

Vision Sensor

FH Series

## Vision System

### Macro Customize Functions Programming Manual

FH-1□□□/FH-1□□□-□□

FH-2□□□/FH-2□□□-□□

FH-3□□□/FH-3□□□-□□

FH-5□□□/FH-5□□□-□□

FH-L□□□/FH-L□□□-□□



# Introduction

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Thank you for purchasing the FH.

This manual provides information regarding functions, performance and operating methods that are required for using the FH.

When using the FH, be sure to observe the following:

- The FH must be operated by personnel knowledgeable in electrical engineering.
- To ensure correct use, please read this manual thoroughly to deepen your understanding of the product.
- Please keep this manual in a safe place so that it can be referred to whenever necessary.

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## Structure of FH Manuals

The following table gives the manual configuration of the FH.

| Name of Manual                                                        | Cat. No.  | Model                                                                                            | Proposes                                                                                                                    | Contents                                                                                                                                                                                                                |
|-----------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vision System FH Instruction Sheet                                    | 9608337-2 | FH-1□□□<br>FH-1□□□-□□<br>FH-3□□□<br>FH-3□□□-□□                                                   | To confirm the safety and usage precautions of the Vision System FH series Sensor Controller.                               | Describes the definitions of basic terms, meaning of signal words, and precautions for correct use of FH series in the manual.                                                                                          |
| Vision System FH Instruction Sheet                                    | 3102269-4 | FH-2□□□<br>FH-2□□□-□□<br>FH-5□□□<br>FH-5□□□-□□                                                   | To confirm the safety and usage precautions of the Vision System FH series Sensor Controller.                               | Describes the definitions of basic terms, meaning of signal words, and precautions for correct use of FH series in the manual.                                                                                          |
| Vision System FH-L Instruction Sheet                                  | 9606631-1 | FH-L□□□<br>FH-L□□□-□□                                                                            | To confirm the safety and usage precautions of the Vision System FH-Lite series Sensor Controller.                          | Describes the definitions of basic terms, meaning of signal words, and precautions for correct use of FH-L series in the manual.                                                                                        |
| Vision System FH/FHV Series User's Manual                             | Z365      |                                                                                                  | When User want to know how to setup the Sensor Controller of the Vision System FH/FHV series.                               | Describes the soft functions, setup, and operations to use Sensor Controller of the Vision System FH/FHV series.                                                                                                        |
| Vision System FH series Hardware Setup Manual                         | Z366      | FH-1□□□                                                                                          | When User want to know about the Hard-ware specifications or to setup the Sensor Controller of the Vision System FH series. | Describes FH series specifications, dimensions, part names, I/O information, installation information, and wiring information.                                                                                          |
| Vision System FH series Macro Customize Functions Programming Manual  | Z367      | FH-1□□□-□□<br>FH-2□□□<br>FH-2□□□-□□<br>FH-3□□□<br>FH-3□□□-□□                                     | When User operate or programming using Macro Customize functions.                                                           | Describes the functions, settings, and operations for using Macro Customize function of the FH series.                                                                                                                  |
| Vision System FH/FHV series Processing Item Function Reference Manual | Z341      | FH-5□□□<br>FH-5□□□-□□<br>FH-L□□□<br>FH-L□□□-□□                                                   | When User confirm the details of each processing items at the create the measurement flow or operate it.                    | Describes the software functions, settings, and operations for using FH/FHV series.                                                                                                                                     |
| Vision System FH/FHV Series User's Manual for Communications Settings | Z342      |                                                                                                  | When User confirm the setting of communication functions.                                                                   | Describes the functions, settings, and communications methods for communicating between FH/FHV series. The following communication protocol are described. Parallel, PLC Link, EtherNet/IP, EtherCAT, and Non-procedure |
| Vision System FH Series Operation Manual for Sysmac Studio            | Z343      | FH-1□□□<br>FH-1□□□-□□<br>FH-2□□□<br>FH-2□□□-□□<br>FH-3□□□<br>FH-3□□□-□□<br>FH-5□□□<br>FH-5□□□-□□ | When User connect to NJ series via EtherCAT communication.                                                                  | Describes the operating procedures for setting up and operating FH series Vision Sensors from the Sysmac Studio FH Tools.                                                                                               |

## Conventions Used in This Manual

### Symbols

The symbols used in this manual have the following meanings.

**IMPORTANT** Indicates relevant operational precautions that must be followed.

**Note** Indicates operation-related suggestions from OMRON.

### Use of Quotation Marks and Brackets

In this manual, menus and other items are indicated as follows.

[ ] Menu Indicates the menu names or processing items shown in the menu bar.

“ ” Item name Indicates the item names displayed on the screen.

## Definitions of Basic Terms

For details on Definitions of Basic Terms, refer to *Definitions of Basic Terms* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365).

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## **Precautions for Safe Use**

For details on Precautions for Safe Use, refer to *Precautions for Safe Use* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365).

## **Precautions for Correct Use**

For details on Precautions for Correct Use, refer to *Precautions for Correct Use* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365).

## **Regulations and Standards**

For details on Regulations and Standards, refer to *Regulations and Standards* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365).

MEMO

# Overview of Macro Customize Functions

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# Macro Customize Functions

In the FH series, the macro customize functions can be used to realize finely adjusted and expandable image processing.

The macro customize functions enable you to perform various types of calculations that are more advanced than normal "Calculation" processing items, as well as functions such as measurement flow/scene control, creation of communication commands, various types of display control, and result output control.

On the FH series, the following types of macro functions can be used.

The four types below can be used.

- "Unit Calculation Macro" processing item
- "Scene Control Macro" tool
- "Communication Command Macro" tool
- "Unit Macro" processing item

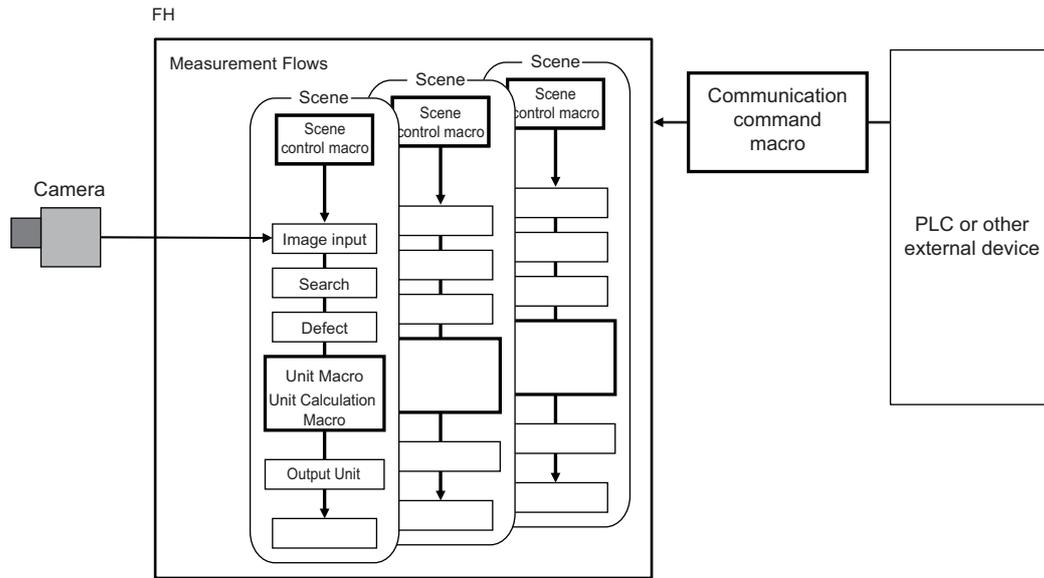
## List of Macro Customize Functions

A table of the macro customize functions and their approximate level of difficulty is shown below.

The level of difficulty varies by function. Check the approximate level of difficulty in the table when considering the expansion you want to create.

| Approximate level of difficulty | Function                                     | Description                                                                                                                                                                                                                                                                    | Target function        |                                       |                        |               |
|---------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------|------------------------|---------------|
|                                 |                                              |                                                                                                                                                                                                                                                                                | Measurement processing |                                       | Communication commands | Scene control |
|                                 |                                              |                                                                                                                                                                                                                                                                                | Calculation            | Other than calculation <sup>(*)</sup> |                        |               |
| High                            | (1) "Unit Macro" processing item             | Use this function to supplement and expand measurement processing performed by processing units. In addition to measurement processing, you can create your own custom processing such as result display processes and measurement initialization processes for scene control. | ○                      | ○                                     | ---                    | ---           |
| ↓                               | (2) "Communication Command Macro" tool       | Use this function to supplement and expand communication commands. You can create custom communication commands that implement functions that do not exist in the standard communication commands, and combine multiple communication commands into a signal command.          | ---                    | ---                                   | ○                      | ---           |
|                                 | (3) "Scene Control Macro" tool               | Use this function to supplement and expand measurement flow and Scene Control. For example, you can add and set processing units to the measurement flow.                                                                                                                      | ---                    | ---                                   | ---                    | ○             |
|                                 | (4) "Unit Calculation Macro" processing item | Use this function to supplement and expand calculation processes during measurement. A "Calculation" processing item allows you to implement complex operations with difficult settings, and calculations that include a logical expression or repeated process.               | ○                      | ---                                   | ---                    | ---           |
|                                 | Low                                          |                                                                                                                                                                                                                                                                                |                        |                                       |                        |               |

\*1: Result display (graphic display, detailed text display, etc.), result output, and creation of initial processing



In the following cases, a macro customize function is used.

|                                            | In this case                                                                                                                                                                                                                                                                                                                                                                                                                                     | Macro customize function that is used    |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Calculation                                | Use to perform a calculation process that is difficult or cannot be expressed using a "Calculation" processing item, such as those below. <ul style="list-style-type: none"> <li>• Use to execute a calculation process that extends over multiple lines or contains a logical expression, conditional branch, loop process, or data setting process</li> <li>• Use to execute a customized judgement process for calculation results</li> </ul> | "Unit Calculation Macro" processing item |
| Calculation, Display result, Output result | Use to customize or include the following processes that that are difficult or cannot be expressed with a "Calculation" processing item or a "Unit Calculation Macro" processing item. <ul style="list-style-type: none"> <li>• Display result (graphic display, detailed text display, etc.)</li> <li>• Output result</li> <li>• Measurement initialization processing (scene switching, etc.)</li> </ul>                                       | "Unit Macro" processing item             |
| Scene Control                              | Use to control the Scene such as the followings. <ul style="list-style-type: none"> <li>• Changing the settings of multiple processing units at once</li> <li>• Managing the common data of multiple processing units</li> <li>• Adding/deleting a processing unit</li> </ul>                                                                                                                                                                    | "Scene Control Macro" tool               |
| Communication commands                     | Use to create expansions that are difficult or cannot be expressed with the standard communication commands, such as those below. <ul style="list-style-type: none"> <li>• Not to exist in the standard communication commands.</li> <li>• To combine multiple communication command functions into a single communication command</li> </ul>                                                                                                    | "Communication Command Macro" tool       |

## Structure of This Manual

The relation between the contents of this manual and the macro customize functions is shown below. Refer to function items that you need to use.

| Item name                                                                                                                                                  | Macro customize function |                     |                             |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------|-----------------------------|--------------|
|                                                                                                                                                            | Unit Calculation Macro   | Scene Control Macro | Communication Command Macro | Unit Macro   |
| What are the Macro Customize Functions?<br>Reference: ▶ Basics of Programming (p.45)                                                                       | Required                 | Required            | Required                    | Required     |
| How to use Macro Customize Functions<br>Reference: ▶ Using Macro Customize Functions (p.13)                                                                | Required                 | Required            | Required                    | Required     |
| Basic Method for Writing Programs<br>Reference: ▶ Basics of Programming (p.45)                                                                             | Required                 | Required            | Required                    | Required     |
| How to Write Advanced Programs                                                                                                                             | ---                      | ---                 | ---                         | ---          |
| Data Types Related to Processing Units<br>Reference: ▶ Data Types Related to Processing Units (p.62)                                                       | As needed                | As needed           | As needed                   | As needed    |
| Data Types Related to the System<br>Reference: ▶ Data Types Related to the System (p.67)                                                                   | As needed                | As needed           | As needed                   | As needed    |
| Scope of Data and Save Area<br>Reference: ▶ Scope of Data and Save Area (p.70)                                                                             | As needed                | As needed           | As needed                   | As needed    |
| Status Transitions and Execution Timing<br>Reference: ▶ State Transitions and Execution Timing (p.72)                                                      | Not required             | As needed           | Not required                | As needed    |
| Exclusive Control in a Process<br>Reference: ▶ Exclusive Control in a Process (p.79)                                                                       | As needed                | As needed           | As needed                   | As needed    |
| Preparations for use of macro customize functions                                                                                                          | ---                      | ---                 | ---                         | ---          |
| Preparations for use of the "Unit Calculation Macro" processing item<br>Reference: ▶ Procedure for Using the unit calculation macro processing item (p.16) | Required                 | Not required        | Not required                | Not required |
| Preparations for use of the scene control macro<br>Reference: ▶ Procedure for Using the Scene Control Macro Tool (p.17)                                    | Not required             | Required            | Not required                | Not required |
| Preparations for use of the communication command macro tool<br>Reference: ▶ Procedure for Using the Communication Command Macro Tool (p.17)               | Not required             | Not required        | Required                    | Not required |
| Preparations for use of the "Unit Macro" processing item<br>Reference: ▶ Procedure for Using the unit macro processing item (p.18)                         | Not required             | Not required        | Not required                | Required     |
| How to Use the Debug Function<br>Reference: ▶ How to Use the Debug Function (p.82)                                                                         | Required                 | Required            | Required                    | Required     |
| Troubleshooting<br>Reference: ▶ Troubleshooting (p.93)                                                                                                     | As needed                | As needed           | As needed                   | As needed    |

# Using Macro Customize Functions

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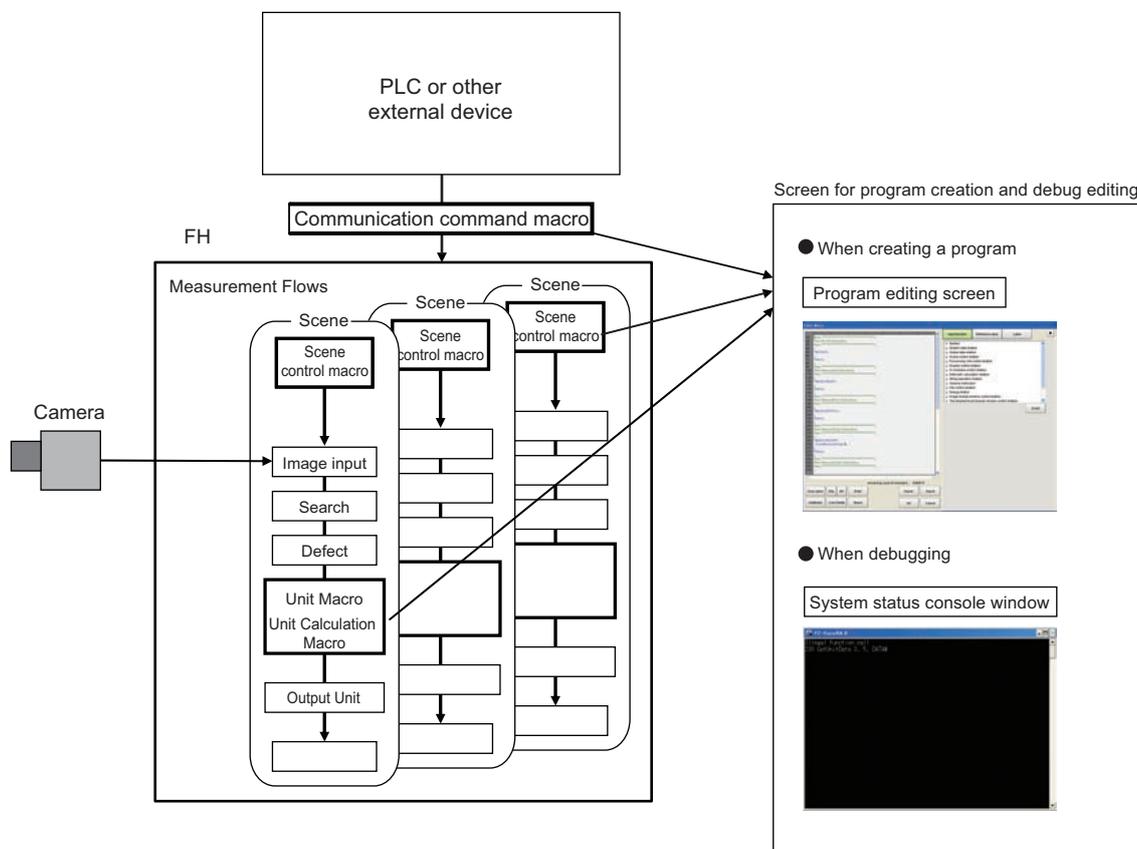
# Instructions on Using Macro Customize Functions

| Necessity of referring to this manual | Unit Macro | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|------------|-----------------------------|---------------------|------------------------|
|                                       | Required   |                             |                     |                        |

You can use the macro customize functions to program processes that you want to add or expand. On a sensor controller, you can execute the macro customize functions and debug the programs of the macro customize functions.

## Components of the Macro Customize Functions

The macro customize functions consist of program editing screens that enable the creation and editing of programs in the processing items, tool setting screens, and setting screens of each function, and a system status console window that allow errors to be checked when a program operates abnormally.



| Function                     | Description                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Program editing screen       | Setting screen of each function in the macro customize functions. The contents of the program editing screen vary by function.<br>Use the program editing screen to create programs. You can create and edit programs, and use input auxiliary functions.<br>Reference: ▶ Components of the Program Editing Screen (p.20)                                                         |
| System status console window | Console window that shows the system status as text.<br>When a program created with a macro customize function operates abnormally, a description of the error appears in text in the system status console window.<br>Use this to debug the program.<br>Reference: ▶ Use the system status console window to debug macro customize programs and check error descriptions. (p.24) |

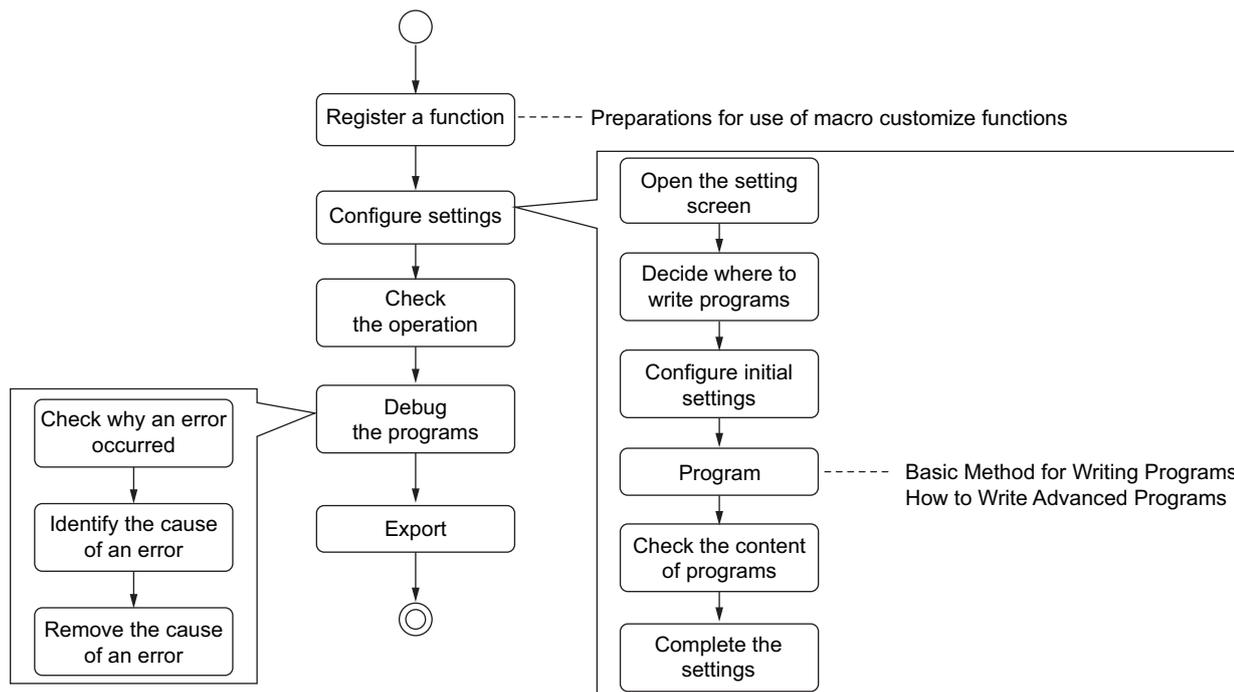
### IMPORTANT

The setting screens of the macro customize functions cannot be displayed by remote operation. To change settings, directly open the setting screen of the function on the sensor controller.

## Procedures for Using the Macro Customize Functions

The procedures for using macro customize functions are two types, one is a common procedure used for all functions and second is the specific procedures for each function.

The flow of the common procedure for using the macro customize functions is shown below.



| Item name                             | Step                                               | Description                                                                                                                                                                  |
|---------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function registration and preparation | Register a function and display the setting screen | Register processing items that enable use of macro customize functions in the measurement flow, and open tool screens. The specific procedure depends on the each functions. |
| ---                                   | ↓                                                  | ---                                                                                                                                                                          |
| Function settings                     | Default function settings                          | Prepare initial settings and variables. The specific procedure depends on the each functions.                                                                                |
|                                       | ↓                                                  | ---                                                                                                                                                                          |
|                                       | Creation of processing content                     | Write the program.                                                                                                                                                           |
|                                       | ↓                                                  | ---                                                                                                                                                                          |
| Program debug                         | Check operation                                    | Check if your settings operate as expected.                                                                                                                                  |
|                                       | ↓                                                  | ---                                                                                                                                                                          |
|                                       | Debug                                              | Debug the program. Debug helps you identify the cause of the unexpected operation and correct the program to run as expected.                                                |
| ---                                   | ↓                                                  | ---                                                                                                                                                                          |
| Save                                  | Save settings                                      | Save your changes.                                                                                                                                                           |

### Procedure for Using the unit calculation macro processing item

The usage flow for the unit calculation macro processing item and the basic usage procedures are described below.

| Item name                                                                                                                                                                                     | Step                                                     | Description                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ---                                                                                                                                                                                           | Registration of a unit calculation macro processing unit | Add a macro calculation processing unit to the measurement flow.                                                                                                                                                                      |
| ---                                                                                                                                                                                           | ↓                                                        | ---                                                                                                                                                                                                                                   |
| Settings of the unit calculation macro processing unit (Reference: ▶ Description of the Setting Screen for the "Unit Calculation Macro" Processing Item and How to Configure Settings (p.25)) | Selection of operators                                   | Select the checkboxes of operators to be used in the unit calculation macro.                                                                                                                                                          |
|                                                                                                                                                                                               | ↓                                                        | ---                                                                                                                                                                                                                                   |
|                                                                                                                                                                                               | Reference Variable Settings                              | Set reference values if reference values will be used. Set reference values in order to use data other than that of the macro calculation processing unit, such as external reference data of other processing units and system data. |
|                                                                                                                                                                                               | ↓                                                        | ---                                                                                                                                                                                                                                   |
|                                                                                                                                                                                               | Program input                                            | Write the program.                                                                                                                                                                                                                    |
|                                                                                                                                                                                               | ↓                                                        | ---                                                                                                                                                                                                                                   |
|                                                                                                                                                                                               | Setting of judgement conditions                          | Set the conditions used to judge calculation results.                                                                                                                                                                                 |
|                                                                                                                                                                                               | ↓                                                        | ---                                                                                                                                                                                                                                   |
| Program debug (Reference: ▶ How to Use the Debug Function (p.82))                                                                                                                             | Check operation                                          | Check if your settings operate as expected.                                                                                                                                                                                           |
|                                                                                                                                                                                               | ↓                                                        | ---                                                                                                                                                                                                                                   |
|                                                                                                                                                                                               | Debug                                                    | Debug the program. Debug helps you identify the cause of the unexpected operation and correct the program to make the unit calculation macro processing unit operate as expected.                                                     |
| ---                                                                                                                                                                                           | ↓                                                        | ---                                                                                                                                                                                                                                   |
| ---                                                                                                                                                                                           | Saving settings                                          | Save your changes.                                                                                                                                                                                                                    |

## Procedure for Using the Scene Control Macro Tool

The usage flow for the scene control macro tool and the basic usage procedures are described below.

| Item name                                                                                                                                                  | Step                                  | Description                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ---                                                                                                                                                        | Starting the Scene Control Macro Tool | Start the scene control macro tool from the external tools.                                                                                                                    |
| ---                                                                                                                                                        | ↓                                     | ---                                                                                                                                                                            |
| Scene control macro tool settings<br>(Reference: ▶ Description of the Setting Screen of the Scene Control Macro Tool and How to Configure Settings (p.29)) | Reference Variable Settings           | Set reference values if reference values will be used. Set reference variables in order to use data such as external reference data of processing units and system data.       |
|                                                                                                                                                            | ↓                                     | ---                                                                                                                                                                            |
|                                                                                                                                                            | Unit label settings                   | Set unit labels if unit labels will be used. Make preparations to use unit labels, rather than processing unit numbers, to reference processing units in the measurement flow. |
|                                                                                                                                                            | ↓                                     | ---                                                                                                                                                                            |
|                                                                                                                                                            | Program input                         | Write in the program.                                                                                                                                                          |
| ---                                                                                                                                                        | ↓                                     | ---                                                                                                                                                                            |
| Program debug<br>(Reference: ▶ How to Use the Debug Function (p.82))                                                                                       | Check operation                       | Check if your settings operate as expected.                                                                                                                                    |
|                                                                                                                                                            | ↓                                     | ---                                                                                                                                                                            |
|                                                                                                                                                            | Debug                                 | Debug the program. Debug helps you identify the cause of the unexpected operation and correct the program to make the scene control macro operate correctly.                   |
| ---                                                                                                                                                        | ↓                                     | ---                                                                                                                                                                            |
| ---                                                                                                                                                        | Saving settings                       | Save your changes.                                                                                                                                                             |

## Procedure for Using the Communication Command Macro Tool

The usage flow for the communication command macro tool and the basic usage procedure are described below.

| Item name                                                                                                                                                            | Step                                                    | Description                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| ---                                                                                                                                                                  | Starting the communication command macro tool           | Start the communication command macro tool from the external tools.                                                               |
| ---                                                                                                                                                                  | ↓                                                       | ---                                                                                                                               |
| Communication command macro settings<br>(Reference: ▶ Components of the Setting Screen of the Communication Command Macro Tool and How to Configure Settings (p.31)) | Selection of the communication command macro to be used | Select the checkbox of the communication command macro to be used.                                                                |
|                                                                                                                                                                      | ↓                                                       | ---                                                                                                                               |
|                                                                                                                                                                      | Communication command macro name setting                | Assign a name to the communication command macro.                                                                                 |
|                                                                                                                                                                      | ↓                                                       | ---                                                                                                                               |
|                                                                                                                                                                      | Flow signal output setting                              | Select whether flow signals such as the BUSY signal are turned ON or left OFF during processing. To turn on, select the checkbox. |
|                                                                                                                                                                      | ↓                                                       | ---                                                                                                                               |
|                                                                                                                                                                      | Program input                                           | Write the program.                                                                                                                |
| ---                                                                                                                                                                  | ↓                                                       | ---                                                                                                                               |

| Item name                                                            | Step            | Description                                                                                                                                                               |
|----------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Program debug<br>(Reference: ► How to Use the Debug Function (p.82)) | Check operation | Check if your settings operate as expected.                                                                                                                               |
|                                                                      | ↓               | ---                                                                                                                                                                       |
|                                                                      | Debug           | Debug the program.<br>Debug helps you identify the cause of the unexpected operation and correct the program to make the communication command macro operate as expected. |
| ---                                                                  | ↓               | ---                                                                                                                                                                       |
| ---                                                                  | Save settings   | Save your changes.                                                                                                                                                        |

### Procedure for Using the unit macro processing item

The usage flow for the unit macro processing item and the basic usage procedure are described below.

| Item name                                                                                                                                                           | Step                                       | Description                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ---                                                                                                                                                                 | Registration of unit macro processing unit | Add a unit macro processing unit to the measurement flow.                                                                                                                                                                |
| ---                                                                                                                                                                 | ↓                                          | ---                                                                                                                                                                                                                      |
| Settings of unit macro processing unit<br>(Reference: ► Description of the Setting Screen of the "Unit Macro" Processing Item and How to Configure Settings (p.39)) | Reference Variable Settings                | Set reference values if reference values will be used.<br>Set reference values to use data other than that of the unit macro processing unit, such as external reference data of other processing units and system data. |
|                                                                                                                                                                     | ↓                                          | ---                                                                                                                                                                                                                      |
|                                                                                                                                                                     | Program input                              | Write the program.                                                                                                                                                                                                       |
| ---                                                                                                                                                                 | ↓                                          | ---                                                                                                                                                                                                                      |
| Program debug<br>(Reference: ► How to Use the Debug Function (p.82))                                                                                                | Check operation                            | Check if your settings operate as expected.                                                                                                                                                                              |
|                                                                                                                                                                     | ↓                                          | ---                                                                                                                                                                                                                      |
|                                                                                                                                                                     | Debug                                      | Debug the program.<br>Debug helps you identify the cause of the unexpected operation and correct the program to make the unit macro processing unit operate as expected.                                                 |
| ---                                                                                                                                                                 | ↓                                          | ---                                                                                                                                                                                                                      |
| ---                                                                                                                                                                 | Save settings                              | Save your changes.                                                                                                                                                                                                       |

# Screen Component and Setting Configuration

|                                                                                                                              |           |
|------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Components of the Screens and How to Configure Settings.....</b>                                                          | <b>20</b> |
| <b>Components of the Program Editing Screen.....</b>                                                                         | <b>20</b> |
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| <b>Saving and Loading Programs .....</b>                                                                                     | <b>43</b> |

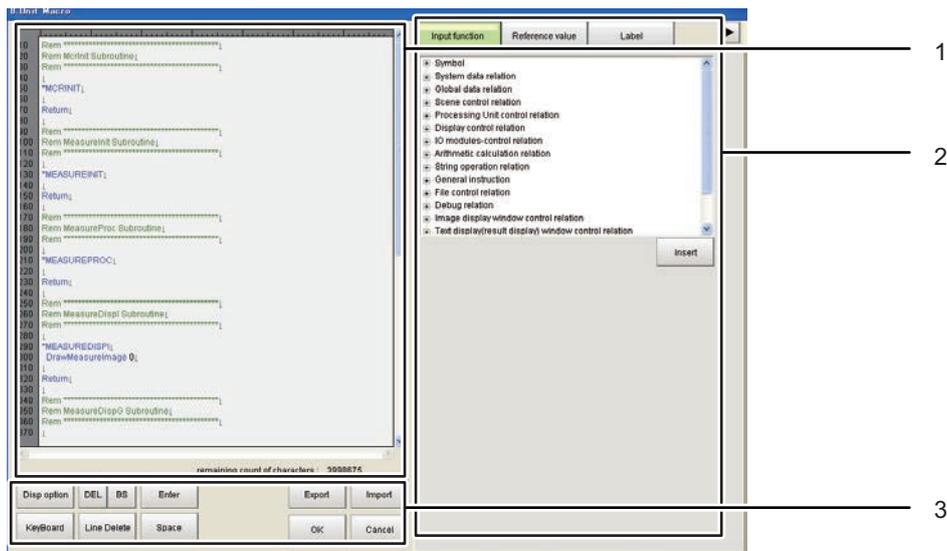
# Components of the Screens and How to Configure Settings

| Necessity of referring to this manual | Unit Macro | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|------------|-----------------------------|---------------------|------------------------|
|                                       |            | Required                    |                     |                        |

The setting screens of the macro customize function consist of a program editing screen that is shared by all macro customize functions, and individual setting screens for each function. The setting methods vary by setting screen.

## Components of the Program Editing Screen

Use the program editing screen to edit a program in the macro customize function. The program editing screen consists of the areas below.

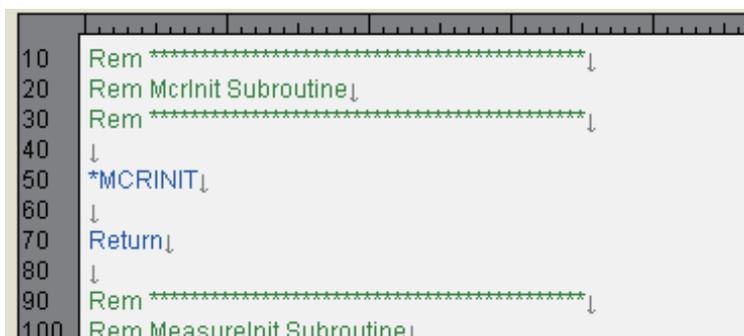


### 1. Program area

The program appears in this area. You can select whether some of the display items are displayed. Reference: ▶ Display option (p.23)

#### • Program input area

This area is used to enter programs. Create and edit programs in this area. When creating and editing programs in the program input area, use the keyboard to write the program in the program input area. The screen keyboard can be displayed from the operation button area. Reference: ▶ 3. Operation button area (p.22)



The control characters are displayed in a visible form in the program area. Control characters are included in the remaining count of characters, and thus are convenient for checking the number of inputtable characters.

Reference: ▶ Remaining count of characters (p.21)

| Display (color) | Description                    |
|-----------------|--------------------------------|
| ↓ (gray)        | Indicates a line break.        |
| □ (gray)        | Indicates a double-byte space. |
| → (gray)        | Indicates the tab character.   |

### IMPORTANT

- You can add comments in the program area. (Reference: ▶ Comment (p.48))
- Note that allowable character strings differ depending on the type of the Sensor Controller as shown below.
- On the FH Series, English characters and characters for the language selected in [Language setting] are allowed.

#### Note

If a function entered in a program cannot be used, the function name is shown in red. Whether or not a function can be used depends on the macro customize function that is used. For details, refer to Macro Function Reference.

Reference: ▶ Macro Reference List (p.554)

#### • Line number display area

The program line number appears in this area. The line number is used in debugging. For lines and line numbers, refer to the Basic Syntax section.

Reference: ▶ Basic Syntax (p.46)

#### Note

Line numbers are assigned as unique numbers in the program. When multiple calculation expressions are set for one unit calculation macro processing unit, unique line numbers that are not redundantly used in the multiple calculation expressions in the processing unit are assigned.

#### • Remaining count of characters

This area shows how many characters can still be input in the program. Control characters such as line breaks and tabs are also included in the count. Create/edit the program so that the remaining inputtable character count is 0 or more. If a program has more than the inputtable character count, it may not operate correctly.

## 2. Supplemental Program Input Area

This area can be used to input supplemental settings and perform supplemental input operations for programs.

To hide the supplemental program input area and enlarge the program area, click the [▼] button.

#### • Input function tab

This area shows a list of the macro functions.

After selecting a macro function in the list, click the [Insert] button to insert the selected macro function immediately behind the cursor position in the program input area.

#### • Reference variable tab

This area allows to register and configure settings for reference variables. This area only appears in the program editing screen for unit calculation macros, scene control macros, and unit macros.

The reference variables set in the reference variable area can only be used by the processing unit of that setting screen and in scene control macro of that setting screen. The reference variable area is not shown in the communication command macro.

For details on reference variables, refer to the Variables section.

Reference: ▶ Variable (p.50)

| Button | Description                                                                                                                                                               |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Add    | Displays the reference variable setting screen. You can add a reference variable in the setting screen.                                                                   |
| Delete | Deletes a reference variable that has been selected in the reference variable list.                                                                                       |
| Edit   | Displays the setting screen of a reference variable selected in the reference variable list. You can change the settings of the reference variable in the setting screen. |
| Export | Displays the save file screen. Specify the save location and file name to save the settings of the current reference variable list as a file in XML format.               |
| Import | Displays the import file screen. Imports reference variables saved in a file in XML format.                                                                               |

- **Label tab**

This area can be used to set and reference unit labels. Unit labels can only be set in the scene control macro. In a macro customize function other than the scene control macro, unit labels settings can only be referenced.

For details on unit labels, refer to "Description of the Setting Screen for the Scene Control Macro Tool and How to Configure Settings".

Reference: ▶ Description of the Setting Screen of the Scene Control Macro Tool and How to Configure Settings (p.29)

### 3. Operation button area

This area contains buttons for editing programs by button operation, and buttons for exporting and importing programs.

The buttons that can be used depend on the macro customize function that is used.

Buttons that can be used in the operation button area are shown below.

| Button           | Description                                                                                                                                                                                                                                                                                        |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display Settings | Shows the display settings screen.                                                                                                                                                                                                                                                                 |
| Keyboard         | Displays the screen keyboard.<br>Use the keyboard to create and edit programs.                                                                                                                                                                                                                     |
| DEL              | Deletes one character immediately after the cursor position in the program input area.                                                                                                                                                                                                             |
| BS               | Deletes one character immediately in front of the cursor position in the program input area.                                                                                                                                                                                                       |
| Enter            | Breaks the line at the cursor position in the program input area.                                                                                                                                                                                                                                  |
| Line Delete      | Deletes the line where the cursor is located in the program input area.                                                                                                                                                                                                                            |
| Space            | Inserts a space at the cursor position in the program input area.                                                                                                                                                                                                                                  |
| Clear            | Initializes the program shown in the program area.<br>Only appears for the scene control macro.                                                                                                                                                                                                    |
| Export           | Exports the program file to a file.<br>Only appears for the unit macro.                                                                                                                                                                                                                            |
| Import           | Imports a program file from a file.<br>Only appears for the unit macro.                                                                                                                                                                                                                            |
| OK               | Finalizes the edited contents of the program editing screen and closes the screen.<br>If there is a error in the program, the error dialog box appears. If the error dialog box appears, remove the error and click OK.<br>A description of the error appears in the system status console window. |
| Cancel           | Discards editing changes in the program editing screen and closes the screen.                                                                                                                                                                                                                      |

### Note

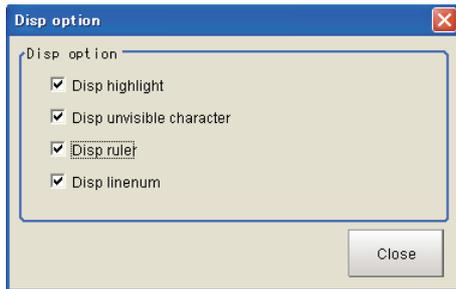
- In the FH series, the layout of the keyboard on the sensor controller is the same as an English keyboard. To enter Japanese, you can change the input mode with [ALT] + [~].
- If the program has an error, the error dialog appears when [OK] is clicked. If the error dialog box appears, remove the error and click OK to complete the settings. You can view a description of the error in the system status console window.

Reference: ▶ Structure of the System Status Console Window (p.24)

## Display option

To add the contents of the program area and make the program easier to view, change the program area display settings.

The settings in the display option screen are described below.



| Setting item             | Setting value<br>[Factory default]                                              | Description                                                                                                                                                                                        |
|--------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Disp highlight           | <ul style="list-style-type: none"><li>• [Checked]</li><li>• Unchecked</li></ul> | Highlights the program in the program input area with distinguishing colors. Each keyword type is highlighted in a different color, making the program easier to view.                             |
| Disp invisible character | <ul style="list-style-type: none"><li>• [Checked]</li><li>• Unchecked</li></ul> | Shows line breaks, tabs, and other control characters in the program input area in a visible form. For details on hidden characters, refer to Program Area.<br>Reference: ▶ 1. Program area (p.20) |
| Disp ruler               | <ul style="list-style-type: none"><li>• [Checked]</li><li>• Unchecked</li></ul> | Shows the ruler in the program input area. Showing the ruler makes it easier to check the number of characters on one line.                                                                        |
| Disp linenum             | <ul style="list-style-type: none"><li>• [Checked]</li><li>• Unchecked</li></ul> | Shows line numbers on the left side of the program input area. Showing line numbers makes it easier to identify lines where errors occur during debug.                                             |

### Note

- In the FH/FZ5-11□□ series, you can increase the size of the program area and make the program easier to view by removing the checkmarks from the display settings. This will also improve the program editing response.
- The display settings are not saved. When the program editing screen is closed, the display settings revert to the factory default settings.
- When "Disp highlight" is selected and a function entered in a program cannot be used, the function name is shown in red.

Whether or not a function can be used depends on the macro customize function that is used. For details, refer to Macro Function Reference.

Reference: ▶ Macro Reference List (p.554)

## Reference Variable Settings

Set the reference variables used in the program. For details on reference variables, refer to the Variables section.

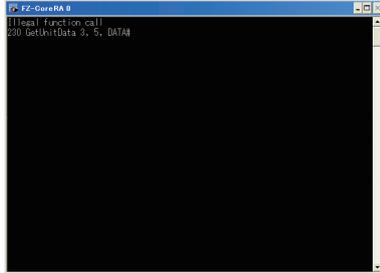
Reference: ▶ Variable (p.50)

## Description of the System Status Console Window

Use the system status console window to debug macro customize programs and check error descriptions.

### Structure of the System Status Console Window

The information shown in the system status console window is described below.



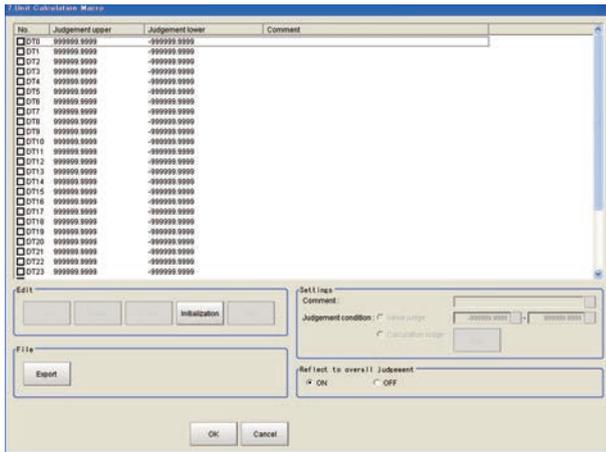
| Display area               | Description                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System status display area | <p>Shows the system status as text.</p> <p>When a program created with a macro customize function operates abnormally, a description of the error appears in the system status display area.</p> <p>For the information displayed, refer to "Checking the System Status Console Window".</p> <p>Reference: ▶ Structure of the System Status Console Window (p.24)</p> |

### IMPORTANT

- Do not close the system status console window by a method such as clicking the "x" button in the upper right corner of the system status console window. The system may not operate correctly. If the system status console window is accidentally closed, save your settings and restart the sensor controller.

## Description of the Setting Screen for the "Unit Calculation Macro" Processing Item and How to Configure Settings

The components of the properties screen of the "Unit Calculation Macro" processing item are described below.



### Selection of Operators (Unit Calculation Macro)

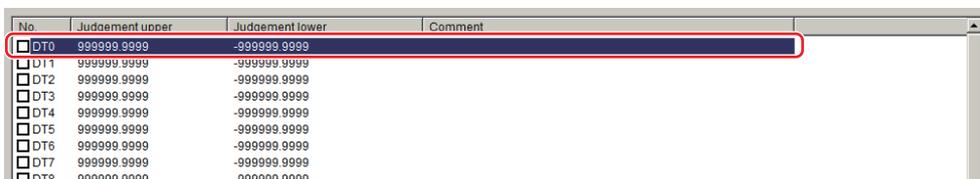
32 calculation processes from "DT0" to "DT31" can be set per unit.  
The processing is executed in ascending order.

#### Note

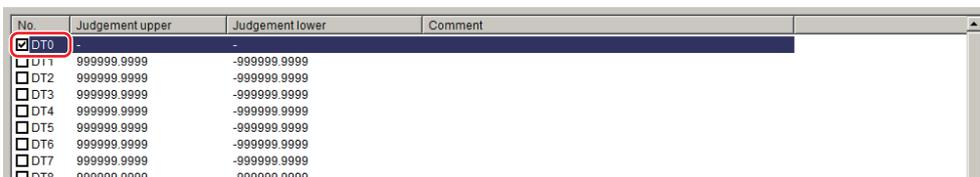
- Calculation results cannot be output to external devices when you only set up macro calculations. When calculation results are output to external devices, set processing items related to results output in units after "Unit Calculation Macro" with flow editing.

Reference: ▶ "Output Result" in the "Vision System FH/FHV Series Processing Item Function Reference Manual (Cat. No. Z341)"

### 1 From the list, click the operator of the calculation processing to be set.



### 2 Place a check at the operator to use to perform the calculation processing.



### 3 In the Edit area, click [Edit].

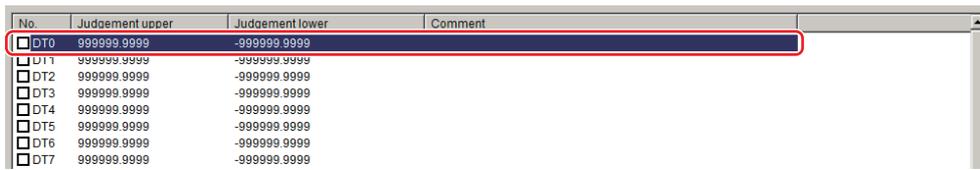
The unit calculation macro setting window is displayed.



## Editing Operator (Unit Calculation Macro)

The calculation processing you have set can be copied or cleared.

- 1 From the list, click the operator of the calculation processing whose setting is to be edited.



- 2 Select each operation in the "Edit" area.

The Unit Calculation Macro settings screen is displayed.



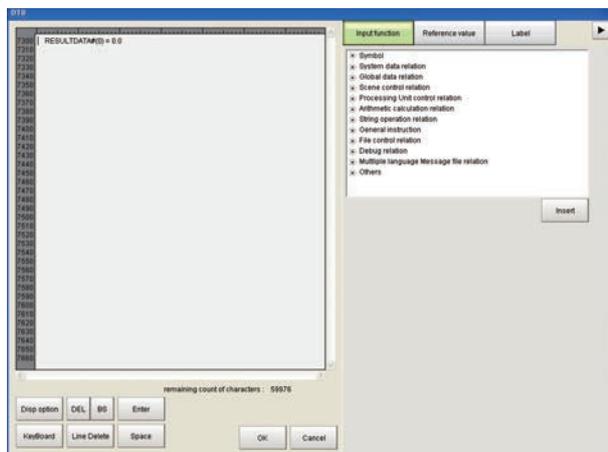
| Item           | Description                                                                                                                                                                                                                                        |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Copy           | Copy the setting of the operator you have selected from the list. The copied setting can be pasted to other operator via [Paste].                                                                                                                  |
| Paste          | Paste the copied set value to the operator selected from the list. Data that can be pasted includes valid/invalid flags, calculation macro codes, comments, judgement flags, upper/lower limits of figure judgement and judgement macro codes.     |
| Clear          | Initialize the setting of the operator you have selected from the list. Data to be initialized includes valid/invalid flags, calculation macro codes, comments, judgement flags, upper/lower limits of figure judgement and judgement macro codes. |
| Initialization | Initialize the settings of all operators.                                                                                                                                                                                                          |
| Edit           | Edit the setting of the operator you have selected from the list.<br>Reference: ▶ Selection of Operators (Unit Calculation Macro) (p.25)                                                                                                           |

## Reference Variable Settings (Unit Calculation Macro)

Set the reference variables used in the program. The reference variables setting method is the same method as for the unit macro processing item.

Reference: ▶ Description of the Setting Screen of the "Unit Macro" Processing Item and How to Configure Settings (p.39)

## Program Input (Unit Calculation Macro)



Note: RESULTDATA#() is a data identify of the calculated data.

The program input method is the same method as for the unit macro processing item.

Reference: ▶ Program Input (Unit Macro) (p.41)

## Judgement Condition Settings (Unit Calculation Macro)

### 1 Set judgement conditions in the "Settings" area.



| Setting item        | Setting value [Factory default]                                                                | Description                                                                                                                                                                                                                                                                               |
|---------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Comment             | -                                                                                              | Enter a comment on the calculation processing you have selected from the list. Multilingual support is also possible.<br>Reference: ► "Inputting text" in the Vision System FH/FHV Series User's Manual (Cat. No. Z365).                                                                  |
| Judgement condition | <ul style="list-style-type: none"> <li>• [Value judge]</li> <li>• Calculation judge</li> </ul> | Select whether to use a figure or macro judgement for the calculation result.<br>If figure judgement selected, set the upper/lower limits of OK judgement.<br>If macro judgement is selected, click [Edit] and define the calculation processing to be performed on the calculated value. |

### 2 Select whether or not to reflect the judgement result in the scene overall judgement in "Reflect to overall judgement" area.



| Setting item                 | Setting value [Factory default]                                         | Description                                                                                                       |
|------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Reflect to overall judgement | <ul style="list-style-type: none"> <li>• [ON]</li> <li>• OFF</li> </ul> | Specify whether or not the judgement results of this processing unit is reflected in the scene overall judgement. |

## Key Points for Test Measurement and Adjustment (Unit Calculation Macro)

To increase the speed and precision of measurement, you can adjust the parameters by performing and checking the results of test measurements.

The following content is displayed in the "Detail result" area as text.

| Displayed items        | Description          |
|------------------------|----------------------|
| Judge                  | Judgement result     |
| Calculation 0 comment  | Calculation 0 value  |
| Calculation 1 comment  | Calculation 1 value  |
| :                      | :                    |
| Calculation 31 comment | Calculation 31 value |

The image specified in the sub image in image display setting is displayed in the image display area.

| Sub image. | Explanation of image to be displayed |
|------------|--------------------------------------|
| 0          | Measurement image                    |

## Key Points for Adjustment

Select the adjustment method referring to the following points.

### An error message appears on the Console Window

| Parameter to be adjusted | Troubleshooting                                                      |
|--------------------------|----------------------------------------------------------------------|
| -                        | Refer to the error messages list.<br>Reference: ► Error List (p.554) |

## Nothing happens when [DEL], [BS], [Enter], etc., is clicked

| Parameter to be adjusted | Troubleshooting                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -                        | Nothing happens while the focus is not on the code window (key entry cursor is not displayed). Click the position you want to operate, and then click the button. |

## Want to include a line feed code in a string

| Parameter to be adjusted | Troubleshooting                                      |
|--------------------------|------------------------------------------------------|
| Macro code               | Add (+) CR → Chr\$(13) LF → Chr\$(10) to the string. |

## Calculation result is indicated as "Unmeasured"

| Parameter to be adjusted | Troubleshooting                                                         |
|--------------------------|-------------------------------------------------------------------------|
| Enabled/disabled         | Place a check to enable the operator.                                   |
| Calculation judgement    | The judgement result may not be set correctly in calculation judgement. |

Check the measurement results that can be displayed and output in "Measurement Results For Which Output is Possible"

(Reference: ► Measurement Results For Which Output is Possible (Unit Macro) (p.43))

## Measurement Results That Can be Output (Unit Calculation Macro)

The measurement results provided by the unit calculation macro are shown below. The measurement results appear in the detailed result area, and you can also use a result output processing item to output the measurement results to an external device.

Refer to the "External Reference Tables" for the parameters that can be referenced, including measurement results. (Reference: ► External Reference Tables (Unit Calculation Macro) (p.28))

| Measurement items     | Character string | Description           |
|-----------------------|------------------|-----------------------|
| Judge                 | JG               | Judgement result      |
| Calculation result 0  | DT00             | Calculation result 0  |
| Judgement result 0    | JG00             | Judgement result 0    |
| :                     |                  |                       |
| Calculation result 31 | DT31             | Calculation result 31 |
| Judgement result 31   | JG31             | Judgement result 31   |

## External Reference Tables (Unit Calculation Macro)

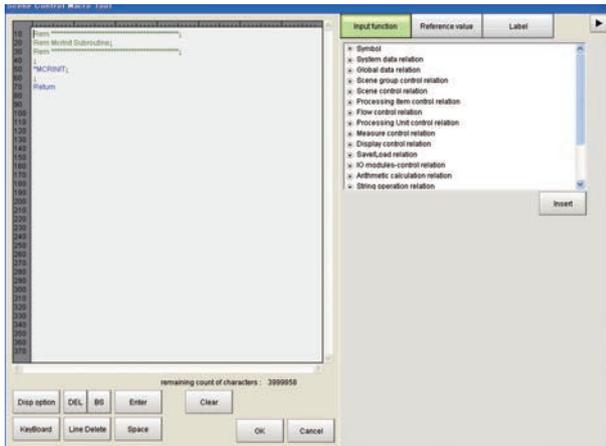
By specifying a number, you can access the following data from processing items that support processing unit data setting/acquisition, and from control commands.

| No.                         | Data name                          | Set/Get  | Data range                                                                        |
|-----------------------------|------------------------------------|----------|-----------------------------------------------------------------------------------|
| 0                           | Judge                              | Get only | 0: No judgement (unmeasured)<br>1: Judgement result OK<br>-1: Judgement result NG |
| 5 + N × 1<br>(N = 0 to 31)  | Calculation result N (N = 0 to 31) | Set/Get  | -99999.9999 to 99999.9999                                                         |
| 37 + N × 1<br>(N = 0 to 31) | Judgement result N (N = 0 to 31)   | Get only | 0: No judgement (unmeasured)<br>1: Judgement result OK<br>-1: Judgement result NG |

## Description of the Setting Screen of the Scene Control Macro Tool and How to Configure Settings

The setting screen for the scene control macro tool is the same as program editing screen. For details on the setting screen, refer to Program Editing Screen.

Reference: Reference: ▶ Components of the Screens and How to Configure Settings (p.20)



### Reference Variable Settings (Scene Control Macro)

Set the reference variables used in the program. The reference variables setting method is the same method as for the unit macro processing item.

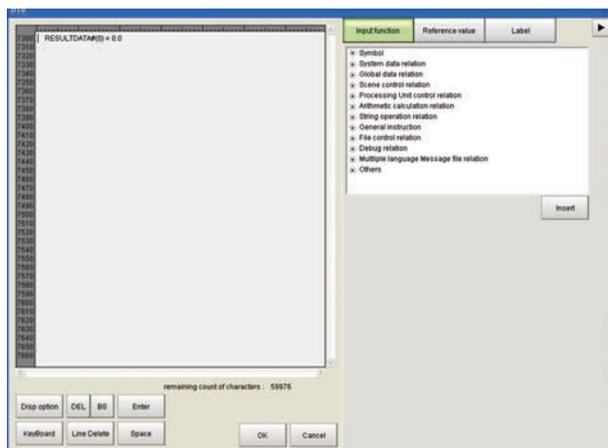
Reference: ▶ Reference Variable Settings (Unit Macro) (p.39)

### Unit Label Settings (Scene Control Macro)

The scene control macro can be used to set unit labels. Setting a unit label allows you to specify a processing unit in a program by the label rather than the processing unit number. The unit label and Ut function is used to specify the processing unit. Using unit labels eliminates the need to change the program when processing unit numbers change due to a change of measurement flow.

Macro customize functions other than the scene control macro cannot be used to set unit labels. These can only be used to reference unit labels already set with the scene control macro.

Reference: ▶ Ut function in Macro Command Reference (p.534)



- 1** Click the "Label" tab of the setting screen for the scene control macro tool.  
A list of the unit labels set in the current scene appears.
- 2** Click [Edit].  
The Unit Label screen appears.
- 3** Select the processing unit for which you want to set a unit label.

#### 4 Click "... " and set the unit label name.

You will return to the setting screen for the scene control macro tool.

| Setting item | Setting value      | Description                                                                                                                                        |
|--------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Unit Label   | 1 to 32 characters | Set the unit label name. The unit label set here is used by the Ut function.<br>You can use letters, numbers, ".", and "_" in the unit label name. |

#### 5 Click [OK].

You will return to the setting screen for the scene control macro tool.

##### IMPORTANT

- The unit label setting is saved in the scene data of the scene. If you want to use the unit label setting in another scene, repeat the setting in that scene, or use the scene maintenance function to copy the scene.  
Reference: ▶ *Editing Scenes in the Vision System FH/FHV Series User's Manual (Cat. No. Z365)*
- The same unit label cannot be set twice in the same scene.

##### Note

"Edit" only appears on the Label tab of the setting screen of the scene control macro.

#### Program Input (Scene Control Macro)

The program input method is the same method as for the unit macro processing item.

Reference: ▶ Program Input (Unit Macro) (p.41)

##### IMPORTANT

When the scene control macro tool is started, regardless of the setting of the initial value, scene variables are set to "0" for integer type, "0.000000" for real type, and "blank" for character string type.

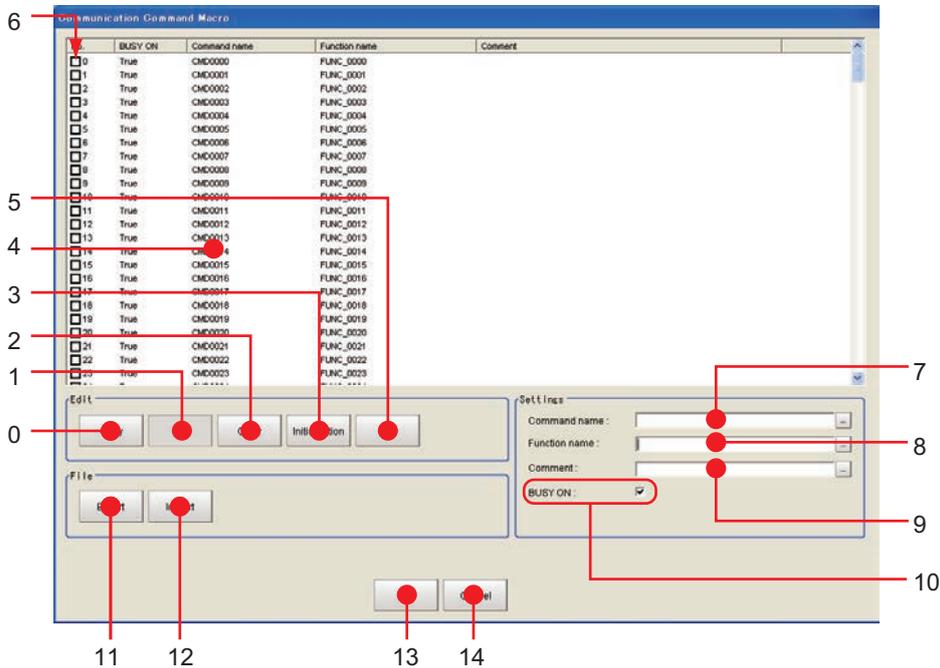
## Components of the Setting Screen of the Communication Command Macro Tool and How to Configure Settings

The components of the setting screen of the communication command macro tool are indicated below.

### Setting Procedure for Communication Command Macro

You can create and edit communication command macros.

You can create up to 256 (from 0 to 255) communication command macros.



### Descriptions of Dialog Box Objects

| No. | Name           | Description                                                                                                                                                                                                                                                                                               |
|-----|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | Copy           | Copy the selected command in the command list.                                                                                                                                                                                                                                                            |
| 1   | Paste          | The selected command is overwritten by the copied information. Paste targets are "comments" and "processing details." If nothing is copied, this is disabled.                                                                                                                                             |
| 2   | Clear          | The information of selected command, such as "Command name" "Function Name" "Comment" and "Program" is initialized.                                                                                                                                                                                       |
| 3   | Initialization | The information of all of the commands, such as "Command name" "Function Name" "Comment" and "Program" is initialized.                                                                                                                                                                                    |
| 4   | Command list   | Display the list of the commands.                                                                                                                                                                                                                                                                         |
| 5   | Edit           | Launch the Macro program editor for selected command.                                                                                                                                                                                                                                                     |
| 6   | Enable/Disable | Set/display whether custom command is enabled. If defined but not checked, it is not executed.                                                                                                                                                                                                            |
| 7   | Command name   | Display and edit command name for selected command.                                                                                                                                                                                                                                                       |
| 8   | Function name  | Display and edit function name for selected command.                                                                                                                                                                                                                                                      |
| 9   | Comment        | Display and edit comment for selected command. Multilingual support is also possible. Reference: ► "Inputting text" in the Vision System FH/FHV Series User's Manual (Cat. No. Z365).                                                                                                                     |
| 10  | Busy On        | Set/display whether to change to measurement stop state (MeasureStop) before executing command. If checked, BUSY is turned ON while command is executing, and then after execution of command has finished, measurement stop state is released (MeasureStart). Afterwards, a MeasureInit event is raised. |
| 11  | Export         | Export the macro program to file.                                                                                                                                                                                                                                                                         |
| 12  | Import         | Import the macro program from file. The existing data will be overwritten.                                                                                                                                                                                                                                |
| 13  | OK             | Save change and return to Main window.                                                                                                                                                                                                                                                                    |
| 14  | Cancel         | Return to Main window without saving.                                                                                                                                                                                                                                                                     |

## Selection of the Communication Command Macro to be Used (Communication Command Macro)

Select the command to define in the [No.] column.

Only the command numbers that are selected are enabled.

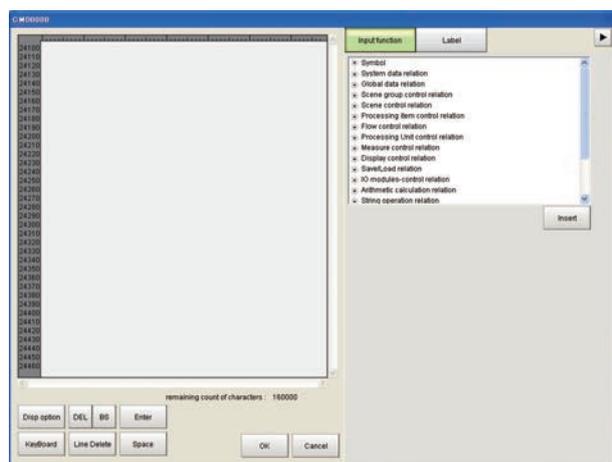
## Communication Command Macro Name Setting (Communication Command Macro)

In the [Command name] field in the Settings Area, enter the command name to use with the non-procedure communications protocol.

## Flow Signal Output Setting (Communication Command Macro)

Use the [BUSY ON] check box in Settings Area in the lower right corner to specify whether the BUSY flag should be turned ON (TRUE) or OFF (FALSE) when the communication command macro that is being set is in execution.

## Program Input (Communication Command Macro)



The program input method is the same method as for the unit macro processing item.

Reference: ▶ Program Input (Unit Macro) (p.41)

## Specifying Communication Command Macro

The specified custom communications command is sent from an external device to the Sensor Controller. The method that you use to specify a command depends on the communications protocol.

### Non-procedure Protocol

Specify the name of the command as an ASCII character string.

Send the ASCII character string as *Command\_name* + (space) + *Numeric\_value*.

If you intend to use standard commands, do not use an existing command name.

### Example: Specifying the Command Name “mycommand” with a Numeric Value of 18 as the Argument.

Send “mycommand 18”.

## Using the Parallel Interface

Specify the command number from 0 to 255 as a binary number.

Specify the command number with the seven bits from DI0 to DI6.

Then, turn ON the Command Execution Bit, DI7. Because the command must be specified with seven bits, the method differs as shown below for command numbers 0 to 127 and command numbers 128 to 255.

- **For 0 to 127: Specify the number as is with the seven bits from DI0 to DI6.**

Example: For command number 120, the binary notation for decimal 120 is 011 1000. Set each bit as follows: DI6: 0, DI5:1, DI4: 1, DI3: 1, DI2: 0, DI1:0, DI0: 0. Then, after 1 ms, change DI7 from OFF to ON to execute the command.

- **For 128 to 255: Use the terminal offset command DIOFFSET to add the difference from 0 to 127 with the seven bits from DI0 to DI6.**

Example: For command number 150, the binary notation for 150 is 1001 0110, which requires eight bits. In this case, you use the terminal offset command DIOFFSET to add, for instance, half of 150, or 75. Then you can use DI0 to DI6 to specify the remaining 75. This procedure is given below.

**1** Send "DIOFFSET 75."

**2** The binary notation for decimal 75 is 100 1011. Set each bit as follows: DI6: 1, DI5:0, DI4: 0, DI3: 1, DI2: 0, DI1:1, DI0: 1. Then, after 1 ms, change DI7 from OFF to ON to send the command.

**3** Send "DIOFFSET 0."  
(0: OFF 1: ON)

- **Using PLC Link, EtherCAT, or EtherNet/IP (Except for the Non-procedure Protocol and Parallel Interface)**

Specify the command number from 0 to 255 as a hexadecimal number from 00 to FF hex to represent the command code (CMD-CODE).

Specify the command code in order from the upper digits to the lower digits of the hexadecimal number.

This corresponds to the upper word address and the lower (smaller) word address in the I/O memory in the PLC. In this case, the highest number is FF hex, so we specify a number from 00 to FF hex to the first word in the Command Area + 2, and 0000 hex to the first word in the Command Area + 3.

Example: For command number 120, the hexadecimal notation is 0078 hex. Specify 0078 hex in the first word in the Command Area + 2, and 0000 hex in the first word in the Command Area + 3.

## Common Behavior of Custom Commands

### Basic sequence

Normally, each of IO commands are processed in the sequence as below :

- 1 Check input command and parameters are valid (range or type)**
- 2 Body of the procedure**
- 3 Output the result or response**

The way of input/output command, parameters and response depends on the type of IO modules.  
For detail, please refer the pages shown below.

Reference: ▶ Creating serial command (p.36)

Reference: ▶ Creating Parallel Command (p.37)

Reference: ▶ Creating PLC Link Command (p.37)

Reference: ▶ Creating Fieldbus command (p.38)

### Control BUSY signal

Basically the BUSY flag on Customize I/O command list window should be ON.

#### IMPORTANT

Executing measurement (Measure command) with BUSY flag set to ON causes error.

If you need to combine measure command with the command which is necessary to set BUSY ON (For example, switching scene and executing measurement), please set BUSY flag OFF and write the program like this way:

---

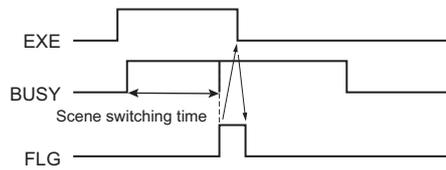
|                              |                                                                |
|------------------------------|----------------------------------------------------------------|
| MeasureStop                  | ' Set BUSY ON (Forbid measurement)                             |
| ChangeSceneArgumentValue#(0) | ' Execute the command which can be used with BUSY ON condition |
| MeasureStart                 | ' Set BUSY OFF (Permit measurement) before measurement         |
| Measure                      | ' Execute measurement                                          |

---

If **BUSY ON** is unchecked, the timing of BUSY signal at the execution of the communication command may differ from the timing described in User's Manual for Communications Settings. The example below shows the timing when scene switching and measurement are executed in series. The timing changes depending on the MeasureStart and MeasureStop commands. To set the BUSY signal ON during processing, send MeasureStop and MeasureStart commands.

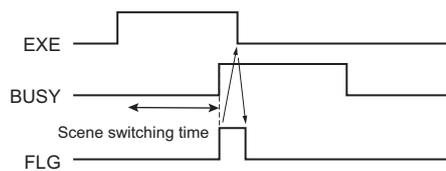
(1) To prohibit measurement trigger input, allow scene switching, allow measurement trigger input and execute measurement.

```
Measure Stop↓
ChangeScene ArgumentValue#(0)↓
Measure Start↓
Measure↓
```



(2) To execute scene switching by communication command macro and execute measurement.

```
ChangeScene ArgumentValue#(0)↓
Measure↓
```



### Standard IO commands

When the same command name / command id of standard IO commands are used for customize IO commands, customize IO command has the priority and the standard IO commands are not executed. If you execute the standard IO commands after execution of customize IO commands, please add the line as below.

---

```
CommandExecute&=False
```

---

In this case, standard IO commands is executed just after executing customize IO command.

### Calling the procedure defined on the other commands

It is possible to call the procedure defined on the other commands during the command execution. Each command has "Function name", and it is used to call the procedure.

Example: When command is defined as the table below and we intend to call procedure of CMD0 from CMD1,

| Command No. | Command name | Busy  | Function name |
|-------------|--------------|-------|---------------|
| 0           | CMD0         | False | FUNC0         |
| 1           | CMD1         | True  | FUNC1         |

the codes for CMD1 should be like this:

---

```
Gosub *FUNC0
```

---

This case, the behavior of the command like BUSY depends on the caller (CMD1), and BUSY stays ON until the end of the procedure.

### IMPORTANT

Please be careful not to make the commands calling each other (In the case above, CMD0 also calls FUNC1), because it makes infinite loop.

## Define the different procedure according to I/O module

The variable `lident$` stores the IO module identification name, which received the current I/O command. When you define the different procedure for each I/O modules, please make branch by the value of `lident$`.

Example: The command which receives "Serial" for serial command, and "Ethernet" for UDP normal

---

```
If lident$ = "SerialNormal" Then
    Response$ = "Serial"
Elseif lident$ = "UdpNormal" Then
    Response$ = "Ethernet"
Endif
```

---

## Creating serial command

### Command parameters

Received text string is split by space character(" ") into command and parameters, and stored in the predefined variables shown below:

| Variable name                     | Type                  | Content                                                                                                                                                 |
|-----------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>ArgumentsLength&amp;</code> | Integer               | Number of parameters (0 to 32)                                                                                                                          |
| <code>ArgumentString\$()</code>   | Array of text string  | Array of parameters (string)<br>Allocate a number of array elements equal to the number of parameters.                                                  |
| <code>ArgumentValue#()</code>     | Array of real numbers | Array of parameters converted to number<br>*1: If conversion fails, set to 0.<br>Allocate a number of array elements equal to the number of parameters. |

---

"AAA param0 param1 param2"

---

When the system received the string as above, parameters are set like this :

---

`ArgumentsLength&`: 3 (number of parameters)

`ArgumentString$(0)`: param0 (String type)

`ArgumentString$(1)`: param1 (String type)

`ArgumentString$(2)`: param2 (String type)

`ArgumentValue#(0)`: numeric value converted from param0 (0 when conversion failed)

`ArgumentValue#(1)`: numeric value converted from param1 (0 when conversion failed)

`ArgumentValue#(2)`: numeric value converted from param2 (0 when conversion failed)

---

Example: The command "SC 1" that switches scene 1

---

`ScaneChange ArgumentValue#(0)`

---

## Response output

Result of the command procedure can be returned to the system by setting the value on these variables.

| Variable name    | Type        | Content                                                                                                                                                                                                    |
|------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ResponseString\$ | Text string | Output data                                                                                                                                                                                                |
| ResponseCode&    | Integer     | Result of command<br><ul style="list-style-type: none"> <li>• 0 : success (returns "OK")</li> <li>• -1: Command processing failed. Returns NG.</li> <li>• -2: No response; No returns OK or ER.</li> </ul> |

Example: The command "TEST"

ResponseString\$ = "TestString"

Command and response will be like this :

```
-> TEST
<- TestString
<- OK
```

## Creating Parallel Command

### Response output

Result of the command procedure can be returned to the system by setting the value on these variables.

| Variable name | Type    | Content                                                                                                                                                                                      |
|---------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ResponseCode& | Integer | Command execution result<br><ul style="list-style-type: none"> <li>• 0 : Command processing successful</li> <li>• -1 : Command processing failed<br/>(The ERROR signal turns on.)</li> </ul> |

## Creating PLC Link Command

### Command parameters

The command parameters are stored on the predefined variables as below.

| Variable name    | Type                  | Content                                                                                                                                  |
|------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| ArgumentsLength& | Integer               | Number of parameters (0 to 6)                                                                                                            |
| ArgumentValue#() | Array of real numbers | Array of parameters<br>*1: integer type of data for 2 channels<br>Allocate a number of array elements equal to the number of parameters. |

### Response output

Result of the command procedure can be returned to the system by setting the value on these variables.

| Variable name    | Type                  | Content                                                                                                                                                    |
|------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ResponseValue&() | Array of Integers     | Response data<br>Outputs the response data, i.e. Scene No.                                                                                                 |
| ResponseCode&    | Array of real numbers | Command execution result<br><ul style="list-style-type: none"> <li>• 0: Command processing successful</li> <li>• -1 : Command processing failed</li> </ul> |

## Creating Fieldbus command

### Command parameters

The command parameters are stored on the predefined variables as below.

| Variable name    | Type                  | Content                                                                                                                                  |
|------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| ArgumentsLength& | Integer               | Number of parameters (0 to 3)                                                                                                            |
| ArgumentValue#() | Array of real numbers | Array of parameters<br>*1: integer type of data for 2 channels<br>Allocate a number of array elements equal to the number of parameters. |

### Response output

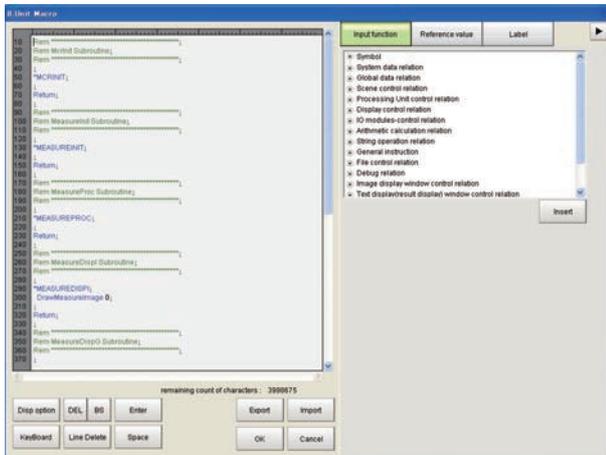
Result of the command procedure can be returned to the system by setting the value on these variables.

| Variable name    | Type                  | Content                                                                                             |
|------------------|-----------------------|-----------------------------------------------------------------------------------------------------|
| ResponseValue&() | Array of Integers     | Response data<br>Outputs the response data, i.e. Scene No.                                          |
| ResponseCode&    | Array of real numbers | Command execution result<br>• 0 : Command processing successful<br>• -1 : Command processing failed |

## Description of the Setting Screen of the "Unit Macro" Processing Item and How to Configure Settings

The properties screen of the "Unit Macro" processing item is the same as the program editing screen. For details on the setting screen, refer to Program Editing Screen.

Reference: ▶ Components of the Program Editing Screen (p.20)



### Reference Variable Settings (Unit Macro)

Set up the reference variables used for function.

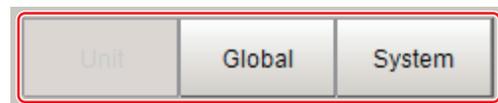
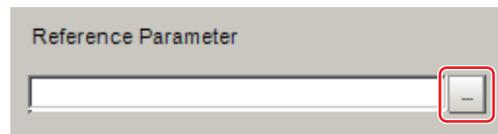
- 1 Click [Add] in the reference variable list on the macro setting screen.

A reference variable window is displayed.

- 2 Click [...] to set the variable name.

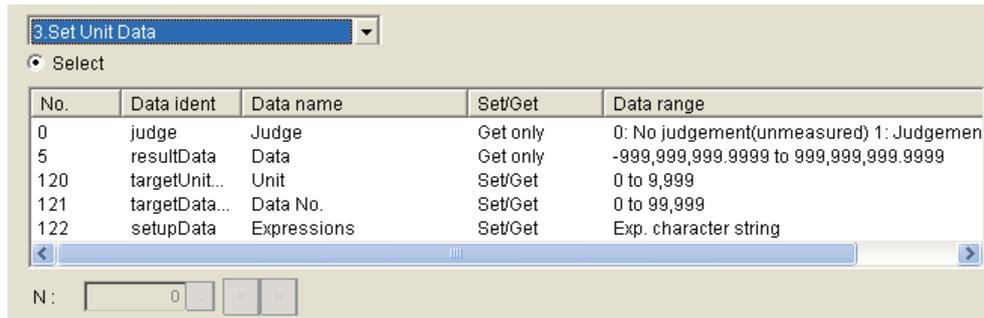
The variable name must consist of alphanumeric characters beginning with a capital letter.

- 3 Set the variable to be referenced.



### If Unit is selected

Select the processing item to be referenced, and then select the data to be referenced from the list.



### If Global is selected

Click [...] to set the Data ident of Global data.

Data ident of Global data is defined with

AddGlobalData function.

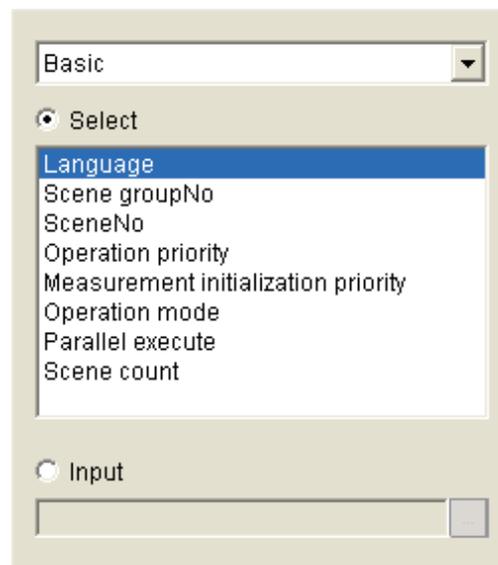
Reference: ►AddGlobalData (p.127)



### If System is selected

Place a check at applicable [Select] to select the type of system variable, and then select the variable to be referenced from the list.

To set a variable value, place a check at [Enter] and then click [...] to set the variable value.

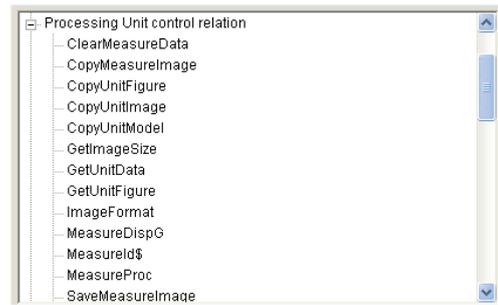


**4** Click [OK].

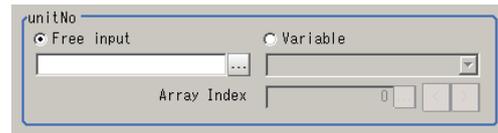
## Program Input (Unit Macro)

### 1 From the function list, select the function to be inserted.

When the function is selected, an operand list appears below the function list.



### 2 Set the operand.



| Setting item         | Setting value<br>[Factory default] | Description                                                                                                                                                                                        |
|----------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operand input method | [Free input]                       | Select this option if you want to enter an operand freely.<br>Click [...] to set the operand.                                                                                                      |
|                      | Variable                           | Select this option if you want to select an operand from variables.<br>Click [▼] to select the variable.<br>You can select any variable or reference variable currently defined in the macro code. |
| Array Index          | 0 to number of arrangements<br>[0] | If the selected variable is an arrangement variable, set the arrangement number to be used as an operand.                                                                                          |

### 3 Click [Insert].

The set function is registered and appears in the code edit window in the top left-hand corner.



### 4 Repeat steps 3 to 6, and set the calculation processing.

### 5 When the setting of calculation processing is complete, click [OK].

## Key Points for Test Measurement and Adjustment (Unit Macro)

To increase the speed and precision of measurement, you can adjust the parameters by performing and checking the results of test measurements.

The following content is displayed in the "Detail result" area as text.

| Displayed items | Description      |
|-----------------|------------------|
| Judge           | Judgement result |

The image specified in the sub image in image display setting is displayed in the image display area.

| Sub image. | Explanation of image to be displayed |
|------------|--------------------------------------|
| 0          | Measurement image                    |

## Key Points for Adjustment

Select the adjustment method referring to the following points.

### An error message appears on the Console Window

| Parameter to be adjusted | Troubleshooting                                                      |
|--------------------------|----------------------------------------------------------------------|
| -                        | Refer to the error messages list.<br>Reference: ▶ Error List (p.554) |

### Nothing happens when [DEL], [BS], [Enter], etc., is clicked

| Parameter to be adjusted | Troubleshooting                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -                        | Nothing happens while the focus is not on the code window (key entry cursor is not displayed). Click the position you want to operate, and then click the button. |

### Want to include a line feed code in a string

| Parameter to be adjusted | Troubleshooting                                      |
|--------------------------|------------------------------------------------------|
| Macro code               | Add (+) CR → Chr\$(13) LF → Chr\$(10) to the string. |

### The "Positions" display is not as desired

| Parameter to be adjusted | Troubleshooting                                                                                                                                                                              |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Macro code               | When "Positions" is OFF, the display processing written in "**MEASUREDISPT" and "**MEASUREDISPG" is executed. When "Positions" is ON, only what is written in "**MEASUREDISPG" is displayed. |

### Data acquisition sometimes fails during measurement

| Parameter to be adjusted | Troubleshooting                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Macro code               | Data may be stolen by the applicable communication processing unless the communication processing is stopped using the SetPollingState function.<br><br>(Example) Receive data without TCP procedure<br>Write the processing in the following sequence. <ul style="list-style-type: none"><li>• SetPollingState "TcpNormal", false</li><li>• Data receive processing</li><li>• SetPollingState "TcpNormal", true</li></ul> |

Check the measurement results that can be displayed and output in "Measurement Results For Which Output is Possible".

Reference: ▶ External Reference Table (Unit Macro) (p.43)

## Measurement Results For Which Output is Possible (Unit Macro)

To output the measurement result of the unit macro, assign the value of the unit macro calculation result to data output or the calculation processing item and output externally.

## External Reference Table (Unit Macro)

The external reference table of the unit macro does not contain any data that can be referenced.

## Saving and Loading Programs

Programs created using macro customize functions can be saved and loaded as scene data in the "Unit Macro" processing item and the "Unit Calculation Macro" processing item, and the settings can be saved in the sensor controller with "Data save". With the exception of some functions, standalone programs can be saved and loaded. A standalone program can be handled as a file, and thus programs can be managed and analyzed on a computer using a text editor.

### Saving and Loading Programs in the Unit Calculation Macro

In the "Unit Calculation Macro" processing item, programs can be saved and loaded to the scene data as a processing unit, and in the properties screen of the processing item, programs can be saved as standalone programs. A program saved in the "Unit Calculation Macro" processing item can be loaded using the properties screen of the "Unit Macro" processing item.

Follow the procedure below to output the set calculation process to a file.

- 1 Click [Export] in the file area.**
- 2 Specify the file save location and the file name, and click [OK].**

#### IMPORTANT

- A standalone program cannot be loaded in the "Unit Calculation Macro" processing item. If loading is necessary, load scene data.
- The programs saved in the "Unit Calculation Macro" processing item include created programs and programs automatically generated by the processing item. Do not change an automatically generated program. If changed, the program may not load normally.

### Saving and Loading Programs in the Scene Control Macro

In the scene control macro tool, a program can be saved when "Data save" is executed.

## Saving and Loading Programs in the Communication Command Macro

In the communication command macro tool, a program can be saved when "Data save" is executed, and a standalone program can be saved and loaded in the tool setting screen.

- **Saving a program**

- 1** Click [Export] in the file area.
- 2** Specify the file save location and the file name, and click [OK].

- **Loading a program**

- 1** Click [Import] in the file area.
- 2** Select the saved file (.mcr) that you want to load and click [OK].

### **IMPORTANT**

---

The programs saved in the communication command macro tool include created programs and programs automatically generated by the tool. Do not change an automatically generated program. If changed, the program may not load normally.

---

## Saving and Loading Programs in the Unit Macro

In the "Unit Macro" processing item, programs can be saved and loaded to the scene data as a processing unit, and in the properties screen of the processing item, standalone programs can be saved and loaded.

- **Saving a program**

- 1** Click [Export] in the file area.
- 2** Specify the file save location and the file name, and click [OK].

- **Loading a program**

- 1** Click [Import] in the file area.
- 2** Select the saved file (.mcr) that you want to load and click [OK].

# Basics of Programming

---

|                                            |           |
|--------------------------------------------|-----------|
| <b>Basic Idea of Programming .....</b>     | <b>46</b> |
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# Basic Idea of Programming

| Necessity of referring to this manual | Unit Macro | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|------------|-----------------------------|---------------------|------------------------|
|                                       | Required   |                             |                     |                        |

The macro customize functions of the FH series use an interpreter-type programming language. Unlike a compiler-type language, programs can be created in an interpreter programming language without the need for a special development environment to compile the program. In contrast to programming languages such as C, you can create and run programs on the FH without a development environment.

The programming language that is used for the macro customize functions is based on BASIC, which is also an interpreter-type programming language. The programming syntax of the macro customize functions is based on the syntax of BASIC, with the addition of some specialized syntax.

The syntax required to create programs for the macro customize functions is explained in the following, starting from basic syntax.

## Basic Syntax

There are some rules which must be known as a minimum in order to create programs.

The examples below include the basic program syntax that is used in the macro customize functions.

Basic syntax examples

```
*MEASUREDISPT
```

```
Rem Displays text in the Detail result pane.  
DrawText "Judgment OK", 1, 0
```

Return

| Types of syntax | Description                                                                                                                                                  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Character       | Alphabetical characters, numbers, symbols, and special marks can be used as characters.<br>Reference: ▶ Character (p.47)                                     |
| Line            | A unit that is composed of a line number and a statement is called a line.<br>Reference: ▶ Line (p.47)                                                       |
| Line number     | The number that is automatically assigned to each line when a program is loaded in the FH system is called a line number.<br>Reference: ▶ Line number (p.47) |
| Statement       | The program processing text written on each line is called a statement.<br>Reference: ▶ Statement (p.48)                                                     |
| Label           | A name assigned to a line in the program to enable identification is called a label.<br>Reference: ▶ Label (p.48)                                            |
| Subroutine      | A part of a program that is enclosed by <label> - Return is called a subroutine.<br>Reference: ▶ Subroutine (p.48)                                           |
| Comment         | Text that follows a Rem function or a single quotation is called a comment.<br>Reference: ▶ Comment (p.48)                                                   |

## Character

Alphabetical characters, numbers, symbols, and the special marks below can be used as characters. Lower case alphabetical characters are only recognized as lower case when enclosed by double quotation marks (""). Lower case and upper case are not distinguished anywhere else. With the exception of text enclosed by double quotations (") and comments described below, use only half-width alphanumeric characters and half-width symbols.

| Special marks that can be used | Description                                                                                                                                                                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Colon (:)                      | Use as a separator when writing two or more lines as a single line.                                                                                                                                                                                                                        |
| Comma (,)                      | Use as a separator when listing parameters.                                                                                                                                                                                                                                                |
| Semicolon (;)                  | Use as a separator when listing parameters in output text.                                                                                                                                                                                                                                 |
| Apostrophe (')                 | Add in front of a comment. A Rem statement can also be used to indicate a comment.                                                                                                                                                                                                         |
| Asterisk (*)                   | Add in front of a label name.                                                                                                                                                                                                                                                              |
| Space ( )                      | Always insert a space between a macro function and its arguments. Spaces can also be inserted wherever desired. However, a space must not be inserted inside a macro function name, variable name, or value.                                                                               |
| Double Quotation Marks (")     | Use to enclose a character string value.                                                                                                                                                                                                                                                   |
| Ampersand (&)                  | Use as a type identifier for integer type variables. Always add after an integer type variable name or array name.<br>For details on type identifiers, refer to the "Naming Rules for Variables" section.<br>Reference: ▶ Naming Rules for Variables (p.51)                                |
| Pound Sign (#)                 | Use as a type identifier for double precision real number variables. Always add after a double precision real number variable name or array name.<br>For details on type identifiers, refer to the "Naming Rules for Variables" section.<br>Reference: ▶ Naming Rules for Variables (p.51) |
| Dollar Mark (\$)               | Use as a type identifier for character string type variables. Always add after a character string type variable name or array name.<br>For details on type identifiers, refer to the "Naming Rules for Variables" section.<br>Reference: ▶ Naming Rules for Variables (p.51)               |
| "At" mark (@)                  | Use as a type identifier for reference variables. Always add at the end of a reference variable name.<br>For details on type identifiers, refer to the "Naming Rules for Variables" section.<br>Reference: ▶ Naming Rules for Variables (p.51)                                             |

## Line

A unit that is composed of a line number and a statement is called a line. Blank lines and lines that are only comments are acceptable in a program. Multiple statements (multi-statement) can also be written on one line. When writing multiple statements, separate each statement with a colon (:).

## Line number

The number that is automatically assigned to each line when a program is loaded in the FH system is called a line number. Line numbers are mainly used during program debugging to identify the locations of errors. Do not write line numbers when creating a program.

## Statement

The program processing text written on each line is called a statement. A statement is mainly composed of expressions of minimum processing units. A statement can be up to 245 characters in length. If a statement is longer than 245 characters, an error will occur and program execution will stop.

Three types of statements exist, as shown below.

| Statement type          | Description                                                             |
|-------------------------|-------------------------------------------------------------------------|
| Execution statement     | A statement that describes and executes processing of a macro function. |
| Non-execution statement | A statement that indicates comments but does not execute processing.    |
| Label                   | A statement that defines a program branch destination.                  |

## Label

A name assigned to a line in the program to enable identification is called a label. Among the basic syntax examples, the following is a label.

---

```
*MEASUREDISPT
```

---

By specifying a label, the "Goto <label>" macro function can be used to jump to the specified label position.

## Subroutine

A part of a program that is enclosed by <label> - Return is called a subroutine. Write the process that you want to execute in the subroutine. Among the basic syntax examples, the following is a subroutine.

---

```
*MEASUREDISPT
```

---

```
Return
```

---

Subroutines can be executed by calling the "GoSub <label>" function. By writing each standalone process as a subroutine, the visibility of the program is improved.

The processing component of a macro customize function consists of subroutines. By writing "GoSub\*(function name)", the processing component of the corresponding macro customize function can be called and executed from another subroutine.

Some of the subroutines of macro customize functions are predefined in the system. The timing at which system defined subroutines are called is fixed. Write the process in a subroutine appropriately for its purpose. For details on calling these subroutines, refer to "Status Transitions and Execution Timing".

Reference: ▶ State Transitions and Execution Timing (p.72)

## Comment

Text that follows a Rem function or a single quotation is called a comment. You can insert any comment line in a program. When a Rem function or single quotation (') is written in a program, the line is treated as a comment.

Among the basic syntax examples, the following is a comment.

---

```
Rem Displays text in the text result field.
```

---

### IMPORTANT

- Do not write comments and statements on the same line. The comments will not be recognized correctly and the program may malfunction.
- You can add comments in the program area. (Reference: ▶ Comment (p.48))
- Note that allowable character strings differ depending on the type of the Sensor Controller as shown below.
- On the FH Series, English characters and characters for the language selected in [Language setting] are allowed.

## Constant

Among the values and character strings used in programming, a constant is a value that never changes and has a unique assigned name.

Use constants for fixed numeric values and character strings that you want to use repeatedly in a program.

### How to Use Constants

Constants are used as shown below.

(Example)

---

```
A& = 255
```

```
AA& = &h7f
```

```
B# = 3.14
```

```
C$ = "TEST STRING"
```

---

### Constant Data Types

Constants that can be used in macro customize functions are shown below.

| Constant type                | Description                                  | Data range                | Number of bytes per data item |
|------------------------------|----------------------------------------------|---------------------------|-------------------------------|
| Integer                      | Used for signed integer values.              | -2147483648 to 2147483647 | 4 bytes                       |
| Double precision real number | Used for double precision type real numbers. | -1.0E30 to 1.0E30         | 8 bytes                       |
| Character string             | Used for character strings.                  | Up to 255 characters      | -                             |

Integer constants can be written in several bases, including decimal. Base notations that can be used in macro customize functions are shown below.

| Base        | Notation method | Example            | Mathematical notation                         |
|-------------|-----------------|--------------------|-----------------------------------------------|
| Decimal     | Not required    | 100, 3456          | 100, 3456                                     |
| Hexadecimal | &h              | &hff, &h7fff       | (ff) <sub>16</sub> , (7fff) <sub>16</sub>     |
| Octal       | &o              | &o77, &o3447       | (77) <sub>8</sub> , (3447) <sub>8</sub>       |
| Binary      | &b              | &b1111, &b01100111 | (1111) <sub>2</sub> , (01100111) <sub>2</sub> |

#### Note

When a program that uses hexadecimal constants is displayed using the List function, the hexadecimal notation is converted to decimal notation.

Example: When a program with "A& = &hff" is displayed using the List function, this is shown as "A& = 255".

---

## Variable

Among the values and character strings used in programming, a variable has a unique assigned name and is used for data that changes. Use a variable for a numeric value or character string that you want to use repeatedly in a program, but whose specific value or character string changes.

### How to Use Variables

Variables are used as shown below.

(Example)

---

```
Rem 1. Declare the variable
Dim POSITION#(1)
```

```
Rem 2. Assign a value to the variable
A# = 320.0
B# = 310.0
```

```
Rem 3. Reference the variable
POSITION#(0) = A#
POSITION#(1) = B#
C# = POSITION#(0) + POSITION#(1)
```

---

#### 1. Declare the variable

By declaring a variable, you allocate the data area required for the variable and enable use of the variable in the remainder of the program. Declaration is only required for array variables, and the Dim function is used for this purpose. For variables other than array variables, the data area is automatically allocated when the program is executed, and thus declaration is not necessary.

In addition, you can check undefined or duplicate variables using the Macro variable check function.

(Reference: ▶ Macro Variable Check Function (p.54))

#### 2. Assign a value to the variable

Assign a value to a variable. Only values of the same data type as the variable can be assigned. In the case of a variable other than an array variable, the variable can be used without being declared. Add the type identifier to the end of the name, and use a variable name that is not used by any other variables. For details on type identifiers, refer to the "Naming Rules for Variables" section.

Reference: ▶ Naming Rules for Variables (p.51)

#### 3. Reference the variable

Reference the value that is assigned to a variable. You can also pass the variable to a macro function as an argument.

## Variable Data Types

Before a variable can be used, the data area that will hold the data must be allocated. A data type defines the size of the data area to be allocated and how the data is handled.

Data types and data ranges of variables that can be used in macro customize functions are described below. Select the data type based on the use and objective of the variable.

| Data type                    | Description                                  | Data range                | Number of bytes per data item | Variable area size |
|------------------------------|----------------------------------------------|---------------------------|-------------------------------|--------------------|
| Integer                      | Used for signed integer values.              | -2147483648 to 2147483647 | 4 bytes                       | Variable length    |
| Double precision real number | Used for double precision type real numbers. | -1.0E30 to 1.0E30         | 8 bytes                       |                    |
| Character string             | Used for character strings.                  | Up to 255 characters      | -                             |                    |

## Naming Rules for Variables

Rules exist for variable names. Decide variable names based on the rules below.

| Variable name                          |                                                                                                 |                                                            |
|----------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Start                                  | Middle                                                                                          | End                                                        |
| Alphabet<br>( 'A' to 'Z', 'a' to 'z' ) | Alphabet, numbers, Symbols<br>( 'A' to 'Z', 'a' to 'z', '0' to '9', underline '_', period '.' ) | Type identifier<br>( '&', '#', '\$', '@' ) <sup>(*1)</sup> |

\*1: "@" is a type identifier for reference variables, and cannot be used for variables that the user directly declares in the program.

An identifier that identifies the type of data used as a variable is referred to as a "type identifier". Always add a type identifier to the end of the variable name of each variable. For the type identifiers that can be used, refer to "Variable Types and Type Identifiers".

### IMPORTANT

- A variable name that starts with a number cannot be used.
- A special mark cannot be used in a variable name.
- A variable name that is reserved cannot be used. However, a variable name that includes a reserved variable name can be used.  
Example: (Cannot be used) WAIT& → (Can be used) WAITTIME&
- Letters are not case sensitive.  
Example: AA& and aa& are treated as the same variable.

