No.DOC1077760
NN67162200

Operation Manual

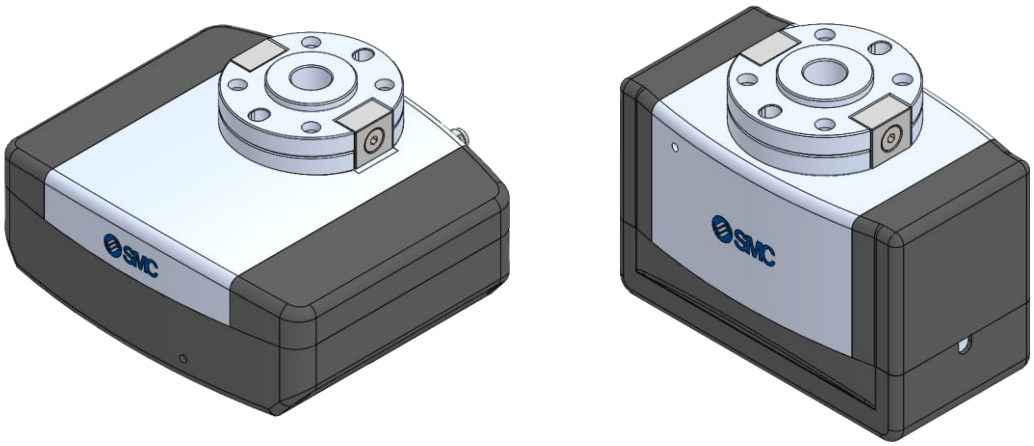
PRODUCT NAME

Electric Gripper for Collaborative Robots

MODEL / Series / Product Number

LEHR Series

—Software（TM component）—



SMC Corporation

Contents

1 How to Download Software

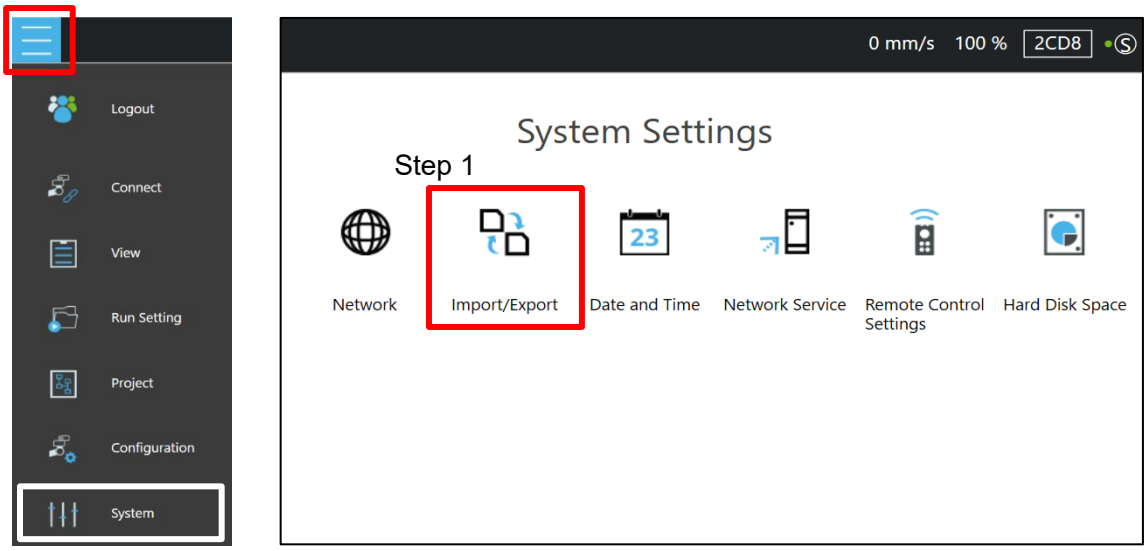
Please download the software (TM component) from the SMC website (URL: https://www.smcworld.com) and save it in a USB memory device.

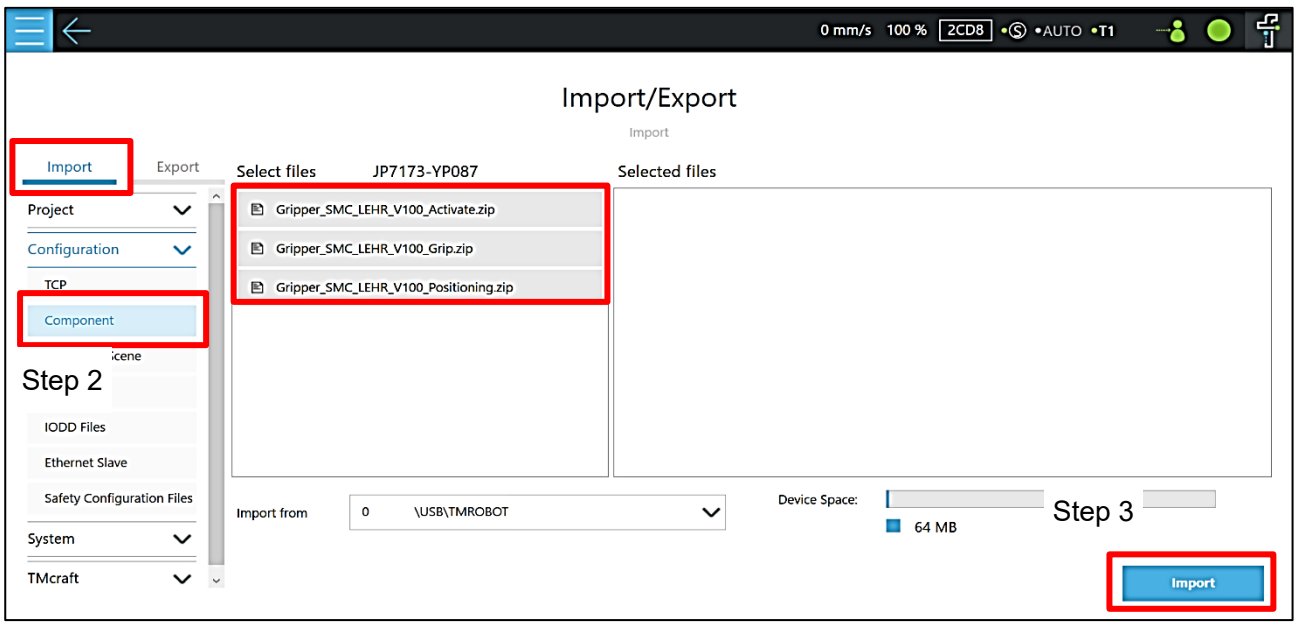
Caution：This software is compatible with TMFlow version 2, and is only compatible with TMS series HW5.0 or later.

