



OPERATING INSTRUCTIONS

MATCH Comfort App

for Fanuc CRX
GuideZ for Laptop for SCM-F/
SCM-C

DDOC01747

THE KNOW-HOW FACTORY

MATCH

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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 for people or that may result in material or environmental damage. Ignoring these notices may result in slight, temporary injuries or damage to the product or to 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.

NOTICE



General notices contain usage tips and valuable information, but no warnings of dangers to health.

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



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 *Tablet Teach Pendant* of the *R-30iB Mini Plus* robot control system.

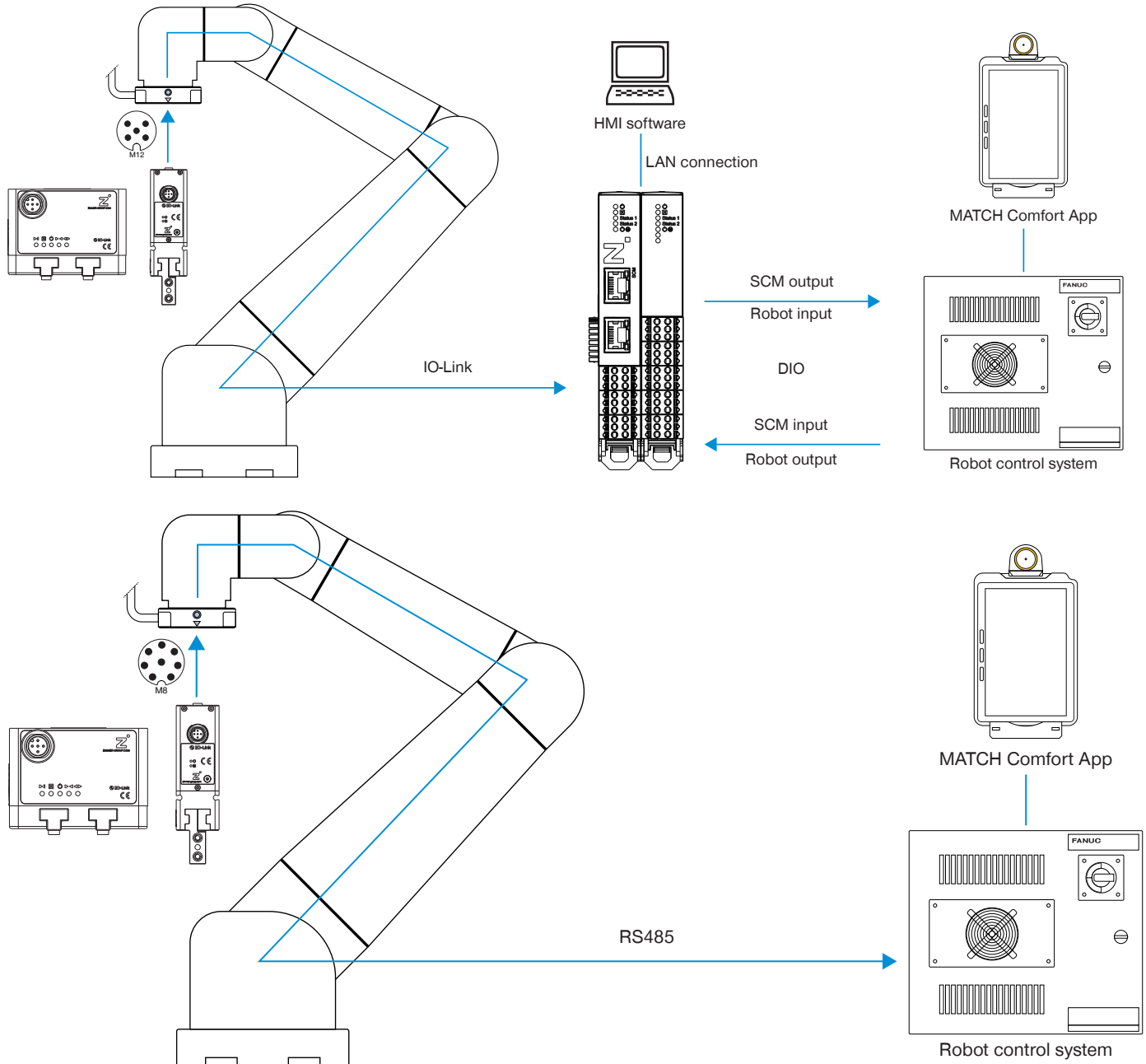
3 Personnel qualification

Installation, commissioning and maintenance may only be performed by trained specialists. These persons must have read and understood the installation and operating instructions in full.

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 MATCH Comfort App. The grippers can be controlled using the MATCH 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

The MATCH Comfort App is used on the robot control panel to control grippers.

Depending on the configuration and the connection used, various robot jobs are available for interacting between robot inputs and robot outputs with the gripper.

The names of the dynamically generated robot jobs remain unchanged. The basic program does not have to be modified for configuration changes or redistribution of the robot inputs and robot outputs.

6 Accessories/scope of delivery

INFORMATION



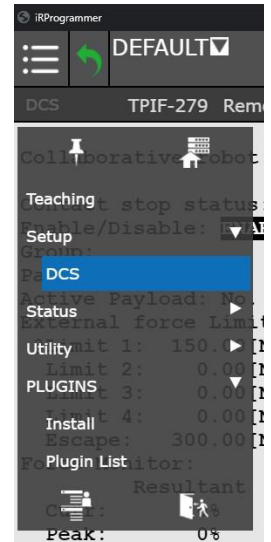
If any accessories not sold or authorized by Zimmer GmbH are used, the function of the product cannot be guaranteed. Zimmer GmbH accessories are specifically tailored to the individual products.

