OMRON

Safety Light Curtain

F3SG-R Series

SAFETY, TECHNOLOGY & INNOVATION

Increase both durability and productivity

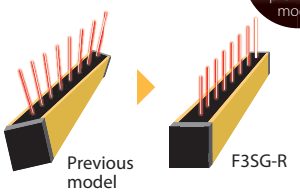
The new cutting oil resistant Robust type is added

Safety Light Curtain
F3SG-R Series

Fast set-up and high resistance to environmental changes

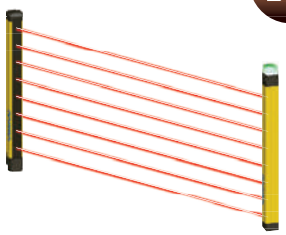
Tough 1 Resistant to vibration

Torsion resistance 5 times* greater than previous model



Tough 2 Robust against environmental changes

High power Operating range Up to 20 m



Tough 3 Reliable in dusty wash-down environments

* Compared to the previous model (Omron survey as of March 2017)

A choice of products to suit your need Multiple versions available: finger, hand and arm protection

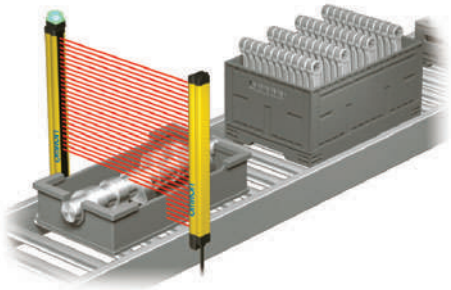
Ideal for flexible manufacturing

Multifunctional **Advanced** type

>>p.4

F3SG-RA

- Quick and easy installation
- Stable operation and predictive maintenance
- For global use
- Easy adjustment
- Easy configuration and maintenance



Even for environments where cutting oil is present

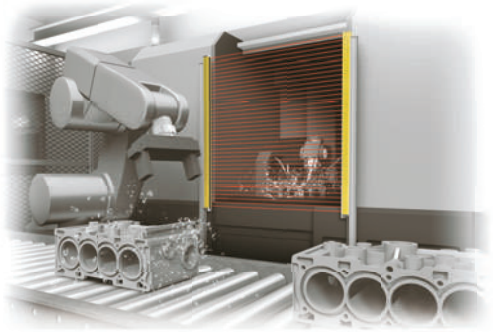
Cutting oil resistant **Robust** type

>>p.10

F3SG-RR NEW

- Four times longer* cutting oil resistance
- No dead space
- IP67G

* Compared to the previous model (Omron survey as of March 2017)



Ideal for simple applications

Simple **Easy** type

>>p.11

F3SG-RE

- Simple functions
- Reduced wiring
- Fast response time: 5 ms

Multifunctional
Advanced
type
F3SG-RA

Quick and easy installation

Intuitive and smart designs for fast set-up

Simple beam adjustment

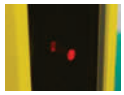
Simply watch for the top and bottom indicators to illuminate when adjustment is completed.
The optional laser pointer and lamp can be used to reduce the time required to set up the light curtain.

1 The TOP indicator turns ON when the top beam is unblocked

2 The BTM indicator turns ON when the bottom beam is unblocked

F39-PTG Laser Pointer

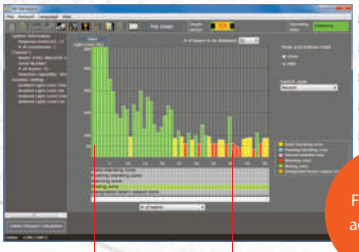
Shows the sensor direction



F39-LP Lamp

Turns ON when safety output turns ON, making adjustment easier

Also The incident light levels of each beam can be checked with the Configuration Tool SD Manager2



* Image for illustration purpose only.

Mounting brackets

Four types of mounting brackets provide vertical or vertical and horizontal adjustment even after mounting, making beam adjustment easier.

Standard fixed bracket

You can slide the F3SG-R up and down to make vertical adjustments after mounting on a safety fence.

Standard adjustable bracket
(sold separately)

This bracket provides vertical as well as horizontal adjustment of ±15°.

Top/bottom adjustable bracket
(sold separately)

Use this bracket at the top and bottom of the F3SG-R to make horizontal adjustment of ±22.5°.

Top/bottom adjustable bracket
(for user-made mounting part)
(sold separately)

The wall mounting bracket is not provided so that you can design your own wall mounting part.

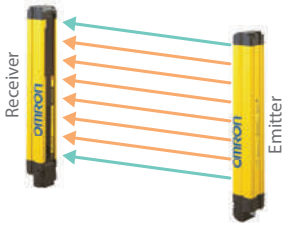
Optical synchronization – No sync lines required

Optical synchronization eliminates the need of wiring for synchronization between the emitter and receiver.
The resulting flexible wiring reduces disconnection risk and avoids noise sources.

Optical synchronization

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.

Smartclick cable connection for fast set-up

No torque-control required:
the Smartclick connectors connect cables with just a 1/8th turn of the M12 waterproof connector.

* Smartclick is a registered trademark of OMRON Corporation.

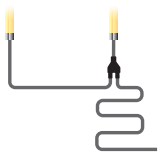
Simple wiring thanks to reduced wiring connectors

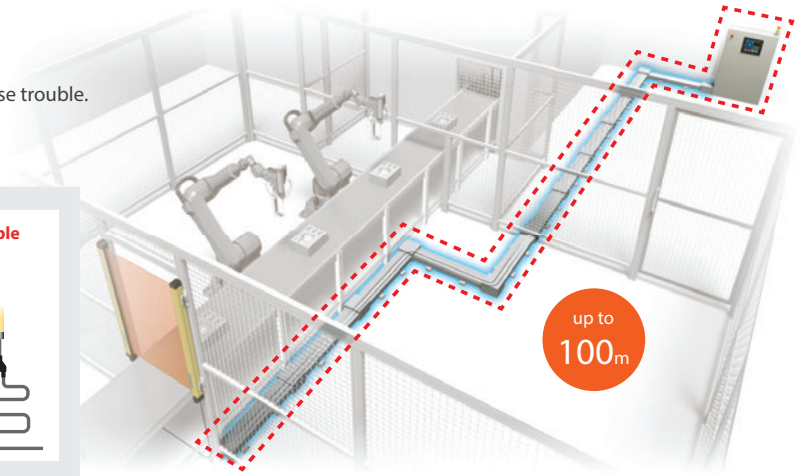
Simple wiring makes installation faster.
Fewer cables reduce disconnection risk and noise trouble.

Previously

Cables of the emitter and receiver

Only one cable





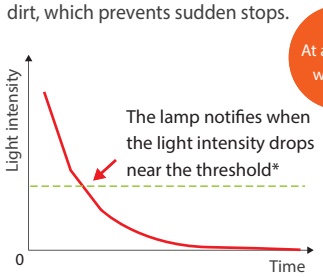
Multifunctional
Advanced
type
F3SG-**RA**

Stable operation and predictive maintenance

Visualization eliminates machine downtime

The lamp notifies low light intensity

The lamp notifies when the incident light level drops due to dirt, which prevents sudden stops.

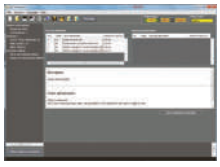


* The incident light level at which the light curtain turns OFF

F39-LP Lamp

Data logging for quick troubleshooting

The error logs stored in the F3SG-RA can be downloaded to a PC that is connected with the F3SG-RA using the dedicated interface unit. The Configuration Tool SD Manager2 can be used to analyze errors to identify causes and solutions. The data on light intensity, power-ON time, and switching frequency can also be collected regularly for predictive maintenance.



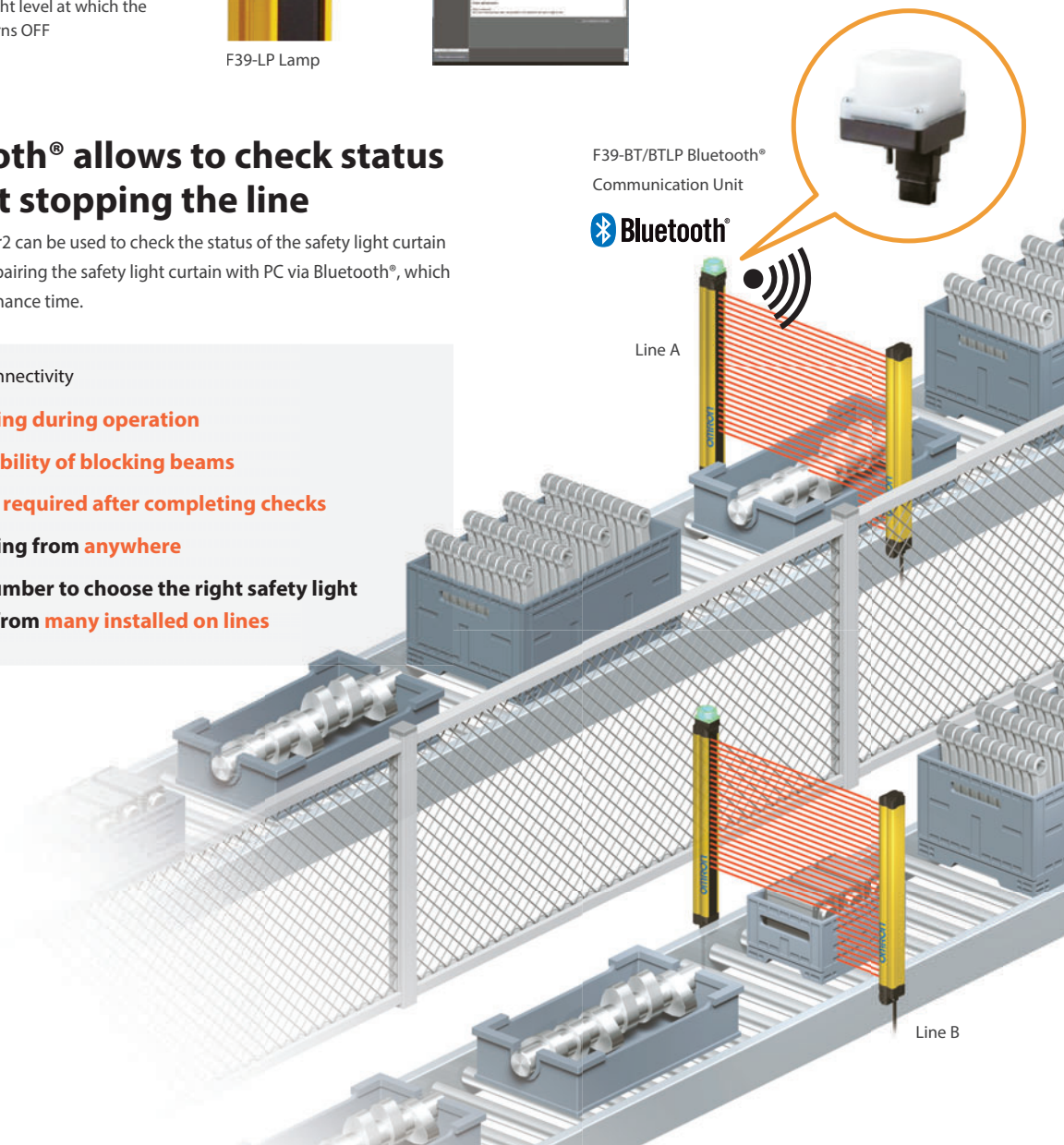
Configuration Tool SD Manager2

Bluetooth® allows to check status without stopping the line

The SD Manager2 can be used to check the status of the safety light curtain wirelessly after pairing the safety light curtain with PC via Bluetooth®, which reduces maintenance time.

Wireless connectivity

- **Monitoring during operation**
- **No possibility of blocking beams**
- **No work required after completing checks**
- **Monitoring from anywhere**
- **Serial number to choose the right safety light curtain from many installed on lines**



For global use

Easy to deploy around the world

PNP/NPN selection

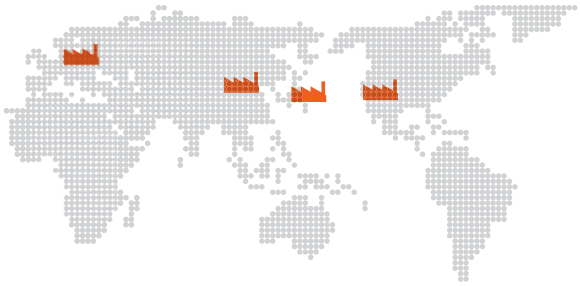
The F3SG-RA is designed to be used in a variety of environments around the world, conforming to international standards.

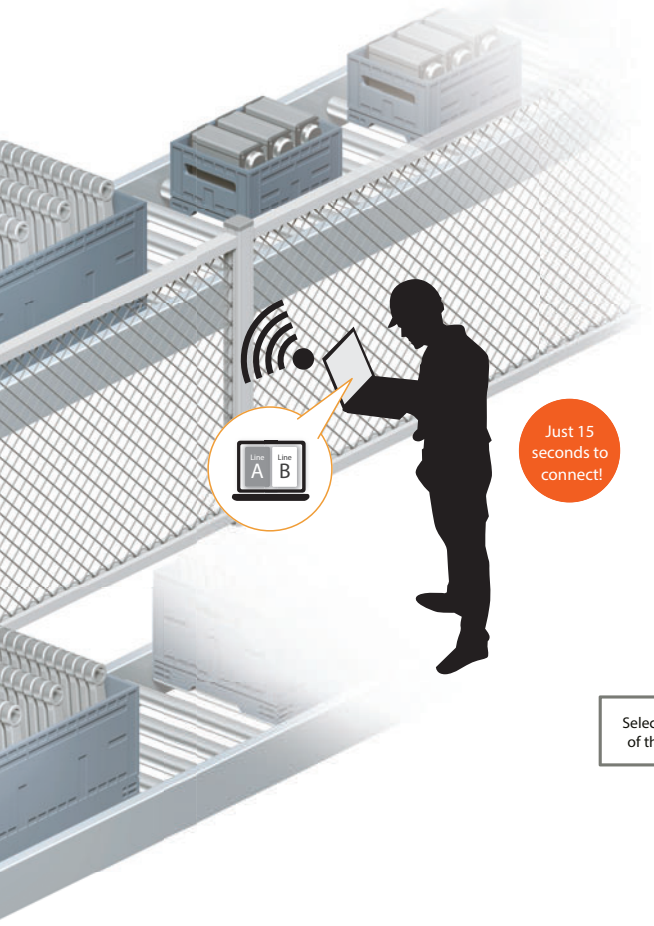
PNP or NPN can be selected with the DIP switch. The same cables are used

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

Global production and delivery

Omron enhanced the global production bases and local services in Japan, China, United States, and Europe to deliver Omron products quickly and reliably. Our sales network of approximately 150 offices in 40 countries and regions supports our customers.



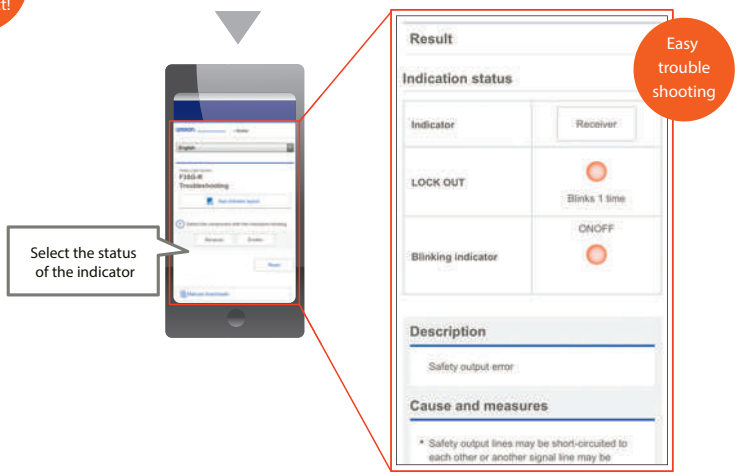


Troubleshooting in eight languages*

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

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

Scan the QR code and go directly to the troubleshooting webpage



Multifunctional
Advanced
type
F3SG-RA

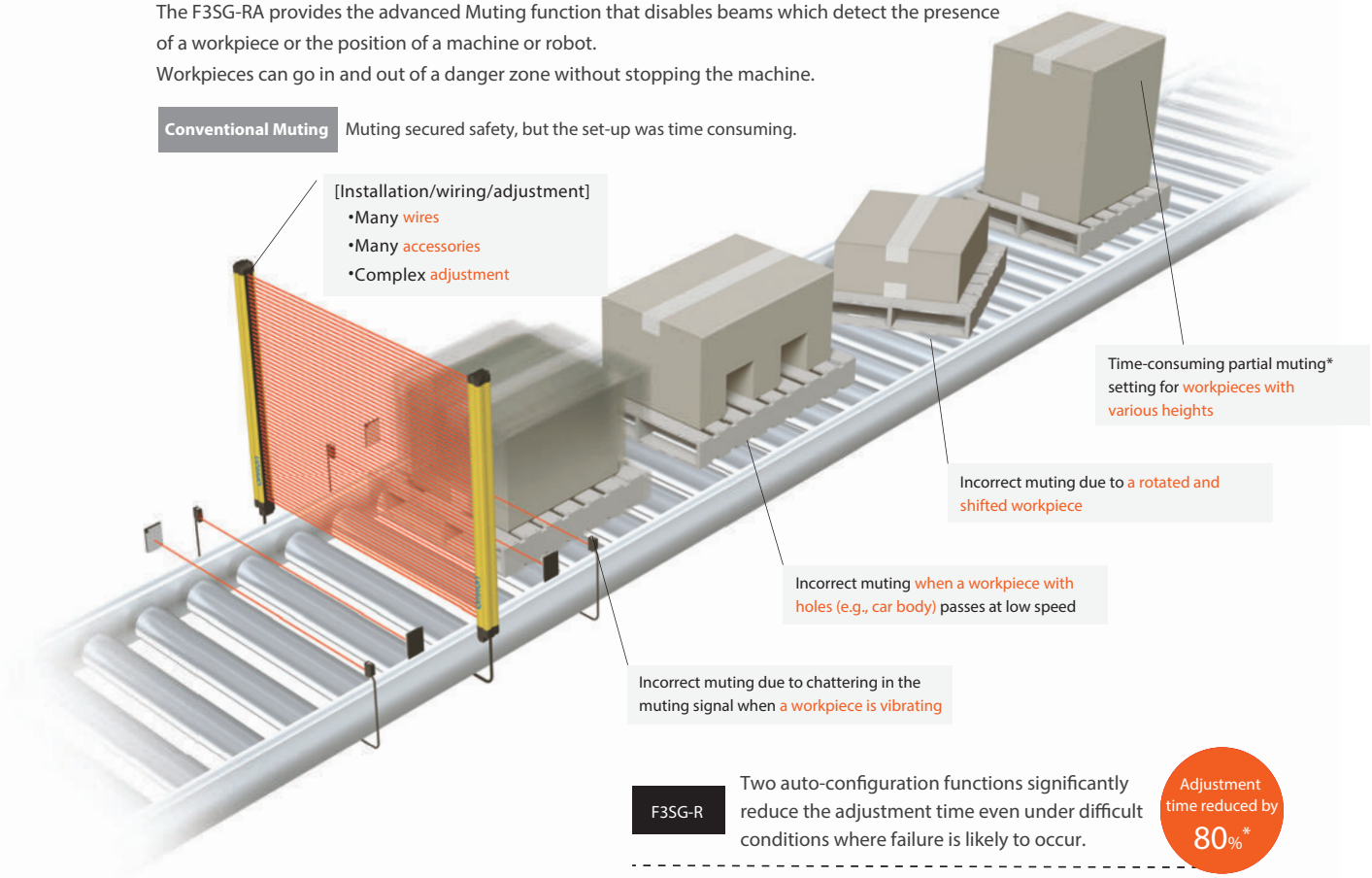
Easy adjustment

Increase productivity by detecting workpieces correctly

Muting

The F3SG-RA provides the advanced Muting function that disables beams which detect the presence of a workpiece or the position of a machine or robot.
Workpieces can go in and out of a danger zone without stopping the machine.

Conventional Muting Muting secured safety, but the set-up was time consuming.



F3SG-R Two auto-configuration functions significantly reduce the adjustment time even under difficult conditions where failure is likely to occur.

Adjustment time reduced by 80%*

* Compared to the previous model (Omron survey as of March 2017)

Multiple-beam sensor technology for vibrating workpieces

Smart muting actuator F3W-MA

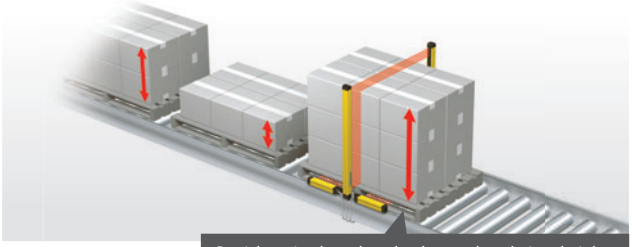
The smart muting actuator extends the functions of the F3SG-R in applications where a workpiece is vibrating forward and backward This prevents unexpected machine downtime and significantly reduces adjustment time.

Automatic and flexible detection even under unstable conveying conditions

Automatic partial muting for workpieces with various heights

Dynamic Muting

When workpieces with various heights are conveyed on the same line, the dynamic muting function automatically sets the appropriate beams, based on the height of the object.



Partial muting based on the detected workpiece height

* Partial muting: A function that allows specified beams (e.g., beams blocked by a workpiece) to be disabled, keeping others active, even during muting.

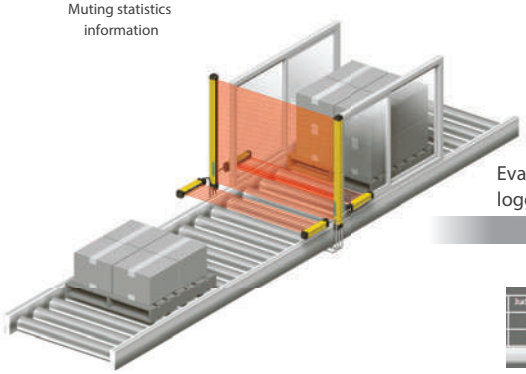
Easy configuration and maintenance

Easy to use | Configuration Tool SD Manager2

Minimizing setting and detection errors

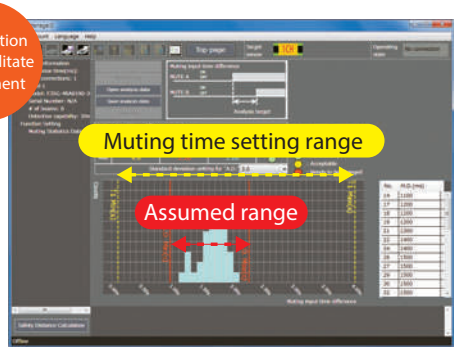
Muting statistics information

The Configuration Tool SD Manager2 visualizes the installation positions and settings by logging the muting sensor operating conditions of the F3SG-R. It helps ensure reliable, first-time-right configuration.



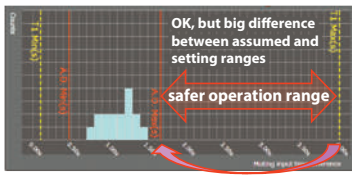
Evaluates settings using logged results

Visualization helps facilitate adjustment

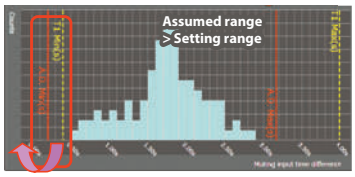


Examples of logging

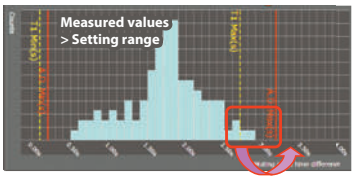
Judgment Low risk of intermittent stop, but not safe



Judgment OK in a test run, but intermittent stop may occur during long-term operations



Judgment Test run result is out of setting range. Muting sequence error occurred



From configuration and adjustment to maintenance

The SD Manager2 helps you to make and change settings.

Easy- to-understand icons

Examples

Monitoring

Incident/ambient light level monitoring

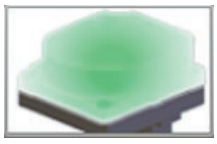
Monitor incident light levels of each beam for fine tuning

Maintenance information

Check error log and other data required for maintenance

I/O Setting

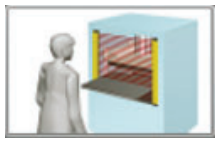
Auxiliary output/ lamp



Change the settings assigned to each output including lamp color and pattern

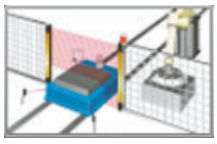
Function Setting

Fixed blanking



Set disabled beams manually or by teach-in

Muting/override



Set disabled beams and time. Setting can be evaluated

The Configuration Tool SD Manager2 is available to download from Omron website:
http://www.ia.omron.com/f3sg-r_tool

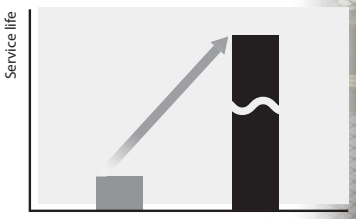
NEW
Cutting oil resistant
Robust
type
F3SG-RR

IP67G

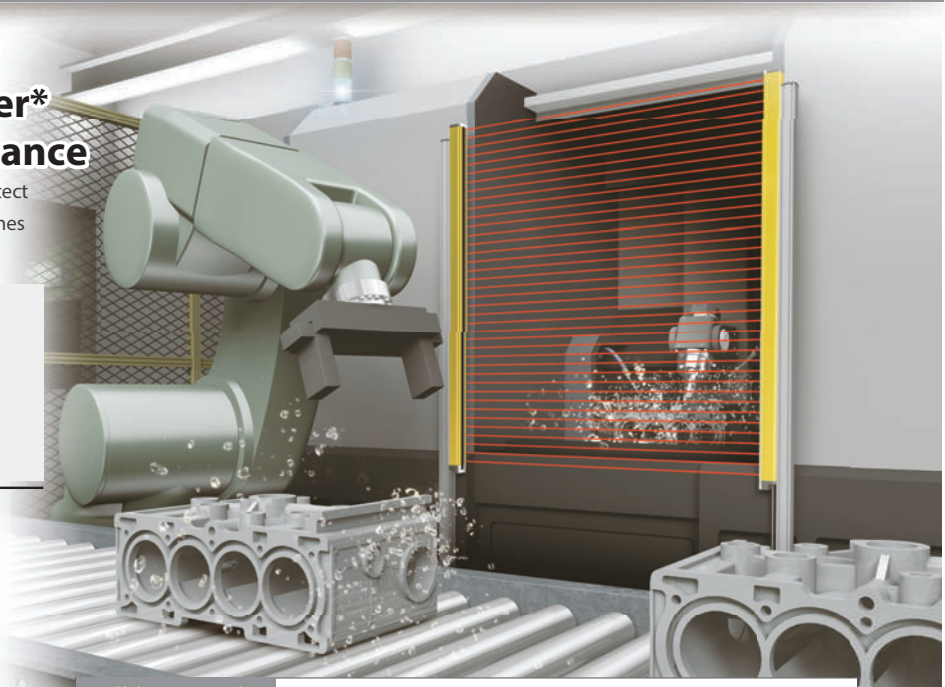
Robust design for reliable use even in cutting oil environments

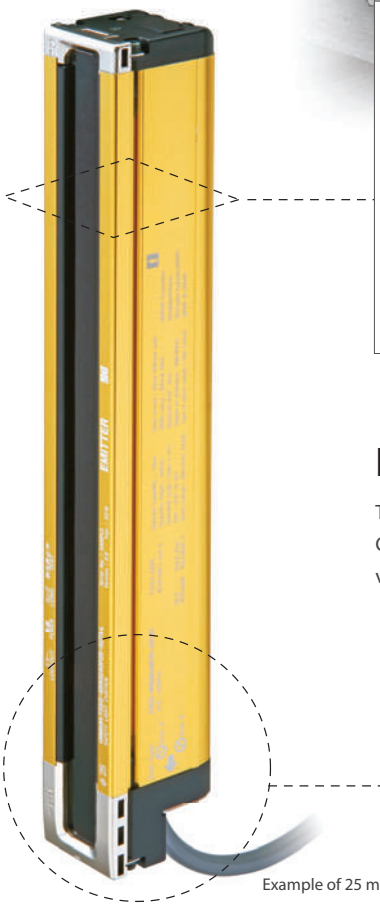
Four times longer* cutting oil resistance

The F3SG-RR has the ability to protect from cutting oil (IP67G) for four times longer than the previous model.



* Compared to the previous model (Omron survey as of March 2017)



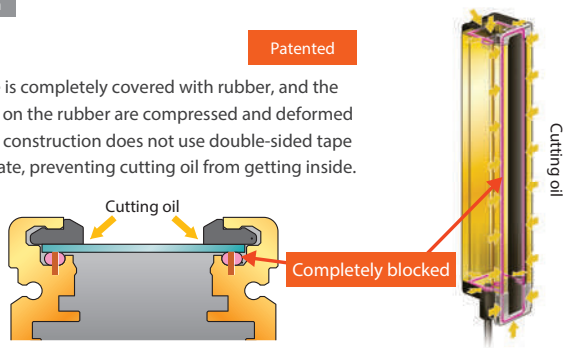


Unique construction

No gaps

Patented

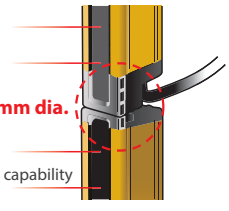
The optical surface is completely covered with rubber, and the metal parts placed on the rubber are compressed and deformed to seal tightly. This construction does not use double-sided tape that oil can penetrate, preventing cutting oil from getting inside.



No dead space

The F3SG-R perfectly fits to machines without wasting space. Thanks to the Cascade Connection function and perfect fit installation, you can series-connect light curtains to fit various protective heights, reducing inventories.

The detection zone completely covers the joint



Example of 25 mm detection capability

*1. Up to three sets of F3SG-R (up to 255 beams in total) can be series-connected.
*2. Protect cascading cables from cutting oil.

Simple
Easy
type

F3SG-RE

Reduced wiring and fast response

Simple ON/OFF detection

Easy version for cost-efficiency

The Easy type inherits the robust but slim housing and basic safety features of the Advanced type. Simple ON/OFF detection reduces errors, preventing productivity from dropping.

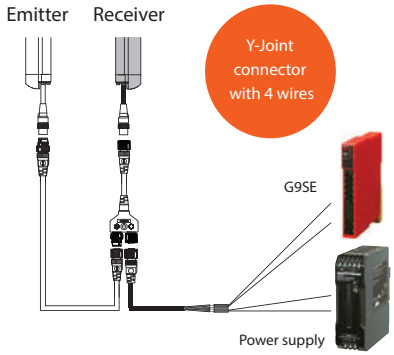
Simple safety functions to reduce errors and save costs

Reduced to just 4 wires

Fastest response time of 5 ms

Easier to build safety circuits

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.



Industry's fastest class*

Fastest response time of 5 ms

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

* Omron survey as of March 2017

Also

Use easy-to-obtain cables

Commercially available M12 connector cables can be used as extension cables to build a safety circuit.

List of specifications and features

		Advanced type		Robust type	
		F3SG-RA		F3SG-RR	
					
Application	Finger protection	●		●	
	Hand and arm protection		●		●
	Body protection				
Specification	Detection capability	14-mm dia.	30-mm dia.	14-mm dia.	25-mm dia.
	Beam gap	10 mm	20 mm	10 mm	20 mm
	Operating range	0.3 to 10 m	0.3 to 20 m	0.3 to 10 m	0.3 to 17 m
	Protective height	160 to 2,080 mm	190 to 2,510 mm	240 to 1,920 mm	
	Number of beams	15 to 207	8 to 124	23 to 191	12 to 96
Feature	PNP/NPN Selection	●		●	
	External Test	*1		*1	
	Interlock	● ●		●	
	Pre-Reset	● ●		●	
	External Device Monitoring (EDM)	● ●		●	
	Auxiliary Output	● ●		●	
	Muting	● ●		●	
	Blanking	● ●		●	
	Reduced Resolution	●		●	
	Warning Zone	●		●	
	Scan Code Selection	●		●	
	Operating Range Selection	●		–	
	Response Time Adjustment	●		●	
	Designated Beam Output	●		●	
Connection/ wiring	Cascade Connection				
	Reduced wiring				
Environmental resistance	Degree of protection	IP67		IP67,IP67G	
Accessory	Lamp	●		●	
	Bluetooth communication unit	●		●	
	SD Manager2	●		●	
	Laser pointer	●		●	
More information		Page 16 (F3SG-RA-01TS : Page 93, F3SG-RA-02TS : Page 120*2)		Page 44	

*1. Supports PNP/NPN by switching between 0 V and 24 V active.
*2. The F3SG-RA-☐TS has different specifications. See the pages listed above for details.

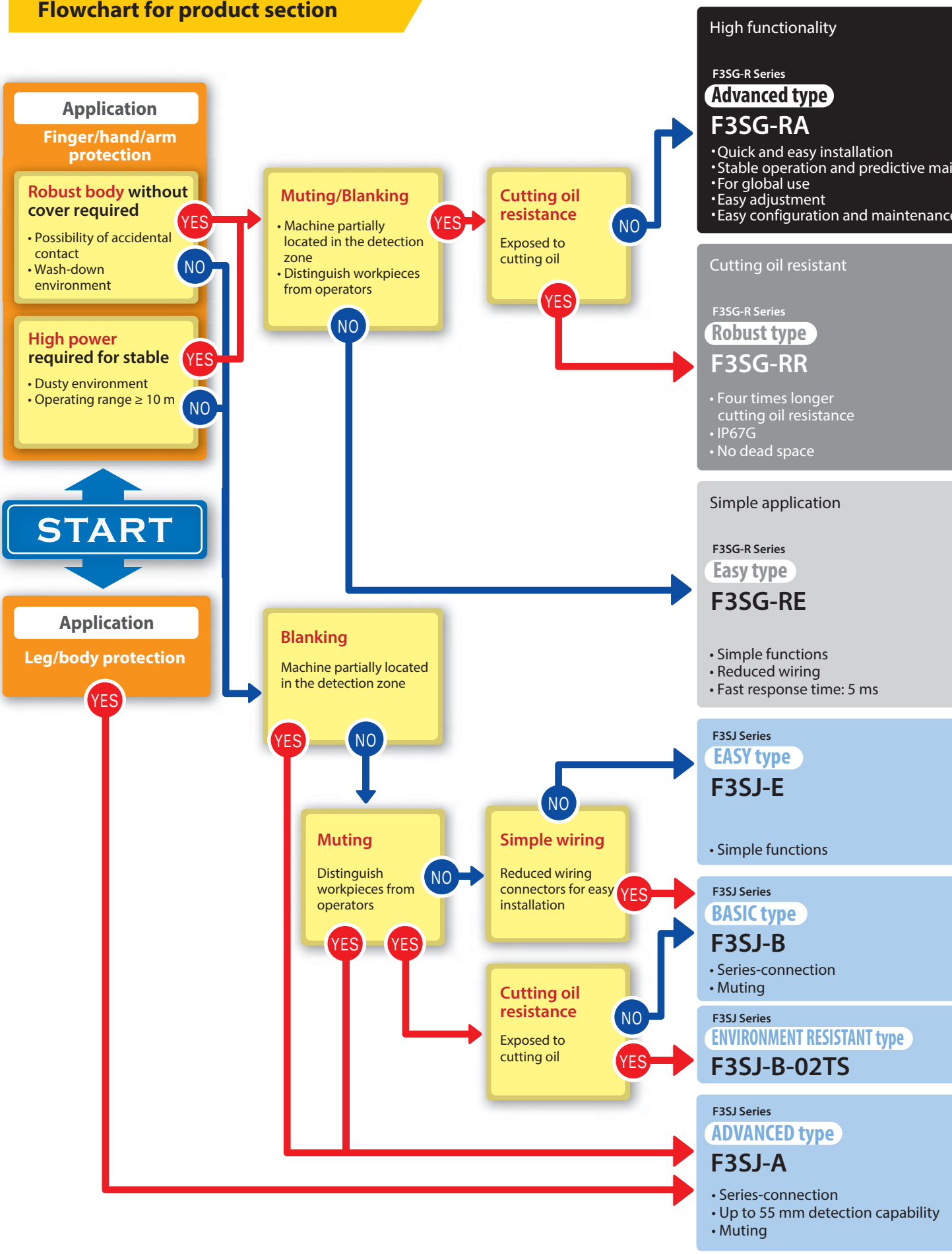
● Setting by DIP Switch ● Setting by Configuration Tool ● Setting by Wiring ● Setting by End Cap/Key Cap

	Easy type		More slim – F3SJ Series				
	F3SG-RE		F3SJ-E	F3SJ-B	F3SJ-A		
	Ideal for simple applications 						
	●				●	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.

Refer to the F3SJ Series Catalog (Cat. No. F074) or visit the Omron website for details of the F3SJ Series. **For details** F3SJ Search **www.ia.omron.com/**

Flowchart for product section



Protective height	Specifications	Brackets	Cable	Accessories (sold separately)

ntenance

e

14-mm dia.
160 to 2,080 mm
(15 to 207 beams)
30-mm dia.
190 to 2,510 mm
(8 to 124 beams)

Detection capability
14-mm dia./30-mm dia.

Beam gap
10 mm/20 mm

Operating range
0.3 to 10 m/
0.3 to 20 m

Accessory
・Standard fixed bracket

Sold separately
・Standard adjustable bracket
・Top/bottom adjustable bracket
・Top/bottom adjustable bracket
(for user-made mounting part)

Connector

- Single/double-ended connector cable
- Cascading cable
- Reduced wiring connector
- Laser pointer
- Spatter protection cover
- Lamp
- Bluetoothcommunication unit
- SD Manager2

* The F3SG-RA-□TS has different specifications.
See the following pages:F3SG-4RA-01TS: p. 93 F3SG-RA-02TS: p. 120

See **p.16** for details.

14-mm dia.
240 to 1,920 mm
(23 to 191 beams)
25-mm dia.
240 to 1,920 mm
(12 to 96 beams)

Detection capability
14-mm dia./25-mm dia.

Beam gap
10 mm/20 mm

Operating range
0.3 to 10 m/
0.3 to 17 m

Sold separately
・Free-Location Bracket (Intermediate Bracket)
・Top/bottom Bracket (3types)

Connector

- Single/double-ended connector cable
- Cascading cable
- Reduced wiring connector
- Laser pointer
- Lamp
- Bluetooth communication unit
- SD Manager2

See **p.44** for details.

14-mm dia.
160 to 2,080 mm
(15 to 207 beams)
30-mm dia.
190 to 2,510 mm
(8 to 124 beams)

Detection capability
14-mm dia./30-mm dia.

Beam gap
10 mm/20 mm

Operating range
0.3 to 10 m/
0.3 to 20 m

Accessory
・Standard fixed Bracket

Sold separately
・Standard adjustable bracket
・Top/bottom adjustable bracket
・Top/bottom adjustable bracket
(for user-made mounting part)

Connector

- Single/double-ended connector cable
- Reduced wiring connector
- Laser pointer
- Spatter protection cover

See **p.73** for details.

25-mm dia.
185 to 1,105 mm
(8 to 54 beams)

Detection capability
25-mm dia.

Beam gap
20 mm

Operating range
0.2 to 7 m

25-mm dia.
185 to 2,065 mm
(8 to 102 beams)

Detection capability
25-mm dia.

Beam gap
20 mm

Operating range
0.2 to 7 m

* ENVIRONMENT RESISTANT type
Protective height: 225 to 1,985 mm Operating range: 0.2 to 6 m

14-mm dia.
245 to 1,271 mm
(26 to 140 beams)

Detection capability
14-mm dia. -

Beam gap
9 mm -

Operating range
0.2 to 9 m

* When the minimum object resolution is 14 mm and the beam gap is 9 mm.

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

www.ia.omron.com/

F3SJ Search

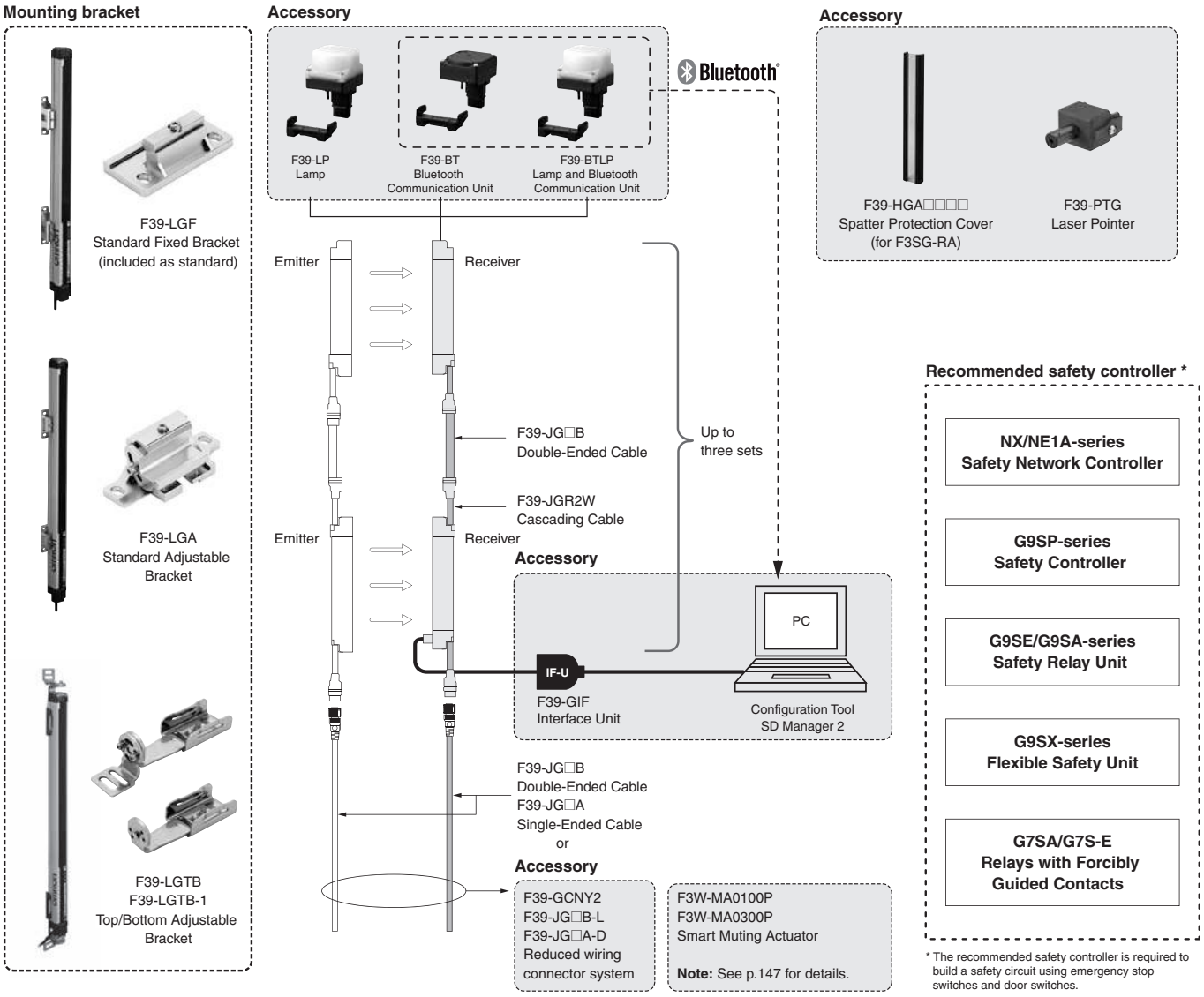
Safety Light Curtain Advanced type

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**

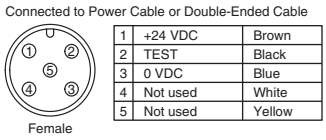
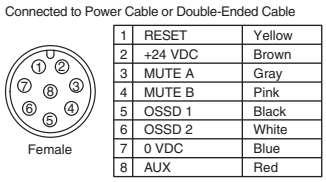
Hand and arm protection

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 *

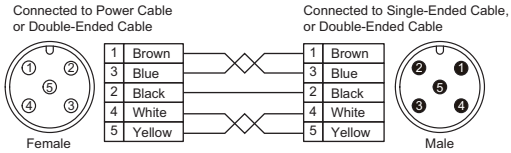
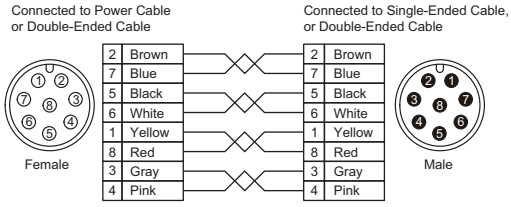
Appearance	Type	Cable length	Specifications	Model
	For emitter M12 connector (5-pin), 5 wires Color: Gray	3 m		**F39-JG3A-L**
		7 m		**F39-JG7A-L**
		10 m		**F39-JG10A-L**
		15 m		**F39-JG15A-L**
		20 m		**F39-JG20A-L**
	For receiver M12 connector (8-pin), 8 wires Color: Black	3 m		**F39-JG3A-D**
		7 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 *

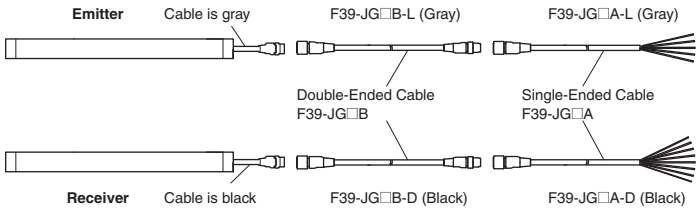
For cable extension and simple wiring

Appearance	Type	Cable length	Specifications	Model
	For emitter M12 connector (5-pin) on both ends Color: Gray	0.5 m		**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		**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**

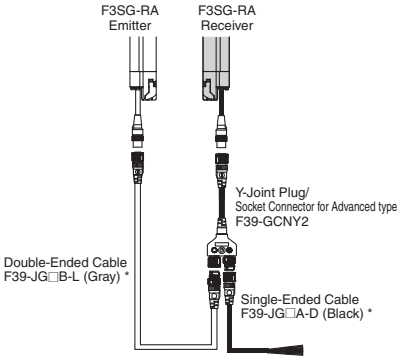
* A set of two Double-Ended Cables (one for emitter and one for receiver) is also available.
Model: Model number without the -L/-D at the end (F39-JG□B)

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>

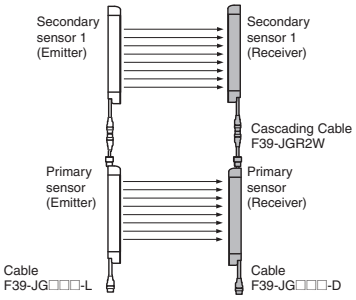


Y-Joint Plug/Socket Connector for F3SG-4RA□□□□-14/-4RA□□□□-30
For reduced wiring

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

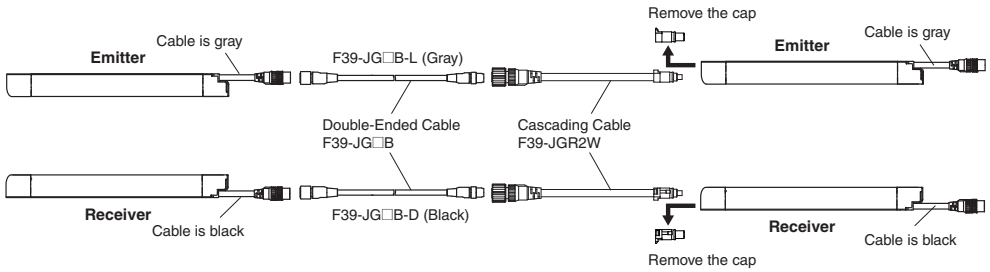
* Order the cable for emitter (end of model: -L) and the cable for receiver (end of model: -D).

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.)	**F39-LGF**
	Standard Adjustable Bracket	Bracket to mount the F3SG-R. Beam alignment after mounting possible. The angle adjustment range is ±15°. 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 ±22.5°. 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 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 http://www.ia.omron.com/f3sg-r_tool. 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. The lamp can indicate red, orange, and green colors, to which three different states can be assigned. IP67 rated when mated.	**F39-LP**
	Lamp and Bluetooth Communication Unit		**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	F3SG-4RA□□□□-14/-30	
		Type 2	F3SG-2RA□□□□-14/-30	
Performance	Object Resolution (Detection Capability)		Opaque objects	
			14-mm dia.	30-mm dia.
	Beam Gap		10 mm	20 mm
	Number of Beams		15 to 207	8 to 124
	Lens Size		5.2 × 3.4 (W × H) mm	7-mm dia.
	Protective Height		160 to 2080 mm (6.3 to 81.9 inch)	190 to 2510 mm (7.3 to 98.7 inch)
	Operating Range	Long	0.3 to 10.0 m (1 to 32 ft.)	0.3 to 20.0 m (1 to 65 ft.)
		Short	0.3 to 3.0 m (1 to 10 ft.)	0.3 to 7.0 m (1 to 23 ft.)
	Response Time	ON to OFF	Normal mode: 8 to 18 ms max. *1 Slow mode: 16 to 36 ms max. *1 *2	
		OFF to ON	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 *Safety Light Curtain F3SG-R Series User's Manual (ManNo.: Z352)* for 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 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	Light-ON (Safety output is enabled when the receiver receives an emitting signal.)	
		Auxiliary Output	Safety output (Inverted signal output:Enable) (default) (Cofigurable 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 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/s^2, 1000 shocks for all 3 axes	
	Pollution Degree (IEC 60664-1)		Pollution Degree 3	
Connections	Power cable	Type of Connection	M12 connectors: 5-pin emitter and 8-pin receiver, IP67 rated when mated, Cables prewired to the sensors	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	0.3 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R5 mm	
	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_D		1.1×10^{-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.

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 Directive2014/30/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 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

* 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 ×1
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^2 , 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)

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.

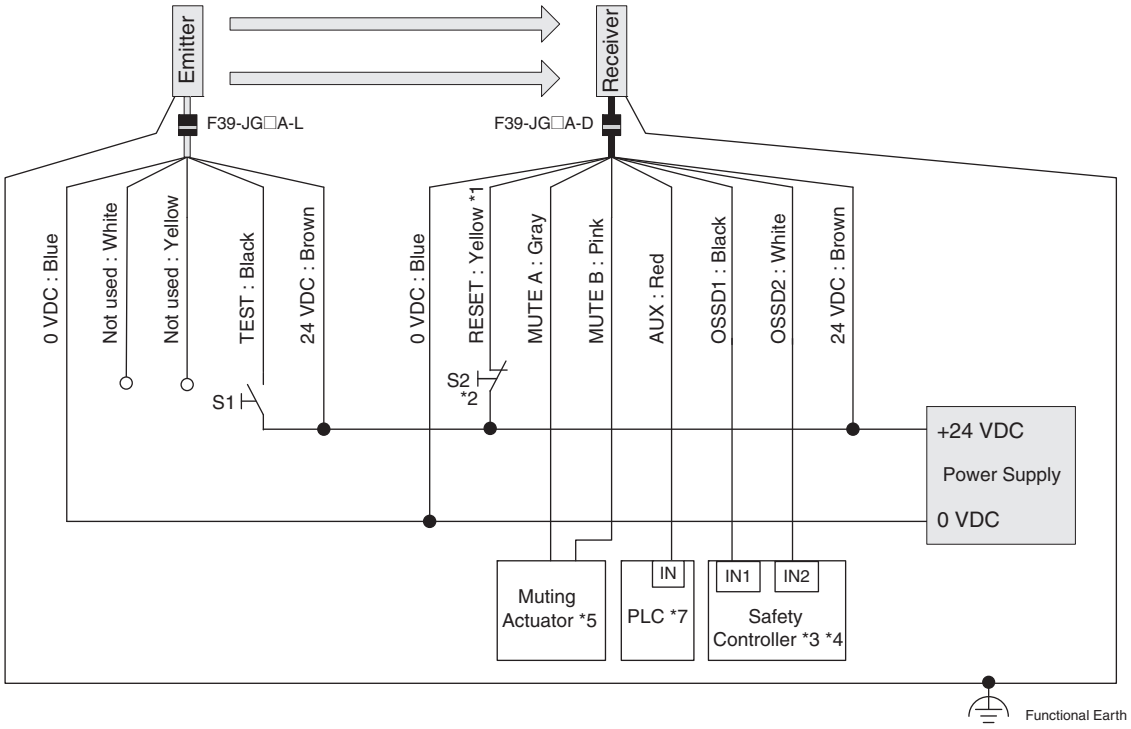
DIP Switch settings *6

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ■ ON	2 ■ ON
	Auto Reset (factory default setting)	3 ■ ON	3 ■ ON
		4 ■ ON	4 ■ ON
	PNP (factory default setting)	7 ■ ON	7 ■ ON
Emitter	External Test: 24 V Active (factory default setting)	4 ■ ON	

□: Indicates a switch position.

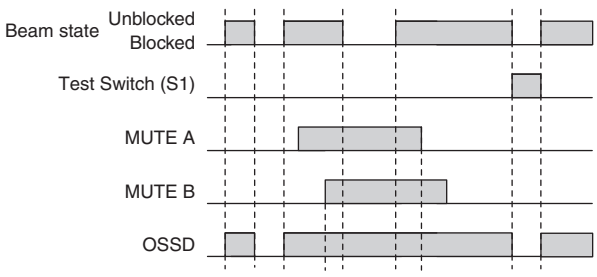
Configure functions with the DIP Switches before wiring.

