Commissioning instructions

EGU / EGK / EZU for Universal Robots

SCHUNK software module for URCapX

Translation of original commissioning instructions

Hand in hand for tomorrow

Imprint

Technical changes:
We reserve the right to make technical improvements.

Document number: 1656617

Version: 01.00 | 2/11/2026 | en-US

Dear Customer

Dear Customer,

Thank you for putting your trust in 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. We look forward to your challenging questions. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management
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cmg@de.schunk.com

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

Table of Contents

1 General

1.1 About this Manual

This manual contains information on SCHUNK URCapX for UR robots and how to use it.

URCapX enables the simple integration and actuation of the following products in UR applications:

- EGU EI: with EtherNet/IP™ interface
- EGU PN: with PROFINET interface
- EGK EI: with EtherNet/IP™ interface
- EGK PN: with PROFINET interface
- EZU EI: with EtherNet/IP™ interface
- EZU PN: with PROFINET interface

NOTE

The compatibility of the product with the robot depends on the current carrying capacity . For compatibility overview see Link ##.

Definition of terms "Product"

The term "product" replaces the product names listed above in this manual.

This manual describes the software environment for a UR robot. Follow the instructions for the robot.

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

Besides this manual, other documents which apply are those listed under ▸ 1.5 [🗋 6].

Abbreviations

The following abbreviations are used:

- GPE: Gripping force and position maintenance
- SG: Single Gripper
- DG: Double Gripper
- TCP: Tool Center Point
- COM: Center of Mass (center of gravity)

1.2 Target group

This manual is intended for robot integrators who have basic mechanical and electrical training skills and who are also familiar with elementary programming concepts.

Commissioning and troubleshooting may only be performed by qualified personnel with appropriate training.

The following knowledge is required:

- Basic knowledge of robotics
- Knowledge of the handling UR robots

Electrical installations may only be carried out by a suitably trained electrician.

1.3 Symbol definition

The following symbols are used in this manual:

■ Prerequisite for an action

1. Action 1
2. Action 2

   ⇨ Intermediate results

⇨ Final results

▸ 1.3 [🗋 5]: chapter number and [page number] in hyperlinks

1.4 Illustration of safety notes

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

⚠ DANGER

Danger to individuals!

Ignoring a safety note such as this will certainly lead to irreversible injury and even death.

⚠ WARNING

Danger to individuals!

Ignoring a safety note such as this can lead to irreversible injury and even death.

⚠ CAUTION

Danger to individuals!

Non-observance can cause minor injuries.

NOTICE

Material damage!

Information about avoiding material damage.

1.5 Applicable documents

- Assembly and operating manual for the product:
  - Universal gripper EGU, electric *
  - Gripper for small components EGK, electric *
  - Electric centric gripper EZU *
- Commissioning instructions:
  - EGU with EtherNet/IP™ interface *
  - EGK with EtherNet/IP™ interface *
  - EZU with EtherNet/IP™ interface *
  - EGU with PROFINET interface *
  - EGK with PROFINET interface *
  - EZU with PROFINET interface *
- Operating manual for the UR robot
- Catalog data sheet of the product *

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

1.6 Brands

- EtherNet/IP™ is a registered trademark of ODVA, Inc.
- PROFINET is a registered trademark of PROFIBUS Nutzerorganisation e.V.
- UR is a registered trademark of Universal Robots A/S (Denmark).

2 Functional description

The software module facilitates operation and creation of applications for SCHUNK products on a UR robot.

All necessary controls are installed via the software module. After the installation is complete, the programming elements are deployed within the graphical user interface (GUI). The GUI provides support when programming the gripper functions.

The following functions are available are in the software module and can be used in SCHUNK URCapX:

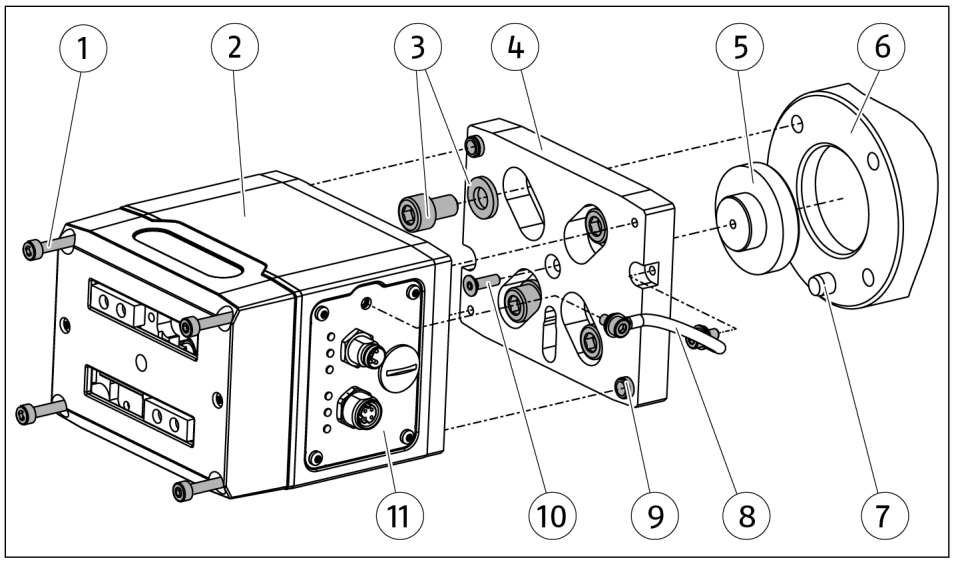
- **Grip**: When workpiece gripping (simple gripping movement), a workpiece is gripped with a specified gripping force value **without** specifying the workpiece position.
- **Grip workpiece at expected position**: When workpiece gripping at an expected position, a workpiece is gripped at the specified workpiece position with the specified gripping force value using a combined gripping movement.
- **Release**: When releasing a workpiece, the product executes a relative positioning movement. Starting from the current position, a defined distance is moved in the opposite direction to the gripping direction.
- **Jog mode**: With jog mode, a movement is executed to the outside or inside.
- **Absolute position**: Absolute positioning of the gripper fingers
- **Relative Position**: Relative positioning of the gripper fingers
- **Acknowledge**: Acknowledge pending warnings and errors
- **Stop**: Controlled stop
- **Fast Stop**: Cancel movements
- **Test Brake**: Perform brake test *(only for products of variant "M" and with firmware version 5.2 or higher)*
- **Prepare for shutdown:** When the module is switched off in a controlled manner, data required for operation is stored permanently. Once the module indicates that it is ready for shutdown, the logic supply voltage can be disconnected or a software restart initiated.

For more information on inserting the commands into the program code, see .

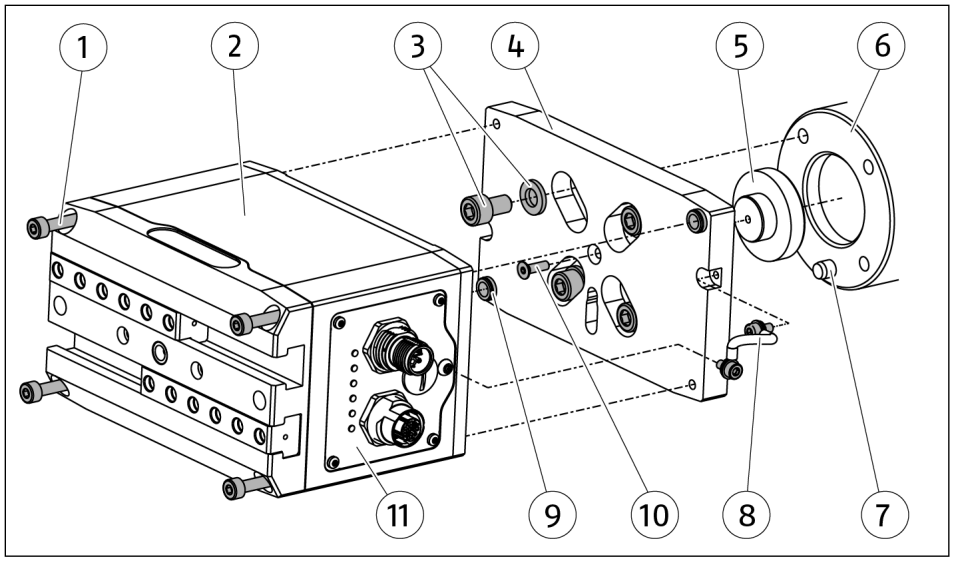
3 Securing the product to the robot

SCHUNK provides robot adaptation packages as accessories for mounting the product on robots. These packages include matching screws, centering pins and centering collar for fastening to the desired robot flange. For more information, see the catalog data sheet at **schunk.com**.

