



**Safety Light Curtain Configuration Tool for Model F3SG
SD Manager 2**

User's Manual



Original instructions

Introduction

Thank you for selecting our products, Safety Light Curtain Configuration Tool for Model F3SG and Interface Unit for F3SG Safety Light Curtain.

This is the instruction manual describing the use of the Safety Light Curtain Configuration Tool for Model F3SG.

Always heed the following points when using them:

- Be sure to have the Safety Light Curtain Configuration Tool for Model F3SG and the F3SG Safety Light Curtain to be configured be handled by a "Responsible Person" who is well aware of and familiar with the machine to be installed.
- The term "Responsible Person" used in this Manual means the person qualified, authorized and responsible to secure "safety" in each process of the design, installation, operation, maintenance services and disposition of the machine.
- It is assumed that the Safety Light Curtain Configuration Tool for Model F3SG and the F3SG Safety Light Curtain will be used properly according to the installation environment, performance and function of the machine. Responsible Person should conduct risk assessment on the machine and determine the suitability of the products before installation.
- Read this Manual thoroughly to understand and make good use of the descriptions before installing and operating the products.
- Keep this Manual at the place where the operator can refer to whenever necessary.

Visual Aids

The following symbols appear in this document to help you locate different types of information.



Indicates important information or advice on a function or operation of the product.



Indicates page numbers or chapter title of related information.

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Reference Manuals

Also refer to the following related manuals.

Document Title	Cat. No.
Safety Light Curtain F3SG-R Series User's Manual	Z352-E1
Safety Light Curtain F3SG-RR Series User's Manual	Z383-E1
F39-GIF Interface Unit for F3SG Safety Light Curtain Instruction Sheet	9600137-6
F39-GIF-1 Interface Unit for F3SG-RR Safety Light Curtain Instruction Sheet	8900170-0
F39-BT Bluetooth® Communication Unit for F3SG Series F39-BTL Lamp and Bluetooth® Communication Unit for F3SG Series Instruction Sheet	9704396-0
F39-BT Bluetooth® Communication Unit for F3SG Series F39-BTL Lamp and Bluetooth® Communication Unit for F3SG Series Instruction Sheet (Regulations and Standards)	9918446-3

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4. CHANGE IN SPECIFICATION

The software specifications and accessories may be changed at any time based on improvements and other reasons.

5. ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

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This Software: SD Manager 2

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This is a translation of the original agreement in Japanese. In the event of any discrepancy, the original agreement in Japanese shall prevail.



Safety Precautions

Indications and Meanings for Safe Use



The precautions listed in this document indicated by alert symbols and statements must be followed for the safe use of the Safety Light Curtain Configuration Tool for Model F3SG. Failure to follow all precautions and alerts may result in an unsafe use or operation. Thoroughly read this manual and understand the installation procedures, operation check procedures, and maintenance procedures before using the Safety Light Curtain Configuration Tool for Model F3SG.

The following word and symbols are used in this document.

Meaning of Signal Word

 WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or in property damage.

Meanings of Alert Symbols

	Indicates prohibited actions.
	Indicates mandatory actions.

Alert Statements in this Manual

For users

WARNING

After changing settings, the responsible person must perform a start inspection and check the safety before beginning normal operation.



For installation

WARNING

Do not use the F3SG Safety Light Curtain and the Interface Unit in an environment with excessive noise when make changes to settings of the F3SG Safety Light Curtain. Doing so may cause setting changes to fail and unintended function setting change may cause a person to go undetected, resulting in serious injury.



For Settings

WARNING

Some settings of functions or the Setting Recovery function configurable with the Configuration Tool may increase risks. Make sure the Responsible Person conduct a thorough risk assessment analysis before managing and changing the settings. Unintended changes to the settings may cause a person go to undetected, resulting in serious injury.



Before making changes to settings, make sure they comply with all relevant legislation and standards.



Security Measures

WARNING

To prevent computer viruses, install antivirus software on a computer where you use this software.

Make sure to keep the antivirus software updated.



Keep your computer's OS updated to avoid security risks caused by a vulnerability in the OS.



Always use the highest version of this software to add new features, increase operability, and enhance security.



Manage usernames and passwords carefully to protect them from unauthorized uses.



Set up a firewall (E.g., disabling unused communication ports, limiting communication hosts, etc.) on a network for a control system and devices to separate them from other IT networks. Make sure to connect to the control system inside the firewall.



Use a virtual private network (VPN) for remote access to a control system and devices.



Precautions for Correct Use

Observe the precautions described below to prevent operation failure, malfunctions, or undesirable effects on product performance.

■ Settings

- When the F3SG Safety Light Curtain is disconnected while the SD Manager 2 is running, a communication error occurs and the data being edited is cancelled.
- Use either of the Interface Unit or the Bluetooth® Communication Unit when connecting to the F3SG. Do not connect both of them to the F3SG. Doing so may cause the devices to malfunction.

■ Bluetooth® Communication Unit

- In order to use the Bluetooth® Communication Unit (F39-BT or F39-BTLP), Bluetooth® wireless technology must be incorporated in the PC used and SPP (Serial Port Profile) must operate properly. Read an instruction manual of a Bluetooth® adaptor and set up the SPP properly. If the SPP is not set up properly, SD Manager 2 cannot run online.
- SD Manager 2 may not run when using some kinds of Bluetooth® adaptor or driver. When SD Manager 2 does not run with a driver of the Bluetooth® adaptor, try to use a standard Windows driver.



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Chapter 1 Overview and Specifications

1-1. Overview of Configuration Tool

The user can configure various functions and view operating states of the F3SG Safety Light Curtain, using the following tools.

- Interface Unit for F3SG Safety Light Curtain: F39-GIF
- Interface Unit for F3SG-RR Safety Light Curtain: F39-GIF-1
- Bluetooth® Communication Unit for F3SG Series: F39-BT
- Lamp and Bluetooth® Communication Unit for F3SG Series: F39-BTLP
- Safety Light Curtain Configuration Tool for Model F3SG: SD Manager 2

Hereinafter, the Interface Unit for F3SG Safety Light Curtain and the Safety Light Curtain Configuration Tool for Model F3SG are referred to as the "Interface Unit" and "SD Manager 2".

Hereinafter, the Bluetooth® Communication Unit for F3SG Series and the Lamp and Bluetooth® Communication Unit for F3SG Series are referred to as the "Bluetooth® Communication Unit".

The above tools are applicable to the following safety light curtains:

- F3SG-RA Series
- F3SG-RR Series



For the F3SG-RA-□□TS, it is not possible to configure functions with SD Manager 2. Refer to 1-7-2. *List of Configurable Functions* for details.

CHECK!

1-2. System Environment

■ PC environment

To use SD Manager 2, the following PC environment is necessary:

Operating system (OS)	Windows 7 SP1 32-bit or 64-bit edition Windows 8 and 8.1 32-bit or 64-bit edition Windows 10 32-bit or 64-bit edition Language: Japanese, English
CPU	1 GHz or higher
Memory capacity	1 GB or higher for 32-bit OS edition 2 GB or higher for 64-bit OS edition
Operating condition	.NET Framework 4.5.2 or higher is installed. Bluetooth® wireless technology is incorporated (to use Bluetooth® Communication Unit).

■ Compatible Products (Bluetooth® adaptors)

[Verification steps conducted by OMRON]

- (1) Connect a Bluetooth® adaptor to a USB port of a PC which does not support Bluetooth® wireless technology and set up the driver.
- (2) Pair the adaptor with the Bluetooth® Communication Unit and confirm by Device Manager that the COM port is set up.
- (3) After confirming the step (2), verify by SD Manager 2 that the communication with F3SG is established.

[Verification results]

Yes: Communication is established.

No: Communication fails.

Note: The verification conducted by OMRON does not guarantee all performance of the Bluetooth® adaptors.

[List of compatible Bluetooth® adaptors (as of July 30, 2015)]

Maker	Model	Radio law conformed by Bluetooth® adaptor			Verification result	
		Japan	FCC	CE	Driver of adaptor	Standard Windows driver
ELECOM	LBT-UAN04C2	✓			No	Yes
ELECOM	LBT-UAN04C1	✓			No	Yes
ELECOM	LBT-UAN05C2	✓			Yes	Yes
SANWA	MM-BTUD44	✓			No	Yes
SANWA	MM-BTUD43	✓			No	No
I-O DATA	USB-BT40LE	✓			Yes	Yes
iBUFFALO	BSBT4D09BK	✓			No	Yes
Princeton	PTM-UBT7	✓			No	Yes
Planex	BT-Micro4	✓	✓	✓	Yes	Yes
Cyberteck	Bluetooth CSR 4.0 Dongle		✓	✓	No	Yes
EasyAcc	BTA-406		✓	✓	No	No
ieGeek	Bluetooth CSR 4.0 Dongle		✓	✓	No	Yes
Kooteck	Bluetooth CSR 4.0 Dongle		✓	✓	No	Yes
mediastic	Bluetooth 4.0 Mini Adaptor		✓	✓	No	Yes
ORICO	BTA-402		✓	✓	No	Yes
ORICO	BTA-403		✓	✓	No	Yes
SHARKK	Bluetooth CSR 4.0 Dongle		✓	✓	Yes	Yes
SoundBot	SB340		✓	✓	No	Yes

Note SD Manager 2 may not run when using some kinds of Bluetooth® adaptor or driver.

When SD Manager 2 does not run with a driver of the Bluetooth® adaptor, try to use a standard Windows driver.

1-3. How to Install SD Manager 2

The following is an example when using a PC that runs on Windows 7.

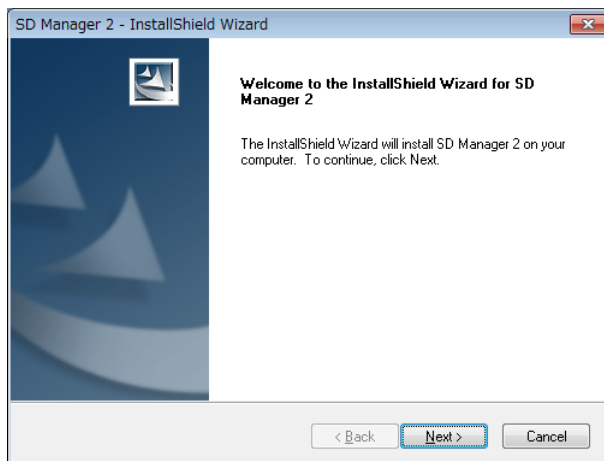
1-3-1. Downloading SD Manager 2

Download **SDManager2_Setup.exe** from the URL below and save it to a desired location on a PC.

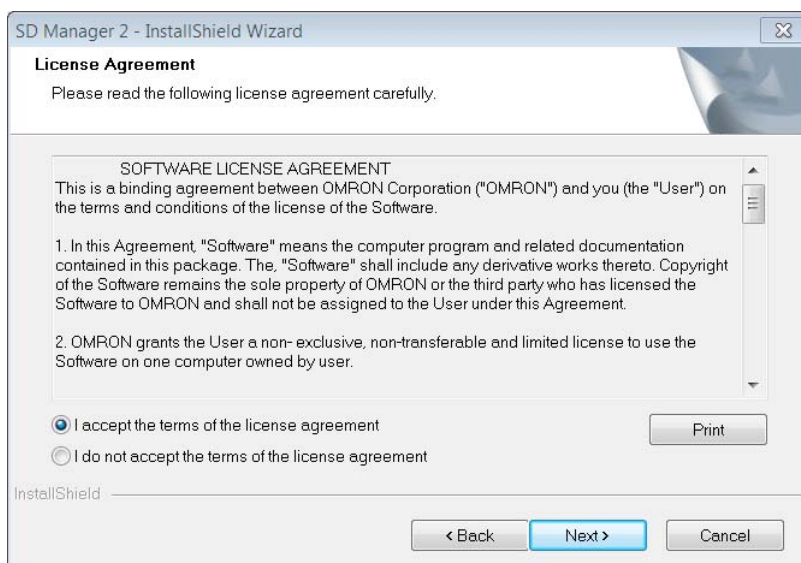
http://www.ia.omron.com/f3sg-r_tool

1-3-2. Installing SD Manager 2

1. Make sure that the PC is not connected to the Interface Unit or Bluetooth® Communication Unit.
2. Double-click on **SDManager2_Setup.exe**.
3. Select a desired language and click [Next].
4. The Installation wizard is displayed. Click [Next].

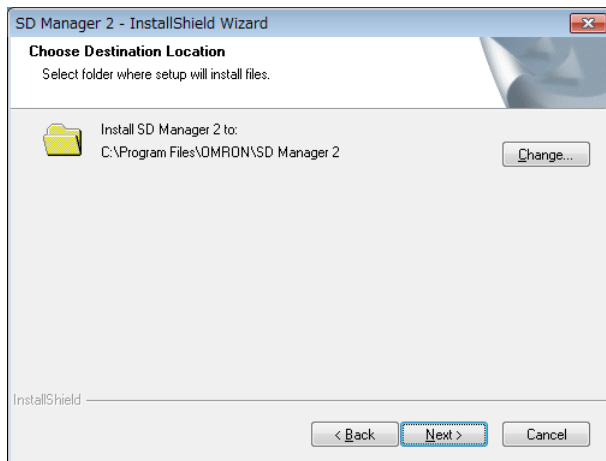


5. Read the software license agreement. If accepting, select [I accept the terms of the license agreement] and click [Next].

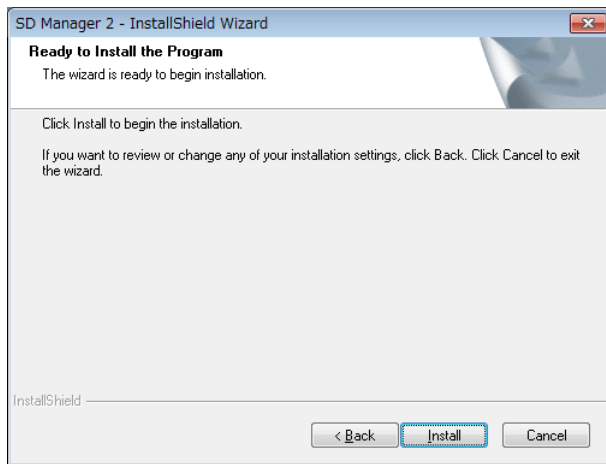


6. Click [Next].

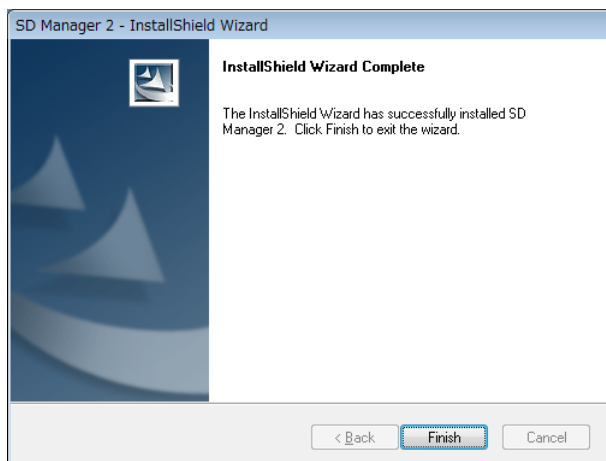
When changing the location to install, click [Change(c)] and select a desired location.



7. The prompt window shown below is displayed. Click [Install] to start the installation.



8. Click [Finish]. Now the installation is complete.

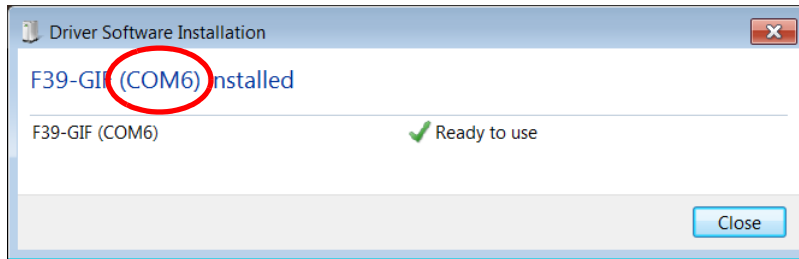


1-3-3. Installing Driver of Interface Unit

1. When SD Manager 2 is successfully installed, connect the Interface Unit to the PC.
2. The PC starts to install the driver automatically. Wait until the installation process is complete. You can click on the icon below on the task tray to view the progress.



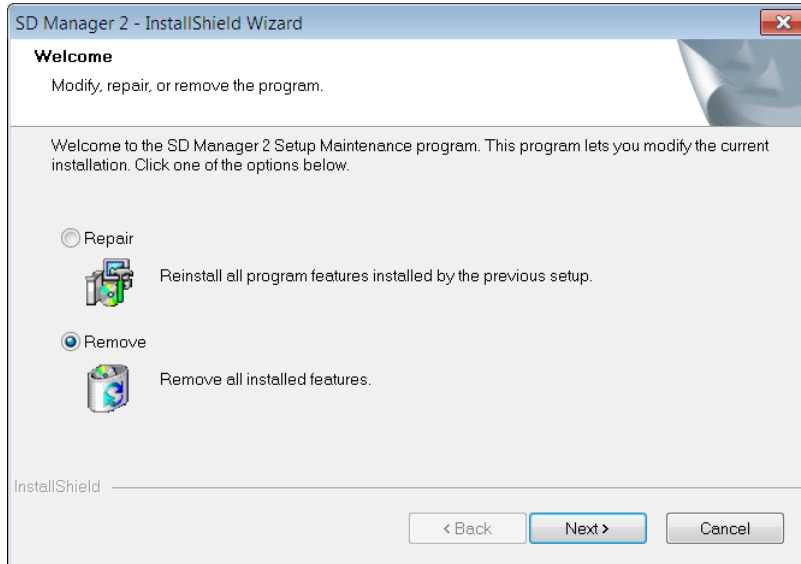
3. The window shown below is displayed when the installation is complete. In this example, the communication port is set to COM6. Click [Close] to finish.



1-4. How to Uninstall SD Manager 2

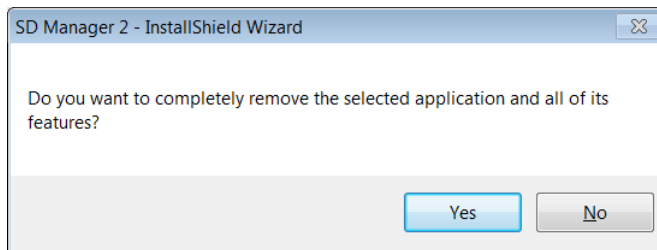
You can uninstall SD Manager 2 using the **SDManager2_Setup.exe** file or **Control Panel**. The following is an example when using a PC that runs on Windows 7.

1. Double-click on **SDManager2_Setup.exe**. Confirm [Remove] is selected in the window shown below and click [Next].

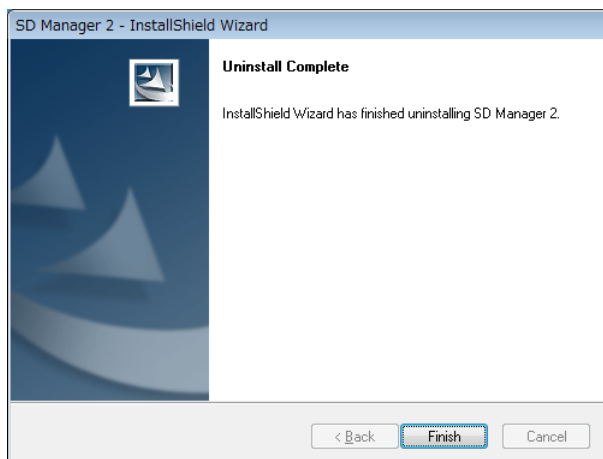


Or from the Start menu, select [Control Panel] and [Uninstall a program]. From the list shown, select [SD Manager 2] and click [Uninstall].

2. Click [Yes] in the window shown below.



3. The window shown below is displayed when the uninstallation is complete. Click [Finish].

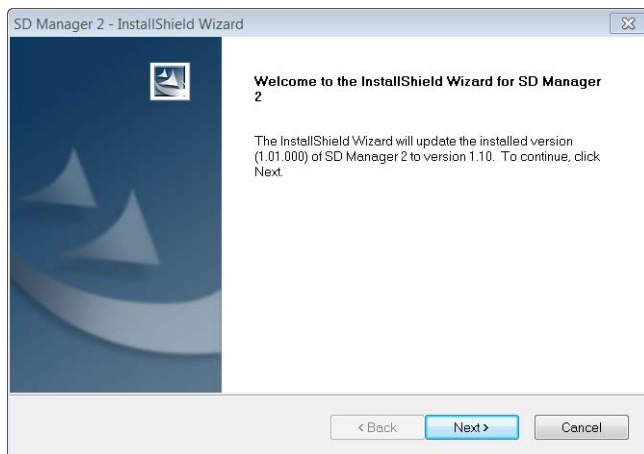


1-5. How to Update SD Manager 2

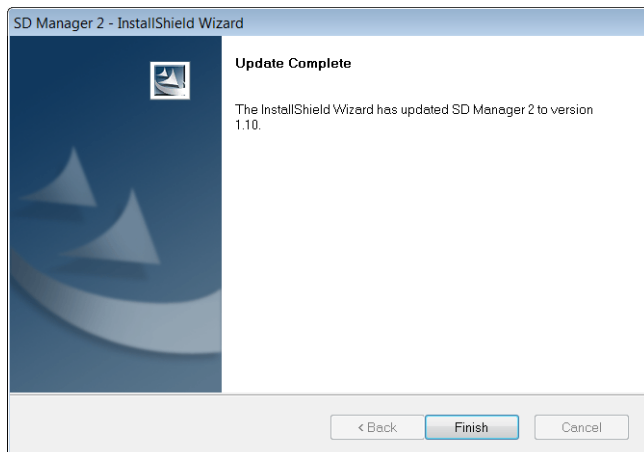
To update an SD Manager 2 installed in a PC to a new version, follow the steps below.

This is an example when using a PC that runs on Windows 7.

1. Download **SDManager2_Setup.exe** from the URL below and save it to a desired location on a PC.
http://www.ia.omron.com/f3sg-r_tool
2. Double-click on **SDManager2_Setup.exe**.
3. The Installation wizard to start update is displayed. Click **[Next]**.



4. The window shown below is displayed when the update is complete. Click **[Finish]**.



1-6. Connection with F3SG

An available Interface Unit is different between the F3SG-RA and the F3SG-RR. Refer to the table below for the available Interface Units.

Bluetooth® Communication Unit (F39-BT/F39-BTLP) can be used for both F3SG-RA and F3SG-RR.

Available communication tool for F3SG-RA and F3SG-RR

Communication Tool	F3SG-RA	F3SG-RR
Interface Unit	F39-GIF	F39-GIF-1
Bluetooth® Communication Unit	F39-BT F39-BTLP	



Do not connect both the Interface Unit and the Bluetooth® Communication Unit to the F3SG. Doing so may cause the devices to malfunction.

CHECK!

Make sure that the F3SG is powered off before connecting the device to the F3SG.

