

Safety Light Curtain

# F3SG-R Series

New standard, offering both robustness and reliability



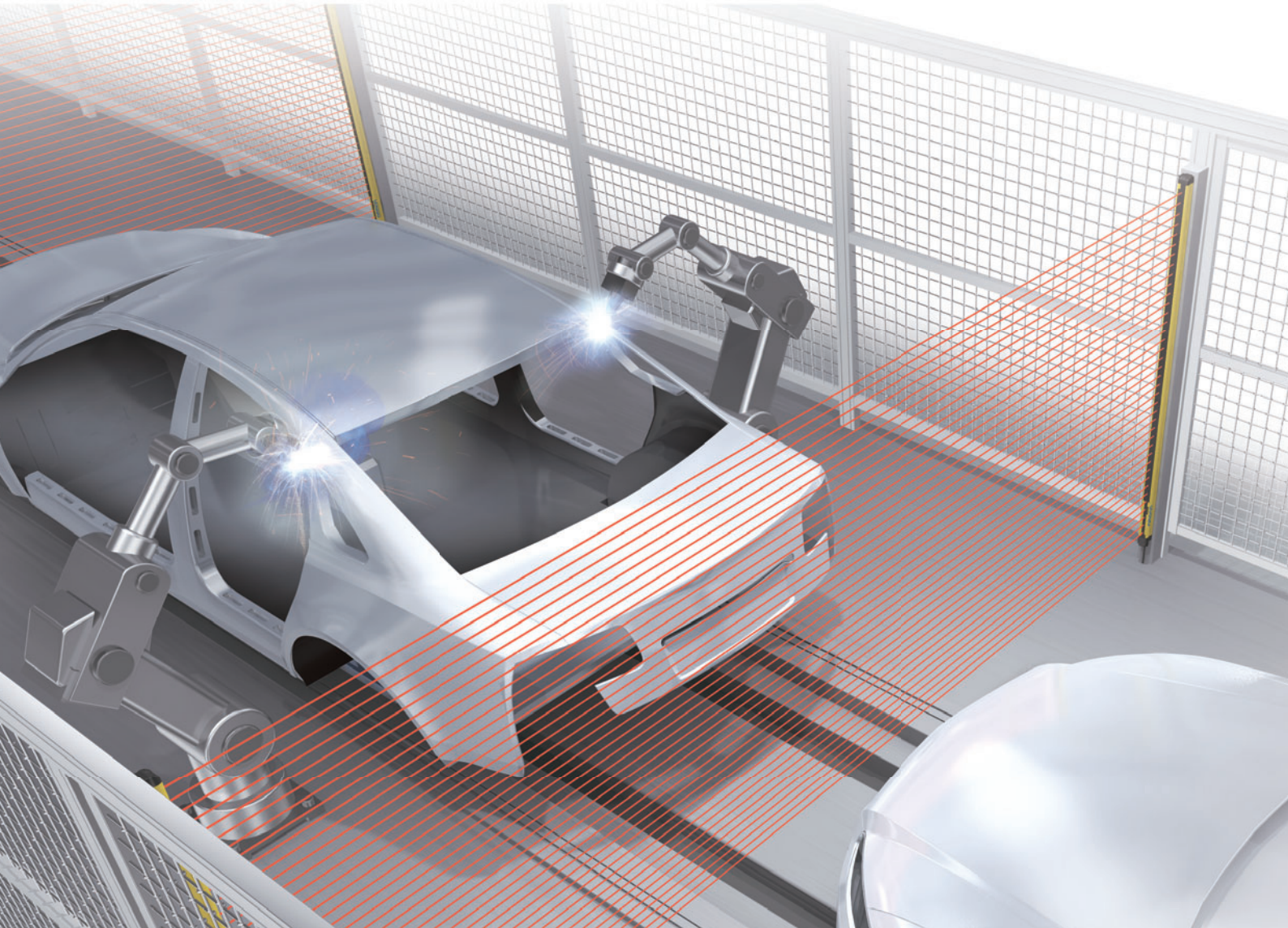
» Compact: Easy installation

» Robust: Even in severe environments

» Global: Reliable safety solutions

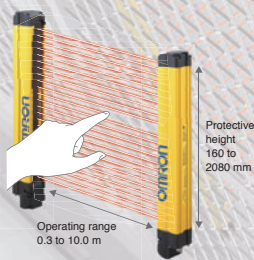


# Next generation safety

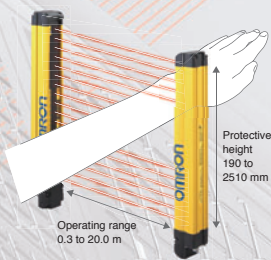


**Advance** Advance type suitable for flexible production line applications

**Easy** Easy type ideal for simple On/Off detection applications  
**NEW**



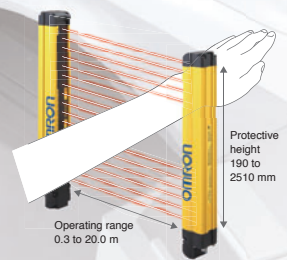
F3SG-4RA □□□□-14  
Detection capability: Dia. 14 mm



F3SG-4RA □□□□-30  
Detection capability: Dia. 30 mm  
F3SG-4RA-□□□□-25-01TS  
Detection capability: Dia. 25 mm



F3SG-4RE □□□□-14  
Detection capability: Dia. 14 mm



F3SG-4RE □□□□-30  
Detection capability: Dia. 30 mm



# light curtain packed with powerful features, offering both robustness and reliability

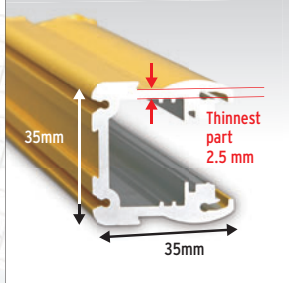
F3SG-R

Benefit

Previously it took time to select the right safety light curtains for the conditions: physical conditions such as size and operating range, ambient environments, and countries.

If just one single safety light curtain can be used in a variety of environments, the time required for selection, installation, and maintenance can be reduced.

## Selection & Design



>> p4

## Easy Selection & Design

### • In almost any environment

Waterproof and shock-resistant yet compact body. Conforms to major international standards including Chinese standard GB 4585 to be used worldwide.

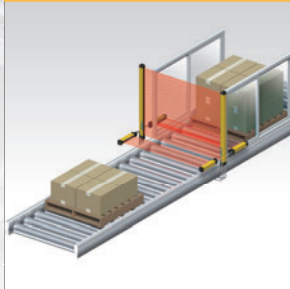
### • Ensuring safety in various production lines

The Muting function to automatically set a minimum muting zone according to workpiece height. Can be used for a variety of production lines.

### • Complete safety measures by detecting presence

Distinguishes between small object passing and human entry by changing resolution and response time. This maintains a high level of safety while minimizing unexpected machine downtime.

## Set-up



>> p8

## Easy Set-up

### • Drastically reduced set-up time and wiring

The Smartclick connectors and optical synchronization enable smooth set-up of machines.

### • Simple, two-step optical adjustment

Quick adjustment by checking beam alignment with the LED indicators and Configuration Tool SD Manager2.

### • Flexible installation

More flexible layout by eliminating the need of synchronization wiring and using extension cables.

## Operation



>> p10

## Stable Operation

### • Quick troubleshooting and predictive maintenance

The sticker and error logs stored in the F3SG-R helps speed troubleshooting. Accumulated log data facilitates systematic maintenance.

### • Mutual interference prevention

The DIP switches is used to change emission light intensity to prevent mutual interference with other sensors.

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Easy Selection & Design

# Robustness

Allows use in a variety of environments

Protects itself and production sites



## In almost any environment | For global use |

The F3SG-R is designed to be used in a variety of environments around the world, conforming to international standards

For global use Advance

NPN Global PNP

International Standard

PNP or NPN can be selected with the DIP switch. The same cables are used.

The F3SG-R conforms to major international standards including Chinese GB standards

## Robust and Compact | Robust housing | Advance Easy

All models are equipped with a robust housing that can be used in harsh conditions and withstand shocks caused by sudden human contact or a dropped tool. The scratch-resistant material is used for the optical surface to prevent unexpected machine stops.

**Slim housing**

35mm  
Thinnest part 2.5mm

**Protected with protection cover**

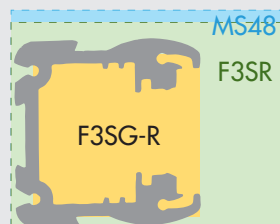
Work piece

The housing structure is significantly improved to enhance resistance against shock and vibration and to reduce the thickness of the thinnest part of the housing material from 3 mm to 2.5mm.

The optical surface can be protected from contact with workpieces by using the optional protection cover together.

### Downsized

The robust housing can be used in harsh conditions and withstand shocks caused by sudden human contact or a dropped tool. The scratch-resistant material is used for the optical surface to prevent unexpected machine stops.



Cross-section is **Approx. 60%** of previous model

## For harsh environments Advance Easy

**Secured against torsion**

**5**  
times more  
torsion resistant

IP67 protection allows use in environments that are subject to water.

The risk of optical axis misalignment due to vibration or aging can be reduced.

\* Compared to OMRON previous model in December 2014.

## Reliable even in harsh environments Advance Easy

**High power**

Operating range **20m max.**

The newly designed high-power optical system provides the best-in-class\* light transmission and operating range. This allows stable operation even in dusty or other environments where light transmission is reduced.

\* Based on OMRON investigation in December 2014.

**Previously... Mixing several models**

Several types of safety light curtains with different environmental resistance and functionality were required to suit the installation environment. It took time to select the right models.



# New Muting Functionality

**Increases both productivity and safety**

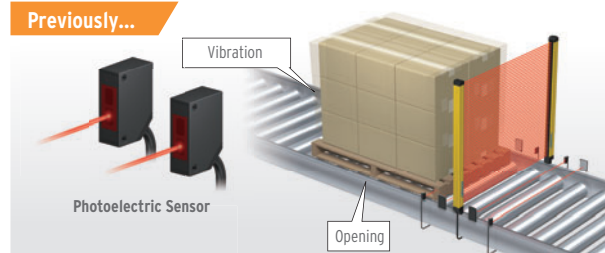
Easily distinguishes between workers and objects

## Increasing both productivity and safety

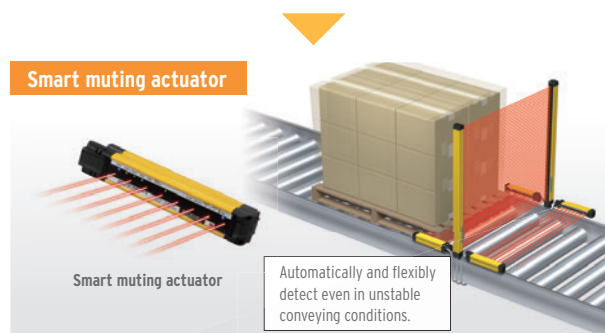
| Muting function | **Advance**

The F3SG-R provides advanced Muting function that detects the zone where workpieces pass or the position of a machine or robot and disable beams of the detected part. This increases both safety and productivity.

By adding the smart muting actuator, the F3SG-R provides stable operation even for the production lines where errors occur due to vibration caused by the passing workpiece.



The point detection muting sensor mistakenly disabled muting while a workpiece was passing, which led to unexpected machine stops.



The muting actuator detects the surface of a passing workpiece. Even if a workpiece moves due to vibration, muting is kept enabled until the workpiece has passed. This prevents unexpected machine stops.

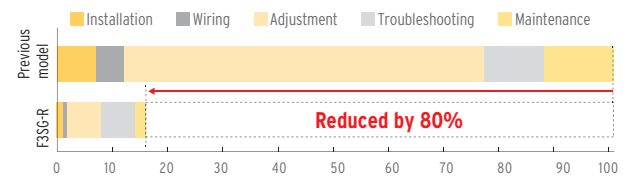
## Adjustment time reduced by 80%\*

**Advance**

| Smart muting actuator |

The use of the dedicated actuator can significantly reduce the time required to adjust the sensor to detect workpieces even in unstable conveying conditions

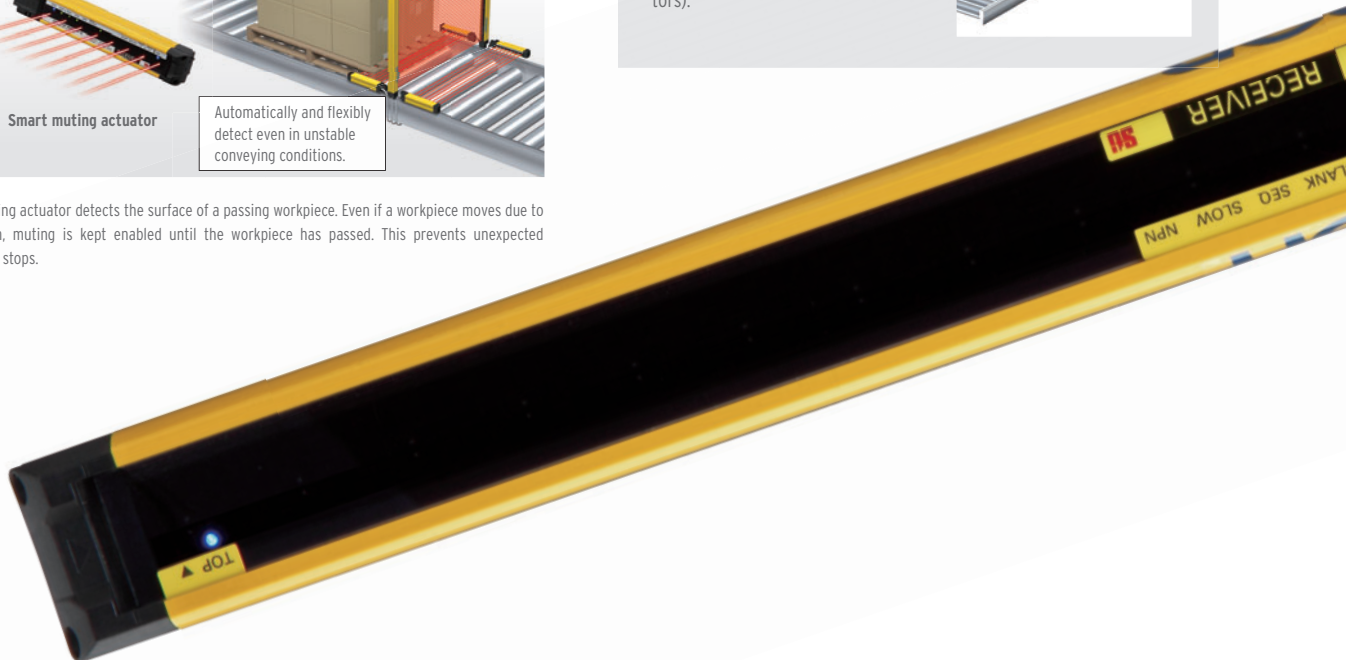
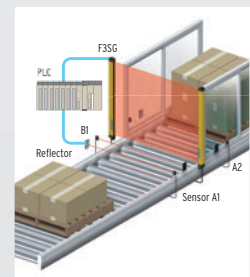
\*Compared to the previous model  
(Based on OMRON investigation in September 2014)



**Previously...**

Many processes including programming and adjustment were required

Since bypass processing to disable the safety light curtain was performed via the PLC, programming before installation required time and work. It also took a lot of time and work to install and adjust many muting sensors (sensors and reflectors).



# Powerful Features

## Prevent unexpected machine stops

Ensure stable operation

### Auto-configuration of muting zone

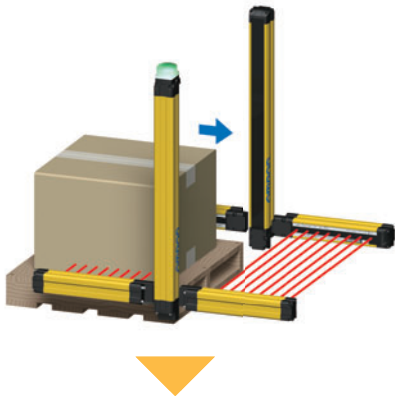
| Dynamic Muting | **Advance**

When workpieces with various heights are conveyed on the same line, partial muting is automatically performed based on the height of the workpiece. This advanced muting function can automatically perform normal detection at the zone where a workpiece does not pass.

Automatically minimizes muting zone according to workpiece size

1

When the muting sensor detects that a workpiece passes, all beams are muted.

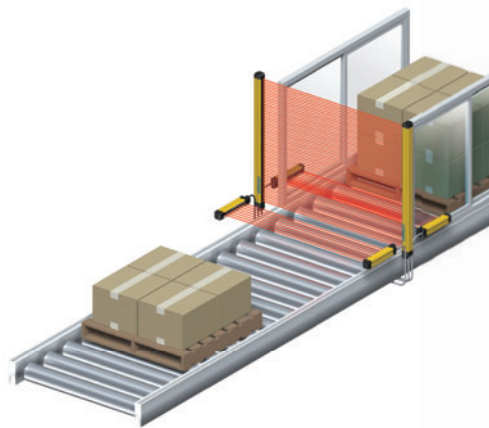
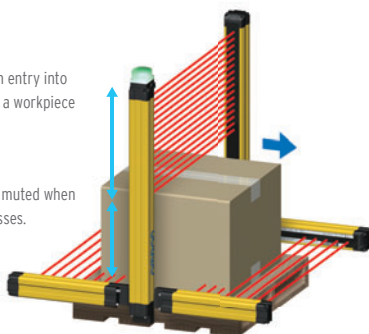


2

The only beams interrupted by the workpiece are kept muted and other beams are released from the muting state three seconds after the workpiece pass through the safety light curtain. Muting is disabled after the workpiece has passed.

Monitors human entry into the zone where a workpiece does not pass.

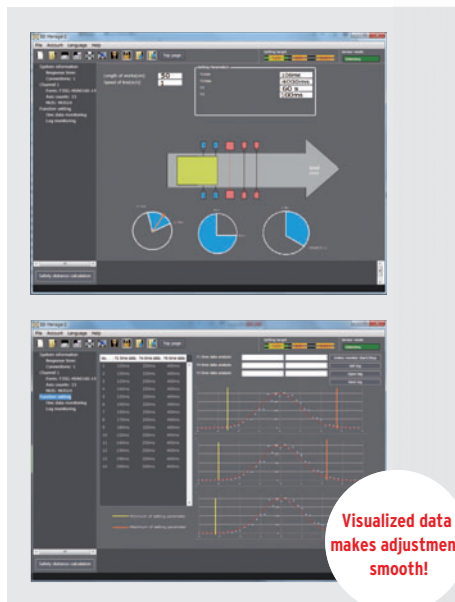
Keeps the zone muted when a workpiece passes.



### Minimizing setting and detection errors

| Configuration Tool SD Manager2 | **Advance**

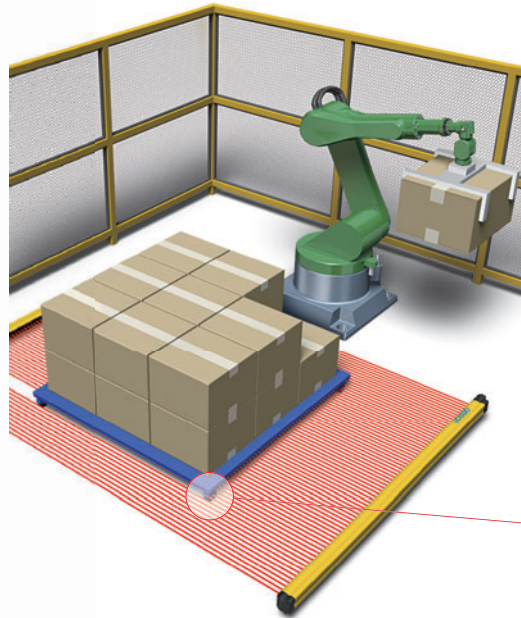
The function to log the muting sensor operating conditions of the F3SG-R visualizes the installation position and setting conditions of the sensor to achieve reliable configuration. The stop due to the muting error can be analyzed using the data stored in the F3SG-R. Quick identification of the cause can reduce unexpected machine downtime.



Visualized data makes adjustment smooth!



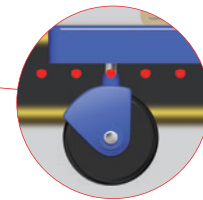




## Detecting both objects and workers

| Reduced Resolution | **Advance**

With the Reduced Resolution function that is used to change the number of interrupted beams (1 to 3 beams), the F3SG-R can detect human entry while workability is maintained. This makes easier to distinguish between objects and workers.



· Keep the safety outputs ON even when an object like a transport vehicle (with the size of 1 to 3 beams) is present discontinuously.

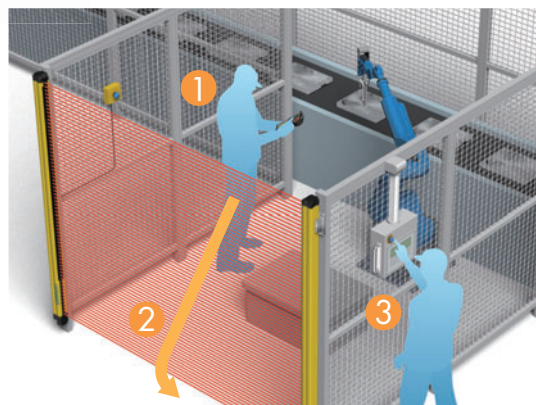
· Turn safety outputs OFF when an object with the size over 3 beams, like an ankle,

## Ensuring safe restart

| Pre-reset | **Advance**

The Pre-reset function prevents possible accidents and supports safe restart of machines. Even if a worker press the reset switch of the safety light curtain without noticing another worker near the robot, restart will not be executed unless certain conditions are met.

Helps prevent workers from being trapped



1 Press the pre-reset switch in the hazardous zone (safety fence)



2 Get out of the hazardous zone (safety fence)



3 Press the reset switch in the control panel to restart the F3SG-R. The machine is ready for restart.

The machine cannot be restarted until the pre-reset switch is pressed to restart the F3SG-R.

## Preventing accidental stops due to insects

| Response Time Adjustment | **Advance**

This function is used to distinguish between an instant passing of a small object such as an insect and a human passing by changing the time to respond to the block of the beam. Accidental machine stops can be avoided.

# Smart Wiring, Beam Adjustment, and Operation Check

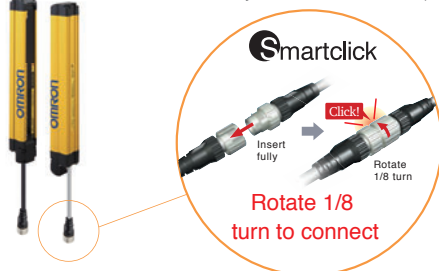
## Facilitate installation

### No torque control required | Smartclick | **Advance** **Easy**

Smartclick connectors are used to quickly connect cables. Just turn the round waterproof M12 connector 1/8 of a turn. This stress-free connection reduces time required for wiring and replacement when many devices are connected together.

#### Smartclick

Smartclick is a registered trademark of OMRON Corporation.



This popular connector is used for a variety of OMRON products to reduce time required for wiring and replacement when many devices are connected together.

#### Previously... **Faulty connection and need of torque control**

When many safety light curtains were connected, torque control of connectors was required and delay in set-up occurred due to failure of connection. The Smartclick connector can be connected with the existing screw-type M12 connector.

### Long-distance wiring

#### | Maximum 100 m cable length | **Advance** **Easy**

The total extension cable length is up to 100 m. Flexible wiring maximizes long-distance detection and optical synchronization functionality.

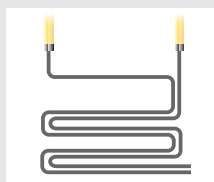
### Simple wiring

#### | Simple wiring connector | **Advance** **Easy**

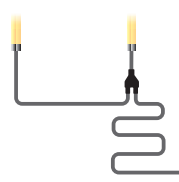
Simple wiring connector can reduce wiring time. Fewer cables mean that the risk of disconnection and noise troubles can also be reduced.

#### Previously...

Cables of the emitter and receiver



#### Only one cable



### No limitation in wiring

#### | Optical synchronization | **Advance** **Easy**

Optical synchronization eliminates the need of synchronization wiring between the emitter and receiver. Flexible wiring enables reducing disconnection risk and avoiding noise sources.

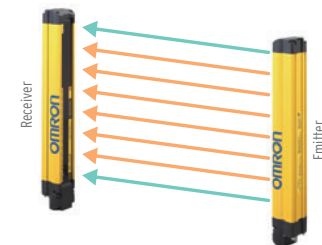
#### Flexible, new method

Fine tuning all beams, the F3SG-R provides high ambient light immunity and flexible detection functions.

**High ambient light immunity**

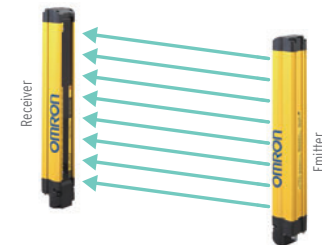
#### Start-up

The Top or Bottom beam of the emitter starts synchronizing with the corresponding beam of the receiver.



#### After sync

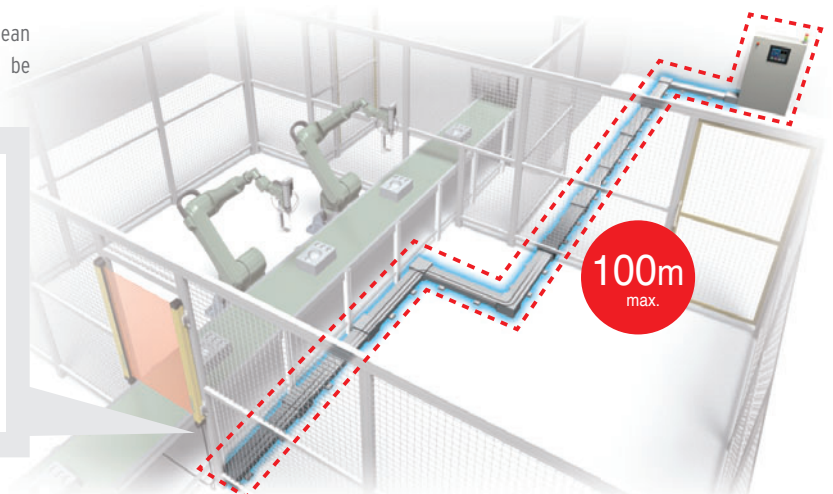
Once synchronization is done, the emitter is kept synchronized with the receiver while at least one beam is unblocked.



#### Previously... **Limitations imposed by synchronization wiring**

Wiring and connection works between the emitter and receiver were required.

- With the previous synchronization function, if the Top or Bottom beam was blocked, synchronization was not maintained.





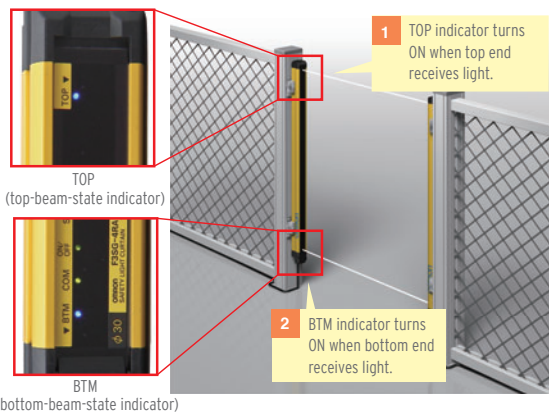


### Simple two steps | Beam adjustment | Advance

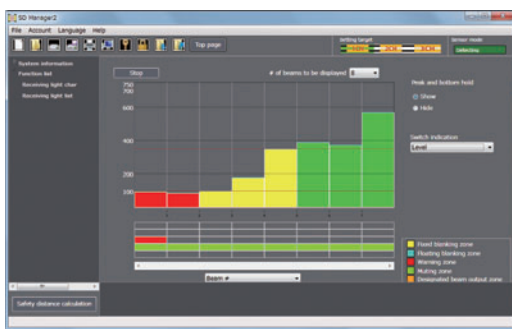
The benefit of robust, torsion-resistant housing contributes to reduce the time required to install the safety light curtain.

**Simple adjustment: Coarse adjustment → positional alignment**

Beam adjustment can be done easily by checking the TOP and BTM LED indicators. The SD Manager 2 helps install the safety light curtain by showing the incident light levels of each beam.



**1** Adjustment is completed when the TOP, BTM, and STB LED indicators turn ON.



**2** Finer adjustments can be made using the Configuration Tool SB Manager2.



### Easy adjustment after mounting

| Mounting bracket | Advance Easy

Two types of mounting brackets are available.

#### Standard fixed bracket



#### Standard adjustable bracket

(sold separately)



After mounted on a safety fence, the F3SG-R can be slid vertically to adjust. This means this mounting bracket allows for a wider adjustment range than the existing top/bottom mounting bracket.

In addition to vertical adjustment, the angle can be adjusted up to  $\pm 15^\circ$ .



#### Standard fixed bracket

The bracket is included in the F3SG-R.

Protective height	No. of brackets included
Less than 1,280 mm	2 sets
1,280 to 2,270 mm	3 sets
2,350 mm or more	4 sets

Quick

# Troubleshooting and Predictive Maintenance

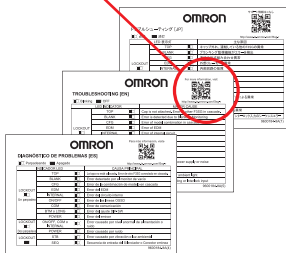
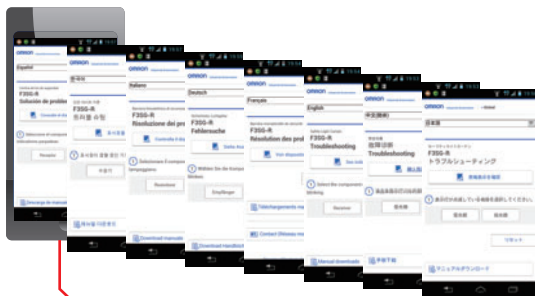
Eliminate machine downtime to ensure stable operation

## For global operators

| Multilingual troubleshooting | **Advance** Easy

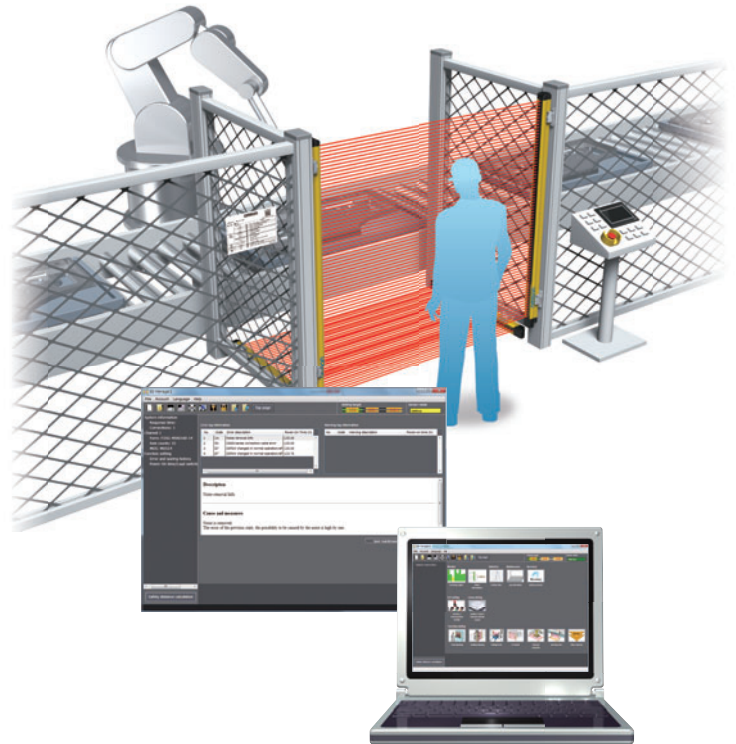
Troubleshooting in eight languages is published on the website to find causes and solutions of errors that occur during operation. Operators across the world can check the error details in their local languages, which will help them minimize time to troubleshoot.

### Troubleshooting Web



Troubleshooting guide sticker

\* English, Chinese, Italian, Korean, French, German, Spanish, and Japanese

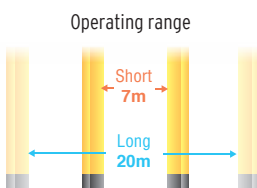


\* The Interface Unit F39-GIF is required to connect with a personal computer.

## Reducing stops due to mutual interference

| Operating Range Selection | **Advance** Easy

When other sensors are installed near the F3SG-R, Operating Range Selection helps reduce mutual interference.



Mutual interference with the other sensor near the F3SG-R can be reduced by changing the mode from Long \* to Short (7 m).

\*. Maximum operating range of 20 m for hand/arm protection or 10 m for finger protection



The mode of Operating Range Selection can be selected with the DIP Switches\* on the emitter.

\*. For the F3SG-RE, the mode can be selected by wiring.

## Quick troubleshooting | Data logging 1 | **Advance**

The error logs stored in the F3SG-R can be obtained by connecting with a personal computer via the interface unit. The Configuration Tool SD Manager2 analyzes error logs to identify causes of errors and suggest solutions. This helps simplify troubleshooting.

## Systematic maintenance based on trend management

| Data logging 2 | **Advance**

By using the Configuration Tool SD Manager2, the data of light intensity, power-ON time, and switching frequency of the F3SG-R can be collected regularly to predict when systematic and preventive maintenance is required.



**NEW**

Easy type

# Easy-to-use safety sensor Ideal for Simple On/Off Detection Applications

Robust but slim housing and basic safety functions are inherited from the F3SG-R Advance type. Providing only simple safety functions, the Easy type helps save TCO (Total Cost of Ownership) by reducing errors that required a lot of time to identify the causes.



### Simple wiring

Only four wires are required for the minimum configuration, which is as simple as wiring a photoelectric sensor. Simple connection with a safety controller makes it easy to build a safety circuit. Commercially available M12 connector cables can be used for extension cables.

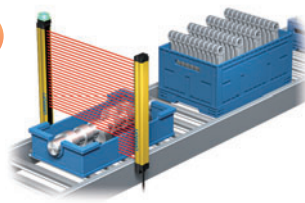
### Fast response time of 5 ms

The Easy type that allows the distance between the light curtain and hazard source to be reduced is best suited to use in a small machine.

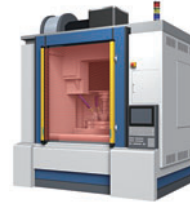
### F3SG-R Line-up

For flexible production lines

#### Advance type F3SG-RA



#### Easy type F3SG-RE



For small machines

### List of Feature

Feature	Advance type F3SG-RA	Easy type F3SG-RE	Factory default setting (Advance type)
PNP/NPN Selection	<input checked="" type="checkbox"/>		PNP output
External Test	<input checked="" type="checkbox"/>		24 V Active
Interlock	<input checked="" type="checkbox"/> <input type="checkbox"/>		Auto Reset Mode
Pre-Reset	<input checked="" type="checkbox"/> <input type="checkbox"/>		Disabled
External Device Monitoring(EDM)	<input checked="" type="checkbox"/> <input type="checkbox"/>		Disabled
Auxiliary Output		<input type="checkbox"/>	Safety output (Inverted signal output)
Muting		<input type="checkbox"/>	Standard Muting mode
Override		<input type="checkbox"/>	Enabled
Fixed Blanking	<input checked="" type="checkbox"/> <input type="checkbox"/>		Disabled
Floating Blanking	<input checked="" type="checkbox"/> <input type="checkbox"/>		Disabled
Reduced Resolution		<input type="checkbox"/>	Disabled
Warning Zone		<input type="checkbox"/>	Disabled
Scan Code Selection	<input checked="" type="checkbox"/>		CodeA
Operating Range Selection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Long mode
Response Time Adjustment		<input type="checkbox"/>	Standard mode
Lamp		<input type="checkbox"/>	Red: Safety output information (Inverted signal output) Orange: Stable-state information (Inverted signal output) Green: Safety output information
Designated Beam Output		<input type="checkbox"/>	Disabled
Cascade Connection		<input checked="" type="checkbox"/>	

Setting by DIP Switch    Setting by Configuration Tool   ● Setting by Wiring

Note: The F3SG-4RA□□□□-25-01TS provides only the monitoring functionality.

## Safety Sensor Line-up

### More slim models

Safety Light  
Curtain F3SJ  
Cat. No. F074



### For flexible zone detection

Safety Laser  
Scanner  
Cat. No. Z298



# Safety Light Curtain Advance type

# F3SG-RA

## New Standard of Safety Light Curtain, Offering Both Robustness and Reliability

- Robust and compact
- New muting function to increase both productivity and safety
- All models designed for global use. PNP/NPN selection by DIP switch
- Conforming to major international standards including Chinese standard GB 4584 \*

\* The F3SG-4RA□□□□-25-01TS does not conform.



## Ordering Information

### Main Units

#### Safety Light Curtain

##### Finger protection

Number of beams	Protective height (mm)	Model
15	160	F3SG-4RA0160-14
23	240	F3SG-4RA0240-14
31	320	F3SG-4RA0320-14
39	400	F3SG-4RA0400-14
47	480	F3SG-4RA0480-14
55	560	F3SG-4RA0560-14
63	640	F3SG-4RA0640-14
71	720	F3SG-4RA0720-14
79	800	F3SG-4RA0800-14
87	880	F3SG-4RA0880-14
95	960	F3SG-4RA0960-14
103	1,040	F3SG-4RA1040-14
111	1,120	F3SG-4RA1120-14
119	1,200	F3SG-4RA1200-14
127	1,280	F3SG-4RA1280-14
135	1,360	F3SG-4RA1360-14
143	1,440	F3SG-4RA1440-14
151	1,520	F3SG-4RA1520-14
159	1,600	F3SG-4RA1600-14
167	1,680	F3SG-4RA1680-14
175	1,760	F3SG-4RA1760-14
183	1,840	F3SG-4RA1840-14
191	1,920	F3SG-4RA1920-14
199	2,000	F3SG-4RA2000-14
207	2,080	F3SG-4RA2080-14

##### Hand and arm protection

Number of beams	Protective height (mm)	Model
8	190	F3SG-4RA0190-30
12	270	F3SG-4RA0270-30
16	350	F3SG-4RA0350-30
20	430	F3SG-4RA0430-30
24	510	F3SG-4RA0510-30
28	590	F3SG-4RA0590-30
32	670	F3SG-4RA0670-30
36	750	F3SG-4RA0750-30
40	830	F3SG-4RA0830-30
44	910	F3SG-4RA0910-30
48	990	F3SG-4RA0990-30
52	1,070	F3SG-4RA1070-30
56	1,150	F3SG-4RA1150-30
60	1,230	F3SG-4RA1230-30
64	1,310	F3SG-4RA1310-30
68	1,390	F3SG-4RA1390-30
72	1,470	F3SG-4RA1470-30
76	1,550	F3SG-4RA1550-30
80	1,630	F3SG-4RA1630-30
84	1,710	F3SG-4RA1710-30
88	1,790	F3SG-4RA1790-30
92	1,870	F3SG-4RA1870-30
96	1,950	F3SG-4RA1950-30
100	2,030	F3SG-4RA2030-30
104	2,110	F3SG-4RA2110-30
108	2,190	F3SG-4RA2190-30
112	2,270	F3SG-4RA2270-30
116	2,350	F3SG-4RA2350-30
120	2,430	F3SG-4RA2430-30
124	2,510	F3SG-4RA2510-30






Hand protection

Number of beams	Protective height (mm)	Model
8	185	F3SG-4RA0185-25-01TS <b>NEW</b>
12	265	F3SG-4RA0265-25-01TS <b>NEW</b>
16	345	F3SG-4RA0345-25-01TS <b>NEW</b>
20	425	F3SG-4RA0425-25-01TS <b>NEW</b>
24	505	F3SG-4RA0505-25-01TS <b>NEW</b>
28	585	F3SG-4RA0585-25-01TS <b>NEW</b>
32	665	F3SG-4RA0665-25-01TS <b>NEW</b>
36	745	F3SG-4RA0745-25-01TS <b>NEW</b>
40	825	F3SG-4RA0825-25-01TS <b>NEW</b>
44	905	F3SG-4RA0905-25-01TS <b>NEW</b>
48	985	F3SG-4RA0985-25-01TS <b>NEW</b>
52	1065	F3SG-4RA1065-25-01TS <b>NEW</b>
56	1145	F3SG-4RA1145-25-01TS <b>NEW</b>
60	1225	F3SG-4RA1225-25-01TS <b>NEW</b>
64	1305	F3SG-4RA1305-25-01TS <b>NEW</b>
68	1385	F3SG-4RA1385-25-01TS <b>NEW</b>
72	1465	F3SG-4RA1465-25-01TS <b>NEW</b>
76	1545	F3SG-4RA1545-25-01TS <b>NEW</b>
80	1625	F3SG-4RA1625-25-01TS <b>NEW</b>
84	1705	F3SG-4RA1705-25-01TS <b>NEW</b>
88	1785	F3SG-4RA1785-25-01TS <b>NEW</b>
92	1865	F3SG-4RA1865-25-01TS <b>NEW</b>
96	1945	F3SG-4RA1945-25-01TS <b>NEW</b>

Accessories (Sold separately)

Single-ended Connector Cable

For F3SG-4RA□□□□-14/-4RA□□□□-30


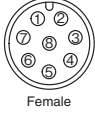
Appearance	Type	Cable length	Specifications	Model																								
	For emitter M12 connector (5-pin), 5 wires Color: Gray	3 m	 <table border="1"> <tr><td>1</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>2</td><td>TEST</td><td>Black</td></tr> <tr><td>3</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>4</td><td>Not used</td><td>White</td></tr> <tr><td>5</td><td>Not used</td><td>Yellow</td></tr> </table>	1	+24 VDC	Brown	2	TEST	Black	3	0 VDC	Blue	4	Not used	White	5	Not used	Yellow	F39-JG3A-L									
		1		+24 VDC	Brown																							
		2		TEST	Black																							
		3		0 VDC	Blue																							
		4		Not used	White																							
	5	Not used	Yellow																									
	7 m	F39-JG7A-L																										
	10 m	F39-JG10A-L																										
	15 m	F39-JG15A-L																										
	20 m	F39-JG20A-L																										
	For receiver M12 connector (8-pin), 8 wires Color: Black	3 m	 <table border="1"> <tr><td>1</td><td>RESET</td><td>Yellow</td></tr> <tr><td>2</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>3</td><td>MUTE A</td><td>Gray</td></tr> <tr><td>4</td><td>MUTE B</td><td>Pink</td></tr> <tr><td>5</td><td>OSSD 1</td><td>Black</td></tr> <tr><td>6</td><td>OSSD 2</td><td>White</td></tr> <tr><td>7</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>8</td><td>AUX</td><td>Red</td></tr> </table>	1	RESET	Yellow	2	+24 VDC	Brown	3	MUTE A	Gray	4	MUTE B	Pink	5	OSSD 1	Black	6	OSSD 2	White	7	0 VDC	Blue	8	AUX	Red	F39-JG3A-D
		1		RESET	Yellow																							
		2		+24 VDC	Brown																							
		3		MUTE A	Gray																							
		4		MUTE B	Pink																							
5	OSSD 1	Black																										
6	OSSD 2	White																										
7	0 VDC	Blue																										
8	AUX	Red																										
7 m	F39-JG7A-D																											
10 m	F39-JG10A-D																											
15 m	F39-JG15A-D																											
20 m	F39-JG20A-D																											

**Note:** To extend the cable length to 20 m or more, add the F39-JG□□B Double-end Connector Cable.

Example: When using a cable of 30 m, connect the F39-JG10A Single-ended Connector Cable with the F39-JG20B Double-end Connector Cable.

Single-ended Connector Cable (2 covers per set, one for emitter and one for receiver)

For F3SG-4RA□□□□-25-01TS


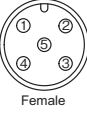

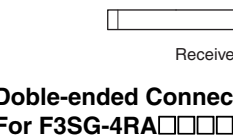


Appearance	Cable length	Specifications	Model																								
	3 m	For emitter M12 connector (8-pin), Color: Gray Connected to Power Cable or Double-Ended Cable  <table border="1"> <tr><td>1</td><td>Not used</td><td>White</td></tr> <tr><td>2</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>3</td><td>TEST</td><td>Black</td></tr> <tr><td>4</td><td>Not used</td><td>Yellow</td></tr> <tr><td>5</td><td>Not used</td><td>Gray</td></tr> <tr><td>6</td><td>Not used</td><td>Pink</td></tr> <tr><td>7</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>8</td><td>Not used</td><td>Red</td></tr> </table>	1	Not used	White	2	+24 VDC	Brown	3	TEST	Black	4	Not used	Yellow	5	Not used	Gray	6	Not used	Pink	7	0 VDC	Blue	8	Not used	Red	F39-JD3A
	1		Not used	White																							
	2		+24 VDC	Brown																							
	3		TEST	Black																							
	4		Not used	Yellow																							
5	Not used	Gray																									
6	Not used	Pink																									
7	0 VDC	Blue																									
8	Not used	Red																									
7 m	F39-JD7A																										
10 m	F39-JD10A																										
15 m	F39-JD15A																										
20 m	F39-JD20A																										

**Note:** To extend the cable length to more than 20 m, add the F39-JD□□B Double-ended Connector Cable.

Example: When using a cable of 30 m, connect the F39-JD10A Single-ended Connector Cable with the F39-JD20B Double-ended Connector Cable.