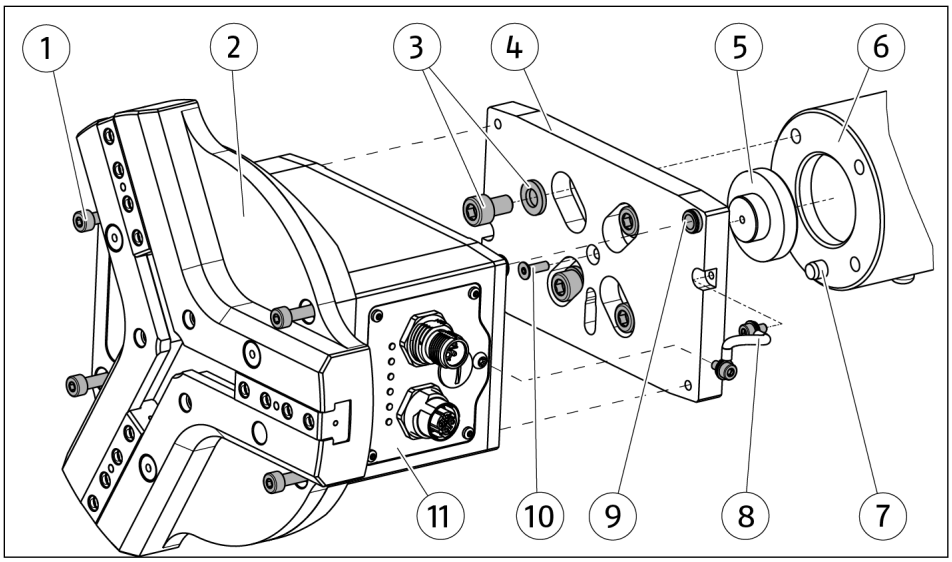
Single gripper (SG)



EGK-SG: Mounting on the robot



EGU-SG: Mounting on the robot



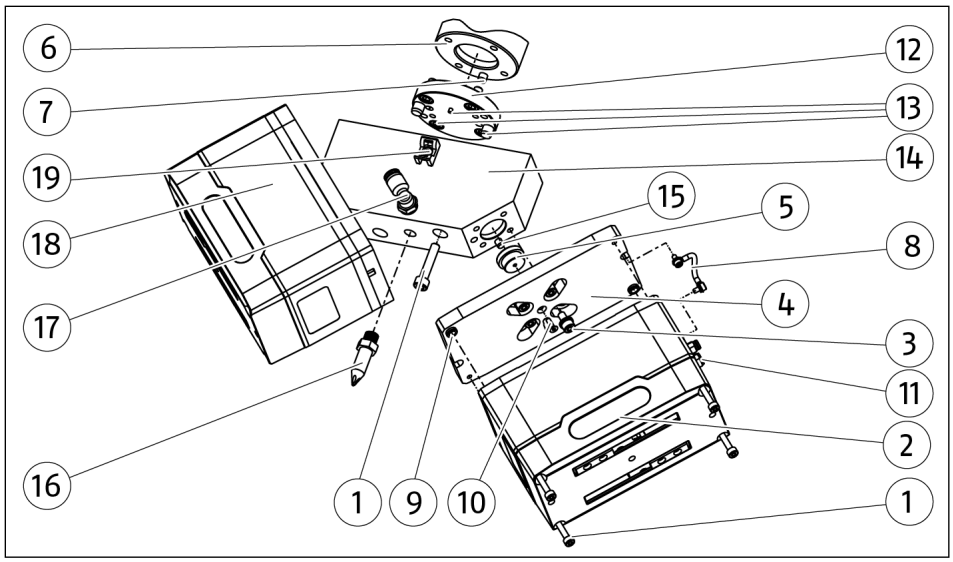
EZU-SG: Mounting on the robot

1. Insert centering pin (7) in robot flange (6).
2. Mount centering collar (5) with screw (10) on adapter plate (4).
3. Fasten adapter plate (4) to robot flange (6) with screws (3) and, if necessary, with washers.
4. Mount the functional earth (8) cable to the adapter plate (4) with screw and toothed lock washer.
5. Insert centering sleeves (9) into adapter plate (4).
6. Fasten the product (2) to the adapter plate (4) with screws (1). Note: Circuit board (11) and functional earth cable (8) must be on the same side.
7. Connect the functional earth cable (8) to the equipotential bonding of the product using a screw and toothed lock washer.

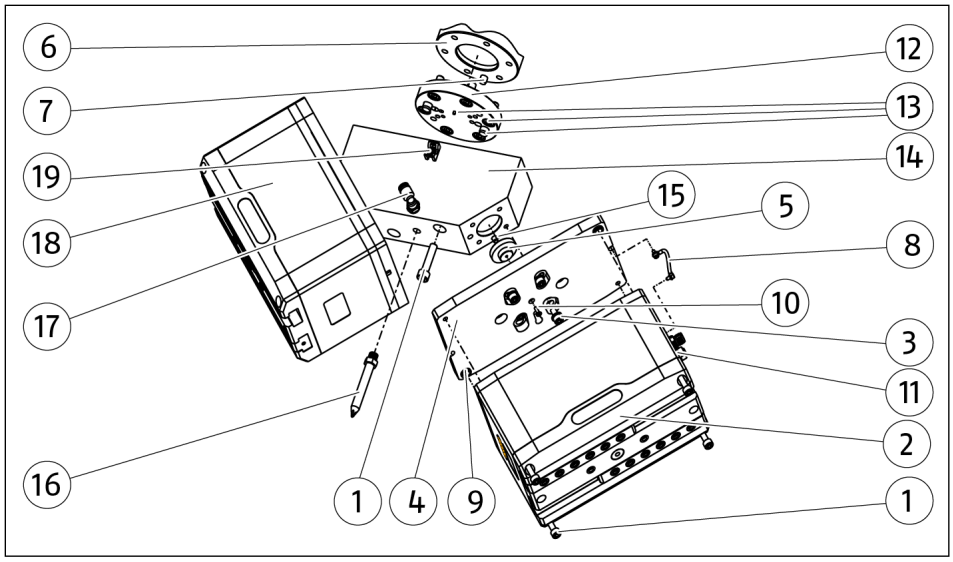
Double gripper (DG)

Note: When used as a double gripper, a blow-off nozzle can be mounted. In the process, the outgoing air from the blow-off nozzle cleans the workpiece of chips or other impurities.

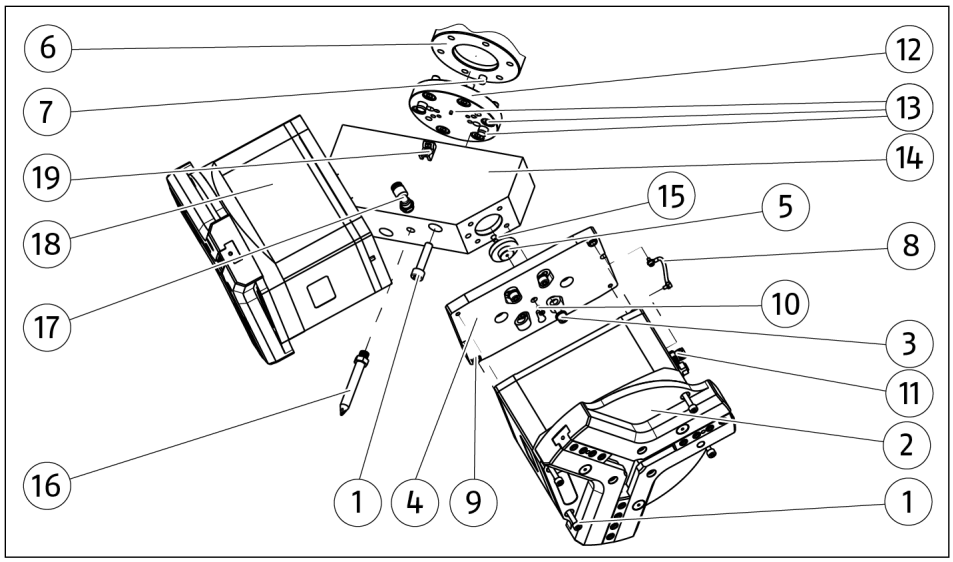
Blow-off nozzle and cable holder are available as accessories from SCHUNK, see catalog data sheet at **schunk.com**.



EGK-DG: Mounting on the robot



EGU-DG: Mounting on the robot



EZU-DG: Mounting on the robot

1. Insert centering pin (7) in robot flange (6).
2. Fasten ISO flange (12) to the robot flange (6) using screws (13).
3. Insert centering pins (13) in ISO flange (12).
4. Fasten elbow adapter (14) with screws (1) to ISO flange (12) in correct position.
5. Insert centering pin (15) into elbow adapter (14).
6. Mount centering collar (5) with screw (10) on adapter plate (4).
7. Fasten the adapter plate (4) with screws (3) and if necessary with washers to the elbow adapter (14).
8. Mount the functional earth (8) cable to the adapter plate (4) with screw and toothed lock washer. Make sure that the functional earth cable (8) points outwards.
9. Insert centering sleeves (9) into adapter plate (4).
10. Fasten the product (2) to the adapter plate (4) with screws (1). Note: Circuit board (11) and functional earth cable (8) must be on the same side.
11. Connect the functional earth cable (8) to the equipotential bonding of the product using a screw and toothed lock washer.
12. Mount the second gripper (18) to the elbow adapter (14) in the same way.
13. Optional: Glue the blow-off nozzle (16) with the enclosed O-ring into the Z-axis of the elbow adapter (14) with liquid, medium-strength threadlocker (tightening torque 1 Nm). Screw the elbow fitting (17) into the elbow adapter (14).
14. Optional: Fasten cable holder (19) to elbow adapter (14) with enclosed screw.

4 Connecting the product to the robot control system

Before connecting or commissioning the product, read the operating manual of the robot and observe the instructions in this manual!

⚠ WARNING

Risk of injury due to sudden movements!

If the energy supply is switched on or if residual energy is still present in the system, this can cause components to move unexpectedly, which may result in serious injuries.

- Before starting any work on the product: Switch off the energy supply and secure against re-connection.
- Ensure that no residual energy remains in the system.

