OMRON

SAFETY, TECHNOLOGY & INNOVATION

For more information, visit
http://www.ia.omron.com/f3sg-r

Safety Light Curtain
F3SG-□RA Series

Quick Installation Manual

Original instructions

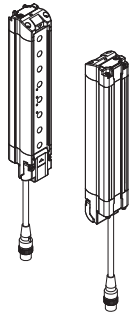
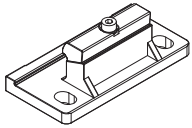
7999687-9C

Introduction

Thank you for purchasing the F3SG-□RA Series Safety Light Curtain (hereinafter referred to as the "F3SG-R").
This document contains simple instructions to install the F3SG-R.
Please download the F3SG-R User's Manual for full contents of the instructions from our website at:
http://www.ia.omron.com/f3sg-r

Table of Contents

1. What is Included

Product	Quantity
F3SG-□RA□□□□□□□□ main unit 	Emitter x 1, Receiver x 1
Standard Fixed Bracket 	The number of brackets included depends on protective height of the F3SG-R. Less than 1,280 mm: 2 sets 1,280 mm or longer and up to 2,270 mm: 3 sets 2,350 mm or longer and up to 2,510 mm: 4 sets
Warning Zone Label	1
Troubleshooting Guide Sticker	1
Safety Precautions	4
Quick Installation Manual	1

2. Factory Default Settings

Feature	Factory Default Setting
External Test	24 V Active
Interlock	Auto Reset Mode enabled
EDM (External Device Monitoring)	Disabled
Auxiliary Output	Enabled
Muting	Standard Muting Mode enabled
Override	Enabled

Refer to *F3SG-R Series User's Manual* for more information.

3. Ratings/Specifications

The □□□□ in the model names indicate the protective heights in millimeters.

		F3SG-4RA□□□□-14 F3SG-2RA□□□□-14	F3SG-4RA□□□□-30 F3SG-2RA□□□□-30
Type of ESPE (IEC 61496-1)	Type 4	F3SG-4RA□□□□-14/-30	
	Type 2	F3SG-2RA□□□□-14/-30	
Performance			
Object Resolution (Detection Capability)		Opaque objects	
		14-mm dia.	30-mm dia.
Beam Gap		10 mm	20 mm
Number of Beams		15 to 207	8 to 124
Lens Size		5.2 x 3.4 (W x H) mm	7-mm dia.
Protective Height		160 to 2080 mm (6.3 to 81.9 inch)	190 to 2510 mm (7.3 to 98.7 inch)
Operating Range	Long	0.3 to 10.0 m (1 to 32 ft.)	0.3 to 20.0 m (1 to 65 ft.)
	Short	0.3 to 3.0 m (1 to 10 ft.)	0.3 to 7.0 m (1 to 23 ft.)
Response Time	ON to OFF	Normal mode: 8 to 18 ms *1 Slow mode: 16 to 36 ms *1 *2	
	OFF to ON	40 to 90 ms *1	
	*1. Response time when used in one segment system or in cascaded connection. Refer to *F3SG-R Series User's Manual* for more information. *2. Selectable by Configuration Tool.		
Effective Aperture Angle (EAA) (IEC 61496-2)	Type 4	±2.5° max., emitter and receiver at operating range of 3 m or greater	
	Type 2	±5.0° max., emitter and receiver at operating range of 3 m or greater	
Light Source		Infrared LEDs, Wavelength: 870 nm	
Startup Waiting Time		2 s max.	
Electrical			
Power Supply Voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
Current Consumption		Refer to *F3SG-R Series User's Manual* for more information.	
Safety Outputs (OSSD)		Two PNP or NPN transistor outputs (PNP or NPN is selectable by DIP Switch.) Load current of 300 mA max., Residual voltage of 2 V max. (except for voltage drop due to cable extension), Capacitive load of 1 μF max., Inductive load of 2.2 H max. *1 Leakage current of 1 mA max. (PNP), 2 mA max. (NPN) *2 *1. The load inductance is the maximum value when the safety output frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger. *2. These values must be taken into consideration when connecting elements including a capacitive load such as a capacitor.	
Auxiliary Output		One PNP or NPN transistor output (PNP or NPN is selectable by DIP Switch.) Load current of 100 mA max., Residual voltage of 2 V max .	
Output Operation Mode	Safety Output	Light-ON (Safety output is enabled when the receiver receives an emitting signal.)	
	Auxiliary Output	Muting or Override output (default) (Configurable by Configuration Tool)	

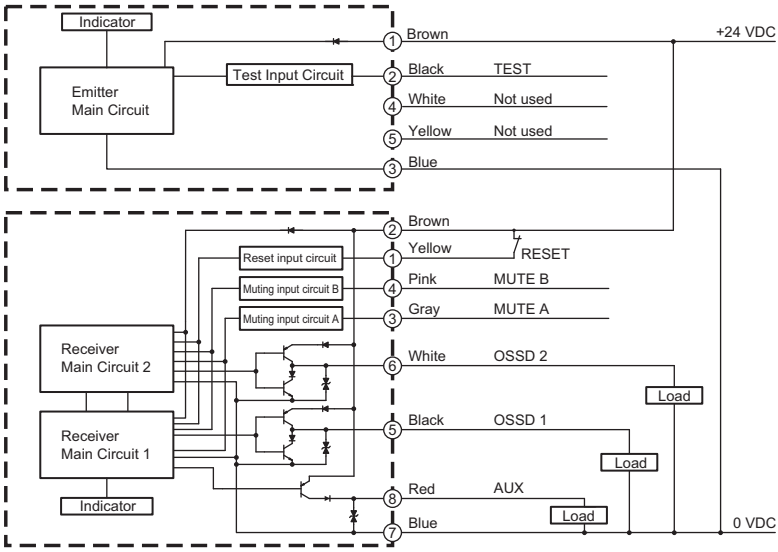
		F3SG-4RA□□□□-14 F3SG-2RA□□□□-14	F3SG-4RA□□□□-30 F3SG-2RA□□□□-30
Input Voltage	ON Voltage	TEST: 24 V Active: 9 V to Vs (sink current 3 mA max.) * 0 V Active: 0 to 3 V (source current 3 mA max.) MUTE A/B: PNP: Vs to Vs-3 V (sink current 3 mA max.) * NPN: 0 to 3 V (source current 3 mA max.) RESET: PNP: Vs to Vs-3 V (sink current 5 mA max.) * NPN: 0 to 3 V (source current 5 mA max.)	
	OFF Voltage	TEST: 24 V Active: 0 to 1.5 V, or open 0 V Active: 9 V to Vs, or open MUTE A/B, RESET: PNP: 0 to 1/2 Vs, or open * NPN: 1/2 Vs to Vs, or open *	
	* The Vs indicates a supply voltage value in your environment.		
Overvoltage Category (IEC 60664-1)		II	
Indicators		Refer to *F3SG-R Series User's Manual* for more information.	
Protective Circuit		Output short protection, Power supply reverse polarity protection	
Insulation Resistance		20 MΩ or higher (500 VDC megger)	
Dielectric Strength		1,000 VAC, 50/60 Hz (1 min)	
Functional			
Mutual Interference Prevention (Scan Code)		This function prevents mutual interference in up to two F3SG-RA systems.	
Cascade Connection		Number of cascaded segments: 3 max. Total number of beams: 255 max. Total sum of cable lengths between sensors: 10 m max.	
Test Function		Self-test (at power-on, and during operation) External test (light emission stop function by test input)	
Safety-Related Functions		Interlock External device monitoring (EDM) Pre-reset Fixed blanking/Floating blanking Reduced resolution Muting/Override Scan code selection PNP/NPN selection Response time adjustment Refer to *F3SG-R Series User's Manual* for more information.	
Environmental			
Ambient Temperature	Operating	-10 to 55°C (14 to 131°F) (non-icing)	
	Storage	-25 to 70°C (-13 to 158°F)	
Ambient Humidity	Operating	35% to 85% (non-condensing)	
	Storage	35% to 95%	
Ambient Illuminance		Incandescent lamp: 3,000 lx max. on receiver surface Sunlight: 10,000 lx max. on receiver surface	
Degree of Protection (IEC 60529)		IP65/IP67	
Vibration Resistance (IEC 61496-1)		10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes	
Shock Resistance (IEC 61496-1)		100 m/s^2, 1000 shocks for all 3 axes	
Pollution Degree (IEC 60664-1)		Pollution Degree 3	
Connections			
Power cable	Type of Connection	M12 connectors: 5-pin emitter and 8-pin receiver, IP67 rated when mated, Cables prewired to the sensors	
	Number of Wires	Emitter: 5, Receiver: 8	
	Cable Length	0.3 m	
	Cable Diameter	6 mm	
	Minimum Bending Radius	R5 mm	