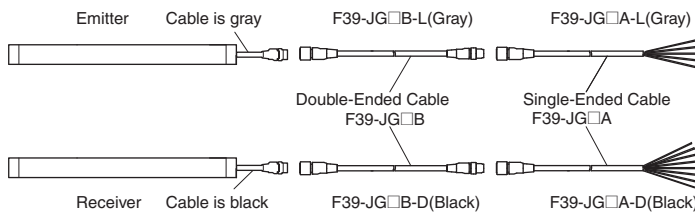
# F3SG-RA

## Double-ended Connector Cable For cable extension and simple wiring For F3SG-4RA□□□□-14/4RA□□□□-30




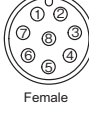

Appearance	Type	Cable length	Specifications	Model			
	For emitter M12 connector (5-pin) on both ends Color: Gray	0.5 m	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Connected to Power Cable or Double-Ended Cable</p>  <p>Female</p> </div> <div style="text-align: center;"> <p>1 Brown 3 Blue 2 Black 4 White 5 Yellow</p> </div> <div style="text-align: center;"> <p>Connected to Single-Ended Cable, or Double-Ended cable</p>  <p>Male</p> </div> </div>	F39-JGR5B-L			
		1 m		F39-JG1B-L			
		3 m		F39-JG3B-L			
		5 m		F39-JG5B-L			
		7 m		F39-JG7B-L			
		10 m		F39-JG10B-L			
		15 m		F39-JG15B-L			
		20 m		F39-JG20B-L			
				For receiver M12 connector (8-pin) on both ends Color: Black	0.5 m	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Connected to Power Cable or Double-Ended Cable</p>  <p>Female</p> </div> <div style="text-align: center;"> <p>2 Brown 7 Blue 5 Black 6 White 1 Yellow 8 Red 3 Gray 4 Pink</p> </div> <div style="text-align: center;"> <p>Connected to Single-Ended Cable, or Double-Ended cable</p>  <p>Male</p> </div> </div>	F39-JGR5B-D
					1 m		F39-JG1B-D
3 m	F39-JG3B-D						
5 m	F39-JG5B-D						
7 m	F39-JG7B-D						
10 m	F39-JG10B-D						
15 m	F39-JG15B-D						
20 m	F39-JG20B-D						

**Note:** To extend the cable length to more than 20 m, use the F39-JG□B Double-ended Connector Cables in combination.  
Example: When using a cable of 30 m, connect the F39-JG10B Double-ended Connector Cable with the F39-JG20B Double-ended Connector Cable.  
To extend the cable length under series connection, use F39-JGR2W and F39-JG□B in combination. Also, the cable length 10 to 20m cannot be used.

### <Connection example>

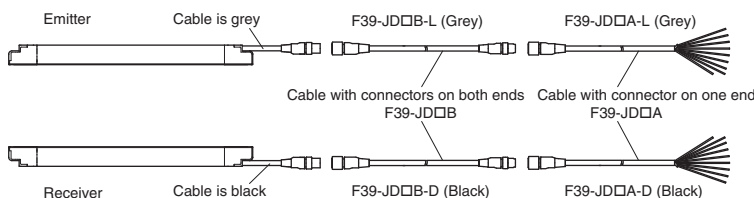


## Double-ended Connector Cable (2 covers per set, one for emitter and one for receiver) For F3SG-4RA□□□□-25-01TS


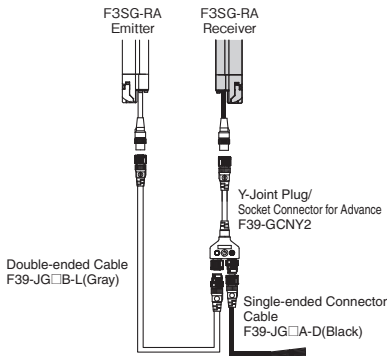
Appearance	Cable length	Specifications	Model		
	0.5 m	<p>For emitter M12 connector (8-pin), Color: Gray</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Female</p> </div> <div style="text-align: center;"> <p>2 Brown 7 Blue 5 Gray 6 Pink 1 White 8 Red 3 Black 4 Yellow</p> </div> <div style="text-align: center;">  <p>Male</p> </div> </div>	F39-JDR5B		
	1 m		F39-JD1B		
	3 m		F39-JD3B		
	5 m		F39-JD5B		
	For receiver M12 connector (8-pin), Color: Black		7 m	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Connected to Power Cable or Double-Ended Cable</p>  <p>Female</p> </div> <div style="text-align: center;"> <p>2 Brown 7 Blue 5 Gray 6 Pink 1 White 8 Red 3 Black 4 Yellow</p> </div> <div style="text-align: center;"> <p>Connected to Single-Ended Cable, or Double-Ended cable</p>  <p>Male</p> </div> </div>	F39-JD7B
			10 m		F39-JD10B
			15 m		F39-JD15B
			20 m		F39-JD20B

**Note:** To extend the cable length to more than 20 m, use the F39-JD□B Double-ended Connector Cables in combination.  
Example: When using a cable of 30 m, connect the F39-JD10B Double-ended Connector Cable with the F39-JD20B Double-ended Connector Cable.  
To extend the cable length under series connection, use F39-JGR2WTS and F39-JD□B in combination. Also, the cable length 10 to 20m cannot be used.

### <Connection example>


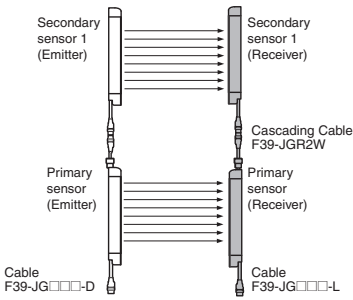


**Y-Joint Plug/Socket Connector for F3SG-4RA□□□□-14/-4RA□□□□-30**

Appearance	Type	Cable length	Specifications	Model
	M12 connectors. Used for reduced wiring.	0.5 m		F39-GCNY2


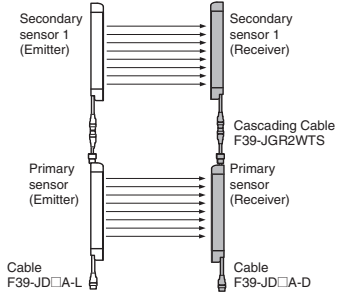
**Cascading Cable (Two cables per set, for emitter and receiver)**

**For F3SG-4RA□□□□-14/-4RA□□□□-30**

Appearance	Type	Cable length	Specifications	Model
	Emitter cable: Cap (5-pin), M12 connector (5-pin) Receiver cable: Cap (8-pin), M12 connector (8-pin)	0.2 m		F39-JGR2W

**Cascading Cable (Two cables per set, for emitter and receiver)**





**For F3SG-4RA□□□□-25-01TS**

Appearance	Type	Cable length	Specifications	Model
	Cap (8-pin), M12 connector (8-pin)	0.2 m		F39-JGR2WTS



# F3SG-RA

## Sensor Mounting Brackets

Appearance	Specification	Application	Model
	Standard Fixed Bracket *3	Bracket to mount the F3SG-R. Side mounting and backside mounting possible. (This is included as a standard accessory with the product. It comes as a set of two Brackets. Refer to note *1 for the number of sets provided with each model.)	F39-LGF
	Standard Adjustable Bracket	Bracket to mount the F3SG-R. Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$ . Side mounting and backside mounting possible. (Sold separately as a set of two Brackets. Refer to note *1 for the number of sets required for each model.)	F39-LGA
	Top/Bottom Adjustable Bracket *2	Bracket to mount the F3SG-R. Use this bracket at the top and bottom positions of the F3SG-R. Beam alignment after mounting possible. The angle adjustment range is $\pm 22.5^\circ$ . Side mounting and backside mounting possible. (Sold separately. 4 brackets per set.)	F39-LGTB
	Top/Bottom Adjustable Bracket *2 (For user-made mounting part)	Top/Bottom Adjustable Bracket without a bracket to mount to the wall. Use the user's own wall mounting part to suit the machine. (Sold separately. 4 brackets per set.)	F39-LGTB-1

\*1 [for F3SG-4RA□□□□-14]

- Protective height of 0160 to 1200: 2 sets, Protective height of 1280 to 2080: 3 sets

[for F3SG-4RA□□□□-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

\*2 Top/Bottom Adjustable Bracket cannot be used with the Standard Fixed Bracket. Use with the Standard Adjustable Bracket.

Using Top/Bottom Adjustable Brackets with Standard Adjustable Brackets

F3SG-4RA□□□□-14: Protective height of 1120 to 1920: 1 set of Top/Bottom Adjustable Brackets and 1 set of Standard Adjustable Brackets

Protective height of 2000 to 2080: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets

Protective height of 1040 or lower: Standard Adjustable Brackets cannot be used.

F3SG-4RA□□□□-30: Protective height of 1150 to 1950: 1 set of Top/Bottom Adjustable Brackets and 1 set of Standard Adjustable Brackets

Protective height of 2030 to 2510: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets




Protective height of 1070 or lower: Standard Adjustable Brackets cannot be used.

F3SG-4RA□□□□-25-01TS: Protective height of 1145 to 1945: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets


Protective height of 1065 or lower: Standard Adjustable Brackets cannot be used.

\*3 Sensor Mounting Brackets are not provided with the F3SG-4RA□□□□-25-01TS. Purchase if required.


## Interface units and configuration tool SD Manager 2

Appearance	Type	Specifications	Model
	SD Manager2	The Configuration Tool SD Manager 2 is available to download from our website at <a href="http://www.ia.omron.com/f3sg-r_tool">http://www.ia.omron.com/f3sg-r_tool</a> .  To change the settings of the F3SG-RA using SD Manager 2, it is necessary to set the receiver's two DIP switches No. 8 to ON.	-
	Interface Unit	F39-GIF interface unit to connect the F3SG-RA receiver to a USB port of the PC	F39-GIF
	Bluetooth Communication Unit	F39-BT bluetooth unit to enable bluetooth on the F3SG-RA	F39-BT


## Lamp

Appearance	Type	Specifications	Model
	Lamp	The lamp unit can be connected to a receiver and turned ON based on the operation of F3SG-RA.	F39-LP
	Lamp and Bluetooth Communication Unit	The lamp can indicate red, orange, and green colors, to which three different states can be assigned.	F39-BTLP

## End Cap

Appearance	Specifications	Model
	Housing color: Black For both emitter and receiver (Attached to the F3SG-R. The End Cap can be purchased if lost.)	F39-CNM


## Laser Pointer for F3SG-R

Appearance	Specifications	Model
	The laser pointer is attached on the optical surface of the F3SG-R to help coarse adjustment of beams.	F39-PTG

## Spatter Protection Cover(Two covers per set, for emitter and receiver)

Spatter Protection Covers include mounting brackets.

For Safety Light Curtain models of the protective height of 2,000 mm or longer, use two Spatter Protection Covers of different lengths.

Appearance	Safety Light Curtain Model			Model
	Finger protection	Hand protection	Hand and arm protection	
	F3SG-□RA0160-14	F3SG-4RA0185-25-01TS	F3SG-□RA0190-30	F39-HGA0200
	F3SG-□RA0240-14	F3SG-4RA0265-25-01TS	F3SG-□RA0270-30	F39-HGA0280
	F3SG-□RA0320-14	F3SG-4RA0345-25-01TS	F3SG-□RA0350-30	F39-HGA0360
	F3SG-□RA0400-14	F3SG-4RA0425-25-01TS	F3SG-□RA0430-30	F39-HGA0440
	F3SG-□RA0480-14	F3SG-4RA0505-25-01TS	F3SG-□RA0510-30	F39-HGA0520
	F3SG-□RA0560-14	F3SG-4RA0585-25-01TS	F3SG-□RA0590-30	F39-HGA0600
	F3SG-□RA0640-14	F3SG-4RA0665-25-01TS	F3SG-□RA0670-30	F39-HGA0680
	F3SG-□RA0720-14	F3SG-4RA0745-25-01TS	F3SG-□RA0750-30	F39-HGA0760
	F3SG-□RA0800-14	F3SG-4RA0825-25-01TS	F3SG-□RA0830-30	F39-HGA0840
	F3SG-□RA0880-14	F3SG-4RA0905-25-01TS	F3SG-□RA0910-30	F39-HGA0920
	F3SG-□RA0960-14	F3SG-4RA0985-25-01TS	F3SG-□RA0990-30	F39-HGA1000
	F3SG-□RA1040-14	F3SG-4RA1065-25-01TS	F3SG-□RA1070-30	F39-HGA1080
	F3SG-□RA1120-14	F3SG-4RA1145-25-01TS	F3SG-□RA1150-30	F39-HGA1160
	F3SG-□RA1200-14	F3SG-4RA1225-25-01TS	F3SG-□RA1230-30	F39-HGA1240
	F3SG-□RA1280-14	F3SG-4RA1305-25-01TS	F3SG-□RA1310-30	F39-HGA1320
	F3SG-□RA1360-14	F3SG-4RA1385-25-01TS	F3SG-□RA1390-30	F39-HGA1400
	F3SG-□RA1440-14	F3SG-4RA1465-25-01TS	F3SG-□RA1470-30	F39-HGA1480
	F3SG-□RA1520-14	F3SG-4RA1545-25-01TS	F3SG-□RA1550-30	F39-HGA1560
	F3SG-□RA1600-14	F3SG-4RA1625-25-01TS	F3SG-□RA1630-30	F39-HGA1640
	F3SG-□RA1680-14	F3SG-4RA1705-25-01TS	F3SG-□RA1710-30	F39-HGA1720
	F3SG-□RA1760-14	F3SG-4RA1785-25-01TS	F3SG-□RA1790-30	F39-HGA1800
	F3SG-□RA1840-14	F3SG-4RA1865-25-01TS	F3SG-□RA1870-30	F39-HGA1880
	F3SG-□RA1920-14	F3SG-4RA1945-25-01TS	F3SG-□RA1950-30	F39-HGA1960
	F3SG-□RA2000-14	-	F3SG-□RA2030-30	F39-HGA1480 F39-HGA0550
	F3SG-□RA2080-14	-	F3SG-□RA2110-30	F39-HGA1560 F39-HGA0550
-	-	F3SG-□RA2190-30	F39-HGA1640 F39-HGA0550	
-	-	F3SG-□RA2270-30	F39-HGA1720 F39-HGA0550	
-	-	F3SG-□RA2350-30	F39-HGA1800 F39-HGA0550	
-	-	F3SG-□RA2430-30	F39-HGA1880 F39-HGA0550	
-	-	F3SG-□RA2510-30	F39-HGA1960 F39-HGA0550	

**Note:** The operating range of the Safety Light Curtain attached with the product is 10% shorter than the rating.

## Test Rod

Diameter	Model
14 mm dia.	F39-TRD14
25 mm dia.	F39-TRD25
30 mm dia.	F39-TRD30

# F3SG-RA

## Ratings and Specifications

### Main unit

F3SG-4RA□□□□-14/-4RA□□□□-30

		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		
	Beam Gap	14-mm dia.	30-mm dia.	
	Number of Beams	10 mm	20 mm	
	Lens Size	15 to 207	8 to 124	
	Protective Height	5.2 × 3.4 (W × H) mm	7-mm dia.	
	Operating Range	Long	160 to 2080 mm (6.3 to 81.9 inch)	190 to 2510 mm (7.3 to 98.7 inch)
		Short	0.3 to 10.0 m (1 to 32 ft.)	0.3 to 20.0 m (1 to 65 ft.)
	Response Time	ON to OFF	0.3 to 3.0 m (1 to 10 ft.)	0.3 to 7.0 m (1 to 23 ft.)
		OFF to ON	Normal mode: 8 to 18 ms max. *1 Slow mode: 16 to 36 ms max. *1 *2	
			40 to 90 ms max. *1	
		*1 Response time when used in one segment system or in cascaded connection. *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 page 22.		
	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	Safety output (Inverted signal output:Enable) (default) (Configurable by Configuration Tool)	
	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 page 25.			
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. 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		



		F3SG-4RA□□□□-14 F3SG-2RA□□□□-14	F3SG-4RA□□□□-30 F3SG-2RA□□□□-30	
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 and 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 <sup>2</sup> , 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	
	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	
	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 page 13.	
		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 page 22 .		
	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		
Conformity	Conforming standards	Refer to page 24.		
	Type of ESPE (IEC 61496-1)	Type 4		
	Performance Level (PL)/Safety category	Type 4	PL e/Category 4 (EN ISO 13849-1:2008)	
		Type 2	PL c/Category 2 (EN ISO 13849-1:2008)	
	PFHd	1.1 × 10 <sup>-8</sup> (IEC 61508)		
	Proof test interval T <sub>M</sub>	Every 20 years (IEC 61508)		
	SFF	99% (IEC 61508)		
HFT	1 (IEC 61508)			
Classification	Type B (IEC 61508-2)			

## F3SG-4RA□□□□-25-01TS

Type of ESPE (IEC 61496-1)		Type 4	F3SG-4RA□□□□-25-01TS
Performance	Object Resolution (Detection Capability)		Opaque objects
	Beam Gap		25-mm dia.
	Number of Beams		8 to 96
	Lens Size		6.0x5.0 (WxH) mm
	Protective Height		185 to 1945 mm (7.3 to 76.6 inch)
	Operating Range	Long	0.3 to 17.0 m (1 to 56 ft.)
		Short	0.3 to 5.0 m (1 to 16 ft.)
	Response Time	ON to OFF	8 to 13 ms *1
		OFF to ON	40 to 65ms *1
		*1 Response time when used in one segment system or in cascaded connection. Refer to page 23.	
Effective Aperture Angle (EAA) (IEC 61496-2)	Type 4	±2.5° 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.	
Power Supply Voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
Current Consumption		Refer to page 23 .	
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 (Safety Output and homopolarity) 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	Reverse output of safety output	
Input Voltage	External device monitoring input (Lockout reset input)	PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 6.5 mA) * OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 8.0 mA) *	
		NPN ON voltage: 0 V to 3 V (short circuit current: approx. 8.0 mA) * OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 6.5 mA) *	
	Test input	TEST: 24 V inactive setting ON voltage: 0 V to 1.5 V or open (short circuit current: approx. 2.0 mA) OFF voltage: 9 V to Vs (short circuit current: approx. 2.5 mA) *  0 V inactive setting ON voltage: 9 V to Vs or open (short circuit current: approx. 2.5 mA) OFF voltage: 0 V to 3 V (short circuit current: approx. 2.0 mA)  * The Vs indicates a supply voltage value in your environment.	
Overvoltage Category (IEC 60664-1)		II	
Indicators		Refer to page 25 .	
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. Cable length 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		External device monitoring (EDM) Scan code selection PNP/NPN selection
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 and 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 <sup>2</sup> , 1000 shocks for all 3 axes	
Pollution Degree (IEC 60664-1)		Pollution Degree 3	

		F3SG-4RA□□□□□-25-01TS	
Connections	Power cable	Type of Connection	M12 connectors: 8-pin emitter and receiver, IP67 rated when mated, Cables prewired to the sensors
		Number of Wires	On emitter: 5-wire, On receiver: 8-wire
		Cable Length	0.3 m
		Cable Diameter	6 mm
	Cascading cable	Minimum Bending Radius	R5 mm
		Type of Connection	M12 connectors: 8-pin emitter and receiver, IP67 rated when mated
		Number of Wires	On emitter: 5-wire, On receiver: 8-wire
		Cable Length	0.2 m
	Extension cable - Single-ended cable - Double-ended cable	Cable Diameter	6 mm
		Minimum Bending Radius	R5 mm
		Type of Connection	M12 connectors: 8-pin emitter and receiver, IP67 rated when mated
		Number of Wires	On emitter and receiver: 8-wire
	Extension of Power Cable	Cable Length	Refer to page 13.
Cable Diameter		6.6 mm	
Minimum Bending Radius		R36 mm	
Extension of Power Cable		100 m max.(Emitter/Receiver)	
Material	Material	Housing: Aluminum Cap: PBT Front window: PMMA Cable: Oil resistant PVC FE plate: SUS	
	Weight (packaged)	Refer to page 23 .	
	Included Accessories	Safety Precautions, Quick Installation Manual, Troubleshooting Guide Sticker,	
Conformity	Conforming standards	Refer to page 24 .	
	Performance Level (PL)/ Safety category	Type 4	
	PFHd	$1.1 \times 10^{-8}$ (IEC 61508)	
	Proof test interval $T_M$	Every 20 years (IEC 61508)	
	SFF	99% (IEC 61508)	
	HFT	1 (IEC 61508)	
	Classification	Type B (IEC 61508-2)	

## Bluetooth Communication Unit

Communication System	Bluetooth Version 3.0
Communication Profile	SPP (Serial Port Profile)
Transmission Distance	Approx. 10 m max. (Output power: Class 2) *

\* It depends on use environment conditions.



# F3SG-RA

## List of Models/Response Time/Current Consumption/Weight

### F3SG-4RA□□□□-14/F3SG-2RA□□□□-14

Model		Number of Beams	Protective Height [mm]	Response Time [ms]			Current Consumption [mA]		Weight [kg] <sup>2</sup>
				ON → OFF <sup>1</sup>	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	
F3SG-4RA0160-14	F3SG-2RA0160-14	15	160	8	40	140	40	75	1.8
F3SG-4RA0240-14	F3SG-2RA0240-14	23	240	8	40	140	45	75	2.0
F3SG-4RA0320-14	F3SG-2RA0320-14	31	320	8	40	140	55	75	2.2
F3SG-4RA0400-14	F3SG-2RA0400-14	39	400	8	40	140	60	80	2.7
F3SG-4RA0480-14	F3SG-2RA0480-14	47	480	13	65	165	50	80	2.9
F3SG-4RA0560-14	F3SG-2RA0560-14	55	560	13	65	165	55	80	3.1
F3SG-4RA0640-14	F3SG-2RA0640-14	63	640	13	65	165	60	85	3.3
F3SG-4RA0720-14	F3SG-2RA0720-14	71	720	13	65	165	65	85	3.9
F3SG-4RA0800-14	F3SG-2RA0800-14	79	800	13	65	165	65	90	4.1
F3SG-4RA0880-14	F3SG-2RA0880-14	87	880	13	65	165	70	90	4.3
F3SG-4RA0960-14	F3SG-2RA0960-14	95	960	13	65	165	75	90	4.5
F3SG-4RA1040-14	F3SG-2RA1040-14	103	1040	13	65	165	80	95	4.7
F3SG-4RA1120-14	F3SG-2RA1120-14	111	1120	13	65	165	85	95	4.8
F3SG-4RA1200-14	F3SG-2RA1200-14	119	1200	13	65	165	90	100	5.0
F3SG-4RA1280-14	F3SG-2RA1280-14	127	1280	13	65	165	95	100	5.2
F3SG-4RA1360-14	F3SG-2RA1360-14	135	1360	13	65	165	95	105	5.6
F3SG-4RA1440-14	F3SG-2RA1440-14	143	1440	18	90	190	85	105	5.8
F3SG-4RA1520-14	F3SG-2RA1520-14	151	1520	18	90	190	90	105	6.0
F3SG-4RA1600-14	F3SG-2RA1600-14	159	1600	18	90	190	90	110	6.6
F3SG-4RA1680-14	F3SG-2RA1680-14	167	1680	18	90	190	95	110	6.8
F3SG-4RA1760-14	F3SG-2RA1760-14	175	1760	18	90	190	100	115	7.0
F3SG-4RA1840-14	F3SG-2RA1840-14	183	1840	18	90	190	100	115	7.2
F3SG-4RA1920-14	F3SG-2RA1920-14	191	1920	18	90	190	105	120	7.3
F3SG-4RA2000-14	F3SG-2RA2000-14	199	2000	18	90	190	105	120	7.5
F3SG-4RA2080-14	F3SG-2RA2080-14	207	2080	18	90	190	110	125	8.1

\*1 The response times are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.

\*2 The weight includes an emitter, a receiver and included brackets in a product package.

### F3SG-4RA□□□□-30/F3SG-2RA□□□□-30

Model		Number of Beams	Protective Height [mm]	Response Time [ms]			Current Consumption [mA]		Weight [kg] <sup>2</sup>
				ON → OFF <sup>1</sup>	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	
F3SG-4RA0190-30	F3SG-2RA0190-30	8	190	8	40	140	35	75	1.8
F3SG-4RA0270-30	F3SG-2RA0270-30	12	270	8	40	140	35	75	2.0
F3SG-4RA0350-30	F3SG-2RA0350-30	16	350	8	40	140	40	75	2.2
F3SG-4RA0430-30	F3SG-2RA0430-30	20	430	8	40	140	45	75	2.7
F3SG-4RA0510-30	F3SG-2RA0510-30	24	510	8	40	140	50	75	2.9
F3SG-4RA0590-30	F3SG-2RA0590-30	28	590	8	40	140	50	75	3.1
F3SG-4RA0670-30	F3SG-2RA0670-30	32	670	8	40	140	55	75	3.3
F3SG-4RA0750-30	F3SG-2RA0750-30	36	750	8	40	140	60	80	3.9
F3SG-4RA0830-30	F3SG-2RA0830-30	40	830	8	40	140	65	80	4.0
F3SG-4RA0910-30	F3SG-2RA0910-30	44	910	13	65	165	50	80	4.2
F3SG-4RA0990-30	F3SG-2RA0990-30	48	990	13	65	165	50	80	4.4
F3SG-4RA1070-30	F3SG-2RA1070-30	52	1070	13	65	165	55	80	4.6
F3SG-4RA1150-30	F3SG-2RA1150-30	56	1150	13	65	165	55	85	4.8
F3SG-4RA1230-30	F3SG-2RA1230-30	60	1230	13	65	165	55	85	4.9
F3SG-4RA1310-30	F3SG-2RA1310-30	64	1310	13	65	165	60	85	5.1
F3SG-4RA1390-30	F3SG-2RA1390-30	68	1390	13	65	165	60	85	5.6
F3SG-4RA1470-30	F3SG-2RA1470-30	72	1470	13	65	165	65	85	5.8
F3SG-4RA1550-30	F3SG-2RA1550-30	76	1550	13	65	165	65	90	6.0
F3SG-4RA1630-30	F3SG-2RA1630-30	80	1630	13	65	165	70	90	6.5
F3SG-4RA1710-30	F3SG-2RA1710-30	84	1710	13	65	165	70	90	6.7
F3SG-4RA1790-30	F3SG-2RA1790-30	88	1790	13	65	165	70	90	6.9
F3SG-4RA1870-30	F3SG-2RA1870-30	92	1870	13	65	165	75	90	7.1
F3SG-4RA1950-30	F3SG-2RA1950-30	96	1950	13	65	165	75	95	7.3
F3SG-4RA2030-30	F3SG-2RA2030-30	100	2030	13	65	165	80	95	7.4
F3SG-4RA2110-30	F3SG-2RA2110-30	104	2110	13	65	165	80	95	8.0
F3SG-4RA2190-30	F3SG-2RA2190-30	108	2190	13	65	165	85	95	8.2
F3SG-4RA2270-30	F3SG-2RA2270-30	112	2270	13	65	165	85	100	8.4
F3SG-4RA2350-30	F3SG-2RA2350-30	116	2350	13	65	165	85	100	8.8
F3SG-4RA2430-30	F3SG-2RA2430-30	120	2430	13	65	165	90	100	8.9
F3SG-4RA2510-30	F3SG-2RA2510-30	124	2510	13	65	165	90	100	9.1

\*1 The response times are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.

The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.

\*2 The weight includes an emitter, a receiver and included brackets in a product package.

## F3SG-4RA□□□□-25-01TS

Model	Number of Beams	Protective Height [mm]	Response Time [ms]			Current Consumption [mA]		Weight [kg] *3
			ON → OFF *1	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	
F3SG-4RA0185-25	8	185	8	40	140	35	75	1.2
F3SG-4RA0265-25	12	265	8	40	140	35	75	1.4
F3SG-4RA0345-25	16	345	8	40	140	40	75	1.6
F3SG-4RA0425-25	20	425	8	40	140	45	75	2.1
F3SG-4RA0505-25	24	505	8	40	140	50	75	2.3
F3SG-4RA0585-25	28	585	8	40	140	50	75	2.4
F3SG-4RA0665-25	32	665	8	40	140	55	75	2.6
F3SG-4RA0745-25	36	745	8	40	140	60	80	3.1
F3SG-4RA0825-25	40	825	8	40	140	65	80	3.2
F3SG-4RA0905-25	44	905	13	65	165	50	80	3.4
F3SG-4RA0985-25	48	985	13	65	165	50	80	3.6
F3SG-4RA1065-25	52	1065	13	65	165	55	80	3.8
F3SG-4RA1145-25	56	1145	13	65	165	55	85	4.5
F3SG-4RA1225-25	60	1225	13	65	165	55	85	4.6
F3SG-4RA1305-25	64	1305	13	65	165	60	85	4.8
F3SG-4RA1385-25	68	1385	13	65	165	60	85	5.1
F3SG-4RA1465-25	72	1465	13	65	165	65	85	5.3
F3SG-4RA1545-25	76	1545	13	65	165	65	90	5.4
F3SG-4RA1625-25	80	1625	13	65	165	70	90	6.0
F3SG-4RA1705-25	84	1705	13	65	165	70	90	6.2
F3SG-4RA1785-25	88	1785	13	65	165	70	90	6.4
F3SG-4RA1865-25	92	1865	13	65	165	75	90	6.6
F3SG-4RA1945-25	96	1945	13	65	165	75	95	6.7

\*1 The response times are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.

\*2 The weight includes an emitter and a receiver in a product package.

## Legislation and Standards

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1. The F3SG-R does not receive type approval provided by Article 44-2 of the Industrial Safety and Health Act of Japan. When using the F3SG-R in Japan as a "safety system for pressing or shearing machines" prescribed in Article 42 of that law, the machine control system must receive type approval.
2. The F3SG-R is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Index Annex V, Item 2.
3. EC Declaration of Conformity  
OMRON declares that the F3SG-R is in conformity with the requirements of the following EC Directives:  
Machinery Directive 2006/42/EC  
EMC Directive 2014/30/EU
4. Conforming Standards
  - (1) European standards  
EN61496-1 (Type 4 and Type 2 ESPE), EN 61496-2 (Type 4 and Type 2 AOPD), EN61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), EN ISO 13849-1:2008 (PL e, Category 4 for Type 4 and PL c, Category 2 for Type 2)
  - (2) International standards  
IEC61496-1 (Type 4 and Type 2 ESPE), IEC61496-2 (Type 4 and Type 2 AOPD), IEC61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), ISO 13849-1:2006 (PL e, Category 4 for Type 4 and PL c, Category 2 for Type 2)
  - (3) JIS standards  
JIS B 9704-1 (Type 4 and Type 2 ESPE), JIS B 9704-2 (Type 4 and Type 2 AOPD)
  - (4) North American standards  
UL61496-1 (Type 4 and Type 2 ESPE), UL61496-2 (Type 4 and Type 2 AOPD), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
  - (5) Chinese standards \*  
GB4584 (Specification of active opto-electronic protective devices for presses)
5. Third-Party Certifications
  - (1) TÜV SÜD
    - EC Type-Examination certificate:  
EU Machinery Directive, Type 4 and Type 2 ESPE (EN61496-1), Type 4 and Type 2 AOPD (EN 61496-2)
    - Certificate:  
Type 4 and Type 2 ESPE (EN61496-1), Type 4 and Type 2 AOPD (EN61496-2), EN 61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), EN ISO 13849-1:2008 (PL e, Category 4 for Type 4, and PL c, Category 2 for Type 2)
  - (2) UL
    - UL Listing:  
Type 4 and Type 2 ESPE (UL61496-1), Type 4 and Type 2 AOPD (UL61496-2), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
  - (3) China National Casting and Forging Machines Quality Supervision and Inspection Center \*
    - Certificate:  
GB4584 (Specification of active opto-electronic protective devices for presses)
6. Other Standards  
The F3SG-R is designed according to the standards listed below. To make sure that the final system complies with the following standards and regulations, you are asked to design and use it in accordance with all other related standards, laws, and regulations. If you have any questions, consult with specialized organizations such as the body responsible for prescribing and/or enforcing machinery safety regulations in the location where the equipment is to be used.
  - European Standards: EN415-4, EN691-1, EN692, EN693, IEC/TS 62046
  - U.S. Occupational Safety and Health Standards: OSHA 29 CFR 1910.212
  - U.S. Occupational Safety and Health Standards: OSHA 29 CFR 1910.217
  - American National Standards: ANSI B11.1 to B11.19
  - American National Standards: ANSI/RIA R15.06
  - Canadian Standards Association CSA Z142, Z432, Z434
  - SEMI Standards SEMI S2
  - Japan Ministry of Health, Labour and Welfare "Guidelines for Comprehensive Safety Standards of Machinery", Standard Bureau's Notification No. 0731001 dated July 31, 2007.rms and Conditions Agreement
  - Chinese National Standards: GB17120, GB27607 \*

\* The F3SG-4RA□□□□-25-01TS does not conform.



## Indicator

### F3SG-4RA□□□□-14/-4RA□□□□-30

#### Emitter

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

#### Receiver

Name of Indicator		Color	Illuminated	Blinking
Top-beam-state	TOP	Blue	The top beam is unblocked	Muting/Override state, or Lockout state due to Cap error or Other sensor error
PNP/NPN mode	NPN	Green	NPN mode is selected by DIP Switch	–
Response time	SLOW	Green	Response Time Adjustment is enabled	–
Sequence error	SEQ	Yellow	–	Sequence error in Muting or Pre-reset mode
Blanking	BLANK	Green	Blanking, Warning Zone or Reduced Resolution is enabled	Teach-in mode, or Blanking Monitoring error
Configuration	CFG	Green	–	Teach-in mode, zone measurement beng performed by Dynamic Muting, or Lockout state due to Parameter error or Cascading Configuration error
Interlock	INT-LK	Yellow	Interlock state	Pre-reset mode
External device monitoring	EDM	Green	RESET input is in ON state	Lockout state due to EDM error
Internal error	INTERNAL	Red	–	Lockout state due to Internal error, or error due to abnormal power supply or noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in receiver
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
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
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
Bottom-beam-state	BTM	Blue	The bottom beam is unblocked	Muting/Override state, or Lockout state due to DIP Switch setting error

# F3SG-RA

## F3SG-4RA□□□□-25-01TS

### Emitter

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

### Receiver

Location	Name of Indicator	Color	Illuminated	Blinking
1	TOP	Blue	The top beam is unblocked	Lockout state due to Cap error or Other sensor error
2	NPN	Green	NPN mode is selected by DIP Switch	–
3	CFG	Green	–	Lockout state due to Cascading Configuration error
4	EDM	Green	EDM input is in ON state *	Lockout state due to EDM error
5	INTERNAL	Red	–	Lockout state due to Internal error, or error due to abnormal power supply or noise
6	LOCKOUT	Red	–	Lockout state due to error in receiver
7	STB	Green	Incident light level is 170% or higher of ON-threshold	Safety output is instantaneously turned OFF due to ambient light or vibration
8	ON/OFF	Green	Safety output is in ON state	–
		Red	Safety output is in OFF state	Lockout state due to Safety Output error, or error due to abnormal power supply or noise
9	COM	Green	Synchronization between emitter and receiver is maintained	Lockout state due to Communication error, or error due to abnormal power supply or noise
10	BTM	Blue	The bottom beam is unblocked	Lockout state due to DIP Switch setting error

\* The LED is illuminated when the EDM input is in ON state regardless of wiring with EDM used or unused.

### Interface Unit

<b>Main unit</b>	PC/AT compatible machine (computer that runs Microsoft Windows)
<b>Operating system (OS)</b>	Windows 7 (32-bit/64-bit), Windows 8 (32-bit/64-bit)
<b>Communication port</b>	USB port ×1
<b>Ambient temperature</b>	Operating: -10 to 55°C, Storage: -30 to 70°C(non-icing and non-condensing)
<b>Ambient humidity</b>	Operating: 35% to 85%, Storage: 35% to 95%(non-condensing)

### Lamp

Item	F39-LP
<b>Applicable Sensor</b>	F3SG-□RA Series Safety Light Curtain (Receiver)
<b>LED Light Color</b>	Red/Green/Orange
<b>Power Supply Voltage</b>	24 VDC±20%, ripple p-p 10% max.(shares sensor's power supply)
<b>Current Consumption</b>	25 mA max. (shares sensor's power supply.)
<b>Ambient Temperature</b>	Operating: -10 to 55°C, Storage: -25 to 70°C
<b>Ambient Humidity</b>	Operating: 35% to 85%, Storage: 35% to 95%
<b>Vibration Resistance</b>	10 to 55 Hz, Multiple amplitude of 0.7 mm,20 sweeps for all 3 axes
<b>Shock Resistance</b>	100 m/s <sup>2</sup> , 1000 shocks for all 3 axes
<b>Degree of Protection</b>	IP65 and IP67(When attached to F3SG)
<b>Type of Connection</b>	Connectable to F3SG-RA's terminal connector
<b>Material</b>	Lighting element: PC, Other body parts: PBT
<b>Weight</b>	45 g (when packaged)

## Connections (Basic Wiring Diagram)

### F3SG-4RA□□□□-14/-4RA□□□□-30

#### Standalone F3SG-RA with Auto Reset mode and EDM disabled using PNP Outputs

The following is the example of Muting disabled, External Device Monitoring disabled, Auto-Reset mode, PNP outputs and External Test not used.

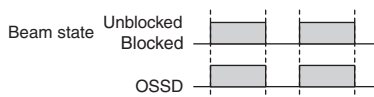
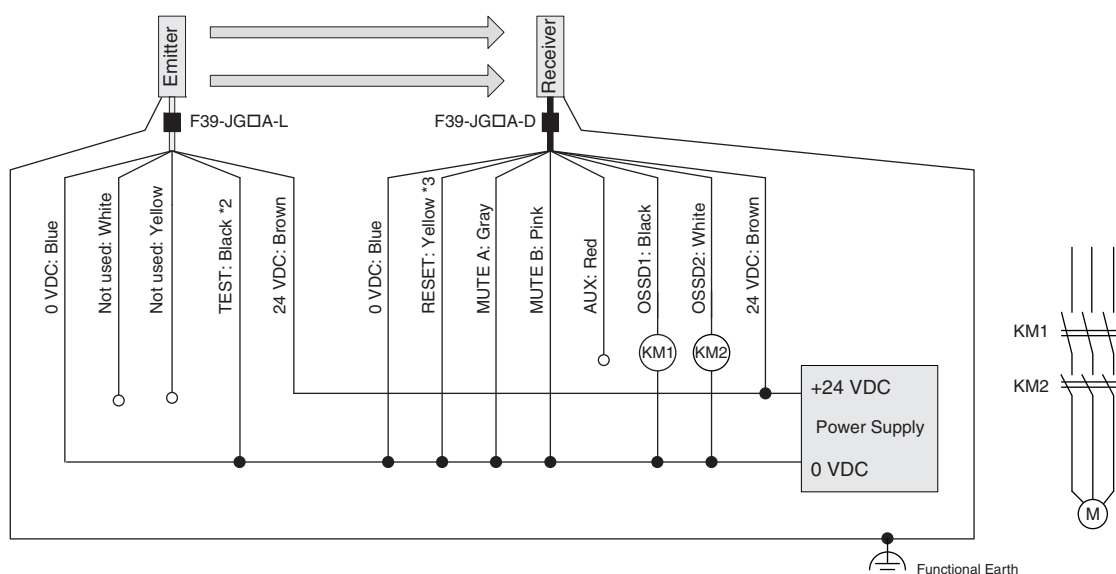
#### DIP Switch settings \*1

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Auto Reset (factory default setting)	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
	PNP (factory default setting)	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input checked="" type="checkbox"/> ON	

☐: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

#### Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor  
M: 3-phase motor

\*1.\*The functions are configurable with DIP Switch. Refer to Safety Light Curtain F3SG-R Series User's Manual for more information on setting the functions by the DIP Switch.

\*2.Connect the line to 24 V via a test switch (N.O. contact) if External Test is used.

\*3.Connect the line to 24 V via a lockout reset switch (N.C. contact) if Lockout Reset is used.

**Note:** Functional earth connection is unnecessary when you use the F3SG-R in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-R in an environment where there may be excessive noise from surroundings or stable power supply may be interfered, it is recommended the F3SG-R be connected to functional earth. The wiring examples in later examples do not indicate functional earth. To use functional earth, wire an earth cable according to the example above. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information.

## Standalone F3SG-RA with Manual Reset mode and EDM enabled using PNP Outputs

The following is the example of External Device Monitoring enabled, Manual Reset mode, PNP output and External Test in 24 V Active.

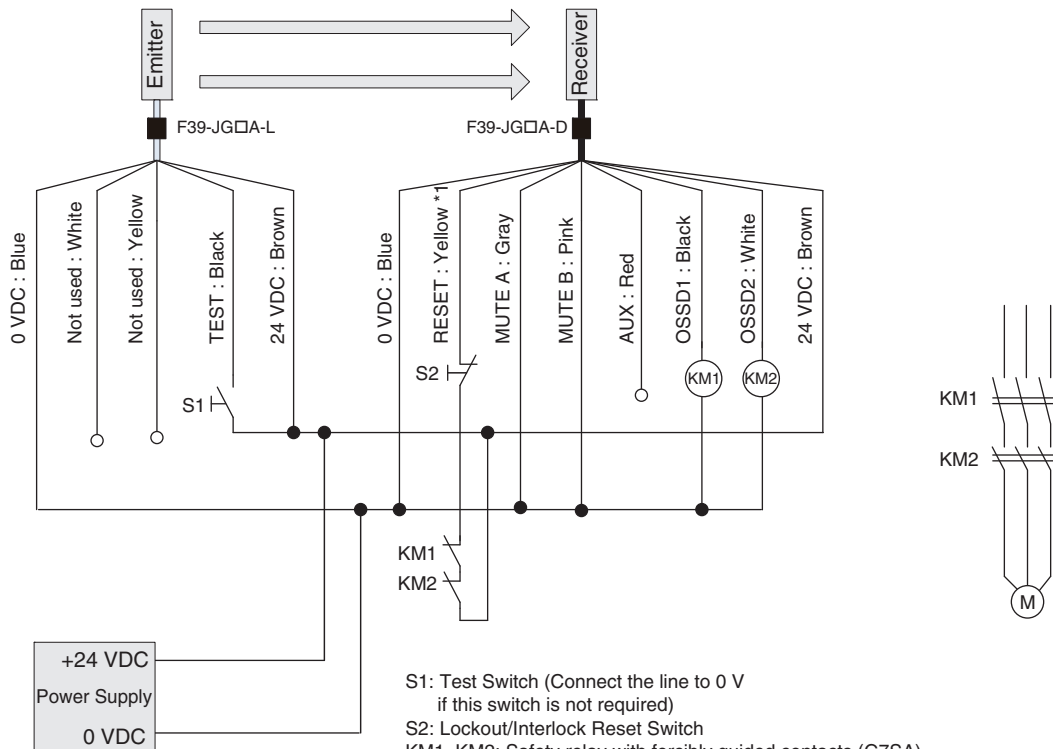
### DIP Switch settings \*2

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Manual Reset	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
	PNP (factory default setting)	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input checked="" type="checkbox"/> ON	

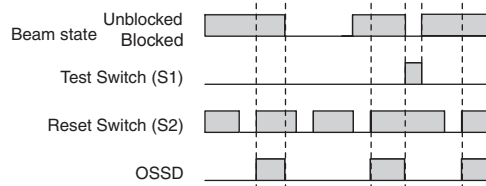
: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



- S1: Test Switch (Connect the line to 0 V if this switch is not required)
- 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 are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.





## Standalone F3SG-RA with Y-Joint Plug/Socket Connector using PNP outputs

The following is the example of Muting disabled, External Device Monitoring enabled, Manual Reset mode, PNP output and External Test in 24 V Active.

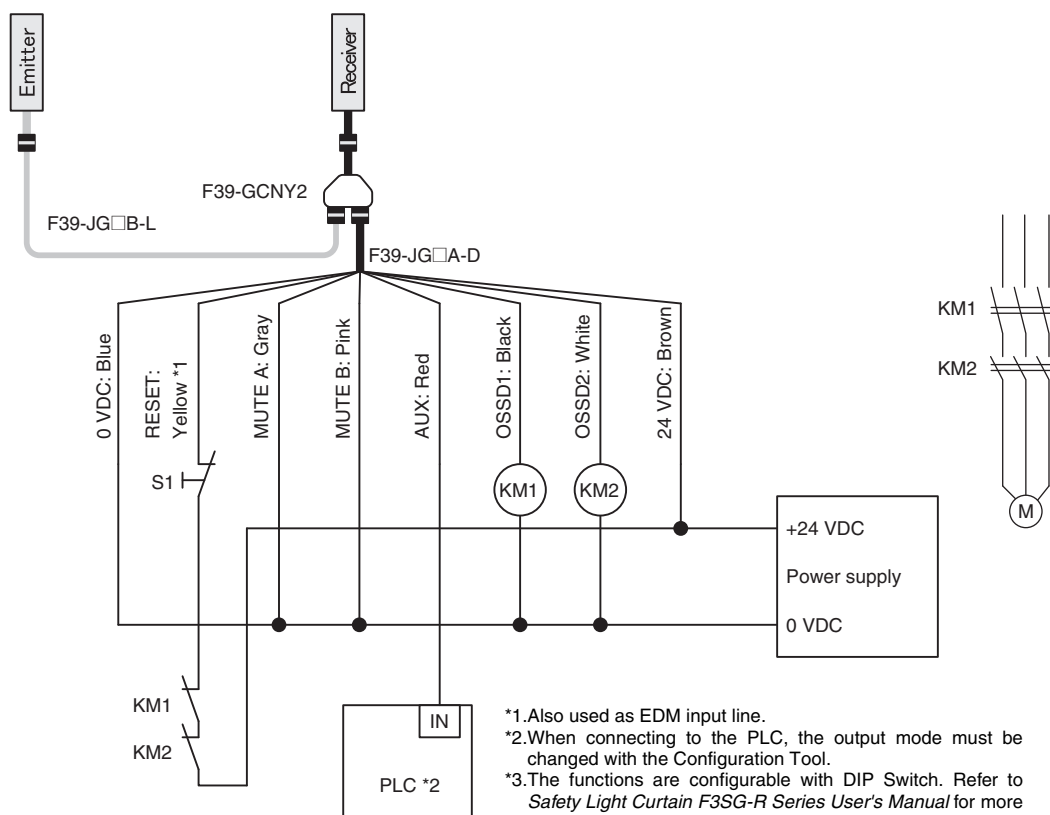
### DIP Switch settings \*3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Manual Reset	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input type="checkbox"/> OFF	4 <input type="checkbox"/> OFF
	PNP (factory default setting)	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input type="checkbox"/> OFF	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



S1: Lockout/Interlock Reset Switch  
 KM1, KM2: External device feedback  
 M: 3-phase motor  
 PLC: Programmable controller  
 (Used for monitoring only. NOT related to safety system.)

