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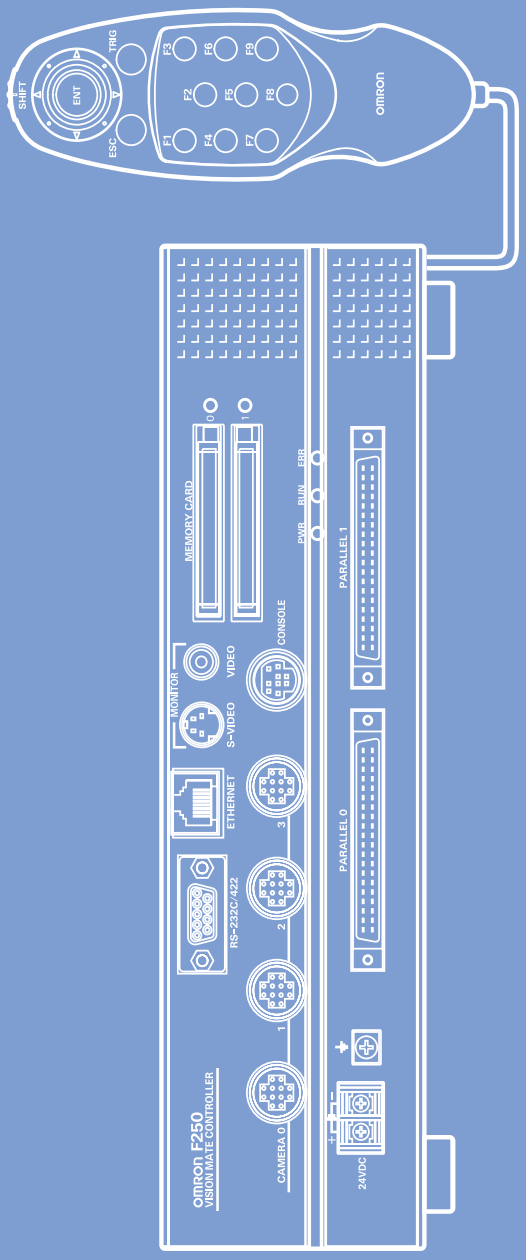
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OMRON



OPERATION MANUAL

Using This Manual

1 Basic Operating Procedures

2 Processing Items Setting Procedures

3 Test/Measurement Execution

4 Other Functions

5 System Settings

6 Communicating with External Devices

7 Appendix

Application Software

F250-UME

This manual explains basic operations, such as installing the Application Software, setting up inspection processes, and communications with external devices.

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SECTION 4
Other Functions

This section explains additional functions such as setup change and data backup.

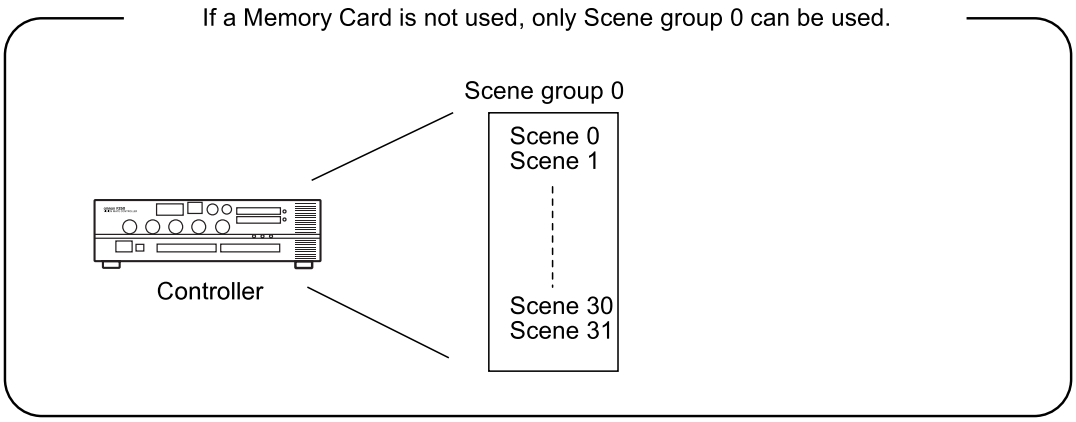
Setup Change (Scenes and Scene Group Functions)	2
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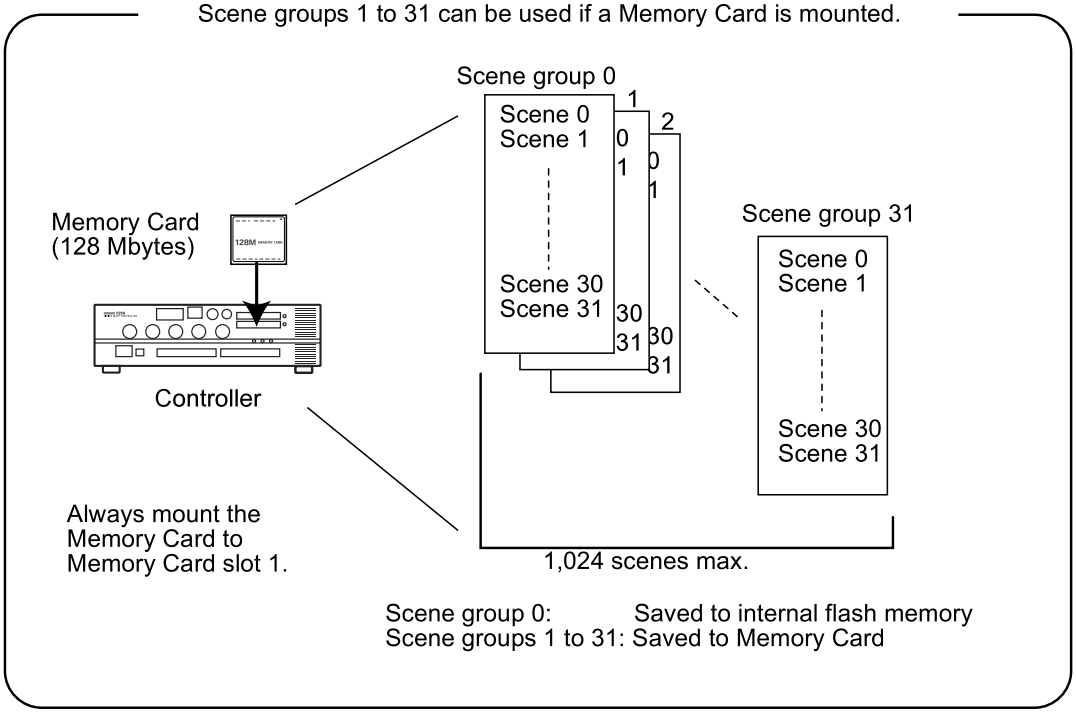
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Setup Change (Scenes and Scene Group Functions)

The different situations (types of measurement workpieces and types of inspections required) in which measurements are performed are called “scenes” and the measurement conditions set in the Set mode are called “scene data”. Use of the scene function allows you to set up to 32 types of measurement conditions. When the inspection requirements change, the inspection process can be changed just by changing the scene.
The normal limit of 32 scenes may not be possible for some settings if there is insufficient memory. A message will appear on the screen if there is insufficient memory. Make the region smaller or delete unnecessary regions or models.

CHECK! Inserting a memory card into a memory card slot can have up to 1,024 scenes (in the case of 128-MB memory card). Up to 32 scene groups (each group consists of 32 scenes) can be set. This means up to 1024 scenes (32 scenes x 32 scene groups) can be set up. Scene group 0 will be saved in the internal flash memory and scene groups 1 to 31 will be saved to the Memory Card.





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Setting Measurement Conditions for Different Models (Changing Scenes)

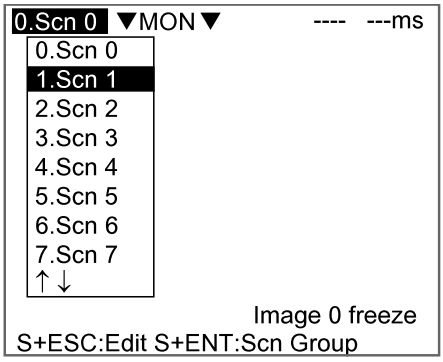
Use the scene changing function to switch between different measurement conditions for different measurement setups or measurement objects.By default, scene 0 is displayed when the power is turned ON. However, scenes 1 to 31 are also available. In addition, inserting a memory card and using it in conjunction with the scene group function will allow you to set up to 1024 scenes.
The command for changing scenes or scene groups can be input from an external device via a parallel or serial interface.

1. Display the basic screen for Monitor mode or Run mode.



2. Move the cursor to [Scn] and press the ENT Key.

The Scene 0 to Scene 7 options will be displayed.
Use the Down Key to display scene group numbers 8 to 31.



3. Move the cursor to the scene number to be switched to and press the ENT Key.

The selected scene will be displayed.



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Using Scene Group Function

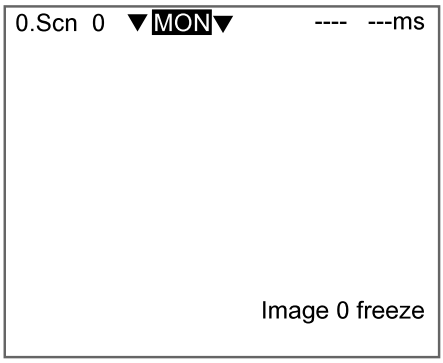
CHECK!

If the controller has two slots, the memory card for storing scene group data must be inserted into slot 1.

CHECK!

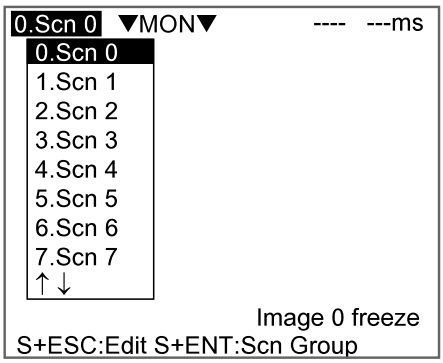
If you switch the scene group to another (1 to 31), a directory called “DEFSCNGR” will be created automatically in the root directory of the memory card.
In this directory, the scene group data is stored in a file called “SGR_00**.SGR” (“*” indicates the scene group no.).

1. Insert the memory card.
2. Display the basic screen for Monitor mode or Run mode.
3. Move the cursor to [Scn] and press the ENT Key.



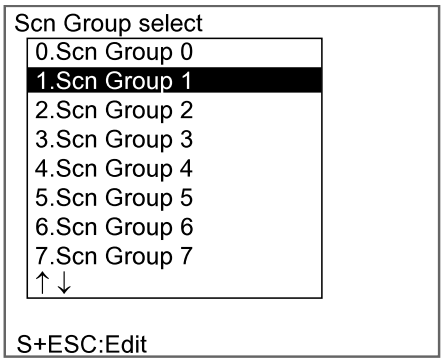
The Scene 0 to Scene 7 options will be displayed.

4. Press the SHIFT+ENT Keys.



The Scene Group 0 to Scene Group 7 options will be displayed.
Use the Down Key to display scene group numbers 8 to 31.

5. Move the cursor to the scene group number to be switched to and press the ENT Key.



The selected scene group will be displayed.

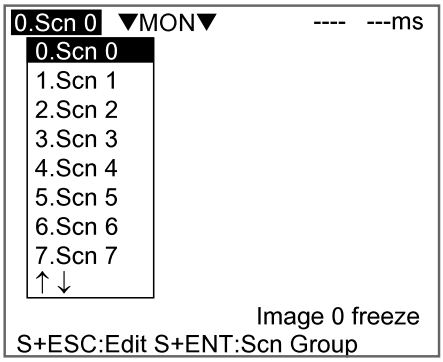
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Copying the Specified Measurement Conditions to Another Scene

This function is useful for creating new scenes by copying scene data from another scene and changing some settings to suit the new requirements.

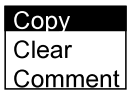
CHECK! Scene data can be copied only within the same scene group. To copy data between scene groups, copy the whole scene group.
p.8

1. Move the cursor to [Scn] and press the ENT Key.
2. Move the cursor to the scene to which the conditions are to be copied.
3. Press the SHIFT+ ESC Keys.



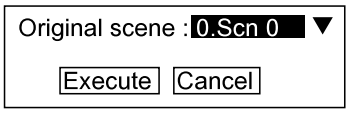
The Copy/Clear/Comment Menu will be displayed.

4. Select [Copy].



The screen for copying will be displayed.

5. Select the scene from which the conditions are to be copied, and select [Execute].



The data will be copied.

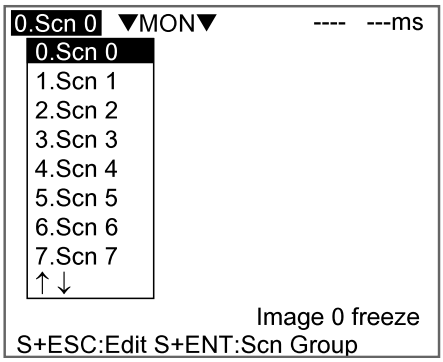
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Initializing Measurement Conditions (Clearing Scenes)

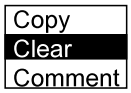
Use the following procedure to clear measurement conditions set in Set Mode, and to return scenes to their default settings. This section explains the procedure performed separately for each scene.

Initializing a Group of Scenes p.8

1. Move the cursor to [Scn] and press the ENT Key.
2. Move the cursor to the scene to be cleared.
3. Press the SHIFT+ ESC Keys.

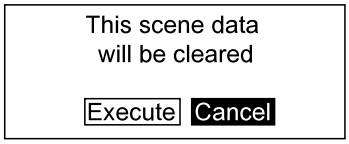


The Copy/Clear/Comment Menu will be displayed.



4. Select [Clear].

A confirmation message appears.



5. Select [Execute].

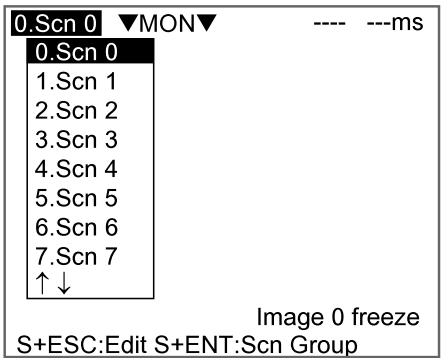
The scene will be cleared.

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Adding Comments to Scenes

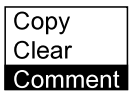
Any comment can be added to each scene. This is useful for understanding settings when many regions have been registered.

1. Move the cursor to [Scn] and press the ENT Key.
2. Move the cursor to the scene to be renamed.
3. Press the SHIFT+ ESC Keys.



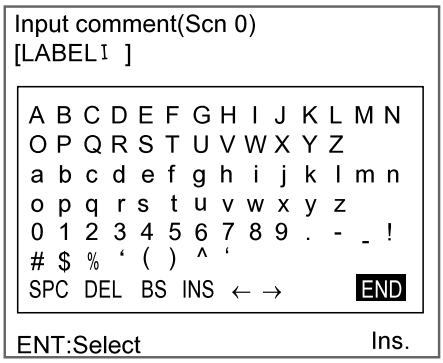
The Copy/Clear/Comment Menu will be displayed.

4. Select [Comment].

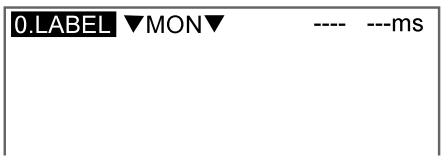


A software keyboard will be displayed.

5. Enter a comment consisting of up to eight characters.
6. Move the cursor to [END] and press the ENT Key.



The scene name will be changed.



CHECK! Comments can also be set in Japanese via a serial interface. However, full-size characters are equivalent to two standard size characters. Thus, if the string consists of full-size characters only, only up to 4 characters can be set.

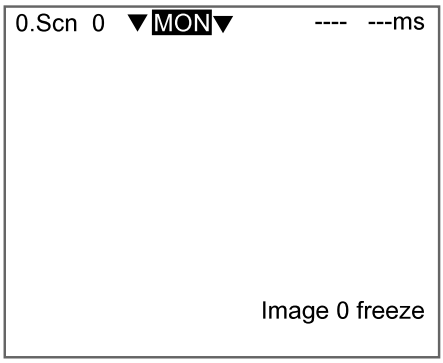
SECTION 6, “4. Serial Interface Menu Operations”

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Using Scene Group Function

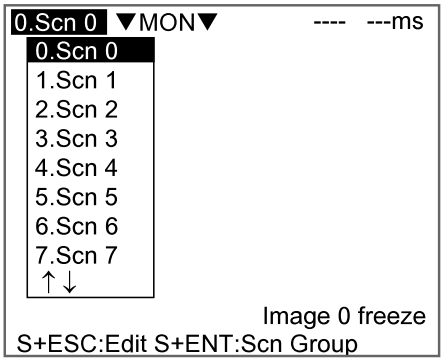
Use the scene group function to copy and clear whole scene groups and change the scene group name to any 11 standard characters.

1. Make sure that a memory card has been inserted.
2. Display the basic screen for Monitor mode or Run mode.
3. Move the cursor to [Scn] and press the ENT Key.



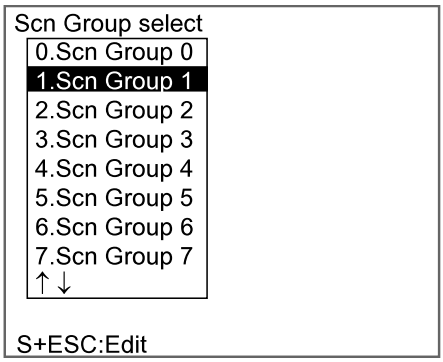
The Scene 0 to Scene 7 options will be displayed.

4. Press the SHIFT+ENT Keys.

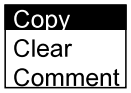


The Scene Group 0 to Scene Group 7 options will be displayed.

5. Move the cursor to the desired scene group no.
6. Press the SHIFT+ ESC Keys.



The Copy/Clear/Comment Menu will be displayed.
The rest of the operations are the same as when using the scene function.



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Backing Up Settings

This section explains how to make backup copies of data to flash memory or a computer.
When the power to the Controller is turned OFF, all data settings are cleared. The Controller loads data saved to flash memory at startup. Therefore, when settings are changed, in order not to lose these settings, be sure to save them to flash memory.
The following five kinds of data can also be backed up to the computer or memory card. This function is useful when you want to set the same data to another machine. It is recommended that data is backed up in case data is lost or the Controller malfunctions.

Data	Contents
System data	Settings under [SYS] are backed up to a computer or memory card. Macro programs are contained in the system data.
Scene group data	Scene data (scenes 0 to 31) for specified scene group are backed up to a computer or Memory Card.
Scene data	Settings under [SET] are backed up to a computer or Memory Card.
System data + Scene group	Both the system data and scene group data (for the scene group currently displayed) are backed up together to a computer or Memory Card.
Image data	Saved measured images are backed up in bitmap format (*.BMP) to a computer or memory card. The bitmap format is often used with Windows, so images backed up in this format can be displayed on a computer.  CHECK! When backing up images saved when [Frame] was selected for the Frame/Field mode, save those images while displaying frame images. When backing up images saved when [Field] was selected for the Frame/Field mode, save those images while displaying field images.



Do not turn OFF the power or input a RESET signal while a message is being displayed in any save or load operation. Data in memory will be destroyed, and the Controller may not operate correctly the next time it is started.



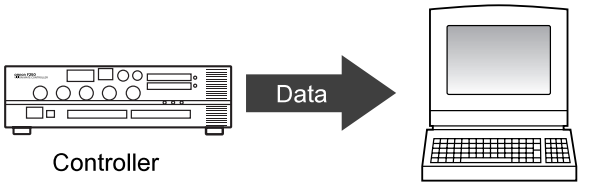
Backing Up to a Memory Card
Some settings may not be backed up to a memory card because of insufficient memory capacity. In this case, a warning message will appear, so delete unnecessary scenes.

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Backing Up to a Personal Computer

This section describes the procedure for data transfer using Hyper Terminal, which is standard software in Windows.
If other communications software is being used, refer to the relevant manual.
Data communications are performed in XMODEM (-CRC or -SUM) or ZMODEM protocols. XMODEM (-1K) is not supported.

Saving Data to the Computer



1. Connect the personal computer and the controller.

2. Make the controller communications settings (serial interface).

The default communications settings are as shown in the following table. These settings can normally be used.

Item	Selection
Interface	RS-232C
Baud rate	38,400 (bps)
Data length	8 (bit)
Parity bits	None
Stop bits	1 (bit)
Protocol	XMODEM (See *.)

*: MODEM and ZMODEM transfer protocols are available.
Set the same settings that are set in the personal computer.

3. Start the Hyper Terminal program on the computer and make the following communications settings.

Use the protocol that matches the personal computer settings.

RS-232C and RS-422 Connections

Item	Selection
Connection	COM* (COM number to which the cable is connected)
Baud rate	38,400 (bps)
Data length	8 (bit)
Parity bits	None
Stop bits	1 (bit)
Flow control	None

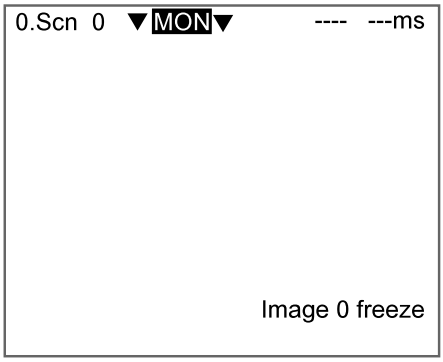
Ethernet Connection

Item	Selection
Connection	TCP/IP (Winsock)
Host address	IP address of Controller
Port number	23 (TELNET)

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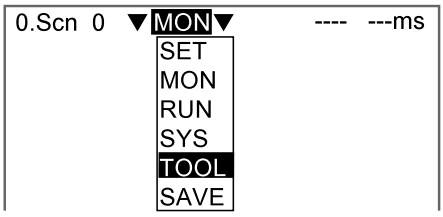
4. Once the preparations have been completed on the computer, display the basic screen for monitor mode or run mode.

5. Place the cursor on [MON] or [RUN], and press the ENT Key.



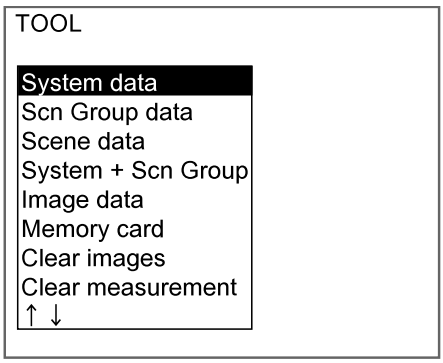
The mode selections will be displayed.

6. Select [TOOL].



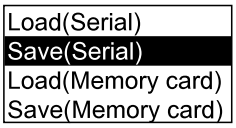
The data selections will be displayed.

7. Select the data to be saved.



The destination selections for load and save will be displayed.

8. Select [Save (Serial)].



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9. Select the desired number for scene group, scene, or image data.

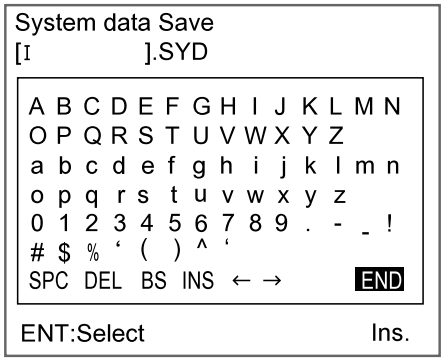

CHECK!

When backing up system and scene group data, the currently displayed scene group will be saved.

Scene group No.	Scene No.	Image data No.
Scn Group 0 Scn Group 1 Scn Group 2 Scn Group 3 Scn Group 4 Scn Group 5 Scn Group 6 Scn Group 7 ↑↓	Scn 0 Scn 1 Scn 2 Scn 3 Scn 4 Scn 5 Scn 6 Scn 7 ↑↓	Memory 0 Memory 1 Memory 2 Memory 3 Memory 4 Memory 5 Memory 6 Memory 7 ↑↓
(0 to 31)	(0 to 31)	(0 to 35)

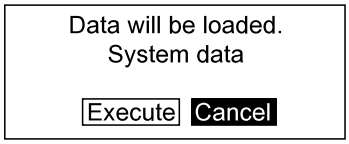
Communication by [ZMODEM]
Specify the desired file name (up to eight characters).

Example:
Screen for saving system data



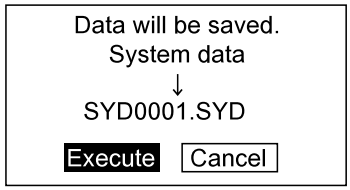
A confirmation message will be displayed.

For XMODEM communications:



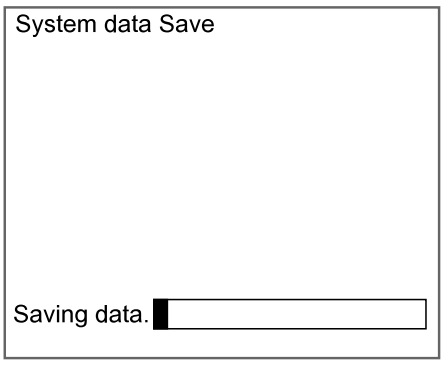
10. Select [Execute].

For ZMODEM communications:



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A screen showing the transfer progress will be displayed.



11. Select [Transfer/Receive File] from the Hyper Terminal menu on the computer.

12. Specify where the file is to be saved.

13. Set the protocol to [XMODEM] or [ZMODEM].

14. Select [RECEIVE].

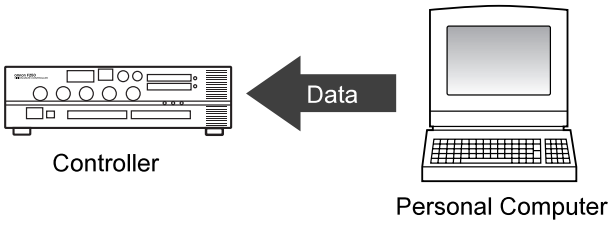
When [XMODEM] is selected, enter the file name.

The data will be transferred from the Controller to the computer.

When data transfer has been completed, the screen in **8.** will return.

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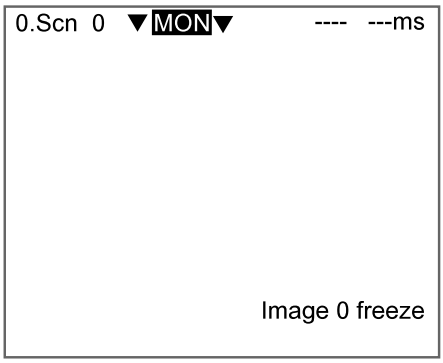
Loading



1. Follow steps 1. to 3. in the above procedure to connect the controller and the computer.
p.10
2. Select [Transfer/Send File] from the Hyper Terminal menu.
3. Select the file to be loaded.
4. Set the protocol to [XMODEM] or [ZMODEM].
5. Select [Send].

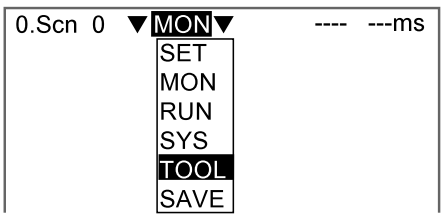
The data transfer screen will be displayed.

6. Once the preparations have been completed on the computer, display the basic screen for Monitor mode or Run mode.
7. Place the cursor on [MON] or [RUN], and press the ENT Key.



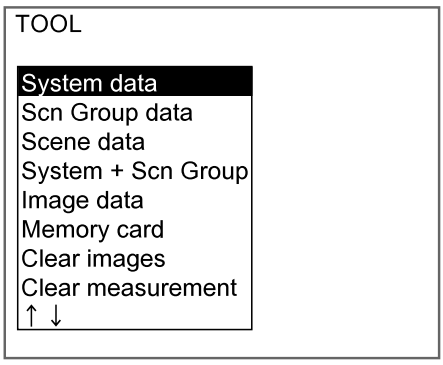
The mode selections will be displayed.

8. Select [TOOL].



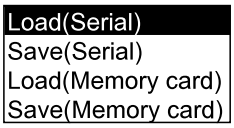
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The data selections will be displayed.



9. Select the data to be loaded.

The destination selections for load and save will be displayed.

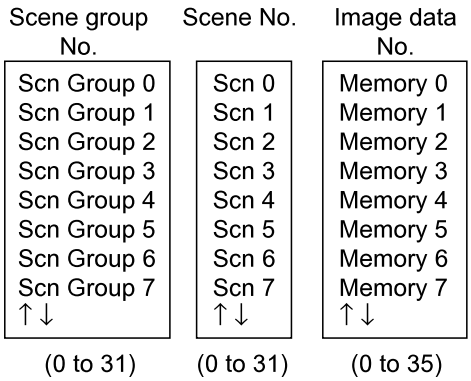


10. Select [Load (Serial)].

11. Select the desired number for scene group, scene, or image data.

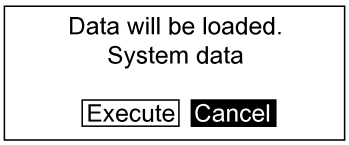

CHECK!

When backing up system and scene group data, the currently displayed scene group will be loaded.



A confirmation message will be displayed.

Example: Screen when loading system data.



12. Select [Execute].

The data will be transferred from the computer to the Controller.

When loading has been completed, the screen in **10.** will return.

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Backing Up to Memory Cards

This section describes inserting a Memory Card and backing up settings data to the Memory Card.

CHECK!

Data can be backed up to Memory Cards inserted for scene group data.Data for scene groups 1 to 31 will be saved in the files listed below. Do not overwrite these files.

```
[DEFSCNGR] ---------- Directory for saving scene group data
  ├─ SGR_0001.SGR -- Scene group 1 file
  ├─ SGR_0002.SGR -- Scene group 2 file
  :                  :
  :                  :
  :                  :
  └─ SGR_0031.SGR -- Scene group 31 file
```

CHECK!

If the 2-line random trigger mode is selected as the run function mode in the case of F270-C10, directories called “DEFSCNGR” and “DEFSCNG2” will be created for the processing sections 0 and 1, respectively.

For the 2-line random trigger, refer to SECTION 3 Test/Measurement Execution.

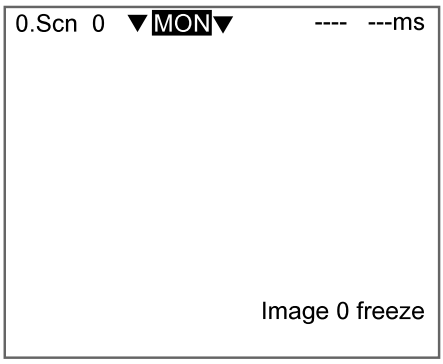
NOTICE

Turn OFF the power supply to the memory card before removing the memory card.

p.45

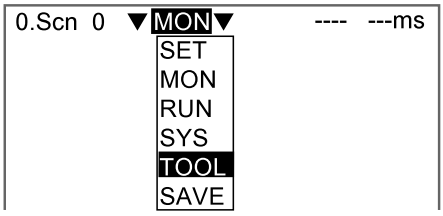
Saving from the Controller to the Memory Card

1. Insert the memory card.
2. Display the basic screen for Monitor mode or Run mode.
3. Place the cursor on [MON] or [RUN], and press the ENT Key.



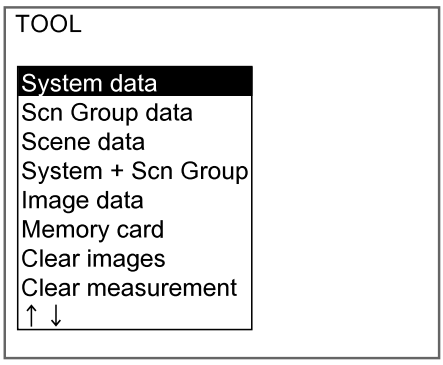
The mode selections will be displayed.

4. Select [TOOL].



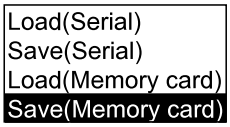
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The data selections will be displayed.



5. Select the data to be backed up.

The destination selections for load and save will be displayed.

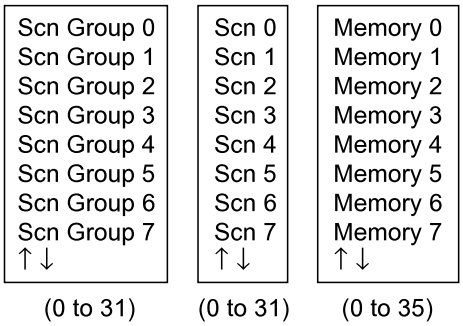


6. Select [Save (Memory card)].

7. Select the desired number for scene group, scene, or image data.

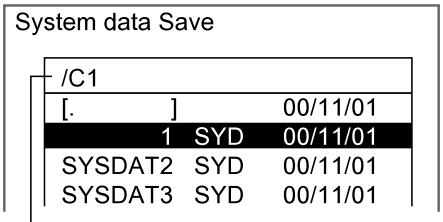

CHECK!

When backing up system and scene group data, the currently displayed scene group will be saved.



A list of files in the Memory Card root directory will be displayed.


To change the drive: p.44
(Only for controllers equipped with two slots)



Drive name
Slot 0 Memory Card: /C0
Slot 1 Memory Card: /C1
For controllers equipped with one slot, [/C0] is displayed.


CHECK!

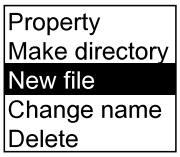
To overwrite an existing file, select that file by pressing the ENT Key and then go to step 12.

To specify a new file name, perform steps 8. to 11.

8. Press the SHIFT+ ESC Keys.

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The edit menu will be displayed.

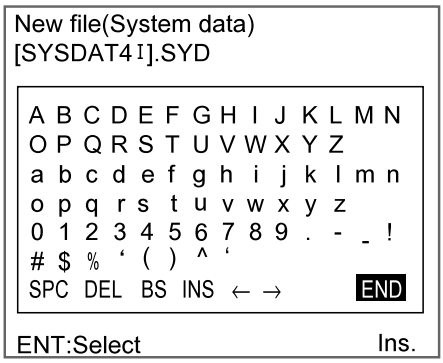


9. Select [New file].



If [Make directory] is selected, the screen for creating new directories will be displayed. Files can be saved in the newly created directory.

A software keyboard will be displayed.



10. Set the file name with up to 8 characters.

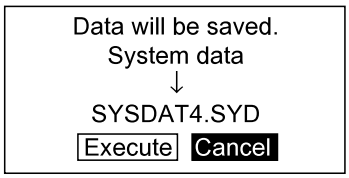


Periods (.) cannot be used in file names.

11. Move the cursor to [END] and press the ENT Key.

A confirmation message will be displayed.

Example:
Confirmation message when saving system data



12. Select [Execute].

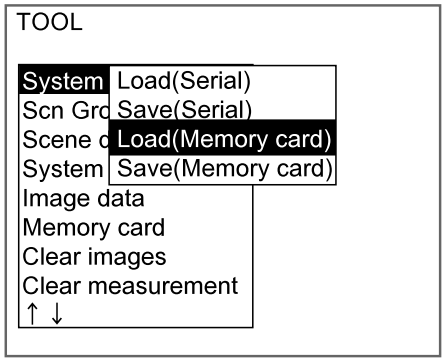
When saving has been completed, the screen in **6.** will return.

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Loading from the Memory Card to the Controller

1. Follow steps 1. to 5. for “Saving from the Controller to the Memory Card” to move to the screen for selecting load destinations.

p.16

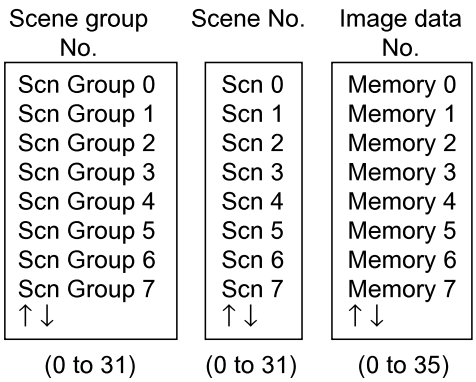


2. Select [Load (Memory card)].

3. Select the desired number for scene group, scene, or image data.



When backing up system and scene group data, the currently displayed scene group will be loaded.

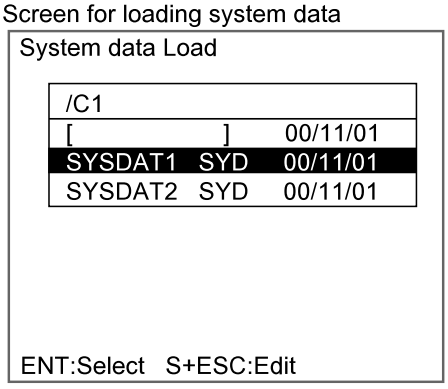


The screen for selecting files will be displayed.

To change the drive: p.44
(Only for controllers equipped with two slots)

4. Select the file to be loaded.

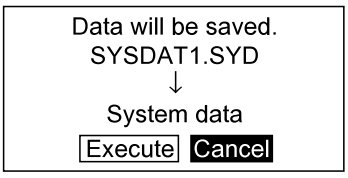
Example:
Screen for loading system data



A confirmation message will be displayed.

5. Select [Execute].

Example:
Screen when loading system data



When loading has been completed, the screen in **1.** will return.

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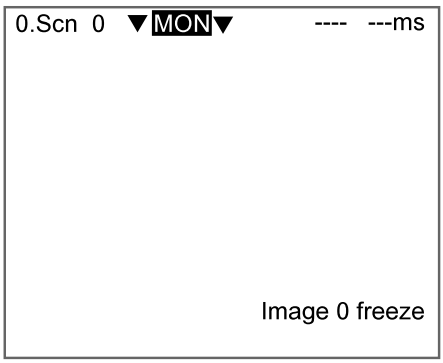
Backing Up to Flash Memory

The scene data set to scene group 0 and system data will be saved to the Controller internal flash memory. If this save operation is performed for scene groups 1 to 31, the data will overwrite the contents of the files on the Memory Card.

NOTICE Flash memory and Memory Card data is loaded each time the Controller is started up. Therefore, when settings have been changed, be sure to save to flash memory before turning the power OFF. If the power is turned OFF without saving, all of the setting changes will be lost.

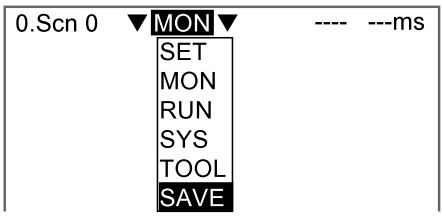
1. Display the basic screen for Monitor mode or Run mode.

2. Place the cursor on [MON] or [RUN], and press the ENT Key.



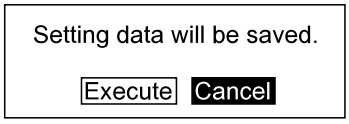
The mode selections will be displayed.

3. Select [SAVE].



A confirmation message appears.

4. Select [Execute].



NOTICE Do not turn OFF the power or input a RESET signal while a message indicating that processing is in progress is being displayed. Data in memory will be destroyed, and the Controller may not operate correctly the next time it is started.

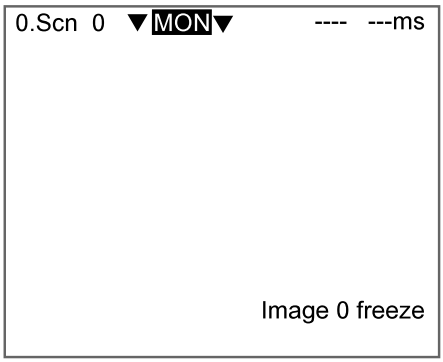
When saving has been completed, the screen in **1.** will return.

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Backing Up Flash Memory Data to a Memory Card

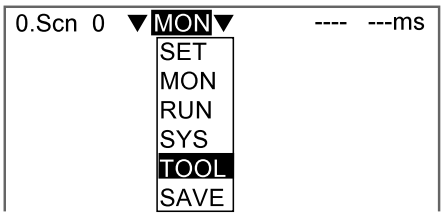
This section explains how to back up the data stored in the flash memory to a memory card. Use of this function allows you to save the installed processing items as well as data (system data, scene data of scene group 1) together to the memory card. This function is useful when you have two controllers and you want to copy the settings made on one of the controllers to the other controller. It is recommended that data is backed up in case data is lost or the Controller malfunctions.

1. Display the basic screen for Monitor mode or Run mode.
2. Place the cursor on [MON] or [RUN], and press the ENT Key.



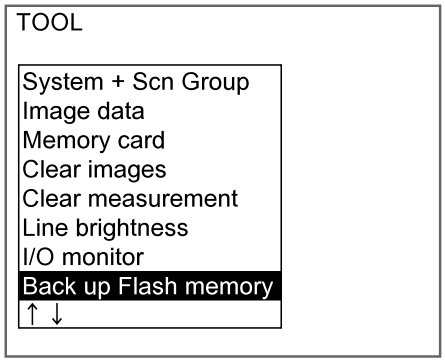
The mode selections will be displayed.

3. Select [TOOL].



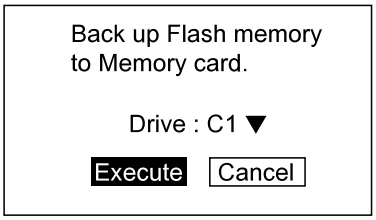
The data selections will be displayed.

4. Select [Back up Flash memory].



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A confirmation screen will be displayed.



5. (Only for controllers equipped with two slots)
Select the drive to which the memory card to be used for backup is inserted.

6. Select [Execute].

NOTICE Do not turn OFF the power or input a RESET signal executing backup. Data in memory will be destroyed, and the Controller may not operate correctly the next time it is started.

When saving has been completed, the screen in **4.** will return.

CHECK! Once backup has been completed, two files named “bkupprog” and “bkupdata(*)” will be created in the root directory of the memory card. Do not change the file names.

* If the 2-line random trigger mode is selected as the run function mode in the case of F270-C10, three files named “bkupprog”, “bkupdata” (backup data for processing section 0), and “bkupdat2” (backup data for processing section 1) will be created.

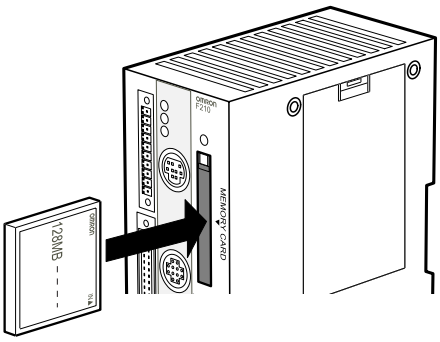
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Loading Method

The load operation is performed using the setup menu.
To start the setup menu, the Application Software that was used for installation is needed .
The loading method varies with the number of slots available on the controller.