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.

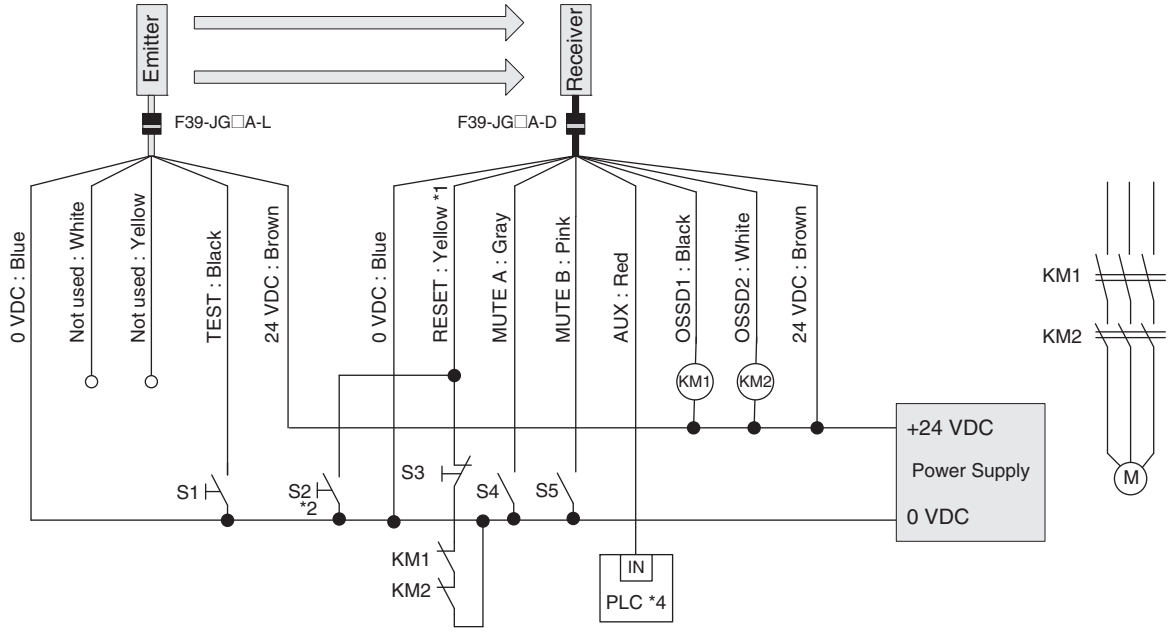
DIP Switch settings *3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ■□ ON	2 ■□ ON
	Auto Reset (factory default setting)	3 □■ ON	3 □■ ON
		4 □■ ON	4 □■ ON
	NPN	7 ■□ ON	7 ■□ ON
Emitter	External Test: 0 V Active	4 ■□ ON	

□: Indicates a switch position.

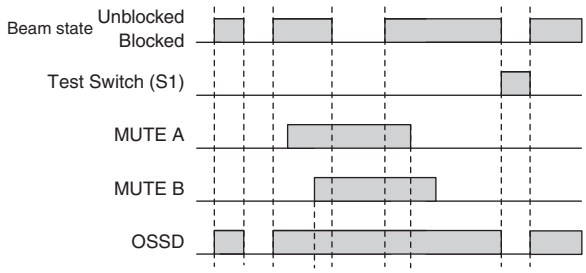
Configure functions with the DIP Switches before wiring.

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.

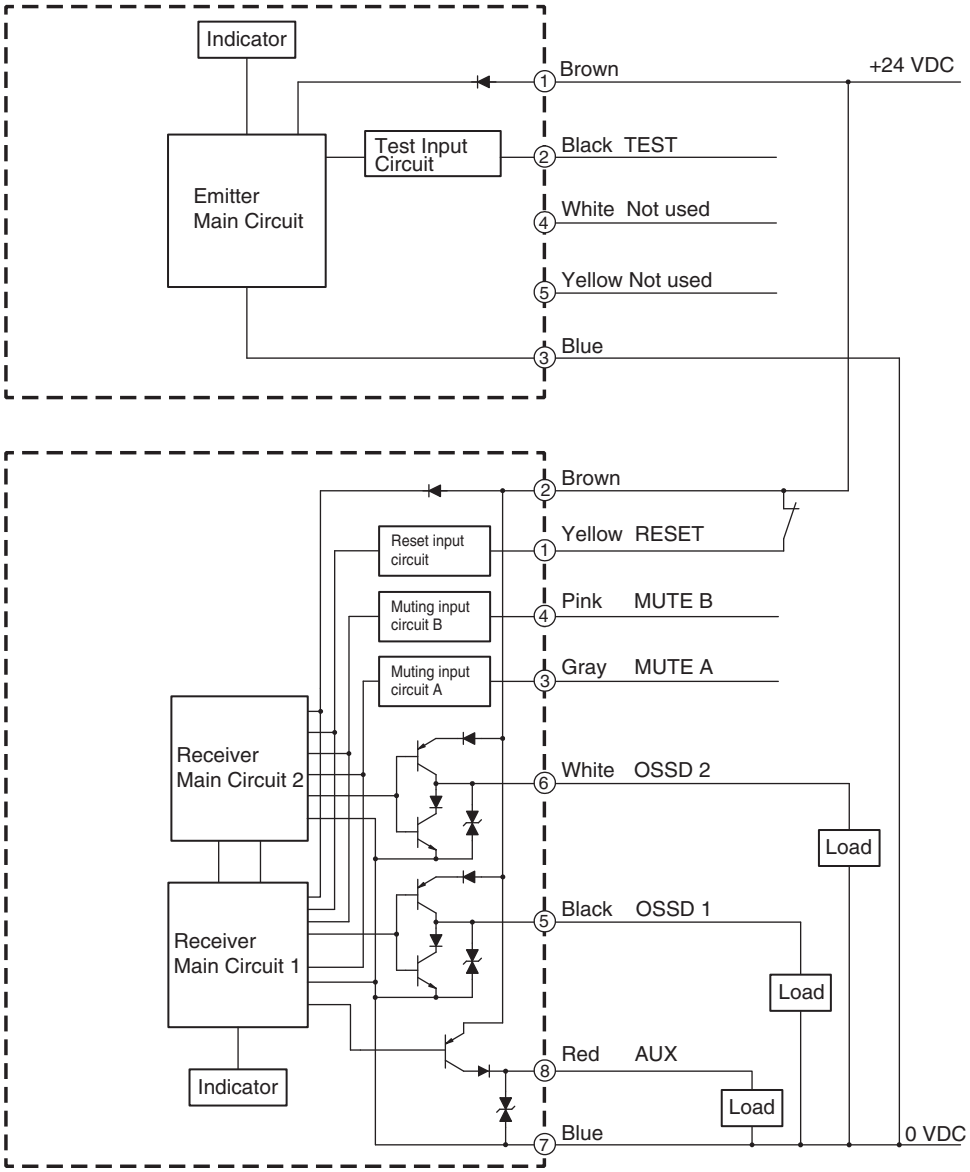
Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

Input/Output Circuit

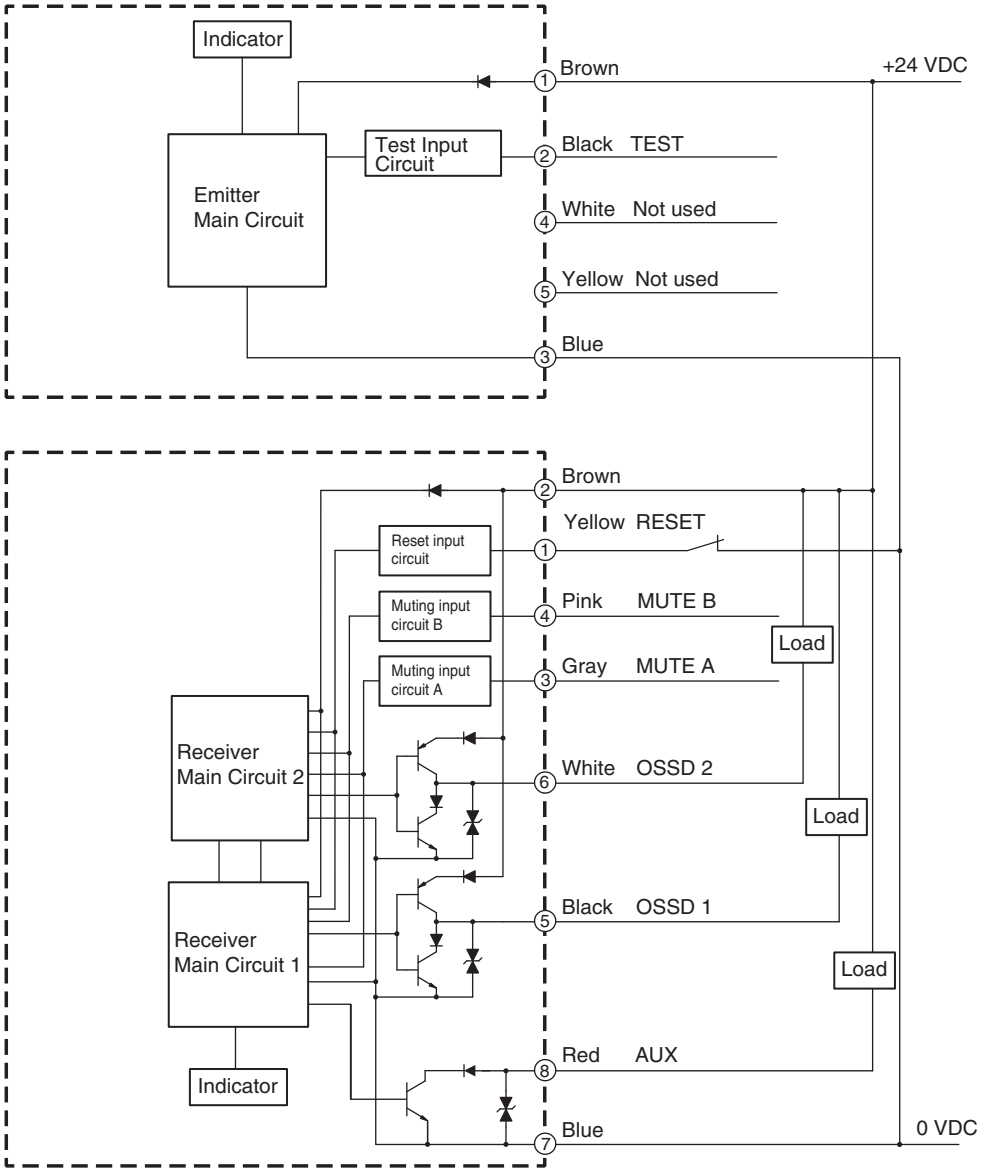
Entire Circuit Diagram

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

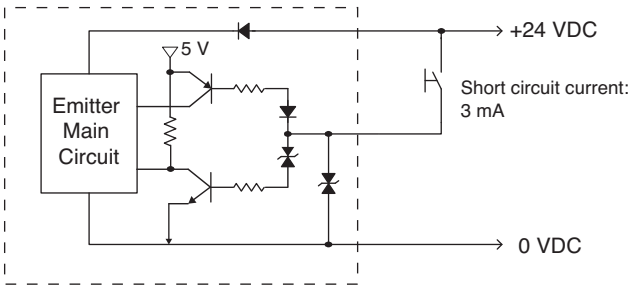

Indicator
Emitter
Main Circuit
Test Input
Circuit
Brown
+24 VDC
Black TEST
White Not used
Yellow Not used
Blue
Brown
Yellow RESET
Reset input
circuit
Muting input
circuit B
Muting input
circuit A
Pink MUTE B
Gray MUTE A
Load
Receiver
Main Circuit 2
White OSSD 2
Load
Receiver
Main Circuit 1
Black OSSD 1
Load
Indicator
Red AUX
Blue
0 VDC

Input Circuit Diagram by Function

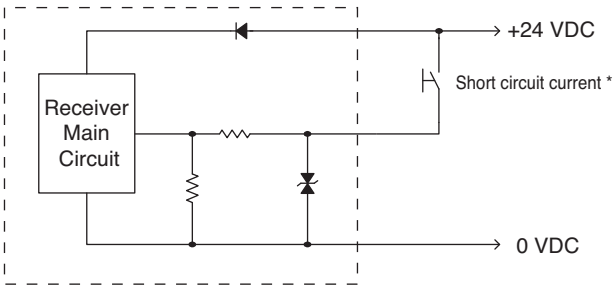
The input circuit diagrams of by function are shown below.

PNP Output

<Input circuit (Test input)>

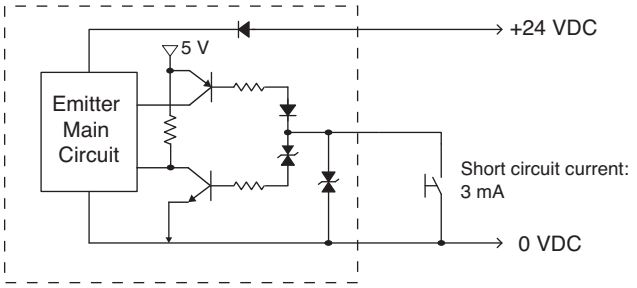


<Input circuit (Reset input, Muting inputs A/B)>

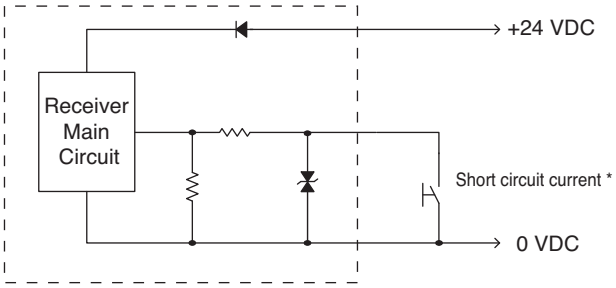


NPN Output

<Input circuit (Test input)>



<Input circuit (Reset, Muting inputs A/B)>



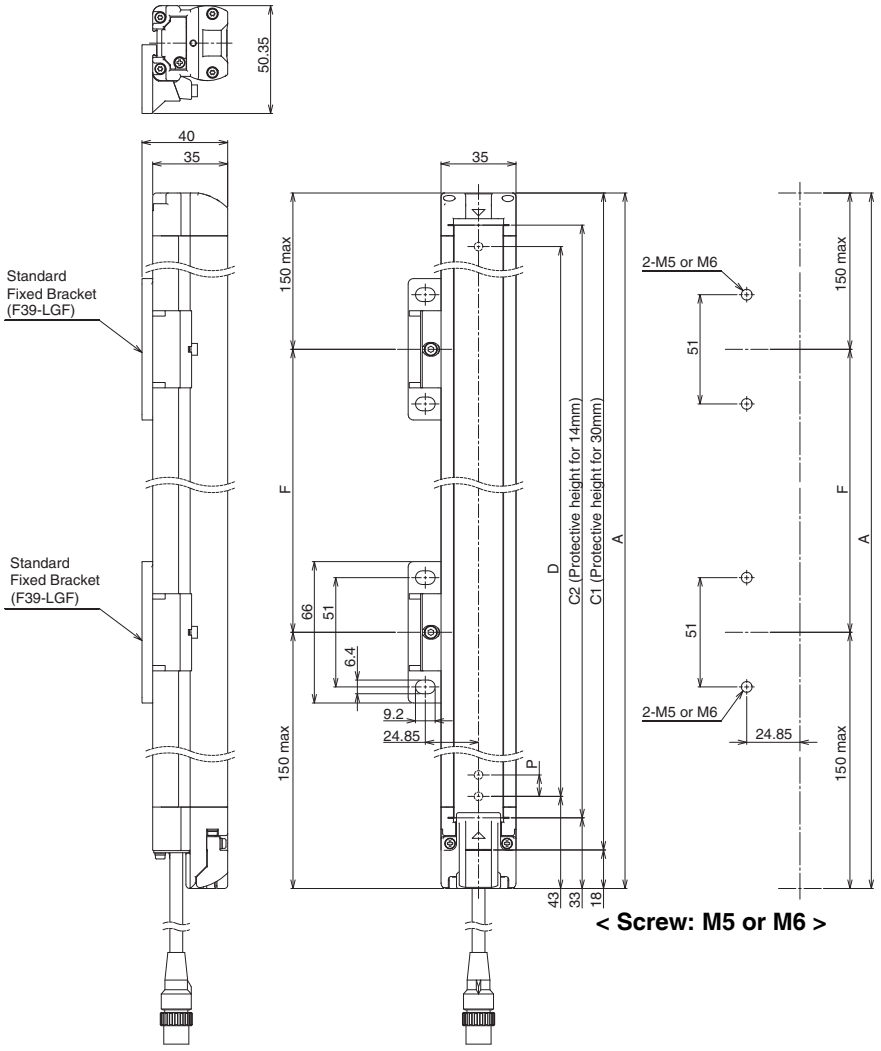
*Short circuit current: 5mA (Reset input), 3mA (Muting inputs A/B)

Dimensions

(Unit: mm)

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

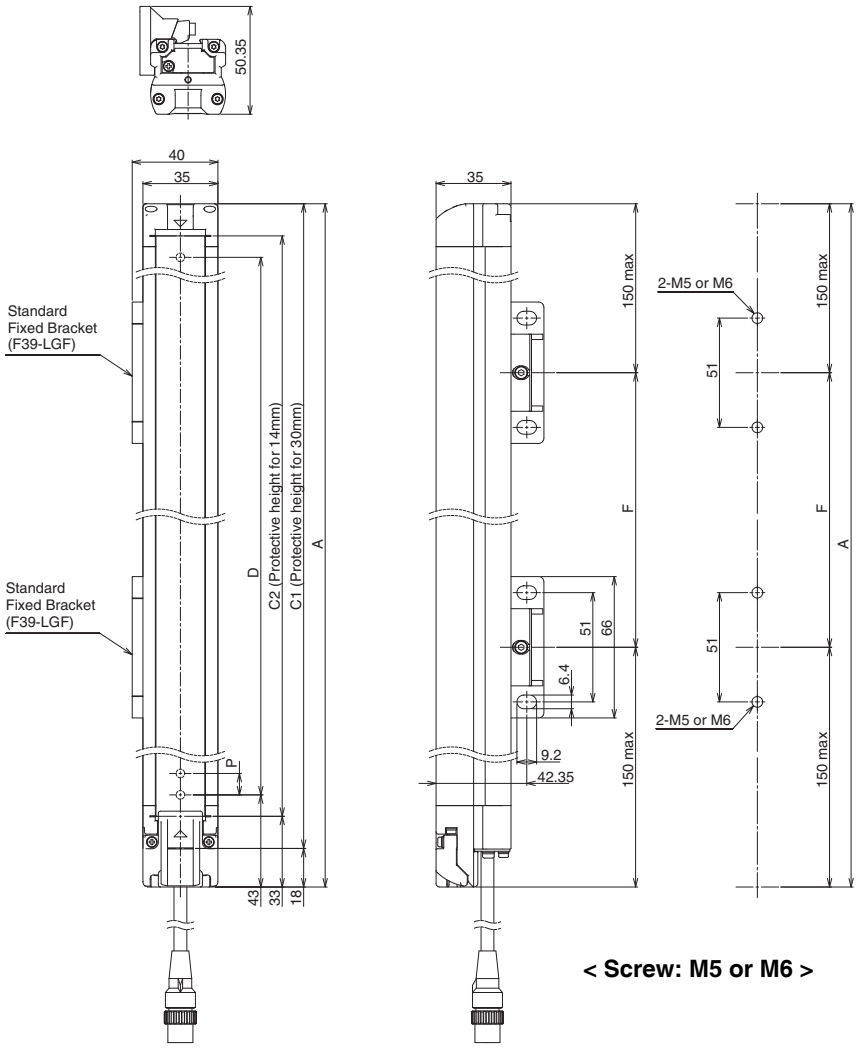
Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

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

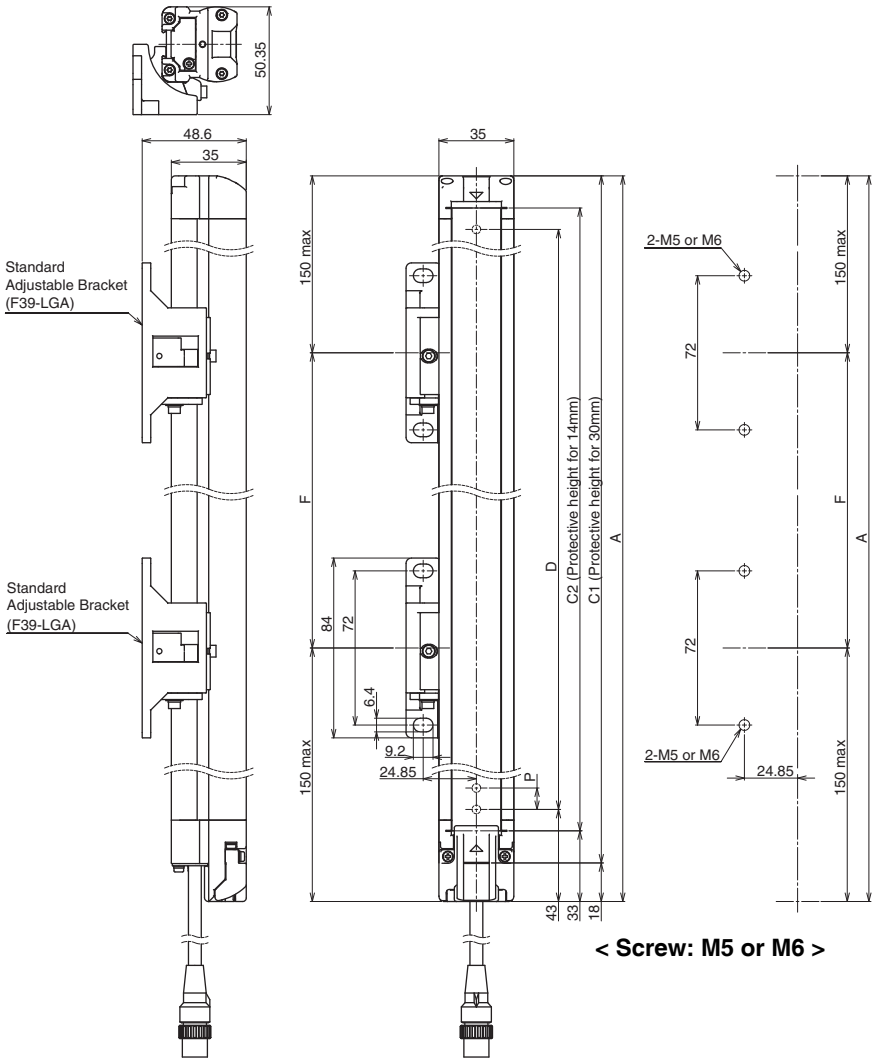
Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

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).

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
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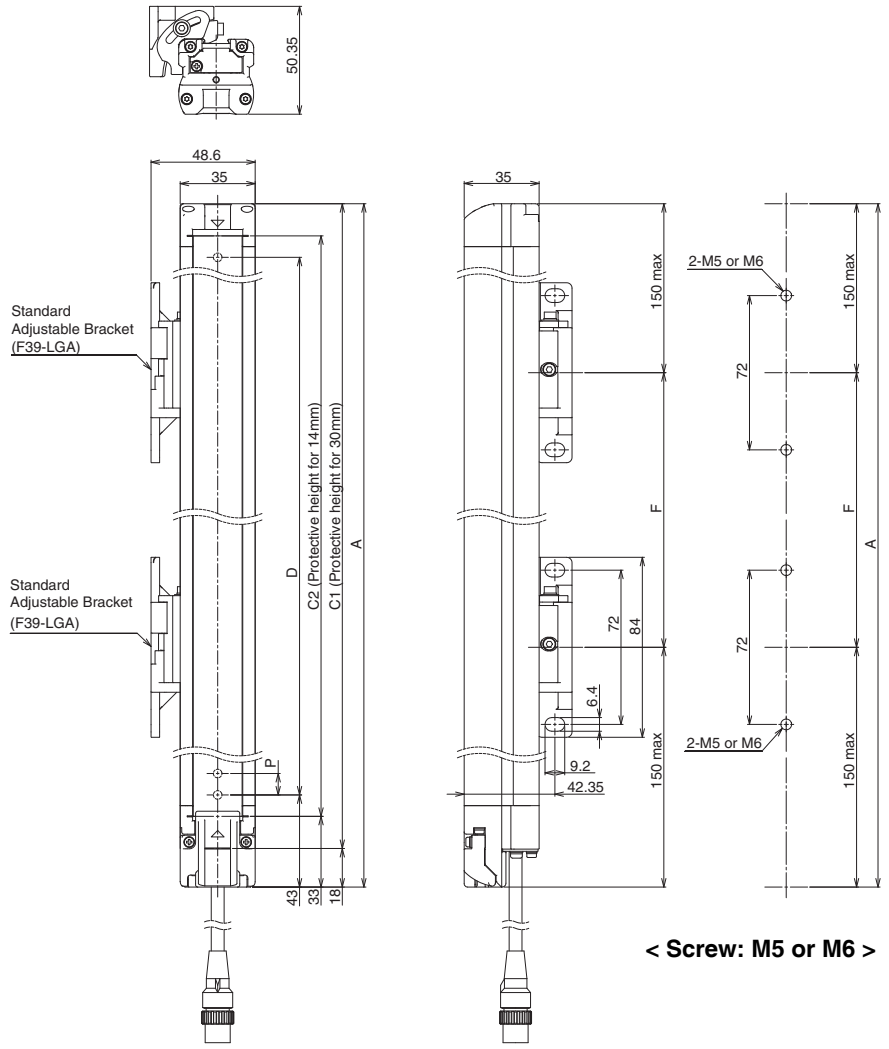
1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

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

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
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1310 to 2270	3	1000 mm max.
2350 to 2510	4	1000 mm max.

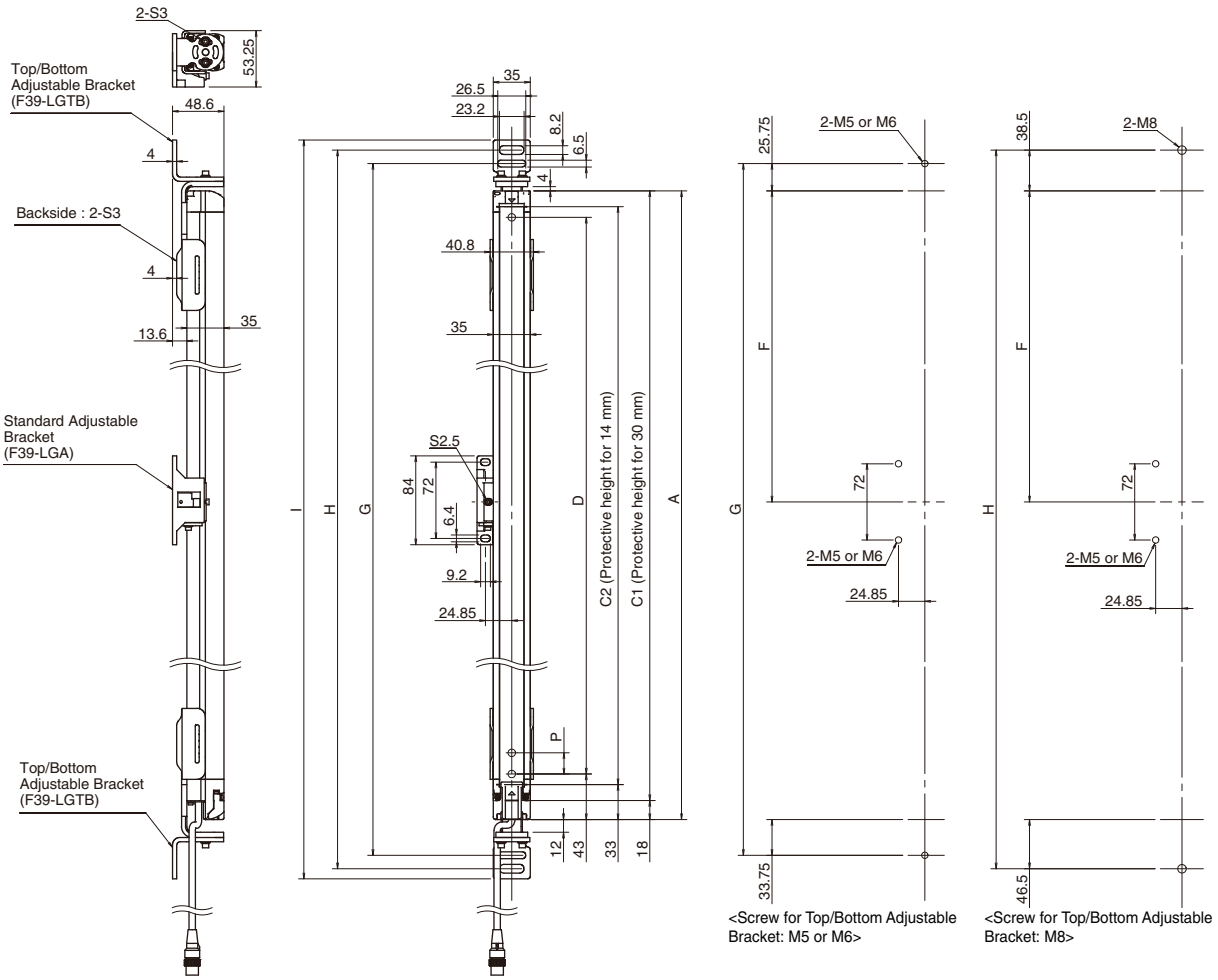
Protective height (C2)	Number of Standard Adjustable Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

*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).

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

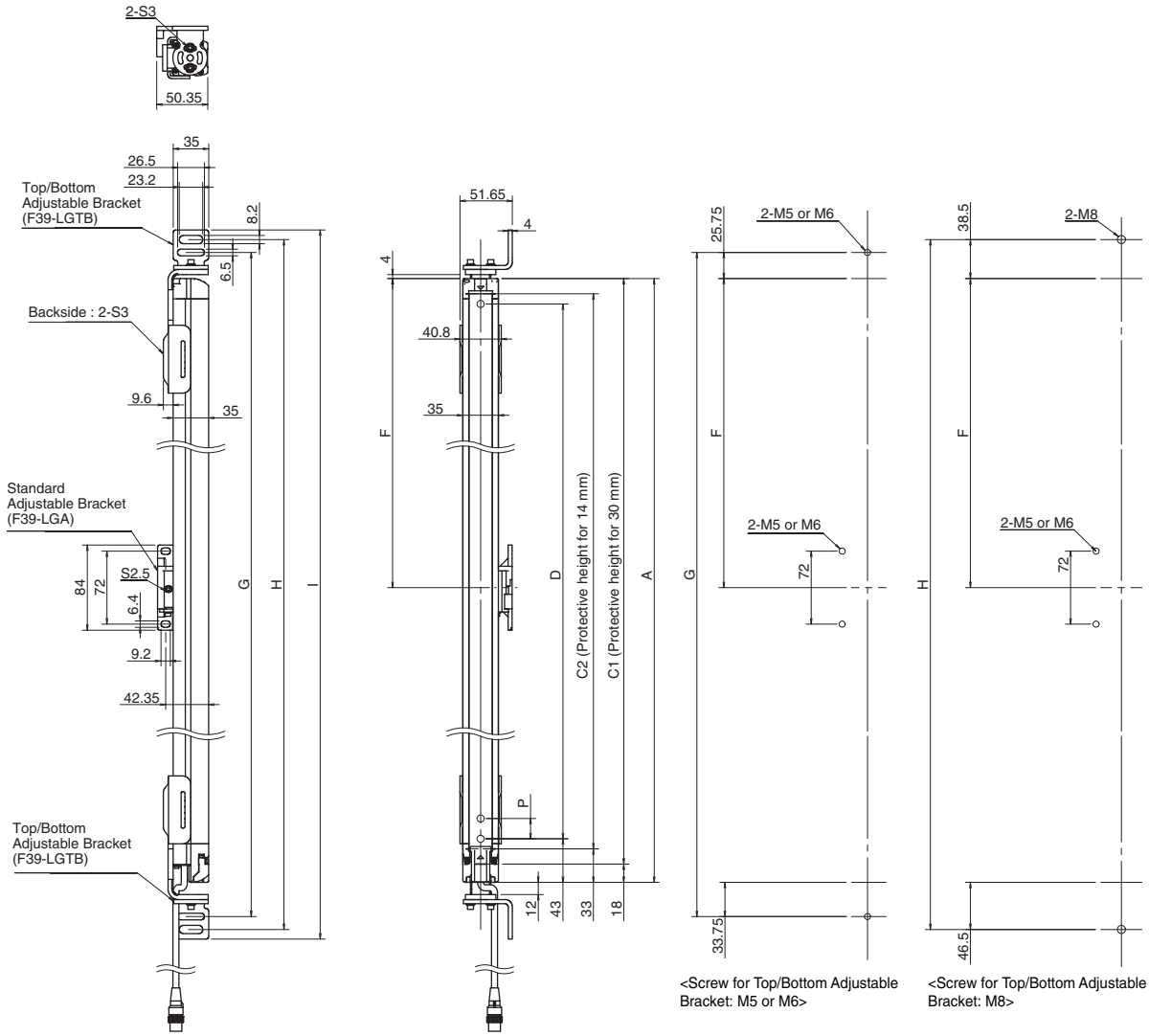
F3SG-□RA□□□□-14 Series

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

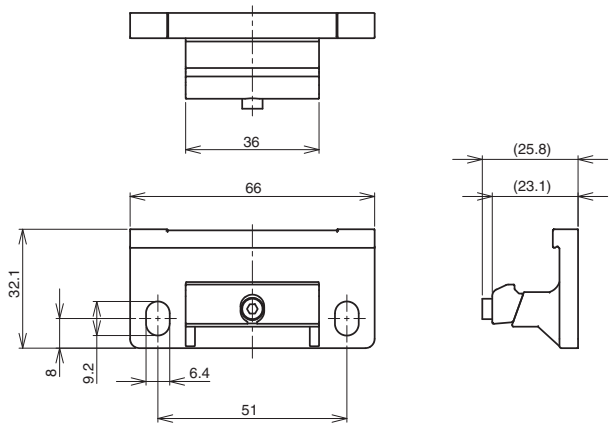
Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension G	C2+107.5
Dimension H	C2+133
Dimension I	C2+152
Dimension P	10

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.

Accessories

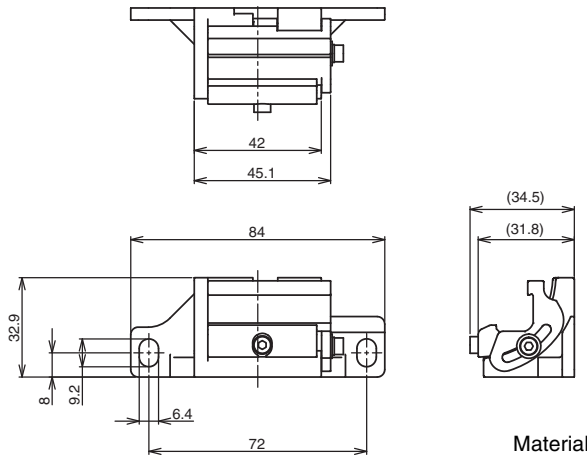
Sensor Mounting Brackets

Standard Fixed Bracket (F39-LGF)



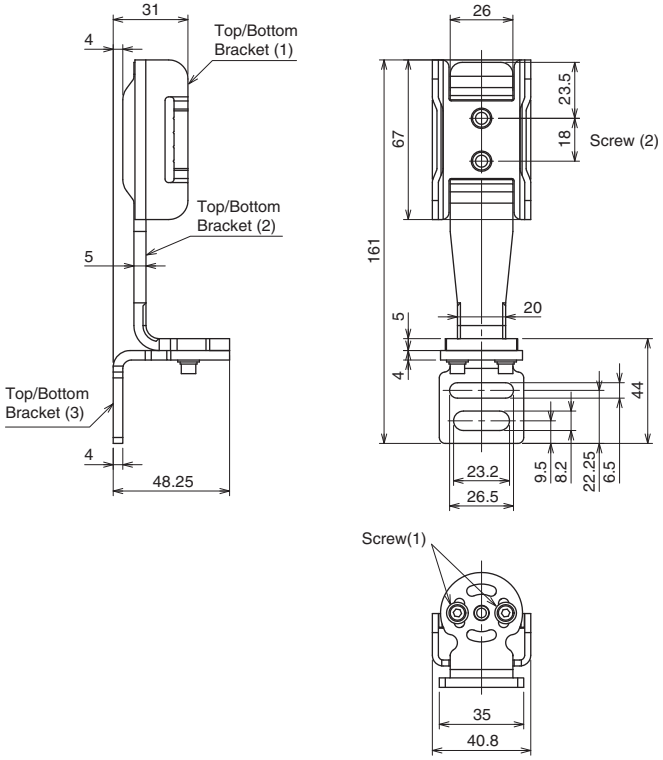
Material: Zinc alloy

Standard Adjustable Bracket (F39-LGA, sold separately)



Material: Zinc alloy ,Fluorochemical lubricant oil

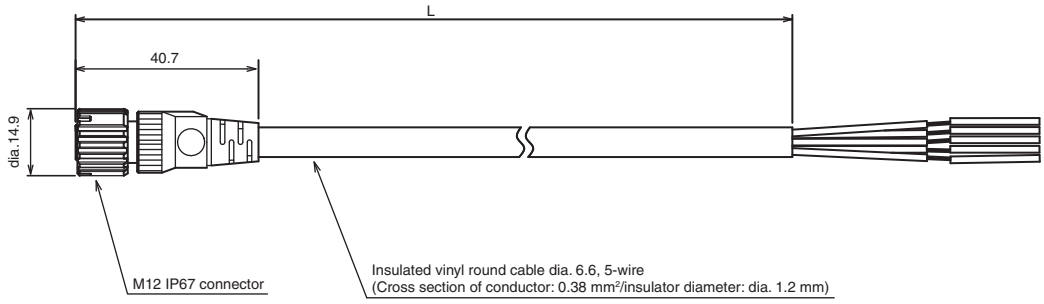
Top/Bottom Adjustable Bracket (F39-LGTB, sold separately)



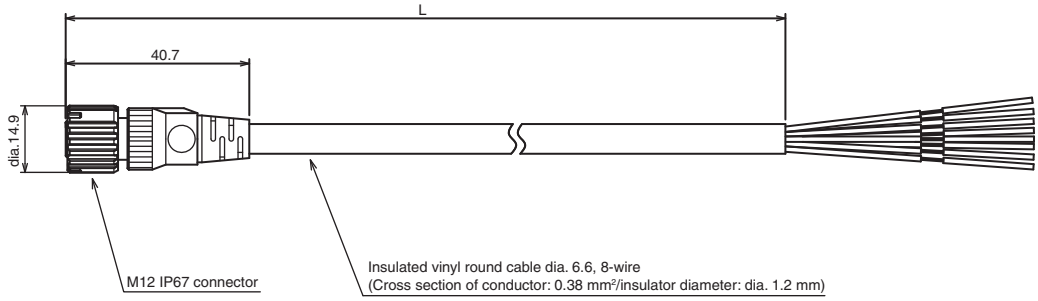
Material: Stainless steel

Safety light curtain connecting cable

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

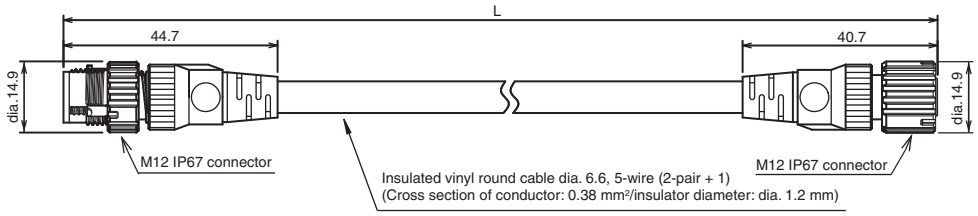


Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)

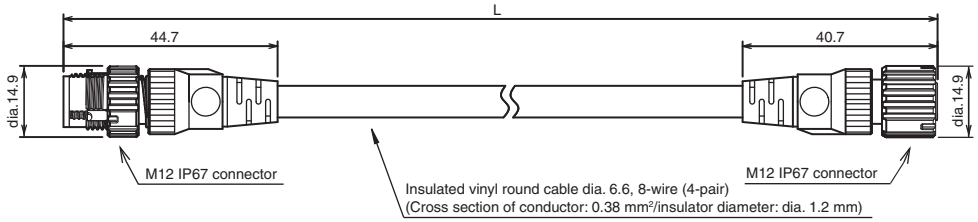


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JG3A-L	**F39-JG3A-D**	3
F39-JG7A-L	**F39-JG7A-D**	7
F39-JG10A-L	**F39-JG10A-D**	10
F39-JG15A-L	**F39-JG15A-D**	15
F39-JG20A-L	**F39-JG20A-D**	20

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

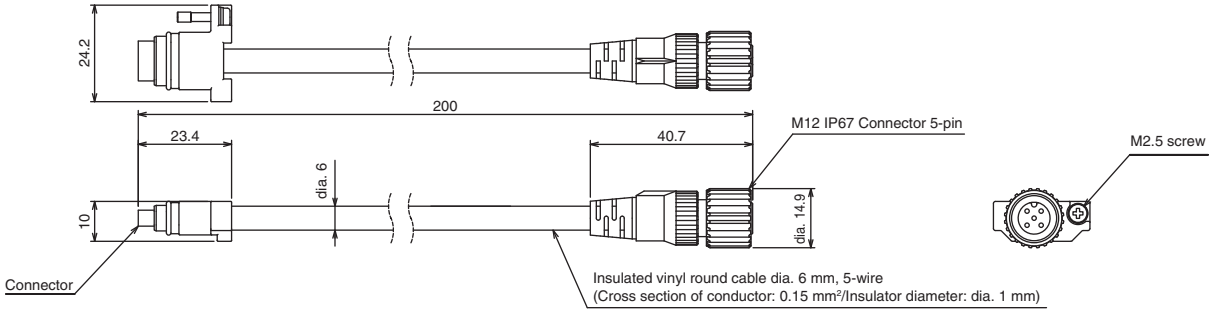


Double-Ended Cable for Receiver: Cable for extension (F39-JG□B-D, sold separately)

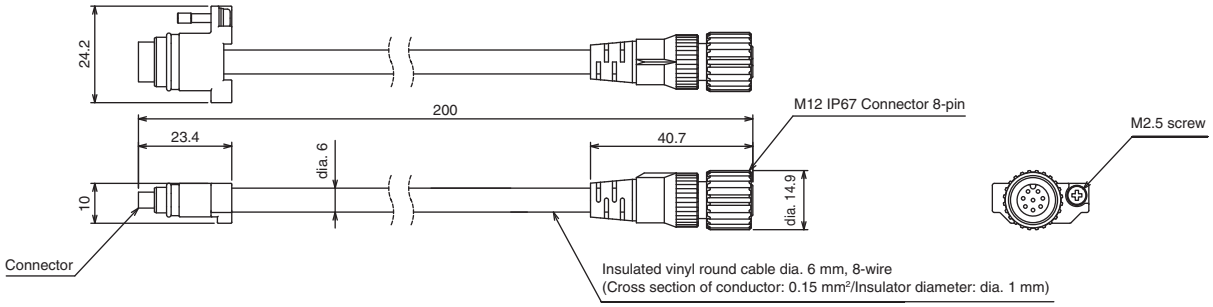


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR5B-L	**F39-JGR15B-D**	0.5
F39-JG1B-L	**F39-JG1B-D**	1
F39-JG3B-L	**F39-JG3B-D**	3
F39-JG5B-L	**F39-JG5B-D**	5
F39-JG7B-L	**F39-JG7B-D**	7
F39-JG10B-L	**F39-JG10B-D**	10
F39-JG15B-L	**F39-JG15B-D**	15
F39-JG20B-L	**F39-JG20B-D**	20

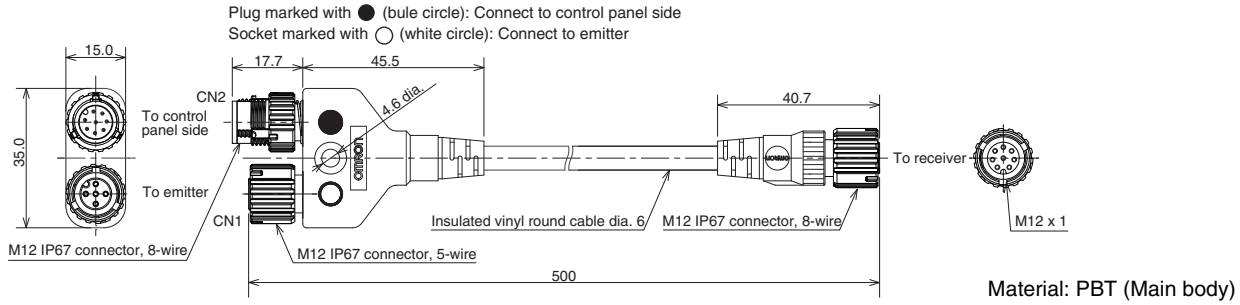
Cascading Cable for Emitter (F39-JGR2W-L, sold separately)



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

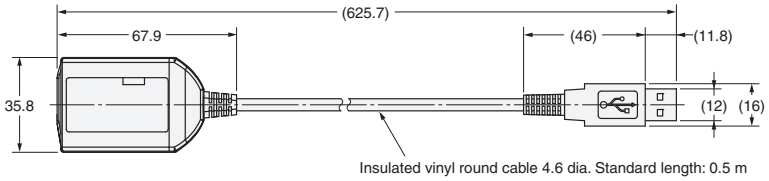


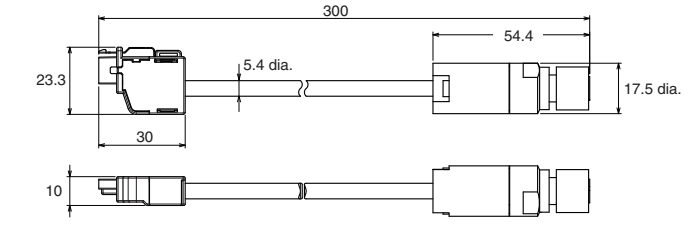
Y-Joint Plug/Socket Connector (F39-GCNY2, sold separately)

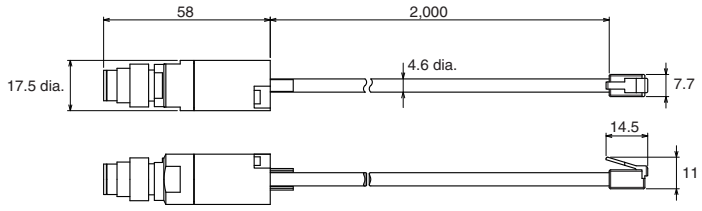


Material: PBT (Main body)

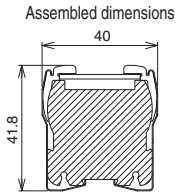
Interface Unit (F39-GIF, sold separately)







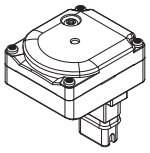
Spatter Protection Cover (F39-HGA, sold separately)



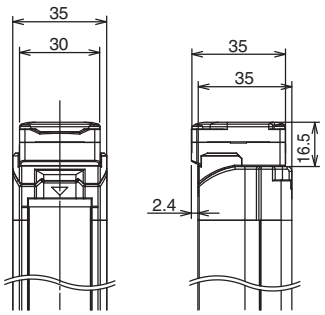
Model	Total length
F39-HGA□□□□	□□□□+4
F39-HGA0550	558

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

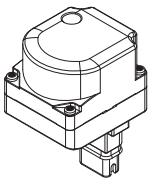
Bluetooth Communication Unit (F39-BT, sold separately)



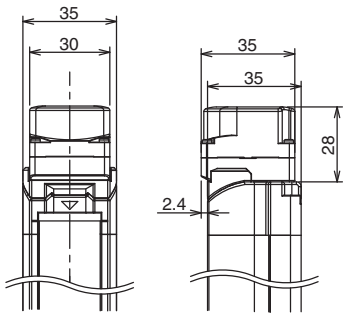
Material: PBT



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

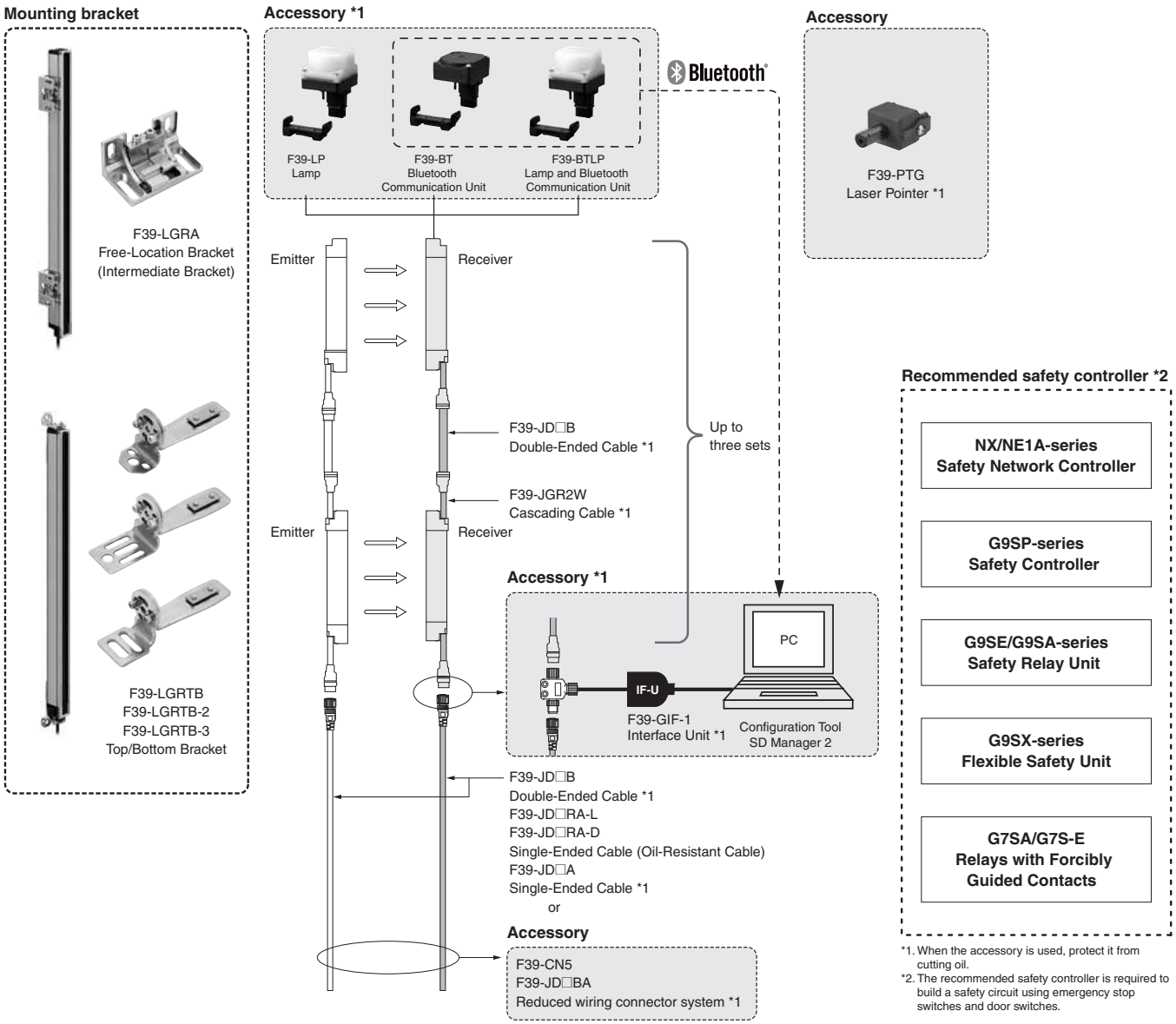
F3SG-RR

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



*1. When the accessory is used, protect it from cutting oil.
*2. The recommended safety controller is required to build a safety circuit using emergency stop switches and door switches.

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**

Accessories (Sold separately)

Safety light curtain connecting cable
Single-Ended Cable (Oil-Resistant Cable)

<table>
<tr><th>Appearance</th><th>Type</th><th>Cable length</th><th>Specifications</th><th>Model</th></tr>
<tr><td rowspan="4">  </td><td rowspan="2">For emitter
M12 connector
(8-pin), 5 wires
Color: Gray</td><td>3 m</td><td rowspan="2">For emitter, M12 connector (8-pin), Color: Gray
Connected to Power Cable or Double-Ended Cable
 
Female
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
For receiver, M12 connector (8-pin), Color: Black
Connected to Power Cable or Double-Ended Cable
 
Female
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
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.</td><td>F39-JD3RA-L</td></tr>
<tr><td>7 m</td><td>F39-JD7RA-L</td></tr>
<tr><td rowspan="2">For receiver
M12 connector
(8-pin), 8 wires
Color: Black</td><td>3 m</td><td>F39-JD3RA-D</td></tr>
<tr><td>7 m</td><td>F39-JD7RA-D</td></tr>
</table>

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.

