

# Reference Manual

## for UNIVERSAL ROBOTS

Model: ARH305A/B, ARH350A

Rev. 1.03



This manual begins with Chapter 6.

Chapters 1 through 5 are described in the Quick Start Manual. Please refer to the Quick Start Manual for information on how to install the gripper, install plug-ins, and set up the installation.

## 6. Spcification

### 6.1. URCaps specification

#### Compatibility

- UR3e, UR5e, UR10e
- UR3, UR5, UR10 (CB3.1)

#### Software version required

- PolyScope 3.7 or higher (CB3.1) and 5.1 or higher (e-Series)

## 6.2. Parameter setting range

The setting range of each parameter is as follows. All communication operations are set in percentage.

tab page.1 I/O operating parameters

Item Name	Parameter Name	Units	scope
Wait	gripper operation standby time	msec	0 ~ 10000

tab page.2 communication operation parameter

Item Name	Parameter Name	Units	scope
Position	gripper target position	%	0 ~ 110(*1)
Torque	gripper positioning torque limit	%	15 ~ 100
Speed	gripper running speed	%	10 ~ 400(*2)
Grip Check Range Lower	grip error range lower limit	%	0 ~ 100
Grip Check Range Upper	grip error range upper limit	%	0 ~ 100
Push-in pos.	push amount	%	0 ~ 100
Push-in spd.	push speed	%	10 ~ 100
Push-in trq.	push torque limit	%	15 ~ 100
Auto Grip angle	automatic grip finger angle change amount	0.1 deg	1 ~ 10
Auto Grip trq	automatic grip starting torque	%	10 ~ 50



\*1 Gripper ARH305A should be used with the position not more than 100.

\*2 Gripper ARH350A cannot move fingers at high speed. If you set the speed to a value greater than 125, a warning will be displayed.

**Grip Check:**

- The Basic menu automatically sets the grip error range according to the selected action type (OuterGrip, InnerGrip).
- The Advanced menu automatically sets the grip error range when updating the target position.

**Push-In Operation:**

- Push operation is not available in the Basic menu.
- The Push Amount parameter sets how far in front of the Target Reach Position the push begins, expressed as a percentage of the Open Width.
- When the operation type is set to InnerGrip, the gripper is pushed to the open side.

**Automatic Grip:**

- The parameters for push-in operation are not displayed in the AutoGrip menu. Push-in operation is disabled.
- The unit for the finger angle change is 0.1 degree, so entering 10 will set the angle change to 1 degree.
- Starting torque can be set to 100%, but since the torque does not increase above 100%, the operation is equivalent to gripping with 100% force.
- Check the "HoldFinger" checkbox to hold finger position to prevent fingers from pushing the workpiece. Check the box if you want to protect the shape of the workpiece.

### 6.3. UR script

The UR script instruction provides several extensions.

The following instructions can be called from a PolyScope assignment or scripting command.



The “ShinanoARH” UR script communicates with the gripper.

Allow RS485 communication in the installation.

(\*Refer to “Quick Start Manual”)

**tab page.3 List of additional scripts**

Script Name	Function
<code>arh_get_position()</code>	Returns the current position of finger from 0% to 100%.
<code>arh_get_torque()</code>	Returns the output torque when the gripper is gripping in % units.
<code>arh_get_temperature_c()</code>	Returns the internal temperature of the gripper in degrees Celsius.
<code>arh_get_encoder()</code>	Returns the pulse count value of the built-in encoder. It is used to calculate how many angle of the gripper is closed compared to the pulse count of fully closed, fully open.
<code>arh_is_alarm()</code>	Returns True if the gripper detects an alarm. Returns False if successful.
<code>arh_is_grip_err()</code>	Returns True if the finger position of gripper is within the grip check range. Returns False if the gripping of workpiece is out of the gripping check range.
<code>arh_is_ready()</code>	Returns True if the gripper is complete or stopped. Returns False during positioning and pushing operation.
<code>arh_move(&lt;pos&gt;, &lt;trq&gt;)</code>	Move the gripper between 0% and 100% by specifying the position of finger and the grip force. It returns True if it is OK, False if it is NG.
<code>arh_move_and_wait(&lt;pos&gt;, &lt;trq&gt;)</code>	Move the gripper between 0% and 100% by specifying the position of finger and the grip force. And wait until the gripper is positioned. It returns True if it is OK, False if it is NG.

Script Name	Function
<code>arh_move_pos(&lt;pos&gt;)</code>	Move the gripper between 0% and 100% by specifying the position of finger. It returns True if it is OK, False if it is NG.
<code>arh_move_and_wait_pos(&lt;pos&gt;)</code>	Move the gripper between 0% and 100% by specifying the position of finger. And wait until the gripper is positioned. It returns True if it is OK, False if it is NG.
<code>arh_stop()</code>	The operating gripper is decelerated and stopped. Deceleration starts True if OK, False if already stopped.
<code>arh_set_speed(&lt;spd&gt;)</code>	Set the operating speed in the range of 10% to 400% before gripper operation. Returns True if the argument is normal, False if it is abnormal.
<code>arh_set_torque(&lt;trq&gt;)</code>	Set the gripping force in the range of 15% to 100% before gripper movement. Returns True if the argument is normal, False if it is abnormal.
<code>arh_set_grip_check_range(&lt;pos_lower&gt;, &lt;pos_upper&gt;)</code>	Set the lower and upper limits of the grip check position range in% before gripper movement. Returns True if the argument is normal, False if it is abnormal. The function also returns False if lower > upper is used.
<code>arh_set_push_in_data(&lt;pos_width&gt;, &lt;spd&gt;, &lt;trq&gt;)</code>	Set the parameters to enable pushing operation before gripper operation. The pushing amount <pos_width> is adjusted to start pushing by decelerating at a position a few percent short of the target position. Set the pushing speed and pushing force in % units. Returns True if the argument is normal, False if it is abnormal. If all arguments are 0, disable push operation and return True.

