



OPERATING INSTRUCTIONS

MATCH Comfort App

for Fanuc CRX
DIO/Analog
DDOC01750

THE KNOW-HOW FACTORY

Content

1	Supporting documents	4
1.1	Notices and graphics in the installation and operating instructions	4
2	Proper use	5
3	Personnel qualification	5
3.1	Electricians	5
3.2	Specialists	5
3.3	Instructed personnel.....	5
3.4	Service personnel.....	5
3.5	Additional qualifications	5
4	Product description	6
5	Functional description	6
6	Accessories/scope of delivery	6
7	Installation	7
7.1	Installing the MATCH Comfort App	7
8	Commissioning	9
8.1	Creating a gripper configuration	10
8.1.1	Selecting the gripping direction	10
8.1.2	Teaching workpieces.....	11
8.1.3	Saving the gripper configuration.....	11
8.1.4	Manual control	12
8.2	Deleting existing setups	12
9	Operation.....	13
9.1	Control principle of the gripper	13
9.2	Overview of generated robot jobs	13
9.3	Creating programs via drag & drop commands.....	14
9.4	Creating programs via text input	16
10	Uninstalling the MATCH Comfort app.....	17
11	Error diagnosis.....	18

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



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

WARNING



Injuries and material damage due to inadequate qualification

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.