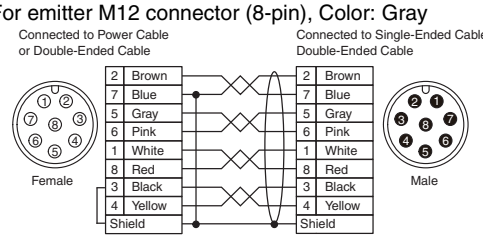
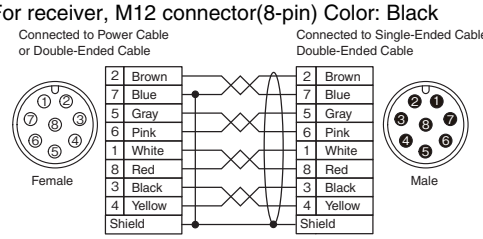
Single-Ended Cable (2 cables per set, one for emitter and one for receiver) *

<table>
<tr><th>Appearance</th><th>Cable length</th><th>Specifications</th><th>Model</th></tr>
<tr><td rowspan="5">  </td><td>3 m</td><td rowspan="5">For emitter M12 connector (8-pin), Color: Gray
Connected to Power Cable or Double-Ended Cable
 
Female
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
For receiver M12 connector (8-pin), Color: Black
Connected to Power Cable or Double-Ended Cable
 
Female
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
IP67* rated when mated.
* When the accessory is used, protect it from cutting oil.</td><td>F39-JD3A</td></tr>
<tr><td>7 m</td><td>F39-JD7A</td></tr>
<tr><td>10 m</td><td>F39-JD10A</td></tr>
<tr><td>15 m</td><td>F39-JD15A</td></tr>
<tr><td>20 m</td><td>F39-JD20A</td></tr>
</table>

* 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.

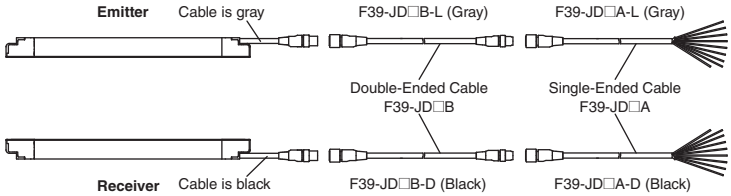
Double-Ended Cable (2 cables per set, one for emitter and one for receiver) *

Appearance	Cable length	Specifications	Model
	0.5 m	For emitter M12 connector (8-pin), Color: Gray  For receiver, M12 connector(8-pin) Color: Black  IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	F39-JDR5B
	1 m		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

* 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.

<Connection example>



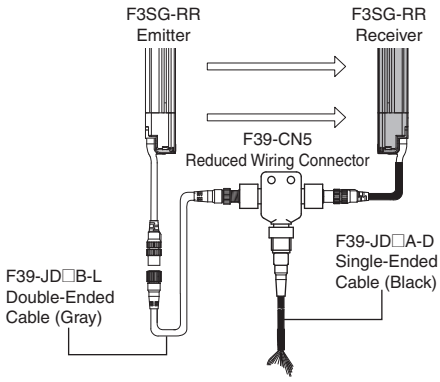
Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)

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.

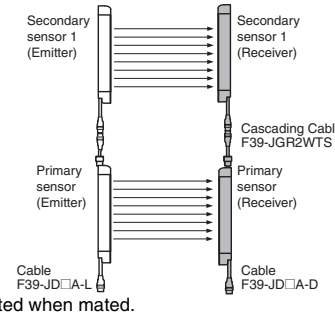


Cable for Reduce Wiring* (2 cables per set, one for emitter and one for receiver)

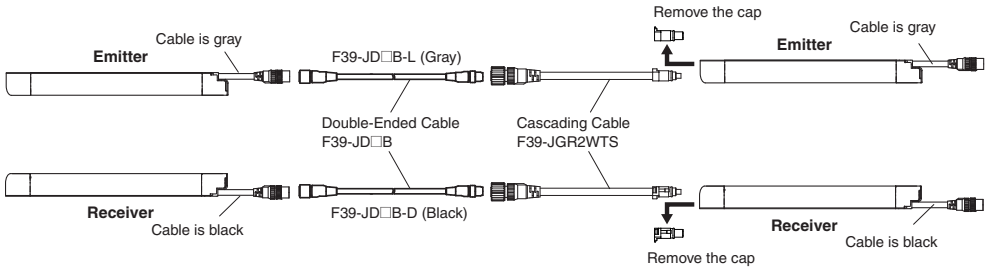
Appearance	Cable length	Specifications	Remarks	Model
 	Emitter: 3 m Receiver: 3 m	IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	Double-Ended Cable: F39-JD3B-L Single-Ended Cable: F39-JD3A-D	F39-JD0303BA
	Emitter: 3 m Receiver: 7 m		Double-Ended Cable: F39-JD3B-L Single-Ended 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	 IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	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 ±15°. 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 ±22.5°. 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 http://www.ia.omron.com/f3sg-r_tool	–
	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. IP67 rated when mated.	**F39-LP**
	Lamp and Bluetooth Communication Unit		**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. Refer to page 52. *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) (Cofigurable 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		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/s^2, 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_D		1.1×10^{-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.

List of Models/Response Time/Current Consumption/Weight

F3SG-4RR□□□□-14

Model	Number of Beams	Protective Height [mm] (Overall length)	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-4RR0240-14	23	240	8	40	140	45	75	0.7	1.5
F3SG-4RR0320-14	31	320	8	40	140	55	75	0.9	1.7
F3SG-4RR0400-14	39	400	8	40	140	60	80	1.1	2.0
F3SG-4RR0480-14	47	480	13	65	165	50	80	1.3	2.3
F3SG-4RR0560-14	55	560	13	65	165	55	80	1.5	2.5
F3SG-4RR0640-14	63	640	13	65	165	60	85	1.7	2.8
F3SG-4RR0720-14	71	720	13	65	165	65	85	1.9	3.1
F3SG-4RR0800-14	79	800	13	65	165	65	90	2.1	3.4
F3SG-4RR0880-14	87	880	13	65	165	70	90	2.4	3.6
F3SG-4RR0960-14	95	960	13	65	165	75	90	2.6	3.9
F3SG-4RR1040-14	103	1040	13	65	165	80	95	2.8	4.2
F3SG-4RR1120-14	111	1120	13	65	165	85	95	3.0	4.4
F3SG-4RR1200-14	119	1200	13	65	165	90	100	3.2	4.7
F3SG-4RR1280-14	127	1280	13	65	165	95	100	3.4	5.0
F3SG-4RR1360-14	135	1360	13	65	165	95	105	3.6	5.3
F3SG-4RR1440-14	143	1440	18	90	190	85	105	3.8	5.5
F3SG-4RR1520-14	151	1520	18	90	190	90	105	4.0	5.8
F3SG-4RR1600-14	159	1600	18	90	190	90	110	4.2	6.1
F3SG-4RR1680-14	167	1680	18	90	190	95	110	4.4	6.3
F3SG-4RR1760-14	175	1760	18	90	190	100	115	4.6	6.6
F3SG-4RR1840-14	183	1840	18	90	190	100	115	4.8	6.9
F3SG-4RR1920-14	191	1920	18	90	190	105	120	5.0	7.2

*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-4RR□□□□-25

Model	Number of Beams	Protective Height [mm] (Overall length)	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-4RR0240-25	12	240	8	40	140	35	75	0.7	1.6
F3SG-4RR0320-25	16	320	8	40	140	40	75	0.9	1.9
F3SG-4RR0400-25	20	400	8	40	140	45	75	1.1	2.1
F3SG-4RR0480-25	24	480	8	40	140	50	75	1.3	2.4
F3SG-4RR0560-25	28	560	8	40	140	50	75	1.5	2.7
F3SG-4RR0640-25	32	640	8	40	140	55	75	1.7	3.0
F3SG-4RR0720-25	36	720	8	40	140	60	80	1.9	3.2
F3SG-4RR0800-25	40	800	8	40	140	65	80	2.1	3.5
F3SG-4RR0880-25	44	880	13	65	165	50	80	2.3	3.8
F3SG-4RR0960-25	48	960	13	65	165	50	80	2.5	4.0
F3SG-4RR1040-25	52	1040	13	65	165	55	80	2.7	4.3
F3SG-4RR1120-25	56	1120	13	65	165	55	85	2.9	4.6
F3SG-4RR1200-25	60	1200	13	65	165	55	85	3.1	4.9
F3SG-4RR1280-25	64	1280	13	65	165	60	85	3.3	5.1
F3SG-4RR1360-25	68	1360	13	65	165	60	85	3.5	5.4
F3SG-4RR1440-25	72	1440	13	65	165	65	85	3.7	5.7
F3SG-4RR1520-25	76	1520	13	65	165	65	90	3.9	5.9
F3SG-4RR1600-25	80	1600	13	65	165	70	90	4.1	6.2
F3SG-4RR1680-25	84	1680	13	65	165	70	90	4.3	6.5
F3SG-4RR1760-25	88	1760	13	65	165	70	90	4.5	6.7
F3SG-4RR1840-25	92	1840	13	65	165	75	90	4.7	7.0
F3SG-4RR1920-25	96	1920	13	65	165	75	95	4.9	7.3

*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-RR does not receive type approval provided by Article 44-2 of the Industrial Safety and Health Act of Japan. When using the F3SG-RR 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-RR is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Index Annex V, Item 2.
3. EC/EU Declaration of Conformity
   OMRON declares that the F3SG-RR is in conformity with the requirements of the following EC/EU Directives:
   Machinery Directive 2006/42/EC
   EMC Directive 2014/30/EU
4. Conforming Standards
   (1) European standards
   EN61496-1 (Type 4 ESPE), EN 61496-2 (Type 4 AOPD), EN61508-1 through -4 (SIL 3), EN ISO 13849-1:2015 (PL e, Category 4)
   (2) International standards
   IEC61496-1 (Type 4 ESPE), IEC61496-2 (Type 4 AOPD), IEC61508-1 through -4 (SIL 3), ISO 13849-1:2015 (PL e, Category 4)
   (3) JIS standards
   JIS B 9704-1 (Type 4 ESPE), JIS B 9704-2 (Type 4 AOPD)
   (4) North American standards
   UL61496-1 (Type 4 ESPE), UL61496-2 (Type 4 AOPD), UL508, UL1998,
   CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
5. Third-Party Certifications
   (1) TÜV SÜD
   - EC Type-Examination certificate:
     EU Machinery Directive, Type 4 ESPE (EN61496-1), Type 4 AOPD (EN 61496-2)
   - Certificate:
     Type 4 ESPE (EN61496-1), Type 4 AOPD (EN61496-2), EN 61508-1 through -4 (SIL 3), EN ISO 13849-1:2015 (PL e, Category 4)

   (2) UL
   - UL Listing:
     Type 4 and ESPE (UL61496-1), Type 4 AOPD (UL61496-2), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
6. Other Standards
   The F3SG-RR 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

F3SG-RR

Indicator

Emitter

Name of Indicator		Color	Illuminated	Blinking
Test	TEST	Green	–	External Test is being performed
Operating range	LONG	Green	Always illuminated	Lockout state due to Scan code 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	–
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	Blanking Monitoring error
Configuration	CFG	Green	–	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 *2
External device monitoring	EDM	Green	RESET input is in ON state *1	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	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 Scan code setting error

Note: TOP, CFG, LOCKOUT, STB and ON/OFF indicators are illuminated when the receiver of the F3SG-RR is in Setting mode.
*1. The EDM indicator is illuminated when the EDM input is in the ON state regardless of the use of the EDM function.
*2. Refer to *Safety Light Curtain F3SG-□RR Series User's Manual (ManNo.: Z383)* for more information of blinking patterns.

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 ×1
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/Green/Orange
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^2 , 1000 shocks for all 3 axes
Degree of Protection	IP65 and IP67 (When attached to F3SG)
Type of Connection	Connectable to F3SG-RA/RR's terminal connector
Material	Lighting element: PC, Other body parts: PBT
Weight	45 g (when packaged)

Connections (Basic Wiring Diagram)

Standalone F3SG-RR using PNP Outputs

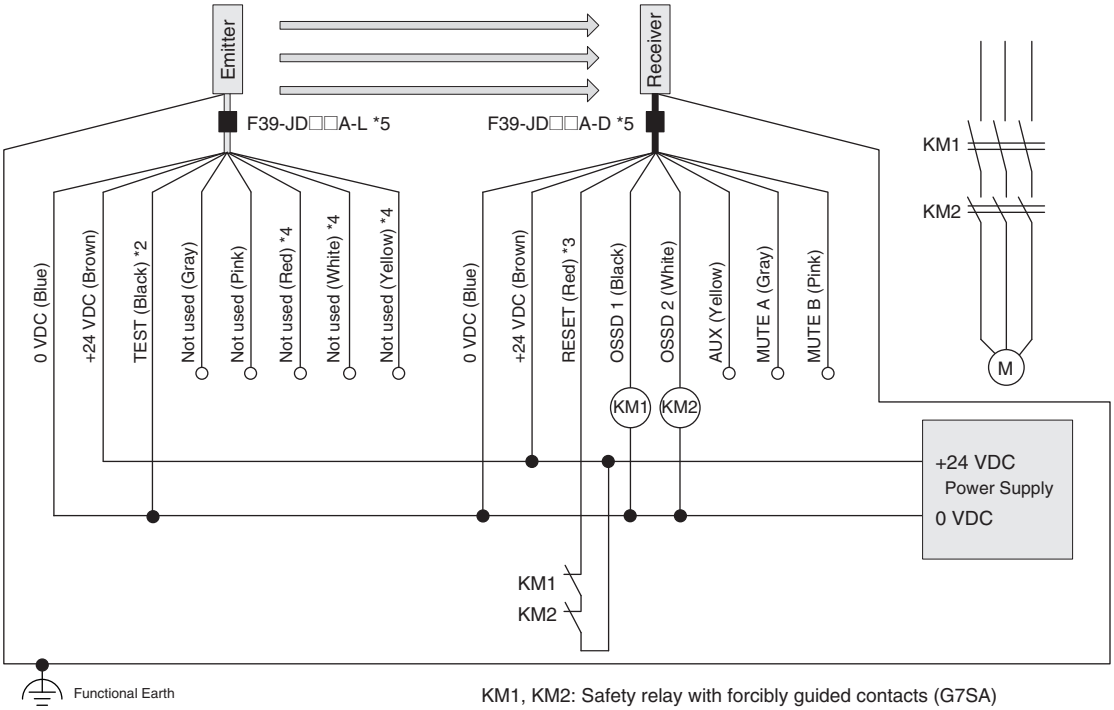
Auto Reset Mode, EDM enabled and PNP Outputs

The following is the example of Muting not used, External Device Monitoring enabled, Auto Reset Mode, PNP outputs and External Test in 24 V Active (not used).

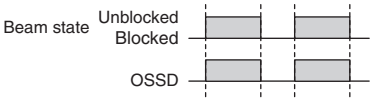
Settings

	Function
Receiver	EDM Enabled (factory default setting) *1
	Auto Reset (factory default setting) *1
	PNP (factory default setting) *1
Emitter	External Test: 24 V Active (End Cap: Black) (factory default setting)

Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: Motor



*1. The functions are configurable with Configuration Tool. Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*2. Connect the line to 24 V via a test switch (N.O. contact) if External Test is used.
*3. Also used as EDM input line. Connect a lockout reset switch (N.C. contact) to this line in series with the KM1 and KM2 if Lockout Reset is used.
*4. The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant Cable) does not have the red, white and yellow wires.
*5. For the F39-JD□A-□ Single-Ended Cable, connect the shield line to 0 V.

Note: Functional earth connection is unnecessary when you use the F3SG-RR in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-RR in an environment where there may be excessive noise from surroundings or stable power supply may be interfered, it is recommended the F3SG-RR 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-RR Series User's Manual* for more information.

Standalone F3SG-RR using NPN Outputs

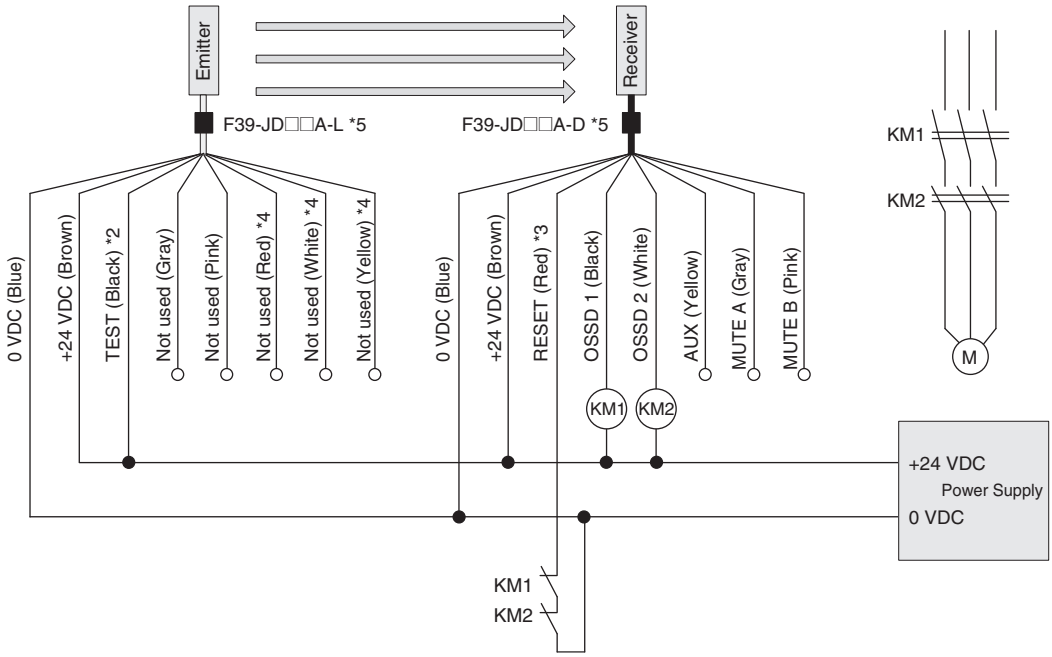
Auto Reset Mode, EDM enabled and NPN Outputs

The following is the example of Muting not used, External Device Monitoring enabled, Auto Reset Mode, NPN outputs and External Test in 0 V Active (not used).

Settings

	Function
Receiver	EDM Enabled (factory default setting) *1
	Auto Reset (factory default setting) *1
	NPN *1
Emitter	External Test: 0 V Active (End Cap: White)

Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: Motor

*1.The functions are configurable with Configuration Tool. Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*2.Connect the line to 0 V via a test switch (N.O. contact) if External Test is used.
*3.Also used as EDM input line. Connect a lockout reset switch (N.C. contact) to this line in series with the KM1 and KM2 if Lockout Reset is used.
*4.The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant Cable) does not have the red, white and yellow wires.
*5.For the F39-JD□A-□ Single-Ended Cable, connect the shield line to 0 V.

Note: For the functional earth connection, refer to page 55.

Connectable Safety Control Units

The F3SG-RR 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 units listed in the table below.

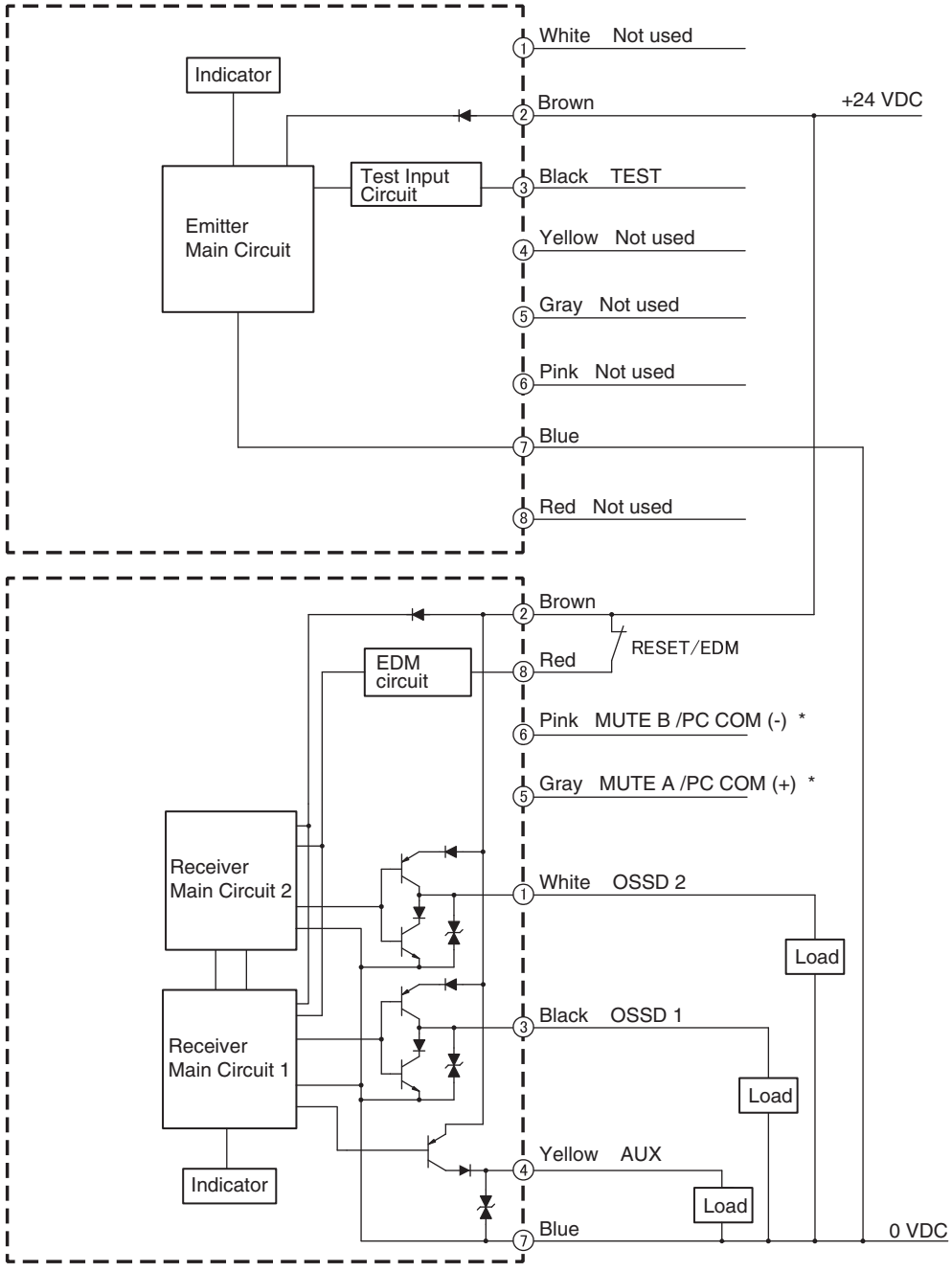
Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

Input/Output Circuit

Entire Circuit Diagram

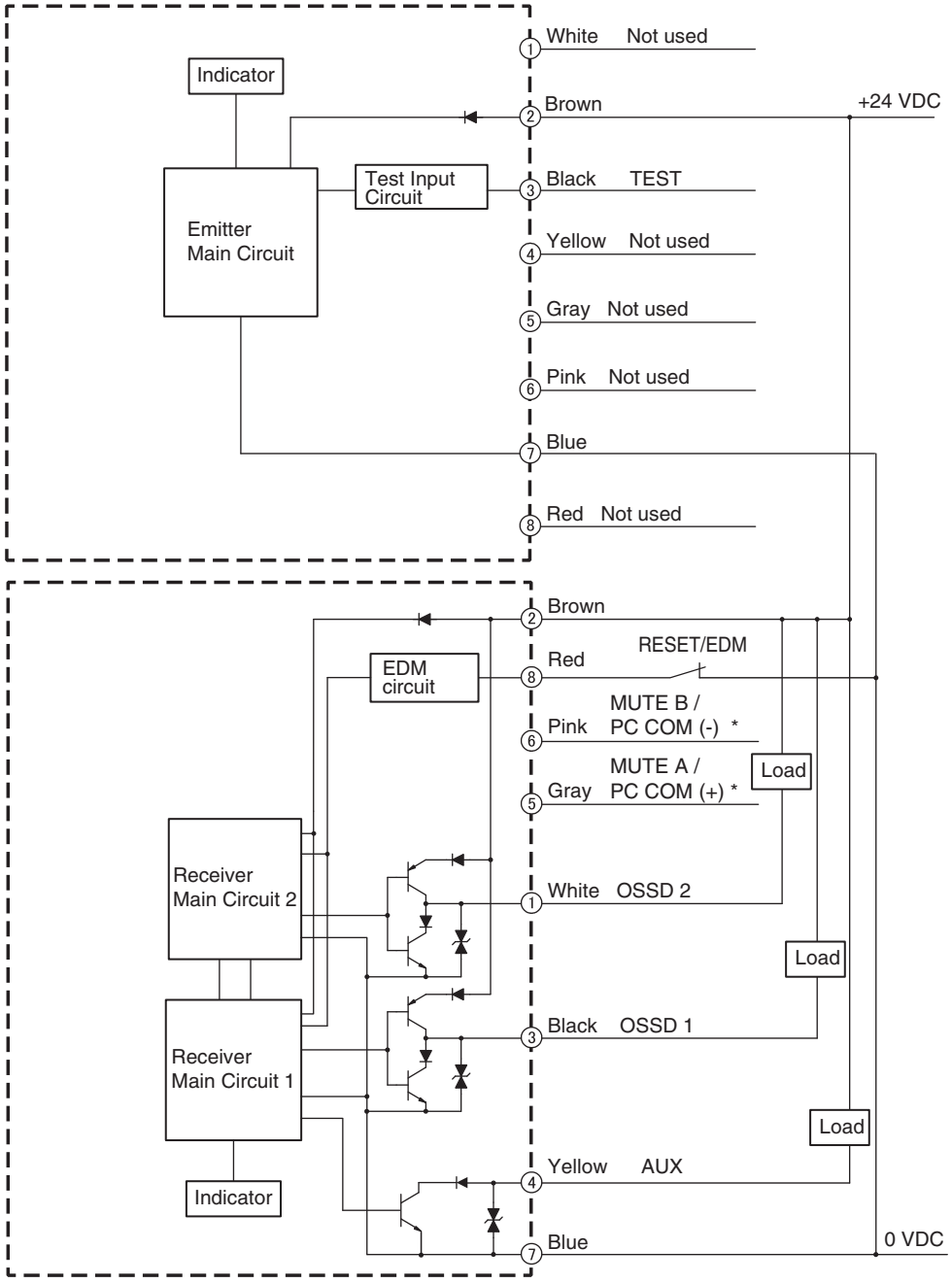
The entire circuit diagram of the F3SG-RR is shown below.
The numbers in the circles indicate the connector's pin numbers.

PNP Output



* This line is used for communication with a PC using the F39-GIF-1 Interface Unit.

NPN Output

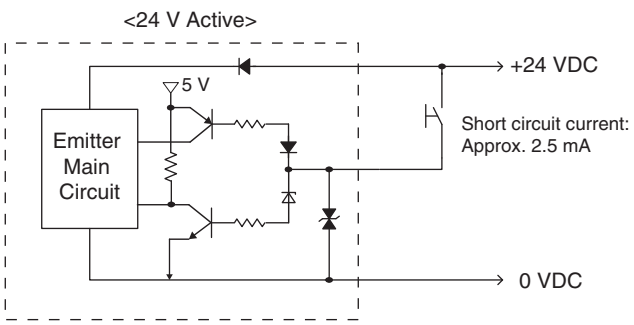


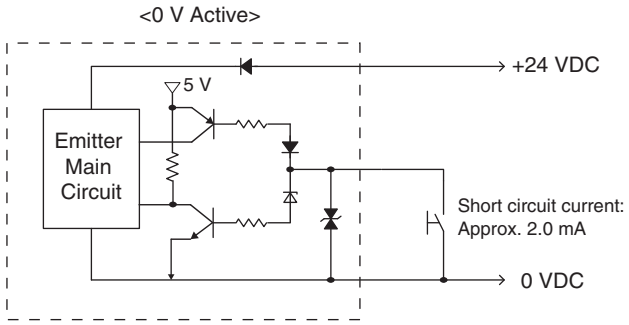
* This line is used for communication with a PC using the F39-GIF-1 Interface Unit.

Input Circuit Diagram by Function

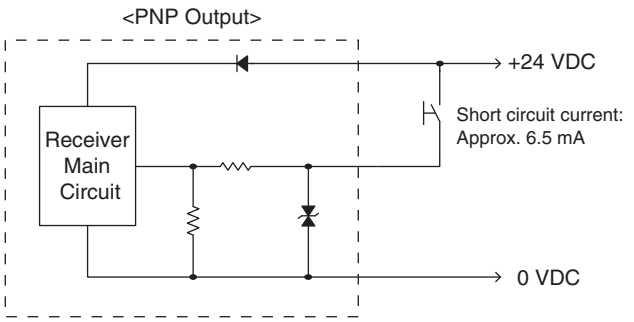
The input circuit diagrams of by function are shown below.

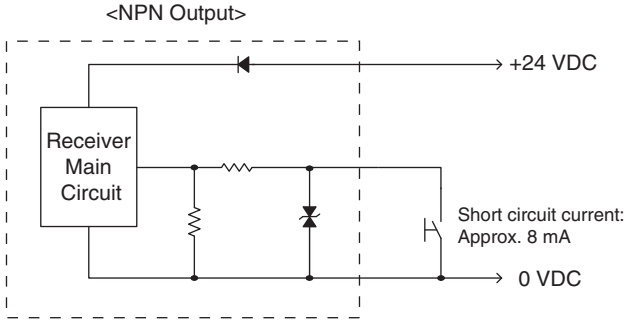
Test Input





Reset/EDM



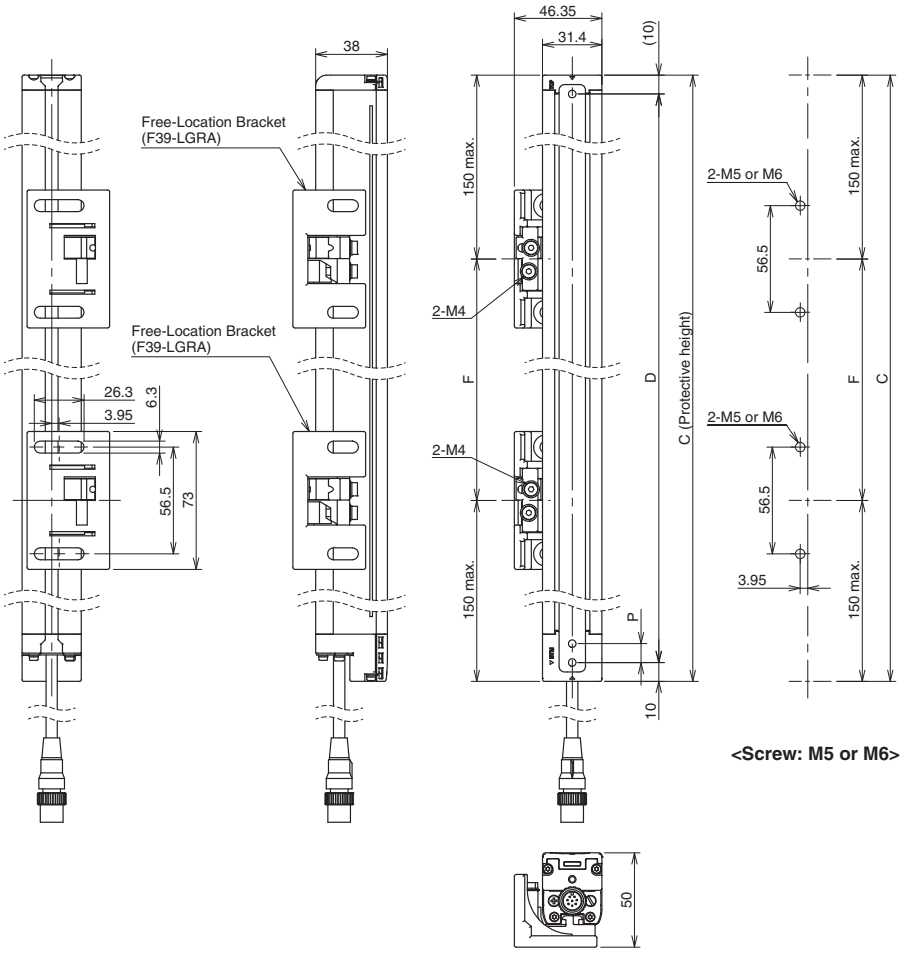


Dimensions

(Unit: mm)

Mounted with Free-Location Brackets (F39-LGRA)

Backside Mounting

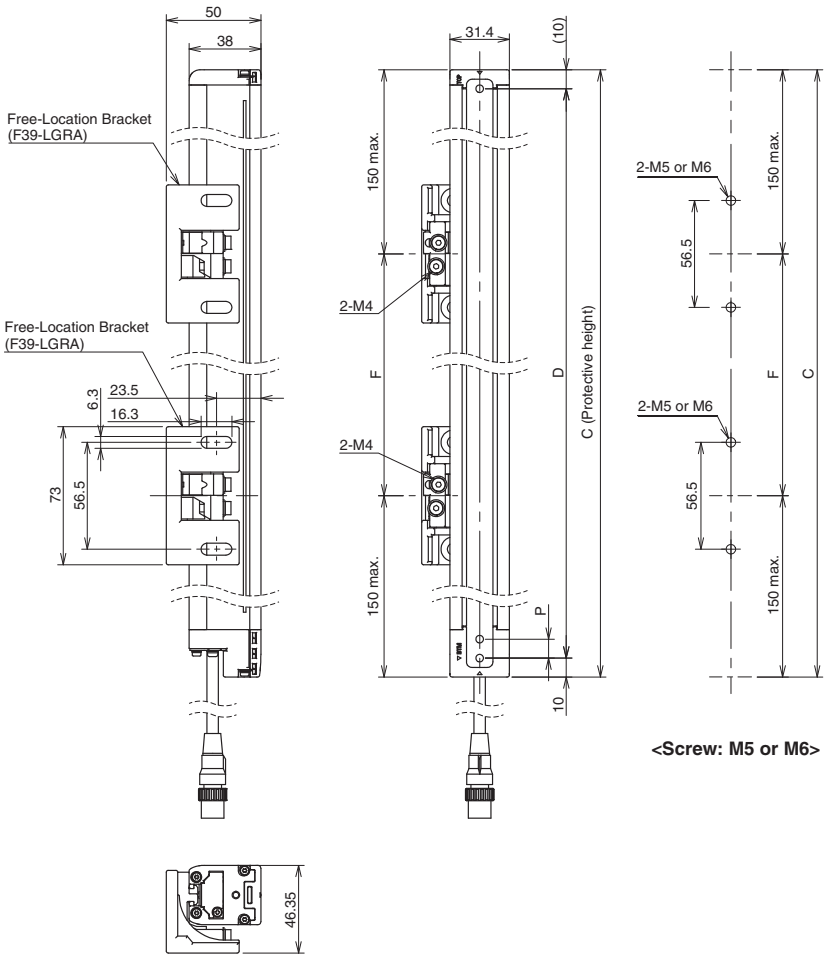


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

Protective height (C)	Number of Free-Location Brackets *1	Dimension F
0240 to 1200	2 *2	1000 mm max.
1280 to 1920	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 model of protective height of 0240. In this case, locate this bracket at half the Dimension C (or at the center of the sensor length).

Side Mounting



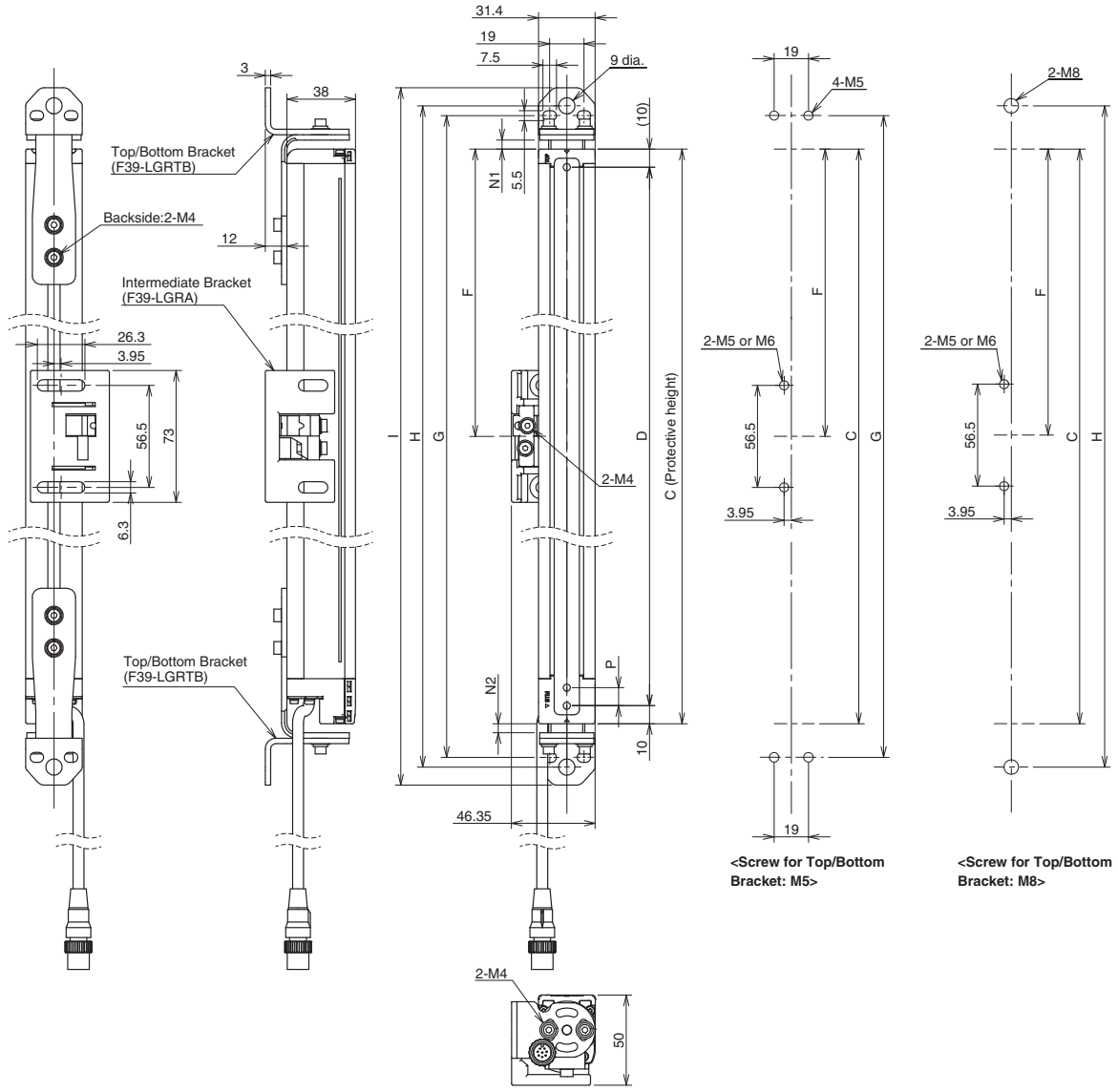
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

Protective height (C)	Number of Free-Location Brackets *1	Dimension F
0240 to 1200	2 *2	1000 mm max.
1280 to 1920	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 model of protective height of 0240. In this case, locate this bracket at half the Dimension C (or at the center of the sensor length).

Mounted with Top/Bottom Brackets (F39-LGRTB) and Intermediate Bracket (F39-LGRA)

Backside Mounting

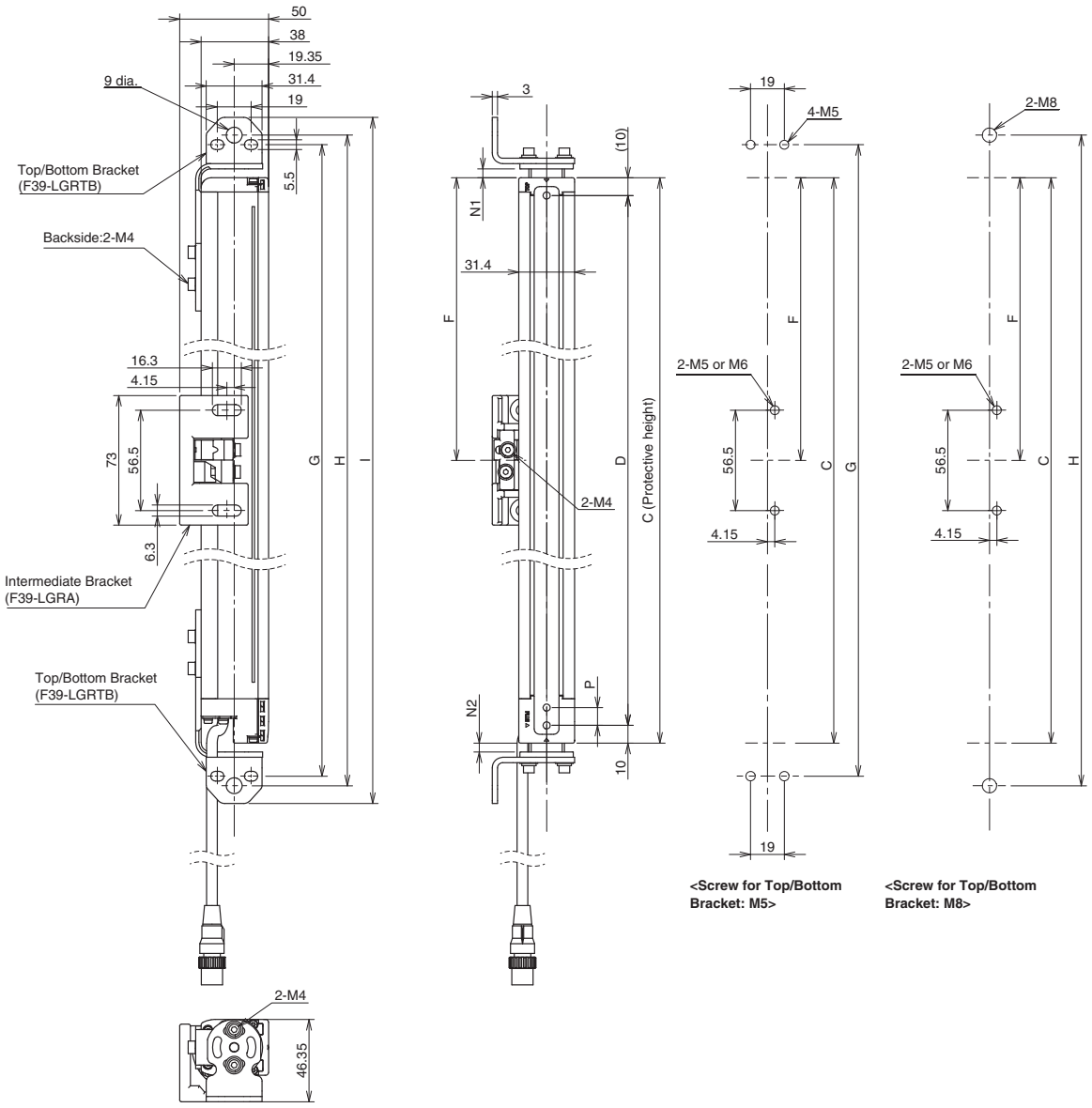


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+27.2+N1+N2	
Dimension H	C+38+N1+N2	
Dimension I	C+58+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Side Mounting



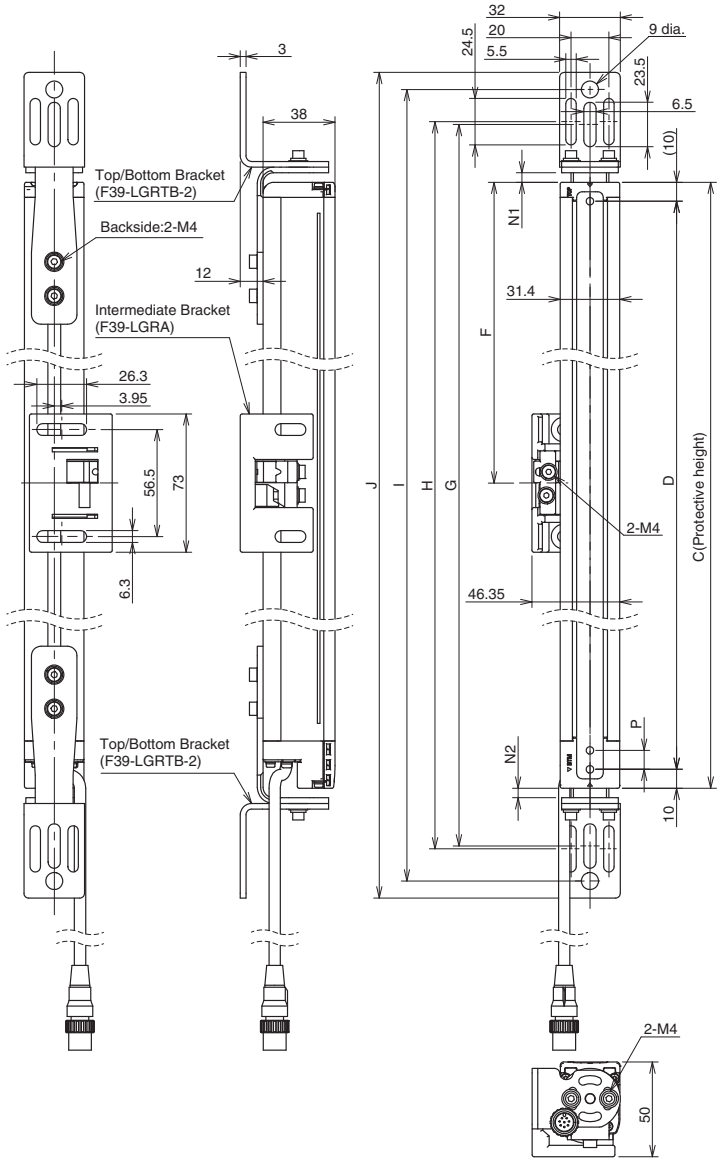
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+27.2+N1+N2	
Dimension H	C+38+N1+N2	
Dimension I	C+58+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

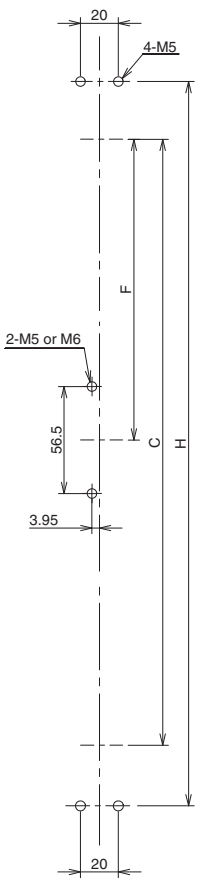
Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

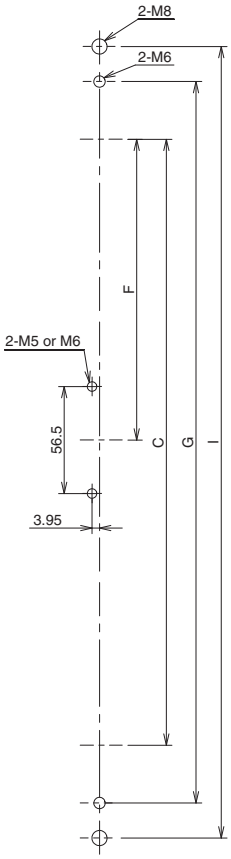
Mounted with Top/Bottom Brackets (F39-LGRTB-2) and Intermediate Bracket (F39-LGRA)

Backside Mounting





<Screw for Top/Bottom Bracket: M5>



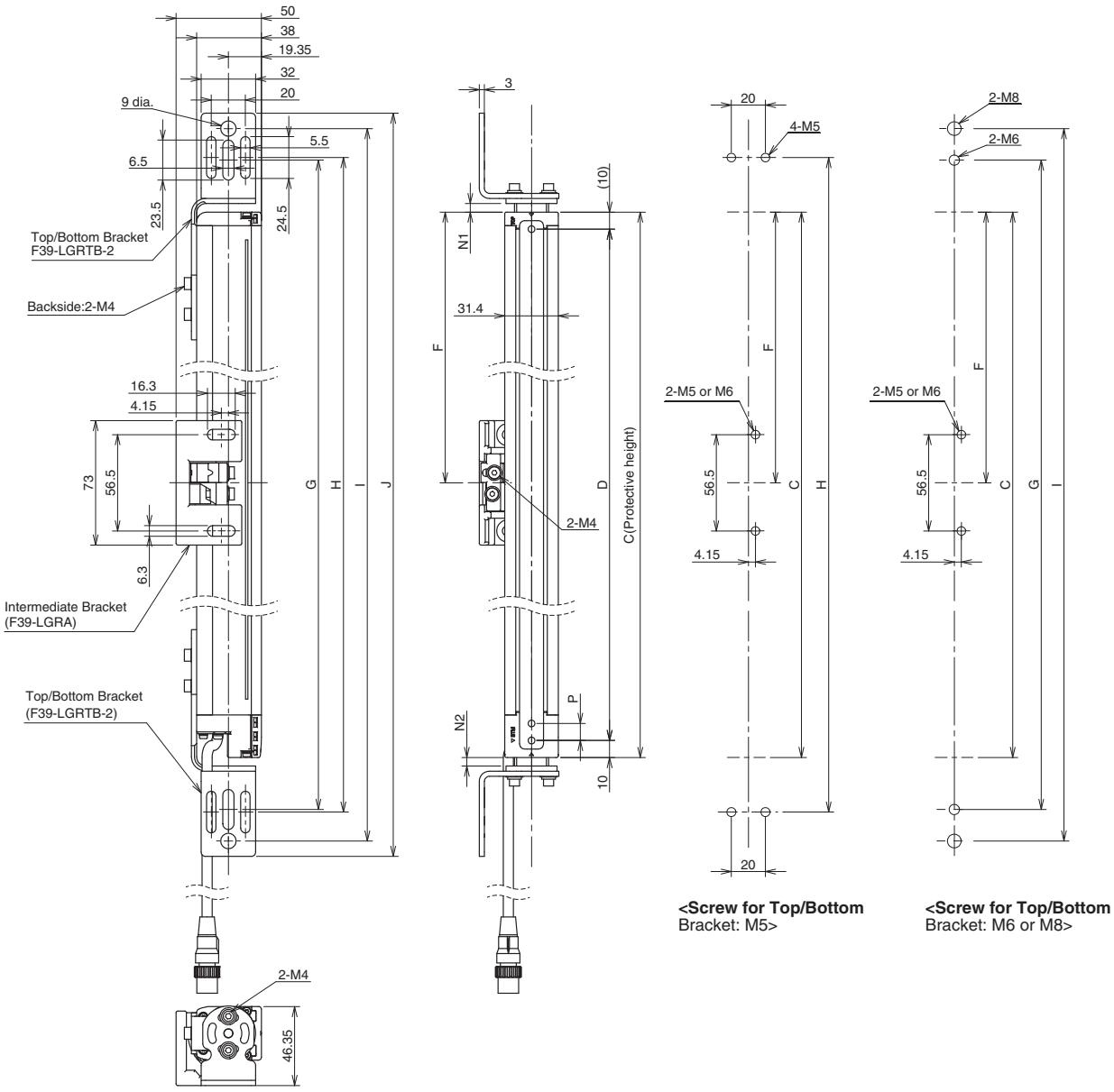
<Screw for Top/Bottom Bracket: M6 or M8>

Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+51+N1+N2	
Dimension H	C+54+N1+N2	
Dimension I	C+88+N1+N2	
Dimension J	C+106+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Side Mounting