		F3SG-4RA□□□□-14 F3SG-2RA□□□□-14	F3SG-4RA□□□□-30 F3SG-2RA□□□□-30
Cascading cable	Type of Connection	M12 connectors: 5-pin emitter and 8-pin receiver, IP67 rated when mated	
	Number of Wires	Emitter: 5, Receiver: 8	
	Cable Length	0.2 m	
	Cable Diameter	6 mm	
	Minimum Bending Radius	R5 mm	
Extension cable - Single-ended cable - Double-ended cable	Type of Connection	M12 connectors: 5-pin emitter and 8-pin receiver, IP67 rated when mated	
	Number of Wires	Emitter: 5, Receiver: 8	
	Cable Length	Refer to *F3SG-R Series User's Manual* for more information.	
	Cable Diameter	6.6 mm	
	Minimum Bending Radius	R36 mm	
Extension of Power Cable		100 m max.	
Material			
Material		Housing: Aluminum Cap: PBT Front window: PMMA Cable: Oil resistant PVC Mounting Bracket: ZDC2 FE plate: SUS	
Weight (packaged)		Refer to *F3SG-R Series User's Manual* for more information.	
Included Accessories		Safety Precautions, Quick Installation Manual, Standard Fixed Bracket*, Troubleshooting Guide Sticker, Warning Zone Label * The quantity of Standard Fixed Brackets included varies depending on the protective height. [F3SG-□RA□□□□-14] - Protective height of 0160 to 1200: 2 sets - Protective height of 1280 to 2080: 3 sets [F3SG-□RA□□□□-30] - Protective height of 0190 to 1230: 2 sets - Protective height of 1310 to 2270: 3 sets - Protective height of 2350 to 2510: 4 sets	

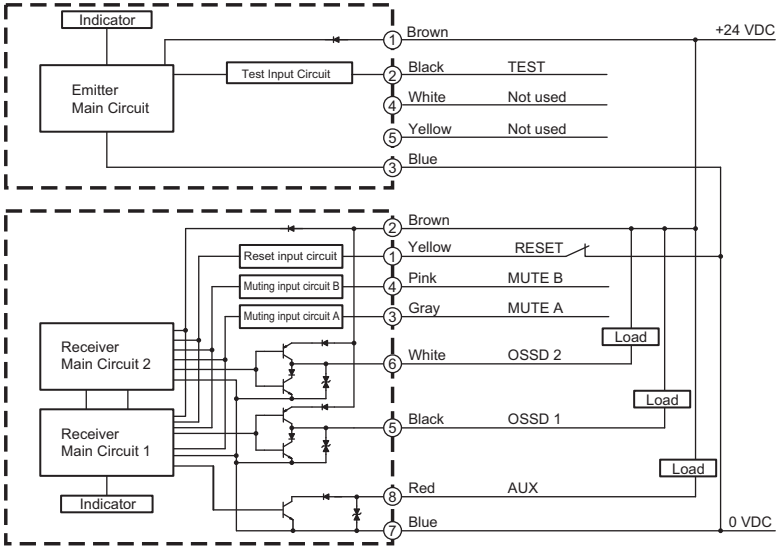
4. Input/Output Circuit

4-1. Input/Output Circuit

• PNP Output

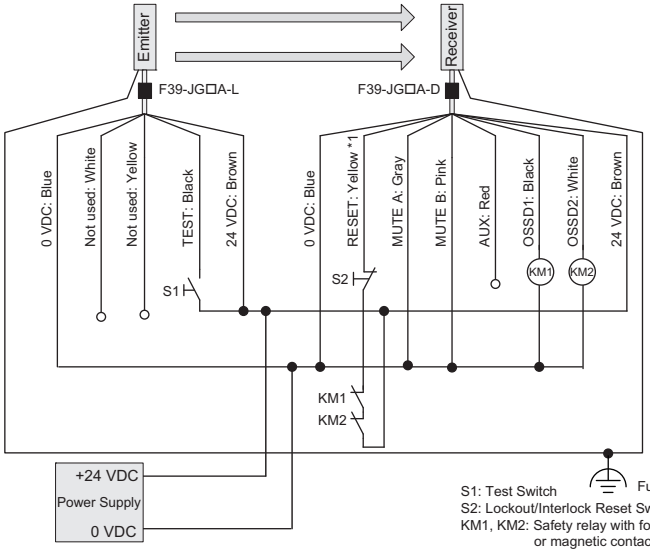


• NPN Output



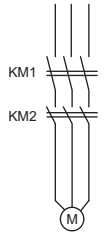
5.Wiring Examples

5-1. Standalone F3SG-RA using PNP Outputs



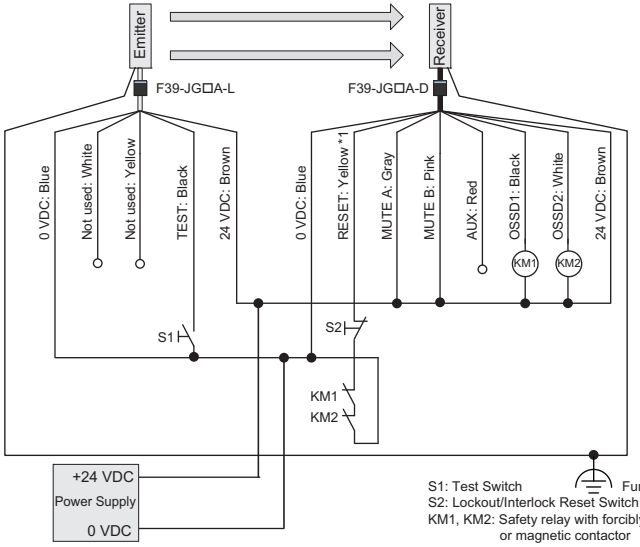
[DIP Switch settings] *2
Receiver:
- Manual Reset Mode
- EDM enabled
- PNP output

Emitter:
- 24 V Active



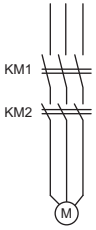
S1: Test Switch
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
or magnetic contactor
M: 3-phase motor
*1. Also used as EDM input line.
*2. The functions can be configured with the DIP Switch. Refer to *6. DIP Switch* for setting with the DIP Switch.

