WEISS ROBOTICS

GRIPKIT-EASY PLUGIN for FANUC CRX

Version 1.0.0

Content

1 Introduction

This manual describes the functions of the GRIPKIT CR EASY plugin for the Fanuc CRX robot series. For information on the configuration and operation of the gripping module, refer to the operating instructions. These can be found online at **www.weiss-robotics.com/gripkit-easy**.

1.1 Notation and Symbols

For a clearer understanding of this manual, the following symbols are used:

Function or safety-relevant note. Non-observance may endanger the safety of personnel and plant, damage the device, or impair the function of the device.

Additional information for a better understanding of the described facts.

Reference to further information.

1.2 Intended Use

The "GRIPKIT CR EASY Plugin" software is intended for controlling the GRIPKIT CR EASY gripping system by a FANUC robot controller from the CRX robot series. The requirements of the applicable directives and the installation and operating instructions in this manual must be observed and complied with. Any other use or use beyond the scope of this manual is considered improper. The manufacturer is not liable for any damage resulting from this.

1.3 System Requirements

GRIPKIT CR EASY for FANUC is compatible with the CRX 10iA and CRX 10iA/L robot models. The following minimum hardware and software requirements apply for operation:

- Controller: RB30iB Plus with software revision V9.40P/06 or above

If you want to connect the GRIPKIT CR EASY with the digital inputs and outputs of the robot controller (refer to chapter 3.3), an external power supply with an output voltage of 24 V and a nominal current of at least 2 A is required.

1.4 License Terms

The GRIPKIT CR EASY plugin is protected by copyright. The respective valid license terms are included in the software package. With the installation you accept these license terms.

2 Installation Instructions

The gripping module is connected either via the enclosed cable with the EE connector at the flange of the robot arm or via a longer cable with the digital inputs and outputs of the robot controller. The plugin software must be installed in advance (refer to chapter 5)

Make sure that the robot controller is turned off when connecting or disconnecting the gripper module.

Preparations when using the **EE-Connector** (refer to chapter 3)

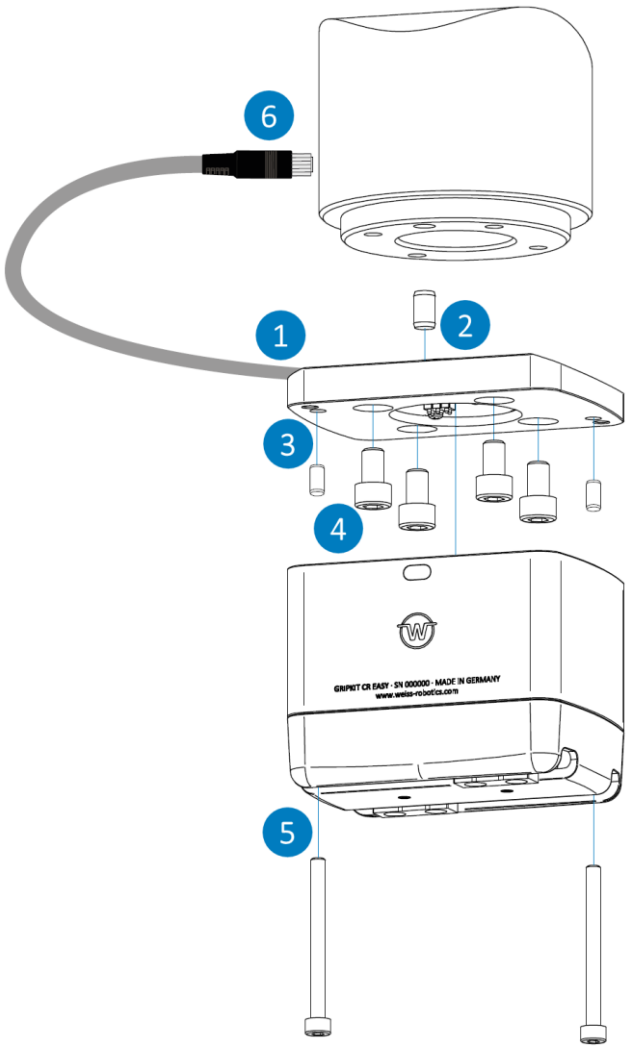
1. Plug the enclosed cable with the label “UR” into the flange.

