SMC®

Operation Manual

PRODUCT NAME

Air Gripper for Collaborative Robots

MODEL / Series / Product Number

RMH* Series

－Soft ware(YASKAWA Plug & Play Kit)－

SMC Corporation

Contents

1. How to Download Software

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

2. YASKAWA Plug & Play kit

The YASKAWA Plug & Play Kit allows you to easily connect the air gripper to the robot and operate it.

2-1. Installing YASKAWA Plug & Play Kit

The YASKAWA Plug & Play Kit is installed by means of the YASKAWA Installation Packages(.yip) file.
* Set the security access level to the administration level.

1.Download YASKAWA Installation Packages "SmcAirGripperExt.yip" from the SMC website.
2.Copy the downloaded file to a USB memory stick, insert the stick to the USB port of the smart pendant, select [MENU] on the upper left of the screen, and tap [System settings] -> [Packages].
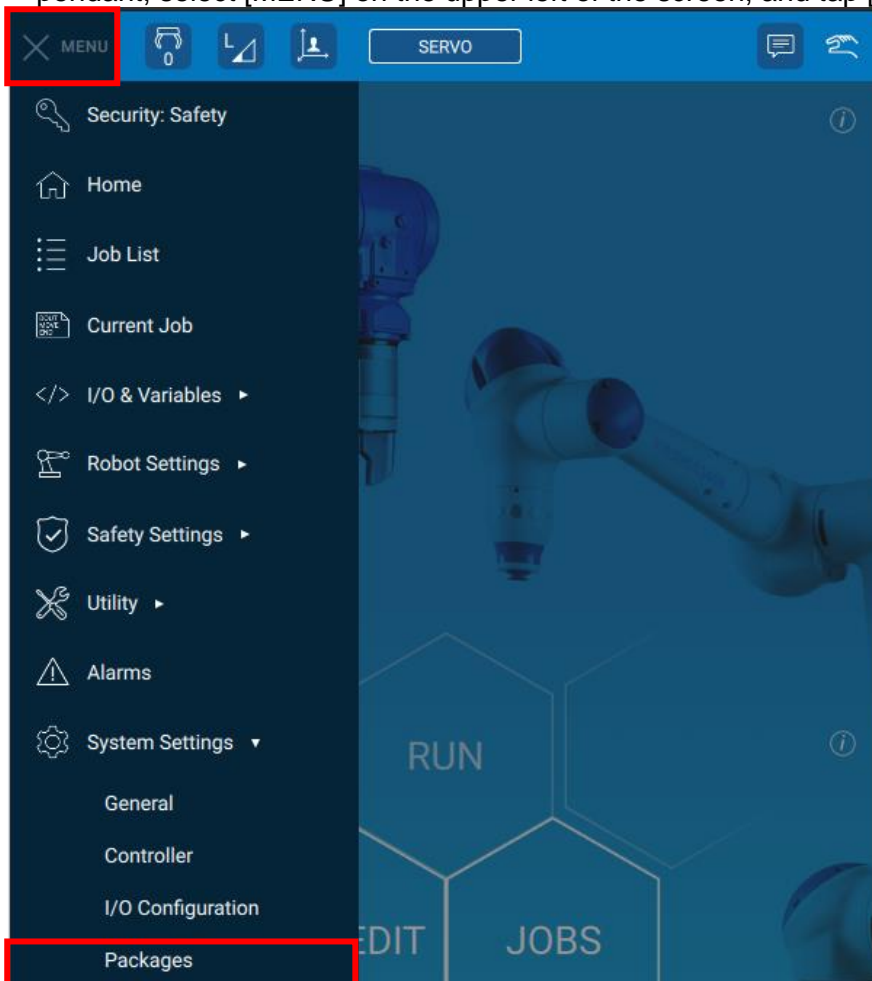
3. Open the "Packages" tab and tap [+INSTALL] at the upper part of the screen. A pop-up dialog box showing the installable packages will appear. From the package list, select "SMC Air Gripper" and install it.
Normally, when the installation has completed, the packages, extension, and tool presets are added to the appropriate list.
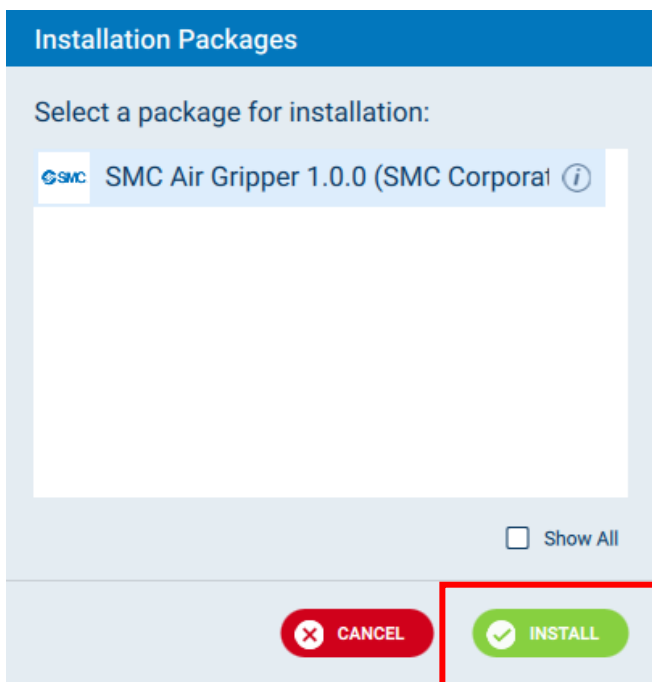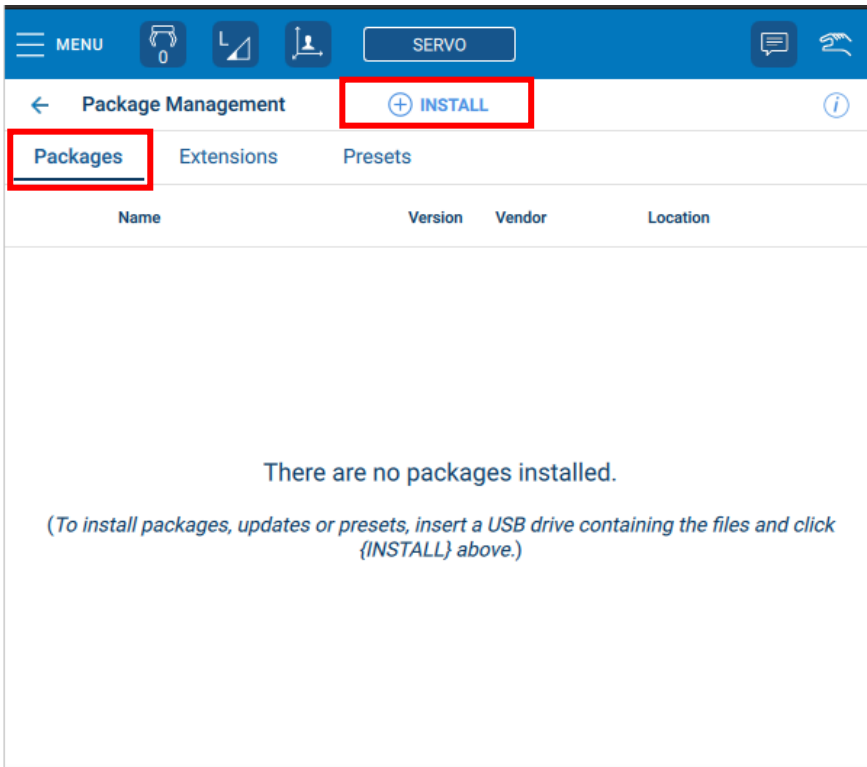
4.On the package administration screen, confirm that the installation has completed.