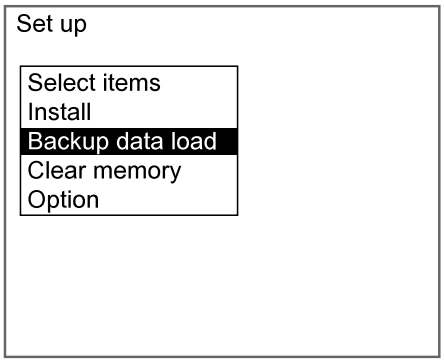
▪ When the Controller has Only One Slot:

1. Turn OFF the controller's power supply.
2. Insert the Application Software memory card to slot 0.
3. Turn ON the controller's power supply.



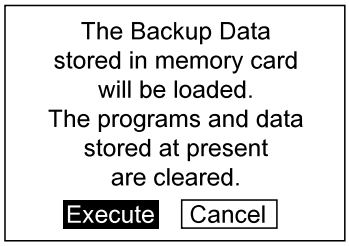
The Setup Menu will be displayed.

4. Remove the Application Software memory card from the slot, and insert the memory card containing the files to be loaded into the slot.
5. Select [Backup data load].



A confirmation message appears.

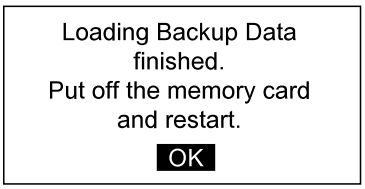
6. Select [Execute].



NOTICE Do not turn OFF the power or input a RESET signal while a message indicating that processing is in progress is being displayed. Data in memory will be destroyed, and the Controller may not operate correctly the next time it is started.

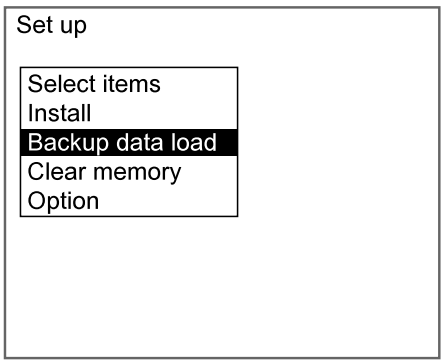
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When saving has been completed, a confirmation message will be displayed.



7. Press the ENT Key.

The display will return to the main setup menu.



8. Turn OFF the controller's power supply.

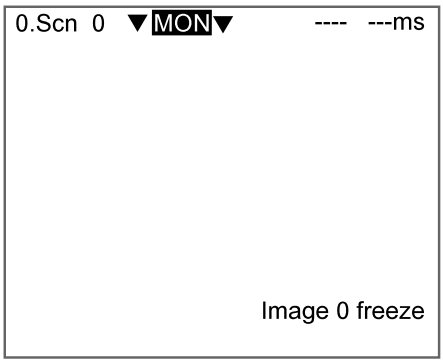
9. Remove the memory card from slot 0.

10. Turn ON the controller's power supply.

CHECK!

If the power supply is turned ON while the Application Software Memory Card is still mounted, the Setup Menu will be started again. Always remove the Application Software Memory Card before starting the Controller.

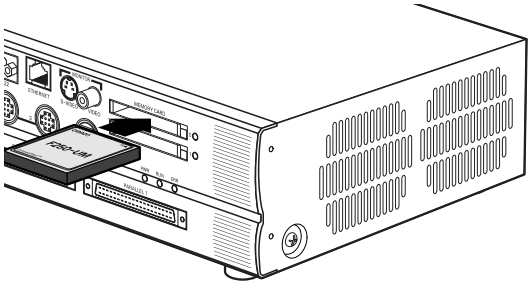
The Main Menu will start.



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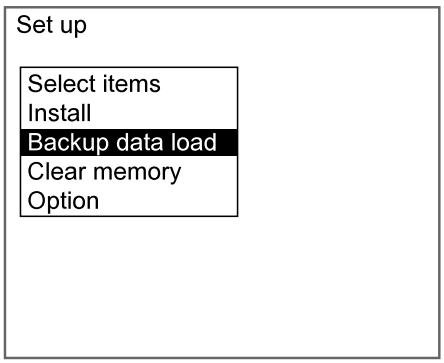
▪ When the Controller has Two Slots:

1. Turn OFF the controller's power supply.
2. Mount the Application Software memory card to slot 0.
3. Mount the memory card containing the backup data into slot 1.
4. Turn ON the controller's power supply.



The Setup Menu will be displayed.

5. Select [Backup data load].



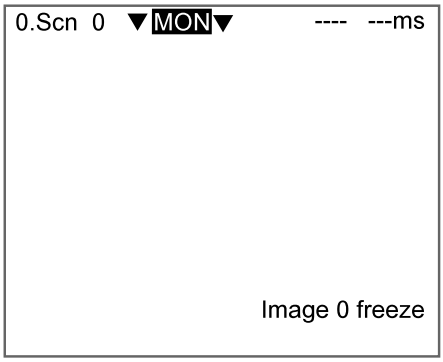
A confirmation message will be displayed.
The subsequent steps are the same as **6.** to **10.** given in "When the Controller has Only One Slot:", so perform them to load the data from the flash memory to the memory card.

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Clearing Measurement Values

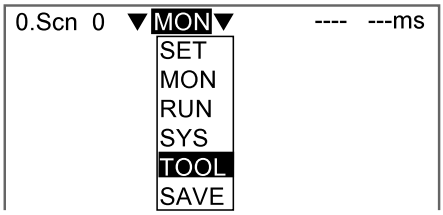
This section explains the function that allows you to clear all measurement values for the currently displayed scene.
This function is useful, for example, for clearing the measurement count when setting an expression to count the number of measurements.

1. Display the basic screen for monitor mode or run mode.
2. Place the cursor on [MON] or [RUN], and press the ENT Key.



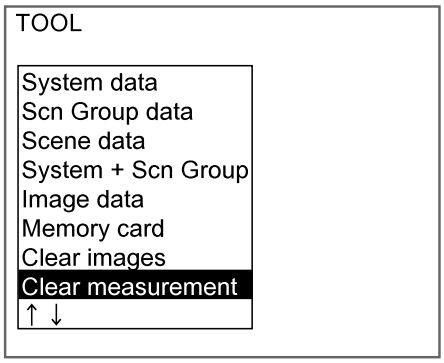
The mode selections will be displayed.

3. Select [TOOL].



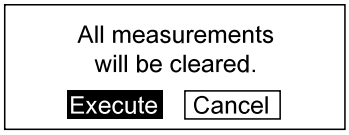
The data selections will be displayed.

4. Select [Clear measurement].



A confirmation message appears.

5. Select [Execute].

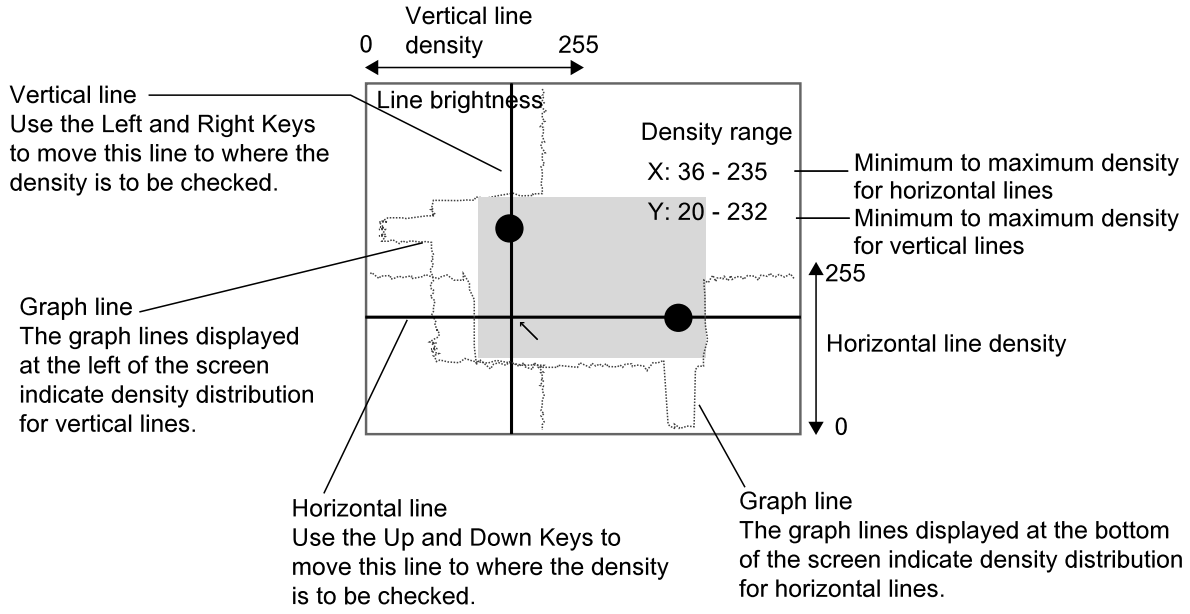


The measurement values will be cleared and the screen in **4.** will return.

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Checking Image Density Distribution (Line Brightness)

The graph showing the density distribution for 1 line in an image is called the line brightness graph. The line brightness can be shown for any line in a horizontal or vertical direction.



CHECK!

Line brightness cannot be shown in the following circumstances:

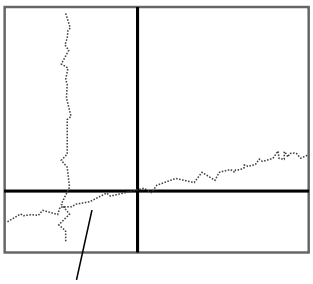
- When the image is either [Last NG (before scroll)] or [Last NG (after scroll)]
- When the image size is set to [Reduced]

SECTION 5 System Settings

CHECK!

Using Line Brightness

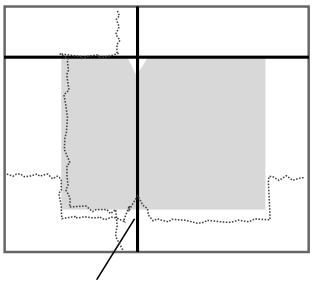
- Use to check if the light distribution is uneven.



If a homogeneous color is being displayed but the graph has an incline, it indicates that the lighting is uneven.

- Use to find how great the density difference is between the location to be measured and the background.

Example: Defect detection



Observe the bumps in the graph line to determine how much difference in density can be detected in what areas.

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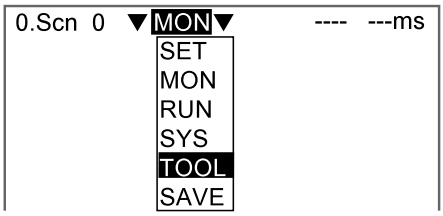
1. Display the basic screen for Monitor mode or Run mode.

2. Place the cursor on [MON] or [RUN], and press the ENT Key.



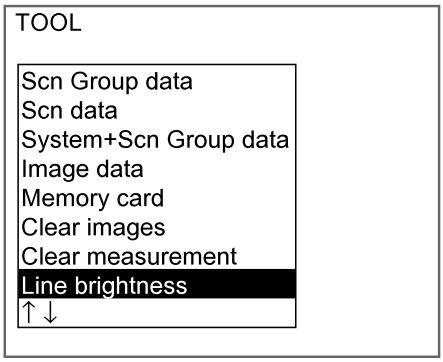
The mode selections will be displayed.

3. Select [TOOL].



The data selections will be displayed.

4. Select [Line brightness].

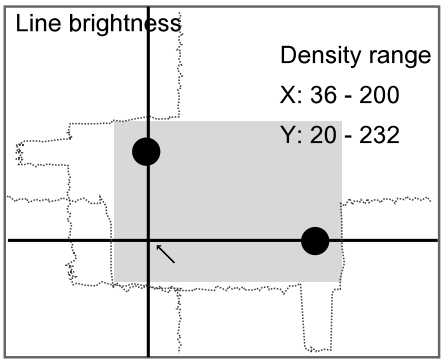


The Line Brightness screen will be displayed.

5. Move the solid lines to the desired position for observing density distribution.

Use the Up/Down Keys to move the horizontal line.
Use the Right/Left Keys to move the vertical line.

6. Press the ESC Key to exit this screen.



The screen in **4.** will return.

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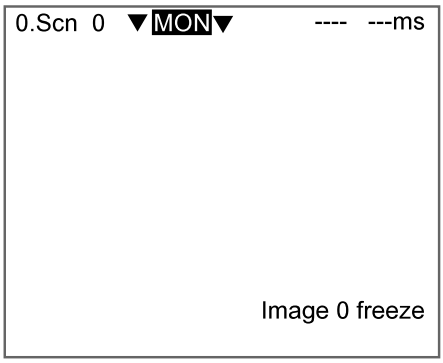
Checking I/O Status with External Devices

Use the I/O monitor function to check the communications status via serial or parallel interfaces. Wiring and communications settings can be checked to see if they are correct.

Serial Interface

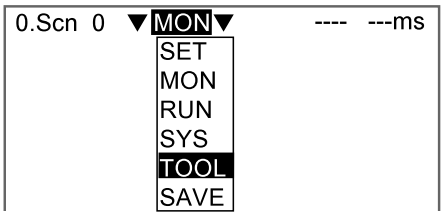
The communications status via the serial interface can be checked.

1. Display the basic screen for Monitor mode or Run mode.
2. Place the cursor on [MON] or [RUN], and press the ENT Key.



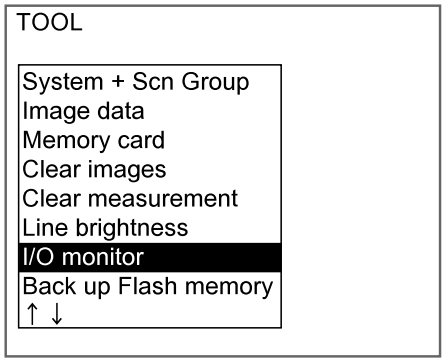
The mode selections will be displayed.

3. Select [TOOL].



The data selections will be displayed.
Down Key: Scrolls through the menu.

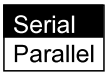
4. Select [I/O monitor].



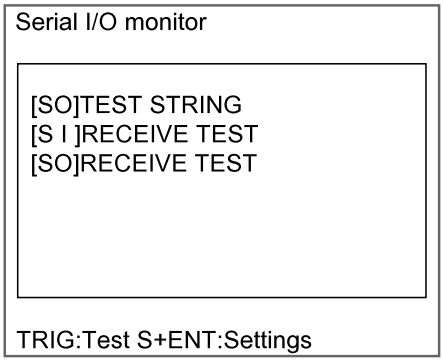
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The interface selections will be displayed.

5. Select [Serial].



The Parallel I/O Monitor Screen will be displayed.



CHECK!

Display Details

Display	Function
SO	Output to external device. Press the TRIG Key once to send a test character string “TEST STRING” from the controller to the external device. The contents of the test character string can be changed. p.31
SI	Input from external device. If more than 26 characters are received, only the first 26 characters will be displayed. If Echo back is set to [ON], the received data will be returned as is to the external device. p.31

6. Press the ESC Key to exit this screen.

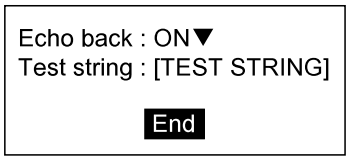
The screen in **5.** will return.

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Changing Test Character String and Echo Back

1. Display the Serial I/O Monitor Screen and press the SHIFT+ENT Keys.

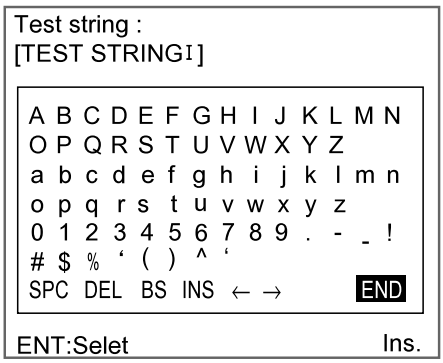
The screen for making detailed settings will be displayed.



2. Select [ON] or [OFF] for Echo back.

3. Move the cursor to the square bracket and press the ENT Key.

A software keyboard will be displayed.



4. Change the test string. Up to 12 characters can be inserted.

5. Select [End] to return to the screen shown at step 2.

6. Move the cursor to [End] and press the ENT Key.

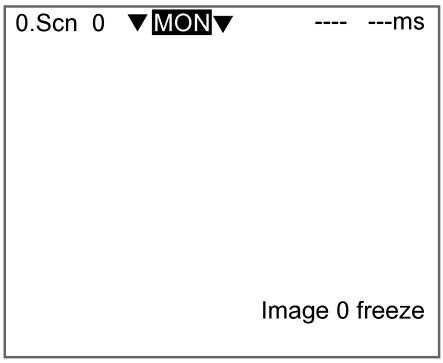
The Serial I/O Monitor Screen will return.

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Parallel Interface

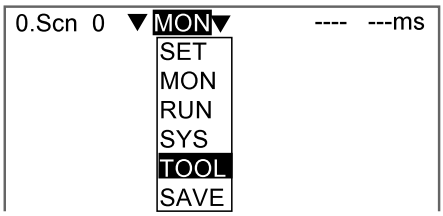
The communications status via the parallel interface can be checked.

1. Display the basic screen for Monitor mode or Run mode.
2. Place the cursor on [MON] or [RUN], and press the ENT Key.



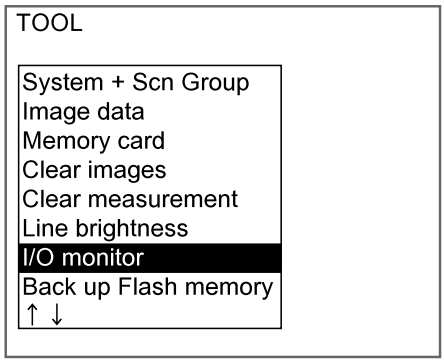
The mode selections will be displayed.

3. Select [TOOL].



The data selections will be displayed.
Down Key: Scrolls through the menu.

4. Select [I/O monitor].



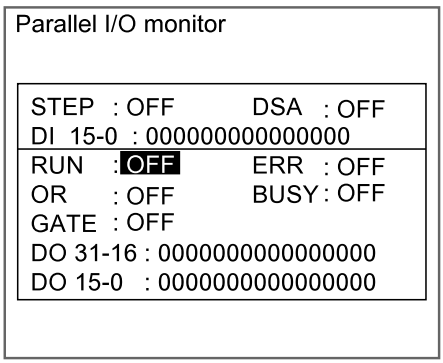
The interface selections will be displayed.

5. Select [Parallel].



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The Parallel I/O Monitor Screen will be displayed.



CHECK!

Display Details

Display	Function
STEP	Displays the input status for each signal from the external device to the Controller.
DSA	
DI	
RUN	Displays the output status for each signal from the Controller to the external device. These displays can be changed to ON/OFF or 0/1 even if measurements are not executed. Move the cursor to the display item. The display will change each time the ENT Key is pressed.
ERR	
OR	
BUSY	
GATE	
DO	

6. Press the ESC Key to exit this screen.

The screen in **5.** will return.

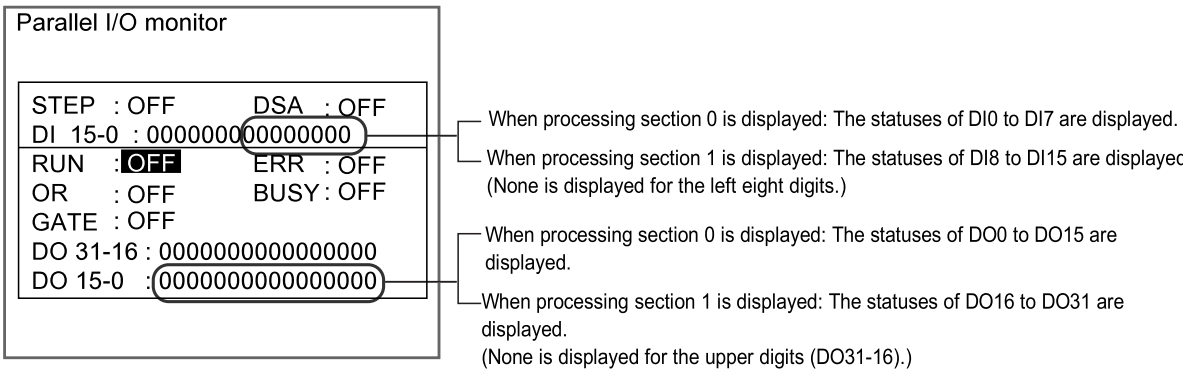
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CHECK!

If the 1-line fast or 2-line random trigger mode is selected as a run function mode in the case of F270-C10, follow the procedure given below.

• 1-Line Fast Mode
Display processing section 0 on the monitor and check the parallel communication status.Only when you want to check the status of the BUSY (1) signal of the parallel I/O connector, use processing section 1.

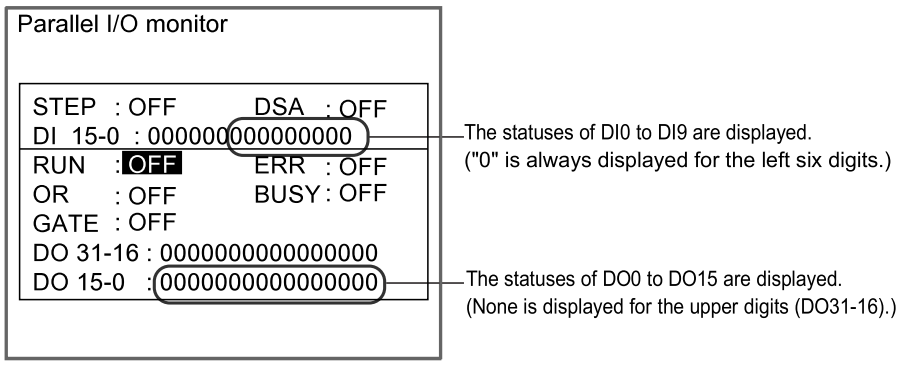
• 2-Line Random Trigger Mode
Display the processing section to be checked on the monitor and check the parallel communication status. Use the following procedure to monitor the DI and DO signals.



SECTION 3 Test/Measurement Execution

CHECK!

Display Screen for F210-C10



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Memory Card Operations

The controller has a function to save settings and measured images to a memory card.
Files stored on a memory card can be copied or renamed.
This section explains these operations for Memory Cards.

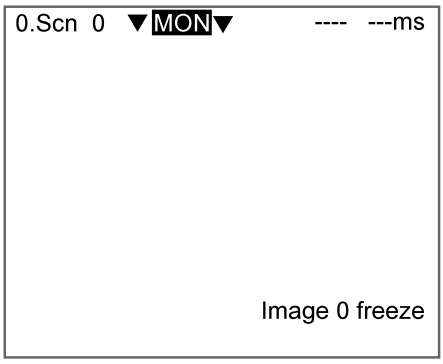
NOTICE When removing a memory card, always turn OFF the power supply to the memory card first. Removing the memory card without turning OFF the power may result in damage to the memory card or controller.

p.44

Creating Directories

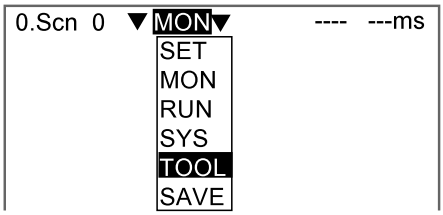
Directories can be created in the Memory Card and files can be stored in those directories. It is easier to find files if separate directories are created for related files.

1. Insert a memory card.
2. Display the basic screen for monitor mode or run mode.
3. Place the cursor on [MON] or [RUN], and press the ENT Key.



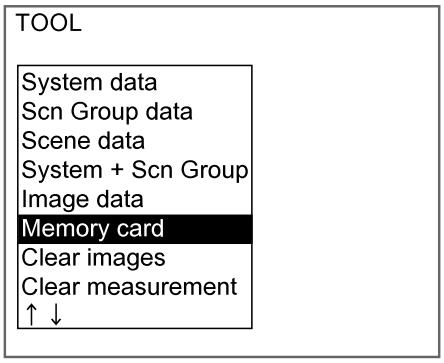
The mode selections will be displayed.

4. Select [TOOL].



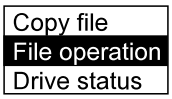
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The data selections will be displayed.



5. Select [Memory card].

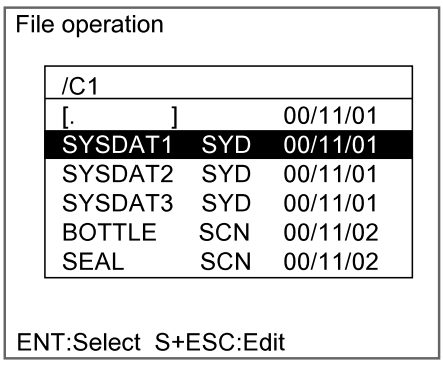
The operation selection menu will be displayed.



6. Select [File operation].

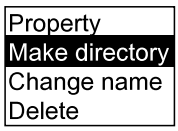
A list of files in the Memory Card root directory will be displayed.

To change the drive: p.44
(Only for controllers equipped with two slots)



7. Press the SHIFT+ ESC Keys.

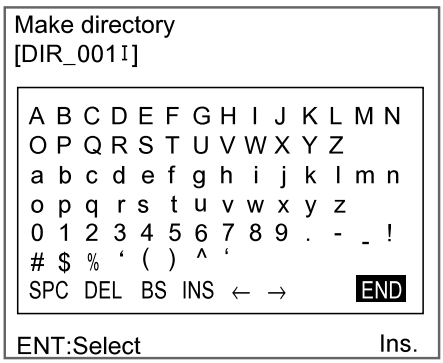
The edit menu will be displayed.



8. Select [Make directory].

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A software keyboard will be displayed.



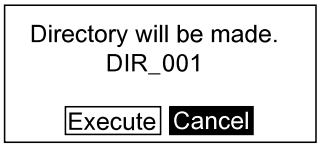
9. Enter the desired directory name (up to 8 characters).

CHECK! Periods (.) cannot be used in directory names.

10. Move the cursor to [END] and press the ENT Key.

A confirmation message appears.

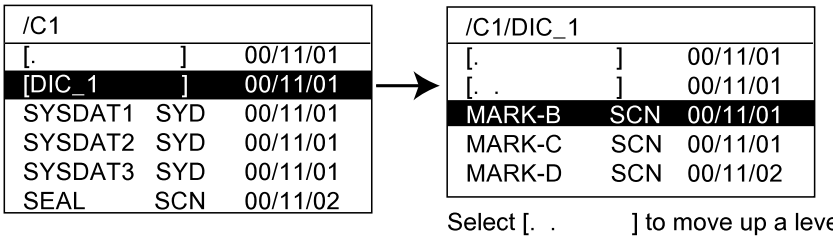
11. Select [Execute].



The directory will be created and the screen in **7.** will return.

CHECK! The directory is displayed in the list of files, encased in square brackets.
Move the cursor to the directory and press the ENT Key to display a list of files in that directory.

Example
When directory [DIC_1] is selected... The files in [DIC_1] will be displayed.

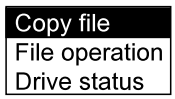


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Copying Files

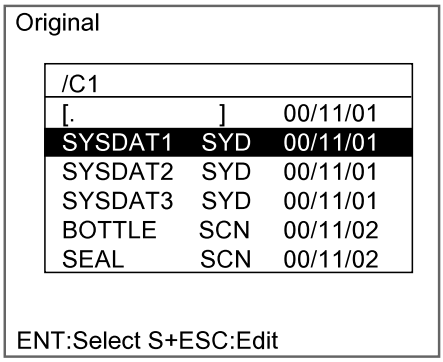
1. Perform steps 1. to 5. given in “Creating Directories” to display the operation selection menu.
p.35

2. Select [Copy file].



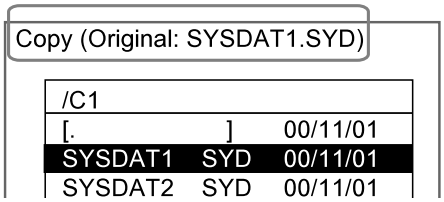
A list of files in the Memory Card root directory will be displayed.

To change the drive: p.44
(Only for controllers equipped with two slots)



3. Move the cursor to the file to be copied and press the ENT Key.

A screen for specifying the copy destination will be displayed.



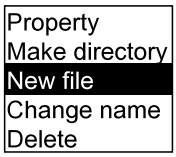
CHECK!

To overwrite an existing file, select that file by pressing the ENT Key and then go to step 8.
To specify a new file name, perform steps 4. to 8.

4. Press the SHIFT+ ESC Keys.

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The selection menu will be displayed.

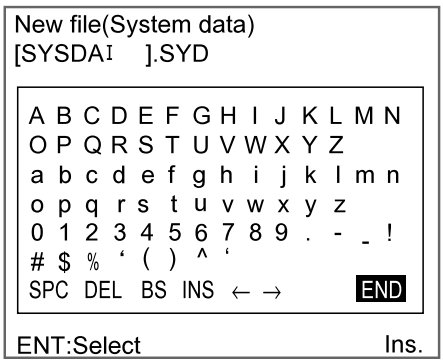


5. Select [New file].

CHECK!

If [Make directory] is selected, the screen for creating new directories will be displayed.Files can be saved in the newly created directory.

A software keyboard will be displayed.



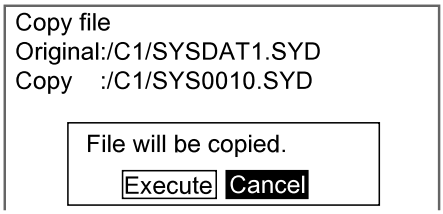
6. Set the file name (up to 8 characters).

CHECK!

Periods (.) cannot be used in file names.

7. Move the cursor to [END] and press the ENT Key.

A confirmation message will be displayed.



8. Select [Execute].

The file will be copied and the screen in **2.** will return.

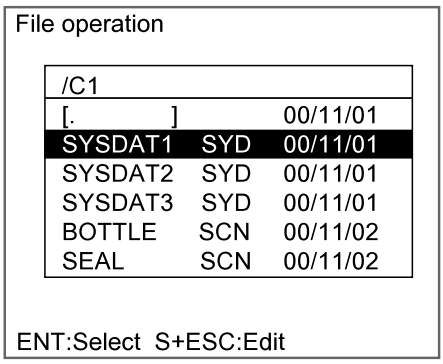
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Checking File Properties

The size, type, or date a file was created can be checked.

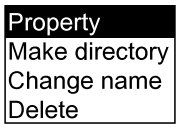
1. Perform steps 1. to 6. given in “Creating Directories” and display a list of file names.
p.35

2. Move the cursor to the file for which the information is to be checked and press the SHIFT+ ESC Keys.
To change the drive: p.44
(Only for controllers equipped with two slots)



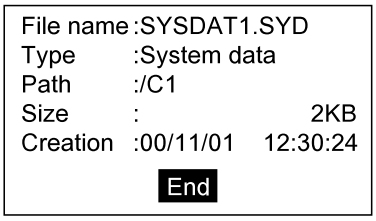
The edit menu will be displayed.

3. Select [Property].



The properties of the selected file will be displayed.

4. Select [End].



The screen in **2.** will return.

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Changing File Names

CHECK!

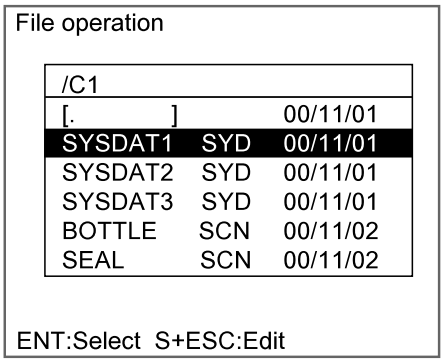
Only the file name can be changed. The directory name cannot be changed.

1. Perform steps 1. to 6. given in “Creating Directories” and display a list of file names.

p.35

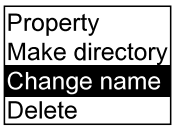
2. Move the cursor to the file to be renamed and press the SHIFT+ ESC Keys.

To change the drive: p.44
(Only for controllers equipped with two slots)



The edit menu will be displayed.

3. Select [Change name].



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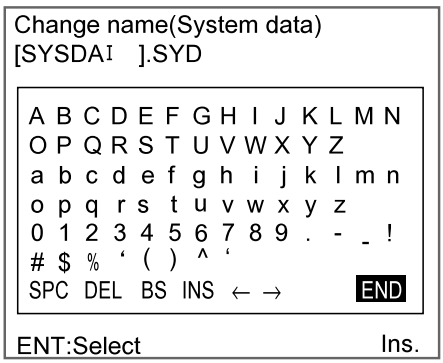
A software keyboard will be displayed.

4. Change the file name to the desired one (up to 8 characters).



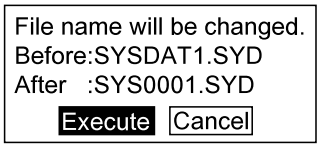
Periods (.) cannot be used in file names.

5. Move the cursor to [END] and press the ENT Key.



A confirmation message will be displayed.

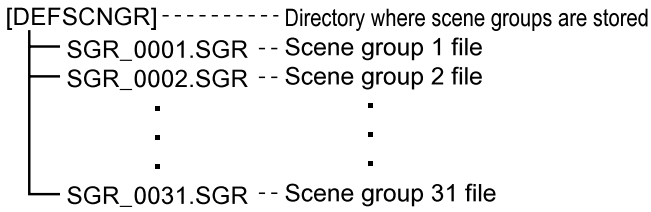
6. Select [Execute].



The file name will be renamed and the screen in **2.** will return.



If the scene group function is used, scene groups 1 to 31 will be saved in the C1 memory card (i.e. memory card mounted in slot 1) under the file names shown below.Do not change these file names. If these file names are changed, measurement setups will no longer be able to be changed by switching scene groups.



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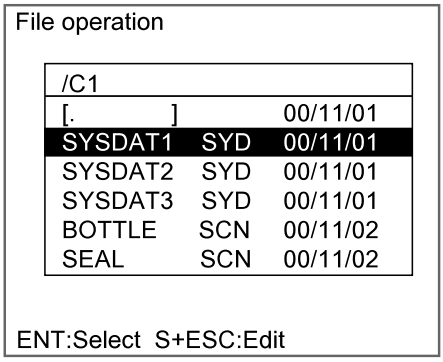
Deleting Files and Directories

1. Perform steps 1. to 6. given in “Creating Directories” and display a list of file names.

p.35

2. Move the cursor to the file or directory to be deleted and press the SHIFT + ESC Keys.

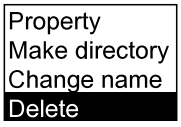
To change the drive: p.44
(Only for controllers equipped with two slots)



CHECK! A directory can be deleted only when there are no files in that directory.

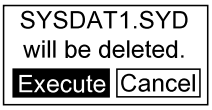
The edit menu will be displayed.

3. Select [Delete].



A confirmation message appears.

4. Select [Execute].

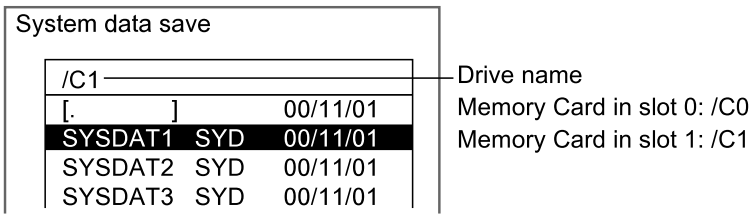


The file or directory will be deleted and the screen in **2.** will return.

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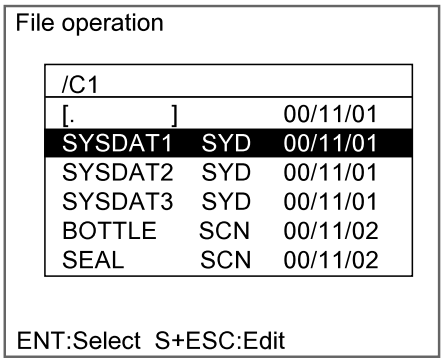
Changing Drives (Only for Controllers Equipped with Two Slots)

If the controller has two memory card slots, drive names will be displayed as shown below when the list of files is displayed.



If there are Memory Cards mounted in both slots 0 and 1, use the following procedure to switch between drives.

1. Press the SHIFT+ESC Keys on the screen where the list of files is displayed.



The edit menu will be displayed.

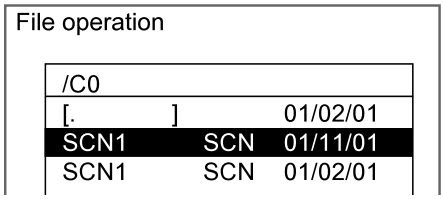
2. Select [Switch Drive].





The [Switch Drive] option will not be displayed if only one memory card is mounted in either slot 0 or slot 1.

The drive will switch from the one displayed at **1.** to the other drive.



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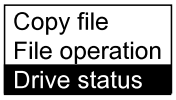
Turning OFF the Power Supply to a Memory Card

Before removing a memory card, always turn OFF the power supply. Removing it without turning OFF the power may result in damage to the memory card or controller.

CHECK! The total space and free space on the Memory Card will be displayed on this screen.

1. Perform steps 1. to 5. given in “Creating Directories” to display the operation selection menu.
p.35

2. Select [Drive status].

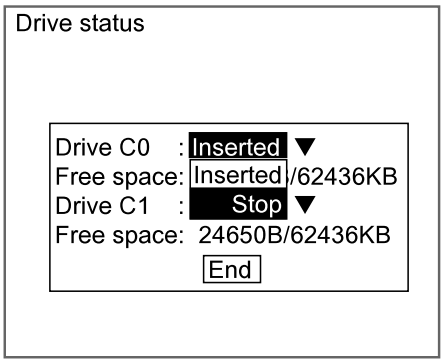


The Drive Status Screen will be displayed.

3. If a memory card is inserted, “Inserted” will be displayed, so change it to “Stop”.

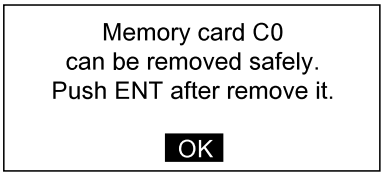
CHECK! If a Memory Card is not inserted, “Not inserted” will be displayed.

4. Select [End].



A confirmation message appears.

5. Remove the memory card and press the ENT Key.

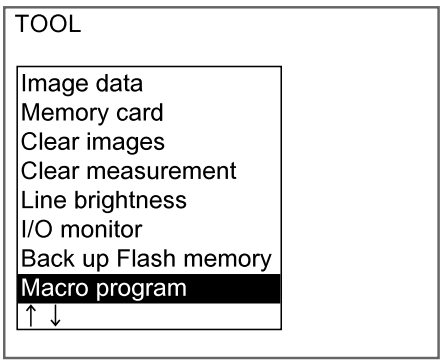


The screen in **2.** will return.

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Macro Programs

To load a macro program to the controller or to check whether any macro program has been loaded, select [TOOL/Macro program].
For details on the function and operation method, refer to the Customize Manual (CD-ROM).



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Operation Procedure and Reference Manual

The following shows main contents of operation steps and manuals. Select the manual suitable for your purpose and read it before starting operation.

Connecting
Wiring
Installing
Setting Inspection Conditions
Checking Settings and Starting Measurement
Outputting Data to External Device



Setup Manual

(Supplied with the controller)

The Setup Manual provides:
- Information for safety use of controller
- Procedures from package content check and installation up to connection of controller
- Information such as functions and specifications of controller and peripheral devices



(CD-ROM)

Operation Manual

The Operation Manual provides:
- Installation method of application software
- Basic operating procedures
- Setting method of each processing item
- Communication method with external devices

Customize Manual

The Customize Manual provides the information necessary for customization and explains the macro function.
This manual is made up of two sections: the "Reverse Customization" section and the "Customizing Macros" section.
- Reverse Customization
  Explains how to search the items you want to customize and how to customize them.
- Customizing Macros
  Provides the operating procedure of the macro function and explains the procedure.

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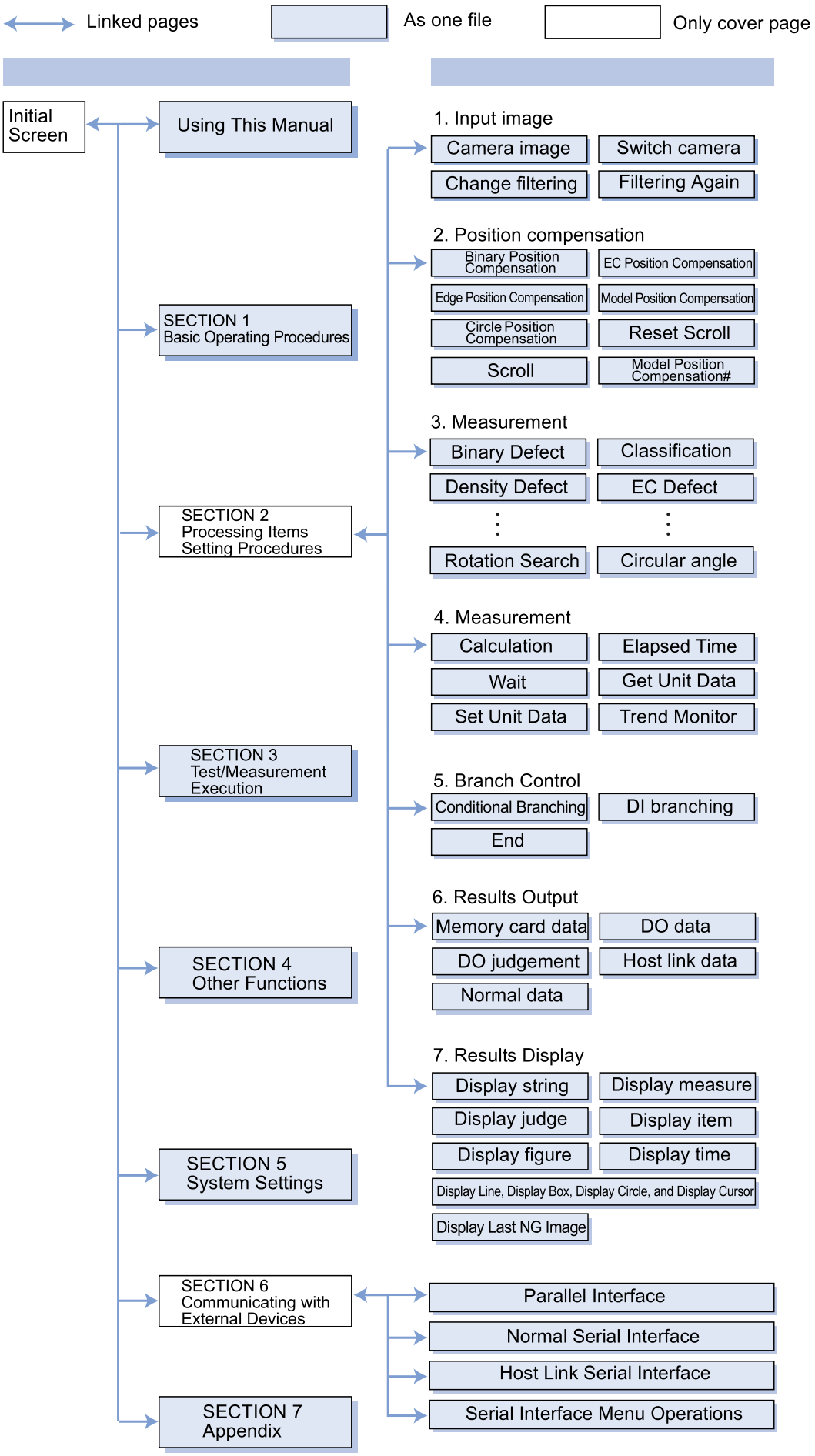
Using This Manual

Hierarchical Structure and Printout Method for Manual

This manual consists of various PDF files. The hierarchical structure of the manual is shown on the next page.
Entire links in the manual are shown by Acrobat's index function, and the initial screen provides links to the front page of each section, and the front page of each section provides links to each item in that section

The manual can be printed one file at a time. Display the file to be printed out, open Acrobat's print dialog box, and then print the file according to the procedure displayed.

