the main routine.

It is also possible to set the program pointer to routine by selecting a module and routine from the **Module** and **Routine** drop-down list first, and then click **PP to Routine**.

Moving the robot

- 1 In the **Robot Control Mate** tab page, click **Control** in the **Controller Tools** group.

The **Control** window is displayed.

- 2 Turn the motors on.



Note

For IRB 14050, setting **LeadThrough** to **Enable** in the **Move** window will automatically turn the motors on, and the **Operation Mode** displays **Auto (LeadThrough)**.

For more details about the lead-through function, see *Operating manual - OmniCore*.

- 3 Click **Move** in the **Controller Tools** group.

The **Move** window is displayed.

- 4 Select the moving mode.
 - **Joint:** this mode moves the robot axis by axis. It moves one robot axis at a time.
 - **Linear:** this mode enables the tool center point of the selected tool to move along straight lines from "point A to point B" in space or to move in rotational motion based on the selected coordinate system's axis.
 - **Arm:** this mode is only available for IRB 14050. In this mode, both the tool center point and the orientation of the tool is fixed in space and only the angle of the arm is changed. The tool center point is neither rotated nor moved.

- 5 Select the coordinate system.

If **Tool** or **Wobj** is selected, a work object or tool must be selected from the **Work Object** or **Tool** drop-down list respectively, to specify the reference based on which the robot axis moves.

- 6 Select the increment mode.
 - **None:** the robot moves continuously to the specified point.
 - **Small/Medium/Large:** the robot will move a rated step each time based on the selected incremental movement size.

Continues on next page

- **Customized:** users can define increment step by clicking **Customized Increment**.
- 7 Set the moving speed by dragging the scroll bar.
 - 8 (Optional) Select load data from the **Load** drop-down list.
If equipment is mounted on any of the robot axes, then axes loads must be set. Otherwise overload errors might occur during moving.
 - 9 Click the + or - button in the **Position** area to move the robot axes to the desired position.



Note

The robot can also be moved using target settings. Select a target from the **Target** drop-down list. Detailed position information of the selected target point is displayed. Then, press and hold **Go to** to move the robot until it reaches the target position or click **Modify Position** to apply the robot position to the RAPID program.

Calibrating the robot



WARNING

Before starting the revolution counter update procedure, make sure all robot axes are moved to the synchronization position and all the notches of synchronization marks are aligned.

If a revolution counter is incorrectly updated, it will cause incorrect manipulator positioning, which in turn may cause damage or injury! Always verify the results after calibrating any robot axis to verify that all calibration positions are correct.

Detailed information about calibration, revolution counter update, and so on can be found in the robot product manual.

- 1 Check the calibration state in the **Controller Status** group in the **Robot Control Mate** tab page.
- 2 If the state is **Uncalibrated**, check whether controller or robot has been replaced or the SMB board has been replaced.
 - If yes, proceed to step 3.
 - If no, proceed to step 7.
- 3 In the **Robot Control Mate** ribbon tab, click **Robot Memory** in the **Calibrate** group.

In the displayed **Update Memory** dialog box, choose **Update controller with robot memory data** or **Update robot memory with controller data** according to the actual situation.



CAUTION

Do not mix the memory data transfer direction.

Continues on next page

3 Working with the Robot Control Mate add-in in RobotStudio

3.2 Procedure

Continued

For more details about memory data transfer, see *Operating manual - Integrator's guide OmniCore*.

- 4 A dialog box is displayed, warning that the transfer operation cannot be undone. Click **OK** to proceed or click **Cancel** to cancel.
- 5 After the data is successfully transferred, a message is displayed, warning that the controller requires to be restarted. Click **OK** to close the message.
- 6 Restart the controller.
- 7 In the **Robot Control Mate** ribbon tab, click **Revolution Counter** in the **Calibrate** group.

In the displayed **Update Revolution Counter** dialog box, check the calibration status of the axes and, in the **Selection** column, select the axes for which revolution counters need to be updated.

For more details about robot revolution counter update, see the robot product manual.