2 Introduction of TM Component

2.1 Install TM Component

1. Rename the USB drive to “TMROBOT”.
2. Locate the downloaded zip file in the USB memory folder TMROBOT:\TMExport\TMComponent\ComponentObject\ .
3. Insert the USB memory stick into the robot controller.
4. On the TM flow screen, select the menu icon and select [Import/Export] under [System]. (Step 1)
5. Select [Import] and select [Component] under [Configuration]. (Step 2)
6. Select the three zip files LEHR_Activate.zip, LEHR_Grip.zip, and LEHR_Positioning.zip and select “Import”.（Step 3）
7. When the import completion guide screen appears, the import of TM Component is complete.

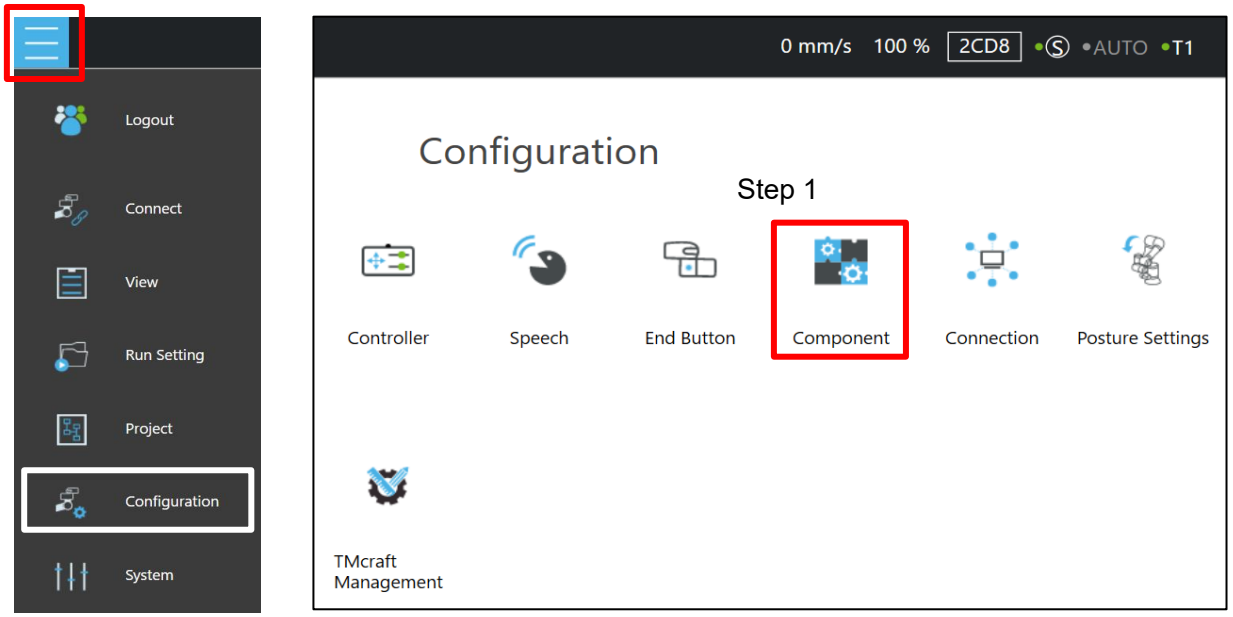




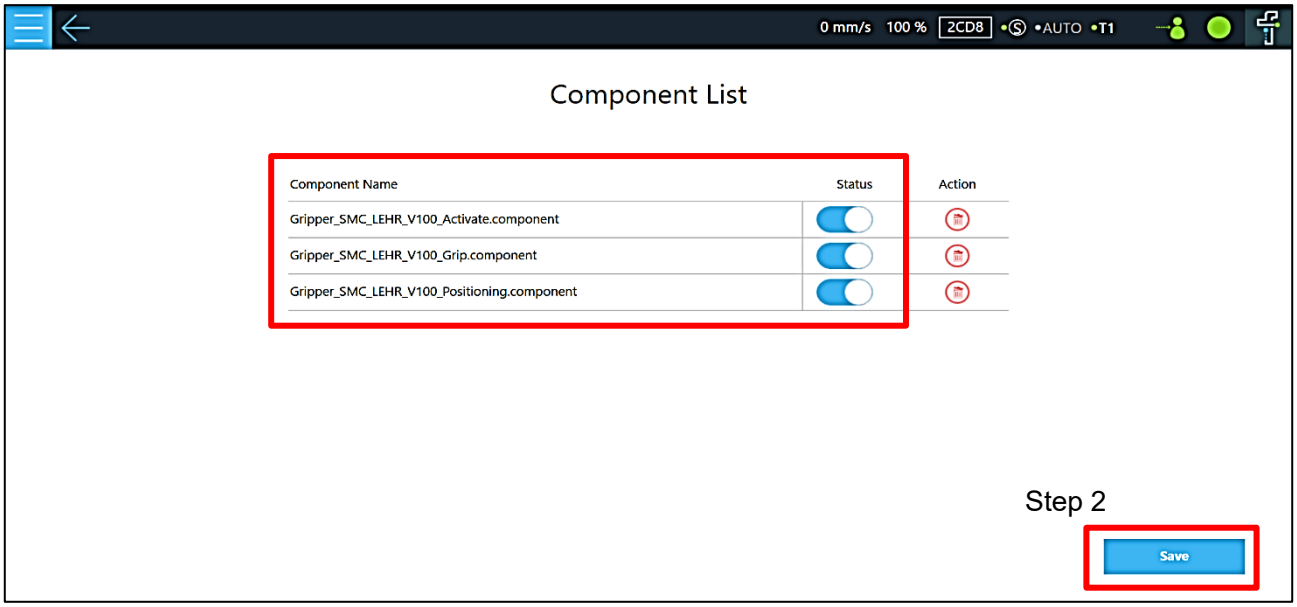
2.2 Activate TM Component

In order to use the installed components, they must be activated in the collaborative robot.

1. Select the menu icon and select [Component] under [Configuration]. (Step 1)



2. Activate the [State] of the installed component and Select “Save”.（Step 2）

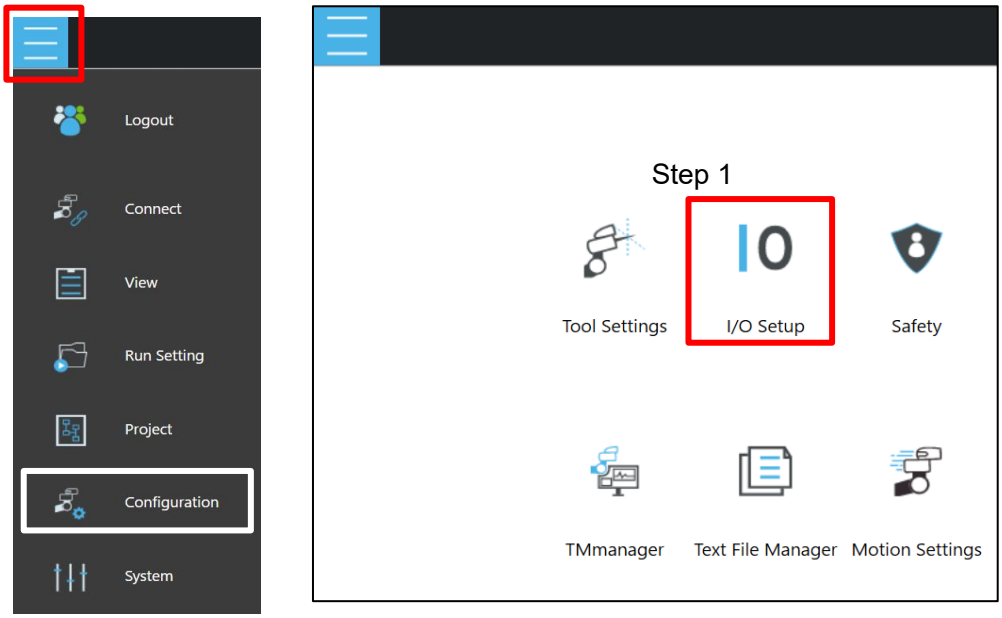


2.3 Serial Communication Settings

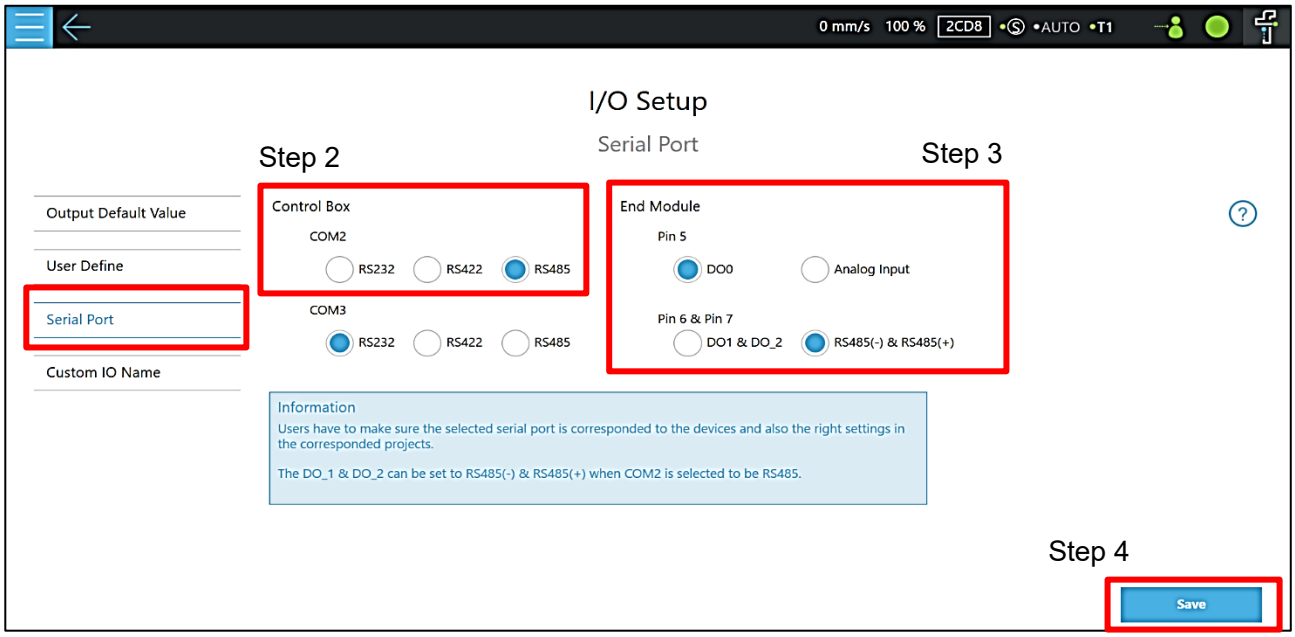
This section describes how to set up serial communication for the collaborative robot.