\*1. Also used as EDM input line.  
 \*2. When connecting to the PLC, the output mode must be changed with the Configuration Tool.  
 \*3. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



## F3SG-RA with Y-Joint Plug/Socket Connector in Standard Muting Mode/Exit-Only Muting Mode using PNP outputs

The following is the example of External Device Monitoring disabled, Auto Reset mode, PNP output and External Test in 24 V Active.

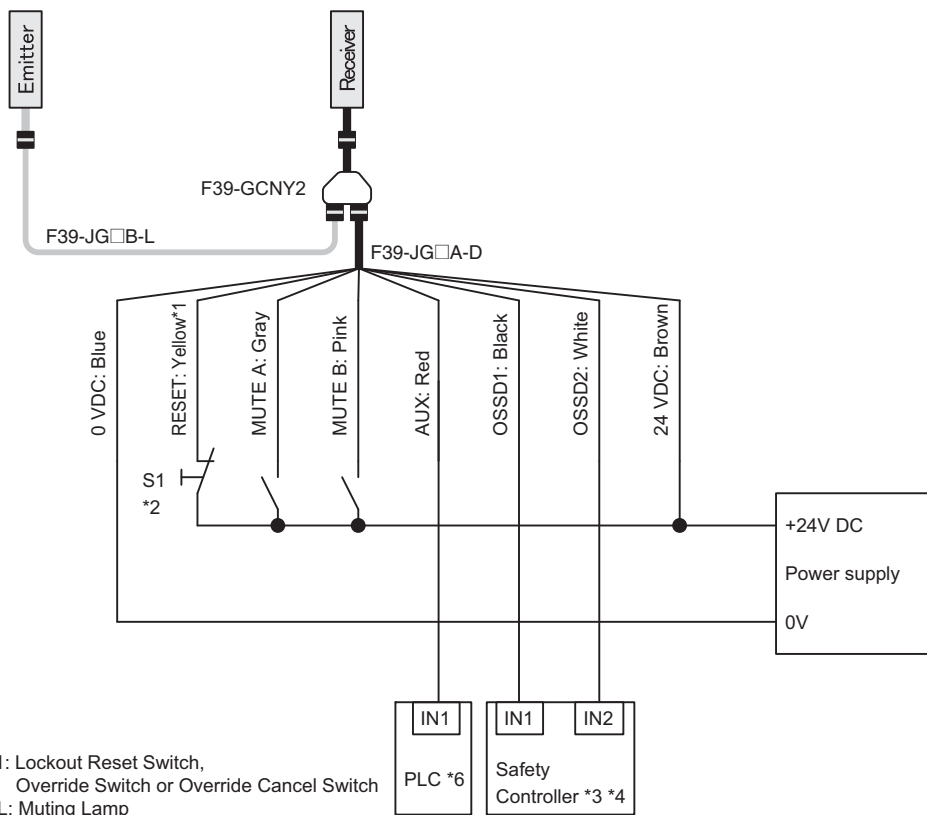
### DIP Switch settings \*5

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Auto Reset (factory default setting)	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
	PNP (factory default setting)	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input checked="" type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



S1: Lockout Reset Switch,  
Override Switch or Override Cancel Switch  
ML: Muting Lamp

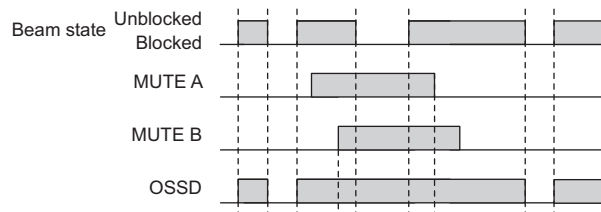
\*1. Also used as EDM input line.

\*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 page 34 for more information.

\*4. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.

\*5. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



## Standard Muting Mode/Exit-Only Muting Mode using PNP Outputs

The following is the example of External Device Monitoring disabled, Auto Reset mode, PNP output and External Test in 24 V Active.

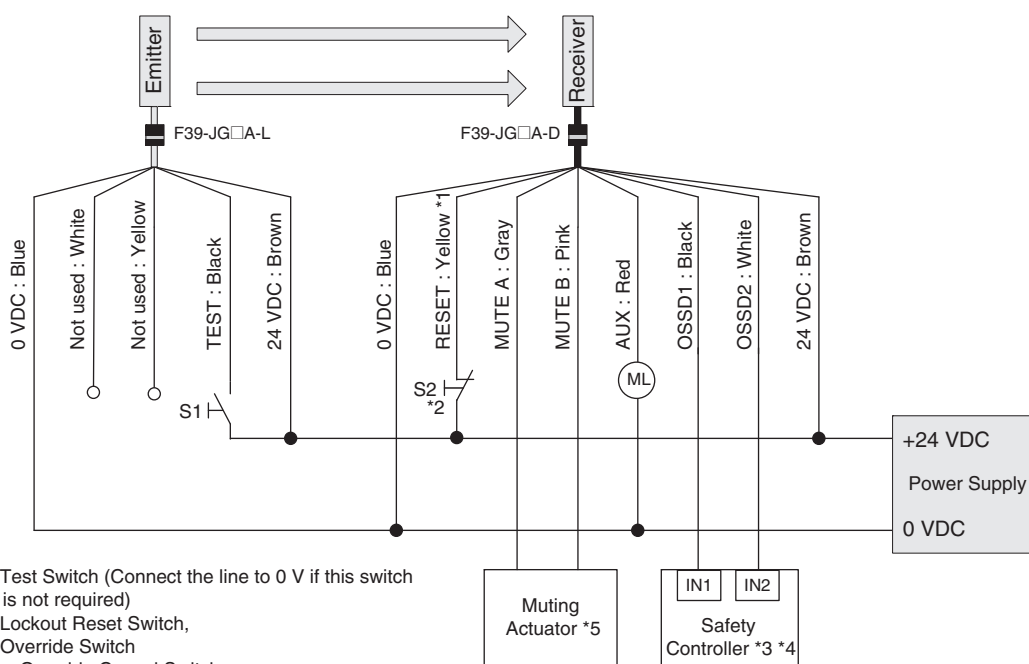
### DIP Switch settings \*6

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Auto Reset (factory default setting)	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
	PNP (factory default setting)	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input checked="" type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



S1: Test Switch (Connect the line to 0 V if this switch is not required)

S2: Lockout Reset Switch, Override Switch or Override Cancel Switch

ML: Muting lamp

\*1. Also used as Override input line.

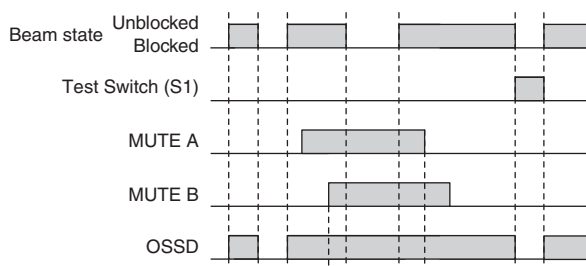
\*2. Make sure to connect an override cancel switch to the Reset line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.

\*3. Refer to page 34 for more information.

\*4. The safety controller and the F3SG-R 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 are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



## Standard Muting Mode/Exit-Only Muting Mode with two Muting Sensors using PNP Outputs

The following is the example of External Device Monitoring disabled, Auto Reset mode, PNP output and External Test in 24 V Active.

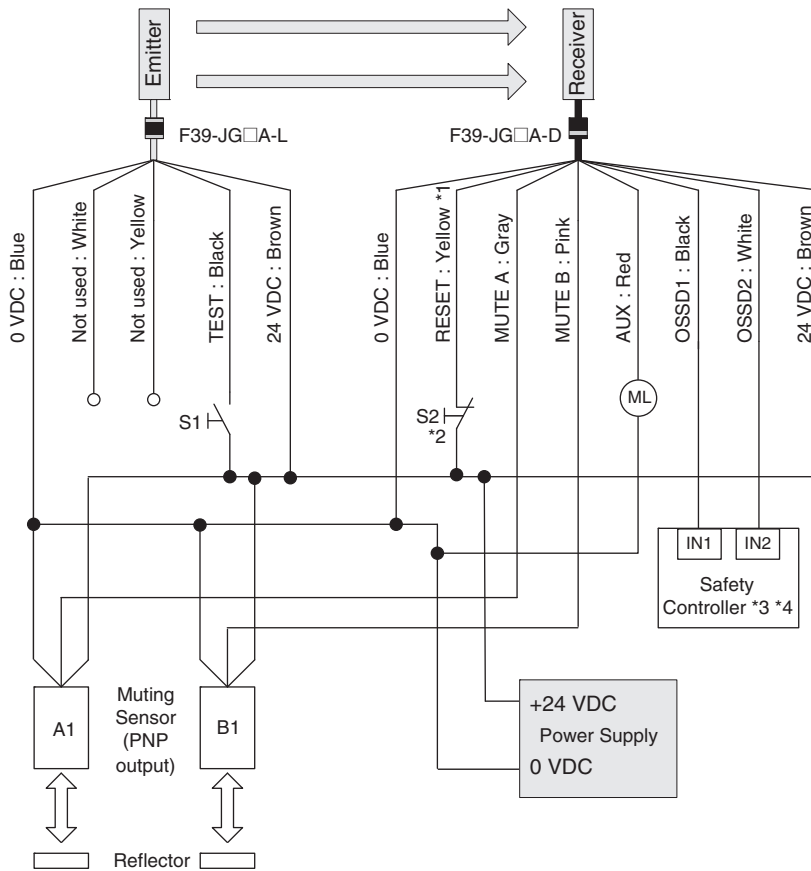
### DIP Switch settings \*5

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON
	Auto Reset (factory default setting)	3 <input type="checkbox"/> ON	3 <input type="checkbox"/> ON
		4 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON
	PNP (factory default setting)	7 <input type="checkbox"/> ON	7 <input type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input type="checkbox"/> ON	

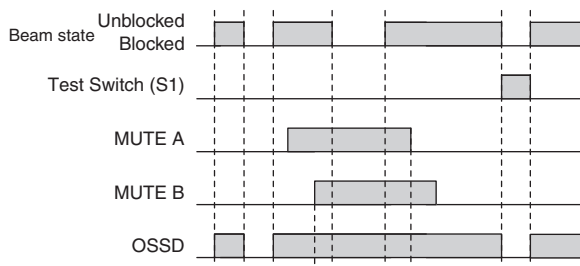
: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



S1: Test Switch (Connect the line to 0 V if this switch is not required)  
 S2: Lockout Reset Switch, Override Switch or Override Cancel Switch  
 ML: Muting lamp  
 A1, B1: Muting sensor



\*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 page 34 for more information.

\*4. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.

\*5. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



## Standard Muting Mode with four Muting Sensors using PNP Outputs

The following is the example of External Device Monitoring disabled, Auto Reset mode, PNP output and External Test in 24 V Active.

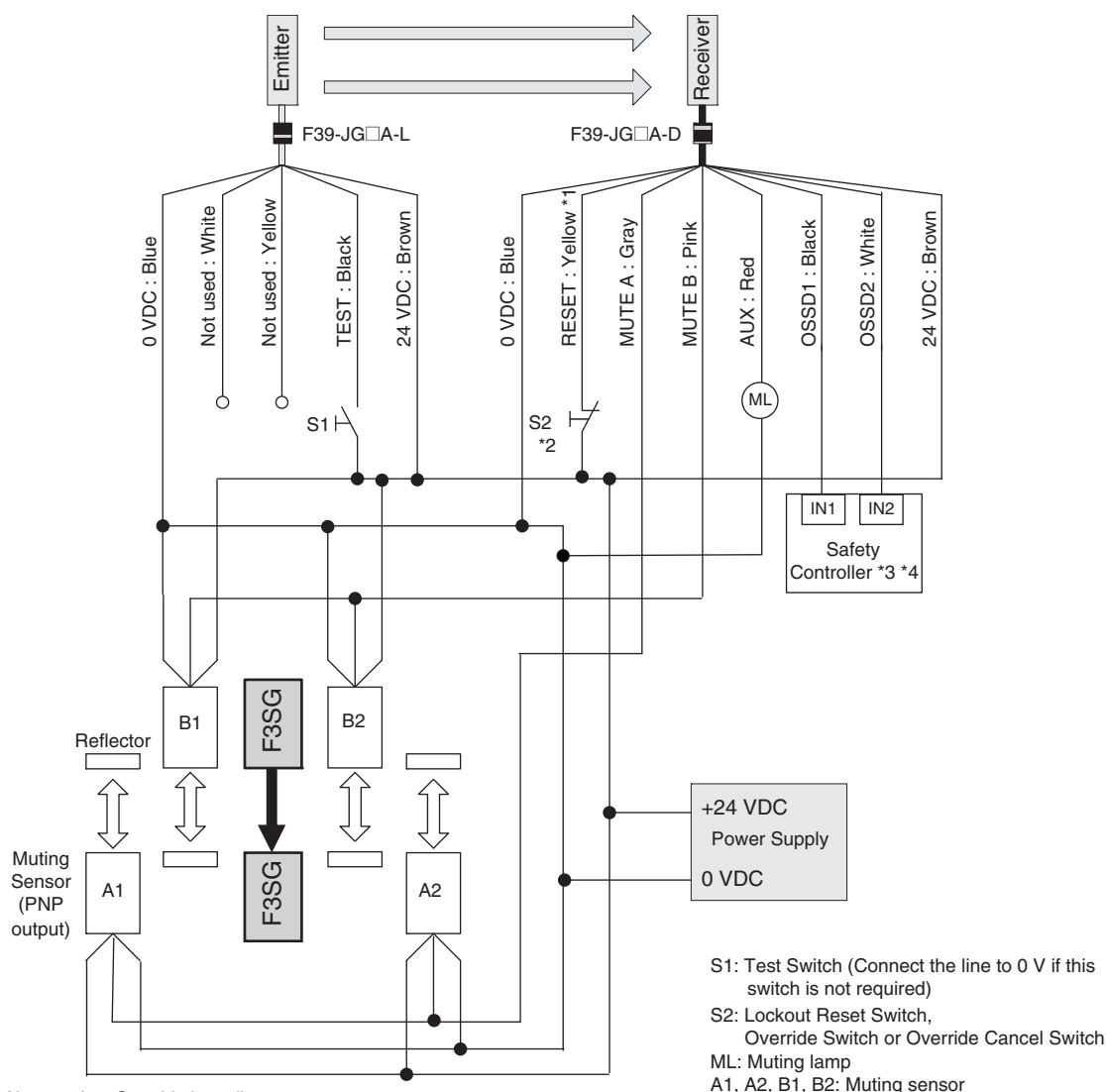
### DIP Switch settings \*5

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Auto Reset (factory default setting)	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
	PNP (factory default setting)	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input checked="" type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



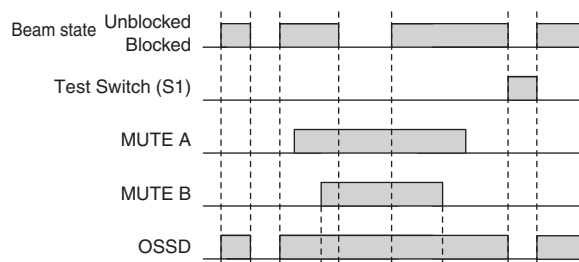
\*1. Also used as Override input line.

\*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 page 34 for more information.

\*4. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.

\*5. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



## Pre-Reset Mode using PNP Output

The following is the example of External Device Monitoring disabled, Pre-Reset mode, PNP output and External Test in 24 V Active.

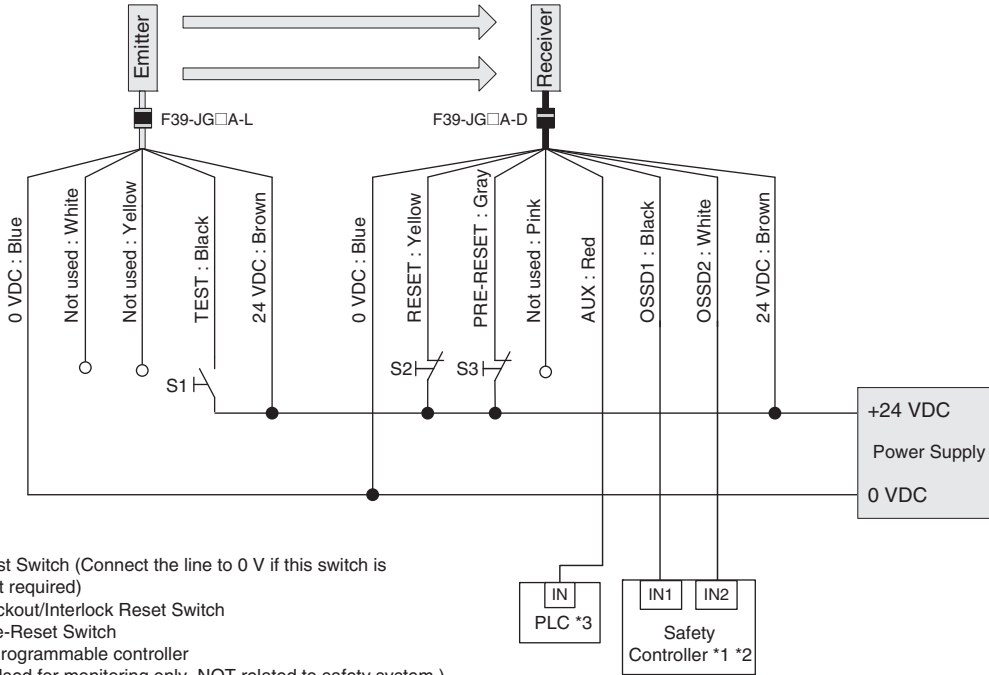
### DIP Switch settings \*4

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Pre-Reset	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
		7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input checked="" type="checkbox"/> ON	

: Indicates a switch position.

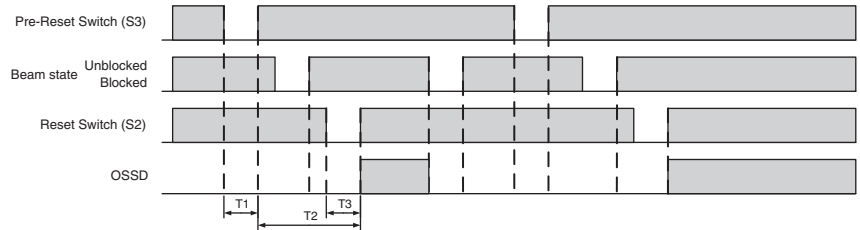
Configure functions with the DIP Switches before wiring.

### Wiring Example



- S1: Test Switch (Connect the line to 0 V if this switch is not required)
- S2: Lockout/Interlock Reset Switch
- S3: Pre-Reset Switch
- PLC: Programmable controller  
(Used for monitoring only. NOT related to safety system.)

- \*1. Refer to the following list "Connectable Safety Control Units" on this page.
- \*2. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.
- \*3. When connecting to the PLC, the output mode must be changed with the Configuration Tool.
- \*4. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



T1: Push time: must be  $T1 \geq 300ms$   
 T2: Pre-reset limit time between Pre-reset and Reset: must be  $T2 \leq 60s$   
 T3: Push time: must be  $T3 \geq 300ms$

## Connectable Safety Control Units

The F3SG-RA with PNP output can be connected to the safety control units listed in the table below.

Connectable Safety Control Units (PNP output)		
Safety Relay Units	Flexible Safety Units	Safety Controllers
G9SA-301 G9SA-321 G9SA-501 G9SB-200-B G9SB-200-D G9SB-301-B G9SB-301-D G9SE-201 G9SE-401 G9SE-221-T□	G9SX-AD322-T G9SX-ADA222-T G9SX-BC202 G9SX-GS226-T15	G9SP-N10S G9SP-N10D G9SP-N20S NE0A-SCPU01 NE1A-SCPU01 NE1A-SCPU02 DST1-ID12SL-1 DST1-MD16SL-1 DST1-MRD08SL-1 NX-SIH400 NX-SID800 F3SP-T01

## Standalone F3SG-RA with Auto Reset mode and EDM disabled using NPN Outputs

The following is the example of Muting disabled, External Device Monitoring disabled, Auto-Reset mode, NPN outputs and External Test not used.

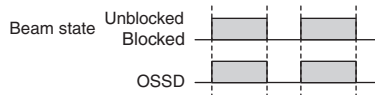
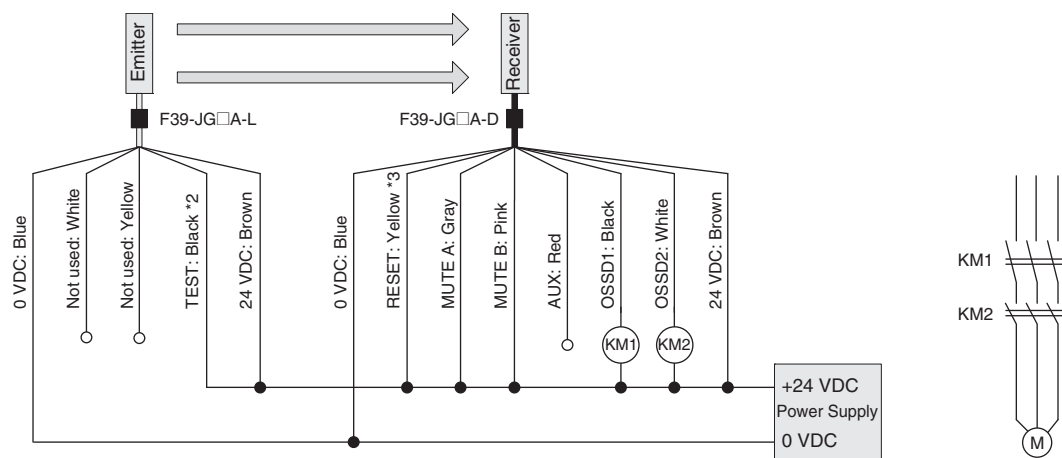
### DIP Switch settings \*1

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Manual Reset	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
	NPN	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 0 V Active	4 <input type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor  
M: 3-phase motor

- \*1. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
- \*2. Connect the line to 0 V via a test switch (N.O. contact) if External Test is used.
- \*3. Connect the line to 0 V via a lockout reset switch (N.C. contact) if Lockout Reset is used.

## Standalone F3SG-RA with Manual Reset mode and EDM enabled using NPN Outputs

The following is the example of Muting disabled, External Device Monitoring enabled, Manual Reset mode, NPN output and External Test in 0 V Active.

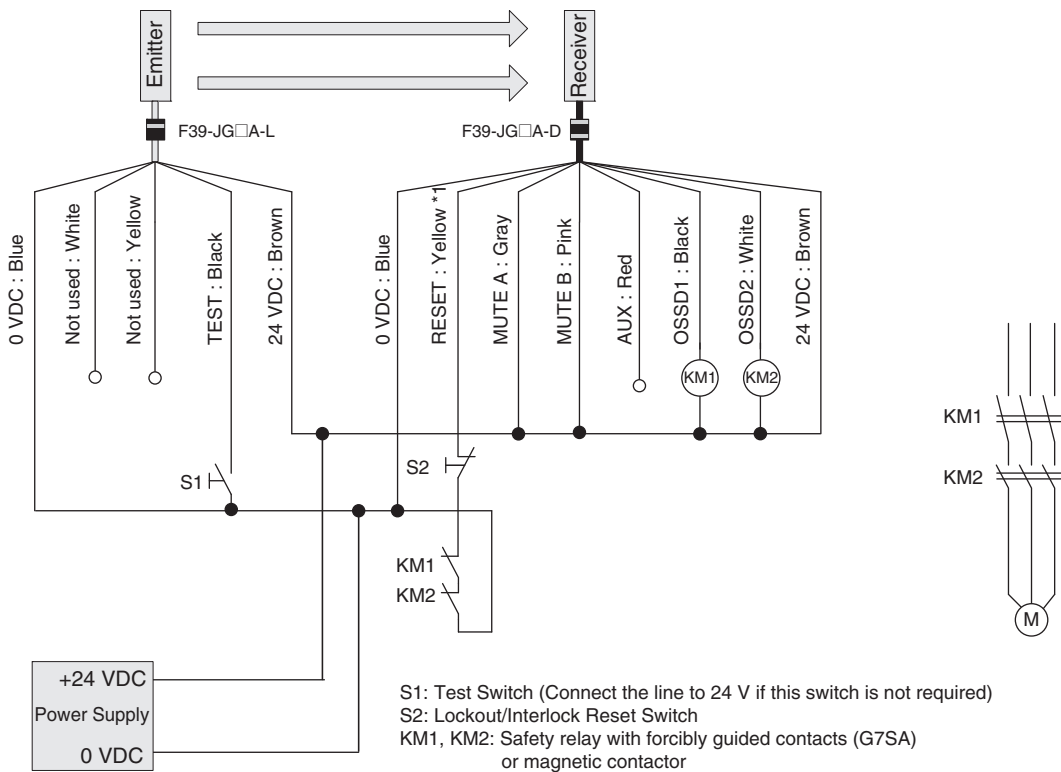
### DIP Switch settings \*2

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Manual Reset	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
	NPN	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 0 V Active	4 <input checked="" type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

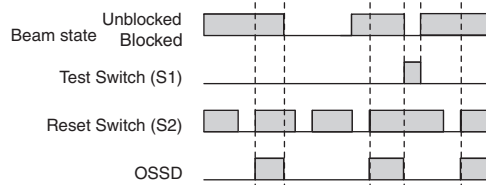
### Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)  
 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 are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.





## Standalone F3SG-RA with Y-Joint Plug/Socket Connector using NPN outputs

The following is the example of Muting disabled, External Device Monitoring enabled, Manual Reset mode, NPN output and External Test in 24 V Active.

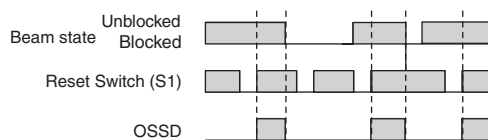
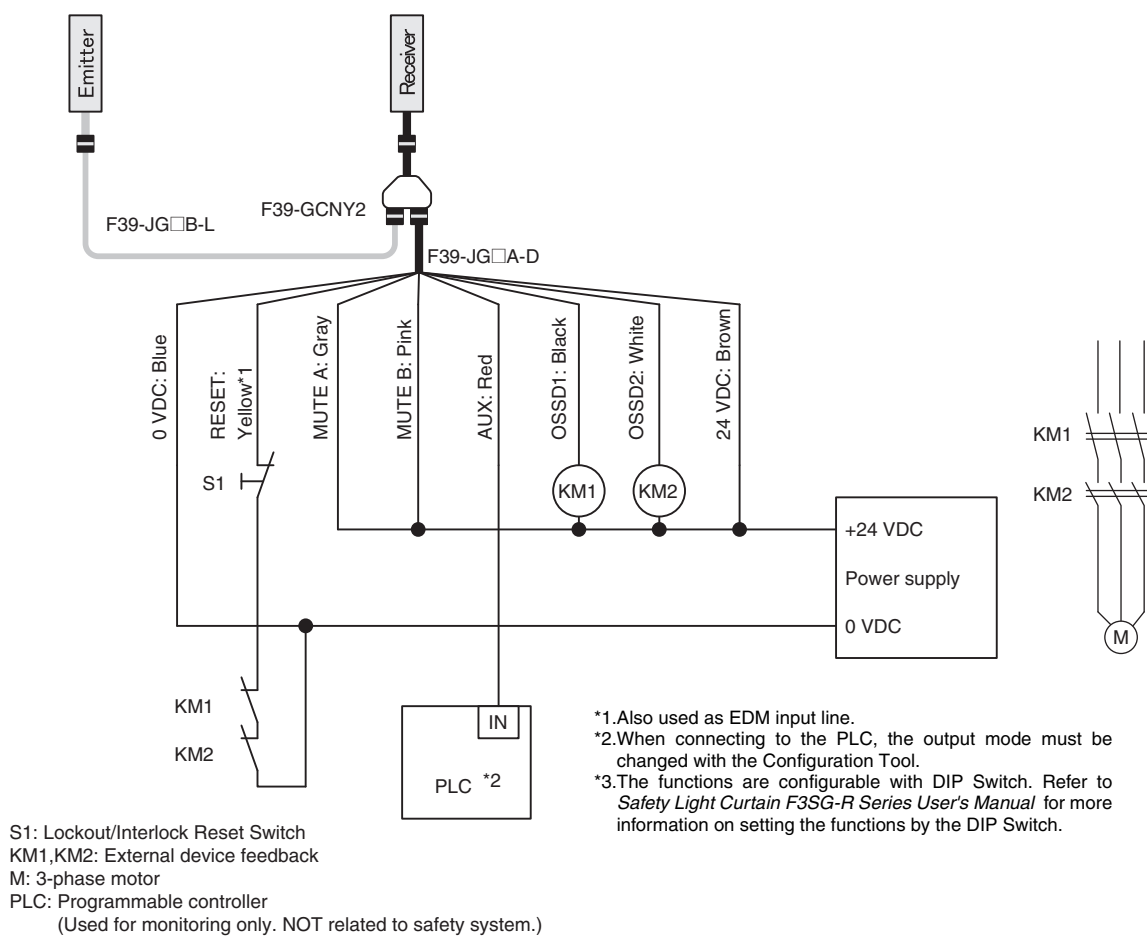
### DIP Switch settings \*3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Manual Reset	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input type="checkbox"/> OFF	4 <input type="checkbox"/> OFF
	NPN	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Active (factory default setting)	4 <input type="checkbox"/> OFF	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



## Standard Muting Mode/Exit-Only Muting Mode using NPN Outputs

The following is the example of External Device Monitoring enabled, Auto Reset mode, NPN output and External Test in 0 V Active.

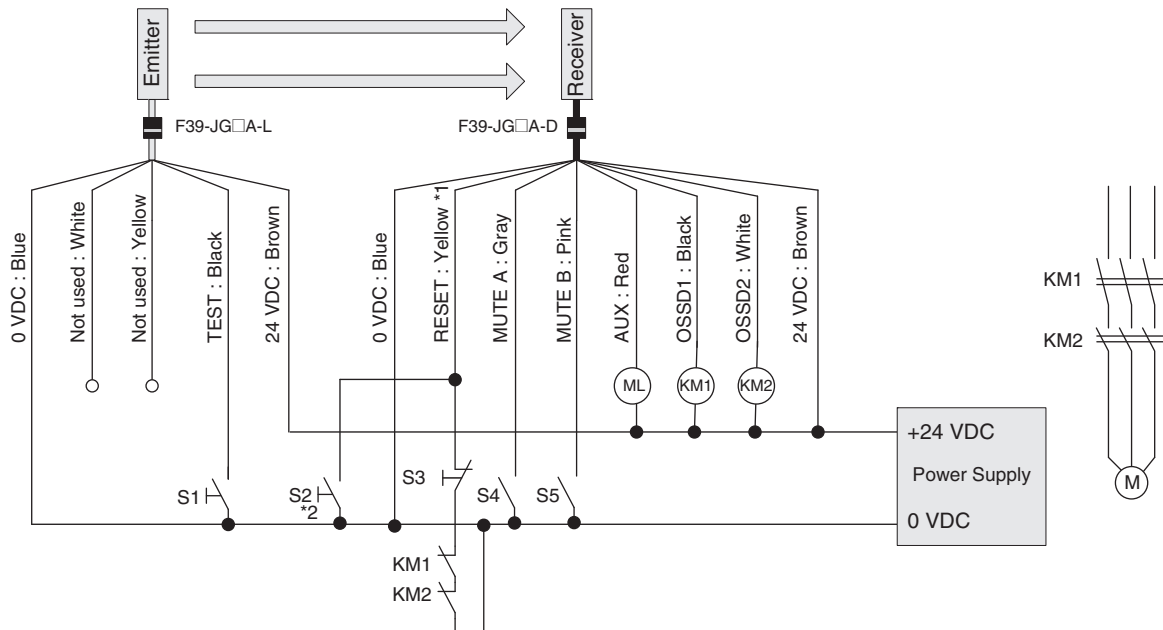
### DIP Switch settings \*3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON
	Auto Reset (factory default setting)	3 <input type="checkbox"/> ON	3 <input type="checkbox"/> ON
		4 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON
	NPN	7 <input type="checkbox"/> ON	7 <input type="checkbox"/> ON
Emitter	External Test: 0 V Active	4 <input type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example

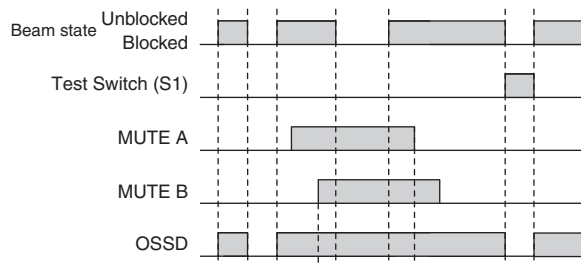


- S1: Test Switch (Connect the line to 24 V if this switch is not required)
- S2: Override Cancel Switch
- S3: Lockout Reset Switch or Override Switch
- S4, S5: Muting sensor
- KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
- M: 3-phase motor
- ML: Muting lamp

\*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 are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



## Standard Muting Mode/Exit-Only Muting Mode with two Muting Sensors using NPN Outputs

The following is the example of External Device Monitoring enabled, Auto Reset mode, NPN output and External Test in 0 V Active.

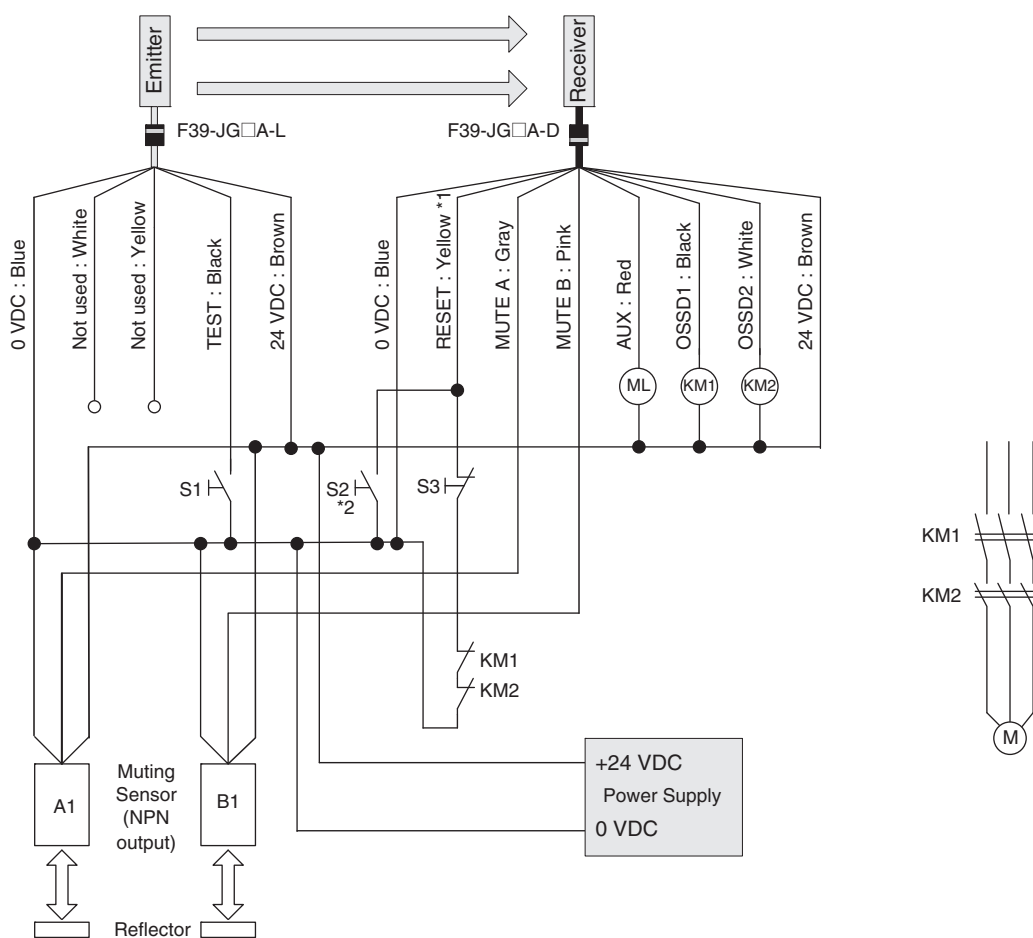
### DIP Switch settings \*3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON
	Auto Reset (factory default setting)	3 <input type="checkbox"/> ON	3 <input type="checkbox"/> ON
		4 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON
	NPN	7 <input type="checkbox"/> ON	7 <input type="checkbox"/> ON
Emitter	External Test: 0 V Active	4 <input type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)

S2: Override Cancel Switch

S3: Lockout Reset Switch or Override Switch

KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor

M: 3-phase motor

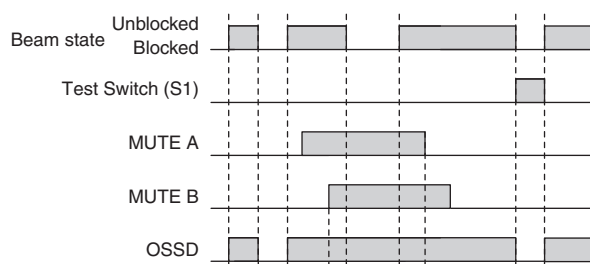
ML: Muting lamp

A1, B1: Muting sensor

\*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 are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



## Standard Muting Mode with four Muting Sensors using NPN Outputs

The following is the example of External Device Monitoring enabled, Auto Reset mode, NPN output and External Test in 0 V Active.

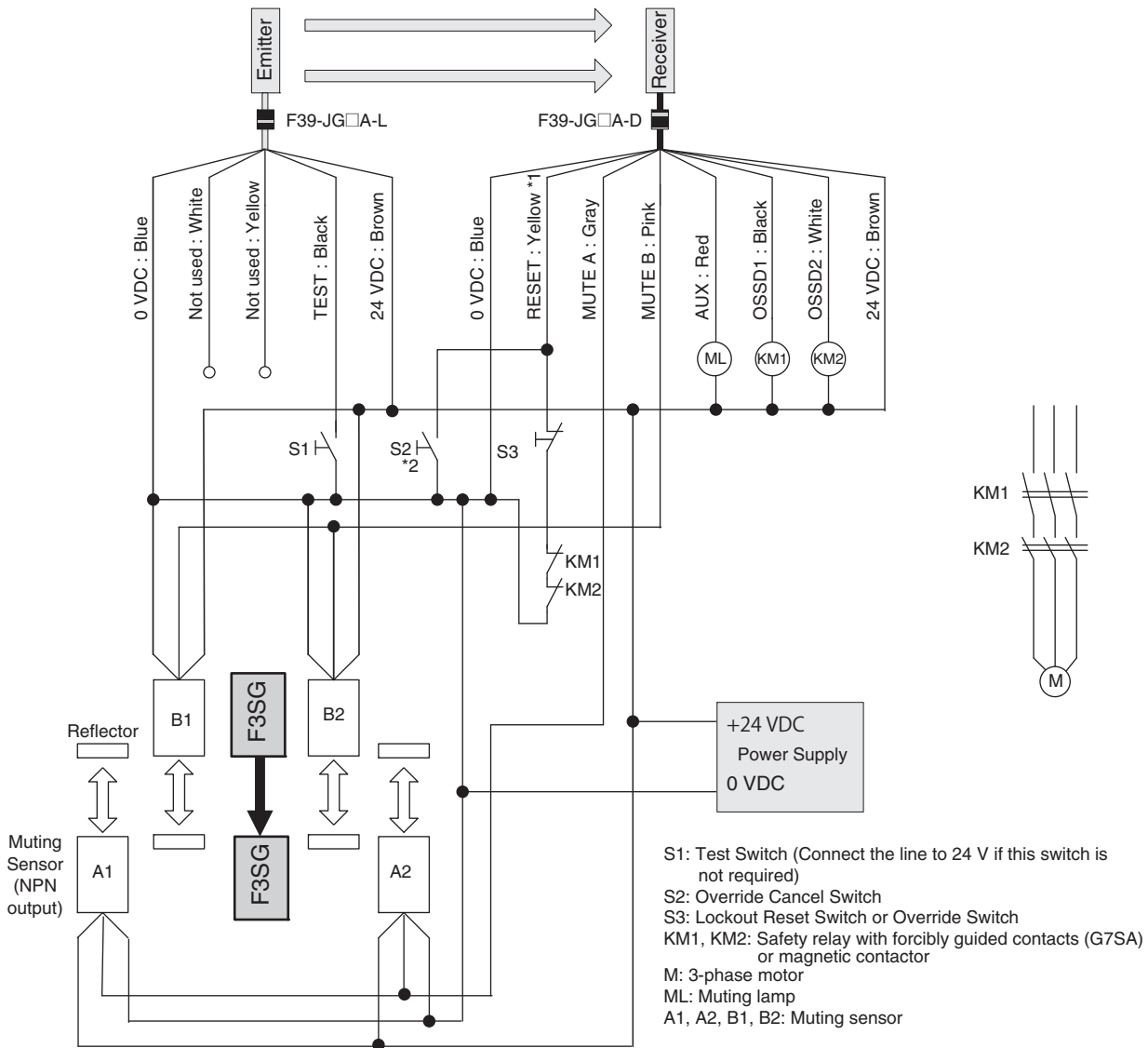
### DIP Switch settings \*3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON
	Auto Reset (factory default setting)	3 <input type="checkbox"/> ON	3 <input type="checkbox"/> ON
		4 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON
	NPN	7 <input type="checkbox"/> ON	7 <input type="checkbox"/> ON
Emitter	External Test: 0 V Active	4 <input type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

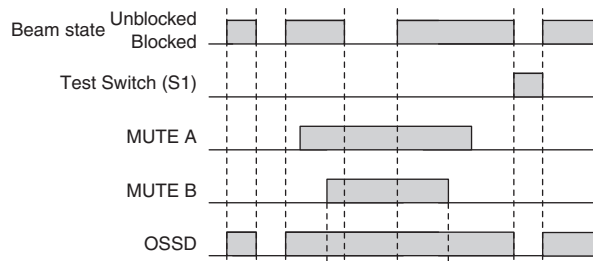
### Wiring Example



\*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 are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.





## Pre-Reset Mode using NPN Output

The following is the example of External Device Monitoring enabled, Pre-Reset mode, NPN output and External Test in 0 V Active.

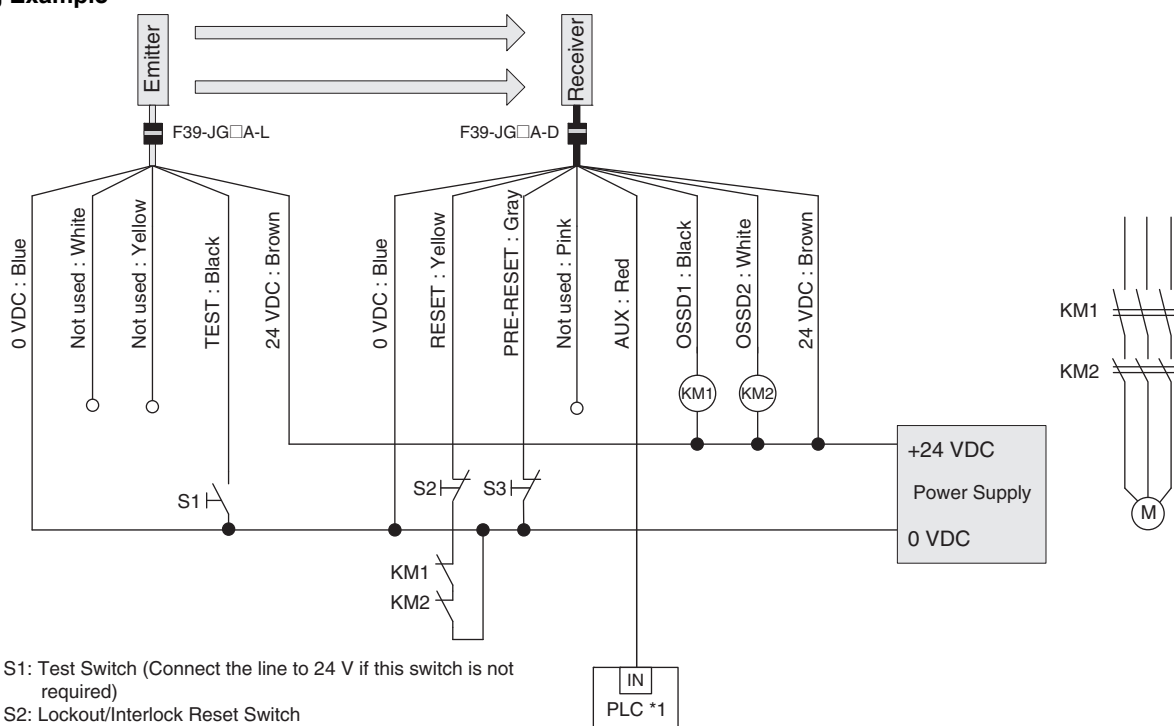
### DIP Switch settings \*2

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	Pre-Reset	3 <input checked="" type="checkbox"/> ON	3 <input checked="" type="checkbox"/> ON
		4 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON
	NPN	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 0 V Active	4 <input checked="" type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

### Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)

S2: Lockout/Interlock Reset Switch

S3: Pre-Reset Switch

KM1, KM2: External device feedback

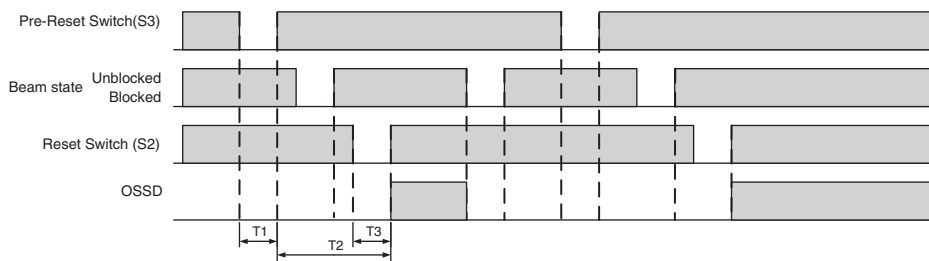
M: 3-phase motor

PLC: Programmable controller

(Used for monitoring only. NOT related to safety system.)

