



Software manual

Flexible gripper EGH for cobot

SCHUNK software module for URCap

Translation of original software
manual

Hand in hand for tomorrow

Imprint

Copyright:

This manual is protected by copyright. The author is SCHUNK SE & Co. KG.
All rights reserved.

Technical changes:

We reserve the right to make alterations for the purpose of technical improvement.

Document number: 1433429

Version: 05.00 | 10/08/2023 | en

Dear Customer,

Thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management

Tel. +49-7133-103-2503

Fax +49-7133-103-2189

cmg@de.schunk.com



Please read the operating manual in full and keep it close to the product.

Table of Contents

1	General	4
1.1	About this manual	4
1.2	Symbol definition	4
1.3	Presentation of Warning Labels	5
1.4	Applicable documents	5
2	Functional description of "URCap"	6
3	Installing the software module	7
3.1	Uninstalling the software module	11
4	Configure the software module	12
4.1	Configuring the IP address	13
4.2	Gripper interface	13
4.3	Autoconnect	13
4.4	Configuring the referencing of the gripper	14
4.5	Configuring digital outputs for the light band	15
4.6	Info button	15
5	Creating the robot program	16
5.1	EGH commands	17
5.2	EGH grip	18
5.3	EGH position	19
5.4	EGH color light band	20
6	Monitoring the gripper status	21
7	Setting the Tool Center Point (TCP) and gripper weight	24
8	Example of a robot program	25

1 General

1.1 About this manual

This manual contains information on the "URCap" software.

The software is used to easily integrate and control the following products in Universal Robots applications:

- Flexible gripper EGH for cobot

NOTE: The illustrations in this manual are intended to provide a basic understanding and may deviate from the actual version.

In addition to these instructions, the documents listed under ▶ 1.4 [4 5] are applicable.

This manual describes the software environment on an e-Series UR robot. The described plug-in is also designed for use with the CB-Series robots, although the content may vary. Follow the instructions for the robot.

1.2 Symbol definition

The following symbols are used in this manual:

■ Prerequisite for an action

1. Action 1

2. Action 2

⇒ Intermediate results

⇒ Final results

▶ 1.2 [4 4]: chapter number and [page number] in hyperlinks

1.3 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.



⚠ DANGER

Dangers for persons!

Non-observance will inevitably cause irreversible injury or death.



⚠ WARNING

Dangers for persons!

Non-observance can lead to irreversible injury and even death.



⚠ CAUTION

Dangers for persons!

Non-observance can cause minor injuries.

CAUTION

Material damage!

Information about avoiding material damage.

1.4 Applicable documents

- Assembly and operating manual for the product *
- Software guide "SCHUNK gripper with IO-Link" *
- Operating manual for the UR robot

The documents labeled with an asterisk (*) can be downloaded from schunk.com/egh-downloads.

2 Functional description of "URCap"

The "URCap" software is used for the simple commissioning and programming of the SCHUNK gripper EGH in combination with robots from Universal Robots. The "URCap" software is integrated seamlessly into the "Polyscope" programming environment of Universal Robots. The programming and configuration of the gripper are supported via the control panel of the robot.

Before installing, check whether a more recent version of the software module is available at [schunk.com/egh-downloads](https://www.schunk.com/egh-downloads).

To avoid compatibility problems, check the operating software of the UR control unit before using "URCap" and update it if necessary.

3 Installing the software module

CAUTION

Possible damage to product!

The product or the robot may get damaged if electrical cables are connected or disconnected during operation.

- Connect or disconnect electrical connections only when the device is switched off.

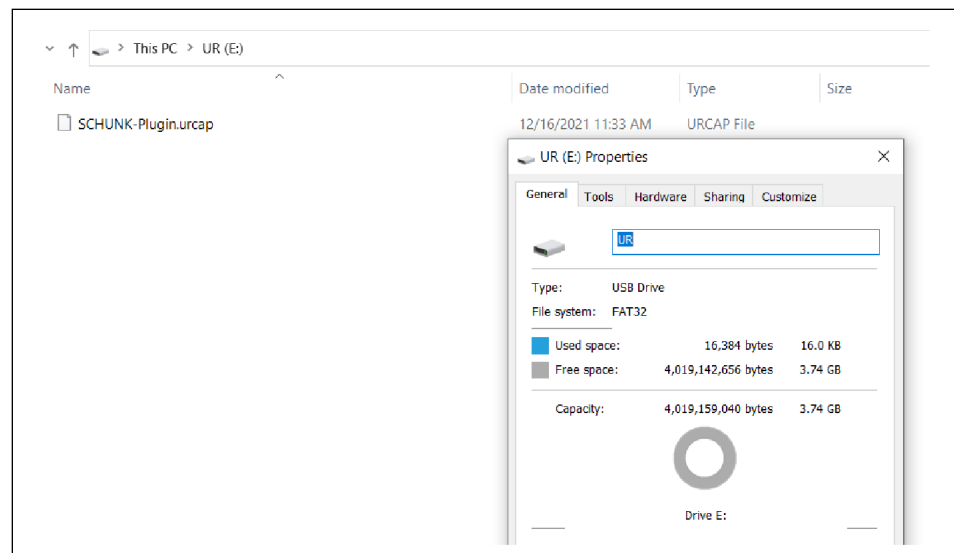
NOTE

To install the software, SCHUNK recommends using a USB stick.