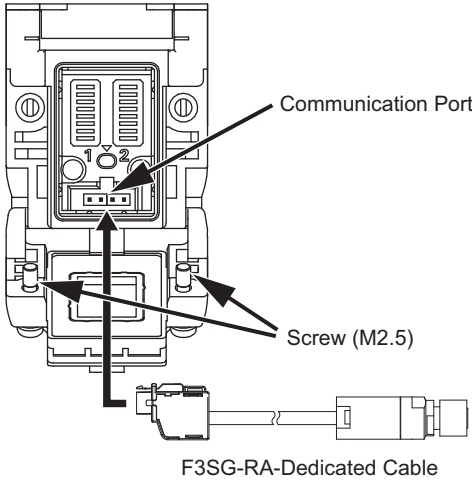
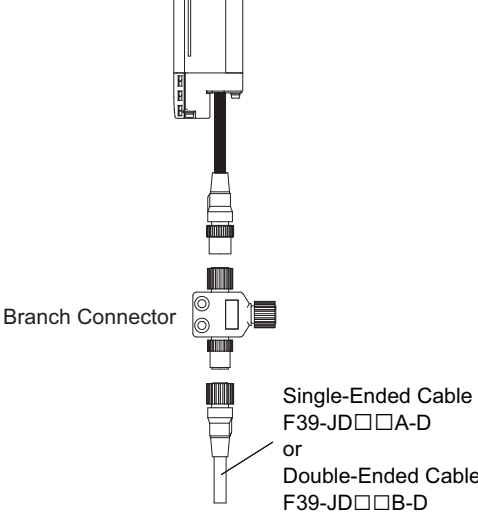

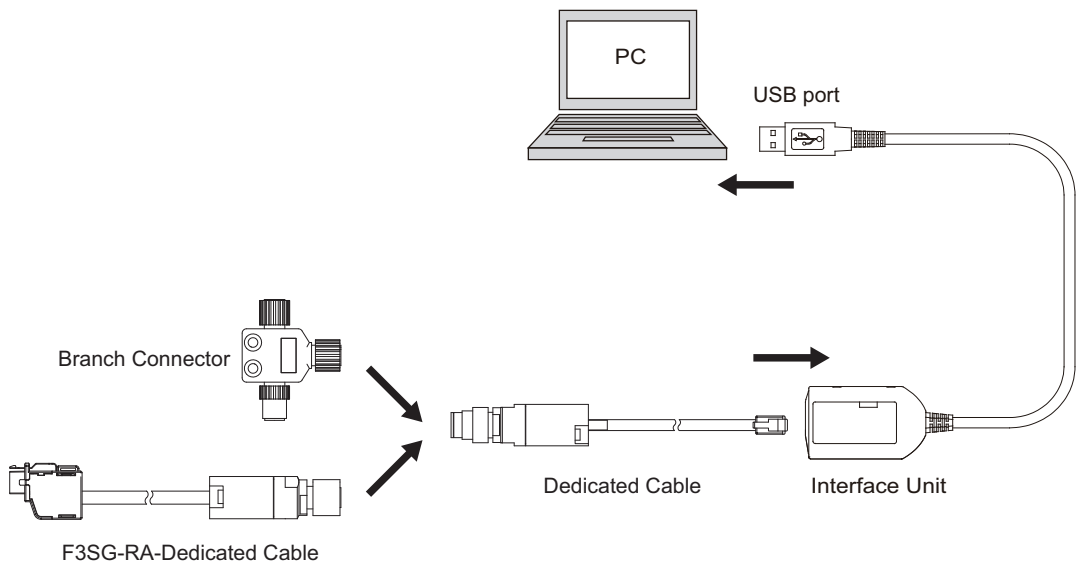
When the connection to the F3SG is complete, power on the F3SG.



When connecting the Interface Unit to the F3SG-RR, make sure the gray MUTE A and pink MUTE B lines are open. SD Manager 2 may not be usable in some wiring conditions.

CHECK!

■ Using Interface Unit

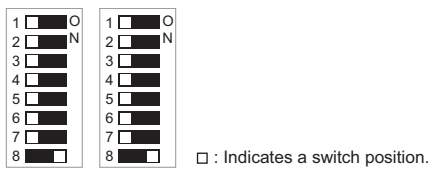
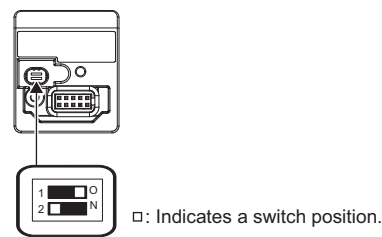
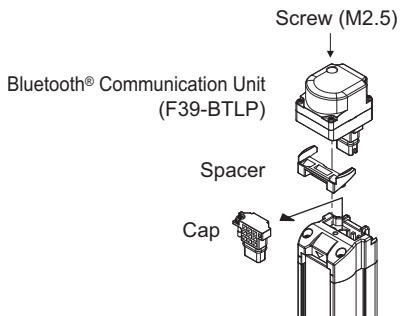
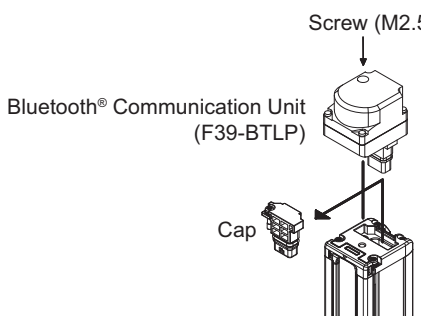
Connecting to F3SG-RA	Connecting to F3SG-RR
<p>Use the F39-GIF. Open the DIP Switch cover of the receiver and connect the device as shown below.</p>  <p>Communication Port</p> <p>Screw (M2.5)</p> <p>F3SG-RA-Dedicated Cable</p>	<p>Use the F39-GIF-1. Connect the Branch Connector to the receiver cable as shown below.</p>  <p>Branch Connector</p> <p>Single-Ended Cable F39-JD□□A-D or Double-Ended Cable F39-JD□□B-D</p>
<p>To change the settings of the F3SG using SD Manager 2, set the Position 8 of the receiver's two DIP Switches to ON.</p>  <p>□ : Indicates a switch position.</p>	<p>The DIP Switch settings are not needed for the F3SG-RR, which has no DIP Switch.</p>
<p>Connect the Interface Unit to the USB port of the PC.</p>  <p>PC</p> <p>USB port</p> <p>Branch Connector</p> <p>Dedicated Cable</p> <p>Interface Unit</p> <p>F3SG-RA-Dedicated Cable</p>	




For details of the Interface Unit, refer to:


- F39-GIF Interface Unit for F3SG Safety Light Curtain Instruction Sheet
- F39-GIF-1 Interface Unit for F3SG-RR Safety Light Curtain Instruction Sheet


■ Using Bluetooth® Communication Unit (Example: F39-BTLP)


Connecting to F3SG-RA	Connecting to F3SG-RR
<p>To change the settings of the F3SG using SD Manager 2, set the Position 8 of the receiver's two DIP Switches to ON.</p>  <p>□ : Indicates a switch position.</p>	<p>The DIP Switch settings are not needed for the F3SG-RR, which has no DIP Switch.</p>
<p>Do not change the positions of the DIP Switch of the Bluetooth® Communication Unit from the factory default settings.</p> <p>[Bottom view]</p>  <p>□ : Indicates a switch position.</p> <p>DIP Switch (Factory default settings)</p>	
 <p>Screw (M2.5)</p> <p>Bluetooth® Communication Unit (F39-BTLP)</p> <p>Spacer</p> <p>Cap</p>	 <p>Screw (M2.5)</p> <p>Bluetooth® Communication Unit (F39-BTLP)</p> <p>Cap</p>


* Mounting the F39-BT is the same as above.

 Refer to *F39-BT Bluetooth® Communication Unit for F3SG Series* and *F39-BTLP Lamp and Bluetooth® Communication Unit for F3SG Series Instruction Sheet* for more information on the Bluetooth® Communication Unit.

 The settings changed by SD Manager 2 are saved in the internal memory of the F3SG.
CHECK!

 For the F3SG-RA, if Position 8 of the two DIP Switches is set OFF (DIP Switch Enabled) after the settings are changed, the F3SG-RA operates based on the settings of the DIP Switches. If Position 8 of the DIP Switches is turned ON again, the F3SG-RA operates based on the settings saved in the internal memory.
CHECK!

 For the F3SG-RA, the settings can be read out even if the Position 8 of the two DIP Switches is set to OFF (DIP Switch Enabled).
CHECK!

 It is not able to connect the emitter with the Bluetooth® Communication Unit.
CHECK!

■ Pairing (Connection Verification)

Pairing is the process required for the Bluetooth® Communication Unit and a device with Bluetooth® wiring technology to recognize and connect with each other.

Indications and operations of the pairing process are different depending on a Bluetooth® device used. Always refer to instruction manuals of such a device when pairing the devices.



When the Bluetooth® Communication Unit and a Bluetooth® device are not paired, it is not possible to connect to the Bluetooth® Communication Unit. These must be paired in advance.

CHECK!



Once the Bluetooth® Communication Unit and a Bluetooth® device are paired, it is not necessary to pair them again.

CHECK!

The following is an example of the pairing process using a Windows-7-based PC.

This example assumes that a Bluetooth® adaptor is incorporated or installed in the PC.

[Example]

1. Confirm that the Bluetooth® Communication Unit is connected to the F3SG properly and then power on the F3SG.
2. Click the [Start] button and select [Devices and Printers] from the Start menu.
3. Select [Add a device].
4. When detected devices are displayed like the below, select a target device, and click [Next].

For the F3SG connected with the Bluetooth® Communication Unit, the F3SG's model name and serial number are indicated.



A serial number is indicated when you use the F3SG Version 1.1 and up. For the F3SG Version 1.0, "XXXXXXXXXX" is indicated instead of the serial number.

CHECK!



When you use the Bluetooth® Communication Unit manufactured March 2017 or earlier, the model name may not be indicated properly.

CHECK!

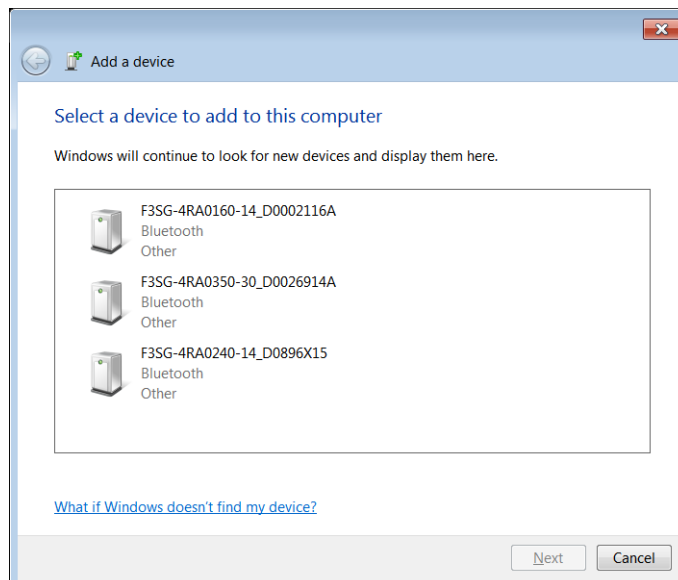


When pairing with more than one device, adding a device must be carried out one by one.

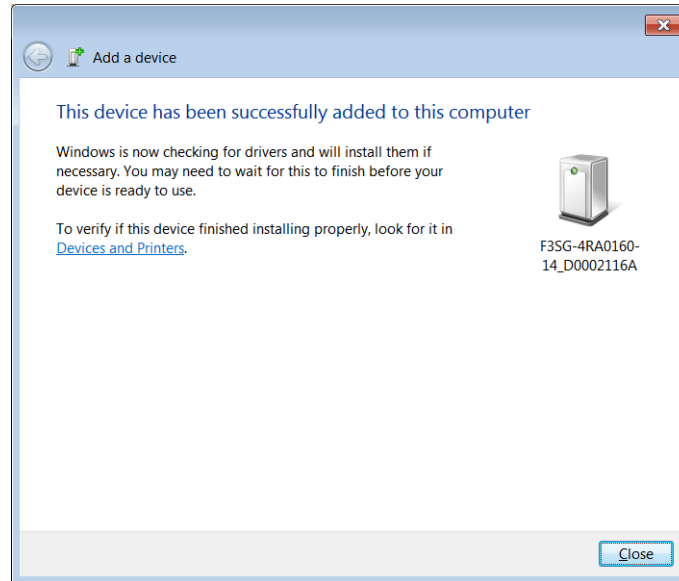
CHECK!



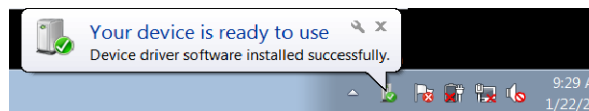
Refer to 1-7-1. *Versions* to check versions of your F3SG.



5. The screen below is displayed and a necessary device driver is installed.



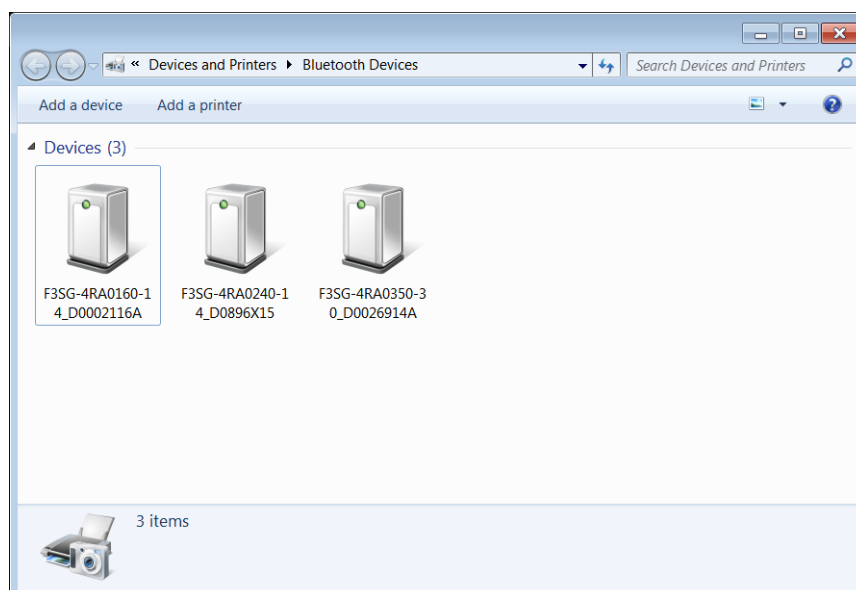
6. Confirm that the installation of the device driver is fully completed. When the installation is complete, the message shown below is displayed.



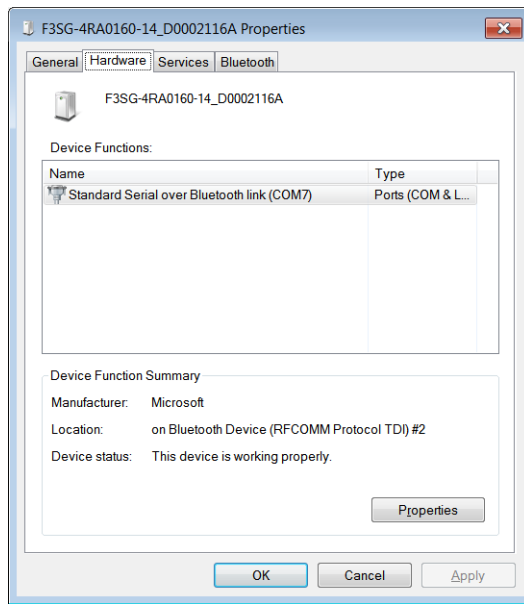
Now the pairing is complete.

[How to check a COM port when connected to a Bluetooth® Communication Unit]

1. Click the [Start] button and select [Devices and Printers] from the Start menu.
2. When the screen below is displayed, right click the icon of a target device to check a COM port number, and then click [Properties].



- When selecting the [Hardware] tab, the screen below is displayed that indicates a COM port. In this example, the device “F3SG-4RA0160-14_D0002116A” is set to COM7.



1-7. List of Functions

1-7-1. Versions

Available features and models vary depending on the versions.



When F3SG-RA are in cascade connection, the F3SG-RA operates according to the settings of the primary sensor.



When F3SG-RA are in cascade connection, the operations of Auxiliary Output and Lamp functions are as follows.

F3SG-RA Primary	F3SG-RA Secondary	Auxiliary Output and Lamp operations*
Ver. 1.0	Ver. 1.1	Ver. 1.0
Ver. 1.1 (Up to January 2016)	Ver. 1.0	Ver. 1.1 (Up to January 2016)
Ver. 1.1 (From February 2016)	Ver. 1.0	Ver. 1.1 (From February 2016)

*Refer to *Default settings when creating a configuration file (Auxiliary Output/Lamp Output)* in this chapter for more information.



When Versions 1.0 and 1.1 or later of F3SG-RA are in cascade connection, all cascaded segments operate as Version 1.0.

Relationship of SD Manager 2 versions with F3SG models and versions

SD Manager 2 Version	F3SG-RA Version		F3SG-RR Version
	1.0	1.1 and up	1.2 and up
1.01	Supported	-	-
1.10	Supported	Supported*1	-
1.11	Supported	Supported*2	-
1.20	Supported	Supported	-
1.30 and up	Supported	Supported	Supported

*1. F3SG-RA of serial number D1298Z15 and later does not support SD Manager 2 Version 1.10 and down.

*2. F3SG-RA of serial number D0923X16 and later does not support SD Manager 2 Version 1.11 and down.

Functions by SD Manager 2 versions

Function	SD Manager 2 Version			
	Version 1.01	Version 1.10/1.11	Version 1.20	Version 1.30
Fixed Blanking	It is possible to configure the same number of allowable beams on both ends of Fixed Blanking zone.	It is possible to configure any number of allowable beams on both or either end of Fixed Blanking zone.		
Output assignment to Auxiliary Output and Lamp	23 items in total, including options of None (OFF).		26 items in total, including options of None (OFF). The following three items have been added: • Mute A input information • Mute B input information • Stable-state information	
Configuration List	Displayed when [Write configuration] button is pressed. Login at the administrator level is required.		The new [Configuration List] button allows viewing and saving data at the operator level.	
Safety Distance Calculation	It is possible to calculate 4 types of installation.		It is possible to calculate 5 types of installation. The following installation has been added. • Vertical approach with no angle (possible circumventing)	
Factory default settings when creating a new configuration file in the offline mode (Auxiliary Output/Lamp Output)	See "Up to January 2016" in the below table.		See "From February 2016" in the below table.	

Function	SD Manager 2 Version			
	Version 1.01	Version 1.10/1.11	Version 1.20	Version 1.30
Selecting model when creating a new configuration file in the offline mode	Two options: • F3SG-RA with 14-mm detection capability • F3SG-RA with 30-mm detection capability			Four options: • F3SG-RA with 14-mm detection capability • F3SG-RA with 30-mm detection capability • F3SG-RR with 14-mm detection capability • F3SG-RR with 25-mm detection capability
PNP/NPN Selection	-			For F3SG-RR, selecting PNP or NPN is available with SD Manager 2.

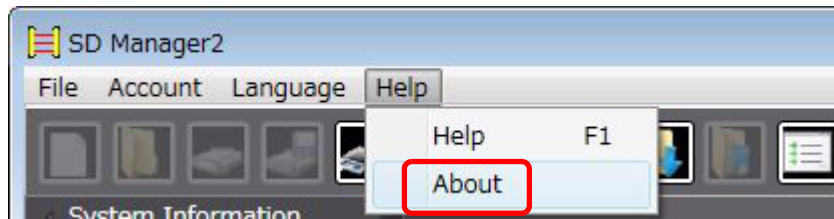
 Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on differences of the functions by F3SG-RA versions.

Default settings when creating a configuration file (Auxiliary Output/Lamp Output)

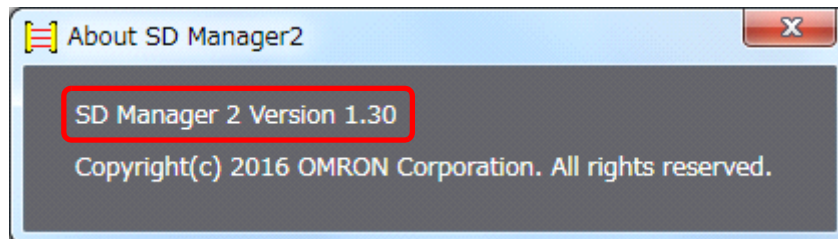
Output	Muting	Function	Default Setting	
			Up to January 2016	From February 2016
Auxiliary Output	Enabled	Output operation mode	Muting/Override information	Safety output information
		Inverted signal output	Disable	Enable
		Output pattern	ON 1 time	Solid-ON
	Disabled	Output operation mode	Safety output information	Safety output information
		Inverted signal output	Enable	Enable
		Output pattern	Solid-ON	Solid-ON
Lamp (red)	Enabled	Output operation mode	None	Safety output information
		Inverted signal output	Disable	Enable
		Output pattern	Solid-ON	Solid-ON
	Disabled	Output operation mode	None	Safety output information
		Inverted signal output	Disable	Enable
		Output pattern	Solid-ON	Solid-ON
Lamp (orange)	Enabled	Output operation mode	None	Stable-state information
		Inverted signal output	Disable	Enable
		Output pattern	Solid-ON	ON 1 time
	Disabled	Output operation mode	None	Stable-state information
		Inverted signal output	Disable	Enable
		Output pattern	Solid-ON	ON 1 time
Lamp (green)	Enabled	Output operation mode	Muting/Override information	Safety output information
		Inverted signal output	Disable	Disable
		Output pattern	ON 1 time	Solid-ON
	Disabled	Output operation mode	None	Safety output information
		Inverted signal output	Disable	Disable
		Output pattern	Solid-ON	Solid-ON

The version of SD Manager 2 can be confirmed as follows.

1. Select [Help] and [About].

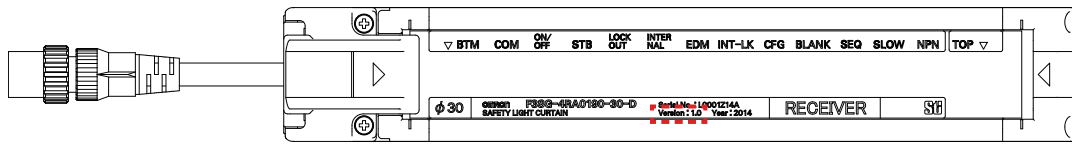


2. The window shown below is displayed. The version is indicated in the area encircled in red.

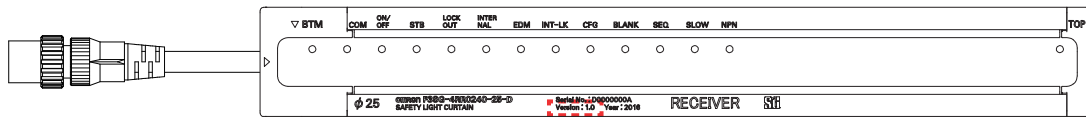


You can find a version of F3SG on the receiver as shown below.

■ F3SG-RA



■ F3SG-RR



Please note that it is not possible to update the version of the F3SG with the SD Manager 2.

1-7-2. List of Configurable Functions

Feature	Setting by							Factory Default Setting	
	F3SG-RA			F3SG-RR				F3SG-RA	F3SG-RR
	DIP Switch		SD Manager 2 *3	Rotary SW		End Cap	SD Manager 2		
	Emitter	Receiver		Emitter	Receiver				
Scan Code Selection	X	X		X	X			Code A	Code A
External Test	X					X		24 V Active	24 V Active
Operating Range Selection	X							Short mode	Long mode (Changing settings not available)
PNP/NPN Selection		X					X	PNP output	PNP output
Interlock		X *3	X				X	Auto Reset Mode	Auto Reset Mode
External Device Monitoring(EDM)		X	X				X	Disabled	Enabled
Auxiliary Output			X				X	Safety output information (Inverted signal output: Enable)	Safety output information (Inverted signal output: Enable)
Lamp			X				X	Red: Safety output information (Inverted signal output: Enable) Orange: Stable-state information (Inverted signal output: Enable, Blinking: ON 1 time) Green: Safety output information	Red: Safety output information (Inverted signal output: Enable) Orange: Stable-state information (Inverted signal output: Enable, Blinking: ON 1 time) Green: Safety output information
Designated Beam Output			X				X	Disabled	Disabled
Fixed Blanking *1		X *3	X				X	Disabled	Disabled
Floating Blanking *1		X *3	X				X	Disabled	Disabled
Muting			X				X	Enabled (Standard Muting)	Disabled
Dynamic Muting *2			X				X	Disabled	Disabled
Override *2			X				X	Enabled	Enabled
Muting Statistics data recording *1*2			X				X	Enabled	Enabled
Pre-Reset		X *3	X				X	Disabled	Disabled
Reduced Resolution			X				X	Disabled	Disabled
Warning Zone			X				X	Disabled	Disabled
Response Time Adjustment			X				X	Normal mode	Normal mode

*1. The functions are upgraded in Version 1.1 or up of F3SG-RA.
 *2. Enabling the functions is possible when the Muting is enabled.
 *3. It is not possible to configure the F3SG-RA-□□TS.

1-7-3. Other Functions

- Incident/Ambient Light Level Monitoring
- Maintenance Information
- Operating Status Monitoring
- Setting Recovery



CHECK!

The Incident/Ambient Light Level Monitoring, Maintenance Information and Operating Status Monitoring functions are available even if the Position 8 of the two DIP Switches of the F3SG-RA is set to OFF (DIP Switch Enabled).



CHECK!

When the Interface Unit is connected to the F3SG-RR, the MUTE information of External Wiring in Operating Status Monitoring is not displayed. The Bluetooth® Communication Unit is necessary to display the MUTE information of External Wiring.



CHECK!

F3SG-RA-□□TS is not available with Setting Recovery.

1-7-4. Combination of Functions

Possible combinations of the functions are shown in the table below. The combinations in the table are available under certain conditions. The other functions can be combined without any limitations.