The electric gripper communicates with the collaborative robot via RS485.

1. Select the menu icon and select [I/O Setup] under [Configuration]. (Step 1)



2. Select [Serial Port] and set COM2 in the [Control Box] to RS485.（Step 2）
3. Set “RS485(-) and RS485(+)” on pin 6 & pin 7 of the “End Module”.（Step 3）
4. Select [Save].（Step 4）



※After setting up the serial communication, turn off the power to the Collaborative Robot before installing the electric gripper.

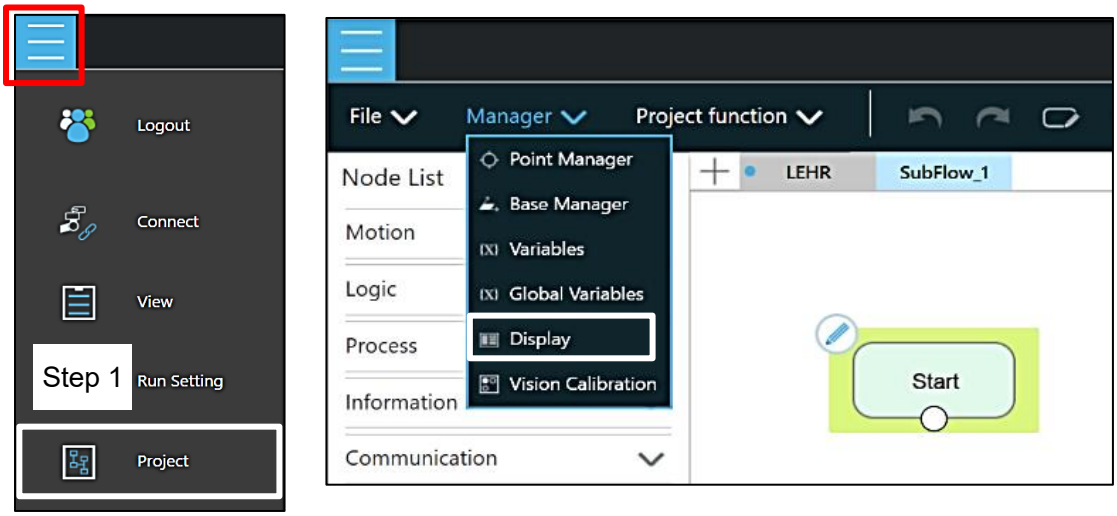
2.4 Current location display settings

The current position of the electric gripper can be checked using TM flow.

2.4.1 Setting method

Select the menu icon and select [Project]. (Step 1)

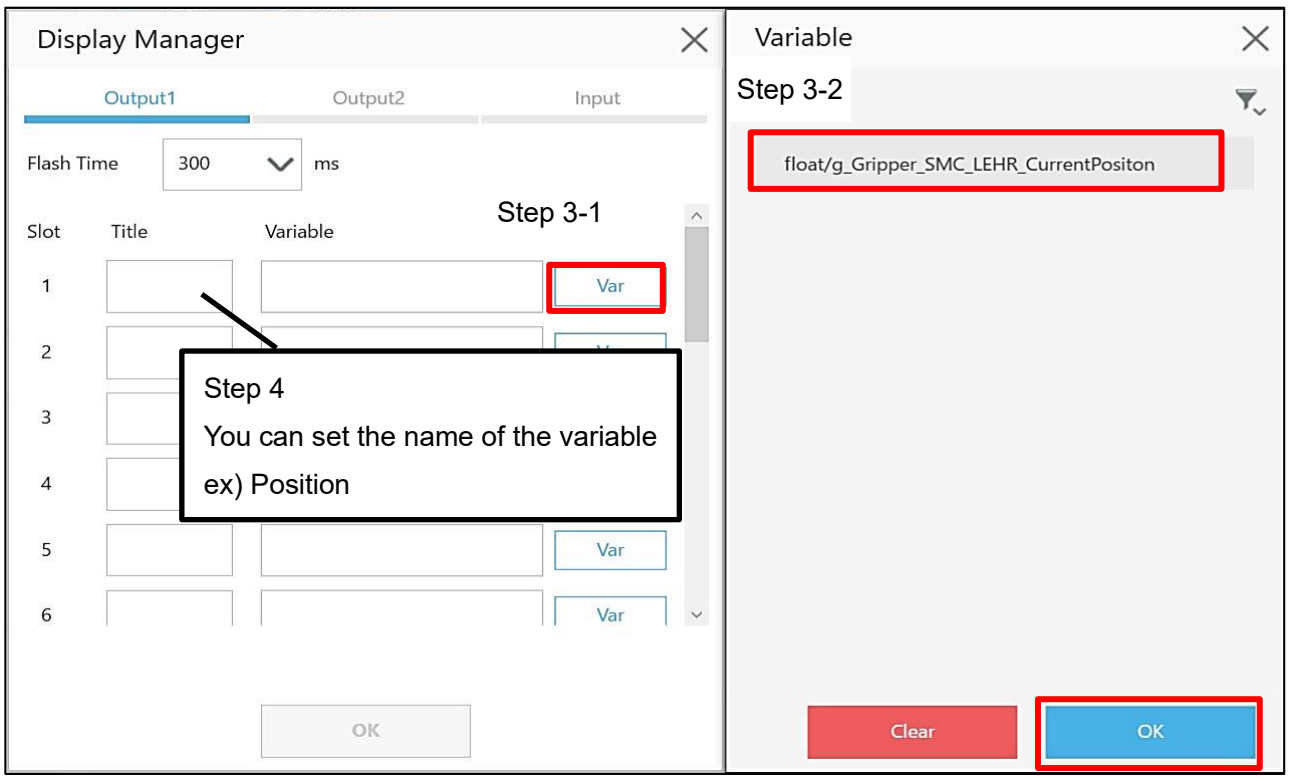
Open the project to be used and select “Display” in the Manager.（Step 2）



When "Var" is selected, the variables for the current position will be displayed as shown below.