5-2. Standalone F3SG-RA using NPN Outputs



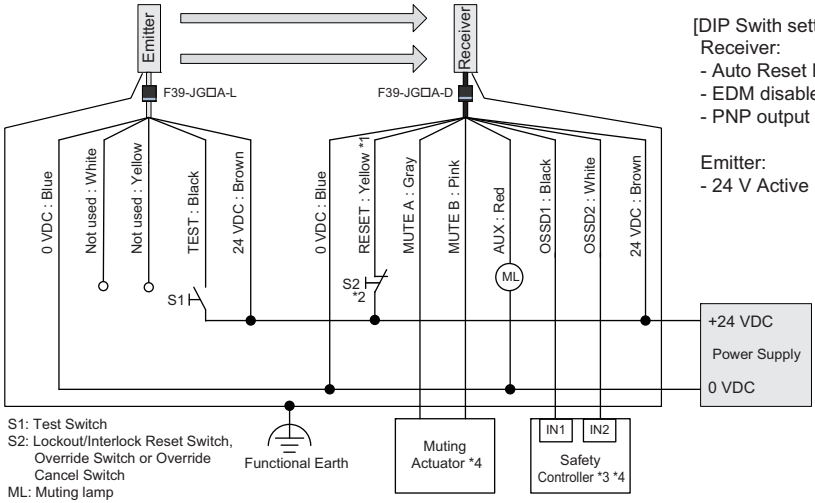
[DIP Switch settings] *2
Receiver:
- Manual Reset Mode
- EDM enabled
- NPN output

Emitter:
- 0 V Active



S1: Test Switch
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
or magnetic contactor
M: 3-phase motor
*1. Also used as EDM input line.
*2. The functions can be configured with the DIP Switch. Refer to *6. DIP Switch* for setting with the DIP Switch.

5-3. Standard Muting Mode/Exit-Only Muting Mode using PNP Outputs



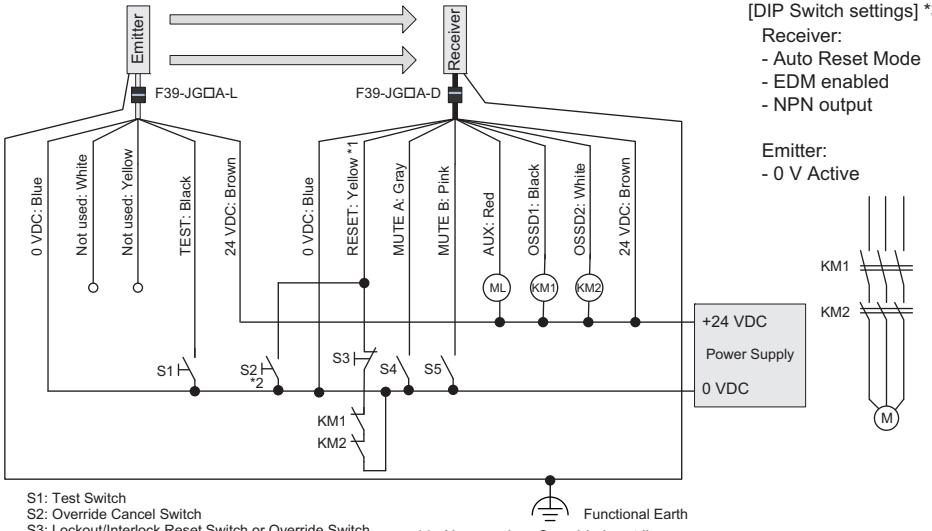
[DIP Swith settings] *5
Receiver:
- Auto Reset Mode
- EDM disabled
- PNP output

Emitter:
- 24 V Active

S1: Test Switch
S2: Lockout/Interlock Reset Switch, Override Switch or Override Cancel Switch
ML: Muting lamp

*1. Also used as Override input line.
*2. Make sure to connect an override cancel switch to the RESET line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3. Refer to *F3SG-R Series User's Manual* for more information.
*4. The safety controller and the F3SG-RA must share the power supply or be connected to the common terminal of the power supply.
*5. Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.
*6. The functions can be configured with the DIP Switch. Refer to *6. DIP Switch* for setting with the DIP Switch.

5-4. Standard Muting Mode/Exit-Only Muting Mode using NPN Outputs



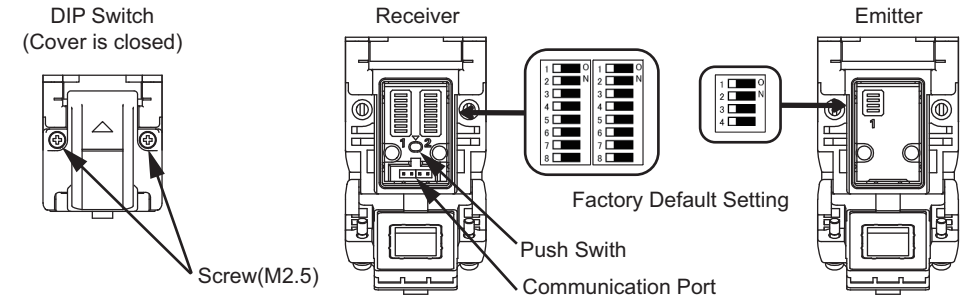
[DIP Switch settings] *3
Receiver:
- Auto Reset Mode
- EDM enabled
- NPN output

Emitter:
- 0 V Active

S1: Test Switch
S2: Override Cancel Switch
S3: Lockout/Interlock Reset Switch or Override Switch
S4, S5: Muting sensor
KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
M: 3-phase motor
ML: Muting lamp

*1. Also used as Override input line.
*2. Make sure to connect an override cancel switch to the RESET line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3. The functions can be configured with the DIP Switch. Refer to *6. DIP Switch* for setting with the DIP Switch.

6. DIP Switch



When attaching the cover, tightly fasten the screws (M2.5, recommended torque: 0.35 N•m). Failure to do so may cause the cover to come loose, leading to deterioration of the protective functions.