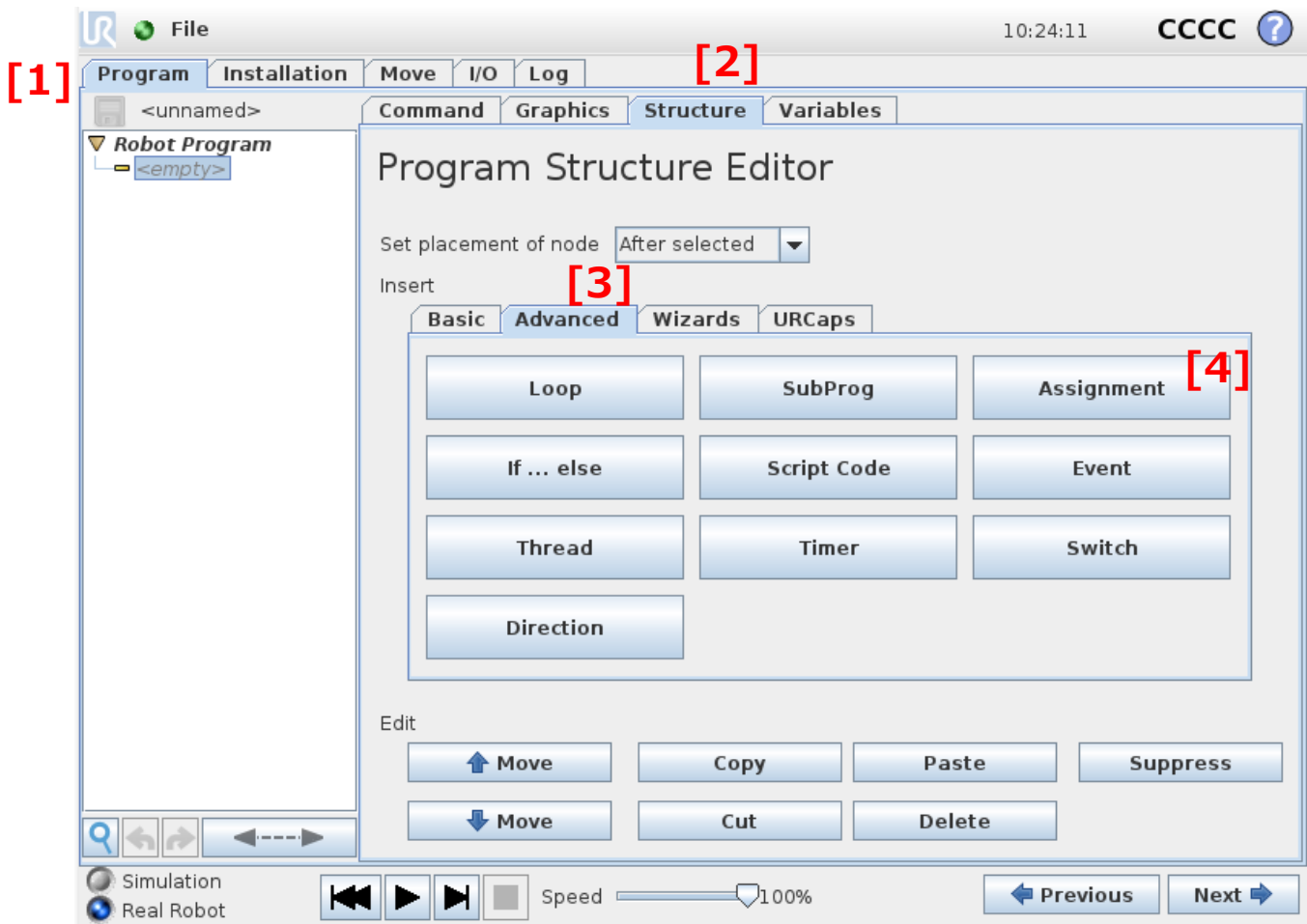
Script Name	Function
<code>arh_set_autogrip(&lt;mode&gt;, &lt;deg&gt;, &lt;trq&gt;)</code>	<p>Sets the parameter to allow the auto grip function before gripper operation.</p> <p>Output mode &lt;mode&gt; can be selected from 1 (keep torque) or 2 (hold finger position).</p> <p>The finger angle change amount &lt;deg&gt; is set in 0.1-degree increments. The starting torque &lt;trq&gt; sets the starting torque of the auto grip in %.</p> <p>If all arguments are 0, auto grip is disabled and True is returned.</p>
<code>arh_set_comm_id(&lt;ID&gt;)</code>	<p>Set the slave ID of the gripper with which the robot communicates. When connecting multiple grippers, you can switch IDs and send instructions to each gripper.</p> <p><b>* When the slave ID is switched by the ARH communication node, that setting takes precedence.</b></p>



### 6.3.1. Script execution method

Run the script with the "Assignment" or "Script Code" command.

#### <Example Assign Command (1/3)>



1. Open the program screen.
2. Tap "Structure".
3. Tap "Advanced" from the additional items.
4. Tap "Assignment".

## &lt;Example Assign Command (2/3)&gt;

**Assignment** [5]

Assigns the selected *variable* with the value of the *expression*.

**Variable** **Expression**

var\_1 [6]

