



Operation Manual

PRODUCT NAME

Air gripper for collaborative robots

MODEL / Series / Product Number

RMH* Series

—Software (URCap)—

SMC Corporation

Contents

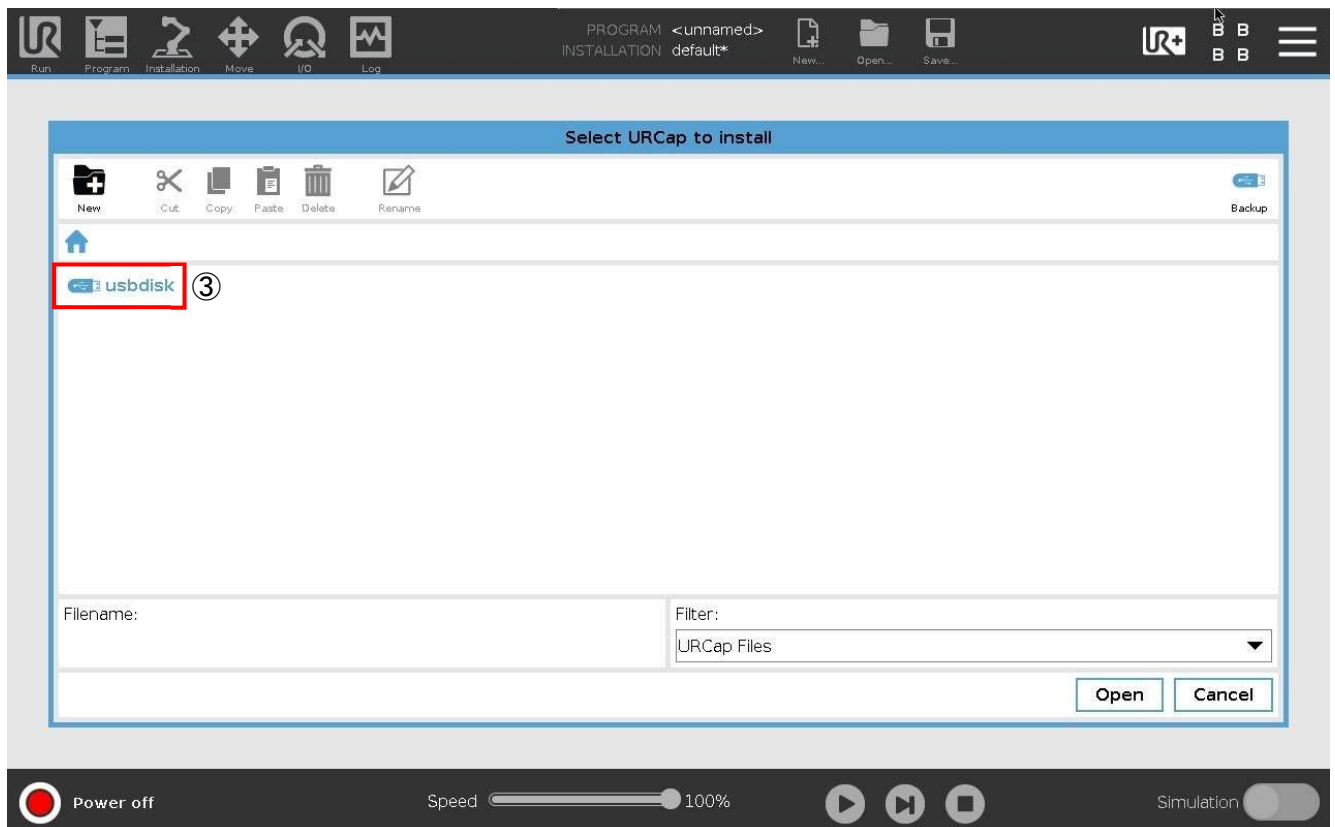
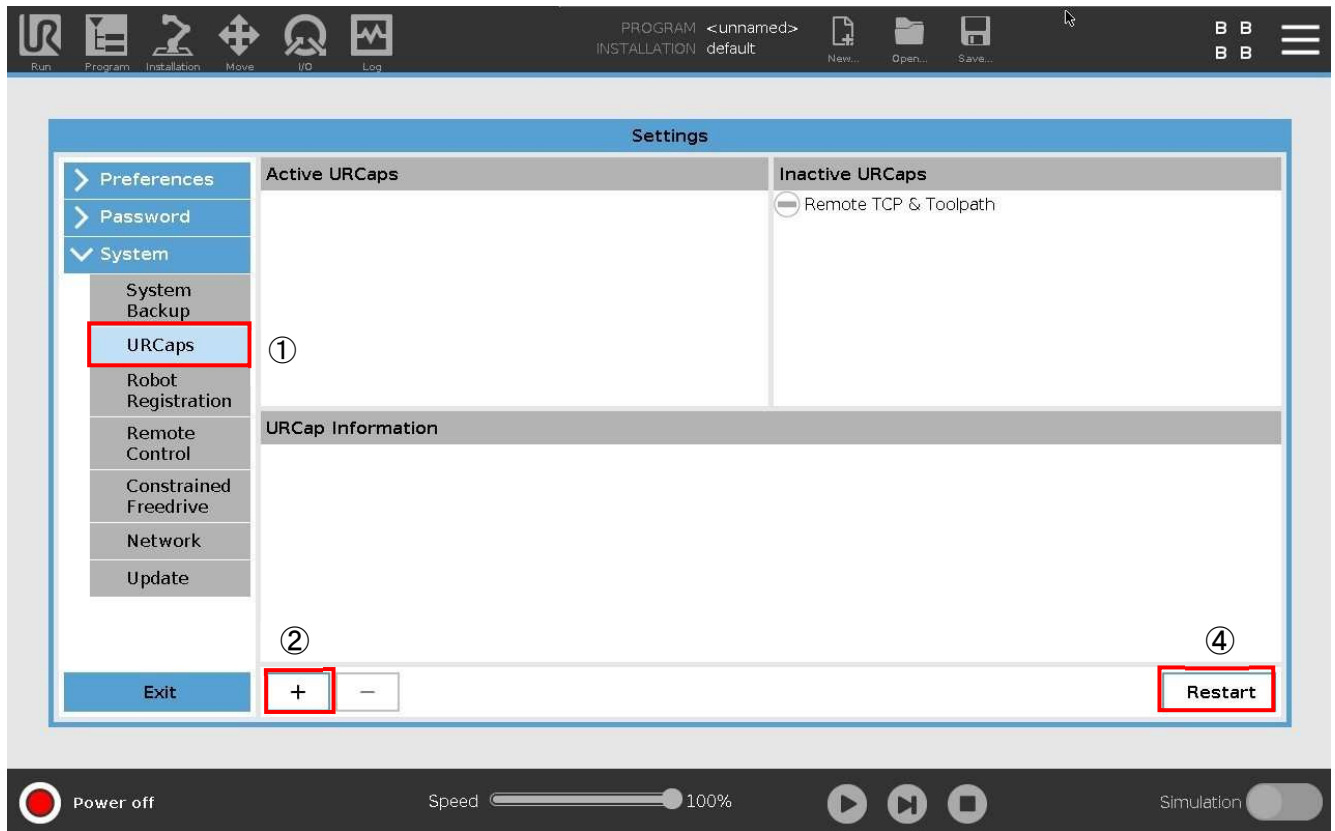
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1. How to Download Software