Receiver

Position	Function	Setting	Description
1	Scan Code	1 OFF ON	Scan Code A (factory default setting)
		1 ON ON	Scan Code B
2	External Device Monitoring (EDM)	2 OFF ON	External Device Monitoring (EDM) Disabled (factory default setting)
		2 ON ON	External Device Monitoring (EDM) Enabled
3, 4	Interlock/Pre-Reset	3 OFF ON 4 OFF ON	Auto Reset (factory default setting)
		3 ON ON 4 OFF ON	Manual Reset (Start/Restart Interlock)
		3 OFF ON 4 ON ON	Pre-Reset
		3 ON ON 4 ON ON	Auto Reset (This also enables Auto Reset.)
5, 6	Fixed Blanking/Floating Blanking	5 OFF ON 6 OFF ON	Blanking Disabled (factory default setting)
		5 ON ON 6 OFF ON	Fixed Blanking Enabled
		5 OFF ON 6 ON ON	Floating Blanking Enabled
		5 ON ON 6 ON ON	Blanking Disabled
7	PNP/NPN Selection	7 OFF ON	PNP (factory default setting)
		7 ON ON	NPN
8	DIP Switch/Configuration Tool Selection	8 OFF ON	DIP Switch Enabled (factory default setting)
		8 ON ON	Configuration Tool Enabled

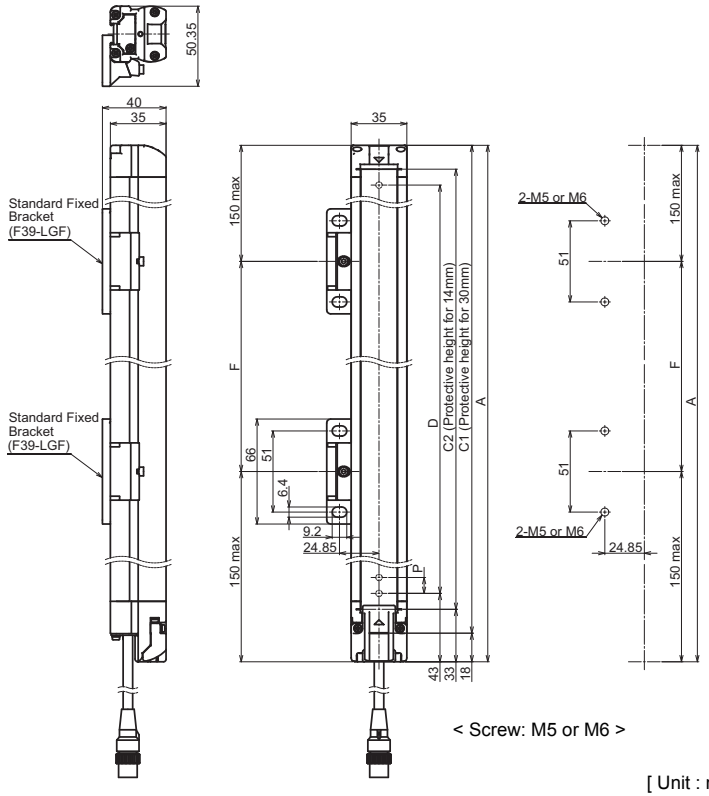
Emitter

Position	Function	Setting	Description
1	Scan Code	1 OFF ON	Scan Code A (factory default setting)
		1 ON ON	Scan Code B
2, 3	Operating Range Selection	2 OFF ON 3 OFF ON	Short Mode (factory default setting)
		2 ON ON 3 OFF ON	Setting Inhibited
		2 OFF ON 3 ON ON	Setting Inhibited
		2 ON ON 3 ON ON	Long Mode
4	External Test	4 OFF ON	24 V Active (factory default setting)
		4 ON ON	0 V Active

7. Dimentions

7-1. Mounted with Standard Fixed Brackets (F39-LGF)

7-1-1. Backside Mounting



< Screw: M5 or M6 >

[Unit : mm]

F3SG-□RA□□□□-30 Series

Dimension A	C1+18
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension P	20

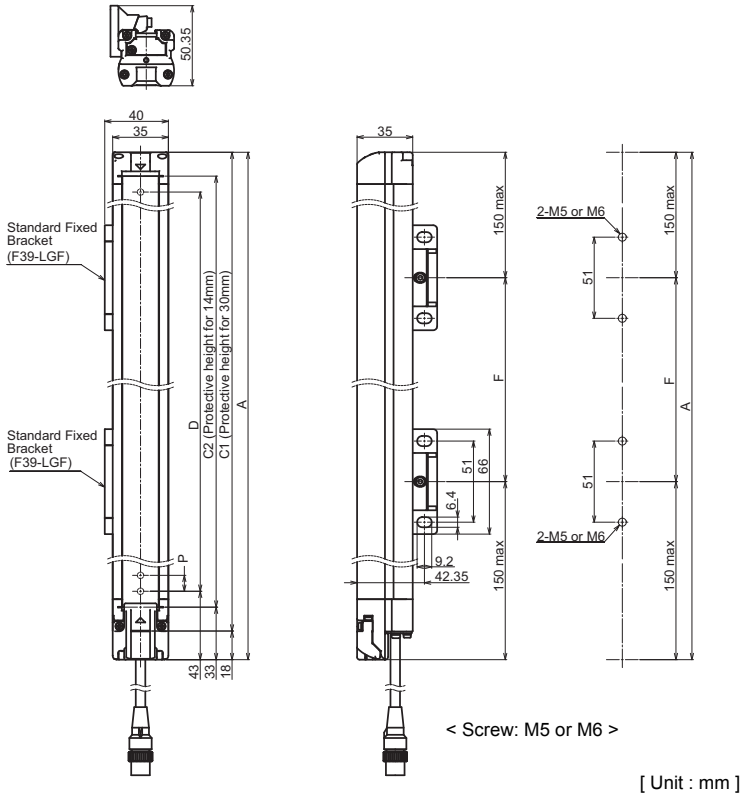
F3SG-□RA□□□□-14 Series

Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

Protective height (C1)	Number of Standard Fixed Brackets	Dimension F
0190 to 1230	2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

Protective height (C2)	Number of Standard Fixed Brackets	Dimension F
0160 to 1200	2	1000 mm max.
1280 to 2080	3	1000 mm max.

