OPERATING INSTRUCTIONS

Comfort App

for Hanwha

DDOC01776

THE KNOW-HOW FACTORY

MATCH

ZIMMER group

Content

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1 Supporting documents

NOTICE

Read through the installation and operating instructions before installing or working with the product.

The installation and operating instructions contain important notes for your personal safety. They must be read and understood by all persons who work with or handle the product during any phase of the product lifetime.

The documents listed below are available for download on our website www.zimmer-group.com.

- Installation and operating instructions
- Catalogs, drawings, CAD data, performance data
- Information on accessories
- Technical data sheets
- General Terms and Conditions, including warranty information.

⇨ Only those documents currently available on the website are valid.

In these installation and operating instructions, "product" refers to the product designation on the title page!

1.1 Notices and graphics in the installation and operating instructions

DANGER

This notice warns of an imminent danger to the life and health of people. Ignoring these notices can lead to serious injury or even death.

► You absolutely must comply with the described measures for avoiding these dangers!

⇨ The warning symbols are assigned according to the type of danger.

WARNING

This notice warns of a situation that is potentially hazardous to personal health. Ignoring these notices can cause serious injury or damage to health.

► You absolutely must comply with the described measures for avoiding these dangers!

⇨ The warning symbols are assigned according to the type of danger.

CAUTION

This notice warns of a situation that is potentially hazardous to persons. Ignoring these notices can cause minor, reversible injuries.

► You absolutely must comply with the described measures for avoiding these dangers!

⇨ The warning symbols are assigned according to the type of danger.

NOTICE

This notice warns of possible material and environmental damage. Ignoring these notices can result in damage to the product or the environment.

► You absolutely must comply with the described measures for avoiding these dangers!

⇨ The warning symbols are assigned according to the type of danger.

INFORMATION

This category contains useful tips for handling the product efficiently. Failure to observe these tips will not result in damage to the product. This information does not include any information relevant to health or workplace safety.

2 Proper use

NOTICE

Material damage and malfunction in case of non-compliance

The product is only to be used in its original state with its original accessories, with no unauthorized changes and within the stipulated parameter limits and operating conditions.

Any other or secondary use is deemed improper.

- ▶ Operate the product only in compliance with the associated installation and operating instructions.
- ▶ Operate the product only when it is in a technical condition that corresponds to the guaranteed parameters and operating conditions.
- ⇨ Zimmer GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.

The product is intended for installation and operation on the robot control panel *Hanwha Techwin* of the *HCR-5* robot control system.

3 Personnel qualification

WARNING

Inadequate qualification can cause injury and material damage

If inadequately qualified personnel perform work on the product, this can cause serious injuries and significant material damage.

- ▶ All work on the product must be performed by qualified personnel.
- ▶ Before working with the product, read the document in its entirety and make sure that you have understood everything.
- ▶ Observe country-specific accident prevention regulations and the general safety notices.

The following qualifications are a prerequisite for performing various work on the product.

3.1 Electricians

Electricians are able to perform work on electrical systems, can recognize and avoid possible dangers and know the relevant standards and provisions due to their technical training, knowledge and experience.

3.2 Specialists

Specialists are able to perform the assigned work, can recognize and avoid possible dangers and know the relevant standards and provisions due to their technical training, knowledge and experience.

3.3 Instructed personnel

Instructed personnel have been trained by the operating company on the tasks and possible dangers of improper behavior.

3.4 Service personnel

Service personnel are able to perform the assigned work and can recognize and avoid possible dangers due to their technical training, knowledge and experience.

3.5 Additional qualifications

Persons who work with the product must be familiar with the valid safety regulations and laws as well as the standards, guidelines and laws listed in this document.

Personnel who work with the product must have facility-issued authorization to commission, program, configure, operate, maintain and also decommission this product.

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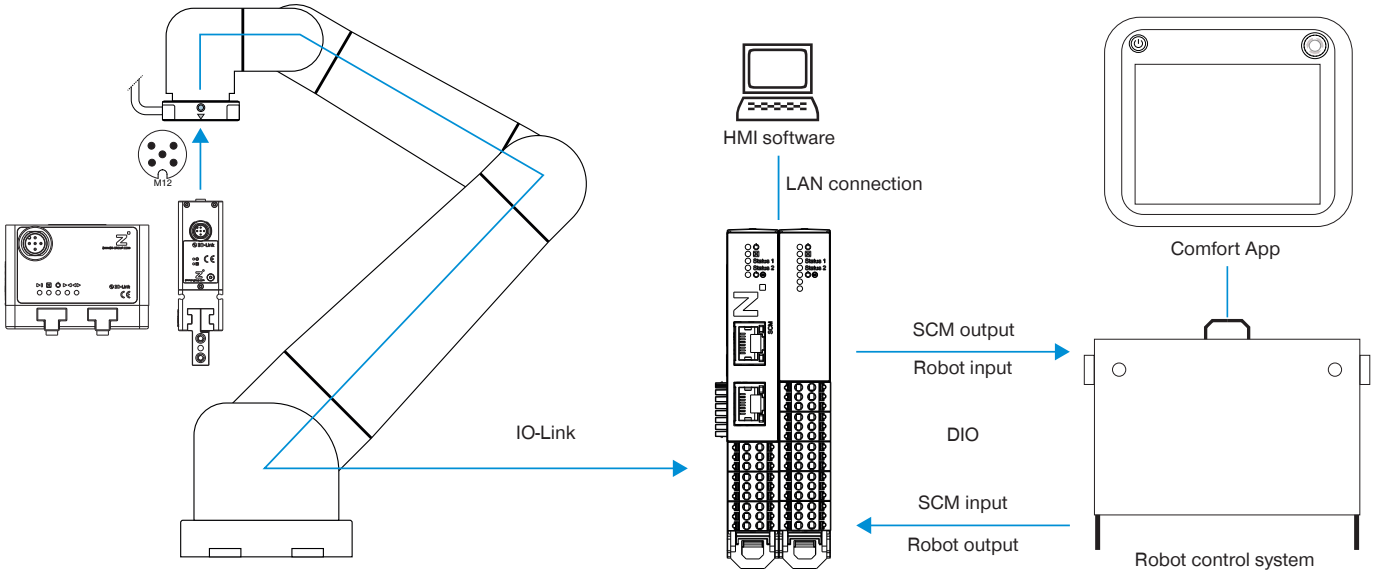
4 Product description

The Smart Communication Module (SCM) is a gateway between the grippers and the robot control system. The SCM can be configured via the HMI software or Comfort App. The grippers can be controlled using the Comfort App on the robot control panel.

The image shows a simplified view of the structure of the overall system. All parts for the electrical connection of a gripper with the robot are included or are available from Zimmer GmbH as optional accessories.



5 Functional description

Using the Comfort App, Zimmer GmbH grippers can be controlled directly from the robot control panel and generated robot jobs can be configured.

The generated robot tasks simplify the use of Zimmer GmbH grippers in the customer program and reduce the development time.

The names of the newly configured robot jobs remain unchanged. This means that the basic program does not have to be modified for configuration changes.

6 Accessories/scope of delivery

INFORMATION

If any accessories not sold or authorized by Zimmer GmbH are used, the function of the product cannot be guaranteed. Zimmer GmbH accessories are specifically tailored to the individual products.