Prepare the USB stick

The USB stick must meet the following requirements:

- Formatted in FAT32 format
- Designation of the removable drive: "UR"



Designation of the USB stick

Installing the software module

NOTE

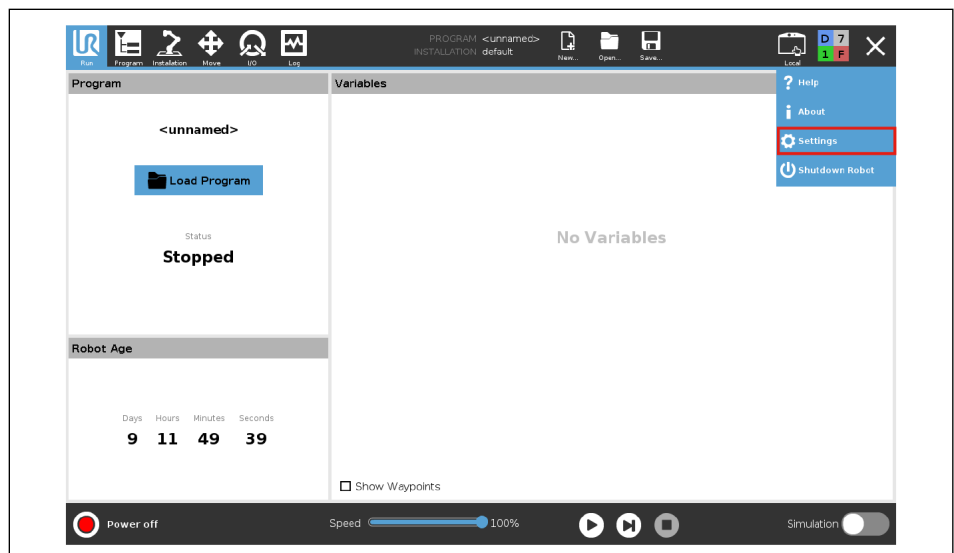
To avoid malfunctions, SCHUNK recommends installing the current version of the software module.

1. Download the latest URcap version at [schunk.com/egh-downloads](https://www.schunk.com/egh-downloads) and copy it to the USB stick.

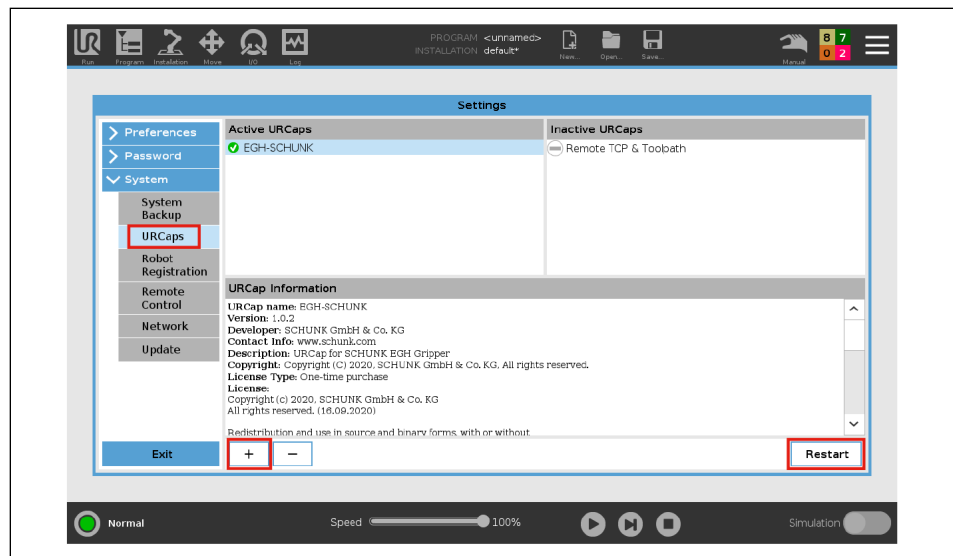
2. Connect the USB stick to the robot control system. The USB interface is located at the back.



3. Switch on the robot control system.
⇒ The robot control system is started.



4. Open the menu at the top right and choose "Settings".



5. Select the "System" button in the left menu.

⇒ A sub-menu opens.

