

**MELSOFT**

Engineering Software

# Laser Displacement Sensor MH11 SettingTool Version 2 Operating Manual

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-SW2DNN-MH11ST-M





# SAFETY PRECAUTIONS

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(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the module used.

In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".

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 <b>WARNING</b>	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
 <b>CAUTION</b>	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

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Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

## [Design Precautions]

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### **WARNING**

- When changing data and operating status of the running module from a personal computer connected, add an interlock circuit external to the programmable controller to ensure that the entire system always operates safely. In addition, before performing online operations, add a fail-safe circuit in case of a communication failure due to poor contact of cables.
- 

## [Startup and Maintenance Precautions]

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### **CAUTION**

- When performing online operations of the running laser displacement sensor from a personal computer connected, read relevant manuals carefully and ensure the safety before operation.
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# CONDITIONS OF USE FOR THE PRODUCT

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- (1) Mitsubishi's laser displacement sensor must be used in applications which do not lead to serious accidents even in cases where failure/nonconformity was unlikely to occur in the laser displacement sensor, as well as, application which execute backup and failsafe functions in systems through external devices when a failure or defect has occurred.
- (2) Mitsubishi's laser displacement sensor was designed/manufactured as a general-purpose product which was designed for use in general industries, etc. Accordingly, the applications of Mitsubishi's laser displacement sensor shall be exempt for usage in special applications such as devices and systems as stated below. In the unlikely event that it is used, we bare no responsibility (includes, but is not limited to debt defaults, defective warranty, QA, illegal acts, and product liabilities) for the quality performance, and safety of Mitsubishi's laser displacement sensor.
- Large applications which greatly affect the public such as, nuclear power plants operated by each power company and other nuclear power plants
  - Application which request Mitsubishi to construct special QA structures such as railway companies and government offices.
  - Application such as aerospace, medicine, railway, combustion-fuel system, passenger cars, manned transfer equipment, entertainment devices, and safety devices that are expected to greatly affect lives, the body and properties

Mitsubishi's information desk should be contacted for more information as the laser displacement sensor may be applicable at the discretion of Mitsubishi, on the condition that the application is strictly limited and special qualities (exceeding the general specifications, etc.) are not required even in the above applications.

## INTRODUCTION

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Thank you for purchasing the laser displacement sensor.

This manual describes the functions, settings, and troubleshooting of the laser displacement sensor MH11 SettingTool Version 2 (hereafter abbreviated as setting tool).

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the setting tool to handle the product correctly.

Please make sure that the end users read this manual.

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# RELEVANT MANUALS

Manual name [manual number]	Description	Available form
Laser Displacement Sensor MH11 SettingTool Version 2 Operating Manual [SH-082021ENG] (this manual)	Installation procedure, operation methods, functions, and error messages of the setting tool. It also describes how to use the buffering function and the received light intensity waveform display function, which are useful for an evaluation analysis of the laser displacement sensor or optimum settings.	e-Manual PDF
MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Startup) [SH-082017ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of the laser displacement sensor control module	Print book e-Manual PDF
MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Application) [SH-082019ENG]	Functions, parameter settings, timing chart, troubleshooting, I/O signals, and buffer memory of the laser displacement sensor control module	Print book e-Manual PDF
MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Sensor head) [SH-082023ENG]	Precautions for using the laser displacement sensor, and installation methods, specifications, maintenance, and inspection for the sensor head	Print book e-Manual PDF
Laser Displacement Sensor MH11 User's Manual [SH-081705ENG]	Precautions for using the laser displacement sensor MH11, and installation methods, operation methods, functions/specifications, maintenance, and inspection for the devices that configure the system (controller and sensor head)	Print book e-Manual PDF

## Point

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

# TERMS

Unless otherwise specified, this manual uses the following terms.

Terms	Description
Controller	The generic term for the MELSEC iQ-R laser displacement sensor control module and the laser displacement sensor MH11
Engineering tool	Another name for the software package for the MELSEC programmable controllers
GOT	Another name for GT2104-PMBDS2 GOTs other than GT2104-PMBDS2 cannot be connected to the laser displacement sensor MH11 and are not included in the terms used in this manual.
M1S file	A management file in which the settings of the setting tool are saved (extension: .m1s)
MH11CTMF-□NA	Another name for the laser displacement sensor MH11 controller
R60MH112NA	Another name for the MELSEC iQ-R laser displacement sensor control module
Recipe	Preset reflection characteristics of typical materials of measurement objects and preset parameters of measurement methods
Sensor head	The generic term for the sensor heads that support controllers
Setting tool	An abbreviation for the laser displacement sensor MH11 SettingTool Version 2

# 1 BEFORE USING THE PRODUCT

## 1.1 Overview

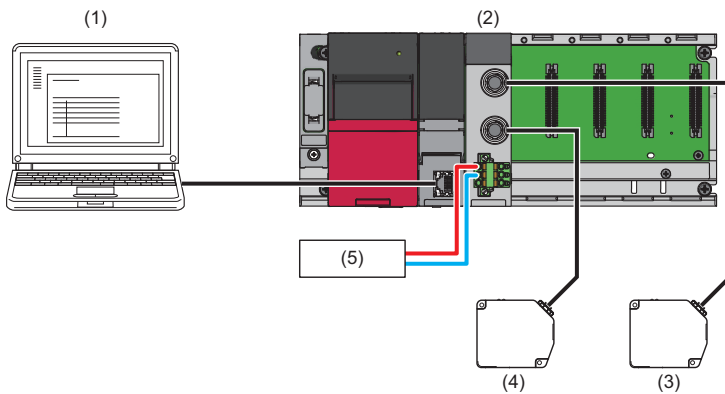
The setting tool provides the following functions:

- Setting/reading measurement conditions and displaying measurement data
- Monitoring measurement data (displaying measurement data and the status)
- Monitoring received light intensity data (displaying a waveform, saving the received light intensity data as a file/loading the received light intensity data from a file, and acquiring snaps)
- Monitoring buffering (accumulated) data (displaying a waveform and saving the buffering data as a file/loading the buffering data from a file)

### System configuration

The following figure shows the system configuration.

#### ■ System configuration of R60MH112NA

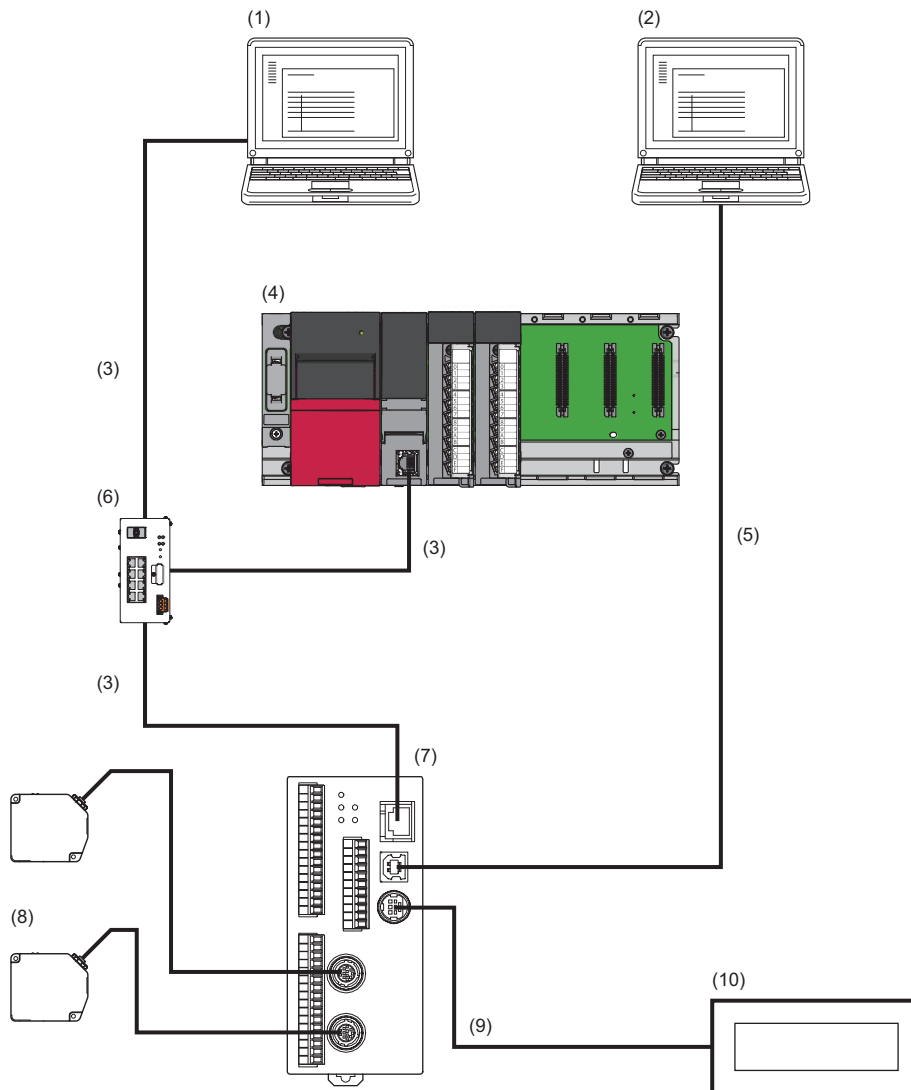


- (1) Engineering tool, setting tool
- (2) R60MH112NA
- (3) Sensor head A
- (4) Sensor head B
- (5) External power supply

The R60MH112NA can be connected to the setting tool using the CPU module interface for communication via network.



## ■ System configuration of MH1CTMF-□NA



- (1) Engineering tool
- (2) Setting tool
- (3) Ethernet cable
- (4) Programmable controller
- (5) USB cable
- (6) Hub
- (7) MH1CTMF-□NA
- (8) Sensor head
- (9) RS-232 connection cable
- (10) GOT

The settings of the MH1CTMF-□NA can be configured not only from the setting tool but also from the engineering tool and GOT.

Note that the functions that can be set by each tool differ. (📖 Laser Displacement Sensor MH11 User's Manual)

When the settings of the MH1CTMF-□NA are configured from other device, the new settings are not applied to the windows until they are read from the MH1CTMF-□NA by using the setting tool. To apply the new settings to the windows, click the [Load] button in the controller setting area. (👉 Page 24 Controller setting area)

# 1.2 Operating Environment

The following table shows the operating environment of the setting tool.

Item	Description	
Computer	—	Personal computer where any of the following operating systems works
	CPU	Pentium®-compatible CPU: 1GHz or more (depending on the operating environment of the operating system)
	Required memory capacity	2GB or more recommended (depending on the operating environment of the operating system)
Display	XGA (1024 × 768, 256 colors) or more	
Hard disk free space	600MB or more	
OS**2 (32-bit version and 64-bit version)	Microsoft® Windows® 10 (Home, Pro, Enterprise)*3 Microsoft® Windows® 8.1 (Pro, Enterprise)*3 Microsoft® Windows® 8 (Pro, Enterprise)*3 Microsoft® Windows® 7 (Professional, Enterprise, Ultimate)*4 The above operating systems of the Japanese, English, Chinese (simplified and traditional), and Korean versions are supported. (📄 Laser Displacement Sensor MH11 SettingTool Version 2 Installation Instructions)	
Interface	USB 2.0 full-speed mode (USB 1.1 compatible) compliant, Ethernet port	

\*1 This product may not work correctly when any of the following functions is used.

- Starting up the application in Windows® compatibility mode
- Simplified user switching function
- Remote desktop
- Windows XP Mode
- Windows Touch or Touch
- Modern UI
- Client Hyper-V
- Virtual desktops
- Tablet mode
- Sleep or standby of Windows®

\*2 The windows of this product may not work correctly in the following cases.

- When the size of the text or other items on the windows are beyond the default values (such as 96DPI, 100%, or 9pt)
- When the resolution of the windows is changed during operation
- When the theme of Windows is changed during operation
- When multi-displays are set up
- When the OS language, the system locale language, and the language of this product when installed do not match.

\*3 Disable the SmartScreen filter.

\*4 A log-on user under parental control cannot use this operating system.

# 1.3 Software License Agreement

This section describes the Software License Agreement to use the setting tool.

## Please read the following.

Thank you for using our software products. This software is provided only on the condition that the customer reviews the following Software License Agreement (hereinafter referred to as "this license") before making use of this software and agrees to all terms and conditions of this license.

By agreeing to the contract when installing this software, the customer agrees to all clauses of this license.

Please note that this software cannot be used if the customer does not agree to this license.

## Software License Agreement

This agreement is applicable to the software for configuring the settings of the laser displacement sensor downloaded from the Mitsubishi Electric FA website (hereinafter referred to as "this software").

### Article 1 (License Grant)

Mitsubishi Electric Corporation (Mitsubishi) grants to the customers the following nonexclusive rights as long as this license remains effective.

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(3) In no event shall Mitsubishi be liable for any damages or other loss caused by or related to modifications to this software by the customer.

(4) In the event that a dispute with any third party has arisen or is likely to arise from any infringement claims against any third-party's industrial property rights or intellectual property rights such as copyright, etc. as a result of the use of this software and/or the sale of the customer's products, related to this software, the customer shall be obligated to settle the dispute at their own responsibility and expense.

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(2) The customer shall not use this software with any other method or purpose than specified in the technical documentation provided by Mitsubishi.

(3) The customer shall not reverse engineer, decompile, disassemble or modify the software.

(4) The customer shall not sell, lend, rent or lease this software.

(5) The customer is permitted to only install this software on one's own personal computer using the installer provided by Mitsubishi, and the software shall not be used in a separate form.

## **Article 6 (License Period, etc.)**

This license shall be governed by and construed in accordance with the laws of Japan, and will remain effective from the point in which the customer commences the use of this software in accordance with this license until terminated by either of the events stated below.

(1) The customer is entitled to terminate the License and invalidate the right granted according to this license within one (1) month after giving written notice to Mitsubishi.

(2) Mitsubishi is entitled to terminate the License and invalidate the right granted to the customer according to this license immediately without notice if the customer fails to comply with any clause within this license.

(3) Even in the event that the license is terminated by any of the previous clauses stated above, all clauses within Article 2 shall remain in full force and effect.

## **Article 7 (Exportation)**

Unless approved by Mitsubishi in advanced with written permission and by the country it is being exported to, the customer is prohibited from exporting or transferring the software directly or indirectly to countries outside the territory of the country where the software is provided.

## **Article 8 (Termination)**

In the event the rights granted in accordance with this License is invalidated for any reason, the customer shall immediately disable and cease using this software, all copies of this software, and any related documentation, etc.

Additionally, the customer shall be obligated to either return the software to Mitsubishi or submit a document, which proves the fact that all copies of this software have been destroyed, within four (4) weeks after the termination date. Furthermore, the customer is entirely responsible for the cost of returns and destruction of the software.

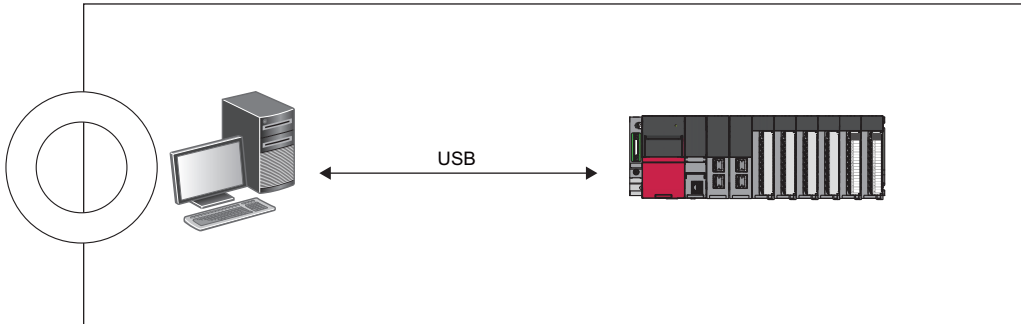
# 1.4 Connection Configuration between Personal Computer and CPU Module

This section describes the configuration where a personal computer and a CPU module are connected.

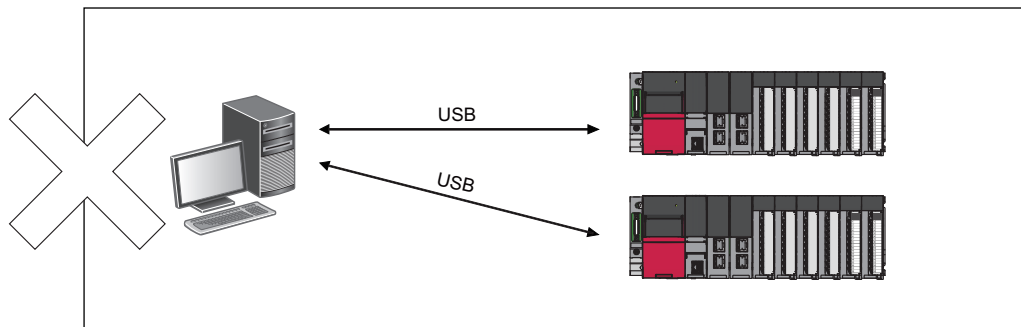
## Connection from USB port

### ■ Connection configuration with USB cables

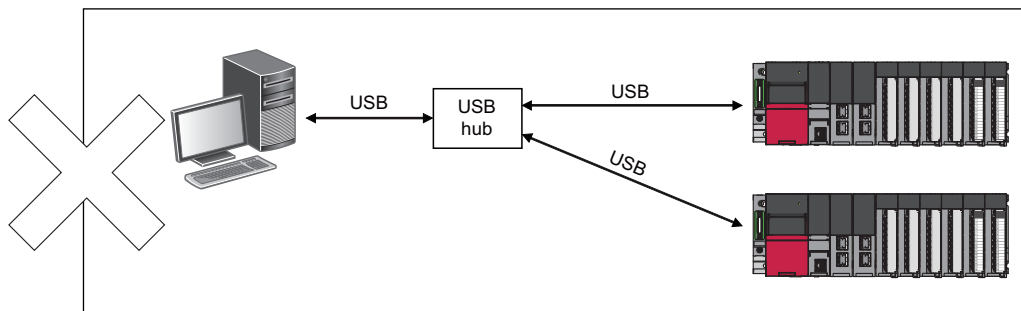
Only one CPU module can be connected at a time.



Multiple CPU modules cannot be connected from a personal computer with multiple USB ports.



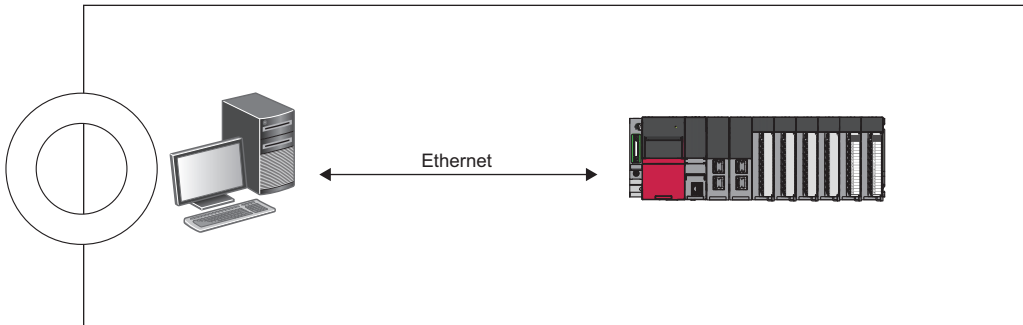
Multiple CPU modules cannot be connected via a USB hub.



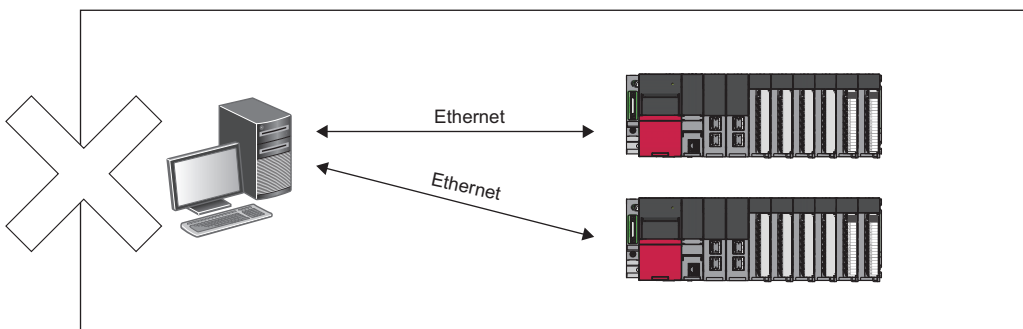
## Connection from Ethernet port

### ■ Configuration for Ethernet connection

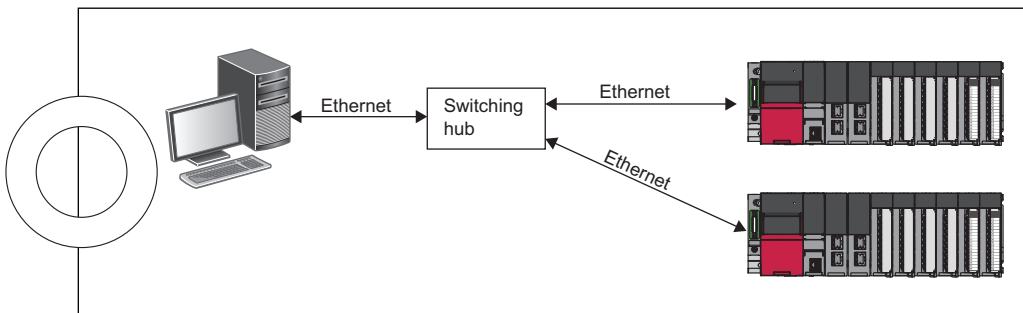
Only one CPU module can be connected at a time.



Multiple CPU modules cannot be connected from a personal computer with multiple Ethernet ports.



Multiple CPU modules can be connected via a switching hub.



# 2 OPERATING PROCEDURE


This chapter describes the procedure for setting the controller and preparing for data measurement.

