

# Safety Light Curtain

F3SG-R Series

## More Rugged

Advanced, Robust, and Easy types

**NEW**  
Robust type

Advanced type

Easy type





# Increase both durability and productivity

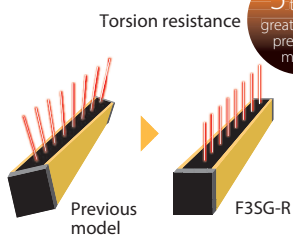
The new cutting oil resistant Robust type is added



## 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

Previous model

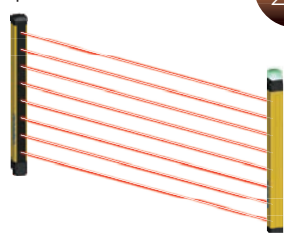
F3SG-R

### Tough 2 Robust against environmental changes

High power

Operating range

Up to  
20 m



### Tough 3 Reliable in dusty wash-down environments




F3SG-RA/RE:IP67

\* 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

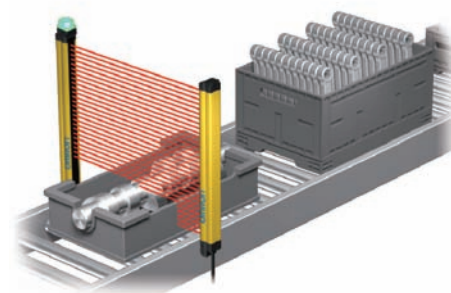
### Ideal for flexible manufacturing

Multifunctional **Advanced** type




**F3SG-RA** >>p.4

- 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

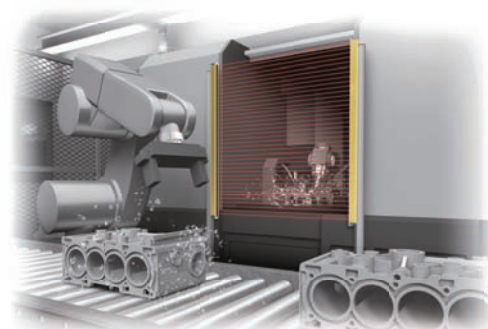
Cutting oil resistant **Robust** type



**F3SG-RR** **NEW** >>p.10


- 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



**F3SG-RE** >>p.11

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



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Multifunctional  
Advanced  
type  
F3SG-RA

Quick and easy installation

# Intuitive and smart designs for fast set-up

TOP  
(top-beam-state indicator)

## 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

F39-PTG Laser Pointer

Shows the sensor direction

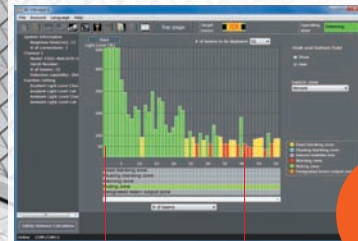


F39-LP Lamp

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



Sufficient Green  
Insufficient Red

Fine beam adjustment

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

BTM

(bottom-beam-state indicator)

\* 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.



### Top/bottom adjustable bracket (sold separately)

Use this bracket at the top and bottom of the F3SG-R to make horizontal adjustment of  $\pm 22.5^\circ$ .



### Standard adjustable bracket (sold separately)

This bracket provides vertical as well as horizontal adjustment of  $\pm 15^\circ$ .



### 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

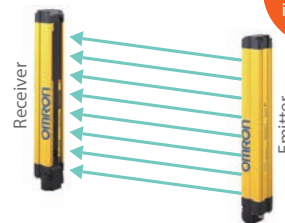
**Start-up**

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.

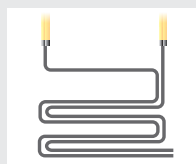


## Simple wiring thanks to reduced wiring connectors

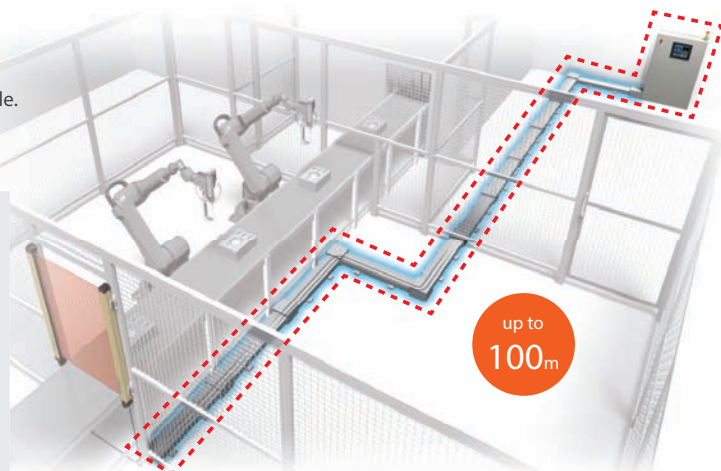
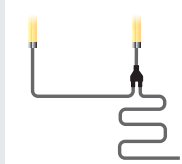
Simple wiring makes installation faster. Fewer cables reduce disconnection risk and noise trouble.

### Previously

Cables of the emitter and receiver



### Only one cable



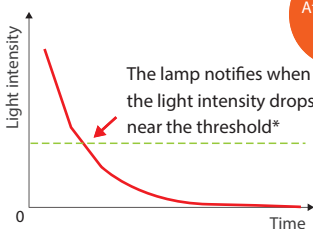
Multifunctional  
Advanced  
type  
F3SG-RA

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.



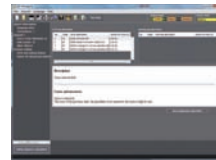
\* The incident light level at which the light curtain turns OFF



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**

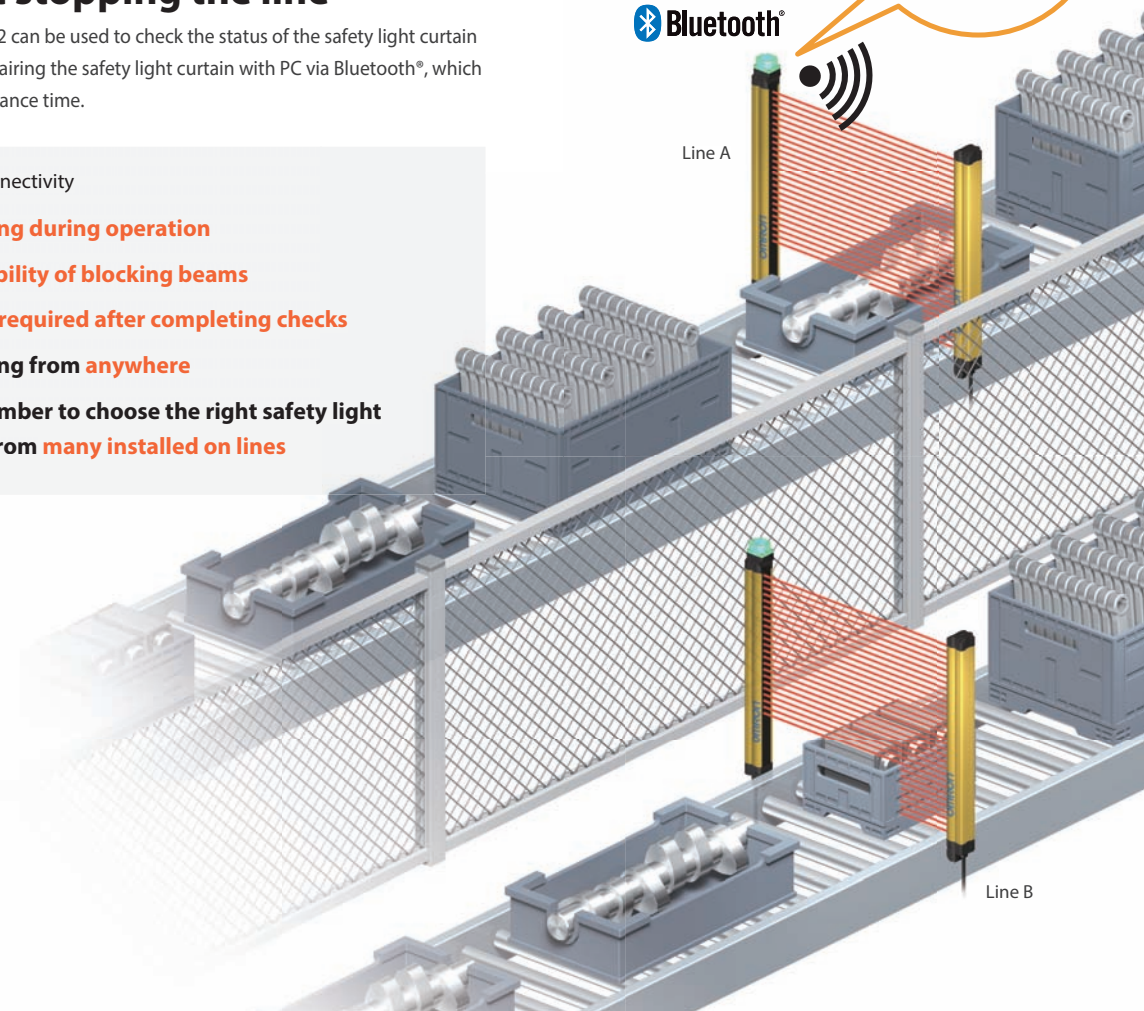
F39-BT/BTLP Bluetooth®  
Communication Unit

Bluetooth®



Line A

Line B





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

Just 15 seconds to connect!



Select the status of the indicator



Easy trouble shooting

| Result   |               |
|--|---------------|
| <b>Indication status</b>   |               |
| Indicator  | Receiver      |
| LOCK OUT   | Blinks 1 time |
| Blinking indicator   | ON/OFF        |
| <b>Description</b>   |               |
| Safety output error  |               |
| <b>Cause and measures</b>  |               |
| * Safety output lines may be short-circuited to each other or another signal line may be |               |