(1)Tap the "Packages" tab, and confirm that SMC Air Gripper is added to the list.
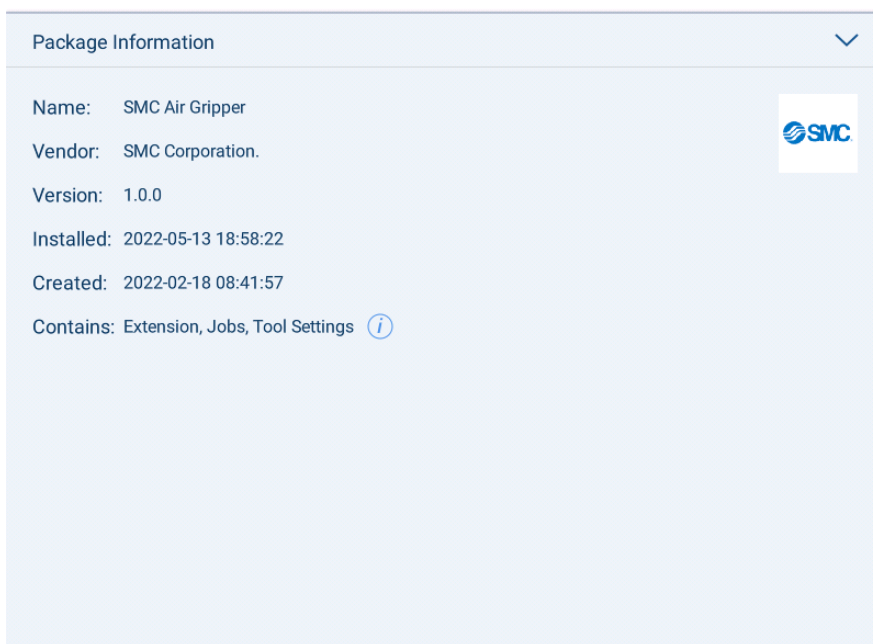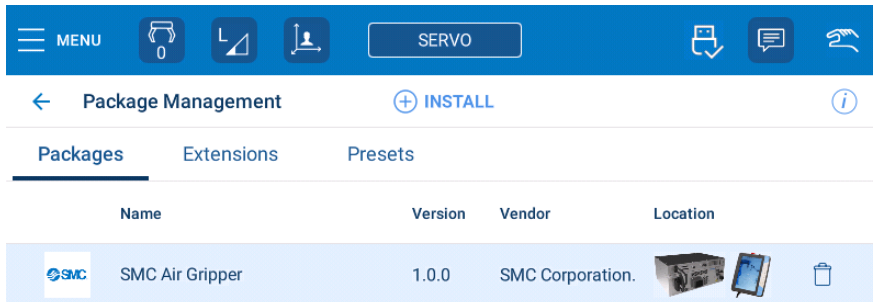
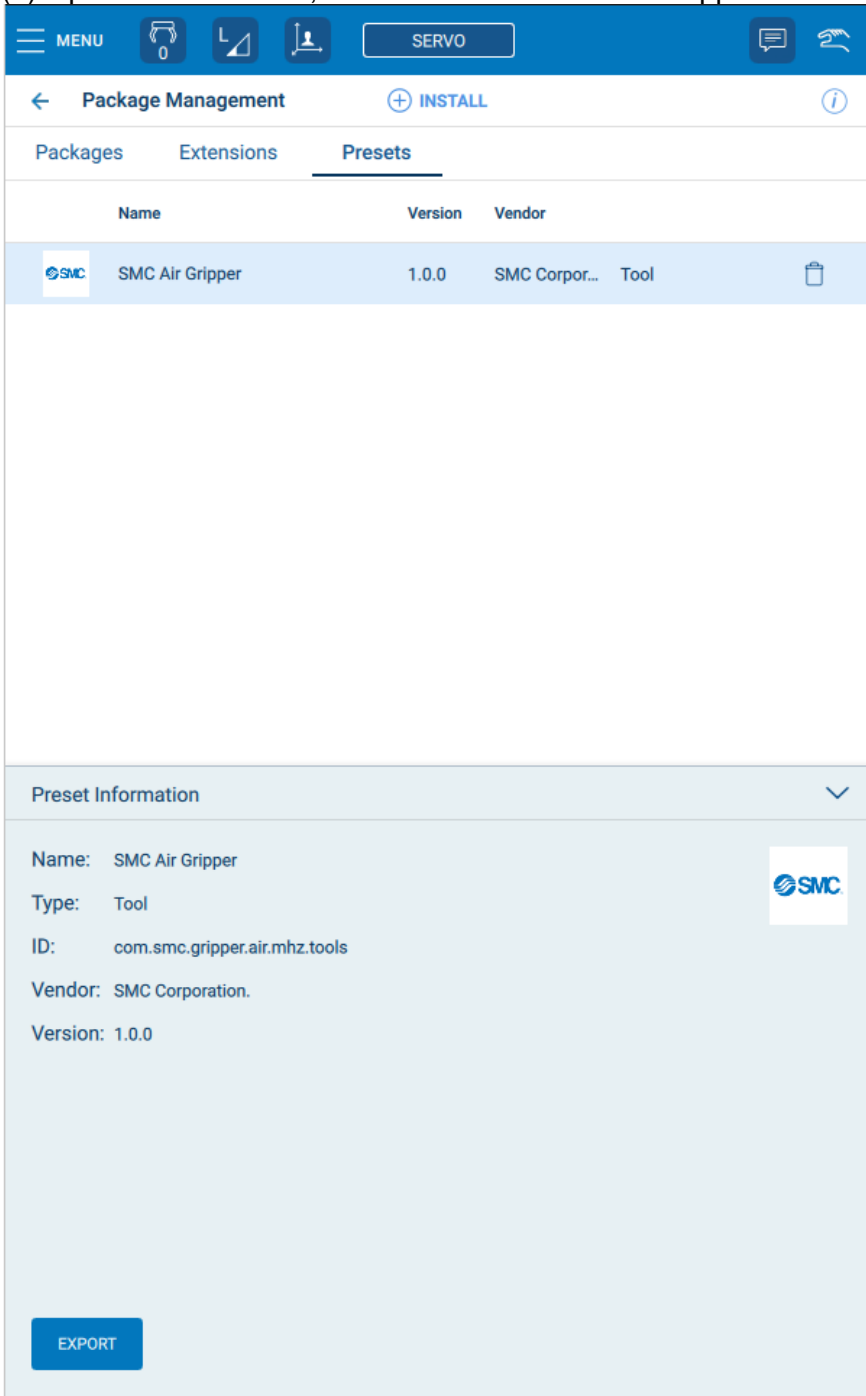(2)Tap the "Extensions" tab, and confirm that the SMC Air Gripper is added to the list.