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

7 Installation

7.1 Installing the MATCH Comfort App

- ▶ 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 MATCH Comfort App into the robot control panel.
- ▶ Press the button.
- ▶ In the *PLUGINS* menu, press *Install*.

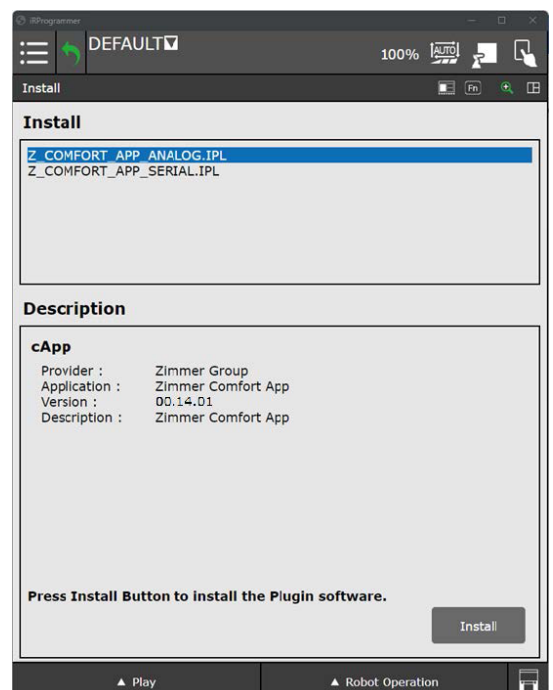


INFORMATION

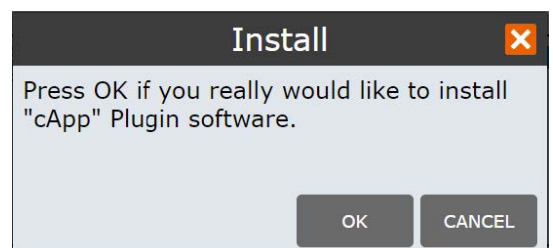


You require the *Z_Comfort_App_Serial.ipl* installation file for grippers that are connected via a controller IO.

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

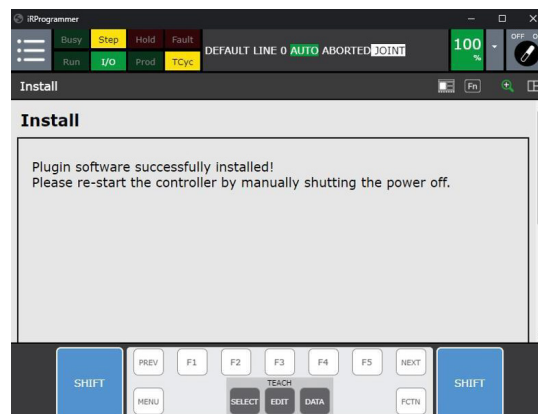


- ▶ In the prompt, click the *Ok* button.



⇒ 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

CAUTION



Risk of injury, material damage and malfunctions in case of non-compliance

The MATCH Comfort App uses registers 138 to 200. If these registers are changed, this could lead to malfunctions, material damage and injuries.

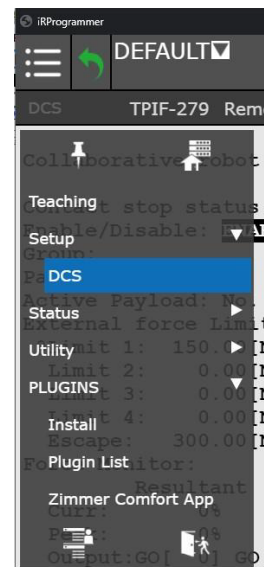
- ▶ Do not use registers 138 to 200 in your program.

NOTICE



- ▶ Switch on the robot so that you can use the MATCH comfort App.

- ▶ Press the button.
- ▶ In the *PLUGINS* menu, press *MATCH Comfort App*.

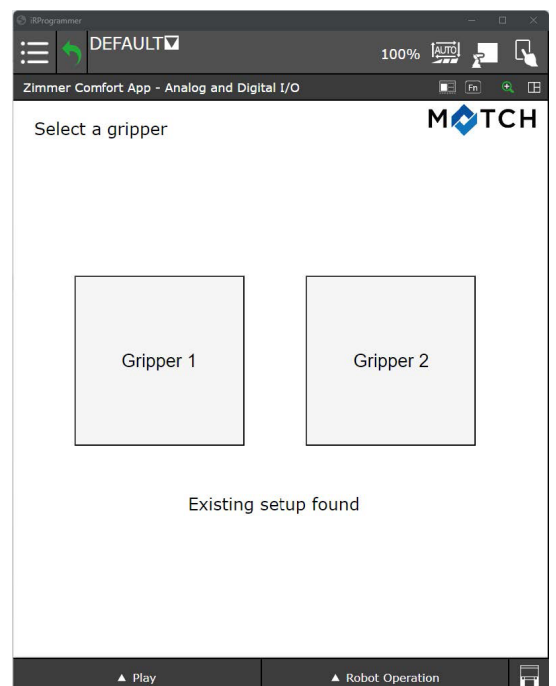


8.1 Existing setup found

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

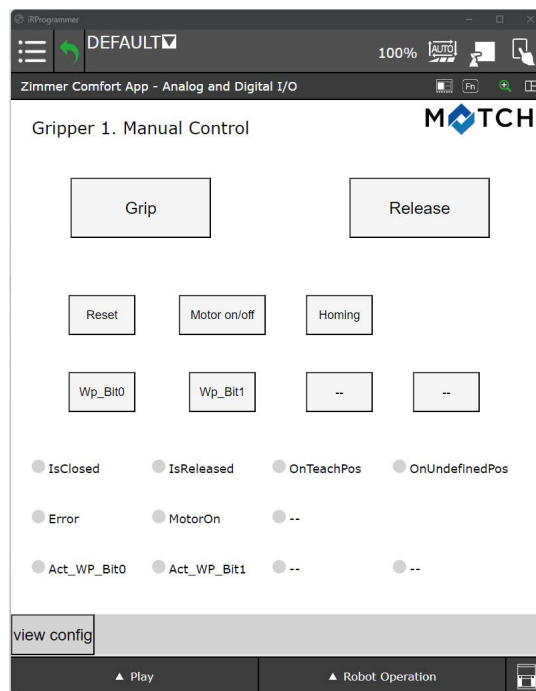
This screen does not appear if the available setup is only found for one gripper. In this case, the next screen is shown right away.