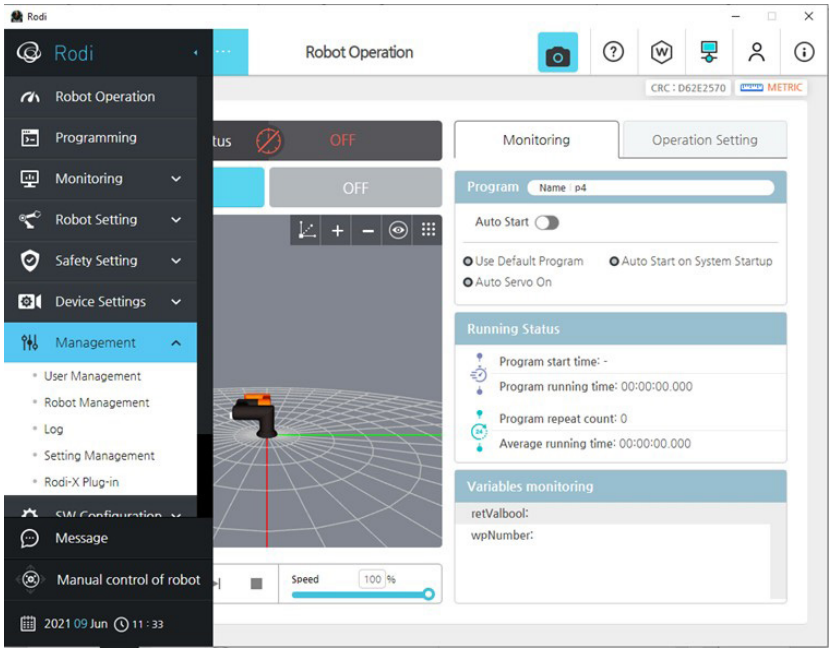
► For optional accessories and those included in the scope of delivery, refer to our website.

7 Installation

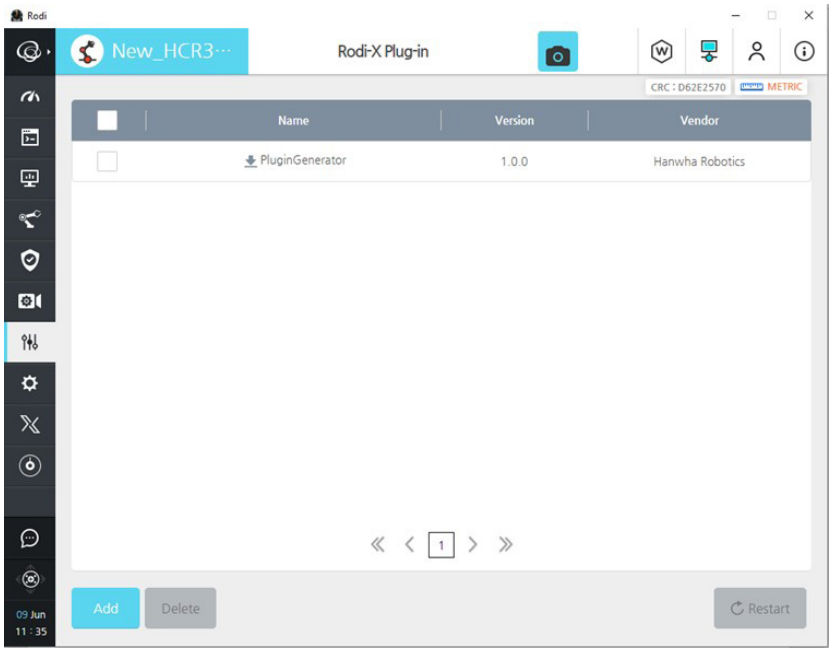
7.1 Installing the Comfort App

The Comfort App is installed to the robot control panel to enable direct control of the grippers.

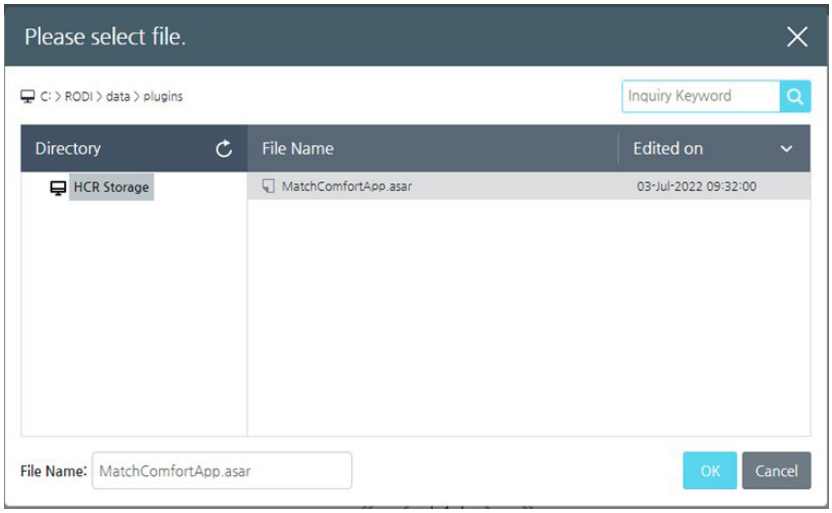
- ► Download the robot app from our website.
- ► Copy the installation file to a USB memory device.
- ► Make sure that the robot control panel is already connected to the robot control system.
- ► Switch off the voltage supply on the robot tool I/O via the emergency stop button.
- ► Plug the USB memory stick with the installation files for the Comfort App into the robot control panel.
- ► In the *Management* menu, press *Rodi-X Plug-in*.
- ⇨ The *Rodi-X Plug-in* window opens.



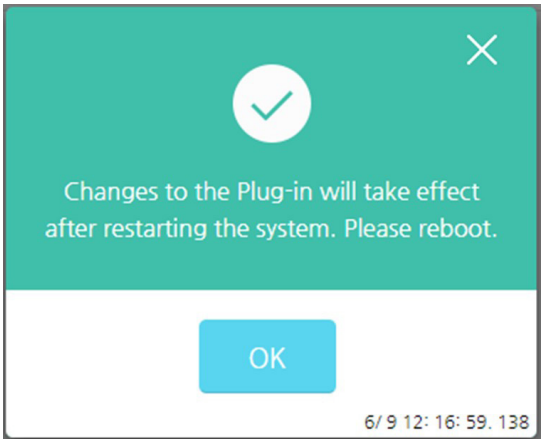
- ► Press the *Add* button.



- ▶ Select the installation file.
- ▶ Press the *OK* button.



- ▶ In the prompt, click the *Ok* button.
- ⇨ The installation is complete.
- ▶ Switch off the power supply of the robot control system and robot control panel.
- ▶ After a few seconds, switch on the power supply of the robot control system and robot control panel again.
- ▶ Switch on the robot control system and robot control panel.

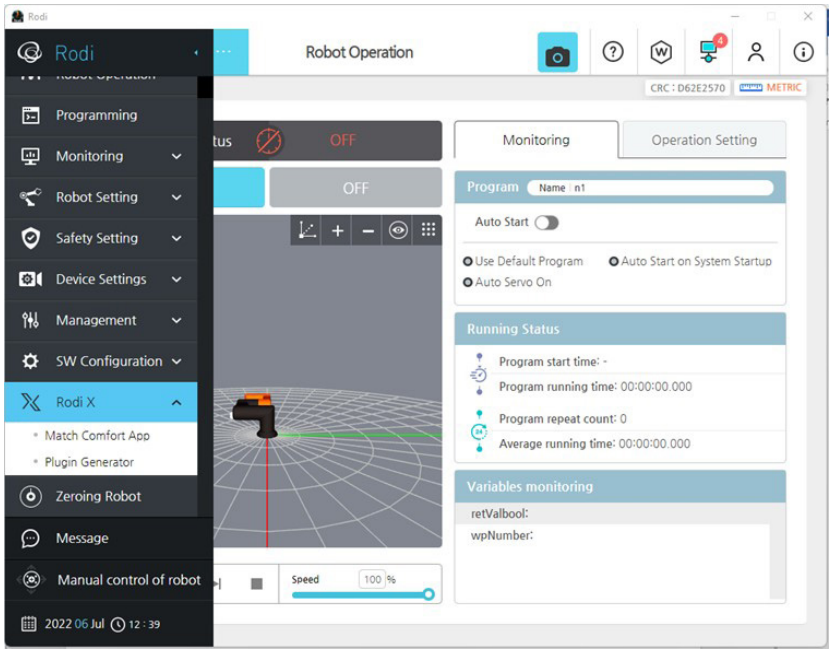


8 Commissioning

NOTICE

► Switch on the robot so that you can use the Comfort App.

► In the *Rodi X* menu, press *Match Comfort App*.



