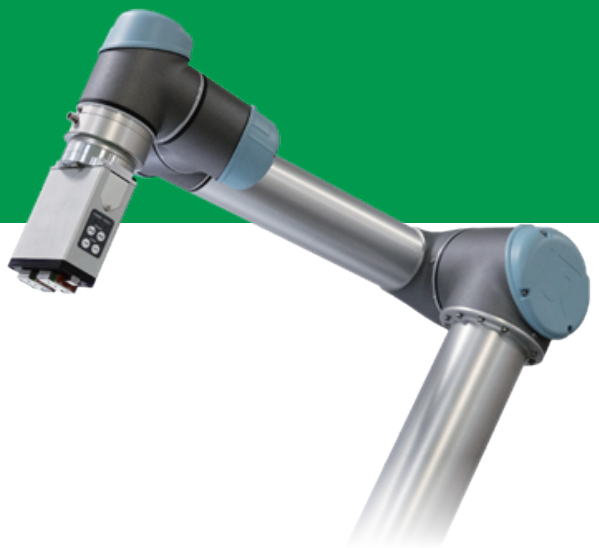
HIWIN®

S-Series and X-Series Electric Grippers

UR Technical Manual Guide



Original Instruction

CE RoHS

www.hiwin.tw

HIWIN® INDUSTRIE 4.0 Best Partner

Multi-Axis Robot

Pick-and-Place / Assembly /
Array and Packaging / Semiconductor /
Electro-Optical Industry /
Automotive Industry / Food Industry

- Articulated Robot
- Delta Robot
- SCARA Robot
- Wafer Robot
- Electric Gripper
- Integrated Electric Gripper
- Rotary Joint

Single-Axis Robot

Precision / Semiconductor /
Medical / FPD

- KK, SK
- KS, KA
- KU, KE, KC

Torque Motor Rotary Table

Medical / Automotive Industry /
Machine Tools / Machinery Industry

- RAB Series
- RAS Series
- RCV Series
- RCH Series

Ballscrew

Precision Ground / Rolled

- Super S Series
- Super T Series
- Mini Roller
- Ecological & Economical Lubrication Module E2
- Rotating Nut (R1)
- Energy-Saving & Thermal-Controlling (Cool Type)
- Heavy Load Series (RD)
- Ball Spline

Linear Guideway

Automation / Semiconductor / Medical

- Ball Type--HG, EG, WE, MG, CG
- Quiet Type--QH, QE, QW, QR
- Other--RG, E2, PG, SE, RC

Bearing

Machine Tools / Robot

- Crossed Roller Bearing
- Ballscrew Bearing
- Linear Bearing
- Support Unit

DATORKER® Robot Reducer

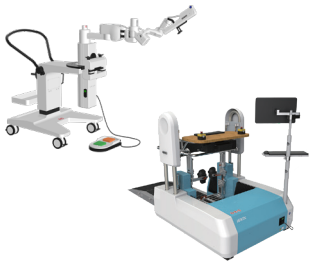
Robot / Automation Equipment /
Semiconductor Equipment / Machine Tools

- WUT-PO Type
- WUI-CO Type
- WTI-PH Type
- WTI-AH Type

AC Servo Motor & Drive

Semiconductor / Packaging Machine
/ SMT / Food Industry / LCD

- Drives--D1, D2T/D2T-LM, E1
- Motors--50W~2000W



Medical Equipment

Hospital / Rehabilitation Centers /
Nursing Homes

- Robotic Gait Training System
- Robotic Endoscope Holder

Linear Motor Stage

Automated Transport /
AOI Application / Precision /
Semiconductor

- Iron-core Linear Motor
- Coreless Linear Motor
- Linear Turbo Motor LMT
- Planar Servo Motor
- Air Bearing Platform
- X-Y Stage • Gantry Systems
- Single-Axis Linear Motor Stage

Torque Motor & Direct Drive Motor

Machine Tools

- Torque Motor--
  TM-2/IM-2, TMRW Series

Inspection / Testing Equipment / Robot

- Direct Drive Motor--
  DMS, DMY, DMN, DMT Series

Contents

1. General Product Introduction

HIWIN is a world leader in reliable and precise linear motion. We offer several plug-and-play solutions for collaborative robots in automation. This manual describes the operation procedures of HIWIN's parallel electric gripper, the S-series and the X-series. HIWIN's electric grippers are made with ball-screws and linear guideways from HIWIN itself which allows us to offer our customers a reliable and high-quality gripping solution at a reasonable price range.

The **S-series Electric Grippers**, S for Simple, includes two different models: SEG-24, with two fingers, and STG-16 with three. This series is characterized by the simplicity of operation, possible thanks to the controller integrated on the body of the gripper itself. Users can simply control this gripper with digital Input/Output discrete signals, to open and close the gripper. For the SEG-24, it is also possible to set in advance the opening and closing position of the gripper, with the intuitive buttons on the side of the gripper. For more information, please refer to the following:
https://www.hiwin.tw/download/tech_doc/ee/Integrated_Electric_Gripper-(E).pdf

The **X-series Electric Grippers**, X for expert, includes five different models depending on the gripping stroke and force required. This series is characterized by the flexibility of the control system possible thanks to the second-generation gripper controller XEG-C2. Users can choose to run the gripper in position control with the move function, for fast positioning, or to use force control with the grip function, to grasp object with a pre-defined certain force, depending on the object. For more information, please refer to the following:
https://www.hiwin.tw/download/tech_doc/ee/Electric_Gripper-(E).pdf

2. Warranty

The warranty period for the product is 12 months or 5 million operations (whichever comes first), but it does not include any of the following causes of failure:

◎ Beyond the operation method, operating environment and storage specifications defined in the product manual.

◎ The damage caused by installation place movement, change of working environment, or improper transfer after being installed by a professional installer.

◎ Product damaged due to collision or accident caused by improper operation or installation.

The following conditions are not covered by the warranty:

◎ Product serial number or date of production(month and year) cannot be verified.

◎ Gripper body and control components using non-HIWIN original products.

◎ Adding or removing any element into/out the gripper or the controller.

◎ Modifying the wire or the cables between the gripper body and the controller.

◎ Any modification of the appearance of the gripper or controller; Removal of the components inside the gripper or the controller. e.g., demolition of the outer covering, product drilling or cutting.

◎ Damage caused by any natural disaster. i.e., fire, earthquake, tsunami, lightning, windstorms, floods etc.

HIWIN does not provide any warranty or compensation to all the damage caused by above-mentioned circumstances unless the user can prove that the product is defective.

For more information towards warranty terms and conditions, please contact the technician or the dealer who you purchased with.

3. Technical Information

3.1. Integrated parallel electric gripper S-series

Model			SEG-24	STG-16
Category	Item	Unit	Value	
Motion specifications	Stroke per side	mm	12	8
	Gripping force	N	35 [Note2]	40 [Note1]
	Gripping speed	mm/s	15(45) [Note3]	30
	Repeatibility	mm	±0.1	±0.1
Power specifications	Operation voltage	V	24±10%	24±10%
	Operation current	A	0.5	0.5
Load	Load torque Mr	N-m	11.76	7
	Load torque Mp	N-m	7.35	4.5
	Load torque My	N-m	7.35	4.5
	Load strength F	N	254.8	196
Hardware specifications	Weight	kg	0.7	0.7
	IP class	-	IP20	IP40
	Cleanroom class	-	-	-
	Operation temperature	°C	5-45	5-45
	Operation humidity	%RH	< 85	< 85
	Storage temperature	°C	0-60	0-60
	Total length	mm	105.5	72.3
	Total height	mm	88	100
	Total thickness	mm	38	100

[Note 1] This gripping force is measured at a gripping point (L) of 20mm with a gripping force accuracy of ±25%.

[Note 2] This gripping force is measured at a gripping point (L) of 20mm with a gripping force accuracy of ±30%.

[Note 3] Moving velocity is 45mm/s.

[Description 1] Gripping force is recommended to be 10 to 20 times the weight of gripped object.

[Description 2] High-speed movement or rotation after gripping requires the weight of object to be reduced.

[Description 3] Material, shape, grip area, etc. of gripping part will affect the maximum weight of gripped object, and the gripping part required to be installed before gripping.

3.2. Parallel electric gripper X-series

Model			XEG-16	XEG-32	XEG-48	XEG-64	XEG-32-PR
Electric Gripper	Stroke [both sides] (mm)		16 ±0.5	32 ±0.5	48 ±0.5	64 ±0.5	32 ±0.5
	Gripping Force (N)		25~50	60~150	135~270	180~450	75~150
	Speed (mm/s)	Motion	1~60	1~80	1~80	1~100	1~60
		Gripping [Note 2]	1~10	1~20	1~20	1~20	1~10
	Repeatability (mm)		±0.01	±0.01	±0.02	±0.02	±0.01
	Weight (kg)		0.4	0.7	1.5	1.9	1.1
	IP Class		IP20				IP65
	Cleanroom Class		ISO Class 5 (Class 100)				ISO Class 3 (Class 1)
	Drive Device		Single-Axis Robot				
	Grease Supply of Drive Device [Note 3]		500,000 cycles or 6 months				
	Impact/Vibration Resistance (m/s^2)		150 / 30				
	Operating Temperature Range (°C)		5 ~ 45				
	Operating Humidity Range (%)		RH 35~85 (No condensing)				

[Note 1] The weight of workpiece(kg) * acceleration of gravity 9.81(m/s2) should be 1/10~1/20 of the gripping force(N).If the gripper holding a workpiece moves or turns with high-acceleration/ deceleration, choose the model with higher force allowance.

[Note 2] Set the parameters and operation mode to avoid application of excessive impact force to the attachments (fingers) during operation.

[Note 3] Apply proper amount of grease to the grease hole of single axis robot by a grease supply device or on the surface of ball screws with brushes.

[Note 4] Mass of a workpiece that the attachments (fingers) can grip greatly differs depending on the material quality, shape, and gripping surface condition of the attachments (fingers). Design the attachments (fingers) to be lightweight and minimum length.

[Note 5] The gripping force of the specification sheet is measured at a speed of 2mm/s and a gripping point (L) of 20mm. The accuracy of the maximum gripping force is XEG-16：±30%, XEG-32：±16.6%, XEG-48：±15%, XEG-64：±13.3%, XEG-32-PR：±20%,.

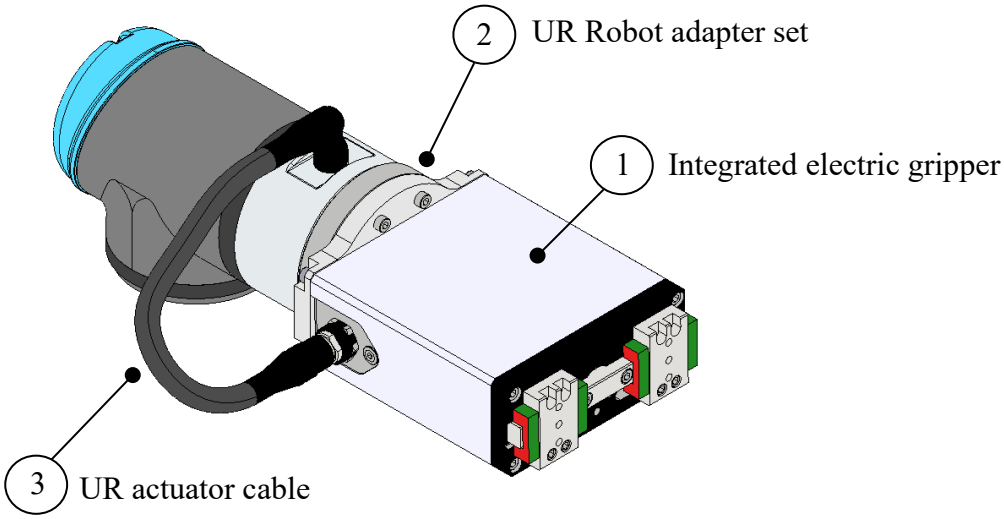
4. S-Series Getting Started

4.1. What's in the box?

- Model: SEG-24-UR
  1. Integrated electric gripper SEG-24-UR
  2. UR Robot adapter set (ISO-9409-1-50-4-M6)
  3. UR actuator cable
  4. Accessory kit
     - Pin
     - Centering sleeve
  5. Software
     - URCap (Download)

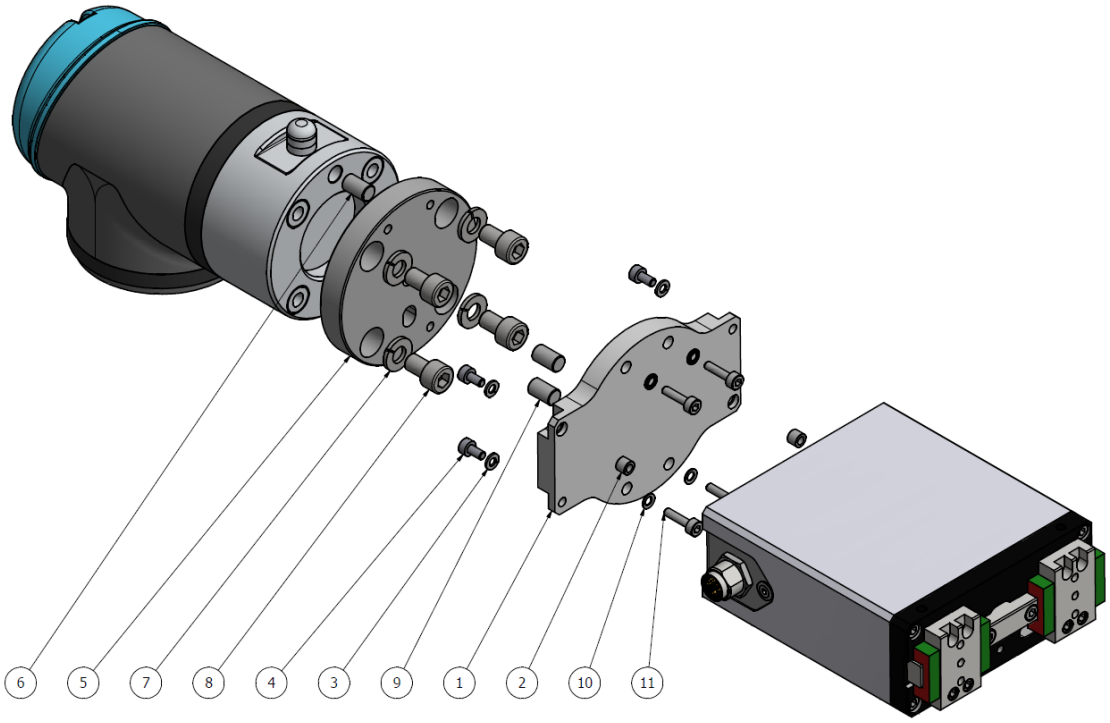
- Model: STG-16-UR
  1. Integrated electric gripper STG-16-UR
  2. UR Robot adapter set (ISO-9409-1-50-4-M6)
  3. UR actuator cable
  4. Accessory kit
     - Pin
     - Centering sleeve
  5. Software
     - URCap (Download)

- Example:



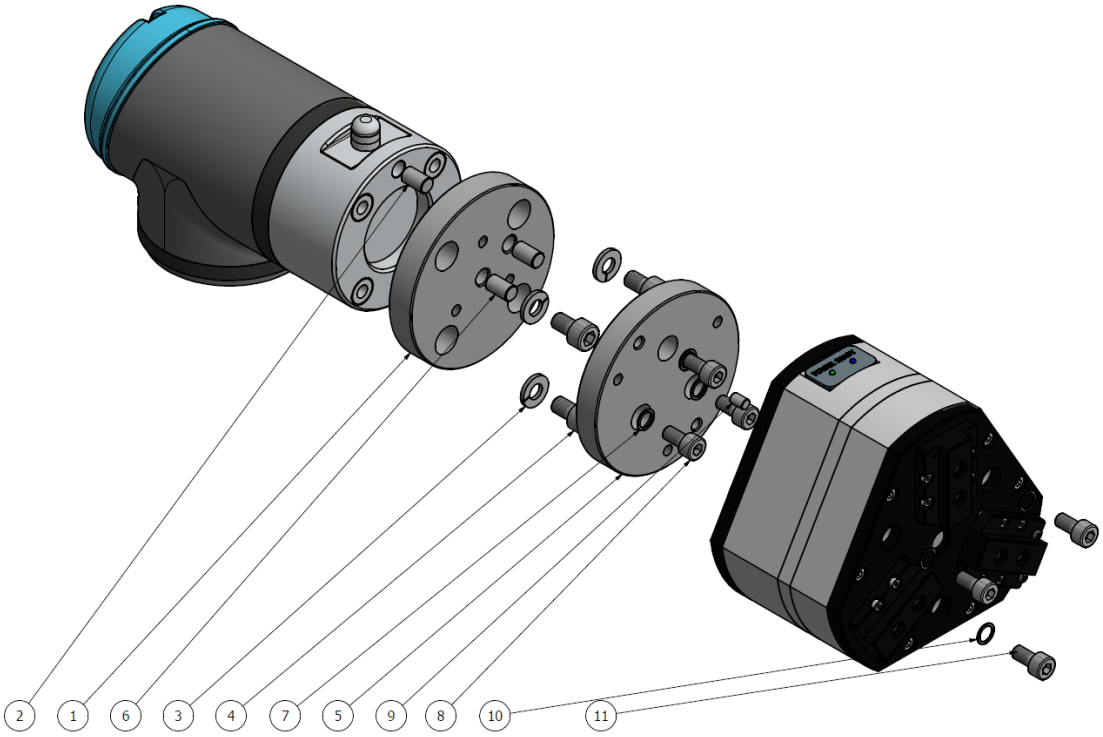
4.2. Mechanical mounting

- Model: SEG-24-UR



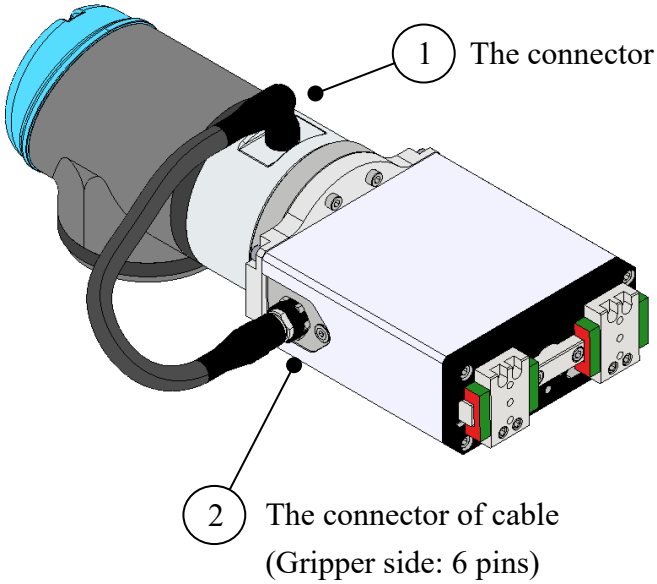
Item	Parts	Description	Amount
1	SEG24 adapter		1
2	SEG24 Centering Sleeve	Ø5xØ3x4L	2
3	Spring Washer	M3 SUS304	4
4	Bolt	M3x0.5Px8L SUS304	4
5	UR adapter		1
6	Pin	Ø6x10L	1
7	Spring Washer	M6 SUS304	4
8	Bolt	M6x1Px8L SUS304	4
9	Pin	Ø6x10L	2
10	Spring Washer	M4 SUS304	4
11	Bolt	M4x0.7Px16L SUS304	4

- Model: STG-16-UR



Item	Parts	Description	Amount
1	UR adapter		1
2	Pin	Ø6x10L	1
3	Spring Washer	M6 SUS304	4
4	Bolt	M6x1Px8L SUS304	4
5	STG16 adapter		1
6	Pin	Ø6x10L	2
7	Spring Washer	M5 SUS304	3
8	Bolt	M5x0.8Px12L SUS304	3
9	Pin	Ø4x6L	2
10	Spring Washer	M5 SUS304	3
11	Bolt	M5x0.8Px12L SUS304	3

4.3. Electrical mounting



No.	Pin define	Function	Wire color
1	AI3	Analog	**NC**
2	AI2	input	**NC**
3	T11	Tool	**Pink**
4	TI0	input	**Blue**
5	POWER	24V	**Black**
6	T01	Tool	**White**
7	TO0	output	**Brown**
8	GND	0V	**Gray**

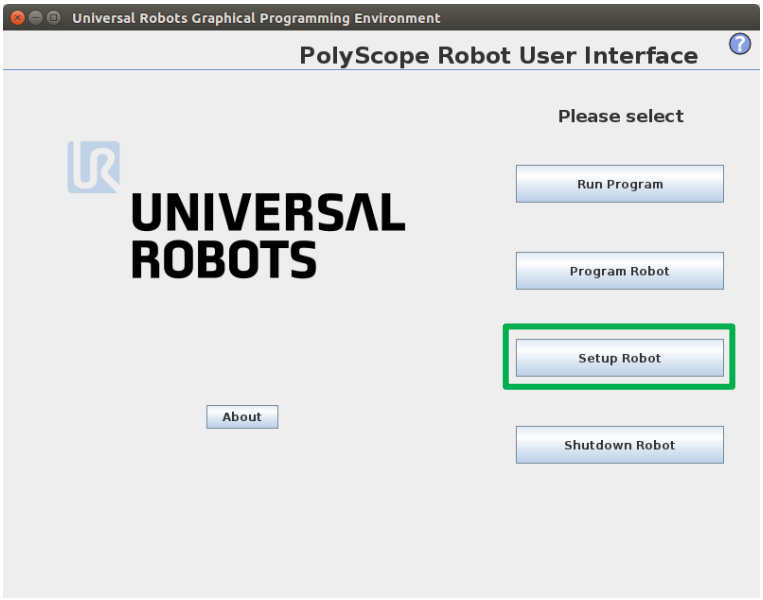
No.	Pin define	Function	Wire color
1	IN1	Ready	**Brown**
2	IN2	O/C	**White**
3	OUT1	Busy	**Blue**
4	VCC	24V	**Black**
5	GND	0V	**Gray**
6	OUT2	Alarm	**Pink**

Note-If necessary, the customer can order the grippers with manually switching PNP and NPN Type through DIP switch (by optional purchase). Kindly put this above note, when placing an order.