- ▶ Click the button of the desired gripper.
- ⇒ The *Manual control* screen for the manual control is displayed.



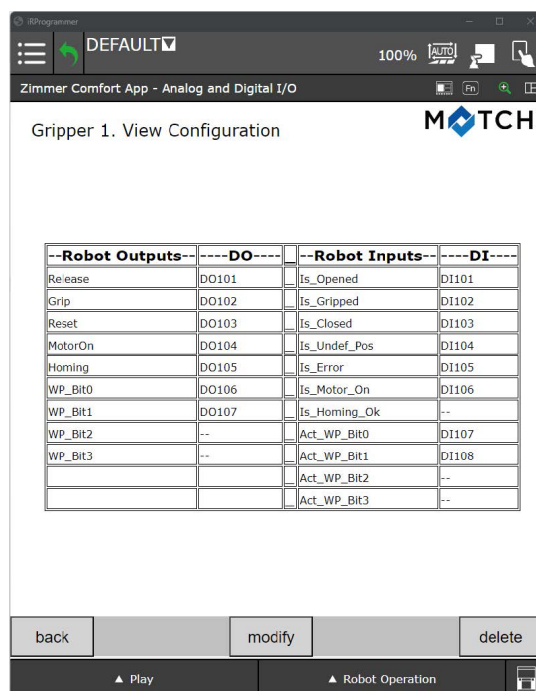
In the *Manual control* screen, you can operate the gripper manually and display the status.

- Click the *view config* button.



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

- Click the *delete* button.



- In the prompt, click the *YES* button.

⇒ The existing setup is deleted.

⇒ The screen sequence for configuring new grippers is displayed.

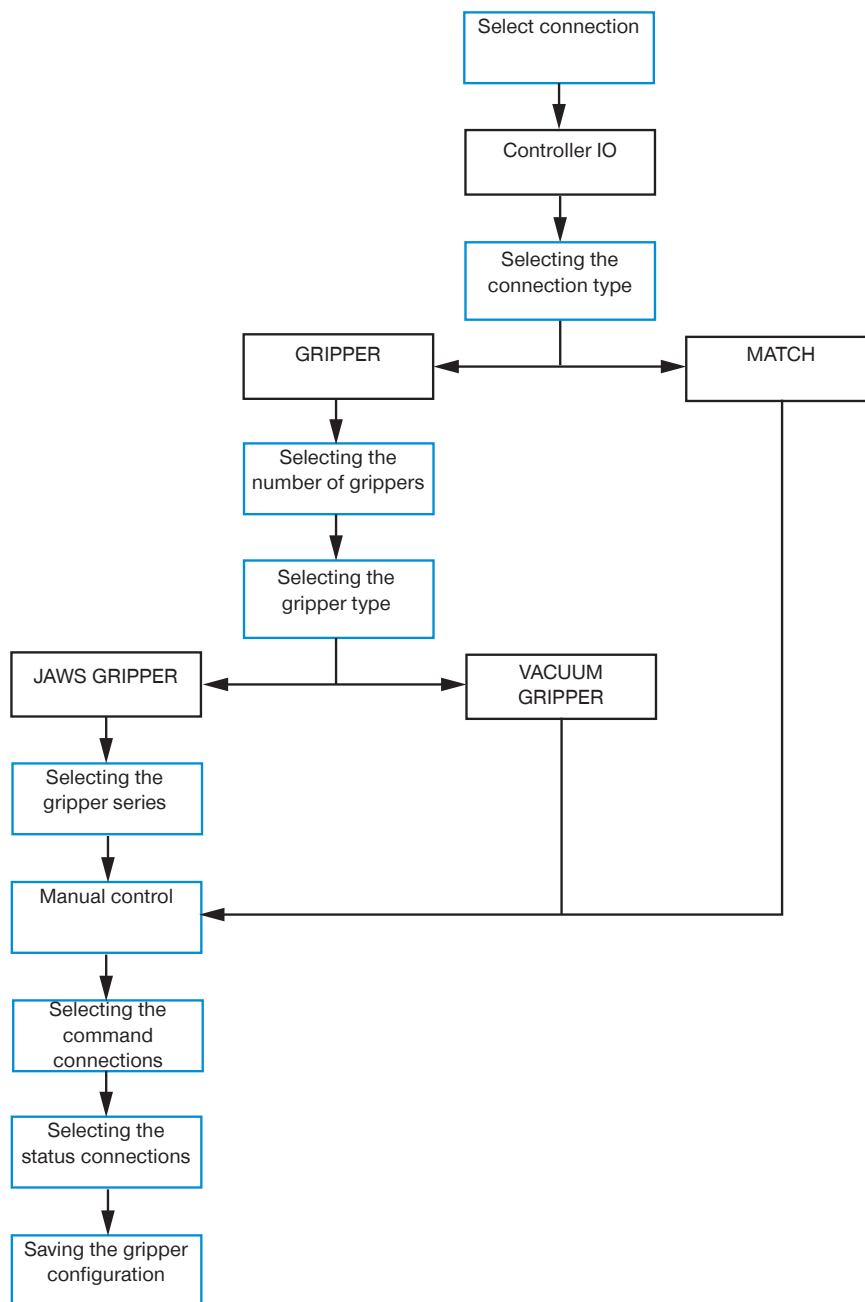


Are you sure ? The assignment will be deleted.