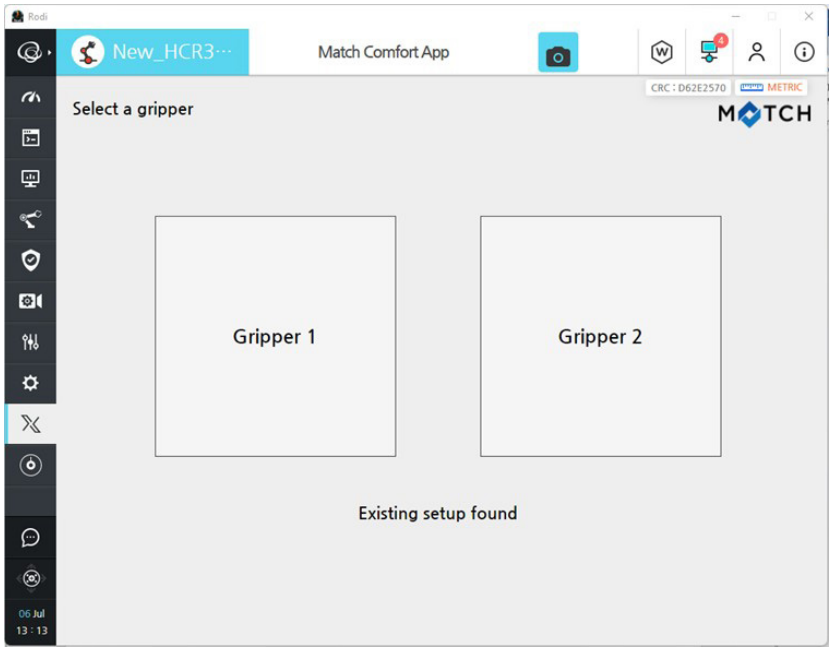
8.1 Deleting existing setups

The following screen is displayed only if an existing setup is found for two grippers.

This screen does not appear if the available setup is only found for one gripper. In this case, the next screen is shown right away.

► Click the button of the desired gripper.

⇨ The *Manual control* screen for the manual control is displayed.



In the *Manual control* screen, you can operate the gripper manually and display the status.

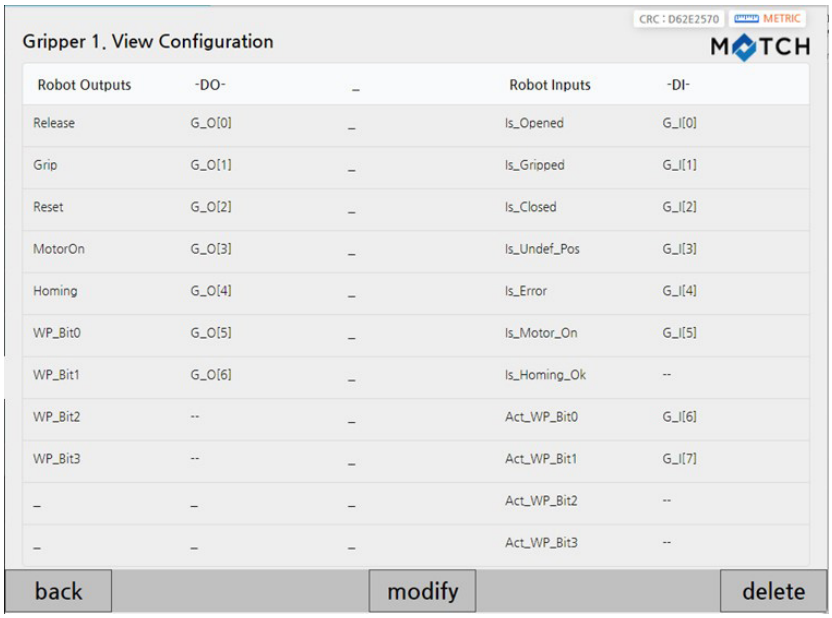
► Click the *view config* button.

⇨ The *View Configuration* screen for editing the gripper configuration is displayed.

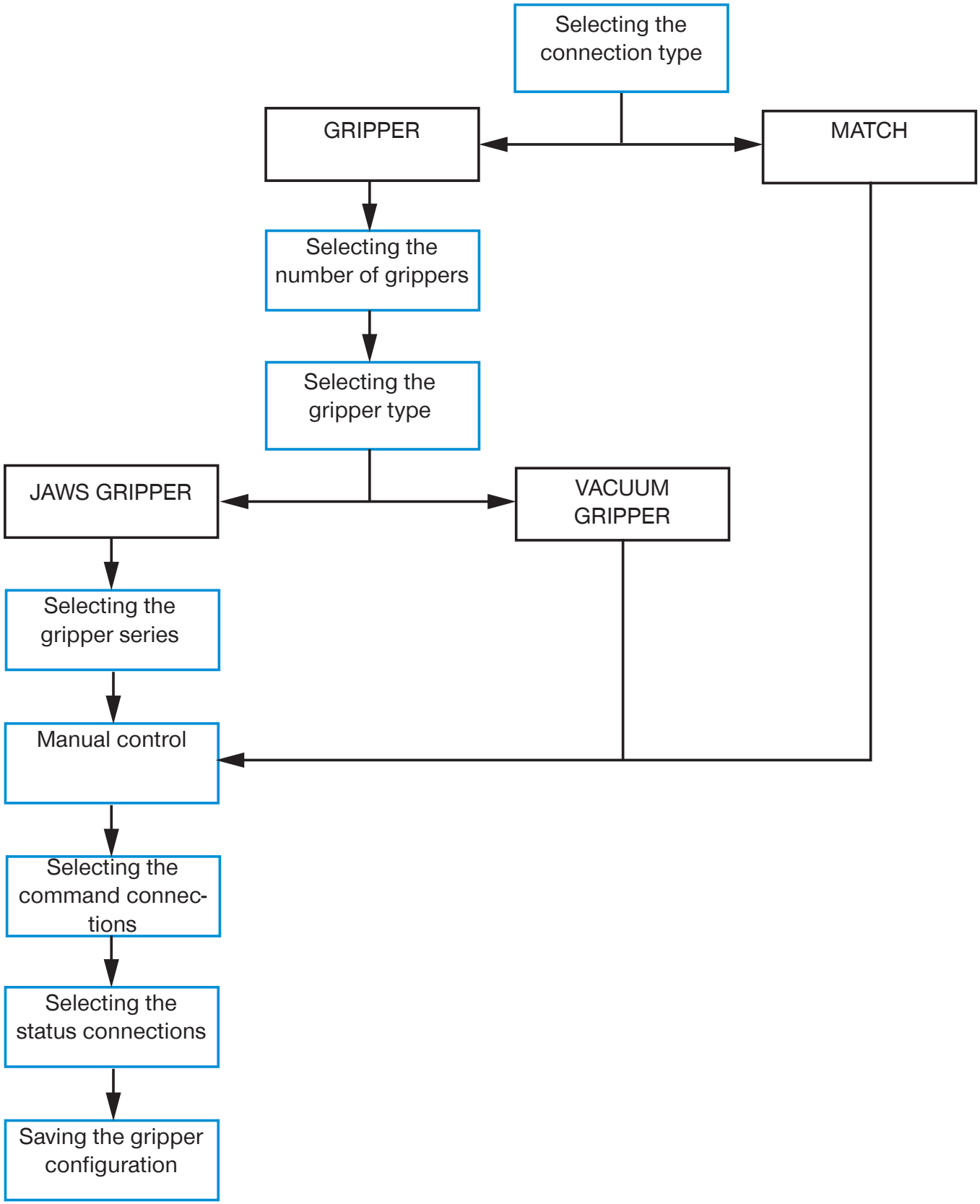
► Click the *delete* button.

⇨ The existing setup is deleted.

⇨ The screen sequence for configuring new grippers is displayed.