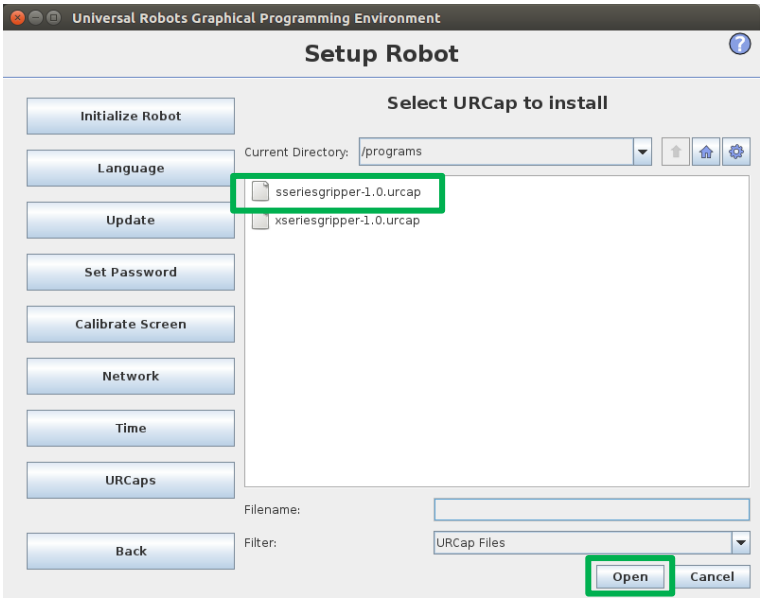
4.4. Installing URCap

1. Click here for free downloading of URCap, and save it to a USB stick.

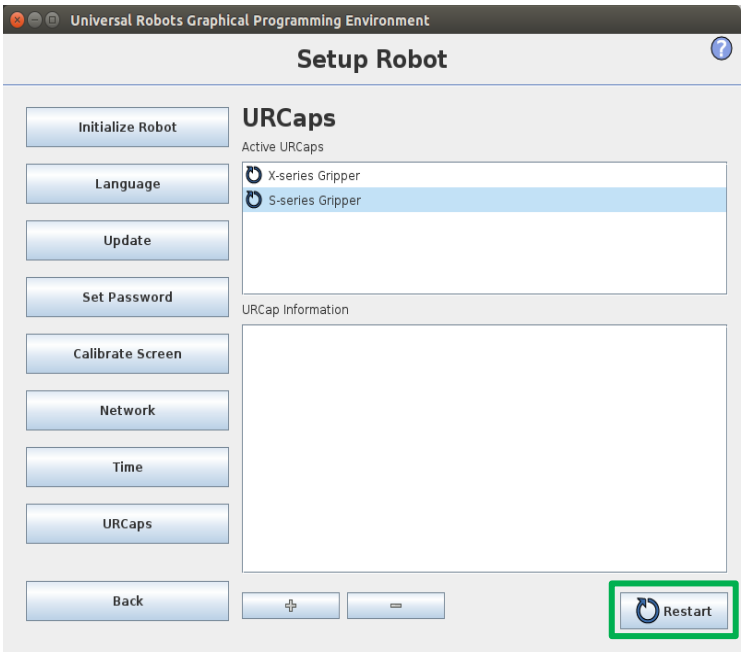
2. Insert the USB with the URCaps file into the UR teach pendant. From the main menu, please select “Setup Robot”.



3. Click “+” on the button side of page to open the URCap file.

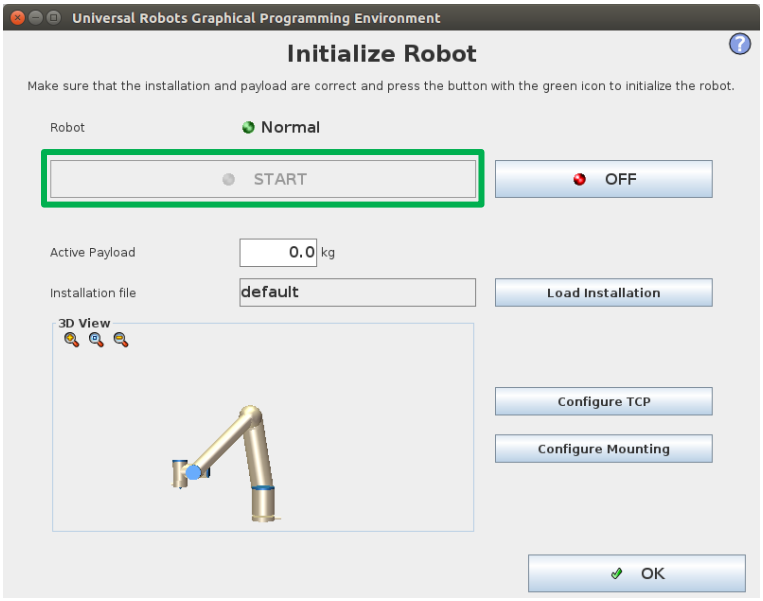


4. Restart the robot when prompted.

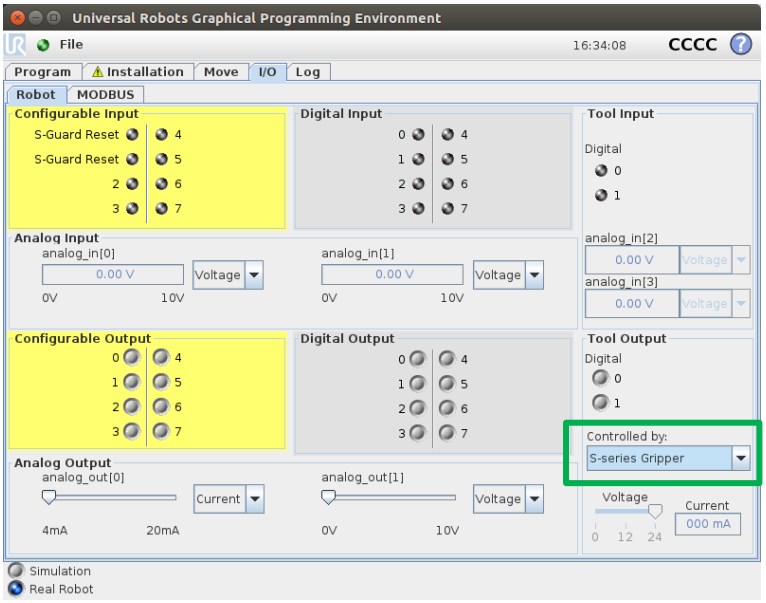


Note：The HIWIN URCaps requires Universal Robots Polyscope software version above 3.14 (CB-series) / 5.9 (e-series) or higher, and lower version may not function properly.

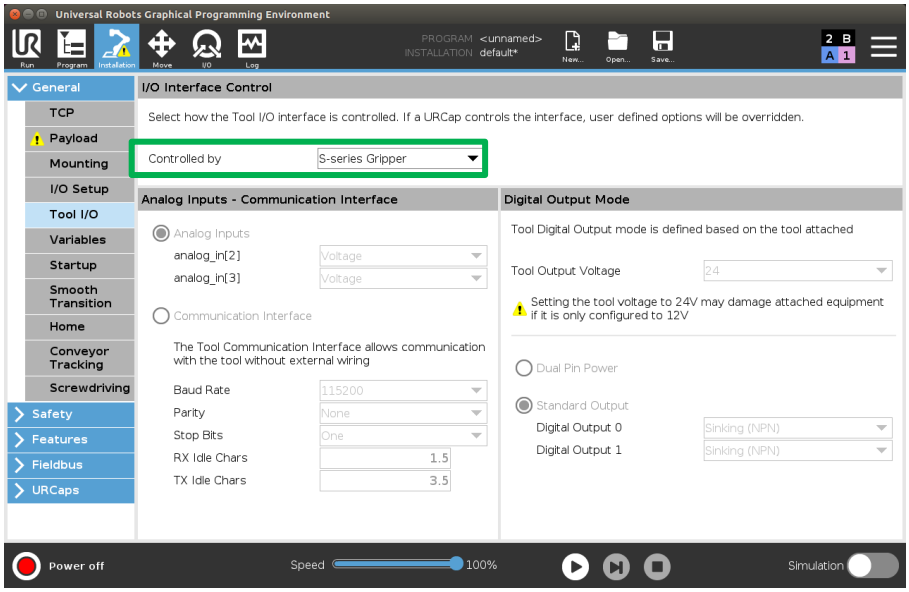
5. After successfully installing the URCaps, please follow the instruction to initialize UR Robot.



6. Set the controlled by “S-series Gripper”. (For CB-series and e-series)



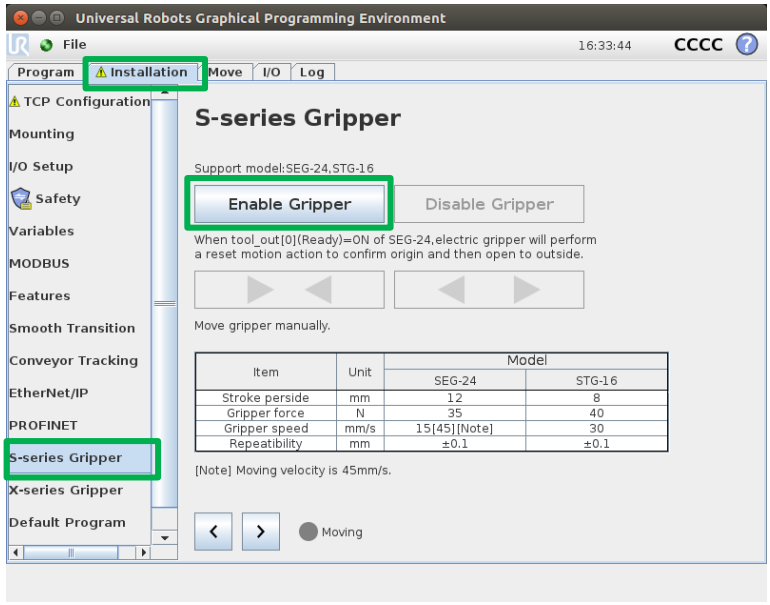
CB-series



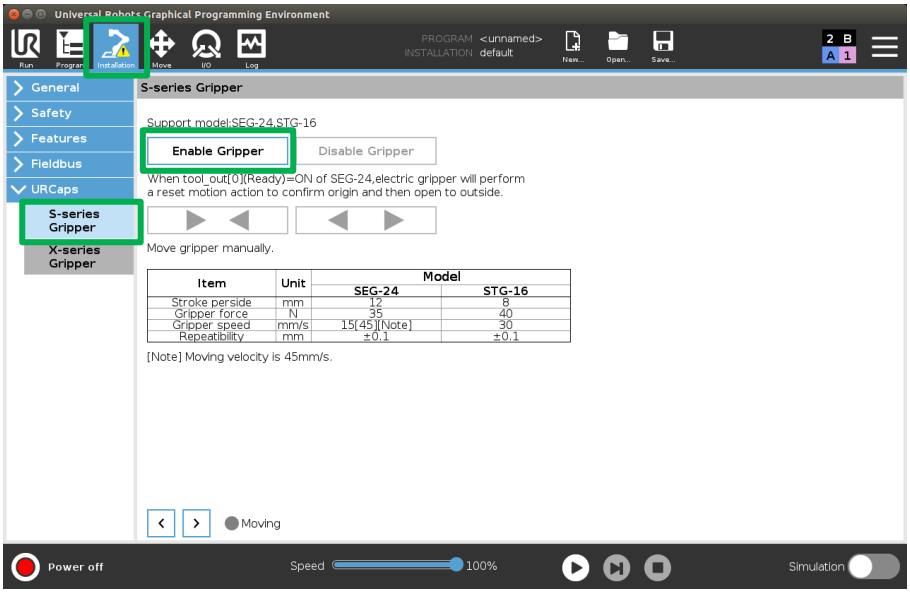
e-series

4.5. Installation page

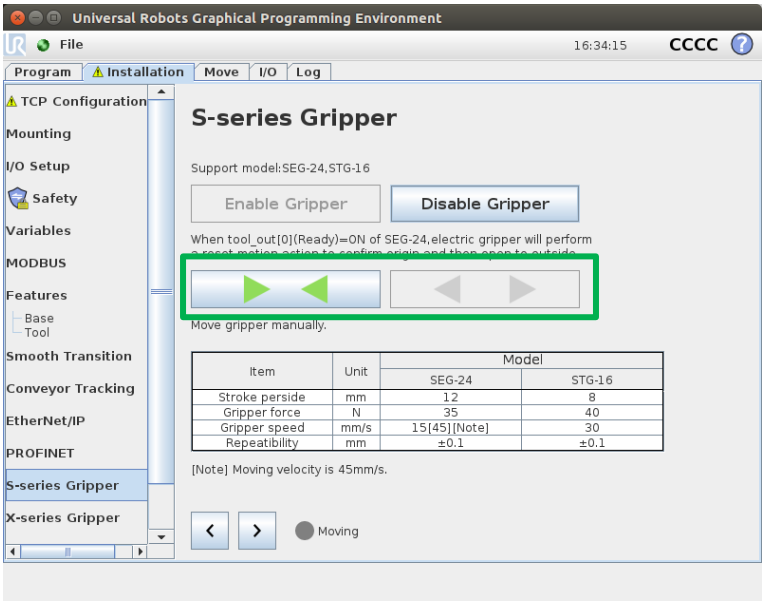
1. Click the “Enable Gripper” to initialize the center point of gripper under installation page. When “Enable Gripper” button is clicked for the first time of SEG-24, electric gripper will perform a reset action to confirm origin and then open to outside.



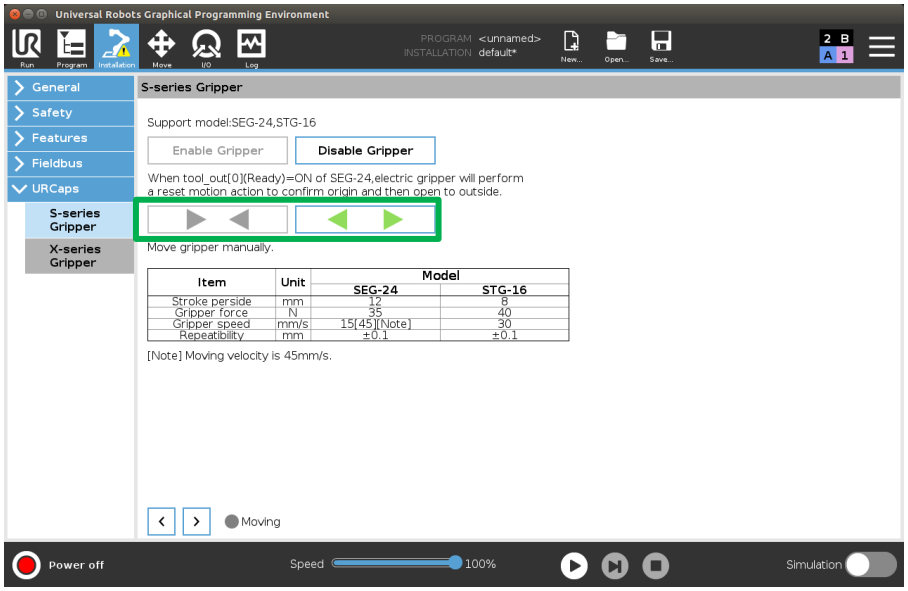
CB-series



e-series



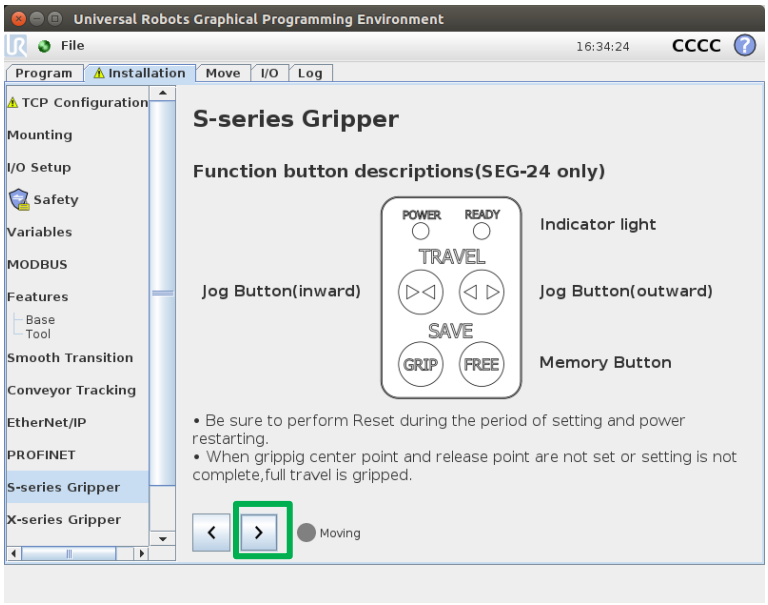
CB-series

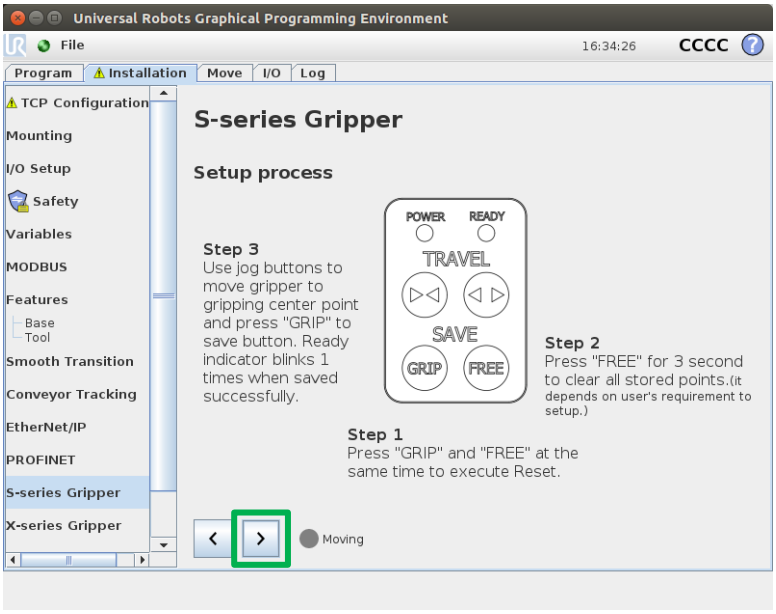


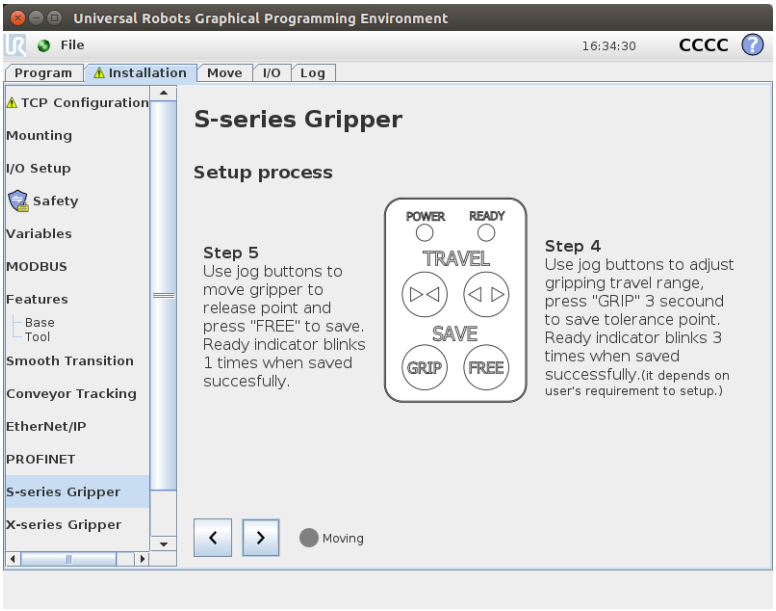
e-series

3. For more information about the function button descriptions and setup process of the electric gripper SEG-24, please refer to the following:

- CB-series






Universal Robots Graphical Programming Environment
File
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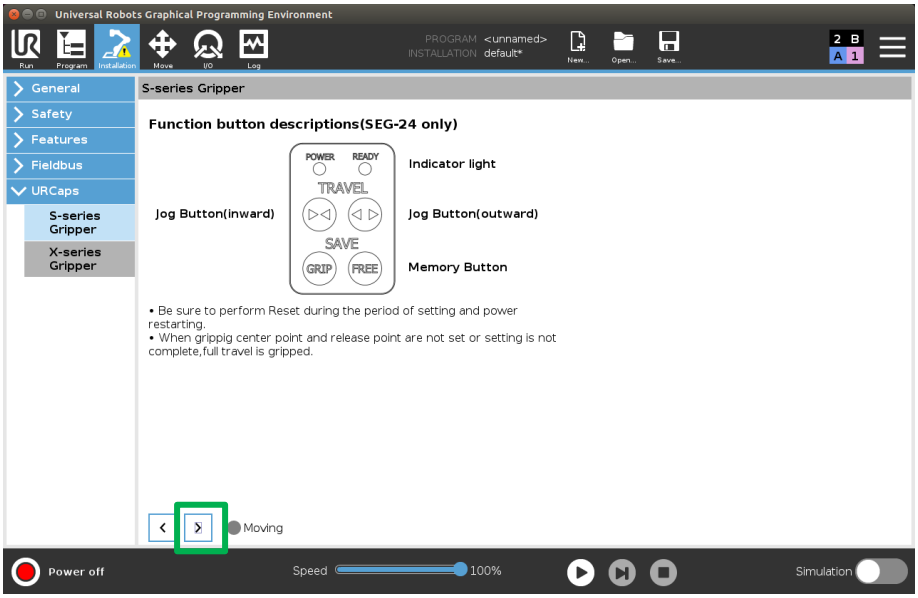
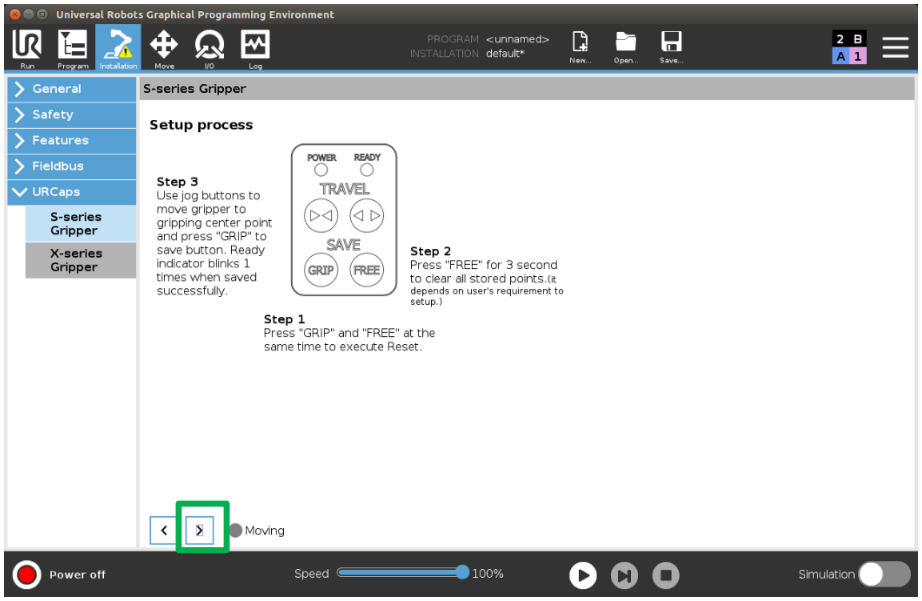
Program
Installation
Move
I/O
Log
TCP Configuration
Mounting
I/O Setup
Safety
Variables
MODBUS
Features
Base
Tool
Smooth Transition
Conveyor Tracking
EtherNet/IP
PROFINET
S-series Gripper
X-series Gripper
S-series Gripper
Setup process
Step 5
Use jog buttons to move gripper to release point and press "FREE" to save. Ready indicator blinks 1 times when saved succesfully.
POWER
READY
TRAVEL
SAVE
GRIP
FREE
Step 4
Use jog buttons to adjust gripping travel range, press "GRIP" 3 secound to save tolerance point. Ready indicator blinks 3 times when saved successfully.(it depends on user's requirement to setup.)
Moving

- e-series


Universal Robots Graphical Programming Environment
PROGRAM <unnamed>
INSTALLATION default*
General
Safety
Features
Fieldbus
URCaps
S-series Gripper
X-series Gripper
S-series Gripper
Function button descriptions(SEG-24 only)
POWER
READY
TRAVEL
SAVE
GRIP
FREE
Indicator light
Jog Button(inward)
Jog Button(outward)
Memory Button
• Be sure to perform Reset during the period of setting and power restarting.
• When grippig center point and release point are not set or setting is not complete,full travel is gripped.
Moving
Power off
Speed
100%
Simulation


Universal Robots Graphical Programming Environment
PROGRAM <unnamed>
INSTALLATION default*
General
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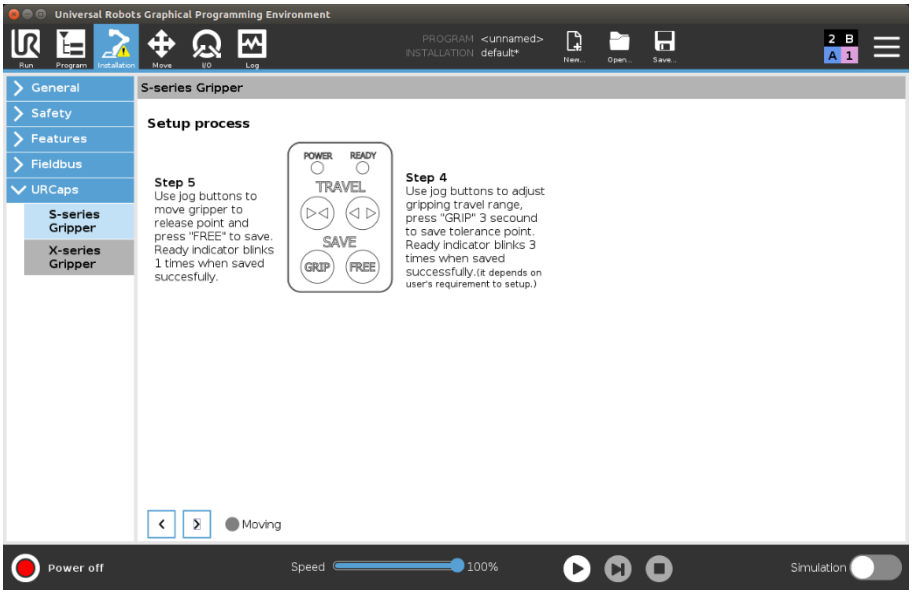
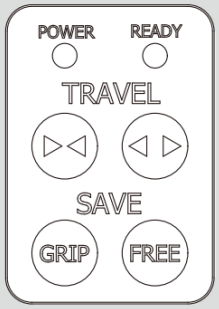
URCaps
S-series Gripper
X-series Gripper
S-series Gripper
Setup process
Step 3
Use jog buttons to move gripper to gripping center point and press "GRIP" to save button. Ready indicator blinks 1 times when saved successfully.
POWER
READY
TRAVEL
SAVE
GRIP
FREE
Step 2
Press "FREE" for 3 second to clear all stored points.(it depends on user's requirement to setup.)
Step 1
Press "GRIP" and "FREE" at the same time to execute Reset.
Moving
Power off
Speed
100%
Simulation


Universal Robots Graphical Programming Environment
PROGRAM <unnamed>
INSTALLATION default*
General
Safety
Features
Fieldbus
URCaps
S-series Gripper
X-series Gripper
S-series Gripper
Setup process
Step 5
Use jog buttons to move gripper to release point and press "FREE" to save. Ready indicator blinks 1 times when saved succesfully.
POWER
READY
TRAVEL
SAVE
GRIP
FREE
Step 4
Use jog buttons to adjust gripping travel range, press "GRIP" 3 secound to save tolerance point. Ready indicator blinks 3 times when saved successfully.(it depends on user's requirement to setup.)
Moving
Power off
Speed
100%
Simulation

- Function button descriptions (SEG-24 only)

Panel	Press button	Mode	Short press	Long press
	▷◁	Jog button (inward)	Move inward 1 mm	Move inward continuously
	◁ ▷	Jog button (outward)	Move outward 1 mm	Move outward continuously
	GRIP	Memory button	Gripping center point (G)	Tolerance (G+n or G-n)
	FREE	Memory button	Release point (F)	Clear all storage points

[Description 1] This function button can be used only when gripper Ready = OFF.

[Description 2] After re-connected to power, reset must be executed first (press GRIP and FREE at the same time). Then, the function button can be used to move the gripper. Or the Ready light would sparkle 5 times rapidly to warn the user.

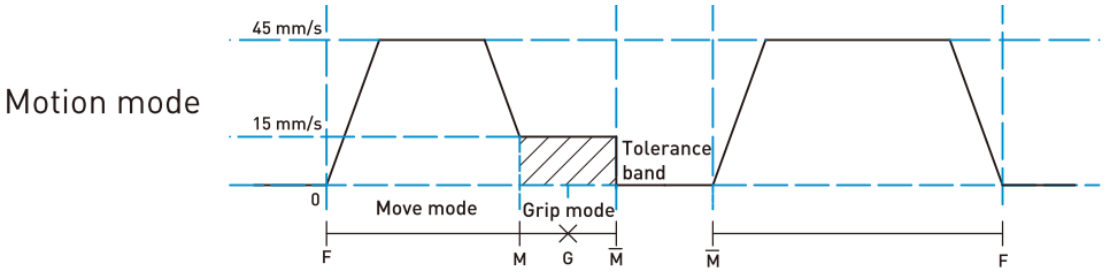
[Description 3] The distance between gripping center point and release point shall not be less than 1mm.

$\overline{M}$

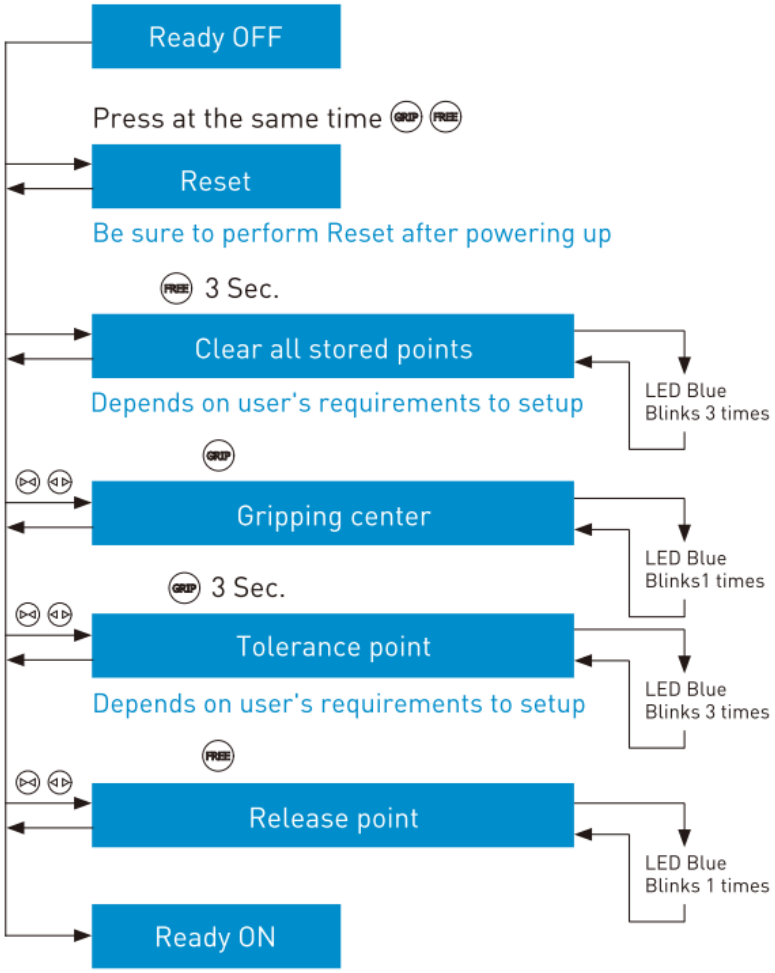
[Description 5] The distance between tolerance point and second tolerance point is called "tolerance band (n)".

[Description 6] If user does not set tolerance point, the system default tolerance point is G ±0.5mm.

[Description 7] Taking grip gripper inward, fast outward movement as an example, the timing chart is as follows:



- Setup process (SEG-24 only)

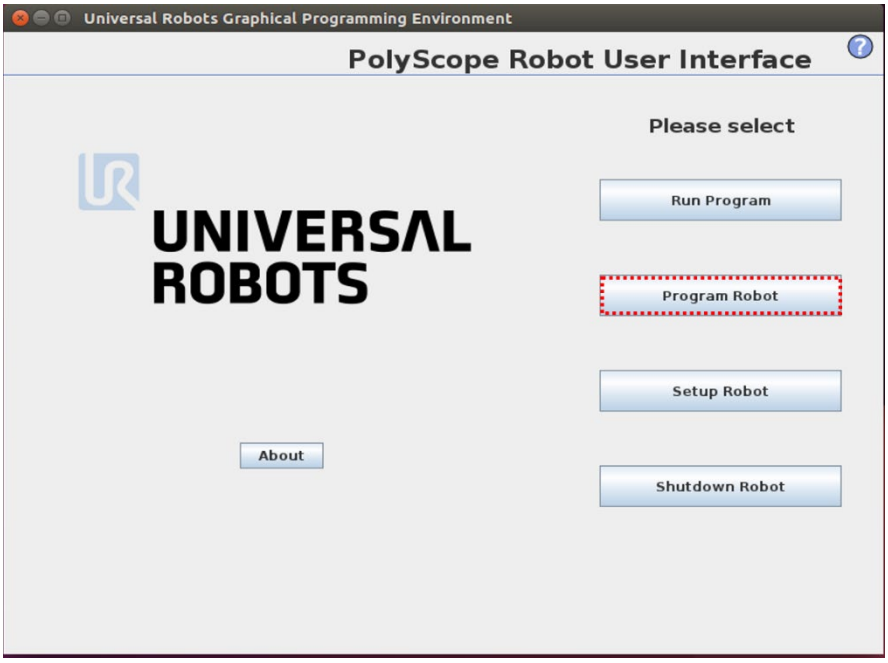


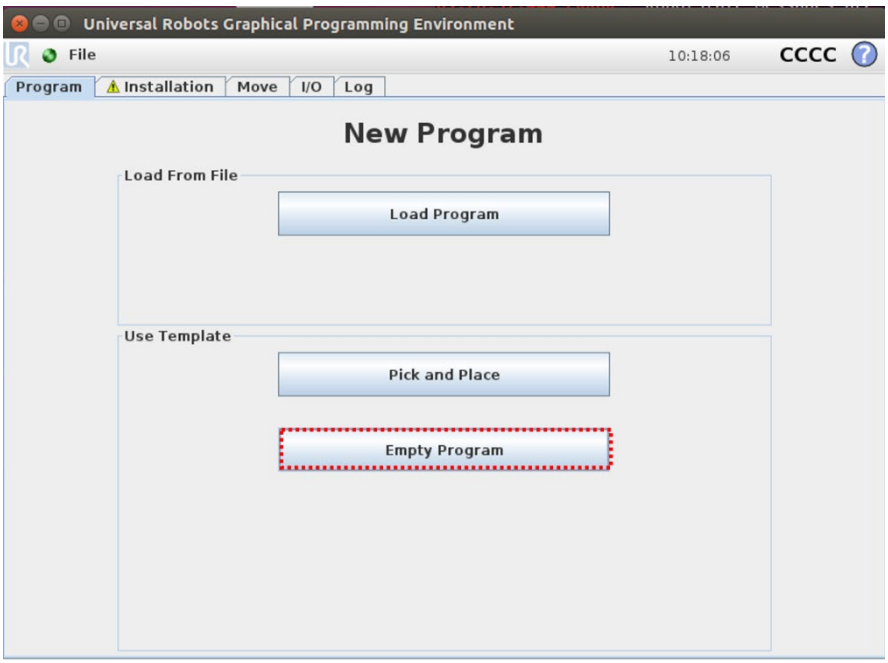
4.6. Program page

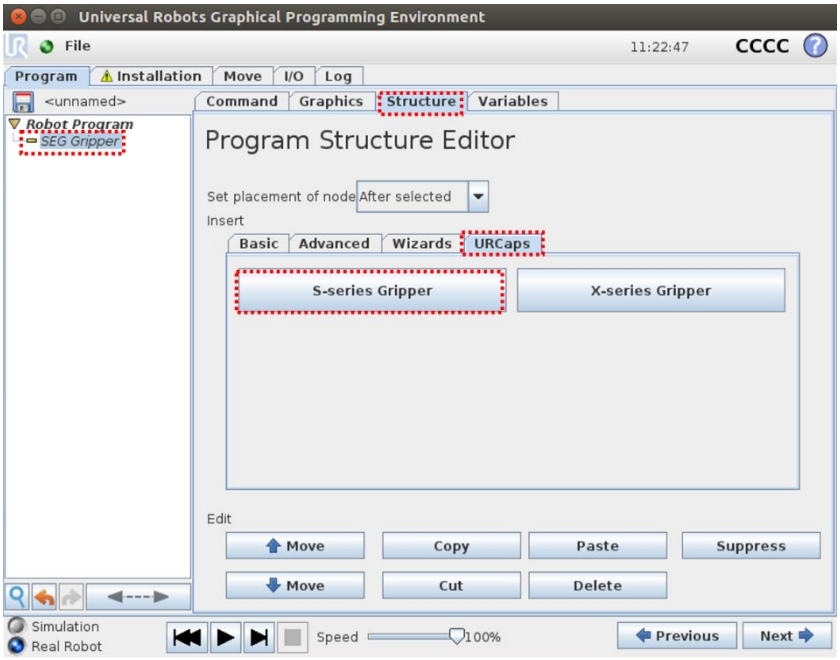
1. Selection of Gripper Type:

The program Structure tab of URCaps provides selecting the gripper types (“X” Or “S” Series) & so the user can perform the **URCaps’ commands**, as follow **Enable Gripper, Grip & Release**.

