



































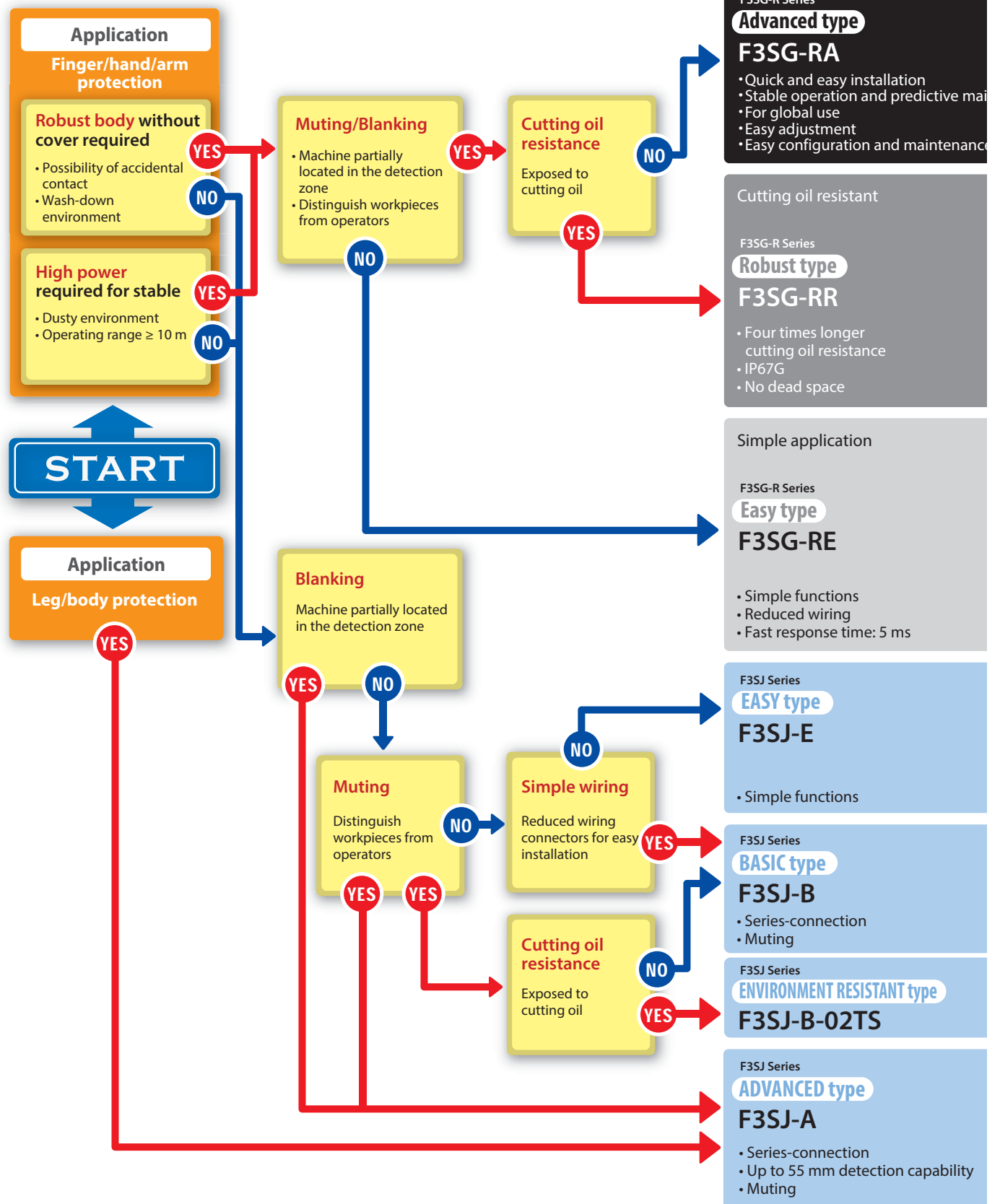







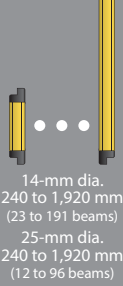

Easy type		More slim – F3SJ Series					
F3SG-RE		F3SJ-E	F3SJ-B	F3SJ-A			
<div><p>Ideal for simple applications</p></div>							
						Finger protection	Application
						Hand and arm protection	
						Body protection	
14-mm dia.	30-mm dia.	25-mm dia.	25-mm dia.	14/20/30/55-mm dia.		Detection capability	Specification
10 mm	20 mm	20 mm	20 mm	9/15/25/50 mm		Beam gap	
0.3 to 10 m	0.3 to 20 m	0.2 to 7 m	0.2 to 7 m	0.2 to 9 m *3		Operating range	
160 to 2,080 mm	190 to 2,510 mm	185 to 1,105 mm	185 to 2,065 mm	245 to 2,495 mm *3		Protective height	
15 to 207	8 to 124	8 to 54	8 to 102	Varies depending on the beam gap *3		Number of beams	
	—	—	—	—		PNP/NPN Selection	Feature
	—					External Test	
	—	—				Interlock	
	—	—	—	—		Pre-Reset	
	—	—				External Device Monitoring (EDM)	
	—	—	—			Auxiliary Output	
	—	—				Muting	
	—	—	—			Blanking	
	—	—	—	—		Reduced Resolution	
	—	—	—			Warning Zone	
	—	(Not required for wired synchronization)				Scan Code Selection	
		—	—			Operating Range Selection	
	—	—	—	—		Response Time Adjustment	
	—	—	—			Designated Beam Output	
	—	—				Cascade Connection	Connection/ wiring
		—				Reduced wiring	
	IP67	IP65	IP65	IP65		Degree of protection	Environmental resistance
	—	—	—			Lamp	Accessory
	—	—	—	—		Bluetooth communication unit	
	—	—	—	SD Manager		SD Manager2	
						Laser pointer	
Page 73		Refer to the F3SJ Series Catalog (Cat. No. F074).				More information	





\*3. Varies depending on the model.


## Flowchart for product section



	Protective height	Specifications	Brackets	Cable	Accessories (sold separately)
	 <p>14-mm dia. 160 to 2,080 mm (15 to 207 beams)</p> <p>30-mm dia. 190 to 2,510 mm (8 to 124 beams)</p>	<p><b>Detection capability</b></p> <p>14-mm dia./30-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/ 0.3 to 20 m</p>	<p><b>Accessory</b></p> <p>• Standard fixed bracket</p>  <p><b>Sold separately</b></p> <p>• Standard adjustable bracket • Top/bottom adjustable bracket • Top/bottom adjustable bracket (for user-made mounting part)</p>	<p><b>Connector</b></p> 	<p>Single/double-ended connector cable</p> <p>Cascading cable</p> <p>Reduced wiring connector</p> <p>Laser pointer</p> <p>Spatter protection cover</p> <p>Lamp</p> <p>Bluetooth communication unit</p> <p>SD Manager2</p>
<p>* The F3SG-RA-□TS has different specifications. See the following pages: F3SG-4RA-01TS: p. 93 F3SG-RA-02TS: p. 120</p> <p>See <a href="#">p.16</a> for details.</p>					


	Specifications	Brackets	Cable	Accessories (sold separately)
	 <p>14-mm dia. 240 to 1,920 mm (23 to 191 beams)</p> <p>25-mm dia. 240 to 1,920 mm (12 to 96 beams)</p>	<p><b>Detection capability</b></p> <p>14-mm dia./25-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/ 0.3 to 17 m</p>	<p><b>Sold separately</b></p> <p>• Free-Location Bracket (Intermediate Bracket) • Top/bottom Bracket (3 types)</p>	<p><b>Connector</b></p>  <p>Single/double-ended connector cable</p> <p>Cascading cable</p> <p>Reduced wiring connector</p> <p>Laser pointer</p> <p>Lamp</p> <p>Bluetooth communication unit</p> <p>SD Manager2</p>
<p>See <a href="#">p.44</a> for details.</p>				


	Specifications	Brackets	Cable	Accessories (sold separately)
	 <p>14-mm dia. 160 to 2,080 mm (15 to 207 beams)</p> <p>30-mm dia. 190 to 2,510 mm (8 to 124 beams)</p>	<p><b>Detection capability</b></p> <p>14-mm dia./30-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/ 0.3 to 20 m</p>	<p><b>Accessory</b></p> <p>• Standard fixed Bracket</p>  <p><b>Sold separately</b></p> <p>• Standard adjustable bracket • Top/bottom adjustable bracket • Top/bottom adjustable bracket (for user-made mounting part)</p>	<p><b>Connector</b></p>  <p>Single/double-ended connector cable</p> <p>Reduced wiring connector</p> <p>Laser pointer</p> <p>Spatter protection cover</p>
<p>See <a href="#">p.73</a> for details.</p>				

	Specifications
	<p><b>Detection capability</b></p> <p>25-mm dia.</p> <p><b>Beam gap</b></p> <p>20 mm</p> <p><b>Operating range</b></p> <p>0.2 to 7 m</p>

Refer to the F3SJ Series Catalog (Cat. No. F074) or visit the Omron website for details of the F3SJ Series.



	Specifications
	<p><b>Detection capability</b></p> <p>25-mm dia.</p> <p><b>Beam gap</b></p> <p>20 mm</p> <p><b>Operating range</b></p> <p>0.2 to 7 m</p>
<p>* ENVIRONMENT RESISTANT type Protective height: 225 to 1,985 mm Operating range: 0.2 to 6 m</p>	

	Specifications
	<p><b>Detection capability</b></p> <p>14-mm dia. -</p> <p><b>Beam gap</b></p> <p>9 mm -</p> <p><b>Operating range</b></p> <p>0.2 to 9 m</p>
<p>* When the minimum object resolution is 14 mm and the beam gap is 9 mm.</p>	

[www.ia.omron.com/](http://www.ia.omron.com/)

F3SJ

Search

# Safety Light Curtain Advanced type

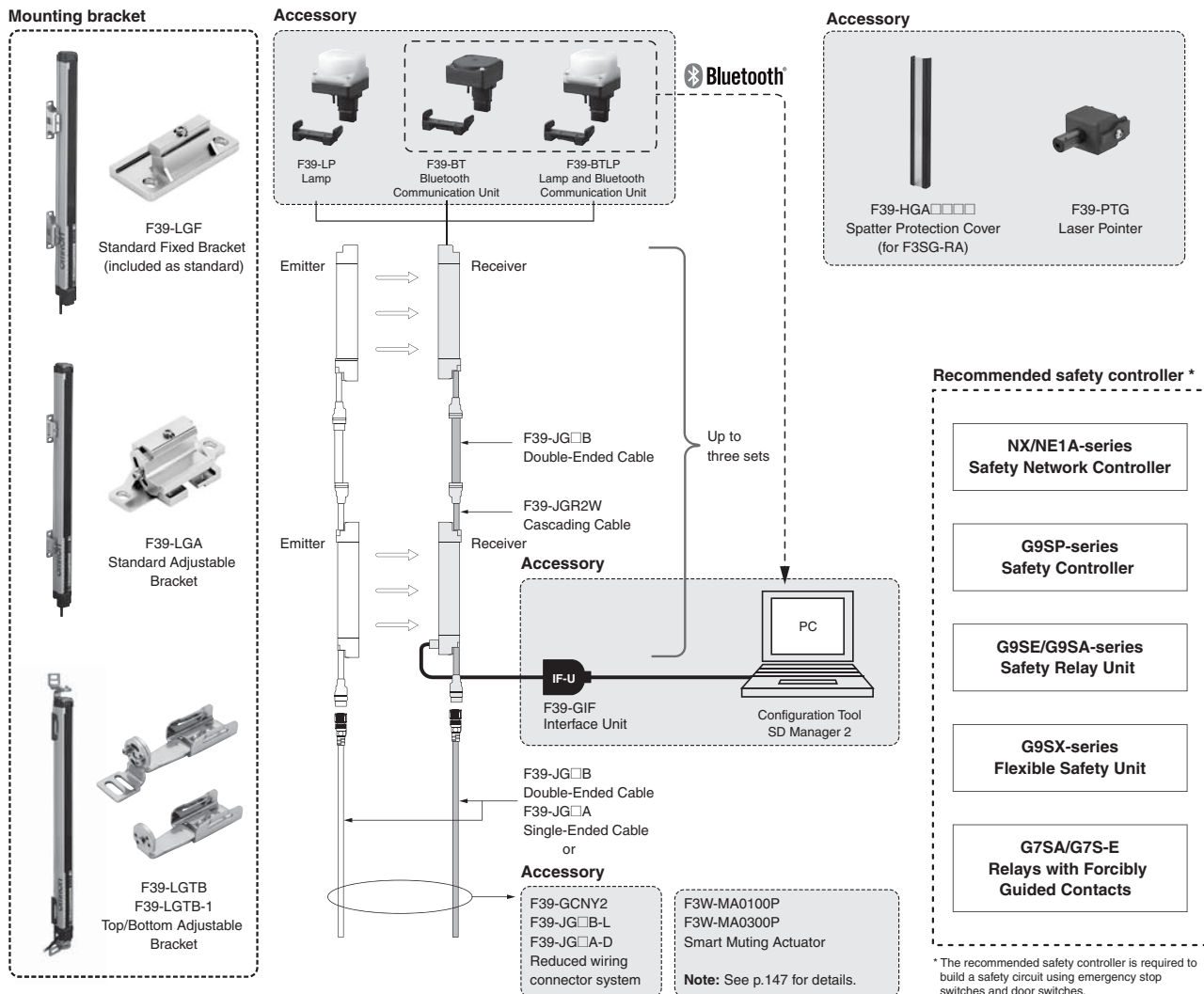
## F3SG-RA

### Offers Both Durability and Reliability

- Rugged 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/T 4584



### System Configuration



## 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	1040	F3SG-4RA1040-14
111	1120	F3SG-4RA1120-14
119	1200	F3SG-4RA1200-14
127	1280	F3SG-4RA1280-14
135	1360	F3SG-4RA1360-14
143	1440	F3SG-4RA1440-14
151	1520	F3SG-4RA1520-14
159	1600	F3SG-4RA1600-14
167	1680	F3SG-4RA1680-14
175	1760	F3SG-4RA1760-14
183	1840	F3SG-4RA1840-14
191	1920	F3SG-4RA1920-14
199	2000	F3SG-4RA2000-14
207	2080	F3SG-4RA2080-14