Various types of software can be downloaded from SMC's website (<https://www.smcworld.com>). Search the product number (RMHZ, RMHS, etc.) on the TOP page and proceed to the detail page to download the software.

2. Install

- ① Tap the "URCaps" menu from the robot settings screen.
- ② Insert the USB memory with a copy of the downloaded file (SMC-AirGripper-RMH-xxx.urcap) into the teaching pad and tap the "+" button.
- ③ Select "SMC-AirGripper-RMH-xxx.urcap" from the file screen and tap the "open" button.
- ④ Tap the "Restart" button to restart the robot.



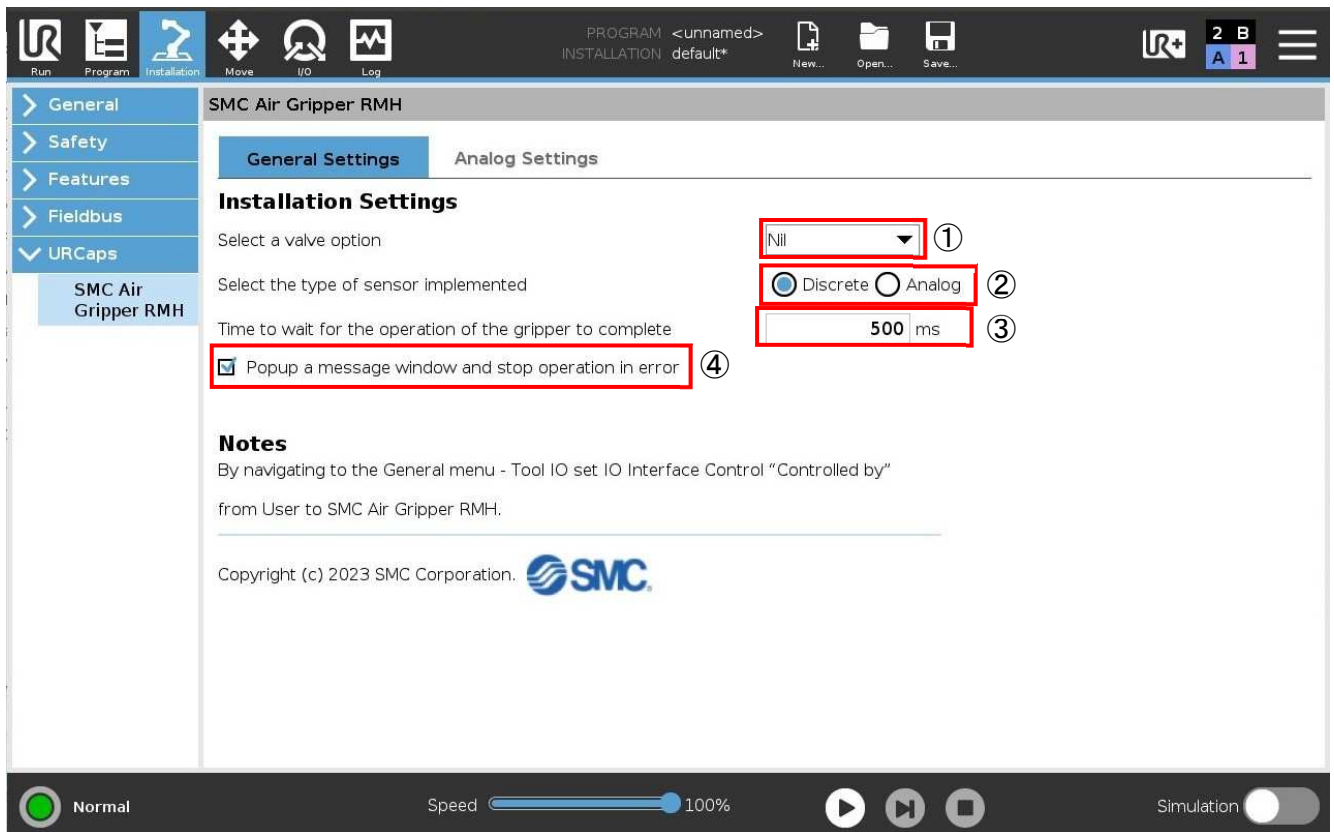
3. Basic setting

3-1. I/O Interface Control

The screenshot displays the 'I/O Interface Control' configuration window. The 'Controlled by' dropdown menu is open, showing the following options: 'User', 'SMC Corporation.', and 'SMC Air Gripper RMH'. The 'SMC Air Gripper RMH' option is highlighted with a red box. The 'Analog Inputs - Communication' section is selected, and the 'Communication Interface' radio button is chosen. The 'Digital Output Mode' section shows 'Standard Output' selected, with 'Digital Output 0' and 'Digital Output 1' both set to 'Sourcing (PNP)'. A warning message is visible: 'Setting the tool voltage to 24V may damage attached equipment if it is only configured to 12V'. The bottom status bar indicates 'Power off', 'Speed' at 100%, and 'Simulation' is turned off.

In the “Tool I/O” setting under the “General” menu in the “Installation” tab, select “SMC air gripper RMH” from “I/O Interface Control” in the “Analog inputs” drop-down.

3-2. Basic setting



Select "SMC Air Gripper RMH" under the "URCaps" menu for basic settings.

- ① "Select a valve option"
Select the symbol corresponding to the valve option of the purchased product from the pull-down list.
No symbol ⇒ NIL
O(Normally open) ⇒ N.O.
C(Normally closed) ⇒ N.C.

【Example of part number】

RMHZ2-20D-011PO-NDE

The symbol at the end of the underlined part is the valve option symbol.