Multifunctional  
Advanced  
type  
F3SG-RA

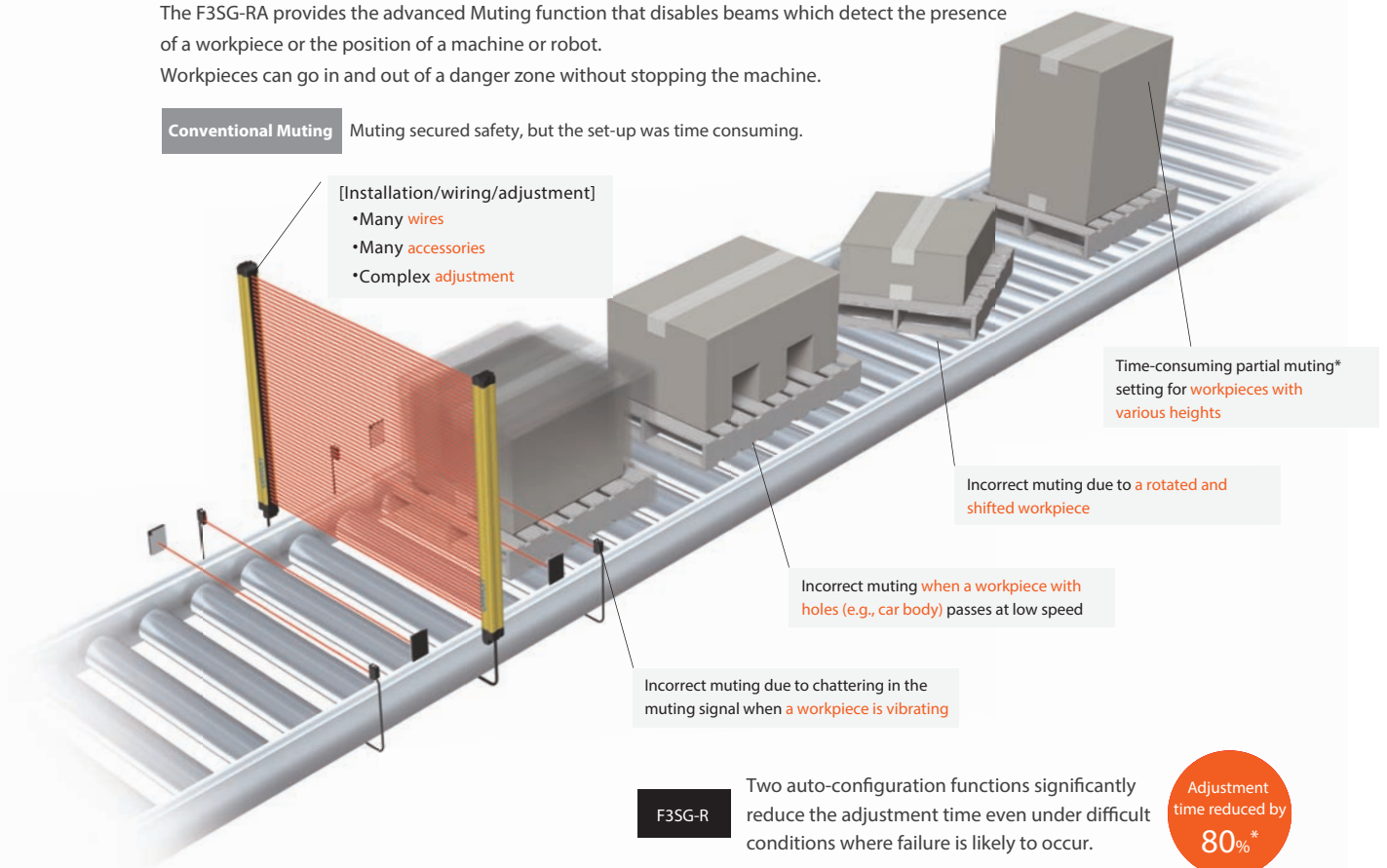
Easy adjustment

# 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.

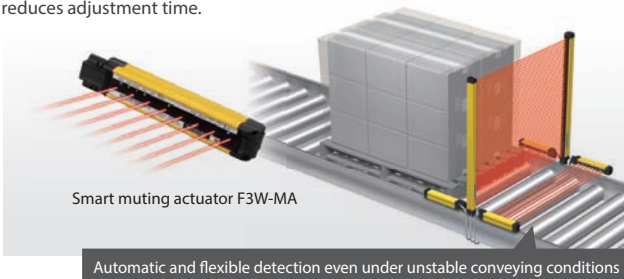
**Conventional Muting** Muting secured safety, but the set-up was time consuming.



Multiple-beam sensor technology for vibrating workpieces

### Smart muting actuator F3W-MA

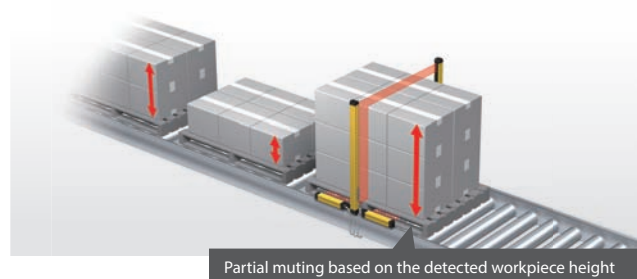
The smart muting actuator extends the functions of the F3SG-R in applications where a workpiece is vibrating forward and backward. This prevents unexpected machine downtime and significantly reduces adjustment time.



Automatic 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: 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.



### Examples of logging



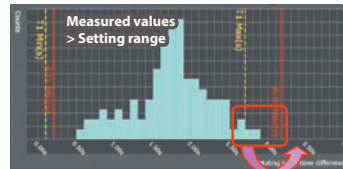
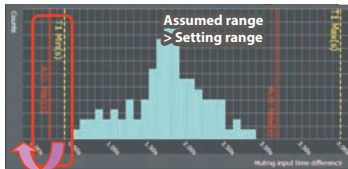
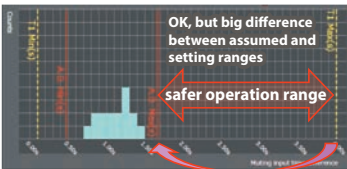
Low risk of intermittent stop, but not safe



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



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

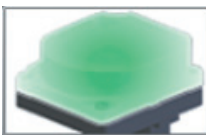
Maintenance information



Check error log and other data required for maintenance

#### I/O Setting

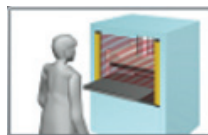
Auxiliary output/lamp



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

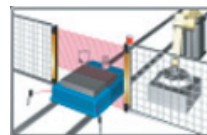
#### Function Setting

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](http://www.ia.omron.com/f3sg-r_tool)



NEW

Cutting oil resistant

**Robust**  
type

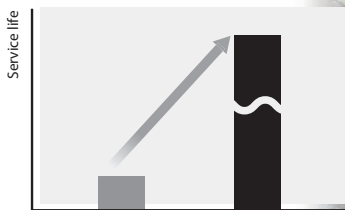
**F3SG-RR**

IP67G

# Robust design for reliable use even in cutting oil environments

## Four times longer\* cutting oil resistance

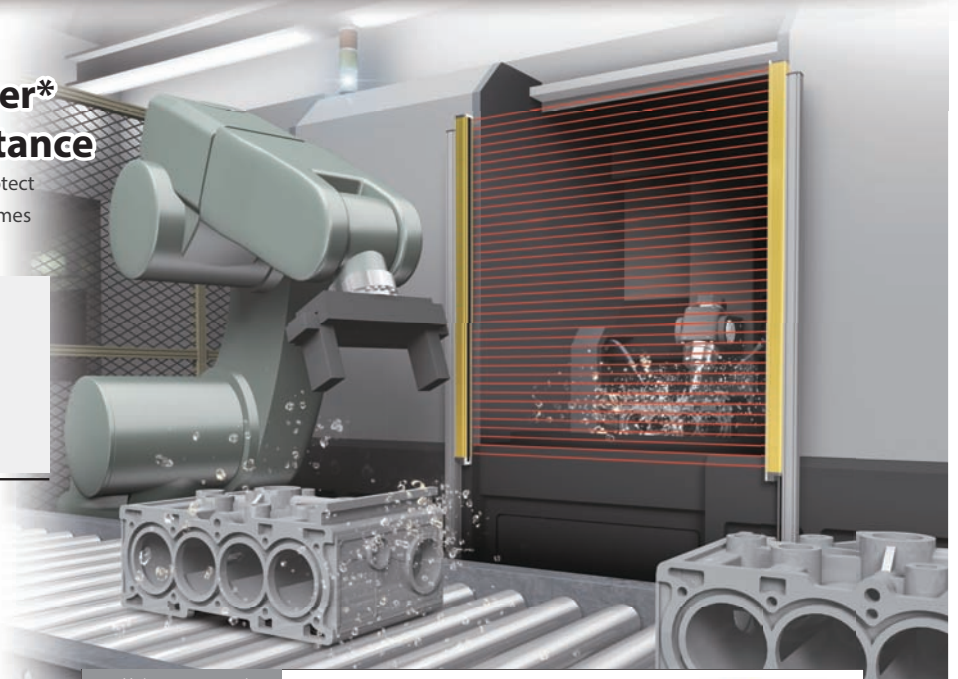
The F3SG-RR has the ability to protect from cutting oil (IP67G) for four times longer than the previous model.



Previous model  
F3SJ-A/B

**F3SG-RR**

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

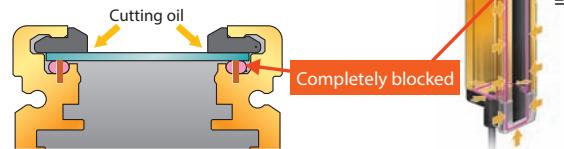


Unique construction

### No gaps

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.

Patented



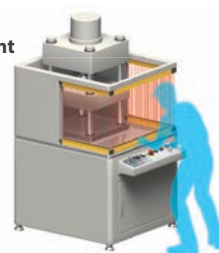
### No dead space

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

25-mm dia.

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.

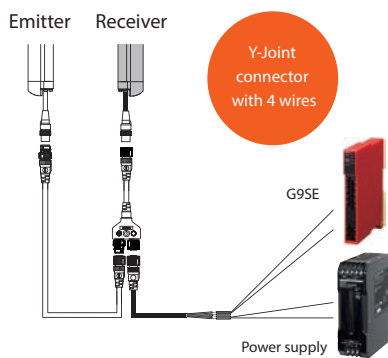
Simple safety functions to reduce errors and save costs

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<br>(F3SG-RA-01TS : Page 93, F3SG-RA-02TS : Page 120*)                     |                 | Page 44   |             |

\*1. Supports PNP/NPN by switching between 0 V and 24 V active.

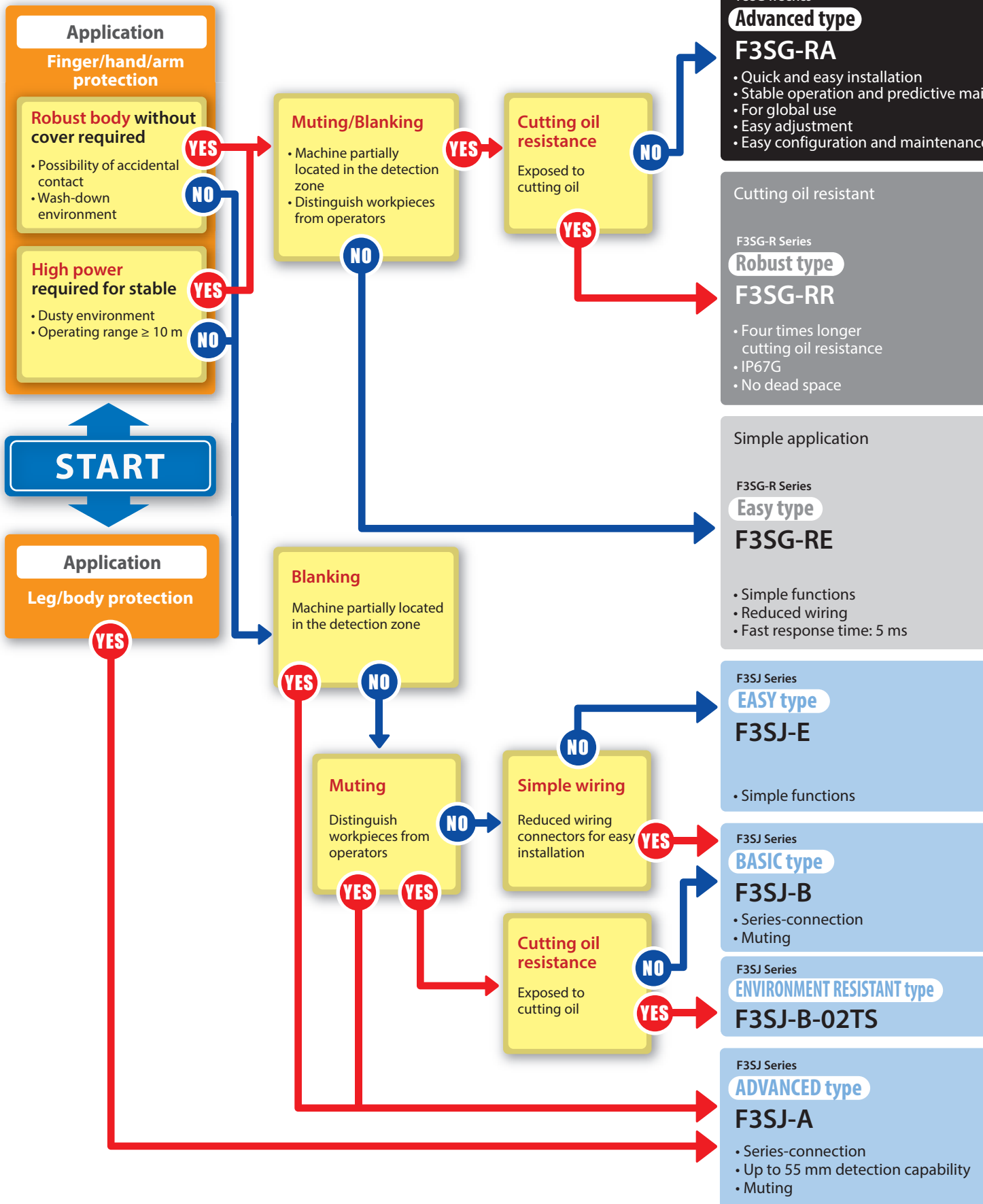
\*2. The F3SG-RA-□TS has different specifications. See the pages listed above for details.