- 8 A dialog box is displayed, warning that the updating operation cannot be undone. Click **OK** to proceed or click **Cancel** to cancel.
- 9 After the revolution counters of the selected axes are successfully updated, a message is displayed, warning that the controller requires to be restarted. Click **OK** to close the message.
- 10 Restart the controller.
- 11 After the calibration is done, move the robot and check whether the robot is well calibrated.

For details about robot moving, see [Moving the robot on page 24](#). If the robot is not correctly calibrated, calibrate again in the **Update Revolution Counter** dialog box.

Working with the robot system

- 1 Create a testing RAPID program or load an existing RAPID program in the RAPID editor.
For more information about how to work with RAPID editor, see *Operating manual - RobotStudio*.
- 2 Move the robot to a desired position in the **Move** window.
For details about robot moving, see [Moving the robot on page 24](#).
- 3 Select a desired target point from the **Targets** drop-down list and click **Modify Position**.
- 4 In the **Robot Control Mate** ribbon tab, click **Control** in the **Controller Tools** group.
The **Control** window is displayed.
- 5 Run the RAPID program.

Continues on next page

For details about how to execute the program, see [Performing the program executions on page 23](#).



CAUTION

If the speed is higher than 10% of the fully speed, a warning message displays, prompting to confirm the running speed. Click **Yes** to remain the speed setting or click **No** to change the speed to 10% of the fully speed.

Make sure all risks are cleared before clicking **Yes** and run the program at a high speed. If any risky situation occurs, click **Pause** in the **Control** tab to stop the program or press the external emergency stop switch.

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4 Working with the web-based Robot Control Mate

4.1 Overview

System preparation

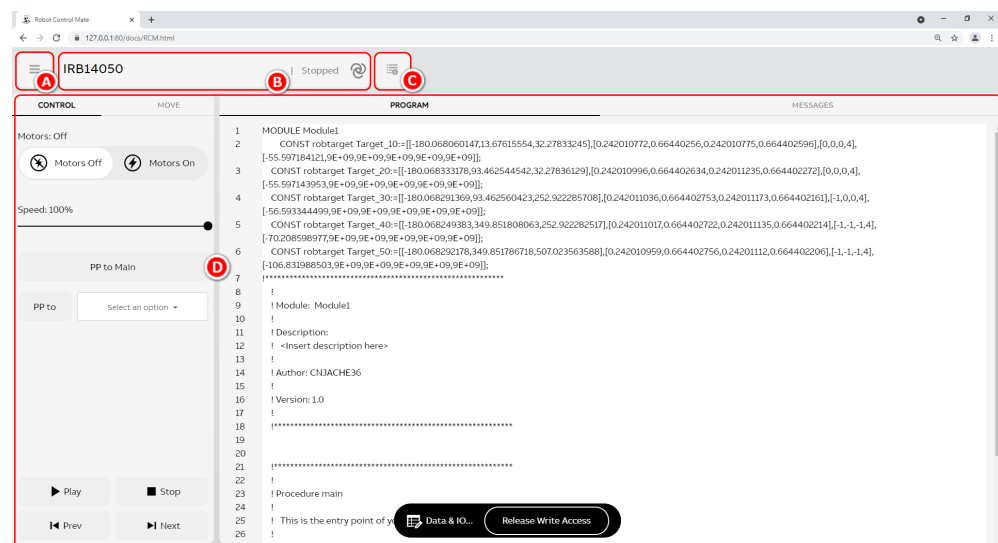
Before entering the main working page, Robot Control Mate Web will automatically check the system settings required for running the Robot Control Mate Web. Follow the procedure below to get the system settings ready first:

- 1 In the **Home** page, check the robot model to make sure that the required one is connected to.
- 2 Click **Start**.
- 3 Read carefully the prompted message and click **Acknowledge** to accept it. You can also click **Open quickstart guide** to get the latest manual version for more details.
- 4 Configure the system settings if any listed item is not configured as required.
 - If **AllowMoveRobAuto** is not activated, click **Configure** and follow the instructions to activate it. You have to re-enter the page after restarting the controller and then the latest state is displayed.
 - If not working as a local client, click **Request** to login as local client.
 - If the controller is in Manual mode, click **Change** and follow the instructions to change the operation mode to Auto.