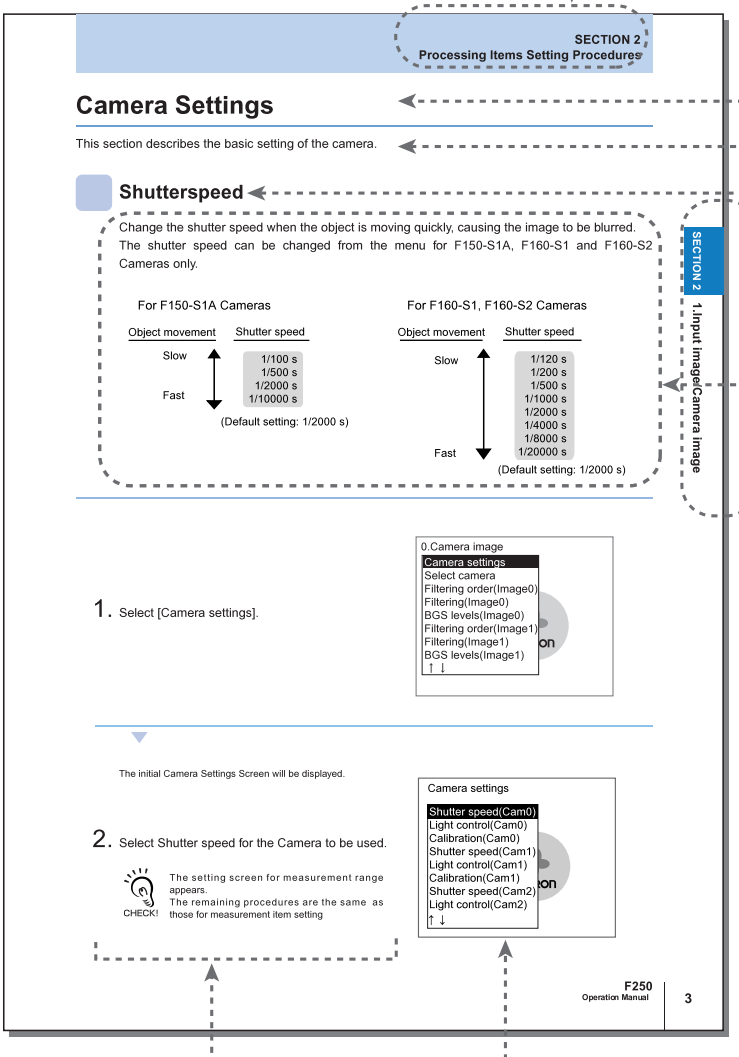
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Editor's Note

Page Format



■ Title of each section

■ Header
Indicates the contents of the page.

■ Overview
Describes the overview and operation flow of the section.

■ Sub-header

■ Overview and points of the setting operations

■ Index Label
Indicates to which section the current page belongs and the contents of the page. This allows the user to find the target page quickly.

■ Screen display
Indicates the status of the screen displayed on the left side.

■ Operation procedure and supplementary explanation
Indicates operation procedures and functions of operation keys. Helpful information regarding operation and reference pages is introduced here using symbols.

CHECK! NOTICE

* This page does not exist.

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Notational Conventions

Key

Key operations are performed from the console.

Example: Press the SHIFT + TRIG Keys.
This statement indicates to press the TRIG Key while pressing the SHIFT Key down on the console.

Example: Select [SET].
This statement indicates to move the cursor to [Setting] and press the ENT Key.

Menu

In this manual, menu items displayed on the screen are enclosed with [ ].
Submenus are separated using "/".

Example: Move to [System/Camera Settings].
This statement indicates to select the [Camera Settings] from [System] to move to the Camera Settings screen.

Operation procedure

Operation steps are numbered to indicate their order.
A supplementary explanation of the behavior, display or operation of the Controller after the execution of a step is given in the lines following the step.
Steps that vary with controller models are indicated by the following symbols.

F210-C10 For F210-C10

F250-C5■ For F250-C50/C55

F270-C10 For F270-C10

Visual Aids

NOTICE — Indicates information required to take full advantage of the functions and performance of the product.Incorrect application methods may result in the loss of damage or damage to the product. Read and follow all precautionary information.

CHECK! — Indicates points that are important in using product functions or in application procedures.

Indicates where to find related information.

Indicates information helpful in operation, such as the definition of terms.

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Functions Available for Each Controller Model

Functions that can be used vary with the controller to which the Application Software is installed.
For the functions available for you controller, refer to the table given below.

Yes: Can be used. No: Cannot be used.

Function		Controller		
		F210-C10	F250-C50/C55	F270-C10
Run Function Mode	Nonstop adjust mode SECTION 3 Test/Measurement Execution p.8	No	No	Yes (Select one of the modes.) SECTION 1 Basic Operating Procedures p.7
	1-line fast mode SECTION 3 Test/Measurement Execution p.15	No	No	
	2-line random trigger mode SECTION 3 Test/Measurement Execution p.25	No	No	
Macro function (See*) SECTION 1 Basic Operating Procedures p.4 Customize Manual (CD-ROM)		Yes	Yes	Yes

* Can be used only if the Application Software has the macro function.

CHECK! Functions which are not shown here can be used with every controller.

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Processing Item Selection Guide

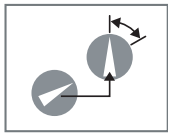
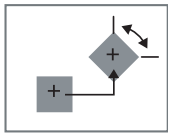
This section provides a guidance that is useful when selecting “Position Displacement Compensation” and “Measurement” processing items.
Some items cannot be used depending on the controller model to which the Application Software is installed. For those items, refer to the table given below.
Processing items which are not shown here can be used with every controller.

For the installation method, refer to SECTION 1 Basic Operating Procedures.

For details on processing items, refer to SECTION 2 Processing Items Setting Procedures.

Position Displacement Compensation Items

Yes: Can be used. No: Cannot be used.

Measurement items	Processing item	Controller			Remark
		F210	F250	F270	
Position compensation in X, Y and θ directions  	Binary Position Compensation	Yes	Yes	Yes	–
	Circle Position Compensation	No	Yes	Yes	–
	EC Position Compensation	Yes	Yes	Yes	–
	Edge Position Compensation	Yes	Yes	Yes	–
	Model Position Compensation	No	Yes	Yes	Enables high-speed processing compared to the model position compensation #.
	Model Position Compensation #	Yes	Yes	Yes	–

Measurement

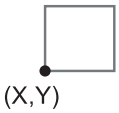
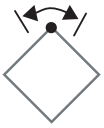
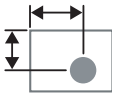
Yes: Can be used. No: Cannot be used.

Measurement items	Processing item	Controller			Remark
		F210	F250	F270	
Size (area) 	Binary Defect	Yes	Yes	Yes	Up to eight regions can be set per Unit, with results displayed in a list.
	Gravity and Area	Yes	Yes	Yes	Only one region can be set per Unit. Menu levels are simple and easy to understand.
	Area (Var. Box)	Yes	Yes	Yes	Used for inspecting measurement items with varying positions and sizes.

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Measurement(Continued)

Yes: Can be used. No: Cannot be used.

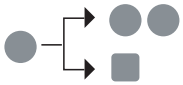
Measurement items	Processing item	Controller			Remark
		F210	F250	F270	
Center-of-gravity detection (Processing time: Short) 	Binary Defect	Yes	Yes	Yes	Up to eight regions can be set per Unit, with results displayed in a list.
	Gravity and Area	Yes	Yes	Yes	Only one region can be set per Unit. Menu levels are simple and easy to understand.
	Area (Var. Box)	Yes	Yes	Yes	Used for inspecting measurement items with varying positions and sizes.
Coordinate detection (Processing time: Long) 	Gray Search	Yes	Yes	Yes	Uses gray models to detect positions in pixel units.
	Precise Search	Yes	Yes	Yes	Uses gray models to detect positions in sub-pixel units.
	Flexible Search	Yes	Yes	Yes	Multiple models are registered to enable searching even when there is variation.
	Pattern Inspection	No	Yes	Yes	Up to 64 regions can be registered per Unit, and high-speed processing is possible. (See*.)
	ECM Search	Yes	Yes	Yes	Uses edge code models so that processing is not affected by deformation or dirt.
	EC Positioning	Yes	Yes	Yes	No model registration is required. Searches using shape information such as “round” or “angular.”
Coordinate detection (Rotation in measurement item) 	Rotation Position	No	Yes	Yes	High-speed processing is possible. (See *.)
	Rotation Search	Yes	Yes	Yes	–
Dimensional measurement 	Edge Position_8	Yes	Yes	Yes	Up to eight regions can be set per Unit, with results displayed in a list.
	Edge Position_1	Yes	Yes	Yes	Only one region can be set per Unit. Menu levels are simple and easy to understand.
	Edge Width	Yes	Yes	Yes	–
Position deviation detection 	Relative Search	Yes	Yes	Yes	–

*: If this item is set just after an image input item ([Camera image], [Switch camera]), it provides a stronger effect. However, high-speed processing is not possible under certain conditions.

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■ Measurement(Continued)

Yes: Can be used. No: Cannot be used.

Measurement items	Processing item	Controller			Remark
		F210	F250	F270	
Angle 	Binary Defect	Yes	Yes	Yes	Up to eight regions can be set per Unit, with results displayed in a list. The number of Units can be reduced.
	Gravity and Axis	Yes	Yes	Yes	Only one region can be set per Unit. Menu levels are simple and easy to understand.
	Rotate Position	No	Yes	Yes	High-speed processing is possible. (See *.)
	Rotation Search	Yes	Yes	Yes	Used when the measurement item rotates.
	Circular Angle	Yes	Yes	Yes	Used only for circular measurement items. Enables higher-speed processing compared to Rotation Search. (See *.)
Quantities 	Labeling	Yes	Yes	Yes	Counts up to 2,500.
	Label Data	Yes	Yes	Yes	Gets label measurement values from other Units.
	Edge Pitch	Yes	Yes	Yes	Gets the number, pitch, and width.
	EC Circle Count	Yes	Yes	Yes	Finds circles using “round” shape information so that processing is not affected even if the circles are deformed or dirty.
Shapes (correlation) 	Pattern	No	Yes	Yes	Up to 64 regions can be registered per Unit, enabling high-speed processing. (See *.)
	Flexible Search	Yes	Yes	Yes	Searching can be performed even if there is variation in model images.
	Fine Matching	Yes	Yes	Yes	Accurately detects differences with models.
Classification 	Classification	No	Yes	Yes	Enables higher-speed processing compared to Classification #. (See *.)
	Classification #	Yes	Yes	Yes	–
Brightness 	Density Data	Yes	Yes	Yes	–

*: If this item is set just after an image input item ([Camera image], [Switch camera]), it provides a stronger effect. However, high-speed processing is not possible under certain conditions.

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Measurement(Continued)

Yes: Can be used. No: Cannot be used.

Measurement items	Processing item	Controller			Remark
		F210	F250	F270	
Defect 	Defect	Yes	Yes	Yes	Only one region can be set per Unit. Menu levels are simple and easy to understand.
	Density Defect	No	Yes	Yes	Up to eight regions can be set per Unit, with results displayed in a list. The number of Units can be reduced.
	Defect (Variable Box)	Yes	Yes	Yes	Used for inspecting measurement items with varying positions and sizes.
	EC Defect	Yes	Yes	Yes	Uses edge codes for defect inspection so that processing is not affected by deformation or dirt.
	Fine Matching	Yes	Yes	Yes	Accurately detects differences with models.
Characters 	Quest Character Verification	Yes	Yes	Yes	Used to verify multiple characters.
	Lot Number OCV1	Yes	Yes	Yes	Handles lot numbers that are changed daily, weekly, monthly, or annually.
	OCR for 1 Character	Yes	Yes	Yes	–

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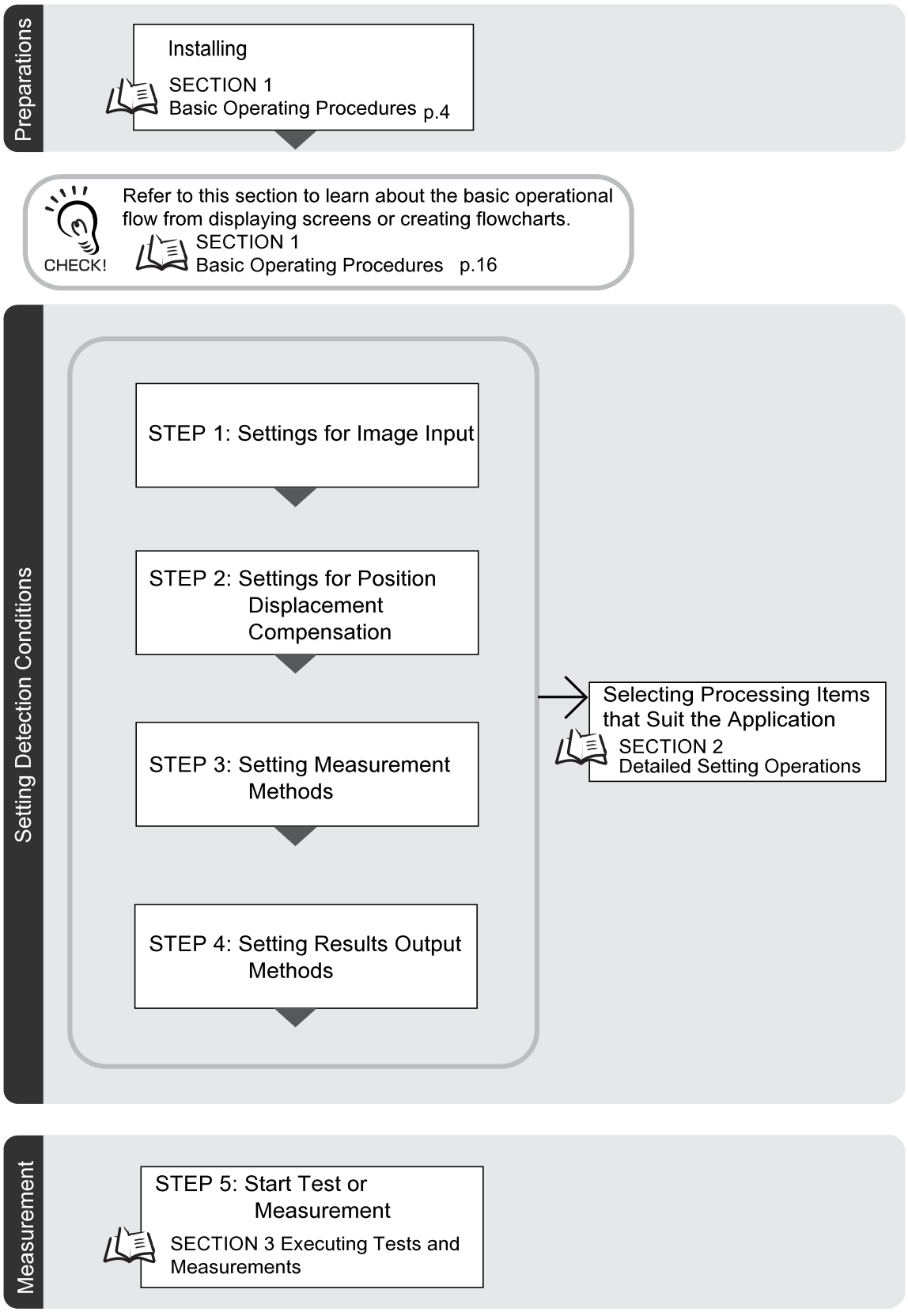
SECTION 1
Basic Operating Procedures

This section describes the basic operating procedures for the Application Software.

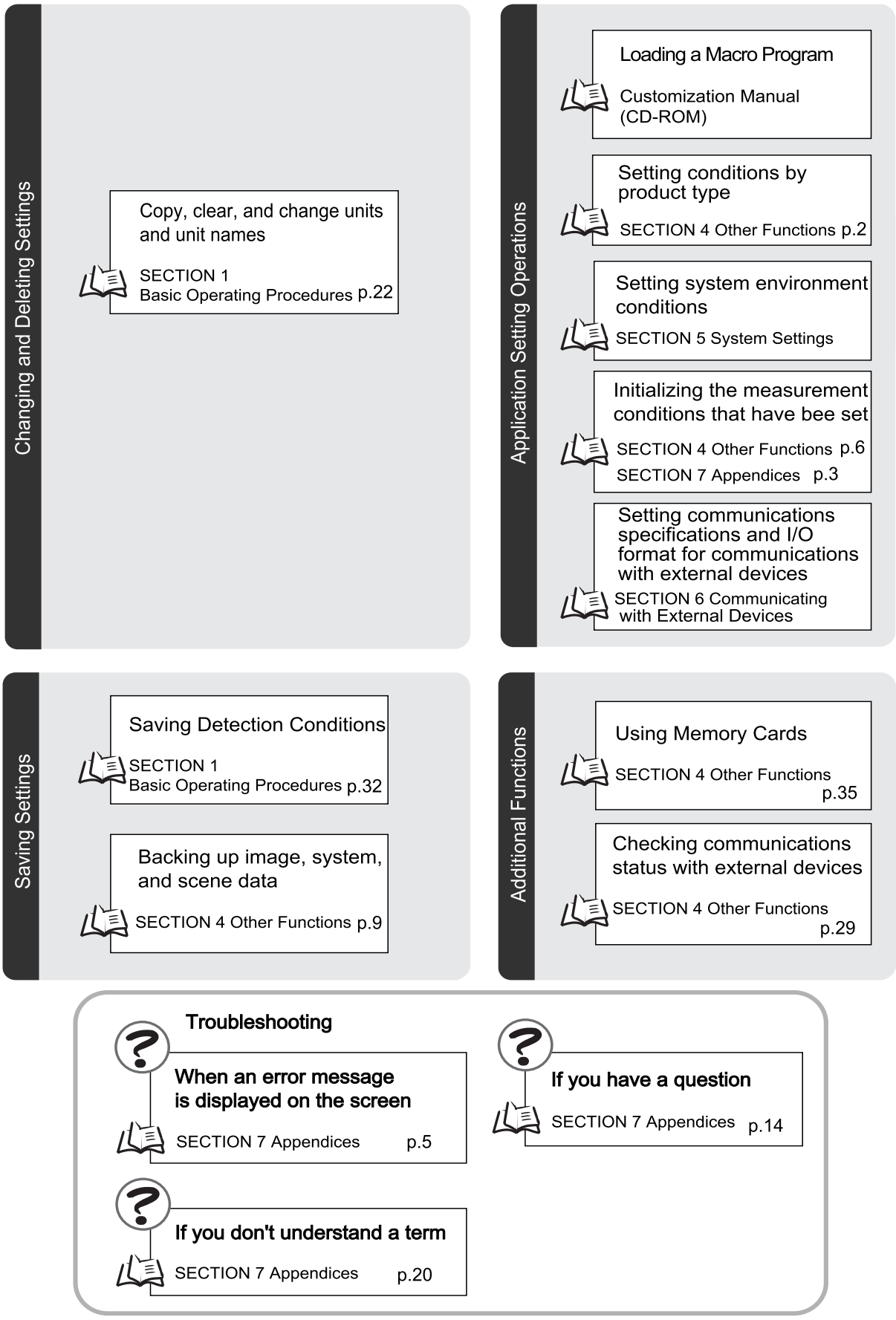
Operational Flow	2
Installing the Application Software	4
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Input Devices	16
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Drawing a Region	28
Inputting Values	30
Inputting Characters	31
Save settings to flash memory before turning the power OFF	32

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Operational Flow



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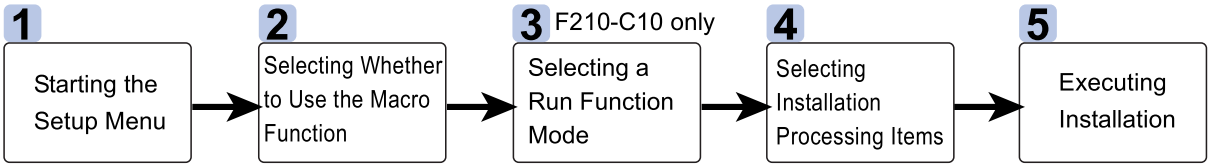


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Installing the Application Software

This section describes how to install the processing items in the Application Software to the Controller.The Setup Menus are used to install these processing items.
The installation procedure varies depending on the controller model and the application software used.

Installation Flow



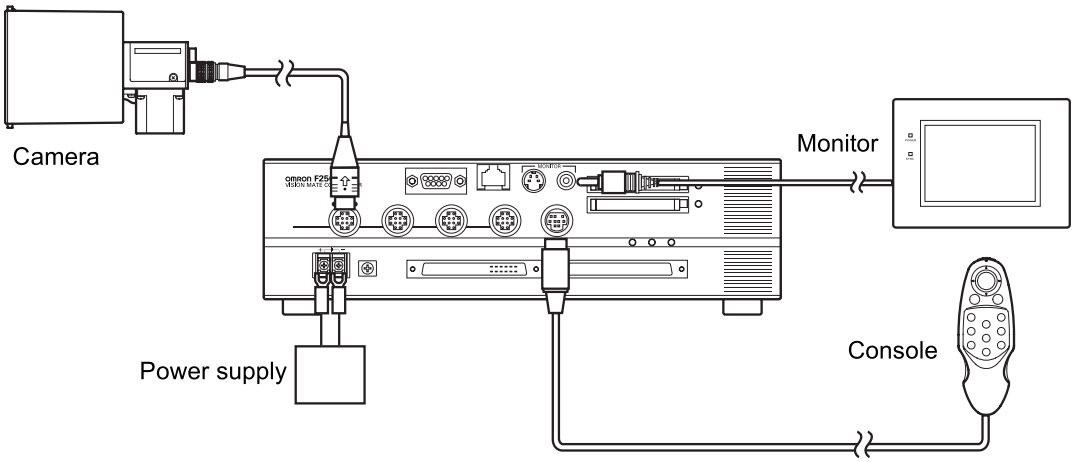
1 Starting the Setup Menu

NOTICE

Application Software
It will not be possible to start the Setup Menu if you change the contents of the memory card after installing it in a personal computer or other device.
Never perform the following with the memory card:
· Changing file names
· Moving or deleting files
· Overwriting data
· Formatting

1. Check that the basic components are connected.

Example of system configuration (for F250/F270)



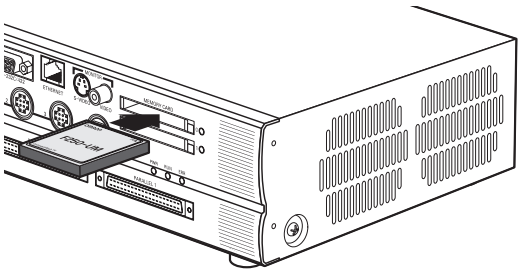
CHECK!

Always refer to the Setup Manual when connecting components or wiring the power supply or ground wires.

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2. Mount the Application Software Memory Card to Memory Card slot 0.

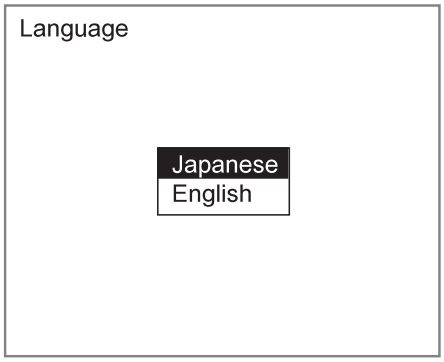
If the controller has two slots, mount the memory card to slot 0.



3. Turn ON the power supply switch to the Monitor.

4. Turn ON the Controller power supply.

The Language Selection Screen for the Setup Menus will be displayed.



5. Select a language.

Use the Up or Down Key on the Console to move the cursor.

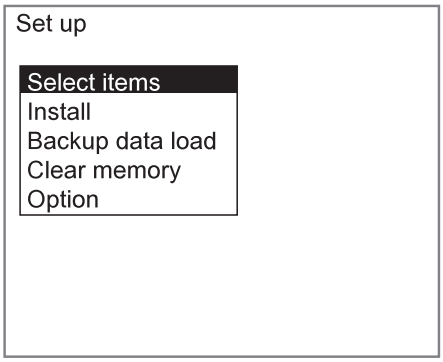
Japanese: Messages will be displayed in Japanese.
English: Messages will be displayed in English.

This manual shows screens displayed with English messages.

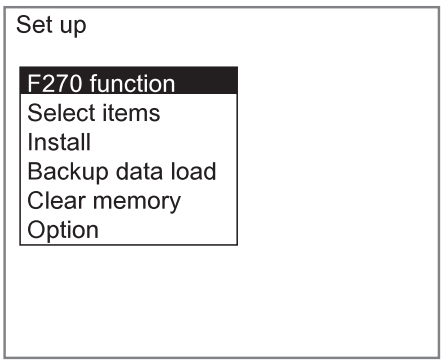
6. Press the ENT Key on the Console to confirm the language selection.

After a short time, the Basic Screen for the Setup Menus will be displayed.

F210-C10 F250-C5■



F270-C10



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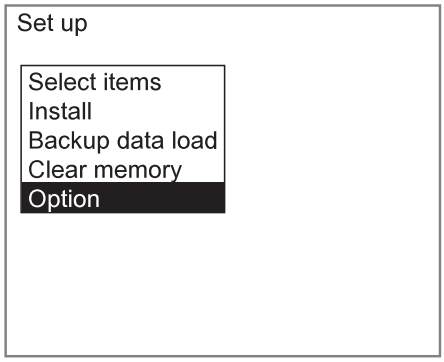
2 Selecting Whether to Use the Macro Function

(The following is effective only if the application software has the macro function.)
Select whether to use the macro customize function.
By default, [ON] is selected to use the macro function. If you want to use work memory for scene data, change the settings to [OFF]. Normally, leave the default setting selected.

Macro Function
Customize Manual (CD-ROM)

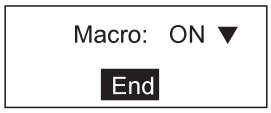
CHECK!
Before starting installation of the application software, select whether to use the macro function. Once the software is installed, it is not possible to change the setting. If you want to change the setting, start the setup menu and reinstall the application software.

1. Select [Option].



The macro function selections appear.

2. Select whether to use the macro function.



3. Select [End].

The screen in 1. will return.

Proceed to 4 in the case of F210-C10/F250-C5□.

Proceed to 3 in the case of F270-C10.

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3 Selecting a Run Function Mode F270-C10 only

F270-C10 provides the following three run function modes. Select an appropriate mode according to your purpose.

Selection	Details
Nonstop mode	Allows you to observe NG image or modify measurement conditions while in run mode. This eliminates the need to stop the production line for adjustment or to wait for the line to stop before adjustment.
Fast mode	Allows inspections to be performed at a speed of up to a maximum of twice that of the conventional method. This mode is useful when you want to inspect more products or to reduce processing time for inspections, such as EC defect inspection that take a long time.
Random trig mode	Allows inspections by receiving two measurement triggers simultaneously. This allows one controller to perform different inspections simultaneously.

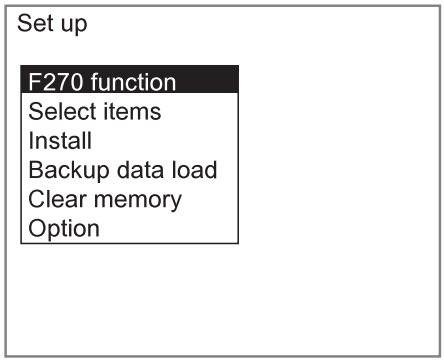
The asterisk (*) indicates the default setting.

Details of Run modes
SECTION 3 Test/Measurement Execution

CHECK! Before starting installation, select a Run Function mode.

CHECK! Once measurement conditions have been set, it is not possible to change the Run Function mode only. If you want to change, start the setup menu and reinstall the application software.

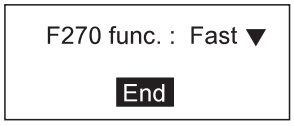
1. Select [F270 function].



The mode selections will be displayed.

2. Select the desired Run Function mode.

3. Select [End].



The screen in **1.** will return.
When the screen in 1. reappears, select [Select items] - [Install].

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4 Selecting Installation Processing Items

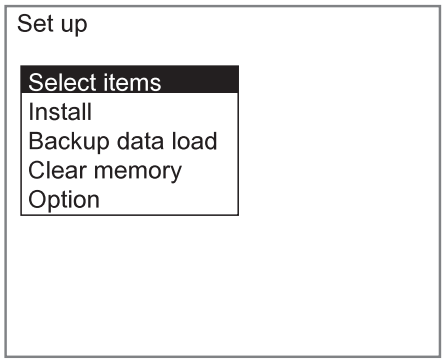
The application software provides many processing items. Select the processing items required for the application. Refer to SECTION 2 “Processing Items Setting Procedures” for an outline of each processing item.

CHECK!

Some items cannot be used depending on the model of the controller to be installed.

Using This Manual
Processing Item Selection Guide

1. Select [Select items].



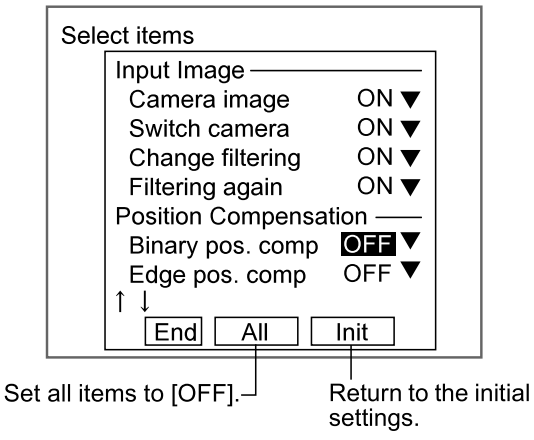
A list of processing items will be displayed.

To install all the processing items, select [All] and proceed to **6**.

For custom installation, proceed to **2**.

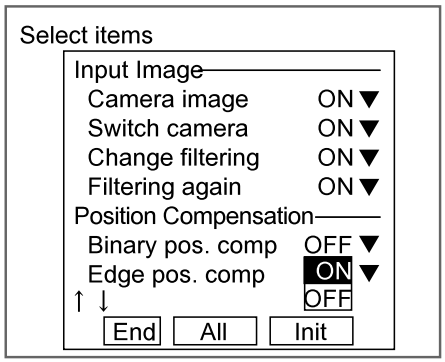
2. Move the cursor to the item to be installed.

3. If that item has been set to [OFF], press the ENT Key.



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The selections (ON/OFF) will be displayed.



4. Select [ON].

5. Repeat this process to select [ON] for the processing items to be installed and set [OFF] for the items that are not to be installed.

6. Select [End].

The screen in **1.** will return.

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5 Executing Installation

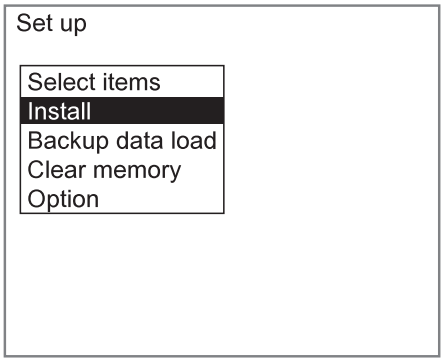
This section describes how to install the selected processing items to the Controller.

CHECK!

Before starting installation, select whether to use the macro function. Also select the desired Run Function mode.

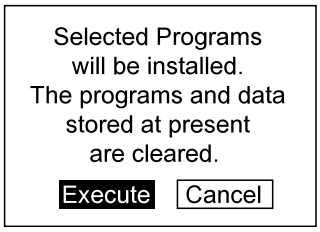
Macro Function p.6 Run Function Mode p.7

1. Select [Install].



A confirmation message appears.

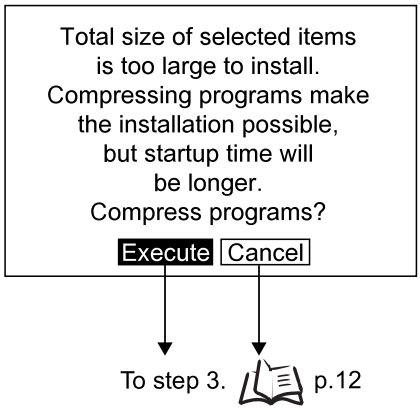
2. Select [Execute].



The size of the processing items will be calculated to determine if they can be installed.
If the total size of the selected processing items is too large to be installed, a confirmation message will be displayed to ask if the files are to be compressed.

NOTICE

Do not turn OFF the power or input a RESET signal while a message indicating that processing is in progress is being displayed. Data in memory will be destroyed, and the Controller may not operate correctly the next time it is started.



A confirmation message will be displayed once the installation has been completed.

CHECK!

If an error message appears:

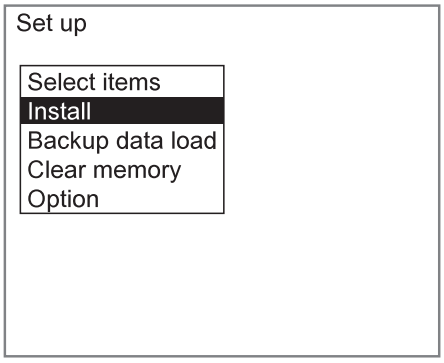
p.13



3. Press the ENT Key.

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The display will return to the main setup menu.



4. Turn OFF the Controller power supply.

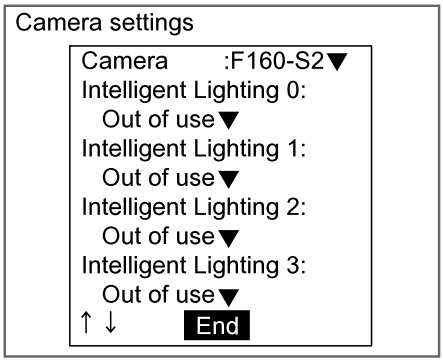
5. Remove the Application Software Memory Card from Memory Card slot 0.

6. Turn ON the Controller power supply.

CHECK!

If the power supply is turned ON while the Application Software Memory Card is still mounted, the Setup Menu will be started again. Always remove the Application Software Memory Card before starting the Controller.

After a while the Camera Settings Screen will be displayed.



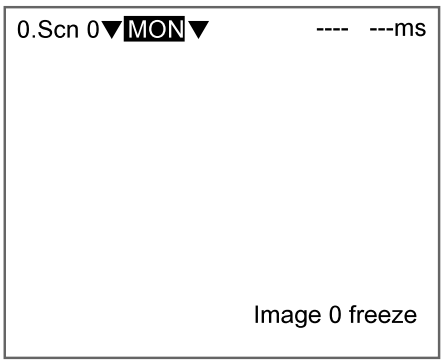
7. Select the model of the connected camera.

8. If using Intelligent Lighting, select the model.

9. Select [End].

SECTION 5 System Settings p.3

The Basic Screen will be displayed.

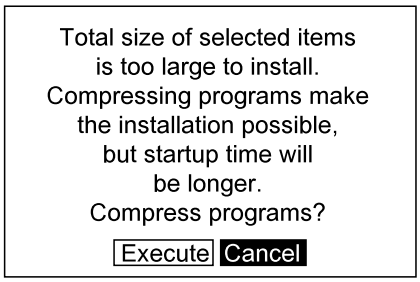


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Installation without Compressing Files

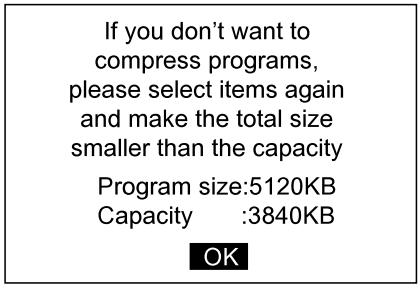
If the total program size of the selected items is greater than the file size that can be installed, a confirmation message will be displayed asking if the files are to be compressed.
If the files are compressed, the Controller startup time will be longer. Use the following procedure to change the selected processing items without compressing the files.

1. Select [Cancel] from the confirmation message.



The program size and capacity will be displayed.

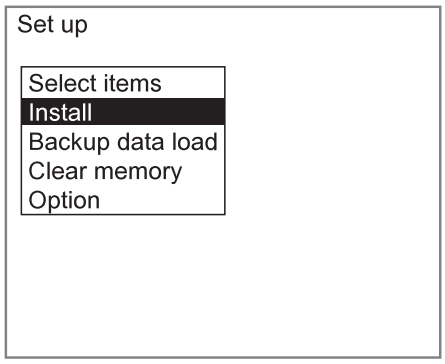
2. Select [OK].



The display will return to the main setup menu.

3. Select [Select items] and reselect the items so that the memory capacity is not exceeded.

p.8



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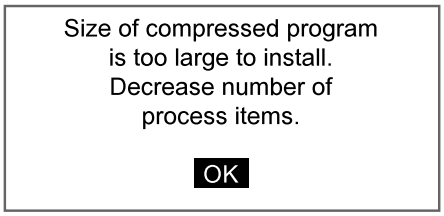
If an error message appears when installing compressed files:

If the total size of the selected items is still greater than the file size that can be installed even though they have been compressed, an error message will be displayed. In this case, follow the procedure below to reselect processing items.

CHECK!

If this error message appears during reinstallation: All of the previously installed program files will be cleared and the default controller settings will be restored.

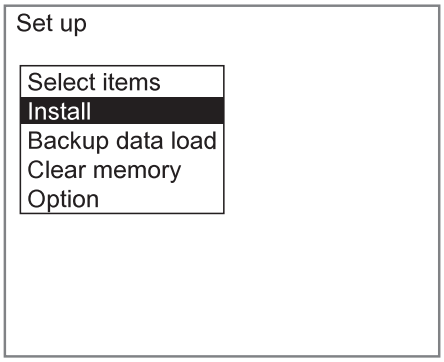
1. Select [OK] in the error message.



The display will return to the main setup menu.

2. Select [Select items] and reselect the items so that the memory capacity is not exceeded.

p.8

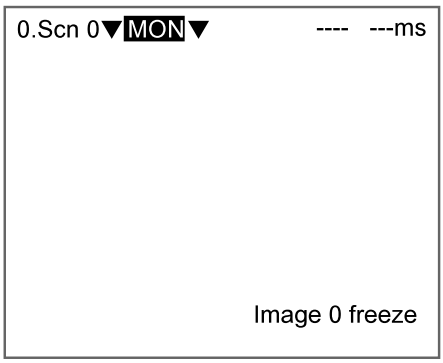


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Displaying Images and Focusing

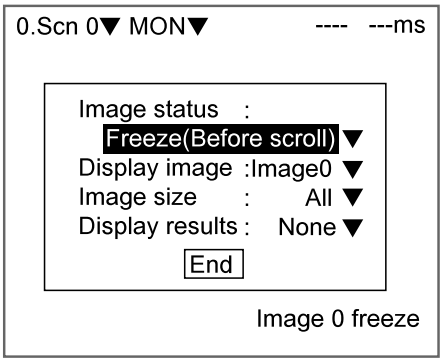
Change the display image to through display to check what kind of image is being displayed.
Adjust the position of the object to adjust the focus of the camera.

1. Change the display image to through display to check what kind of image is being displayed.
   Press the SHIFT + ENT Keys.



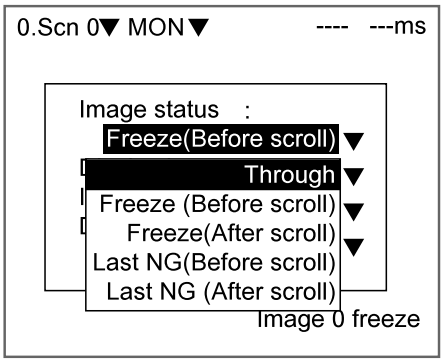
The screen for changing the display image will be displayed.

2. Move the cursor to [Freeze (Before Scroll)].
3. Press the ENT key.



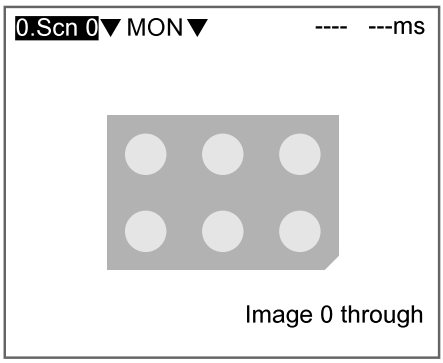
The selections appear.

4. Select [Through].
5. Select [End].

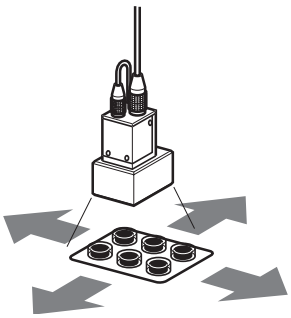


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The Through Display Screen will be displayed.



6. Adjust the position of the measurement object so that it appears at the center of the monitor screen.



Adjust the position of the object.

7. Focus the Camera.

- Cameras with a light (including Intelligent Lighting) have lenses with a fixed focal point.
  Adjust the Camera position based on the positioning distances in the Setup Manual to focus the Camera.

CHECK!

The light level for Intelligent Lighting can be adjusted from the Controller.

SECTION 2, “1.1 Inputting Camera Images”

- When using a Camera Unit that does not have a light
  Turn the focus ring to focus the Camera.