| Easy type  |   | More slim – F3SJ Series   |   |  |                                  |                             |
|--|---|---|---|--|----------------------------------|-----------------------------|
| F3SG-RE  |   | F3SJ-E  | F3SJ-B  | F3SJ-A   |                                  |                             |
|  <p>Ideal for simple applications</p> |   |    |    |    |                                  |                             |
| ●  |   |   |   | ●  | 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/<br>wiring       |
|                                     | –   | –   |  |   | Reduced wiring                   |                             |
| IP67   | IP65  | IP65  | IP65  | IP65   | Degree of protection             | Environmental<br>resistance |
| –  | –   | –   | –   | ●  | Lamp                             | Accessory                   |
| –  | –   | –   | –   | –  | Bluetooth communication unit     |                             |
| –  | –   | –   | –   | SD Manager   | SD Manager2                      |                             |
| ●  | ●   | ●   | ●   | ●  | Laser pointer                    |                             |
| Page 73  | Refer to the F3SJ Series Catalog (Cat. No. F074). |   |   |  | More information                 |                             |

\*3. Varies depending on the model.




## Flowchart for product section







aintenance

e




| Protective height  | Specifications  | Brackets   | Cable   | Accessories (sold separately)  |
|--|---|--|---|--|
|  <p>14-mm dia.<br/>160 to 2,080 mm<br/>(15 to 207 beams)</p> <p>30-mm dia.<br/>190 to 2,510 mm<br/>(8 to 124 beams)</p> | <p><b>Detection capability</b></p> <p>14-mm dia./30-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/<br/>0.3 to 20 m</p> | <p><b>Accessory</b></p> <ul style="list-style-type: none"> <li>• Standard fixed bracket</li> </ul>  <p><b>Sold separately</b></p> <ul style="list-style-type: none"> <li>• Standard adjustable bracket</li> <li>• Top/bottom adjustable bracket</li> <li>• Top/bottom adjustable bracket (for user-made mounting part)</li> </ul> | <p><b>Connector</b></p>  | <ul style="list-style-type: none"> <li>Single/double-ended connector cable</li> <li>Cascading cable</li> <li>Reduced wiring connector</li> <li>Laser pointer</li> <li>Spatter protection cover</li> <li>Lamp</li> <li>Bluetooth communication unit</li> <li>SD Manager2</li> </ul> |

\*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.


|  |   |   |   |  |
|--|---|---|---|--|
|  <p>14-mm dia.<br/>240 to 1,920 mm<br/>(23 to 191 beams)</p> <p>25-mm dia.<br/>240 to 1,920 mm<br/>(12 to 96 beams)</p> | <p><b>Detection capability</b></p> <p>14-mm dia./25-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/<br/>0.3 to 17 m</p> | <p><b>Sold separately</b></p> <ul style="list-style-type: none"> <li>• Free-Location Bracket (Intermediate Bracket)</li> <li>• Top/bottom Bracket (3types)</li> </ul> | <p><b>Connector</b></p>  | <ul style="list-style-type: none"> <li>Single/double-ended connector cable</li> <li>Cascading cable</li> <li>Reduced wiring connector</li> <li>Laser pointer</li> <li>Lamp</li> <li>Bluetooth communication unit</li> <li>SD Manager2</li> </ul> |
|--|---|---|---|--|

See **p.44** for details.


|  |   |  |  |  |
|--|---|--|--|--|
|  <p>14-mm dia.<br/>160 to 2,080 mm<br/>(15 to 207 beams)</p> <p>30-mm dia.<br/>190 to 2,510 mm<br/>(8 to 124 beams)</p> | <p><b>Detection capability</b></p> <p>14-mm dia./30-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/<br/>0.3 to 20 m</p> | <p><b>Accessory</b></p> <ul style="list-style-type: none"> <li>• Standard fixed Bracket</li> </ul>  <p><b>Sold separately</b></p> <ul style="list-style-type: none"> <li>• Standard adjustable bracket</li> <li>• Top/bottom adjustable bracket</li> <li>• Top/bottom adjustable bracket (for user-made mounting part)</li> </ul> | <p><b>Connector</b></p>  | <ul style="list-style-type: none"> <li>Single/double-ended connector cable</li> <li>Reduced wiring connector</li> <li>Laser pointer</li> <li>Spatter protection cover</li> </ul> |
|--|---|--|--|--|

See **p.73** for details.

|   |  |
|---|--|
|  <p>25-mm dia.<br/>185 to 1,105 mm<br/>(8 to 54 beams)</p> | <p><b>Detection capability</b></p> <p>25-mm dia.</p> <p><b>Beam gap</b></p> <p>20 mm</p> <p><b>Operating range</b></p> <p>0.2 to 7 m</p> |
|---|--|

|  |  |
|--|--|
|  <p>25-mm dia.<br/>185 to 2,065 mm<br/>(8 to 102 beams)</p> | <p><b>Detection capability</b></p> <p>25-mm dia.</p> <p><b>Beam gap</b></p> <p>20 mm</p> <p><b>Operating range</b></p> <p>0.2 to 7 m</p> |
|--|--|

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

|   |   |
|---|---|
|  <p>14-mm dia.<br/>245 to 1,271 mm<br/>(26 to 140 beams)</p> | <p><b>Detection capability</b></p> <p>14-mm dia. -</p> <p><b>Beam gap</b></p> <p>9 mm -</p> <p><b>Operating range</b></p> <p>0.2 to 9 m</p> |
|---|---|

\*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/](http://www.ia.omron.com/)

F3SJ

Search

# Safety Light Curtain Advanced type

# F3SG-RA

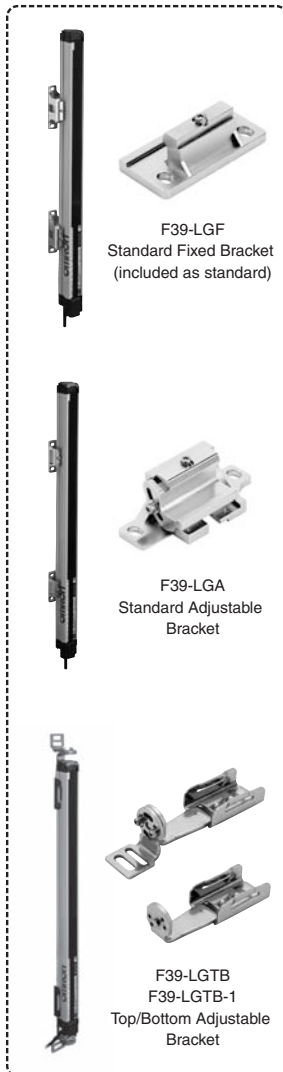
## Offers Both Durability and Reliability

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

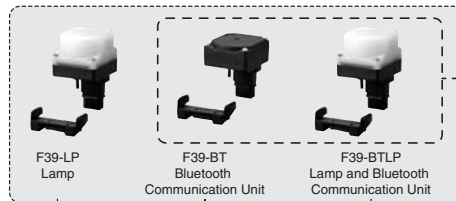


## System Configuration

### Mounting bracket

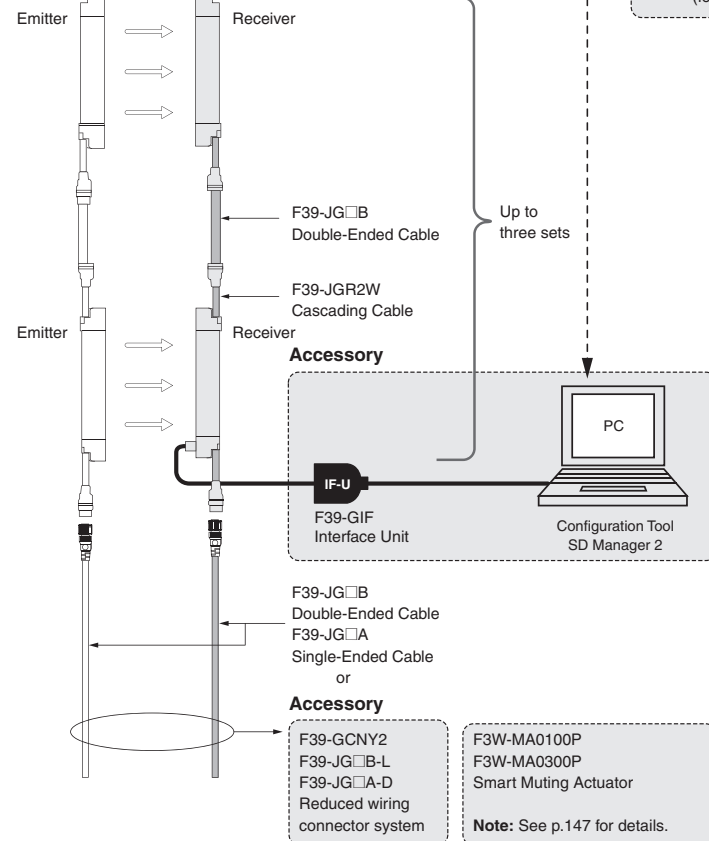
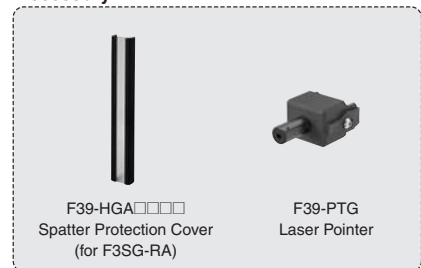


