ROBOTIQ

HAND-E

2F-85

2F-140

ROBOTIQ GRIPPER PLUGIN

FANUC Robot CRX Series

Original Notice

Robotiq Gripper Plugin
for FANUC Robot CRX Series

Instruction Manual

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Table of Contents

Revisions

Robotiq may modify this product without notice, when necessary, due to product improvements, modifications or changes in specifications. If such modification is made, the manual will be revised. Refer to the revision history below for more information. See the latest version of this manual online at support.robotiq.com.

Revision 2024/04/18

Added section for Advanced Karel Programs and Routines.

Revision 2021/09/20

Initial release

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1. General Presentation

This instruction manual presents the installation procedure and the different features of the Robotiq Gripper Plugin for FANUC CRX Series Robots. This plugin offers compatibility with the Robotiq 2F-85, 2F-140 and Hand-E Grippers in single or dual Gripper mode.

For any information regarding the following topics, please refer to the General Instruction Manual of the specific gripper available at support.robotiq.com:

- Safety
- Environmental and operating conditions
- Gripper specifications
- Maintenance
- Spare Parts, kits and accessories
- Warranty
- Harmonized standards, declarations and certificates

2. Installation

Warning

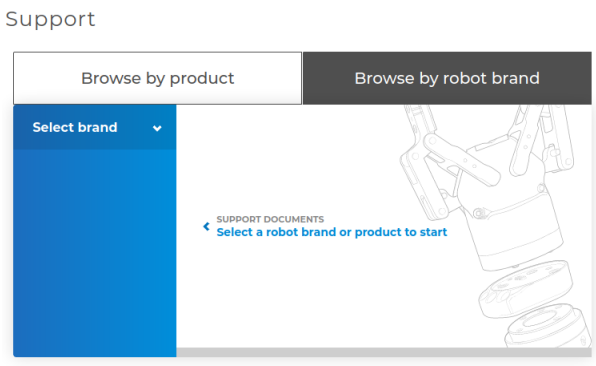
- The installation of the plugin software must be completed before connecting the Gripper to the cobot.
- The CRX Series robots do not support hot swapping between the tool and the EE connector. Please turn off the robot controller prior to connecting or disconnecting the Gripper.
- The software version of the robot controller should be 9.40P/19 or later before the installation of the plugin software.

Info

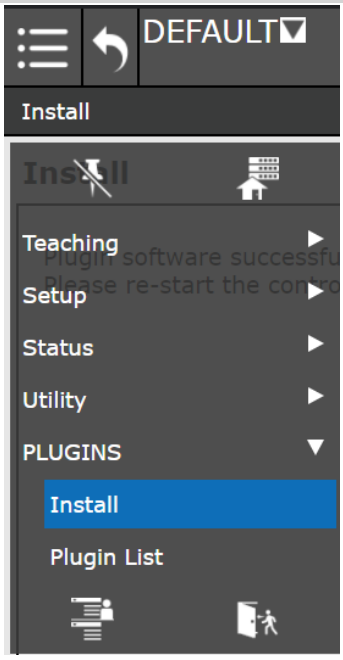
For Gripper specifications, please refer to the instruction manual available at support.robotiq.com.

2.1. Plugin Installation

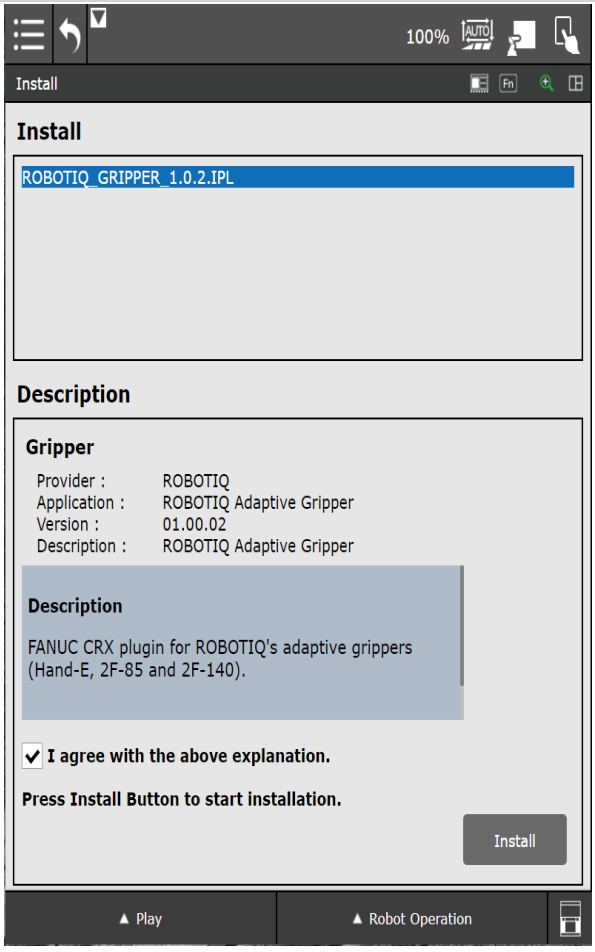
The following steps will guide you through the installation of the Robotiq Gripper plugin for FANUC CRX Series Robots.