## 2.1 Installation


Install the setting tool. ( Laser Displacement Sensor MH11 SettingTool Version 2 Installation Instructions)

## 2.2 Connecting the Controller to the Personal Computer

### When the personal computer communicates with the R60MH112NA

1. Connect the sensor head to the R60MH112NA.  
 MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Startup)
2. Connect the CPU module and the personal computer with a USB cable or Ethernet cable.
3. Power on the programmable controller and the external power supply, and check that they have started up. After the programmable controller has started up, laser will turn on. The programmable controller may need approximately 40 to 50 seconds for start-up after power-on.

### When the personal computer communicates with the MH11CTMF-□NA

1. Connect the sensor head to MH11CTMF-□NA.  
 Laser Displacement Sensor MH11 User's Manual
2. Power on the MH11CTMF-□NA and check that the MH11CTMF-□NA has started up. After the MH11CTMF-□NA has started up, laser will turn on. The programmable controller may need approximately 40 to 50 seconds for start-up after power-on.
3. Connect the MH11CTMF-□NA and the personal computer with a USB cable.

## 2.3 Starting Up the Setting Tool

Start up the setting tool from the start menu of Windows®.

The following describes the procedure for the standard installation.

 Start of Windows®\*1 ⇒ [MELSOFT] ⇒ [SENSOR]\*2 ⇒ [MH11 SettingTool]

\*1 Start the setting tool from [Start Menu] ⇒ [All Apps] or [Start] ⇒ [Programs]/[All Apps].

\*2 This item is not displayed on Windows® 8 or later.

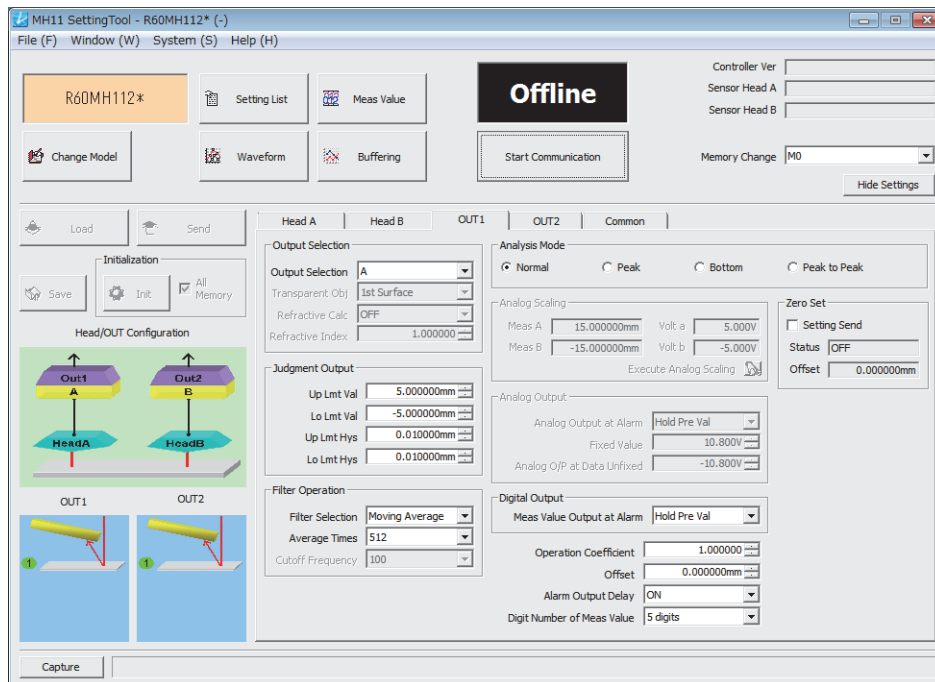
### Point

When the MH11CTMF-□NA that has started up is connected to the personal computer with a USB cable for the first time, a USB driver is installed automatically, and the setting tool and the MH11CTMF-□NA can be connected.

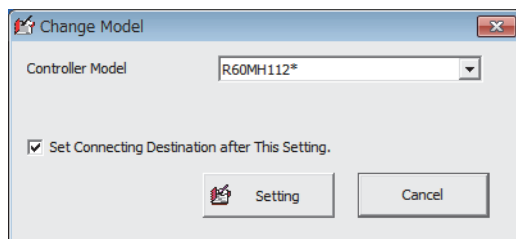
## 2.4 Measurement

### Basic measuring procedure

1. After the setting tool is started up, the main window appears.



2. Check that the controller has started up. After the controller has started up, laser will turn on.
3. Click the [Change Model] button to set the controller type.



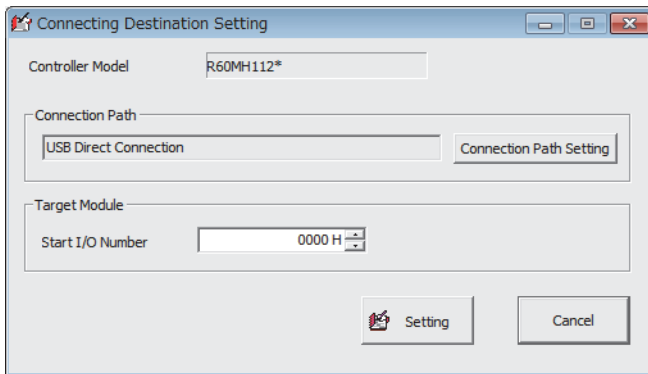
Select "R60MH112\*" when the controller model is the R60MH112NA or "MH11CTMF-\*" when the controller model is MH11CTMF-□NA.

After setting the controller model in the "Change Model" window, check "Set Connecting Destination after This Setting" in the same window and click the [Setting] button to display the "Connecting Destination Setting" window. (➡ Page 69 Connecting Destination Setting)

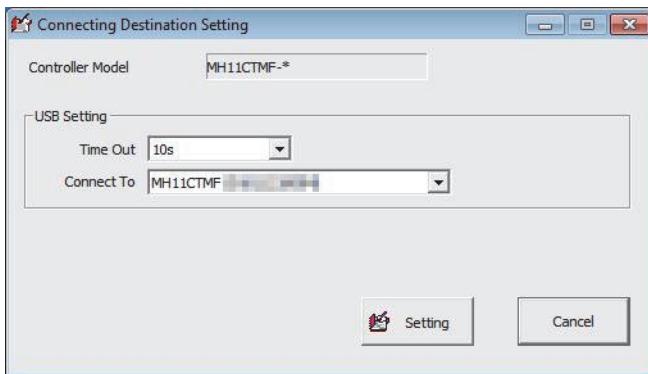


4. Click [Connecting Destination Setting] from [System] in the menu bar to set the method to connect the R60MH112NA or MH11CTMF-□NA.

To communicate with the R60MH112NA, set the connection path and the start I/O number in the target module. Then, click the [Setting] button to apply the connection method. (☞ Page 69 Connecting Destination Setting)



To communicate with the MH11CTMF-□NA, select the target MH11CTMF-□NA as a connection destination in the USB settings. Then, click the [Setting] button to apply the connection method.



5. Click the [Start Communication] button to start communication with the controller.
- Offline (Offline): "Offline" appears in the online or offline display area with a black background.
  - Online (Online): "Online" appears in the online or offline display area with a green background.

When an error appears and the status remains offline, check that the correct connection destination is selected. (☞ Page 69 Connecting Destination Setting)







### Restriction

Do not start communication before the controller has started up. Before clicking the [Start Communication] button, check that the laser turns on.

6. When the devices are connected correctly, corresponding items of "Controller Ver", "Sensor Head A", and "Sensor Head B" are displayed on the upper right of the window. (The items to be displayed differ depending on the devices used.)
7. Click the [Load] button to receive the controller settings and load the settings to the setting tool. If the button is not clicked, the settings are not loaded to the setting tool.
8. Click the [Meas Value] button to open the "Measurement Value" window. (☞ Page 52 "Measurement Value" Window)

## Advanced analysis and measurement



Click a button or tab in the following list on the main window.

- [Waveform] button: The received light status of the sensor head can be checked in a waveform. (  Page 54 Received Light Intensity Waveform Display)
- [Buffering] button: Accumulated measurement data can be checked in a graph. (  Page 59 Buffering Display)
- [Setting List] button: The settings of the memory in the setting tool and the controller can be checked in a list. (  Page 72 "Setting List" Window)
- "Head A" and "Head B" tabs: Measurement conditions of the sensor head can be set. (  Page 26 "Head A" and "Head B" tabs)
- "OUT1" and "OUT2" tabs: Output conditions for OUT can be set. (  Page 35 "OUT1" and "OUT2" tabs)
- "Common" tab: Common measurement conditions can be set. (  Page 47 "Common" tab)

## 2.5 Initialization

The settings can be initialized if the setting process fails.

### Initializing the controller

1. Click [Initialize Controller] from [File] in the menu. (  Page 18 Initialize Controller)
2. After initializing the settings, click [Save to Controller] from [File] in the menu bar to save the initialized settings to the controller. (  Page 18 Save to Controller)


#### Point

When the settings are not saved, the controller will start up under the previously saved measurement conditions at the next power-on.


### Initializing the setting tool

1. Initialize the controller.
2. Click the [Load] button on the main window to load the initialized settings of the controller.

## 2.6 Sending the Settings

Click [Send All Memory to Controller] from [File] in the menu bar to load the settings in the setting tool to the controller as the measurement conditions. The settings are not applied to the controller until [Send All Memory to Controller] is clicked. (  Page 19 Send All Memory to Controller)

## 2.7 Saving the Settings

Click [Save to Controller] from [File] in the menu bar to save the measurement conditions, which were loaded by [Send All Memory to Controller], to the controller. (  Page 18 Save to Controller)

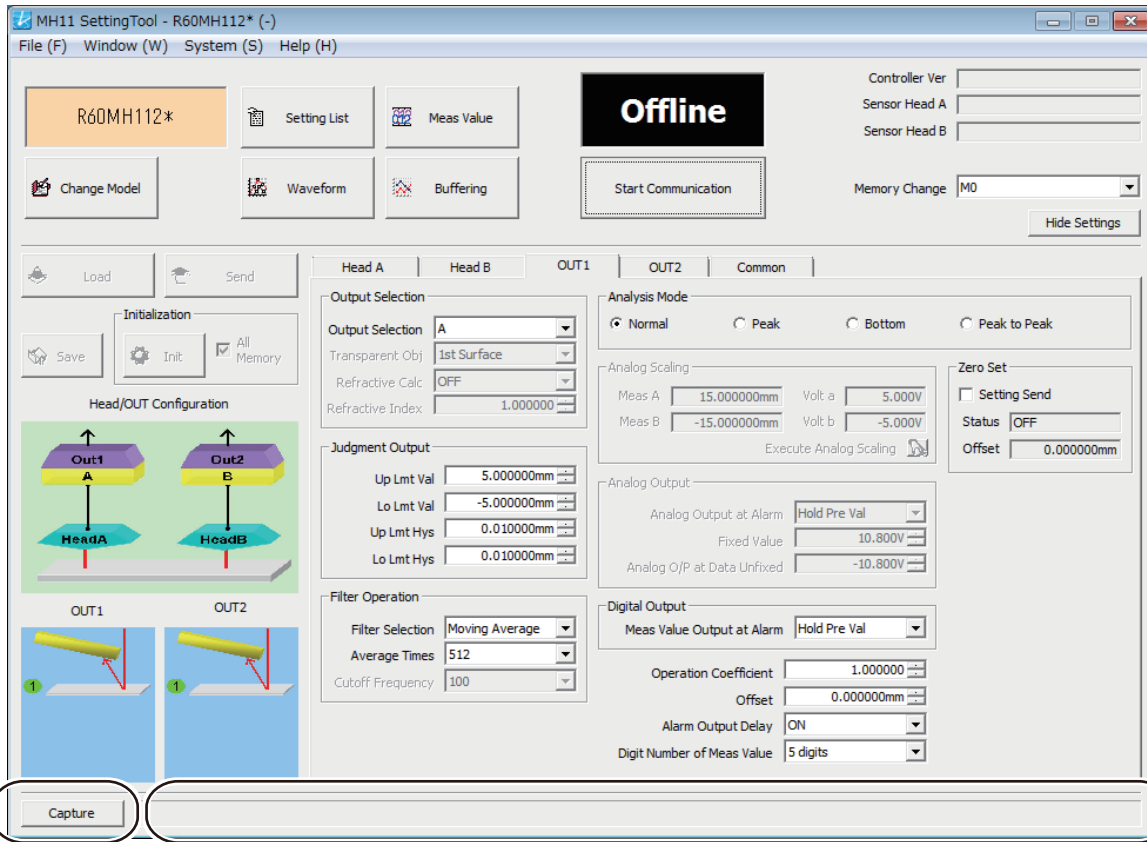
When the measurement conditions are not saved, the controller will start up under the previously saved measurement conditions at the next power-on.

## 2.8 Closing the Setting Tool

To close the setting tool, click the [Stop Communication] button to change the status to offline and close the window. When the opened file has been edited, a window to select whether to save the data appears.

# 2.9 Functions Common to the Windows

This section describes the functions that are common to the windows of the setting tool.



No.	Description
(1)	Capture function
(2)	Status bar

## Title bar

As window titles, the following are displayed.

Title name	Description
Main window	MH11 SettingTool - Controller model (ID) - File name [File storage location]
"Measurement Value" window	Window name - Controller model (ID)
"Received Light Intensity Waveform" window	
"Buffering" window	
"Setting List" window	Title name
"Change Model" window	

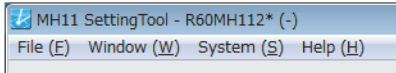
## Precautions

- For ID, when "MH11CTMF-\*" is selected for controller model, the serial number of the controller is displayed, and when "R60MH112\*" is selected, the production information of the controller module is displayed.
- When "R60MH112\*" is selected, until the online state becomes active, a hyphen "-" is displayed in the ID part.
- If an alias is set for the controller in the "Software Operation Setting" window, the set alias of the controller is displayed in the controller model (ID) part.

# 3 FUNCTION DETAILS

## 3.1 Menu Bar

The menu bar includes menu items for displaying windows, setting operations, and saving data to a file of the setting tool.



### "File" menu

#### Open File

[File] ⇒ [Open File]

This item is used to load the M1S file that has been saved in an external memory such as the hard disk of the personal computer.

#### Precautions

If the M1S file is opened on a system using dual displays, the window may not be displayed in the center of the screen. This is because the file contains screen position information from the last time the window was closed.

In that case, press the Alt + Space key while the window is active, then a shortcut menu will be displayed.

Select "Move" to move the window to the desired position by pressing the cursor key repeatedly.

#### Save As File

[File] ⇒ [Save As File]

This item is used to save the current settings of the setting tool as an M1S file in an external storage device such as the hard disk of the personal computer.

The settings are not saved in the controller. To save the settings in the controller, execute "Save to Controller". ( Page 18 Save to Controller)

#### Read Default Recipe

[File] ⇒ [Read Default Recipe]

This item is used to read the selected recipes to set the conditions for various applications as default conditions.

( Page 71 "Read Default Recipe" Window)

#### Change Controller Model

[File] ⇒ [Change Controller Model]

This item is used to change the controller model to be used.

( Page 51 "Change Model" Window)

#### Save to Controller

[File] ⇒ [Save to Controller]

This item is used to save the settings currently held by the controller in the controller.

To save the settings of the setting tool in the controller, execute "Send All Memory to Controller" and then execute "Save to Controller", since the settings stored in the controller may differ from the settings of the setting tool.

#### Initialize Controller

[File] ⇒ [Initialize Controller]

This item is used to restore the initial values for the settings of the selected memory area in the controller.

## Load All Memory from Controller

 [File] ⇒ [Load All Memory from Controller]

This item is used to load the settings of all the 16 memory areas in the controller to the setting tool.

When this item is executed, the selected memory area in the setting tool is replaced with the selected memory area in the controller, and the settings of that selected memory area are loaded to each window, and thus the window displays change automatically.

## Send All Memory to Controller

 [File] ⇒ [Send All Memory to Controller]


This item is used to send the settings of all the 16 memory areas in the setting tool to the controller.

If the settings are normally sent, the displayed number of the selected memory area in the setting tool is applied to the number of the selected memory area in the controller.


## Initialize All Memory in Controller

 [File] ⇒ [Initialize All Memory in Controller]

This item is used to restore the initial values for the settings of all the 16 memory areas and the system settings in the controller.

To save the initialized settings in the controller, execute "Save to Controller". When "Save to Controller" is not executed, the controller will start up under the previously saved settings at the next power-on. ( Page 18 Save to Controller)

## Exit


 [File] ⇒ [Exit]

This item is used to close the setting tool.

## "Window" menu

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### Measurement Value Display

 [Window] ⇒ [Measurement Value Display]


This item is used to acquire and check measurement data from the controller. ( Page 52 "Measurement Value" Window)

### Received Light Intensity Waveform Display

 [Window] ⇒ [Received Light Intensity Waveform Display]


This item is used to check the status of the light, which is received by the sensor head, in a waveform. ( Page 54 Received Light Intensity Waveform Display)


### Buffering Display

 [Window] ⇒ [Buffering Display]

This item is used to check accumulated measurement data in a graph. ( Page 59 Buffering Display)

### Setting List Display

 [Window] ⇒ [Setting List Display]


This item is used to check the settings of the memory in the setting tool and the controller in a list. ( Page 72 "Setting List" Window)

## "System" menu

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### Controller System Setting

 [System] ⇒ [Controller System Setting]


This item is used to set the operating conditions of the controller. ( Page 73 "Controller System Setting" Window)  
[Controller System Setting] does not appear in the R60MH112NA.

### Connecting Destination Setting

 [System] ⇒ [Connecting Destination Setting]

This item is used to set the method to connect the controller that communicates with the personal computer. ( Page 69 Connecting Destination Setting)

### Software Operation Setting


 [System] ⇒ [Software Operation Setting]

This item is used to set the operating conditions of the setting tool. ( Page 74 "Software Operation Setting" Window)

# "Help" menu


---

## Displaying the manual

 [Help] ⇒ [Help]


This item is used to activate e-Manual Viewer that displays the manual.


## Connection to MITSUBISHI ELECTRIC FA Global Website

 [Help] ⇒ [Connection to MITSUBISHI ELECTRIC FA Global Website]

This item is used to access the Mitsubishi Electric FA global website.

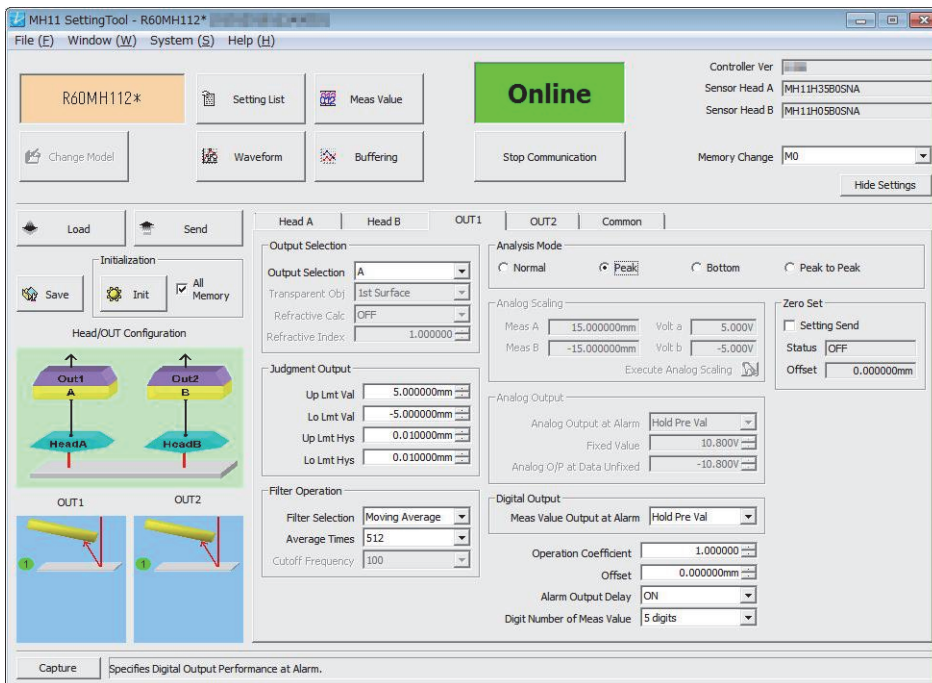
## Version

 [Help] ⇒ [Version]

This item is used to display the version of the setting tool. ( Page 75 "Version" Window)

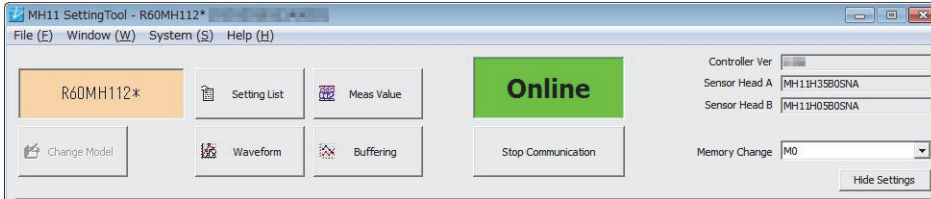
# 3.2 Main Window

This window shows the top-level menu for operation settings of the setting tool and measurement.