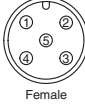
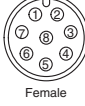
##### Hand and arm protection

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	1070	F3SG-4RA1070-30
56	1150	F3SG-4RA1150-30
60	1230	F3SG-4RA1230-30
64	1310	F3SG-4RA1310-30
68	1390	F3SG-4RA1390-30
72	1470	F3SG-4RA1470-30
76	1550	F3SG-4RA1550-30
80	1630	F3SG-4RA1630-30
84	1710	F3SG-4RA1710-30
88	1790	F3SG-4RA1790-30
92	1870	F3SG-4RA1870-30
96	1950	F3SG-4RA1950-30
100	2030	F3SG-4RA2030-30
104	2110	F3SG-4RA2110-30
108	2190	F3SG-4RA2190-30
112	2270	F3SG-4RA2270-30
116	2350	F3SG-4RA2350-30
120	2430	F3SG-4RA2430-30
124	2510	F3SG-4RA2510-30

## Accessories (Sold separately)

### Safety light curtain connecting cable

#### Single-Ended Cable \*

Appearance	Type	Cable length	Specifications	Model																							
	For emitter M12 connector (5-pin), 5 wires Color: Gray	3 m	<div>Connected to Power Cable or Double-Ended Cable</div> <div></div> <div>Female</div> <table><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	<div>Connected to Power Cable or Double-Ended Cable</div> <div></div> <div>Female</div> <table><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																										






\* A set of two Single-Ended Cables (one for emitter and one for receiver) is also available.

Model: Model number without the -L/-D at the end (F39-JG□A)

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

#### Double-Ended Cable \*

#### For cable extension and simple wiring

Appearance	Type	Cable length	Specifications	Model
	For emitter M12 connector (5-pin) on both ends Color: Gray	0.5 m	Connected to Power Cable or Double-Ended Cable  Connected to Single-Ended Cable, or Double-Ended Cable 	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	Connected to Power Cable or Double-Ended Cable  Connected to Single-Ended Cable, or Double-Ended Cable 	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

\* A set of two Double-Ended Cables (one for emitter and one for receiver) is also available.

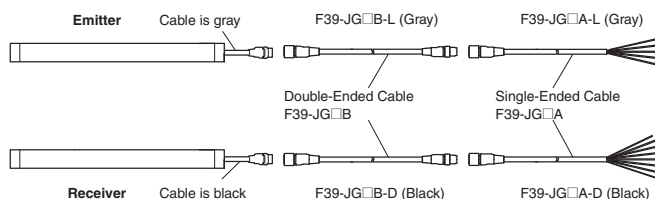
Model: Model number without the -L/-D at the end (F39-JG□B)

**Note:** To extend the cable length to more than 20 m, add the F39-JG□B Double-Ended Cable to the F39-JG□A Single-Ended Cable.

To extend the cable length to more than 40 m, add several Double-Ended Cables to the Single-Ended Cable.


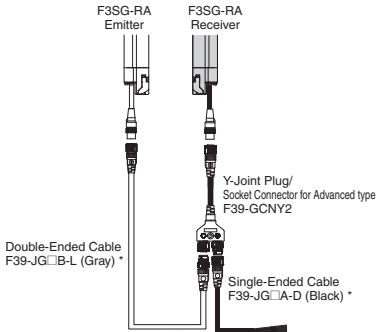
Example: To extend the cable length to 50 m, connect two F39-JG20B (20 m) cables and one F39-JG10A (10 m) cable.

#### <Connection example>




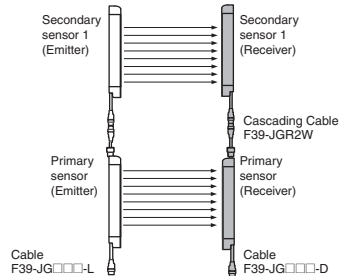
### Y-Joint Plug/Socket Connector for F3SG-4RA□□□□-14/-4RA□□□□-30

For reduced wiring

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

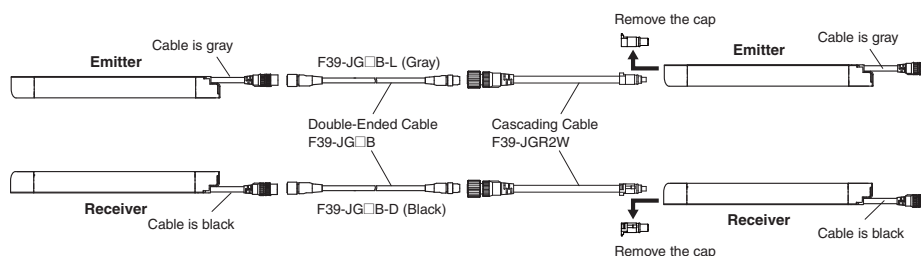
\* Order the cable for emitter (end of model: -L) and the cable for receiver (end of model: -D).

### Cascading Cable (2 cables per set, for emitter and receiver)





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

**Note:** The Double-Ended Cable (up to 10 m: F39-JG10B) can be added to extend the cable length between the series-connected sensors.  
Cable length between sensors: 10 m max. (not including cascading cable (F39-JGR2W) and power cable)

#### <Connection example>



## 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.)	<b>F39-LGF</b>
	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.)	<b>F39-LGA</b>
	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.)	<b>F39-LGTB</b>
	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.)	<b>F39-LGTB-1</b>

\*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 1040 or less: The Standard Adjustable Bracket is not required. Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)).

Protective height of 1120 to 1920: Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)) and 1 set of Standard Adjustable Brackets (F39-LGA).

Protective height of 2000 to 2080: Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)) and 2 sets of Standard Adjustable Brackets (F39-LGA).




F3SG-4RA□□□□-30: Protective height of 1070 or less: The Standard Adjustable Bracket is not required. Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)).

Protective height of 1150 to 1950: Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)) and 1 set of Standard Adjustable Brackets (F39-LGA).


Protective height of 2030 to 2510: Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)) and 2 sets of Standard Adjustable Brackets (F39-LGA).




## Interface units and configuration tool SD Manager 2

Appearance	Type	Specifications	Model
	SD Manager 2	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  Accessories: 0.3-m Dedicated Cable 1 (1), 2-m Dedicated Cable 2 (1), Instruction Manual	F39-GIF
	Bluetooth Communication Unit	F39-BT bluetooth unit to enable bluetooth on the F3SG-RA  IP67 rated when mated.	F39-BT


## Lamp

Appearance	Type	Specifications	Model
	Lamp	The lamp can be connected to a receiver and turned ON based on the operation of F3SG-RA/RR.	F39-LP
	Lamp and Bluetooth Communication Unit	The lamp can indicate red, orange, and green colors, to which three different states can be assigned.  IP67 rated when mated.	F39-BTLP

## End Cap

Appearance	Specifications	Model
	Housing color: Black For both emitter and receiver (Attached to the F3SG-RA. The End Cap can be purchased if lost.)  IP67 rated when mated.	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 (2 covers per set, one for emitter and one for 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-4RA0160-14	F3SG-4RA0190-30	F39-HGA0200
	F3SG-4RA0240-14	F3SG-4RA0270-30	F39-HGA0280
	F3SG-4RA0320-14	F3SG-4RA0350-30	F39-HGA0360
	F3SG-4RA0400-14	F3SG-4RA0430-30	F39-HGA0440
	F3SG-4RA0480-14	F3SG-4RA0510-30	F39-HGA0520
	F3SG-4RA0560-14	F3SG-4RA0590-30	F39-HGA0600
	F3SG-4RA0640-14	F3SG-4RA0670-30	F39-HGA0680
	F3SG-4RA0720-14	F3SG-4RA0750-30	F39-HGA0760
	F3SG-4RA0800-14	F3SG-4RA0830-30	F39-HGA0840
	F3SG-4RA0880-14	F3SG-4RA0910-30	F39-HGA0920
	F3SG-4RA0960-14	F3SG-4RA0990-30	F39-HGA1000
	F3SG-4RA1040-14	F3SG-4RA1070-30	F39-HGA1080
	F3SG-4RA1120-14	F3SG-4RA1150-30	F39-HGA1160
	F3SG-4RA1200-14	F3SG-4RA1230-30	F39-HGA1240
	F3SG-4RA1280-14	F3SG-4RA1310-30	F39-HGA1320
	F3SG-4RA1360-14	F3SG-4RA1390-30	F39-HGA1400
	F3SG-4RA1440-14	F3SG-4RA1470-30	F39-HGA1480
	F3SG-4RA1520-14	F3SG-4RA1550-30	F39-HGA1560
	F3SG-4RA1600-14	F3SG-4RA1630-30	F39-HGA1640
	F3SG-4RA1680-14	F3SG-4RA1710-30	F39-HGA1720
	F3SG-4RA1760-14	F3SG-4RA1790-30	F39-HGA1800
	F3SG-4RA1840-14	F3SG-4RA1870-30	F39-HGA1880
	F3SG-4RA1920-14	F3SG-4RA1950-30	F39-HGA1960
	F3SG-4RA2000-14	F3SG-4RA2030-30	F39-HGA1480
			F39-HGA0550
	F3SG-4RA2080-14	F3SG-4RA2110-30	F39-HGA1560
			F39-HGA0550
	-	F3SG-4RA2190-30	F39-HGA1640
			F39-HGA0550
	-	F3SG-4RA2270-30	F39-HGA1720
			F39-HGA0550
	-	F3SG-4RA2350-30	F39-HGA1800
			F39-HGA0550
	-	F3SG-4RA2430-30	F39-HGA1880
			F39-HGA0550
	-	F3SG-4RA2510-30	F39-HGA1960
			F39-HGA0550

**Note:** 1. The operating range of the Safety Light Curtain attached with the product is 10% shorter than the rating.

2. The product extends over the DIP Switch cover of the Safety Light Curtain. Be sure to use the product only after all required settings are made to the DIP Switch.