7-1-2. Side Mounting



F3SG-□RA□□□□-30 Series

Dimension A	C1+18
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension P	20

Protective height (C1)	Number of Standard Fixed Brackets	Dimension F
0190 to 1230	2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

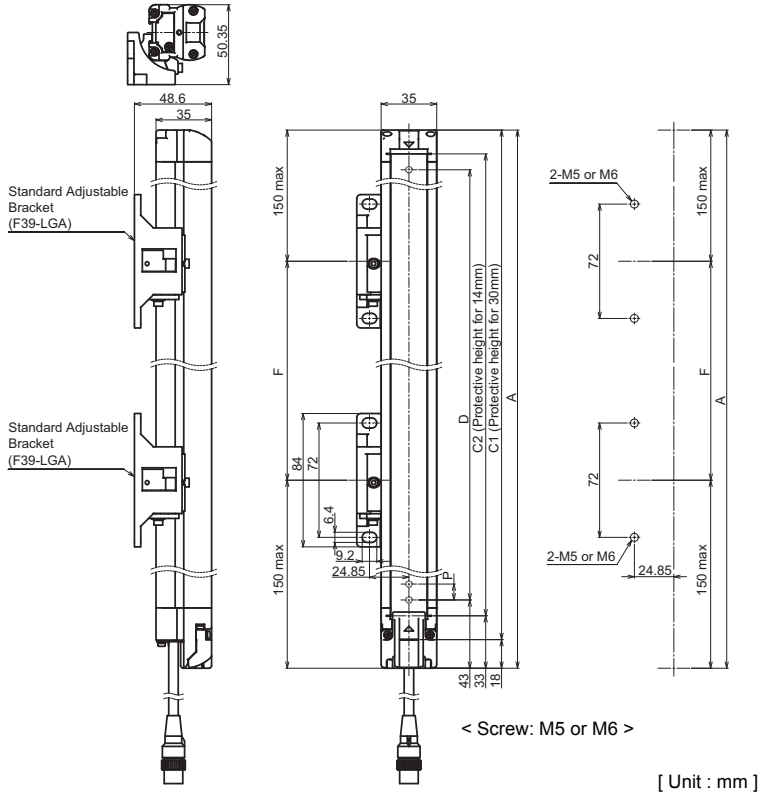
F3SG-□RA□□□□-14 Series

Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

Protective height (C2)	Number of Standard Fixed Brackets	Dimension F
0160 to 1200	2	1000 mm max.
1280 to 2080	3	1000 mm max.

7-2. Mounted with Standard Adjustable Brackets (F39-LGA)

7-2-1. Backside Mounting



F3SG-□RA□□□□-30 Series

Dimension A	C1+18
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension P	20

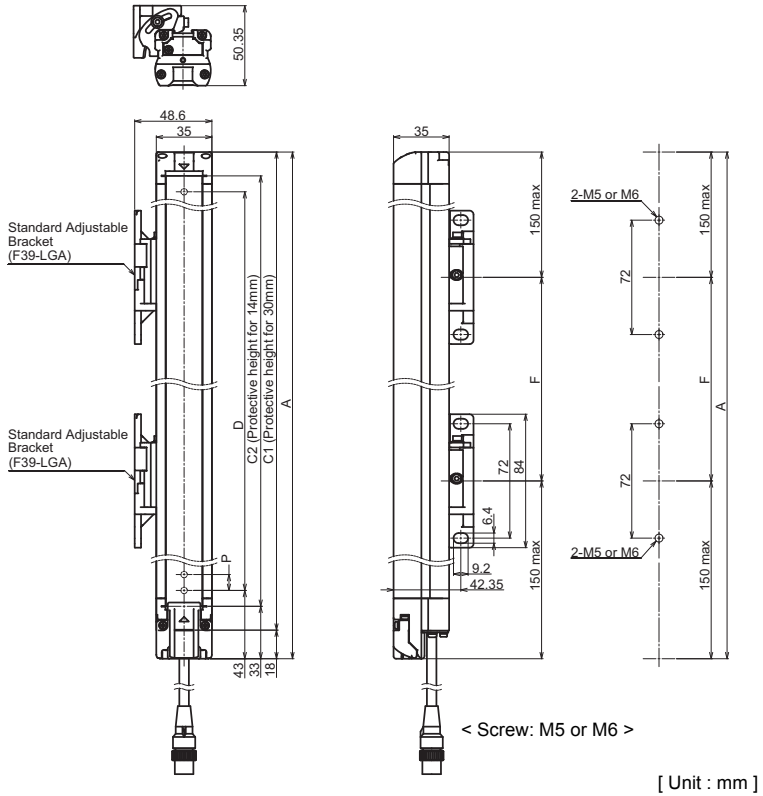
F3SG-□RA□□□□-14 Series

Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

Protective height (C1)	Number of Standard Adjustable Brackets	Dimension F
0190 to 1230	2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

Protective height (C2)	Number of Standard Adjustable Brackets	Dimension F
0160 to 1200	2	1000 mm max.
1280 to 2080	3	1000 mm max.

7-2-2. Side Mounting



F3SG-□RA□□□□-30 Series

Dimension A	C1+18
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension P	20

Protective height (C1)	Number of Standard Adjustable Brackets	Dimension F
0190 to 1230	2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

F3SG-□RA□□□□-14 Series

Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

Protective height (C2)	Number of Standard Adjustable Brackets	Dimension F
0160 to 1200	2	1000 mm max.
1280 to 2080	3	1000 mm max.

8. Mounting

8-1. Mounting with Standard Fixed Brackets (F39-LGF)

Step 1. Loosen screws (M3 x 15).

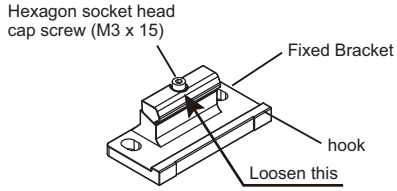


Fig. 1

Step 2. Attach the bracket to the F3SG-R and lightely tighten the screws.

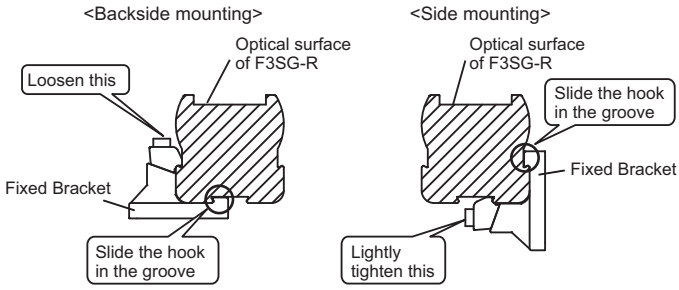


Fig. 2

Step 3. Adjust the position and secure the bracket to the F3SG-R.
Tightening torque: 2.0 N•m (recommended)

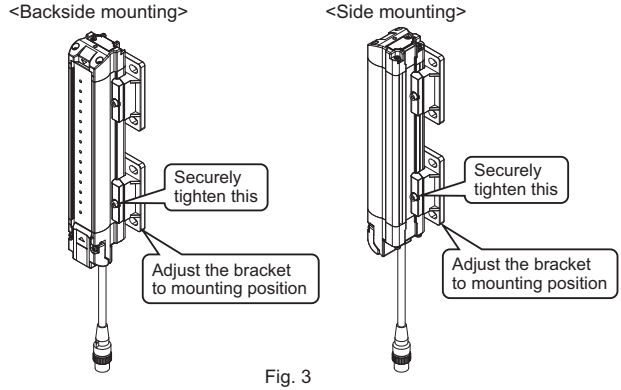


Fig. 3

Step 4. Secure the bracket to the wall.