Preparations when using the **digital inputs and outputs of the robot controller** (refer to chapter 3)

1. Plug the assembled cable with the label (for specifications refer to Table 1) into the flange (available as optional accessory).

Further installation

2. Insert the cylindrical pin (Ø 6mm) into the flange and position it on the robot.
3. Screw the flange to the robot.
4. Insert the two cylindrical pins (Ø 4mm) into the flange.
5. Screw the gripper module to the flange.
6. Connect the cable with the robot.



3 Electrical Installation

The gripping module is connected either via the enclosed cable with EE connector on the flange or via a longer cable to the digital inputs and outputs of the robot controller.

Work on the electrical system of the robot and on mounted gripping systems may only be carried out when the robot is switched off!

3.1 Pin Assignments of the Connector

Table 1 lists the pin assignments of the connector plug.

Table 1: Pin assignments of the connector plug

Pin	Function
1	Reserved
2	IN 1
3	IN 0
4	Reserved
5	Reserved
6	GND
7	+24 V/1,5 A Input
8	Reserved
9	OUT 1
10	OUT 0

3.2 Connection with the EE-Connector

The gripping module is supplied with power via the connection cable. Use the enclosed cable with the label “UR” for this purpose.

Further information regarding the EE-connector can be found in the operator’s manual of the robot.

3.3 Connection with the digital Inputs and Outputs of the Robot Controller

Connect the two cable strands for the IN 0 and IN 1 signals to two free outputs of the robot controller. Connect the two cable strands for the OUT 0 and OUT 1 signals to two free inputs of the robot controller.

The gripping module is supplied with power via an external power supply (not via the robot controller).

The power supply must provide a nominal voltage of 24 V and a nominal current of 1.5 A.

When connecting the power supply, ensure that the polarity is correct, otherwise the robot and the gripping module may be damaged!

Further information regarding the digital inputs and outputs of the robot controller can be found in the operator's manual of the robot.

3.4 Cable Routing on the Robot Arm

The gripping module is connected to the robot controller via the EE-connector of the tool flange per default. When mounting the gripping module, make sure that the enclosed connection cable is not kinked or under tension.

The screw connector must be screwed on with sufficient force. Do not tighten too tightly or too loosely to prevent damage or accidental disconnection of the connector!

When the gripping module is not connected to the robot controller via the EE-connector of the tool flange, a longer cable with corresponding cable routing is required.

Ensure good cable routing so that the cable is not kinked or placed under tension during operation of the robot!

The longer cable for operation at the digital inputs and outputs of the robot controller is not part of the scope of delivery.