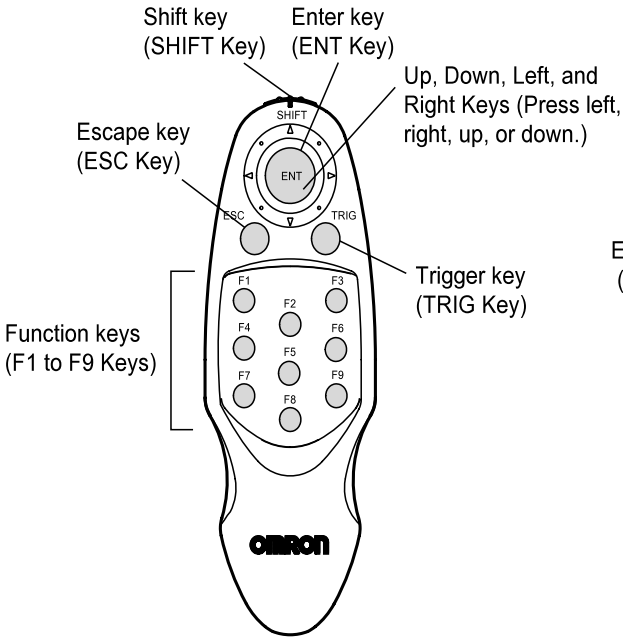
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Menu Operations

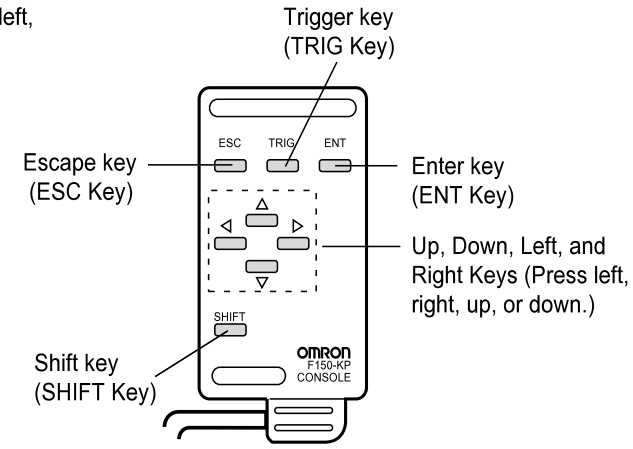
Input Devices

Menu operations are performed from either the Console or the serial interface.

■F160-KP Console



■F150-KP Console



Key	Key Function
Escape key (ESC Key)	Returns the user to the previous menu display or operation.
Trigger key (TRIG Key)	Starts object measurement.
Enter key (ENT Key)	Executes a function or sets a value. Note: On the F160-KP, also functions as a Cursor Key.
Shift key (SHIFT Key)	Pressing this key alone does not have any effect. Must be pressed in combination with another key to have any effect. Specific functions are assigned to combinations of the SHIFT Key and other keys for specific screens.
Cursor keys (Up, Down, Left, and Right Keys)	The Up and Down keys are used to move the cursor up or down, and also to set values. Use the Up key to increment a value by 1. Use the Down key to decrement a value by 1. Hold down the Up or Down key to increase or decrease a value rapidly. The Left and Right Keys are used to move the cursor left or right.
Function keys (F1 to F9 Keys)	Functions can be assigned to function keys F1 to F8. SECTION 5 System Settings p.16 The display can be captured using F9. SECTION 5 System Settings p.20

CHECK!

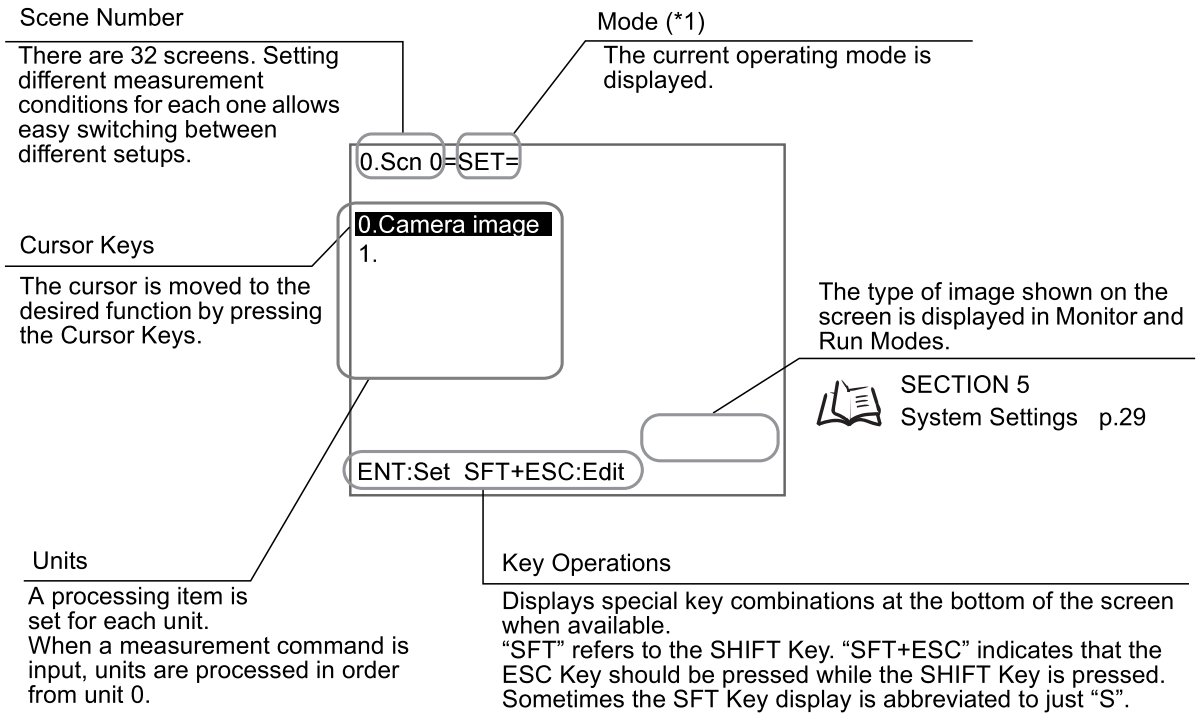
Menu operations can be performed from a personal computer via a serial interface.

SECTION 6, “4. Serial Interface Menu Operations”

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Screen Displays

The Application Software is operated by selecting functions from menus displayed on the screen. Familiarize yourself with each function before operating the Controller.



*1 Mode

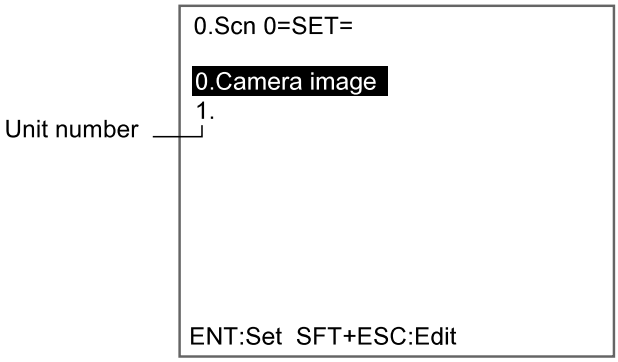
Display	Contents
Setting	Used to set the inspection conditions.
MON (Monitor)	Used to check whether inspections are being performed correctly under the set inspection conditions. The measurement results are displayed on the monitor only. The results cannot be output to external devices.
RUN	Performs inspection. The measurement results are output to an external device via the parallel interface or serial interface.
SYS (System)	Used to set system conditions.
TOOL	Provides a data backup menu. Used to save settings and images to a computer as backup.
Save	Used to saves data to flash memory in the Controller. If new settings have been made, be sure to save the data before quitting.

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Creating Flowcharts

In the Application Software, measurement processing is broken up into different processing items to facilitate a variety of applications.These are called processing items. Flowcharts are created using a combination of processing items to suit each application.

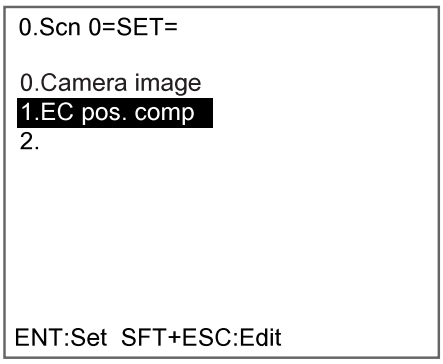
When Set Mode is entered, the number 1 will be displayed below [0.Camera image]. This number is called the unit number.



CHECK!

[Camera image] is set for unit 0 as the default processing item. A camera image must be read to perform measurements, so never delete [Camera image] for unit 0 or change it to another processing item.

The processing items are set in order from unit 0.
Once a processing item is set for unit 1, unit 2 will automatically be displayed.



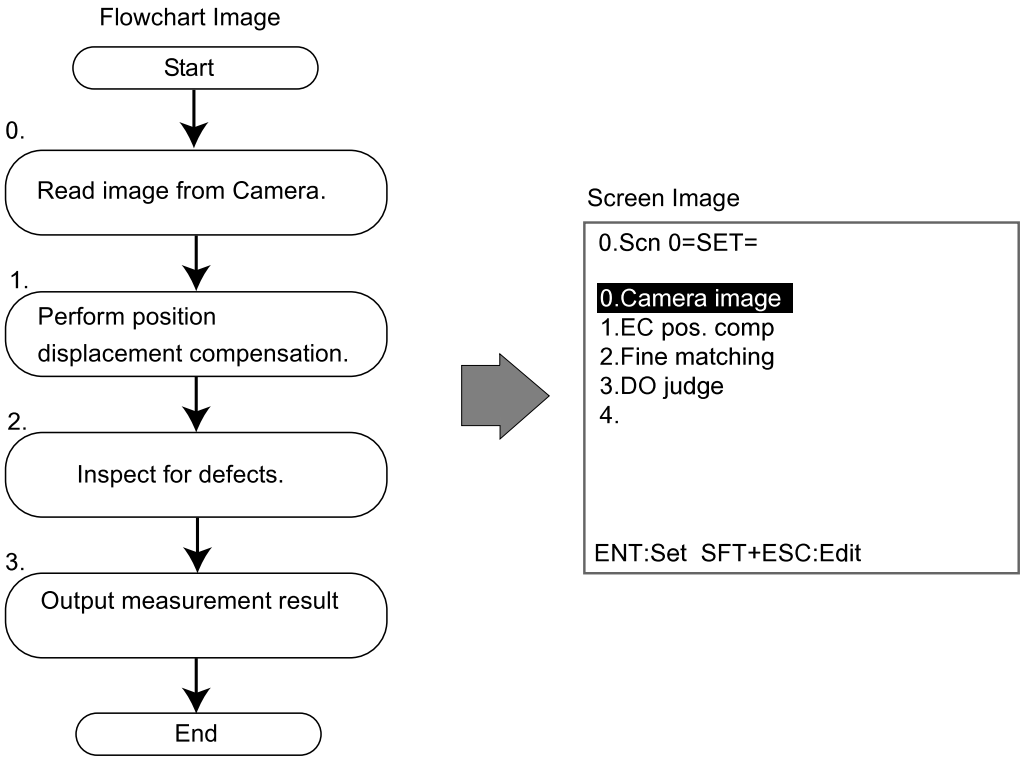
CHECK!

There is no limit to the number of units. Any number of units can be set provided the Controller has enough free memory.

Checking method for the remaining capacity of work memory (main)
SECTION 5 System Settings p.36

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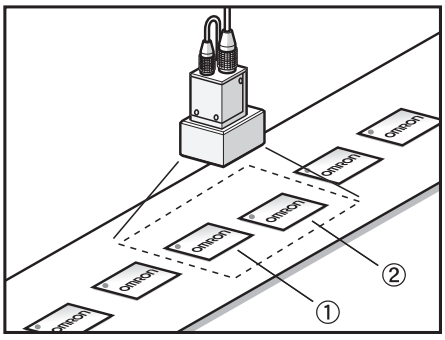
When a measurement command is input, processing items will be executed in order, starting from those set for unit 0. The desired processing item must be registered to each unit number as when creating a flowchart.



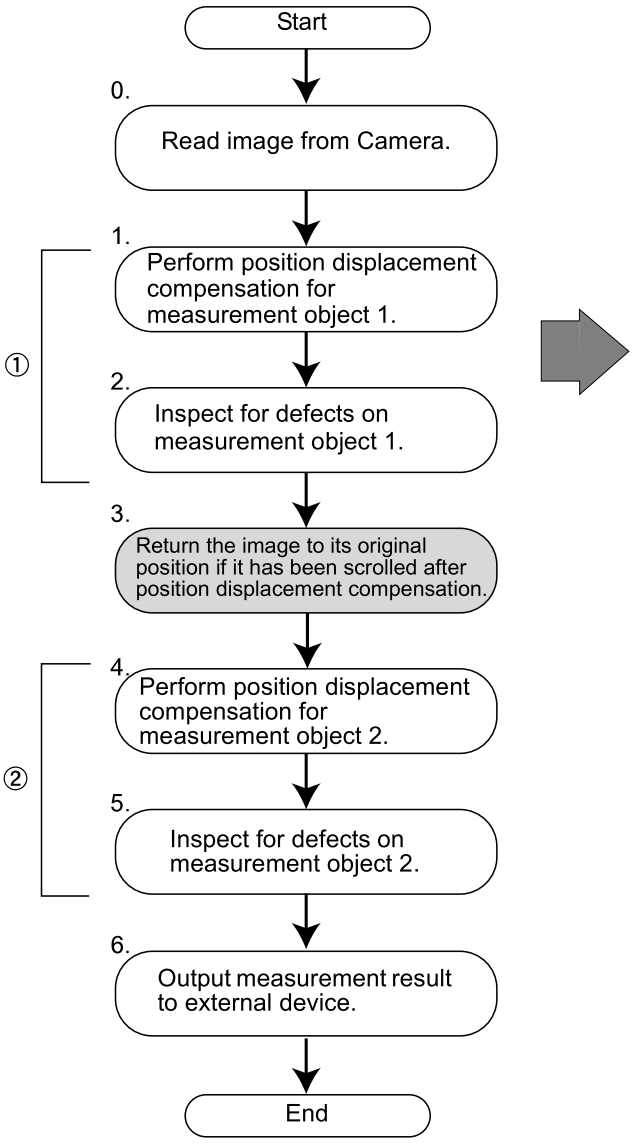
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The following type of processing is also possible by adjusting the registered order.

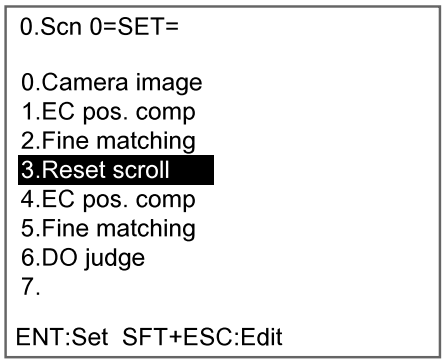
Example: Performing Position Displacement Compensation for Two Measurement Objects in the Same Field of Vision



Flowchart Image



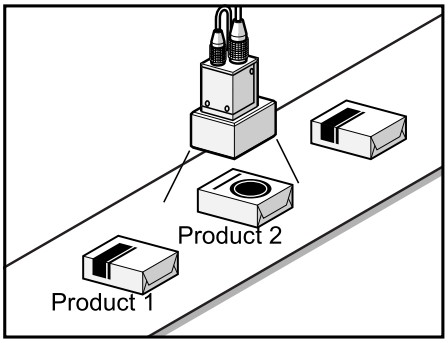
Screen Image



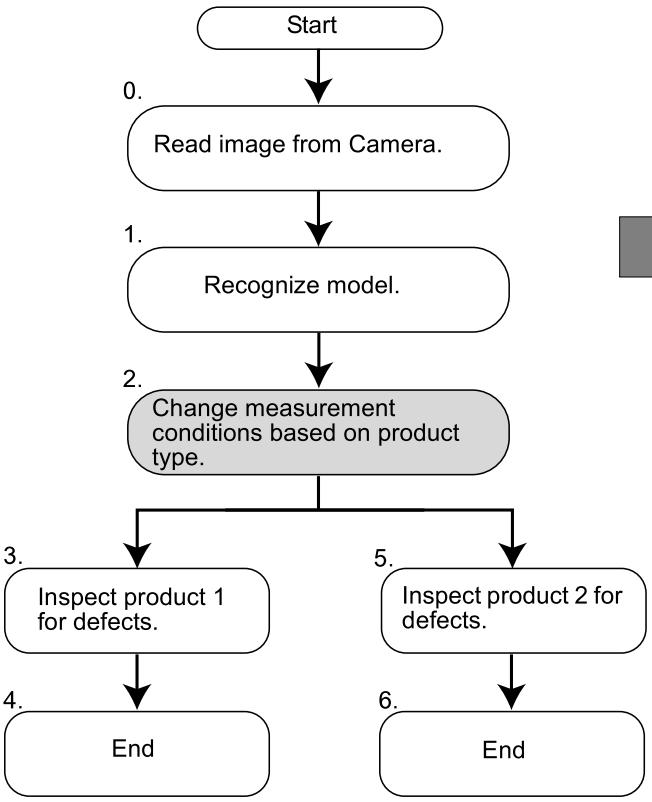
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The Application Software also has branch control processing items.

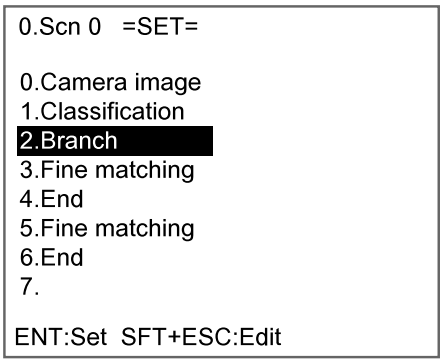
Example: Changing Inspection Conditions Based on the Upcoming Product



Flowchart Image



Screen Image

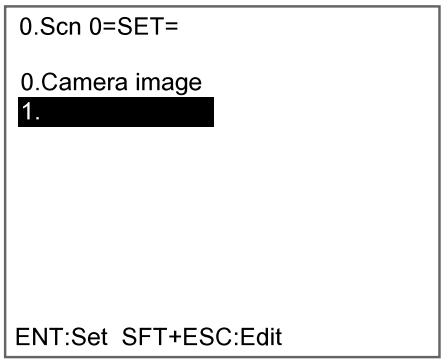


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Registering Processing Items to Units

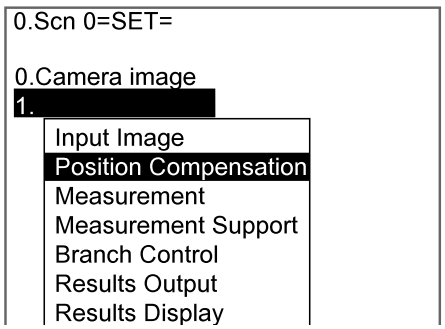
The registration procedure will be explained using the example of registering binary position compensation, one of the position compensation processing items. Change the procedure as required to register other processing items.

1. Move the cursor to a free unit number and press the ENT Key.



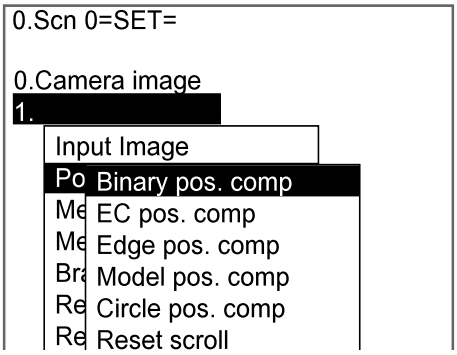
The processing item groups will be displayed.

2. Select [Position Compensation].



A list of the installed position compensation processing items will be displayed.

3. Select [Binary pos. comp].



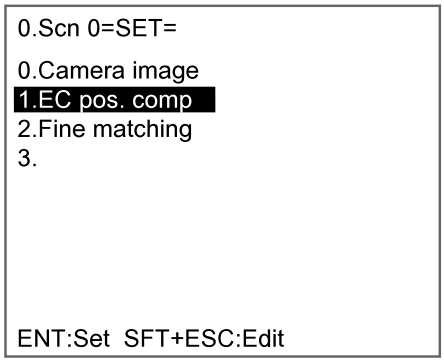
Binary position compensation will be set for unit 1 and the next unit number (unit 2 in this case) will be displayed.



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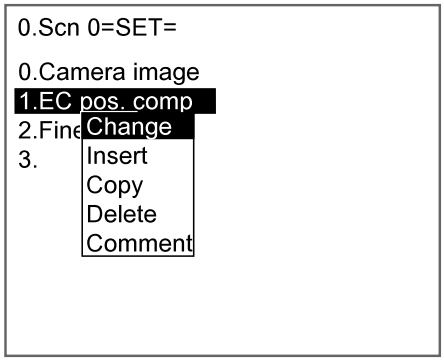
Changing to Other Processing Items

1. Move the cursor to the unit number of the processing item to be changed. Press the SHIFT+ESC Keys.



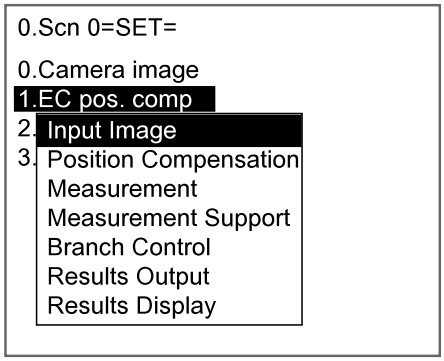
A list of options will be displayed.

2. Select [Change].



The processing item groups will be displayed.

3. Use the same procedure as for registering new processing items to register items for the inserted unit.



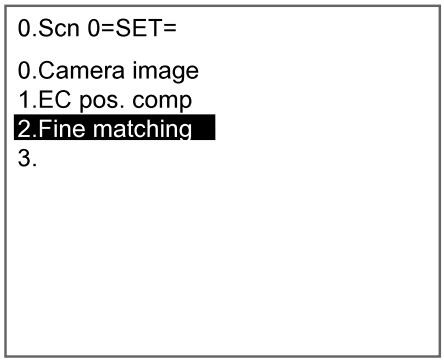
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Inserting Units

CHECK!

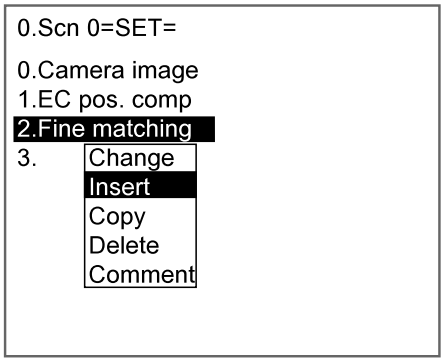
When a unit is inserted, the subsequent unit numbers will be increased. The unit numbers set in other units for outputting results and branching will also be increased automatically.

1. Move the cursor to the unit number where a new unit is to be inserted. Press the SHIFT+ESC Keys.



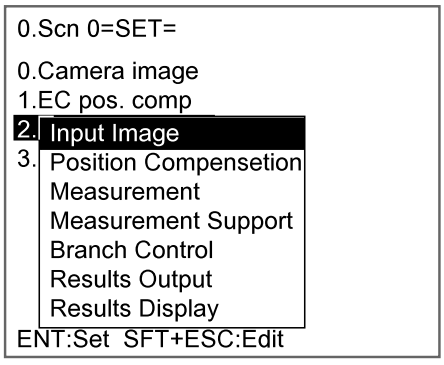
A list of options will be displayed.

2. Select [Insert].

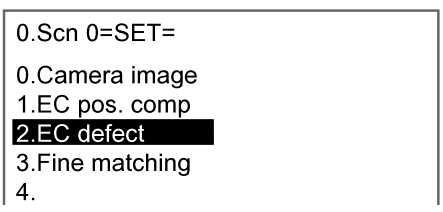


The processing item groups will be displayed.

3. Use the same procedure as for registering new processing items to register items for the inserted unit.



The selected processing item will be inserted.

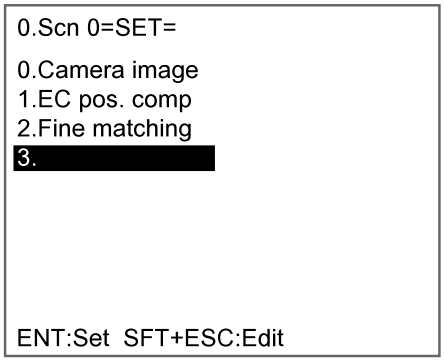


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Copying from Other Units

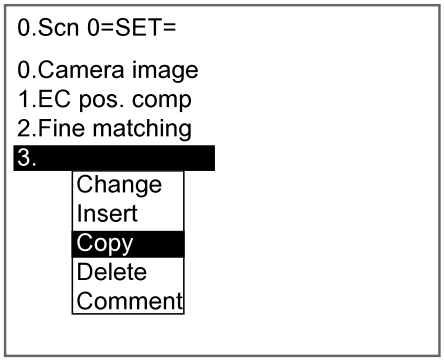
Settings data can be copied, which is convenient for reusing data when only a part of the settings need to be changed.

1. Move the cursor to the unit to which the data is to be copied. Press the SHIFT+ESC Keys.



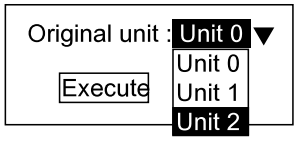
A list of options will be displayed.

2. Select [Copy].



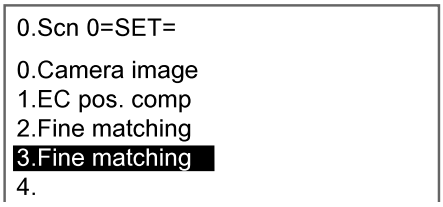
A screen for selecting the source unit for the data to be copied will be displayed.

3. Select the unit from which processing items are to be copied.



4. Select [Execute].

The data will be copied.



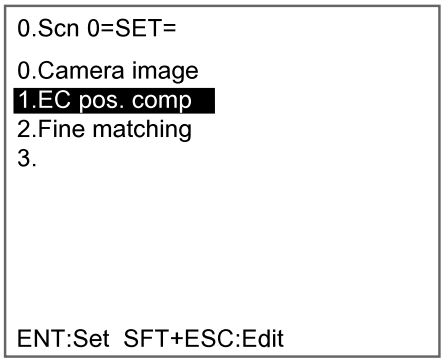
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Deleting Units

CHECK!

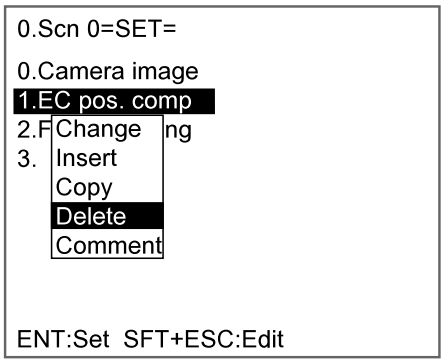
When units are deleted, the subsequent unit numbers will be decreased. The unit numbers set in other units for outputting results and branching will also be reduced automatically.

1. Move the cursor to the unit to be deleted. Press the SHIFT+ESC Keys.

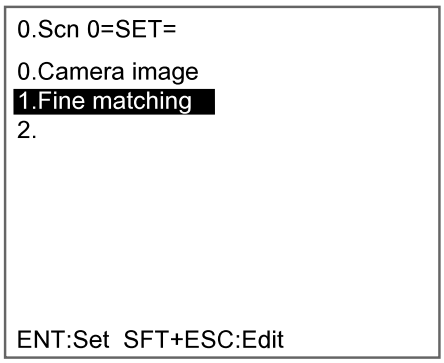


A list of options will be displayed.

2. Select [Delete].



The selected unit will be deleted and the subsequent unit numbers will be moved up one.



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Changing Processing Item Names

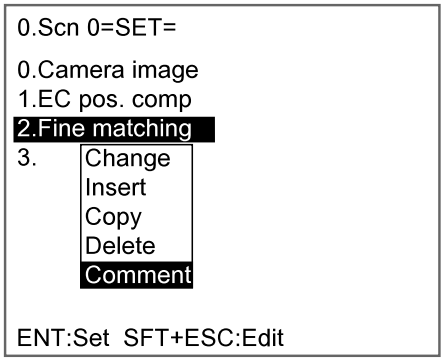
The names of processing items set to units can be changed to any name up to 16 characters long. This is useful for understanding settings when many units have been registered.

1. Move the cursor to the unit for which the name of the processing item is to be changed. Press the SHIFT+ESC Keys.



A list of options will be displayed.

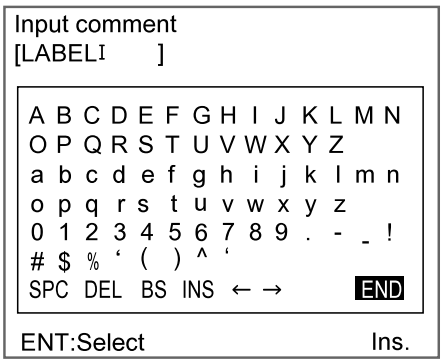
2. Select [Comment].



A software keyboard will be displayed.

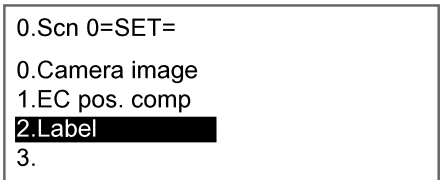
3. Set up to 16 characters.

4. Move the cursor to [END] and press the ENT Key.



Inputting Characters p.31

The item name will be changed.



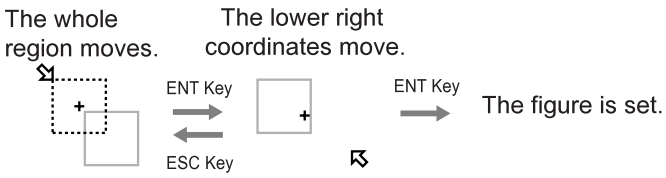
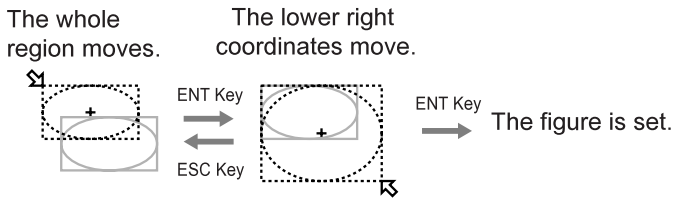
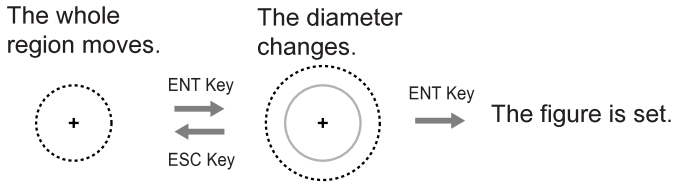
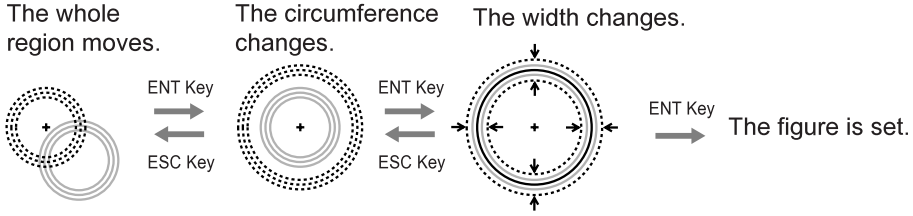
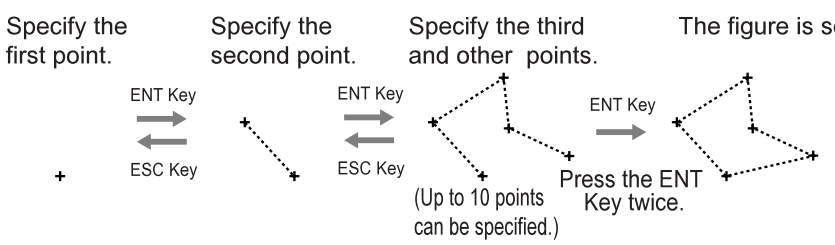
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Drawing a Region

Use the following method to draw model regions and measurement regions.The region figures that can be drawn depend on the processing item. Refer to the explanation for each processing item for information on what figures can be drawn.

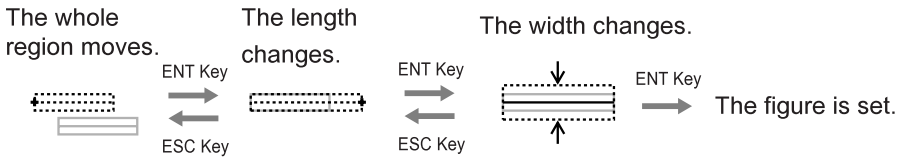
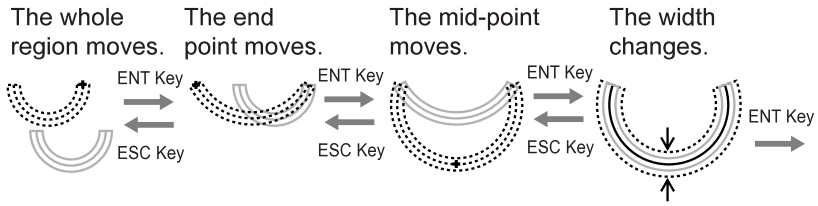
Move the cursor with the Up, Down, Left, and Right Keys. Use these keys together with the SHIFT Key to move the cursor quickly.
Press the ENT Key at the desired positions and press the ESC Key to undo the setting.

▪ Drawing method

Measurement region selection	Drawing method
Box	
Ellipse	
Circle	
Circumference	
Polygon	

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Drawing method (Continued)

Measurement region selection	Drawing method
Line	
Arc	

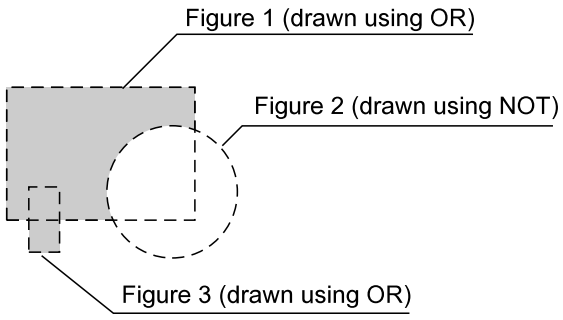
▪ Drawing mode

For many processing items, up to 3 figures can be combined to draw a measurement region. Select either the OR or NOT drawing mode.

Drawing mode	Function
OR	Used to draw a shape as a model or region. All of the shapes that are drawn are registered as one region.
NOT	Used to delete part of a region.

In this example, the gray area will be the measurement region.

Regions with complicated shapes can be drawn and areas can be omitted from the measurement region by combining figures.

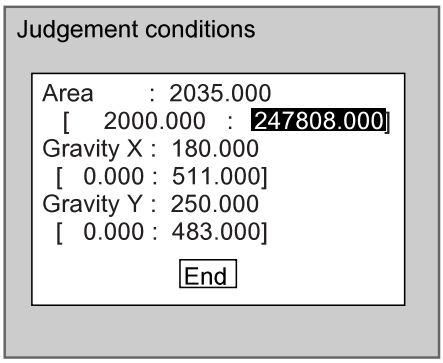


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Inputting Values

This section explains how to input values when setting measurement conditions or communications specifications.

1. Move the cursor to the item for which a value is to be changed.
2. Press the ENT Key.



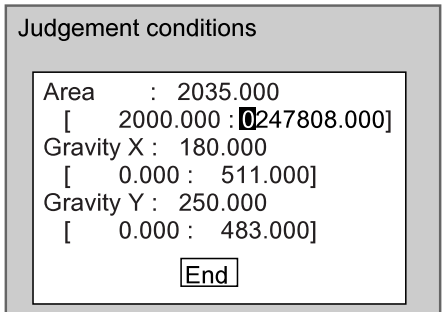
The cursor will change to a cursor the size of a single digit.

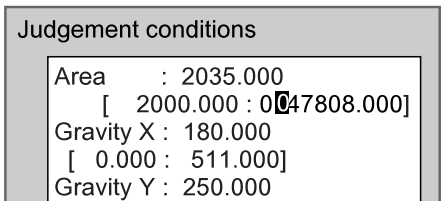
3. Move the cursor to the digit to be changed.

Use the Left and Right Keys to move the cursor.

4. Change the value.

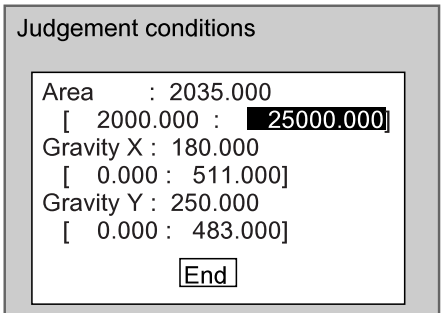
Use the Up Key to increase the value.
Use the Down Key to decrease the value.





5. Repeat this operation to change other digits.
6. Press the ENT Key.

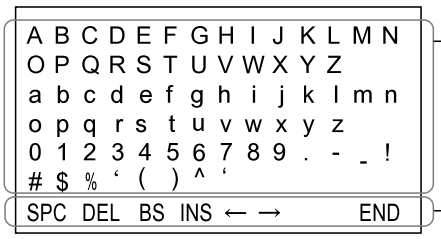
The values will be set.



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Inputting Characters

This section explains how to input characters.
The software keyboard shown below is displayed on the screen where characters are input.



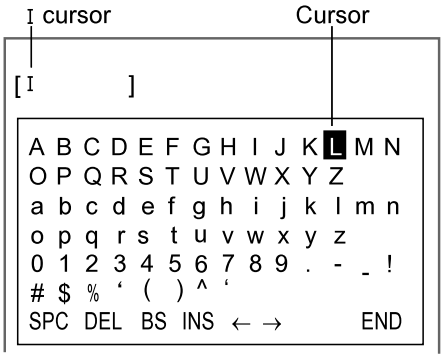
These characters can be input.

SPC	Inserts a space.
DEL	Deletes 1character to the right of the I cursor.
BS	Deletes 1character to the left of the I cursor.
INS	Switches between insert (default)/overwrite.
←	Moves the I cursor to the left.
→	Moves the I cursor to the right.
END	Ends character input.

1. Move the cursor to the character to be input.

   Up/Down/Left/Right Keys: Move the cursor.

2. Press the ENT Key.



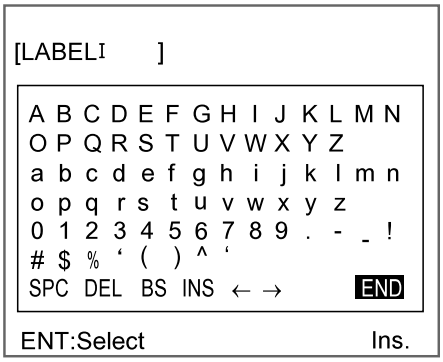
The character is set and the I cursor moves one space to the right.

3. Repeat these steps to input more characters.



4. Once all required characters have been input, move the cursor to [END].

5. Press the ENT Key.



The characters will be set.

CHECK! Characters can be input from a personal computer via a serial interface.Japanese characters can be input as comment from the personal computer. (Only characters of JIS level-1 can be input.)

SECTION 6 Serial Interface Menu Operations

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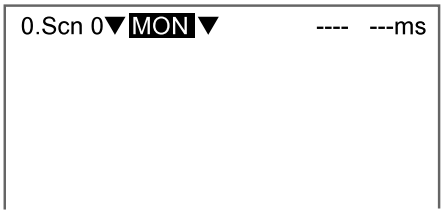
Save settings to flash memory before turning the power OFF

Therefore, when settings have been changed, be sure to save then to flash memory before turning OFF the power.

NOTICE If the power is turned OFF without saving new settings, all of the setting changes will be lost. Stored images cannot be saved to flash memory so all stored images will be cleared when the power is turned OFF. If stored images are to be kept, backup the images to a personal computer or Memory Card.

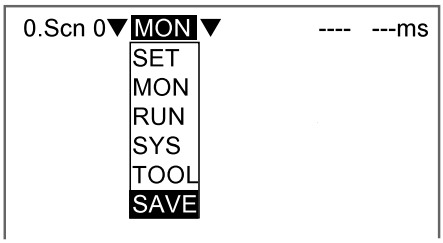
SECTION 4 Backing Up Data p.9

1. Display the Basic Screen for Monitor Mode or Run Mode.
2. Move the cursor to MON (or RUN) and press the ENT Key.



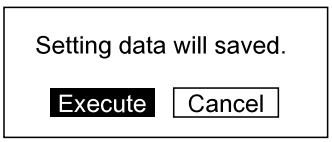
The mode selections will be displayed.

3. Select [SAVE].



A confirmation message will be displayed.

4. Select [Execute].



NOTICE Do not turn OFF the power or input a RESET signal while a message indicating that saving is in progress is being displayed. Data in memory will be destroyed, and the Controller may not operate correctly the next time it is started.

Once the setting data has been saved, the screen in **1.** return.

5. Turn OFF the power supply to the Controller to shut down.

CHECK! Using Scene Group Function
The scene data set to scene group 0 and the system data will be saved to the Controller flash memory. If this save operation is executed, the settings data for scene groups 1 to 31 will be saved to the Memory Card mounted to drive 1. The Memory Card data will be overwritten.

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SECTION 3
Test/Measurement Execution

This section explains how to check if measurements are being correctly performed with the set measurement conditions using Monitor Mode, and how to make actual measurements using Run Mode.

Testing	2
Starting Measurements	6
Using Nonstop Adjust Mode	8
Performing Measurement in 1-Line Fast Mode	15
Performing Measurement in 2-Line Random Trigger Mode	25

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Testing

1 Entering Monitor Mode

Use the following procedure to check that measurements are being correctly performed with the set measurement conditions.

CHECK!

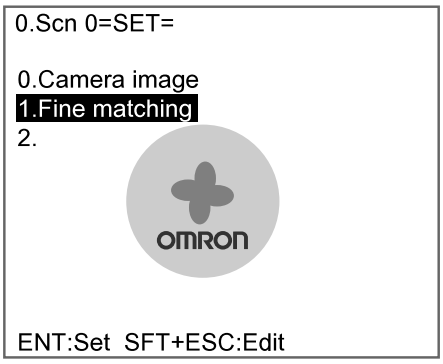
Assignment of console keys can be changed using the [MON] or [RUN] screen.
The description given here is based on the default key assignment. Thus, be careful if the key assignment has been changed.

SECTION 5 System Settings

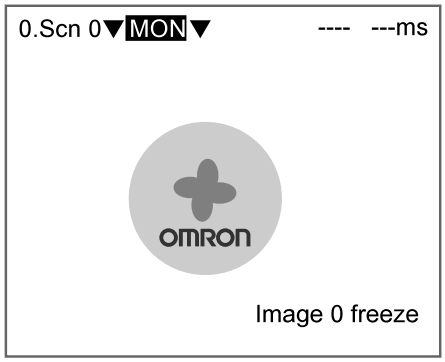
■ Switching from Setting Mode to Monitor Mode

1. Display the setting mode screen.

2. Press the ESC Key.



This will exit the setting mode and activate the monitor mode automatically.