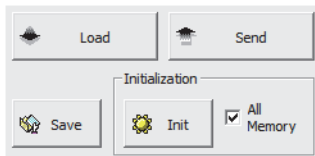


# Function launch area



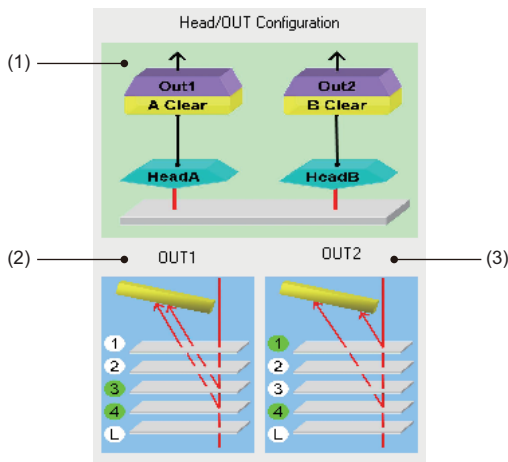
Item	Description
Controller Model	Displays the model of the target controller. The display does not change even if the status is switched from online to offline.
[Change Model] button	Changes the model of the target controller while offline. (☞ Page 51 "Change Model" Window)
[Setting List] button	Opens the "Setting List" window. (☞ Page 72 "Setting List" Window)
[Meas Value] button	Opens the "Measurement Value" window. (☞ Page 52 "Measurement Value" Window)
[Waveform] button	Opens the "Received Light Intensity Waveform" window. (☞ Page 54 Received Light Intensity Waveform Display)
[Buffering] button	Opens the "Buffering" window. (☞ Page 59 Buffering Display)
Online/Offline	Indicates the communication status with the controller. "Offline" and "Online" are switched depending on the communication status.
[Start Communication] button, [Stop Communication] button	Starts or stops communication with the controller. <ul style="list-style-type: none"> <li>• The communication starts by clicking the [Start Communication] button.</li> <li>• The communication stops by clicking the [Stop Communication] button.</li> </ul>
Controller Ver	Displays the version of the controller connected to a USB port or Ethernet port while online. The display does not change even if the status is switched from online to offline.
Sensor Head A, Sensor Head B	Displays the type of the sensor head connected to the controller while online, and displays "Unknown" when the sensor head is not connected. The display does not change even if the status is switched from online to offline.
Memory Change	Displays the memory numbers and memory aliases of all the 16 memory areas in the setting tool in a drop-down list. Select a memory number to be set. <ul style="list-style-type: none"> <li>• The memory alias assigned to each memory number can be set in the "Software Operation Setting" window. (☞ Page 74 "Software Operation Setting" Window)</li> <li>• Changing the memory number in "Memory Change" cannot switch the selected memory area in the controller. To switch the selected memory area, press the [Send] button to send all the memory areas to the controller. (☞ Page 24 Controller setting area)</li> </ul>
[Hide Settings ▲] button, [Display Settings ▼] button	Switches between whether to display or hide the controller setting area, configuration image output area, and the tabs on the main window. The text on the buttons changes according to the display status. <ul style="list-style-type: none"> <li>• Displayed: "Hide Settings ▲"</li> <li>• Hidden: "Display Settings ▼"</li> </ul> The display status can be switched only when the main window is active.

## Controller setting area



Item	Description
[Load] button	<p>Loads the settings of all the 16 memory areas in the controller to the setting tool.</p> <p>When this item is executed, the selected memory area in the setting tool is replaced with the selected memory area in the controller, and the settings of that selected memory area are loaded to each window, and thus the window displays change automatically.</p> <p>The function is the same as that of "Load All Memory from Controller" in the "File" menu.</p>
[Send] button	<p>Sends the settings of all the 16 memory areas in the setting tool to the controller.</p> <p>If the settings are normally sent, the displayed number of the selected memory area in the setting tool is applied to the number of the selected memory area in the controller.</p> <p>The function is the same as that of "Send All Memory to Controller" in the "File" menu.</p>
[Save] button	<p>Writes the current settings of the controller to the controller.</p> <p>The function is the same as that of "Save to Controller" in the "File" menu.</p>
Initialization	<p>[Init] button: Initializes the controller memory.</p> <p>With "All Memory" not selected: Restores the initial values for the settings of the selected memory area in the controller.</p> <p>The function is the same as that of "Initialize Controller" in the "File" menu.</p> <p>With "All Memory" selected: Restores the initial values for the settings of all the 16 memory areas and the system settings in the controller.</p> <p>The function is the same as that of "Initialize All Memory in Controller" in the "File" menu.</p>

# Configuration image output area



- (1) Example when "Output Selection" is set to "A [Tr]" on the "OUT1" tab and "Output Selection" is set to "B [Tr]" on the "OUT2" tab
- (2) Example when "Output Selection" is set to "A [Tr]" and "Transparent Obj" is set to "3rd-4th Surf" on the "OUT1" tab, and "Installation Mode" is set to "Diff Refl" and "Meas Surf Ref" is set to "Near" on the "Head A" tab
- (3) Example when "Output Selection" is set to "B [Tr]" and "Transparent Obj" is set to "1st-4th Surf" on the "OUT2" tab, and "Installation Mode" is set to "Diff Refl" and "Meas Surf Ref" is set to "Near" on the "Head B" tab

Item	Description
Head/OUT Configuration	Displays the measurement status set with a combination of "Output Selection" on the "OUT1" and "OUT2" tabs in an image. Set "Output Selection" on the tabs. (☞ Page 35 "OUT1" and "OUT2" tabs)
OUT1	Displays the measurement points set with a combination of the following four selections in an image. <ul style="list-style-type: none"> <li>• "Output Selection" on the "OUT1" tab</li> <li>• "Transparent Obj" on the "OUT1" tab (when a transparent object is selected for "Output Selection" on the "OUT1" tab)</li> <li>• "Installation Mode" on the "Head A" or "Head B" tab corresponding to "Output Selection" on the "OUT1" tab</li> <li>• "Meas Surf Ref" on the "Head A" or "Head B" tab corresponding to "Output Selection" on the "OUT1" tab</li> </ul> (☞ Page 35 "OUT1" and "OUT2" tabs, Page 26 "Head A" and "Head B" tabs)
OUT2	Displays the measurement points set with a combination of the following four selections in an image. <ul style="list-style-type: none"> <li>• "Output Selection" on the "OUT2" tab</li> <li>• "Transparent Obj" on the "OUT2" tab (when "Transparent Obj" is selected for "Output Selection" on the "OUT2" tab)</li> <li>• "Installation Mode" on the "Head A" or "Head B" tab corresponding to "Output Selection" on the "OUT2" tab</li> <li>• "Meas Surf Ref" on the "Head A" or "Head B" tab corresponding to "Output Selection" on the "OUT2" tab</li> </ul> (☞ Page 35 "OUT1" and "OUT2" tabs, Page 26 "Head A" and "Head B" tabs)

## "Head A" and "Head B" tabs

The settings on the tabs are not applied to the controller until the [Send] button is clicked.

The screenshot shows a control panel interface with the following sections:

- Head A | Head B | OUT1 | OUT2 | Common** (Navigation tabs)
- Installation Mode:** Diff Refl (dropdown)
- Alarm Delay Times:** 8times (input)
- Measurement Mode:** Diffuse [Std] (dropdown)
- Meas Surf Ref:** Near (dropdown)
- Peak Recognition Lv:** 100 (input)
- Median Filter:** OFF (dropdown)
- Emission Adjustment:**
  - Emission Adjustment: Auto (dropdown)
  - Emitted Light Intensity Search: [button]
  - Emission Adjustment Area:
    - Emission Adjustment Area a: 1 (input)
    - Emission Adjustment Area b: 512 (input)
- Calibration:**
  - Meas A: 5.000000mm (input) | Corr a: 5.000000mm (input)
  - Meas B: -5.000000mm (input) | Corr b: -5.000000mm (input)
  - Execute Calibration: [button]
- Measuring Range:**
  - Measuring Range Point a: 3 (input)
  - Measuring Range Point b: 510 (input)

For the following items, a maximum of 16 settings can be saved by executing memory change.

Item	Description
Installation Mode	Selects a measurement type of either "Diff Refl" or "Spec Refl" depending on the measurement object. (Page 27 Installation mode)
Alarm Delay Times	Holds the last normal value up to the set number of times during alarm operation. (Page 27 Alarm delay times)
Measurement Mode	Selects a measurement value processing method depending on the measurement object. (Page 28 Measurement mode)
Meas Surf Ref	Selects the counting method of the surface which is set in "Output Selection". (Page 29 Measurement surface reference)
Peak Recognition Lv	Sets the level that is recognized as the peak of the received light intensity waveform. (Page 30 Peak recognition sensitivity)
Median Filter <sup>*1</sup>	Cuts off sudden changes in the measurement value to prevent variations in measurement. (Page 31 Median filter)
Emission Adjustment	Sets the appropriate emitted light intensity for the measurement area. (Page 32 Emission adjustment) [Emitted Light Intensity Search] button: The "Emitted Light Intensity Search" window is displayed. (Page 65 "Emitted Light Intensity Search" Window) Emission Adjustment Area: Specifies an automatic emission adjustment area. The light intensity feedback function operates between "Emission Adjustment Area a" and "Emission Adjustment Area b". (Page 33 Emission adjustment area specification)
Calibration	Corrects an inaccurate measurement value due to the color, material, or surface condition of the measurement object. [Execute Calibration] button: The "Execute Calibration" window is displayed. (Page 66 "Execute Calibration" Window)
Measuring Range	Sets the measurement conditions for each sensor head. (Page 34 Measuring range)

\*1 This item cannot be used in the R60MH112NA.

## Precautions

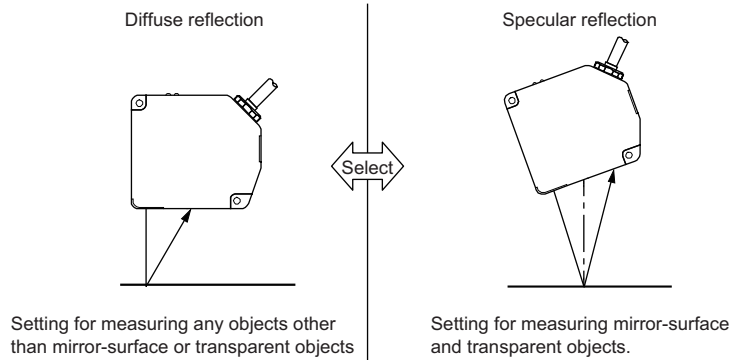
The display limit of the measurement value is  $\pm 950.000000$ mm. Set the value within the range.

## Installation mode

This item is used to select a measurement type of either "Diff Refl" or "Spec Refl" depending on the measurement object.

### ■Setting method

🔑 "Head A" or "Head B" tab on the main window ⇨ "Installation Mode"  
Set "Diff Refl" or "Spec Refl" in "Installation Mode".



### ■Supplemental remarks

Always set the mode to "Spec Refl" when measuring a specular-surface or transparent object. Note that the mounting angle of the sensor head is different between diffuse reflection and specular reflection. Install the sensor head properly. If the setting or installation is not correct, accurate data cannot be acquired.

For details on the sensor head mounting method, refer to the following.

📖 MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Sensor head)

## Precautions

When the setting is initialized with the 8mm/10mm/15mm type (MH11H01A□□NA) connected, the default value for the controller is "Spec Refl".

## Alarm delay times

This item is used to hold the last normal value up to the set number of times during alarm operation.

This function relates to the measurement value and alarm indicator in the alarm status.

### ■Setting method

🔑 "Head A" or "Head B" tab on the main window ⇨ "Alarm Delay Times"  
Set "Alarm Delay Times".

Setting value	Setting details
0 to 65534	Number of alarm delay times
65535	The last normal value is held while the alarm exists regardless of the number of delay times.


### Point

- When "Fixed Value" is selected for the setting of the measurement value output at alarm, the function can be used to prevent output with the fixed value of an instantaneous alarm status due to changes in the surface condition of the measurement object.
- When an alarm occurs (due to insufficient light intensity, or when a measurement object is not in the measurement range), the last normal value is held up to the number of alarm delay times. If the alarm status where the set number of alarm delay times is exceeded continues, the fixed value that has been selected in the setting of measurement output at alarm is output. However, when "Hold Pre Val" is selected in the setting of the measurement value output at alarm, the alarm output is held during the alarm status irrespective of the alarm delay times.
- To detect an alarm immediately even when the number of alarm delay times is set, turn off the alarm output delay setting. The alarm status can be immediately detected only from Alarm signal OUT1 (X18) and Alarm signal OUT2 (X19).

## Measurement mode

This item is used to select a measurement value processing method depending on the measurement object. The measurement mode is a function for selecting the most appropriate measurement algorithm such as correction of received light intensity waveform instability. To acquire a stable measurement value, select the most appropriate measurement mode depending on the measurement object. Refer to the following table to select a mode.

### ■Setting method

 "Head A" or "Head B" tab on the main window ⇨ "Measurement Mode"  
Set "Measurement Mode".

Item	Measurement object	Effect	Recommended installation
Diffuse [Std]	<ul style="list-style-type: none"> <li>Any objects other than specular-surface objects and transparent objects</li> <li>Metal, resin, rubber, ceramic, and other materials</li> </ul>	Standard setting suitable for many types of measurement object. Try this setting first.	Diffuse reflection
Metal 1	<ul style="list-style-type: none"> <li>Hairline-finished metal<sup>*1</sup></li> <li>Extrusion material, rolled material, and other materials</li> </ul>	Variation in the measurement value caused by metal surface finishing can be reduced.	
Metal 2	<ul style="list-style-type: none"> <li>Hard hairline-finished metal<sup>*1</sup></li> <li>Materials with tiny scratches, cutting marks, or grinding surfaces</li> </ul>	The effect in "Metal 1" mode is enhanced.	
Penetration	<ul style="list-style-type: none"> <li>Translucent objects</li> <li>Translucent resin</li> </ul>	Penetration of a laser beam can be reduced to the surface of the measurement object.	
Specular [Std]	<ul style="list-style-type: none"> <li>Specular-surface objects or transparent objects</li> <li>Front and back surfaces of glass</li> </ul>	Standard setting used as reference for measurement at specular reflection installation. Try this setting first.	Specular reflection
Glass	<ul style="list-style-type: none"> <li>Clearance and thickness of glass</li> </ul>	Thinner clearance than the standard can be measured.	
Glass Pattern	<ul style="list-style-type: none"> <li>Pattern glass</li> </ul>	Variation in the measurement value due to the pattern of glass with a different refractive index can be reduced.	

\*1 Hairline means metal finishing with detailed continuous line patterns on the surface.

## Precautions

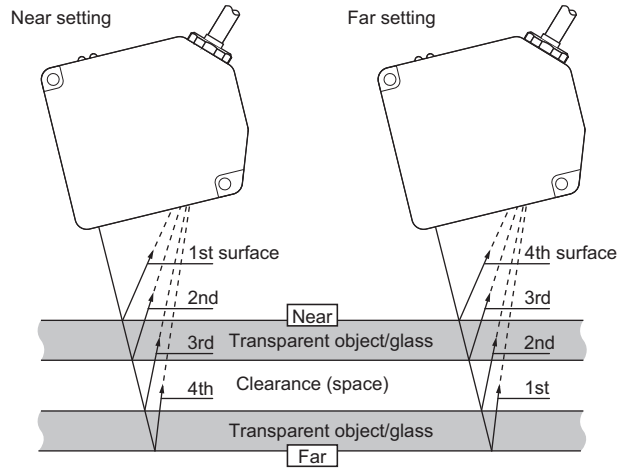
- Always actually perform measurement to select an appropriate measurement mode for the measurement object used.
- Regardless of the installation mode setting ("Spec Refl" or "Diff Refl"), any measurement mode can be selected.
- When the setting is initialized with the 8mm/10mm/15mm type (MH11H01A□□NA) connected, the default value for the controller is "Specular [Std]".

## Measurement surface reference

This item is used to select the counting method of the surface which is set in "Output Selection".

When measuring a transparent object, select the measurement surface reference from the Near setting (counting the layer of the measurement surfaces which is set in "Output Selection" from the nearest surface to the farthest surface) or the Far setting (counting the layer from the farthest surface to the nearest surface).

The default setting is "Near".



### Setting method

🔍 "Head A" or "Head B" tab on the main window ⇨ "Meas Surf Ref"

Set "Meas Surf Ref".

Setting value	Setting details
Near	Measurement surfaces are counted in such an order as surface 1, surface 2, and surface 3 from the nearest surface to the farthest surface in relation to the sensor head.
Far	Measurement surfaces are counted in such an order as surface 1, surface 2, and surface 3 from the farthest surface to the nearest surface in relation to the sensor head.

### Point

The measurement surfaces can be recognized stably only when they are within the measurement range of the sensor head.

Thus, if they go beyond the measurement range due to movement of the sensor head or the measurement object, the actual measurement surface may be different from the selected surface. In this case, to prevent a detection error, set the measurement surface reference by taking into consideration the moving range of the sensor head or the measurement object.

## Peak recognition sensitivity

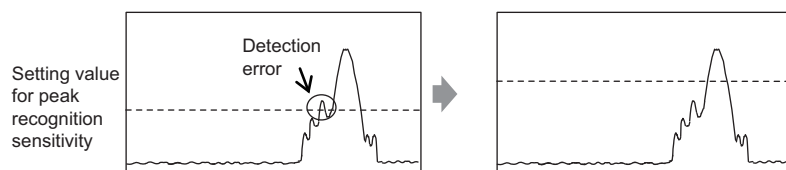
This item is used to set the level that is recognized as the peak of the received light intensity waveform.

The maximum received light intensity from the point where the received light intensity rises above the peak recognition sensitivity level up to the point where it drops below that level is recognized as a peak.

### Point

This function is useful in the following cases.

- When the measurement value originally expected to be detected cannot be acquired due to waveform instability
- When the measurement value originally expected to be detected is acquired for a transparent object
- When multiple peaks are separated



### Setting method

"Head A" or "Head B" tab on the main window ⇔ "Peak Recognition Lv"

Set "Peak Recognition Lv".

Setting value	Setting details
100 to 400	Level recognized as the peak of the received light intensity waveform



## Median filter

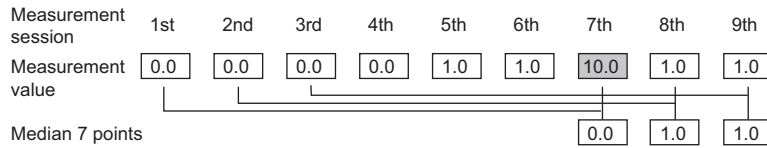
This item is used to cut off sudden changes in the measurement value to prevent variations in measurement.

The median filter setting can be selected from "OFF", "7", "15", and "31" (points).

Median filter is effective in cutting off sudden changes in the measurement value.

The changes in all the measurement values are cut off after the selected point.

**Ex.**



### Setting method

"Head A" or "Head B" tab on the main window ⇔ "Median Filter"

Set "Median Filter".

Setting value	Setting details
OFF	Filter processing off
7	Filter processing 7 points
15	Filter processing 15 points
31	Filter processing 31 points

### Point

The function enables a spiked measurement value to be cut off, while holding the measurement of steps and edges in measured shapes.

### Precautions

- When the sampling cycle is set to 10 $\mu$ s or 20 $\mu$ s, set the median filter to "OFF". Even if a setting other than "OFF" is selected, the median filter operates as when it is set to "OFF".
- This item cannot be used in the R60MH112NA.

## Emission adjustment


This item is used to set the appropriate emitted light intensity for the measurement area.

The default value is "Auto". In this setting, optimum emitted light intensity is automatically set according to the amount of light reflected by the measurement object.

When the setting of the emitted light intensity is "Auto", the current emitted light intensity is displayed in percent figures.

When setting a fixed value, set the value to approximately 600 to 700 while checking the received light intensity waveform display or received light intensity at peak on the setting tool.

### ■ Setting method

 "Head A" or "Head B" tab on the main window ⇔ "Emission Adjustment"

Set "Emission Adjustment".

Setting value	Setting details
Auto	The emitted light intensity is adjusted automatically.
0.04% Fixed	The emitted light intensity is fixed to 0.04%.
0.05% Fixed	The emitted light intensity is fixed to 0.05%.
0.06% Fixed	The emitted light intensity is fixed to 0.06%.
0.08% Fixed	The emitted light intensity is fixed to 0.08%.
0.11% Fixed	The emitted light intensity is fixed to 0.11%.
0.14% Fixed	The emitted light intensity is fixed to 0.14%.
0.18% Fixed	The emitted light intensity is fixed to 0.18%.
0.24% Fixed	The emitted light intensity is fixed to 0.24%.
0.31% Fixed	The emitted light intensity is fixed to 0.31%.
0.40% Fixed	The emitted light intensity is fixed to 0.40%.
0.53% Fixed	The emitted light intensity is fixed to 0.53%.
0.68% Fixed	The emitted light intensity is fixed to 0.68%.
0.89% Fixed	The emitted light intensity is fixed to 0.89%.
1.16% Fixed	The emitted light intensity is fixed to 1.16%.
1.50% Fixed	The emitted light intensity is fixed to 1.50%.
1.95% Fixed	The emitted light intensity is fixed to 1.95%.
2.54% Fixed	The emitted light intensity is fixed to 2.54%.
3.30% Fixed	The emitted light intensity is fixed to 3.30%.
4.29% Fixed	The emitted light intensity is fixed to 4.29%.
5.58% Fixed	The emitted light intensity is fixed to 5.58%.
7.25% Fixed	The emitted light intensity is fixed to 7.25%.
9.43% Fixed	The emitted light intensity is fixed to 9.43%.
12.3% Fixed	The emitted light intensity is fixed to 12.3%.
15.9% Fixed	The emitted light intensity is fixed to 15.9%.
20.7% Fixed	The emitted light intensity is fixed to 20.7%.
26.9% Fixed	The emitted light intensity is fixed to 26.9%.
35.0% Fixed	The emitted light intensity is fixed to 35.0%.
45.5% Fixed	The emitted light intensity is fixed to 45.5%.
59.2% Fixed	The emitted light intensity is fixed to 59.2%.
76.9% Fixed	The emitted light intensity is fixed to 76.9%.
100% Fixed	The emitted light intensity is fixed to 100%.

## Precautions

Normally set the emission adjustment to "Auto".

### Point

- In measurement of objects where light reflection may vary excessively, such as on an object having many holes or connector pins in which light-shielding state and light-passing state may be repeated, alarm status may continue due to delayed light intensity feedback (inaccurate measurement). In this case, to increase the measurement speed, fix the appropriate emitted light intensity to the measurement point.
- The laser light reflection intensity excessively varies depending on the surface condition or the refractive index of the installation environment or the measurement object. If the emission adjustment settings are not sufficient, change the sampling cycle to acquire appropriate received light intensity.
- If the refractive index of the measurement object is high, the emission adjustment setting is not sufficient due to the excessive light reflection intensity. In this case, install the ND filter.