## Test Rod

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

# Ratings and Specifications

## Main unit

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

		F3SG-4RA□□□□-14 F3SG-2RA□□□□-14	F3SG-4RA□□□□-30 F3SG-2RA□□□□-30
Type of ESPE (IEC 61496-1)		Type 4 Type 2	F3SG-4RA□□□□-14/-30 F3SG-2RA□□□□-14/-30
Performance	Object Resolution (Detection Capability)	Opaque objects 14-mm dia. 30-mm dia.	
	Beam Gap	10 mm 20 mm	
	Number of Beams	15 to 207 8 to 124	
	Lens Size	5.2 x 3.4 (W x H) mm 7-mm dia.	
	Protective Height	160 to 2080 mm (6.3 to 81.9 inch) 190 to 2510 mm (7.3 to 98.7 inch)	
	Operating Range	Long Short	0.3 to 10.0 m (1 to 32 ft.) 0.3 to 3.0 m (1 to 10 ft.) 0.3 to 20.0 m (1 to 65 ft.) 0.3 to 7.0 m (1 to 23 ft.)
	Response Time	ON to OFF 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. Refer to page 25 for the one segment system. Refer to <i>Safety Light Curtain F3SG-R Series User's Manual (ManNo.: Z352)</i> for cascaded connection. *2. Selectable by Configuration Tool.	
	Effective Aperture Angle (EAA) (IEC 61496-2)	Type 4 Type 2	±2.5° max., emitter and receiver at operating range of 3 m or greater ±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 25.	
	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 Auxiliary Output	Light-ON (Safety output is enabled when the receiver receives an emitting signal.) Safety output (Inverted signal output:Enable) (default) (Configurable by Configuration Tool)
	Input Voltage	ON Voltage OFF 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.) 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 27.	
	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. (not including cascading cable (F39-JGR2W) and power cable)	
	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/s², 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	
		Minimum Bending Radius	R5 mm	
	Extension cable - Single-Ended Cable - Double-Ended Cable	Type of Connection	M12 connectors: 5-pin emitter and 8-pin receiver, IP67 rated when mated	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	Refer to page 18.	
		Cable Diameter	6.6 mm	
		Minimum Bending Radius	R36 mm	
	Extension of Power Cable		100 m max.	
Material	Material		Housing: Aluminum alloy Cap: PBT resin Front window: Acrylic resin Cable: Oil-resistant PVC resin Standard Fixed Bracket (F39-LGF): Zinc alloy FE plate: Stainless steel	
	Weight		Refer to page 25.	
	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 26.	
	Type of ESPE (IEC 61496-1)		Type 4	
	Performance Level (PL)/Safety category	Type 4	PL e/Category 4 (EN ISO 13849-1:2015)	
		Type 2	PL c/Category 2 (EN ISO 13849-1:2015)	
	PFH <sub>D</sub>		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)	

## 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.

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

## F3SG-4RA□□□□-14/F3SG-2RA□□□□-14

Model		Number of Beams	Protective Height [mm]	Response Time [ms] *1			Current Consumption [mA]		Weight [kg]	
				ON → OFF *2	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	Net *3	Gross *4
F3SG-4RA0160-14	F3SG-2RA0160-14	15	160	8	40	140	40	75	0.7	2.0
F3SG-4RA0240-14	F3SG-2RA0240-14	23	240	8	40	140	45	75	0.9	2.3
F3SG-4RA0320-14	F3SG-2RA0320-14	31	320	8	40	140	55	75	1.1	2.6
F3SG-4RA0400-14	F3SG-2RA0400-14	39	400	8	40	140	60	80	1.3	2.9
F3SG-4RA0480-14	F3SG-2RA0480-14	47	480	13	65	165	50	80	1.5	3.2
F3SG-4RA0560-14	F3SG-2RA0560-14	55	560	13	65	165	55	80	1.7	3.5
F3SG-4RA0640-14	F3SG-2RA0640-14	63	640	13	65	165	60	85	1.9	3.9
F3SG-4RA0720-14	F3SG-2RA0720-14	71	720	13	65	165	65	85	2.1	4.2
F3SG-4RA0800-14	F3SG-2RA0800-14	79	800	13	65	165	65	90	2.3	4.5
F3SG-4RA0880-14	F3SG-2RA0880-14	87	880	13	65	165	70	90	2.6	4.8
F3SG-4RA0960-14	F3SG-2RA0960-14	95	960	13	65	165	75	90	2.8	5.1
F3SG-4RA1040-14	F3SG-2RA1040-14	103	1040	13	65	165	80	95	3.0	5.4
F3SG-4RA1120-14	F3SG-2RA1120-14	111	1120	13	65	165	85	95	3.2	5.7
F3SG-4RA1200-14	F3SG-2RA1200-14	119	1200	13	65	165	90	100	3.4	6.0
F3SG-4RA1280-14	F3SG-2RA1280-14	127	1280	13	65	165	95	100	3.6	6.4
F3SG-4RA1360-14	F3SG-2RA1360-14	135	1360	13	65	165	95	105	3.8	6.7
F3SG-4RA1440-14	F3SG-2RA1440-14	143	1440	18	90	190	85	105	4.0	7.0
F3SG-4RA1520-14	F3SG-2RA1520-14	151	1520	18	90	190	90	105	4.2	7.3
F3SG-4RA1600-14	F3SG-2RA1600-14	159	1600	18	90	190	90	110	4.4	7.6
F3SG-4RA1680-14	F3SG-2RA1680-14	167	1680	18	90	190	95	110	4.7	7.9
F3SG-4RA1760-14	F3SG-2RA1760-14	175	1760	18	90	190	100	115	4.9	8.2
F3SG-4RA1840-14	F3SG-2RA1840-14	183	1840	18	90	190	100	115	5.1	8.5
F3SG-4RA1920-14	F3SG-2RA1920-14	191	1920	18	90	190	105	120	5.3	8.8
F3SG-4RA2000-14	F3SG-2RA2000-14	199	2000	18	90	190	105	120	5.5	9.2
F3SG-4RA2080-14	F3SG-2RA2080-14	207	2080	18	90	190	110	125	5.7	9.5

\*1. The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.

\*2. 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.

\*3. The net weight is the weight of an emitter and a receiver.

\*4. The gross weight is the weight of an emitter, a receiver, included accessories and a package.

## F3SG-4RA□□□□-30/F3SG-2RA□□□□-30

Model		Number of Beams	Protective Height [mm]	Response Time [ms] *1			Current Consumption [mA]		Weight [kg]	
				ON → OFF *2	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	Net *3	Gross *4
F3SG-4RA0190-30	F3SG-2RA0190-30	8	190	8	40	140	35	75	0.6	2.1
F3SG-4RA0270-30	F3SG-2RA0270-30	12	270	8	40	140	35	75	0.9	2.4
F3SG-4RA0350-30	F3SG-2RA0350-30	16	350	8	40	140	40	75	1.1	2.7
F3SG-4RA0430-30	F3SG-2RA0430-30	20	430	8	40	140	45	75	1.3	3.0
F3SG-4RA0510-30	F3SG-2RA0510-30	24	510	8	40	140	50	75	1.5	3.3
F3SG-4RA0590-30	F3SG-2RA0590-30	28	590	8	40	140	50	75	1.7	3.6
F3SG-4RA0670-30	F3SG-2RA0670-30	32	670	8	40	140	55	75	1.9	3.9
F3SG-4RA0750-30	F3SG-2RA0750-30	36	750	8	40	140	60	80	2.1	4.2
F3SG-4RA0830-30	F3SG-2RA0830-30	40	830	8	40	140	65	80	2.3	4.5
F3SG-4RA0910-30	F3SG-2RA0910-30	44	910	13	65	165	50	80	2.5	4.8
F3SG-4RA0990-30	F3SG-2RA0990-30	48	990	13	65	165	50	80	2.7	5.1
F3SG-4RA1070-30	F3SG-2RA1070-30	52	1070	13	65	165	55	80	2.9	5.4
F3SG-4RA1150-30	F3SG-2RA1150-30	56	1150	13	65	165	55	85	3.1	5.7
F3SG-4RA1230-30	F3SG-2RA1230-30	60	1230	13	65	165	55	85	3.3	6.0
F3SG-4RA1310-30	F3SG-2RA1310-30	64	1310	13	65	165	60	85	3.5	6.3
F3SG-4RA1390-30	F3SG-2RA1390-30	68	1390	13	65	165	60	85	3.8	6.6
F3SG-4RA1470-30	F3SG-2RA1470-30	72	1470	13	65	165	65	85	4.0	6.9
F3SG-4RA1550-30	F3SG-2RA1550-30	76	1550	13	65	165	65	90	4.2	7.2
F3SG-4RA1630-30	F3SG-2RA1630-30	80	1630	13	65	165	70	90	4.4	7.5
F3SG-4RA1710-30	F3SG-2RA1710-30	84	1710	13	65	165	70	90	4.6	7.8
F3SG-4RA1790-30	F3SG-2RA1790-30	88	1790	13	65	165	70	90	4.8	8.1
F3SG-4RA1870-30	F3SG-2RA1870-30	92	1870	13	65	165	75	90	5.0	8.4
F3SG-4RA1950-30	F3SG-2RA1950-30	96	1950	13	65	165	75	95	5.2	8.7
F3SG-4RA2030-30	F3SG-2RA2030-30	100	2030	13	65	165	80	95	5.4	9.0
F3SG-4RA2110-30	F3SG-2RA2110-30	104	2110	13	65	165	80	95	5.6	9.3
F3SG-4RA2190-30	F3SG-2RA2190-30	108	2190	13	65	165	85	95	5.8	9.6
F3SG-4RA2270-30	F3SG-2RA2270-30	112	2270	13	65	165	85	100	6.0	9.9
F3SG-4RA2350-30	F3SG-2RA2350-30	116	2350	13	65	165	85	100	6.2	10.2
F3SG-4RA2430-30	F3SG-2RA2430-30	120	2430	13	65	165	90	100	6.4	10.5
F3SG-4RA2510-30	F3SG-2RA2510-30	124	2510	13	65	165	90	100	6.7	10.8

\*1. The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.

\*2. 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.

\*3. The net weight is the weight of an emitter and a receiver.

\*4. The gross weight is the weight of an emitter, a receiver, included accessories and a package.

## Legislation and Standards

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 13849-1:2015 (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 13849-1:2015 (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  
GB/T 4584 (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 13849-1:2015 (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:  
GB/T 4584 (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 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

## Indicator

### 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 being 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

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

### Interface Unit

Main unit	PC/AT compatible machine (computer that runs Microsoft Windows)
Operating system (OS)	Windows 7 (32-bit/64-bit), Windows 8, 8.1 (32-bit/64-bit), Windows 10 (32-bit/64-bit)
Communication port	USB port x1
Ambient temperature	Operating: -10 to 55°C, Storage: -30 to 70°C (non-icing and non-condensing)
Ambient humidity	Operating: 35% to 85%, Storage: 35% to 95% (non-condensing)

### Lamp

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



# F3SG-RA

## Connections (Basic Wiring Diagram)

### Standalone F3SG-RA using PNP Outputs

#### 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.

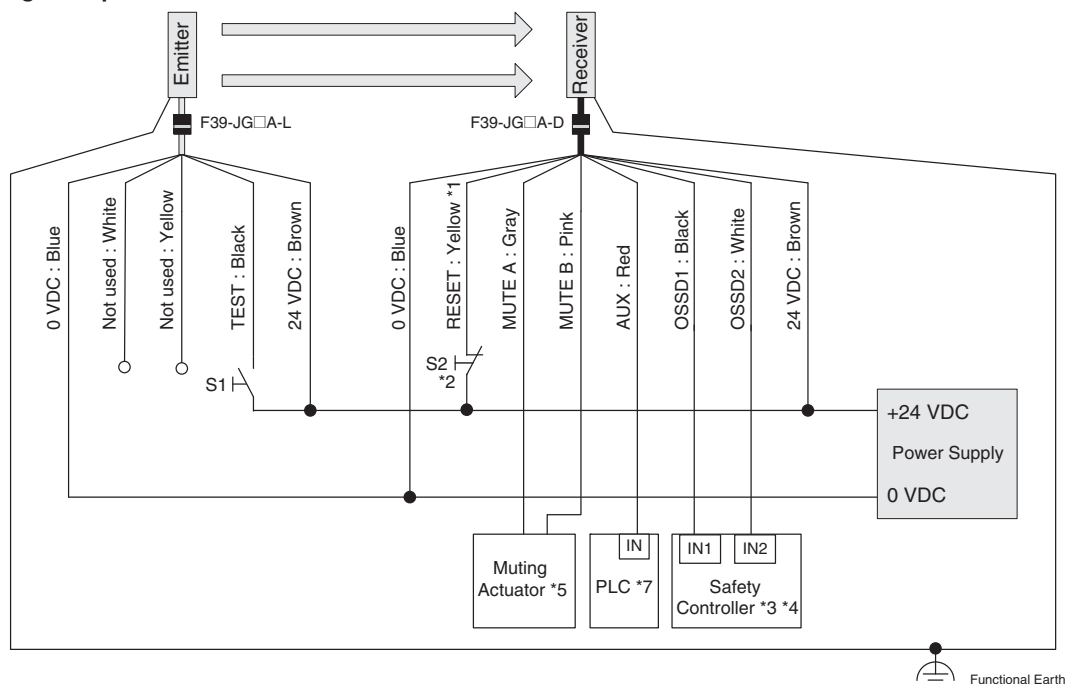
#### DIP Switch settings \*6

	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/Interlock Reset Switch, Override Switch or Override Cancel Switch

\*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.

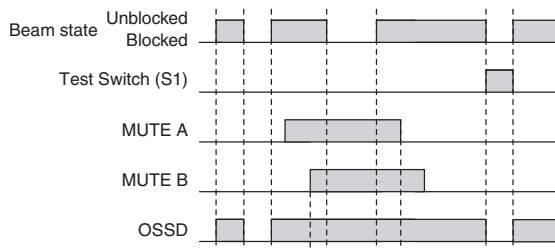
\*3.Refer to page 30 for more information.

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

\*5.Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.

\*6.The functions 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.

\*7.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.