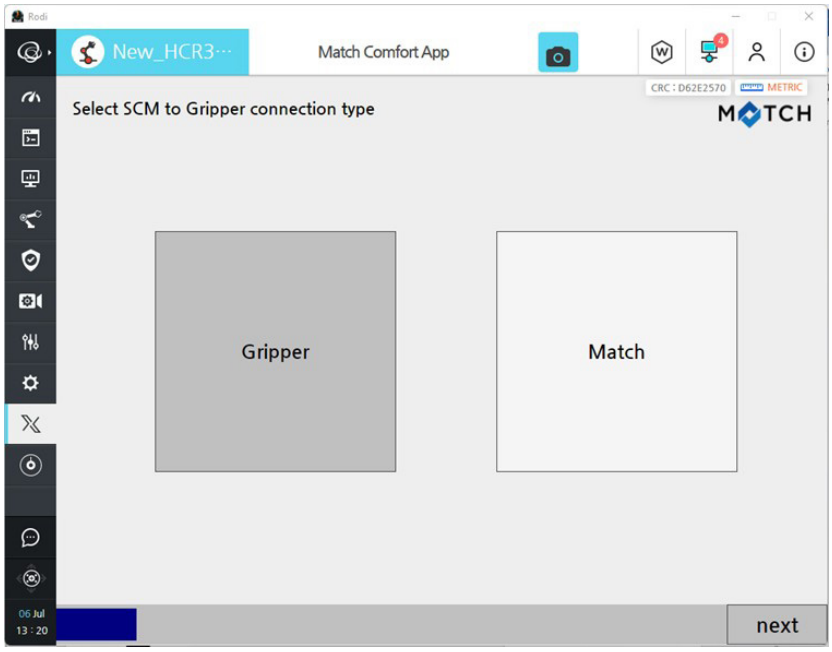


8.2 Creating a gripper configuration



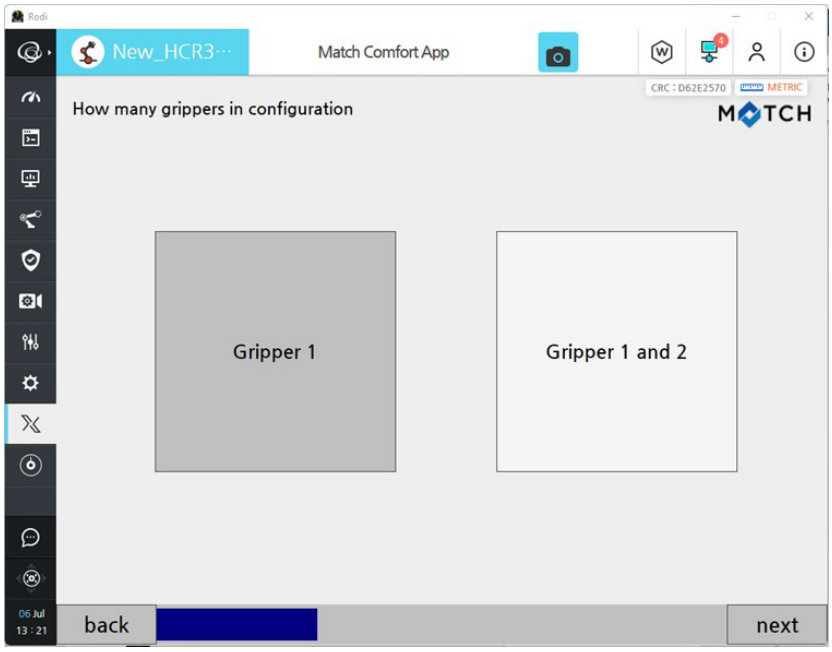
8.2.1 Selecting the connection type

- ► Click *GRIPPER* if you have connected a gripper.
- ► Click *MATCH* if you have connected a MATCH gripper.
- ► Click the *next* button.



8.2.2 Selecting the number of grippers

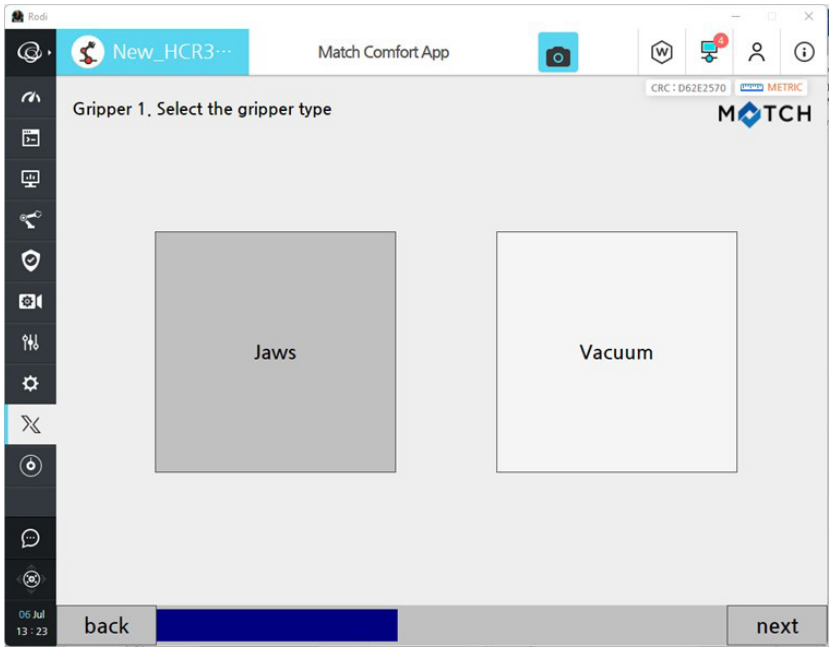
- ► Click the desired number of grippers you want to have in your robot application.
- ► Click the *next* button.



8.2.3 Selecting the gripper type

► Click the desired gripper type.

► Click the *next* button.



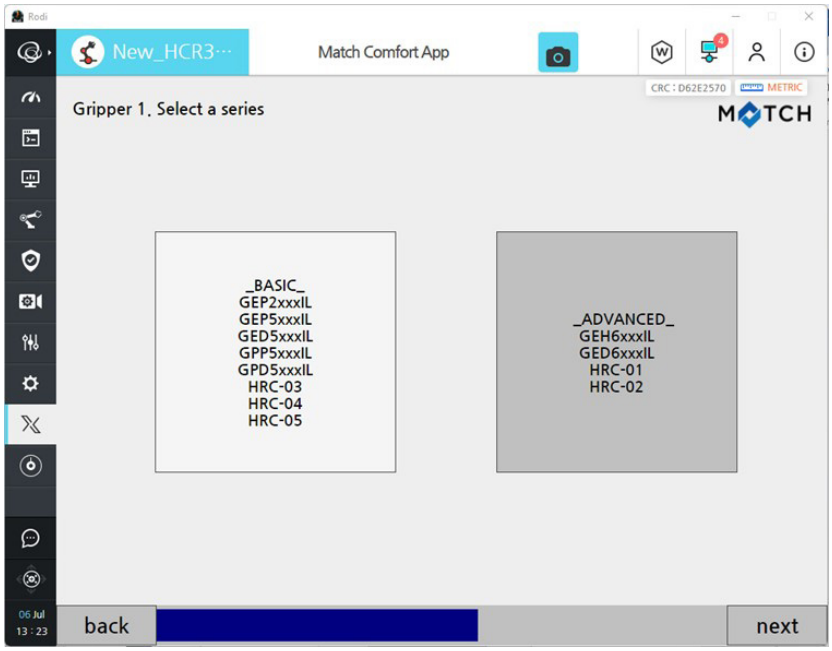
8.2.4 Selecting the gripper series

INFORMATION

Basic and *Advanced* designate different classes of grippers from Zimmer GmbH.

► Click the class of your gripper.

► Click the *next* button.



8.2.5 Manual control

NOTICE

The prerequisite for the function test is that the wiring between the robot and SCM is present and that the robot, SCM and gripper are switched on.

You can test and operate the function of the gripper and view its status in the lower area of the screen.

