# DH-Robotics/Universal Robots

# Plugin Version 2.4.7

**Version information**: suitable for the robot end connection, control cabinet connection mode.

**Version features**： 1. Support for multi-clip-claw collaboration.

1. Support for Toolbar quick debugging.
2. Support for E-Series Tool I / O communication control.
3. Two functional nodes: initialization, control.
4. Support the clamp detection script.
5. Add the support connection script to realize the automatic boot connection.

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# Adapt Material

|  |  |  |  |
| --- | --- | --- | --- |
|  | CB-Series | E-Series | 备注 |
| End special wiring | 03.05.0135 | 03.05.0135/03.05.0136 | Connect End-interface should be indicated at the order.  03.05.0136 for e-series dual pin power supply mode need used |
| Gripper | √ | √ |  |
| flange and nuts | √ | √ |  |
| Extension line | √ | √ | To connect the control cabinet |
| USB-to-485 | √ | √ | Use it with the extension line |

# Software Configuration

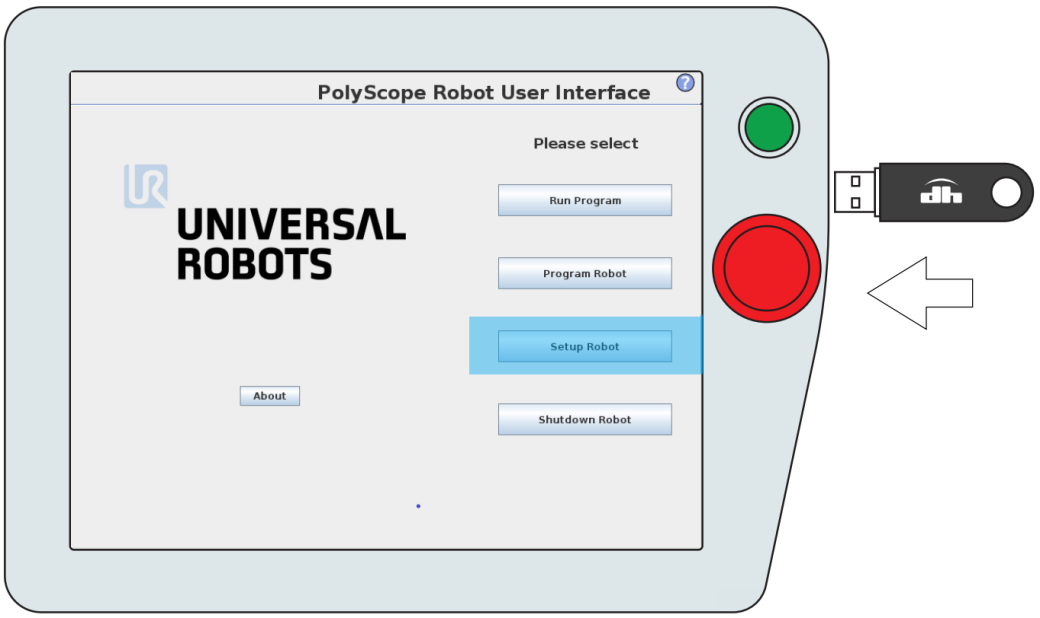
## Software Installation（UR CB-series）

**Note: This version of the plug-in is compatible with the UR3 / 5 / 10 / 16 series;**

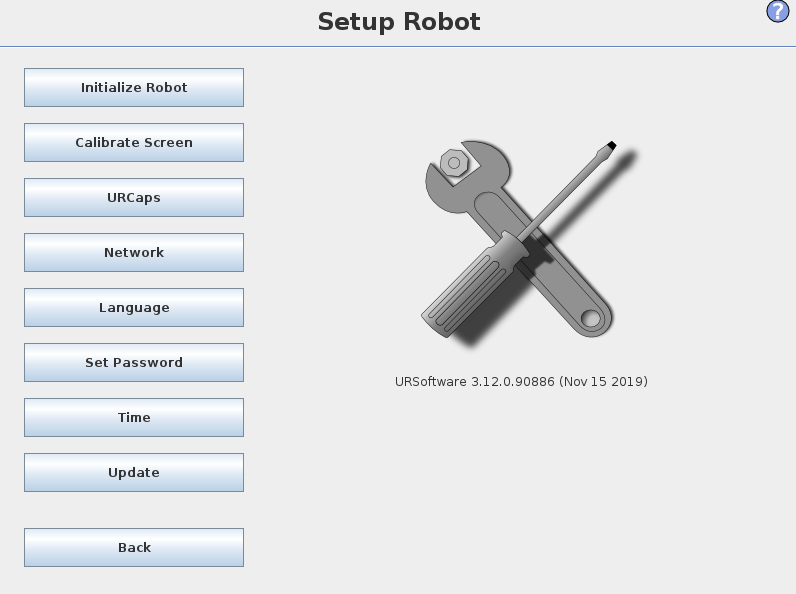
**The minimum ur software version of the plug-in is version 3.10.0.**

The following is the process of UR CB-series installation plug-in process:

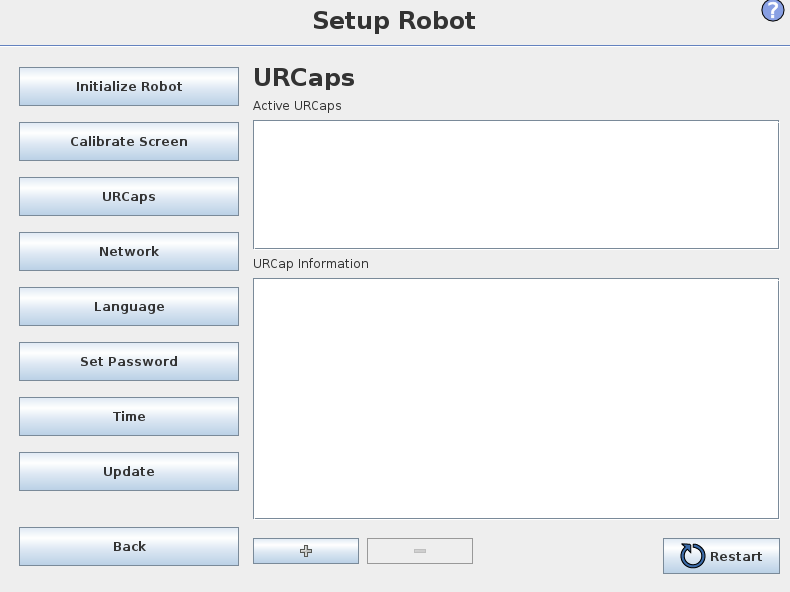
1. Plug in the DH USB stick in to the teach pendant.
2. Click the **Setup Robot** button on the home page.



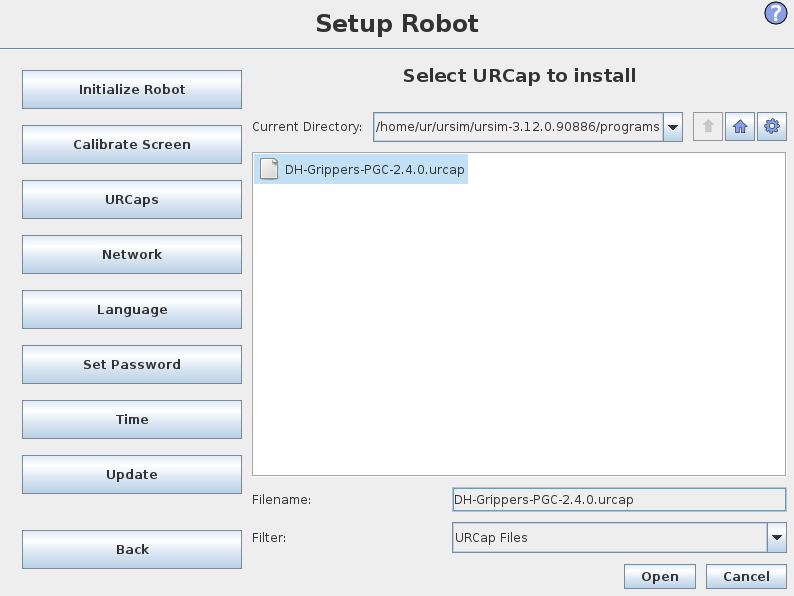
1. Select **URCaps**.



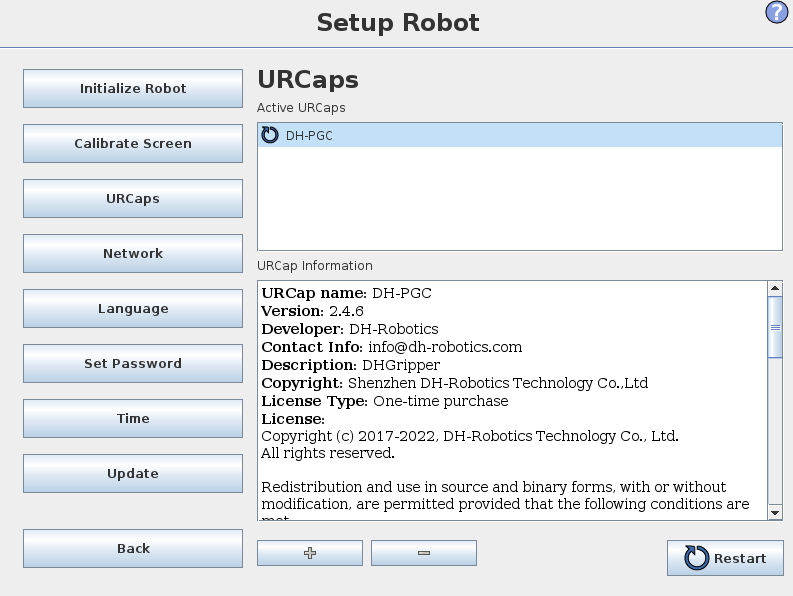
1. Click the **+** button on the URcaps page.