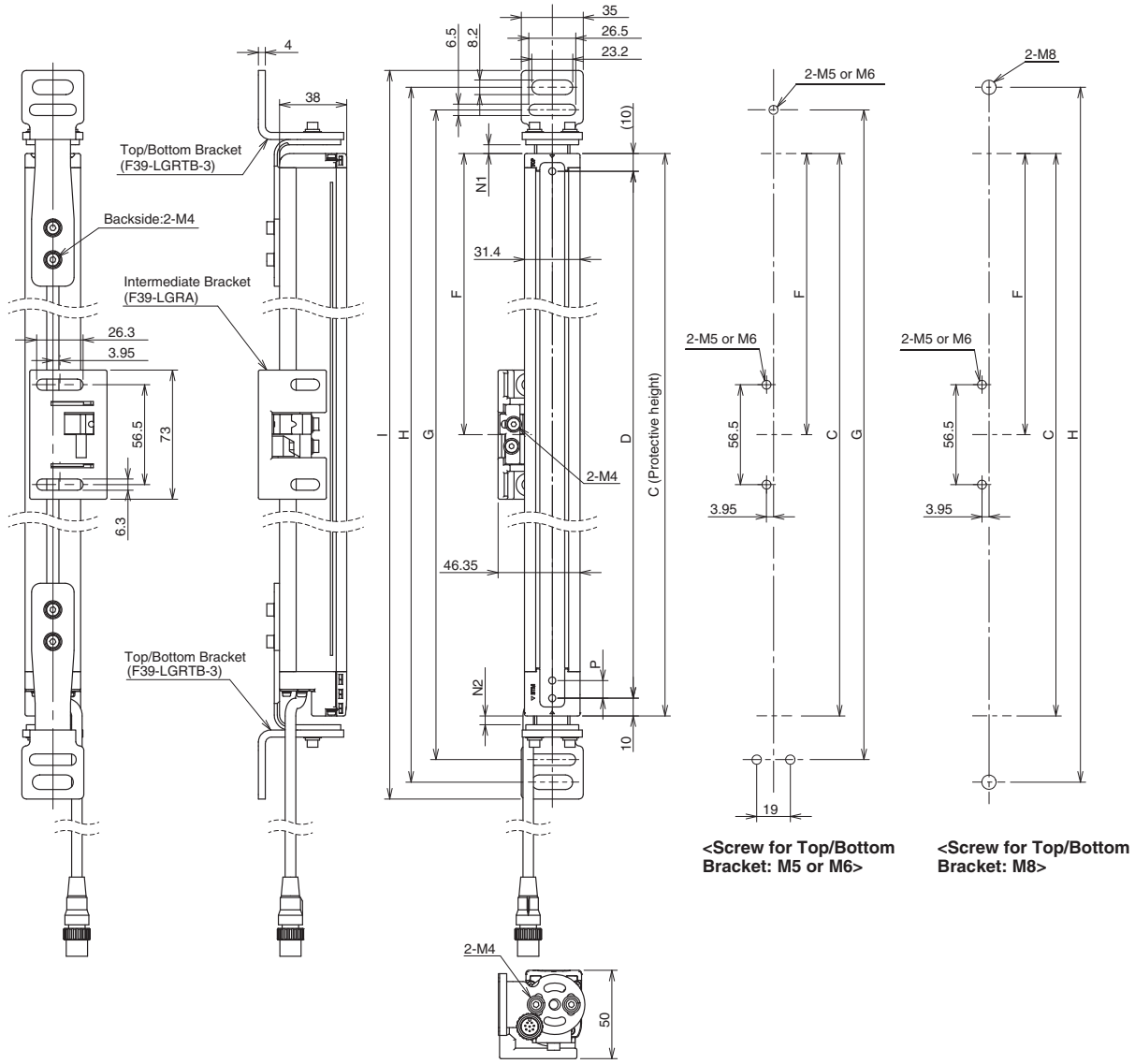
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+51+N1+N2	
Dimension H	C+54+N1+N2	
Dimension I	C+88+N1+N2	
Dimension J	C+106+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Mounted with Top/Bottom Brackets (F39-LGRTB-3) and Intermediate Bracket (F39-LGRA)

Backside Mounting

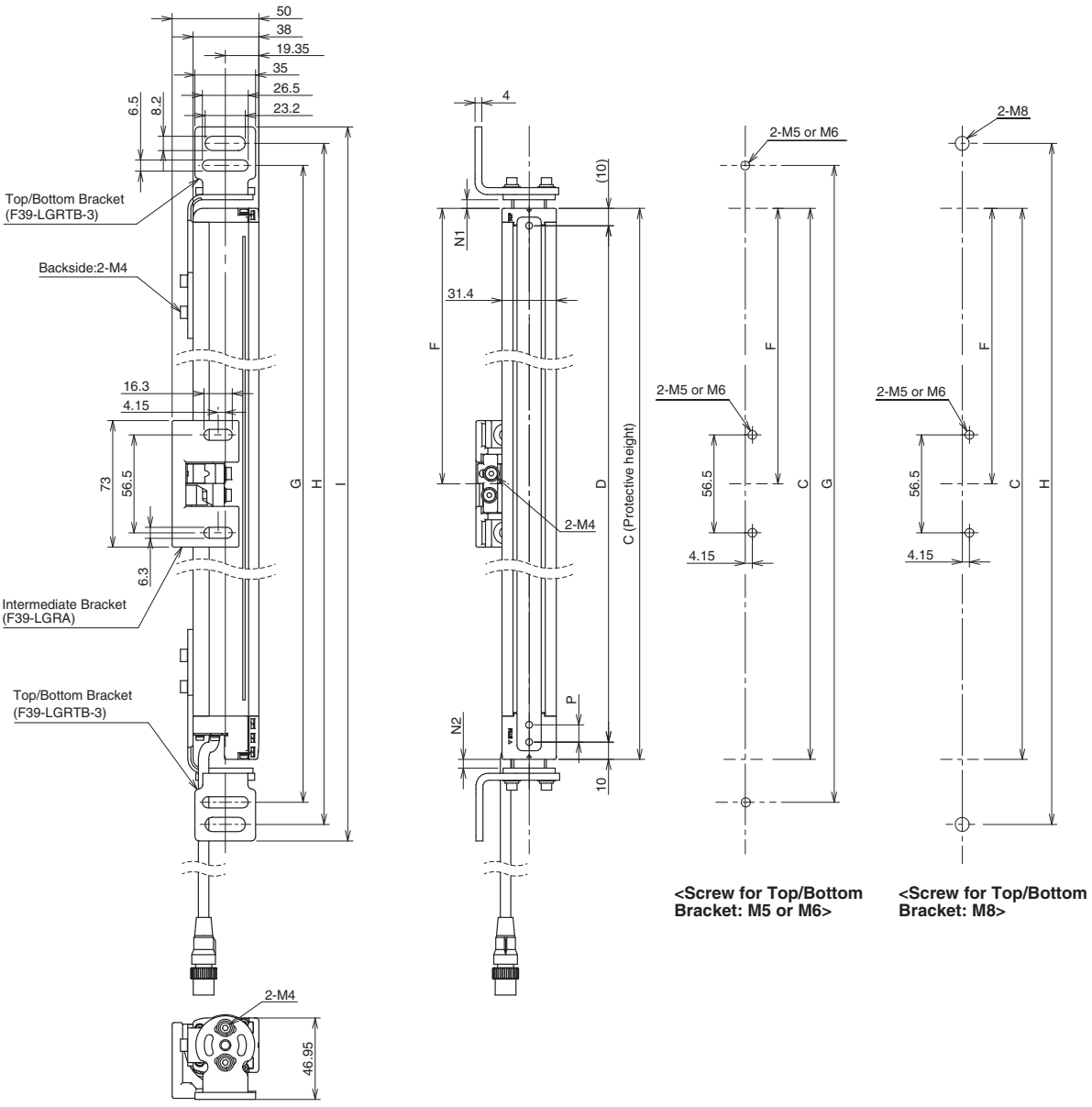


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+39.5+N1+N2	
Dimension H	C+65+N1+N2	
Dimension I	C+84+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Side Mounting



Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+39.5+N1+N2	
Dimension H	C+65+N1+N2	
Dimension I	C+84+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

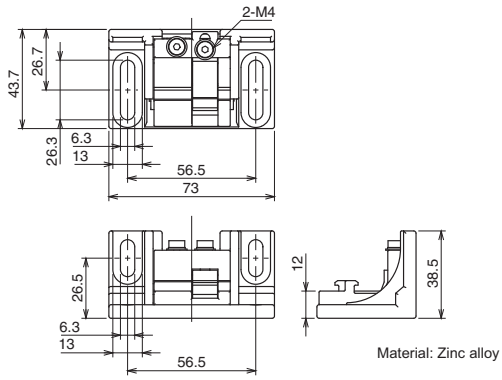
Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Accessories

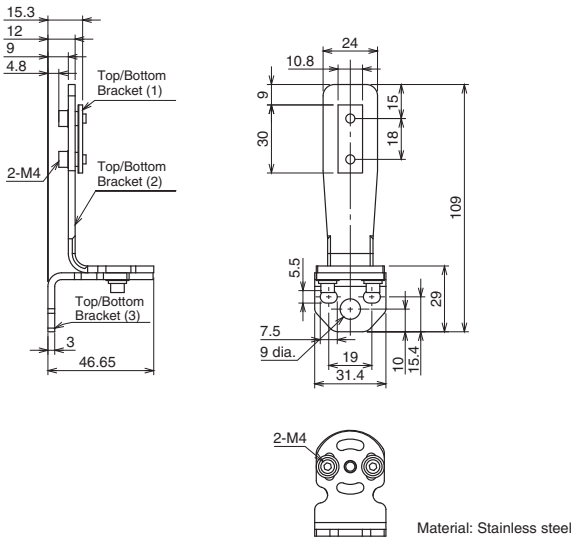
Sensor Mounting Brackets

Free-Location Bracket / Intermediate Bracket (F39-LGRA, sold separately)



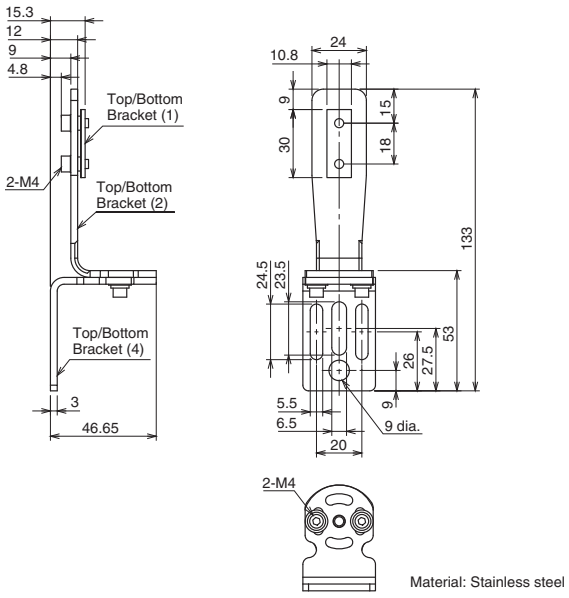
Material: Zinc alloy

Top/Bottom Bracket (F39-LGRTB, sold separately)



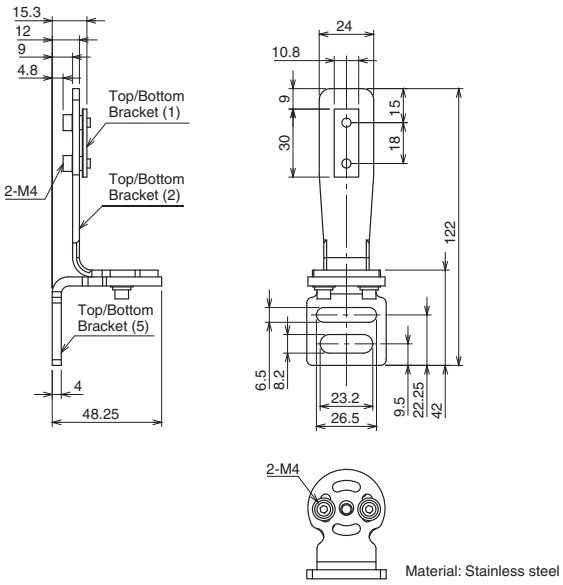
Material: Stainless steel

Top/Bottom Bracket (F39-LGRTB-2, sold separately)



Material: Stainless steel

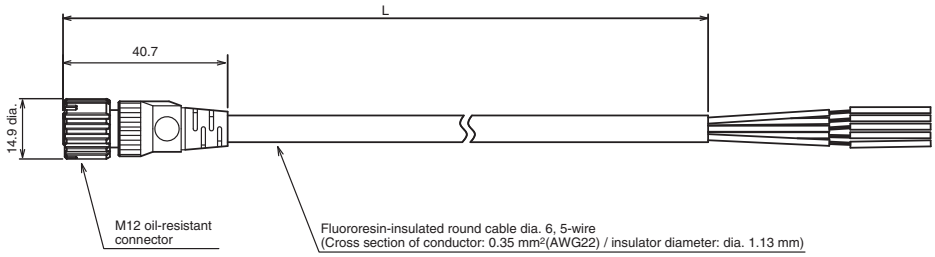
Top/Bottom Bracket (F39-LGRTB-3, sold separately)



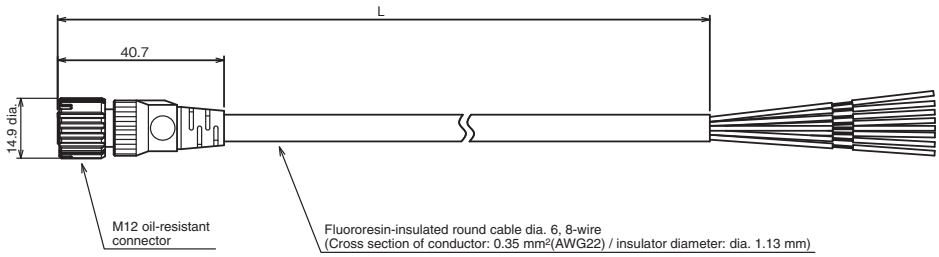
Material: Stainless steel

Safety light curtain connecting cable

Single-Ended Cable for Emitter (Oil-Resistant Cable) (F39-JD□RA-L, sold separately)

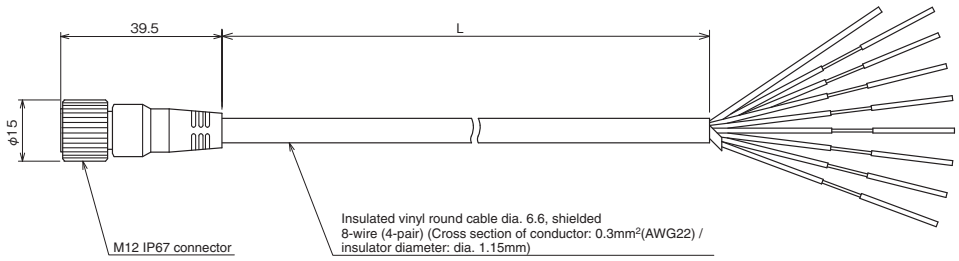


Single-Ended Cable for Receiver (Oil-Resistant Cable) (F39-JD□RA-D, sold separately)

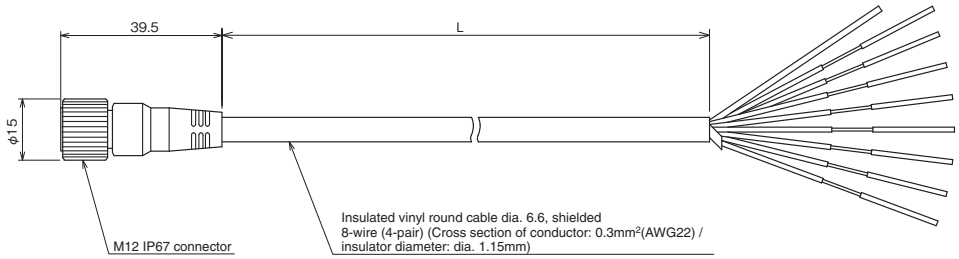


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3RA-L	F39-JD3RA-D	3
F39-JD7RA-L	F39-JD7RA-D	7

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

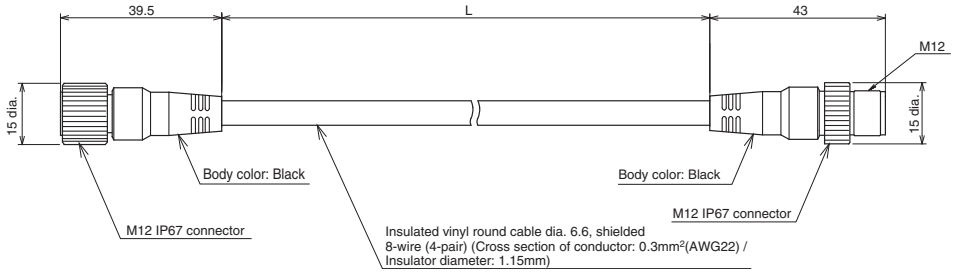


Single-Ended Cable for Receiver (F39-JD□A-D, sold separately)

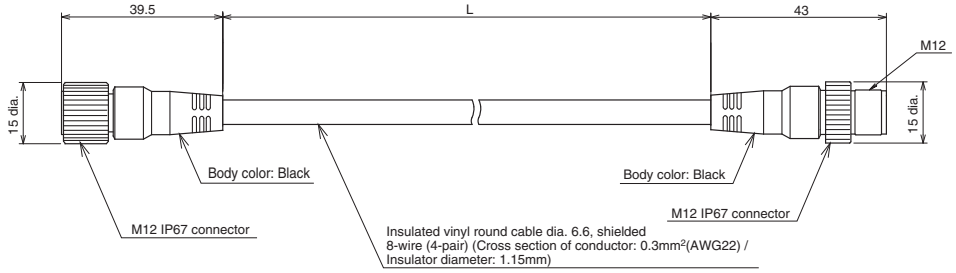


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3A-L	F39-JD3A-D	3
F39-JD7A-L	F39-JD7A-D	7
F39-JD10A-L	F39-JD10A-D	10
F39-JD15A-L	F39-JD15A-D	15
F39-JD20A-L	F39-JD20A-D	20

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

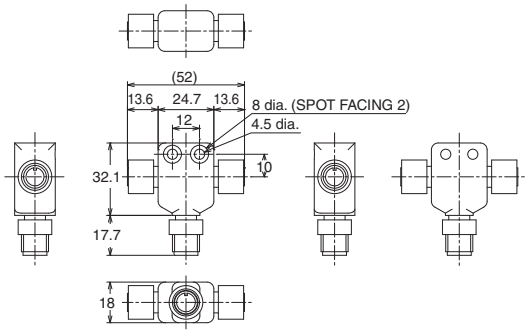


Double-Ended Cable for Receiver: Cable for extension (F39-JD□B-D, sold separately)

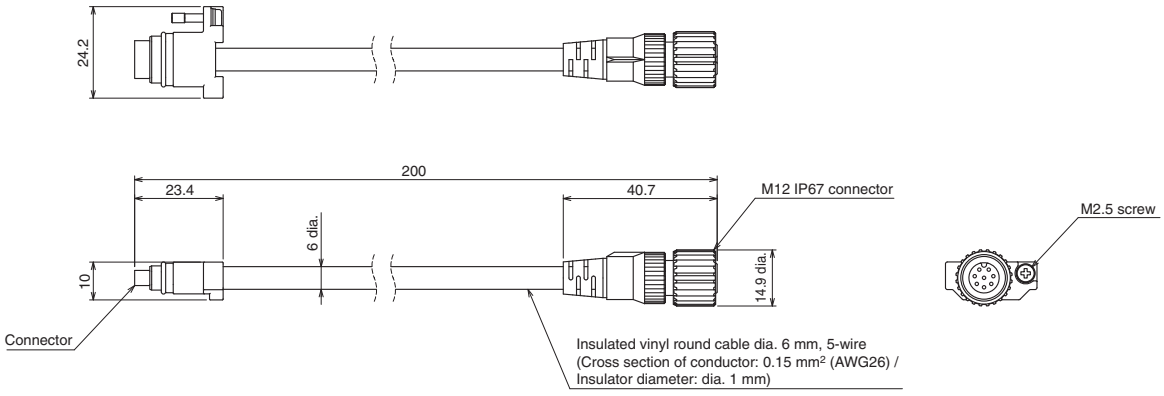


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JDR5B-L	F39-JDR5B-D	0.5
F39-JD1B-L	F39-JD1B-D	1
F39-JD3B-L	F39-JD3B-D	3
F39-JD5B-L	F39-JD5B-D	5
F39-JD7B-L	F39-JD7B-D	7
F39-JD10B-L	F39-JD10B-D	10
F39-JD15B-L	F39-JD15B-D	15
F39-JD20B-L	F39-JD20B-D	20

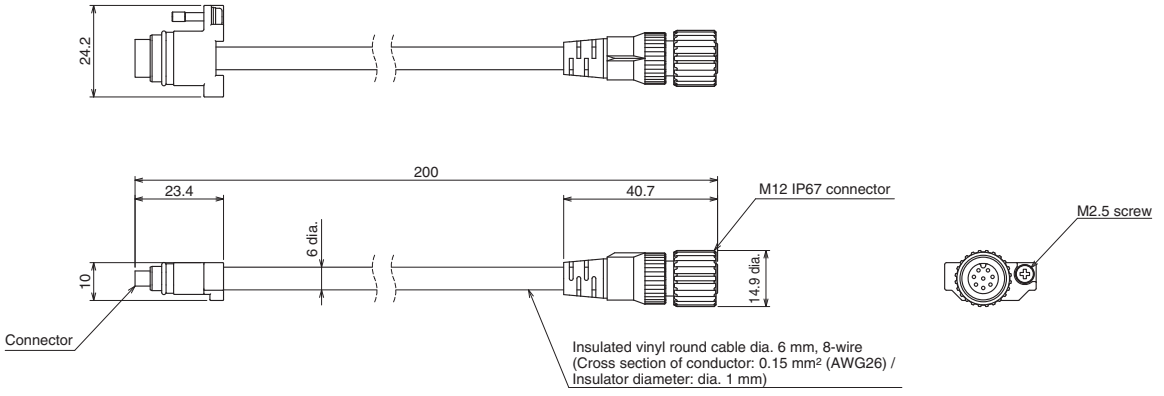
Reduced Wiring Connector (F39-CN5, sold separately)



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

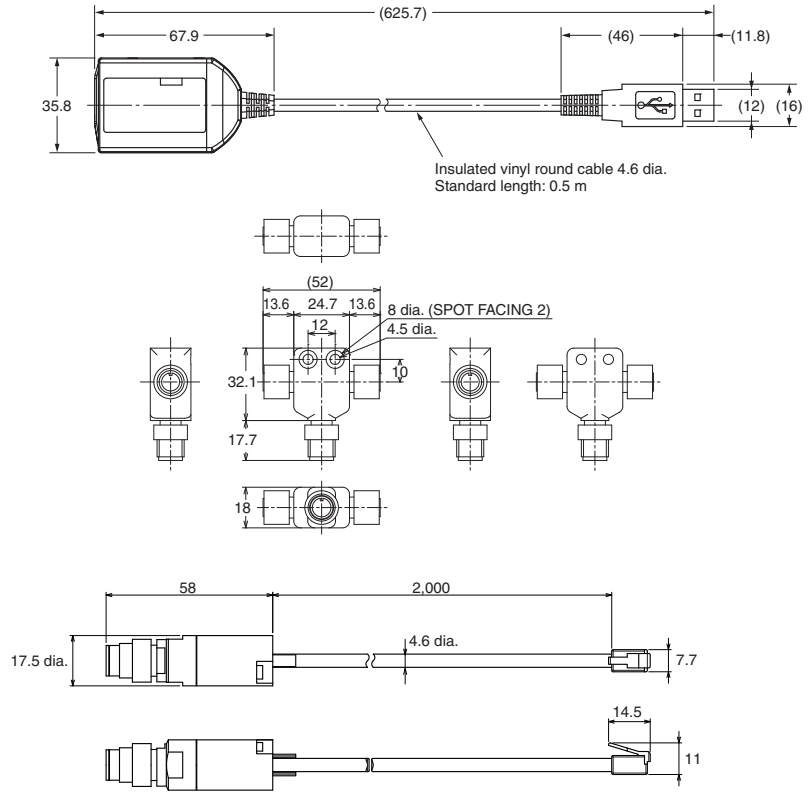


Cascading Cable for Receiver (F39-JGR2WTS-D, sold separately)

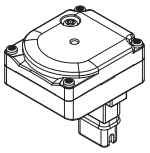


Set model name	Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR2WTS	F39-JGR2WTS-L	F39-JGR2WTS-D	0.2

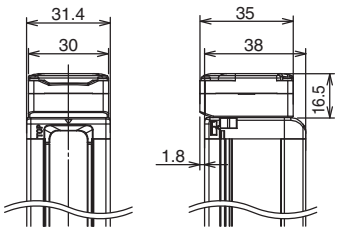
Interface Unit (F39-GIF-1, sold separately)



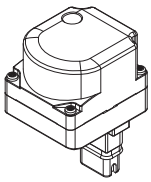
Bluetooth Communication Unit (F39-BT, sold separately)



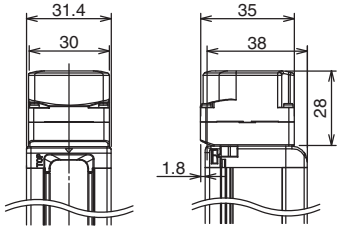
Material: PBT



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
Z383	**F3SG-□RR□□□□□□□□□□□□**	Safety Light Curtain F3SG-□RR Series User's Manual

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

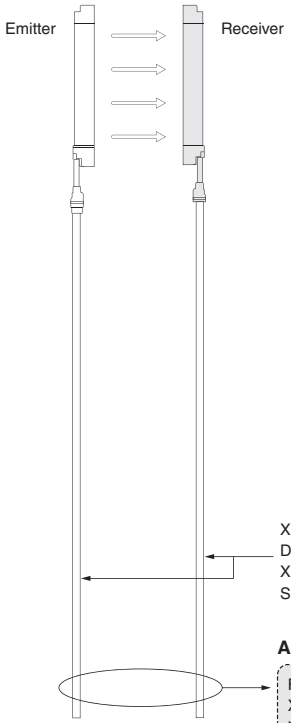
System Configuration

Mounting bracket

F39-LGF
Standard Fixed Bracket
(included as standard)

F39-LGA
Standard Adjustable Bracket

F39-LGTB
F39-LGTB-1
Top/Bottom Adjustable Bracket



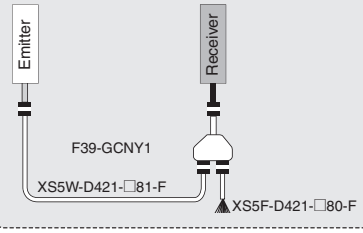
Accessory

F39-HGB□□□□
Spatter Protection Cover
(for F3SG-RE)

F39-PTG
Laser Pointer

Accessory

F39-GCNY1
XS5W-D421-□81-F
XS5F-D421-□80-F
Reduced wiring connector system



Recommended safety controller *

- **NX/NE1A-series Safety Network Controller**
- **G9SP-series Safety Controller**
- **G9SE/G9SA-series Safety Relay Unit**
- **G9SX-series Flexible Safety Unit**
- **G7SA/G7S-E Relays with Forcibly Guided Contacts**

* The recommended safety controller is required to build a safety circuit using emergency stop switches and door switches.

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)

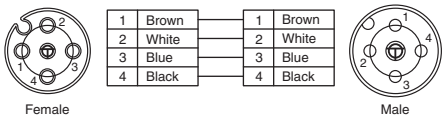
Safety light curtain connecting cable

Single-Ended 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	 Female 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
		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

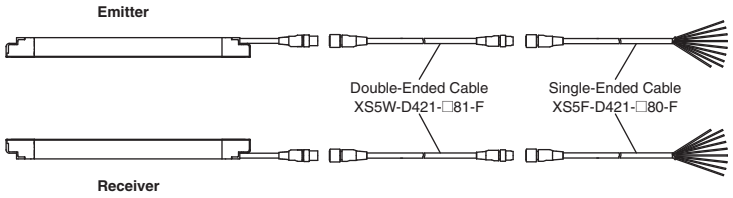
Note: 1. One cable that can be used for both emitter and receiver is provided. Order two cables for one set of safety light curtains.
2. To extend the cable length to 20 m or more, add the XS5W-D421-□81-F Double-Ended Cable.

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

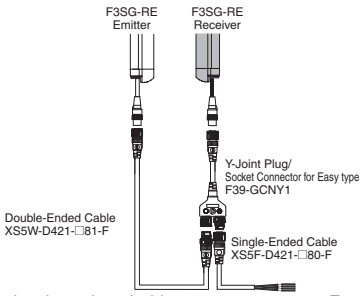
Appearance	Type	Cable length	Specifications	Model
	M12 connector (4-pin) on both ends	1 m	 Female / Male 1 Brown — 1 Brown 2 White — 2 White 3 Blue — 3 Blue 4 Black — 4 Black	XS5W-D421-C81-F
		2 m		XS5W-D421-D81-F
		3 m		XS5W-D421-E81-F
		5 m		XS5W-D421-G81-F
		10 m		XS5W-D421-J81-F
		20 m		XS5W-D421-L81-F

Note: 1. One cable that can be used for both emitter and receiver is provided. Order two cables for one set of safety light curtains.
2. To extend the cable length to more than 20 m, add the XS5W-D421-□81-F Double-Ended Cable to the XS5F-D421-□80-F 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 XS5W-D421-L81-F (20 m) cables and one XS5F-D421-J80-F (10 m) cable.

<Connection example>



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	 F3SG-RE Emitter / F3SG-RE Receiver / Y-Joint Plug/ Socket Connector for Easy type F39-GCNY1 / Double-Ended Cable XS5W-D421-□81-F / Single-Ended Cable XS5F-D421-□80-F When using the reduced wiring connector system F39-GCNY1, the Operating Range Selection is fixed to Long Mode.	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 ±15°. 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 ±22.5°. 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 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-4RE□□□□□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).

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 the 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-4RE0160□14	F3SG-4RE0190□30	F39-HGB0180
	F3SG-4RE0240□14	F3SG-4RE0270□30	F39-HGB0260
	F3SG-4RE0320□14	F3SG-4RE0350□30	F39-HGB0340
	F3SG-4RE0400□14	F3SG-4RE0430□30	F39-HGB0420
	F3SG-4RE0480□14	F3SG-4RE0510□30	F39-HGB0500
	F3SG-4RE0560□14	F3SG-4RE0590□30	F39-HGB0580
	F3SG-4RE0640□14	F3SG-4RE0670□30	F39-HGB0660
	F3SG-4RE0720□14	F3SG-4RE0750□30	F39-HGB0740
	F3SG-4RE0800□14	F3SG-4RE0830□30	F39-HGB0820
	F3SG-4RE0880□14	F3SG-4RE0910□30	F39-HGB0900
	F3SG-4RE0960□14	F3SG-4RE0990□30	F39-HGB0980
	F3SG-4RE1040□14	F3SG-4RE1070□30	F39-HGB1060
	F3SG-4RE1120□14	F3SG-4RE1150□30	F39-HGB1140
	F3SG-4RE1200□14	F3SG-4RE1230□30	F39-HGB1220
	F3SG-4RE1280□14	F3SG-4RE1310□30	F39-HGB1300
	F3SG-4RE1360□14	F3SG-4RE1390□30	F39-HGB1380
	F3SG-4RE1440□14	F3SG-4RE1470□30	F39-HGB1460
	F3SG-4RE1520□14	F3SG-4RE1550□30	F39-HGB1540
	F3SG-4RE1600□14	F3SG-4RE1630□30	F39-HGB1620
	F3SG-4RE1680□14	F3SG-4RE1710□30	F39-HGB1700
	F3SG-4RE1760□14	F3SG-4RE1790□30	F39-HGB1780
	F3SG-4RE1840□14	F3SG-4RE1870□30	F39-HGB1860
	F3SG-4RE1920□14	F3SG-4RE1950□30	F39-HGB1940
	F3SG-4RE2000□14	F3SG-4RE2030□30	F39-HGB1460
			F39-HGA0550
	F3SG-4RE2080□14	F3SG-4RE2110□30	F39-HGB1540
			F39-HGA0550
	–	F3SG-4RE2190□30	F39-HGB1620
			F39-HGA0550
	–	F3SG-4RE2270□30	F39-HGB1700
			F39-HGA0550
	–	F3SG-4RE2350□30	F39-HGB1780
			F39-HGA0550
	–	F3SG-4RE2430□30	F39-HGB1860
			F39-HGA0550
	–	F3SG-4RE2510□30	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

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

			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.	30-mm dia.
	Beam Gap		10mm	20mm
	Number of Beams		15 to 207	8 to 124
	Lens Size		5.2 ×3.4 (W×H) mm	7-mm dia.
	Protective Height		160 to 2080 mm (6.3 to81.9 inch)	190 to 2510 mm (7.3 to98.7 inch)
	Operating Range	Long	0.3 to 10.0 m (1 to 32 ft.)	0.3 to 20.0 m (1 to 65 ft.)
		Short	0.3 to 3.0 m (1 to 10 ft.)	0.3 to 7.0 m (1 to 23 ft.)
	Response Time	ON to OFF	5 to 15ms *1	
		OFF to ON	25 to 75ms *1	
			*1.Response time when used in one segment system Refer to page 79.	
	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	

			F3SG-4RE□□□□-14, F3SG-2RE□□□□-14	F3SG-4RE□□□□-30, F3SG-2RE□□□□-30
Performance	Light Source		Infrared LEDs, Wavelength: 870 nm	
	Startup Waiting Time		2 s max.	
Electricall	Power Supply Voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
	Current Consumption		Refer to page 79	
	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 80	
	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^2, 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 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 79.	
	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 26	
	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_D		9.1×10^{-9} (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)	

List of Models/Response Time/Current Consumption/Weight

F3SG-□RE□□□□□-14

Model	Number of Beams	Protective Height [mm]	Response Time [ms] *1			Current Consumption [mA]		Weight [kg]	
			ON→OFF	OFF (Synchronized) →ON	OFF (Not synchronized) →ON	Emitter	Receiver	Net *2	Gross *3
F3SG-□RE0160□14	15	160	5	25	125	45	50	0.6	1.9
F3SG-□RE0240□14	23	240	5	25	125	55	55	0.8	2.2
F3SG-□RE0320□14	31	320	7	35	135	55	55	1.0	2.5
F3SG-□RE0400□14	39	400	7	35	135	65	60	1.2	2.9
F3SG-□RE0480□14	47	480	7	35	135	70	60	1.4	3.2
F3SG-□RE0560□14	55	560	7	35	135	80	60	1.6	3.5
F3SG-□RE0640□14	63	640	7	35	135	85	65	1.9	3.8
F3SG-□RE0720□14	71	720	9	45	145	80	65	2.1	4.1
F3SG-□RE0800□14	79	800	9	45	145	85	70	2.3	4.4
F3SG-□RE0880□14	87	880	9	45	145	90	70	2.5	4.7
F3SG-□RE0960□14	95	960	9	45	145	95	75	2.7	5.0
F3SG-□RE1040□14	103	1040	9	45	145	100	75	2.9	5.4
F3SG-□RE1120□14	111	1120	11	55	155	90	75	3.1	5.7
F3SG-□RE1200□14	119	1200	11	55	155	95	80	3.3	6.0
F3SG-□RE1280□14	127	1280	11	55	155	100	80	3.5	6.3
F3SG-□RE1360□14	135	1360	11	55	155	105	85	3.7	6.6
F3SG-□RE1440□14	143	1440	11	55	155	110	85	3.9	6.9
F3SG-□RE1520□14	151	1520	13	65	165	100	90	4.1	7.2
F3SG-□RE1600□14	159	1600	13	65	165	105	90	4.4	7.5
F3SG-□RE1680□14	167	1680	13	65	165	110	95	4.6	7.9
F3SG-□RE1760□14	175	1760	13	65	165	115	95	4.8	8.2
F3SG-□RE1840□14	183	1840	13	65	165	115	95	5.0	8.5
F3SG-□RE1920□14	191	1920	15	75	175	110	100	5.2	8.8
F3SG-□RE2000□14	199	2000	15	75	175	115	100	5.4	9.1
F3SG-□RE2080□14	207	2080	15	75	175	115	105	5.6	9.4

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

F3SG-□RE□□□□□30

Model	Number of Beams	Protective Height [mm]	Response Time [ms] *1		Current Consumption [mA]			Weight [kg]	
			ON→OFF	OFF (Synchronized) →ON	OFF (Not synchronized) →ON	Emitter	Receiver	Net *2	Gross *3
F3SG-□RE0190□30	8	190	5	25	125	40	50	0.6	2.0
F3SG-□RE0270□30	12	270	5	25	125	45	50	0.8	2.3
F3SG-□RE0350□30	16	350	5	25	125	50	50	1.0	2.6
F3SG-□RE0430□30	20	430	5	25	125	55	55	1.2	2.9
F3SG-□RE0510□30	24	510	5	25	125	60	55	1.4	3.2
F3SG-□RE0590□30	28	590	7	35	135	50	55	1.6	3.5
F3SG-□RE0670□30	32	670	7	35	135	55	55	1.8	3.8
F3SG-□RE0750□30	36	750	7	35	135	60	60	2.0	4.1
F3SG-□RE0830□30	40	830	7	35	135	65	60	2.2	4.4
F3SG-□RE0910□30	44	910	7	35	135	65	60	2.4	4.7
F3SG-□RE0990□30	48	990	7	35	135	70	60	2.6	5.0
F3SG-□RE1070□30	52	1070	7	35	135	75	60	2.8	5.3
F3SG-□RE1150□30	56	1150	7	35	135	80	65	3.0	5.6
F3SG-□RE1230□30	60	1230	7	35	135	85	65	3.3	5.9
F3SG-□RE1310□30	64	1310	7	35	135	85	65	3.5	6.2
F3SG-□RE1390□30	68	1390	9	45	145	75	65	3.7	6.5
F3SG-□RE1470□30	72	1470	9	45	145	80	65	3.9	6.8
F3SG-□RE1550□30	76	1550	9	45	145	80	70	4.1	7.1
F3SG-□RE1630□30	80	1630	9	45	145	85	70	4.3	7.4
F3SG-□RE1710□30	84	1710	9	45	145	85	70	4.5	7.7
F3SG-□RE1790□30	88	1790	9	45	145	90	70	4.7	8.0
F3SG-□RE1870□30	92	1870	9	45	145	95	75	4.9	8.3
F3SG-□RE1950□30	96	1950	9	45	145	95	75	5.1	8.6
F3SG-□RE2030□30	100	2030	9	45	145	100	75	5.3	8.9
F3SG-□RE2110□30	104	2110	9	45	145	100	75	5.5	9.2
F3SG-□RE2190□30	108	2190	11	55	155	90	75	5.7	9.5
F3SG-□RE2270□30	112	2270	11	55	155	95	80	5.9	9.8
F3SG-□RE2350□30	116	2350	11	55	155	95	80	6.1	10.1
F3SG-□RE2430□30	120	2430	11	55	155	95	80	6.3	10.4
F3SG-□RE2510□30	124	2510	11	55	155	100	80	6.5	10.7

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

LED Indicator Status

Emitter

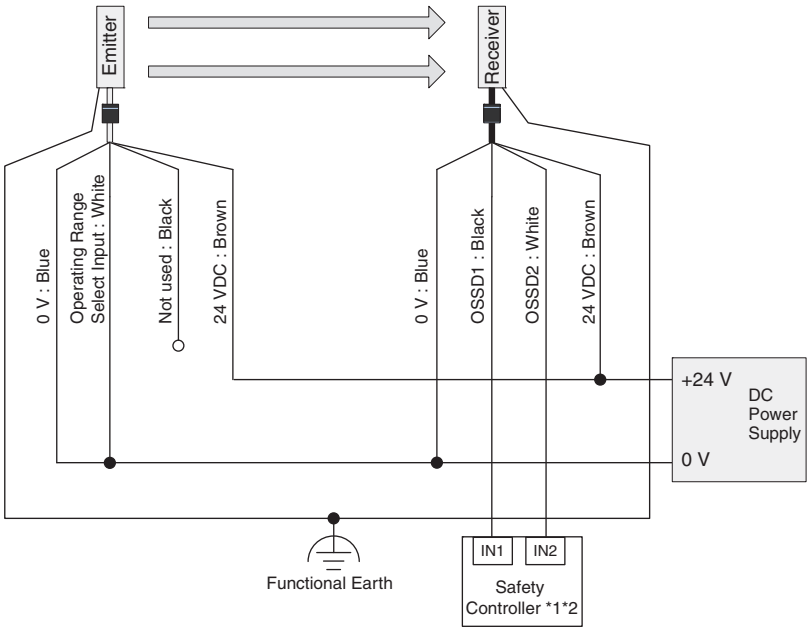
Name of Indicator		Color	Illuminated	Blinking
Operating range	LONG	Green	Long range mode is selected	Lockout state due to Operating range selection setting error
Power	POWER	Green	Power is ON.	Error due to noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in emitter

Receiver

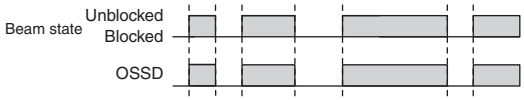
Name of Indicator		Color	Illuminated	Blinking
Top-beam-state	TOP	Blue	The top beam is unblocked	–
Internal error	INTERNAL	Red	–	Lockout state due to Internal error, or error due to abnormal power supply or noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in receiver
Stable-state	STB	Green	Incident 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

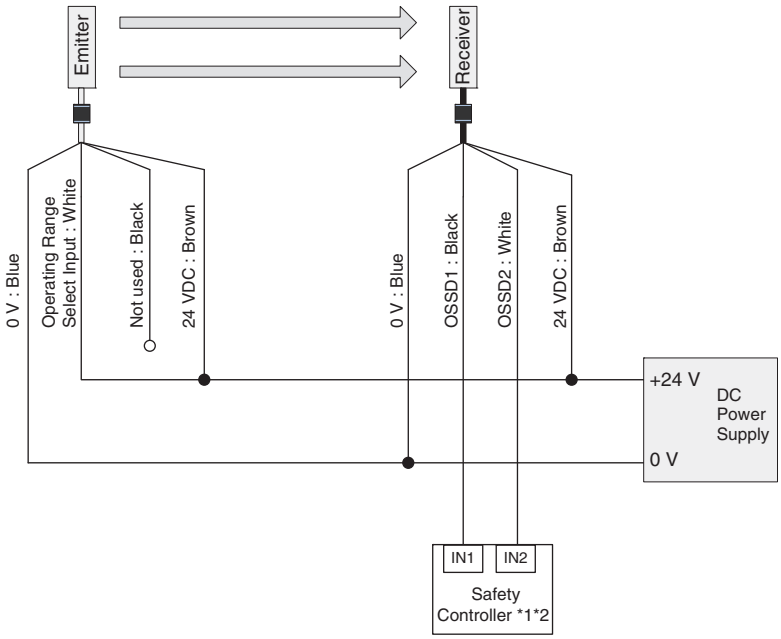


*1.Refer to page 82 for more information.
*2.The safety controller and the F3SG-RE must share the power supply or be connected to the common terminal of the power supply.

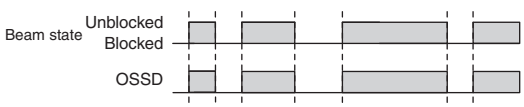


Note: Functional earth connection is unnecessary when you use the F3SG-RE in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-RE in an environment where there may be excessive noise from surroundings or stable power supply may be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

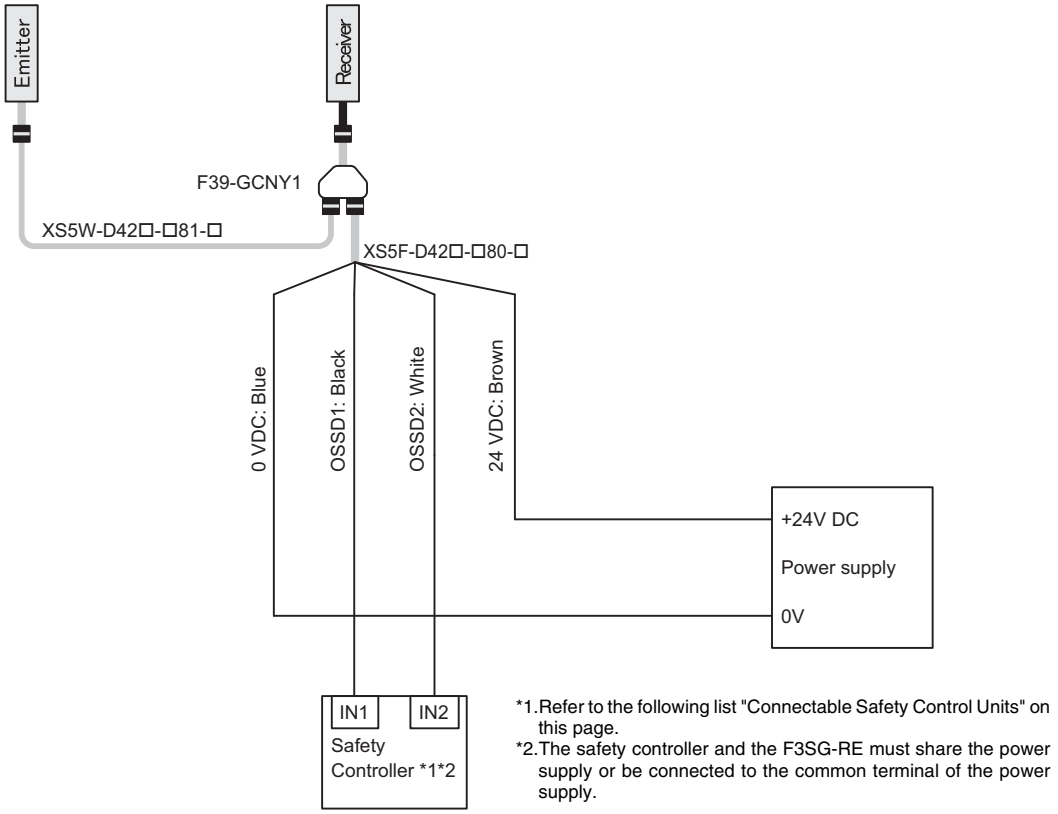


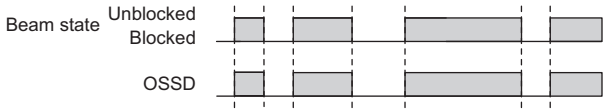
*1.Refer to page 82 for more information.
*2.The safety controller and the F3SG-RE must share the power supply or be connected to the common terminal of the power supply.



Note: For the functional earth connection, refer to the Short Mode example.

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





Note: 1. When using the reduced wiring connector system F39-GCNY1, the Operating Range Selection is fixed to Long Mode.
2. For the functional earth connection, refer to the Short Mode example.

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-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 units listed in the table below.

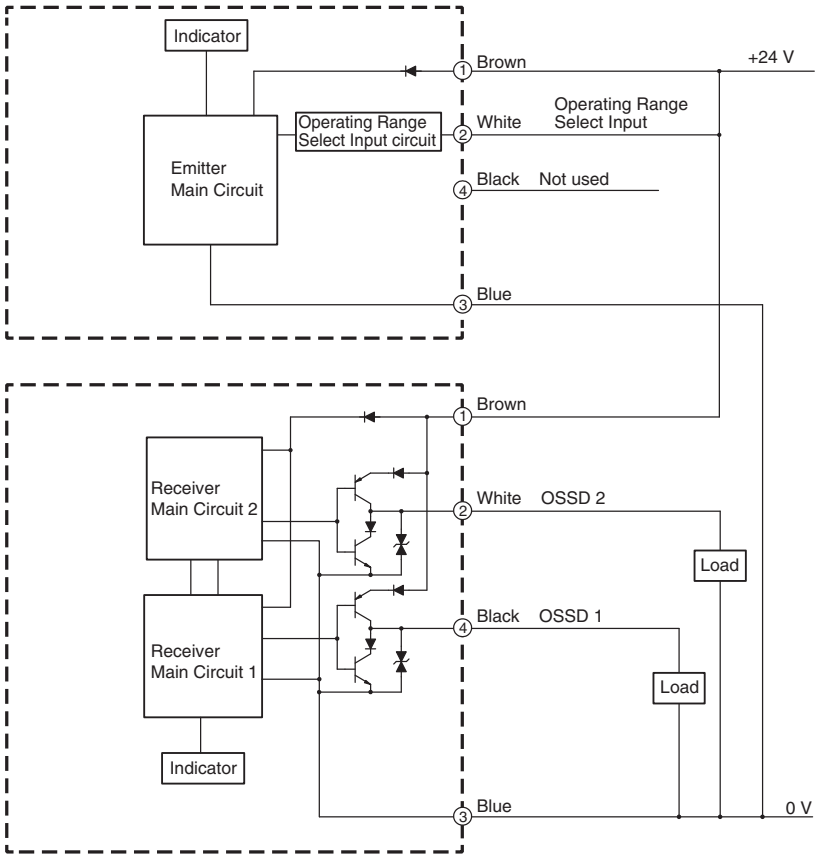
Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

Input/Output Circuit

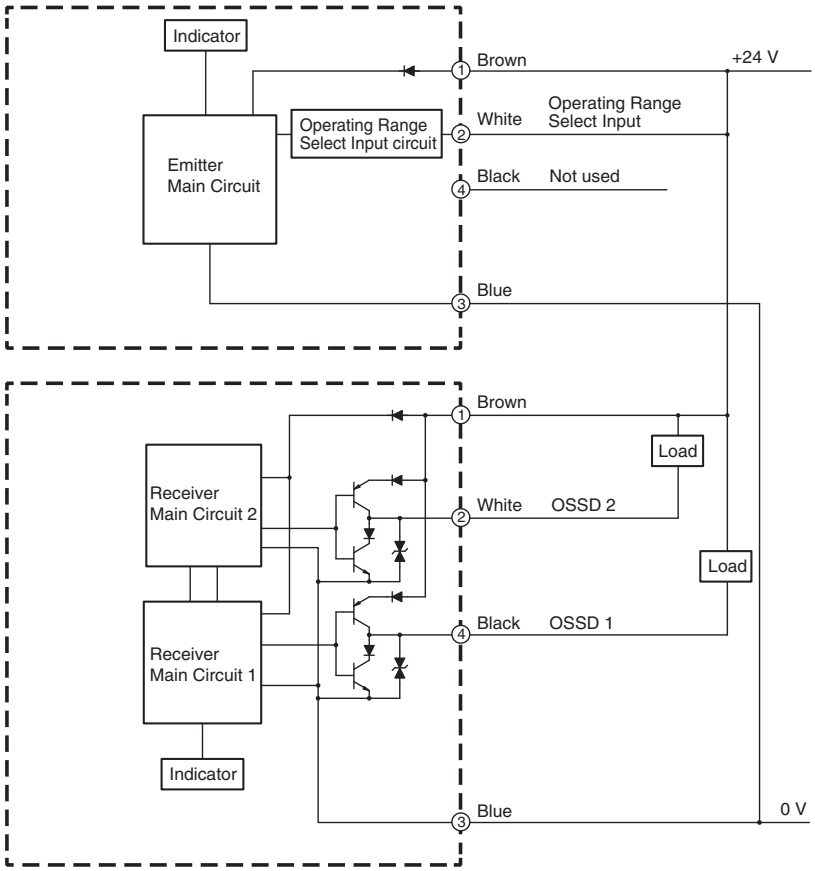
Entire Circuit Diagram

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

PNP Output



NPN Output

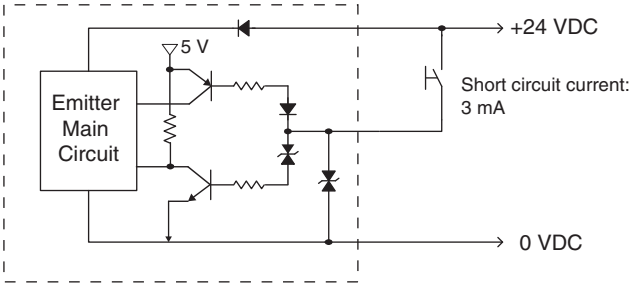


Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

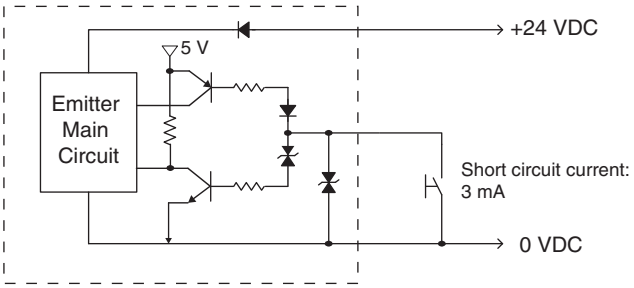
PNP Output

<Input circuit (Operating Range Select Input)>



NPN Output

<Input circuit (Operating Range Select Input)>

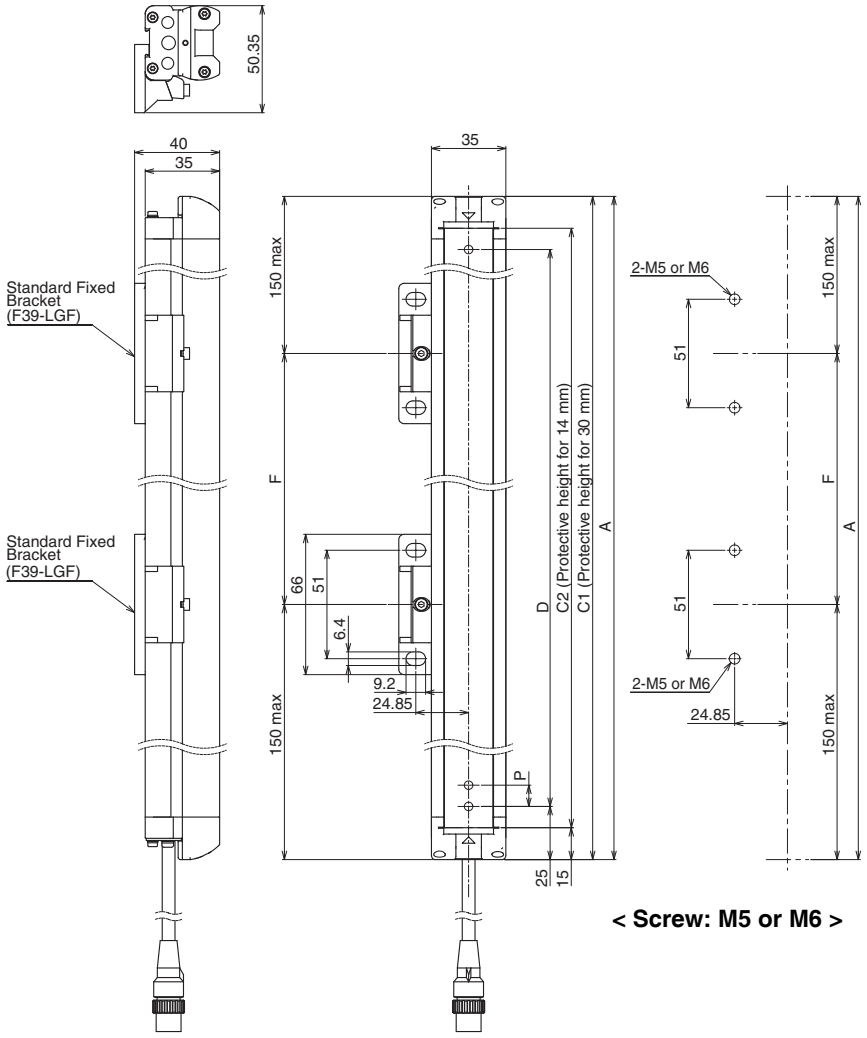


Dimensions

(Unit: mm)

Mounted with Standard Fixed Brackets (F39-LGF)

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 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.