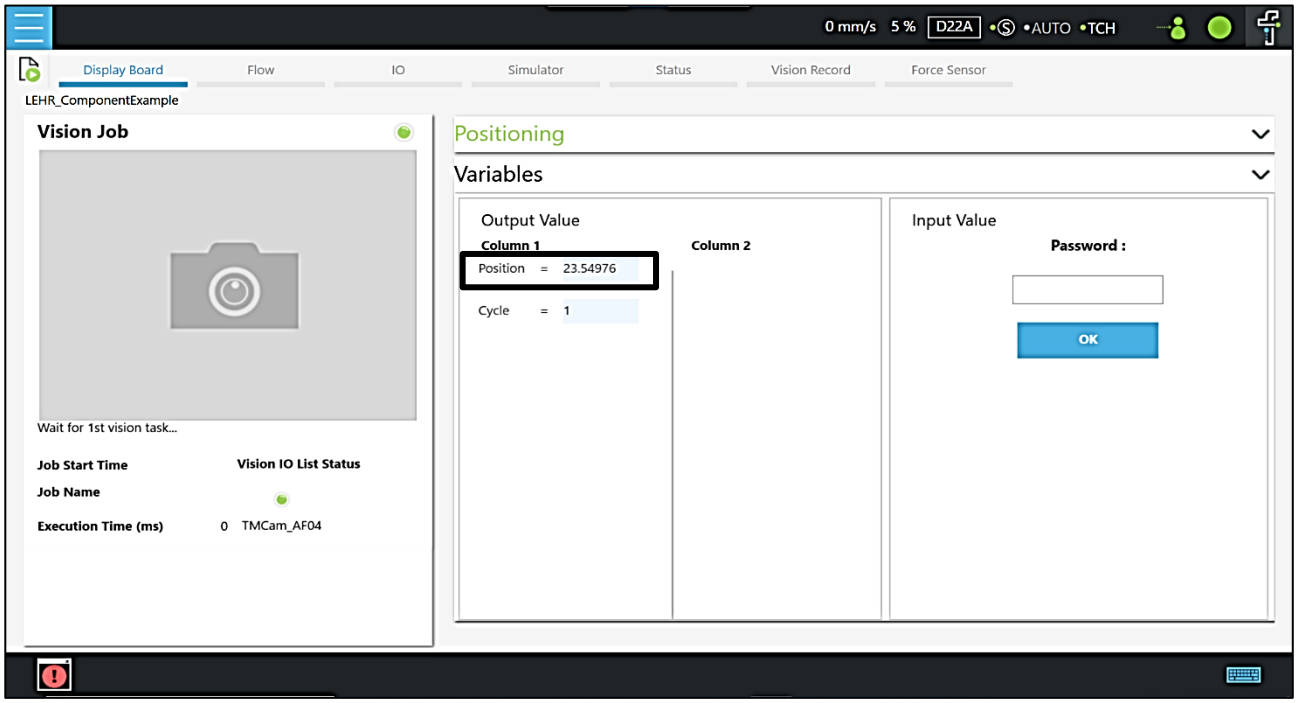
Set the variables for each slot.（Step 3）

The display name of the output variable can be set in the title.（Step 4）



2.4.2 Confirmation method

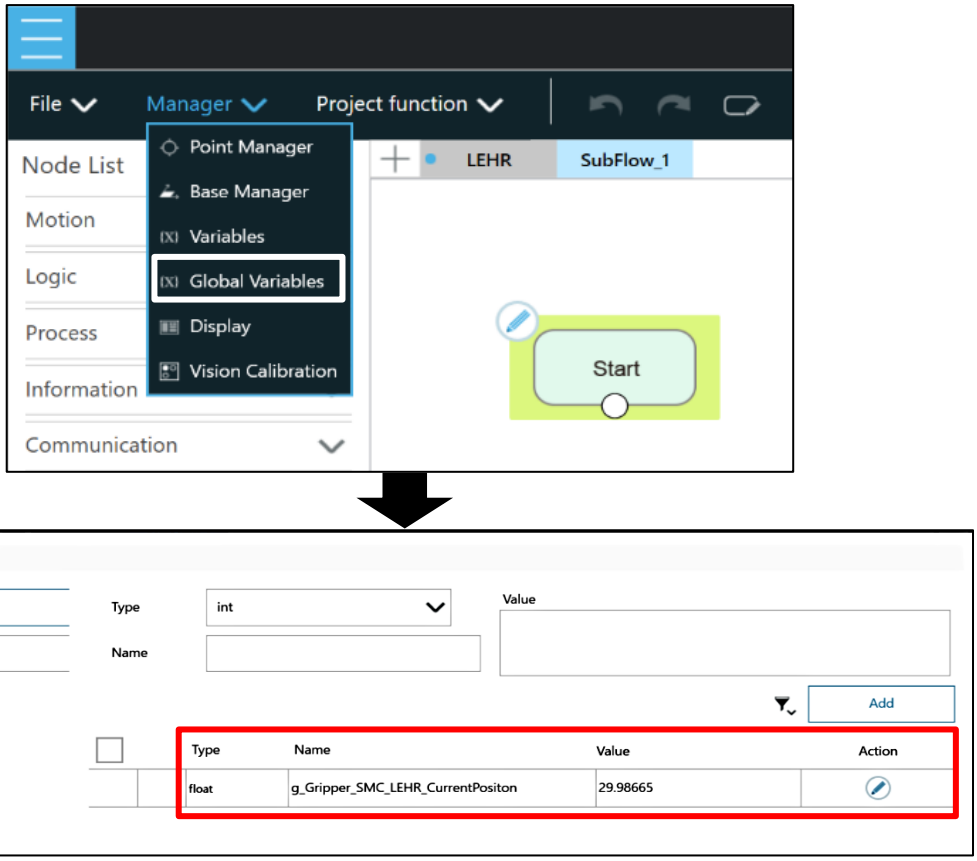
When the program is executed, the following screen will be displayed.