\*1. When connecting to the PLC, the output mode must be changed with the Configuration Tool.

\*2. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



T1: Push time: must be  $T1 \geq 300\text{ms}$

T2: Pre-reset limit time between Pre-reset and Reset: must be  $T2 \leq 60\text{s}$

T3: Push time: must be  $T3 \geq 300\text{ms}$

The F3SG-RA with NPN output can be connected to the safety control unit listed in the table below.

Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

## F3SG-4RA□□□□-25-01TS

### EDM disabled, External Test unused and PNP Outputs

The following is the example of EDM disabled, PNP outputs and External Test unused.

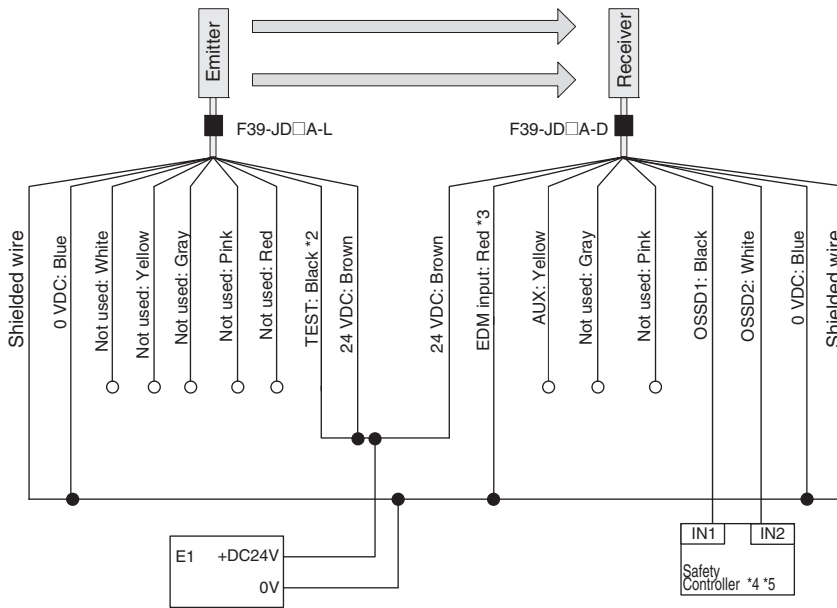
#### DIP Switch settings \*1

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON
	PNP (factory default setting)	7 <input checked="" type="checkbox"/> ON	7 <input checked="" type="checkbox"/> ON
Emitter	External Test: 24 V Inactive (factory default setting)	4 <input checked="" type="checkbox"/> ON	

□: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

#### Wiring Example



\*1. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual* for more information on setting the functions by the DIP Switch.

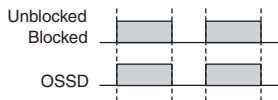
\*2. When the external test function is used, connect to 24V via the test switch (N.C. contact).

\*3. Also used for the lockout reset input. When using the lockout reset function, connect to 24V via lockout reset switch (N.C. contact).

\*4. Refer to User's Manual for more information.

\*5. The safety controller and the F3SG-RA must share the power supply or be connected to the common terminal of the power supply.

E1: 24VDC power supply (S8VS)



## EDM enabled, External Test 0V Inactive and NPN Outputs

The following is the example of External Device Monitoring enabled, NPN outputs and External Test in 0 V Inactive.

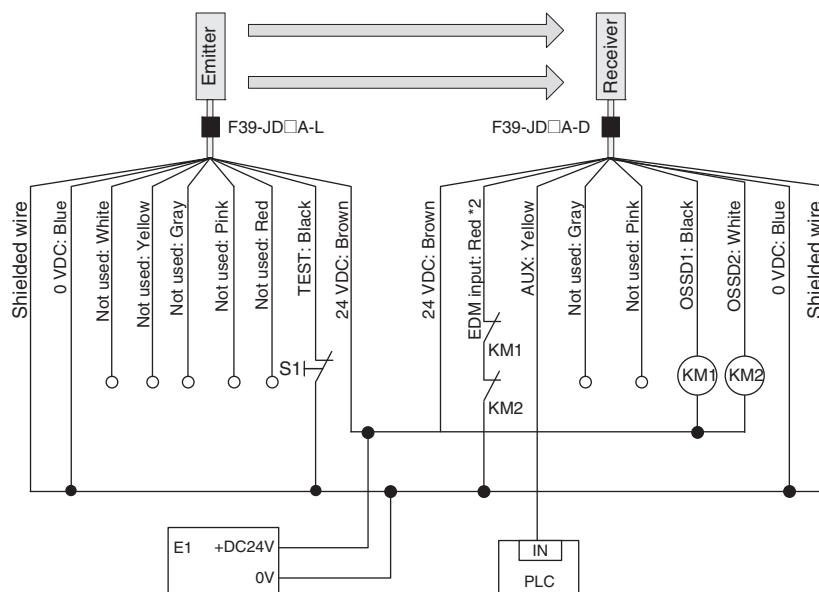
### DIP Switch settings \*1

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON
	NPN	7 <input type="checkbox"/> ON	7 <input type="checkbox"/> ON
Emitter	External Test: 0 V Inactive	4 <input type="checkbox"/> ON	

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

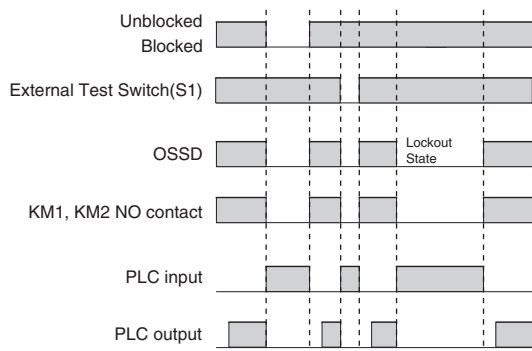
### Wiring Example



\*1. The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual* for more information on setting the functions by the DIP Switch.

\*2. Also used for the lockout reset input. When using the lockout reset function connect to 0V via lockout reset switch (N.C. contact).

- S1: External test switch (connect to 0V if a switch is not required)
- KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
- E1: 24VDC power supply (S8VS)
- PLC: Programmable controller (Used for monitoring -- not related to safety system)



## Connectable Safety Control Units

The F3SG-R with PNP output can be connected to the safety control units listed in the table below.

Connectable Safety Control Units (PNP output)		
Safety Relay Units	Flexible Safety Units	Safety Controllers
G9SA-301		G9SP-N10S
G9SA-321		G9SP-N10D
G9SA-501		G9SP-N20S
G9SB-200-B	G9SX-AD322-T	NE0A-SCPU01
G9SB-200-D	G9SX-ADA222-T	NE1A-SCPU01
G9SB-301-B	G9SX-BC202	NE1A-SCPU02
G9SB-301-D	G9SX-GS226-T15	DST1-ID12SL-1
G9SE-201		DST1-MD16SL-1
G9SE-401		DST1-MRD08SL-1
G9SE-221-T□		NX-SIH400
		NX-SID800
		F3SP-T01

The F3SG-R with NPN output can be connected to the safety control unit listed in the table below.

Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

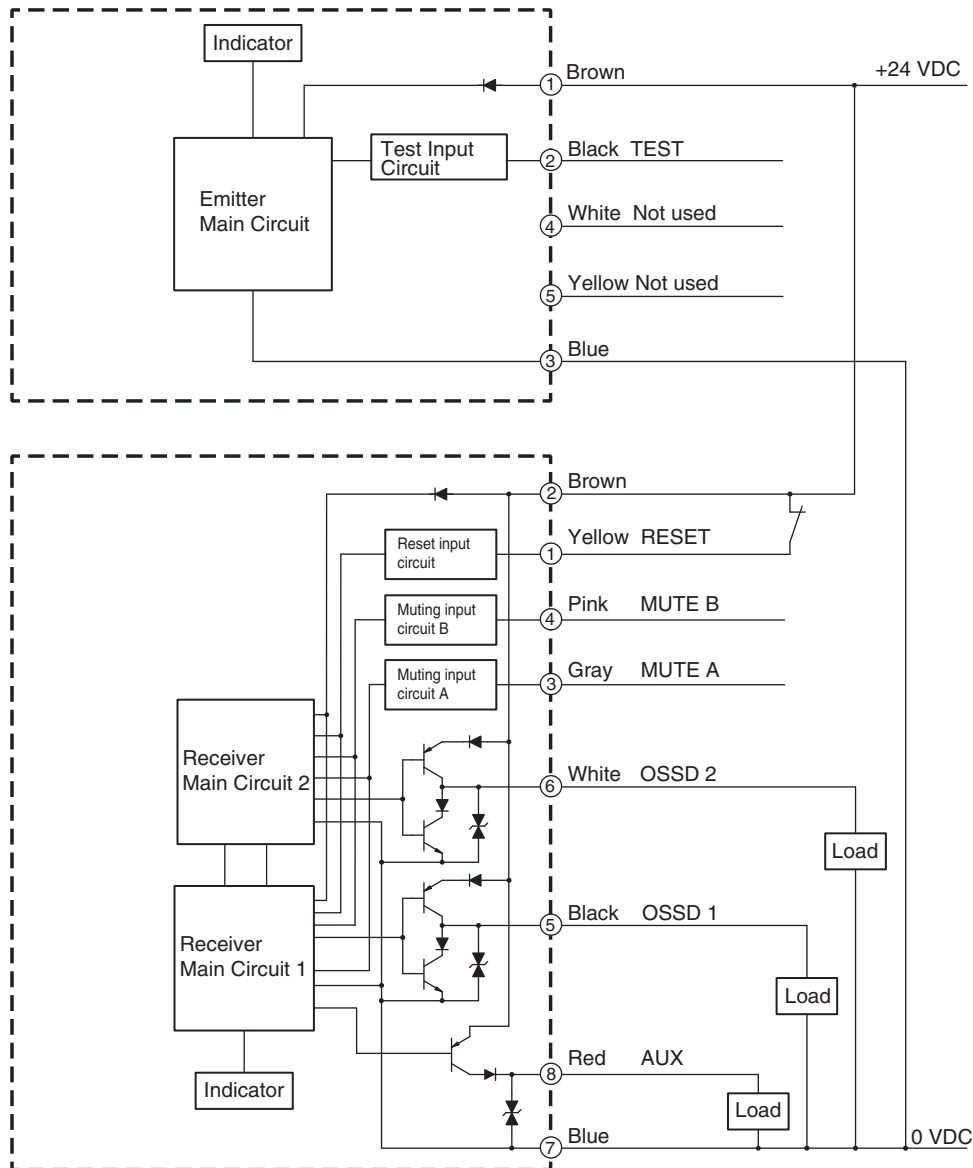
# Input/Output Circuit

## F3SG-4RA□□□□-14/-4RA□□□□-30

### Entire Circuit Diagram

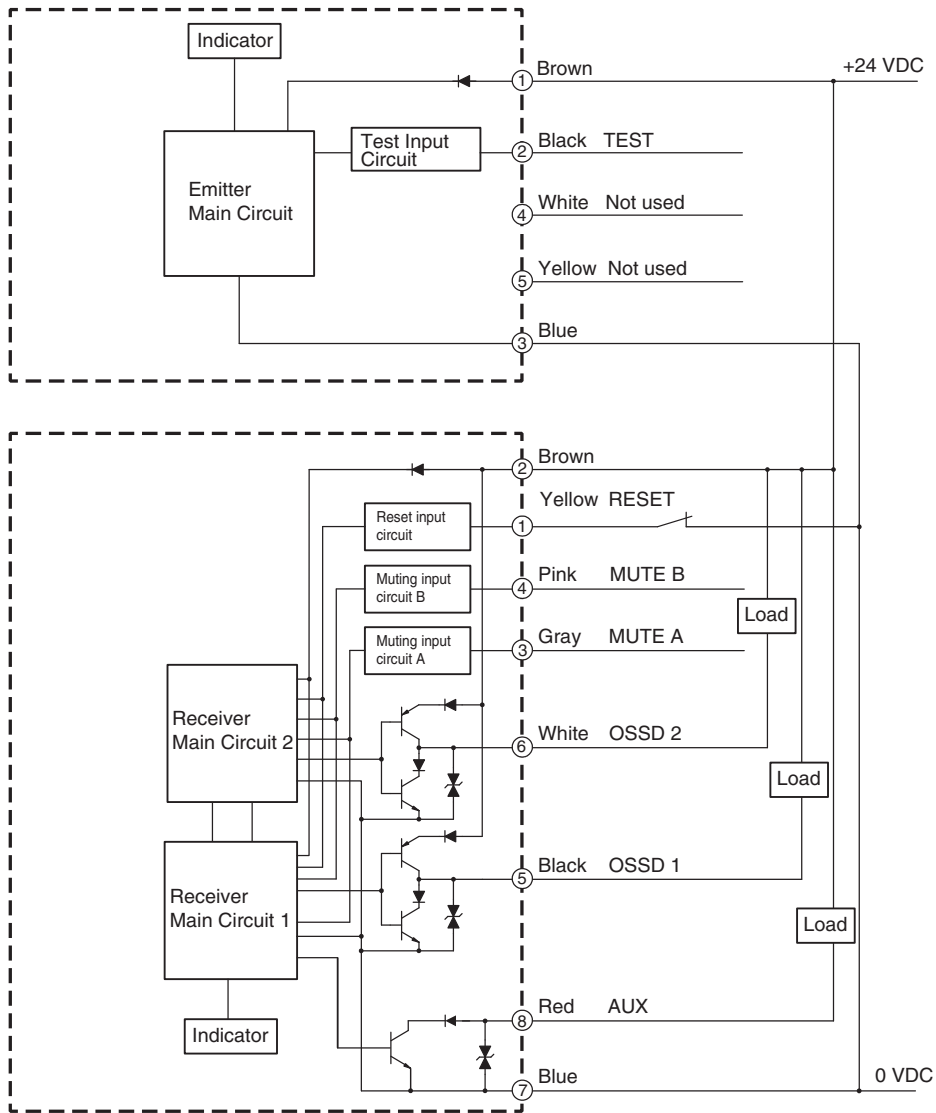
The entire circuit diagram of the F3SG-R is shown below.  
The numbers in the circles indicate the connector's pin numbers.

### PNP Output





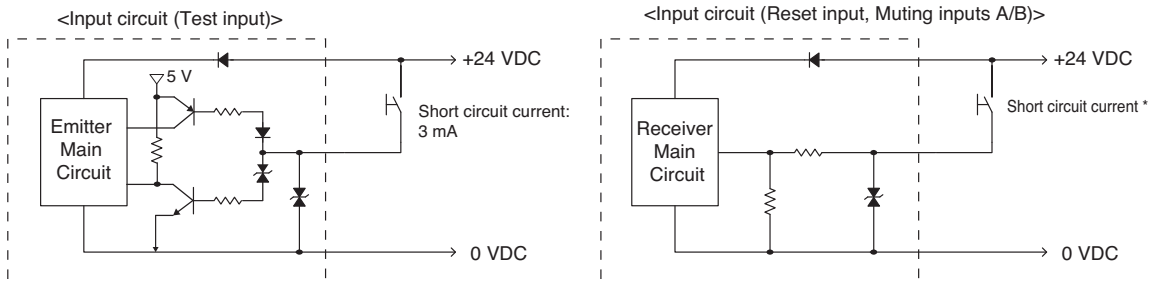
NPN Output



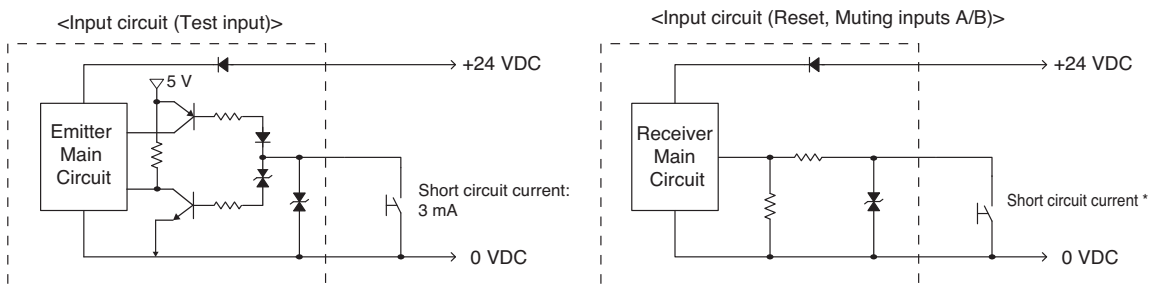
Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

PNP Output



NPN Output



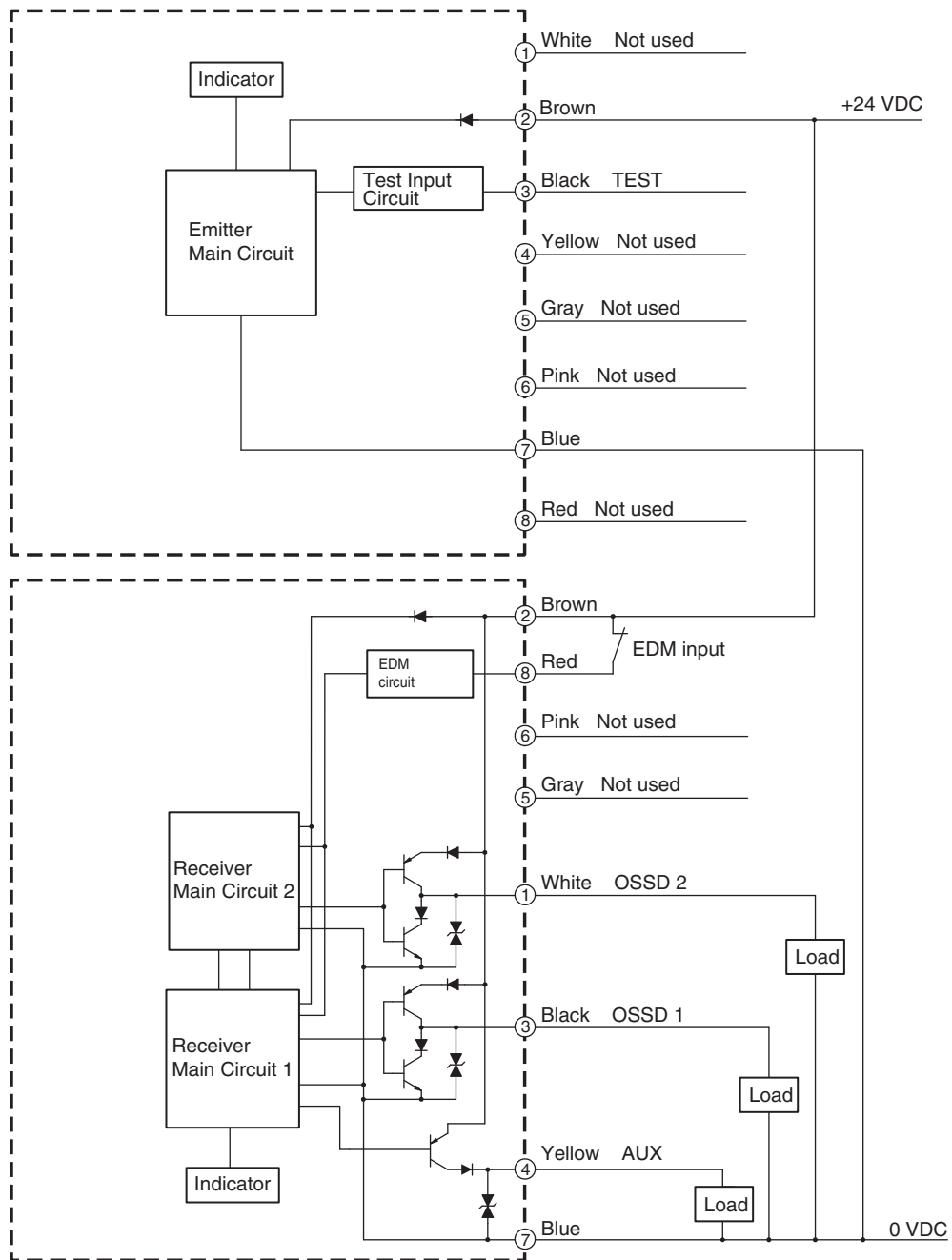
\*Short circuit current: 5mA (Reset input), 3mA (Muting inputs A/B)

### F3SG-4RA□□□□-25-01TS

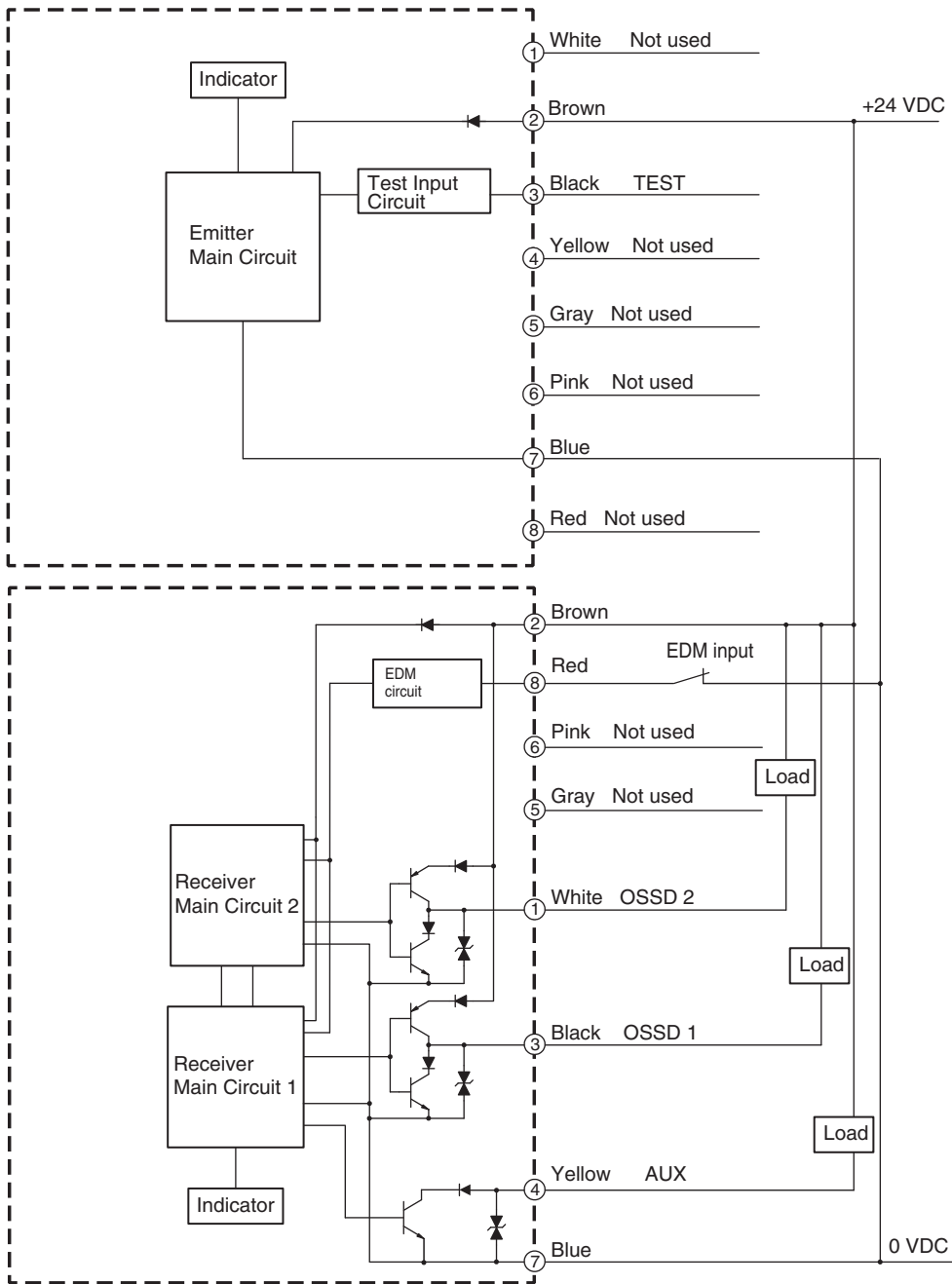
#### Entire Circuit Diagram

The entire circuit diagram of the F3SG-R is shown below.  
The numbers in the circles indicate the connector's pin numbers.

#### PNP Output



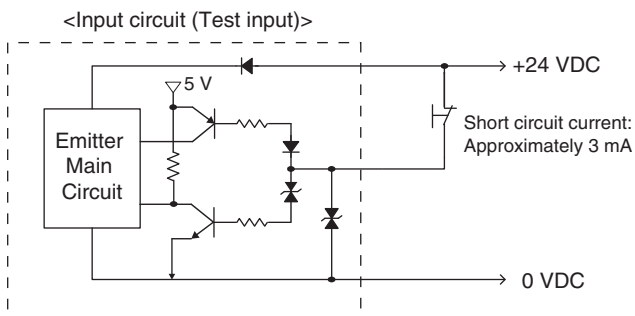
## NPN Output



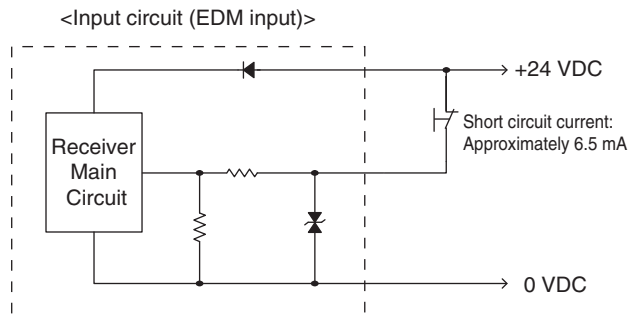
## Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

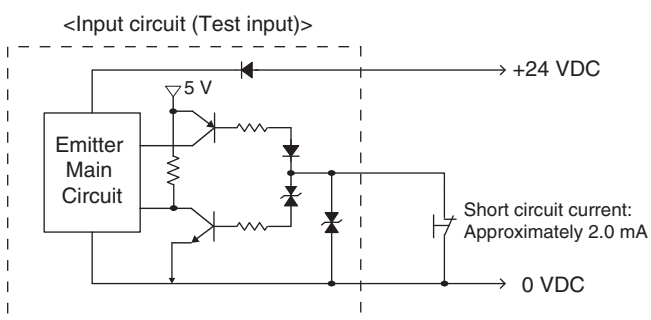
### 24V Inactive



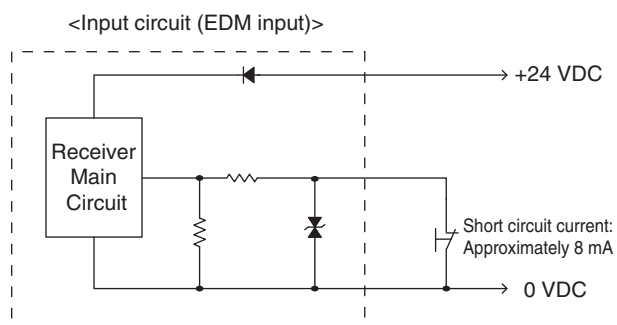
### PNP Output



### 0V Inactive



### NPN Output



\*Short circuit current: 5mA (Reset input), 3mA (Muting inputs A/B)

# F3SG-RA

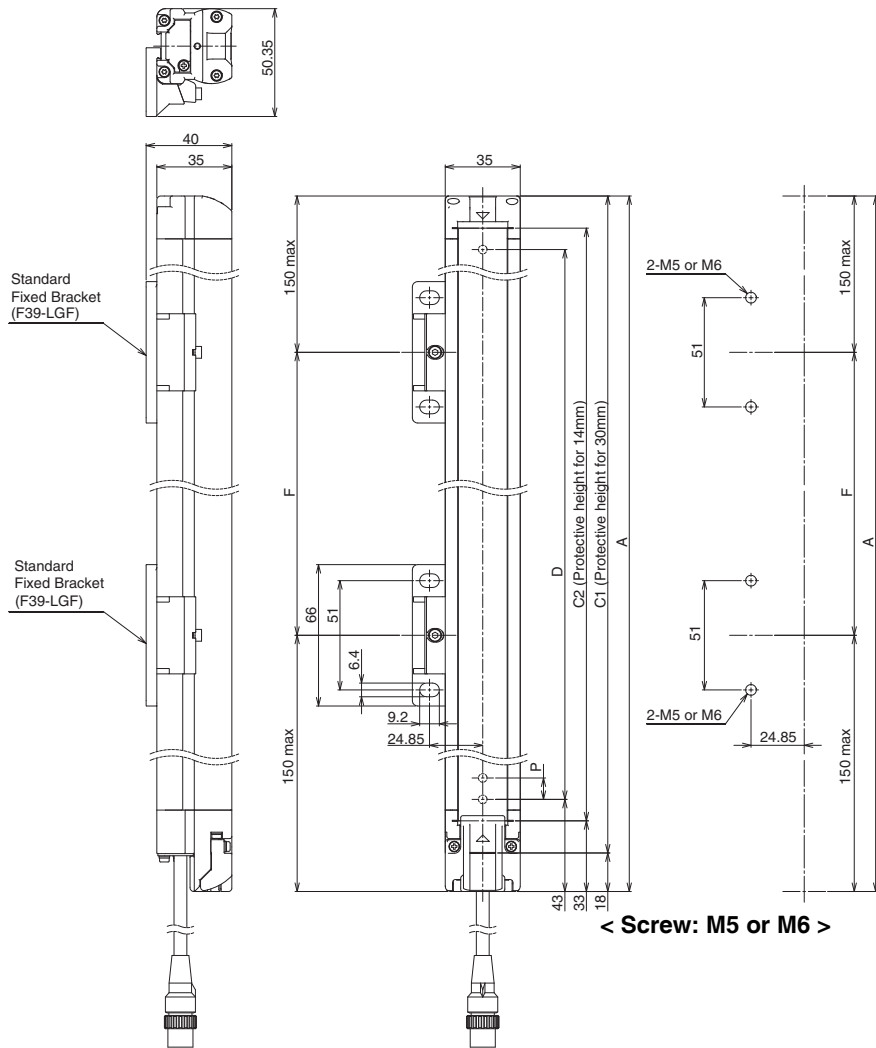
## Dimensions

(Unit: mm)

### F3SG-4RA□□□□-14/-4RA□□□□-30

Mounted with Standard Fixed Brackets (F39-LGF)

#### 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 Fixed Brackets *1	Dimension F
0190 to 1230	2 *2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

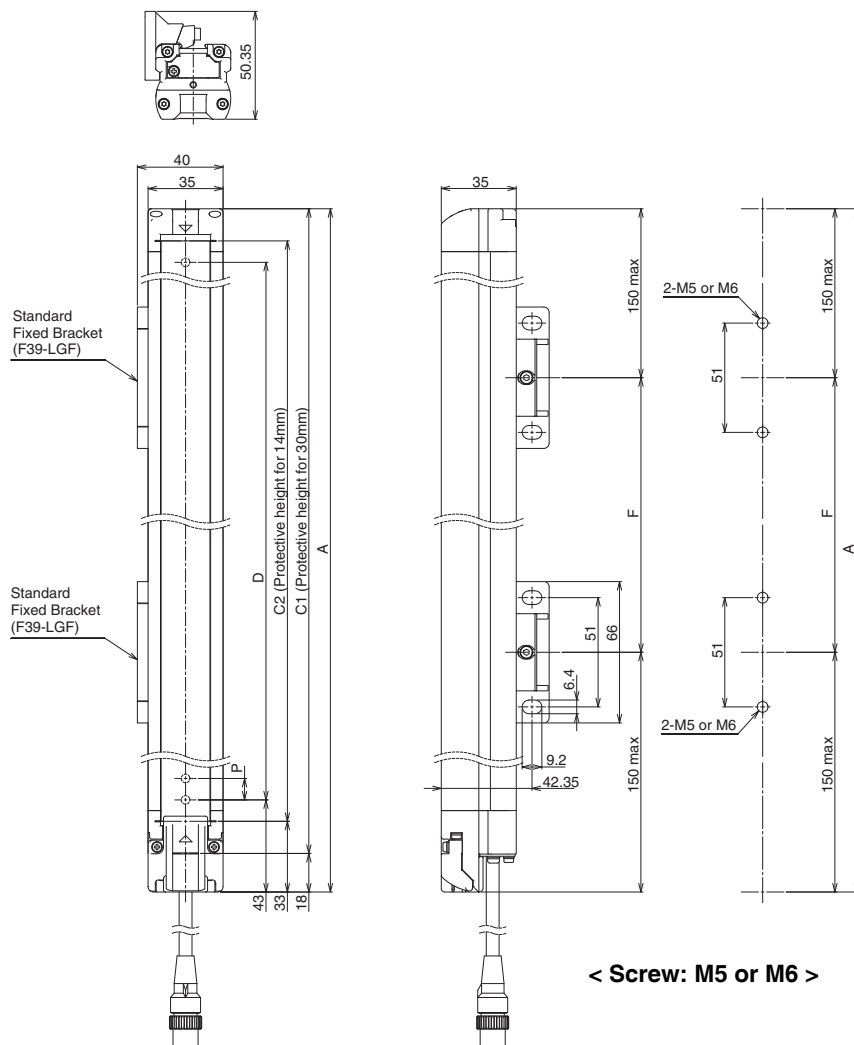
Protective height (C2)	Number of Standard Fixed Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

\*1. The number of brackets required to mount either one of emitter and receiver.

\*2. Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).



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 *1	Dimension F
0190 to 1230	2 *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 *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

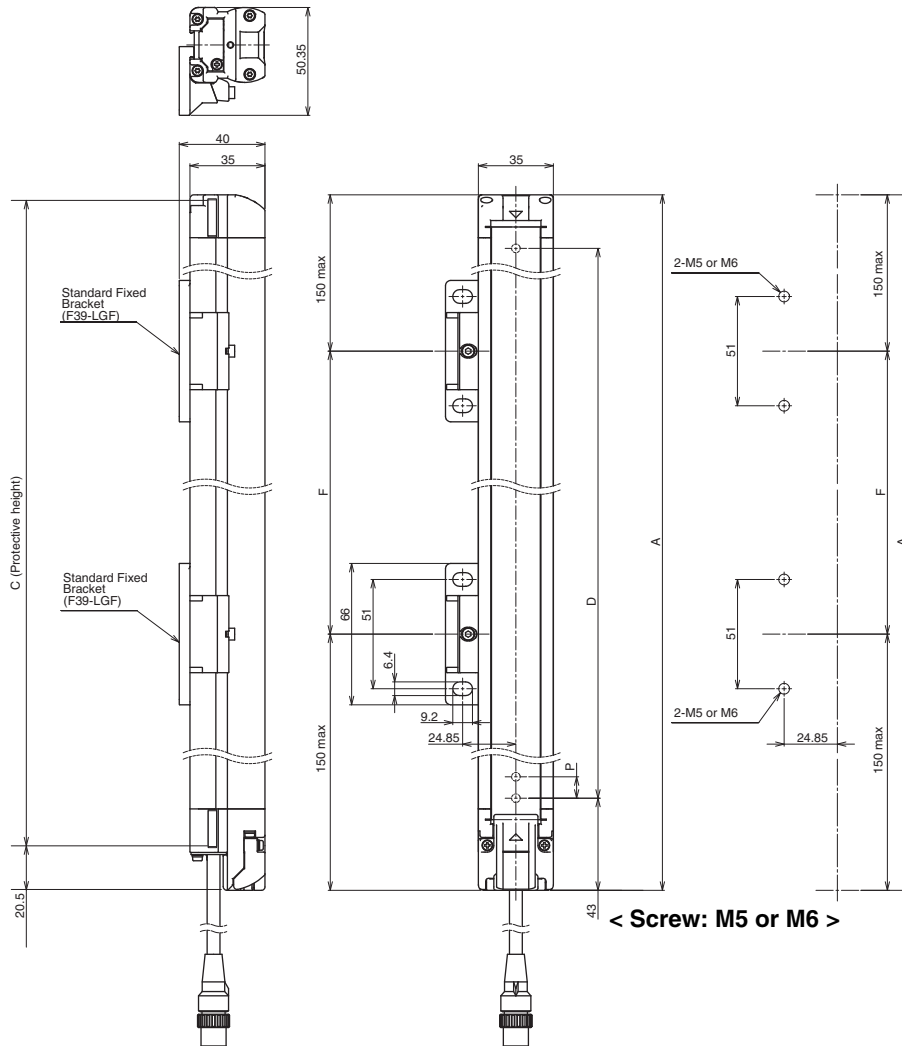
\*1.The number of brackets required to mount either one of emitter and receiver.

\*2.Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

## F3SG-4RA□□□□-25-01TS

Mounted with Standard Fixed Brackets (F39-LGF)

Backside Mounting



### F3SG-4RA□□□□-25-01TS Series

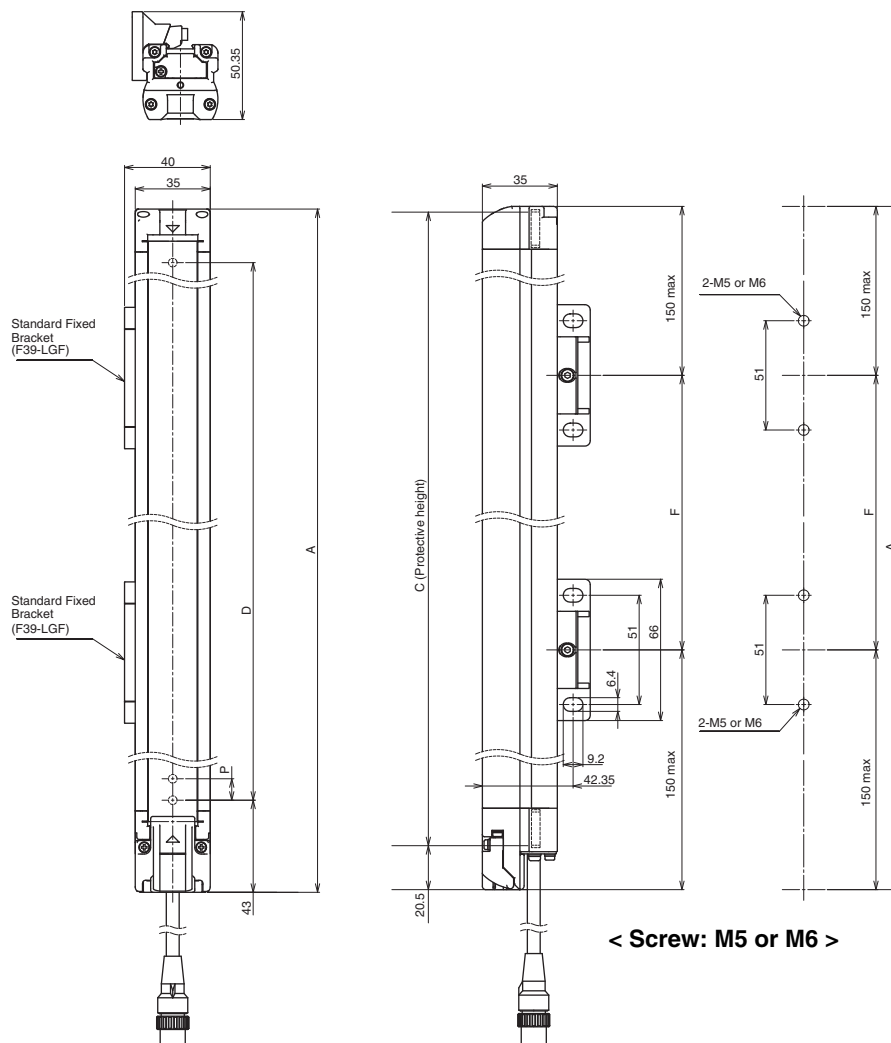
Dimension A	C+23
Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-45
Dimension P	20

Protective height (C1)	Number of Standard Fixed Brackets *1	Dimension F
0185 to 1225	2 *2	1000 mm max.
1305 to 1945	3	1000 mm max.

\*1. The number of brackets required to mount either one of emitter and receiver.

\*2. Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0185 or 0265. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Side Mounting



F3SG-4RA□□□□-25-01TS Series

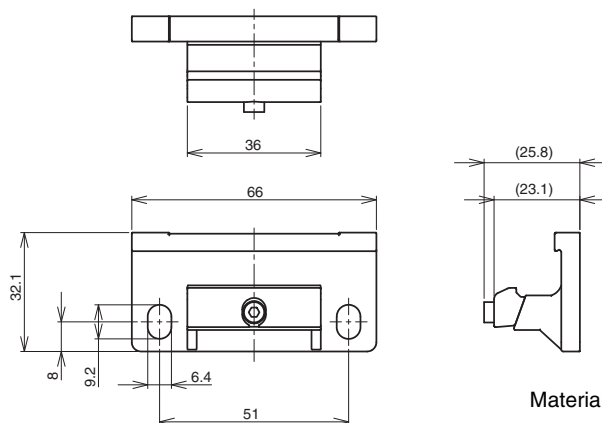
Dimension A	C+23
Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-45
Dimension P	20

Protective height (C1)	Number of Standard Fixed Brackets *1	Dimension F
0185 to 1225	2 *2	1000 mm max.
1305 to 1945	3	1000 mm max.

\*1.The number of brackets required to mount either one of emitter and receiver.

\*2.Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0185 or 0265. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

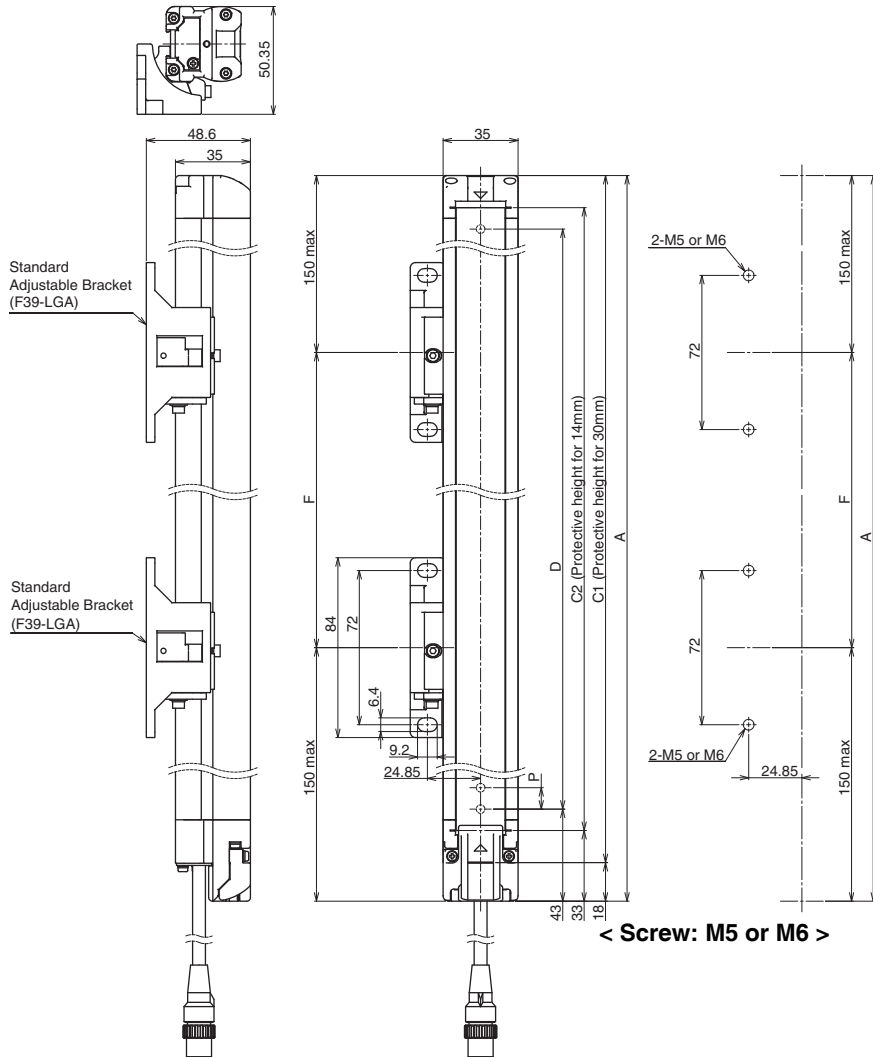
Standard Fixed Bracket (F39-LGF)



Material: ZDC2

## F3SG-4RA□□□□-14/4RA□□□□-30

Mounted with Standard Adjustable Brackets (F39-LGA)  
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

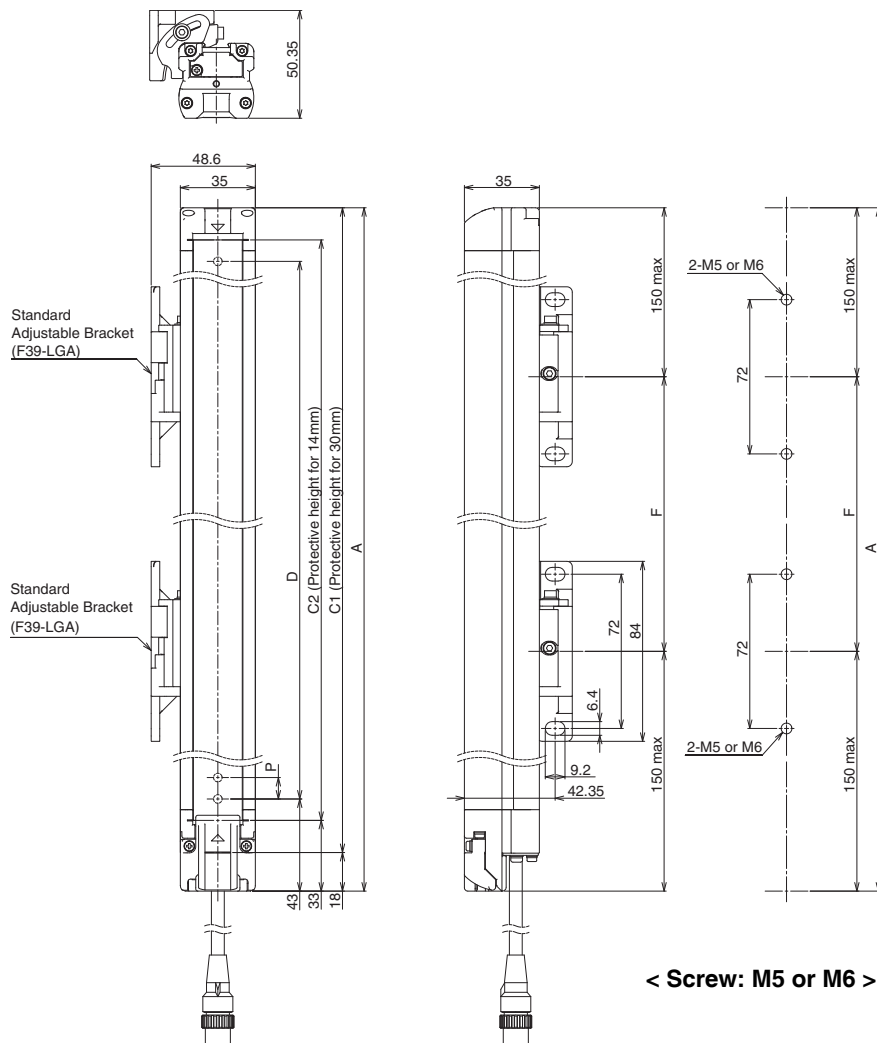
Protective height (C1)	Number of Standard Adjustable Brackets *1	Dimension F
0190 to 1230	2 *2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

Protective height (C2)	Number of Standard Adjustable Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

\*1. The number of brackets required to mount either one of emitter and receiver.