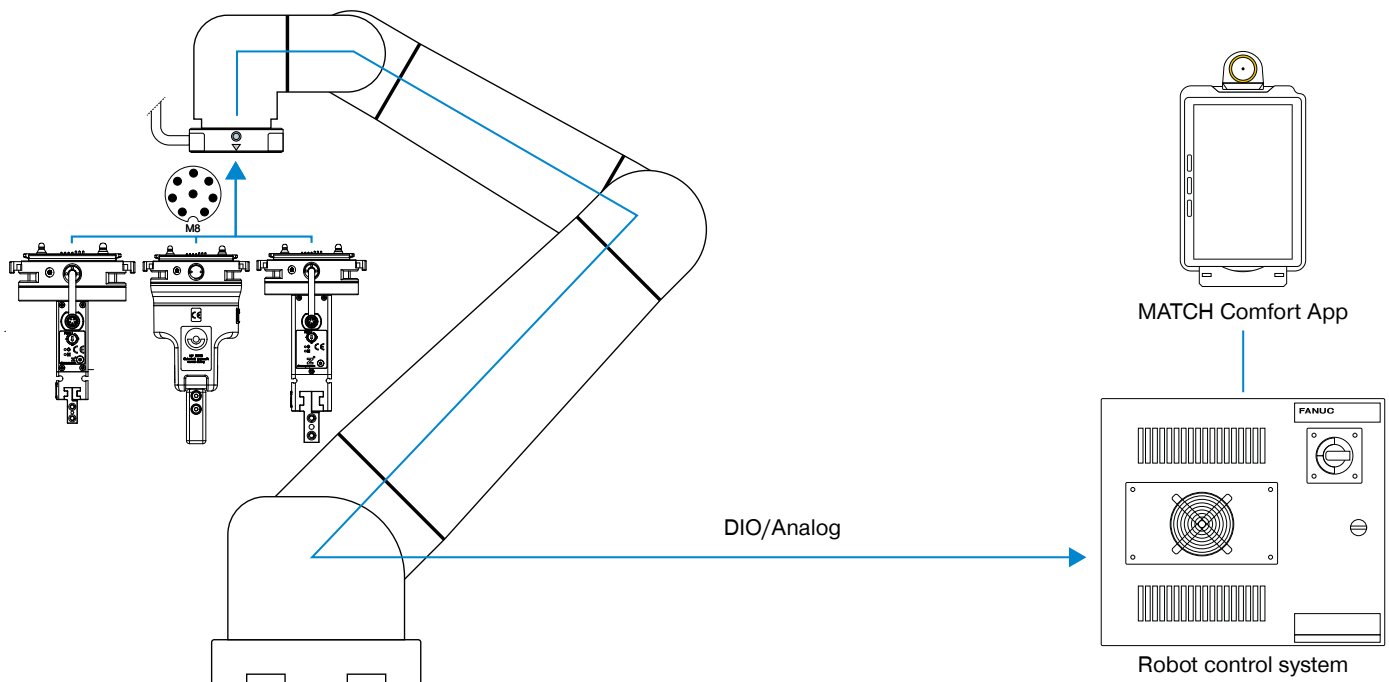
3.5 Additional qualifications

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.

4 Product description

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 MATCH 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



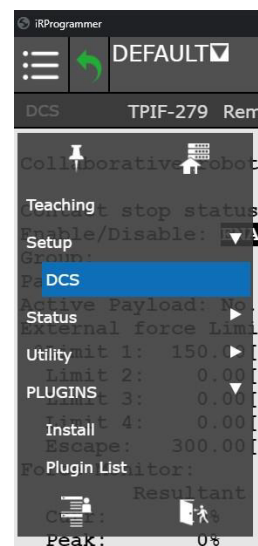
If any accessories not sold or authorized by Zimmer GmbH are used, the function of the product cannot be guaranteed. Zimmer GmbH accessories are specifically tailored to the individual products.

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

7 Installation

7.1 Installing the MATCH Comfort App

- ▶ Switch off the power supply of the robot control system.
- ▶ Wire the gripper to the connection on the tool holder.
- ▶ Switch on the voltage supply.
- ▶ 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*.

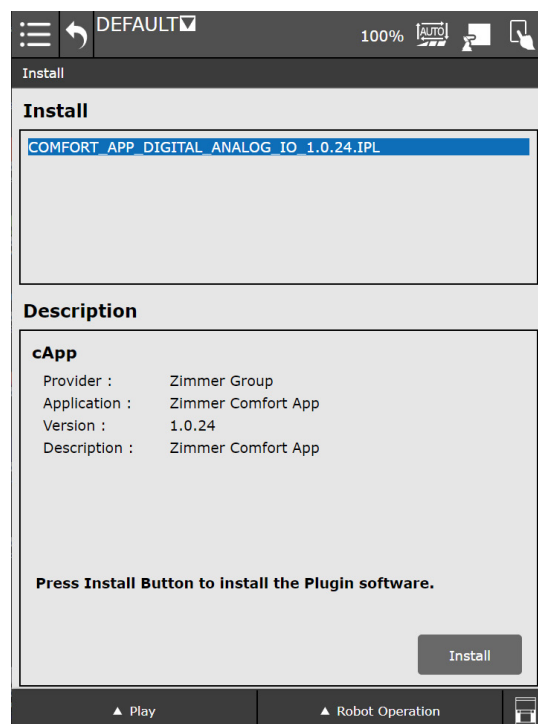


INFORMATION

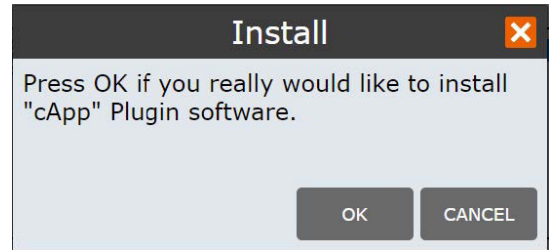


You require the *Comfort_App_Digital_Analog_IO_x.x.xx.ipl* installation file for grippers that are connected via an analog IO.

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

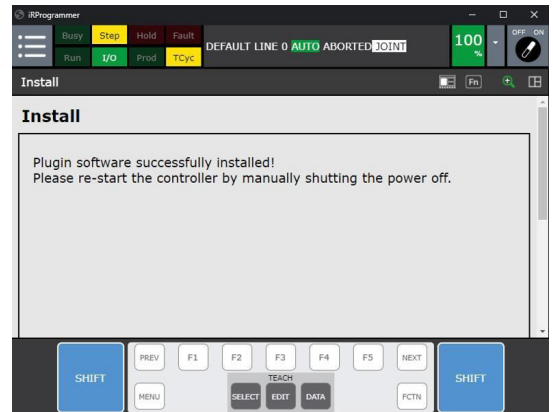


► In the prompt, click the *Ok* button.