2.4.3 Global Variables

The current position of the electric gripper is set in the Global Variables.

Global variables can be viewed in the "Global Variables" section of the Manager.



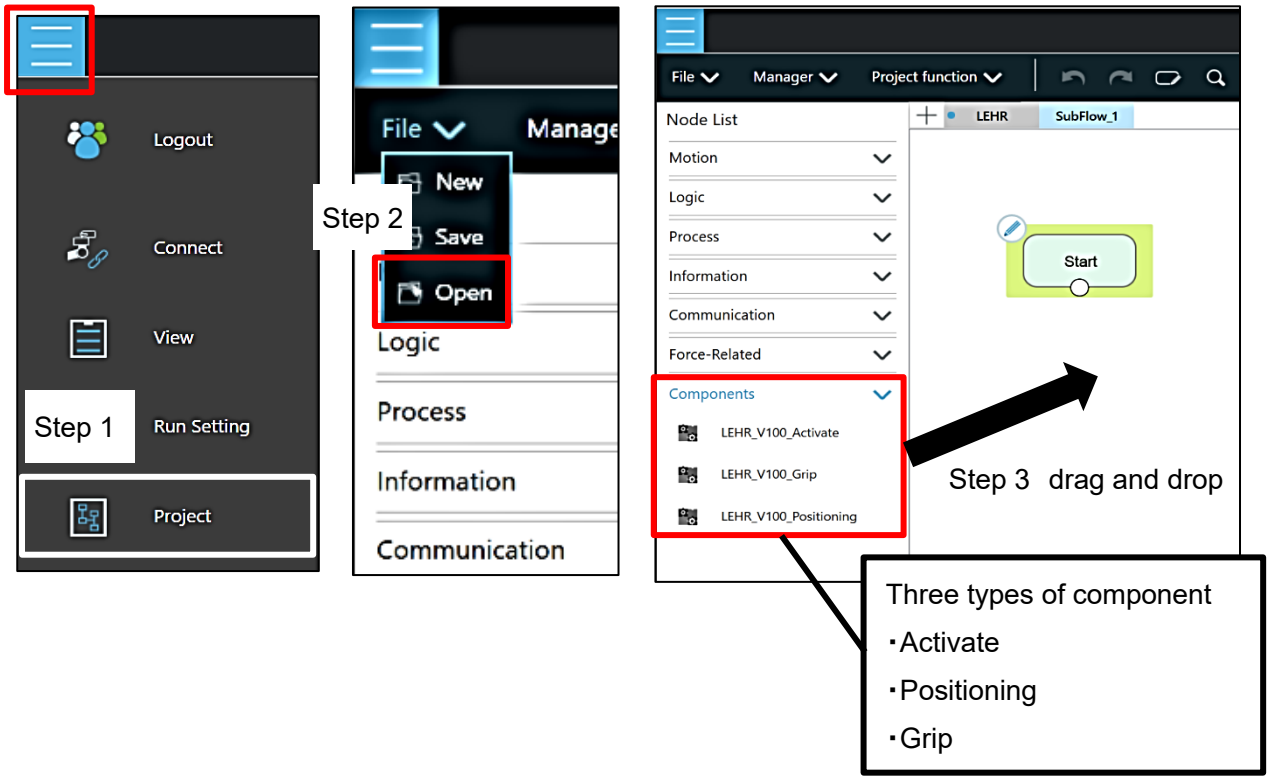
Name	Type	Description
G gripper SMC LEHR CurrentPosition	Float	The current position is stored.

3 How to use TM Component

3.1 Various settings for the project

3.1.1 How to add a component

1. Select the menu icon and select [Project]. (Step 1)
2. Open the project to be added and drag and drop each component under [Component] in the [Node list] onto the program.（Step 2,3）