YES

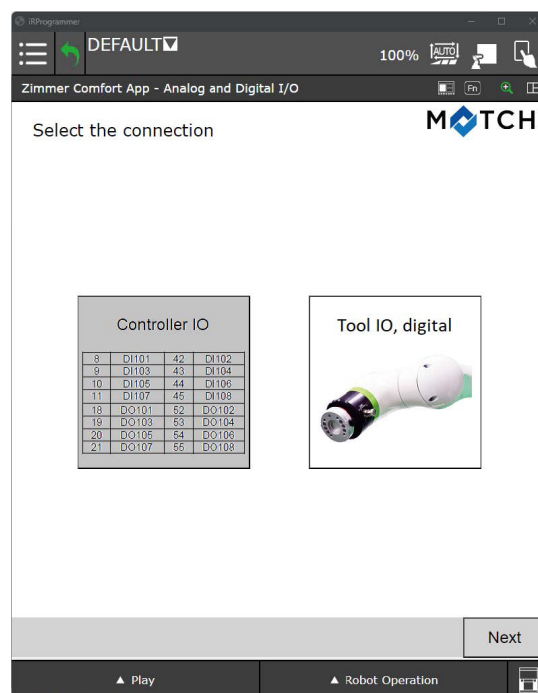
NO

8.2 Creating a gripper configuration



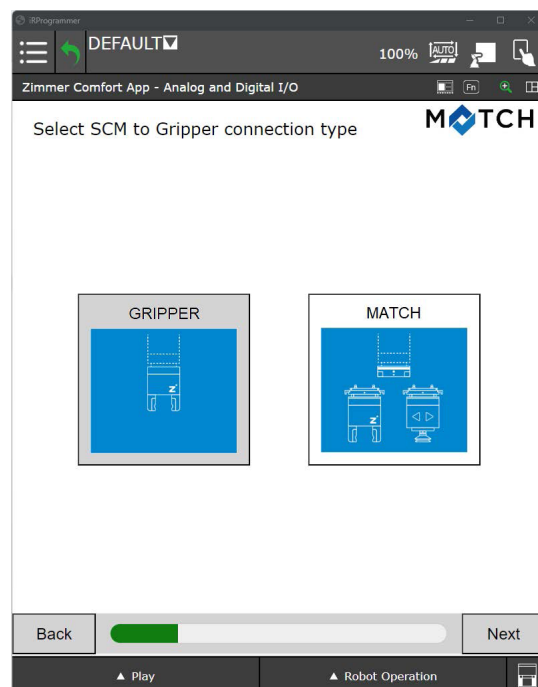
8.2.1 Selecting the connection

- ▶ Press the *Controller IO* button if you want to use a MATCH gripper without an integrated SCM on the MATCH robot module.
- ▶ Click the *next* button.



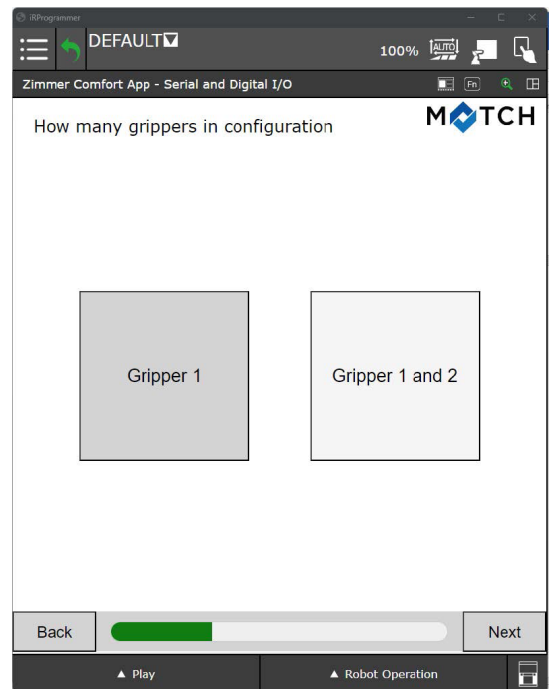
8.2.2 Selecting the connection type

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



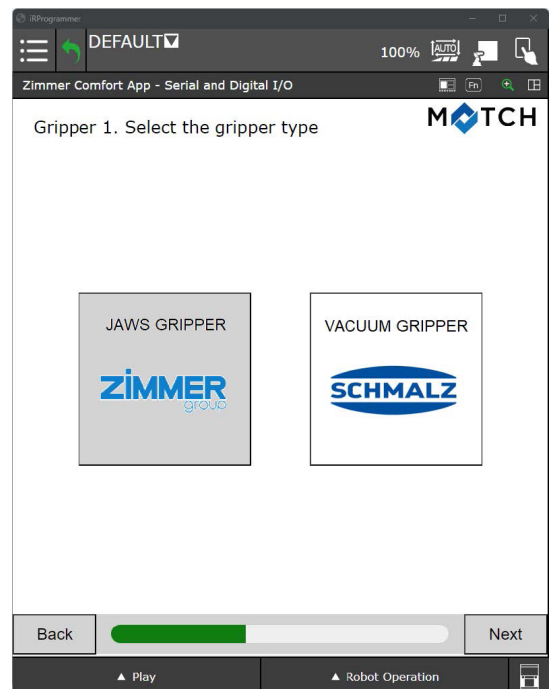
8.2.3 Selecting the number of grippers

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



8.2.4 Selecting the gripper type

- ▶ Click the desired gripper type.
- ▶ Click the *next* button.