**Input** <Input>

**Output** <Output>

**Variable** <Variable>

**Pose** <Pose>

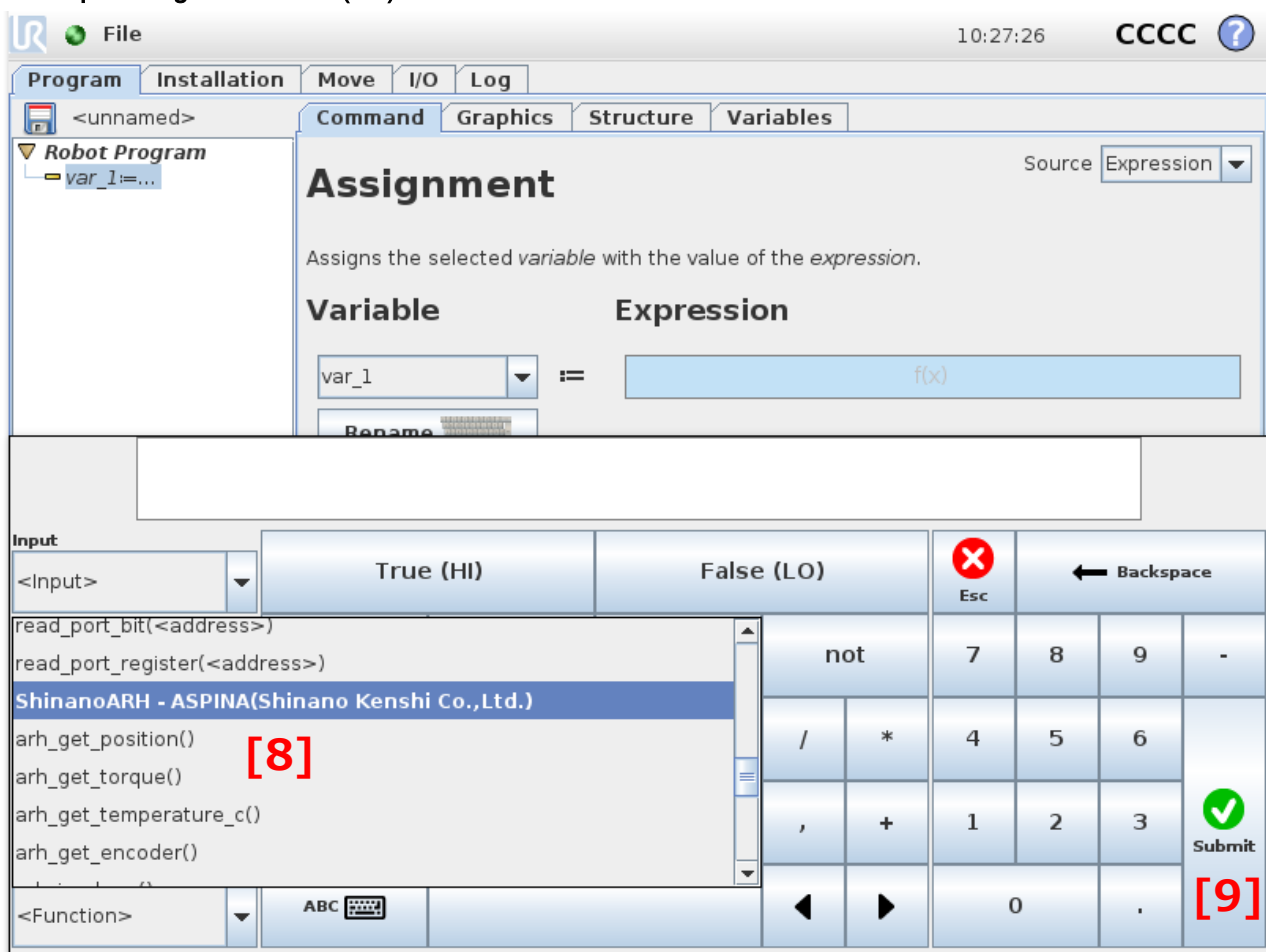
**Function** <Function> [7]

True (HI)		False (LO)					
and	or	xor	not	7	8	9	-
=	≠	(	)	<	>	/	*
-	"	[	]	≤	≥	,	+
ABC				◀	▶	0	.

Submit

5. Tap "Command".
6. Tap Expression field.
7. Tap Function.

## &lt;Example Assign Command (3/3)&gt;

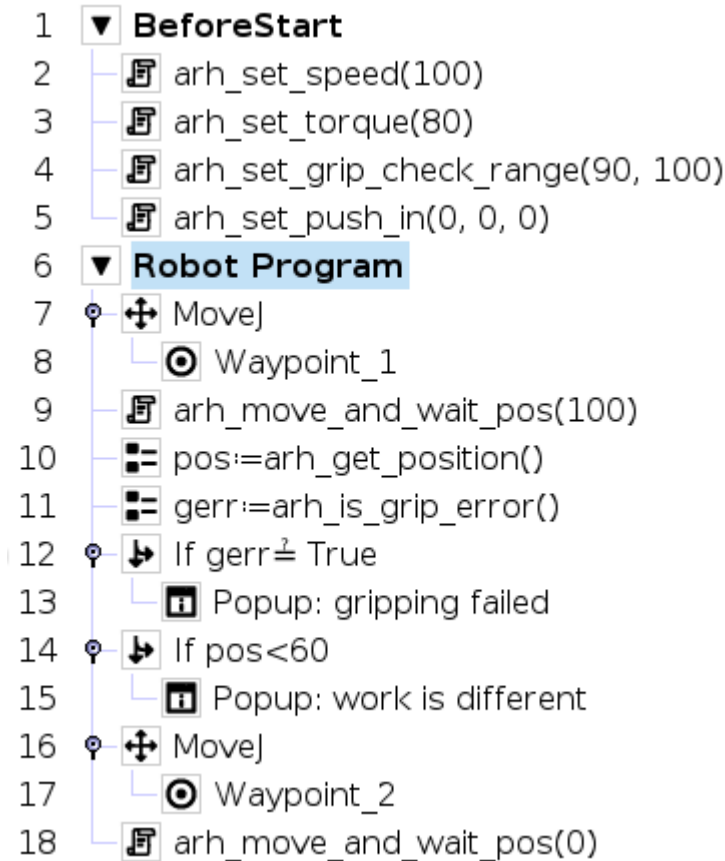


8. Select the script code you want to use from the function list.
9. Tap "Submit" button.

Now add the gripper script code to the program and store the result in variable "var\_1".

### 6.3.2. Script usage example

An example of a program using a script is shown below.