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

### 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.

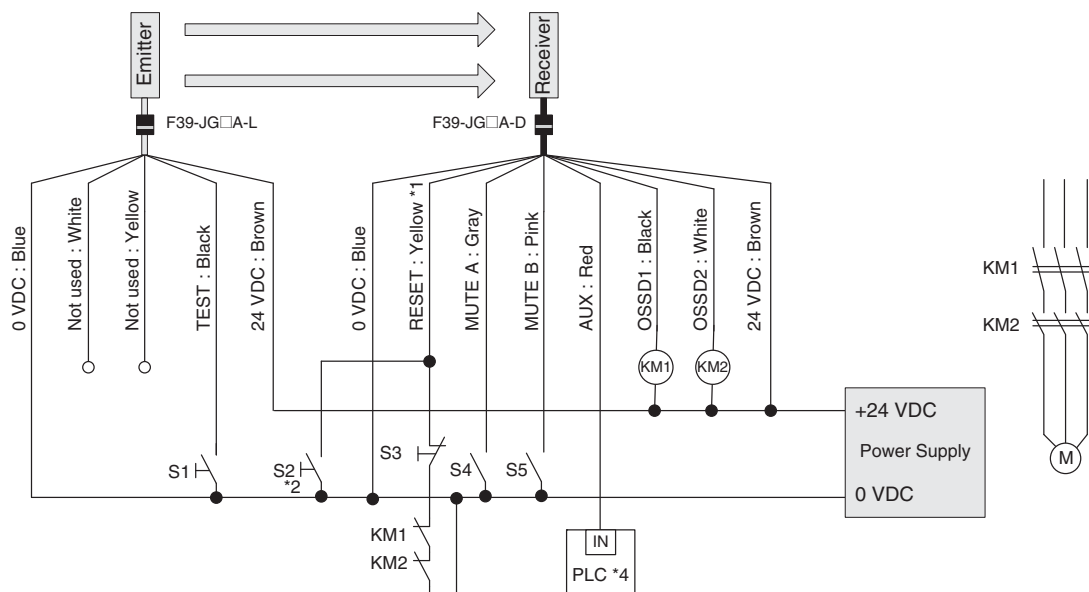
#### DIP Switch settings \*3

	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/Interlock Reset Switch or Override Switch

S4, S5: Muting sensor

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

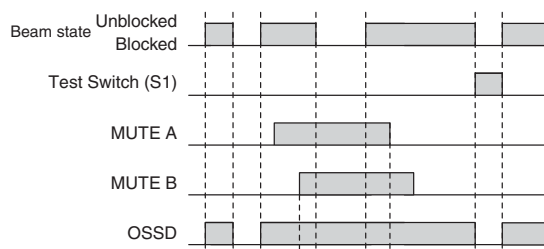
M: Motor

\*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.

\*4. When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.



**Note:** For the functional earth connection, refer to page 28.

## 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-T□ 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

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

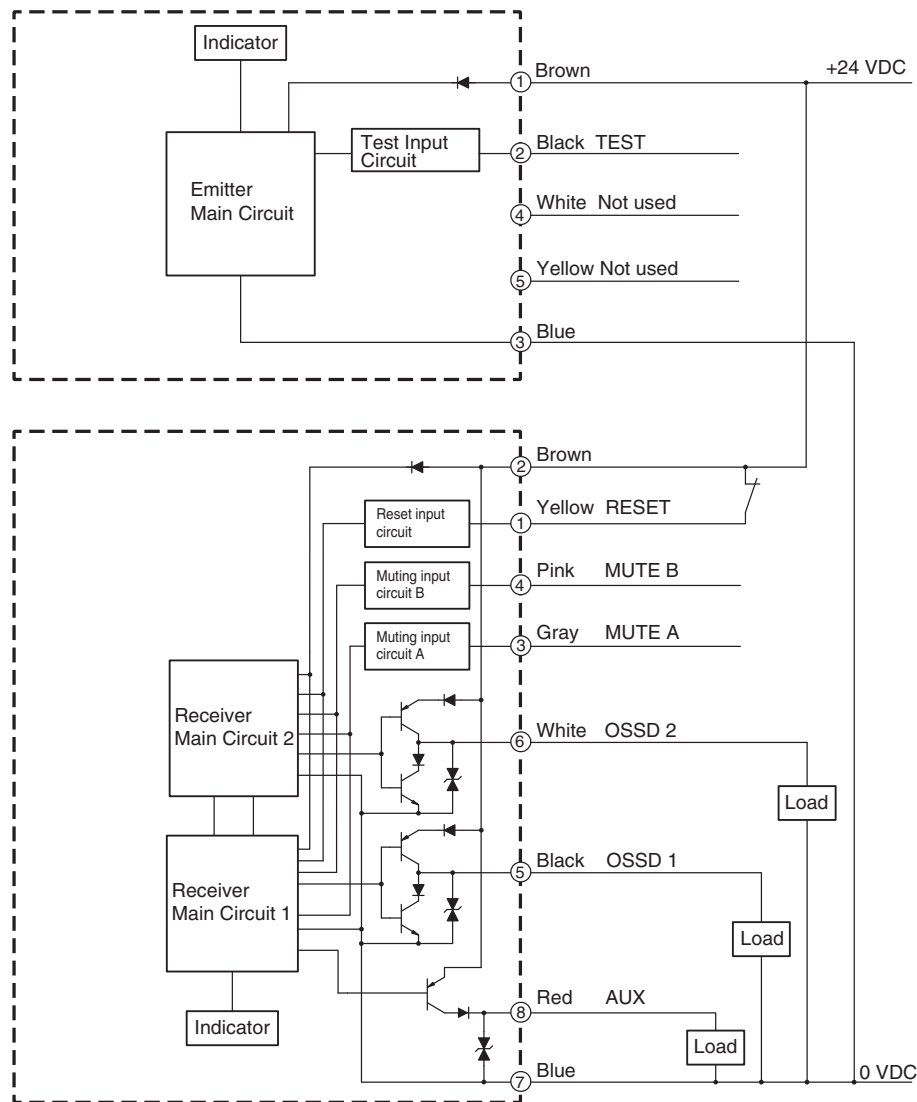
Connectable Safety Control Units (NPN output)	
Safety Relay Units	
G9SA-301-P	

## Input/Output Circuit

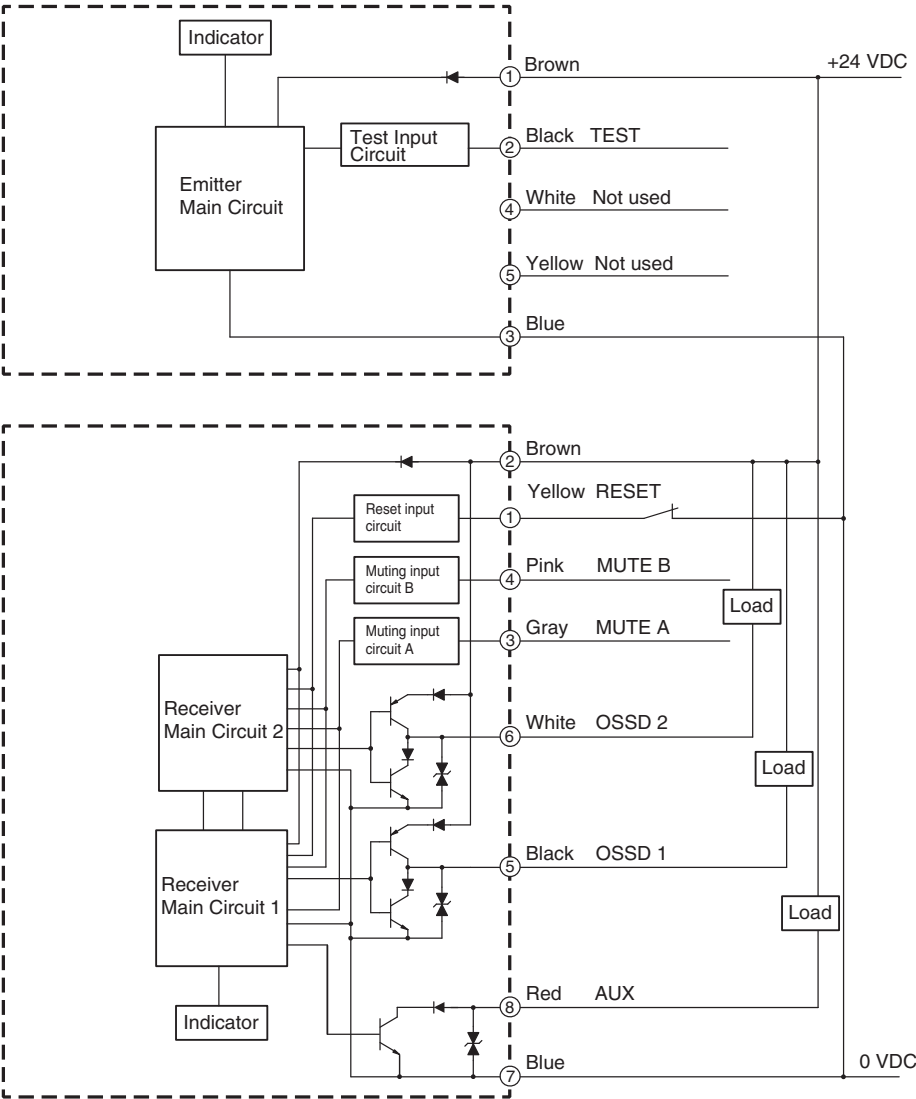
### Entire Circuit Diagram

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

### PNP Output



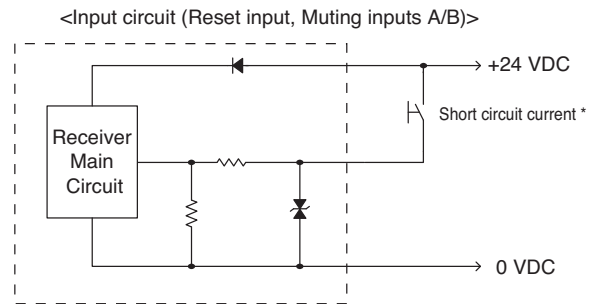
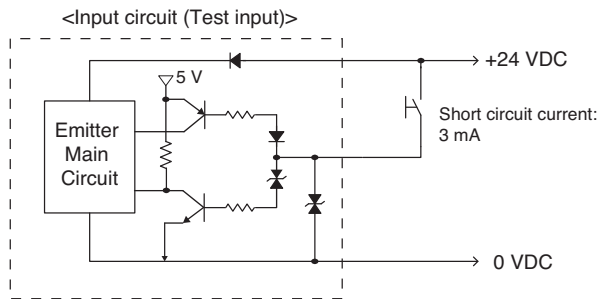
NPN Output



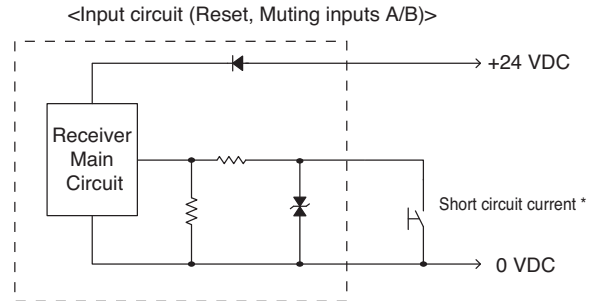
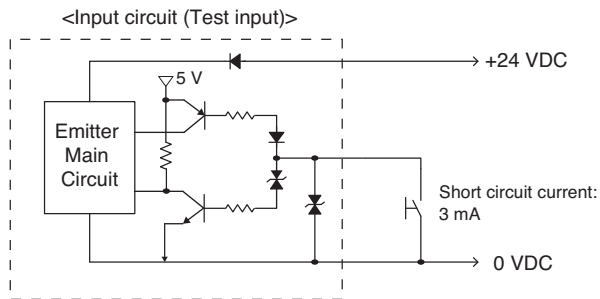
## Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