(3)Tap the "Presets" tab, and confirm that SMC Air Gripper is added to the list.

2-2. Tool Presets

Select the gripper preset to be used from the list of installed tool presets. The tool properties of the gripper are copied to the currently selected tool. The tool properties can be edited manually before saving.

Tool #1: CTool1

General	Interference

Select preset to apply: ⌄

- ⊙SMC SMC Gripper JMHZ
- ⊙SMC SMC Gripper RMHZ
- ⊙SMC SMC Gripper RMHF
- ⊙SMC SMC Gripper RMHG
- ⊙SMC SMC Gripper RMHS

Name
CTool1

Block I/O
Not Assigned

Tool Center Point (TCP) Orientation ⸺ ⚙ ESTI

X_F	0.000 mm	R_X	0.0000 deg
Y_F	0.000 mm	R_Y	0.0000 deg
Z_F	0.000 mm	R_Z	0.0000 deg

Weight ⚠ ⸺ ⚙ ESTIMATE

W 0.000 kg

Center of Gravity ⚠   **Moment of Inertia**

X_G	0.000 mm	I_X	0.000 kg-m^2
Y_G	0.000 mm	I_Y	0.000 kg-m^2
Z_G	0.000 mm	I_Z	0.000 kg-m^2

Tool #0: SMC Gripper RMHZ 📄 PRESETS

General	Interference

Name
SMC Gripper RMHZ

Block I/O
Not Assigned ⌄

3D ⓘ

Tool Center Point (TCP) Orientation ⸺ ⚙ ESTIMATE   ☐ Show without tool

X_F	0.000 mm	R_X	0.0000 deg
Y_F	0.000 mm	R_Y	0.0000 deg
Z_F	138.000 mm	R_Z	0.0000 deg

Weight ⸺ ⚙ ESTIMATE

W 0.638 kg

Center of Gravity   **Moment of Inertia**

X_G	-0.400 mm	I_X	0.000 kg-m^2
Y_G	1.100 mm	I_Y	0.001 kg-m^2
Z_G	52.960 mm	I_Z	0.001 kg-m^2
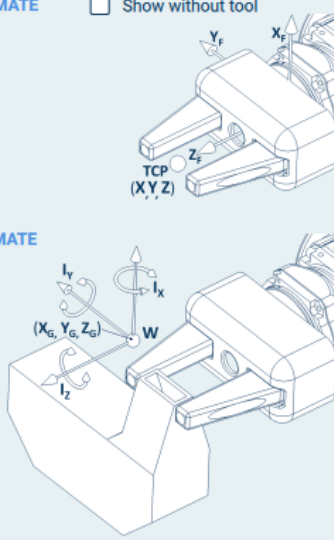
2-3. Utility Window

1. Select [MENU] at the upper left of the screen, tap [Utility] -> [SMC Air Gripper], or tap [JOGGING] on the job contents review screen and then tap the "Air gripper" icon at the lower right of the screen to open the utility window.
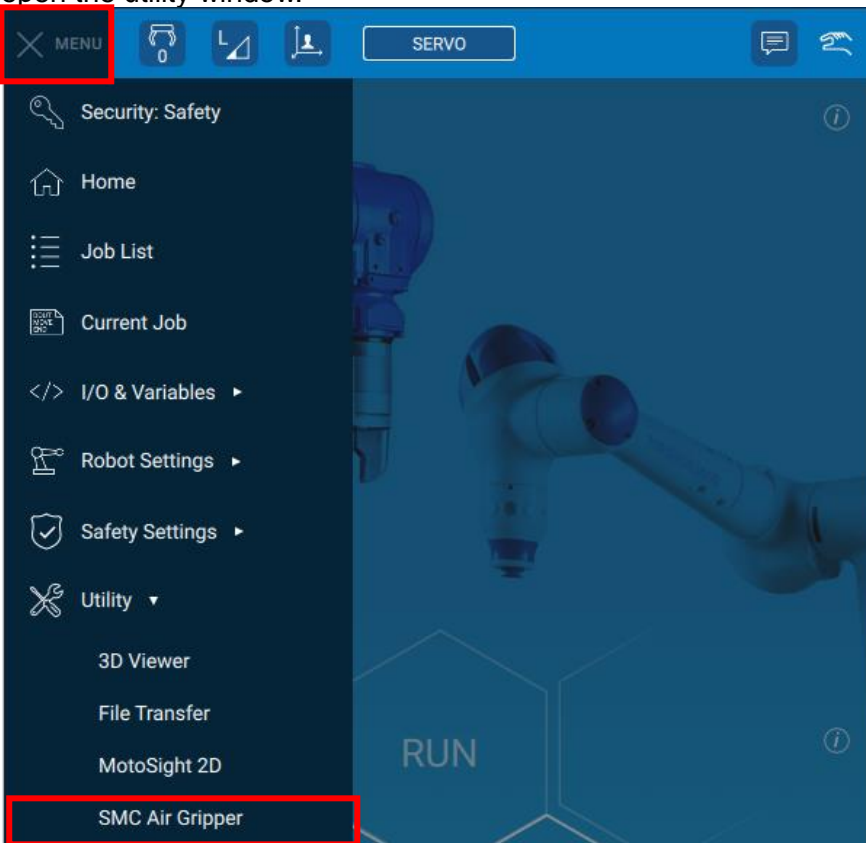
2. Utility Window Features

(1) Manual operation

It is possible to check the manual operation of the Air Gipper.