The working page displays after all the required system settings are correctly configured.

The user interface of the Robot Control Mate Web

Taking the **CONTROL** working page as an example, the following figure shows the main working page in the Robot Control Mate Web.



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Continues on next page

4 Working with the web-based Robot Control Mate

4.1 Overview

Continued

	Item	Description
A	Menu	<p>Displays the menu when clicking the hamburger button.</p> <ul style="list-style-type: none">• Controller Tools: accessing the controlling and moving functions.• Calibration: accessing the revolution counter update and memory data transfer functions.• Restart: restarting the controller. Available only when a real controller is connected.• Help: showing information about the Robot Control Mate Web version, open-source licenses and manuals. <p>Information of the current user is also displayed.</p>
B	Status bar	<p>Shows the controller status.</p> <p>You can also request or release write access by clicking the status bar and then clicking the Request or Release button in the displayed message page.</p>
C	Event log	<p>Displays the event logs.</p>
D	Working area	<p>Displays the detailed setting pages. You have to request write access first to start working.</p> <p>For the controlling and moving functions, the programs and messages are also displayed in real time in the working area, which can be viewed but not be edited. The I/O information and position data can be viewed by clicking the Data & IO button at the bottom of the working area and clicking the I/O tab and Position tab, respectively.</p>

4.2 Procedure

Introduction

Use the following procedures to operate a robot system using the Robot Control Mate Web.

Performing the program executions

- 1 Click the **Menu** button and then click **Calibration** to check the calibration status of the robot.

If the robot is uncalibrated, calibrate the robot as instructed in [Calibrating the robot on page 33](#).

- 2 Click the **Menu** button and then click **Controller Tools**.
The **CONTROL** working page is displayed.



Note

The **CONTROL** working page is also the first page displayed when you enter the Robot Control Mate Web.

- 3 Click **Request write access** to have the write access granted.
- 4 Turn the motors on.
- 5 Set the speed of program execution by dragging the scroll bar.
The speed of 100% indicates that the program is running at full speed.
- 6 Perform program executions.
 - **Play**: starts the program execution.
 - **Stop**: pauses a program execution.
 - **Prev**: executes one instruction backward.
 - **Next**: executes one instruction forward.



Note

Click **PP to main** to set the program pointer to the first line of the main routine.

It is also possible to set the program pointer to routine by selecting a routine from the **PP to drop-down** list.

Moving the robot

- 1 Turn the motors on in the **CONTROL** working page.



Note

For IRB 14050, turn on the **Lead-through** switch in the **MOVE** working page will automatically turn the motors on, and the status bar is highlighted.

For more details about the lead-through function, see *Operating manual - OmniCore*.

Continues on next page

4 Working with the web-based Robot Control Mate

4.2 Procedure

Continued

- 2 Click the **MOVE** tab.

The **MOVE** working page is displayed.

- 3 Select required mechanical unit, work object, tool and load from the corresponding drop-down list.

- If there is equipment mounted on any of the robot axes, the axis load data must be set. Otherwise overload errors might occur during moving.

- 4 Set the moving speed by dragging the scroll bar.

- 5 Select the moving mode by clicking the corresponding icon.

- **Axis:** this mode moves the robot axis by axis. It moves one robot axis at a time.
- **Linear & Reorient:** this mode enables the tool center point of the selected tool to move along straight lines from "point A to point B" in space or to move in rotational motion based on the selected coordinate system's axis.
 - If this moving mode is selected, the coordinate system drop-down list is displayed.
 - If **Tool** or **Wobj** is selected in the coordinate system drop-down list, a work object or tool must be selected from the work object or tool drop-down list respectively, to specify the reference based on which the robot axis moves.
- **Arm:** this mode is only available for IRB 14050. In this mode, both the tool center point and the orientation of the tool is fixed in space and only the angle of the arm is changed. The tool center point is neither rotated nor moved.