### Accessory



Bluetooth

### Accessory



### 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           |
|-----------------|------------------------|-----------------|
| 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<br>M12 connector<br>(5-pin), 5 wires<br>Color: Gray | 3 m  | Connected to Power Cable or Double-Ended Cable<br><br>Female <table border="1" data-bbox="922 385 1129 488"> <tr><td>1</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>2</td><td>TEST</td><td>Black</td></tr> <tr><td>3</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>4</td><td>Not used</td><td>White</td></tr> <tr><td>5</td><td>Not used</td><td>Yellow</td></tr> </table> | 1        | +24 VDC | Brown | 2       | TEST  | Black | 3      | 0 VDC | Blue | 4      | Not used | White | 5      | Not used | Yellow | F39-JG3A-L |       |   |       |      |   |     |     |            |
|   |   | 1  |   | +24 VDC  | Brown   |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   |   | 2  |   | TEST     | Black   |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   |   | 3  |   | 0 VDC    | Blue    |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   |   | 4  |   | Not used | White   |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   | 5   | Not used   | Yellow  |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   | 7 m   | F39-JG7A-L   |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   | 10 m  | F39-JG10A-L  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   | 15 m  | F39-JG15A-L  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   | 20 m  | F39-JG20A-L  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| For receiver<br>M12 connector<br>(8-pin), 8 wires<br>Color: Black                 | 3 m   | Connected to Power Cable or Double-Ended Cable<br><br>Female <table border="1" data-bbox="922 564 1129 712"> <tr><td>1</td><td>RESET</td><td>Yellow</td></tr> <tr><td>2</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>3</td><td>MUTE A</td><td>Gray</td></tr> <tr><td>4</td><td>MUTE B</td><td>Pink</td></tr> <tr><td>5</td><td>OSSD 1</td><td>Black</td></tr> <tr><td>6</td><td>OSSD 2</td><td>White</td></tr> <tr><td>7</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>8</td><td>AUX</td><td>Red</td></tr> </table> | 1   | RESET    | Yellow  | 2     | +24 VDC | Brown | 3     | MUTE A | Gray  | 4    | MUTE B | Pink     | 5     | OSSD 1 | Black    | 6      | OSSD 2     | White | 7 | 0 VDC | Blue | 8 | AUX | Red | F39-JG3A-D |
|   | 1   |  | RESET   | Yellow   |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   | 2   |  | +24 VDC   | Brown    |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   | 3   |  | MUTE A  | Gray     |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
|   | 4   |  | MUTE B  | Pink     |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| 5   | OSSD 1  | Black  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| 6   | OSSD 2  | White  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| 7   | 0 VDC   | Blue   |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| 8   | AUX   | Red  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| 7 m   | F39-JG7A-D  |  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| 10 m  | F39-JG10A-D   |  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| 15 m  | F39-JG15A-D   |  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |
| 20 m  | F39-JG20A-D   |  |   |          |         |       |         |       |       |        |       |      |        |          |       |        |          |        |            |       |   |       |      |   |     |     |            |






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

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

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

#### Double-Ended Cable \*

#### For cable extension and simple wiring

| Appearance  | Type   | Cable length | Specifications   | Model  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|---|--|--------------|--|--------|-------|---|------|---|-------|---|-------|---|--------|---|-------|---|------|---|-------|---|-------|---|--------|-------------|-------|---|-------|---|--------|---|-----|---|------|---|------|-------------|
|  | For emitter<br>M12 connector<br>(5-pin)<br>on both ends<br>Color: Gray   | 0.5 m        | Connected to Power Cable or Double-Ended Cable<br><br>Female <table border="1" data-bbox="817 1025 1098 1128"> <tr><td>1</td><td>Brown</td></tr> <tr><td>3</td><td>Blue</td></tr> <tr><td>2</td><td>Black</td></tr> <tr><td>4</td><td>White</td></tr> <tr><td>5</td><td>Yellow</td></tr> </table> Connected to Single-Ended Cable, or Double-Ended Cable<br><br>Male <table border="1" data-bbox="1018 1025 1098 1128"> <tr><td>1</td><td>Brown</td></tr> <tr><td>3</td><td>Blue</td></tr> <tr><td>2</td><td>Black</td></tr> <tr><td>4</td><td>White</td></tr> <tr><td>5</td><td>Yellow</td></tr> </table>   | 1      | Brown | 3 | Blue | 2 | Black | 4 | White | 5 | Yellow | 1 | Brown | 3 | Blue | 2 | Black | 4 | White | 5 | Yellow | F39-JGR5B-L |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 1            |  | Brown  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 3            |  | Blue   |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 2            |  | Black  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 4            |  | White  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 5            |  | Yellow |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 1            |  | Brown  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 3            |  | Blue   |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 2            |  | Black  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 4            |  | White  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 5   | Yellow   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 1 m   | F39-JG1B-L   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 3 m   | F39-JG3B-L   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 5 m   | F39-JG5B-L   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 7 m   | F39-JG7B-L   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 10 m  | F39-JG10B-L  |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 15 m  | F39-JG15B-L  |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 20 m  | F39-JG20B-L  |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   | For receiver<br>M12 connector<br>(8-pin)<br>on both ends<br>Color: Black | 0.5 m        | Connected to Power Cable or Double-Ended Cable<br><br>Female <table border="1" data-bbox="817 1258 1098 1429"> <tr><td>2</td><td>Brown</td></tr> <tr><td>7</td><td>Blue</td></tr> <tr><td>5</td><td>Black</td></tr> <tr><td>6</td><td>White</td></tr> <tr><td>1</td><td>Yellow</td></tr> <tr><td>8</td><td>Red</td></tr> <tr><td>3</td><td>Gray</td></tr> <tr><td>4</td><td>Pink</td></tr> </table> Connected to Single-Ended Cable, or Double-Ended Cable<br><br>Male <table border="1" data-bbox="1018 1258 1098 1429"> <tr><td>2</td><td>Brown</td></tr> <tr><td>7</td><td>Blue</td></tr> <tr><td>5</td><td>Black</td></tr> <tr><td>6</td><td>White</td></tr> <tr><td>1</td><td>Yellow</td></tr> <tr><td>8</td><td>Red</td></tr> <tr><td>3</td><td>Gray</td></tr> <tr><td>4</td><td>Pink</td></tr> </table> | 2      | Brown | 7 | Blue | 5 | Black | 6 | White | 1 | Yellow | 8 | Red   | 3 | Gray | 4 | Pink  | 2 | Brown | 7 | Blue   | 5           | Black | 6 | White | 1 | Yellow | 8 | Red | 3 | Gray | 4 | Pink | F39-JGR5B-D |
|   |  | 2            |  | Brown  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 7            |  | Blue   |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 5            |  | Black  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 6            |  | White  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 1            |  | Yellow |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 8            |  | Red    |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 3            |  | Gray   |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 4            |  | Pink   |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
|   |  | 2            |  | Brown  |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 7   | Blue   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 5   | Black  |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 6   | White  |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 1   | Yellow   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 8   | Red  |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 3   | Gray   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 4   | Pink   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 1 m   | F39-JG1B-D   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 3 m   | F39-JG3B-D   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 5 m   | F39-JG5B-D   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 7 m   | F39-JG7B-D   |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 10 m  | F39-JG10B-D  |              |  |        |       |   |      |   |       |   |       |   |        |   |       |   |      |   |       |   |       |   |        |             |       |   |       |   |        |   |     |   |      |   |      |             |
| 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.

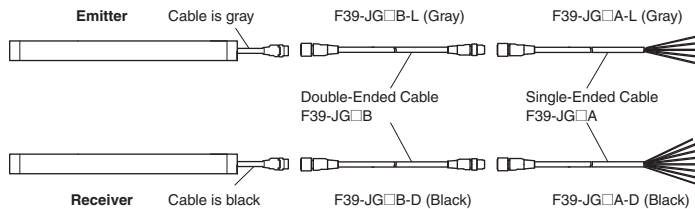
Model: Model number without the -L/-D at the end (F39-JG□B)

**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.


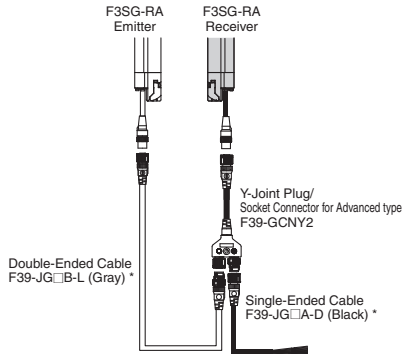
Example: To extend the cable length to 50 m, connect two F39-JG20B (20 m) cables and one F39-JG10A (10 m) cable.

#### <Connection example>




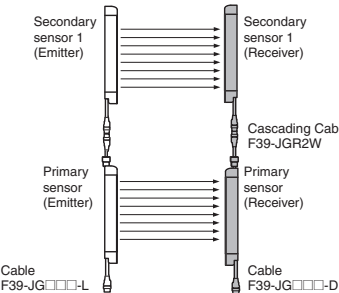


**Y-Joint Plug/Socket Connector for F3SG-4RA□□□□-14/-4RA□□□□-30**  
**For reduced wiring**

| Appearance  | Type                                     | Cable length | Specifications   | Model            |
|---|--|--------------|--|------------------|
|  | M12 connectors. Used for reduced wiring. | 0.5 m        |  | <b>F39-GCNY2</b> |

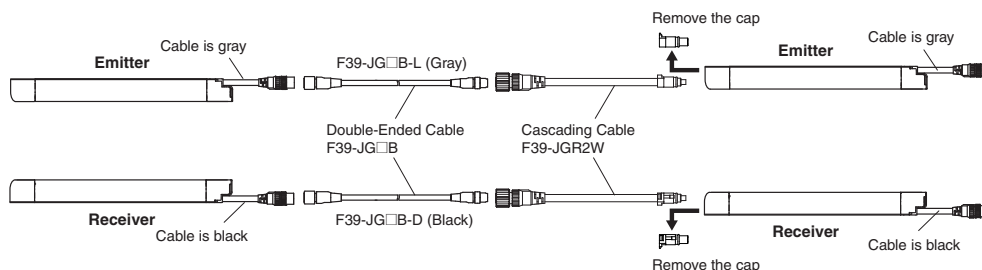
\* Order the cable for emitter (end of model: -L) and the cable for receiver (end of model: -D).

**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)<br>Receiver cable: Cap (8-pin), M12 connector (8-pin) | 0.2 m        |  | <b>F39-JGR2W</b> |

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

**<Connection example>**



## Sensor Mounting Brackets

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

\*1. [for F3SG-4RA□□□□-14]

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

[for F3SG-4RA□□□□-30]

- Protective height of 0190 to 1230: 2 sets, Protective height of 1310 to 2270: 3 sets, Protective height of 2350 to 2510: 4 sets

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

Using Top/Bottom Adjustable Brackets with Standard Adjustable Brackets

F3SG-4RA□□□□-14: Protective height of 1040 or less: The Standard Adjustable Bracket is not required. Please purchase 1 set of Top/Bottom Adjustable Brackets (F39-LGTB(-1)).