⚠ CAUTION

Risk of injury from electric shock due to contact with live parts!

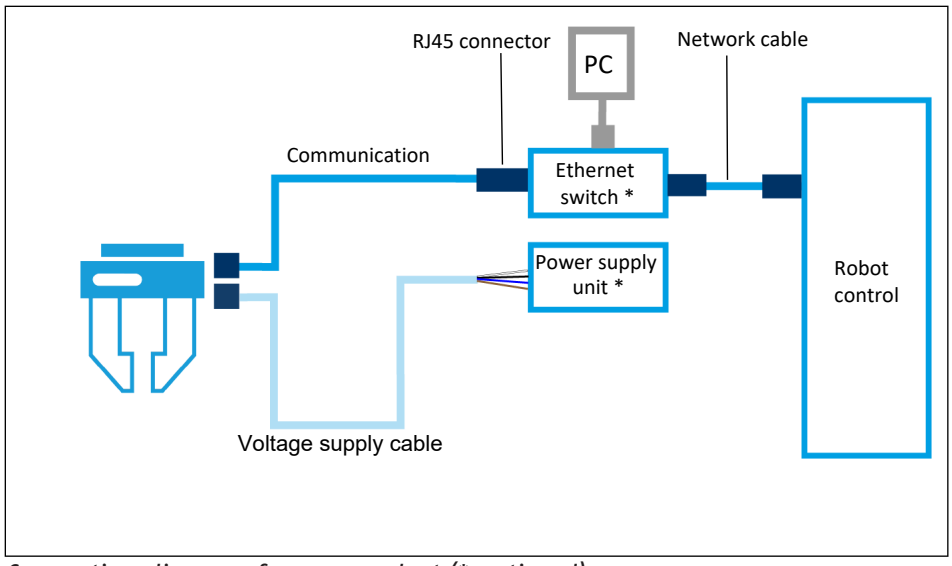
- Follow the operating manual for the robot.
- Before starting any work on the product: Switch off the energy supply and secure against re-connection.

NOTE

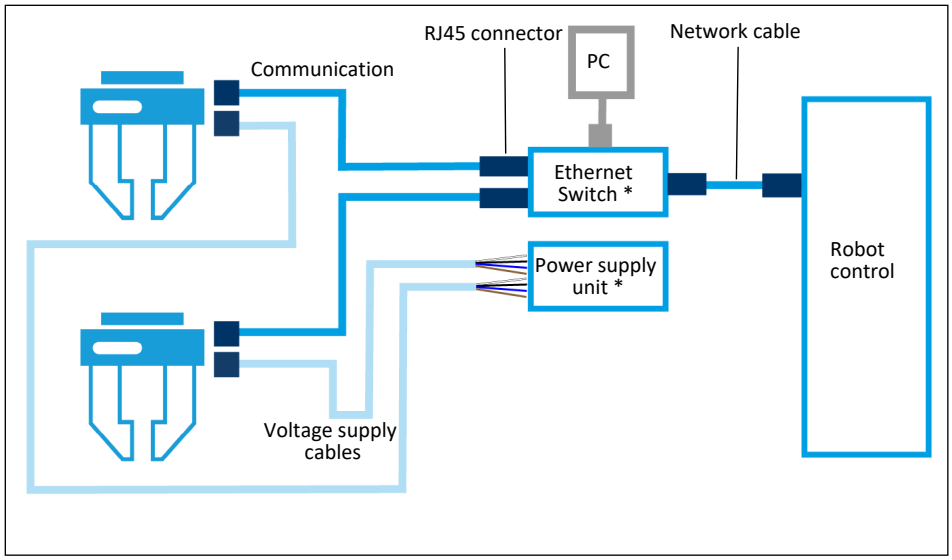
Safety-relevant signals (e.g. emergency stop) must be wired externally, e.g. via safety relays, thus completely disconnecting the product from the power supply.

- Perform a risk assessment for the entire robotic application based on legal requirements to evaluate all safety-related aspects of the application.

Connection diagram



Connection diagram for one product (optional)*



Connection diagram for two products (optional)*

* Ethernet switch and power supply unit are optional; design and procurement are carried out by the customer. Alternatively, suitable products are available from SCHUNK.

Instead of the power supply unit, the robot's power supply can also be used to supply the gripper. The customer must pay attention to the design.

Connecting the product

- There is **no** energy supply.
- Product is mounted on the robot.
- Gripper fingers are mounted. Cables are connected to the product (see product assembly and operating manual).

1. Connect the communication cable with the RJ45 connector
   a) to the customer's Ethernet switch or
   b) to a vacant slot on the robot control system.
2. Route the power supply cables along the robot and secure them, e.g. using a cable carrier.

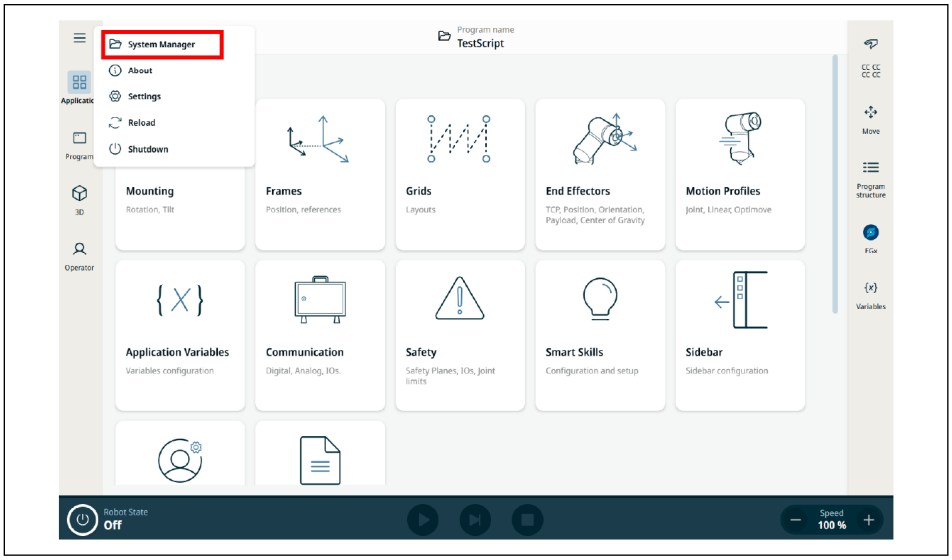
3. Connect the voltage supply cables to the power supply unit or to the robot control system.
4. Connect logic and power supply to the product.
   ⇨ On the product, the "LOG" and "PWR" LEDs light up green.

5 Installing the software module

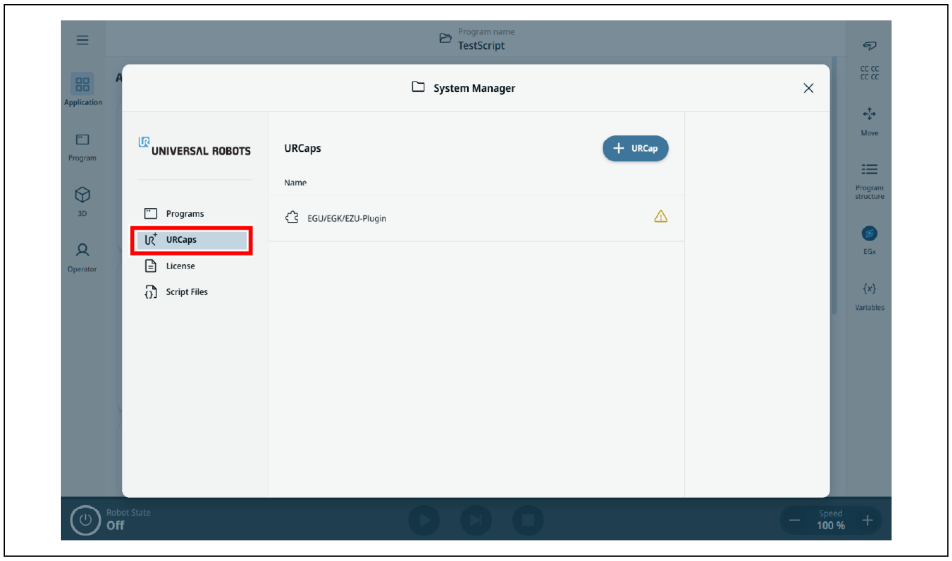
Installing

- Product is mounted and connected to the robot control system.

1. Download the current version of the URCAPX software module from **schunk.com/downloads-software** and copy it to the USB stick.
2. Connect the USB stick to the Teach Pendant.
3. Select the "System Manager" button.