## Emission adjustment area specification

This item is used to specify the automatic emission adjustment area. The light intensity feedback function operates between two points: the specified emission adjustment area point a and the specified emission adjustment area point b.

### ■Setting method

 "Head A" or "Head B" tab on the main window ⇨ "Emission Adjustment Area"

Set the specified emission adjustment area point a and the specified emission adjustment area point b for "Emission Adjustment Area".

Setting value	Setting details
1 to 512	Position of the receiving cell

### Point

When measuring a transparent object where high refractive index in the surrounding affects emission adjustment, specify an emission adjustment area to execute emission adjustment on a desired light receiving surface.

For an emission adjustment area, specify two light receiving cell positions of the specified emission adjustment area point a and the specified emission adjustment area point b. The light intensity feedback function works so that the received light intensity is optimal in the specified area. Set a value in the range 1 to 512 for each of the specified emission adjustment area point a and the specified emission adjustment area point b.

## Precautions

- This setting is valid when "Auto" is selected for emission adjustment.
- When the sampling cycle is set to 10 $\mu$ s, set each of the specified emission adjustment area point a and the specified emission adjustment area point b to a value in the range 1 to 112.
- When the sampling cycle is set to 20 $\mu$ s, set each of the specified emission adjustment area point a and the specified emission adjustment area point b to a value in the range 1 to 256.
- The magnitude relationship between the specified emission adjustment area point a and the specified emission adjustment area point b is automatically determined by the controller. However, do not set the two to the same value. If the same value is set, all the measurement values become out of the range and measurement cannot be performed.
- If the setting range of the specified emission adjustment area is not appropriate, light will be emitted at 100% fixed and a measurement alarm occurs.

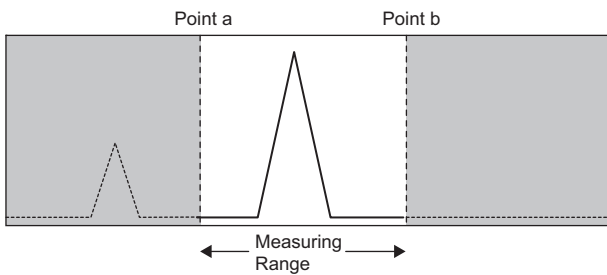
## Measuring range

This item is used to specify two light receiving cells of specified measuring range point a and point b. The area between the specified two points is set as the measurement range, so that other areas can be excluded from measurement.

### Point

When measuring the thickness of a transparent object, measurement of selected measurement surfaces in "Output Selection" becomes impossible if there are eight or more measurement surfaces. Measurement becomes possible by specifying only the surface to be detected in the measuring range.

Ex.



### Setting method

"Head A" or "Head B" tab on the main window ⇔ "Measuring Range"

Set the specified measuring range point a and the specified measuring range point b for "Measurement Range".

Setting value	Setting details
3 to 510	Position of the receiving cell

### Precautions

- The magnitude relationship between the specified measuring range point a and the specified measuring range point b is automatically determined by the controller. However, do not set the two to the same value. If the same value is set, all the measurement values become out of the range and measurement cannot be performed.
- When the sampling cycle is set to 10 $\mu$ s, set each of the specified measuring range point a and the specified measuring range point b in the range 3 to 112.
- When the sampling cycle is set to 20 $\mu$ s, set each of the specified measuring range point a and the specified measuring range point b in the range 3 to 256.
- If the measuring range is not appropriately set, light will be emitted at 100% fixed and a measurement alarm occurs.
- Check the received light intensity waveform display on the setting tool while setting the measuring range.

## "OUT1" and "OUT2" tabs

The settings on the tabs are not applied to the controller until the [Send] button is clicked.

For the following items, a maximum of 16 settings can be saved by executing memory change.

Item	Description
Output Selection	Selects whether measurement is individually performed by each sensor head or performed by two sensor heads with various calculations. (☞ Page 36 Output selection)
Transparent Obj	Selects measurement surfaces from several surfaces of a transparent object. (☞ Page 37 Transparent object)
Refractive Calc	Reflects the refractive index, which is set in "Refractive Index", to the measurement result. (☞ Page 39 Refractive index calculation)
Refractive Index	Sets the refractive index of the transparent object to be measured. (☞ Page 40 Refractive index)
Up Lmt Val, Lo Lmt Val <sup>*2</sup>	Judges the measurement value by setting the upper and lower limit values. (☞ MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Application))
Up Lmt Hys, Lo Lmt Hys <sup>*2</sup>	Stabilizes the judgment output for chattering of the measurement value. (☞ MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Application))
Filter Selection	Selects among moving average, low-pass, and high-pass. (☞ Page 41 Filter processing)
Average Times	Sets the average times of moving average. (☞ Page 41 Average times)
Cutoff Frequency	Sets the cutoff frequency of the low pass/high pass filter. (☞ Page 41 Cutoff frequency)
Analysis Mode	Sets the analysis mode. (☞ Page 43 Analysis mode)
Analog Scaling <sup>*1</sup>	[Execute Analog Scaling] button: Displays the "Execute Analog Scaling" window. (☞ Page 68 "Execute Analog Scaling" Window)
Analog Output <sup>*1</sup>	Sets the analog output status during alarm operation. (☞ Laser Displacement Sensor MH11 User's Manual)
Digital Output <sup>*3</sup>	Sets the measurement value output status during alarm operation. (☞ Page 44 Measurement value output at alarm)
Operation Coefficient	Sets the coefficient for the measurement value. (☞ Page 45 Operation coefficient)
Offset <sup>*2</sup>	Subtracts or adds a set value from/to the measurement value. (☞ Page 45 Offset)
Alarm Output Delay	Delays output from the alarm output terminal. (☞ Page 46 Alarm output delay)
Digit Number of Meas Value	Sets the digit number of the measurement value. (☞ Laser Displacement Sensor MH11 User's Manual)
Zero Set <sup>*2</sup>	<ul style="list-style-type: none"> <li>• Loads the current zero set status and zero set amount from the controller.</li> <li>• Send the current zero set status and zero set amount to the controller.</li> </ul> (☞ Page 46 Zero set)

\*1 This item cannot be used in the R60MH112NA.

\*2 The value is rounded down in units of 0.25μs in operations.

\*3 When the "MH11CTMF-\*" is selected on the "Change Model" window, "Digital Output at Alarm" is displayed on the "OUT1" and "OUT2" tab. When the "R60MH112\*" is selected on the "Change Model" window, "Meas Value Output at Alarm" is displayed on the "OUT1" and "OUT2" tab.

## Precautions


The display limit of the measurement value is ±950.000000mm. Set the value within the range.

## Output selection

This item is used to select whether measurement is individually performed by each sensor head or performed by two sensor heads with various calculations.

The following table lists the setting items and the output details.

### ■Setting method

 "OUT1" or "OUT2" tab on the main window ⇔ "Output Selection"

Select "Output Selection".

Item	Function
A	Outputs the measurement value of sensor head A.
B	Outputs the measurement value of sensor head B.
-A	Outputs the measurement value of sensor head A adding a negative sign.
-B	Outputs the measurement value of sensor head B adding a negative sign.
A+B	Adds the measurement values of sensor heads A and B and outputs the value.
-(A+B)	Adds the measurement values of sensor heads A and B, and adds a negative sign and outputs the value.
A-B	Subtracts the measurement value of sensor head B from that of sensor head A and outputs the value.
B-A	Subtracts the measurement value of sensor head A from that of sensor head B and outputs the value.
A [Tr]	Outputs the measurement value of a transparent object by using sensor head A.
B [Tr]	Outputs the measurement value of a transparent object by using sensor head B.
-A [Tr]	Outputs the measurement value of A [Tr] adding a negative sign.
-B [Tr]	Outputs the measurement value of B [Tr] adding a negative sign.
A1+B1 [Tr]	Adds the measurement values of the 1st surface of a transparent object measured by sensor heads A and B and outputs the value.
-(A1+B1) [Tr]	Adds the measurement values of the 1st surface of a transparent object measured by sensor heads A and B, adds a negative sign, and outputs the value.
A1-B1 [Tr]	Subtracts the measurement value (1st surface of a transparent object) of sensor head B from the measurement value (1st surface of a transparent object) of sensor head A and outputs the value.
B1-A1 [Tr]	Subtracts the measurement value (1st surface of a transparent object) of sensor head A from the measurement value (1st surface of a transparent object) of sensor head B and outputs the value.

## Precautions

- To measure a transparent object, set "A [Tr]", "B [Tr]", "-A [Tr]", "-B [Tr]", "A1+B1 [Tr]", "-(A1+B1) [Tr]", "A1-B1 [Tr]", or "B1-A1 [Tr]". In this case, set "Spec Refl" for "Installation Mode". (Note that the mounting method of the sensor head differs between specular reflection and diffuse reflection.) In addition, set the measurement surface reference and the transparent object. If they are not set, measurement is executed up to the front surface from the sensor head. Before measuring a transparent object, set the recommended measurement mode for specular reflection installation.
- When "-A", "-B", "-(A+B)", "-A [Tr]", "-B [Tr]", or "-(A1+B1) [Tr]" is set, the setting is reflected in all outputs such as the measurement value display.

## Transparent object

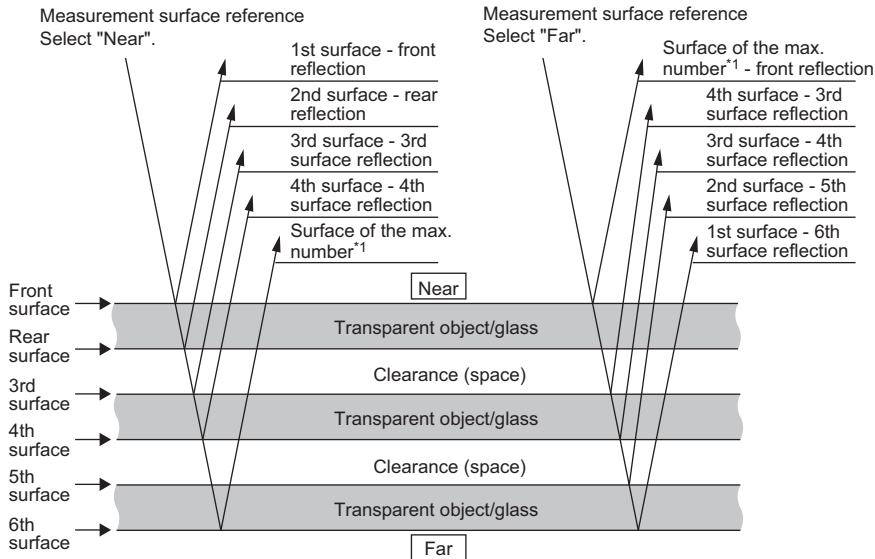
This item is used to select measurement surfaces from several surfaces of a transparent object.

According to the counting method for the surface set in "Meas Surf Ref", select measurement surfaces from several surfaces of a transparent object. One or several surfaces can be selected among the surfaces from the 1st surface to the upper limit surface.

### ■Supplemental remarks

This setting is enabled when "A [Tr]", "B [Tr]", "-A [Tr]", or "-B [Tr]" is selected in "Output Selection".

(If one of the above is not selected in "Output Selection", the setting of the transparent object cannot be configured.)



\*1 A maximum of seven surfaces can be detected.

### ■Setting method

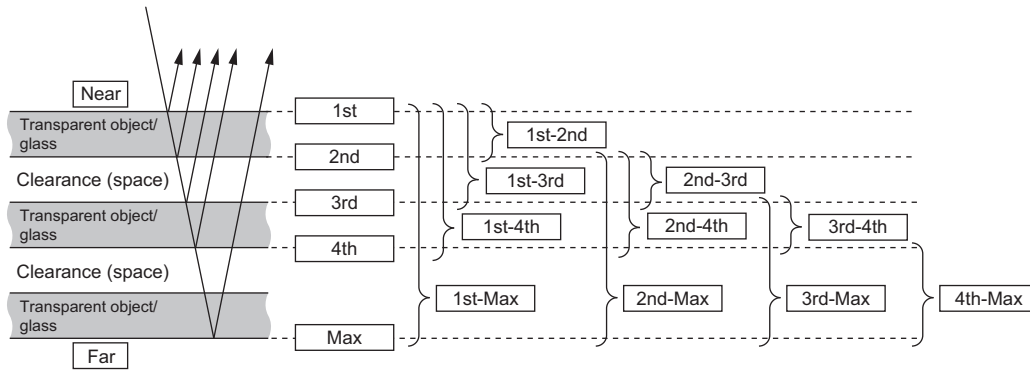
🔑 "OUT1" or "OUT2" tab on the main window ⇨ "Transparent Obj"

Set "Transparent Obj".

Setting value	Setting details
1st Surf	Sets the 1st surface as the measurement surface.
2nd Surf	Sets the 2nd surface as the measurement surface.
3rd Surf	Sets the 3rd surface as the measurement surface.
4th Surf	Sets the 4th surface as the measurement surface.
Up Surf	Sets the upper limit surface as the measurement surface.
1st-2nd Surf	Sets surfaces from the 1st surface to the 2nd surface as the measurement surfaces.
1st-3rd Surf	Sets surfaces from the 1st surface to the 3rd surface as the measurement surfaces.
1st-4th Surf	Sets surfaces from the 1st surface to the 4th surface as the measurement surfaces.
1st-Up Surf	Sets surfaces from the 1st surface to the upper limit surface as the measurement surfaces.
2nd-3rd Surf	Sets surfaces from the 2nd surface to the 3rd surface as the measurement surfaces.
2nd-4th Surf	Sets surfaces from the 2nd surface to the 4th surface as the measurement surfaces.
2nd-Up Surf	Sets surfaces from the 2nd surface to the upper limit surface as the measurement surfaces.
3rd-4th Surf	Sets surfaces from the 3rd surface to the 4th surface as the measurement surfaces.
3rd-Up Surf	Sets surfaces from the 3rd surface to the upper limit surface as the measurement surfaces.
4th-Up Surf	Sets surfaces from the 4th surface to the upper limit surface as the measurement surfaces.

**Ex.**

When "Near" is set for "Meas Surf Ref", the measurement surfaces are selected as shown in the following figure.



## Precautions

- When selecting a transparent object, set "Spec Refl" for "Installation Mode". Note that the mounting method of the sensor head differs between specular reflection and diffuse reflection.
- Before measuring a transparent object, set "Measurement Mode" recommended for specular reflection installation.
- When selecting a measurement surface, check the reference in "Meas Surf Ref". An appropriate measurement surface varies depending on the setting of the measurement surface reference. If the setting is incorrect, the correct value is not displayed.



## Refractive index calculation

This item is used to reflect the refractive index, which is set in "Refractive Index", to the measurement result. When "Refractive Calc" is set to "ON" for measuring a transparent object, the refractive index set in "Refractive Index" becomes valid and it is reflected in the measurement result. For measuring the thickness of a transparent object, set the function to "ON"; for measuring the clearance of a transparent object, set it to "OFF". When the function is set to "OFF", the setting of the refractive index becomes invalid and not reflected in the calculation result.

### ■Supplemental remarks

The refractive index calculation can be set only when "A [Tr]", "B [Tr]", "-A [Tr]", or "-B [Tr]" is selected in "Output Selection".

### ■Setting method

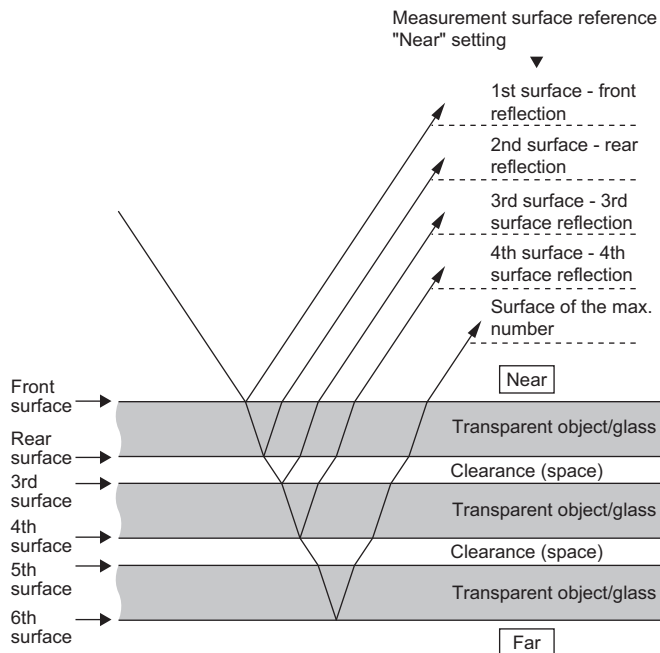
🔍 "OUT1" or "OUT2" tab on the main window ⇔ "Refractive Calc"

Set "Refractive Calc".

Setting value	Setting details
OFF	The refractive index, which is set in "Refractive Index", is not reflected to the measurement result.
ON	The refractive index, which is set in "Refractive Index", is reflected to the measurement result.

## Precautions

- When selecting a transparent object, set "Spec Refl" for "Installation Mode". Note that the mounting method of the sensor head differs between specular reflection and diffuse reflection.
- When a single surface (1st, 2nd, 3rd, 4th, or upper limit surface) is selected for "Transparent Obj", the function becomes disabled even if it is set to "ON".




## Refractive index

This item is used to set the refractive index of the transparent object to be measured.

### ■Supplemental remarks

- This function is enabled when "A [Tr]", "B [Tr]", "-A [Tr]", or "-B [Tr]" is selected in "Output Selection" and several surfaces ("1st-2nd Surf", "1st-3rd Surf", "1st-4th Surf", "1st-Up Surf", "2nd-3rd Surf", "2nd-4th Surf", "2nd-Up Surf", "3rd-4th Surf", "3rd-Up Surf", "4th-Up Surf") are selected in "Transparent Obj".
- The refractive index can be set only when "ON" is set for "Refractive Calc".

### ■Setting method

 "OUT1" or "OUT2" tab on the main window ⇨ "Refractive Index"

Set "Refractive Index".

Setting value	Setting details
0.500000 to 2.000000	Refractive index of the transparent object to be measured

## Precautions

- Set "Spec Refl" for "Installation Mode". Note that the mounting method of the sensor head differs between specular reflection and diffuse reflection.
- Note that changing "Refractive Index" may take much time.

## Filter processing

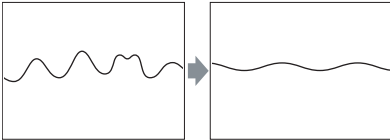
This item is used to select an appropriate filter according to the application to stabilize the measurement value and detect specific parts easily.

Select filter processing among "Moving Average", "Low Pass Filter", and "High Pass Filter". The filter picks out required amount of frequency from the measurement data, cuts unnecessary signal component, and then acquires a stabilized measurement value.

### ■Filter selection

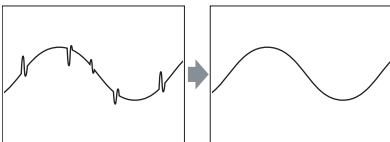
- Moving average

Moving average is calculated on the measurement result for the number of set average times.



- Low pass filter

Select the low-pass filter to pick out only the signal with low frequency component from the measurement data. The components lower than the set cutoff frequency are picked out.

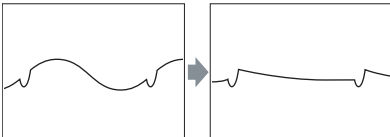


#### Point

The low-pass filter is useful for measuring stabilized displacement by decreasing noise that might occur depending on the metal surface condition to prevent accurate measurement.

- High pass filter

Select the high-pass filter to pick out only the signal with high frequency component from the measurement data. The components higher than the set cutoff frequency are picked out.



#### Point

The high-pass filter is effective for detecting a joint line or slot of an object under a state of large vibration or inclination such as eccentricity of a revolving object since the influence of gradual change is reduced.

### ■Average times

Set the average times of moving average. This setting is used for stabilizing an unstable (including variation) measurement value. This becomes enabled when "Moving Average" is selected.


### ■Cutoff frequency

Set the cutoff frequency for the low pass/high pass filter.

This setting is enabled when "Low Pass Filter" or "High Pass Filter" is selected.

For stability of filter effectiveness, set the value to below 1/2 of the sampling cycle setting value.

For setting the sampling cycle, refer to the following.

 Page 48 Sampling cycle

## ■ Setting method

🔗 "OUT1" or "OUT2" tab on the main window ⇨ "Filter Selection"

Set "Filter Selection".

- Moving Average

Specify the count (for averaging).

Setting value	Setting details
Once	Executes a moving average once.
Twice	Executes a moving average twice.
4 times	Executes a moving average 4 times.
8 times	Executes a moving average 8 times.
16 times	Executes a moving average 16 times.
32 times	Executes a moving average 32 times.
64 times	Executes a moving average 64 times.
128 times	Executes a moving average 128 times.
256 times	Executes a moving average 256 times.
512 times	Executes a moving average 512 times.
1024 times	Executes a moving average 1024 times.
2048 times	Executes a moving average 2048 times.
4096 times	Executes a moving average 4096 times.
8192 times	Executes a moving average 8192 times.
16384 times	Executes a moving average 16384 times.
32768 times	Executes a moving average 32768 times.
65536 times	Executes a moving average 65536 times.

- Low Pass Filter, High Pass Filter

Specify the cutoff frequency.

Setting value	Setting details
1	Sets the cutoff frequency to 1Hz.
2	Sets the cutoff frequency to 2Hz.
4	Sets the cutoff frequency to 4Hz.
10	Sets the cutoff frequency to 10Hz.
20	Sets the cutoff frequency to 20Hz.
40	Sets the cutoff frequency to 40Hz.
100	Sets the cutoff frequency to 100Hz.
200	Sets the cutoff frequency to 200Hz.
400	Sets the cutoff frequency to 400Hz.
1000	Sets the cutoff frequency to 1000Hz.
2000	Sets the cutoff frequency to 2000Hz.