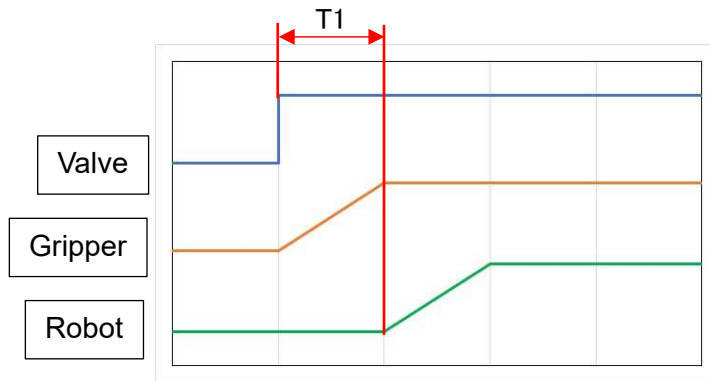
- ② "Select the type of sensor implemented"
The item to be selected depends on whether the purchased product is equipped with an auto switch or a position sensor.
Auto switch ⇒ "Discrete"
Position sensor ⇒ "Analog"
The "Analog Setting" tab is enabled when the "Analog" is selected.

【Example of part number】

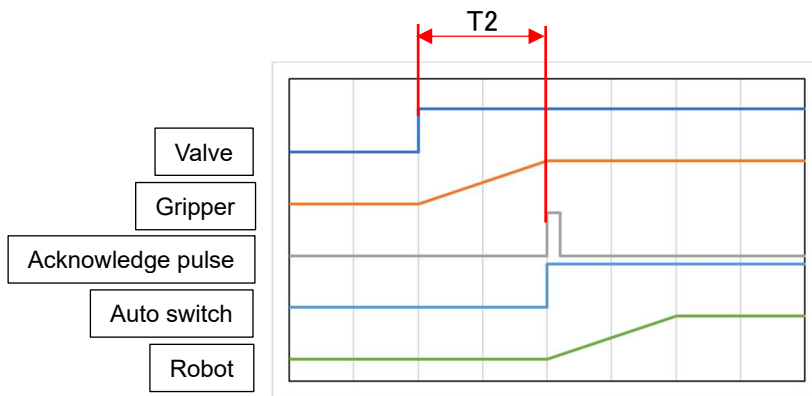
RMHZ2-20D-011PO-NDE

The symbol of the 4th digit refers to an auto switch when it is N or P and a position sensor when it is A.

- ③ “Time to wait for the operation of the gripper to complete”
 If the NODE is “OPEN ONLY NODE” or “CLOSE ONLY NODE” (see p. 13 to p. 15 for NODE), the delay time T1 between outputting the valve switching signal and the transition of the robot to the next operation can be set.



If the NODE is “OPEN AND CHECK SIGNAL NODE” or “CLOSE AND CHECK SIGNAL NODE,” the delay time T2 between outputting the valve switching signal and checking the auto switch input signal can be set.



Enter the appropriate value according to the opening/closing speed of the finger by adjusting the metering valve.

【Example 1】 Set value 500ms, “OPEN ONLY NODE” or “CLOSE ONLY NODE”.

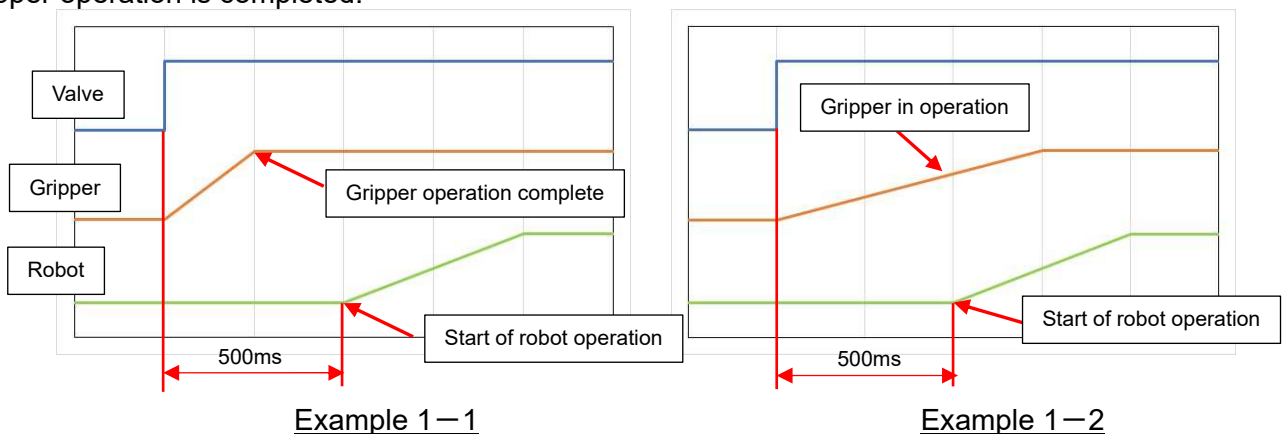
When the valve switching signal is output, the robot operation moves to next operation in 500ms.

Case 1 :If the gripper operation time is less than 500ms

The robot will transition to the next operation when 500ms has passed even if the gripper has completed its operation in less than 500ms from the valve switching.

Case 2 :If the gripper operation time is 500 ms or longer

It is necessary to be careful because the robot will transition to the next operation before the gripper operation is completed.



【Example 2】 **Set value 500ms.** “OPEN AND CHECK SIGNAL NODE” or “CLOSE AND CHECK SIGNAL MODE”.

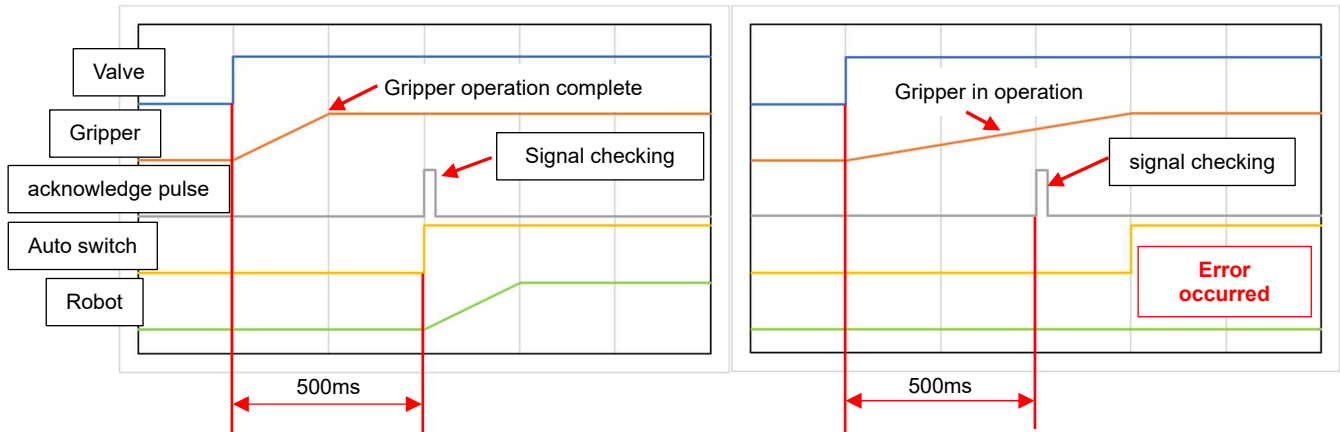
500ms after the valve switching signal is output, the auto switch signal will be checked and the gripper transitions to the next operation.