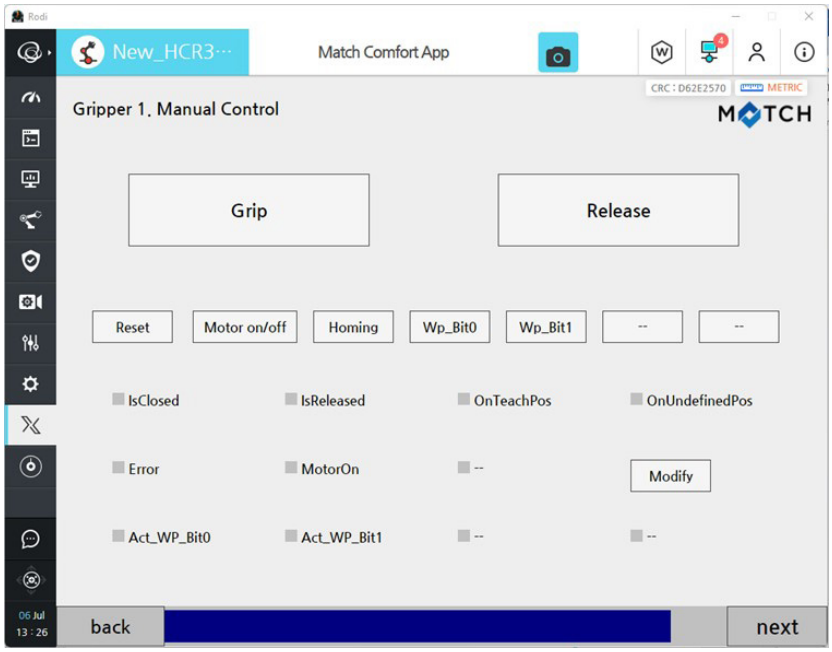
INFORMATION

The ⚙ button is only displayed for the connection via a controller IO.

Connection type: Gripper

You can test and operate the function of the gripper and view its status in the lower area of the screen.

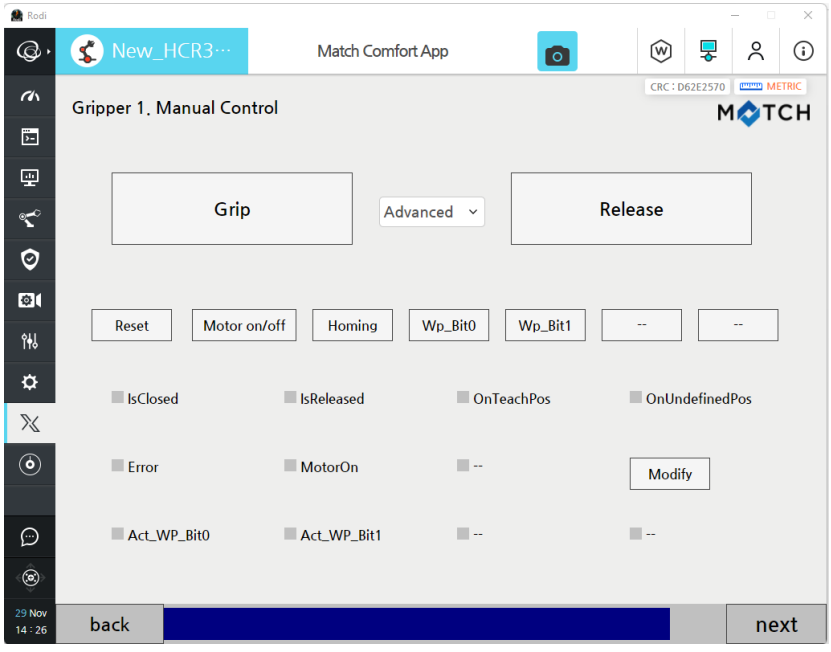
► Press the *Modify* button to select command connections and status connections.



Connection type: MATCH

You can test and operate the function of the gripper and view its status in the lower area of the screen.

You can choose between the grippers in the drop-down menu.



► Click the *next* button.

8.2.6 Selecting the command connections

NOTICE

The gripper wiring must match the gripper configuration done in the Comfort App.

NOTICE

If this screen is displayed for the first time, a standard assignment is displayed.

► Complete the wiring precisely as shown on this screen.

To reset the values to the defaults, edit the values or return to the selection of the number of grippers (see the section "Selecting the number of grippers").

► Establish the correspondence of the robot output number with the digital input function of the SCM.

You can accept the default assignment or change it.

► Click the *next* button if you want to keep the default assignment.

Editing the command connection

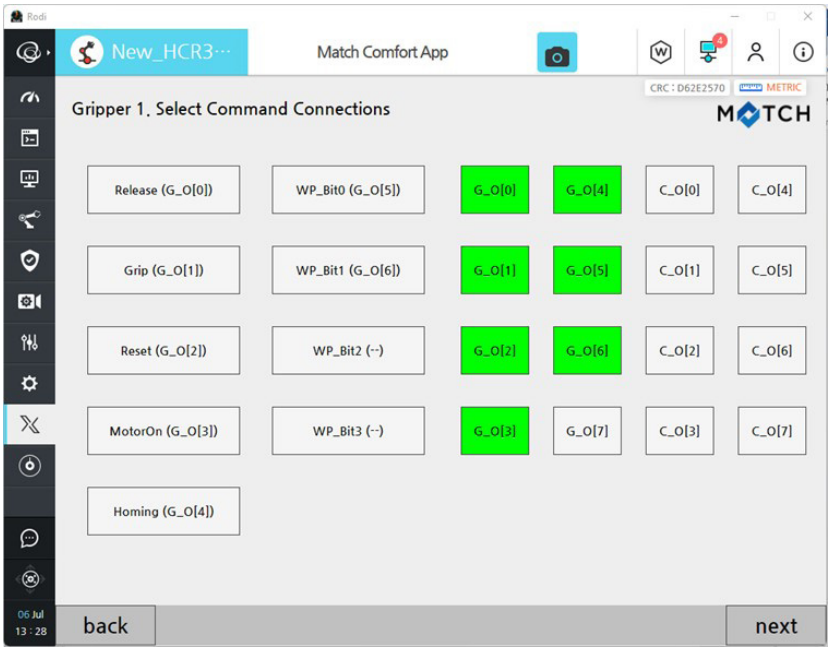
► Click the button of the desired signal.
- e.g. Release

► Click the desired output.
- e.g. G_O[7]

⇨ The output has been assigned to the signal.

⇨ The button of the signal is expanded by adding the output.
- e.g. Release (G_O[7])

► Click the *Next* button.



8.2.7 Selecting the status connections

► Establish the correspondence of the robot input number with the digital input function of the SCM.

NOTICE

If this screen is displayed for the first time, a standard assignment is displayed.

► Complete the wiring precisely as shown on this screen.

You can accept the default assignment or change it.

► Click the *next* button if you want to keep the default assignment.

Editing the status connections

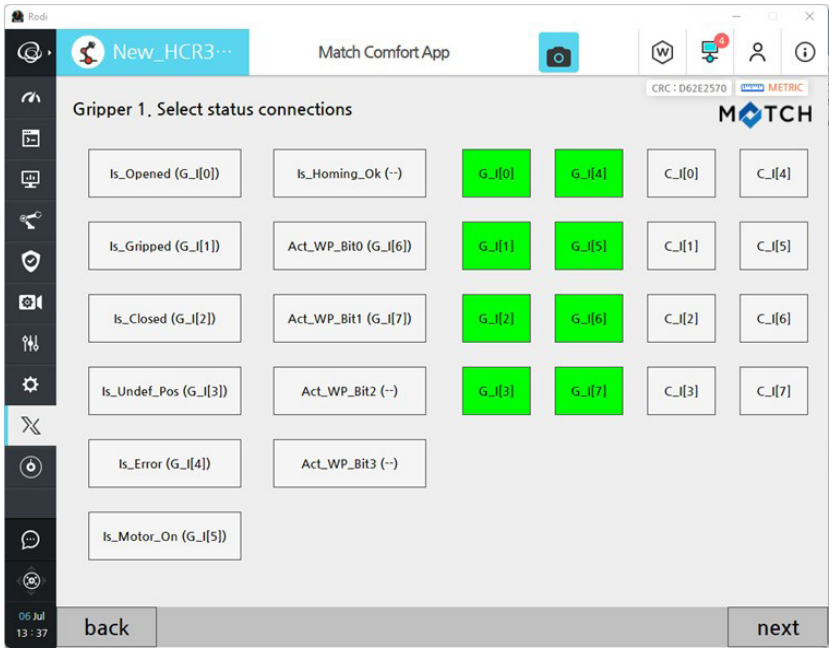
► Click the button of the desired signal.
- e.g. Is_Opened

► Click the desired input.
- e.g. G_I[7]

⇨ The input has been assigned to the signal.