1. Select **DH-Robotics-PGC\_2.4.6.urcap** file in the usb disk. Click **Open** button.



1. Click **Restart** button to finish the installation.

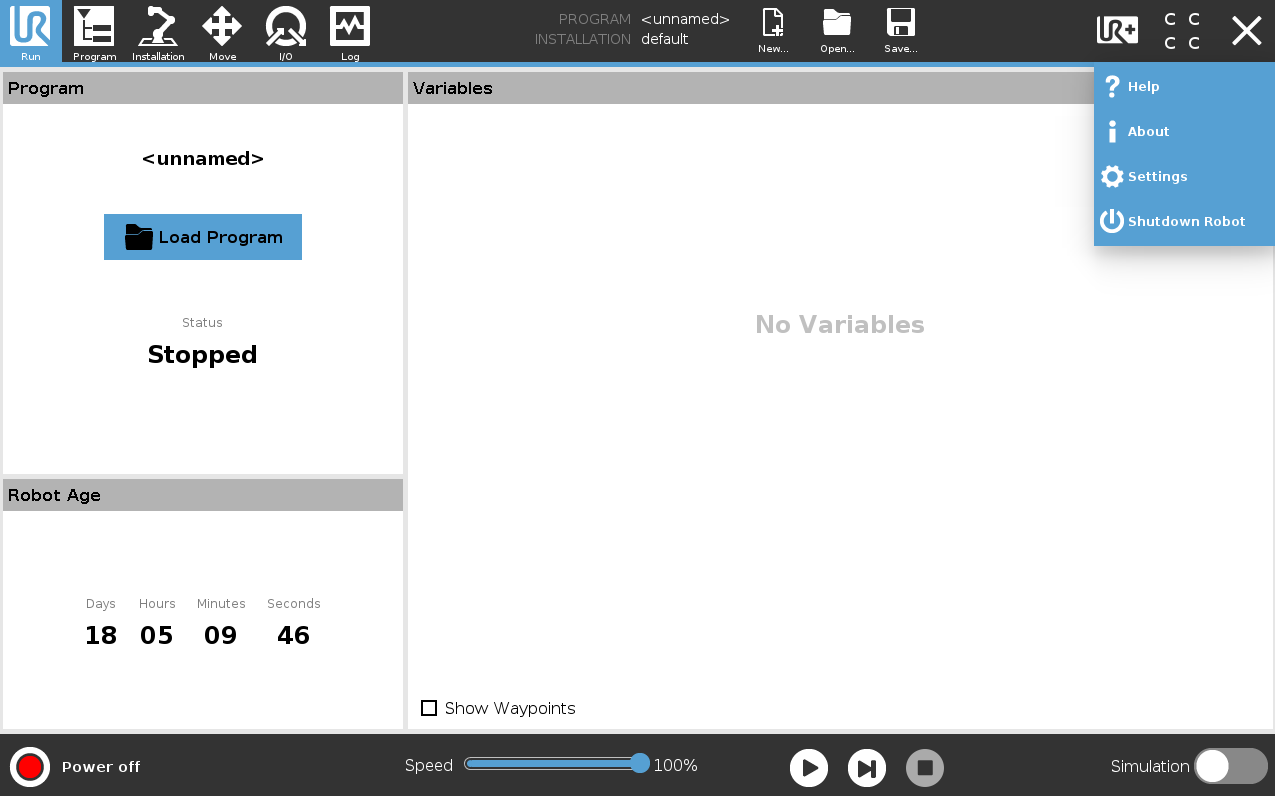


## Software Installation（UR E-series）

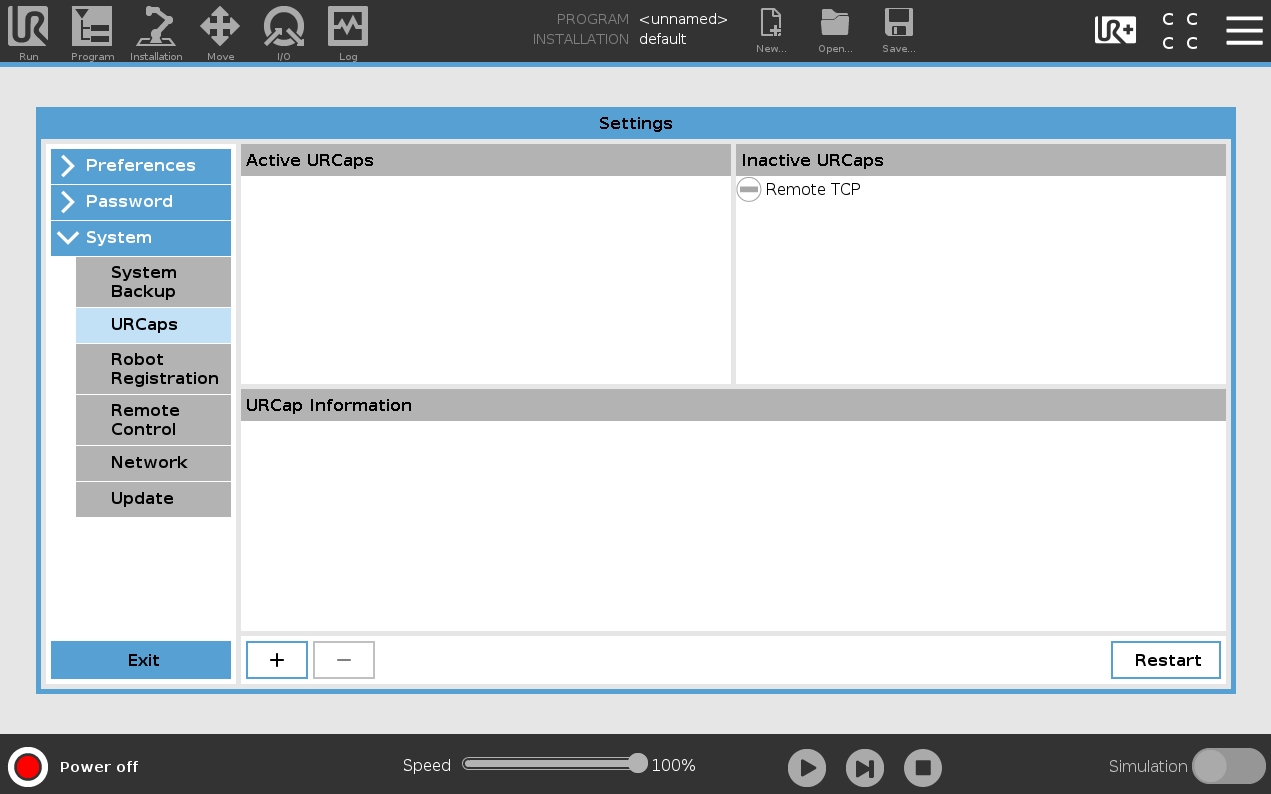