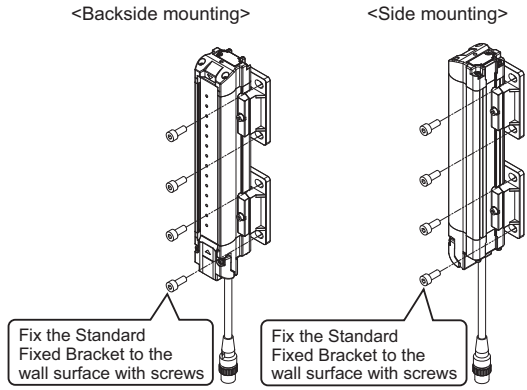


Fig. 4

Screws to mount the brackets to the wall are not included.

8-2. Mounting with Standard Adjustable Brackets (F39-LGA)

Step 1. Loosen the Screw (1) and adjust the angle.

Step 2. Loosen the Screw (2).

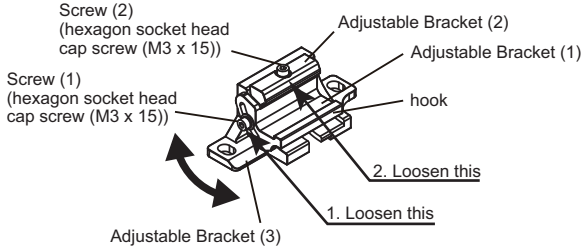


Fig. 1

Step 3. Attach the bracket to the F3SG-R and lightely tighten the Screw (2).

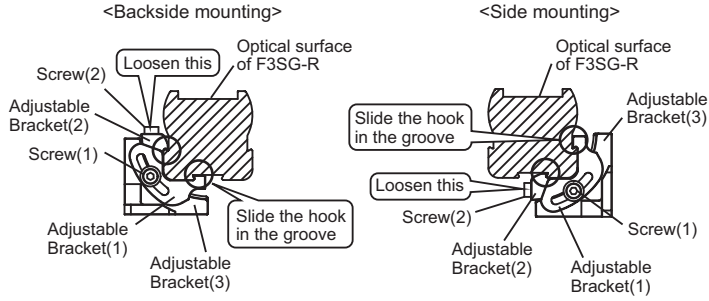


Fig. 2

Step 4. Adjust the position and secure the bracket to the F3SG-R lightely.
Tightening torque: 2.0 N•m (recommended)

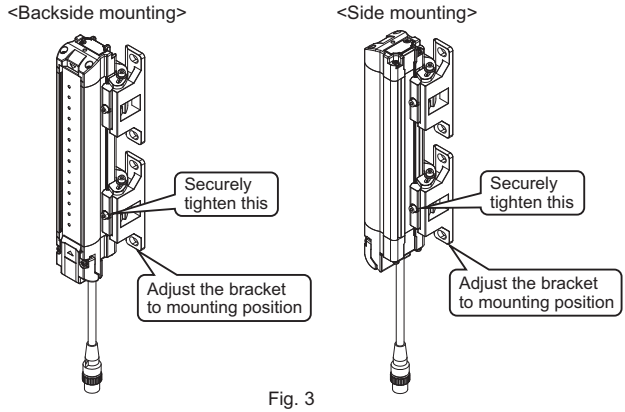


Fig. 3

Step 5. Secure the bracket to the wall.

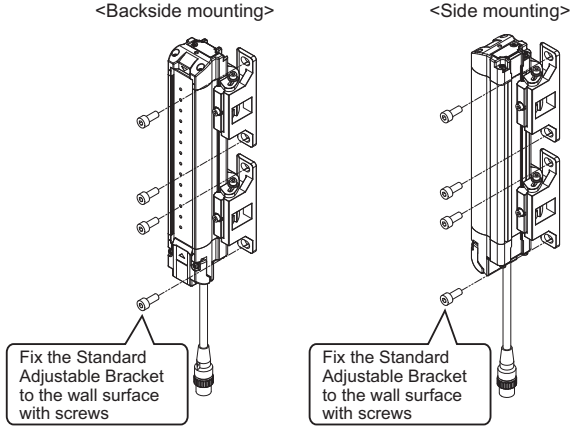


Fig. 4

Step 6. Power the F3SG-R on and perform beam alignment.

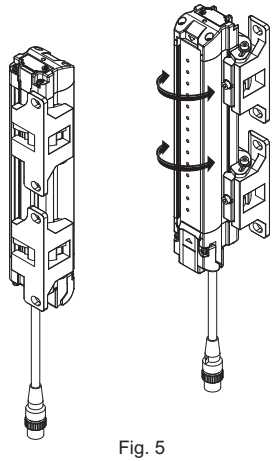


Fig. 5

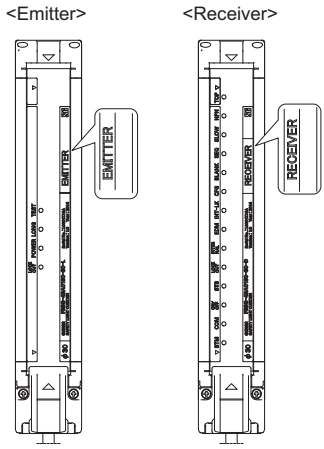


Fig. 6

Angle adjustment range: ±15°

Step 7. Secure the bracket to the F3SG-R.
Tightening torque: 2.0 N•m (recommended)

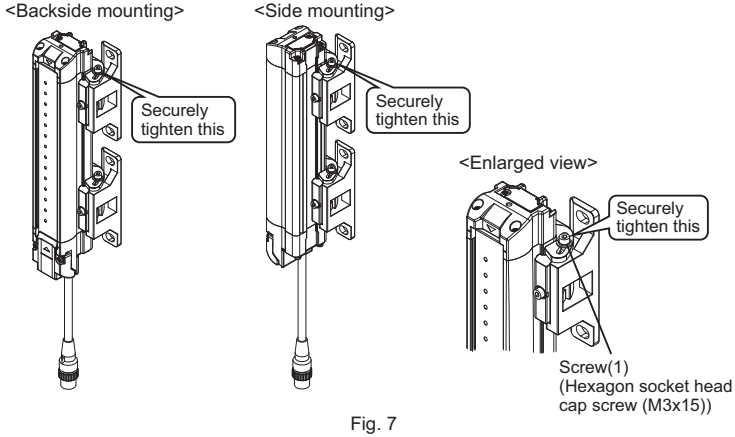
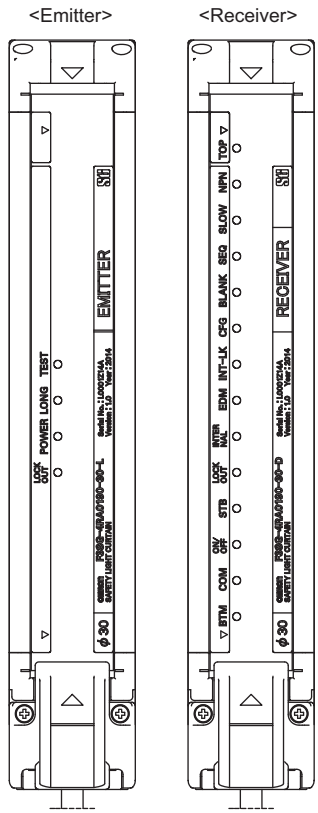