By tapping the OPEN or CLOSE button, it is possible to perform an opening or closing action of the gripper.

(2) Monitor sensor Signal

It is possible to confirm whether the Open or Close position auto switches react.
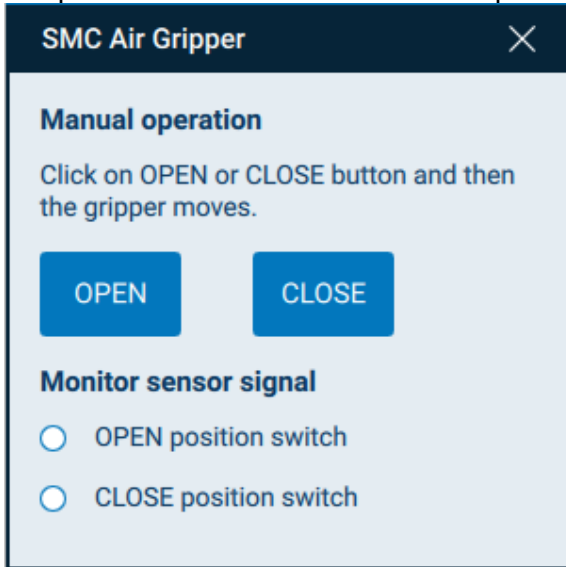
2-4. Air Gripper Integration Window

1.On the Job Contents review screen, tapping [AIRGRIPPER] on the navigation bar opens the "Air Gripper" Integration Window.

2. Insert Commands Tab

(1) Selection Operation

Select the behaviour of the Open or Close operations.

・OPEN ONLY

Puts the gripper into the "Open state", recognises it as" Open success" without checking the Open position signal, and proceeds to the next operation.

・OPEN AND CHECK SIGNAL

Puts the gripper into the "Open state" and waits for the Open position signal input before proceeding to the next operation. When the signal is turned on, the software recognises it as "Open success" and proceeds to the next operation.

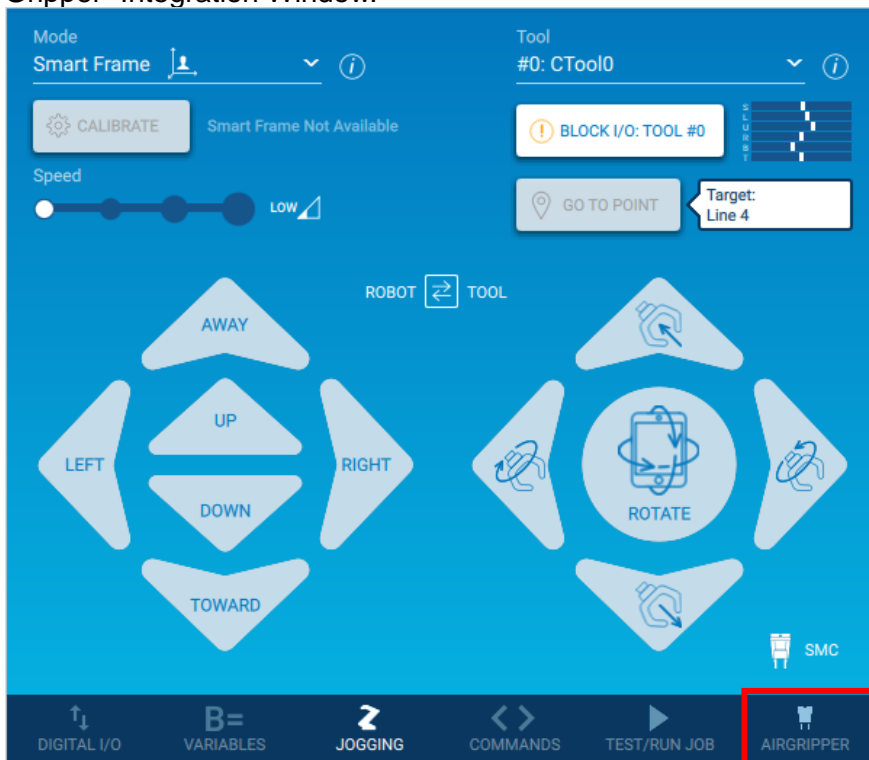・CLOSE

Puts the gripper into the "Closed state", recognises it as "Close success" without checking the Close position signal, and proceeds to the next operation.