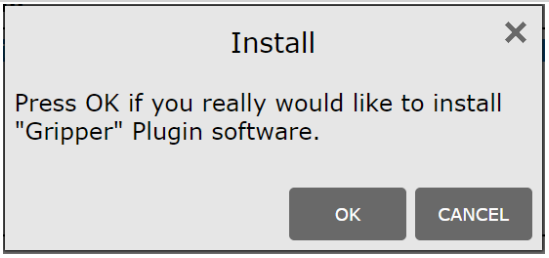
- Go to support.robotiq.com, select **Browse by robot brand**. Then, click on **Select brand > FANUC**.
- For a Hand-E Gripper, select **Hand-E Adaptive Gripper** and for a 2F Gripper, select **2F-85 and 2F-140 Grippers**. The same plugin is used for all gripper products.
- Go to **Software > Gripper Software**.
- Select the **FANUC CRX** plugin.
- Download the zip file.
- Extract the files at the root of a blank USB storage device.
- Insert the USB storage device in the robot controller.



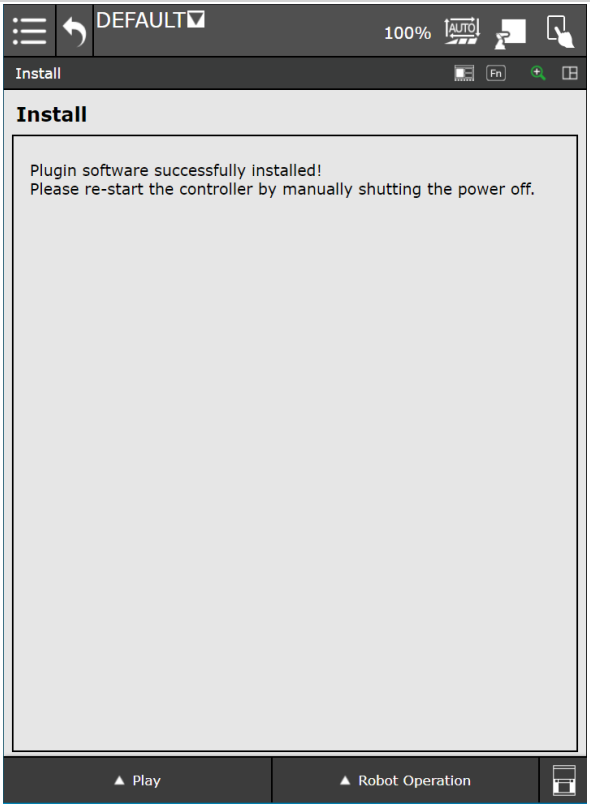
- On the Tablet TP, tap **Menu > PLUGINS > Install**.



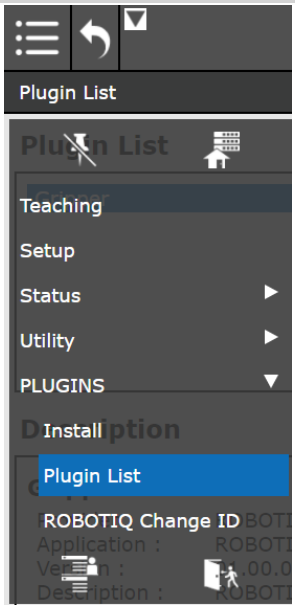
- In the Install menu, tap **ROBOTIQ_GRIPPER_X.X.X.IPL** in the Install section.
- Select the "I agree with the above explanation." checkbox.
- Tap the **Install** button.