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




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

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


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

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


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

| Appearance  | Type                         | Specifications  | Model          |
|---|------------------------------|---|----------------|
|  | SD Manager 2                 | The Configuration Tool SD Manager 2 is available to download from our website at <a href="http://www.ia.omron.com/f3sg-r_tool">http://www.ia.omron.com/f3sg-r_tool</a> .<br>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<br><br>Accessories:<br>0.3-m Dedicated Cable 1 (1),<br>2-m Dedicated Cable 2 (1),<br>Instruction Manual  | <b>F39-GIF</b> |
|  | Bluetooth Communication Unit | F39-BT bluetooth unit to enable bluetooth on the F3SG-RA<br><br>IP67 rated when mated.  | <b>F39-BT</b>  |


**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.   | <b>F39-LP</b>   |
|  | Lamp and Bluetooth Communication Unit | The lamp can indicate red, orange, and green colors, to which three different states can be assigned.<br><br>IP67 rated when mated. | <b>F39-BTLP</b> |

**End Cap**

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

**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. | <b>F39-PTG</b> |




# F3SG-RA

## 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<br>F3SG-2RA□□□□-14  | F3SG-4RA□□□□-30<br>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<br>14-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  |  |                             |
|  | Protective Height  | 160 to 2080 mm (6.3 to 81.9 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<br>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.<br>Refer to page 25 for the one segment system. Refer to <i>Safety Light Curtain F3SG-R Series User's Manual (ManNo.: Z352)</i> for cascaded connection.<br>*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.   |   |  |                             |
| 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.)<br>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<br>Leakage current of 1 mA max. (PNP), 2 mA max. (NPN) *2<br><br>*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.<br>*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.)<br>Load current of 100 mA max., Residual voltage of 2 V max.  |   |  |                             |
| Output Operation Mode  | Safety Output  | Light-ON (Safety output is enabled when the receiver receives an emitting signal.)  |  |                             |
|  | Auxiliary Output   | Safety output (Inverted signal output:Enable) (default) (Configurable by Configuration Tool)  |  |                             |
| Input Voltage  | RESET (EDM)  | PNP<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 6.5 mA) *<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 8.0 mA) *<br>NPN<br>ON voltage: 0 to 3 V (short circuit current: approx. 8.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 6.5 mA) * |  |                             |
|  |  | MUTE A/B  | PNP<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 3.0 mA) *<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 5.0 mA) *<br>NPN<br>ON voltage: 0 to 3 V (short circuit current: approx. 5.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 3.0 mA) *  |                             |
|  | TEST   |   | 24 V Active<br>ON voltage: 9 V to Vs (short circuit current: approx. 2.5mA) *<br>OFF voltage: 0 to 3 V, or open (short circuit current: approx. 2.0 mA)<br>0 V Active<br>ON voltage: 0 to 3 V (short circuit current: approx. 2.0 mA)<br>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 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)  |   |  |                             |
| 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.<br>Total number of beams: 255 max.<br>Cable length between sensors: 10 m max.<br>(not including cascading cable (F39-JGR2W) and power cable)   |   |  |                             |
| Test Function  | Self-test (at power-on, and during operation)<br>External test (light emission stop function by test input)  |   |  |                             |
| Safety-Related Functions                                       | Interlock<br>External device monitoring (EDM)<br>Pre-reset<br>Fixed blanking/Floating blanking<br>Reduced resolution<br>Muting/Override<br>Scan code selection<br>PNP/NPN selection<br>Response time adjustment  |   |  |                             |

|                                |   |  | F3SG-4RA□□□□□-14<br>F3SG-2RA□□□□□-14   | F3SG-4RA□□□□□-30<br>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<br>Sunlight: 10,000 lx max. on receiver surface   |                                      |
|                                | Degree of Protection (IEC 60529)                                |  | IP65 and IP67  |                                      |
|                                | Vibration Resistance (IEC 61496-1)                              |  | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: 5 to 150 Hz, Multiple amplitude of 7 mm, Acceleration of 1 G, 10 sweeps each in X, Y, and Z directions (no delay at resonant frequencies) |                                      |
|                                | Shock Resistance (IEC 61496-1)                                  |  | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: Acceleration of 15 G, Pulse duration of 6 ms, 100 shocks for each in X, Y, and Z directions (600 shocks in total)                         |                                      |
| 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  |                                      |
|                                |   | Minimum Bending Radius   | R5 mm  |                                      |
|                                | Extension cable<br>- Single-Ended Cable<br>- 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.  |                                      |
|                                |   | Minimum Bending Radius   | R36 mm   |                                      |
| Extension of Power Cable       |   | 100 m max.   |  |                                      |
| Material                       | Material  | Housing: Aluminum alloy<br>Cap: PBT resin<br>Front window: Acrylic resin<br>Cable: Oil-resistant PVC resin<br>Standard Fixed Bracket (F39-LGF): Zinc alloy<br>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<br>* The quantity of Standard Fixed Brackets included varies depending on the protective height.<br>[F3SG-□RA□□□□□-14]<br>- Protective height of 0160 to 1200: 2 sets<br>- Protective height of 1280 to 2080: 3 sets<br>[F3SG-□RA□□□□□-30]<br>- Protective height of 0190 to 1230: 2 sets<br>- Protective height of 1310 to 2270: 3 sets<br>- Protective height of 2350 to 2510: 4 sets |  |                                      |
| Conformity                     | Conforming standards  |  | Refer to page 26.  |                                      |
|                                | Type of ESPE (IEC 61496-1)                                      |  | Type 4   |                                      |
|                                | Performance Level (PL)/Safety category                          | Type 4   | PL e/Category 4 (EN ISO 13849-1:2015)  |                                      |
|                                |   | Type 2   | PL c/Category 2 (EN ISO 13849-1:2015)  |                                      |
|                                | PFH <sub>0</sub>  |  | 1.1 × 10 <sup>-8</sup> (IEC 61508)   |                                      |
|                                | Proof test interval T <sub>M</sub>                              |  | Every 20 years (IEC 61508)   |                                      |
|                                | SFF   |  | 99% (IEC 61508)  |                                      |
|                                | HFT   |  | 1 (IEC 61508)  |                                      |
| Classification                 |   | Type B (IEC 61508-2)   |  |                                      |

## Bluetooth Communication Unit

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

\* It depends on use environment conditions.

## 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

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1. The F3SG-R does not receive type approval provided by Article 44-2 of the Industrial Safety and Health Act of Japan. When using the F3SG-R in Japan as a "safety system for pressing or shearing machines" prescribed in Article 42 of that law, the machine control system must receive type approval.
2. The F3SG-R is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Index Annex V, Item 2.
3. EU Declaration of Conformity  
OMRON declares that the F3SG-R is in conformity with the requirements of the following EU Directives:  
Machinery Directive 2006/42/EC  
EMC Directive 2014/30/EU
4. Conforming Standards
  - (1) European standards  
EN61496-1 (Type 4 and Type 2 ESPE), EN 61496-2 (Type 4 and Type 2 AOPD), EN61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), EN ISO 13849-1:2015 (PL e, Category 4 for Type 4 and PL c, Category 2 for Type 2)
  - (2) International standards  
IEC61496-1 (Type 4 and Type 2 ESPE), IEC61496-2 (Type 4 and Type 2 AOPD), IEC61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), ISO 13849-1:2015 (PL e, Category 4 for Type 4 and PL c, Category 2 for Type 2)
  - (3) JIS standards  
JIS B 9704-1 (Type 4 and Type 2 ESPE), JIS B 9704-2 (Type 4 and Type 2 AOPD)
  - (4) North American standards  
UL61496-1 (Type 4 and Type 2 ESPE), UL61496-2 (Type 4 and Type 2 AOPD), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
  - (5) Chinese standards  
GB/T 4584 (Specification of active opto-electronic protective devices for presses)
5. Third-Party Certifications
  - (1) TÜV SÜD
    - EC Type-Examination certificate:  
EU Machinery Directive, Type 4 and Type 2 ESPE (EN61496-1), Type 4 and Type 2 AOPD (EN 61496-2)
    - Certificate:  
Type 4 and Type 2 ESPE (EN61496-1), Type 4 and Type 2 AOPD (EN61496-2), EN 61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), EN ISO 13849-1:2015 (PL e, Category 4 for Type 4, and PL c, Category 2 for Type 2)
  - (2) UL
    - UL Listing:  
Type 4 and Type 2 ESPE (UL61496-1), Type 4 and Type 2 AOPD (UL61496-2), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
  - (3) China National Casting and Forging Machines Quality Supervision and Inspection Center
    - Certificate:  
GB/T 4584 (Specification of active opto-electronic protective devices for presses)
6. Other Standards  
The F3SG-R is designed according to the standards listed below. To make sure that the final system complies with the following standards and regulations, you are asked to design and use it in accordance with all other related standards, laws, and regulations. If you have any questions, consult with specialized organizations such as the body responsible for prescribing and/or enforcing machinery safety regulations in the location where the equipment is to be used.
  - European Standards: EN415-4, EN691-1, EN692, EN693, IEC 62046
  - U.S. Occupational Safety and Health Standards: OSHA 29 CFR 1910.212
  - U.S. Occupational Safety and Health Standards: OSHA 29 CFR 1910.217
  - American National Standards: ANSI B11.1 to B11.19
  - American National Standards: ANSI/RIA R15.06
  - Canadian Standards Association CSA Z142, Z432, Z434
  - SEMI Standards SEMI S2
  - Japan Ministry of Health, Labour and Welfare "Guidelines for Comprehensive Safety Standards of Machinery", Standard Bureau's Notification No. 0731001 dated July 31, 2007.rms and Conditions Agreement
  - Chinese National Standards: GB17120, GB27607

## Indicator

### Emitter

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

### Receiver

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

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

### Interface Unit

|                       |   |
|-----------------------|---|
| Main unit             | PC/AT compatible machine (computer that runs Microsoft Windows)                       |
| Operating system (OS) | Windows 7 (32-bit/64-bit), Windows 8, 8.1 (32-bit/64-bit), Windows 10 (32-bit/64-bit) |
| Communication port    | USB port ×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 <sup>2</sup> , 1000 shocks for all 3 axes                   |
| Degree of Protection | IP65 and IP67 (When attached to F3SG)                               |
| Type of Connection   | Connectable to F3SG-RA's terminal connector                         |
| Material             | Lighting element: PC, Other body parts: PBT                         |
| Weight               | 45 g (when packaged)  |

# F3SG-RA

## Connections (Basic Wiring Diagram)

### Standalone F3SG-RA using PNP Outputs

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

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

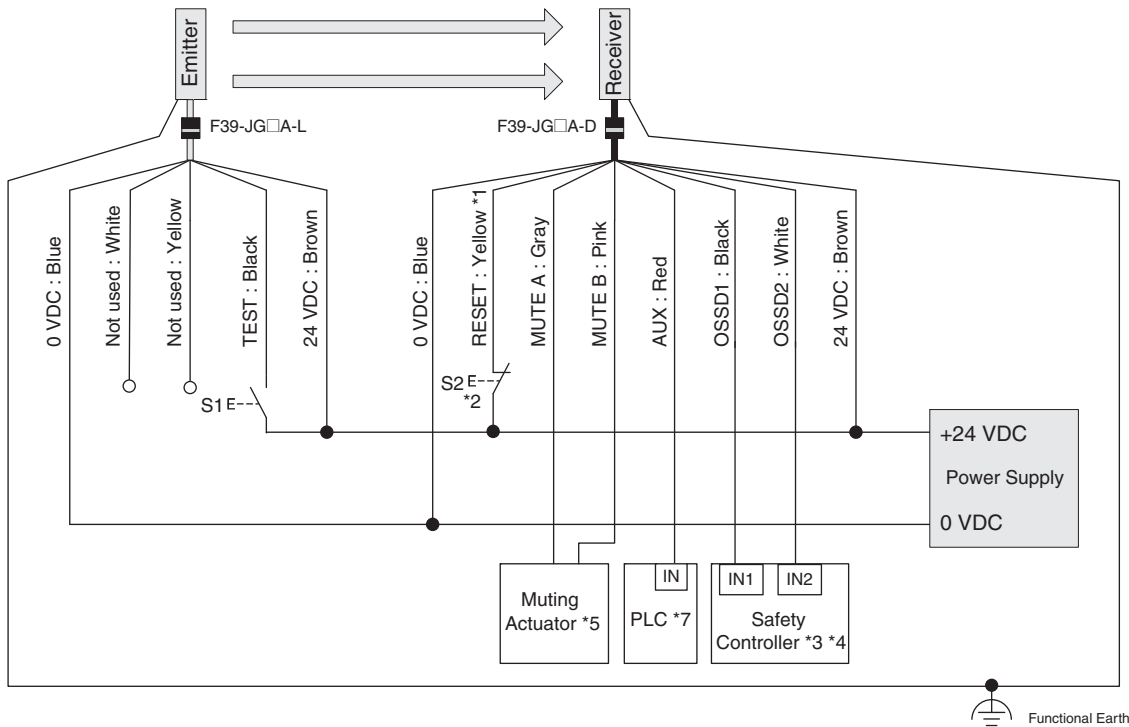
#### DIP Switch settings \*6

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

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

#### Wiring Example



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

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

\*1.Also used as Override input line.