## Variable Types and Type Identifiers

Variable types that can be used in macro customize functions are shown below. Use a variable type that matches your use and purpose.

### • Temporary Variable

This can handle one datum and is the most basic variable.

Type identifiers that can be used with temporary variables are shown below.

| Temporary variable data type | Type identifier | Example        |
|------------------------------|-----------------|----------------|
| Integer                      | &               | A& = 1         |
| Double precision real number | #               | A# = 12.34     |
| Character string             | \$              | AA\$ = "OMRON" |

### IMPORTANT

The type identifier cannot be omitted. Always add a type identifier to the end of the variable name.

### • Array Variable

When you want to handle multiple data items of the same data type as a group, you can assign numbers to temporary variables. Such temporary variables are called array variables. Macro customize functions enable the use of up to four dimensions of array variables. The element number of an array starts from 0, and the number of elements is "element number + 1". You can also change the number of elements in array variables using the ReDim function.

#### Example

---

```
Rem One-dimensional array with four elements A&(0), A&(1), A&(2), A&(3)
Dim A&(3)
```

```
Rem Two-dimensional array with 11 x 11 = 121 elements
Dim B&(10, 10)
```

```
Rem Three-dimensional array with 101 x 101 x 101 = 1030301 elements
Dim C&(100, 100, 100)
```

```
Rem Array definition with undefined number of elements.
Dim AA&()
```

```
Rem Change the number of elements for defined array variables.
Dim AA&()
ReDim AA&(10)
Dim BB&(3)
ReDim BB&(10)
```

---

Type identifiers that can be used with array variables are shown below.

| Array variable data type     | Type identifier | Example           |
|------------------------------|-----------------|-------------------|
| Integer                      | &()             | A&(1) = 1         |
| Double precision real number | #()             | A#(2) = 12.34     |
| Character string             | \$()            | AA\$(3) = "OMRON" |

## IMPORTANT

- Even if the name is the same, an array variable name and a regular temporary variable name are distinguished.  
Example: The variables below are all distinguished.  
A&, A&(10), A#(10), A\$, A\$(10)
- Even if the number of dimensions is different, two arrays with the same variable name are treated as the same array. In this case, the array defined last is effective.  
Example: The last defined A&(10.10.10.10) is enable.  
A&(10), A&(10,10), A&(10,10,10), A&(10,10,10,10)
- Using the ReDim function without defining the number of elements will cause a Syntax error.
- Defining arrays without defining the number of elements, or using the ReDim function will cause a Syntax error on the FH Sensor Controller versions earlier than ver.5.40.

### • Reference Variables

Reference variables are defined by the user and can be used to reference processing unit data, global data, and system data.

(Note: When using the macro customize functions, a macro function can be used to set and acquire data such as processing unit data and system data. Reference variables allow you to handle processing unit data and system data without using the macro function.)

Reference variables must be set in advance in the program editing screen of the "Unit Macro" processing item, "Unit Calculation Macro" processing item, or the scene control macro tool. For the setting method, refer to the setting screen of each processing item.

Type identifiers that can be used with reference variables are shown below.

| Reference variable data type | Type identifier | Example       |
|------------------------------|-----------------|---------------|
| Integer                      | @               | A@ = 1        |
| Double precision real number | @               | A@ = 12.34    |
| Character string             | @               | AA@ = "OMRON" |

## IMPORTANT

- The data type (integer, real number, etc.) can be identified from the type identifier of a regular variable, however, identification of the data type from the type identifier is not possible with a reference variable. When using a reference variable, check the data type of the allocated data before using the variable.
- A reference variable setting is saved in scene data, however, the value itself that the reference variable references is not saved. If you want to save the value, use user data.
- When you set the Global data to the Variable whose type is integer or double precision real number variable, use Val function.

### Note

- If you set the name of a reference variable in the properties screen the type identifier of the reference variable is automatically added to the reference variable name.
- There is no limit on the number of reference variable settings that can be added. However, there is a limit on the total number of variable name characters per processing unit of the unit macro and unit calculation macro, and the number of variable name characters per scene of the scene control macro. When the reference variable name is 32 characters, about 1000 reference variable settings can be added.

## Macro Variable Check Function

The Macro Variable Check function is a capability of the macro customization function to check undefined or duplicate variables.

You can define a variable as a Dim variable, and execute the Option Explicit command to be able to find undefined or duplicate variables afterwards. The [Undefined variable] error message is shown for undefined variables, and the [Duplicated variable] error message is shown for duplicate variables in the System Status Console Window.

The Macro Variable Check function can be used with the Unit Macro processing item, Communication Command Macro tool, and Scene Control Macro tool.

Support version of the FH Sensor Controller is ver.5.40 or later.

Dim (Reference: ▶ Details (p.187))

Option Explicit (Reference: ▶ Details (p.281))

ReDim (Reference: ▶ Details (p.391))

### Defining the Dim variable

When you execute the Option Explicit command, only defined variables will be available to use, and duplicate of the defined variables will be checked. Therefore, you need to define temporary variable, array variable, and reference variable in the Dim variable format. Note that you cannot assign value to the variables at the same time when you define them.

Example:

---

```
Rem Check of macro variables
Option Explicit
Rem Definition of variables by the Dim variable
Dim A&
Dim B&
Dim C&
A& = 0
B& = 1
C& = A& + B&
Print Str$(C&)
```

---

#### IMPORTANT

Using the Dim variable on the FH Sensor Controller versions earlier than ver.5.40 causes the Syntax error. Note that using the Dim array variables does not cause error since it has already been used on the earlier versions.

### Executing the Option Explicit command

When you execute the Option Explicit command, the Macro Variable Check function will be effective for lines after the line where the Option Explicit command is executed. Undefined and duplicates of variables in preceding lines will not be checked. In other word, they are not the subject to the [Undefined variable] error or [Duplicated variable] error.

#### IMPORTANT

- The Option Explicit command is unavailable when the power is on or when macros are loaded. It is available from the time a macro and the Option Explicit command are both executed until the next macro is loaded or the power is turned off.
- Using the Option Explicit command on the FH Sensor Controller versions earlier than ver.5.40 causes the Syntax error.

# Operator

A symbol that indicates an operation in a program is referred to as an operator. Operators are used to add a process to a variable, as well as to calculate and compare variables and constants.

## How to Use Operators

Operators are used as shown below.

(Example)

```
A& = 0
B& = 2
C& = 4
D& = 35
E& = 0

A& = 1 + 2 + 4 / 2
F& = (A& + B&) * C&
If F& < D& Then
    E& = D& AND 31
Else
    E& = F& AND 31
EndIf
```

### 1. Assignment Operator

An assignment operator is used to assign a value to a variable.

Assignment operators that can be used in macro customize functions are shown below.

| Operator | Description of operation                             | Example      |
|----------|------------------------------------------------------|--------------|
| =        | Assigns the value on the right side to the left side | A& = B& + C& |

#### Note

- When "=" is used in a conditional comparison such as an "If - Then" or "Select" statement, "=" is treated as a relational operator that determines whether the left side and right side are equal.
- When a double precision real number variable value is assigned to an integer variable, the digits to the right of the decimal point are rounded off.
- If the value assigned to an integer variable is other than -2147483648 to 2147483647, an overflow error will occur when the assignment takes place.
- If the value assigned to a double precision real number variable is other than -1.0E30 to 1.0E30, an overflow error will occur when the assignment takes place.

## 2. Arithmetic Operator

An arithmetic operator performs an arithmetic operation, exponent operation, or remainder operation on numerical value data. Division by 0 results in an error. If the interim result of an arithmetic operation such as addition, subtraction, or multiplication is outside the range -1.0e30 to 1.0e30, an error will result.

Arithmetic operators that can be used in macro customize functions are shown below.

| Operator | Description of operation | Example   | Mathematical notation                |
|----------|--------------------------|-----------|--------------------------------------|
| +        | Addition                 | A& + B&   | A+B                                  |
| -        | Subtraction              | A& - B&   | A-B                                  |
| *        | Multiplication           | A& * B&   | AxB or AB                            |
| /        | Division                 | A& / B&   | A/B                                  |
| ^        | Exponent operation       | A& ^ B&   | A <sup>B</sup>                       |
| mod      | Remainder                | A& MOD B& | A-[A/B]A~B<br>[] is the Gauss symbol |

## 3. Relational Operator

A relational operator compares two numerical data items or two character data items. If the result of the comparison is true, (-1) is returned. If false, (0) is returned. Normally this is used in an "If - Then" statement for such purposes as controlling the flow of the program.

Relational operators that can be used in macro customize functions are shown below.

| Operator | Description of operation | Example            |
|----------|--------------------------|--------------------|
| =        | Equal                    | A& = B&            |
| <>, ><   | Not equal                | A& <> B&, A& >< B& |
| <        | Less than                | A& < B&            |
| >        | Greater than             | A& > B&            |
| <=, =<   | Less than or equal to    | A& <= B&, A& =< B& |
| >=, =>   | Greater than or equal to | A& >= B&, A& => B& |

### Note

When "=" is used in other than a conditional comparison such as an "If - Then" or "Select" statement, "=" is treated as an assignment operator that assigns the value on the right side to the left side.

## 4. Logic Operator

A logic operator is used to investigate multiple conditions, and perform bit operations and binary operations on exponential values. Logic operators that can be used in macro customize functions are shown below.

| Operator | Description of operation | Example   |
|----------|--------------------------|-----------|
| NOT      | Not                      | NOT A&    |
| AND      | Logical AND              | A& AND B& |
| OR       | Logical OR               | A& OR B&  |
| XOR      | Exclusive OR             | A& XOR B& |

## Operation Order of Operators

When multiple operators are included in one expression, operations are executed in the order of priority of the operators. If you want to control the order of the operations, enclose the operations you want to perform first in parentheses.

The order of priority of the operators is shown below.

| Order of priority | Operator                            |
|-------------------|-------------------------------------|
| 1                 | Operation enclosed in parentheses   |
| 2                 | Macro function                      |
| 3                 | Exponent operation (^)              |
| 4                 | Minus sign (-)                      |
| 5                 | Multiplication and division (*, /)  |
| 6                 | Remainder (mod)                     |
| 7                 | Addition and subtraction (+, -)     |
| 8                 | Relational operators (< >, =, etc.) |
| 9                 | NOT                                 |
| 10                | AND                                 |
| 11                | OR                                  |
| 12                | XOR                                 |

## Expression

Constants, variables, and the operators that join them are referred to as an expression. Not only joined constants and variables, but the constants and variables themselves are expressions, and expressions and combinations of expressions form a statement.

### Numerical expression

An expression that returns a numerical value is referred to as a numerical expression. This joins numerical constants, numerical variables, and macro functions that return numerical values with arithmetical operators and logic operators. Multiple numerical expressions can be joined by enclosing the expressions in parentheses.

(Example of a numerical expression)

---

A& = 1 + 2 + 4 / 2

---

### Character expression

An expression that returns a character string is referred to as a character expression. This joins character string constants, character string variables, and macro functions that return character strings with plus signs. Multiple character expressions can be joined by enclosing the expressions in parentheses.

(Example of a character expression)

---

B\$ = "OMRON" + "FH"

---

## Relational expression

An expression that joins two numerical expressions by a relational operator is referred to as a relational expression.

(Example of a relational expression)

---

```
If A < 10 Then
```

```
EndIf
```

---

## Logical Expression

An expression that joins multiple relational expressions by a logical operator is referred to as a logical expression. This is used to execute bit operations and binary operations, and to evaluate complex conditions. When the operation result of a logical expression is other than 0, the result is treated as true, and when 0, the result is treated as false. Because a logical expression returns a numerical value, it can also be treated as a numerical expression.

(Example of a logical expression)

---

```
A = D & AND & b110000
```

---

## Function

An expression that executes a predefined command or operation, or an expression that executes a predefined operation on a specific specified value (argument) and returns the result of the operation, is generally referred to as a function. In particular, the functions that can be used in the macro customize functions are referred to as macro functions. Macro functions include functions that do not return a value, and functions that return the numerical value or character string that is the result of the operation. Macro functions that do not return a value are written with the macro function name and argument separated by a space. Macro functions that return a value add an argument enclosed by parentheses ( ) to the end of the macro function name.

(Example of a macro function that does not return a value)

---

```
ChangeScene 1
```

---

(Example of a macro function that returns a value)

---

```
C# = Abs(-10)
```

---





# Macro Programming

---

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# How to Write Macro Programs

Macro customize functions can be used for a variety of purposes depending on the content being programmed. This section explains programming techniques that can be used together with the basic program writing methods to widen the range of application of the macro customize functions.

## Data Types Related to Processing Units

| Necessity of referring to this manual | Unit Macro | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|------------|-----------------------------|---------------------|------------------------|
|                                       | As needed  |                             |                     |                        |

A macro customize function program can be used to change measurement flow settings by setting or acquiring processing unit data such as external reference data, figure data, and model data. The data access method varies depending on the data type.

| Type                    | Description                                                                                                                      |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| External reference data | Data used to set or acquire settings and measurement values of a processing unit.<br>Reference: ▶ External reference data (p.62) |
| Figure data             | Data used to set and acquire region figures and model figures of a processing unit.<br>Reference: ▶ Figure data (p.63)           |
| Model data              | Data used to set the model registration of a processing unit.<br>Reference: ▶ Model data (p.65)                                  |
| Image data              | Image data held by the processing unit itself.<br>Reference: ▶ Image data (p.66)                                                 |

### External reference data

External reference data is used to set and acquire settings and measurement values of a processing unit. Unique numbers are assigned to the external reference data within the processing item, and thus data can be set and acquired by specifying the processing unit number and external reference data number. In addition to a macro customize program, external reference data can be set and acquired from a processing unit data setting item, processing unit data acquisition item, and a communication commands. A processing unit data setting macro function or processing unit data acquisition macro function is used to set or acquire external reference data from a macro customize program. Numerical data and character string data can be set and acquired in a processing unit data setting macro function or processing unit data acquisition macro function. However, figure data such as measurement region data, model data such as search model and model edge data, and image data such as camera images and measurement filter images cannot be set or acquired by this method. Refer to the figure data, model data, and image data sections.

- **Acquisition of Data**

External reference data is acquired by the methods below.

Example: Acquiring External Reference Data No. 5 (correlation value) of the Unit No. 1 Search processing unit.

---

```
Rem The correlation value is a real number, and thus the variable type identifier is #  
GetUnitData 1, 5, DATA#
```

---

Example: Acquiring External Reference Data No. 7 (decode character string) of the Unit No. 2D code code processing unit.

---

```
Rem The decode character string is a character string, and thus the variable type identifier is $  
GetUnitData 2, 7, DATA$
```

---

- **Data Settings**

The method of setting external reference data is as follows.

Example: Setting 1 in External Reference Data No. 147 (search number) of the Unit No. 1 search processing unit

---

```
SetUnitData 1, 147, 1
```

---

Example: Setting "comparison" in External Reference Data No. 300 (index 0 comparison character string) of the Unit No. 2 two-dimensional code processing unit.

---

```
SetUnitData 2, 300, "comparison"
```

---

In addition to the external reference data number, external reference data can also be set and acquired using the external reference data identification name.

Example: Setting "1" in the external reference data ID name "searchNo" (search number) of the Unit No. 1 search processing unit.

The result is the same as when "1" is set in External Reference Data No. 147.

---

```
SetUnitData, "searchNo", 1
```

---

## Figure data

Figure data is used to set and acquire region figures and model figures of a processing unit. When there are multiple figure data items in the processing item, a unique number is assigned to each figure data item. This makes it possible to set and acquire figure data by specifying the processing unit number and figure number. In addition to a macro customize program, figure data can be set and acquired from a processing unit figure setting item and a processing unit figure acquisition item.

A processing unit figure setting macro function or processing unit figure acquisition macro function is used to set or acquire figure data from a macro customize program.

Reference: ▶ List of Figure Numbers (p.619)

## • Format of Figure Data

Figure data is specified using an array variable. The elements of the array are described below.

| Array element | Description                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| figure(0)     | Figure data header information | <p>This is figure data header information. Includes the number of figures and figure data size information.<br/>           Upper 16 bits: Number of figures<br/>           Lower 16 bits: Number of bytes of figure data size (figure array length x 4)<br/>           Figure data header information = Number of bytes of figure data size + Number of figure data x 65536</p> <p>Number of figures: Sets the number of figures included in the figure data. Normally 1 should be set. If you are combining multiple figures, set the number of figures that are combined (2 or more).<br/>           Number of bytes of figure data size:<br/>           Set the figure data size converted into bytes. Set the value that is 4 times the number of array elements.</p> <p>Example: One rectangle<br/>           Array length = 5, Number of figure data items = 1<br/>           Number of bytes of figure data size = 5 x 4 = 20<br/>           Figure data header information = 20 + 1 x 65536 = 65556</p> |
| figure(1)     | Figure 0 type information      | <p>Type information of figure 0 data. Includes drawing mode and figure type information.<br/>           Upper 16 bits: Drawing mode<br/>           Lower 16 bits: Figure type<br/>           Figure type information = Figure type + Drawing mode x 65536</p> <p>Drawing mode: Set whether the figure drawing mode is OR mode or NOTE mode. Normally 0 (OR mode) should be set. When multiple figures are used and you want to exclude some of the figures, set 1 (NOT mode) for the 2nd or later figures.<br/>           Figure type: Set the figure type (line, rectangle, etc.).</p> <p>Example: One rectangle (drawing mode is OR)<br/>           Figure type = 8, Drawing mode = 0<br/>           Figure type information = 8 + 0 x 65536 = 8</p>                                                                                                                                                                                                                                                          |
| figure(2)     | Figure 0 data                  | Figure data of figure 0. The size and content depends on the figure type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| figure(M)     | Figure 1 type information      | Type information of figure 1 data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| figure(M+1)   | Figure 1 data                  | Figure data of figure 1. The size and content depends on the figure type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| ⋮             | ⋮                              | ⋮                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| figure(N*M)   | Figure N type information      | Type information of figure N data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| figure(N*M+1) | Figure N data                  | Figure data of figure N. The size and content depends on the figure type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## • Acquisition of Data

Figure data is acquired by the method below.

Example: Acquiring Figure Data No. 1 (region figure) of the Unit No. 1 Search processing unit

```
Dim FIGURE&(5)
GetUnitFigure 1, 1, FIGURE&()
```

### Note

If the number of array elements is insufficient for the figure data to be set or acquired, an error will occur when setting or acquiring is attempted.

## • Data Settings

The method of setting figure data is as follows.

Example: Changing the upper left coordinates of Figure Data No. 1 (region figure) of the Unit No. 1 Search processing unit to (100, 50).

---

```
Dim FIGURE&10  
GetUnitFigure 1, 1, FIGURE&()
```

```
FIGURE&(2) = 100  
FIGURE&(3) = 50
```

```
SetUnitFigure 1, 1, FIGURE&()
```

---

Example: Changing the ellipse x direction radius of Figure 1 of Figure Data No. 0 (region figure (Figure 0: rectangle, Figure 1: Ellipse)) of the Unit No. 2 defect processing unit to 100

---

```
Dim FIGURE&(10)  
GetUnitFigure 2, 0, FIGURE&()
```

```
Rem FIGURE&(0): Figure data header information  
Rem FIGURE&(1): Figure 0 type information  
Rem FIGURE&(2) to FIGURE&(5): Upper left XY coordinates and lower right XY coordinates of rectangle  
Rem FIGURE&(6): Figure 1 type information  
Rem FIGURE&(7) to FIGURE&(8): XY coordinates of center of ellipse  
Rem FIGURE&(9) to FIGURE&(10): X direction radius and Y direction radius of ellipse  
FIGURE&(9) = 100
```

```
SetUnitFigure 2, 0, FIGURE&()
```

---

## Model data

Model data is used to set the model registration of a processing unit. When there are multiple model data items in the processing item, a unique number is assigned to each model data item. This makes it possible to set model data by specifying the processing unit number and model number.

In addition to a macro customize program, model data can also be set by communication commands.

A processing unit figure setting macro function or model copy macro function is used to set model data from a macro customize program.

Reference: ▶ Model Number List (p.622)

### IMPORTANT

---

Model data has a close association with the model figure and model parameters. Before re-registering a model, set the model figure and model parameters.

---

## • Acquisition of Data

Execution of only model data acquisition is not possible.

- **Data Settings**

The data setting method is as follows.

Example: Re-registering the model of the Unit No. 1 Search processing unit (model figure: rectangle) in the current measurement image, and changing the reference position (0, 0) and detection point coordinates (320, 240).

---

```
Dim FIGURE&(5)
GetUnitFigure 1, 0, FIGURE&()

Rem Re-register the model by setting the model figure
SetUnitFigure 1, 0, FIGURE&()

Rem Update reference coordinates XY
SetUnitData 1, 129, 0
SetUnitData 1, 130, 0

Rem Update detection point coordinates XY
SetUnitData 1, 132, 320
SetUnitData 1, 133, 240
```

---

### Image data

Image data is data that is held by the processing unit itself.

When there are multiple image data items in the processing item, a unique number is assigned to each image data item. This makes it possible to set image data by specifying the processing unit number and image number.

Image data can be set from a macro customize program.

An image data setting macro function is used to set image data from a macro customize program.

Reference: ▶ Image Number List (p.624)

- **Image Data Types**

There are two types of image data.

| Type                       | Image number | Description                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measurement image data     | 0 to 3       | Image data that the processing unit registered in the measurement flow processes at the time of measurement. Normally the image is set in measurement image 0 at the time of measurement for "image input related" processing items and "image conversion related" processing items such as camera image input and filtering, and image processing is performed using images set in other processing items. Normally 0 should be used. |
| Processing unit image data | 0 to max. 31 | Image data that is held by each processing item separately from the measurement image data. The number of processing unit image data items and content varies by processing item. Use when you want to retain image processing results such as binarized images and filtered images.                                                                                                                                                   |

- **Acquisition of Data**

Execution of only image data acquisition is not possible.

- **Data Settings**

The image data setting method is as follows.

Example: Setting Image Data No. 0 (filtered image) of the Unit No. 2 filtering processing unit in Filtered Image No. 0, and enabling use as a measurement image by following processing units

---

SetMeasureImage 0, 2, 0

---

## Data Types Related to the System

| Necessity of referring to this manual | Unit Macro | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|------------|-----------------------------|---------------------|------------------------|
|                                       | As needed  |                             |                     |                        |

With a macro customize program, data that does not depend on the measurement flow can be set and acquired by setting or acquiring data held by the system such as user data, global data, and system data.

The data access method varies depending on the data type.

| Type        | Description                                                                                                                                                                                                                                                                                 |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Global Data | Data that can be set or acquired from a different scene using a macro function. Use this when you want to set or acquire a temporary numerical value or character string that does not need to be saved, such as an interim result of an operation.<br>Reference: ► Global Data (p.67)      |
| User Data   | Data that can be set or acquired from a different scene using a user data processing item. Use this when you want to set or acquire numerical values that you want to be retained even if a power interruption occurs or restart is performed.<br>Reference: ► User Data (p.68)             |
| System data | Data that can be set or acquired from a different scene using a macro function. Use this when you want to set or acquire numerical values or character strings that you want to be retained even if a power interruption occurs or restart is performed.<br>Reference: ► System data (p.69) |

### Global Data

Global data is data that can be set or acquired from a different scene using a macro function. Use this when you want to set or acquire a temporary numerical value or character string that does not need to be saved, such as an interim result of an operation, as global data. (Reference: ► Scope of Data and Save Area (p.70))

Use system data when you need to save data that you want to set or acquire from a different scene.

Reference: ► System data (p.69)

When you newly use the Global data, in advance, you should specify the Data ident with AddGlobalData, and then register it as Global data.

Half-width alphabetical characters and the half-width marks "." and "\_" can be used for the global data identification name.

Reference: ► AddGlobalData (p.127)

- **Acquisition of Data**

Global data is acquired by the method below.

Example: Acquiring the data identification name "GData" value

---

```
Rem Register the default value 10 for the global data whose data identification name is "GData"  
AddGlobalData "GData", 10
```

```
Rem Acquire global data with the data identification name "GData"  
GetGlobalData "GData", GDATA&
```

---

- **Data Settings**

The global data setting method is as follows.

Example: Setting the data identification name "GData" value

---

```
Rem Register the default value 10 for the global data whose data identification name is "GData"  
AddGlobalData "GData", 10
```

```
Rem Set 15 in the global data with the data identification name "GData"  
SetGlobalData "GData", 15
```

---

## User Data

User data is data that can be set or acquired from a different scene using a user data processing item. Use user data to set or acquire numerical values that you want to be retained even if a power interruption occurs or restart is performed. (Reference: ▶ Scope of Data and Save Area (p.70))

When there is no need to save data that you want to set or acquire from a different scene, use global data.

When you want to set or acquire not only numerical values but character strings as well, use system data.

Reference: ▶ Global Data (p.67)

Reference: ▶ System data (p.69)

Before using user data, you can set the default values of the user data with the user data tool.

Reference: ▶ *User Data Tool* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365).

- **Acquisition of Data**

The user data processing item is used to acquire user data.

Reference: ▶ *User Data* in the *Vision System FH/FHV Series Processing Item Function Reference Manual* (Cat. No. Z341)

- **Data Settings**

A user data processing item is used to set user data.

Reference: ▶ *User Data* in the *Vision System FH/FHV Series Processing Item Function Reference Manual* (Cat. No. Z341)

## System data

System data is data that can be set or acquired from a different scene using a macro function. Use system data to set or acquire numerical values or character strings that you want to be retained even if a power interruption occurs or restart is performed. (Reference: ▶ Scope of Data and Save Area (p.70))

Use global data when there is no need to save data that you want to set or acquire from a different scene. When you only want to set or acquire numerical values, use user data.

Reference: ▶ User Data (p.68)

Reference: ▶ Global Data (p.67)

To use new system data, first specify a data identification name and register the system data that you want to use. Data identification names for system data are Data ID Name 0 and Data ID Name 1. The data identification names that correspond to ID Information 0 and ID Information 1 must be specified as arguments of the macro function.

For details on identification information and data identification names, refer to the system data list.

Reference: ▶ Macro Reference List (p.554)

Reference: ▶ System Data List (p.561)

### • Acquisition of Data

System data is acquired by the method below.

Example: Acquiring the value of "Initial Scene No." in the system data

---

```
Rem Acquire the system data whose Data ID Name 0 is "Configuration" and whose Data ID Name 1 is
"initialSceneNo"
GetSystemData "Configuration", "initialSceneNo", SDATA&
```

---

### • Data Settings

The system data setting method is as follows.

Example: Setting the values of Data ID Name 0 "PanDA" and Data ID Name 1 "SData"

---

```
Rem Register 0 as the default value of the system data whose Data ID Name 0 is "PanDA" and whose
Data ID Name 1 is "SData"
AddSystemData "PanDA", "SData", 0

Rem Set 5 in the system data whose Data ID Name 0 is "PanDA" and whose Data ID Name 1 is "SData"
SetSystemData "PanDA", "SData", 5
```

---

### IMPORTANT

---

When adding new data to the system data, specify "PanDA" in Data ID Name 0.

---

## Scope of Data and Save Area

| Necessity of referring to this manual | Unit Macro | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|------------|-----------------------------|---------------------|------------------------|
|                                       | As needed  |                             |                     |                        |

In macro customize functions, many types of data can be used as needed for the objective, and variables and macro functions can be used to set and acquire data.

The areas where data settings and acquisition can be executed and the areas where data are saved vary depending on the type of data.

By using data types appropriately for the objective of the program, macro customize functions enable the creation of programs that are easy to change and maintain.

### Data Scope

The locations from which data can be set and acquired are limited; data cannot be set or acquired from any location. This limited location is called a "scope", and data can only be set and acquired from within the scope defined for that data type.

Data scopes that can be used with the macro customize functions are as follows.

| Scope                                                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Within a processing unit<br>Within a communication command macro | Only enabled within one processing unit.<br>If multiple processing units of the "Unit Macro" processing item or the "Unit Calculation Macro" processing item are included in the measurement flow, variables with the same name that exist in the processing units will be treated as separate variables.<br>If multiple communication command macros are defined in the communication command macro tool, variables with the same name that exist in the communication command macros will be treated as separate variables. |
| Within a scene                                                   | Enabled within one scene.<br>If multiple processing units of the "Unit Macro" processing item or the "Unit Calculation Macro" processing item are included in the measurement flow, the same data can be set and acquired from each processing unit.<br>The data cannot be set or acquired from the processing unit of a different scene.                                                                                                                                                                                     |
| Within the system                                                | Enabled with the system.<br>If multiple processing units of the "Unit Macro" processing item or the "Unit Calculation Macro" processing item are included in the measurement flow, the same data can be set and acquired from each processing unit.<br>If multiple communication command macros are defined in the communication command macro tool, the same data can be set and acquired from each communication command macro.<br>The data can be set and acquired from all scene groups and scenes.                       |

## Data Save Area

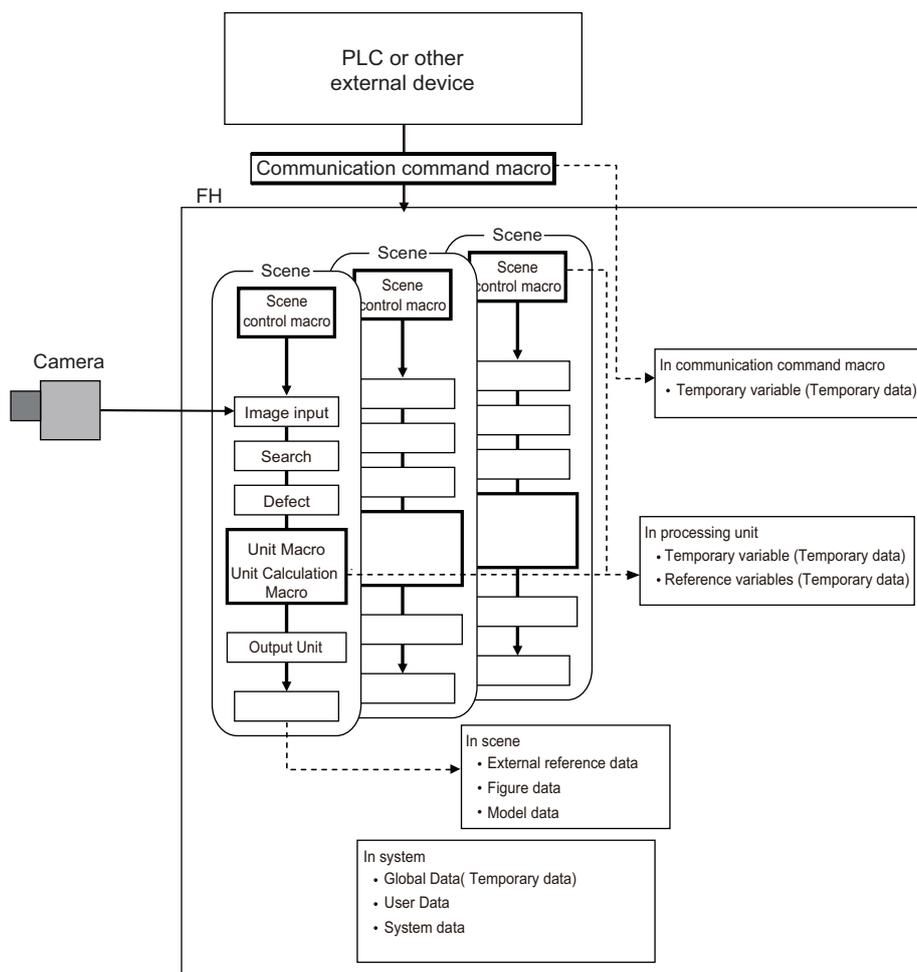
Some data that can be used in the macro customize functions is only saved temporarily in memory, and some data is saved as scene or system data. The area where data is saved is called the "save area", and each data item has a specific save area.

Data save areas that can be used with the macro customize functions are as follows.

| Save area      | Can be saved?<br>○: Yes ×: No | Description                                                                                                                                                                                                                                                                                                                             |
|----------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temporary data | ×                             | Data temporarily stored in memory.<br>Cleared when the power is interrupted or the system is restarted.<br>Use to handle data that does not need to be stored, such as temporary data used during an operation.                                                                                                                         |
| Scene data     | ○                             | Data stored as scene data.<br>In addition to "Data save", scene data can be saved to a file as a scene data file.<br>For example, use this when handling data that must be saved for each scene, such as measurement parameters and other settings that vary by product type,                                                           |
| System data    | ○                             | Data stored as system data.<br>In addition to "Data save", system data can be saved to a file as a system data file.<br>For example, use this to handle common scene data (not for only a single scene) and common system system data, such as reference settings and other inspection settings that do not depend on the product type. |

## Scope and Save Area by Variable and Data Item

The relation between the scope and save area of each variable and data item that can be used in a macro customize function is shown below.





Execution timing and corresponding subroutines are shown below. For a description of each execution timing, refer to the execution timing details.

Reference: ► Details of subroutine execution timing (p.76)

| Execution timing of subroutine |                 | Pre-defined subroutine name | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | Description                                                          |
|--------------------------------|-----------------|-----------------------------|------------------------|---------------------|-----------------------------|------------|----------------------------------------------------------------------|
| Program initialization         |                 | *MCRINIT                    | ---                    | ○                   | ---                         | ○          | Executed immediately after the program is loaded.                    |
| Measurement initialization     |                 | *MEASUREINIT                | ---                    | ---                 | ---                         | ○          | Executed before starting measurements.                               |
| Measurement execution          |                 | *MEASUREPROC                | ○                      | ---                 | ○                           | ○          | Executed when measurement processing is executed.                    |
| Display                        | Image display   | *MEASUREDISPI               | ---                    | ---                 | ---                         | ○          | Called when an image is displayed in the image window.               |
|                                | Text display    | *MEASUREDISPT               | ---                    | ---                 | ---                         | ○          | Called when text is displayed in the text window.                    |
|                                | Graphic display | *MEASUREDISPG               | ---                    | ---                 | ---                         | ○          | Called when a graphic display is displayed in the image window.      |
| Measurement flow update        |                 | *RENUMPROC                  | ---                    | ---                 | ---                         | ○          | Called when the processing unit reference number is updated.         |
| Measurement result clear       |                 | *CLEARMEASUREDATA           | ---                    | ---                 | ---                         | ○          | Called when the processing unit measurement results are initialized. |

## System Status Transitions and Possibility of Execution

There are processes that cannot be executed in certain system statuses in a macro customize program. The following types of system status exist.

| Status type                  | Description                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measurement prohibited state | Measurement instructions and communication commands cannot be accepted in this state. The measurement prohibited state generally occurs during startup, as well as changes of measurement flow, processing unit and system settings, and when executing a process or operation. In the measurement prohibited state, the BUSY signal or similar status signal turns ON. |
| Measurement acceptance state | Measurement instructions and communication commands can be accepted in this state. In the measurement accepted state, the BUSY signal or similar status signal turns OFF.                                                                                                                                                                                               |

The relation between sensor controller system statuses and execution timing is shown below.

| Execution timing of subroutine | Pre-defined subroutine name | System status<br>○: Can be executed<br>×: Cannot be executed |                              |
|--------------------------------|-----------------------------|--------------------------------------------------------------|------------------------------|
|                                |                             | Measurement prohibited state                                 | Measurement acceptance state |
| Program initialization         | *MCRINIT                    | ○                                                            | ×                            |
| Measurement initialization     | *MEASUREINIT                | ○                                                            | ×                            |
| Measurement execution          | *MEASUREPROC                | ×                                                            | ○                            |
| View                           | Screen display              | ○                                                            | ○                            |
|                                | Text display                | ○                                                            | ○                            |
|                                | Graphic display             | ○                                                            | ○                            |
| Measurement flow update        | *RENUMPROC                  | ○                                                            | ×                            |
| Measurement result clear       | *CLEARMEASUREDATA           | ○                                                            | ×                            |

In some cases it is possible to change the measurement prohibited state and measurement acceptance state while in a subroutine. For details, refer to Exclusive Control in a Process.

Reference: ▶ Exclusive Control in a Process (p.79)

## Execution During Screen Transitions

Some types of macro customize program execution timing occur in relation to screen transitions. The following types of screen transitions exist.

| Original screen      | New screen                                                                   | Description                                                               |
|----------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Splash screen        | Main screen                                                                  | Transition from splash screen at startup to main screen.                  |
| Main screen          | Flow edit screen<br>Menu settings screen<br>Tool screen<br>Properties screen | Transition from main screen to other screens.                             |
| Flow edit screen     | Main screen                                                                  | Transition from flow edit screen to main screen.                          |
|                      | Properties screen                                                            | Transition from flow edit screen to properties screen of processing unit. |
| Menu settings screen | Main screen                                                                  | Transition from menu settings screen to main screen.                      |
| Tool screen          | Main screen                                                                  | Transition from tool screen to main screen.                               |
|                      | Properties screen                                                            | Transition from tool screen to properties screen of processing unit.      |
| Properties screen    | Main screen                                                                  | Transition from properties screen of processing unit to main screen.      |
|                      | Flow edit screen                                                             | Transition from properties screen of processing unit to flow edit screen. |

The relation between sensor controller screen transitions and program execution timing is shown below.

| Execution timing of subroutine |                 | Pre-defined subroutine name | Screen transition                                                                    |                                 |
|--------------------------------|-----------------|-----------------------------|--------------------------------------------------------------------------------------|---------------------------------|
|                                |                 |                             | Original screen                                                                      | New screen                      |
| Program initialization         |                 | *MCRINIT                    | Splash screen                                                                        | Main screen                     |
|                                |                 |                             | Properties screen (macro customize functions)                                        | Flow edit screen<br>Main screen |
|                                |                 |                             | Tool screen (Macro customize functions)                                              | Main screen                     |
| Measurement initialization     |                 | *MEASUREINIT                | Splash screen<br>Flow edit screen<br>Menu screen<br>Tool screen<br>Properties screen | Main screen                     |
| Measurement execution          |                 | *MEASUREPROC                | ---                                                                                  | ---                             |
| View                           | Screen display  | *MEASUREDISPI               | ---                                                                                  | ---                             |
|                                | Text display    | *MEASUREDISPT               | ---                                                                                  | ---                             |
|                                | Graphic display | *MEASUREDISPG               | ---                                                                                  | ---                             |
| Measurement flow update        |                 | *RENUMPROC                  | ---                                                                                  | ---                             |
| Measurement result clear       |                 | *CLEARMEASUREDATA           | ---                                                                                  | ---                             |

### Process Transitions and Execution Timing

The timing of macro customize program execution is related both to screen transitions and to the type of process being executed.

The relation between process type and program execution timing is shown below.

| Process                  | Timing of execution during process | Timing of execution after process | Description                                                                                                                                                                                                                                                                                                                     |
|--------------------------|------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scene change             | ---                                | Measurement initialization        | Scene change process. The program is executed when measurement initialization takes place after the process.                                                                                                                                                                                                                    |
| Measurement result clear | Measurement result clear           | Measurement initialization        | Measurement result clear process. The program is executed when the measurement result is cleared during the process, and when measurement initialization takes place after the process.                                                                                                                                         |
| Measurement execution    | Measurement execution              | ---                               | Measurement execution process. The program is executed when measurement is executed during the process.                                                                                                                                                                                                                         |
|                          | Image display                      | ---                               | Image display process. The program is executed when the image is displayed during the process.                                                                                                                                                                                                                                  |
|                          | Graphic display                    | ---                               | Graphic display process. The program is executed when graphic display takes place during the process.                                                                                                                                                                                                                           |
|                          | Text display                       | ---                               | Text display process. The program is executed when text display takes place during the process.                                                                                                                                                                                                                                 |
| Flow edit                | Measurement flow update            | ---                               | Measurement flow update process. The program is executed when the flow is updated during the process. Measurement flow update consists of the operation and process by which the unit number of the measurement flow is updated, including adding and deleting processing units to the measurement flow and changing the order. |

## Menu Operations and Execution Timing

In addition to screen transitions and process transitions, the timing of macro customize program execution is also related to the type of menu operation being executed.

The relation between process type and program execution timing is shown below.

| Process                   | Timing of execution during process | Timing of execution after process | Description                                                                                                                                                   |
|---------------------------|------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Processing unit selection | Image display                      | ---                               | Selection of a processing unit in the measurement flow when "Define displayed unit" is selected.<br>The program is executed when the image is displayed.      |
|                           | Graphic display                    | ---                               | Selection of a processing unit in the measurement flow when "Define displayed unit" is selected.<br>The program is executed when graphic display takes place. |
|                           | Text display                       | ---                               | Selection of a processing unit in the measurement flow when "Define displayed unit" is selected.<br>The program is executed when text display takes place.    |

## Image Display Status Transitions and Execution Timing

The timing of execution of macro customize programs related to display is also related to image window display changes. The relation between the image window and program execution timing is shown below.

| Process                           | Execution timing of processing   | Execution timing of processing   | Description                                                                                                                                                                                                      |
|-----------------------------------|----------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Image mode change                 | Image display<br>Graphic display | Measurement initialization       | Image mode change process for the image window. The program is executed when image display and graphic display take place during the process, and when measurement initialization takes place after the process. |
| Image mode "Through camera image" | Image display<br>Graphic display | Image display<br>Graphic display | Process when the image mode of the image window is "Through camera image". The program is executed repeatedly when image display or graphic display take place while the image mode is "Through camera image".   |

### IMPORTANT

If the image mode of one or more of the image windows of the 24 image windows that can be used in the layout function is "Through camera image", the "Image mode 'Through camera image'" process is executed repeatedly.

## Details of subroutine execution timing

Details of the execution timing of subroutines pre-defined in the system are described below.

### • Measurement Initialization (\*MCRINIT)

The program initialization subroutine is executed immediately after the program is loaded. The process is executed at the timing below.

| Details of subroutine execution timing | Main cases of execution                                                                                                                                                                                                                                                                                                           |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Immediately after macro editing        | <ul style="list-style-type: none"> <li>• When the program editing screen is opened</li> <li>• When the program editing screen is closed</li> </ul>                                                                                                                                                                                |
| When scene data is loaded              | <ul style="list-style-type: none"> <li>• At startup</li> <li>• When the scene group is changed</li> <li>• When any of the following file is loaded               <ul style="list-style-type: none"> <li>•Scene data</li> <li>•Scene group data</li> <li>•System + Scene group 0 data</li> <li>•Backup data</li> </ul> </li> </ul> |

• **Measurement Initialization (\*MEASUREINIT)**

The measurement initialization subroutine is executed before starting measurements. The process is executed at the timing below.

| Details of subroutine execution timing                                                              | Main cases of execution                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Screen transition to main screen                                                                    | <ul style="list-style-type: none"> <li>• When the flow edit screen is closed</li> <li>• When the system settings screen is closed</li> <li>• When any other screen that can be called from the main screen such as a scene change screen or saved screen is closed</li> </ul> |
| Immediately after a layout change                                                                   | <ul style="list-style-type: none"> <li>• When the layout change is closed</li> <li>• When an image window setting or text window setting is changed</li> </ul>                                                                                                                |
| When a setting communication macro function or acquisition communication macro function is executed | When measurement is executed or a communication command other than continuous execution is executed                                                                                                                                                                           |
| Immediately after the measurement start macro function is executed                                  | When the "MeasureStart" macro function is executed                                                                                                                                                                                                                            |

**IMPORTANT**

When the image mode is "Freeze camera image", the measurement image is not updated when measurement initialization takes place. However, if at least one of the 24 image windows that can be used in the layout function is set to "Through camera image", the measurement image of the "Freeze image camera" image windows will be updated. Use the main window layout change function to change the image of all image windows to "Freeze camera image", or use the SetImageWindow macro function to set the image mode of all image windows to "Freeze camera image" before the measurement initialization process is executed.

Reference: ▶ *Changing the Image Mode and Other Display Contents in the Vision System FH/FHV Series User's Manual (Cat. No. Z365)*

• **Measurement Execution (\*MEASUREPROC)**

The measurement subroutine is executed when measurement is executed. The process is executed at the timing below.

| Details of subroutine execution timing | Main cases of execution                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When measurement is executed           | <ul style="list-style-type: none"> <li>• When measurement is executed or a communication command for continuous measurement execution is executed</li> <li>• When a measurement button such as the measurement button in the main screen or in the properties screen is clicked</li> <li>• When the "Measure" macro function is executed</li> </ul> |

• **Image display (\*MEASUREDISPI)**

The image display subroutine is executed when an image is displayed. The process is executed at the timing below.

| Details of subroutine execution timing | Main cases of execution                                                                                                                                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When the image display is updated      | <ul style="list-style-type: none"> <li>• When measurement is executed</li> <li>• When the image window settings are changed</li> <li>• When the image window is set to "Define displayed unit" and the processing unit selected in the measurement flow is changed</li> </ul> |

**IMPORTANT**

When the position list display is ON, the image display subroutine and text display subroutine are not executed. If you want to execute the image display subroutine or text display subroutine, set the position list display to OFF. Reference: ► *Changing the Image Mode and Other Display Contents in the Vision System FH/FHV Series User's Manual* (Cat. No. Z365)

- **Text display (\*MEASUREDISPT)**

The text display subroutine is executed when text display is executed. The process is executed at the timing below.

| Details of subroutine execution timing | Main cases of execution                                                                                                                                                                                                                                                     |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When the text display is updated       | <ul style="list-style-type: none"> <li>• When measurement is executed</li> <li>• When the text window settings are changed</li> <li>• When the text window is set to "Define displayed unit" and the processing unit selected in the measurement flow is changed</li> </ul> |

- **Graphic display (\*MEASUREDISPG)**

The graphic display subroutine is executed when graphic display is executed. The process is executed at the timing below.

| Details of subroutine execution timing | Main cases of execution                                                                                                                                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When the image display is updated      | <ul style="list-style-type: none"> <li>• When measurement is executed</li> <li>• When the image window settings are changed</li> <li>• When the image window is set to "Define displayed unit" and the processing unit selected in the measurement flow is changed</li> </ul> |

- **Measurement Flow Update (\*RENUMPROC)**

The measurement flow update subroutine is executed when the measurement flow is changed. The process is executed at the timing below.

| Details of subroutine execution timing | Main cases of execution                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Immediately after flow editing         | <ul style="list-style-type: none"> <li>• When the order of the processing units in the measurement flow is changed, such as adding, deleting, or moving a processing unit.</li> <li>• When a macro function is executed that changes a processing unit number in the measurement flow or changes a processing unit, such as "AssignUnit", "CopyUnit", or "DeleteUnit".</li> </ul> |

- **Measurement result clear (\*CLEARMEASUREDATA)**

The measurement result clear subroutine is executed when measurement results are cleared. The process is executed at the timing below.

| Details of subroutine execution timing | Main cases of execution                                                                                                                                                                         |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When measurement results are cleared   | <ul style="list-style-type: none"> <li>• When "OK" is clicked in the measurement result clear screen.</li> <li>• When the macro function that clears measurement results is executed</li> </ul> |

## Exclusive Control in a Process

| Necessity of referring to this manual | Unit Macro   | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|--------------|-----------------------------|---------------------|------------------------|
|                                       | Not required | As needed                   |                     | Not required           |

This primarily uses the communication command macro and scene control macro.

Macro customize functions can be used to perform exclusive control in a process when a program is executed. Exclusive control must be performed during measurement and communication in order to prevent incorrect processing, such as a communication command or screen operation accidentally changing the scene during measurement, or subsequently received data overwriting the currently received data.

### Exclusive Control in a Measurement Process

When executing the setting or acquisition of processing unit data, system data, or other data in a program, and when executing a process that changes scene data such as a scene change, you must first stop acceptance of measurement triggers during processing. If data setting, data acquisition, or a scene change is executed when measurement triggers can be accepted and a measurement trigger is then input during the setting process, acquisition process, or scene change, there is a risk that data inconsistencies will occur or an incorrect measurement result will be output.

To stop acceptance of measurement trigger input, use the MeasureStop function. To enable acceptance of measurement trigger input, use the MeasureStart function.

#### Example

---

Rem Stop measurement  
MeasureStop

Rem Change the scene or set data

Rem Resume measurement  
MeasureStart

---

#### IMPORTANT

- When executing a scene change or setting or acquiring processing unit data or other data in a program, always execute MeasureStop beforehand. If data setting or data acquisition is executed without executing MeasureStop, there is a risk that measurement may be executed during the setting process or acquisition process and cause inconsistencies in the data being set or acquired.
- If MeasureStart is not executed after MeasureStop, it will not be possible to accept measurement triggers. The BUSY signal will remain ON.
- If measurement is to be executed after MeasureStop in a program, execute MeasureStart before executing measurement. If MeasureStart is not executed after MeasureStop, measurement will not take place when executed.
- With the unit macro or unit calculation macro, create a program that does not require exclusive control. Switching between the measurement prohibited state and measurement acceptance state during measurement execution may cause unexpected operation.

## Exclusive Control in a Communication Process

In communication with external devices, the FH series uses a polling process to monitor statuses and data transmission/reception. When sending or receiving data, stop the communication polling process before sending/receiving the data. If data transmission/reception is executed without stopping the polling process, there is a risk that inconsistencies may occur in the received data, such as data other than the intended data being received from the external device.

To change the state of the communication polling process, use the SetPollingState function.

Example: Receiving data in serial normal communication

---

```
Rem Stop serial normal communication  
SetPollingState "SerialNormal", FALSE
```

```
Rem Receive the data
```

```
Rem Start serial normal communication  
SetPollingState "SerialNormal", TRUE
```

---

# Debug Function

---

|                                        |    |
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# How to Use the Debug Function

| Necessity of referring to this manual | Unit Macro | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|------------|-----------------------------|---------------------|------------------------|
|                                       | Required   |                             |                     |                        |

Invalid macro function calls and programming bugs in macro customize programs may cause errors in operation. Identifying the cause and correcting the program when an error occurs is called "debugging". Macro customize functions have a support function for program debugging, allowing errors to be efficiently removed.

## IMPORTANT

- Do not close the system status console window by a method such as clicking the "x" button in the upper right corner of the system status console window. The system may not operate correctly. If the system status console window is accidentally closed, save your settings and restart the sensor controller.

## Debug Preparations

Debugging is performed in macro customize functions by changing the execution form of the program and using macro functions that are effective for debugging. Debugging can be performed by writing a macro function for debugging in the program and executing the program, and by directly entering a macro function from the system status console window and executing the program.

### Program Execution Mode

Macro customize functions allow the execution mode of the program to be specified for each function. By varying the execution form of the program as appropriate for the execution conditions, program management and debugging is made easier.

| Execution form | Description                                                                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Release mode   | Execution form used for program execution and regular use.<br>In release mode, the macro functions that are entered in the program for debugging are disabled. |
| Debugging mode | This is a convenient execution form used for program correction and debugging.<br>Some debugging functions are only enabled in debug mode.                     |

## IMPORTANT

Specify the program execution mode individually for each function and unit.

- Unit calculation macro, unit macro: specify by processing unit
- Scene control macro: specify by scene
- Communication command macro: specify by communication macro

## Macro Functions Used for Debugging

Some of the macro functions are effective for debugging. Macro functions that are effective for debugging are described below.

| Macro function                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Debug<br>(Reference: Details (p.182))      | <p>Select the program usage mode and the information output method used when the program is executed.</p> <p>0 : Set the usage mode to release mode. When an error occurs, an error description is output.</p> <p>1 : Set the usage mode to release mode. When an error occurs, an error description is output to the system status console window. This setting is recommended for times other than when debugging is performed.</p> <p>2 : Set the usage mode to release mode. When the program is executed, the contents of each line are output to the system status console window.</p> <p>3 : Set the usage mode to release mode. When an error occurs, an error description is output to the message box.</p> <p>16 : Set the usage mode to debug mode. When an error occurs, an error description is output.</p> <p>17 : Set the usage mode to debug mode. When an error occurs, an error description is output to the system status console window.</p> <p>18 : Set the usage mode to debug mode. When the program is executed, the contents of each line are output to the system status console window. This setting is recommended when normal debugging is performed.</p> <p>19 : Set the usage mode to debug mode. When an error occurs, an error description is output to the message box.</p> |
| Stop<br>(Reference: Details (p.488))       | <p>This macro function is only enabled in debug mode.</p> <p>The function is used to stop execution of the program at a break point. You can also set conditions with the SetStop function. When the specified conditions are met, execution of the program stops.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| SetStop<br>(Reference: Details (p.465))    | <p>This macro function is only enabled in debug mode.</p> <p>Use this function to set conditions for stopping the program with the Stop function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| DebugPrint<br>(Reference: Details (p.184)) | <p>This macro function is only enabled in debug mode.</p> <p>The function displays text in the system status console window.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

When performing debugging, you can enter macro functions for debugging in the system console window and execute the program. This allows you to conveniently execute and stop the program in the system status console window without the need to edit the program.

Macro functions for debugging that are convenient to use in the system status console window are described below.

| Macro function                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cont<br>(Reference: Details (p.161))    | <p>Resumes execution of the program after it has been stopped using the Stop function.</p> <p>Parameters can be specified to execute the program in steps.</p> <p>No parameters:</p> <ul style="list-style-type: none"> <li>Resumes execution of the program. The next program is executed until it ends or an error occurs.</li> <li>Executes the program by step-in execution.</li> <li>0 : If the current program line calls a subroutine, the subroutine is entered and is executed in steps. Otherwise, the current statement is executed and the program is stopped at the next line.</li> <li>Executes the program by step-over execution.</li> <li>1 : If the current program line calls a subroutine, the entire subroutine is executed and the program stops at the next line after the subroutine call. Otherwise, the current statement is executed and the program is stopped at the next line.</li> <li>Executes the program by step-out execution.</li> <li>2 : If the current program line is a subroutine that was called from a subroutine, the entire subroutine after the current program line is executed, and the program stops at the next line of the subroutine that called the subroutine. Otherwise, the program is executed until it ends or an error occurs.</li> </ul> |
| Varlist<br>(Reference: Details (p.537)) | <p>Displays information on the variables with the specified variable names in a list in the system status console window.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Debug Procedure

When an error occurs in the program, follow the steps below to correct the program.

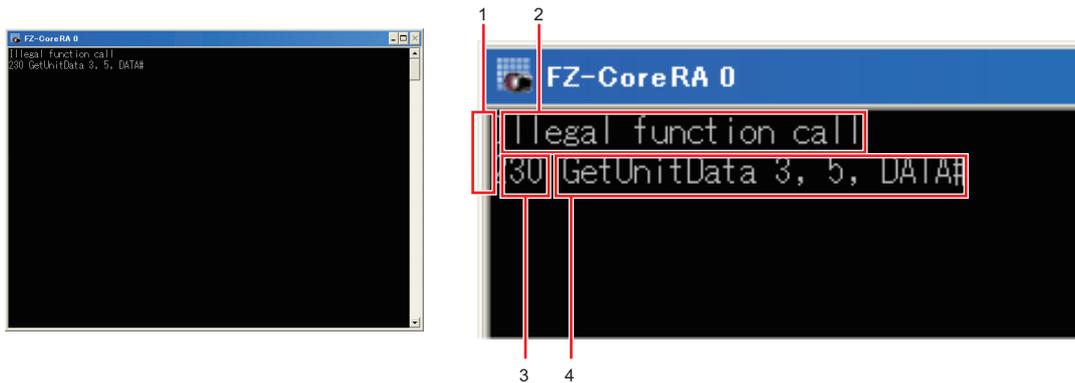
| Item name                                                                                       | Step                                  | Description                                                                                                             |
|-------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| ---                                                                                             | Error occurs                          | An error occurs during program execution and the program execution process is forcibly stopped.                         |
| ---                                                                                             | ↓                                     | ---                                                                                                                     |
| Checking Why an Error Occurred<br>(Reference:<br>▶ Checking Why an Error Occurred (p.86))       | Check the Console Window              | A brief description of the error appears in the system status Console Window. Check the error description.              |
|                                                                                                 | ↓                                     | ---                                                                                                                     |
| ---                                                                                             | Identify the nature of the error      | Refer to the error list to identify the nature of the error.                                                            |
| ---                                                                                             | ↓                                     | ---                                                                                                                     |
| Starting Debug                                                                                  | Change to debug mode                  | Specify 18 for the debug function parameter at the start of the *MCRINIT subroutine or process of the program.          |
| ---                                                                                             | ↓                                     | ---                                                                                                                     |
| Identifying the Cause of an Error<br>(Reference:<br>▶ Identifying the Cause of an Error (p.88)) | Identifying the location of the error | Based on the identified nature of the error, determine which line and where on the line the error occurred.             |
|                                                                                                 | ↓                                     | ---                                                                                                                     |
| ---                                                                                             | Identifying the Cause of the Error    | Identify why the error occurred.                                                                                        |
| ---                                                                                             | ↓                                     | ---                                                                                                                     |
| Removing the Error<br>(Reference:<br>▶ Removing the Error (p.91))                               | Correct and check operation           | Correct the program to remove the cause of the error, and check operation to verify that the error has been eliminated. |
| ---                                                                                             | ↓                                     | ---                                                                                                                     |
| Exiting Debug                                                                                   | Change to release mode                | Specify 1 for the debug function parameter at the start of the *MCRINIT subroutine or process of the program.           |
| ---                                                                                             | ↓                                     | ---                                                                                                                     |
| ---                                                                                             | Save settings                         | Save your changes.                                                                                                      |

## Checking Why an Error Occurred

When an error occurs during program execution, the subroutine process in which the error occurred is forcibly stopped. Processes other than that in which the sensor controller error occurred continue to run. If an error occurs in the "Unit Macro" processing item or "Unit Calculation Macro" processing item, the measurement result of the processing unit in which the error occurred is NG. If an error occurs in a communication command macro, the macro function returns an error. Regardless of where the error occurred, error information appears in the system status console window.

### Checking the System Status Console Window

When an error occurs in the program, error information appears in the system status console window. You can check this information to determine the type of error and the location of the error in the program.



#### 1. Error module

Module that outputs the error. This indicates the function of the macro customize function that output the error.

| Content displayed for error module | Description                                                                                                           |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Macro(U**>                         | The unit macro or unit calculation macro outputted error information. "*" after "U" shows the processing unit number. |
| Macro(SC)>                         | The scene control macro outputted error information.                                                                  |
| Macro(IO)>                         | The communication command macro outputted error information.                                                          |

#### 2. Error Message

This message indicates error factors. Based on the error message, you can check what type of error occurred.

#### 3. Error line number

The number of the line where the error occurred. Use this to determine the location of the error in the program.

#### 4. Error statement

Written program content on the line where the error occurred. The error statement allows you to check the written content of the program without opening the program editing screen.

## Identifying the Error

Based on the error message that appears in the system status console window, check the error in the error list.

If this gives you sufficient information to identify the cause of the error, remove the error.

Reference: ▶ Error List (p.554)

### IMPORTANT

If you specified 0 or 16 for the debug function parameter, the error information will not appear in the system status console window. Specify a value other than 0 or 16 for the debug function parameter.

Reference: ▶ Macro Functions Used for Debugging (p.83)

## Starting Debug

After checking why the error occurred, start Debug. The \*MEASUREPROC subroutine of the "Unit Macro" processing item is used for debugging below as an example.

Open the program editing screen and write the debug function at the beginning of the \*MCRINIT subroutine or the program.

Example: To start Unit Macro Debug, specify 18 in the parameter for the debug function in the \*MCRINIT subroutine.

```
*MCRINIT  
  
    Rem Specify 18 for the debug function parameter and execute  
    Debug 18  
  
Return
```

Example: To start Communication Command Macro Debug, specify 18 in the parameter for the debug function at the beginning of the communication command program to be debugged.

```
Rem Specify 18 for the debug function parameter and execute  
Debug 18  
  
Rem The actual communication command process is written from here  
ChangeScene 1  
SetUnitData 2, 101, 0
```

### Note

- In addition to 1 and 18, other values are available for the parameter for the debug function. Use these when appropriate. Reference: ▶ Macro Functions Used for Debugging (p.83)
- If you delete the debug function from the program, the usage mode will remain the usage mode that was set the last time the debug function was executed. Restart to return the usage mode to its default setting.

## Identifying the Cause of an Error

After changing the usage mode to debug mode, identify the cause of the error.

### Identifying the location of the error

To identify the cause of the error, determine where the error occurred.

#### 1 Enter the Stop function in the program editing screen.

Example: Enter the Stop function immediately before the measurement process in the \*MEASUREPROC subroutine of the Unit Macro.

---

```
*MEASUERPROC
```

```
Rem Execute the Stop function and stop the program at this line  
Stop
```

```
Rem The actual measurement process is written from here  
POS.X#=(POS0.X@ + POS1.X@) / 2  
POS.Y#=(POS0.Y@ + POS1.Y@) / 2  
Print POS.Y# / POS.X#
```

```
Return
```

---

#### 2 Close the program editing screen with [OK] and return to the main screen.

The main screen appears.

#### 3 Execute measurement.

When the Stop function line is executed, the measurement process stops. If the process does not stop, check if debug mode is specified with the debug function parameter.

#### 4 Check the system status console window.

The system status console window shows the following:

```
Macro(U3)210 *MEASUREPROC  
Macro(U3)220 Stop  
Macro(U3)>
```

#### 5 Execute the program in steps of one line.

Enter "Cont 1" in the system status console window from your keyboard.

```
Macro(U3)210 *MEASUREPROC  
Macro(U3)220 Stop  
Macro(U3)>cont 1
```

## 6 Hit [Enter] on your keyboard.

One line of the program is executed. The program stops at the next line.

```
Macro(U3)210 *MEASUREPROC
Macro(U3)220 Stop
Macro(U3)>cont 1
Macro(U3)230 POS.X#=(POS0.X@ + POS1.X@) / 2
Macro(U3)>
```

## 7 Continue to step through the program unit until the line that contains the error is executed.

When the line with the error is executed, error information appears in the system status console window. In this case, it can be seen that the error is caused by dividing by 0.

```
Macro(U3)210 *MEASUREPROC
Macro(U3)220 Stop
Macro(U3)>cont 1
Macro(U3)230 POS.X#=(POS0.X@ + POS1.X@) / 2
Macro(U3)>cont 1
Macro(U3)240 POS.Y#=(POS0.Y@ + POS1.Y@) / 2
Macro(U3)>cont 1
Macro(U3)250 Print POS.Y# / POS.X#
Macro(U3)Division by zero in 250
Macro(U3)>
```

### Identifying the Cause of the Error

Once you have determined the location of the error, identify the cause.

## 8 Check the value of the variable.

Enter "VarList" in the system status console window from your keyboard.

## 9 Hit [Enter] on your keyboard.

The variables are listed in the system status console window.

```
Macro(U3)210 *MEASUREPROC
Macro(U3)220 Stop
Macro(U3)>cont 1
Macro(U3)230 POS.X#=(POS0.X@ + POS1.X@) / 2
Macro(U3)>cont 1
Macro(U3)240 POS.Y#=(POS0.Y@ + POS1.Y@) / 2
Macro(U3)>cont 1
Macro(U3)250 Print POS.Y# / POS.X#
Macro(U3)Division by zero in 250
Macro(U3)>varlist
POS.X#=0.000
POS0.X@=0.000
POS1.X@=0.000
POS.Y#=211.000
POS0.Y@=209.000
POS1.Y@=213.000
```

From the program contents and the variable list, it can be seen that the value of the POS.X# denominator variable is 0.

## Stopping the Program When a Specific Condition is Met

The program can also be stopped when a specific condition is met. Setting an appropriate condition allows the location of an error to be identified more efficiently than with the Stop function.

---

\*MCRINIT

Debug 18

Rem Use the SetStop function to set the program stop condition so that the program stops when the Stop function parameter is 0  
SetStop Str\$(0)

Return

\*MEASUERPROC

Rem The actual measurement process is written from here  
POS.X#=(POS0.X@ + POS1.X@) / 2  
POS.Y#=(POS0.Y@ + POS1.Y@) / 2

Rem Execute the Stop function and stop the program on the line where the POS.X# variable is 0  
Stop Str\$(POS.X#)  
Rem Execute the Stop function and stop the program on the line where the POS.Y# variable is 0  
Stop Str\$(POS.Y#)

Print POS.Y# / POS.X#

Return

---

### Note

A true/false relational expression (true: -1, false: 0) can also be set as the condition for the Stop function.  
Example: Stopping the program when the CORRELATION& variable is less than 60  
Set the SetStop function so that the program stops when the relational expression is true (-1).  
SetStop Str\$(-1)  
The Stop function stops the program when the relational expression CORRELATION& < 60 is true.  
Stop Str\$(CORRELATION& < 60)

---

## Removing the Error

Once you have identified the cause of the error, correct the program to remove the error.  
After correcting the program, check operation and verify that the error has been removed.

Example: Use "If" to prevent the denominator from becoming 0 in the \*MEASUREPROC subroutine of the Unit Macro.

---

```
*MEASUERPROC

Rem Execute the Stop function and stop the program at this line
Stop

Rem The actual measurement process is written from here
POS.X#=(POS0.X@ + POS1.X@) / 2
POS.Y#=(POS0.Y@ + POS1.Y@) / 2

Rem Add an "If" statement so that division is only executed when POS.X# is not 0
If POS.X# <> 0 Then
Print POS.Y# / POS.X#
EndIf

Return
```

---

## Exiting Debug

When the error has been removed, exit Debug.  
Open the program editing screen and change the parameter of the debug function at the beginning of the \*MCRINIT subroutine or the program.

Example: To exit Unit Macro Debug, change the parameter for the debug function in the \*MCRINIT subroutine to 1.

---

```
*MCRINIT

Rem Specify 1 for the debug function parameter and execute
Debug 1

Return
```

---

### Note

- In addition to 1 and 18, other values are available for the parameter for the debug function. Use these when appropriate. Reference: ► Macro Functions Used for Debugging (p.83)
- If you delete the debug function from the program, the usage mode will remain the usage mode that was set the last time the debug function was executed. Restart to return the usage mode to its default setting.



# Troubleshooting

---

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# Troubleshooting

| Necessity of referring to this manual | Unit Macro | Communication Command Macro | Scene Control Macro | Unit Calculation Macro |
|---------------------------------------|------------|-----------------------------|---------------------|------------------------|
|                                       | As needed  |                             |                     |                        |

When a unit macro customize function does not operate correctly, refer to the following to correct settings or operation.

## Troubleshooting for Programming

Problems that are commonly encountered when creating programs with the macro customize functions are described below, along with the actions to take.

| Problem                                                                         | Cause                                                                                                                                                                                                                                                                                                    | Action                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No response when [DEL], [BS], or [Enter] is clicked.                            | The focus may not be on the program window.                                                                                                                                                                                                                                                              | Click the place you want to work in and then click the button.                                                                                                                                                                                                                                  |
| A symbol cannot be entered when using a USB keyboard.                           | The USB key layout may be different from the keys that appear on the keyboard.                                                                                                                                                                                                                           | The keyboard of the FH series uses the same layout as an English keyboard.<br>Either read the keys on your keyboard as English layout keys, or click [Keyboard] in the program editing screen and use the screen keyboard that appears.                                                         |
| It takes time for the screen keyboard to appear.                                | The Sensor Controller and external devices may be connected by Ethernet.                                                                                                                                                                                                                                 | If the Sensor Controller is connected to external devices by Ethernet, it occasionally takes time for the screen keyboard to appear.<br>In a network environment that does not use a router or DNS server, set the same value for the default gateway and DNS server address as the IP address. |
| An unintended value is set.                                                     | When the same name is applied to multiple variables, unintended values can be set to those variables.<br>For example, when the sub-routines of *MEASUREPROC and *MEASUREDISPT have variables of the same name and they are used for different purposes, unintended values can be set to those variables. | Do not assign the same name to multiple variables.                                                                                                                                                                                                                                              |
| A value is not set in a variable.                                               | The variable in which you are attempting to set a value may have a type mistake.                                                                                                                                                                                                                         | If the variable name including the identifier is not correct, the variable will be treated as a different variable in the program.<br>Make sure the variable name is correct.                                                                                                                   |
| A comment or character string output with the Print function becomes corrupted. | Characters other than Japanese or English characters may be used in the Print function or comment.                                                                                                                                                                                                       | For Print function, only English is available. Language-characters are not available such as "ä" in German.<br>• FH series: English and selected language of [Language setting] are displayable.                                                                                                |

| Problem                                                                                             | Cause                                                                        | Action                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When attempting to close the program editing screen, an error occurs and the screen does not close. | Full-width space characters or tab characters may be used in the program.    | An error will occur if you attempt to close the program screen editing screen when full-width spaces or tabs are included in parts of the program other than character string type constants and variables. Select "Disp invisible characters" in the "Disp option" of the program editing screen, and then locate the full-width spaces and tabs in the program and remove. |
|                                                                                                     | An incorrect macro function name may be used in the program.                 | If an incorrect macro function name is used in the program, an error will occur when the program editing screen is closed. Select "Disp highlight" in the "Disp option" of the program editing screen, and then locate macro function names that are not color-highlighted and correct the macro function names.                                                             |
| When loading a program created with the text editor on a computer, only part of the program loads.  | The program may exceed the maximum number of characters that can be entered. | A program that exceeds the maximum number of characters that can be entered will not load correctly. Check the remaining number of characters that can be entered in the program editing screen, and correct the program so that it does not exceed the character limit.                                                                                                     |

## Troubleshooting When Checking Operation

Problems that are commonly encountered when checking the operation of programs created with the macro customize functions are described below, along with the actions to take.

### Troubleshooting when checking the operation of the Unit Calculation Macro

| Problem                                                                             | Cause                                                          | Action                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An error message appears in the system status console window                        | An error occurred when the program was executed.               | Check the error message and correct the error.<br>Reference: ▶ Error List (p.554)<br>If it is difficult to identify the error, use Debug to determine the cause and correct the error.<br>Reference: ▶ How to Use the Debug Function (p.82) |
| The calculation result of the Unit Calculation Macro processing unit is unmeasured. | The operator setting may be disabled.                          | Set the check box of the operator on to enable.                                                                                                                                                                                             |
|                                                                                     | The calculation judgement conditions may not be correctly set. | Set judgement conditions that are appropriate for the calculation and expected result.                                                                                                                                                      |

### Troubleshooting when checking the operation of the Scene Control Macro

| Problem                                                                                                             | Cause                                                                                    | Action                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An error message appears in the system status console window                                                        | An error occurred when the program was executed.                                         | Check the error message and correct the error.<br>Reference: ▶ Error List (p.554)<br>If it is difficult to identify the error, use Debug to determine the cause and correct the error.<br>Reference: ▶ How to Use the Debug Function (p.82)                                                                                 |
| Data reception during processing sometimes fails.                                                                   | The communication process may not have been stopped with the SetPollingState function.   | Before acquiring data with the ReceiveData or other function, use the SetPollingState function to stop the communication process.<br>Reference: ▶ SetPollingState in Macro Function Reference (p.454)                                                                                                                       |
| Processing unit figure data cannot be set with the SetUnitFigure function, and registered figures are also cleared. | There may not be a measurement image when the figure is set.                             | When there is no measurement image because the processing unit is in the unmeasured state or otherwise, the figure setting will fail and previous settings will be cleared.<br>Execute measurement before setting a figure, or use the ImageUpdate function to ready an image.<br>Reference: ▶ ImageUpdate Function (p.302) |
| Measurement or re-measurement does not take place in the program                                                    | "Measure" or "Remeasure" is executed in the program in the measurement prohibited state. | When executing measurement with "Measure" or "Remeasure" in the program, use the MeasureStop function and MeasureStart function to appropriately control the measurement trigger input prohibited/allowed state.<br>Reference: ▶ Exclusive Control in a Measurement Process (p.79)                                          |

## Troubleshooting when checking the operation of the communication command macro

| Problem                                                                                                             | Cause                                                                                                             | Action                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An error message appears in the system status console window                                                        | An error occurred during program execution.                                                                       | Check the error message and correct the error.<br>Reference: ▶ Error List (p.554)<br>If it is difficult to identify the error, use Debug to determine the cause and correct the error.<br>Reference: ▶ How to Use the Debug Function (p.82)                                                                                                                                                                                 |
| Data reception during processing sometimes fails.                                                                   | The communication process may not have been stopped with the SetPollingState function.                            | Before acquiring data with the ReceiveData or other function, use the SetPollingState function to stop the communication process.<br>Reference: ▶ SetPollingState in Macro Function Reference (p.454)                                                                                                                                                                                                                       |
| Processing unit figure data cannot be set with the SetUnitFigure function, and registered figures are also cleared. | There may not be a measurement image when the figure is set.                                                      | When there is no measurement image because the processing unit is in the unmeasured state or otherwise, the figure setting will fail and previous settings will be cleared.<br>Execute measurement before setting a figure, or use the ImageUpdate function to ready an image.<br>Reference: ▶ ImageUpdate Function (p.302)                                                                                                 |
| The communication command macro does not execute                                                                    | The command may not be enabled.                                                                                   | In the setting screen of the communication command macro tool, select the checkbox of the command "No." that you want to execute.                                                                                                                                                                                                                                                                                           |
|                                                                                                                     | You are using simulation software.                                                                                | The communication function does not operate on a computer.<br>To execute commands created with the communication command macro, execute on the sensor controller.                                                                                                                                                                                                                                                           |
|                                                                                                                     | "Measure" or "Remeasure" is executed in the program when there is a checkmark in BUSY ON.                         | Before using "Measure" or "Remeasure" in command processing to execute measurement, remove the checkmark from BUSY ON of that command in the setting screen of the communication command macro tool. In addition, use the MeasureStop function and MeasureStart function to appropriately control the measurement trigger input prohibited/allowed state.<br>Reference: ▶ Exclusive Control in a Measurement Process (p.79) |
| The normal communication command macro is not executed.                                                             | The character string sent as the command may not match the character string set in the command name.              | Send the same character string for the command as the command name set in the setting screen of the communication command macro tool.                                                                                                                                                                                                                                                                                       |
| A communication command macro other than the normal communication command macro is not executed.                    | The numerical value sent as the command parameter when the command is executed does not match the command number. | As the command, send the same numerical value in hexadecimal (binary in the case of parallel) as the command number shown in the setting screen of the communication command macro tool.                                                                                                                                                                                                                                    |
| A command parameter cannot be specified in the communication command macro                                          | You may be attempting to specify a command parameter in the parallel communication command macro.                 | A command parameter cannot be specified in the communication command macro in parallel communication. Consider one of the following methods: <ul style="list-style-type: none"> <li>• Set the necessary data in the processing unit with the processing unit data setting, and then execute the command.</li> <li>• Use a communication method other than parallel.</li> </ul>                                              |
| BUSY ON does not take place when the communication command macro is executed                                        | The BUSY ON checkbox may not be selected.                                                                         | Select the BUSY ON checkbox of the command you want to execute in the setting screen of the communication command macro tool.                                                                                                                                                                                                                                                                                               |

| Problem                                                   | Cause                                                                                                                                 | Action                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The communication command macro settings cannot be saved. | You may be attempting to save the settings with [Save to file].                                                                       | The communication command macro settings are not saved in the backup data (.bkd). Consider one of the following methods: <ul style="list-style-type: none"> <li>• Execute [Data save].</li> <li>• Execute [Export] in the setting screen of the communication command macro tool.</li> </ul>                         |
| A standard communication command does not execute         | The name of a command created with the communication command macro may be the same as the name of the standard communication command. | If the name of a command created with the communication command macro function is the same as the name of a standard communication command, the command created with the communication command macro is given priority. Change the command name to a name that is different from the standard communication command. |

### Troubleshooting when checking the operation of the unit macro

| Problem                                                                                                                                             | Cause                                                                                                             | Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An error message appears in the system status console window                                                                                        | An error occurred when the program was executed.                                                                  | Check the error message and correct the error.<br>Reference: ▶ Error List (p.554)<br>If it is difficult to identify the error, use Debug to determine the cause and correct the error.<br>Reference: ▶ How to Use the Debug Function (p.82)                                                                                                                                                                                                                                              |
| Data reception during processing sometimes fails                                                                                                    | The communication process may not have been stopped with the SetPollingState function.                            | Before acquiring data with the ReceiveData or other function, use the SetPollingState function to stop the communication process.<br>Reference: ▶ SetPollingState in Macro Function Reference (p.454)                                                                                                                                                                                                                                                                                    |
| Unit figure data cannot be set, and registered figures are also cleared.                                                                            | There may not be a measurement image when the figure is set.                                                      | When there is no measurement image because the processing unit is in the unmeasured state or otherwise, the figure setting will fail and previous settings will be cleared.<br>Execute measurement before setting a figure, or use the ImageUpdate function to ready an image.<br>Reference: ▶ ImageUpdate Function (p.302)                                                                                                                                                              |
| A figure drawn with a macro function of screen display window control such as DrawLine is drawn at a position different from the actual coordinates | The processing unit that corrects position such as Position Correction may be registered in the measurement flow. | If the processing unit that corrects position is registered in the measurement flow, the coordinate values that can be acquired with the UnitData function are the values before correction. In the parameter of the DrawLine function, specify the processing unit number of the unit macro processing unit for which the program is written.                                                                                                                                           |
| A measurement result image such as the labeling binary image using the display process subroutine cannot be displayed.                              | You may be attempting to display the measurement result image of a processing unit that does not have image data. | The main measurement processing items such as labeling do not have image data. The measurement result image of a processing item that does not have image data cannot be acquired in the program. To acquire and display a measurement result image, use a processing item that has image data such as Advanced Filter.<br>For image numbers and image content that can be referenced in each processing item, refer to the image number list.<br>Reference: ▶ Image Number List (p.624) |

| Problem                                                                                                                          | Cause                                                                                                | Action                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An error such as "Illegal function call" or "zero divide" occurs when the Sensor Controller is started                           | It is possible that a value is used that has not been initialized in the display process subroutine. | If executed with the display process subroutine in the unmeasured state, a data acquire process such as GetGlobalData may fail, or a variable may be used without a set value. Change the program for the display process subroutine so that the drawing process is only executed after measurement.                                          |
| The processing result of the Unit Macro processing unit text display process and screen display process do not appear            | The position list display may be ON.                                                                 | When the position list display is ON, the text display subroutine and image display subroutine are not executed. Set the position list display to OFF.<br>Reference: ▶ <i>Changing the Image Mode and Other Display Contents</i> in the <i>Vision System FH/FHV Series User's Manual</i> (Cat. No. Z365)                                      |
| An "illegal function call" error sometimes occurs when search process unit measurement is executed with the MeasureProc function | It is possible that no objects were found in the search process.                                     | An "illegal function call" error occurs if there are 0 detections in the measurement process of the search process unit executed with the MeasureProc function. Use the Try - Catch - End Try function to create a process that handles the occurrence of 0 detections in the program.<br>Reference: ▶ Try - Catch - End Try function (p.515) |

## Troubleshooting during debugging

Problems that are commonly encountered when debugging programs with the macro customize functions are described below, along with the actions to take.

| Problem                                                                                                    | Cause                                                                                              | Action                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An error message appears in the system status console window                                               | An error occurred when the program was executed.                                                   | Check the error message and correct the error.<br>Reference: ▶ Error List (p.554)<br>If it is difficult to identify the error, use Debug to determine the cause and correct the error.<br>Reference: ▶ How to Use the Debug Function (p.82)                                                 |
| A comment or character string output with the Print function becomes corrupted.                            | Characters other than Japanese or English characters may be used in the Print function or comment. | For Print function, only English is available. Language-characters are not available such as "ä" in German.<br>• FH series: English and selected language of [Language setting] are displayable.                                                                                            |
| The Stop function does not stop the program                                                                | It is possible that release mode is specified in the Debug function.                               | When release mode is specified in the Debug function, functions such as the Stop function and DebugPrint function are not enabled.<br>Execute the Debug function in the *Mcrinit subroutine to change from release mode to debug mode.<br>Reference: ▶ How to Use the Debug Function (p.82) |
| A debug character string cannot be output to the system status console window with the DebugPrint function | It is possible that release mode is specified in the Debug function.                               | When release mode is specified in the Debug function, functions such as the Stop function and DebugPrint function are not enabled.<br>Execute the Debug function to change from release mode to debug mode.<br>Reference: ▶ How to Use the Debug Function (p.82)                            |

| Problem                                  | Cause                                                                       | Action                                                                                                                                                                                                                                                           |
|------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A specific program line does not execute | It is possible that a statement and a comment are written on the same line. | A statement is sometimes not executed correctly when written on the same line as a comment.<br>Write the comment on a separate line.                                                                                                                             |
|                                          | It is possible that release mode is specified in the Debug function.        | When release mode is specified in the Debug function, functions such as the Stop function and DebugPrint function are not enabled.<br>Execute the Debug function to change from release mode to debug mode.<br>Reference: ► How to Use the Debug Function (p.82) |

## Troubleshooting during regular operation

Problems that are commonly encountered when using the macro customize functions in regular operation are described below, along with the actions to take.

| Problem                                                                             | Cause                                                                                                                                 | Action                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An error message appears in the system status console window                        | An error occurred when the program was executed.                                                                                      | Check the error message and correct the error.<br>Reference: ► Error List (p.554)<br>If it is difficult to identify the error, use Debug to determine the cause and correct the error.<br>Reference: ► How to Use the Debug Function (p.82)                                                                                                                                                                                                                     |
| A standard communication command does not execute                                   | The name of a command created with the communication command macro may be the same as the name of the standard communication command. | If the name of a command created with the communication command macro function is the same as the name of a standard communication command, the command created with the communication command macro is given priority.<br>Change the command name to a name that is different from the standard communication command.                                                                                                                                         |
| Communication command macro settings cannot be applied to another sensor controller | It is possible that only backup data (.bkd) is loaded in the other sensor controller.                                                 | Communication command macro settings cannot be saved in backup data (.bkd). Load the settings file (.mcr) that was saved by executing [Save] in the setting screen of the communication command macro tool into the other sensor controller separately from the backup data (.bkd).<br>To load the settings file (.mcr) in the other sensor controller, execute [Load] in the setting screen of the communication command macro tool of that sensor controller. |
| The communication command macro settings cannot be saved.                           | You may be attempting to save the settings with [Save to file].                                                                       | The communication command macro settings are not saved in the backup data (.bkd). Consider one of the following methods: <ul style="list-style-type: none"> <li>• Execute [Data save].</li> <li>• Execute [Export] in the setting screen of the communication command macro tool.</li> </ul>                                                                                                                                                                    |
| Measurement flow settings that were saved are cleared after restart                 | It is possible that the *SaveProc subroutine is written in the scene control macro program.                                           | When the *SaveProc subroutine is written, only the process written in the *SaveProc subroutine is executed when [Data save] is executed or scene data is saved. For this reason, overall scene data changes are not saved in the way they are when regular [Data save] or [Save to file] is executed.<br>Delete the *SaveProc subroutine.                                                                                                                       |

| Problem                                                                                                                          | Cause                                                            | Action                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| An "Illegal function call" error sometimes occurs when search process unit measurement is executed with the MeasureProc function | It is possible that no objects were found in the search process. | An "Illegal function call" error occurs if there are 0 detections in the measurement process of the search process unit executed with the MeasureProc function. Use the Try - Catch - End Try function to create a process that handles the occurrence of 0 detections in the program.<br>Reference: ▶ Try - Catch - End Try function (p.515) |

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# Macro Functions

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|                                      |            |
|--------------------------------------|------------|
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# Macro Function List

Macro functions that can be used in macro customize functions are shown below.