- Select **Program Robot** → Select **Empty Program** → Click **Structure** → Click **URCaps** & Select **S-series Gripper**





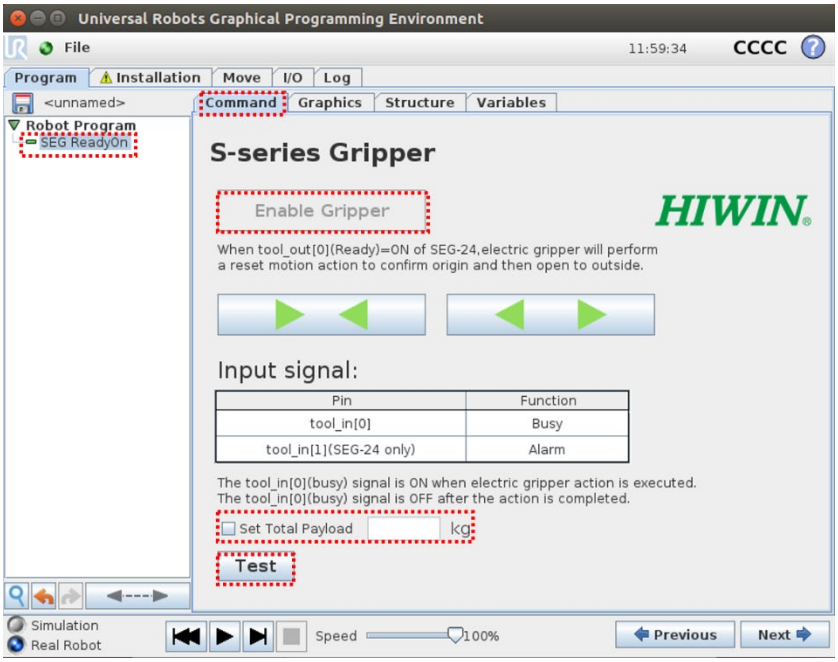


2. Command: Enable Gripper

Set “Enable Gripper” option to confirm the central point of gripper. Normally, it happens when the first time supply the power. SEG ReadyOn command will show up.

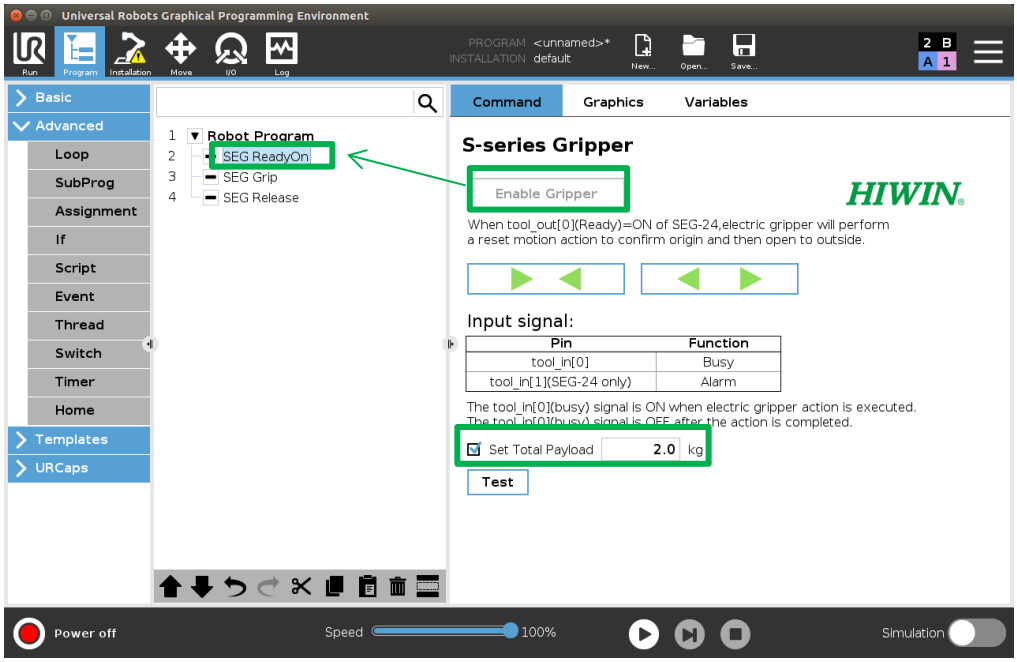
- Click **Command** → Select **Enable Gripper** → **Set Total Payload** → **Test**

CB-series



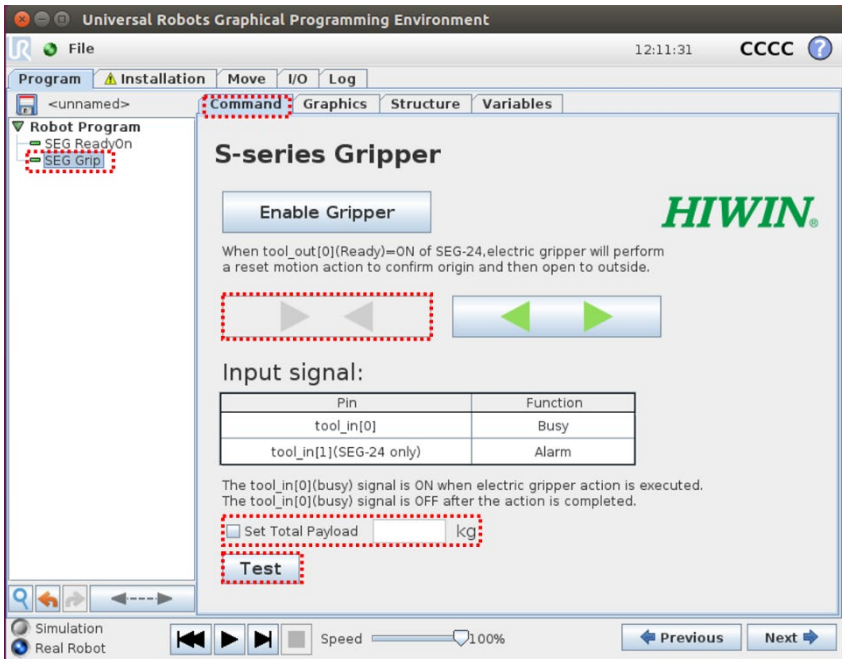
Note: - For example, total payload of the robot arm end is 1 kg before the gripper clamping, and it can be changed to 1.5 kg (e.g., 0.5 is an object weight) after clamping.

E-series

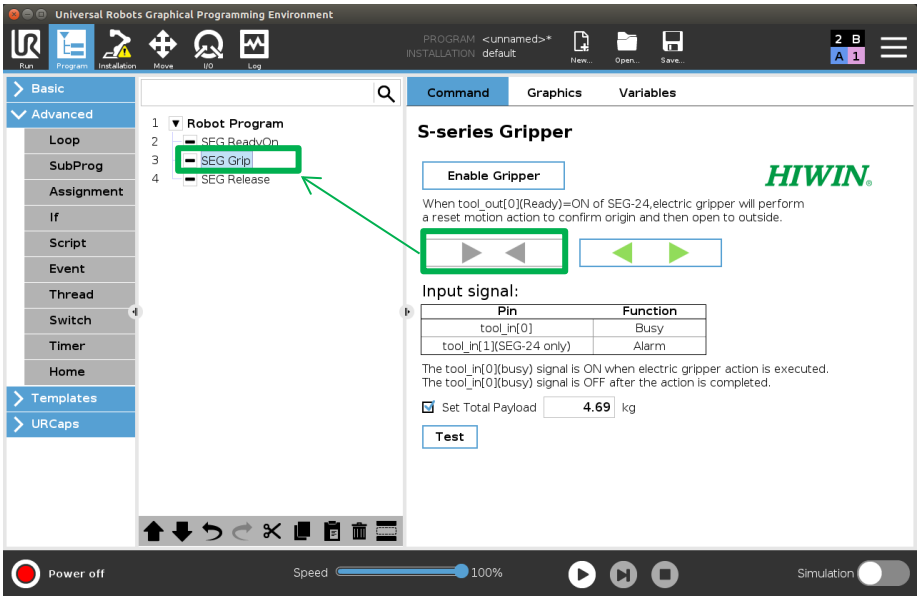


3. Command: Grip

CB-series

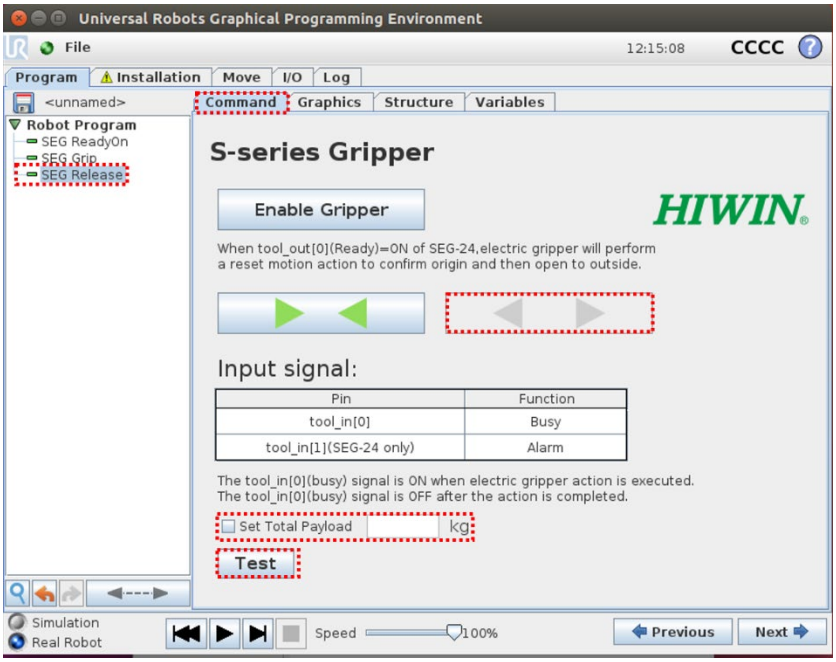


E-series

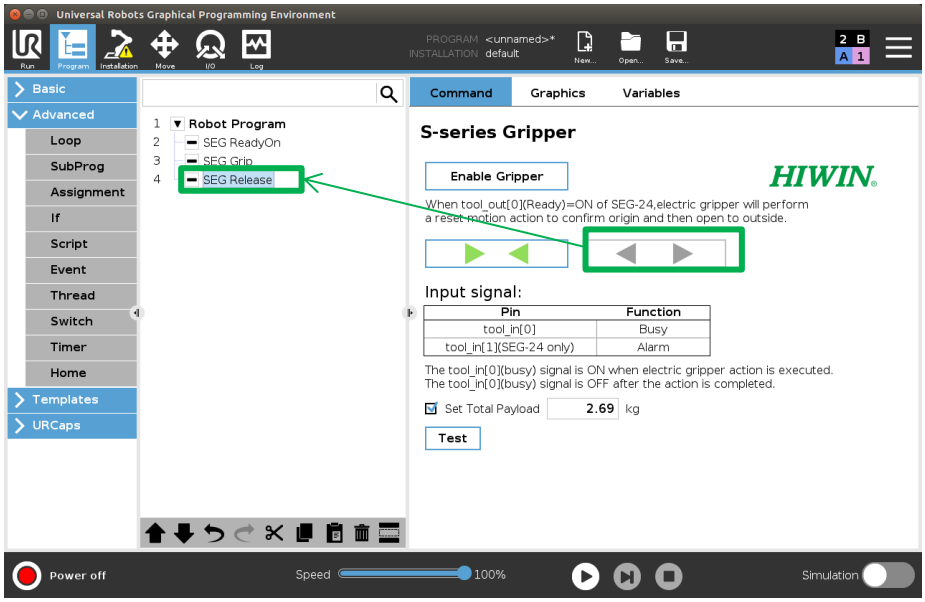


4. Command: Release

CB-series



E-series


Universal Robots Graphical Programming Environment
Run
Program
Installation
Move
I/O
Log
PROGRAM <unnamed>*
INSTALLATION default
New...
Open...
Save...
Basic
Advanced
Loop
SubProg
Assignment
If
Script
Event
Thread
Switch
Timer
Home
Templates
URCaps
1 Robot Program
2 SEG ReadyOn
3 SEG Grip
4 SEG Release
Command
Graphics
Variables
S-series Gripper
Enable Gripper
HIWIN
When tool_out[0](Ready)=ON of SEG-24,electric gripper will perform
a reset motion action to confirm origin and then open to outside.
Input signal:
Pin
Function
tool_in[0]
Busy
tool_in[1](SEG-24 only)
Alarm
The tool_in[0](busy) signal is ON when electric gripper action is executed.
The tool_in[0](busy) signal is OFF after the action is completed.
Set Total Payload
2.69
kg
Test
Power off
Speed
100%
Simulation

5. X-Series Getting Started

5.1. What's in the box?

- Model: XEG-16-C25L1-UR
  1. Electric gripper XEG-16
  2. Electric gripper controller XEG-C2
  3. UR Robot adapter set (ISO-9409-1-50-4-M6)
  4. Cable
     - Actuator cable 5M-L
     - RS485 cable 1.5M (USB to RJ45)
     - I/O cable 1.5M
     - USB cable 1.5M
  5. Accessory kit
     - Power plug
     - Pin
     - Greasing nozzle/tubing
  6. Software
     - URCap (download)

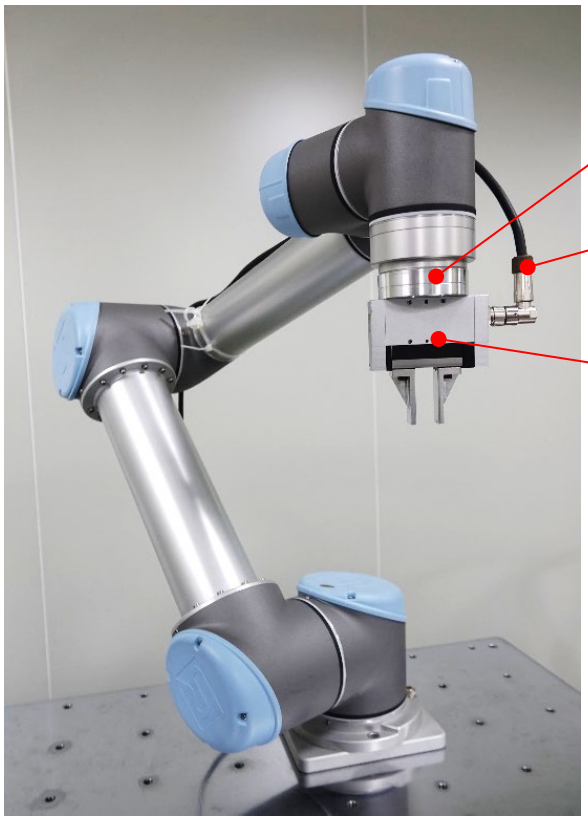
- Model: XEG-32-C25L1-UR
  1. Electric gripper XEG-32
  2. Electric gripper controller XEG-C2
  3. UR Robot adapter set (ISO-9409-1-50-4-M6)
  4. Cable
     - Actuator cable 5M-L
     - RS485 cable 1.5M (USB to RJ45)
     - I/O cable 1.5M
     - USB cable 1.5M
  5. Accessory kit
     - Power plug
     - Pin
     - Greasing nozzle/tubing
  6. Software
     - URCap (download)

- Model: XEG-48-C25L1-UR
  1. Electric gripper XEG-48
  2. Electric gripper controller XEG-C2
  3. UR Robot adapter set (ISO-9409-1-50-4-M6)
  4. Cable
     - Actuator cable 5M-L
     - RS485 cable 1.5M (USB to RJ45)
     - I/O cable 1.5M
     - USB cable 1.5M
  5. Accessory kit
     - Power plug
     - Pin
     - Greasing nozzle/tubing
  6. Software
     - URCap (download)

- Model: XEG-64-C25L1-UR
  1. Electric gripper XEG-64
  2. Electric gripper controller XEG-C2
  3. UR Robot adapter set (ISO-9409-1-50-4-M6)
  4. Cable
     - Actuator cable 5M-L
     - RS485 cable 1.5M (USB to RJ45)
     - I/O cable 1.5M
     - USB cable 1.5M
  5. Accessory kit
     - Power plug
     - Pin
     - Greasing nozzle/tubing
  6. Software
     - URCap (download)

- Model: XEG-32PR-C25L1-UR
  1. Electric gripper XEG-32-PR
  2. Electric gripper controller XEG-C2
  3. UR Robot adapter set (ISO-9409-1-50-4-M6)
  4. Cable
     - Actuator cable 5M-L
     - RS485 cable 1.5M (USB to RJ45)
     - I/O cable 1.5M
     - USB cable 1.5M
  5. Accessory kit
     - Power plug
     - Pin
  6. Software
     - URCap (download)

Example:

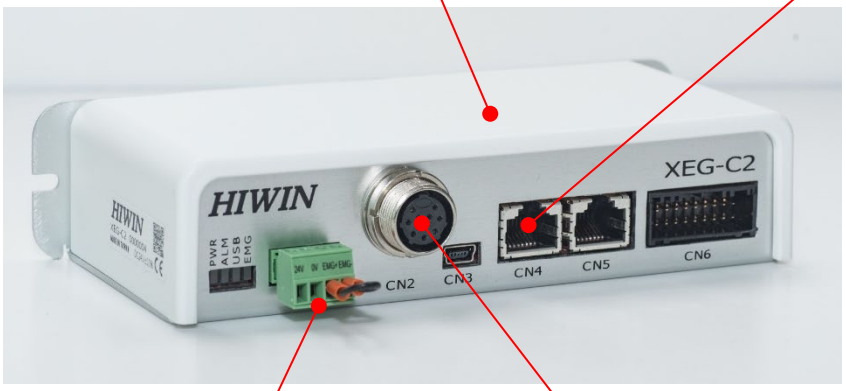


3 UR Robot adapter set

4 Actuator cable

1 Electric gripper

Electric gripper controller 2



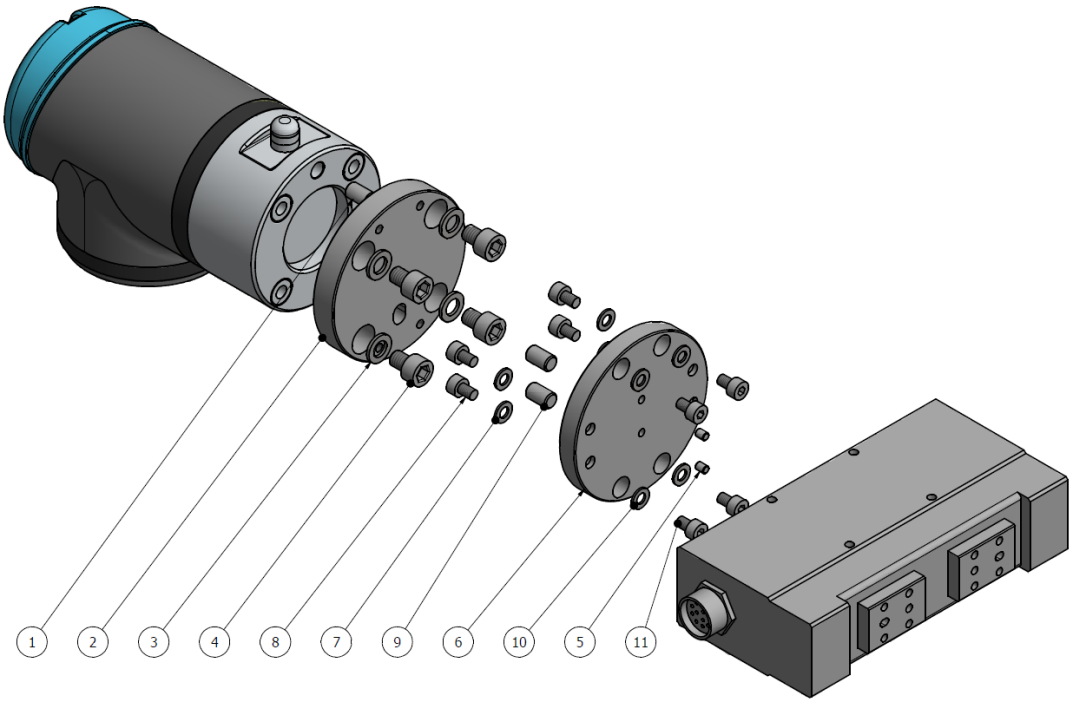
4 RS485 cable (USB-to-RJ45)

Power Plug 5

4 Actuator cable

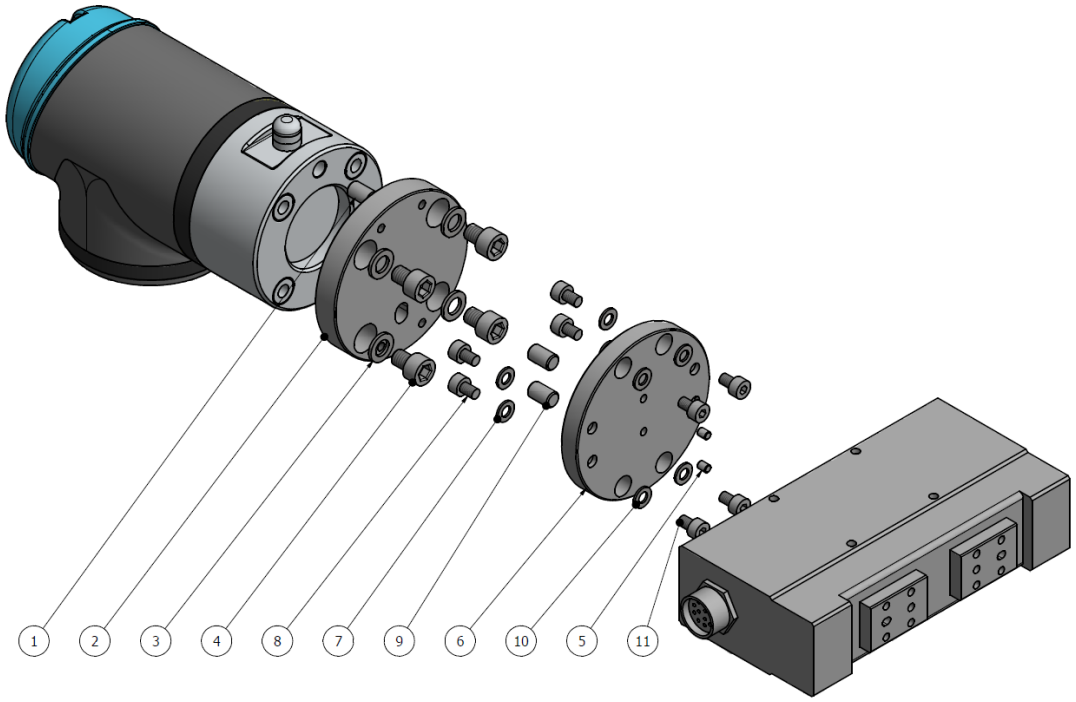
5.2. Mechanical mounting

- Model: XEG-16-UR



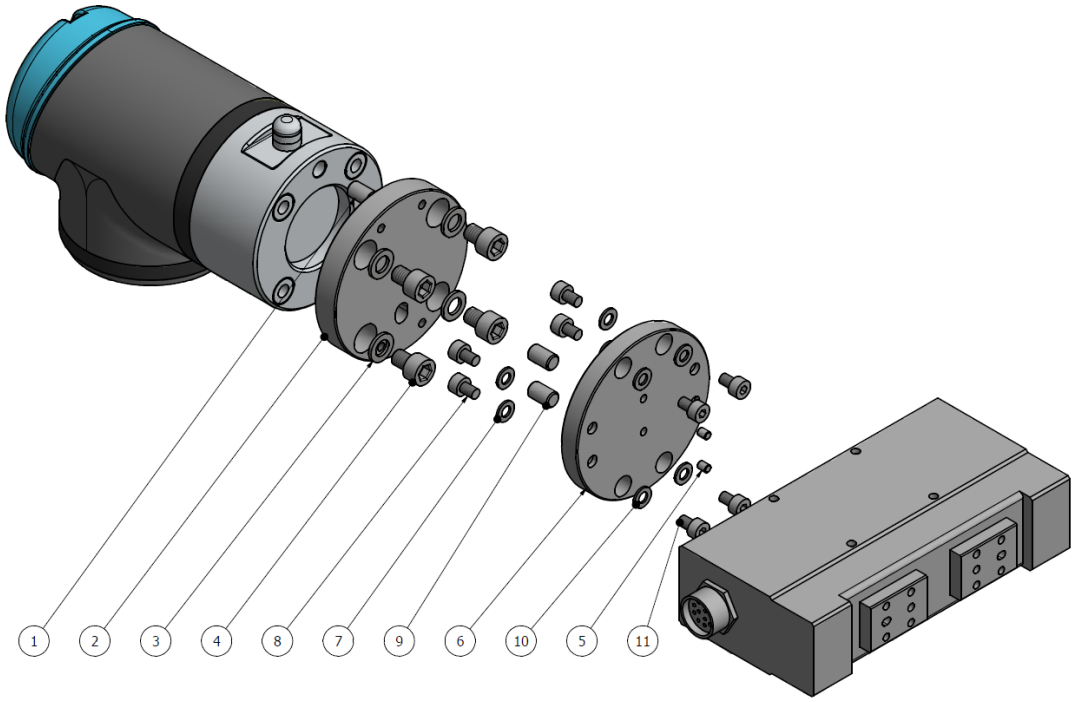
Items	Parts	Description	Amount
11	Bolt	M4X0.7PX6L SUS304	4
10	Spring washer	M4 SUS304	4
9	Pin	ϕ6X10L	2
8	Bolt	M3X0.5PX5L SUS304	4
7	Spring washer	M3 SUS304	4
6	XEG-16 adapter	—	1
5	Pin	ϕ2X4.4L	2
4	Bolt	M6X1PX8L SUS304	4
3	Spring washer	M6 SUS304	4
2	UR adapter	—	1
1	Pin	ϕ6X10L	1

- Model: XEG-32-UR



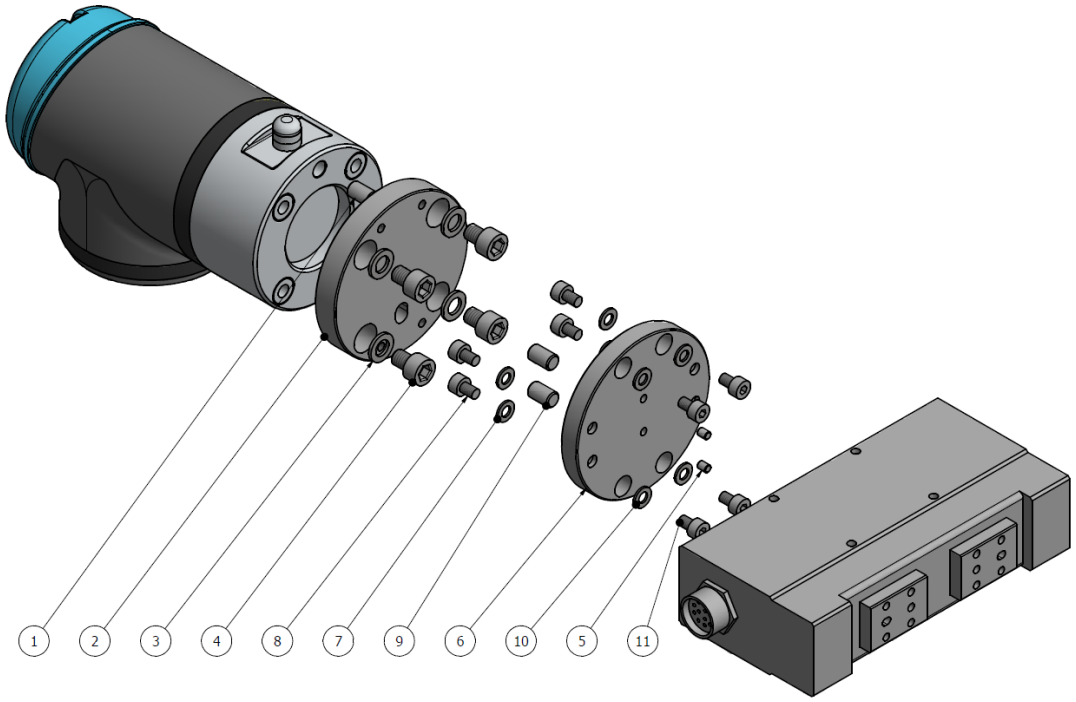
11	Bolt	M4X0.7PX6L SUS304	4
10	Spring washer	M4 SUS304	4
9	Pin	ϕ6X10L	2
8	Bolt	M4X0.7PX6L SUS304	4
7	Spring washer	M4 SUS304	4
6	XEG-32 adapter	—	1
5	Pin	ϕ3X4L	2
4	Bolt	M6X1PX8L SUS304	4
3	Spring washer	M6 SUS304	4
2	UR adapter	—	1
1	Pin	ϕ6X10L	1
Items	Parts	Description	Amount

- Model: XEG-48-UR



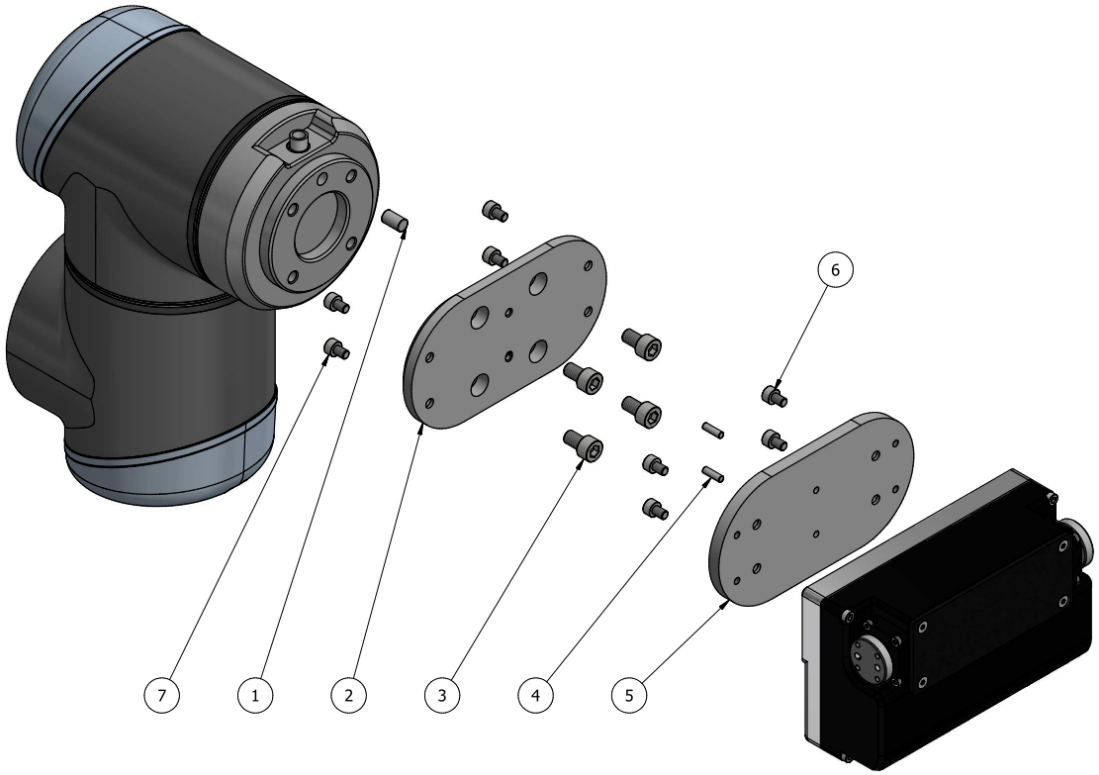
11	Bolt	M6X1PX8L SUS304	4
10	Spring washer	M6 SUS304	4
9	Pin	ϕ5X6L	2
8	Bolt	M6X1PX8L SUS304	4
7	Spring washer	M6 SUS304	4
6	XEG-64 adapter	—	1
5	Pin	ϕ5X6L	2
4	Bolt	M6X1PX8L SUS304	4
3	Spring washer	M6 SUS304	4
2	UR adapter	—	1
1	Pin	ϕ6X10L	1
Items	Parts	Description	Amount

- Model: XEG-64-UR



11	Bolt	M6X1PX8L SUS304	4
10	Spring washer	M6 SUS304	4
9	Pin	ϕ5X6L	2
8	Bolt	M6X1PX8L SUS304	4
7	Spring washer	M6 SUS304	4
6	XEG-64 adapter	—	1
5	Pin	ϕ5X6L	2
4	Bolt	M6X1PX8L SUS304	4
3	Spring washer	M6 SUS304	4
2	UR adapter	—	1
1	Pin	ϕ6X10L	1
Items	Parts	Description	Amount

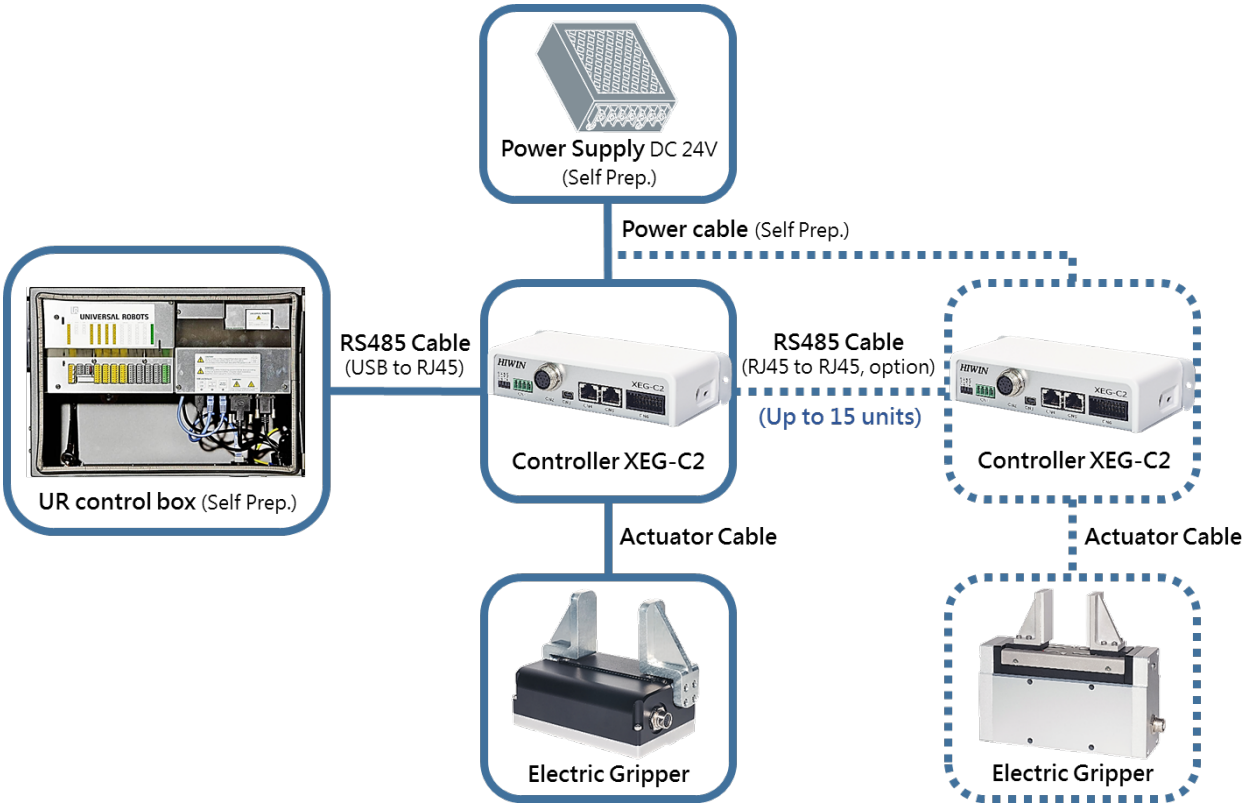
- Model: XEG-32-PR-UR



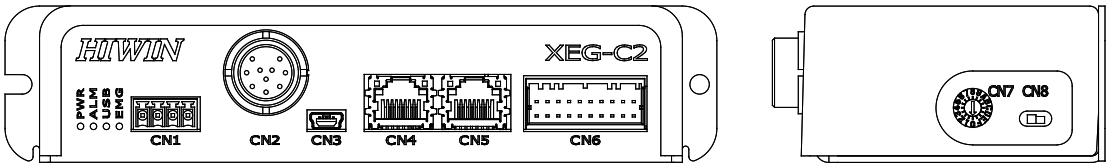
Items	Parts	Description	Amount
7	Bolt	M4X0.7PX6L SUS304	4
6	Bolt	M4X0.7PX6L SUS304	4
5	XEG-32-PR adapter	---	1
4	Pin	Φ3X10L	2
3	Bolt	M6X1PX10L SUS304	4
2	UR adapter	---	1
1	Pin	Φ6X10L	1

5.3. Electric mounting

- System construction:



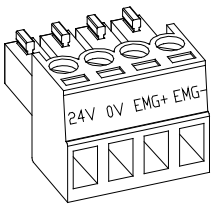
- Names and function of XEG-C2

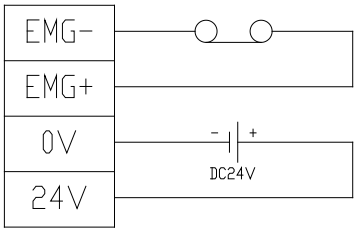


Code	Part Name	Illustration
PWR	24V Power supply lamp (Green)	Lights after 24V / 0V power input
ALM	Error status lamp (Red)	Lights after error status occurs [Note 1]
USB	5V Power supply lamp (Green)	Lights after USB cable is connected
EMG	Emergency stop lamp (Red)	Lights after emergency stop trigger
CN1	Power terminal and Emergency stop terminal	Connect power supply and emergency stop [Note 2]
CN2	Actuator terminal	Connect actuator cable
CN3	Communication terminal	Connect USB cable
CN4	Communication terminal	Connect RS485 cable [Note 3]
CN5	Communication terminal	Connect RS485 cable [Note 3]
CN6	I/O signal terminal	Connect I/O cable
CN7	Station channel	Set controller station number [Note 4]
CN8	Terminal resistor	Two-stage switch, left direction is off, right direction is on [Note 5]

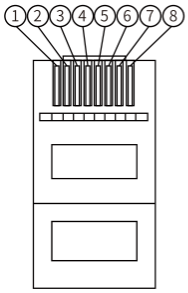
[Note 1] The display mode of the ALM indicator in each abnormal state is as follows:

Error Status	ALM Indicator
1. Position fault	After every 1 second, ALM indicator blinks 1 time
2. Over travel	After every 1 second, ALM indicator blinks 2 times
3. Original point fault	After every 1 second, ALM indicator blinks 3 times
4. Trigger emergency stop	After every 1 second, ALM indicator blinks 4 times
5. Firmware version update	Continuous flashing

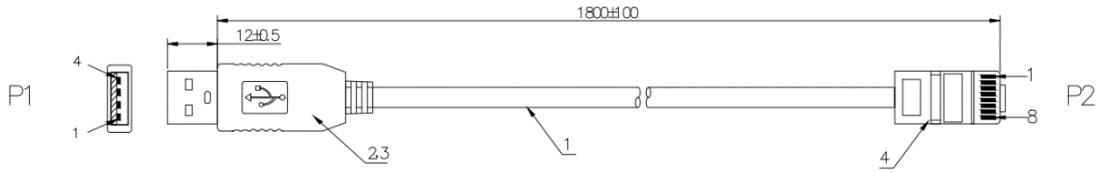




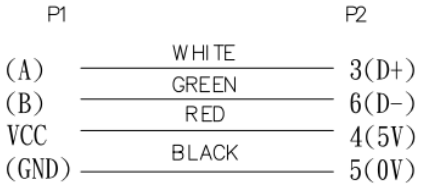
[Note 3] The pin definition of the RS485 cable is as follows. Please use EIA-485 as the reference, use twisted pair cables and recommend TIA/EIA CAT5e or more. A maximum of 15 controllers can be connected in series, and the longest serial cable length is 50 meters in total.