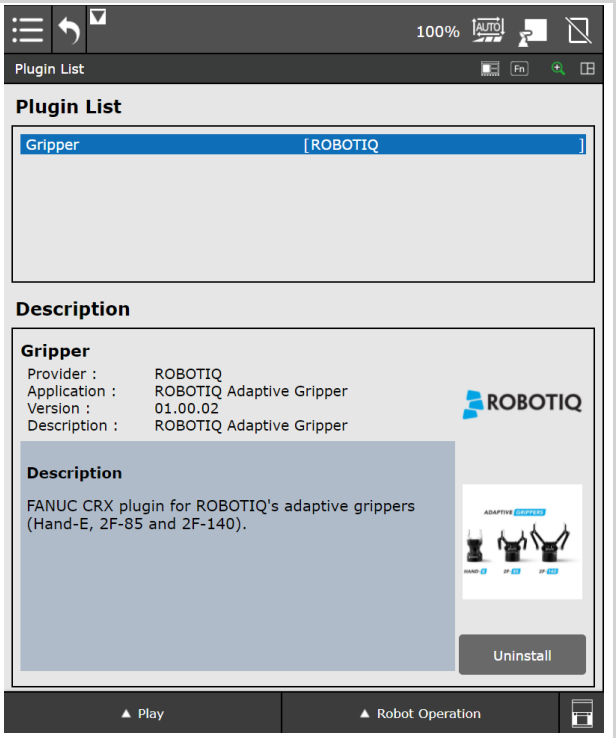
- Tap the **OK** button to confirm the installation.



- Once the installation is completed, manually power off the robot controller.
- Power on the robot controller.



- Once the controller booted, tap **Menu > PLUGINS > Plugin List**.



- The Gripper plugin appears in the list.

2.2. Mechanical Installation

2.2.1. Single Gripper Installation

A coupling is required to attach the Gripper to the robot. Here are the steps to follow to mount the Gripper on the robot (exploded view in the figure below).

1. Mount the coupling on the robot wrist using the provided M6 screws and tooth lock washers. Align properly with the dowel pin.
2. Fasten the Gripper to the coupling using the provided M5 screws and tooth lock washers.
3. Connect the coupling's cable to the robot's wrist connector. (The plugin software installation must be completed before connecting the gripper.)

> **Caution**
>
> Tooth lock washers provide grounding for the casing of the Gripper through the mounting screws.

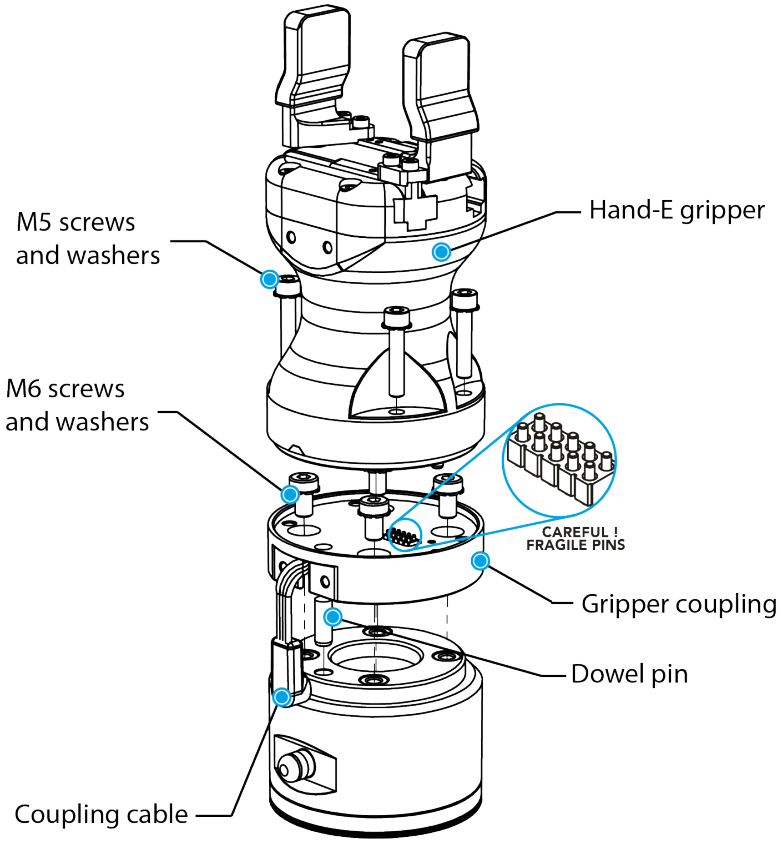


Fig. 2.1: Mechanical installation of the Hand-E Gripper on the robot tool flange.

2.2.2. Multiple Gripper Installation

When installing multiple grippers on the same robot, each gripper should have its own coupling.

1. Fasten the M8 splitter (ACC-SPLIT-M8-2:1) to the dual gripper adapter plate (AGC-APL-159-002).

> **Caution**
>
> Fasten the splitter on the side of the adapter plate that receives the dowel pin.