Case 1: When the gripper operating time is less than 500ms.

The auto switch signal will be checked when 500ms has passed even if the gripper has completed its operation in less than 500ms from the valve switching.

Case 2: When the gripper operating time is 500ms or more

The auto switch signal will be checked when 500ms have passed even if the gripper is still in operation. An error will be generated when the auto switch signal cannot be checked at that time.



Example 2-1

Example 2-2

④ “Popup a message window and stop operation in error”

When a check mark is entered in the check box, a pop-up message will be displayed and the program currently running will be stopped when an error occurs during program execution.

4. Manual operation

From the “UR+” icon in the upper right corner of the screen, the manual operation of the gripper can be checked. The gripper will perform an open / close operation when the “Open” or “Close” button is tapped.

4-1. For auto switch option

The auto switch reaction of open or close can be checked by “Monitor sensor signal.”

The screenshot displays the SMC Air Gripper RMH software interface. The top menu bar includes icons for Run, Program, Installation, Move, I/O, and Log, along with program information (PROGRAM <unnamed>, INSTALLATION default*) and file management options (New..., Open..., Save...). The main window is divided into three sections:

- Left Panel:** A navigation menu with options: General, Safety, Features, Fieldbus, URCaps, and SMC Air Gripper RMH.
- Center Panel:** Titled "SMC Air Gripper RMH", it contains "General Settings" and "Analog Settings" tabs. Under "Installation Settings", there are options to "Select a valve option", "Select the type of sensor implemented", and "Time to wait for the operation of the gripper to complete". A checkbox is checked for "Popup a message window and stop operation in error". A "Notes" section provides instructions: "By navigating to the General menu - Tool IO set IO Interface Control from User to SMC Air Gripper RMH." The SMC logo and copyright notice "(c) 2023 SMC Corporation." are also present.
- Right Panel:** Titled "SMC Air Gripper RMH", it features a "Commissioning" section with the instruction "Click Open or Close below to test the operation" and two buttons: "Open" and "Close". Below this is the "Monitor sensor signal" section, which includes two radio buttons: "Open position switch" and "Close position switch". Red arrows point from a box labeled "Auto switch response confirmation light" to these two radio buttons.

The bottom status bar shows a "Normal" mode indicator, a "Speed" slider set to 100%, and a "Simulation" toggle switch.

4-2. For position sensor option

The stroke positions of the finger can be checked by the “Monitor sensor signal.”

The screenshot displays the SMC software interface for configuring an SMC Air Gripper RMH. The interface is divided into several sections:

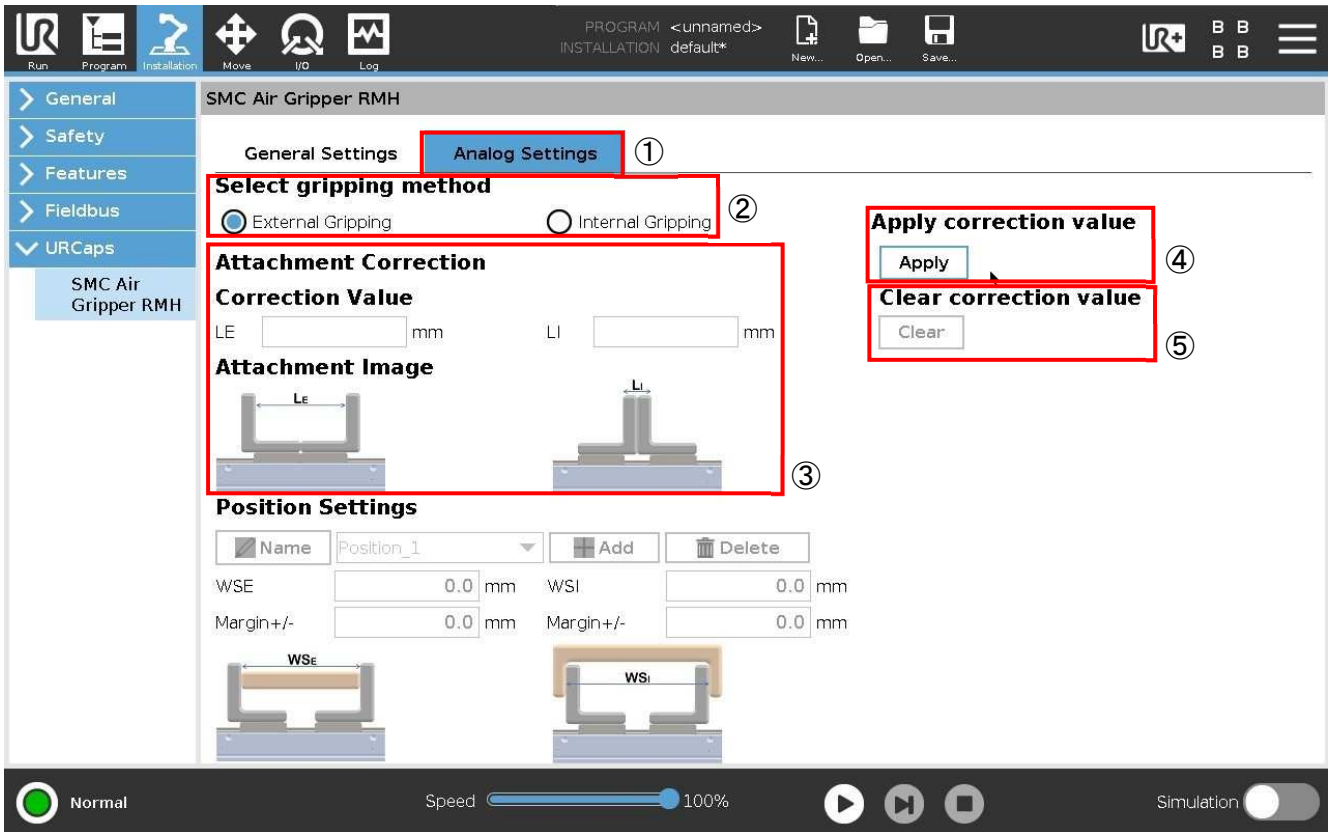
- Top Bar:** Includes icons for Run, Program, Installation, Move, I/O, and Log. It also shows the current program name as "<unnamed>" and the installation name as "default*".
- Left Panel:** A navigation menu with options: General, Safety, Features, Fieldbus, and UR Caps. The "SMC Air Gripper RMH" option is selected.
- Main Panel (Left):** Titled "SMC Air Gripper RMH", it contains "General Settings" and "Analog Settings" tabs. Under "Installation Settings", there are instructions to select a valve option and a sensor type, and a checkbox for "Popup a message window and stop operation in error" which is checked. A "Notes" section provides instructions on navigating to the General menu.
- Main Panel (Right):** Titled "SMC Air Gripper RMH", it includes a "Commissioning" section with "Open" and "Close" buttons. Below this is the "Monitor sensor signal" section, which displays "Sensor Position : 64.0 mm". A red arrow points from a callout box to this value.
- Bottom Bar:** Shows the simulation status as "Normal", a "Speed" slider set to 100%, and a "Simulation" toggle switch.