\*2. Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

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 *1	Dimension F
0190 to 1230	2 *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

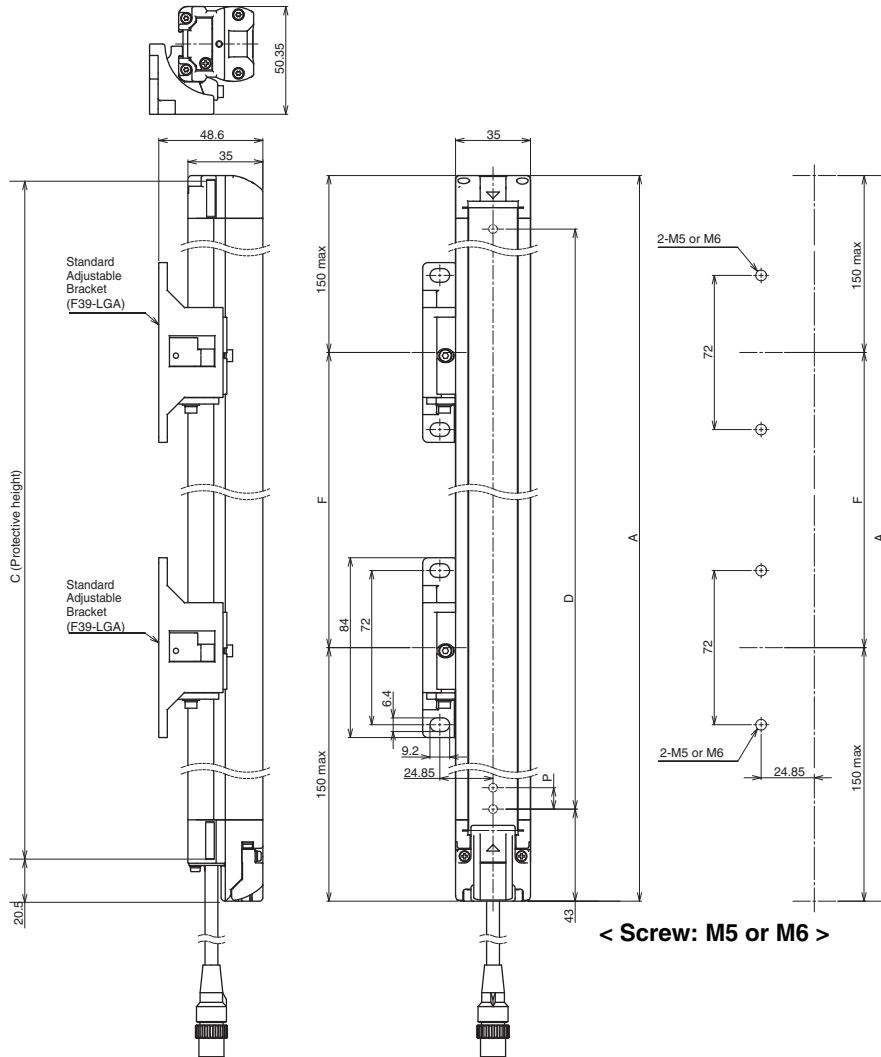
Protective height (C2)	Number of Standard Adjustable Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

\*1. The number of brackets required to mount either one of emitter and receiver.

\*2. Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

## F3SG-4RA□□□□-25-01TS

Mounted with Standard Adjustable Brackets (F39-LGA)  
Backside Mounting



### F3SG-4RA□□□□-25-01TS Series

Dimension A	C+23
Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-45
Dimension P	20

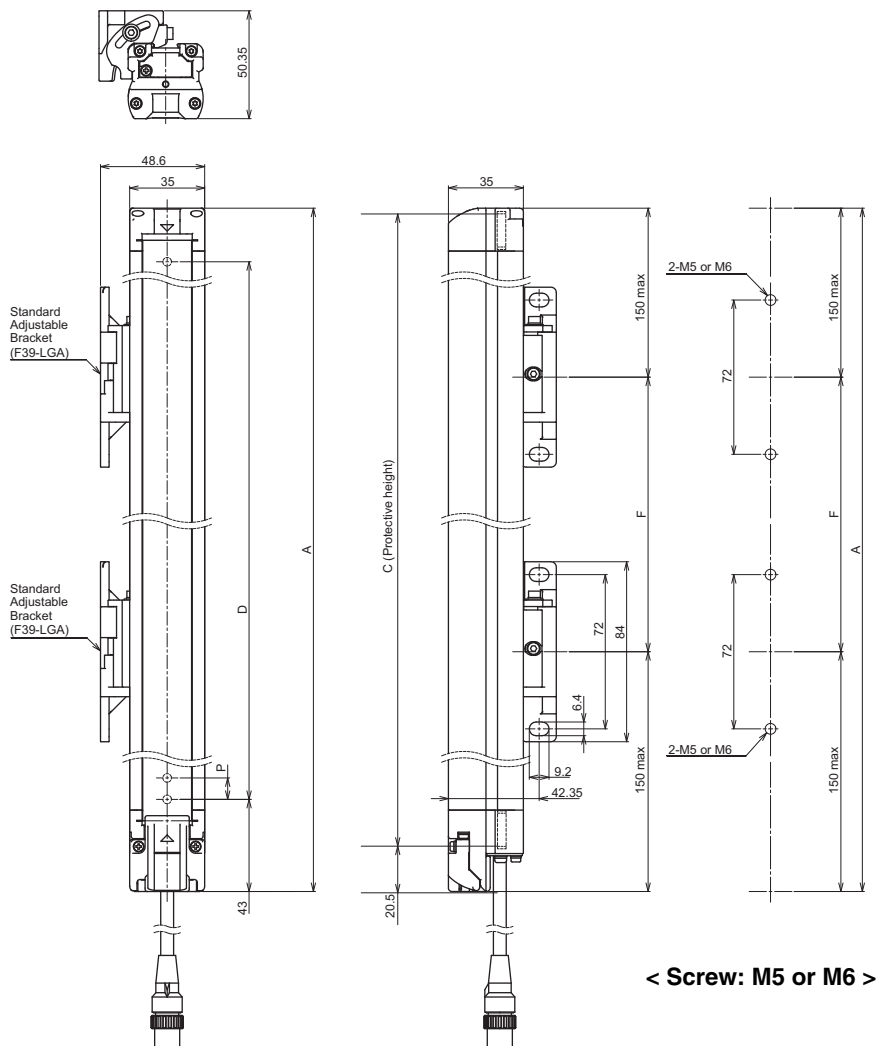
Protective height (C)	Number of Standard Adjustable Brackets *1	Dimension F
0185 to 1225	2 *2	1000 mm max.
1305 to 1945	3	1000 mm max.

\*1. The number of brackets required to mount either one of emitter and receiver.

\*2. Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0185 or 0265. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).



Side Mounting



F3SG-4RA□□□□-25-01TS Series

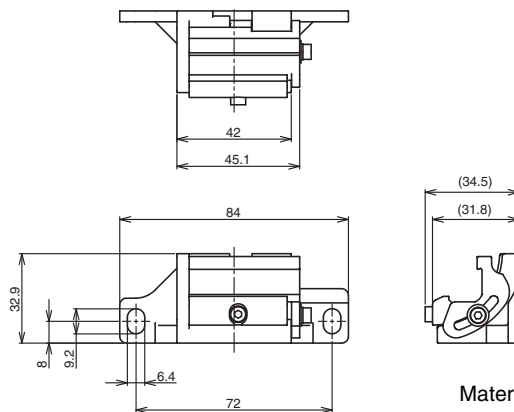
Dimension A	C+23
Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-45
Dimension P	20

Protective height (C)	Number of Standard Adjustable Brackets *1	Dimension F
0185 to 1225	2 *2	1000 mm max.
1305 to 1945	3	1000 mm max.

\*1.The number of brackets required to mount either one of emitter and receiver.

\*2.Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0185 or 0265. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Standard Adjustable Bracket (F39-LGA)



Material: ZDC2 ,Fluorochemical lubricant oil

# F3SG-RA

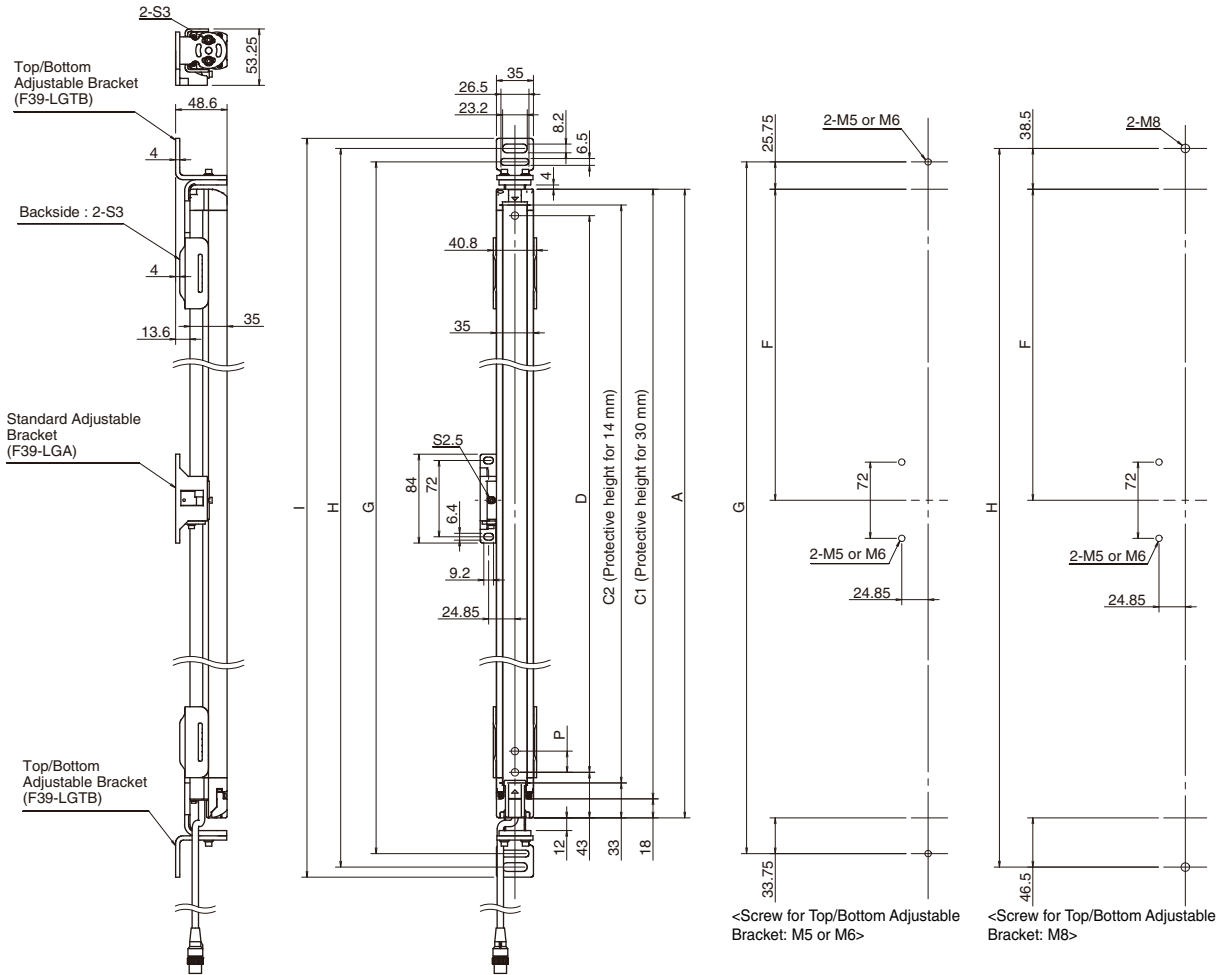
## F3SG-4RA□□□□-14/-4RA□□□□-30

### Mounted with Top/Bottom Adjustable Brackets (F39-LGTB) and Standard Adjustable Brackets (F39-LGA)

Dimensions when using the F3SG-RA Series except the F3SG-4RA0190-30 and F3SG-4RA0160-14

Refer to *Safety Light Curtain F3SG-R Series User's Manual* for the dimensions when using the F3SG-4RA0190-30 and F3SG-4RA0160-14.

### 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 G	C1+77.5
Dimension H	C1+103
Dimension I	C1+122
Dimension P	20

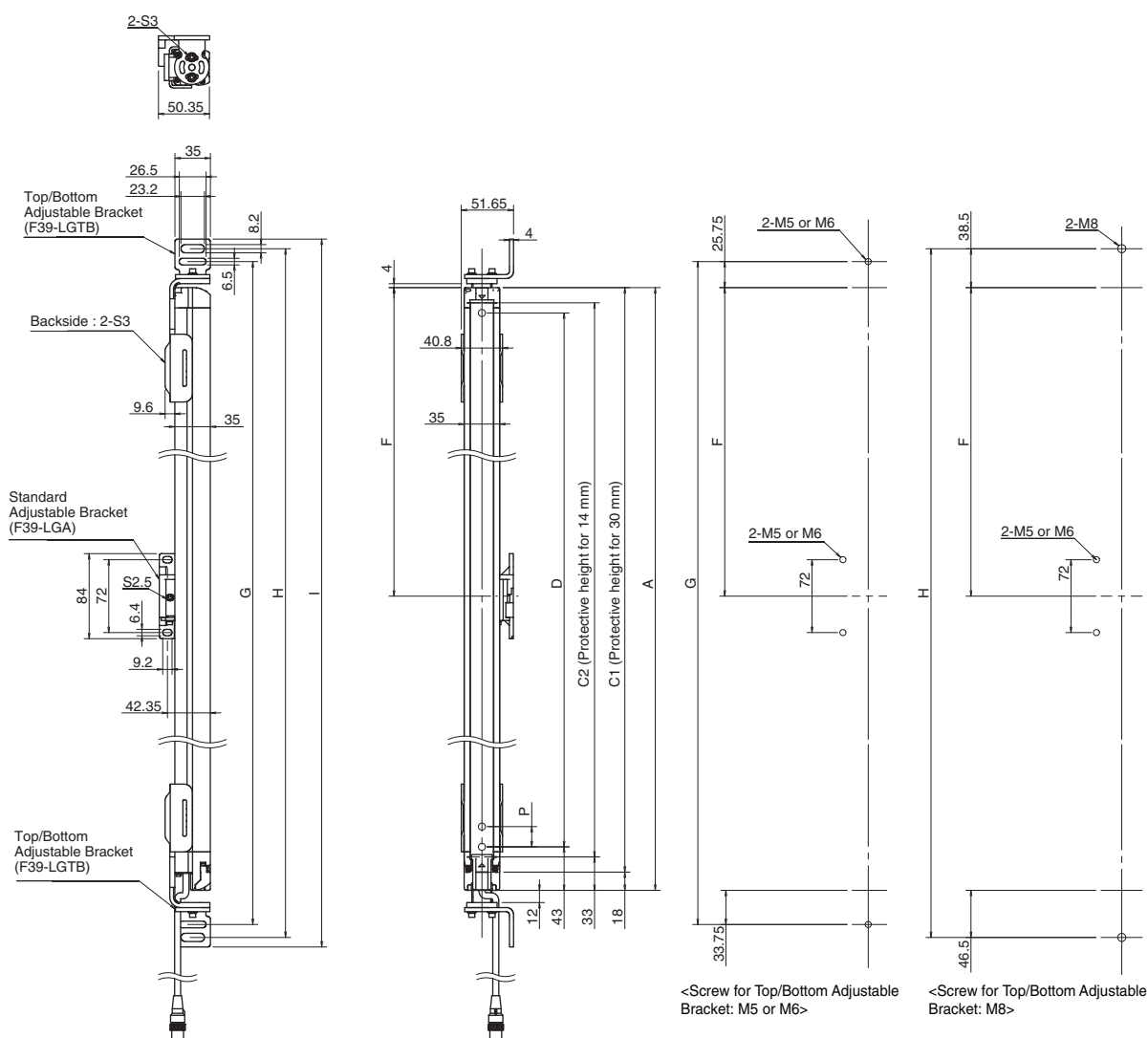
### F3SG-□RA□□□□-14 Series

Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension G	C2+107.5
Dimension H	C2+133
Dimension I	C2+152
Dimension P	10

Protective height (C1)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0270 to 1070	2	0	-
1150 to 1950	2	1	1000 mm max.
2030 to 2510	2	2	1000 mm max.

Protective height (C2)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0240 to 1040	2	0	-
1120 to 1920	2	1	1000 mm max.
2000 to 2080	2	2	1000 mm max.

## 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 G	C1+77.5
Dimension H	C1+103
Dimension I	C1+122
Dimension P	20

Protective height (C1)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0270 to 1070	2	0	-
1150 to 1950	2	1	1000 mm max.
2030 to 2510	2	2	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 G	C2+107.5
Dimension H	C2+133
Dimension I	C2+152
Dimension P	10

Protective height (C2)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0240 to 1040	2	0	-
1120 to 1920	2	1	1000 mm max.
2000 to 2080	2	2	1000 mm max.

# F3SG-RA

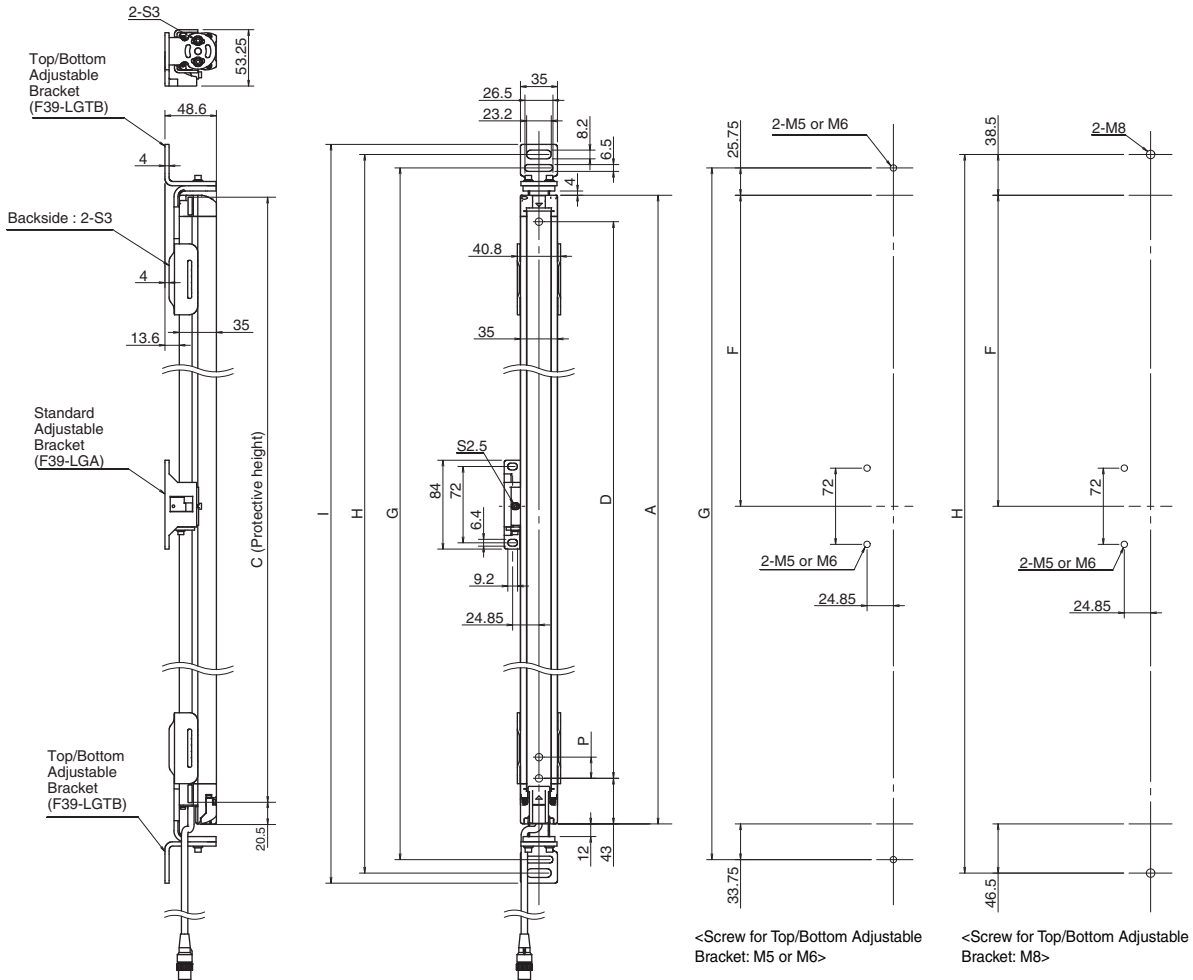
## F3SG-4RA□□□□-25-01TS

### Mounted with Top/Bottom Adjustable Brackets (F39-LGTB) and Standard Adjustable Brackets (F39-LGA)

Dimensions when using the F3SG-RA Series except the F3SG-4RA0185-25-01TS.

Refer to *Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual* for the dimensions when using the F3SG-4RA0185-25-01TS.

#### Backside Mounting



<Screw for Top/Bottom Adjustable Bracket: M5 or M6>

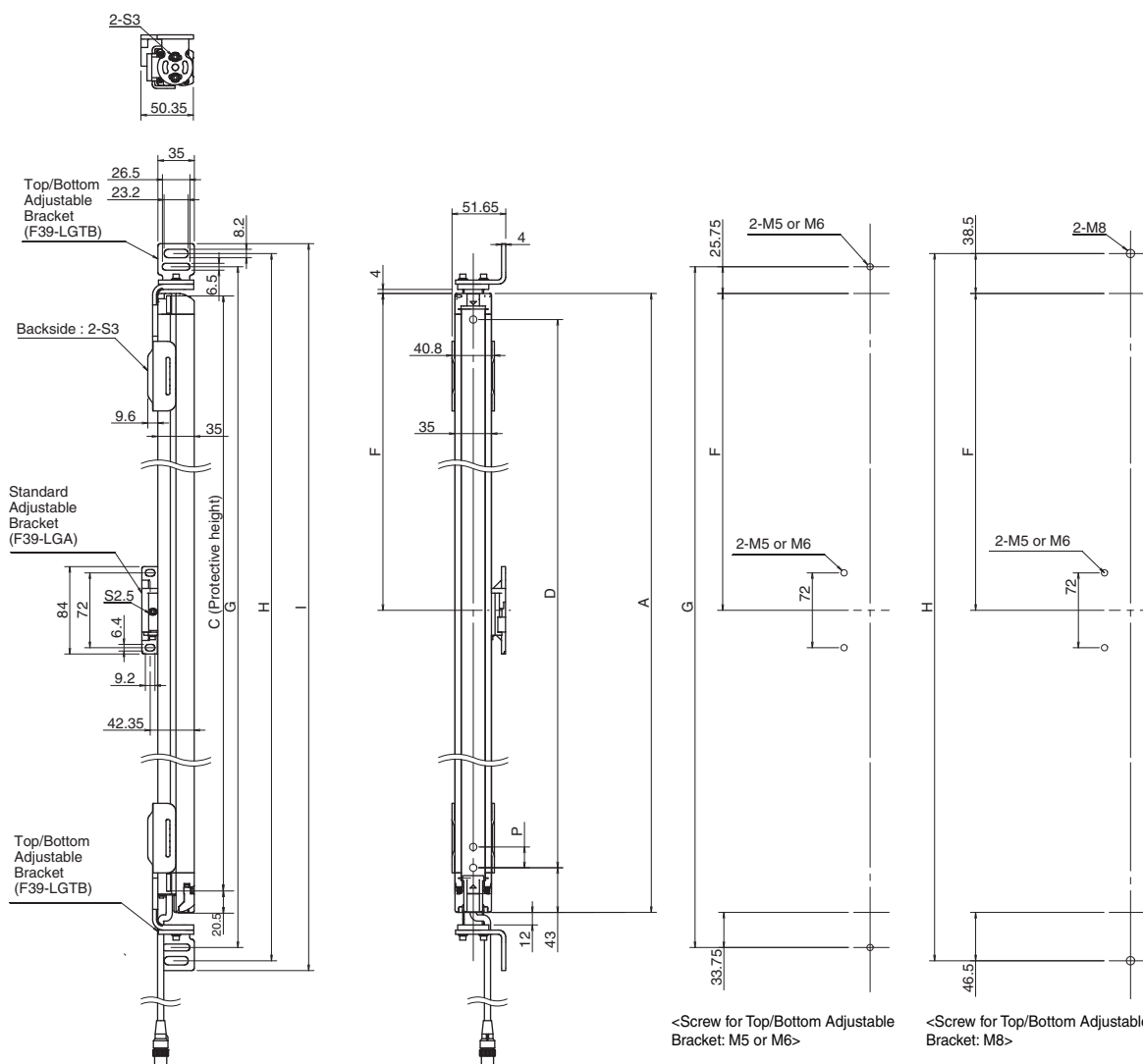
<Screw for Top/Bottom Adjustable Bracket: M8>

#### F3SG-4RA□□□□-25-01TS Series (Except for 0185)

	Optional accessory not connected	Optional accessory connected		
		F39-JGR2WTS	F39-BT	F39-LP F39-BTLP
Dimension A	C+23	C+23		
Dimension C	4-digit number of the type name (Protective height)	4-digit number of the type name (Protective height)		
Dimension D	C-45	C-45		
Dimension G	C+82.5	C+85.5	C+96	C+107.5
Dimension H	C+108	C+111	C+121.5	C+133
Dimension I	C+127	C+130	C+140.5	C+152
Dimension P	20	20		

Protective height (C)	Number of Standard Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0265 to 1065	2	0	-
1145 to 1945	2	1	1000 mm max.

Side Mounting



<Screw for Top/Bottom Adjustable Bracket: M5 or M6>

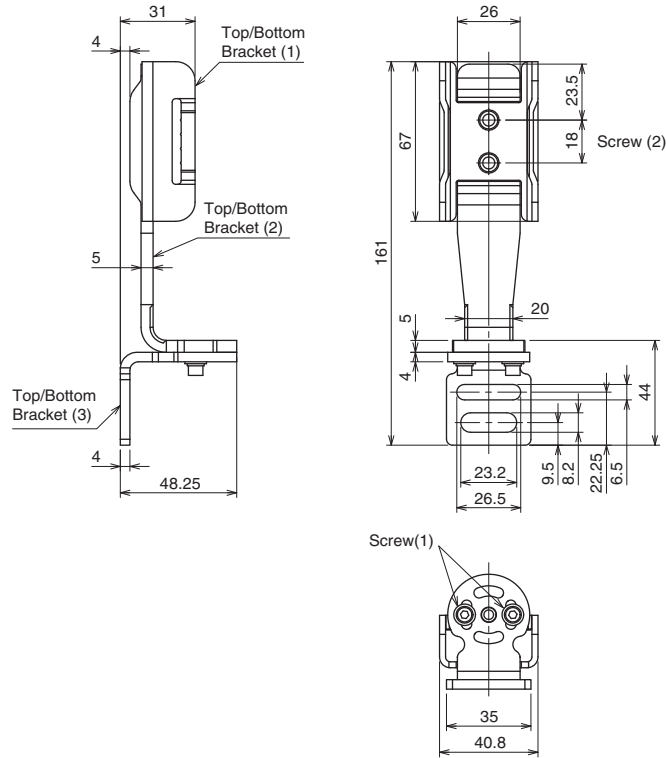
<Screw for Top/Bottom Adjustable Bracket: M8>

F3SG-4RA□□□□-25-01TS Series (Except for 0185)

	Optional accessory not connected	Optional accessory connected		
		F39-JGR2WTS	F39-BT	F39-LP F39-BTLP
Dimension A	C+23	C+23		
Dimension C	4-digit number of the type name (Protective height)	4-digit number of the type name (Protective height)		
Dimension D	C-45	C-45		
Dimension G	C+82.5	C+85.5	C+96	C+107.5
Dimension H	C+108	C+111	C+121.5	C+133
Dimension I	C+127	C+130	C+140.5	C+152
Dimension P	20	20		

Protective height (C)	Number of Standard Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0265 to 1065	2	0	-
1145 to 1945	2	1	1000 mm max.

## Top/Bottom Adjustable Bracket (F39-LGTB)

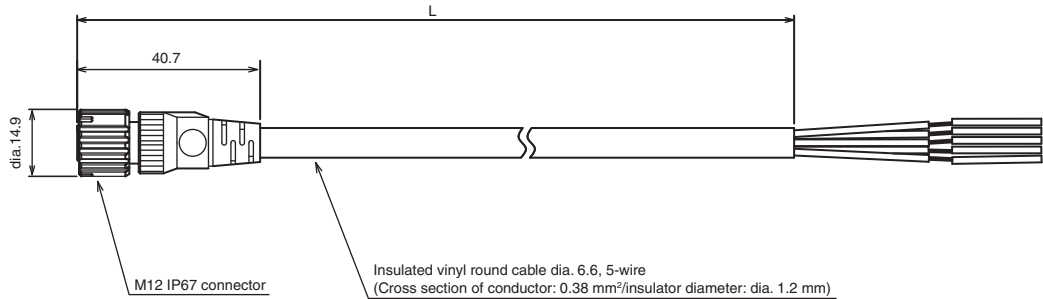


Material: SUS304

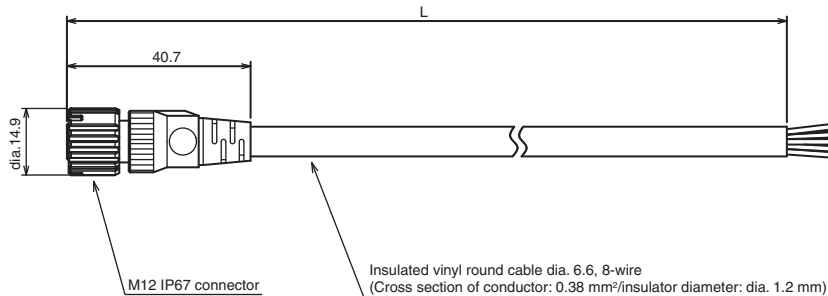
## Accessories

### For F3SG-4RA□□□□-14/-4RA□□□□-30

#### Single-Ended Cable for Emitter (F39-JG□A-L, sold separately)



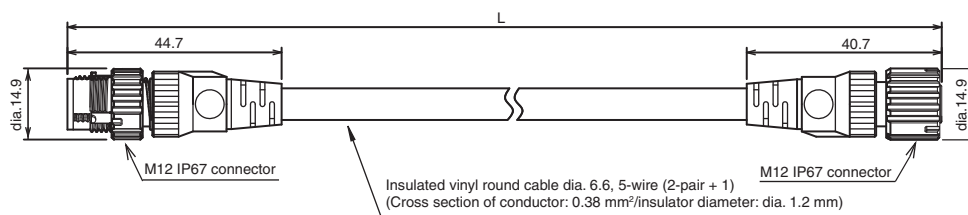
#### Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)



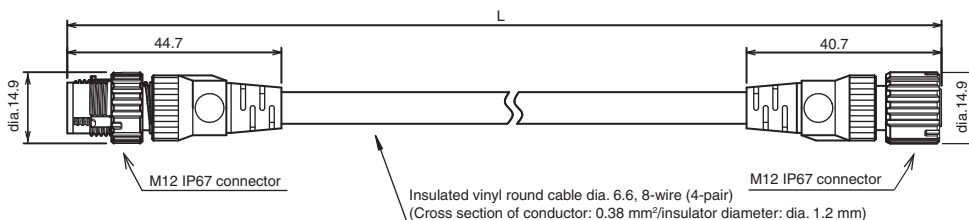
Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JG3A-L	F39-JG3A-D	3
F39-JG7A-L	F39-JG7A-D	7
F39-JG10A-L	F39-JG10A-D	10
F39-JG15A-L	F39-JG15A-D	15
F39-JG20A-L	F39-JG20A-D	20



**Double-ended Cable for Emitter: Cable for extension (F39-JG□B-L, sold separately)**

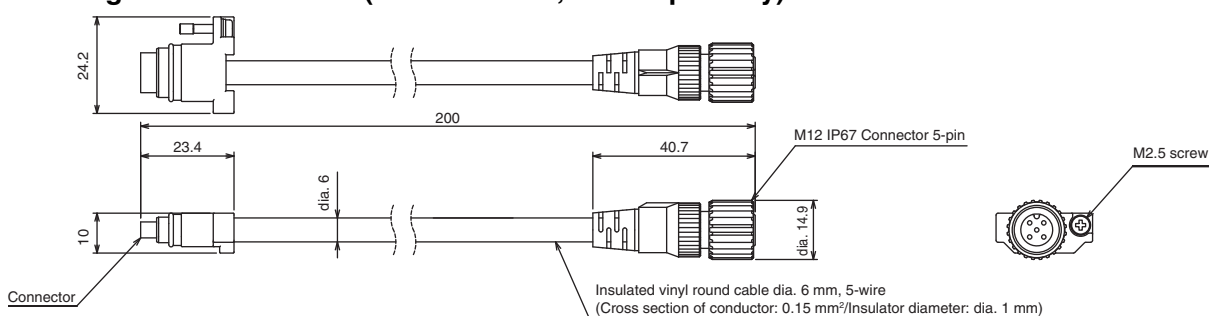


**Double-Ended Cable for Receiver: Cable for extension (F39-JG□B-D, sold separately)**

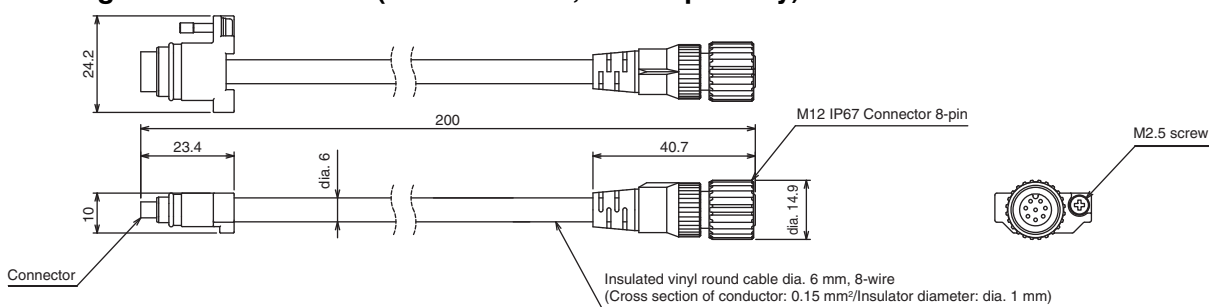


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR5B-L	F39-JGR15B-D	0.5
F39-JG1B-L	F39-JG1B-D	1
F39-JG3B-L	F39-JG3B-D	3
F39-JG5B-L	F39-JG5B-D	5
F39-JG7B-L	F39-JG7B-D	7
F39-JG10B-L	F39-JG10B-D	10
F39-JG15B-L	F39-JG15B-D	15
F39-JG20B-L	F39-JG20B-D	20

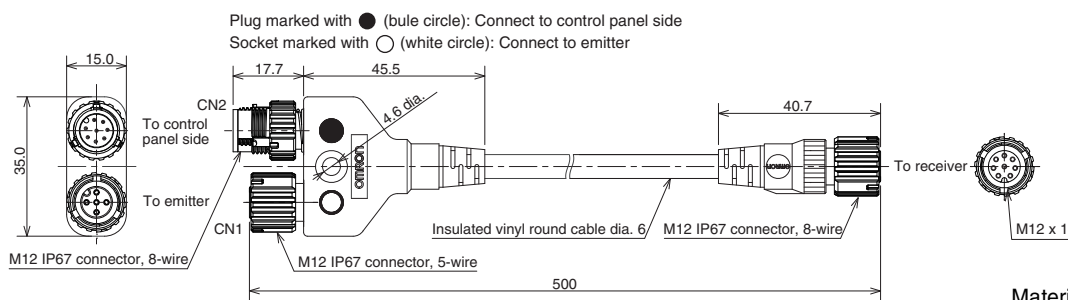
**Cascading Cable for Emitter (F39-JGR2W-L, sold separately)**



**Cascading Cable for Receiver (F39-JGR2W-D, sold separately)**



**Y-Joint Plug/Socket Connector (F39-GCNY2, sold separately)**

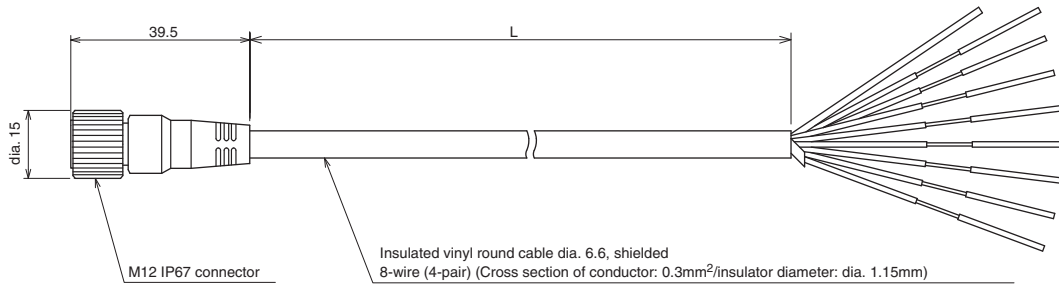


Material: PBT (Main body)

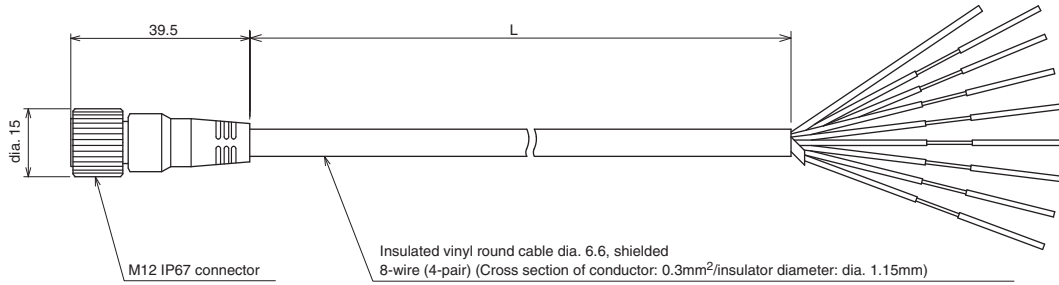
# F3SG-RA

## For F3SG-4RA□□□□-25-01TS

### Single-Ended Cable for Emitter (F39-JD□A-L, sold separately)

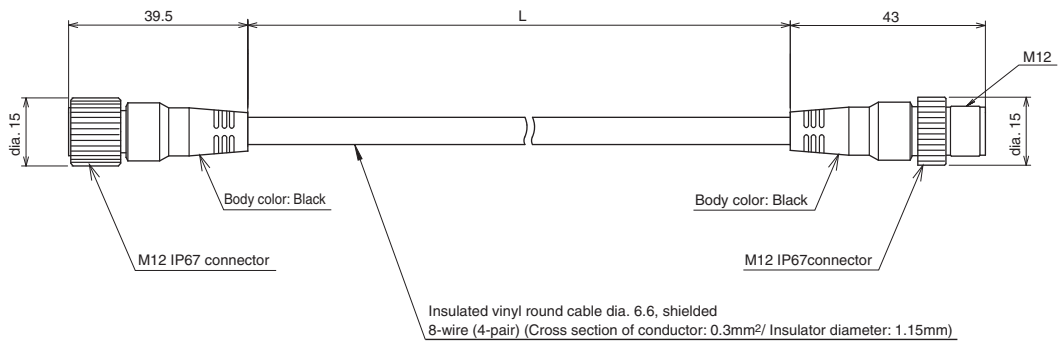


### Single-Ended Cable for Receiver (F39-JD□A-D, sold separately)

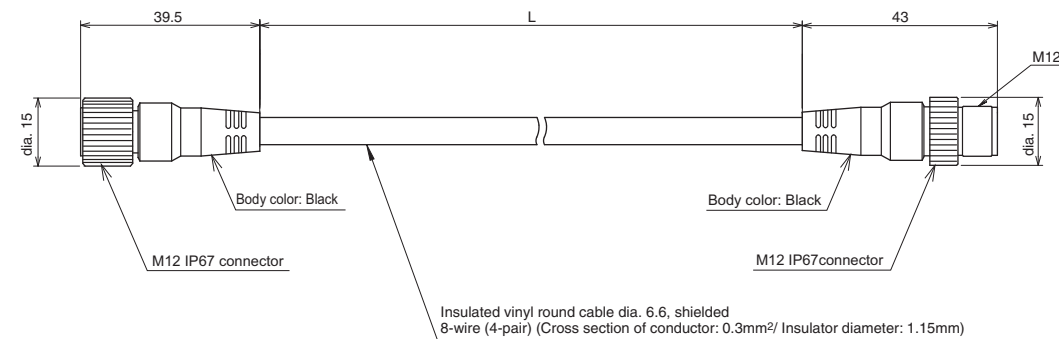


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3A-L	F39-JD3A-D	3
F39-JD7A-L	F39-JD7A-D	7
F39-JD10A-L	F39-JD10A-D	10
F39-JD15A-L	F39-JD15A-D	15
F39-JD20A-L	F39-JD20A-D	20

### Double-Ended Cable for Emitter: Cable for extension (F39-JD□B-L, sold separately)

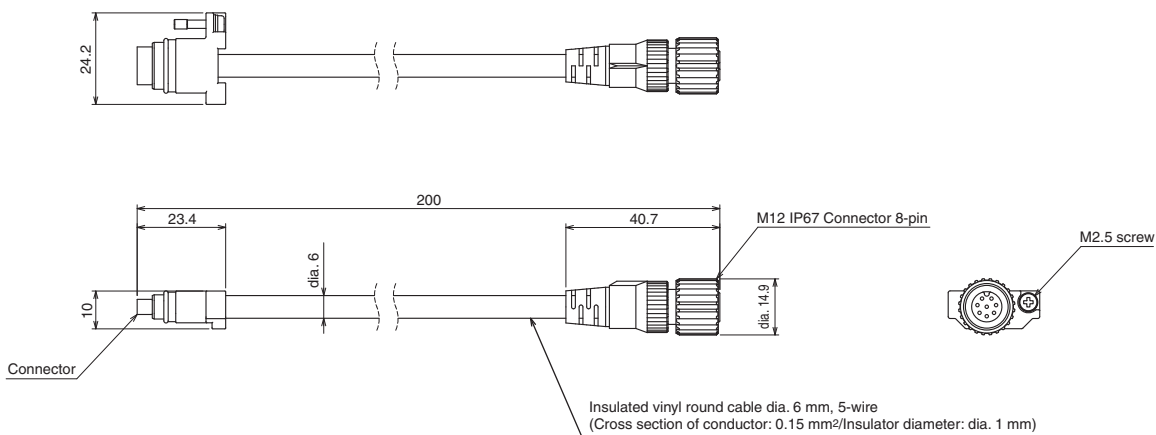


### Double-Ended Cable for Receiver: Cable for extension (F39-JD□B-D, sold separately)

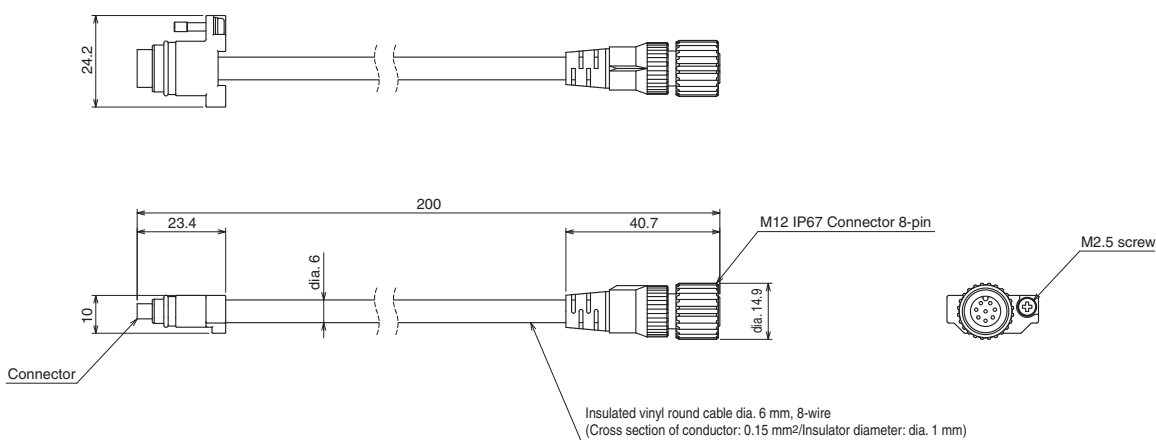


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JDR5B-L	F39-JDR5B-D	0.5
F39-JD1B-L	F39-JD1B-D	1
F39-JD3B-L	F39-JD3B-D	3
F39-JD5B-L	F39-JD5B-D	5
F39-JD7B-L	F39-JD7B-D	7
F39-JD10B-L	F39-JD10B-D	10
F39-JD15B-L	F39-JD15B-D	15
F39-JD20B-L	F39-JD20B-D	20