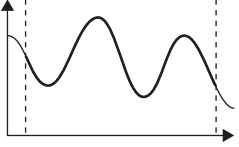
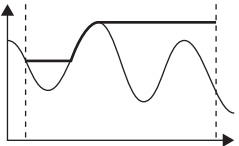
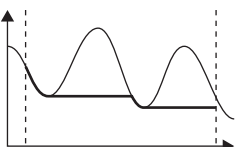
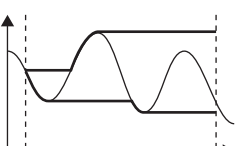
## Precautions

Because of different conditions, always perform actual measurement and check the results before setting the cutoff frequency.

## Analysis mode

This item is used to set the analysis mode.

The following table lists the function of each analysis mode.

Item	Function	
Normal		Outputs the displacement amount from the measurement center distance in real time.
Peak		Holds and outputs the maximum value of the measurement value.
Bottom		Holds and outputs the minimum value of the measurement value.
Peak to Peak		Holds and outputs the difference between the maximum and minimum values.

### Point

Peak to peak measurement can be used for vibration measurement and eccentricity measurement.

### Setting method

"OUT1" or "OUT2" tab on the main window ⇒ "Analysis Mode"

Set "Analysis Mode".

Setting value	Setting details
Normal	Outputs the displacement amount from the measurement center distance in real time.
Peak	Holds and outputs the maximum value of the measurement value.
Bottom	Holds and outputs the minimum value of the measurement value.
Peak to Peak	Holds and outputs the difference between the maximum and minimum values.

## Measurement value output at alarm


This item is used to set the measurement value output status during alarm operation.

Measurement value output (the measurement value display of the setting tool) can be set when an alarm occurs (due to insufficient light intensity, or when a measurement object is not in the measurement range). When "Fixed Value" is selected, "999.999999" is displayed as measurement value output data. When "Hold Pre Val" is selected, the held value is displayed.

### Point

Selecting "Fixed Value" allows alarm status to be detected easily from the measurement result. The function is especially useful because an alarm state can be checked when the measurement value is loaded by performing the data buffering function.

## ■Setting method

 "OUT1" or "OUT2" tab on the main window ⇨ "Meas Value Output at Alarm"

Set "Meas Value Output at Alarm".

Setting value	Setting details
Hold Pre Val	Displays the measurement value before alarm occurrence when an alarm occurs.
Fixed Value	Displays the fixed value: 999.999999 as the measurement value when an alarm occurs.

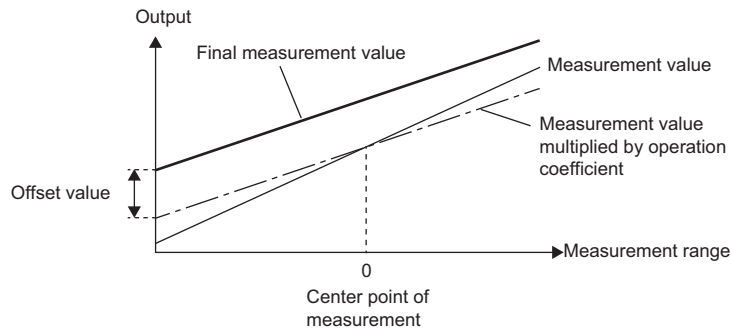
## Precautions

- If "Fixed Value" is selected and the sensor head goes into the alarm status, the judgment output is held at HI by interlocking with the measurement value output.

## Operation coefficient

This item is used to multiply the measurement value by a coefficient and output the data.

Final measurement value = Operation coefficient × Measurement value + Offset value



### ■Setting method

🔍 "OUT1" or "OUT2" tab on the main window ⇨ "Operation Coefficient"

Set "Operation Coefficient".

Setting value	Setting details
0.100000 to 9.999999	Coefficient by which the measurement value is multiplied

### Precautions

The unit of a measurement value after operation is mm. When a measurement value is a positive number, round it down to seven decimal points, and round up when a negative number.

## Offset

This item is used to subtract or add a set value from/to the measurement value.

### Point

Measure the size of a master (reference) measurement object and set the measurement value as the offset value. When measuring a object, turn on the zero set so that size tolerance can be judged easily because of the combination of the zero set and judgment output functions.

### ■Setting method

🔍 "OUT1" or "OUT2" tab on the main window ⇨ "Offset"

Set "Offset".

Setting value	Setting details
-950.000000 to 950.000000	Value to be added to or subtracted from the measurement value (unit: mm)

### Precautions

- Set the offset and turn on the zero set to use the set value as the offset value.
- The display limit of the measurement value is  $\pm 950.000000$ mm. Set the value within the range.

## Alarm output delay

This item is used to delay output from the alarm output.

Select whether to output the alarm in real time or hold the last normal value up to the set number of times when an alarm occurs (due to light intensity saturation, insufficient light intensity, or when a measurement object is not in the measurement range).

### Point

When not reflecting an alarm occurrence status in measurement value, the measurement value is acquired while ignoring the alarm status for the number of times set in the alarm delay times. When the number of alarm delay times is set, turn off the alarm output delay setting to check the status of alarm occurrence in real time.

### ■Setting method

☞ "OUT1" or "OUT2" tab on the main window ⇨ "Alarm Output Delay"

Set "Alarm Output Delay".

Setting value	Setting details
OFF	Outputs the alarm status in real time when an alarm occurs.
ON	Holds the last normal value until the set number of alarm delay times is reached when an alarm occurs, and outputs the alarm status.

For details on the measurement value when an alarm occurs, refer to the following.

(☞ Page 44 Measurement value output at alarm)

### Precautions

- When this setting is off, regardless of the setting of the number of alarm delay times, the alarm status is output in real time.

### Zero set

- The current zero set status and zero set amount load from the controller.
- The current zero set status and zero set amount send to the controller.
- Click the [Load] button in the controller setting area to display the current zero set status and zero set amount.

Click the setting send checkbox to turn on or off its selection.

- When the setting send checkbox is selected: The displayed zero set status and zero set amount are sent into the controller when the [Send] button in the controller setting area is clicked.
- When the setting send checkbox is cleared: The displayed zero set status and zero set amount are not sent into the controller when the [Send] button in the controller setting area is clicked.



## "Common" tab

The settings on the tab are not applied to the controller until the [Send] button is clicked.

Head A	Head B	OUT1	OUT2	Common
				Sampling Cycle: 40us
				Interference Prevention: OFF
				Terminal Input Control: Independent
				Chat Prev for Term I/P: ON1
				Judgment Output Off Delay: OFF

3

For the following items, a maximum of 16 settings can be saved by executing memory change.

Item	Description
Sampling Cycle	Sets the measurement sampling cycle. (☞ Page 48 Sampling cycle)
Interference Prevention	Prevents interference between two sensor heads. (☞ Page 49 Interference prevention)
Terminal Input Control <sup>*1</sup>	Sets this function to control two sensor heads with one terminal input. (☞ Laser Displacement Sensor MH11 User's Manual)
Chat Prev for Term I/P <sup>*1</sup>	Prevents chattering of terminal input. (☞ Laser Displacement Sensor MH11 User's Manual)
Judgment Output Off Delay	Delays the timing of switching on to off of judgment output. (☞ Page 50 Judgment output off delay)

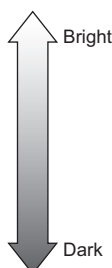
\*1 This item cannot be used in the R60MH112NA.

## Sampling cycle

This item is used to set the measurement sampling cycle.

### Point

When measuring a object with extremely poor received light intensity such as black rubber, extend the sampling cycle to acquire sufficient received light for stable measurement.

Cycle	Frequency	Measurement range	Brightness of object
10 $\mu$ s	100kHz	The measurement range becomes narrower.	
20 $\mu$ s	50kHz		
40 $\mu$ s	25kHz	All in the measurement range	
100 $\mu$ s	10kHz		
200 $\mu$ s	5kHz		
400 $\mu$ s	2.5kHz		
1ms	1kHz		
2ms	500Hz		

## Setting method


 "Common" tab on the main window  $\Rightarrow$  "Sampling Cycle"

Set "Sampling Cycle".

Setting value	Setting details
10 $\mu$ s (Median Filter: OFF)	Sets the sampling cycle to 10 $\mu$ s.
20 $\mu$ s (Median Filter: OFF)	Sets the sampling cycle to 20 $\mu$ s.
40 $\mu$ s	Sets the sampling cycle to 40 $\mu$ s.
100 $\mu$ s	Sets the sampling cycle to 100 $\mu$ s.
200 $\mu$ s	Sets the sampling cycle to 200 $\mu$ s.
400 $\mu$ s	Sets the sampling cycle to 400 $\mu$ s.
1ms	Sets the sampling cycle to 1ms.
2ms	Sets the sampling cycle to 2ms.


## Precautions

- If the sampling cycle is changed, the data becomes unfixed because the sampling is executed again. Strobe output turns off under data unfixed status. After the system recovers from the data unfixed status, strobe output turns on and measurement data display starts.
- When the sampling cycle is set to 10 $\mu$ s or 20 $\mu$ s, the measurement range is limited.
- When the sampling cycle is set to 10 $\mu$ s or 20 $\mu$ s, the median filter function is limited. For the median filter function, refer to the following.

 Page 31 Median filter

### Ex.

Measurement range of when the installation mode of MH11H03B0SNA is set to "Diff Refl"

The measurement range is 3.8 to 5.0mm for the sampling cycle of 10 $\mu$ s, 0 to 5.0mm for a sampling cycle of 20 $\mu$ s, and  $\pm$ 5mm for others. For the measurement range for each model, refer to the specifications of the sensor head. ( MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Sensor Head))

## Interference prevention

This item is used to prevent interference between two sensor heads.

Set the function when light from the other sensor head enters into the mutual interference area. (📖 MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Sensor Head))


### Point

If two sensor heads are connected and the setting distance between the two sensor heads is close, one sensor head receives a laser beam from the other sensor head, causing a measurement error. In this case, by turning on the interference prevention function, two sensor heads emit lights in turn and are not susceptible to interference from the other sensor head.

Data update timing is twice as long as the set sampling cycle.

3

### ■Setting method

 "Common" tab on the main window ⇨ "Interference Prevention"

Set "Interference Prevention".

Setting value	Setting details
OFF	Disables the interference prevention function.
ON	Enables the interference prevention function.

### Precautions

When this function is turned on and only one sensor head is connected, the sampling cycle doubles. Turn off the function when one sensor head is connected.

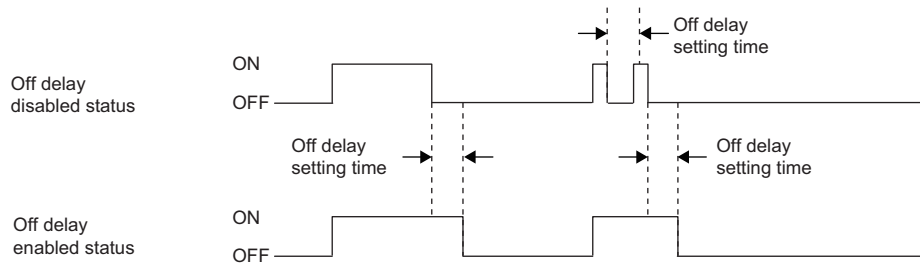
## Judgment output off delay

This item is used to delay the timing of switching on to off of judgment output.

### Point

The function is effective for loading output fluctuating at high speed into a programmable controller.

Timing of judgment output



## Precautions

When the judgment output operates faster than the off delay setting time, the off delay time becomes effective from the last turning off point.

### Setting method

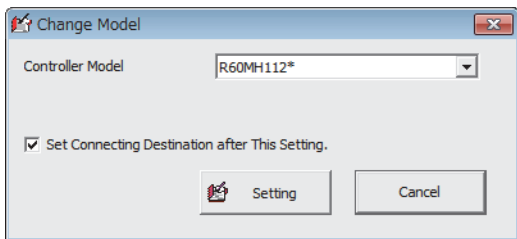
"Common" tab on the main window ⇒ "Judgment Output Off Delay"  
Set "Judgment Output Off Delay".

Setting value	Setting details
OFF	Outputs according to the sampling cycle.
2ms	Executes off delay for 2ms.
10ms	Executes off delay for 10ms.
100ms	Executes off delay for 100ms.
Hold	Holds the output when the judgment output is turned on once. Turn on the reset function to cancel the hold state.

# 3.3 "Change Model" Window

Main window ⇒ [Change Model] button

This window is used to change the controller model to be used.



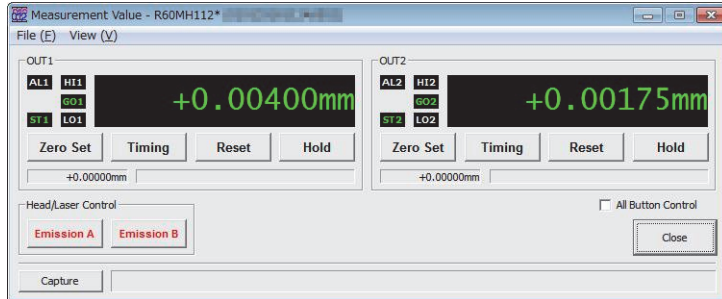
Item	Description
Controller Model	Selects the controller model to be changed. The default setting is R60MH112*.
[Setting] button	Sets the changed controller model. When the controller model is selected and the [Setting] button is clicked with "Set Connecting Destination after This Setting." checked, the controller model is set and the "Connecting Destination Setting" window appears after the "Change Model" window is closed. (Page 69 Connecting Destination Setting)

# 3.4 "Measurement Value" Window

Main window ⇨ [Meas Value] button

The measurement values of OUT1 and OUT2 and the output status (judgment output, alarm signal, and strobe signal) can be checked.

Pressing each button executes various input controls. The measurement values and the output status are displayed in real-time.



Item	Description
File	Exit: Closes the "Measurement Value" window.
View	OUT1: Displays or hides "OUT1" measurement data each time this item is selected. OUT2: Displays or hides "OUT2" measurement data each time this item is selected.
OUT1, OUT2	<p>Output status</p> <p>Displays the output status of judgment output, alarm signal, and strobe signal. When the text is white, it indicates that the output status is off, and when the text is colored, it indicates that the output status is on. AL1, AL2: Alarm signal HI1, HI2: Judgment HI output GO1, GO2: Judgment GO output LO1, LO2: Judgment LO output ST1, ST2: Strobe signal They indicate the status of the currently selected memory area in the controller.</p> <p>Measurement data</p> <p>Displays the measurement data. They indicate the status of the currently selected memory area in the controller.</p> <p>[Zero Set] button</p> <p>Turns on or off the zero set each time this button is clicked. When the text is black, it indicates that the zero set is off, and when the text is red, it indicates that the zero set is on.</p> <p>[Timing] button</p> <p>Turns on or off the timing input each time this button is clicked. When the text is black, it indicates that the timing input is off, and when the text is red, it indicates that the timing input is on.</p> <p>[Reset] button</p> <p>Resets the measurement data.</p> <p>[Hold] button</p> <p>Turns on or off the hold each time this button is clicked. When the text is black, it indicates that the hold is off, and when the text is red, it indicates that the hold is on. Although the measurement data display of the setting tool is held, the controller does not stop the measurement.</p> <p>Zero set amount</p> <p>When the zero set is enabled, the offset amount is displayed.</p> <p>Alarm code</p> <p>Displays the alarm code and alarm name. When an error occurs, the error code and error name are displayed. The alarm codes and alarm names are not displayed at this time. If the occurring error is a minor error, the error code is not displayed. For the alarm codes and error codes, refer to the following. <a href="#">Laser Displacement Sensor MH11 User's Manual</a> <a href="#">MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Application)</a></p>
All Button Control	With this item selected, the [Zero Set] button, [Timing] button, [Reset] button, and [Hold] button become effective on both OUT1 and OUT2.

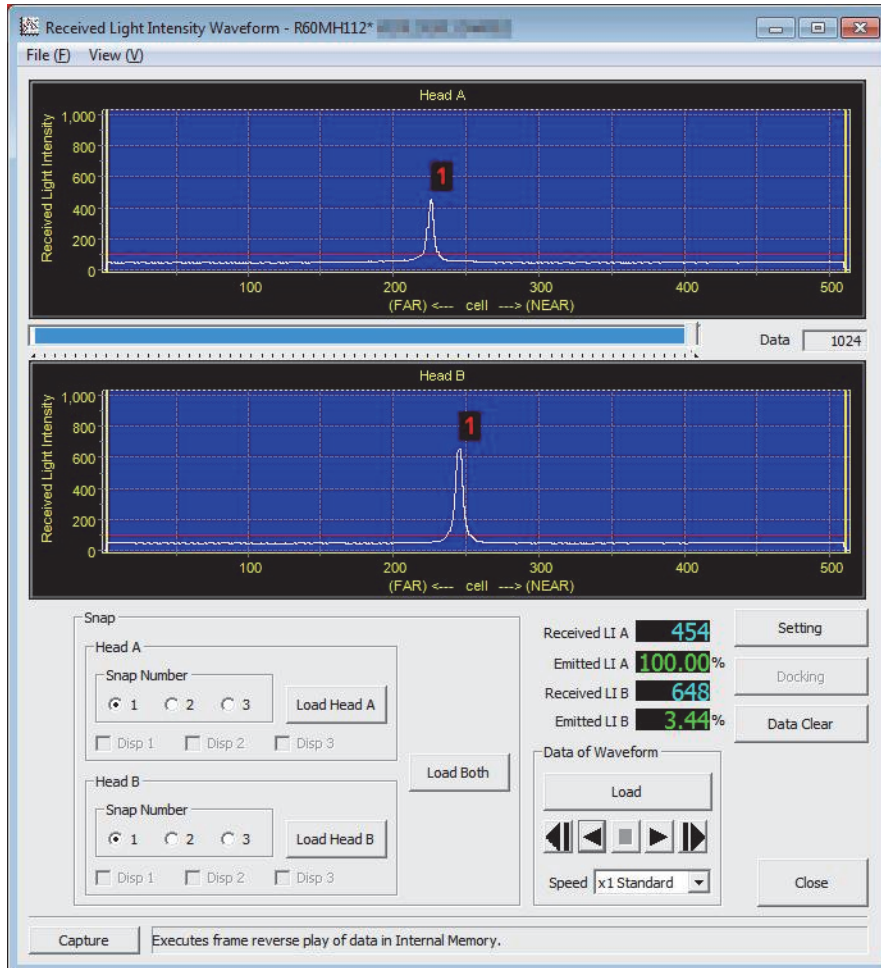
Item		Description
Head/Laser Control	[Emission A] button, [Emission B] button	Laser is emitted or stopped each time this button is clicked. When the text is black, it indicates that the laser is stopped, and when the text is red, it indicates that the laser is emitted.

# 3.5 Received Light Intensity Waveform Display

## "Received Light Intensity Waveform" window

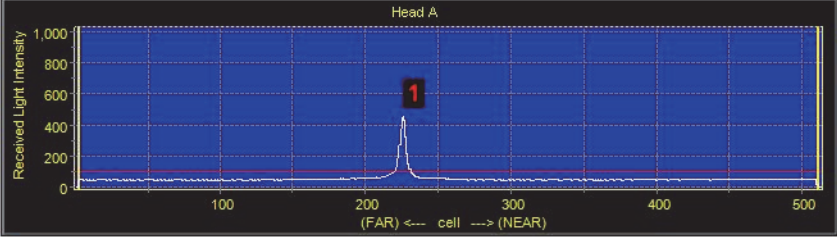

☞ Main window ⇨ [Waveform] button






The received light intensity waveform can be displayed and snaps (still images of the received light intensity waveform) can be acquired for comparison.



Item	Description
File	Exit: Closes the "Received Light Intensity Waveform" window. When the "Received Light Intensity Waveform Setting" window is open, the windows are closed simultaneously.
View	Head A Display: Displays or hides the received light intensity waveform of sensor head A each time this item is selected. Head B Display: Displays or hides the received light intensity waveform of sensor head B each time this item is selected.