3.1.2 Test operation

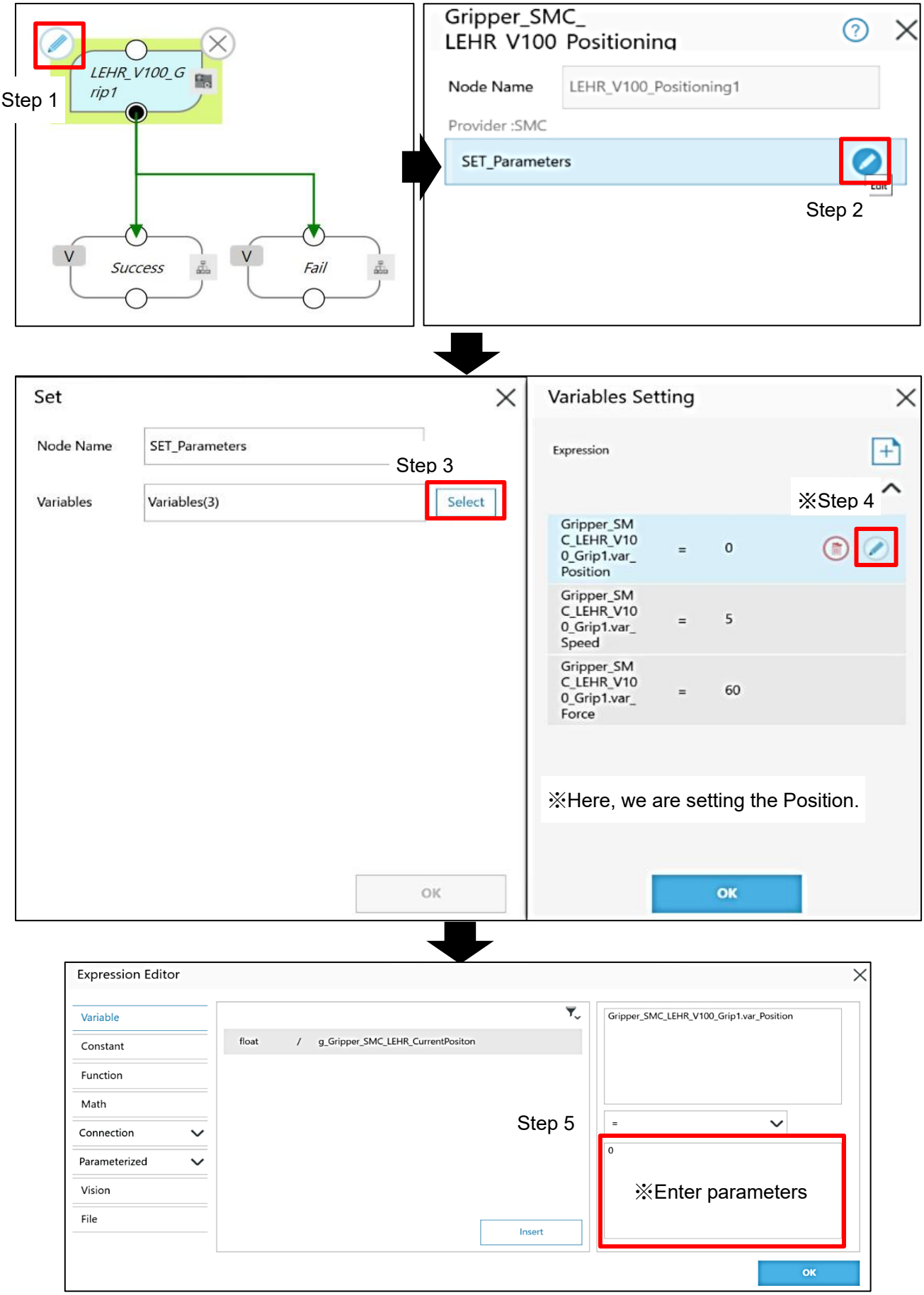
The [Step run] at the top can be used to test run the Grip operation.

Select the components of the Grip and select [Step run].

※Adjust each parameter in a test operation until you are sure that the electric gripper is working properly.

3.1.3 How to set parameters

The procedure for setting parameters for each component is as follows.



※For input values, refer to 3.2.2 Setting the Grip operating conditions.

For Positioning operation, refer to 3.2.3 Setting the Positioning operating

3.2 LEHR Components

Components for the Electric gripper has three types (Activate, Grip, Positioning).

- Activate: It has two functions. The first, Activate is a function that turns the electric gripper servo-on. Activate only needs to be performed once before Positioning and Grip are performed. The second, this is a function to reset the electric gripper alarm. Please execute this function to reset the alarm that occurred during Positioning and Grip execution.

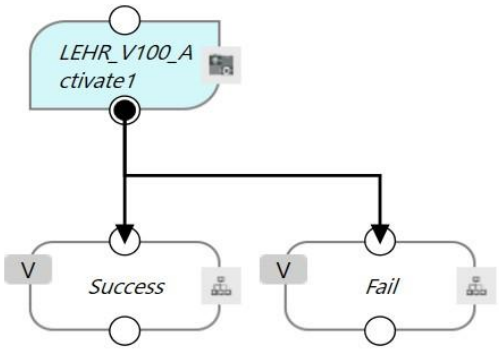
- Grip: Grip is a function that instructs the gripping movement.

- Positioning: Positioning is a function that instructs the opening and closing movement of the gripper fingers.

3.2.1 Activate

Activate is a function that turns the electric gripper servo-on. Activate only needs to be performed once before Positioning and Grip are performed. It does not have to be run more than once within the same program. There is also no content to be set in the Activate settings screen.

- Activate node



Success:	This means that the electric gripper has successfully turned the servo-on or reset the alarm. The LED on the electric gripper changes from magenta to blue.
Fail:	This means that an error occurred during the execution of Activate and the servo could not be switched on or reset the alarm.

If an abnormality occurs, check the LED display on the electric gripper and refer to [4. Alarm detection].

3.2.2 Grip

Grip is a function that instructs the gripping movement.

- Setting the operating parameters.

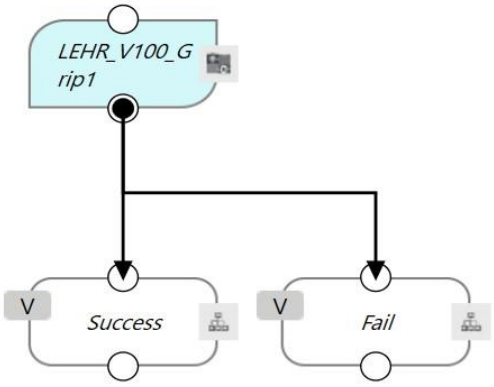
  Position, speed and gripping force can be set in the Grip settings screen.

  Check the table below for the possible setting ranges for each parameter.

Parameter	Min.	Max.
Position [mm]※	0	50
Speed [mm/s]	5	30
Force [N]	60	140

※Position settings must be set with enough margin to ensure secure gripping.