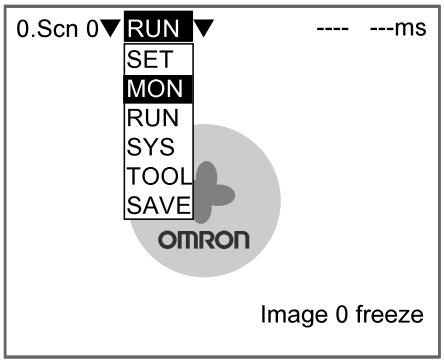


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Switching from Run Mode to Monitor Mode

1. Place the cursor on [RUN] and press the ENT Key.

2. Select [MON].



This will activate the run mode.

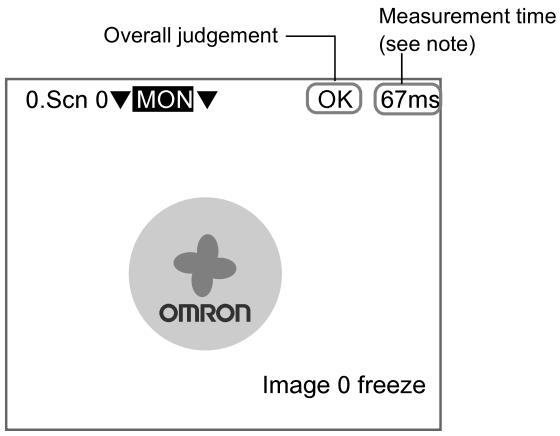
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2 Test Measurement

Use the following procedure to execute measurement according to the conditions set for the scene currently displayed. The test is completed internally by the Controller and the measurement results are not output via serial or parallel interfaces.
The measurement commands can be input, however, via serial or parallel interfaces.

SECTION 6 Communicating with External Devices

1. Press the TRIG Key on the Console or input the measurement command from an external device.

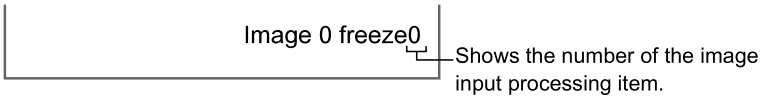


Note: Through display requires longer measurement time than freeze display.
Frame: approx. 20ms max.
Field: approx. 10 ms max.
(when F160-S1 is used)

Measurement result will be displayed.

CHECK!

If the image size is set to [All] and image input-related processing items (camera image, switch camera) are set to two or more units, images can be switched from one to another by using the Up and Down Keys.



CHECK!

Up to 35 measured images can be stored. If 35 images have already been stored, they will be overwritten when new images are stored, starting from the oldest image.

SECTION 5 System Settings

Measurement can be performed again for stored images.
For this, display the desired stored image using the SHIFT and Up/Down Keys, then press the SHIFT+ TRIG Keys, Even for [Freeze] images, measurement can be performed again by pressing the SHIFT+ TRIG Keys, without image input. If judgement conditions are changed, to check whether the conditions are appropriate can be done by performing measurement again.

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3 Changing Display Results

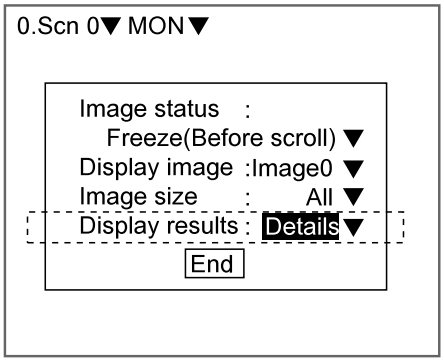
The contents to be displayed on the screen can be changed. Judegment conditions can also be changed while monitoring detailed measurement values.
This section gives an outline only. For details, refer to SECTION 5.

SECTION 5 System Settings

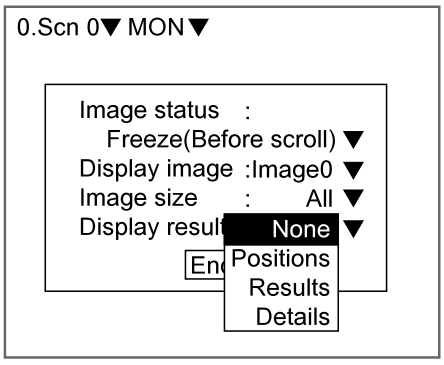
1. Press the SHIFT+ ESC Keys.

This takes you to measurement screen setting.

2. Place the cursor on [Display results] and press the ENT Key.



Change the setting.



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Starting Measurements

1 Entering Run Mode

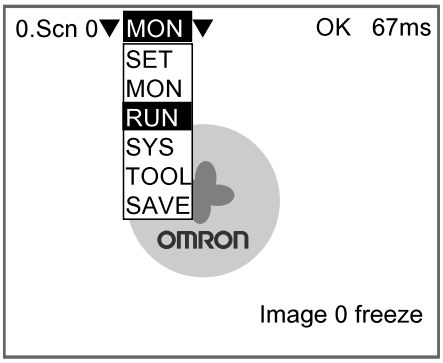
CHECK!

Assignment of console keys can be changed using the [MON] or [RUIN] screen.
The description given here is based on the default key assignment. Thus, be careful if the key assignment has been changed.

SECTION 5 System Settings

1. Place the cursor on [MON] and press the ENT Key.

2. Select [RUN].



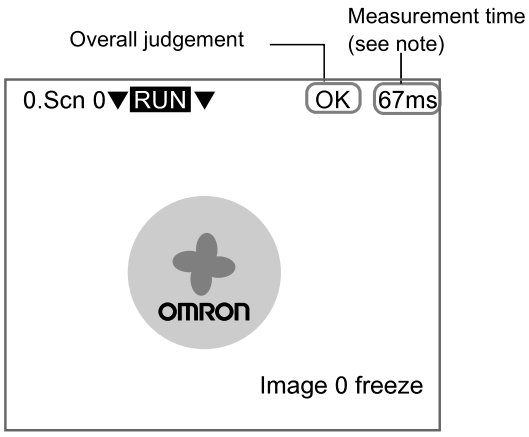
This will activate the run mode.

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2 Performing Measurement

Use the following procedure to execute measurement according to the conditions set for the scene currently displayed.
The measurement results will be output to external devices as well.

1. Press the TRIG Key on the Console or input the measurement command from an external device.



Note: Through display requires longer measurement time than freeze display.
- Frame: approx. 20ms max.
- Field: approx. 10 ms max.
(when F160-S1 is used)

Measurement result will be diaplayed.

CHECK!

Key operations are the same as for monitor mode. For details, refer to the explanation of the Monitor mode.

p.4

CHECK!

The light will gradually lose brightness over time, so the judgement conditions must be adjusted periodically.
The light becomes about 20% darker after 1,500 hours of use. (In the case of intelligent lighting)

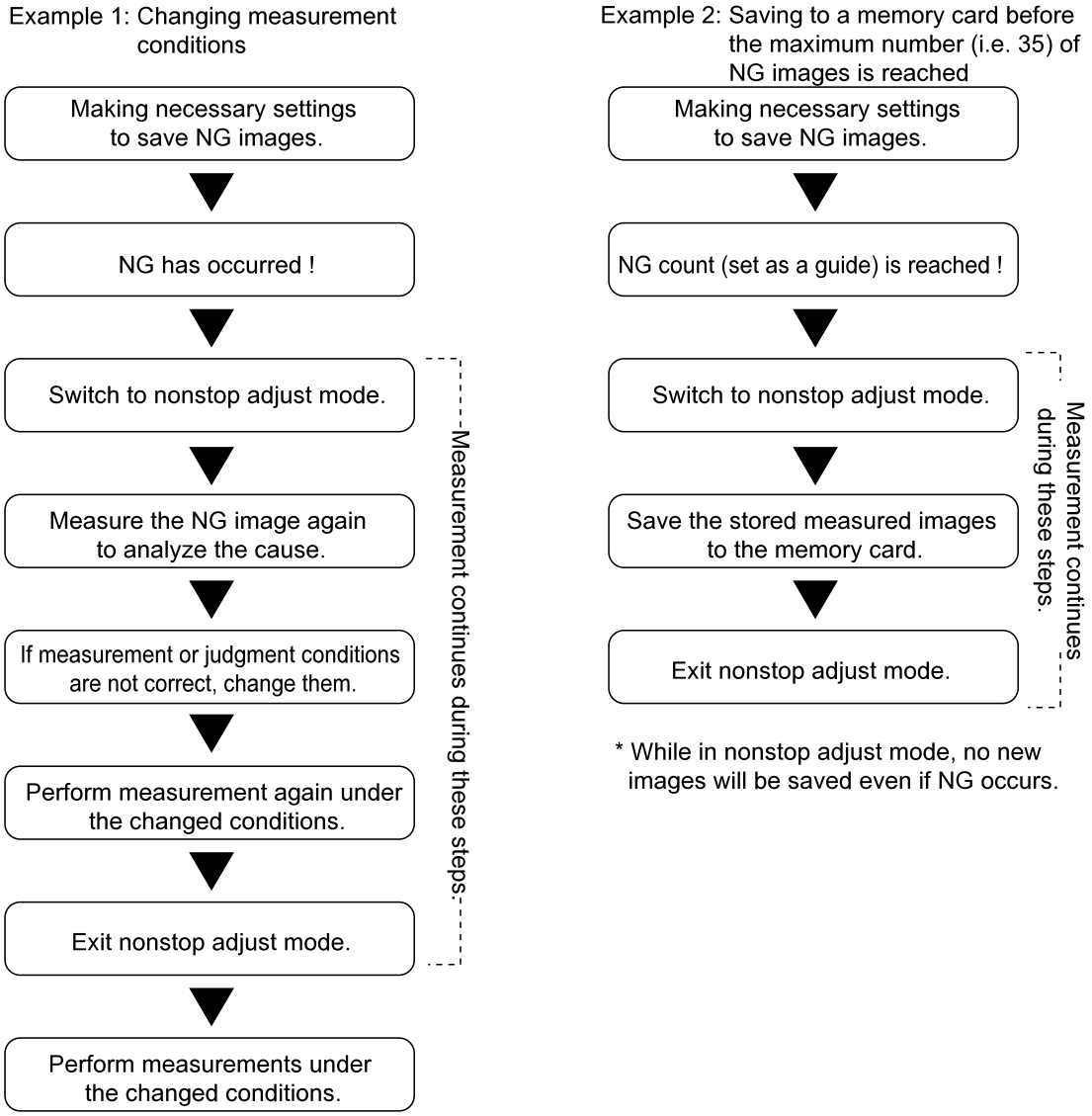
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Using Nonstop Adjust Mode

F270-C10 Only

Use of the nonstop adjust mode allows you to observe NG images or change judgement conditions while continuing measurement. This eliminates the need to stop the production line for adjustment of measurement conditions or to wait for the line to stop before adjustment.
Measurement conditions can be changed from the console or via the serial interface.

Example of Use of Nonstop Adjust Mode



Nonstop adjust mode can only be performed in the following cases. Use of other input/output interfaces is not guaranteed.

- Input of measurement command : STEP signal, Continuous measurement by parallel (DI)
- Output of measurement results: Parallel interface (DO, OR)

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Settings to be Made In Advance

To use the nonstop adjust mode, [Set key operation] and [Nonstop/Fast] functions need to be set.

Key Operation

Specify the key to be used to activate the nonstop adjust mode and the key to be used to transfer data to processing sections.

SECTION 5 System Settings

Nonstop/Fast

The controller has two built-in processing sections. Only one processing section is used for normal measurement. However, for nonstop adjustment, one is used for adjustment while the other is used for measurement. Thus, prior to start of nonstop adjustment, the same settings need to be set for both processing sections. With [Nonstop/Fast], it is possible to select the timing at which the data is transferred automatically.

SECTION 5 System Settings

CHECK!

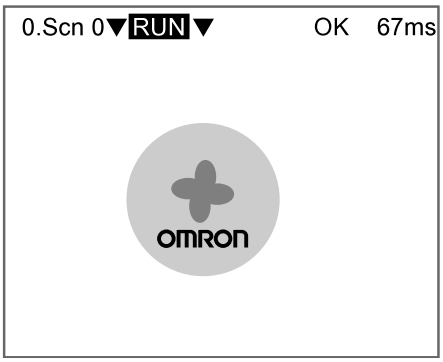
Normally, select [Yes (Standard)].

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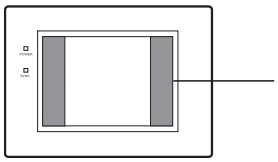
Nonstop Adjustment Execution Method

While the Controller is in run mode, carry out the following steps.

1. Press the console key assigned to [Switch nonstop].



The system will switch to nonstop adjust mode.
The monitor's background color will switch as follows:
- Color monitor : Black to blue
- Monochrome monitor: Black to gray

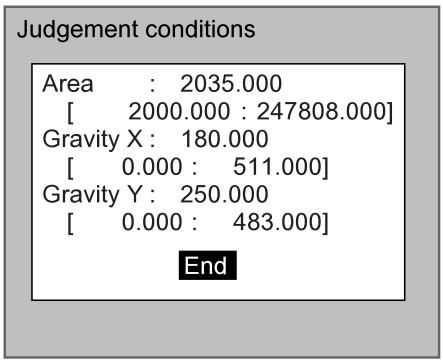


CHECK! The nonstop adjust mode can also be activated by inputting the NONSTOP command via the serial interface (normal mode).

2. Change measurement conditions and save data in the same way as you normally do.

While you are changing measurement conditions or saving data, measurement will still be continued according to the STEP signal or parallel (DI) input, and measurement results are output via the parallel interface.

Example: Adjustments to the judgement conditions



CHECK! If measurement conditions are changed, it can be verified whether the conditions are appropriate by measuring the measurement image again.
In monitor or run mode, press the following keys.
SHIFT+Up/Down Keys: Switches from one image to another (displaying stored images one by one)
TRIG Key, or SHIFT+ TRIG Keys: Performs measurement again (no results are output).

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3. Exit nonstop adjust mode.

Press the console key assigned to [Switch nonstop].

Measurement will start under the new conditions.


CHECK!

In the following cases, data will not be transferred automatically even if [Auto data transfe] has been set to [Yes (Standard)]. Data needs to be transferred manually.
(If [Yes (Each time)] is selected, data will be transferred automatically.)

- When activating nonstop adjust mode after measurement has been stopped to change the measurement conditions:
  Press the key assigned to [Proc. data transfer] to transfer the data, then press the key assigned to [Switch nonstop] to activate the nonstop adjust mode.

- When measurement conditions have been changed by a serial interface (normal mode) command:
  Changes made to the conditions by a normal mode command are reflected for the processing section 0 only. If the conditions have been changed, execute the DATATRNS command (data transfer command) to copy the changes to the processing section 1.
  The DATATRNS command will not be accepted during nonstop adjustment, therefore, the command must be executed after exiting the nonstop adjust mode.

Example: Loading scene data from a memory card during nonstop adjustment

SCNLOADM 0 /C0/KENSA.SCN Delimiter Loads scene data.
MEASOUT 1 Delimiter Switches to the run mode.
NONSTOP 0 Delimiter Exits nonstop adjust mode. (See *1.)
DATATRNS Delimiter Transfers the data present in the processing section 0 to the processing section 1.
(See *2.)

(*1) The NONSTOP command cannot be accepted during the monitor mode.
Execute the MEASOUT command to switch to the run mode first, and then execute the NONSTOP command.
(*2) Measurement will not be performed during data transfer even if a measurement trigger is input.

SECTION 6, “2. Normal Serial Interface”

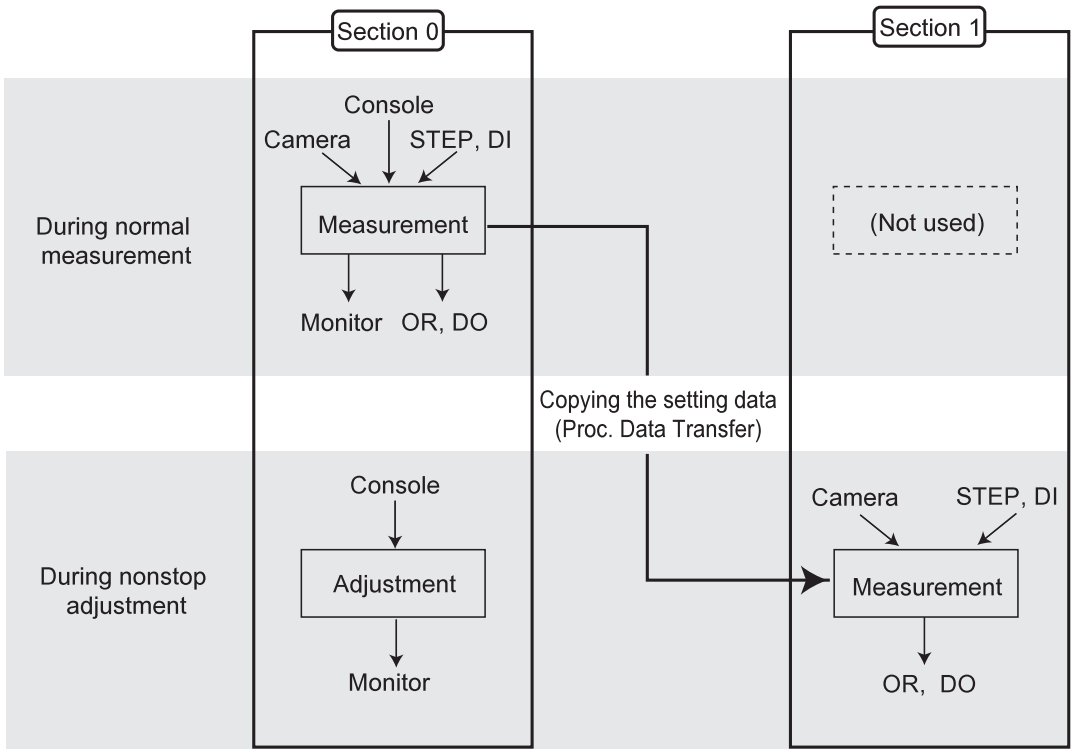

What is Proc. Data Transfer

p.12

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Mechanism of Nonstop Adjustment

The controller has two built-in processing sections, which are called processing section 0 and processing section 1 Only processing section 0 is used for normal measurement. However, during nonstop adjust mode, processing section 0 is used for adjustment while processing section 1 is used for measurement. Thus, to allow measurement to continue during adjustment, the settings made to processing section 0 need to be copied to processing section 1. This copy processing is called “Proc. Data Transfer”.



Setting [Auto transfer] to [Yes (Standard)] or [[Yes (Each time)] will perform Proc. Data Transfer automatically according to the conditions.

SECTION 5 System Settings

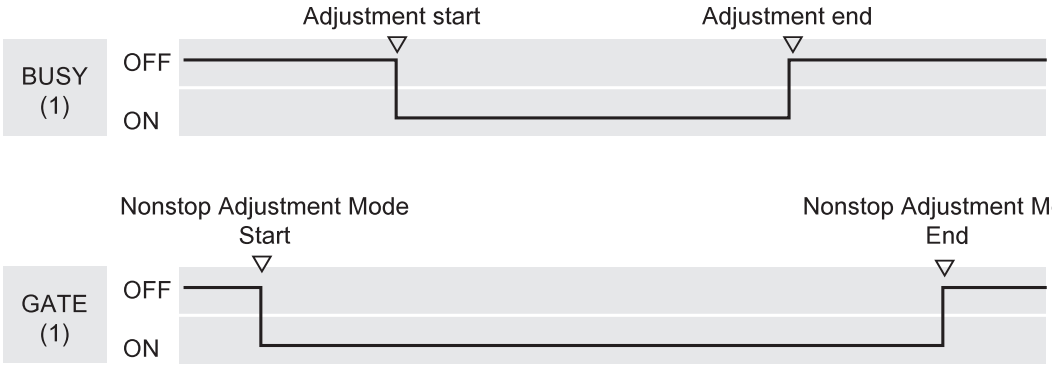
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Communication with External Devices

Parallel Interface

Control signals are output and commands are input via parallel 0 of the parallel I/O connector. With the BUSY (1) and GATE (1) signals of parallel 1, the following can be monitored.

Signal	Terminal No.	Details
BUSY (1)	A10	Allows you to check whether nonstop adjust mode is in progress. This signal is ON during nonstop adjustment.
GATE (1)	B10	Allows you to check whether adjustment is in progress for processing section 0 during nonstop adjustment. This signal is ON during adjustment for processing section 0.



CHECK!

Normal commands are not accepted while nonstop adjustment is performed by the console, so check the state of the parallel interface by monitoring the BUSY (1) signal before performing adjustment.

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Operations Not Allowed During Nonstop Adjustment

• Do not change the following camera and communication related settings. (Do not load system data that contains different camera and communication related settings.)
Failure to observe this may result in odd images or measured values or cause communication problems.
[System/Camera Settings]
[System/Communication]
[Shutter speed] under [Camera Image]
[Lighting Control] under [Camera Image]
[Frame/Field] under [Camera Image]
• When the processing section 1 is switching the scene group to another, do not allow the processing section 0 to access the data file of the same scene group or shut down power supply. This may cause the controller to stop.
• To change setup by inputting a scene group switch command via the parallel interface, scene group 0 cannot be used.
Measurement will be performed with no scene set and measurement results will not be output.

Points to Note during Nonstop Adjustment

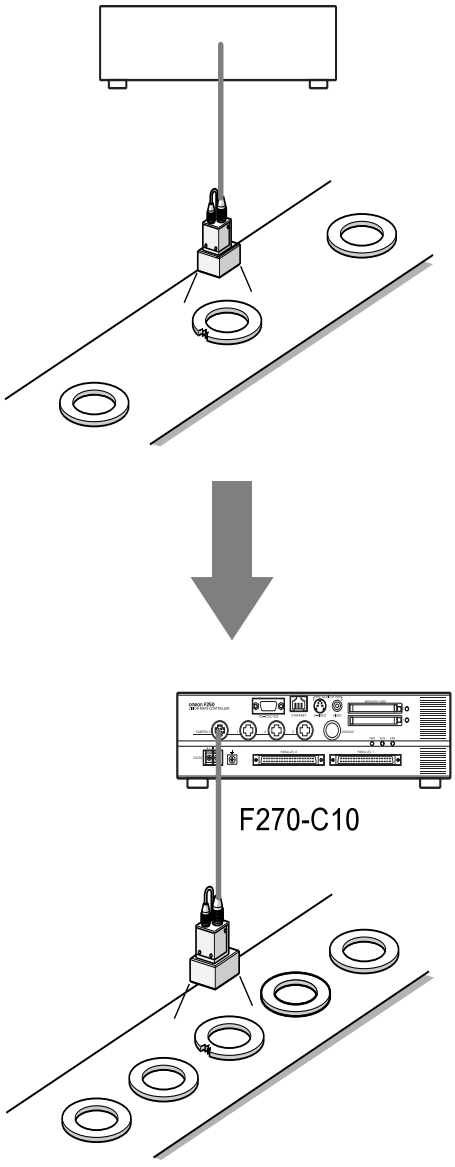
The points that are to be noted during nonstop adjust mode are given below.
Make sure that they are observed.
• Since the menu screen for processing section 0 is displayed on the monitor, the measurement status of processing section 1 will not be displayed on the monitor.
• Since camera image cannot be displayed, the image will not be changed even if the through display or last NG display has been selected.
• The following restrictions apply to the parallel interface input for the processing section 1.
- Even if [Save at switch Scn Group] has been set to ON, the data will not be saved if the scene is switched to another via the parallel interface.
- It takes time to exit the nonstop adjust mode because of preparation for the next nonstop adjustment. During the preparation, it is not possible to switch a scene or a scene group to another via the parallel interface.
- If [DI branching] has been set, the system assumes that “0” is input if measurement is performed again by processing section 0, and will not refer to the state of the parallel interface. Processing section 1 operates according to the input state of DI.
• No more new images can be saved.
• Variables cannot be used as a counter for the number of measurements.
(Because measurement results obtained prior to nonstop adjustment cannot be used)
• Measurement results on the Trend Monitor are not accumulated.
• It is not possible to use the parallel I/O monitor.
• Measurements performed while the setting data is changed as follows cannot be guaranteed.
- Performing measurement while re-registering a model
- Performing measurement while changing conditions using unit data

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Performing Measurement in 1-Line Fast Mode

F270-C10 Only

Use of the 1-line fast mode allows inspections to be performed at a maximum speed of up to twice that of the conventional methods.



Inspections can be performed at a speed of up to a maximum of twice that of the conventional method.

This mode is effective for inspections, such as EC defect inspection, that require long processing time.

1-line fast mode can only be performed in the following cases. Use of other input/output interfaces is not guaranteed.

- Measurement command input: STEP signal
- Output of measurement results: Parallel interface (DO, OR signals)

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Settings to be Made In Advance

To use the 1-line fast mode, [Set key operation] and [Nonstop/Fast] functions need to be set.

Key Operation

Specify the key to be used to transfer data to processing sections and the key to be used to switch monitor display.

SECTION 5 System Settings

Mechanism of 1-Line Fast Mode
p.19

Nonstop/Fast

The controller has two built-in processing sections. Only one processing section is used when setting conditions. However, for measurements, both processing sections are used. Thus, prior to start of measurement, the same settings need to be set for both processing sections.
With [Nonstop/Fast], it is possible to select the timing at which the data is transferred automatically.

SECTION 5 System Settings

CHECK!
Normally, select [Yes (Standard)].

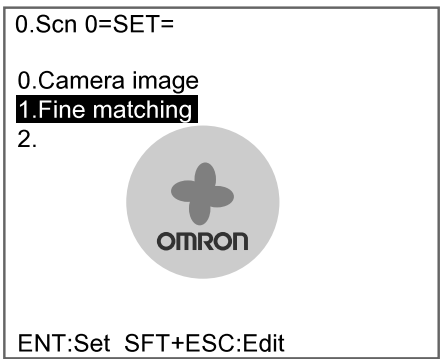
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▪ Manual Data Transfer

If you have changed the setting data, data transfer between the two processing sections must be performed prior to start of measurement, even if [Yes (Standard)] has been selected.

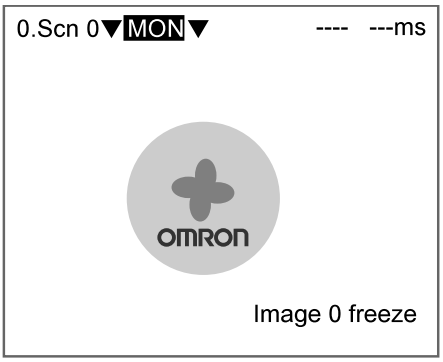
1. Set the desired measurement conditions in the setting mode.

2. After the conditions are set, press the ESC Key.



This will activate the monitor mode.

3. Press the console key assigned to [Proc. data transfer].

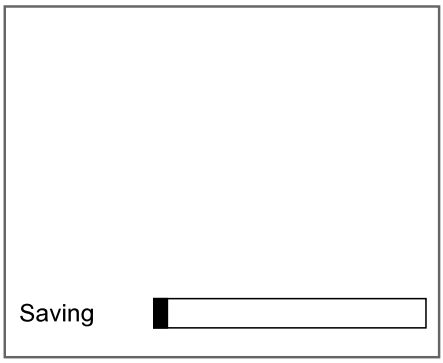


The data will be transferred from processing section 0 to processing section 1.

CHECK!

The data can also be transferred by using the DATATRNS command via the serial interface (normal mode).

Data transfer is now complete.

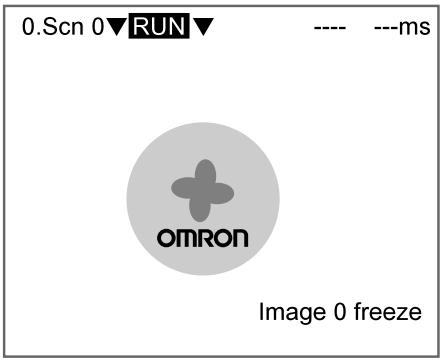


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Starting Measurement

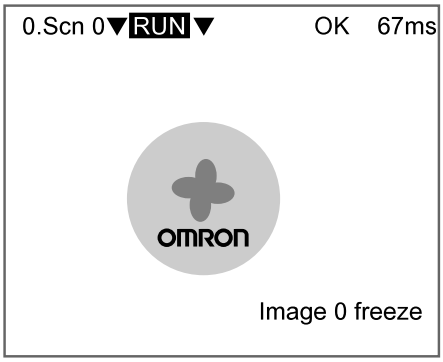
1. Start the run mode.

2. Input the STEP signal.



Measurement will be performed in 1-line fast mode.

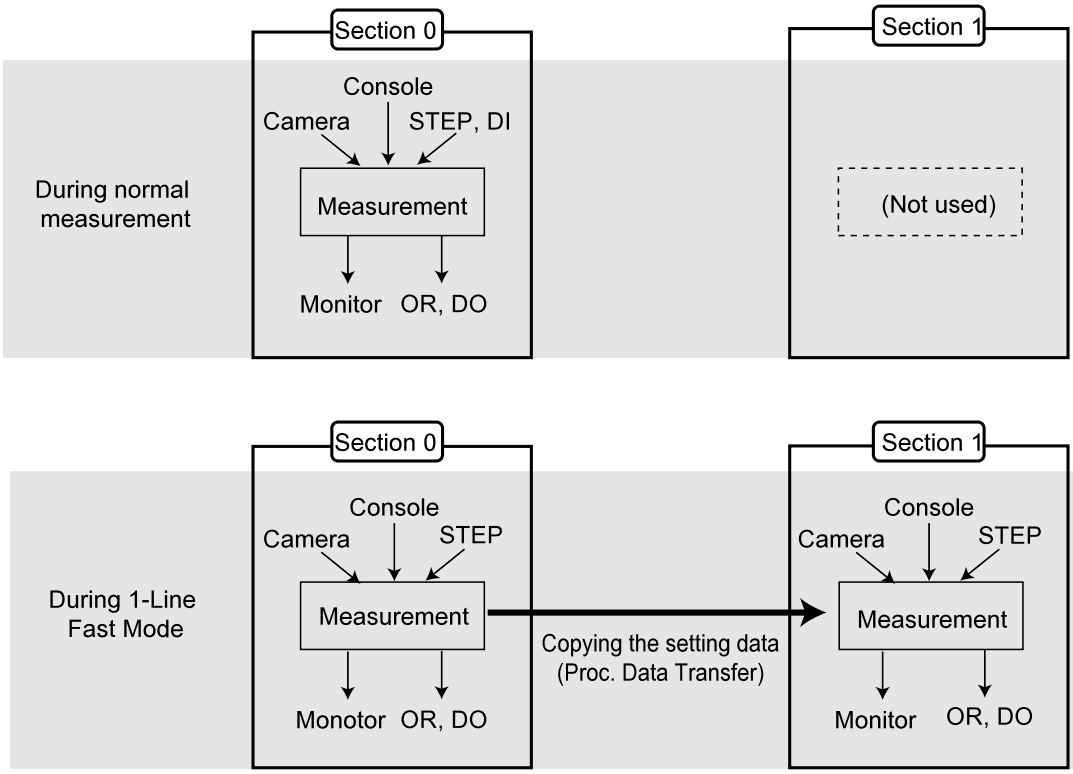
Section 0 screen



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Mechanism of 1-Line Fast Mode

The controller has two built-in processing sections, which are called processing section 0 and processing section 1. In 1-line fast mode, measurement is performed by the two processing sections under the same measurement conditions. Thus, prior to start of measurement, the same data needs to be set for both processing sections 0 and 1. This copy processing is called “Proc. Data Transfer”.



Setting [Auto transfer] to [Yes (Standard)] or [[Yes (Each time)] will perform Proc. Data Transfer automatically according to the conditions.

SECTION 5 System Settings

CHECK!

Data can only be transferred from processing section 0 to processing section 1.
Data cannot be transferred from processing section 1 to processing section 0, so switching of the system data or scene data must be performed by processing section 0.

Switching Monitor Display p.20

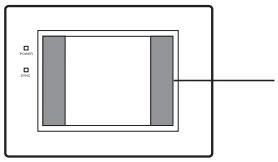
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▪ Monitor Display

The state of processing section 0 is normally displayed on the monitor. However, it is possible to monitor the state of processing section 1.
For this, press the console key assigned to [Switch Proc. monitor] to switch the monitor display.

SECTION 5 System Settings

The monitor's background color changes when the state of processing section 1 is displayed.
(Color monitor: Black to blue, Monochrome monitor: Black to gray)
Images are always displayed in freeze mode.



CHECK!

The monitor display can also be switched by executing the CONMON command of the serial interface (normal).

SECTION 6, "2. Normal Serial Interface"

▪ Accumulated Data in Processing Sections

Saved images and Trend Monitor's measurement data are stored for each processing section.
To do the following, switch the monitor display to the desired processing section first.These operations can be performed via the console or using normal commands.

- Viewing saved images
- Performing re-calculation for a saved image (SHIFT + TRIG Keys)
- Saving a stored image to an external device
- Saving measurement data of Trend Monitor to an external device

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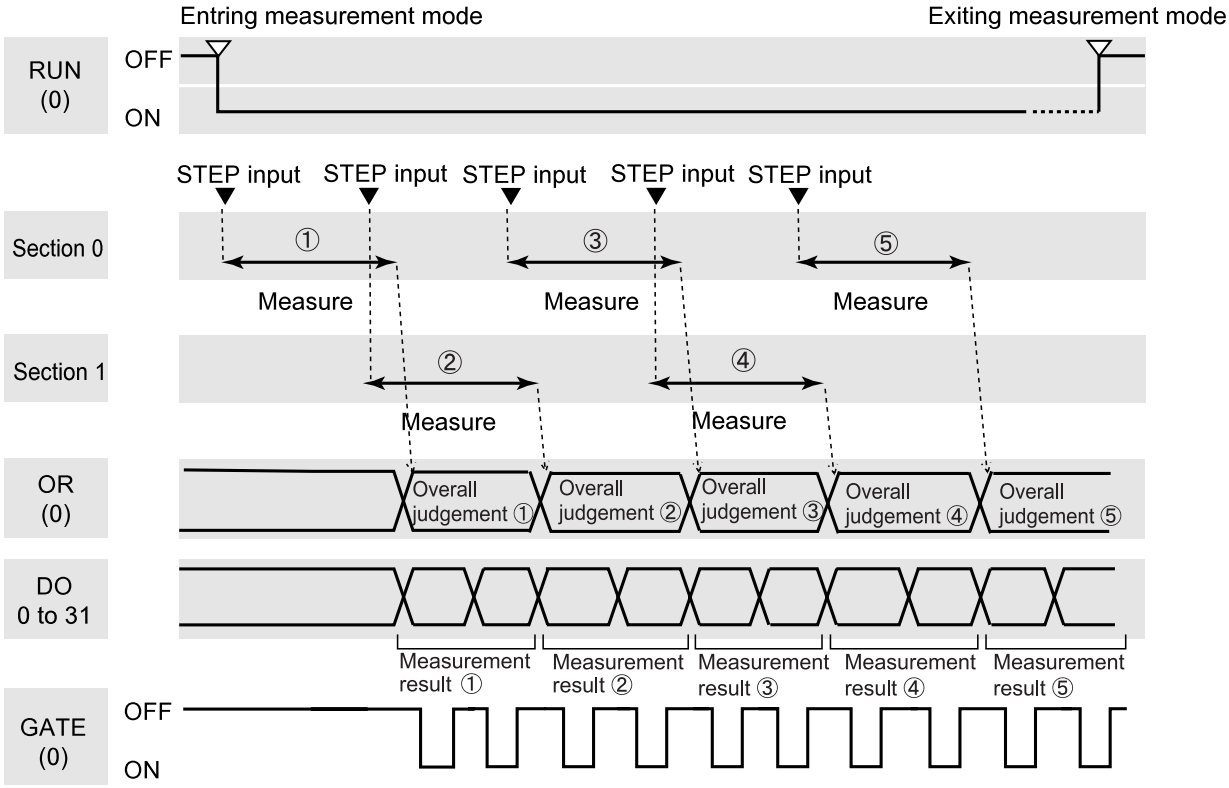
Communication with External Devices

Parallel Interface

Control signals are output and commands are input via parallel 0 of the parallel I/O connector. This is done independently of the processing section where measurement is performed.

When the STEP signal is input, the processing section that is in idle state performs measurement.

The measurement results are output in the order they are processed.



Function of Each Signal
SECTTION 6, “1. Parallel Interface (Timing Chart)”

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- BUSY Signal

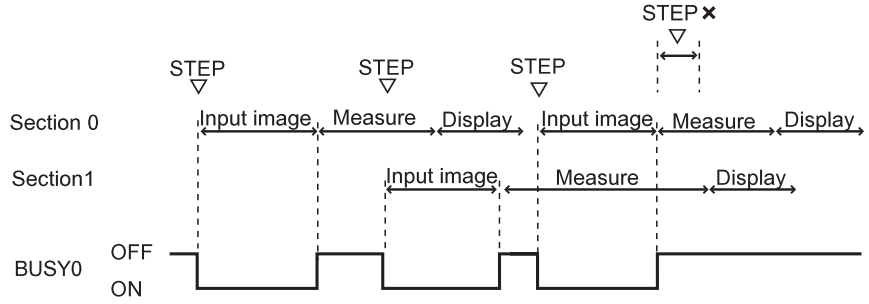
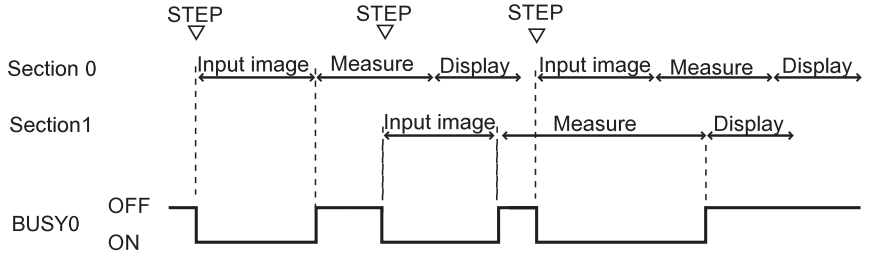
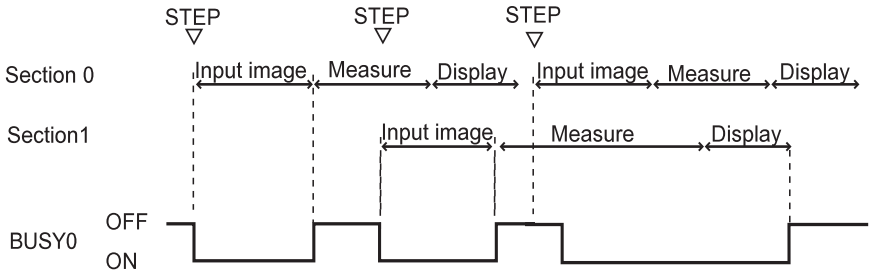
  The BUSY signal is a control signal used to indicate that processing is in progress by the controller. The ON/OFF timing of this BUSY signal is monitored by the external device to perform communications.

  With the 1-line fast mode, both processing sections 0 and 1 are used for measurement. However, the BUSY signal combines the measurement status of both processing sections, and is output to the BUSY (0) of the parallel I/O connector.

  The BUSY (0) signal turns ON when an image is input by one of the processing sections. The timing at which the signal is turned OFF can be changed by [System/Measurement control/ BUSY range].

  The timing can be selected from the following three.

For the BUSY signal handling method, refer to SECTION 5 System Settings.

BUSY Range	Details
Input image	When image input is started by either of the processing sections, the BUSY signal will turn ON. It will turn OFF when image input has been completed. This can be used as a guide as to whether or not the workpiece can be moved. However, even if the BUSY (0) signal turns OFF, the STEP input signal will not be accepted if measurement is in progress in both the processing sections. 
Measurement completed *	If measurement is in progress in the other processing section when image input is completed, the BUSY signal will not turn OFF until the measurement is completed. The BUSY signal will remain ON and the controller considers that measurement is in progress until the end of measurement. The next STEP input can be accepted while the BUSY signal (0) is OFF. 
Display	If measurement is in progress in the other processing section when image input is completed, the signal will not turn OFF until the results of that measurement have been displayed. The BUSY signal will remain ON and the controller considers that measurement continues until the end of display. The next STEP input can be accepted while the BUSY signal (0) is OFF. 

The asterisk (*) indicates the default setting.

CHECK!

The BUSY (1) signal of parallel 1 also remains ON only while measurement is in progress in processing section 1. Using this signal with the BUSY (0) signal of parallel 0 allows you to find which processing section is currently used for measurement.

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- Parallel I/O Monitor
  Used to monitor the communication status of the parallel interface.
  Run I/O Monitor while the screen for the processing section 0 is displayed.
  Only when you want to check the status of the BUSY (1) signal of parallel 1, switch the monitor display to the processing section 1.

SECTION 4 Other Functions

Serial Interface

The serial interface allows input of normal commands only.
[Host link input], [Normal data output] and [Host link data output] are not supported.
Normal commands are executed in the processing section displayed on the monitor.
Switching of the system data or scene data must be done in the processing section 0.

Input of Normal Commands
Section 6, “2. Normal Serial Interface”

CHECK!
When system data or scene data has been changed by a normal command:
If [Auto data transfer] has been set to [Yes (Standard)], press the key assigned to [Proc. data transfer] or execute the DATATRNS command.
If [Yes (Each time)] has been selected, data will be transferred automatically.

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Points to Note for 1-Line Fast Mode

- Only one setting can be made for [Camera Image]. (Fixed at unit 0)
- Measurement is performed by both processing sections, but the state of only one processing section is displayed on the monitor.
  Therefore, measurement results are updated for every two measurements.
- If NG occurs in a processing section other than the one displayed on the monitor even though [Last NG] has been selected, the latest NG image will not be displayed unless you press the key assigned to [Switch Proc. monitor] to switch the monitor display.
- The measurement time displayed on the monitor is the same as that for any run modes except for the 1-line fast mode. Since measurement is performed by both processing sections, double the amount of processing can be performed. However, the time required for each measurement is not shortened.
- The tact time is half the measurement time that is displayed. However, since the image input time is not shortened, consider that it will be the same as the tact time if it is equal or smaller than “half of the displayed time”.

Guide to image input time

	F160-S1 (Double-speed Camera)	Other Cameras
Frame	16.7ms	33.3ms
Field	8.3ms	16.7ms

* Guideline time for freeze display
  Strictly speaking, the shutter time needs to be added to the above figures.