・CLOSE AND CHECK SIGNAL

Puts the gripper into the "Closed state" and waits for the Close position signal input before proceeding to the next operation. When the signal is turned on, the software recognises it as "Close success" and proceeds to the next operation.

(2) INSERT COMMAND

It is possible to add commands for controlling the gripper opening/closing action to the job.
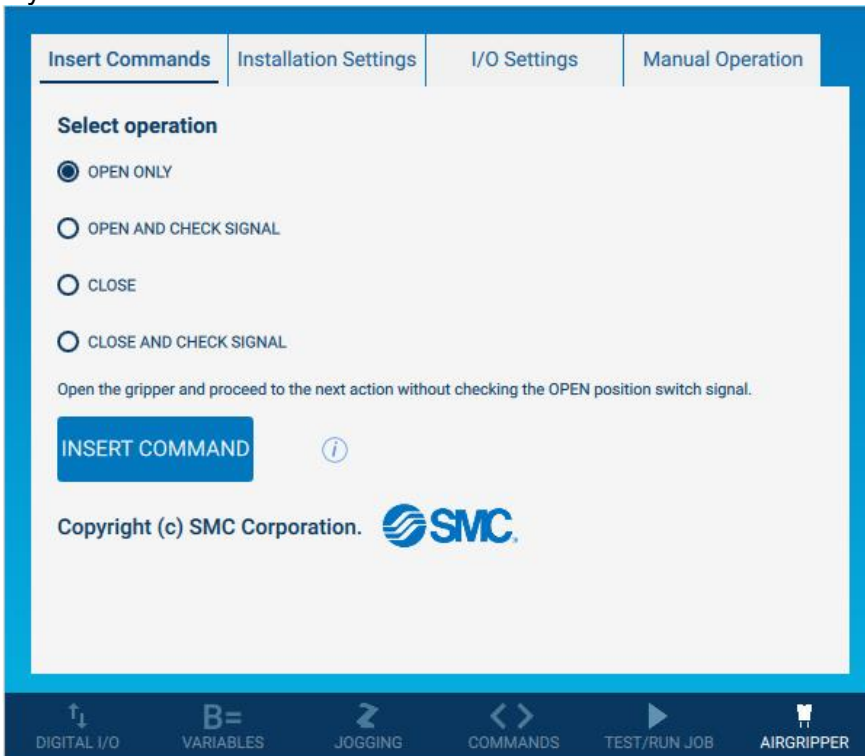
・SMC_OPEN_AIRGRIPPER

This command is used to make a gripper opening action.

If you select "OPEN ONLY" or "OPEN AND CHECK SIGNAL" this command will be added.

・SMC_CLOSE_AIRGRIPPER

This command is used to make a gripper closing action.

If you select "CLOSE ONLY" or "CLOSE AND CHECK SIGNAL" this command will be added.

3. Installation Settings Tab
* To change the setting, set the security access level to the administration level.
(1) Select a valve option.
Check the product number, and then select a valve option that suits the type of the air gripper you are using.
Nil: no symbol
N.O. : Normally open
N.C. : Normally closed
(2) Gripper operation completion waiting time
This is the set value for the waiting time after the valve is operated for the finger opening/closing action to turn on.
Adjust the opening of the exhaust restrictor and enter an appropriate value according to the gripper finger opening/closing operation time. The default value is 500ms. It can be set in the range of 0 to 1000ms.
(3) Status signal output to digital output port.
Select whether to output a status signal to the digital output port when "Open/Close success" or "Open/Close failure" is detected.
When "Enabled" is selected:
Selection of the digital output port is enabled. If either of "Open/Close success" and "Open/Close failure" is detected, the corresponding digital output port is turned on.
When "Disabled" is selected:
The selection of the digital output port is disabled. Even if either of "Open/Close success" and "Open/Close failure" is detected, no status signal is output.
(4) Select a digital output port
Selected box operation is enabled when "Output status signal to digital output port" is enabled. Select the digital output port to which a status signal is output when "Open/Close success" or "Open/Close failure" is detected.