Fig. 7

9. LED Indicators



1. Test indicator (Green)
2. Operating range indicator (Green)
3. Power indicator (Green)
4. Lockout indicator (Red)

1. Top-beam-state indicator (Blue)
2. PNP/NPN mode indicator (Green)
3. Response time indicator (Green)
4. Sequence error indicator (Yellow)
5. Blanking indicator (Green)
6. Configuration indicator (Green)
7. Interlock indicator (Yellow)
8. External device monitoring indicator (Green)
9. Internal error indicator (Red)
10. Lockout indicator (Red)
11. Stable-state indicator (Green)
12. ON/OFF indicator (Green/Red)
13. Communication indicator (Green)
14. Bottom-beam-state indicator (Blue)

LED Indicator Status

Emitter

Location	Name of Indicator		Color	Illuminated	Blinking
1	Test	TEST	Green	-	External Test is being performed
2	Operating range	LONG	Green	Long range mode is selected	Lockout state due to DIP Switch setting error or Operating range selection setting error
3	Power	POWER	Green	Power is ON.	Error due to noise
4	Lockout	LOCKOUT	Red	-	Lockout state due to error in emitter

Receiver

Location	Name of Indicator		Color	Illuminated	Blinking
1	Top-beam-state	TOP	Blue	The top beam is unblocked	Muting/Override state, or Lockout state due to Cap error or Other sensor error
2	PNP/NPN mode	NPN	Green	NPN mode is selected by DIP Switch	-
3	Response time	SLOW	Green	Response Time Adjustment is enabled	-
4	Sequence error	SEQ	Yellow	-	Sequence error in Muting or Pre-reset mode
5	Blanking	BLANK	Green	Blanking, Warning Zone or Reduced Resolution is enabled	Teach-in mode, or Blanking Monitoring error
6	Configuration	CFG	Green	-	Teach-in mode, zone measurement being performed by Dynamic Partial Muting, or Lockout state due to Parameter error or Cascading Configuration error
7	Interlock	INT-LK	Yellow	Interlock state	Pre-reset mode *2
8	External device monitoring	EDM	Green	RESET input is in ON state *1	Lockout state due to EDM error
9	Internal error	INTERNAL	Red	-	Lockout state due to Internal error, or error due to abnormal power supply or noise
10	Lockout	LOCKOUT	Red	-	Lockout state due to error in receiver
11	Stable-state	STB	Green	Incident light level is 170% or higher of ON-threshold	Safety output is instantaneously turned OFF due to ambient light or vibration
12	ON/OFF	ON/OFF	Green	Safety output is in ON state	-
			Red	Safety output is in OFF state, or the sensor is in Setting state	Lockout state due to Safety Output error, or error due to abnormal power supply or noise
13	Communication	COM	Green	Synchronization between emitter and receiver is maintained	Lockout state due to Communication error, or error due to abnormal power supply or noise
14	Bottom-beam-state	BTM	Blue	The bottom beam is unblocked	Muting/Override state, or Lockout state due to DIP Switch setting error

*1.The EDM indicator is illuminated when the RESET input is in the ON state regardless of the use of the EDM function.
*2.Refer to *F3SG-R Series User's Manual* for more information.

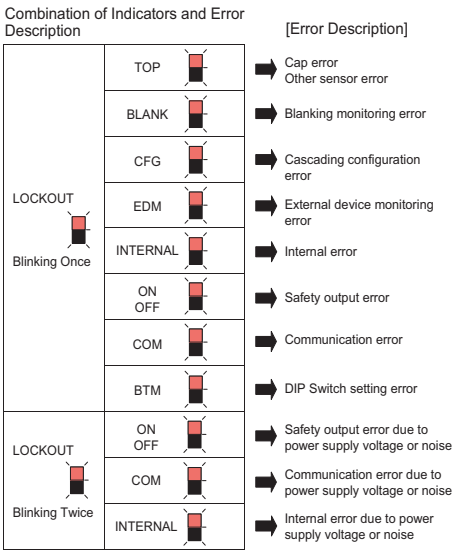
TOP, CFG, LOCKOUT, STB and ON/OFF indicators are illuminated when the receiver is in Setting mode.

10. Troubleshooting

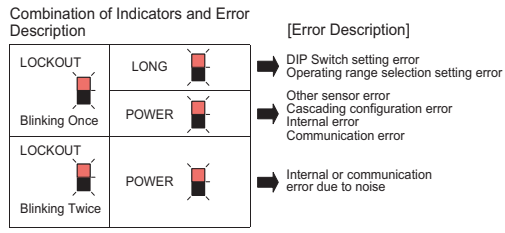
■Lockout State

Blink OFF

<Indicator status at lockout: Receiver>

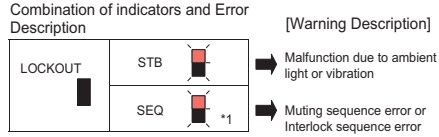


<Indicator status at lockout: Emitter>



■Warning

<Indicator status at warning: Receiver>



*1 There are several illumination patterns to identify a faulty sequcence.

<Indicator status at warning: Emitter>

None

10-1. Lockout State

Description	Cause and measures
Cap error	A cap may be detached. Attach the cap properly.
Other sensor error	Other sensor being cascaded caused an error. Check the indicator of the sensor.
Blanking monitoring error	An error is detected by the fixed blanking monitoring function or the floating blanking monitoring function.
Cascading configuration error	The cascading cable may be short-circuited, broken, or disconnected. Check that the cascading cable should be tightly connected. If the cascading cable is broken, replace it.
	The number of connected sensors or beams may have exceeded the maximum value due to cascading. Check the configuration.
External device monitoring error	Relay may be welded. Replace the relay.
	The relay and the RESET line may not be properly wired. Check the wiring with the relay.
	The relay response time may be exceeding the allowable delay time. Change the allowable delay time or replace the relay with one that has an appropriate response time.
Internal error	An error may have occurred in the internal circuit. Replace the F3SG-R.
Safety output error	Safety output lines may be short-circuited to each other or another signal line may be short-circuited to the safety output line. Wire the safety output lines properly.
Communication error	The communication line or other wiring may be broken or short-circuited. Check the Cascading or extension cables.
	If the wiring is extended with cables other than specified, the cables used for extension may not have performance equivalent or greater than the specified cables. Use cables with the same performance or more than the specified cables.
DIP Switch setting error	A DIP Switch may have been changed during operation. Check if a DIP Switch Setting was changed or not.
	Settings of two DIP Switches of a receiver may be unmatched. Check if two DIP Switches of a receiver are matched.
Operating range selection setting error	The setting of the operating range selection may be incorrect. Check if the Operating Range Selection of the DIP Switch is properly set.