### PNP Output



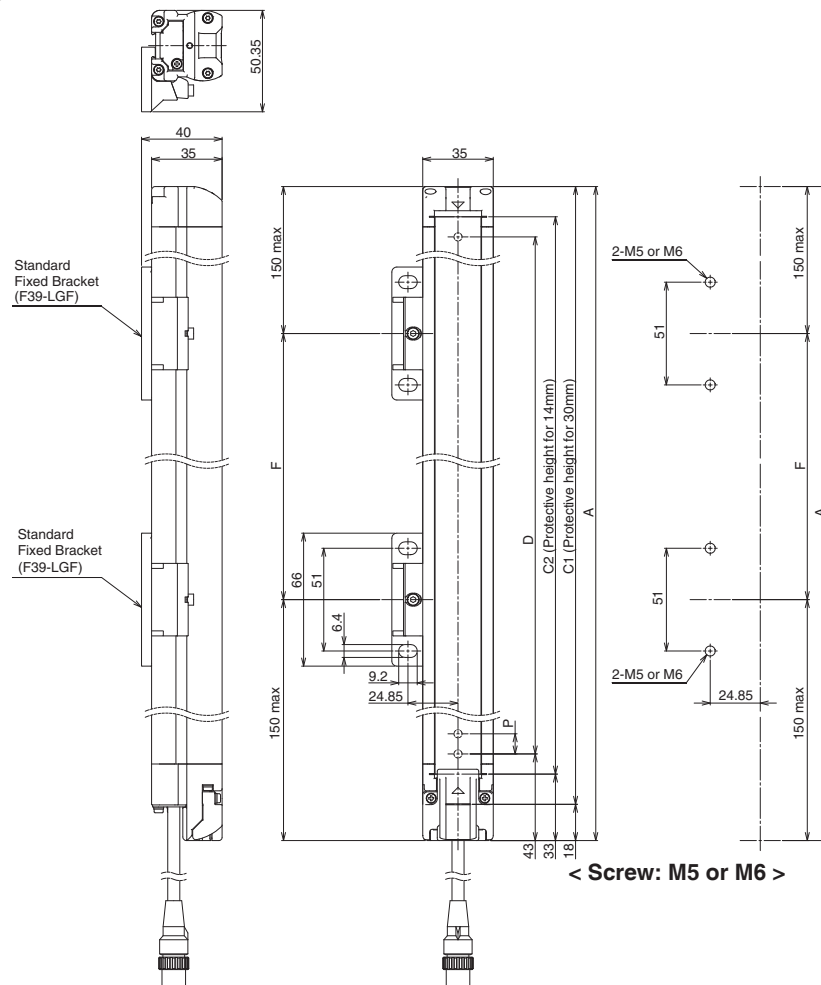
### NPN Output



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

### 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

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

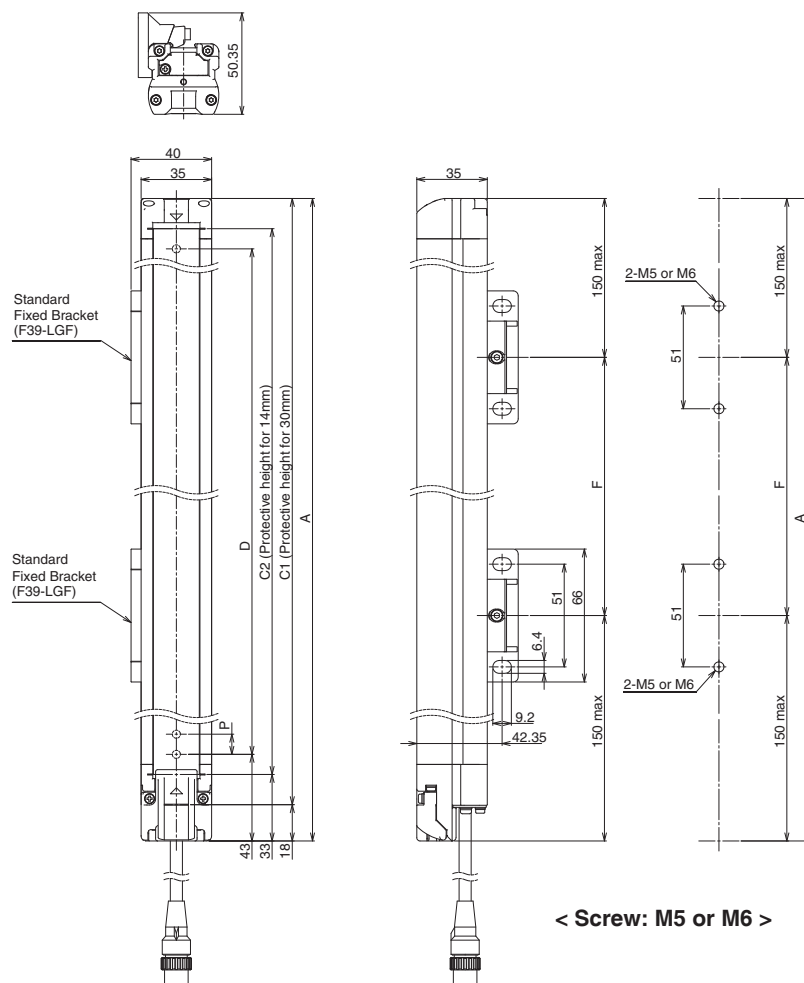
Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

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).

## 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

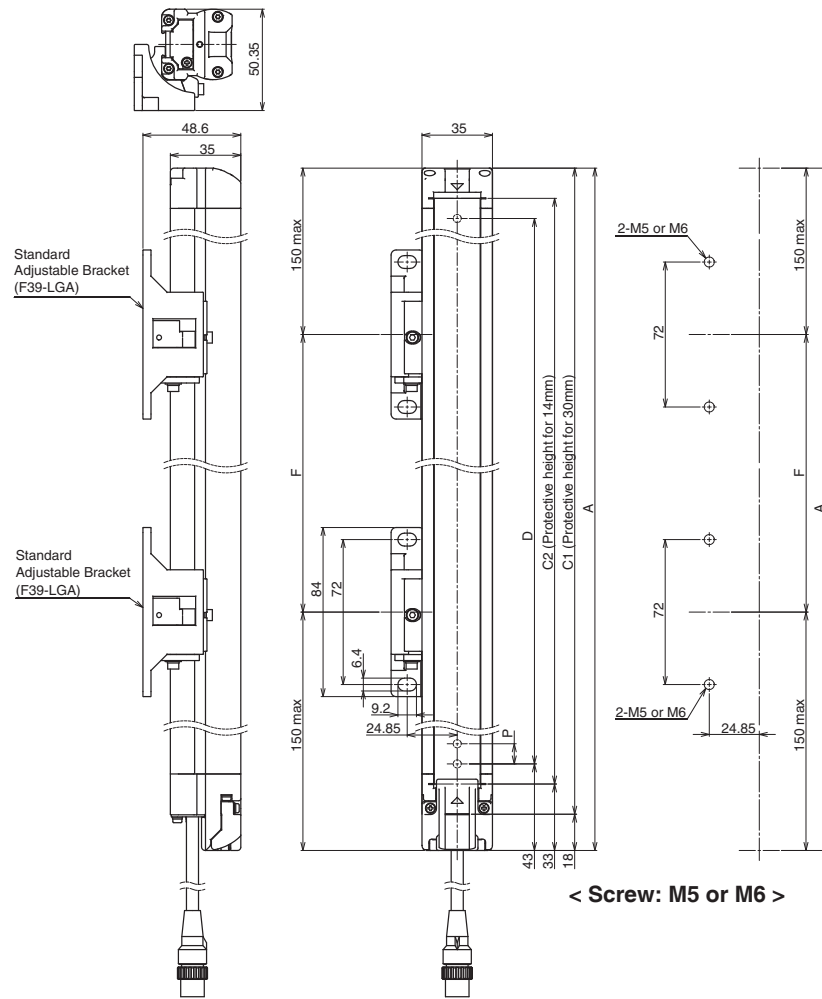
Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

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).

## 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).

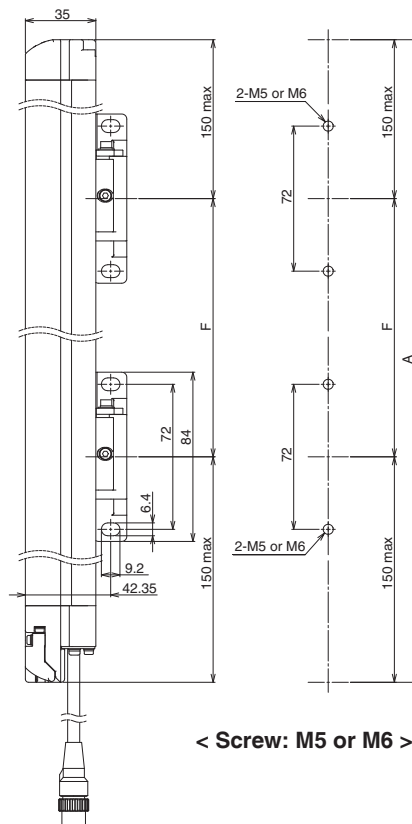


Technical drawing of the F39-LGA connector. The top view shows a rectangular footprint with a width of 50.35 mm. The side view shows a height of 48.6 mm and a width of 35 mm. The side view also shows the connector's profile with a protective height of 14 mm (C2) and 30 mm (C1). The connector is labeled "Standard Adjustable Bracket (F39-LGA)".

<b>Dimension A</b>	C1+18
<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.

\*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).



<b>Dimension A</b>	C2+48
<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.

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

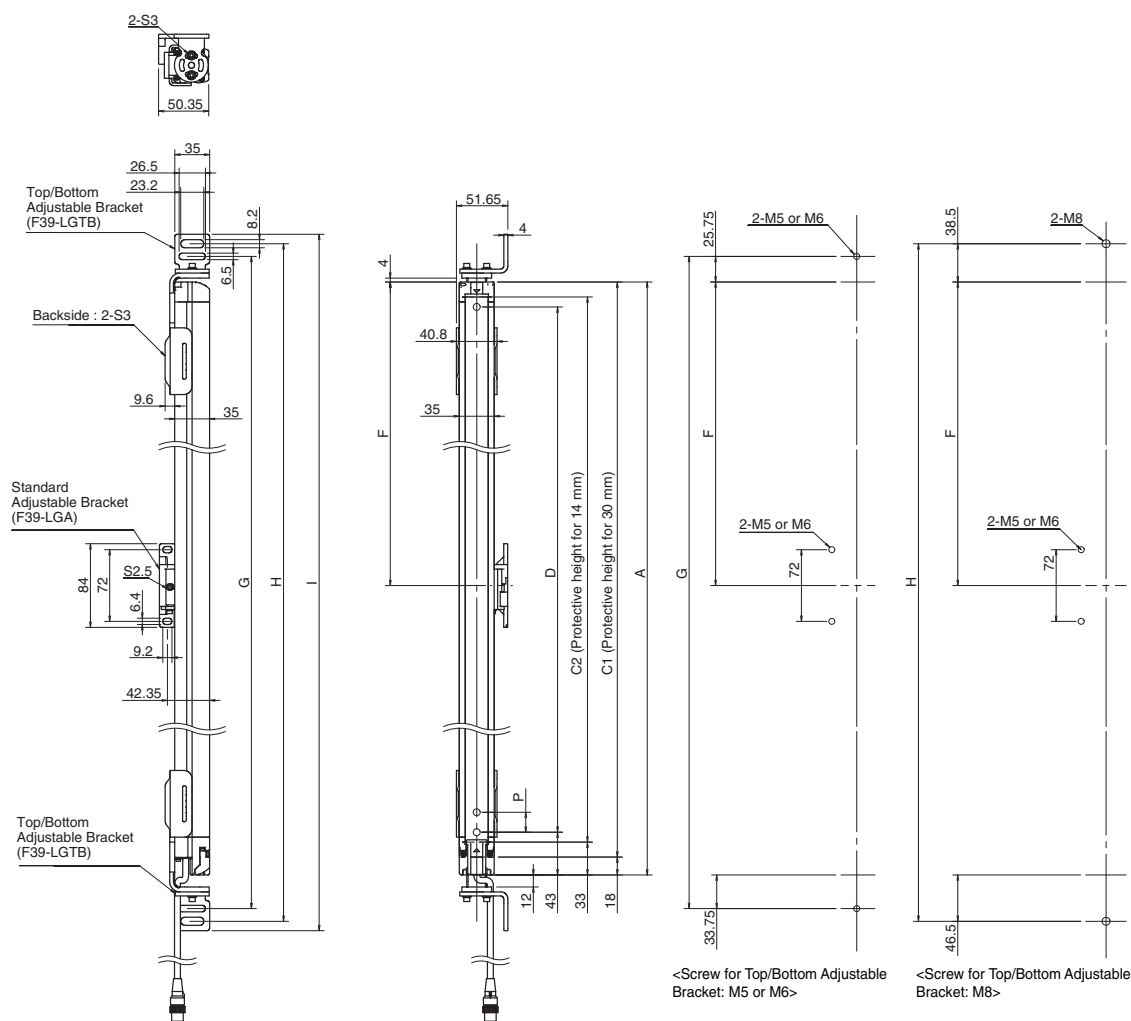


## F3SG-□RA□□□□-14 Series

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

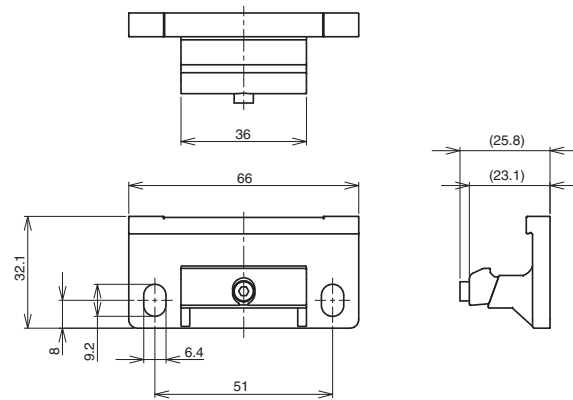
Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension G	C2+107.5
Dimension H	C2+133
Dimension I	C2+152
Dimension P	10

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.