6. Select the "URCaps" button.

7. Select the "+" button.

8. Select software module "SCHUNK Gripper".

9. Select the "Open" button.

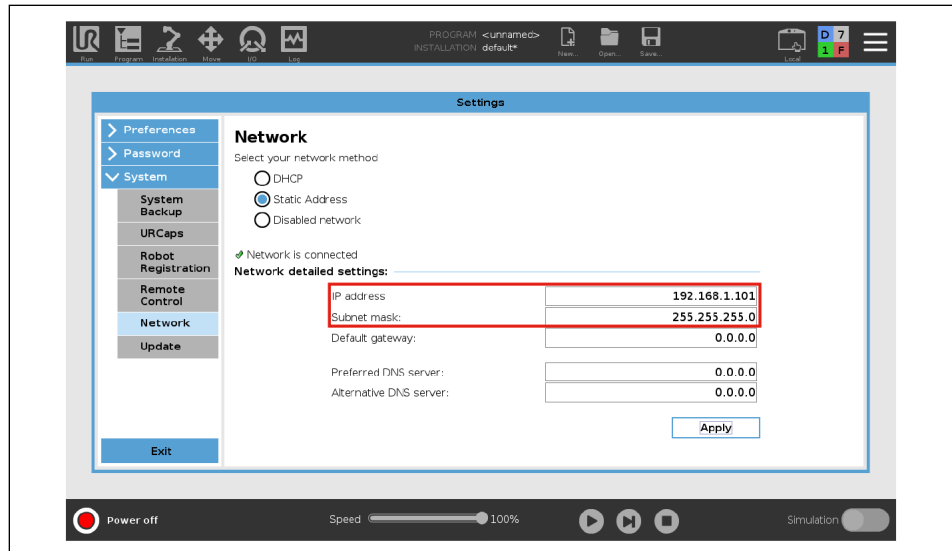
⇒ The software module is added and displayed in the Explorer window.

10. Select the "Restart" button to complete the installation.

⇒ The system restarts.

Configuring network settings

1. Open the menu at the top right and choose "Settings".
2. Select the "System" button in the left menu.
 - ⇒ A sub-menu opens.
3. Select the "Network" button.
 - ⇒ The network settings are displayed in the Explorer window on the right.



4. Configure the connection via "Static IP Address".

NOTE

SCHUNK recommends the following information for error-free communication with the product.

5. Enter an IP address for the robot control system in the "IP address" input field, e.g. 192.168.1.101.
6. Enter the subnet mask of the network in the "Subnet mask" input field, e.g. 255.255.255.0.
7. Select the "Apply" button.
8. Select the "Cancel" button in the left menu to close the network settings.

3.1 Uninstalling the software module

1. Open the menu at the top right and choose "Settings".
2. Select the "System" button in the left menu.
 - ⇒ A sub-menu opens.
3. Select the "URCaps" button.
4. Select software module "SCHUNK Gripper".
5. Select the "-" button.
6. Select the "Restart" button to complete the deinstallation.
 - ⇒ The system restarts.

4 Configure the software module



⚠ CAUTION

Risk of injury possible!

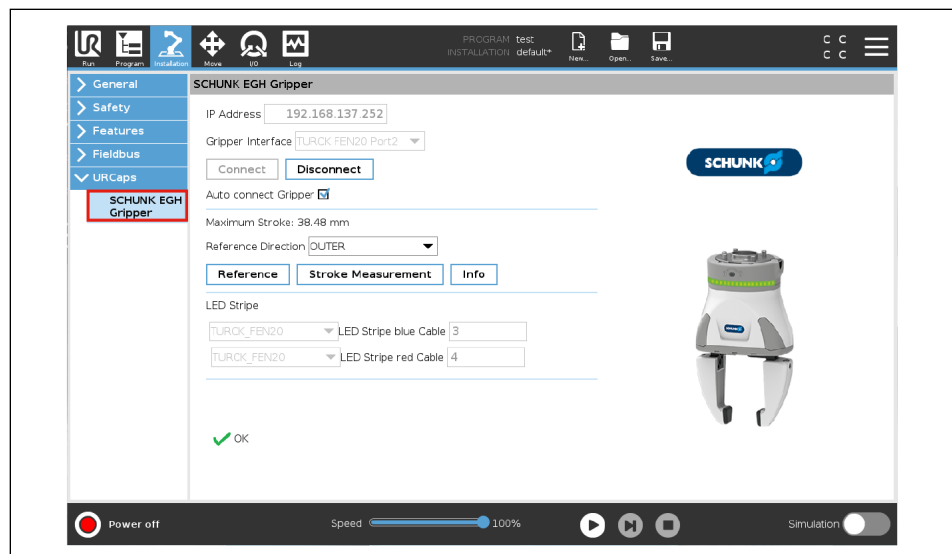
Safety-relevant signals (e.g. emergency stop) must be transmitted externally, e.g. using a safety relay. In this configuration the product would not be energized in the event of a safety incident.

- Review safety aspects within a risk assessment.

NOTE

Directly after the robot has started up or after the product has been switched on for the first time, the message "FAST STOP" must be acknowledged twice in the installation node. This is an internal safety function that only enables the product after the control system in use has been completely started up. Even if the "URCap" software is deactivated, the product is still placed in a security state and the "FAST STOP" must be acknowledged twice if URcap is activated again.