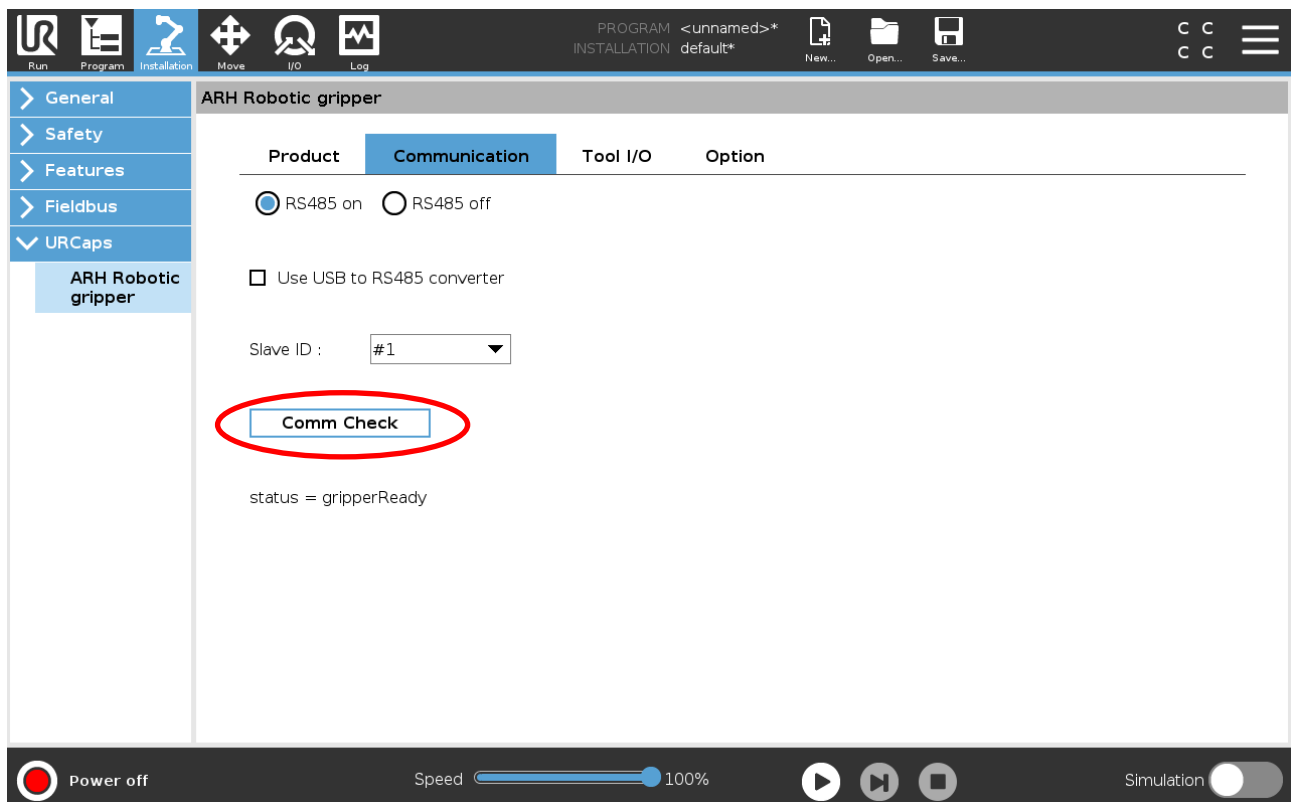


1. Before the robot program is executed, parameters such as operation speed, grip force and grip check must be set. (Lines 2 ~ 5)
2. MoveJ to waypoint 1. (Lines 7 ~ 8)
3. Move the gripper to the 100% position and wait for the positioning to complete. (Line 9)
4. The current position after the gripper movement is assigned to the variable pos, and the result of the grip check is assigned to the variable gerr. (Lines 10 ~ 11)
5. Displays the popup of "grasping failure" if the gerr variable is true, or displays the popup of "work differently" if the pos variable is less than 60%. (Lines 12 ~ 15)
6. MoveJ to waypoint 2. (Lines 16 ~ 17)
7. Move the gripper to the 0% position and wait for the positioning to complete. (Line 18)

## 6.4. Installation menu

### 6.4.1. Comm check

By tapping the “Comm Check” button on the Communication tab of the installation screen, you can perform a communication test.



Tap “Comm Check” to send a status inquiry command to the gripper and display the result.

The message displayed as a result of the communication test is as follows.

**tab page.4 Comm Check message**

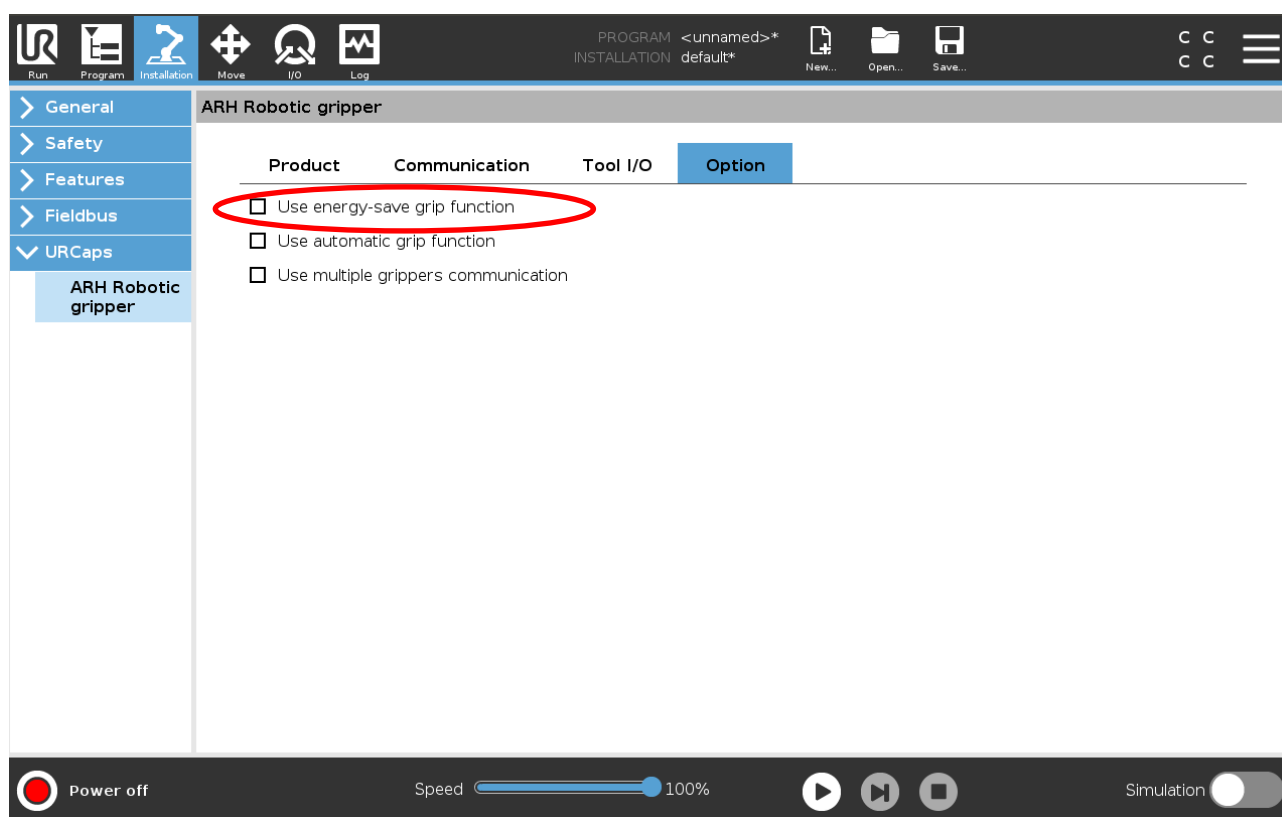
ERROR: command failure	Communication has failed. Check the wiring with robot and Slave ID setting.
status = gripperOff	The gripper is not energized. When no power is supplied, opening / closing operation to the gripper is not accepted.
status = alarm	The gripper has stopped abnormally. When it stops abnormally, it does not accept opening and closing movements to the gripper.
status = notHome	Home position return operation is not performed. It is necessary to detect the fully closed position and fully open position by home return operation.
status = gripperBusy	The gripper is busy. It is busy while opening / closing operation is being executed.
status = gripErr	The gripper is in a gripping failure state. The finger of gripper is located within the grip check range.
status = gripperReady	The gripper is ready. Open / close operation command is accepted.