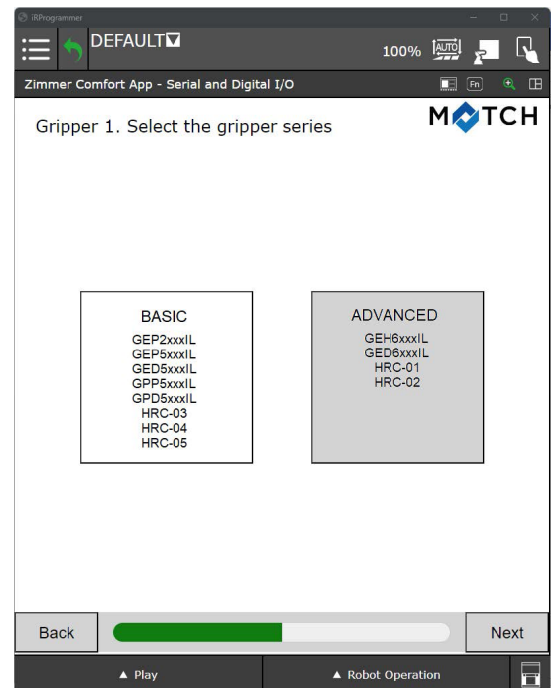
8.2.5 Selecting the gripper series

INFORMATION



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

- ▶ Click the class of your gripper.
- ▶ Click the *next* button.



8.2.6 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

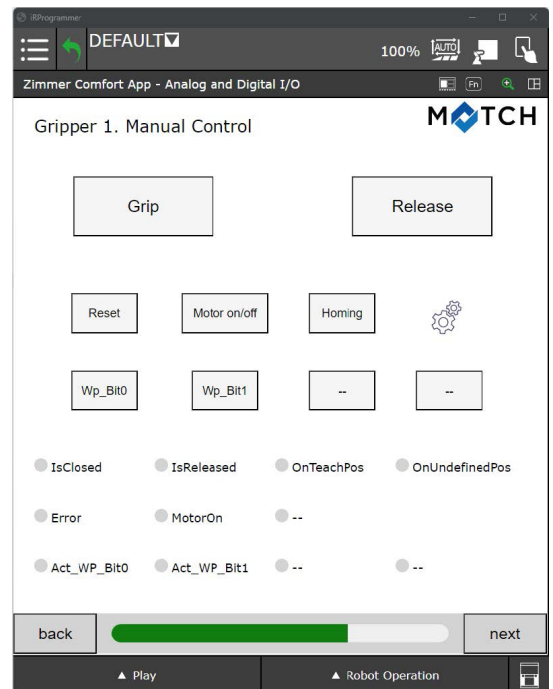


The button is only displayed for the connection via a controller IO.

Connection type: Gripper

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

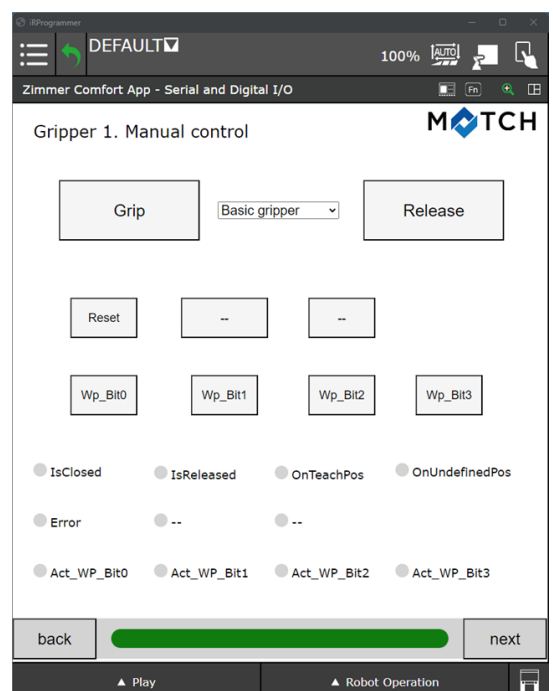
- Press the button to select command connections and status connections.



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.

8.2.7 Selecting the command connections

NOTICE



The gripper wiring must match the gripper configuration done in the MATCH 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.

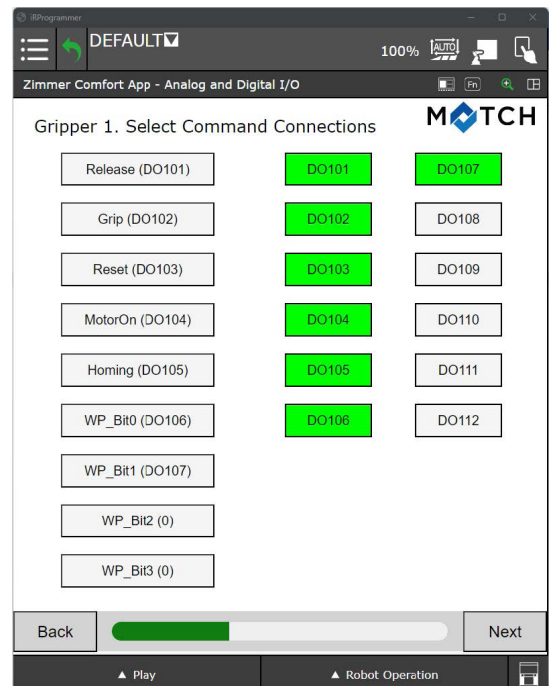
- e.g. DO7

⇒ The output has been assigned to the signal.