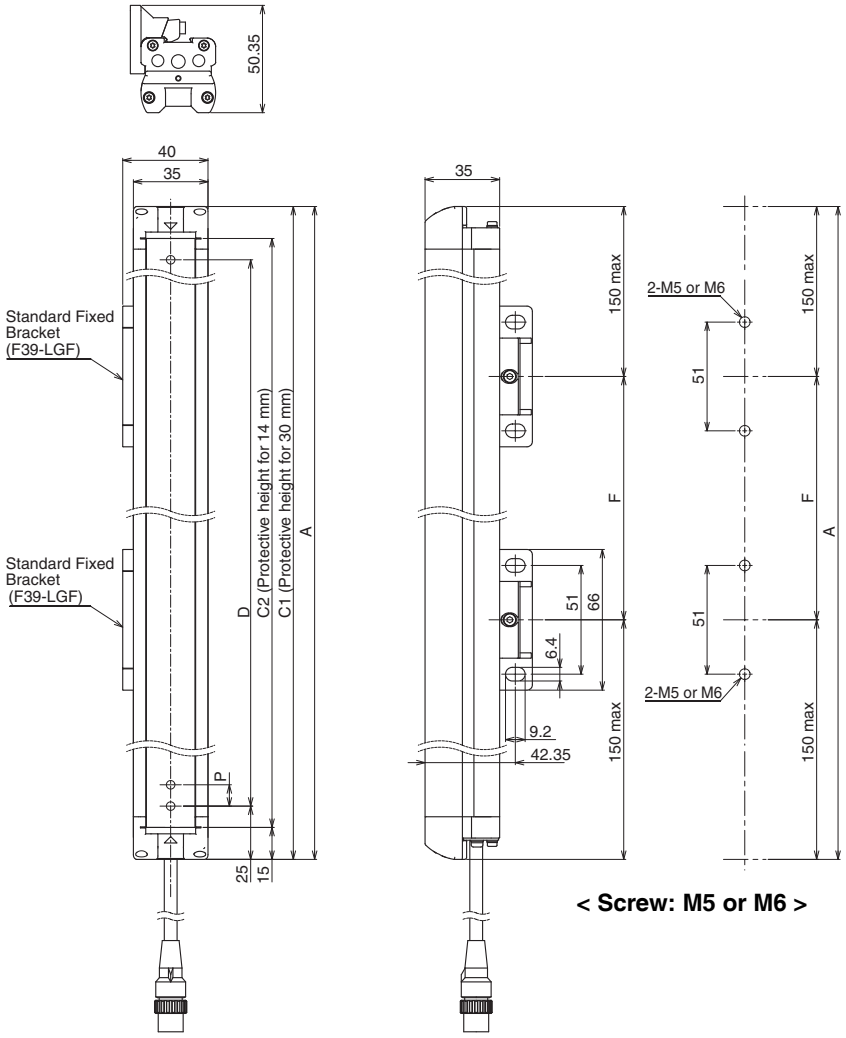
F3SG-4RE□□□□14 Series

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).

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

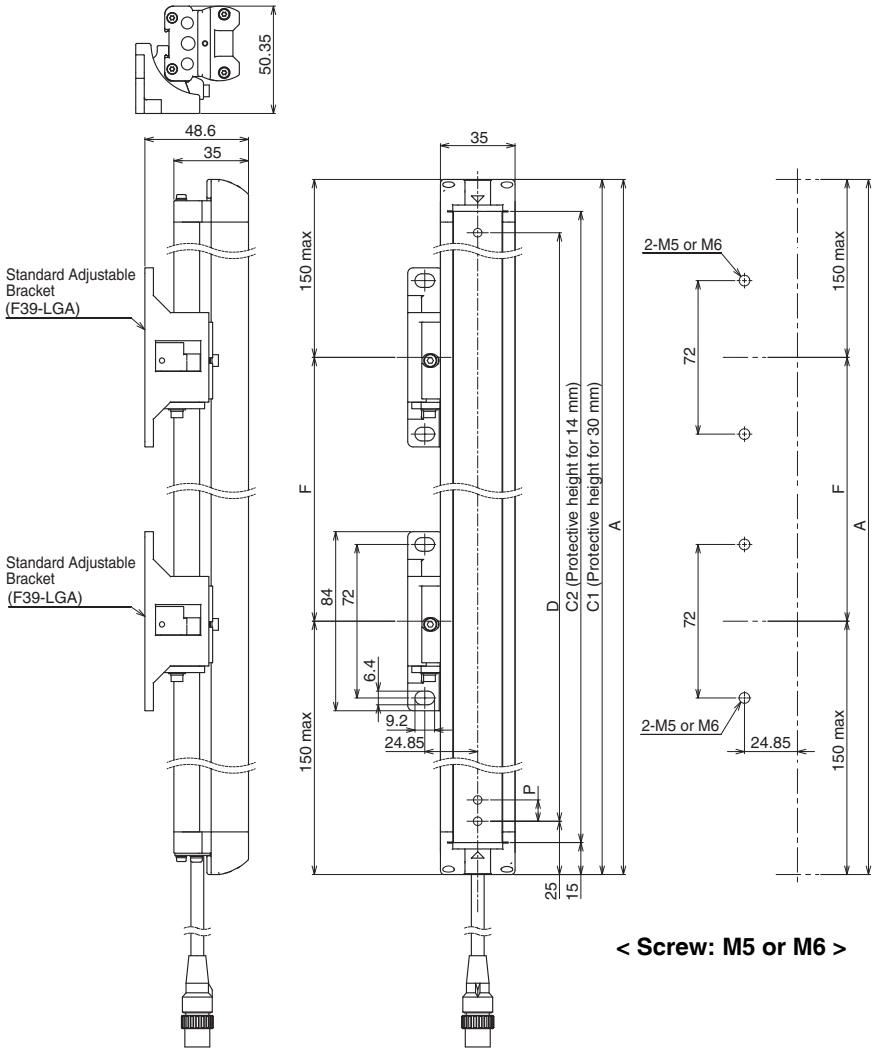
Dimension A	C2+30
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

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).

Mounted with Standard Fixed Brackets (F39-LGA)

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 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.

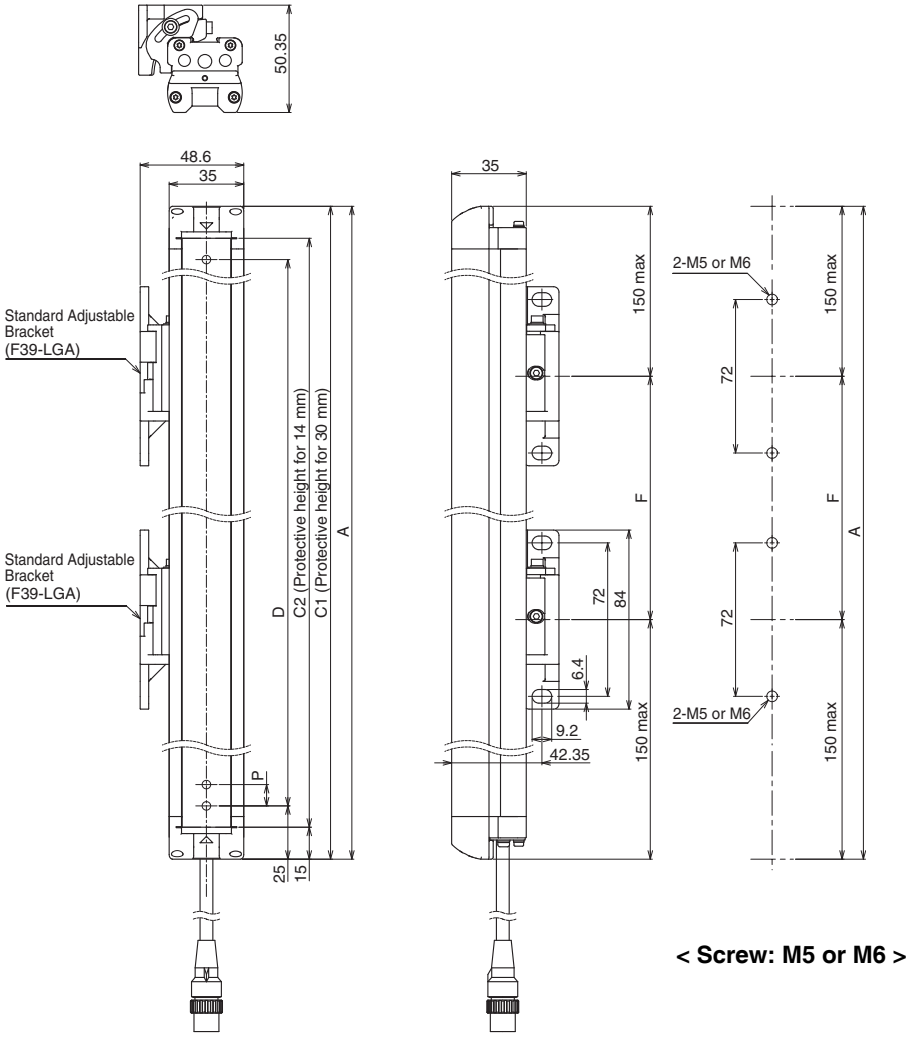
F3SG-4RE□□□□□14 Series

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).

Side Mounting



< Screw: M5 or M6 >

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

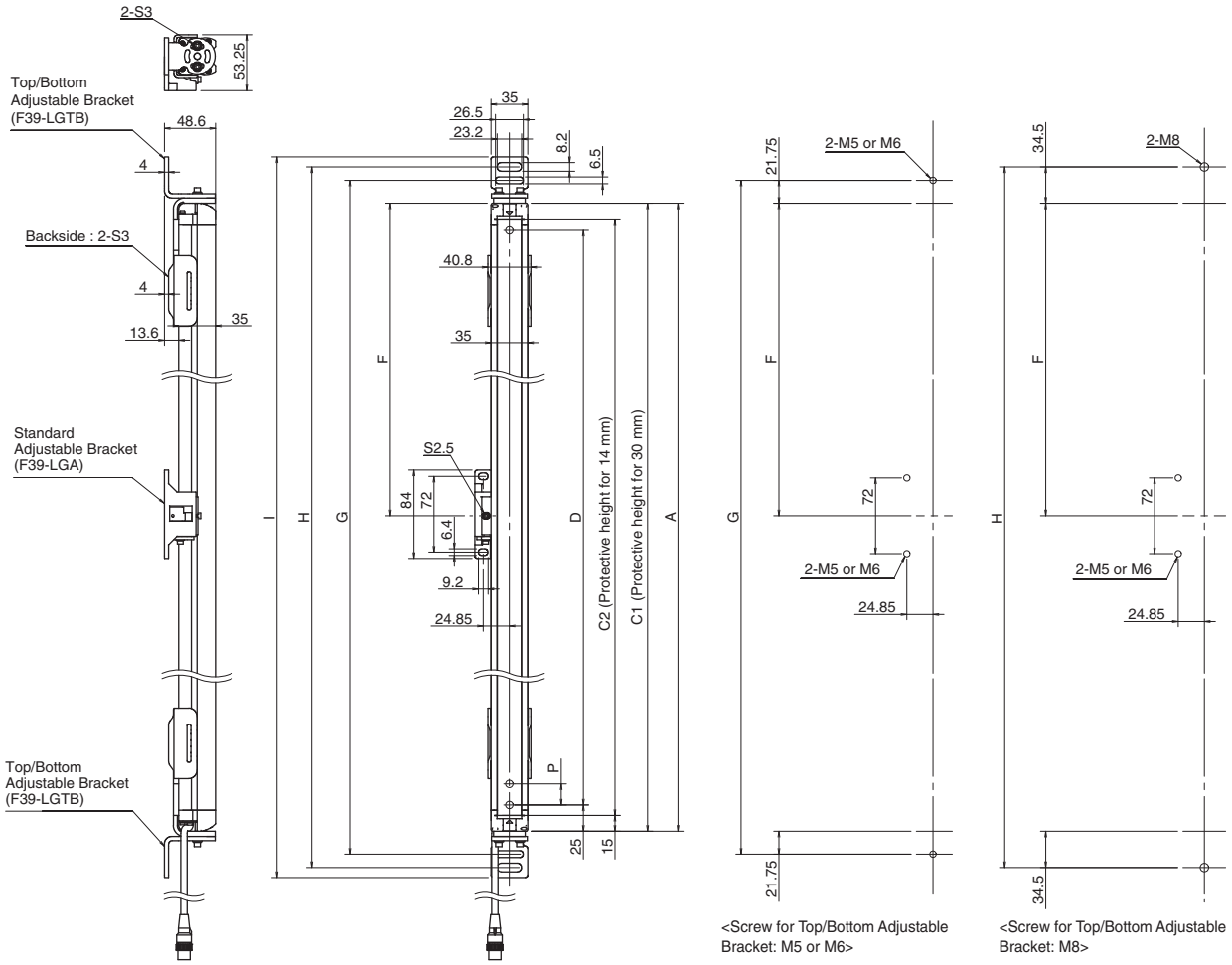
Protective height (C2)	Number of Standard Adjustable Brackets *1	Dimension F
0160 to 1200	2 *2	1000 mm max.
1280 to 2080	3	1000 mm max.

*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).

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

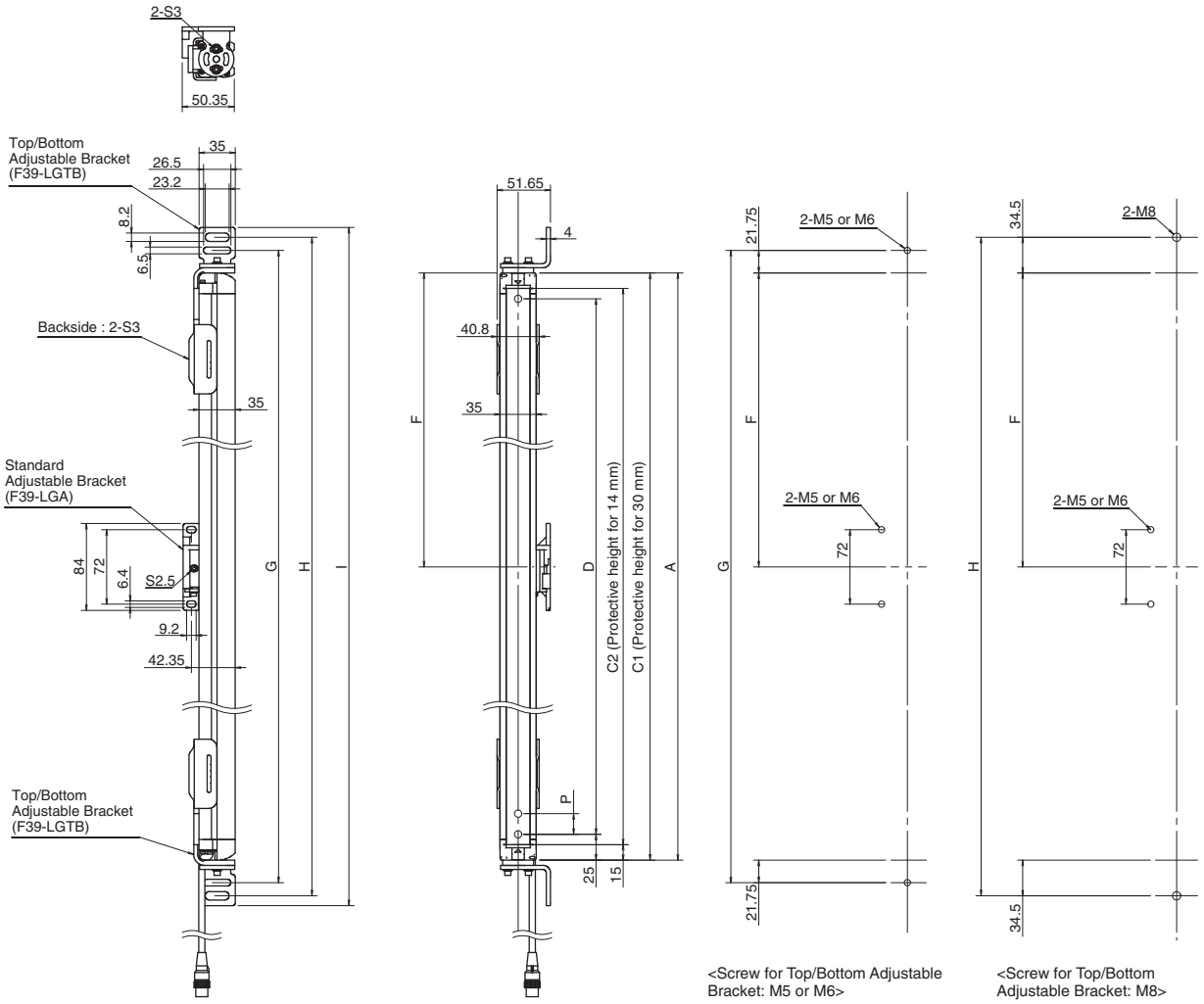
Protective height (C1)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0270 to 1070	2	0	–
1150 to 1950	2	1	1000 mm max.
2030 to 2510	2	2	1000 mm max.

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



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

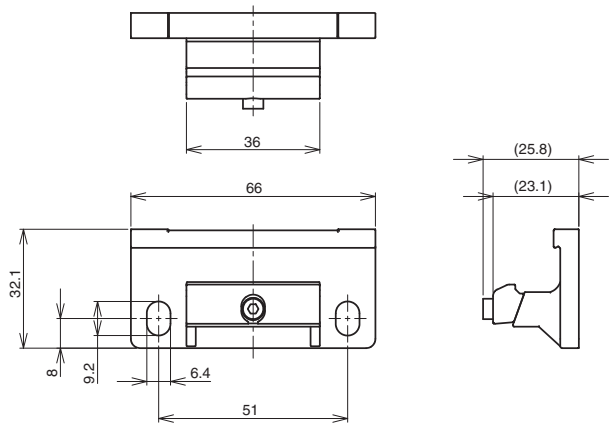
Dimension A	C2+30
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension G	C2+73.5
Dimension H	C2+99
Dimension I	C2+118
Dimension P	10

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.

Accessories

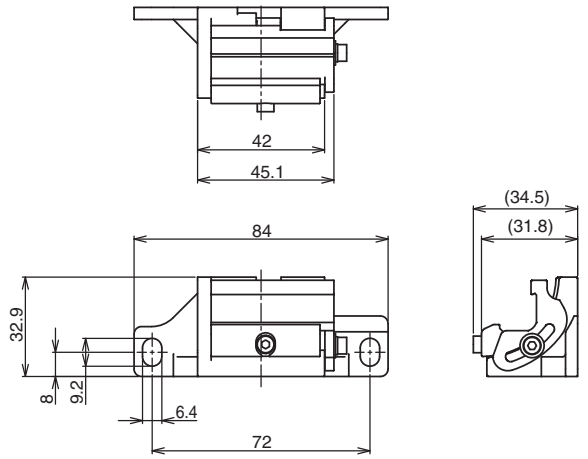
Sensor Mounting Brackets

Standard Fixed Bracket (F39-LGF)



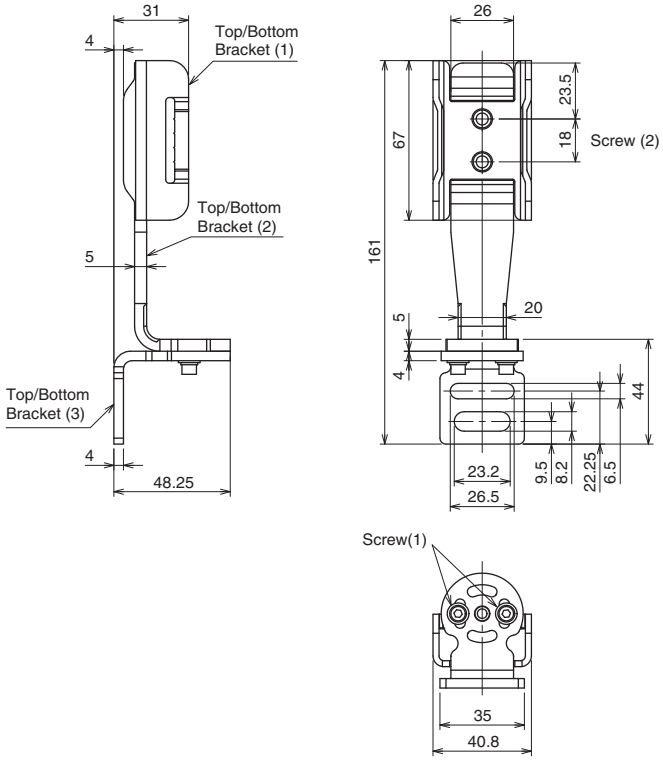
Material: Zinc alloy

Standard Fixed Bracket (F39-LGA, sold separately)



Material: Zinc alloy, Fluorochemical lubricant oil

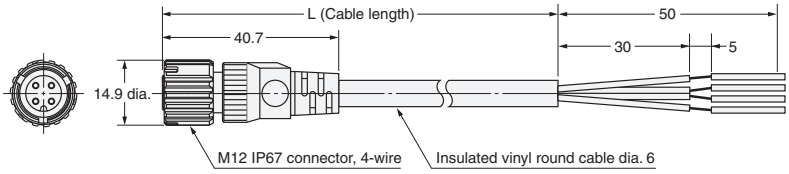
Top/Bottom Adjustable Bracket (F39-LGTB, sold separately)



Material: Stainless steel

Safety light curtain connecting cable

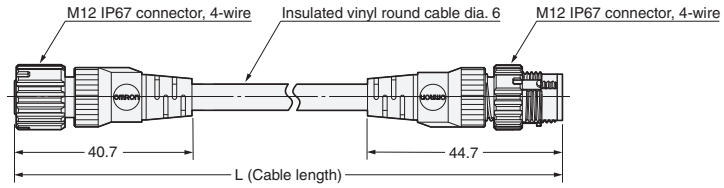
Round Water-resistant Connector: Connector Connected to Cable, Socket on One Cable End (XS5F-D421-□80-F, sold separately)



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

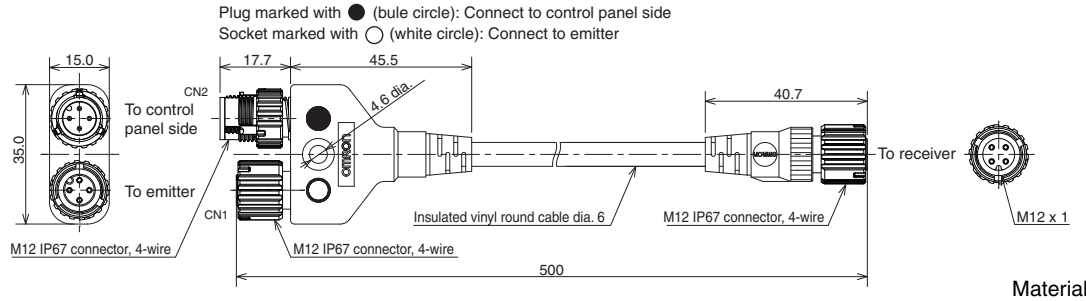
Round Water-resistant Connector: Connectors Connected to Cable, Socket and Plug on Cable Ends (XS5W-D421-□81-F, sold separately)



Material: Insulated vinyl round cable

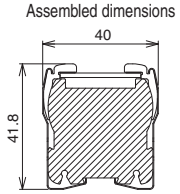
Specification	Model	L (m)
Fire-retardant, Robot cable	**XS5W-D421-C81-F**	1
	XS5W-D421-D81-F	2
	XS5W-D421-E81-F	3
	XS5W-D421-G81-F	5
	XS5W-D421-J81-F	10
	XS5W-D421-L81-F	20

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



Material: PBT (Main body)

Spatter Protection Cover(F39-HGA/-HGB, sold separately)



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

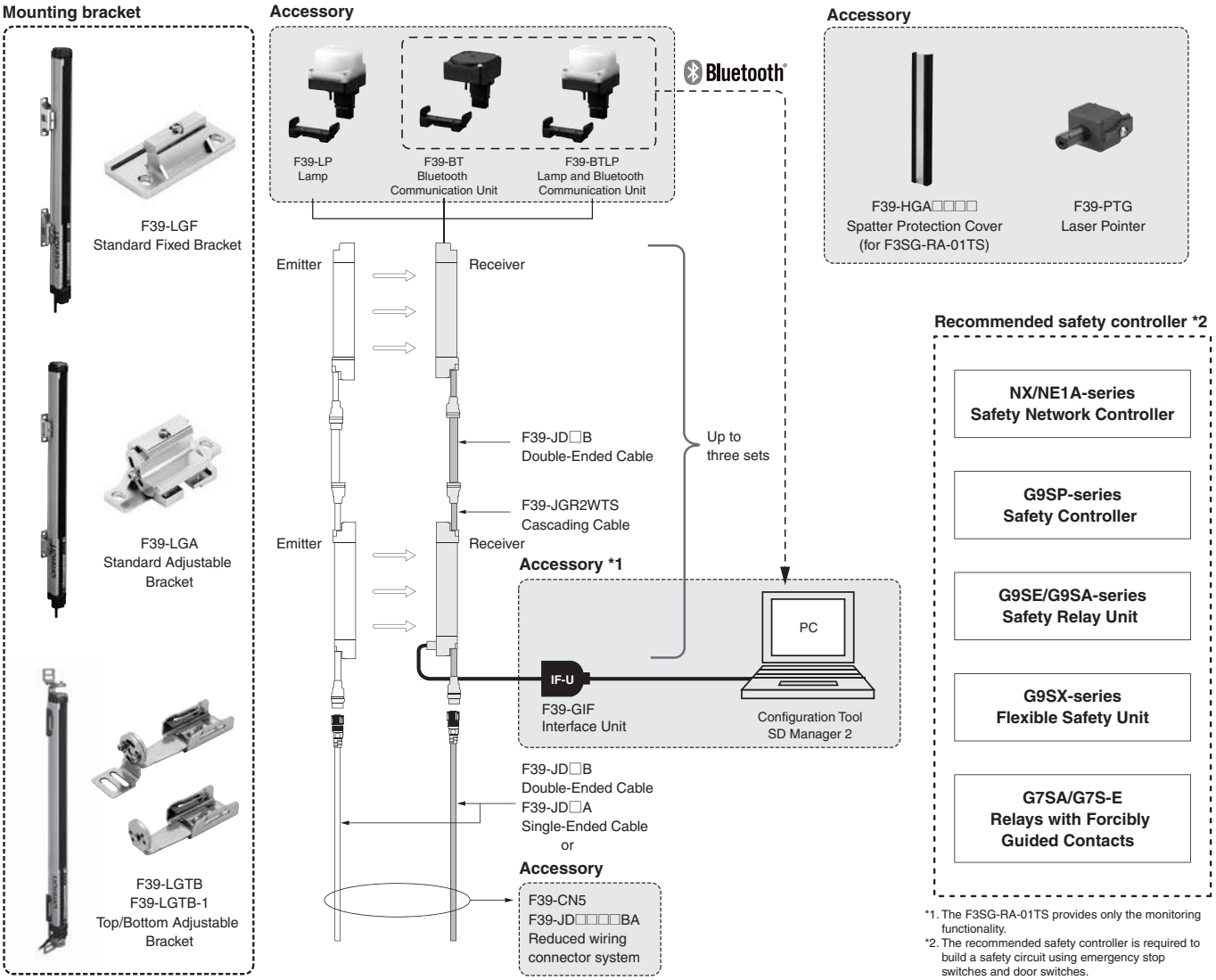
Safety Light Curtain

F3SG-RA-01TS

Offers Both Durability and Reliability

- Rugged and compact
- All models designed for global use. PNP/NPN selection by DIP switch
- Conforming to major international standards
- Prevents accidental changes of settings by configuration tool (monitoring only)

System Configuration



*1. The F3SG-RA-01TS provides only the monitoring functionality.
*2. The recommended safety controller is required to build a safety circuit using emergency stop switches and door switches.

Ordering Information

Main Units

Safety Light Curtain

Hand and arm protection

Number of beams	Protective height (mm)	Model
8	185	**F3SG-4RA0185-25-01TS**
12	265	**F3SG-4RA0265-25-01TS**
16	345	**F3SG-4RA0345-25-01TS**
20	425	**F3SG-4RA0425-25-01TS**
24	505	**F3SG-4RA0505-25-01TS**
28	585	**F3SG-4RA0585-25-01TS**
32	665	**F3SG-4RA0665-25-01TS**
36	745	**F3SG-4RA0745-25-01TS**
40	825	**F3SG-4RA0825-25-01TS**
44	905	**F3SG-4RA0905-25-01TS**
48	985	**F3SG-4RA0985-25-01TS**
52	1,065	**F3SG-4RA1065-25-01TS**
56	1,145	**F3SG-4RA1145-25-01TS**
60	1,225	**F3SG-4RA1225-25-01TS**
64	1,305	**F3SG-4RA1305-25-01TS**
68	1,385	**F3SG-4RA1385-25-01TS**
72	1,465	**F3SG-4RA1465-25-01TS**
76	1,545	**F3SG-4RA1545-25-01TS**
80	1,625	**F3SG-4RA1625-25-01TS**
84	1,705	**F3SG-4RA1705-25-01TS**
88	1,785	**F3SG-4RA1785-25-01TS**
92	1,865	**F3SG-4RA1865-25-01TS**
96	1,945	**F3SG-4RA1945-25-01TS**

Accessories (Sold separately)

Safety light curtain connecting cable

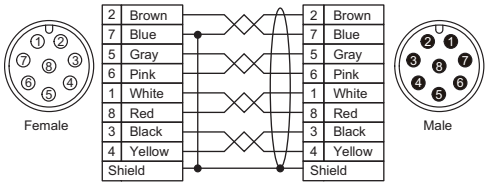
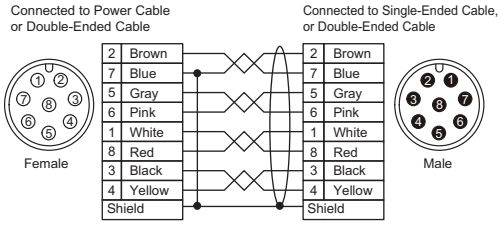
Single-Ended Cable (2 cables per set, one for emitter and one for receiver) *

Appearance	Cable length	Specifications	Model
	3m	For emitter M12 connector (8-pin), Color: Gray Connected to Power Cable or Double-Ended Cable  Female 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 Shield	**F39-JD3A**
	7m		**F39-JD7A**
	10m	For receiver M12 connector (8-pin), Color: Gray Connected to Power Cable or Double-Ended Cable  Female 1 OSSD 2 White 2 +24 VDC Brown 3 OSSD 1 Black 4 AUX Yellow 5 Not used Gray 6 Not used Pink 7 0 VDC Blue 8 EDM Red Shield	**F39-JD10A**
	15m		**F39-JD15A**
	20m		**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: To extend the cable length to more than 20 m, add the F39-JD□B Double-Ended Cable.

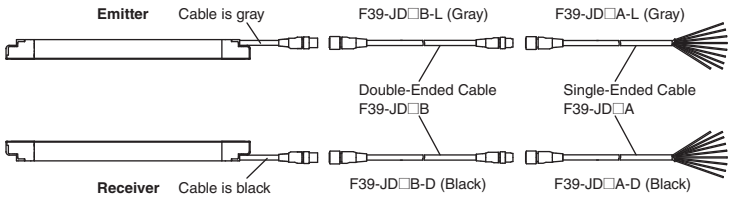
Doble-Ended Cable (2 cables per set, one for emitter and one for receiver) *
For cable extension

Appearance	Cable length	Specifications	Model
	0.5 m	For emitter M12 connector (8-pin), Color: Gray  For receiver M12 connector (8-pin), Color: Black 	**F39-JDR5B**
	1 m		**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**

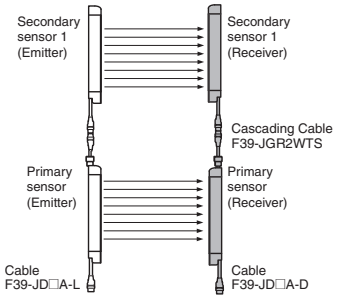
* The cable for emitter and the cable for receiver are available separately. Add '-L' for emitter or '-D' for receiver to the end of the model number when you order.
Double-Ended Cable for Emitter: F39-JD(R)□B-L, Double-Ended Cable for Receiver: F39-JD(R)□B-D

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.

<Connection example>

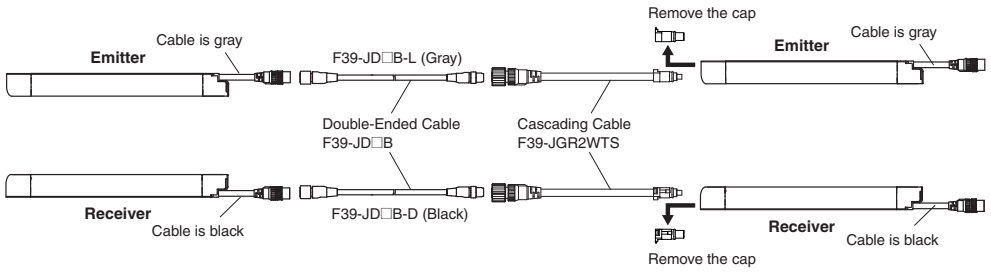


Cascading Cable (2 cables per set, for emitter and receiver)

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

<Connection example>

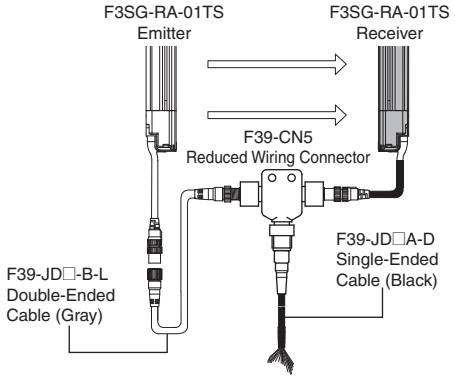


Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)

Reduced Wiring Connector

Appearance	Specifications	Model
	IP67 rated when mated.	**F39-CN5**

Note: When using the Reduced Wiring Connector (F39-CN5), the following functions are not available.
- External Device Monitoring
- Auxiliary Output



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.	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 Receive: 10mr		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.

Sensor Mounting Brackets

Appearance	Specification	Application	Model
	Standard Fixed Bracket	Bracket to mount the F3SG-RA-01TS. 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-LGF**
	Standard Adjustable Bracket	Bracket to mount the F3SG-RA-01TS. Beam alignment after mounting possible. The angle adjustment range is ±15°. 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-RA-01TS. Use this bracket at the top and bottom positions of the F3SG-RA-01TS. Beam alignment after mounting possible. The angle adjustment range is ±22.5°. 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. Protective height of 0185 to 1225: 2 sets, Protective height of 1305 to 1945: 3 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
Protective height of 1065 or less: The Standard Adjustable Bracket is not required. Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)).
Protective height of 1145 to 1945: Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)) and 1 set 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 http://www.ia.omron.com/f3sg-r_tool.	–
	Interface Unit	F39-GIF interface unit to connect the F3SG-RA-01TS 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**

* The F3SG-RA-01TS provides only the monitoring functionality.

Lamp

Appearance	Type	Specifications	Model
	Lamp	The lamp can be connected to a receiver and turned ON based on the operation of F3SG-RA. The lamp output pattern is set as follows: Red (ON): Inverted signal of safety output information Orange (Blink once): Inverted signal of stable-state information Green (ON): Safety output information IP67 rated when mated.	**F39-LP**
	Lamp and Bluetooth Communication Unit		**F39-BTLP**

End Cap *

Appearance	Specifications	Model
	Housing color: Black For both emitter and receiver (Attached to the F3SG-RA-01TS. The End Cap can be purchased if lost.) IP67 rated when mated.	**F39-CNM**

* This accessory can also be used with the F3SG-RA-02TS.

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.

Appearance	Safety Light Curtain Model Hand protection	Model
	F3SG-4RA0185-25-01TS	F39-HGA0200
	F3SG-4RA0265-25-01TS	F39-HGA0280
	F3SG-4RA0345-25-01TS	F39-HGA0360
	F3SG-4RA0425-25-01TS	F39-HGA0440
	F3SG-4RA0505-25-01TS	F39-HGA0520
	F3SG-4RA0585-25-01TS	F39-HGA0600
	F3SG-4RA0665-25-01TS	F39-HGA0680
	F3SG-4RA0745-25-01TS	F39-HGA0760
	F3SG-4RA0825-25-01TS	F39-HGA0840
	F3SG-4RA0905-25-01TS	F39-HGA0920
	F3SG-4RA0985-25-01TS	F39-HGA1000
	F3SG-4RA1065-25-01TS	F39-HGA1080
	F3SG-4RA1145-25-01TS	F39-HGA1160
	F3SG-4RA1225-25-01TS	F39-HGA1240
	F3SG-4RA1305-25-01TS	F39-HGA1320
	F3SG-4RA1385-25-01TS	F39-HGA1400
	F3SG-4RA1465-25-01TS	F39-HGA1480
	F3SG-4RA1545-25-01TS	F39-HGA1560
	F3SG-4RA1625-25-01TS	F39-HGA1640
	F3SG-4RA1705-25-01TS	F39-HGA1720
	F3SG-4RA1785-25-01TS	F39-HGA1800
	F3SG-4RA1865-25-01TS	F39-HGA1880
	F3SG-4RA1945-25-01TS	F39-HGA1960

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
25 mm dia.	F39-TRD25

Ratings and Specifications

Main unit

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

			F3SG-4RA□□□□-25-01TS
Performance	Object Resolution (Detection Capability)		Opaque objects 25-mm dia.
	Beam Gap		20 mm
	Number of Beams		8 to 96
	Lens Size		6.0×5.0 (W×H) 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 101 for the one segment system. Refer to *Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual (ManNo.: Z380)* for cascaded connection.	
	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.
Electrical	Power Supply Voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)
	Current Consumption		Refer to page 101 .
	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 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	24 V inactive setting ON voltage: 0 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 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 103 .
	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-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		External device monitoring (EDM) Scan code selection PNP/NPN selection

			F3SG-4RA□□□□-25-01TS
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^2, 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, IP67 rated when mated, Cables pre-wired to the sensors
		Number of Wires	On emitter: 5-wire, On receiver: 8-wire
		Cable Length	0.3 m
		Cable Diameter	6 mm
		Minimum Bending Radius	R5 mm
	Cascading cable	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
		Cable Diameter	6 mm
		Minimum Bending Radius	R5 mm
	Extension cable - Single-Ended Cable - Double-Ended Cable	Type of Connection	M12 connectors: 8-pin emitter and receiver, IP67 rated when mated
		Number of Wires	On emitter and receiver: 8-wire
		Cable Length	Refer to page 94.
		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: Oil-resistant PVC resin FE plate: Stainless steel
	Weight		Refer to page 101 .
	Included Accessories		Safety Precautions, Quick Installation Manual, Troubleshooting Guide Sticker,
Conformity	Conforming standards		Refer to page 102 .
	Type of ESPE (IEC 61496-1)		Type 4
	Performance Level (PL)/ Safety category		PL e/Category 4 (EN ISO 13849-1:2015)
	PFH_D		1.1×10^{-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.

List of Models/Response Time/Current Consumption/Weight

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-4RA0185-25-01TS	8	185	8	40	140	35	75	0.7	1.4
F3SG-4RA0265-25-01TS	12	265	8	40	140	35	75	0.9	1.6
F3SG-4RA0345-25-01TS	16	345	8	40	140	40	75	1.1	1.9
F3SG-4RA0425-25-01TS	20	425	8	40	140	45	75	1.3	2.2
F3SG-4RA0505-25-01TS	24	505	8	40	140	50	75	1.5	2.5
F3SG-4RA0585-25-01TS	28	585	8	40	140	50	75	1.7	2.7
F3SG-4RA0665-25-01TS	32	665	8	40	140	55	75	1.9	3.0
F3SG-4RA0745-25-01TS	36	745	8	40	140	60	80	2.1	3.3
F3SG-4RA0825-25-01TS	40	825	8	40	140	65	80	2.3	3.6
F3SG-4RA0905-25-01TS	44	905	13	65	165	50	80	2.5	3.8
F3SG-4RA0985-25-01TS	48	985	13	65	165	50	80	2.8	4.1
F3SG-4RA1065-25-01TS	52	1065	13	65	165	55	80	3.0	4.4
F3SG-4RA1145-25-01TS	56	1145	13	65	165	55	85	3.2	4.7
F3SG-4RA1225-25-01TS	60	1225	13	65	165	55	85	3.4	5.0
F3SG-4RA1305-25-01TS	64	1305	13	65	165	60	85	3.6	5.2
F3SG-4RA1385-25-01TS	68	1385	13	65	165	60	85	3.8	5.5
F3SG-4RA1465-25-01TS	72	1465	13	65	165	65	85	4.0	5.8
F3SG-4RA1545-25-01TS	76	1545	13	65	165	65	90	4.2	6.0
F3SG-4RA1625-25-01TS	80	1625	13	65	165	70	90	4.4	6.3
F3SG-4RA1705-25-01TS	84	1705	13	65	165	70	90	4.6	6.6
F3SG-4RA1785-25-01TS	88	1785	13	65	165	70	90	4.9	6.9
F3SG-4RA1865-25-01TS	92	1865	13	65	165	75	90	5.1	7.1
F3SG-4RA1945-25-01TS	96	1945	13	65	165	75	95	5.3	7.4

*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-RA-01TS does not receive type approval provided by Article 44-2 of the Industrial Safety and Health Act of Japan. When using the F3SG-RA-01TS 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-RA-01TS 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-RA-01TS is in conformity with the requirements of the following EC Directives:
   Machinery Directive 2006/42/EC
   EMC Directive2014/30/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. 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

6. Other Standards
   The F3SG-RA-01TS 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

Indicator

Emitter

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

Receiver

Name of Indicator	Color	Illuminated	Blinking
TOP	Blue	The top beam is unblocked	Lockout state due to Cap error or Other sensor error
NPN	Green	NPN mode is selected by DIP Switch	–
CFG	Green	–	Lockout state due to Cascading Configuration error
EDM	Green	EDM input is in ON state *	Lockout state due to EDM error
INTERNAL	Red	–	Lockout state due to Internal error, or error due to abnormal power supply or noise
LOCKOUT	Red	–	Lockout state due to error in receiver
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	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
COM	Green	Synchronization between emitter and receiver is maintained	Lockout state due to Communication error, or error due to abnormal power supply or noise
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

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 ×1
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 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^2 , 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)

Connections (Basic Wiring Diagram)

Standalone F3SG-RA-01TS using PNP Outputs

EDM disabled, External Test unused and PNP Outputs

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

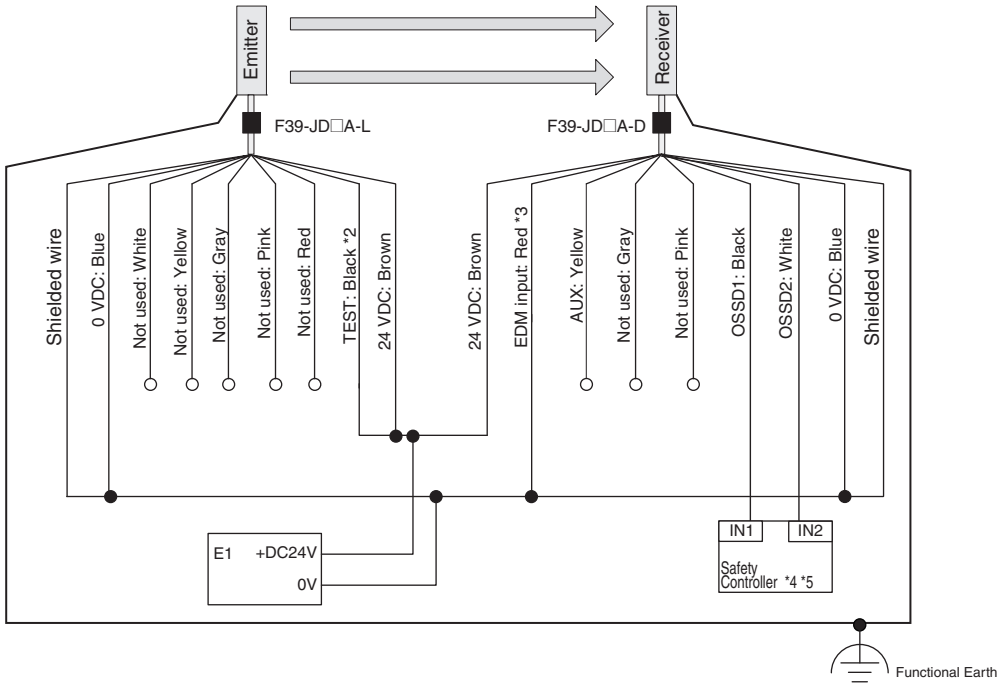
DIP Switch settings *1

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ■ ON	2 ■ ON
	PNP (factory default setting)	7 ■ ON	7 ■ ON
Emitter	External Test: 24 V Inactive (factory default setting)	4 ■ ON	

□: Indicates a switch position.

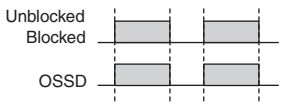
Configure functions with the DIP Switches before wiring.

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 page 106 for more information.
*5.The safety controller and the F3SG-RA-01TS must share the power supply or be connected to the common terminal of the power supply.

E1: 24VDC power supply (S8VS)



Note: Functional earth connection is unnecessary when you use the F3SG-RA-01TS in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-RA-01TS in an environment where there may be excessive noise from surroundings or stable power supply may be interfered, it is recommended the F3SG-RA-01TS 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-4RA□□□□-25-01TS Series User's Manual* for more information.

Standalone F3SG-RA-01TS using NPN Outputs

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.

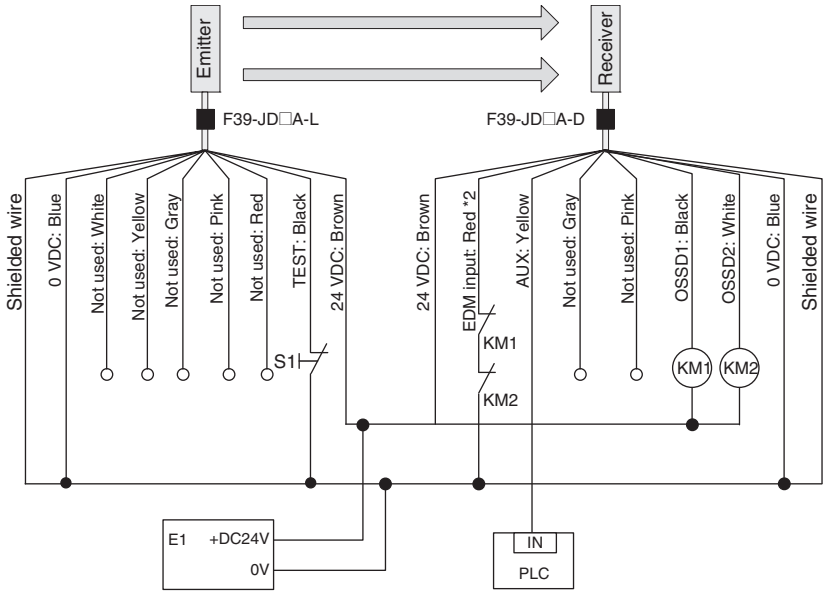
DIP Switch settings *1

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ■□ ON	2 ■□ ON
	NPN	7 ■□ ON	7 ■□ ON
Emitter	External Test: 0 V Inactive	4 ■□ ON	

□: Indicates a switch position.

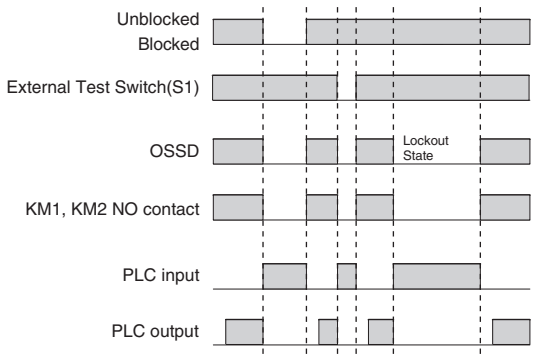
Configure functions with the DIP Switches before wiring.

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)



Note: For the functional earth connection, refer to page 104.

Connectable Safety Control Units

The F3SG-RA-01TS 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.

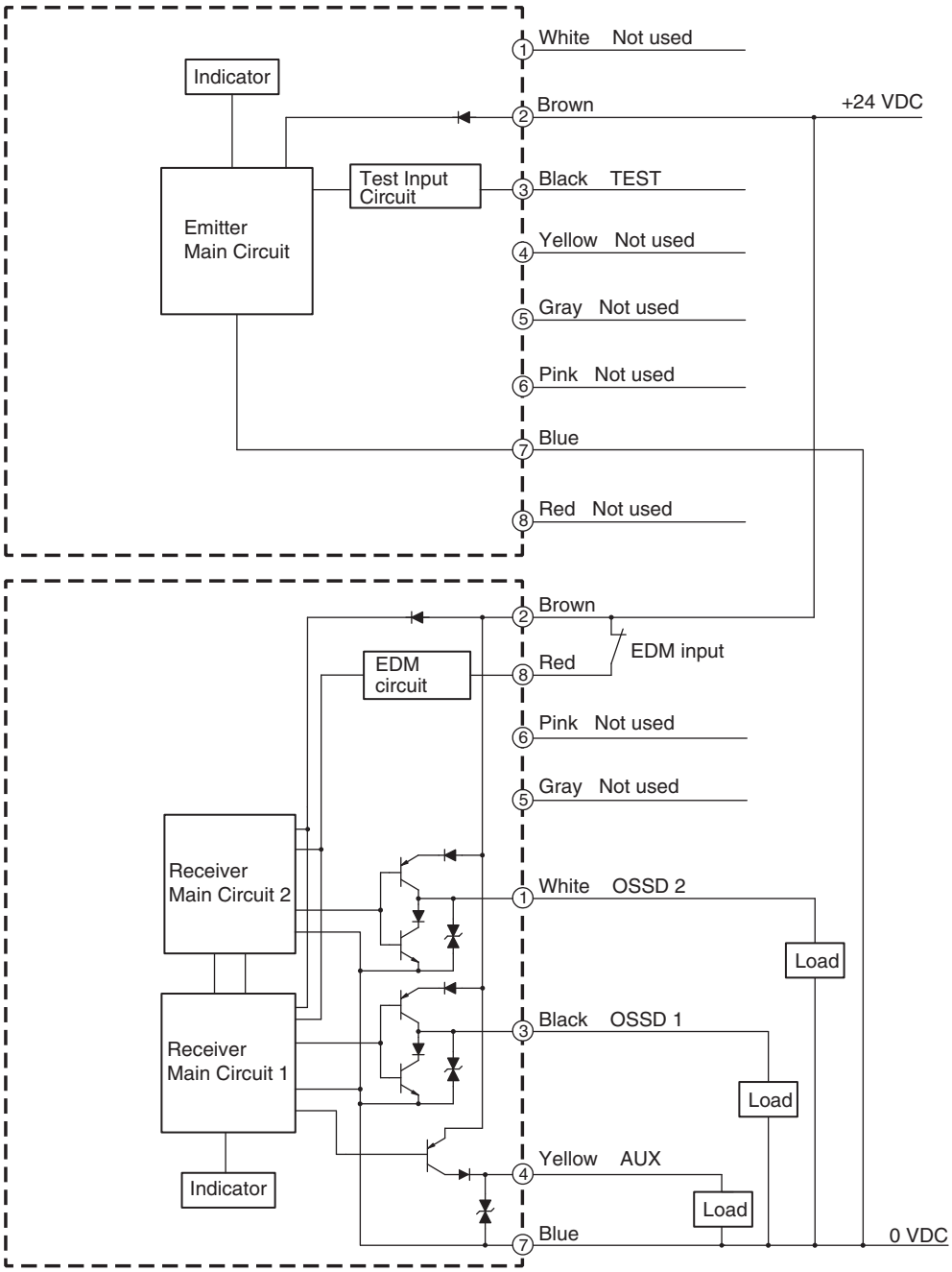
Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

Input/Output Circuit

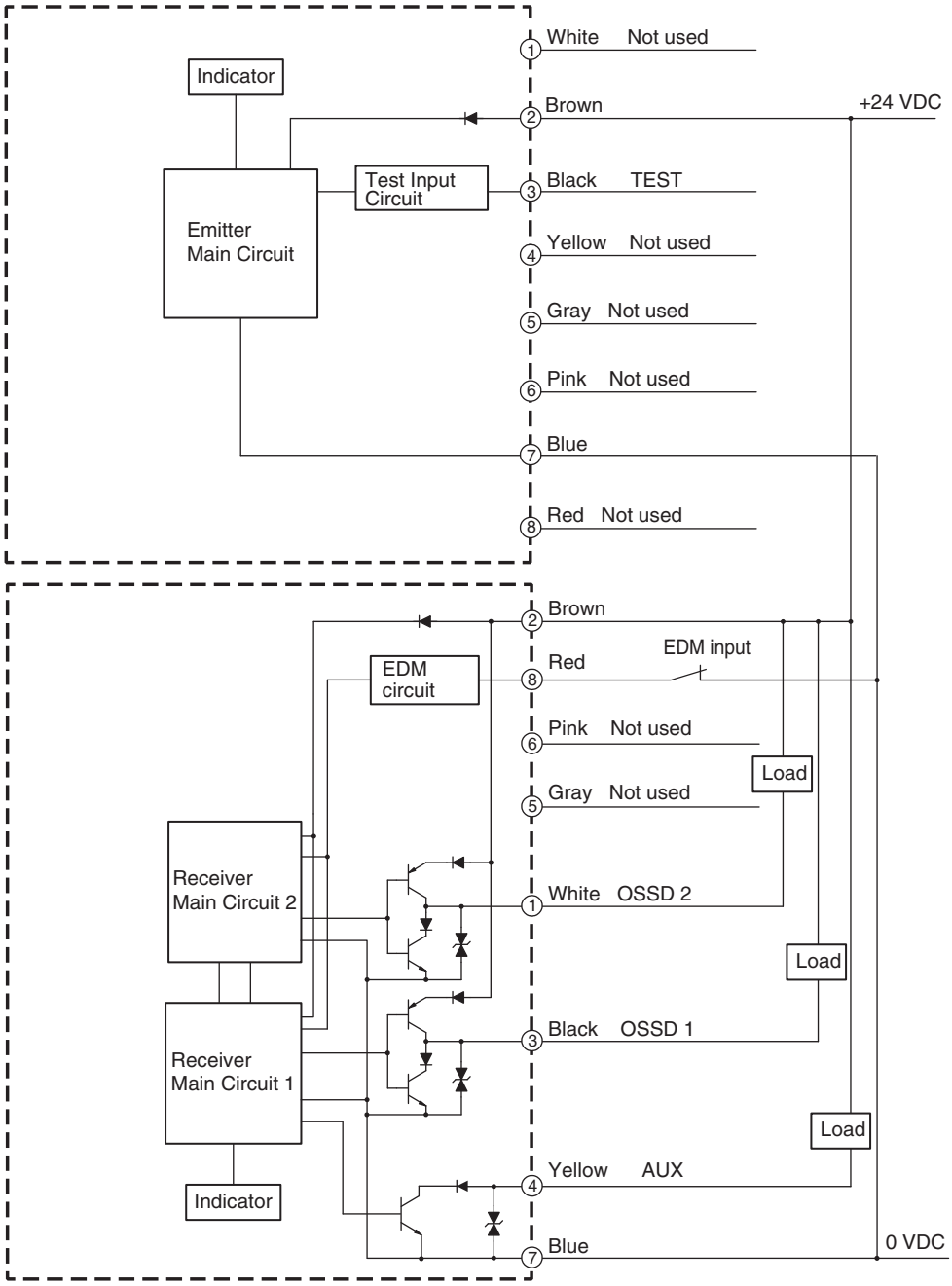
Entire Circuit Diagram

The entire circuit diagram of the F3SG-RA-01TS is shown below.
The numbers in the circles indicate the connector's pin numbers.