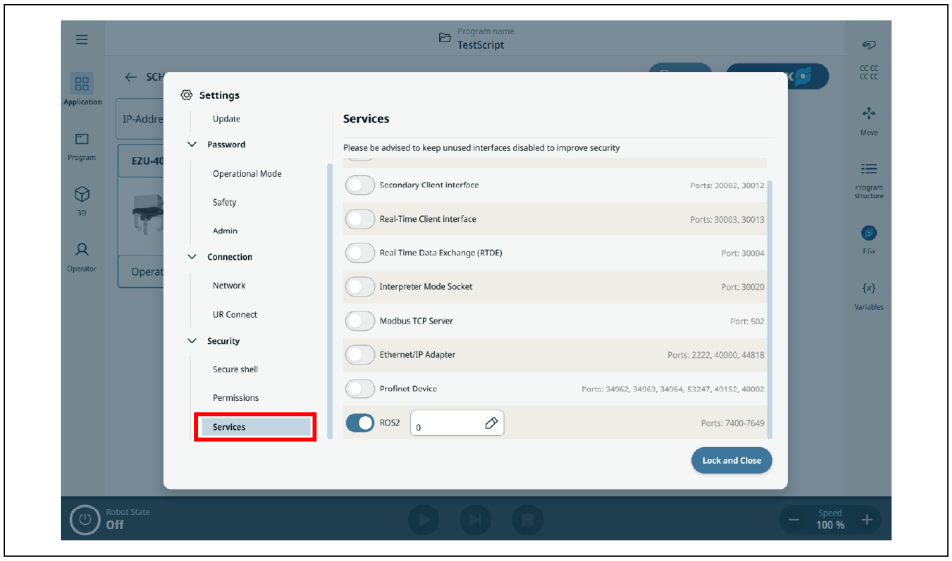


4. Select the "URCaps" -> "+URCap" button.



5. Select "SCHUNK ...." URCapX and confirm.
   - ⇨ The software module is installed. This may take a few seconds.
   - ⇨ The robot performs a restart.
   - ⇨ The URCap "SCHUNK EGU/EGK/EZU" appears on the Teach Pendant under "Applications", ▸ 8 [🗋 22].

6. Activate ROS2 service: Select "Settings" -> "Services" and activate ROS2.



5.1 SCHUNK Control Center – Mechatronic Grippers app

The *Mechatronic grippers* application can be started via the SCHUNK Control Center (SCC). This app is used for commissioning, configuring, monitoring and diagnosing mechatronic grippers.

Download SCC

The software can be downloaded from **schunk.com/downloads-software**.

Range of functions of the *Mechatronic grippers* app

- Configuration and commissioning:
  - Display of status information
  - Execution of gripping and movement commands
  - Changing the IP address
  - Display and save error messages
  - Executing firmware updates
  - Saving and reading configuration files
- Automatic and manual search for modules in the network
- Optical display of the connected module
- Configuration and control via computer possible
- Resetting to factory settings

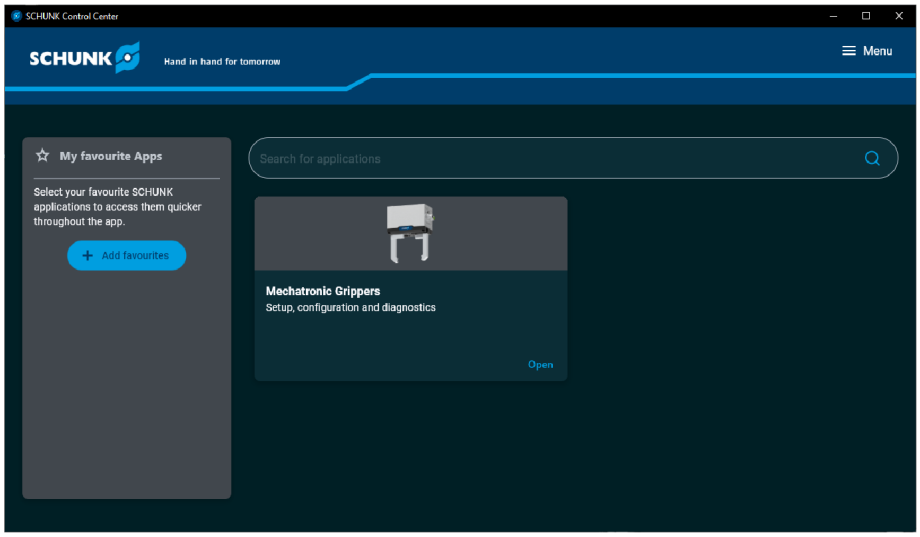
Starting the software

NOTE

In order to ensure the *Mechatronic Grippers* app communicates with the module via an Ethernet network, ensure that communication is not prevented by a firewall or any other network technology.

- The module is electrically connected to the power supply unit.
- SCHUNK Control Center is installed.

1. Connect the computer directly to the module via Ethernet.
   OR:
   Connect the computer to the network in which the module is integrated.
2. Open SCHUNK Control Center.
   ⇨ The start screen is displayed.

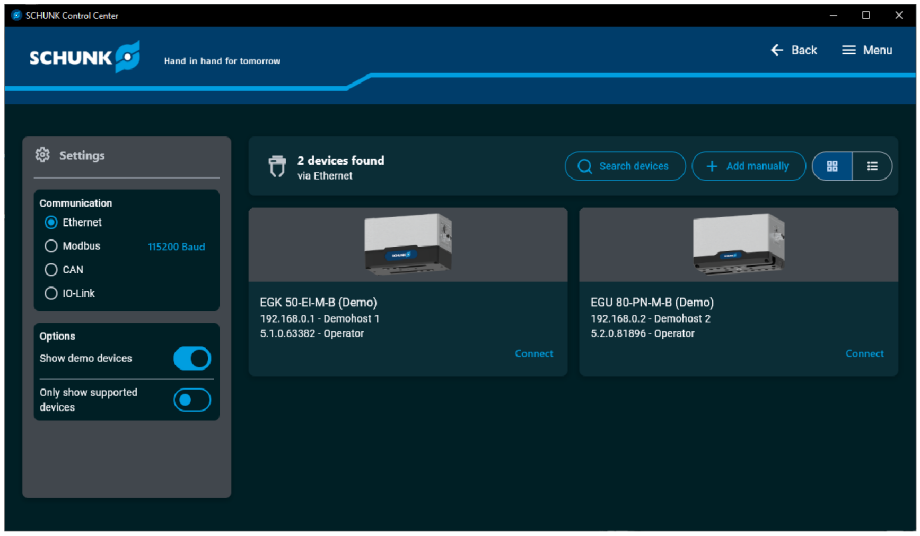


Start screen

3. Select the *Mechatronic grippers* app.
   ⇨ The system automatically searches for modules that are located in the network.
   ⇨ Modules found are displayed in the selection window of the communication interfaces.
   ⇨ If the product does not appear in the list:
   – Check the firewall settings and add exception for SCHUNK Control Center.
   – Enable DHCP for the network adapter.

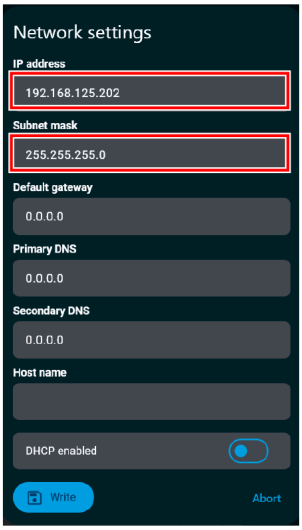
Set IP address and connect gripper

1. Select the gripper and open the Quick Select menu (•••) Select "Settings > Network settings".

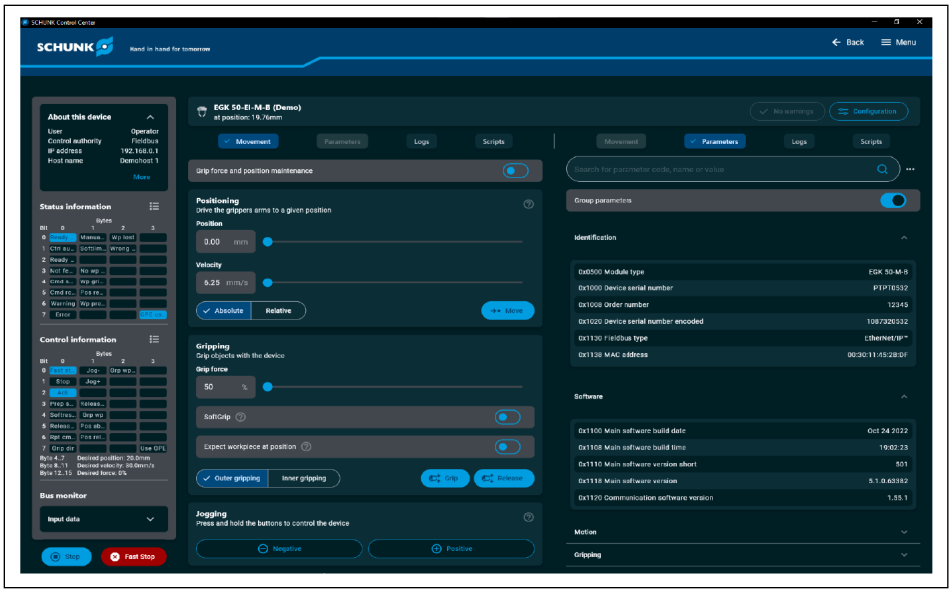


Communication interfaces selection window

2. Enter values for IP address and subnet mask. Observe the notes on the IP address, ▶ 5.1 [🗋 19].



3. In the communication interfaces selection window, select "Connect".
   ⇨ The app connects to the module.
   ⇨ Access to the functions of the module is possible.