⇒ The button of the signal is expanded by adding the output.

- e.g. Release (DO7)

► Press the *Next* button.



8.2.8 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.

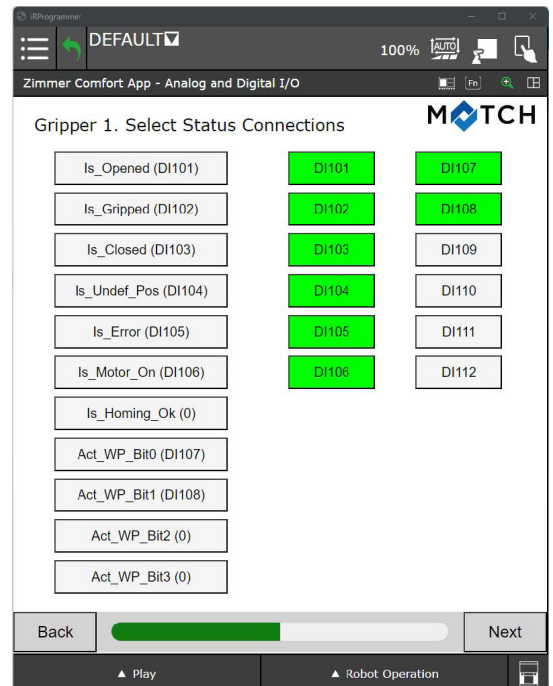
- Complete the wiring precisely as shown on this screen.

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_Closed
- Click the desired input.
 - e.g. DI107
- ⇒ The input has been assigned to the signal.
- ⇒ The button of the signal is expanded by adding the input.
 - e.g. Is_Closed (DI107)
- Press the *Next* button.



8.2.9 Saving the gripper configuration

NOTICE

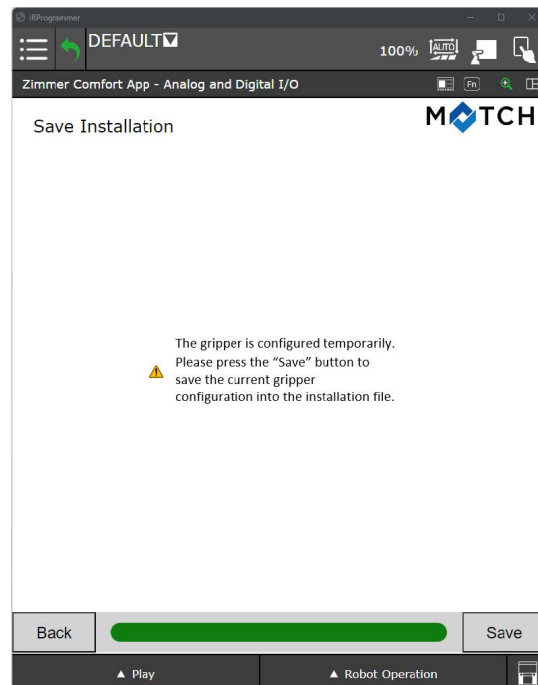


The settings are temporary.

- Save the settings to the installation file.

► 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.



Gripper Configuration Saved !

OK

9 Operation




9.1 Control principle of the gripper






- ▶ Prepare *Advanced* grippers for the control system:
 - ▶ If necessary, do a reference run (IPL_ZIMMER_CAPP_HOMING).
 - ▶ Check if the reference run was done (IPL_ZIMMER_CAPP_ISHOMINGOK or IPL_ZIMMER_CAPP_ISHOMING-SUCCESS).
 - ▶ Switch on the motor (IPL_ZIMMER_CAPP_MOTORON).
 - ▶ Check whether the motor is switched on (IPL_ZIMMER_CAPP_ISMOTORON).
- ⇒ The gripper is prepared for the control system if no error is present (IPL_ZIMMER_CAPP_ISERROR).
- ▶ Set a workpiece configured with the HMI software ZG_IO_LINK_HMI (IPL_ZIMMER_CAPP_CHANGEWP) if more than one workpiece is used.
- ▶ Check whether a workpiece has changed (IPL_ZIMMER_CAPP_ISWPCHANGED).
- ▶ Grip (IPL_ZIMMER_CAPP_GRIP) or release (IPL_ZIMMER_CAPP_RELEASE) the workpiece.
- ▶ Check the position of the gripper jaw (IPL_ZIMMER_CAPP_ISONTEACHPOS, IPL_ZIMMER_CAPP_ISOPENED, IPL_ZIMMER_CAPP_ISCLOSED or IPL_ZIMMER_CAPP_ISONUNDEFPOS).





9.2 Overview of generated robot jobs





After successful configuration of the grippers using the HMI software ZG_IO_LINK_HMI, 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 MATCH 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
 IPL_ZIMMER_CAPP_GRIP(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -X, all other negative values are errors	Gripping
 IPL_ZIMMER_CAPP_RELEASE(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -X, all other negative values are errors	Release
 IPL_ZIMMER_CAPP_MOTORON(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Switch on motor for <i>Advanced</i> grippers.

Generated robot job name	Parameter In	Parameter Out	Function
 IPL_ZIMMER_CAPP_ MOTOROFF(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	Register No. = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Switch off motor if gripper is present.
 IPL_ZIMMER_CAPP_ HOMING(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	Register No. = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Perform reference run for <i>Advanced</i> grippers.
 IPL_ZIMMER_CAPP_ RESET(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	Register No. = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Reset if gripper is present.
 IPL_ZIMMER_CAPP_ CHANGEW- P(workpiece number, register number)	Workpiece number = 1 to 15	Register No. = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Set workpiece number (n) for use with SCM.
 IPL_ZIMMER_CAPP_ ISWPCHANGED(workpiece number, register number)	Workpiece number = 1 to 15	Register No. = 1, TRUE Workpiece number(s) activated = 2, FALSE Workpiece number(s) not activated = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the workpiece number(s) is/are activated.