**Note: This version of the plug-in is compatible with the UR3 / 5 / 10 / 16 series;**

**The minimum ur software version of the plug-in is version 5.4.3**

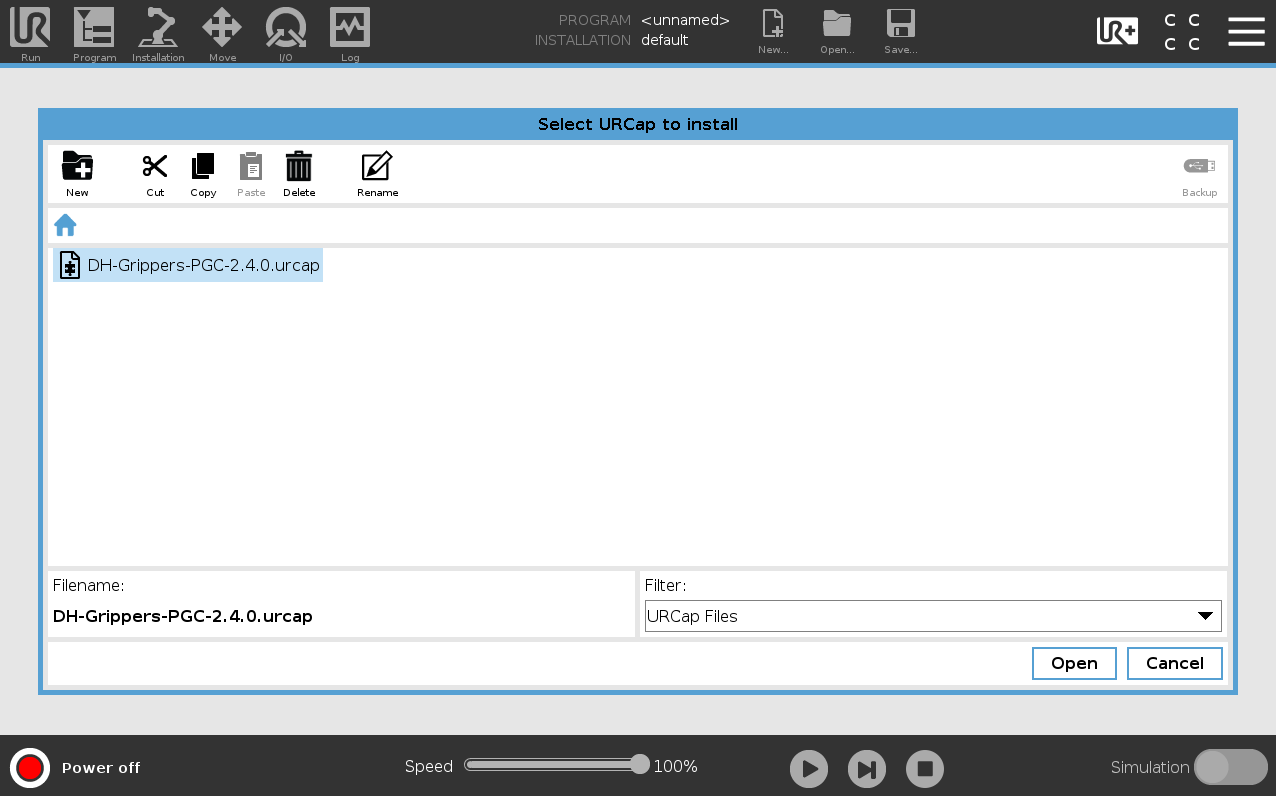
1. Plug in the DH USB stick in to the teach pendant.
2. Click Settings button on the upper right corner, as shown below.