YES: Combination available

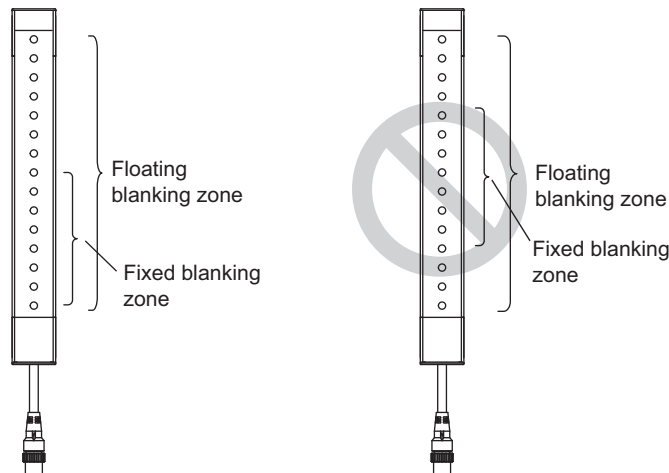
YES-C: Combination available by setting with SD Manager 2

NO: Combination unavailable

	Fixed Blanking	Floating Blanking	Reduced Resolution	Muting/Override	Pre-Reset	Warning Zone	EDM	Interlock
Fixed Blanking	-	YES-C *2	NO	YES	NO	YES-C	YES	YES
Floating Blanking	YES-C *2	-	NO	YES *1	NO	YES-C	YES	YES
Reduced Resolution	NO	NO	-	NO	YES-C	NO	YES-C	YES-C
Muting/Override	YES	YES *1	NO	-	NO	YES-C	YES	YES
Pre-Reset	NO	NO	YES-C	NO	-	YES-C	YES	NO
Warning Zone	YES-C	YES-C	NO	YES-C	YES-C	-	YES-C	YES-C
EDM	YES	YES	YES-C	YES	YES	YES-C	-	YES
Interlock	YES	YES	YES-C	YES	NO	YES-C	YES	-

*1. This combination requires that the Floating Blanking zone covers the full detection zone and that the Muting/Override function also covers the full detection zone.

*2. When the Fixed Blanking and Floating Blanking are selected, the top or bottom beam must be included in the Fixed Blanking zone, as shown in the left figure below. It is not allowed to set the Fixed Blanking zone not to cover the top or bottom beam, as shown in the right figure below. It is also not allowed to set a Fixed Blanking zone to split a Floating Blanking zone.



■ Considerations for enabling and disabling Muting function

Setting parameters of the following functions are saved according to the states where the Muting function is enabled and disabled, respectively. After changing the Muting function from Enable to Disable or from Disable to Enable, check the settings of these functions again.

Affected functions:

- External Device Monitoring (EDM)
- Start Interlock
- Restart Interlock
- Auxiliary Output
- Lamp Output




For more information on the setting parameters, refer to:

- F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
- F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*

Receiver

LED Indicator	Access Level	
	Operator Level	Administrator Level
TOP	Blinking once	Blinking twice
NPN	Off	Off
SLOW	Off	Off
SEQ	Off	Off
BLANKING	Off	Off
CFG	Blinking once	Blinking twice
INT-LK	Off	Off
EDM	Off	Off
INTERNAL	Off	Off
LOCKOUT	Blinking once	Blinking twice
STB	Blinking once	Blinking twice
ON/OFF	Blinking once	Blinking twice
COM	Off	Off
BTM	Off	Off

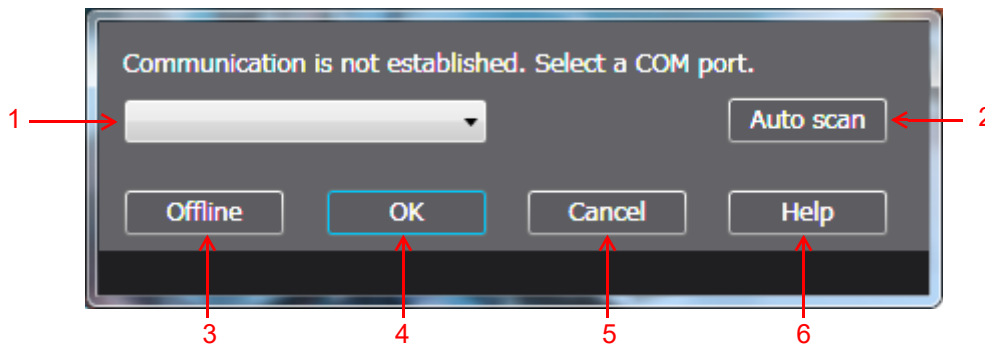
 For the access levels, refer to 2-5. *Logging In.*

Chapter 2 Basic Operation of SD Manager 2


2-1. Getting Started

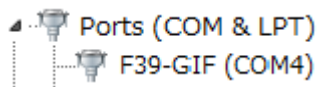
To get started, select [All Programs], [OMRON] and [SD Manager 2] from the Start menu.


SD Manager 2 starts up, and the following dialog is displayed.





No.	Function	Description
1	Select COM port	Select the COM port with which the Interface Unit or Bluetooth® Communication Unit is connected.
2	Auto scan	Obtains an available COM port.
3	Offline	Starts the SD Manager 2 in the offline mode.
4	OK	Starts the SD Manager 2.
5	Cancel	Cancels the start of SD Manager 2.
6	Help	Used to go to the troubleshooting website.


 The COM port with which the Interface Unit is connected can be confirmed by Device Manager.
CHECK! To start up Device Manager, select [Start] -> [Search programs and files] to search for and click [Device Manager]. In the Ports category of Device Manager, confirm the COM port assigned to F39-GIF/F39-GIF-1.
 In the examples below, it can be confirmed that the F39-GIF Interface Unit is connected with COM4.



 If there are more than one connectable Bluetooth® Communication Unit, perform the [2: Auto scan] step first, select a COM port of a target device in the [1: Select COM port] step, and then press the [4: OK] button.
CHECK!

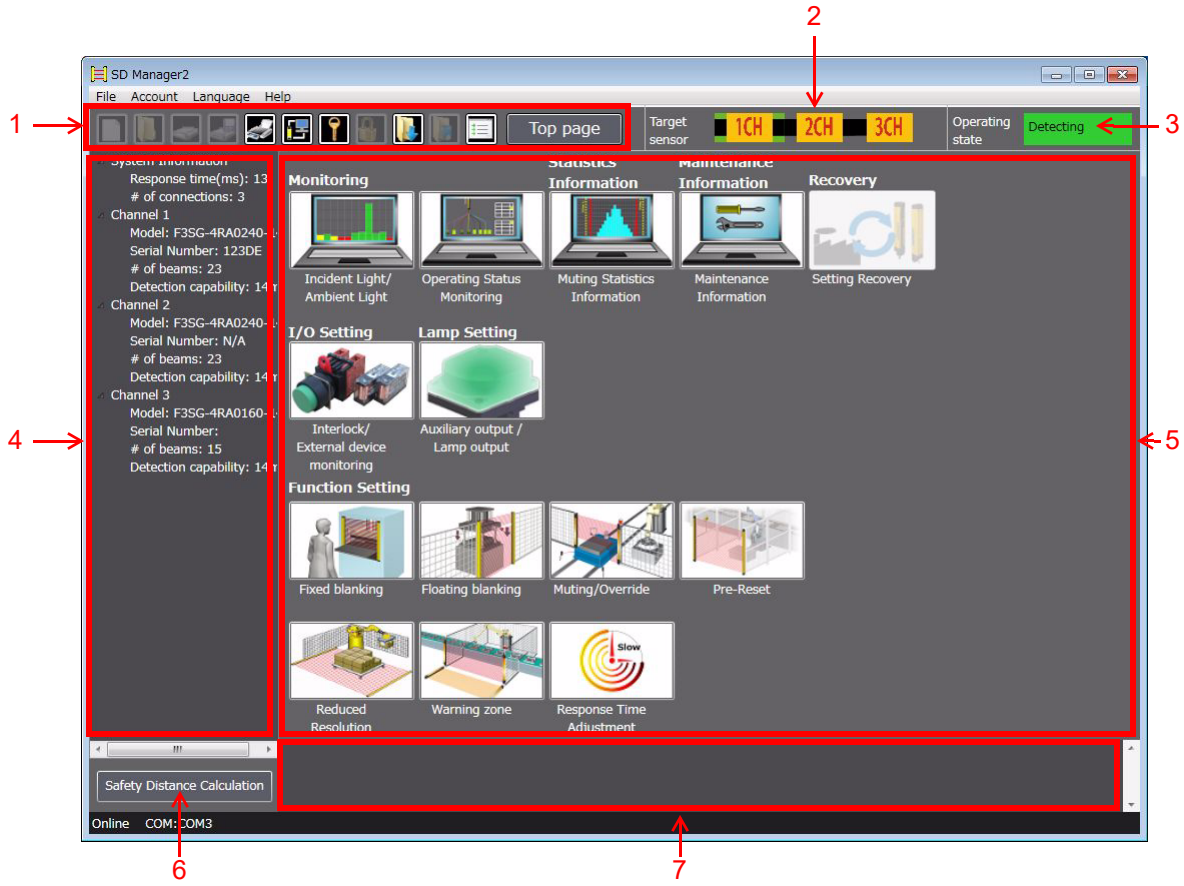
 In the offline mode, the setting data file can be edited without connecting with the F3SG.
CHECK!

 For how to check a COM port when the F3SG is connected to a Bluetooth® Communication Unit, refer to [How to check a COM port when connected to a Bluetooth® Communication Unit].

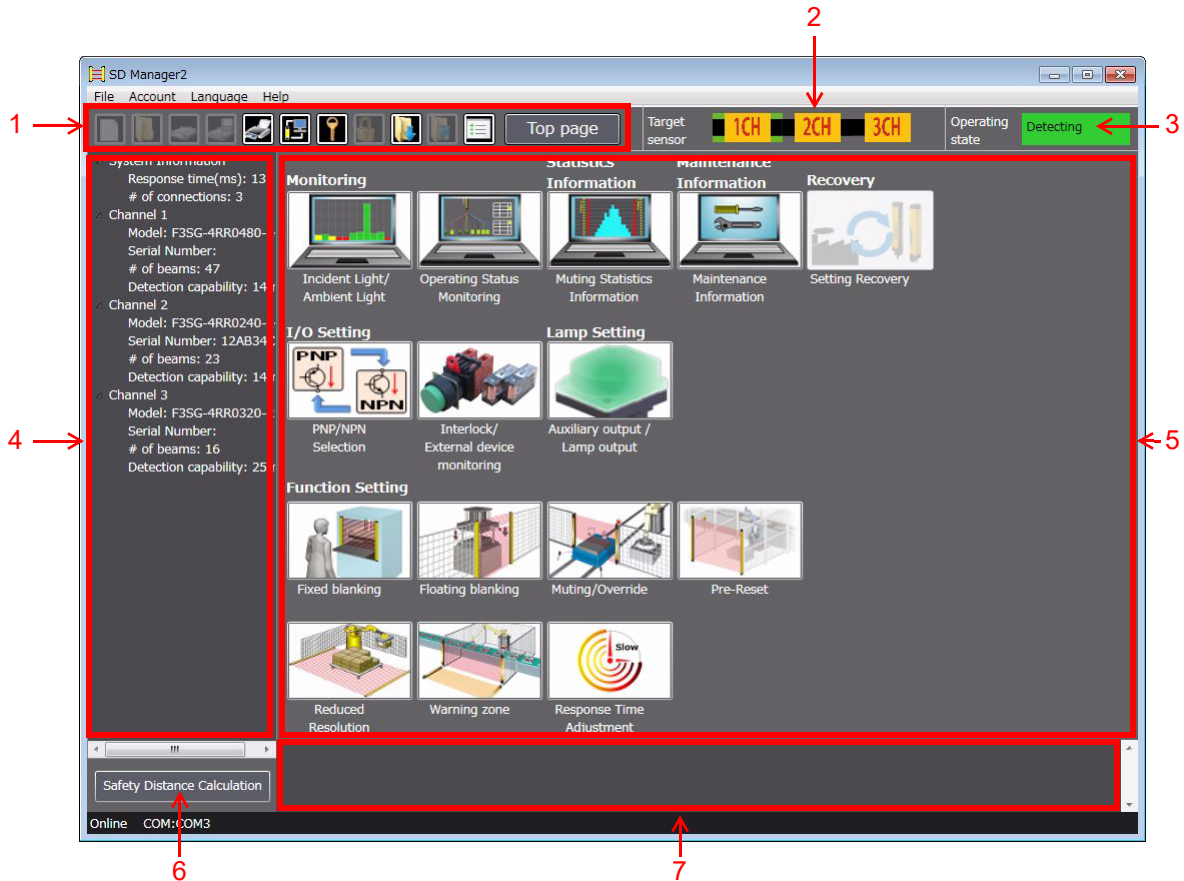
 Troubleshooting website: <http://www.ia.omron.com/f3sg-r>

The Top page is displayed.


■ F3SG-RA



■ F3SG-RR












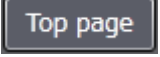


No.	Function	Description
1	Menu	The menu can be selected using the buttons.
2	Target sensor	Select a target sensor segment to write information to or read information from. The view changes according to actual cascade connection of the F3SG. The example above shows the F3SG system with three sensor segments in cascade connection is connected to the PC.
3	Operating state	Shows the following statuses of the F3SG. <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: green; margin-right: 5px;"></div> Detecting </div> <div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: yellow; margin-right: 5px;"></div> Setting state </div> <div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: red; margin-right: 5px;"></div> Lockout state </div> <div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: gray; margin-right: 5px;"></div> No connection </div> </div> <p>Operating: The F3SG keeps normal operation.</p> <p>Setting state: It is possible to read configuration from the F3SG. The safety outputs of the F3SG are in the OFF state.</p> <p>Lockout state: The F3SG is in the Lockout State.</p> <p>No connection: The SD Manager 2 is running offline or disconnected from or not properly connected to the F3SG.</p>
4	System Information	Shows information on the F3SG connected.
5	Settings	Configurable or other functions are displayed.
6	Safety distance calculation	Used to calculate the safety distance.
7	View message	Shows messages according to operations and settings of SD Manager 2.

 When you use the F3SG-RA Version 1.0, the F3SG serial number may not be indicated properly.

CHECK!

Descriptions of buttons

Button	Function	Description
	New	Creates a new configuration file. This is available only when running offline.
	Open	Opens a configuration file.
	Save	Saves or overwrites configuration file.
	Save As	Saves configuration file as another file name.
	Print muting configuration	Prints muting settings.
	Monitor	Switches the operating state from [Setting state] to [Operating].
	Login	Shows the login screen.
	Log-out	Used to log out of SD Manager 2. Pressing this button allows the access level to transition from the administrator level to the operator level.
	Read configuration	Reads configuration information from the F3SG. Pressing this button switches the safety outputs to the OFF state and the operating state to [Setting state].
	Write configuration	Writes configuration information to the F3SG.
	Configuration List	Shows a list of parameters.
	Top page	Used to return to the Top page.

2-2. Password Protection

■ Access Restriction

The administrator level requires a password to log in. The initial password for administrator login is "0000".

■ Changing Password

To prevent unintended configurations by an unauthorized user, the administrator must change the password. The password must contain no more than 6 alphanumeric characters. The password is case-sensitive.

The new password will take effect by power-cycling the F3SG. Shut down SD Manager 2 and power cycle the F3SG.

■ Forgot the Password?

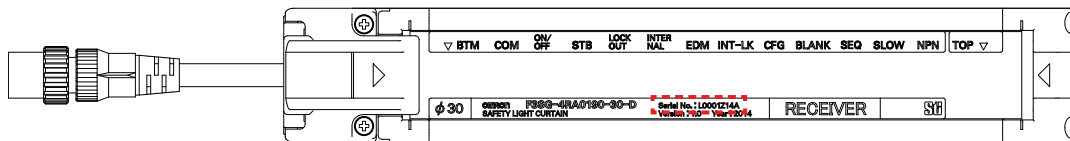
If you forget the password after changing it from the initial setting, contact your sales representative with the serial number on the nameplate of the F3SG receiver.

A master password will be issued to reset to the initial password "0000".

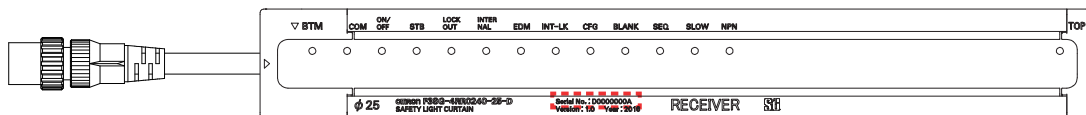
■ Checking Serial No.

Location of serial number (as shown by dashed line)

■ F3SG-RA



■ F3SG-RR




You can also check the serial number from the [Clear Password] window described in Step 3 below.

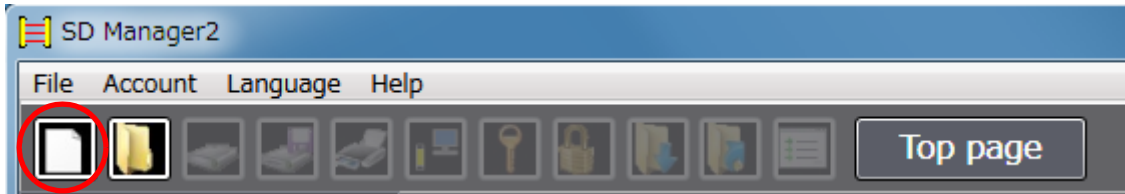
■ Resetting the Initial Password to "0000"

1. Log in at the operator level. (No password is required to log in at the operator level.)
2. Select [Account] and [Clear Password] from the menu on the top of the screen.
3. Enter a master password in the displayed [Clear Password] window and click the [OK] button. (A message to indicate that resetting the password is successful will appear on the bottom of the screen.)
4. Power-cycle the F3SG. The password of the administrator will be reset to "0000" after the power-cycle is complete.

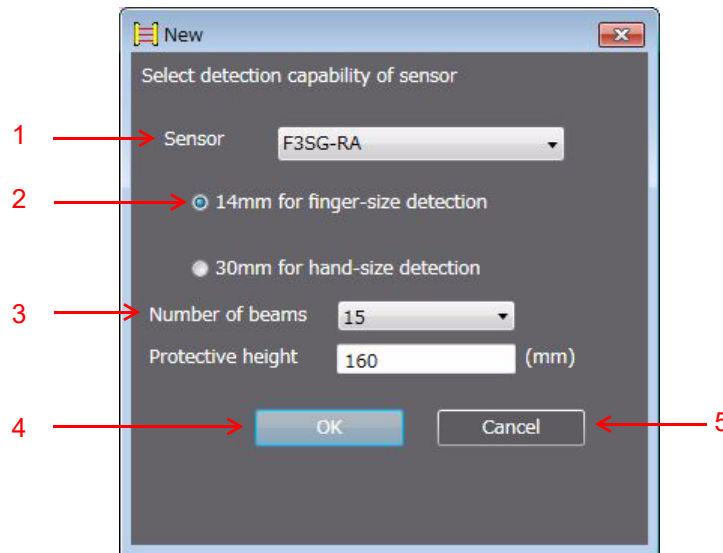
2-3. Starting SD Manager 2 Offline

2-3-1. Creating New Configuration File

You can create a configuration file when the F3SG is not connected to the PC (or offline). Start SD Manager 2 offline and select [File] and [New], or click the  button.



The following dialog is displayed.




No.	Function	Description
1	Sensor	Select the model F3SG-RA or F3SG-RR.
2	Detection capability	F3SG-RA: Select a desired detection capability from 14 mm or 30 mm. F3SG-RR: Select a desired detection capability from 14 mm or 25 mm.
3	Number of beams	Select the desired number of beams from the drop-down list. The protective height is changed automatically according to the number of beams selected.
4	OK	Enables SD Manager 2 to create a configuration file according to the settings made.
5	Cancel	Cancels the creation of a new file.





The configuration file to be created is for the F3SG in one segment system. (For the F3SG in cascade connection, create a configuration file for each segment and write it to a target segment.)

2-3-2. Reading Configuration from PC

You can read a configuration file saved on a PC into SD Manager 2.
Start SD Manager 2 offline and select [File] and [Open], or click the  button.
Select a desired configuration file (with extension .sdm2) saved on your PC.

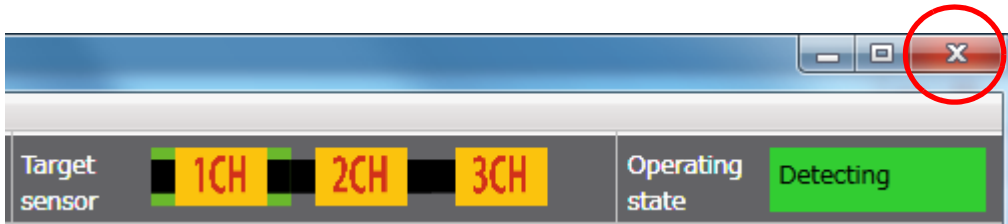
2-3-3. Saving New Configuration File to PC

Select [File] and [Save] or [Save As], or click the  or  button.
Save the configuration file to a desired location on your PC.



2-4. Shutting Down

To shut down SD Manager 2, click the X mark in the top right corner of the Top page or select [File] and [Exit] on the toolbar.



2-5. Logging In

When moving the F3SG to the Setting state by SD Manager 2, the following two access levels can be selected. When you log in SD Manager 2, select the level you want to log in.


- Operator level: Only reading configuration information is available. (Only writing a power-on time and load switching frequency thresholds is available.)
- Administrator level: Reading and changing configuration information is available.

When logging in the software, the F3SG goes to the Setting state and the safety outputs of the F3SG are turned to the OFF state.



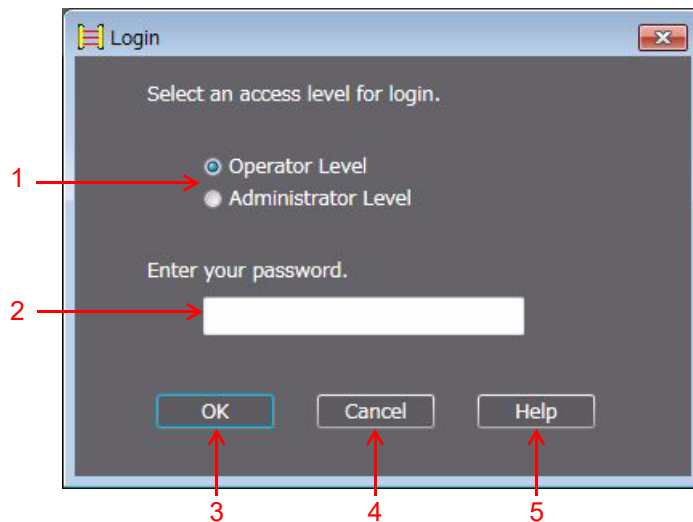
Logging in the F3SG-RA is possible even if the Position 8 of the two DIP Switches is set to OFF (DIP Switch Enabled). In such a case, the login is only possible at the operator level.

CHECK!

On the toolbar, select [Account] and [Login], or click the  button.



The following dialog is displayed.



No.	Function	Description
1	Operator Level Administrator Level	Select an access level.
2	Enter your password	Enter a password if you want to log in with the administrator level.
3	OK	Enables the login at the selected level.
4	Cancel	Cancels the login.
5	Help	The screen is linked with the troubleshooting website.



Troubleshooting website: <http://www.ia.omron.com/f3sg-r>



F3SG-RA-□□TS is not available with logging in with the administrator level.

CHECK!

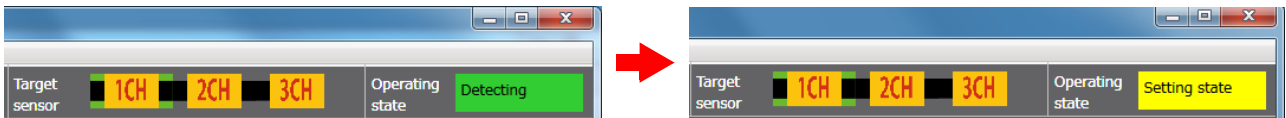
When logging in at the administrator level:

Select the administrator level, enter the password, and click [OK]. The initial password is "0000".


When logging in at the operator level:

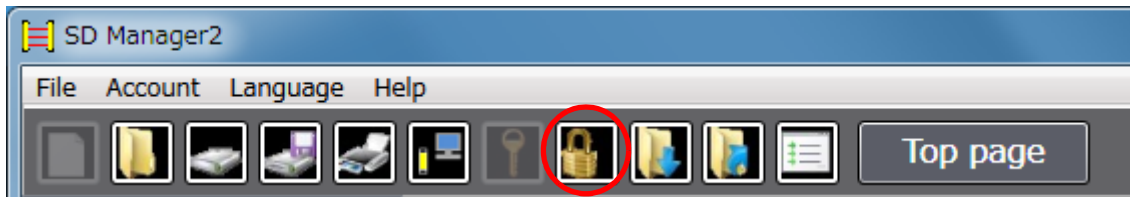
Select the operator level, and click [OK].