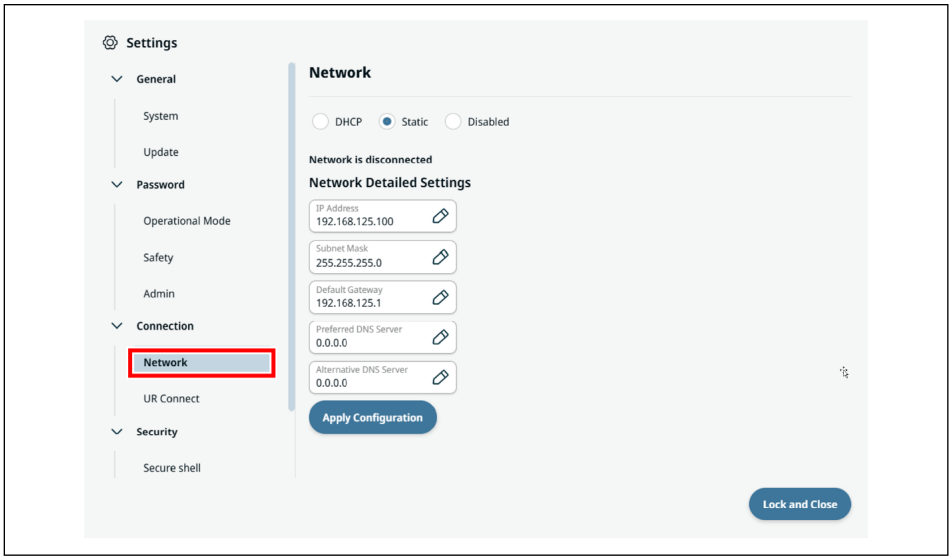


Range of functions

Notes on the IP address

The product is shipped with the IP address 0.0.0.0 by default. DHCP is enabled.

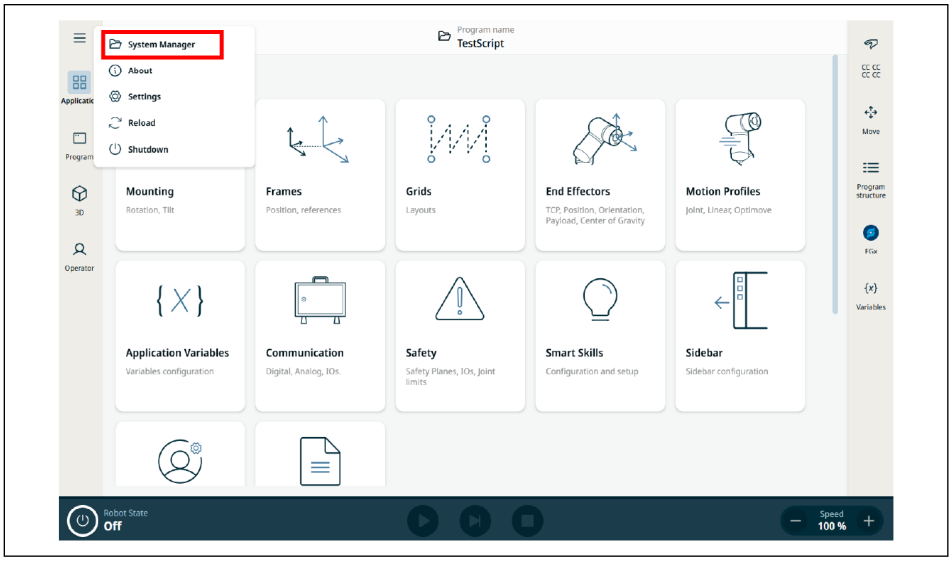
- The IP address of the gripper must be in the address range of the robot controller.
- The IP address of the robot controller can be viewed under "Settings" -> "Network":



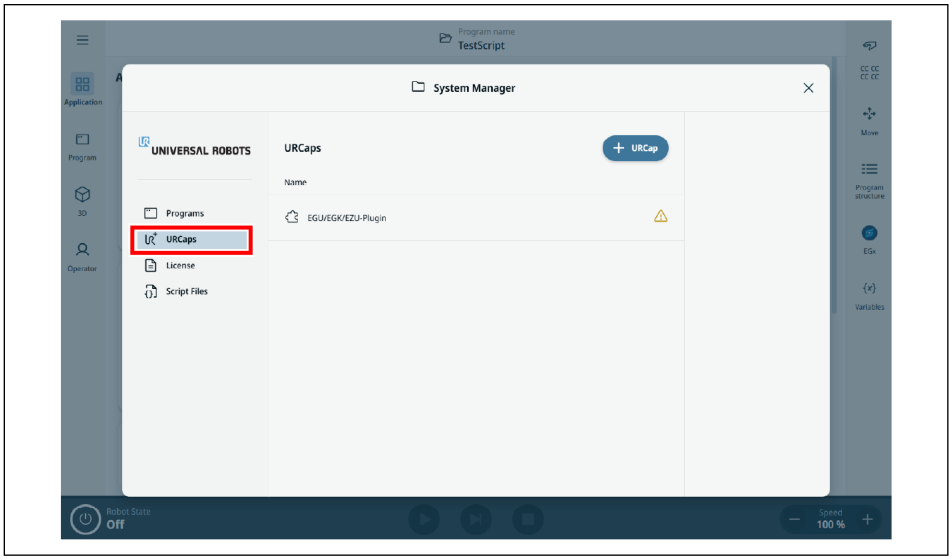
The gripper requires an IP address in the range 192.168.125.xxx for the configuration shown above

6 Uninstalling the software module

1. Select the "System Manager" button.



2. Press the "URCaps" button.



3. Select "EGU/EGK/EZU plug-in".
4. Select "Uninstall".
   ⇨ Software module is installed.

7 Updating the software module

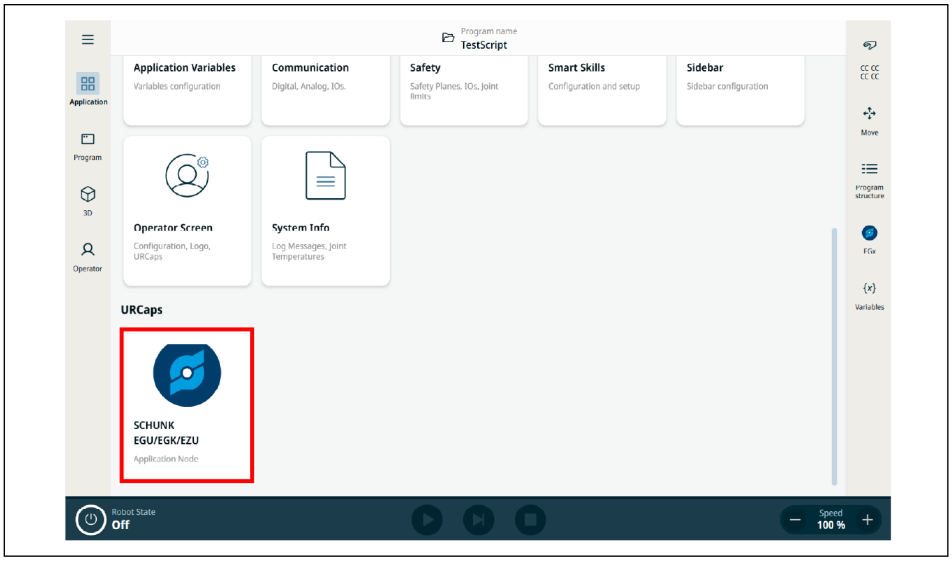
1. Uninstall the software module, ▶ 6 [🗋 20].
2. Download and install the new version of the software module, ▶ 5 [🗋 15].

8 SCHUNK Application Node

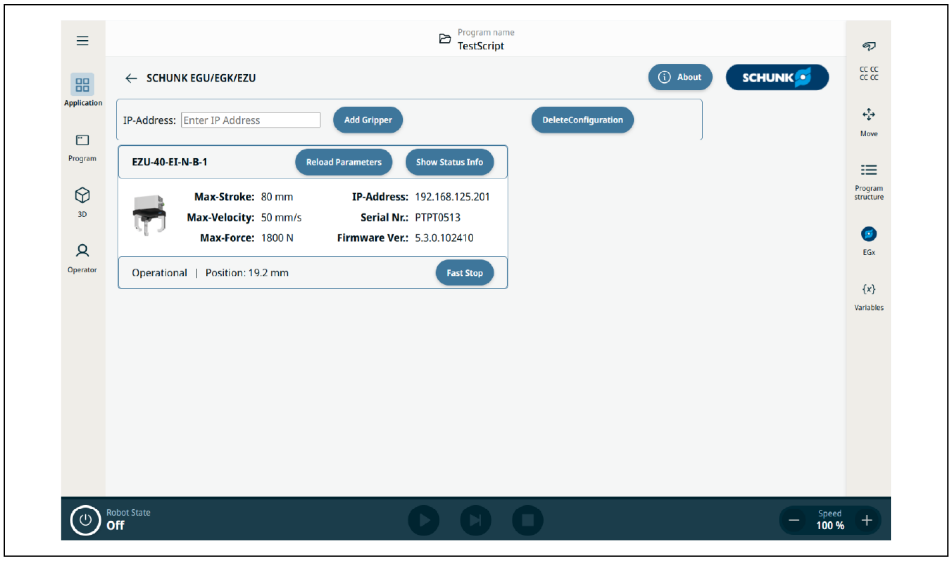
After installing the URCapX, the SCHUNK Application Node is available on the teach pendant.

Starting the SCHUNK app

- Select the "SCHUNK EGU/EGK/EZU" button.



1. Enter the IP address of the gripper and press "Add-Gripper".
   ⇨ If the connection is successful, the gripper appears as a card in the application node.