PNP Output



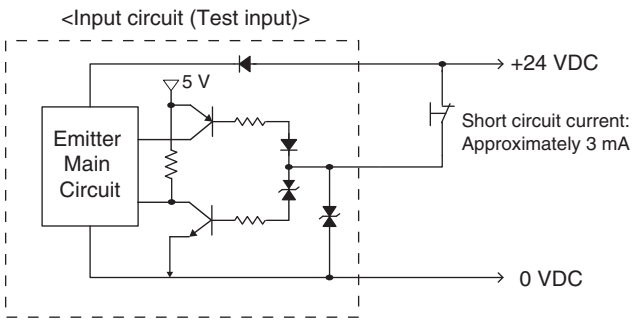
NPN Output


Indicator
Emitter
Main Circuit
Test Input
Circuit
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
8 Red Not used
2 Brown
EDM input
EDM
circuit
8 Red
6 Pink Not used
Load
5 Gray Not used
Receiver
Main Circuit 2
1 White OSSD 2
Load
Receiver
Main Circuit 1
3 Black OSSD 1
Load
Indicator
4 Yellow AUX
7 Blue
0 VDC

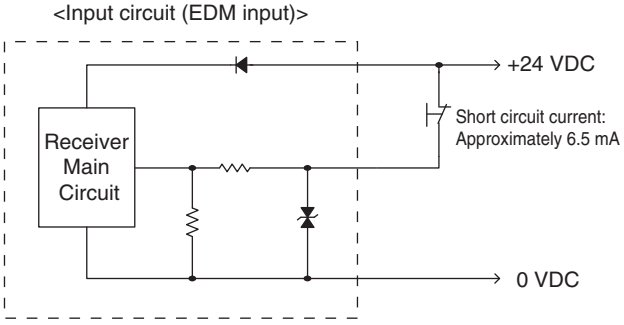
Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

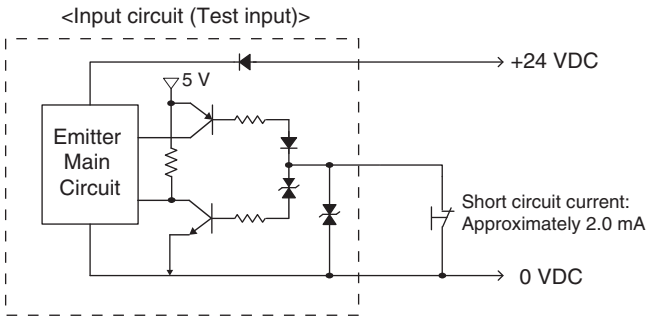
24V Inactive



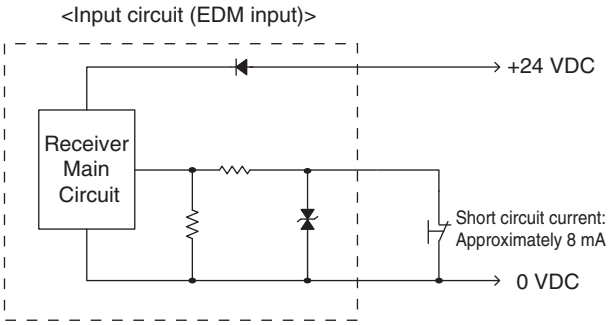
PNP Output



0V Inactive



NPN Output



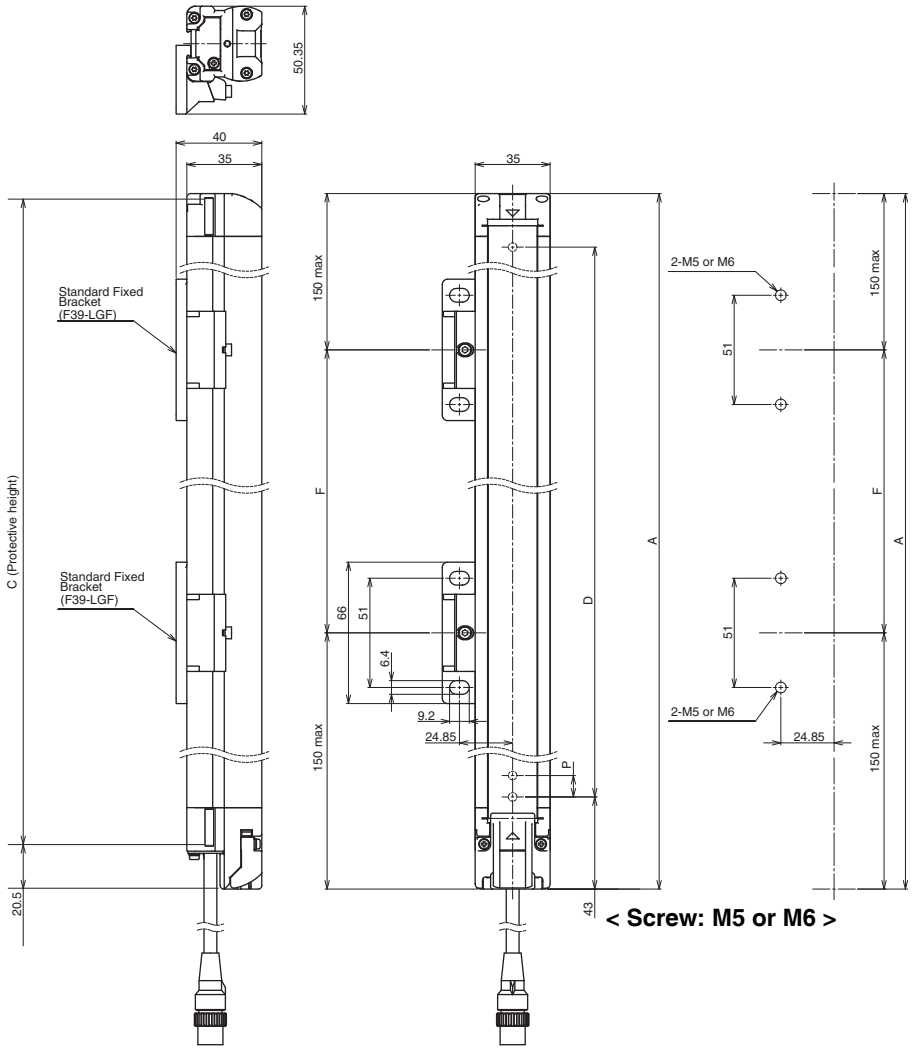
*Short circuit current: 5mA (Reset input), 3mA (Muting inputs A/B)

Dimensions

(Unit: mm)

Mounted with Standard Fixed Brackets (F39-LGF)

Backside Mounting



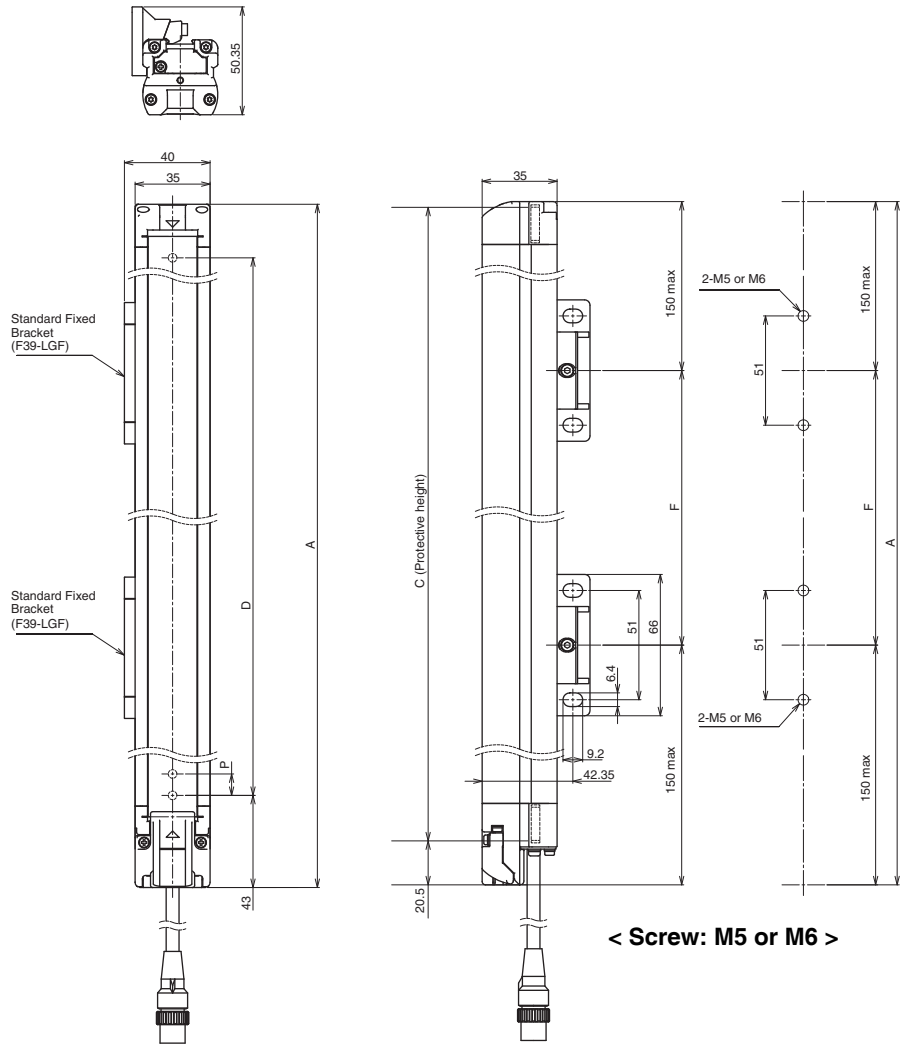
F3SG-4RA□□□-25-01TS Series

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

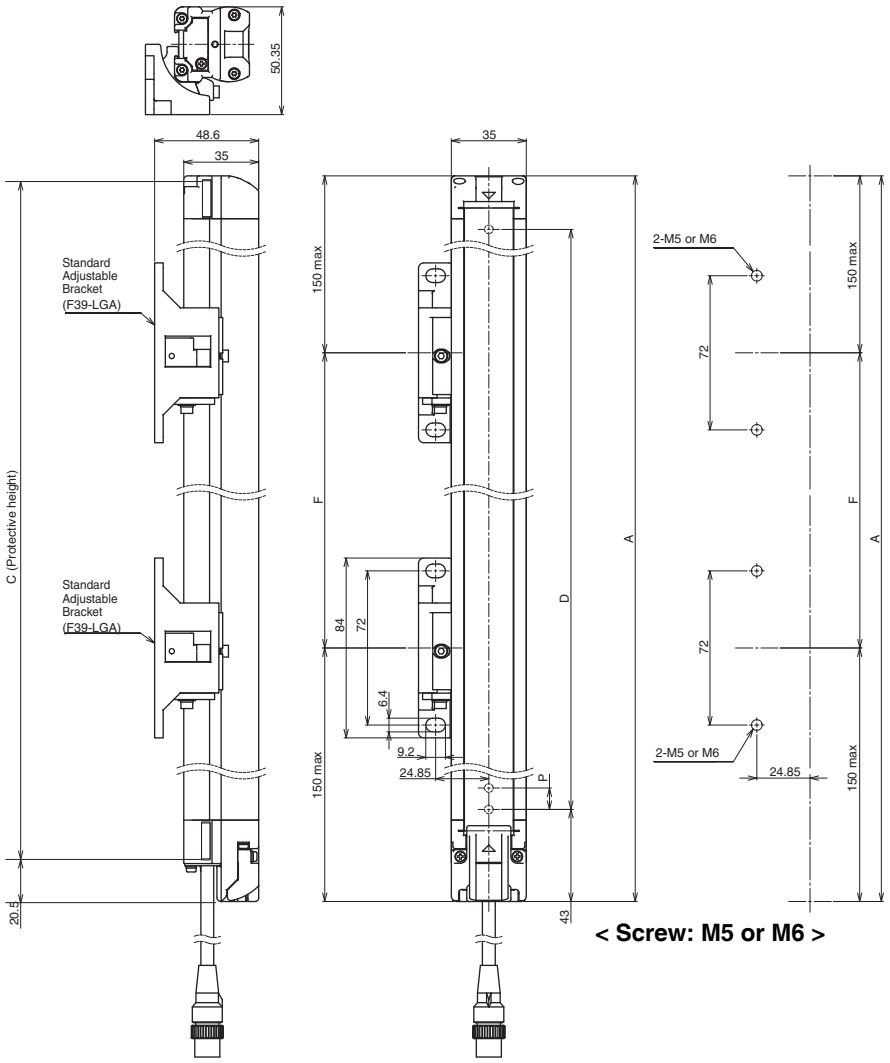
Dimension A	C+23
Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-45
Dimension P	20

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).

Mounted with Standard Adjustable Brackets (F39-LGA)

Backside Mounting



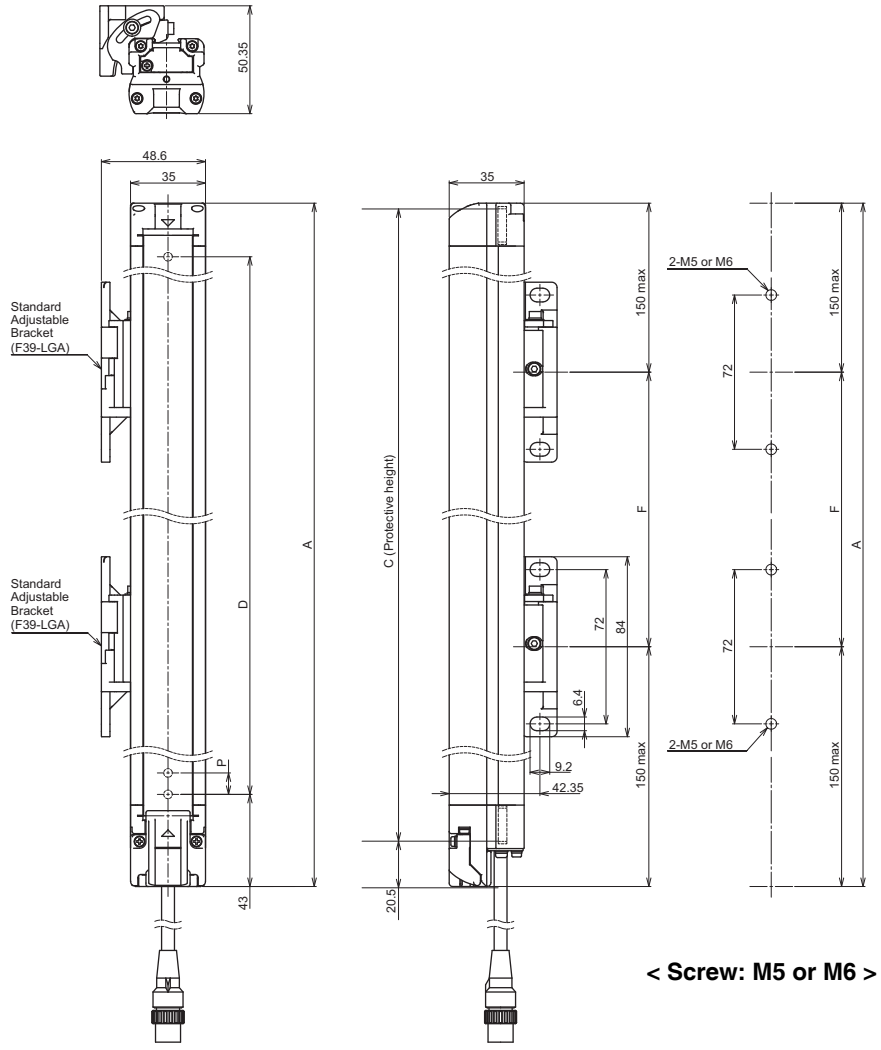
F3SG-4RA□□□□-25-01TS Series

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

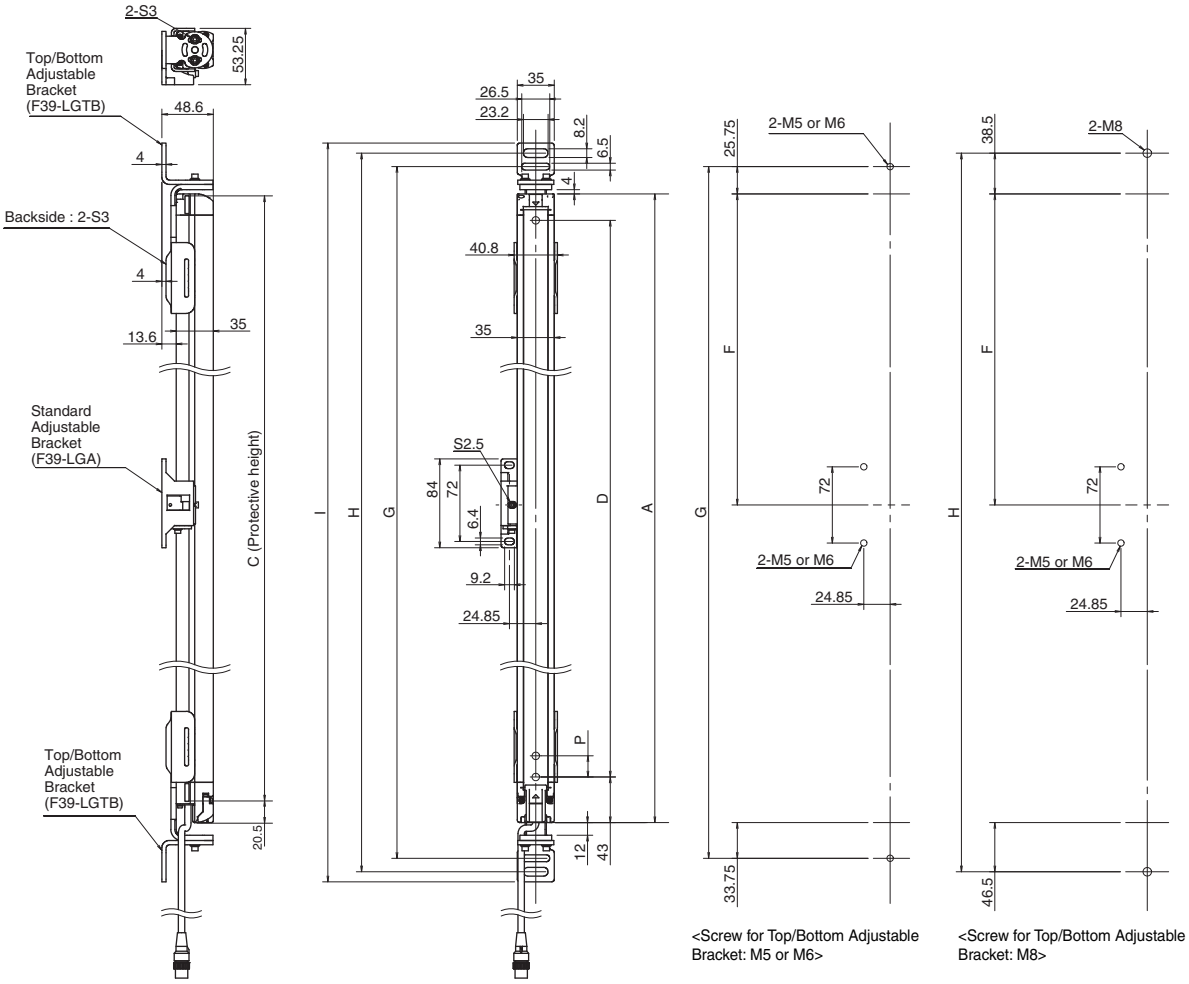
Protective height (C)	Number of Standard Adjustable Brackets *1	Dimension F
0185 to 1225	2 *2	1000 mm max.
1305 to 1945	3	1000 mm max.

*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).

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

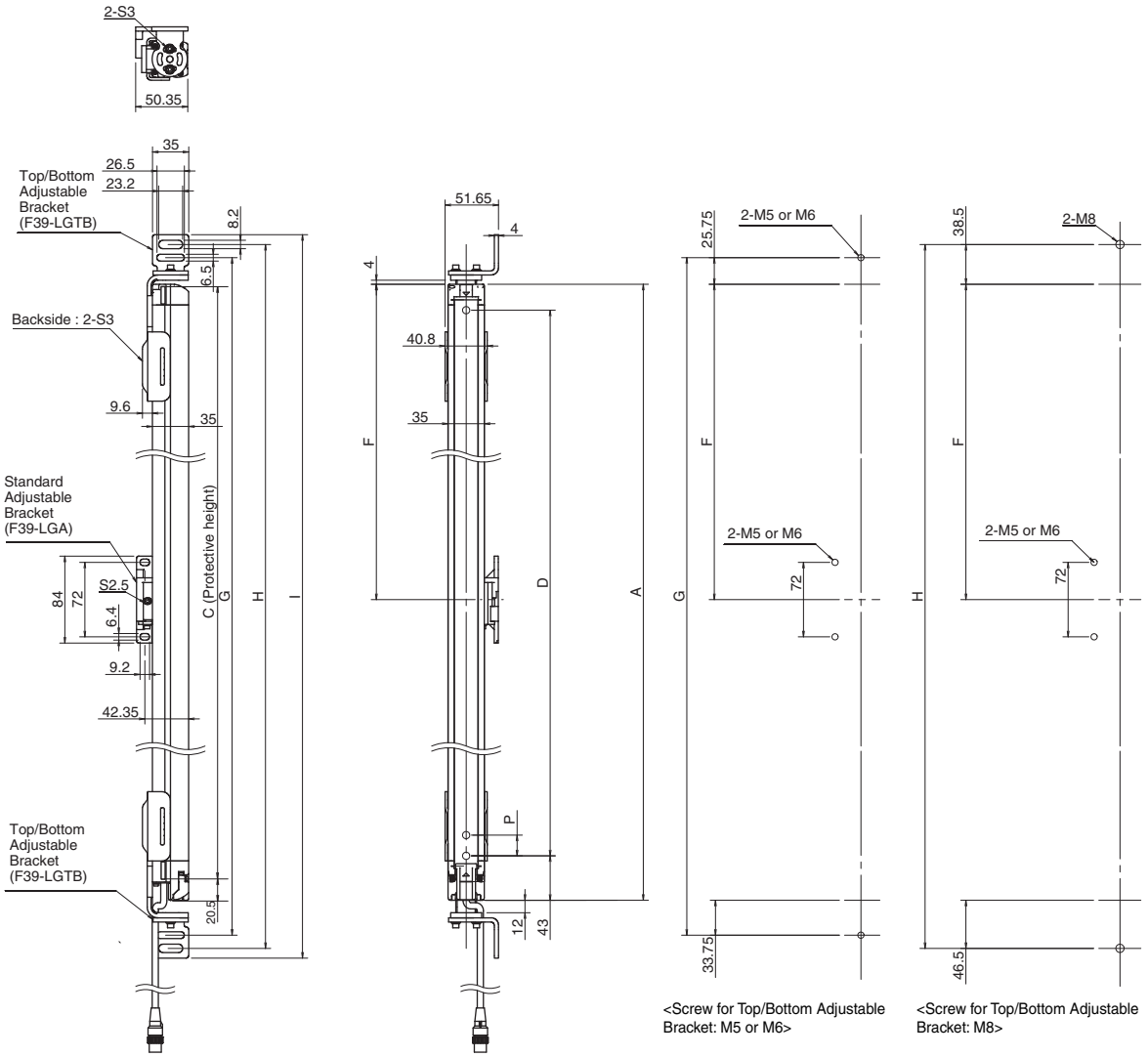


F3SG-4RA□□□□-25-01TS Series (Except fot 0185)

	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



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

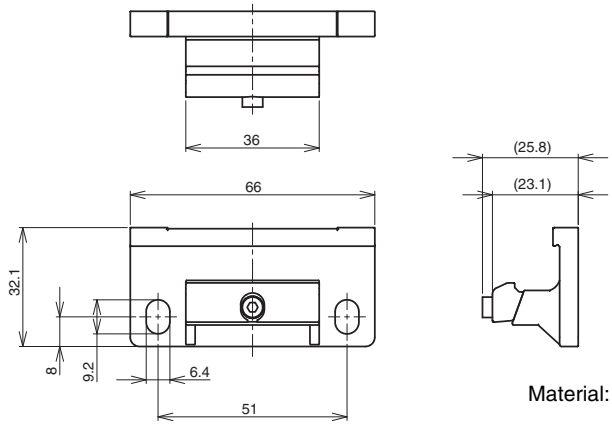
	Optional accessory not connected	Optional accessory connected		
		F39-JGR2WTS	F39-BT	F39-LP F39-BTLP
Dimension A	C+23	C+23		
Dimension C	4-digit number of the type name (Protective height)	4-digit number of the type name (Protective height)		
Dimension D	C-45	C-45		
Dimension G	C+82.5	C+85.5	C+96	C+107.5
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.

Accessories

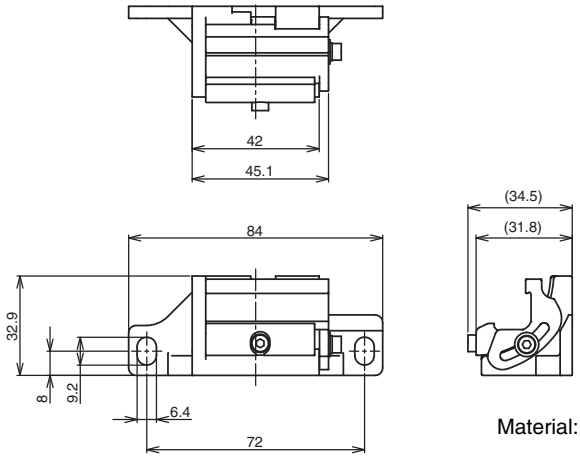
Sensor Mounting Brackets

Standard Fixed Bracket (F39-LGF, sold separately)



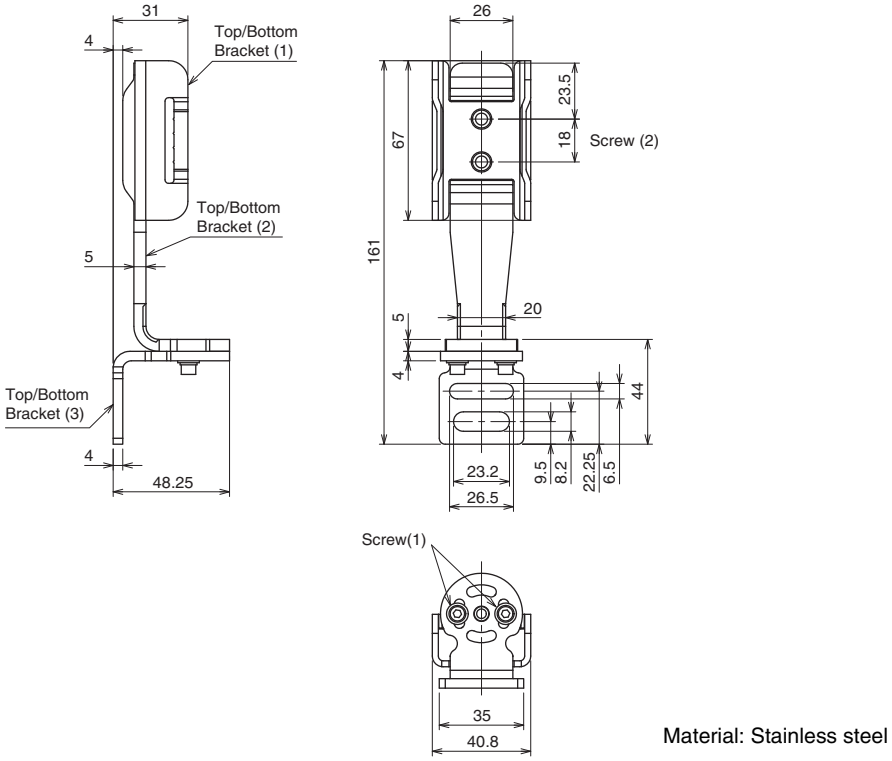
Material: Zinc alloy

Standard Adjustable Bracket (F39-LGA, sold separately)



Material: Zinc alloy, Fluorochemical lubricant oil

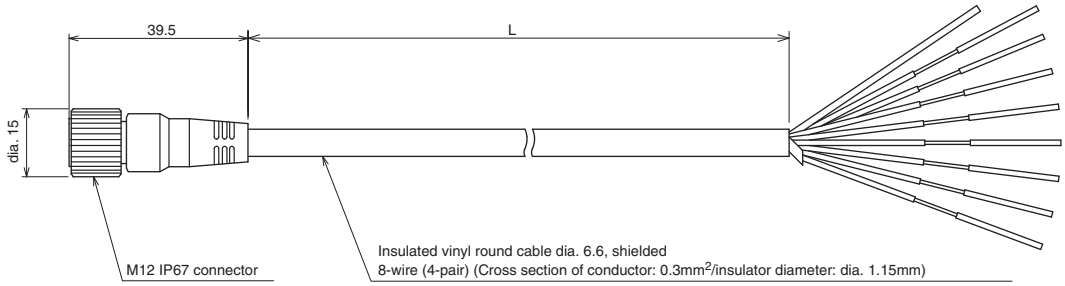
Top/Bottom Adjustable Bracket (F39-LGTB, sold separately)



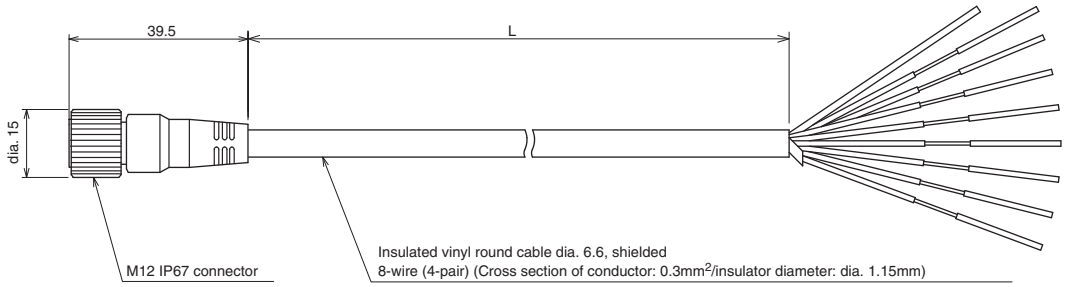
Material: Stainless steel

Safety light curtain connecting cable

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

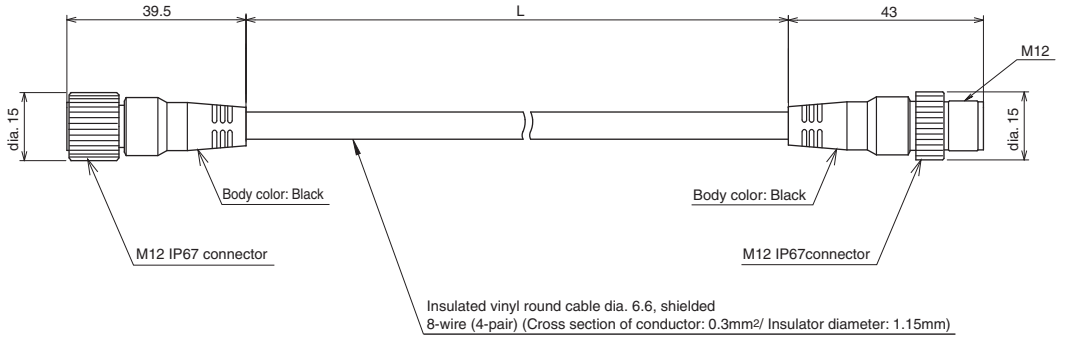


Single-Ended Cable for Receiver (F39-JD□A-D, sold separately)

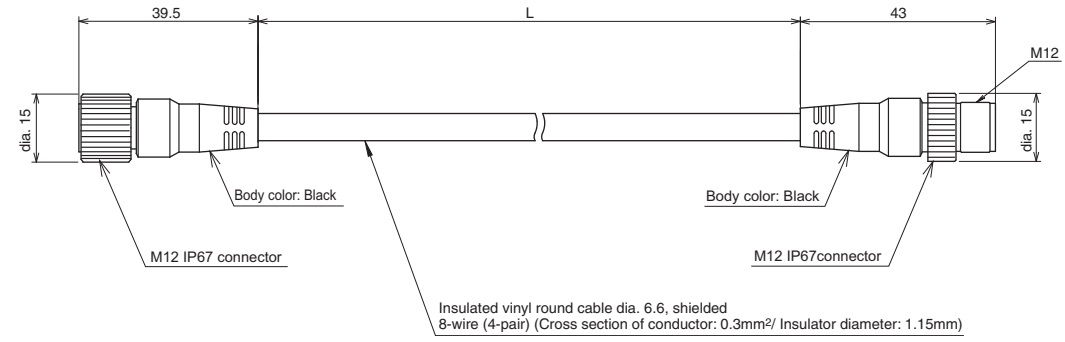


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3A-L	F39-JD3A-D	3
F39-JD7A-L	F39-JD7A-D	7
F39-JD10A-L	F39-JD10A-D	10
F39-JD15A-L	F39-JD15A-D	15
F39-JD20A-L	F39-JD20A-D	20

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

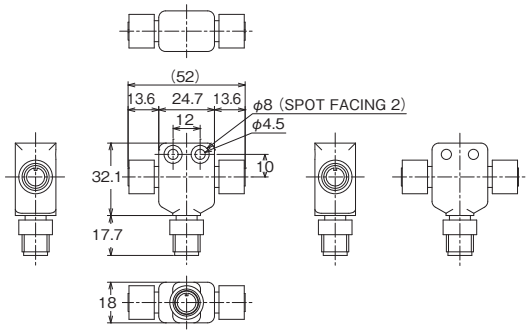


Double-Ended Cable for Receiver: Cable for extension (F39-JD□B-D, sold separately)

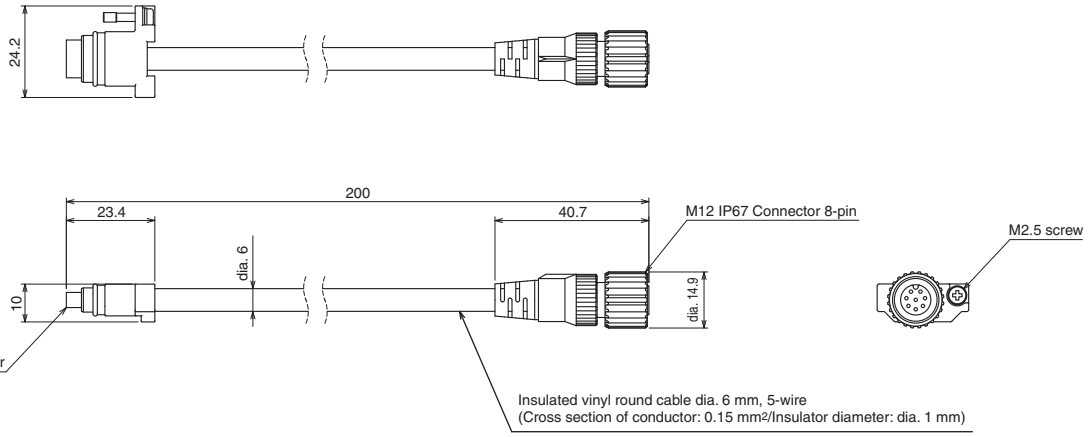


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JDR5B-L	F39-JDR5B-D	0.5
F39-JD1B-L	F39-JD1B-D	1
F39-JD3B-L	F39-JD3B-D	3
F39-JD5B-L	F39-JD5B-D	5
F39-JD7B-L	F39-JD7B-D	7
F39-JD10B-L	F39-JD10B-D	10
F39-JD15B-L	F39-JD15B-D	15
F39-JD20B-L	F39-JD20B-D	20

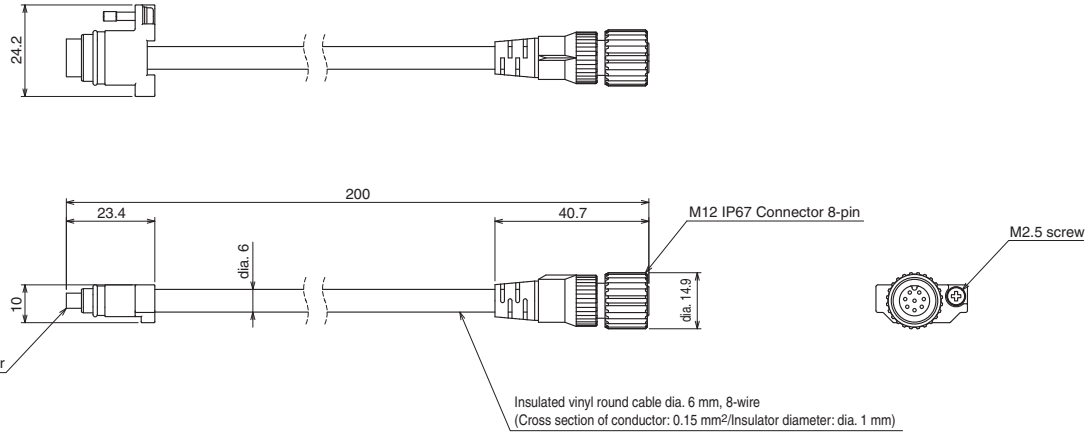
Reduced Wiring Connector (F39-CN5, sold separately)



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

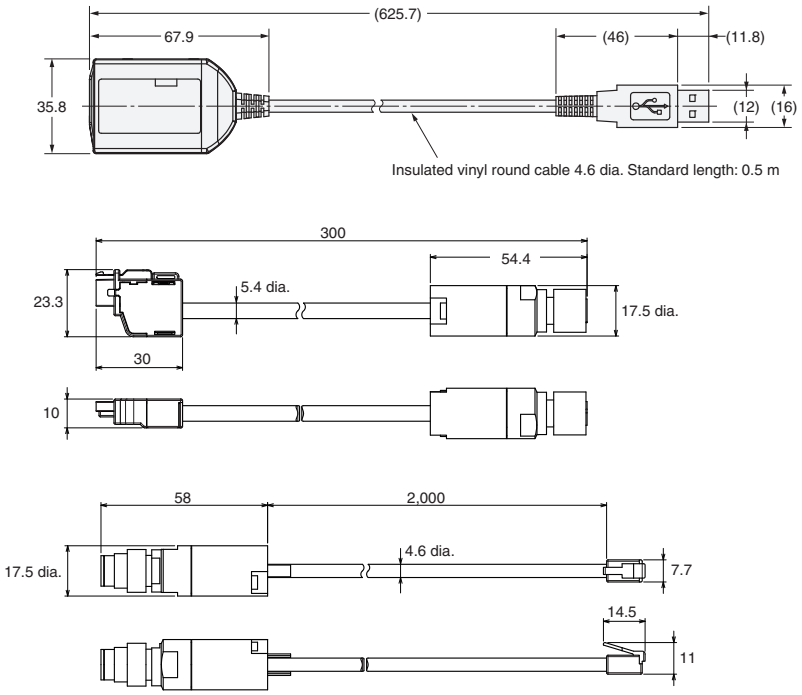


Cascading Cable for Receiver (F39-JGR2WTS-D, sold separately)

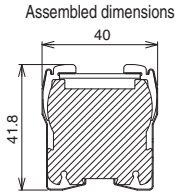


Set model name	Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR2WTS	F39-JGR2WTS-L	F39-JGR2WTS-D	0.2

Interface Unit (F39-GIF, sold separately)



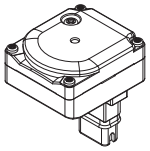
Spatter Protection Cover (F39-HGA, sold separately)



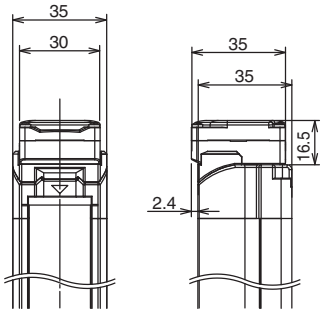
Model	Total length
F39-HGA□□□□	□□□□+4
F39-HGA0550	558

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

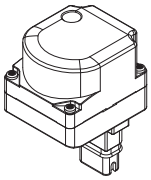
Bluetooth Communication Unit (F39-BT, sold separately)



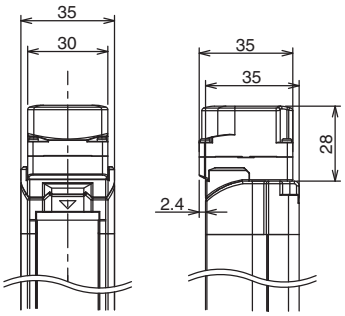
Material: PBT



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
Z380	**F3SG-4RA□□□□-25-01TS**	Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual

Safety Light Curtain

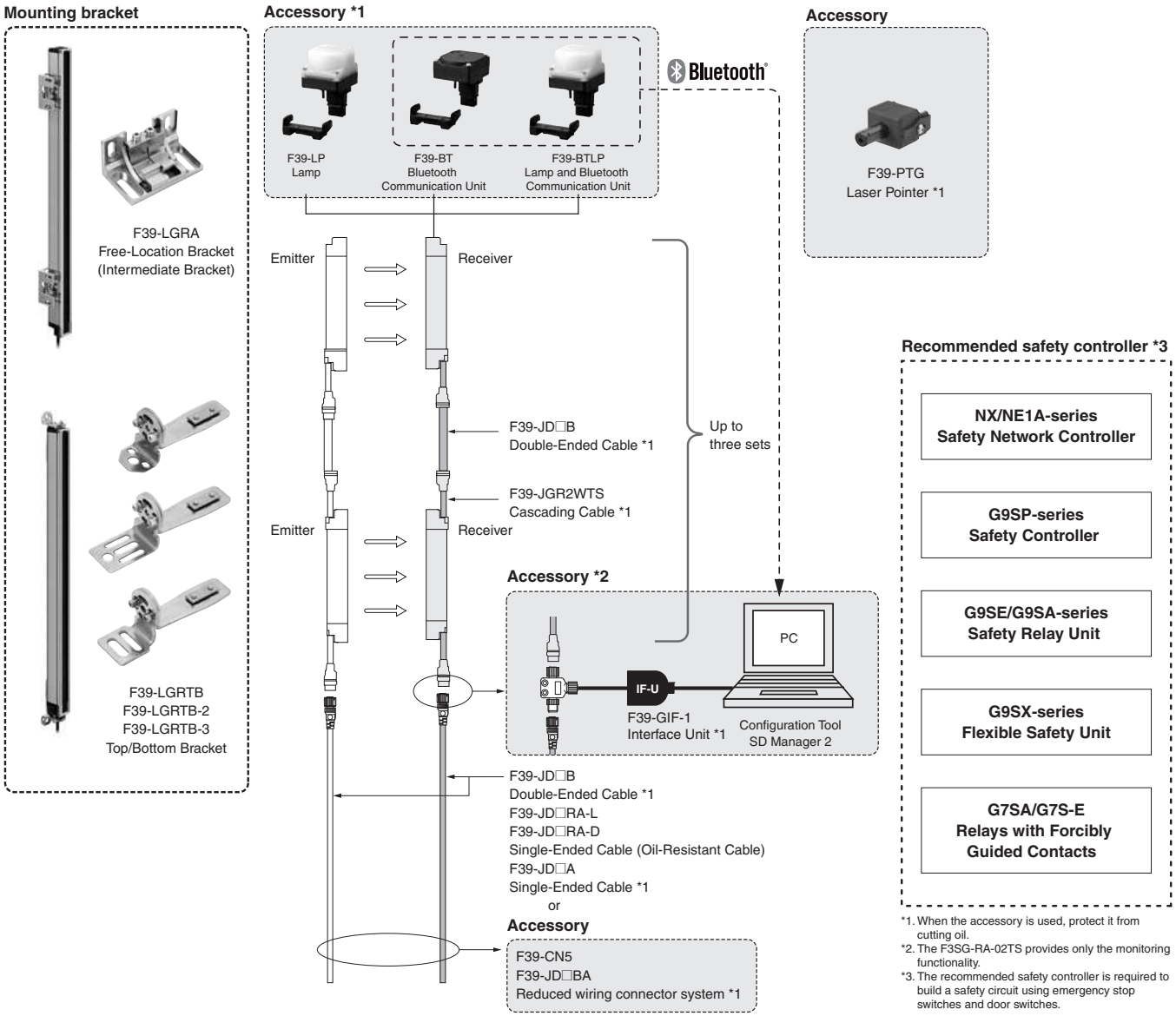
F3SG-RA-02TS

Enhanced Cutting Oil Resistance

- Mechanical seal structure prevents cutting oil from getting inside
- Special materials and cables significantly enhanced oil resistance
- Rugged and compact housing. Perfect fit installation
- IP67G (JIS C 0920 Annex 1) rated
- Prevents accidental changes of settings by configuration tool (monitoring only)

NEW

System Configuration



*1. When the accessory is used, protect it from cutting oil.
*2. The F3SG-RA-02TS provides only the monitoring functionality.
*3. The recommended safety controller is required to build a safety circuit using emergency stop switches and door switches.

Ordering Information

Main Units

Safety Light Curtain

Hand and arm protection

Number of beams	Protective height (mm)	Model
12	240	**F3SG-4RA0240-25-02TS**
16	320	**F3SG-4RA0320-25-02TS**
20	400	**F3SG-4RA0400-25-02TS**
24	480	**F3SG-4RA0480-25-02TS**
28	560	**F3SG-4RA0560-25-02TS**
32	640	**F3SG-4RA0640-25-02TS**
36	720	**F3SG-4RA0720-25-02TS**
40	800	**F3SG-4RA0800-25-02TS**
44	880	**F3SG-4RA0880-25-02TS**
48	960	**F3SG-4RA0960-25-02TS**
52	1,040	**F3SG-4RA1040-25-02TS**
56	1,120	**F3SG-4RA1120-25-02TS**
60	1,200	**F3SG-4RA1200-25-02TS**
64	1,280	**F3SG-4RA1280-25-02TS**
68	1,360	**F3SG-4RA1360-25-02TS**
72	1,440	**F3SG-4RA1440-25-02TS**
76	1,520	**F3SG-4RA1520-25-02TS**
80	1,600	**F3SG-4RA1600-25-02TS**
84	1,680	**F3SG-4RA1680-25-02TS**
88	1,760	**F3SG-4RA1760-25-02TS**
92	1,840	**F3SG-4RA1840-25-02TS**
96	1,920	**F3SG-4RA1920-25-02TS**

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	3m	For emitter, M12 connector (8-pin), Color: Gray Connected to Power Cable or Double-Ended Cable  Female 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**
		7m		**F39-JD7RA-L**
	For receiver M12 connector (8-pin), 8 wires Color: Black	3m	For receiver, M12 connector (8-pin), Color: Black Connected to Power Cable or Double-Ended Cable  Female 1 White OSSD 2 2 Brown +24 VDC 3 Black OSSD 1 4 Yellow AUX 5 Gray PC COM (+) 6 Pink PC COM (-) 7 Blue 0 VDC 8 Red EDM	**F39-JD3RA-D**
		7m	IP67 and IP67G (JIS C 0920 Annex 1)* rated when mated. * F3SG-RA-02TS meets the degree of protection when this cable is correctly connected with the power cable of the F3SG-RA-02TS. The degree of protection is not satisfied with the part where cable wires are uncovered.	**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.

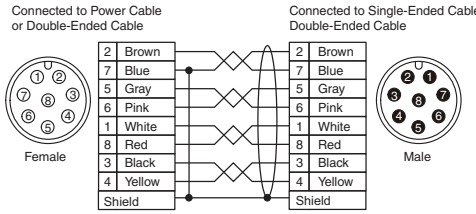
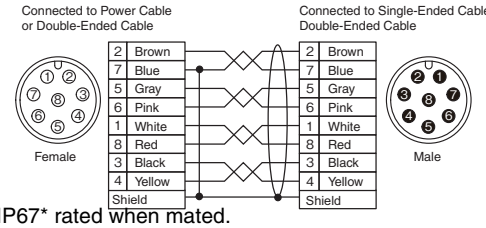
Single-Ended Cable (2 cables per set, one for emitter and one for receiver) *

Appearance	Cable length	Specifications	Model
	3m	For emitter M12 connector (8-pin), Color: Gray Connected to Power Cable or Double-Ended Cable  Female 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**
	7m		**F39-JD7A**
	10m	For receiver M12 connector (8-pin), Color: Black Connected to Power Cable or Double-Ended Cable  Female 1 White OSSD 2 2 Brown +24 VDC 3 Black OSSD 1 4 Yellow AUX 5 Gray PC COM (+) 6 Pink PC COM (-) 7 Blue 0 VDC 8 Red EDM Shield	**F39-JD10A**
	15m		**F39-JD15A**
	20m	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.

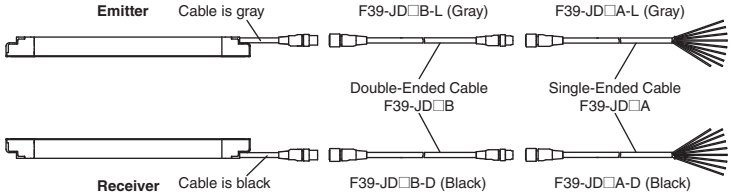
Double-Ended Cable (2 cables per set, one for emitter and one for receiver) *

Appearance	Cable length	Specifications	Model
	0.5m	For emitter M12 connector (8-pin), Color: Gray  For receiver, M12 connector(8-pin) Color: Black  IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	F39-JDR5B
	1m		F39-JD1B
	3m		F39-JD3B
	5m		F39-JD5B
	7m		F39-JD7B
	10m		F39-JD10B
	15m		F39-JD15B
	20m		F39-JD20B

* 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.