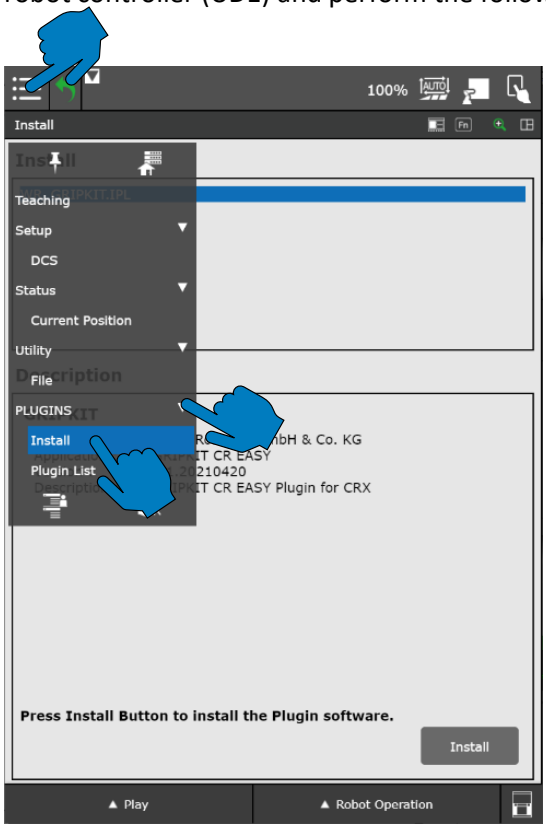
4 Plugin Components

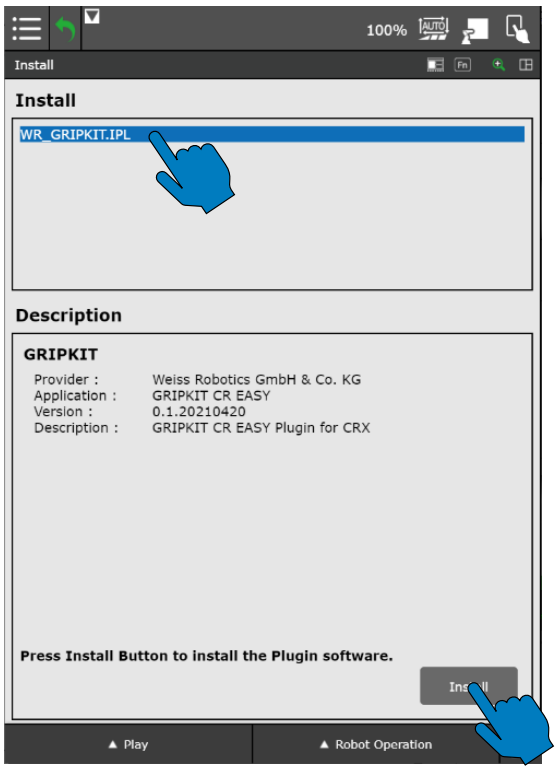
The plugin consists of a configuration page and various instructions that can be dragged and dropped into a robot application. The configuration page is used to make basic settings that are required for the operation of the gripper module.

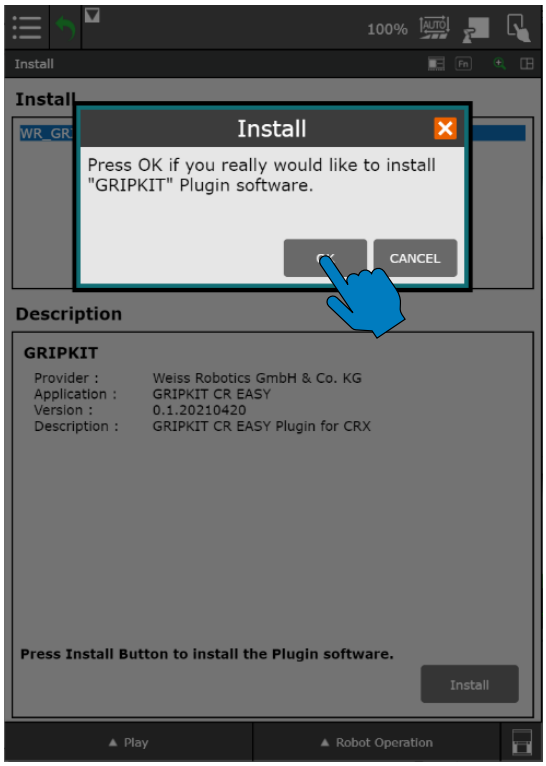
5 Installation of the Software

The control-side Implementation of the GRIPKIT CR EASY is done using a plugin on the robot controller, which is provided as a download on **www.weiss-robotics.com/gripkit-easy**.

For the installation, first start the robot and switch on the Tablet Teach Pendant. Wait until the Tablet TP app is opened and the Teach Pendant has established a connection to the controller. Download the plugin from the link above and save it on a USB stick. Then insert the USB stick into the USB socket on the side of the robot controller (UD1) and perform the following steps:







After the prompt to restart the robot controller, switch it off at the main switch and switch it on again after about ten seconds. The teach pendant does not have to be restarted. Wait until the teach pendant has re-connected with the robot controller.

Attention! After installing the plug-in, the voltage at the flange connection (EE-connector) is automatically set to 24 V. This may cause damage to connected devices that do not tolerate this voltage. It is therefore essential to **disconnect all devices from the flange connection before installation**!

There is no guarantee that the plugin is working properly when other third-party plugins are installed on the same robot controller! Ensure that all installed and used plugins are compatible before running an application.