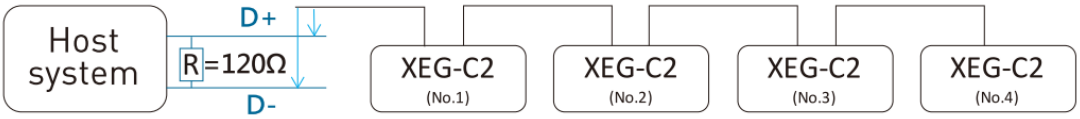
PIN	Define	Color
1	N/A	White/Orange
2	GND	Orange
3	D+	White/Green
4	N/A	Blue
5	GND	White/Blue
6	D-	Green
7	N/A	White/Brown
8	N/A	Brown



PIN WIRING



[Note 5] When two or more controllers are connected in series and the total cable length is more than 10 meters, the last controller must have the terminating resistor function enabled. The host system needs to be connected with a terminating resistor (120Ω) between the two signal wires. The system wiring is as follows:

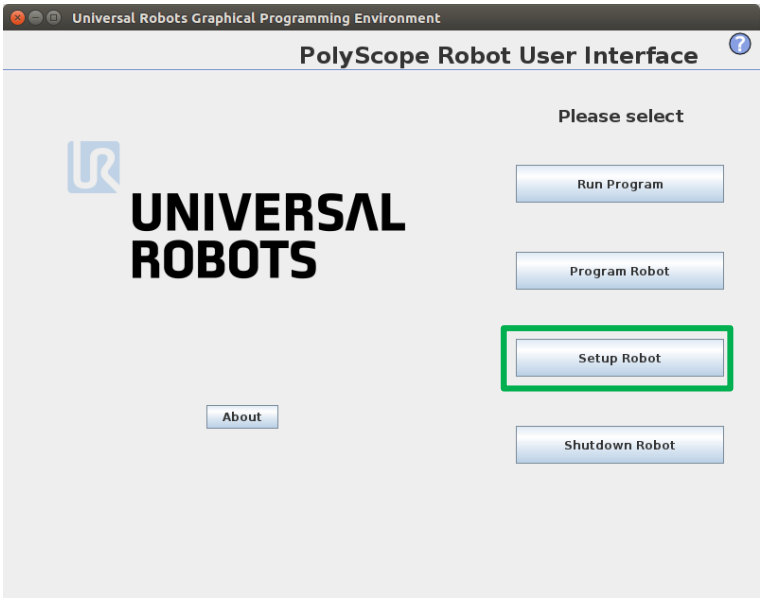


Function Setting	CN7 CN8 OFF ON	CN7 CN8 OFF ON	CN7 CN8 OFF ON	CN7 CN8 OFF ON
Station Number	No.1	No.2	No.3	No.4
Terminal Resistor	OFF	OFF	OFF	ON

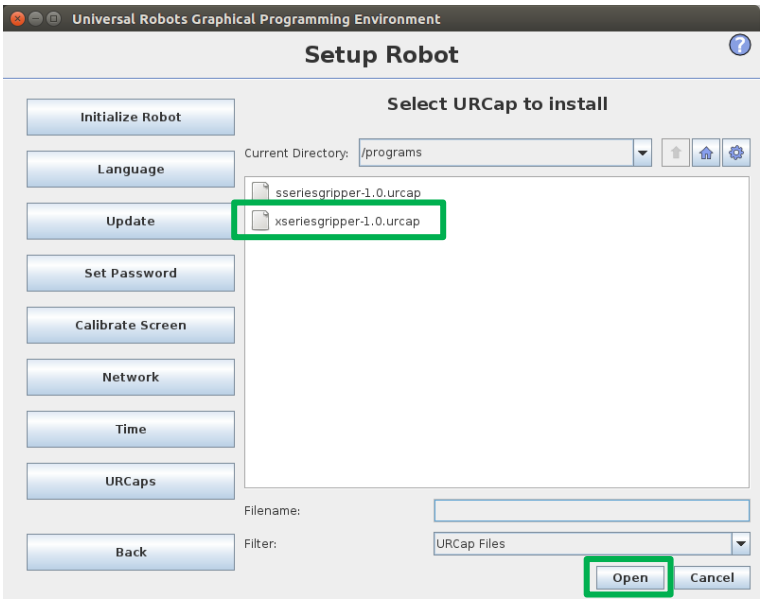
[Note 7] XEG-C2 controller firmware update information, please refer to the following:
https://www.hiwin.tw/download/tech_doc/ee/XEG-C2_firmware_update_user_manual-(E).pdf

5.4. Installing URCap

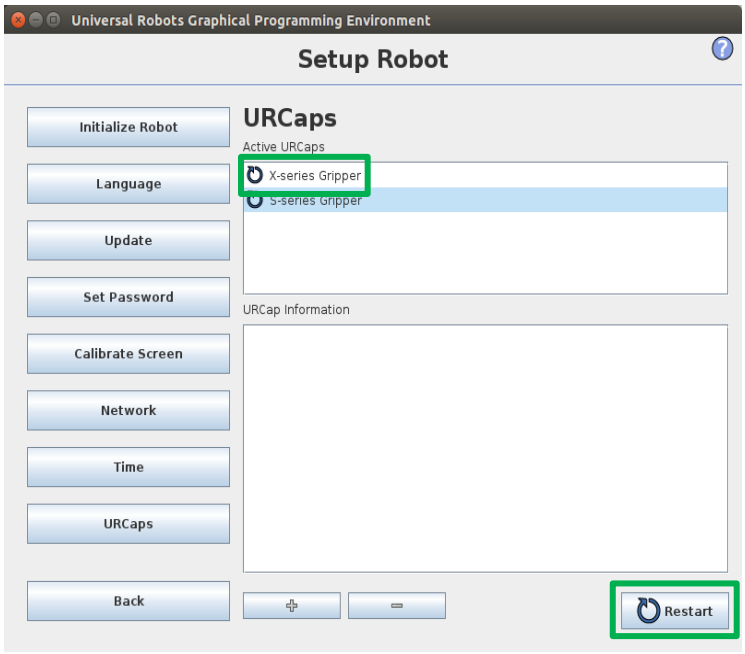
1. Click **here** for free downloading of URCap, and save it to a USB stick.
2. Insert the USB with the URCaps file into the UR teach pendant. From the main menu, please select “Setup Robot”.



3. Click “+” on the button side of page to open the URCap file.

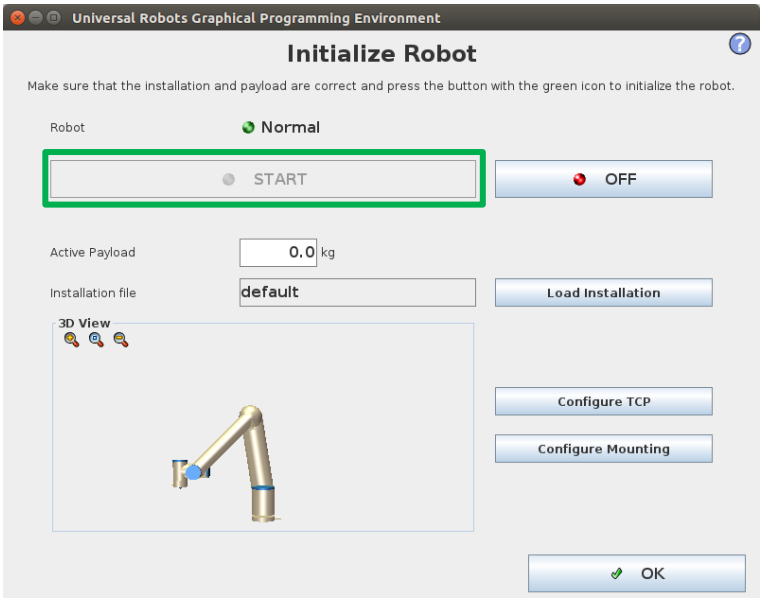


4. Restart the robot when prompted.



> Note：The HIWIN URCaps requires Universal Robots Polyscope software version above 3.14 (CB-series) / 5.9 (e-series) or higher, and lower version may not function properly.

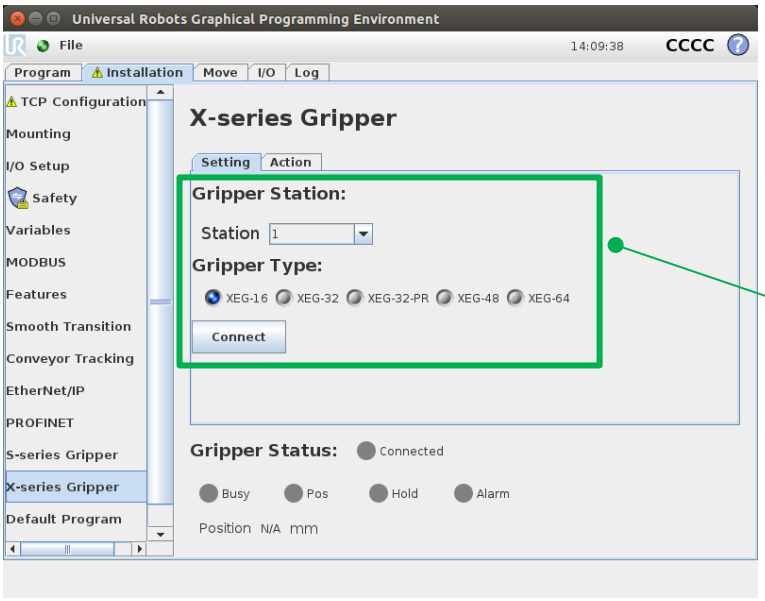
5. After successfully installing the URCaps, please follow the instruction to initialize UR Robot.



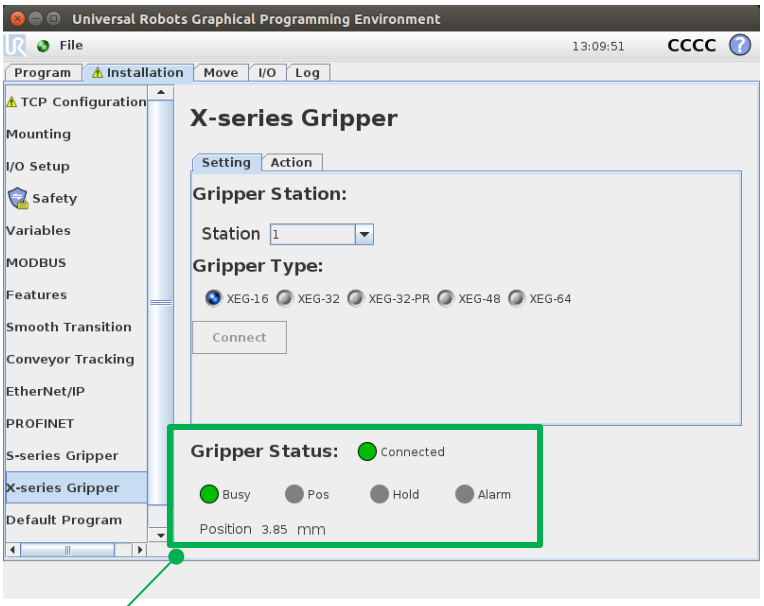
5.5. Installation page

Here are some detailed description under setting and action page for CB-series.

- Setting page:



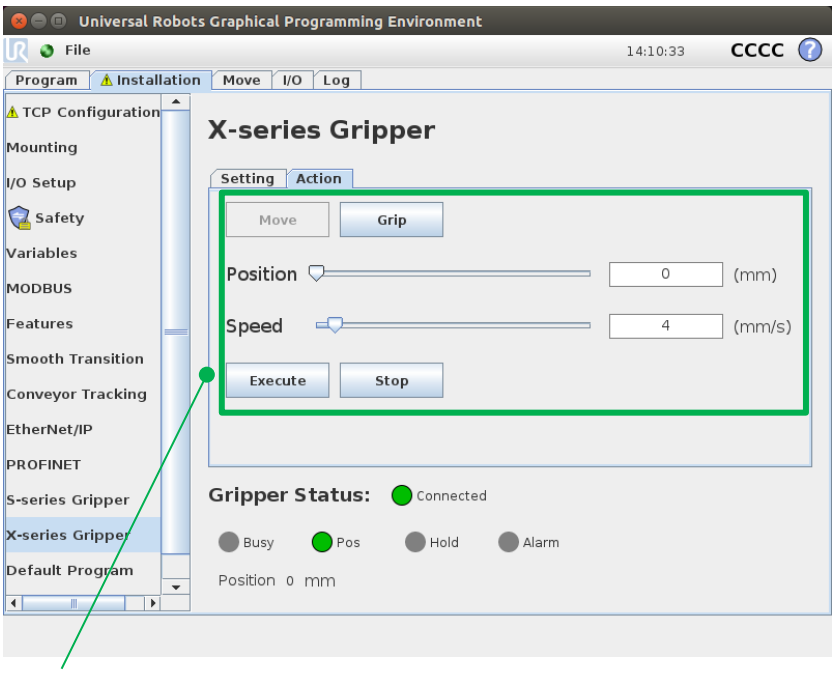
Choose correspond gripper station, gripper type and connect.



- Busy：The busy signal happens when gripper is moving.
- Pos：The position signal happens when gripper executes MOVE command and moves to position exactly.
- Hold：When the gripper exactly grips the object, then the hold signal will show up.
- Alarm：The alarm signal happens when error shows up during gripper operation.
- Position：Gripper absolute position or relative size of the clamped object.

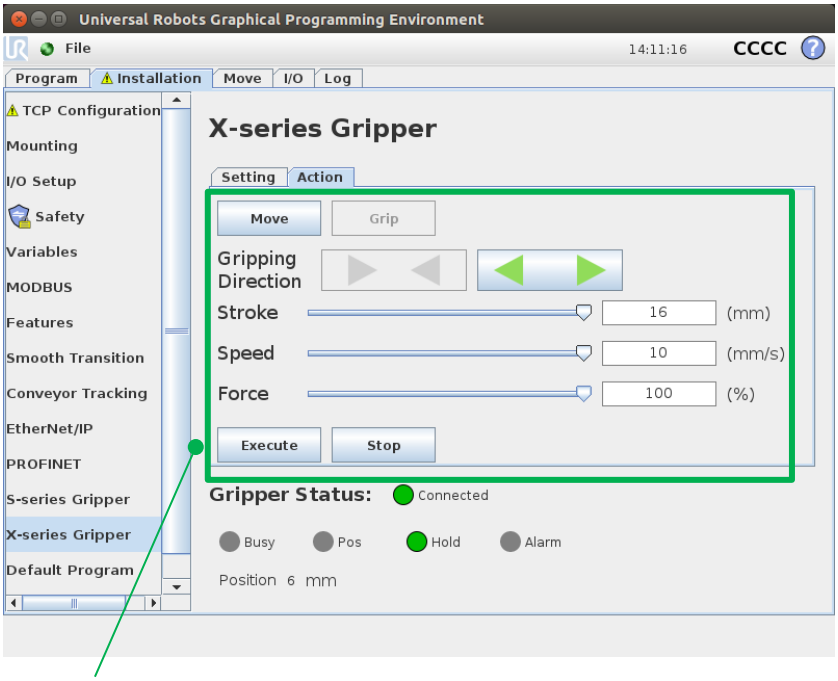
- Action page:

  - Move: move with position control, used to move the gripper quickly.



Set position and speed, then click Execute to run the MOVE action. The maximum value of parameters sliders will be set automatically according to the gripper type in setting page.

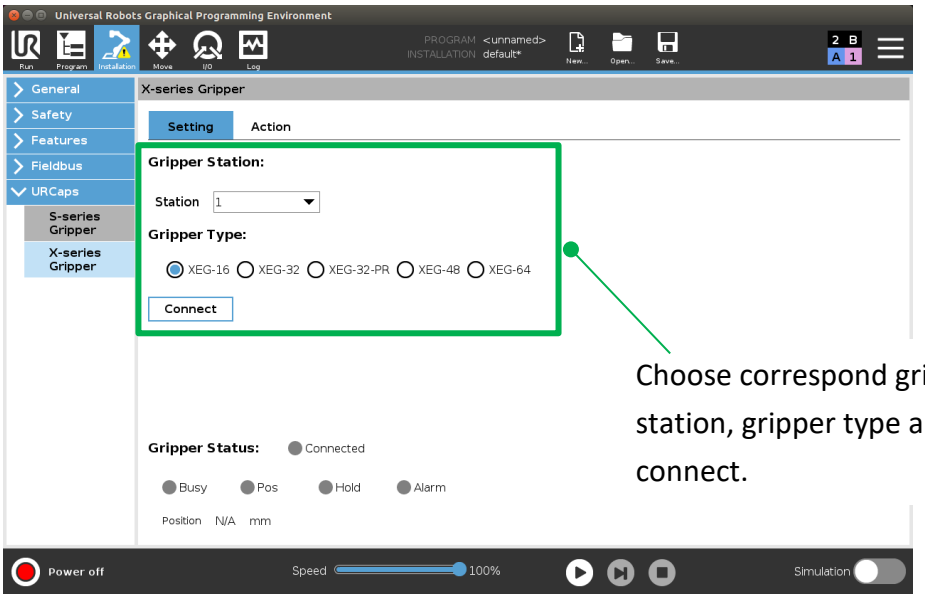
  - Grip: move with force control, used to grip objects.