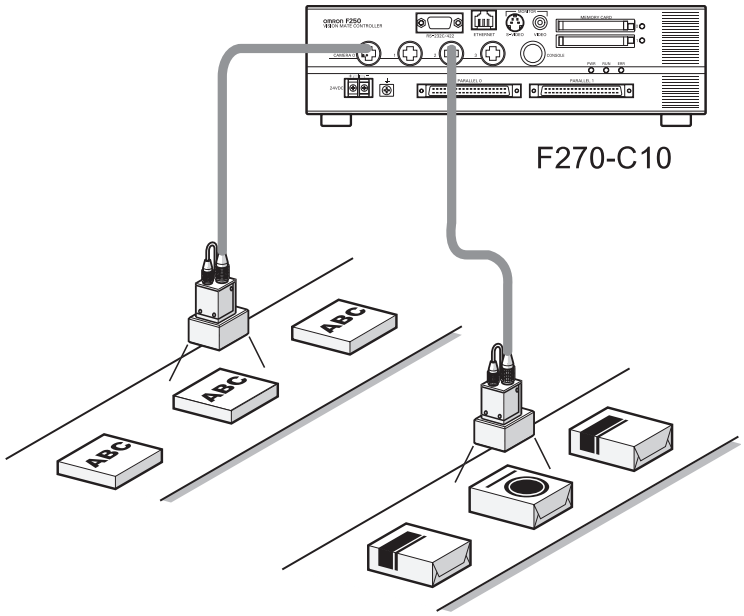
- Variables cannot be used as a counter for the number of measurements, since they are counted by each processing section.
- Saved images and Trend Monitor’s measurement data are stored for each processing section.
- Measurements performed while the setting data is changed cannot be guaranteed.
  (e.g. when performing measurement while changing conditions using unit data)

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Performing Measurement in 2-Line Random Trigger Mode

F270-C10 Only

Two measurement triggers can be input simultaneously. This allows one controller to perform different inspections simultaneously.



2-line random trigger mode can only be performed in the following cases.
Use of other input/output interfaces is not guaranteed.
• Input of measurement command: STEP signal, continuous measurement by parallel (DI)
• Output of measurement results: Parallel interface (DO, OR signals)

Camera Connection

Up to two cameras can be connected to each processing section.
The relationship between processing sections and cameras that can be connected is shown below.

Processing section 0: Camera 0, Camera 1
Processing section 1: Camera 2, Camera 3

CHECK! Internally synchronized cameras (F200-S) cannot be used.

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Settings to be Made In Advance

To perform measurement in 2-line random mode, [Set key operation] function needs to be set.

Key Operation

Specify the key to be used to switch the monitor display.

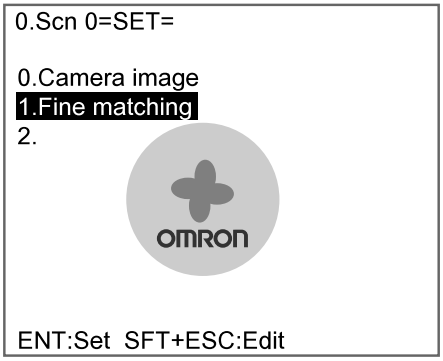
SECTION 5 System Settings

Mechanism of 2-Line Random Trigger Mode
p.29

Setting Measurement Conditions

Set the measurement conditions for each processing section. After they are set, they must be saved to the flash memory for each processing unit.

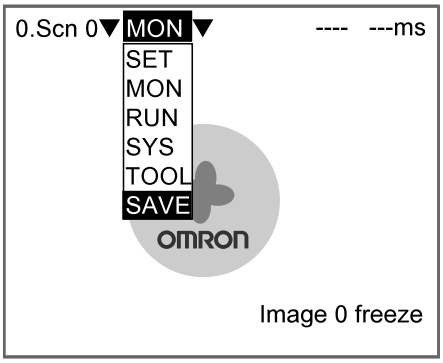
1. Set the measurement conditions for processing section 0.



2. After the conditions are set, press the ESC Key.

This will activate the monitor mode.

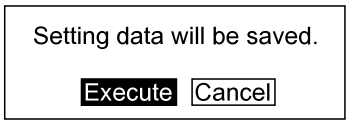
3. Select [Save].



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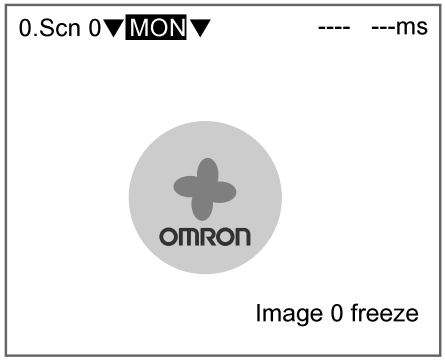
A save confirmation message appears.

4. Select [Execute].

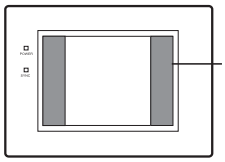


The settings made for processing section 0 will be saved.

5. Press the console key assigned to [Switch Proc. monitor].



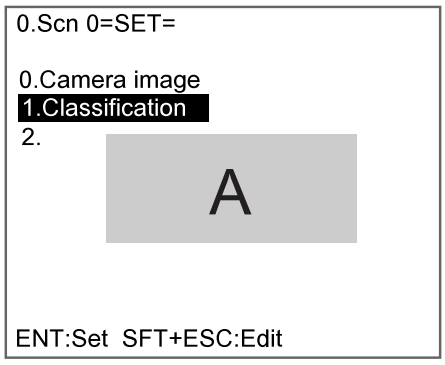
The monitor will switch to processing section 1.
The monitor's background color will switch.



Monitor's background color
Color monitor: Black to blue
Monochrome monitor: Black to gray

CHECK! The screen can also be switched by using the CONMON command via the serial interface (normal mode).

6. Repeat steps 1. to 4. to complete setting the measurement conditions for the processing section 1.



CHECK! Actually cameras 2 and 3 are connected to processing section 1. However, when making settings for [Camera Image] and [Switch camera], assume that Cameras 0 and 1 are connected.

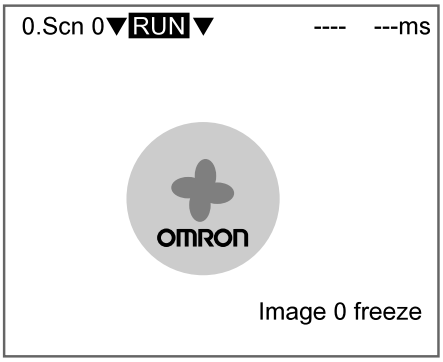
The settings made for processing section 1 will be saved.

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Starting Measurement

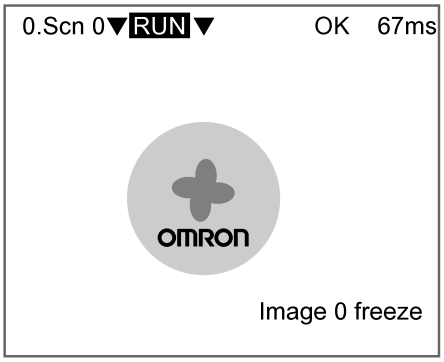
1. Start a run mode.

2. Input the SETP signal or parallel DI signal of each processing section.

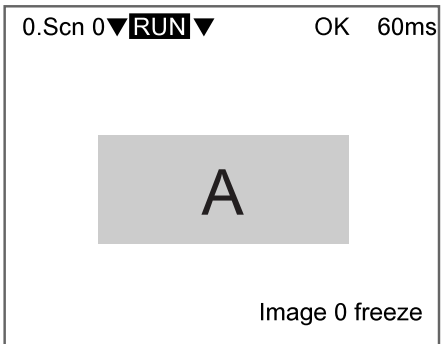


Measurement will be performed in 2-line random trigger mode.

Section 0 screen



Section 1 screen



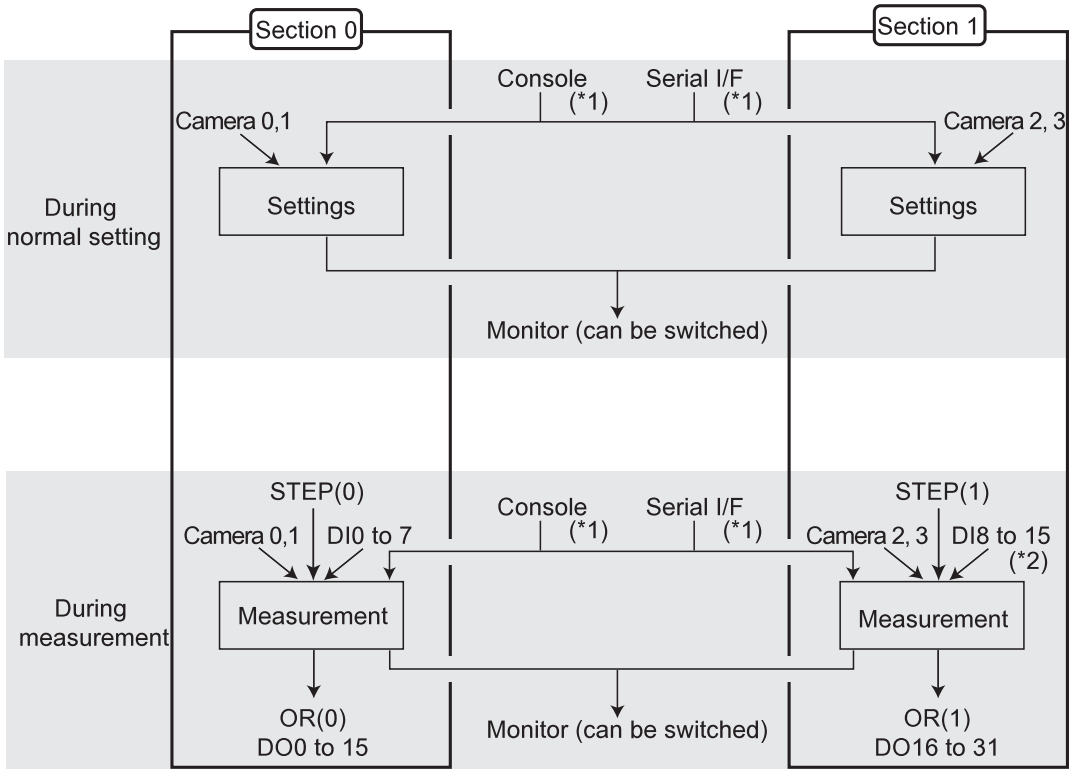
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Mechanism of 2-Line Random Trigger Mode

The controller has two built-in processing sections, which are called processing section 0 and processing section 1. With the 2-line random trigger mode, both processing sections are used.

Each processing section can have its own system data and scene data, allowing simultaneous measurement by both processing sections.

However, only one processing section is displayed on the monitor, so press the console key assigned to [Switch Proc. monitor] if you want to switch to the other processing section.



*1: The processing section currently displayed on the monitor is input.
*2: The command format is the same as that for DI0 to DI7.

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Communication with External Devices

Parallel Interface

Parallel 0 of the parallel I/O connector is used for processing section 0, and parallel 1 for processing section 1.

SECTION 4 Connecting External Devices of the F270 Setup Manual

• Timing Charts

For details, refer to SECTION 6 Communication with External Devices, “1. Parallel Interface”.

• [DO Data Output]

Both processing sections can output 16-bit data. The output range varies as follows with the data format. Data will not be output correctly if this range is exceeded.

Binary data: -32768 to +32767

BCD data : -999 to +999

SECTION 2 “6.2 DO Data Output"

• [DO Judgement Output]

Both processing sections can output judgement data 0 to 15. No data will be output even if setting is made for judgements 16 to 31.

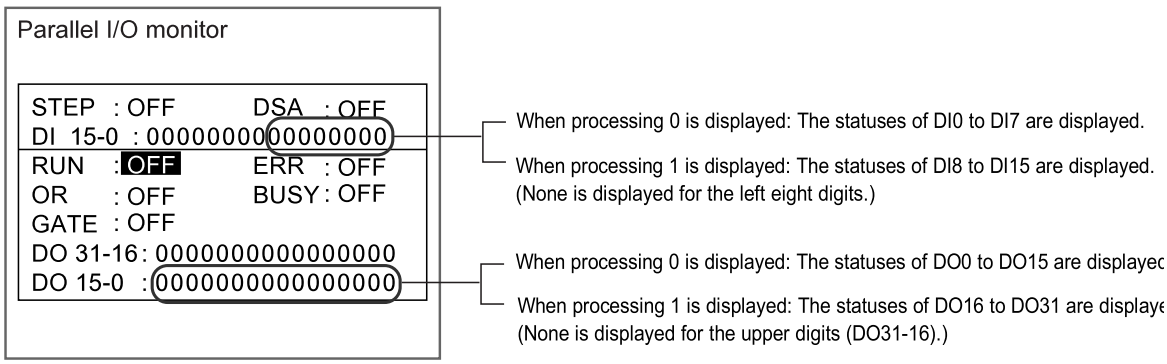
SECTION 2, “6.3 DO Judgement Output"

• Parallel I/O Monitor

Used to monitor the communication status of the parallel interface.

It allows you to monitor the status of parallel 0 while processing section 0 is displayed on the monitor, and parallel 1 while processing section 1 is displayed on the monitor.

Use the following procedure to monitor the DI and DO signals.



SECTION 4 Other Functions

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Serial Interface

The serial interface allows input of normal commands only.
Host link input, normal data output and host link data output are not supported.
Normal commands are accepted by the processing section that is currently displayed on the monitor, so check the monitor display first and then execute an appropriate command.

Input of Normal Commands
SECTION 6, “2. Normal Serial Interface (Normal)”

Backing Up Data to the Memory Card

Backing Up Scene Group Data

The scene group data for each processing section is saved in the following directory.
Data backup must be performed for each processing section.

SECTION 4 Other Functions

Directory for processing section 0

Scene group data for processing section 0

Directory for processing section 1

Scene group data for processing section 1

Backing Up Data to the Flash Memory

Data backup must be performed for each processing section.
Once backup has been completed, the following files will be created in the memory card automatically. Do not change the file names.

File Name	Data Content
bkupprog	Installed program
bkupdata	Backup data for processing section 0
bkupdat2	Backup data for processing section 1

SECTION4 Other Functions

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SECTION 5
System Settings

This section describes how to set conditions related to the system environment.
For the communication specifications, refer to SECTION 6 Communication with External Devices.

Entering System Mode	2
Camera Settings	3
Screen Display and Monitor	4
Customizing Operations	16
Setting Save Conditions for Measurement Images	27
Using BUSY Signals	32
Setting Startup Conditions (Start Mode)	34
Setting the Calendar Date and Time (Date/Time)	35
Checking System Information	36

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Entering System Mode

To set conditions related to the system environment it is necessary to enter System Mode.
This section explains how to enter the system mode.

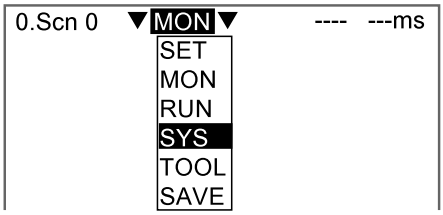
1. Display the basic screen for monitor mode or run mode.

2. Place the cursor on [MON] or [RUN], and press the ENT Key.

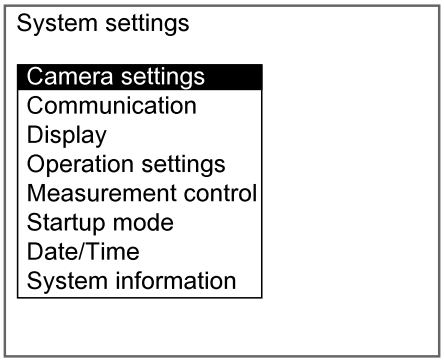


The mode selections will be displayed.

3. Select [SYS].



The System Settings Screen will be displayed.



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Camera Settings

Specify the model of the connected camera and whether to use the intelligent lighting.
The model of each unit (camera, intelligent lighting) must be specified, so refer to the model name written on each unit.

Menu item	Selection	Details
Camera used	F150-S1A F160-S1 F160-S2* Other	Select the model of the connected camera.
Intelligent Lighting 0 Intelligent Lighting 1 Intelligent Lighting 2 Intelligent Lighting 3	Out of use* LTC20 LTC50	If a camera with intelligent lighting is connected, select the model of the intelligent lighting. Always set the DIP switch on the intelligent lighting to 0, regardless of the camera number.The DIP switch setting method is described in the Setup Manual.

The asterisk (*) indicates the default setting.

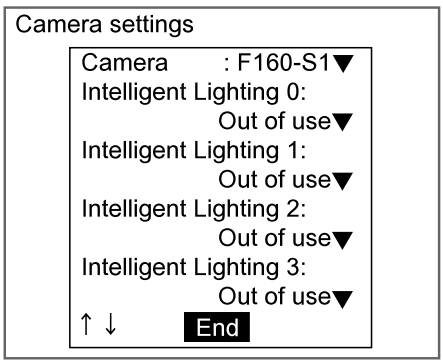
1. Start the system mode and select [Camera settings].
p.2

The setting screen appears.

2. Select the model of the connected camera.

3. If using intelligent lighting, select its model.

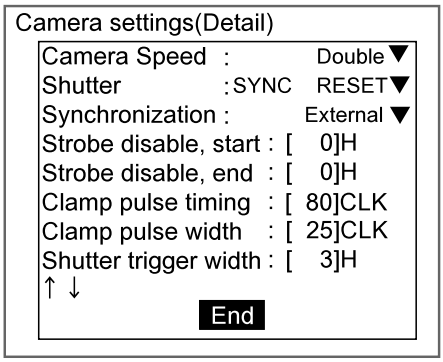
4. Select [End].



The settings will be registered and the System Settings Screen will return.

CHECK!

If [Others] is selected for [Camera], the Camera Settings (Detail) Screen will be displayed.The settings for F200/F300 cameras are listed in the Setup Manual.



NOTICE When changing the camera model, save the settings in the flash memory. Set the measurement conditions after starting the controller again.

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Screen Display and Monitor

Changing Font Sizes

Select the size of the font for screen display.

Selection	Details
Normal	Default font size.
Small	Half the normal font size.

CHECK!

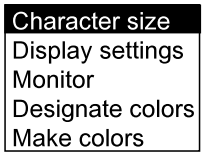
The font sizes set for each results display processing item will be enabled for any results data being displayed under those items.

1. Start the system mode and select [Display].

p.2

The selection menu will be displayed.

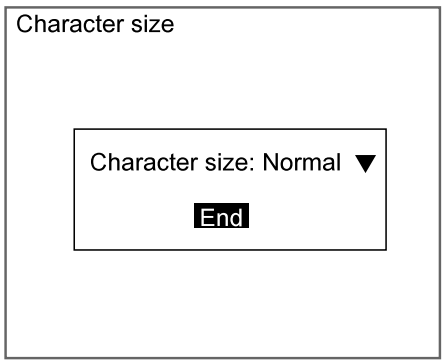
2. Select [Character size].



The Character Size Selection Screen will be displayed.

3. Change the setting.

4. Select [End].

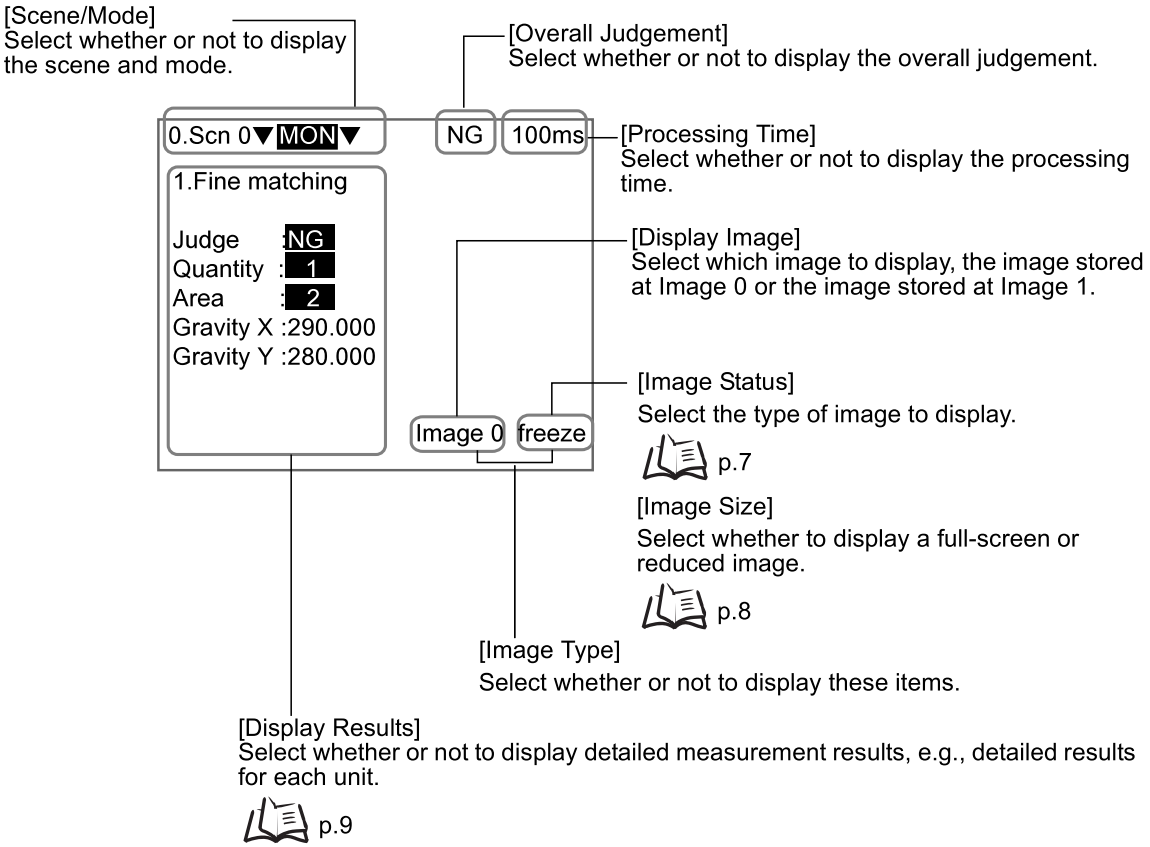


The settings will be registered and the screen in **2.** will return.

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Measurement Screen Settings

Set the items below to determine the information displayed in Run Mode and Monitor Mode. The display settings made here will be reflected in all scenes.



CHECK!

[Scene/Mode]
Even if [Scene/Mode] is set to not be displayed, the scene or mode can be displayed temporarily by pressing the ENT Key. However, measurement cannot be performed while the scene or mode is being displayed this way. Press the ESC Key again to turn OFF the display.

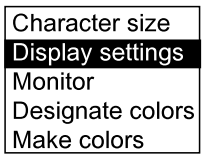
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1. Start the system mode and select [Display].

p.2

The Memory Capacity/Version Menu will be displayed.

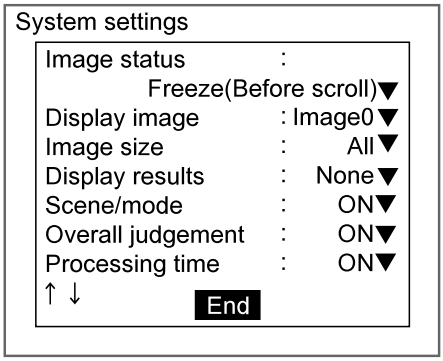
2. Select [Display settings].



The screen for setting the measurement display settings will be displayed.

3. Change the settings for each item.

4. Select [End].

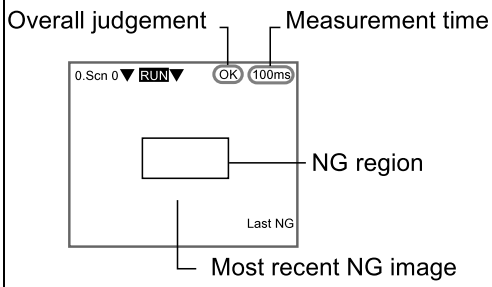


The settings will be registered and the screen in **2.** will return.

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Image Status

Select the type of image to be displayed in the background.

Selection	Details
Through	The latest image taken by the Camera is displayed directly. If measurement is performed using a Through display, the measurement time will be increased by the amount of time from when the measurement command is input until the image input starts. This delay is included in the measurement time shown on the Monitor and Run Mode screens.
Freeze (before scroll) *	A still of the image taken by the Camera is displayed. This image is updated when measurement is performed. Select Freeze when measuring moving objects. If position displacement compensation is set, an unscrolled image will be displayed. The region will be scrolled the position displacement amount.)
Freeze (after scroll)	A still of the image taken by the Camera is displayed. This image is updated when measurement is performed. Select Freeze when measuring moving objects. If position displacement compensation is set, an image scrolled the position displacement amount will be displayed.
Last NG (before scroll)	The image of the latest image to receive an overall judgement of NG is displayed. If position displacement compensation is set, an unscrolled image will be displayed. (The region will be scrolled the position displacement amount.)  CHECK! The latest measurement results are always displayed for overall judgement and measurement time. Be careful, because the display image and the overall judgement will not match when this image type is selected if the latest measurement gave an OK judgement. CHECK! The following operations cannot be performed, while the last NG image is being displayed. • Re-measurement • Display capture • Line Brightness display • Stored image display When operations other than measurement are performed, the latest NG image will be cleared and the display will remain clear until the next NG result is returned.
Last NG (after scroll)	The image of the latest image to receive an overall judgement of NG is displayed. If position displacement compensation is set, an image scrolled the position displacement amount will be displayed. All other operations are the same as for Last NG (before scroll).

The asterisk (*) indicates the default setting.

CHECK! When [After scroll] is selected, the measurement times will be lengthened by the following amounts:
(Number of displayed images) × 16.7 ms (See *.)
*: Measurement time may vary with the settings.

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Image Size

Select the size of the image in relation to the screen.

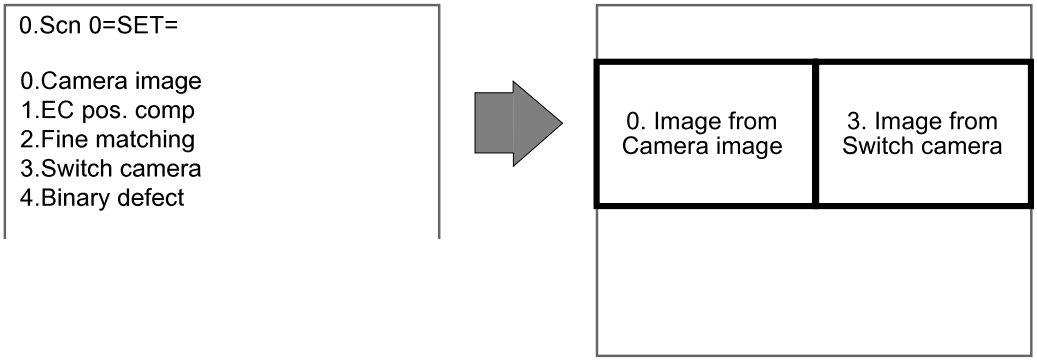
▪ All

One image will cover the whole screen. (This is the default setting.)

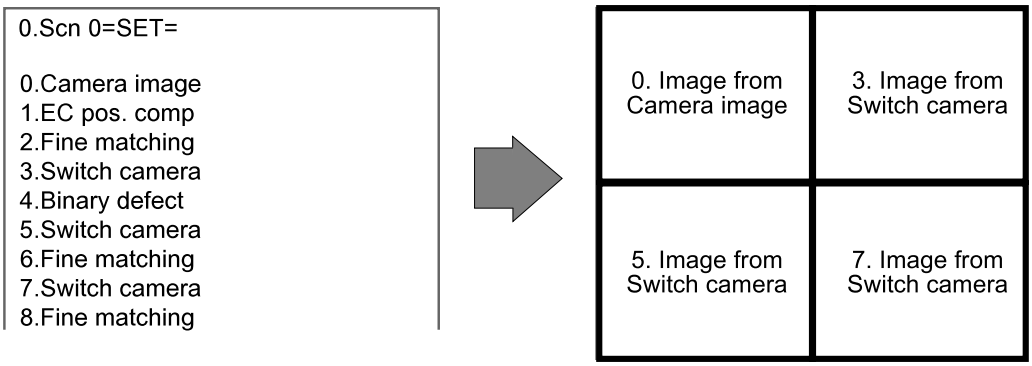
▪ Reduced

Depending on the number of units set for the displayed scene under [Camera image] or [Switch camera], 1 to 4 screens will be reduced and displayed.

Example: When [Camera Image] is set to 1 and [Switch Camera] is set to 1



Example: When [Camera Image] is set to 1 and [Switch Camera] is set to 3



CHECK!

Light brightness cannot be displayed for reduced images.

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Display Results

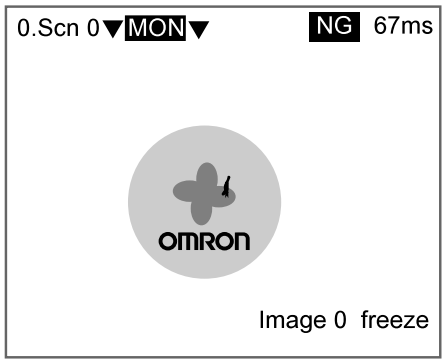
Detailed measurement results can be displayed on the screen.

Judgement conditions can also be set while monitoring measurement values.

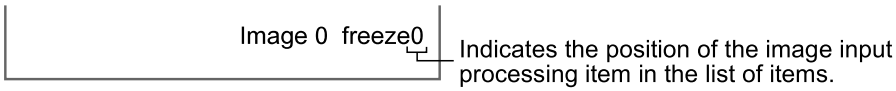
CHECK! The description given here is based on default key allocations. Be careful if the key allocations have been changed.

• None (default)

Only the overall judgement will be displayed.

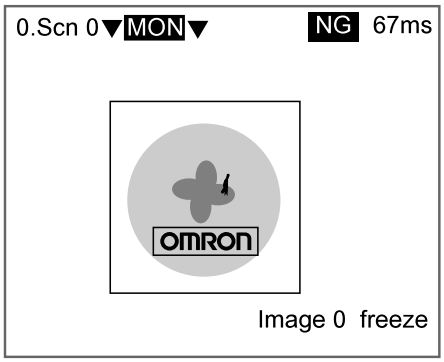


CHECK! If the image size is set to [All] and the [Camera image] or [Switch camera] settings in the image input-related processing items are set to 2 or more, use the Up and Down Keys to switch between images.



• Positions

Displays all the regions set to the unit that executed the measurement. Figures drawing using OR are shown in solid lines and figures drawn using NOT are shown in dash lines.



CHECK! If the image size is set to [All] and the [Camera image] or [Switch camera] settings in the image input-related processing items are set to 2 or more, use the Up and Down Keys to switch between images.

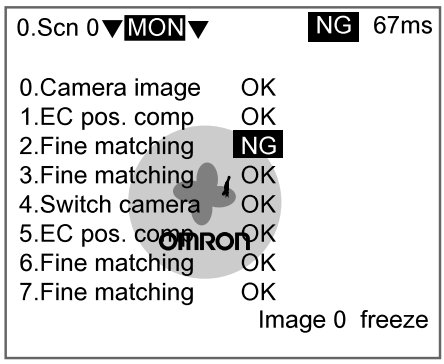
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• Results

Displays a list of judgement results for the set unit.

If the character size is set to Normal, 8 sets of results will be shown on one screen. If the character size is set to Small, 32 sets of results will be shown on one screen.

SHIFT + Right/Left Keys: Scroll through the unit numbers.



CHECK!

If the image size is set to [All] and the [Camera image] or [Switch camera] settings in the image input-related processing items are set to 2 or more, use the Up and Down Keys to switch between images.

• Details

Displays detailed information for each unit. Use the Up and Down Keys to switch between units.

The displayed data differs depending on the processing item and some processing items have multiple Details Screens.

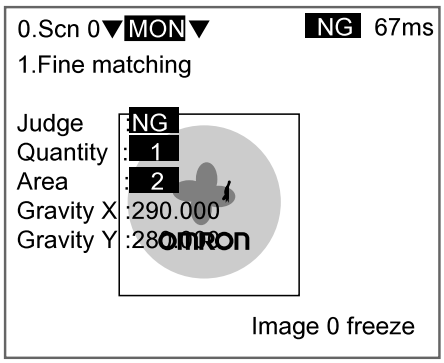
Use the SHIFT + Left/Right Keys to switch between Details Screens.

For details, refer to the explanation given for each processing item.

SECTION 2 Processing Items Setting Procedures

Example: Details Screen for fine matching

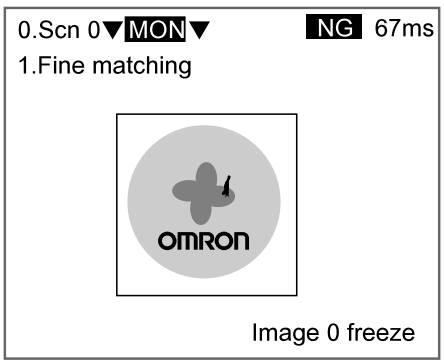
Measurement values



SHIFT + Right Keys

SHIFT + Left Keys

Position



CHECK!

Press the SHIFT + ENT Keys in the Details Screen to display the menu for changing settings. The measurement conditions can be changed while in Run Mode or Monitor Mode. However, measurement will not be performed while in the screen to change the settings, even if the measurement command is input.

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Selecting Color or Monochrome Monitors

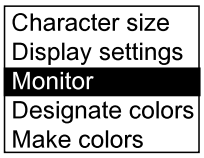
Select the type of monitor to be connected.
When color monitors are used, characters and figures can be color-coded and displayed in color.

1. Start the system mode and select [Display].

p.2

The selection menu will be displayed.

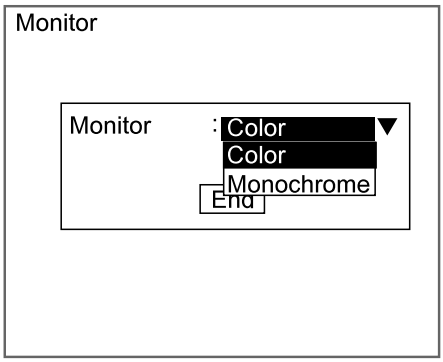
2. Select [Monitor].



The Monitor Settings Screen will be displayed.

3. Select the desired monitor type.

4. Select [End].



The settings will be registered and the screen in **2.** will return.

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Changing Character or Figure Colors

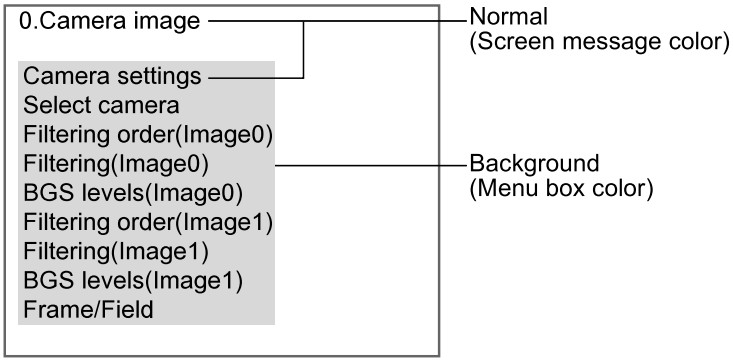
The color for characters or added figures can be set. Change the color when it is difficult to see the character or figure on the image. The display color set here, however, will be reflected in all scenes.
For color monitors, select white, black, red, green, blue, yellow, or original. (A combination of up to any 7 colors can be set.) For monochrome monitors, select white or black.

Creating Original Colors p.14

The positions where color can be changed are described below.

Normal and Background Colors

Messages displayed on the screen will be appear in the color set under [Normal].
Menu boxes will shaded in the color set under [Background].



OK and NG Colors

The judgement display, all measurement values, and the measurement region will be displayed in the color set under [OK color] or [NG color], depending on the measurement result.

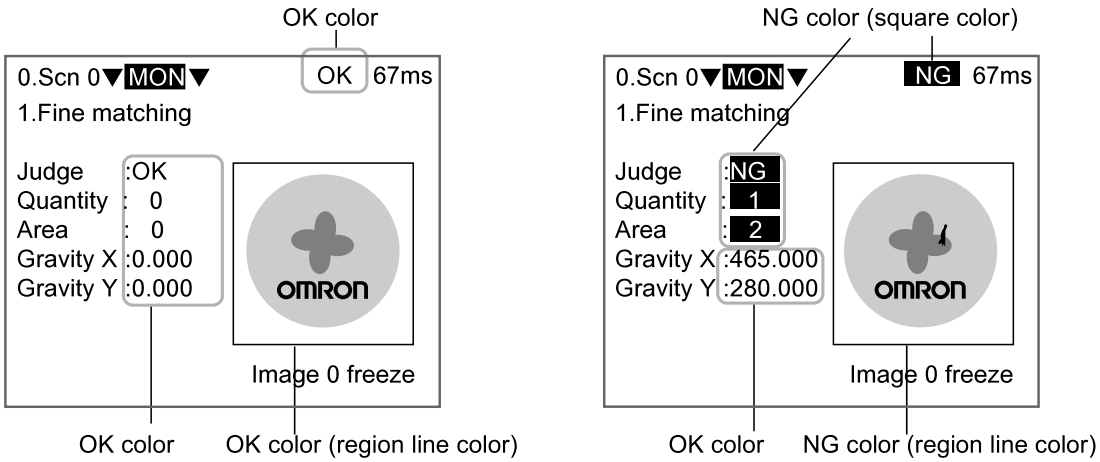


Figure Colors 0 to 6

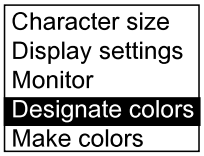
The figure color is the color for figures or characters displayed on the screen using the results display-related processing items.

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1. Start the system mode and select [Display].

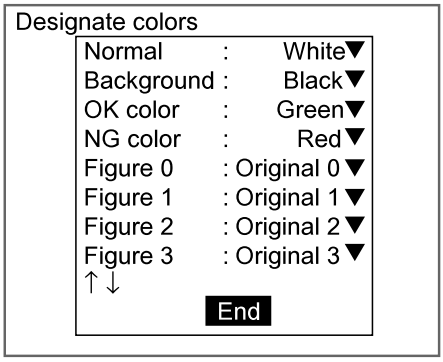
p.2

The selection menu will be displayed.



2. Select [Designate colors].

The Designate Colors Screen will be displayed.



3. Make the settings for each item.

4. Select [End].

The settings will be registered and the screen in **2.** will return.

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Creating Original Colors

Up to 7 original colors can be created for displaying characters or figures, using a combination of red, green, and blue.

Effectuating Created Colors p.12

The default settings are shown below.

Display item	R (red)	G (green)	B (blue)
Original 0	32	32	32
Original 1	64	64	64
Original 2	96	96	96
Original 3	128	128	128
Original 4	160	160	160
Original 5	196	196	196
Original 6	224	224	224

1. Start the system mode and select [Display].

p.2

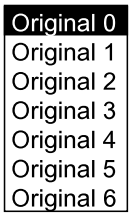
The selection menu will be displayed.

2. Select [Make colors].



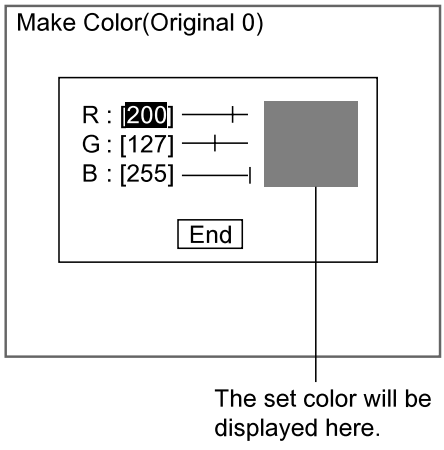
The menu for selecting color numbers will be displayed.

3. Select a color number to set for the new color.



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The Make Color Screen will be displayed.



4. Make the settings for each item.

Up and Down Keys: Moves the cursor
Left and Right Keys: Increases or reduces the color at the cursor position by one.
SHIFT+Left/Right Keys: Increases or reduces the color at the cursor position by ten.

5. Select [End].

The settings will be registered and the screen in **3.** will return.

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Customizing Operations

Changing Console Key Allocations

It is possible to change the allocations for console key operations.


CHECK!

The set allocations are only enabled in Monitor Mode or Run Mode.

Default Key Allocations

Key	Allocation
ESC	None
SHIFT + ESC	Measurement display
SHIFT + ENT	Judgement conditions
SHIFT + RIGHT	Next sub-display
SHIFT + LEFT	Previous sub-display
SHIFT + UP	Previous image
SHIFT + DOWN	Next image
F1 to F8 (See note 1.)	None



Allocatable functions
None
Measurement display
Previous image
Next image
Judgement conditions
Previous scene
Next scene
Previous scene group
Next scene group
Clear image
Erase characters
Save
Through/Freeze
Measurement control
Monitor
Designate Color
Thumbnail
Drive status
Scene/mode
Line Brightness
Display capture (Note 2.)
Previous sub-display
Next sub-display
Clear measurement
Switch nonstop
Proc. data transfer
Switch Proc. monitor

Note 1: Function keys are suppported only for F160-KP.
If the F150-KP is being used, input will not be possible using these keys, even if key allocations are made.


Roles of Available Functions p.17

Note 2: Changing display capture key allocations

Inputs based on the key allocations made here will be accepted in Monitor or Run Mode, even if [SYS/Operation settings/Display capture] is set to OFF.


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• Roles of Available Functions

Selection	Function
None	Nothing allocated.
Measurement display	Displays the [SYS/Conditions/Display settings] screen.
Previous image *1	Displays the previous memory image.
Next image *1.	Displays the next memory image.
Judge conditions	Displays the screen for setting evaluation criteria.
Previous scene	Displays the previous scene.
Next scene	Displays the next scene.
Previous scene group	Displays the previous scene group.(Scene no. is the same as that in effect before switched)
Next scene group	Displays the next scene group.(Scene no. is the same as that in effect before switched)
Clear image	A message confirming whether all stored images are to be cleared is displayed. Images stored in memory are cleared when power is turned OFF. By allocating this function to a Console Key, stored images can be cleared without turning power OFF.
Erase characters	Displays the menu for character display settings. To prevent scorching of the monitor screen, it is possible to delete screen characters.
Save	Displays a confirmation message for saving to flash memory or Memory Card.
Through/Freeze *1	Switches to [Freeze (before scroll)] display if currently on [Through] display. Switches to [Through] display if currently on [Freeze ☐] / [Last NG ☐] display.
Measurement control	Displays the [SYS/Measurement control] screen.
Monitor	Displays the [SYS/Display/Monitor] screen.
Designate colors	Displays the [SYS/Display/Designate colors] screen.
Thumbnail *2	The saved measurement images are displayed 4 at a time.
Drive status	Displays the [Tool/Memory card/Drive status] screen.
Scene/mode	The scene number and mode display shown at the top left corner of the Basic Screen in Monitor and Run Modes is deleted. Press the ENT Key to display the scene number and mode display temporarily. Measurement cannot be performed, however, during this display. Press the ESC Key to make the display disappear.
Line Brightness	Displays the [Tool/Line brightness] screen. Line brightness cannot be displayed, however, when [Last NG ☐] is set for [Image status] or [Image size] is set to [Reduced].
Display capture	Saves the displayed image to the Memory Card. p.20
Previous sub-display	When results display is set to [Detail], the display will switch to the previous Details Screen for the displayed unit. The unit number will be switched when set to [Results].
Next sub-display	When results display is set to [Detail], the display will switch to the next Details Screen for the displayed unit. The unit number will be switched when set to [Results].
Clear measurements	Clears all measurement values for the currently displayed scene.
Switch nonstop	Starts/exits nonstop adjust mode.
Proc. data transfer *3	Transfers (copies) the data from processing section 0 to processing section 1. This key is used only in nonstop adjust or 1-line fast mode.
Switch Proc. monitor	Switches monitor display to the other processing section. (From processing section 0 to 1, or from processing section 1 to 0) This key is used only in 1-line fast or 2-line random trigger mode.