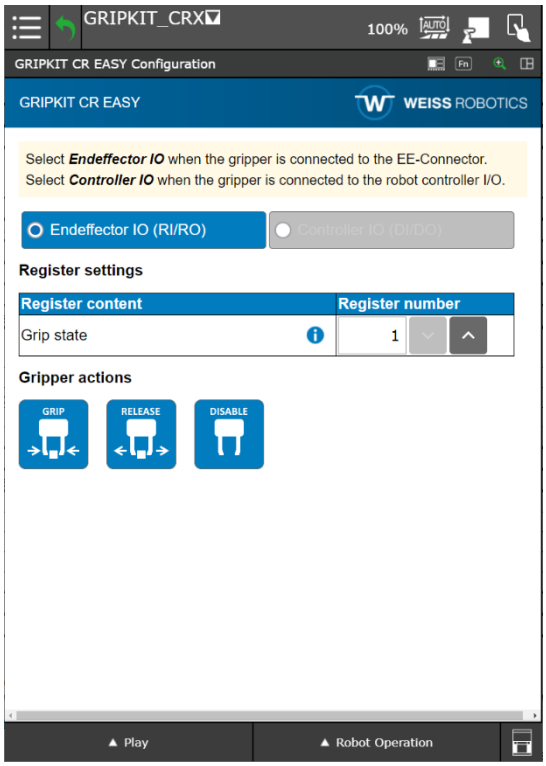
6 Programming

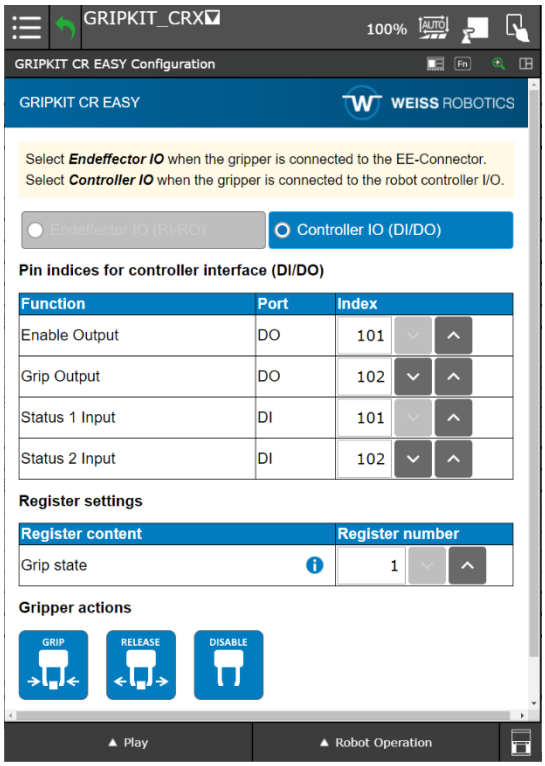
6.1 Setup the Application

To be able to control a gripping system with the GRIPKIT CR EASY plugin from a robot application, you must first set up the application. To do this, open the configuration page by selecting the “Plugins” tab in the menu and tapping on the “GRIPKIT CR EASY” entry.

6.1.1 Setup the Interface

The GRIPKIT CR EASY allows you to connect the gripper module directly to the flange or to the digital inputs and outputs of the robot controller. Select the option that matches your setup by selecting the corresponding button. The currently selected option is highlighted in blue.





If your gripper is connected to the digital inputs and outputs of the robot controller ("Controller IO"), you must adjust the respective indices of the connections in the table.