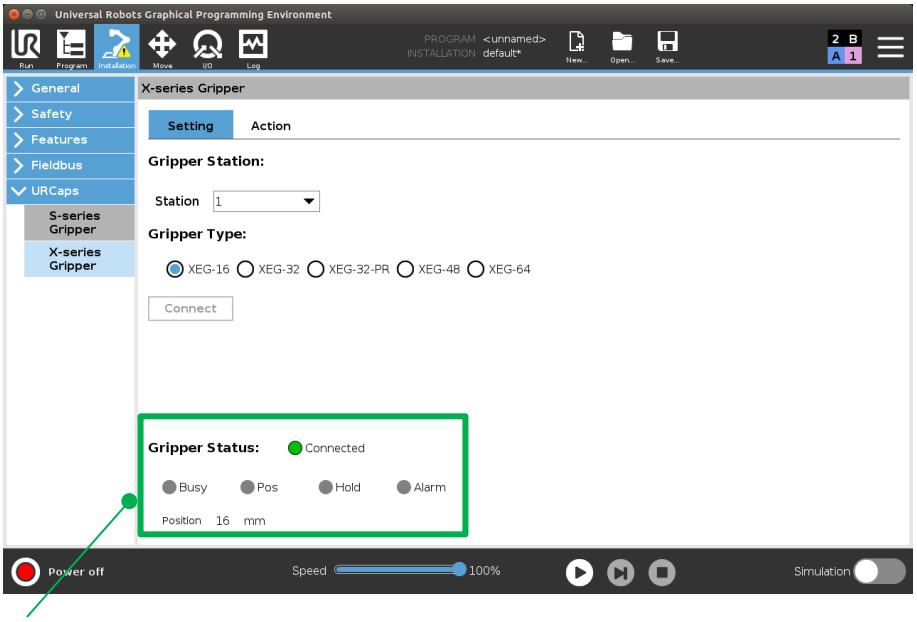


Set gripping direction, stroke distance, speed and force, then click Execute to run the GRIP action.

Here are some detailed description under setting and action page for e-series.

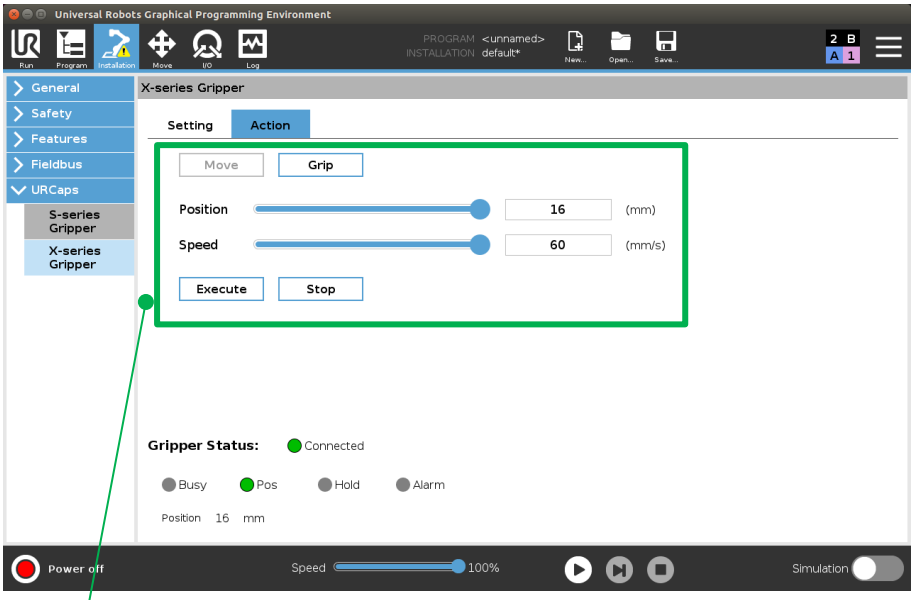
- Setting page:





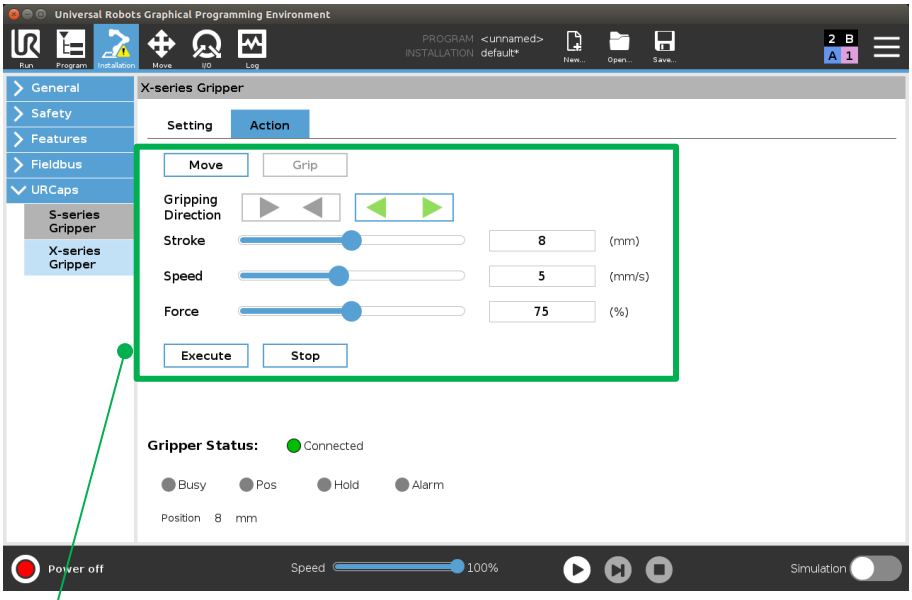
- Busy：The busy signal happens when gripper is executing the program.
- Pos：The pos signal happens when gripper executes MOVE command and moves to position exactly.
- Hold：When the gripper exactly grips the object, then the hold signal will show up.
- Alarm：The alarm signal happens when error shows up during gripper operation.
- Position：Gripper absolute position or relative size of the clamped object.

- Action page:
  - Move: moving with position control, used to move the gripper quickly.



Set position and speed, then click Execute to run the MOVE action. The maximum value of parameters sliders will be set automatically according to the gripper type in setting page.

- Grip: moving with force control, used to grip objects.



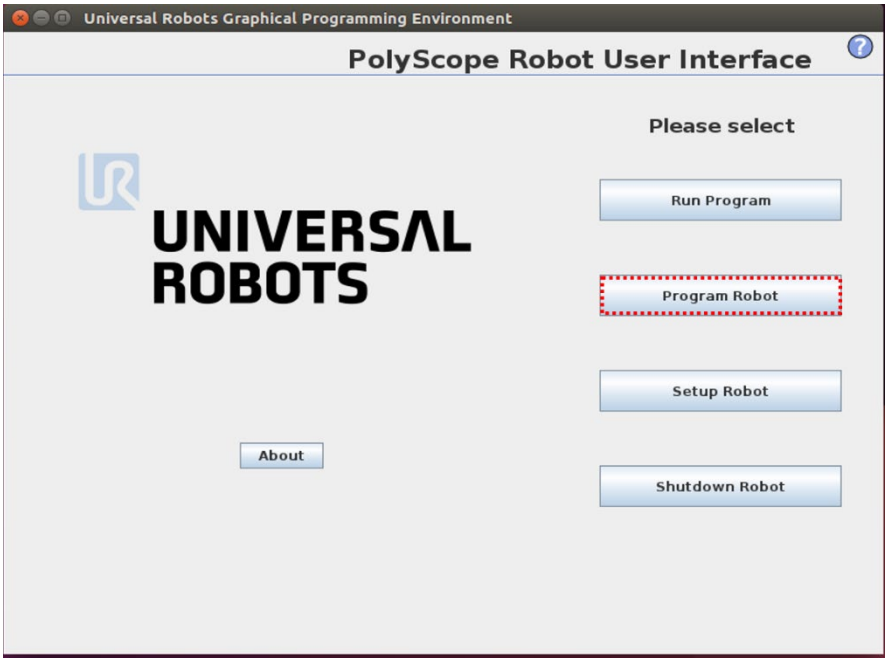
Set gripping direction, stroke distance, speed and force, then click Execute to run the GRIP action.

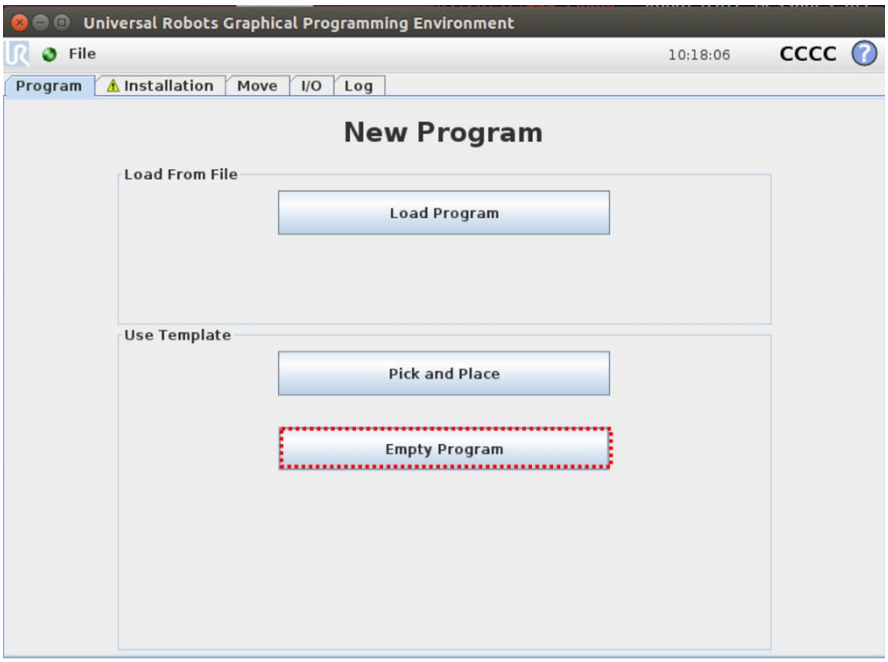
5.6. Program page

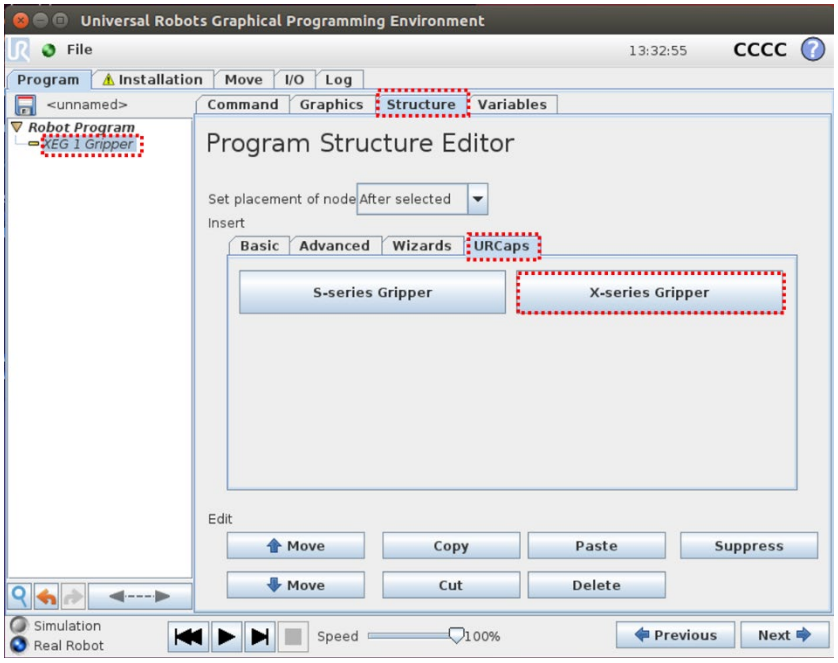
1. Selection of Gripper Type:

The program Structure tab of URCaps provides selecting the gripper types (“X” Or “S” Series) & so the user can perform the **URCaps’ commands**, as follow **Connect, Move & Grip**.

- Select Program Robot → Select Empty Program → Click Structure → Click URCaps & Select X-series Gripper



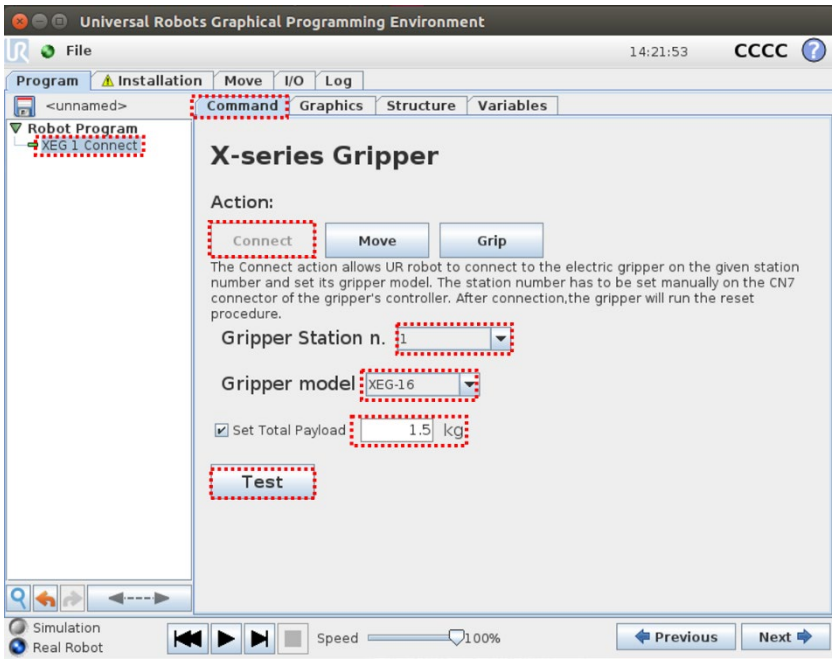




2. Command: Connect

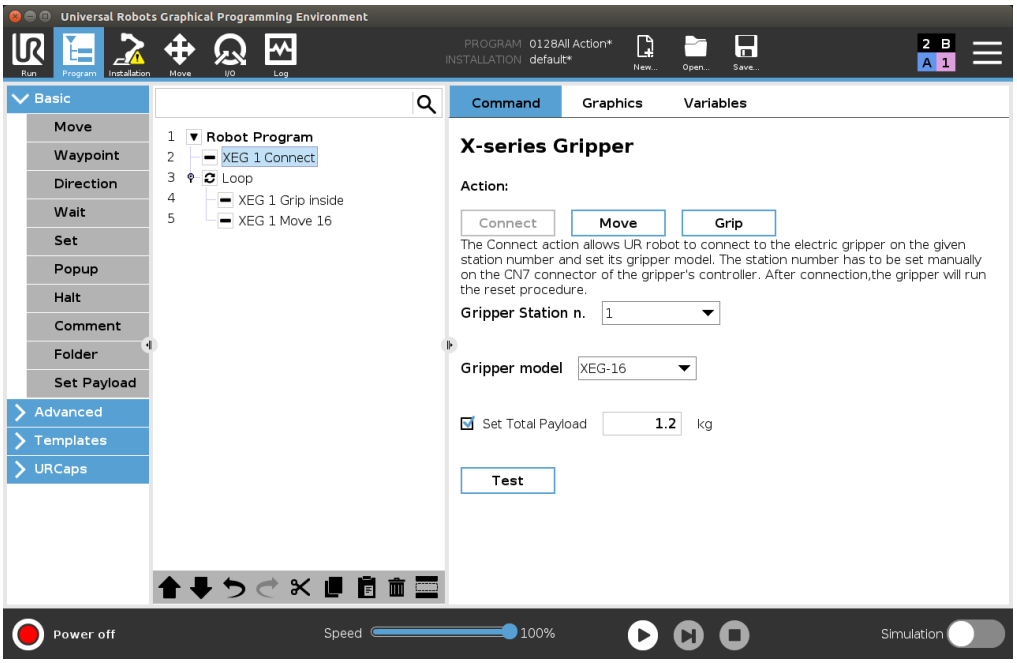
- Click **Command** → Select **Connect** → Select **Gripper Station** → Select **Gripper Model** → **Set Total Payload** → **Test**

  CB-series



Note: - For example, total payload of the robot arm end is 1 kg before the gripper clamping,and it can be changed to 1.5 kg (e.g., 0.5 is an object weight) after clamping.

E-series

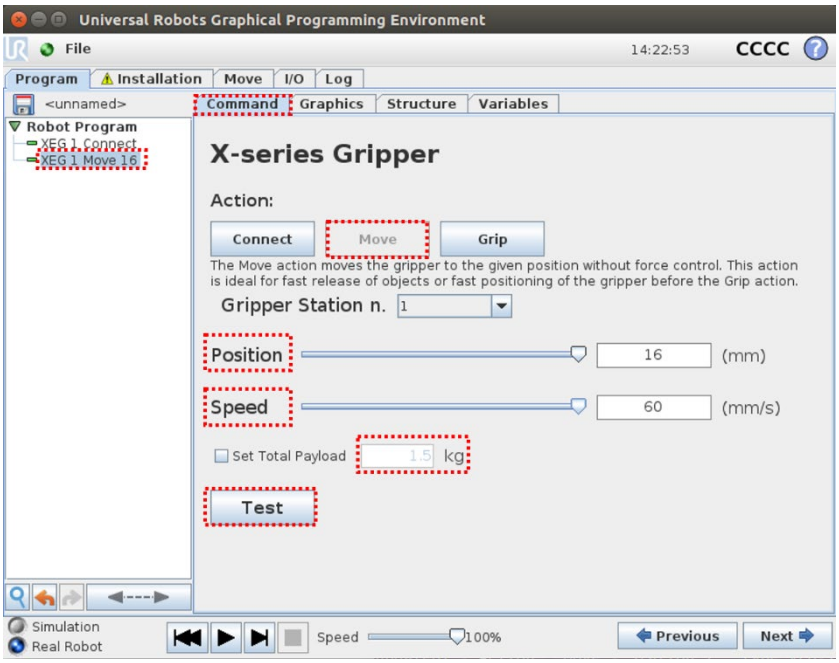


3. Command: Move

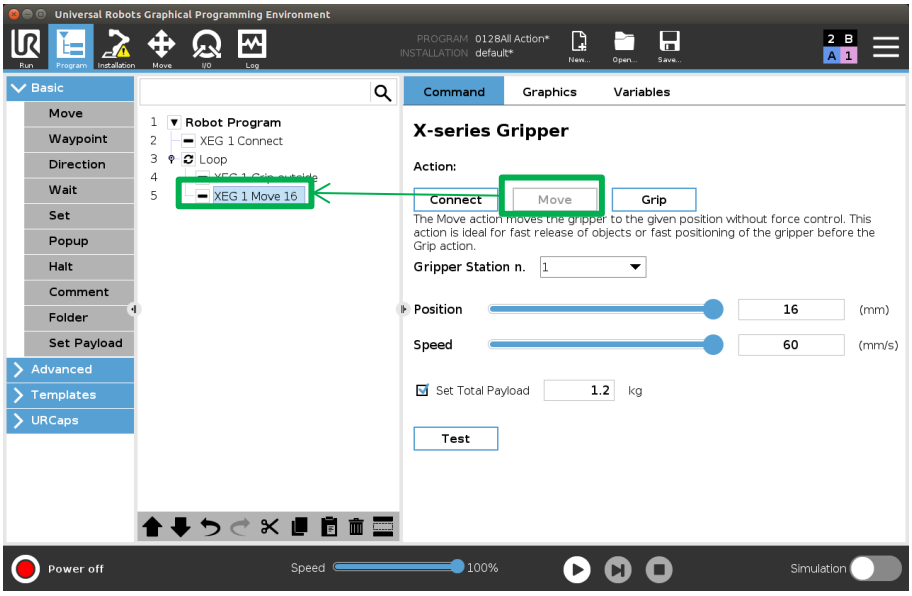
Set “Move” to move quickly (for releasing or positioning).