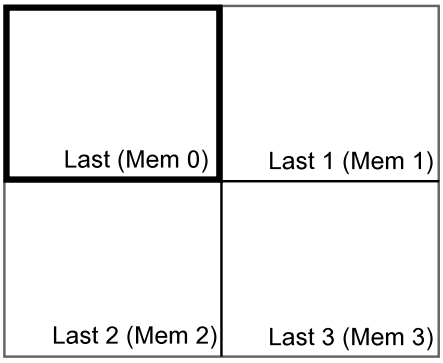
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*1 Previous Image, Next image, Through/Freeze

When the image display is set to [Last NG (before scroll)] or [Last NG (after scroll)], the display will not switch even if this allocated key is input.

*2 Thumbnail Display

Stored images are displayed 4 at a time, making it faster to find a particular measurement image.



SHIFT+Up/Down Keys	: Switches four images at once.(Last four/next four images)
Up/Down and Left/Right Keys	: Moves the thick frame for selecting images.
ENT Key	: Selects the image inside the thick frame and returns to the previous screen.

CHECK!

Measurement cannot be performed during thumbnail display.

*3 Proc. data transfer

To prevent incorrect operations, do not assign this function to any key in the case of 2-line random trigger mode.

Even if the measurement conditions set for processing section 0 are different from those set for processing section 1, pressing the key assigned to this function will copy the data stored in processing section 0 to processing section 1, resulting in the same measurement conditions being set for both processing sections.

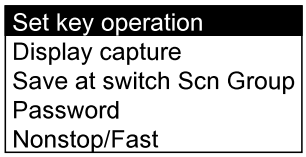
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1. Start the system mode and select [Operation settings].

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The Memory Capacity/Version Menu will be displayed.

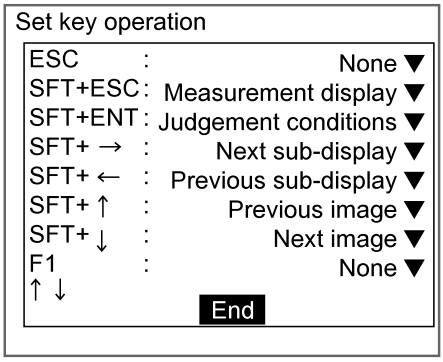
2. Select [Set key operation].



The Set Key Operation Screen will be displayed.

3. Make the settings for each item.

4. Select [End].



The settings will be registered and the screen in **2.** will return.

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Capturing and Saving Images

Enable this function and press the Execution Key to capture the image displayed on the monitor screen and save it to the memory card.
Stored images can be pasted to documents on a personal computer or loaded to the Controller and re-measured.

Selection	Details
OFF*	Screen capture is not performed.
LIVE+CAPT	Captures the screen image and saves it in two files (LIVE***.BMP, CAPT***.BMP). The screen image is saved in a file (LIVE***.BMP) only when this function is executed in Run or Monitor mode.
CAPT only	Captures the screen image and saves it in a file (CAPT***.BMP). The screen will not be saved in a file (LIVE***.BMP).

The asterisk (*) indicates the default setting.

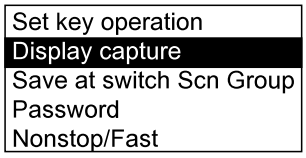
*File Type p.21

CHECK!
- Capture operation takes several seconds, during which measurement cannot be performed. To prevent incorrect operation, set this function to OFF.
- When the image display is set to [Last NG ☐], captured images are not accepted.

1. Start the system mode and select [Operation settings].
p.2

The selection menu will be displayed.

2. Select [Display capture].

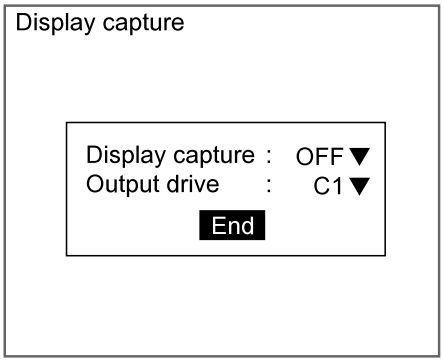


The Display Capture Screen will be displayed.

3. Select [Display capture].

4. Select the drive of the memory card to which the captured images are to be saved.
(Select either C0 or C1.)

5. Select [End].



The settings will be registered and the screen in **2.** will return.

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Execution Keys

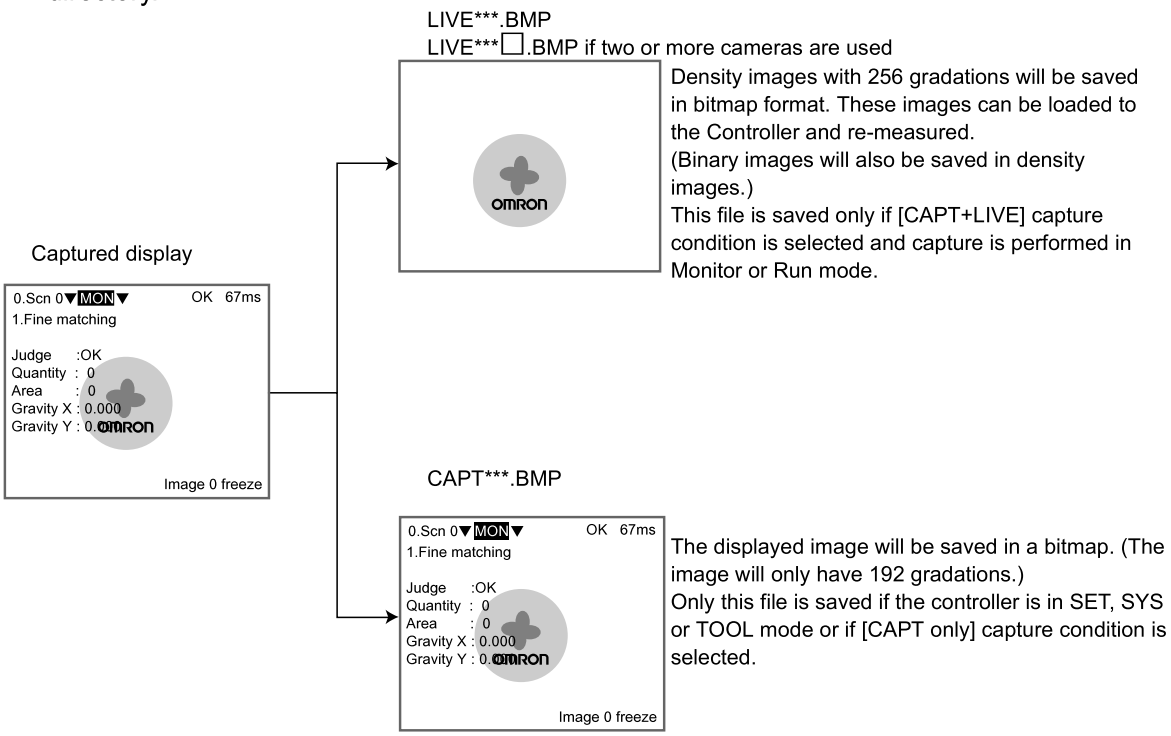
The following keys can be used to perform capture when the display capture function is enabled.
For F160-KP: F9 Key
For F150-KP: SHIFT+Left+Right Keys (Press 3 keys at the same time.)

CHECK! In Monitor and Run Modes only, the display capture function can be allocated to another key. For example, the key allocation can be changed when the F150-KP is being used to enable one-touch operation, rather than having to press three keys at the same time.
However, if [Display capture] is set to [OFF] after the display capture function is allocated to another key, the allocation will no longer be effective.

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Display Capture Results

When display capture is executed, a directory called IMAGE will automatically be created in the root directory of the Memory Card and the following two types of files will be stored in that directory.



A serial number starting from 000 will be automatically allocated to ***.
The same number is used for both files.

When using two or more cameras, an alphabet corresponding to the processing item ([Camera Image], [Switch Camera]) set to the flowchart will be added to the file name (in ☐ after "***"). This applies for "LIVE***.BMP" image files only.
Alphabets A, B, C and D are assigned to processing items in this order, starting from the processing item set for the smallest unit No.

CHECK! However, if capture is performed in the following cases, images that have not been captured by the specified camera may be saved.

- When the system has just started and no measurements have been made
- When the scene has just been switched to another and no measurements have been made
- When the scene flowchart has just been edited and no measurements have been made

CHECK! If the number of lines to be read is set to a value other than 484 and capture is executed in the case of F160-S2 camera, uncertain image may be captured below the valid image range.

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Shortening Scene Group Switching Time

Normally, settings data is saved to flash memory and the Memory Card when scene groups are changed. The time taken to save is, therefore, added to the time taken to change scene groups. The time to change scene for changes in measurement setups can be reduced by omitting the save process.

NOTICE If settings are changed with this function set to OFF, always save the settings before changing scene groups. When scene groups are changed, data from the flash memory or the Memory Card is loaded. So if the changed settings data is not saved, the data will be replaced by the loaded data.

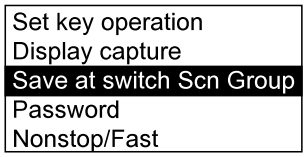
SECTION 4 Other Functions

1. Start the system mode and select [Operation settings].

p.2

The Selection menu will be displayed.

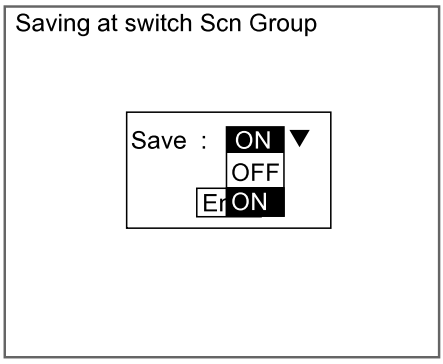
2. Select [Save at switch Scn Group].



The setting screen appears.

3. Select [ON] or [OFF].
ON: Saves the data (default)
OFF: Does not save the data

4. Select [End].



The settings will be registered and the screen in **2.** will return.

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Setting Passwords

Passwords can be set to prevent settings being changed through incorrect operation.
Set whether or not a password is required for the following two operations.

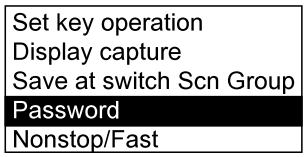
- When moving from Run Mode to Set, Monitor, or other modes
- When changing scenes in Run Mode

1. Start the system mode and select [Operation settings].

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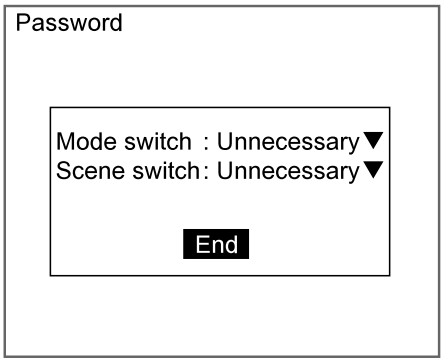
The selection menu will be displayed.

2. Select [Password].



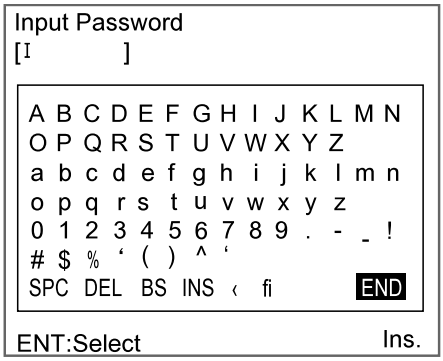
The Password Settings Screen will be displayed.

3. Select [Necessary] or [Unnecessary].
4. Select [End].



If [Necessary] is selected, the Input Password Settings Screen will be displayed.

5. Set the desired password (6 to 8 characters).
6. Select [END].



The settings will be registered and the screen in **2.** will return.

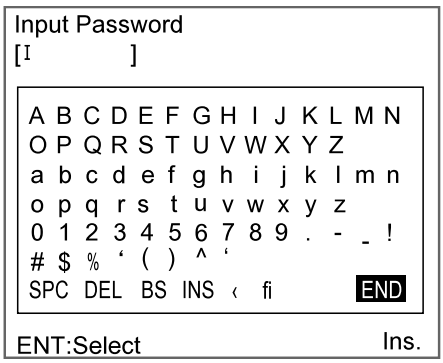
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Example: Password Set for Mode Switching

1. Move the cursor to [RUN] and press the ENT Key.



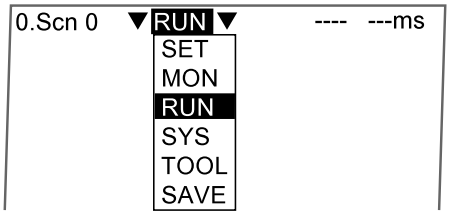
The Input Password Settings Screen will be displayed.



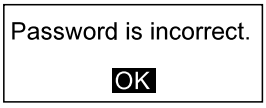
2. Enter the desired password.

3. Select [END].

If the entered password is correct, the mode selections will be displayed.



If the entered password is incorrect, an error message will be displayed.



CHECK!

If you have forgotten the password:
The password can be checked by inputting a password confirmation command from the serial interface.

SECTION 6, “2. Normal Serial Interface”

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Transferring Data from Processing Section 0 to Processing Section 1 Automatically

In nonstop adjust or 1-line fast mode, the same settings need to be made to both processing sections 0 and 1.
Set this function so that data is transferred from processing section 0 to processing section 1. This prevents loss of data transfer.

CHECK! Normally, select [Yes (Standard)].

CHECK! In the case of 2-line random trigger mode, this setting will be ignored.
(Data will not be transferred automatically.)

Selection	Details
OFF *	Data is not transferred automatically. To transfer the data, press the data transfer key. Data transfer key p.16 However, data will be transferred when power is turned ON.
Normal	Transfers data from processing section 0 to processing section 1 in the following cases. • When a scene is switched by parallel I/O input • When a scene group is switched by parallel I/O input • When nonstop adjust mode is exited
Each time	Transfers data from processing section 0 to processing section 1 when the BUSY signal switches from ON to OFF, except when measurement is progress. Example) • When the condition setting screen is exited • When the currently displayed image is switched to another by using the Up/Down Keys Since data is transferred frequently, inconsistency in data that may occur if you forget to press the data transfer key can be prevented. However, operation time will increase.

The asterisk (*) indicates the default setting.

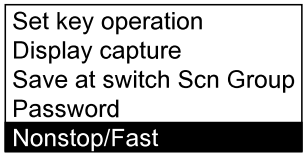
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1. Start the system mode and select [Operation settings].

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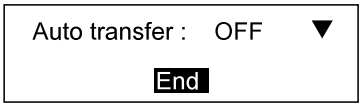
The selection menu will be displayed.

2. Select [Nonstop/Fast].



The automatic data transfer setting screen will be displayed.

3. Select either [Normal] or [Each time].



4. Select [End].

The screen in **2.** will return.

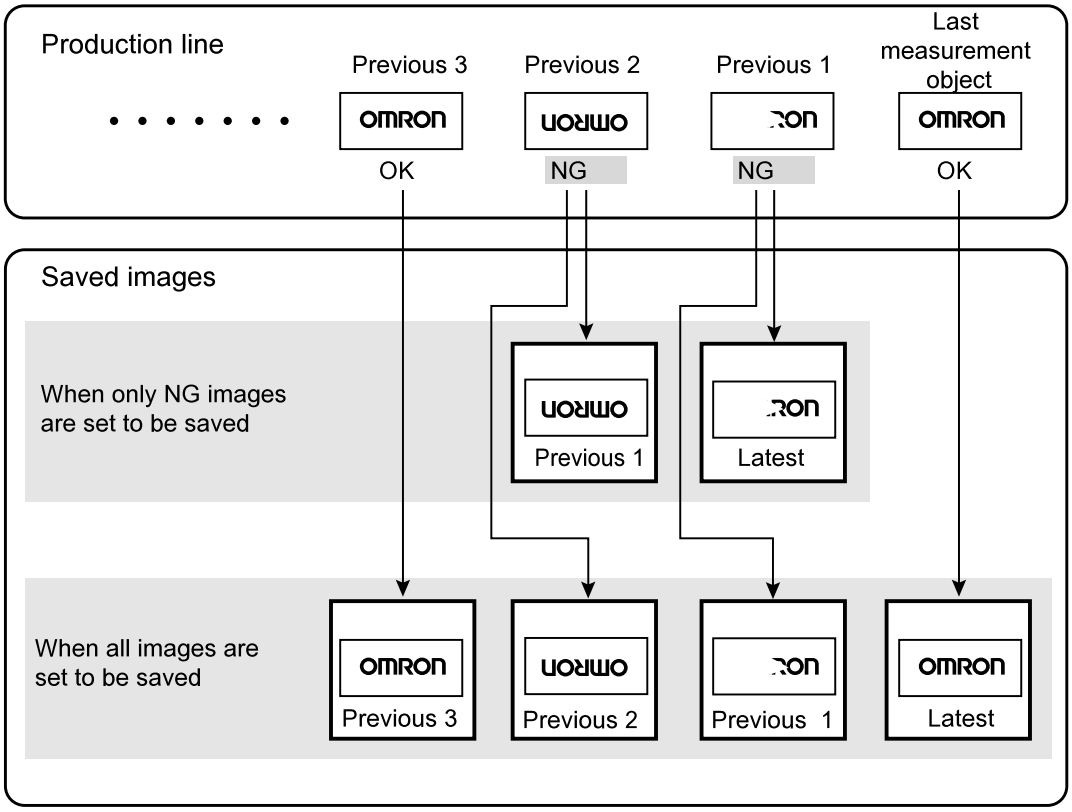
5. Save the settings to the flash memory and restart the controller.

The automatic data transfer setting that has been set will become effective.

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Setting Save Conditions for Measurement Images

The controller provides a function to save measured images. (35 images for 32 scenes)
The condition for saving the images can be selected from saving only when the measurement result is NG or saving all images regardless of the measurement result.
When 35 images have been stored, new images will be stored by overwriting old images, starting with the oldest.



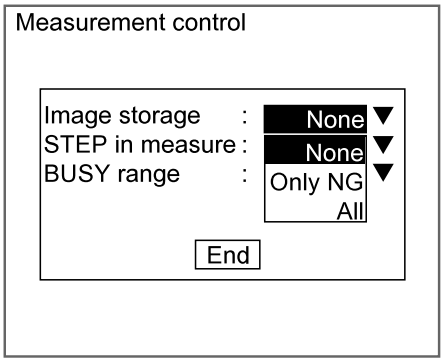
NOTICE Stored images will be cleared when the power is turned OFF.Images to be kept must be backed up to a personal computer or Memory Card.

SECTION 4 Other Functions

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1. Start the system mode and select [Measurement control].
p.2

The Measurement Control Settings Screen will be displayed.



2. Change the current setting made for [Image storage].

3. Select [End].

The settings will be recorded and the System Mode Screen will return.

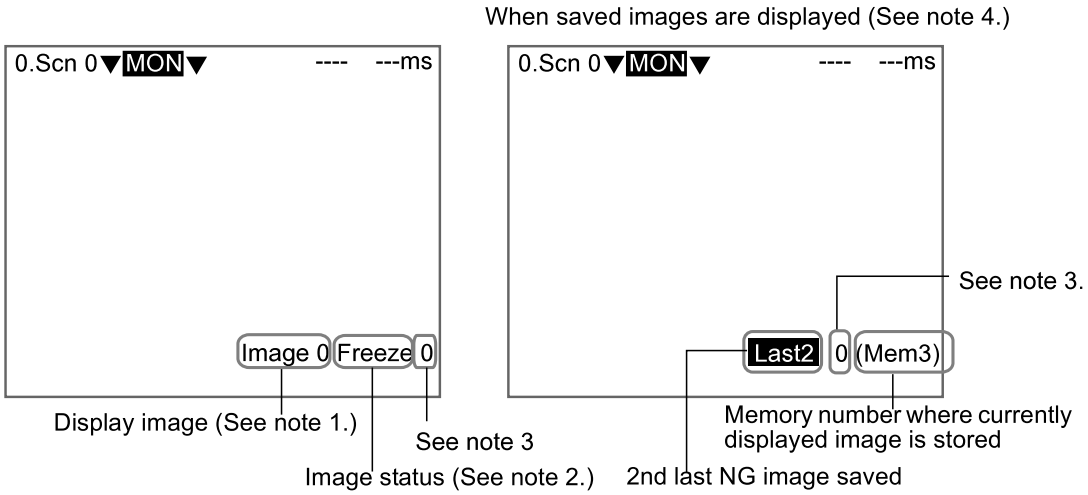
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Displaying Stored Images

By displaying a stored image on the screen, the reason for a previous NG judgement can be checked. Also, measurement can be re-performed on the stored image with different evaluation criteria.

The current image is displayed in the lower-right corner of the screen.
However, the current image will not be displayed if Image type is set to OFF under Conditions.

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	Display	Details
Note 1	Image 0	The image stored at Image 0 is displayed.
	Image 1	The image stored at Image 1 is displayed.
Note 2	Freeze	The image immediately after measurement is displayed.
	Through	
	Last NG	
Note 3	(Number)	If the image input processing items Camera image or Switch camera are set to 2 or more units, a number will be displayed to show the position of the item in the list. The number will not be shown, however, if the screen size is set to Small.
Note 4	——— (Memory ☐)	Past saved measurement images are displayed. The images that match the image save conditions (Only NG/All) will be stored in Memory 0 to Memory 35. Specify a number for Memory ☐ when backing up saved images to a personal computer or Memory Card.

Types of saved images

Last	The measured image most recently stored is displayed. If this image had an NG judgement, "Last" will be highlighted.
Last *	The * after "Last" contains the number of screens stored before the image. Up to 35 previous images can be displayed. "Last *" will be highlighted for NG images.
–––––	Either no image is stored in memory, or an image other than a measurement image (an image loaded from a personal computer) is displayed.

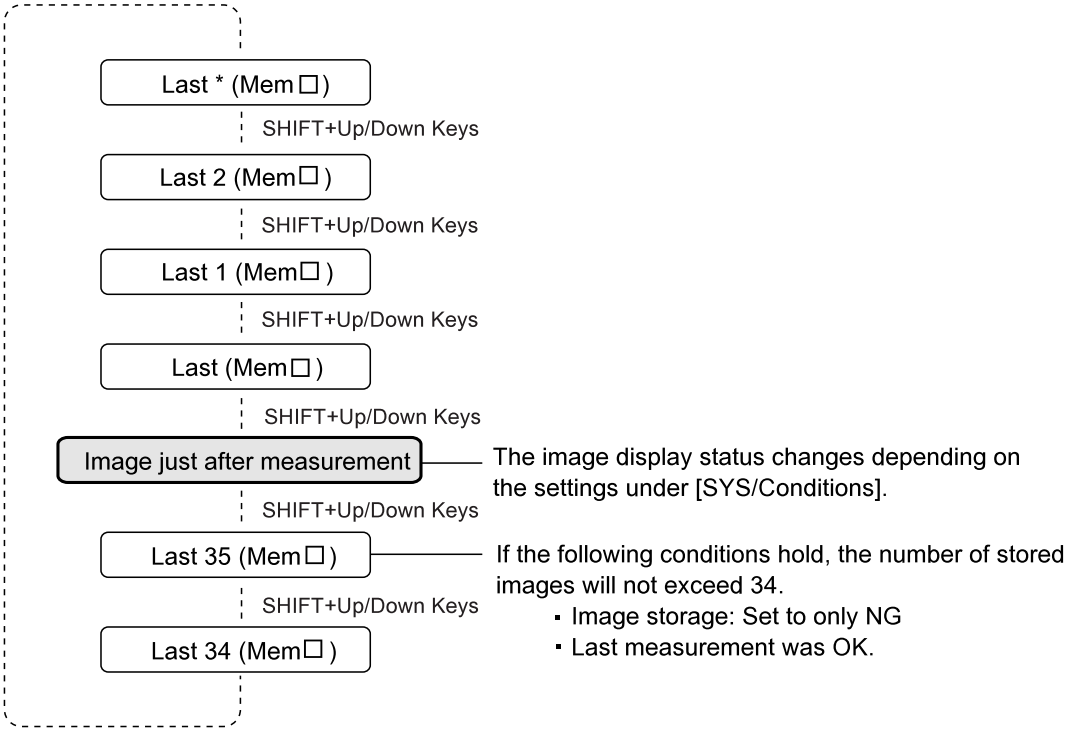
Notes 1 and 2 will change depending on the settings under [SYS/Display/Display settings].

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Switching Method

In Monitor Mode or Run Mode, press the SHIFT+Up/Down Keys to switch between images.



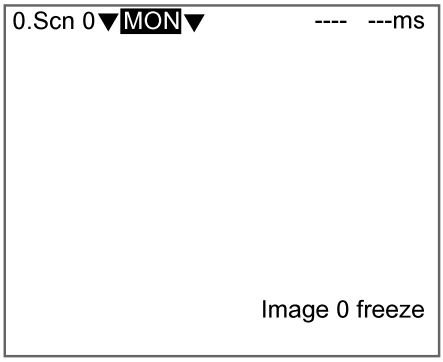
CHECK!

- When [Display] is set to [Last NG ☐], the display cannot be switched to stored images. Change the display to Freeze or another display mode and then use the SHIFT+Up/Down Keys to switch between images.
- When the image input processing items [Camera image] or [Switch camera] are set to 2 or more units, use the Up and Down Keys to switch between images.

Clearing All Stored Images

All images are automatically cleared when the power is turned OFF, but the images can also be cleared without turning OFF the power by using the following procedure.

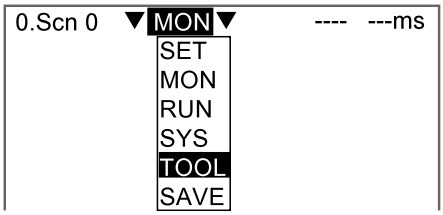
1. Display the basic screen for monitor mode or run mode.
2. Move the cursor to [MON] or [RUN] and press the ENT Key.



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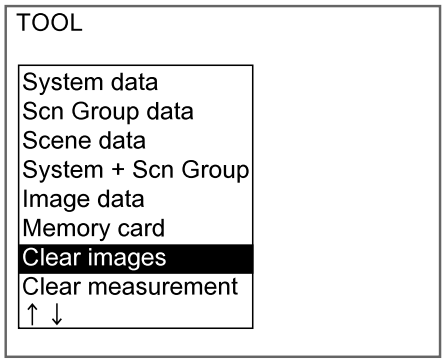
The mode selections will be displayed.

3. Select [TOOL].



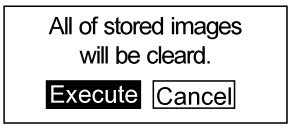
The tool selections will be displayed.

4. Select [Clear image].



A confirmation message appears.

5. Select [Execute].



All the saved images will be cleared and the screen in **4.** will return.

CHECK! If you assign this function to a console key, you can clear the stored images with a one-touch key operation.

p.16

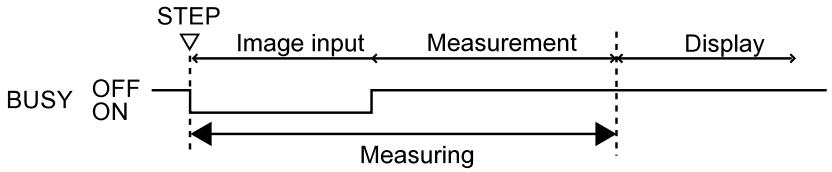
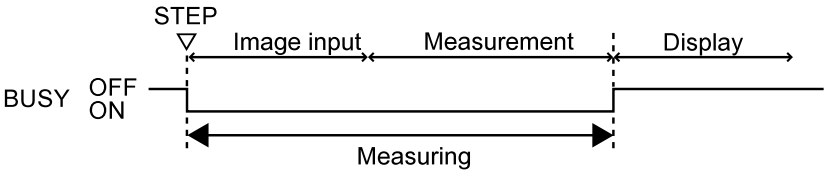
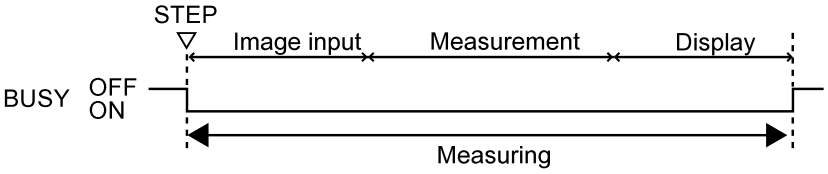
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Using BUSY Signals

The BUSY signal is a control signal used to show that the Controller is busy processing. The ON/OFF timing of this BUSY signal is monitored at the external device to time communications. The handling of the BUSY signal can be changed to create a smoother system.

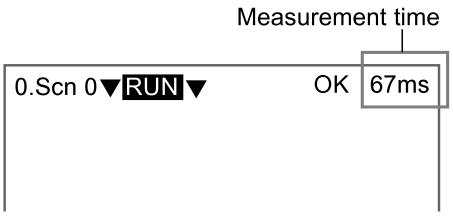
BUSY Range

Select at what point in the processing that the BUSY signal will turn OFF.

Selection	Details
Input image	The BUSY signal turns OFF when the image input has been completed. This can be used as a guide as to whether or not the workpiece can be moved. If Camera image is set to multiple units, the BUSY signal turns OFF when the first Camera image input has been completed.  CHECK! In this case, do not input the next command until measurement is completed, even if the BUSY signal switches to OFF. If another command is input, either the operation being performed or the command that was input may not be properly executed.
Measurement*	The BUSY signal turns OFF when the measurement has been completed. 
Display	The BUSY signal turns OFF when the display of the measurement result has been completed. The busy signal remains ON and the Controller is treated as “measuring” until the display has been completed. 

The asterisk (*) indicates the default setting.

CHECK! The measurement times shown in Monitor and Run Modes will change depending on the settings for the BUSY range.
The time taken for “Measuring” indicated in the above table is displayed as the measurement time.



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STEP in measure

Measurement will not be performed by the Controller during another measurement, even if the STEP signal turns ON. Set whether or not the ERR signal will turn ON to notify the external device that the STEP signal was not accepted.

Selection	Details
ERR ON*	Measurement will not be performed and the ERR signal will turn ON if the STEP signal turns ON during processing. The ERR signal will turn OFF when the next STEP signal is input at the correct timing.
OFF	The ERR signal will not turn ON even if the STEP signal turns ON during processing. Measurement will not be performed.

The asterisk (*) indicates the default setting.

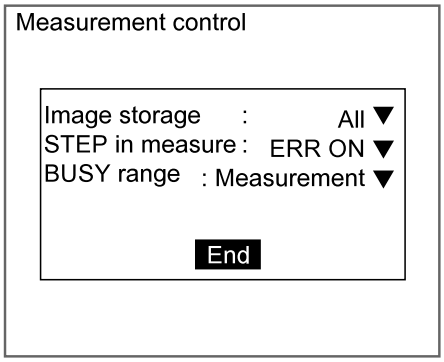
1. Start the system mode and select [Measurement control].

p.2

The Measurement Control Settings Screen will be displayed.

2. Change the current setting for [STEP in measure] and [BUSY range].

3. Select [End].



The settings will be registered and the System Mode Screen will return.

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Setting Startup Conditions (Start Mode)

Use the following procedure to set the status when the power is turned ON. If the Controller is set to start in Run Mode for the scene where the desired measurement conditions are registered, measurement of objects can be started by simply turning the power ON.
Also, unnecessary menu selection screens and Camera setting screens that are always displayed at startup can be set to not be displayed.

Item	Details
Startup scene group	Selections: 0* to 31 CHECK! When a scene group between 1 and 31 is selected, make sure the Memory Card where that scene group is stored is inserted.
Startup scene	Selections: 0* to 31, OFF(scene number when saved to flash memory)
Startup mode	Selections: Set, Monitor*, Run, OFF (i.e. the mode when saved to flash memory)
Language	Select the language for screen messages. Selections: Japanese, English*
Camera settings	Select whether or not to display the Camera Settings Screen. Selections: ON* (display), OFF (no display)

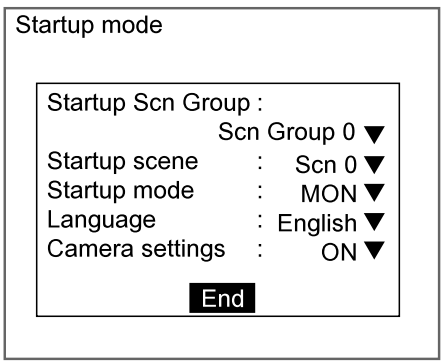
The asterisk (*) indicates the default setting.

1. Start the system mode and select [Startup mode].
p.2

The Startup Mode Settings Screen will be displayed.

2. Change the settings.

3. Select [End].



The settings will be registered and the System Mode Screen will return.

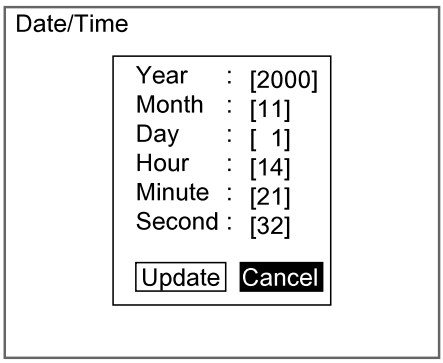
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Setting the Calendar Date and Time (Date/Time)

Check if the internal calendar is set to the correct date and time, and adjust if necessary.

1. Start the system mode and select [Date/Time].
p.2

The Date/Time Settings Screen will be displayed.



2. Check if the date and time are correct.
Adjust if necessary.

3. If the settings do not require adjustment, select [Cancel] to exit this screen.
Select [Update] to save changes to the date and time.

The settings will be registered and the System Mode Screen will return.

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Checking System Information

Checking Remaining Memory Space and Battery Status

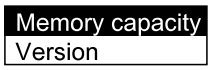
Use the following procedure to check the remaining work memory and internal flash memory and the status of the battery mounted for date and time data backup.

1. Start the system mode and select [System information].

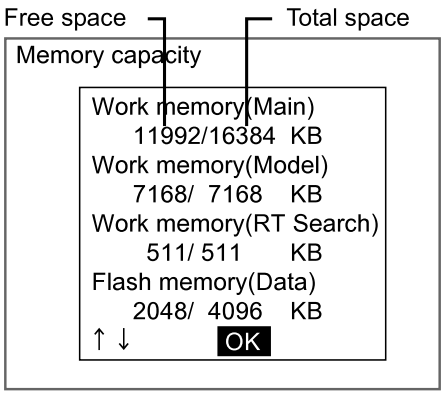
p.2

The selection menu will be displayed.

2. Select [Memory capacity].

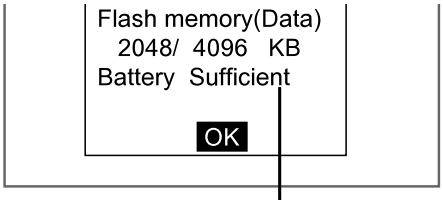


The memory capacity will be displayed.



Press the Down Key to scroll down and display the rest of the information. The battery status will be displayed at the bottom of the list.

3. Select [OK] to exit this screen.



If Insufficient is displayed, the battery must be replaced. Take the Controller to your OMRON representative to replace the battery. The battery must be changed by a professional.

The screen in **2.** will return.

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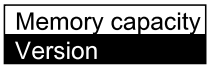
Checking the Software Version

Use the following procedure to check the software system version and selected function mode.

1. Start the system mode and select [System information].

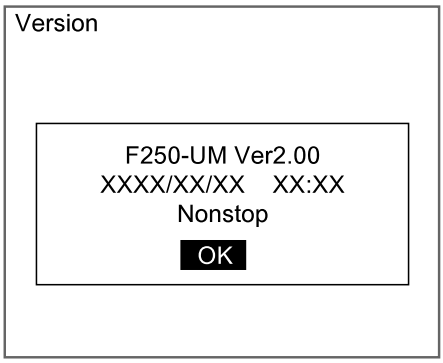
p.2

The Memory Capacity/Version Menu will be displayed.



2. Select [Version].

The version information will be displayed.



3. Select [OK] to exit this screen.

The screen in **2.** will return.

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SECTION 6
Communicating with External Devices

This section describes the methods for communications with external devices, such as personal computers and Programmable Controllers, via parallel or serial interfaces.

- Parallel Interface
- Normal Serial Interface
- Host Link Serial Interface
- Serial Interface Menu Operations

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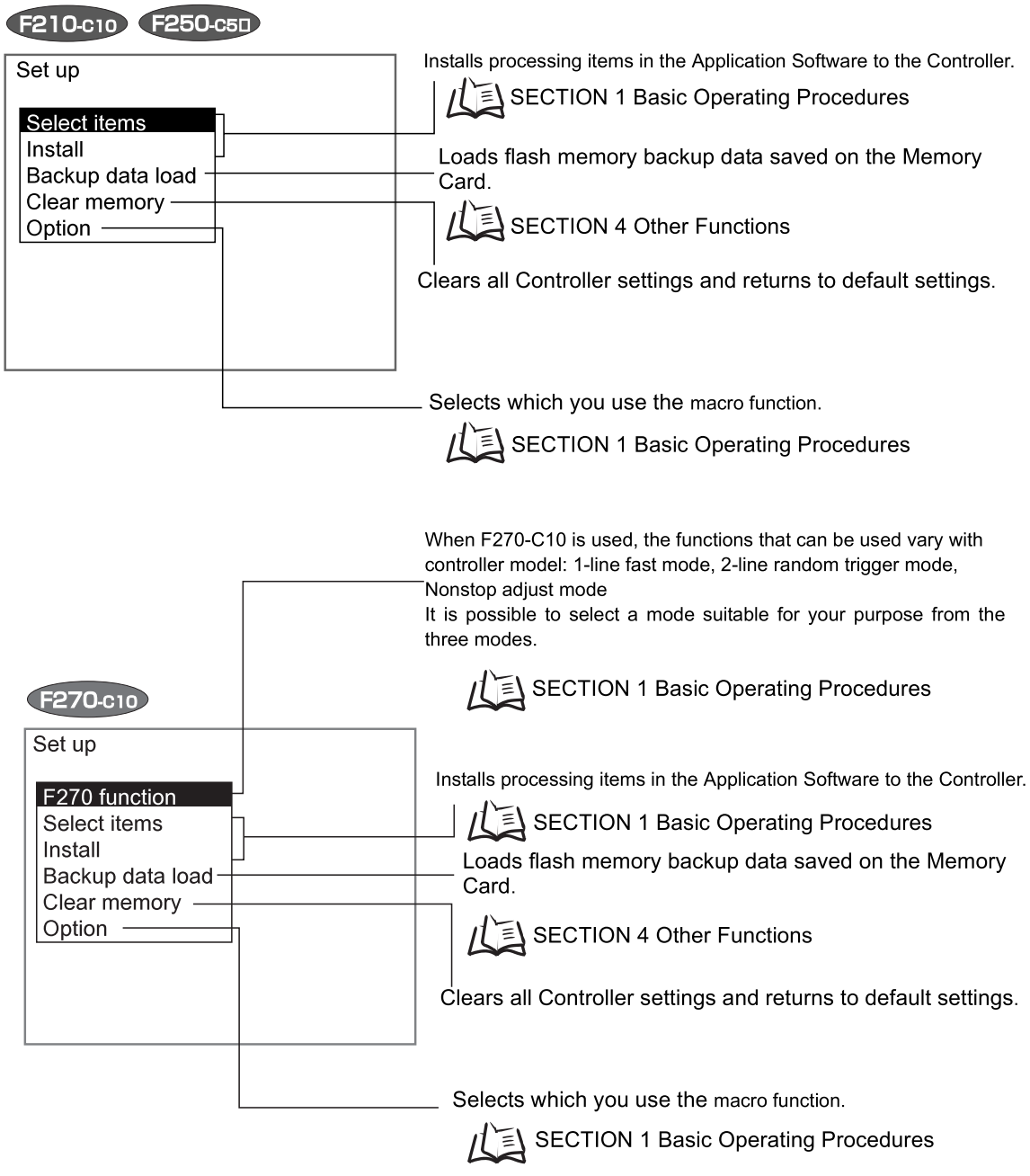
SECTION 7
Appendix

Set Up Menu	2
Troubleshooting	5
Q & A	14
Terminology	20
Character Codes	24
Menu Hierarchy	25
Version-up Information (Ver2.0 to 3.1)	27

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Set Up Menu

This SECTION gives a general description of the Setup menu of the Application Software. For detailed information, refer to the pages in this manual where a detailed description of each item can be found.



CHECK!

Starting the SetUp Menu

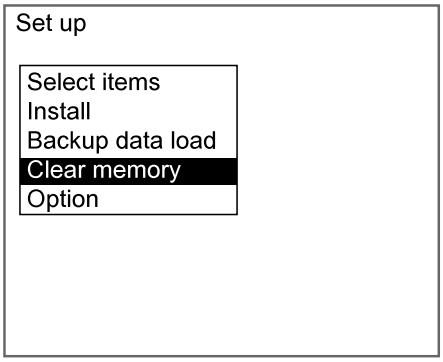
SECTION 1 Basic Operating Procedures

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Clearing Memory

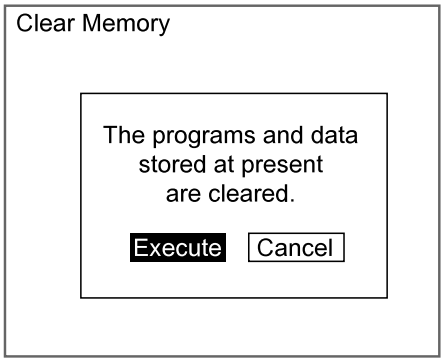
The Clear Memory processing item clears all Controller settings and returns to the default settings. Any installed processing items will also be cleared.

1. Start the setup menu and select [Clear memory].



A confirmation message will be displayed.

2. Select [Execute].



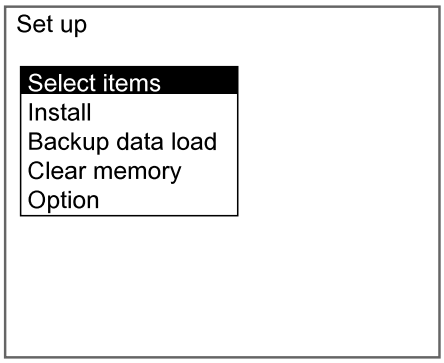
NOTICE Do not turn OFF the power or input a RESET signal while a message indicating that processing is in progress is being displayed. Data in memory will be destroyed, and the Controller may not operate correctly the next time it is started.