4.I/O Settings Tab
* To change the setting, set the security access level to the administration level.
(1) I/O settings for gripper operation
At the time of installation of the YASKAWA Plug & Play Kit, the I/O assignment is already set. If wiring is made as per the manual, it can be used with the default setting.
However, if the wiring is changed to connect with another device, it is possible to change the signal setting for gripper operation from this tab.
If you intend to return the I/O setting to the factory default condition, pressing the button at the lower part of the screen can initialize this setting.
(2) Tool setting for the gripper
The collaborative robot calculates the external force by canceling the tool mass. For this purpose, it is necessary to set the tool to be mounted on the manipulator and the masses and the centers of gravity of the tool and workpiece should be set in the tool file.
In the initial setting, the tool number 0 is selected when the OPEN button is pressed. Tool number 1 is selected when the CLOSE button is pressed. The tool number can be changed.
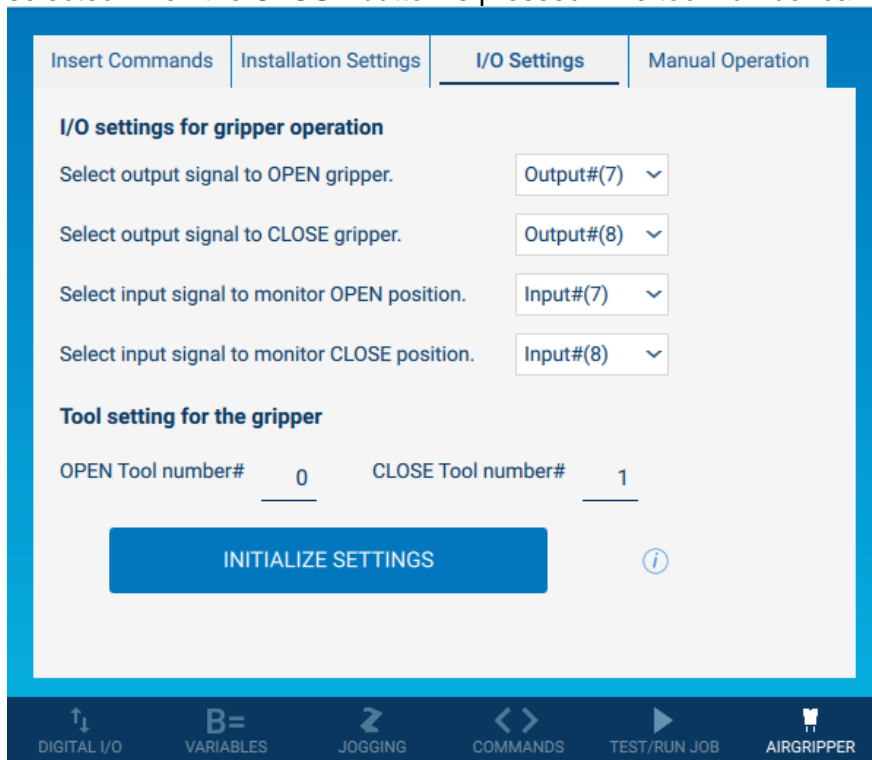
5. Manual Operation tab
(1) Manual operation
The manual operation of the air gripper can be checked.
By tapping the OPEN or CLOSE button, it is possible to perform an opening or closing action of the gripper.
(2) Monitor sensor signal
It is possible to confirm whether the Open position or Close position auto switch reacts.

3. Example of wiring to robot controller

The table below shows wiring examples of I/O cables and general-purpose I/O terminal blocks. Customers are responsible for connecting I/O cables to the general-purpose I/O terminal block. Also, before wiring, be sure to check whether the robot controller has NPN or PNP specifications.