1. Select the "Installation" button in the header line.
2. Select the "URCaps" button.
 - ⇒ A sub-menu opens.
3. Select the "SCHUNK EGH Gripper" button.
 - ⇒ The Explorer window displays the settings to be configured and an image of the product.



4. Perform the configuration.

The following details can be configured:

- IP address, ▶ 4.1 [13]
- Gripper interface, ▶ 4.2 [13]
- Autoconnect, ▶ 4.3 [13]
- Referencing of the gripper, ▶ 4.4 [14]
- Digital outputs, ▶ 4.5 [15]

4.1 Configuring the IP address

1. Connect the product to a free port of the TURCK FEN20-4IOL IO-Link master.
2. Enter the default IP address: 192.168.1.253

For further configurations please refer to the software offered by TURCK, www.turck.de/de/productgroup/Downloads

4.2 Gripper interface

- Select the port of the TURCK FEN20-4IOL IO-Link master to which the product has been connected in the drop-down menu.

4.3 Autoconnect

The gripper can be automatically connected to the control system using the autoconnect function. After a one-time configuration of the IP address and port of the IO-Link master, the autoconnect function can be activated by a checkbox. Upon subsequent restarts of the control system, the gripper is automatically connected to the control system.

NOTE

In order for a gripper to be used automatically in a program after autoconnecting, an error must be acknowledged twice in the preprogram with a short delay. Afterwards, the gripper must still be referenced.

4.4 Configuring the referencing of the gripper

NOTE

Referencing the product takes some time. During this time, it is recommended not to perform any other operations on the product and robot.

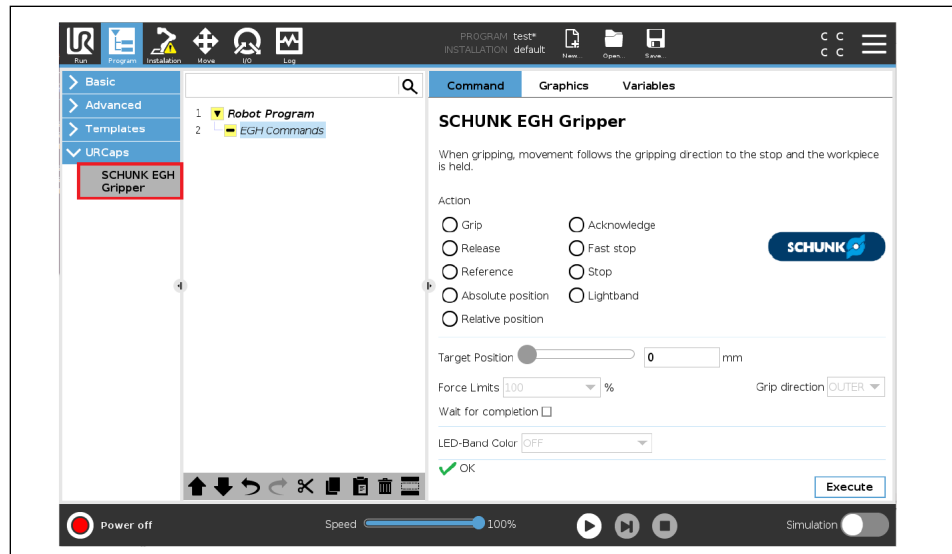
NOTE

A stroke measurement should be performed if the stroke of the base jaws is limited, for instance, by specific gripper finger shapes. The stroke measurement moves contrary to the referencing direction. If no stroke measurement is performed, a stored default value for a stroke of 40 mm per base jaw is used.

- All workpieces have been removed.
- The base jaws are unobstructed as far as the end stop in the referencing direction.
- 1. Set the reference direction of the base jaws to "Inner" or "Outer" in the drop-down menu.
- 2. Select the "Reference" button
 - ⇒ The product moves in a set direction up to the mechanical end stop, zero position is set.
- 3. Select the "Stroke measurement" button.
 - ⇒ Maximum stroke is determined

5 Creating the robot program

After installing the software module "SCHUNK EGH URCap", URCap actions can be inserted into a robot program.