Item	Description
Received light intensity waveform of sensor head A, received light intensity waveform of sensor head B	 <p>Displays the received light intensity waveform acquired by sensor heads A and B in white. The set peak recognition sensitivity of each sensor head is displayed in a red line. To enlarge the graph: Drag the mouse from the upper left corner to the lower right corner of the area to be enlarged. To restore the display to the original: Drag the mouse from the lower right to the upper left at any position on the graph. To scroll: Drag the mouse while holding down the right mouse button.</p>
Emission adjustment area a, emission adjustment area b	<p>These areas are displayed in transparent blue in the received light intensity waveform display. For details on setting the specified emission adjustment area, refer to the following. (☞ Page 33 Emission adjustment area specification)</p>
Measuring range point a, measuring range point b	<p>These points are displayed in yellow lines in the received light intensity waveform display. For details on setting the specified measuring range, refer to the following. (☞ Page 34 Measuring range)</p>
Indicator	 <p>The received light intensity data can be loaded in the setting tool until the indicator reaches the maximum value. After the maximum value is reached, the oldest data is deleted and new received light intensity data continues to be acquired. The displayed area of the received light intensity waveform can be moved to a desired position by dragging the cursor of the indicator.</p>
Data	<p>Displays the total number of received light intensity data sets loaded in the setting tool.</p>
Snap	<p>— Acquires snaps (still images of the received light intensity waveform). Up to three snaps can be acquired per sensor head.</p> <p>Head A, Head B Snap Number: Selecting "1", "2", or "3" and clicking the [Load Head A] button, [Load Head B] button, or [Load Both] button registers the snap in the selected number.</p> <p>Disp 1: With this item selected, the snap registered in "1" is displayed in red.                      Disp 2: With this item selected, the snap registered in "2" is displayed in light blue.                      Disp 3: With this item selected, the snap registered in "3" is displayed in green.                      If no snap is acquired, the above items are grayed out.</p> <p>[Load Head A] button: Acquires a snap of the received light intensity waveform of sensor head A.                      [Load Head B] button: Acquires a snap of the received light intensity waveform of sensor head B.</p> <p>[Load Both] button Acquires snaps of the received light intensity waveform of both sensor heads A and B.</p>
Received LI A, Received LI B	<p>Displays the peak received light intensity of sensor heads A and B. If the waveform has more than one peak, the received light intensity of the highest peak is displayed. The status of the received light intensity can be checked if an alarm occurs in the measurement range. The values are held when received light intensity data acquisition is stopped.</p>
Emitted LI A, Emitted LI B	<p>Displays the emitted light intensity when the emitted light intensity adjustment of sensor head A or B is set to "Auto". The values are held when received light intensity data acquisition is stopped. When the emitted light intensity adjustment is set to a fixed value, the display of the emitted light intensity shows the fixed value.</p>

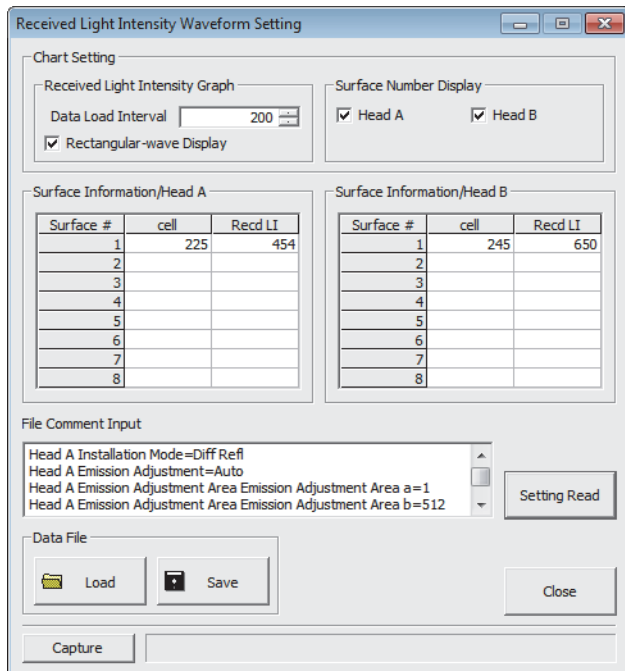
Item	Description
Data of Waveform	<p>—</p> <p>The received light intensity data can be acquired from the controller and can be replayed. When some received light intensity data has already been acquired, the received light intensity waveform can be replayed even during offline. When the received light intensity data has not been acquired or being acquired, the buttons which cannot be executed are grayed out. Frames are advanced forward or played back one by one each time the corresponding button is clicked.</p>
[Load] button/[Stop] button	<p>Acquires the received light intensity data from the controller. It also stops acquiring the received light intensity data. The [Stop] button is displayed during data acquisition.</p>
Frame-by-frame reverse	<p></p> <p>Replays the received light intensity data with frames played back (in the backward direction).</p>
Reverse replay	<p></p> <p>Replays the received light intensity data in reverse (in the backward direction).<sup>*1</sup></p>
Stop	<p></p> <p>Stops replaying the received light intensity data. This operation can be executed only while the received light intensity data is replayed or replayed in reverse.</p>
Replay	<p></p> <p>Replays the received light intensity data (in the forward direction).<sup>*1</sup></p>
Frame-by-frame advance	<p></p> <p>Replays the received light intensity data with frames advanced (in the forward direction).</p>
Speed	<p>Select the speed (magnification) of replaying data or replaying data in reverse.<sup>*1</sup></p>
[Setting] button	<p>Displays the "Received Light Intensity Waveform Setting" window. (☞ Page 57 "Received Light Intensity Waveform Setting" window)</p>
[Docking] button	<p>Moves the "Received Light Intensity Waveform Setting" window right under the "Received Light Intensity Waveform" window. This operation can be executed only when the "Received Light Intensity Waveform Setting" window is displayed.</p>
[Data Clear] button	<p>Clears the acquired received light intensity data, and resets the received light intensity waveform display and snaps.</p>

\*1 The replay speed for replaying received light intensity waveform data or replaying it in reverse varies depending on the selected magnification or the settings for acquiring received light intensity waveform data. However, the shortest graph drawing cycle is approximately 100ms.

# "Received Light Intensity Waveform Setting" window

Main window ⇒ [Waveform] button ⇒ [Setting] button

The display method of the received light intensity waveform can be set, the acquired received light intensity data can be saved in a file, and the data in a file can be loaded.



Item	Description
Received Light Intensity Graph	<p>Data Load Interval: Specifies an update interval of the received light intensity graph. The setting range is 0 to 65535, the default value is 200, and the unit is "ms".</p> <ul style="list-style-type: none"> <li>This setting is common to both sensor heads A and B.</li> <li>Due to the processing capacity of the personal computer or any applications running at the same time, the actual update interval may not always match the setting value.</li> </ul> <p>Rectangular-wave Display: With this item selected, the received light intensity waveform can be displayed in a rectangular-wave graph.</p>
Surface Number Display	<p>Head A, Head B: With each item selected, numbers are given to the peak positions of the received light intensity. This function is convenient when "Installation Mode" is set to "Spec Refl" on the "Head A" or "Head B" tab and "Output Selection" is set to a transparent object on the "OUT1" or "OUT2" tab on the main window. When a transparent object is set, the given numbers for the measurement surface are shown in red, and others are shown in white. In other settings, the peak received light intensity waveform is shown in red.</p>
Surface Information/Head A, Surface Information/Head B	<p>Displays up to eight items of cell position and received light intensity for each surface number of sensor heads A and B.</p>
File Comment Input	<p>Any comment can be input in the file in which the received light intensity data is saved (extension: .m1l). The comment is displayed when the file is loaded. When the file is saved, the input text is written to the file as comments.</p>

Item	Description
[Setting Read] button	Pastes the setting details of the M1S file as character strings at the head position of "File Comment Input". This function is convenient for recording the setting details of the acquired received light intensity data. If the button is clicked many times successively, the setting details for the number of click times are pasted.
Data File	[Load] button: Loads the file of the received light intensity data (extension: .m1l) and displays the data in the "Received Light Intensity Waveform" window.
	[Save] button: Saves the received light intensity data in the file (extension: .m1l).

# 3.6 Buffering Display

## Buffering function

The measurement data can be temporarily accumulated in the controller memory. The accumulated data can be loaded from the controller to the setting tool.

**Point**

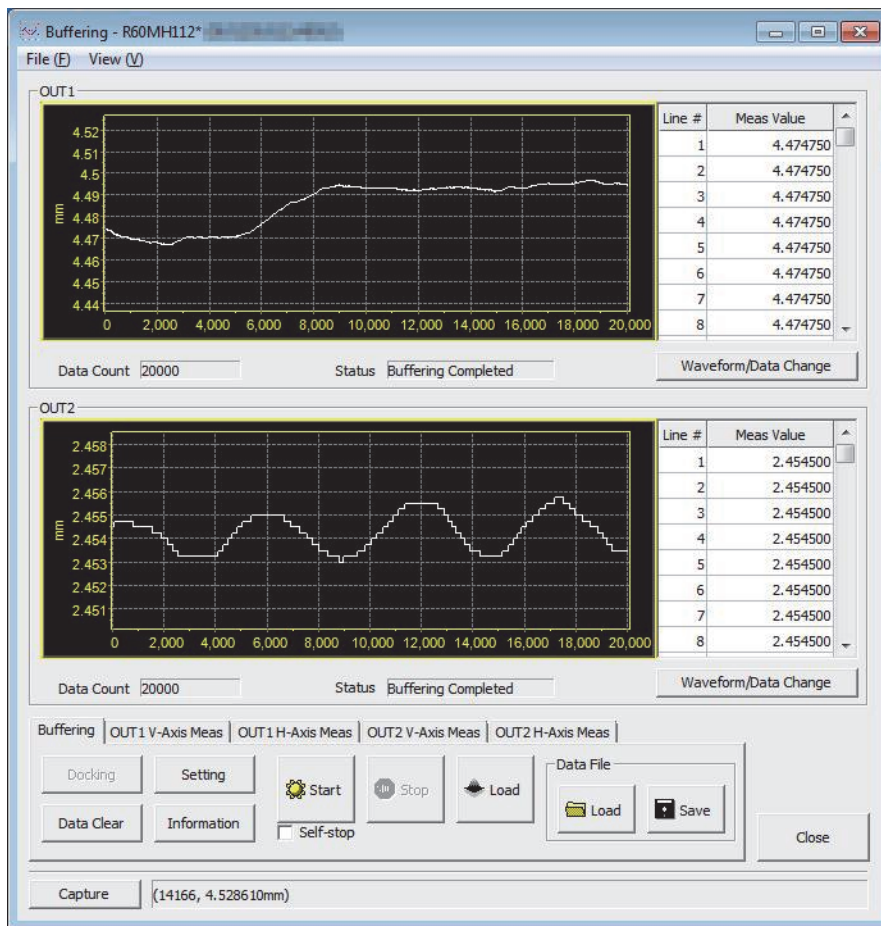
- The buffering function operates on the currently selected memory area in the controller.
- Note that the data buffering function has restrictions on the maximum accumulation number and sampling cycle. (📖 Laser Displacement Sensor MH11 User's Manual, 📖 MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Application))

## "Buffering" window

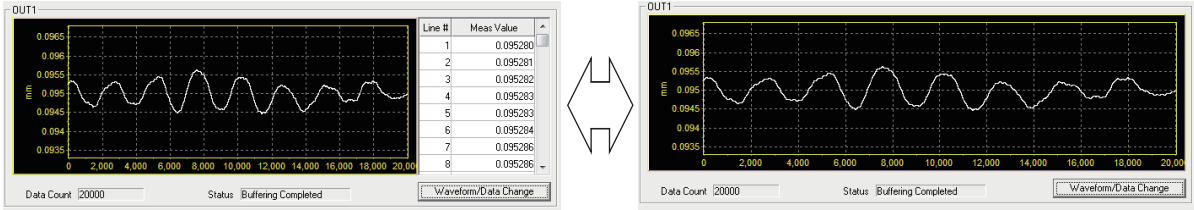
🖱️ Main window ⇒ [Buffering] button

The accumulated data can be displayed and saved as a waveform and data.

In addition, measures can be displayed for analyzing the data.



Item	Description
File	Exit: Closes the "Buffering" window. When the "Buffering Setting" window or "Buffering Information" window is open, the windows are closed simultaneously.
View	OUT1 Display: Displays or hides "OUT1" each time this item is selected. OUT2 Display: Displays or hides "OUT2" each time this item is selected.

Item	Description
OUT1, OUT2	<p>Displays the waveform after the accumulated data is loaded.</p> <p>In sample trigger mode, the color of the waveform changes per accumulation amount for "Sample Trigger Data Count".</p> <p>To enlarge the graph: Drag the mouse from the upper left corner to the lower right corner of the area to be enlarged.</p> <p>To restore the display to the original: Drag the mouse from the lower right to the upper left at any position on the graph.</p> <p>To scroll: Drag the mouse while holding down the right mouse button.</p>
	<p>Line #: Displays the X-axis values of the waveform.</p> <p>Meas Value: Displays the Y-axis values of the waveform.</p>
	<p>Data Count: Displays the number of actual accumulated data sets.</p>
	<p>Status: Displays the accumulation status as follows.</p> <ul style="list-style-type: none"> <li>• Non-buffering: Buffering operation is not started after power-on or initialization.</li> <li>• Wait for Trigger: Buffering operation is waiting for a trigger after it has started.</li> <li>• Buffering: Buffering operation has started and measurement data is being accumulated.</li> <li>• Buffering Completed: The accumulation amount has reached the set value or buffering operation has stopped.</li> </ul>
	<p>[Waveform/Data Change] button: Switches the display between waveform/data and only waveform.</p>
	

## "Buffering" tab

Buffering operation can be controlled and measurement data can be saved and loaded.

In addition, the "Buffering Setting" window and the "Buffering Information" window can be opened.



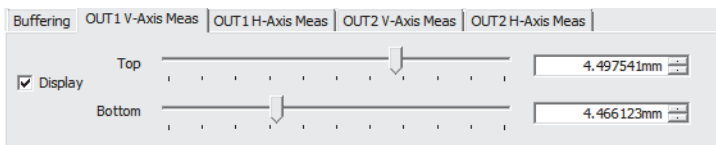
Item	Description
[Docking] button	<p>Moves the "Buffering Setting" window right under the "Buffering" window, and the "Buffering Information" window to the upper left of the desktop window.</p> <p>This function can be executed only when the "Buffering Setting" window or the "Buffering Information" window is displayed.</p>
[Data Clear] button	<p>Deletes the displayed waveform.</p>
[Setting] button	<p>Displays the "Buffering Setting" window. (Page 62 "Buffering Setting" window)</p>
[Information] button	<p>Displays the "Buffering Information" window. (Page 64 "Buffering Information" window)</p>
[Start] button	<p>Sends an instruction to the controller to start buffering operation.</p>
[Stop] button	<p>Sends an instruction to the controller to stop buffering operation.</p>
[Load] button	<p>Acquires the accumulated data of the controller.</p>
Self-stop	<p>Stops buffering operation automatically while online.</p> <p>However, this function is invalid when the buffering mode is the timing mode.</p> <p>When "Buffering Type" set to "OUT1&amp;OUT2" on the "Buffering Setting" window, the function is stopped at completion of accumulation for measurement data of OUT1 or OUT2.</p>
Data File	<p>[Load] button: Loads the file of the accumulated data (extension: .m1b) and displays the data in the "Buffering" window.</p> <p>[Save] button: Saves the accumulated data in the file (extension: .m1b).</p>

## Measure tabs

Measures can be displayed on the graph.

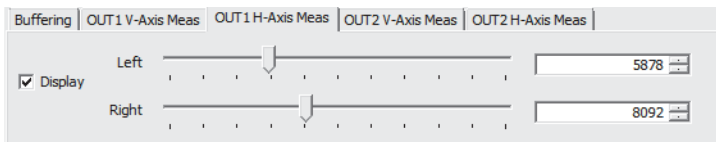
### ■ "OUT1 V-Axis Meas" and "OUT2 V-Axis Meas" tabs

If the "Top" or "Bottom" cursor is moved with "Display" selected, each vertical axis measure moves.



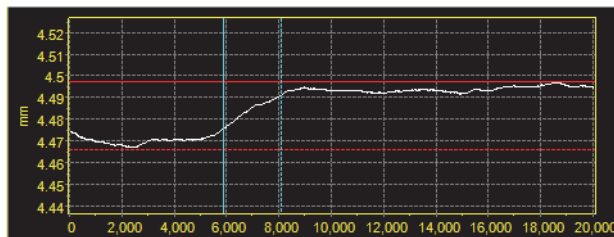
### ■ "OUT1 H-Axis Meas" and "OUT2 H-Axis Meas" tabs

If the "Left" or "Right" cursor is moved with "Display" checked, each horizontal axis measure moves.



### ■ Displaying measures

Item	Description
View	With this item selected, the measure is displayed on the graph.
Top, Bottom	Specifying a position with the cursor displays the measures on the graph as follows.
Left, Right	<p>Red solid line: Vertical axis measure of "Top"</p> <p>Red dotted line: Vertical axis measure of "Bottom"</p> <p>Light-blue solid line: Horizontal axis measure of "Left"</p> <p>Light-blue dotted line: Horizontal axis measure of "Right"</p>



When enlarging or reducing the display of the vertical axis, the measures of "Top" and "Bottom" are overlapped to the axes of the top and bottom and hard to be seen. They are displayed when the cursors of "Top" and "Bottom" are moved.

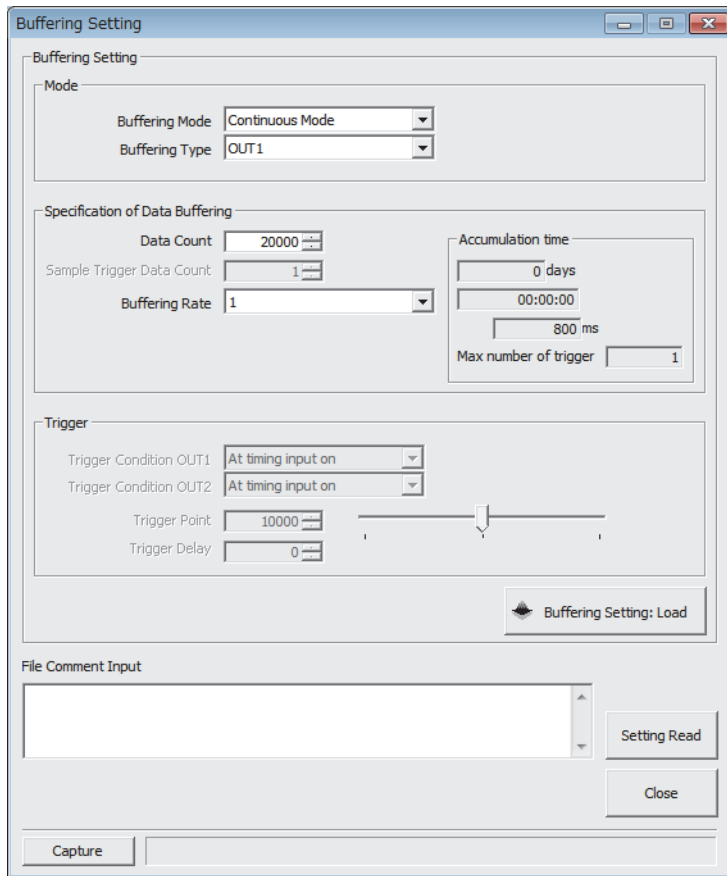
When enlarging or reducing the display of the horizontal axis, the measures of "Left" and "Right" are overlapped to the axes of the left and right and hard to be seen. They are displayed when the cursors of "Left" and "Right" are moved.

# "Buffering Setting" window

Main window ⇒ [Buffering] button ⇒ "Buffering" tab ⇒ [Setting] button

The buffering method and the chart for the waveform can be set.

In addition, the acquired accumulated data can be saved and loaded.



Item	Description
Buffering Mode	<p>Selects a buffering mode.</p> <ul style="list-style-type: none"> <li>■Continuous Mode Starts accumulating the measurement data to the controller memory when the buffering operation start command is issued, and stops the accumulation when the accumulation amount of the measurement data reaches the set value or when the buffering operation stop command is issued.</li> <li>■Timing Mode Changes the status of the controller to the standby state for timing input when the buffering operation start command is issued, and starts accumulating the measurement data to the controller memory when the timing input is turned off during the standby state. The accumulation is stopped if the timing input is turned on, the accumulation amount reaches the set value, or the buffering operation stop command is issued.</li> <li>■Trigger Mode Changes the status of the controller to the waiting state for a trigger when the buffering operation start command is issued. When the set trigger condition is generated, the measurement data before and after the point (trigger point) is accumulated in the controller memory. Accumulation stops when the accumulation amount reaches the setting value or buffering operation stops.</li> <li>■Sample Trigger Mode Changes the status of the controller to the waiting state for a trigger when the buffering operation start command is issued. When the set trigger condition is generated, the measurement data for the set "Sample Trigger Data Count" is accumulated in the controller memory and the status is switched to the waiting state for a trigger again. After that, each time the set trigger condition is generated, the measurement data for "Sample Trigger Data Count" is accumulated. The accumulation is stopped when the number of measurement data reaches "Data Count" or the buffering operation stop command is issued.</li> </ul>
Buffering Type	<p>Selects the target data to be accumulated.</p> <p>OUT1: Accumulates the measurement data of "OUT1" only.            OUT2: Accumulates the measurement data of "OUT2" only.            OUT1&amp;OUT2: Accumulates measured data of "OUT1" and "OUT2".</p>
Data Count	<p>Sets the amount of data to be accumulated within the range of 1 to the maximum accumulation amount. ( Laser Displacement Sensor MH11 User's Manual, MELSEC iQ-R Laser Displacement Sensor Control Module User's Manual (Application))</p>



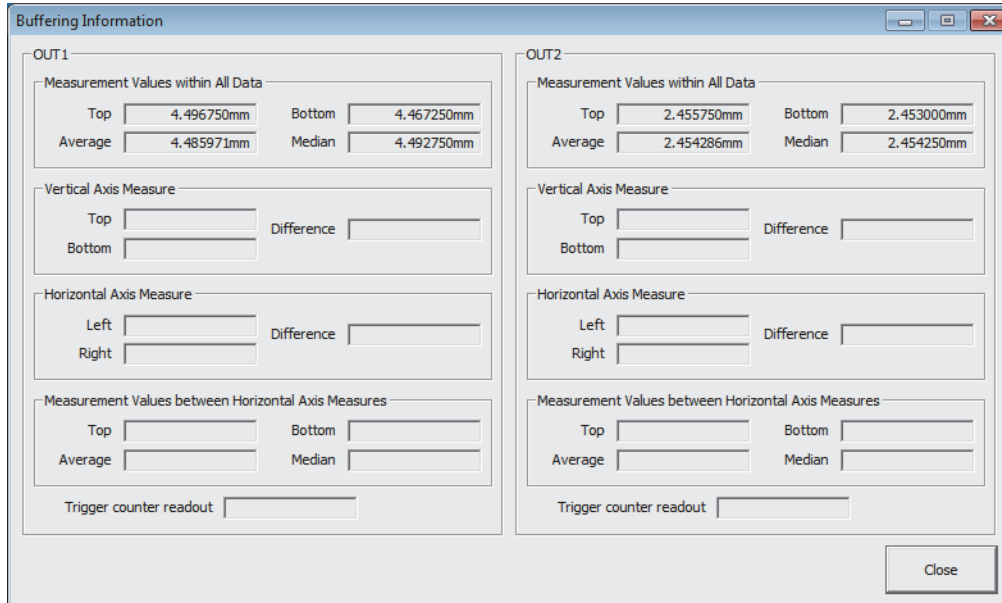
Item	Description
Sample Trigger Data Count	Sets the accumulation amount for every trigger generation when "Buffering Mode" is set to "Sample Trigger Mode". The setting range is 1 to the set "Data Count". The default value is 1. Set a value so that "Data Count" ÷ "Sample Trigger Data Count" is an integer value.
Buffering Rate	Sets the accumulation interval for the measurement data based on the sampling cycle. The value is selected among 1 (all measurement data), 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, 1/512, 1/1024, 1/2048, 1/4096, 1/8192, 1/16384, and 1/32768. Setting "Buffering Rate" enables accumulation of not all the measurement data. If the variation amount of measurement data is small, a longer accumulation interval can be set so that measurement data for longer time period can be accumulated.
Accumulation time	Displays the time required for accumulating the measurement data until it reaches the set "Data Count". The time is displayed with "days", "hour:minute:second", and "ms". Note that "Accumulation time" displays the time required for accumulating sample trigger when "Buffering Mode" is set to "Sample Trigger Mode".  Max number of trigger: Displays the maximum number of triggers until the completion of the accumulation. The displayed value is calculated from "Data Count" ÷ "Sample Trigger Data Count".
Trigger Condition OUT1, Trigger Condition OUT2	Sets the trigger conditions of OUT1 and OUT2 when "Buffering Mode" is set to "Trigger Mode" or "Sample Trigger Mode". Select a value from "At timing input on", "At HI", "At LO", "At HI or LO", "When HI turns to GO", "When LO turns to GO", "When HI or LO turns to GO", "At an alarm occurred", and "At an alarm released".
Trigger Point	Sets this item to display the measurement data before trigger generation. For "Trigger Point", set the number of data to be displayed before trigger generation. The trigger point is enabled only when "Buffering Mode" is set to "Trigger Mode". In addition, when "Trigger Delay" is set, the point where the trigger delay period has elapsed after the set trigger generation is regarded as a trigger point. The measurement data can be loaded based on this trigger point.
Trigger Delay	Delays the timing of trigger detection when "Buffering Mode" is set to "Trigger Mode" or "Sample Trigger Mode". Set the number of sampling times as the trigger delay value. The setting range is 0 to 10000000 and the default value is 0. The status during trigger delay operation is indicated as "Buffering". ■For "Trigger Mode" The measurement data is loaded based on the point where the set trigger delay period has elapsed after the set trigger generation. The point is regarded as a trigger point. ■For "Sample Trigger Mode" The measurement data starts to be accumulated from the point where the set trigger delay period has elapsed after the set trigger generation. A new trigger generated during trigger delay operation is ignored. ■Caution When "Buffering Rate" is set, the trigger delay is counted with the extended sampling cycle in accordance with the setting.
[Buffering Setting: Load] button	Acquires the buffering setting from the controller.
File Comment Input	Any comment can be added to the file in which the accumulated data is saved (extension: .m1b). The comment is displayed when the file is loaded. When the file is saved, the input text is written to the file as comments.
[Setting Read] button	Pastes the setting details of the M1S file as character strings at the head position of "File Comment Input". This function is convenient for recording the setting details of the acquired accumulated data. If the button is clicked many times successively, the setting details for the number of click times are pasted.