A callout box with a red arrow points to the "64.0 mm" value in the "Monitor sensor signal" section, containing the text: "Check analog value of position sensor".

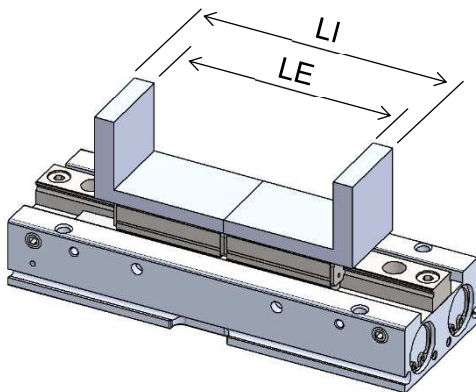
4-3. Change the displayed value according to the attachment(Position sensor option only)

The value displayed in the “Monitor sensor signal” can be adjusted to give a suitable reading for the shape of the attachment mounted on the fingers.

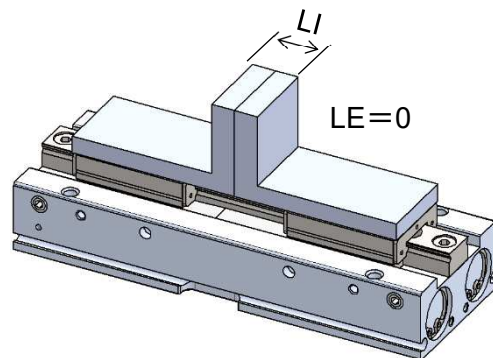
*The purpose of this operation is for matching the displayed value (mm) on the manual operation screen and program screen to the attachment shape and it is not a required operation for creating programs.



- ① Select the “Analog Settings” tab from the “SMC Air Gripper RMH” of the “URCaps” menu.”
- ② Select “External Gripping” when the workpiece gripping method is external gripping and “Internal Gripping” when it is internal gripping.
- ③ Enter the width when the finger is fully closed to “LE” for “External Gripping” and “LI” for “Internal Gripping.”

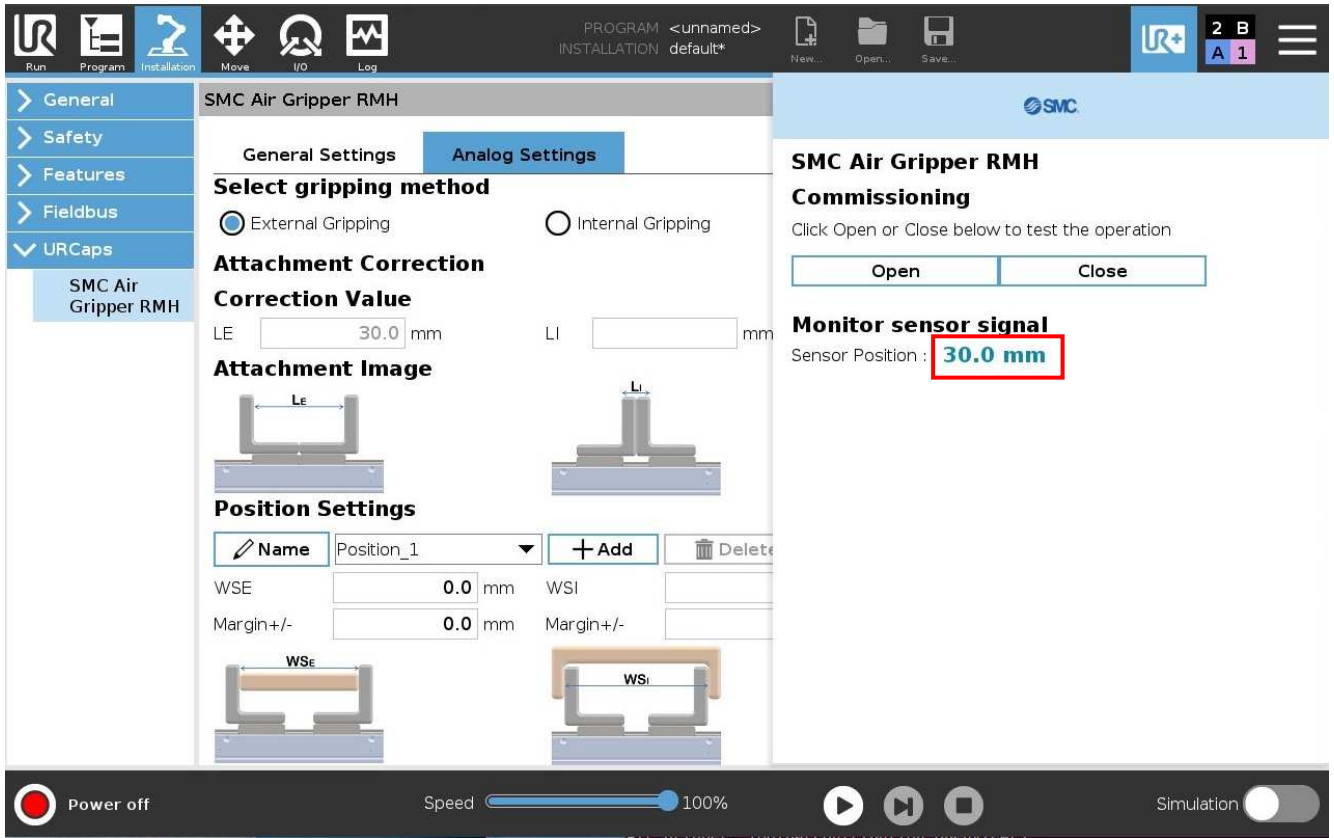


Attachment Example 1



Attachment Example 2

④ Tap the “Apply” button, under ‘Apply correction value’. The displayed value of “Monitor sensor signal” on the manual operation screen changes.