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

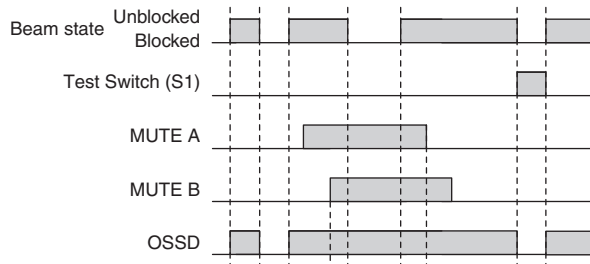
\*3.Refer to page 30 for more information.

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

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

\*6.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.

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



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

## Standalone F3SG-RA using NPN Outputs

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

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

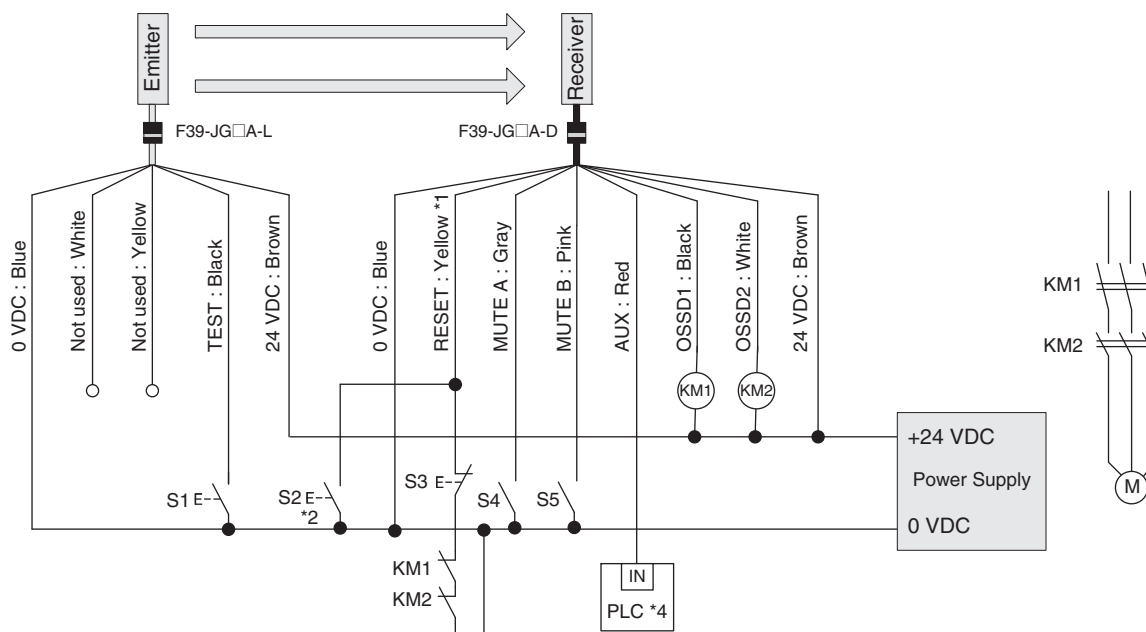
#### DIP Switch settings \*3

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

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

#### Wiring Example



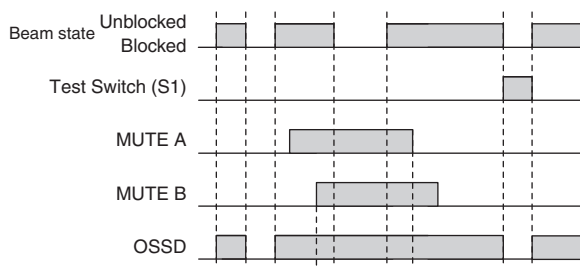
- S1: Test Switch (Connect the line to 24 V if this switch is not required)
- S2: Override Cancel Switch
- S3: Lockout Reset Switch or Override Switch
- S4, S5: Muting sensor
- KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
- M: Motor

\*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<br>G9SA-321-T□<br>G9SA-501<br>G9SB-200-B<br>G9SB-200-D<br>G9SB-301-B<br>G9SB-301-D<br>G9SE-201<br>G9SE-401<br>G9SE-221-T□ | G9SX-AD322-T<br>G9SX-ADA222-T<br>G9SX-BC202<br>G9SX-GS226-T15 | G9SP-N10S<br>G9SP-N10D<br>G9SP-N20S<br>NE0A-SCPU01<br>NE1A-SCPU01<br>NE1A-SCPU02<br>DST1-ID12SL-1<br>DST1-MD16SL-1<br>DST1-MRD08SL-1<br>NX-SIH400<br>NX-SID800<br>F3SP-T01 |

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

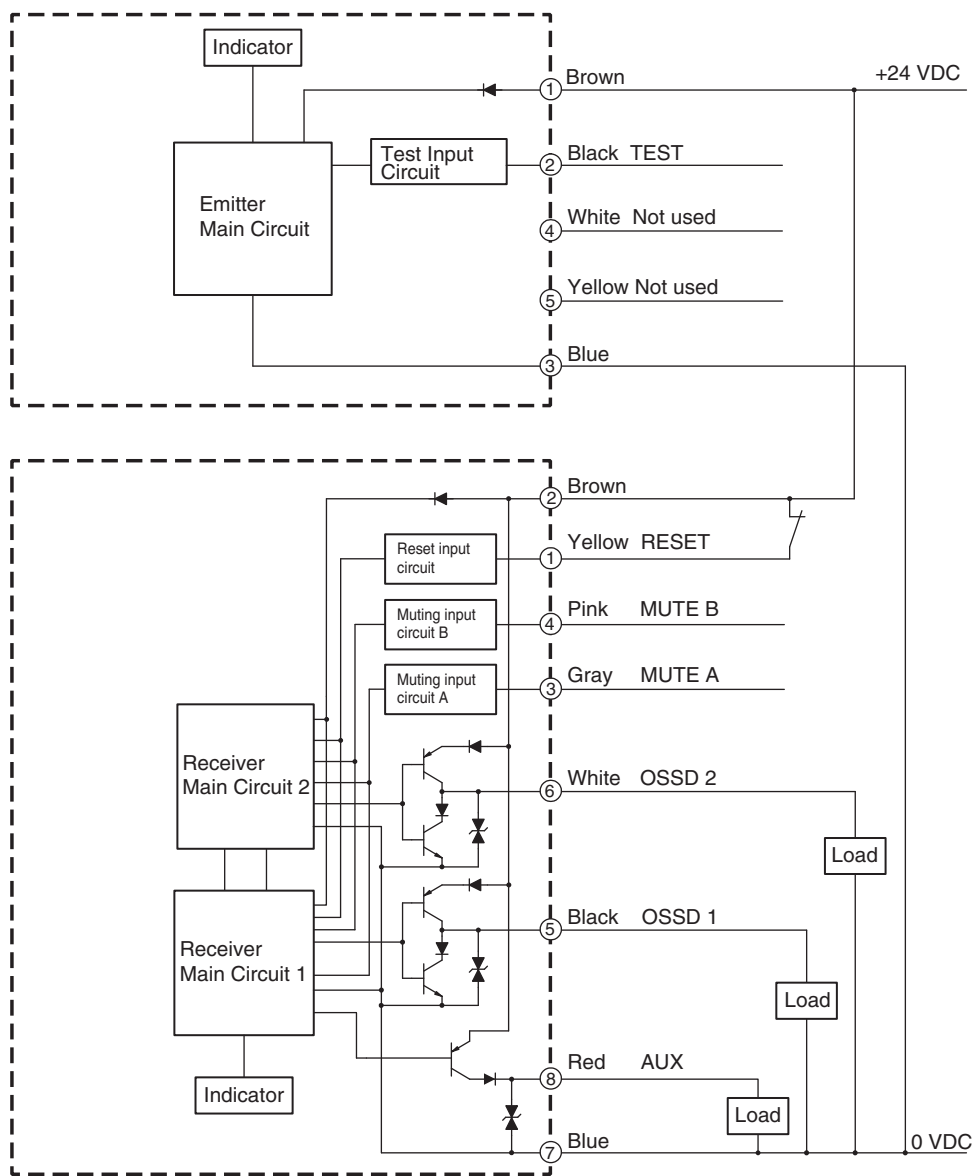
| Connectable Safety Control Units (NPN output) |
|---|
| Safety Relay Units                            |
| G9SA-301-P                                    |