⇨ The button of the signal is expanded by adding the input.
- e.g. Is_Opened (G_I[7])

► Click the *Next* button.



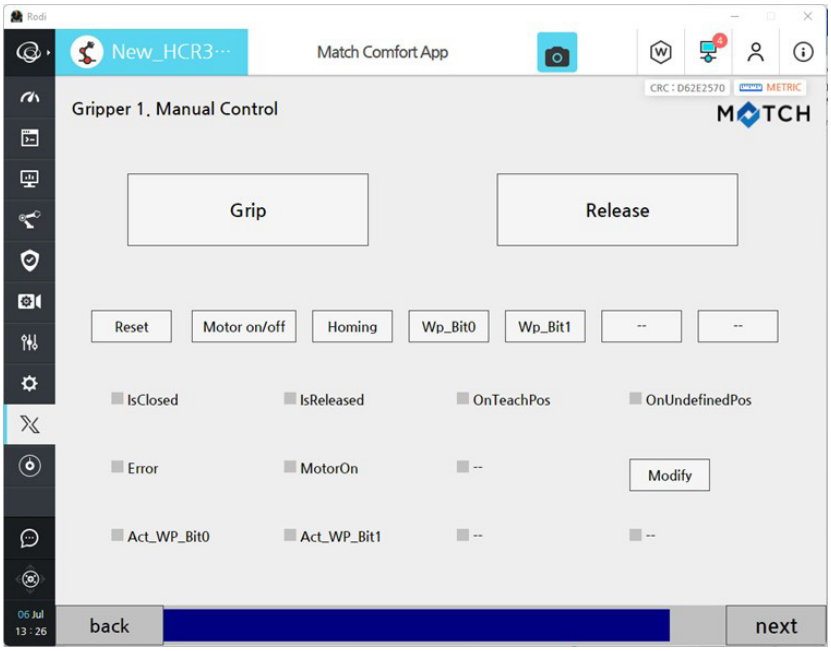
8.2.8 Saving the gripper configuration

NOTICE

The settings are temporary.

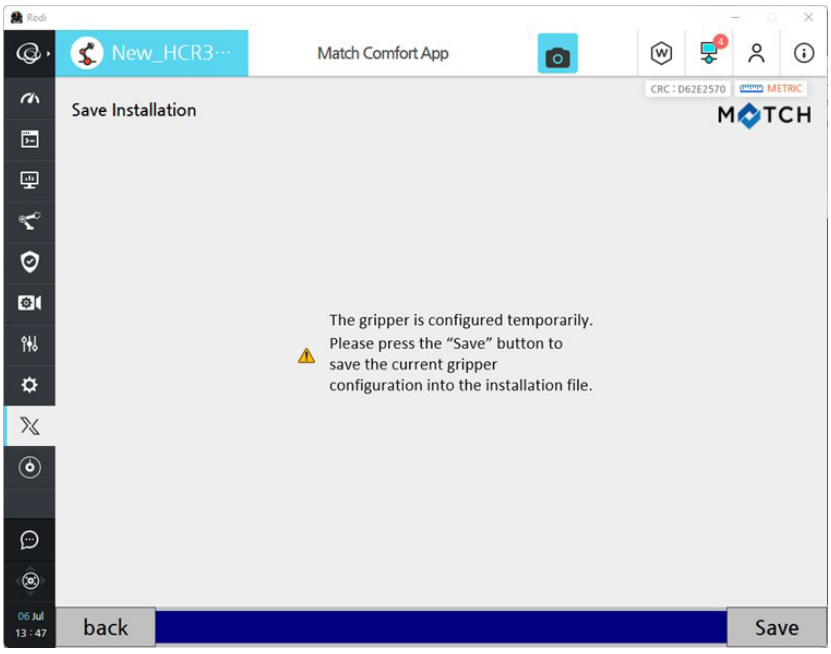
► Save the settings to the installation file.

► Click the *next* button.



► In the prompt, click the *Save* button.

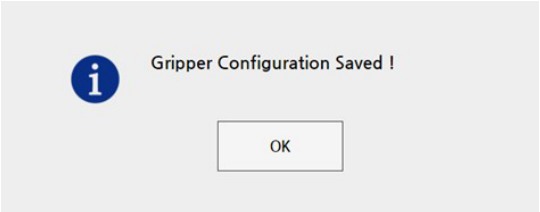
⇨ The gripper configuration has been stored.



► In the prompt, click the *Ok* button.

⇨ The gripper configuration is complete.

⇨ The function blocks/subprograms have been created and are available for programming.



9 Operation

9.1 Control principle of the gripper

- ▶ Prepare *Advanced* grippers for the control system:
  - ▶ If necessary, do a reference run (ZHOMING).
  - ▶ Check if the reference run was done (ZISHOMINGOK or ZISHOMINGSUCCESS).
  - ▶ Switch on the motor (ZMOTORON).
  - ▶ Check whether the motor is switched on (ZISMOTORON).
  - ⇨ The gripper is prepared for the control system if no error is present (ZISERROR).
- ▶ Set a workpiece configured with the HMI software *ZG_IO_LINK_HMI* (ZCHANGEWP(number)) if more than one workpiece is used.
- ▶ Check whether a workpiece has changed (Z_ISWPCHANGED(number)).
- ▶ Grip (ZGRIP) or release (ZRELEASE) the workpiece.
- ▶ Check the position of the gripper jaw (ZISONTEACHPOS, ZISOPENED, ZISCLOSED or ZISONUNDEFPOS).

9.2 Overview of generated robot jobs

After successful configuration of the grippers using the HMI software, robot jobs for various functions are generated in the robot control panel. The robot jobs can be called up from user jobs. The following robot jobs can be created using the Comfort App.

Not all robot jobs are generated after successful configuration of the grippers. The job is created only if the corresponding command or status is wired and used by the equipped gripper(s).

Generated robot job name	Parameter In	Parameter Out	Function
ZGRIP	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Gripping
ZRELEASE	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Release
ZMOTORON	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Switch on motor for *Advanced* grippers.
ZMOTOROFF	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Switch off motor if gripper is present.
ZHOMING	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Perform reference run for *Advanced* grippers.
ZRESET	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Reset if gripper is present.
ZCHANGEWP	*WpNumber* = workpiece number (1 to 15)	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Set workpiece number (n) for use with SCM.

Generated robot job name	Parameter In	Parameter Out	Function
ZISWPCHANGED	*WpNumber* = workpiece number (1 to 15)	*retValbool* = *TRUE*, if the workpiece is active = *FALSE*, if the workpiece is not active	Outputs TRUE if workpiece number (n) is activated.
ZISOPENED	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the gripper is open = *FALSE*, if the gripper is closed	Outputs TRUE if the gripper is open.
ZISCLOSED	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the gripper is closed = *FALSE*, if the gripper is open	Outputs TRUE if the gripper is closed.
ZISONTEACHPOS	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the gripper is set to TeachPosition = *FALSE*, if the gripper is not set to TeachPosition	Outputs TRUE if the gripper is set to *TeachPosition*.
ZISONUNDEFPOS	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the gripper is set to UndefinedPosition = *FALSE*, if the gripper is not set to UndefinedPosition	Outputs TRUE if the gripper is set to *OnUndefinedPos*.
ZISERROR	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the gripper is in error state = *FALSE*, if the gripper is not in error state	Outputs TRUE if the gripper is in an error state.
ZISMOTORON	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the motor is on = *FALSE*, if the motor is off	Outputs TRUE if the motor of the gripper is switched on.
ZISHOMINGOK	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if homing is OK = *FALSE*, if homing is not OK	Outputs TRUE if the referencing of the gripper is OK.
ZISHOMINGSUCCESS	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command ZHOMING was run successfully = *FALSE*, if the gripper is in error state after the command ZHOMING	Outputs TRUE if the referencing of the gripper is successful.
ZERRORWARNINGON	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Enables Error/Warning for robot if gripper is present.
ZERRORWARNINGOFF	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Disables Error/Warning for robot if gripper present.
ZISPARTDETACHED	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the part is detached = *FALSE*, if the part is not detached	B[n] = 1, if gripper of gripper type *Vacuum* signals *Part detached*. B[n] = 0, if part is not detached.
ZISPARTPRESENT	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = *TRUE*, if the part is present = *FALSE*, if the part is not present	B[n] = 1, if gripper of gripper type *Vacuum* signals *Part present*. B[n] = 0 if part is not present.