<Connection example>

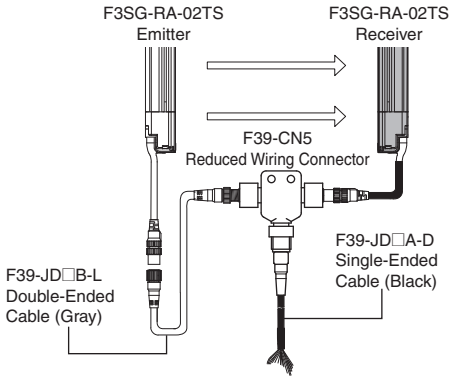


Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)

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.
- External Device Monitoring
- Auxiliary Output

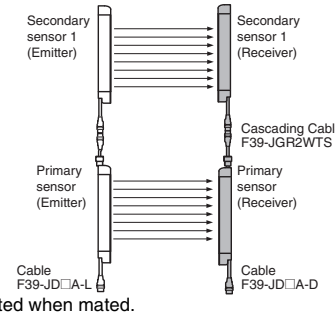


Cable for Reduce Wiring* (2 cables per set, one for emitter and one for receiver)

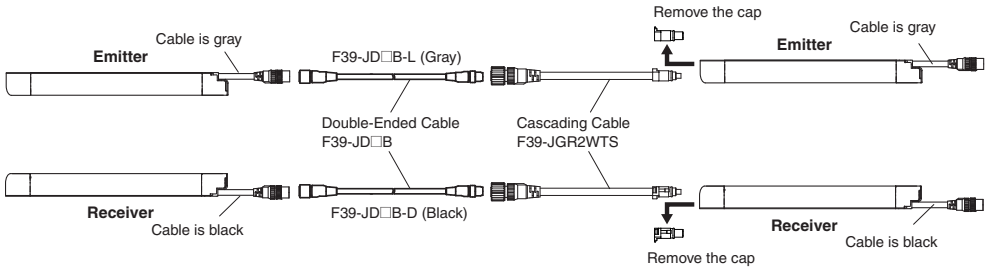
Appearance	Cable length	Specifications	Remarks	Model
 	Emitter: 3 m Receiver: 3 m	IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	Double-Ended Cable: F39-JD3B-L Single-Ended Cable: F39-JD3A-D	F39-JD0303BA
	Emitter: 3 m Receiver: 7 m		Double-Ended Cable: F39-JD3B-L Single-Ended 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: 10m		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)	0.2m	 IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	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 ±15°. 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-RA-02TS. Beam alignment after mounting possible. The angle adjustment range is ±22.5°. 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-RA-02TS. (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 *1 *2

Appearance	Type	Specifications	Model
	SD Manager 2	The Configuration Tool SD Manager 2 is available to download from our website at http://www.ia.omron.com/f3sg-r_tool	–
	Interface Unit	F39-GIF-1 interface unit to connect the F3SG-RA-02TS 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-RA IP67 rated when mated.	**F39-BT**

*1. The F3SG-RA-02TS provides only the monitoring functionality.
*2. When the accessory is used, protect it from cutting oil.

Lamp *

Appearance	Type	Specifications	Model
	Lamp	The lamp can be connected to a receiver and turned ON based on the operation of F3SG-RA. The lamp output pattern is set as follows: Red (ON): Inverted signal of safety output information Orange (Blink once): Inverted signal of stable-state information Green (ON): Safety output information IP67 rated when mated.	**F39-LP**
	Lamp and Bluetooth Communication Unit		**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-RA-02TS. 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-01TS.
*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
25 mm dia.	**F39-TRD25**

F3SG-RA-02TS

Ratings and Specifications

Main unit

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

			F3SG-4RA□□□□-25-02TS
Performance	Object Resolution (Detection Capability)		Opaque objects 25-mm dia.
	Beam Gap		20 mm
	Number of Beams		12 to 96
	Lens Size		6.0 × 5.0 (W × H) mm
	Protective Height		240 to 1920 mm
	Operating Range		0.3 to 17.0 m
	Response Time	ON to OFF	Normal mode: 8 to 13 ms *1
		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. Refer to page 128 for the one segment system. Refer to *Safety Light Curtain F3SG-4RA□□□□-25-02TS Series User's Manual (ManNo.: Z391)* for cascaded connection.
	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 128 .
	Safety Outputs (OSSD)		Two PNP 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. *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 transistor output 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)	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) *
		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 130.
	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-25-02TS systems.
	Cascade Connection		Number of cascaded segments: 3 max. (only among F3SG-4RA□□□□-25-02TS's)
			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		External device monitoring (EDM) Scan code 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)		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/s^2, 1000 shocks for all 3 axes
	Pollution Degree (IEC 60664-1)		Pollution Degree 3

			F3SG-4RA□□□□-25-02TS
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-RA-25-02TS meets the degree of protection when it is correctly connected with an F39-JD□□RA-□ Oil-Resistant extension 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-RA-25-02TS 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 122.
		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 122 and 123.
		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 128 .
	Included Accessories		Safety Precautions, Quick Installation Manual, Troubleshooting Guide Sticker, End Cap (for switching External Test Input function)
Conformity	Conforming standards		Refer to page 129.
	Performance Level (PL)/Safety category		PL e/Category 4 (EN ISO 13849-1:2015)
	PFH_D		1.1×10^{-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.

List of Models/Response Time/Current Consumption/Weight

Model	Number of Beams	Protective Height [mm] (Overall length)	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-4RA0240-25-02TS	12	240	8	40	140	35	75	0.7	1.6
F3SG-4RA0320-25-02TS	16	320	8	40	140	40	75	0.9	1.9
F3SG-4RA0400-25-02TS	20	400	8	40	140	45	75	1.1	2.1
F3SG-4RA0480-25-02TS	24	480	8	40	140	50	75	1.3	2.4
F3SG-4RA0560-25-02TS	28	560	8	40	140	50	75	1.5	2.7
F3SG-4RA0640-25-02TS	32	640	8	40	140	55	75	1.7	3.0
F3SG-4RA0720-25-02TS	36	720	8	40	140	60	80	1.9	3.2
F3SG-4RA0800-25-02TS	40	800	8	40	140	65	80	2.1	3.5
F3SG-4RA0880-25-02TS	44	880	13	65	165	50	80	2.3	3.8
F3SG-4RA0960-25-02TS	48	960	13	65	165	50	80	2.5	4.0
F3SG-4RA1040-25-02TS	52	1040	13	65	165	55	80	2.7	4.3
F3SG-4RA1120-25-02TS	56	1120	13	65	165	55	85	2.9	4.6
F3SG-4RA1200-25-02TS	60	1200	13	65	165	55	85	3.1	4.9
F3SG-4RA1280-25-02TS	64	1280	13	65	165	60	85	3.3	5.1
F3SG-4RA1360-25-02TS	68	1360	13	65	165	60	85	3.5	5.4
F3SG-4RA1440-25-02TS	72	1440	13	65	165	65	85	3.7	5.7
F3SG-4RA1520-25-02TS	76	1520	13	65	165	65	90	3.9	5.9
F3SG-4RA1600-25-02TS	80	1600	13	65	165	70	90	4.1	6.2
F3SG-4RA1680-25-02TS	84	1680	13	65	165	70	90	4.3	6.5
F3SG-4RA1760-25-02TS	88	1760	13	65	165	70	90	4.5	6.7
F3SG-4RA1840-25-02TS	92	1840	13	65	165	75	90	4.7	7.0
F3SG-4RA1920-25-02TS	96	1920	13	65	165	75	95	4.9	7.3

*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-RA-02TS does not receive type approval provided by Article 44-2 of the Industrial Safety and Health Act of Japan. When using the F3SG-RA-02TS 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-RA-02TS is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Index Annex V, Item 2.
3. EC/EU Declaration of Conformity
   OMRON declares that the F3SG-RA-02TS is in conformity with the requirements of the following EC/EU Directives:
   Machinery Directive 2006/42/EC
   EMC Directive 2014/30/EU
4. Conforming Standards
   (1) European standards
   EN61496-1 (Type 4 ESPE), EN 61496-2 (Type 4 AOPD), EN61508-1 through -4 (SIL 3), EN ISO 13849-1:2015 (PL e, Category 4)
   (2) International standards
   IEC61496-1 (Type 4 ESPE), IEC61496-2 (Type 4 AOPD), IEC61508-1 through -4 (SIL 3), ISO 13849-1:2015 (PL e, Category 4)
   (3) JIS standards
   JIS B 9704-1 (Type 4 ESPE), JIS B 9704-2 (Type 4 AOPD)
   (4) North American standards
   UL61496-1 (Type 4 ESPE), UL61496-2 (Type 4 AOPD), UL508, UL1998,
   CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
5. Third-Party Certifications
   (1) TÜV SÜD
   - EC Type-Examination certificate:
     EU Machinery Directive, Type 4 ESPE (EN61496-1), Type 4 AOPD (EN 61496-2)
   - Certificate:
     Type 4 ESPE (EN61496-1), Type 4 AOPD (EN61496-2), EN 61508-1 through -4 (SIL 3), EN ISO 13849-1:2015 (PL e, Category 4)

   (2) UL
   - UL Listing:
     Type 4 and ESPE (UL61496-1), Type 4 AOPD (UL61496-2), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
6. Other Standards
   The F3SG-RA-02TS 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

F3SG-RA-02TS

Indicator

Emitter

Name of Indicator		Color	Illuminated	Blinking
Test	TEST	Green	–	External Test is being performed
Operating range	LONG	Green	Always illuminated	Lockout state due to Scan code 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	Lockout state due to Cap error or Other sensor error
PNP/NPN mode	NPN	Green	Always illuminated	–
Configuration	CFG	Green	–	Lockout state due to Parameter error or Cascading Configuration error
External device monitoring	EDM	Green	EDM 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	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	Lockout state due to Scan code setting error

Note: TOP, CFG, LOCKOUT, STB and ON/OFF indicators are illuminated when the receiver of the F3SG-RA-02TS is in Setting mode.
* The EDM indicator is illuminated when the EDM input is in the ON state regardless of the use of the EDM function.

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 ×1
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 Series Safety Light Curtain (Receiver)
LED Light Color	Red/Green/Orange
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^2 , 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)

Connections (Basic Wiring Diagram)

Standalone F3SG-RA-02TS

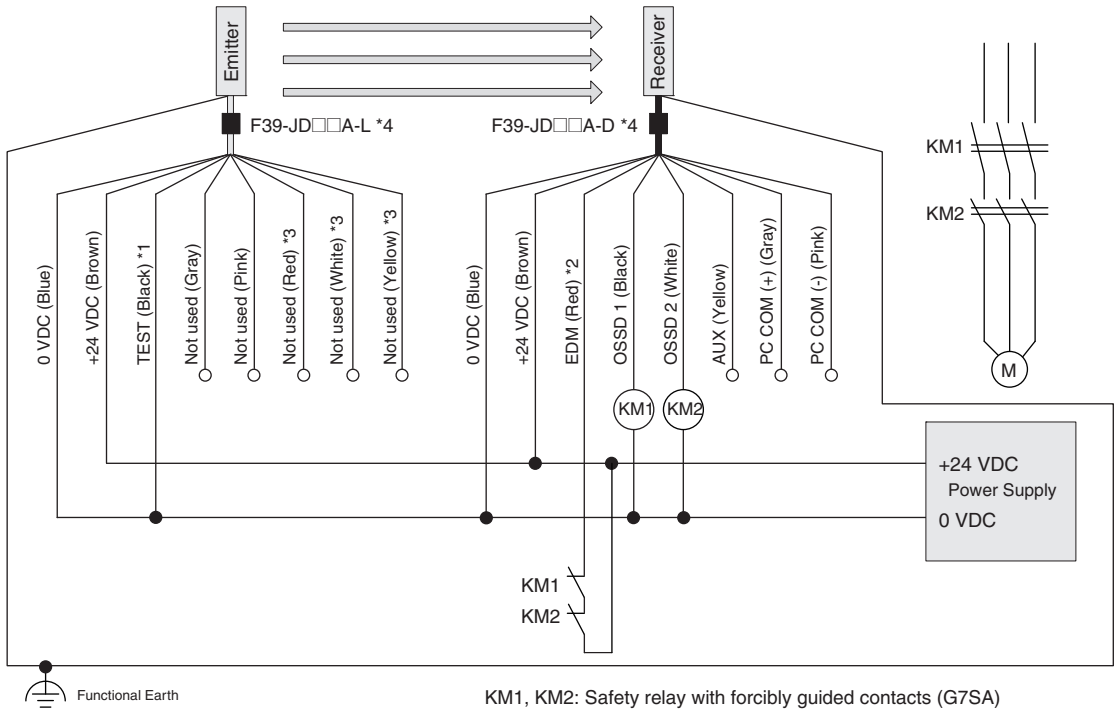
EDM used and External Test in 24V Active not used

The following is the example of External Device Monitoring used and External Test in 24 V Active not used.

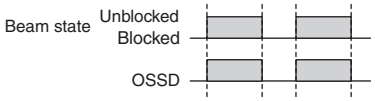
Settings

	Function
Receiver	EDM
Emitter	External Test: 24 V Active (End Cap: Black) (factory default setting)

Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: Motor



*1.Connect the line to 24 V via a test switch (N.O. contact) if External Test is used.
*2.Connect a lockout reset switch (N.C. contact) to this line in series with the KM1 and KM2 if Lockout Reset is used.
*3.The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant Cable) does not have the red, white and yellow wires.
*4.For the F39-JD□A-□ Single-Ended Cable, connect the shield line to 0 V.

Note: Functional earth connection is unnecessary when you use the F3SG-RA-02TS in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-RA-02TS in an environment where there may be excessive noise from surroundings or stable power supply may be interfered, it is recommended the F3SG-RA-02TS 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-RA-02TS Series User's Manual* for more information.

Connectable Safety Control Units

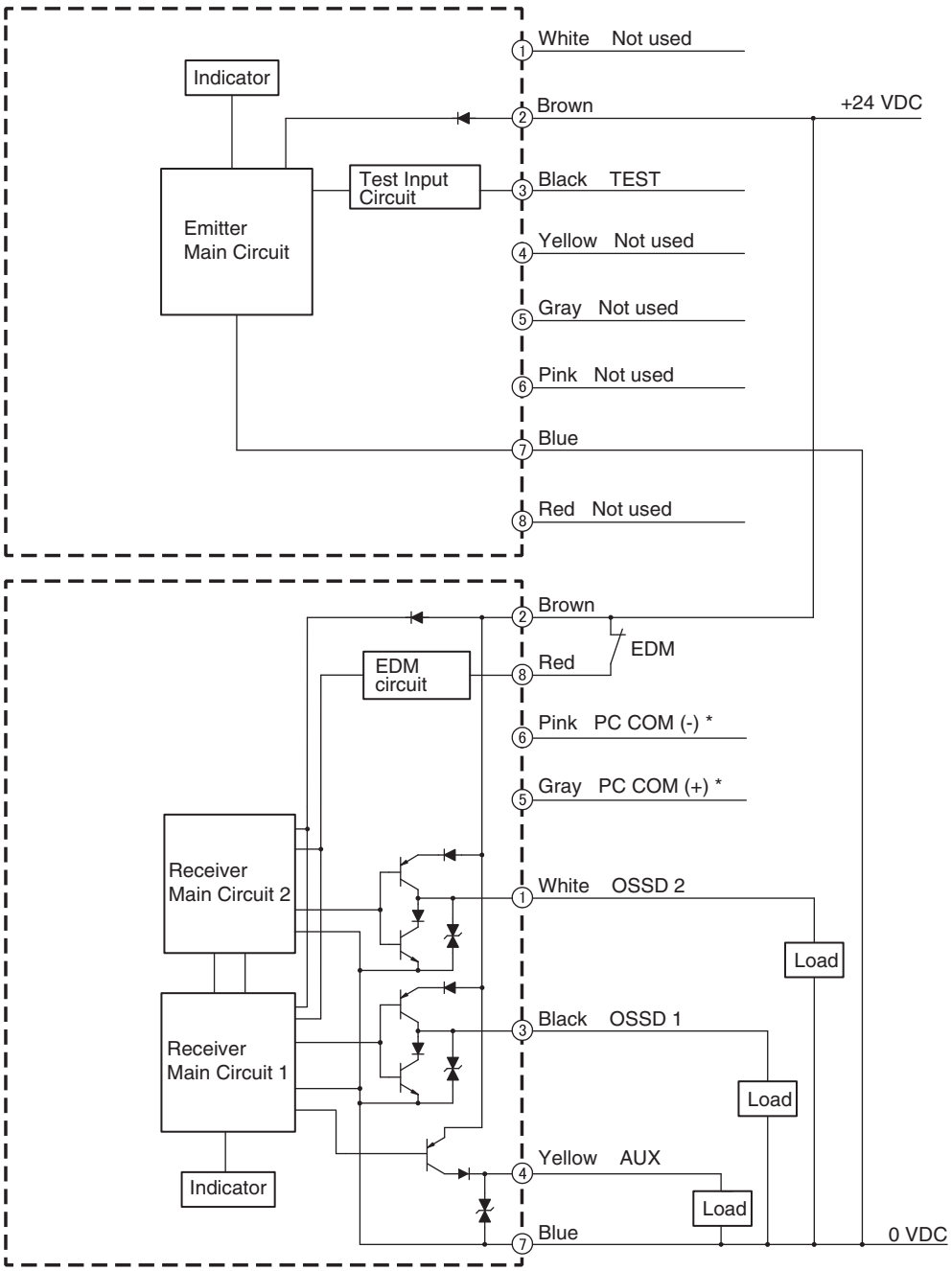
The F3SG-RA-02TS can be connected to the safety control units listed in the table below.

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

Input/Output Circuit

Entire Circuit Diagram

The entire circuit diagram of the F3SG-RA-02TS is shown below.
The numbers in the circles indicate the connector's pin numbers.



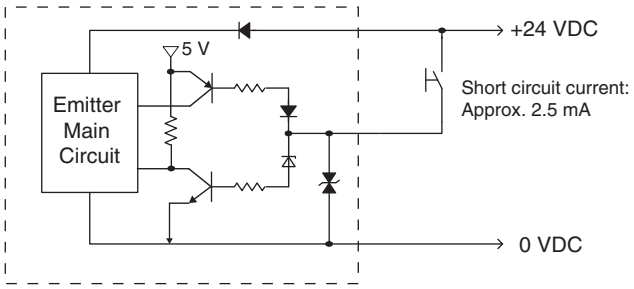
* This line is used for communication with a PC using the F39-GIF-1 Interface Unit.

Input Circuit Diagram by Function

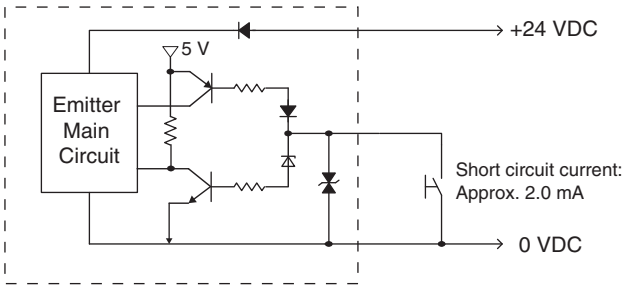
The input circuit diagrams of by function are shown below.

Test Input

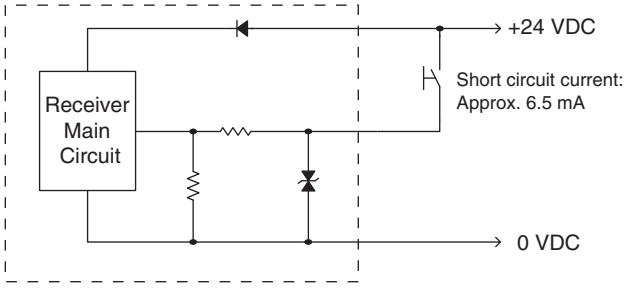
<24 V Active>



<0 V Active>



EDM

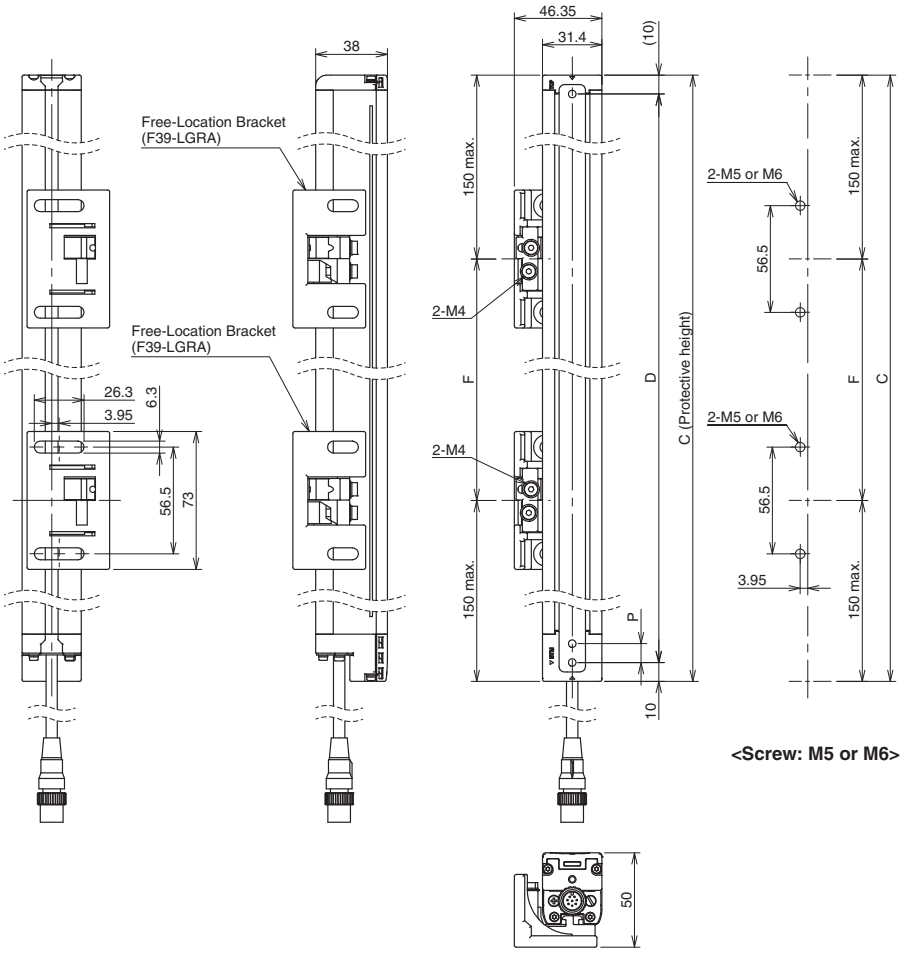


Dimensions

(Unit: mm)

Mounted with Free-Location Brackets (F39-LGRA)

Backside Mounting



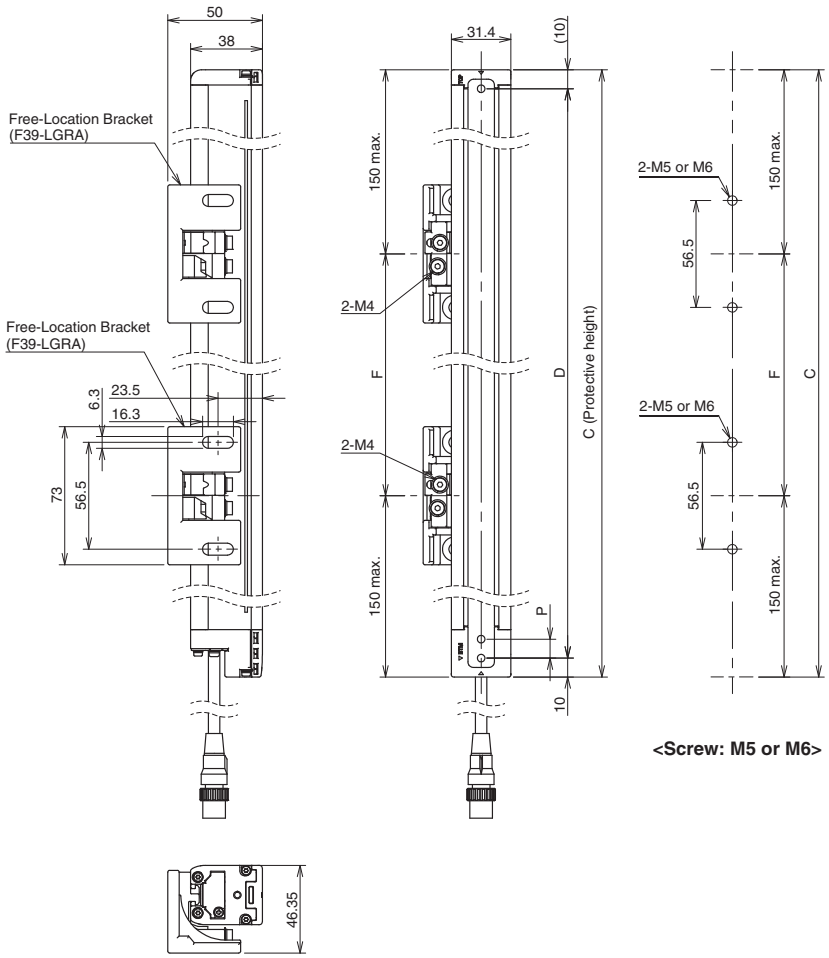
F3SG-4RA-□□□□-25-02TS Series

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

Protective height (C)	Number of Free-Location Brackets *1	Dimension F
0240 to 1200	2 *2	1000 mm max.
1280 to 1920	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 model of protective height of 0240. In this case, locate this bracket at half the Dimension C (or at the center of the sensor length).

Side Mounting



F3SG-4RA-□□□□-25-02TS Series

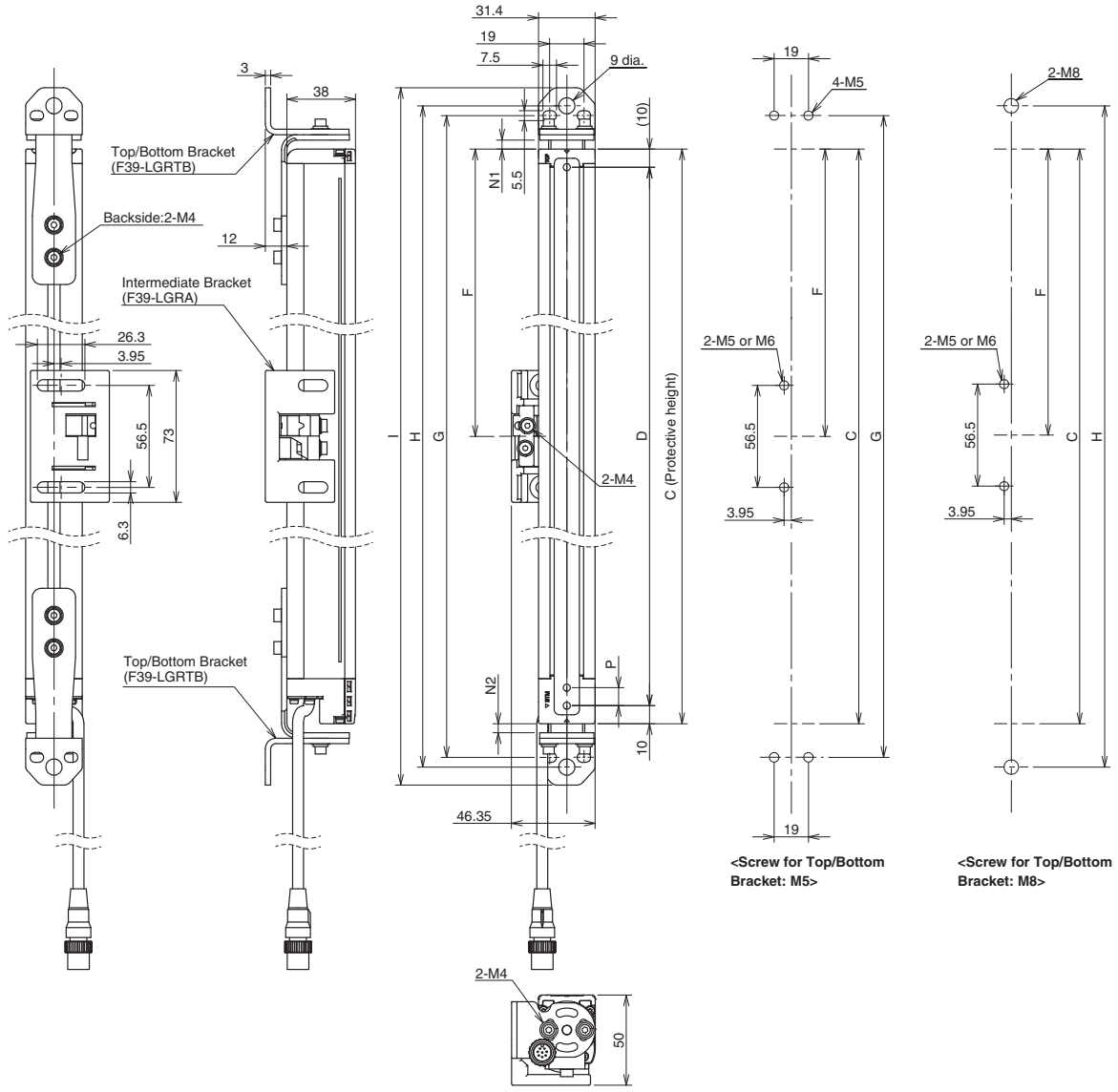
Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-20
Dimension P	20

Protective height (C)	Number of Free-Location Brackets *1	Dimension F
0240 to 1200	2 *2	1000 mm max.
1280 to 1920	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 model of protective height of 0240. In this case, locate this bracket at half the Dimension C (or at the center of the sensor length).

Mounted with Top/Bottom Brackets (F39-LGRTB) and Intermediate Bracket (F39-LGRA)

Backside Mounting



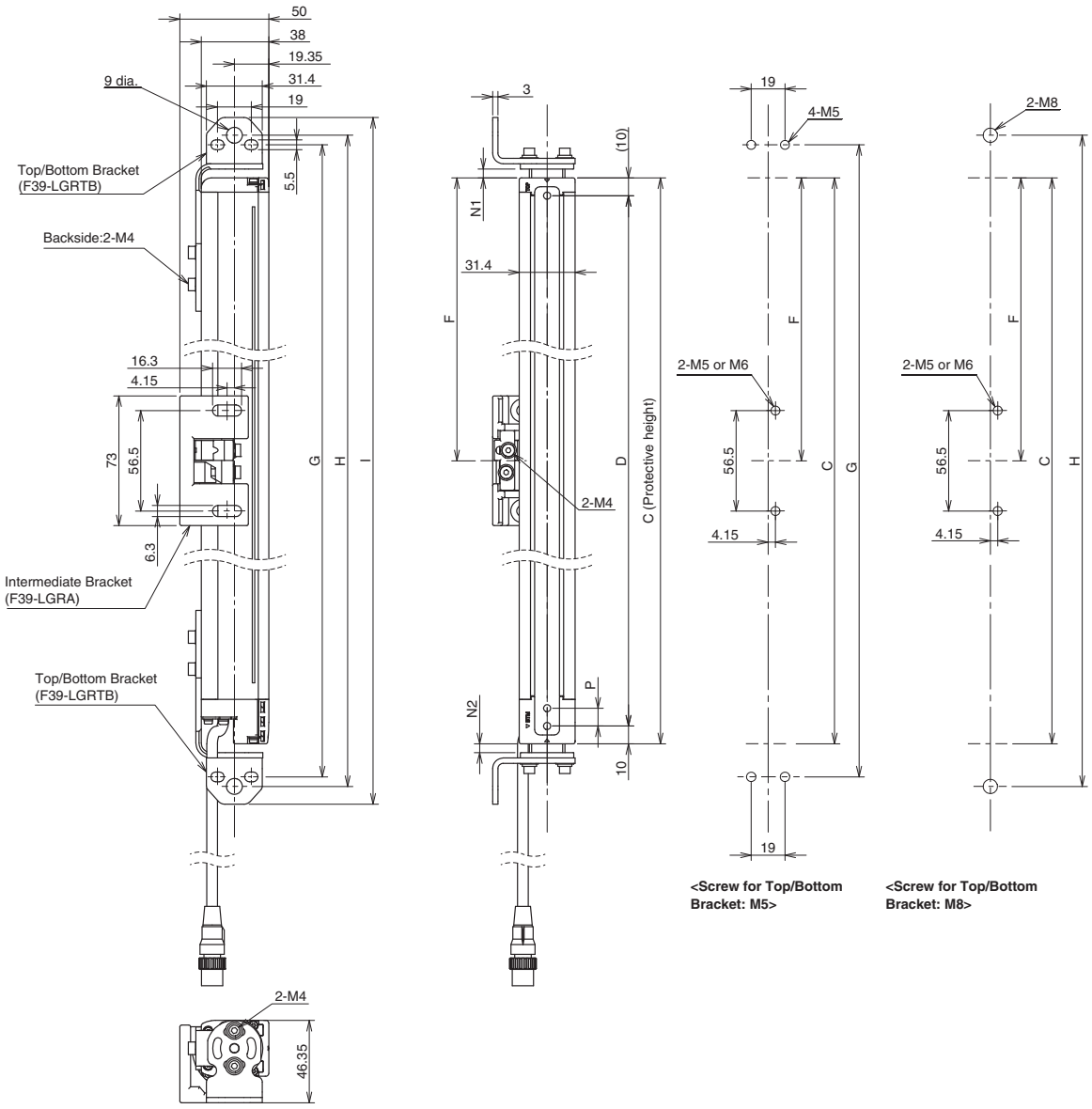
F3SG-4RA-□□□-25-02TS Series

Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-20
Dimension G	C+27.2+N1+N2
Dimension H	C+38+N1+N2
Dimension I	C+58+N1+N2
Dimension N1	0 to 30
Dimension N2	0 to 13
Dimension P	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Side Mounting



F3SG-4RA-□□□□-25-02TS Series

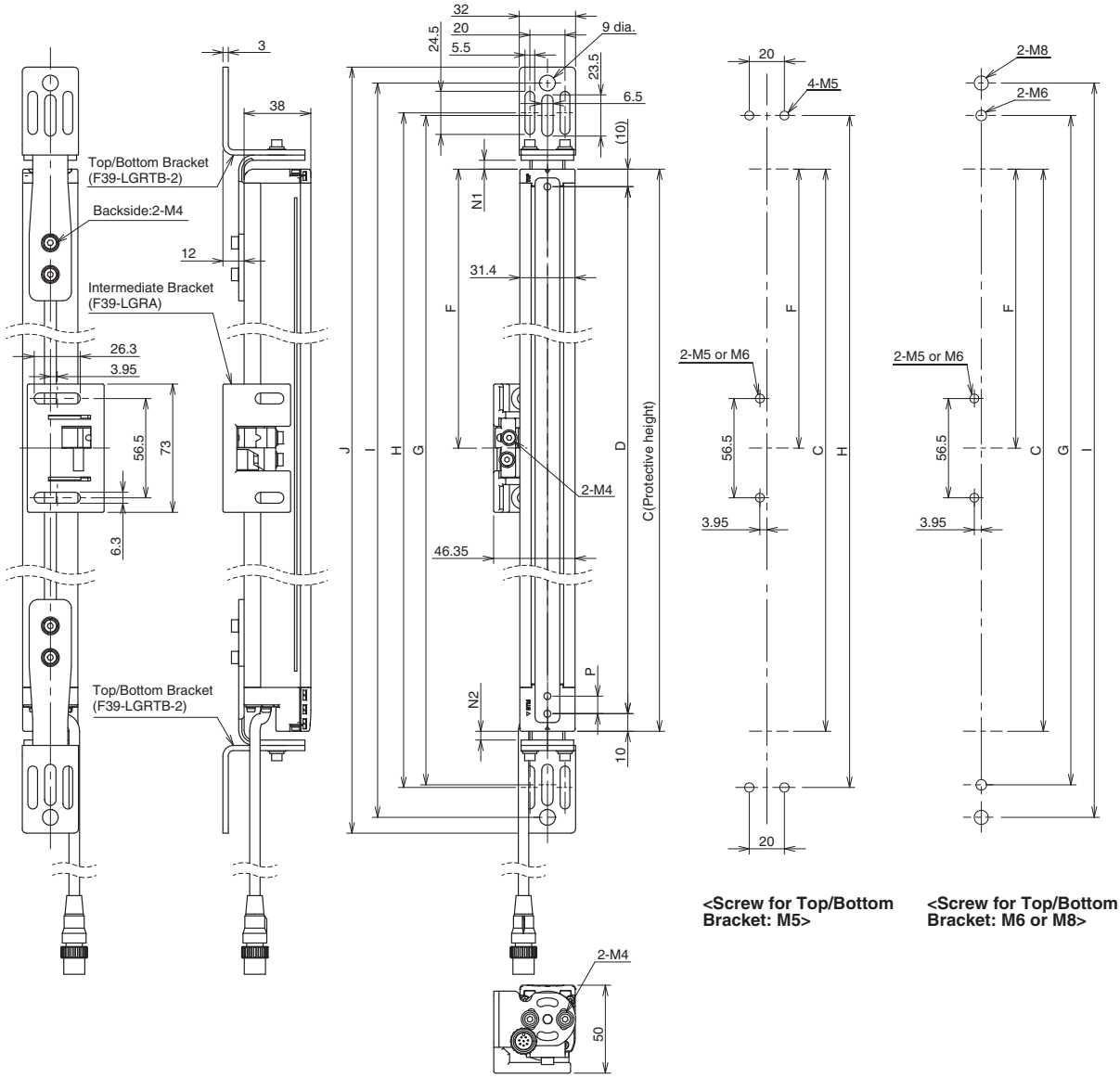
Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-20
Dimension G	C+27.2+N1+N2
Dimension H	C+38+N1+N2
Dimension I	C+58+N1+N2
Dimension N1	0 to 30
Dimension N2	0 to 13
Dimension P	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Mounted with Top/Bottom Brackets (F39-LGRTB-2) and Intermediate Bracket (F39-LGRA)

Backside Mounting



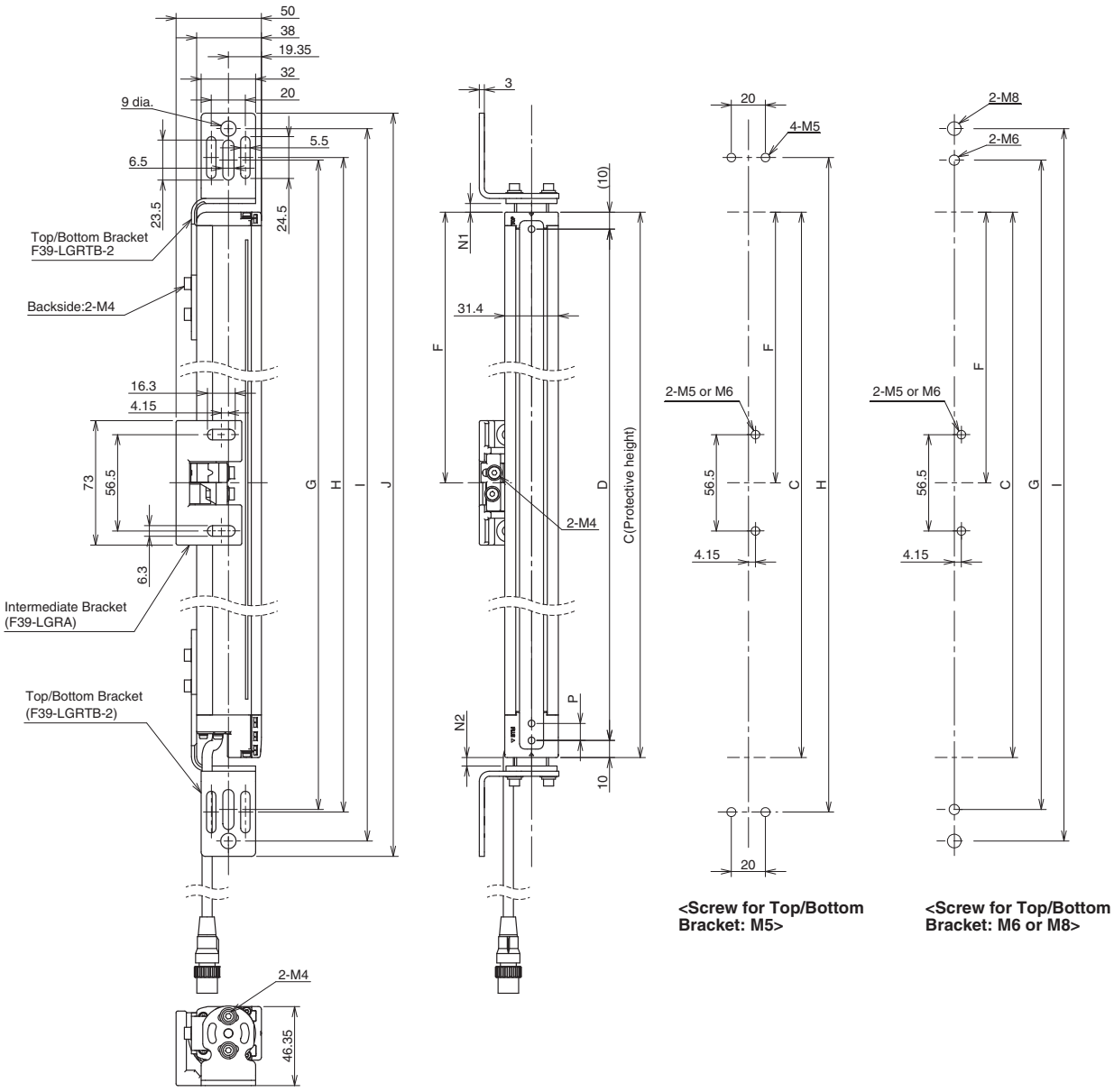
F3SG-4RA-□□□-25-02TS Series

Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-20
Dimension G	C+51+N1+N2
Dimension H	C+54+N1+N2
Dimension I	C+88+N1+N2
Dimension J	C+106+N1+N2
Dimension N1	0 to 30
Dimension N2	0 to 13
Dimension P	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Side Mounting



F3SG-4RA-□□□□-25-02TS Series

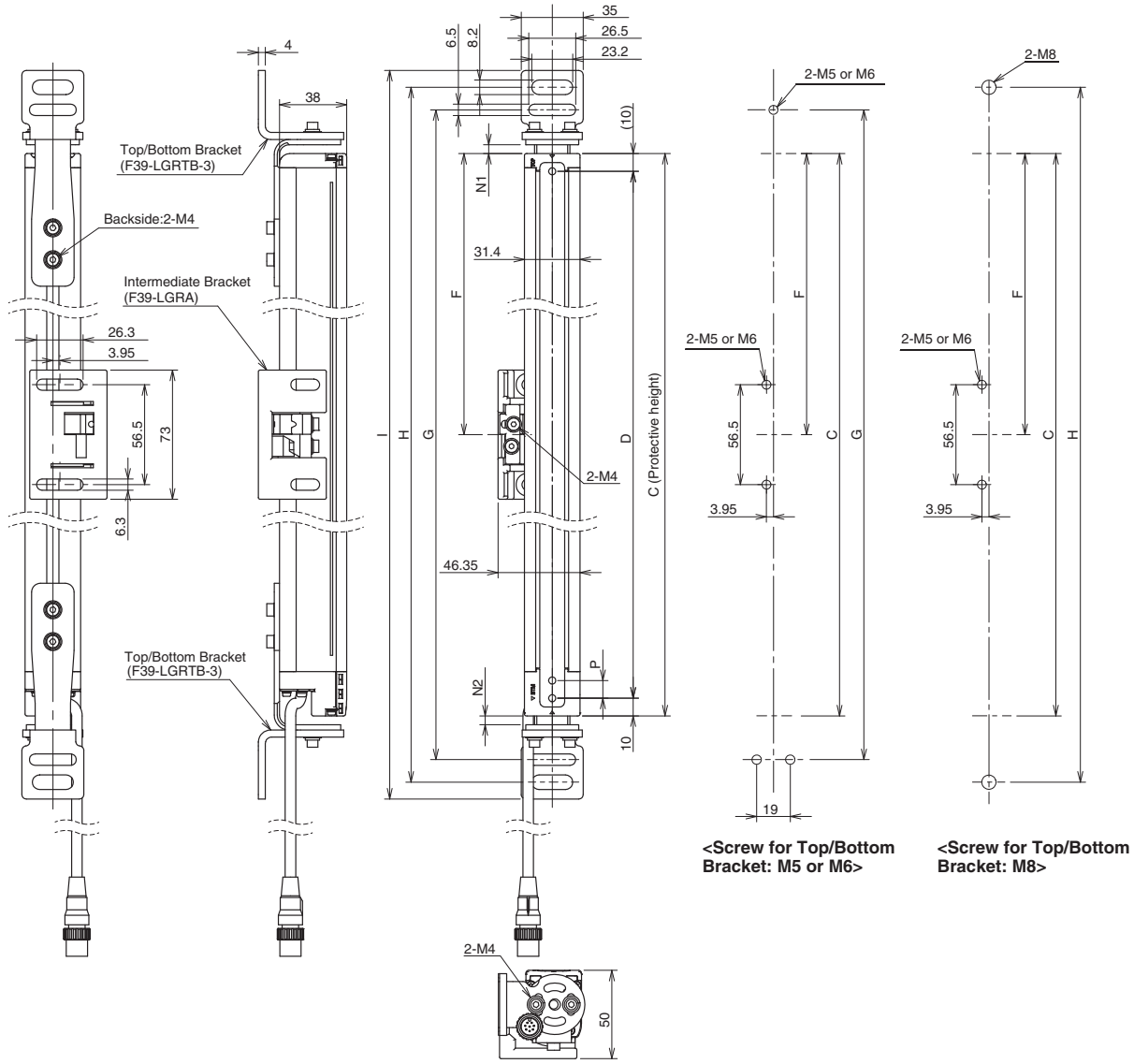
Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-20
Dimension G	C+51+N1+N2
Dimension H	C+54+N1+N2
Dimension I	C+88+N1+N2
Dimension J	C+106+N1+N2
Dimension N1	0 to 30
Dimension N2	0 to 13
Dimension P	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Mounted with Top/Bottom Brackets (F39-LGRTB-3) and Intermediate Bracket (F39-LGRA)

Backside Mounting



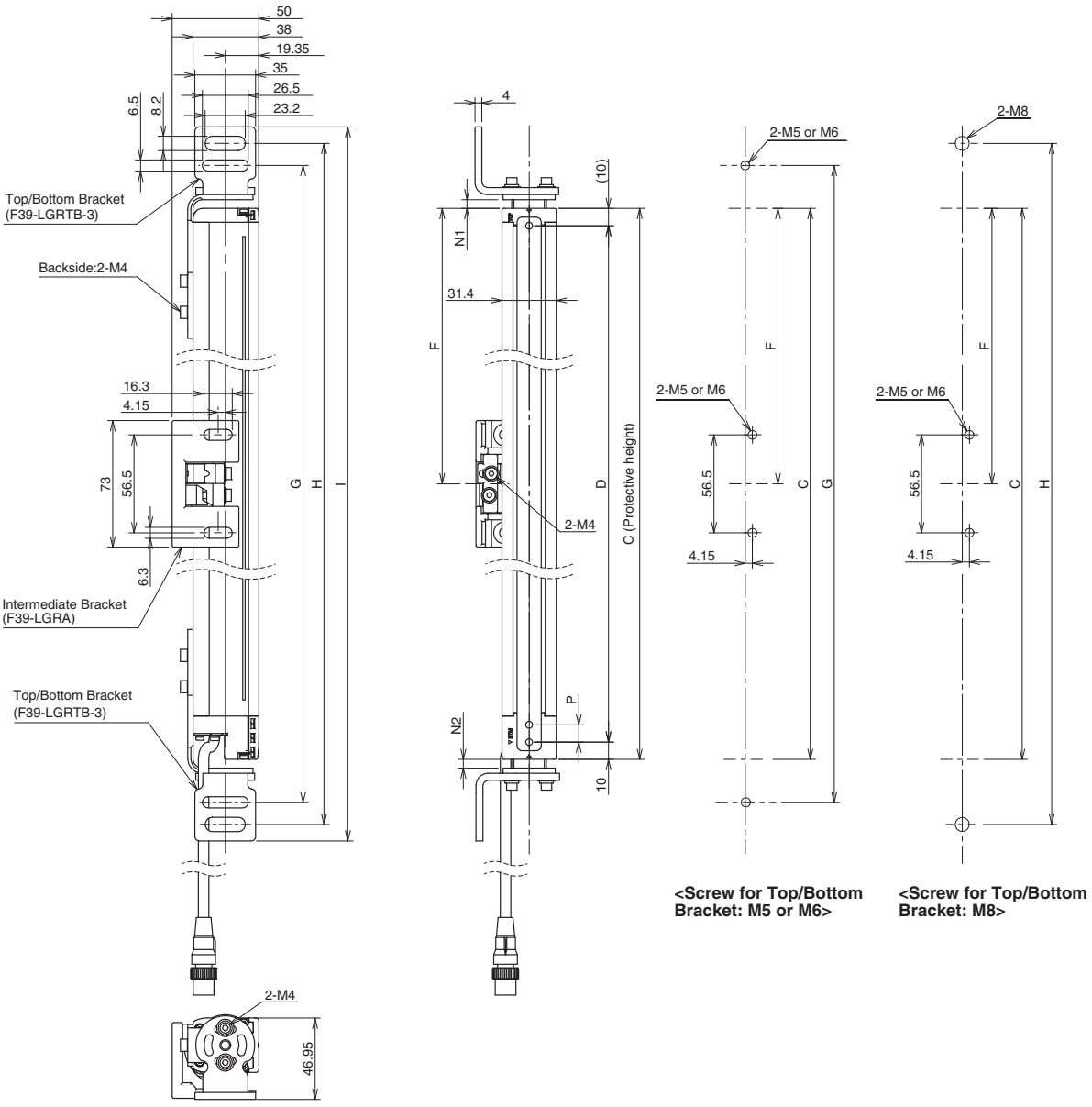
F3SG-4RA-□□□□-25-02TS Series

Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-20
Dimension G	C+39.5+N1+N2
Dimension H	C+65+N1+N2
Dimension I	C+84+N1+N2
Dimension N1	0 to 30
Dimension N2	0 to 13
Dimension P	20

Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Side Mounting



F3SG-4RA-□□□-25-02TS Series

Dimension C	4-digit number of the type name (Protective height)
Dimension D	C-20
Dimension G	C+39.5+N1+N2
Dimension H	C+65+N1+N2
Dimension I	C+84+N1+N2
Dimension N1	0 to 30
Dimension N2	0 to 13
Dimension P	20

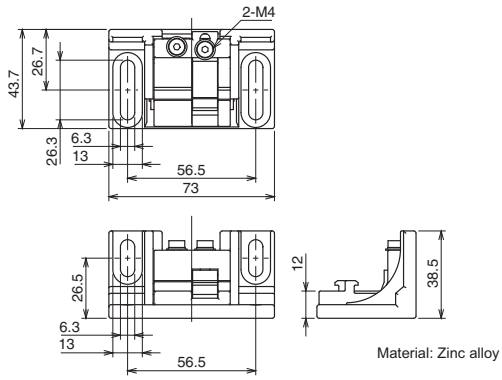
Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Accessories

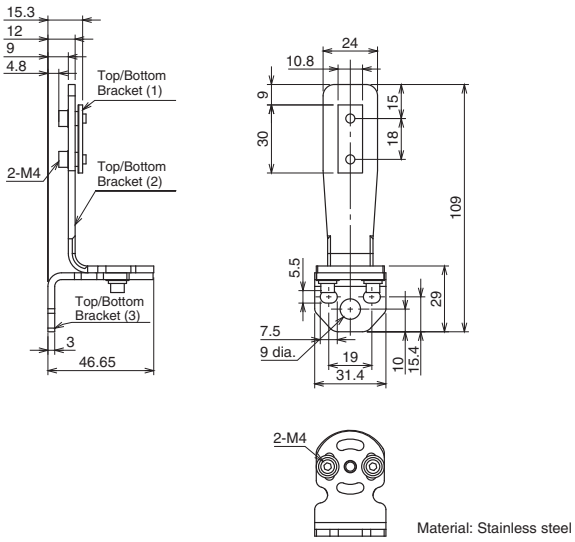
Sensor Mounting Brackets

Free-Location Bracket / Intermediate Bracket (F39-LGRA, sold separately)



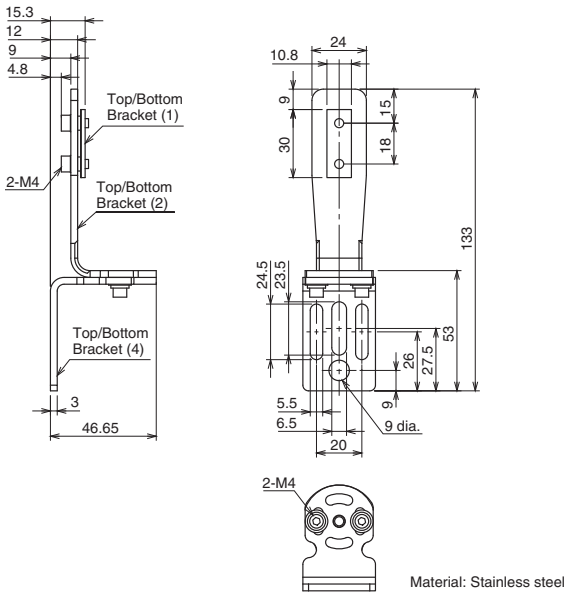
Material: Zinc alloy

Top/Bottom Bracket (F39-LGRTB, sold separately)