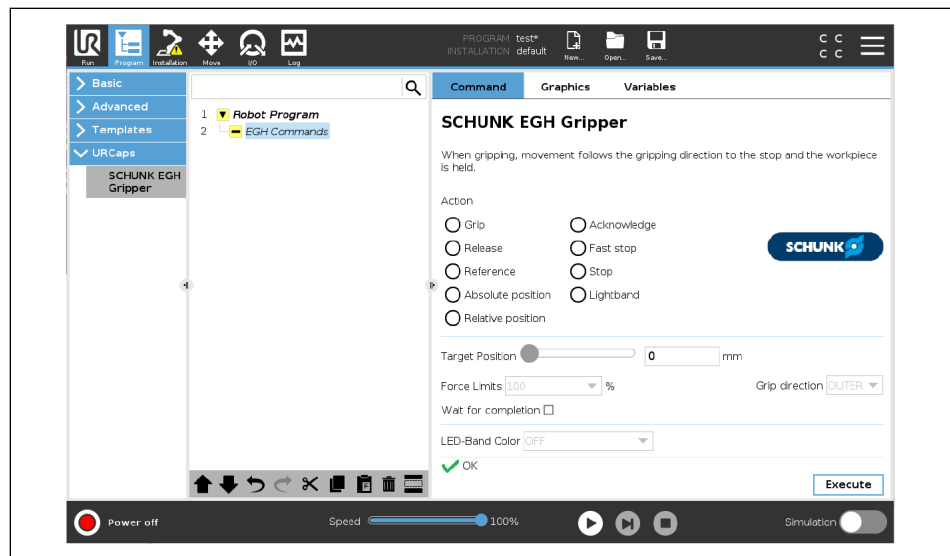


1. Select the "Program" button in the header line.
 - ⇒ The robot program and a short description for creating the program are displayed in the Explorer window.
2. Select the "URCaps" > "SCHUNK EGH Gripper" button.
 - ⇒ The plug-in actions are displayed in the Explorer window.

The following actions can be selected in the Explorer window:

- EGH commands
 - Stop
 - Quick stop
 - Referencing
 - Acknowledging
- EGH grip (or EGH release)
- EGH position travel (or EGH relative travel)
- EGH color light band

5.1 EGH commands



Command	Description
Stop	The gripper is brought to a controlled standstill. The gripping force is maintained.
Fast stop	The electrical power supply is interrupted immediately, the gripper is stopped uncontrolled. An error message requiring acknowledgment is generated. IMPORTANT! Material damage to the workpiece possible! Ensure that all workpieces have been removed and that the base jaws are free to move in the reference direction up to the end stop
Reference	The gripper moves in the configured referencing direction up to the mechanical end stop, ▶ 4.4 [14].
Acknowledge	If an error has been eliminated, the gripper is switched from the error state to the normal operating state. The actuator remains de-energized until the next command. In the event of an error that needs to be acknowledged, the first of the three indicator LEDs on the gripper changes from green to red.

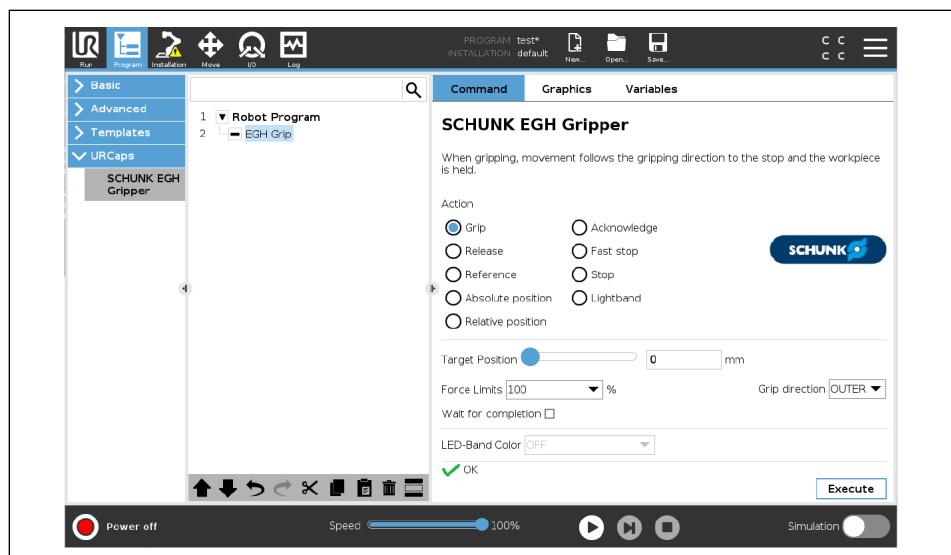
1. Select a command.
 - ⇒ The action has been added to the robot program.
2. Select the "Execute" button to test the action.

5.2 EGH grip

With the "Gripping" action, the set gripping direction is moved to the stop and the workpiece is held with fixed force (25/50/75/100%). Before reaching the entered target position, the motor current and thus the speed of the base jaws is reduced. This protects the gripped workpiece from damage.

NOTE

During the first gripping process, the complete stroke is driven at a reduced speed and current. The position of the last successful grip is accepted as the intended workpiece position for the next grip command. The intended workpiece position is reset to blockage after referencing, stroke measurement as well as after positioning.



Gripping parameters	Value	Note
Gripping direction	I.D. gripping	The base jaws move from the inside to the outside. The workpiece is gripped from the inside. With this setting, the gripper moves the base jaws together when released.
	O.D. gripping	The base jaws move from the outside to the inside. The workpiece is gripped from the outside. With this setting, the gripper moves the base jaws apart when released.
Gripping force	25%, 50%, 75% or 100%	Percentage of the maximum gripping force used for the current grip.

Gripping parameters	Value	Note
Target position	between 0.0 and max. stroke	The target position indicates up to where the gripper is to be opened or closed. The maximum stroke can be determined when referencing the gripper, ▶ 4.4 [14].