## 6.4.2. Energy-save grip



The energy-save grip function cannot be used with the ARH305A / 305B.

You can enable / disable energy-save grip with the Option tab on the installation setting screen. However, energy-save grip is only available when "ARH350A" is selected as the gripper name and communication function is enabled.



Energy-save grip is a function that reduces the current supplied to gripper while gripper is holding the workpiece to reduce power consumption. Since it can also suppress heat generation, it also has the effect of preventing overheating.

When energy-save grip is enabled, the gripper is communicated with a command to allow energy-save grip at the start of robot program. On the contrary, if it is disabled, a command to prohibit energy-save grip is transmitted by communication.

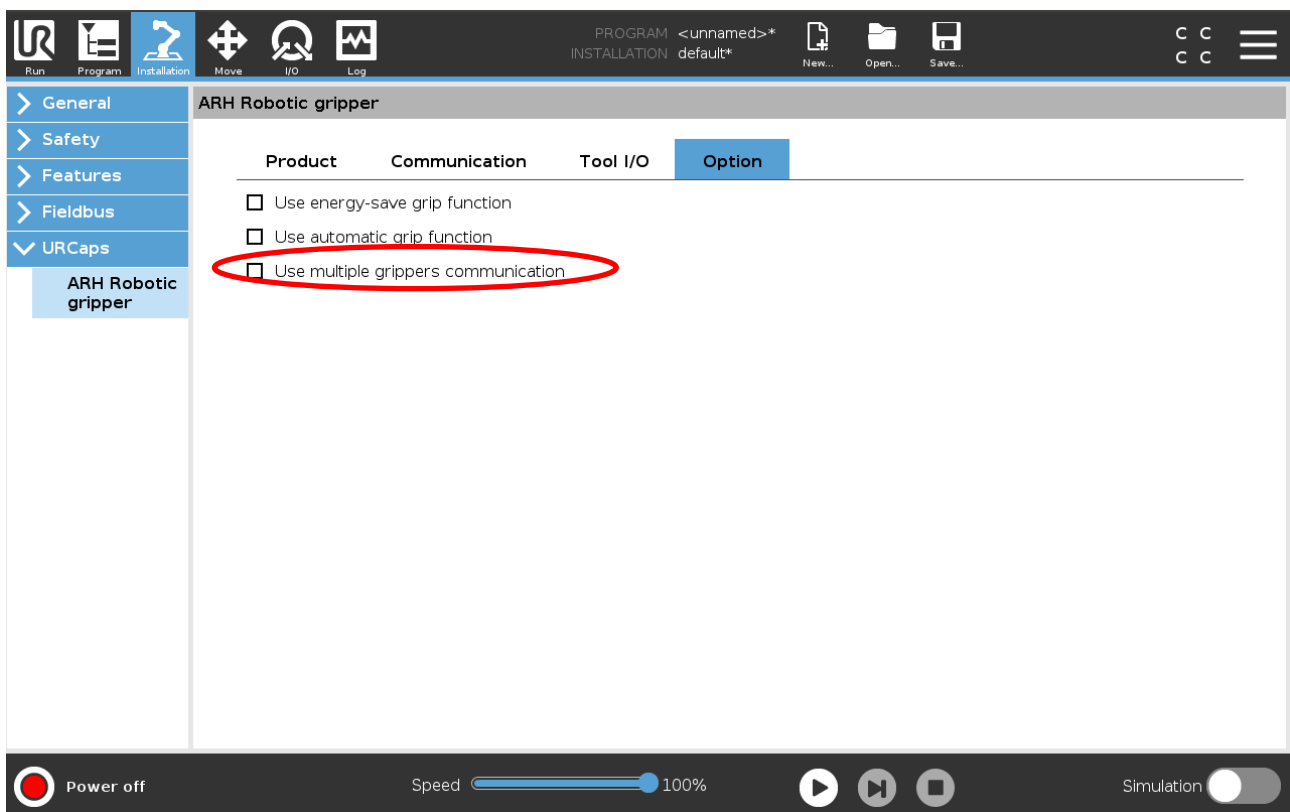
### 6.4.3. Multi grippers control



To do multi-grippers control,  
Please prepare a gripper with slave ID set to 2 in advance

Although limited to communication control, the robot can be connected to two grippers and ordered to close/open for each gripper. By controlling multiple grippers, it is possible to grasp and carry another workpiece while grasping the workpiece, which improves the work efficiency of the robot.

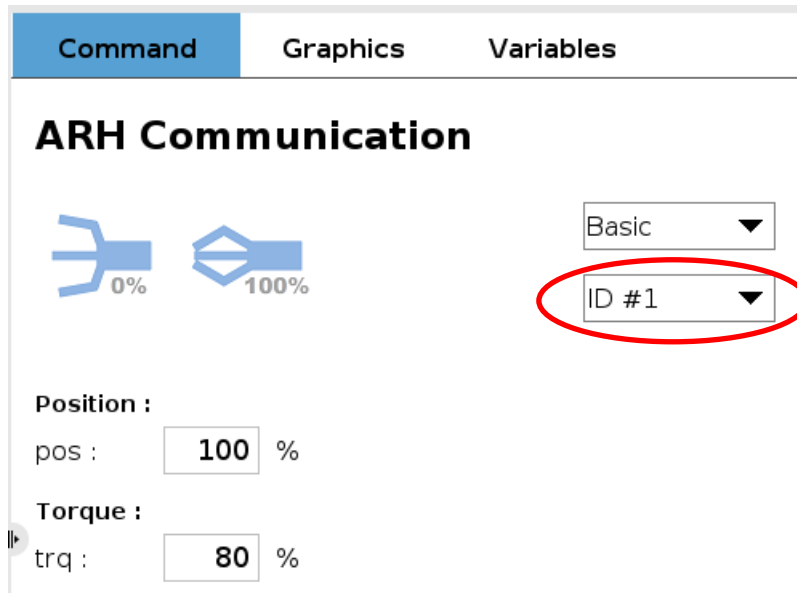
In the Options tab of the installation settings screen, you can enable multi-grippers control.