When login succeeds, the [Operating state] indication in the top right corner of the Top page is changed from [Detecting] to [Setting state].



2-6. Logging Out

When you are logged in with at the administrator level, select [Account] and [Logout], or click the  button.



Access level is changed from the administrator level to the operator level.



It is not possible to log out using the operator level.

CHECK!

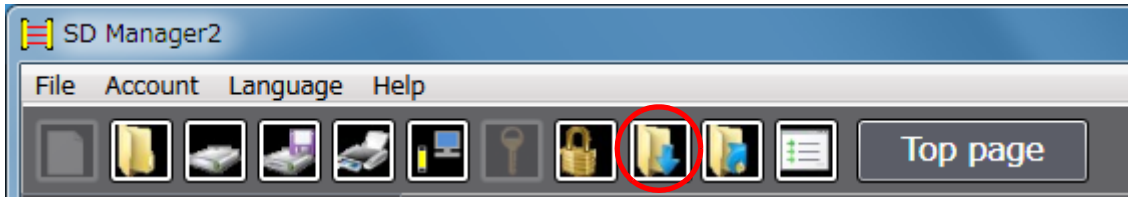



To return to the [Detecting] state, click the [Monitoring] button  or power cycle the F3SG.

CHECK!

2-7. Reading Configuration from F3SG

When the operating state of the F3SG is [Detecting] or [Setting state], click the  button



By clicking the button, configuration information is received. The user can confirm the information on setting screens of corresponding functions or the [Configuration list] button .

It is able to move to a setting screen by clicking an icon of a function on the Top page.

 For how to use setting screens, refer to the descriptions on how to change settings of corresponding functions.



When the F3SG is in the [Detecting] state, a dialog to confirm if it is OK to change mode is displayed. When OK is selected, the F3SG enters the Setting state (at the operator level). The safety outputs of the F3SG are turned to the OFF state.

CHECK!



The settings of the F3SG-RA can be read out even if the Position 8 of the two DIP Switches is set to OFF (DIP Switch Enabled).

CHECK!

2-8. Saving F3SG Configuration to PC

Confirm that the operating state of the F3SG is [Detecting] or [Setting state].

Follow the steps in 2-7. *Reading Configuration from F3SG* to read configuration information from the F3SG.

Select [File] and [Save] or [Save As], or click the  or  button.

Save the configuration file to a desired location on your PC.




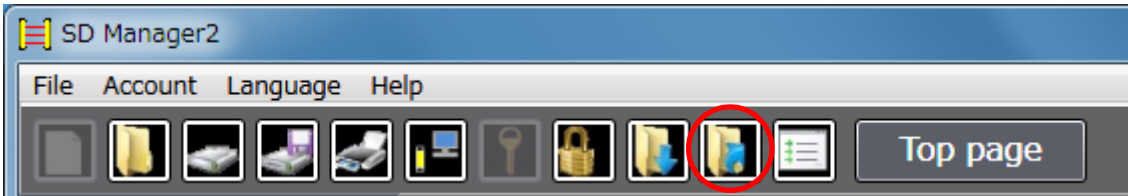
When in cascade connection, configuration information must be saved to each sensor segment.

CHECK!

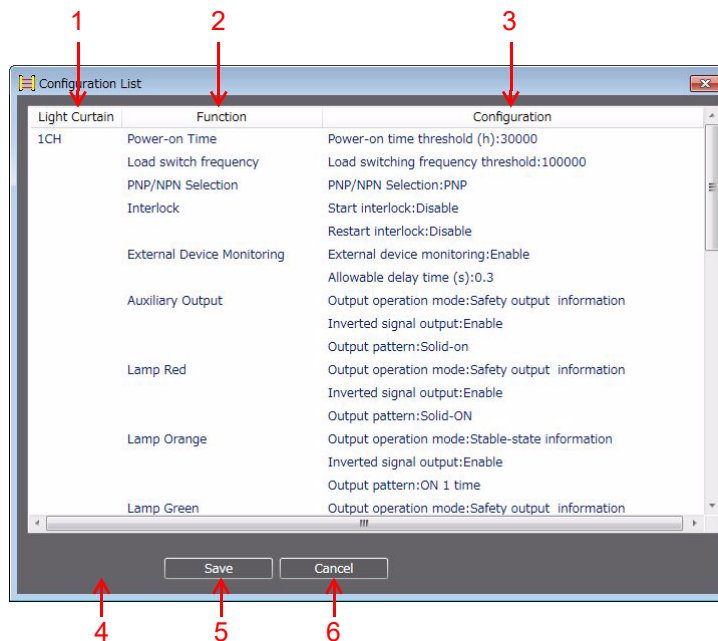
2-9. Writing Configuration to F3SG

2-9-1. Writing Configuration Edited with SD Manager 2 to F3SG Directly


When you are logged in with the administrator level, change the settings. Then click the  button.






A Configuration List is displayed. The user can confirm the configuration information to be written to the F3SG. By clicking [Write], the information is sent to the F3SG.




No.	Function	Description
1	Light Curtain	The target sensor segment to write the settings to is displayed.
2	Function	The function name is displayed.
3	Parameter	The parameters to be to be written to in the F3SG are displayed.
4	Write	Enables the writing.
5	Save	Saves the parameters as a .csv file.
6	Cancel	Cancels the writing.

 For operator and administrator levels, refer to 2-5. *Logging In*.

 For reading configuration information from the F3SG, refer to 2-7. *Reading Configuration from F3SG*.

 To enable the settings written to the F3SG, click the [Monitoring] button  or power cycle the F3SG.

CHECK!

 F3SG-RA-□□TS is not available with writing configuration information to the F3SG.


CHECK!


2-9-2. Writing Configuration File Saved on a PC into F3SG

Log in SD Manager 2 at the administrator level.

When the F3SG is in a cascade connection, select a desired sensor segment to write parameters from [Target sensor] in the top right corner of the screen. The example below shows the Channel 1 sensor is selected.



Select [File] and [Open], or click the  button. Then select a configuration file (with extension .sdm2) saved in a desired location.

Click the  button to write parameters.



For operator and administrator levels, refer to 2-5. *Logging In*.




For reading a configuration file saved on a PC, refer to 2-3-2. *Reading Configuration from PC*.



For writing configuration to the F3SG, 2-9-1. *Writing Configuration Edited with SD Manager 2 to F3SG Directly*.



To enable the written configuration, click the [Monitoring] button  or power cycle the F3SG.


CHECK!

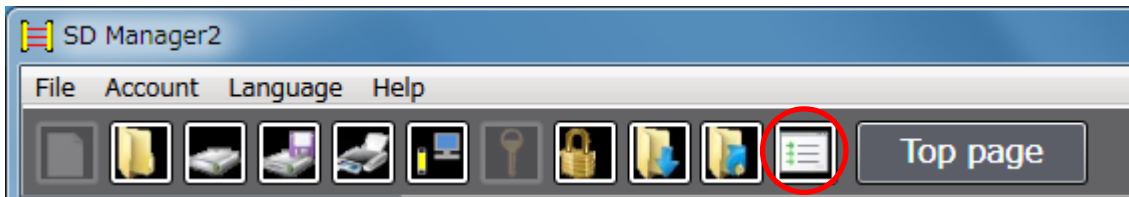



F3SG-RA-□□TS is not available with writing configuration information to the F3SG.

CHECK!


2-10. Viewing Current Configuration

You can view a list of current configuration by clicking  .



 The Configuration List button is only available for SD Manager 2 Version 1.20 or later. When you use an older version, download the latest one from the URL below.

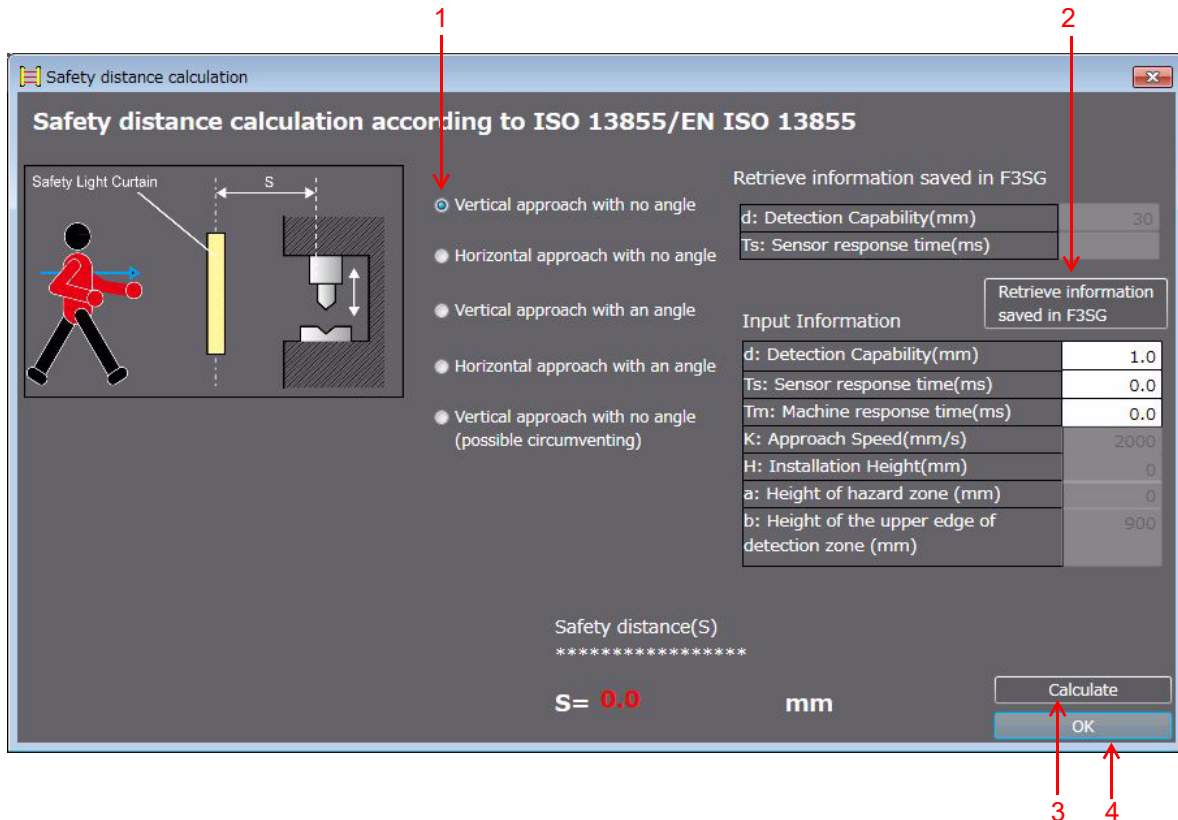
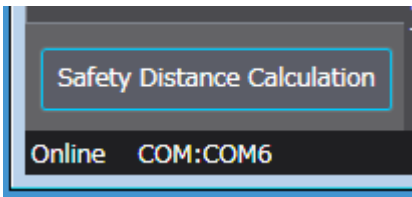
CHECK! http://www.ia.omron.com/f3sg-r_tool

 Viewing a configuration list of the F3SG-RA is possible even if the Position 8 of the two DIP Switches is set to OFF (DIP Switch Enabled).

CHECK!

2-11. Safety Distance Calculation

Click the following button in the bottom left corner of the Top page.



No.	Function	Description
1	Types of safety distance	Select a type of safety distance to be calculated.
2	Retrieve information from sensor	Update the data in [Input Information] to reflect the information in [Retrieve information stored in sensor].
3	Calculate	Calculates safety distance according to the specified condition.
4	OK	Closes the [Safety Distance Calculation] window.

- For more information on the safety distance calculation, refer to:
- F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
 - F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*

The calculation is based on values entered in the screen. To calculate based on the settings of the F3SG currently connected to the PC, click the [Retrieve information from sensor] button to refresh the values.

CHECK!

Chapter 3 Changing Settings with SD Manager 2

3-1. Preparing to Change Settings


To change settings, log in SD Manager 2 with the administrator level.





Select a target sensor segment to be configured.





No.	Function	Description
1	Login	Shows the login screen.
2	Target sensor	Select a sensor to be configured. The part displayed in green indicates the target sensor.


 For the administrator level and login, refer to 2-5. *Logging In*.

 For reading the configuration, refer to 2-7. *Reading Configuration from F3SG*.

 For reflecting settings of functions described later to the F3SG, refer to 2-9. *Writing Configuration to F3SG*.

 To enable the written configuration, click the [Monitoring] button  or power cycle the F3SG.

CHECK!

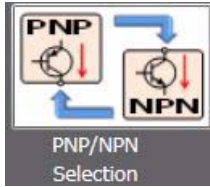
 F3SG-RA-□□TS is not available with changing the settings described later.

CHECK!

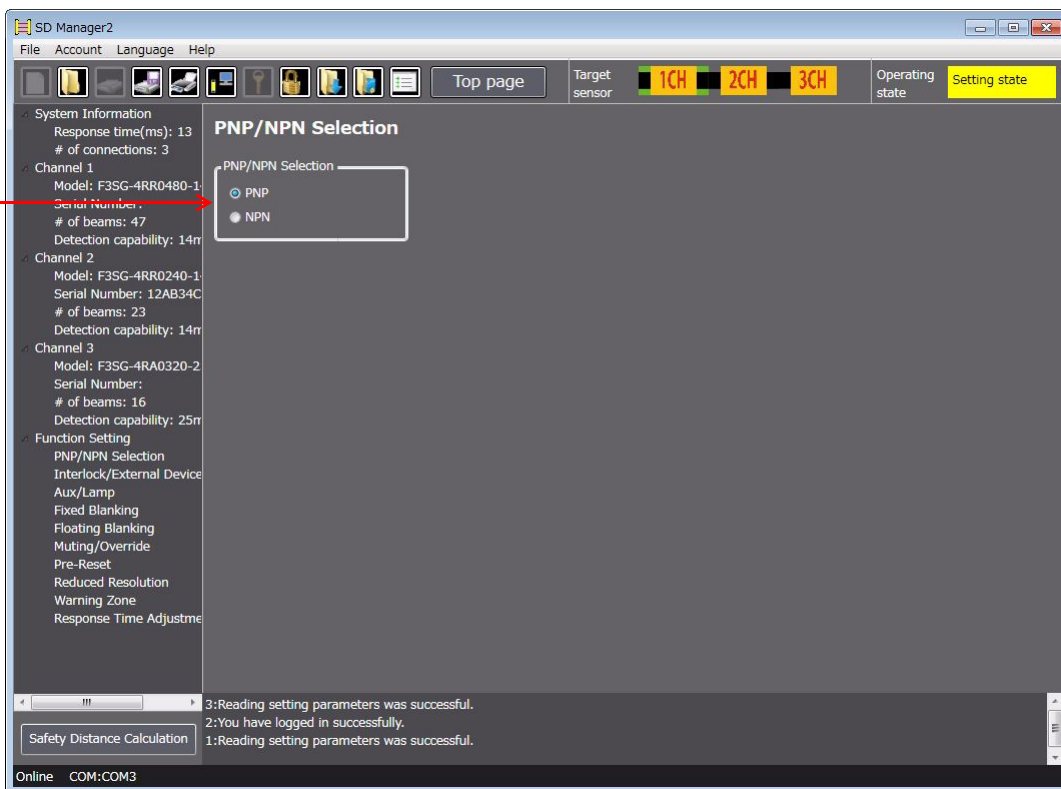
3-2. PNP/NPN Selection

- F3SG-RA: It is only possible to configure this function with DIP Switch on the receiver, not with SD Manager 2.
- F3SG-RR: It is possible to configure this function with SD Manager 2.

First, follow the steps in 3-1. *Preparing to Change Settings*.
Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	PNP/NPN Selection	Select PNP or NPN for the output mode.

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!

To enable the written configuration, click the [Monitoring] button or power cycle the F3SG.

CHECK!

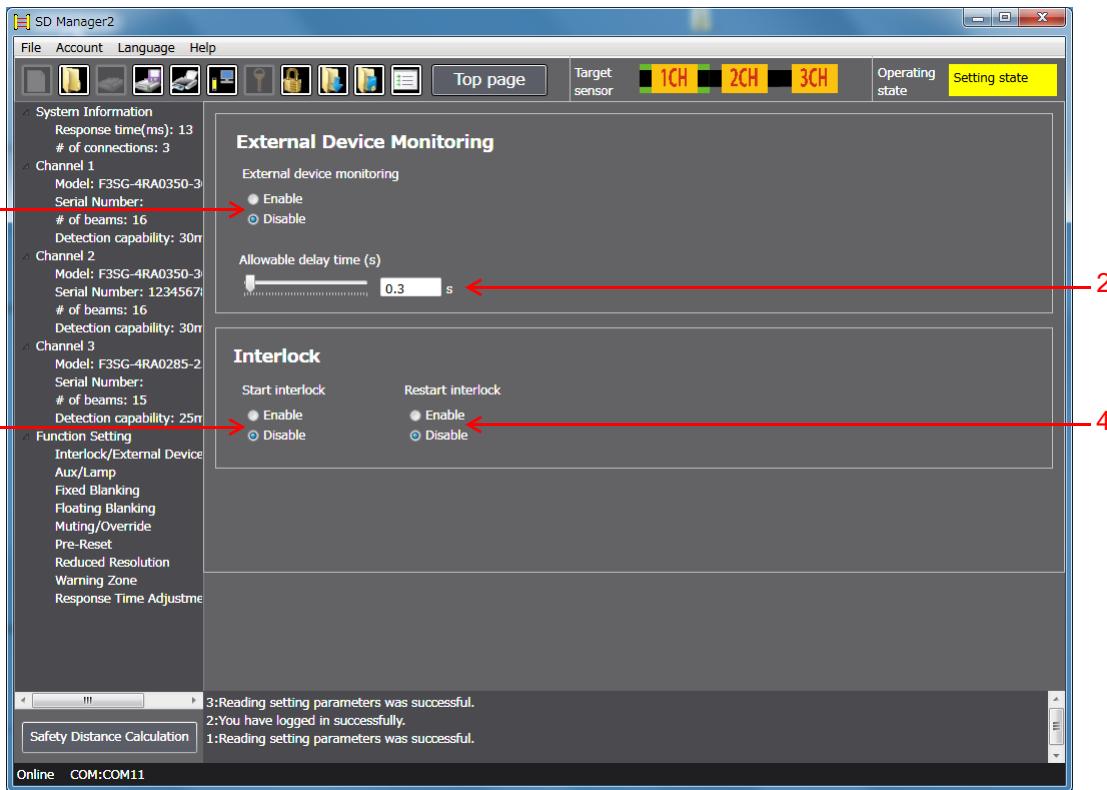
3-3. Interlock/External Device Monitor (EDM)

First, follow the steps in 3-1. *Preparing to Change Settings*.

Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	External device monitoring	Select Enable or Disable for the External Device Monitoring function.
2	Allowable delay time	Select desired delay time for the External Device Monitoring function.
3	Start interlock	Select Enable or Disable for the Start Interlock function.
4	Restart interlock	Select Enable or Disable for the Restart Interlock function.

Setting parameters of the following functions including these functions are saved according to the states where the Muting function is enabled and disabled, respectively. After changing the Muting function from Enable to Disable or from Disable to Enable, check the settings of these functions again.

CHECK!

Affected functions: External Device Monitoring (EDM), Start Interlock, Restart Interlock, Auxiliary Output, Lamp Output

Refer to **■ Considerations for enabling and disabling Muting function** under 1-7-4. *Combination of Functions* for more information.

For more information on the setting parameters, refer to:
 • F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
 • F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!

To enable the written configuration, click the [Monitoring] button or power cycle the F3SG.

CHECK!

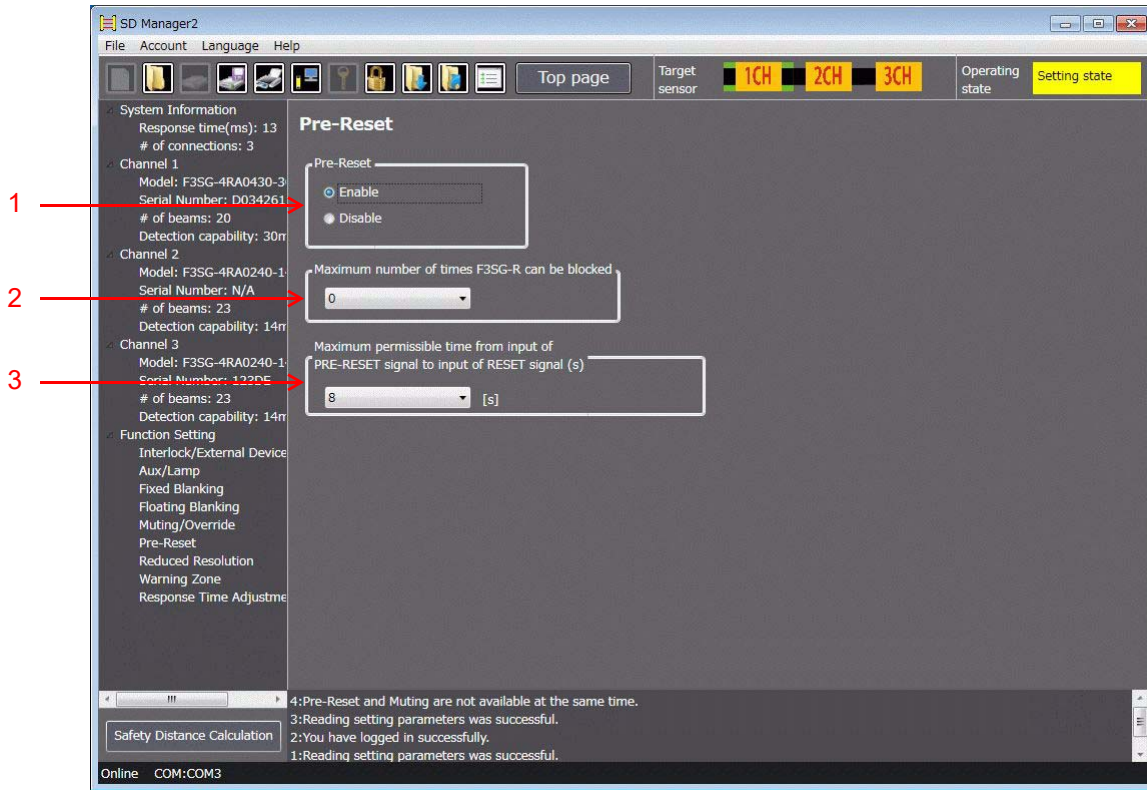
3-4. Pre-Reset

First, follow the steps in 3-1. *Preparing to Change Settings*.

Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	Pre-Reset function	Select Enable or Disable for the Pre-Reset function.
2	Maximum number of times F3SG is blocked	Select desired maximum number the F3SG can be blocked in the Pre-Reset process. The minimum number of times is 1. If you want to set this item to infinite, select zero.
3	Maximum period of time from input of PRE-RESET signal to input of RESET signal	Select desired maximum time from inputting the PRE-RESET signal to inputting the RESET signal.

It is not possible to configure the Pre-Reset function together with the Muting function. To enable settings of the Pre-Reset function, disable the Muting function.

CHECK!

Setting parameters of the following functions including this function are saved according to the states where the Muting function is enabled and disabled, respectively. After changing the Muting function from Enable to Disable or from Disable to Enable, check the settings of these functions again.

CHECK!

Affected functions: External Device Monitoring (EDM), Start Interlock, Restart Interlock, Auxiliary Output, Lamp Output

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!

To enable the written configuration, click the [Monitoring] button or power cycle the F3SG.