1. Select "Gripping" or "Releasing".
2. Set gripping parameters.
 - ⇒ The action has been added to the robot program.
3. Select the "Execute" button to test the action.

5.3 EGH position

CAUTION

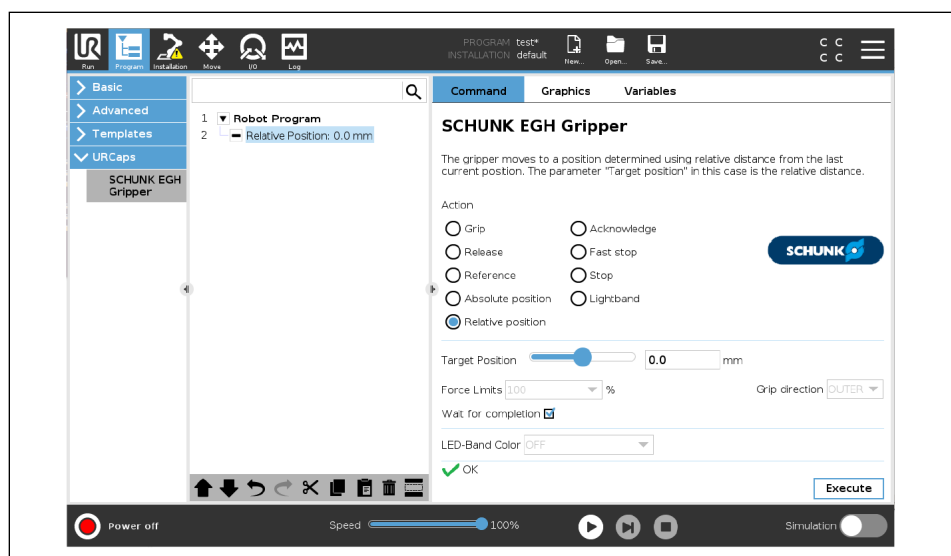
Material damage to the workpiece possible!

This action is not suitable for gripping, because the movement always takes place at maximum speed.

- For positioning on an end stop, select the commands "Gripping" and "Releasing".

NOTE

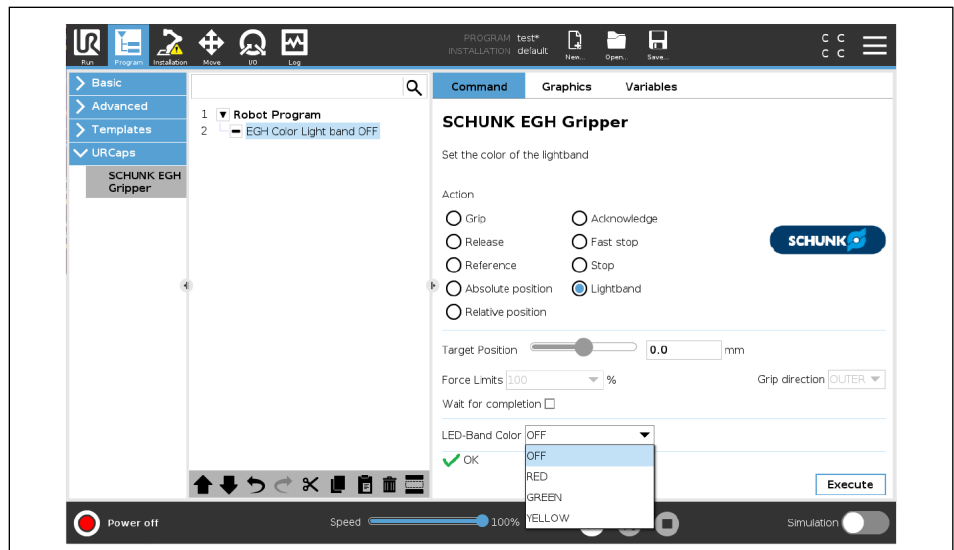
If the action "EGH position" is interrupted by a blockage, the drive switches off and an error message requiring acknowledgment is generated. The actuator remains de-energized until the next motion command.



Command	Description
Absolute position	The base jaws move to the position defined under "Target position".
Relative position	The base jaws move to a position determined by the relative distance to the current position of the base jaws. The relative distance is defined in the "Target position" field.
Wait for command to complete	<p>If the command is selected, the entire movement waits before the next action in the robot program is executed.</p> <p>If the command is not selected, the next action is performed before the movement is complete. For example, the robot arm is then moved while the base jaws are moved into position.</p> <p>No other gripping commands should follow in direct succession. Otherwise, the corresponding follow-up gripping command is executed before the movement is completed.</p>

1. Select "Absolute position " or "Relative position".
2. Enter the desired value in the "Target position" input field.
3. If necessary, select "Wait for command to complete".
 - ⇒ The action has been added to the robot program.
4. Select the "Execute" button to test the action.