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Generated robot job name	Parameter In	Parameter Out	Function
ZISREADY	*1*: Address gripper 1 *2:* Address gripper 2	*retValbool* = TRUE, if the input is switched on = *FALSE*, if the input is not switched on	B[n] = 1 if gripper of gripper type *Vacuum* signals *Ready*. B[n] = 0 if gripper is not ready.
ZMATCHSTARTCHANGE	-	*retValbool* = *TRUE*, if the command was successful = *FALSE*, if the command fails	Is output before the gripper is changed for *MATCH* .
ZISMATCHCHANGEDONE	-	*retValbool* = *TRUE*, if MATCH was changed = *FALSE*, if MATCH was not changed	For *MATCH* B[n] = 1 if gripper is connected successfully. B[n] = 0, if gripper is not connected successfully.

9.3 Creating robot jobs

9.3.1 Creating variables

INFORMATION

The variables *retValbool* and *wpNumber* must be created in order to use robot jobs.

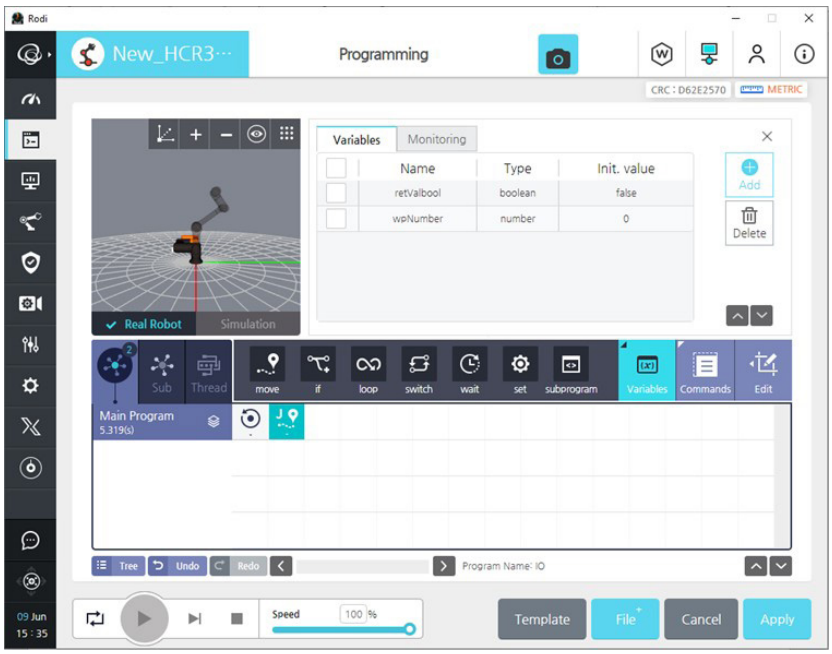
► Only use these variables for grippers from Zimmer GmbH.

► Press *Programming* in the menu bar.

► Press the *Add* button.

► Create the variable *retValbool* with *Type boolean* and *Init. value false*.

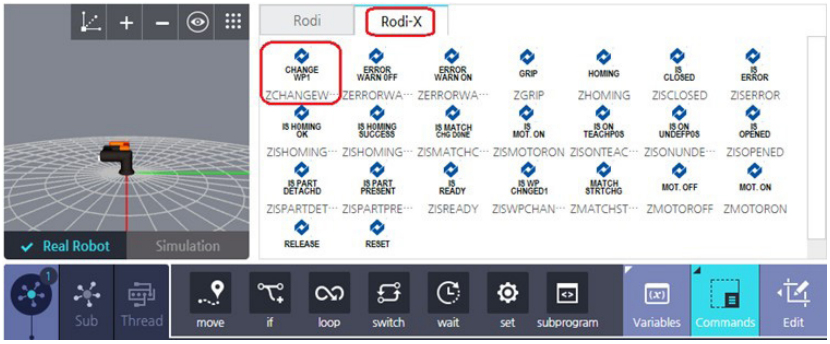
► Create the variable *wpNumber* with *Type number* and *Init. value 0*.



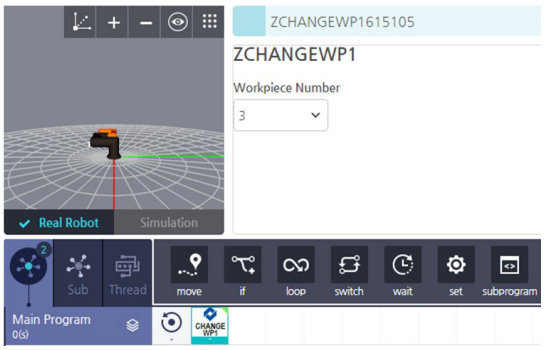
9.3.2 Example of robot jobs

In the example, a workpiece is specified and a gripping process is run for it.

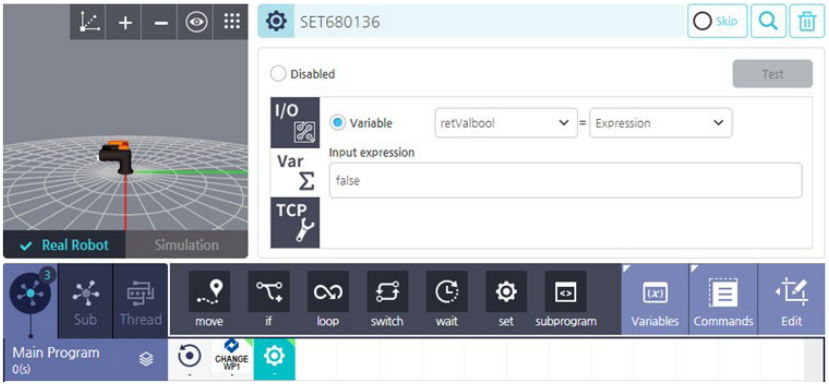
- ▶ Press *Commands*.
- ▶ Press the *Rodi-X* tab.
- ▶ Press the robot job *ZCHANGEWP1*.



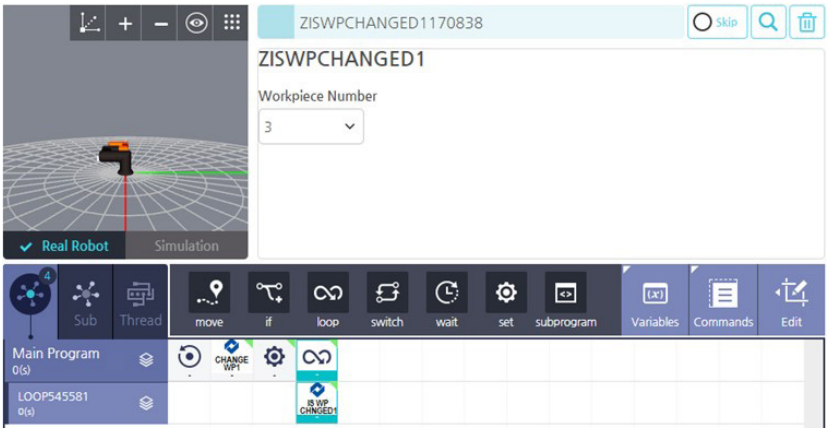
- ▶ In the *Workpiece Number* drop-down menu, select the workpiece number.



- ▶ Press the initialization *set*.
- ▶ In the *Input expression* field, enter the value *false*.