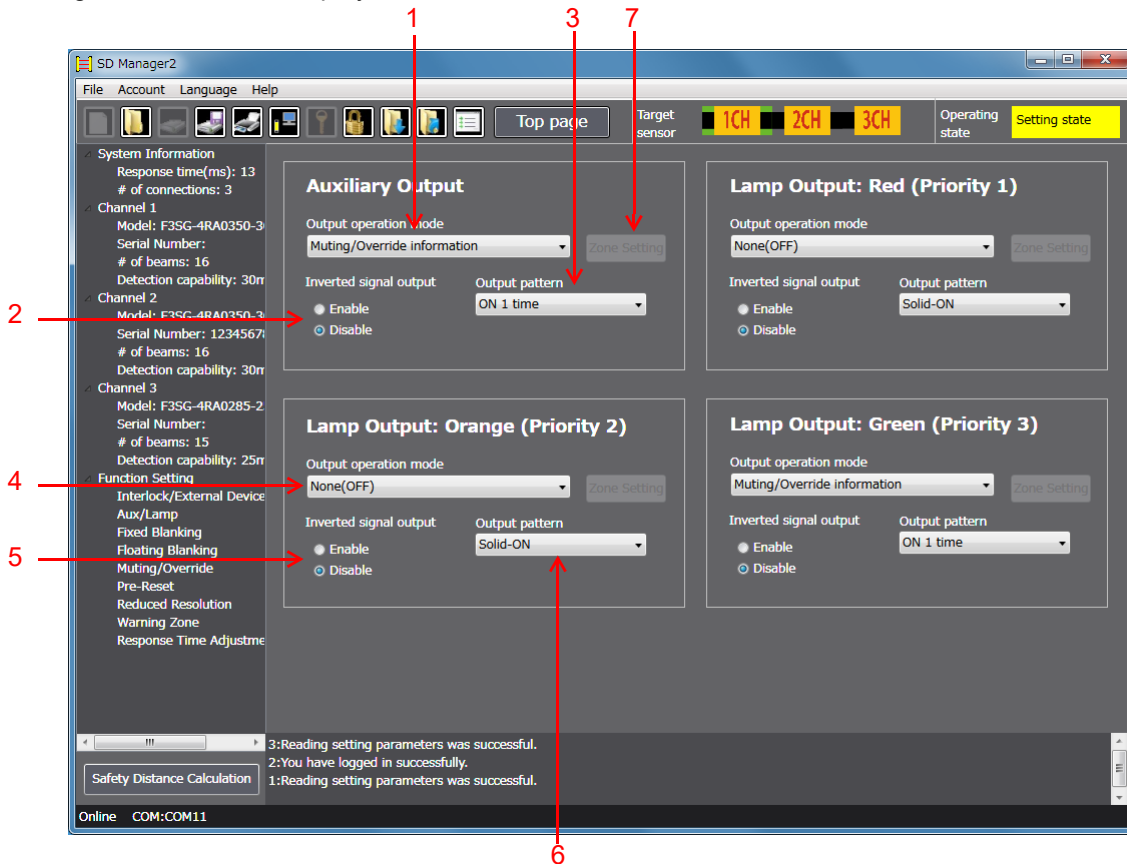
CHECK!



3-5. Auxiliary Output / Lamp

First, follow the steps in 3-1. *Preparing to Change Settings*.
Next, click the icon below on the Top page.




The setting screen below is displayed.



No.	Function	Description
1	Output operation mode of auxiliary output	Select desired information to assign to the auxiliary output. Refer to the table below for information to be assigned.
2	Inverted signal output of auxiliary output	Select Enable or Disable for inverted signal of the auxiliary output.
3	Output pattern of auxiliary output	Select a desired output pattern of the auxiliary output.
4	Output operation mode of Lamp output (orange) *	Select a desired information to assign to the Lamp output (orange).
5	Inverted signal output of Lamp output (orange) *	Select Enable or Disable for inverted signal of the Lamp output (orange).
6	Output pattern of Lamp output (orange) *	Select a desired output pattern of the Lamp output (orange).
7	Zone setting	Opens a zone setting screen for the Designated Beam Output function.  The [Zone setting] button is only active when the [Designated beam output information] option is selected for the [Output operation mode]. CHECK!  For details of the setup method, refer to 3-13. <i>Designated Beam Output</i> .

* This function is applicable to the Lamp outputs (green and red), too.

 When there are information signals of output operation mode of all the three colors of Lamp output at once, the Lamp illuminates in the color of the top priority
 CHECK! Priority of colors to illuminate (from high to low): Red > Orange > Green



Setting parameters of the following functions including these functions are saved according to the states where the Muting function is enabled and disabled, respectively. After changing the Muting function from Enable to Disable or from Disable to Enable, check the settings of these functions again.

CHECK! Affected functions: External Device Monitoring (EDM), Start Interlock, Restart Interlock, Auxiliary Output, Lamp Output



Refer to ■ *Considerations for enabling and disabling Muting function under 1-7-4. Combination of Functions* for more information.




- For more information on the setting parameters, refer to:
- F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
 - F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*



When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!



To enable the written configuration, click the [Monitoring] button  or power cycle the F3SG.

CHECK!

■ Information (Output operation mode) assigned to Auxiliary/Lamp output

Information Name	Description
Safety output information	When Safety output is in the ON state
Interlock information	Under Interlock state
Lockout information	Under error/ Lockout state
Excess power-on time information	When power-on time exceeds power-on time threshold
Excess load switching frequency information	When load switching frequency exceeds load switching frequency threshold
Stable-state information	When light intensity, which is constantly monitored, is 170% or higher of ON-threshold
Muting information	Under Muting state
Override information	Under Override state
Muting/Override information	Under either Muting or Override state
Light level diagnosis information	When the F3SG is unblocked and light intensity is within a range from 100% to 170% of ON-threshold for 10 s or longer
Warning Zone Information	When warning zone is blocked
Blanking beam unblocked information	When Fixed-Blanking or Floating Blanking beams are unblocked
Troubleshooting support signal	When one of the signals of Sequence error information, Interference/vibration information and Light level diagnosis information is in the ON state.
Designated beam output information	When a designated beam is blocked or unblocked
Sequence error information	Under Muting sequence error state or Interlock sequence error state
Reset-input information	When Reset/EDM/Override input is in the ON state
Mute A input information	When muting input A is in the ON state
Mute B input information	When muting input B is in the ON state
EDM input information	When EDM signal input is in the ON state
Individual cascaded sensor output (Channel 1)	When Safety output of Primary sensor in cascade connection is the ON state
Individual cascaded sensor output (Channel 2)*	When Safety output of 1st Secondary sensor in cascade connection is the ON state
Individual cascaded sensor output (Channel 3)*	When Safety output of the 2nd Secondary sensor in cascade connection is the ON state
Blanking/Warning-zone information	When Fixed Blanking, Floating Blanking, Reduced Resolution or Warning Zone function is enabled
Interference/vibration information	When the F3SG system stops accidentally due to interference or vibration. (In case of cascade connection, when any of cascaded segments comes under this condition.)
Pre-reset Information	Under Pre-reset state
None (OFF)	Disables the function.

*The function can be configured even when no secondary sensor (Channel 2 or Channel 3) is connected. In that case, the safety outputs of the secondary sensor (Channel 2 or Channel 3) are regarded as the OFF state.

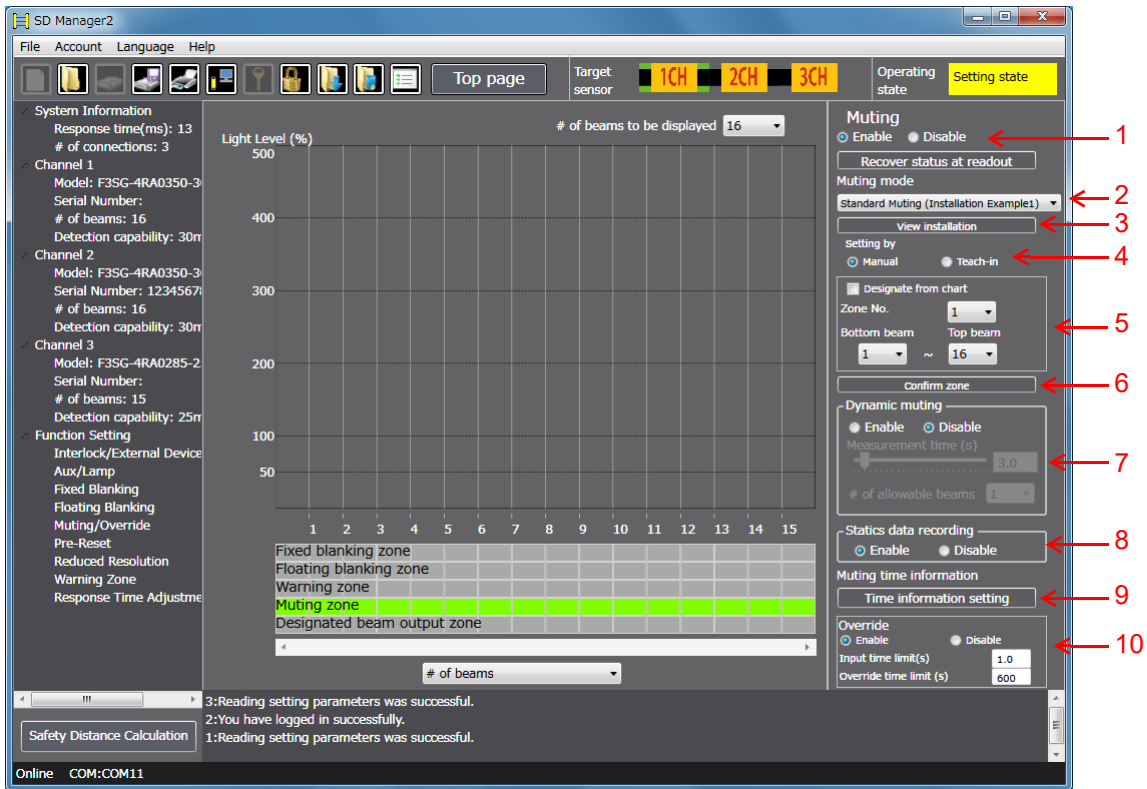
3-6. Muting/Override

First, follow the steps in 3-1. *Preparing to Change Settings*.

Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	Muting	Select Enable or Disable for the Muting function. When you want to restore the settings received from the F3SG, click [Recover status at readout].
2	Muting mode	Select a desired muting mode.
3	View installation	Shows installation conditions.
4	Setting by	Select manual setting using this software or setting by teach-in.
5	Zone setting	Select a desired zone number. To configure zone settings, specify desired bottom and top beam numbers from the drop-down list, or directly on the chart. When you check the [Designate from chart] box, you can specify a zone range by dragging red lines shown on the chart. In both cases above, click [Confirm zone] to confirm the settings.
6	Confirm zone	Confirm the settings of the zone.
7	Dynamic muting	Select Enable or Disable, measurement time and the number of allowable for the Dynamic Muting function.
8	Statics data recording	Select Enable or Disable for the Statistics Data Recording function.
9	Time information setting	Shows a setting screen of muting time information.
10	Override	Select Enable or Disable and a time limit for the Override function.



Zone setting is possible for desired channel and beam (in 1-beam increments).
The settings after the zone is determined are displayed in the zone information area under the chart.

CHECK!



CHECK!

Setting parameters of the following functions are saved according to the states where the Muting function is enabled and disabled, respectively. After changing the Muting function from Enable to Disable or from Disable to Enable, check the settings of these functions again.

Affected functions: External Device Monitoring (EDM), Start Interlock, Restart Interlock, Auxiliary Output, Lamp Output



For more information on the setting parameters, refer to:

- F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
- F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*




CHECK!

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.



CHECK!

To enable the written configuration, click the [Monitoring] button  or power cycle the F3SG.

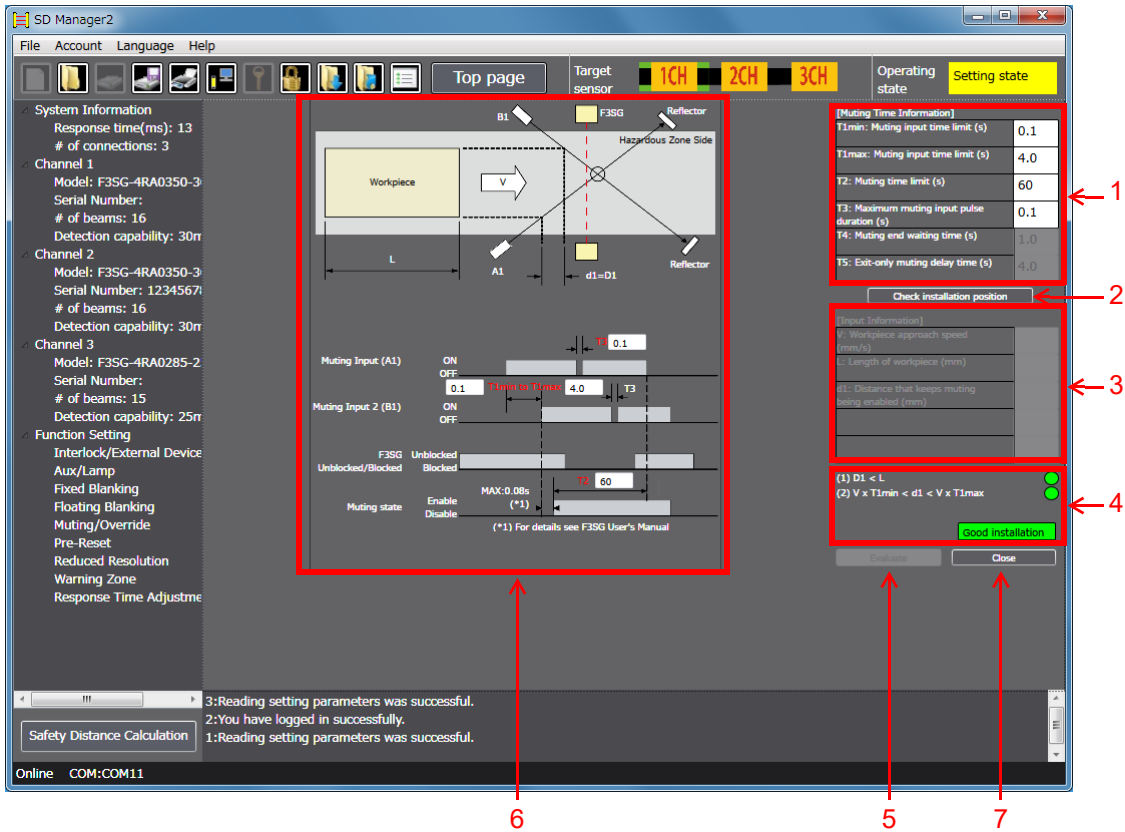
■ Muting Setup Procedure

1. Enable the Muting function (No. 1).
2. Select a muting type (No. 2).
3. Set up a zone (Details are described later) (Nos. 4, 5, and 6).
4. As needed, set up the Dynamic Muting function (No. 7).
5. As needed, set up the Statistics Data Recording function (No. 8).
6. Set up muting time information (Details are described later) (No. 9).
7. As needed, set up the Override function (No. 10).
8. Click the [Write Configuration] button. On the settings list which will appear, confirm that the changed content is correct, and click the [OK] button.

■ Muting Zone Setup Procedure

- 3-(1) Select a setup method (No. 4).
 - [Manual setting] (No. 5)
 - Select a zone No., and set up the bottom and top beam numbers.
 - [Teach-in]
 - When teach-in is selected, the software enters the teach-in mode.
 - Block light in the zone that you wish to specify as the muting zone.
- 3-(2) Determine the zone (No. 6)
 - When the zone has been selected by teach-in, select the Manual button again after the zone is determined (No. 4)

Setting of muting time information



No.	Function	Description
1	Muting Time Information	Enter values of Muting-related time limits. For the Muting time input time limit and the Muting time limit, setting the value to zero means the time limit is infinite.
2	Check installation position	Reflects the Muting Time Information settings to the timing chart shown in the left side of the screen, and allows data entry to the Input Information fields.
3	Input Information	Enter information about the work-piece.
4	Diagnosis of installation condition	It is diagnosed and displayed if the setting condition is appropriate.
5	Evaluate	Checks if the muting with the entered settings is possible.
6	Installation diagram and Timing chart	Shows the positions and timing chart of a work-piece, the F3SG and muting sensors.
7	Close	Finishes the setting process of muting time information, and returns to muting setting.

If using this function together with other functions, make settings taking the condition of adjacent zones into account.

CHECK!



For the condition of adjacent zones, refer to:

- F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
- F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*



When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!



To enable the written configuration, click the [Monitoring] button or power cycle the F3SG.

CHECK!

■ Muting Time Information Setup Procedure

- 6-(1) Enter [Muting Time Information] according to the setup state (No. 1).
- 6-(2) Click [Installation Position Check] button (No. 2).
- 6-(3) Enter [Input Information] according to the setup state (No. 3).
- 6-(4) Click [Evaluation] to confirm the integrity of the entered condition (No. 5). The result is displayed in area 4.
If the result is Installation NG, review the entered condition above.
- 6-(5) Click [Close] button (No. 7).



For more information on Muting Time Information (how to optimize T1), refer to 4-3. *Muting Statistics Information*.

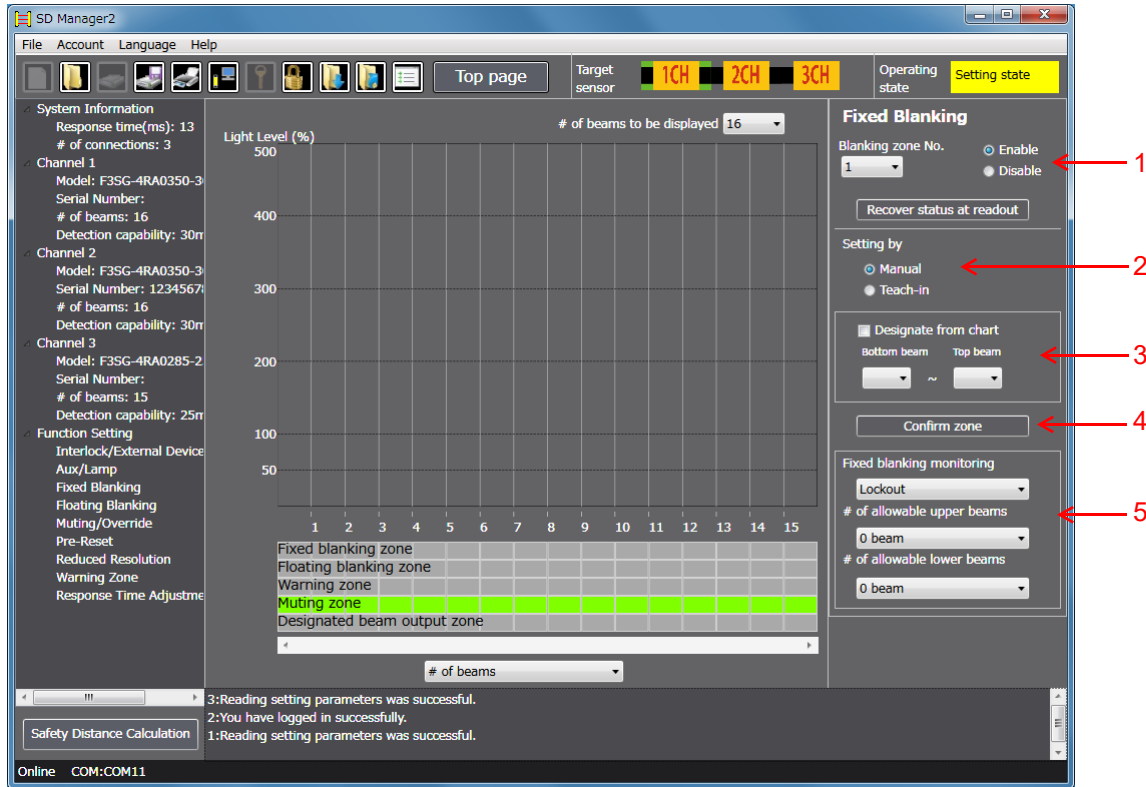
3-7. Fixed Blanking

First, follow the steps in 3-1. *Preparing to Change Settings*.

Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	Fixed Blanking	Select Enable or Disable for the Fixed Blanking function. Up to three fixed blanking zone can be configured for each channel. When you want to restore the settings received from the F3SG, click [Recover status at readout].
2	Setting by	Select manual setting using this software or setting by teach-in.
3	Zone setting	To configure zone settings, specify desired bottom and top beam numbers from the drop-down list, or directly on the chart. When you check the [Designate from chart] box, you can specify a zone range by dragging red lines shown on the chart. In both cases above, click [Confirm zone] to confirm the settings.
4	Confirm zone	Confirm the settings of the zone.
5	Fixed blanking monitoring	Select a desired monitoring method and number of allowable beams.

If using this function together with other functions, make settings taking the condition of adjacent zones into account.

CHECK!

- For the condition of adjacent zones, refer to:
- F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
 - F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*



When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!

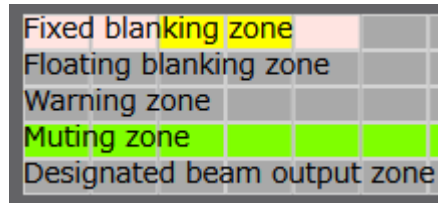


To enable the written configuration, click the [Monitoring] button  or power cycle the F3SG.

CHECK!

■ Fixed Blanking Setup Procedure

1. Select a fixed blanking zone, and enable the function (No. 1).
2. Set up the zone (Details are described later) (Nos. 2, 3, and 4).
3. Set up the fixed blanking monitoring function (No. 5).
4. Set up the number of allowable beams (No. 5).
The set allowable beams will be indicated as shown below. In this example, one upper and two lower beams are set as allowable beams.



5. Click the [Write Configuration] button. On the settings list which will appear, confirm that the changed content is correct, and click the [OK] button.

■ Fixed Blanking Zone Setup Procedure

- 2-(1) Select a setup method (No. 2).
 - [Manual setting] (No. 3)
 - Set up the bottom and top beam numbers.
 - [Teach-in]
 - When teach-in is selected, the software enters the teach-in mode.
 - Block light in the zone that you wish to set up as the fixed blanking zone.
- 2-(2) Determine the zone (No. 4).
When the zone has been selected by teach-in, select the Manual button again after the zone is determined (No. 2).

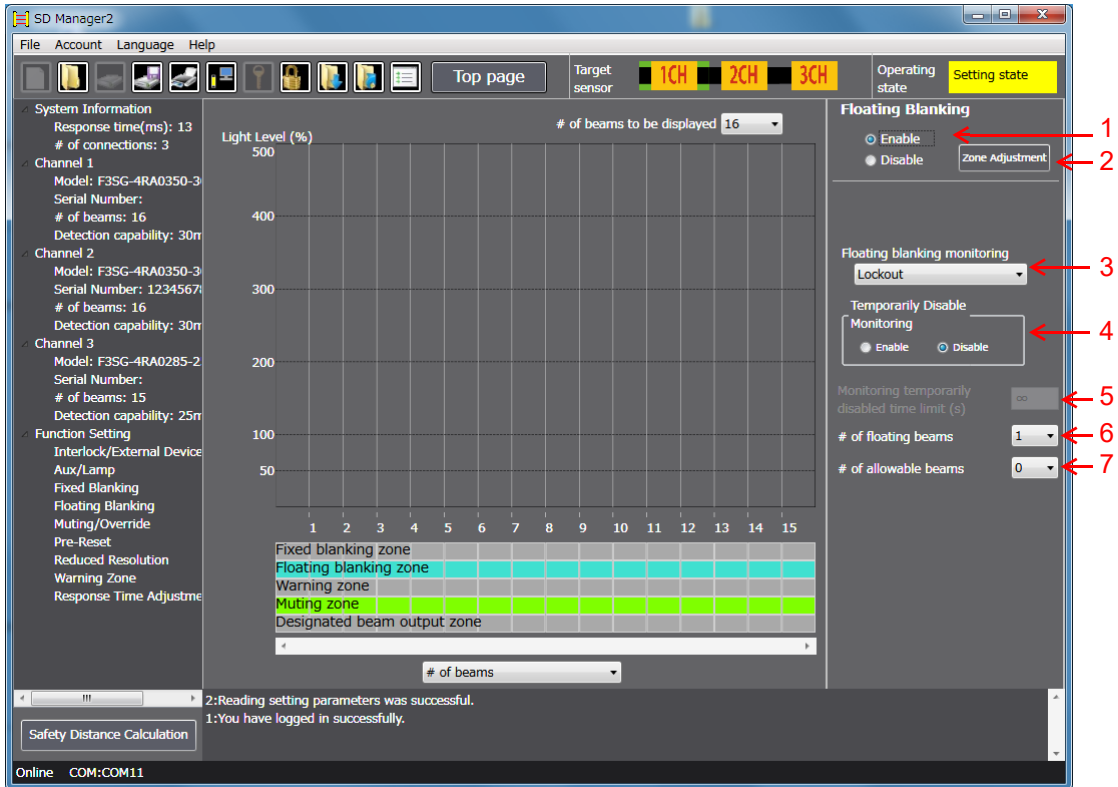
3-8. Floating Blanking

First, follow the steps in 3-1. *Preparing to Change Settings*.

Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	Floating Blanking	Select Enable or Disable for the Floating Blanking function.
2	Zone Adjustment	Automatically adjusts a floating blanking zone setting when the setting is not correct.
3	Floating blanking monitoring	Select a desired monitoring function.
4, 5	Temporarily Disable Monitoring Function	Select Enable or Disable for the Temporarily Disable Monitoring function and configure the Monitoring-temporarily-disabled time limit.
6, 7	Other setting	Configure the numbers of floating beams and allowable beams.