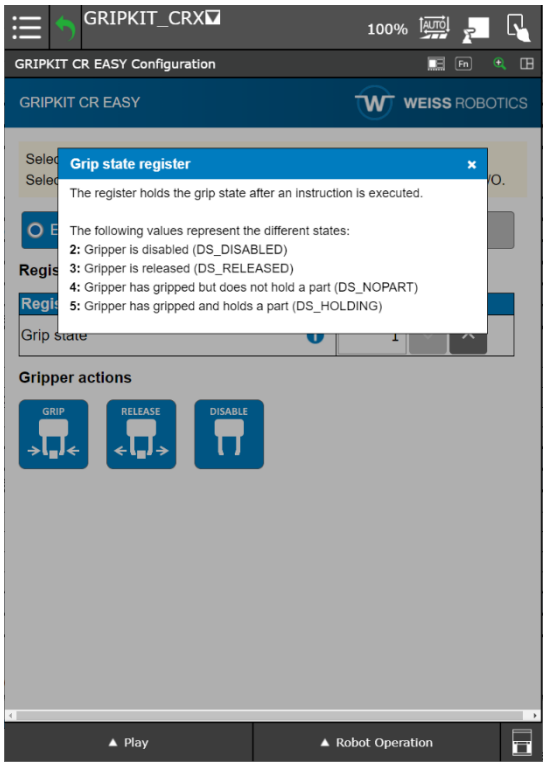
Attention. Ensure that the indices are entered correctly to avoid misbehavior.

6.1.2 Setup the Registers for the Grip State

After calling an instruction (Grip, Release, or disable) within a robot application (refer to chapter **Fehler! V erweisquelle konnte nicht gefunden werden.**), the updated grip state is written to the configured register. Choose a register of type “Numeric Register” that is not yet in use and enter its number in the table “Register settings” in the row “Grip state”.

Further information regarding the numeric registers can be found in the operator’s manual of the robot.

Tap the info icon in the "Register content" column to get more information about the register value.



6.1.3 Test of the Gripper Module

Both on the configuration page and in the instructions, the connected gripping module can be tested. The “GRIP”, “RELEASE” and “DISABLE” buttons might be used for this purpose.

To perform a test, the interface described in section **Fehler! Verweisquelle konnte nicht gefunden werden.** has to be configured correctly and the gripper module has to be connected to the robot.

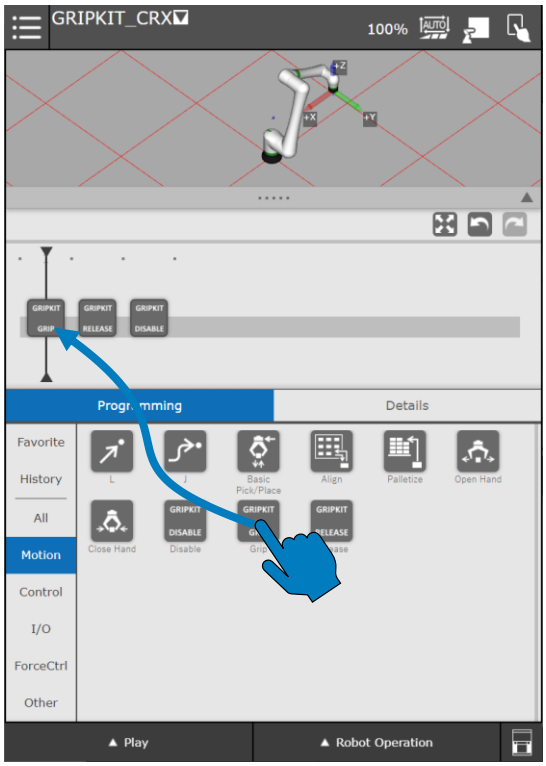
The gripping system either performs a gripping or releasing action or is deactivated when one of the buttons is clicked.

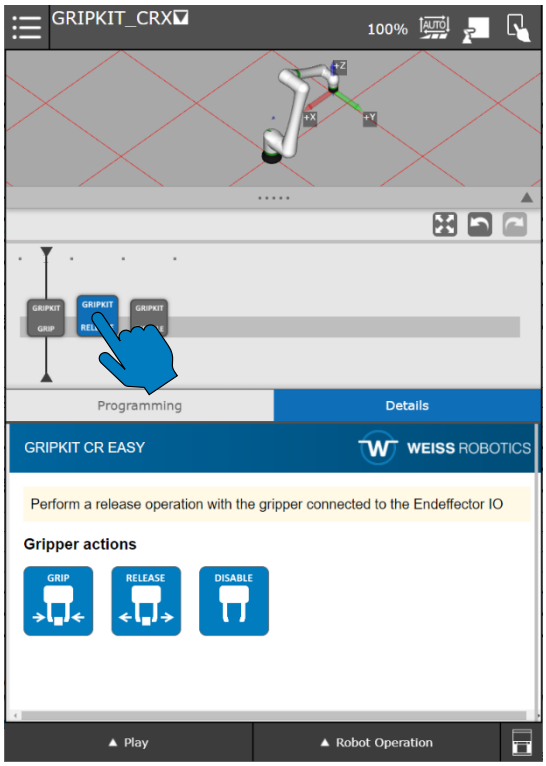
The grip parameters can be set in advance using the configuration software. Additional information to the configuration process can be found in the operating manual of the gripping module.