## Alphabetical Order

| Command Name         | Function                                                  | Classification         | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|----------------------|-----------------------------------------------------------|------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| Abs                  | Gets the absolute value of the specified expression       | Arithmetic Calculation | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.125) |
| AddGlobalData        | Adds the global data                                      | Control Global Data    | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.127) |
| AddSystemData        | Adds the system data                                      | System Data            | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.129) |
| AND                  | Gets the logical product of two expressions               | Arithmetic Calculation | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.131) |
| ApplicationPath\$    | Gets the pass name regarding application soft.            | Others                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.133) |
| ApplicationVersion\$ | Gets the version information of application soft.         | Others                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.135) |
| ApproximationCircle  | Gets the approximate circle                               | Arithmetic Calculation | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.136) |
| Asc                  | Gets the character code of the specified character        | String Operation       | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.138) |
| AssignUnit           | Registers the processing unit                             | Flow control           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.140) |
| Atn                  | Gets the arctangent of the specified expression           | Arithmetic Calculation | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.142) |
| BusyOut              | Sets the output state of the processing busy signal       | IO Module Control      | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.144) |
| Call                 | Executes the registered user-defined function             | Debug Command          | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.146) |
| ChangeScene          | Change the scene                                          | Scene control          | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.148) |
| ChangeSceneGroup     | Changes the scene group                                   | Scene group control    | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.149) |
| CheckUnit            | Checks the registration status of a processing unit       | Flow control           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.150) |
| Chr\$                | Determining the character of the specified character code | String Operation       | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.152) |
| ClearMeasureData     | Clears the measurement results of the processing unit     | Measurement control    | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.154) |
| ClearScene           | Clears the scene data                                     | Scene control          | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.155) |
| ClearSceneGroup      | Clears scene group data                                   | Scene group control    | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.156) |

| Command Name         | Function                                                                   | Classification                         | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|----------------------|----------------------------------------------------------------------------|----------------------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| Close                | Closes up the file                                                         | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.157) |
| CloseTextData        | Close up a messages file                                                   | Multilingual Support Message Functions | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.159) |
| Cont                 | Resumes execution of the program after it has been stopped                 | Debug Command                          | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.161) |
| ContinuousMeasure    | Do the start or stop of the continuous measurement                         | Measurement Control                    | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.163) |
| CopyMeasurementImage | Copies the measurement image as an image of the Unit Macro processing unit | Processing unit control                | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.164) |
| CopyScene            | Copies scene data                                                          | Scene control                          | ---                    | OK                  | ---                         | ---        | Reference: ▶ Details (p.166) |
| CopySceneGroup       | Copies scene group data                                                    | Scene group control                    | ---                    | OK                  | ---                         | ---        | Reference: ▶ Details (p.167) |
| CopyUnit             | Copies a processing unit                                                   | Flow control                           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.168) |
| CopyUnitFigure       | Copies figure data to the processing unit                                  | Processing unit control                | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.170) |
| CopyUnitImage        | Copies a processing unit image as a unit macro processing unit image       | Processing unit control                | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.172) |
| CopyUnitModel        | Copies the model data of a processing unit                                 | Processing unit control                | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.174) |
| Cos                  | Gets the cosine of the specified expression                                | Arithmetic Calculation                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.176) |
| Crspoint             | Gets the intersection between 2 straight lines                             | Arithmetic Calculation                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.178) |
| Date\$               | Reads out the date from the internal clock                                 | Arithmetic Calculation                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.180) |
| Debug                | Set the program execution form and information output method               | Debug Command                          | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.182) |
| DebugPrint           | Outputs debug information to the system status console window              | Debug Command                          | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.184) |
| DeleteUnit           | Deletes a processing unit                                                  | Flow control                           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.186) |
| Dim                  | Defines the array variable                                                 | General instruction                    | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.187) |
| DisplaySubNo         | Get the sub-image number of the displayed sub-image                        | Image Window Control                   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.189) |
| DisplayUnitNo        | Gets the selection state of the processing unit number of the flow window  | Display control                        | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.191) |

| Command Name         | Function                                                                                   | Classification         | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|----------------------|--------------------------------------------------------------------------------------------|------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| Do Loop While        | Repeatedly executes the statements between Do and Loop while the specified condition meets | General instruction    | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.192) |
| Dposline             | Gets the shortest distance between the line and point                                      | Arithmetic Calculation | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.194) |
| DrawArc              | Draw the arc on the image window                                                           | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.196) |
| DrawArcW             | Draw the wide arc on the image window                                                      | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.198) |
| DrawBox              | Draws a rectangle on the image window                                                      | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.200) |
| DrawCircle           | Draw a circle on the image window                                                          | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.202) |
| DrawCircleW          | Draw the wide circle on the image window                                                   | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.204) |
| DrawCursor           | Draw the cross-hair cursor on the image window                                             | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.206) |
| DrawEllipse          | Draw the ellipse on the image window                                                       | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.208) |
| DrawFigure           | Draw a figure on the image window                                                          | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.210) |
| DrawFillImage        | Draw the fill image on the image window                                                    | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.212) |
| DrawJudgeText        | Draws the judgement result of the character string on the text display screen              | Text Window Control    | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.213) |
| DrawLine             | Draw a straight line on the image window                                                   | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.215) |
| DrawLineW            | Draw the wide straight line on the image window                                            | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.217) |
| DrawMeasurementImage | Draw the measurement image on the image window                                             | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.219) |
| DrawPoint            | Draw a point on the image window                                                           | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.220) |
| DrawPolygon          | Draw a polygon on the image window                                                         | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.222) |
| DrawSearchFigure     | Draw the search figure on the image window                                                 | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.224) |
| DrawText             | Draw a character string on the text window                                                 | Text Window Control    | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.227) |
| DrawTextG            | Draw a character string on the image window                                                | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.229) |
| DrawUnitImage        | Display the "other unit image" on the image window                                         | Image Window Control   | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.231) |

| Command Name        | Function                                                                             | Classification          | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|---------------------|--------------------------------------------------------------------------------------|-------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| Dskf                | Gets the free space on disk drives                                                   | File Control            | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.233) |
| ElapsedTime         | Gets the elapsed time since starting the measurement                                 | Others                  | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.234) |
| Eof                 | Examines the end of the file                                                         | File Control            | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.236) |
| Erase               | Releases array variable                                                              | General instruction     | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.238) |
| Errcmd\$            | Get the function name of the macro where an error occurred                           | General instruction     | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.239) |
| Errno               | Gets the error number                                                                | General instruction     | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.241) |
| ErrorOut            | Sets the output state of the Error (ERROR) signal.                                   | IO Module Control       | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.243) |
| ExecuteErrorProc    | Executes the error processing.                                                       | Others                  | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.245) |
| ExecuteImageLogging | Executes image logging                                                               | Others                  | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.247) |
| ExitFzProcesses     | Terminate the Sensor Controller                                                      | Others                  | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.249) |
| Exp                 | Gets the value of the exponential function of the base e natural logarithm           | Arithmetic Calculation  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.250) |
| Fcopy               | Copies the file                                                                      | File Control            | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.252) |
| Fix                 | Gets the integer of a value by rounding off digits to the right of the decimal point | Arithmetic Calculation  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.254) |
| For To Step Next    | Repeats the statements between the For and Next statements                           | General instruction     | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.256) |
| GetAll              | Gets the input states of all input terminals                                         | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.258) |
| GetGlobalData       | Gets the global data                                                                 | Control Global Data     | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.260) |
| GetImageSize        | Gets the image size of the processing unit image                                     | Processing unit control | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.262) |
| GetImageWindow      | Get the state of the image window                                                    | Display control         | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.264) |
| GetMeasureOut       | Gets the external output setting for measurement results                             | Measurement control     | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.267) |
| GetPlcData          | Gets data read with the ReadPlcMemory function                                       | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.268) |
| GetPollingState     | Gets the polling state of the communication module                                   | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.270) |

| Command Name              | Function                                                                                 | Classification                         | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|---------------------------|------------------------------------------------------------------------------------------|----------------------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| GetPort                   | Gets the input state of the specified input terminal                                     | IO Module Control                      | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.272) |
| GetSceneData              | Gets data related to the scene control macro or scene variables                          | Scene control                          | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.274) |
| GetSystemData             | Gets the system data or system variable                                                  | System Data                            | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.276) |
| GetText\$                 | Get a text data from a messages file                                                     | Multilingual Support Message Functions | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.278) |
| GetTextWindow             | Gets the state of the text window                                                        | Display control                        | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.282) |
| GetUnitData               | Gets the data of a processing unit                                                       | Processing unit control                | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.286) |
| GetUnitFigure             | Gets figure data to the processing unit                                                  | Processing unit control                | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.288) |
| Gosub                     | Operate the specified subroutine                                                         | General instruction                    | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.290) |
| Goto                      | Moves the process to the statement line with a specified label                           | General instruction                    | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.292) |
| Hex\$                     | Converts the value in the expression to the hexadecimal value in character string format | String Operation                       | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.294) |
| If Then Else              | Controls the process flow according to the specified condition                           | General instruction                    | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.296) |
| If Then Elseif Else Endif | Controls the process flow according to the specified condition                           | General instruction                    | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.298) |
| ImageFormat               | Gets the image format of the image in the processing unit                                | Processing unit control                | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.300) |
| ImageUpdate               | Updates the image input from the camera                                                  | Measurement control                    | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.302) |
| Input#                    | Reads data from the file                                                                 | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.303) |
| Input\$                   | Reads binary data from the file                                                          | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.305) |
| InsertUnit                | Inserts a processing unit                                                                | Flow control                           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.307) |
| Int                       | Converts numeric value to integer value                                                  | Arithmetic Calculation                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.309) |
| Isfile                    | Checks the attribute and the existence of the file                                       | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.311) |
| ItemCount                 | Gets the number of usable processing item types                                          | Control processing item                | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.313) |

| Command Name    | Function                                                                                                  | Classification          | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|-----------------|-----------------------------------------------------------------------------------------------------------|-------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| ItemIdent\$     | Gets the identification name of the processing item                                                       | Control processing item | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.314) |
| ItemInfo        | Gets the processing item information                                                                      | Control processing item | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.316) |
| ItemTitle\$     | Gets the processing item title                                                                            | Control processing item | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.318) |
| JudgeOut        | Sets the output state of the overall judgement signal                                                     | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.319) |
| Kill            | Deletes a file                                                                                            | File Control            | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.321) |
| LCase\$         | Converts an upper case letter to a lower case letter                                                      | String Operation        | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.323) |
| Left\$          | Extracts the specified length of characters from the left side of character string                        | String Operation        | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.325) |
| Len             | Gets the length of the specified character string                                                         | String Operation        | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.327) |
| Line Input#     | Reads the data of one line from the file                                                                  | File Control            | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.329) |
| List            | Outputs all or a part of program list in the system status console window                                 | Debug Command           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.331) |
| LoadBackup Data | Loads the system + scene group 0 data                                                                     | Data Save/ Load         | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.333) |
| LoadScene       | Loads the scene data                                                                                      | Data Save/ Load         | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.335) |
| LoadSceneGroup  | Loads the scene group data                                                                                | Data Save/ Load         | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.337) |
| LoadSystem Data | Loads the system data                                                                                     | Data Save/ Load         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.339) |
| LoadUnitData    | Loads the processing unit data                                                                            | Data Save/ Load         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.341) |
| Log             | Gets the natural logarithm                                                                                | Arithmetic Calculation  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.343) |
| Lsqumeth        | Gets the approximate straight line from the coordinates of multiple points using the least squares method | Arithmetic Calculation  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.344) |
| Measure         | Executes measurement processing                                                                           | Measurement control     | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.346) |
| MeasureDisplay  | Executes display of the measurement result of the processing unit                                         | Processing unit control | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.348) |
| MeasureId\$     | Gets the measurement identification                                                                       | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.349) |
| MeasureProc     | Executes measurement processing in a processing unit                                                      | Processing unit control | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.350) |

| Command Name        | Function                                                                                  | Classification                         | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|---------------------|-------------------------------------------------------------------------------------------|----------------------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| MeasureStart        | Allows input of the measurement trigger                                                   | Measurement control                    | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.351) |
| MeasureStop         | Prohibits input of the measurement trigger                                                | Measurement control                    | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.353) |
| MessageBox          | Displays the message box.                                                                 | Others                                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.355) |
| Mid\$               | Extracts a part from the character string                                                 | String Operation                       | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.356) |
| Mkdir               | Builds a directory                                                                        | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.358) |
| MOD                 | Gets the remainder                                                                        | Arithmetic Calculation                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.359) |
| MoveUnit            | Moves a processing unit                                                                   | Flow control                           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.360) |
| NOT                 | Gets the "not" result (negation) of the expression                                        | Arithmetic Calculation                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.361) |
| Open For Append As# | Open the file in append mode                                                              | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.362) |
| Open For Input As#  | Open the file in reading mode                                                             | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.364) |
| Open For Output As# | Opens the file in writing mode                                                            | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.366) |
| OpenTextData        | Opens a messages file                                                                     | Multilingual Support Message Functions | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.368) |
| OR                  | Gets the logical sum of two expressions                                                   | Arithmetic Calculation                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.372) |
| Piece\$             | Extract the part of the character string which was separated by delimiter from the string | String Operation                       | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.374) |
| Print               | Outputs data in the system status console window                                          | Debug Command                          | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.376) |
| Print#              | Outputs data in a file                                                                    | File Control                           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.378) |
| PutAll              | Sets the output state of all output terminals                                             | IO Module Control                      | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.380) |
| PutPort             | Sets the output state of the specified output terminal                                    | IO Module Control                      | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.382) |
| RaiseErrorProcEvent | Notifies the error processing on UI screen.                                               | Others                                 | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.384) |
| RaiseOptionEvent    | Notifies option events to the UI screen                                                   | Others                                 | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.386) |
| ReadPlcMemory       | Reads a value from the PLC memory area                                                    | IO Module Control                      | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.387) |

| Command Name           | Function                                                                            | Classification          | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|------------------------|-------------------------------------------------------------------------------------|-------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| ReceiveData            | Receives data                                                                       | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.389) |
| RefreshImageWindow     | Updates the image window                                                            | Display control         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.392) |
| RefreshJudgementWindow | Updates the judgement window                                                        | Display control         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.393) |
| RefreshText Window     | Updates the text display window                                                     | Display control         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.394) |
| RefreshTime Window     | Updates the display of the information window                                       | Display control         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.395) |
| Rem                    | Puts a comment in the program                                                       | Others                  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.396) |
| Remeasure              | Executes remeasurement                                                              | Measurement control     | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.397) |
| RenumUnitNo            | Gets the processing unit number after flow edit                                     | Others                  | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.399) |
| RGB                    | Gets the color value                                                                | Arithmetic Calculation  | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.401) |
| Right\$                | Extracts the specified length of characters from the right side of character string | String Operation        | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.403) |
| Rmdir                  | Deletes a directory                                                                 | File Control            | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.405) |
| RunOut                 | Sets the output state of the RUN signal                                             | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.406) |
| SaveBackup Data        | Saves the system + scene group 0 data                                               | Data Save/ Load         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.408) |
| SaveData               | Saves the data to the controller                                                    | Data Save/ Load         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.410) |
| SaveImage              | Saves image data                                                                    | Measurement control     | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.411) |
| SaveMeasurementImage   | Saves the measurement image of the processing unit                                  | Processing unit control | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.413) |
| SaveScene              | Saves the scene data                                                                | Data Save/ Load         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.415) |
| SaveSceneGroup         | Saves the scene group data                                                          | Data Save/ Load         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.417) |
| SaveSystem Data        | Saves the system data                                                               | Data Save/ Load         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.419) |
| SaveUnitData           | Saves a processing unit                                                             | Data Save/ Load         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.421) |
| SceneCount             | Gets the number of scenes that can be used                                          | Scene control           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.423) |
| SceneDescription\$     | Gets the scene description                                                          | Scene control           | OK                     | ---                 | OK                          | ---        | Reference: ▶ Details (p.424) |

| Command Name                     | Function                                                                                                            | Classification          | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| SceneGroup Count                 | Gets the number of usable scene groups                                                                              | Scene group control     | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.426) |
| SceneGroup No                    | Gets the scene group number of the current scene group                                                              | Scene group control     | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.427) |
| SceneGroup Title\$               | Gets the title of the scene group                                                                                   | Scene group control     | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.428) |
| SceneMaker \$                    | Gets the scene creator                                                                                              | Scene control           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.429) |
| SceneNo                          | Gets the scene number of the current scene                                                                          | Scene control           | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.431) |
| SceneTitle\$                     | Gets the scene title                                                                                                | Scene control           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.432) |
| ScreenCapture                    | Saves the capture of the screen                                                                                     | Others                  | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.433) |
| Select Case Case Else End Select | Controls the process flow according to the specified condition                                                      | General instruction     | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.435) |
| SendData                         | Sends data                                                                                                          | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.437) |
| SendString                       | Sends the character string data                                                                                     | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.439) |
| SetDisplayUnitNo                 | Sets the processing unit number in the flow window to the selected state                                            | Display control         | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.441) |
| SetDrawStyle                     | Set the drawing attributes of the graphic figure                                                                    | Image Window Control    | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.442) |
| SetForegroundLine                | This command specifies the object line for operation in Multi-line Random trigger mode or Non-stop Adjustment mode. | Others                  | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.444) |
| SetGlobalData                    | Sets the global data                                                                                                | Control Global Data     | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.445) |
| SetImageWindow                   | Sets the state of the image window                                                                                  | Display control         | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.447) |
| SetMeasureImage                  | Sets the measurement image of the processing unit                                                                   | Processing unit control | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.450) |
| SetMeasureOut                    | Sets the external output setting for the measurement result                                                         | Measurement control     | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.451) |
| SetPlcData                       | Creates the data that is written with the WritePlcMemory function                                                   | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.452) |
| SetPollingState                  | Sets the execution status of the communication module                                                               | IO Module Control       | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.454) |
| SetSceneData                     | Sets data for the scene control macro or scene variables                                                            | Scene control           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.456) |
| SetSceneDescription              | Sets the scene description                                                                                          | Scene control           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.458) |

| Command Name       | Function                                                                        | Classification          | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|--------------------|---------------------------------------------------------------------------------|-------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| SetSceneGroupTitle | Sets the title of the scene group                                               | Scene group control     | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.460) |
| SetSceneMaker      | Sets the creator of the scene                                                   | Scene control           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.461) |
| SetSceneTitle      | Sets the title of a scene                                                       | Scene control           | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.463) |
| SetStop            | Sets the conditions for stopping program execution                              | Debug Command           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.465) |
| SetSystemData      | Sets the system data or system variable                                         | System Data             | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.467) |
| SetTextStyle       | Set the draw attributes of the character string                                 | Image Window Control    | ---                    | ---                 | ---                         | OK         | Reference: ▶ Details (p.469) |
| SetTextWindow      | Sets the state of the text window                                               | Display control         | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.471) |
| SetUnitData        | Sets the data of a processing unit                                              | Processing unit control | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.473) |
| SetUnitFigure      | Sets the figure data of the processing unit                                     | Processing unit control | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.475) |
| SetUnitJudge       | Sets the judgement result of a processing unit                                  | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.477) |
| SetUnitTitle       | Sets the title of a processing unit                                             | Processing unit control | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.479) |
| SetUserSubroutine  | Register a user-defined function that has been defined in the external DDL file | Debug Command           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.480) |
| SetVar             | Sets all variables with the specified variable names                            | Others                  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.482) |
| Sin                | Gets the sine of the specified expression                                       | Arithmetic Calculation  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.484) |
| Sqr                | Determines the square root                                                      | Arithmetic Calculation  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.486) |
| StartTimer         | Starts the elapsed time measurement                                             | Others                  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.487) |
| Stop               | Stops program execution                                                         | Debug Command           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.488) |
| Str\$              | Converts a numeric value in the numeric character string                        | String Operation        | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.490) |
| Str2\$             | Converts a value to a numeric character string in the specified formats         | String Operation        | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.492) |
| SystemReset        | Reboots the Sensor Controller                                                   | Others                  | ---                    | ---                 | OK                          | ---        | Reference: ▶ Details (p.495) |
| Tan                | Gets the tangent of the specified expression                                    | Arithmetic Calculation  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.496) |
| TestMeasure        | Executes the test measurement.                                                  | Measurement control     | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.497) |

| Command Name      | Function                                                                                | Classification          | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|-------------------|-----------------------------------------------------------------------------------------|-------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| Time\$            | Reads out the clock time from the internal clock                                        | Arithmetic Calculation  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.499) |
| Timer             | Gets the elapsed time                                                                   | Others                  | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.501) |
| TotalJudge        | Gets the total judgement result                                                         | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.503) |
| TransformAngle    | Applies the calibration result and position correction amount in the angle value        | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.505) |
| TransformArea     | Applies the calibration result and position correction amount in the area value         | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.507) |
| TransformDistance | Applies a calibration result and position correction amount to a distance value         | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.509) |
| TransformLine     | Applies the calibration result and position correction amount to a line component value | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.511) |
| TransformXY       | Applies the calibration result and position correction amount to coordinate values      | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.513) |
| Try Catch End Try | Detects an error occurrence and executes an exception process                           | General instruction     | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.515) |
| UCase\$           | Converts an lower case letter to a upper case letter                                    | String Operation        | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.517) |
| UnitCount         | Gets the number of registered processing units                                          | Flow control            | ---                    | OK                  | OK                          | ---        | Reference: ▶ Details (p.519) |
| UnitData          | Gets the numerical data of a processing unit                                            | Processing unit control | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.520) |
| UnitData\$        | Gets the character string data of the specified processing unit                         | Processing unit control | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.522) |
| UnitData2         | Gets the drawing coordinate data of a processing unit                                   | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.524) |
| UnitInfo          | Gets the processing unit information                                                    | Processing unit control | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.526) |
| UnitItemIdent\$   | Gets the processing item identification name of the specified processing unit           | Processing unit control | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.528) |
| UnitJudge         | Gets the judgement result of a processing unit                                          | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.530) |
| UnitNo            | Gets the processing unit number                                                         | Processing unit control | OK                     | ---                 | ---                         | OK         | Reference: ▶ Details (p.531) |
| UnitTitle\$       | Gets the title of a processing unit                                                     | Processing unit control | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.532) |
| Ut                | Gets a processing unit number based on the specified unit label                         | Scene control           | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.534) |

| Command Name   | Function                                                                                    | Classification         | Unit Calculation Macro | Scene Control Macro | Communication Command Macro | Unit Macro | References                   |
|----------------|---------------------------------------------------------------------------------------------|------------------------|------------------------|---------------------|-----------------------------|------------|------------------------------|
| Val            | Converts a numeric character string to numeric value                                        | String Operation       | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.535) |
| VarList        | Outputs a list of the values of the specified variables in the system status console window | Debug Command          | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.537) |
| VarPop         | Restores the value of the variables that are saved temporarily                              | Others                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.539) |
| VarPush        | Saves the value of the variables that are saved temporarily                                 | Others                 | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.542) |
| VarSave        | Saves the values of the variables in the scene data                                         | Others                 | ---                    | OK                  | ---                         | ---        | Reference: ▶ Details (p.545) |
| Wait           | Pauses the program process for the specified amount of time elapses                         | Others                 | ---                    | OK                  | OK                          | OK         | Reference: ▶ Details (p.547) |
| WritePlcMemory | Writes values in the PLC memory area                                                        | IO Module Control      | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.548) |
| XOR            | Gets the exclusive disjunction (XOR) of two expressions                                     | Arithmetic Calculation | OK                     | OK                  | OK                          | OK         | Reference: ▶ Details (p.550) |

## Function-based Index

### General Instructions

| Command                          | Function                                                                                    | References                   |
|----------------------------------|---------------------------------------------------------------------------------------------|------------------------------|
| Dim                              | Defines the array variable.                                                                 | Reference: ▶ Details (p.187) |
| Do Loop While                    | Repeatedly executes the statements between Do and Loop while the specified condition meets. | Reference: ▶ Details (p.192) |
| Erase                            | Releases array variable.                                                                    | Reference: ▶ Details (p.238) |
| Errcmd\$                         | Get the function name of the macro where an error occurred.                                 | Reference: ▶ Details (p.239) |
| Errno                            | Gets the error number.                                                                      | Reference: ▶ Details (p.241) |
| For To Step Next                 | Repeats the statements between the For and Next statements.                                 | Reference: ▶ Details (p.256) |
| Gosub                            | Operate the specified subroutine.                                                           | Reference: ▶ Details (p.290) |
| Goto                             | Move the process to the statement line with a specified label.                              | Reference: ▶ Details (p.292) |
| If Then Else                     | Controls the process flow according to the specified condition.                             | Reference: ▶ Details (p.296) |
| If Then Elseif Else EndIf        | Controls the process flow according to the specified condition.                             | Reference: ▶ Details (p.298) |
| Select Case Case Else End Select | Controls the process flow according to the specified condition.                             | Reference: ▶ Details (p.435) |
| Try Catch End Try                | Detects an error occurrence and executes an exception process.                              | Reference: ▶ Details (p.515) |

## Arithmetic Calculations

| Command             | Function                                                                                                   | References                   |
|---------------------|------------------------------------------------------------------------------------------------------------|------------------------------|
| Abs                 | Gets the absolute value of the specified expression.                                                       | Reference: ▶ Details (p.125) |
| AND                 | Gets the logical product of two expressions.                                                               | Reference: ▶ Details (p.131) |
| ApproximationCircle | Gets the approximate circle.                                                                               | Reference: ▶ Details (p.136) |
| Atn                 | Getting the arctangent of the specified expression.                                                        | Reference: ▶ Details (p.142) |
| Cos                 | Gets the cosine of the specified expression.                                                               | Reference: ▶ Details (p.176) |
| Crspoint            | Gets the intersection between 2 straight lines.                                                            | Reference: ▶ Details (p.178) |
| Date\$              | Reads out the date from the internal clock.                                                                | Reference: ▶ Details (p.180) |
| Dposline            | Gets the shortest distance between the line and point.                                                     | Reference: ▶ Details (p.194) |
| Exp                 | Gets the value of the exponential function of the base e natural logarithm.                                | Reference: ▶ Details (p.250) |
| Fix                 | Gets the integer of a value by rounding off digits to the right of the decimal point.                      | Reference: ▶ Details (p.254) |
| Int                 | Converts numeric value to integer value.                                                                   | Reference: ▶ Details (p.309) |
| Log                 | Gets the natural logarithm.                                                                                | Reference: ▶ Details (p.343) |
| Lsqumeth            | Gets the approximate straight line from the coordinates of multiple points using the least squares method. | Reference: ▶ Details (p.344) |
| MOD                 | Gets the remainder.                                                                                        | Reference: ▶ Details (p.359) |
| NOT                 | Gets the "not" result (negation) of the expression.                                                        | Reference: ▶ Details (p.361) |
| OR                  | Gets the logical sum of two expressions.                                                                   | Reference: ▶ Details (p.372) |
| RGB                 | Gets the color value.                                                                                      | Reference: ▶ Details (p.401) |
| Sin                 | Gets the sine of the specified expression.                                                                 | Reference: ▶ Details (p.484) |
| Sqr                 | Determining the square root.                                                                               | Reference: ▶ Details (p.486) |
| Tan                 | Gets the tangent of the specified expression.                                                              | Reference: ▶ Details (p.496) |
| Time\$              | Reads out the clock time from the internal clock.                                                          | Reference: ▶ Details (p.499) |
| XOR                 | Gets the exclusive disjunction (XOR) of two expressions.                                                   | Reference: ▶ Details (p.550) |

## String Operations

| Command | Function                                                                                   | References                   |
|---------|--------------------------------------------------------------------------------------------|------------------------------|
| Asc     | Gets the character code of the specified character.                                        | Reference: ▶ Details (p.138) |
| Chr\$   | Determining the character of the specified character code.                                 | Reference: ▶ Details (p.152) |
| Hex\$   | Converts the value in the expression to the hexadecimal value in character string format.  | Reference: ▶ Details (p.294) |
| LCase\$ | Converts an upper case letter to a lower case letter.                                      | Reference: ▶ Details (p.323) |
| Left\$  | Extracts the specified length of characters from the left side of character string.        | Reference: ▶ Details (p.325) |
| Len     | Gets the length of the specified character string.                                         | Reference: ▶ Details (p.327) |
| Mid\$   | Extract a part from the character string.                                                  | Reference: ▶ Details (p.356) |
| Piece\$ | Extract the part of the character string which was separated by delimiter from the string. | Reference: ▶ Details (p.374) |
| Right\$ | Extracts the specified length of characters from the right side of character string.       | Reference: ▶ Details (p.403) |
| Str\$   | Converts a numeric value in the numeric character string.                                  | Reference: ▶ Details (p.490) |
| Str2\$  | Converts a value to a numeric character string in the specified formats.                   | Reference: ▶ Details (p.492) |

| Command | Function                                              | References                   |
|---------|-------------------------------------------------------|------------------------------|
| UCase\$ | Converts an lower case letter to a upper case letter. | Reference: ▶ Details (p.517) |
| Val     | Converts a numeric character string to numeric value. | Reference: ▶ Details (p.535) |

## Scene Controls

| Command             | Function                                                         | References                   |
|---------------------|------------------------------------------------------------------|------------------------------|
| ChangeScene         | Change the scene.                                                | Reference: ▶ Details (p.148) |
| ClearScene          | Clears the scene data.                                           | Reference: ▶ Details (p.155) |
| CopyScene           | Copies scene data.                                               | Reference: ▶ Details (p.166) |
| GetSceneData        | Gets data related to the scene control macro or scene variables. | Reference: ▶ Details (p.274) |
| SceneCount          | Gets the number of scenes that can be used.                      | Reference: ▶ Details (p.423) |
| SceneDescription\$  | Gets the scene description.                                      | Reference: ▶ Details (p.424) |
| SceneMaker\$        | Gets the scene creator.                                          | Reference: ▶ Details (p.429) |
| SceneNo             | Gets the scene number of the current scene.                      | Reference: ▶ Details (p.431) |
| SceneTitle\$        | Gets the scene title.                                            | Reference: ▶ Details (p.432) |
| SetSceneData        | Sets data for the scene control macro or scene variables.        | Reference: ▶ Details (p.456) |
| SetSceneDescription | Sets the scene description.                                      | Reference: ▶ Details (p.458) |
| SetSceneMaker       | Sets the creator of the scene.                                   | Reference: ▶ Details (p.461) |
| SetSceneTitle       | Sets the title of a scene.                                       | Reference: ▶ Details (p.463) |
| Ut                  | Gets a processing unit number based on the specified unit label. | Reference: ▶ Details (p.534) |

## Scene Group Controls

| Command            | Function                                                | References                   |
|--------------------|---------------------------------------------------------|------------------------------|
| ChangeSceneGroup   | Changes the scene group.                                | Reference: ▶ Details (p.149) |
| ClearSceneGroup    | Clears scene group data.                                | Reference: ▶ Details (p.156) |
| CopySceneGroup     | Copies scene group data.                                | Reference: ▶ Details (p.167) |
| SceneGroupCount    | Gets the number of usable scene groups.                 | Reference: ▶ Details (p.426) |
| SceneGroupNo       | Gets the scene group number of the current scene group. | Reference: ▶ Details (p.427) |
| SceneGroupTitle\$  | Gets the title of the scene group.                      | Reference: ▶ Details (p.428) |
| SetSceneGroupTitle | Sets the title of the scene group.                      | Reference: ▶ Details (p.460) |

## Processing Item Controls

| Command     | Function                                             | References                   |
|-------------|------------------------------------------------------|------------------------------|
| ItemCount   | Gets the number of usable processing item types.     | Reference: ▶ Details (p.313) |
| ItemIdent\$ | Gets the identification name of the processing item. | Reference: ▶ Details (p.314) |
| ItemInfo    | Gets the processing item information.                | Reference: ▶ Details (p.316) |
| ItemTitle\$ | Gets the processing item title.                      | Reference: ▶ Details (p.318) |

## Processing Flow Controls

| Command    | Function                                             | References                   |
|------------|------------------------------------------------------|------------------------------|
| AssignUnit | Registers the processing unit.                       | Reference: ▶ Details (p.140) |
| CheckUnit  | Checks the registration status of a processing unit. | Reference: ▶ Details (p.150) |
| CopyUnit   | Copies a processing unit.                            | Reference: ▶ Details (p.168) |
| DeleteUnit | Deletes a processing unit.                           | Reference: ▶ Details (p.186) |
| InsertUnit | Inserts a processing unit.                           | Reference: ▶ Details (p.307) |
| MoveUnit   | Moves a processing unit.                             | Reference: ▶ Details (p.360) |
| UnitCount  | Gets the number of registered processing units.      | Reference: ▶ Details (p.519) |

## Processing Unit Controls

| Command          | Function                                                                                 | References                   |
|------------------|------------------------------------------------------------------------------------------|------------------------------|
| CopyMeasureImage | Copies the measurement image as an image of the Unit Macro processing unit.              | Reference: ▶ Details (p.164) |
| CopyUnitFigure   | Copies figure data to the processing unit.                                               | Reference: ▶ Details (p.170) |
| CopyUnitImage    | Copies a processing unit image as a unit macro processing unit image.                    | Reference: ▶ Details (p.172) |
| CopyUnitModel    | Copies the model data of a processing unit.                                              | Reference: ▶ Details (p.174) |
| GetImageSize     | Gets the image size of the processing unit image.                                        | Reference: ▶ Details (p.262) |
| GetUnitData      | Gets the data of a processing unit.                                                      | Reference: ▶ Details (p.286) |
| GetUnitFigure    | Gets figure data to the processing unit.                                                 | Reference: ▶ Details (p.288) |
| ImageFormat      | Gets the image format of the image in the processing unit.                               | Reference: ▶ Details (p.300) |
| MeasureDispG     | Executes display of the measurement result of the processing unit.                       | Reference: ▶ Details (p.348) |
| MeasureId\$      | Gets the measurement identification.                                                     | Reference: ▶ Details (p.349) |
| MeasureProc      | Executes measurement processing in a processing unit.                                    | Reference: ▶ Details (p.350) |
| SaveMeasureImage | Saves the measurement image of the processing unit.                                      | Reference: ▶ Details (p.413) |
| SetMeasureImage  | Sets the measurement image of the processing unit.                                       | Reference: ▶ Details (p.450) |
| SetUnitData      | Sets the data of a processing unit.                                                      | Reference: ▶ Details (p.473) |
| SetUnitFigure    | Sets the figure data of the processing unit.                                             | Reference: ▶ Details (p.475) |
| SetUnitJudge     | Sets the judgement result of a processing unit.                                          | Reference: ▶ Details (p.477) |
| SetUnitTitle     | Sets the title of a processing unit.                                                     | Reference: ▶ Details (p.479) |
| TotalJudge       | Gets the total judgement result.                                                         | Reference: ▶ Details (p.503) |
| TransformAngle   | Applies the calibration result and position correction amount in the angle value.        | Reference: ▶ Details (p.505) |
| TransformArea    | Applies the calibration result and position correction amount in the area value.         | Reference: ▶ Details (p.507) |
| TransformDist    | Applies a calibration result and position correction amount to a distance value.         | Reference: ▶ Details (p.509) |
| TransformLine    | Applies the calibration result and position correction amount to a line component value. | Reference: ▶ Details (p.511) |
| TransformXY      | Applies the calibration result and position correction amount to coordinate values.      | Reference: ▶ Details (p.513) |
| UnitData         | Gets the numerical data of a processing unit.                                            | Reference: ▶ Details (p.520) |

| Command         | Function                                                                       | References                   |
|-----------------|--------------------------------------------------------------------------------|------------------------------|
| UnitData\$      | Gets the character string data of the specified processing unit.               | Reference: ▶ Details (p.522) |
| UnitData2       | Gets the drawing coordinate data of a processing unit.                         | Reference: ▶ Details (p.524) |
| UnitInfo        | Gets the processing unit information.                                          | Reference: ▶ Details (p.526) |
| UnitItemIdent\$ | Gets the processing item identification name of the specified processing unit. | Reference: ▶ Details (p.528) |
| UnitJudge       | Gets the judgement result of a processing unit.                                | Reference: ▶ Details (p.530) |
| UnitNo          | Gets the processing unit number.                                               | Reference: ▶ Details (p.531) |
| UnitTitle\$     | Gets the title of a processing unit.                                           | Reference: ▶ Details (p.532) |

## Measurement Controls

| Command           | Function                                                     | References                   |
|-------------------|--------------------------------------------------------------|------------------------------|
| ClearMeasureData  | Clears the measurement results of the processing unit.       | Reference: ▶ Details (p.154) |
| ContinuousMeasure | Do the start or stop of the continuous measurement           | Reference: ▶ Details (p.163) |
| GetMeasureOut     | Gets the external output setting for measurement results.    | Reference: ▶ Details (p.267) |
| ImageUpdate       | Updates the image input from the camera.                     | Reference: ▶ Details (p.302) |
| Measure           | Executes measurement processing.                             | Reference: ▶ Details (p.346) |
| MeasureStart      | Allows input of the measurement trigger.                     | Reference: ▶ Details (p.351) |
| MeasureStop       | Prohibits input of the measurement trigger.                  | Reference: ▶ Details (p.353) |
| Remeasure         | Executes remeasurement.                                      | Reference: ▶ Details (p.397) |
| SaveImage         | Saves image data.                                            | Reference: ▶ Details (p.411) |
| SetMeasureOut     | Sets the external output setting for the measurement result. | Reference: ▶ Details (p.451) |
| TestMeasure       | Executes the test measurement.                               | Reference: ▶ Details (p.497) |

## IO Module Controls

| Command         | Function                                                | References                   |
|-----------------|---------------------------------------------------------|------------------------------|
| BusyOut         | Sets the output state of the processing busy signal.    | Reference: ▶ Details (p.144) |
| ErrorOut        | Sets the output state of the Error (ERROR) signal.      | Reference: ▶ Details (p.243) |
| GetAll          | Gets the input states of all input terminals.           | Reference: ▶ Details (p.258) |
| GetPlcData      | Gets data read with the ReadPlcMemory function.         | Reference: ▶ Details (p.268) |
| GetPollingState | Gets the polling state of the communication module.     | Reference: ▶ Details (p.270) |
| GetPort         | Gets the input state of the specified input terminal.   | Reference: ▶ Details (p.272) |
| JudgeOut        | Sets the output state of the overall judgement signal.  | Reference: ▶ Details (p.319) |
| PutAll          | Sets the output state of all output terminals.          | Reference: ▶ Details (p.380) |
| PutPort         | Sets the output state of the specified output terminal. | Reference: ▶ Details (p.382) |
| ReadPlcMemory   | Reads a value from the PLC memory area.                 | Reference: ▶ Details (p.387) |
| ReceiveData     | Receives data.                                          | Reference: ▶ Details (p.389) |
| RunOut          | Sets the output state of the RUN signal.                | Reference: ▶ Details (p.406) |
| SendData        | Sends data.                                             | Reference: ▶ Details (p.437) |
| SendString      | Sends the character string data.                        | Reference: ▶ Details (p.439) |

| Command         | Function                                                           | References                   |
|-----------------|--------------------------------------------------------------------|------------------------------|
| SetPlcData      | Creates the data that is written with the WritePlcMemory function. | Reference: ▶ Details (p.452) |
| SetPollingState | Sets the execution status of the communication module.             | Reference: ▶ Details (p.454) |
| WritePlcMemory  | Writes values in the PLC memory area.                              | Reference: ▶ Details (p.548) |

## Display Controls

| Command            | Function                                                                   | References                   |
|--------------------|----------------------------------------------------------------------------|------------------------------|
| DisplayUnitNo      | Gets the selection state of the processing unit number of the flow window. | Reference: ▶ Details (p.191) |
| GetImageWindow     | Get the state of the image window.                                         | Reference: ▶ Details (p.264) |
| GetTextWindow      | Gets the state of the text window.                                         | Reference: ▶ Details (p.282) |
| RefreshImageWindow | Updates the image window.                                                  | Reference: ▶ Details (p.392) |
| RefreshJudgeWindow | Updates the judgement window.                                              | Reference: ▶ Details (p.393) |
| RefreshTextWindow  | Updating the text display window.                                          | Reference: ▶ Details (p.394) |
| RefreshTimeWindow  | Updates the display of the information window.                             | Reference: ▶ Details (p.395) |
| SetDisplayUnitNo   | Sets the processing unit number in the flow window to the selected state.  | Reference: ▶ Details (p.441) |
| SetImageWindow     | Sets the state of the image window.                                        | Reference: ▶ Details (p.447) |
| SetTextWindow      | Sets the state of the text window.                                         | Reference: ▶ Details (p.471) |

## Image Window Controls

| Command          | Function                                             | References                   |
|------------------|------------------------------------------------------|------------------------------|
| DisplaySubNo     | Get the sub-image number of the displayed sub-image. | Reference: ▶ Details (p.189) |
| DrawArc          | Draw the arc on the image window.                    | Reference: ▶ Details (p.196) |
| DrawArcW         | Draw the wide arc on the image window.               | Reference: ▶ Details (p.198) |
| DrawBox          | Draws a rectangle on the image window.               | Reference: ▶ Details (p.200) |
| DrawCircle       | Draw a circle on the image window.                   | Reference: ▶ Details (p.202) |
| DrawCircleW      | Draw the wide circle on the image window.            | Reference: ▶ Details (p.204) |
| DrawCursor       | Draw the cross-hair cursor on the image window.      | Reference: ▶ Details (p.206) |
| DrawEllipse      | Draw the ellipse on the image window.                | Reference: ▶ Details (p.208) |
| DrawFigure       | Draw a figure on the image window.                   | Reference: ▶ Details (p.210) |
| DrawFillImage    | Draw the fill image on the image window.             | Reference: ▶ Details (p.212) |
| DrawLine         | Draw a straight line on the image window.            | Reference: ▶ Details (p.215) |
| DrawLineW        | Draw the wide straight line on the image window.     | Reference: ▶ Details (p.217) |
| DrawMeasureImage | Draw the measurement image on the image window.      | Reference: ▶ Details (p.219) |
| DrawPoint        | Draw a point on the image window.                    | Reference: ▶ Details (p.220) |
| DrawPolygon      | Draw a polygon on the image window.                  | Reference: ▶ Details (p.222) |
| DrawSearchFigure | Draw the search figure on the image window.          | Reference: ▶ Details (p.224) |
| DrawTextG        | Draw a character string on the image window.         | Reference: ▶ Details (p.229) |
| DrawUnitImage    | Display the "other unit image" on the image window.  | Reference: ▶ Details (p.231) |
| SetDrawStyle     | Set the drawing attributes of the graphic figure.    | Reference: ▶ Details (p.442) |
| SetTextStyle     | Set the draw attributes of the character string.     | Reference: ▶ Details (p.469) |

## Text Window Controls

| Command       | Function                                                                       | References                   |
|---------------|--------------------------------------------------------------------------------|------------------------------|
| DrawJudgeText | Draws the judgement result of the character string on the text display screen. | Reference: ▶ Details (p.213) |
| DrawText      | Draw a character string on the text window.                                    | Reference: ▶ Details (p.227) |

## System Data

| Command       | Function                                 | References                   |
|---------------|------------------------------------------|------------------------------|
| AddSystemData | Adds the system data.                    | Reference: ▶ Details (p.129) |
| GetSystemData | Gets the system data or system variable. | Reference: ▶ Details (p.276) |
| SetSystemData | Sets the system data or system variable. | Reference: ▶ Details (p.467) |

## Global Data

| Command       | Function              | References                   |
|---------------|-----------------------|------------------------------|
| AddGlobalData | Adds the global data. | Reference: ▶ Details (p.127) |
| GetGlobalData | Gets the global data. | Reference: ▶ Details (p.260) |
| SetGlobalData | Sets the global data. | Reference: ▶ Details (p.445) |

## Data Save/Load

| Command        | Function                               | References                   |
|----------------|----------------------------------------|------------------------------|
| LoadBackupData | Loads the system + scene group 0 data. | Reference: ▶ Details (p.333) |
| LoadScene      | Loads the scene data.                  | Reference: ▶ Details (p.335) |
| LoadSceneGroup | Loads the scene group data.            | Reference: ▶ Details (p.337) |
| LoadSystemData | Loads the system data.                 | Reference: ▶ Details (p.339) |
| LoadUnitData   | Loads the processing unit data.        | Reference: ▶ Details (p.341) |
| SaveBackupData | Saves the system + scene group 0 data. | Reference: ▶ Details (p.408) |
| SaveData       | Saves the data to the controller.      | Reference: ▶ Details (p.410) |
| SaveScene      | Saves the scene data.                  | Reference: ▶ Details (p.415) |
| SaveSceneGroup | Saves the scene group data.            | Reference: ▶ Details (p.417) |
| SaveSystemData | Saves the system data.                 | Reference: ▶ Details (p.419) |
| SaveUnitData   | Saves a processing unit.               | Reference: ▶ Details (p.421) |

## File Controls

| Command | Function                            | References                   |
|---------|-------------------------------------|------------------------------|
| Close   | Closes up the file.                 | Reference: ▶ Details (p.157) |
| Dskf    | Gets the free space on disk drives. | Reference: ▶ Details (p.233) |
| Eof     | Examines the end of the file.       | Reference: ▶ Details (p.236) |
| Fcopy   | Copies the file.                    | Reference: ▶ Details (p.252) |
| Input#  | Reads data from the file.           | Reference: ▶ Details (p.303) |
| Input\$ | Reads binary data from the file.    | Reference: ▶ Details (p.305) |

| Command             | Function                                            | References                   |
|---------------------|-----------------------------------------------------|------------------------------|
| Isfile              | Checks the attribute and the existence of the file. | Reference: ▶ Details (p.311) |
| Kill                | Deletes a file.                                     | Reference: ▶ Details (p.321) |
| Line Input#         | Reads the data of one line from the file.           | Reference: ▶ Details (p.329) |
| Mkdir               | Build a directory                                   | Reference: ▶ Details (p.358) |
| Open For Append As# | Open the file in append mode.                       | Reference: ▶ Details (p.362) |
| Open For Input As#  | Open the file in reading mode.                      | Reference: ▶ Details (p.364) |
| Open For Output As# | Opens the file in writing mode.                     | Reference: ▶ Details (p.366) |
| Print#              | Outputs data in a file.                             | Reference: ▶ Details (p.378) |
| Rmdir               | Deletes a directory.                                | Reference: ▶ Details (p.405) |

### Multilingual Support Message Functions

| Command       | Function                              | References                   |
|---------------|---------------------------------------|------------------------------|
| CloseTextData | Close up a messages file.             | Reference: ▶ Details (p.159) |
| GetText\$     | Get a text data from a messages file. | Reference: ▶ Details (p.278) |
| OpenTextData  | Opens a messages file.                | Reference: ▶ Details (p.368) |

### Debug Commands

| Command           | Function                                                                                     | References                   |
|-------------------|----------------------------------------------------------------------------------------------|------------------------------|
| Call              | Executes the registered user-defined function.                                               | Reference: ▶ Details (p.146) |
| Cont              | Resumes execution of the program after it has been stopped.                                  | Reference: ▶ Details (p.161) |
| Debug             | Set the program execution form and information output method.                                | Reference: ▶ Details (p.182) |
| DebugPrint        | Outputs debug information to the system status console window.                               | Reference: ▶ Details (p.184) |
| List              | Outputs all or a part of program list in the system status console window.                   | Reference: ▶ Details (p.331) |
| Print             | Outputs data in the system status console window.                                            | Reference: ▶ Details (p.376) |
| SetStop           | Sets the conditions for stopping program execution.                                          | Reference: ▶ Details (p.465) |
| SetUserSubroutine | Register a user-defined function that has been defined in the external DDL file.             | Reference: ▶ Details (p.480) |
| Stop              | Stops program execution.                                                                     | Reference: ▶ Details (p.488) |
| VarList           | Outputs a list of the values of the specified variables in the system status console window. | Reference: ▶ Details (p.537) |

## Others

| Command              | Function                                                                                                            | References                   |
|----------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------|
| ApplicationPath\$    | Gets the pass name regarding application soft.                                                                      | Reference: ▶ Details (p.133) |
| ApplicationVersion\$ | Gets the version information of application soft.                                                                   | Reference: ▶ Details (p.135) |
| ElapsedTime          | Gets the elapsed time since starting the measurement.                                                               | Reference: ▶ Details (p.234) |
| ExecuteErrorProc     | Executes the error processing.                                                                                      | Reference: ▶ Details (p.245) |
| ExecuteImageLogging  | Executes image logging.                                                                                             | Reference: ▶ Details (p.247) |
| ExitFzProcess        | Terminate the Sensor Controller.                                                                                    | Reference: ▶ Details (p.249) |
| MessageBox           | Displays the message box.                                                                                           | Reference: ▶ Details (p.355) |
| RaiseErrorProcEvent  | Notifies the error processing on UI screen.                                                                         | Reference: ▶ Details (p.384) |
| RaiseOptionEvent     | Notifies option events to the UI screen.                                                                            | Reference: ▶ Details (p.386) |
| Rem                  | Put a comment in the program.                                                                                       | Reference: ▶ Details (p.396) |
| RenumUnitNo          | Gets the processing unit number after flow edit.                                                                    | Reference: ▶ Details (p.399) |
| ScreenCapture        | Saves the capture of the screen.                                                                                    | Reference: ▶ Details (p.433) |
| SetForegroundLine    | This command specifies the object line for operation in Multi-line Random trigger mode or Non-stop Adjustment mode. | Reference: ▶ Details (p.444) |
| SetVar               | Sets all variables with the specified variable names.                                                               | Reference: ▶ Details (p.482) |
| StartTimer           | Starts the elapsed time measurement.                                                                                | Reference: ▶ Details (p.487) |
| SystemReset          | Reboots the Sensor Controller.                                                                                      | Reference: ▶ Details (p.495) |
| Timer                | Gets the elapsed time.                                                                                              | Reference: ▶ Details (p.501) |
| VarPop               | Restores the value of the variables that are saved temporarily.                                                     | Reference: ▶ Details (p.539) |
| VarPush              | Saves the value of the variables that are saved temporarily.                                                        | Reference: ▶ Details (p.542) |
| VarSave              | Saves the values of the variables in the scene data.                                                                | Reference: ▶ Details (p.545) |
| Wait                 | Pauses the program process for the specified amount of time elapses.                                                | Reference: ▶ Details (p.547) |

## Abs

Gets the absolute value of the specified expression.

### Format

**Abs(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                          |
|----------------|-----------------------------------------------------------------|--------------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression to get the absolute value |

### Return value

Returns a double precision real absolute value.

### Description

Gets the absolute value of the expression specified in the <expression> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the difference between the two points (X1, Y1) and (X2, Y2).

```
X1# = 100  
Y1# = 200  
X2# = 200  
Y2# = 100
```

```
DX# = Abs(X1# - X2#)  
DY# = Abs(Y1# - Y2#)
```

The result is shown below.

```
DX# = 100  
DY# = 100
```

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

UnitData (Reference: ▶ Details (p.520))

## AddGlobalData

Adds the global data.

### Format

**AddGlobalData <dataIdent>, <data>**

### Parameter

| Parameter name | Data type                                                                                   | Description                                   |
|----------------|---------------------------------------------------------------------------------------------|-----------------------------------------------|
| <dataIdent>    | Character string type                                                                       | Identification name of the global data to add |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Value added in the global data                |

### Return value

None.

### Description

Adds the data of the identification name specified in the <dataIdent> parameter to the global data, and sets the value specified in the <data> parameter in the added data.

If the global data of the specified identification name already exists, the process ends without taking any action.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified in the <dataIdent> parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Adds the global data that has the identification name "ABC", and sets 1 as the value.

---

```
Rem Add global data "ABC", and set 1 as the value
AddGlobalData "ABC", 1
```

```
Rem Get the value (integer value) set in the global data "ABC", and store in the variable DATA&.
GetGlobalData "ABC", DATA&
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetGlobalData (Reference: ▶ Details (p.260))

SetGlobalData (Reference: ▶ Details (p.445))

## AddSystemData

Adds the system data.

### Format

**AddSystemData** <dataIdent0>, <dataIdent1>, <data>

### Parameter

| Parameter name | Data type                                                                                   | Description                                                                                           |
|----------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <dataIdent0>   | Character string type                                                                       | Data identification name of identification information 0 of system data to be added (specify "PanDA") |
| <dataIdent1>   | Character string type                                                                       | Data identification name of identification information 1 of system data to be added                   |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Value of the system data to add                                                                       |

### Return value

None.

### Description

Adds the data of identification information 1 specified in the <dataIdent1> parameter, which belongs to identification information 0 specified in the <dataIdent0> parameter, to the system data, and sets the value specified in the <data> parameter in the added data.

If an identification name other than "PanDA" is specified in the <dataIdent0> parameter, an "Illegal function call" error will occur.

If the system data of identification information 1 that belongs to the specified identification information 0 is already registered, no action is taken and the process ends.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If an identification name that does not exist is specified in the <dataIdent0> parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified in the <dataIdent1> parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Adds the data of identification information 1, "LoggingCount", to the system data of identification information 0, "PanDA". Sets 20 for the setting data.

---

```
AddSystemData "PanDA", "LoggingCount", 20
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

AddGlobalData (Reference: ▶ Details (p.127))  
SetSystemData (Reference: ▶ Details (p.467))

GetSystemData (Reference: ▶ Details (p.276))

## AND

Gets the logical product of two expressions.

### Format

**<expression1> AND <expression2>**

### Parameter

| Parameter name | Data type    | Description                                 |
|----------------|--------------|---------------------------------------------|
| <expression1>  | Integer type | Expression to calculate the logical product |
| <expression2>  | Integer type | Expression to calculate the logical product |

### Return value

Returns the logical product as an integer value.

### Description

Gets the logical product by bit of the expression specified in the <expression1> parameter and the expression specified in the <expression2> parameter.

When the values of the <expression1> parameter and <expression2> parameter are double precision real values, the decimal part of the returned logical product is rounded off.

This can also be used as an And condition in an If statement. For details on the logical expression, refer to "Operators".

Reference: ▶ Operator (p.55)

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the logical product of variable X and variable Y.

---

```
X& = 15
Y& = 8
```

```
DATA& = X& AND Y&
```

---

The result is shown below.

---

```
DATA& = 8
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

OR (Reference: ▶ Details (p.372))

XOR (Reference: ▶ Details (p.550))

NOT (Reference: ▶ Details (p.361))

UnitData (Reference: ▶ Details (p.520))

## ApplicationPath\$

Acquires the pass name related application software.

### Format

**ApplicationPath\$(<kind>)**

### Parameter

| Parameter name | Data type              | Description                                                                                                                                                                                                                                                                                                                             |
|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <kind>         | Character strings type | The following type of pass name related to application software.<br>0: Pass name installed the application software.<br>1: Standard pass name for file controlling<br>2: Default pass name of saved data<br>3: Pass name of saved system data<br>10000+Scene group number: Pass name of saved Scene grope data for corresponding number |

### Return value

Returns the information of pass name (character strings) using <kind>.

### Description

Type mismatch error is occurred when wrong data is specified as parameter. Illegal function call error is not occurred even if non-exist number, values, combination of data or values.

An error of String too long will be occurred when you specify the character strings as character strings type exceeds 255 characters.

Syntax error is occurred when you specify wrong formatting; typographical error of macro function's name, no comma or no spaces.

### Usage Cautions

- None.

### Example

Registers the image data as a registered image with non-procedure communication.

---

```
Rem Acquires the saved pass name of registered image.
USBPATH$ = ApplicationPath$(2)
FILENAME$ = ARGUMENTSTRING$(0)
DATAPATH$ = USBPATH$ + "RegisteredImage\" + FILENAME$ + ".ifz"
```

```
Rem Registers the latest input image to registered image.
SaveImage -1, DATAPATH$
```

---

### Usable Modules

Unit Macro / Scene Control Macro / Communication Command Macro / Calculate Unit Macro

## Supported Versions

Version 5.40, or more

## Related Items

SaveImage (Reference: [▶ Details \(p.411\)](#))

## ApplicationVersion\$

Acquires the version information of application software.

### Format

**ApplicationVersion\$(<kind>)**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                      |
|----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <kind>         | Integer type | The following number is for the version information of application software.<br>0: Model information<br>1: Version information<br>2: Created day |

### Return value

Return the version information (character strings) of application software using <kind> parameter.

### Description

Acquires the version information of application software.

Information according to the contents of Version.ini file in the application software will be returned.

Type mismatch error is occurred when wrong data is specified as parameter. Illegal function call error is not occurred even if non-exist number, values, combination of data or values.

Overflow error will be occurred when you specify as Integer value extends range; -2147483648 to 2147483647.

Syntax error is occurred when you specify wrong formatting; typographical error of macro function's name, no comma or no spaces.

### Usage Cautions

- None.

### Example

Sends the version information of application software with UDP non-procedure.

---

```
Rem Acquires the version information of system.
APPVER$ = ApplicationVersion$(1)
SendString "UdpNormal", APPVER$
```

---

### Usable Modules

Unit Macro / Scene Control Macro / Communication Command Macro / Calculate Unit Macro

### Supported Versions

Version 5.40, or more

### Related Items

SendString (Reference: ► Details (p.439))

## ApproximationCircle

Gets the approximate circle.

### Format

**ApproximationCircle <count>, <x()>, <y()>, <centerX>, <centerY>, <radius>**

### Parameter

| Parameter name | Data type                                           | Description                                    |
|----------------|-----------------------------------------------------|------------------------------------------------|
| <count>        | Integer type                                        | Number of the specified coordinate             |
| <x()>          | Integer array<br>Double precision real number array | 1D array stored each point of the X-coordinate |
| <y()>          | Integer array<br>Double precision real number array | 1D array stored each point of the Y-coordinate |
| <centerX>      | Double precision real number data type              | Central X coordinate of the approximate circle |
| <centerY>      | Double precision real number data type              | Central Y coordinate of the approximate circle |
| <radius>       | Double precision real number data type              | Radius of the approximate circle               |

### Return value

None.

### Description

Gets the approximate circle from the specified number of points, whose coordinates are specified in the <x()> and <y()> parameters, in the <count> parameter. In the <centerX> and <centerY> parameters, respectively specify the variables that will hold the center X coordinate and center Y coordinate of the approximate circle gotten. In the <radius> parameter, specify the variable that will hold the radius of the circle gotten.

In the <count> parameter, specify an integer value of at least 3.

In the <x()> parameter and <y()> parameter, respectively specify a 1D integer array variable or double precision real number array variable, where a number of coordinate values greater than or equal to the number specified in the <count> parameter are stored, without adding element numbers but adding () to the variables.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- None.

## Example

Calculates the approximate circle and getting the center coordinates and radius from each of the three points (50, 50), (100, 100), and (150, 50).

---

```
Dim X&(3), Y&(3)
```

```
Rem Assign the three values of the coordinate value to the array.
```

```
X&(0) = 50
```

```
Y&(0) = 50
```

```
X&(1) = 100
```

```
Y&(1) = 100
```

```
X&(2) = 150
```

```
Y&(2) = 50
```

```
Rem Calculate the approximate circle and get the center coordinates and the radius.
```

```
ApproximationCircle 3, X&(), Y&(), CENTERX#, CENTERY#, RADIUS#
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

Lsqumeth (Reference: ▶ Details (p.344))

UnitData (Reference: ▶ Details (p.520))

## Asc

Gets the character code of the specified character.

### Format

**Asc <string>**

### Parameter

| Parameter name | Data type             | Description                                        |
|----------------|-----------------------|----------------------------------------------------|
| <string>       | Character string type | Character string that requests the character code. |

### Return value

Returns the integer type character code value in decimal.

### Description

Gets the character code of the first character in a character string specified in the <string> parameter in ASCII code.

Asc is the inverse function of Chr\$. Chr\$ returns the character corresponds to the specified character code.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a character string longer than 255 characters is specified for a character string parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the character code of letter "A".

---

```
CHARA$ = "A"
```

```
CODE& = Asc(CHARA$)
```

---

The result is shown below.

---

```
CODE& = 65
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

Chr\$ (Reference: ▶ Details (p.152))

LCase\$ (Reference: ▶ Details (p.323))

Len (Reference: ▶ Details (p.327))

Piece\$ (Reference: ▶ Details (p.374))

Str\$ (Reference: ▶ Details (p.490))

UCase\$ (Reference: ▶ Details (p.517))

Hex\$ (Reference: ▶ Details (p.294))

Left\$ (Reference: ▶ Details (p.325))

Mid\$ (Reference: ▶ Details (p.356))

Right\$ (Reference: ▶ Details (p.403))

Str2\$ (Reference: ▶ Details (p.492))

Val (Reference: ▶ Details (p.535))

## AssignUnit

Registers the processing unit.

### Format

**AssignUnit <unitNo>, <itemIdent>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                              |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type          | Processing unit number on the measurement flow to register the processing unit (0 to the enrollment number of the processing units at the current scene) |
| <itemIdent>    | Character string type | Identification name of the processing item to register as a processing unit                                                                              |

### Return value

None.

### Description

Registers the processing item with the identification name specified in the <itemIdent> parameter as a processing unit in the position in the measurement flow specified in the <unitNo> parameter.

If a processing unit is already registered in the position specified in the <unitNo> parameter, that processing unit is overwritten.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If an identification name that does not exist is specified as the <itemIdent> parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Registers the search processing unit at the end of the measurement flow.

---

```
Rem Get the number of processing units registered in the current measurement flow.  
UNUM& = UnitCount
```

```
Rem Add the search processing unit.  
AssignUnit UNUM&, "Search"
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

## Related Items

CheckUnit (Reference: ▶ Details (p.150))

DeleteUnit (Reference: ▶ Details (p.186))

MeasureStart (Reference: ▶ Details (p.351))

MoveUnit (Reference: ▶ Details (p.360))

CopyUnit (Reference: ▶ Details (p.168))

InsertUnit (Reference: ▶ Details (p.307))

MeasureStop (Reference: ▶ Details (p.353))

UnitCount (Reference: ▶ Details (p.519))

## Atn

Getting the arctangent of the specified expression.

### Format

**Atn(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                          |
|----------------|-----------------------------------------------------------------|--------------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression that gets the arc tangent |

### Return value

Returns the arctangent as a double precision real value in the range  $-\pi/2$  to  $\pi/2$  radians.

### Description

Gets the arctangent of the expression specified in the <expression> parameter.

To convert the gotten value to an angle, multiply by  $\pi/180$ .

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the arctangent of the variable X#.

---

X# = 1

XX# = Atn(X#)\*180/3.141592

---

The result is shown below. (The returned value is rounded off to the nearest thousandth.)

---

XX# = 45.000

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

Cos (Reference: ▶ Details (p.176))

Sin (Reference: ▶ Details (p.484))

UnitData (Reference: ▶ Details (p.520))

GetUnitData (Reference: ▶ Details (p.286))

Tan (Reference: ▶ Details (p.496))

## BusyOut

Sets the output state of the processing busy signal.

### Format

**BusyOut <iolident>, <state>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                          |
|----------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <iolident>     | Character string type | Identification name of the communication module to be used ("Parallelo" or "EtherCAT")<br>(Reference: ► List of I/O Modules (p.581)) |
| <state>        | Integer type          | Output state of terminal<br>0: Output OFF<br>1: Output ON                                                                            |

### Return value

None.

### Description

Set the output state specified in the <state> parameter in the processing busy signal, such as the BUSY signal, of the communication module specified in the <iolident> parameter.

Normally "Parallelo" or "EtherCAT" should be specified in the <iolident> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If an identification name that does not exist is specified in the <iolident> parameter, an "Illegal function call" error will occur.

Even if an output status parameter value that does not exist (i.e., other than 0 and 1) is specified in the <state> parameter, an error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the communication command macro, sets the BUSY signal of parallel I/O to ON.

---

```
IOMODULE$ = "Parallelo"
```

```
Rem Set the output state.  
BusyOut IOMODULE$, 1
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

GetAll (Reference: ▶ Details (p.258))

JudgeOut (Reference: ▶ Details (p.319))

PutPort (Reference: ▶ Details (p.382))

GetPort (Reference: ▶ Details (p.272))

PutAll (Reference: ▶ Details (p.380))

RunOut (Reference: ▶ Details (p.406))

## Call

Executes the registered user-defined function.

### Format

**Call <subroutineIdent>[; | , <argument>...]**

### Parameter

| Parameter name    | Data type                                                                                   | Description                                                               |
|-------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <subroutineIdent> | Character string type                                                                       | Identification name of the user-defined function that has been registered |
| <argument>        | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Argument of the user-defined function that has been registered            |

### Return value

None.

### Description

Calls a user-defined function with the specified identification name by the <subroutineIdent> parameter and executes the function. If the user-defined function has arguments, the specified data by the <argument> parameter is passed to the user-defined function. In the <argument> parameter, specify an argument according to the user-defined function definition.

Register a user-defined function with the SetUserSubroutine function before executing this function.

How user-defined functions work depends on the defined processes in external DLL files.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a user-defined function that is not registered is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

In case an error is returned as a result of the user-defined function execution, this Call function will return one of the following errors.

- Syntax error
- Illegal function call
- Out of memory
- Type mismatch

If this macro function calls a user-defined function that has not been programmed with a supported interface, an error occurs during the user-defined function processing.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- Only the user-defined functions that have been defined in programmed DLL files by the supported interfaces are accepted to this macro function. If other DLL files or user-defined functions than above is used, unexpected operation may occur such as a measurement error or the Sensor Controller abnormal termination. For user-defined functions creation, refer to the FH-AP1.
- Depending on the called user-defined function processings by this macro function, unexpected operation may occur such as a measurement error or the Sensor Controller abnormal termination. Be sure to fully check the operations and debug with external devices disconnected from the sensor controller in advance.
- To operate this macro function in an actual environment with external devices connected to, always apply external fail safe measures to the system.

## Example

With identification name "USR", registers a user-defined function "UserProc0" that has been defined in MacroUserProc.dll. Then, specifies the identification name to call the user-defined function and executes it.

---

```
Rem Register the user-defined function so that the function can be used in this program
SetUserSubroutine "USR", "MacroUserProc", "UserProc0"
```

```
Rem Call the registered user-defined function and execute it
Call "USR", 0
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

SetUserSubroutine (Reference: ► Details (p.480))

## ChangeScene

---

Change the scene.

### Format

**ChangeScene <sceneNo>**

### Parameter

| Parameter name | Data type    | Description                       |
|----------------|--------------|-----------------------------------|
| <sceneNo>      | Integer type | Scene number to change (0 to 127) |

### Return value

None.

### Description

Changes the current scene to the scene with the scene number specified in the <sceneNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Changes the current scene to scene number 2.

---

```
ChangeScene 2
```

---

### Usable Modules

Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ChangeSceneGroup (Reference: ▶ Details (p.149))    MeasureStart (Reference: ▶ Details (p.351))  
MeasureStop (Reference: ▶ Details (p.353))    SceneCount (Reference: ▶ Details (p.423))  
SceneNo (Reference: ▶ Details (p.431))    SceneGroupNo (Reference: ▶ Details (p.427))

## ChangeSceneGroup

Changes the scene group.

### Format

**ChangeSceneGroup** <sceneGroupNo>, <sceneNo>

### Parameter

| Parameter name | Data type    | Description                       |
|----------------|--------------|-----------------------------------|
| <sceneGroupNo> | Integer type | New scene group (0 to 31)         |
| <sceneNo>      | Integer type | Scene number to change (0 to 127) |

### Return value

None.

### Description

Changes the current scene group to the scene specified in the <sceneNo> parameter, which belongs to the scene group specified in the <sceneGroupNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Changes the current scene group to scene 2 of scene group 10.

---

```
ChangeSceneGroup 10, 2
```

---

### Usable Modules

Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ChangeScene (Reference: ▶ Details (p.148))

MeasureStop (Reference: ▶ Details (p.353))

SceneGroupNo (Reference: ▶ Details (p.427))

MeasureStart (Reference: ▶ Details (p.351))

SceneGroupCount (Reference: ▶ Details (p.426))

## CheckUnit

Checks the registration status of a processing unit.

### Format

**CheckUnit(<unitNo>)**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                          |
|----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number (0 to (number of processing units of current scene minus one)) of processing unit whose registration status is to be checked. |

### Return value

Returns the registration status as an integer.

- 0: Processing unit not registered
- 1: Processing unit already registered

### Description

Checks if the processing unit in the position in the measurement flow specified in the <unitNo> parameter has been registered.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the processing unit title if a processing unit has been registered in processing unit number 3 in the measurement flow.

---

```
Rem Check the registration status of unit number 3.
If CheckUnit(3) = 1 Then
    Rem Get the title of the processing unit.
    TITLE$ = UnitTitle$(3)
Endif
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

## Related Items

AssignUnit (Reference: ▶ Details (p.140))

DeleteUnit (Reference: ▶ Details (p.186))

MeasureStart (Reference: ▶ Details (p.351))

MoveUnit (Reference: ▶ Details (p.360))

CopyUnit (Reference: ▶ Details (p.168))

InsertUnit (Reference: ▶ Details (p.307))

MeasureStop (Reference: ▶ Details (p.353))

UnitCount (Reference: ▶ Details (p.519))

## Chr\$

Determining the character of the specified character code.

### Format

**Chr\$(<expression>)**

### Parameter

| Parameter name | Data type    | Description                                |
|----------------|--------------|--------------------------------------------|
| <expression>   | Integer type | Expression to get the character (0 to 255) |

### Return value

Returns the character string type character.

### Description

Gets the character of the ASCII character code specified in the <expression> parameter.

ASCII control codes can also be specified in the <expression> parameter.

Chr\$ is the inverse function of Asc. Asc returns the character code in decimal corresponds to the specified character.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the characters for ASCII codes "48" and "13".

---

```
CHARA1$ = Chr$(48)
```

```
CHARA2$ = Chr$(13)
```

---

The result is shown below.

---

```
CHARA1$ = "0"
```

```
CHARA2$ = "CR"
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: ▶ Details (p.138))

LCase\$ (Reference: ▶ Details (p.323))

Len (Reference: ▶ Details (p.327))

Piece\$ (Reference: ▶ Details (p.374))

Str\$ (Reference: ▶ Details (p.490))

UCase\$ (Reference: ▶ Details (p.517))

Hex\$ (Reference: ▶ Details (p.294))

Left\$ (Reference: ▶ Details (p.325))

Mid\$ (Reference: ▶ Details (p.356))

Right\$ (Reference: ▶ Details (p.403))

Str2\$ (Reference: ▶ Details (p.492))

Val (Reference: ▶ Details (p.535))

## ClearMeasureData

Clears the measurement results of the processing unit.

### Format

**ClearMeasureData [<unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                              |
|----------------|--------------|----------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

Clears the measurement results of the processing unit specified in the <unitNo> parameter.

If the Scene Control Macro or the Communication Command Macro is used and the <unitNo> parameter is omitted or -1 is specified, all the measurement results of the processing units will be cleared.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

In the communication command macro, clears the measurement results of the search processing unit (Processing Unit number 2).

---

```
Rem Clear the measurement results.  
ClearMeasureData 2
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

UnitNo (Reference: ▶ Details (p.531))

## ClearScene

Clears the scene data.

### Format

**ClearScene <sceneNo>**

### Parameter

| Parameter name | Data type    | Description                                    |
|----------------|--------------|------------------------------------------------|
| <sceneNo>      | Integer type | Scene number of scene to be cleared (0 to 127) |

### Return value

None.

### Description

Clears the setting information in the scene with the scene number specified in the <sceneNo> parameter, and restores the scene to the factory default state.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Clears the scene data of scene number 2.

---

```
ClearScene 2
```

---

### Usable Modules

Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

|                                                 |                                             |
|-------------------------------------------------|---------------------------------------------|
| ChangeSceneGroup (Reference: ▶ Details (p.149)) | MeasureStart (Reference: ▶ Details (p.351)) |
| MeasureStop (Reference: ▶ Details (p.353))      | SceneCount (Reference: ▶ Details (p.423))   |
| SceneNo (Reference: ▶ Details (p.431))          | SceneGroupNo (Reference: ▶ Details (p.427)) |

## ClearSceneGroup

Clears scene group data.

### Format

**ClearSceneGroup <sceneGroupNo>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                  |
|----------------|--------------|------------------------------------------------------------------------------------------------------------------------------|
| <sceneGroupNo> | Integer type | Scene group whose scene group data is to be cleared<br>0 to 31: scene group number 0 to 31<br>-1: current scene group number |

### Return value

None.

### Description

Clears the settings of the scene group specified in the <sceneGroupNo> parameter and restores the factory settings.

If -1 is specified for the <sceneGroupNo> parameter, the settings in the current scene group will be cleared.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or value are specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Clears the scene group data of scene group number 1.

---

```
ClearSceneGroup 1
```

---

### Usable Modules

Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ClearScene (Reference: ▶ Details (p.155))

MeasureStop (Reference: ▶ Details (p.353))

SceneGroupNo (Reference: ▶ Details (p.427))

MeasureStart (Reference: ▶ Details (p.351))

SceneGroupCount (Reference: ▶ Details (p.426))

## Close

Closes up the file.

### Format

**Close [#<fileNo>[, #<fileNo>]...]**

### Parameter

| Parameter name | Data type    | Description                          |
|----------------|--------------|--------------------------------------|
| <fileNo>       | Integer type | File number (0 to 15) of closed file |

### Return value

None.

### Description

Close the file number specified in the <fileNo> parameter.

In the <fileNo> parameter, specify the specified file number in the Open function that has been used to open the file.

If multiple file numbers have been specified in the <fileNo> parameter, the multiple open files are closed.

If the <fileNo> parameter is omitted, all open files are closed.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

Be sure to use this macro function to close the opened file with the Open function within the same subroutine as where the Open function is used. File accessing processes such as data writing to a file and data reading from a file may not be completed properly in the following cases.

- This macro function is not executed.
- This macro function is used in a different subroutine from where the Open function is executed.
- This macro function is executed at a different timing from the Open function execution.

To access the files that have been closed by executing this macro function, execute the Open function again to open the closed file.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Opens the file, writes the data in the file, and then closes the file.

---

```
DATA& = 10
```

```
Rem Open the file  
Open "E:\input.dat" For Output As #1
```

```
Rem Write the data in the opened file  
Print #1 DATA&
```

```
Rem Close the opened file  
Close #1
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Open For Append As# (Reference: ▶ Details (p.362)) Open For Input As# (Reference: ▶ Details (p.364))  
Open For Output As# (Reference: ▶ Details (p.366)) Print (Reference: ▶ Details (p.376))

## CloseTextData

Close up a messages file.

### Format

**CloseTextData** [#<textDataNo>[, #<textDataNo>]...]

### Parameter

| Parameter name | Data type    | Description                                           |
|----------------|--------------|-------------------------------------------------------|
| <textDataNo>   | Integer type | Text data number (0 to 15) of the closed message file |

### Return value

None.

### Description

Close the messages file in the text data number specified in the <textDataNo> parameter.

In the <textDataNo> parameter, specify the specified text data number in the OpenTextData function that has been used to open the message file.

If multiple text data numbers have been specified in the <textDataNo> parameter, the multiple open message files are closed.

Close all the open message file if the <textDataNo> parameter is omitted.

If a value outside the range from 0 to 15 is specified in the <textDataNo> parameter, an "Illegal function call" error will occur.

Be sure to use this macro function to close the opened file with the OpenTextData function within the same subroutine as where the OpenTextData function is used. The message file cannot properly be closed and this macro function may not properly be executed in the subsequent processes in the following cases.

- This macro function is not executed.
- This macro function is used in a different subroutine from where the OpenTextData function is executed.
- This macro function is executed at a different timing from the OpenTextData function execution.

To access the messages file that has been closed with this macro function, execute the OpenTextData function again to open the messages file.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Uses the \*MEASUREDISPT subroutine of the Unit Macro processing unit to display the measured correlation value by the search processing unit (Processing Unit number 5), along with the gotten text string from the prepared message file for the processing unit, in the text window. The correlation value can be gotten with External Reference Data number 5.

---

```
*MEASUREDISPT
```

```
Rem Get the measurement result.  
GetUnitData 5, 5, CR#
```

```
Rem Open the messages file  
OpenTextData "Search" As #1
```

```
Rem Get the text  
TEXT$ = GetText$(#1, "Correlation")
```

```
Rem Draw the gotten text string from the messages file without adding any line break on the text window.  
DrawText TEXT$, UnitJudge(5), 0
```

```
Rem Draw the measurement results on the text window.  
DrawText Str2$(CR#, 4, 4, 0, 0), UnitJudge(5), 1
```

```
Rem Close up the messages file.  
CloseTextData
```

```
Return
```

---

The result is shown below.

---

```
Correlation value: 90.0000
```

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 5.00 or later

## Related Items

DrawText (Reference: ▶ Details (p.227))

GetUnitData (Reference: ▶ Details (p.286))

UnitJudge (Reference: ▶ Details (p.530))

GetText\$ (Reference: ▶ Details (p.278))

OpenTextData (Reference: ▶ Details (p.368))

Resumes execution of the program after it has been stopped.

**Format**

**Cont [<mode>]**

**Parameter**

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <mode>         | Integer type | <p>Resuming method of the stopped program</p> <p>This parameter can be omitted.<br/>Omitting the parameter resumes the program execution. After the resume, the program runs to the end unless an error occurs.</p> <p>0: Execute the program by step-in execution.</p> <p>If the current program line calls a subroutine, the subroutine is entered and is executed in steps. Otherwise, the current statement is executed and the program is stopped at the next line.</p> <p>1: Step-over execution</p> <p>If the current program line calls a subroutine, the entire subroutine is executed and the program stops at the next line after the subroutine call. Otherwise, the current statement is executed and the program is stopped at the next line.</p> <p>2: Execute the program by step-out execution.</p> <p>If the current program line is a subroutine that was called from a subroutine, the entire subroutine after the current program line is executed, and the program stops at the next line of the subroutine that called the subroutine. Otherwise, the program is executed until it ends or an error occurs.</p> |

**Return value**

None.

**Description**

With a use of the resuming method specified in the <mode> parameter, resumes the program execution from the statement line where the program has been stopped by the Stop function execution. All the statuses before the Stop function execution is handed to the operation after resuming. (How to Use the Debug Function (p.82))

By specifying the <mode> parameter, the program can be executed in steps of one line at a time after the Stop function is executed.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or value is specified for the parameter, an error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

**Usage Cautions**

- None.

## Example

After the execution of the Stop function in line 220 of the Unit Macro processing unit (Processing number 1), executes the next single line (line 230)

```
Macro(U1) 220 Stop
Macro(U1) Stop in 220
Macro(U1) 230 POS.X#=(POS0.X@ + POS1.X@) / 2
Macro(U1)>Cont 1
Macro(U1)>
```

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

Debug (Reference: ▶ Details (p.182))  
List (Reference: ▶ Details (p.331))  
SetStop (Reference: ▶ Details (p.465))  
Stop (Reference: ▶ Details (p.488))

DebugPrint (Reference: ▶ Details (p.184))  
Print (Reference: ▶ Details (p.376))  
SetVar (Reference: ▶ Details (p.482))  
VarList (Reference: ▶ Details (p.537))

## ContinuousMeasure

This macro executes start/stop of the continuous measurement.

### Format

**ContinuousMeasure <state>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                            |
|----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <state>        | Integer type | Continuous measurement is in the running status.<br>False: Stop the Continuous measurement.<br>True: Start the Continuous measurement. |

### Return value

None.

### Description

Specifies the Start/Stop of the Continuous measurement using <state> parameter.

Start the Continuous measurement when you set True.

Stop the Continuous measurement when you set False.

If you set the non-existing number, value, combination of data or values, an Illegal function call error may occur.

### Usage Cautions

Executes this function in the status when measure signal is OFF.

Refer to Reference: ▶ State Transitions and Execution Timing (p.72).

### Example

---

```
Rem Start or Stop the Continuous measurement.
```

```
NO& = int(Argumentvalue#(0))
```

```
Rem Start the Continuous measurement if the received value of communication command macro is 1.
```

```
If NO& = 1 then
```

```
ContinuousMeasure true
```

```
Rem Stop the Continuous measurement if the received value of communication command macro is except 1.
```

```
Else
```

```
ContinuousMeasure false
```

```
EndIf
```

---

### Usable Modules

Scene control macro/ Communication command macro

### Supported Versions

Version 5.40 or later.

### Related Items

MeasureStart (Reference: ▶ Details (p.351))

If Then Else (Reference: ▶ Details (p.296))

## CopyMeasureImage

Copies the measurement image as an image of the Unit Macro processing unit.

### Format

**CopyMeasureImage <measureImageNo>, <myImageNo>**

### Parameter

| Parameter name   | Data type    | Description                                |
|------------------|--------------|--------------------------------------------|
| <measureImageNo> | Integer type | Measurement image number (always 0)        |
| <myImageNo>      | Integer type | Image number of copy destination (0 to 31) |

### Return value

None.

### Description

Copies the image with the measurement image number specified in the <measureImageNo> parameter to the image buffer of the image number specified in the <myImageNo> parameter of the Unit Macro processing unit that calls this macro function.

Normally 0 should be specified in the <measureImageNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Stores the measurement image of each measurement in order in the image buffer.

---

```
Rem Calculate the image buffer number  
MYIMAGENO& = MYIMAGENO& + 1
```

```
Rem Overwrite the 32nd and following images in order from the oldest image.  
If MYIMAGENO& > 31 Then
```

```
    MYIMAGENO& = 0
```

```
Endif
```

```
Rem Store the measurement image in the image buffer of the Unit Macro processing unit.  
CopyMeasureImage 0, MYIMAGENO&
```

---

### Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

CopyUnitImage (Reference: ▶ Details (p.172))

SetMeasureImage (Reference: ▶ Details (p.450))

## CopyScene

Copies scene data.

### Format

**CopyScene** <srcSceneNo>, <destSceneNo>

### Parameter

| Parameter name | Data type    | Description                                        |
|----------------|--------------|----------------------------------------------------|
| <srcSceneNo>   | Integer type | Scene number (0 to 127) of the scene to be copied. |
| <destSceneNo>  | Integer type | Scene number (0 to 127) of destination scene.      |

### Return value

None.

### Description

Copies the scene data of the scene number specified in the <srcSceneNo> parameter to the scene data of the scene number specified in the <destSceneNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If the same scene number is specified in the <destSceneNo> parameter as the <srcSceneNo> parameter, an "Illegal function call" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If there is insufficient free working memory to copy the data, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Copies the data of scene 2 to scene 3.

---

```
CopyScene 2, 3
```

---

### Usable Modules

Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

CopySceneGroup (Reference: ▶ Details (p.167))

MeasureStop (Reference: ▶ Details (p.353))

SceneGroupNo (Reference: ▶ Details (p.427))

MeasureStart (Reference: ▶ Details (p.351))

SceneCount (Reference: ▶ Details (p.423))

SceneNo (Reference: ▶ Details (p.431))

## CopySceneGroup

Copies scene group data.

### Format

**CopySceneGroup** <srcSceneGroupNo>, <destSceneGroupNo>

### Parameter

| Parameter name     | Data type    | Description                                                   |
|--------------------|--------------|---------------------------------------------------------------|
| <srcSceneGroupNo>  | Integer type | Scene group number (0 to 31) of the scene group to be copied. |
| <destSceneGroupNo> | Integer type | Scene group number (0 to 31) of the destination scene group.  |

### Return value

None.

### Description

Copies the scene group data of the scene group number specified in the <srcSceneGroupNo> parameter to the scene group data of the scene group specified in the <destSceneGroupNo> parameter

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If the same scene number is specified in the <destSceneNo> parameter as the <srcSceneNo> parameter, an "Illegal function call" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If there is insufficient free working memory to copy the data, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Copies the data of scene group 0 to scene group 1.

---

```
CopySceneGroup 0, 1
```

---

### Usable Modules

Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

CopyScene (Reference: ▶ Details (p.166))

MeasureStop (Reference: ▶ Details (p.353))

SceneGroupNo (Reference: ▶ Details (p.427))

MeasureStart (Reference: ▶ Details (p.351))

SceneCount (Reference: ▶ Details (p.423))

SceneNo (Reference: ▶ Details (p.431))

## CopyUnit

Copies a processing unit.

### Format

**CopyUnit [<srcSceneNo>,<srcUnitNo>,<destUnitNo>,<mode>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                |
|----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <srcSceneNo>   | Integer type | Scene number of the origin of copy (0 to 127)                                                                                                                                              |
| <srcUnitNo>    | Integer type | Processing unit number of copy source (0 to (number of scene processing units of copy source minus one))                                                                                   |
| <destUnitNo>   | Integer type | Processing unit number that is to copy to (0 to the enrollment number of the processing units at the current scene -1)                                                                     |
| <mode>         | Integer type | Processing mode<br>0: Overwrites the processing unit of the processing unit number of the copy destination<br>1: Insert the loaded processing unit in front of the processing unit number. |

### Return value

None.

### Description

Copies the processing unit specified in the <srcUnitNo> parameter of the scene number specified in the <srcSceneNo> parameter to the measurement flow position specified in the <destUnitNo> parameter of the current scene, using the mode specified in the <mode> parameter. If the <srcSceneNo> parameter is omitted, the copy source scene is the current scene.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

An "Illegal function call" error will also occur if you specify Camera Image Input (processing unit 0) of an unselected scene in the Copy source processing unit.

Unprocessed scenes do not contain processing units, and Camera Image Input is input as processing unit 0 after scene switching. Please switch scenes before executing the CopyUnit command.

When 0 is specified in the <mode> parameter, the processing unit that has the processing unit number of the copy destination is overwritten by the copy source processing unit. When 1 is specified in the <mode> parameter, the processing unit of the copy source is inserted in the processing unit number of the copy destination, and the processing unit number of the processing unit of the copy destination is moved down by 1.

When the <srcSceneNo> parameter is omitted and 0 is specified in the <mode> parameter, specify different values in the <srcUnitNo> parameter and <destUnitNo> parameter. If the same value is specified, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

## Example

Copies processing unit 3 of scene 2 and inserts in front of processing unit 4 of the current scene.

---

```
CopyUnit 2, 3, 4, 1
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

AssignUnit (Reference: ▶ Details (p.140))

DeleteUnit (Reference: ▶ Details (p.186))

MeasureStart (Reference: ▶ Details (p.351))

MoveUnit (Reference: ▶ Details (p.360))

CheckUnit (Reference: ▶ Details (p.150))

InsertUnit (Reference: ▶ Details (p.307))

MeasureStop (Reference: ▶ Details (p.353))

UnitCount (Reference: ▶ Details (p.519))

## CopyUnitFigure

Copies figure data to the processing unit.

### Format

**CopyUnitFigure** <srcSceneNo>, <srcUnitNo>, <srcFigureNo>, <destUnitNo>, <destFigureNo>

### Parameter

| Parameter name | Data type    | Description                                                                                             |
|----------------|--------------|---------------------------------------------------------------------------------------------------------|
| <srcSceneNo>   | Integer type | Scene number of the origin of copy (0 to 127)                                                           |
| <srcUnitNo>    | Integer type | Unit number of copy source (0 to (number of scene processing units of copy source minus one))           |
| <srcFigureNo>  | Integer type | Figure number of copy source (Reference: ► Figure Data List (p.617))                                    |
| <destUnitNo>   | Integer type | Unit number of copy destination (0 to (number of scene processing units of copy destination minus one)) |
| <destFigureNo> | Integer type | Figure number of copy destination (Reference: ► Figure Data List (p.617))                               |

### Return value

None.

### Description

For the scene specified in the <srcSceneNo> parameter, copies the figure data of the figure number specified in the <srcFigureNo> parameter, of the processing unit specified in the <srcUnitNo> parameter, to the figure data of the figure number specified in the <destFigureNo> parameter, of the processing unit specified in the <destUnitNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))
- Use this macro function with the measurement image displayed after one or more measurements, or after the image file is specified and re-measured.
- Set the figure data so that pixels from outside the image are not included in the figure.

## Example

Copies the measurement region figure of the Shape Search III processing unit of Processing Unit number 2 in the measurement flow of scene 0 to the measurement region of the Shape Search III processing unit of Processing Unit number 5. The measurement region figure of the Shape Search III processing item is figure 1.

---

Rem Copy the figure of the measurement region  
CopyUnitFigure 0, 2, 1, 5, 1

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitFigure (Reference: ▶ Details (p.288))

MeasureStop (Reference: ▶ Details (p.353))

SetUnitFigure (Reference: ▶ Details (p.475))

Ut (Reference: ▶ Details (p.534))

MeasureStart (Reference: ▶ Details (p.351))

SceneNo (Reference: ▶ Details (p.431))

UnitNo (Reference: ▶ Details (p.531))

## CopyUnitImage

Copies a processing unit image as a unit macro processing unit image.

### Format

**CopyUnitImage <unitNo>, <imageNo>, <myImageNo>**

### Parameter

| Parameter name | Data type    | Description                                                                                                            |
|----------------|--------------|------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number that is to be copied (0 to (the number of registered processing units in the current scene -1)) |
| <imageNo>      | Integer type | Image number of copy source (Reference: ► Image Number List (p.624))                                                   |
| <myImageNo>    | Integer type | Image number of copy destination (0 to 31)                                                                             |

### Return value

None.

### Description

Copies the image with the image number specified in the <ImageNo> parameter, of the processing unit specified in the <unitNo> parameter, to the image buffer of the unit macro processing unit that calls this macro function with the image number specified in the <myImageNo> parameter.

Normally 0 should be specified in the <imageNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

None.

## Example

Stores the image of each measurement in order in the image buffer after filtering by the color gray filter processing unit of processing unit number 1.

---

```
Rem Calculate the image buffer number
MYIMAGENO& = MYIMAGENO& + 1
```

```
Rem Overwrite the 32nd and following images in order from the oldest image.
```

```
If MYIMAGENO& > 31 Then
```

```
    MYIMAGENO& = 0
```

```
Endif
```

```
Rem Store the filtered image in the image buffer of the unit macro processing unit.
```

```
CopyUnitImage 1, 0, MYIMAGENO&
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

CopyMeasureImage (Reference: ► Details (p.164))

SetMeasureImage (Reference: ► Details (p.450))

UnitNo (Reference: ► Details (p.531))

Ut (Reference: ► Details (p.534))

## CopyUnitModel

Copies the model data of a processing unit.

### Format

**CopyUnitModel <srcSceneNo>, <srcUnitNo>, <srcModelNo>, <destUnitNo>, <destModelNo>**

### Parameter

| Parameter name | Data type    | Description                                                                                             |
|----------------|--------------|---------------------------------------------------------------------------------------------------------|
| <srcSceneNo>   | Integer type | Scene number of the origin of copy (0 to 127)                                                           |
| <srcUnitNo>    | Integer type | Unit number of copy source (0 to (number of scene processing units of copy source minus one))           |
| <srcModelNo>   | Integer type | Model number of copy source (Reference: ▶ Model Number List (p.622))                                    |
| <destUnitNo>   | Integer type | Unit number of copy destination (0 to (number of scene processing units of copy destination minus one)) |
| <destModelNo>  | Integer type | Model number of copy destination (Reference: ▶ Model Number List (p.622))                               |

### Return value

None.

### Description

Copies the model data of the model number specified in the <srcModelNo> parameter, of the processing unit specified in the <srcUnitNo> parameter, of the scene specified in the <srcSceneNo> parameter, to the model data of the model number specified in the <destModelNo> parameter, of the processing unit specified in the <destUnitNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

On models that use a processing item for measurement, there is also the model data, model figure, model parameter, and other information. The model information varies by processing item, and correct operation does not always result from simply copying the model data, but it is also possible to use a variant-type variable in the scene control macro to copy model data. For details, refer to Application Producer (FH-AP1, sold separately).

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))
- Use this macro function with the measurement image displayed after one or more measurements, or after the image file is specified and re-measured.
- Set the figure data so that pixels from outside the image are not included in the figure.

**Example**

Copies the Shape Search III processing unit model of Processing Unit number 2 to the Shape Search III processing unit of Processing Unit number 3.

---

Rem Copy the model figure of Shape Search III.  
CopyUnitFigure 0, 2, 0, 3, 0

Rem Copy the detection point setting of Shape Search III  
GetUnitData 2, "detectionPosX", PosX#  
GetUnitData 2, "detectionPosY", PosY#  
SetUnitData 3, "detectionPosX", PosX#  
SetUnitData 3, "detectionPosY", PosY#

Rem Copy the model data of Shape Search III.  
CopyUnitModel 0, 2, 0, 3, 0

---

**Usable Modules**

Scene Control Macro / Communication Command Macro / Unit Macro

**Supported Versions**

Version 3.50 or later

**Related Items**

CopyUnitFigure (Reference: ▶ Details (p.170))  
MeasureStart (Reference: ▶ Details (p.351))  
SceneNo (Reference: ▶ Details (p.431))  
UnitNo (Reference: ▶ Details (p.531))

GetUnitData (Reference: ▶ Details (p.286))  
MeasureStop (Reference: ▶ Details (p.353))  
SetUnitData (Reference: ▶ Details (p.473))  
Ut (Reference: ▶ Details (p.534))

## Cos

Gets the cosine of the specified expression.

### Format

**Cos(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                        |
|----------------|-----------------------------------------------------------------|------------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression to calculate the cosine |

### Return value

Returns the cosine as a double precision real value in the range -1 to 1.

### Description

Gets the cosine of the expression specified in the <expression> parameter.

In the <expression> parameter, specify the value in radians. To convert an angle value to a radian value, multiply by  $\pi/180$ .

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the cosine of 60°.

---

```
DATA# = Cos(60/180*3.141592)
```

---

The result is shown below.

---

```
DATA# = 0.5
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

Atn (Reference: ▶ Details (p.142))

Sin (Reference: ▶ Details (p.484))

UnitData (Reference: ▶ Details (p.520))

GetUnitData (Reference: ▶ Details (p.286))

Tan (Reference: ▶ Details (p.496))

## Crspoint

Gets the intersection between 2 straight lines.

### Format

**Crspoint <line1(>, <line2(>, <x>, <y>**

### Parameter

| Parameter name | Data type                              | Description                                                            |
|----------------|----------------------------------------|------------------------------------------------------------------------|
| <line1(>       | Double precision real number array     | Straight line component of the straight line 1 to get the intersection |
| <line2(>       | Double precision real number array     | Straight line component of the straight line 2 to get the intersection |
| <x>            | Double precision real number data type | Variable that holds the X coordinate of the intersection gotten        |
| <y>            | Double precision real number data type | Variable that holds the Y coordinate of the intersection gotten        |

### Return value

None.

### Description

Gets the intersection point of the line component specified in the <line1(> parameter and the line component specified in the <line2(> parameter. In the <x> parameter and <y> parameter, specify the respective variables that will hold the X coordinate and Y coordinate of the intersection point.

In the <line1(> parameter and in the <line2(> parameter, specify a 1D double precision real number array with "a" in element 0, "b" in element 1, and "c" in element 2, where a, b, and c satisfy the linear equation  $ax + by + c = 0$ , without adding element numbers but adding () to the variables.

This macro function is mainly used to get the intersection point of lines gotten with the Lsqumeth function.

If an undefined array is specified a parameter, an "Undefined label" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Gets the intersection point of two gotten lines. The two lines are respectively gotten using Processing Units 1 to 4 and Processing Units 5 to 8.

---

```
Dim POS1X#(3), POS1Y#(3), POS2X#(3), POS2Y#(3), PARAM1#(2), PARAM2#(2)
```

```
Rem Rem Initialize variables for straight line 1
For I&=0 To 3
```

```
    GetUnitData I&+1, "X", POS1X#(I&)
```

```
    GetUnitData I&+1, "Y", POS1Y#(I&)
```

```
Next
```

```
Rem Get the straight line 1st component.
Lsqumeth 4, POS1X#(), POS1Y#(), PARAM1#()
```

```
Rem Rem Initialize variables for straight line 2
For I&=0 To 3
```

```
    GetUnitData I&+5, "X", POS2X#(I&)
```

```
    GetUnitData I&+5, "Y", POS2Y#(I&)
```

```
Next
```

```
Rem Get the straight line 2nd component.
Lsqumeth 4, POS2X#(), POS2Y#(), PARAM2#()
```

```
Rem Get the intersection between 2 straight lines.
Crspoint PARAM1#(), PARAM2#(), CRSX#, CRSY#
Erase POS1X#(), POS1Y#(), POS2X#(), POS2Y#(), PARAM1#(), PARAM2#()
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Erase (Reference: ► Details (p.238))

Lsqumeth (Reference: ► Details (p.344))

GetUnitData (Reference: ► Details (p.286))

UnitData (Reference: ► Details (p.520))

## Date\$

---

Reads out the date from the internal clock.

### Format

Date\$

### Parameter

None.

### Return value

Returns the date as a character string value.

The date value is a character string of the internal clock date whose year (YY), month (MM), and day (DD) separated by a slash (/). The range of each is indicated below.

- Year (YY): 00 to 80
- Month (MM): 01 to 12
- Day (DD): 01 to 31

### Description

Reads the date from the internal clock and returns the date value (YY/MM/DD) in character string format.

The year is expressed as a value from 00 to 80, representing 2000 to 2080.

The internal clock can be adjusted in [Date-time Settings] under [System settings]. (Reference: ► *Date-time setting [Other]* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Reads the date in the internal clock and outputs the date to the system status console window.

---

```
Rem Read out the date from the internal clock.  
TODAY$ = Date$
```

```
Rem Output the read date to the system status console window.  
Print "20";TODAY$
```

---

The result is shown below.

---

```
2011/03/10
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

Piece\$ (Reference: ▶ Details (p.374))

SetSystemData (Reference: ▶ Details (p.467))

Mid\$ (Reference: ▶ Details (p.356))

Print (Reference: ▶ Details (p.376))

Time\$ (Reference: ▶ Details (p.499))

## Debug

Set the program execution form and information output method.

### Format

**Debug <mode>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <mode>         | Integer type | Execution form and information output method<br>0: Release mode, no error description is output when an error occurs<br>1: Release mode, an error description is output to the system status console window when an error occurs.<br>2: Release mode, the contents of each line are output to the system status console window when the program is executed.<br>3: Release mode, an error description is output to the message box when an error occurs.<br>16: Debug mode, no error description is output when an error occurs<br>17: Debug mode, an error description is output to the system status console window when an error occurs.<br>18: Debug mode, the contents of each line are output to the system status console window when the program is executed.<br>19: Debug mode, an error description is output to the error box when an error occurs. |

### Return value

None.

### Description

Sets the program execution form and information output method specified in the <mode> parameter. Debug mode can be set to debug the program using macro functions that are only executed in debug mode. Set the mode to release mode after the debug so that there will be no need of removing DebugPrint functions and other macro functions that are only used in debug mode from the program. (How to Use the Debug Function (p.82))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Uses the MCRINIT subroutine in the unit macro processing unit to set the program execution form to "debug mode" and information output method so as to output error descriptions to the system status console window at an error occurrence.

---

\*MCRINIT

Rem Output an error description to the system status console window when an error occurs in debug mode.  
Debug 17

Return

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

Cont (Reference: ▶ Details (p.161))

List (Reference: ▶ Details (p.331))

SetStop (Reference: ▶ Details (p.465))

Stop (Reference: ▶ Details (p.488))

DebugPrint (Reference: ▶ Details (p.184))

Print (Reference: ▶ Details (p.376))

SetVar (Reference: ▶ Details (p.482))

VarList (Reference: ▶ Details (p.537))

## DebugPrint

Outputs debug information to the system status console window.

### Format

**DebugPrint <expression>[;], <expression>...]**

### Parameter

| Parameter name | Data type                                                                                            | Description                                           |
|----------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type<br>Array | Numerical expression or character string to be output |

### Return value

None.

### Description

Outputs the numerical expression or character string specified in the <expression> parameter to the system status console window. (Reference: ► Use the system status console window to debug macro customize programs and check error descriptions. (p.24))

If an non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function is only enabled when specified in debug mode with the Debug function. Specifying other values than the range above will treat the statement with this function in the same manner with the Rem function (i.e., ignores the statement). (Reference: ► How to Use the Debug Function (p.82))
- After the data output to the system status console window, the window is displayed on top of the Sensor Controller main screen. To display the system status console window on top of the main screen, click  on the upper-right of the system status console window or press [Alt] + [Tab] on the connected USB keyboard to the sensor controller.

### Example

Outputs a debug information (character string) to the system status console window in debug mode.

---

Rem Set the execution form to debug mode.

Debug 18

Rem Output character string "Result = OK" as the debug information

DebugPrint "Result = " + "OK"

Rem Set the execution form to release mode.

Debug 1

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

Cont (Reference: ▶ Details (p.161))

List (Reference: ▶ Details (p.331))

SetStop (Reference: ▶ Details (p.465))

Stop (Reference: ▶ Details (p.488))

Debug (Reference: ▶ Details (p.182))

Print (Reference: ▶ Details (p.376))

SetVar (Reference: ▶ Details (p.482))

VarList (Reference: ▶ Details (p.537))

## DeleteUnit

Deletes a processing unit.

### Format

**DeleteUnit <unitNo>**

### Parameter

| Parameter name | Data type    | Description                                                                                                             |
|----------------|--------------|-------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number (0 to (number of processing units of current scene minus one)) of processing unit to be deleted. |

### Return value

None.

### Description

Deletes the processing unit specified in the <unitNo> parameter of the current scene from the measurement flow.

The processing unit numbers of processing units after the processing unit number specified in the <unitNo> parameter are moved up by 1.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Deletes the processing unit of unit number 2.

---

```
DeleteUnit 2
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

AssignUnit (Reference: ▶ Details (p.140))  
CopyUnit (Reference: ▶ Details (p.168))  
MeasureStart (Reference: ▶ Details (p.351))  
MoveUnit (Reference: ▶ Details (p.360))

CheckUnit (Reference: ▶ Details (p.150))  
InsertUnit (Reference: ▶ Details (p.307))  
MeasureStop (Reference: ▶ Details (p.353))  
UnitCount (Reference: ▶ Details (p.519))

## Dim

Defines the array variable.

### Format

**Dim <arrayName>(<maxCount>[, <maxCount>[, <maxCount>[, <maxCount>]]])**

### Parameter

| Parameter name | Data type    | Description                    |
|----------------|--------------|--------------------------------|
| <arrayName>    | ---          | Used array variable name       |
| <maxCount>     | Integer type | Maximum value of the subscript |

### Return Value

None.

### Description

Defines a 1D to 4D array with maximum dimensional length specified in the <maxCount> parameter for each dimension.

Add one of type identifiers to the end of the parameter specified in the <arrayName>. (Reference: ▶ Variable (p.50))

Release the array variables defined with this macro function by executing the Erase function.

If the number of array dimension is different, two arrays with the same variable name are treated as the same variable.

An array variable and a variable with the same name are treated as different variables.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

Dim is used when defining temporary variables, array variables, and reference variables by the Option Explicit command. (Reference: ▶ Macro Variable Check Function (p.54))

### Usage Cautions

- The behavior changes depending on the use of the Option Explicit command.
  - When the Option Explicit command is used, and if array variables are defined twice due to check of undefined or duplicate variables by the command, an error occurs for multiple definitions.
  - If the array variables are re-defined while the Option Explicit command is not used, the previously defined array variables are released first, and then they will be redefined.

### Example

Defines the array.

---

```
Dim XY&(3)
Dim XY#(7, 15)
Dim CHARA$(31, 63, 127, 255)
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.40 or later

## Related Items

Erase (Reference: ▶ Details (p.238))

ReDim (Reference: ▶ Details (p.391))

Option Explicit (Reference: ▶ Details (p.371))

## DisplaySubNo

Get the sub-image number of the displayed sub-image.

### Format

**DisplaySubNo**

### Parameter

None.

### Return value

Returns the sub-image number as an integer value.

### Description

Gets the sub-image number of the displayed sub-image set in the image window on the main screen. If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

### Example

Uses the \*MEASUREDISPG subroutine in the unit macro processing unit to change the display in the image window according to the set image display sub-number in the image window of the main screen.

---

```
*MEASUREDISPG

Rem Get the displayed sub-image number
SUBNO& = DisplaySubNo

Rem Change the display on the image window according to the sub-image number of the sub-image to be displayed.
Select SUBNO&
Case 1
    Rem If the gotten sub-image number is 1, the title of processing unit 1 is displayed with the color in accordance with
    the judgment result.
    SetTextStyle 24, TA_LEFT, UnitJudge(1), 0, FONTSTYLE_NORMAL
    TEXT$ = UnitTitle$(1)
Case 2
    Rem If the gotten sub-image number is 2, the title of processing unit 2 is displayed with the color in accordance with
    the judgment result.
    SetTextStyle 24, TA_LEFT, UnitJudge(2), 0, FONTSTYLE_NORMAL
    TEXT$ = UnitTitle$(2)
Case Else
    Rem If the gotten sub-image number is other than 1 and 2, "Error" is displayed in the "unmeasured" color.
    SetTextStyle 24, TA_LEFT, JUDGE_NC, 0, FONTSTYLE_NORMAL
    TEXT$ = "Error"
End Select

Rem Displays text on the image window.
DrawTextG TEXT$, 50, 0, 0, UnitNo
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawTextG (Reference: ▶ Details (p.229))

UnitJudge (Reference: ▶ Details (p.530))

UnitTitle\$ (Reference: ▶ Details (p.532))

SetTextStyle (Reference: ▶ Details (p.469))

UnitNo (Reference: ▶ Details (p.531))

## DisplayUnitNo

---

Gets the selection state of the processing unit number of the flow window.

### Format

**DisplayUnitNo**

### Parameter

None.

### Return value

Returns the processing unit number as an integer value.

### Description

Gets the processing unit number of the unit selected in the flow window.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the communication command macro, gets the processing unit number selected in the flow window.

---

```
Rem Get the processing unit number selected in the flow window.  
NO& = DisplayUnitNo
```

```
Rem Set the processing unit number in the response data of the communication command.  
ResponseString$ = Str$(NO&)  
CommandResponse& = 0
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

GetImageWindow (Reference: ▶ Details (p.264))  
UnitNo (Reference: ▶ Details (p.531))

SetDisplayUnitNo (Reference: ▶ Details (p.441))  
Ut (Reference: ▶ Details (p.534))

## Do Loop While

Repeatedly executes the statements between Do and Loop while the specified condition meets.

### Format

**Do**

**<statement>**

**Loop While <expression>**

### Parameter

| Parameter name | Data type | Description                                                                                                            |
|----------------|-----------|------------------------------------------------------------------------------------------------------------------------|
| <statement>    | ---       | Statement to be executed repeatedly                                                                                    |
| <expression>   | ---       | Conditional logical expression for which gets a repetition of operation (Reference: <a href="#">▶Operator (p.55)</a> ) |

### Return value

None.

### Description

The statement is repeatedly executed if the specified logical expression by the <expression> parameter is true as a result of the specified Do block execution by the <statement> parameter.

If the Exit Do statement is used in the Do block statement, the statement force stops the repeating execution of the program immediately.

If the program process is jumped into or out of the Do block statement using the Goto or Gosub function, unexpected operation may occur.

If neither the Do statement nor the Loop While statement is used, either the "DO without LOOP", "LOOP without DO", or "EXIT without DO" error will occur depending on the statement that is used.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Repeats the process until the loop counter reaches a constant value.

---

```
NUM& = 0

Rem Repeat the process
Do
  NUM& = NUM& + 1
Loop While NUM& < 100

Print NUM&
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

For To Step Next (Reference: ▶ Details (p.256))

Print (Reference: ▶ Details (p.376))

## Dposline

Gets the shortest distance between the line and point.