If using this function together with other functions, make settings taking the condition of adjacent zones into account.

CHECK!

For the condition of adjacent zones, refer to:

- F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
- F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!

To enable the written configuration, click the [Monitoring] button or power cycle the F3SG.

CHECK!

■ Floating Blanking Setup Procedure

1. Enable the floating blanking function (No. 1).
2. Set up the floating monitoring function (No. 3).
3. Set up the temporarily disable monitoring function (No. 4).

When Enable is selected, also set up the monitoring-temporarily-disabled time limit (No. 5).



This function is only available when [Lockout] or [Cancel blanking zone] option is selected for the Floating Blanking Monitoring function.

CHECK!

4. Set up the number of floating beams (No. 6).
5. Set up the number of allowable beams (No. 7).
6. Click the [Write Configuration] button. On the settings list which will appear, confirm that the changed content is correct, and click the [OK] button.

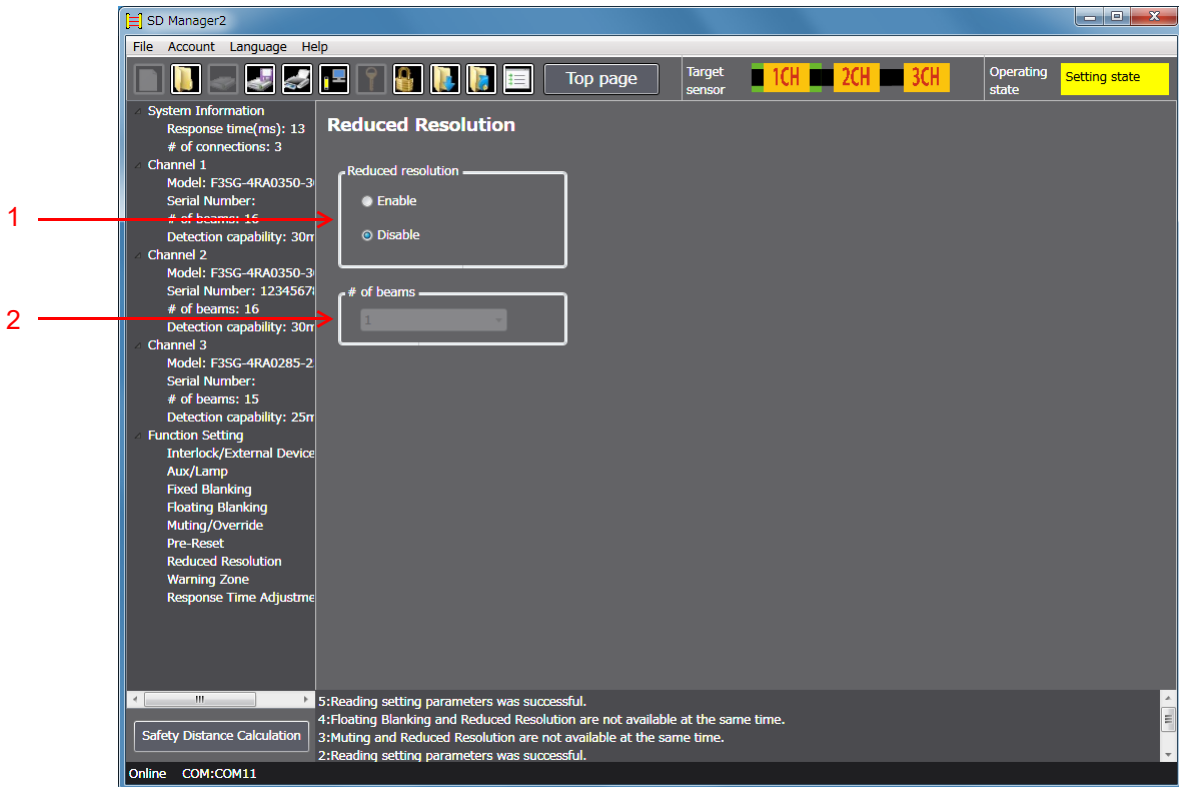
3-9. Reduced Resolution

First, follow the steps in 3-1. *Preparing to Change Settings*.

Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	Reduced resolution	Select Enable or Disable for the Reduced Resolution function.
2	No. of beams	Select desired number of beams to be ignored. Up to three beams can be configured.

It is not possible to configure the Reduced Resolution function together with the Muting function. To enable settings of the Reduced Resolution function, disable the Muting function.

CHECK!
 Setting parameters of the following functions including this function are saved according to the states where the Muting function is enabled and disabled, respectively. After changing the Muting function from Enable to Disable or from Disable to Enable, check the settings of these functions again.

CHECK!
 Affected functions: External Device Monitoring (EDM), Start Interlock, Restart Interlock, Auxiliary Output, Lamp Output

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!

To enable the written configuration, click the [Monitoring] button or power cycle the F3SG.

CHECK!

■ Detection Capability

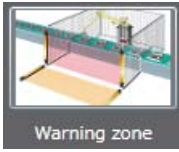
Detection capability for F3SG differs based on the number of floating beams as shown below.

Model		Number of beams configured	Detection capability	Number of blocked beams to turn safety outputs OFF	Maximum diameter of object ignored
F3SG-RA	F3SG-4RA□□□□-14	-	14 mm	1 beam	-
		1 beam	24 mm	2 beams	6.6 mm
		2 beams	34 mm	3 beams	16.6 mm
		3 beams	44 mm	4 beams	26.6 mm
	F3SG-4RA□□□□-30	-	30 mm	1 beam	-
		1 beam	50 mm	2 beams	13 mm
		2 beams	70 mm	3 beams	33 mm
F3SG-RR	F3SG-4RR□□□□-14	3 beams	90 mm	4 beams	53 mm
		-	14 mm	1 beam	-
		1 beam	24 mm	2 beams	6.6 mm
		2 beams	34 mm	3 beams	16.6 mm
	F3SG-4RR□□□□-25	3 beams	44 mm	4 beams	26.6 mm
		-	25 mm	1 beam	-
		1 beam	45 mm	2 beams	13 mm
		2 beams	65 mm	3 beams	33 mm
		3 beams	85 mm	4 beams	53 mm

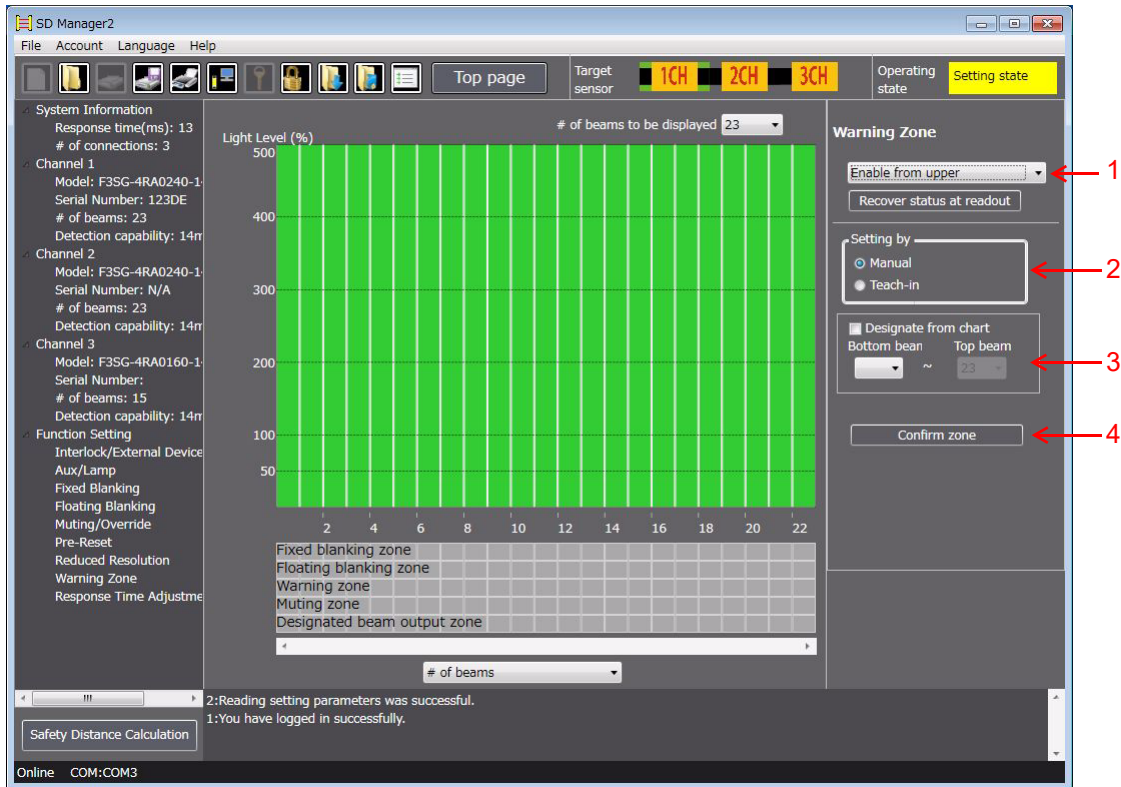
3-10. Warning Zone

First, follow the steps in 3-1. *Preparing to Change Settings*.

Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	Warning Zone	Select Enable or Disable for the Warning Zone function. When you want to restore the settings received from the F3SG, click [Recover status at readout].
2	Setting by	Select either manual setup using this tool or setup by teach-in
3	Zone setting	To configure zone settings, specify desired bottom and top beam numbers from the drop-down list, or directly on the chart. When you check the [Designate from chart] box, you can specify a zone range by dragging red lines shown on the chart. In both cases above, click [Confirm zone] to confirm the settings.
4	Confirm zone	Confirm the settings of the zone.

If using this function together with other functions, make settings taking the condition of adjacent zones into account.

CHECK!


For the condition of adjacent zones, refer to:

- F3SG-RA: *Safety Light Curtain F3SG-R Series User's Manual*
- F3SG-RR: *Safety Light Curtain F3SG-RR Series User's Manual*

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!



To enable the written configuration, click the [Monitoring] button  or power cycle the F3SG.

CHECK!

■ Warning Zone Setup Procedure

1. Enable the Warning Zone function (Details are described later) (No. 1).
2. Set up a zone (Details are described later) (Nos. 2, 3, and 4).
3. Click the [Write Configuration] button. On the settings list which will appear, confirm that the changed content is correct, and click the OK button.

■ Setup Procedure of the Function

- 1-(1) The warning zone must include either a top or bottom beam of the F3SG.
 - Enable from upper : The warning zone is enabled from the upper end.
 - Enable from lower : The warning zone is enabled from the bottom end.
 - Disable : The warning zone is disabled.

■ Setup Procedure of the Zone

- 2-(1) Select a setup method (No. 2).
 - [Manual setting] (No. 3)
 - When selecting [Enable from upper], set up the top beam.
 - When selecting [Enable from lower], set up the bottom beam.
 - [Teach-in]
 - When teach-in is selected, the software enters the teach-in mode.
 - When selecting [Enable from upper], block the lowest beam in the zone that you wish to specify as the warning zone.
 - When selecting [Enable from lower], block the top beam in the zone that you wish to specify as the warning zone.
- 2-(2) Determine the zone (No. 4).
 - When the zone has been selected by teach-in, select the Manual button again after the zone is determined (No. 3)

3-11. Operating Range Selection

- F3SG-RA: It is only possible to configure this function with DIP Switch on the emitter, not with SD Manager 2.
- F3SG-RR: It is not possible to configure this function.

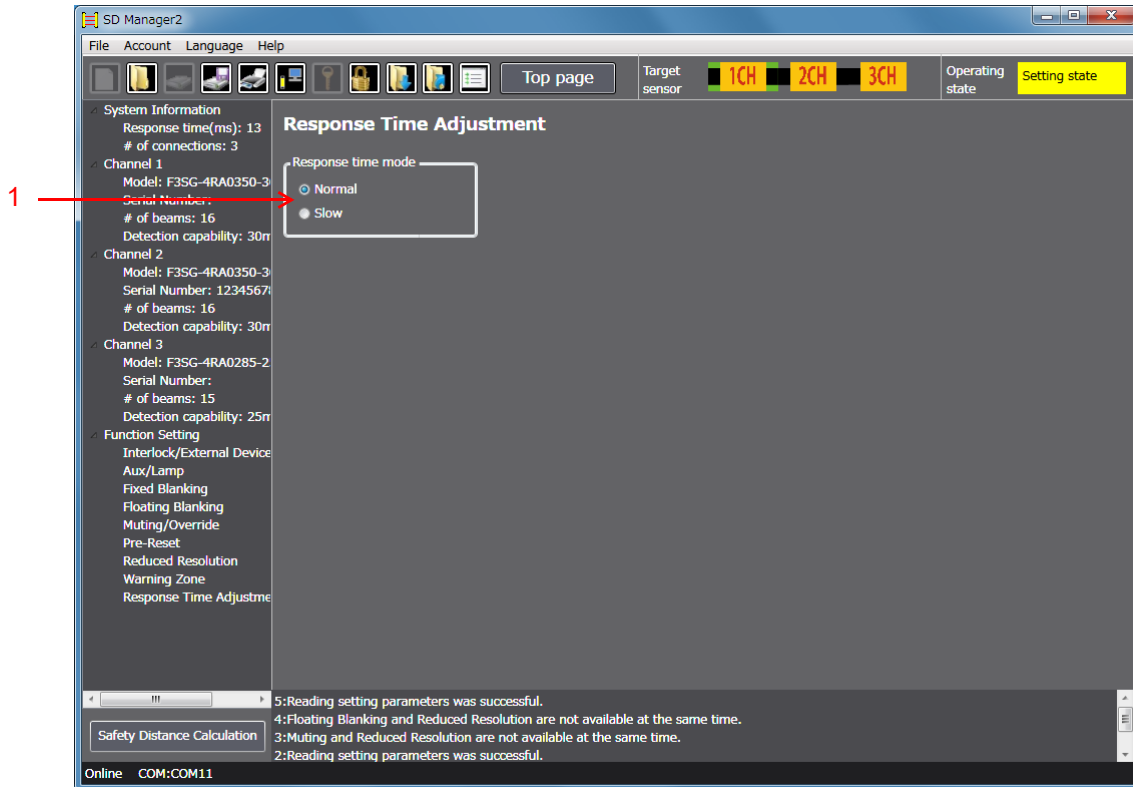
3-12. Response Time Adjustment

First, follow the steps in 3-1. *Preparing to Change Settings*.

Next, click the icon below on the Top page.



The setting screen below is displayed.



No.	Function	Description
1	Response time mode	Select a desired mode of the response time.

To change the response time, calculate the safety distance based on the setting.

CHECK!

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!

To enable the written configuration, click the [Monitoring] button or power cycle the F3SG.

CHECK!

3-13. Designated Beam Output

First, follow the steps in 3-1. *Preparing to Change Settings.*

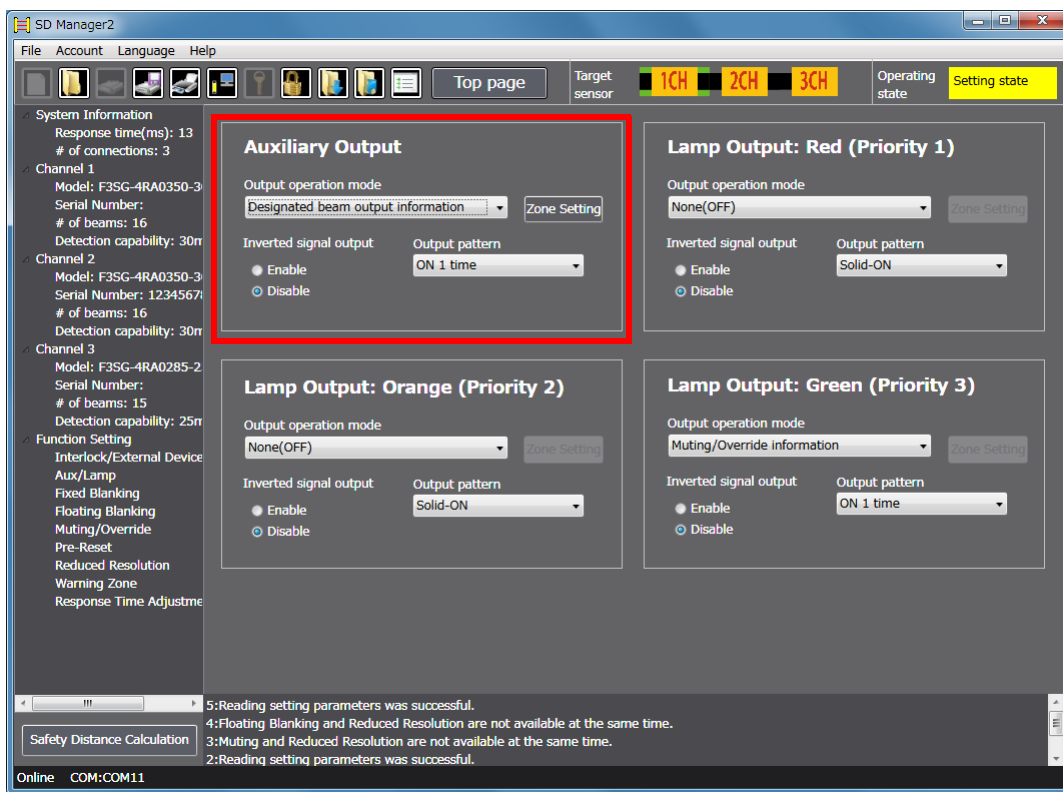
Next, click the icon below on the Top page.



The setting screen below is displayed.

Select [Designated beam output information] for the output operation mode of the auxiliary output or Lamp output.

In the following example, the designated beam output information is assigned to the output operation mode of the auxiliary output.

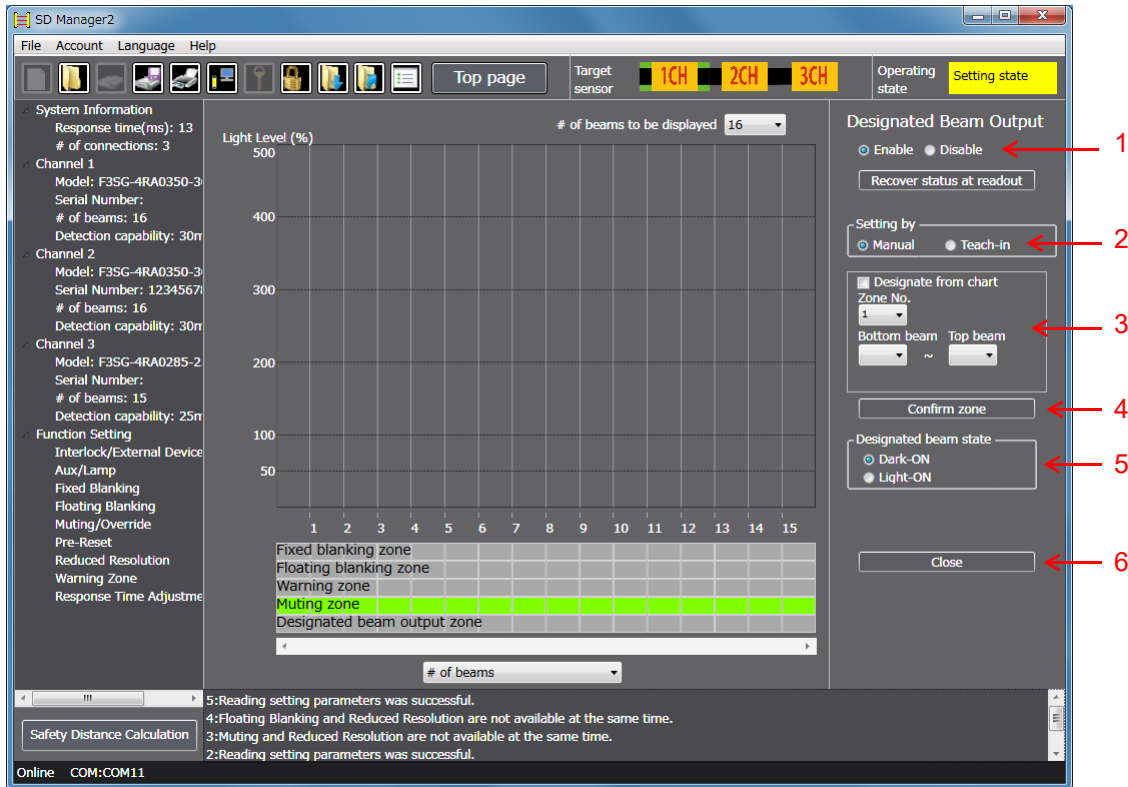


When [Designated beam output information] is selected for Auxiliary Output and each color of Lamp Output at the same time, the area configured is the same for all these outputs.



CHECK!

Click the [Zone Setting] button to configure the designated beam output.



No.	Function	Description
1	Designated Beam Output	Select Enable or Disable for the Designated Beam Output function. When you want to restore the settings received from the F3SG, click [Recover status at readout].
2	Setting by	Select manual setting using this software or setting by teach-in.
3	Zone setting	Select a desired zone number. To configure zone settings, specify desired bottom and top beam numbers from the drop-down list, or directly on the chart. When you check the [Designate from chart] box, you can specify a zone range by dragging red lines shown on the chart. In both cases above, click [Confirm zone] to confirm the settings.
4	Confirm zone	Confirm the settings of the zone.
5	Designated beam state	Select either Dark-ON or Light-ON.
6	Close	Returns to Auxiliary Output/Lamp setting.

Zone setting is possible for desired channel and beam (in 1-beam increments).
 The settings after the zone is determined are displayed in the zone information area under the chart.

CHECK!

When changing the settings is complete, confirm the settings and write the configuration to the F3SG. Refer to 2-9. *Writing Configuration to F3SG* for more information.

CHECK!

To enable the written configuration, click the [Monitoring] button or power cycle the F3SG.

CHECK!

■ Designated Beam Output Setup Procedure

1. Set the output operation mode of the auxiliary output or lamp output in [Designated beam output information], and press the [Zone Setting] button.
2. Enable the designated beam output function (No.1).
3. Set up the zone (Details are described later) (Nos. 2, 3, and 4).
4. Set up the designated beam unblocked state (No. 5).
5. Click the [Write Configuration] button. On the settings list which will appear, confirm that the changed content is correct, and click the OK button.

■ Designated Beam Output Zone Setup Procedure

- 3-(1) Select a setup method (No. 2).
 [Manual setting] (No. 3)
 Select a zone No., and set up the bottom and top beam numbers.
 [Teach-in]
 When teach-in is selected, the software enters the teach-in mode.
 Block light in the zone that you wish to specify as the designated beam output zone.
- 3-(2) Determine the zone (No. 4).
 When the zone has been selected by teach-in, select the Manual button again after the zone is determined (No. 3).

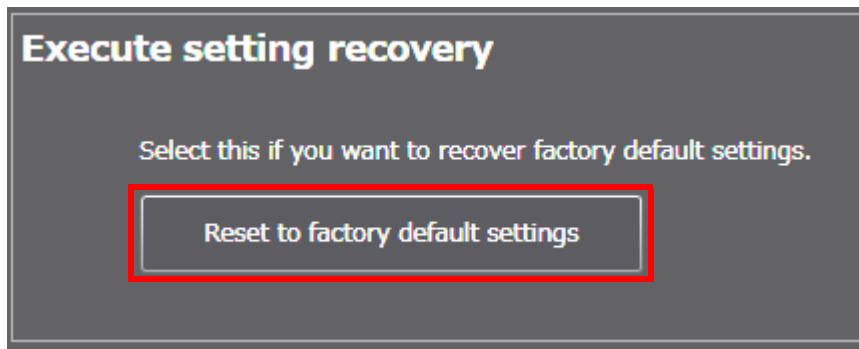
3-14. Setting Recovery

Log in SD Manager 2 with the administrator level, and click the icon below on the Top page:



The setting screen below is displayed on the Top page.

To execute setting recovery, click the [Reset to factory default settings] button.



When the F3SG is in a cascade connection, select a desired sensor segment from [Target sensor] in the top right corner of the screen and click [Reset to factory default settings].

Settings of each function can be reset to the factory default.



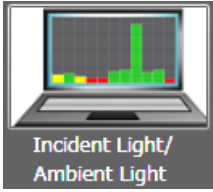
When the setting recovery is executed, the changed password is not reset to "0000".
Refer to 2-2. *Password Protection* for more information on the password.

CHECK!