All settings will be cleared and the screen in **1.** will return.

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Checking the Setup Menu Version

1. Press the SHIFT+ESC Keys at the basic Setup Menu Screen.



The Setup Menu version information will be displayed.

2. Press the ENT Key.



The screen in **1.** will return.

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Troubleshooting

This SECTION lists the errors that may be displayed on the screen, along with their probable causes and remedies.

ERR When the error messages marked with an asterisk are displayed, the ERR signal will come ON at the parallel interface.

Error message	Causes and remedies
APPLICATION ERROR	Flash memory backup data saved on a higher-level model was loaded. Restart the setup menu and either load backup data suitable for the Controller that is being used or reinstall the software.
BATTERY LOW	The battery volume (for date and time data backup) is low. The battery must be replaced. Contact your OMRON representative.
HMILIB ERROR	The Controller has a failure. Contact your OMRON representative.
Draw at least one OR figure.	Draw diagrams in OR mode. Reason: NOT mode is used to delete part of a drawn diagram. SECTION 1 Basic Operating Procedures p.29
PLC is not in MONITOR Mode.	Change the mode of the Programmable Controller to MONITOR Mode.
SYSTEM ERROR	The Controller has a failure. Contact your OMRON representative.
Set address is not available.	Check the Controller address and enter the correct address. SECTION 6, “2. Normal Serial Interface” p.11
Installation failed.	Mount the Application Software memory card correctly into slot 0 and restart installation. SECTION 1 Basic Operating Procedures p.4
Intelligent Lighting is not selected.	Check the settings under [SYS/Camera settings]. SECTION 5 System Settings p.3
This camera cannot use with Intelligent Lighting.	Check the settings under [SYS/Camera settings]. Reason: Cameras other than F160-S1, F160-S2 and F150-S1A cannot use Intelligent Lighting. SECTION 5 System Settings p.3
Illegal syntax in expression.	Check the following for the expression: • There are the same number of right and left parentheses. • There is not more than one operator in a row without a variable in between them. • There is not more than one region number in a row. • There is not more than one function in a row without a variable in between them. • There is not more than one constant in a row. • There are not too many, or too few arguments for a function.

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Error message	Causes and remedies
Detailed settings of camera is incorrect.	Correct the settings. Setup Manual
Camera connection is incorrect. ERR	• Are the Camera Cables connected to the Controller? • Is the Camera Cable disconnected from the Camera? • Is the setting correct under [Camera image/Camera settings] or [Switch camera/Camera settings]? SECTION 2, “1. Camera Image” p.25 SECTION 2, “1. Switch Camera” p.2 • Check the settings under [SYS/Camera settings] then restart the Controller. SECTION 5 System Settings p.3
Cannot register Defect (Deviation) when image 1 is selected.	If density defect is set, select [Image 0] under [Measurement image]. SECTION 2, “3. Density Defects” p.3
Calibration failed.	Perform sampling in at least 2 places. Reason: Sampling or specifying points has only been performed once. SECTION 2, “1. Camera Image” p.9, p.15
	Perform sampling in 3 places, including X and Y directions or specify a point. Reason: 3 places are specified in a solid line in one direction, X or Y. SECTION 2, “1. Camera Image” p.9, p.15
Limits of warning exceed limits of judgement.	Re-set the upper and lower limits for the warning so that they fall within the judgement upper and lower limits. SECTION 2, “4. Trend Monitor” p.5
Set measurement in advance.	Select the measurement to be displayed on the Trend Monitor. SECTION 2, “4. Trend Monitor” p.3
Cannot access this file.	Check the following points and re-select a file. • Is the file read-only? • Is Japanese used in the file name? • Does the Memory Card have sufficient space to save the file?
Search coordinates are not appropriate.	For ECM searches: The search coordinates must be specified within the screen.
	For processing items other than ECM searches: The search coordinates must be specified within the box circumscribing the model.

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Error message	Causes and remedies
Cannot operate line brightness during last NG display.	Check the mage status setting under [SYS/Conditions/Display setting]. Reason: Either Last NG (before scroll) or Last NG (after scroll) is selected under Image status.  SECTION 5 System Settings p.7
Cannot capture display during last NG display.	Check the mage status setting under [SYS/Conditions/Display setting]. Reason: Either [Last NG (before scroll)] or [Last NG (after scroll)] is selected under Image status.  SECTION 5 System Settings p.7
Scn Group file cannot be written in.	Delete unnecessary scenes or save scenes individually. Reason: Failed to write since the scene group size is excessively large.  SECTION 4 Other Functions p.6 Is the file read-only? Change the file attributes so that it is write enabled.
Failure of DIC deployment.	Delete the unused models or processing items that are set to other units. Reason: There is insufficient disk space so the selected dictionary cannot be opened.
Cannot operate line brightness during reduction image display.	Check the Image size setting under [SYS/Conditions/Display setting]. Reason: Reduced has been selected under Image size.  SECTION 5 System Settings p.8
Cannot change shutter speed of this camera.	Check the [Camera settings] under [SYS/Camera settings]. Reason: With cameras other than F160-S1, F160-S2 and F150-S1A, it is not possible to change the shutter speed using the menu.  SECTION 5 System Settings p.3
Number of lines to be read is fixed. Image is always displayed in full screen.	Check the [Camera] under [SYS/Camera settings]. Reason: With cameras other than F160-S2, it is not possible to change the number of lines to be read.  SECTION 5 System Settings p.3

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Error message	Causes and remedies
Host Link error. Change to normal mode. ERR	After checking for the following items, either change the communications mode under [SYS/Communications/Serial] to [Host Link] mode (See note.), or restart the Controller: • The cable is connected properly. • The communications specifications for the external device and the Controller are the same. • The Programmable Controller is ON. Note: The communications mode will automatically return to normal mode when this error occurs. Setup Manual SECTION 6, “3. Host Link Serial Interface” p.6
Process item cannot be registered.	There is insufficient work memory.Delete scenes and units that are not required. SECTION 1 Basic Operating Procedures p.26 SECTION 4 Other Functions p.6
	The following processing items cannot be registered before the first Camera image unit. • Switch camera • Change filtering • Filtering again.
Direction settings are not appropriate.	• Select midpoint for X and Y when relative angle selected for θ. • Select the same region number for X and Y when region 0 or region 1 selected for θ. Reason: Position cannot be compensated with the current combination.
This figure cannot be applied to model registration	Part of the drawn circle or circumference is outside the range. Draw it again so that the entire figure is displayed on the monitor.
Cannot select this direction.	Combine upper, lower, left, and right edge search directions that will surround the area to be measured. Reason: The selected directions do not surround the region to be searched. SECTION 2, “3. Binary Defects” p.28 SECTION 2, “3. Density Defects” p.17
Background is the same color as the normal color.	Change one of the colors. SECTION 5 System Settings p.12
Communications error. <Data transfer>	Turn OFF the power to the Controller and check for the following items before restarting the Controller. • The cable is connected properly. • The communications specifications for the external device and the Controller are the same. • The external device is operating properly. Reason: Data transfer has been interrupted due to a communications error in communications between the Controller and an external device. If the same error message appears after restart, it may mean that the Controller is faulty. Contact your OMRON representative. Setup Manual SECTION 6, “2. Normal Serial Interface” p.6 SECTION 6, “3. Host Link Serial Interface” p.6 SECTION 6, “4. Serial Interface Menu Operations” p.2
Communications error. (Normal) ERR	
Communications error. (Host Link) ERR	

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Error message	Causes and remedies
Timeout error. (Data transmission)	Turn OFF the power to the Controller and check for the following items before restarting the Controller. • The cable is connected properly. • The communications specifications for the external device and the Controller are the same. • The external device is operating properly. Reason: Data transfer has been interrupted due to a timeout in communications between the Controller and an external device. If the same error message appears after restart, it may mean that the Controller is faulty. Contact your OMRON representative. Setup Manual SECTION 6, “2. Normal Serial Interface” p.6 SECTION 6, “3. Host Link Serial Interface” p.6 SECTION 6, “4. Serial Interface Menu Operations” p.2
Timeout error. (Normal) ERR	
Timeout error. (Host Link) ERR	
Incorrect data format received.	Select the correct transfer file and re-execute the data transfer. Reason: The wrong file has been selected.
	Reinstall the processing item. Reason: The scene data or scene group data that was to be loaded includes processing item(s) that are not currently installed to the Controller. SECTION 1 Basic Operating Procedures p.4
Data are too large. Cannot save by serial communication.	Save the data to a Memory Card or delete surplus data and then save. Reason: Data 2MB and over cannot be saved via serial communications. SECTION 4, “Other Functions” p.16
Failed to load data.	Mount the Memory Card properly and re-execute.
Cannot delete directory having files.	Delete the files in the directory to be deleted or move the files to another directory. Reason: Only empty directories can be deleted. SECTION 4, “Other Functions” p.43
Directory name is not specified.	Specify the directory name and press the ENT Key.
Directory name contains unusable character.	Check the directory name. The following characters cannot be used: “\”, “/”, “,”, “:”, “;”, “*”, “?”, “””, “<, “>, “!”, “&”, SPC (space)
Same directory name has already existed.	Specify a directory name that is not being used.
Same file name has already existed.	Specify a file name that is not being used in the directory.
Calculated magnification highers. Correct magnification range 0.01 to 9.999.	Change the magnification (unit) of the actual coordinates to be entered by points or sampling. Reason: The Camera magnification is not between 0.00100 and 9.99999. SECTION 2, “1. Camera Image” p.9, p.15
Calculated magnification lowers. Correct magnification range 0.01 to 9.999.	

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Error message	Causes and remedies
Cannot perform during nonstop adjustment.	Make settings after exiting nonstop adjust mode. Reason: Camera setting, communication parameter setting and parallel I/O monitor cannot be performed.  SECTION 3 Test/Measurement Execution p.8
Password is incorrect.	Enter the correct password.  SECTION 5 System Settings” p.23 SECTION 6 2. Normal Serial Interface p.29
No Backup Data in memory card.	Mount the Memory Card on which the backup data was saved to Memory Card slot 1 (C1).  SECTION 4 Other Functions p.23
The backup data is not correct.	This backup data is damaged and cannot be loaded.
Date/time settings error.	Set the correct date and time. Reason: A date not in the calendar or an invalid time has been input.  SECTION 5, “System Settings” p.35
File name is not specified.	Specify the file name and then press the ENT Key.
File name contains unusable characters.	Check the directory name. The following characters cannot be used: “\”, “/”, “,”, “:”, “;”, “*”, “?”, “””, “<, “>, “!”, “&”, SPC (space).

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Error message	Causes and remedies
Fan error. ERR	Turn OFF the Controller power supply and check that nothing is obstructing the fan operation. If the error message continues to be displayed when the Controller is restarted, the Controller itself may be malfunctioning. Contact your OMRON representative.
Cannot select image 1 when Defect (Deviation) is registered.	To use Image 1 for measurement, delete the region to which density deviation is set. SECTION 2, “3. Density Defects” p.3
Memory error	There is insufficient work memory. Delete unnecessary scenes and units. SECTION 1 Basic Operating Procedures p.26 SECTION 4 Other Functions p.43
	Labeling was not completed since there were too many labels.
Contents of memory card is incorrect. Cannot execute Select items and Install.	Turn OFF the Controller power supply, re-install the Application Software, and restart the Controller. If the error remains even after the Controller is restarted again, the Application Software may be malfunctioning. Contact your OMRON representative.
Memory card access error.	• The recommended Memory Card has not been inserted. • Use another Memory Card. • The Memory Card has not been formatted. Setup Manual
Memory card is not inserted.	Insert the recommended Memory Card. Setup Manual
Insufficient free space of memory card	• Delete unnecessary files to create free space. • Replace the Memory Card with a bigger capacity card. SECTION 4 Other Functions p.43
Insufficient flash memory.	• Reduce the size of regions to be registered. • Delete unnecessary scenes and units. SECTION 1 Basic Operating Procedures p.26 SECTION 4 Other Functions p.6
Insufficient model memory.	• Reduce the size of regions to be registered. • Delete unnecessary models.
Insufficient work memory.	• Reduce the size of the registered model. • Delete unnecessary models. • Reduce the size of regions to be registered. • Delete unnecessary scenes and units. SECTION 1 Basic Operating Procedures p.26 SECTION 4 Other Functions p.6
String must be set within 20 characters.	Set the character string to within 20 characters.The “m” and “v” that precede production dates and expiration dates will not be counted in the number of characters. E.g., “mYY” will be counted as 2 characters.

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Error message	Causes and remedies
Model is not appropriate.	For classification, pattern inspections, and rotation positioning: • Register an image with high contrast as the model. • Increase the model size. (15 x 9 pixels min.)
	For density defect inspections: • Reduce the element size or increase the inspection region.
	For fine matching: • Set the model registration range to within 6,6 to 505,477.
	For model position compensation: • Register an image with high contrast as the model.
	For circle position compensation: • Register an image with high contrast as the model. • The rotation direction reference position will be registered, so use an image with a defect and register a model.
	For ECM searches: • Adjust the edge extraction level so that the edges of the SECTION to be registered as the model will be extracted. • Adjust the edge extraction level so that fine edges appear thicker. Reason: No edge-extracted image exists in the region.
Model is too large.	Reduce the size of the region to be registered as the model.
Model is not registered.	Specify the region to be registered as the model.

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Error message	Causes and remedies
Label unit is not set up.	Set a label unit. Reason: The label unit is set to [No].
Illegal region setting.	The region is not drawn properly. Draw the region again.
Portion of region is off screen.	Draw the region so that it fits on the screen.
Loaded file error.	Specify the correct file and reload. Reason: • A formatting error may have occurred during data or program file load. • Data 2MG or greater cannot be loaded using serial communications. Load the data using the Memory Card. SECTION 4 Other Functions p.19

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Q & A

Controller Operation

Questions	Answer
When units are added to or deleted from a flowchart, what happens to expressions in processing items (calculations, branching, etc.) referencing other unit data?	Unit numbers are automatically incremented or decremented in expressions or for branching. If a unit that is being reference is deleted, however, an error will occur and “#ERR” will be displayed.
What data is saved to flash memory or the Memory Card when the save operation is executed?	System data and scene data for scene group 0 will be saved to flash memory. Scene data for scene groups 1 to 31 will be overwritten on the Memory Card.
Why can scene group data sometimes not be saved even though there is sufficient space on the Memory Card?	When saving scene groups, work memory in the Controller is required in addition to Memory Card space. If there is not sufficient work memory, scene groups containing a lot of data cannot be saved. Try deleting unnecessary data and saving again.
Does processing time depend on the type of images being displayed on the monitor?	Processing time varies with the type of images displayed on the monitor. When a [Through] image is used, measurement starts only after completing the previous image input, making processing slower than with [Freeze□] images. Processing time is also different depending on when scrolling is performed (before or after). SECTION 5 System Settings p.7
Why is a memory image not display even when the Shift+Up/Down Keys are pressed when [Last NG□] is displayed on the screen?	Memory images cannot be displayed when the image status is set to [Last NG]. Change the image status to display [Through] or [Freeze□] images to display memory images. SECTION 5 System Settings p.7
Can characters displayed on the screen be deleted?	Yes. The information displayed on the screen can be set under the [System settings]. SECTION 5 System Settings p.5
Can bitmap files that are not 512 × 484 pixels be loaded?	Cannot load. Images to be loaded must satisfy the following requirements. • 512 × 484-pixel images • Gray-scale images • 256-gradation images

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Input image

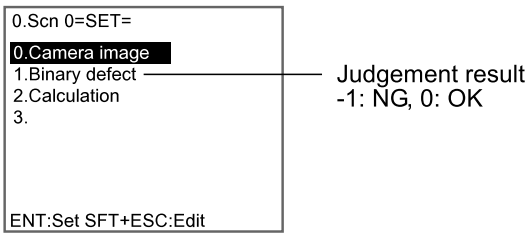
Questions	Answer
Why are the Camera coordinates output to the external device when calibration is set?	Check whether or not [Coordinate mode]-[Calibration] is set to [ON] for each unit. If set to [OFF], the Camera coordinate values will be output.
What happens to the display when 5 or more processing items ([Camera image] or [Switch camera]) are set?	If the image status is set to [Through] [□□(Before scroll)], the first 4 images at image input are displayed. If the image status is set to Through [□□(After scroll)], the first 3 images and the last image are displayed. SECTION 5 System Settings p.5
Can the image be viewed after filtering when [Change filtering] or [Filtering again] have been executed?	If the image status is set to [□□(After scroll)], the image can be viewed after filtering when [Change filtering] or [Filtering again] have been executed. SECTION 5 System Settings p.5

Measurement

Questions	Answer
QUEST Character Verification Can the characters that are read (A to Z, 0 to 9, :, /, _ (space)) be output directly as text strings to an external divide?	Turn [ON] the Output results under the [Measurement conditions]. The text strings will be output through the serial port. SECTION 2, “3.10 QUEST Character Verification”
EC Positioning Can an edge-extracted image be captured?	No. Edge-extracted images are produced by processing camera buffer images, so they cannot be captured. Only images input through the [Camera Image] processing item can be captured.

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Measurement Support

Questions	Answer
How do I set a formula with more than 64 characters in an expression?	Set up an additional expression and an expression that will reference the additional expression. SECTION 2, “4.1 Calculation”
Is there any way to count NG images?	Yes, by using the [Calculation] processing item. Use the following procedure. Example: Counted NG images for [Binary Defect] Set a [Calculation] unit after the [Binary Defect] unit.  Set the following expression for calculation 0 in the Calculation unit: U2.D00-U1.JG SECTION 2, “4.1 Calculation” CHECK! To output the count to an external device, change [Calculation] processing item to [DO Data] or [Normal Data] processing item (depending on where the data is to be output.) SECTION 2, “6.2 DO Data Output” “6.5 Normal Data Output”

Results Display

Questions	Answer
Can figures display with the [Display Figure] processing item be changed through serial communications?	Position of the figures set by [Display Figure] processing item cannot be changed by serial commands. Change them from the console. Section 6, “2. Normal Serial Interface”

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I/O

Questions	Answer
Will the RUN signal be output during scene switching?	• The RUN signal will remain ON during scene switching in Run Mode. • The RUN signal will remain OFF during scene switching in Monitor Mode.
Will the RUN signal turn OFF when the ERROR signal turns ON with Camera or other errors in Run Mode?	The RUN signal will remain ON even if the ERROR signal turns ON.
Why does the ERR signal turn ON when no error message has been displayed?	The ERR signal turns ON when STEP is input while the BUSY signal is ON. Select whether or not the ERR signal will turn ON under [SYS/ Measurement control]. SECTION 5 System Settings p.32
	The ERR signal turns ON when a command input via parallel interface has not been received correctly. For example, the switch scene group command was input but there is no Memory Card mounted in Memory Card slot 1 so the current scene group data was unable to be saved. The ERR signal turns ON.
In what format is data output for “normal” output?	The [Output format] can be changed under the [Condition settings] for normal data output. [ASCII] : Output in ASCII format. [Binary] : Output in binary format. SECTION 2, “6.5 Normal Data”
A command to switch the scene group was executed through the parallel interface when a Memory Card was not inserted, preventing returning to the previous scene group. How can this be fixed?	• Using a Memory Card Place the Memory Card into slot 1 and execute the command to switch the scene group again. • Without a Memory Card Perform the following. In this example, scene group 0 is returned to. (1) Turn [OFF] the Save at switch Scn Group setting under the [System settings/Operation settings]. (2) Execute a command to switch to scene group 0 through the parallel interface.

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1-Line Fast Mode

Questions	Answer
NG occurs once every two measurements even if the workpiece is good. What can I do?	There is a possibility that the scene data for processing SECTION 0 does not match that for processing SECTION 1. If the scene data has been changed, press the key assigned to [Proc. data transfer] to copy (transfer) the data from processing SECTION 0 to processing SECTION 1. In the case of normal serial interface, this can be done by executing the DATATRNS command.  CHECK! Setting [Auto transfer] to [Each time] will prevent data transfer being forgotten.  SECTION 5 System Settings
Data has been saved to the flash memory, but the previous data will be effective when the system is restarted. Why?	The data was saved while processing SECTION 1 was being displayed. Before saving data to the flash memory, make sure that processing SECTION 0 is displayed.
The key assigned to [Proc. data transfer] was pressed after the scene data was changed, but measurement was performed under the conditions in effect before the change. Why?	There is a possibility that processing SECTION 1 was being displayed when the scene data was changed. [Proc. data transfer] copies data from processing SECTION 0 to processing SECTION, so make sure that processing SECTION 0 is displayed before changing the scene data.

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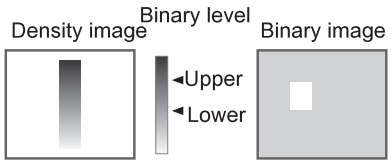
2-Line Random Trigger Mode

Questions	Answer
Is the same system data shared by processing SECTIONs 0 and 1?	System data can be set for each processing SECTION. With the 2-line random trigger mode, scene data and system data (*) can be set independently for each processing SECTION. * Only the communication parameters set for processing SECTION 0 are effective for processing SECTION 1.
How can I set measurement conditions for processing SECTION 0 and 1, respectively?	Display the processing SECTION for which you want to set measurement conditions. Use the following procedure to set measurement conditions. 1. Select [SYS] – [Operation setting] – [Set key operation], and assign [Switch Proc. monitor] to the desired key. 2. Press this key in monitor or run mode. Each time the key is pressed, the display switches to processing SECTION 0 and 1 alternately. The processing SECTION that is currently displayed can be found by the background color at the both edges on the monitor. For background color SECTION 3 Test/Measurement Execution 3. Enter the setting mode and set the desired measurement conditions.
Data has been saved to the flash memory, but the data in one of the processing SECTIONs disappears when the system is restarted. Why?	Only the data in the processing SECTION that is displayed during operation can be saved. Execute [Save] for each processing SECTION.
Measured values for one of the processing SECTIONs are not output via the parallel interface. Why?	There is a possibility that the processing SECTION from which no measured values are output is in [Monitor] mode. Switch both processing SECTIONs to the [Run] mode.
The flash memory backup function is used to load data, but the data in processing SECTION 1 is not loaded. Why?	Only the data in the processing SECTION displayed during backup operation can be saved. Execute [Flash memory backup] for each processing SECTION. To load backup data, the memory card containing the following three files is required. • bkupprog (Installed program) • bkupdata (Backup data for processing SECTION 0) • bkupdata2 (Backup data for processing SECTION 1)

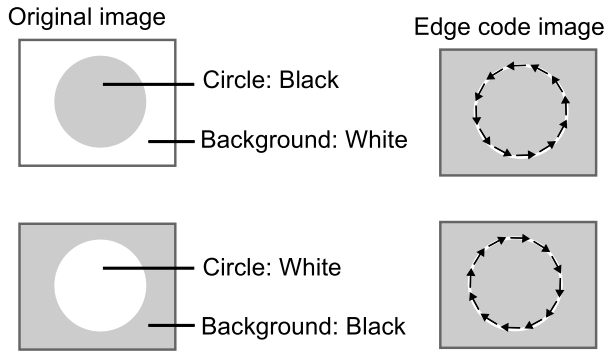
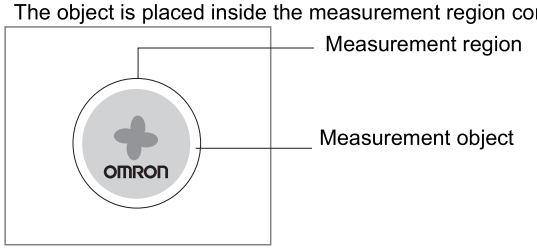
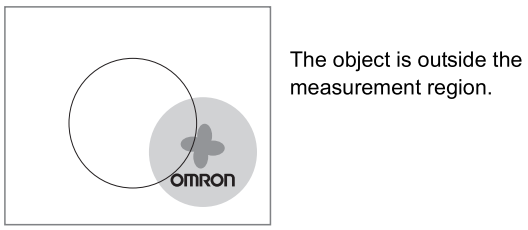
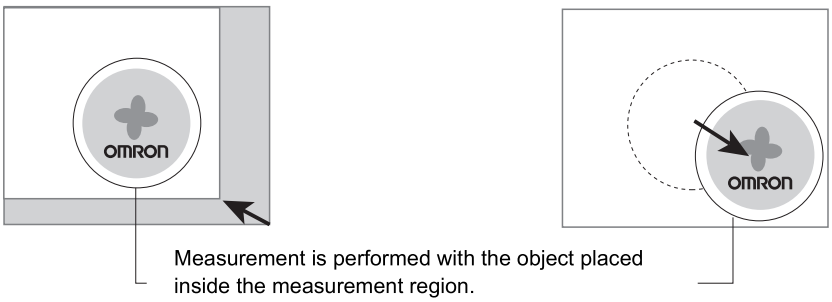
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Terminology

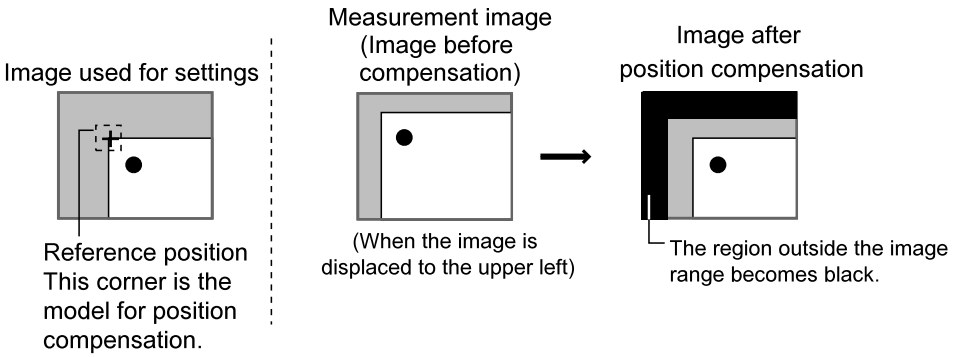
This SECTION explains terms listed beside the HELP icons.

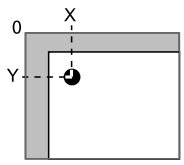
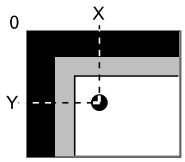
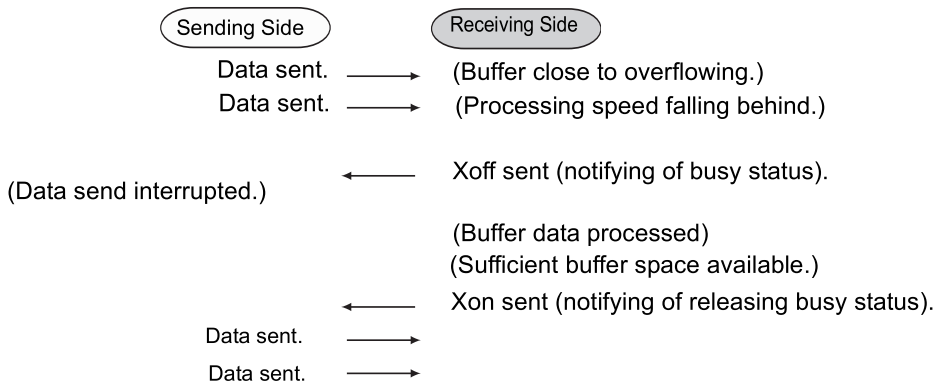
Terms	Explanation
Binary	Binary refers to the separation of the density images with 256 gradations read by the Camera into black pixels and white pixels. Upper and lower threshold values (binary levels) are set and the parts of the density image that fall within that gradation range are converted to white pixels and the rest are converted to black pixels. The Controller uses the white pixels to measure the object. 
2's complement	A common method used to express negative numbers in binary format. The 2's complement method expresses a negative number by inverting all of the bits of the positive value and then adding 1. Example: The 2's complement of -1 is expressed as follows: The value -1 can be derived from 0 - 1. Subtract −1 from 0 assuming there is a 1 in this place. 00000000 (= 0) -) 00000001 (= 1) 11111111 (=-1) ← The 2's complement of −1 (in 8 digits) The following gives a simpler way. The 2's complement of -1 can be obtained by inverting all of the bits of the negative value = positive value and then adding 1. 00000001 (= 1) ↓ Invert all bits. 11111110 ↓ Add 1. 11111111 (=-1) The MSB can be used to determine if a number is positive or negative. If the MSB is 0, the number is positive (or zero). If the MSB is 1, the number is negative. Numbers expressed in the 2's complement method are convenient in that they can be used in calculations without further conversion. Example for -1 + 10 = 9: 11111111 (= -1) +) 00001010 (= 10) 00001001 (= 9)

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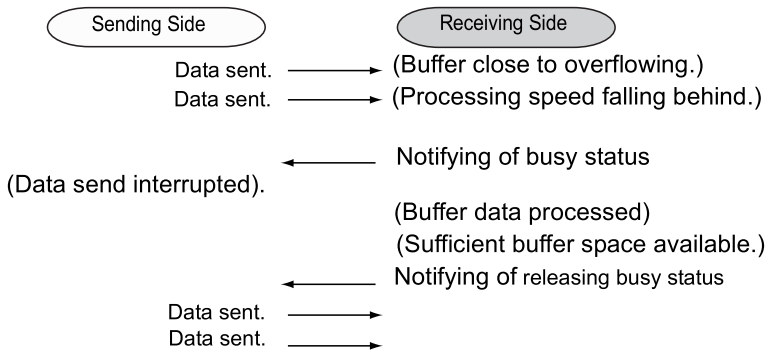
Terms	Explanation
Edge Code (EC)	An edge code indicates the direction of an edge. The directions are indicated by arrows in the following diagram. The positions where the brightness changes are extracted as edges and the directions of the changes in brightness are found. The direction of the arrows is determined by whether the measurement image and the background are black or white.  The edge codes can still be used for low contrast images if image light difference and change direction (edge code) processing items are used.
Position compensation	When the position or direction of the object is not constant, the displacement between the reference and current positions is obtained, and this displacement is compensated for in measurements. Select the position compensation processing items suitable for the measurement object. • Reference position The object is placed inside the measurement region correctly.  • When the object is out of position  If Position Displacement Compensation is set: The measurement region is shifted to enclose the object before starting measurement. The image is scrolled to return to the reference position before starting measurement. 

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<table>
<tr><th>Terms</th><th>Explanation</th></tr>
<tr><td>Calibration</td><td>Calibration means to convert measured dimensions (in units of pixels) to actual dimensions (μm, mm, cm, m). By setting the relationship between the physical coordinates and the camera coordinates, the measurement results are converted from pixels to physical units. To output calibrated measurement results to an external device, set [Coordinate mode/Calibration] to [ON] for each unit.</td></tr>
<tr><td>Output coordinates</td><td>Select the type of coordinates to be output to external devices.


<table>
<tr><td>Before scroll</td><td>Outputs the coordinates in effect before position compensation.
(The display set under [SYS/Conditions/Display settings] will be effective.)

</td></tr>
<tr><td>After scroll</td><td>Outputs the coordinates in effect after position compensation.
(The display set under [SYS/Conditions/Display settings] will be effective.)

</td></tr>
</table></td></tr>
<tr><td>Center of gravity</td><td>The center of gravity is calculated by regarding the white pixels as a sheet of thick paper of uniform thickness. The center of gravity is the point at which the sheet of paper would balance when placed on a sharp point. For example, the center of gravity for a circular object would be the center of the circle. The center of gravity of a rectangular object would be the intersection of lines drawn from diagonally opposite corners.</td></tr>
<tr><td>Correlation</td><td>Indicates the similarity (0 to 100) to a good workpiece. The more similar it is, the larger the value.</td></tr>
<tr><td>Software flow control
(Xon/Xoff control)</td><td>A flow control method. Flow is controlled using Xon and Xoff signals.

</td></tr>
<tr><td>Density image</td><td>Density images are the gray images of 256 gradations read by the Camera.</td></tr>
</table>

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Terms	Explanation
Flow control	Flow control is used to adjust the rate of data transfer. The receiving side notifies the sending side when it cannot keep up with the processing speed, causing the sending side to interrupt the transmission, and then the receiving side notifies the sending side when it wants the transmission to be restarted.  Flow control methods include both hardware and software methods. The Controller uses software flow control.
Model	The model is the image pattern used for detection.

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Character Codes

When [QUEST OCV] or [OCR for 1 chara] is used to recognize 1st and 2nd candidate characters, the recognized characters are output to external devices as decimal character codes. When no pattern is detected, an underscore (_) is output.

Method for Calculating Decimal Outputs
(Numeric value of the leftmost digit of the recognized character) × 16 + (Numeric value of the rightmost digit) = output value

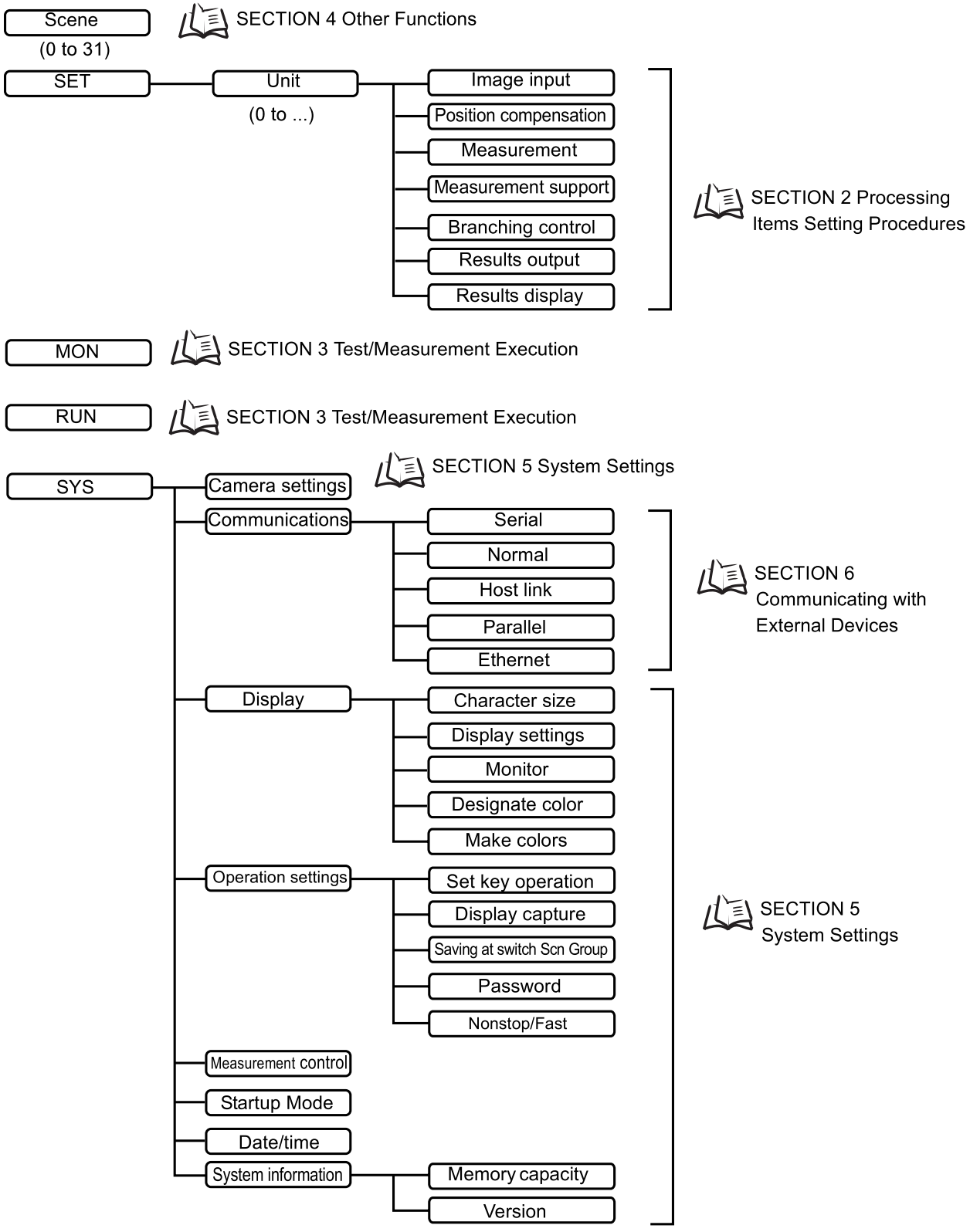
Example: When the recognized character is “2”, the output will be “50.”
When the recognized character is “C”, the output will be “67.”

Leftmost digit

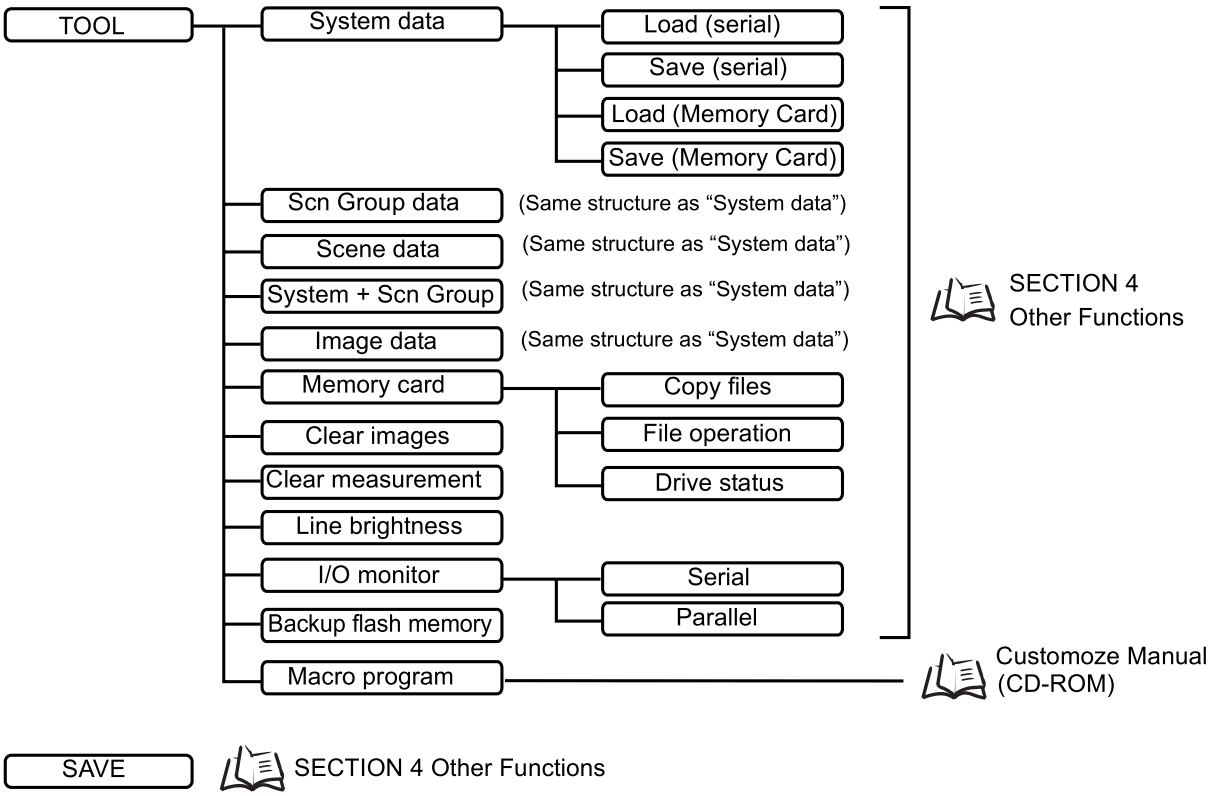
Rightmost digit	0	1	2	3	4	5	6	7
0		DE		0	@	P	`	p
1	SH	D1	!	1	A	Q	a	q
2	SX	D2	”	2	B	R	b	r
3	EX	D3	#	3	C	S	c	s
4	ET	D4	$	4	D	T	d	t
5	EQ	NK	%	5	E	U	e	u
6	AK	SN	&	6	F	V	f	v
7	BL	EB	’	7	G	W	g	w
8	BS	CN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SB	*	:	J	Z	j	z
B	HM	EC	+	;	K	[	k	{
C	CL	→	,	<	L	\	l	¦
D	CR	←	-	=	M	]	m	}
E	SO	↑	.	>	N	^	n	~
F	SI	↓	/	?	O	_	o	

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Menu Hierarchy



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Version-up Information (Ver2.0 to 3.1)

Controller

Changes	Details
More camera types can be connected.	F160-S2 camera can be connected. Setup Manual
More controller types allow installation of the Application Software.	These are F210-C10, F250-C50/C55 and F270-C10. Functions that can be used vary with controller model. Using This Manual

Processing item

Changes	Details
The image range to be captured by the camera can be specified. (F160-S2 camera only)	Image capture time can be reduced by setting the capture range. SECTION 2 Processing Items Setting Procedures
The result display functions (line, box, circle, cursor) have been improved.	Results can be displayed at the correct positions (camera coordinates) even if calibration ON data is used for the expression of figure coordinate position.
Image capture options have been changed.	The conventional option [ON/OFF] has been changed to [OFF/CAPT only/CAPT + LIVE]. SECTION 5 System Settings
17 processing items have been added.	(Position compensation items) • Model Position Compensation # (General measurement items) • Area (Var. Box) • Defect (Variable Box) • Gravity and Area • Gravity and Axis • OCR for 1 character • Classification # • Defect • Edge Position_1 (*) • Edge Width • Gray Search • Precise Search • Flexible Search • Relative Search • Rotation Search • Circular Angle (Results display items) • Display Last NG (*) The conventional item “Edge position” has been changed to “Edge position_8”. SECTION 2 Processing Items Setting Procedures
More edge related functions have been added.	Addition of edge related functions allows checking of the density distribution near edges. The edge level can also be set while monitoring density distribution. • Edge Position Compensation • Edge Position_1 • Edge Position_8 • Edge Width SECTION 2 Processing Items Setting Procedures

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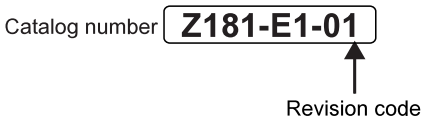
Other

Changes	Details
The macro function has been added.	The macro function allows you to create a basic-like program called a macro program, to make operations easier as shown below by loading the program to the controller. • Putting frequently used menus into one • Including complicating calculations into measurement processing Many sample programs are provided. Use of them enables you to perform simply what you want to do. For details on how to create sample programs and execute macro programs, refer to the Customize Manual contained in the CD-ROM.  (Only the method of selecting whether to use the macro function) SECTION 1 Basic Operating Procedures

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Revision History

The manual revision code is provided at the end of the catalog number on the CD-ROM.



Revision code	Date	Revised content
01	January 2003	Original production

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