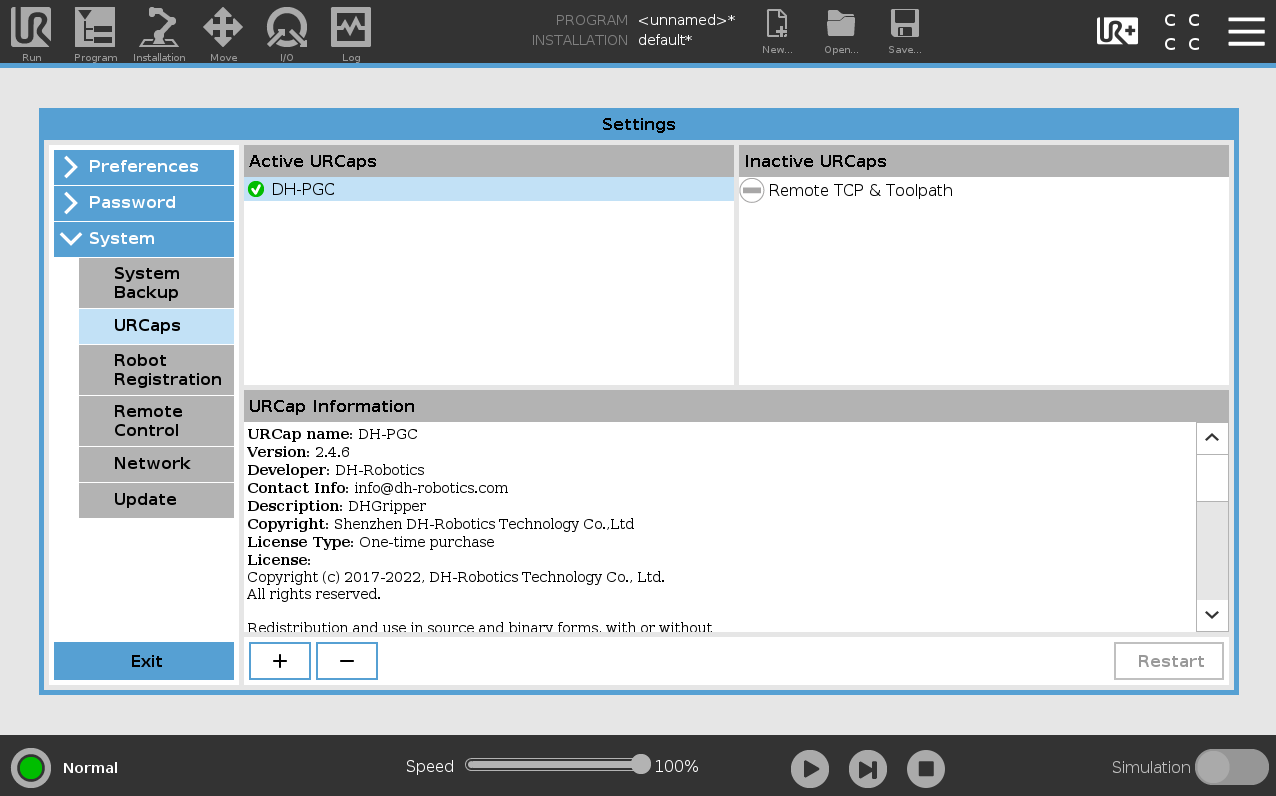
1. Click System -> URCaps. Click the “+” button.