⇒ 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

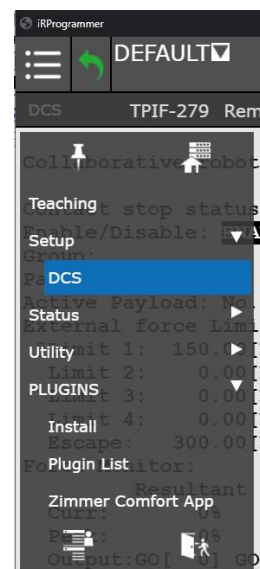
NOTICE



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

- Press the  button.

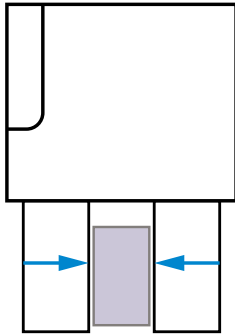
- In the *PLUGINS* menu, press *MATCH Comfort App*.



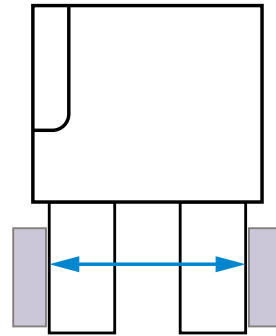
8.1 Creating a gripper configuration

8.1.1 Selecting the gripping direction

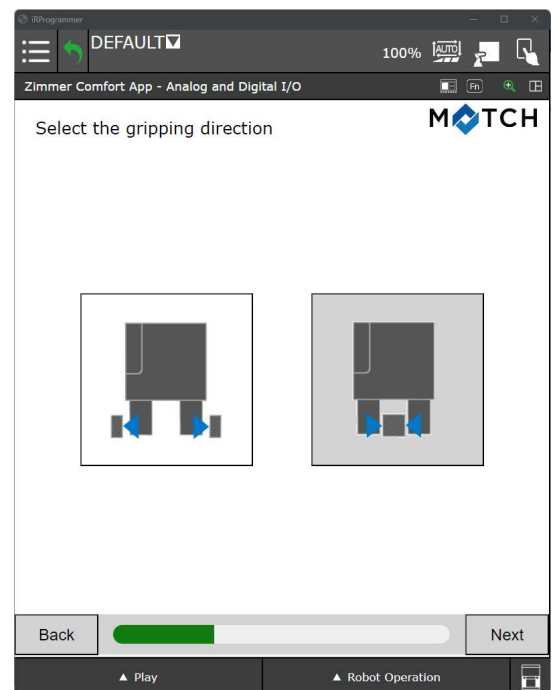
Outside gripping



Inside gripping



- Select the gripping direction.
- Click the *next* button.