## Accessories

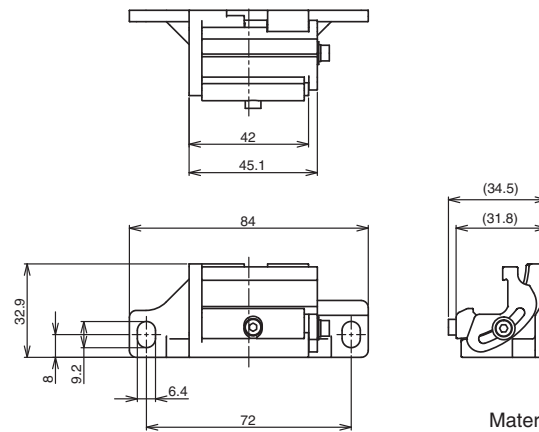
### Sensor Mounting Brackets

#### Standard Fixed Bracket (F39-LGF)



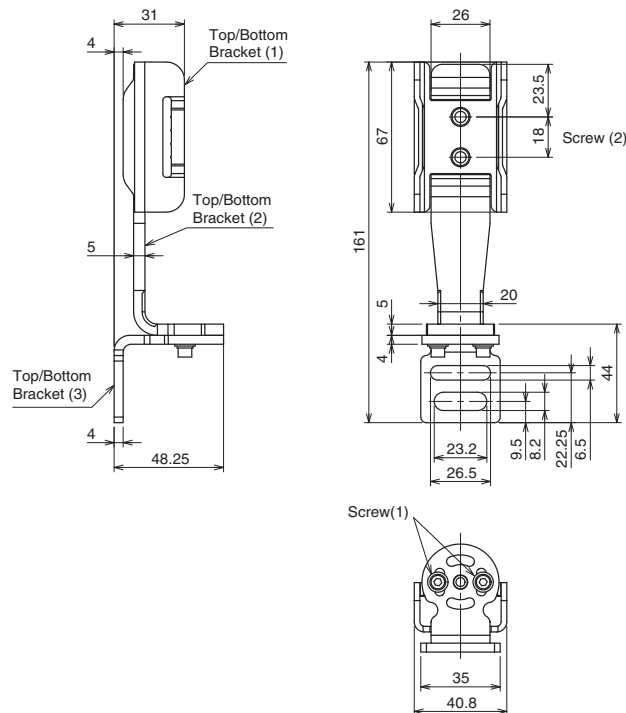
Material: Zinc alloy

#### Standard Adjustable Bracket (F39-LGA, sold separately)



Material: Zinc alloy ,Fluorochemical lubricant oil

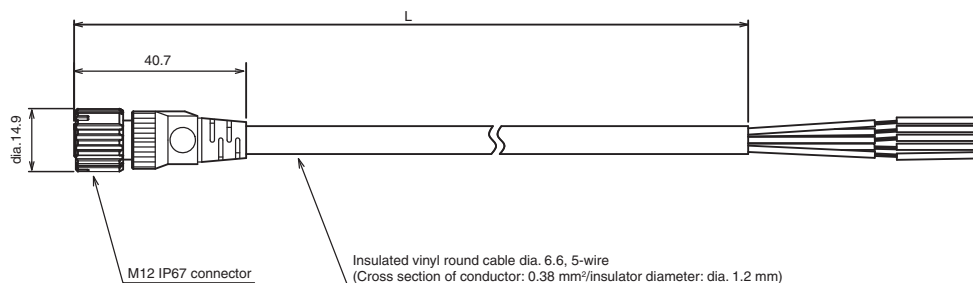
#### Top/Bottom Adjustable Bracket (F39-LGTB, sold separately)



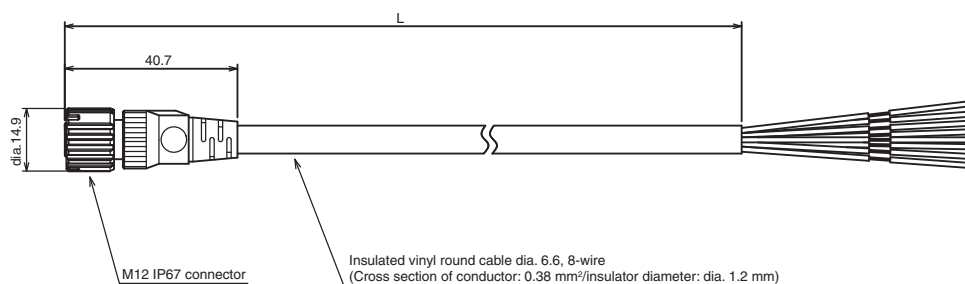
Material: Stainless steel

## Safety light curtain connecting cable

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

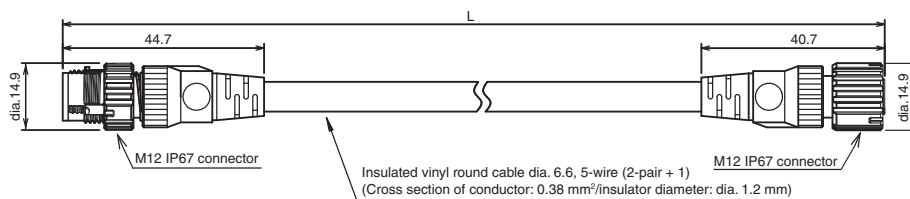


## Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)

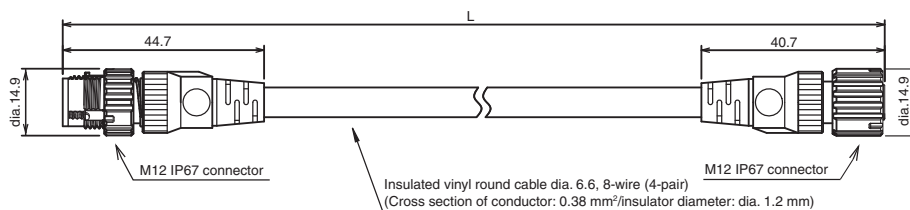


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JG3A-L	F39-JG3A-D	3
F39-JG7A-L	F39-JG7A-D	7
F39-JG10A-L	F39-JG10A-D	10
F39-JG15A-L	F39-JG15A-D	15
F39-JG20A-L	F39-JG20A-D	20

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

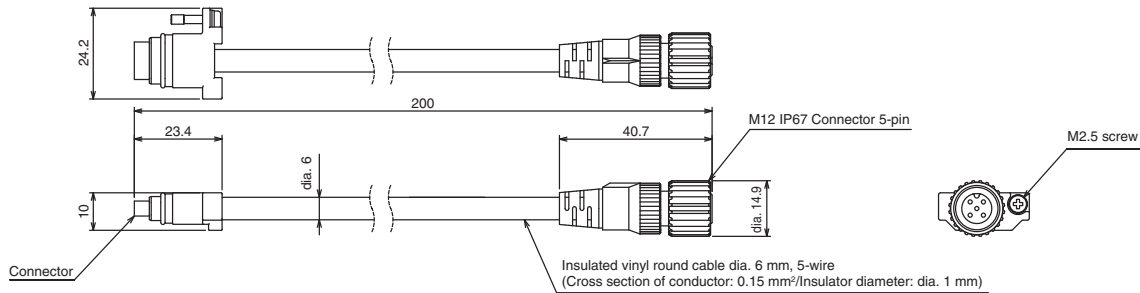


## Double-Ended Cable for Receiver: Cable for extension (F39-JG□B-D, sold separately)

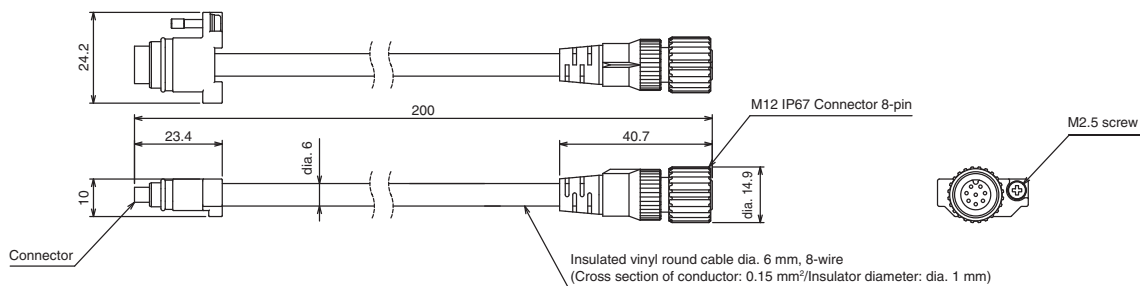


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR5B-L	F39-JGR15B-D	0.5
F39-JG1B-L	F39-JG1B-D	1
F39-JG3B-L	F39-JG3B-D	3
F39-JG5B-L	F39-JG5B-D	5
F39-JG7B-L	F39-JG7B-D	7
F39-JG10B-L	F39-JG10B-D	10
F39-JG15B-L	F39-JG15B-D	15
F39-JG20B-L	F39-JG20B-D	20

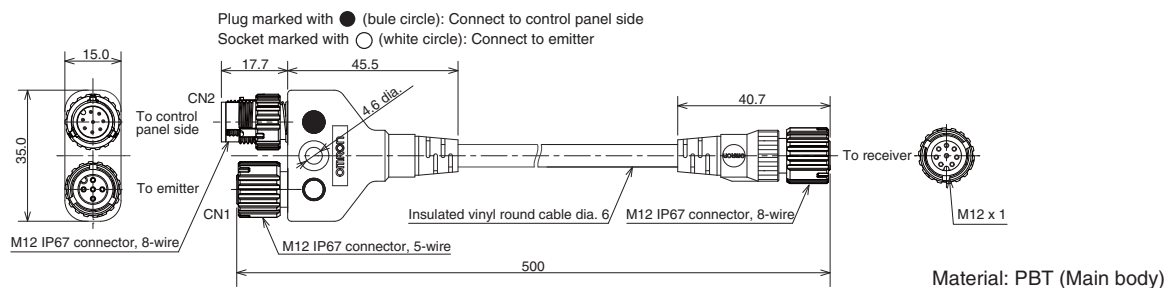
## Cascading Cable for Emitter (F39-JGR2W-L, sold separately)



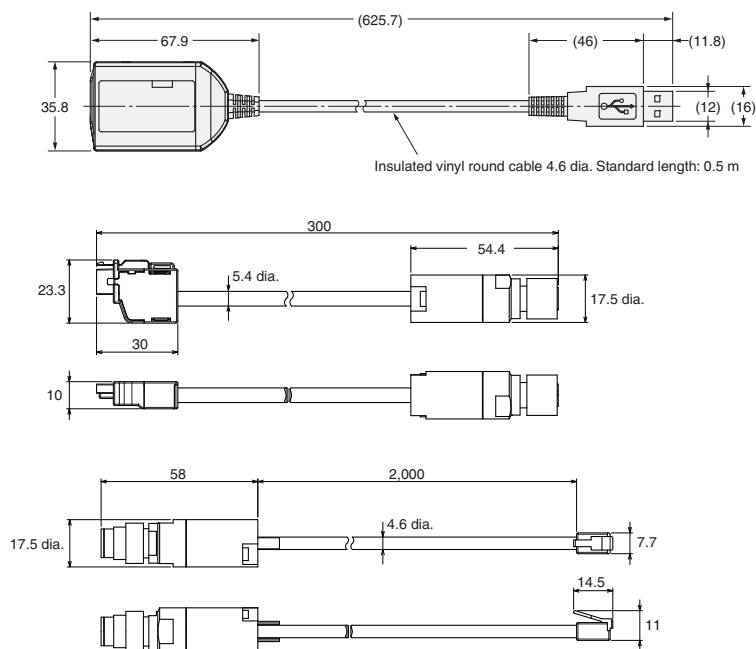
## Cascading Cable for Receiver (F39-JGR2W-D, sold separately)



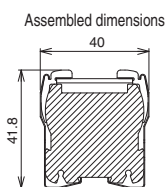
## Y-Joint Plug/Socket Connector (F39-GCNY2, sold separately)



## Interface Unit (F39-GIF, sold separately)



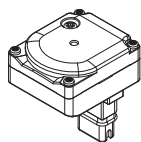
### Spatter Protection Cover (F39-HGA, sold separately)



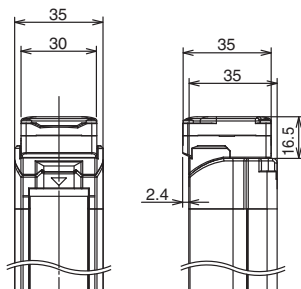
Model	Total length
F39-HGA□□□□	□□□□+4
F39-HGA0550	558

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

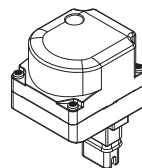
### Bluetooth Communication Unit (F39-BT, sold separately)