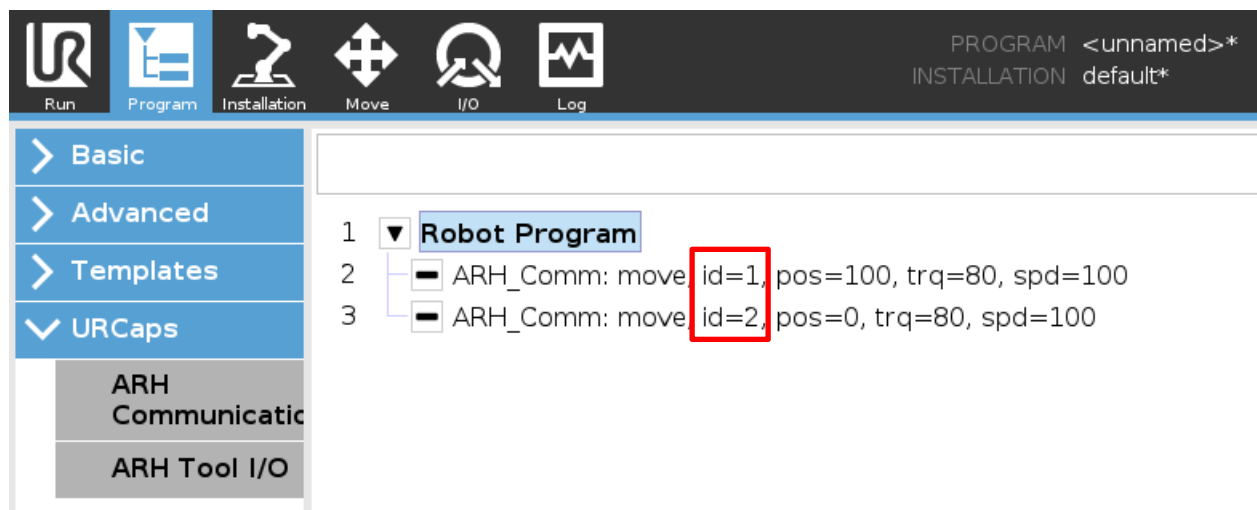


When multi-grippers control is enabled, a button is added to the command screen to select an ID. Go ahead and select the slave ID as #1 or #2.

The Grip Test button is enabled for the selected ID.



From the edit screen of the robot program, you can check which gripper the added node is the instruction for.



## 7. Additional Notes

### 7.1. ARH Tool I/O signal assignment

On the "Tool I/O" tab of the installation screen, select the input/output signals for the grippers. However, do not select any function without a circle in "URCap Enabled" in the table below.

tab page.5 input signal list

Signal Name	Functionality	URCap Enabled
SRV_ON	This signal switches between energizing and deenergizing the gripper.	-
HOME	This signal starts the open/close position detection operation.	-
DRIVE	The signal to start the grip.	-
STOP	The signal to interrupt the grip.	-
ALM_RST	This signal returns to the abnormal stop state.	-
SEL0	This signal is used to select the operation number and start the grip.	○
SEL1		○
SEL2		○

tab page.6 output signal list

Signal Name	Functionality	URCap Enabled
SRV	The signal is output while the gripper is energized.	-
READY	The signal is output while the gripper is energized and waiting.	-
ALARM	If an alarm occurs, stop the signal output.	○
GRIP_ERR	If holding fails, a signal is output.	○
AREA	If the tip of the gripper is within the area, the signal is output.	-

You can retrieve your gripper's internal settings by tapping the Load button on the installation screen. However, if communication is disabled, you cannot obtain the data. Check the input/output signal settings of the gripper before selecting the function.

You can also tap the "Save" button to overwrite the on-screen settings on the gripper.

The input/output signal switching takes effect after the power is turned on. Tap the Save button and restart the robotic gripper and PolyScope.

## 7.2. ARH Tool I/O grip pattern specification

Pattern 3 and pattern 4 of the grip pattern are valid only when "Tool output 1" on the installation screen is SEL

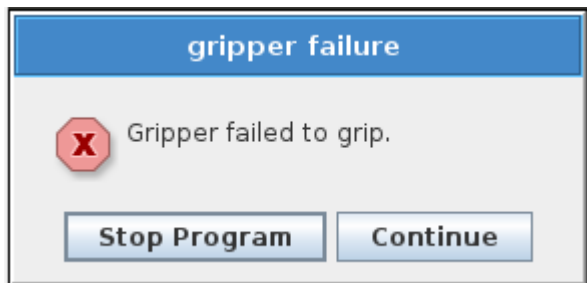
.\*

<div><div><input checked="" type="radio"/> Tool I/O on <input type="radio"/> Tool I/O off</div><div>Tool output 0 : <input type="text" value="SEL0"/></div><div>Tool output 1 : <input type="text" value="ALM_RST"/></div><div>Tool input 0 : <input type="text" value="GRIP_ERR"/></div><div>Tool input 1 : <input type="text" value="ALARM"/></div></div> <div>→</div> <div><div>Test pattern 1</div><div>Test pattern 2</div><div>Test pattern 3</div><div>Test pattern 4</div></div>	<div><div><input checked="" type="radio"/> Tool I/O on <input type="radio"/> Tool I/O off</div><div>Tool output 0 : <input type="text" value="SEL0"/></div><div>Tool output 1 : <input type="text" value="SEL1"/></div><div>Tool input 0 : <input type="text" value="GRIP_ERR"/></div><div>Tool input 1 : <input type="text" value="ALARM"/></div></div> <div>→</div> <div><div>Test pattern 1</div><div>Test pattern 2</div><div>Test pattern 3</div><div>Test pattern 4</div></div>
<div><div><input checked="" type="radio"/> Tool I/O on <input type="radio"/> Tool I/O off</div><div>Tool output 0 : <input type="text" value="SEL0"/></div><div>Tool output 1 : <input type="text" value="SEL1"/></div><div>Tool input 0 : <input type="text" value="GRIP_ERR"/></div><div>Tool input 1 : <input type="text" value="ALARM"/></div></div> <div>→</div> <div><div>Test pattern 1</div><div>Test pattern 2</div><div>Test pattern 3</div><div>Test pattern 4</div></div>	

## 8. Trouble Shooting

### 8.1. Program stop due to gripping failure

If a gripping failure is detected during program execution, the following pop-up screen is displayed.