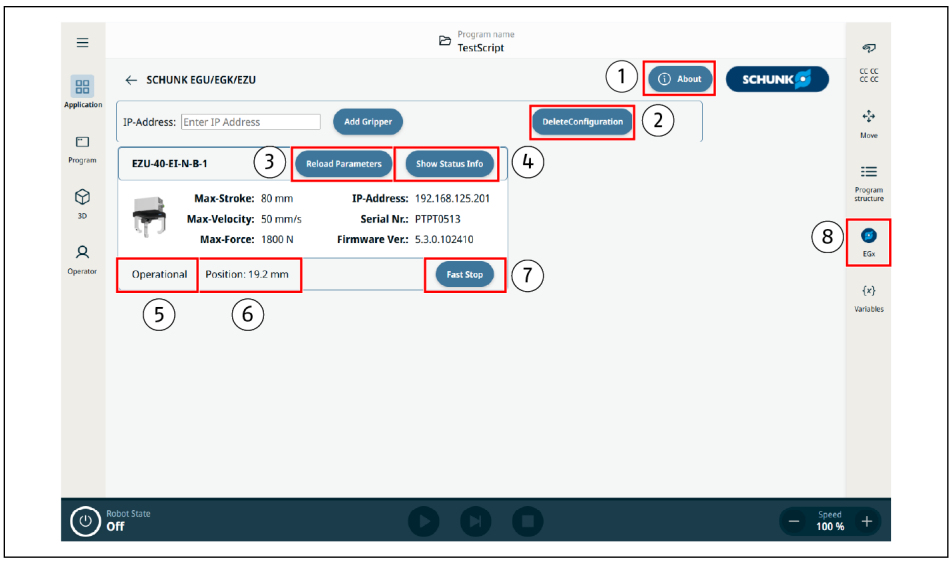


   ⇨ If the connection is not successful, an error message appears.
2. Check cable.
3. Check whether the gripper IP address matches the parameterized IP address. If necessary, adjust the IP address of the gripper using the commissioning software (**schunk.com/downloads-software**).

- For general notes on the user interface, see ▶ 9 [🗋 23].

9 General operating instructions

View: Select the  button.



SCHUNK dashboard

Item	Designation	Description
1	About Screen	Information about the software module is displayed.
2	Delete Configuration	Removes the currently added grippers from the application node. This cannot be reversed.
3	Reload Parameters	If gripper parameters have been changed in the Control Center, e.g. , they can be updated using the "Reload Parameters" button in the URCapX.
4	Show Status Info	Displays the status of the bits in the status word.
5	Status	The following messages indicate the current status of the product.
	Operational	The product is ready for operation.
	Warning / Not Feasible	There is a warning. The warning code or the Not Feasible reason is displayed.
	Error	There is an error. The error code is displayed. Acknowledge pending errors by selecting the "Acknowledge" button.
6	Position	The current approached position is displayed.

Item	Designation	Description
7	Button	Depending on the current status of the product, the display of the buttons alternates between "Fast Stop" and "Acknowledge".
	Fast Stop	When "Fast Stop" is selected, the product is stopped immediately. The movement is stopped immediately.
	Acknowledge	When "Acknowledge" is selected, errors requiring acknowledgment are confirmed.
8	Sidebar	Opens the sidebar in which gripper functions can be tested.

10 Parameterizing the product

⚠ WARNING

Risk of injury due to sudden movements!

Components could move unexpectedly and result in serious injuries.

- During commissioning, observe all warnings displayed on the software interface.
- Keep a safe distance and wear suitable protective equipment.

The product is configured via the SCHUNK Control Center, ▸ 5 [🗋 15].

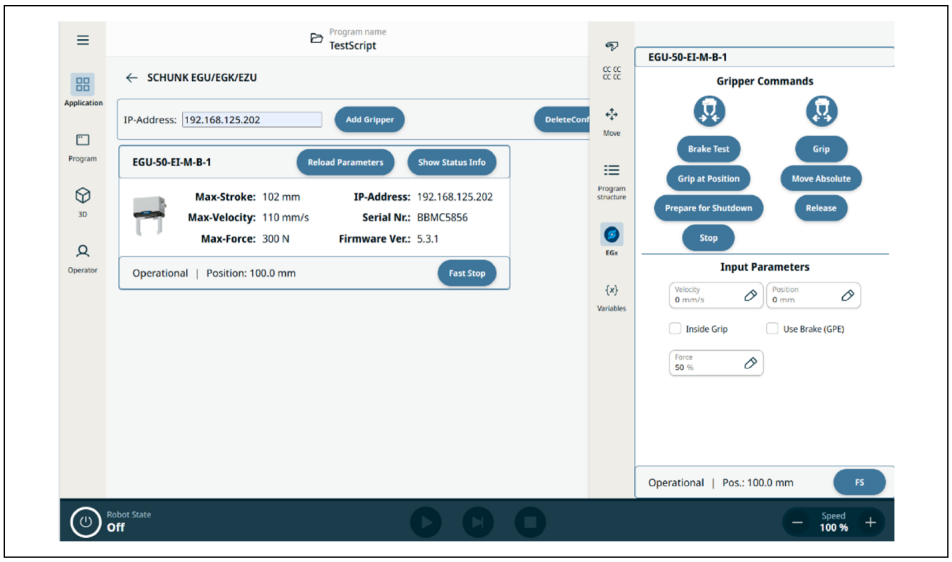
11 Testing products

The following commands can be tested in the sidebar:

- Jog mode "Jog negative" and "Jog positive"
- Grip workpiece "Grip" or grip workpiece at expected position "Grip at Position"
- Release workpiece "Release"
- Finish movement "Stop"
- "Absolute Pos" absolute positioning run
- "Test Brake" (only available for products of variant "M")
- "Prepare for Shutdown"

Testing products

1. Select the EGx button.
2. Use the inching mode buttons / to move the gripper fingers step by step.
3. Enter gripping force, position and speed.
   Note: By default, the values are set to 50% gripping force, 0 mm position and 0 mm/s speed.
   Select the gripping direction via "Inside Grip". If "Inside Grip" is selected, the jaws move apart.
   Use "Use Brake (GPE)" to select whether the brake is activated for products of the "M" variant. GPE is active.
4. **CAUTION! Risk of injury due to moving parts!** Select the desired button to test the command.
   ⇨ Command is executed.



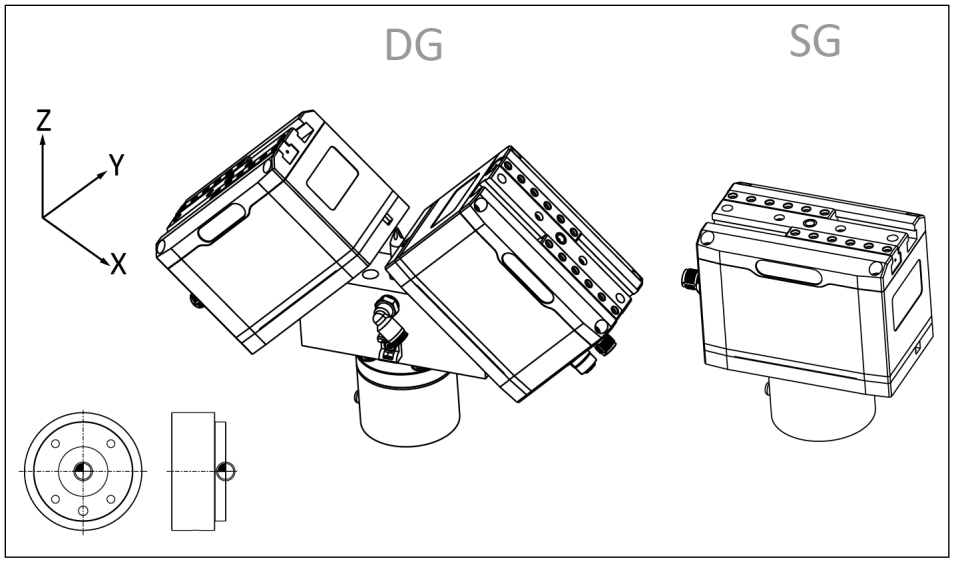
NOTE

For more information on commands and bits, refer to the commissioning instructions for EtherNet/IP™ andPROFINET.

12 Adjusting the Tool Center Point (TCP) and gripper weight

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

12.1 Values for EGU



EGU: Tool Center Point, DG: two products mounted, SG: one product mounted

ISO 50

Size	TCP				Center of gravity			Weight [kg]
	X [mm]	Y [mm]	Z [mm]	RY [deg]	CX [mm]	CY [mm]	CZ [mm]	
SG: one mounted product								
EGU 50	–	–	93.5	–	−0.3	−0.3	47.9	1.8
EGU 60	–	–	119	–	1.6	−0.7	61.3	3.3
DG: two mounted products								
EGU 50	±114.1	–	116.9	±45°	0	0	75.2	4.2
EGU 60	±143.6	–	149.9	±45°	0	0	99.7	7.7