### Format

**Dposline (<x>, <y>, <line()>)**

### Parameter

| Parameter name | Data type                              | Description                                                      |
|----------------|----------------------------------------|------------------------------------------------------------------|
| <x>            | Double precision real number data type | X coordinate of the points to get the distance                   |
| <y>            | Double precision real number data type | Y coordinate of the points to get the distance                   |
| <line()>       | Double precision real number array     | Straight line component of the straight line to get the distance |

### Return value

Returns the shortest distance as a double precision real number value.

### Description

Gets the shortest distance between the point that has the X coordinate specified in the <x> parameter and the Y coordinate specified in the <y> parameter, and the line component specified in the <line()> parameter. In the <line()> parameter, specify a 1D double precision real number array with "a" in element 0, "b" in element 1, and "c" in element 2, where a, b, and c satisfy the linear equation  $ax + by + c = 0$ , without adding element numbers but adding () to the variables.

This macro function is mainly used to get the deviation and distribution from an origin point for a line gotten with the Lsqumeth function.

If an undefined array is specified a parameter, an "Undefined label" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

**Example**

Gets the distribution and deviation for a line gotten from four points.

---

```
Dim POSX#(3), POSY#(3), PARAM#(2), DIST#(3)

Rem Initialize variables for straight line
For I&=0 To 3
    GetUnitData I&+1, "X", POSX#(I&)
    GetUnitData I&+1, "Y", POSY#(I&)
Next

Rem Get the straight line component.
Lsqumeth 4, POSX#(), POSY#(), PARAM#()

SUMDIST# = 0
For I&=0 To 3
    Rem Calculate the shortest distance between the straight line and point.
    DIST#(I&) = Dposline(POSX#(I&), POSY#(I&), PARAM#())
    SUMDIST# = SUMDIST# + DIST#(I&)
Next

Erase POSX#(), POSY#(), PARAM#(), DIST#()
```

---

**Usable Modules**

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

**Supported Versions**

Version 3.50 or later

**Related Items**

Erase (Reference: ► Details (p.238))

Lsqumeth (Reference: ► Details (p.344))

GetUnitData (Reference: ► Details (p.286))

UnitData (Reference: ► Details (p.520))

## DrawArc

Draw the arc on the image window.

### Format

**DrawArc <x>, <y>, <radius>, <start>, <end>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x>            | Integer type | The center X coordinate of the drawn arc                                                                                                |
| <y>            | Integer type | The center Y coordinate of the drawn arc                                                                                                |
| <radius>       | Integer type | Radius of the drawn arc                                                                                                                 |
| <start>        | Integer type | Starting angle of the drawn arc                                                                                                         |
| <end>          | Integer type | Ending angle of the drawn arc                                                                                                           |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw an arc of the specified radius by the <radius> parameter and whose starting angle and ending angle are specified in the <start> and <end> parameters respectively at the center coordinates specified in the <x> and <y> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <X> and <Y> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

In the <start> and <end> parameters, specify the angle so that the angle increases in a clockwise direction respect to the positive X-axis of the camera coordinates.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to draw an arc of the measured radius whose starting angle is  $-90^\circ$  and ending angle is  $180^\circ$  at the measured center coordinates by the circular scan edge position processing unit (Processing Unit number 5). The measured X and Y coordinates and radius can be gotten with External Reference Data numbers 5 to 7 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG

Rem Get the measurement result.
GetUnitData 5, 5, X#
GetUnitData 5, 6, Y#
GetUnitData 5, 7, R#

Rem Set the drawing attribute.
SetDrawStyle PS_SOLID,1,JUDGE_OK

Rem Draw the image
DrawArc Int(X#), Int(Y#), Int(R#), -90, 180, 0, UnitNo

Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))  
 SetDrawStyle (Reference: ▶ Details (p.442))  
 UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))  
 UnitData (Reference: ▶ Details (p.520))  
 Ut (Reference: ▶ Details (p.534))

## DrawArcW

Draw the wide arc on the image window.

### Format

**DrawArc <x>, <y>, <radius>, <start>, <end>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x>            | Integer type | The center X coordinate of the drawn wide arc                                                                                           |
| <y>            | Integer type | The center Y coordinate of the drawn wide arc                                                                                           |
| <radius>       | Integer type | Radius of the drawn wide arc                                                                                                            |
| <start>        | Integer type | Starting angle of the drawn wide arc                                                                                                    |
| <end>          | Integer type | Ending angle of the drawn wide arc                                                                                                      |
| <width>        | Integer type | Width of the drawn wide arc                                                                                                             |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a wide arc of whose radius, width, starting angle, and ending angle are specified in the <radius>, <width>, <start>, and <end> parameters respectively at the center coordinates specified in the <x> and <y> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <X> and <Y> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

In the <start> and <end> parameters, specify the angle so that the angle increases in a clockwise direction respect to the positive X-axis of the camera coordinates.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to draw an arc of the measured radius whose starting angle is  $-90^\circ$  and ending angle is  $180^\circ$  at the measured center coordinates by the circular scan edge position processing unit (Processing Unit number 5). The displayed arc is a wide arc whose outer radius is the measured maximum radius and whose inner radius is the measured minimum radius. The measured X/Y coordinates and radius, and maximum/minimum radii can be gotten with External Reference Data numbers 5, 6, 7, 8, and 9 respectively.

To display the arc at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 5, X#
```

```
GetUnitData 5, 6, Y#
```

```
GetUnitData 5, 7, R#
```

```
GetUnitData 5, 8, R_MAX#
```

```
GetUnitData 5, 9, R_MIN#
```

```
Rem Set the drawing attribute.
```

```
SetDrawStyle PS_SOLID,1,JUDGE_OK
```

```
Rem Determine the width
```

```
W# = R_MAX# - R_MIN#
```

```
Rem Draw the image
```

```
DrawArcW Int(X#),Int(Y#), Int(R#), -90, 180, Int(W#), 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawBox

Draws a rectangle on the image window.

### Format

**DrawBox <x0>, <y0>, <x1>, <y1>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                   |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <x0>           | Integer type | The upper-left corner X coordinate of the drawn rectangle                                                                                     |
| <y0>           | Integer type | The upper-left corner Y coordinate of the drawn rectangle                                                                                     |
| <x1>           | Integer type | The lower-right corner X coordinate of the drawn rectangle                                                                                    |
| <y1>           | Integer type | The lower-right corner Y coordinate of the drawn rectangle                                                                                    |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                                |
| <unitNo>       | Integer type | Processing unit number that executes the drawing processing (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draws a rectangle that has the specified upper left vertex coordinates by the <x0> and <y0> parameters and the specified lower right vertex coordinates by the <x1> and <y1> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <x0>, <y0>, <x1>, and <y1> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to display the rectangle whose upper-left and lower-right corner coordinates are the coordinates measured by the Processing Unit numbers 5 and 6 search processing units respectively. The measured X and Y coordinates can be gotten with External Reference Data numbers 6 and 7 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 6, X_LEFTTOP#
```

```
GetUnitData 5, 7, Y_LEFTTOP#
```

```
GetUnitData 6, 6, X_RIGHTBOTTOM#
```

```
GetUnitData 6, 7, Y_RIGHTBOTTOM#
```

```
Rem Set the drawing attribute.
```

```
SetDrawStyle PS_SOLID,1,JUDGE_OK
```

```
Rem Draw the image
```

```
DrawBox Int(X_LEFTTOP#), Int(Y_LEFTTOP#), Int(X_RIGHTBOTTOM#), Int(Y_RIGHTBOTTOM#), 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawCircle

Draw a circle on the image window.

### Format

**DrawCircle <x>, <y>, <radius>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x>            | Integer type | The center X coordinate of the drawn circle                                                                                             |
| <y>            | Integer type | The center Y coordinate of the drawn circle                                                                                             |
| <radius>       | Integer type | Radius of the drawn circle                                                                                                              |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a circle of the specified radius by the <radius> parameter at the center coordinates specified in the <x> and <y> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <X> and <Y> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to draw a circle of the measured radius by the circular scan edge position processing unit (Processing Unit number 5) at the measured center coordinates by the same circular scan edge position processing unit used for measuring the radius. The measured X and Y coordinates and radius can be gotten with External Reference Data numbers 5 to 7 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 5, X#
```

```
GetUnitData 5, 6, Y#
```

```
GetUnitData 5, 7, R#
```

```
Rem Set the drawing attribute.
```

```
SetDrawStyle PS_SOLID,1,JUDGE_OK
```

```
Rem Draw the image
```

```
DrawCircle Int(X#),Int(Y#), Int(R#), 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawCircleW

Draw the wide circle on the image window.

### Format

**DrawCircleW** <x>, <y>, <width>, <radius>, <imageNo>[, <unitNo>]

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x>            | Integer type | The center X coordinate of the drawn circle                                                                                             |
| <y>            | Integer type | The center Y coordinate of the drawn circle                                                                                             |
| <width>        | Integer type | The width of the drawn wide circle                                                                                                      |
| <radius>       | Integer type | Radius of the drawn circle                                                                                                              |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a wide circle of the specified radius by the <radius> parameter and the specified width by the <width> parameter at the center coordinates specified in the <x> and <y> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <X> and <Y> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to draw a circle of the measured radius by the circular scan edge position processing unit (Processing Unit number 5) at the measured center coordinates by the same circular scan edge position processing unit used for measuring the radius. This wide circle has an outer radius of the measured maximum radius and an inner radius of the measured minimum radius. The measured X/Y coordinates and radius, and maximum/minimum radii can be gotten with External Reference Data numbers 5, 6, 7, 8, and 9 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 5, X#
```

```
GetUnitData 5, 6, Y#
```

```
GetUnitData 5, 7, R#
```

```
GetUnitData 5, 8, R_MAX#
```

```
GetUnitData 5, 9, R_MIN#
```

```
Rem Set the drawing attribute.
```

```
SetDrawStyle PS_SOLID,1,JUDGE_OK
```

```
Rem Determine the width
```

```
W# = R_MAX# - R_MIN#
```

```
Rem Draw the image
```

```
DrawCircleW Int(X#), Int(Y#), Int(W#), Int(R#), 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawCursor

Draw the cross-hair cursor on the image window.

### Format

**DrawCursor <x>, <y>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x>            | Integer type | The center X coordinate of the drawn cross-hair cursor                                                                                  |
| <y>            | Integer type | The center Y coordinate of the drawn cross-hair cursor                                                                                  |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a cross-hair cursor at the center coordinates specified in the <x> and <y> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <X> and <Y> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to draw a cross-hair cursor at the measured coordinates by the search processing unit (Processing Unit number 5). The measured X and Y coordinates can be gotten with External Reference Data numbers 6 and 7 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

\*MEASUREDISPG

Rem Get the measurement result.

GetUnitData 5, 6, X#

GetUnitData 5, 7, Y#

Rem Set the drawing attribute.

SetDrawStyle PS\_SOLID,1,JUDGE\_OK

Rem Draw the image

DrawCursor Int(X#), Int(Y#), 0, UnitNo

Return

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawEllipse

Draw the ellipse on the image window.

### Format

**DrawCircle** <x>, <y>, <radiusX>, <radiusY>, <imageNo>[, <unitNo>]

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x>            | Integer type | The center X coordinate of the drawn ellipse                                                                                            |
| <y>            | Integer type | The center Y coordinate of the drawn ellipse                                                                                            |
| <radiusX>      | Integer type | Radius in the X direction of the drawn ellipse                                                                                          |
| <radiusY>      | Integer type | Radius in the Y direction of the drawn ellipse                                                                                          |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw an ellipse of the specified radius in the X direction by the <radiusX> parameter and the specified radius in the Y direction by the <radius Y> parameter at the center coordinates specified in the <x> and <y> parameters. Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <X> and <Y> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to display the ellipse whose radii in the X and Y directions are the measured coordinates of the center of gravity by the labeling processing unit (Processing Unit number 5). In this example, set the judgement conditions for the labeling processing unit to "Gravity X", "Gravity Y", "Elliptic major axis", and "Elliptic minor axis" from label number 0. Therefore, the assigned external reference data numbers to the gravity X, gravity Y, elliptic major axis, and elliptic minor axis parameters are 1000, 1100, 1200, and 1300 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 1000, X#
```

```
GetUnitData 5, 1100, Y#
```

```
GetUnitData 5, 1200, XDIAMETER#
```

```
GetUnitData 5, 1300, YDIAMETER#
```

```
Rem Set the drawing attribute.
```

```
SetDrawStyle PS_SOLID,1,JUDGE_OK
```

```
Rem Draw the image
```

```
DrawEllipse Int(X#), Int(Y#), Int(XDIAMETER# / 2), Int(YDIAMETER# / 2), 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: [▶ Details \(p.286\)](#))

SetDrawStyle (Reference: [▶ Details \(p.442\)](#))

UnitNo (Reference: [▶ Details \(p.531\)](#))

Int (Reference: [▶ Details \(p.309\)](#))

UnitData (Reference: [▶ Details \(p.520\)](#))

Ut (Reference: [▶ Details \(p.534\)](#))

## DrawFigure

Draw a figure on the image window.

### Format

**DrawFigure** <figure()>, <imageNo>[, <unitNo>]

### Parameter

| Parameter name | Data type     | Description                                                                                                                             |
|----------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <figure()>     | Integer array | 1D array that stores the drawn figure data (Reference: ► Figure Data Structure List (p.617))                                            |
| <imageNo>      | Integer type  | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type  | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a figure specified in the <figure()> parameter.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <figure()> parameter, specify the 1D integer array variable that will hold the figure data by adding only () without specifying an element number.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values are specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to simultaneously display registered model figures for the search processing units (Processing Unit numbers 5, 6, 7, and 8). The model registration figure of the Search processing item is figure 0. (Reference: ► List of Figure Numbers (p.619))  
Use the Dim function to define an array with element number that is larger than the element number used for the figure data.

---

```
*MEASUREDISPG

Dim FIGURE1&(255), FIGURE2&(255), FIGURE3&(255), FIGURE4&(255)

Rem Get the figure data of the model figure.
GetUnitFigure 5, 0, FIGURE1&()
GetUnitFigure 6, 0, FIGURE2&()
GetUnitFigure 7, 0, FIGURE3&()
GetUnitFigure 8, 0, FIGURE4&()

Rem Set the drawing attribute.
SetDrawStyle PS_SOLID,1,JUDGE_OK

Rem Draw the image
DrawFigure FIGURE1&(), 0, UnitNo
DrawFigure FIGURE2&(), 0, UnitNo
DrawFigure FIGURE3&(), 0, UnitNo
DrawFigure FIGURE4&(), 0, UnitNo

Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ► Details (p.286))  
SetDrawStyle (Reference: ► Details (p.442))  
UnitNo (Reference: ► Details (p.531))

Int (Reference: ► Details (p.309))  
UnitData (Reference: ► Details (p.520))  
Ut (Reference: ► Details (p.534))

## DrawFillImage

Draw the fill image on the image window.

### Format

**DrawFillImage <color>**

### Parameter

| Parameter name | Data type    | Description                                                      |
|----------------|--------------|------------------------------------------------------------------|
| <color>        | Integer type | Color value of the color to fill with (Reference: ▶ RGB (p.401)) |

### Return value

None.

### Description

Draw the color filled image specified in the <color> parameter.

In <color> parameter, specify the color value gotten with the RGB function.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

### Example

Uses the \*MEASUREDISPI subroutine in the Unit Macro processing unit to display a white-filled figure.

---

```
*MEASUREDISPI
```

```
    DrawFillImage RGB(255, 255, 255)
```

```
Return
```

---

### Usable Modules

Unit macro

### Supported Versions

Version 3.50 or later

### Related Items

DrawMeasureImage (Reference: ▶ Details (p.219))   DrawUnitImage (Reference: ▶ Details (p.231))  
RGB (Reference: ▶ Details (p.401))

## DrawJudgeText

Draws the judgement result of the character string on the text display screen.

### Format

**DrawJudgeText <judge>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <judge>        | Integer type | Judgement results to be drawn<br>JUDGE_NC: "No judgement (unmeasured)"<br>JUDGE_OK: Judgement: OK<br>JUDGE_NG: Judgement: NG<br>JUDGE_IMAGEERROR: Judgement: NG (Image mismatch)<br>JUDGE_MODELERROR: Judgement: NG (model not register)<br>JUDGE_MEMORYERROR: Judgement: NG (Out of memory)<br>JUDGE_ERRORJudgement: NG (immeasurable) |

### Return value

None.

### Description

Draw the specified judgement result string by the <judge> parameter in the text window.

Goten value with the UnitJudge function can be specified in the <judge> parameter. (Reference: ►UnitJudge (p.530))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPT subroutine. If used in another subroutine, an "Illegal function call" error will occur.

### Example

Uses the \*MEASUREDISPT subroutine in the Unit Macro processing unit to draw the judgement result text string for the processing unit in the text window.

---

```
*MEASUREDISPT
  DrawJudgeText UnitJudge(UnitNo)
Return
```

---

### Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawText (Reference: ▶ Details (p.227))

UnitData (Reference: ▶ Details (p.520))

UnitNo (Reference: ▶ Details (p.531))

GetUnitData (Reference: ▶ Details (p.286))

UnitJudge (Reference: ▶ Details (p.530))

## DrawLine

Draw a straight line on the image window.

### Format

**DrawBox <x0>, <y0>, <x1>, <y1>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x0>           | Integer type | The starting point X coordinate of the drawn straight line                                                                              |
| <y0>           | Integer type | The starting point Y coordinate of the drawn straight line                                                                              |
| <x1>           | Integer type | The ending point X coordinate of the drawn straight line                                                                                |
| <y1>           | Integer type | The ending point Y coordinate of the drawn straight line                                                                                |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draws a line that starts at the specified X- and Y-coordinates by the <x0> and <y0> parameters and ends at the specified X- and Y-coordinates by the <x1> and <y1> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <x0>, <y0>, <x1>, and <y1> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to display the line whose starting and ending point coordinates are the coordinates measured by the Processing Unit numbers 5 and 6 search processing units respectively. The measured X and Y coordinates can be gotten with External Reference Data numbers 6 and 7 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 6, X_START#
```

```
GetUnitData 5, 7, Y_START#
```

```
GetUnitData 6, 6, X_END#
```

```
GetUnitData 6, 7, Y_END#
```

```
Rem Set the drawing attribute.
```

```
SetDrawStyle PS_SOLID,1,JUDGE_OK
```

```
Rem Draw the image
```

```
DrawLine Int(X_START#), Int(Y_START#), Int(X_END#), Int(Y_END#), 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawLineW

Draw the wide straight line on the image window.

### Format

**DrawBox <x0>, <y0>, <x1>, <y1>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x0>           | Integer type | The starting point X coordinate of the drawn straight line                                                                              |
| <y0>           | Integer type | The starting point Y coordinate of the drawn straight line                                                                              |
| <x1>           | Integer type | The ending point X coordinate of the drawn straight line                                                                                |
| <y1>           | Integer type | The ending point Y coordinate of the drawn straight line                                                                                |
| <width>        | Integer type | Width of the drawn straight line                                                                                                        |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draws a wide line that starts at the specified X and Y coordinates by the <x0> and <y0> parameters and ends at the specified X and Y coordinates by the <x1> and <y1> parameters with the specified width by the <width> parameter.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <x0>, <y0>, <x1>, and <y1> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to display the wide line with width of 10 whose starting and ending point coordinates are the coordinates measured by the Processing Unit numbers 5 and 6 search processing units respectively. The measured X and Y coordinates can be gotten with External Reference Data numbers 6 and 7 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 6, X_START#
```

```
GetUnitData 5, 7, Y_START#
```

```
GetUnitData 6, 6, X_END#
```

```
GetUnitData 6, 7, Y_END#
```

```
Rem Set the drawing attribute.
```

```
SetDrawStyle PS_SOLID,1,JUDGE_OK
```

```
Rem Draw the image
```

```
DrawLineW Int(X_START#), Int(Y_START#), Int(X_END#), Int(Y_END#), 10, 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawMeasureImage

Draw the measurement image on the image window.

### Format

**DrawMeasureImage <imageNo>**

### Parameter

| Parameter name | Data type    | Description                                           |
|----------------|--------------|-------------------------------------------------------|
| <imageNo>      | Integer type | Number of the measurement image to display (always 0) |

### Return value

None.

### Description

Display an image that has been registered to the Unit Macro processing unit where this macro function is executed and whose image number is specified in the <imageNo> parameter.

Even if a value that does not exist is specified for the <imageNo> parameter, an error will not occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

### Example

Uses the \*MEASUREDISPI subroutine in the Unit Macro processing unit to display a measurement image.

---

```
*MEASUREDISPI
```

```
    DrawMeasureImage 0
```

```
Return
```

---

### Usable Modules

Unit macro

### Supported Versions

Version 3.50 or later

### Related Items

DrawFillImage (Reference: ▶ Details (p.212))

DrawUnitImage (Reference: ▶ Details (p.231))

## DrawPoint

Draw a point on the image window.

### Format

**DrawPoint <x>, <y>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                             |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <x>            | Integer type | The X coordinate of the drawn point                                                                                                     |
| <y>            | Integer type | The Y coordinate of the drawn point                                                                                                     |
| <imageNo>      | Integer type | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a point at the coordinates specified in the <x> and <y> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <X> and <Y> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to draw a point at the measured coordinates by the search processing unit (Processing Unit number 5). The measured X and Y coordinates can be gotten with External Reference Data numbers 6 and 7 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

\*MEASUREDISPG

Rem Get the measurement result.

GetUnitData 5, 6, X#

GetUnitData 5, 7, Y#

Rem Set the drawing attribute.

SetDrawStyle PS\_SOLID,1,JUDGE\_OK

Rem Draw the image

DrawPoint Int(X#), Int(Y#), 0, UnitNo

Return

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawPolygon

Draw a polygon on the image window.

### Format

**DrawPolygon <count>, <x()>, <y()>, <imageNo>[, <unitNo>]**

### Parameter

| Parameter name | Data type     | Description                                                                                                                             |
|----------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <count>        | Integer type  | Number of polygon vertices (0 or larger) to be drawn                                                                                    |
| <x()>          | Integer array | 1D array that stores the X coordinate of the drawn polygon                                                                              |
| <y()>          | Integer array | 1D array that stores the Y coordinate of the drawn polygon                                                                              |
| <imageNo>      | Integer type  | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type  | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a polygon having the specified number of vertices by the <count> parameter and whose vertices are at the specified coordinates by the <x()> and <y()> parameters.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <x()> parameter and in the <y()> parameter, specify a 1D integer number array variable that stores a number of coordinate values greater than or equal to the number specified in the <count> parameter, without adding element numbers but adding () to the variables.

In the <x()> and <y()> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to draw a polygon whose vertices are at the measured positions by the search processing units (Processing unit numbers 5 to 7). The measured X and Y coordinates can be gotten with External Reference Data numbers 6 and 7 respectively. To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
```

```
Dim X&(2), Y&(2)
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 6, X&(0)
```

```
GetUnitData 5, 7, Y&(0)
```

```
GetUnitData 6, 6, X&(1)
```

```
GetUnitData 6, 7, Y&(1)
```

```
GetUnitData 7, 6, X&(2)
```

```
GetUnitData 7, 7, Y&(2)
```

```
Rem Set the drawing attribute.
```

```
SetDrawStyle PS_SOLID,1,JUDGE_OK
```

```
Rem Draw the image
```

```
DrawPolygon 3, X&(), Y&(), 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

SetDrawStyle (Reference: ▶ Details (p.442))

UnitNo (Reference: ▶ Details (p.531))

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## DrawSearchFigure

Draw the search figure on the image window.

### Format

**DrawSearchFigure** <figure()>, <referenceX>, <referenceY>, <measureX>, <measureY>, <measureAngle>, <imageNo>, <unitNo>

### Parameter

| Parameter name | Data type                              | Description                                                                                                                             |
|----------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <figure()>     | Integer array                          | 1D array that stores the drawn figure data (Reference: ► Figure Data List (p.617))                                                      |
| <referenceX>   | Double precision real number data type | Detection point X coordinate used for the drawn figure position specification                                                           |
| <referenceY>   | Double precision real number data type | Detection point Y coordinate used for the drawn figure position specification                                                           |
| <measureX>     | Double precision real number data type | Measurement X coordinate used for the drawn figure position specification                                                               |
| <measureY>     | Double precision real number data type | Measurement Y coordinate used for the drawn figure position specification                                                               |
| <measureAngle> | Double precision real number data type | Measured angle used for the drawn figure angle specification                                                                            |
| <imageNo>      | Integer type                           | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type                           | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a figure specified in the <figure()> parameter at the specified position with the <referenceX>, <referenceY>, <measureX>, and <measureY> parameter at an angle specified in the <measureAngle>.

With the use of this macro function, drawing of a figure composed of registered model figures and detected points gotten mainly from search processing units and shape search III processing units. This macro function cannot draw images properly if the referenced measurement results from processing units where the model registration or detection point specification is not implemented are specified in the function arguments.

In the <referenceX> parameter and the <referenceY> parameter, normally specify detection points X and Y of the referenced search processing unit.

In the <measureX> parameter, the <measureY> parameter, and the <measureAngle> parameter, normally specify the measurement coordinates X and Y and the measurement angle of a referenced search

processing unit.

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <figure()> parameter, specify the 1D integer array variable that will hold the figure data by adding only () without specifying an element number.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

This macro function is mainly used for drawing the model figure detected by the search processing unit.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value outside the range -1.0E30 to 1.0E30 is specified for a double precision real number parameter, an "Overflow" error might occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.
- Set the line type, color, or width in SetDrawStyle before drawing. If you don't specify these settings, the image is drawn with the previous settings.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to display a registered model figure for the search processing unit (Processing Unit number 5). The measured X/Y coordinates and radius, and the detection point X/Y coordinates can be gotten with External Reference Data numbers 6, 7, 8, 132, and 133 respectively.

To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

\*MEASUREDISPG

Dim FIGURE&(255)

Rem Get the model figure  
GetUnitFigure 5, 0, FIGURE&()

Rem Get the measurement result.  
GetUnitData 5, 6, X#  
GetUnitData 5, 7, Y#  
GetUnitData 5, 8, TH#  
GetUnitData 5, 132, RX#  
GetUnitData 5, 133, RY#

Rem Set the drawing attribute.  
SetDrawStyle PS\_SOLID,1,JUDGE\_OK

Rem Draw the image  
DrawSearchFigure FIGURE&(), RX#, RY#, X#, Y#, TH#, 0, UnitNo

Return

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ► Details (p.286))  
SetDrawStyle (Reference: ► Details (p.442))  
UnitNo (Reference: ► Details (p.531))

Int (Reference: ► Details (p.309))  
UnitData (Reference: ► Details (p.520))  
Ut (Reference: ► Details (p.534))

## DrawText

Draw a character string on the text window.

### Format

**DrawText** <string>, <color>, <newLine>

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                                     |
|----------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <string>       | Character string type | Character string to display                                                                                                                                                                     |
| <color>        | Integer type          | Color value of character string color to be drawn<br>JUDGE_NC: Unmeasured color (Grey)<br>JUDGE_OK: OK judgement color (Green)<br>JUDGE_NG: NG judgement color (Red)<br>RGB Function: Any color |
| <newLine>      | Integer type          | Line break after display<br>0: Do not break a line<br>1: Break a line                                                                                                                           |

### Return value

None.

### Description

Use the color specified in the <color> parameter and with the line break method specified in the <newLine> parameter to draw the character string specified in the <string> parameter in the text window.

The gotten color value by the RGB function can be set for the <color> parameter. (Reference: ▶ RGB (p.401))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a value that does not exist is specified for a parameter, an error will not occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPT subroutine. If used in another subroutine, an "Illegal function call" error will occur.

#### IMPORTANT

- On the FH Series, English characters and characters for the language selected in [Language setting] are allowed.

## Example

Uses the \*MEASUREDISPT subroutine of the Unit Macro processing unit to display the provided measurement results by the search processing unit (Processing Unit number 5) in the text window. The measured X and Y coordinates and angle can be gotten with External Reference Data numbers 6, 7, and 8 respectively.

---

```
*MEASUREDISPT
```

```
Rem Get the measurement result.
```

```
GetUnitData 5, 6, X#
```

```
GetUnitData 5, 7, Y#
```

```
GetUnitData 5, 8, TH#
```

```
Rem Draw the delimiter after drawing the character string with the "OK" judgement color without adding any line break.
```

```
DrawText Str2$(X#, 4, 4, 0, 0), JUDGE_OK, 0
```

```
DrawText ", ", JUDGE_OK, 0
```

```
Rem Draw the character string with the "OK" judgement color and add a line break.
```

```
DrawText Str2$(Y#, 4, 4, 0, 0), JUDGE_OK, 1
```

```
Rem Draw the character string with the "OK" judgement color without adding any line break.
```

```
DrawText Str2$(TH#, 4, 4, 0, 0), JUDGE_OK, 0
```

```
Return
```

---

The result is shown below.

---

```
123.4567, 10.5000
```

```
90.0000
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawJudgeText (Reference: [▶ Details \(p.213\)](#))

RGB (Reference: [▶ Details \(p.401\)](#))

Str2\$ (Reference: [▶ Details \(p.492\)](#))

GetUnitData (Reference: [▶ Details \(p.286\)](#))

Str\$ (Reference: [▶ Details \(p.490\)](#))

UnitData (Reference: [▶ Details \(p.520\)](#))

## DrawTextG

Draw a character string on the image window.

### Format

**DrawTextG** <string>, <x>, <y>, <imageNo>[, <unitNo>]

### Parameter

| Parameter name | Data type             | Description                                                                                                                             |
|----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <string>       | Character string type | Character string to display                                                                                                             |
| <x>            | Integer type          | Upper left X coordinate value of the drawn area                                                                                         |
| <y>            | Integer type          | Upper left Y coordinate value of the drawn area                                                                                         |
| <imageNo>      | Integer type          | Measurement image number to draw on (always 0)                                                                                          |
| <unitNo>       | Integer type          | Processing unit number to display the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

On the measurement image whose specified image number is in the <imageNo> parameter, draw a character string specified in the <string> parameter at the position coordinates specified in the <x> and <y> parameters.

To display a character string that includes the "%" character, double it to be "%%"

Specify the corresponding Unit Macro processing unit number in the <unitNo> parameter to draw the image at the position coordinates before applying position compensation. If the <unitNo> parameter is omitted, the image is drawn at the position coordinates after applying position compensation.

In the <X> and <Y> parameters, specify the camera coordinates whose origin is at the upper-left corner of the image.

Normally 0 should be specified in the <imageNo> parameter.

In the <unitNo> parameter, normally specify the processing unit number of the Unit Macro processing unit that executes this process.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

### IMPORTANT

- On the FH Series, English characters and characters for the language selected in [Language setting] are allowed.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to display the string "OK" at fixed position coordinates (100, 100). To display the string at the fixed position regardless of the position compensation result, specify the assigned processing unit number to this Unit Macro processing unit (where the \*MEASUREDISPG subroutine is used) for the <unitNo> parameter.

---

```
*MEASUREDISPG
  DrawTextG "OK", 100, 100, 0, UnitNo
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))  
Str\$ (Reference: ▶ Details (p.490))  
UnitData (Reference: ▶ Details (p.520))  
Ut (Reference: ▶ Details (p.534))

SetTextStyle (Reference: ▶ Details (p.469))  
Str2\$ (Reference: ▶ Details (p.492))  
UnitNo (Reference: ▶ Details (p.531))

## DrawUnitImage

Display the "other unit image" on the image window. The "other unit image" refers to the held image by a processing unit for the judgement reference.

### Format

**DrawUnitImage <unitNo>, <imageNo>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                  |
|----------------|--------------|------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number that holds the displayed image (0 to (the number of processing units in the current scene minus one)) |
| <imageNo>      | Integer type | Drawn image number (Reference: ►List of Figure Numbers (p.619))                                                              |

### Return value

None.

### Description

Draw the image of the specified image number by the <imageNo> parameter that is held by the specified processing unit number by the <unitNo> parameter.

If a non-existent number, numerical value, or combination of data types or values is specified for the <unitNo> parameter, an "Illegal function call" error will occur.

Even if a value that does not exist is specified for the <imageNo> parameter, an error will not occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

### Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to display image number 1 that is held in advance by the advanced filter processing unit (Processing Unit number 5) and is allocated to output image 1.

---

```
*MEASUREDISPG
```

```
    Rem Display the "other unit image"
    DrawUnitImage 5, 1
```

```
Return
```

---

### Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawFillImage (Reference: ▶ Details (p.212))

UnitNo (Reference: ▶ Details (p.531))

DrawMeasureImage (Reference: ▶ Details (p.219))

Ut (Reference: ▶ Details (p.534))

## Dskf

Gets the free space on disk drives.

### Format

**Dskf(<driveName>)**

### Parameter

| Parameter name | Data type             | Description                                 |
|----------------|-----------------------|---------------------------------------------|
| <driveName>    | Character string type | Drive name whose free space is to be gotten |

### Return value

Returns free space (in bytes) on the disk drive as a double-precision real value.

Returns -1 when the specified disk drive does not exist.

### Description

Determinate the free space (in bytes) on the disk drive specified in the <driveName> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Turns ON the ERROR signal when the free space on the disk drive reaches less than KB (1,024 bytes).

---

```
Rem Check the free space on the disk drive
DiskSize# = Dskf("E:\")
If DiskSize# < 1024 Then
```

```
    Rem Turn ON the ERROR Signal
    PutPort "Parallelo", 103, 1
```

```
Endif
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Fcopy (Reference: ▶ Details (p.252))

Kill (Reference: ▶ Details (p.321))

PutPort (Reference: ▶ Details (p.382))

IsFile (Reference: ▶ Details (p.311))

Mkdir (Reference: ▶ Details (p.358))

Rmdir (Reference: ▶ Details (p.405))

## ElapsedTime

Gets the elapsed time since starting the measurement.

### Format

**ElapsedTime(<mode>)**

### Parameter

| Parameter name | Data type    | Description                                                   |
|----------------|--------------|---------------------------------------------------------------|
| <mode>         | Integer type | Unit of the elapse time to get<br>0: ms unit<br>1: $\mu$ unit |

### Return value

Returns the elapsed time as an integer value.

### Description

Gets the elapsed time since starting the measurement with the unit specified in the <mode> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Uses the MEASUREPROC subroutine of the Unit Macro processing unit to get the elapsed time until this macro function is executed. If the elapsed time is 1,000 ms or longer, the error character string is displayed in the text window.

---

```
*MEASUREPROC
```

```
    Rem Get the elapsed time.  
    TIME& = ElapsedTime(0)
```

```
Return
```

```
*MEASUREDISPT
```

```
    Rem If the elapsed time is 1,000 ms or longer, the error character string is displayed in the NG color.  
    If TIME& > 999 Then  
        DrawText "Error", JUDGE_NG, 1  
    Endif
```

### Usable Modules

Unit Calculation Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

DrawText (Reference: ▶ Details (p.227))

Timer (Reference: ▶ Details (p.501))

StartTimer (Reference: ▶ Details (p.487))

Wait (Reference: ▶ Details (p.547))

## Eof

Examines the end of the file.

### Format

**Eof(<fileNo>)**

### Parameter

| Parameter name | Data type    | Description                                     |
|----------------|--------------|-------------------------------------------------|
| <fileNo>       | Integer type | File number (0 to 15) of the examined file end. |

### Return value

Returns an integer value that notifies if the end of the file is reached.

- 0: The end of the file is reached
- -1: The end of file is not reached

### Description

Check if the end of the file of the file number specified in the <fileNo> is reached.

If an unopened file number is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Reads the data until the end of the file.

---

```
Dim ALLDATA$(255)

Rem Open the file
Open "E:\input.dat" For Input As #1

For I&=0 to 255

    Rem Read line by line from the top of the file
    Input #1, DATA$
    ALLDATA$(I&) = DATA$

    Rem Check if the end of the file is reached
    If Eof(1) <> 0 Then
        Exit For
    Endif
```

---

Next

Rem Close up the file.  
Close #1

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Close (Reference: ▶ Details (p.157))

Input# (Reference: ▶ Details (p.303))

Open For Append As# (Reference: ▶ Details (p.362)) Open For Input As# (Reference: ▶ Details (p.364))

Open For Output As# (Reference: ▶ Details (p.366))

## Erase

Releases array variable.

### Format

**Erase <array>[, <array>...]**

### Parameter

| Parameter name | Data type | Description             |
|----------------|-----------|-------------------------|
| <array>        | ---       | Released array variable |

### Return value

None.

### Description

Releases the allocated memory area of the predefined array variable with the Dim function that is specified in the <array> parameter. By releasing the temporarily used array variables with this function, the allocated memory areas of the variables can be released so that the released memory areas can be efficiently utilized. If an array variable is redefined without being released, its allocated memory area is released before the redefinition.

If variables other than array variables are specified in the <array> parameter, "Syntax error" will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Releases defined array.

```
Dim XY&(3)
Dim XY#(7, 15)
Dim CHARA$(31, 63, 127, 255)
```

```
Rem Releases array variable.
Erase XY&, XY#(), CHARA$()
```

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Dim (Reference: ▶ Details (p.187))

**Errcmd\$**

Get the function name of the macro where an error occurred.

**Format**

**Errcmd\$**

**Parameter**

None.

**Return value**

Returns the character string type value of the upper case letters that represents the macro function name where the error occurred.

**Description**

Gets the character string of the macro function name where the error occurred at error occurrence in the program.

If there is no error in the program or an error occurred as a result of the unrelated operations to the macro functions such as a division by zero operation, a null string is returned.

Use this macro function in the Try-Catch-End Try statement.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

**Usage Cautions**

- None.

**Example**

Outputs the error information to the system status console window only if the error is occurred in the GetUnitData statement process in the \*MEASUREPROC subroutine within the Unit Macro processing unit. If an error is occurred in other macro function statement in the subroutine, the measurement processing ends without taking any action.

---

```
*MEASUREPROC

Try
  GetUnitData 5, 5, CR#

  SetUnitData 6, 143, CR#
Catch
  If Errcmd$ = "GetUnitData" Then
    Print Errcmd$
  Endif
End Try

Return
```

---

**Usable Modules**

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Errno (Reference: ▶ Details (p.241))

Print (Reference: ▶ Details (p.376))

Try Catch End Try (Reference: ▶ Details (p.515))

GetUnitData (Reference: ▶ Details (p.286))

SetUnitData (Reference: ▶ Details (p.473))

## Errno

Gets the error number.

### Format

**Errno**

### Parameter

None.

### Return value

Returns the error number as an integer value. (Reference: ► Error List (p.554))

### Description

Gets the error number of the error which occurred in the program.

Use this macro function in the Try-Catch-End Try statement

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Uses the Try Catch-End Try statement in the \*MEASUREPROC subroutine of the Unit Macro processing unit to detect the error occurrence and get the detected error number.

---

```
*MEASUREPROC
```

```
Try
```

```
WORK& = 0
```

```
SUMM& = 100 + 200 + 300
```

```
ANS& = SUMM& / WORK&
```

```
Catch
```

```
If Errno = 11 Then
```

```
Rem Output the error number and the error content on the system status console window
```

```
Print "Error Number = " + Str$(Errno) + ", Division by Zero"
```

```
Endif
```

```
End Try
```

```
Return
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

Errcmd\$ (Reference: ▶ Details (p.239))

Try Catch End Try (Reference: ▶ Details (p.515))

Print (Reference: ▶ Details (p.376))

## ErrorOut

Set the output status of error (ERROR) signal.

### Format

**ErrorOut [<iolident>,<errorKind>**

### Parameter

| Parameter name | Data type              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <iolident>     | Character strings type | Parameter name for using communication module.<br>(Reference: ►List of I/O Modules (p.581))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <errorKind>    | Integer type           | Select the number of error type to notify. If 0 or a larger number is selected, ERROR output turns ON.<br>-1: ERROR output OFF<br>0: System error<br>1: System error (Fan or voltage error)<br>10: Camera connection error<br>11: Connected camera has been changed<br>12: Detection of camera over current<br>13: Configuration error of light device connection<br>20: Write error of image logging disk<br>30: Time out of parallel output<br>31: PLC link communication error<br>32: Detection of parallel I/O camera over current<br>40: Data load error<br>41: Data transfer error<br>42: Incorrect number of start-up Scene group<br>43: Incorrect number of start-up Scene |

### Return value

None.

### Description

Set the ERROR signal status of a communication module selected in <iolident> parameter. When the EtherCAT communication module is used, set the ERROR signal status and error type number.

All of the communication module will be as an object if you set "" (specify an empty character strings) or omit <iolident> parameter.

If 0 or a larger number is set to <errorKind> parameter, ERROR signal turns ON and if -1 is set, ERROR signal turns OFF.

Type mismatch error is occurred when wrong data is specified as parameter. Illegal function call error is not occurred even if non-existent number, values, combination of data or values.

Overflow error will be occurred when you specify a value extends range; -2147483648 to 2147483647.

An error of String too long will be occurred when you specify the character strings exceeds 255 characters.

Syntax error is occurred when you specify wrong formatting; typographical error of macro function's name, no comma or no spaces.

## Usage Cautions

Only action of notified in error message when you write \*ErrorProc.

Normally error processing (Refer to the following example)

```
RaiseErrorProcEvent ERRORKIND&, 0, True
```

```
ErrorOut "", ERRORKIND&
```

If you write the above parameters, normally error processing can be executed when except specified error is occurred.

## Example

---

```
Rem Displays a message box when logging error is occurred.
*ERRORPROC

If ERRORKIND& = 20 Then

    MessageBox "error"

Rem Executes normally error processing when an error except logging error is occurred.
Else

    RaiseErrorProcEvent ERRORKIND&, 0, True
    ErrorOut "", ERRORKIND&

EndIf
Return
```

---

## Usable Modules

Unit Macro / Scene Control Macro / Communication Command Macro / Calculate Unit Macro

## Supported Versions

Version 5.40, or more

## Related Items

MessageBox (Reference: ► Details (p.355))

RaiseErrorProcEvent (Reference: ► Details (p.384))

## ExecuteErrorProc

Executes an error processing.

### Format

**ExecuteErrorProc** <errorKind>, <parameter>

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <errorKind>    | Integer type | Error number to notify the error processing.<br>0: System error<br>1: System error (Fan or voltage error)<br>10: Camera connection error<br>11: Connected camera has been changed<br>12: Detection of camera over current<br>13: Configuration error of light device connection<br>20: Write error of image logging disk<br>30: Time out of parallel output<br>31: PLC link communication error<br>32: Detection of parallel I/O camera over current<br>40: Data load error<br>41: Data transfer error<br>42: Incorrect number of start-up Scene group<br>43: Incorrect number of start-up Scene |
| <parameter>    | Integer type | Error processing parameter to notify<br>This parameter is not used in this version. Therefore, specify to 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### Return value

None.

### Description

Notify a specified error is occurred to system.

Defining your original error number and its error processing to \*ErrorProc subroutine of unit macro, you can create your original error processing.

When you use original error number, specify after number 10000.

Type mismatch error is occurred when wrong data is specified as parameter. Illegal function call error is not occurred even if non-exist number, values, combination of data or values.

Overflow error will be occurred when you specify a value extends range; -2147483648 to 2147483647.

Syntax error is occurred when you specify wrong formatting; typographical error of macro function's name, no comma or no spaces.

### Usage Cautions

Do not write to \*MCRINIT.

## Example

Notifies an error to system when acquired character of OCR is 0, and defines the number of original error.  
Creates an error processing (error message) according to the number of its error.

---

```
Rem Force an error to be occurred when acquired character of OCR is 0 in Unit1.
■ Unit macro
GetUnitData 1, "characterNum0", NUM0&
SetGlobalData "NUM", NUM0&

■ Communication command macro1 (CMD0000)
Measure 1

GetGlobalData "NUM", NUM0&

If NUM0& = 0 Then
  ExecuteErrorProc 10000, 0
EndIf

■ A Communication command macro 2(CMD0001)
*ERRORPROC
Rem Defines an error automatically (10000).
If ERRORKIND& = 10000 Then
  MessageBox "ERROR"
  ErrorOut "", 10000
Else

Rem Normal error processing is executed when an error is occurred except number of error is 10000.
RaiseErrorProcEvent ERRORKIND&, 0, True
ErrorOut "", ERRORKIND&

EndIf
Return
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 5.40, or more

## Related Items

|                                                    |                                              |
|----------------------------------------------------|----------------------------------------------|
| ErrorOut (Reference: ▶ Details (p.243))            | GetGlobalData (Reference: ▶ Details (p.260)) |
| GetUnitData (Reference: ▶ Details (p.286))         | Measure (Reference: ▶ Details (p.346))       |
| RaiseErrorProcEvent (Reference: ▶ Details (p.384)) | SetGlobalData (Reference: ▶ Details (p.445)) |
| SetUnitData (Reference: ▶ Details (p.473))         |                                              |

## ExecutImageLogging

Executes image logging.

### Format

**ExecutImageLogging** <directory>, <header>

### Parameter

| Parameter name | Data type             | Description                                              |
|----------------|-----------------------|----------------------------------------------------------|
| <directory>    | Character string type | Subdirectory name that saves the logging images          |
| <header>       | Character string type | Header string added to the file name of the logged image |

### Return value

None.

### Description

Executes image logging and saves the logged images using the file name (composed from the header character string specified in the <header> parameter and a measurement identification) in the subdirectory specified in the <directory> parameter.

Logged images are saved in the destination folder specified in [System setting] - [Logging setting].

(Reference: ▶ *Setting Logging Conditions [Logging Setting]* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If a subdirectory name is specified in the <directory> parameter, the logged file is saved in a subdirectory created under the logged image files destination folder.

If any empty string "" is specified in the <directory> parameter, the subdirectory is not created.

Logged images are saved as a file with the file name composed of measurement identification number and logging file extension .ifz (i.e., YYYY-MM-DD\_HH-MM-SS-SSSS.ifz). If a header character string is specified in the <header> parameter, the specified character string is added to the saved file name. If an empty string "" is specified in the <header> parameter, no header character string is added to the file name.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If a character string longer than 63 characters is specified in the <directory> parameter, the 63-character string before the 64th character is used for the macro function processing. Characters after the 64th character will be discarded.

If a character string longer than 31 characters is specified in the <header> parameter, the 31-character string before the 32nd character is used for the macro function processing. Characters after the 32nd character will be discarded.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREPROC subroutine. If used in any other subroutines, an error will occur and the function will not be executed.

## Example

Uses the MEASUREPROC subroutine in the Unit Macro processing unit to save the logged images using the file names with a header "new\_" in the subdirectory named "Image" under the "E:\\" directory set as the logged files destination in the system settings.

---

```
*MEASUREPROC
```

```
Rem Execute image logging.  
ExecutImageLogging "Image", "new_"
```

```
Return
```

---

After the measurement, a file with file name "new\_2012-11-01\_13-11-25-0025.ifz" is saved under "E:\Image".

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

Str\$ (Reference: ▶ Details (p.490))

GetUnitData (Reference: ▶ Details (p.286))

Str2\$ (Reference: ▶ Details (p.492))

## ExitFzProcess

---

Terminate the Sensor Controller.

### Format

**ExitFzProcess**

### Parameter

None.

### Return value

None.

### Description

Terminate the FH process execution.

If this macro function macro is executed on the sensor controller, turn OFF the power to the sensor controller after the execution.

### Usage Cautions

- None.

### Example

After saving the data to the controller, terminates the controller.

---

```
Rem Carry out the 'Data save'.  
SaveData
```

```
Rem Terminate the Sensor Controller.  
ExitFzProcess
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

SaveData (Reference: ▶ Details (p.410))

SystemReset (Reference: ▶ Details (p.495))

## Exp

Gets the value of the exponential function of the base e natural logarithm.

### Format

**Exp(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                             |
|----------------|-----------------------------------------------------------------|-----------------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression to get the exponential value |

### Return value

Returns the calculated exponent (power) as a double precision real number value.

### Description

Calculates the exponent (power) of the base e natural logarithm of the expression specified in the <expression> parameter.

The Exp function is the inverse function of the Log function. The Exp function can be used to derive other mathematical functions, such as the hyperbolic sine function.

In the <expression> parameter, specify a value no greater than 21.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the values of the hyperbolic sine function and hyperbolic cosine function of the value TH&.

---

```
SINH& = (Exp(TH&) - Exp(-TH&)) / 2  
COSH& = (Exp(TH&) + Exp(-TH&)) / 2
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

Cos (Reference: ▶ Details (p.176))

Log (Reference: ▶ Details (p.343))

UnitData (Reference: ▶ Details (p.520))

GetUnitData (Reference: ▶ Details (p.286))

Sin (Reference: ▶ Details (p.484))

## Fcopy

Copies the file.

### Format

**Fcopy <srcPath>, <dstPath>**

### Parameter

| Parameter name | Data type             | Description                                     |
|----------------|-----------------------|-------------------------------------------------|
| <srcPath>      | Character string type | Absolute path of the original file to be copied |
| <dstPath>      | Character string type | Absolute path for the copy destination file     |

### Return value

None.

### Description

Copies the file of the file name specified in the <srcPath> parameter as file of the file name specified in the <dstPath> parameter.

In the <srcPath> parameter and the <dstPath> parameter, specify with the absolute path the copy source file and the file name of the copy destination file.

Overwrite if the copy destination file already exists. If it does not exist, create a new one.

In the following cases, the file cannot be copied.

- The original file to copy from does not exist.
- The destination directory does not exist.
- The external memory has not been inserted.
- There is insufficient free space on the external memory.

If only the directory name is specified in the <srcPath> parameter or the <dstPath> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- BMP(BFZ) file formats are not applied.

### Example

Copies a file named "1280-720.bmp" under the directory "E:\\" to the directory "F:\\"

---

```
Fcopy "E:\1280-720.bmp", "F:\1280-720.bmp"
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Dskf (Reference: ▶ Details (p.233))

Kill (Reference: ▶ Details (p.321))

Rmdir (Reference: ▶ Details (p.405))

IsFile (Reference: ▶ Details (p.311))

Mkdir (Reference: ▶ Details (p.358))

## Fix

Gets the integer of a value by rounding off digits to the right of the decimal point.

### Format

**Fix(<expression>)**

### Parameter

| Parameter name | Data type                              | Description                                    |
|----------------|----------------------------------------|------------------------------------------------|
| <expression>   | Double precision real number data type | Expression to truncate after the decimal point |

### Return value

Returns an integer value gotten by rounding off digits to the right of the decimal point.

### Description

Gets the integer value of the expression specified in the <expression> parameter by rounding off digits to the right of the decimal point.

If a negative value is specified in the <expression> parameter, the Fix function will return the least negative integer value greater than the specified negative value. This contrasts with the Int function that returns the greatest negative value that does not exceed the specified negative value. For example, Int(-7.2) returns -8 and Fix(-7.2) returns -7.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Changes the double precision real number value of a measurement result to an integer by rounding off digits to the right of the decimal point.

---

```
NUMBER1& = Fix(9.7)
NUMBER2& = Fix(-9.7)
NUMBER3& = Fix(-9.2)
```

---

The result is shown below.

---

```
NUMBER1& = 9
NUMBER2& = -9
NUMBER3& = -9
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Int (Reference: ▶ Details (p.309))

UnitData (Reference: ▶ Details (p.520))

GetUnitData (Reference: ▶ Details (p.286))

## For To Step Next

Repeats the statements between the For and Next statements.

### Format

```
For <variable> = <startValue> To <endValue>[ Step <increment>]  
<statement>  
Next[ <variable>]
```

### Parameter

| Parameter name | Data type    | Description                                                |
|----------------|--------------|------------------------------------------------------------|
| <variable>     | Integer type | Loop counter variable of repetition process                |
| <startValue>   | Integer type | Initial value of loop counter variable                     |
| <endValue>     | Integer type | Loop counter variable value that end up repetition process |
| <increment>    | Integer type | Increment of the loop counter variable                     |
| <statement>    | Integer type | Statement to be executed repeatedly                        |

### Return value

None.

### Description

Repeats the specified For block statement in the <statement> parameter until the loop counter variable specified in the <variable> parameter reaches the <endValue> parameter value. The loop counter value starts from the <startValue> parameter value. Every repeating process increments the loop counter value by the <increment> parameter value.

If the <increment> parameter is omitted, the every repeating process increments the loop counter variable value by one.

If the Exit For statement is used in the For block statement, the statement force stops the repeating operation immediately.

If the program process is jumped into or out of the For block statement using the Goto or Gosub function, the resulting operation may be unpredictable.

If neither the For statement nor the Next statement is used, either the "NEXT without FOR", "FOR without NEXT", or "EXIT without FOR" error will occur depending on the statement that is used.

If the Next statement is not followed by the For statement, the "NEXT without FOR" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Uses the \*MEASUREPROC subroutine in the Unit Macro processing unit to set the gotten the edge position X values with the edge position processing units (Processing Unit numbers 1 to 4) for the upper limits of measure X of the search processing units (Processing Unit numbers 6 to 9) respectively.

---

```
*MEASUREPROC

Dim POS#(3)

Rem Get the measurement result.
GetUnitData 1, 5, POS#(0)
GetUnitData 2, 5, POS#(1)
GetUnitData 3, 5, POS#(2)
GetUnitData 4, 5, POS#(3)

For NUM& = 0 To 3
  Rem Set the setting data
  SetUnitData NUM&+6, 136, POS#(NUM&)
Next

Return
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Do Loop While (Reference: ► Details (p.192))  
SetUnitData (Reference: ► Details (p.473))

GetUnitData (Reference: ► Details (p.286))

## GetAll

Gets the input states of all input terminals.

### Format

**GetAll(<iolident>)**

### Parameter

| Parameter name | Data type             | Description                                                                                                                |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------|
| <iolident>     | Character string type | Identification name of the communication module to be used (always "Parallelo") (Reference: ► List of I/O Modules (p.581)) |

### Return value

Returns the input states of all input terminals as integer values.

The input state of each input terminal is expressed as an integer value (OFF (0) or ON (1)) in each digit of a character string in binary notation.

In parallel I/O, integer values are returned expressing DI0 to DI7 in the 1st digit to the 8th digit.

Example: When DI0 to DI5 are ON and DI6 to DI7 are OFF

- Binary notation: 0011 1111
- Value of input states that can be gotten: 63

### Description

Gets the input states of all input terminals of the communication module specified in the <iolident> parameter. Normally "Parallelo" should be specified in the <iolident> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the communication command macro, gets the input state of DI in parallel I/O.

---

```
IOMODULE$ = "Parallelo"
```

```
Rem Get the input state.  
STATE& = GetAll(IOMODULE$)
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

BusyOut (Reference: ▶ Details (p.144))

JudgeOut (Reference: ▶ Details (p.319))

PutPort (Reference: ▶ Details (p.382))

GetPort (Reference: ▶ Details (p.272))

PutAll (Reference: ▶ Details (p.380))

RunOut (Reference: ▶ Details (p.406))

## GetGlobalData

---

Gets the global data.

### Format

**GetGlobalData** <dataIdent>, <data>

### Parameter

| Parameter name | Data type                                                                                   | Description                                   |
|----------------|---------------------------------------------------------------------------------------------|-----------------------------------------------|
| <dataIdent>    | Character string type                                                                       | Identification name of the global data to get |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Gotten data                                   |

### Return value

None.

### Description

Gets the value of the global data that has the identification name specified in the <dataIdent> parameter. The value of the gotten global data is converted to the specified variable type and stored in the <data> parameter.

If a character string that cannot be converted to a numerical value is gotten and an integer or double precision variable is specified for the <data> parameter, 0 is stored in the gotten data.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified in the <dataIdent> parameter, a "String too long" error will occur.

If a constant is specified for the <data> parameter, a "Syntax error" error will result.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the integer value set in the global data that has the identification name "ABC".

---

```
Rem Set the integer value 1 in the "ABC" global data value.
```

```
SetGlobalData "ABC", 1
```

```
Rem Get the value of the global data "ABC" and store in the integer variable DATA&.
```

```
GetGlobalData "ABC", DATA&
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

AddGlobalData (Reference: ▶ Details (p.127))

SetGlobalData (Reference: ▶ Details (p.445))

## GetImageSize

Gets the image size of the processing unit image.

### Format

**GetImageSize** <unitNo>, <measureImageNo>, <sizeX>, <sizeY>

### Parameter

| Parameter name   | Data type    | Description                                                                                                                                                 |
|------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>         | Integer type | Processing unit number (0 to (the number of registered processing units in the current scene minus one))                                                    |
| <measureImageNo> | Integer type | Image number of the current unit to be acquired (Reference: ► <i>List of Figure Numbers</i> (p.619). Reference: ► <i>List of Sub-Image Numbers</i> (p.626)) |
| <sizeX>          | Integer type | X size of the gotten image                                                                                                                                  |
| <sizeY>          | Integer type | Y size of the gotten image                                                                                                                                  |

### Return value

None.

### Description

Gets the size of the image data of the image number specified in the <measureImageNo> parameter, held by the processing unit specified in the <unitNo> parameter.

In <sizeX> parameter and <sizeY> parameter, specify variables to store the gotten image size.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

Use this macro function after executing the following procedures while the measurement image is displayed.

- Measure the image once, or more.
- Specify the image file and re-measure it.

### Example

Gets the size of the image of Image number 0 in Processing Unit number 2.

```
GetImageSize 2, 0, SIZEX&, SIZEY&
```

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

SaveMeasureImage (Reference: ▶ Details (p.413))    UnitNo (Reference: ▶ Details (p.531))  
Ut (Reference: ▶ Details (p.534))

## GetImageWindow

Get the state of the image window.

### Format

**[Scene Control Macro / Communication Command Macro]**

**GetImageWindow <windowNo>, <locationX>, <locationY>, <width>, <height>, <unitNo>, <subNo>, <magnification>, <originX>, <originY>, <update>, <visible>**

**[Unit Macro]**

**GetImageWindow <locationX>, <locationY>, <width>, <height>, <unitNo>, <subNo>, <magnification>, <originX>, <originY>, <update>, <visible>**

### Parameter

| Parameter name  | Data type                              | Description                                                                                                                                                                                                                                                                               |
|-----------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <windowNo>      | Integer type                           | Image window number to get the status                                                                                                                                                                                                                                                     |
| <locationX>     | Integer type                           | Upper left X coordinate value of the image window                                                                                                                                                                                                                                         |
| <locationY>     | Integer type                           | Upper left Y coordinate value of the image window                                                                                                                                                                                                                                         |
| <width>         | Integer type                           | Width of the image window                                                                                                                                                                                                                                                                 |
| <height>        | Integer type                           | Height of the image window                                                                                                                                                                                                                                                                |
| <unitNo>        | Integer type                           | Processing unit number of the target processing unit to display                                                                                                                                                                                                                           |
| <subNo>         | Integer type                           | Sub-image number of the target image to display                                                                                                                                                                                                                                           |
| <magnification> | Double precision real number data type | Display magnification                                                                                                                                                                                                                                                                     |
| <originX>       | Integer type                           | Upper left X coordinate of the image display relative to the upper left coordinate of the image window.                                                                                                                                                                                   |
| <originY>       | Integer type                           | Upper left Y coordinate of the image display relative to the upper left coordinate of the image window                                                                                                                                                                                    |
| <update>        | Integer type                           | Update timing of image window<br>0: Every measurement (Image mode Freeze)<br>1: Only when an overall judgement result is NG at the time of measurement (Last NG image).<br>2: Only when a target processing unit is NG at the time of measurement.<br>3: Always updated (through display) |
| <visible>       | Integer type                           | Setting of whether to display<br>0: Window invisible<br>1: Window visible                                                                                                                                                                                                                 |

### Return value

None.

## Description

Gets the state of the image window specified in the <windowNo> parameter. When this macro function is used with the unit macro, the state of the image window displayed using the MEASUREDISPI subroutine is set.

In the <locationX> parameter and <locationY> parameter, specify the variables that store the relative coordinate values from the upper left coordinates of the gotten image container window to the upper left coordinates of the image window.

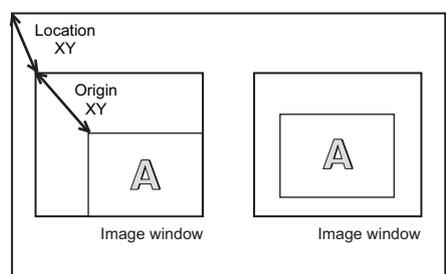
In the <width> parameter and <height> parameter, specify the variables that store the values of the gotten image window width and height.

In the <unitNo> parameter, specify the variable that stores the value of the gotten processing unit number that is displayed. When the processing unit displayed in the image window is linked to flow display, -1 is stored.

In the <subNo> parameter, specify the variable that stores the value of the gotten sub image number that is displayed. When the content displayed in the image window is the position list, -1 is stored.

In the <magnification> parameter, specify the variable that stores the value of the display zoom of the gotten image window. When the display zoom is auto, -1 is stored.

In the <originX> parameter and the <originY> parameter, specify the variables that store the values of the relative coordinates from the upper left coordinates of the gotten image window to the upper left coordinates of the displayed image.



Acquired image container window

In the <update> parameter, specify the variable that stores the value of the image mode of the gotten image window.

In the <visible> parameter, specify the variable that stores the value of the display state of the gotten image window.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- [Unit Macro]

This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

## Example

In the communication command macro, changes the image mode of image windows 0 to 3 to Through. Setting the BusyOn flag to ON in advance in the communication command macro.

---

For I& = 0 To 3

Rem Get the state of the image window.

GetImageWindow I&, LOCATIONX&, LOCATIONY&, WIDTH&, HEIGHT&, UNITNO&, SUBNO&,MAG#,  
ORIGINX&, ORIGINY&, UPDATE&, VISIBLE&

Rem Change the update timing to Through.

UPDATE& = 3

Rem Set the state of the image window.

SetImageWindow I&, LOCATIONX&, LOCATIONY&, WIDTH&, HEIGHT&, UNITNO&, SUBNO&,MAG#, ORIGINX&,  
ORIGINY&, UPDATE&, VISIBLE&,

Next

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DisplayUnitNo (Reference: ▶ Details (p.191))

SetDisplayUnitNo (Reference: ▶ Details (p.441))

UnitNo (Reference: ▶ Details (p.531))

GetTextWindow (Reference: ▶ Details (p.282))

SetImageWindow (Reference: ▶ Details (p.447))

Ut (Reference: ▶ Details (p.534))

## GetMeasureOut

Gets the external output setting for measurement results.

### Format

**GetMeasureOut**

### Parameter

None.

### Return value

Returns the external output setting as an integer value.

0: Not output externally

1: Output externally

### Description

Gets the "External output" setting in the layout settings as the external output setting for measurement results. (Reference: ► *Setting the Behavior of Output Signals for Each Layout (Layout Settings)* in the *Vision System FH/FHV Series User's Manual (Cat. No. Z365)*)

Even when the measurement result external output setting is 0, data can be output using the SendData function or SendString function in the macro customize function.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► *State Transitions and Execution Timing (p.72)*)

### Example

In the scene control macro, outputs the measurement results to an external device when "External Output" is ON, and outputs the measurement results to the system status console window when OFF.

---

```
Rem Get the read character string of the 2D code processing unit of Processing Unit number 3.
GetUnitData 3, "decodeCharStr", RESULT$
```

```
Rem Branch the processing based on the external output setting
If GetMeasureOut = 1 Then
```

```
    SendString "TcpNormal", RESULT$
```

```
Else
```

```
    Print RESULT$
```

```
Endif
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

SendData (Reference: ► *Details (p.437)*)

SendString (Reference: ► *Details (p.439)*)

SetMeasureOut (Reference: ► *Details (p.451)*)

## GetPlcData

Gets data read with the ReadPlcMemory function.

### Format

**GetPlcData <iolent>, <readData(>, <offset>, <size>, <data>**

### Parameter

| Parameter name | Data type                                                                                   | Description                                                                                          |
|----------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <iolent>       | Character string type                                                                       | Identification name of the communication module to be used (Reference: ►List of I/O Modules (p.581)) |
| <readData(>    | Integer array                                                                               | Loaded data                                                                                          |
| <offset>       | Integer type                                                                                | Offset from the top of the loaded data to the head of the loaded data to read in (byte unit)         |
| <size>         | Integer type                                                                                | Size of the data to get (byte unit)                                                                  |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Gotten data                                                                                          |

### Return value

None.

### Description

Using the communication module specified in the <iolent> parameter, the data size specified in the <size> parameter is gotten from the position that is offset by the value specified in the <offset> parameter from the start of the data array specified in the <readData> parameter.

Use this macro function to get the data after executing the ReadPlcMemory function to read the value in the PLC memory area.

In the <readData(> parameter, specify the 1D integer array variable that stores the data read with the ReadPlcMemory function. Add () without specifying element numbers.

In the <offset> parameter and <size> parameter, specify the offset and size in units of bytes. These units are different from the units specified in the ReadPlcMemory function (channel units).

Specify 2, 4, or 8 in the <size> parameter. These will respectively get a 2 byte integer, 4 byte integer, or 8 byte real number.

In the <data> parameter, specify the variable that will store the gotten data.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- If the value in the PLC memory area is read using the ReadPlcMemory function in PLC link communication, always use this macro function to get the value from the data that is read. If the value is directly gotten from the ReadPlcMemory function parameter without using this macro function, the correct value may not be gotten.

## Example

In the communication command macro, reads multiple data from the PLC connected by PLC link.

---

```
IOMODULE$ = "UdpPlcLink"

Rem Get the settings of the output data area.
GetSystemData IOMODULE$, "outputArea", AREA&
GetSystemData IOMODULE$, "outputMemoryAddress", ADDRESS&

Rem Create the integer array variable to store the read data.
Dim DATA&(1)

Rem Load the data (4ch) from data output area.
ReadPlcMemory IOMODULE$, AREA&, ADDRESS&, 4, DATA&()

Get the values from the read data.
GetPlcData IOMODULE$, DATA&(), 0, 4, VALUE0&
GetPlcData IOMODULE$, DATA&(), 4, 4, VALUE1&
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 4.20 or later

## Related Items

ReadPlcMemory (Reference: ▶ Details (p.387))

SetPlcData (Reference: ▶ Details (p.452))

WritePlcMemory (Reference: ▶ Details (p.548))

## GetPollingState

Gets the polling state of the communication module.

### Format

**GetPollingState(<iolident>)**

### Parameter

| Parameter name | Data type             | Description                                                                                                                |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------|
| <iolident>     | Character string type | Identification name of communication module whose polling state is to be gotten (Reference: ► List of I/O Modules (p.581)) |

### Return value

Returns the polling state as an integer value.

- False: Stopped
- True: Operating

### Description

Gets the polling state of the communication module specified in the <iolident> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Receives normal TCP communication data in the MEASUREPROC subroutine of the Unit Macro processing unit.

---

```
Rem Prepare a buffer that can receive 12 bytes of data.
```

```
Dim BUFFER&(11)
```

```
IOMODULE$ = "TcpNormal"
```

```
Rem Set the polling state of the communication module to stopped in order to receive the data.
```

```
SetPollingState IOMODULE$, False
```

```
Rem Executing the initialization of the reception data size.
```

```
SIZE& = 0
```

```
Repeat the reception process until the data has been received.
```

```
Try
```

```
Do
```

```
Rem Attempting the data reception.
ReceiveData IOMODULE$, BUFFER&(), 12, SIZE&

Rem Once the data has been received, display the data size in the system status console window.
If(SIZE& > 0) Then
    Print "Received data size = " + Str$(SIZE&)
Endif

Loop While SIZE& = 0

Rem Data has been received, so set the polling state of the communication module to running.
SetPollingState IOMODULE$, True

Catch

Rem Return the polling state of the stopped communication module to running.
If GetPollingState(IOMODULE$) = False Then
    SetPollingState IOMODULE$, True
Endif

End Try
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 4.20 or later

## Related Items

SendData (Reference: ▶ Details (p.437))

SetPollingState (Reference: ▶ Details (p.454))

SendString (Reference: ▶ Details (p.439))

ReceiveData (Reference: ▶ Details (p.389))

## GetPort

Gets the input state of the specified input terminal.

### Format

**GetPort(<iolident>, <portNo>)**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                                                               |
|----------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <iolident>     | Character string type | Identification name of the communication module to be used (always "Parallelo")<br>(Reference: ►List of I/O Modules (p.581))                                                                                              |
| <portNo>       | Integer type          | Terminal number of input terminal whose input state is to be gotten.<br>Parallel I/O<br>• FH<br>DI0 to DI7: 0 to 7<br>DSA N: 100 + N x 8 (N: Line number (0 to 7))<br>STEP N: 101+N x 8<br>DILINE0 to DILINE2: 200 to 202 |

### Return value

Returns the input state of the input terminal as an integer value.

- 0: Input OFF state
- 1: Input ON state

### Description

Gets the state of the input terminal of the terminal number specified in the <portNo> parameter of the communication module specified in the <iolident> parameter.

Normally "Parallelo" should be specified in the <iolident> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

In the communication command macro, gets the input state of DI7 of parallel I/O.

---

```
IOMODULE$ = "Parallelo"
```

```
Rem Get the input state.
```

```
STATE& = GetPort(IOMODULE$, 7)
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

BusyOut (Reference: ▶ Details (p.144))

JudgeOut (Reference: ▶ Details (p.319))

PutPort (Reference: ▶ Details (p.382))

GetPort (Reference: ▶ Details (p.272))

PutAll (Reference: ▶ Details (p.380))

RunOut (Reference: ▶ Details (p.406))

## GetSceneData

Gets data related to the scene control macro or scene variables.

### Format

**GetSceneData<dataIdent>,<data>**

### Parameter

| Parameter name | Data type                                                                                   | Description                              |
|----------------|---------------------------------------------------------------------------------------------|------------------------------------------|
| <dataIdent>    | Character string type                                                                       | Identification name of data to be gotten |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Gotten data                              |

### Return value

None.

### Description

In the <dataIdent> parameter, specify the variable name to be used in the scene control macro program or the scene variable name. The scene variable name is a character string following "SC." displayed on the scene variable registration screen of TDM editor.

Gets the data identified by the identification name specified in the <dataIdent> parameter.

In the <data> parameter, specify the variable that will store the gotten data.

If the data type of the data to be gotten is different from the data type of the variable specified in the <data> parameter, the gotten data will be converted to the data type of the <data> parameter.

If an identification name that does not exist is specified as the parameter, an "Illegal function call" error will occur.

Even if a combination of different data types is specified as parameters, an error will not occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))

### Example

Substitute the value for a scene variable to an arbitrary variable.

---

```
Rem When substituting the value stored in the SC.ABC& to TMP& with integer type.  
GetSceneData "ABC&", TMP&
```

```
Rem When substituting the value in the first array element in the SC_ASDF&() array variable of the scene variable  
Rem to TMP& with integer type.  
GetSceneData "ASDF&(0)", TMP&
```

---

Uses the unit macro to get the integer variables "SearchResult0&" and "SEARCHRESULT1&" defined in the communication command macro.

---

Rem Get the value of the variable that has been defined in the scene control macro.

GetSceneData "SEARCHRESULT0&", RET0&

GetSceneData "SEARCHRESULT1&", RET1&

Rem Calculate the result based on the gotten variable value

RESULTDATA& = (RET0& + RET1&) / 2

---

### Usable Modules

When applying to scene variables:

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

When applying to other than scene variables:

Communication Command Macro

### Supported Versions

Version 5.20 or later (For scene variables, Version 6.30 or later)

### Related Items

SetSceneData (Reference: ► Details (p.456))

## GetSystemData

Gets the system data or system variable.

### Format

**GetSystemData <dataIdent0>, <dataIdent1>, <data>**

### Parameter

| Parameter name | Data type                                                                       | Description                                                                          |
|----------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <dataIdent0>   | Character string type                                                           | Data identification name of identification information 0 of system data to be gotten |
| <dataIdent1>   | Character string type                                                           | Data identification name of identification information 1 of system data to be gotten |
| <data>         | Integer type<br>Double precision real number data type<br>Character string type | Value of the gotten system data                                                      |

### Return value

None.

### Description

When getting values of the system data:

Gets the system data of identification information 1 specified in the <dataIdent1> parameter, which belongs to identification information 0 specified in the <dataIdent0> parameter. In the <data> parameter, specify the variable that will hold the gotten system data. For the identification information list, refer to the system data list. (Reference: ►System Data List (p.561))

When getting values of system variables:

Set a character string for "macro\_sy" to <dataIdent0>, and the variable name following "SY." displayed on the system variable registration screen of TDM editor to <dataIdent1>. Specify a variable to store the value of the system variable gotten to the <data> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If an identification name that does not exist is specified as the parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified in the <dataIdent1> parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Substitute the value for a system variable in an arbitrary variable.

---

Rem When substituting the value stored in the SY.ABC& of the system variable to TMP& with integer type.

```
GetSystemData "macro_sy", "ABC&", TMP&
```

Rem When substituting the value of the first array element in the SY.ASDF&() of the system variable

Rem to TMP& with integer type.

```
GetSystemData "macro_sy", "ASDF&(0)", TMP&
```

---

Gets the value set for the screen capture destination folder of identification information 1, "captureDirectory", which belongs to the measurement control settings of identification information 0, "Measure", and copies the Sample.bmp file to "E:\temp\bmp".

---

Rem Get the screen capture destination folder that belongs to the measurement control settings.

```
GetSystemData "Measure", "captureDirectory", DIRNAME$
```

Rem Get the file name, including the copy destination path, of the file to be copied.

```
FILE$ = DIRNAME$ + "/Sample.bmp"
```

Rem Copy the file.

```
Fcopy FILE$, "E:\temp\bmp\Sample.bmp"
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later (For scene variables, Version 6.30 or later)

## Related Items

AddSystemData (Reference: ▶ Details (p.129))

GetGlobalData (Reference: ▶ Details (p.260))

SetSystemData (Reference: ▶ Details (p.467))

Fcopy (Reference: ▶ Details (p.252))

GetUnitData (Reference: ▶ Details (p.286))

## GetText\$

Get a text data from a messages file.

### Format

**GetText\$(#<textDataNo>, <textIdnt>)**

### Parameter

| Parameter name | Data type             | Description                                                                   |
|----------------|-----------------------|-------------------------------------------------------------------------------|
| <textDataNo>   | Integer type          | Text data number of the messages file (0 to 15) that contains the gotten text |
| <textIdnt>     | Character string type | Identification name of the text data to be gotten                             |

### Return value

Returns an gotten text data value in character string type.

### Description

Message file defines the displayed messages.

The message file is configured one file for each languages.

The message file name is configured as the below.

<Message file Data ident>\_<Language Data ident>.msg

<Message file Data ident> indicates an ident specified <ident> in OpenTextData function.

<Language Data ident> is a character string.

Each languages and its Data ident are as the following:

- Simplified Chinese: chs
- Traditional Chinese: cht
- German: deu
- English: eng
- Spanish: esp
- French: fra
- Italian: ita
- Japanese: jpn
- Korean: kor

A Data ident specified <textIdnt> for each lines and a text data which is corresponded to <textIdnt>.

<Data ident 1>=<Text data 1>

<Data ident 2>=<Text data 2>

<Data ident 3>=<Text data 3>

•

•

<Data ident n>=<Text data n>

Acquires the specified text data in <textIdnt> parameter from the message file of the text data No. which is specified in <textDataNo> parameter.

Get the text data of the identification name specified in the <textIdnt> parameter, from the message file of the text data number specified in the <textDataNo> parameter.

In the <textDataNo> parameter, specify the specified text data number in the OpenTextData function that has been used to open the message file.

If a value outside the range from 0 to 15 is specified in the <textDataNo> parameter, an "Illegal function call" error will occur.

If the text data number that has not been opened is specified in the <textDataNo> parameter, an "Illegal function call" error will occur.

Even if an identification name that does not exist is specified in the <textIdnt> parameter, an error will not occur. If an identification name that does not exist is specified for a parameter, a text string of "#ERROR" will be returned.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Uses the \*MEASUREDISPT subroutine of the Unit Macro processing unit to display the measured correlation value by the search processing unit (Processing Unit number 5), along with the gotten text string from the prepared message file for the processing unit, in the text window. The correlation value can be gotten with External Reference Data number 5.

---

```
*MEASUREDISPT
```

```
Rem Get the measurement result.  
GetUnitData 5, 5, CR#
```

```
Rem Open the messages file  
OpenTextData "Search" As #1
```

```
Rem Get the text  
TEXT$ = GetText$(#1, "Correlation")
```

```
Rem Draw the gotten text string from the messages file without adding any line break on the text window.  
DrawText TEXT$, UnitJudge(5), 0
```

```
Rem Draw the measurement results on the text window.  
DrawText Str2$(CR#, 4, 4, 0, 0), UnitJudge(5), 1
```

```
Rem Close up the messages file.  
CloseTextData
```

```
Return
```

---

The result is shown below.

---

```
Correlation value: 90.0000
```

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 5.00 or later

## Related Items

CloseTextData (Reference: ▶ Details (p.159))

GetUnitData (Reference: ▶ Details (p.286))

UnitJudge (Reference: ▶ Details (p.530))

DrawText (Reference: ▶ Details (p.227))

OpenTextData (Reference: ▶ Details (p.368))

## Option Explicit

Finds undefined or duplicate variable that is defined in the Dim variable format.

### Format

**Option Explicit**

### Parameter

None.

### Return value

None.

### Description

When you execute the Option Explicit command, only defined variables will be available to use, and duplicate of the defined variables will be checked.

### Precautions for Correct Use

- When you execute the Option Explicit command, the Macro Variable Check function will be effective for lines after the line where the Option Explicit command is executed. Undefined and duplicates of variables in preceding lines will not be checked. In other word, they are not the subject to the [Un-defined variable] error or [Duplicated variable] error.
- The Option Explicit command is unavailable when the power is on or when macros are loaded. It is available from the time a macro and the Option Explicit command are both executed until the next macro is loaded or the power is turned off.

### Example

Option Explicit can be used to check macro variables.

---

```
Option Explicit
Rem Definition of variable by the Dim variable
Dim A&
Dim B&
Dim C&
A& = 0
B& = 1
C& = A& + B&
Print Str$(C&)
```

---

### Supported modules

Unit Macro, Communication Command Macro, Scene Control Macro

### Supported version of the FH Sensor Controller

Version 5.40 or later

### Related Items

Dim (Reference: ▶ Details (p.187))

ReDim (Reference: ▶ Details (p.391))

VarList (Reference: ▶ Details (p.537))

## GetTextWindow

Gets the state of the text window.

### Format

**GetTextWindow** <unitNo>, <subNo>, <update>, <visible>

### Parameter

| Parameter name | Data type    | Description                                                               |
|----------------|--------------|---------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number of the target processing unit to display           |
| <subNo>        | Integer type | Sub number of the target image to display                                 |
| <update>       | Integer type | Updated timing (always 0)                                                 |
| <visible>      | Integer type | Setting of whether to display<br>0: Window invisible<br>1: Window visible |

### Return value

None.

### Description

Gets the state of the text window.

In the <unitNo> parameter, specify the variable that stores the value of the gotten processing unit number that is displayed. When the processing unit displayed in the text window is linked to flow display, -1 is stored. In the <subNo> parameter, specify the variable that stores the value of the gotten sub image number that is displayed.

In the <update> parameter, specify the variable that stores the value of the gotten update timing.

In the <visible> parameter, specify the variable that stores the display state of the gotten text window.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the communication command macro, changes the processing unit number of the processing unit displayed in the text display window to the number specified in the communication command argument.

---

```
Rem Get the state of the text window.  
GetTextWindow UNITNO&, SUBNO&, UPDATE&, VISIBLE&
```

```
Rem Set the number specified in the command argument in the processing unit number that is displayed.  
SetTextWindow argumentValue#(0), SUBNO&, UPDATE&, VISIBLE&
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DisplayUnitNo (Reference: ▶ Details (p.191))

SetDisplayUnitNo (Reference: ▶ Details (p.441))

UnitNo (Reference: ▶ Details (p.531))

GetImageWindow (Reference: ▶ Details (p.264))

SetTextWindow (Reference: ▶ Details (p.471))

Ut (Reference: ▶ Details (p.534))

## GetUnitData

Gets the data of a processing unit.

### Format

**GetUnitData** <unitNo>, <dataNo>, <data>

**GetUnitData** <unitNo>, <dataIdent>, <data>

### Parameter

| Parameter name | Data type                                                                                   | Description                                                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type                                                                                | Processing unit number (0 to (the number of registered processing units in the current scene minus one))                                                        |
| <dataNo>       | Integer type                                                                                | External reference data of the processing unit data to get (reference: ► Vision System FH/FHV Series Processing Item Function Reference Manual (Cat. No. Z341)) |
| <dataIdent>    | Character string type                                                                       | Data identification name of processing unit data to be gotten.                                                                                                  |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Gotten processing unit data                                                                                                                                     |

### Return value

None.

### Description

Gets the data of the external reference data number specified in the <dataNo> parameter, held by the processing unit specified in the <unitNo> parameter. In the <data> parameter, specify the variable that will store the gotten data.

The data can also be gotten by specifying the <dataIdent> parameter instead of the <dataNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the judgement result of the processing unit of Processing Unit number 2. The judgement result is external reference data number 0 and external reference data identification name "JG".

---

```
GetUnitData 2, 0, JUDGE&
```

Rem The same result can be gotten by specifying "JG" instead of 0.

```
GetUnitData 2, "JG", JUDGE&
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitFigure (Reference: ▶ Details (p.288))

SetUnitFigure (Reference: ▶ Details (p.475))

UnitData\$ (Reference: ▶ Details (p.522))

UnitNo (Reference: ▶ Details (p.531))

SetUnitData (Reference: ▶ Details (p.473))

UnitData (Reference: ▶ Details (p.520))

UnitData2 (Reference: ▶ Details (p.524))

Ut (Reference: ▶ Details (p.534))

## GetUnitData

Gets the data of a processing unit.

### Format

**GetUnitData** <unitNo>, <dataNo>, <data>

**GetUnitData** <unitNo>, <dataIdent>, <data>

### Parameter

| Parameter name | Data type                                                                                   | Description                                                                                                                                                    |
|----------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type                                                                                | Processing unit number (0 to (the number of registered processing units in the current scene minus one))                                                       |
| <dataNo>       | Integer type                                                                                | External reference data of the processing unit data to get (reference: ►Vision System FH/FZ5 Series Processing Item Function Reference Manual (Cat. No. Z341)) |
| <dataIdent>    | Character string type                                                                       | Data identification name of processing unit data to be gotten.                                                                                                 |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Gotten processing unit data                                                                                                                                    |

### Return value

None.

### Description

Gets the data of the external reference data number specified in the <dataNo> parameter, held by the processing unit specified in the <unitNo> parameter. In the <data> parameter, specify the variable that will store the gotten data.

The data can also be gotten by specifying the <dataIdent> parameter instead of the <dataNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the judgement result of the processing unit of Processing Unit number 2. The judgement result is external reference data number 0 and external reference data identification name "JG".

---

```
GetUnitData 2, 0, JUDGE&
```

Rem The same result can be gotten by specifying "JG" instead of 0.

```
GetUnitData 2, "JG", JUDGE&
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitFigure (Reference: ▶ Details (p.288))

SetUnitFigure (Reference: ▶ Details (p.475))

UnitData\$ (Reference: ▶ Details (p.522))

UnitNo (Reference: ▶ Details (p.531))

SetUnitData (Reference: ▶ Details (p.473))

UnitData (Reference: ▶ Details (p.520))

UnitData2 (Reference: ▶ Details (p.524))

Ut (Reference: ▶ Details (p.534))

## GetUnitFigure

Gets figure data to the processing unit.

### Format

**GetUnitFigure <unitNo>, <figureNo>, <figure()>**

### Parameter

| Parameter name | Data type     | Description                                                                                              |
|----------------|---------------|----------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type  | Processing unit number (0 to (the number of registered processing units in the current scene minus one)) |
| <figureNo>     | Integer type  | Figure data to get (Reference: ► List of Figure Numbers (p.619))                                         |
| <figure()>     | Integer array | Gotten figure data (Reference: ► Figure Data List (p.617))                                               |

### Return value

None.

### Description

Gets the figure data of the figure specified in the <figureNo> parameter, of the processing unit specified in the <unitNo> parameter.

In the <figure()> parameter, specify the 1D integer array variable that will hold the figure data by adding only () without specifying an element number.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Changes the value of wide arc line thickness if the figure of the edge processing unit of Processing Unit number 2 is a wide arc

---

```
Dim FIGURE&(10)

Rem Get the figure data of the processing unit.
GetUnitFigure 2, 0, FIGURE&()

Rem Case of width of the wide arc.
If FIGURE&(1) = 256 Then
    Rem Set the thickness value
    FIGURE&(7) = 64
    SetUnitFigure 2, 0, FIGURE&()
Endif
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitFigure (Reference: ▶ Details (p.288))

SetUnitFigure (Reference: ▶ Details (p.475))

UnitNo (Reference: ▶ Details (p.531))

SetUnitData (Reference: ▶ Details (p.473))

UnitData (Reference: ▶ Details (p.520))

Ut (Reference: ▶ Details (p.534))

## Gosub

Operate the specified subroutine.

### Format

**Gosub <label>**

### Parameter

| Parameter name | Data type             | Description                             |
|----------------|-----------------------|-----------------------------------------|
| <label>        | Character string type | Label name for the executing subroutine |

### Return value

None.

### Description

Execute the subroutine whose label name is specified in the <label> parameter.

At the Return statement in the end of a subroutine, the program resumes the operation from the next statement of the Gosub statement in the calling subroutine.

If the Return statement will not resume the operation in the original subroutine, use the Goto function.

If the specified label does not exist for a parameter, an "Undefined label" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Uses the \*MCRINIT subroutine in the Unit Macro processing unit to execute the process in the \*INITPROC subroutine (defined separately from \*MCRINIT).

---

```
*MCRINIT
```

```
    Rem Execute another subroutine  
    Gosub *INITPROC
```

```
Return
```

```
*INITPROC
```

```
    Dim DATA$(255)
```

```
Return
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Goto (Reference: [▶ Details \(p.292\)](#))

## Goto

Move the process to the statement line with a specified label.

### Format

**Goto <label>**

### Parameter

| Parameter name | Data type                                | Description                                                 |
|----------------|------------------------------------------|-------------------------------------------------------------|
| <label>        | Integer type<br>Character<br>string type | Move destination line number or move destination label name |

### Return value

None.

### Description

Move the process to the specified line number or label name in the <label> parameter.

To return to the calling subroutine where the Return statement is used, use the Gosub function.

If the specified label does not exist for a parameter, an "Undefined label" error will occur.

If the specified line number does not exist for a parameter, an "Undefined line number" error will occur.

If the specified data type in the parameter is incorrect, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Uses the \*MEASUREPROC subroutine in the Unit Macro processing unit to move the programming process to the \*PROC2 labeled line and output the text string to the system status console window. If the first Goto statement is rewritten to jump the process to the \*PROC1 labeled line or the \*PROC3 labeled line, the process ends without taking any action. Similarly, if the first Goto statement is skipped, the process moves to the \*PROC3 labeled line and the process ends without taking any action.

---

```
*MEASUREPROC
```

```
Rem Move the process to another line  
Goto *PROC2
```

```
*PROC1  
Goto *PROC3
```

```
*PROC2  
Print "PROC1"
```

```
*PROC3
```

```
Return
```

---

**Usable Modules**

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

**Supported Versions**

Version 3.50 or later

**Related Items**

Gosub (Reference: ▶ Details (p.290))

## Hex\$

Converts the value in the expression to the hexadecimal value in character string format.

### Format

Hex\$(<expression>)

### Parameter

| Parameter name | Data type    | Description                                      |
|----------------|--------------|--------------------------------------------------|
| <expression>   | Integer type | Expression to be converted to a character string |

### Return value

Returns the character string type hexadecimal value.

If the value in the expression is negative, the two's complement hexadecimal value is returned.

(&H) to express a hexadecimal number is not added to the return value.

### Description

Converts the value specified in the <expression> parameter to the hexadecimal value in character string format.

To specify a double precision real number type expression in the <expression> parameter, convert the expression to the integer type with Fix or Int in advance.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Gets the read letter "A" with the OCR processing unit (Processing Unit number 5) using the unit calculation macro processing unit and converts the letter into a hexadecimal value. The read character string can be gotten with External Reference Data number 20

---

Rem Get the measurement result of the processing unit.  
GetUnitData 5, 20, CHARA1\$

Rem Convert the character to the character code.  
CODE& = Asc(CHARA1\$)

Rem Convert the character code to the hexadecimal value in character string format.  
CHARA2\$ = Hex\$(CODE&)

---

The result is shown below.

---

CHARA1\$ = "A"  
CODE& = 65  
CHARA2\$ = 41

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: ▶ Details (p.138))

GetUnitData (Reference: ▶ Details (p.286))

Left\$ (Reference: ▶ Details (p.325))

Mid\$ (Reference: ▶ Details (p.356))

Right\$ (Reference: ▶ Details (p.403))

Str2\$ (Reference: ▶ Details (p.492))

Val (Reference: ▶ Details (p.535))

Chr\$ (Reference: ▶ Details (p.152))

LCase\$ (Reference: ▶ Details (p.323))

Len (Reference: ▶ Details (p.327))

Piece\$ (Reference: ▶ Details (p.374))

Str\$ (Reference: ▶ Details (p.490))

UCase\$ (Reference: ▶ Details (p.517))

## If Then Else

Controls the process flow according to the specified condition.

### Format

If <expression> Then <statement>|<label>[ Else <statement>|<label>]

### Parameter

| Parameter name | Data type             | Description                                                                       |
|----------------|-----------------------|-----------------------------------------------------------------------------------|
| <expression>   | ---                   | Logical expression that controls the process flow. (Reference: ► Operator (p.55)) |
| <statement>    | ---                   | Processed statement                                                               |
| <label>        | Character string type | Label name for the jump destination                                               |

### Return value

None.

### Description

If the specified condition by the <expression> parameter is true, the specified If block statement by the <statement> parameter is executed. If a label name is specified in the "Then" part statement, the process is jumped to the line with a label name specified in the <label> parameter. If the condition specified in the <expression> parameter is false, the specified Else block with the <statement> parameter in the "Else" part statement is executed. In the similar way as the "Then" part, if a label name is specified in the "Else" part statement, the process is jumped to the line with a label name specified in the <label> parameter. If the "Else" part statement is omitted, the process flow is controlled only when the specified condition by the <expression> parameter is true.

The Else statement line cannot be broken into multiple parts. Write the If-Else statement in a single line.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Uses the \*MEASUREPROC subroutine in the Unit Macro processing unit to branch the processing depending on the gotten judgement result by the Processing Unit number 0.

---

```
*MEASUREPROC
```

```
    If UnitJudge(0)=JUDGE_OK Then Gosub *OKOUT Else Gosub *NGOUT
```

```
Return
```

```
*OKOUT
```

```
    Print "OK"
```

```
Return
```

```
*NGOUT
```

```
    Print "NG"
```

```
Return
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Gosub (Reference: ▶ Details (p.290))

If Then Elseif Else EndIf (Reference: ▶ Details (p.298))

Print (Reference: ▶ Details (p.376))

UnitJudge (Reference: ▶ Details (p.530))

Select Case Case Else End Select

(Reference: ▶ Details (p.435))

## If Then Elseif Else EndIf

Controls the process flow according to the specified condition.

### Format

```
If <expression> Then
<ifStatement>
[Elseif <expression> Then
<elseifStatement>]
:
:
[Else
<elseStatement>]
EndIf
```

### Parameter

| Parameter name    | Data type | Description                                                                               |
|-------------------|-----------|-------------------------------------------------------------------------------------------|
| <expression>      | ---       | Logical expression that controls the process flow. (Reference: ► Operator (p.55))         |
| <ifStatement>     | ---       | Executed statement if the following logical expression after the If statement is true     |
| <elseifStatement> | ---       | Executed statement if the following logical expression after the Elseif statement is true |
| <elseStatement>   | ---       | Executed statement if all logical expressions in the statement are false.                 |

### Return value

None.

### Description

If the logical expression specified in the <expression> parameter is true, the specified statement by the <statement> parameter in the If block or multiple of Elseif blocks is executed.

If the logical expression specified in the <expression> parameter in the "If" part statement is true, the If block statement specified in the <ifStatement> parameter is executed.

If the logical expression specified in the <expression> parameter in the "If" part statement is false, and the logical expression specified in the <expression> parameter in the "Elseif" part statement is true, the Elseif block statement specified in the <elseifStatement> parameter is executed.

If all logical expressions specified in the <expression> parameter are false, the specified Else block statement by the <elseStatement> parameter is executed.

If there are multiple of If, Elseif, and Else statements having a true logical expression within the statement, only the first statement from the beginning of the block statement having a true logical expression is executed.

Elseif block statements and Else block statement are optional.

If the program process is jumped into or out of the Do block statement using the Goto function in a statement, unexpected operation may occur.

If neither the If statement nor the EndIf statement is used, either the "ELSEIF without IF", "ELSE without IF", "ENDIF without IF", "IF without ENDIF", "ELSEIF without ENDIF", or "ELSE without ENDIF" error will occur depending on the statement that is used.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- None.

## Example

Uses the \*MEASUREDISPG subroutine in the Unit Macro processing unit to output the measured correlation value with the search processing unit (Processing Unit number 1) to the system status console window.

---

```
*MEASUREDISPT

Rem Get the measurement result.
GetUnitData 1, 5, RESULT&

Rem Branch the process according the measured value
If RESULT&>=80 Then
    DrawTextG "Excellent", 100, 100, 0
Elseif RESULT&>=60 Then
    DrawTextG "Good", 100, 100, 0
Else
    DrawTextG "Bad", 100, 100, 0
EndIf

Return
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawTextG (Reference: ▶ Details (p.229))  
If Then Else (Reference: ▶ Details (p.296))  
Select Case Case Else End Select  
(Reference: ▶ Details (p.435))

GetUnitData (Reference: ▶ Details (p.286))

## ImageFormat

Gets the image format of the image in the processing unit.

### Format

**ImageFormat(<unitNo>, <measureImageNo>)**

### Parameter

| Parameter name   | Data type    | Description                                                                                              |
|------------------|--------------|----------------------------------------------------------------------------------------------------------|
| <unitNo>         | Integer type | Processing unit number (0 to (the number of registered processing units in the current scene minus one)) |
| <measureImageNo> | Integer type | Measurement image number of image format to be gotten (always 0)                                         |

### Return value

Returns the image format as an integer value.

- 0: Binary image
- 1: Monochrome image
- 2: Color image
- -1: Invalid image

### Description

Gets the format of the image of the image number specified in the <measureImageNo> parameter, of the processing unit specified in the <unitNo> parameter.

Normally 0 should be specified in the <measureImageNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

In the \*MEASUREDISPT subroutine of the unit macro, displays the character string corresponding to the image format in the text window.

---

```
*MEASUREDISPT

Rem Get the judgement result of the processing unit.
JUDGE& = UnitJudge(UnitNo)

Rem Get the image format.
FORMAT& = ImageFormat(UnitNo, 0)

If FORMAT& = 2 Then
    Rem If the format is a color image, display "Color".
    DrawText "Color", JUDGE&, 1

Elseif FORMAT& = 1 Then
    Rem If the format is a monochrome image, display "Monochrome".
    DrawText "Monochrome", JUDGE&, 1

EndIf
Return
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawText (Reference: ▶ Details (p.227))  
UnitNo (Reference: ▶ Details (p.531))

UnitJudge (Reference: ▶ Details (p.530))  
Ut (Reference: ▶ Details (p.534))

## ImageUpdate

---

Updates the image input from the camera.