# "Buffering Information" window

Main window ⇒ [Buffering] button ⇒ "Buffering" tab ⇒ [Information] button

The values of "OUT1" and "OUT2" are displayed as accumulated data.

"Top" (maximum value), "Bottom" (minimum value), "Average", and "Median" are calculated from the accumulated data.

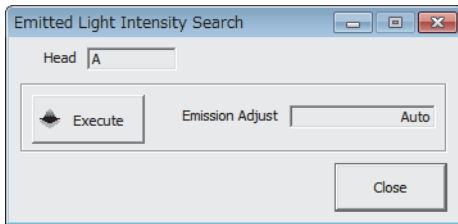


Item	Description
Measurement Values within All Data	Top: Displays the maximum value of the accumulated data. Bottom: Displays the minimum value of the accumulated data. Average: Displays the average value of the accumulated data. Median: Displays the median value of the accumulated data.
Vertical Axis Measure	Top: Displays the position of the vertical axis measure of "Top". Bottom: Displays the position of the vertical axis measure of "Bottom". Difference: Displays the difference of the vertical axis measures of "Top" and "Bottom". These values are displayed only when "Display" is selected on the "OUT1 V-Axis Meas" or "OUT2 V-Axis Meas" tab in the "Buffering" window.
Horizontal Axis Measure	Left: Displays the position of the horizontal axis measure of "Left". Right: Displays the position of the horizontal axis measure of "Right". Difference: Displays the difference of the horizontal axis measures of "Left" and "Right". These values are displayed only when "Display" is selected on the "OUT1 H-Axis Meas" or "OUT2 H-Axis Meas" tab in the "Buffering" window.
Measurement Values between Horizontal Axis Measures	Top: Displays the maximum value of the accumulated data between the horizontal axis measures of "Left" and "Right". Bottom: Displays the minimum value of the accumulated data between the horizontal axis measures of "Left" and "Right". Average: Displays the average value of the accumulated data between the horizontal axis measures of "Left" and "Right". Median: Displays the median value of the accumulated data between the horizontal axis measures of "Left" and "Right". These values are displayed only when "Display" is selected on the "OUT1 H-Axis Meas" or "OUT2 H-Axis Meas" tab in the "Buffering" window.
Trigger counter readout	Displays the number of generated triggers. The value is displayed only when "Buffering Mode" is set to "Sample Trigger Mode". The displayed state is updated only for the target data to be accumulated selected in "Buffering Type".

## 3.7 "Emitted Light Intensity Search" Window

☞ "Head A" or "Head B" tab on the main window ⇒ [Emitted Light Intensity Search] button

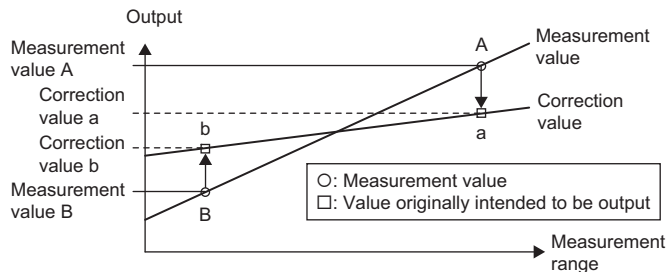
The emitted light intensity can be adjusted so that it is optimal.



Item	Description
Head	Displays the target sensor head of the emitted light intensity search.
[Execute] button	Executes the emission adjustment. The emitted light intensity is adjusted so that the set measurement surface will have the optimal amount of received light for measurement. When two or more surfaces are selected, the emitted light intensity is adjusted so that it is optimized for the surface which receives less amount of light. The emitted light intensity is set within the emission adjustment setting range of 0.04 to 100%. When the emitted light intensity cannot be optimized within the range, the emitted light intensity search fails and the emitted light intensity is automatically adjusted.
Emission Adjust	Displays the adjusted value of emitted light intensity.
[Close] button	Closes the "Emitted Light Intensity Search" window. The value displayed in "Emission Adjust" is set to "Emission Adjustment" on the "Head A" or "Head B" tab on the main window.

## 3.8 "Execute Calibration" Window

An inaccurate measurement value is corrected due to the color, material, or surface condition of the measurement object. As shown in the following figure, the values can be corrected by setting each of the two points of a and b to points A and B. Set the actual measurement value, which is an inaccurate value, as measurement value A, and set the value originally intended to be output as correction value a. Measurement value B and correction value b can be set in the same way as the above. The values can be corrected with this simple setting.

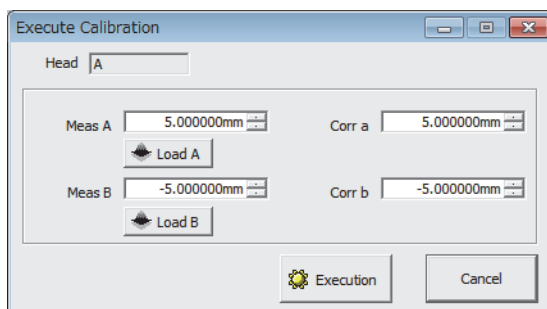


### Setting method

☞ "Head A" or "Head B" tab on the main window ⇒ [Execute Calibration] button  
Set to Meas A, Meas B, Corr a, and Corr b.

Setting value	Setting details
-950.000000 to 950.00000000	Value for correcting an inaccurate measurement value due to the color, material, or surface condition of the measurement object. (mm unit)

The calibration is executed by determining two measurement data values and two correction values using the teaching method that specifies two points.



Item	Description
Head	Displays the target sensor head for the calibration.
Meas A <sup>*1</sup>	First measurement data value used for 2-point teaching
[Load A] button	Acquires the first measurement data value used for 2-point teaching. The value is displayed in "Meas A".
Corr a <sup>*1</sup>	Specifies a value to be originally output for "Meas A".
Meas B <sup>*1</sup>	Second measurement data value used for 2-point teaching
[Load B] button	Acquires the second measurement data value used for 2-point teaching. The value is displayed in "Meas B".
Corr b <sup>*1</sup>	Specifies a value to be originally output for "Meas B".
[Execution] button	Executes calibration.
[Cancel] button	Closes the "Execute Calibration" window. Even if some measurement data values have been acquired, they are discarded.

\*1 The value is rounded down in units of 0.25μs in operations.

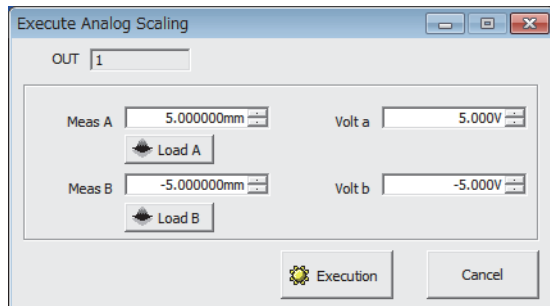
## Precautions

- Before setting calibration, be sure that the timing input, offset, and zero set are canceled, the measuring mode is set to normal, and OUT1 is set to A and OUT2 is set to B in the output selection.
- A parameter cannot be set due to a setting error when Meas A, Meas B, Corr a, and Corr b are the following:
  - Meas A = Meas B
  - Corr a = Corr b
  - Meas A > Meas B and Corr a < Corr b
  - Meas A < Meas B and Corr a > Corr b

## 3.9 "Execute Analog Scaling" Window

☞ "OUT1" or "OUT2" tab on the main window ⇒ [Execute Analog Scaling] button

The analog scaling is executed in the MH11CTMF-□NA by determining two measurement data values and two voltage values using the teaching method that specifies two points. (📖 Laser Displacement Sensor MH11 User's Manual)



Item	Description
OUT	Displays the target output for analog scaling.
Meas A <sup>*1</sup>	First measurement data value used for 2-point teaching
[Load A] button	Acquires the first measurement data value used for 2-point teaching. The value is displayed in "Meas A".
Volt a <sup>*1</sup>	Specifies the voltage to be originally output for "Meas A".
Meas B <sup>*1</sup>	Second measurement data value used for 2-point teaching
[Load B] button	Acquires the second measurement data value used for 2-point teaching. The value is displayed in "Meas B".
Volt b <sup>*1</sup>	Specifies the voltage to be originally output for "Meas B".
[Execution] button	Executes analog scaling.
[Cancel] button	Closes the "Execute Analog Scaling" window. Even if some measurement data values have been acquired, they are discarded.

\*1 The value is rounded down in units of 0.25μs in operations.

### Precautions

This item cannot be used in the R60MH112NA.

# 3.10 Connecting Destination Setting

Main window ⇒ [System] ⇒ [Connecting Destination Setting]

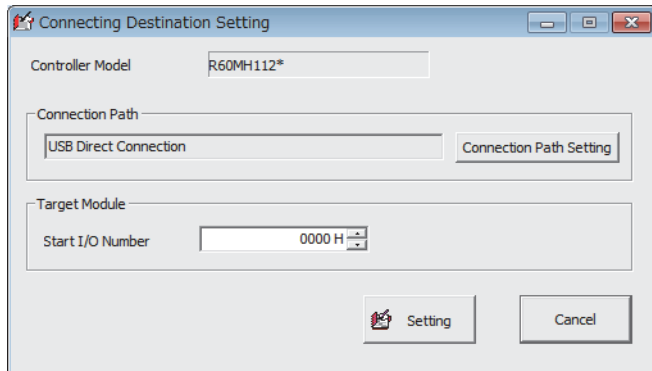
The method is set to connect to the controller that communicates with the personal computer.



The settings of the connection destination can be changed only while offline.

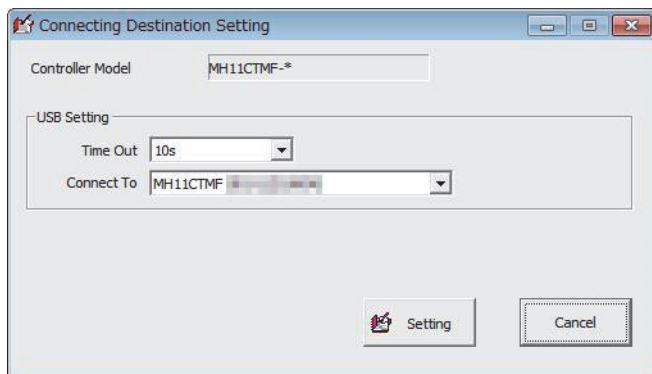
## "Connecting Destination Setting" window

When the R60MH112NA is connected



Item	Description
Controller Model	Displays the controller model set in the main window.
Connection Path	Displays the information on the connection path to the MELSEC iQ-R series system when communicating with the R60MH112NA. To change the connection path, click the [Connection Path Setting] button and display the "Connection Path Setting" window. (☞ Page 70 "Connection Path Setting" window)
Target Module	This item is used to set the start I/O number that indicates where the R60MH112NA is installed in the MELSEC iQ-R series system when communicating with the R60MH112NA. The default value is 0000H.

When the MH11CTMF-□NA is connected



Item	Description	
Controller Model	Displays the controller model set in the main window.	
USB Setting	Time Out	This item is used to set the timeout period for when communications between the MH11CTMF-□NA and the setting tool is interrupted. Select the value from 1s, 2s, 3s, 5s, and 10s. The default value is 10s.
	Connect To	This item is used to select a destination MH11CTMF-□NA connected via USB. (Offline only) The selectable USB ID and alias (if set) of the MH11CTMF-□NA are displayed. The default value is the ID registered at the top. The alias can be set in "Alias Setting of Controller" in the "Software Operation Setting" window.

## "Connection Path Setting" window

A path is set until a station on which the R60MH112NA is mounted when communicating to the R60MH112NA.

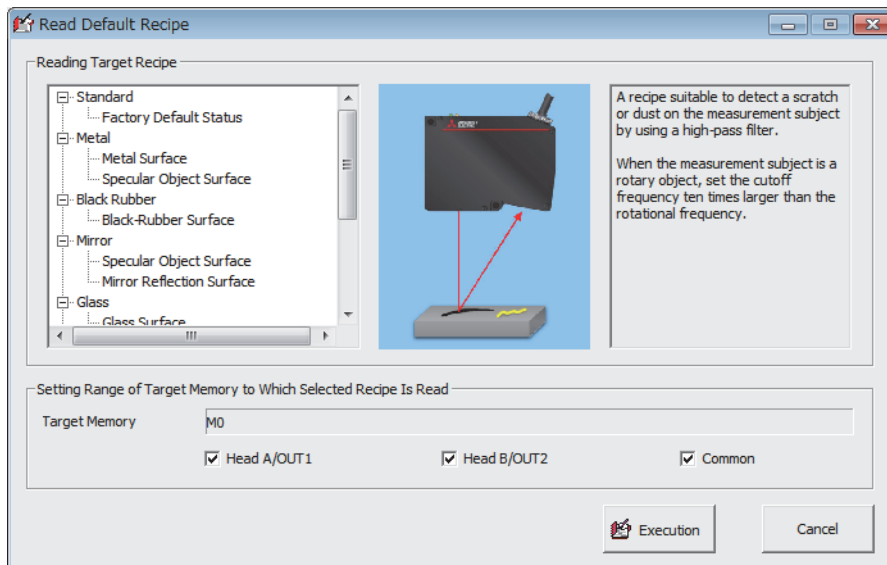
Item			Description	
Connected Station Setting	USB		Selects when the destination station and the personal computer are connected directly with a USB cable.	
	Ethernet	—	Selects when the destination station and the personal computer are connected with an Ethernet cable.	
		Connection via Hub	—	Selects when the destination station and the personal computer are connected via an Ethernet hub.
	IP Address			Sets an IP address of the destination station when Ethernet communication is executed with an IP address specified.
	Host Name			Sets a host name of the destination station when Ethernet communication is executed with a host name specified.
	Direct Connection		Selects when the destination station and the personal computer are connected with an Ethernet cable.	
	Protocol		Sets a protocol when Ethernet communication is executed. The default value is UDP.	
Other Station Specification	—		Sets to communicate with another station via a network. Check this item to enable the setting.	
	Network Number		Sets a network number to communicate with another station via a network. The default value is 1.	
	Station Number		Sets a station number to communicate with another station via a network. The default value is 0.	
Communication Time Check			Sets the timeout period for when communications between the R60MH112NA and the setting tool is interrupted. The setting range is 1 to 9999 seconds. The default value is 30 seconds.	
Number of Retries			Sets the number of retries when communications between the R60MH112NA and the setting tool have timed out. The setting range is 0 to 5 times. The default value is 0 times.	
[Communication Test] button			Executes a communication test with the set connection destination.	



# 3.11 "Read Default Recipe" Window


Main window ⇒ [File] ⇒ [Read Default Recipe]

Conditions for various applications are set as default conditions by reading selected recipes.



Item	Description	
Reading Target Recipe	Selects a recipe to be read.	
	Recipe list (On the left side of the window)	Lists the names of selectable recipes as a tree. Default setting is "Factory Default Status".
	Recipe image (In the center of the window)	Displays an image of a recipe selected from the recipe list.
	Recipe description (On the right side of the window)	Displays a description of a recipe selected from the recipe list.
Setting Range of Target Memory to Which Selected Recipe Is Read	Specifies a range that is set when a selected recipe is read.	
	[Target Memory]	Displays a memory targeted to be set. A target memory is the one selected in "Memory Change" of the main window.
	Head A/OUT1	Sets recipe conditions to head A and OUT 1 of the target memory area when the box checked. It is selected by default.
	Head B/OUT2	Sets recipe conditions to head B and OUT 2 of the target memory area when checked. It is selected by default.
	Common	Sets recipe conditions to the common measurement conditions of the target memory area when checked. It is selected by default.
[Execution] button	Reads conditions of the selected recipe and sets the specified range when clicked. When the recipe conditions are read, the recipe conditions are overwritten and thus cannot be undone.	

## 3.12 "Setting List" Window

 Main window ⇨ [Setting List] button

The data of the setting tool memory can be displayed and captured.

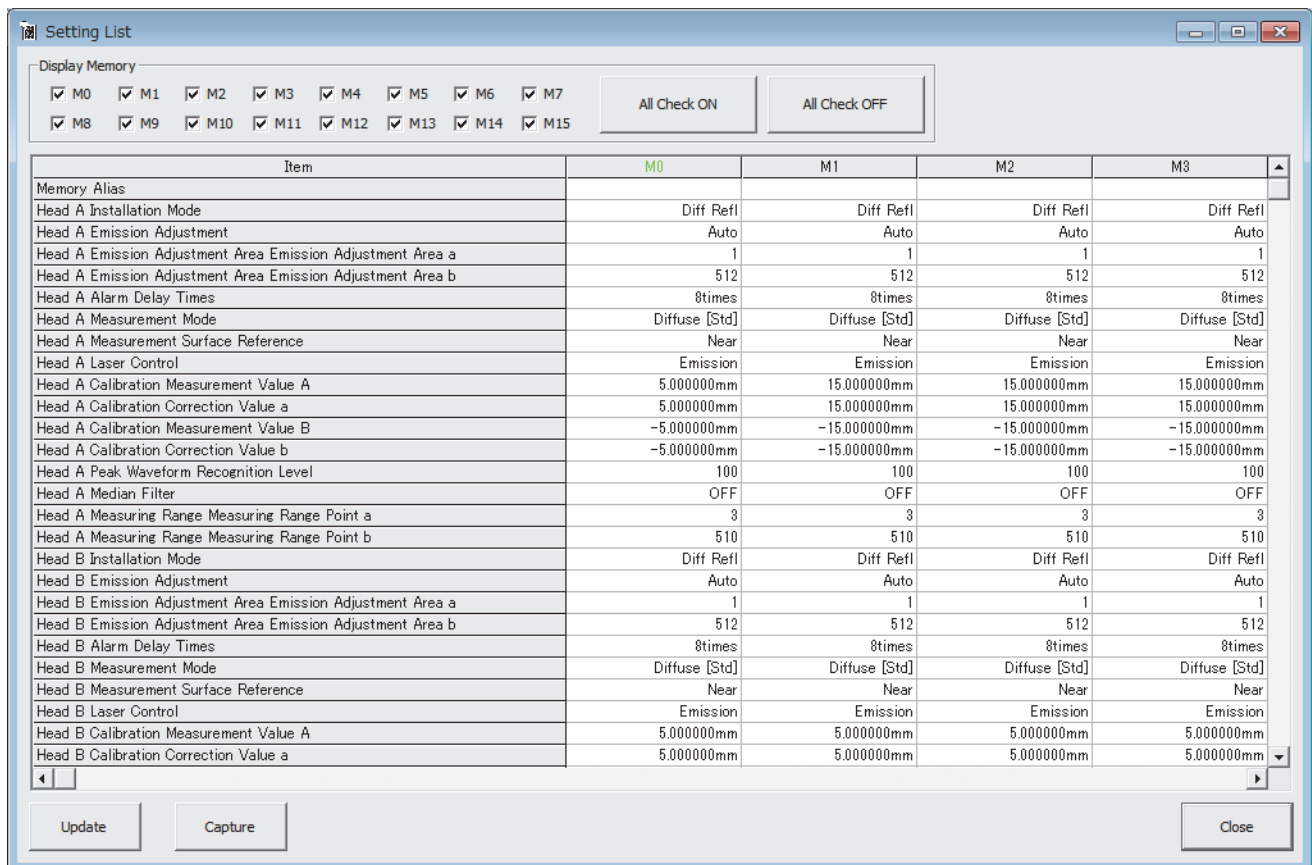
The number of selected memory is shown in green.