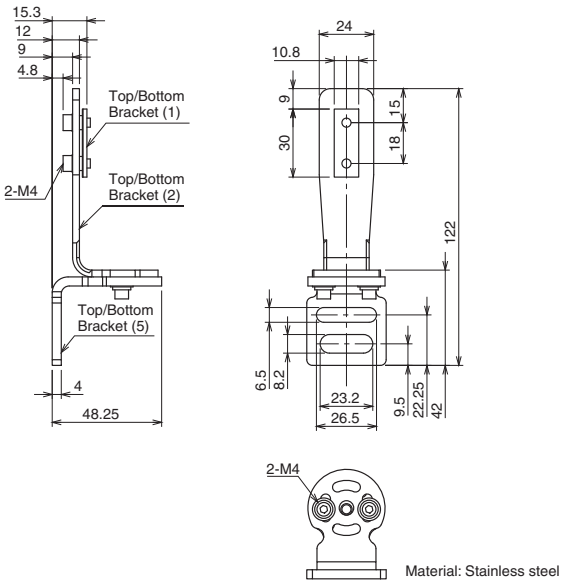
Material: Stainless steel

Top/Bottom Bracket (F39-LGRTB-2, sold separately)



Material: Stainless steel

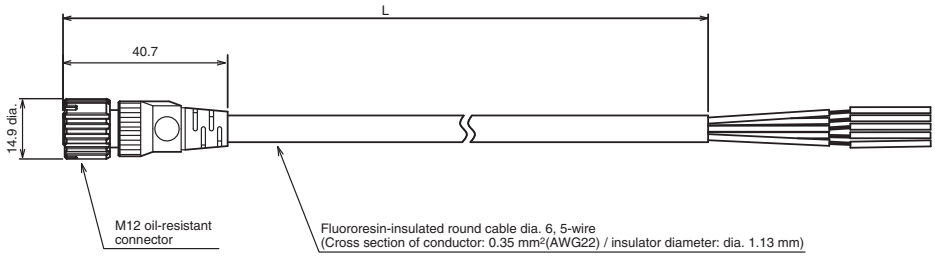
Top/Bottom Bracket (F39-LGRTB-3, sold separately)



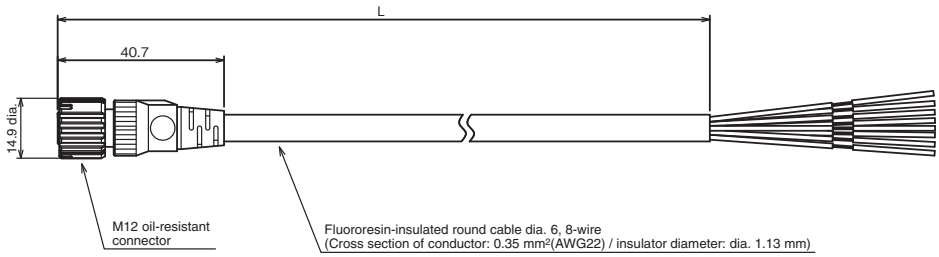
Material: Stainless steel

Safety light curtain connecting cable

Single-Ended Cable for Emitter (Oil-Resistant Cable) (F39-JD□RA-L, sold separately)

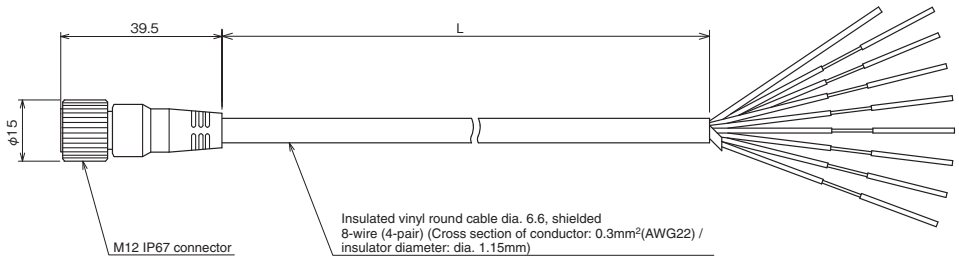


Single-Ended Cable for Receiver (Oil-Resistant Cable) (F39-JD□RA-D, sold separately)

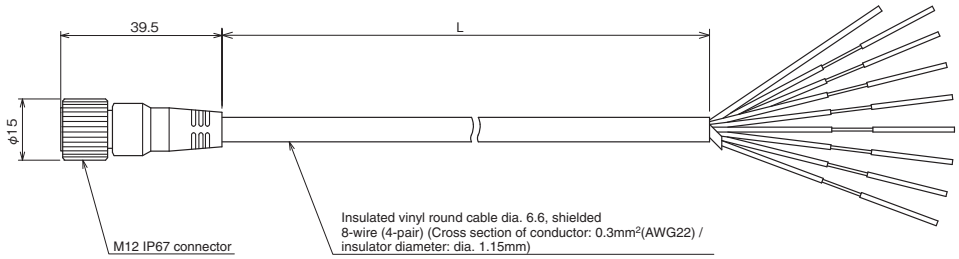


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3RA-L	F39-JD3RA-D	3
F39-JD7RA-L	F39-JD7RA-D	7

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

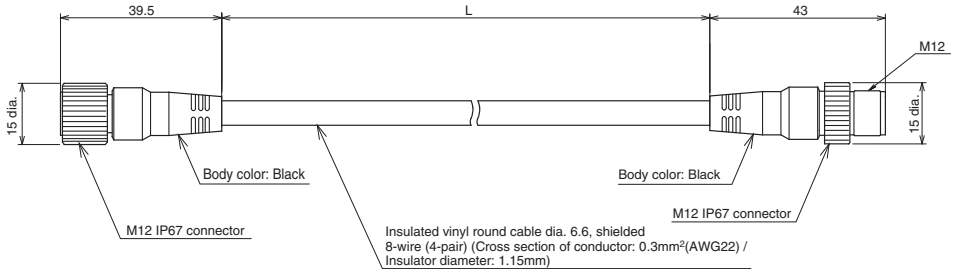


Single-Ended Cable for Receiver (F39-JD□A-D, sold separately)

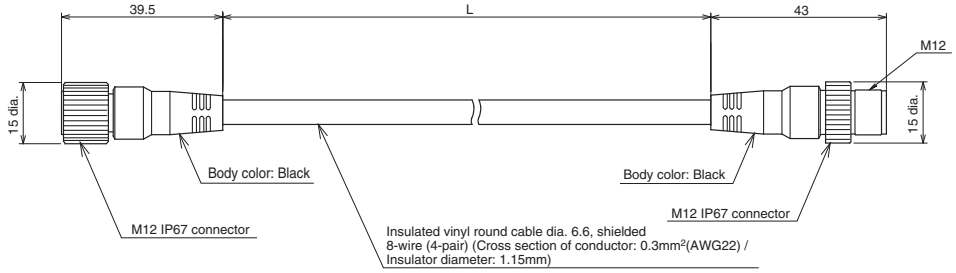


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3A-L	F39-JD3A-D	3
F39-JD7A-L	F39-JD7A-D	7
F39-JD10A-L	F39-JD10A-D	10
F39-JD15A-L	F39-JD15A-D	15
F39-JD20A-L	F39-JD20A-D	20

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

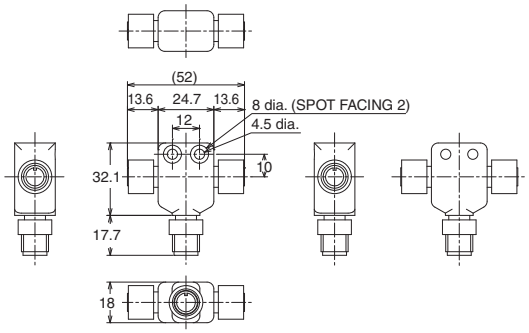


Double-Ended Cable for Receiver: Cable for extension (F39-JD□B-D, sold separately)

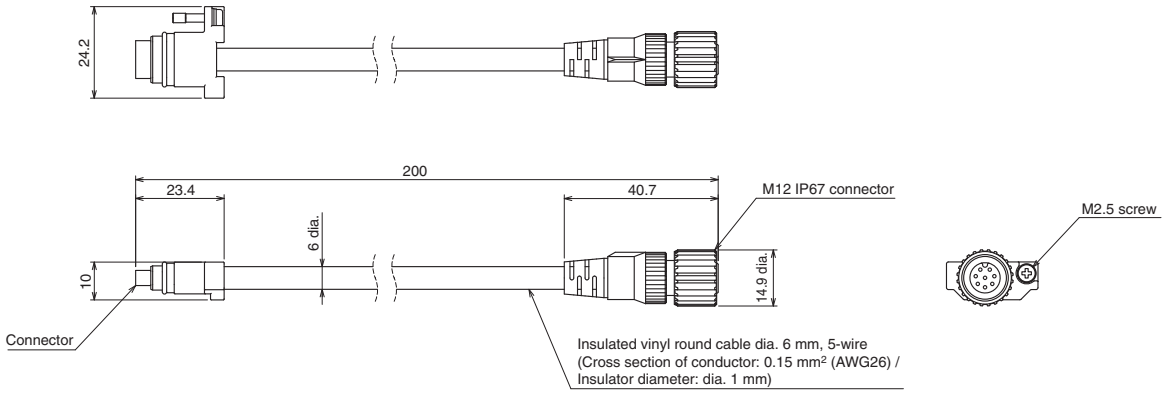


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JDR5B-L	F39-JDR5B-D	0.5
F39-JD1B-L	F39-JD1B-D	1
F39-JD3B-L	F39-JD3B-D	3
F39-JD5B-L	F39-JD5B-D	5
F39-JD7B-L	F39-JD7B-D	7
F39-JD10B-L	F39-JD10B-D	10
F39-JD15B-L	F39-JD15B-D	15
F39-JD20B-L	F39-JD20B-D	20

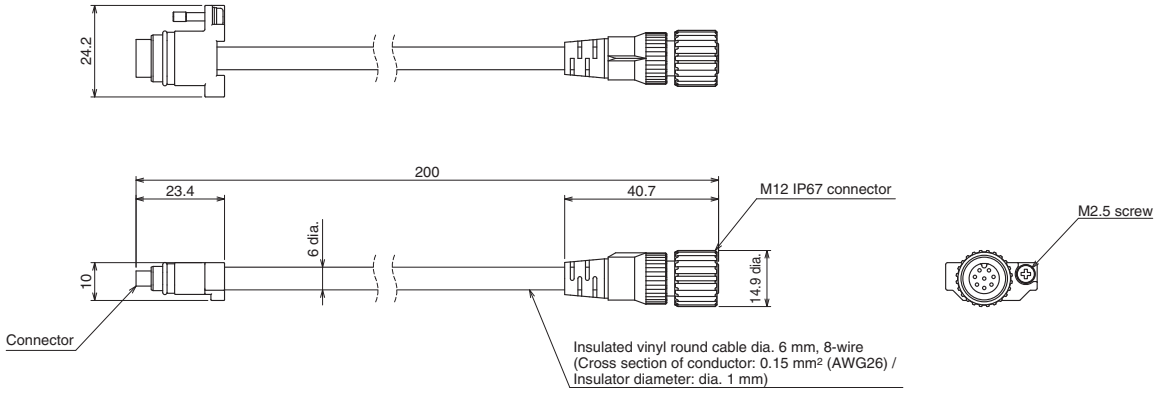
Reduced Wiring Connector (F39-CN5, sold separately)



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

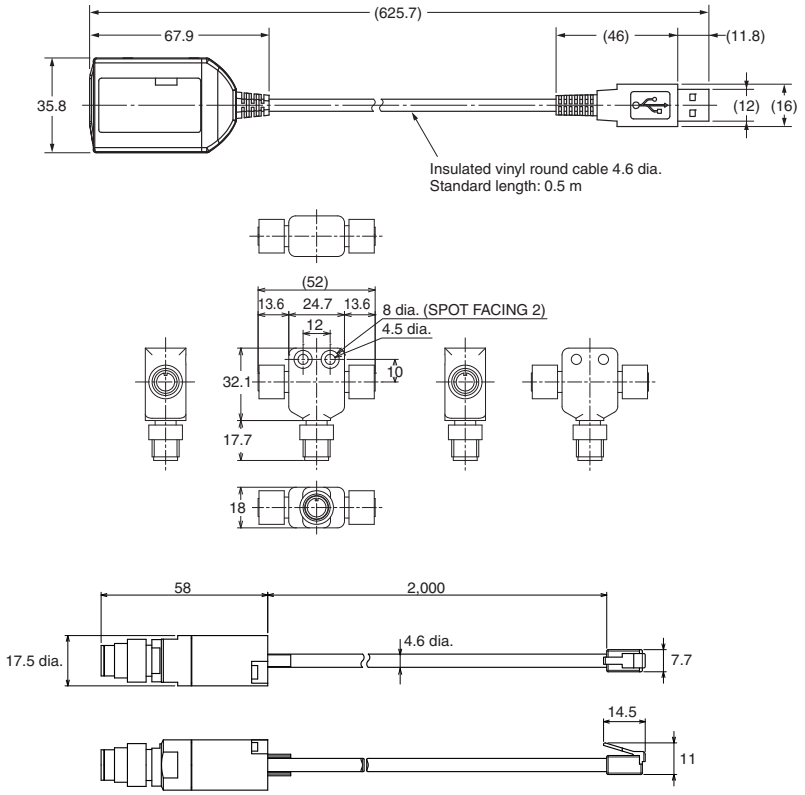


Cascading Cable for Receiver (F39-JGR2WTS-D, sold separately)

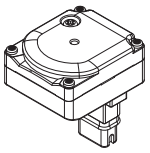


Set model name	Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR2WTS	F39-JGR2WTS-L	F39-JGR2WTS-D	0.2

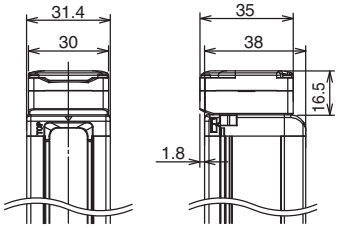
Interface Unit (F39-GIF-1, sold separately)



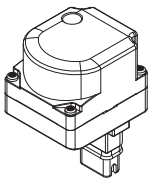
Bluetooth Communication Unit (F39-BT, sold separately)



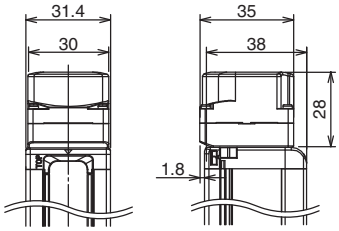
Material: PBT



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
Z391	**F3SG-4RA□□□□-25-02TS**	Safety Light Curtain F3SG-4RA□□□□-25-02TS Series User's Manual

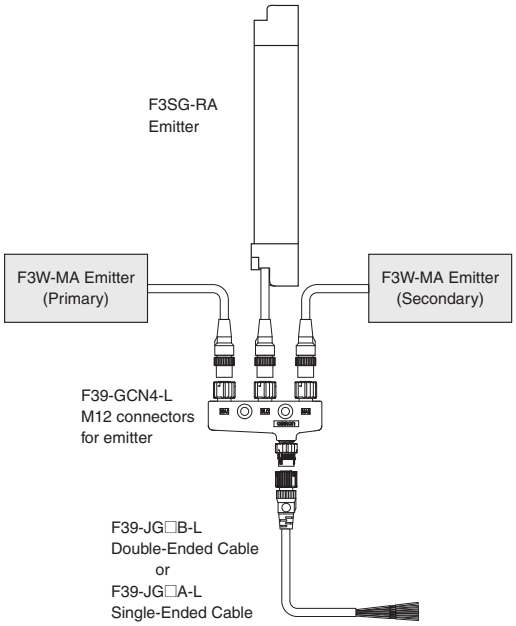
Smart Muting Actuator

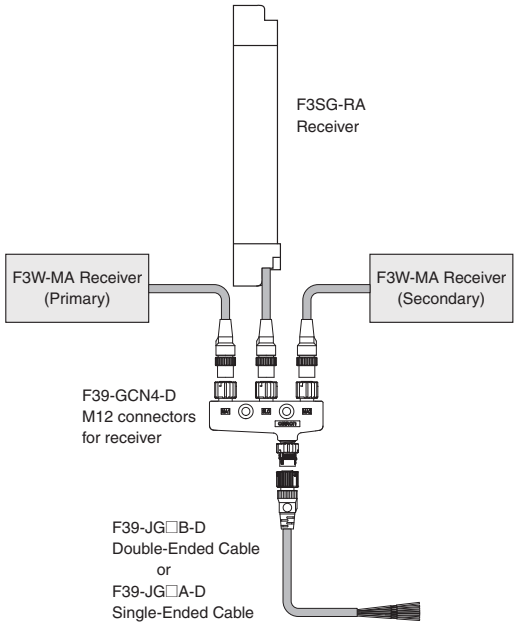
F3W-MA

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.

System Configuration





Ordering Information

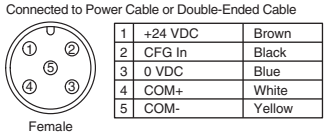
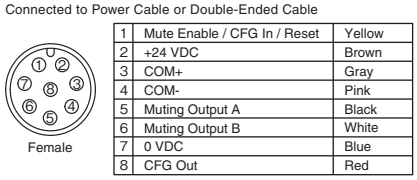
Smart Muting Actuator

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 Cable *

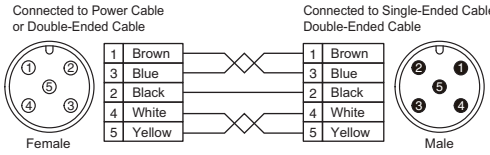
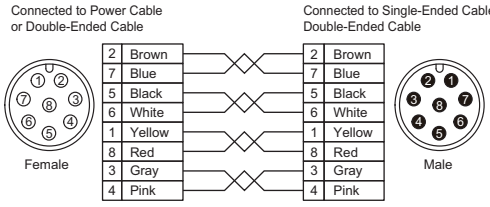
Appearance	Type	Cable length	Specifications	Model
	M12 connector (5-pin), 5 wires Color: Gray	3 m		**F39-JG3A-L**
		7 m		**F39-JG7A-L**
		10 m		**F39-JG10A-L**
		15 m		**F39-JG15A-L**
		20 m		**F39-JG20A-L**
	For receiver M12 connector (8-pin), 8 wires Color: Black	3 m		**F39-JG3A-D**
		7 m		**F39-JG7A-D**
		10 m		**F39-JG10A-D**
		15 m		**F39-JG15A-D**
		20 m		**F39-JG20A-D**

1	+24 VDC	Brown
2	CFG In	Black
3	0 VDC	Blue
4	COM+	White
5	COM-	Yellow

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

* 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)

Double-Ended Cable *

Appearance	Type	Cable length	Specifications	Model
	M12 connector (5-pin) on both ends Color: Gray	0.5 m		**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**
	M12 connector (8-pin) on both ends Color: Black	0.5 m		**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**

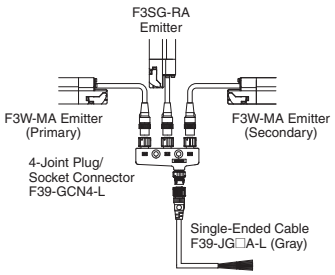
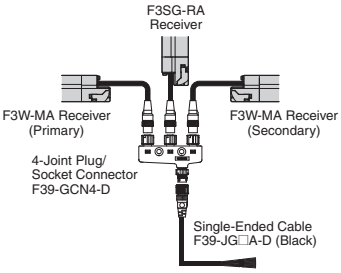
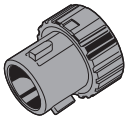
1	Brown	Brown
3	Blue	Blue
2	Black	Black
4	White	White
5	Yellow	Yellow

2	Brown	Brown
7	Blue	Blue
5	Black	Black
6	White	White
1	Yellow	Yellow
8	Red	Red
3	Gray	Gray
4	Pink	Pink

* 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)

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.		**F39-GCN4-L**
	For receiver (PNP output) M12 connectors. Used for reduced wiring.		**F39-GCN4-D**
	Includes one each of F39-GCN4-L and F39-GCN4-D	–	**F39-GCN4**
	Water-resistive Cover for 4-Joint Plug/Socket Connector	One 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. Material: PBT. IP67 rated when attached. Smartclick mechanism.	**XS5Z-11**
	Dust Cover for 4-Joint Plug/Socket Connector	One 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. Material: Rubber/black. This cover does not ensure IP67 degree of protection. XS2Z-14: Attach to a pin block inside the M12 female screw. XS2Z-15: Attach to a M12 female screw. When attaching the cover to the connector, press the cover onto the connector until the connector is fully inserted into the cover.	**XS2Z-14**
			**XS2Z-15**

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 ±15°. 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^2, 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 the F39-LGA, the protective height of the F3SG-RA must be 270 mm or longer. When using together with F39-LGTB, the protective height of 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 159 for details.

Ratings/Specifications

			F3W-MA0100P	F3W-MA0300P
Performance	Beam Gap between Muting Trigger Beams		100 mm	300 mm
	Number of Beams		8	20
	Standard Detection Object		30 mm	
	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	35 mA	45 mA
		Receiver	75 mA	75 mA
	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)j	
		* 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 152. 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		- Scan Code Selection - Operation Mode Selection (Point to Point Detection/ Chattering and Void Space Prevention) - Off-Delay - Muting Enable - Muting Trigger Beam Allocation - Operating Range Selection	
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^2, 1000 shocks for all 3 axes	
	Pollution Degree (IEC 60664-1)		Pollution Degree 3	
Connections	Power Cable	Type of Connection	M12 connectors: 5-pin emitter, 8-pin receiver, IP67 rated when mated, Cables prewired to sensors	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	0.3 mm	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R5 mm	
	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 alloy, Cap: PBT resin, Front window: Acrylic resin, Cable: Oil-resistant PVC resin, FE plate: Stainless steel	
Net Weight *1			0.7 kg	0.9 kg
Gross Weight *2			1.3 kg	2.2 kg
Included Accessories			Instruction Sheet	

*1. The net weight is the weight of an emitter and a receiver.
*2. The gross weight is the weight of an emitter, a receiver, included accessories and a package.

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.	-

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

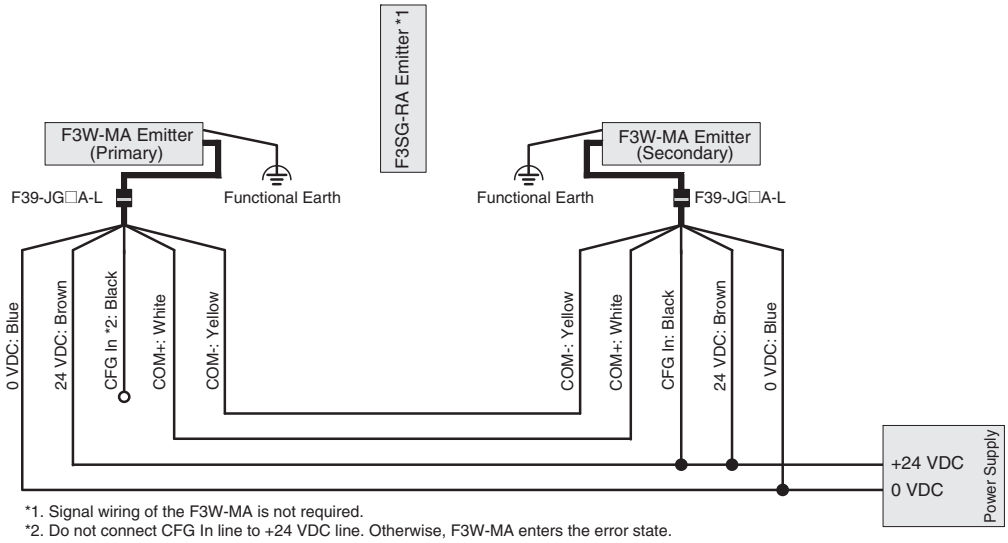
		Function	DIP-SW1	DIP-SW2 *2
F3W-MA Primary	Receiver	Scan Code B (factory default setting)	1 ON	1 ON
		Chattering and Void Space Prevention 1	2 ON 3 ON	2 ON 3 ON
		Off-Delay 100 ms	4 ON 5 ON	4 ON 5 ON
		Muting Enable Disabled (factory default setting)	6 ON	6 ON
	Emitter	Scan Code B (factory default setting)	1 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.

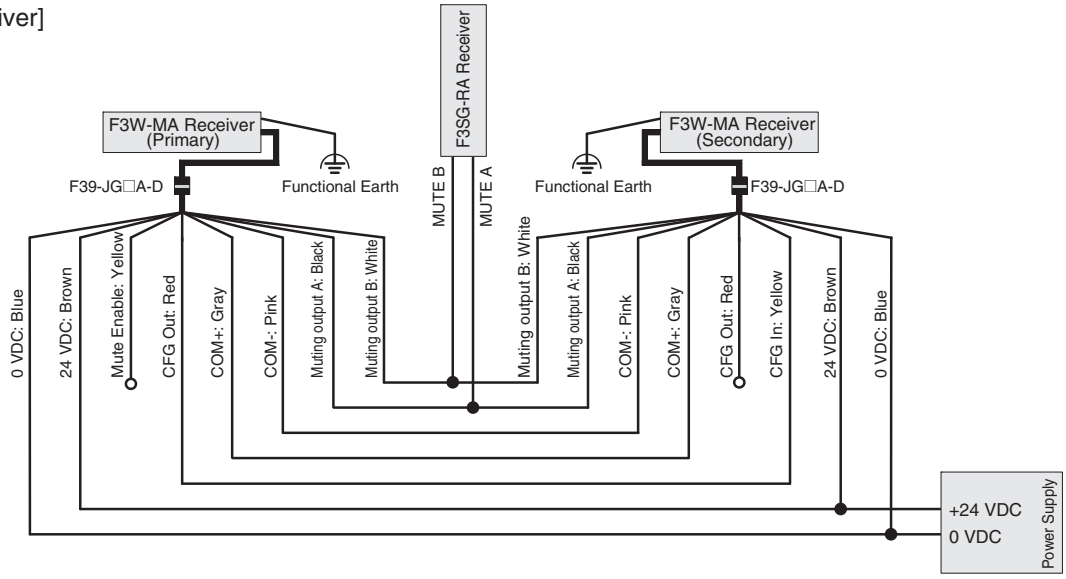
Wiring example

[Emitter]



*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.

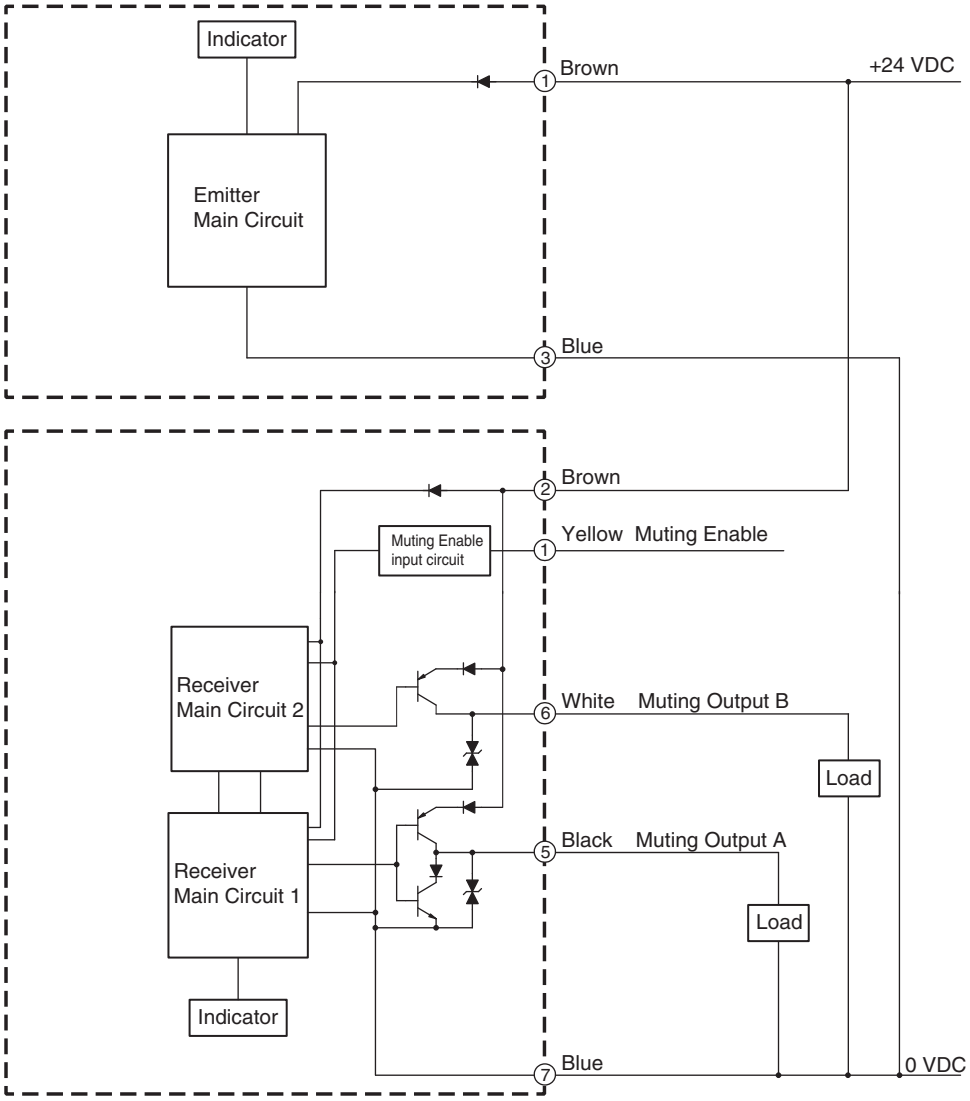
[Receiver]



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.

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.

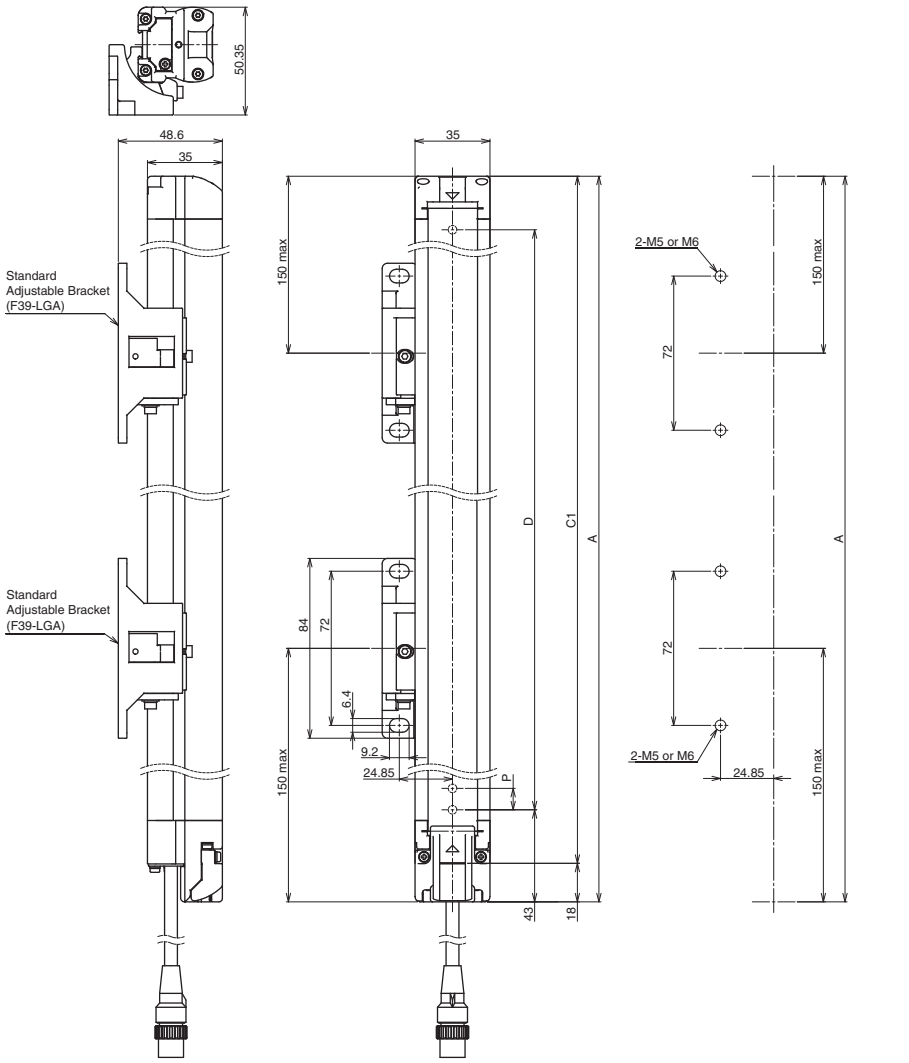


Dimensions

(Unit: mm)

Mounted with Standard Adjustable Brackets (F39-LGA)

Backside Mounting

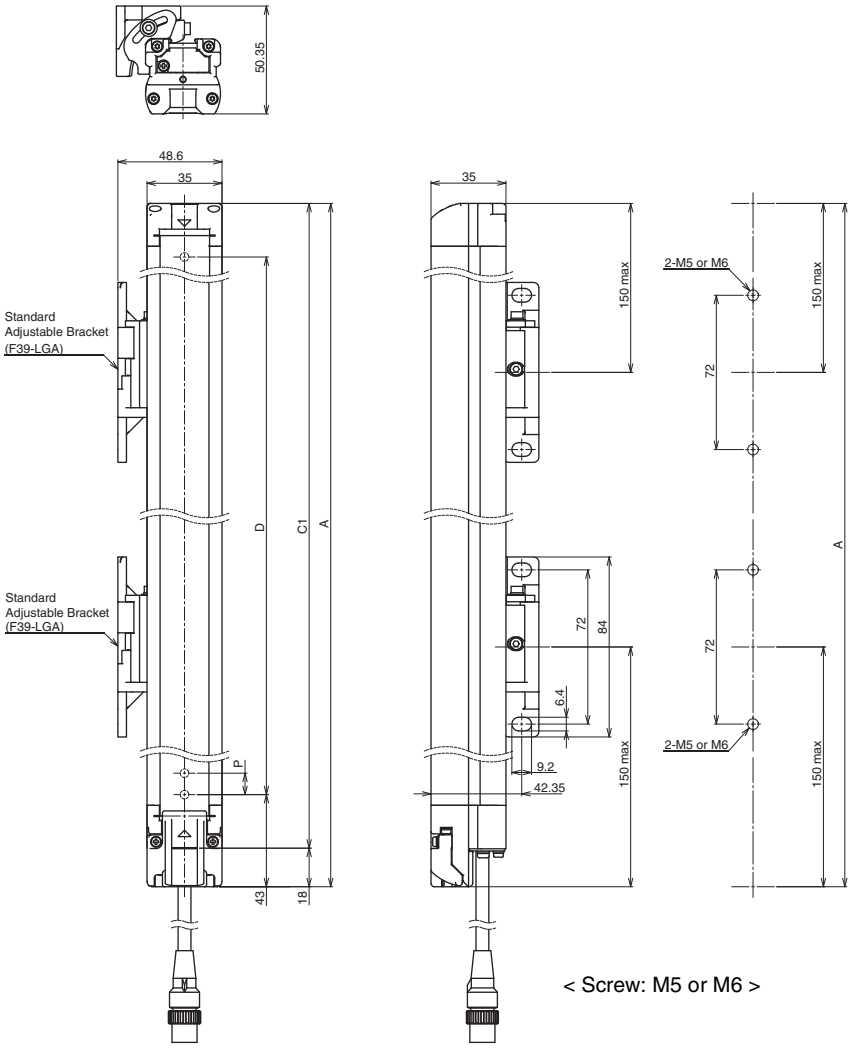


< Screw: M5 or M6 >

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).

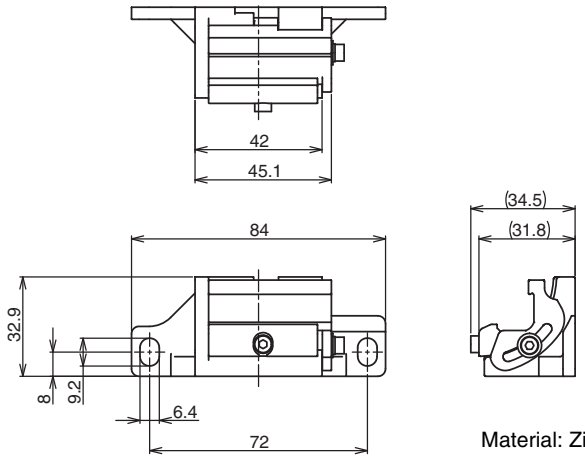
Side Mounting



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).

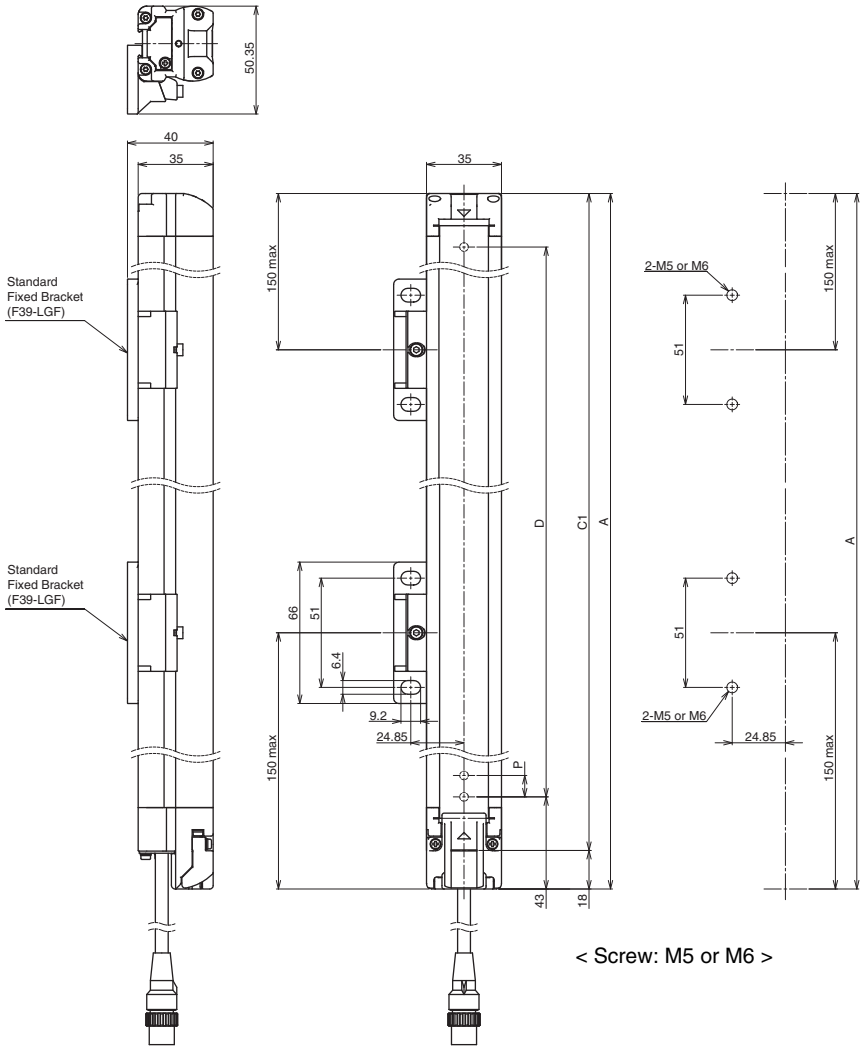
Standard Adjustable Bracket (F39-LGA, sold separately)



Material: Zinc alloy, Fluorine-containing

Mounted with Standard Fixed Brackets (F39-LGF)

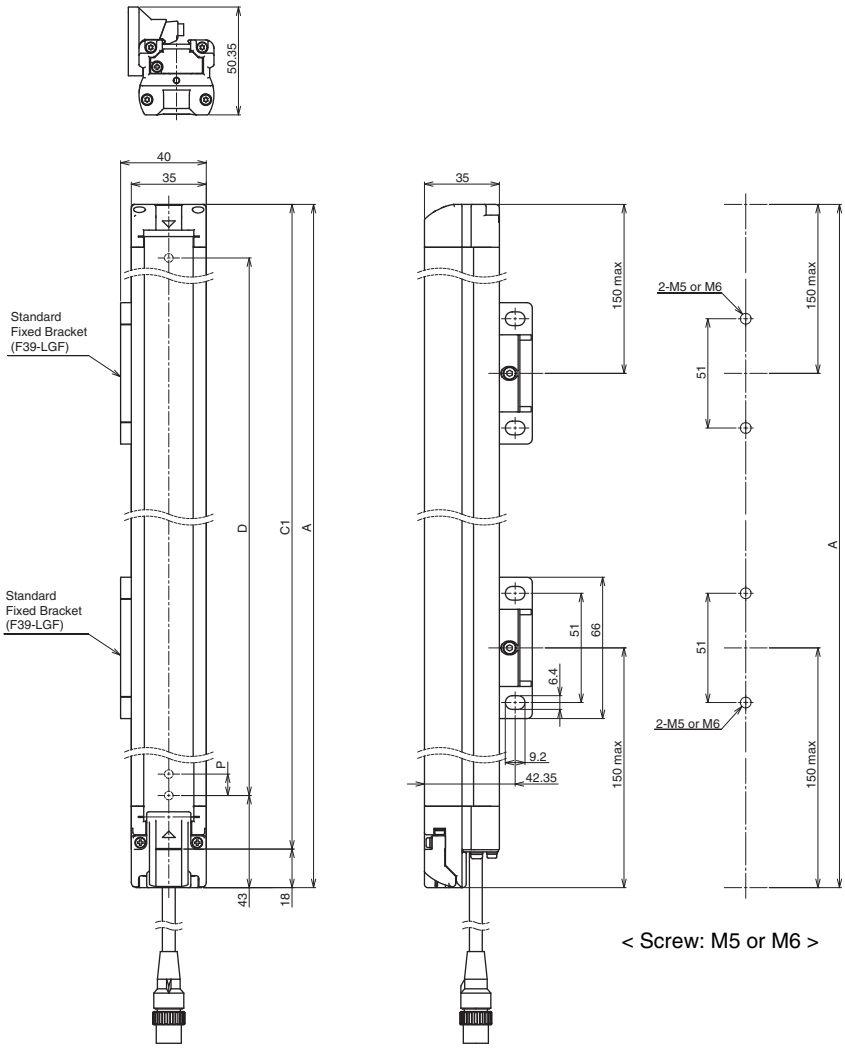
Backside Mounting



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).

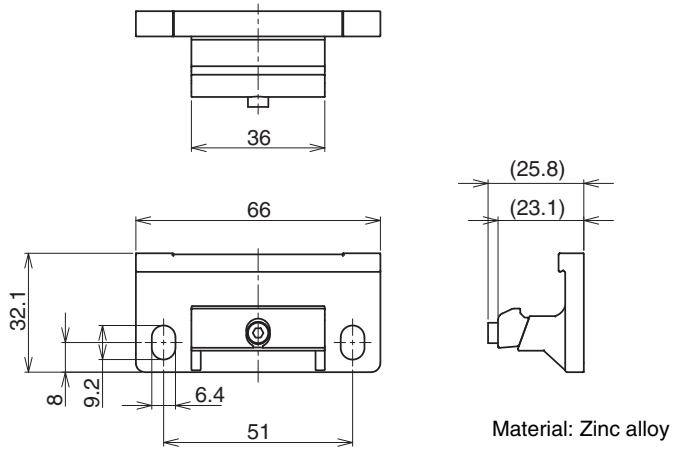
Side Mounting



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

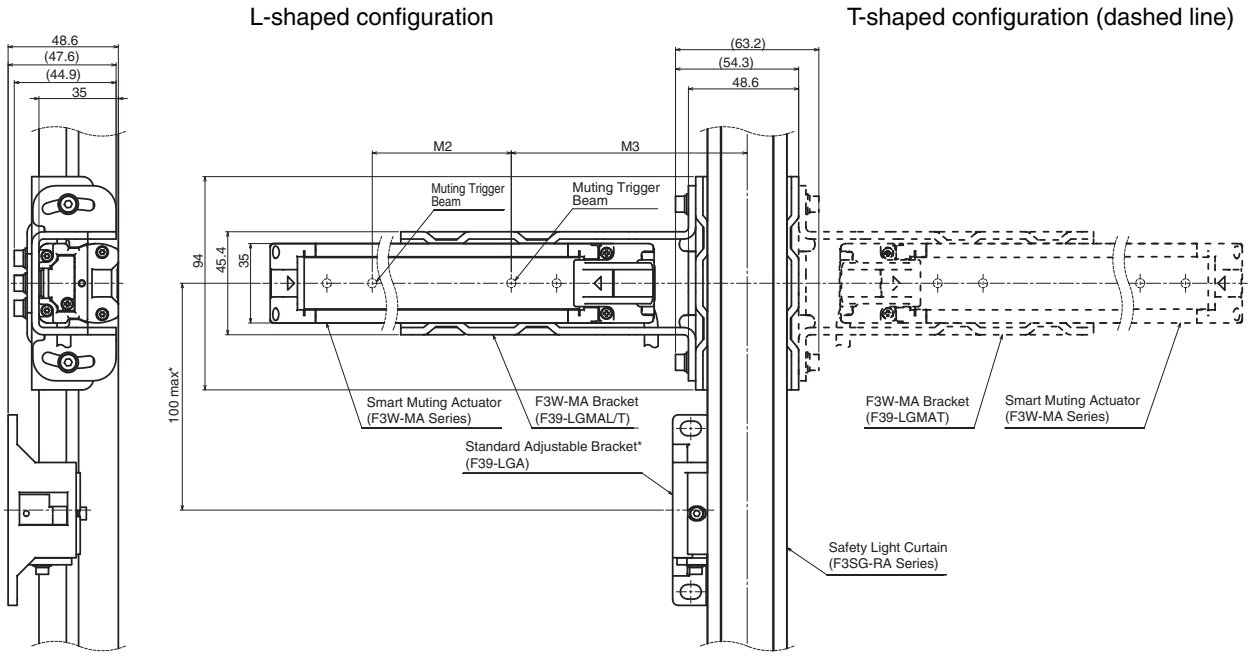
*1. The number of brackets required to mount either one of emitter and receiver.
*2. Mounting an emitter or receiver with one bracket is possible. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Standard Fixed Bracket (F39-LGF, sold separately)



Material: Zinc alloy

Mounted with F3W-MA Bracket (F39-LGMA□) and Standard Adjustable Bracket (F39-LGA) on F3SG-RA



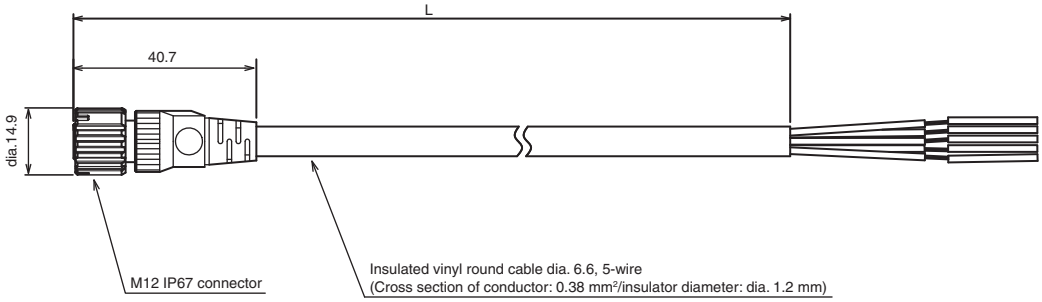
Note: When mounting an F3W-MA0300P in the L-shaped configuration, the shock resistance becomes as follows.
Shock resistance: 50 m/s^2, 1000 shocks for all 3 axes
For mounting an F3W-MA0300P under a shock environment exceeding this, the F3W-MA Bracket cannot be used. Use a Standard Adjustable Bracket (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.

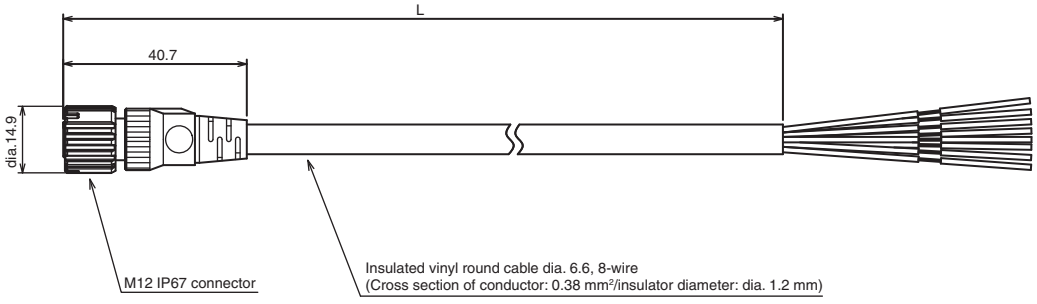
Model	F3W-MA0100P	F3W-MA0300P
Dimension M2	100	300
Dimension M3	104	124

Accessories

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

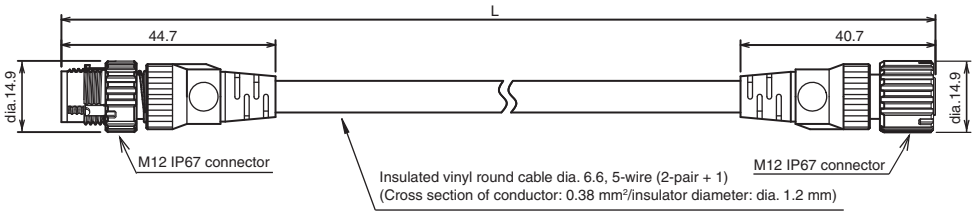


Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)

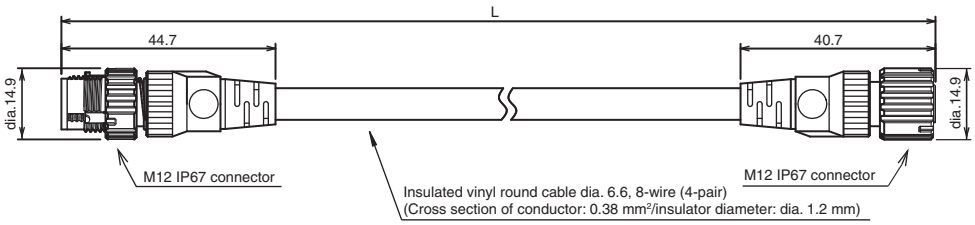


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JG3A-L	**F39-JG3A-D**	3
F39-JG7A-L	**F39-JG7A-D**	7
F39-JG10A-L	**F39-JG10A-D**	10
F39-JG15A-L	**F39-JG15A-D**	15
F39-JG20A-L	**F39-JG20A-D**	20

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

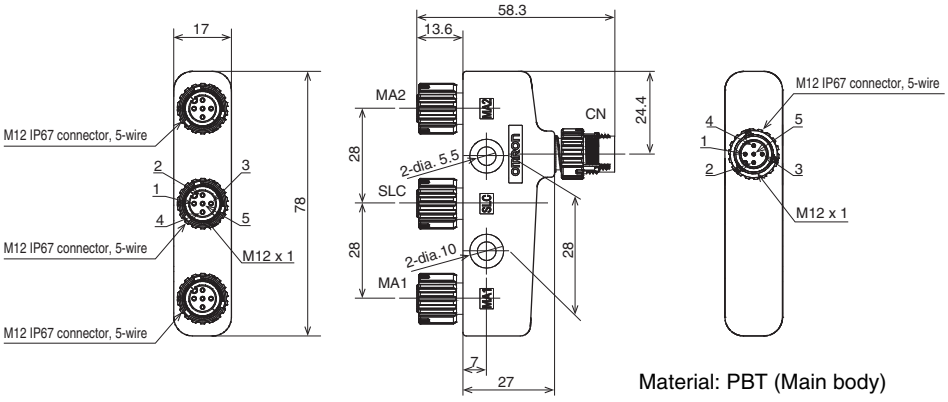


Double-Ended Cable for Receiver: Cable for extension (F39-JG□B-D, sold separately)



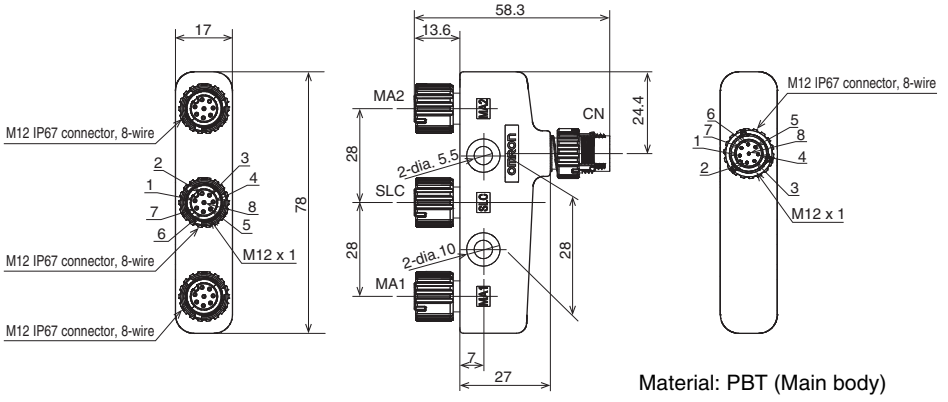
Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR5B-L	**F39-JGR15B-D**	0.5
F39-JG1B-L	**F39-JG1B-D**	1
F39-JG3B-L	**F39-JG3B-D**	3
F39-JG5B-L	**F39-JG5B-D**	5
F39-JG7B-L	**F39-JG7B-D**	7
F39-JG10B-L	**F39-JG10B-D**	10
F39-JG15B-L	**F39-JG15B-D**	15
F39-JG20B-L	**F39-JG20B-D**	20

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



Material: PBT (Main body)

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



Material: PBT (Main body)

Related Manuals

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

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