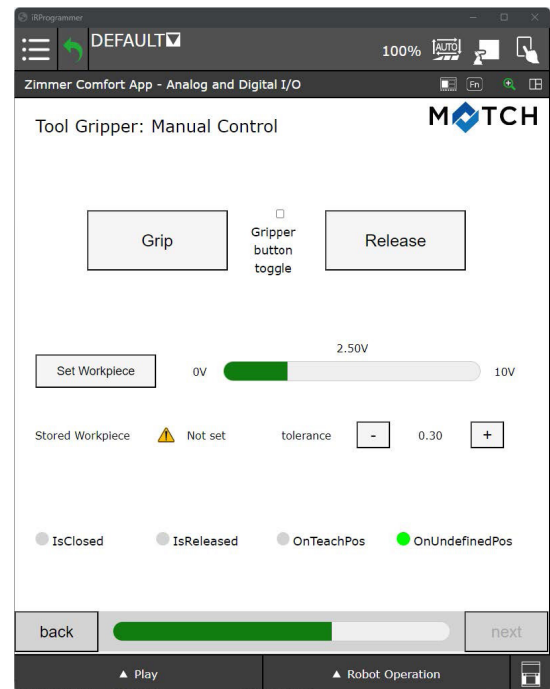


8.1.2 Teaching workpieces

- ▶ Open the gripper by pressing the *Release* button.
- ▶ Position the gripper centered over the workpiece.
- ▶ Press the *Grip* button.
- ⇒ The bar graph display shows the current jaw position as an analog signal from 0 V to 10 V.

The figure shows the dependence of the analog feedback signal on the gripper finger position. This dependency is linear and independent of the selected gripping direction (outside gripping or inside gripping).

- ▶ Modify the workpiece detection tolerance using the + and - buttons.
- ▶ Press the *Set Workpiece* button to set the workpiece parameters and generated parameter tasks in the app.
- ▶ Click the *next* button.



8.1.3 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

8.1.4 Manual control

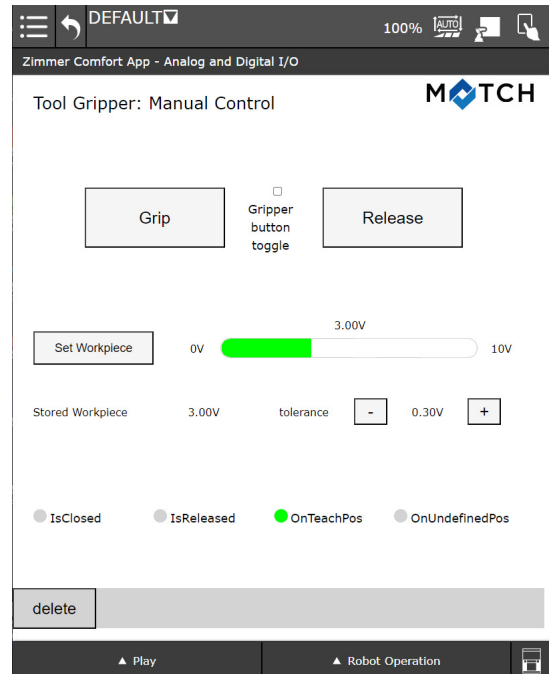
NOTICE



The prerequisite for the function test is that the wiring between the robot and the gripper is present and that the robot 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.

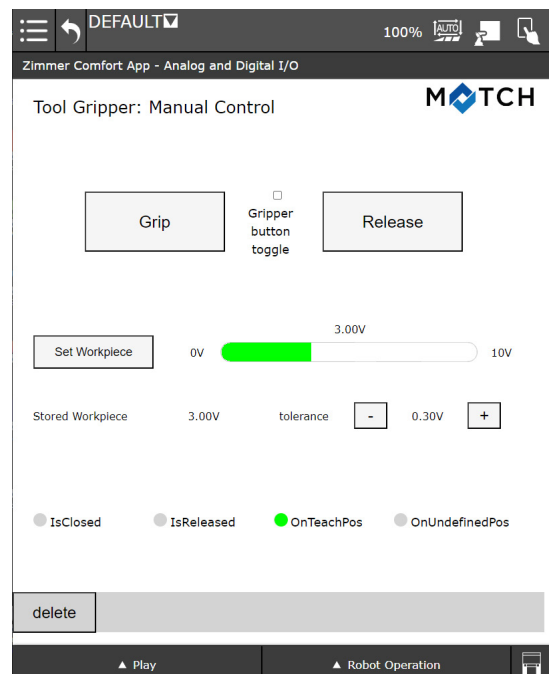
- ▶ Activate the *Gripper button toggle* option field so that you can open the gripper via a button on the gripper.
- ▶ Press the button on the gripper to grip the workpiece via manual opening and closing.
- ▶ Press the *Grip* button to grip the workpiece.
- ⇒ The gripper fingers move according to the set gripping direction.
- ▶ Press the *Release* button to open the gripper and/or release the gripped workpiece.
- ⇒ Depending on the saved parameters, the analog signal is evaluated and the corresponding status *IsClosed*, *IsReleased*, *OnTeachPos* or *OnUndefinedPos* is set.