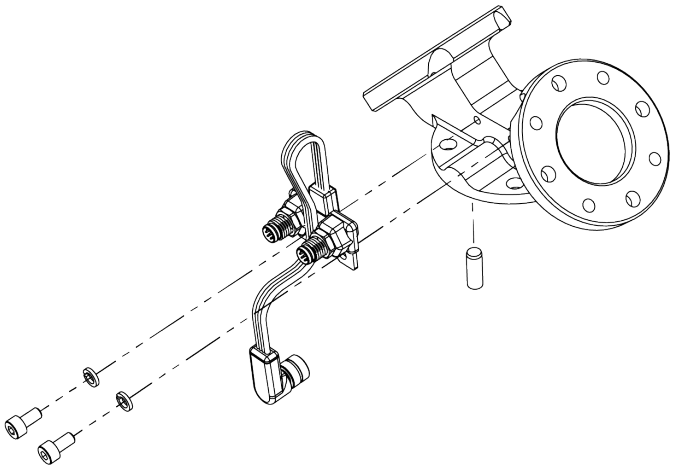


Fig. 2.2: Fastening the splitter to the dual gripper adapter plate.

2. Mount the adapter plate on the robot tool flange.
3. Mount the Gripper couplings on the adapter plate using the provided M6 screws and tooth lock washers.
4. Mount each Gripper on a coupling using the provided M5 screws and tooth lock washers.
5. Connect the splitter's cable to the robot's wrist connector.
6. Connect each coupling's cable to the splitter. (The plugin software installation must be completed before connecting the Grippers to the splitter.)

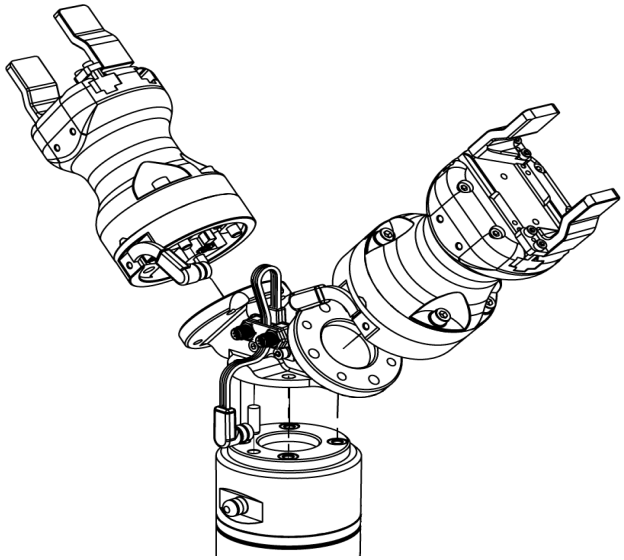


Fig. 2.3: Dual Hand-E Gripper Configuration.

3. Teaching

The following steps will guide you through the teaching of the Robotiq Gripper on FANUC CRX Series robots.

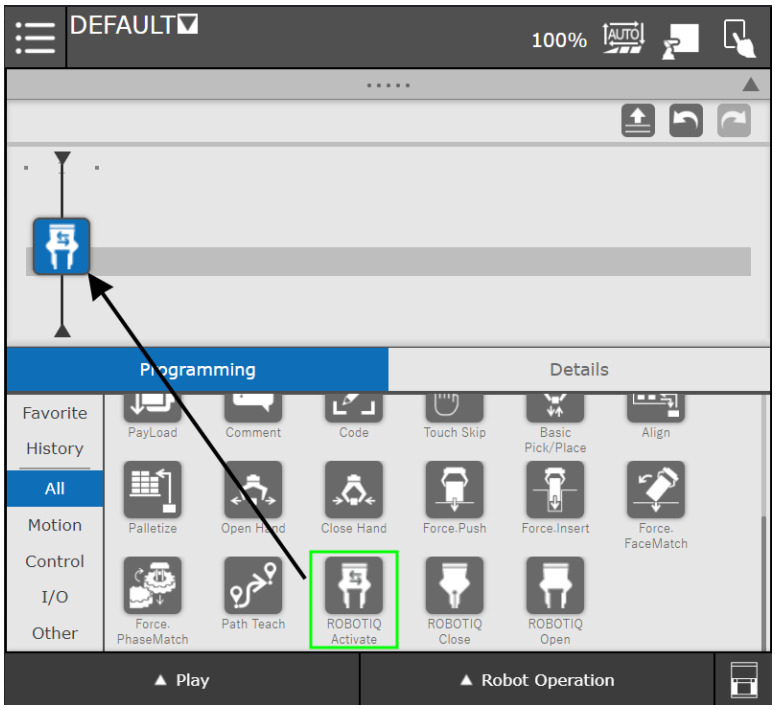
3.1. Slave ID

The slave ID corresponds to the address of the Gripper. All Grippers made by Robotiq are set to the default slave ID 9. If there is only one Gripper installed on the wrist of the robot, use the default slave ID 9. If two Grippers (dual Gripper setup) are installed on the wrist of the robot, change the slave ID of the second Gripper to 10. See the **Change ID** section to change the slave ID of a Gripper.