- 6 Select the increment mode.

- **No increment:** the robot moves continuously to the specified point.
- **Small/Medium/Large increment:** the robot will move a rated step each time based on the selected incremental movement size.

- 7 Click the + or - button in the right pane to move the robot axes to a desired position.

- 8 If required, align the tool to another coordinate system by clicking **Align**.

In the displayed page, select the required coordinate system in the **Align to coordinate system** area. Click and hold the **Align** button until the tool is aligned.

For more details about the tool align, see *Operating manual - OmniCore*.

Continues on next page



Note

The robot can also be moved using target settings:

- 1 Click **Data & IO** at the bottom of the working area.
Detailed position information of the target points are displayed in the **POSITION** tab.
- 2 Click the **More info** button for the desired target.
- 3 Click **Go to position** until the robot reaches the target position.

The target positions can be updated to the current robot position by clicking **Update position**. It is also allowed to be manually edited by clicking **Edit position**.

Calibrating the robot



WARNING

Before starting the revolution counter update procedure, make sure all robot axes are moved to the synchronization position and all the notches of synchronization marks are aligned.

If a revolution counter is incorrectly updated, it will cause incorrect manipulator positioning, which in turn may cause damage or injury! Always verify the results after calibrating any robot axis to verify that all calibration positions are correct.

Detailed information about calibration, revolution counter update, and so on can be found in the robot product manual.

- 1 Click the **Menu** button and then click **Calibration**.
The calibration summary is displayed.
- 2 If the robot is uncalibrated, check whether controller or robot has been replaced or the SMB board has been replaced.
 - If yes, proceed to step [3](#).
 - If no, proceed to step [7](#).
- 3 Click **Robot Memory** at the bottom of the working area.
In the displayed **ROBOT MEMORY** page, choose **Update controller with robot memory data** or **Update robot memory with controller data** according to the actual situation.



CAUTION

Do not mix the memory data transfer direction.

For more details about memory data transfer, see *Operating manual - Integrator's guide OmniCore*.

- 4 Click **Apply**.
A dialog box is displayed, warning that the transfer operation cannot be undone. Click **Update** to proceed or click **Cancel** to cancel.

Continues on next page

4 Working with the web-based Robot Control Mate

4.2 Procedure

Continued

- 5 After the data is successfully transferred, a message is displayed, warning that the controller requires to be restarted. Click **OK** to close the message.
- 6 Restart the controller.
- 7 Click **Revolution Counter** at the bottom of the working area.
A dialog box is displayed, warning that the updating operation may change the programmed position. Click **Yes** to proceed or click **No** to cancel.
- 8 In the displayed **Update Revolution Counters** dialog box, check the calibration status of the axes and select the axes for which revolution counters need to be updated.
For more details about robot revolution counter update, see the robot product manual.
- 9 Click **Update selected axes**.
A dialog box is displayed, warning that the updating operation cannot be undone. Click **Update** to proceed or click **Cancel** to cancel.
- 10 After the calibration is done, move the robot and check whether the robot is well calibrated.
For details about robot moving, see [Moving the robot on page 31](#). If the robot is not correctly calibrated, calibrate again in the **Update Revolution Counter** dialog box.

5 Reference information

5.1 Features in RobotStudio

Feature list

The following table provides the features in RobotStudio that will be used together with the Robot Control Mate when operating a robot system.

For more details about how to use the RobotStudio features, refer to the popup message displayed in RobotStudio or see *Operating manual - RobotStudio*.