8.2 Deleting existing setups

The existing setup must be deleted in order to learn a new workpiece.

- ▶ Click the *delete* button.
- ▶ In the prompt, click the *YES* button.
- ⇒ The existing setup has been deleted.



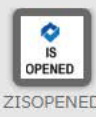





9 Operation

9.1 Control principle of the gripper



- ▶ 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).

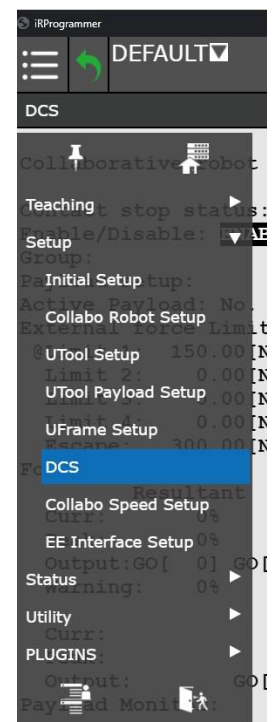
9.2 Overview of generated robot jobs

Generated robot job name	Parameter In	Parameter Out	Function
 IPL_ZIMMER_CAPP_GRIP(gripper number, register number)	Gripper No.:1 ▶ Please note that the value may not be changed. Register No.: The return value is entered in this register.	Value in set register: = 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)	Gripper No.:1 ▶ Please note that the value may not be changed. Register No.: The return value is entered in this register.	Value in set register: = 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_ISOPENED(gripper number, register number)	Gripper No.:1 ▶ Please note that the value may not be changed. Register No.: The return value is entered in this register.	Value in set register: = 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 = 1, TRUE Gripper open = 2, FALSE Gripper closed = -X, all other negative values are errors	Checks once whether the gripper is open.
 IPL_ZIMMER_CAPP_ISCLOSED(gripper number, register number)	Gripper No.:1 ▶ Please note that the value may not be changed. Register No.: The return value is entered in this register.	Value in set register: = 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 = 1, TRUE Gripper closed = 2, FALSE Gripper open = -X, all other negative values are errors	Checks once whether the gripper is closed.

Generated robot job name	Parameter In	Parameter Out	Function
 IPL_ZIMMER_CAPP_ISONTEACH-POS (gripper number, register number)	Gripper No.:1 ► Please note that the value may not be changed. Register No.: The return value is entered in this register.	Value in set register: = 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 = 1, TRUE Gripper at TeachPosition = 2, FALSE Gripper not at TeachPosition = -X, all other negative values are errors	Checks once whether the gripper is at the TeachPosition.
 IPL_ZIMMER_CAPP_ISONUNDEF-POS (gripper number, register number)	Gripper No.:1 ► Please note that the value may not be changed. Register No.: The return value is entered in this register.	Value in set register: = 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 = 1, TRUE Gripper at UndefinedPosition = 2, FALSE Gripper not at UndefinedPosition = -X, all other negative values are errors	Checks once whether the gripper is at the UndefinedPosition.