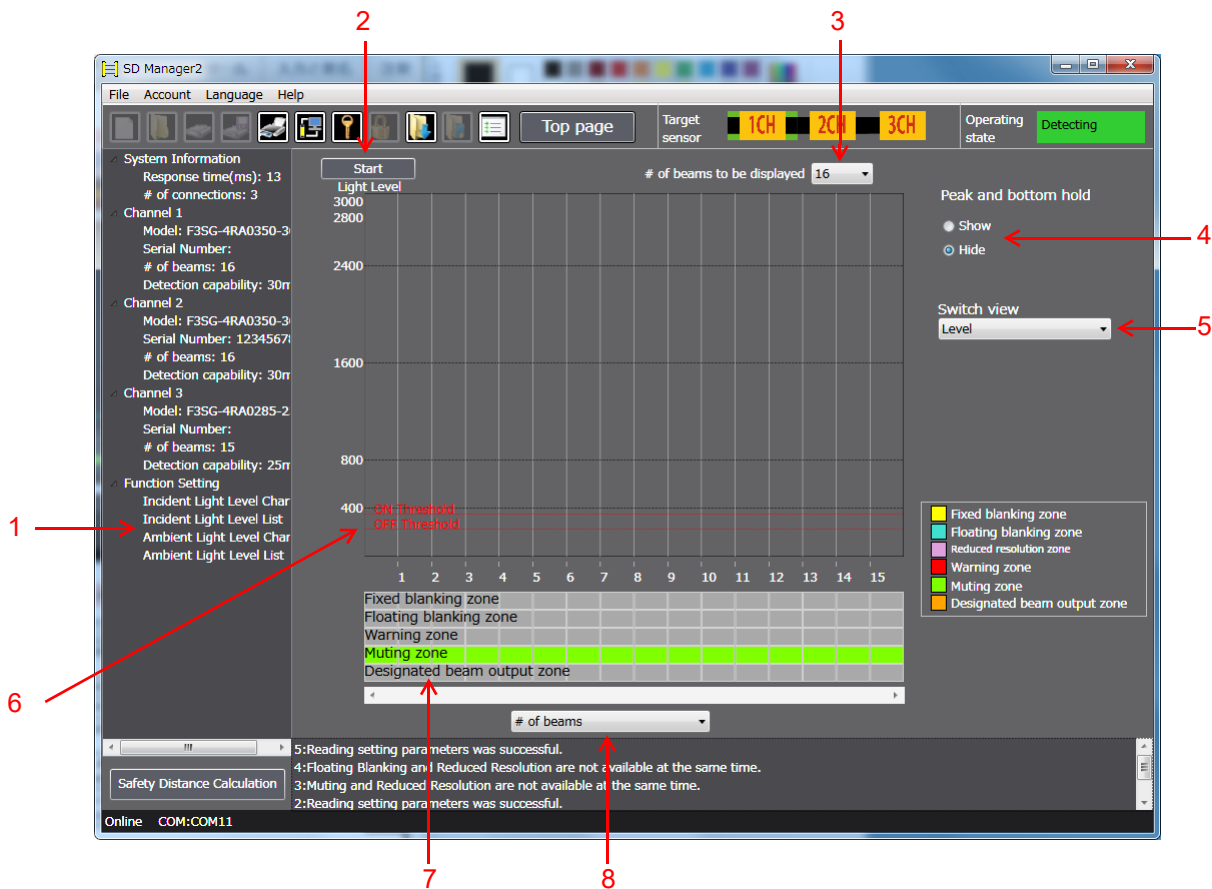
Chapter 4 Monitoring with SD Manager 2

4-1. Incident/Ambient Light Level Monitoring

On the Top page, click the icon below.



The screen below is displayed.



No.	Function	Description
1	Select light level monitoring function	Select incident light level or ambient light level to be monitored and chart or list view.
2	Start/stop	Enables the monitoring of light level selected to start or stop.
3	No. of beams to be displayed	Select the number of F3SG beams to be displayed.
4	Show/hide held peak and bottom hold	Shows the maximum and minimum values of a selected light level by light blue and pink lines, respectively when [Show] is selected.
5	Select unit of vertical axis	Switch the unit of the vertical axis on the chart between Percent and Level. When [Percent] is selected, the light level is shown in percentage based on the ON threshold value as 100%. When [Level] is selected, the light level is converted to voltage.
6	ON/OFF threshold values	Shows the ON and OFF threshold values of the F3SG. This information is only shown when the [Level] view is selected for the unit of vertical axis.

No.	Function	Description
7	Information assigned	Shows a function assigned to the beams. The following five functions can be assigned. - Fixed blanking zone - Floating blanking zone or Reduced resolution zone - Warning zone - Muting zone - Designated beam output zone
8	Select unit of horizontal axis	Switch the unit of the horizontal axis on the chart between the number of beams and sensor length.

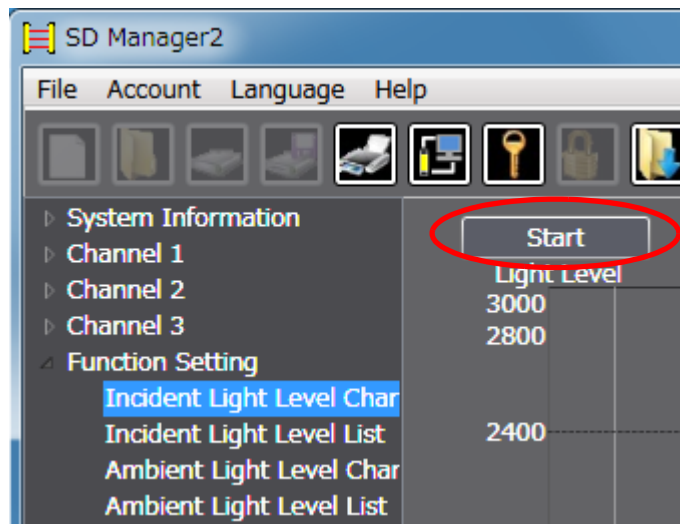


Reduced resolution zone is displayed in the Information assigned section only when the reduced resolution is enabled.

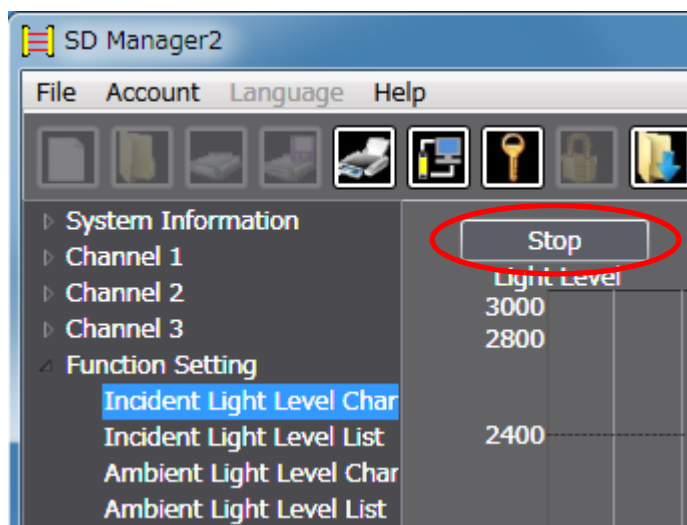
CHECK!

To start monitoring of a light level, select a display type in the [Function Setting] area on the left side of the screen, and click [Start]

When the F3SG is in a cascade connection, select a desired sensor segment from [Target sensor] in the top right corner of the screen and click [Start].



To stop the monitoring, click [Stop].

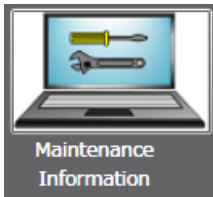


The incident/ambient light level monitoring function is available even if the Position 8 of the two DIP Switches is set to OFF (DIP Switch Enabled).

CHECK!

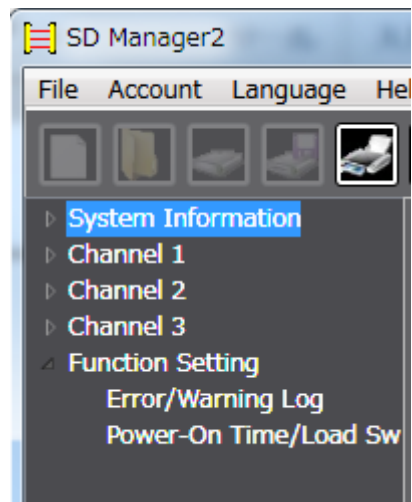
4-2. Maintenance Information


On the Top page, click the icon below.



In the [Function Setting] area on the left side of the screen, select a menu of either [Error/Warning Log] or [Power-On Time/Load Switching Frequency].

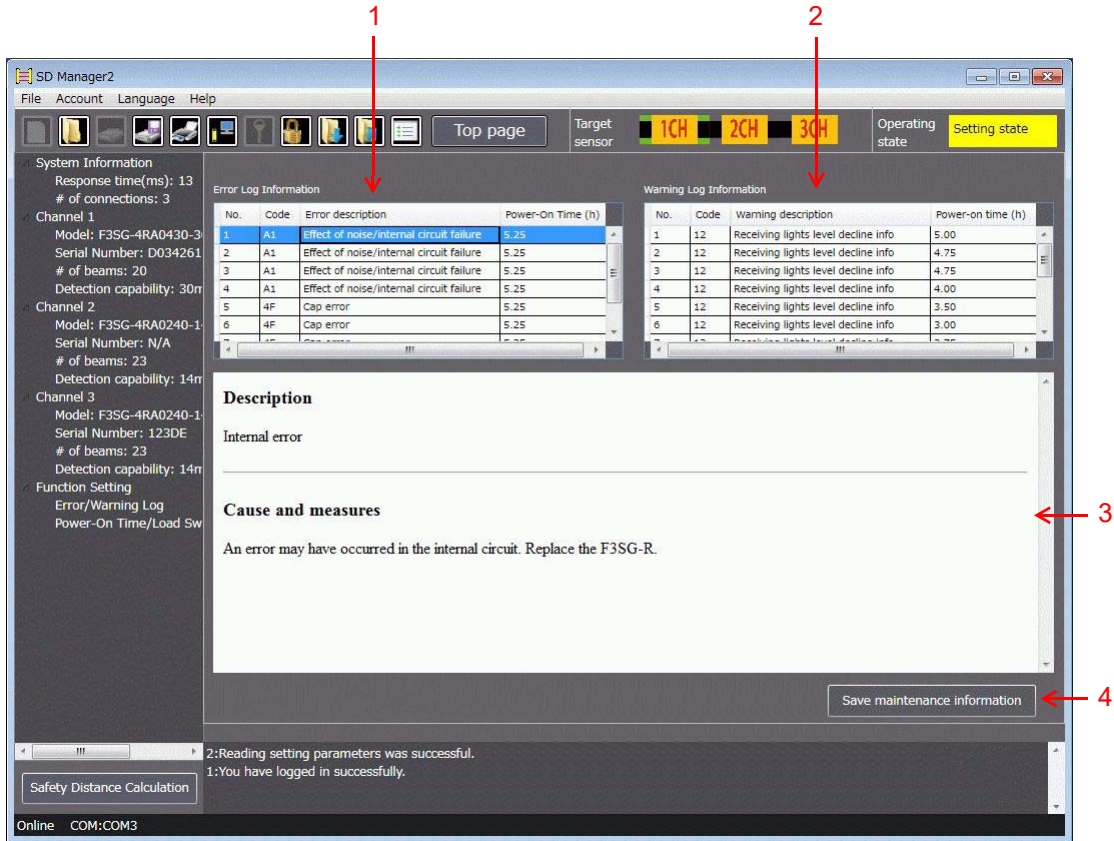
When the F3SG is in a cascade connection, select a desired sensor segment from [Target sensor] in the top right corner of the screen.




 The maintenance information function is available even if the Position 8 of the two DIP Switches is set to OFF (DIP Switch Enabled).

CHECK!


Error/Warning Log




No.	Function	Description
1	Error Log Information	Error logs including error codes, error descriptions and accumulated power-on time at the time when errors occurred are shown, with the most recent errors first.
2	Warning Log information	Warning logs including warning codes, warning descriptions and accumulated power-on time at the time when warnings occurred are shown, with the most recent warnings first.
3	Show error descriptions	Click an error or warning log to show details, cause and measures of the event.
4	Save maintenance information	Saves error and warning logs, power-on time, accumulated power-on time, load switching frequency and accumulated load switching frequency as a .csv file.

 To save maintenance information, login at the operator or administrator level is necessary.

CHECK!

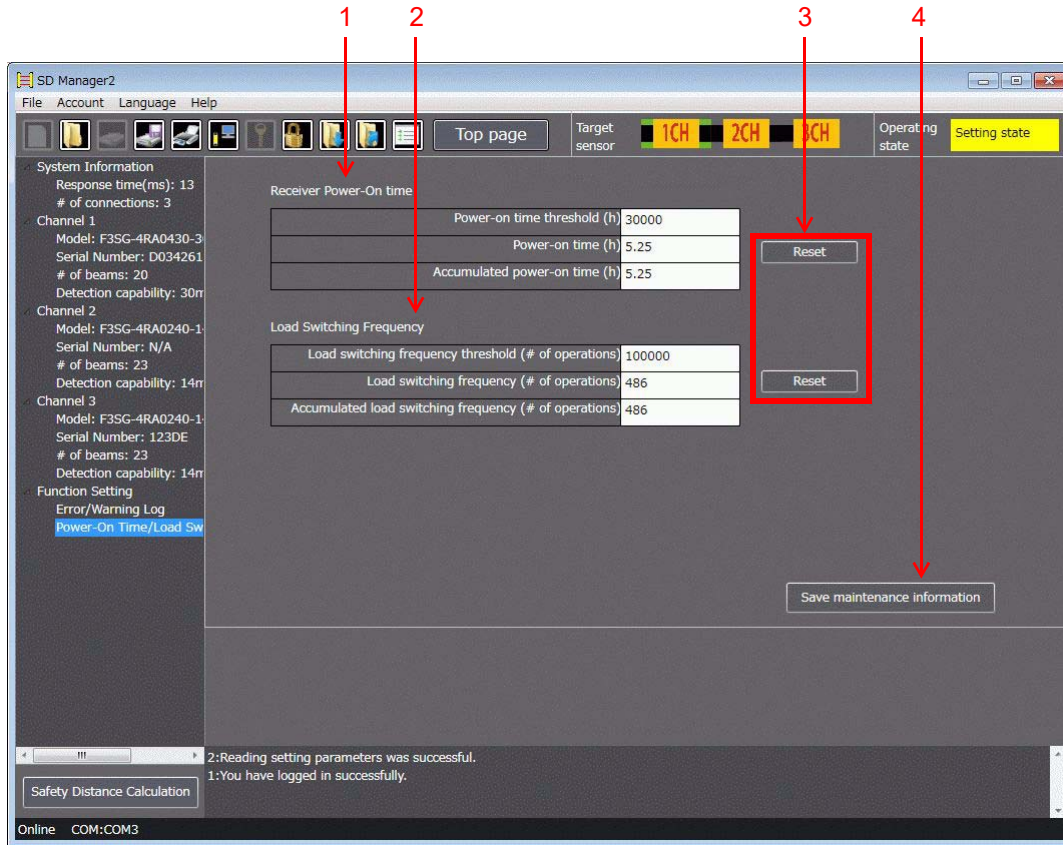
 Error and warning logs are only displayed for a sensor segment selected in the Target sensor section.

CHECK!


 Up to 50 past errors can be recorded. To view them, Login at the operator or administrator level is required.

CHECK!


Power-On Time/Load Switching Frequency




No.	Function	Description
1	Receiver power-on time	Power-on time threshold, power-on time and accumulated power-on time are shown. Only power-on time threshold is configurable. Available Parameters: 30,000 to 1,000,000 h in 1-h increments/Disable
2	Load switching frequency	Load switching frequency threshold, load switching frequency and accumulated load switching frequency are shown. Only load switching frequency threshold is configurable. Available Parameters: 100,000 to 4,000,000 times in 1-time increments/Disable
3	Reset	Resets power-on time and load switching frequency to zero. Resetting is only possible when you are logged in with the administrator level.
4	Save maintenance information	Saves error and warning logs, power-on time, accumulated power-on time, load switching frequency and accumulated load switching frequency as a .csv file.

 To save maintenance information, login at the operator or administrator level is necessary.

CHECK!

 Writing the configurations of power-on time threshold and load switching frequency threshold to the F3SG is also possible with the operator level.

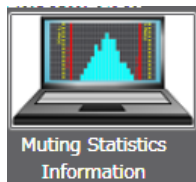
CHECK!

 The power-on time information is recorded in the F3SG main unit every 15 minutes.

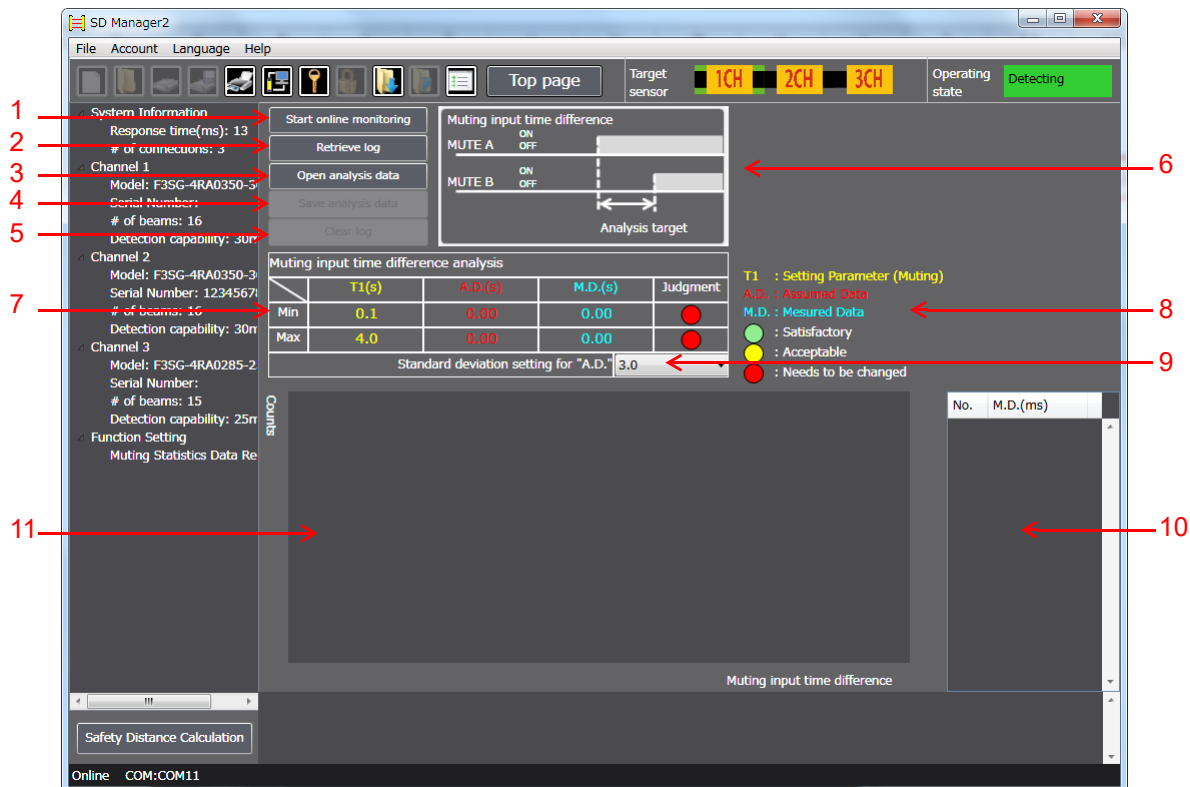
CHECK!

4-3. Muting Statistics Information

This function logs and visualizes conditions of F3SG muting operations to help the user adjust settings of muting input time difference. Also, its statistic calculation allows for optimal settings with reduced test runs. On the Top page, click the icon below.



The screen below is displayed.



No.	Function	Description
1	Start (stop) online monitoring	Retrieves muting input time difference information from the F3SG in real time and displays it in the analysis data area (10).
2	Retrieve log	Retrieves muting time logs saved in the F3SG and displays it in the analysis data area (10).
3	Open analysis data	Opens a .csv file saved by the operation (4).
4	Save analysis data	Saves data displayed in the analysis data area (10) as a .csv file. The data saved also includes other muting time information and sensor information.
5	Clear log	Clears muting time logs saved in the F3SG.
6	Timing chart	Displays a timing chart of time analyzed.
7	Table	Displays minimum and maximum values of muting setting parameter, assumed data and measured data, and judgment results on these values.
8	Table legends	Displays meanings of abbreviations and judgment results in the table. A.D.: Assumed Data*1 M.D.: Measured Data*2
9	Standard deviation setting	The range of variation of assumed data can be selected from 2.6σ , 3.0σ and 6.0σ .
10	Analysis data	Displays measured data of muting input time difference (to be analyzed).
11	Chart	Displays a setting parameters and assumed data of the chart (7) and analyzed data (10) in graph form.

*1. Calculated with the standard deviation setting based on the measured data. (Values equal to 0 or less are assumed to be 0.)

*2. Measured time difference between inputs of MUTE A and MUTE B.



The muting statistics information function is available even if the Position 8 of the two DIP Switches is set to OFF (DIP Switch Enabled).

CHECK!



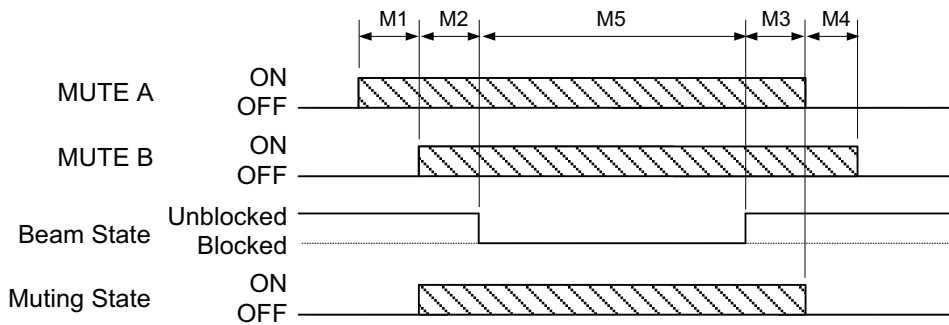
To use online monitoring with the F3SG-RR, the Bluetooth® Communication Unit must be used. When the Interface Unit is connected to the F3SG-RR, the online monitoring cannot be used.

CHECK!

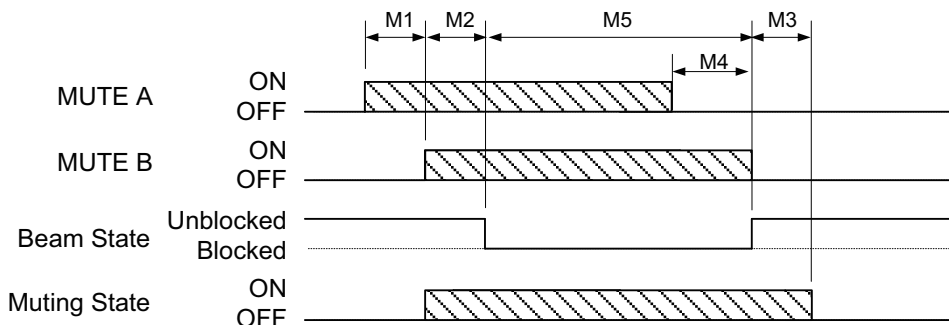
■ Data Description

For the time data obtained, refer to the timing charts below.

■ Standard/ Position Detection Muting



■ Exit Only Muting



M1 (input time difference) is the data to be analyzed for Muting Statistics Information. All M1 to M5 data and internal data will be saved in a .csv file when saving the analysis data.

CHECK!

■ How to use muting statistics information

1. Carry out test runs including the muting in an actual installation environment.

Performing the muting allows the F3SG to log muting information.



If the F3SG used is secondhand, there may be logs of previous settings left in the F3SG. If you do not need such logs, delete them by the [Clear log] button before enabling the muting.

CHECK!

Cleared logs cannot be restored once they are cleared. Save logs in advance, if necessary. Logs can be saved as a .csv file by selecting [Retrieve log] and [Save analysis data].