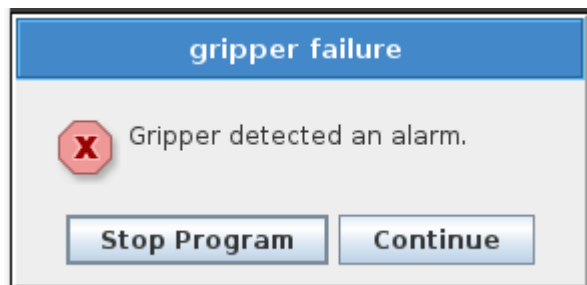


If a gripping failure is detected, stop the program immediately and correct the work position.

If it stops at a timing that does not indicate a gripping failure, check that "GripCheck" is not checked even though it is not necessary.

### 8.2. Program stop by alarm detection

If a gripper alarm is detected during program execution, the following pop-up screen is displayed.



If an alarm is detected, stop the program immediately and remove the cause of the alarm.

In addition, when the power is not supplied to the gripper, the ALARM signal output of the gripper is fixed to OFF, so the robot detects an alarm. Check if power is supplied to the gripper.

### 8.3. Program stop due to communication failure

If communication with the gripper is interrupted during program execution, the following pop-up screen is displayed.



If communication fails, stop the program immediately and check the following points in the installation settings.

- Check for USB-RS485 converter
- Whether the slave ID matches the internal setting value of the gripper
- Check that the tool IO communication settings are correct

If there is no problem with the settings, turn off the robot and check whether the robot and the gripper are connected correctly.

### 8.4. Program stop due to gripper identification

Only when communication is enabled, the model information of the gripper is acquired by communication at the start of the program.

If the model does not match the model selected on the installation setting screen, the following pop-up screen will be displayed.



If this pop-up screen appears, modify the gripper selection in installation settings.

## 8.5. Program stop due to automatic grip

"Automatic grip" is a function that the gripper automatically recognizes the hardness of the workpiece and optimizes the gripping force.

To use automatic grip, a gripper that supports automatic grip is required.

If you send an automatic grip command from the robot program to gripper that does not support automatic grip, the following popup screen will be displayed.



Old gripper cannot use communication commands related to automatic grip, so they return a communication error response.

If you see this pop-up screen, follow the steps below.

- Replace with automatic grip compatible gripper.
- Open the option tab from the installation screen, disable automatic grip, and modify the communication node.

## 9. URCaps Release Notes

### 9.1. ShinanoARH version 1.1.0

#### Specification change

- Multilingual support (English, Japanese only)
- Added UR script code
- Corrected notation such as "Enter Position:" -> "Position:"
- Change gripper image on ARH Tool I/O command screen
- Added "ARH350A" and "ARH250A" in model selection of installation, and when selected, limit speed to 100%

#### Bug fix

- Fixed the operation speed parameter not returning to 100% when the menu is changed from Advanced to Basic on the communication command screen.

### 9.2. ShinanoARH version 1.1.6 β

#### Specification change

- Add load/save button in gripper selection of installation screen.
- At the start of robot program, execute gripper identification processing only when communication is enabled.
- Added an option tab to the installation settings and added energy-save grip switching button.

#### Bug fix

- Corrected the phenomenon that communication failure occurs when the load button of tool I/O is tapped before executing the communication test on installation screen

### 9.3. ShinanoARH version 1.1.7 β

#### Bug fix

- Corrected the English notation of the gripper from "robot hand" to "robotic gripper" when the system language is other than Japanese.

#### 9.4. ShinanoARH version 1.2.0

##### Bug fix

- Fixed the program tree display being "ARH\_Comm" when Japanese was selected.

#### 9.5. ShinanoARH version 1.2.2

##### Specification change

- "ARH305B" is added to the product tab of the installation setting screen.
- Added the function to display "ARH305B" with the load button on the product tab when ARH305B is connected to the robot.

#### 9.6. ShinanoARH version 1.2.3 β

##### Specification change

- Changed the target position range of ARH Communication to 0-110[%].
- Changed the upper limit of speed to 125[%] when model selection is set to "ARH350A".

#### 9.7. ShinanoARH version 1.2.4 β

##### Specification change

- Added a checkbox to allow multi-grippers control in the communication tab of the installation settings.
- Added a combo box to select the slave ID on the command screen of ARH communication.
- Added script function "arh\_set\_comm\_id".

#### 9.8. ShinanoARH version 1.2.5 β

##### Specification change

- Added a fully close command button to the command screen of ARH communication.
- Added a fully open command button to the command screen of ARH communication.

#### 9.9. ShinanoARH version 1.2.6 β

##### Specification change

- Added a radio button to prevent auto-grip permission in the Options tab of the installation settings.
- Added auto-grip menu to the ARH communication command screen.



### 9.10. ShinanoARH version 1.2.7 β

#### Specification change

- In the Options tab of the installation setting, the selection functions of power saving gripping ON/OFF, auto grip ON/OFF, and multi-grippers communication ON/OFF are consolidated, and the radio button is changed to check box.
- Also changed to auto-grip selectable on ARH305B.

#### Bug fixes

- Fixed to ban because auto grip selection was allowed when the gripper name was indeterminate.

### 9.11. ShinanoARH version 1.2.8 β

#### Specification change

- Added script function “arh\_set\_autogrip”.

### 9.12. ShinanoARH version 1.2.9 β

#### Bug fix

- Fixed a bug that the value of the grip check range becomes strange when the position exceeds 100 in the communication node.
- Corrected the problem that the warning of the push-in operation parameter is displayed when the grip operation is set to inner grip when the position exceeds 100 in the communication node.