### Point


A red item has an error. Check the set value.

The set value may be out of range and may cause an error. For the setting range, refer to the following.

 Laser Displacement Sensor MH11 User's Manual



Item	M0	M1	M2	M3
Memory Alias				
Head A Installation Mode	Diff Refl	Diff Refl	Diff Refl	Diff Refl
Head A Emission Adjustment	Auto	Auto	Auto	Auto
Head A Emission Adjustment Area Emission Adjustment Area a	1	1	1	1
Head A Emission Adjustment Area Emission Adjustment Area b	512	512	512	512
Head A Alarm Delay Times	8times	8times	8times	8times
Head A Measurement Mode	Diffuse [Std]	Diffuse [Std]	Diffuse [Std]	Diffuse [Std]
Head A Measurement Surface Reference	Near	Near	Near	Near
Head A Laser Control	Emission	Emission	Emission	Emission
Head A Calibration Measurement Value A	5.000000mm	15.000000mm	15.000000mm	15.000000mm
Head A Calibration Correction Value a	5.000000mm	15.000000mm	15.000000mm	15.000000mm
Head A Calibration Measurement Value B	-5.000000mm	-15.000000mm	-15.000000mm	-15.000000mm
Head A Calibration Correction Value b	-5.000000mm	-15.000000mm	-15.000000mm	-15.000000mm
Head A Peak Waveform Recognition Level	100	100	100	100
Head A Median Filter	OFF	OFF	OFF	OFF
Head A Measuring Range Measuring Range Point a	3	3	3	3
Head A Measuring Range Measuring Range Point b	510	510	510	510
Head B Installation Mode	Diff Refl	Diff Refl	Diff Refl	Diff Refl
Head B Emission Adjustment	Auto	Auto	Auto	Auto
Head B Emission Adjustment Area Emission Adjustment Area a	1	1	1	1
Head B Emission Adjustment Area Emission Adjustment Area b	512	512	512	512
Head B Alarm Delay Times	8times	8times	8times	8times
Head B Measurement Mode	Diffuse [Std]	Diffuse [Std]	Diffuse [Std]	Diffuse [Std]
Head B Measurement Surface Reference	Near	Near	Near	Near
Head B Laser Control	Emission	Emission	Emission	Emission
Head B Calibration Measurement Value A	5.000000mm	5.000000mm	5.000000mm	5.000000mm
Head B Calibration Correction Value a	5.000000mm	5.000000mm	5.000000mm	5.000000mm

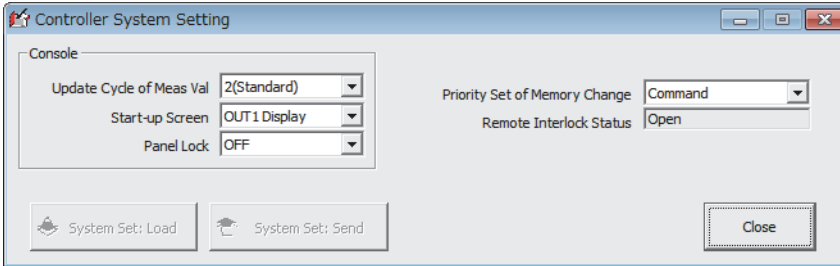
Item	Description
Display Memory	Whether to display or hide the data in the 16 memory areas for each memory number ("M0" to "M15"). When the window is opened, all the memory numbers are selected and the data in all the memory areas is displayed. Select memory numbers to be displayed and click the [Update] button to switch the display. [All Check ON] button: Selects all the memory numbers in "Display Memory". [All Check OFF] button: Clears all the selections in "Display Memory".
Item	Lists the data in the memory in a table A red item has an error because the value exceeds the allowable range. When an item has an error, correct its value.
Memory Alias	The memory alias can be set in "Alias Setting of Memory in Controller" in the "Software Operation Setting" window. (  ) Page 74 "Software Operation Setting" Window) If no alias is set, the corresponding field is empty.
[Update] button	When the [Update] button is clicked, the displayed content on the "Setting List" window is updated with the content of the memory whose memory number is selected in "Display Memory". The displayed content of the "Setting List" window is the current data of the setting tool memory. The displayed content of the "Setting List" window is not updated until the [Update] button is clicked.

# 3.13 "Controller System Setting" Window

Main window ⇒ [System] ⇒ [Controller System Setting]

The system setting of the MH11CTMF-□NA can be loaded and sent.

The settings on the window are not applied to the MH11CTMF-□NA until the [System Set: Send] button is clicked.



Item	Description
[System Set: Load] button	Loads the system setting values from the MH11CTMF-□NA.
[System Set: Send] button	Writes the system setting values to the MH11CTMF-□NA.
Console	Configures the GOT settings. (Laser Displacement Sensor MH11 User's Manual) Update Cycle of Meas Val: The default setting is "2(Standard)". Start-up Screen: The default setting is "OUT1 Display". Panel Lock: The default setting is "OFF".
Priority Set of Memory Change	Selects "Command" or "Terminal" as the priority setting of memory change. If "Command" is not selected, the [Send] button on the main window (Send All Memory to Controller) cannot be executed.
Remote Interlock Status	Displays "Open" or "Close" as the current remote interlock status when the status is read from the MH11CTMF-□NA.

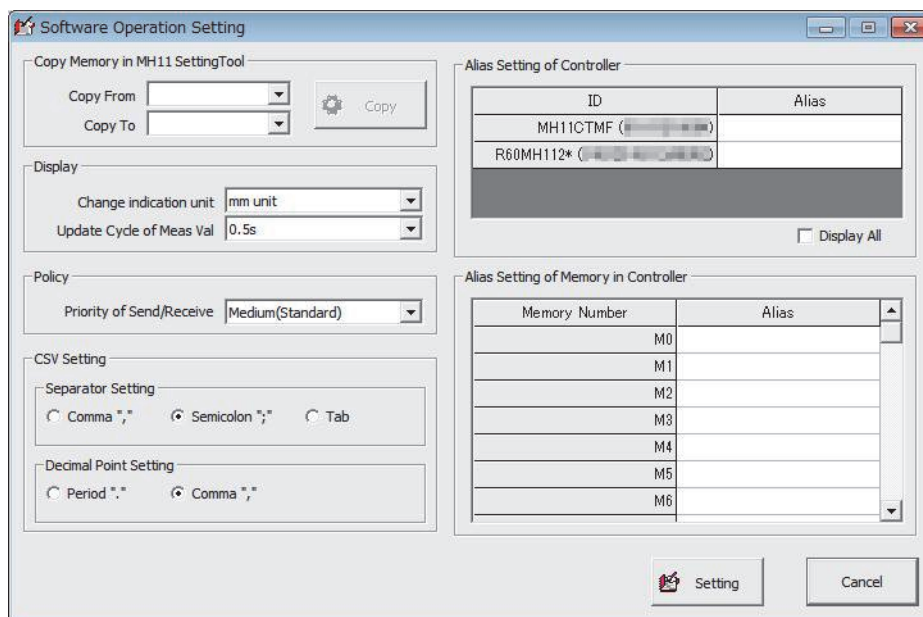
## Precautions

This item cannot be used in the R60MH112NA.

## 3.14 "Software Operation Setting" Window

Main window ⇒ [System] ⇒ [Software Operation Setting]

The operating conditions of the setting tool can be set.

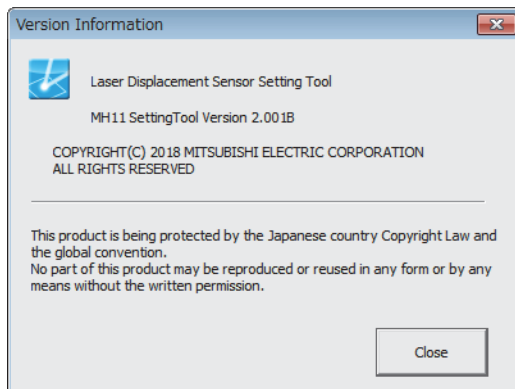


Item	Description
Copy Memory in MH11 Setting Tool	The settings of a memory area can be copied in the setting tool. When the copy destination memory area is the selected memory area, executing copy applies the settings of the copy source memory area to each window and automatically changes the displays.
	Copy From: Selects a copy source from the displayed memory numbers and aliases (if set).
	Copy To: Selects a copy destination from the displayed memory numbers and aliases (if set).
	[Copy] button: Executes memory copy. If the same memory number is selected for the copy source and copy destination, memory copy cannot be executed.
Display	Change indication unit: Selects a displayed unit of the measurement data from "mm unit" and "μm unit".
	Update Cycle of Meas Val: Selects a display update cycle for the "Measurement Value" window from "2s", "1s", "0.5s", and "0.1s".
Policy	Sets the priority for data communications between the setting tool and the controller in the personal computer. Giving high priority to the communications allows smooth operation in a low-spec personal computer even when other applications are running.
	Priority of Send/Receive: Selects a priority from "Very Low", "Low", "Medium(Standard)", and "High". The default value is "Medium(Standard)".
CSV Setting	Sets the specifications for when the CSV-format data is output from the setting tool.
	Separator Setting: Selects a separator from "Comma ",", "Semicolon ";", and "Tab". The default value is "Comma ","".
	Decimal Point Setting: Selects a decimal point from "Period "." and "Comma ",". The default value is "Period ".".
Alias Setting of Controller	ID: Displays a product number of the controller that is connected successfully on the "Connecting Destination Setting" window.
	Sets the alias (proper name) for the controller connected to the setting tool. <ul style="list-style-type: none"> <li>An alias set with this function is saved into the M1S file.</li> <li>An alias can be input by double-clicking on the "Alias" field. If no alias is input or the preset alias is deleted, an alias is not saved into the M1S file.</li> </ul>
	Display All: With this item selected, all the controllers saved in the M1S file are displayed. If this item is not selected, the controller recognized (detected) by the personal computer at startup of the setting tool and the controller last specified in the "Connecting Destination Setting" is displayed.
Alias Setting of Memory in Controller	Sets the alias (proper name) for each memory number of the controller. This function is convenient for future use if the application used or setting conditions are registered as the alias. <ul style="list-style-type: none"> <li>An alias set with this function is saved into the M1S file.</li> <li>An alias can be input by double-clicking on the "Alias" field. If no alias is input or the preset alias is deleted, an alias is not saved into the M1S file.</li> </ul>
[Setting] button	Applies the settings changed in the "Software Operation Setting" window.
[Cancel] button	Closes the "Software Operation Setting" window without changing the settings.

## 3.15 "Version" Window

Main window ⇒ [Help] ⇒ [Version]

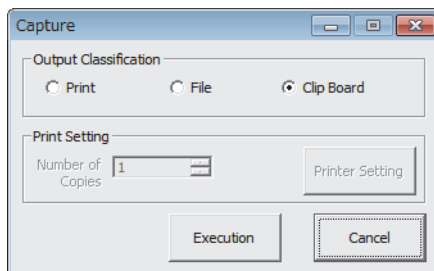
The version of the setting tool is displayed.



## 3.16 "Capture" Window

When the [Capture] button is provided at the bottom of each window, this window is opened by clicking the button. (☞ Page 17 Functions Common to the Windows)

The displayed contents in the window with the [Capture] button can be output.



Item	Description
Output Classification	Print: Outputs the window capture to the printer.
	File: Outputs the captured window in a .jpg file or .bmp file. Note that the "Setting List" window is output in a CSV file. For outputting the "Setting List" window, configure "CSV Setting" in the "Software Operation Setting" window first. If the setting is not configured in advance, the output CSV file may not be able to be loaded. (☞ Page 74 "Software Operation Setting" Window)
	Clip Board: Outputs the captured window to the clipboard.
Print Setting	This item can be set only when "Output Classification" is set to "Print".
	Number of Copies: Sets the number of copies.
	[Printer Setting] button: Configures the printer settings.
[Execution] button	Outputs the window according to "Output Classification".
[Cancel] button	Cancels the output and closes the window.

### Precautions

When the [Execution] button on the windows other than the "Setting List" window is clicked, the operation will be the following:

- When the window to be captured is not displayed in the center of the screen, the position is automatically moved to fit on the screen before captured.
- When the window is captured, it is momentarily displayed on top of other windows.

# 4 ERROR MESSAGES

## 4.1 Error Message List

The following table lists the error messages displayed on the setting tool.

Error code	Error message	Cause	Corrective action
ID: 10000001	Management File Read Error	<ul style="list-style-type: none"> <li>The file is being used in another program.</li> <li>The file does not exist.</li> <li>The file path is too long.</li> <li>The file path contains text that cannot be handled with the setting tool.</li> </ul>	<ul style="list-style-type: none"> <li>Check that the file is not being used in another program.</li> <li>Check the file name.</li> <li>Make the folder or file name short so that the length of the file path falls within 259 single-byte characters (129 two-byte characters).</li> <li>Check the file path.</li> </ul>
ID: 10000002	Management File Write Error	<ul style="list-style-type: none"> <li>The file is being used in another program.</li> <li>Writing to the file is inhibited.</li> <li>Free space is insufficient.</li> <li>The file path is too long.</li> <li>The file path contains text that cannot be handled with the setting tool.</li> </ul>	<ul style="list-style-type: none"> <li>Check that the file is not being used in another program.</li> <li>Enable writing.</li> <li>Reserve free space.</li> <li>Make the folder or file name short so that the length of the file path falls within 259 single-byte characters (129 two-byte characters).</li> <li>Check the file path.</li> </ul>
ID: 10000003	Communication Time Out	<ul style="list-style-type: none"> <li>The controller is powered off.</li> <li>An incorrect USB device is specified in "USB Setting".</li> <li>No controller is connected to the connected USB device.</li> <li>The time period of "Time Out" set in "USB Setting" is too short compared to the data transmission time from the controller.</li> <li>Data has been damaged by electrical noise.</li> </ul>	<ul style="list-style-type: none"> <li>Power on the controller.</li> <li>Specify a correct USB device.</li> <li>Connect a controller.</li> <li>Set a longer timeout period.</li> <li>Eliminate electrical noise.</li> </ul>
ID: 10000004	Communication Response Error	<ul style="list-style-type: none"> <li>The data transmission time from the controller is too long.</li> <li>Data has been damaged by electrical noise.</li> </ul>	<ul style="list-style-type: none"> <li>Set a longer timeout period.</li> <li>Eliminate electrical noise.</li> </ul>
ID: 10000005 or ID: 10000007	File Read Error	<ul style="list-style-type: none"> <li>The file is being used in another program.</li> <li>The file does not exist.</li> <li>The file path is too long.</li> <li>The file path contains text that cannot be handled with the setting tool.</li> </ul>	<ul style="list-style-type: none"> <li>Check that the file is not being used in another program.</li> <li>Check the file name.</li> <li>Make the folder or file name short so that the length of the file path falls within 259 single-byte characters (129 two-byte characters).</li> <li>Check the file path.</li> </ul>
ID: 10000006 or ID: 10000008	File Write Error	<ul style="list-style-type: none"> <li>The file is being used in another program.</li> <li>Writing to the file is inhibited.</li> <li>Free space is insufficient.</li> <li>The file path is too long.</li> <li>The file path contains text that cannot be handled with the setting tool.</li> </ul>	<ul style="list-style-type: none"> <li>Check that the file is not being used in another program.</li> <li>Enable writing.</li> <li>Reserve free space.</li> <li>Make the folder or file name short so that the length of the file path falls within 259 single-byte characters (129 two-byte characters).</li> <li>Check the file path.</li> </ul>
ID: 1000000D or ID: 1000000F	USB Send Error	<ul style="list-style-type: none"> <li>The controller is powered off.</li> <li>An incorrect USB device is specified in "USB Setting".</li> <li>No controller is connected to the connected USB device.</li> <li>Data has been damaged by electrical noise.</li> </ul>	<ul style="list-style-type: none"> <li>Power on the controller.</li> <li>Specify a correct USB device.</li> <li>Connect a controller.</li> <li>Eliminate electrical noise.</li> </ul>
ID: 1000000E	USB Open Error	<ul style="list-style-type: none"> <li>An incorrect USB device is specified in "USB Setting".</li> <li>The controller is connected to another device with a USB cable.</li> </ul>	<ul style="list-style-type: none"> <li>Specify a correct USB device.</li> <li>Check that the controller is not connected to another device with a USB cable.</li> </ul>

Error code	Error message	Cause	Corrective action
ID: 10000011	Value Exceeds Its Range	The input value exceeds the input range.	<ul style="list-style-type: none"> <li>Input a value again so that it falls within the input range.</li> <li>Input a value again for the value displayed in red on the "Setting List" window.</li> <li>When this message is displayed when buffering starts, check that the number of accumulated sample triggers on the buffering setting window is a divisor of the accumulation amount.</li> </ul>
ID: 10000012	Failed to execute Emitted Light Intensity Search.	The emitted light intensity is set within the emission adjustment setting range of 0.04 to 100% (fixed). When the emitted light intensity cannot be optimized within the range, the emitted light intensity search fails and the emitted light intensity is automatically adjusted.	When the emitted light intensity search cannot be executed correctly, check the received light intensity waveform and adjust the light intensity manually.
ID: 10000013	Printer Not Found	A printer is not connected.	Connect a printer.
ID: 10000014	Buffering in progress	<ul style="list-style-type: none"> <li>The setting tool was closed during buffering processing of the controller.</li> <li>The controller is executing buffering processing commanded by an application other than the setting tool.</li> </ul>	Execute the processing after the buffering processing terminated.
ID: 10000015	Send After Setting Command of Memory Change Priority Setting	"Terminal" is set for "Priority Set of Memory Change" on "Controller System Setting Window".	Execute the processing after setting "Priority Set of Memory Change" to "Command" on "Controller System Setting Window" and clicking the [System Set: Send] button.
ID: 10000017	Failed to Create dialog.	<ul style="list-style-type: none"> <li>ActiveX controls cannot be initialized.</li> <li>Dynamic-link libraries cannot be initialized.</li> <li>The memory capacity is insufficient.</li> </ul>	<ul style="list-style-type: none"> <li>Reinstall the application.</li> <li>When other applications are run, exit them.</li> <li>Increase the memory capacity.</li> </ul>
ID: 10000019	Cannot be set to Meas A = Meas B or Corr a = Corr b.	The same value is set to Meas A and Meas B or Corr a and Corr b in the calibration execution window.	Set different values to Meas A and Meas B or Corr a and Corr b.
ID: 1000001A	Cannot be set to Meas A = Meas B or Volt a = Volt b.	The same value is set to Meas A and Meas B or Volt a and Volt b in the analog scaling window.	Set different values to Meas A and Meas B or Volt a and Volt b.
ID: 1000001B or ID: 1000001C	Failed to acquire a measurement value due to invalid data or alarm occurring.	A measurement value could not be acquired because invalid data was acquired or an alarm was occurring in the controller.	<ul style="list-style-type: none"> <li>Check that the controller status is not abnormal.</li> <li>Restart the controller.</li> </ul>
ID: 1000001D	USB Communication Device Error	<ul style="list-style-type: none"> <li>The controller is powered off.</li> <li>No controller is connected to the connected USB device.</li> <li>The time period of "Time Out" set in "USB Setting" is too short compared to the data transmission time from the controller.</li> <li>Data has been damaged by electrical noise.</li> </ul>	<ul style="list-style-type: none"> <li>Power on the controller.</li> <li>Specify a correct USB device.</li> <li>Connect a controller.</li> <li>Set a longer timeout period.</li> <li>Eliminate electrical noise.</li> </ul>
ID: 10000020	The selected memory areas of the setting tool and of the controller do not match. Select the same memory area both for the setting tool and the controller and try again. Selected memory area of the setting tool: Memory select number Selected memory area of the controller: Selected memory area number of the controller	The processing cannot be executed because the selected memory area numbers of the setting tool and of the controller differ.	Set the same memory numbers both for the setting tool and the controller by changing the selected memory area of the setting tool or of the controller. Then, try again.
ID: 10000021	There is no data to be acquired.	Data acquisition was executed while the controller had no buffering data.	Execute data acquisition when the controller has buffering data.
ID: 10000022	~ is used by MH11 SettingTool.	The specified M1S file of the setting tool is being used.	<ul style="list-style-type: none"> <li>Perform editing operation on the window of the M1S file that is open.</li> <li>When an incorrect M1S file has been specified, specify the correct M1S file.</li> </ul>
ID: 10000024	Failed to recognize the controller. Check the start I/O number of the connection destination settings.	The start I/O number of the connection destination settings and the configuration of the actual device do not match.	<ul style="list-style-type: none"> <li>Check the configuration of the actual device.</li> <li>Check the start I/O number of the connection destination settings.</li> </ul>

<b>Error code</b>	<b>Error message</b>	<b>Cause</b>	<b>Corrective action</b>
ID: 10000025	The standard browser is not set. Set the browser.	The standard browser is not set or installed.	<ul style="list-style-type: none"> <li>• Install the browser.</li> <li>• Set the standard browser.</li> </ul>
ID: 10000026	Cannot start e-Manual Viewer because it is not installed. Install e-Manual Viewer.	e-Manual Viewer is not installed.	Install e-Manual Viewer.
ID: 10000027	Failed to start e-Manual Viewer.	Failed to start e-Manual Viewer. The installation may be failed.	Reinstall e-Manual Viewer.
ID: 10000028	The operating environment of the application may be broken. Reinstall the setting tool.	Failed to start the setting tool. The operating environment may be broken.	Reinstall the setting tool.



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# MEMO

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# REVISIONS

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\*The manual number is given on the bottom left of the back cover.

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