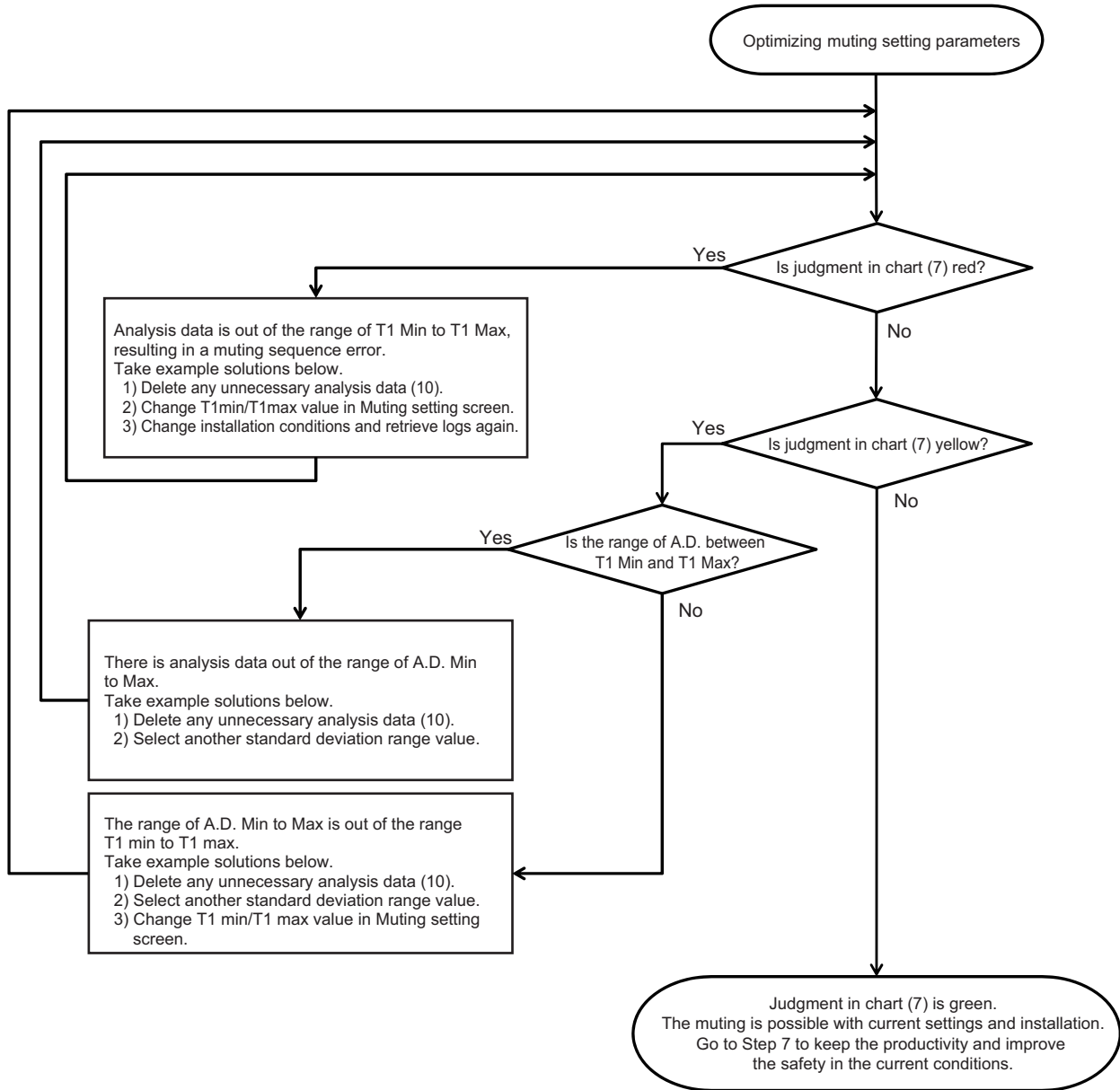


It is necessary to perform the muting at least five times in order to obtain assumed data.

CHECK!

2. Connect SD Manager 2 to the F3SG and display the muting statistics information screen above.
3. Clicking the [Retrieve log] button to obtain logs saved in the F3SG during the test runs in Step 1. Obtained data (table, chart and analysis data) is displayed in the screen.

4. Check the analysis data (10) to see if there is any unnecessary data.
 It is possible to delete unnecessary data by selecting the data on the screen and pressing the [Delete] key.
 The table (7) and chart (11) will be updated each time analysis data is deleted.
 If you have deleted analysis data accidentally, click the [Retrieve log] button again to recall it.
5. Select a desired standard deviation range (9) from the pull-down menu.
6. The flowchart below shows an example to optimize setting parameters of muting input time difference based on analysis data.



7. Adjusting the T1 Min and T1 Max closer to the A.D. Min and Max allows the user to keep the productivity and improve the safety.



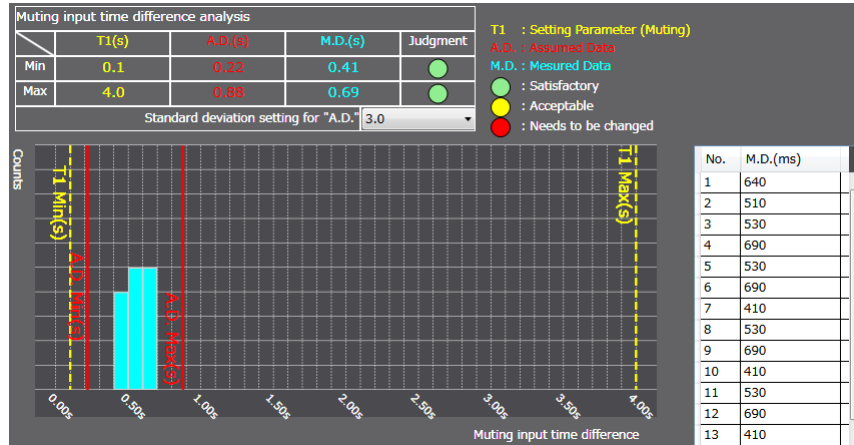
The following operations in Step 7 are unnecessary if the T1 Min and T1 Max are fairly close to the A.D. Min and Max.

CHECK!



If you change T1 Min and T1 Max, make sure that these values satisfies "T1 Min < A.D. Min < A.D. Max < T1 Max".

When the optimization result below is obtained as a result of the flowchart above, the T1 Max deviates largely from the A.D. Max, as shown in the chart below.



Go to the muting time setting screen and change the T1 Max to 1.0 s.

The deviation of T1 Min and Max from the A.D. Min and Max has been reduced, resulting in improved safety, as shown below.



8. When installation and changing settings are complete, write the settings to the F3SG.

4-4. Operating Status Monitoring

On the Top page, click the icon below.



CHECK! The F3SG enters detecting state, and the safety outputs are turned ON/OFF according to the beam state and settings.

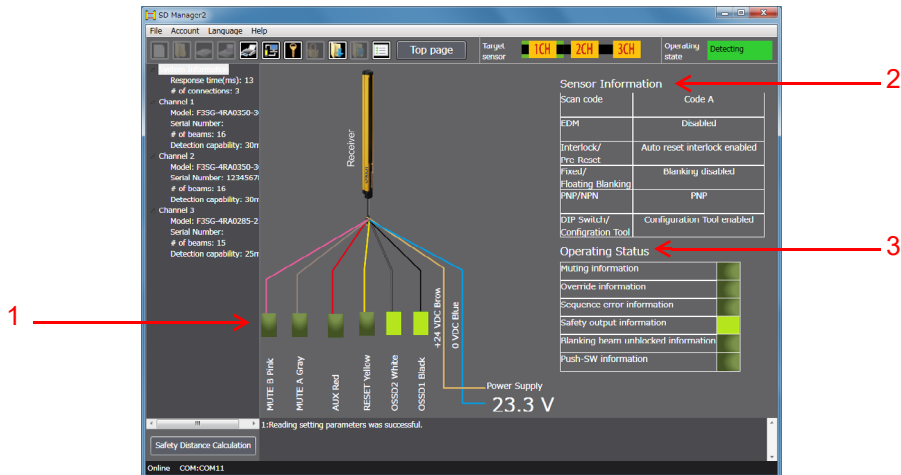
CHECK!

CHECK! When the Interface Unit is connected to the F3SG-RR, the MUTE information of External Wiring is not displayed.

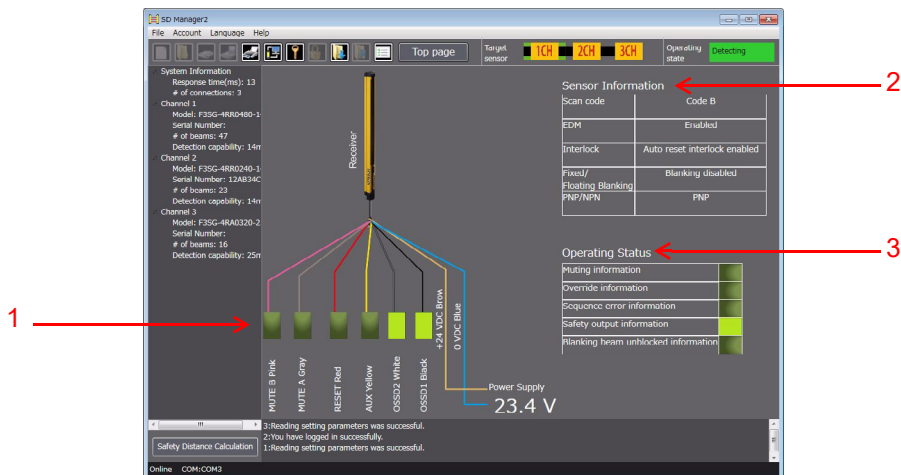
CHECK!

The screen below is displayed.

■ F3SG-RA



■ F3SG-RR



No.	Function	Description
1	External wiring status	Shows ON or OFF state of signal lines.
2	Sensor Information	<p>■ F3SG-RA</p> <p>When DIP Switch Enabled is selected, it shows a state of DIP Switch settings. When Configuration Tool Enabled is selected, it shows setting parameters saved in the F3SG-RA.</p> <p>■ F3SG-RR</p> <p>It shows a state of Rotary Switch settings and setting parameters saved in the F3SG-RR.</p>
3	Operating Status Monitoring	Shows states of the F3SG.

■ Readout Information

The user can view the following information related to a receiver.

The information is displayed in a block in case of a cascade connection.

Information		Description
External wiring	Power Supply	The power supply voltage in the power-on status is displayed.
	OSSD 1 (Black)	Linked with safety output 1
	OSSD 2 (White)	Linked with safety output 2
	RESET (F3SG-RA: Yellow, F3SG-RR: Red)	Linked with Reset/EDM/Override input
	AUX (F3SG-RA: Red, F3SG-RR: Yellow)	Linked with auxiliary output
	MUTE A (Gray)*1	Linked with MUTE A/Pre-Reset input
	MUTE B (Pink)*1	Linked with MUTE B input
Sensor	Scan code	Displays Scan Code configured
	EDM	Displays EDM configuration
	Interlock/Pre-Reset	Displays Interlock/Pre-Reset mode configured
	Fixed/Floating Blanking	Displays Fixed/Floating Blanking configured
	PNP/NPN	Displays output mode (PNP/NPN) configured
	DIP Switch/Configuration Tool*2	Displays DIP Switch/Configuration Tool configured
Operating Status	Muting information	Linked with muting status
	Override information	Linked with override status
	Sequence error information	Linked with muting sequence error status or interlock sequence error status
	Safety output information	Linked with safety output
	Blanking beam unblocked information	Linked with the state where the blanking beam is unblocked
	Push-SW information*2	Linked with the input signal of Push Switch

*1. When the Interface Unit is connected to the F3SG-RR, the MUTE (gray) and MUTE B (pink) information is not displayed. To view the information with the F3SG-RR, the Bluetooth® Communication Unit must be used.

*2. This information is not displayed with the F3SG-RR.



The operating status monitoring function is available even if the Position 8 of the two DIP Switches is set to OFF (DIP Switch Enabled).

CHECK!

Chapter 5 Appendix

5-1. Glossary

	Term	Description
A	Access level	Levels required to log in the SD Manager 2. - Operator level: It is only possible to read configurations from the F3SG. (Writing configurations of power-on time and load switching frequency thresholds is also possible with this level.) - Administrator level: It is possible to read and change configurations from/to the F3SG.)
	Administrator level	Access level where reading and changing configurations is possible.
	Allowable beams	- Dynamic Muting: Area(s) (or beam(s)) to be added in a Dynamic Muting zone, in order to prevent an accidental interruption of the F3SG due to vibration. - Fixed/Floating Blanking: Beam(s) in a Blanking zone, that are likely to be blocked and unblocked repeatedly due to vibration of workpieces, and therefore configured not to be monitored by the Blanking Monitoring function.
	Allowable delay time	The allowable amount of time difference from when the state of the safety outputs changes until the state of an external relay changes. The F3SG enters the Lockout state if this time is exceeded.
	Ambient light level	Degree to indicate how much light from other than the F3SG emitter is received by the corresponding F3SG receiver.
	Auto reset	Mode that disables Start Interlock and Restart Interlock. The safety outputs are turned ON when no object is detected in the detection zone.
	Auxiliary output	Function to configure a signal to be given to the auxiliary output of the F3SG. This must not be used for safety applications.
B	Blanking beam unblocked information	This information is signaled when blanking beams for Fixed/Floating Blanking are unblocked. It is possible to view the status in the Operating Status Monitoring screen. It is also possible to assign this information to an output operation mode of Lamp or auxiliary output.
	Blanking zone	Area in the detection zone of the F3SG, where the Fixed Blanking or the Floating Blanking is enabled.
	Bluetooth® Communication Unit	F39-BT or F39-BTLP.
C	Configuration Tool	Means SD Manager 2.
	Configurations	Configuration information of the F3SG, that can be read, edited or written by SD Manager 2. Configurations can also be created offline. A file of configurations saved on a PC is called a configuration file, with extension .sdm2.
D	Designated beam output	Function to configure target beams to signal the designated beam output information to.
	Designated beam output information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when the beams configured in the setting screen of the designated beam output are blocked. The setting screen appears when you click the Zone Setting button.
	Dynamic muting	Function to configure a new muting zone after muting is enabled based on a result measuring a workpiece height for a certain period of time.
E	EDM	Stands for External Device Monitoring.
	Excess power-on time information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when the power-on time exceeds a specified power-on time threshold value.
	Excess power-on time information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when the load switching frequency exceeds a specified load switching frequency threshold value.
	Exit-only muting delay time	Time from when the signal of Muting input A or B is turned OFF until the Muting state is cancelled.
	Exit-only muting mode	Muting mode to be used for such an application where objects move from the inside to the outside of the hazardous zone.
	External device monitoring	Function to monitor the operation of an N.C. contacts of external relays (or contactors) that control the hazardous zone of a machine, for any malfunctions such as welding.
F	F3SG	F3SG-R or F3SG-RR Series Safety Light Curtain.

	Term	Description
F	Fixed blanking	Function to disable part of the detection zone of the F3SG and keep the safety outputs in the ON state even if an object blocks the disabled detection zone.
	Fixed blanking monitoring function	Function to configure a behavior when part or all of the Fixed Blanking zone is unblocked. The following three options are available for the behavior. - Disable monitoring: Disables this function. - Lockout: Brings the F3SG to the Lockout state. - Cancel blanking zone: Cancels this function. The fixed blanking is enabled again with previous settings upon power-cycling the F3SG.
	Floating blanking	Function to disable a specified number of beams in the detection zone of the F3SG, and keep the safety outputs in the ON state even if an object smaller than the dimension of the specified number of beams blocks the F3SG.
	Floating blanking monitoring	Function to configure a behavior when the number of blocked beams is smaller than specified. The following three options are available for the behavior. - Disable monitoring: Disables this function. - Lockout: Brings the F3SG to the Lockout state. - Cancel blanking zone: Cancels this function.
I	Interface Unit	F39-GIF or F39-GIF-1.
	Incident light level	Degree to indicate how much light from the F3SG emitter is received by the corresponding F3SG receiver.
	Incident/ambient level monitoring	Function to monitor the light level of incident light or ambient light on the F3SG.
	Interlock	Function to keep the safety outputs in the OFF state until safety is ensured and a reset signal is received.
	Interlock information	One of output operation modes to be assigned to Lamp or auxiliary output. When the interlock information is assigned to the output, signals of this information are issued with the safety outputs being in the OFF state until safety is ensured and a reset signal is received.
	Inverted signal output	In this mode, the logic of the auxiliary output signal is reversed.
L	Lamp output	Information and illumination pattern to be signaled can be assigned to the lamp colors, red, orange and green when F39-LP or F39-BTLP is connected to the F3SG.
	Light level diagnosis information	One of output operation modes to be assigned to Lamp or auxiliary output. The information is signaled when the safety outputs are in the ON state and when the incident light level is 170% or less of the ON-threshold value for 10 seconds or more.
	Load switching frequency	Function to display the number of ON/OFF operations of the safety outputs. The number is counted from when the number of switching operations was last reset until the present time.
	Lockout	Function to keep the safety outputs in the OFF state when an error is detected by the F3SG.
	Lockout information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when an error or the Lockout state occurs.
	Lower beam(s)	Beams located toward the Power Cable of the F3SG.
M	Maintenance information	Function to read the maintenance information of the F3SG and view it on a PC screen, with the Configuration Tool.
	Manual reset	Mode that enables Start Interlock and Restart Interlock. The safety outputs are kept in the OFF state until safety is ensured and a reset signal is received.
	Maximum allowable muting signal interruption	Maximum duration of a signal interruption ignored in Muting inputs A and B.
	Muting	Function to temporarily disable the safety function of the F3SG and keep the safety outputs in the ON state even if the F3SG is blocked.
	Muting end wait time	Time difference from when the F3SG is unblocked until the Muting state is cancelled.
	Muting information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when the F3SG is in the Muting state.
	Muting input time limit value (maximum)	Maximum time difference between Muting inputs A and B.
	Muting input time limit value (minimum)	Minimum time difference between Muting inputs A and B.
	Muting sensor	Input device, such as photoelectric sensor or proximity sensor, to give an input signal for notifying the start and end of the Muting function. The Smart Muting Actuator (F3W-MA) is one of the muting sensors.

	Term	Description
M	Muting sequence error	An error that occurs when muting signal is not received in the correct order or a specified muting time is exceeded.
	Muting statistics information	Function to help the user optimize installation and settings of the F3SG according to muting input information saved in the F3SG.
	Muting time limit	The duration time of the Muting function. The Muting state is cancelled if it continues for longer than this time limit.
	Muting/Override information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when the F3SG is in the Muting or Override state.
N	Number of floating beams	Number of beams to be configured in the Floating Blanking zone, for which the safety outputs of the F3SG are not turned to the OFF state even when blocked. If a specified number of beams are not blocked, the F3SG transitions to the state configured for the floating blanking monitoring.
O	Object resolution (Detection capability)	Minimum size of an object that can be detected in the protective height of the F3SG.
	Offline	State where SD Manager 2 is disconnected from the F3SG.
	Operating status monitoring	Function to read out the I/O data and status of functions of the F3SG.
	Operator level	Access level where only reading configurations from the F3SG is possible. (Writing configurations of power-on time and load switching frequency thresholds is also possible with this level.) Login with the administrator level (password) is required to change configurations.
	Output operation mode	The user can select information to be assigned to Lamp or auxiliary output from the drop-down list.
	Override	Function to disable the safety functions and forcibly turn the safety outputs to the ON state. This can be used in such a case that a muting error has occurred and it is necessary to eject a workpiece forcibly. (Override can also be enabled at power-on when Exit-Only Muting is enabled.)
	Override information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when the F3SG is in the Override state.
	Override input time limit (maximum)	Input time limit (maximum value) of the special sequence to activate the Override function.
	Override time limit	The duration time of the Override function. The Override state is cancelled if it continues for longer than this time limit.
P	Position detection muting mode	Mode that enables the Muting function according to the position of a hazardous source such as a robot arm, using heterogeneous redundant inputs.
	Power-on time	Function to display the period of time when the F3SG is energized, starting from when the power-on time was last reset until the present time.
	Pre-Reset	One of the Interlock reset functions. Interlock state can be released only in the sequence that the operator operates the Pre-reset switch installed in the hazardous zone and leave the hazardous zone, and then operates the Reset switch outside the hazardous zone.
	Primary sensor	Name used for the F3SG to be connected nearest the power supply, when in cascade connection.
	Priority	When there are information signals of output operation mode of all the three colors of Lamp output at once, the Lamp illuminates in the color of the top priority. The smaller the number is, the higher the priority becomes. (Priority of colors to illuminate (from high to low): Red > Orange > Green)
	Push Switch information	The area shown in the Operating Status Monitoring screen lights up when the Push Switch of the F3SG-RA is pressed.
R	Reduced resolution	Function to change the size of the object resolution so that an object of the size between 1 and 3 beams has no effect. The safety outputs are kept in the ON state even when the designated number of beams (1 to 3 beams) is blocked at multiple places at the same time.
	Reset	Function to reset power-on time and load switching frequency to zero.
	Response time adjustment	Function to change the response time so that the safety outputs can hardly be turned OFF due to accidental interruption by an environmental factor.
	Restart interlock	Function to keep the safety outputs in the OFF state until a reset signal is received even when a guarded machine returns to a safe state after the F3SG is blocked and turned the safety outputs to the OFF state.

	Term	Description
S	Safety distance	Distance that must be set between the F3SG and a machine's hazardous part to stop the hazardous part before a person or object reaches it.
	Safety output (OSSD)	Output to be turned to the ON state when safety is ensured. This can be used for safety applications.
	Safety output information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when the safety outputs are in the ON state.
S	Scan code	Code for synchronization between emitter and receiver pair. The F3SG has two scan codes (Code A, Code B). Switching one code to another minimizes mutual interference between closely installed F3SG's.
	SD Manager 2	Setting software that is used as the Configuration Tool for the F3SG. It allows the user to make settings to or monitor the operation of the F3SG when the F3SG is connected to a PC via the Interface Unit or Bluetooth® Communication Unit.
	Secondary sensor	Name used for other segments of F3SG's than the primary sensor, when in cascade connection.
	Setting recovery	Function to restore the factory settings of the F3SG.
	Setting state	State to allow the user to change configurations of the F3SG. In this state, the safety outputs are in the OFF state.
	Stable-state information	One of output operation modes to be assigned to Lamp or auxiliary output. The information is signaled when the incident light level, which is constantly monitored, is 170% or higher of the ON-threshold value.
	Standard muting mode	Muting mode to be used for such an application where a muting sensor is positioned on both sides of the F3SG. The factory default setting is this mode.
	Start interlock	Function to keep the safety outputs in the OFF state until a reset signal is received even when a guarded machine is in a safe state at power-on or recovery from power failure.
	System information	Displays the response time and the number of sensor segments in cascade connection of the current configuration (cascade connection details and the number of beams).
T	Teach-in	Function to configure blocked beams as target beams of the following functions. - Designated beam output - Fixed Blanking - Muting - Warning zone
	Troubleshooting support signal	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when any one of a Muting Sequence Error, Interference/Vibration Information and Light Level Diagnosis Information signals is in the ON state.
U	Upper beam(s)	Beams located toward the terminal of the F3SG.
W	Warning zone function	Function to configure part of the detection zone, in which the safety outputs are not affected by the beam state. This function must not be used for safety applications.
	Warning zone information	One of output operation modes to be assigned to Lamp or auxiliary output. This information is signaled when a warning zone is blocked.

5-2. Revision History

A manual revision number appears as a suffix to the manual number at the bottom of the front and back covers of this manual.

Z357-E1-08



Revision No.

Revision number	Revision date	Description
01	January 2015	First edition
02	April 2015	<ul style="list-style-type: none"> - Changed updating procedure - Added version information - Added functions to Muting Statistics Information - Minor corrections
03	August 2015	<ul style="list-style-type: none"> - Added Bluetooth® Communication Unit - Minor corrections
04	August 2015	<ul style="list-style-type: none"> - Added the list of compatible Bluetooth® adaptors - Minor corrections
05	February 2016	<ul style="list-style-type: none"> - Improved the Muting Statistic Information function. - Added Vertical approach with no angle (possible circumventing) to Safety Distance Calculation - Added functions to be assigned to Auxiliary/Lamp Outputs - Changed the default settings when creating a new configuration file offline, according to the F3SG modification - Added Windows 10 (32-bit/64-bit) to OS supported - Improved the visuality. - Minor corrections
06	June 2017	<ul style="list-style-type: none"> - Added the F3SG-RR - Minor corrections
07	January 2018	<ul style="list-style-type: none"> - Improved the descriptions of 1-7-1. <i>Versions</i> - Improved the descriptions of 2-5. <i>Logging In.</i> - Minor corrections
08	September, 2023	Added precaution to " <i>Safety Precautions</i> ".

OMRON Corporation Industrial Automation Company

Kyoto, JAPAN

Contact : www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.

Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31) 2356-81-300 Fax: (31) 2356-81-388

OMRON ASIA PACIFIC PTE. LTD.

438B Alexandra Road, #08-01/02 Alexandra
Technopark, Singapore 119968
Tel: (65) 6835-3011 Fax: (65) 6835-3011

OMRON ELECTRONICS LLC

2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.
Tel: (1) 847-843-7900 Fax: (1) 847-843-7787

OMRON (CHINA) CO., LTD.

Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-6023-0333 Fax: (86) 21-5037-2388

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