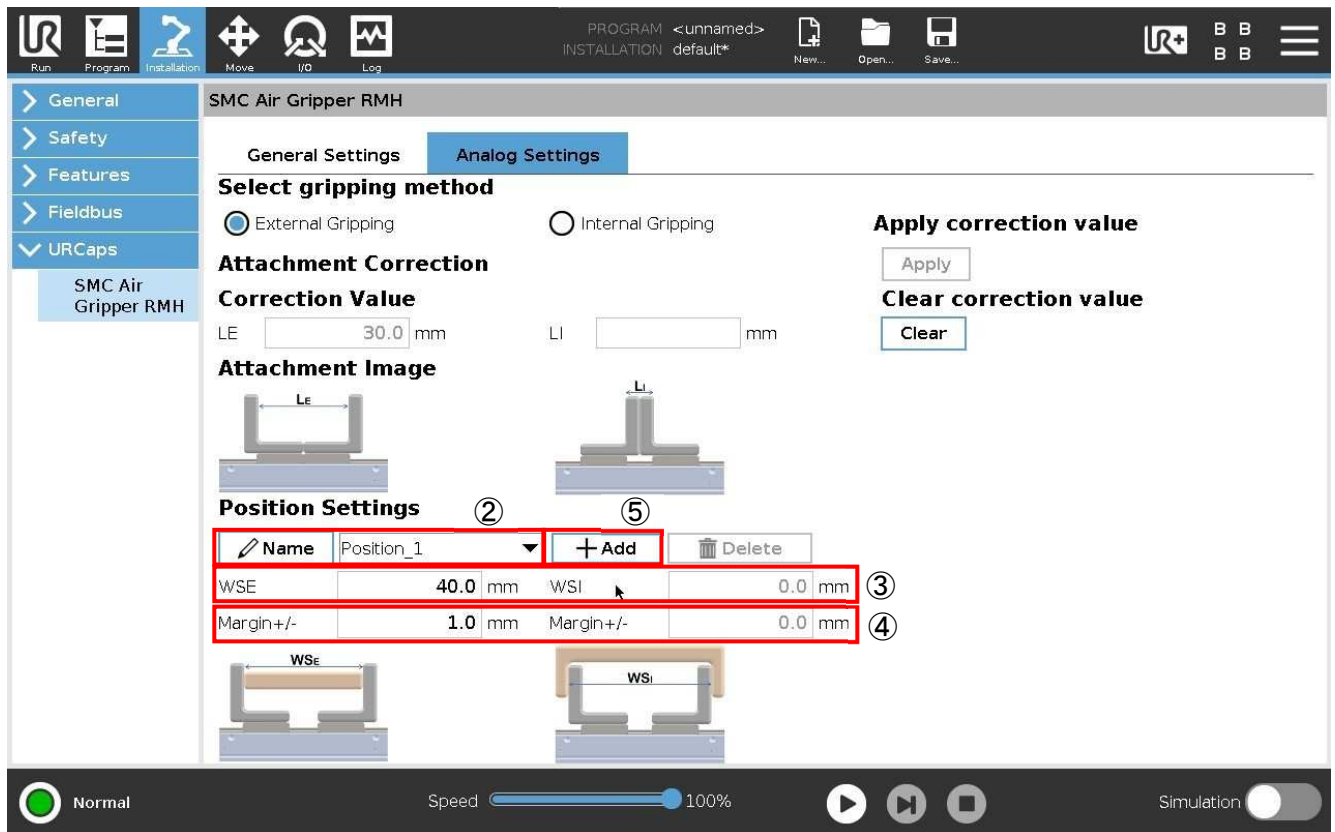


⑤ When returning the value to the initial setting, tap the “Clear” button, under ‘Clear correction value’.

5. Manual registration of finger positions (Position sensor option only)

When the position sensor option is selected, the finger position (workpiece size) to be used for program condition branching can be manually registered.

*When there is a workpiece to transport at hand, the workpiece size can be easily registered by using the “Read current position” function on the program screen. Use this operation when the workpiece is not at hand but there is a necessity to create the program.



① P9. Set up the setting to match the actual attachment shape to the monitor values displayed on the manual operation screen referring to “Change the displayed value according to the attachment.”

② Register a position name.

The name can be changed to any position name by pressing the “Name” button.