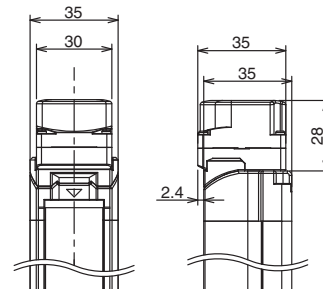
Material: PBT



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



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

# Safety Light Curtain Robust type

## F3SG-RR

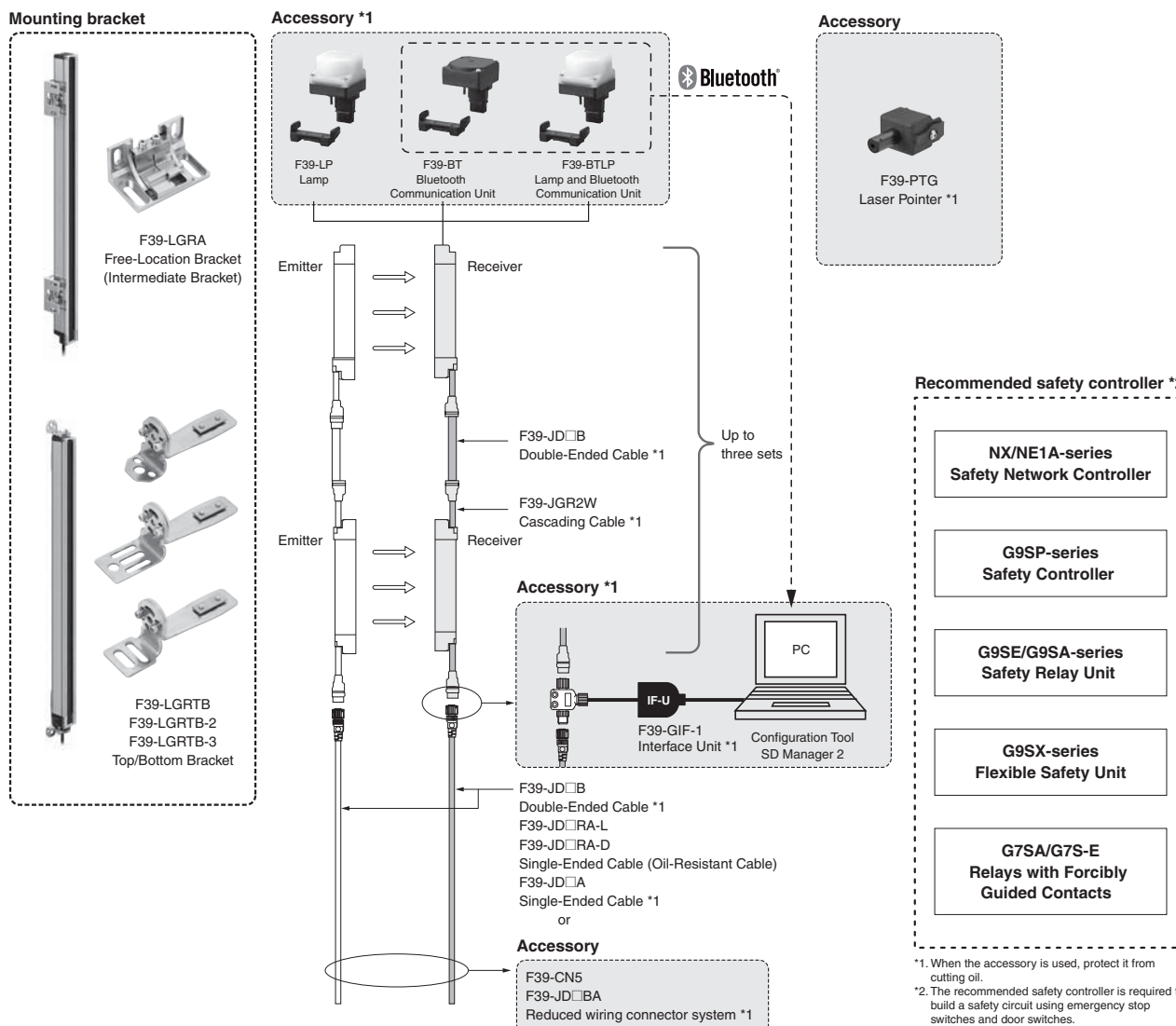
### Enhanced Cutting Oil Resistance

- Mechanical seal structure prevents cutting oil from getting inside
- Special materials and cables significantly enhanced cutting oil resistance
- Rugged and compact housing. Perfect fit installation
- IP67G (JIS C 0920 Annex 1) rated



**NEW**

### System Configuration





## Ordering Information

### Main Units

#### Safety Light Curtain

##### Finger protection

Number of beams	Protective height (mm)	Model
23	240	F3SG-4RR0240-14
31	320	F3SG-4RR0320-14
39	400	F3SG-4RR0400-14
47	480	F3SG-4RR0480-14
55	560	F3SG-4RR0560-14
63	640	F3SG-4RR0640-14
71	720	F3SG-4RR0720-14
79	800	F3SG-4RR0800-14
87	880	F3SG-4RR0880-14
95	960	F3SG-4RR0960-14
103	1040	F3SG-4RR1040-14
111	1120	F3SG-4RR1120-14
119	1200	F3SG-4RR1200-14
127	1280	F3SG-4RR1280-14
135	1360	F3SG-4RR1360-14
143	1440	F3SG-4RR1440-14
151	1520	F3SG-4RR1520-14
159	1600	F3SG-4RR1600-14
167	1680	F3SG-4RR1680-14
175	1760	F3SG-4RR1760-14
183	1840	F3SG-4RR1840-14
191	1920	F3SG-4RR1920-14

##### Hand and arm protection




Number of beams	Protective height (mm)	Model
12	240	F3SG-4RR0240-25
16	320	F3SG-4RR0320-25
20	400	F3SG-4RR0400-25
24	480	F3SG-4RR0480-25
28	560	F3SG-4RR0560-25
32	640	F3SG-4RR0640-25
36	720	F3SG-4RR0720-25
40	800	F3SG-4RR0800-25
44	880	F3SG-4RR0880-25
48	960	F3SG-4RR0960-25
52	1040	F3SG-4RR1040-25
56	1120	F3SG-4RR1120-25
60	1200	F3SG-4RR1200-25
64	1280	F3SG-4RR1280-25
68	1360	F3SG-4RR1360-25
72	1440	F3SG-4RR1440-25
76	1520	F3SG-4RR1520-25
80	1600	F3SG-4RR1600-25
84	1680	F3SG-4RR1680-25
88	1760	F3SG-4RR1760-25
92	1840	F3SG-4RR1840-25
96	1920	F3SG-4RR1920-25

F3SG-RR

## Accessories (Sold separately)




### Safety light curtain connecting cable

#### Single-Ended Cable (Oil-Resistant Cable)

Appearance	Type	Cable length	Specifications	Model																								
	For emitter M12 connector (8-pin), 5 wires Color: Gray	3 m	For emitter, M12 connector (8-pin), Color: Gray  Connected to Power Cable or Double-Ended Cable  <table><tr><td>1</td><td>—</td><td>Not used</td></tr><tr><td>2</td><td>Brown</td><td>+24 VDC</td></tr><tr><td>3</td><td>Black</td><td>TEST</td></tr><tr><td>4</td><td>—</td><td>Not used</td></tr><tr><td>5</td><td>Gray</td><td>Not used</td></tr><tr><td>6</td><td>Pink</td><td>Not used</td></tr><tr><td>7</td><td>Blue</td><td>0 VDC</td></tr><tr><td>8</td><td>—</td><td>Not used</td></tr></table>	1	—	Not used	2	Brown	+24 VDC	3	Black	TEST	4	—	Not used	5	Gray	Not used	6	Pink	Not used	7	Blue	0 VDC	8	—	Not used	F39-JD3RA-L
		1	—	Not used																								
	2	Brown	+24 VDC																									
	3	Black	TEST																									
4	—	Not used																										
5	Gray	Not used																										
6	Pink	Not used																										
7	Blue	0 VDC																										
8	—	Not used																										
7 m	For receiver, M12 connector (8-pin), Color: Black  Connected to Power Cable or Double-Ended Cable  <table><tr><td>1</td><td>White</td><td>OSSD 2</td></tr><tr><td>2</td><td>Brown</td><td>+24 VDC</td></tr><tr><td>3</td><td>Black</td><td>OSSD 1</td></tr><tr><td>4</td><td>Yellow</td><td>AUX</td></tr><tr><td>5</td><td>Gray</td><td>MUTE A /PC COM (+)</td></tr><tr><td>6</td><td>Pink</td><td>MUTE B /PC COM (-)</td></tr><tr><td>7</td><td>Blue</td><td>0 VDC</td></tr><tr><td>8</td><td>Red</td><td>RESET/EDM</td></tr></table>	1	White	OSSD 2	2	Brown	+24 VDC	3	Black	OSSD 1	4	Yellow	AUX	5	Gray	MUTE A /PC COM (+)	6	Pink	MUTE B /PC COM (-)	7	Blue	0 VDC	8	Red	RESET/EDM	F39-JD7RA-L		
1	White	OSSD 2																										
2	Brown	+24 VDC																										
3	Black	OSSD 1																										
4	Yellow	AUX																										
5	Gray	MUTE A /PC COM (+)																										
6	Pink	MUTE B /PC COM (-)																										
7	Blue	0 VDC																										
8	Red	RESET/EDM																										
For receiver M12 connector (8-pin), 8 wires Color: Black	3 m	IP67 and IP67G (JIS C 0920 Annex 1)* rated when mated.  * F3SG-RR meets the degree of protection when this cable is correctly connected with the power cable of the F3SG-RR. The degree of protection is not satisfied with the part where cable wires are uncovered.	F39-JD3RA-D																									
	7 m		F39-JD7RA-D																									

**Note:** To extend the cable length to more than 7 m, add the F39-JD□B Double-Ended Cable.  
When the Double-Ended Cable is used, protect it from cutting oil.

#### Single-Ended Cable (2 cables per set, one for emitter and one for receiver) \*

Appearance	Cable length	Specifications	Model																											
	3 m	For emitter M12 connector (8-pin), Color: Gray Connected to Power Cable or Double-Ended Cable <div><table><tr><td>1</td><td>White</td><td>Not used</td></tr><tr><td>2</td><td>Brown</td><td>+24 VDC</td></tr><tr><td>3</td><td>Black</td><td>TEST</td></tr><tr><td>4</td><td>Yellow</td><td>Not used</td></tr><tr><td>5</td><td>Gray</td><td>Not used</td></tr><tr><td>6</td><td>Pink</td><td>Not used</td></tr><tr><td>7</td><td>Blue</td><td>0 VDC</td></tr><tr><td>8</td><td>Red</td><td>Not used</td></tr><tr><td colspan="2">Shield</td><td></td></tr></table></div>	1	White	Not used	2	Brown	+24 VDC	3	Black	TEST	4	Yellow	Not used	5	Gray	Not used	6	Pink	Not used	7	Blue	0 VDC	8	Red	Not used	Shield			F39-JD3A
	1	White	Not used																											
	2	Brown	+24 VDC																											
	3	Black	TEST																											
	4	Yellow	Not used																											
5	Gray	Not used																												
6	Pink	Not used																												
7	Blue	0 VDC																												
8	Red	Not used																												
Shield																														
7 m			F39-JD7A																											
10 m		For receiver M12 connector (8-pin), Color: Black Connected to Power Cable or Double-Ended Cable <div><table><tr><td>1</td><td>White</td><td>OSSD 2</td></tr><tr><td>2</td><td>Brown</td><td>+24 VDC</td></tr><tr><td>3</td><td>Black</td><td>OSSD 1</td></tr><tr><td>4</td><td>Yellow</td><td>AUX</td></tr><tr><td>5</td><td>Gray</td><td>MUTE A /PC COM (+)</td></tr><tr><td>6</td><td>Pink</td><td>MUTE B /PC COM (-)</td></tr><tr><td>7</td><td>Blue</td><td>0 VDC</td></tr><tr><td>8</td><td>Red</td><td>RESET/EDM</td></tr><tr><td colspan="2">Shield</td><td></td></tr></table></div>	1	White	OSSD 2	2	Brown	+24 VDC	3	Black	OSSD 1	4	Yellow	AUX	5	Gray	MUTE A /PC COM (+)	6	Pink	MUTE B /PC COM (-)	7	Blue	0 VDC	8	Red	RESET/EDM	Shield			F39-JD10A
1	White	OSSD 2																												
2	Brown	+24 VDC																												
3	Black	OSSD 1																												
4	Yellow	AUX																												
5	Gray	MUTE A /PC COM (+)																												
6	Pink	MUTE B /PC COM (-)																												
7	Blue	0 VDC																												
8	Red	RESET/EDM																												
Shield																														
15 m			F39-JD15A																											
20 m		IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	F39-JD20A																											


\* The cable for emitter and the cable for receiver are available separately. Add '-L' for emitter or '-D' for receiver to the end of the model number when you order.

Single-Ended Cable for Emitter: F39-JD□A-L, Single-Ended Cable for Receiver: F39-JD□A-D

**Note:** 1. Use the F39-JD□RA-L/-D for applications where cutting oil resistance is required.

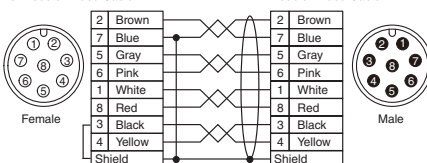
2. To extend the cable length to more than 20 m, add the F39-JD□B Double-Ended Cable.