# Input/Output Circuit

## Entire Circuit Diagram

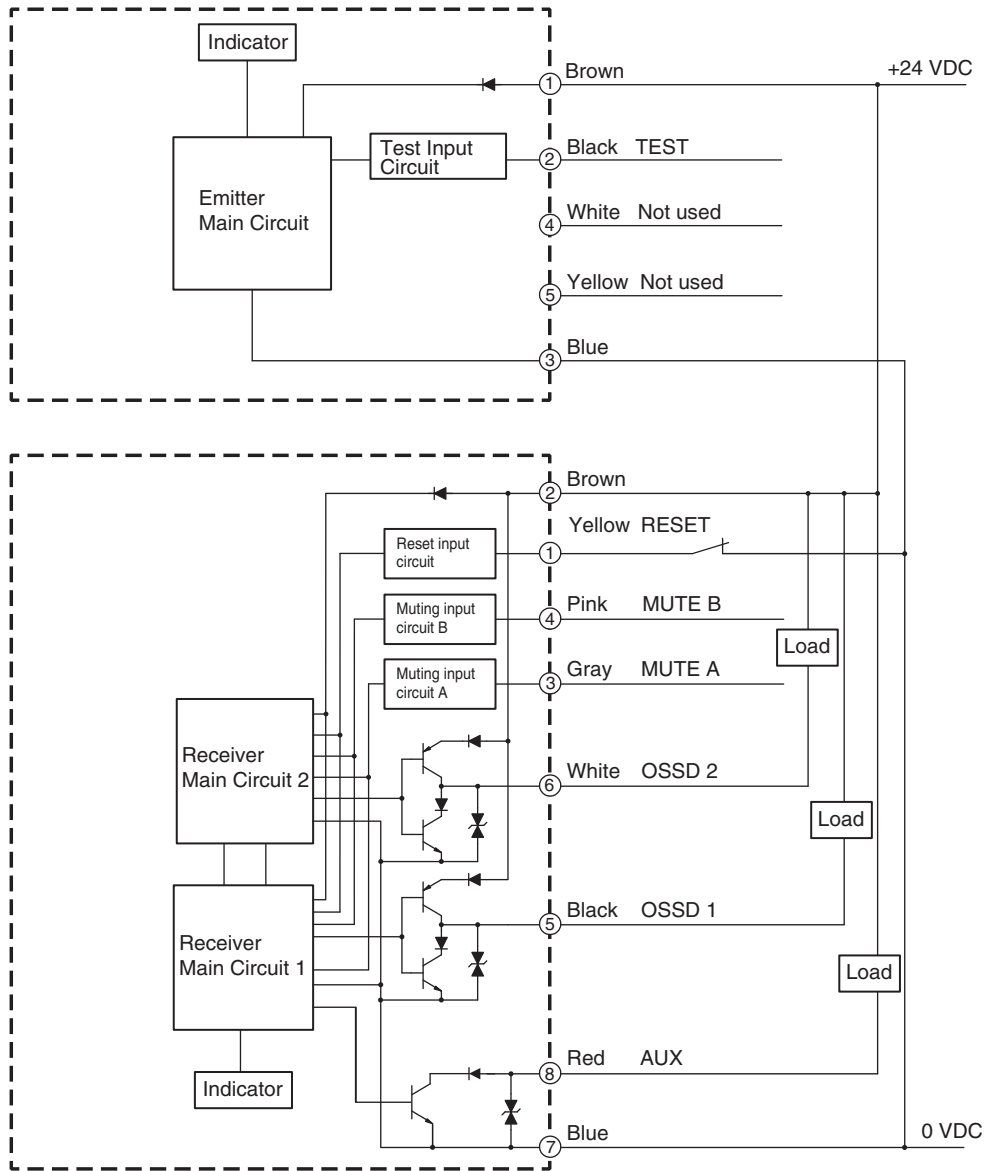
The entire circuit diagram of the F3SG-RA is shown below.  
The numbers in the circles indicate the connector's pin numbers.

## PNP Output



F3SG-RA

## NPN Output

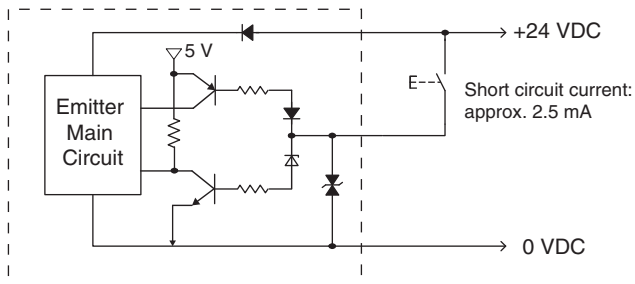


### Input Circuit Diagram by Function

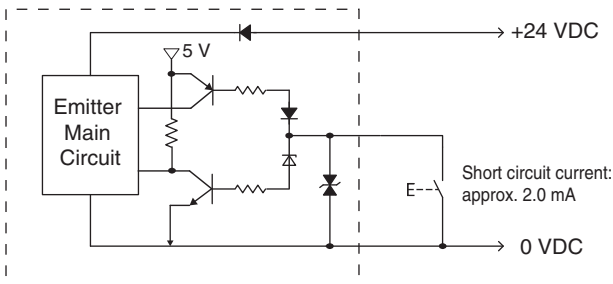
The input circuit diagrams of by function are shown below.

#### TEST

<24 V Active>

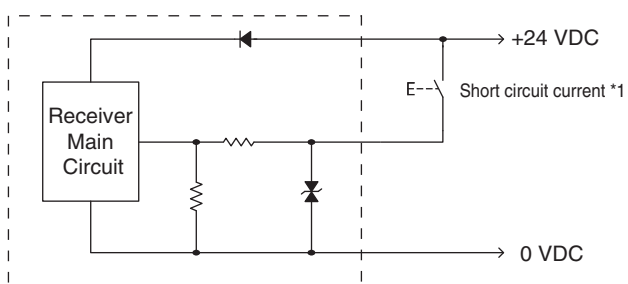


<0 V Active>



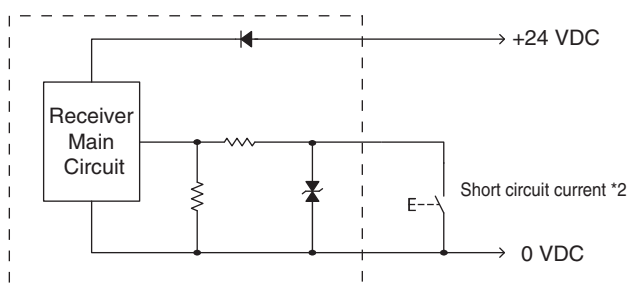
#### RESET/EDM, MUTE A/B

<PNP output>



\*1. Short circuit current: approx. 6.5 mA (RESET/EDM), approx. 3.0 mA (MUTE A/B)

<NPN output>

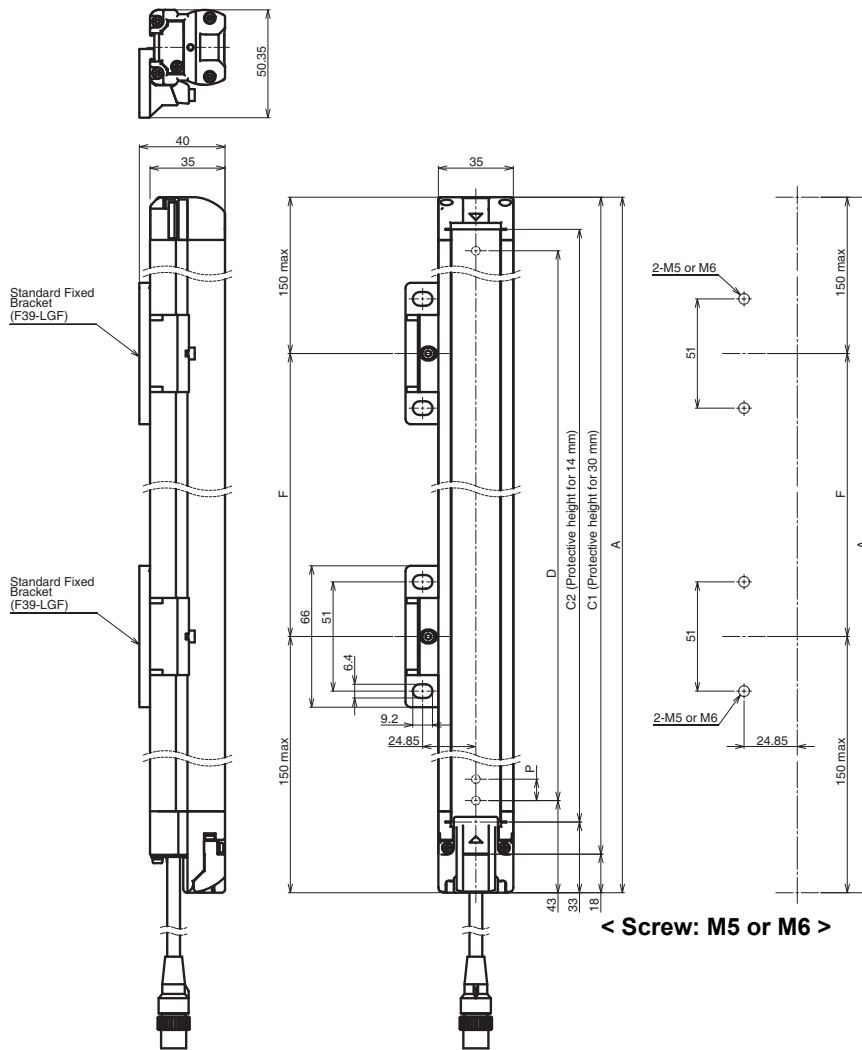


\*2. Short circuit current: approx. 8.0 mA (RESET/EDM), approx. 5.0 mA (MUTE A/B)



Mounted with Standard Fixed Brackets (F39-LGF)

Backside Mounting



F3SG-□RA□□□□-30 Series

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

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  |

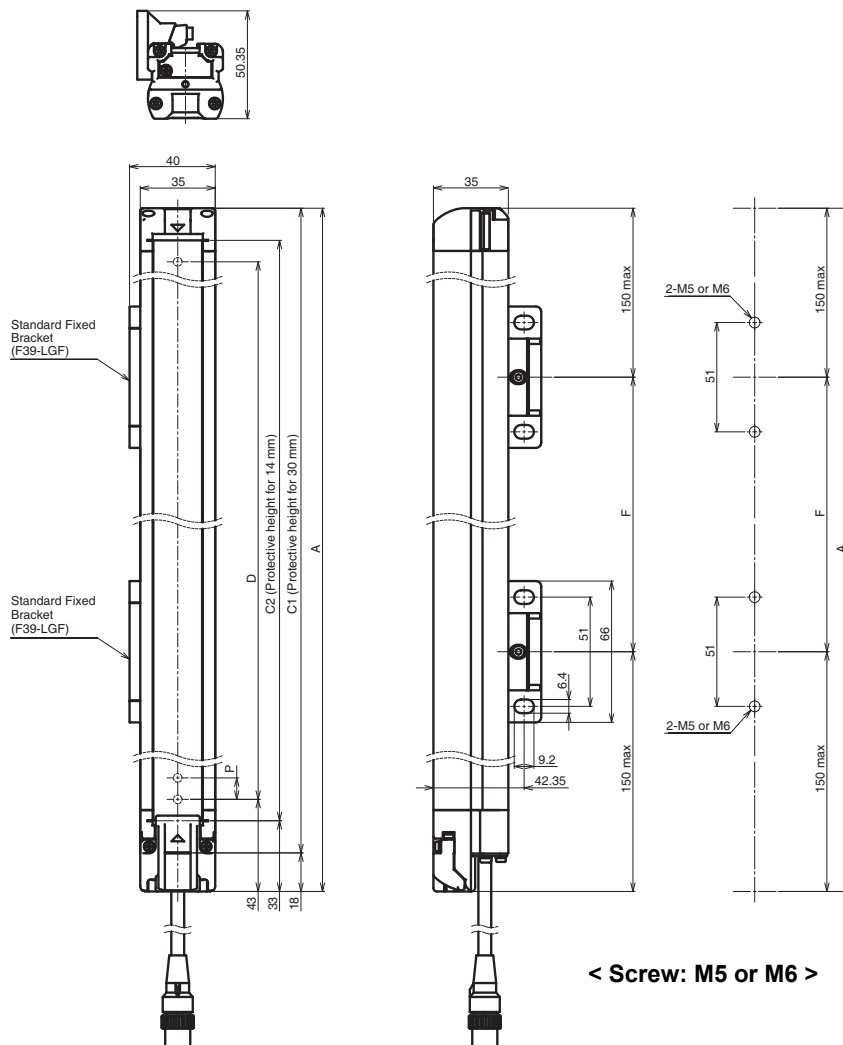
| Protective height (C1) | Number of Standard Fixed Brackets *1 | Dimension F  |
|------------------------|--------------------------------------|--------------|
| 0190 to 1230           | 2 *2                                 | 1000 mm max. |
| 1310 to 2270           | 3                             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