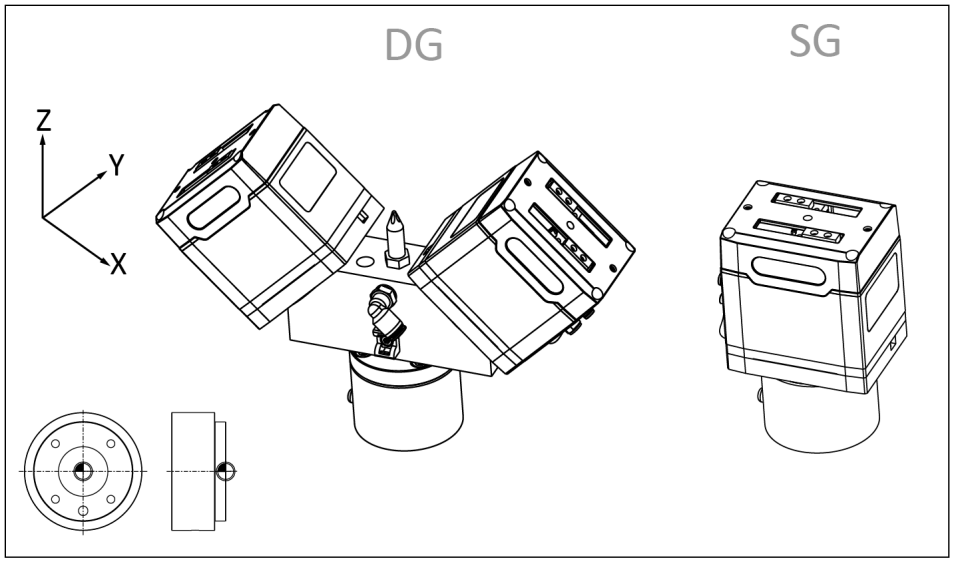
Tab.: EGU: TCP, center of gravity and weight with ISO flange 50

ISO 80

Size	TCP				Center of gravity			Weight [kg]
	X [mm]	Y [mm]	Z [mm]	RY [deg]	CX [mm]	CY [mm]	CZ [mm]	
DG: two mounted products								
EGU 50	±114.1	–	120.9	±45°	0	0	74.6	4.5
EGU 60	±143.6	–	153.9	±45°	0	0	100.2	8

Tab.: EGU: TCP, center of gravity and weight with ISO flange 80

12.2 Values for EGK



EGK: Tool Center Point, DG: two products mounted, SG: one product mounted

ISO 50

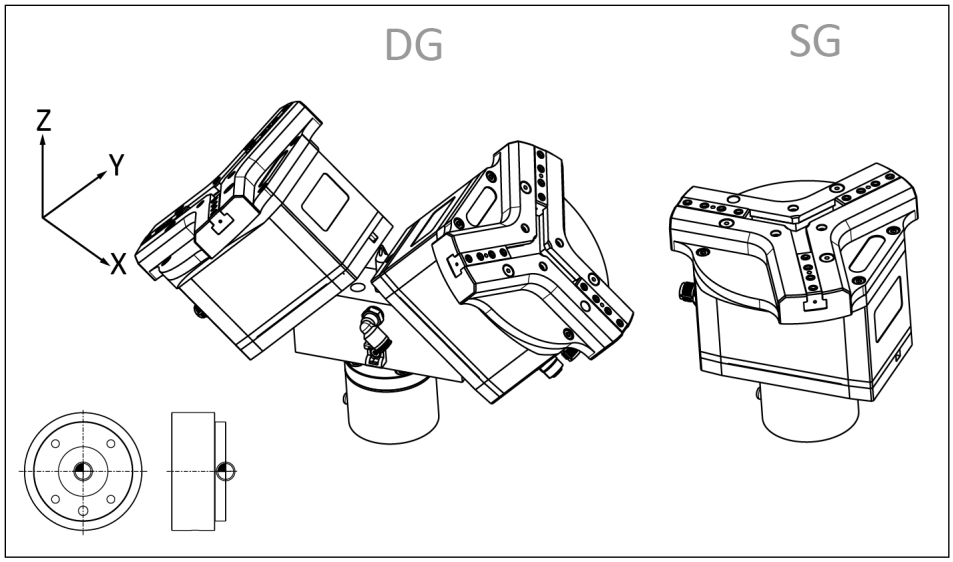
Size	TCP				Center of gravity			Weight [kg]
	X [mm]	Y [mm]	Z [mm]	RY [deg]	CX [mm]	CY [mm]	CZ [mm]	
SG: one mounted product								
EGK 25	–	–	90.2	–	-1.5	-0.1	42.7	0.8
EGK 40	–	–	94.5	–	-0.5	-0.3	44.9	1.3
EGK 50	–	–	102	–	0.5	-0.2	49.1	2.1
DG: two mounted products								
EGK 25	±111.8	–	114.6	±45°	0	0	64.7	2.3
EGK 40	±114.8	–	117.6	±45°	0	0	71	3.3
EGK 50	±131.6	–	137.9	±45°	0	0	87.3	5.3

Tab.: EGK: TCP, center of gravity and weight with ISO flange 50

ISO 80

Connection to an ISO 80 flange is not possible with EGK.

12.3 Values for EZU



EZU: Tool Center Point, DG: two products mounted, SG: one product mounted

ISO 50

Size	TCP				Center of gravity			Weight [kg]
	X [mm]	Y [mm]	Z [mm]	RY [deg]	CX [mm]	CY [mm]	CZ [mm]	
SG: one mounted product								
EZU 30	–	–	107	–	−0.9	−0.3	62	2.6
EZU 35	–	–	135,5	–	0.5	−0.7	79.2	4.9
EZU 40	–	–	156.9	–	0	−0.8	94.3	8.2
DG: two mounted products								
EZU 30	±123.7	–	126.5	±45°	0	0	86.3	5.9
EZU 35	±155.3	–	161.6	±45°	0	0	113.4	10.9

Tab.: EZU: TCP, center of gravity and weight with ISO flange 50

ISO 80

Size	TCP				Center of gravity			Weight [kg]
	X [mm]	Y [mm]	Z [mm]	RY [deg]	CX [mm]	CY [mm]	CZ [mm]	
SG: one mounted product								
EZU 40	–	–	156.9	–	0	−0.8	93.5	8.3
DG: two mounted products								
EZU 30	±123.7	–	130.5	±45°	0	0	87.1	6.1
EZU 35	±155.3	–	165.6	±45°	0	0	114.5	11.2
EZU 40	±193.4	–	197.7	±45°	0	0	136.2	19.7

Tab.: EGU: TCP, center of gravity and weight with ISO flange 80

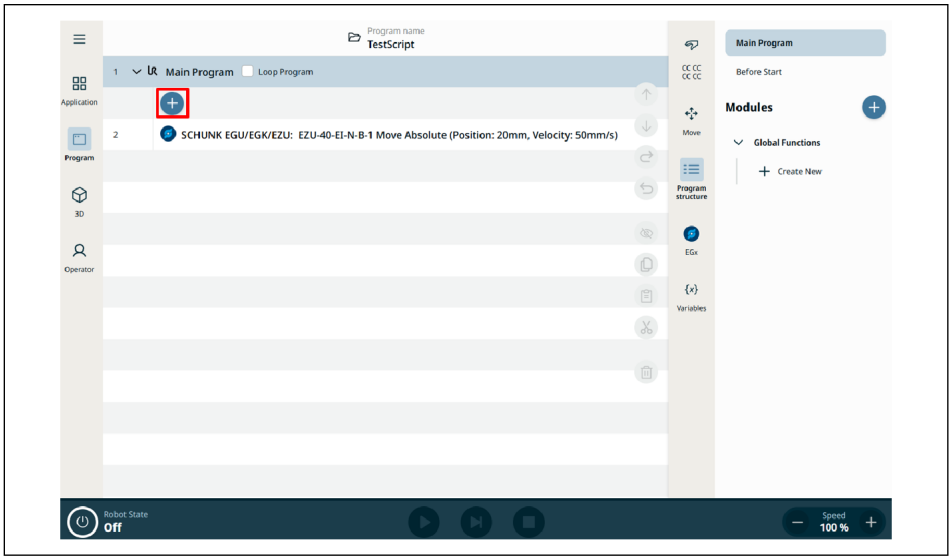
13 Inserting the functions into the program code

All commands listed below can be inserted into the robot program. The generated sequences are translated into URScript code.