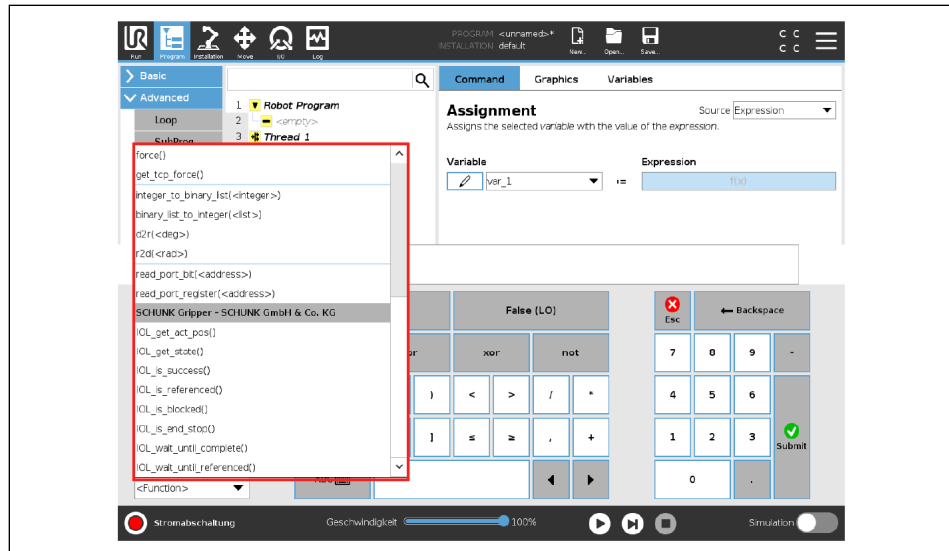
5.4 EGH color light band



- Select the desired color in the drop-down menu or select "OFF" to deactivate the light band.

6 Monitoring the gripper status

The "URCap" software provides functions with which the execution status of a running command or the gripper status in general can be monitored.



1. Select the "Program" button in the header line.
2. Select the "Basic" button in the left menu.
 - ⇒ A sub-menu opens.
3. Select basic command.
 - ⇒ The command appears in the robot program.
4. Specify the command in the Explorer window.
5. Select the function to be assigned to the command.
 - ⇒ The drop-down menu "<Function>" opens.
 - ⇒ The drop-down menu shows the various functions.
6. Select the desired function.

Function	Return value	Description
IOL_get_state()	0 to 3	The current status of the product is displayed: 0: Error 1: Outside of specification 2: Maintenance required 3: Ready for operation

Function	Return value	Description
IOL_is_referenced()	True / False	True: Gripper is referenced False: Gripper is not referenced Note: The gripper should always be referenced within a program.
IOL_get_act_pos()	Float	The current gripping position is displayed. The position (in mm) is the distance of a base jaw from the referenced zero point.
IOL_is_end_stop()	True / False	"True" is returned when the gripper is positioned at the end stop. The end stop matches the position "0.0" ± tolerance or "Maximum stroke" ± tolerance. Otherwise, "False" is returned.
IOL_is_blocked()	True / False	"True" is returned if the base jaws are blocked and the gripper does not move although the actuator is energized. Otherwise, "False" is returned.
IOL_is_success()	True / False	"True" is returned when a command is successfully executed. If a new command is executed, this command is reset to false. If the command was not executed successfully, "False" is returned. Note: The monitoring is applicable to all commands. For an adequate check, SCHUNK recommends the other functions. For more information, see the software manual "SCHUNK Grippers with IO-Link," ▶ 1.4 [5].

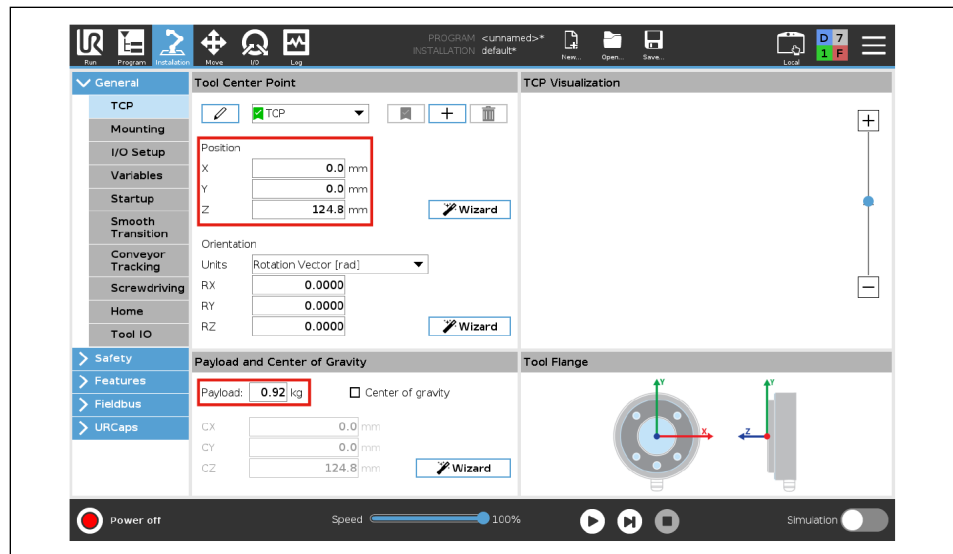
Function	Return value	Description
IOL_wait_until_complete()	True / False	If the value is "True" , it is indicated whether the running program will wait until the gripper returns that the last command was successful. The next action in the robot program is then executed.
IOL_wait_until_referenced()	True / False	If the value is "True" , it is indicated whether the running program will wait until the gripper returns that it is referenced. The next action in the robot program is then executed.