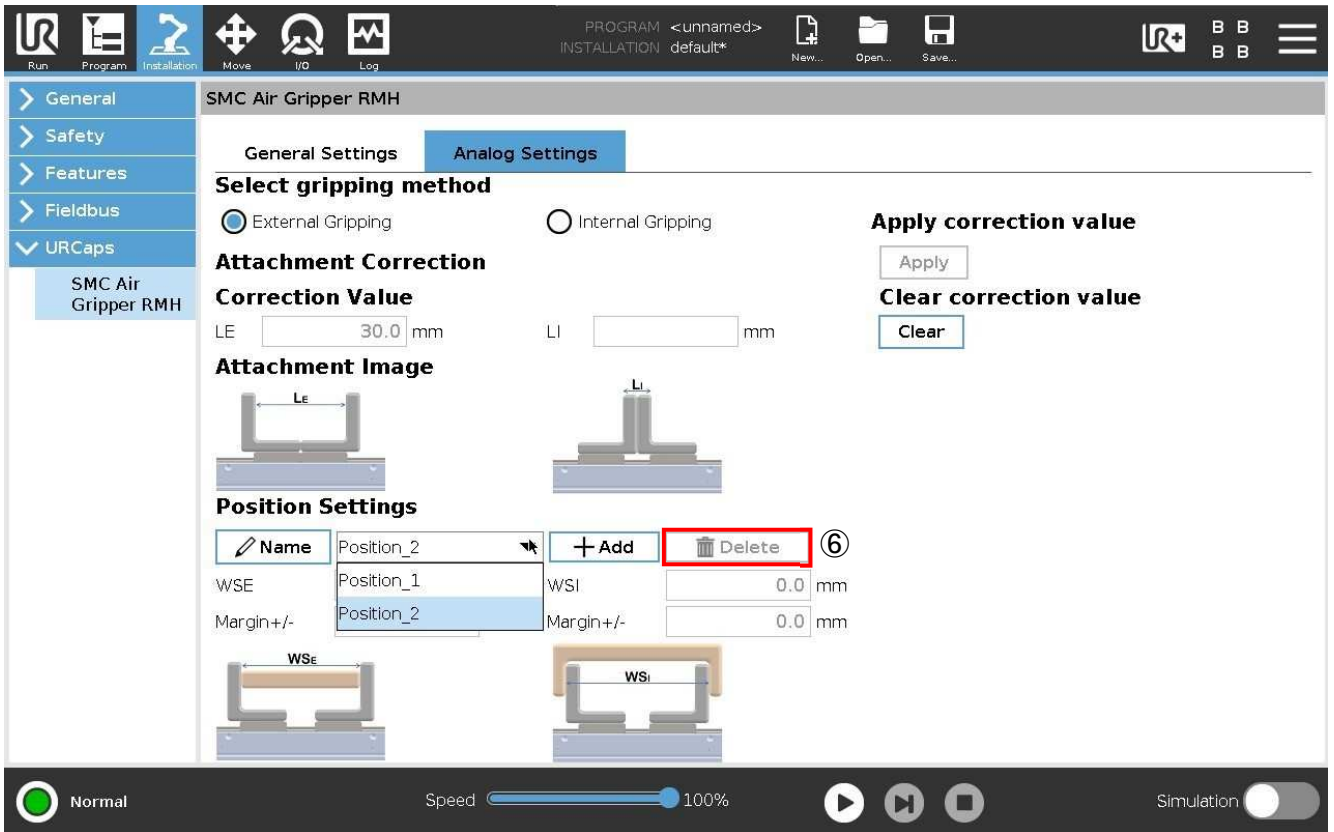
“Position1” is entered as default and as a new position is added, it will be registered as “Position2” → “Position3.”

③ Enter the workpiece size in “WSE” for external gripping and “WSI” for internal gripping. Refer to the icon for the workpiece size image.

④ Set the margin. The minimum setting value is ± 0.5 mm. The position cannot be registered without setting the margin.

⑤ The finger position can be set by tapping “Add.”

*Registration of duplicate finger opening/closing widths is not allowed.
Example: 40 ± 1 mm and 39 ± 0.5 mm



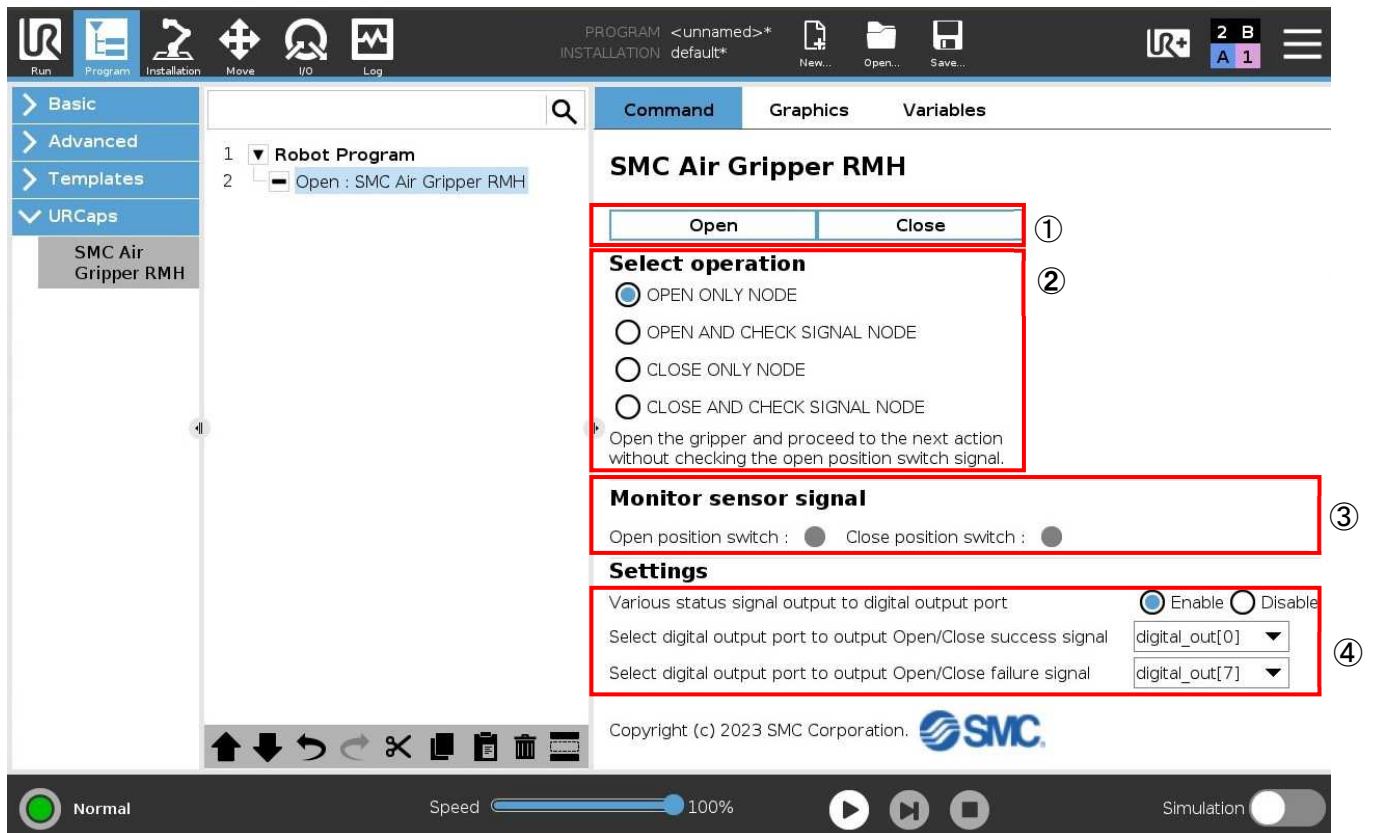
Registered positions can be viewed from the pull-down menu.

⑥ The position can be deleted by selecting the position to delete and pressing the “Delete” button.

6. Program settings

From the "Program" tab, you can configure the program settings.