**Cascading Cable for Emitter (F39-JGR2WTS-L, sold separately)**

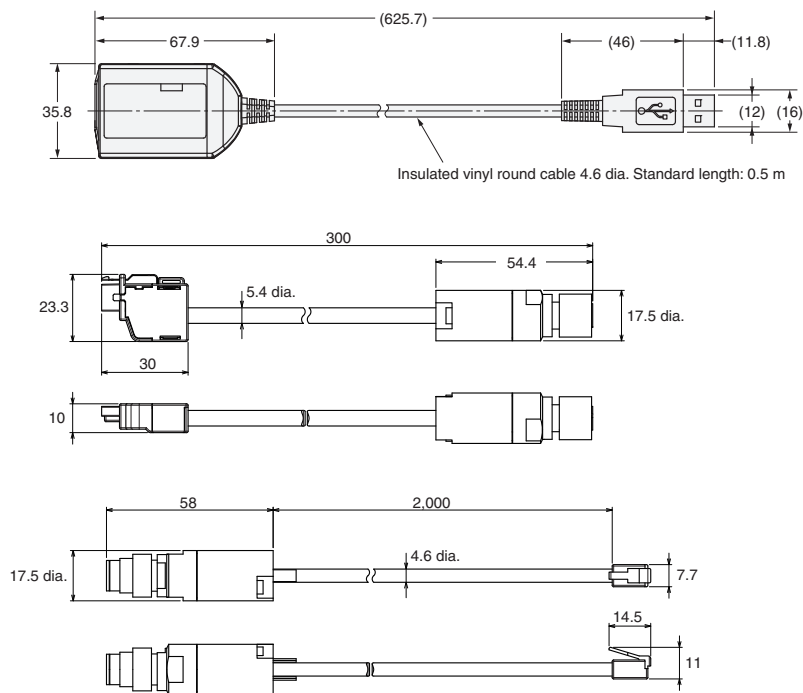


**Cascading Cable for Receiver (F39-JGR2WTS-D, sold separately)**

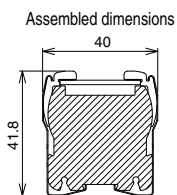


Set model name	Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR2WTS	F39-JGR2WTS-L	F39-JGR2WTS-D	0.2

**Interface Unit (F39-GIF)**



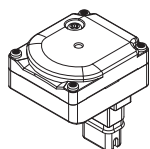
## Spatter Protection Cover (F39-HGA)



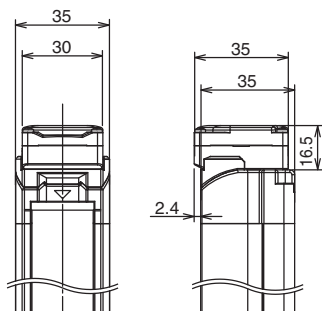
Model	Total length
F39-HGA□□□□	□□□□+4
F39-HGA0550	558

Material: PC (Transparent cover)  
 ABS (Side wall)  
 Stainless steel (Bracket)  
 Aluminum adhesive tape  
 (Fixing sticker)

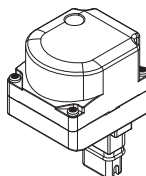
## Bluetooth Communication Unit (F39-BT)



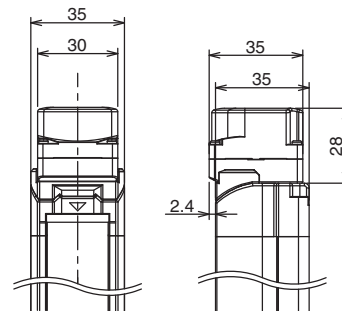
Material: PBT



## Lamp and Bluetooth Communication Unit (F39-BTLP) Lamp (F39-LP)



Material:  
 PC (Lighting element)  
 PBT (Other body parts)



## Related Manuals

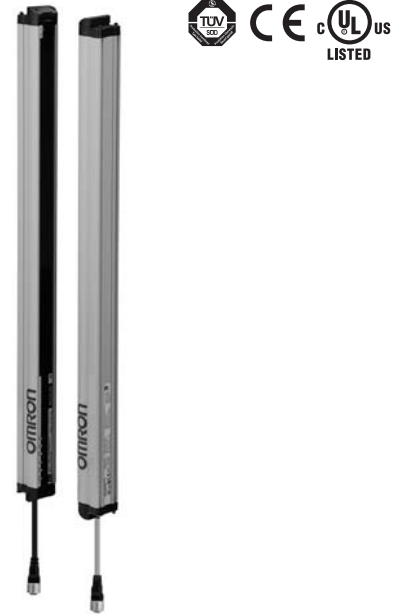
ManNo.	Model	Manual name
Z352	F3SG-□R□□□□□□□□	Safety Light Curtain F3SG-□R Series User's Manual
Z380	F3SG-4RA□□□□-25-01TS	Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual

# Safety Light Curtain Easy type

## F3SG-RE

### Easy-to-use Safety Sensor Ideal for Simple On/Off Detection Applications

- Provides simple safety functions - saving TCO by reducing errors
- Simple wiring with only 4 wires
- Fast response time of 5 ms



### Ordering Information

#### Main Units

Safety Light Curtain

Finger protection



Number of beams	Protective height (mm)	Model	
		PNP output	NPN output
15	160	F3SG-4RE0160P14	F3SG-4RE0160N14
23	240	F3SG-4RE0240P14	F3SG-4RE0240N14
31	320	F3SG-4RE0320P14	F3SG-4RE0320N14
39	400	F3SG-4RE0400P14	F3SG-4RE0400N14
47	480	F3SG-4RE0480P14	F3SG-4RE0480N14
55	560	F3SG-4RE0560P14	F3SG-4RE0560N14
63	640	F3SG-4RE0640P14	F3SG-4RE0640N14
71	720	F3SG-4RE0720P14	F3SG-4RE0720N14
79	800	F3SG-4RE0800P14	F3SG-4RE0800N14
87	880	F3SG-4RE0880P14	F3SG-4RE0880N14
95	960	F3SG-4RE0960P14	F3SG-4RE0960N14
103	1,040	F3SG-4RE1040P14	F3SG-4RE1040N14
111	1,120	F3SG-4RE1120P14	F3SG-4RE1120N14
119	1,200	F3SG-4RE1200P14	F3SG-4RE1200N14
127	1,280	F3SG-4RE1280P14	F3SG-4RE1280N14
135	1,360	F3SG-4RE1360P14	F3SG-4RE1360N14
143	1,440	F3SG-4RE1440P14	F3SG-4RE1440N14
151	1,520	F3SG-4RE1520P14	F3SG-4RE1520N14
159	1,600	F3SG-4RE1600P14	F3SG-4RE1600N14
167	1,680	F3SG-4RE1680P14	F3SG-4RE1680N14
175	1,760	F3SG-4RE1760P14	F3SG-4RE1760N14
183	1,840	F3SG-4RE1840P14	F3SG-4RE1840N14
191	1,920	F3SG-4RE1920P14	F3SG-4RE1920N14
199	2,000	F3SG-4RE2000P14	F3SG-4RE2000N14
207	2,080	F3SG-4RE2080P14	F3SG-4RE2080N14

## Hand and arm protection




Number of beams	Protective height (mm)	Model	
		PNP	NPN
8	190	F3SG-4RE0190P30	F3SG-4RE0190N30
12	270	F3SG-4RE0270P30	F3SG-4RE0270N30
16	350	F3SG-4RE0350P30	F3SG-4RE0350N30
20	430	F3SG-4RE0430P30	F3SG-4RE0430N30
24	510	F3SG-4RE0510P30	F3SG-4RE0510N30
28	590	F3SG-4RE0590P30	F3SG-4RE0590N30
32	670	F3SG-4RE0670P30	F3SG-4RE0670N30
36	750	F3SG-4RE0750P30	F3SG-4RE0750N30
40	830	F3SG-4RE0830P30	F3SG-4RE0830N30
44	910	F3SG-4RE0910P30	F3SG-4RE0910N30
48	990	F3SG-4RE0990P30	F3SG-4RE0990N30
52	1,070	F3SG-4RE1070P30	F3SG-4RE1070N30
56	1,150	F3SG-4RE1150P30	F3SG-4RE1150N30
60	1,230	F3SG-4RE1230P30	F3SG-4RE1230N30
64	1,310	F3SG-4RE1310P30	F3SG-4RE1310N30
68	1,390	F3SG-4RE1390P30	F3SG-4RE1390N30
72	1,470	F3SG-4RE1470P30	F3SG-4RE1470N30
76	1,550	F3SG-4RE1550P30	F3SG-4RE1550N30
80	1,630	F3SG-4RE1630P30	F3SG-4RE1630N30
84	1,710	F3SG-4RE1710P30	F3SG-4RE1710N30
88	1,790	F3SG-4RE1790P30	F3SG-4RE1790N30
92	1,870	F3SG-4RE1870P30	F3SG-4RE1870N30
96	1,950	F3SG-4RE1950P30	F3SG-4RE1950N30
100	2,030	F3SG-4RE2030P30	F3SG-4RE2030N30
104	2,110	F3SG-4RE2110P30	F3SG-4RE2110N30
108	2,190	F3SG-4RE2190P30	F3SG-4RE2190N30
112	2,270	F3SG-4RE2270P30	F3SG-4RE2270N30
116	2,350	F3SG-4RE2350P30	F3SG-4RE2350N30
120	2,430	F3SG-4RE2430P30	F3SG-4RE2430N30
124	2,510	F3SG-4RE2510P30	F3SG-4RE2510N30

## Accessories (Sold separately)


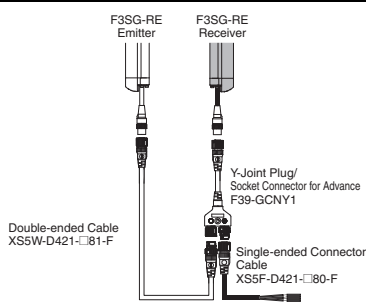
### Single-ended Connector Cable (Round Water-resistant Connector: Connector Connected to Cable, Socket on One Cable End)

Appearance	Type	Cable length	Specifications	Model																				
	M12 connector (4-pin), 4 wires	1 m	 <table border="1"> <thead> <tr> <th>PIN</th> <th>Emitter</th> <th>Receiver</th> <th>Color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+24 VDC</td> <td>+24 VDC</td> <td>Brown</td> </tr> <tr> <td>2</td> <td>Range setting</td> <td>OSSD 2</td> <td>White</td> </tr> <tr> <td>3</td> <td>0 VDC</td> <td>0 VDC</td> <td>Blue</td> </tr> <tr> <td>4</td> <td>Not used</td> <td>OSSD 1</td> <td>Black</td> </tr> </tbody> </table>	PIN	Emitter	Receiver	Color	1	+24 VDC	+24 VDC	Brown	2	Range setting	OSSD 2	White	3	0 VDC	0 VDC	Blue	4	Not used	OSSD 1	Black	XS5F-D421-C80-F
		PIN		Emitter	Receiver	Color																		
		1		+24 VDC	+24 VDC	Brown																		
		2		Range setting	OSSD 2	White																		
		3		0 VDC	0 VDC	Blue																		
		4		Not used	OSSD 1	Black																		
		2 m		XS5F-D421-D80-F																				
3 m	XS5F-D421-E80-F																							
5 m	XS5F-D421-G80-F																							
10 m	XS5F-D421-J80-F																							
20 m	XS5F-D421-L80-F																							





### Double-ended Cable (Round Water-resistant Connector: Connectors Connected to Cable, Socket and Plug on Cable Ends) For cable extension and simple wiring

Appearance	Type	Cable length	Specifications	Model								
	M12 connector (4-pin) on both ends	1 m	 <table border="1"> <tbody> <tr><td>1</td><td>Brown</td></tr> <tr><td>2</td><td>White</td></tr> <tr><td>3</td><td>Blue</td></tr> <tr><td>4</td><td>Black</td></tr> </tbody> </table> 	1	Brown	2	White	3	Blue	4	Black	XS5W-D421-C81-F
		1		Brown								
		2		White								
		3		Blue								
		4		Black								
		2 m		XS5W-D421-D81-F								
		3 m		XS5W-D421-E81-F								
5 m	XS5W-D421-G81-F											
10 m	XS5W-D421-J81-F											
20 m	XS5W-D421-L81-F											

**Y-Joint Plug/Socket Connector for Easy type F3SG-RE**


Appearance	Type	Cable length	Specifications	Model
	M12 connectors. Used for reduced wiring.	0.5 m	 <p>When using the reduced wiring connector system F39-GCNY1, the Operating Range Selection is fixed to Long Mode.</p>	F39-GCNY1

**Sensor Mounting Brackets**

Appearance	Specification	Application	Model
	Standard Fixed Bracket	Bracket to mount the F3SG-R. Side mounting and backside mounting possible. (This is included as a standard accessory with the product. It comes as a set of two Brackets. Refer to note *1 for the number of sets provided with each model.)	F39-LGF
	Standard Adjustable Bracket	Bracket to mount the F3SG-R. Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$ . Side mounting and backside mounting possible. (Sold separately as a set of two Brackets. Refer to note *1 for the number of sets required for each model.)	F39-LGA
	Top/Bottom Adjustable Bracket *2	Bracket to mount the F3SG-R. Use this bracket at the top and bottom positions of the F3SG-R. Beam alignment after mounting possible. The angle adjustment range is $\pm 22.5^\circ$ . Side mounting and backside mounting possible. (Sold separately. 4 brackets per set.)	F39-LGTB
	Top/Bottom Adjustable Bracket *2 (For user-made mounting part)	Top/Bottom Adjustable Bracket without a bracket to mount to the wall. Use the user's own wall mounting part to suit the machine. (Sold separately. 4 brackets per set.)	F39-LGTB-1

- \*1 [for F3SG-4RE□□□□□14] Protective height of 0160 to 1200: 2 sets, Protective height of 1280 to 2080: 3 sets  
 [for F3SG-4RE□□□□□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
- \*2 Top/Bottom Adjustable Bracket cannot be used with the Standard Fixed Bracket. Use with the Standard Adjustable Bracket.  
 Using Top/Bottom Adjustable Brackets with Standard Adjustable Brackets  
 F3SG-4RE□□□□□14: Protective height of 1120 to 1920: 1 set of Top/Bottom Adjustable Brackets and 1 set of Standard Adjustable Brackets  
 Protective height of 2000 to 2080: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets  
 Protective height of 1040 or lower: Standard Adjustable Brackets cannot be used.  
 F3SG-4RE□□□□□30: Protective height of 1150 to 1950: 1 set of Top/Bottom Adjustable Brackets and 1 set of Standard Adjustable Brackets  
 Protective height of 2030 to 2510: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets  
 Protective height of 1070 or lower: Standard Adjustable Brackets cannot be used.

**Laser Pointer for F3SG-R**


Appearance	Specifications	Model
	The laser pointer is attached on the optical surface of the F3SG-R to help coarse adjustment of beams.	F39-PTG



## Spatter Protection Cover (Two covers per set, for emitter and receiver)

Spatter Protection Covers include mounting brackets.

For Safety Light Curtain models of the protective height of 2,000 mm or longer, use two Spatter Protection Covers of different lengths.

Appearance	Safety Light Curtain Model		Model
	Finger protection	Hand and arm protection	
	F3SG-□RE0160□14	F3SG-□RE0190□30	F39-HGB0180
	F3SG-□RE0240□14	F3SG-□RE0270□30	F39-HGB0260
	F3SG-□RE0320□14	F3SG-□RE0350□30	F39-HGB0340
	F3SG-□RE0400□14	F3SG-□RE0430□30	F39-HGB0420
	F3SG-□RE0480□14	F3SG-□RE0510□30	F39-HGB0500
	F3SG-□RE0560□14	F3SG-□RE0590□30	F39-HGB0580
	F3SG-□RE0640□14	F3SG-□RE0670□30	F39-HGB0660
	F3SG-□RE0720□14	F3SG-□RE0750□30	F39-HGB0740
	F3SG-□RE0800□14	F3SG-□RE0830□30	F39-HGB0820
	F3SG-□RE0880□14	F3SG-□RE0910□30	F39-HGB0900
	F3SG-□RE0960□14	F3SG-□RE0990□30	F39-HGB0980
	F3SG-□RE1040□14	F3SG-□RE1070□30	F39-HGB1060
	F3SG-□RE1120□14	F3SG-□RE1150□30	F39-HGB1140
	F3SG-□RE1200□14	F3SG-□RE1230□30	F39-HGB1220
	F3SG-□RE1280□14	F3SG-□RE1310□30	F39-HGB1300
	F3SG-□RE1360□14	F3SG-□RE1390□30	F39-HGB1380
	F3SG-□RE1440□14	F3SG-□RE1470□30	F39-HGB1460
	F3SG-□RE1520□14	F3SG-□RE1550□30	F39-HGB1540
	F3SG-□RE1600□14	F3SG-□RE1630□30	F39-HGB1620
	F3SG-□RE1680□14	F3SG-□RE1710□30	F39-HGB1700
	F3SG-□RE1760□14	F3SG-□RE1790□30	F39-HGB1780
	F3SG-□RE1840□14	F3SG-□RE1870□30	F39-HGB1860
	F3SG-□RE1920□14	F3SG-□RE1950□30	F39-HGB1940
	F3SG-□RE2000□14	F3SG-□RE2030□30	F39-HGB1460
	F3SG-□RE2080□14	F3SG-□RE2110□30	F39-HGA0550
	-	F3SG-□RE2190□30	F39-HGB1540
	-	F3SG-□RE2270□30	F39-HGB1620
	-	F3SG-□RE2350□30	F39-HGA0550
	-	F3SG-□RE2430□30	F39-HGB1700
	-	F3SG-□RE2510□30	F39-HGA0550
-		F39-HGB1780	
-		F39-HGA0550	
-		F39-HGB1860	
-		F39-HGA0550	
-		F39-HGB1940	
-		F39-HGA0550	

**Note:** The operating range of the Safety Light Curtain attached with the product is 10% shorter than the rating.

### Test Rod

Diameter	Model
14 mm dia.	F39-TRD14
30 mm dia.	F39-TRD30

## Ratings/Specifications

### Main unit

		F3SG-4RE□□□□-14, F3SG-2RE□□□□-14	F3SG-4RE□□□□-30, F3SG-2RE□□□□-30	
Performance	Type of ESPE (IEC 61496-1)	Type 4	F3SG-4RE□□□□14/30	
		Type 2	F3SG-2RE□□□□14/30	
	Object Resolution (Detection Capability)	Opaque objects 14-mm dia.		
	Beam Gap	10mm	30-mm dia.	
	Number of Beams	15 to 207	20mm	
	Lens Size	5.2 × 3.4 (W×H) mm	8 to 124	
	Protective Height	160 to 2080 mm (6.3 to 81.9 inch)	7-mm dia.	
	Operating Range	Long	0.3 to 10.0 m (1 to 32 ft.)	190 to 2510 mm (7.3 to 98.7 inch)
		Short	0.3 to 3.0 m (1 to 10 ft.)	0.3 to 20.0 m (1 to 65 ft.)
	Response Time	ON to OFF	5 to 15ms *1	0.3 to 7.0 m (1 to 23 ft.)
		OFF to ON	25 to 75ms *1	
	*1. Response time when used in one segment system or in cascaded connection Refer to page 72 .			
	Effective Aperture Angle (EAA) (IEC61496-2)	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.			

		F3SG-4RE□□□□-14, F3SG-2RE□□□□-14	F3SG-4RE□□□□-30, F3SG-2RE□□□□-30	
Electrical	Power Supply Voltage (Vs)	SELV/PELV 24 VDC±20% (ripple p-p 10% max.)		
	Current Consumption	Refer to page 72		
	Safety Outputs (OSSD)	F3SG-□RE□□□□P□□: Two PNP transistor outputs F3SG-□RE□□□□N□□: Two NPN transistor outputs		
		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.		
	Output Operation Mode	Safety Output	Light-ON (Safety output is enabled when the receiver receives an emitting signal.)	
	Input Voltage	ON Voltage	Operating Range Select Input: Long: 9 V to Vs (sink current 3 mA max.) * Short: 0 to 3 V (source current 3 mA max.)	
		OFF Voltage	*The Vs indicates a supply voltage value in your environment.	
	Overvoltage Category (IEC60664-1)		II	
	Indicators		Refer to page 73	
	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	Test Function	Self-test (at power-on, and during operation)		
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 and 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 <sup>2</sup> , 1000 shocks for all 3 axes		
Pollution Degree (IEC 60664-1)		Pollution Degree 3		
Connections	Power cable	Type of Connection	M12 connectors: 4-pin, IP67 rated when mated, Cables prewired to the sensors	
		Number of Wires	Emitter: 4, Receiver: 4	
		Cable Length	0.3 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R5 mm	
	Extension cable - Single-ended cable - Double-ended cable	Type of Connection	Use the XS5□-D42□ series cables.	
		Number of Wires		
Cable Length				
Cable Diameter				
Minimum Bending Radius				
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 page 72.		
	Included Accessories	Safety Precautions, Quick Installation Manual, Standard Fixed Bracket*1, Troubleshooting Guide Sticker *1. The quantity of Standard Fixed Brackets included varies depending on the protective height. [F3SG-□RE□□□□□14] - Protective height of 0160 to 1200: 2 sets - Protective height of 1280 to 2080: 3 sets [F3SG-□RE□□□□□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		
Conformity	Conforming standards		Refer to page 24	
	Performance Level (PL)/Safety category	Type 4	PL e/Category 4 (EN ISO 13849-1:2008)	
		Type 2	PL c/Category 2 (EN ISO 13849-1:2008)	
	PFHd		9.1 × 10 <sup>-9</sup> (IEC 61508)	
	Proof test interval T <sub>M</sub>		Every 20 years (IEC 61508)	
	SFF		99% (IEC 61508)	
HFT		1 (IEC 61508)		
Classification		Type B (IEC 61508-2)		

# F3SG-RE

## List of Models/Response Time/Current Consumption/Weight

### F3SG-□RE□□□□□-14

Model	Number of Beams	Protective Height [mm]	Response Time[ms]			Current Consumption[mA]		Weight [kg] *
			ON→OFF	OFF (Synchronized) →ON	OFF (Not synchronized) →ON	Emitter	Receiver	
F3SG-□RE0160□14	15	160	5	25	125	45	50	1.7
F3SG-□RE0240□14	23	240	5	25	125	55	55	1.9
F3SG-□RE0320□14	31	320	7	35	135	55	55	2.1
F3SG-□RE0400□14	39	400	7	35	135	65	60	2.6
F3SG-□RE0480□14	47	480	7	35	135	70	60	2.8
F3SG-□RE0560□14	55	560	7	35	135	80	60	3.1
F3SG-□RE0640□14	63	640	7	35	135	85	65	3.3
F3SG-□RE0720□14	71	720	9	45	145	80	65	3.8
F3SG-□RE0800□14	79	800	9	45	145	85	70	4.0
F3SG-□RE0880□14	87	880	9	45	145	90	70	4.2
F3SG-□RE0960□14	95	960	9	45	145	95	75	4.4
F3SG-□RE1040□14	103	1040	9	45	145	100	75	4.6
F3SG-□RE1120□14	111	1120	11	55	155	90	75	4.7
F3SG-□RE1200□14	119	1200	11	55	155	95	80	4.9
F3SG-□RE1280□14	127	1280	11	55	155	100	80	5.1
F3SG-□RE1360□14	135	1360	11	55	155	105	85	5.6
F3SG-□RE1440□14	143	1440	11	55	155	110	85	5.7
F3SG-□RE1520□14	151	1520	13	65	165	100	90	5.9
F3SG-□RE1600□14	159	1600	13	65	165	105	90	6.5
F3SG-□RE1680□14	167	1680	13	65	165	110	95	6.7
F3SG-□RE1760□14	175	1760	13	65	165	115	95	6.9
F3SG-□RE1840□14	183	1840	13	65	165	115	95	7.1
F3SG-□RE1920□14	191	1920	15	75	175	110	100	7.3
F3SG-□RE2000□14	199	2000	15	75	175	115	100	7.4
F3SG-□RE2080□14	207	2080	15	75	175	115	105	8.0

\* The weight includes an emitter, a receiver and included brackets in a product package.

### F3SG-□RE□□□□□30

Model	Number of Beams	Protective Height [mm]	Response Time[ms]			Current Consumption[mA]		Weight [kg] *
			ON→OFF	OFF (Synchronized) →ON	OFF (Not synchronized) →ON	Emitter	Receiver	
F3SG-□RE0190□30	8	190	5	25	125	40	50	1.7
F3SG-□RE0270□30	12	270	5	25	125	45	50	1.9
F3SG-□RE0350□30	16	350	5	25	125	50	50	2.1
F3SG-□RE0430□30	20	430	5	25	125	55	55	2.6
F3SG-□RE0510□30	24	510	5	25	125	60	55	2.8
F3SG-□RE0590□30	28	590	7	35	135	50	55	3.0
F3SG-□RE0670□30	32	670	7	35	135	55	55	3.2
F3SG-□RE0750□30	36	750	7	35	135	60	60	3.8
F3SG-□RE0830□30	40	830	7	35	135	65	60	4.0
F3SG-□RE0910□30	44	910	7	35	135	65	60	4.2
F3SG-□RE0990□30	48	990	7	35	135	70	60	4.4
F3SG-□RE1070□30	52	1070	7	35	135	75	60	4.5
F3SG-□RE1150□30	56	1150	7	35	135	80	65	4.7
F3SG-□RE1230□30	60	1230	7	35	135	85	65	4.9
F3SG-□RE1310□30	64	1310	7	35	135	85	65	5.1
F3SG-□RE1390□30	68	1390	9	45	145	75	65	5.5
F3SG-□RE1470□30	72	1470	9	45	145	80	65	5.7
F3SG-□RE1550□30	76	1550	9	45	145	80	70	5.9
F3SG-□RE1630□30	80	1630	9	45	145	85	70	6.4
F3SG-□RE1710□30	84	1710	9	45	145	85	70	6.6
F3SG-□RE1790□30	88	1790	9	45	145	90	70	6.8
F3SG-□RE1870□30	92	1870	9	45	145	95	75	7.0
F3SG-□RE1950□30	96	1950	9	45	145	95	75	7.2
F3SG-□RE2030□30	100	2030	9	45	145	100	75	7.3
F3SG-□RE2110□30	104	2110	9	45	145	100	75	7.9
F3SG-□RE2190□30	108	2190	11	55	155	90	75	8.1
F3SG-□RE2270□30	112	2270	11	55	155	95	80	8.2
F3SG-□RE2350□30	116	2350	11	55	155	95	80	8.7
F3SG-□RE2430□30	120	2430	11	55	155	95	80	8.8
F3SG-□RE2510□30	124	2510	11	55	155	100	80	9.0

\* The weight includes an emitter, a receiver and included brackets in a product package.

## LED Indicator Status

### Emitter

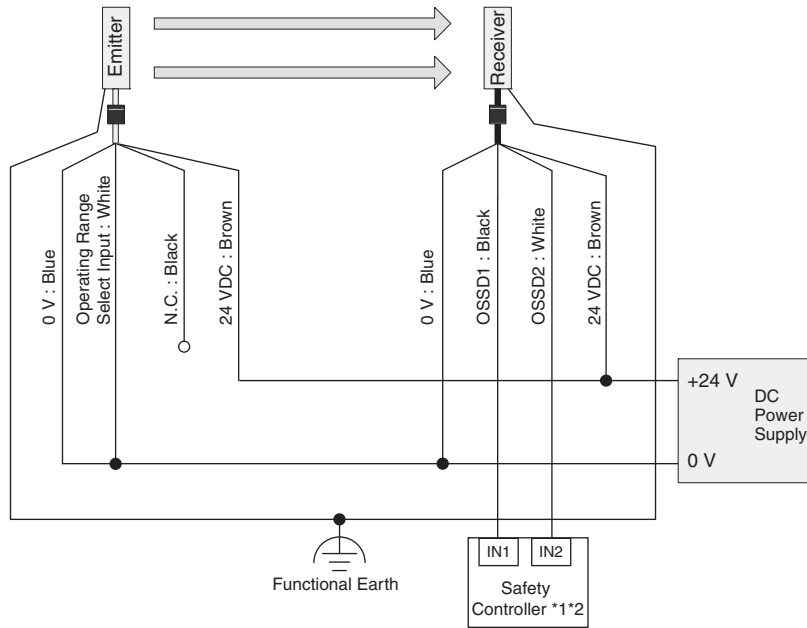
Name of Indicator		Color	Illuminated	Blinking
Operating range	LONG	Green	Long range mode is selected	Lockout state due to Operating range selection setting error
Power	POWER	Green	Power is ON.	Error due to noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in emitter

### Receiver

Name of Indicator		Color	Illuminated	Blinking
Top-beam-state	TOP	Blue	The top beam is unblocked	–
Internal error	INTERNAL	Red	–	Lockout state due to Internal error, or error due to abnormal power supply or noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in receiver
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
ON/OFF	ON/OFF	Green	Safety output is in ON state	–
		Red	Safety output is in OFF state	Lockout state due to Safety Output error, or error due to abnormal power supply or noise
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
Bottom-beam-state	BTM	Blue	The bottom beam is unblocked	–

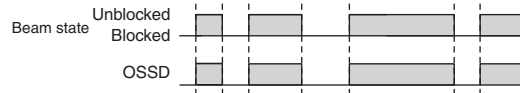
## Connections (Basic Wiring Diagram)

### Short Mode



\*1. Refer to page 49 for more information.

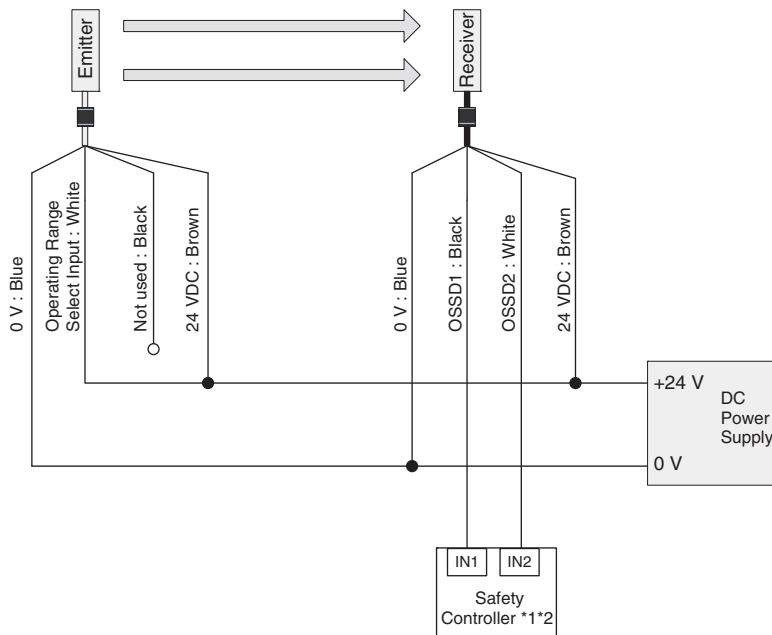
\*2. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.



**Note:** Functional earth connection is unnecessary when you use the F3SG-R in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-R in an environment where there may be excessive noise from surroundings or stable power supply may be interfered, it is recommended the F3SG-R be connected to functional earth.

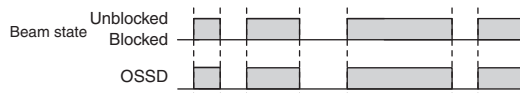
The wiring examples in later examples do not indicate functional earth. To use functional earth, wire an earth cable according to the example above. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information.

### Long Mode

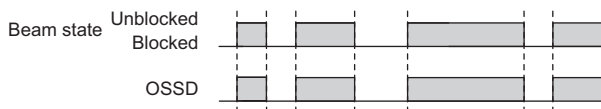
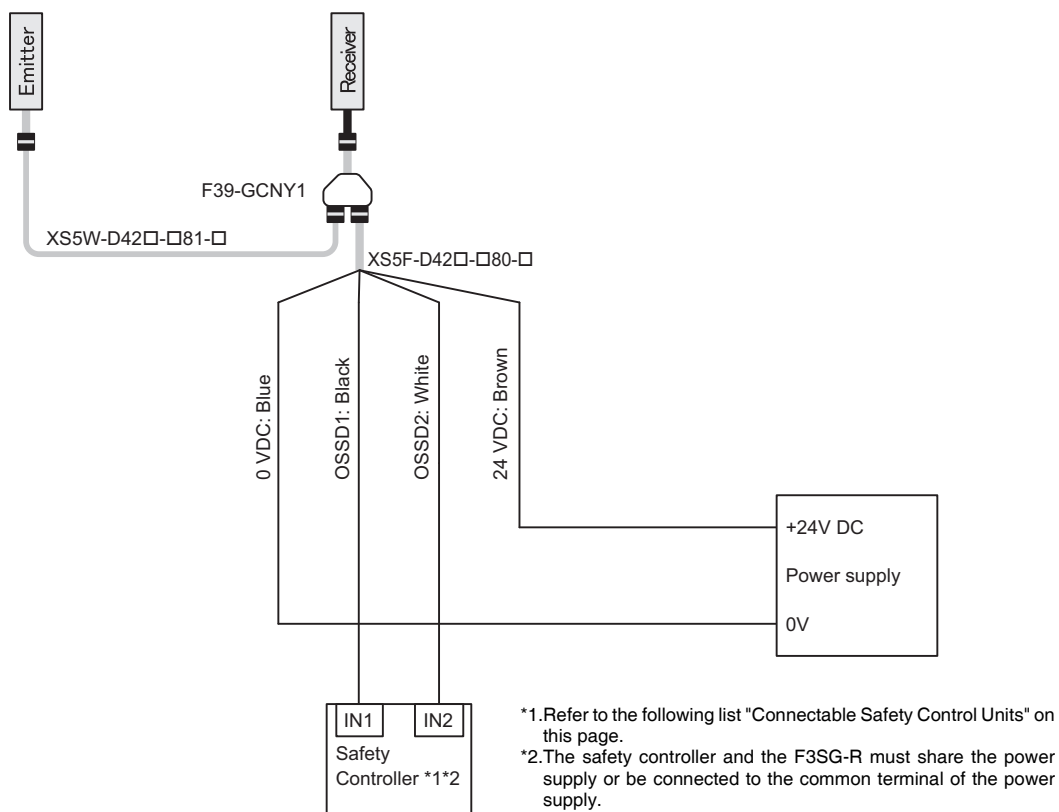


\*1. Refer to page 49 for more information.

\*2. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.



## Standalone F3SG-RE with Y-Joint Plug/Socket Connector



**Note:** When using the reduced wiring connector system F39-GCNY1, the Operating Range Selection is fixed to Long Mode.

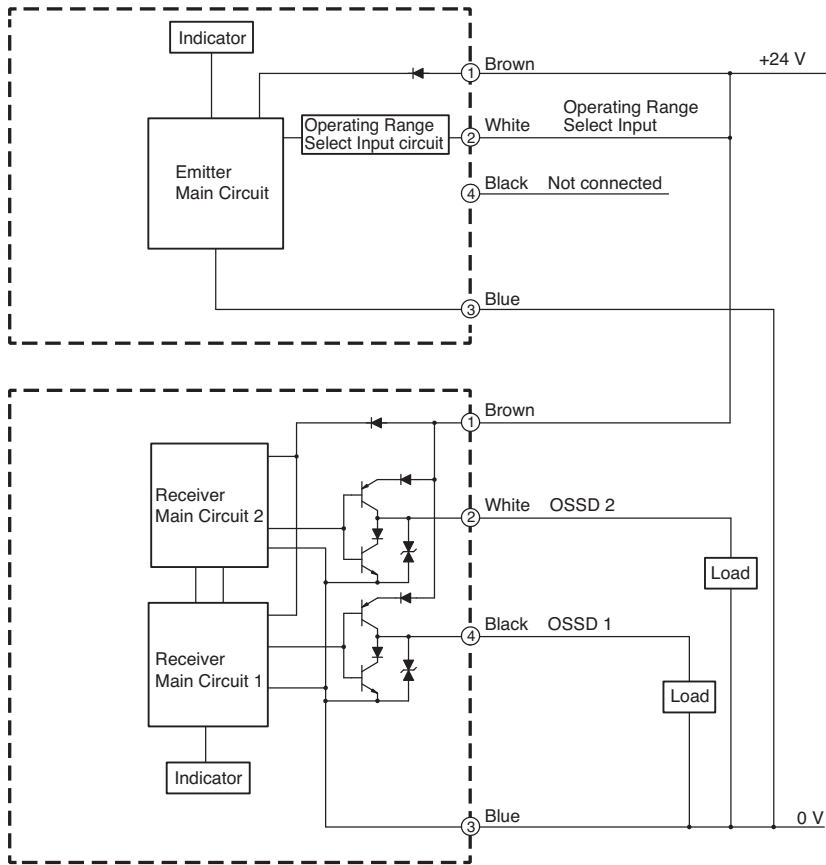
### Connectable Safety Control Units

The F3SG-RE with PNP output can be connected to the safety control units listed in the table below.

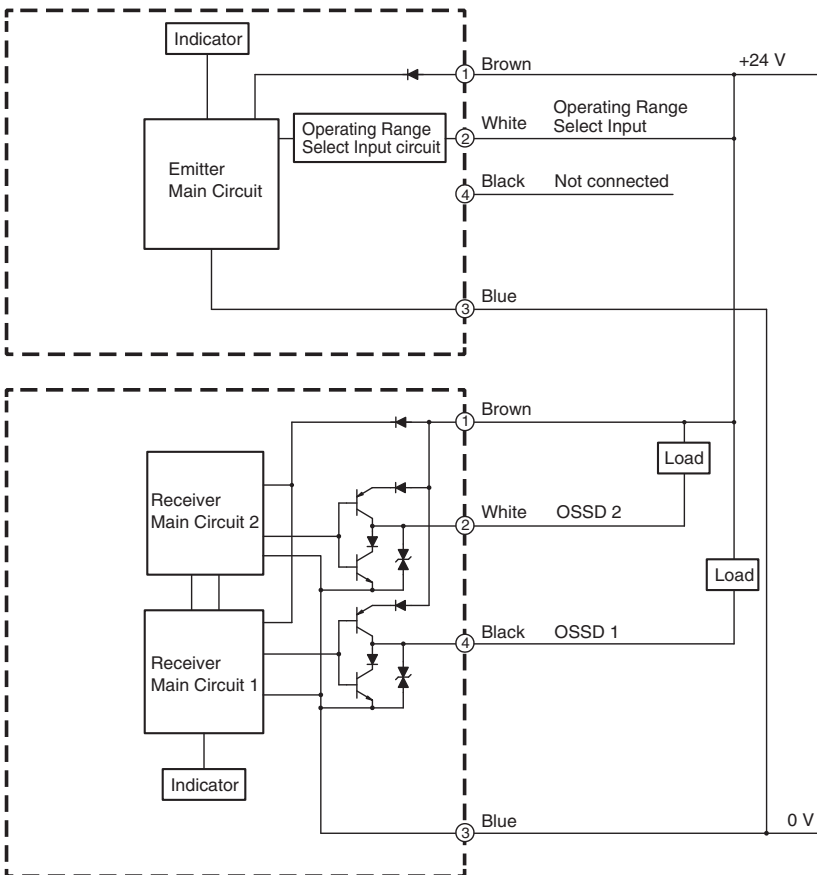
Connectable Safety Control Units (PNP output)		
Safety Relay Units	Flexible Safety Units	Safety Controllers
G9SA-301 G9SA-321 G9SA-501 G9SB-200-B G9SB-200-D G9SB-301-B G9SB-301-D G9SE-201 G9SE-401 G9SE-221-T□	G9SX-AD322-T G9SX-ADA222-T G9SX-BC202 G9SX-GS226-T15	G9SP-N10S G9SP-N10D G9SP-N20S NE0A-SCPU01 NE1A-SCPU01 NE1A-SCPU02 DST1-ID12SL-1 DST1-MD16SL-1 DST1-MRD08SL-1 NX-SIH400 NX-SID800 F3SP-T01

# Input/Output Circuit

## PNP Output



## NPN Output



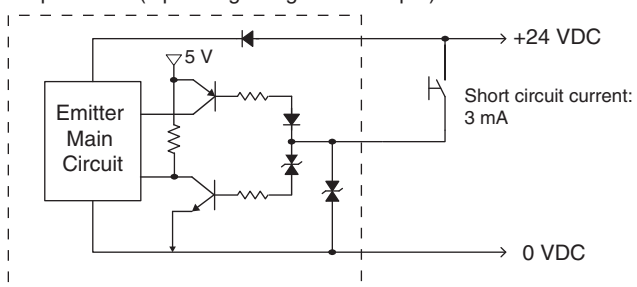


## Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

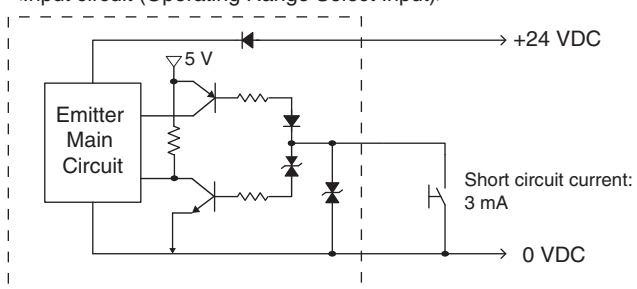
### PNP Output

<Input circuit (Operating Range Select Input)>



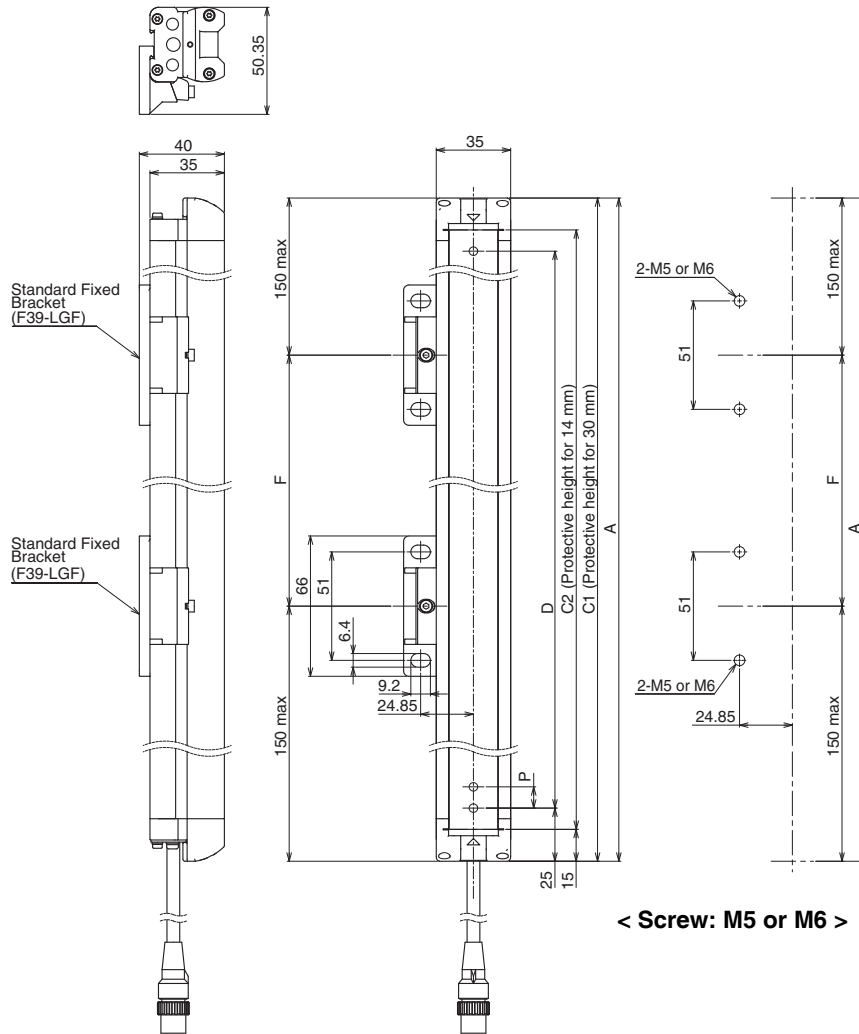
### NPN Output

<Input circuit (Operating Range Select Input)>



### Mounted with Standard Fixed Brackets (F39-LGF)

#### Backside Mounting



#### F3SG-4RE□□□□□30 Series

<b>Dimension A</b>	C1
<b>Dimension C1</b>	4-digit number of the type name(Protective height)
<b>Dimension D</b>	C1-50
<b>Dimension P</b>	20

Protective height (C1)	Number of Standard Fixed Brackets *1	Dimension F
0190 to 1230	2 *2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

#### F3SG-4RE□□□□□14 Series

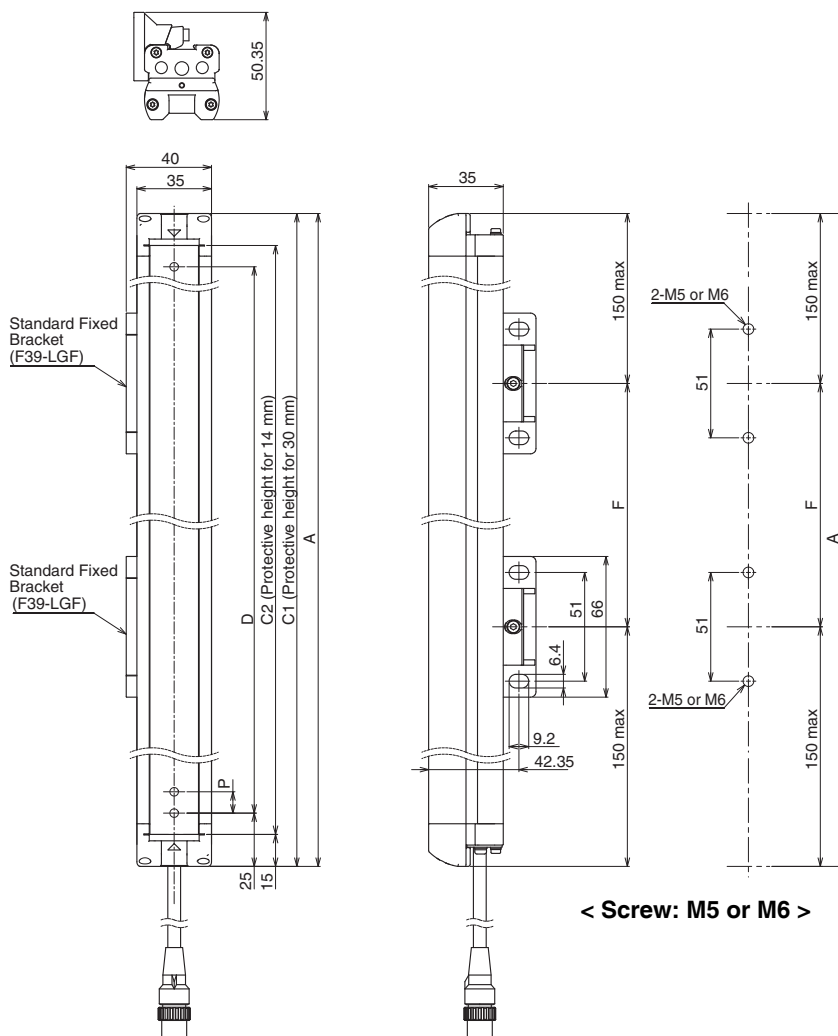
<b>Dimension A</b>	C2+30
<b>Dimension C2</b>	4-digit number of the type name(Protective height)
<b>Dimension D</b>	C2-20
<b>Dimension P</b>	10

Protective height (C2)	Number of Standard Fixed Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

\*1.The number of brackets required to mount either one of emitter and receiver.