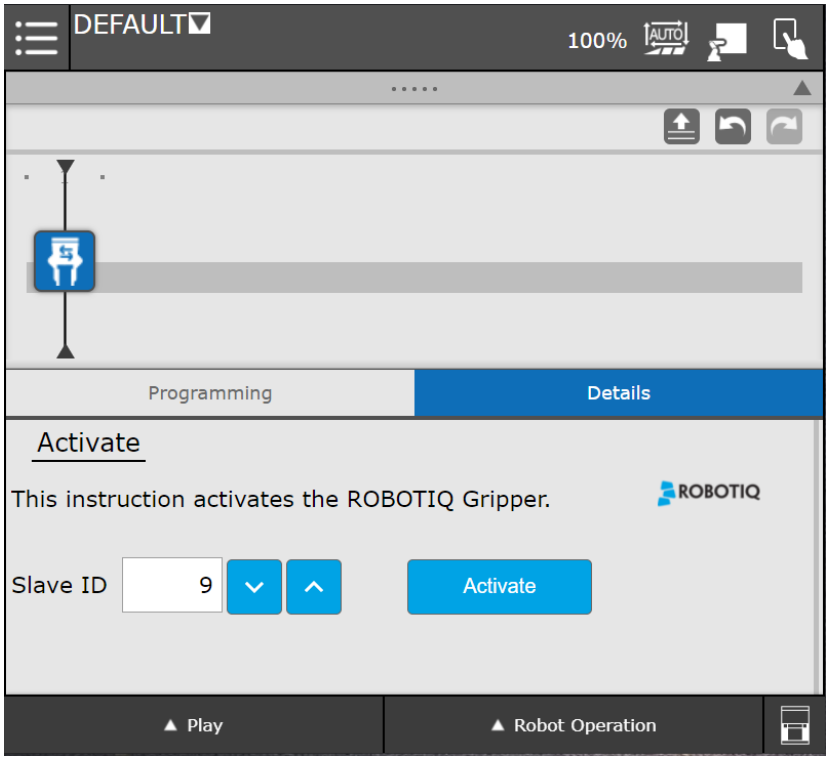
3.2. Activate

The activation process must be performed in order to move the Gripper to a specific position. To do so, select the **Programming** tab and insert a **ROBOTIQ Activate** instruction in the timeline. The instruction should always be placed at the beginning of the timeline to ensure that the Gripper is activated when the program performs a close or an open action.

- Drag and drop a **ROBOTIQ Activate** instruction on the timeline.



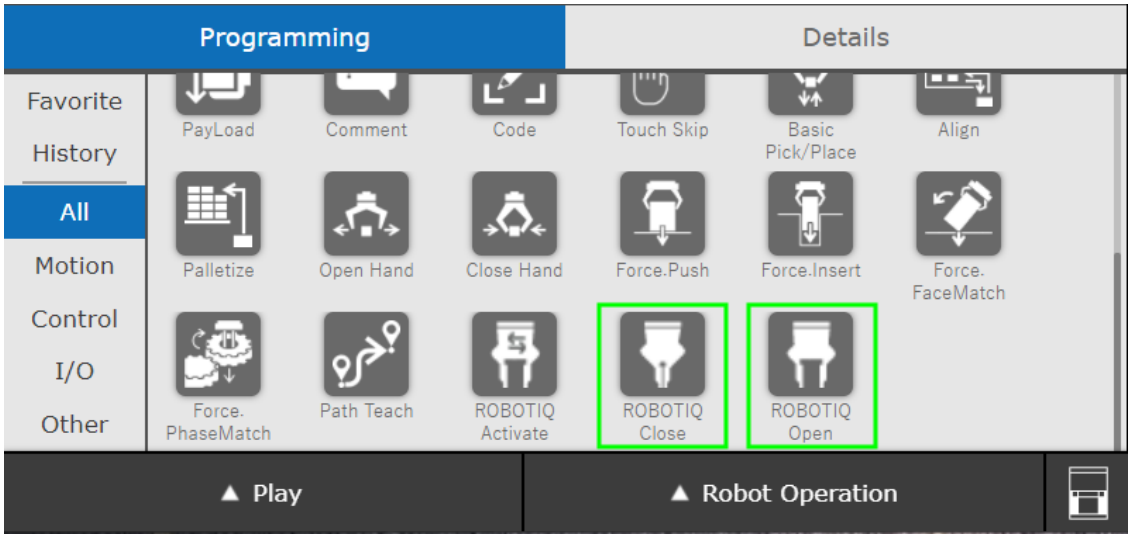
- Under the **Details** tab, set the slave ID (9 is for a single Gripper), then **run** the program in order to test the activation. An alternate way to test the activation process is to tap the **Activate** button.