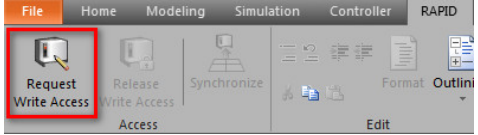
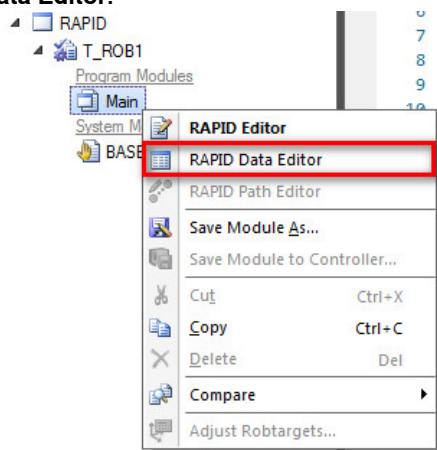
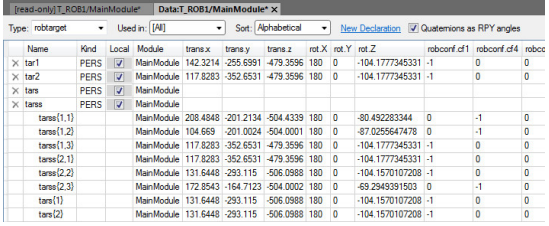
Feature group	Feature	Action
Operation	Run from the current cursor	<ol style="list-style-type: none"> 1 Make sure the RAPID program is opened by double-clicking the specific RAPID module from the Controller navigation tree. 2 In the RAPID ribbon tab, click Request Write Access in the Access group. 3 Right-click the line where the cursor is and choose Set Program Point to Cursor from the shortcut list. <div data-bbox="965 929 1364 1332" data-label="Image"> <p>A screenshot of a context menu in RobotStudio. The menu is open over a line of code in a RAPID program. The option 'Set Program Pointer to Cursor' is highlighted with a red rectangle. Other options include 'Go To Definition', 'Find All References', 'Go To Visualization', 'Add Watch', 'Save Selection as Snippet', 'Compare', 'Toggle Breakpoint', 'Set Program Pointer to Main in all tasks', 'Set Program Pointer to Routine', 'Go To Program Pointer', 'Go To Mjtion Pointer', 'Follow Program Pointer', 'RAPID Data Editor', and 'RAPID Path Editor'.</p> </div> 4 Click Play in the Control tab and then the program will run from the line where the cursor is. <div data-bbox="893 1467 957 1534" data-label="Image"> </div> <div data-bbox="981 1489 1045 1518" data-label="Section-Header"> <p>Note</p> </div> <div data-bbox="885 1541 1444 1653" data-label="Text"> <p>The find a desired line or program module, type the required line number or choose the module from the list in the Find group in the RAPID ribbon tab</p> </div> <div data-bbox="885 1668 1444 1803" data-label="Image"> <p>A screenshot of the RAPID ribbon tab in RobotStudio. The 'Find' group is visible, and the 'Go to line (Data)' option is highlighted with a red rectangle. Other options in the group include 'Find / Replace' and 'Compare'.</p> </div>

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5 Reference information

5.1 Features in RobotStudio

Continued

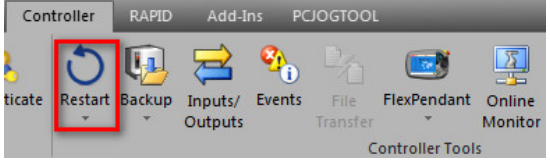
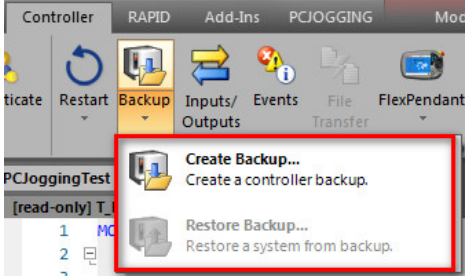
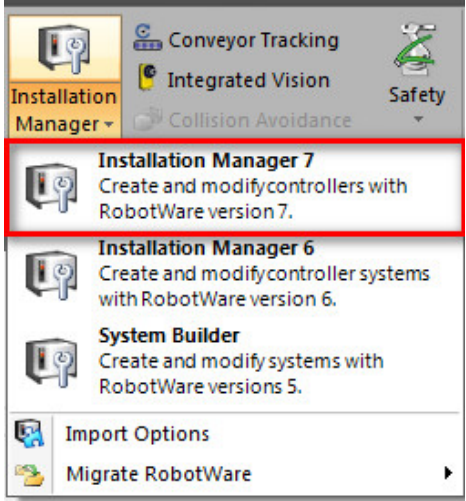
Feature group	Feature	Action
Programming	Online programming	<ol style="list-style-type: none"> 1 Make sure the RAPID program is opened by double-clicking the specific RAPID module from the Controller navigation tree. 2 In the RAPID ribbon tab, click Request Write Access in the Access group. Then, the RAPID script can be edited and programmed.  <p>xx1900001369</p>
	RAPID data editing	<p>Right-click a specific RAPID module from the Controller navigation tree and then choose RAPID Data Editor.</p>  <p>xx1900001368</p>
	Specific point data editing	<p>In the RAPID Data Editor window, edit the detailed data of a specific point.</p>  <p>xx1900001402</p>