1. Select the file “**DH-Grippers-PGC-2.4.6.urcap**”, click the open button. As shown below.

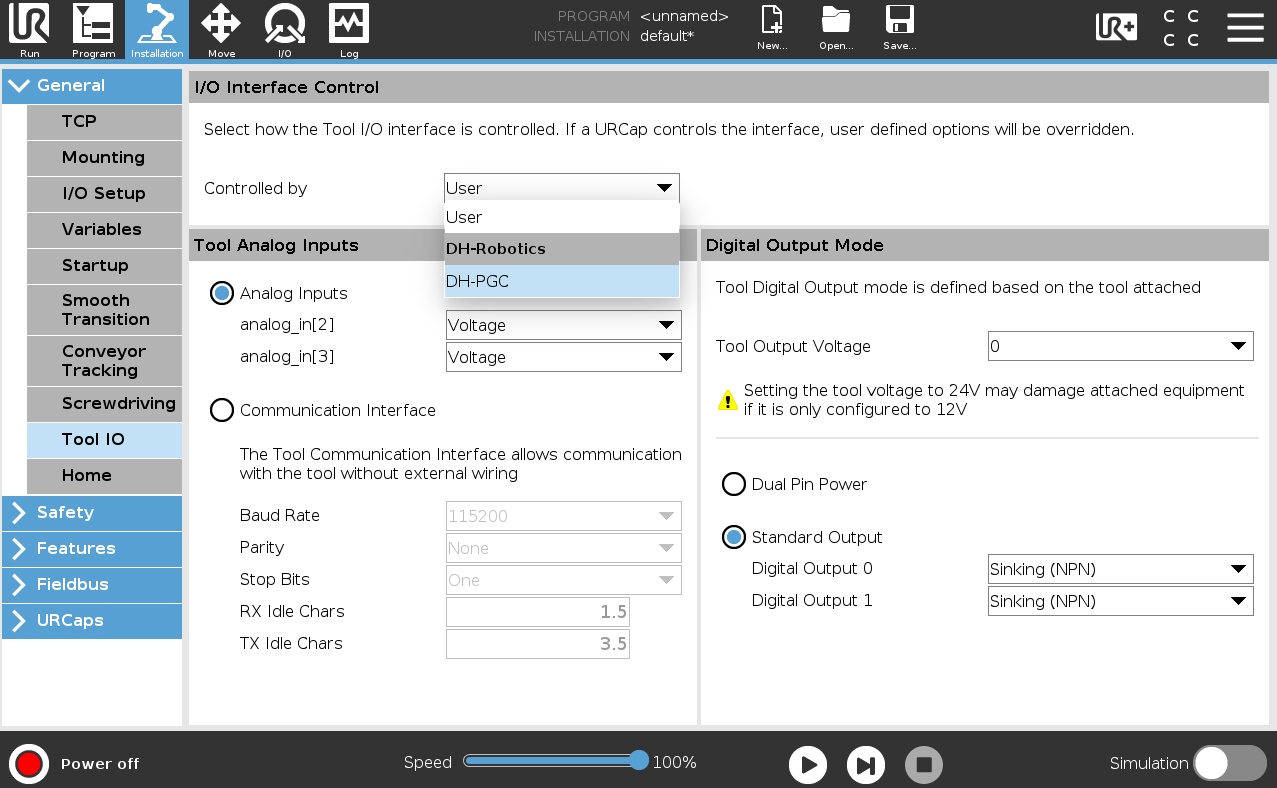


1. Click button Restart.



## Installation Instructions（Only E-series）

The DH gripper connect to the UR robot e-series wrist, please: Click the installation button. Select “General” -> “Tool IO” -> Controller “DH-PGC” in turn. As shown below.

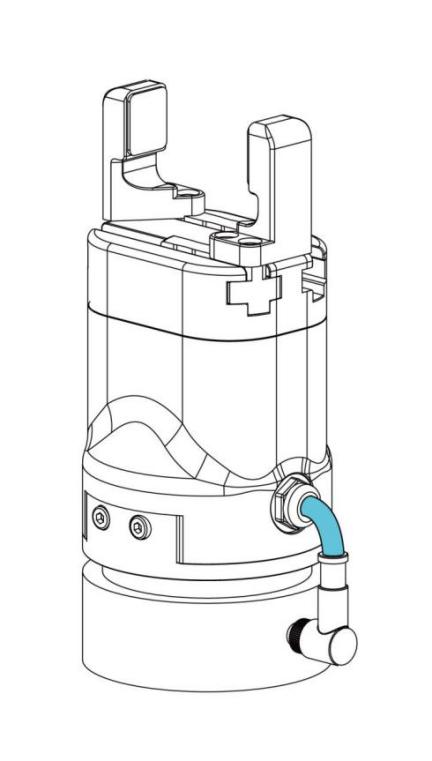


# Hardware Installation

## Tool IO connect

The PGC series gripper is mounted on the end of the robot, as shown.

The gripper is connected to the UR tool communication interface (TCI), and only URe robot.



## Control box connect

Power wire 24V and GND is accessed control box output power 24V DC regulator.

485A access 485 to USB converter T/R+;

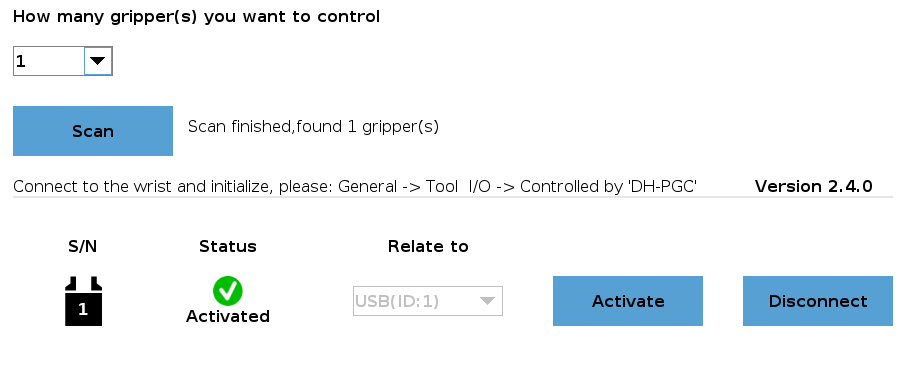
485B access 485 to USB converter T/R-, and 485 to USB converter access the control box.

图示

描述已自动生成

# URCap operating instructions

1. Click “URCaps” -> “DH-PGC” to set the gripper. As shown below.



**Gripper operation:**

·Select the number of grippers you want to control.

·Select the connection method on “Relate to”.