3.3. Open and Close Instructions

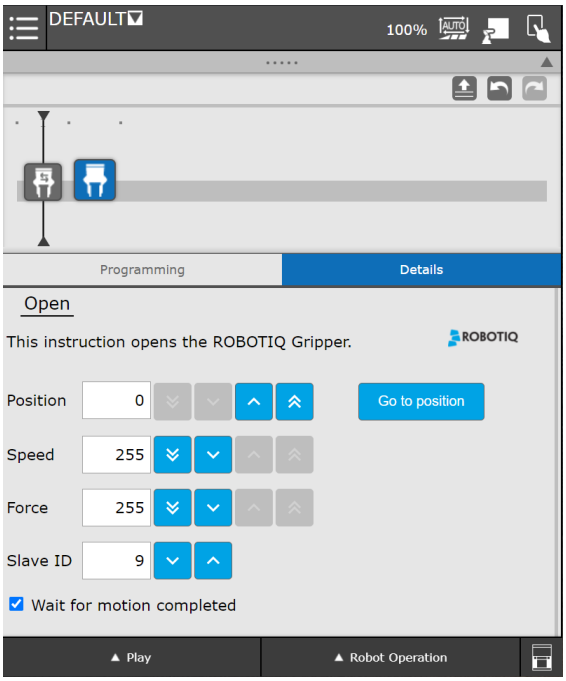
The Gripper must be activated in order to perform an open or a close action.

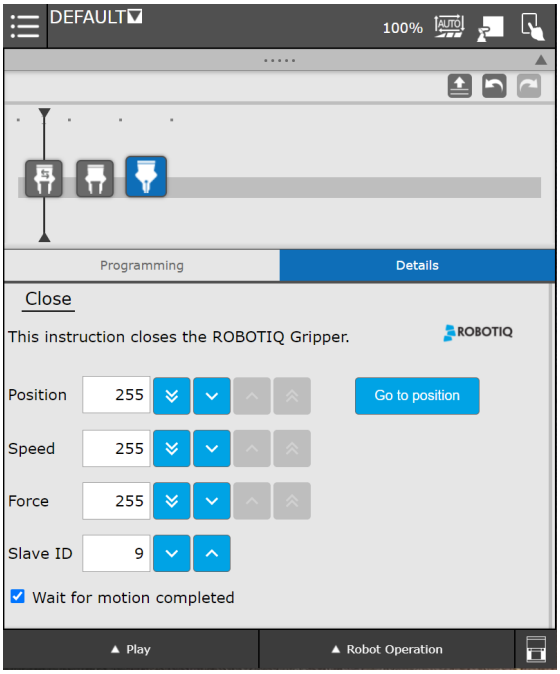
- Drag and drop a **ROBOTIQ Open** instruction on the timeline to open the Gripper.
- Drag and drop a **ROBOTIQ Close** instruction on the timeline to close the Gripper.



- Under the **Details** tab, set the following parameters:

Parameter	Minimum	Maximum
Position	0 (Fully opened)	255 (Fully closed)
Speed	0	255
Force	0	255





Info

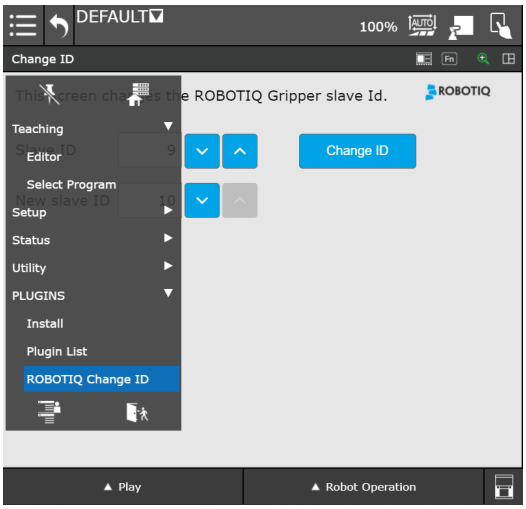
- Regrasp option is enabled when force > 0.
- **Wait for motion completed**: If checked, the program will wait until the end of the Gripper's action before executing the next instruction on the timeline.