9.3 Creating programs via drag & drop commands

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



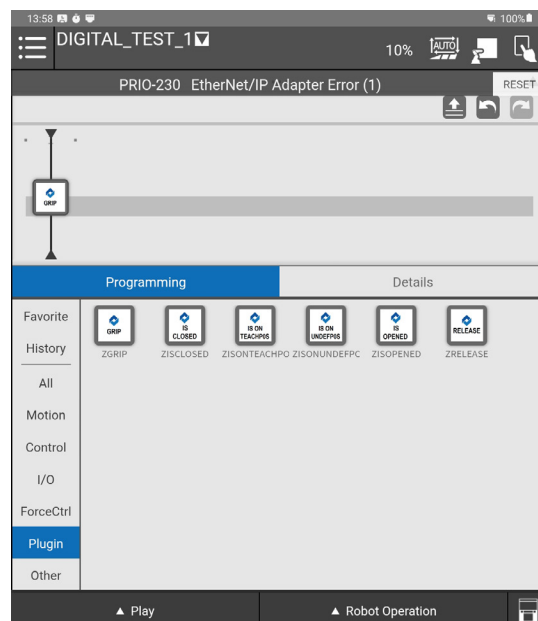
INFORMATION



This initial situation is required for the following example:

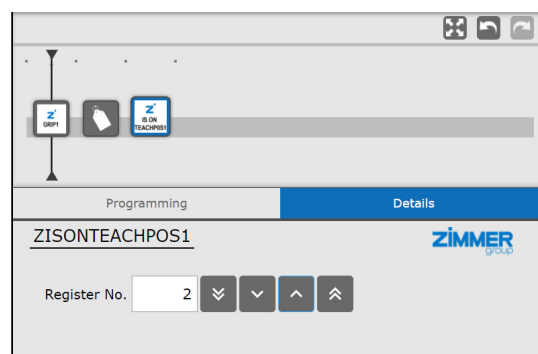
- Gripper is open and ready for gripping.
- Taught workpiece is located centered between the gripper fingers.

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

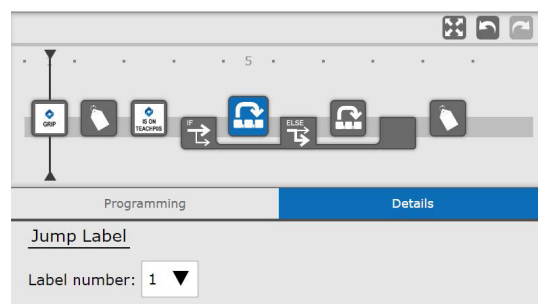
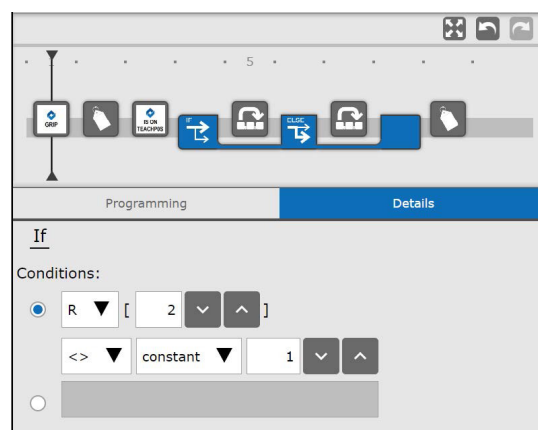


In this example, Register 2 receives the result of the command after executing the *ZISONTEACHPOS* command.

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



The return value of the *ZISONTEACHPOS* in Register 2 is checked via an If-query. If the value in Register 2 does not equal 1, the *ZISONTEACHPOS* function is continually executed via a constraint-based jump from the If-query until the taught workpiece is gripped.



9.4 Creating programs via text input

The setting for the `IPL_ZIMMER_CAPP_GRIP` command is used as an example.

- Grip workpiece.
- Wait until the gripper detects that it is in the TeachPosition.



The `IPL_ZIMMER_CAPP_GRIP(1,7)` command queries the gripper 1 and register 7.