7 Setting the Tool Center Point (TCP) and gripper weight

NOTE

For further information on Tool Center Point (TCP), see the operating manual of the UR robot, ▶ 1.4 [5].

For proper use of the gripper on a UR robot, it is recommended to store the Tool Center Point (TCP) and the gripper weight in the robot settings.



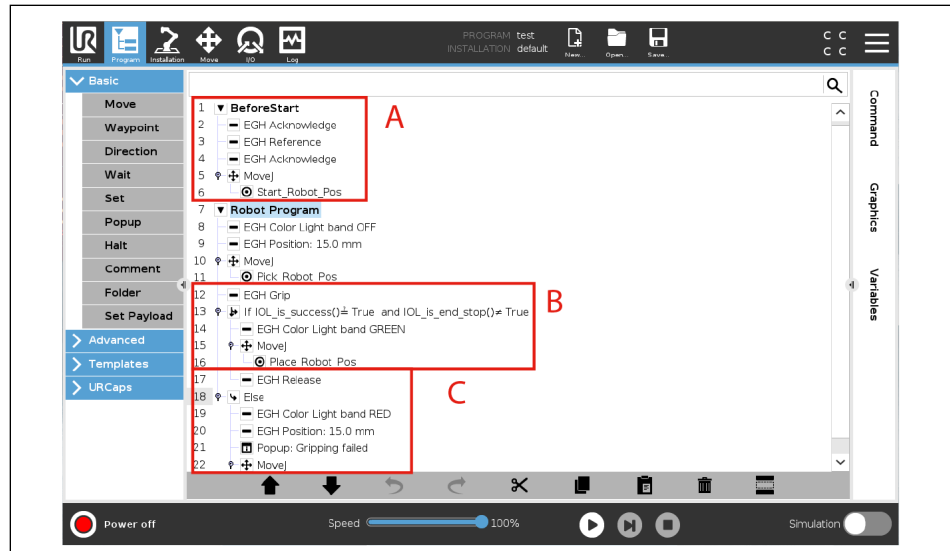
1. Select the "Installation" button in the header line.
2. Select the "General" button in the left menu.
⇒ A sub-menu opens.
3. Select the "TCP" button.
4. Enter the following values in the X, Y and Z fields in the "Tool Center Point" section:
⇒ X = 0.0 mm
⇒ Y = 0.0 mm
⇒ Z = 124.8 mm + length of gripper fingers
5. Enter the gripper weight of 0.95 kg in the "Payload and center of gravity" section in the "Payload" field.

NOTE

If a workpiece with a certain weight is gripped, the total useful load can be dynamically adjusted within the robot program under "Program" > "Basic" > "Adjust".

8 Example of a robot program

The following program demonstrates a simple pick and place application with an EGH gripper using the functionality provided by the URCap.



Program module A ("BeforeStart") configures the gripper:

- If robot and gripper have just been switched on, the "FastStop" is acknowledged to activate the gripper (line 2).
- The gripper is referenced (line 3).
- Before the program loop starts, the arm is moved to the starting position – Start_Robot_Pos – (line 6).

In the following lines, the light band color is set to yellow (line 8) and the gripper fingers are pre-positioned (line 9), e.g. to be able to grip at a closer distance. Meanwhile, the robot arm is moved to the gripping position – Pick_Robot_Pos (line 11). In line 12, an object is gripped via the program node EGH grip.

Program modules B and C contain an If-Else construction to monitor the gripping status:

- If an object was gripped, the function `EGH_is_success()` returns the value `TRUE` while the end stop has not been reached (`EGH_is_endstop()≠TRUE`) (line 13).
- The success of this monitoring is acknowledged by setting the light band to green (line 14).
- At the end, the robot arm moves to the end position `Place_Robot_Pos` (line 16) to place the object (line 17).

If no object has been gripped, the light band turns red (line 19). Further measures are the pre-positioning of the gripper fingers (line 20) and a notification popup (line 21). If the user decides to continue the program, the robot arm moves to the starting position `Start_Robot_Pos` (line 23).





SCHUNK SE & Co. KG
Toolholding and workholding | Gripping Technology |
Automation technology

Bahnhofstr. 106 - 134
D-74348 Lauffen/Neckar
Tel. +49-7133-103-0
Fax +49-7133-103-2399
info@de.schunk.com
schunk.com

Folgen Sie uns | *Follow us*



Wir drucken nachhaltig | *We print sustainable*