Generated robot job name	Parameter In	Parameter Out	Function
 IPL_ZIMMER_CAPP_ ISOPENED(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 1, TRUE Gripper open = 2, FALSE Gripper closed = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the gripper is open.
 IPL_ZIMMER_CAPP_ ISCLOSED(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 1, TRUE Gripper closed = 2, FALSE Gripper open = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the gripper is closed.
 IPL_ZIMMER_CAPP_ ISONTEACH-POS(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 1, TRUE Gripper at TeachPosition = 2, FALSE Gripper not at TeachPosition = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the gripper is at the TeachPosition.
 IPL_ZIMMER_CAPP_ ISONUNDEF-POS(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 1, TRUE Gripper at UndefinedPosition = 2, FALSE Gripper not at UndefinedPosition = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the gripper is at the UndefinedPosition.

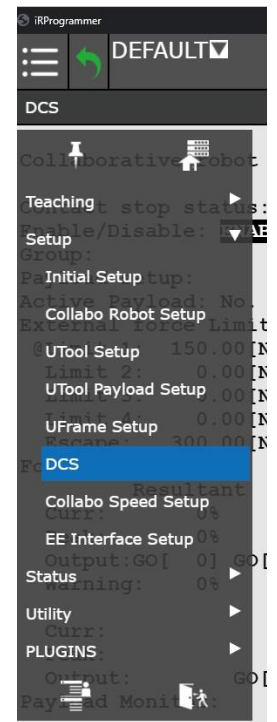
Generated robot job name	Parameter In	Parameter Out	Function
 IPL_ZIMMER_CAPP_ ISERROR(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 1, TRUE Gripper in error state = 2, FALSE Gripper not in error state = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the gripper is in error state.
 IPL_ZIMMER_CAPP_ ISMOTORON(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 1, TRUE Motor switched on = 2, FALSE Motor switched off = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Check whether the motor is switched on.
 IPL_ZIMMER_CAPP_ ISHOMIN-GOK(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 1, TRUE Referencing of gripper OK = 2, FALSE Referencing of gripper not OK = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the referencing of the gripper is OK.
 IPL_ZIMMER_CAPP_ ISHOMINGSUCCESS(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	<i>Register No.</i> = 1, TRUE Referencing of gripper successful = 2, FALSE Referencing of gripper not successful = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the referencing of the gripper is successful.

Generated robot job name	Parameter In	Parameter Out	Function
 IPL_ZIMMER_CAPP_ERRORWARNIN- GON(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	Register No. = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Enables Error/Warning for robot if gripper is present.
 IPL_ZIMMER_CAPP_ERRORWARNIN- GOFF(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	Register No. = 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Disables Error/Warning for robot if gripper present.
 IPL_ZIMMER_CAPP_ISPARTDE- TACHED(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	Register No. = 1, TRUE Part detached from gripper = 2, FALSE Part not detached from gripper = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the part is detached.
 IPL_ZIMMER_CAPP_ISPARTPRE- SENT(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	Register No. = 1, TRUE Part present on gripper = 2, FALSE Part not present on gripper = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the part is present.
 IPL_ZIMMER_CAPP_ISREADY(gripper number, register number)	1: Address gripper 1 2: Address gripper 2	Register No. = 1, TRUE Gripper ready = 2, FALSE Gripper not ready = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors	Checks whether the gripper is ready.

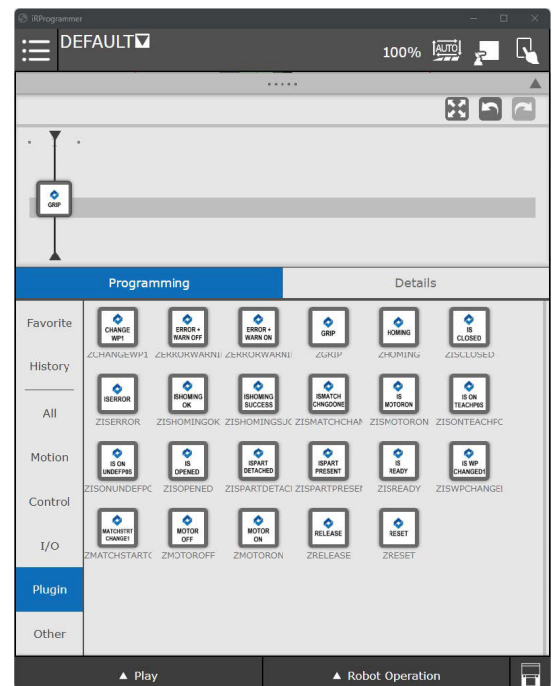
Generated robot job name	Parameter In	Parameter Out	Function
 <p>IPL_ZIMMER_CAPP_ MSTART- CHANGE(gripper number, register number)</p>	-	<p><i>Register No.</i></p> <p>= 0, if no error is present = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors</p>	Is output before the gripper is changed for <i>MATCH</i> .
 <p>IPL_ZIMMER_CAPP_ ISMCHG- DONE(gripper number, register number)</p>	-	<p><i>Register No.</i></p> <p>= 1, TRUE Gripper connected successfully = 2, FALSE Gripper not connected successfully = -1, if an error has occurred = -2, if incorrect settings have been made = -3, if gripper has not be configured = -4, if command cannot be used with gripper configuration = -X, all other negative values are errors</p>	Checks whether the gripper has been connected successfully.

9.3 Creating programs via drag & drop commands

- Press the button.
- Press the button.
- ⇒ A new program has been created.