## Double-Ended Cable (2 cables per set, one for emitter and one for receiver) \*

Appearance	Cable length	Specifications	Model
	0.5 m	For emitter M12 connector (8-pin), Color: Gray Connected to Power Cable or Double-Ended Cable	F39-JDR5B
	1 m	Connected to Single-Ended Cable, or Double-Ended Cable	F39-JD1B
	3 m		F39-JD3B
	5 m		F39-JD5B
	7 m		F39-JD7B
	10 m		F39-JD10B
	15 m		F39-JD15B
	20 m		F39-JD20B

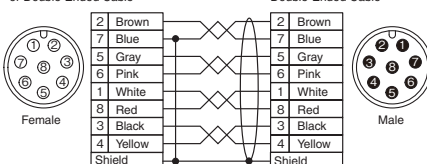
For emitter M12 connector (8-pin), Color: Gray

Connected to Power Cable or Double-Ended Cable



For receiver, M12 connector (8-pin) Color: Black

Connected to Power Cable or Double-Ended Cable



IP67\* rated when mated.

\* When the accessory is used, protect it from cutting oil.

\* The cable for emitter and the cable for receiver are available separately. Add '-L' for emitter or '-D' for receiver to the end of the model number when you order.

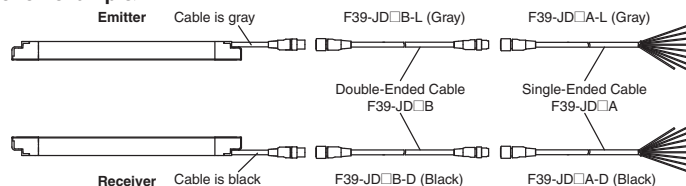
Double-Ended Cable for Emitter: F39-JD□B-L, Double-Ended Cable for Receiver: F39-JD□B-D


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

To extend the cable length to more than 40 m, add several Double-Ended Cables to the Single-Ended Cable.

Example: To extend the cable length to 50 m, connect two F39-JD20B (20 m) cables and one F39-JD10A (10 m) cable.

## &lt;Connection example&gt;

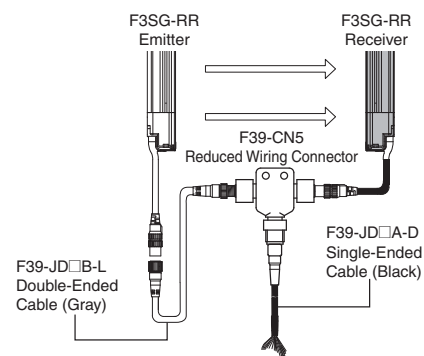
Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)  
Reduced Wiring Connector

Appearance	Specifications	Model
	IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	F39-CN5


**Note:** When using the Reduced Wiring Connector (F39-CN5), the following functions are not available.

- Manual Reset
- External Device Monitoring
- Auxiliary Output

Make sure to keep the settings in the factory default.




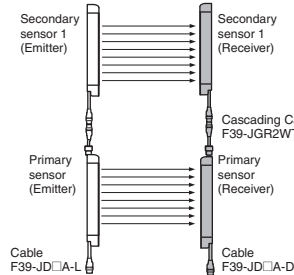
## Cable for Reduce Wiring\* (2 cables per set, one for emitter and one for receiver)

Appearance	Cable length	Specifications	Remarks	Model
	Emitter: 3 m Receiver: 3 m	IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	Double-Ended Cable: F39-JD3B-L Single-Ended Cable: F39-JD3A-D	F39-JD0303BA
	Emitter: 3 m Receiver: 7 m		Double-Ended Cable: F39-JD3B-L Single-Ended Cable: F39-JD7A-D	F39-JD0307BA
	Emitter: 3 m Receiver: 10 m		Double-Ended Cable: F39-JD3B-L Single-Ended Cable: F39-JD10A-D	F39-JD0310BA
	Emitter: 5 m Receiver: 3 m		Double-Ended Cable: F39-JD5B-L Single-Ended Cable: F39-JD3A-D	F39-JD0503BA
	Emitter: 5 m Receiver: 7 m		Double-Ended Cable: F39-JD5B-L Single-Ended Cable: F39-JD7A-D	F39-JD0507BA
	Emitter: 5 m Receiver: 10 m		Double-Ended Cable: F39-JD5B-L Single-Ended Cable: F39-JD10A-D	F39-JD0510BA
	Emitter: 10 m Receiver: 3 m		Double-Ended Cable: F39-JD10B-L Single-Ended Cable: F39-JD3A-D	F39-JD1003BA
	Emitter: 10 m Receiver: 7 m		Double-Ended Cable: F39-JD10B-L Single-Ended Cable: F39-JD7A-D	F39-JD1007BA
	Emitter: 10 m Receiver: 10 m		Double-Ended Cable: F39-JD10B-L Single-Ended Cable: F39-JD10A-D	F39-JD1010BA

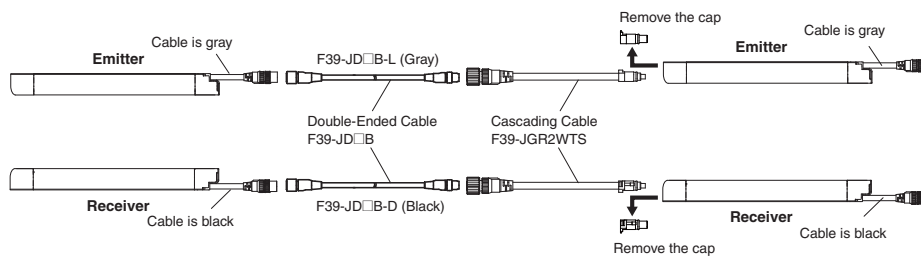
**Note:** A combination of emitter and receiver cables of other lengths than the above is also available. For details, contact your Omron representative.

\* Double-Ended Cable for emitter and Single-Ended Cable for receiver.



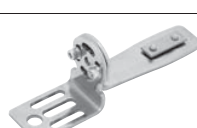

## Cascading Cable (2 cables per set, one for emitter and one for receiver)

Appearance	Type	Cable length	Specifications	Model
	Cap (8-pin), M12 connector (8-pin)	0.2 m	 <p>IP67* rated when mated.</p> <p>* When the accessory is used, protect it from cutting oil.</p>	F39-JGR2WTS

**Note:** The Double-Ended Cable (up to 10 m: F39-JD10B) can be added to extend the cable length between the series-connected sensors. Cable length between sensors: 10 m max. (not including cascading cable (F39-JGR2WTS) and power cable)



## Sensor Mounting Brackets




Appearance	Specifications	Application	Model
	Free-Location Bracket (Intermediate Bracket)	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 2 brackets. Refer to note *1 for the number of sets required for each model.)	F39-LGRA
	Top/Bottom Bracket *2	Use this bracket at the top and bottom positions of the F3SG-RR. Beam alignment after mounting possible. The angle adjustment range is $\pm 22.5^\circ$ . Side mounting and backside mounting possible. (Sold separately as a set of 4 brackets.)	F39-LGRTB
	Top/Bottom Bracket *2	The part of this bracket to contact with a wall surface has a different shape from the F39-LGRTB Top/Bottom Bracket. Use this bracket when replacing an existing safety light curtain with the F3SG-RR. (Sold separately as a set of 4 brackets.)	F39-LGRTB-2
	Top/Bottom Bracket *2	Select a bracket that fit into the existing mounting hole.	F39-LGRTB-3

\*1. Protective height of 0240 to 1200 mm: 2 sets, Protective height of 1280 to 1920 mm: 3 sets

\*2. Use the Top/Bottom Bracket in combination with the Intermediate Bracket.


Protective height of 1040 or less: The Intermediate Bracket is not required. Please purchase 1 set of Top/Bottom Brackets (F39-LGRTB(-2/-3)). Protective height of 1120 to 1920: Please purchase 1 set of Top/Bottom Brackets (F39-LGRTB(-2/-3)) and 1 set of Intermediate Brackets (F39-LGRA).

## Interface units and configuration tool SD Manager 2 \*

Appearance	Type	Specifications	Model
	SD Manager 2	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>	—
	Interface Unit	F39-GIF-1 interface unit to connect the F3SG-RR receiver to a USB port of the PC  Accessories: F39-CN1 Branch Connector (1), Connector Cap (1), 2-m Dedicated Cable (1), Instruction Manual	F39-GIF-1
	Bluetooth Communication Unit	F39-BT bluetooth unit to enable bluetooth on the F3SG-RR  IP67 rated when mated.	F39-BT


\* When the accessory is used, protect it from cutting oil.

## 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/RR. The lamp can indicate red, orange, and green colors, to which three different states can be assigned.	F39-LP
	Lamp and Bluetooth Communication Unit	IP67 rated when mated.	F39-BTLP

\* When the accessory is used, protect it from cutting oil.


## End Cap \*1 \*2

Appearance	Specifications	Model
	Housing color: Black For both emitter and receiver (Attached to the F3SG-RR. The End Cap can be purchased if lost.)  IP67 rated when mated.	F39-CNM

\*1. This accessory can also be used with the F3SG-RA.

\*2. When the accessory is used, protect it from cutting oil.

## 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

\* When the accessory is used, protect it from cutting oil.

## Test Rod





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

# Ratings and Specifications

## Main unit

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

		F3SG-4RR□□□□-14	F3SG-4RR□□□□-25
Performance	Object Resolution (Detection Capability)	Opaque objects 14-mm dia.	25-mm dia.
	Beam Gap	10 mm	20 mm
	Number of Beams	23 to 191	12 to 96
	Lens Size	5.2 × 3.4 (W × H) mm	6.0 × 5.0 (W × H) mm
	Protective Height	240 to 1920 mm	
	Operating Range	0.3 to 10.0 m	0.3 to 17.0 m
	Response Time	ON to OFF	Normal mode: 8 to 18 ms *1 Slow mode: 16 to 36 ms *1 *2
		OFF to ON	Normal mode: 40 to 90ms (synchronized), 140 to 190ms (not synchronized) *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)	±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	Refer to page 52 .	
	Safety Outputs (OSSD)	Two PNP or NPN transistor outputs (PNP or NPN is selectable by Configuration Tool.)	
		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 Configuration Tool.)	
		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	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) *
		Muting input A/B	PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 3.0 mA) * OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 5.0 mA) * NPN ON voltage: 0 V to 3 V (short circuit current: approx. 5.0 mA) OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 3.0 mA) *
		Test input	24 V Active setting: ON voltage: 9 V to Vs (short circuit current: approx. 2.5 mA) * OFF voltage: 0 V to 1.5 V or open (short circuit current: approx. 2.0 mA) 0 V Active setting: ON voltage: 0 V to 3 V (short circuit current: approx. 2.0 mA) OFF voltage: 9 V to Vs or open (short circuit current: approx. 2.5 mA) *
	* The Vs indicates a supply voltage value in your environment.		
	Overvoltage Category (IEC 60664-1)	II	
	Indicators	Refer to page 54.	
	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-RR systems.	
	Cascade Connection	Number of cascaded segments: 3 max.	
		Total number of beams: 255 max. Cable length between sensors: 10 m max. (not including cascading cable (F39-JGR2WTS) and power cable)	
	Test Function	Self-test (at power-on, and during operation) External test (light emission stop function by test input)	
Safety-Related Functions	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-4RR□□□□-14	F3SG-4RR□□□□-25
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)		IEC 60529: IP65 and IP67, JIS C 0920 Annex 1: IP67G	
	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/s², 1000 shocks for all 3 axes	
	Pollution Degree (IEC 60664-1)		Pollution Degree 3	
Connections	Power cable	Type of Connection	M12 connectors: 8-pin emitter and receiver. Cables prewired to the sensors. IP67 and IP67G (JIS C 0920 Annex 1) * rated when mated. *F3SG-RR meets the degree of protection when it is correctly connected with an F39-JD□□RA-□ Oil-Resistant cable.	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	0.3 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R36 mm	
	Cascading cable	Type of Connection	M12 connectors: 8-pin emitter and receiver. IP67 rated when mated.	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	0.3 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R5 mm	
	F39-JD□□RA-□ Oil-Resistant cable - Single-Ended Cable	Type of Connection	M12 connectors: 8-pin emitter and receiver. Cables prewired to the sensors. IP67 and IP67G (JIS C 0920 Annex 1) * rated when mated. * F3SG-RR meets the degree of protection when it is correctly connected with the power cable. The degree of protection is not satisfied with the part where cable wires are uncovered.	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	 Refer to page 46.	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R36 mm	
	Extension cable - Single-Ended Cable (F39-JD□□A) - Double-Ended Cable (F39-JD□□B)	Type of Connection	M12 connectors: 8-pin emitter and receiver. IP67 rated when mated.	
		Number of Wires	Emitter: 8, Receiver: 8	
		Cable Length	 Refer to page 46 and 47.	
		Cable Diameter	6.6 mm	
		Minimum Bending Radius	R36 mm	
	Extension of Power Cable		100 m max. (Emitter/Receiver)	
Material	Material		Housing: Aluminum alloy Cap: PBT resin Front window: Acrylic resin Cable: Fluororesin FE plate: Stainless steel	
	Weight		 Refer to page 52 .	
	Included Accessories		Safety Precautions, Quick Installation Manual, Troubleshooting Guide Sticker, Warning Zone Label, End Cap (for switching External Test Input function)	
Conformity	Conforming standards		 Refer to page 53.	
	Performance Level (PL)/Safety category		PL e/Category 4 (EN ISO 13849-1:2015)	
	PFH <sub>0</sub>		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)	

## 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.