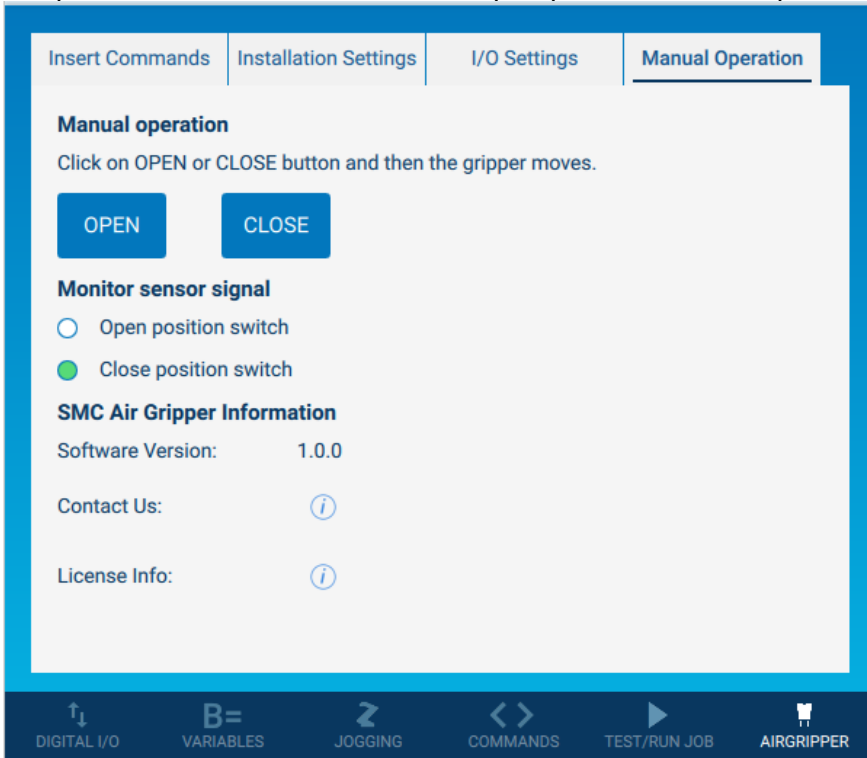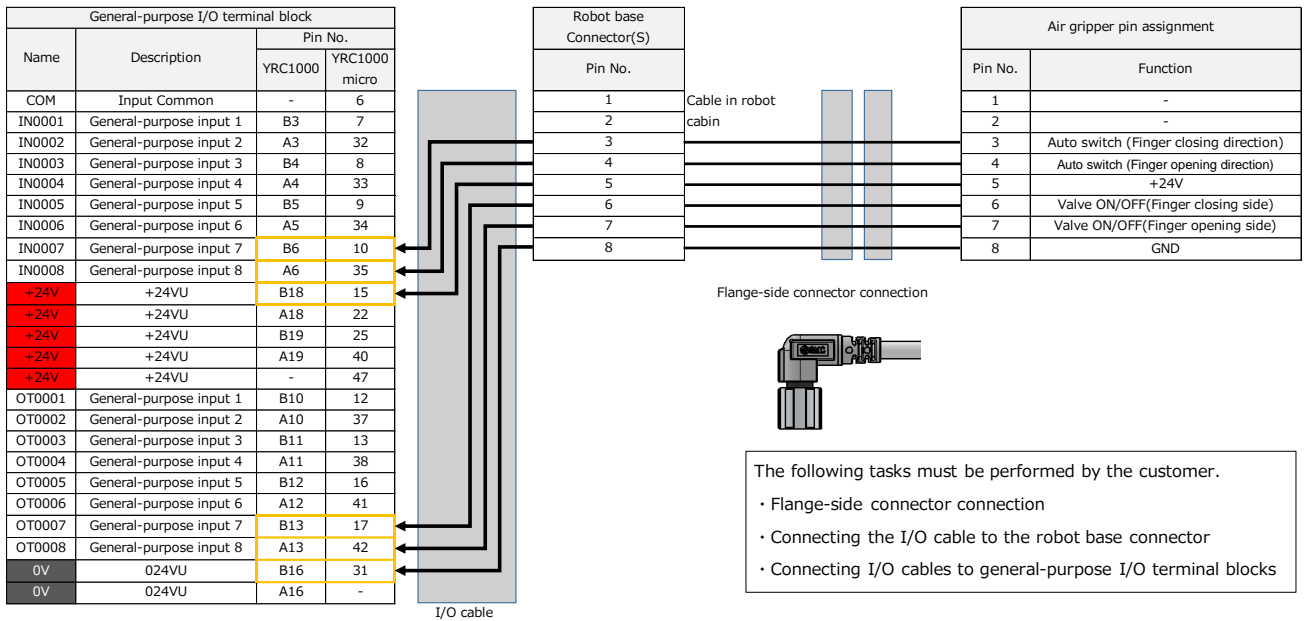| General-purpose I/O terminal block		Pin No.		Robot base Connector(S)	Air gripper pin assignment	
Name	Description	YRC1000	YRC1000 micro	Pin No.	Pin No.	Function
COM	Input Common	-	6	1	1	-
IN0001	General-purpose input 1	B3	7	2	2	-
IN0002	General-purpose input 2	A3	32	3	3	Auto switch (Finger closing direction)
IN0003	General-purpose input 3	B4	8	4	4	Auto switch (Finger opening direction)
IN0004	General-purpose input 4	A4	33	5	5	+24V
IN0005	General-purpose input 5	B5	9	6	6	Valve ON/OFF(Finger closing side)
IN0006	General-purpose input 6	A5	34	7	7	Valve ON/OFF(Finger opening side)
IN0007	General-purpose input 7	B6	10	8	8	GND
IN0008	General-purpose input 8	A6	35			
+24V	+24VU	B18	15			
+24V	+24VU	A18	22			
+24V	+24VU	B19	25			
+24V	+24VU	A19	40			
+24V	+24VU	-	47			
OT0001	General-purpose input 1	B10	12			
OT0002	General-purpose input 2	A10	37			
OT0003	General-purpose input 3	B11	13			
OT0004	General-purpose input 4	A11	38			
OT0005	General-purpose input 5	B12	16			
OT0006	General-purpose input 6	A12	41			
OT0007	General-purpose input 7	B13	17			
OT0008	General-purpose input 8	A13	42			
0V	024VU	B16	31			
0V	024VU	A16	-			

I/O cable

Cable in robot cabin

Flange-side connector connection

The following tasks must be performed by the customer.
・Flange-side connector connection
・Connecting the I/O cable to the robot base connector
・Connecting I/O cables to general-purpose I/O terminal blocks

Revision history