### Format

ImageUpdate

### Parameter

None.

### Return value

None.

### Description

Updates the images of processing units related to image input in the measurement flow and processing units related to image conversion to the image that uses the most recent image from the camera.

### Usage Cautions

- None.

### Example

In the communication command macro, updates an image displayed in "Camera Image Freeze" image mode to the most recent image.

---

Rem Update the freeze image to the most recent image.  
ImageUpdate

Rem Apply the updated image to the display in the image window.  
RefreshImageWindow

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

GetImageWindow (Reference: ▶ Details (p.264))  
SetImageWindow (Reference: ▶ Details (p.447))

RefreshImageWindow (Reference: ▶ Details (p.392))

## Input#

Reads data from the file.

### Format

**Input#** <fileNo>, <data>[, <data>...]

### Parameter

| Parameter name | Data type                                                                                            | Description                |
|----------------|------------------------------------------------------------------------------------------------------|----------------------------|
| <fileNo>       | Integer type                                                                                         | Read file number (0 to 15) |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type<br>Array | Loaded data                |

### Return value

None.

### Description

Reads the comma separated data in a separated line by a line break code within the specified file number by the <fileNo> parameter.

Specify the variable to store the read data in the <data> parameter.

The value of the read global data is converted to the specified variable type and stored in the <data> parameter. If a character string that cannot be converted to a numerical value is read and an integer or double precision variable is specified for the <data> parameter, 0 is stored in the read data.

If the read data contains a double quoted character string, the double quotation marks (") are also read as characters.

If an unopened file number is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a file number of the opened file by a macro function other than the Open For Input As# function is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If the number of variables specified in the <data> parameter and the number of data to be read do not match, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Reads the data until the end of the file.

---

```
Dim ALLDATA$(255)

Rem Open the file
Open "E:\input.dat" For Input As #1

For I&=0 to 255

    Rem Read line by line from the top of the file
    Input #1, DATA$
    ALLDATA$(I&) = DATA$

    Rem Check if the end of the file is reached
    If Eof(1) <> 0 Then
        Exit For
    Endif

Next

Rem Close up the file.
Close #1
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Close (Reference: ► Details (p.157))

Input\$ (Reference: ► Details (p.305))

Open For Input As# (Reference: ► Details (p.364))

Eof (Reference: ► Details (p.236))

Line Input# (Reference: ► Details (p.329))

## Input\$

Reads binary data from the file.

### Format

**Input\$(<length>[, #<fileNo>])**

### Parameter

| Parameter name | Data type    | Description                          |
|----------------|--------------|--------------------------------------|
| <length>       | Integer type | Bytes number (0 to 255) of read data |
| <fileNo>       | Integer type | Read file number (0 to 15)           |

### Return value

Returns the read binary data value in the character string format.

### Description

Reads specified size of binary data whose read size is specified in the <length> parameter from the file with the specified file number in the <fileNo> parameter.

If a larger byte number than 255 is specified in the <length> parameter, the 255 byte data from the beginning is read.

If a less byte number is specified in the <length> parameter than the byte number of data in the file to be read, only the specified integer number of data is read. Unread data after the specified read range is read next time the Input\$ function is executed.

If the read data contains a double quoted character string, the double quotation marks (") are also read as characters.

If a larger value than the byte number of all read data is specified in the <length> parameter, an "Illegal function call" error will occur.

If an unopened file number is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a file number of the opened file by a macro function other than the Open For Input As# function is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Reads 6 bytes of binary data from the file

---

```
Rem Open the file  
Open "E:\input.dat" For Input As #1
```

```
Rem Read 6 bytes of data from the file.  
DATA$ = Input$(6, #1)
```

```
Rem Close up the file.  
Close #1
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Close (Reference: ▶ Details (p.157))

Line Input# (Reference: ▶ Details (p.329))

Input\$ (Reference: ▶ Details (p.305))

Open For Input As# (Reference: ▶ Details (p.364))

## InsertUnit

Inserts a processing unit.

### Format

**InsertUnit <unitNo>, <itemIdent>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                        |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type          | Processing unit number on the measurement flow to insert the processing unit (0 to the number of registered processing units in the current scene) |
| <itemIdent>    | Character string type | Identification name of the processing item to insert the processing unit                                                                           |

### Return value

None.

### Description

Registers the processing item with the identification name specified in the <itemIdent> parameter as a processing unit in the position in the measurement flow specified in the <unitNo> parameter.

The processing unit numbers of processing units after the processing unit number specified in the <unitNo> parameter are moved down by 1.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If an identification name that does not exist is specified as the <itemIdent> parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))

### Example

Inserts the search processing unit between Processing Unit number 2 and Processing Unit number 3.

---

```
InsertUnit 3, "Search"
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

## Related Items

AssignUnit (Reference: ▶ Details (p.140))

CopyUnit (Reference: ▶ Details (p.168))

MeasureStart (Reference: ▶ Details (p.351))

MoveUnit (Reference: ▶ Details (p.360))

CheckUnit (Reference: ▶ Details (p.150))

DeleteUnit (Reference: ▶ Details (p.186))

MeasureStop (Reference: ▶ Details (p.353))

UnitCount (Reference: ▶ Details (p.519))

## Int

Converts numeric value to integer value.

### Format

**Int(<expression>)**

### Parameter

| Parameter name | Data type                              | Description                         |
|----------------|----------------------------------------|-------------------------------------|
| <expression>   | Double precision real number data type | Expression to get the integer value |

### Return value

Returns an integer value.

### Description

Rounds off digits to the right of the decimal point in the expression specified in the <expression> parameter, and converts the value to the maximum integer value that does not exceed the value of the specified expression.

If a negative value is specified in the <expression> parameter, the Int function will return the greatest negative value that does not exceed the specified negative value. This contrasts with the Fix function that returns the least negative integer value greater than the specified negative value. For example, Fix(-7.2) returns -7 and Int(-7.2) returns -8.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Changes the double precision real number value of a measurement result to an integer by rounding off digits to the right of the decimal point.

---

```
NUMBER1& = Int(9.7)
NUMBER2& = Int(-9.7)
NUMBER3& = Int(-9.2)
```

---

The result is shown below.

---

```
NUMBER1& = 9
NUMBER2& = -10
NUMBER3& = -10
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Fix (Reference: ▶ Details (p.254))

UnitData (Reference: ▶ Details (p.520))

GetUnitData (Reference: ▶ Details (p.286))

## Isfile

Checks the attribute and the existence of the file.

### Format

**Isfile(<fileName>)**

### Parameter

| Parameter name | Data type             | Description                             |
|----------------|-----------------------|-----------------------------------------|
| <fileName>     | Character string type | Absolute path of the file to be checked |

### Return value

Returns integer values representing the attribute and the existence of the file.

- 0: There is no file
- 1: File attribute is "file"
- 2: File attribute is "directory"

### Description

Checks the attribute and the existence of the file specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be checked.

If the file in the external memory is specified in the <fileName> parameter without the external memory being inserted to the sensor controller, "0" (There is no file) is returned.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a character string longer than 255 characters is specified for a character string parameter, an error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Checks if the file exists before opening it.

---

```
Rem Check the file existence
If Isfile("E:\input.dat") <> 1 Then
```

```
    Print "There is no file"
```

```
Endif
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

Dskf (Reference: ▶ Details (p.233))

Fcopy (Reference: ▶ Details (p.252))

GetSystemData (Reference: ▶ Details (p.276))

Kill (Reference: ▶ Details (p.321))

Open For Append As# (Reference: ▶ Details (p.362))

Open For Input As# (Reference: ▶ Details (p.364))

Open For Output As# (Reference: ▶ Details (p.366))

Print (Reference: ▶ Details (p.376))

## ItemCount

Gets the number of usable processing item types.

### Format

**ItemCount**

### Parameter

None.

### Return value

Returns the number of usable processing item types as an integer value.

### Description

Gets the number of processing item types that can be used on the sensor controller.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the number of processing item types, and by repeated processing, searches for search processing items and gets the processing item type of each search processing item.

---

```
Rem Get the number of the available processing items.
INUM& = ItemCount
```

```
Rem Search for search processing items a number of times equal to the number of processing items
For I&=0 To INUM&-1
```

```
  If ItemIdent$(I&) = "Search" Then
```

```
    Rem Get the processing item type of the search processing item
```

```
    FIGNAME& = ItemInfo(I&, 0)
```

```
  Endif
```

```
Next
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ItemIdent\$ (Reference: ▶ Details (p.314))

ItemTitle\$ (Reference: ▶ Details (p.318))

ItemInfo (Reference: ▶ Details (p.316))

## ItemIdent\$

Gets the identification name of the processing item.

### Format

**ItemIdent\$(<itemNo>)**

### Parameter

| Parameter name | Data type    | Description                                                                  |
|----------------|--------------|------------------------------------------------------------------------------|
| <itemNo>       | Integer type | Processing item number to get the identification name of the processing item |

### Return value

Returns the value of the processing item identification name as a character string.

### Description

Gets the identification name of the processing item with the processing item number specified in the <itemNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the number of processing item types, and by repeated processing, searches for search processing items and gets the processing item type of each search processing item.

---

```
Rem Get the number of the available processing items.  
INUM& = ItemCount
```

```
Rem Search for search processing items a number of times equal to the number of processing items  
For I&=0 To INUM&-1
```

```
  If ItemIdent$(I&) = "Search" Then
```

```
    Rem Get the processing item type of the search processing item  
    FIGNAME& = ItemInfo(I&, 0)
```

```
  Endif
```

```
Next
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

ItemCount (Reference: ▶ Details (p.313))

ItemTitle\$ (Reference: ▶ Details (p.318))

ItemInfo (Reference: ▶ Details (p.316))

## ItemInfo

Gets the processing item information.

### Format

**ItemInfo(<itemNo>, <kind>)**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <itemNo>       | Integer type | Processing item number to get the information                                                                                                                                                                                                                                                                                                                                                                                        |
| <kind>         | Integer type | Type of information<br>0: Processing item type<br><br>Number that indicates the processing item type. The values below can be gotten.<br>0: Inspect and Measure (measurement)<br>1: Input image (Image input)<br>2: Compensate image (image correction)<br>3: Support Inspection and Measurement (supplementary measurement)<br>4: Branch (branch control)<br>5: Output result (result output)<br>6: Display result (result display) |

### Return value

Returns processing item information as an integer. Returns -1 if information does not exist.

### Description

Gets the information specified in the <kind> parameter of the processing item specified in the <itemNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Gets the number of processing item types, and by repeated processing, searches for search processing items and gets the processing item type of each search processing item.

---

```
Rem Get the number of the available processing items.  
INUM& = ItemCount
```

```
Rem Search for search processing items a number of times equal to the number of processing items  
For I&=0 To INUM&-1
```

```
  If ItemIdent$(I&) = "Search" Then
```

```
    Rem Get the processing item type of the search processing item  
    FIGNAME& = ItemInfo(I&, 0)
```

```
  Endif
```

```
Next
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

ItemCount (Reference: ▶ Details (p.313))

ItemTitle\$ (Reference: ▶ Details (p.318))

ItemIdent\$ (Reference: ▶ Details (p.314))

UnitInfo (Reference: ▶ Details (p.526))

## ItemTitle\$

Gets the processing item title.

### Format

ItemTitle\$(<itemNo>)

### Parameter

| Parameter name | Data type    | Description                                  |
|----------------|--------------|----------------------------------------------|
| <itemNo>       | Integer type | Processing item number to get the title name |

### Return value

Returns the title as a character string.

### Description

Gets the title of the processing item specified in the <itemNo> parameter.

The title can be gotten in a language based on the language setting.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the number of processing item types, and gets the title of the processing item of each processing item number by repeated processing.

---

```
Rem Get the number of the available processing items.  
INUM& = itemCount
```

```
Rem Repeat the process up to the number of the processing items.  
For I&=0 To INUM&-1
```

```
    Rem Get the title of the processing item  
    TITLE$ = ItemTitle$(I&)
```

```
Next
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ItemCount (Reference: ▶ Details (p.313))

ItemInfo (Reference: ▶ Details (p.316))

ItemIdent\$ (Reference: ▶ Details (p.314))

## JudgeOut

Sets the output state of the overall judgement signal.

### Format

**JudgeOut <iolident>, <state>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                                                                                                                                                                                                                              |
|----------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <iolident>     | Character string type | Identification name of the communication module to be used ("Parallelo" or "EtherCAT") (Reference: ►List of I/O Modules (p.581))                                                                                                                                                                                                                                                         |
| <state>        | Integer type          | Total judgement result to be output<br>JUDGE_OK: Total judgement result OK<br>JUDGE_NG: Total judgement result NG<br>The actual signal output depends on this parameter setting and the total judgement (Total Judgement or OR) signal output polarity setting.<br>Specify "ON at NG" for the total judgement signal polarity when using the communication modules other than Parallelo. |

### Return value

None.

### Description

Sets the output state specified in the <state> parameter of the OR signal or other overall judgement signal of the communication module specified in the <iolident> parameter.

Normally "Parallelo" or "EtherCAT" should be specified in the <iolident> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If an identification name that does not exist is specified in the <iolident> parameter, an "Illegal function call" error will occur.

Even if an output status parameter value that does not exist (i.e., other than 0 and 1) is specified in the <state> parameter, an error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the communication command macro, sets the OR signal of parallel I/O to ON.

---

```
IOMODULE$ = "Parallelo"
```

```
Rem Set the output state.
JudgeOut IOMODULE$, 1
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

BusyOut (Reference: ▶ Details (p.144))

GetPort (Reference: ▶ Details (p.272))

PutAll (Reference: ▶ Details (p.380))

TotalJudge (Reference: ▶ Details (p.503))

GetAll (Reference: ▶ Details (p.258))

RunOut (Reference: ▶ Details (p.406))

PutPort (Reference: ▶ Details (p.382))

## Kill

Deletes a file.

### Format

**Kill <fileName>**

### Parameter

| Parameter name | Data type             | Description                         |
|----------------|-----------------------|-------------------------------------|
| <fileName>     | Character string type | Absolute path of the file to delete |

### Return value

None.

### Description

Deletes the file of the file name specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name including the drive name.

Characters \* (character string wildcard operator) and ? (single character wildcard operator) can be used as wildcards for the <fileName> specification. These wildcards can be used to specify file names and cannot be used for the directory name specification. Directory names that match the wildcard pattern will not be deleted. For example, the "Kill "E:\img\\*" statement will not delete the "M:\img\capture\" directory.

Wildcards can be used to specify file names in the following manner.

|         |                                                                                                                      |
|---------|----------------------------------------------------------------------------------------------------------------------|
| *.*     | Specify all file with the extension.                                                                                 |
| *       | Specify all files.                                                                                                   |
| ???.*   | Specify the files with file name having an extension with a three-character file root name.                          |
| ??????? | Specify the files with file name having a seven-character file name including the file name extension separator (.). |
| A*.*    | Specify the files with file name having an extension with file name starting with "A".                               |
| A*A*A   | Specify the files with file name (including file extension) having three and more "A"s.                              |
| ????*   | Specify the files with file name (including file extension) having four and more characters.                         |
| ????*.* | Specify the files with a file name having a file root name with four or more characters and an extension.            |
| *.??    | Specify the file with 2 characters extension name.                                                                   |

In the following cases, the file cannot be deleted.

- The specified file does not exist.
- The external memory has not been inserted.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Deletes a file named "1280-720.bmp" under the directory "M:\"

---

```
Kill "M:\1280-720.bmp"
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Dskf (Reference: [▶ Details \(p.233\)](#))

IsFile (Reference: [▶ Details \(p.311\)](#))

Fcopy (Reference: [▶ Details \(p.252\)](#))

## LCASE\$

Converts an upper case letter to a lower case letter.

### Format

LCASE\$(<string>)

### Parameter

| Parameter name | Data type             | Description                                                          |
|----------------|-----------------------|----------------------------------------------------------------------|
| <string>       | Character string type | Character string contains an alphabet to be converted to lower case. |

### Return value

Returns the case converted character string type value.

### Description

Converts the upper case letters in the character strings specified in the <string> parameter to lower case.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, the 255-character string before the 256th character is used for the macro function processing. Characters after the 256th character will be discarded.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Converts an upper case letter to a lower case letter.

---

```
CHARA1$ = "Measurement Result = 100.0(OK)"
```

```
Rem Convert the upper case letters in the character strings to lower case.
```

```
CHARA2$ = LCASE$(CHARA1$)
```

---

The result is shown below.

---

```
CHARA2$ = "measurement result = 100.0(ok)"
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 4.20 or later

## Related Items

Asc (Reference: ▶ Details (p.138))  
Hex\$ (Reference: ▶ Details (p.294))  
Len (Reference: ▶ Details (p.327))  
Piece\$ (Reference: ▶ Details (p.374))  
Str\$ (Reference: ▶ Details (p.490))  
UCase\$ (Reference: ▶ Details (p.517))

Chr\$ (Reference: ▶ Details (p.152))  
Left\$ (Reference: ▶ Details (p.325))  
Mid\$ (Reference: ▶ Details (p.356))  
Right\$ (Reference: ▶ Details (p.403))  
Str2\$ (Reference: ▶ Details (p.492))  
Val (Reference: ▶ Details (p.535))

## Left\$

Extracts the specified length of characters from the left side of character string.

### Format

**Left\$(<string>, <length>)**

### Parameter

| Parameter name | Data type             | Description                                                                           |
|----------------|-----------------------|---------------------------------------------------------------------------------------|
| <string>       | Character string type | Extraction target character string                                                    |
| <length>       | Integer type          | Length of characters to be extracted (1 to the length of the target character string) |

### Return value

Returns the character string type value of the extracted character string.

### Description

Extracts the specified length in the <length> parameter from the left side of specified character string in the <string> parameter.

Specify the length of characters to be extracted in bytes for the <length> parameter. Each single-byte character (i.e., half-width alphanumeric character and symbol) consumes one byte, whereas each double-byte character consumes two bytes.

If the length specified in the <length> parameter is longer than the length of the character string specified in the <string> parameter, the whole character string in the parameter is extracted.

If 0 or less number is specified in the <length> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, the 255-character string before the 256th character is used for the macro function processing. Characters after the 256th character will be discarded.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Extracts 11-byte length of characters from the left side of the character string. Because one half-width alphabet consumes single byte, this example extracts 11 characters from the character string.

---

```
CHARA$ = "Measurement Result"
```

```
Rem Extract 11-byte length of characters from the left side of the character string.  
TITLE$ = Left$(CHARA$, 11)
```

---

The result is shown below.

---

```
TITLE$ = "Measurement"
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: ▶ Details (p.138))

Hex\$ (Reference: ▶ Details (p.294))

Len (Reference: ▶ Details (p.327))

Piece\$ (Reference: ▶ Details (p.374))

Str\$ (Reference: ▶ Details (p.490))

UCase\$ (Reference: ▶ Details (p.517))

Chr\$ (Reference: ▶ Details (p.152))

LCase\$ (Reference: ▶ Details (p.323))

Mid\$ (Reference: ▶ Details (p.356))

Right\$ (Reference: ▶ Details (p.403))

Str2\$ (Reference: ▶ Details (p.492))

Val (Reference: ▶ Details (p.535))

## Len

Gets the length of the specified character string.

### Format

**Len(<string>)**

### Parameter

| Parameter name | Data type             | Description                                 |
|----------------|-----------------------|---------------------------------------------|
| <string>       | Character string type | Character string to be gotten the length of |

### Return value

Returns the character string length in bytes as an integer value.

### Description

Gets the length of the specified character string in the <string> parameter in bytes.

Each single-byte character (i.e., half-width alphanumeric character and symbol) consumes one byte, whereas each double-byte character consumes two bytes.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a character string longer than 255 characters is specified for a character string parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the length of the character string "OMRON".

---

```
CHRLLEN& = Len("OMRON")
```

---

The result is shown below.

---

```
CHRLLEN& = 5
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: ▶ Details (p.138))

Hex\$ (Reference: ▶ Details (p.294))

Left\$ (Reference: ▶ Details (p.325))

Piece\$ (Reference: ▶ Details (p.374))

Str\$ (Reference: ▶ Details (p.490))

UCase\$ (Reference: ▶ Details (p.517))

Chr\$ (Reference: ▶ Details (p.152))

LCase\$ (Reference: ▶ Details (p.323))

Mid\$ (Reference: ▶ Details (p.356))

Right\$ (Reference: ▶ Details (p.403))

Str2\$ (Reference: ▶ Details (p.492))

Val (Reference: ▶ Details (p.535))

## Line Input#

Reads the data of one line from the file.

### Format

**Line Input #<fileNo>, <data>**

### Parameter

| Parameter name | Data type             | Description                |
|----------------|-----------------------|----------------------------|
| <fileNo>       | Integer type          | Read file number (0 to 15) |
| <data>         | Character string type | Loaded data                |

### Return value

None.

### Description

Read the data of one line separated by the line break code from the file of the file number specified in the <fileNo> parameter. The Input# function operates in similar way. This Line Input# function reads all data within a single line as a character string type data, whereas the Input# function reads multiple data within a single line and data type specifications for each piece of read data are required in advance.

Specify the variable to store the read data in the <data> parameter.

When a read line only has a line break code, a null character string is stored in the read data.

If the read data contains a double quoted character string, the double quotation marks (") are also read as characters.

If an unopened file number is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a file number of the opened file by a macro function other than the Open For Input As# function is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Reads the data until the end of the file.

---

```
Dim ALLDATA$(255)

Rem Open the file
Open "E:\input.dat" For Input As #1

For I&=0 to 255

    Rem Read line by line from the top of the file
    Line Input #1, DATA$
    ALLDATA$(I&) = DATA$

    Rem Check if the end of the file is reached
    If Eof(1) <> 0 Then
        Exit For
    Endif

Next

Rem Close up the file.
Close #1
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Close (Reference: ▶ Details (p.157))

Input# (Reference: ▶ Details (p.303))

Open For Input As# (Reference: ▶ Details (p.364))

Eof (Reference: ▶ Details (p.236))

Input\$ (Reference: ▶ Details (p.305))

## List

Outputs all or a part of program list in the system status console window.

### Format

**List [<lineNo1>][-<lineNo2>]**

### Parameter

| Parameter name | Data type    | Description                         |
|----------------|--------------|-------------------------------------|
| <lineNo1>      | Integer type | Line number where the output starts |
| <lineNo2>      | Integer type | Line number where the output ends   |

### Return value

None.

### Description

Program list from the specified line number in the <lineNo1> parameter to the specified line number in the <lineNo2> parameter is output to the system status console window.

If the <lineNo1> and <lineNo2> parameters are omitted, all lines in the program are output. If only the <lineNo1> parameter is omitted, program lines from the beginning to the specified line number by the <lineNo2> parameter are output.

If only the <lineNo2> parameter is omitted, only the program line specified in the <lineNo1> parameter is output.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Undefined line number" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function is only enabled when specified in debug mode with the Debug function. Otherwise, this macro function statement is ignored. (Reference: ►How to Use the Debug Function (p.82))

### Example

After stopping the program execution with the Stop function used in the Unit Macro processing unit, executes the List function in the system status console window to output the program line numbers from 230 to 240 to the window.

```
Macro(U1) Stop in 220
Macro(U1) List 230-240
230 POS.X#=(POS0.X@ + POS1.X@) / 2
240 POS.Y#=(POS0.Y@ + POS1.Y@) / 2
Macro(U1)>
```

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Cont (Reference: ▶ Details (p.161))

DebugPrint (Reference: ▶ Details (p.184))

SetStop (Reference: ▶ Details (p.465))

Stop (Reference: ▶ Details (p.488))

Debug (Reference: ▶ Details (p.182))

Print (Reference: ▶ Details (p.376))

SetVar (Reference: ▶ Details (p.482))

VarList (Reference: ▶ Details (p.537))

## LoadBackupData

Loads the system + scene group 0 data.

### Format

**LoadBackupData(<fileName>)**

### Parameter

| Parameter name | Data type             | Description                                                                 |
|----------------|-----------------------|-----------------------------------------------------------------------------|
| <fileName>     | Character string type | File name of bkd file to read in (System data + scene group 0 data (*.bkd)) |

### Return value

None.

### Description

Loads the system + scene group 0 data file specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be loaded.

In the <fileName> parameter, specify a system + scene group 0 data file name. If a file other than a system + scene group 0 data file is specified, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))
- After loading a file, execute "Save data". To apply the loaded settings in the sensor controller, restart the sensor controller.

### Example

Loads a system + scene group 0 data file, and execute "Save data". To apply the loaded settings in the sensor controller, restart the sensor controller.

---

```
Rem Load the system + scene group 0 data to a file.
LoadBackupData "E:\BACKDIR\BackupData.bkd"
```

```
Rem Save to the controller.
SaveData
```

```
Rem Reboot the Sensor Controller.
SystemReset
```

---

## Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

LoadSceneGroup (Reference: ▶ Details (p.337))

LoadUnitData (Reference: ▶ Details (p.341))

SaveData (Reference: ▶ Details (p.410))

LoadScene (Reference: ▶ Details (p.335))

LoadSystemData (Reference: ▶ Details (p.339))

SaveBackupData (Reference: ▶ Details (p.408))

SystemReset (Reference: ▶ Details (p.495))

## LoadScene

Loads the scene data.

### Format

**LoadScene** <sceneNo>, <fileName>

### Parameter

| Parameter name | Data type             | Description                                           |
|----------------|-----------------------|-------------------------------------------------------|
| <sceneNo>      | Integer type          | Scene number of the destination to read in (0 to 127) |
| <fileName>     | Character string type | File name of the scene data to read in (*.scn)        |

### Return value

None.

### Description

The scene data file specified in the <fileName> parameter is loaded into the scene number specified in the <sceneNo> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be loaded.

In the <fileName> parameter, specify a scene data file name. If a file other than a scene data file is specified, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))

### Example

Loads scene data into scene 2 and then changes the scene used to scene 2.

---

```
Rem Load the file of the scene data.
LoadScene 2, "E:\BACKDIR\scene02.scn"
```

```
Rem Switch the scene.
ChangeScene 2
```

---

### Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

ChangeScene (Reference: ▶ Details (p.148))

LoadBackupData (Reference: ▶ Details (p.333))

LoadSystemData (Reference: ▶ Details (p.339))

SaveScene (Reference: ▶ Details (p.415))

GetSystemData (Reference: ▶ Details (p.276))

LoadSceneGroup (Reference: ▶ Details (p.337))

LoadUnitData (Reference: ▶ Details (p.341))

SceneNo (Reference: ▶ Details (p.431))

## LoadSceneGroup

Loads the scene group data.

### Format

**LoadSceneGroup** <sceneGroupNo>, <fileName>

### Parameter

| Parameter name | Data type             | Description                                                |
|----------------|-----------------------|------------------------------------------------------------|
| <sceneGroupNo> | Integer type          | Scene group number of the destination to read in (0 to 31) |
| <fileName>     | Character string type | File name of the scene group data to read in (*.sgp)       |

### Return value

None.

### Description

Loads the scene group data file specified in the <fileName> parameter into the scene group number specified in the <sceneGroupNo> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be loaded.

In the <fileName> parameter, specify the file name of the scene group data. If a file other than a scene group data file is specified, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))

### Example

Loads scene data into scene group 2 and then changes the scene used to scene 0.

---

```
Rem Load the file of the scene group data.
LoadSceneGroup 2, "C:\BACKDIR\scenegroup02.sgp"
```

```
Rem Switch the scene.
ChangeScene 0
```

---

### Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

ChangeScene (Reference: ▶ Details (p.148))

LoadBackupData (Reference: ▶ Details (p.333))

LoadSystemData (Reference: ▶ Details (p.339))

SaveSceneGroup (Reference: ▶ Details (p.417))

GetSystemData (Reference: ▶ Details (p.276))

LoadScene (Reference: ▶ Details (p.335))

LoadUnitData (Reference: ▶ Details (p.341))

SceneGroupNo (Reference: ▶ Details (p.427))

## LoadSystemData

Loads the system data.

### Format

**LoadSystemData <fileName>**

### Parameter

| Parameter name | Data type             | Description                                     |
|----------------|-----------------------|-------------------------------------------------|
| <fileName>     | Character string type | File name of the system data to read in (*.ini) |

### Return value

None.

### Description

Loads the system data file specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be loaded.

In the <fileName> parameter, specify a system data file name. If a file other than a system data file is specified, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))
- After loading a file, execute "Save data". To apply the loaded settings in the sensor controller, restart the sensor controller.

## Example

After loading the system data, executes "Save data". To apply the loaded settings in the sensor controller, restart the sensor controller.

---

```
Rem Load the file of the system data
LoadSystemData "E:\BACKDIR\backupsysset.ini"
```

```
Rem Save to the controller.
SaveData
```

```
Rem Reboot the Sensor Controller.
SystemReset
```

---

## Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))  
LoadScene (Reference: ▶ Details (p.335))  
LoadUnitData (Reference: ▶ Details (p.341))  
SaveSystemData (Reference: ▶ Details (p.419))

LoadBackupData (Reference: ▶ Details (p.333))  
LoadSceneGroup (Reference: ▶ Details (p.337))  
SaveData (Reference: ▶ Details (p.410))  
SystemReset (Reference: ▶ Details (p.495))

## LoadUnitData

Loads the processing unit data.

### Format

**LoadUnitData <sceneNo>, <unitNo>, <unitCount>, <mode>, <fileName>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                       |
|----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <sceneNo>      | Integer type          | Scene number of the destination to read in (-1 to 127)                                                                                                                            |
| <unitNo>       | Integer type          | Processing unit number to begin to read in (0 to (the number of registered processing units in the current scene minus one))                                                      |
| <unitCount>    | Integer type          | Number of pieces of the processing unit to read in (-1, 1 to (the number of registered processing units in the current scene) - (the processing unit number to begin to read in)) |
| <mode>         | Integer type          | Read mode<br>0: Overwrite the processing unit by the loaded processing unit.<br>1: Insert the loaded processing unit in front of the processing unit.                             |
| <fileName>     | Character string type | File name of the processing unit to read in (*unt)                                                                                                                                |

### Return value

None.

### Description

Loads the processing unit data file specified in the <fileName> parameter in the mode specified in the <mode> parameter from processing units whose processing unit numbers are specified in the <unitNo> parameter, with the number of processing units specified in the <unitCount> parameter, of the scene number specified in the <sceneNo> parameter.

If -1 is specified in the <sceneNo> parameter, the scene number of the current scene is specified in the scene number of the destination scene.

If -1 is specified in the <unitCount> parameter, all processing unit data included in the processing unit data file is loaded.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be loaded.

In the <fileName> parameter, specify the file name of a processing unit data file. If a file other than a processing unit data file is specified, an "Illegal function call" error will occur, and the scene data in the load destination will be cleared.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))

## Example

Loads a processing unit data file and inserting five of the same processing units between Processing Unit number 3 and Processing Unit number 4 of scene 2.

---

Rem Load the file of the scene data.

LoadUnitData 2, 4, 5, 1, "E:\BACKDIR\unitsave.unt"

---

## Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

LoadScene (Reference: ▶ Details (p.335))

LoadSystemData (Reference: ▶ Details (p.339))

SceneNo (Reference: ▶ Details (p.431))

Ut (Reference: ▶ Details (p.534))

LoadBackupData (Reference: ▶ Details (p.333))

LoadSceneGroup (Reference: ▶ Details (p.337))

SaveUnitData (Reference: ▶ Details (p.421))

UnitNo (Reference: ▶ Details (p.531))

## Log

Gets the natural logarithm.

### Format

**Log(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                             |
|----------------|-----------------------------------------------------------------|-----------------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression to get the natural logarithm |

### Return value

Returns the natural logarithm value as a double precision real number.

### Description

Gets the value of the natural logarithm of the expression specified in the <expression> parameter.

In the <expression> parameter, specify a positive number.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the natural logarithm of the integer 25 assigned to the variable X&.

---

```
X& = 25
XLOG# = Log(X&)
```

---

The result is shown below.

---

```
XLOG# = 3.21887582487
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Exp (Reference: ▶ Details (p.250))

GetUnitData (Reference: ▶ Details (p.286))

UnitData (Reference: ▶ Details (p.520))

## Lsqumeth

Gets the approximate straight line from the coordinates of multiple points using the least squares method.

### Format

**Lsqumeth** <count>, <x()>, <y()>, <line()>

### Parameter

| Parameter name | Data type                                       | Description                                                                                                    |
|----------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <count>        | Integer type                                    | Number of coordinates calculated for the approximate line                                                      |
| <x()>          | Array of double precision real number data type | 1D array that stores the X coordinates of the points from which the approximate straight line is to be gotten. |
| <y()>          | Array of double precision real number data type | 1D array that stores the Y coordinates of the points from which the approximate straight line is to be gotten. |
| <line()>       | Array of double precision real number data type | Straight line component gotten by the approximate line                                                         |

### Return value

None.

### Description

Gets the approximate straight line from the coordinates specified in the <x()> parameter and <y()> parameter. The number of coordinates is specified in the <count> parameter.

In the <line()> parameter, specify the variable that will hold the line components of the gotten approximate straight line, without adding element numbers but adding () to the variables. In the <line()> parameter, the parameters a, b, and c that satisfy the linear equation  $ax + by + c = 0$  are stored in the array elements of the double precision real number array variable, with "a" in element 0, "b" in element 1, and "c" in element 2.

In the <count> parameter, specify an integer value of at least 2.

In the <x()> parameter and in the <y()> parameter, specify a 1D double precision real number array variable that stores a number of coordinate values greater than or equal to the number specified in the <count> parameter, without adding element numbers but adding () to the variables.

This macro function is mainly used to get the straight line of an edge from the measurement points gotten in multiple edge measurements.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

**Example**

Gets the straight line of the edge of a workpiece from four edge points.

---

```
Dim POSX#(3), POSY#(3), PARAM#(2)
```

```
Rem Calculate the edge points from the measurement result.
```

```
For I&=0 To 3
```

```
  GetUnitData I&+1, "X", POSX#(I&)
```

```
  GetUnitData I&+1, "Y", POSY#(I&)
```

```
Next
```

```
Rem Get the straight line component.
```

```
Lsqmeth 4, POSX#(), POSY#(), PARAM#()
```

```
Erase POSX#(), POSY#(), PARAM#(), DIST#()
```

---

**Usable Modules**

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

**Supported Versions**

Version 3.50 or later

**Related Items**

ApproximationCircle (Reference: ▶ Details (p.136))    Crspoint (Reference: ▶ Details (p.178))

Dposline (Reference: ▶ Details (p.194))

Erase (Reference: ▶ Details (p.238))

GetUnitData (Reference: ▶ Details (p.286))

UnitData (Reference: ▶ Details (p.520))

## Measure

Executes measurement processing.

### Format

**Measure[ <wait>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                           |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <wait>         | Integer type | Recovery timing of macro function<br>0: Executes subsequent program lines without waiting for measurement to end.<br>1: Waits for measurement to end and then executes subsequent program lines.<br>2: Waits for measurement to end and measurement result display to end and then executes subsequent program lines. |

### Return value

None.

### Description

Executes measurement processing at the recovery timing specified in the <wait> parameter. If the <wait> parameter is omitted, operation is the same as when the <wait> parameter is set to 0. When 0 is specified for the <wait> parameter, there is a possibility that the measurement processing executed immediately after execution of this macro function will not have ended and the measurement result cannot be properly gotten. If you want to get the measurement result, specify 1 or 2 for the <wait> parameter. If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur. Even if a non-existent number, numerical value, or combination of data types is specified for the parameter, an "Illegal function call" error will not occur. If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur. If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when a measurement-in-progress signal such as the BUSY signal is OFF and measurement is allowed. (Reference: ► State Transitions and Execution Timing (p.72))

### Example

In the communication command macro, gets the measurement X coordinate and measurement Y coordinate of the search processing unit of Processing Unit number 2 after measurement is executed. The measured X and Y coordinates can be gotten with External Reference Data numbers 6 and 7 respectively.

---

```
Rem Execute measurement and wait until measurement ends.  
Measure 1
```

```
Rem Get the measurement result.  
GetUnitData 2, 6, POSX#  
GetUnitData 2, 7, POSY#
```

---

## Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

MeasureStart (Reference: ▶ Details (p.351))

Remeasure (Reference: ▶ Details (p.397))

MeasureStop (Reference: ▶ Details (p.353))

## MeasureDispG

Executes display of the measurement result of the processing unit.

### Format

**MeasureDispG <unitNo>, <subNo>**

### Parameter

| Parameter name | Data type    | Description                                                                                                          |
|----------------|--------------|----------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number (0 to (the number of registered processing units in the current scene minus one))             |
| <subNo>        | Integer type | Image display sub-number of the image window to be used for display (Reference: ► List of Sub-Image Numbers (p.626)) |

### Return value

None.

### Description

Graphically displays the judgement result in the image of the image display sub-number specified in the <subNo> parameter, of the processing unit specified in the <unitNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for the <unitNo> parameter, an "Illegal function call" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the <subNo> parameter, an error will not occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

### Example

In the \*MEASUREDISPG subroutine of the Unit Macro processing unit, executes the analysis result display process (graphic display) of sub number 0 of Processing Unit number 2.

---

```
*MEASUREDISPG
  MeasureDispG 2, 0
Return
```

---

### Usable Modules

Unit macro

### Supported Versions

Version 3.50 or later

### Related Items

UnitNo (Reference: ► Details (p.531))

Ut (Reference: ► Details (p.534))

## MeasureId\$

Gets the measurement identification.

### Format

**MeasureId\$**

### Parameter

None.

### Return value

Returns the measurement identification as a character string.

Measurement ID : measurement time YYYY-MM-DD\_HH-MM-SS-XXXX

(YYYY: Calendar, MM: Month, DD: Day, HH: Hour, MM: Minute, SS: Second, XXXX: Millisecond and Line number)

Example

Measurement time: 11:10:25.500 AM, December 24, 2007 and Line 0, the measurement ID is "2007-12-24\_11-10-25-5000".

Since the file name of the logging image also includes the same measurement ID, confirmation of the measurement data and image data can be performed with the measurement ID.

### Description

Gets the measurement identification.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREPROC subroutine. If used in any other subroutines, an error will occur and the function will not be executed.

### Example

In the \*MEASUREPROC subroutine of the Unit Macro processing unit, gets the measurement identification and saves the processing unit measurement image with the measurement identification as the file name.

---

```
*MEASUREPROC
```

```
Rem Get the measurement identification to set the character string for the file name.
```

```
FILENAME$ = MeasureId$ + ".bmp"
```

```
Rem Output measurement image 0 in bitmap format.
```

```
SaveMeasureImage 0, FILENAME$, 0
```

```
Return
```

---

### Usable Modules

Unit Macro / Unit Calculation Macro

### Supported Versions

Version 3.50 or later

### Related Items

SaveMeasureImage (Reference: ► Details (p.413))

## MeasureProc

Executes measurement processing in a processing unit.

### Format

**MeasureProc <unitNo>**

### Parameter

| Parameter name | Data type    | Description                                                                                              |
|----------------|--------------|----------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

None.

### Description

Executes measurement processing in the processing unit specified in the <unitNo> parameter.

If a processing unit related to image input is specified in the <unitNo> parameter, processing may not take place correctly.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Executes measurement processing in the search processing unit of Processing Unit number 2.

---

```
MeasureProc 2
```

---

### Usable Modules

Unit Macro / Communication Command Macro / Scene Control Macro / Unit Calculation Macro

### Supported Versions

Version 5.40 or later

### Related Items

UnitNo (Reference: [▶ Details \(p.531\)](#))

Ut (Reference: [▶ Details \(p.534\)](#))

## MeasureStart

Allows input of the measurement trigger.

### Format

**MeasureStart**

### Parameter

None.

### Return value

None.

### Description

Allows input of the measurement trigger and input of communication commands, and changes to the measurement allowed state.

After setting the measurement prohibited state with the MeasureStop function, execute this macro function to return to the measurement allowed state.

After executing the MeasureStart function, be sure to execute the MeasureStop function. If the MeasureStop function is not executed or the MeasureStart function is executed without executing the MeasureStop function, unexpected operation may occur.

There are macro functions that can and cannot be executed in the measurement allowed state and in the measurement prohibited state. For details, refer to the explanations of the macro functions and usage cautions.

If input of the measurement trigger is allowed, measurement-in-progress signals such as the BUSY signal turn OFF.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))

## Example

In the communication command macro, executes measurement on the Shape Search III processing unit of Processing Unit number 1 after input of the measurement trigger is allowed, and gets the measurement result. Sets the "BUSY ON" setting to ON in advance. Multi-point output is external reference data number 168, the measurement X coordinate is external reference data number 6, and the measurement Y coordinate is external reference data number 7.

---

Rem Set multi-point output to OFF on the Shape Search III processing unit.  
SetUnitData 1, 168, 0

Rem Allow input of the measurement trigger.  
MeasureStart

Rem Execute measurement.  
Measure 1

Rem Prohibit input of the measurement trigger.  
MeasureStop

Rem Get the measurement result of the Shape Search processing unit.  
GetUnitData 1, 6, POSX#  
GetUnitData 1, 7, POSY#

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))  
MeasureStop (Reference: ▶ Details (p.353))

Measure (Reference: ▶ Details (p.346))  
SetUnitData (Reference: ▶ Details (p.473))

## MeasureStop

Prohibits input of the measurement trigger.

### Format

**MeasureStop[ <mode>]**

### Parameter

| Parameter name | Data type    | Description                                          |
|----------------|--------------|------------------------------------------------------|
| <mode>         | Integer type | Measurement trigger input prohibited mode (always 0) |

### Return value

None.

### Description

In the measurement trigger input prohibited mode specified in the <mode> parameter, prohibits measurement trigger input and communication command input, and sets the measurement prohibited state. After executing this macro function to prohibit measurement trigger input, execute the MeasureStart function to return to the measurement allowed state.

After executing the MeasureStop function, be sure to execute the MeasureStart function. If the MeasureStart function is not executed or the MeasureStop function is executed without executing the MeasureStart function, unexpected operation may occur.

If the <mode> parameter is omitted, operation is the same as when 0 is specified for the <mode> parameter. There are macro functions that can and cannot be executed in the measurement allowed state and in the measurement prohibited state. For details, refer to the explanations of the macro functions and usage cautions.

When measurement trigger input is prohibited, measurement in progress signals such as the BUSY signal turn ON.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types is specified for the parameter, an "Illegal function call" error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when a measurement-in-progress signal such as the BUSY signal is OFF and measurement is allowed. (Reference: ► State Transitions and Execution Timing (p.72))

## Example

In the communication command macro, executes measurement on the Shape Search III processing unit of Processing Unit number 1 after input of the measurement trigger is allowed, and gets the measurement result. Sets the "BUSY ON" setting to ON in advance. Multi-point output is external reference data number 168, the measurement X coordinate is external reference data number 6, and the measurement Y coordinate is external reference data number 7.

---

Rem Set multi-point output to OFF on the Shape Search III processing unit.  
SetUnitData 1, 168, 0

Rem Allow input of the measurement trigger.  
MeasureStart

Rem Execute measurement.  
Measure 1

Rem Prohibit input of the measurement trigger.  
MeasureStop

Rem Get the measurement result of the Shape Search processing unit.  
GetUnitData 1, 6, POSX#  
GetUnitData 1, 7, POSY#

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))  
MeasureStart (Reference: ▶ Details (p.351))

Measure (Reference: ▶ Details (p.346))  
SetUnitData (Reference: ▶ Details (p.473))

## MessageBox

Displays a message box.

### Format

**MessageBox** <message>

### Parameter

| Parameter name | Data type              | Description                                             |
|----------------|------------------------|---------------------------------------------------------|
| <message>      | Character strings type | This character strings is displayed on the message box. |

### Return value

None.

### Description

Type mismatch error is occurred when wrong data is specified as parameter. Illegal function call error is not occurred even if non-exist number, values, combination of data or values.

An error of String too long will be occurred when you specify the character strings as character strings type exceeds 255 characters.

Syntax error is occurred when you specify wrong formatting; typographical error of macro function's name, no comma or no spaces.

### Usage Cautions

None.

### Example

Displays the NG message and forces the measurement to stop when the measurement is NG (failed).

---

Rem Displays the MessageBox message and forces the measurement to stop when the measurement is NG (failed).

```
If totaljudge = -1 then
  MessageBox "NG"
Endif
```

---

### Usable Modules

Unit Macro / Scene Control Macro / Communication Command Macro / Calculate Unit Macro

### Supported Versions

Version 5.40, or more

### Related Items

If Then Elseif Else Endif (Reference: ► Details (p.298))

## Mid\$

Extract a part from the character string.

### Format

**Mid\$(<string>, <start>, <length>)**

### Parameter

| Parameter name | Data type             | Description                                                                                       |
|----------------|-----------------------|---------------------------------------------------------------------------------------------------|
| <string>       | Character string type | Extraction target character string                                                                |
| <start>        | Integer type          | Starting position of extraction (1 to the length of the target character string)                  |
| <length>       | Integer type          | Length of characters to be extracted (1 to the remaining length from specified starting position) |

### Return value

Returns the character string type value of the extracted character string.

### Description

Extracts the specified length of the character string in the <length> parameter after the position specified in the <start> parameter from the <string> parameter.

Specify the length of characters to be extracted in bytes for the <length> parameter. Each single-byte character (i.e., half-width alphanumeric character and symbol) consumes one byte, whereas each double-byte character consumes two bytes.

If the length specified in the <length> parameter is longer than the length of the character string between the <start> parameter position and the end of the character string, the all characters from the <start> parameter position to the end of the character string are extracted.

If a larger value than the length of the target character string is specified in the <start> parameter, an "Illegal function call" error will occur.

If 0 or smaller value is specified in the <start> parameter or <length> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, the 255-character string before the 256th character is used for the macro function processing. Characters after the 256th character will be discarded.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Extracts four characters from the second character and eight characters from the third character in the half-width alphanumeric character string. For the latter operation, because the specified length exceeds the target character string length of eight in this example, only five characters from the third to the end of the character string.

---

```
INPUTSTR$ = "ABCDEFGG"
```

Rem Extract four characters from the second character of the character string.

```
OUTPUTSTR1$ = Mid$(INPUTSTR$, 2, 4)
```

Rem Extract eight characters from the third character of the character string

```
OUTPUTSTR2$ = Mid$(INPUTSTR$, 3, 8)
```

---

The result is shown below.

---

```
OUTPUTSTR1$ = "BCDE"
```

```
OUTPUTSTR2$ = "CDEFG"
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: ▶ Details (p.138))

Hex\$ (Reference: ▶ Details (p.294))

Left\$ (Reference: ▶ Details (p.325))

Piece\$ (Reference: ▶ Details (p.374))

Str\$ (Reference: ▶ Details (p.490))

UCase\$ (Reference: ▶ Details (p.517))

Chr\$ (Reference: ▶ Details (p.152))

LCase\$ (Reference: ▶ Details (p.323))

Len (Reference: ▶ Details (p.327))

Right\$ (Reference: ▶ Details (p.403))

Str2\$ (Reference: ▶ Details (p.492))

Val (Reference: ▶ Details (p.535))

## Mkdir

Build a directory

### Format

**Mkdir <directoryName>**

### Parameter

| Parameter name  | Data type             | Description                       |
|-----------------|-----------------------|-----------------------------------|
| <directoryName> | Character string type | Directory name of built directory |

### Return value

None.

### Description

Build the directory specified in the <directoryName> parameter.

In the <directoryName> parameter, use an absolute path to specify the directory name of the directory to be built.

In the following case, a "Illegal function call" error occurs without building a directory.

- If the specified directory already exists
- If the external memory is specified for where to build a directory in with no external memory inserted
- Free space in the disk drive specified for the directory building is insufficient for building a new directory

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Builds a directory named "IMAGE2" under the root folder of the E drive.

---

```
Mkdir "E:\IMAGE2"
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Dskf (Reference: ▶ Details (p.233))

GetSystemData (Reference: ▶ Details (p.276))

Kill (Reference: ▶ Details (p.321))

Fcopy (Reference: ▶ Details (p.252))

IsFile (Reference: ▶ Details (p.311))

Rmdir (Reference: ▶ Details (p.405))

## MOD

Gets the remainder.

### Format

**<expression1> MOD <expression2>**

### Parameter

| Parameter name | Data type    | Description                                           |
|----------------|--------------|-------------------------------------------------------|
| <expression1>  | Integer type | Expression of the dividend to calculate the remainder |
| <expression2>  | Integer type | Expression of the divisor to calculate the remainder  |

### Return value

Returns the remainder as an integer value.

### Description

Gets the remainder from division of the expression specified in the <expression1> parameter by the expression specified in the <expression2> parameter.

If double precision real number expressions are specified, the values are treated as values with digits to the right of the decimal point rounded off.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If 0 is specified in the <expression2> parameter, a "Division by zero" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Increments a counter from 0 to 100.

---

```
I& = (I&+1) MOD 100
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Fix (Reference: ▶ Details (p.254))

GetUnitData (Reference: ▶ Details (p.286))

UnitData (Reference: ▶ Details (p.520))

## MoveUnit

Moves a processing unit.

### Format

**MoveUnit <srcUnitNo>, <destUnitNo>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                              |
|----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <srcUnitNo>    | Integer type | Processing unit number (0 to (number of processing units of current scene minus one)) of source                                                          |
| <destUnitNo>   | Integer type | Processing unit number (0 to (number of processing units of current scene minus one)) indicating the position of the destination in the measurement flow |

### Return value

None.

### Description

Moves the processing unit specified in the <srcUnitNo> parameter to the position in the measurement flow specified in the <destUnitNo> parameter.

The processing unit numbers of processing units after the processing unit number specified in the <srcUnitNo> parameter are moved up by 1. The processing unit numbers of processing units after the processing unit number specified in the <destUnitNo> parameter are moved down by 1.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Moves the processing unit of Processing Unit number 2 between Processing Unit number 5 and Processing Unit number 6.

---

```
MoveUnit 2, 5
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

AssignUnit (Reference: ▶ Details (p.140))

CopyUnit (Reference: ▶ Details (p.168))

InsertUnit (Reference: ▶ Details (p.307))

MeasureStop (Reference: ▶ Details (p.353))

CheckUnit (Reference: ▶ Details (p.150))

DeleteUnit (Reference: ▶ Details (p.186))

MeasureStart (Reference: ▶ Details (p.351))

UnitCount (Reference: ▶ Details (p.519))

## NOT

Gets the "not" result (negation) of the expression.

### Format

**NOT(<expression>)**

### Parameter

| Parameter name | Data type    | Description                          |
|----------------|--------------|--------------------------------------|
| <expression>   | Integer type | Expression to calculate the negation |

### Return value

Returns an integer "not" value.

### Description

Gets the "not" result of the 32-digit binary value specified in the <expression> parameter by inverting each bit. If a double precision real number expression is specified in the <expression> parameter, the value is treated as a value with digits to the right of the decimal point rounded off.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the "not" value of the integer 0 assigned to the variable X&.

---

```
X& = 0
XX& = NOT(X&)
```

---

The result is shown below.

---

```
XX& = -1
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

AND (Reference: [▶ Details \(p.131\)](#))

UnitData (Reference: [▶ Details \(p.520\)](#))

XOR (Reference: [▶ Details \(p.550\)](#))

GetUnitData (Reference: [▶ Details \(p.286\)](#))

OR (Reference: [▶ Details \(p.372\)](#))

## Open For Append As#

Open the file in append mode.

### Format

Open <fileName> For Append As #<fileNo>

### Parameter

| Parameter name | Data type             | Description                                       |
|----------------|-----------------------|---------------------------------------------------|
| <fileName>     | Character string type | Absolute path of the file to be opened            |
| <fileNo>       | Integer type          | Assigned file number (0 to 15) to the opened file |

### Return value

None.

### Description

Assigns the specified file number in the <fileNo> parameter to the specified file by the <fileName> parameter and open the file in append mode.

Be sure to execute the Close function to close the file opened with this macro function within the same subroutine. File accessing processes such as data writing to a file and data reading from a file may not be completed properly in the following cases.

- The Close function is not executed. The Close function is used in a different subroutine from where this macro function is executed.
- This macro function is executed at a different timing from the Open function execution.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be opened.

If the file of the file name specified in the <fileName> parameter does not exist, the file is newly created.

If the file of the file name specified in the <fileName> parameter already exists, open the existing file so that the additional writing in the file is possible.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Opens the file named "input.txt" under the E drive and writes the data to the file.

---

```
STRING$ = "Sample"
```

```
Rem Open the file  
Open "E:\input.txt" For Append As #1
```

```
Print #1, STRING$
```

```
Rem Close up the file.  
Close #1
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Close (Reference: ▶ Details (p.157))

GetSystemData (Reference: ▶ Details (p.276))

Input\$ (Reference: ▶ Details (p.305))

Line Input# (Reference: ▶ Details (p.329))

Open For Output As# (Reference: ▶ Details (p.366))

Eof (Reference: ▶ Details (p.236))

Input# (Reference: ▶ Details (p.303))

IsFile (Reference: ▶ Details (p.311))

Open For Input As# (Reference: ▶ Details (p.364))

Print# (Reference: ▶ Details (p.378))

## Open For Input As#

Open the file in reading mode.

### Format

Open <fileName> For Input As #<fileNo>

### Parameter

| Parameter name | Data type             | Description                                       |
|----------------|-----------------------|---------------------------------------------------|
| <fileName>     | Character string type | Absolute path of the file to be opened            |
| <fileNo>       | Integer type          | Assigned file number (0 to 15) to the opened file |

### Return value

None.

### Description

Assigns the specified file number in the <fileNo> parameter to the specified file by the <fileName> parameter and open the file in reading mode.

Be sure to execute the Close function to close the file opened with this macro function within the same subroutine. File accessing processes such as data writing to a file and data reading from a file may not be completed properly in the following cases.

- The Close function is not executed.
- The Close function is used in a different subroutine from where this macro function is executed.
- This macro function is executed at a different timing from the Open function execution.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be opened.

If the file of the file name specified in the <fileName> parameter does not exist, an "Illegal function call" error will occur.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

**Example**

Reads the data until the end of the file.

---

```
Dim ALLDATA$(255)

Rem Open the file
Open "E:\input.dat" For Input As #1

For I&=0 to 255

    Rem Read line by line from the top of the file
    Input #1, DATA$
    ALLDATA$(I&) = DATA$

    Rem Check if the end of the file is reached
    If Eof(1) <> 0 Then
        Exit For
    Endif

Next

Rem Close up the file.
Close #1
```

---

**Usable Modules**

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

**Supported Versions**

Version 3.50 or later

**Related Items**

|                                                    |                                                    |
|----------------------------------------------------|----------------------------------------------------|
| Close (Reference: ▶ Details (p.157))               | Eof (Reference: ▶ Details (p.236))                 |
| GetSystemData (Reference: ▶ Details (p.276))       | Input# (Reference: ▶ Details (p.303))              |
| Input\$ (Reference: ▶ Details (p.305))             | IsFile (Reference: ▶ Details (p.311))              |
| Line Input# (Reference: ▶ Details (p.329))         | Open For Append As# (Reference: ▶ Details (p.362)) |
| Open For Output As# (Reference: ▶ Details (p.366)) | Print# (Reference: ▶ Details (p.378))              |

## Open For Output As#

Opens the file in writing mode.

### Format

**Open <fileName> For Output As #<fileNo>**

### Parameter

| Parameter name | Data type             | Description                                       |
|----------------|-----------------------|---------------------------------------------------|
| <fileName>     | Character string type | Absolute path of the file to be opened            |
| <fileNo>       | Integer type          | Assigned file number (0 to 15) to the opened file |

### Return value

None.

### Description

Assigns the specified file number in the <fileNo> parameter to the specified file by the <fileName> parameter and open the file in writing mode.

Be sure to execute the Close function to close the file opened with this macro function within the same subroutine. File accessing processes such as data writing to a file and data reading from a file may not be completed properly in the following cases.

- The Close function is not executed.
- The Close function is used in a different subroutine from where this macro function is executed.
- This macro function is executed at a different timing from the Open function execution.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be opened.

If the file of the file name specified in the <fileName> parameter does not exist, an "Illegal function call" error will occur.

If the file of the file name specified in the <fileName> parameter already exists, the existing file content is once deleted, then opens the existing file so that the writing in the file is possible.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Opens the file, writes the data in the file, and then closes the file.

---

```
DATA& = 10
```

```
Rem Open the file  
Open "E:\input.dat" For Output As #1
```

```
Rem Write the data in the opened file  
Print #1 DATA&
```

```
Rem Close the opened file  
Close #1
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Close (Reference: ▶ Details (p.157))

GetSystemData (Reference: ▶ Details (p.276))

Input\$ (Reference: ▶ Details (p.305))

Line Input# (Reference: ▶ Details (p.329))

Open For Input As# (Reference: ▶ Details (p.364))

Eof (Reference: ▶ Details (p.236))

Input# (Reference: ▶ Details (p.303))

IsFile (Reference: ▶ Details (p.311))

Open For Append As# (Reference: ▶ Details (p.362))

Print# (Reference: ▶ Details (p.378))

## OpenTextData

Opens a messages file.

### Format

**OpenTextData <ident> As #<textDataNo>**

### Parameter

| Parameter name | Data type             | Description                                                                          |
|----------------|-----------------------|--------------------------------------------------------------------------------------|
| <ident>        | Character string type | Identification name for the message file that is opened as text data                 |
| <textDataNo>   | Integer type          | Text data number (0 to 15) that is assigned to the message file opened as text data. |

### Return value

None.

### Description

Message file defines the displayed messages.

The message file is configured one file for each language.

The message file name is configured as below.

<Message file Data ident>\_<Language Data ident>.msg

<Message file Data ident> indicates an ident specified <ident> in OpenTextData function.

<Language Data ident> is a character string.

Each language and its Data ident are the following:

- Simplified Chinese: chs
- Traditional Chinese: cht
- German: deu
- English: eng
- Spanish: esp
- French: fra
- Italian: ita
- Japanese: jpn
- Korean: kor

A Data ident specified <textIdent> for each lines and a text data which is corresponded to <textIdent>.

<Data ident 1>=<Text data 1>

<Data ident 2>=<Text data 2>

<Data ident 3>=<Text data 3>

•

•

<Data ident n>=<Text data n>

Acquires the specified text data in <textIdent> parameter from the message file of the text data No. which is specified in <textDataNo> parameter.

Assigns the specified text data number in the <textDataNo> parameter to the specified file by the <ident> parameter and opens the file.

Be sure to execute the CloseTextData function to close the file opened with this macro function within the same subroutine. The message file cannot properly be closed and this macro function may not properly be executed in the subsequent processes in the following cases.

- The CloseTextData function is not executed.
- This CloseTextData function is used in a different subroutine from where this function is executed.
- This CloseTextData function is executed at a different timing from this function execution.

If a value outside the range from 0 to 15 is specified in the <textDataNo> parameter, an "Illegal function call" error will occur.

If the text data number that is already opened is specified in the <textDataNo> parameter, an "Illegal function

call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- None.

## Example

Uses the \*MEASUREDISPT subroutine of the Unit Macro processing unit to display the measured correlation value by the search processing unit (Processing Unit number 5), along with the gotten text string from the prepared message file for the processing unit, in the text window. The correlation value can be gotten with External Reference Data number 5.

---

```
*MEASUREDISPT
```

```
Rem Get the measurement result.  
GetUnitData 5, 5, CR#
```

```
Rem Open the messages file  
OpenTextData "Search" As #1
```

```
Rem Get the text  
TEXT$ = GetText$(#1, "Correlation")
```

```
Rem Draw the gotten text string from the messages file without adding any line break on the text window.  
DrawText TEXT$, UnitJudge(5), 0
```

```
Rem Draw the measurement results on the text window.  
DrawText Str2$(CR#, 4, 4, 0, 0), UnitJudge(5), 1
```

```
Rem Close up the messages file.  
CloseTextData
```

```
Return
```

---

The result is shown below.

---

```
Correlation value: 90.0000
```

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 5.00 or later

## Related Items

CloseTextData (Reference: ▶ Details (p.159))

GetText\$ (Reference: ▶ Details (p.278))

UnitJudge (Reference: ▶ Details (p.530))

DrawText (Reference: ▶ Details (p.227))

GetUnitData (Reference: ▶ Details (p.286))

## Option Explicit

Finds undefined or duplicate variable that is defined in the Dim variable format.

### Format

Option Explicit

### Parameter

None.

### Return value

None.

### Description

When you execute the Option Explicit command, only defined variables will be available to use, and duplicate of the defined variables will be checked.

### Precautions for Correct Use

- When you execute the Option Explicit command, the Macro Variable Check function will be effective for lines after the line where the Option Explicit command is executed. Undefinition and duplicates of variables in preceding lines will not be checked. In other word, they are not the subject to the [Un-defined variable] error or [Duplicated variable] error.
- The Option Explicit command is unavailable when the power is on or when macros are loaded. It is available from the time a macro and the Option Explicit command are both executed until the next macro is loaded or the power is turned off.

### Example

Option Explicit can be used to check macro variables.

---

```
Option Explicit
Rem Definition of variable by the Dim variable
Dim A&
Dim B&
Dim C&
A& = 0
B& = 1
C& = A& + B&
Print Str$(C&)
```

---

### Supported modules

Unit Macro, Communication Command Macro, Scene Control Macro

### Supported version of the FH Sensor Controller

Version 5.40 or later

### Related topics

Dim (Reference: ▶ Details (p.187))

ReDim (Reference: ▶ Details (p.391))

VarList (Reference: ▶ Details (p.537))

## OR

Gets the logical sum of two expressions.

### Format

**<expression1> OR <expression2>**

### Parameter

| Parameter name | Data type    | Description                             |
|----------------|--------------|-----------------------------------------|
| <expression1>  | Integer type | Expression to calculate the logical sum |
| <expression2>  | Integer type | Expression to calculate the logical sum |

### Return value

Returns the logical sum as an integer value.

### Description

Gets the logical sum by bit of the expression specified in the <expression1> parameter and the expression specified in the <expression2> parameter.

When the values of the <expression1> parameter and <expression2> parameter are double precision real values, the decimal part is rounded off.

This can also be used as an Or condition in an If statement. For details on the logical expression, refer to "Operators".

Reference: ► Operator (p.55)

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the logical sum of 1 assigned to the variable EXP1& and 4 assigned to the variable EXP2&.

---

```
EXP1& = 1  
EXP2& = 4
```

```
EXPALL& = EXP1& OR EXP2&
```

---

The result is shown below.

---

```
EXPALL& = 5
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

AND (Reference: ▶ Details (p.131))

UnitData (Reference: ▶ Details (p.520))

XOR (Reference: ▶ Details (p.550))

GetUnitData (Reference: ▶ Details (p.286))

NOT (Reference: ▶ Details (p.361))

## Piece\$

Extract the part of the character string which was separated by delimiter from the string.

### Format

**Piece\$(<string>, <delimiter>, <start>, <end>)**

### Parameter

| Parameter name | Data type             | Description                                                                                             |
|----------------|-----------------------|---------------------------------------------------------------------------------------------------------|
| <string>       | Character string type | Extraction target character string                                                                      |
| <delimiter>    | Character string type | Character string delimiter                                                                              |
| <start>        | Integer type          | Index number of the character string that the extraction is started (Number 1 to number of substrings)  |
| <end>          | Integer type          | Index number of the character string that the extraction is finished (Number 1 to number of substrings) |

### Return value

Returns the character string type value of the extracted character string.

### Description

Extracts the character string portions from the starting index number specified in the <start> parameter to the ending index number specified in the <end> parameter after assigning index numbers to the portions separated with the separator string specified in the <delimiter> parameter.

If the character string in the <string> parameter cannot be separated with the character string in the <delimiter> parameter, all characters in the character string is extracted as a portion.

Specify the starting index number to be extracted in the <start> parameter. The index numbers are assigned to the portions in ascending order starting with 1 to the first portion.

If a larger value than the number of separated portions is specified in the <start> parameter, an "Illegal function call" error will occur.

If the index number specified in the <end> parameter is larger than the index number specified in the <start> parameter, an "Illegal function call" error will occur.

If 0 or smaller value is specified in the <start> parameter or <end> parameter, an "Illegal function call" error will occur.

If a larger value than the number of separated portions is specified in the <end> parameter, all portions from the starting index number in the <start> parameter to the end of the character string are extracted.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified in the <string> parameter, the 255-character string before the 256th character is used for the macro function processing. Characters after the 256th character will be discarded.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- None.

## Example

Gets the part of the character string which was separated by a semicolon (;) delimiter from the string.

---

```
INPUTSTR$ = "PIECE1;PIECE2;PIECE3;PIECE4"
DELIMITER$ = ";"
```

```
Rem Extract the first substring of the character string
OUTPUTSTR1$ = Piece$(INPUTSTR$, DELIMITER$, 1, 1)
Rem Extract the third and fourth substrings from the character string
OUTPUTSTR2$ = Piece$(INPUTSTR$, DELIMITER$, 3, 4)
```

---

The result is shown below.

---

```
OUTPUTSTR1$ = "PIECE1"
OUTPUTSTR2$ = "PIECE3;PIECE4"
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: ▶ Details (p.138))

Hex\$ (Reference: ▶ Details (p.294))

Left\$ (Reference: ▶ Details (p.325))

Mid\$ (Reference: ▶ Details (p.356))

Str\$ (Reference: ▶ Details (p.490))

UCase\$ (Reference: ▶ Details (p.517))

Chr\$ (Reference: ▶ Details (p.152))

LCase\$ (Reference: ▶ Details (p.323))

Len (Reference: ▶ Details (p.327))

Right\$ (Reference: ▶ Details (p.403))

Str2\$ (Reference: ▶ Details (p.492))

Val (Reference: ▶ Details (p.535))

## Print

Outputs data in the system status console window.

### Format

**Print <expression>[;], <expression>...][;],**

### Parameter

| Parameter name | Data type                                                                                            | Description                                           |
|----------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type<br>Array | Numerical expression or character string to be output |

### Return value

None.

### Description

Outputs the numerical expression or character string specified in the <expression> parameter to the system status console window. (Reference: ► Use the system status console window to debug macro customize programs and check error descriptions. (p.24))

If the parameters are separated with commas (,), the specified expressions and character strings in the <expression> parameters are separated by tab delimiters and output.

If the parameters are separated with semicolons (;), the specified expressions and character strings in the <expression> parameters are output subsequently to the output expression or text string immediately before.

If any of semicolon (;) and comma (,) are specified at the end of parameters, a line break is added after all the parameters are output to the system status console window.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- After the data output to the system status console window, the window is displayed on top of the Sensor Controller main screen. To display the system status console window on top of the main screen, click [ ] on the upper-right of the system status console window or press [Alt] + [Tab] on the connected USB keyboard to the sensor controller.

**Example**

Gets the gotten values of "correlation value", "measurement coordinate X", and "measurement coordinate Y" by the search processing unit (Processing Unit number 2) and outputs to the system status console window. The correlation value, measured position coordinates X and Y can be gotten with External Reference Data numbers 5, 6, and 7 respectively.

---

Rem Get the measurement result.

GetUnitData 2, 5, CR#

GetUnitData 2, 6, X#

GetUnitData 2, 7, Y#

Rem Output the gotten measurement results to the system status console window.

Print CR#, ";"; X#, ";"; Y#

---

**Usable Modules**

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

**Supported Versions**

Version 3.50 or later

**Related Items**

Cont (Reference: ▶ Details (p.161))

DebugPrint (Reference: ▶ Details (p.184))

List (Reference: ▶ Details (p.331))

SetVar (Reference: ▶ Details (p.482))

VarList (Reference: ▶ Details (p.537))

Debug (Reference: ▶ Details (p.182))

GetUnitData (Reference: ▶ Details (p.286))

SetStop (Reference: ▶ Details (p.465))

Stop (Reference: ▶ Details (p.488))

## Print#

Outputs data in a file.

### Format

**Print #<fileNo>[, <expression>[:], <expression>...][:;],**

### Parameter

| Parameter name | Data type                                                                                            | Description                                           |
|----------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <fileNo>       | Integer type                                                                                         | File number (0 to 15) of the output destination file  |
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type<br>Array | Numerical expression or character string to be output |

### Return value

None.

### Description

Outputs an expression or a character string specified in the <expression> parameter in the file with the file number specified in the <fileNo> parameter.

If the parameters are separated with commas (,), the specified expressions and character strings in the <expression> parameters are separated by tab delimiters and output.

If the parameters are separated with semicolons (;), the specified expressions and character strings in the <expression> parameters are output subsequently to the output expression or text string immediately before. If any of semicolon (;) and comma (,) are specified at the end of parameters, a line break is added after all the parameters are output.

If an unopened file number is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a file number of the opened file by a macro function other than the Open For Append As# function and the Open For Output As# function is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a value outside the range of 0 to 15 is specified in the <fileNo> parameter, an "Illegal function call" error will occur.

If a character string longer than 127 characters is specified in the <expression> parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Outputs a character string to the file "E:\input.txt".

---

```
STRING$ = "Sample"
```

```
Rem Open the file  
Open "E:\input.txt" For Append As #1
```

```
Print #1, STRING$
```

```
Rem Close up the file.  
Close #1
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Close (Reference: ► Details (p.157))

Open For Append As# (Reference: ► Details (p.362))

Open For Output As# (Reference: ► Details (p.366))

## PutAll

Sets the output state of all output terminals.

### Format

**PutAll <iolent>, <state>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------|
| <iolent>       | Character string type | Identification name of the communication module to be used (always "Parallelo") (Reference: ► List of I/O Modules (p.581)) |
| <state>        | Integer type          | Output state of terminal                                                                                                   |

### Return value

None.

### Description

Sets the output state of all output terminals of the communication module specified in the <iolent> parameter to the state specified in the <state> parameter.

Normally "Parallelo" should be specified in the <iolent> parameter.

The output state of each output terminal is expressed as an integer value (OFF (0) or ON (1)) in each digit of a character string in binary notation.

In parallel I/O, integer values are returned expressing DO0 to DO15 in the 1st digit to the 16th digit.

Example: When DO0 to DO5 are ON and DO6 to DO15 are OFF

- Binary notation: 0000 0000 0011 1111
- Value of output states that are set: 63

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- When the operation mode is multi-line random trigger and there are three or more lines, the output states of the DO signal cannot be set. Even if this macro function is used when there are three or more lines, an "Illegal function call" error will not occur.

### Example

In the communication command macro, sets all DO output states of parallel I/O to ON.

---

```
IOMODULE$ = "Parallelo"
```

```
Rem Set the output state.  
PutAll IOMODULE$, 65535
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

BusyOut (Reference: ▶ Details (p.144))

GetPort (Reference: ▶ Details (p.272))

PutPort (Reference: ▶ Details (p.382))

GetAll (Reference: ▶ Details (p.258))

JudgeOut (Reference: ▶ Details (p.319))

RunOut (Reference: ▶ Details (p.406))

## PutPort

Sets the output state of the specified output terminal.

### Format

**PutPort <iolident>, <portNo>, <state>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                                                                                                                                |
|----------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <iolident>     | Character string type | Identification name of the communication module to be used (always "Parallelo")<br>(Reference: ►List of I/O Modules (p.581))                                                                                                                                                               |
| <portNo>       | Integer type          | Terminal number of output terminal whose output state is to be set.<br>Parallel I/O<br>• FH<br>DO0 to DO15: 0 to 15<br>GATE N: 100 + N x 8 (N: Line number (0 to 7))<br>BUSY N: 101+N x 8<br>OR N: 102+N x 8<br>ERROR N: 103+N x 8<br>RUN N: 104+N x 8<br>READY N: 105 + N x 8<br>ACK: 200 |
| <state>        | Integer type          | Output state of output terminal<br>0: Output OFF<br>1: Output ON                                                                                                                                                                                                                           |

### Return value

None.

### Description

Sets the state of the output terminal of the terminal number specified in the <portNo> parameter of the communication module specified in the <iolident> parameter to the output state specified in the <state> parameter.

Normally "Parallelo" should be specified in the <iolident> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified in any of the <iolident> and <portNo> parameters, an "Illegal function call" error will occur.

Even if an output status parameter value that does not exist (i.e., other than 0 and 1) is specified in the <state> parameter, an error will not occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

In the communication command macro, sets the output state of DO3 of parallel I/O to ON.

---

```
IOMODULE$ = "Parallelo"
```

```
Rem Set the output state.  
PutPort IOMODULE$, 3, 1
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

BusyOut (Reference: ▶ Details (p.144))

GetPort (Reference: ▶ Details (p.272))

PutAll (Reference: ▶ Details (p.380))

GetAll (Reference: ▶ Details (p.258))

JudgeOut (Reference: ▶ Details (p.319))

RunOut (Reference: ▶ Details (p.406))

## RaiseErrorProcEvent

Notify the error processing on the window.

### Format

**RaiseErrorProcEvent <errorKind>, <parameter>[, <wait>]**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <errorKind>    | Integer type | Error number to notify the error processing.<br>0: System error<br>1: System error (Fan or voltage error)<br>10: Camera connection error<br>11: Connected camera has been changed<br>12: Detection of camera over current<br>13: Configuration error of light device connection<br>20: Write error of image logging disk<br>30: Time out of parallel output<br>31: PLC link communication error<br>32: Detection of parallel I/O camera over current<br>40: Data load error<br>41: Data transfer error<br>42: Incorrect number of start-up Scene group<br>43: Incorrect number of start-up Scene |
| <parameter>    | Integer type | Error processing parameter to notify<br>This parameter is not used in this version. Therefore, specify to 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <wait>         | Integer type | Back timing of macro<br>0: Executes remaining program without waiting for measurement finish<br>1: Executes remaining program after waiting for measurement finish<br>2: Executes remaining program after waiting for measurement finish and measurement result display.                                                                                                                                                                                                                                                                                                                         |

### Return value

None.

### Description

Notify the error processing of error number specified <errorKind> and a parameter specified <parameter> on the PanDA window.

<parameter> is not used in this version. Therefore, specify to 0.

<wait> is optional.

Type mismatch error is occurred when wrong data is specified as parameter. Illegal function call error is not occurred even if non-exist number, values, combination of data or values.

Overflow error will be occurred when you specify a value extends range; -2147483648 to 2147483647.

Syntax error is occurred when you specify wrong formatting; typographical error of macro function's name, no comma or no spaces.

### Usage Cautions

Do not write to \*MCRINIT.

## Example

Communication Command Macro example.

When the logging error is occurred, ERROR signal is not turned to ON, and notices the error processing of event.

When other error is occurred, normal error processing is executed.

---

```
*ERRORPROC

If ERRORKIND& <>20 Then
    Rem When the logging error is occurred, ERROR signal is not turned to ON, and notices the error processing of
    event.
    ERROROUT "",ERRORKIND&
Endif

Rem Notices the error processing event on the window.
RaiseErrorProcEvent ERRORKIND&, 0, 0

Return
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 5.40, or more

## Related Items

ErrorOut (Reference: ▶ Details (p.243))

MessageBox (Reference: ▶ Details (p.355))

If Then Else (Reference: ▶ Details (p.296))

## RaiseOptionEvent

Notifies option events to the UI screen.

### Format

**RaiseOptionEvent <eventNo>, <parameter>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                           |
|----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <eventNo>      | Integer type | Event number to be notified<br>0xFF: Layout switch in the main screen of both sensor controller and remote operation tool<br>0x1FF: Layout switch in the main screen of the sensor controller<br>0x2FF: Layout switch in the main screen of the remote operation tool |
| <parameter>    | Integer type | Event parameter to be notified<br>If the event is layout switch<br>0 to 8: New layout number                                                                                                                                                                          |

### Return value

None.

### Description

Notifies the UI screen of the event specified in the <eventNo> parameter and the parameter specified in the <parameter> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

Through the use of the FH-AP1 Application Producer (sold separately), it is possible to create a new event in the UI screen.

### Usage Cautions

None.

### Example

Switches the main screen layout of the sensor controller with the communications command macro.

---

```
Rem switch to layout 1  
RaiseOptionEvent 511, 1
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

None.

## ReadPlcMemory

Reads a value from the PLC memory area.

### Format

**ReadPlcMemory** <iolent>, <area>, <channelOffset>, <channelCount>, <readData()>

### Parameter

| Parameter name  | Data type             | Description                                                                                          |
|-----------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <iolent>        | Character string type | Identification name of the communication module to be used (Reference: ►List of I/O Modules (p.581)) |
| <area>          | Integer type          | Area classification number of data output area to read in the target                                 |
| <channelOffset> | Integer type          | Offset from beginning of data output area to address where reading is to start.                      |
| <channelCount>  | Integer type          | Data size to read in (channel unit)                                                                  |
| <readData()>    | Integer array         | Loaded data                                                                                          |

### Return value

None.

### Description

Using the communication module specified in the <iolent> parameter, the data size specified in the <channelCount> parameter is read from the address that is offset by the value specified in the <channelOffset> parameter, of the PLC area type specified in the <area> parameter.

After reading the value from the PLC memory area using this macro function, execute the GetPlcData function to get the read value.

In the <readData()> parameter, specify the 1D integer array variable that stores the data that was read. Add () without specifying element numbers.

In the <area> parameter, specify the Identification of the register that is set with the PLC link setting in the system settings.

In the <channelCount> parameter, specify the size in channel units. The size of one integer type data item is two channels (four bytes), and thus to read one integer value, a one-element array should be prepared with the <readData()> parameter, and 2 should be specified in the <channelCount> parameter.

If a size larger than the array size specified in the <readData()> parameter is specified in the <channelCount> parameter, a "Subscript out of range" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- After using this macro function to read data, always use the GetPlcData function to get the value from the data that was read. If the value is gotten directly from the <readData()> parameter without using the GetPlcData function, the correct value may not be gotten.

## Example

In the communication command macro, reads multiple data from the PLC connected by PLC link.

---

```
IOMODULE$ = "UdpPlcLink"

Rem Get the settings of the output data area.
GetSystemData IOMODULE$, "outputArea", AREA&
GetSystemData IOMODULE$, "outputMemoryAddress", ADDRESS&

Rem Create the integer array variable to store the read data.
Dim DATA&(1)

Rem Load the data (4ch) from data output area.
ReadPlcMemory IOMODULE$, AREA&, ADDRESS&, 4, DATA&()

Get the values from the read data.
GetPlcData IOMODULE$, DATA&(), 0, 4, VALUE0&
GetPlcData IOMODULE$, DATA&(), 4, 4, VALUE1&
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 4.20 or later

## Related Items

GetPlcData (Reference: ▶ Details (p.268))

SetPlcData (Reference: ▶ Details (p.452))

WritePlcMemory (Reference: ▶ Details (p.548))

## ReceiveData

Receives data.

### Format

**ReceiveData** <iolident>, <inputData()>, <inputMaxSize>, <inputSize>[, <parameter()>, <parameterSize>]

### Parameter

| Parameter name  | Data type             | Description                                                                                          |
|-----------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <iolident>      | Character string type | Identification name of the communication module to be used (Reference: ►List of I/O Modules (p.581)) |
| <inputData()>   | Integer array         | Received data                                                                                        |
| <inputMaxSize>  | Integer type          | Maximum size of data to be received                                                                  |
| <inputSize>     | Integer type          | Received data size                                                                                   |
| <parameter()>   | Integer array         | The parameter data specified in the option                                                           |
| <parameterSize> | Integer type          | Size of parameter data specified optionally.                                                         |

### Return value

None.

### Description

Receive data up to the size specified in the <inputMaxSize> parameter by using the communication module specified in the <iolident> parameter.

In the <inputData()> parameter, specify the 1D integer array variable that will hold the data to be received, without adding element numbers but adding () to the variables. In the <inputSize> parameter, specify the integer variable that will hold the size of the received data.

Values that can be set in the <parameter()> parameter and <parameterSize> parameter depend on the communication module specified in the <iolident> parameter. The <parameter()> parameter and <parameterSize> parameter can be omitted.

With this macro function, data that has arrived at the sensor controller from an external device is received when the macro function is executed. If no data has arrived, 0 is stored in the <inputSize> parameter. If the desired data is not received the first time the macro function is executed, execute repeatedly until all data has been received.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If Handshake is on and data reception fails due to a communication timeout or other reason, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the target communication module is stopped. (Reference: ►Exclusive Control in a Process (p.79))

## Example

Receives data from an external device in the measurement process of the unit macro.

---

```
Rem Prepare a buffer that can receive 12 bytes of data.
```

```
Dim BUFFER$(11)
```

```
IOMODULE$ = "TcpNormal"
```

```
Rem Set the polling state of the communication module to stopped in order to receive the data.
```

```
SetPollingState IOMODULE$, False
```

```
Rem Executing the initialization of the reception data size.
```

```
SIZE& = 0
```

```
Repeat the reception process until the data has been received.
```

```
Try
```

```
Do
```

```
    Rem Attempting the data reception.
```

```
    ReceiveData IOMODULE$, BUFFER&(), 12, SIZE&
```

```
    Rem Once the data has been received, display the data size in the system status console window.
```

```
    If(SIZE& > 0) Then
```

```
        Print "Received data size = " + Str$(SIZE&)
```

```
    Endif
```

```
Loop While SIZE& = 0
```

```
Rem Data has been received, so set the polling state of the communication module to running.
```

```
SetPollingState IOMODULE$, True
```

```
Catch
```

```
Rem Return the polling state of the stopped communication module to running.
```

```
If GetPollingState(IOMODULE$) = False Then
```

```
SetPollingState IOMODULE$, True
```

```
Endif
```

```
End Try
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetPollingState (Reference: [▶ Details \(p.270\)](#))

SendString (Reference: [▶ Details \(p.439\)](#))

SendData (Reference: [▶ Details \(p.437\)](#))

SetPollingState (Reference: [▶ Details \(p.454\)](#))

## ReDim

Defines the array.

### Format

**ReDim <arrayName>(<maxCount>[, <maxCount>[, <maxCount>[, <maxCount>]]])**

### Parameter

| Parameter name | Data type    | Description                    |
|----------------|--------------|--------------------------------|
| <arrayName>    | ---          | Used array variable name       |
| <maxCount>     | Integer type | Maximum value of the subscript |

### Return value

None.

### Description

Defines a 1D to 4D array with maximum dimensional length specified in the <maxCount> parameter for each dimension.

Add one of type identifiers to the end of the parameter specified in the <arrayName>. (Reference: ▶ Variable (p.50))

Release the array variables defined with this macro function by executing the Erase function.

If the number of array dimension is different, two arrays with the same variable name are treated as the same variable.

An array variable and a variable with the same name are treated as different variables.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- The behavior changes depending on the use of the Option Explicit command.
  - When the Option Explicit command is used, and if variables that are not predefined by the Dim function are redefined, an error will occur for the undefined variables when loading macros.
  - When the Option Explicit command is not used, predefinition by the Dim function is not required. Array variables are defined the same as when using the Dim function.

### Example

Defines the array.

---

```
Dim AA&()
ReDim AA&(10)
Dim BB&(3)
Redim BB&(10)
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 5.40 or later

### Related Items

Erase (Reference: ▶ Details (p.238))

## RefreshImageWindow

---

Updates the image window.

### Format

**RefreshImageWindow**

### Parameter

None.

### Return value

None.

### Description

Updates the image window.

Execute this macro function to update the display after executing the ImageUpdate function when a graphic is redrawn in the image window or the image is redrawn.

### Usage Cautions

- None.

### Example

In the communication command macro, updates an image displayed in "Camera Image Freeze" image mode to the most recent image.

---

```
Rem Update the freeze image to the most recent image.  
ImageUpdate
```

```
Rem Apply the updated image to the display in the image window.  
RefreshImageWindow
```

---

### Usable Modules

Communication Command Macro / Scene Control Macro

### Supported Versions

Version 3.50 or later

### Related Items

ImageUpdate (Reference: ▶ Details (p.302))

RefreshTextWindow (Reference: ▶ Details (p.394))

SetImageWindow (Reference: ▶ Details (p.447))

RefreshJudgeWindow (Reference: ▶ Details (p.393))

RefreshTimeWindow (Reference: ▶ Details (p.395))

## RefreshJudgeWindow

---

Updates the judgement window.

### Format

**RefreshJudgeWindow**

### Parameter

None.

### Return value

None.

### Description

Updates the judgement window.

### Usage Cautions

- None.

### Example

Updates the judgement window in the communication command macro.

---

```
RefreshJudgeWindow
```

---

### Usable Modules

Communication Command Macro / Scene Control Macro

### Supported Versions

Version 3.50 or later

### Related Items

RefreshImageWindow (Reference: ▶ Details (p.392)) RefreshTextWindow (Reference: ▶ Details (p.394))  
RefreshTimeWindow (Reference: ▶ Details (p.395))

## RefreshTextWindow

---

Updating the text display window.

### Format

**RefreshTextWindow**

### Parameter

None.

### Return value

None.

### Description

Updating the text display window.

Execute this macro function to update the display after redrawing detailed results in the text window.

### Usage Cautions

- None.

### Example

In the communication macro, sets the value of the measurement result of calculation expression 0 of the calculation processing unit of Processing Unit number 5 of the current scene, and then updating the display of the text window."Calculation result of calculation expression 0" is external reference data number 5.

---

```
Rem Set the value as the measurement result.  
SetUnitData 5, 5, 100
```

```
Rem Update the text window display.  
RefreshTextWindow
```

---

### Usable Modules

Communication Command Macro / Scene Control Macro

### Supported Versions

Version 3.50 or later

### Related Items

RefreshImageWindow (Reference: ▶ Details (p.392)) RefreshJudgeWindow (Reference: ▶ Details (p.393))  
RefreshTimeWindow (Reference: ▶ Details (p.395)) SetTextWindow (Reference: ▶ Details (p.471))

## RefreshTimeWindow

---

Updates the display of the information window.

### Format

**RefreshTimeWindow**

### Parameter

None.

### Return value

None.

### Description

Updates the display of the information window.

### Usage Cautions

- None.

### Example

Updates the display of the information window in the communication macro.

---

```
RefreshTimeWindow
```

---

### Usable Modules

Communication Command Macro / Scene Control Macro

### Supported Versions

Version 3.50 or later

### Related Items

RefreshImageWindow (Reference: ▶ Details (p.392)) RefreshJudgeWindow (Reference: ▶ Details (p.393))  
RefreshTextWindow (Reference: ▶ Details (p.394)) SetTextWindow (Reference: ▶ Details (p.471))

## Rem

---

Put a comment in the program.

### Format

**Rem**

### Parameter

None.

### Return value

None.

### Description

Add a comment or a description in the program. The readability of the program is improved by adding comments.

For details on comment, refer to the "Comment" section. (Reference: [▶ Comment \(p.48\)](#))

### Usage Cautions

- Do not mix a non-comment statement together with a comment on the same line. If a comment and another type of statement are written in one same line, the comment may not be correctly recognized and the program may not operate properly.

### Example

Inserts a comment statement in a program to describe the program process.

---

```
Rem Display the judgement result provided by the latest executed processing unit on the system status console window.  
Print UnitJudge(UnitNo - 1)
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Print (Reference: [▶ Details \(p.376\)](#))

UnitNo (Reference: [▶ Details \(p.531\)](#))

UnitJudge (Reference: [▶ Details \(p.530\)](#))

## Remeasure

Executes remeasurement.

### Format

**Remeasure <preImageNo>[, <wait>]**

**Remeasure <fileName>[, <wait>]**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                                                                                                                                                           |
|----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <preImageNo>   | Integer type          | Image Logging No. which is re-measured. (0 to the number of Image logging which has been logged.)                                                                                                                                                                                                                     |
| <fileName>     | Character string type | Image file name of image to be remeasured.                                                                                                                                                                                                                                                                            |
| <wait>         | Integer type          | Recovery timing of macro function<br>0: Executes subsequent program lines without waiting for measurement to end.<br>1: Waits for measurement to end and then executes subsequent program lines.<br>2: Waits for measurement to end and measurement result display to end and then executes subsequent program lines. |

### Return value

None.

### Description

Executes remeasurement at the recovery timing specified in the <wait> parameter for the image of the image logging number specified in the <preImageNo> parameter or the image of the image file name specified in the <fileName> parameter.

In the <preImageNo> parameter, specify the number of the logging image already logged as a logging image in the main unit. (Reference: ► *Setting Logging Conditions [Logging Setting]* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If 0 is specified for the <preImageNo> parameter, remeasurement is executed using the most recent logged image of the main unit.

If the <wait> parameter is omitted, operation is the same as when the <wait> parameter is set to 0.

When 0 is specified for the <wait> parameter, there is a possibility that the measurement processing executed immediately after execution of this macro function will not have ended and the measurement result cannot be properly gotten. If you want to get the measurement result, specify 1 or 2 for the <wait> parameter. If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types is specified for the parameter, an "Illegal function call" error will not occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- Execute this macro function when a measurement-in-progress signal such as the BUSY signal is OFF and measurement is allowed. (Reference: ▶ State Transitions and Execution Timing (p.72))

## Example

In the communication command macro, gets the measurement X coordinate and measurement Y coordinate of the search processing unit of Processing Unit number 2 after remeasurement is executed using the most recent logging image. The measured X and Y coordinates can be gotten with External Reference Data numbers 6 and 7 respectively.

---

```
Rem Execute remeasurement and wait until measurement ends.  
Remeasure 0, 1
```

```
Rem Get the measurement result.  
GetUnitData 2, 6, POSX#  
GetUnitData 2, 7, POSY#
```

---

## Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

MeasureStart (Reference: ▶ Details (p.351))

MeasureStop (Reference: ▶ Details (p.353))

Measure (Reference: ▶ Details (p.346))

## RenumUnitNo

Gets the processing unit number after flow edit.

### Format

**RenumUnitNo(<oldUnitNo>)**

### Parameter

| Parameter name | Data type    | Description                                                                                   |
|----------------|--------------|-----------------------------------------------------------------------------------------------|
| <oldUnitNo>    | Integer type | Processing unit number before edit (0 to (Processing unit number of current scene minus one)) |

### Return value

Returns the processing unit number after update of measurement flow as an integer.

### Description

Gets the processing unit number specified in the <oldUnitNo> parameter after editing the measurement flow. If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

Besides using this macro function, using reference variables follows the changes of the processing unit numbers resulting from editing the measurement flow. (Reference: ▶ Variable (p.50))

### Usage Cautions

- This macro function can only be used in the \*RENUMPROC subroutine. If used in another subroutine, an "Illegal function call" will occur.

### Example

Uses the \*RENUMPROC subroutine in the Unit Macro processing unit to get the processing unit number (whose original processing unit number was 5) after editing the measurement flow.

---

```
*RENUMPROC
```

```
LATESTUNITNO& = 5
```

```
Rem Get the processing unit number after flow edit.
```

```
LATESTUNITNO& = RenumUnitNo(LATESTUNITNO&)
```

```
Return
```

---

### Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DeleteUnit (Reference: ▶ Details (p.186))

UnitNo (Reference: ▶ Details (p.531))

InsertUnit (Reference: ▶ Details (p.307))

Ut (Reference: ▶ Details (p.534))

## RGB

Gets the color value.

### Format

**RGB(<red>, <green>, <blue>)**

### Parameter

| Parameter name | Data type    | Description                                                |
|----------------|--------------|------------------------------------------------------------|
| <red>          | Integer type | Red component of the color value being gotten (0 to 255)   |
| <green>        | Integer type | Green component of the color value being gotten (0 to 255) |
| <blue>         | Integer type | Blue component of the color value being gotten (0 to 255)  |

### Return value

Returns the color value as an integer value.

The red component is stored in the lower byte of the color value, green component is stored in the middle byte of the color value, and blue component is stored in the upper byte of the color value.

### Description

Gets the color value of the color that has the red component specified in the <red> parameter, the green component specified in the <green> parameter, and the blue component specified in the <blue> parameter. A drawing color can be specified in specifying a color value in a macro function that sets a drawing style and in some drawing macro functions.

If a value that exceeds the allowed setting range is specified in the <red> parameter, <green> parameter, or <blue> parameter, the value is handled as being 255.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Displays a green character string in the text window.

---

```
Rem Get the color value of green.
COLOR& = RGB(0, 255, 0)
```

```
Rem Draw the character string in the text window.
DrawText "Processing OK", COLOR&, 1
```

---

### Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawFillImage (Reference: ▶ Details (p.212))

SetDrawStyle (Reference: ▶ Details (p.442))

DrawText (Reference: ▶ Details (p.227))

SetTextStyle (Reference: ▶ Details (p.469))

## Right\$

Extracts the specified length of characters from the right side of character string.

### Format

**Right\$(<string>, <length>)**

### Parameter

| Parameter name | Data type             | Description                                                                           |
|----------------|-----------------------|---------------------------------------------------------------------------------------|
| <string>       | Character string type | Extraction target character string                                                    |
| <length>       | Integer type          | Length of characters to be extracted (1 to the length of the target character string) |

### Return value

Returns the character string type value of the extracted character string.

### Description

Extracts the specified length in the <length> parameter from the right side of specified character string in the <string> parameter.

Specify the length of characters to be extracted in bytes for the <length> parameter. Each single-byte character (i.e., half-width alphanumeric character and symbol) consumes one byte, whereas each double-byte character consumes two bytes.

If the length specified in the <length> parameter is longer than the length of the character string specified in the <string> parameter, the whole character string in the parameter is extracted.

If 0 or less number is specified in the <length> parameter, an "Illegal function call" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

Even if a character string longer than 255 characters is specified for a character string parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Extracts 6-byte length of characters from the right side of the character string. Because one half-width alphabet consumes single byte, this example extracts 6 characters from the character string.

---

```
CHARA$ = "Measurement Result"
```

```
Rem Extract 6-byte length of characters from the right side of the character string.  
TITLE$ = Right$(CHARA$, 6)
```

---

The result is shown below.

---

```
TITLE$ = "Result"
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: ▶ Details (p.138))

Hex\$ (Reference: ▶ Details (p.294))

Left\$ (Reference: ▶ Details (p.325))

Mid\$ (Reference: ▶ Details (p.356))

Str\$ (Reference: ▶ Details (p.490))

UCase\$ (Reference: ▶ Details (p.517))

Chr\$ (Reference: ▶ Details (p.152))

LCase\$ (Reference: ▶ Details (p.323))

Len (Reference: ▶ Details (p.327))

Piece\$ (Reference: ▶ Details (p.374))

Str2\$ (Reference: ▶ Details (p.492))

Val (Reference: ▶ Details (p.535))

## Rmdir

Deletes a directory.

### Format

**Rmdir <directoryName>**

### Parameter

| Parameter name  | Data type             | Description                       |
|-----------------|-----------------------|-----------------------------------|
| <directoryName> | Character string type | Name of a directory to be deleted |

### Return value

None.

### Description

Deletes the directory specified in the <directoryName> parameter.

In the <directoryName> parameter, use an absolute path to specify the directory name of the directory to be deleted.

In the following case, an "Illegal function call" error occurs without deleting a directory.

- The specified directory does not exist
- If the external memory is specified for where to delete a directory from with no external memory inserted
- If more than one file is in the specified directory

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Deletes a directory named "IMAGE2" under the root folder of the E drive.

---

```
Rmdir "E:\IMAGE2"
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Dskf (Reference: ▶ Details (p.233))

GetSystemData (Reference: ▶ Details (p.276))

Kill (Reference: ▶ Details (p.321))

Fcopy (Reference: ▶ Details (p.252))

IsFile (Reference: ▶ Details (p.311))

Mkdir (Reference: ▶ Details (p.358))

## RunOut

Sets the output state of the RUN signal.