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5 Reference information

5.1 Features in RobotStudio

Continued

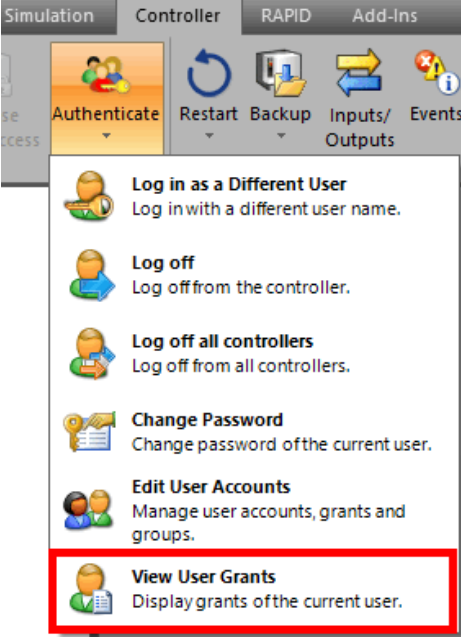
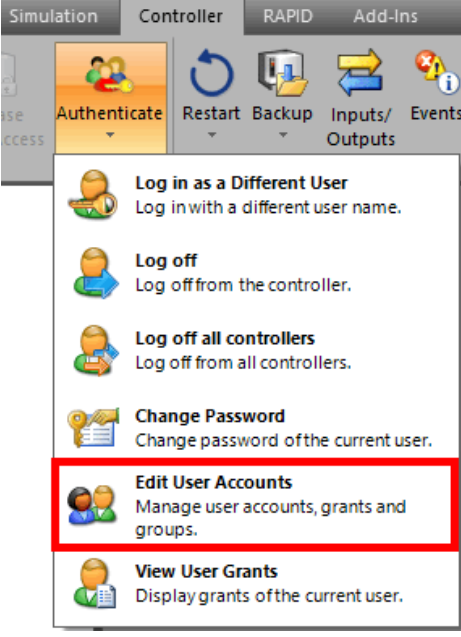
Feature group	Feature	Action
Controller management	System restart	<p>In the Controller ribbon tab, click Restart in the Controller Tools group.</p>  <p>xx1900001329</p>
	System backup and restore	<p>In the Controller ribbon tab, choose Create Backup or Restore Backup from the Backup list in the Controller Tools group.</p>  <p>xx1900001370</p>
	System installation	<p>In the Controller ribbon tab, choose Installation Manager 7 from the Installation Manager list in the Configuration group.</p>  <p>xx1900001372</p>