Description	Cause and measures
Safety output error due to power supply voltage or noise	The power supply voltage may have dropped temporarily when the F3SG-R is in operation. Check for temporary power supply voltage drop (by about 12 VDC) by the influence of the inductive load, etc. If the exclusive power supply is not used, check the power consumption of other connected devices for enough capacity.
	Effect of noise may be excessive. If other devices using the same power supply generate noise, do not share the same power supply with other devices, and use a separate power supply exclusively for the safety components. The inductive noise tends to be induced especially if the power supply line of the machine guarded and the power supply line of the F3SG-R are arranged in parallel. Arrange the exclusive power supply near the F3SG-R or lay the power supply line of the F3SG-R away from the power supply line of the machine guarded. If the power supply for the F3SG-R is located near the power supply of the machine guarded and it uses the same ground, it is subject to the influence of common mode noise from the ground. Separate the grounding point or use it as the exclusive ground.
	Power supply voltage may be outside the rated range. Connect the F3SG-R to a 24 VDC±20% power supply voltage.
	Voltage fluctuation may have occurred due to insufficient power supply capacity. Replace the power supply with one that has a larger capacity.
	Instantaneous break or instantaneous stop may have occurred due to power sharing with other devices. Do not share the power supply with other devices. Connect the F3SG-R to a power supply that is dedicated to electro-sensitive protective devices for electro-sensitive protective equipment such as the F3SG-R, safety controller, etc.
Communication error due to power supply voltage or noise	Communication error may have occurred due to noise. Check the noise level in the environment.
	The power supply voltage may have dropped temporarily when the F3SG-R is in operation. Check for temporary power supply voltage drop (by about 12 VDC) by the influence of the inductive load, etc. If the exclusive power supply is not used, check the power consumption of other connected devices for enough capacity.
Internal error due to power supply voltage or noise	The internal circuitry may be defective due to power supply voltage or noise. Check the ambient noise environment. Make sure that the power supply voltage is 24 VDC±20%. If the indicator still shows this error, replace the F3SG-R.
Internal or communication error due to noise	The internal circuitry may be defective due to noise. Check the noise level in the environment.
	Communication error may have occurred due to noise. Check the noise level in the environment.

10-2. Warning

Description	Cause and measures
Malfunction due to ambient light or vibration	An instantaneous beam shift may have occurred due to vibration or ambient light. Check the installation condition. Take necessary measures against mutual interference according to "*Mutual Interference Prevention* ".
Muting sequence error	Muting input may have been applied in the incorrect order. The cause of a muting error can be determined according to the indicator display patterns.
Interlock sequence error	An input related to interlock may have been applied in an incorrect sequence. A cause of an interlock error can be recognized by an indication pattern of indicators.

■Muting Sequence Error Indication

Sequence error indicator	Cause and measures
 Blinking: Once	Power supply may have been turned ON with muting input A or B being ON. Check the condition of the muting sensors and light curtains.
	muting input B may have been turned ON before muting input A was turned ON. Check the condition of the muting sensors.
	muting input A and B may have been turned ON at the same time. Check the arrangement of the muting sensors. Check if the wiring of muting input A and B is short-circuited.
	Either muting input A or B may have been turned ON with the light curtain being blocked or in Interlock State. Check the condition of the light curtains.

Sequence error indicator	Cause and measures
 Blinking: Twice	muting input B may have been turned ON within T1min (= 0.1 s *1) after muting input A was turned ON. Check that if the muting sensors are installed too close each other. Check that if the speed of the workpiece is too fast. *1 Factory default setting
	It may have taken T1max (= 4 s *1) or longer for muting input B to be turned ON after muting input A was turned ON. Check that if the muting sensors are installed too far each other. Check that if the speed of the workpiece is too slow. *1 Factory default setting
	The light curtain may have been blocked after muting input A was turned ON but before muting input B was turned ON. Check the condition of the light curtains.
 Blinking: Four times	The light curtain may have been blocked within 0.08 s after muting input A and B were normally turned ON. Check that if the muting sensor and light curtain are installed too close each other. Check that if the speed of the workpiece is too fast.
	Muting may have been released after the light curtain entered the muting state but before a workpiece blocked the light curtain. Check that the workpiece still remains. Check that the speed of the workpiece is too slow.
 Blinking: Five times	The light curtain entered the muting state, but muting may have then been released while a workpiece passes through the light curtain. Check that the workpiece still remains. Check that if the speed of the workpiece is too slow. Check that the muting sensors have been installed upstream and downstream of the light curtain with the size of workpieces taken into account. (Using four muting sensors)
 Blinking: Six times	Muting may have been released with muting input A and B remained ON after a workpiece passed through the light curtain. Check that the workpiece still remains. Check that the speed of the workpiece is too slow.
 Blinking: Seven times	The next muting sequence may have started after muting was released but before the initial muting condition was established. Check that if a next workpiece has not entered before the current workpiece passes through the light curtain. Check that if the interval between workpieces are too narrow.

■Interlock Sequence Error Indication

Sequence error indicator	Cause and measures
 Blinking: Once	The reset or pre-reset switch may have been pressed before the light curtain receives light. Check the reset input and pre-reset input wiring.
	The light curtain may have been interrupted or the pre-reset switch may have been pressed before the pre-reset switch is pressed. Check the light curtain status and pre-reset input wiring.
 Blinking: Twice	After the pre-reset switch was pressed, the pre-reset or reset switch may have been pressed before the light curtain is interrupted. Check the installation environment of the light curtain.
 Blinking: Three times	After the pre-reset switch was pressed and the light curtain was interrupted, the pre-reset switch may have been pressed before the reset switch is pressed. Check the pre-reset input wiring.
	After the pre-reset switch was pressed, a time period from interruption of the light curtain to the reset switch being pressed may have exceeded the allowable time. Check the installation environment of the light curtain as well as pre-reset and reset switches.
	The number of interruptions of the light curtain may have exceeded the allowable value after the pre-reset switch was pressed and before the reset switch is pressed. Check the installation environment of the light curtain.

11. Reference Documents

Document Title	Language	Cat. No.
Safety Light Curtain F3SG-R Series User's Manual	English	Z352-E1
	Japanese	SGFM-712
	Italian	Z352-IT1
	Simplified Chinese	Z352-CN1

Please download the F3SG-R User's Manual for full contents of the instructions from our website at:
http://www.ia.omron.com/f3sg-r

Suitability for Use

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

See also Product catalog for Warranty and Limitation of Liability.

OMRON Corporation **Industrial Automation Company (Manufacturer)**

Shiokoji Horikawa, Shimogyo-ku, Kyoto, 600-8530 JAPAN **Contact: www.ia.omron.com**

Regional Headquarters

■ OMRON EUROPE B.V. (Representative and Importer in EU)
Wegalaan 67-69, NL-2132 JD Hoofddorp
THE NETHERLANDS
Tel: (31)-2356-81-300 / FAX: (31)-2356-81-388

■ OMRON SCIENTIFIC TECHNOLOGIES INC.
6550 Dumbarton Circle
Fremont, CA 94555 U.S.A.
Tel: (1) 510-608-3400 / Fax: (1) 510-744-1442

■ OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011 / Fax: (65) 6835-2711

■ OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222 / Fax: (86) 21-5037-2200