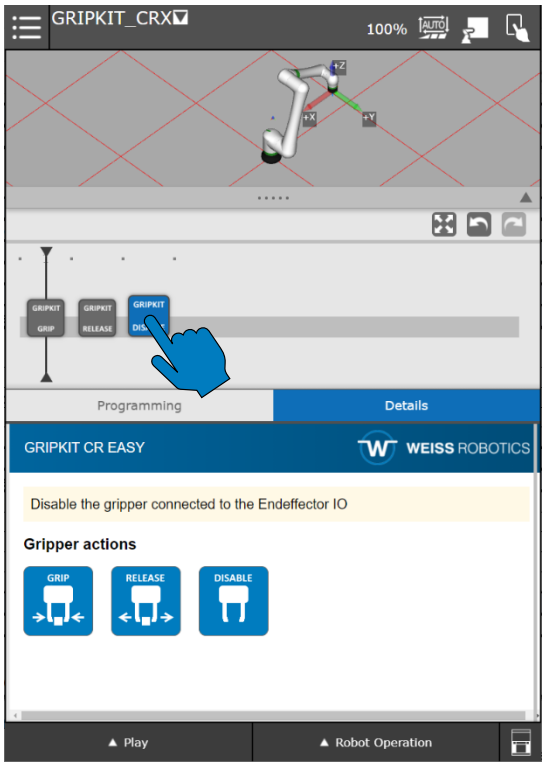
6.2 Create Robot Applications

To easily address the gripping module in the robot program, the GRIPKIT CR EASY provides graphic commands for the basic functions gripping, releasing and deactivating. The commands can be dragged and dropped into the program via the program editor of the robot controller.

When an instruction is selected, the respective detail page is displayed. There you have the option to perform gripping/release actions with the connected gripping module or to deactivate the gripper via the buttons.