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5 Reference information

5.1 Features in RobotStudio

Continued

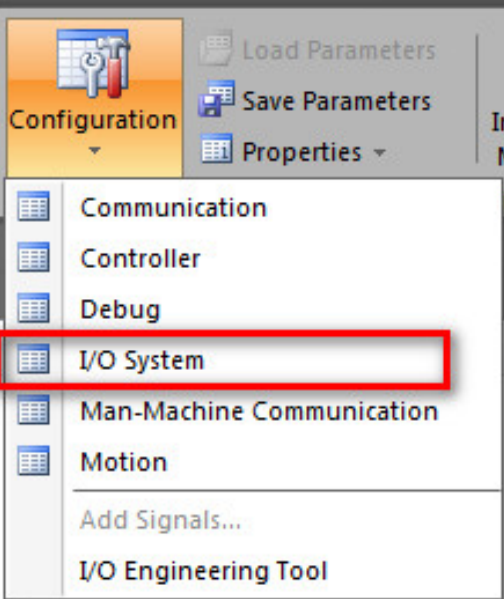
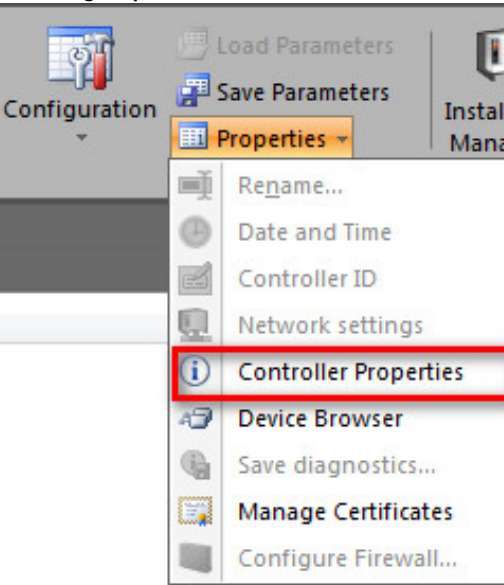
Feature group	Feature	Action
User right management	User grant viewing	<p>In the Controller ribbon tab, choose View User Grants from the Authenticate list in the Access group.</p>  <p>xx210000399</p>
	User grant editing	<p>In the Controller ribbon tab, choose Edit User Accounts from the Authenticate list in the Access group.</p>  <p>xx210000400</p>

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5 Reference information

5.1 Features in RobotStudio

Continued

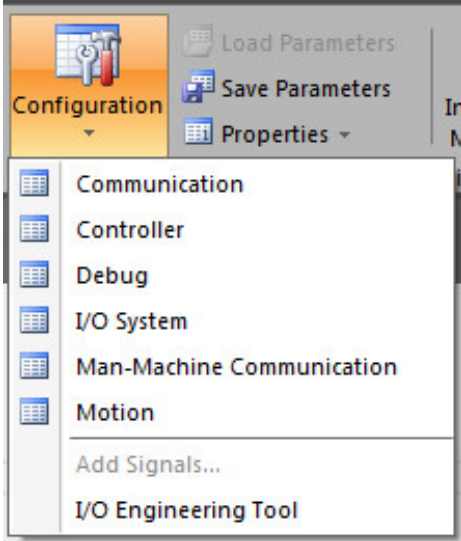
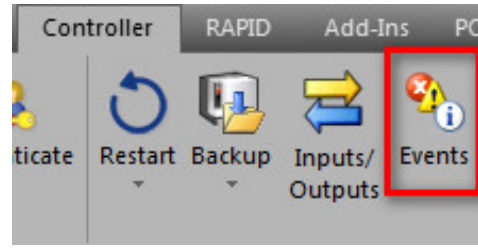
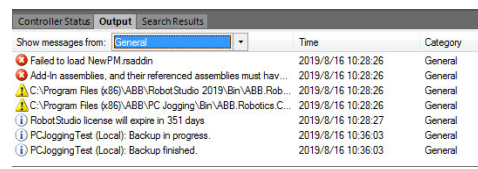
Feature group	Feature	Action
System status and configuration	I/O status checking	<p>In the Controller ribbon tab, choose I/O System from the Configuration list in the Configuration group.</p>  <p>xx1900001327</p>
	System information checking	<p>In the Controller ribbon tab, choose Controller Properties from the Properties list in the Configuration group.</p>  <p>xx1900001326</p>
	System configuration	<p>In the Controller ribbon tab, choose the required item from the Configuration list in the Configuration group.</p>