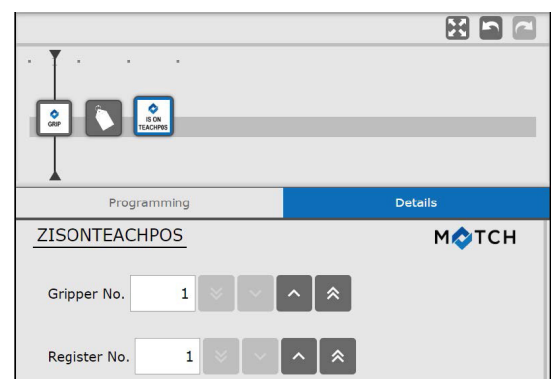


- Move the commands to the upper area via drag & drop.

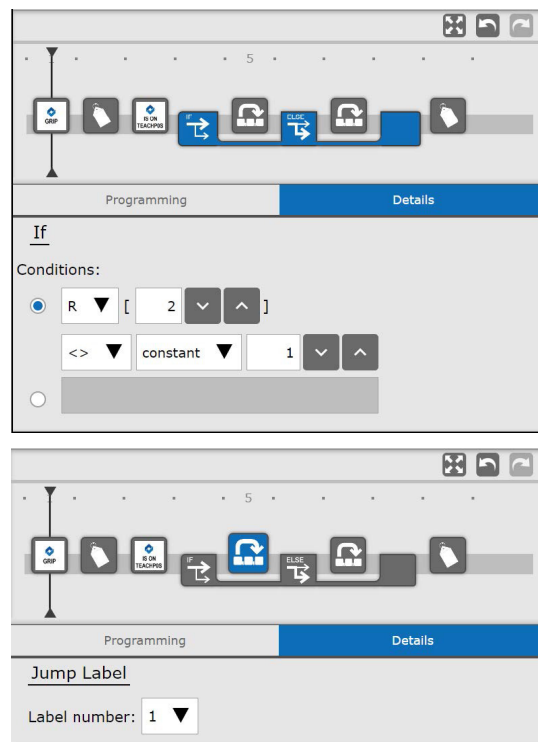


In the example, Register 2 receives the result of the command after the command is executed.


- A 1 is displayed in the *Register No.* field: Gripper 1 is in the TeachPosition.
- A 2 is displayed in the *Register No.* field: Gripper 1 is not in the TeachPosition.

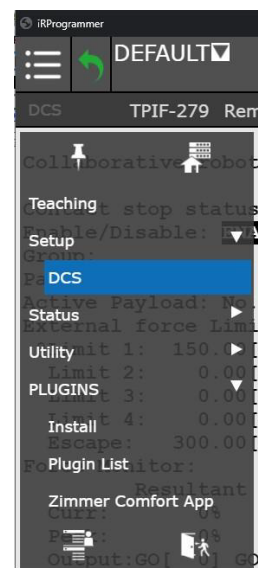


The content of Register 2 can be checked via a constraint-based jump.

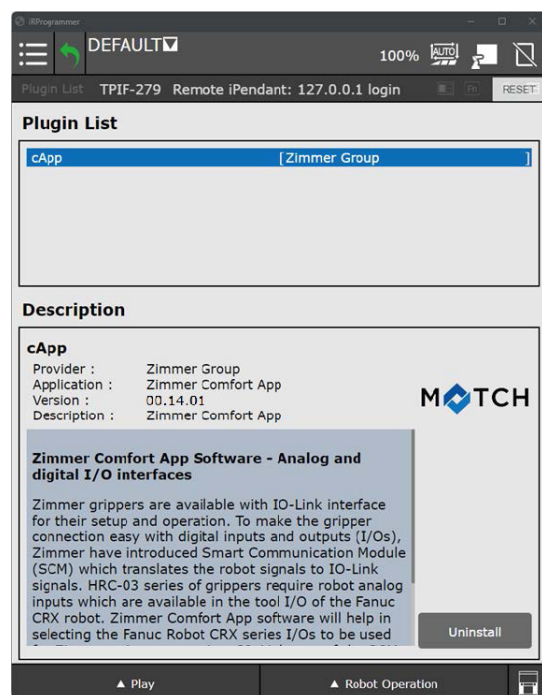


10 Uninstalling the MATCH Comfort app

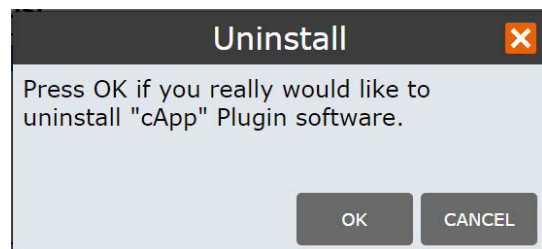
- ▶ Press the  button.
- ▶ In the *PLUGINS* menu, press *Plugin List*.



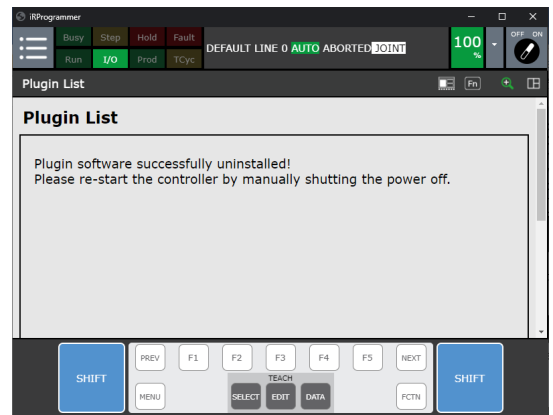
- ▶ Press the *Uninstall* button.



- ▶ In the prompt, click the *Ok* button.



⇒ Uninstallation is complete.



11 Error diagnosis

INFORMATION



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