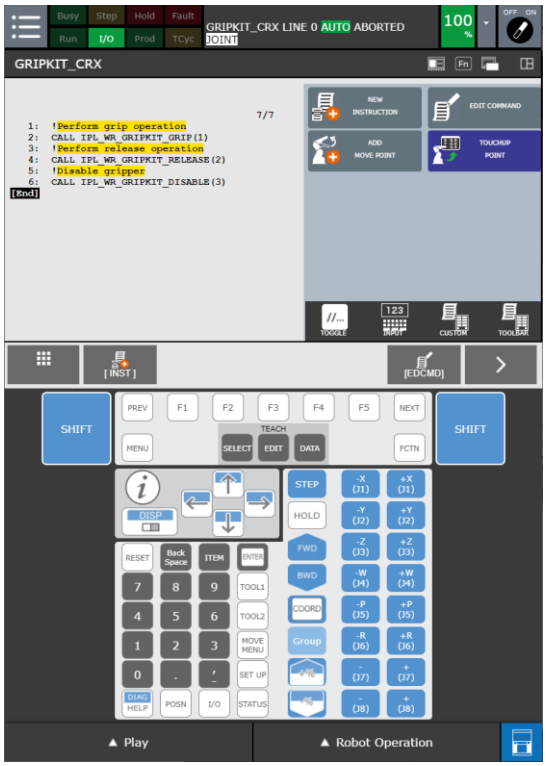


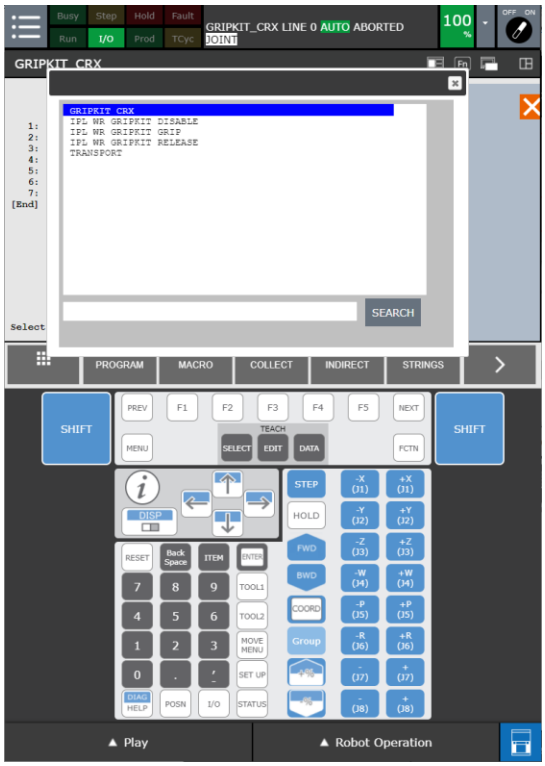




Alternatively, the actions can be performed as a call of the corresponding TP program. To do this, the respective program must be selected in the TP editor using "NEW INSTRUCTION", "CALL", "CALL program". The TP

programs always start with "IPL WR GRIPKIT". If further third-party plugins installed on the robot controller, these functions are displayed in the same selection area.





For the correct function, a numerical parameter must be passed to the programs. The value of the parameter is 1 for GRIP, 2 for RELEASE and 3 for DISABLE.
It is recommended to use the graphical interface to avoid misbehavior.

6.2.1 Reading the Grip State

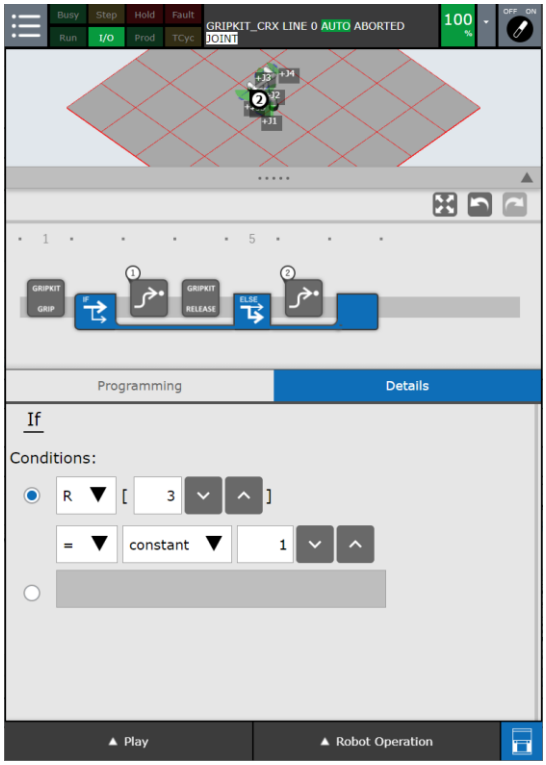
Based on the preconfigured gripping parameters, the gripping system determines whether a component has been gripped or not after a gripping process. Other gripping states occur when a component is released or deactivated. The following states are possible:

Table 2: Grip states

Grip state	Code	Description
IDLE	2	Gripper is ready, inactive
RELEASED	3	Work piece released
NO PART	4	No work piece found
HOLDING	5	Work piece held by gripper

The current grip state after the execution of a grip can be used to influence the program flow. The numerical register set up in section 6.1.2 is used for this purpose. An individual program branch can be called up for the “HOLDING” or “NO PART” state via an IF statement.

To use the grab state from the register, the previously set register number must be entered in the IF statement. The comparison is done with a constant (refer to chapter 6.1.2).



The register of the gripping state must not be written by other instructions between the gripping instruction and the comparison query!

7 Uninstall

To uninstall the GRIPKIT CR EASY plugin from your robot, follow the assembly instructions in reverse order. For uninstalling the plugin, navigate to the menu “Plugin List” and refer to the instructions in the robot controller’s manual.