- Grip node



Success:	This means that the gripping movement of the electric gripper has been completed successfully.
Fail:	This means that an operational error has occurred during the gripping movement of the electric gripper.

If an abnormality occurs, check the LED display on the electric gripper and refer to [4. Alarm detection].

3.2.3 Positioning

Positioning is a function that instructs the opening and closing movement of the gripper fingers.

- Setting the operating parameters.

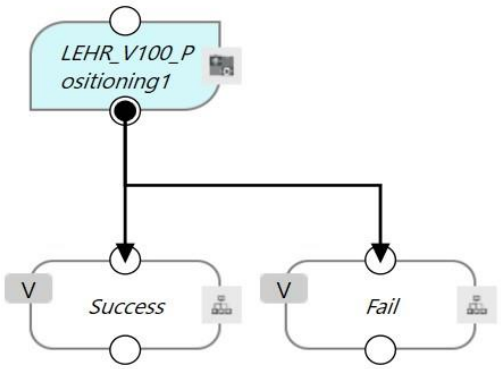
  Position and speed can be set in the Positioning settings screen.

  Check the table below for the possible setting ranges for each parameter.

Parameter	Min.	Max.
Position [mm]※	0	50
Speed [mm/s]	5	30

※The Position setting value must be set with sufficient margin to ensure that the fingers do not collide with the workpiece.

- Positioning node



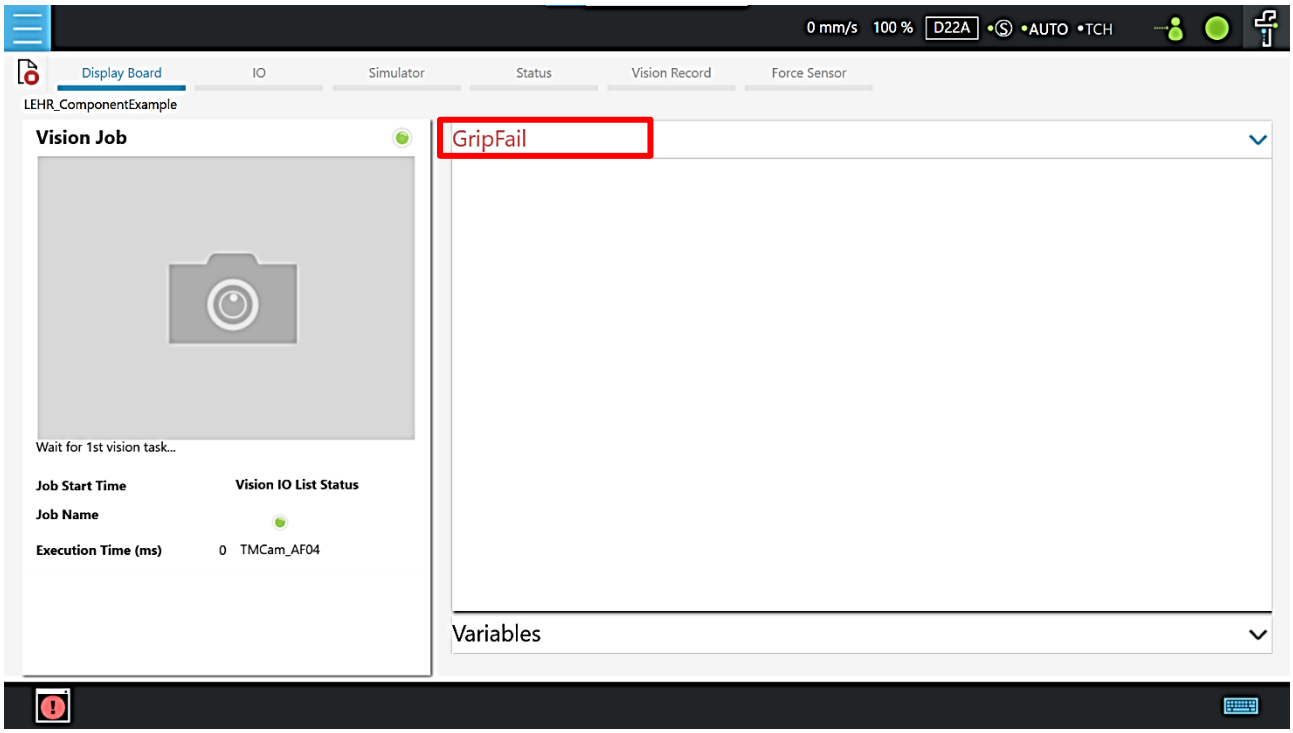
Success:	This means that the opening and closing movement of the electric gripper has been completed successfully.
Fail:	This means that an operational error has occurred during the opening and closing movement of the electric gripper.

If an abnormality occurs, check the LED display on the electric gripper and refer to [4. Alarm detection].

4 Alarm detection

If a warning or alarm occurs, it will be notified on the TM flow screen and the LED lamp on the electric gripper. Refer to the table below for alarms displayed on the TM flow screen.

For the LED lamp display patterns, refer to the operation manual for the "Electric gripper for Collaborative Robots."



Display name	Contents	Countermeasure
Communication error	RS485 communication is not operating correctly.	Check that the serial communication settings are correct. Check the cable connections.
WrongValue error	The parameters set for Positioning or Grip are incorrect.	Check the operating conditions in 3.2.2 or 3.2.3 and review the parameter settings.
ServoOnFail	Servo ON failed	Check if the fingers are jammed.
GripFail	Grip failed	Check that the position and gripping force settings are appropriate for the workpiece.
GripperNotReady	Grip operation is not ready	Reset the electric gripper alarm.
PositioningFail	Positioning failed	Check if there are any factors impeding the finger movement.
PositioningNotReady	Positioning operation is not ready	Reset the electric gripper alarm.

Revision history
2024：Frist edition

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