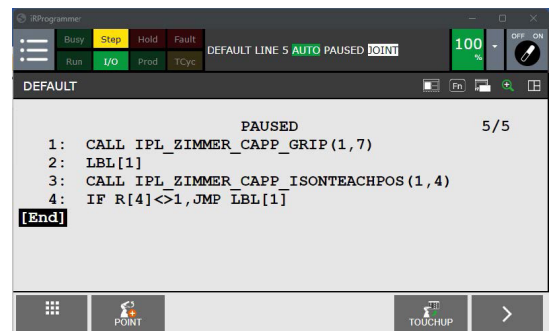


Line 1 and 3 address gripper 1 (gripper number).


Line 4 indicates the result of the command (register number).

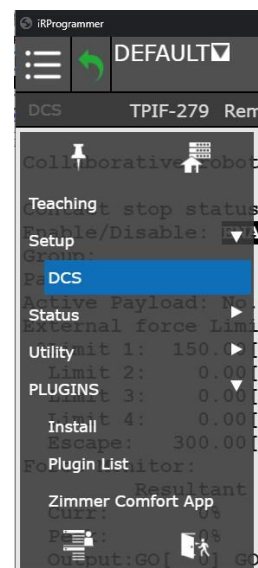
If register 4 has the value 1 in line 3 after executing the command, gripper 1 is in the TeachPosition. The command was executed and the loop is complete.

If register 4 has the value 2 in line 3 after executing the command, gripper 1 is not in the TeachPosition.

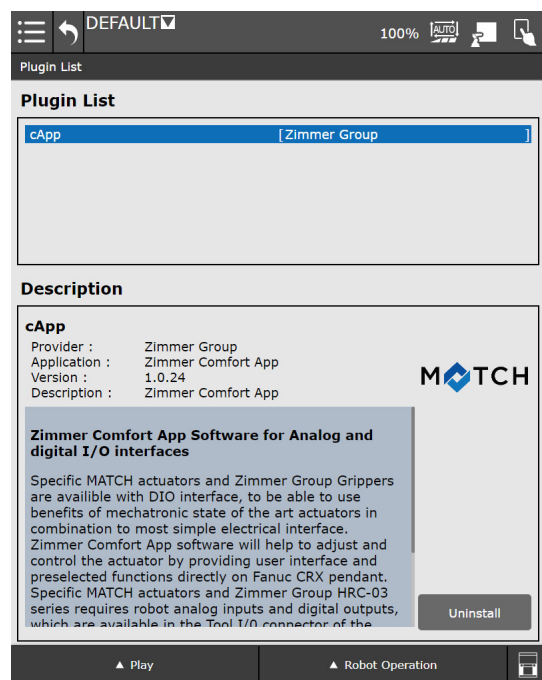


10 Uninstalling the MATCH Comfort app

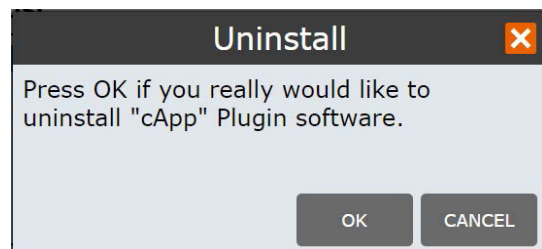
- Press the  button.
- In the *PLUGINS* menu, press *Plugin List*.



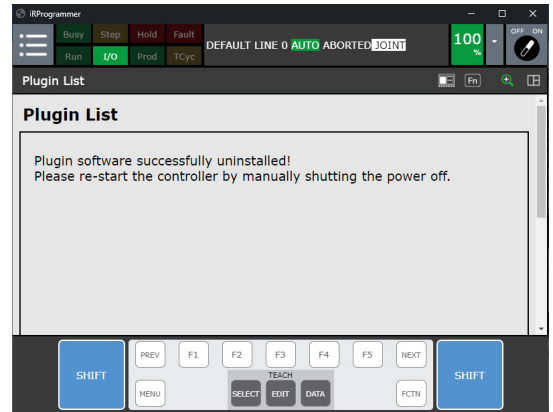
- Press the *Uninstall* button.



- 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 Customer Service if you have any questions.