·Click the “Connect” button, wait for the “Status” from the connection method to “Connected”.

·Click the “Activate” button, wait for the gripper activated.

**The PGC indicator light provides instructions**

·**Inactivate**：The red light blink;

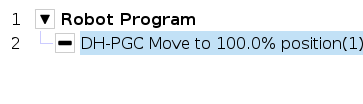
·**Activated**：Blue light constant;

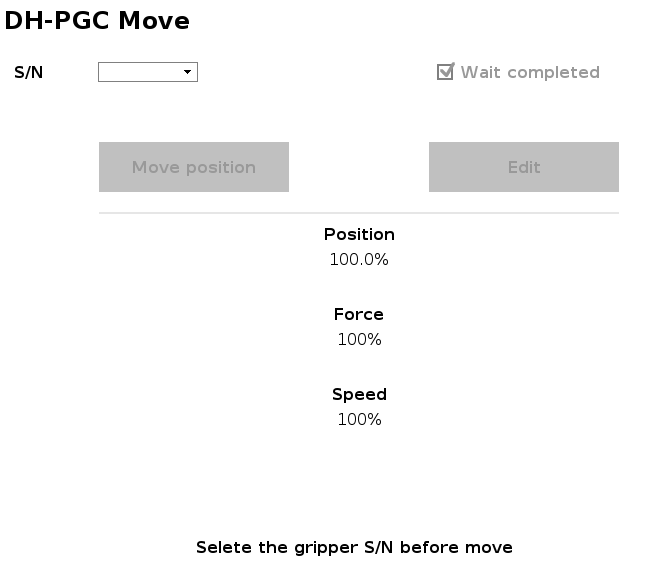
·**Read**：The red light blink quickly;

·**Detect object**：green light constant;

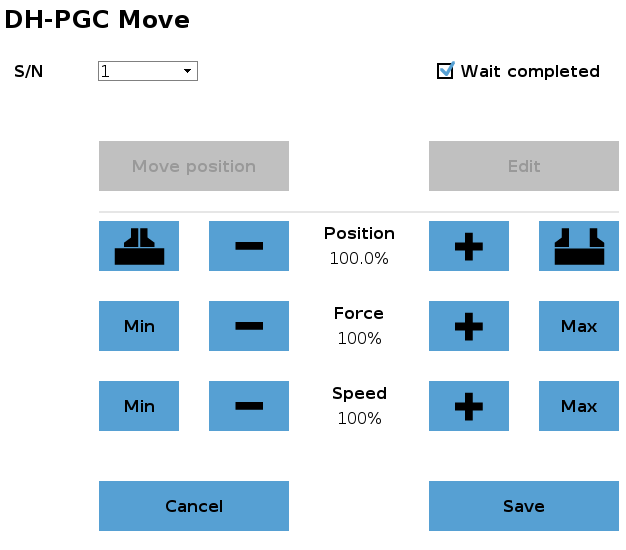
·**Dropped**：The green light blink.

1. Click the “URCaps” to get the plugin command, increase the “URCaps” plugin node int the program. For example, select the “DH-PGC Move” to increase a gripper control node.





1. Setting the gripper parameter for node。

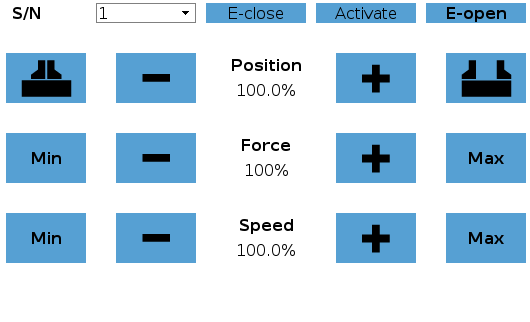


·Click “Edit” to set the position, force and speed.

·Click “Save” to save the current parameters.

·Click “Move position” to action the gripper.

1. Click the logic “UR+”, will open the quick debug wight, as shown below.



# Script

The script commands implement position control, read location, read feedback, and connection initialization commands, as shown in Table.

|  |  |  |
| --- | --- | --- |
| **Function** | **Script Format ①②** | **Note** |
| Scan device | dh\_pgc\_scan() |  |
| Is scanned | var = dh\_pgc\_is\_scanned() |  |
| Relate device | dh\_pgc\_relate\_device(Index, ConnectMode，DeviceID)  E.g dh\_pgc\_relate\_device(1,“TCI”，1) | **③** |
| Connect gripper | var = dh\_pgc\_connect(Index) |  |
| Disconnect gripper | var = dh\_pgc\_disconnect(Index) |  |
| Is gripper connected | var = dh\_pgc\_is\_connected(Index) | Return: True or False |
| Is object detected | var = dh\_pgc\_is\_gripped(Index) | Return: True or False |
| Is gripper activate | var = dh\_pgc\_is\_activated(Index) | Return: True or False |
| Gripper activate | dh\_pgc\_set\_activate(Index) |  |
| Set gripper’s position | dh\_pgc\_set\_position(Index,Position) | Position range:  0.0~100.0(%) |
| Get gripper’s position | var = dh\_pgc\_get\_position(Index) | Range: 0.0~100.0(%) |
| Set gripper’s force | dh\_pgc\_set\_force(Index,Force) | Force, range:  20~100(%) |
| Get gripper’s force | dh\_pgc\_set\_force(Index,Force) | Range: 20~100(%) |
| Wait for the gripper activated | dh\_pgc\_wait\_until\_activated(Index) |  |
| Wait for grip object | dh\_pgc\_wait\_until\_activated(Index) |  |
| Set gripper’s speed | dh\_pgc\_set\_speed(Index,Speed) | Speed range:  1~100(%) |
| Get gripper’s speed | var = dh\_pgc\_get\_speed(index) | Range: 1~100(%) |