### Format

**RunOut <ioident>, <state>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                       |
|----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <ioident>      | Character string type | Identification name of the communication module to be used ("Parallelo" or "EtherCAT") (Reference: ► List of I/O Modules (p.581)) |
| <state>        | Integer type          | Output state of terminal<br>0: Output OFF<br>1: Output ON                                                                         |

### Return value

None.

### Description

Sets the RUN signal of the communication module specified in the <ioident> parameter to the output state specified in the <state> parameter.

Normally "Parallelo" or "EtherCAT" should be specified in the <ioident> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If an identification name that does not exist is specified in the <ioident> parameter, an "Illegal function call" error will occur.

If specifying a blank character string ("") as <ioident> parameter or omitting <ioident> parameter, the setting is applied to all communication modules.

Even if an output status parameter value that does not exist (i.e., other than 0 and 1) is specified in the <state> parameter, an error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the communication command macro, sets the BUSY signal of parallel I/O to ON.

---

```
IOMODULE$ = "Parallelo"
```

```
Rem Set the output state.  
RunOut IOMODULE$, 1
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 5.40 or later

## Related Items

BusyOut (Reference: ▶ Details (p.144))  
GetPort (Reference: ▶ Details (p.272))  
PutAll (Reference: ▶ Details (p.380))

GetAll (Reference: ▶ Details (p.258))  
JudgeOut (Reference: ▶ Details (p.319))  
PutPort (Reference: ▶ Details (p.382))

## SaveBackupData

Saves the system + scene group 0 data.

### Format

**SaveBackupData(<fileName>)**

### Parameter

| Parameter name | Data type             | Description                                                         |
|----------------|-----------------------|---------------------------------------------------------------------|
| <fileName>     | Character string type | File name of bkd file to save (system + scene group 0 data (*.bkd)) |

### Return value

None.

### Description

Saves the system + scene group 0 in the file with the file name specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be saved.

Specify the file extension ".bkd" in the file name specified in the <fileName> parameter.

If the file specified in the <fileName> parameter already exists, it is overwritten.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))
- When you use FH series, do not save to the any folder except RAMDisk and external memory device (such as C:\ProgramFiles\FZ).

It is possible not to perform correctly due to the decrease of Scene data storage region.

| Save Destination       | FH series                                    |
|------------------------|----------------------------------------------|
| RAMDisk                | C:\Data\RAMDisk                              |
| External Memory Device | E:\, F:\, G:\, H:\, M:\ (only for FH series) |

### Example

Saves the system + scene group 0 data to a file.

---

```
Rem Save the system + scene group 0 data to a file.  
SaveBackupData "E:\BACKDIR/BackupData.bkd"
```

---

### Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

SaveData (Reference: ▶ Details (p.410))

SaveSceneGroup (Reference: ▶ Details (p.417))

SaveUnitData (Reference: ▶ Details (p.421))

LoadBackupData (Reference: ▶ Details (p.333))

SaveScene (Reference: ▶ Details (p.415))

SaveSystemData (Reference: ▶ Details (p.419))

## SaveData

---

Saves the data to the controller.

### Format

**SaveData**

### Parameter

None.

### Return value

None.

### Description

Saves the current system group data and the system data to the sensor controller.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Saves the current system group data and the system data to the sensor controller.

---

```
Rem Save the data to the controller.  
SaveData
```

---

### Usable Modules

Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

SaveBackupData (Reference: ▶ Details (p.408))  
SaveSceneGroup (Reference: ▶ Details (p.417))  
SaveUnitData (Reference: ▶ Details (p.421))

SaveScene (Reference: ▶ Details (p.415))  
SaveSystemData (Reference: ▶ Details (p.419))

## SaveImage

Saves image data.

### Format

**SaveImage <preImageNo>, <fileName>**

### Parameter

| Parameter name | Data type             | Description                                                                                                    |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------------|
| <preImageNo>   | Integer type          | Number (-1 to (number of images already logged in main unit minus one)) of main unit logging image to be saved |
| <fileName>     | Character string type | File name of file to be saved                                                                                  |

### Return value

None.

### Description

Saves the image that has the image logging number specified in the <preImageNo> parameter, using the file name specified in the <fileName> parameter, in ifz format.

In the <preImageNo> parameter, specify the number of the logging image already logged as a logging image in the main unit. (Reference: ► *Setting Logging Conditions [Logging Setting]* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If -1 is specified for the <preImageNo> parameter, the most recent input image is saved.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be saved.

Specify the file extension ".ifz" in the file name specified in the <fileName> parameter.

If the file of the file name specified in the <fileName> parameter already exists, it is overwritten.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Regardless of logging settings, this command saves the image file in the IFZ format.
- When you use FH series, do not save to the any folder except RAMDisk and external memory device (such as C:\ProgramFiles\FZ).

It is possible not to perform correctly due to the decrease of Scene data storage region.

| Save Destination       | FH series               |
|------------------------|-------------------------|
| RAMDisk                | C:\Data\RAMDisk         |
| External Memory Device | E:\, F:\, G:\, H:\, M:\ |

## Example

Saves the most recent measurement image.

---

Rem Save the most recent input image as a file.  
SaveImage -1, "E:\IMAGE\sample.ifz"

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

Remeasure (Reference: ▶ Details (p.397))

## SaveMeasureImage

Saves the measurement image of the processing unit.

### Format

**SaveMeasureImage** <measureImageNo>, <fileName>, <imageFormat>[, <startX>, <startY>, <sizeX>, <sizeY>]

### Parameter

| Parameter name   | Data type             | Description                                                                                                               |
|------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------|
| <measureImageNo> | Integer type          | Measurement image number of the measurement image to be saved (always 0)                                                  |
| <fileName>       | Character string type | File name of file to be saved                                                                                             |
| <imageFormat>    | Integer type          | Image format of image to be saved<br>0: BMP format<br>10000 to 10100: JPEG format (10000 + JPEG image quality (0 to 100)) |
| <startX>         | Integer type          | Start point X of image region to be saved                                                                                 |
| <startY>         | Integer type          | Start point Y of image region to be saved                                                                                 |
| <sizeX>          | Integer type          | X dimension of image to be saved (at least 1)                                                                             |
| <sizeY>          | Integer type          | Y dimension of image to be saved (at least 1)                                                                             |

### Return value

None.

### Description

Saves the measurement image specified in the <measureImageNo> parameter in a file with the file name specified in the <fileName> parameter, the image format specified in the <imageFormat> parameter, and the pixel size specified in the <sizeX> and <sizeY> parameters cut off from the position in camera coordinates that starts from the upper left point specified in the <startX> parameter and <startY> parameter.

If the <start X>, <start Y>, <size X>, and <size Y> parameters are omitted, the entire image is saved.

Always specify 0 in the <measureImageNo> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be saved.

In the file name specified in the <fileName> parameter, specify the file extension ".bmp" or ".jpg/jpeg".

If the file of the file name specified in the <fileName> parameter already exists, it is overwritten.

Specify a value of at least 1 in the <sizeX> and <sizeY> parameters.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- When you use FH series, do not save to the any folder except RAMDisk and external memory device (such as C:\ProgramFiles\FZ).  
It is possible not to perform correctly due to the decrease of Scene data storage region.

| Save Destination       | FH series               |
|------------------------|-------------------------|
| RAMDisk                | C:\Data\RAMDisk         |
| External Memory Device | E:\, F:\, G:\, H:\, M:\ |

## Example

Saves the entire image of measurement image 0 in a file in BMP format.

---

```
SaveMeasureImage 0, "E:\IMAGE\sample.bmp", 0
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 4.00 or later

## Related Items

GetImageSize (Reference: ▶ Details (p.262))

GetSystemData (Reference: ▶ Details (p.276))

GetUnitData (Reference: ▶ Details (p.286))

## SaveScene

Saves the scene data.

### Format

**SaveScene** <sceneNo>, <fileName>

### Parameter

| Parameter name | Data type             | Description                                 |
|----------------|-----------------------|---------------------------------------------|
| <sceneNo>      | Integer type          | Scene number to save the scene (0 to 127)   |
| <fileName>     | Character string type | File name of the scene data to save (*.scn) |

### Return value

None.

### Description

Saves the scene data of the scene number specified in the <sceneNo> parameter in the file with the file name specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be saved.

Specify the file extension ".scn" in the file name specified in the <fileName> parameter.

If the file specified in the <fileName> parameter already exists, it is overwritten.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))
- When you use FH series, do not save to the any folder except RAMDisk and external memory device (such as C:\ProgramFiles\FZ).

It is possible not to perform correctly due to the decrease of Scene data storage region.

| Save Destination       | FH series               |
|------------------------|-------------------------|
| RAMDisk                | C:\Data\RAMDisk         |
| External Memory Device | E:\, F:\, G:\, H:\, M:\ |

### Example

Saves the scene data of scene 2 in a file

---

```
Rem Save the scene data of scene 2 in a file.
SaveScene 2, "E:\BACKDIR\scene02.scn"
```

---

## Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

SaveBackupData (Reference: ▶ Details (p.408))

SaveSceneGroup (Reference: ▶ Details (p.417))

SaveUnitData (Reference: ▶ Details (p.421))

LoadScene (Reference: ▶ Details (p.335))

SaveData (Reference: ▶ Details (p.410))

SaveSystemData (Reference: ▶ Details (p.419))

SceneNo (Reference: ▶ Details (p.431))

## SaveSceneGroup

Saves the scene group data.

### Format

**SaveSceneGroup <sceneGroupNo>, <fileName>**

### Parameter

| Parameter name | Data type             | Description                                             |
|----------------|-----------------------|---------------------------------------------------------|
| <sceneGroupNo> | Integer type          | Scene group number of the scene group to save (0 to 31) |
| <fileName>     | Character string type | File name of the scene group data to save (*.sgp)       |

### Return value

None.

### Description

Saves the scene group data of the scene group number specified in the <sceneNo> parameter in the file with the file name specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be saved.

Specify the file extension ".sgp" in the file name specified in the <fileName> parameter.

If the file specified in the <fileName> parameter already exists, it is overwritten.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))
- When you use FH series, do not save to the any folder except RAMDisk and external memory device (such as C:\ProgramFiles\FZ).

It is possible not to perform correctly due to the decrease of Scene data storage region.

| Save Destination       | FH series               |
|------------------------|-------------------------|
| RAMDisk                | C:\Data\RAMDisk         |
| External Memory Device | E:\, F:\, G:\, H:\, M:\ |

### Example

Saves the scene group data of scene group 2 in a file

---

```
Rem Save the scene group data of scene group 2 in a file.
SaveSceneGroup 2, "E:\BACKDIR\scenegroup02.sgp"
```

---

## Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

SaveBackupData (Reference: ▶ Details (p.408))

SaveScene (Reference: ▶ Details (p.415))

SaveUnitData (Reference: ▶ Details (p.421))

LoadSceneGroup (Reference: ▶ Details (p.337))

SaveData (Reference: ▶ Details (p.410))

SaveSystemData (Reference: ▶ Details (p.419))

SceneGroupNo (Reference: ▶ Details (p.427))

## SaveSystemData

Saves the system data.

### Format

**SaveSystemData <fileName>**

### Parameter

| Parameter name | Data type             | Description                                  |
|----------------|-----------------------|----------------------------------------------|
| <fileName>     | Character string type | File name of the system data to save (*.ini) |

### Return value

None.

### Description

Saves the system data in the file with the file name specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be saved.

Specify the file extension ".ini" in the file name specified in the <fileName> parameter.

If the file specified in the <fileName> parameter already exists, it is overwritten.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))
- When you use FH series, do not save to the any folder except RAMDisk and external memory device (such as C:\ProgramFiles\FZ).

It is possible not to perform correctly due to the decrease of Scene data storage region.

| Save Destination       | FH series               |
|------------------------|-------------------------|
| RAMDisk                | C:\Data\RAMDisk         |
| External Memory Device | E:\, F:\, G:\, H:\, M:\ |

### Example

Saves the system data in a file

```
Rem Save the system data in a file.
SaveSystemData "E:\BACKDIR\backupsysset.ini"
```

### Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

SaveBackupData (Reference: ▶ Details (p.408))

SaveScene (Reference: ▶ Details (p.415))

SaveUnitData (Reference: ▶ Details (p.421))

LoadSystemData (Reference: ▶ Details (p.339))

SaveData (Reference: ▶ Details (p.410))

SaveSceneGroup (Reference: ▶ Details (p.417))

## SaveUnitData

Saves a processing unit.

### Format

**SaveUnitData <sceneNo>, <unitNo>, <unitCount>, <fileName>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                 |
|----------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <sceneNo>      | Integer type          | Scene number to save the scene (-1 to 127)                                                                                                                                  |
| <unitNo>       | Integer type          | Processing unit number to begin to save (0 to (the number of registered processing units in the current scene minus one))                                                   |
| <unitCount>    | Integer type          | Number of pieces of the processing unit to save (-1, 1 to (the number of registered processing units in the current scene) - (the processing unit number to begin to save)) |
| <fileName>     | Character string type | File name of the processing unit to save (*unt)                                                                                                                             |

### Return value

None.

### Description

Saves processing unit data in the file with the file name specified in the <fileName> parameter from processing units whose processing unit numbers are specified in the <unitNo> parameter, with the number of processing units specified in the <unitCount> parameter, of the scene number specified in the <sceneNo> parameter.

When -1 is specified in the <sceneNo> parameter, the scene number of the current scene is specified in the scene number of the scene to be saved.

If -1 is specified in the <unitCount> parameter, all processing unit data included in the processing unit data file is saved.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be saved.

Specify the file extension ".unt" in the file name specified in the <fileName> parameter.

If the file specified in the <fileName> parameter already exists, it is overwritten.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))
- When you use FH series, do not save to the any folder except RAMDisk and external memory device (such as C:\ProgramFiles\FZ).

It is possible not to perform correctly due to the decrease of Scene data storage region.

| Save Destination       | FH series               |
|------------------------|-------------------------|
| RAMDisk                | C:\Data\RAMDisk         |
| External Memory Device | E:\, F:\, G:\, H:\, M:\ |

## Example

Saves the processing units of Processing Unit number 2 to Processing Unit number 4 of the current scene in a processing unit data file.

---

```
Rem Save Processing Unit number 2 to Processing Unit number 4 of the current scene in a processing unit data file.  
SaveUnitData -1, 2, 3, "E:\BACKDIR\unitsave.unt"
```

---

## Usable Modules

Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))  
SaveBackupData (Reference: ▶ Details (p.408))  
SaveScene (Reference: ▶ Details (p.415))  
SaveSystemData (Reference: ▶ Details (p.419))  
UnitNo (Reference: ▶ Details (p.531))

LoadUnitData (Reference: ▶ Details (p.341))  
SaveData (Reference: ▶ Details (p.410))  
SaveSceneGroup (Reference: ▶ Details (p.417))  
SceneNo (Reference: ▶ Details (p.431))  
Ut (Reference: ▶ Details (p.534))

## SceneCount

---

Gets the number of scenes that can be used.

### Format

SceneCount

### Parameter

None.

### Return value

Returns the number of scenes that can be used as an integer.

### Description

Gets the number of scenes that can be used.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the number of scenes that can be used.

---

```
NUM& = SceneCount
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ChangeScene (Reference: ▶ Details (p.148))

CopyScene (Reference: ▶ Details (p.166))

ClearScene (Reference: ▶ Details (p.155))

SceneNo (Reference: ▶ Details (p.431))

## SceneDescription\$

Gets the scene description.

### Format

SceneDescription\$(<sceneNo>)

### Parameter

| Parameter name | Data type    | Description                                                         |
|----------------|--------------|---------------------------------------------------------------------|
| <sceneNo>      | Integer type | Scene number (0 to 127) of scene whose description is to be gotten. |

### Return value

Returns the scene description as a character string.

### Description

Gets the description set in the scene of the scene number specified in the <sceneNo> parameter.

If a description is not set, the null character string ("" ) is returned.

The scene description can be set in the maintenance screen or by executing the SetSceneDescription function. (Reference: ▶ SetSceneDescription (p.458)) (Reference: ▶ *Editing Scenes in the Vision System FH/ FHV Series User's Manual* (Cat. No. Z365))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the description of scene 1, and if a description is not set, setting the description.

```
Rem Get the scene description
DESCRIPTION$ = SceneDescription$(1)

If DESCRIPTION$ = "" Then
  Rem Set the scene description
  SetSceneDescription 1, "Description 1"
Endif
```

### Usable Modules

Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

## Related Items

SceneMaker\$ (Reference: ▶ Details (p.429))

SceneTitle\$ (Reference: ▶ Details (p.432))

SetSceneDescription (Reference: ▶ Details (p.458)) SetSceneMaker (Reference: ▶ Details (p.461))

SetSceneTitle (Reference: ▶ Details (p.463))

## SceneGroupCount

---

Gets the number of usable scene groups.

### Format

**SceneGroupCount**

### Parameter

None.

### Return value

The number of usable scene groups is returned as an integer value.

### Description

Gets the number of usable scene groups.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the number of usable scene groups.

---

```
NUM& = SceneGroupCount
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ChangeSceneGroup (Reference: ▶ Details (p.149))    ClearSceneGroup (Reference: ▶ Details (p.156))  
CopySceneGroup (Reference: ▶ Details (p.167))    SceneGroupNo (Reference: ▶ Details (p.427))

## SceneGroupNo

Gets the scene group number of the current scene group.

### Format

**SceneGroupNo**

### Parameter

None.

### Return value

The scene group number of the current scene group is returned as an integer value.

### Description

Gets the scene group number of the current scene group.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the scene group number of the current scene group, and if the scene group number is 2, change to scene 3.

---

```
Rem Get the scene group number of the current scene group.
NO& = SceneGroupNo
```

```
Rem Get the scene group number, and if 2, change to scene 3
If NO& = 2 Then
  ChangeScene3
```

```
Endif
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ChangeScene (Reference: ▶ Details (p.148))

ClearSceneGroup (Reference: ▶ Details (p.156))

SceneGroupCount (Reference: ▶ Details (p.426))

ChangeSceneGroup (Reference: ▶ Details (p.149))

CopySceneGroup (Reference: ▶ Details (p.167))

SceneNo (Reference: ▶ Details (p.431))

## SceneGroupTitle\$

Gets the title of the scene group.

### Format

**SceneGroupTitle\$(<sceneGroupNo>)**

### Parameter

| Parameter name | Data type    | Description                                                                        |
|----------------|--------------|------------------------------------------------------------------------------------|
| <sceneGroupNo> | Integer type | Scene group number (0 to 31) of the scene group whose scene group title is gotten. |

### Return value

Returns the title value of the character string scene group.

### Description

Gets the title set in the scene group that has the scene group number specified in the <sceneGroupNo> parameter.

If the title is not set, returns the default character string such as "scene group 0".

The scene group title can be set by executing the SetSceneGroupTitle function, or in the scene maintenance screen. (Reference: ▶ SetSceneMaker (p.461)) (Reference: ▶ *Editing Scenes* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the title of scene group 2.

---

```
TITLE$ = SceneGroupTitle$(2)
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

SceneTitle\$ (Reference: ▶ Details (p.432))

SetSceneGroupTitle (Reference: ▶ Details (p.460))

## SceneMaker\$

Gets the scene creator.

### Format

**SceneMaker\$(<sceneNo>)**

### Parameter

| Parameter name | Data type    | Description                                                     |
|----------------|--------------|-----------------------------------------------------------------|
| <sceneNo>      | Integer type | Scene number (0 to 127) of scene whose creator is to be gotten. |

### Return value

Returns the value of the scene creator as a character string.

### Description

Gets the name of the creator set in the scene that has the screen number specified in the <sceneNo> parameter. If a creator name is not set, returns the null character string ("").

The scene creator can be set in the scene maintenance screen, or by executing the SetSceneMaker function. (Reference: ▶ SetSceneMaker (p.461)) (Reference: ▶ *Editing Scenes* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the creator of scene 3, and if not set, setting the creator.

---

```
Rem Get the creator of the scene.
```

```
NAME$ = SceneMaker$(3)
```

```
If NAME$ = "" Then
```

```
  Rem Set the creator of the scene.
```

```
  SetSceneMaker 3, "Maker"
```

```
Endif
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

## Related Items

SceneDescription\$ (Reference: ▶ Details (p.424))    SceneTitle\$ (Reference: ▶ Details (p.432))  
SetSceneDescription (Reference: ▶ Details (p.458))    SetSceneMaker (Reference: ▶ Details (p.461))  
SetSceneTitle (Reference: ▶ Details (p.463))

## SceneNo

---

Gets the scene number of the current scene.

### Format

SceneNo

### Parameter

None.

### Return value

Returns the scene number of the current scene as an integer value.

### Description

Gets the scene number of the current scene.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the scene number of the current scene, and if not 2, changing to scene 2.

---

```
Rem Gets the scene number of the current scene
NO& = SceneNo
```

```
Rem If the scene number is not 2, change to scene 2
If NO& <> 2 Then
  ChangeScene 2
Endif
```

---

### Usable Modules

Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

ChangeScene (Reference: ▶ Details (p.148))

CopyScene (Reference: ▶ Details (p.166))

ClearScene (Reference: ▶ Details (p.155))

SceneCount (Reference: ▶ Details (p.423))

## SceneTitle\$

Gets the scene title.

### Format

**SceneTitle\$(<sceneNo>)**

### Parameter

| Parameter name | Data type    | Description                                                  |
|----------------|--------------|--------------------------------------------------------------|
| <sceneNo>      | Integer type | Scene number (0 to 127) of scene whose title is to be gotten |

### Return value

Returns the scene title as a character string.

### Description

Gets the title set in the scene that has the scene number specified in the <sceneNo> parameter.

If a title is not set, returns the default character string, such as "Scene0".

The scene title can be set in the scene maintenance screen or flow edit screen, or by executing the SetSceneTitle function. (Reference: ▶ SetSceneMaker (p.461)) (Reference: ▶ *Editing Scenes* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365)) (Reference: ▶ *Editing Processing Units in Scenes* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the title of scene 2.

---

```
TITLE$ = SceneTitle$(2)
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

SceneDescription\$ (Reference: ▶ Details (p.424))    SceneMaker\$ (Reference: ▶ Details (p.429))  
SetSceneDescription (Reference: ▶ Details (p.458))    SetSceneMaker (Reference: ▶ Details (p.461))  
SetSceneTitle (Reference: ▶ Details (p.463))

## ScreenCapture

Saves the capture of the screen.

### Format

**ScreenCapture <fileName>**

### Parameter

| Parameter name | Data type             | Description                                     |
|----------------|-----------------------|-------------------------------------------------|
| <fileName>     | Character string type | File name that saves the capture of the screen. |

### Return value

None.

### Description

Takes a screen capture of the sensor controller screen and saves it in BMP format with the file name specified in the <fileName> parameter.

In the <fileName> parameter, use an absolute path to specify the file name of the file to be saved.

In the <fileName> parameter, specify the file name with the file extension ".bmp" to save as BMP. It is not possible to capture the screen correctly if an extension other than ".bmp" is specified.

If the file of the file name specified in the <fileName> parameter already exists, it is overwritten.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- When you use FH series, do not save to the any folder except RAMDisk and external memory device (such as C:\ProgramFiles\FZ).

It is possible not to perform correctly due to the decrease of Scene data storage region.

| Save Destination       | FH series               |
|------------------------|-------------------------|
| RAMDisk                | C:\Data\RAMDisk         |
| External Memory Device | E:\, F:\, G:\, H:\, M:\ |

### Example

Captures the screen and save the screen capture to a file with a file name "E:\IMAGE\samplecapture.bmp".

```
ScreenCapture "E:\IMAGE\samplecapture.bmp"
```

### Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetSystemData (Reference: ▶ Details (p.276))

Str2\$ (Reference: ▶ Details (p.492))

Str\$ (Reference: ▶ Details (p.490))

## Select Case Case Else End Select

Controls the process flow according to the specified condition.

### Format

```

Select <expression>
[Case <value>
<caseStatement>]
:
:
[Case Else
<elseStatement>]
End Select

```

### Parameter

| Parameter name  | Data type    | Description                                                                                           |
|-----------------|--------------|-------------------------------------------------------------------------------------------------------|
| <expression>    | Integer type | Expression that controls the process flow.                                                            |
| <value>         | Integer type | Numeric value that is compared with the expression value                                              |
| <caseStatement> | ---          | Statement that is executed when a result value of the expression and the numeric value match          |
| <elseStatement> | ---          | Statement that is executed when any of numeric values did not match a result value of the expression. |

### Return value

None.

### Description

Among the multiple Case block statement in the statement, executes the statements whose specified value in the <value> parameter match the value of the specified expression in the <expression> parameter.

If any of values specified in the <value> parameters did not match the result value of the specified expression in the <expression> parameter, the Case Else block statement specified in the <elseStatement> parameter is executed.

If there are multiple of <value> parameters having a value that matches a result value of the expression, only the first statement from the beginning of the Case block statement having a value that matches a result value of the expression is executed.

Case block statements and Case Else block statement are optional.

If the program process is jumped into or out of the Case and Case Else block statements using the Goto function in a statement, unexpected operation may occur.

If neither the Select statement nor the End Select statement is used, either the "CASE without SELECT", "END SELECT without SELECT", "SELECT without END SELECT", or "CASE without END SELECT" error will occur depending on the statement that is used.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Uses the \*MEASUREDISPG subroutine in the Unit Macro processing unit to change the display in the image window according to the set image display sub-number in the image window of the main screen.

---

\*MEASUREDISPG

Rem Get the displayed sub-image number  
SUBNO& = DisplaySubNo

Rem Change the display on the image window according to the sub-image number of the sub-image to be displayed.  
Select SUBNO&  
Case 1

Rem If the gotten sub-image number is 1, the title of processing unit 1 is displayed with the color in accordance with the judgment result.

SetTextStyle 24, TA\_LEFT, UnitJudge(1), 0, FONTSTYLE\_NORMAL  
TEXT\$ = UnitTitle\$(1)

Case 2

Rem If the gotten sub-image number is 2, the title of processing unit 2 is displayed with the color in accordance with the judgment result.

SetTextStyle 24, TA\_LEFT, UnitJudge(2), 0, FONTSTYLE\_NORMAL  
TEXT\$ = UnitTitle\$(2)

Case Else

Rem If the gotten sub-image number is other than 1 and 2, "Error" is displayed in the "unmeasured" color.

SetTextStyle 24, TA\_LEFT, JUDGE\_NC, 0, FONTSTYLE\_NORMAL  
TEXT\$ = "Error"

End Select

Rem Displays text on the image window.

DrawTextG TEXT\$, 50, 0, 0, UnitNo

Return

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DisplaySubNo (Reference: ▶ Details (p.189))

DrawTextG (Reference: ▶ Details (p.229))

Gosub (Reference: ▶ Details (p.290))

If Then Else (Reference: ▶ Details (p.296))

If Then Elseif Else EndIf (Reference: ▶ Details (p.298))

SetTextStyle (Reference: ▶ Details (p.469))

UnitJudge (Reference: ▶ Details (p.530))

UnitNo (Reference: ▶ Details (p.531))

## SendData

Sends data.

### Format

**SendData** <iolident>, <outputData()>, <outputSize>[, <parameter()>, <parameterSize>]

### Parameter

| Parameter name  | Data type             | Description                                                                                          |
|-----------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <iolident>      | Character string type | Identification name of the communication module to be used (Reference: ►List of I/O Modules (p.581)) |
| <outputData()>  | Integer array         | Data to send                                                                                         |
| <outputSize>    | Integer type          | Data size to send                                                                                    |
| <parameter()>   | Integer array         | The parameter data specified in the option (Reference: ►List of I/O Modules (p.581))                 |
| <parameterSize> | Integer type          | Size of parameter data specified optionally (Reference: ►List of I/O Modules (p.581))                |

### Return value

None.

### Description

Sends the amount, specified in the <outputSize> parameter, of the data specified in the <outputData()> parameter by using the communication module specified in the <iolident> parameter.

In the <outputData()> parameter, specify the 1D integer array variable that stores the data to be sent, without adding element numbers but adding () to the variables.

Values that can be set in the <parameter()> parameter and <parameterSize> parameter depend on the communication module specified in the <iolident> parameter. For details, refer to (Reference: ►List of I/O Modules (p.581)) The <parameter()> parameter and <parameterSize> parameter can be omitted.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If Handshake is on and data sending fails due to a communication timeout or other reason, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

In normal UDP communication, specifies the destination and sends data.

---

Rem Create the destination address information (10.1.1.101)

```
Dim IPADDR&(4)
IPADDR&(0) = 10
IPADDR&(1) = 1
IPADDR&(2) = 1
IPADDR&(3) = 101
```

Rem Make the transmit data.

```
Dim BUFFER&(4)
BUFFER&(0) = 1
BUFFER&(1) = 2
BUFFER&(2) = 3
BUFFER&(3) = 4
BUFFER&(4) = 5
```

Rem Transmit the data selected address.

```
SendData "UdpNormal", BUFFER&(), 4 * 5, IPADDR&(), 4 * 4
```

---

In PLC link, specifying the offset value and writing data to the data output area.

---

Rem Create the offset data.

```
Dim OFFSET&(0)
OFFSET&(0) = 2
```

Rem Make the transmit data.

```
Dim BUFFER&(4)
BUFFER&(0) = 1
BUFFER&(1) = 2
BUFFER&(2) = 3
BUFFER&(3) = 4
BUFFER&(4) = 5
```

Rem Use the offset value to send the data.

```
SendData "SerialPlcLink", BUFFER&(), 4 * 5, OFFSET&(), 4 * 1
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

ReceiveData (Reference: ▶ Details (p.389))

SendString (Reference: ▶ Details (p.439))

## SendString

Sends the character string data.

### Format

**SendString** <iolident>, <outputString>

### Parameter

| Parameter name | Data type             | Description                                                                                          |
|----------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <iolident>     | Character string type | Identification name of the communication module to be used (Reference: ►List of I/O Modules (p.581)) |
| <outputString> | Character string type | Character string to send                                                                             |

### Return value

None.

### Description

Sends the character string specified in the <outputString()> parameter by using the communication module specified in the <iolident> parameter.

Some communication modules do not support this macro function. (Reference: ►List of I/O Modules (p.581))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

If the Scene Control Macro or the Unit Macro using UDP non-procedure communication, is used and never received any command from external devices such as a PLC, an "Illegal function call" error will occur after SendString is executed.

#### IMPORTANT

- On the FH Series, English characters and characters for the language selected in [Language setting] are allowed.

### Example

Sends the character string in TCP normal communication

---

```
Rem Make the transmit characters.
DATA$ = "Test string"
```

```
Rem Send a character string.
SendString "TcpNormal", DATA$
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

ReceiveData (Reference: ▶ Details (p.389))

SendData (Reference: ▶ Details (p.437))

## SetDisplayUnitNo

Sets the processing unit number in the flow window to the selected state.

### Format

**SetDisplayUnitNo <unitNo>**

### Parameter

| Parameter name | Data type    | Description                           |
|----------------|--------------|---------------------------------------|
| <unitNo>       | Integer type | Processing unit number to be selected |

### Return value

None.

### Description

Sets the processing unit of the processing unit number specified in the <unitNo> parameter to the selected state in the flow window.

When the processing unit displayed in the image window and the text window is set to "Link to Flow Display", the information of the processing unit selected in the flow window is displayed.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Sets the unit specified in the command argument of the communication command macro to the selected state in the flow window.

---

```
Rem Select the processing unit that has the number specified in the argument of the communication command.
SetDisplayUnitNo argumentValue#(0)
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

DisplayUnitNo (Reference: ▶ Details (p.191))

UnitNo (Reference: ▶ Details (p.531))

SetImageWindow (Reference: ▶ Details (p.447))

Ut (Reference: ▶ Details (p.534))

## SetDrawStyle

Set the drawing attributes of the graphic figure.

### Format

**SetDrawStyle <style>, <width>, <color>**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                          |
|----------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <style>        | Integer type | Type of the drawn line<br>PS_SOLID: Solid line<br>PS_DASH: Dashed line* <sup>1</sup><br>PS_DOT: Dotted line* <sup>1</sup><br>PS_DASHDOT: Long dashed short dashed line* <sup>1</sup><br>PS_DASHDOTDOT: Long dashed double-short dashed* <sup>1</sup><br>PS_NULL: No line<br>PS_INSIDEFRAME: Solid line* <sup>2</sup> |
| <width>        | Integer type | Line width of the drawn graphic line                                                                                                                                                                                                                                                                                 |
| <color>        | Integer type | Line color value of the drawn graphic line<br>JUDGE_NC: Unmeasured color (Grey)<br>JUDGE_OK: OK judgement color (Green)<br>JUDGE_NG: NG judgement color (Red)<br>RGB Function: Any color                                                                                                                             |

\*1: This selection is valid only when the specified line width is 1

\*2: Enabled for the following figures;

- Circle-with-width
- Ellipse
- Arc-with-width

### Return value

None.

### Description

Sets the specified line type by the <style> parameter, the specified line width by the <width> parameter, and specified line color by the <color> parameter as the drawing attributes. Before executing the image screen window control macro function that draws graphic figure, execute this macro function to draw the graphic figure using the set drawing attribute. Use the SetTextStyle function to set the drawing attribute used for the DrawTextG function. (Reference: ► SetTextStyle (p.469))

If any of "PS\_DASH", "PS\_DASHDOT", and "PS\_DASHDOTDOT" is specified in the <style> parameter, specify 1 in the <width> parameter. If other than 1 is specified, a solid line will be drawn.

If circle, wide circle, ellipse, arc, wide arc is drawn with specification of "PS\_INSIDEFRAME" for the <style> parameter, the figure with specified line width by the <width> parameter is drawn and diminished so that the drawn figure is within the figure. Other figure types than ones mentioned above are drawn with a solid line (i.e., the same line type as when "PS\_SOLID" is specified for the <style> parameter).

The gotten color value by the RGB function can be set for the <color> parameter. (Reference: ► RGB (p.401))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to draw a straight line whose line type is "dashed line" and whose color is "OK Color".

---

```
*MEASUREDISPG

Rem Set the draw attributes
SetDrawStyle PS_DASH, 1, JUDGE_OK

Rem Draw the image
DrawLine 100, 100, 500, 400, 0, UnitNo

Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

|                                                 |                                            |
|-------------------------------------------------|--------------------------------------------|
| DrawArc (Reference: ▶ Details (p.196))          | DrawArcW (Reference: ▶ Details (p.198))    |
| DrawBox (Reference: ▶ Details (p.200))          | DrawCircle (Reference: ▶ Details (p.202))  |
| DrawCircleW (Reference: ▶ Details (p.204))      | DrawCursor (Reference: ▶ Details (p.206))  |
| DrawEllipse (Reference: ▶ Details (p.208))      | DrawFigure (Reference: ▶ Details (p.210))  |
| DrawLine (Reference: ▶ Details (p.215))         | DrawLineW (Reference: ▶ Details (p.217))   |
| DrawPoint (Reference: ▶ Details (p.220))        | DrawPolygon (Reference: ▶ Details (p.222)) |
| DrawSearchFigure (Reference: ▶ Details (p.224)) | RGB (Reference: ▶ Details (p.401))         |
| SetTextStyle (Reference: ▶ Details (p.469))     |                                            |

## SetForegroundLine

This command specifies the object line for operation in Multi-line Random trigger mode or Non-stop Adjustment mode.

### Format

**SetForegroundLine <lineNo>**

### Parameter

| Parameter name | Data type    | Description                                 |
|----------------|--------------|---------------------------------------------|
| <lineNo>       | Integer type | Operation object of the line number 0 to 7. |

### Return value

None.

### Description

Specify the operation object of the line number using this parameter.

The screen of the specified line number is displayed on the top of other screens.

Line numbers of the Non-stop Adjustment mode are the below.

0: Measurement operation side

1: Non-stop Adjustment side

An Illegal function call error will occur if you specify the non-existent number, values or combination of data type or values as this parameter.

### Usage Cautions

- None.

### Example

---

```
Rem Switch the line displayed with non-procedure communication.  
NO& = int(Argumentvalue#(0))  
SetForegroundLine NO&
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 5.40, or later

### Related Items

None.

## SetGlobalData

Sets the global data.

### Format

**SetGlobalData** <dataIdent>, <data>

### Parameter

| Parameter name | Data type                                                                                   | Description                                             |
|----------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <dataIdent>    | Character string type                                                                       | Identification name of the global data to set the value |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Value set in the global data                            |

### Return value

None.

### Description

Sets the value specified in the <data> parameter in the global data with the identification name specified in the <dataIdent> parameter.

If global data with the specified identification name does not exist, global data with the identification name specified in the <dataIdent> parameter is added, and the value specified in the <data> parameter is set in the added data.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified in the <dataIdent> parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Sets 1 as the value in the global data with the identification name "ABC".

---

```
Rem Set 1 in the value of the global data "ABC".
SetGlobalData "ABC", 1
```

```
Rem Get the value (integer value) set in the global data "ABC", and store in the variable DATA&.
GetGlobalData "ABC", DATA&
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

AddGlobalData (Reference: ▶ Details (p.127))

GetGlobalData (Reference: ▶ Details (p.260))

## SetImageWindow

Sets the state of the image window.

### Format

**[Scene Control Macro / Communication Command Macro]**

**SetImageWindow <windowNo>, <locationX>, <locationY>, <width>, <height>, <unitNo>, <subNo>, <magnification>, <originX>, <originY>, <update>, <visible>**

**[Unit Macro]**

**SetImageWindow <magnification>, <originX>, <originY>**

### Parameter

| Parameter name  | Data type                              | Description                                                                                                                                                                                                                                                            |
|-----------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <windowNo>      | Integer type                           | Number of the image window whose state is to be set (0 to 23)                                                                                                                                                                                                          |
| <locationX>     | Integer type                           | Upper left X coordinate value of the image window                                                                                                                                                                                                                      |
| <locationY>     | Integer type                           | Upper left Y coordinate value of the image window                                                                                                                                                                                                                      |
| <width>         | Integer type                           | Width of the image window                                                                                                                                                                                                                                              |
| <height>        | Integer type                           | Height of the image window                                                                                                                                                                                                                                             |
| <unitNo>        | Integer type                           | Processing unit number of the target processing unit to display (-1 to (the number of registered processing units in the current scene minus one))                                                                                                                     |
| <subNo>         | Integer type                           | Sub-image number of the target image to display (-1 to 100)                                                                                                                                                                                                            |
| <magnification> | Double precision real number data type | Display magnification (-1, 0 to 16)                                                                                                                                                                                                                                    |
| <originX>       | Integer type                           | Upper left X coordinate of the image display relative to the upper left coordinate of the image window.                                                                                                                                                                |
| <originY>       | Integer type                           | Upper left Y coordinate of the image display relative to the upper left coordinate of the image window                                                                                                                                                                 |
| <update>        | Integer type                           | Image mode<br>0: Every measurement (Image mode Freeze)<br>1: Only when an overall judgement result is NG at the time of measurement (Last NG image).<br>2: Only when a target processing unit is NG at the time of measurement.<br>3: Always updated (through display) |
| <visible>       | Integer type                           | Setting of whether to display<br>0: Window invisible<br>1: Window visible                                                                                                                                                                                              |

### Return value

- None.

## Description

Sets the state of the image window specified in the <windowNo> parameter. When this macro function is used with the unit macro, the state of the image window displayed using the MEASUREDISPI subroutine is set.

In the <locationX> parameter and <locationY> parameter, specify the relative coordinate values from the upper left coordinates of the gotten image container window to the upper left coordinates of the image window.

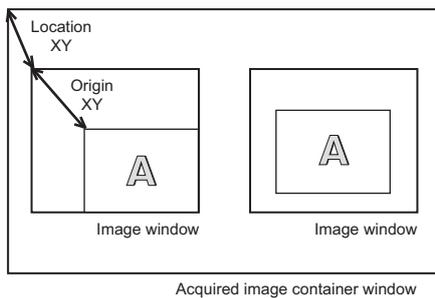
In the <width> parameter and <height> parameter, set the values of the image window width and height.

Specify the value of the displayed processing unit number in the <unitNo> parameter. To link the processing unit displayed in the image window to the flow display, specify -1.

Specify the value of the displayed sub image number in the <subNo> parameter. To display the contents of the image window as a position list, specify -1.

Specify the zoom of the image window in the <magnification> parameter. To set the zoom to auto, specify -1.

In the <originX> parameter and the <originY> parameter, specify the values of the relative coordinates from the upper left coordinates of the image window to the upper left coordinates of the displayed image.



In the <update> parameter, specify the value of the image mode of the image window.

In the <visible> parameter, specify the value of the display state of the image window.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- [Scene Control Macro / Communication Command Macro]  
Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))
- [Unit Macro]  
This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

## Example

In the communication command macro, changes the image mode of image windows 0 to 3 to Through. Sets the BusyOn flag to ON in advance in the communication command macro.

---

```

For I& = 0 To 3
    Rem Get the state of the image window.
    GetImageWindow I&, LOCATIONX&, LOCATIONY&, WIDTH&, HEIGHT&, UNITNO&, SUBNO&,
    MAG#, ORIGINX&, ORIGINY&, UPDATE&, VISIBLE&

    Rem Change the update timing to Through.
    UPDATE& = 3

    Rem Set the state of the image window.
    SetImageWindow I&, LOCATIONX&, LOCATIONY&, WIDTH&, HEIGHT&, UNITNO&, SUBNO&,
    MAG#, ORIGINX&, ORIGINY&, UPDATE&, VISIBLE&
Next

```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DisplayUnitNo (Reference: ▶ Details (p.191))  
 SetDisplayUnitNo (Reference: ▶ Details (p.441))  
 UnitNo (Reference: ▶ Details (p.531))

GetTextWindow (Reference: ▶ Details (p.282))  
 GetImageWindow (Reference: ▶ Details (p.264))  
 Ut (Reference: ▶ Details (p.534))

## SetMeasureImage

Sets the measurement image of the processing unit.

### Format

**SetMeasureImage** <measureImageNo>, <unitNo>, <imageNo>

### Parameter

| Parameter name   | Data type    | Description                                                                                            |
|------------------|--------------|--------------------------------------------------------------------------------------------------------|
| <measureImageNo> | Integer type | Measurement image number to set to the target image of the measurement (always 0)                      |
| <unitNo>         | Integer type | Processing unit number of the processing unit that holds the image to be set as the measurement image. |
| <imageNo>        | Integer type | Image number of the image that is set to the measurement image                                         |

### Return value

None.

### Description

Sets the image of the image number specified in the <imageNo> parameter, which is held by the processing unit specified in the <unitNo> parameter, as the measurement image specified in the <measureImageNo> parameter. The measurement image is an image that can be used for measurement or filtering by a succeeding processing unit in the measurement flow.

Normally 0 should be specified in the <measureImageNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*MEASUREPROC subroutine. If used in any other subroutines, an error will occur and the function will not be executed.

### Example

Changes the measurement image used by a succeeding processing unit to the camera change image of processing unit 4.

---

```
Rem Set camera change measurement image 0 of processing unit 4 as the measurement image.  
SetMeasureImage 0, 4, 0
```

---

### Usable Modules

Unit macro

### Supported Versions

Version 3.50 or later

### Related Items

CopyMeasureImage (Reference: ▶ Details (p.164))    CopyUnitImage (Reference: ▶ Details (p.172))  
UnitNo (Reference: ▶ Details (p.531))            Ut (Reference: ▶ Details (p.534))

## SetMeasureOut

Sets the external output setting for the measurement result.

### Format

**SetMeasureOut <mode>**

### Parameter

| Parameter name | Data type    | Description                                                                 |
|----------------|--------------|-----------------------------------------------------------------------------|
| <mode>         | Integer type | External output setting<br>0: Not output externally<br>1: Output externally |

### Return value

None.

### Description

Sets the "External Output" value in the layout settings to the external output setting value specified in the <mode> parameter. (Reference: ► *Setting the Behavior of Output Signals for Each Layout (Layout Settings)* in the *Vision System FH/FHV Series User's Manual (Cat. No. Z365)*)

Even if 0 is set for the measurement result external output setting value, data is output if the SendData function or SendString function is used in the macro customize functions.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types is specified for the parameter, an "Illegal function call" error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► *State Transitions and Execution Timing (p.72)*)  
Even when "External Output" is OFF, data output that uses a macro function is executed.

### Example

Sets "External Output" to ON in the communication command macro.

---

```
SetMeasureOut 1
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

GetMeasureOut (Reference: ► *Details (p.267)*)

SendData (Reference: ► *Details (p.437)*)

SendString (Reference: ► *Details (p.439)*)

## SetPlcData

Creates the data that is written with the WritePlcMemory function.

### Format

**SetPlcData** <iolent>, <writeData()>, <offset>, <size>, <data>

### Parameter

| Parameter name | Data type                                                                       | Description                                                                                          |
|----------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <iolent>       | Character string type                                                           | Identification name of the communication module to be used (Reference: ►List of I/O Modules (p.581)) |
| <writeData()>  | Integer array                                                                   | Data to write                                                                                        |
| <offset>       | Integer type                                                                    | Offset to address from which the beginning of the data is to be written (byte units).                |
| <size>         | Integer type                                                                    | Data size to set (byte unit)                                                                         |
| <data>         | Integer type<br>Double precision real number data type<br>Character string type | Data to set                                                                                          |

### Return value

None.

### Description

Sets the amount, specified in the <size> parameter, of the data specified in the <data> parameter by using the communication module specified in the <iolent> parameter. The data is set from the beginning of the data array specified in the <writeData()> parameter, in the position offset by the amount of the value specified in the <offset> parameter.

After creating data with this macro function, execute the WritePlcMemory function to write the data to the PLC memory area.

In the <writeData()> parameter, specify the 1D integer array variable that stores the data to be written, without adding element numbers but adding () to the variables.

In the <offset> parameter and <size> parameter, specify the offset and size in units of bytes. These units are different from the units used in the WritePlcMemory function (units of channels).

Specify 2, 4, or 8 in the <size> parameter. These respectively set a 2-byte integer, 4-byte integer, or 8-byte real number.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Before using the WritePlcMemory function in PLC link communication to write data to the PLC memory area, always use this macro function to create the data to be written. If the data is directly set in the WritePlcMemory parameter without using this macro function, the correct data may not be set.

## Example

In the communication macro, writes measurement coordinate X and measurement coordinate Y of the search processing unit of Processing Unit number 2 to the PLC connected by PLC link. Measurement coordinate X is external data number 6, and measurement coordinate Y is external data number 7.

---

```
IOMODULE$ = "UdpPlcLink"
```

```
Rem Get the measurement result.
```

```
GetUnitData 2, 6, X#
```

```
GetUnitData 2, 7, Y#
```

```
Rem Convert the real number value multiplied by 1,000 to the integer value.
```

```
VALUE0& = Int(X# * 1000)
```

```
VALUE1& = Int(Y# * 1000)
```

```
Rem Get the settings of the output data area.
```

```
GetSystemData IOMODULE$, "outputArea", AREA&
```

```
GetSystemData IOMODULE$, "outputMemoryAddress", ADDRESS&
```

```
Rem Store the data to be written in an integer array variable.
```

```
Dim DATA&(1)
```

```
SetPlcData IOMODULE$, DATA&(), 0, 4, VALUE0&
```

```
SetPlcData IOMODULE$, DATA&(), 4, 4, VALUE1&
```

```
Rem Write the data (4ch) in data output area.
```

```
WritePlcMemory IOMODULE$, AREA&, ADDRESS&, 4, DATA&()
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 4.20 or later

## Related Items

GetPlcData (Reference: ▶ Details (p.268))

ReadPlcMemory (Reference: ▶ Details (p.387))

WritePlcMemory (Reference: ▶ Details (p.548))

## SetPollingState

Sets the execution status of the communication module.

### Format

**SetPollingState <iolident>, <state>**

### Parameter

| Parameter name | Data type             | Description                                                                                                                              |
|----------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <iolident>     | Character string type | Identification name of communication module whose polling state is to be set (Reference: <a href="#">▶ List of I/O Modules (p.581)</a> ) |
| <state>        | Integer type          | Execution status of the communication module to set<br>False: Stopped<br>True: Operating.                                                |

### Return value

None.

### Description

Sets the polling state specified in the <state> parameter in the communication module specified in the <iolident> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- After using this macro function to set the polling state of the communication module to the stopped state, always return the polling state to the running state. If the polling state of the communication module is left in the stopped state, the communication module will not be able to receive communication commands.

## Example

Receives normal TCP communication data in the MEASUREPROC subroutine of the Unit Macro processing unit.

---

```

Rem Prepare a buffer that can receive 12 bytes of data.
Dim BUFFER&(11)
IOMODULE$ = "TcpNormal"

Rem Set the polling state of the communication module to stopped in order to receive the data.
SetPollingState IOMODULE$, False

Rem Executing the initialization of the reception data size.
SIZE& = 0

Repeat the reception process until the data has been received.
Try

    Do

        Rem Attempting the data reception.
        ReceiveData IOMODULE$, BUFFER&(), 12, SIZE&

        Rem Once the data has been received, display the data size in the system status console window.
        If(SIZE& > 0) Then
            Print "Received data size = " + Str$(SIZE&)
        Endif

    Loop While SIZE& = 0

    Rem Data has been received, so set the polling state of the communication module to running.
    SetPollingState IOMODULE$, True

Catch

    Rem Return the polling state of the stopped communication module to running.
    If GetPollingState(IOMODULE$) = False Then
        SetPollingState IOMODULE$, True
    Endif

End Try

```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 4.20 or later

## Related Items

GetPollingState (Reference: [▶ Details \(p.270\)](#))

SendData (Reference: [▶ Details \(p.437\)](#))

ReceiveData (Reference: [▶ Details \(p.389\)](#))

SendString (Reference: [▶ Details \(p.439\)](#))

## SetSceneData

Sets data for the scene control macro or scene variables.

### Format

**SetSceneData <dataIdent>, <data>**

### Parameter

| Parameter name | Data type                                                                                   | Description                           |
|----------------|---------------------------------------------------------------------------------------------|---------------------------------------|
| <dataIdent>    | Character string type                                                                       | Identification name of data to be set |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Data to set                           |

### Return value

None.

### Description

Executes the process associated with the identification name specified in the <dataIdent> parameter.

In addition to the variable name used in the scene control macro program, the following identification names can be specified in the <dataIdent> parameter.

- Scene variable name: Set the value specified with <data> to the variable of "Scene variable name".
- The Scene variable name is a character string following "SC." displayed on the scene variable registration screen of TDM editor.
- "direct": Executes the scene control macro specified in the <data> parameter.
- "gosub": Executes the subroutine of the scene control macro specified in the <data>.

If an error occurs during execution of the process when "direct" or "gosub" is specified in the <dataIdent> parameter, the error will occur in the corresponding location as a scene control macro error, and then an "Illegal function call" error will occur in this macro function as an error of the module that called the macro function.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))

## Example

Set an arbitrary value to a system variable.

---

```
Rem Set an integer value of 123 when a variable of SC.ABC& is registered in the scene variable.
SetSceneData "ABC&", 123
```

```
Rem When an array variable of SC.ASDF&() is registered in the scene variable
Rem set an integer value of 123 to the first array element.
SetSceneData "ASDF&(0)", 123
```

---

Sets the communication command parameter received by the communication command macro in the variable of the scene control macro, and executes the subroutine that applies this value in the appropriate unit.

---

```
Rem Set the parameter received by the communication command in the variable of the scene control macro
SetSceneData "PARAM0&", ARGUMENTVALUE#(0)
SetSceneData "PARAM1&", ARGUMENTVALUE#(1)
```

```
Rem Execute the UPDATE_PARAM subroutine that has been defined in the scene control macro
SetSceneData "gosub", "**UPDATE_PARAM"
```

---

## Usable Modules

When applying to scene variables:

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

When applying to other than scene variables:

Communication Command Macro

## Supported Versions

Version 5.20 or later (For scene variables, Version 6.30 or later)

## Related Items

GetSceneData (Reference: [▶ Details \(p.274\)](#))

## SetSceneDescription

Sets the scene description.

### Format

**SetSceneDescription <sceneNo>, <sceneDescription>**

### Parameter

| Parameter name     | Data type             | Description                                                                  |
|--------------------|-----------------------|------------------------------------------------------------------------------|
| <sceneNo>          | Integer type          | Scene number (0 to 127) of the scene for which the description is to be set. |
| <sceneDescription> | Character string type | Scene description                                                            |

### Return value

None.

### Description

Sets the description specified in the <sceneDescription> parameter in the description of the scene of the scene number specified in the <sceneNo> parameter.

The scene description can be set by executing this macro function, or in the scene maintenance screen. (Reference: ▶ *Editing Scenes* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ *State Transitions and Execution Timing* (p.72))

### Example

Gets the description of scene 1, and if a description is not set, sets the description.

---

```
Rem Get the scene description
DESCRIPTION$ = SceneDescription$(1)

If DESCRIPTION$ = "" Then
    Rem Set the scene description
    SetSceneDescription 1, "Description 1"
Endif
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

SceneMaker\$ (Reference: ▶ Details (p.429))

SceneDescription\$ (Reference: ▶ Details (p.424))

SetSceneTitle (Reference: ▶ Details (p.463))

SceneTitle\$ (Reference: ▶ Details (p.432))

SetSceneMaker (Reference: ▶ Details (p.461))

## SetSceneGroupTitle

Sets the title of the scene group.

### Format

**SetSceneGroupTitle** <sceneGroupNo>, <title>

### Parameter

| Parameter name | Data type             | Description                                                              |
|----------------|-----------------------|--------------------------------------------------------------------------|
| <sceneGroupNo> | Integer type          | Scene group number of the scene group whose title is to be set (-1 only) |
| <title>        | Character string type | Title of scene group                                                     |

### Return value

None.

### Description

Sets the title specified in the <title> parameter in the title of the scene group with the scene group number specified in the <sceneGroupNo> parameter.

If a title with 32 or more characters is specified in the <title> parameter, the first 31 characters are set in the title.

The title of the scene group can be set by executing this macro function, or in the scene maintenance screen. (Reference: ▶ *Editing Scenes in the Vision System FH/FHV Series User's Manual (Cat. No. Z365)*)

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ *State Transitions and Execution Timing (p.72)*)

### Example

Sets the title of the current scene group.

---

```
SetSceneGroupTitle -1, "Title"
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

SceneGroupTitle\$ (Reference: ▶ *Details (p.428)*)

SceneTitle\$ (Reference: ▶ *Details (p.432)*)

SetSceneTitle (Reference: ▶ *Details (p.463)*)

## SetSceneMaker

Sets the creator of the scene.

### Format

**SetSceneMaker <sceneNo>, <sceneMaker>**

### Parameter

| Parameter name | Data type             | Description                                                      |
|----------------|-----------------------|------------------------------------------------------------------|
| <sceneNo>      | Integer type          | Scene number (0 to 127) of the scene whose creator is to be set. |
| <sceneMaker>   | Character string type | Creator of the scene                                             |

### Return value

None.

### Description

Sets the creator specified in the <sceneMaker> parameter in the creator of the scene that has the scene number specified in the <sceneNo> parameter.

When a creator name with 32 or more characters is specified in the <sceneMaker> parameter, the first 31 characters are set in the creator.

The scene creator can be set by executing this macro, or in the scene maintenance screen. (Reference: ▶ *Editing Scenes* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ *State Transitions and Execution Timing* (p.72))

### Example

Gets the creator of scene 3, and if not set, sets the creator.

---

```
Rem Get the creator of the scene.
NAME$ = SceneMaker$(3)
```

```
If NAME$ = "" Then
```

```
    Rem Set the creator of the scene.
    SetSceneMaker 3, "Maker"
```

```
Endif
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

SceneDescription\$ (Reference: ▶ Details (p.424))

SceneTitle\$ (Reference: ▶ Details (p.432))

SetSceneTitle (Reference: ▶ Details (p.463))

SceneMaker\$ (Reference: ▶ Details (p.429))

SetSceneDescription (Reference: ▶ Details (p.458))

## SetSceneTitle

Sets the title of a scene.

### Format

**SetSceneTitle** <sceneNo>, <title>

### Parameter

| Parameter name | Data type             | Description                                                          |
|----------------|-----------------------|----------------------------------------------------------------------|
| <sceneNo>      | Integer type          | Scene number (0 to 127) of the scene for which a title is to be set. |
| <title>        | Character string type | Scene title                                                          |

### Return value

None.

### Description

Sets the title specified in the <title> parameter in the title of the scene with the scene number specified in the <sceneNo> parameter.

If a title with 32 or more characters is specified in the <title> parameter, the first 31 characters are set in the title.

The scene title can be set by executing this macro function, or in the scene maintenance screen or flow edit screen. (Reference: ▶ *Editing Scenes* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365)) (Reference: ▶ *Editing Processing Units in Scenes* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ *State Transitions and Execution Timing* (p.72))

### Example

Sets the title of scene 2

---

```
SetSceneTitle 2, "Title"
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

## Related Items

SceneDescription\$ (Reference: ▶ Details (p.424))

SceneTitle\$ (Reference: ▶ Details (p.432))

SetSceneMaker (Reference: ▶ Details (p.461))

SceneMaker\$ (Reference: ▶ Details (p.429))

SetSceneDescription (Reference: ▶ Details (p.458))

## SetStop

Sets the conditions for stopping program execution.

### Format

**SetStop** <string>

### Parameter

| Parameter name | Data type             | Description                    |
|----------------|-----------------------|--------------------------------|
| <string>       | Character string type | Execution stop condition label |

### Return value

None.

### Description

Set the character string specified in the <string> parameter as the stop condition for stopping program execution with the Stop function.

By specifying the execution stop condition character string set with the SetStop function as the parameter for the Stop function, you can stop program execution when the execution form is debug mode. Characters \* (character string wildcard operator) and ? (single character wildcard operator) can be used as wildcards for the <string> specification.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Stops the program execution using the specified condition using the SetStop function in debug mode.

---

```
Rem Set the execution form to debug mode.
```

```
Debug 18
```

```
SetStop "AA?"
```

```
SetStop "B*"
```

```
Rem If character string "AAB" specified in the Stop function argument matches pattern "AA?", the program stops.
```

```
Stop "AAB"
```

```
Rem If character string "AABB" specified in the Stop function argument does not match pattern "AA?", the program does not stop.
```

```
Stop "AABB"
```

```
Rem If character string "BCDEF" specified in the Stop function argument matches pattern "B*", the program stops.
```

```
Stop "BCDEF"
```

```
Rem If character string "CDEF" specified in the Stop function argument does not match pattern "B*", the program does not stop.
```

```
Stop "CDEF"
```

```
Rem Set the execution form to release mode.
```

```
Debug 1
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

Cont (Reference: ▶ Details (p.161))

DebugPrint (Reference: ▶ Details (p.184))

Print (Reference: ▶ Details (p.376))

Stop (Reference: ▶ Details (p.488))

Debug (Reference: ▶ Details (p.182))

List (Reference: ▶ Details (p.331))

SetVar (Reference: ▶ Details (p.482))

VarList (Reference: ▶ Details (p.537))

## SetSystemData

Sets the system data or system variable.

### Format

**SetSystemData** <dataIdent0>, <dataIdent1>, <data>

### Parameter

| Parameter name | Data type                                                                       | Description                                                                        |
|----------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <dataIdent0>   | Character string type                                                           | Data identification name of identification information 0 of system data to be set. |
| <dataIdent1>   | Character string type                                                           | Data identification name of identification information 1 of system data to be set. |
| <data>         | Integer type<br>Double precision real number data type<br>Character string type | Value of the system data to set                                                    |

### Return value

None.

### Description

When setting values to the system data:

Sets the value specified in the <data> parameter in the system data of identification information 1 specified in the <dataIdent1> parameter, which belongs to identification information 0 specified in the <dataIdent0> parameter. For the identification information list, refer to the system data list. (Reference: ► System Data List (p.561))

When setting values to system variables:

Set a character string for "macro\_sy" to <data ident0>, and the variable name following "SY." displayed on the system variable registration screen of TDM editor to <dataIdent1>. Specify the value to set to the system variable specified with <dataIdent1>, to <data>.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If an identification name that does not exist is specified as the parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified in the <dataIdent1> parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Set an arbitrary value to a system variable.

---

```
Rem Set an integer value of 123 when a variable of SY.ABC& is registered in the system variable.  
SetSystemData "macro_sy", "ABC&", 123
```

```
Rem When an array variable of SY.ASDF&() is registered in the system variable,  
Rem set an integer value of 123 to the first array element.  
SetSystemData "macro_sy", "ASDF&(0)", 123
```

---

Sets the value "E:\temp\bmp" in the screen capture destination folder of identification information 1, "captureDirectory", which belongs to the measurement control settings of identification information 0, "Measure".

---

```
Rem Get the destination path to be set as the screen capture destination folder.  
DIRNAME$ = "E:\temp\bmp"
```

```
Rem Set the screen capture destination folder that belongs to the measurement control settings.  
SetSystemData "Measure", "captureDirectory", DIRNAME$
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later (For scene variables, Version 6.30 or later)

## Related Items

AddSystemData (Reference: ▶ Details (p.129))

SetGlobalData (Reference: ▶ Details (p.445))

GetSystemData (Reference: ▶ Details (p.276))

SetUnitData (Reference: ▶ Details (p.473))

## SetTextStyle

Set the draw attributes of the character string.

### Format

**SetTextStyle** <fontSize>, <align>, <color>, <angle>, <style>

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                                           |
|----------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <fontSize>     | Integer type | Font size of the drawn character string                                                                                                                                                                                                                                                                                               |
| <align>        | Integer type | Alignment of the drawn character string<br>TA_BASELINE: Align baseline<br>TA_BOTTOM: Align lower end<br>TA_TOP: Align top<br>TA_CENTER: Align horizontal center<br>TA_LEFT: Align left<br>TA_RIGHT: Align right<br>TA_NOUPDATECP: Current position not update<br>TA_RTLRENDING: Right to left<br>TA_UPDATECP: Current position update |
| <color>        | Integer type | Color value of the character string color to be drawn<br>JUDGE_NC: Unmeasured color (Grey)<br>JUDGE_OK: OK judgement color (Green)<br>JUDGE_NG: NG judgement color (Red)<br>RGB Function: Any color                                                                                                                                   |
| <angle>        | Integer type | Rotation angle (0 to 359) of the drawn character string                                                                                                                                                                                                                                                                               |
| <style>        | Integer type | Font style of the drawn character string<br>FONTSTYLE_NORMAL: Normal<br>FONTSTYLE_BOLD: Bold<br>FONTSTYLE_ITALIC: Italic<br>FONTSTYLE_UNDERLINE: Underline<br>FONTSTYLE_STRIKEOUT: Strike-through                                                                                                                                     |

### Return value

None.

### Description

Sets the following parameters as the drawing attributes: specified font size by the <fontSize> parameter, the specified string alignment by the <align> parameter, the specified string color by the <color> parameter, the specified string rotation angle by the <angle> parameter, and the specified string style by the <style> parameter. Before executing the DrawTextG image screen window control function, execute this macro function to draw the graphic figure using the set drawing attribute. Use the SetDRAWStyle function to set the drawing attribute used for macro functions that draw graphic figures. (Reference: ► SetDrawStyle (p.442)) Disjunctive specification of TA\_BOTTOM, TA\_TOP, TA\_LEFT, TA\_CENTER, and TA\_RIGHT in the <align> parameter is possible.

The gotten color value by the RGB function can be set for the <color> parameter. (Reference: ► RGB (p.401)) If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- This macro function can only be used in the \*MEASUREDISPI subroutine or the \*MEASUREDISPG subroutine. If used in another subroutine, an "Illegal function call" error will occur.

## Example

Uses the \*MEASUREDISPG subroutine of the Unit Macro processing unit to display a character string with its font size of 20, aligned to bottom and horizontally centered, colored by the "OK" judgement color, and inclined by 90 degrees.

---

```
*MEASUREDISPG
```

```
Rem Set the draw attributes
```

```
SetTextSty 20, TA_BOTTOM OR TA_CENTER, JUDGE_OK, 90, FONTSTYLE_ITALIC
```

```
Rem Draw the image
```

```
DrawTextG "Measurement OK", 100, 100, 0, UnitNo
```

```
Return
```

---

## Usable Modules

Unit macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawTextG (Reference: ▶ Details (p.229))

SetDrawStyle (Reference: ▶ Details (p.442))

RGB (Reference: ▶ Details (p.401))

## SetTextWindow

Sets the state of the text window.

### Format

**SetTextWindow** <unitNo>, <subNo>, <update>, <visible>

### Parameter

| Parameter name | Data type    | Description                                                                                                 |
|----------------|--------------|-------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number of the target processing unit to display                                             |
| <subNo>        | Integer type | Sub number of the target image to display                                                                   |
| <update>       | Integer type | Updated timing (always 0)                                                                                   |
| <visible>      | Integer type | Setting of whether to display (This parameter is always invalid i.e., the entered value is always ignored). |

### Return value

None.

### Description

Sets the state of the text window.

Specify the value of the displayed processing unit number in the <unitNo> parameter. To link the processing unit displayed in the text window to the flow display, specify -1.

In the <subNo> parameter, 0 should normally be specified for the value of the displayed sub image number. When used with the unit macro, the text window state of a sub image number other than 0 can be set by including the DisplaySubNo macro function in the MEASUREDISPT subroutine.

In the <update> parameter, 0 should always be specified for the update timing.

The value specified in the <visible> parameter is not reflected to the setting.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

In the communication command macro, changes the processing unit number of the processing unit displayed in the text display window to the number specified in the communication command argument.

---

```
Rem Get the state of the text window.
GetTextWindow UNITNO&, SUBNO&, UPDATE&, VISIBLE&
```

```
Rem Set the number specified in the command argument in the processing unit number that is displayed.
SetTextWindow argumentValue#(0), SUBNO&, UPDATE&, VISIBLE&
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 3.50 or later

## Related Items

DisplaySubNo (Reference: ▶ Details (p.189))

GetTextWindow (Reference: ▶ Details (p.282))

SetDisplayUnitNo (Reference: ▶ Details (p.441))

UnitNo (Reference: ▶ Details (p.531))

DisplayUnitNo (Reference: ▶ Details (p.191))

RefreshTextWindow (Reference: ▶ Details (p.394))

SetImageWindow (Reference: ▶ Details (p.447))

Ut (Reference: ▶ Details (p.534))

## SetUnitData

Sets the data of a processing unit.

### Format

**SetUnitData** <unitNo>, <dataNo>, <data>

**SetUnitData** <unitNo>, <dataIdent>, <data>

### Parameter

| Parameter name | Data type                                                                                   | Description                                                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type                                                                                | Processing unit number (0 to (the number of registered processing units in the current scene minus one))                                                        |
| <dataNo>       | Integer type                                                                                | External reference data of the processing unit data to set (reference: ► Vision System FH/FHV Series Processing Item Function Reference Manual (Cat. No. Z341)) |
| <dataIdent>    | Character string type                                                                       | Data identification name of processing unit data to be set.                                                                                                     |
| <data>         | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Processing unit data to set                                                                                                                                     |

### Return value

None.

### Description

Sets the data specified in the <data> parameter in the data of the external reference data number specified in the <dataNo> parameter, held by the processing unit specified in the <unitNo> parameter.

The data can also be gotten by specifying the <dataIdent> parameter instead of the <dataNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))
- Use this macro function with the measurement image displayed after one or more measurements, or after the image file is specified and re-measured.
- This macro function automatically converts character strings to numeric values when that is the required input format.

Therefore, it recognizes and sets the available range as values from the head of strings when you set the character strings including the values.

## Example

Sets "Reflect to overall judgement" of the search processing unit of Processing Unit number 2 to "OFF".  
"Reflect to overall judgement" is external reference data number 103 and external reference data identification name "overallJudge".

---

SetUnitData 2, 103, 1

Rem The same result will be gotten if "overallJudge" is specified instead of 103.  
SetUnitData 2, "overallJudge", 1

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))  
MeasureStart (Reference: ▶ Details (p.351))  
UnitNo (Reference: ▶ Details (p.531))

GetUnitFigure (Reference: ▶ Details (p.288))  
MeasureStop (Reference: ▶ Details (p.353))  
Ut (Reference: ▶ Details (p.534))

## SetUnitFigure

Sets the figure data of the processing unit.

### Format

**SetUnitFigure** <unitNo>, <figureNo>, <figure()>

### Parameter

| Parameter name | Data type     | Description                                                                                              |
|----------------|---------------|----------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type  | Processing unit number (0 to (the number of registered processing units in the current scene minus one)) |
| <figureNo>     | Integer type  | Figure number to be set (Reference: ► List of Figure Numbers (p.619))                                    |
| <figure()>     | Integer array | Figure data to be set (Reference: ► Figure Data List (p.617))                                            |

### Return value

None.

### Description

Sets the figure data specified in the <figure()> parameter in the figure specified in the <figureNo> parameter of the processing unit specified in the <unitNo> parameter.

In the <figure()> parameter, specify the 1D integer array variable that will hold the figure data by adding only () without specifying an element number.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ► State Transitions and Execution Timing (p.72))
- Use this macro function with the measurement image displayed after one or more measurements, or after the image file is specified and re-measured.
- Set the figure data so that pixels from outside the image are not included in the figure.

## Example

Changes the position of the region figure (rectangle) of the search processing unit of Processing Unit number 2.

---

```
Dim FIGURE&(5)
```

```
Rem Get the figure data of the processing unit.  
GetUnitFigure 2, 1, FIGURE&()
```

```
Rem Based on the gotten figure data, change the values of the upper left point XY coordinates and lower right point XY  
coordinates of the region figure.  
FIGURE&(2) = 100  
FIGURE&(3) = 100  
FIGURE&(4) = 300  
FIGURE&(5) = 300
```

```
Rem Set the figure data in which the position of the region figure has been changed in the processing unit.  
SetUnitFigure 2, 1, FIGURE&()
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

CopyUnitFigure (Reference: ▶ Details (p.170))  
GetUnitFigure (Reference: ▶ Details (p.288))  
MeasureStop (Reference: ▶ Details (p.353))  
UnitNo (Reference: ▶ Details (p.531))

GetUnitData (Reference: ▶ Details (p.286))  
MeasureStart (Reference: ▶ Details (p.351))  
SetUnitData (Reference: ▶ Details (p.473))  
Ut (Reference: ▶ Details (p.534))

## SetUnitJudge

Sets the judgement result of a processing unit.

### Format

**SetUnitJudge <unitNo>, <judge>[, <totalJudgeRefract>]**

### Parameter

| Parameter name      | Data type    | Description                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>            | Integer type | Processing unit number (0 to (the number of registered processing units in the current scene minus one))                                                                                                                                                                                                                                                                                      |
| <judge>             | Integer type | Judgement result to set<br>JUDGE_NC: No judgement (unmeasured)<br>JUDGE_OK: Judgement result OK<br>JUDGE_NG: Judgement result NG<br>JUDGE_IMAGEERROR: Judgement result error (image format mismatch)<br>JUDGE_MODELERROR: Judgement result error (unregistered model)<br>JUDGE_MEMORYERROR: Judgement result error (insufficient memory)<br>JUDGE_ERROR: Judgement result error (other error) |
| <totalJudgeRefract> | Integer type | Setting of whether to reflect the overall judgement result<br>False: not reflected<br>True: reflected                                                                                                                                                                                                                                                                                         |

### Return value

None.

### Description

Sets the judgement result specified in the <judge> parameter in the judgement result of the processing unit specified in the <unitNo> parameter. If the <totalJudgeRefract> parameter is omitted, the specified judgement is applied to the overall judgement.

When this macro function is used to set the judgement result of another processing unit, operation is as follows:

- If measurement processing is executed on the processing unit after the judgement result for the first measurement is set with this macro function, the judgement result set with this macro function is overwritten with the measurement processing result of the processing unit.
- If the judgement result is set with this macro function after measurement processing is executed on the processing unit for the first measurement, the judgement result of the processing unit is overwritten by the judgement result set with this macro function.

In both cases, the judgement result can be reflected in the overall judgement prior to overwriting by specifying True with the <totalJudgeRefract> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- The measurement result for the unit macro executing SetUnitJudge cannot be set. A Syntax error will occur.

## Example

Sets the judgement result of the search processing unit of Processing Unit number 2 in Judgement Result OK.

---

SetUnitJudge 2, JUDGE\_OK, True

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

SetUnitData (Reference: ▶ Details (p.473))

UnitJudge (Reference: ▶ Details (p.530))

Ut (Reference: ▶ Details (p.534))

TotalJudge (Reference: ▶ Details (p.503))

UnitNo (Reference: ▶ Details (p.531))

## SetUnitTitle

Sets the title of a processing unit.

### Format

**SetUnitTitle** <unitNo>, <title>

### Parameter

| Parameter name | Data type             | Description                                                                                              |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type          | Processing unit number (0 to (the number of registered processing units in the current scene minus one)) |
| <title>        | Character string type | Title of processing unit to be set (31 characters max.)                                                  |

### Return value

None.

### Description

Sets the title specified in the <title> parameter in the title name of the processing unit specified in the <unitNo> parameter. If a title with 32 or more characters is specified in the <title> parameter, the first 31 characters are set in the title.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))

### Example

Sets "bolt search" as the search name in the title of the search processing unit of Processing Unit number 2.

---

```
SetUnitTitle 2, "bolt search"
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

MeasureStart (Reference: ▶ Details (p.351))

MeasureStop (Reference: ▶ Details (p.353))

UnitNo (Reference: ▶ Details (p.531))

UnitTitle\$ (Reference: ▶ Details (p.532))

Ut (Reference: ▶ Details (p.534))

## SetUserSubroutine

Register a user-defined function that has been defined in the external DDL file.

### Format

**SetUserSubroutine <subroutineId>, <dllFileName>, <functionName>**

### Parameter

| Parameter name | Data type             | Description                                                       |
|----------------|-----------------------|-------------------------------------------------------------------|
| <subroutineId> | Character string type | Identification name to the user-defined function to be registered |
| <dllFileName>  | Character string type | DLL file name                                                     |
| <functionName> | Character string type | User-defined function name to be registered                       |

### Return value

None.

### Description

Registers the function that is defined in the specified DLL file by the <dllFileName> and has a specified function name by the <functionName> parameter as the specified identification name by the <subroutineId> parameter. If registered by this macro function, the user-defined functions can be called using the Call function and specify the identification names.

In the <dllFileName> parameter, specify the file name without the file extension ".dll".

Normally use the SetUserSubroutine statement in the \*MCRINIT subroutine and execute the subroutine to perform this macro function, or execute this macro function before executing the Call function.

User-defined functions can only be registered by executing this the SetUserSubroutine function using the macro customize function. Execute this command on all processing units, all scene control macros in all scene, and all communications commands in all communications command macros that call and execute user-defined functions.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a character string longer than 255 characters is specified in the <subroutineId> parameter or the <functionName> parameter, a "String too long" error will occur.

If a character string of a file name (including the absolute path name) longer than 255 characters is specified in the <dllFileName> parameter, a "String too long" error will occur.

If a registered user-defined function by this macro function has not been programmed with the supported interfaces, an error will not occur. In this case, an error will occur at the execution of the user-defined function processing with this Call function.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- Only the user-defined functions that have been defined in programmed DLL files by the supported interfaces are accepted to This macro function only accepts the user-defined function that have been defined in programmed DLL files by the supported interfaces. Also, the DLL files must be saved in the same directory as the FZ-CoreRA.exe For user-defined functions creation, use the FH-AP1.

## Example

With identification name "USR", registers a user-defined function "UserProc0" that has been defined in MacroUserProc.dll. Then, specifies the identification name to call the user-defined function and execute it.

---

```
Rem Register the user-defined function so that the function can be used in this program
SetUserSubroutine "USR","MacroUserProc","UserProc0"
```

```
Rem Call the registered user-defined function and execute it
Call "USR", 0
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

Call (Reference: ► Details (p.146))

## SetVar

Sets all variables with the specified variable names.

### Format

**SetVar <variableName>, <value>**

### Parameter

| Parameter name | Data type                                                                                   | Description                |
|----------------|---------------------------------------------------------------------------------------------|----------------------------|
| <variableName> | Character string type                                                                       | Name of variable to be set |
| <value>        | Integer type<br>Double<br>precision real<br>number data<br>type<br>Character<br>string type | Value to be set            |

### Return value

None.

### Description

This sets the value specified in the <value> parameter in the variable specified in the <variableName> parameter. Set a value of the same data type in the <value> parameter as the variable specified in the <variableName> parameter.

Characters \* (character string wildcard operator) and ? (single character wildcard operator) can be used as wildcards for the <variableName> specification. When using a wildcard to specify multiple variables in the <variableName> parameter, make sure that the specified variables are the same data type.

Wildcards can be used to specify file names in the following manner.

|         |                                                                                  |
|---------|----------------------------------------------------------------------------------|
| *       | Specify all variables.                                                           |
| ???     | Specify variables with a 3-character variable name.                              |
| A*      | Specify variables with a variable name that starts with "A".                     |
| *A*A*A* | Specify variables with a variable name that includes at least three "A" letters. |
| ????*   | Specify variables with a variable name that consists of four or more characters. |

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a character string longer than 255 characters is specified in the <variableName> parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- Execute this macro function when the BUSY signal or other measurement in progress signal is ON and measurement is prohibited. (Reference: ▶ State Transitions and Execution Timing (p.72))
- Use this macro function with the measurement image displayed after one or more measurements, or after the image file is specified and re-measured.

## Example

Among the variables registered as reference variables of the Unit Macro processing unit of Processing Unit number 1, i.e., A01@, A02@, AA01@, AB01@, B01@, and B02@, sets the values of all reference variables that start with "A", i.e., A01@, A02@, AA01@, and AB01@.

---

```
A01@ = 100
A02@ = 100
AA01@ = 100
AB01@ = 100
B01@ = 100
B02@ = 100
```

```
Rem Set "123" only to the variables whose name start with "A".
SetVar "A*@", 123
```

---

The result is shown below.

---

```
A01@ = 123
A02@ = 123
AA01@ = 123
AB01@ = 123
B01@ = 100
B02@ = 100
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

Cont (Reference: ▶ Details (p.161))

DebugPrint (Reference: ▶ Details (p.184))

Print (Reference: ▶ Details (p.376))

Stop (Reference: ▶ Details (p.488))

Debug (Reference: ▶ Details (p.182))

List (Reference: ▶ Details (p.331))

SetStop (Reference: ▶ Details (p.465))

VarList (Reference: ▶ Details (p.537))

## Sin

Gets the sine of the specified expression.

### Format

**Sin(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                |
|----------------|-----------------------------------------------------------------|----------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression to get the sine |

### Return value

Returns the sine as a double precision real number value in the range -1 to 1.

### Description

Gets the sine of the expression specified in the <expression> parameter.

In the <expression> parameter, specify the value in radians. To convert an angle value to a radian value, multiply by  $\pi/180$ .

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the sine of 30°.

---

```
DATA# = Sin(30/180*3.141592)
```

---

The result is shown below.

---

```
DATA# = 0.5
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

## Related Items

Atn (Reference: ▶ Details (p.142))

GetUnitData (Reference: ▶ Details (p.286))

Tan (Reference: ▶ Details (p.496))

Cos (Reference: ▶ Details (p.176))

UnitData (Reference: ▶ Details (p.520))

## Sqr

Determining the square root.

### Format

**Sqr(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                       |
|----------------|-----------------------------------------------------------------|-----------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression to get the square root |

### Return value

Returns the double precision real square root value.

### Description

Gets the square root of the expression specified in the <expression> parameter.

Specify 0 or positive number for the <expression> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the square root of 256.

---

```
DATA# = Sqr(256)
```

---

The result is shown below.

---

```
DATA# = 16
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

GetUnitData (Reference: [▶ Details \(p.286\)](#))

UnitData (Reference: [▶ Details \(p.520\)](#))

## StartTimer

Starts the elapsed time measurement.

### Format

**StartTimer**

### Parameter

None.

### Return value

Returns the elapsed time as a double precision type real number value.

### Description

Starts the elapsed time measurement.

After starting measurement of elapsed time with this macro function, get the elapsed time by executing the Timer function.

Execution of the ElapsedTime function is valid only for the processing units such as the unit calculation macro and the Unit Macro processing units. In contrast, executions of this macro function and the Timer function are valid for all macro customize functions.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Measures the elapsed time since the beginning of the StartTimer function until the execution of the Timer function.

---

```
T# = StartTimer
```

```
Rem Executes the process whose the process execution elapsed time is measured.
```

```
Rem Gets the elapsed time using the return value of the StartTimer function.
```

```
TIME& = Timer(T#, 0)
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

ElapsedTime (Reference: ▶ Details (p.234))

Timer (Reference: ▶ Details (p.501))

Wait (Reference: ▶ Details (p.547))

## Stop

Stops program execution.

### Format

**Stop [<string>]**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                         |
|----------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <string>       | Character string type | Execution stop condition label<br>This parameter can be omitted.<br>Without If the parameter is not specified, program execution stops at the point that this function is executed. |

### Return value

None.

### Description

When the character string specified in the <string> parameter matches the character string set as the execution stop condition by executing the SetStop function, program execution stops.

To resume the stopped program, use the Cont function in the system status console window.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function is only enabled when specified in debug mode with the Debug function. Specifying other values than the range above will treat the statement with this function in the same manner with the Rem function (i.e., ignores the statement). (Reference: ►How to Use the Debug Function (p.82))
- After the data output to the system status console window, the window is displayed on top of the Sensor Controller main screen. To display the system status console window on top of the main screen, click [ ] on the upper-right of the system status console window or press [Alt] + [Tab] on the connected USB keyboard to the sensor controller.

### Example

Stops the program execution using the specified condition using the SetStop function in debug mode.

---

Rem Set the execution form to debug mode.

Debug 18

SetStop "ABC"

Rem If character string "ABC" specified in the Stop function argument matches pattern "ABC", the program stops.

Stop "ABC"

Rem If character string "ABCD" specified in the Stop function argument does not match pattern "ABC", the program does not stop.

Stop "ABCD"

Rem If the parameter is not specified in the Stop function, program execution stops at the point that the Stop function is executed.

Stop

Rem Set the execution form to release mode.

Debug 1

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

Cont (Reference: ▶ Details (p.161))

DebugPrint (Reference: ▶ Details (p.184))

Print (Reference: ▶ Details (p.376))

SetVar (Reference: ▶ Details (p.482))

Debug (Reference: ▶ Details (p.182))

List (Reference: ▶ Details (p.331))

SetStop (Reference: ▶ Details (p.465))

VarList (Reference: ▶ Details (p.537))

## Str\$

Converts a numeric value in the numeric character string.

### Format

**Str\$(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                                          |
|----------------|-----------------------------------------------------------------|------------------------------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression converted to a numerical character string |

### Return value

Returns the character string type numeric value.

### Description

Converts the specified expression in the <expression> parameter to the numeric character string.

Str\$ is the inverse function of Val. Val converts the specified numeric character string in numeric value.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -1.0E30 to 1.0E30 is specified for a double precision real number parameter, an "Overflow" error might occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Outputs the gotten judgement result and measured correlation value with the search processing unit (Processing Unit number 5) to the system status console window using the MEASUREPROC subroutine in the Unit Macro processing unit. The judgement result and the correlation value can be gotten with External Reference Data numbers 0 and 5 respectively.

---

```
*MEASUREPROC
```

```
Rem Get the measurement result of the processing unit.  
GetUnitData 5, 0, JG&  
GetUnitData 5, 5, CR#
```

```
Rem Convert the gotten measurement result to the numeric character string and output the character  
string to the system status console window using the Print function.  
Print Str$(JG&) + "," + Str$(CR#)
```

```
Return
```

---

The result is shown below.

---

1,98.4

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: [▶ Details \(p.138\)](#))

GetUnitData (Reference: [▶ Details \(p.286\)](#))

LCase\$ (Reference: [▶ Details \(p.323\)](#))

Len (Reference: [▶ Details \(p.327\)](#))

Piece\$ (Reference: [▶ Details \(p.374\)](#))

Right\$ (Reference: [▶ Details \(p.403\)](#))

UCase\$ (Reference: [▶ Details \(p.517\)](#))

Chr\$ (Reference: [▶ Details \(p.152\)](#))

Hex\$ (Reference: [▶ Details \(p.294\)](#))

Left\$ (Reference: [▶ Details \(p.325\)](#))

Mid\$ (Reference: [▶ Details \(p.356\)](#))

Print (Reference: [▶ Details \(p.376\)](#))

Str2\$ (Reference: [▶ Details \(p.492\)](#))

Val (Reference: [▶ Details \(p.535\)](#))

## Str2\$

Converts a value to a numeric character string in the specified formats.

### Format

**Str2\$(<expression>, <integral>, <fixed>, <zeroSuppression>, <negative>)**

### Parameter

| Parameter name    | Data type                                                       | Description                                                                                         |
|-------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <expression>      | Integer type<br>Double<br>precision real<br>number data<br>type | Expression converted to a numerical character string                                                |
| <integral>        | Integer type                                                    | Number of digits in integer part (0 to 8)                                                           |
| <fixed>           | Integer type                                                    | Number of digits in decimal part (0 to 5)                                                           |
| <zeroSuppression> | Integer type                                                    | Inserting character to the unused integer places<br>0: Fill in with spaces<br>1: Fill in with zeros |
| <negative>        | Integer type                                                    | Negative number sign<br>0: -<br>1: 8                                                                |

### Return value

Returns the character string type numeric value.

### Description

Converts the expression specified in the <expression> parameter to the numeric character string after the following processes:

- Adjust number of integer places to the <integral> parameter and number of decimal places to the <fixed> parameter,
- Insert the character specified in the <zeroSuppression> parameter to the unused places, and
- Replace the negative sign with the sign specified in the <negative> parameter.

Str\$ is the inverse function of Val. There is no inverse function for Str2\$. Val converts the specified numeric character string in numeric value.

If 0 is specified in the <integral> parameter, all digits in the integer part in the <expression> parameter are converted to a numeric character string.

If a smaller number than number of integer places in the <expression> parameter is specified in the <integral> parameter, a maximum positive number (or a minimum negative number) that can be expressed with the specified number of integer digits in the <expression> parameter is returned as a numeral character string.

Example: Specify the following parameters: Number of digits in the integer part: 2, number of digits in the decimal part: 0

When <expression> parameter is 179.099, the changed numerical character string is "99"

If a larger value than the number of integer places in the <expression> parameter is specified in the <integral> parameter, either zeros or spaces (depending on the <zeroSuppression> parameter) are filled to the higher digit places of the converted numeral character string until the digit place number reaches to the <integral> parameter.

Note that the negative number uses one extra digit in the integer part for the negative number sign (specified

in the <negative> parameter).

Example: Specify the following parameters: Number of digits in the integer part: 3, number of digits in the decimal part: 3

When <expression> parameter is 999.999, the changed numerical character string is "999.999"

When <expression> parameter is -999.999, the changed numerical character string is "-99.999"

If 0 is specified in the <fixed> parameter, the expression in the <expression> parameter is rounded off to the nearest whole number and converted to the numeric character string.

If a smaller number than number of decimal places in the <expression> parameter is specified in the <fixed> parameter, the expression in the <expression> parameter is rounded off to the nearest number that can be expressed with a <fixed> number and converted to the numeral character string.

Example: Specify the following parameters: Number of digits in the integer part: 2, number of digits in the decimal part: 4

When <expression> parameter is 10.12345, the changed numerical character string is "10.1235"

If a larger number than number of decimal places in the <expression> parameter is specified in the <fixed> parameter, zeros are filled to the lower digit places of the converted numeral character string until the digit place number reaches to the <fixed> parameter.

Example: Specify the following parameters: Number of digits in the integer part: 2, number of digits in the decimal part: 5

When <expression> parameter is 10.123, the changed numerical character string is "10.12300"

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value outside the range -1.0E30 to 1.0E30 is specified for a double precision real number parameter, an "Overflow" error might occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- None.

## Example

Outputs the measured correlation value, measured position coordinates X and Y (Position X and Position Y) with the search processing unit (Processing Unit number 5) to the system status console window. The correlation value, measured position coordinates X and Y can be gotten with External Reference Data numbers 5, 6, and 7 respectively.

---

Rem Get the measurement result of the processing unit.

GetUnitData 5, 6, X#

GetUnitData 5, 7, Y#

GetUnitData 5, 5, CR#

Rem Convert the measurement results to the numeric character strings in the specified format.

RESX\$ = Str2\$(X#, 3, 3, 0, 0)

RESY\$ = Str2\$(Y#, 3, 3, 0, 0)

RESCR\$ = Str2\$(CR#, 3, 0, 0, 0)

Rem Use the Print function to output the strings to the value to the system status console window.

Print RESX\$ + "," + RESY\$ + "," + RESCR\$

---

The result is shown below.

---

150.000,359.000, 97

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Asc (Reference: ▶ Details (p.138))  
Hex\$ (Reference: ▶ Details (p.294))  
Left\$ (Reference: ▶ Details (p.325))  
Mid\$ (Reference: ▶ Details (p.356))  
Print (Reference: ▶ Details (p.376))  
Str\$ (Reference: ▶ Details (p.490))  
Val (Reference: ▶ Details (p.535))

Chr\$ (Reference: ▶ Details (p.152))  
LCase\$ (Reference: ▶ Details (p.323))  
Len (Reference: ▶ Details (p.327))  
Piece\$ (Reference: ▶ Details (p.374))  
Right\$ (Reference: ▶ Details (p.403))  
UCase\$ (Reference: ▶ Details (p.517))

## SystemReset

Reboots the Sensor Controller.

### Format

#### SystemReset

### Parameter

None.

### Return value

None.

### Description

Reboots the Sensor Controller.

If this command is executed on the Sysmac Studio FH Tools, no action is taken and the process ends.

### Usage Cautions

- None.

### Example

After loading the system data, executes "Save data". To apply the loaded settings in the sensor controller, restart the sensor controller.

---

```
Rem Load the file of the system data
LoadSystemData "E:\BACKDIR\backupsysset.ini"
```

```
Rem Save to the controller.
SaveData
```

```
Rem Reboot the Sensor Controller.
SystemReset
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

Date\$ (Reference: ▶ Details (p.180))

Left\$ (Reference: ▶ Details (p.325))

SaveData (Reference: ▶ Details (p.410))

ExitFzProcess (Reference: ▶ Details (p.249))

LoadSystemData (Reference: ▶ Details (p.339))

## Tan

Gets the tangent of the specified expression.

### Format

**Tan(<expression>)**

### Parameter

| Parameter name | Data type                                                       | Description                   |
|----------------|-----------------------------------------------------------------|-------------------------------|
| <expression>   | Integer type<br>Double<br>precision real<br>number data<br>type | Expression to get the tangent |

### Return value

Returns the double precision real tangent value.

### Description

Gets the tangent of the expression specified in the <expression> parameter.

In the <expression> parameter, specify the value in radians. To convert an angle value to a radian value, multiply by  $\pi/180$ .

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the tangent of 45°.

---

```
DATA# = Tan(45/180*3.141592)
```

---

The result is shown below.

---

```
DATA# = 0.999999673205
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

Atn (Reference: ▶ Details (p.142))

GetUnitData (Reference: ▶ Details (p.286))

UnitData (Reference: ▶ Details (p.520))

Cos (Reference: ▶ Details (p.176))

Sin (Reference: ▶ Details (p.484))

## TestMeasure

Executes measurement test.

### Format

**TestMeasure** [<preImageNo> | <fileName>]

### Parameter

| Parameter name | Data type              | Description                                                                                                                                                                 |
|----------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <preImageNo>   | Integer type           | The number of image logging for measurement test.<br>(Counts of logging images have been done -1)<br>-1: Latest input image<br>0: Latest logging image of Sensor Controller |
| <fileName>     | Character strings type | Name of image file for measurement test                                                                                                                                     |

### Return value

None.

### Description

TestMeasure is a command for measuring the specified image as a measurement image. When you use this command, its measurement does not include a measurement result. This command is recommended when you want to avoid a situation that Image input is not executed after Sensor Controller startup or Scene switch. Measurement test will be executed for images of the number of image logging specified <preImageNo> parameter or images of the name of image file specified <fileName> parameter.

For <preImageNo> parameter, specify the number of logging image has already been logged as Sensor Controller's logging image. (Reference: ► *Setting Logging Conditions [Logging Setting]* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

Measurement test will be executed for latest input image when you specify -1 as <preImageNo> parameter. Measurement test may be executed for latest Sensor Controller's logging image when you specify 0 as <preImageNo> parameter.

If you omitted argument, measurement test will be input an image from camera.

Type mismatch error is occurred when wrong data is specified as parameter. Illegal function call error is not occurred even if non-exist number, values, combination of data or values.

Overflow error will be occurred when you specify as Integer value extends range; -2147483648 to 2147483647.

An error of String too long will be occurred when you specify the character strings as character strings type exceeds 255 characters.

Syntax error is occurred when you specify wrong formatting; typographical error of macro function's name, no comma or no spaces.

### Usage Cautions

- Execute the measurement test under condition that measurement trigger input is not allowed; before MeasureStart command is executed after MeasureStop command is executed.
- Do not write in \*MCRINIT.

## Example

Loads specified registered image as measurement image.

---

```
Rem Acquires the save direction of registered image.  
USBPATH$ = ApplicationPath$(2)  
filename$ = argumentstring$(0)  
FilePATH$ = USBPATH$ + "RegisteredImage\" + filename$ + ".ifz"
```

```
Rem Loads as a measurement image.  
Testmeasure FilePATH$
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro

## Supported Versions

Version 5.40, or more

## Related Items

ApplicationPath\$ (Reference: ▶ Details (p.133))

MeasureStart (Reference: ▶ Details (p.351))

Remeasure (Reference: ▶ Details (p.397))

Measure (Reference: ▶ Details (p.346))

MeasureStop (Reference: ▶ Details (p.353))

## Time\$

Reads out the clock time from the internal clock.

### Format

Time\$

### Parameter

None.

### Return value

Returns the character string type time value.

The time value is a character string of the internal clock time whose hour (HH), minute (MM), and second (SS) separated by a colon (:). The ranges of the hour, minute, and second values are as follows.

Hour (HH) : 00 to 23

Minute (MM) : 00 to 59

Second (SS) : 00 to 59

### Description

Reads the time from the internal clock and returns the time value (HH, MM, SS) in character string format.

The internal clock can be adjusted in [Date-time Settings] under [System settings]. (Reference: ▶ *Date-time setting [Other]* in the *Vision System FH/FHV Series User's Manual* (Cat. No. Z365))

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Outputs to the read internal clock value to the system status console window.

---

```
Dim NOW$(2)
```

```
Rem Read out the clock time from the internal clock.
```

```
NOW$ = Time$
```

```
Rem Change the format of the read out clock time.
```

```
For I&=0 To 2
```

```
    NOW$(I&) = Piece$(NOW$, ":", I&+1, I&+1)
```

```
Next
```

```
Rem Output to the system status console window the time which the format have been changed previously.
```

```
Print NOW$(0) + ":" + NOW$(1) + ":" + NOW$(2)
```

---

The result is shown below.

---

```
01:23:45
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Date\$ (Reference: ▶ Details (p.180))

Mid\$ (Reference: ▶ Details (p.356))

Print (Reference: ▶ Details (p.376))

GetSystemData (Reference: ▶ Details (p.276))

Piece\$ (Reference: ▶ Details (p.374))

SetSystemData (Reference: ▶ Details (p.467))

## Timer

Gets the elapsed time.