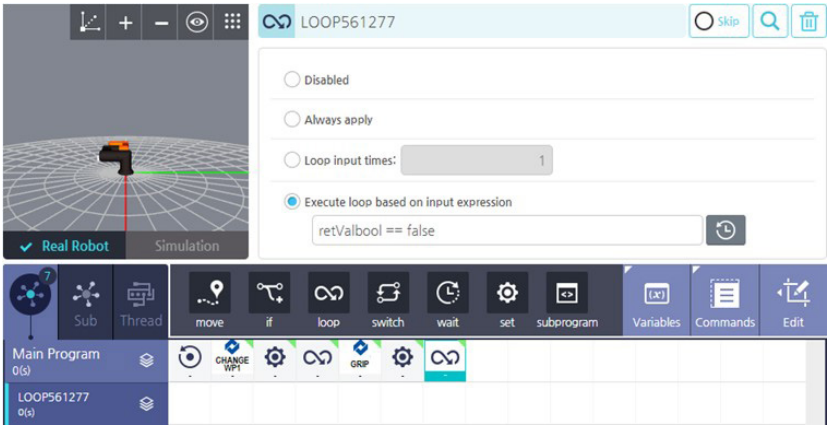


- ▶ Press the initialization *loop*.
- ▶ Press the robot job *ZISWPCHANGED1*.
- ▶ In the *Workpiece Number* drop-down menu, select the workpiece number.
- ⇨ The loop runs until the workpiece has received the assigned workpiece number (retValbool = true).

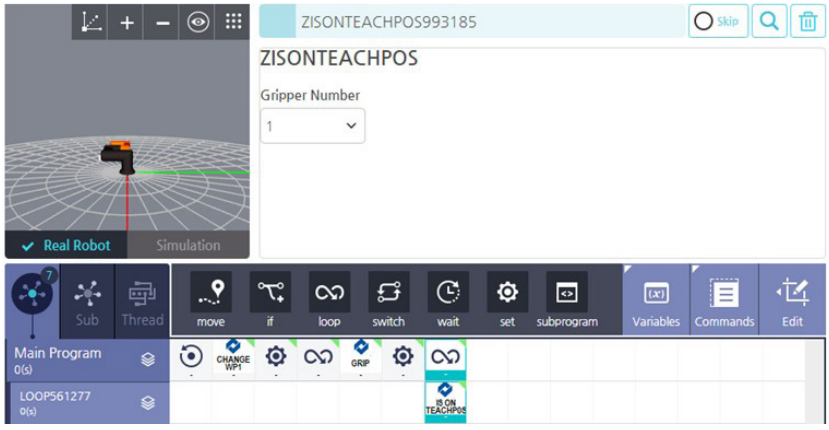


- ▶ Press *Commands*.
- ▶ Press the *Rodi-X* tab.
- ▶ Press the robot job *ZGRIP*.
- ▶ In the *Gripper Number* drop-down menu, select the gripper number.
- ▶ Press the initialization *set*.
- ▶ In the *Input expression* field, enter the value *false*.

- ▶ Press the initialization *loop*.
- ▶ In the *Execute loop based on input expression* field, enter the value *false* for the variable *retValbool*: retValbool == false

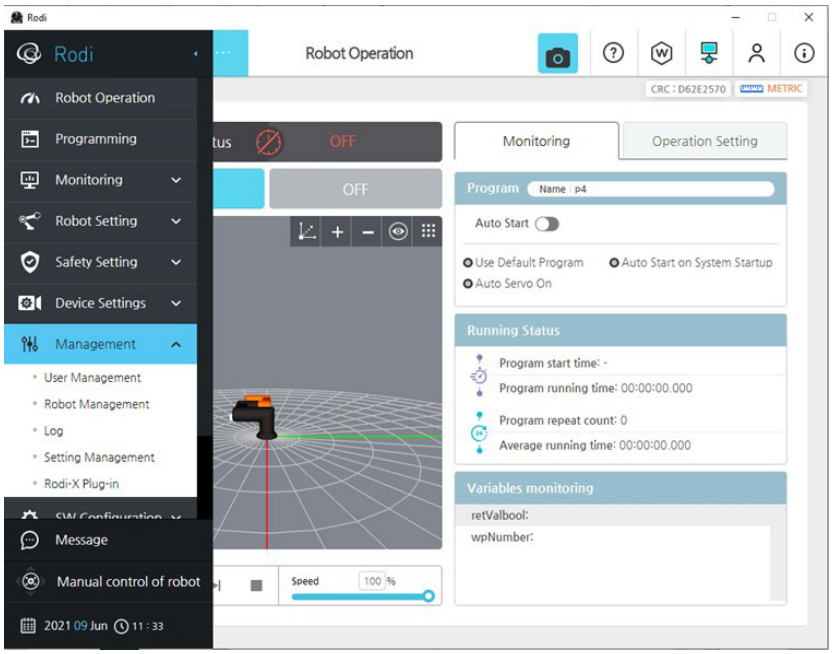


- ▶ Press *Commands*.
- ▶ Press the *Rodi-X* tab.
- ▶ Press the robot job *ZISONTEACHPOS*.
- ▶ In the *Gripper Number* drop-down menu, select the gripper number.
- ⇨ The loop runs until the gripping process ends and gripper 1 is at the TeachPosition (retValbool = true).

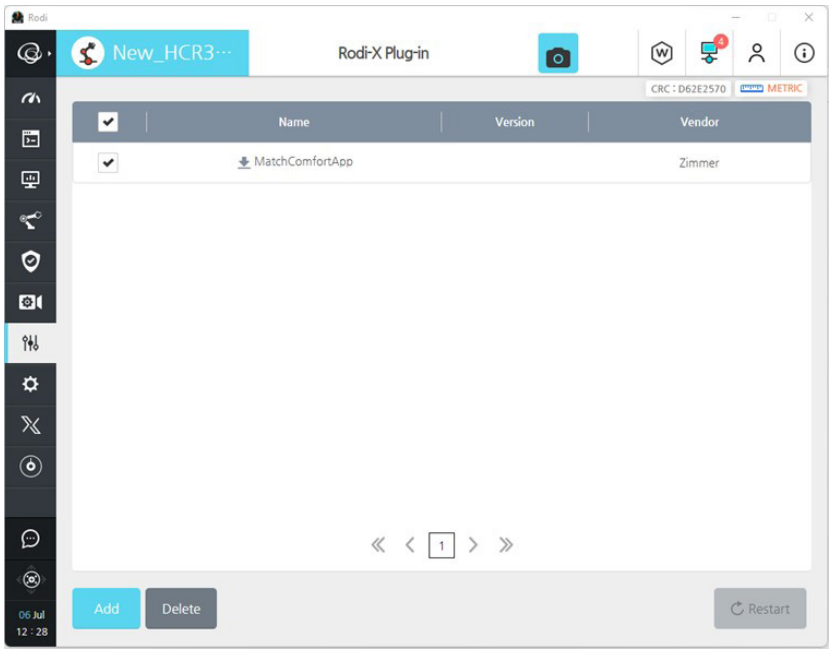


10 Uninstalling the Comfort App

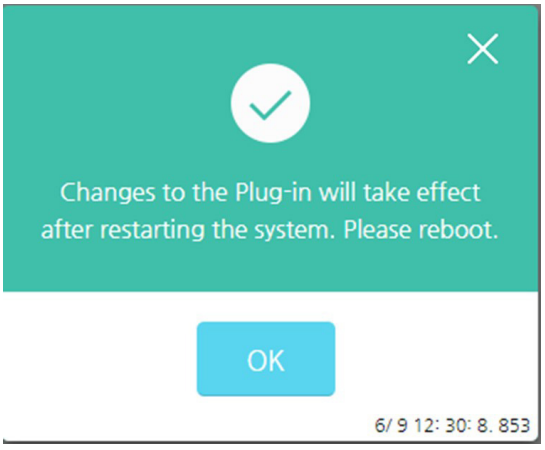
- ▶ In the *Management* menu, press *Rodi-X Plug-in*.
- ⇨ The *Rodi-X Plug-in* window opens.



- ▶ Activate the Comfort app option field.
- ▶ Click the *delete* button.



- ▶ In the prompt, click the *Ok* button.
- ⇨ Uninstallation is complete.
- ▶ Switch off the power supply of the robot control system and robot control panel.
- ▶ After a few seconds, switch on the power supply of the robot control system and robot control panel again.
- ▶ Switch on the robot control system and robot control panel.



11 Error diagnosis

INFORMATION

- ▶ More information can be found in the installation and operating instructions of the gripper.
- ▶ Please contact Customer Service if you have any questions.