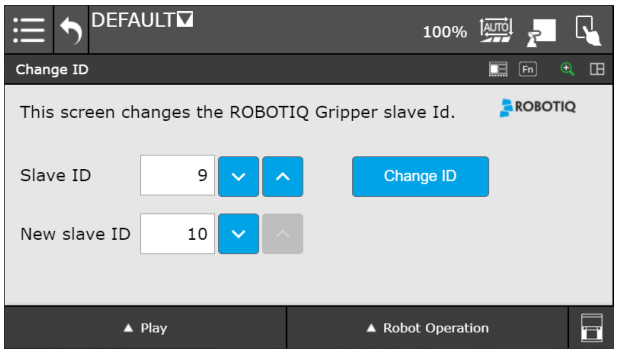
- **Run** the program to test the Open or the Close instruction. An alternate way to test the instruction is to tap the **Go to position** button.

3.4. Change ID

On a dual Gripper setup, the slave ID of the second Gripper should be changed to 10. The following steps will guide you through the change of slave ID for the second Gripper.

- Disconnect the first Gripper from the wrist.
- On the Tablet TP, tap **Menu > PLUGINS > ROBOTIQ Change ID**.





- Set the current slave ID and the new slave ID. The default slave ID on every Robotiq Gripper is 9.
- Tap the **Change ID** button.
- Connect the first Gripper to the wrist.
- On the Tablet TP, tap **Menu > Teaching > Editor**.
- Use the **ROBOTIQ Activate** instruction with the proper slave ID to confirm that the slave ID has been changed

3.5. Advanced Karel Programs and Routines

Here is a list of additional programs and routines for advanced use.

3.5.1. Karel Programs

- IPL_ROBOTIQ_GRIPPER_MOVE
  (slave_id : INTEGER; grip_pose : INTEGER; speed : INTEGER; force : INTEGER; wait_motion : INTEGER)
  - slave_id : 9, 2, 3 or 4
  - grip_pose : between 0 and 255
  - speed : between 0 and 255
  - force : between 0 and 255
  - wait_motion : 0 or 1 (Will complete the motion before the next command.)
- IPL_ROBOTIQ_GRIPPER_ACT
  (slave_id : INTEGER)
  - slave_id : 9, 2, 3 or 4
- IPL_ROBOTIQ_GRIPPER_GRIP_CHECK
  (register_id : INTEGER; slave_id : INTEGER)
  - register_id : id of a FANUC registers R[ ] to share and keep value.
  - slave_id : 9, 2, 3 or 4

3.5.2. TP Programs

- IPL_ROBOTIQ_GRIPPER_OPEN
  - Calls IPL_ROBOTIQ_GRIPPER_MOVE Karel program with the provided parameters to open the gripper. The default position value is 0.
- IPL_ROBOTIQ_GRIPPER_CLOSE
  - Calls IPL_ROBOTIQ_GRIPPER_MOVE Karel program with the provided parameters to close the gripper. The default value is 255.

3.5.3. Routines

Routines can be used in Karel programs

- move_gripper
  (slave_id : INTEGER; grip_pose : INTEGER; speed : INTEGER; force : INTEGER; wait_motion : INTEGER) : BOOLEAN from IPL_ROBOTIQ_GRIPPER_MOVE

- slave_id : 9, 2, 3 or 4
- grip_pose : between 0 and 255
- speed : between 0 and 255
- force : between 0 and 255
- wait_motion : 0 or 1 (Will complete the motion before the next command.)
- Returns TRUE when completed.

- get_gripper_position
  (slave_id : INTEGER) : INTEGER from IPL_ROBOTIQ_GRIPPER_GET_POSITION
  - slave_id : 9, 2, 3 or 4
  - Returns the actual gripper position between 0 and 255.

- is_gripper_activated
  (slave_id : INTEGER) : BOOLEAN from IPL_ROBOTIQ_GRIPPER_ACT
  - slave_id : 9, 2, 3, or 4
  - Returns TRUE or FALSE depending on the activation state.