### 9.13. ShinanoARH version 1.2.10 β

#### Specification change

- Auto Grip mode selection changed from text box to check box.

## 9.14. ShinanoARH version 1.3.0

### Bug fix

- When multi gripper control is enabled and power saving grip is enabled, power saving grip is set for both slave ID1 and ID2 at the start of the robot program.

## Revision history

Date	edition	Contents
2019/10/08	0.00	first edition production
2019/10/18	0.01	<p>Corrected wiring diagram of Section 1.2 CB series controller box.</p> <p>Section 3.1 Communication and Tool I/O Setting</p> <p>Section 3.3 Add Tool Center Point (TCP)</p> <p>Section 5.1 Change heading to RobotHand I/O</p> <p>Section 5.1 Command Screen Updated</p> <p>Section 5.1 Modification of the Explanation of the Grasp Check</p> <p>Section 5.2 Change heading to RobotHand Communication</p> <p>Section 5.2 Adding Basic Menu and Advanced Menu to Communication Operation</p> <p>Section 5.2. 1: Add notes for TestGrip operations</p> <p>Updated the description of the grip check in Section 5.2.1.</p> <p>Updated the description of Item 5.2.2. grip check.</p> <p>Clause 5.2. 2 Updated the explanation of pushing operation.</p> <p>Added supplementary explanation about Section 5.2.3 Parameter</p>
2019/11/01	0.02	<p>Section 1.1 Illustration of mounting method added</p> <p>Chapter 2. Update installation screen</p> <p>Change Chapter 3 "ASPINA RobotHand" to ARH RobotHand</p> <p>Updated the tool I/O setting screen in Section 3.1.1.</p> <p>Updated RS485 setting screen in Section 3.1.2.</p> <p>Chapter 4. Update structure screen</p> <p>Section 5.1 "RobotHand I/O" was changed to "ARH Tool I/O".</p> <p>Section 5.1 Modify Drive Pattern Number to Grip Pattern Number</p> <p>Section 5.2 "RobotHand Communication" changed to ARH Communication</p> <p>Chapter 6. Adding Supporting Information</p>
2019/11/07	0.03	Section 3.2 Added "CB series" and "e series"
2019/11/07	1.00	Update revision to 1.00
2019/11/11	1.00.01	Chapter 7. Added troubleshooting
2019/11/29	1.00.02	<p>Chapter 2. Added URCaps installation notes.</p> <p>Section 3.3.2 Added e-Series TCP settings</p> <p>Added specifications to Chapter 6 and changed additional notes to Chapter 7</p> <p>Section 6.1 Add URCaps specification</p> <p>Section 7.3 Added explanation of communication check</p>
2020/02/07	1.00.03	<p>Section 6.3 Add UR script</p> <p>Chapter 9. Added URCaps Release Notes</p> <p>Revision history moved to Chapter 10</p>

Date	edition	Contents
2020/03/03	1.00.04	Update screen shot Section 6.3.1 Added script execution method Section 6.3.2 Added script usage example
2020/03/12	1.00.05	Section 9.1 Added specification changes
2020/04/13	1.00.06	Section 6.3 Descriptions in the script execution method
2020/04/24	1.00.07	Section 1.2.2 Added about RS485 communication of e series
2020/05/27	1.01	Update revision to 1.01
2020/07/15	1.01.01	ARH350A added to the target models Section 3.1.3 Added hand selection Section 3.3.3 Added TCP setting list for ARH305A and ARH350A Section 9.2 Added URCaps release notes
2020/09/04	1.01.02	Section 1.2 Wiring method is described separately for CB series and e series Section 8.4 Added description of program stop due to hand identification
2020/10/28	1.01.03	Swapped the contents of Sections 1.2.1 and 1.2.2 Swapped the contents of Sections 3.1 and 3.2 Swapped the contents of Sections 3.3.1 and 3.3.2
2020/10/30	1.01.04	Changed the communication check method in Section 7.3 to Section 6.4.1 Section 6.4.2 Added the item of Energy-save grip
2020/11/10	1.01.05	Corrected the English notation of gripper from "robot hand" to "robotic gripper" Chapter 8 Fixed screenshots on pop-up screen Section 9.3 Added URCaps release notes
2020/12/11	1.01.06	Section 9.4 Added URCaps release notes
2020/12/24	1.02	Update revision to 1.02
2021/01/20	1.02.01	Section 1.2 Changed words from "interface cable" to "robot cable"
2021/03/09	1.02.02	Section 1.1 Added notes on attaching the cable holder Section 3.3.3 Added TCP setting list for ARH305B Section 9.5 Added URCaps release notes
2022/01/05	1.02.03	Section 6.2 Changed the range of target position to 0-110 Section 6.2 Added a note on the target position of ARH305A Section 9.6 Added URCaps release notes

Date	edition	Contents
2022/04/06	1.02.04	Section 6.3 Added Script "arh_set_comm_id". Section 6.4.3 Added Multi-grippers Control Section 9.7 Added URCaps Release Notes
2022/05/20	1.02.05	Section 1.2 Changing the Format of the Wiring Method Description Section 3.1 Updated Tool I/O Configuration Description Section 3.2 Updated description of installation settings Section 5.2 Changing the image to e-series Section 6.1 Modifications to Software Version Terms Section 6.4 Changing the Image to the E-Series Section 9.8 Added URCaps Release Notes
2022/09/21	1.02.06	Section 5.2.3 Added Auto Grip Menu Section 6.2 Added Auto Grip Related Parameters Section 9.9 Added URCaps Release Notes.
2022/09/27	1.02.07	Section 9.10 Added URCaps Release Notes.
2022/10/03	1.02.07.1	Separated chapters 6 and following from the Quick Start Manual Document name changed to Reference Manual
2022/11/02	1.02.08	Section 6.3 Added Script "arh_set_autogrip". Section 9.11 Added URCaps Release Notes.
2022/11/11	1.02.09	Section 9.12 Added URCaps Release Notes.
2022/11/17	1.02.10	Section 6.2 Added explanation of Auto Grip parameters. Section 9.13 Added URCaps Release Notes.
2022/11/24	1.03	Section 8.5 Added troubleshooting of auto grip. Section 9.14 Added URCaps Release Notes.