### Format

**StartTimer(<start>, <mode>)**

### Parameter

| Parameter name | Data type                              | Description                                                                                   |
|----------------|----------------------------------------|-----------------------------------------------------------------------------------------------|
| <start>        | Double precision real number data type | Rem Return value of the StartTimer function that started the measurement of the elapsed time. |
| <mode>         | Integer type                           | Unit of the elapse time to get<br>0: ms unit<br>1: $\mu$ unit                                 |

### Return value

Returns the elapsed time after the execution of the StartTimer function as an integer value gotten by rounding off digits to the right of the decimal point.

### Description

Gets the elapsed time after the execution of the StartTimer function with the unit specified in the <mode> parameter. (To use this function, specify the return value of the StartTimer function in the <start> parameter.) Specify the return value of the StartTimer function to be executed prior to this macro function.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Depending on the processing time of this macro function and the StartTimer function itself, there may be an error in the elapsed time gotten.

### Example

Measures the elapsed time since the beginning of the StartTimer function until the execution of the Timer function.

---

```
T# = StartTimer
```

```
Rem Executes the process whose the process execution elapsed time is measured.
```

```
Rem Gets the elapsed time using the return value of the StartTimer function.  
TIME& = Timer(T#, 0)
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

ElapsedTime (Reference: ▶ Details (p.234))

StartTimer (Reference: ▶ Details (p.487))

Wait (Reference: ▶ Details (p.547))

## TotalJudge

Gets the total judgement result.

### Format

**TotalJudge**

### Parameter

None.

### Return value

Returns the overall judgement result as an integer value.

- 0: No judgement (unmeasured)
- 1: Judgement result OK
- -1: Judgement result NG

### Description

Gets the overall judgement result that is the result of execution of the measurement flow.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the \*MEASUREDISPG subroutine of the Unit Macro processing unit, gets the overall judgement result and displays a character string in the image window.

---

```
CHARSTRING$ = ""
```

```
Rem Get the total judgement result.
JG& = TotalJudge
```

```
Change the displayed character string depending on the overall judgement result.
If JG& = 1 Then
```

```
    CHARSTRING$ = "OK"
```

```
Elseif JG& = -1 Then
```

```
    CHARSTRING$ = "NG"
```

```
Elseif JG& = 0 Then
```

```
    CHARSTRING$ = "NC"
```

```
Endif
```

```
Rem Display a character string.
DrawTextG CHARSTRING$, 100, 100, 0
```

---

### Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

DrawTextG (Reference: ▶ Details (p.229))

SetUnitJudge (Reference: ▶ Details (p.477))

## TransformAngle

Applies the calibration result and position correction amount in the angle value.

### Format

**TransformAngle** <unitNo>, <imageNo>, <mode>, <srcAngle>, <destAngle>

### Parameter

| Parameter name | Data type                              | Description                                                                                                                                                                                            |
|----------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type                           | Processing unit number (0 to (number of processing units of current scene minus one)) of the processing unit that holds the data to be converted.                                                      |
| <imageNo>      | Integer type                           | Measurement image number (always 0) of the processing unit that holds the data to be transformed                                                                                                       |
| <mode>         | Integer type                           | Transformation mode<br>0: After image transformation. -> Before image transformation.<br>1: Before image transformation. -> After image transformation.<br>10: Camera coordinates -> After calibration |
| <srcAngle>     | Double precision real number data type | Pre-transformation angle gotten from the processing unit that holds the data to be transformed.                                                                                                        |
| <destAngle>    | Double precision real number data type | Angle after the transformation                                                                                                                                                                         |

### Return value

None.

### Description

Applies the transformation information specified in the <mode> parameter to the angle value specified in the <srcAngle> parameter on the image specified in the <imageNo> parameter of the processing unit specified in the <unitNo> parameter.

Specify 0, 1, or 10 in the <mode> parameter. If a value other than 0, 1, and 10 is specified, operation after the execution of this macro function will be undefined.

Specify the variable that will contain the transformed angle value with the <destAngle> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Transforms the value of the measurement angle before calibration measured with the search processing unit of Processing Unit number 2 is applied, to the angle value after calibration is applied. "Measurement angle" is the external reference data identification name "angle".

---

Rem Get the measurement result.

GetUnitData 2, "angle", BEFOREANGLE#

Rem Transform to the value after calibration is applied.

TransformAngle 2, 0, 10, BEFOREANGLE#, AFTERANGLE#

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

TransformDist (Reference: ▶ Details (p.509))

TransformXY (Reference: ▶ Details (p.513))

Ut (Reference: ▶ Details (p.534))

TransformArea (Reference: ▶ Details (p.507))

TransformLine (Reference: ▶ Details (p.511))

UnitNo (Reference: ▶ Details (p.531))

## TransformArea

Applies the calibration result and position correction amount in the area value.

### Format

**TransformArea <unitNo>, <imageNo>, <mode>, <srcArea>, <destArea>**

### Parameter

| Parameter name | Data type                              | Description                                                                                                                                                                                            |
|----------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type                           | Processing unit number (0 to (number of processing units of current scene minus one)) of the processing unit that holds the data to be converted.                                                      |
| <imageNo>      | Integer type                           | Measurement image number (always 0) of the processing unit that holds the data to be transformed                                                                                                       |
| <mode>         | Integer type                           | Transformation mode<br>0: After image transformation. -> Before image transformation.<br>1: Before image transformation. -> After image transformation.<br>10: Camera coordinates -> After calibration |
| <srcArea>      | Double precision real number data type | Pre-transformation area gotten from the processing unit that holds the data to be transformed.                                                                                                         |
| <destArea>     | Double precision real number data type | Area after the transformation                                                                                                                                                                          |

### Return value

None.

### Description

Applies the transformation information specified in the <mode> parameter to the area value specified in the <srcArea> parameter on the image specified in the <imageNo> parameter of the processing unit specified in the <unitNo> parameter.

Specify 0, 1, or 10 in the <mode> parameter. If a value other than 0, 1, and 10 is specified, operation after the execution of this macro function will be undefined.

Specify the variable that will contain the transformed area value with the <destArea> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Transforms the value of the area before calibration measured with the labeling processing unit of Processing Unit number 2 is applied, to the area value after calibration is applied. "Area" is the external reference data identification name "area".

---

```
Rem Get the measurement result.  
GetUnitData 2, "area", BEFOREAREA#
```

```
Rem Transform to the value after calibration is applied.  
TransformArea 2, 0, 10, BEFOREAREA#, AFTERAREA#
```

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))  
TransformDist (Reference: ▶ Details (p.509))  
TransformXY (Reference: ▶ Details (p.513))  
Ut (Reference: ▶ Details (p.534))

TransformAngle (Reference: ▶ Details (p.505))  
TransformLine (Reference: ▶ Details (p.511))  
UnitNo (Reference: ▶ Details (p.531))

## TransformDist

Applies a calibration result and position correction amount to a distance value.

### Format

**TransformDist <unitNo>, <imageNo>, <mode>, <srcDist>, <destDist>**

### Parameter

| Parameter name | Data type                              | Description                                                                                                                                                                                            |
|----------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type                           | Processing unit number (0 to (number of processing units of current scene minus one)) of the processing unit that holds the data to be converted.                                                      |
| <imageNo>      | Integer type                           | Measurement image number (always 0) of the processing unit that holds the data to be transformed                                                                                                       |
| <mode>         | Integer type                           | Transformation mode<br>0: After image transformation. -> Before image transformation.<br>1: Before image transformation. -> After image transformation.<br>10: Camera coordinates -> After calibration |
| <srcDist>      | Double precision real number data type | Pre-transformation distance gotten from the processing unit that holds the data to be transformed.                                                                                                     |
| <destDist>     | Double precision real number data type | Distance after the transformation                                                                                                                                                                      |

### Return value

None.

### Description

Applies the transformation information specified in the <mode> parameter to the distance value specified in the <srcDist> parameter on the image specified in the <imageNo> parameter, of the processing unit specified in the <unitNo> parameter.

Specify 0, 1, or 10 in the <mode> parameter. If a value other than 0, 1, and 10 is specified, operation after the execution of this macro function will be undefined.

In the <destDist> parameter, specify the variable that holds the transformed distance value.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Transforms the distance value of the average width before calibration is applied, which is measured with the scan edge width processing unit of Processing Unit number 2, to the distance value after calibration is applied. The "average width" is external reference data identification name "width ave".

---

```
Rem Get the measurement result.  
GetUnitData 2, "width_ave", BEFOREDIST#
```

```
Rem Transform to the value after calibration is applied.  
TransformDist 2, 0, 10, BEFOREDIST#, AFTERDIST#
```

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))  
TransformArea (Reference: ▶ Details (p.507))  
TransformXY (Reference: ▶ Details (p.513))  
Ut (Reference: ▶ Details (p.534))

TransformAngle (Reference: ▶ Details (p.505))  
TransformLine (Reference: ▶ Details (p.511))  
UnitNo (Reference: ▶ Details (p.531))

## TransformLine

Applies the calibration result and position correction amount to a line component value.

### Format

**TransformLine** <unitNo>, <imageNo>, <mode>, <srcA>, <srcB>, <srcC>, <destA>, <destB>, <destC>

### Parameter

| Parameter name | Data type                              | Description                                                                                                                                                                                            |
|----------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type                           | Processing unit number (0 to (number of processing units of current scene minus one)) of the processing unit that holds the data to be converted.                                                      |
| <imageNo>      | Integer type                           | Measurement image number (always 0) of the processing unit that holds the data to be transformed                                                                                                       |
| <mode>         | Integer type                           | Transformation mode<br>0: After image transformation. -> Before image transformation.<br>1: Before image transformation. -> After image transformation.<br>10: Camera coordinates -> After calibration |
| <srcA>         | Double precision real number data type | Pre-transformation line component A gotten from the processing unit that holds the data to be transformed.                                                                                             |
| <srcB>         | Double precision real number data type | Pre-transformation line component B gotten from the processing unit that holds the data to be transformed.                                                                                             |
| <srcC>         | Double precision real number data type | Pre-transformation line component C gotten from the processing unit that holds the data to be transformed.                                                                                             |
| <destA>        | Double precision real number data type | Transformed line component A                                                                                                                                                                           |
| <destB>        | Double precision real number data type | Transformed line component B                                                                                                                                                                           |
| <destC>        | Double precision real number data type | Transformed line component C                                                                                                                                                                           |

### Return value

None.

## Description

Applies the transformation information specified in the <mode> parameter to the line components of the lines specified in the <srcA>, <srcB>, and <srcC> parameters on the image specified in the <imageNo> parameter, of the processing unit specified in the <unitNo> parameter.

Specify 0, 1, or 10 in the <mode> parameter. If a value other than 0, 1, and 10 is specified, operation after the execution of this macro function will be undefined.

In the <destA>, <destB>, and <destC> parameters, specify the variables that will hold the transformed line component values.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- None.

## Example

Transforms the values of the line components measured with the scan edge position processing unit of Processing Unit number 2 before calibration is applied, to the values of the line components after calibration is applied. "Line component A" is the external reference parameter identification name "coefficientA", "line component B" is the external reference parameter identification name "coefficientB", and "line component C" is the external reference parameter identification name "coefficientC".

---

Rem Get the measurement result.

GetUnitData 2, "coefficientA", BEFOREA#

GetUnitData 2, "coefficientB", BEFOREB#

GetUnitData 2, "coefficientC", BEFOREC#

Rem Transform to the value after calibration is applied.

TransformLine 2, 0, 10, BEFOREA#, BEFOREB#, BEFOREC#, AFTERA#, AFTERB#, AFTERC#

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

TransformArea (Reference: ▶ Details (p.507))

TransformXY (Reference: ▶ Details (p.513))

Ut (Reference: ▶ Details (p.534))

TransformAngle (Reference: ▶ Details (p.505))

TransformDist (Reference: ▶ Details (p.509))

UnitNo (Reference: ▶ Details (p.531))

## TransformXY

Applies the calibration result and position correction amount to coordinate values.

### Format

**TransformXY <unitNo>, <imageNo>, <mode>, <srcX>, <srcY>, <destX>, <destY>**

### Parameter

| Parameter name | Data type                              | Description                                                                                                                                                                                            |
|----------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type                           | Processing unit number (0 to (number of processing units of current scene minus one)) of the processing unit that holds the data to be converted.                                                      |
| <imageNo>      | Integer type                           | Measurement image number (always 0) of the processing unit that holds the data to be transformed                                                                                                       |
| <mode>         | Integer type                           | Transformation mode<br>0: After image transformation. -> Before image transformation.<br>1: Before image transformation. -> After image transformation.<br>10: Camera coordinates -> After calibration |
| <srcX>         | Double precision real number data type | Pre-transformation X coordinate gotten from the processing unit that holds the data to be transformed.                                                                                                 |
| <srcY>         | Double precision real number data type | Pre-transformation Y coordinate gotten from the processing unit that holds the data to be transformed.                                                                                                 |
| <destX>        | Double precision real number data type | Transformed X coordinate                                                                                                                                                                               |
| <destY>        | Double precision real number data type | Transformed Y coordinate                                                                                                                                                                               |

### Return value

None.

### Description

Applies the transformation information specified in the <mode> parameter to the coordinate values specified in the <srcX> and <srcY> parameters on the image specified in the <imageNo> parameter, of the processing unit specified in the <unitNo> parameter.

Specify 0, 1, or 10 in the <mode> parameter. If a value other than 0, 1, and 10 is specified, operation after the execution of this macro function will be undefined.

In the <destX> and <destY> parameters, specify the variables that will store the transformed coordinate values.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- None.

## Example

Transforms the pre-calibration measurement coordinates measured with the search processing unit of Processing Unit 2 to the measurement coordinates after calibration is applied. "Measurement coordinate X" is the external reference data identification name "positionX", and "measurement coordinate Y" is the external reference data identification name "positionY".

---

Rem Get the measurement result.

GetUnitData 2, "positionX", BEFOREX#

GetUnitData 2, "positionY", BEFOREY#

Rem Transform to the value after calibration is applied.

TransformXY 2, 0, 10, BEFOREX#, BEFOREY#, AFTERX#, AFTERY#

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

TransformArea (Reference: ▶ Details (p.507))

TransformLine (Reference: ▶ Details (p.511))

Ut (Reference: ▶ Details (p.534))

TransformAngle (Reference: ▶ Details (p.505))

TransformDist (Reference: ▶ Details (p.509))

UnitNo (Reference: ▶ Details (p.531))

## Try Catch End Try

Detects an error occurrence and executes an exception process.

### Format

```
Try
<statement>
Catch
<exceptionStatement>]
End Try
```

### Parameter

| Parameter name       | Data type | Description                                       |
|----------------------|-----------|---------------------------------------------------|
| <statement>          | ---       | Statement that can make error occurs              |
| <exceptionstatement> | ---       | Statement that is executed when an error occurred |

### Return value

None.

### Description

Executes the specified Catch block statement in the <exceptionStatement> parameter if an error is occurred as a result of the Try block statement execution specified in the <statement> parameter.

If there is no error occurrence as a result of executing all statements in the Try block statement, the process execution ends without executing the Catch block statement.

Use the Erno function or the Errcmd\$ function in the Catch block statement to get a macro function name and occurred error number in the Try block statement. (Reference: ▶ Erno (p.241)) (Reference: ▶ Errcmd\$ (p.239))

Errors in the Catch block statement cannot be detected. If statements in the Catch block can cause an error, nest the Try Catch-End Try statement to detect the error occurrence.

If the program process is jumped into or out of the Try and Catch block statements using the Goto function in a statement, unexpected operation may occur.

If neither the Try statement nor the End Try statement is used, either the "CATCH without TRY" or "END TRY without TRY" error will occur depending on the statement that is used.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

Uses the Try Catch-End Try statement in the \*MEASUREPROC subroutine of the Unit Macro processing unit to detect the error occurrence and get the detected error number.

---

```
*MEASUREPROC
```

```
Try
```

```
WORK& = 0
```

```
SUMM& = 100 + 200 + 300
```

```
ANS& = SUMM& / WORK&
```

```
Catch
```

```
If Errno = 11 Then
```

```
Rem Output the error number and the error content on the system status console window
```

```
Print "Error Number = " + Str$(Errno) + ", Division by Zero"
```

```
Endif
```

```
End Try
```

```
Return
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Errcmd\$ (Reference: ▶ Details (p.239))

If Then Elseif Else Endif (Reference: ▶ Details (p.298))

Str\$ (Reference: ▶ Details (p.490))

Errno (Reference: ▶ Details (p.241))

Print (Reference: ▶ Details (p.376))

## UCase\$

Converts an lower case letter to a upper case letter.

### Format

UCase\$(<string>)

### Parameter

| Parameter name | Data type             | Description                                                          |
|----------------|-----------------------|----------------------------------------------------------------------|
| <string>       | Character string type | Character string contains an alphabet to be converted to upper case. |

### Return value

Returns the case converted character string as a string type value.

### Description

Converts the lower case letters in the character strings specified in the <string> parameter to upper case.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, the 255-character string before the 256th character is used for the macro function process. Characters after the 256th character will be discarded.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Converts an lower case letter to a upper case letter.

---

```
CHARA1$ = "Measurement Result = 100.0(OK)"
```

Rem Convert the lower case letters in the character strings to upper case.

```
CHARA2$ = UCase$(CHARA1$)
```

---

The result is shown below.

---

```
CHARA2$ = "MEASUREMENT RESULT = 100.0(OK)"
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 4.20 or later

## Related Items

Asc (Reference: ▶ Details (p.138))

Hex\$ (Reference: ▶ Details (p.294))

Left\$ (Reference: ▶ Details (p.325))

Mid\$ (Reference: ▶ Details (p.356))

Right\$ (Reference: ▶ Details (p.403))

Str2\$ (Reference: ▶ Details (p.492))

Chr\$ (Reference: ▶ Details (p.152))

LCase\$ (Reference: ▶ Details (p.323))

Len (Reference: ▶ Details (p.327))

Piece\$ (Reference: ▶ Details (p.374))

Str\$ (Reference: ▶ Details (p.490))

Val (Reference: ▶ Details (p.535))

## UnitCount

Gets the number of registered processing units.

### Format

**UnitCount**

### Parameter

None.

### Return value

Returns the number of registered processing units as an integer value.

### Description

Gets the number of processing units registered in the current scene.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Adds the search processing unit to the end of the measurement flow.

---

```
Rem Get the number of processing units registered in the current flow.  
UNUM& = UnitCount
```

```
Rem Specify the processing item identifier.  
IDENT$ = "Search"
```

```
Rem Add the "Search" processing item to the end of the flow.  
AssignUnit UNUM& , IDENT$
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro

### Supported Versions

Version 3.50 or later

### Related Items

AssignUnit (Reference: ▶ Details (p.140))

CopyUnit (Reference: ▶ Details (p.168))

InsertUnit (Reference: ▶ Details (p.307))

MeasureStop (Reference: ▶ Details (p.353))

CheckUnit (Reference: ▶ Details (p.150))

DeleteUnit (Reference: ▶ Details (p.186))

MeasureStart (Reference: ▶ Details (p.351))

MoveUnit (Reference: ▶ Details (p.360))

## UnitData

Gets the numerical data of a processing unit.

### Format

**UnitData(<unitNo>, <dataNo>)**

**UnitData(<unitNo>, <dataIdent>)**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                                                                                       |
|----------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type          | Processing unit number (0 to (the number of registered processing units in the current scene minus one))                                                                                                                                          |
| <dataNo>       | Integer type          | External reference data of the processing unit data to get (reference:  Vision System FH/FHV Series Processing Item Function Reference Manual (Cat. No. Z341)) |
| <dataIdent>    | Character string type | Data identification name of processing unit data to be gotten.                                                                                                                                                                                    |

### Return value

Returns processing unit data as integer or double precision real values.

If non-numerical data is gotten, the data is converted to numerical values and returned.

### Description

Gets numerical data of the external reference data number specified in the <dataNo> parameter, in the processing unit specified in the <unitNo> parameter. The data can also be gotten by specifying the <dataIdent> parameter instead of the <dataNo> parameter.

To get data other than numerical data, use the UnitData\$ function or the GetUnitData function.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the value of the measurement X coordinate of the search processing unit of Processing Unit number 5. The measurement X coordinate is external reference data number 6 and external reference data identification name "X".

---

```
SEARCH# = UnitData(5, 6)
```

Rem The same result can be gotten by specifying "X" instead of 6.

```
SEARCH# = UnitData(5, "X")
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

UnitData\$ (Reference: ▶ Details (p.522))

UnitNo (Reference: ▶ Details (p.531))

SetUnitData (Reference: ▶ Details (p.473))

UnitData2 (Reference: ▶ Details (p.524))

Ut (Reference: ▶ Details (p.534))

## UnitData\$

Gets the character string data of the specified processing unit.

### Format

**UnitData\$(<unitNo>, <dataNo>)**

**UnitData\$(<unitNo>, <dataIdent>)**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                      |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type          | Processing unit number (0 to (the number of registered processing units in the current scene minus one))                                                                         |
| <dataNo>       | Integer type          | External reference data of the processing unit data to get (reference: <a href="#">▶ Vision System FH/FHV Series Processing Item Function Reference Manual (Cat. No. Z341)</a> ) |
| <dataIdent>    | Character string type | Data identification name of processing unit data to be gotten.                                                                                                                   |

### Return value

Returns the character string data of the processing unit as a string type value.

If non character string data is gotten, the data is converted to a character string and returned.

### Description

Gets the data of the external reference data number specified in the <dataNo> parameter, held by the processing unit specified in the <unitNo> parameter. The data can also be gotten by specifying the <dataIdent> parameter instead of the <dataNo> parameter.

To get data other than character string data, use the UnitData function or the GetUnitData function.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the decode character string of the 2D code processing unit of Processing Unit number 5. The decode character string is external reference data number 7 and external reference data identification name "decodeCharStr".

---

```
DECODECHAR$ = UnitData$(5, 7)
```

Rem The same result can be gotten by specifying "decodeCharStr" instead of 7.

```
DECODECHAR$ = UnitData$(5, "decodeCharStr")
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

UnitData (Reference: ▶ Details (p.520))

UnitNo (Reference: ▶ Details (p.531))

SetUnitData (Reference: ▶ Details (p.473))

UnitData2 (Reference: ▶ Details (p.524))

Ut (Reference: ▶ Details (p.534))

## UnitData2

Gets the drawing coordinate data of a processing unit.

### Format

**UnitData2(<unitNo>, <dataNo>)**

**UnitData2(<unitNo>, <dataIdent>)**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                      |
|----------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type          | Processing unit number (0 to (the number of registered processing units in the current scene minus one))                                                                         |
| <dataNo>       | Integer type          | External reference data of the processing unit data to get (reference: <a href="#">▶ Vision System FH/FHV Series Processing Item Function Reference Manual (Cat. No. Z341)</a> ) |
| <dataIdent>    | Character string type | Data identification name of processing unit data to be gotten.                                                                                                                   |

### Return value

Returns processing unit data as integer or double precision real values.

### Description

Gets numerical data of the external reference data number specified in the <dataNo> parameter, in the processing unit specified in the <unitNo> parameter. The data can also be gotten by specifying the <dataIdent> parameter instead of the <dataNo> parameter.

This macro function can be used to get measurement coordinate values prior to transformation by calibration or otherwise. Use to get drawing coordinates for the display of measurement results in the image window.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

## Example

In the \*MEASUREDISPG subroutine of the Unit Macro processing unit, gets the measurement X and Y coordinate values of the search processing unit of Processing Unit number 5 and displaying the cursor in the image coordinates. The measurement X coordinate is the external reference data number 8 and the external reference data identification name "X", and the measurement Y coordinate is the external reference data number 7 and the external reference data identification name "Y".

Even when the "Calibration" setting of the search processing unit is "ON", this macro function can be used to get drawing coordinates without concern for the calibration settings.

---

```
SEARCHX& = UnitData2(5, 6)
SEARCHY& = UnitData2(5, 7)
```

Rem The same result can be gotten by specifying "X" instead of 6.

```
SEARCHX& = UnitData2(5, "X")
SEARCHY& = UnitData2(5, "Y")
```

Rem Display the cursor in the coordinates prior to position correction.  
 DrawCursor SEARCHX&, SEARCHY&, 0, UnitNo

---

## Usable Modules

Unit Calculation Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

GetUnitData (Reference: ▶ Details (p.286))

UnitData (Reference: ▶ Details (p.520))

UnitNo (Reference: ▶ Details (p.531))

SetUnitData (Reference: ▶ Details (p.473))

UnitData\$ (Reference: ▶ Details (p.522))

Ut (Reference: ▶ Details (p.534))

## UnitInfo

Gets the processing unit information.

### Format

**UnitInfo(<unitNo>, <kind>)**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number (0 to (number of processing units of current scene minus one)) of the processing unit whose information is to be gotten.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <kind>         | Integer type | <p>Type of information</p> <p>0: Processing item type</p> <p>Number that indicates the processing item type. The values below can be gotten.</p> <ul style="list-style-type: none"> <li>0: Inspect and Measure (measurement)</li> <li>1: Input image (Image input)</li> <li>2: Compensate image (image correction)</li> <li>3: Support Inspection and Measurement (supplementary measurement)</li> <li>4: Branch (branch control)</li> <li>5: Output result (result output)</li> <li>6: Display result (result display)</li> </ul> <p>1: Setting data structure size</p> <p>Size of setting data structure. Units are bytes.</p> <p>2: Measurement data structure size</p> <p>Size of measurement data structure. Units are bytes.</p> <p>3: Control data structure size</p> <p>Size of control data structure. Units are bytes.</p> <p>4: The maximum number of figure data</p> <p>Maximum number of figure data items held by processing unit.</p> <p>5: Maximum number of model data</p> <p>Maximum number of model data items held by processing unit.</p> <p>6: Maximum number of image data</p> <p>Maximum number of image data items held by processing unit.</p> <p>7: Maximum number of inner processing unit</p> <p>Maximum number of processing units held (incorporated) by processing unit.</p> <p>8: Whether camera setting is effective or not</p> <p>Displays whether or not the processing unit updates the camera settings at measurement initialization and other times. "1" is returned when there is an image input processing unit for camera image input.</p> <ul style="list-style-type: none"> <li>0: Camera settings invalid</li> <li>1: Camera settings valid</li> </ul> <p>9: Whether processing unit measure processing can parallel or not</p> <p>Displays whether or not parallel execution of processing units is possible in the measurement flow during measurement. "1" is returned when the processing units support parallel processing.</p> <ul style="list-style-type: none"> <li>0: Parallel processing disabled</li> <li>1: Parallel processing enabled</li> </ul> <p>For the parallel processing, refer to Parallel Processing. (Reference: ► <i>Parallel Processing</i> in the <i>Vision System FH/FHV Series User's Manual</i> (Cat. No. Z365))</p> |

## Return value

Returns processing unit information as an integer value. Returns -1 if information does not exist.

## Description

Gets the information specified in the <kind> parameter of the processing unit specified in the <unitNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

## Usage Cautions

- None.

## Example

Checks if model registration is possible on the processing unit of Processing Unit number 2.

---

```
If UnitInfo(2, 5) > 0 Then
```

```
    Rem Write a model registration processing statements here.
```

```
Endif
```

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

UnitNo (Reference: ▶ Details (p.531))

Ut (Reference: ▶ Details (p.534))

## UnitItemIdent\$

Gets the processing item identification name of the specified processing unit.

### Format

UnitItemIdent\$(<unitNo>)

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                         |
|----------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number (0 to (number of processing units of current scene minus one)) of processing unit whose processing item identification name is to be gotten. |

### Return value

Returns the value of the processing item identification name as a character string.

### Description

Gets the processing item identification name of the processing unit specified in the <unitNo> parameter. If the specified processing unit is not registered on the measurement flow, the null character string ("") is returned. If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the scene macro, searches for the search processing unit registered in the measurement flow, and updating the correlation value lower limit, which is the judgement condition, to "70". The search correlation value lower limit is external reference number 143.

---

```
Rem Get the enrollment number of the processing unit.
```

```
COUNT& = UnitCount
```

```
Rem Search the search processing unit.
```

```
For I&=0 To COUNT&-1
```

```
  If UnitItemIdent$(I&) = "Search" Then
```

```
    Rem Update the correlation value lower limit, which is the judgement condition of the search processing unit.
```

```
    SetUnitData I&, 143, 70
```

```
  Endif
```

```
Next
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

SetUnitData (Reference: ▶ Details (p.473))

UnitNo (Reference: ▶ Details (p.531))

UnitCount (Reference: ▶ Details (p.519))

Ut (Reference: ▶ Details (p.534))

## UnitJudge

Gets the judgement result of a processing unit.

### Format

**UnitJudge(<unitNo>)**

### Parameter

| Parameter name | Data type    | Description                                                                                                                                                 |
|----------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number to get the judgement result of the processing unit (0 to (the number of registered processing units in the current scene minus one)) |

### Return value

Returns the judgement result as an integer value.

- 0: No judgement (unmeasured)
- 1: Judgement result OK
- 1: Judgement result NG
- 10: Judgement result error (image format mismatch)
- 11: Judgement result error (unregistered model)
- 12: Judgement result error (insufficient memory)
- 20: Judgement result error (other errors)

### Description

Gets the judgement result of the processing unit specified in the <unitNo> parameter.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the judgement result of the processing unit of Processing Unit number 5.

```
JUDGE& = UnitJudge(5)
```

### Usable Modules

Unit Calculation Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

GetUnitData (Reference: ▶ Details (p.286))

TotalJudge (Reference: ▶ Details (p.503))

Ut (Reference: ▶ Details (p.534))

SetUnitJudge (Reference: ▶ Details (p.477))

UnitNo (Reference: ▶ Details (p.531))

## UnitNo

---

Gets the processing unit number.

### Format

UnitNo

### Parameter

None.

### Return value

Returns the processing unit number as an integer value.

### Description

Gets the processing unit number of the processing unit.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the judgement result of the processing unit registered immediately before the current processing unit.

---

```
Rem Get the processing unit number of this processing unit  
UNO& = UnitNo
```

```
Rem Get the judgement result of the processing unit registered immediately before this processing unit.  
JUDGE& = UnitJudge(UNO& - 1)
```

---

### Usable Modules

Unit Calculation Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

UnitJudge (Reference: ▶ Details (p.530))

Ut (Reference: ▶ Details (p.534))

## UnitTitle\$

Gets the title of a processing unit.

### Format

**UnitTitle\$(<unitNo>)**

### Parameter

| Parameter name | Data type    | Description                                                                                                                           |
|----------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <unitNo>       | Integer type | Processing unit number (0 to (number of processing units of current scene minus one)) of processing unit whose title is to be gotten. |

### Return value

Returns the title as a character string.

### Description

Gets the title of the processing unit specified in the <unitNo> parameter.

The title can be gotten in a language based on the language setting.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the scene control macro, searches for the search processing unit registered in the measurement flow with the title "Bolt search", and updates the correlation value lower limit, which is the judgement condition, to "70". The search correlation value lower limit is external reference number 143.

---

```
Rem Get the enrollment number of the processing unit.
```

```
COUNT& = UnitCount
```

```
Rem Search for the processing unit with the title "Bolt search"
```

```
For I&=0 To COUNT&-1
```

```
  If UnitTitle$(I&) = "Bolt search" Then
```

```
    Rem Change the correlation value lower limit, which is the judgement condition
```

```
    SetUnitData I&, 143, 70
```

```
  Endif
```

```
Next
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

SetUnitData (Reference: ▶ Details (p.473))

UnitCount (Reference: ▶ Details (p.519))

Ut (Reference: ▶ Details (p.534))

SetUnitTitle (Reference: ▶ Details (p.479))

UnitNo (Reference: ▶ Details (p.531))

## Ut

Gets a processing unit number based on the specified unit label.

### Format

**Ut(<unitLabel>)**

### Parameter

| Parameter name | Data type             | Description                   |
|----------------|-----------------------|-------------------------------|
| <unitLabel>    | Character string type | Unit label of processing unit |

### Return value

Returns the processing unit number as an integer value.

### Description

Gets the processing unit number of the processing unit that has the set unit label specified in the <unitLabel> parameter.

Knowing the unit label allows you to get the processing unit number, and thus even if the measurement flow is changed and the unit number changes, there is no need to change the program.

Set the unit label in advance with the scene control macro tool.

Reference: ▶ Description of the Setting Screen of the Scene Control Macro Tool and How to Configure Settings (p.29)

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

In the scene control macro tool, gets the processing unit number of the unit label "Position Search" set in the search processing unit of processing unit number 10, and gets the judgement result.

---

```
Rem Specify the unit label that was set with the scene control macro tool and get the processing unit number.  
UNITNO& = Ut("PositionSearch")
```

```
Rem Using the gotten processing unit number, get the judgement result of the processing unit.  
JG& = UnitJudge(UNITNO&)
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 5.20 or later

### Related Items

UnitJudge (Reference: ▶ Details (p.530))

UnitNo (Reference: ▶ Details (p.531))

## Val

Converts a numeric character string to numeric value.

### Format

**Val(<string>)**

### Parameter

| Parameter name | Data type             | Description                                         |
|----------------|-----------------------|-----------------------------------------------------|
| <string>       | Character string type | Numeric character string converted to numeric value |

### Return value

Returns the value as the double precision type real number.

### Description

Converts the specified numeric character string in the <string> parameter to the numeric value.

Val is the inverse function of Str\$. Str\$ converts the specified numeric value to the numeric character string.

Specify a character string starting with either "+", "-", ".", or half-width numbers "0" to "9" to the <string> parameter. If other characters than above is in the first character of the specified character string, 0 is returned.

If there are characters that cannot be converted to numeric values in the specified alphanumeric character string with the <string> parameter, characters from the beginning of the string to one character before the inconvertible character are converted to a numeric value.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a character string longer than 255 characters is specified for a character string parameter, an error will not occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Converts a numeric character string to numeric value.

---

```

VALUE1# = Val("123.456")
VALUE2# = Val("-123.456")
VALUE3# = Val(".123")
VALUE4# = Val("-.456")
VALUE5# = Val("123"+"."+456")
VALUE6# = Val("123+456")

```

---

The result is shown below.

---

VALUE1# = 123.456  
VALUE2# = -123.456  
VALUE3# = 0.123  
VALUE4# = -0.456  
VALUE5# = 123.456  
VALUE6# = 123

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

Asc (Reference: ▶ Details (p.138))  
Hex\$ (Reference: ▶ Details (p.294))  
Left\$ (Reference: ▶ Details (p.325))  
Mid\$ (Reference: ▶ Details (p.356))  
Right\$ (Reference: ▶ Details (p.403))  
Str2\$ (Reference: ▶ Details (p.492))

Chr\$ (Reference: ▶ Details (p.152))  
LCase\$ (Reference: ▶ Details (p.323))  
Len (Reference: ▶ Details (p.327))  
Piece\$ (Reference: ▶ Details (p.374))  
Str\$ (Reference: ▶ Details (p.490))  
UCase\$ (Reference: ▶ Details (p.517))

## VarList

Outputs a list of the values of the specified variables in the system status console window.

### Format

**VarList [<variableName>]**

### Parameter

| Parameter name | Data type             | Description                                                                                                                                                                         |
|----------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <variableName> | Character string type | Name of variable to be output.<br>This parameter can be omitted.<br>When the parameter is not specified, a list of the values of the variables used in the current scope is output. |

### Return Value

None.

### Description

Outputs the values of the variables specified in the <variableName> parameter to the system status console window.

This macro function cannot output the values of the elements of an array variable. To output the value of each element of an array variable, specify each element of the array variable by entering a question mark (?), a half-width space ( ), and then the array variable and the element number (for example, "? AA&(5)").

Characters \* (character string wildcard operator) and ? (single character wildcard operator) can be used as wildcards for the <variableName> specification.

Wildcards can be used to specify file names in the following manner.

|         |                                                                                  |
|---------|----------------------------------------------------------------------------------|
| *       | Specify all variables.                                                           |
| ???     | Specify variables with a 3-character variable name.                              |
| A*      | Specify variables with a variable name that starts with "A".                     |
| *A*A*A* | Specify variables with a variable name that includes at least three "A" letters. |
| ????*   | Specify variables with a variable name that consists of four or more characters. |

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- Use this macro function when program execution has been stopped by the Stop function.
- The timing of displaying variables by the VarList command changes depending on the use of the Option Explicit command.  
When the Option Explicit command is used, variables are not displayed by setting reference variables and executing the VarList command. They are displayed when the Dim function is used and the VarList command is executed.  
When the Option Explicit command is not used, variables are displayed when reference variables are set and the VarList command is executed.

## Example

Among the variables used by the Unit Macro processing unit of Processing Unit number 1 (AA&, AB#, BB&, ABC\$, DEF#), outputs a list of the values of variables AA& and AB\$, which start with "A" and consist of three characters including the type identifier.

```
Macro(U1)>VarList "A?&"
AA&=123
AB$=123.456
```

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 5.20 or later

## Related Items

Cont (Reference: ▶ Details (p.161))

DebugPrint (Reference: ▶ Details (p.184))

List (Reference: ▶ Details (p.331))

Option Explicit (Reference: ▶ Details (p.482))

ReDim (Reference: ▶ Details (p.391))

SetVar (Reference: ▶ Details (p.482))

Debug (Reference: ▶ Details (p.182))

Dim (Reference: ▶ Details (p.187))

Option Explicit (Reference: ▶ Details (p.281))

Print (Reference: ▶ Details (p.376))

SetStop (Reference: ▶ Details (p.465))

Stop (Reference: ▶ Details (p.488))

## VarPop

---

Restores the value of the variables that are saved temporarily.

### Format

**VarPop**

### Parameter

None.

### Return value

None.

### Description

Restore the values of all variables that were saved by the most recent VarPush function.

If the VarPush function is executed more than once, the saved values are restored from the latest saved variable to the oldest saved variable.

If this function is executed before saving the values with the VarPush function, an "Internal error" will occur.

### Usage Cautions

- None.

## Example

Uses the variables used in subroutines as local variables.

---

\*EXPA

Rem Display the current value of the variable.

Print A&, B&, C&, D#, E#

Rem Use the EXPA subroutine to save the current values of the variables in order to prepare for treating the variable as local variables.

VarPush A&, B&, C&, D#, E#

Rem Use A&, B&, C&, D#, and E# freely.

GetUnitData 2, "CR", A&

GetUnitData 3, "CR", B&

GetUnitData 4, "CR", C&

GetUnitData 5, "X", D#

GetUnitData 6, "Y", E#

Rem Check the current values of the variables before calling the subroutine.

Print A&, B&, C&, D#, E#

Rem Variables named A&, B&, C& are used in the \*EXPB subroutine.

Rem These names are also used for variables in this \*EXPA subroutine.

Rem Although being nested with the Gosub statement in this program example,

Rem saving and restoration of variable values are performed with the Varpush and Varpop functions within the \*EXPB subroutine,

Rem so as to prevent variable values from being unintentionally overwritten.

Gosub \*EXPB

Rem Check the current value of the variables after calling the subroutine.

Print A&, B&, C&, D#, E#

Rem Restore the current value of the variables that were saved at the beginning of the subroutine EXPA.

VarPop

Return

## \*EXPB

Rem Use the EXPB subroutine to save the current values of the variables in order to prepare for treating the variable as local variables.

Rem Values in variables A&, B&, C&, D#, E# are saved in different areas from  
Rem where the Varpush statement in the earlier part of the \*EXPA subroutine saves.

Rem This prevents the previously saved values from being overwritten.

Rem VarPush can be executed up to 16 times consecutively.

VarPush A&, B&, C&, D#, E#

Rem Use A&, B&, C&, D#, and E# freely.

GetUnitData 2, "X", A&

GetUnitData 3, "X", B&

GetUnitData 4, "X", C&

D# = 3

E# = 100 / 512

Rem Check the current values of the variables after change.

Print A&, B&, C&, D#, E#

Rem Restore the current value of the variables that were saved at the beginning of the subroutine EXPB.

VarPop

Return

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

VarPush (Reference: ► [Details \(p.542\)](#))

## VarPush

Saves the value of the variables that are saved temporarily.

### Format

**VarPush <variable>[, <variable>[,..., <variable>]]**

### Parameter

| Parameter name | Data type             | Description                                                    |
|----------------|-----------------------|----------------------------------------------------------------|
| <variable>     | Character string type | Variable name of the variable whose value is saved temporarily |

### Return value

None.

### Description

Temporarily save the variable value specified in the <variable> parameter. Execute the Varpush function to restore the saved value. (Reference: ►VarPop (p.815))

If this macro function is executed 17 times or more without executing the VarPop function, an "Internal error" will occur. Execute the VarPop function to restore the value so that this function execution count is equal to or less than the Varpop execution count + 16.

If variables except array variable are specified as parameter, a "Type mismatch" error will occur.

### Usage Cautions

- None.

## Example

Uses the variables used in subroutines as local variables.

---

```
*EXPA
  Rem Display the current value of the variable.
  Print A&, B&, C&, D#, E#

  Rem Use the EXPA subroutine to save the current values of the variables in order to prepare for treating the variable
  as local variables.
  VarPush A&, B&, C&, D#, E#

  Rem Use A&, B&, C&, D#, and E# freely.
  GetUnitData 2, "CR", A&
  GetUnitData 3, "CR", B&
  GetUnitData 4, "CR", C&
  GetUnitData 5, "X", D#
  GetUnitData 6, "Y", E#

  Rem Check the current values of the variables before calling the subroutine.
  Print A&, B&, C&, D#, E#

  Rem Variables named A&, B&, C& are used in the *EXPB subroutine.
  Rem These names are also used for variables in this *EXPA subroutine.
  Rem Although being nested with the Gosub statement in this program example,
  Rem saving and restoration of variable values are performed with the Varpush and Varpop functions within the *EXPB
  subroutine,
  Rem so as to prevent variable values from being unintentionally overwritten.
  Gosub *EXPB

  Rem Check the current value of the variables after calling the subroutine.
  Print A&, B&, C&, D#, E#

  Rem Restore the current value of the variables that were saved at the beginning of the subroutine EXPA.
  VarPop

Return
```

\*EXPB

Rem Use the EXPB subroutine to save the current values of the variables in order to prepare for treating the variable as local variables.

Rem Values in variables A&, B&, C&, D#, E# are saved in different areas from where the VarPush statement in the earlier part of the \*EXPA subroutine saves.

Rem This prevents the previously saved values from being overwritten.

Rem VarPush can be executed up to 16 times consecutively.

Varpush A&, B&, C&, D#, E#

Rem Use A&, B&, C&, D#, and E# freely.

GetUnitData 2, "X", A&

GetUnitData 3, "X", B&

GetUnitData 4, "X", C&

D# = 3

E# = 100 / 512

Rem Check the current values of the variables after change.

Print A&, B&, C&, D#, E#

Rem Restore the current value of the variables that were saved at the beginning of the subroutine EXPB.

VarPop

Return

---

## Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

VarPop (Reference: [▶ Details \(p.539\)](#))

## VarSave

Saves the values of the variables in the scene data.

### Format

**VarSave <variableName>**

### Parameter

| Parameter name | Data type             | Description                   |
|----------------|-----------------------|-------------------------------|
| <variableName> | Character string type | Name of the variables to save |

### Return value

None.

### Description

Saves the values of the variables specified in the <variableName> parameter to the scene data.

Characters \* (character string wildcard operator) and ? (single character wildcard operator) can be used as wildcards for the <variableName> specification.

Wildcards can be used to specify file names in the following manner.

|         |                                                                                  |
|---------|----------------------------------------------------------------------------------|
| *       | Specify all variables.                                                           |
| ???     | Specify variables with a 3-character variable name.                              |
| A*      | Specify variables with a variable name that starts with "A".                     |
| *A*A*A* | Specify variables with a variable name that includes at least three "A" letters. |
| ????*   | Specify variables with a variable name that consists of four or more characters. |

The variable value saved with this macro function will be read when the scene data is loaded.

If this macro function is executed multiple times, values are restored to the original variables in execution order of the VarSave statement (from the oldest saved variable value to the latest saved variable value) at the loading of the scene data.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

Even if a non-existent number, numerical value, or combination of data types or values is specified for the parameter, an error will not occur.

If a character string longer than 255 characters is specified for a character string parameter, a "String too long" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- This macro function can only be used in the \*SAVEPROC subroutine. If used in another subroutine, an "Illegal function call" error will occur.

## Example

In SAVEPROC subroutine of scene control macro, saves the version information managed independently in scene data.

---

```
*SAVEPROC
```

```
    Rem Create a variable to store the version information and set 100.  
    Version& = 100
```

```
    Rem Save the version information.  
    VarSave "Version*"
```

```
Return
```

---

## Usable Modules

Scene Control Macro

## Supported Versions

Version 5.20 or later

## Related Items

None.

## Wait

Pauses the program process for the specified amount of time elapses.

### Format

**Wait <time>**

### Parameter

| Parameter name | Data type    | Description       |
|----------------|--------------|-------------------|
| <time>         | Integer type | Standby time (ms) |

### Return value

None.

### Description

Pauses the program process on the period of time specified in the <time> parameter.

When the process is performed in the background while waiting, the background process will be performed without waiting.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- An error may occur between the waiting time specified as a parameter and the actual waiting time.

### Example

After switching to the scene 2 with the communication command macro, waits for 10 ms.

---

```
Rem Switch the scene.
ChangeScene 2
```

```
Rem Wait 10ms
Wait 10
```

---

### Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

### Supported Versions

Version 3.50 or later

### Related Items

ChangeScene (Reference: ▶ Details (p.148))

StartTimer (Reference: ▶ Details (p.487))

ElapsedTime (Reference: ▶ Details (p.234))

Timer (Reference: ▶ Details (p.501))

## WritePlcMemory

Writes values in the PLC memory area.

### Format

**WritePlcMemory** <iolent>, <area>, <channelOffset>, <channelCount>, <writeData()>

### Parameter

| Parameter name  | Data type             | Description                                                                                          |
|-----------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <iolent>        | Character string type | Identification name of the communication module to be used (Reference: ►List of I/O Modules (p.581)) |
| <area>          | Integer type          | Area type number of data output area to be written to.                                               |
| <channelOffset> | Integer type          | Offset from beginning of data output area to address where writing is to start.                      |
| <channelCount>  | Integer type          | Data size to write                                                                                   |
| <writeData()>   | Integer array         | Data to write                                                                                        |

### Return value

None.

### Description

Writes the amount of data specified in the <channelCount> parameter from the address offset by the amount of the value specified in the <channelOffset> parameter, of the PLC area type specified in the <area> parameter by using the communication module specified in the <iolent> parameter.

Before using this macro function to write data to the PLC memory area, execute the SetPlcData function to set the data to be written.

In the <writeData()> parameter, specify the 1D integer array variable that stores the data to be written, without adding element numbers but adding () to the variables.

This macro function cannot be used to write data to a PLC that is connected by other than the PLC link communication module.

In the <area> parameter, specify the identification of the register that is set with the PLC link setting in the system settings.

In the <channelCount> parameter, specify the size in channel units. The size of one integer type data item is two channels (4 bytes), and thus to write one integer value, a one-element array should be prepared with the <writeData()> parameter, and 2 should be specified in the <channelCount> parameter.

If a size larger than the array size specified in the <writeData()> parameter is specified in the <channelCount> parameter, a "Subscript out of range" error will occur.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a non-existent number, numerical value, or combination of data types or values is specified for a parameter, an "Illegal function call" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

Writes the data to the data output area. Note that if the data is written to the response area, the response data will be overwritten after the command processing.

### Usage Cautions

- Before using this macro function to write data, always use the SetPlcData function to set the data to be written. If the data is directly set in the <writeData()> parameter without using the SetPlcData function, the correct data may not be set.

## Example

In the communication macro, writes measurement coordinate X and measurement coordinate Y of the search processing unit of Processing Unit number 2 to the PLC connected by PLC link. Measurement coordinate X is external data number 6, and measurement coordinate Y is external data number 7.

---

```
IOMODULE$ = "UdpPlcLink"
```

```
Rem Get the measurement result.
```

```
GetUnitData 2, 6, X#
```

```
GetUnitData 2, 7, Y#
```

```
Rem Convert the real number value multiplied by 1,000 to the integer value.
```

```
VALUE0& = Int(X# * 1000)
```

```
VALUE1& = Int(Y# * 1000)
```

```
Rem Get the settings of the output data area.
```

```
GetSystemData IOMODULE$, "outputArea", AREA&
```

```
GetSystemData IOMODULE$, "outputMemoryAddress", ADDRESS&
```

```
Rem Store the data to be written in an integer array variable.
```

```
Dim DATA&(1)
```

```
SetPlcData IOMODULE$, DATA&(), 0, 4, VALUE0&
```

```
SetPlcData IOMODULE$, DATA&(), 4, 4, VALUE1&
```

```
Rem Write the data (4ch) in data output area.
```

```
WritePlcMemory IOMODULE$, AREA&, ADDRESS&, 4, DATA&()
```

---

## Usable Modules

Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 4.20 or later

## Related Items

GetPlcData (Reference: ▶ Details (p.268))

GetUnitData (Reference: ▶ Details (p.286))

ReadPlcMemory (Reference: ▶ Details (p.387))

GetSystemData (Reference: ▶ Details (p.276))

Int (Reference: ▶ Details (p.309))

SetPlcData (Reference: ▶ Details (p.452))

## XOR

Gets the exclusive disjunction (XOR) of two expressions.

### Format

**<expression1> XOR <expression2>**

### Parameter

| Parameter name | Data type    | Description                                 |
|----------------|--------------|---------------------------------------------|
| <expression1>  | Integer type | Expression to get the exclusive disjunction |
| <expression2>  | Integer type | Expression to get the exclusive disjunction |

### Return value

Returns the XOR value as an integer value.

### Description

Gets the XOR value of the expressions specified in the <expression 1> and <expression 2> parameters. (Each bit of the two expressions is computed separately.)

When the values of the <expression1> parameter and <expression2> parameter are double precision real values, the decimal part is rounded off.

If an incorrect data type is specified for a parameter, a "Type mismatch" error will occur.

If a value outside the range -2147483648 to 2147483647 is specified as an integer parameter, an "Overflow" error will occur.

If a value is assigned to the return value variable or the variable is not used in an expression, a "Syntax error" error will occur.

If the format is written incorrectly, such as writing the macro function name incorrectly, omitting a comma, or omitting a half-width space, a "Syntax error" error will occur.

### Usage Cautions

- None.

### Example

Gets the XOR value of 12 and 31.

---

```
DATA1& = 12  
DATA2& = 31
```

```
DATA3& = DATA1& XOR DATA2&
```

---

The result is shown below.

---

```
DATA3& = 19
```

---

### Usable Modules

Unit Calculation Macro / Scene Control Macro / Communication Command Macro / Unit Macro

## Supported Versions

Version 3.50 or later

## Related Items

AND (Reference: ▶ Details (p.131))

NOT (Reference: ▶ Details (p.361))

UnitData (Reference: ▶ Details (p.520))

GetUnitData (Reference: ▶ Details (p.286))

OR (Reference: ▶ Details (p.372))



# Macro Reference

---

|                                       |            |
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# Macro Reference List

## Error List

If an error occurs during execution of the program of a macro customize function, you can identify the cause of the error from the error number and error message that are displayed. The error messages that may appear are described below.

| No. | Error Message          | Explanation                                                                                                                                                          | Action                                                                                                                                                                                                                                                                                                                                                                                             |
|-----|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | NEXT without FOR       | A Next statement occurs without a corresponding For statement.                                                                                                       | Write For properly in a For - Next statement.                                                                                                                                                                                                                                                                                                                                                      |
| 2   | Syntax error           | Incorrect function format or spelling, or a function is not used in accordance with the rules.                                                                       | Check the macro function reference and correct the function format or spelling.                                                                                                                                                                                                                                                                                                                    |
| 3   | RETURN without GOSUB   | A Return statement occurs without a corresponding Gosub statement.                                                                                                   | A Gosub function does not exist or is not written correctly. Write the Gosub function correctly.                                                                                                                                                                                                                                                                                                   |
| 5   | Illegal function call  | The argument specified for a function is not within the allowed range, or an error occurred when the function was executed.                                          | Occurs when a macro function argument is not within the allowed range. Check the macro function reference and set the macro function argument appropriately. If the macro function is executed from an inappropriate subroutine, execute from an appropriate subroutine.                                                                                                                           |
| 6   | Overflow               | The calculation result or entered value is not within the allowed range for double precision real numbers, or the character string length is over the allowed range. | Occurs when a double precision real number value is not within the range -1.0E30 to 1.0E30. Correct the process so that the value is within the double precision real number range.<br>Occurs when the length of a character string variable or constant is over 255 characters. Shorten the character string length.                                                                              |
| 7   | Out of memory          | Insufficient sensor controller working memory, or a loop process is nested too deep.                                                                                 | Occurs when too many character strings or array variables are used in a program. Decrease the number used until the error no longer occurs.<br>Occurs when the number of nested levels in a loop process is too large. Decrease the number of nested levels until the error no longer occurs.                                                                                                      |
| 8   | Undefined line number  | The program branches to an undefined line number.                                                                                                                    | Occurs when a Goto or other function branches to a non-existent line number. Specify an existing line number, or use a <label> instead of a line number to specify the branch destination.                                                                                                                                                                                                         |
| 9   | Subscript out of range | An attempt was made to use an array element with an index over the declared maximum.                                                                                 | Occurs when an attempt is made to access an array variable over the number of array variable elements declared in the Dim instruction. Change the element number to a number equal to or less than the number of elements, or change the number of declared elements.                                                                                                                              |
| 11  | Division by Zero       | Division by zero was attempted.                                                                                                                                      | Division by 0 is not possible. Divide by a value other than 0.                                                                                                                                                                                                                                                                                                                                     |
| 13  | Type mismatch          | Variable types do not match, such as on the left or right side of an expression, or in the argument of a function.                                                   | Occur when variable types do not match on the left or right side of an expression, or in the argument of a function. Specify the correct variable type or array variable.<br>Occurs when a character string is assigned to a numerical value, or a numerical value is assigned to a character string. Assign a numerical value to a numerical value, and a character string to a character string. |
| 15  | String too long        | The number of characters in a character string assigned to a character string variable is over 255.                                                                  | If the character string variable is over 255 characters, break the string into two variables.                                                                                                                                                                                                                                                                                                      |

| No. | Error Message             | Explanation                                                                                 | Action                                                                                                                                                            |
|-----|---------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18  | Undefined array           | An undefined array is used.                                                                 | Declare the array variable with a Dim instruction before using the array.                                                                                         |
| 23  | Line buffer overflow      | An attempt was made to input more than the allowed character limit (255 bytes) on one line. | Generally occurs when one line of data is received by serial communication or from a memory card. Use the Input\$ function to input the required number of bytes. |
| 26  | FOR without NEXT          | A For statement occurs without a corresponding Next statement.                              | Occurs when a Next instruction does not exist or is not written correctly in a For - Next statement. Write the Next instruction correctly.                        |
| 32  | Undefined label           | An attempt was made to access an undefined label.                                           | Occurs when the referencing and referenced label names do not match. Use a defined label name.                                                                    |
| 121 | CASE without SELECT       | A Case statement occurs without a corresponding Select statement.                           | Occurs when a Select instruction does not exist or is not written correctly in a Select - Case statement. Write the Select instruction correctly.                 |
| 122 | END SELECT without SELECT | An End Select statement occurs without a corresponding Select statement.                    | Occurs when a Select instruction does not exist or is not written correctly in a Select - Case statement. Write the Select instruction correctly.                 |
| 123 | SELECT without END SELECT | A Select statement occurs without a corresponding End Select statement.                     | Occurs when an End Select instruction does not exist or is not written correctly in a Select - Case statement. Write the End - Select instruction correctly.      |
| 124 | CASE without END SELECT   | A Case statement occurs without a corresponding End Select statement.                       | Occurs when an End Select instruction does not exist or is not written correctly in a Select - Case statement. Write the End - Select instruction correctly.      |
| 125 | ELSEIF without IF         | An Elself statement occurs without a corresponding If statement.                            | Occurs when an If instruction does not exist or is not written correctly in an If Else statement. Write the If instruction correctly.                             |
| 126 | ELSE without IF           | ELSE statement occurs without a corresponding If statement.                                 | Occurs when an If instruction does not exist or is not written correctly in an If Else statement. Write the If instruction correctly.                             |
| 127 | ENDIF without IF          | Endif statement occurs without a corresponding If statement.                                | Occurs when an If instruction does not exist or is not written correctly in an If - Endif statement. Write the If instruction correctly.                          |
| 128 | IF without ENDIF          | If statement occurs without a corresponding Endif statement.                                | Occurs when an Endif instruction does not exist or is not written correctly in an If - Endif statement. Write the Endif instruction correctly.                    |
| 129 | ELSEIF without ENDIF      | Endif statement occurs without a corresponding Elself statement.                            | Occurs when an Endif instruction does not exist or is not written correctly in an If - Endif statement. Write the Endif instruction correctly.                    |
| 130 | ELSE without ENDIF        | Else statement occurs without a corresponding Endif statement.                              | Occurs when an Endif instruction does not exist or is not written correctly in an If - Endif statement. Write the Endif instruction correctly.                    |
| 135 | DO without LOOP           | Do statement occurs without a corresponding Loop statement.                                 | Occurs when a Loop instruction does not exist or is not written correctly in a Do Loop While statement. Write the Loop instruction correctly.                     |
| 136 | LOOP without DO           | Loop statement occurs without a corresponding Do statement.                                 | Occurs when a Do instruction does not exist or is not written correctly in a Do Loop While statement. Write the Do instruction correctly.                         |
| 140 | EXIT without FOR          | An Exit Do statement occurs without a corresponding For statement.                          | Occurs when a For instruction does not exist or is not written correctly in a For Next statement. Write the For instruction correctly.                            |
| 141 | EXIT without DO           | Exit Do statement occurs without a corresponding Do statement.                              | Occurs when a Do instruction does not exist or is not written correctly in a Do Loop While statement. Write the Do instruction correctly.                         |

## IMPORTANT

- When an error occurs in a process other than a communication command macro or Try - Catch - End Try, the error number cannot be used to check the error. Determine the nature of the error from the error message that appears in the system status console window.

### Note

- Error information appears in the system status console window.

## List of Reserved Words

Macro functions, operators, and other character strings predefined in the system are referred to as "reserved words". Do not use the reserved words for Macro customize function.

### List of Reserved Words

Reserved words that are defined in the FH series are shown below.

#### A

|                  |                     |                  |
|------------------|---------------------|------------------|
| Abs              | ACTIVE&             | ACTIVETABLE&     |
| AddGlobalData    | AddSystemData       | And              |
| Append           | ApproximationCircle | ARGMENTCOUNTMAX& |
| ARGMENTSLENGTH&  | ARGMENTSTRING\$     | ARGMENTVALUE#    |
| ARGUMENTSLENGTH& | ARGUMENTSTRING\$    | ARGUMENTVALUE#   |
| As               | Asc                 | AssignUnit       |
| Atn              |                     |                  |

#### B

|         |             |  |
|---------|-------------|--|
| BusyOut | BITPATTERN& |  |
|---------|-------------|--|

#### C

|                       |                  |                  |
|-----------------------|------------------|------------------|
| Call                  | Case             | Catch            |
| ChangeScene           | ChangeSceneGroup | CheckUnit        |
| Chr\$                 | Clear            | ClearMeasureData |
| ClearScene            | ClearSceneGroup  | Close            |
| CloseTextData         | CMD\$            | COMMANDAREA&     |
| COMMANDCODE&          | COMMANDCOUNTMAX& | COMMANDDATA&     |
| COMMANDDELIMITER\$    | COMMANDEXECUTE&  | COMMANDLINE\$    |
| COMMANDMEMORYADDRESS& | COMMANDRESPONSE& | COMMANDRESPONSE& |
| COMMANDSTRING\$       | COMMENTSTRING\$  | Cont             |
| CopyMeasureImage      | CopyScene        | CopySceneGroup   |
| CopyUnit              | CopyUnitFigure   |                  |

**D**

|                  |              |               |
|------------------|--------------|---------------|
| DATACOUNT&       | Date\$       | Debug         |
| DebugPrint       | Delete       | DeleteUnit    |
| Dim              | DisplaySubNo | DISPLAYTEXT\$ |
| DisplayUnitNo    | Do           | Dposline      |
| DrawArc          | DrawArcW     | DrawBox       |
| DrawCircle       | DrawCircleW  | DrawCursor    |
| DrawEllipse      | DrawFigure   | DrawFillImage |
| DrawJudgeText    | DrawLine     | DrawLineW     |
| DrawMeasureImage | DrawPoint    | DrawPolygon   |
| DrawSearchFigure | DrawText     | DrawTextG     |
| DrawUnitImage    | Dskf         |               |

**E**

|                     |          |               |
|---------------------|----------|---------------|
| ElapsedTime         | Else     | Elseif        |
| End                 | EndIf    | Eof           |
| Erase               | Erl      | Err           |
| Errcmd\$            | Errno    | Error         |
| ExecuteImageLogging | Exit     | ExitFzProcess |
| Exp                 | Explicit |               |

**F**

|                  |                     |                     |
|------------------|---------------------|---------------------|
| FALSE            | Fcopy               | Files               |
| Fix              | FlowProcListSize    | FlowUnitListSize    |
| FONTSIZE_NORMAL  | FONTSTYLE_BOLD      | FONTSTYLE_ITALIC    |
| FONTSTYLE_NORMAL | FONTSTYLE_STRIKEOUT | FONTSTYLE_UNDERLINE |
| For              |                     |                     |

**G**

|                 |               |               |
|-----------------|---------------|---------------|
| GetAll          | GetGlobalData | GetImageSize  |
| GetImageWindow  | GetMeasureOut | GetPicData    |
| GetPollingState | GetPort       | GetSceneData  |
| GetSystemData   | GetText\$     | GetTextWindow |
| GetUnitData     | GetUnitFigure | Global        |
| Gosub           | Goto          |               |

**H**

|       |  |  |
|-------|--|--|
| Hex\$ |  |  |
|-------|--|--|

**I**

|                 |                       |             |
|-----------------|-----------------------|-------------|
| If              | ImageFormat           | ImageUpdate |
| initialLayoutNo | initialRemoteLayoutNo | Input       |
| Input\$         | InsertUnit            | Int         |
| IOIDENT\$       | IsFile                | ItemCount   |
| ItemIdent\$     | ItemInfo              | ItemTitle\$ |

**J**

|                  |                   |                   |
|------------------|-------------------|-------------------|
| JGINDEX&         | JUDGE&            | JUDGE_ERROR       |
| JUDGE_IMAGEERROR | JUDGE_MEMORYERROR | JUDGE_MODELEERROR |
| JUDGE_NC         | JUDGE_NG          | JUDGE_OK          |
| JUDGELOWER#      | JUDGEMACROFLAG&   | JudgeOut          |
| JUDGEUPPER#      |                   |                   |

**K**

|         |      |  |
|---------|------|--|
| Keyword | Kill |  |
|---------|------|--|

**L**

|                                           |                                                  |                                           |
|-------------------------------------------|--------------------------------------------------|-------------------------------------------|
| Layout?_Title<br>(? represents a number)  | Layout?_WindowSetting<br>(? represents a number) | Layout?_output<br>(? represents a number) |
| Layout?_runout<br>(? represents a number) | LayoutSetting?_?<br>(? represents a number)      | LCase\$                                   |
| Left\$                                    | Len                                              | LF                                        |
| Line                                      | List                                             | Load                                      |
| LoadBackupData                            | LoadScene                                        | LoadSceneGroup                            |
| LoadSystemData                            | LoadUnitData                                     | Local                                     |
| Log                                       | Loop                                             |                                           |

**M**

|                   |              |             |
|-------------------|--------------|-------------|
| Measure           | MeasureDispG | MeasureId\$ |
| MeasureProc       | MeasureStart | MeasureStop |
| MEASURESTOPTABLE& | Mid\$        | Mkdir       |
| Mod               | MoveUnit     |             |

**N**

|     |      |     |
|-----|------|-----|
| New | Next | Not |
|-----|------|-----|

**O**

|        |      |              |
|--------|------|--------------|
| On     | Open | OpenTextData |
| Option | Or   | Output       |

**P**

|                 |                |               |
|-----------------|----------------|---------------|
| ParallelExecute | PARAOFFSET&    | Piece\$       |
| PLCRCVDATA&     | PLCSNDDATA&    | Print         |
| PS_DASH         | PS_DASHDOT     | PS_DASHDOTDOT |
| PS_DOT          | PS_INSIDEFRAME | PS_NULL       |
| PS_SOLID        | PutAll         | PutPort       |

**R**

|                     |                        |                    |
|---------------------|------------------------|--------------------|
| RaiseErrorProcEvent | RaiseOptionEvent       | ReadPlcMemory      |
| ReceiveData         | RefreshImageWindow     | RefreshJudgeWindow |
| RefreshTextWindow   | RefreshTimeWindow      | Rem                |
| Remeasure           | RenumUnitNo            | RESPONSEAREA&      |
| RESPONSECODE&       | RESPONSEMEMORYADDRESS& | RESPONSESTRING\$   |
| RESPONSEVALUE&      | RESULTDATA#            | RESULTJUDGE&       |
| Return              | RGB                    | Right\$            |
| Rmdir               | Run                    |                    |

**S**

|                    |                    |                     |
|--------------------|--------------------|---------------------|
| Save               | SaveBackupData     | SaveData            |
| SaveImage          | SaveMeasureImage   | SaveScene           |
| SaveSceneGroup     | SaveSystemData     | SaveUnitData        |
| SceneCount         | SceneDescription\$ | SceneGroupCount     |
| sceneGroupDataPath | SceneGroupNo       | SceneGroupTitle\$   |
| SceneMaker\$       | SceneNo            | SceneTitle\$        |
| ScreenCapture      | Select             | SendData            |
| SendString         | setDisplayUnitNo   | SetDrawStyle        |
| SetGlobalData      | setImageWindow     | SetJudgeWindow      |
| SetMeasureImage    | SetMeasureOut      | SetPlcData          |
| SetPollingState    | SetSceneData       | SetSceneDescription |
| SetSceneGroupTitle | SetSceneMaker      | SetSceneTitle       |
| SetStop            | SetSystemData      | SetTextStyle        |
| SetTextWindow      | SetTimeWindow      | SetUnitData         |
| SetUnitFigure      | SetUnitJudge       | SetUnitTitle        |
| SetUserSubroutine  | SetVar             | Sin                 |
| Sqr                | StartTimer         | StartupLanguageSet  |
| StartupSceneCheck  | Step               | Stop                |
| Str\$              | Str2\$             | Setupproc           |
| Sub                | SystemReset        |                     |

**T**

|                |               |               |
|----------------|---------------|---------------|
| TA_BASELINE    | TA_BOTTOM     | TA_CENTER     |
| TA_LEFT        | TA_NOUPDATECP | TA_RIGHT      |
| TA_RTREADING   | TA_TOP        | TA_UPDATECP   |
| TAB            | Tan           | Task          |
| Then           | Time\$        | Timer         |
| TJGFLAG&       | To            | TotalJudge    |
| TransformAngle | TransformArea | TransformDist |
| TransformLine  | TransformXY   | TRUE          |
| Try            |               |               |

**U**

|                 |           |          |
|-----------------|-----------|----------|
| UCase\$         | UnitCount | UnitData |
| UnitData\$      | UnitData2 | UnitInfo |
| UnitItemIdent\$ | UnitJudge | UnitNo   |
| UnitTitle\$     | Ut        |          |

**V**

|        |         |         |
|--------|---------|---------|
| Val    | VarList | VarPop  |
| VarPtr | VarPush | VarSave |

**W**

|      |       |                |
|------|-------|----------------|
| Wait | While | WritePlcMemory |
|------|-------|----------------|

**X**

|     |  |  |
|-----|--|--|
| Xor |  |  |
|-----|--|--|

### List of Reserved Global Data Words

Global data that is reserved in the FH series is shown below.

|                                   |                             |                                 |
|-----------------------------------|-----------------------------|---------------------------------|
| ControlFlowParallelCommand_status | editScnGroupNo              | editScnNo                       |
| editState                         | ImageWindowOrigin_loCommand | ImageWindowSubNoMax_loCommand   |
| LayoutNoLocal_loCommand           | LayoutNoRemote_loCommand    | LineNoLocal_loCommand           |
| LineNoRemote_loCommand            | ParallelDIOffset            | RemoteOperationStatus_loCommand |

## System Data List

The ID information and ID names required to set or acquire system data are indicated below.

### IMPORTANT

- Do not edit settings data not listed in this manual. Doing so could cause the system to not operate correctly.

| Identifier information 0   | Data identifier name | Identifier information 1                                                                                                                                                                                                                                  |
|----------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration<br>(General) | Language             | Language<br>Sets the display language.<br>jpn: Japanese                      deu: German<br>eng: English                        fra: French<br>chs: Simplified Chinese        esp: Spanish<br>cht: Traditional Chinese        ita: Italian<br>kor: Korean |
|                            | initialSceneGroupNo  | Initial scene group number                                                                                                                                                                                                                                |
|                            | initialSceneNo       | Initial scene number                                                                                                                                                                                                                                      |
|                            | initialMeasureOut    | External output setting<br>0: Not output externally<br>1: Output externally                                                                                                                                                                               |
|                            | operationPriority    | Operation priority<br>0: Measurement result priority<br>1: Menu operation priority                                                                                                                                                                        |
|                            | measureInitPriority  | Measurement initialization priority<br>0: Measurement trigger receipt priority<br>1: Processing of re-drawing on screen priority                                                                                                                          |
|                            | measureProcPriority  | Measurement process priority<br>0: Measurement trigger receipt priority<br>1: Processing of re-drawing on screen priority                                                                                                                                 |
|                            | operatingMode        | Operation Mode<br>0: [Standard] (Operation Mode)<br>1: Double Speed Multi-input<br>2: Multi-line Random-trigger<br>3: Non-stop Adjustment                                                                                                                 |
|                            | parallelExecute      | Parallel execution<br>0: OFF<br>1: ON                                                                                                                                                                                                                     |
|                            | SceneCount           | Number of scenes                                                                                                                                                                                                                                          |
|                            | sceneGroupCount      | Number of scene groups                                                                                                                                                                                                                                    |
|                            | unitDataAllocator    | Memory management setting<br>0: Usable memory maximum size set, free memory re-allocated<br>1: Usable memory maximum size set, free memory not re-allocated<br>2: Usable memory maximum size not set, free memory not re-allocated                        |
|                            | imageDataAllocator   | Memory management setting<br>0: Usable memory maximum size set, free memory re-allocated<br>1: Usable memory maximum size set, free memory not re-allocated<br>2: Usable memory maximum size not set, free memory not re-allocated                        |

| Identifier information 0     | Data identifier name | Identifier information 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ErrorProc<br>(Error process) | errorKind00011       | Error operation settings when connected camera is changed:<br>Set errorKind00011 n1 n2<br>n1 : Error output<br>0 : Error output enable<br>1 : Error output disable<br>n2 : How to display the Error output on the UI.<br>0 : Don't display the error.<br>1 : Informs the error contents on the information display window.<br>Note that displays the error dialog except Logging error and PLC Link communication error.<br>2 : Displays the error dialog.<br>3 : Displays the error dialog and clears the error at close the dialog. |
|                              | errorKind00000       | Error handling for when a system malfunction occurs.<br>Set errorKind 00043 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                                     |
|                              | errorKind00012       | Error handling for when a Camera over-current condition is detected.<br>Set errorKind 00043 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                     |
|                              | errorKind00001       | Error handling for when a system malfunction (Fan / Voltage error) occurs.<br>Set errorKind 00043 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                               |
|                              | errorKind00013       | Error handling for when a lighting connection, or configuration error occurs.<br>Set errorKind 00043 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                            |
|                              | errorKind00020       | Error operation setting for when image logging disk write error occurs.<br>Set errorKind00020 n1 n2.<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                  |
|                              | errorKind00030       | Error operation setting for parallel output time-out.<br>Set errorKind00030 n1 n2.<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                                    |
|                              | errorKind00031       | Error operation setting when the PLC Link communication error occurs.<br>Set errorKind00031 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                     |
|                              | errorKind00040       | Error operation setting for data load error<br>Set errorKind00040 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                                               |
|                              | errorKind00041       | Error operation setting for data transfer error<br>Set errorKind00041 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                                           |
|                              | errorKind00042       | Error operation setting for invalid Initial Scene group number error.<br>Set errorKind00042 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                     |
|                              | errorKind00043       | Error operation setting for invalid Initial Scene number error.<br>Set errorKind 00043 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                          |
|                              | errorKind00032       | Error handling for when a Parallel I/O over-current condition is detected.<br>Set errorKind 00043 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                               |
|                              | errorKind00010       | Error handling for when a camera connection error occurs.<br>Set errorKind 00043 n1 n2<br>The setting is same as the data value of errorKind00011.<br>Refer to data of errorKind00011.                                                                                                                                                                                                                                                                                                                                                |

| Identifier information 0                                     | Data identifier name       | Identifier information 1                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IoModule<br>(Communication module)                           | ioIdent2                   | Serial (Ethernet)<br>UdpNormal: Normal (UDP)<br>TcpNormal: Normal (TCP)<br>TcpClient: Normal (TCP Client)<br>UdpNormal2: Normal (UDP) (Fxxx series method)<br>UdpPlcLink: PLC Link (SYSMAC CS/CJ/CP/One)(UDP)<br>TcpPlcLink: PLC Link (SYSMAC CS/CJ/CP/One)(TCP)<br>UdpPlcLinkM: PLC Link (MELSEC QnU/Q/QnAS)(UDP)<br>TcpPlcLinkM: PLC Link (MELSEC QnU/Q/QnAS)(TCP)<br>UdpPlcLinkY: PLC Link (JEPMC MP) |
|                                                              | ioIdent1                   | Serial (RS-232C/422)<br>SerialNormal: Normal<br>SerialNormal2: Normal (Fxxx series method)<br>SerialPlcLink: PLC Link (SYSMAC CS/CJ/CP/One)<br>SerialPlcLinkM: PLC Link (MELSEC QnU/Q/QnAS series)                                                                                                                                                                                                       |
|                                                              | ioIdent0                   | Parallel<br>ParallelIo: Standard Parallel I/O                                                                                                                                                                                                                                                                                                                                                            |
|                                                              | ioIdent3                   | Fieldbus<br>*1: Blank character: None<br>EtherCAT: EtherCAT<br>EtherNet/IP: EtherNet/IP                                                                                                                                                                                                                                                                                                                  |
|                                                              | ioIdent4                   | Remote Operation<br>RemoteServer: Yes<br>*1: Blank character: None                                                                                                                                                                                                                                                                                                                                       |
| MultiLineRandom<br>(Multi line Random trigger mode settings) | lineCount                  | Number of lines (2/3/4/5/6/7/8)                                                                                                                                                                                                                                                                                                                                                                          |
|                                                              | physicalCameraMask0        | Camera - line assignment 0                                                                                                                                                                                                                                                                                                                                                                               |
|                                                              | physicalCameraMask1        | Camera - line assignment 1                                                                                                                                                                                                                                                                                                                                                                               |
|                                                              | physicalCameraMask2        | Camera - line assignment 2                                                                                                                                                                                                                                                                                                                                                                               |
|                                                              | physicalCameraMask3        | Camera - line assignment 3                                                                                                                                                                                                                                                                                                                                                                               |
|                                                              | physicalCameraMask4        | Camera - line assignment 4                                                                                                                                                                                                                                                                                                                                                                               |
|                                                              | physicalCameraMask5        | Camera - line assignment 5                                                                                                                                                                                                                                                                                                                                                                               |
|                                                              | physicalCameraMask6        | Camera - line assignment 6                                                                                                                                                                                                                                                                                                                                                                               |
| physicalCameraMask7                                          | Camera - line assignment 7 |                                                                                                                                                                                                                                                                                                                                                                                                          |

| Identifier information 0           | Data identifier name                                                         | Identifier information 1                                                                        |
|------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| CameraControl<br>(Camera settings) | cameraDelay0                                                                 | STEP - camera 0 delay                                                                           |
|                                    | cameraDelay1                                                                 | STEP - camera 1 delay                                                                           |
|                                    | cameraDelay2                                                                 | STEP - camera 2 delay                                                                           |
|                                    | cameraDelay3                                                                 | STEP - camera 3 delay                                                                           |
|                                    | cameraDelay4                                                                 | STEP - camera 4 delay                                                                           |
|                                    | cameraDelay5                                                                 | STEP - camera 5 delay                                                                           |
|                                    | cameraDelay6                                                                 | STEP - camera 6 delay                                                                           |
|                                    | cameraDelay7                                                                 | STEP - camera 7 delay                                                                           |
|                                    | transferRate0                                                                | Baud rate 0<br>0: Normal<br>1: Fast                                                             |
|                                    | transferRate1                                                                | Baud rate 1<br>0: Normal<br>1: Fast                                                             |
|                                    | transferRate2                                                                | Baud rate 2<br>0: Normal<br>1: Fast                                                             |
|                                    | transferRate3                                                                | Baud rate 3<br>0: Normal<br>1: Fast                                                             |
|                                    | transferRate4                                                                | Baud rate 4<br>0: Normal<br>1: Fast                                                             |
|                                    | transferRate5                                                                | Baud rate 5<br>0: Normal<br>1: Fast                                                             |
|                                    | transferRate6                                                                | Baud rate 6<br>0: Normal<br>1: Fast                                                             |
|                                    | transferRate7                                                                | Baud rate 7<br>0: Normal<br>1: Fast                                                             |
|                                    | timingSignal                                                                 | Output signal setting<br>0: STGOUT<br>1: SHTOUT                                                 |
|                                    | stgoutCamera                                                                 | SGTOUT output when camera is not connected.<br>0: STGOUT is not output.<br>1: STGOUT is output. |
|                                    | shtoutDelay                                                                  | SHTOUT signal delay                                                                             |
|                                    | shtoutWidth                                                                  | SHTOUT signal pulse width                                                                       |
| shtoutPolarity                     | SHTOUT signal pulse polarity<br>0: Negative polarity<br>1: Positive polarity |                                                                                                 |
| CameraInfo<br>(Camera information) | cameraMode0                                                                  | Connected camera type                                                                           |
|                                    | cameraMode1                                                                  | Connected camera type                                                                           |
|                                    | cameraMode2                                                                  | Connected camera type                                                                           |
|                                    | cameraMode3                                                                  | Connected camera type                                                                           |
|                                    | cameraMode4                                                                  | Connected camera type                                                                           |
|                                    | cameraMode5                                                                  | Connected camera type                                                                           |
|                                    | cameraMode6                                                                  | Connected camera type                                                                           |
|                                    | cameraMode7                                                                  | Connected camera type                                                                           |

| Identifier information 0      | Data identifier name                      | Identifier information 1                                                |
|-------------------------------|-------------------------------------------|-------------------------------------------------------------------------|
| Parallelo<br>(Parallel)       | polarity                                  | Output polarity<br>0: ON at NG<br>1: ON at OK                           |
|                               | handshake                                 | Output control<br>0: OFF<br>1: Handshaking<br>2: Synchronization output |
|                               | cycleTime                                 | Output cycle                                                            |
|                               | riseTime                                  | Gate ON delay                                                           |
|                               | outputTime                                | Output time                                                             |
|                               | timeout                                   | Timeout                                                                 |
|                               | delayCount                                | Number of delay                                                         |
|                               | orOutMode                                 | One-shot OR signal<br>0: OFF<br>1: ON                                   |
| SeriaNormal<br>(Non-protocol) | orOutputTime                              | OR signal output time                                                   |
|                               | timeout                                   | Timeout                                                                 |
|                               | rsMode                                    | Interface<br>0: RS-232C<br>1: RS-422                                    |
|                               | baudRate                                  | Baud rate (2,400, 4,800, 9,600, 19,200, 38,400, 57,600, or 115,200)     |
|                               | byteSize                                  | Data length (7 or 8)                                                    |
|                               | parity                                    | Parity<br>0: OFF<br>1: Odd<br>2: Even                                   |
|                               | stopBits                                  | Stop bits (1 or 2)                                                      |
|                               | softFlow                                  | Flow control<br>0: OFF<br>1: Xon/Xoff                                   |
| delimiter                     | Delimiter<br>0: CR<br>1: LF<br>2: CR + LF |                                                                         |

| Identifier information 0                                      | Data identifier name  | Identifier information 1                                         |
|---------------------------------------------------------------|-----------------------|------------------------------------------------------------------|
| SerialNormal2<br>(Non-protocol for F××× series method)        | timeout               | Timeout                                                          |
|                                                               | rsMode                | Interface<br>0: RS-232C<br>1: RS-422                             |
|                                                               | baudRate              | Baud rate (2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200) |
|                                                               | byteSize              | Data length (7 or 8)                                             |
|                                                               | parity                | Parity<br>0: OFF<br>1: Odd<br>2: Even                            |
|                                                               | stopBits              | Stop bits (1 or 2)                                               |
|                                                               | softFlow              | Flow control<br>0: OFF<br>1: Xon/Xoff                            |
|                                                               | delimiter             | Delimiter<br>0: CR<br>1: LF<br>2: CR + LF                        |
| SerialPlcLink<br>(RS-232C/422 PLC Link (SYSMAC CS/CJ/CP/One)) | handshake             | Output control<br>0: OFF<br>1: Handshaking                       |
|                                                               | timeout               | Timeout                                                          |
|                                                               | rsMode                | Interface<br>0: RS-232C<br>1: RS-422                             |
|                                                               | baudRate              | Baud rate (2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200) |
|                                                               | byteSize              | Data length (7 or 8)                                             |
|                                                               | parity                | Parity<br>0: OFF<br>1: Odd<br>2: Even                            |
|                                                               | stopBits              | Stop bits (1 or 2)                                               |
|                                                               | softFlow              | Flow control<br>0: OFF<br>1: Xon/Xoff                            |
|                                                               | commandArea           | Command Area type                                                |
|                                                               | commandMemoryAddress  | Command Area address                                             |
|                                                               | responseArea          | Response Area type                                               |
|                                                               | responseMemoryAddress | Response Area address                                            |
|                                                               | outputArea            | Data Output Area type                                            |
|                                                               | outputMemoryAddress   | Data Output Area address                                         |
|                                                               | outputBuffering       | Asynchronous output<br>0: OFF<br>1: ON                           |
|                                                               | responseTimeout       | Retry interval                                                   |
| pollingMinCycle                                               | Polling cycle         |                                                                  |

| Identifier information 0                                         | Data identifier name  | Identifier information 1                                         |
|------------------------------------------------------------------|-----------------------|------------------------------------------------------------------|
| SerialPcLinkM<br>(RS-232C/422 PLC Link<br>(SYSMAC CS/CJ/CP/One)) | handshake             | Output control<br>0: OFF<br>1: Handshaking                       |
|                                                                  | timeout               | Timeout                                                          |
|                                                                  | rsMode                | Interface<br>0: RS-232C<br>1: RS-422                             |
|                                                                  | baudRate              | Baud rate (2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200) |
|                                                                  | byteSize              | Data length (7 or 8)                                             |
|                                                                  | parity                | Parity<br>0: OFF<br>1: Odd<br>2: Even                            |
|                                                                  | stopBits              | Stop bits (1 or 2)                                               |
|                                                                  | softFlow              | Flow control<br>0: OFF<br>1: Xon/Xoff                            |
|                                                                  | commandArea           | Command Area type                                                |
|                                                                  | commandMemoryAddress  | Command Area address                                             |
|                                                                  | responseArea          | Response Area type                                               |
|                                                                  | responseMemoryAddress | Response Area address                                            |
|                                                                  | outputArea            | Data Output Area type                                            |
|                                                                  | outputMemoryAddress   | Data Output Area address                                         |
|                                                                  | outputBuffering       | Asynchronous output<br>0: OFF<br>1: ON                           |
|                                                                  | responseTimeout       | Retry interval                                                   |
| pollingMinCycle                                                  | Polling cycle         |                                                                  |

| Identifier information 0                                            | Data identifier name  | Identifier information 1                   |
|---------------------------------------------------------------------|-----------------------|--------------------------------------------|
| UdpPlcLink<br>(Ethernet PLC Link<br>(SYSMAC CS/CJ/CP/<br>One)(UDP)) | handshake             | Output control<br>0: OFF<br>1: Handshaking |
|                                                                     | commandArea           | Command Area type                          |
|                                                                     | commandMemoryAddress  | Command Area address                       |
|                                                                     | responseArea          | Response Area type                         |
|                                                                     | responseMemoryAddress | Response Area address                      |
|                                                                     | outputArea            | Data Output Area type                      |
|                                                                     | outputMemoryAddress   | Data Output Area address                   |
|                                                                     | outputBuffering       | Asynchronous output<br>0: OFF<br>1: ON     |
|                                                                     | responseTimeout       | Retry interval                             |
|                                                                     | responseTimeout2      | Retry interval 2                           |
|                                                                     | pollingMinCycle       | Polling cycle                              |
|                                                                     | enableDhcp            | Automatic<br>0: OFF<br>1: ON               |
|                                                                     | ipAddress             | IP address                                 |
|                                                                     | subnetMask            | Subnet mask                                |
|                                                                     | defaultGateway        | Default gateway                            |
|                                                                     | enableDhcp2           | Automatic 2<br>0: OFF<br>1: ON             |
|                                                                     | ipAddress2            | IP address 2                               |
|                                                                     | subnetMask2           | Subnet mask 2                              |
|                                                                     | defaultGateway2       | Default gateway 2                          |
|                                                                     | dns                   | DNS server                                 |
|                                                                     | dns2                  | DNS server 2                               |
|                                                                     | wins                  | WINS server                                |
|                                                                     | wins2                 | WINS server 2                              |
| destIpAddress                                                       | Output IP address     |                                            |
| portNo                                                              | Input port number     |                                            |

| Identifier information 0                                           | Data identifier name  | Identifier information 1                   |
|--------------------------------------------------------------------|-----------------------|--------------------------------------------|
| UdpPlcLinkM<br>(Ethernet PLC Link<br>(MELSEC QnU/Q/<br>QnAS)(UDP)) | handshake             | Output control<br>0: OFF<br>1: Handshaking |
|                                                                    | commandArea           | Command Area type                          |
|                                                                    | commandMemoryAddress  | Command Area address                       |
|                                                                    | responseArea          | Response Area type                         |
|                                                                    | responseMemoryAddress | Response Area address                      |
|                                                                    | outputArea            | Data Output Area type                      |
|                                                                    | outputMemoryAddress   | Data Output Area address                   |
|                                                                    | outputBuffering       | Asynchronous output<br>0: OFF<br>1: ON     |
|                                                                    | responseTimeout       | Retry interval                             |
|                                                                    | responseTimeout2      | Retry interval 2                           |
|                                                                    | pollingMinCycle       | Polling cycle                              |
|                                                                    | enableDhcp            | Automatic<br>0: OFF<br>1: ON               |
|                                                                    | ipAddress             | IP address                                 |
|                                                                    | subnetMask            | Subnet mask                                |
|                                                                    | defaultGateway        | Default gateway                            |
|                                                                    | enableDhcp2           | Automatic 2<br>0: OFF<br>1: ON             |
|                                                                    | ipAdress2             | IP address 2                               |
|                                                                    | subnetMask2           | Subnet mask 2                              |
|                                                                    | defaultGateway2       | Default gateway 2                          |
|                                                                    | dns                   | DNS server                                 |
|                                                                    | dns2                  | DNS server 2                               |
|                                                                    | wins                  | WINS server                                |
|                                                                    | wins2                 | WINS server 2                              |
| destIpAddress                                                      | Output IP address     |                                            |
| portNo                                                             | Input port number     |                                            |

| Identifier information 0                                           | Data identifier name  | Identifier information 1                   |
|--------------------------------------------------------------------|-----------------------|--------------------------------------------|
| TcpPlcLink<br>(Ethernet PLC Link<br>(SYSMAC CS/CJ/CP/<br>One)(TCP) | handshake             | Output control<br>0: OFF<br>1: Handshaking |
|                                                                    | commandArea           | Command Area type                          |
|                                                                    | commandMemoryAddress  | Command Area address                       |
|                                                                    | responseArea          | Response Area type                         |
|                                                                    | responseMemoryAddress | Response Area address                      |
|                                                                    | outputArea            | Data Output Area type                      |
|                                                                    | outputMemoryAddress   | Data Output Area address                   |
|                                                                    | outputBuffering       | Asynchronous output<br>0: OFF<br>1: ON     |
|                                                                    | responseTimeout       | Retry interval                             |
|                                                                    | responseTimeout2      | Retry interval 2                           |
|                                                                    | pollingMinCycle       | Polling cycle                              |
|                                                                    | enableDhcp            | Automatic<br>0: OFF<br>1: ON               |
|                                                                    | ipAddress             | IP address                                 |
|                                                                    | subnetMask            | Subnet mask                                |
|                                                                    | defaultGateway        | Default gateway                            |
|                                                                    | enableDhcp2           | Automatic2<br>0: OFF<br>1: ON              |
|                                                                    | ipAddress2            | IP address 2                               |
|                                                                    | subnetMask2           | Subnet mask 2                              |
|                                                                    | defaultGateway2       | Default gateway 2                          |
|                                                                    | dns                   | DNS server                                 |
|                                                                    | dns2                  | DNS server 2                               |
|                                                                    | wins                  | WINS server                                |
|                                                                    | wins2                 | WINS server 2                              |
| serverIpAddress                                                    | Server IP address     |                                            |
| portNo                                                             | Input port number     |                                            |

| Identifier information 0                                           | Data identifier name  | Identifier information 1                   |
|--------------------------------------------------------------------|-----------------------|--------------------------------------------|
| TcpPlcLinkM<br>(Ethernet PLC Link<br>(MELSEC QnU/Q/QnAS)<br>(TCP)) | handshake             | Output control<br>0: OFF<br>1: Handshaking |
|                                                                    | commandArea           | Command Area type                          |
|                                                                    | commandMemoryAddress  | Command Area address                       |
|                                                                    | responseArea          | Response Area type                         |
|                                                                    | responseMemoryAddress | Response Area address                      |
|                                                                    | outputArea            | Data Output Area type                      |
|                                                                    | outputMemoryAddress   | Data Output Area address                   |
|                                                                    | outputBuffering       | Asynchronous output<br>0: OFF<br>1: ON     |
|                                                                    | responseTimeout       | Retry interval                             |
|                                                                    | responseTimeout2      | Retry interval 2                           |
|                                                                    | pollingMinCycle       | Polling cycle                              |
|                                                                    | enableDhcp            | Automatic<br>0: OFF<br>1: ON               |
|                                                                    | ipAddress             | IP address                                 |
|                                                                    | subnetMask            | Subnet mask                                |
|                                                                    | defaultGateway        | Default gateway                            |
|                                                                    | enableDhcp2           | Automatic2<br>0: OFF<br>1: ON              |
|                                                                    | ipAddress2            | IP address 2                               |
|                                                                    | subnetMask2           | Subnet mask 2                              |
|                                                                    | defaultGateway2       | Default gateway 2                          |
|                                                                    | dns                   | DNS server                                 |
|                                                                    | dns2                  | DNS server 2                               |
|                                                                    | wins                  | WINS server                                |
|                                                                    | wins2                 | WINS server 2                              |
| serverIpAddress                                                    | Server IP address     |                                            |
| portNo                                                             | Input port number     |                                            |

| Identifier information 0         | Data identifier name | Identifier information 1      |
|----------------------------------|----------------------|-------------------------------|
| UdpNormal<br>(Non-protocol(UDP)) | enableDhcp           | Automatic<br>0: OFF<br>1: ON  |
|                                  | ipAddress            | IP address                    |
|                                  | subnetMask           | Subnet mask                   |
|                                  | defaultGateway       | Default gateway               |
|                                  | enableDhcp2          | Automatic2<br>0: OFF<br>1: ON |
|                                  | ipAddress2           | IP address 2                  |
|                                  | subnetMask2          | Subnet mask 2                 |
|                                  | defaultGateway2      | Default gateway 2             |
|                                  | dns                  | DNS server                    |
|                                  | dns2                 | DNS server 2                  |
|                                  | wins                 | WINS server                   |
|                                  | wins2                | WINS server 2                 |
|                                  | destIpAddress        | Output IP address             |
|                                  | portNo               | Input port number             |
| portNo2                          | Output port number   |                               |
| TcpNormal<br>(Non-protocol(TCP)) | enableDhcp           | Automatic<br>0: OFF<br>1: ON  |
|                                  | ipAddress            | IP address                    |
|                                  | subnetMask           | Subnet mask                   |
|                                  | defaultGateway       | Default gateway               |
|                                  | enableDhcp2          | Automatic2<br>0: OFF<br>1: ON |
|                                  | ipAddress2           | IP address 2                  |
|                                  | subnetMask2          | Subnet mask 2                 |
|                                  | defaultGateway2      | Default gateway 2             |
|                                  | dns                  | DNS server                    |
|                                  | dns2                 | DNS server 2                  |
|                                  | wins                 | WINS server                   |
|                                  | wins2                | WINS server 2                 |
|                                  | portNo               | Input port number             |

| Identifier information 0                                | Data identifier name | Identifier information 1      |
|---------------------------------------------------------|----------------------|-------------------------------|
| TcpClient<br>(Non-protocol(TCP Client))                 | enableDhcp           | Automatic<br>0: OFF<br>1: ON  |
|                                                         | ipAddress            | IP address                    |
|                                                         | subnetMask           | Subnet mask                   |
|                                                         | defaultGateway       | Default gateway               |
|                                                         | enableDhcp2          | Automatic2<br>0: OFF<br>1: ON |
|                                                         | ipAddress2           | IP address 2                  |
|                                                         | subnetMask2          | Subnet mask 2                 |
|                                                         | defaultGateway2      | Default gateway 2             |
|                                                         | dns                  | DNS server                    |
|                                                         | dns2                 | DNS server 2                  |
|                                                         | wins                 | WINS server                   |
|                                                         | wins2                | WINS server 2                 |
|                                                         | portNo               | Input port number             |
|                                                         | serverIpAddress      | Server IP address             |
| UdpNormal2<br>(Non-protocol(UDP Fxxx<br>series method)) | enableDhcp           | Automatic<br>0: OFF<br>1: ON  |
|                                                         | ipAddress            | IP address                    |
|                                                         | subnetMask           | Subnet mask                   |
|                                                         | defaultGateway       | Default gateway               |
|                                                         | enableDhcp2          | Automatic2<br>0: OFF<br>1: ON |
|                                                         | ipAddress2           | IP address 2                  |
|                                                         | subnetMask2          | Subnet mask 2                 |
|                                                         | defaultGateway2      | Default gateway 2             |
|                                                         | dns                  | DNS server                    |
|                                                         | dns2                 | DNS server 2                  |
|                                                         | wins                 | WINS server                   |
|                                                         | wins2                | WINS server 2                 |
|                                                         | destIpAddress        | Output IP address             |
|                                                         | portNo               | Input port number             |
| portNo2                                                 | Output port number   |                               |

| Identifier information 0                         | Data identifier name  | Identifier information 1                   |
|--------------------------------------------------|-----------------------|--------------------------------------------|
| UdpPlcLinkY<br>(Ethernet PLC Link<br>(JEPMC MP)) | handshake             | Output control<br>0: OFF<br>1: Handshaking |
|                                                  | commandArea           | Command Area type                          |
|                                                  | commandMemoryAddress  | Command Area address                       |
|                                                  | responseArea          | Response Area type                         |
|                                                  | responseMemoryAddress | Response Area address                      |
|                                                  | outputArea            | Data Output Area type                      |
|                                                  | outputMemoryAddress   | Data Output Area address                   |
|                                                  | outputBuffering       | Asynchronous output<br>0: OFF<br>1: ON     |
|                                                  | responseTimeout       | Retry interval                             |
|                                                  | responseTimeout2      | Retry interval 2                           |
|                                                  | pollingMinCycle       | Polling cycle                              |
|                                                  | enableDhcp            | Automatic<br>0: OFF<br>1: ON               |
|                                                  | ipAddress             | IP address                                 |
|                                                  | subnetMask            | Subnet mask                                |
|                                                  | defaultGateway        | Default gateway                            |
|                                                  | enableDhcp2           | Automatic2<br>0: OFF<br>1: ON              |
|                                                  | ipAddress2            | IP address 2                               |
|                                                  | subnetMask2           | Subnet mask 2                              |
|                                                  | defaultGateway2       | Default gateway 2                          |
|                                                  | dns                   | DNS server                                 |
| dns2                                             | DNS server 2          |                                            |
| wins                                             | WINS server           |                                            |
| wins2                                            | WINS server 2         |                                            |
| destIpAddress                                    | Output IP address     |                                            |

| Identifier information 0 | Data identifier name | Identifier information 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EtherCAT<br>(EtherCAT)   | handshake            | Output control<br>0: OFF<br>1: Handshaking                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                          | cycleTime            | Output cycle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | outputTime           | Output time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | timeout              | Timeout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                          | outputDataSize0      | Data output number for line 0 (number of data output items for line 0)<br>32: Result Data Format 0 (8 DINT)<br>64: Result Data Format 1 (16 DINT)<br>128: Result Data Format 2 (32 DINT)<br>256: Result Data Format 3 (64 DINT)<br>2097152: Result Data Format 4 (4 LREAL)<br>4194304: Result Data Format 5 (8 LREAL)<br>8388608: Result Data Format 6 (16 LREAL)<br>16777216: Result Data Format 7 (32 LREAL)<br>1572872: Result Data Format 8 (2 DINT + 3 LREAL)<br>3145744: Result Data Format 9 (4 DINT + 6 LREAL)<br>6291488: Result Data Format 10 (8 DINT + 12 LREAL)<br>12582976: Result Data Format 11 (16 DINT + 24 LREAL) |
|                          | outputDataSize1      | Data output number for line 1 (number of data output items for line 1)<br>32: Result Data Format 0 (8 DINT)<br>64: Result Data Format 1 (16 DINT)<br>128: Result Data Format 2 (32 DINT)<br>256: Result Data Format 3 (64 DINT)<br>2097152: Result Data Format 4 (4 LREAL)<br>4194304: Result Data Format 5 (8 LREAL)<br>8388608: Result Data Format 6 (16 LREAL)<br>16777216: Result Data Format 7 (32 LREAL)<br>1572872: Result Data Format 8 (2 DINT + 3 LREAL)<br>3145744: Result Data Format 9 (4 DINT + 6 LREAL)<br>6291488: Result Data Format 10 (8 DINT + 12 LREAL)<br>12582976: Result Data Format 11 (16 DINT + 24 LREAL) |
|                          | outputDataSize2      | Data output number for line 2 (number of data output items for line 2)<br>32: Result Data Format 0 (8 DINT)<br>64: Result Data Format 1 (16 DINT)<br>128: Result Data Format 2 (32 DINT)<br>256: Result Data Format 3 (64 DINT)<br>2097152: Result Data Format 4 (4 LREAL)<br>4194304: Result Data Format 5 (8 LREAL)<br>8388608: Result Data Format 6 (16 LREAL)<br>16777216: Result Data Format 7 (32 LREAL)<br>1572872: Result Data Format 8 (2 DINT + 3 LREAL)<br>3145744: Result Data Format 9 (4 DINT + 6 LREAL)<br>6291488: Result Data Format 10 (8 DINT + 12 LREAL)<br>12582976: Result Data Format 11 (16 DINT + 24 LREAL) |

| Identifier information 0 | Data identifier name | Identifier information 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EtherCAT<br>(EtherCAT)   | outputDataSize3      | Data output number for line 3 (number of data output items for line 3)<br>32: Result Data Format 0 (8 DINT)<br>64: Result Data Format 1 (16 DINT)<br>128: Result Data Format 2 (32 DINT)<br>256: Result Data Format 3 (64 DINT)<br>2097152: Result Data Format 4 (4 LREAL)<br>4194304: Result Data Format 5 (8 LREAL)<br>8388608: Result Data Format 6 (16 LREAL)<br>16777216: Result Data Format 7 (32 LREAL)<br>1572872: Result Data Format 8 (2 DINT + 3 LREAL)<br>3145744: Result Data Format 9 (4 DINT + 6 LREAL)<br>6291488: Result Data Format 10 (8 DINT + 12 LREAL)<br>12582976: Result Data Format 11 (16 DINT + 24 LREAL) |
|                          | outputDataSize4      | Data output number for line 4 (number of data output items for line 4)<br>32: Result Data Format 0 (8 DINT)<br>64: Result Data Format 1 (16 DINT)<br>128: Result Data Format 2 (32 DINT)<br>256: Result Data Format 3 (64 DINT)<br>2097152: Result Data Format 4 (4 LREAL)<br>4194304: Result Data Format 5 (8 LREAL)<br>8388608: Result Data Format 6 (16 LREAL)<br>16777216: Result Data Format 7 (32 LREAL)<br>1572872: Result Data Format 8 (2 DINT + 3 LREAL)<br>3145744: Result Data Format 9 (4 DINT + 6 LREAL)<br>6291488: Result Data Format 10 (8 DINT + 12 LREAL)<br>12582976: Result Data Format 11 (16 DINT + 24 LREAL) |
|                          | outputDataSize5      | Data output number for line 5 (number of data output items for line 5)<br>32: Result Data Format 0 (8 DINT)<br>64: Result Data Format 1 (16 DINT)<br>128: Result Data Format 2 (32 DINT)<br>256: Result Data Format 3 (64 DINT)<br>2097152: Result Data Format 4 (4 LREAL)<br>4194304: Result Data Format 5 (8 LREAL)<br>8388608: Result Data Format 6 (16 LREAL)<br>16777216: Result Data Format 7 (32 LREAL)<br>1572872: Result Data Format 8 (2 DINT + 3 LREAL)<br>3145744: Result Data Format 9 (4 DINT + 6 LREAL)<br>6291488: Result Data Format 10 (8 DINT + 12 LREAL)<br>12582976: Result Data Format 11 (16 DINT + 24 LREAL) |

| Identifier information 0 | Data identifier name | Identifier information 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EtherCAT<br>(EtherCAT)   | outputDataSize6      | Data output number for line 6 (number of data output items for line 6)<br>32: Result Data Format 0 (8 DINT)<br>64: Result Data Format 1 (16 DINT)<br>128: Result Data Format 2 (32 DINT)<br>256: Result Data Format 3 (64 DINT)<br>2097152: Result Data Format 4 (4 LREAL)<br>4194304: Result Data Format 5 (8 LREAL)<br>8388608: Result Data Format 6 (16 LREAL)<br>16777216: Result Data Format 7 (32 LREAL)<br>1572872: Result Data Format 8 (2 DINT + 3 LREAL)<br>3145744: Result Data Format 9 (4 DINT + 6 LREAL)<br>6291488: Result Data Format 10 (8 DINT + 12 LREAL)<br>12582976: Result Data Format 11 (16 DINT + 24 LREAL) |
|                          | outputDataSize7      | Data output number for line 7 (number of data output items for line 7)<br>32: Result Data Format 0 (8 DINT)<br>64: Result Data Format 1 (16 DINT)<br>128: Result Data Format 2 (32 DINT)<br>256: Result Data Format 3 (64 DINT)<br>2097152: Result Data Format 4 (4 LREAL)<br>4194304: Result Data Format 5 (8 LREAL)<br>8388608: Result Data Format 6 (16 LREAL)<br>16777216: Result Data Format 7 (32 LREAL)<br>1572872: Result Data Format 8 (2 DINT + 3 LREAL)<br>3145744: Result Data Format 9 (4 DINT + 6 LREAL)<br>6291488: Result Data Format 10 (8 DINT + 12 LREAL)<br>12582976: Result Data Format 11 (16 DINT + 24 LREAL) |
|                          | userOutputDataSize0  | Line 0 User Output Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | userOutputDataSize1  | Line 1 User Output Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | userOutputDataSize2  | Line 2 User Output Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | userOutputDataSize3  | Line 3 User Output Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | userOutputDataSize4  | Line 4 User Output Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | userOutputDataSize5  | Line 5 User Output Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | userOutputDataSize6  | Line 6 User Output Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | userOutputDataSize7  | Line 7 User Output Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                          | userInputDataSize0   | Line 0 User Input Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | userInputDataSize1   | Line 1 User Input Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | userInputDataSize2   | Line 2 User Input Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | userInputDataSize3   | Line 3 User Input Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | userInputDataSize4   | Line 4 User Input Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | userInputDataSize5   | Line 5 User Input Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | userInputDataSize6   | Line 6 User Input Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | userInputDataSize7   | Line 7 User Input Data Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Identifier information 0     | Data identifier name | Identifier information 1                                                                                                                       |
|------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| EtherNet/IP<br>(EtherNet/IP) | handshake            | Output control<br>0: OFF<br>1: Handshaking                                                                                                     |
|                              | cycleTime            | Output cycle                                                                                                                                   |
|                              | outputTime           | Output time                                                                                                                                    |
|                              | timeout              | Timeout                                                                                                                                        |
|                              | outputDataSize       | Output data size                                                                                                                               |
|                              | userOutputDataSize   | User data area output data size<br>0: OFF<br>32:ON                                                                                             |
| Measure<br>(measurement)     | userInputDataSize    | User data area input data size<br>0: OFF<br>32:ON                                                                                              |
|                              | fanControl           | Fan control setting<br>0: Slow rotation<br>1: Fast rotation                                                                                    |
|                              | captureDirectory     | Destination folder of Image Capture                                                                                                            |
|                              | stepError            | STEP in measure<br>0: ERROR signal output OFF for STEP input during measurement<br>1: ERROR signal output ON for STEP input during measurement |
|                              | sceneGroupSave       | Scene group switch<br>0: Do not save when changing scene group<br>1: Save when changing scene group                                            |
|                              | sceneWaitTime        | Scene switch time                                                                                                                              |

| Identifier information 0                | Data identifier name   | Identifier information 1                                                       |
|-----------------------------------------|------------------------|--------------------------------------------------------------------------------|
| Trigger<br>(Other)                      | digitalFilter          | STEP signal filter width<br>5: 100<br>11: 200<br>18: 300<br>24: 400<br>30: 500 |
|                                         | encoderEnabled         | Use Encoder trigger<br>0: Not used<br>1 : Used                                 |
|                                         | encoderInputPulse      | Encoder input selection<br>0: Open collector<br>1: Line driver                 |
|                                         | encoderResolutionA     | Phase A resolution                                                             |
|                                         | encoderZ               | Count rotations with phase Z<br>0: Do not count<br>1: Count                    |
|                                         | encoderStart           | Encoder start                                                                  |
|                                         | encoderCount           | Encoder count                                                                  |
|                                         | encoderTriggerAngleA0  | Phase A trigger timing usage flag 0                                            |
|                                         | encoderTriggerAngleA1  | Phase A trigger timing usage flag 1                                            |
|                                         | encoderTriggerAngleA2  | Phase A trigger timing usage flag 2                                            |
|                                         | encoderTriggerAngleA3  | Phase A trigger timing usage flag 3                                            |
|                                         | encoderTriggerAngleA4  | Phase A trigger timing usage flag 4                                            |
|                                         | encoderTriggerAngleA5  | Phase A trigger timing usage flag 5                                            |
|                                         | encoderBacklash        | Support backlash (phase B)<br>0: Do not support<br>1: Support                  |
|                                         | encoderBacklashTrigger | Trigger in backlash<br>0: Do not generate<br>1: Generate                       |
|                                         | encoderTriggerCountA   | Phase A                                                                        |
|                                         | encoderTriggerCountZ   | Phase Z                                                                        |
| NetworkDrive<br>(Network drive setting) | drive0                 | S                                                                              |
|                                         | drive1                 | T                                                                              |
|                                         | drive2                 | U                                                                              |
|                                         | drive3                 | V                                                                              |
|                                         | drive4                 | W                                                                              |
|                                         | drive5                 | X                                                                              |
|                                         | drive6                 | Y                                                                              |
|                                         | drive7                 | Z                                                                              |

| Identifier information 0                              | Data identifier name  | Identifier information 1                                                                                         |
|-------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------|
| Logging<br>(Logging setting)                          | imageLogging          | Image Logging<br>0: None<br>1: Save for only NG<br>2: All                                                        |
|                                                       | imageLoggingDirectory | Destination<br>Specify the image file save destination (RAMDisk or the external memory device, i.e. USB memory). |
|                                                       | imageLoggingHeader    | Prefix                                                                                                           |
|                                                       | imageLoggingScene     | Switch saving folder by scene<br>0: Disabled<br>1: Enabled                                                       |
|                                                       | imageLoggingType      | Number of images for Image logging<br>single: OFF<br>multiple: ON                                                |
|                                                       | imageLoggingFormat    | Image file type<br>ifz<br>bfz                                                                                    |
|                                                       | imageLoggingJudge     | Switch saving folder by judge<br>0: Disabled<br>1: Enabled                                                       |
|                                                       | imageLoggingPriority  | Logging priority<br>0: Give priority to logging<br>1: Give priority to measurement takt                          |
|                                                       | dataLogging           | Data Logging<br>0: None<br>1: Save for only NG<br>2: All                                                         |
|                                                       | dataLoggingDirectory  | Destination folder of Data Logging                                                                               |
| FtpImageLogging<br>(FTP client image logging setting) | enabled               | Save to controller memory + FTP<br>0: No logging<br>1: Logging to FTP client                                     |
|                                                       | serverIpAddress       | IP Address                                                                                                       |
|                                                       | userName              | Username                                                                                                         |
|                                                       | password              | Password                                                                                                         |
|                                                       | portNo                | Port No.                                                                                                         |
|                                                       | passiveMode           | Connection Method<br>0: Active<br>1: Passive                                                                     |
|                                                       | targetDirectory       | Folder name                                                                                                      |
| OperationLog<br>(Operation logging setting)           | targetDirectory       | Save destination                                                                                                 |
|                                                       | autoEnabled           | Start at launch<br>0: Don't start<br>1: Start                                                                    |
| PanDA<br>(User definition)                            | PanDA                 | ---                                                                                                              |

## List of I/O Modules

I/O module settings required for communication with external devices are indicated below.

| Identification name                                | IO module name                                                | References                 |
|----------------------------------------------------|---------------------------------------------------------------|----------------------------|
| EtherCAT                                           | EtherCAT communication                                        | Reference: Details (p.581) |
| EtherNet/IP                                        | EtherNet/IP Interface communication                           | Reference: Details (p.584) |
| PROFINET                                           | PROFINET Interface communication                              | Reference: Details (p.587) |
| Parallelo                                          | Parallel Interface communication                              | Reference: Details (p.589) |
| SerialNormal<br>SerialNormal2 (Fxxx series method) | Serial Interface Normal communication                         | Reference: Details (p.590) |
| SerialPlcLinkM                                     | Serial Interface PLC Link (MELSEC QnU/Q/QnAS) communication   | Reference: Details (p.593) |
| SerialPlcLink                                      | Serial Interface PLC Link (SYSMAC CS/CJ/CP/One) communication | Reference: Details (p.595) |
| TcpClient                                          | TCP Client Normal communication                               | Reference: Details (p.598) |
| TcpNormal                                          | TCP Normal communication                                      | Reference: Details (p.599) |
| UdpNormal<br>UdpNormal2 (Fxxx series method)       | UDP Normal communication                                      | Reference: Details (p.601) |
| UdpPlcLinkM                                        | PLC Link(MELSEC QnU/Q/QnAS) (UDP)                             | Reference: Details (p.603) |
| UdpPlcLinkY                                        | PLC Link (JEPMC MP) communication                             | Reference: Details (p.605) |
| UdpPlcLink                                         | PLC Link(SYSMAC CS/CJ/CP/One) (UDP)                           | Reference: Details (p.608) |
| TcpPlcLinkM                                        | PLC Link(MELSEC QnU/Q/QnAS) (TCP)                             | Reference: Details (p.611) |
| TcpPlcLink                                         | PLC Link(SYSMAC CS/CJ/CP/One) (TCP)                           | Reference: Details (p.614) |

### EtherCAT

EtherCAT communication

#### IoModule identification name

EtherCAT

#### Overview

This is a module for sending and receiving commands and data by EtherCAT protocol.

#### System data

| Identification name      | Meaning                                      | Initial value |
|--------------------------|----------------------------------------------|---------------|
| handshake                | Output control<br>0: OFF<br>1: Handshaking   | 0             |
| cycleTime                | Output period [EtherCAT communication cycle] | 2             |
| outputTime               | Output time [EtherCAT communication cycle]   | 1             |
| Timeout                  | Timeout [0.1 s]                              | 100           |
| outputDataSize0 to 7     | Output area data formatting setting          | 32            |
| userOutputDataSize0 to 7 | User output formatting setting               | 0             |

| Identification name     | Meaning                       | Initial value |
|-------------------------|-------------------------------|---------------|
| userInputDataSize0 to 7 | User input formatting setting | 0             |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | OK  | Reference: ► BusyOut (p.144)         |
| JudgeOut        | OK  | Reference: ► JudgeOut (p.319)        |
| RunOut          | OK  | Reference: ► RunOut (p.406)          |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | OK  | Reference: ► ErrorOut (p.243)        |

## Example

Send data using SendData.

Parameter and parameter size for SendData are not required.

Use output data according to the EtherCAT output count setting under System Setting.

---