Continues on next page

5 Reference information

5.1 Features in RobotStudio

Continued

Feature group	Feature	Action
		 <p>xx1900001371</p>
Log	Log viewing	<p>View the logs by either of the following methods:</p> <ul style="list-style-type: none"> In the Controller ribbon tab, click Events.  <p>xx1900001373</p> <ul style="list-style-type: none"> Check the logs from the Output area at the bottom of the RobotStudio window.  <p>xx1900001374</p>

5.2 Scenarios for controllers with FlexPendant

Overview

The Robot Control Mate is mainly used for the controller without a FlexPendant. The FlexPendant can be disconnected from the controller in automatic mode. To disconnect the FlexPendant in automatic mode the user must have the **Safety Services** grant. The administrator must provide this grant using the **UAS Administration Tool** in RobotStudio.



Note

In cases where the controller is replaced with a new main computer, a FlexPendant is required after the replacement to be able to change to automatic mode. Otherwise, the controller starts in manual mode and the Robot Control Mate is unable to use.

This section describes how to properly disconnect the FlexPendant from a controller.

Disconnecting the FlexPendant



Note

The disconnection operation can only be executed on the FlexPendant. Do not use the Robot Control Mate to disconnect the FlexPendant.

- 1 On the status bar, tap the **QuickSet** button.
The **QuickSet** window is displayed.
- 2 Tap the **Info** tab.
The **System Info** window is displayed.
- 3 Check the robot type and options.
Make sure the robot type is supported and the option 3018-1 Hot Swappable FlexPendant exists.



Note

If the controller does not have the option 3018-1 Hot Swappable FlexPendant, contact ABB to install the RobotWare version with the option.

- 4 Tap the **Control** tab.
The **Control Panel** window is displayed.
- 5 In the **Mode** section, check the operating mode and make sure the system is in Auto mode.
- 6 Tap the **Logout/Restart** tab.
The **Logout/Restart** window is displayed.
- 7 Tap **Detach FlexPendant** in the FlexPendant section.

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5 Reference information

5.2 Scenarios for controllers with FlexPendant

Continued

A message is displayed, prompting to disconnect the FlexPendant within 30 seconds.



Note

The logged-in user must be the one has sufficient grant to disconnect the FlexPendant. If not, you will get a permission denied message. In this case, click **Log out** in the **Current User** section. Then, log in again using the user with the Safety Service permission is granted.

8 Tap **Disconnect**.

A popup window with 30 seconds countdown timer is displayed.

9 Disconnect the FlexPendant within 30 seconds.

6 Troubleshooting

6.1 What should I do if I experience a certificate failure when opening Robot Control Mate Web?

Symptom

When working with Robot Control Mate Web, a page showing warning message "Your connection is not private" is displayed after entering the IP address of the connected controller in the address bar of the browser.

Cause

The PC does not installed with the trusted certificate.

Action

- 1 Click **Not secure** in the address bar.
- 2 Click the **Show certificate** icon next to **Certificate is not valid**.
- 3 Click the **Details** tab in the displayed **Certificate** dialog box.
- 4 Click **Copy to File**.
- 5 Follow the instructions in the **Certificate Export Wizard** to export the certificate file.
 - Remain the default file format **DER encoded binary X.509 (.CER)**.The certificate file is successfully exported.
- 6 Enter the browser settings page.
- 7 Choose **Privacy and security > Security > Manage certificates**.
- 8 In the displayed **Certificates** dialog box, click the **Trusted Root Certification Authorities** tab.
- 9 Click **Import** in the displayed tab page.
- 10 Follow the instructions in the **Certificate Import Wizard** to import the certificate file.
 - Keep the **Certificate store** as **Trusted Root Certification Authorities**.
 - Confirm the certificate installation by clicking **Yes** in the **Security Warning** dialog box.

The certificate file is successfully imported and **Not secure** is replaced by the **Lock** icon in the address bar.

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