- get_obj_detection_code
  (slave_id : INTEGER) : INTEGER from IPL_ROBOTIQ_GRIPPER_GRIP_CHECK
  - slave_id : 9, 2, 3 or 4
  - Returns :
    - 0 = Object unknown
    - 1 = Object detected on open
    - 2 = Object detected on close
    - 3 = No object detected

- get_gripper_fault
  (slave_id : INTEGER) : INTEGER from IPL_ROBOTIQ_GRIPPER_GET_FAULT
  - slave_id : 9, 2, 3 or 4
  - Returns:
    - 0 = None
    - 3 = BRAKE_PROBLEM
    - 4 = BLOCKED_AT_START
    - 5 = NOT_ACT
    - 7 = GTO_WHILE_NOT_ACT
    - 8 = OVER_TEMPERATURE
    - 9 = COM_NOT_READY
    - 10 = UNDERVOLTAGE

- 11 = ATR_IN_PROGRESS
- 12 = INTERNAL
- 13 = INIT
- 14 = OVERCURRENT
- 15 = ATR_COMPLETED

4. Troubleshooting

4.1. Teach Pendant Error Codes

PLUG-001	Gripper not activated [Robotiq Gripper-001]

Possible causes and solutions:

- The Gripper was not activated before the execution of a Gripper Open or Close instruction. Insert an Activate instruction before the move instruction or tap the Activate button.
- The Gripper has lost power for a short moment and has been deactivated. Inspect the cables for wear, kinks or damage; check if the connections are secure.

PLUG-001	Get Gripper status failed [Robotiq Gripper-002]

Possible causes and solutions:

- Failure to request the Gripper status while activating or moving. Inspect the cables for wear, kinks or damage; check if the connections are secure.

PLUG-001	Gripper move failed [Robotiq Gripper-003]

Possible causes and solutions:

- Failure to send a move request to the Gripper. Inspect the cables for wear, kinks or damage; check if the connections are secure.

PLUG-001	Gripper activate failed [Robotiq Gripper-004]

Possible causes and solutions:

- Failure to send an activate request to the Gripper. Inspect the cables for wear, kinks or damage; check if the connections are secure.

PLUG-001	Get registers failed [Robotiq Gripper-005]

Possible causes and solutions:

- The Gripper was not connected during the change of slave ID. Inspect the cables for wear, kinks or damage; check if the connections are secure.
- The change ID request is not directed to the proper slave ID. Select the proper slave ID.

PLUG-001	Gripper change ID error [Robotiq Gripper-006]

Possible causes and solutions:

- This message will display when changing the slave ID on a 2F-85/2F-140. Make sure the change ID process has been completed.

PLUG-001	Gripper failed to reboot [Robotiq Gripper-007]

Possible causes and solutions:

- Failure to reboot the Gripper during the change ID process. Repeat the process.

PLUG-001	Gripper failed to change ID [Robotiq Gripper-008]

Possible causes and solutions:

- The Gripper has not properly saved its new slave ID. Repeat the process.

PLUG-001	Slave ID not present or type must be int [Robotiq Gripper-009]

Possible causes and solutions:

- The slave ID parameter is missing or invalid. Make sure the slave ID has been entered. The type must be an integer.

PLUG-001	Position not present or type must be int [Robotiq Gripper-010]

Possible causes and solutions:

- The position parameter is missing or invalid. Make sure the position has been entered. The type must be an integer.

PLUG-001	Position out of range (0-255) [Robotiq Gripper-011]

Possible causes and solutions:

- The position parameter is out of range. Make sure the position is in the following range (0-255).

PLUG-001	Speed not present or type must be int [Robotiq Gripper-012]

Possible causes and solutions:

- The speed parameter is missing or invalid. Make sure the speed has been entered. The type must be an integer.

PLUG-001	Speed out of range (0-255) [Robotiq Gripper-013]

Possible causes and solutions:

- The speed parameter is out of range. Make sure the speed is in the following range (0-255).

PLUG-001	Force not present or type must be int [Robotiq Gripper-014]

Possible causes and solutions:

- The force parameter is missing or invalid. Make sure the force has been entered. The type must be an integer.

PLUG-001	Force out of range (0-255) [Robotiq Gripper-015]

Possible causes and solutions:

- The force parameter is out of range. Make sure the force is in the following range (0-255).

PLUG-001	Wait for motion completed not present or type must be int [Robotiq Gripper-016]

Possible causes and solutions:

- The Wait for motion completed parameter is missing or invalid. Make sure the Wait for motion completed has been entered. The type must be an integer.

PLUG-001	Wait for motion completed out of range (0-1) [Robotiq Gripper-017]

Possible causes and solutions:

- The Wait for motion completed parameter is out of range. Make sure the Wait for motion completed is in the following range (0-1).

5. Contact

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Contact Us

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