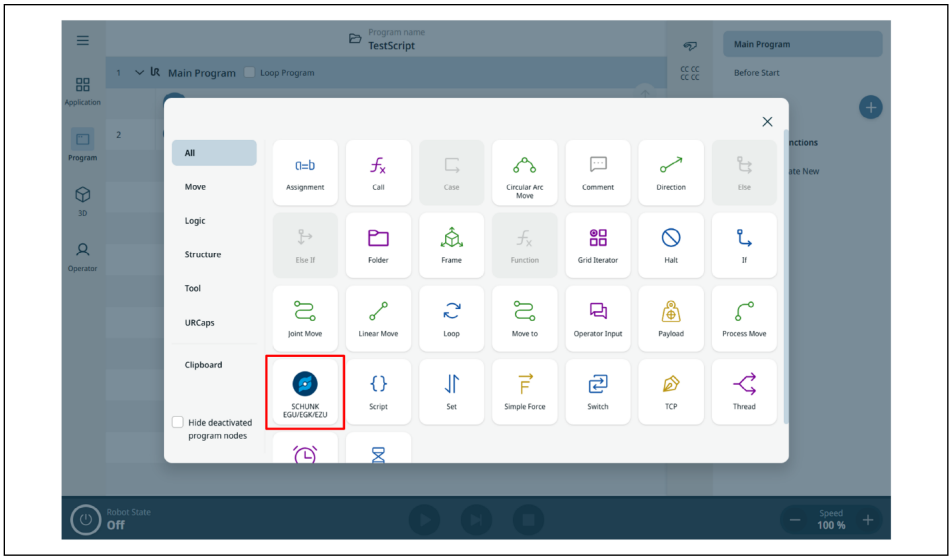
NOTE

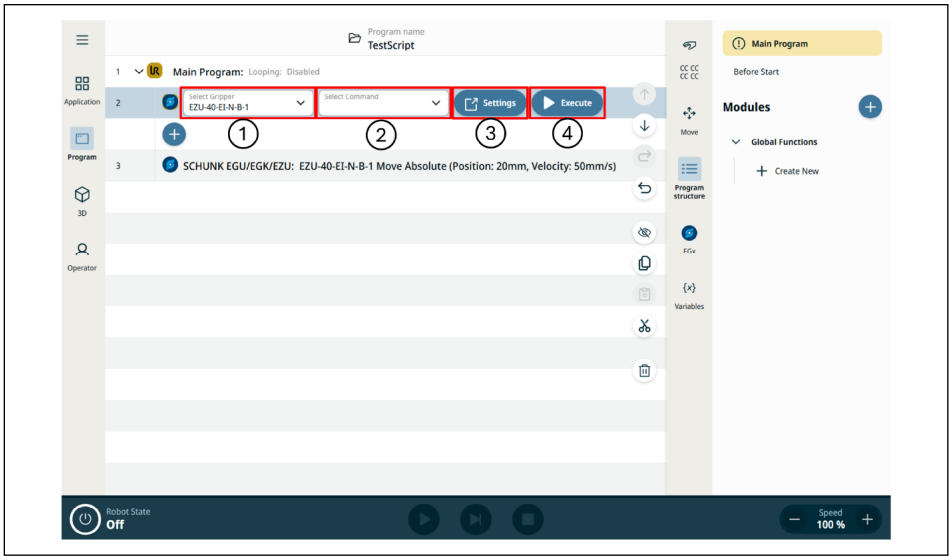
If the gripper configuration changes, the old configuration must be removed in the dashboard via the "Delete Configuration" button and a new configuration must be created via "Add Gripper".

- Select the "+" button to insert a new node.



⇨ SCHUNK commands are available under "SCHUNK EGU/EGK/EZU".





Item	Designation	Description
1	Gripper selection	Grippers that have been added in the SCHUNK Installation Node can be used in the program.
2	Command selection	The commands available for the selected gripper can be selected.
3	Settings	Configuration of the command, e.g. force, position or speed specifications, see the following table ▶ 13 [🗋 31].
4	Execute command	Executes the selected command with the parameters selected under "Settings".

Tab.: Possible commands with associated parameters (G*x*: G1 or G2 (gripper 1 or gripper 2))

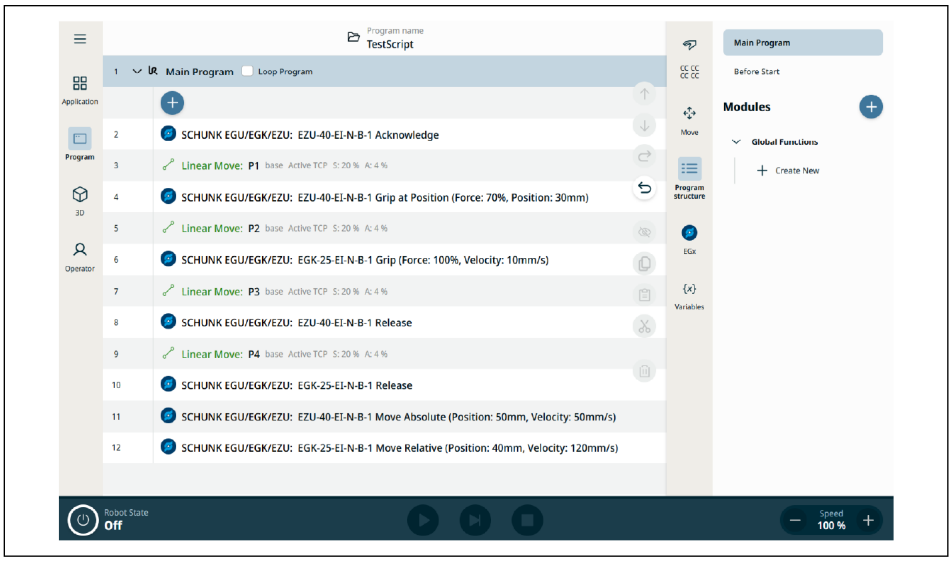
SCHUNK command • *Parameter*	Type	Description
Stop		This command is used to stop the current movement as quickly as possible until it comes to a controlled standstill.
• *Use Brake (GPE)*	Boolean	For products of the "M" variant, the brake is activated after a controlled stop; GPE is active.
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.
Fast Stop		This command stops the current movement immediately and forces it to standstill. An error requiring acknowledgment is set.

SCHUNK command • *Parameter*	Type	Description
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.
Acknowledge		If errors requiring acknowledgment are present, they are actuated by this command.
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.
Grip		When workpiece gripping (simple gripping movement), a workpiece is gripped with the specified gripping force value **without** specifying the workpiece position.
• *Force [%]*	Int16	Gripping force, limit values see catalog data sheet– Entries are only possible within the limit values.
• *Velocity [mm/s]*	Float32	Gripping speed, limit values see catalog data sheet– Entries are only possible within the limit values. Note: Only available with EGK.
• *Inside Grip*	Boolean	*selected*: A workpiece is gripped from the inside. The gripper fingers move away from each other. *Not selected:* A workpiece is gripped from the outside. The gripper fingers move toward each other.
• *Use Brake (GPE)*	Boolean	For products of the "M" variant, the brake is activated; GPE is active.
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.

SCHUNK command • *Parameter*	Type	Description
Grip at position		When workpiece gripping at an expected position, a workpiece is gripped at the specified workpiece position with the specified gripping force value using a combined gripping movement.
• *Position [mm*	Float32	Workpiece position
• *Force [%]*	Int16	Gripping force, limit values see catalog data sheet
• *Velocity [mm/s]*	Float32	Gripping speed, limit values see catalog data sheet Note: Only available with EGK.
• *Inside Grip*	Boolean	*selected*: A workpiece is gripped from the inside. The gripper fingers move away from each other. *Not selected:* A workpiece is gripped from the outside. The gripper fingers move toward each other.
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.
• *Use Brake (GPE)*	Boolean	For products of the "M" variant, the brake is activated; GPE is active.
Release		This command releases the workpiece.
• *Use Brake (GPE)*	Boolean	For products of the "M" variant, the brake is activated; GPE is active.
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.
Absolute Position		With absolute positioning, the product moves to the entered position value. This position value refers to the parameterized zero point of the module.
• *Position [mm]*	Float32	absolute target position
• *Velocity [mm/s]*	Float32	Velocity of movement
• *Use Brake (GPE)*	Boolean	For products of the "M" variant, the brake is activated; GPE is active.

SCHUNK command • *Parameter*	Type	Description
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.
Relative Position		With relative positioning, the product moves from the current position by the cyclically transferred and signed position value.
• *Position [mm]*	Float32	relative target position
• *Velocity [mm/s]*	Float32	Velocity of movement
• *Use Brake (GPE)*	Boolean	For products of the "M" variant, the brake is activated; GPE is active.
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.
Brake Test		*For products of variant "M" and with firmware version 5.2 or higher:* During the brake test, the product checks the holding force of the brake by applying a defined moment alternately in both directions against the applied brake.
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.
Prepare for Shutdown		When the module is switched off in a controlled manner, data required for operation is stored permanently. Once the module indicates that it is ready for shutdown, the logic supply voltage can be disconnected or a software restart initiated.
• *Wait until complete*	Boolean	The following command is only executed after the inserted gripping command has been completely processed or the maximum waiting time of 17 seconds has been reached.

14 Example of a robot program



Example program

Item	Description
2	Any errors that may be present are acknowledged for gripper 1.
3	The robot arm moves to position 1, where gripper 1 is to grip a workpiece.
4	Gripper 1 grips the workpiece at the expected workpiece position of 35 mm, with a gripping force of 70% of the maximum gripping force.
5	The robot arm moves to position 2, where the second workpiece is to be gripped.
6	Gripper 2 grips the workpiece with a force of 100% of the maximum gripping force and a speed of 10 mm/s.
7 – 10	The robot arm moves to the respective position where the workpieces are to be placed. The grippers release the workpieces.
11 – 12	The two grippers perform an absolute or relative positioning movement to optimally position the fingers for picking up new workpieces. The option "Wait until complete" can be deactivated so that the gripper jaw movement takes place simultaneously.

Tab.: Robot example description

15 Appendix

15.1 Definition of gripping force mode

BasicGrip

This gripping mode is available for all variants of the product. In BasicGrip, the workpiece is gripped with the nominal gripping force or less. The motor is permanently energized, which allows the workpieces to be continuously re-gripped.

Note: The gripping velocity changes depending on the set gripping force.

SoftGrip

This gripping mode is available for all EGK variants.

The SoftGrip mode can be used to gently grip delicate, fragile or fracture-sensitive workpieces such as electronics, glass and ceramics.

To influence the force pulse at SoftGrip, a gripping velocity value must be transferred. This gripping velocity value must be between the minimum gripping velocity <min_vel> and the calculated gripping velocity used in BasicGrip mode with the same gripping force.

Note: The gripping force changes depending on the set gripping velocity.

StrongGrip

This gripping mode is only available for the "M" variant with the EGU and EZU.

In StrongGrip mode, the workpiece is gripped with a gripping force greater than 100 percent, which makes it possible to grip heavy workpieces.

In this mode, the motor briefly activates a higher power level, and an elastomer stores the high gripping force. After an adjustable time, the motor brake engages and the workpiece is held.

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