\*2.Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Side Mounting



F3SG-4RE...30 Series

Dimension A	C1
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 *1	Dimension F
0190 to 1230	2 *2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

F3SG-4RE...14 Series

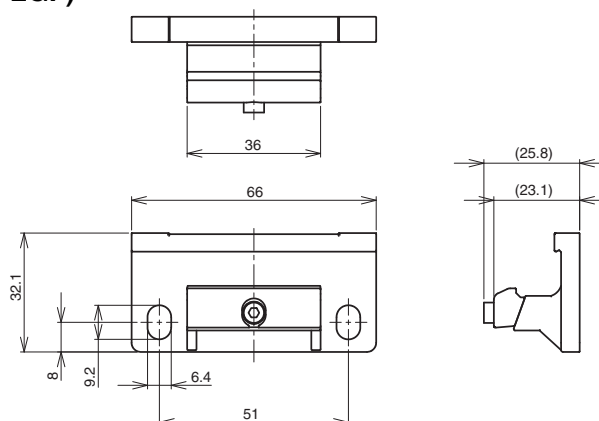
Dimension A	C2+30
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

Protective height (C2)	Number of Standard Fixed Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

\*1.The number of brackets required to mount either one of emitter and receiver.

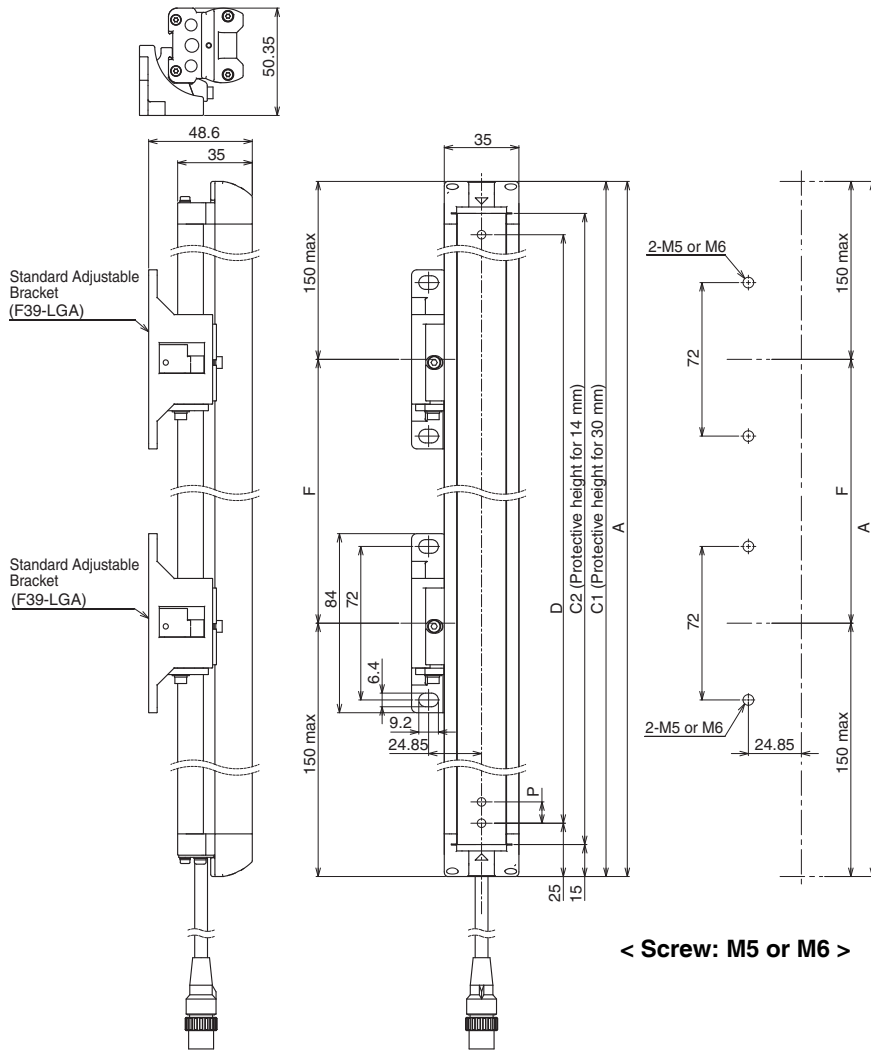
\*2.Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Standard Fixed Bracket(F39-LGF)



Material: ZDC2

**Mounted with Standard Fixed Brackets (F39-LGA)**  
**Backside Mounting**



< Screw: M5 or M6 >

**F3SG-4RE□□□□30 Series**

<b>Dimension A</b>	C1
<b>Dimension C1</b>	4-digit number of the type name (Protective height)
<b>Dimension D</b>	C1-50
<b>Dimension P</b>	20

Protective height (C1)	Number of Standard Adjustable Brackets *1	Dimension F
0190 to 1230	2 *2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

**F3SG-4RE□□□□14 Series**

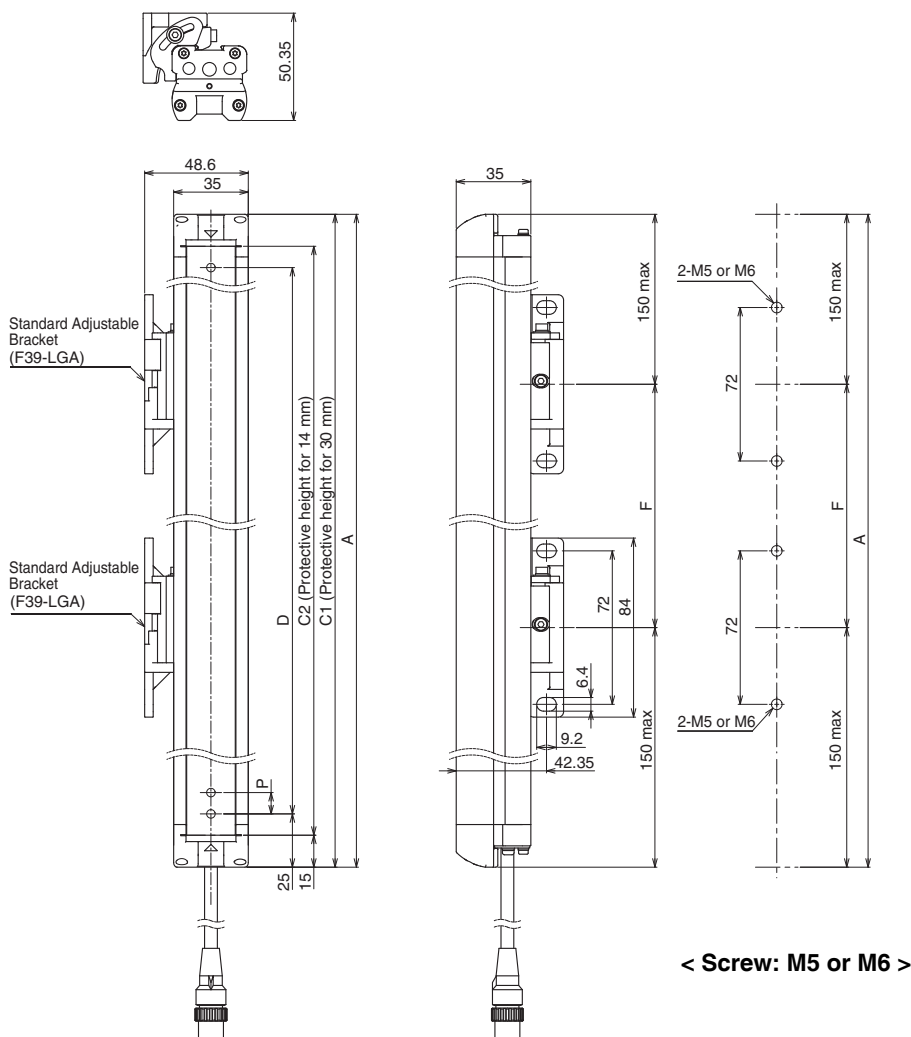
<b>Dimension A</b>	C2+30
<b>Dimension C2</b>	4-digit number of the type name (Protective height)
<b>Dimension D</b>	C2-20
<b>Dimension P</b>	10

Protective height (C2)	Number of Standard Adjustable Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

\*1.The number of brackets required to mount either one of emitter and receiver.

\*2.Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Side Mounting



F3SG-4RE□□□□30 Series

Dimension A	C1
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 *1	Dimension F
0190 to 1230	2 *2	1000 mm max.
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

F3SG-4RE□□□□14 Series

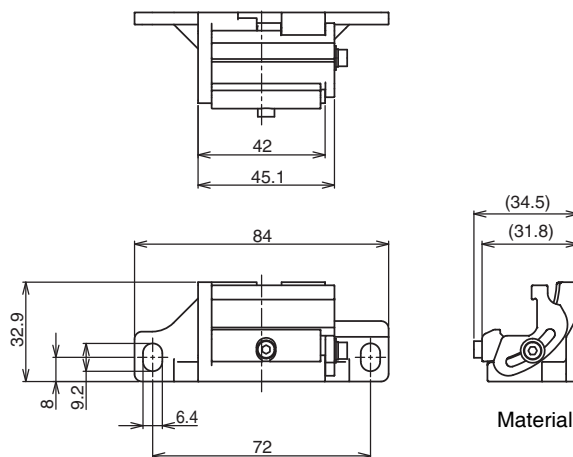
Dimension A	C2+30
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

Protective height (C2)	Number of Standard Adjustable Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

\*1.The number of brackets required to mount either one of emitter and receiver.

\*2.Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Standard Fixed Bracket (F39-LGA)



Material: ZDC2, Fluorochemical lubricant oil

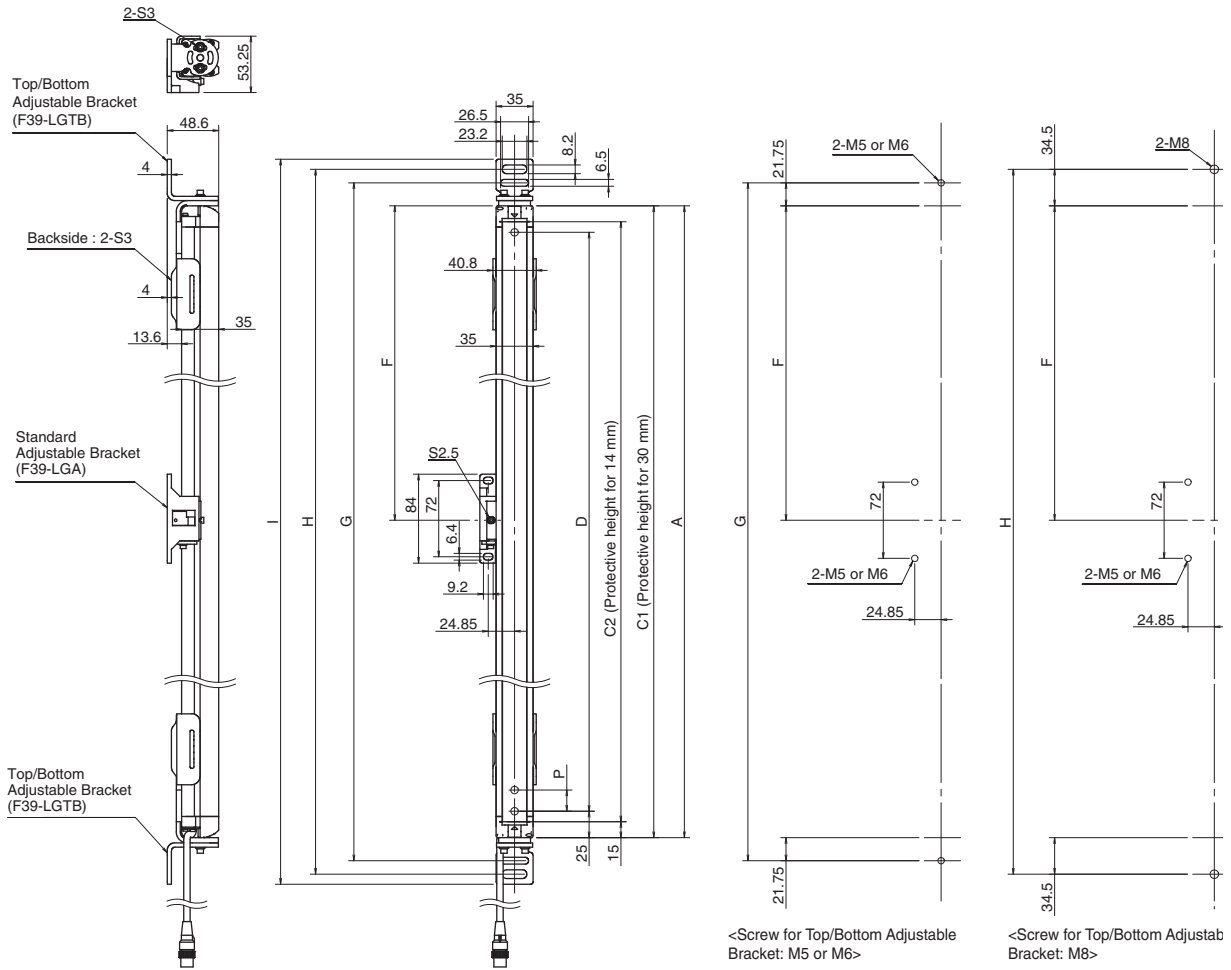
# F3SG-RE

## Mounted with Top/Bottom Adjustable Brackets (F39-LGTB) and Standard Adjustable Brackets (F39-LGA)

Dimensions when using the F3SG-RE Series except the F3SG-4RE0190□30 and F3SG-4RE0160□14

Refer to *Safety Light Curtain F3SG-R Series User's Manual* for the dimensions when using the F3SG-4RE0190□30 and F3SG-4RE0160□14.

### Backside Mounting



#### F3SG-4RE□□□□30 Series

Dimension A	C1
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension G	C1+43.5
Dimension H	C1+69
Dimension I	C1+88
Dimension P	20

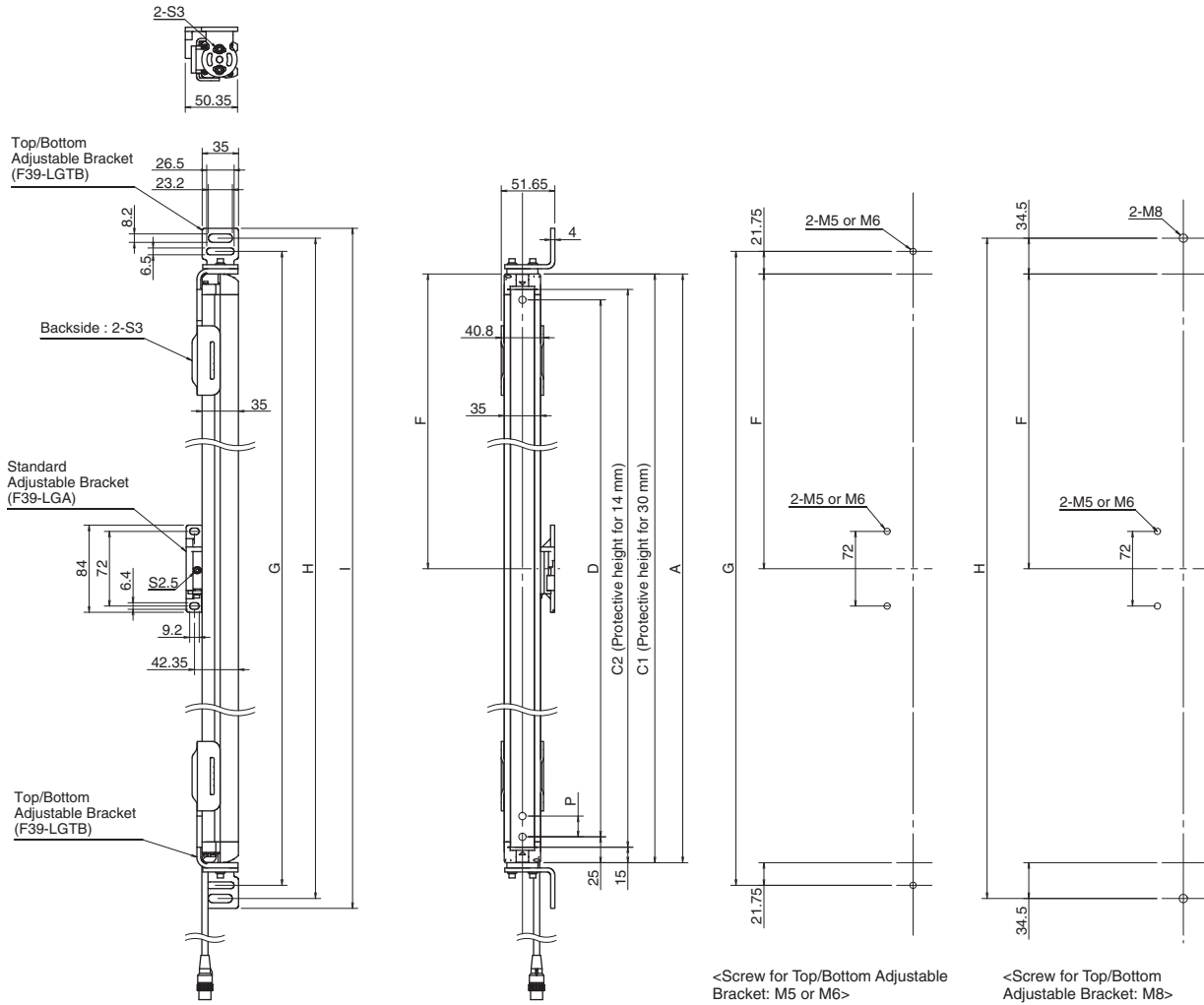
Protective height (C1)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0270 to 1070	2	0	-
1150 to 1950	2	1	1000 mm max.
2030 to 2510	2	2	1000 mm max.

#### F3SG-4RE□□□□14 Series

Dimension A	C2+30
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension G	C2+73.5
Dimension H	C2+99
Dimension I	C2+118
Dimension P	10

Protective height (C2)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0240 to 1040	2	0	-
1120 to 1920	2	1	1000 mm max.
2000 to 2080	2	2	1000 mm max.

Side Mounting



<Screw for Top/Bottom Adjustable Bracket: M5 or M6>

<Screw for Top/Bottom Adjustable Bracket: M8>

F3SG-4RE□□□□30 Series

Dimension A	C1
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension G	C1+43.5
Dimension H	C1+69
Dimension I	C1+88
Dimension P	20

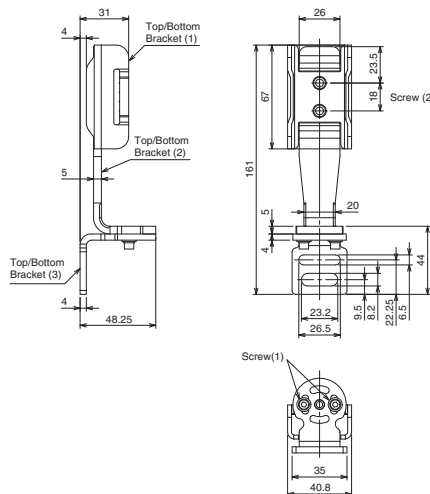
Protective height (C1)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0270 to 1070	2	0	-
1150 to 1950	2	1	1000 mm max.
2030 to 2510	2	2	1000 mm max.

F3SG-4RE□□□□14 Series

Dimension A	C2+30
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension G	C2+73.5
Dimension H	C2+99
Dimension I	C2+118
Dimension P	10

Protective height (C2)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0240 to 1040	2	0	-
1120 to 1920	2	1	1000 mm max.
2000 to 2080	2	2	1000 mm max.

Top/Bottom Adjustable Bracket (F39-LGTB)



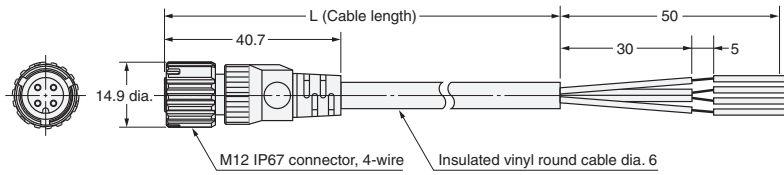
Material: SUS304



# F3SG-RE

## Accessories

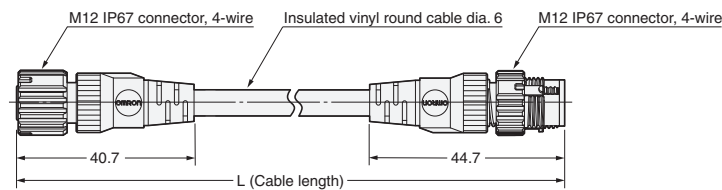
### Round Water-resistant Connector: Connector Connected to Cable, Socket on One Cable End (XS5F-D421-□80-F, sold separately)



Material: Insulated vinyl round cable

Specification	Model	L (m)
Fire-retardant, Robot cable	XS5F-D421-C80-F	1
	XS5F-D421-D80-F	2
	XS5F-D421-E80-F	3
	XS5F-D421-G80-F	5
	XS5F-D421-J80-F	10
	XS5F-D421-L80-F	20

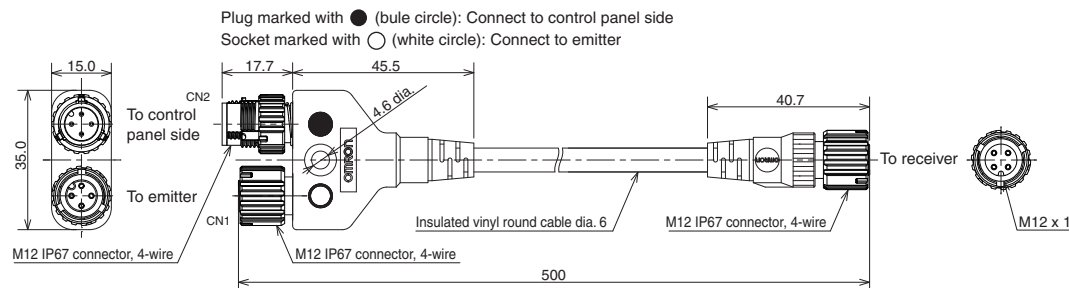
### Round Water-resistant Connector: Connectors Connected to Cable, Socket and Plug on Cable Ends (XS5W-D421-□81-F, sold separately)



Material: Insulated vinyl round cable

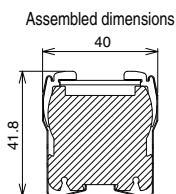
Specification	Model	L (m)
Fire-retardant, Robot cable	XS5W-D421-C81-F	1
	XS5W-D421-D81-F	2
	XS5W-D421-E81-F	3
	XS5W-D421-G81-F	5
	XS5W-D421-J81-F	10
	XS5W-D421-L81-F	20

### Y-Joint Plug/Socket Connector (F39-GCNY1, sold separately)



Material: PBT (Main body)

### Spatter Protection Cover(F39-HGA/-HGB)



Model	Total length
F39-HGB□□□□	□□□□+6
F39-HGA0550	558

Material: PC (Transparent cover)  
 ABS (Side wall)  
 Stainless steel (Bracket)  
 Aluminum adhesive tape  
 (Fixing sticker)

## Related Manuals

ManNo.	Model	Manual name
Z352	F3SG-□R□□□□□□□□	Safety Light Curtain F3SG-□R Series User's Manual

# Smart Muting Actuator

## F3W-MA



### Integrated muting sensor based on multi-beam photoelectric sensor

- A muting system can be configured easily in combination with the safety light curtain.
- Muting functions can be stably performed even when workpieces with holes pass.



### Ordering Information

#### Smart Muting Actuator

Appearance	Beam Gap between Muting Trigger Beams	output	Number of Beams	Model
	100 mm	PNP output	8	F3W-MA0100P
	300 mm		20	F3W-MA0300P

Note: Use with the PNP output model safety light curtain.

#### Accessories (Sold separately)

##### Single-ended Connector Cable

Appearance	Type	Cable length	Specifications	Model																							
	M12 connector (5-pin), 5 wires Color: Gray	3 m	<table border="1"> <tr><td>1</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>2</td><td>CFG In</td><td>Black</td></tr> <tr><td>3</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>4</td><td>COM+</td><td>White</td></tr> <tr><td>5</td><td>COM-</td><td>Yellow</td></tr> </table>	1	+24 VDC	Brown	2	CFG In	Black	3	0 VDC	Blue	4	COM+	White	5	COM-	Yellow	F39-JG3A-L								
		1		+24 VDC	Brown																						
		2		CFG In	Black																						
		3		0 VDC	Blue																						
		4		COM+	White																						
	5	COM-	Yellow																								
	7 m	F39-JG7A-L																									
	10 m	F39-JG10A-L																									
	15 m	F39-JG15A-L																									
	20 m	F39-JG20A-L																									
For receiver M12 connector (8-pin), 8 wires Color: Black	3 m	<table border="1"> <tr><td>1</td><td>Mute Enable / CFG In / Reset</td><td>Yellow</td></tr> <tr><td>2</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>3</td><td>COM+</td><td>Gray</td></tr> <tr><td>4</td><td>COM-</td><td>Pink</td></tr> <tr><td>5</td><td>Muting Output A</td><td>Black</td></tr> <tr><td>6</td><td>Muting Output B</td><td>White</td></tr> <tr><td>7</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>8</td><td>CFG Out</td><td>Red</td></tr> </table>	1	Mute Enable / CFG In / Reset	Yellow	2	+24 VDC	Brown	3	COM+	Gray	4	COM-	Pink	5	Muting Output A	Black	6	Muting Output B	White	7	0 VDC	Blue	8	CFG Out	Red	F39-JG3A-D
	1		Mute Enable / CFG In / Reset	Yellow																							
	2		+24 VDC	Brown																							
	3		COM+	Gray																							
	4		COM-	Pink																							
5	Muting Output A	Black																									
6	Muting Output B	White																									
7	0 VDC	Blue																									
8	CFG Out	Red																									
7 m	F39-JG7A-D																										
10 m	F39-JG10A-D																										
15 m	F39-JG15A-D																										
20 m	F39-JG20A-D																										


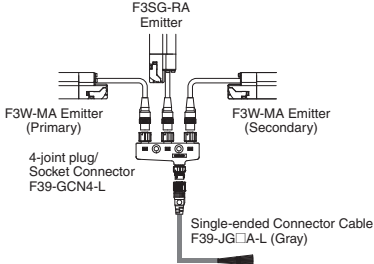

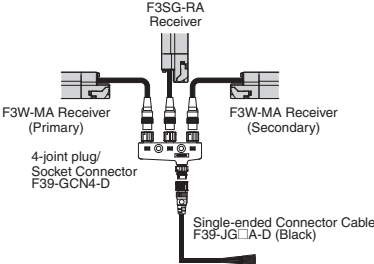

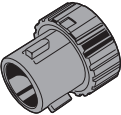


##### Double-ended Cable

Appearance	Type	Cable length	Specifications	Model															
	M12 connector (5-pin) on both ends Color: Gray	0.5 m	<table border="1"> <tr><td>1</td><td>Brown</td></tr> <tr><td>2</td><td>Blue</td></tr> <tr><td>3</td><td>Black</td></tr> <tr><td>4</td><td>White</td></tr> <tr><td>5</td><td>Yellow</td></tr> </table>	1	Brown	2	Blue	3	Black	4	White	5	Yellow	F39-JGR5B-L					
		1		Brown															
		2		Blue															
		3		Black															
		4		White															
		5		Yellow															
		1 m		F39-JG1B-L															
		3 m		F39-JG3B-L															
	5 m	F39-JG5B-L																	
	7 m	F39-JG7B-L																	
	10 m	F39-JG10B-L																	
	15 m	F39-JG15B-L																	
	20 m	F39-JG20B-L																	
	M12 connector (8-pin) on both ends Color: Black	0.5 m	<table border="1"> <tr><td>2</td><td>Brown</td></tr> <tr><td>7</td><td>Blue</td></tr> <tr><td>5</td><td>Black</td></tr> <tr><td>6</td><td>White</td></tr> <tr><td>1</td><td>Yellow</td></tr> <tr><td>8</td><td>Red</td></tr> <tr><td>3</td><td>Gray</td></tr> <tr><td>4</td><td>Pink</td></tr> </table>	2	Brown	7	Blue	5	Black	6	White	1	Yellow	8	Red	3	Gray	4	Pink
2		Brown																	
7		Blue																	
5		Black																	
6		White																	
1		Yellow																	
8	Red																		
3	Gray																		
4	Pink																		
1 m	F39-JG1B-D																		
3 m	F39-JG3B-D																		
5 m	F39-JG5B-D																		
7 m	F39-JG7B-D																		
10 m	F39-JG10B-D																		





# F3W-MA

## 4-Joint Plug/Socket Connector

Used for reduced wiring for connecting F3W-MA with F3SG-RA.

Appearance	Type	Specifications	Model
	For emitter M12 connectors. Used for reduced wiring.		<b>F39-GCN4-L</b>
	For receiver(PNP output) M12 connectors. Used for reduced wiring.		<b>F39-GCN4-D</b>
	Includes one each of F39-GCN4-L and F39-GCN4-D	—	<b>F39-GCN4</b>
	Water-resistive Cover for 4-Joint Plug/Socket Connector	<p>Water-resistive cover for an F39-GCN4-L/-D 4-Joint Plug/Socket Connector. You can use this when the MA2 connector part is not used.</p> <p>Material: PBT IP67 rated when attached. Smart click mechanism.</p>	<b>XS5Z-11</b>
	Dust Cover for 4-Joint Plug/Socket Connector	<p>Dust cover for an F39-GCN4-L/-D 4-Joint Plug/Socket Connector. You can use this when the MA2 connector part is not used.</p> <p>Material: Rubber/black This cover does not ensure IP67 degree of protection.</p> <p>XS2Z-14: Attach to a pin block inside the M12 female screw.</p>	<b>XS2Z-14</b>
		<p>XS2Z-15: Attach to a M12 female screw.</p> <p>When attaching the cover to the connector, press the cover onto the connector until the connector is fully inserted into the cover.</p>	<b>XS2Z-15</b>

Sensor Mounting Brackets

Appearance	Specification	Application	Remarks	Model
	Standard Fixed Bracket	Bracket to mount the F3W-MA. Side mounting and backside mounting possible.	Two brackets per set	F39-LGF
	Standard Adjustable Bracket	Bracket to mount the F3W-MA. Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$ . Side mounting and backside mounting possible.	Two brackets per set	F39-LGA
	F3W-MA Bracket	Bracket to fix the F3W-MA to the F3SG-RA. F39-LGMAL: L-shaped configuration F39-LGMAT: T-shaped configuration Beam alignment after mounting possible. When using the F3W-MA Bracket, it is necessary to add an extra Standard Adjustable Bracket (F39-LGA) to the F3SG-RA. * Please also purchase Standard Adjustable Bracket (F39-LGA).	Two brackets per set	F39-LGMAL
				F39-LGMAT

**Note:** When mounting an F3W-MA0300P in the L-shaped configuration, the shock resistance becomes as follows.


Shock resistance: 50 m/s<sup>2</sup>, 1000 shocks for all 3 axes

For mounting an F3W-MA0300P under a shock environment exceeding this, the F3W-MA Bracket cannot be used. Use a Standard Adjustable Bracket (F39-LGA).

\* When using F39-LGMA□, there are some restrictions on the brackets to mount the F3SG-RA. This bracket is not usable together with F39-LGF. When using together with F39-LGA, the F3SG-RA must be 270 mm or longer. When using together with F39-LGTB, the F3SG-RA must be 400 mm or longer. An extra F39-LGA is required for reinforcement, depending on the mounting position of the F39-LGMA□. Refer to "Dimensions" on page 100 for details.

# F3W-MA

## Ratings/Specifications

		F3W-MA0100P	F3W-MA0300P	
Performance	Beam Gap between Muting Trigger Beams	100mm	300mm	
	Number of Beams	8	20	
	Standard Detection Object	30mm		
	Operating Range	Long	0.3 to 20.0 m (1 to 65 ft.)	
		Short	0.3 to 7.0 m (1 to 23 ft.)	
	Response Time	Operation	13 ms max.	
		Reset	26 ms max. (Synchronized) 78 ms max. (Not synchronized)	
	Effective Aperture Angle	±2.5° 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	Emitter	35mA	45mA
		Receiver	75mA	75mA
	Muting Outputs	Two PNP transistor outputs. * Load current of 300 mA max., Residual voltage of 2 V max. (except for voltage drop due to cable extension))		
		* This product is a PNP output model. Use with the PNP output model safety light curtain.		
	Output Operation Mode	Muting Output A	Dark-ON (Muting Output A is enabled when MuteA trigger beam is blocked.)	
		Muting Output B	Dark-ON (Muting Output B is enabled when MuteB trigger beam is blocked.)	
	Input Voltage	ON Voltage	[MuteEnable] Vs to Vs-3 V (sink current 5 mA max.) *	
		OFF Voltage	[Mute Enable] 0 to 1/2 Vs, or open *	
		* The Vs indicates a supply voltage value in your environment.		
Indicators	 Refer to page 89. LED Indicator Status			
Protective Circuit	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	Functions	<ul style="list-style-type: none"> <li>- Scan Code Selection</li> <li>- Operation Mode Selection (Point to Point Detection/ Chattering and Void Space Prevention)</li> <li>- Off-Delay</li> <li>- Muting Enable</li> <li>- Muting Trigger Beam Allocation</li> <li>- Operating Range Selection</li> </ul>		
Environmental	Ambient Temperature	Operating	-10 to 55°C (13 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 and 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 <sup>2</sup> , 1000 shocks for all 3 axes			
Pollution Degree (IEC 60664-1)	Pollution Degree 3			
Connections	Extension of Power Cable	100 m max. Note: For T-Shaped configuration with COM lines, the length of cable extension is 30m max.		
Material	Housing: Aluminum, Cap: PBT, Front Window: PMMA, Cable: Oil resistant PVC, FE plate: SUS			
Weight (packaged)	1.8 kg max.	2.8 kg max.		
Included Accessories	Instruction Sheet			

## LED Indicator Status

Shown below are indication statuses of F3W-MA LED indicators when you purchased.

### Emitter

Name of Indicator		Color	Illuminated	Blinking
Operating range	LONG	Green	Long Range mode is selected by DIP Switch.	-
Running	RUN	Green	Power is ON.	-
Error	ERR	Red	-	Error in emitter. Generic error happens.

### Receiver

Name of Indicator		Color	Illuminated	Blinking
Top-beam-state	TOP	Blue	The top beam is unblocked.	-
Muting output A	MUTE A	Green	Muting Output A is activated.	-
Muting output B	MUTE B	Green	Muting Output B is activated.	-
Off-Delay	DELAY	Yellow	Off-Delay function is enabled by DIP Switch.	-
Chattering/ Void space	CHAT	Green	Chattering and Void Space Prevention mode is selected by DIP Switch.	-
Muting Enable	MUTE DISABLE	Red	The Muting Enable function is enabled and Muting Enable input is turned OFF by DIP Switch.	-
Error	ERR	Red	-	Error in receiver. Generic error happens.
Stable-state	STB	Green	Incident light level is 170% or higher of ON-threshold	-
Running	RUN	Green	Power is ON.	-
Communication	COM	Green	Synchronization between emitter and receiver is maintained.	[Primary sensor] - Start-up (for approx. 3 s) - Synchronization between emitter and receiver is lost
Bottom-beamstate	BTM	Blue	The bottom beam is unblocked.	-

# F3W-MA

## Wiring Examples

### Standard Muting Mode with F3SG-R (T-Shaped Configuration with COM lines)

The following is the example of F3W-MA with Scan Code B, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable Disabled.

#### DIP Switch settings \*1

		Function	DIP-SW1	DIP-SW2 *2
F3W-MA Primary	Receiver	Scan Code B (factory default setting)	1 <input checked="" type="checkbox"/> ON	1 <input checked="" type="checkbox"/> ON
		Chattering and Void Space Prevention 1	2 <input checked="" type="checkbox"/> ON 3 <input checked="" type="checkbox"/> ON	2 <input checked="" type="checkbox"/> ON 3 <input checked="" type="checkbox"/> ON
		Off-Delay 100 ms	4 <input checked="" type="checkbox"/> ON 5 <input checked="" type="checkbox"/> ON	4 <input checked="" type="checkbox"/> ON 5 <input checked="" type="checkbox"/> ON
		Muting Enable Disabled (factory default setting)	6 <input checked="" type="checkbox"/> ON	6 <input checked="" type="checkbox"/> ON
	Emitter	Scan Code B (factory default setting)	1 <input checked="" type="checkbox"/> ON	-
F3W-MA Secondary	Receiver Emitter	-	No setting required	No setting required

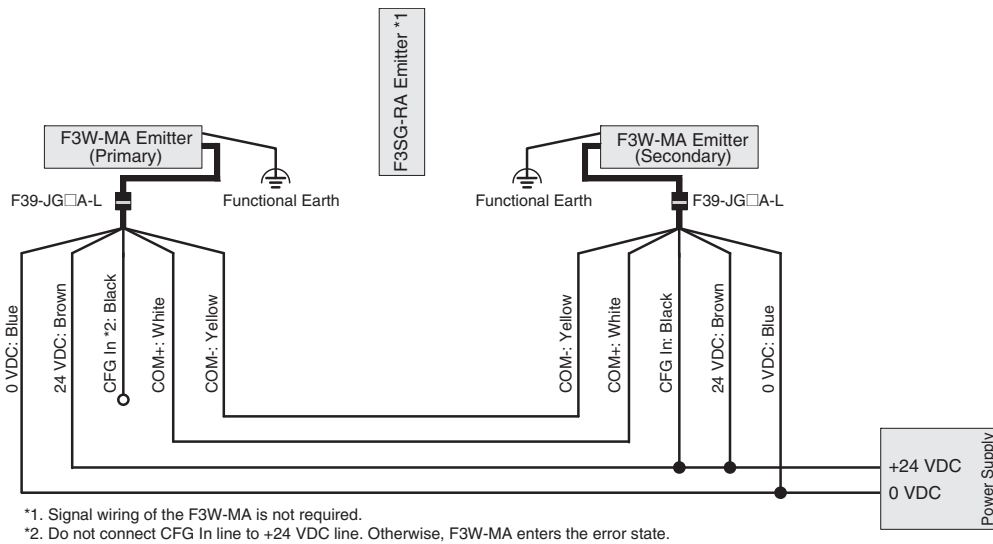
: Indicates a switch position.

\*1. Configure functions with the DIP Switches before wiring. Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.

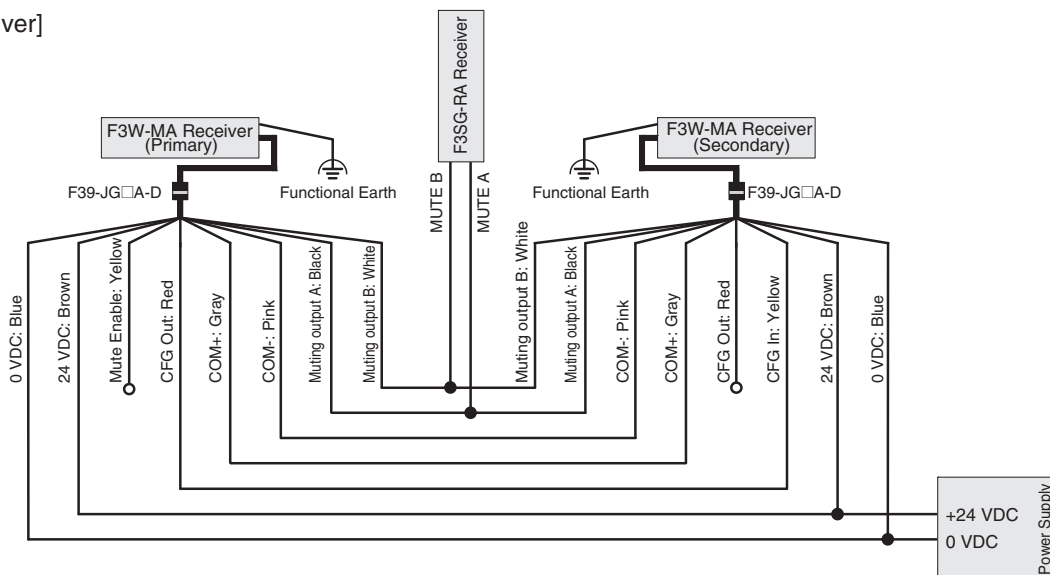
\*2. DIP Switch Bank 2 is not used.

#### Wiring example

[Emitter]



[Receiver]



**Note:** The wiring examples in later pages do not indicate functional earth. To use functional earth, wire an earth cable according to the example above. Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.

## Standard Muting Mode with F3SG-R (T-Shaped Configuration with 4-Joint Connector)

The following is the example of F3SG-RA with Scan Code B, External Device Monitoring disabled, Auto Reset mode, PNP output and External Test in 24 V Active, and F3W-MA with Scan Code A, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable disabled.

### DIP Switch settings\*1

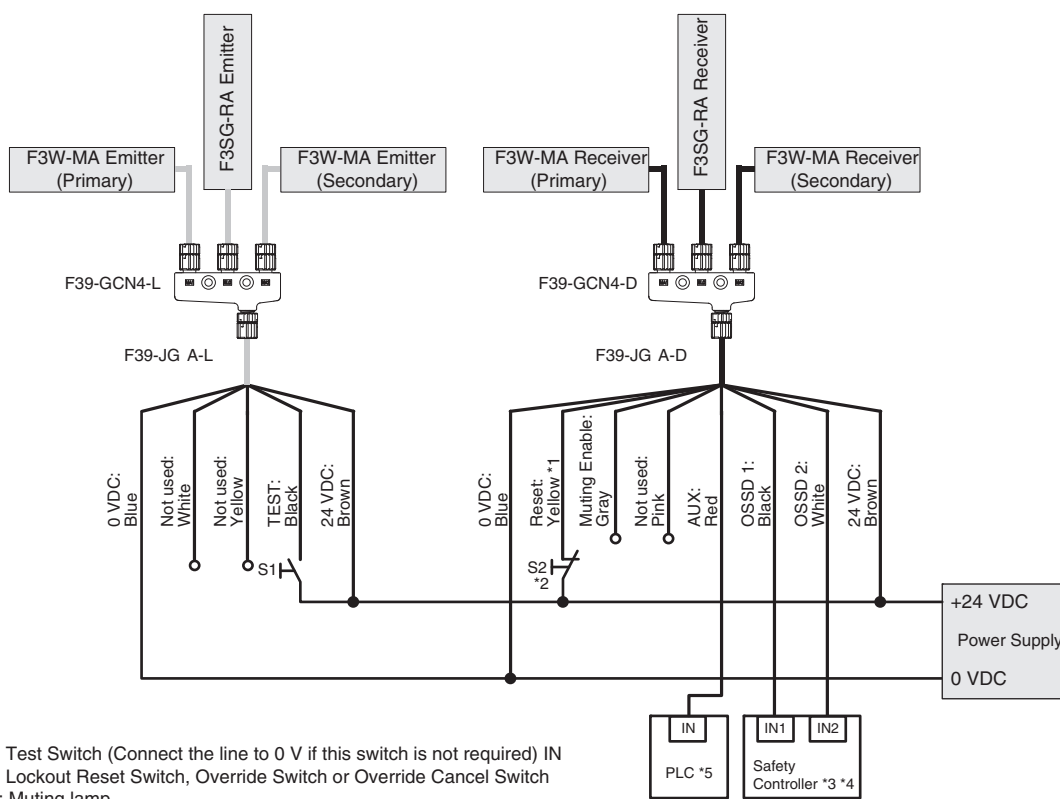
		Function	DIP-SW1	DIP-SW2
F3SG-RA	Receiver	Scan Code B	1 <input type="checkbox"/> ON	1 <input type="checkbox"/> ON
		EDM Disabled (factory default setting)	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON
		Auto Reset (factory default setting)	3 <input type="checkbox"/> ON	3 <input type="checkbox"/> ON
			4 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON
	PNP (factory default setting)	7 <input type="checkbox"/> ON	7 <input type="checkbox"/> ON	
		Emitter	Scan Code B	1 <input type="checkbox"/> ON
External Test: 24 V Active (factory default setting)	4 <input type="checkbox"/> ON		-	
F3W-MA Primary	Receiver	Scan Code A	1 <input type="checkbox"/> ON	1 <input type="checkbox"/> ON*2
		Chattering and Void Space Prevention 1	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON*2
			3 <input type="checkbox"/> ON	3 <input type="checkbox"/> ON*2
			4 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON*2
		Off-Delay 100 ms	5 <input type="checkbox"/> ON	5 <input type="checkbox"/> ON*2
	Muting Enable Disabled (factory default setting)	6 <input type="checkbox"/> ON	6 <input type="checkbox"/> ON*2	
Emitter	Scan Code A	1 <input type="checkbox"/> ON	-	
F3W-MA Secondary	Receiver Emitter	-	No setting required	No setting required

: Indicates a switch position.