- Click **Command** → Select **Move** → Set **Position** → Select **Set Speed** → **Set Total Payload** → **Test**

  CB-series



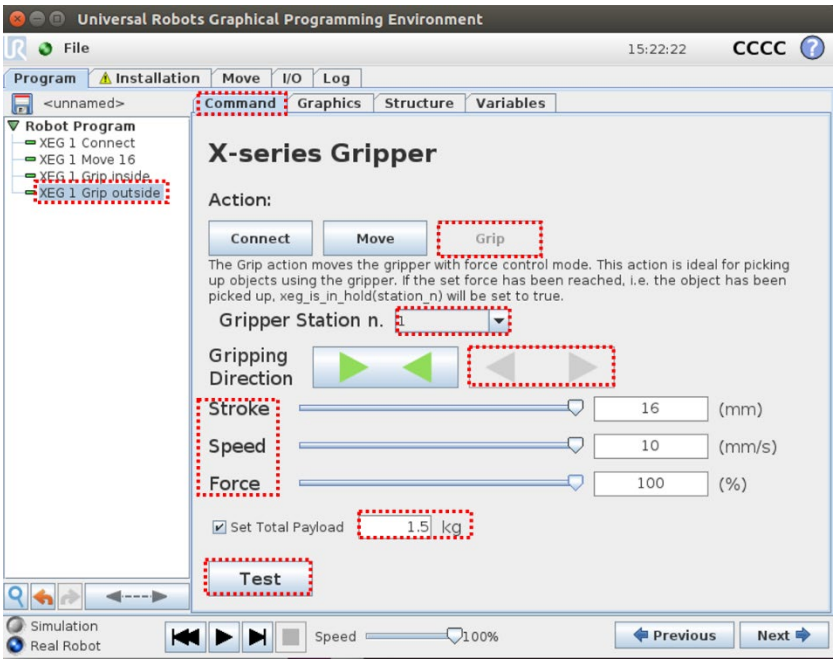
E-series



4. Command: Grip Outside

Set “Grip” to move with force control (for gripping outside).

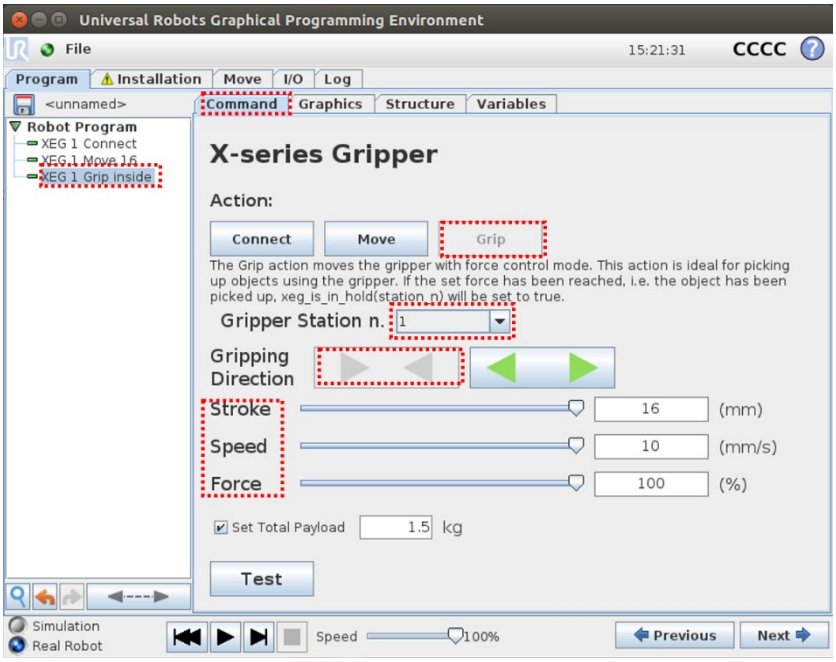
- Click **Command** → Select **Grip** → Select **Gripper Station** → Select **Gripping Outside** → Set **Stroke, Speed, Force** → **Set Total Payload** → **Test**



5. Command: Grip Inside

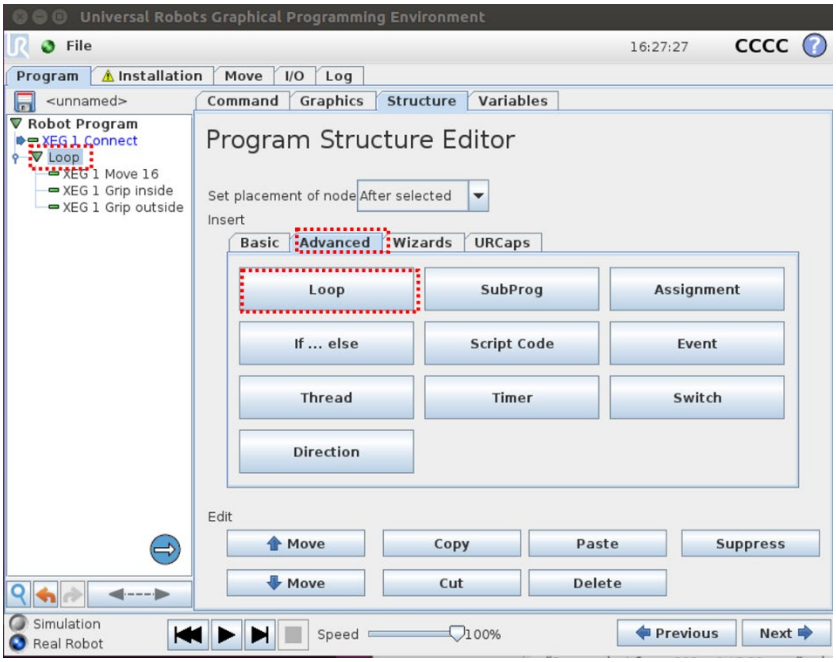
Set “Grip” to move with force control (for gripping inside).

- Click **Command** → Select **Grip** → Select **Gripper Station** → Select **Gripping Inside** → Set **Stroke, Speed, Force** → **Set Total Payload** → **Test**



6. UR Robot Command: Loop

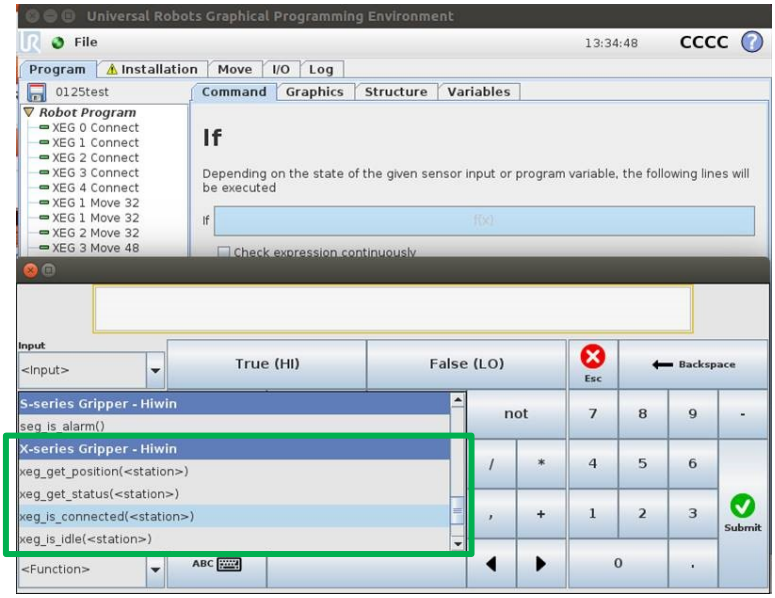
- Click **Structure** → Select **Loop**

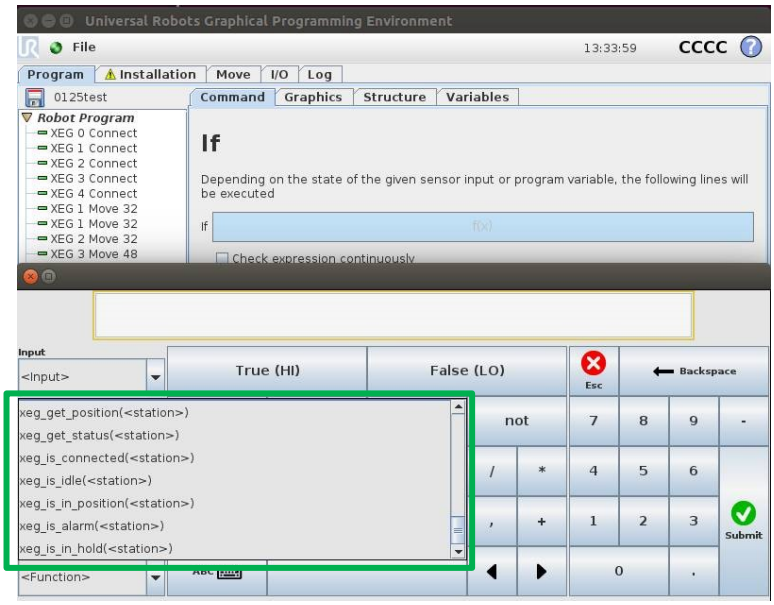


5.7. Other special functions

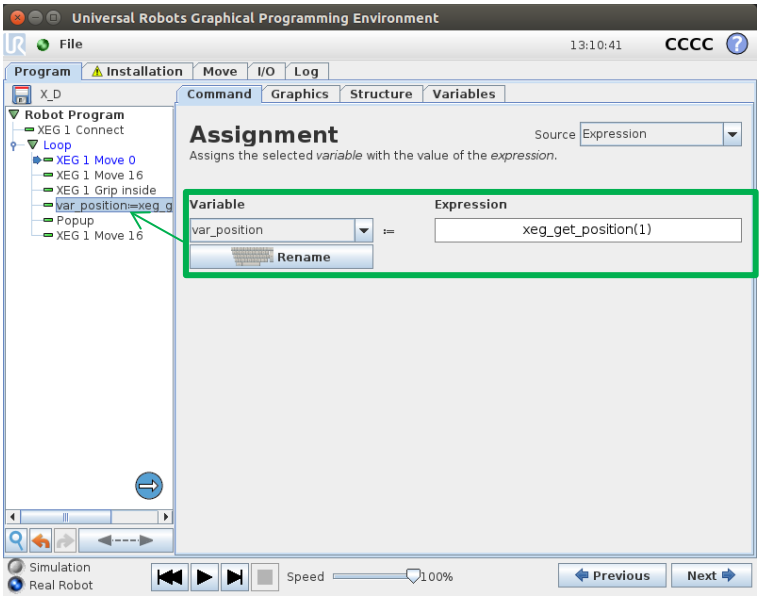
Different functions related to position feedback, connect, idle, position, alarm and hold signal are provided. The user can use it depending on the application. The position feedback can be used to check what the current position of the gripper is. The busy signal is on when gripper is executing the program. The position signal is on when gripper executes MOVE command and moves to position exactly. The alarm signal is on when some error shows up during gripper operation. The hold signal is on when something has been gripped, note that this signal has to be checked only after a grip action.

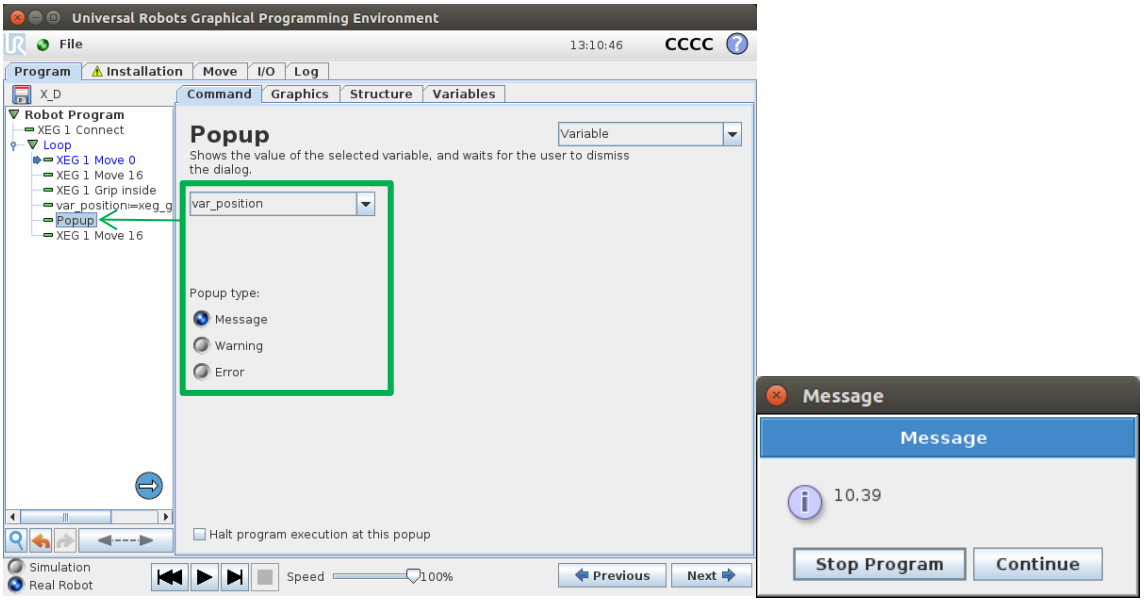
XEG functions	Description
xeg_get_position(station)	Get XEG gripper absolute position value. (Unit: 0.01 mm)
xeg_get_status(station)	Get XEG gripper status code. Code 0: idle state Code 1: busy state Code 2: moves to position exactly Code 3: in a grasped state Code 4: alarm state-position error Code 5: alarm state-over stroke Code 6: alarm state-reset error Code 7: alarm state-emergency stop
xeg_is_connected(station)	Confirm XEG gripper is connected.
xeg_is_idle(station)	Confirm XEG gripper is in an idle state.
xeg_is_in_position(station)	Confirm XEG gripper moves to position exactly.
xeg_is_alarm(station)	Confirm XEG gripper is in an alarm state.
xeg_is_in_hold(station)	Confirm XEG gripper is in a grasped state.




Universal Robots Graphical Programming Environment
File
13:33:59
CCCC
Program
Installation
Move
I/O
Log
0125test
Command
Graphics
Structure
Variables
Robot Program
XEG 0 Connect
XEG 1 Connect
XEG 2 Connect
XEG 3 Connect
XEG 4 Connect
XEG 1 Move 32
XEG 1 Move 32
XEG 2 Move 32
XEG 3 Move 48
If
Depending on the state of the given sensor input or program variable, the following lines will be executed
If
f(x)
Check expression continuously
Input
<Input>
True (HI)
False (LO)
Esc
Backspace
xeg_get_position(<station>)
xeg_get_status(<station>)
xeg_is_connected(<station>)
xeg_is_idle(<station>)
xeg_is_in_position(<station>)
xeg_is_alarm(<station>)
xeg_is_in_hold(<station>)
not
7
8
9
-
/
*
4
5
6
,
+
1
2
3
Submit
<Function>
0
.

The following example shows the gripper position in a message window when the gripper grips an object.





Appendix.1：Example program

To set up the HIWIN Electric gripper with Universal Robot, a quick example is provided as below.

Universal Robot model：UR5 with CB3.0
Software version：Polyscope version above 3.14
URCap version: URCap 2.0
Gripper type：SEG-24

1. SEG ReadyOn → Initialize the center point of gripper under installation page. Normally, it happens when the first time supply the power. Therefore, we put it before executing the main program.
2. SEG Grip → Set grip stroke with gripper side function button according to the actual application.
3. SEG Release → Set release stroke with gripper side function button according to the actual application.

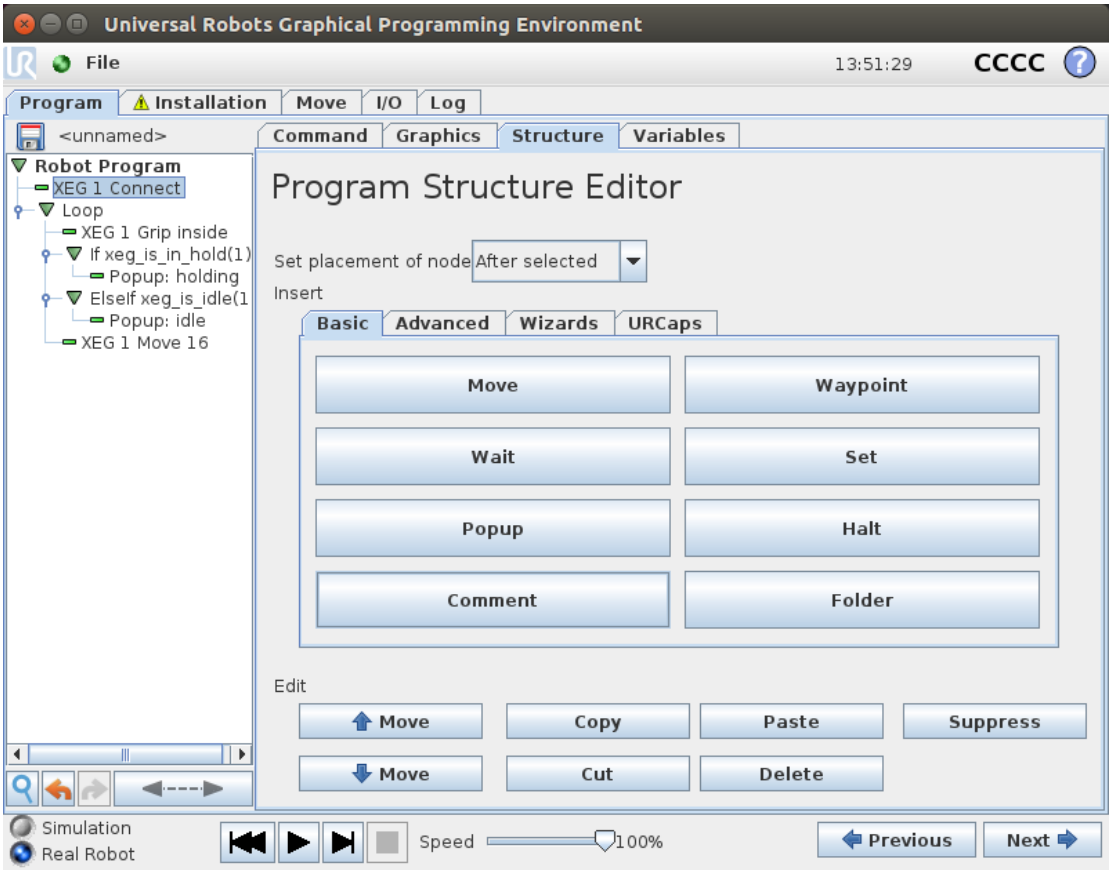
Universal Robot model：UR5 with CB3.0

Software version：Polyscope version above 3.14

URCap version: URCap 2.0

Gripper type：XEG-16

1. XEG Connect → Connect to the correct station number and model of the gripper. If the gripper is connected successfully, the origin reset will be executed, otherwise an error warning will appear.
2. XEG Grip inside → Set grip stroke according to the actual application.
3. If xeg_is_in_hold → Popup “holding” when there is a one.
4. ElseIf xeg_is_idle → Popup “idle” when there is a one.
5. X -series Release → Set release stroke according to the actual application.



Appendix.2：Certification

Declarations of conformity with the following directives and standards are available on request.

CE Compliance	
Machinery Directives	2006/42/EC
Low Voltage Directives (LVD)	2014/35/EU
Safety of Machinery	EN ISO 12100:2010
	EN 60204-1:2006+AC:2010
Electromagnetic Compatibility Directives (EMC)	EN 61000-6-2:2005
	EN 61000-6-4:2007+A1:2011
Hazardous Substances Restriction Directives (RoHS 2)	2011/65/EU (2015/863)

S-Series and X-Series Electric Grippers (Original Instruction)
UR Technical Manual Guide

Publication Date：December 2021

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