6-1. For auto switch option



① Manual operation button

By tapping "Open" and "Close," manual operation can be performed while creating the program.

*The manual operation performed here does not affect the program.

② "Select operation"

Four types of NODEs are provided to direct the operation.

- (1) Finger opens when "OPEN ONLY NODE" is executed. At this time, the auto switch signal will not be checked.
- (2) Finger opens when "OPEN AND CHECK SIGNAL NODE" is executed. At this time, it can transition to the next operation after checking the auto switch signal and the reaction.
- (3) Finger closes when "CLOSE ONLY NODE" is executed. At this time, the auto switch signal will not be checked.
- (4) Finger closes when "CLOSE AND CHECK SIGNAL NODE" is executed. At this time, it can transition to the next operation after checking the auto switch signal and the reaction.

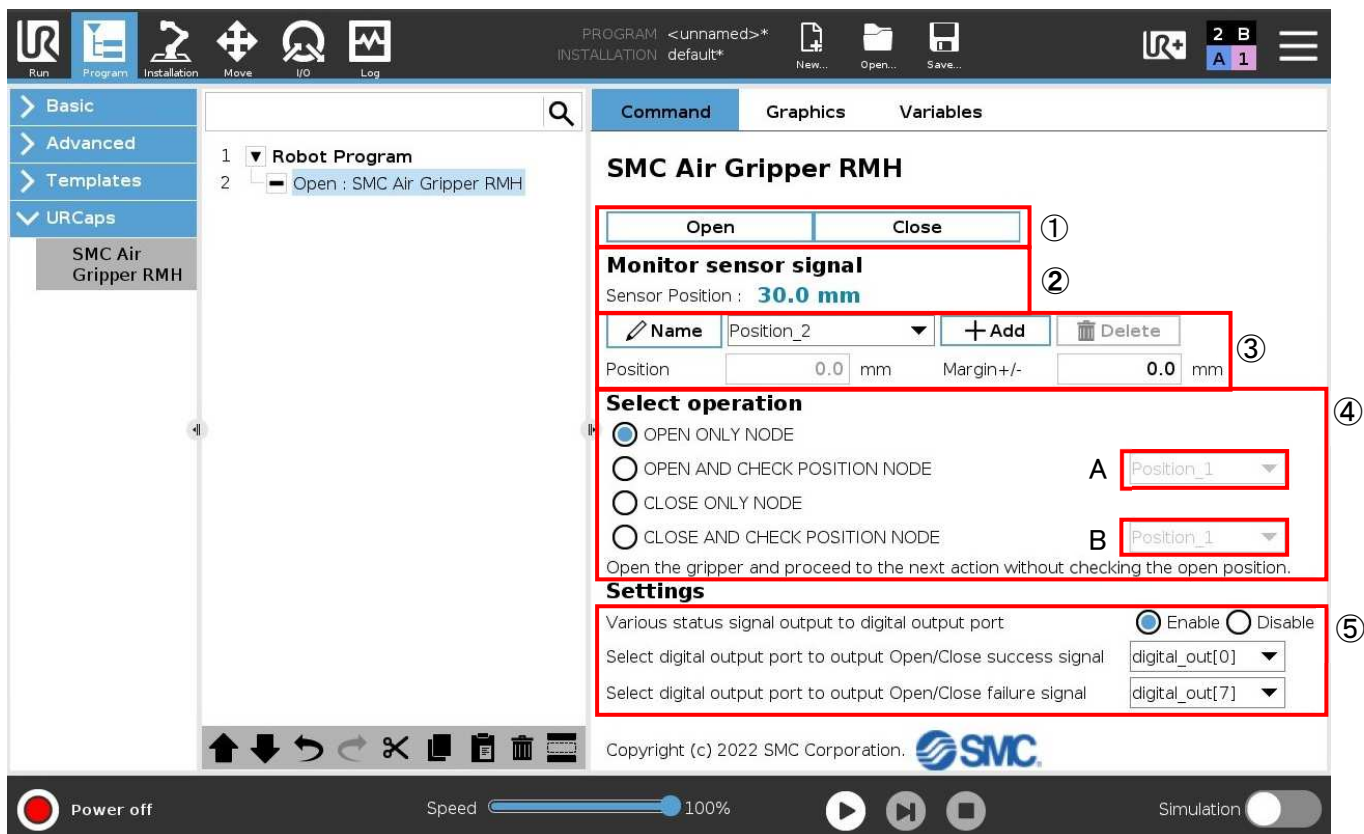
③ "Monitor sensor signal"

Signal detection of auto switch

④ "Settings"

The output port to output signal can be selected in case the auto switch signal is detected and in case it is not detected in "OPEN AND CHECK SIGNAL NODE" or "CLOSE AND CHECK SIGNAL NODE."

6-2. For position sensor option



*Before creating the program of the position sensor option, set up the setting to match the actual attachment shape to the monitor values displayed on the manual operation screen referring to “Change the displayed value according to the attachment shape” on page 9.

① Manual operation button

By tapping “Open” and “Close,” manual operation can be performed while creating the program.
*The manual operation described here does not affect the program.

② “Monitor sensor signal”

The current finger position can be checked.
After setting up “2-3-2. Change the displayed value according to the attachment shape,” the values after the setup is displayed.

③ The finger's current position can be captured and position registration can be performed.

Name" button allows you to change the name. (Default is "Position1".).
Enter the margin and press the "Add" button to register the current location.
The minimum margin setting value is ± 0.5 mm.
*Registration of duplicate finger opening/closing widths is not allowed.
Example: 40 ± 1 mm and 39 ± 0.5 mm

④ “Select operation”

Four types of NODEs are provided to direct the operation.

- (1) Finger opens when “OPEN ONLY NODE” is executed. At this time, the position sensor signal will not be checked.
- (2) Finger opens when “OPEN AND CHECK POSIOTION NODE” is executed. At this time, the position sensor signal is checked and whether fingers are within the position range registered after the opening operation is checked. Select a position from A.
- (3) Finger closes when “CLOSE ONLY NODE” is executed. At this time, position sensor signal will not be checked.

(4) Finger closes when “CLOSE AND CHECK POSITION NODE” is executed. At this time, the position sensor signal is checked and whether fingers are within the position range after the closing operation is checked. Select the position from B.

⑤ “Settings”

The output port to output signals can be selected when the workpiece gripped in “OPEN AND CHECK SIGNAL POSITION NODE” or “CLOSE AND CHECK SIGNAL POSITION NODE” is the size that the workpiece can be kept within the registered position or when it is not.

Revision history
1. Name change and image replacement.

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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