\*1. Configure functions with the DIP Switches before wiring. For the DIP Switch of the F3W-MA, refer to *Smart Muting Actuator F3W-MA Series User's Manual*. For the DIP Switch of the F3SG-RA, refer to the *Safety Light Curtain F3SG-R Series User's Manual*.

\*2. DIP Switch Bank 2 of F3W-MA receiver is not used.

### Wiring example



S1: Test Switch (Connect the line to 0 V if this switch is not required) IN  
S2: Lockout 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 page 34, *Connectable Safety Control Units* for more information.

\*4. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.

\*5. When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.



## Exit-Only Muting Mode with F3SG-R (L-Shaped Configuration)

The following is the example of F3W-MA with Scan Code A, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable enabled.

### DIP Switch settings\*1

		Function	DIP-SW1	DIP-SW2 *2
F3W-MA	Receiver	Scan Code A	1 <input type="checkbox"/> ON	1 <input checked="" type="checkbox"/> ON
		Chattering and Void Space Prevention 1	2 <input type="checkbox"/> ON 3 <input checked="" type="checkbox"/> ON	2 <input type="checkbox"/> ON 3 <input checked="" type="checkbox"/> ON
		Off-Delay 100 ms	4 <input type="checkbox"/> ON 5 <input checked="" type="checkbox"/> ON	4 <input type="checkbox"/> ON 5 <input checked="" type="checkbox"/> ON
		Muting Enable Enabled	6 <input type="checkbox"/> ON	6 <input checked="" type="checkbox"/> ON
	Emitter	Scan Code A	1 <input type="checkbox"/> ON	-

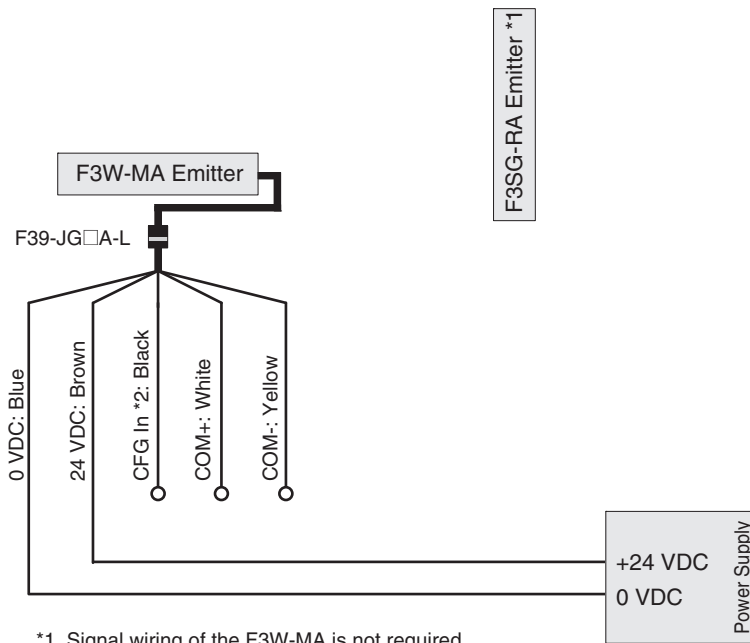
: Indicates a switch position.

\*1. Configure functions with the DIP Switches before wiring. Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.

\*2. DIP Switch Bank 2 is not used.

### Wiring example

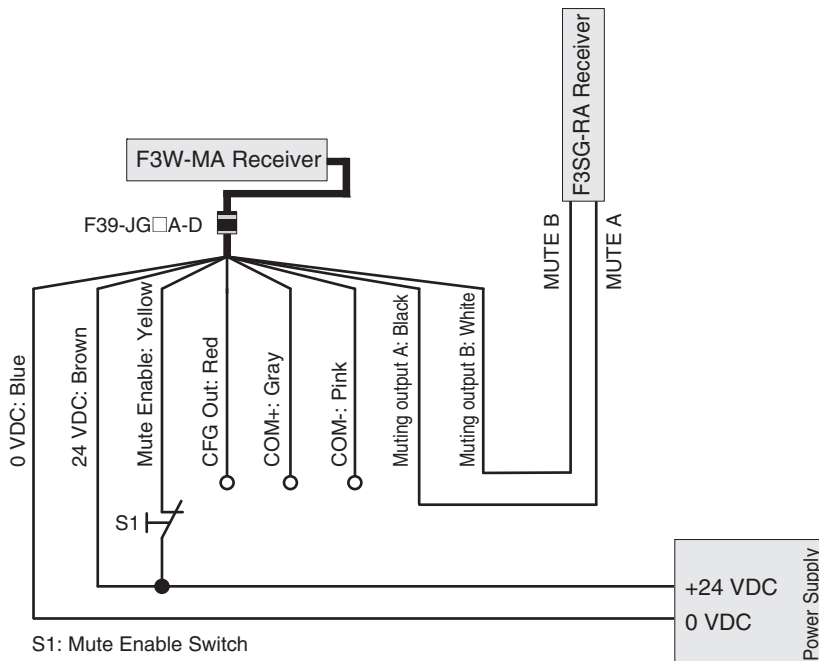
[Emitter]



\*1. Signal wiring of the F3W-MA is not required.

\*2. Do not connect CFG In line to +24 VDC line. Otherwise, F3W-MA enters the error state.

[Receiver]



S1: Mute Enable Switch

## Exit-Only Muting Mode with F3SG-R (L-Shaped Configuration with 4-Joint Connector)

The following is the example of F3SG-RA with Scan Code A, External Device Monitoring disabled, Auto Reset mode, PNP output and External Test in 24 V Active, and F3W-MA with Scan Code B, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable enabled.

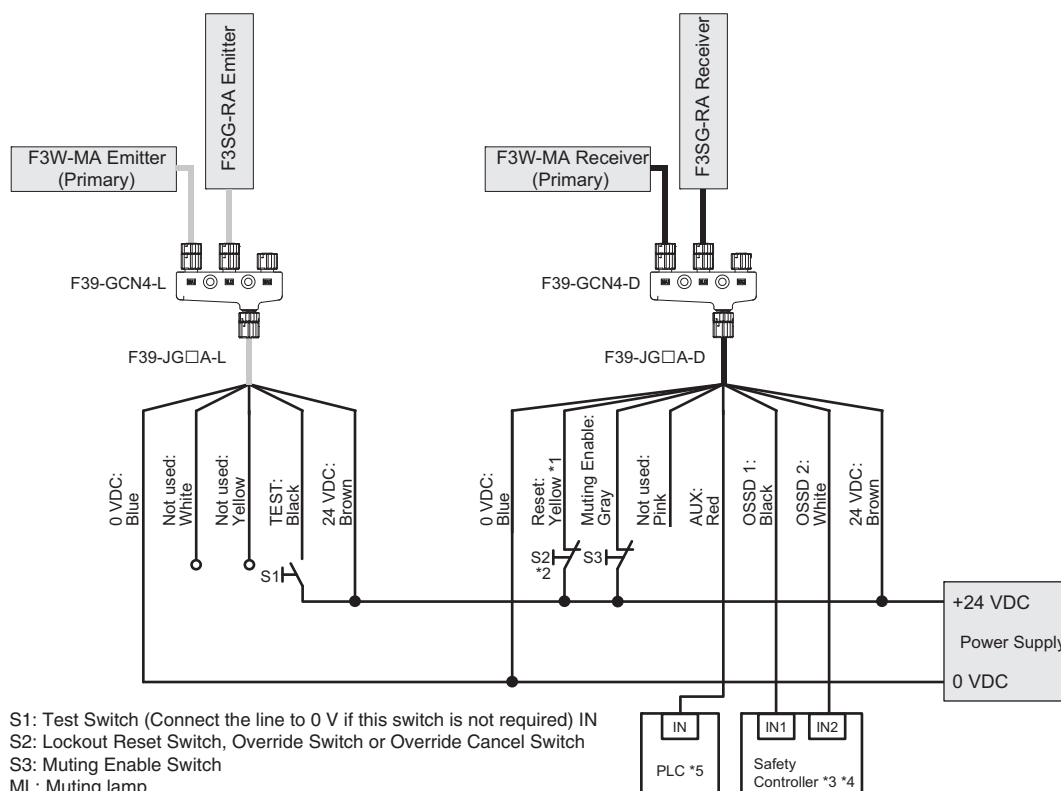
### DIP Switch settings\*1

		Function	DIP-SW1	DIP-SW2
F3SG-RA	Receiver	Scan Code A (factory default setting)	1 <input type="checkbox"/> ON	1 <input type="checkbox"/> ON
		EDM Disabled (factory default setting)	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON
		Auto Reset (factory default setting)	3 <input type="checkbox"/> ON	3 <input type="checkbox"/> ON
			4 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON
	PNP (factory default setting)	7 <input type="checkbox"/> ON	7 <input type="checkbox"/> ON	
Emitter	Scan Code A (factory default setting)	1 <input type="checkbox"/> ON	-	
	External Test: 24 V Active (factory default setting)	4 <input type="checkbox"/> ON	-	
F3W-MA	Receiver	Scan Code B (factory default setting)	1 <input type="checkbox"/> ON	1 <input type="checkbox"/> ON*2
		Chattering and Void Space Prevention 1	2 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON*2
			3 <input type="checkbox"/> ON	3 <input type="checkbox"/> ON*2
			4 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON*2
		Off-Delay 100 ms	5 <input type="checkbox"/> ON	5 <input type="checkbox"/> ON*2
	Muting Enable Enabled	6 <input type="checkbox"/> ON	6 <input type="checkbox"/> ON*2	
Emitter	Scan Code B (factory default setting)	1 <input type="checkbox"/> ON	-	

: Indicates a switch position.

\*1. Configure functions with the DIP Switches before wiring. For the DIP Switch of the F3W-MA, refer to *Smart Muting Actuator F3W-MA Series User's Manual*. For the DIP Switch of the F3SG-RA, refer to the *Safety Light Curtain F3SG-R Series User's Manual*.  
 \*2. DIP Switch Bank 2 of F3W-MA receiver is not used.

### Wiring example



\*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 34, *Connectable Safety Control Units* for more information.

\*4. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.

\*5. When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.

## Standard Muting Mode with Other Safety Component (T-Shaped Configuration)

The following is the example of F3W-MA-1 with Scan Code A, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable enabled, and F3W-MA-2 with Scan Code B, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable enabled.

### DIP Switch settings\*1

		Function	DIP-SW1	DIP-SW2 *2
F3W-MA-1	Receiver	Scan Code A	1 <input type="checkbox"/> ON	1 <input type="checkbox"/> ON
		Chattering and Void Space Prevention 1	2 <input type="checkbox"/> ON 3 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON 3 <input type="checkbox"/> ON
		Off-Delay 100 ms	4 <input type="checkbox"/> ON 5 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON 5 <input type="checkbox"/> ON
		Muting Enable Enabled	6 <input type="checkbox"/> ON	6 <input type="checkbox"/> ON
	Emitter	Scan Code A	1 <input type="checkbox"/> ON	-
F3W-MA-2	Receiver	Scan Code B (factory default setting)	1 <input type="checkbox"/> ON	1 <input type="checkbox"/> ON
		Chattering and Void Space Prevention 1	2 <input type="checkbox"/> ON 3 <input type="checkbox"/> ON	2 <input type="checkbox"/> ON 3 <input type="checkbox"/> ON
		Off-Delay 100 ms	4 <input type="checkbox"/> ON 5 <input type="checkbox"/> ON	4 <input type="checkbox"/> ON 5 <input type="checkbox"/> ON
		Muting Enable Enabled	6 <input type="checkbox"/> ON	6 <input type="checkbox"/> ON
	Emitter	Scan Code B (factory default setting)	1 <input type="checkbox"/> ON	-

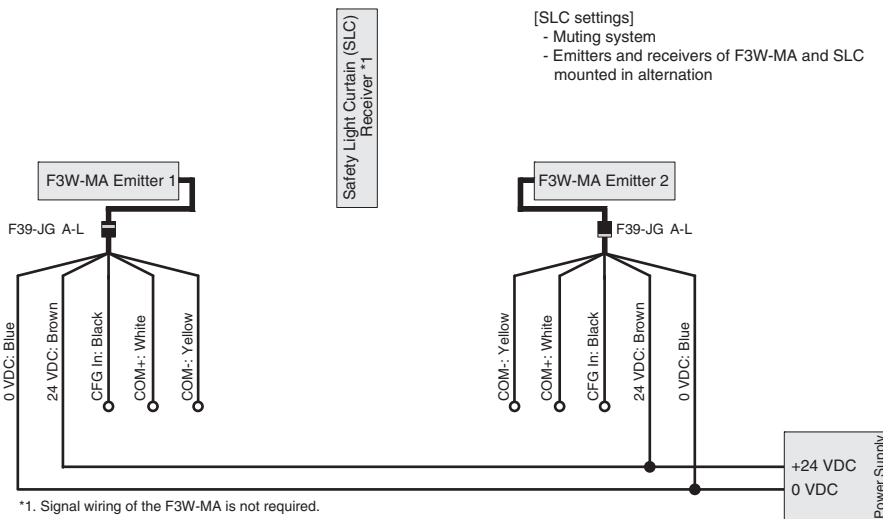
: Indicates a switch position.

\*1. Configure functions with the DIP Switches before wiring. For the DIP Switch of the F3W-MA, refer to *Smart Muting Actuator F3W-MA Series User's Manual*. For the DIP Switch of the F3SG-RA, refer to the *Safety Light Curtain F3SG-R Series User's Manual*.

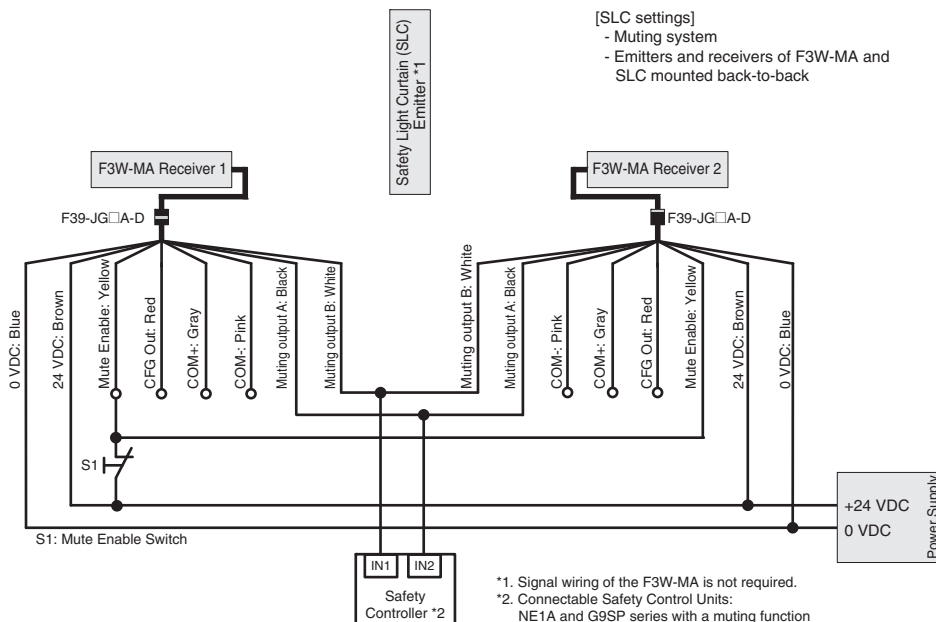
\*2. DIP Switch Bank 2 is not used.

### Wiring example

[Emitter]

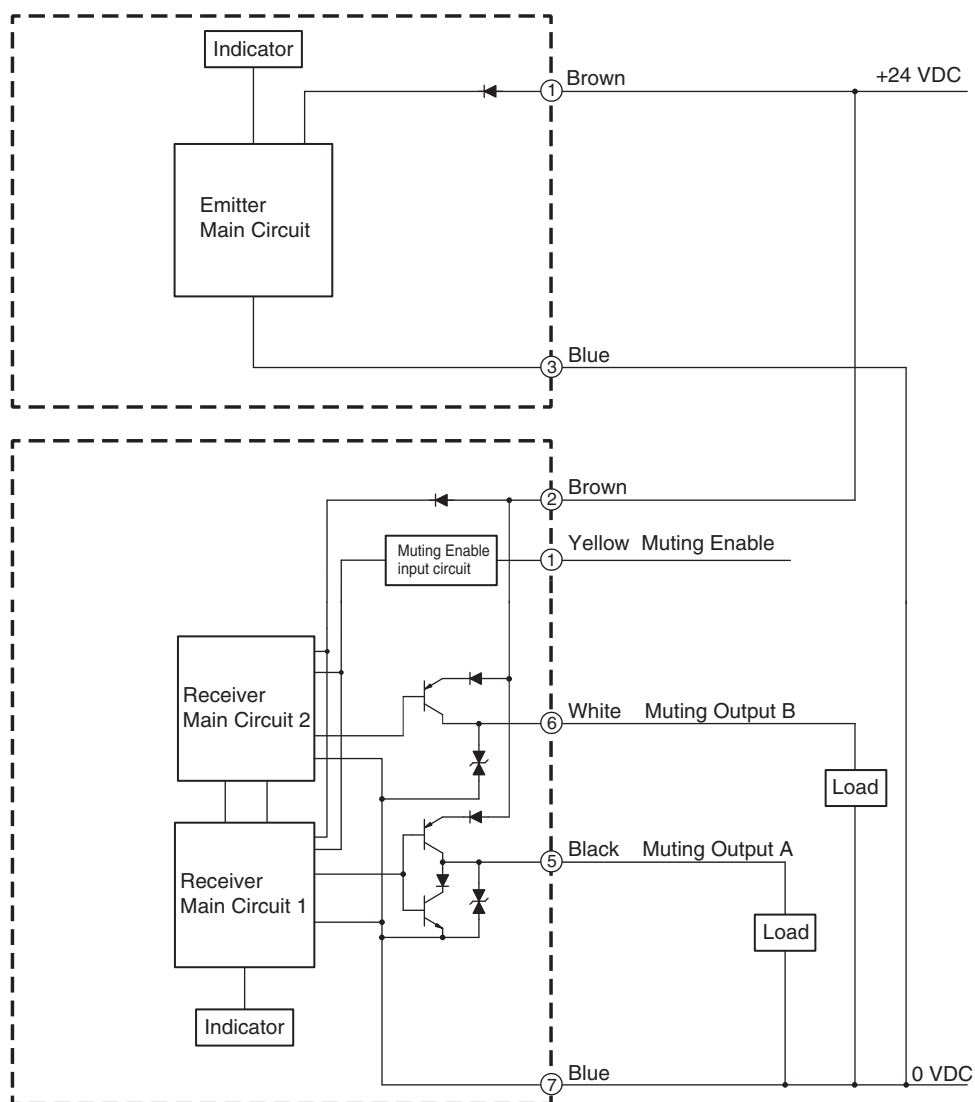


[Receiver]

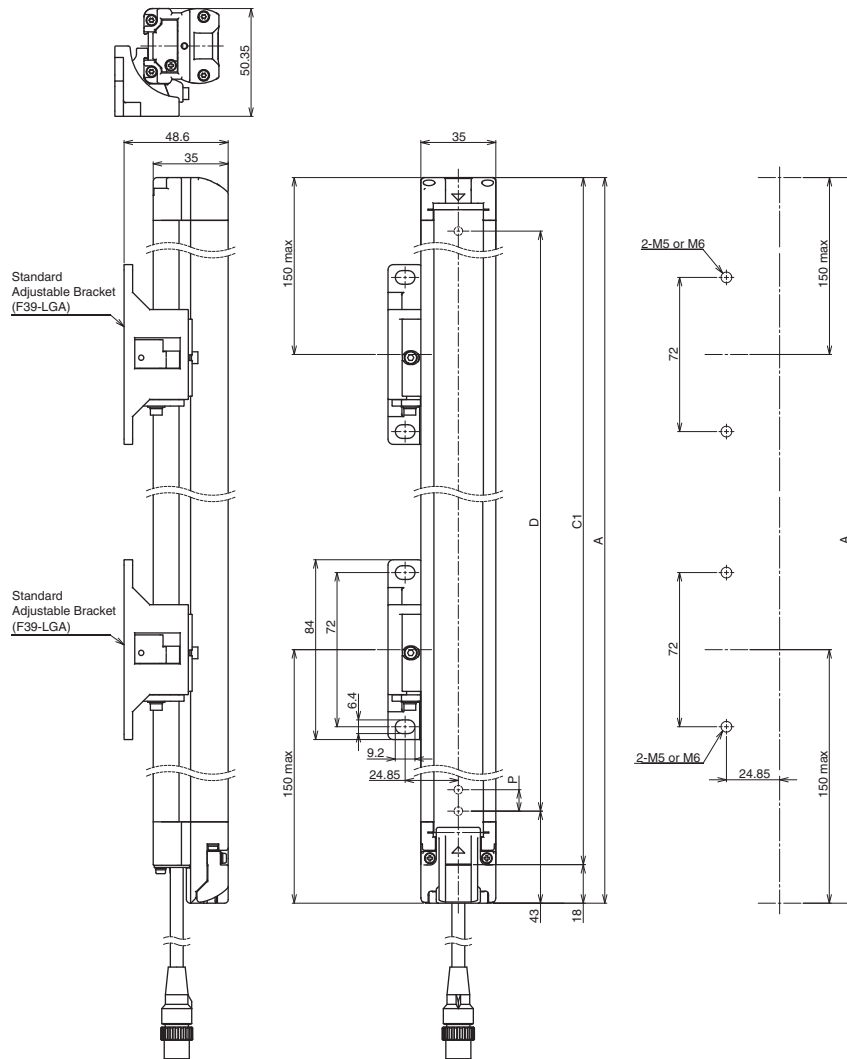


# Input/Output Circuit

The entire circuit diagram of the F3W-MA is shown below.  
 The numbers in the circles indicate the connector's pin numbers.



Mounted with Standard Adjustable Brackets (F39-LGA)  
Backside Mounting



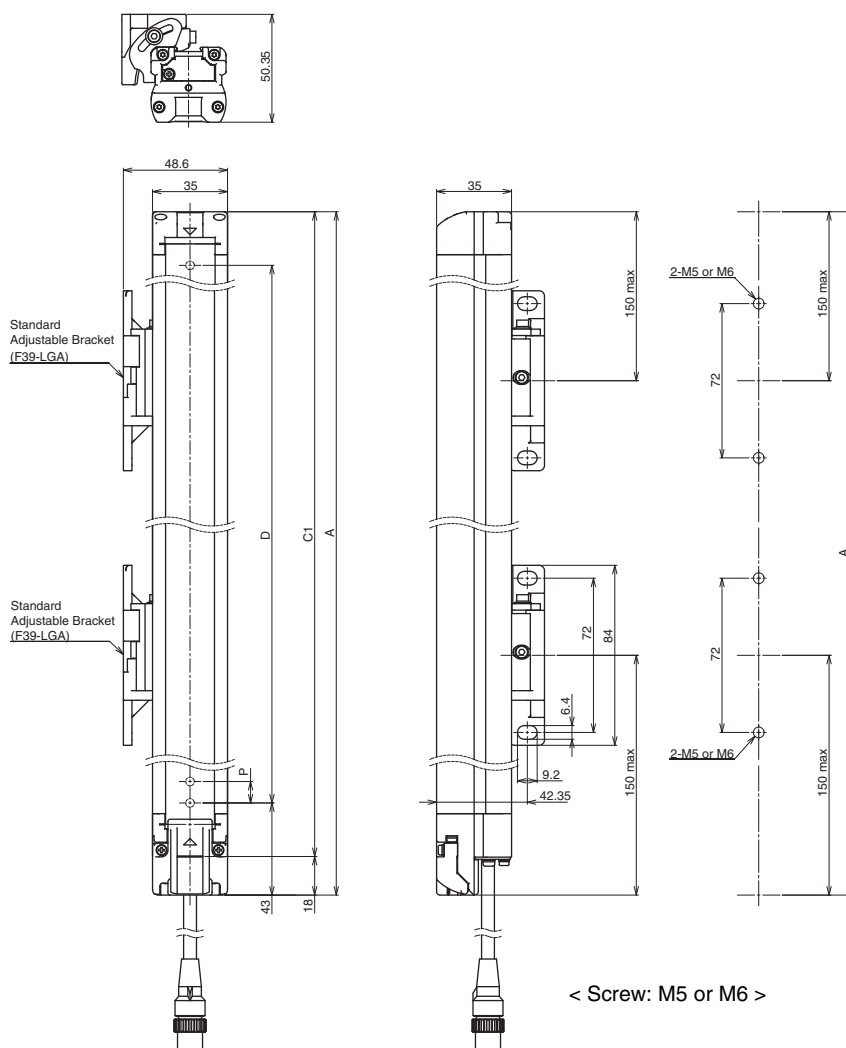
< Screw: M5 or M6 >

Model	F3W-MA0100P	F3W-MA0300P
Dimension A	208	448
Dimension C1	190	430
Dimension D	140	380
Dimension P	20	20
Number of Standard Adjustable Brackets *1	2 *2	2

\*1 The number of brackets required to mount either one of emitter and receiver.

\*2 Mounting an emitter or receiver with one bracket is possible. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

## Side Mounting

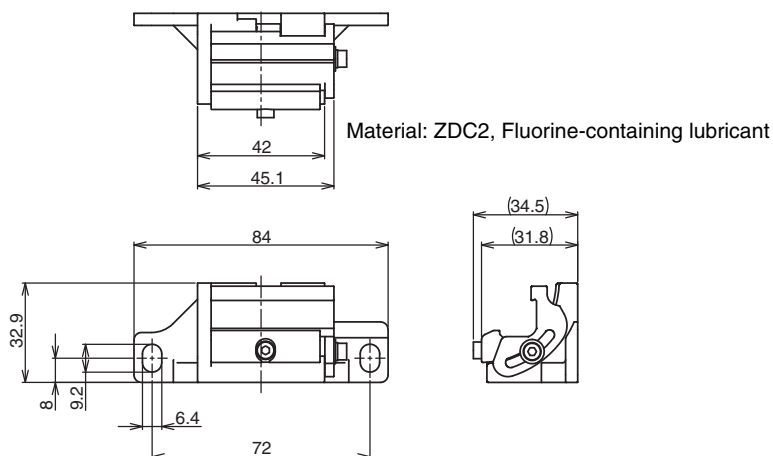


Model	F3W-MA0100P	F3W-MA0300P
Dimension A	208	448
Dimension C1	190	430
Dimension D	140	380
Dimension P	20	20
Number of Standard Adjustable Brackets *1	2 *2	2

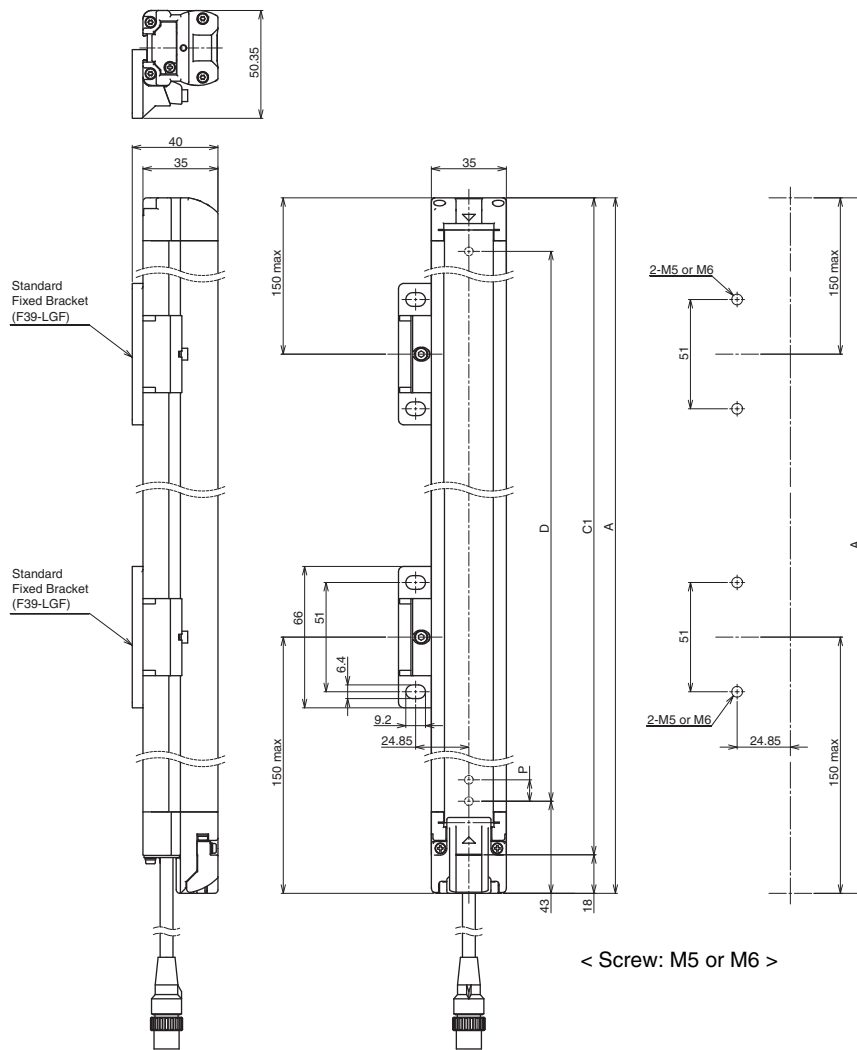
\*1 The number of brackets required to mount either one of emitter and receiver.

\*2 Mounting an emitter or receiver with one bracket is possible. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

## Standard Adjustable Bracket (F39-LGA)



## Mounted with Standard Fixed Brackets (F39-LGF) Backside Mounting

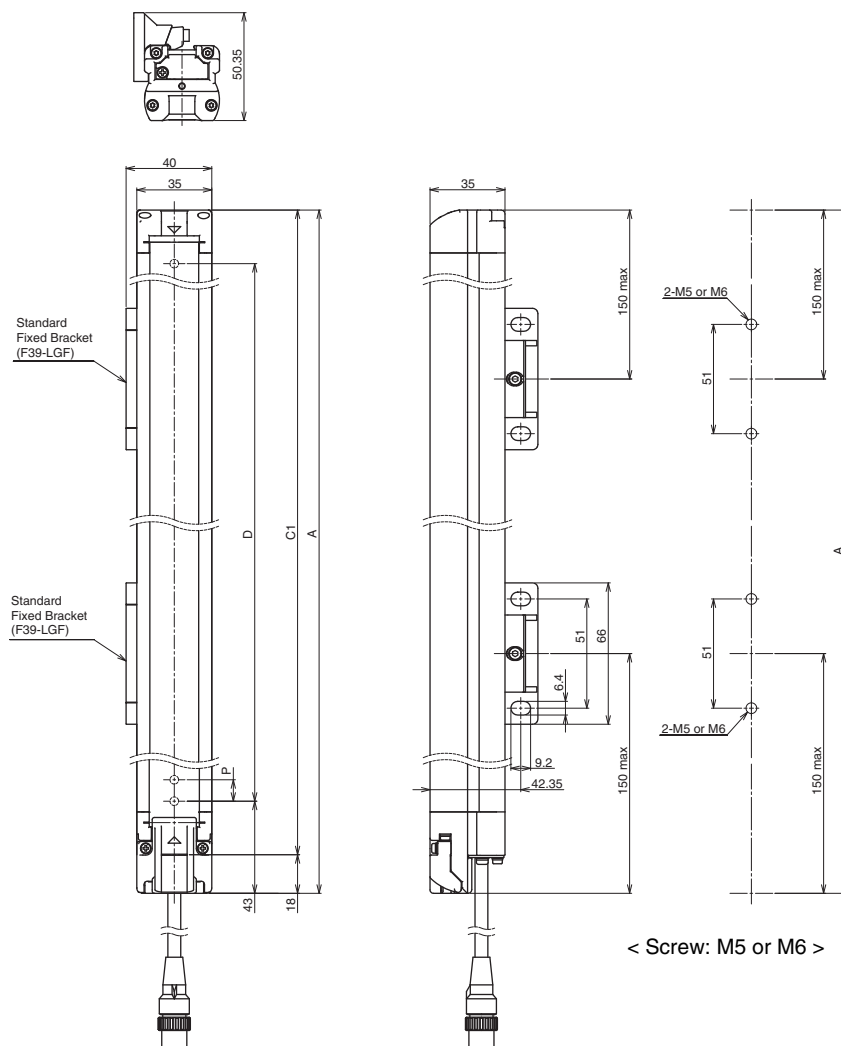


Model	F3W-MA0100P	F3W-MA0300P
Dimension A	208	448
Dimension C1	190	430
Dimension D	140	380
Dimension P	20	20
Number of Standard Fixed Brackets *1	2 *2	2

\*1 The number of brackets required to mount either one of emitter and receiver.

\*2 Mounting an emitter or receiver with one bracket is possible. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

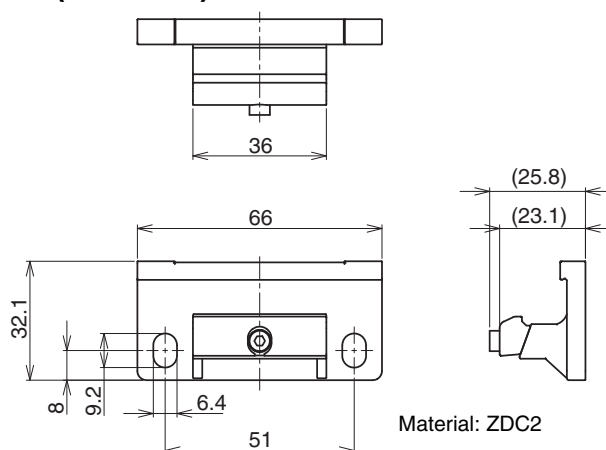
## Side Mounting



Model	F3W-MA0100P	F3W-MA0300P
Dimension A	208	448
Dimension C1	190	430
Dimension D	140	380
Dimension P	20	20
Number of Standard Fixed Brackets *1	2 *2	2

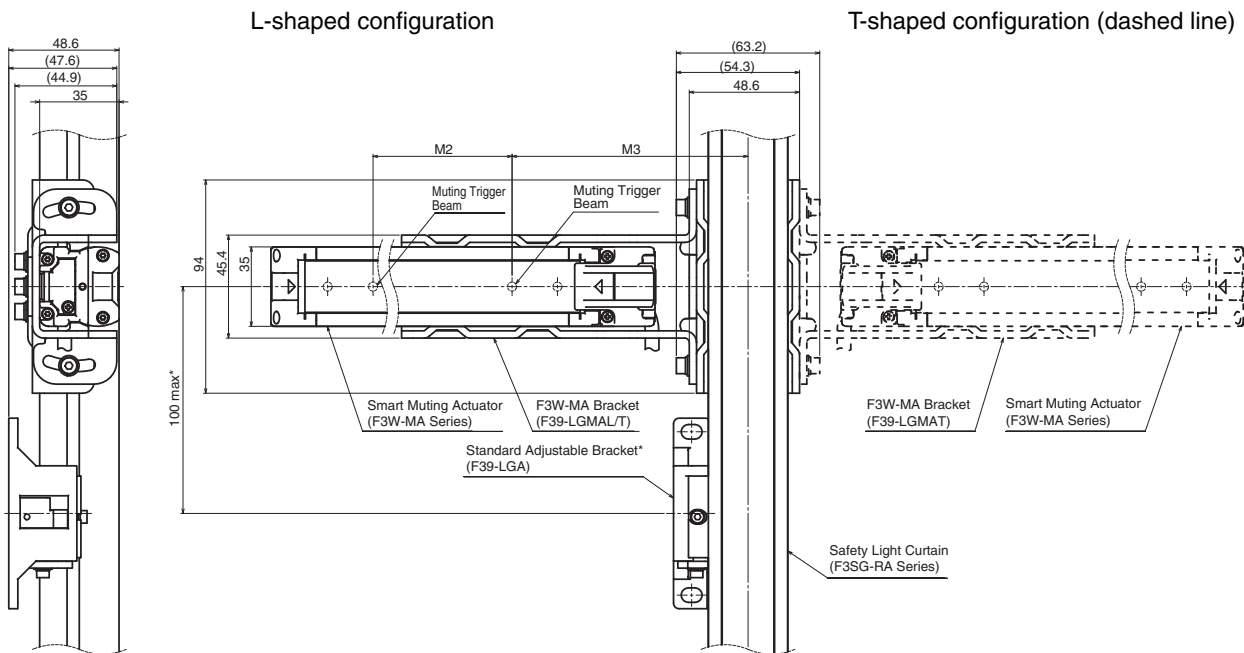
- \*1 The number of brackets required to mount either one of emitter and receiver.
- \*2 Mounting an emitter or receiver with one bracket is possible. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

## Standard Fixed Bracket (F39-LGF)





## Mounted with F3W-MA Bracket (F39-LGMA□) and Standard Adjustable Bracket (F39-LGA)



**Note:** When mounting an F3W-MA0300P in the L-shaped configuration, the shock resistance becomes as follows.

Shock resistance: 50 m/s<sup>2</sup>, 1000 shocks for all 3 axes

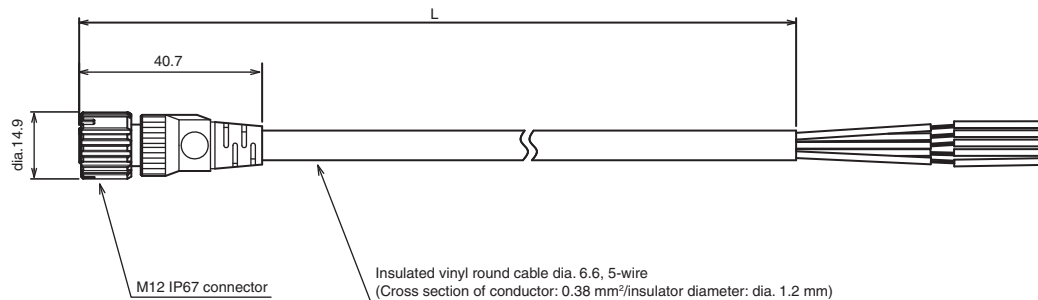
For mounting an F3W-MA0300P under a shock environment exceeding this, the F3W-MA Bracket cannot be used. Use a Standard Adjustable Bracket (F39-LGA).

\* The distance between the centers of the F3W-MA and the Standard Adjustable Bracket (F39-LGA) must be 100 mm or less. When the distance is longer than 100 mm, add an extra Standard Adjustable Bracket for reinforcement.

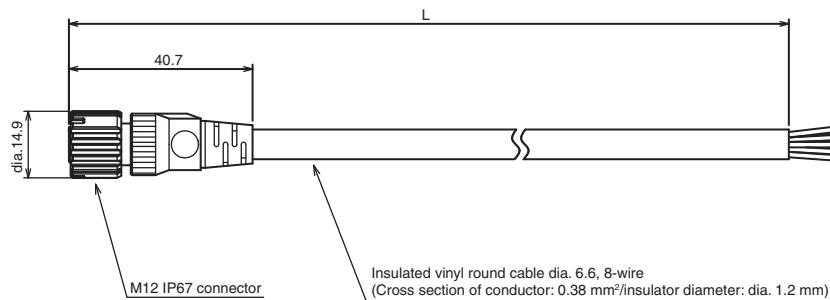
Model	F3W-MA0100P	F3W-MA0300P
Dimension M2	100	300
Dimension M3	104	124

### Accessories

#### Single-Ended Cable for Emitter (F39-JG□A-L, sold separately)

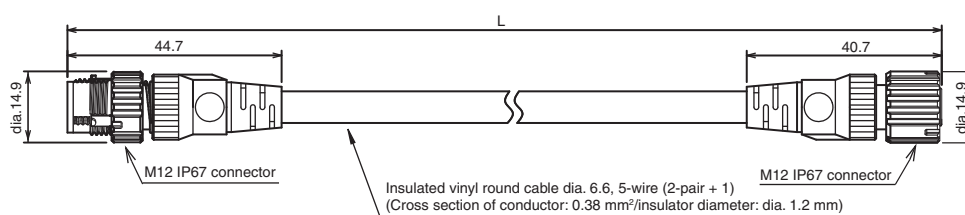


#### Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)

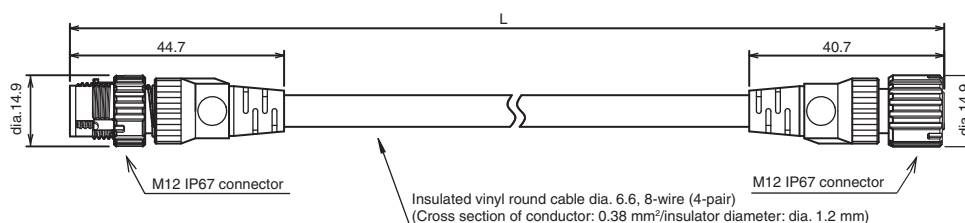


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JG3A-L	F39-JG3A-D	3
F39-JG7A-L	F39-JG7A-D	7
F39-JG10A-L	F39-JG10A-D	10
F39-JG15A-L	F39-JG15A-D	15
F39-JG20A-L	F39-JG20A-D	20

**Double-ended Cable for Emitter: Cable for extension (F39-JG□B-L, sold separately)**

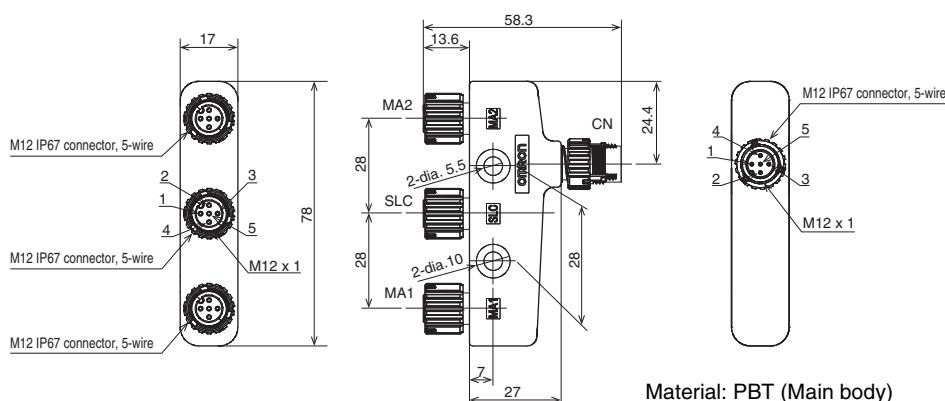


**Double-ended Cable for Receiver: Cable for extension (F39-JG□B-D, sold separately)**

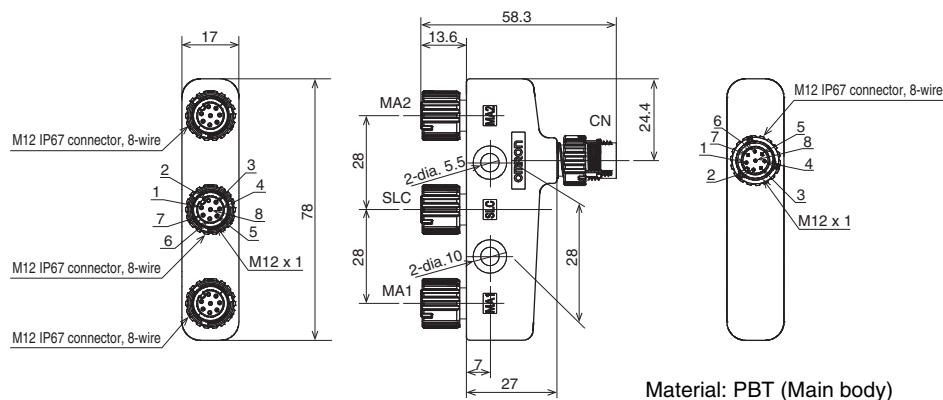


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR5B-L	F39-JGR15B-D	0.5
F39-JG1B-L	F39-JG1B-D	1
F39-JG3B-L	F39-JG3B-D	3
F39-JG5B-L	F39-JG5B-D	5
F39-JG7B-L	F39-JG7B-D	7
F39-JG10B-L	F39-JG10B-D	10
F39-JG15B-L	F39-JG15B-D	15
F39-JG20B-L	F39-JG20B-D	20

**4-Joint Plug/Socket Connector for Emitter (F39-GCN4-L, sold separately)**



**4-Joint Plug/Socket Connector for Receiver (F39-GCN4-D, sold separately)**



**Related Manuals**

ManNo.	Model	Manual name
Z355	F3W-MA	Smart Muting Actuator F3W-MA Series User's Manual

MEMO

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