**①**：In the script function "dh-xxx-function", “xxx” refers to the model number. AG series with "ag95", "pgc" for PGC series, and "pge" for PGE series.

**②**：In the script function, the parameters-index, the S/N of the gripper. Take S/N from the gripper number of the installation view, rather than the ID of the slave.

**③：**Script function “dh\_pgc\_relate\_device” parameter: ConnectMode, is select TCP/TCI/ USB. TCI is tool-communication-interface, USB is connect the control cabinet.

## In the following example, can refer to the 5.3 Sample to quickly add the script.

## Sample to the script of auto-connection initialization：

$ **Before start**

$ Wait：3.0 Power latency on boot

$ dh\_pgc\_scan() Script: Scan the device

$ Wait：3.0

$ dh\_pgc\_relate\_device(1, “USB”, 2) device is 1，connect mode is USB，ID is 2

$ Wait：1.0

$ dh\_pgc\_connect(1)

$ Wait：1.0

$ dh\_pgc\_set\_activate(1)

$ **Robot program**

……

……

$ dh\_pgc\_set\_position(1, 100.0)

……

……

## Sample to the script of gripper gripped：

$ **Robot program**

……

$ Is\_gripped:= False

……

$ dh\_pgc\_set\_position(1, 100.0)

$ Wait Is\_gripped = True

……

……

$ **Thread\_1**

$ Loop

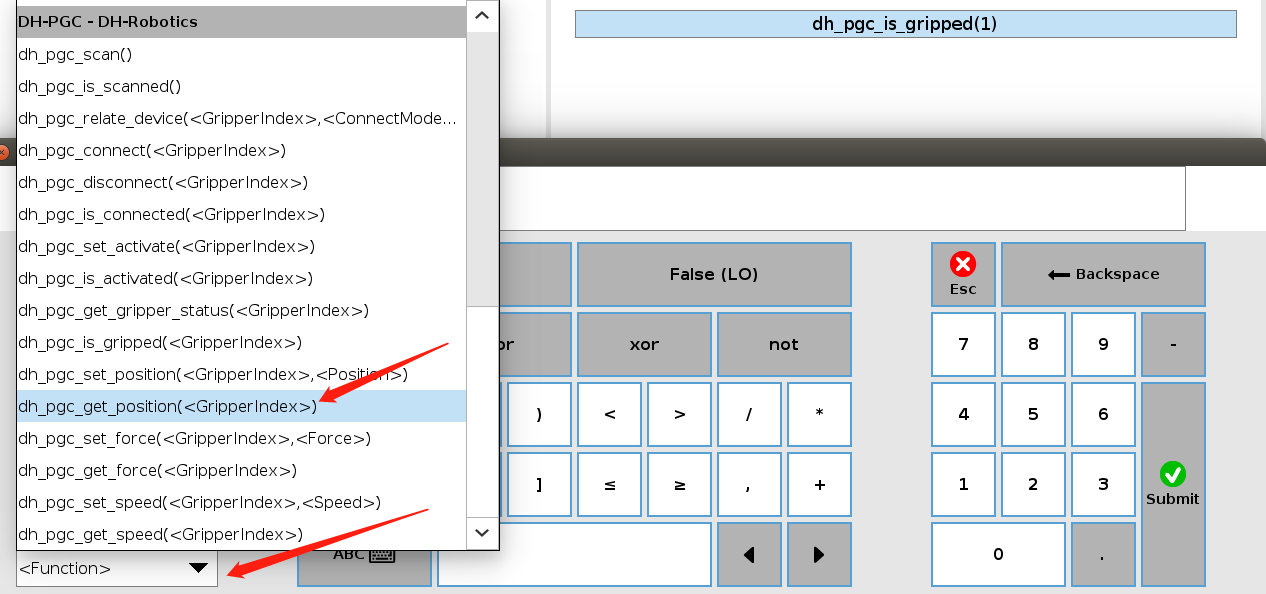
$ Wait 0.1

$ Is\_gripped = dh\_pgc\_is\_gripped(1) return True or False

……

……

## Sample to quickly add the script：



# Exception

1. READ EXCP / WRITE EXCP: Communication error. Please check the gripper wiring and power.
2. Select the gripper S/N before move: Operate error. Please select S/N.
3. Make sure connect the gripper before edit: Operate error. Please connect the gripper.
4. Make sure activate the gripper before edit: Operate error. Please activate the gripper.