```
Dim DATA&(7)
DATA&(0) = 100
DATA&(1) = 200
DATA&(2) = 300
DATA&(3) = 400
DATA&(4) = 500
DATA&(5) = 600
DATA&(6) = 700
DATA&(7) = 800
```

Outputs eight integer type data.

```
SendData "EtherCAT", data&(), 4*8
```

---

You can load and write using User Area.

### Loading from User Input Area

---

```
Dim BUF&(7)
Dim DATA_DINT&(3)
Dim DATA_LREAL#(1)

Rem Loads EtherCAT memory.
ReadPlcMemory "EtherCAT", 0, 10, 16, BUF&()

Rem Gets DINT type data and LREAL type data from buffer.
GetPlcData "EtherCAT", BUF&(), 0, 4, DATA_DINT&(0)
GetPlcData "EtherCAT", BUF&(), 4, 4, DATA_DINT&(1)
GetPlcData "EtherCAT", BUF&(), 8, 4, DATA_DINT&(2)
GetPlcData "EtherCAT", BUF&(), 12, 4, DATA_DINT&(3)
GetPlcData "EtherCAT", BUF&(), 16, 8, DATA_LREAL#(0)
GetPlcData "EtherCAT", BUF&(), 24, 8, DATA_LREAL#(1)
```

---

### Writing to User Output Area.

---

```
Dim BUF&(7)
Dim DATA_DINT&(3)
Dim DATA_LREAL#(1)

Rem Set you are writing.
DATA_DINT&(0) = 100
DATA_DINT&(1) = 200
DATA_DINT&(2) = 300
DATA_DINT&(3) = 400
DATA_LREAL#(0) = 12.34
DATA_LREAL#(1) = 56.78
```

Set the target data.

```
Rem Sets DINT type and LREAL type to buffer.
SetPlcData "EtherCAT", BUF&(), 0, 4, DATA_DINT&(0)
SetPlcData "EtherCAT", BUF&(), 4, 4, DATA_DINT&(1)
SetPlcData "EtherCAT", BUF&(), 8, 4, DATA_DINT&(2)
SetPlcData "EtherCAT", BUF&(), 12, 4, DATA_DINT&(3)
SetPlcData "EtherCAT", BUF&(), 16, 8, DATA_LREAL#(0)
SetPlcData "EtherCAT", BUF&(), 24, 8, DATA_LREAL#(1)

Rem Writes EtherCAT memory.
WritePlcMemory "EtherCAT", 0, 24, 16, BUF&()
```

---

EtherNet/IP interface communication

## IoModule identification name

EtherNet/IP

## Overview

This is a module for sending and receiving commands and data by Ethernet/IP protocol.

## System data

| Identification | Meaning                                    | Initial value |
|----------------|--------------------------------------------|---------------|
| handshake      | Output control<br>0: OFF<br>1: Handshaking | 0             |
| cycleTime      | Output period [ms]                         | 100           |
| outputTime     | Output time [ms]                           | 50            |
| timeout        | Timeout [0.1 s]                            | 100           |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | OK  | Reference: ► JudgeOut (p.319)        |
| RunOut          | OK  | Reference: ► RunOut (p.406)          |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | OK  | Reference: ► ErrorOut (p.243)        |

**Example**

Transmit data.

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim DATA&(4)
DATA&(0) = 111
DATA&(1) = 222
DATA&(2) = 333
DATA&(3) = 444
DATA&(4) = 555
```

```
' Transmit the five integer type data.
SendData "EtherNetIP", data&(), 4*5
```

---

Gets 7ch data from the Command area.

---

```
Dim DATA&(7)
ReadPlcMemory "EtherNetIP", 0, 0, 16, DATA&()
For I&= 0 To 7
  Print DATA&(I&)
Next
```

---

Output 4ch data to the Data Output area.

---

```
Dim BUF&(7)
Dim DATA_DINT&(3)
Rem Set you are writing.
DATA_DINT&(0) = 100
DATA_DINT&(1) = 200
DATA_DINT&(2) = 300
DATA_DINT&(3) = 400

Rem Sets DINT type to buffer.
SetPlcData "EtherNetIP", BUF&(), 0, 4, DATA_DINT&(0)
SetPlcData "EtherNetIP", BUF&(), 4, 4, DATA_DINT&(1)
SetPlcData "EtherNetIP", BUF&(), 8, 4, DATA_DINT&(2)
SetPlcData "EtherNetIP", BUF&(), 12, 4, DATA_DINT&(3)
Rem EtherNetIP.
WritePlcMemory "EtherNetIP", 0, 8, 16, BUF&()
```

---

You can load and write using User Area.

Loading from User Input Area

---

```
Dim BUF&(7)
Dim DATA_DINT&(3)
Dim DATA_LREAL#(1)

Rem Loads EtherNet/IP memory.
ReadPlcMemory "EtherNetIP", 0, 10, 16, BUF&()

Rem Gets DINT type data and LREAL type data from buffer.
GetPlcData "EtherNetIP", BUF&(), 0, 4, DATA_DINT&(0)
GetPlcData "EtherNetIP", BUF&(), 4, 4, DATA_DINT&(1)
GetPlcData "EtherNetIP", BUF&(), 8, 4, DATA_DINT&(2)
GetPlcData "EtherNetIP", BUF&(), 12, 4, DATA_DINT&(3)
GetPlcData "EtherNetIP", BUF&(), 16, 8, DATA_LREAL#(0)
GetPlcData "EtherNetIP", BUF&(), 24, 8, DATA_LREAL#(1)
```

---

## Writing to User Output Area.

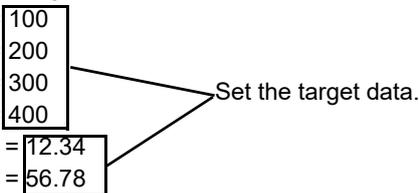
---

```
Dim BUF&(7)
Dim DATA_DINT&(3)
Dim DATA_LREAL#(1)
```

Rem Set you are writing.

```
DATA_DINT&(0) = 100
DATA_DINT&(1) = 200
DATA_DINT&(2) = 300
DATA_DINT&(3) = 400
DATA_LREAL#(0) = 12.34
DATA_LREAL#(1) = 56.78
```

Set the target data.



Rem Sets DINT type data and LREAL type data to buffer.

```
SetPlcData "EtherNetIP", BUF&(), 0, 4, DATA_DINT&(0)
SetPlcData "EtherNetIP", BUF&(), 4, 4, DATA_DINT&(1)
SetPlcData "EtherNetIP", BUF&(), 8, 4, DATA_DINT&(2)
SetPlcData "EtherNetIP", BUF&(), 12, 4, DATA_DINT&(3)
SetPlcData "EtherNetIP", BUF&(), 16, 8, DATA_LREAL#(0)
SetPlcData "EtherNetIP", BUF&(), 24, 8, DATA_LREAL#(1)
```

Rem Writes EtherNet/IP memory.

```
WritePlcMemory "EtherNetIP", 0, 24, 16, BUF&()
```

---

PROFINET interface communication

## IoModule identification name

PROFINET

## Overview

This is a module for sending and receiving commands and data by PROFINET protocol.

## System data

| Identification | Meaning                                    | Initial value |
|----------------|--------------------------------------------|---------------|
| handshake      | Output control<br>0: OFF<br>1: Handshaking | 0             |
| cycleTime      | Output period [ms]                         | 100           |
| outputTime     | Output time [ms]                           | 50            |
| timeout        | Timeout [0.1 s]                            | 100           |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | OK  | Reference: ► JudgeOut (p.319)        |
| RunOut          | OK  | Reference: ► RunOut (p.406)          |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | OK  | Reference: ► ErrorOut (p.243)        |

## Example

Transmit data.

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim DATA&(4)
DATA&(0) = 111
DATA&(1) = 222
DATA&(2) = 333
DATA&(3) = 444
DATA&(4) = 555
```

```
' Transmit the five integer type data.
SendData "PROFINET", data&(), 4*5
```

---

Gets 7ch data from the Command area.

---

```
Dim DATA&(7)
ReadPlcMemory "PROFINET", 0, 0, 16, DATA&()
For I&= 0 To 7
  Print DATA&(I&)
Next
```

---

Output 4ch data to the Data Output area.

---

```
Dim BUF&(7)
Dim DATA_DINT&(3)
Rem Set you are writing.
DATA_DINT&(0) = 100
DATA_DINT&(1) = 200
DATA_DINT&(2) = 300
DATA_DINT&(3) = 400

Rem Sets DINT type to buffer.
SetPlcData "PROFINET", BUF&(), 0, 4, DATA_DINT&(0)
SetPlcData "PROFINET", BUF&(), 4, 4, DATA_DINT&(1)
SetPlcData "PROFINET", BUF&(), 8, 4, DATA_DINT&(2)
SetPlcData "PROFINET", BUF&(), 12, 4, DATA_DINT&(3)
Rem PROFINET.
WritePlcMemory "PROFINET", 0, 8, 16, BUF&()
```

---

You can load and write using User Area.

Loading from User Input Area

---

```
Dim BUF&(7)
Dim DATA_DINT&(3)
Dim DATA_LREAL#(1)

Rem Loads EtherNetIP memory.
ReadPlcMemory "PROFINET", 0, 10, 16, BUF&()

Rem Gets DINT type data and LREAL type data from buffer.
GetPlcData "PROFINET", BUF&(), 0, 4, DATA_DINT&(0)
GetPlcData "PROFINET", BUF&(), 4, 4, DATA_DINT&(1)
GetPlcData "PROFINET", BUF&(), 8, 4, DATA_DINT&(2)
GetPlcData "PROFINET", BUF&(), 12, 4, DATA_DINT&(3)
GetPlcData "PROFINET", BUF&(), 16, 8, DATA_LREAL#(0)
GetPlcData "PROFINET", BUF&(), 24, 8, DATA_LREAL#(1)
```

---

Writing to User Output Area.

```
Dim BUF&(7)
Dim DATA_DINT&(3)
Dim DATA_LREAL#(1)
```

Rem Set you are writing.

```
DATA_DINT&(0) = 100
```

```
DATA_DINT&(1) = 200
```

```
DATA_DINT&(2) = 300
```

```
DATA_DINT&(3) = 400
```

```
DATA_LREAL#(0) = 12.34
```

```
DATA_LREAL#(1) = 56.78
```

Set the target data.

```
Rem Sets DINT type data and LREAL type data to buffer.
SetPlcData "PROFINET", BUF&(), 0, 4, DATA_DINT&(0)
SetPlcData "PROFINET", BUF&(), 4, 4, DATA_DINT&(1)
SetPlcData "PROFINET", BUF&(), 8, 4, DATA_DINT&(2)
SetPlcData "PROFINET", BUF&(), 12, 4, DATA_DINT&(3)
SetPlcData "PROFINET", BUF&(), 16, 8, DATA_LREAL#(0)
SetPlcData "PROFINET", BUF&(), 24, 8, DATA_LREAL#(1)
```

Rem Writes PROFINET memory.

```
WritePlcMemory "PROFINET", 0, 24, 16, BUF&()
```

## Parallelo

Parallel Interface communication

### IoModule identification name

Parallelo

### Overview

This is a module is for sending and receiving commands and data via the Parallel interface.

### System data

| Identification | Meaning                                                            | Initial value |
|----------------|--------------------------------------------------------------------|---------------|
| polarity       | Output polarity<br>0: ON when NG<br>1: ON when OK                  | 0             |
| handshake      | Output control<br>0: None<br>1: Handshake<br>2: Synchronous output | 0             |
| cycleTime      | Cycle time [0.1 ms]                                                | 100           |
| riseTime       | Rise time [0.1 ms]                                                 | 10            |
| outputTime     | Output time [0.1 ms]                                               | 50            |
| timeout        | Timeout [0.1 ms]                                                   | 100           |
| delayCount     | Number of delay                                                    | 1             |
| orOutMode      | One-shot OR signal<br>0: OFF<br>1: ON                              | 0             |

| Identification | Meaning                                         | Initial value |
|----------------|-------------------------------------------------|---------------|
| orOutputTime   | Time of one-shot output when OK signal [0.1 ms] | 50            |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | OK  | Reference: ► GetPort (p.272)         |
| PutPort         | OK  | Reference: ► PutPort (p.382)         |
| GetAll          | OK  | Reference: ► GetAll (p.258)          |
| PutAll          | OK  | Reference: ► PutAll (p.380)          |
| BusyOut         | OK  | Reference: ► BusyOut (p.144)         |
| JudgeOut        | OK  | Reference: ► JudgeOut (p.319)        |
| RunOut          | OK  | Reference: ► RunOut (p.406)          |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | --- | ---                                  |
| WritePlcMemory  | --- | ---                                  |
| SetPlcData      | --- | ---                                  |
| GetPlcData      | --- | ---                                  |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | OK  | Reference: ► ErrorOut (p.243)        |

## Example

Send data

A parameter of SendData, the parameter size are unnecessary.

---

Dim data&(256)

'Transmit the five data.

SendData "Parallelo", data&(), 4\*5

---

## SerialNormal

Serial Interface Normal communication

### IoModule identification name

SerialNormal

SerialNormal2 (Fxxx series method)

## Overview

This is a module is for sending and receiving commands and data via the serial interface.

## System data

| Identification | Meaning                                              | Initial value |
|----------------|------------------------------------------------------|---------------|
| rsMode         | Interface<br>0: RS-232C<br>1: RS-422                 | 0             |
| baudRate       | Baud rate [bps]                                      | 38400         |
| byteSize       | Data length [bit]<br>7 or 8                          | 8             |
| parity         | Parity<br>0: None<br>1: Odd number<br>2: Even number | 0             |
| stopBits       | Stop bits [bit]<br>0: 1<br>1: 2                      | 0             |
| softFlow       | Flow control<br>0: None<br>1: Xon/Xoff               | 0             |
| delimiter      | Delimiter<br>0: CR<br>1: LF<br>2: CR + LF            | 0             |
| timeout        | Timeout [s]                                          | 5             |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | OK  | Reference: ► ReceiveData (p.389)     |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | OK  | Reference: ► SendString (p.439)      |
| ReadPlcMemory   | --- | ---                                  |
| WritePlcMemory  | --- | ---                                  |
| SetPlcData      | --- | ---                                  |
| GetPlcData      | --- | ---                                  |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

Receive data

A parameter of ReceiveData, the parameter size are unnecessary.

---

Dim data&(256)

'Gets the five data.

ReceiveData "SerialNormal", data&(), 4\*5, size&

---

Send data

A parameter of ReceiveData, the parameter size are unnecessary.

---

Dim data&(256)

'Transmit the five data.

SendData "SerialNormal", data&(), 4\*5

---

## SerialPlcLinkM

Serial Interface PLC Link (MELSEC QnU/Q/QnAS) communication

### IoModule identification name

SerialPlcLinkM

### Overview

This is a module is for sending and receiving commands and data via the serial PLC Link interface.

### System data

| Identification | Meaning                                              | Initial value |
|----------------|------------------------------------------------------|---------------|
| rsMode         | Interface<br>0: RS-232C<br>1: RS-422                 | 0             |
| baudRate       | Baud rate [bps]                                      | 9600          |
| byteSize       | Data length [bit]<br>7 or 8                          | 7             |
| parity         | Parity<br>0: None<br>1: Odd number<br>2: Even number | 2             |
| stopBits       | Stop bits [bit]<br>0: 1<br>1: 2                      | 1             |
| softFlow       | Flow control<br>0: None<br>1: Xon/Xoff               | 0             |
| timeout        | Timeout[s]                                           | 5             |

### PLC Link data

| Identification        | Meaning                  | Initial value  |
|-----------------------|--------------------------|----------------|
| commandArea           | Command area Area        | CIO Area (CIO) |
| commandMemoryAddress  | Command area Address     | 0              |
| responseArea          | Response area Area       | CIO Area (CIO) |
| responseMemoryAddress | Response area Address    | 100            |
| outputArea            | Data Output area Area    | CIO Area (CIO) |
| outputMemoryAddress   | Data Output area Address | 200            |
| handshake             | Handshaking              | 1              |
| responseTimeout       | Retry interval [ms]      | 10000          |

## Area classification

| Area classification name | Area classification number |
|--------------------------|----------------------------|
| Data register            | 168                        |
| File register            | 175                        |
| Link register            | 180                        |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

Send data

A parameter of ReceiveData, the parameter size are unnecessary.

---

Dim data&(256)

'Transmit the five data.

SendData "SerialPlcLinkM", data&(), 4\*5

---

## SerialPlcLink

Serial Interface PLC Link (SYSMAC CS/CJ/CP/One) communication

### IoModule identification name

SerialPlcLink

### Overview

This is a module is for sending and receiving commands and data via the serial PLC Link interface.

### System data

| Identification | Meaning                                              | Initial value |
|----------------|------------------------------------------------------|---------------|
| rsMode         | Interface<br>0: RS-232C<br>1: RS-422                 | 0             |
| baudRate       | Baud rate [bps]                                      | 9600          |
| byteSize       | Data length [bit]<br>7 or 8                          | 7             |
| parity         | Parity<br>0: None<br>1: Odd number<br>2: Even number | 2             |
| stopBits       | Stop bits [bit]<br>0: 1<br>1: 2                      | 1             |
| softFlow       | Flow control<br>0: None<br>1: Xon/Xoff               | 0             |
| timeout        | Timeout [s]                                          | 5             |

### PLC Link data

| Identification        | Meaning                  | Initial value  |
|-----------------------|--------------------------|----------------|
| commandArea           | Command area Area        | CIO Area (CIO) |
| commandMemoryAddress  | Command area Address     | 0              |
| responseArea          | Response area Area       | CIO Area (CIO) |
| responseMemoryAddress | Response area Address    | 100            |
| outputArea            | Data Output area Area    | CIO Area (CIO) |
| outputMemoryAddress   | Data Output area Address | 200            |
| handshake             | Handshaking              | 1              |
| responseTimeout       | Retry interval [ms]      | 10000          |

## Area classification

| Area classification name | Area classification number |
|--------------------------|----------------------------|
| CIO Area (CIO)           | 176                        |
| Work Area (WR)           | 177                        |
| Holding Bit Area(HR)     | 178                        |
| Auxiliary Bit Area (AR)  | 179                        |
| DM Area (DM)             | 130                        |
| EM Area (EM0)            | 160                        |
| EM Area (EM1)            | 161                        |
| EM Area (EM2)            | 162                        |
| EM Area (EM3)            | 163                        |
| EM Area (EM4)            | 164                        |
| EM Area (EM5)            | 165                        |
| EM Area (EM6)            | 166                        |
| EM Area (EM7)            | 167                        |
| EM Area (EM8)            | 168                        |
| EM Area (EM9)            | 169                        |
| EM Area (EMA)            | 170                        |
| EM Area (EMB)            | 171                        |
| EM Area (EMC)            | 172                        |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

Send data

A parameter of ReceiveData, the parameter size are unnecessary.

---

```
Dim data&(256)
```

```
' Transmit the five data.
```

```
SendData "SerialPlcLink", data&(), 4*5
```

---

Gets 7ch data from 10ch of the DM area.

Gets the data from readData().

---

```
Dim readData&(256)
```

```
Dim data3$(21)
```

```
'Gets the data from PLC
```

```
ReadPlcMemory "SerialPlcLink", 130, 10, 7, readData&()
```

```
'Gets the data of the real number type
```

```
GetPlcData "SerialPlcLink", readData&(), 0, 8, data1#
```

```
'Gets the data of the integer type
```

```
GetPlcData "SerialPlcLink", readData&(), 8, 4, data2&
```

```
'Gets the data of the character type
```

```
GetPlcData "SerialPlcLink", readData&(), 12, 5, data2&
```

---

Set data to writeData().

Write in data for 7ch from 10ch of the DM area.

---

```
Dim writeData&(256)
```

```
'Set the data (123.45) of the real number type.
```

```
SetPlcData "SerialPlcLink", writeData&(), 0, 8, 123.45
```

```
'Set the data (20) of the integer type.
```

```
SetPlcData "SerialPlcLink", writeData&(), 32, 4, 20
```

```
'Set the data (OMRON) of the character type.
```

```
SetPlcData "SerialPlcLink", writeData&(), 36, 5, "OMRON"
```

---

```
'Write in data for 7ch from 10ch of the DM area.
```

```
WritePlcMemory "SerialPlcLink", 130, 10, 7, writeData&()
```

---

## TcpClient

TCP Client Normal communication

### IoModule identification name

TcpClient

### Overview

This is a module is for sending and receiving commands and data by Ethernet TCP Client protocol.

### System data

| Identification  | Meaning                                  | Initial value |
|-----------------|------------------------------------------|---------------|
| enableDhcp      | Enable DHCP<br>0: Disabled<br>1: Enabled | 0             |
| ipAddress       | IP address of the system                 | 10.5.5.100    |
| subnetMask      | Subnet mask                              | 255.255.255.0 |
| defaultGateway  | Default gateway                          | 10.5.5.110    |
| dns             | DNS server                               | 10.5.5.1      |
| serverIpAddress | Server IP address                        | 10.5.5.101    |
| portNo          | Port number to receive commands          | 9600          |

### Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | OK  | Reference: ► ReceiveData (p.389)     |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | OK  | Reference: ► SendString (p.439)      |
| ReadPlcMemory   | --- | ---                                  |
| WritePlcMemory  | --- | ---                                  |
| SetPlcData      | --- | ---                                  |
| GetPlcData      | --- | ---                                  |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

Receive data.

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Gets the five data.
ReceiveData "TcpClient", data&(), 4*5, size&, ipaddr&(), 4*4
```

---

Send data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Transmit the five data.
SendData "TcpClient", data&(), 4*5, ipaddr&(), 4*4
```

---

## TcpNormal

TCP Normal communication

### IoModule identification name

TcpNormal

### Overview

This is a module is for sending and receiving commands and data by Ethernet TCP server.

### System data

| Identification | Meaning                                  | Initial value |
|----------------|------------------------------------------|---------------|
| enableDhcp     | Enable DHCP<br>0: Disabled<br>1: Enabled | 0             |
| ipAddress      | IP address of the system                 | 10.5.5.100    |
| subnetMask     | Subnet mask                              | 255.255.255.0 |
| defaultGateway | Default gateway                          | 10.5.5.110    |
| dns            | DNS server address                       | 10.5.5.1      |
| portNo         | Port number to receive commands          | 9600          |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | OK  | Reference: ► ReceiveData (p.389)     |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | OK  | Reference: ► SendString (p.439)      |
| ReadPlcMemory   | --- | ---                                  |
| WritePlcMemory  | --- | ---                                  |
| SetPlcData      | --- | ---                                  |
| GetPlcData      | --- | ---                                  |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

### Receive data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Gets the five data.
ReceiveData "TcpNormal", data&(), 4*5, size&, ipaddr&(), 4*4
```

---

### Send data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Transmit the five data.
SendData "TcpNormal", data&(), 4*5, ipaddr&(), 4*4
```

---

## UdpNormal

UDP Normal communication

### IoModule identification name

UdpNormal

UdpNormal2 (Fxxx series method)

### Overview

This is a module is for sending and receiving commands and data by Ethernet UDP protocol.

### System data

| Identification | Meaning                                  | Initial value |
|----------------|------------------------------------------|---------------|
| enableDhcp     | Enable DHCP<br>0: Disabled<br>1: Enabled | 0             |
| ipAddress      | IP address of the system                 | 10.5.5.100    |
| subnetMask     | Subnet mask                              | 255.255.255.0 |
| defaultGateway | Gateway address                          | 10.5.5.110    |
| dns            | DNS server address                       | 10.5.5.1      |
| destIpAddress  | Destination IP address to send data      | 0.0.0.0       |
| portNo         | Port number to receive commands          | 9600          |
| portNo2        | Port number to send data                 | -1            |

(\*) If the input port number and the output port number are the same setting, set the output port number to -1.

### Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | OK  | Reference: ► ReceiveData (p.389)     |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | OK  | Reference: ► SendString (p.439)      |
| ReadPlcMemory   | --- | ---                                  |
| WritePlcMemory  | --- | ---                                  |
| SetPlcData      | --- | ---                                  |
| GetPlcData      | --- | ---                                  |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

### Receive data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Gets the five data.
ReceiveData "UdpNormal", data&(), 4*5, size&, ipaddr&(), 4*4
```

---

### Send data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Transmit the five data.
SendData "UdpNormal", data&(), 4*5, ipaddr&(), 4*4
```

---

## UdpPlcLinkM

PLC Link (MELSEC QnU/Q/QnAS)(UDP)

### IoModule identification name

UdpPlcLinkM

### Overview

This is a module is for sending and receiving commands and data by Ethernet PLC Link protocol.

### System data

| Identification | Meaning                                  | Initial value |
|----------------|------------------------------------------|---------------|
| enableDhcp     | Enable DHCP<br>0: Disabled<br>1: Enabled | 0             |
| ipAddress      | IP address of the system                 | 10.5.5.100    |
| subnetMask     | Subnet mask                              | 255.255.255.0 |
| defaultGateway | Gateway address                          | 10.5.5.110    |
| dns            | DNS server                               | 10.5.5.1      |
| delayCount     | Output IP address                        | 0.0.0.0       |
| portNo         | Input port No.                           | 9600          |

### PLC Link data

| Identification        | Meaning                  | Initial value |
|-----------------------|--------------------------|---------------|
| commandArea           | Command area Area        | Data register |
| commandMemoryAddress  | Command area Address     | 0             |
| responseArea          | Response area Area       | Data register |
| responseMemoryAddress | Response area Address    | 100           |
| outputArea            | Data Output area Area    | Data register |
| outputMemoryAddress   | Data Output area Address | 200           |
| handshake             | Handshaking              | 1             |
| responseTimeout       | Retry interval [ms]      | 10000         |
| responseTimeout2      | Retry interval 2 [ms]    | 1000          |

### Area classification

| Area classification name | Area classification number |
|--------------------------|----------------------------|
| Data register            | 168                        |
| File register            | 175                        |
| Link register            | 180                        |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

Send data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Transmit the five data.
SendData "UdpPlcLinkM", data&(), 4*5, ipaddr&(), 4*4
```

---

Gets 7ch data from 10ch of the Data register area.

Gets the data from readData().

---

```
Dim readData&(256)
Dim data3$(21)

'Gets the data from PLC
ReadPlcMemory "UdpPlcLinkM", 168, 10, 7, readData&()

'Gets the data of the real number type
GetPlcData "UdpPlcLinkM", readData&(), 0, 8, data1#
'Gets the data of the integer type
GetPlcData "UdpPlcLinkM", readData&(), 8, 4, data2&
'Gets the data of the character type
GetPlcData "UdpPlcLinkM", readData&(), 12, 5, data2&
```

---

Set data to writeData().

Write in data for 7ch from 10ch of the Data register area.

---

Dim writeData&(256)

'Set the data (123.45) of the real number type.

SetPlcData "UdpPlcLinkM", writeData&(), 0, 8, 123.45

'Set the data (20) of the integer type.

SetPlcData "UdpPlcLinkM", writeData&(), 32, 4, 20

'Set the data (OMRON) of the character type.

SetPlcData "UdpPlcLinkM", writeData&(), 36, 5, "OMRON"

'Write in data for 7ch from 10ch of the Data register area.

WritePlcMemory "UdpPlcLinkM", 168, 10, 7, writeData&()

---

## UdpPlcLinkY

PLC Link (JEPMC MP) communication

### IoModule identification name

UdpPlcLinkY

### Overview

This is a module is for sending and receiving commands and data by Ethernet PLC Link protocol.

### PLC Link data

| Identification | Meaning                                  | Initial value |
|----------------|------------------------------------------|---------------|
| enableDhcp     | Enable DHCP<br>0: Disabled<br>1: Enabled | 0             |
| ipAddress      | IP address                               | 10.5.5.100    |
| subnetMask     | Subnet mask                              | 255.255.255.0 |
| defaultGateway | Gateway address                          | 10.5.5.110    |
| dns            | DNS server address                       | 10.5.5.1      |
| delayCount     | Output IP address                        | 0.0.0.0       |
| portNo         | Input port number                        | 9600          |

## PLC Link data

| Identification        | Meaning                  | Initial value |
|-----------------------|--------------------------|---------------|
| commandArea           | Command area Area        | Data register |
| commandMemoryAddress  | Command area Address     | 0             |
| responseArea          | Response area Area       | Data register |
| responseMemoryAddress | Response area Address    | 100           |
| outputArea            | Data Output area Area    | Data register |
| outputMemoryAddress   | Data Output area Address | 200           |
| handshake             | Handshaking              | 1             |
| responseTimeout       | Retry interval [ms]      | 10000         |
| responseTimeout2      | Retry interval 2 [ms]    | 1000          |

## Area classification

| Area classification name | Area classification number |
|--------------------------|----------------------------|
| Data register            | 176                        |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

Send data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Transmit the five data.
SendData "UdpPlcLinkY", data&(), 4*5, ipaddr&(), 4*4
```

---

Gets 7ch data from 10ch of the Data register area.

Gets the data from readData&().

---

```
Dim readData&(256)
Dim data3$(21)

'Gets the data from PLC
ReadPlcMemory "UdpPlcLinkY", 176, 10, 7, readData&()

'Gets the data of the real number type
GetPlcData "UdpPlcLinkY", readData&(), 0, 8, data1#
'Gets the data of the integer type
GetPlcData "UdpPlcLinkY", readData&(), 8, 4, data2&
'Gets the data of the character type
GetPlcData "UdpPlcLinkY", readData&(), 12, 5, data2&
```

---

Set data to writeData&().

Write in data for 7ch from 10ch of the Data register area.

---

```
Dim writeData&(256)

'Set the data (123.45) of the real number type.
SetPlcData "UdpPlcLinkY", writeData&(), 0, 8, 123.45
'Set the data (20) of the integer type.
SetPlcData "UdpPlcLinkY", writeData&(), 32, 4, 20
'Set the data (OMRON) of the character type.
SetPlcData "UdpPlcLinkY", writeData&(), 36, 5, "OMRON"

'Write in data for 7ch from 10ch of the Data register area.
WritePlcMemory "UdpPlcLinkY", 176, 10, 7, writeData&()
```

---

## UdpPlcLink

PLC Link (SYSMAC CS/CJ/CP/One)(UDP)

### IoModule identification name

UdpPlcLink

### Overview

This is a module is for sending and receiving commands and data by Ethernet PLC Link protocol.

### System data

| Identification | Meaning                                  | Initial value |
|----------------|------------------------------------------|---------------|
| enableDhcp     | Enable DHCP<br>0: Disabled<br>1: Enabled | 0             |
| ipAddress      | IP address of the system                 | 10.5.5.100    |
| subnetMask     | Subnet mask                              | 255.255.255.0 |
| defaultGateway | Gateway address                          | 10.5.5.110    |
| dns            | DNS server DNS server address            | 10.5.5.1      |
| delayCount     | Output IP address                        | 0.0.0.0       |
| portNo         | Input port No.                           | 9600          |

### PLC Link data

| Identification        | Meaning                  | Initial value  |
|-----------------------|--------------------------|----------------|
| commandArea           | Command area Area        | CIO Area (CIO) |
| commandMemoryAddress  | Command area Address     | 0              |
| responseArea          | Response area Area       | CIO Area (CIO) |
| responseMemoryAddress | Response area Address    | 100            |
| outputArea            | Data Output area Area    | CIO Area (CIO) |
| outputMemoryAddress   | Data Output area Address | 200            |
| handshake             | Handshaking              | 1              |
| responseTimeout       | Retry interval [ms]      | 10000          |
| responseTimeout2      | Retry interval 2 [ms]    | 1000           |

## Area classification

| Area classification name | Area classification number |
|--------------------------|----------------------------|
| CIO Area (CIO)           | 176                        |
| Work Area (WR)           | 177                        |
| Holding Bit Area (HR)    | 178                        |
| Auxiliary Bit Area (AR)  | 179                        |
| DM Area (DM)             | 130                        |
| EM Area (EM0)            | 160                        |
| EM Area (EM1)            | 161                        |
| EM Area (EM2)            | 162                        |
| EM Area (EM3)            | 163                        |
| EM Area (EM4)            | 164                        |
| EM Area (EM5)            | 165                        |
| EM Area (EM6)            | 166                        |
| EM Area (EM7)            | 167                        |
| EM Area (EM8)            | 168                        |
| EM Area (EM9)            | 169                        |
| EM Area (EMA)            | 170                        |
| EM Area (EMB)            | 171                        |
| EM Area (EMC)            | 172                        |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

Send data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Transmit the five data.
SendData "UdpPlcLink", data&(), 4*5, ipaddr&(), 4*4
```

---

Gets 7ch data from 10ch of the DM area.

Gets the data from readData().

---

```
Dim readData&(256)
Dim data3$(21)

'Gets the data from PLC
ReadPlcMemory "UdpPlcLink", 130, 10, 7, readData&()

'Gets the data of the real number type
GetPlcData "UdpPlcLink", readData&(), 0, 8, data1#
'Gets the data of the integer type
GetPlcData "UdpPlcLink", readData&(), 8, 4, data2&
'Gets the data of the character type
GetPlcData "UdpPlcLink", readData&(), 12, 5, data2&
```

---

Set data to writeData().

Write in data for 7ch from 10ch of the DM area.

---

```
Dim writeData&(256)

'Set the data (123.45) of the real number type.
SetPlcData "UdpPlcLink", writeData&(), 0, 8, 123.45
'Set the data (20) of the integer type.
SetPlcData "UdpPlcLink", writeData&(), 32, 4, 20
'Set the data (OMRON) of the character type.
SetPlcData "UdpPlcLink", writeData&(), 36, 5, "OMRON"

'Write in data for 7ch from 10ch of the DM area.
WritePlcMemory "UdpPlcLink", 130, 10, 7, writeData&()
```

---

## TcpPlcLinkM

PLC Link(MELSEC QnU/Q/QnAS) (TCP)

### IoModule identification name

TcpPlcLinkM

### Overview

This is a module is for sending and receiving commands and data by Ethernet PLC Link protocol.

### System data

| Identification  | Meaning                                                            | Initial value                    |
|-----------------|--------------------------------------------------------------------|----------------------------------|
| enableDhcp      | Acquires the IP Address automatically.<br>User the next IP Address | 0                                |
| ipAddress       | IP Address                                                         | 10.5.5.100                       |
| subnetMask      | Sub net mask                                                       | 255.255.255.0                    |
| defaultGateway  | Default Gateway                                                    | 10.5.5.100                       |
| dns             | DNS server                                                         | 10.5.5.100                       |
| wins            | WINS server                                                        | 0.0.0.0, 0.0.0.0 <sup>(*1)</sup> |
| enableDhcp2     | Acquires the IP Address automatically.<br>User the next IP Address | 0                                |
| ipAddress2      | IP Address                                                         | 10.5.6.100                       |
| subnetMask2     | Sub net mask                                                       | 255.255.255.0                    |
| defaultGateway2 | Default Gateway                                                    | 10.5.6.100                       |
| dns2            | DNS server                                                         | 10.5.6.100                       |
| wins2           | WINS server                                                        | 0.0.0.0, 0.0.0.0 <sup>(*1)</sup> |
| serverIpAddress | IP Address for output                                              | 10.5.5.101                       |
| portNo          | Port number of input and output                                    | 9876                             |

\*1: This value is displayed "0.0.0.0" on the [Communication] setting window of [System Settings] in [Tool], it means an empty data.

### PLC Link data

| Identification        | Meaning                          | Initial value |
|-----------------------|----------------------------------|---------------|
| commandArea           | Command area, each area type     | Data register |
| commandMemoryAddress  | Command area, address            | 0             |
| responseArea          | Response area, each area type    | Data register |
| responseMemoryAddress | Response area, address           | 100           |
| outputArea            | Data output area, each area type | Data register |
| outputMemoryArea      | Data output area, address        | 200           |
| handshake             | Output control                   | 1             |
| responseTimeout       | Retry interval (ms)              | 10000         |
| outputBuffering       | Asynchronous output              | 0             |
| pollingMinCycle       | Polling interval (ms)            | 0             |

## Area classification

| Area classification name | Area classification number |
|--------------------------|----------------------------|
| Data register            | 168                        |
| File register            | 175                        |
| Link register            | 180                        |

## Supported functions

|                 |     |                                      |
|-----------------|-----|--------------------------------------|
| IoInitialize    | OK  | ---                                  |
| GetPort         | --- | ---                                  |
| PutPort         | --- | ---                                  |
| BusyOut         | --- | ---                                  |
| JudgeOut        | --- | ---                                  |
| RunOut          | --- | ---                                  |
| GetAll          | --- | ---                                  |
| PutAll          | --- | ---                                  |
| ReceiveData     | --- | ---                                  |
| SendData        | OK  | Reference: ► SendData (p.437)        |
| SendString      | --- | ---                                  |
| ReadPlcMemory   | OK  | Reference: ► ReadPlcMemory (p.387)   |
| WritePlcMemory  | OK  | Reference: ► WritePlcMemory (p.548)  |
| SetPlcData      | OK  | Reference: ► SetPlcData (p.452)      |
| GetPlcData      | OK  | Reference: ► GetPlcData (p.268)      |
| SetPollingState | OK  | Reference: ► SetPollingState (p.454) |
| GetPollingState | OK  | Reference: ► GetPollingState (p.270) |
| ErrorOut        | --- | ---                                  |

## Example

Send data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```

Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Transmit the five data.
SendData "TcpPlcLinkM", data&(), 4*5, ipaddr&(), 4*4

```

---

Gets 7ch data from 10ch of the Data register area.

Gets the data from readData().

---

```
Dim readData&(256)
Dim data3$
```

```
'Gets the data from PLC
ReadPlcMemory "TcpPlcLinkM", 168, 10, 7, readData&()
```

```
'Gets the data of the real number type
GetPlcData "TcpPlcLinkM", readData&(), 0, 8, data1#
'Gets the data of the integer type
GetPlcData "TcpPlcLinkM", readData&(), 8, 4, data2&
'Gets the data of the character type
GetPlcData "TcpPlcLinkM", readData&(), 12, 5, data3&
```

---

```
Set data to writeData().
Write in data for 7ch from 10ch of the Data register area.
```

---

```
Dim writeData&(256)

'Set the data (123.45) of the real number type.
SetPlcData "TcpPlcLinkM", writeData&(), 0, 8, 123.45
'Set the data (20) of the integer type.
SetPlcData "TcpPlcLinkM", writeData&(), 32, 4, 20
'Set the data (OMRON) of the character type.
SetPlcData "TcpPlcLinkM", writeData&(), 36, 5, "OMRON"
```

```
'Write in data for 7ch from 10ch of the Data register area.
WritePlcMemory "TcpPlcLinkM", 168, 10, 7, writeData&()
```

---

## TcpPlcLink

PLC Link (SYSMAC CS/CJ/CP/One)(TCP)

### IoModule identification name

TcpPlcLink

### Overview

This is a module is for sending and receiving commands and data by Ethernet PLC Link protocol.

### System data

| Identification  | Meaning                                                            | Initial value       |
|-----------------|--------------------------------------------------------------------|---------------------|
| enableDhcp      | Acquires the IP Address automatically.<br>User the next IP Address | 0                   |
| ipAddress       | IP Address                                                         | 10.5.5.100          |
| subnetMask      | Sub net mask                                                       | 255.255.255.0       |
| defaultGateway  | Default Gateway                                                    | 10.5.5.100          |
| dns             | DNS server                                                         | 10.5.5.100          |
| wins            | WINS server                                                        | 0.0.0.0, 0.0.0.0 *1 |
| enableDhcp2     | Acquires the IP Address automatically.<br>User the next IP Address | 0                   |
| ipAddress2      | IP Address                                                         | 10.5.6.100          |
| subnetMask2     | Sub net mask                                                       | 255.255.255.0       |
| defaultGateway2 | Default Gateway                                                    | 10.5.6.100          |
| dns2            | DNS server                                                         | 10.5.6.100          |
| wins2           | WINS server                                                        | 0.0.0.0, 0.0.0.0 *1 |
| serverIpAddress | IP Address for output                                              | 10.5.5.101          |
| portNo          | Port number of input and output                                    | 9876                |

\*1: This value is displayed "0.0.0.0" on the [Communication] setting window of [System Settings] in [Tool], it means an empty data.

### PLC Link data

| Identification        | Meaning                          | Initial value |
|-----------------------|----------------------------------|---------------|
| commandArea           | Command area, each area type     | CIO Area(CIO) |
| commandMemoryAddress  | Command area, address            | 0             |
| responseArea          | Response area, each area type    | CIO Area(CIO) |
| responseMemoryAddress | Response area, address           | 100           |
| outputArea            | Data output area, each area type | CIO Area(CIO) |
| outputMemoryArea      | Data output area, address        | 200           |
| handshake             | Output control                   | 1             |
| responseTimeout       | Retry interval (ms)              | 10000         |
| outputBuffering       | Asynchronous output              | 0             |
| pollingMinCycle       | Polling interval (ms)            | 0             |

## Area classification

| Area classification name | Area classification number |
|--------------------------|----------------------------|
| CIO Area (CIO)           | 176                        |
| Work Area (WR)           | 177                        |
| Holding Bit Area (HR)    | 178                        |
| Auxiliary Bit Area (AR)  | 179                        |
| DM Area (DM)             | 130                        |
| EM Area (EM0)            | 160                        |
| EM Area (EM1)            | 161                        |
| EM Area (EM2)            | 162                        |
| EM Area (EM3)            | 163                        |
| EM Area (EM4)            | 164                        |
| EM Area (EM5)            | 165                        |
| EM Area (EM6)            | 166                        |
| EM Area (EM7)            | 167                        |
| EM Area (EM8)            | 168                        |
| EM Area (EM9)            | 169                        |
| EM Area (EMA)            | 170                        |
| EM Area (EMB)            | 171                        |
| EM Area (EMC)            | 172                        |

## Supported functions

|                |     |                                     |
|----------------|-----|-------------------------------------|
| IoInitialize   | OK  | ---                                 |
| GetPort        | OK  | Reference: ► GetPort (p.272)        |
| PutPort        | OK  | Reference: ► PutPort (p.382)        |
| BusyOut        | --- | ---                                 |
| JudgeOut       | --- | ---                                 |
| RunOut         | --- | ---                                 |
| GetAll         | OK  | Reference: ► GetAll (p.258)         |
| PutAll         | OK  | Reference: ► PutAll (p.380)         |
| ReceiveData    | --- | ---                                 |
| SendData       | OK  | Reference: ► SendData (p.437)       |
| SendString     | --- | ---                                 |
| ReadPlcMemory  | OK  | Reference: ► ReadPlcMemory (p.387)  |
| WritePlcMemory | OK  | Reference: ► WritePlcMemory (p.548) |
| SetPlcData     | OK  | Reference: ► SetPlcData (p.452)     |
| GetPlcData     | OK  | Reference: ► GetPlcData (p.268)     |

## Example

Send data

Set an IP address and parameter size (\*4 integer type domain) in a parameter to use an Ethernet.

---

```
Dim data&(256)
Dim ipaddr&(4)
'Set the IP address of the destination.
ipaddr&(0) = 10
ipaddr&(1) = 5
ipaddr&(2) = 5
ipaddr&(3) = 101
'Transmit the five data.
SendData "TcpPlcLink", data&(), 4*5, ipaddr&(), 4*4
```

---

Gets 7ch data from 10ch of the DM area.

Gets the data from readData().

---

```
Dim readData&(256)
Dim data3$

'Gets the data from PLC
ReadPlcMemory "TcpPlcLink", 130, 10, 7, readData&()

'Gets the data of the real number type
GetPlcData "TcpPlcLink", readData&(), 0, 8, data1#
'Gets the data of the integer type
GetPlcData "TcpPlcLink", readData&(), 8, 4, data2&
'Gets the data of the character type
GetPlcData "TcpPlcLink", readData&(), 12, 5, data3$
```

---

Set data to writeData().

Write in data for 7ch from 10ch of the DM area.

---

```
Dim writeData&(256)

'Set the data (123.45) of the real number type.
SetPlcData "TcpPlcLink", writeData&(), 0, 8, 123.45
'Set the data (20) of the integer type.
SetPlcData "TcpPlcLink", writeData&(), 32, 4, 20
'Set the data (OMRON) of the character type.
SetPlcData "TcpPlcLink", writeData&(), 36, 5, "OMRON"

'Write in data for 7ch from 10ch of the DM area.
WritePlcMemory "TcpPlcLink", 130, 10, 7, writeData&()
```

---

## Figure Data List

To set or acquire a model figure or region figure held in a processing unit, use an array to specify the figure data to be set or acquired

### Figure Data Structure List

The structure of figure data is indicated below.

| Array element | Description                    | Description                                                                                                                                                                                                                                                                                                                          |
|---------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| figure(0)     | Figure data header information | This is figure data header information. Includes the number of figures and figure data size information.<br>Upper 16 bits: Number of figures<br>Lower 16 bits: Number of bytes of figure data size (figure array length x 4)<br>Figure data header information = Number of bytes of figure data size + Number of figure data x 65536 |
| figure(1)     | Figure 0 type information      | Type information of figure 0 data. Includes drawing mode and figure type information.<br>Upper 16 bits: Drawing mode<br>Lower 16 bits: Figure type<br>Figure type information = Figure type + Drawing mode x 65536                                                                                                                   |
| figure(2)     | Figure 0 data                  | Figure data of figure 0. The size and content depends on the figure type.                                                                                                                                                                                                                                                            |
| figure(M)     | Figure 1 type information      | Type information of figure 1 data.                                                                                                                                                                                                                                                                                                   |
| figure(M+1)   | Figure 1 data                  | Figure data of figure 1. The size and content depends on the figure type.                                                                                                                                                                                                                                                            |
| ...           | ...                            | ...                                                                                                                                                                                                                                                                                                                                  |
| figure(N*M)   | Figure N type information      | Type information of figure N data.                                                                                                                                                                                                                                                                                                   |
| figure(N*M+1) | Figure N data                  | Figure data of figure N. The size and content depends on the figure type.                                                                                                                                                                                                                                                            |

### List of Figure Data Array Elements

The array elements of each figure and corresponding settings are shown below. The information shown in the table is for a figure count of 1.

| Figure | Figure kind | Array element | Description                    |
|--------|-------------|---------------|--------------------------------|
| Point  | 1           | figure(0)     | Figure data header information |
|        |             | figure(1)     | Figure type information        |
|        |             | figure(2)     | X-coordinate                   |
|        |             | figure(3)     | Y-coordinate                   |
| Line   | 2           | figure(0)     | Figure data header information |
|        |             | figure(1)     | Figure type information        |
|        |             | figure(2)     | First point X                  |
|        |             | figure(3)     | First point Y                  |
|        |             | figure(4)     | Second point X                 |
|        |             | figure(5)     | Second point Y                 |

| Figure      | Figure kind | Array element | Description                    |
|-------------|-------------|---------------|--------------------------------|
| Wide line   | 4           | figure(0)     | Figure data header information |
|             |             | figure(1)     | Figure type information        |
|             |             | figure(2)     | First point X                  |
|             |             | figure(3)     | First point Y                  |
|             |             | figure(4)     | Second point X                 |
|             |             | figure(5)     | Second point Y                 |
|             |             | figure(6)     | Width                          |
| Rectangle   | 8           | figure(0)     | Figure data header information |
|             |             | figure(1)     | Figure type information        |
|             |             | figure(2)     | Upper left X                   |
|             |             | figure(3)     | Upper left Y                   |
|             |             | figure(4)     | Lower right X                  |
|             |             | figure(5)     | Lower right Y                  |
| Ellipse     | 16          | figure(0)     | Figure data header information |
|             |             | figure(1)     | Figure type information        |
|             |             | figure(2)     | X-coordinate of center         |
|             |             | figure(3)     | Y-coordinate of center         |
|             |             | figure(4)     | X-direction radius             |
|             |             | figure(5)     | Y-direction radius             |
| Circle      | 32          | figure(0)     | Figure data header information |
|             |             | figure(1)     | Figure type information        |
|             |             | figure(2)     | X-coordinate of center         |
|             |             | figure(3)     | Y-coordinate of center         |
|             |             | figure(4)     | Radius                         |
| Wide circle | 64          | figure(0)     | Figure data header information |
|             |             | figure(1)     | Figure type information        |
|             |             | figure(2)     | X-coordinate of center         |
|             |             | figure(3)     | Y-coordinate of center         |
|             |             | figure(4)     | Radius                         |
|             |             | figure(5)     | Width                          |
| Arc         | 128         | figure(0)     | Figure data header information |
|             |             | figure(1)     | Figure type information        |
|             |             | figure(2)     | X-coordinate of center         |
|             |             | figure(3)     | Y-coordinate of center         |
|             |             | figure(4)     | Radius                         |
|             |             | figure(5)     | Start angle                    |
|             |             | figure(6)     | End angle                      |

| Figure     | Figure kind  | Array element | Description                    |
|------------|--------------|---------------|--------------------------------|
| Wide arc   | 256          | figure(0)     | Figure data header information |
|            |              | figure(1)     | Figure type information        |
|            |              | figure(2)     | X-coordinate of center         |
|            |              | figure(3)     | Y-coordinate of center         |
|            |              | figure(4)     | Radius                         |
|            |              | figure(5)     | Start angle                    |
|            |              | figure(6)     | End angle                      |
|            |              | figure(7)     | Width                          |
| Polygon    | 512          | figure(0)     | Figure data header information |
|            |              | figure(1)     | Figure type information        |
|            |              | figure(2)     | Number of vertices             |
|            |              | figure(3)     | First point X                  |
|            |              | figure(4)     | First point Y                  |
|            |              | figure(5)     | Second point X                 |
|            |              | figure(6)     | Second point Y                 |
|            |              | .             | .                              |
|            |              | .             | .                              |
|            |              | .             | .                              |
|            |              | figure(19)    | 9th point X                    |
|            |              | figure(20)    | 9th point Y                    |
| figure(21) | 10th point X |               |                                |
| figure(22) | 10th point Y |               |                                |

## List of Figure Numbers

To set or acquire a model figure or region figure held in a processing unit, specify the number of the figure to be set or acquired. The figure numbers and figures of each processing item are shown below.

| Parameter        | Figure number | Description                                                |
|------------------|---------------|------------------------------------------------------------|
| Search           | 0             | Model registration figure (model registration)             |
|                  | 1             | Measurement region figure (region setting)                 |
| Flexible Search  | 0             | Model registration figure for model 0 (model registration) |
|                  | 1             | Model registration figure for model 1 (model registration) |
|                  | 2             | Model registration figure for model 2 (model registration) |
|                  | 3             | Model registration figure for model 3 (model registration) |
|                  | 4             | Model registration figure for model 4 (model registration) |
|                  | 5             | Measurement region figure (region setting)                 |
| Sensitive Search | 0             | Model registration figure(model registration)              |
|                  | 1             | Measurement region figure (region setting)                 |

| Parameter                   | Figure number                                                     | Description                                                      |
|-----------------------------|-------------------------------------------------------------------|------------------------------------------------------------------|
| ECM Search                  | 0                                                                 | Model registration figure(model registration)                    |
|                             | 1                                                                 | Measurement region figure (region setting)                       |
|                             | 2                                                                 | Mask registration figure (model registration)                    |
|                             | 3                                                                 | Model registration figure (error model registration)             |
|                             | 4                                                                 | Mask registration figure(error model registration)               |
| EC Circle Search            | 0                                                                 | Model registration figure(model registration)                    |
|                             | 1                                                                 | Measurement region figure (region setting)                       |
| Shape Search II             | 0                                                                 | Model registration figure(model registration)                    |
|                             | 1                                                                 | Measurement region figure (region setting)                       |
| Shape Search III            | 0                                                                 | Model registration figure(model registration)                    |
|                             | 1                                                                 | Measurement region figure (region setting)                       |
| Ec Corner                   | 0                                                                 | Measurement region figure (region setting)                       |
| Ec Cross                    | 0                                                                 | Measurement region figure (region setting)                       |
| Classification              | 0                                                                 | Index 0, model 0 registration model figure (model registration)  |
|                             | 1                                                                 | Index 0, model 1 registration model figure (model registration)  |
|                             | 2                                                                 | Index 0, model 2 registration model figure (model registration)  |
|                             | 3                                                                 | Index 0, model 3 registration model figure (model registration)  |
| Classification              | 4                                                                 | Index 0, model 4 registration model figure (model registration)  |
|                             | 5                                                                 | Index 1, model 0 registration model figure (model registration)  |
|                             | 6                                                                 | Index 1, model 1 registration model figure (model registration)  |
|                             | .                                                                 | .                                                                |
|                             | .                                                                 | .                                                                |
|                             | .                                                                 | .                                                                |
|                             | 178                                                               | Index 35, model 3 registration model figure (model registration) |
|                             | 179                                                               | Index 35, model 4 registration model figure (model registration) |
|                             | 180                                                               | Measurement region figure (region setting)                       |
|                             | 181                                                               | Index 36, model 0 registration model figure (model registration) |
|                             | 182                                                               | Index 36, model 1 registration model figure (model registration) |
| .                           | .                                                                 |                                                                  |
| .                           | .                                                                 |                                                                  |
| .                           | .                                                                 |                                                                  |
| 999                         | Index 199, model 3 registration model figure (model registration) |                                                                  |
| 1000                        | Index 199, model 4 registration model figure (model registration) |                                                                  |
| Edge Position               | 0                                                                 | Measurement region figure (region setting)                       |
| Edge Pitch                  | 0                                                                 | Measurement region figure (region setting)                       |
| Scan Edge Position          | 0                                                                 | Measurement region figure (region setting)                       |
| Scan Edge Width             | 0                                                                 | Measurement region figure (region setting)                       |
| Circular Scan Edge Position | 0                                                                 | Measurement region figure (region setting)                       |
| Circular Scan Edge Width    | 0                                                                 | Measurement region figure (region setting)                       |
| Intersection                | 0                                                                 | Measurement region figure for straight line 0 (region setting)   |
|                             | 2                                                                 | Measurement region figure for straight line 1 (region setting)   |
| Color Data                  | 0                                                                 | Measurement region figure (region setting)                       |

| Parameter                 | Figure number                                                    | Description                                                      |
|---------------------------|------------------------------------------------------------------|------------------------------------------------------------------|
| Gravity and Area          | 0                                                                | Measurement region figure (region setting)                       |
| Labeling                  | 0                                                                | Measurement region figure (region setting)                       |
| Label Data                | ---                                                              | No figure                                                        |
| Defect                    | 0                                                                | Measurement region figure (region setting)                       |
| Precise Defect            | 0                                                                | Measurement region figure (region setting)                       |
| Fine Matching             | 0                                                                | Model registration figure(model registration)                    |
| Character inspection      | 0                                                                | Measurement region figure (region setting)                       |
| Date Verification         | ---                                                              | No figure                                                        |
| Model Dictionary          | 0                                                                | Index 0, model 0 registration model figure (model registration)  |
|                           | 1                                                                | Index 0, model 1 registration model figure (model registration)  |
|                           | 2                                                                | Index 0, model 2 registration model figure (model registration)  |
|                           | 3                                                                | Index 0, model 3 registration model figure (model registration)  |
|                           | 4                                                                | Index 0, model 4 registration model figure (model registration)  |
|                           | 5                                                                | Index 1, model 0 registration model figure (model registration)  |
|                           | 6                                                                | Index 1, model 1 registration model figure (model registration)  |
|                           | .                                                                | .                                                                |
|                           | .                                                                | .                                                                |
|                           | .                                                                | .                                                                |
|                           | 178                                                              | Index 35, model 3 registration model figure (model registration) |
| 179                       | Index 35, model 4 registration model figure (model registration) |                                                                  |
| 180                       | Measurement region figure (region setting)                       |                                                                  |
| 2DCode                    | 0                                                                | Measurement region figure (region setting)                       |
| Barcode                   | 0                                                                | Measurement region figure (region setting)                       |
| Circle Angle              | 0                                                                | Measurement region figure (region setting)                       |
| Glue Bead Inspection      | ---                                                              | No figure                                                        |
| Position Compensation     | 0                                                                | Measurement region figure (region setting)                       |
| Filtering                 | 0                                                                | Measurement region figure (region setting)                       |
| Background Suppression    | 0                                                                | Measurement region figure (region setting)                       |
| Brightness Correct Filter | 0                                                                | Measurement region figure (region setting)                       |
| Color Gray Filter         | 0                                                                | Measurement region figure (region setting)                       |
| Extract Color Filter      | 0                                                                | Measurement region figure (region setting)                       |
| Anti Color Shading        | 0                                                                | Measurement region figure (region setting)                       |
| Stripes Removal Filter II | 0                                                                | Measurement region figure (region setting)                       |
| Polar Transformation      | 0                                                                | Measurement region figure (region setting)                       |
| Trapezoidal Correction    | 0                                                                | Measurement region figure (region setting)                       |
| Machine Simulator         | ---                                                              | No figure                                                        |
| Image Subtraction         | 0                                                                | Model registration figure(model registration)                    |
| Advanced filter           | 0                                                                | Measurement region figure (region setting)                       |
| Panorama                  | ---                                                              | No figure                                                        |

## Model Number List

When you need to re-register the processing unit model, specify the number of the model to be re-registered. The model numbers and models of each processing item are shown below.

| Parameter                   | Model number                    | Description                    |
|-----------------------------|---------------------------------|--------------------------------|
| Search                      | 0                               | Search model                   |
| Flexible Search             | 0                               | Index 0, model 0 search model  |
|                             | 1                               | Index 0, model 1 search model  |
|                             | 2                               | Index 0, model 2 search model  |
|                             | 3                               | Index 0, model 3 search model  |
|                             | 4                               | Index 0, model 4 search model  |
| Sensitive Search            | 0                               | Search model                   |
| ECM Search                  | 0                               | Search model                   |
| EC Circle Search            | 0                               | Search model                   |
| Shape Search II             | 0                               | Search model                   |
| Shape Search III            | 0                               | Search model                   |
| Ec Corner                   | 0                               | Reference position             |
| Ec Cross                    | 0                               | Reference position             |
| Classification              | 0                               | Index 0, model 0 search model  |
|                             | 1                               | Index 0, model 1 search model  |
|                             | 2                               | Index 0, model 2 search model  |
|                             | 3                               | Index 0, model 3 search model  |
|                             | 4                               | Index 0, model 4 search model  |
|                             | 5                               | Index 1, model 0 search model  |
|                             | 6                               | Index 1, model 1 search model  |
|                             | .                               | .                              |
|                             | .                               | .                              |
|                             | .                               | .                              |
|                             | 178                             | Index 35, model 3 search model |
|                             | 179                             | Index 35, model 4 search model |
|                             | 180                             | Index 36, model 0 search model |
|                             | 181                             | Index 36, model 1 search model |
|                             | .                               | .                              |
| .                           | .                               |                                |
| .                           | .                               |                                |
| 998                         | Index 199, model 3 search model |                                |
| 999                         | Index 199, model 4 search model |                                |
| Edge Position               | 0                               | Edge model                     |
| Edge Pitch                  | 0                               | Edge model                     |
| Scan Edge Position          | 0                               | Edge model                     |
| Scan Edge Width             | 0                               | Edge model                     |
| Circular Scan Edge Position | 0                               | Edge model                     |
| Circular Scan Edge Width    | 0                               | Edge model                     |

| Parameter            | Model number                   | Description                   |
|----------------------|--------------------------------|-------------------------------|
| Intersection         | 0                              | Edge model                    |
| Color Data           | 0                              | Color Data model              |
| Gravity and Area     | 0                              | Gravity and Area model        |
| Labeling             | 0                              | Labeling model                |
| Label Data           | ---                            | No model                      |
| Defect               | 0                              | Defect model                  |
| Precise Defect       | 0                              | Precise Defect model          |
| Fine Matching        | 0                              | Fine Matching model           |
| Character inspection | ---                            | No model                      |
| Date Verification    | ---                            | No model                      |
| Model Dictionary     | 0                              | Index 0, model 0 search model |
|                      | 1                              | Index 0, model 1 search model |
|                      | 2                              | Index 0, model 2 search model |
|                      | 3                              | Index 0, model 3 search model |
|                      | 4                              | Index 0, model 4 search model |
|                      | 5                              | Index 1, model 0 search model |
|                      | 6                              | Index 1, model 1 search model |
|                      | .                              | .                             |
|                      | .                              | .                             |
|                      | .                              | .                             |
| 178                  | Index 35, model 3 search model |                               |
| 179                  | Index 35, model 4 search model |                               |
| 2DCode               | ---                            | No model                      |
| Barcode              | ---                            | No model                      |
| Circle Angle         | ---                            | No model                      |
| Glue Bead Inspection | ---                            | No model                      |

## Image Number List

When you need to access image data in a processing unit, specify the number of the image that you want to access. The image numbers and images of each processing item are shown below.

| Item                        | Image number | Description  |
|-----------------------------|--------------|--------------|
| Search                      | -            | No image     |
| Flexible Search             | -            | No image     |
| Sensitive Search            | -            | No image     |
| ECM Search                  | -            | No image     |
| EC Circle Search            | -            | No image     |
| Shape Search II             | -            | No image     |
| Shape Search III            | -            | No image     |
| Ec Corner                   | -            | No image     |
| Ec Cross                    | -            | No image     |
| Classification              | -            | No image     |
| Edge Position               | -            | No image     |
| Edge Pitch                  | -            | No image     |
| Scan Edge Position          | -            | No image     |
| Scan Edge Width             | -            | No image     |
| Circular Scan Edge Position | -            | No image     |
| Circular Scan Edge Width    | -            | No image     |
| Intersection                | -            | No image     |
| Color Data                  | -            | No image     |
| Gravity and Area            | -            | No image     |
| Labeling                    | -            | No image     |
| Label Data                  | -            | No image     |
| Defect                      | -            | No image     |
| Precise Defect              | -            | No image     |
| Fine Matching               | -            | No image     |
| Character Inspection        | -            | No image     |
| Date Verification           | -            | No image     |
| Model Dictionary            | -            | No image     |
| 2DCode                      | -            | No image     |
| Barcode                     | -            | No image     |
| Character Recognition       | -            | No image     |
| Character Dictionary        | -            | No image     |
| Circle Angle                | -            | No image     |
| Glue Bead Inspection        | -            | No image     |
| Camera Image Input          | 0            | Camera image |
| Camera Image Input FH       | 0            | Camera image |
| Camera Image Input HDR      | 0            | Camera image |
| Camera Image Input HDR Lite | 0            | Camera image |
| Camera Switching            | 0            | Camera image |

| Item                        | Image number | Description                 |
|-----------------------------|--------------|-----------------------------|
| Measurement Image Switching | -            | No image                    |
| Position Compensation       | 0            | Position compensated image  |
| Filtering                   | 0            | Filtered image              |
| Background Suppression      | 0            | Background suppressed image |
| Brightness Correct Filter   | 0            | Brightness corrected image  |
| Color Gray Filter           | 0            | Color gray image            |
| Extract Color Filter        | 0            | Color extracted image       |
| Anti Color Shading          | 0            | Anti color shading image    |
| Stripes Removal Filter II   | 0            | Stripes removed image       |
| Polar Transformation        | 0            | Polar transformed image     |
| Trapezoidal Correction      | 0            | Trapezoidal corrected image |
| Machine Simulator           | 0            | Axis shifted image          |
| Image Subtraction           | 0            | Subtraction image           |
| Advanced filter             | 0            | Output image 0              |
|                             | 1            | Output image 1              |
|                             | 2            | Output image 2              |
|                             | 3            | Output image 3              |
| Panorama                    | 0            | Panorama image              |
| Unit Macro                  | 0            | Processing unit image 0     |
|                             | 1            | Processing unit image 1     |
|                             | ...          | ...                         |
|                             | 30           | Processing unit image 30    |
|                             | 31           | Processing unit image 31    |
| Unit Calculation Macro      | -            | No image                    |
| Calculation                 | -            | No image                    |
| Line Regression             | -            | No image                    |
| Circle Regression           | -            | No image                    |
| Precise Calibration         | 0            | Corrected image             |
| User Data                   | -            | No image                    |
| Set Unit Data               | -            | No image                    |
| Get Unit Data               | -            | No image                    |
| Set Unit Figure             | -            | No image                    |
| Get Unit Figure             | -            | No image                    |
| Trend Monitor               | -            | No image                    |
| Image Logging               | -            | No image                    |
| Image Conversion Logging    | -            | No image                    |
| Data Logging                | -            | No image                    |
| Elapsed Time                | -            | No image                    |
| Wait                        | -            | No image                    |
| Focus                       | -            | No image                    |
| Iris                        | -            | No image                    |
| Parallelize                 | -            | No image                    |

| Item                      | Image number | Description          |
|---------------------------|--------------|----------------------|
| Parallelize Task          | -            | No image             |
| Statistics                |              | No image             |
| Reference Calib Data      | 0            | Corrected image      |
| Position Data Calculation | -            | No image             |
| Stage Data                | -            | No image             |
| Robot Data                | -            | No image             |
| Vision Master Calibration | -            | No image             |
| PLC Master Calibration    | -            | No image             |
| Convert Position Data     | -            | No image             |
| Movement Single Position  | -            | No image             |
| Movement Multi Points     | -            | No image             |
| Detection Point           | -            | No image             |
| Camera Calibration        | -            | No image             |
| Data Save                 | -            | No image             |
| Conditional Branch        | -            | No image             |
| End                       | -            | No image             |
| DI Branch                 | -            | No image             |
| Control Flow Normal       | -            | No image             |
| Control Flow PLC Link     | -            | No image             |
| Control Flow Parallel     | -            | No image             |
| Control Flow Fieldbus     | -            | No image             |
| Selective Branch          | -            | No image             |
| Data Output               | -            | No image             |
| Parallel Data Output      | -            | No image             |
| Parallel Judgement Output | -            | No image             |
| Fieldbus Data Output      | -            | No image             |
| Result Display            | -            | No image             |
| Display Image File        | 0            | File display image 0 |
|                           | 1            | File display image 1 |
|                           | 2            | File display image 2 |
|                           | 3            | File display image 3 |
| Display Last NG Image     | 0            | NG image 0           |
|                           | 1            | NG image 1           |
|                           | 2            | NG image 2           |
|                           | 3            | NG image 3           |

## List of Sub-Image Numbers

In addition to measurement images, the processing unit also contains images being processed and images that have been processed, and these can be displayed in the image window as sub-images. To display a sub-image, specify the number of the sub-image. The sub-image numbers and sub-images of each processing item are shown below.

| Item                        | Sub-image | Description                                                                                               |
|-----------------------------|-----------|-----------------------------------------------------------------------------------------------------------|
| Search                      | 0         | Measurement image                                                                                         |
| Flexible Search             | 0         | Measurement image                                                                                         |
| Sensitive Search            | 0         | Measurement image                                                                                         |
| ECM Search                  | 0         | Measurement image                                                                                         |
|                             | 1         | Image with the edge that matches the measurement image overlaid                                           |
| EC Circle Search            | 0         | Measurement image                                                                                         |
| Shape Search II             | 0         | Measurement image                                                                                         |
| Shape Search III            | 0         | Measurement image                                                                                         |
|                             | 1         | Display of measurement object and corresponding model.                                                    |
|                             | 2         | Edge image                                                                                                |
|                             | 3         | Display of edge image and corresponding model                                                             |
| Ec Corner                   | 0         | Measurement image                                                                                         |
| Ec Cross                    | 0         | Measurement image                                                                                         |
| Classification              | 0         | Measurement image                                                                                         |
| Edge Position               | 0         | Measurement image                                                                                         |
|                             | 1         | Profile image                                                                                             |
| Edge Pitch                  | 0         | Measurement image                                                                                         |
|                             | 1         | Profile image                                                                                             |
| Scan Edge Position          | 0         | Measurement image                                                                                         |
|                             | 1         | Scan image                                                                                                |
| Scan Edge Width             | 0         | Measurement image                                                                                         |
|                             | 1         | Scan image                                                                                                |
| Circular Scan Edge Position | 0         | Measurement image                                                                                         |
|                             | 1         | Edge position display image of each divided region                                                        |
| Circular Scan Edge Width    | 0         | Measurement image                                                                                         |
|                             | 1         | Edge position image of each region division                                                               |
| Intersection                | 0         | Measurement image                                                                                         |
|                             | 1         | Scan region image                                                                                         |
| Color Data                  | 0         | Measurement image                                                                                         |
|                             | 1         | Masked image                                                                                              |
| Gravity and Area            | 0         | Measurement image                                                                                         |
|                             | 1         | Color extraction image (when measuring a color image)<br>Binary image (when measuring a monochrome image) |
| Labeling                    | 0         | Measurement image                                                                                         |
|                             | 1         | Color extraction image (when measuring a color image)<br>Binary image (when measuring a monochrome image) |
| Label Data                  | 0         | Measurement image                                                                                         |
| Defect                      | 0         | Measurement image                                                                                         |
|                             | 1         | Masked defect profile image (with area measurement)                                                       |

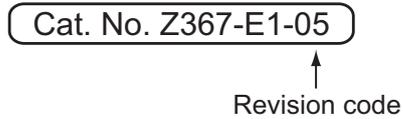
| Item                        | Sub-image | Description                                                                                              |
|-----------------------------|-----------|----------------------------------------------------------------------------------------------------------|
| Precise Defect              | 0         | Measurement image                                                                                        |
|                             | 1         | Masked defect profile image (with area measurement)                                                      |
| Fine Matching               | 0         | Measurement image                                                                                        |
|                             | 1         | Difference image                                                                                         |
| Character Inspection        | 0         | Measurement image                                                                                        |
| Date Verification           | 0         | Measurement image                                                                                        |
| Model Dictionary            | 0         | Measurement image                                                                                        |
| 2DCode                      | 0         | Measurement image                                                                                        |
| Barcode                     | 0         | Measurement image                                                                                        |
| OCR                         | 0         | Measurement image                                                                                        |
| OCR User Dictionary         | 0         | Measurement image                                                                                        |
| Circle Angle                | 0         | Measurement image                                                                                        |
| Glue Bead Inspection        | 0         | Measurement image                                                                                        |
|                             | 1         | Selection color image (when measuring a color image)<br>Binary image (when measuring a monochrome image) |
|                             | 3         | Route (Reference path) image                                                                             |
|                             | 4         | Binary image                                                                                             |
| Camera Image Input          | 0         | Camera image                                                                                             |
| Camera Image Input FH       | 0         | Camera image                                                                                             |
| Camera Image Input HDR      | 0         | Camera image                                                                                             |
| Camera Image Input HDR Lite | 0         | Camera image                                                                                             |
| Camera Switching            | 0         | Camera image                                                                                             |
| Measurement Image Switching | 0         | Image after switching                                                                                    |
|                             | 1         | Measurement image                                                                                        |
| Position Compensation       | 0         | After scroll                                                                                             |
|                             | 1         | Before scroll                                                                                            |
| Filtering                   | 0         | Filtered image                                                                                           |
| Background Suppression      | 0         | Background suppressed image                                                                              |
| Brightness Correct Filter   | 0         | Brightness corrected image                                                                               |
| Color Gray Filter           | 0         | Color gray image                                                                                         |
| Extract Color Filter        | 0         | Color extracted image                                                                                    |
|                             | 1         | Measurement image                                                                                        |
| Anti Color Shading          | 0         | Anti color shading image                                                                                 |
| Stripes Removal Filter II   | 0         | Color extracted image                                                                                    |
| Polar Transformation        | 0         | Circle image                                                                                             |
|                             | 1         | Measurement image                                                                                        |
| Trapezoidal Correction      | 0         | Trapezoidal corrected image                                                                              |
| Machine Simulator           | 0         | Axis shifted image                                                                                       |
| Image Subtraction           | 0         | Subtraction image                                                                                        |
|                             | 1         | Measurement image                                                                                        |

| Item                      | Sub-image | Description                                                  |
|---------------------------|-----------|--------------------------------------------------------------|
| Advanced filter           | 0         | Advanced filter image                                        |
|                           | 1         | Output image 0                                               |
|                           | 2         | Output image 1                                               |
|                           | 3         | Output image 2                                               |
|                           | 4         | Output image 3                                               |
|                           | 5         | Output image                                                 |
| Panorama                  | 0         | Panorama image                                               |
| Unit Macro                | 0 to 100  | Can defined as desired                                       |
| Unit Calculation Macro    | 0         | Measurement image                                            |
| Calculation               | 0         | Measurement image                                            |
| Line Regression           | 0         | Measurement image                                            |
| Circle Regression         | 0         | Measurement image                                            |
| Precise Calibration       | 0         | High-precision calibration image                             |
| User Data                 | 0         | Measurement image                                            |
| Set Unit Data             | 0         | Measurement image                                            |
| Get Unit Data             | 0         | Measurement image                                            |
| Set Unit Figure           | 0         | Measurement image                                            |
| Get Unit Figure           | 0         | Measurement image                                            |
| Trend Monitor             | 0         | Trend graph display                                          |
|                           | 1         | Histogram display                                            |
| Image Logging             | 0         | Measurement image                                            |
| Image Conversion Logging  | 0         | Measurement image                                            |
| Data Logging              | 0         | Measurement image                                            |
| Elapsed Time              | 0         | Measurement image                                            |
| Wait                      | 0         | Measurement image                                            |
| Focus                     | 0         | Measurement image                                            |
| Iris                      | 0         | Measurement image                                            |
| Parallelize               | 0         | Measurement image                                            |
| Parallelize Task          | 0         | Measurement image                                            |
| Statistics                | 0         | Graph display corresponding to "Data number" in setting data |
|                           | 1         | Data graph display of data 0                                 |
|                           | 2         | Data graph display of data 1                                 |
|                           | 3         | Data graph display of data 2                                 |
|                           | 4         | Data graph display of data 3                                 |
|                           | 5         | Data graph display of data 4                                 |
|                           | 6         | Data graph display of data 5                                 |
|                           | 7         | Data graph display of data 6                                 |
|                           | 8         | Data graph display of data 7                                 |
| Reference Calib Data      | 0         | Calibration reference image                                  |
| Position Data Calculation | 0         | Measurement image                                            |
| Stage Data                | 0         | Measurement image                                            |
| Robot Data                | 0         | Measurement image                                            |

| Item                      | Sub-image | Description                                                                                                                  |
|---------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------|
| Vision Master Calibration | 0         | Measurement image + Calibration progress display                                                                             |
|                           | 1         | Measurement image                                                                                                            |
| PLC Master Calibration    | 0         | Measurement image + Calibration progress display                                                                             |
|                           | 1         | Measurement image                                                                                                            |
| Convert Position Data     | 0         | Measurement image                                                                                                            |
| Movement Single Position  | 0         | Measurement image                                                                                                            |
| Movement Multi Points     | 0         | Measurement image                                                                                                            |
| Detection Point           | 0         | Measurement image                                                                                                            |
| Camera Calibration        | 0         | Measurement image                                                                                                            |
| Data Save                 | 0         | Measurement image                                                                                                            |
| Conditional Branch        | 0         | Measurement image                                                                                                            |
| End                       | 0         | Measurement image                                                                                                            |
| DI Branch                 | 0         | Measurement image                                                                                                            |
| Control Flow Normal       | 0         | Measurement image                                                                                                            |
| Control Flow PLC Link     | 0         | Measurement image                                                                                                            |
| Control Flow Parallel     | 0         | Measurement image                                                                                                            |
| Control Flow Fieldbus     | 0         | Measurement image                                                                                                            |
| Selective Branch          | 0         | Measurement image                                                                                                            |
| Data Output               | 0         | Measurement image                                                                                                            |
| Parallel Data Output      | 0         | Measurement image                                                                                                            |
| Parallel Judgement Output | 0         | Measurement image                                                                                                            |
| Fieldbus Data Output      | 0         | Measurement image                                                                                                            |
| Result image              | 0         | Result image                                                                                                                 |
| Display Image File        | 0         | Image 0                                                                                                                      |
|                           | 1         | Image 1                                                                                                                      |
|                           | 2         | Image 2                                                                                                                      |
|                           | 3         | Image 3                                                                                                                      |
| Display Last NG Image     | 0         | Last NG                                                                                                                      |
|                           | 1         | 1st preceding NG image (when two or more images are saved)<br>Most recent NG image (when less than two images are saved)     |
|                           | 2         | 2nd preceding NG image (when three or more images are saved)<br>Most recent NG image (when less than three images are saved) |
|                           | 3         | 3rd preceding NG image (when four or more images are saved)<br>Most recent NG image (when less than four images are saved)   |

# Manual Revision History

The manual revision symbol is an alphabet appended at the end of the manual number found in the bottom left-hand corner of the front or back cover.



| Rev. No. | Rev. Date | Revision Contents                                                                 | Software Version |
|----------|-----------|-----------------------------------------------------------------------------------|------------------|
| 01       | Apr. 2016 | Original production                                                               | Ver.5.60         |
| 02       | Mar. 2017 | Corrected mistakes.                                                               | Ver.5.71         |
| 03       | Jun. 2017 | Additions for software version upgrade.                                           | Ver.5.72         |
| 04       | Jul. 2018 | Additions for software version upgrade.                                           | Ver.6.10         |
| 05       | Jul. 2019 | Additions for software version upgrade.<br>Removed the description of FZ5 series. | Ver.6.30         |

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