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  |

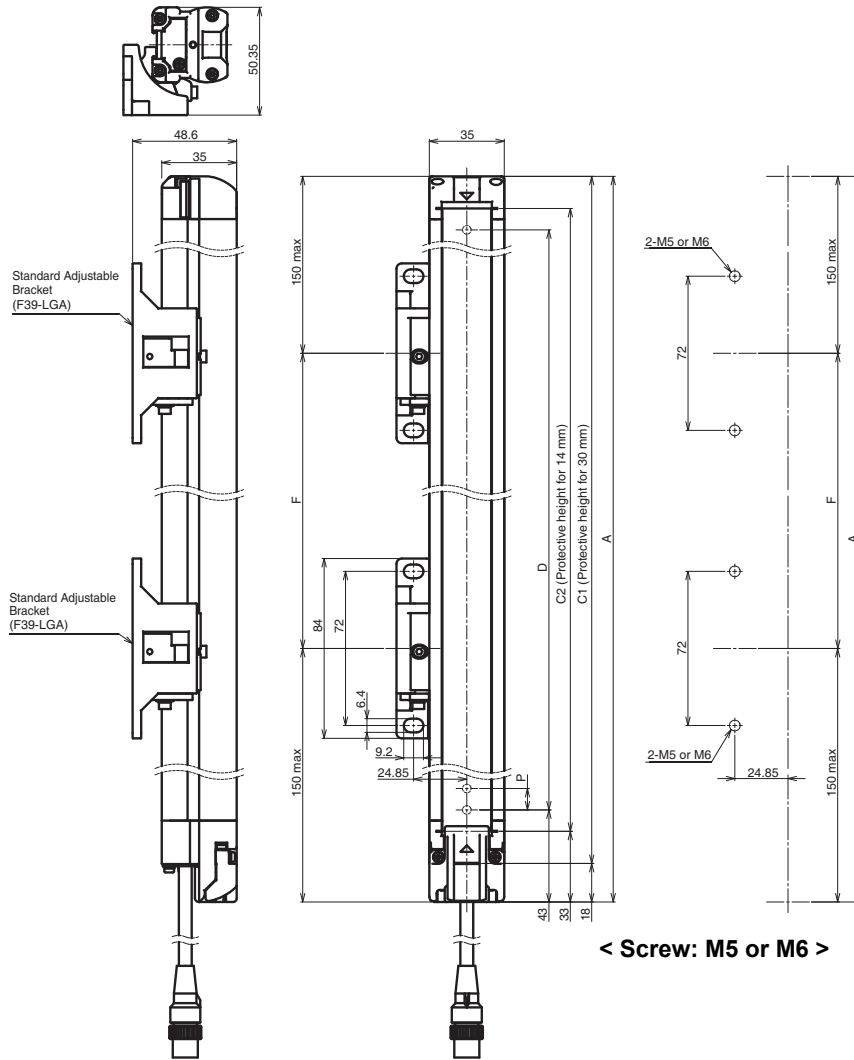
| Protective height (C1) | Number of Standard Fixed Brackets *1 | Dimension F  |
|------------------------|--------------------------------------|--------------|
| 0190 to 1230           | 2 *2                                 | 1000 mm max. |
| 1310 to 2270           | 3                             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

## 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<br>(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<br>(Protective height) |
| Dimension D  | C2-20  |
| Dimension P  | 10   |

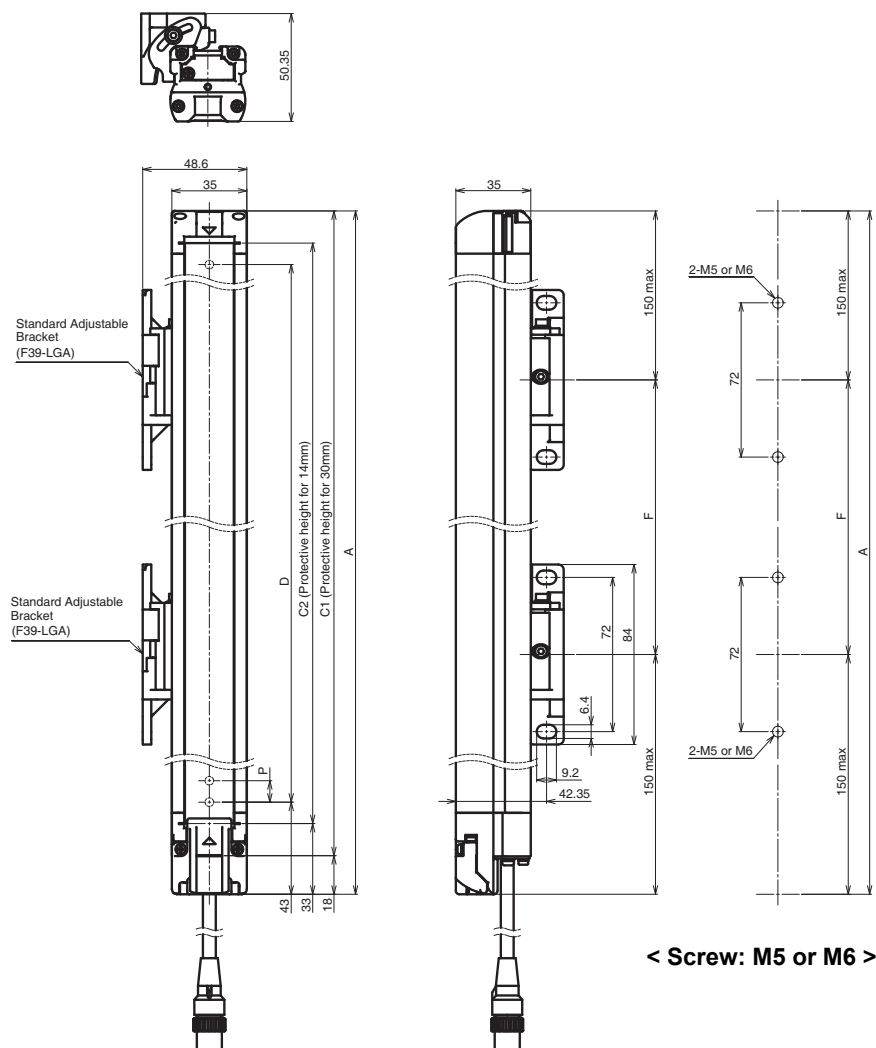
| Protective height (C1) | Number of Standard Adjustable Brackets *1 | Dimension F  |
|------------------------|---|--------------|
| 0190 to 1230           | 2 *2                                      | 1000 mm max. |
| 1310 to 2270           | 3   | 1000 mm max. |
| 2350 to 2510           | 4   | 1000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

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

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

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

Side Mounting



F3SG-□RA□□□□-30 Series

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

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

F3SG-□RA□□□□-14 Series

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

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

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

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

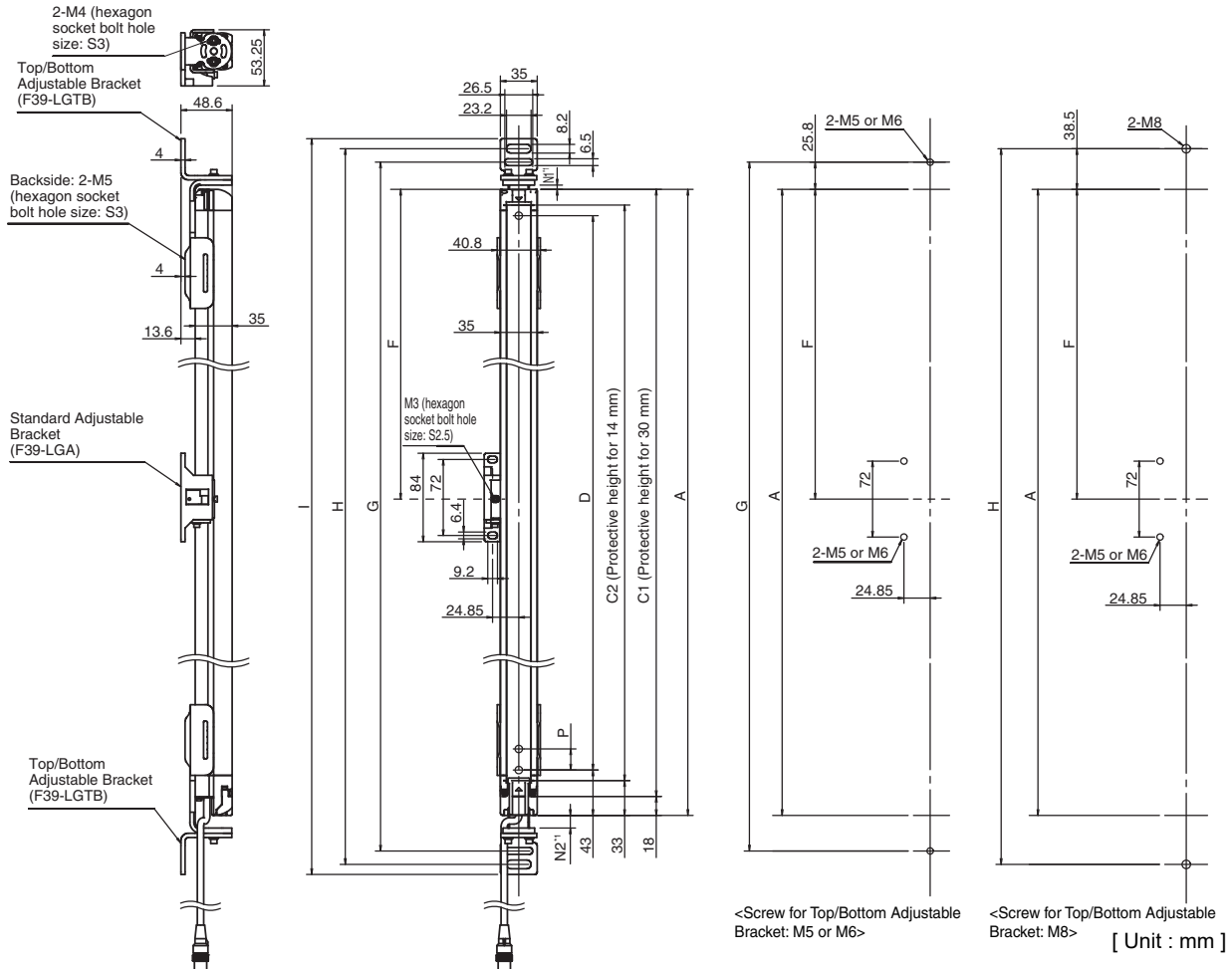
# F3SG-RA

## 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

|              | Optional accessory not connected                    | Optional accessory connected |             |                    |
|--------------|---|------------------------------|-------------|--------------------|
|              |   | F39-JGR2W                    | F39-BT      | F39-LP<br>F39-BTLP |
| Dimension A  | C1+18   | Same as on the left          |             |                    |
| Dimension C1 | 4-digit number of the type name (Protective height) | Same as on the left          |             |                    |
| Dimension D  | C1-50   | Same as on the left          |             |                    |
| Dimension G  | C1+N1+N2+61.5                                       | C1+N2+68.5                   | C1+N2+79    | C1+N2+90.5         |
| Dimension H  | C1+N1+N2+87   | C1+N2+94                     | C1+N2+104.5 | C1+N2+116          |
| Dimension I  | C1+N1+N2+106  | C1+N2+113                    | C1+N2+123.5 | C1+N2+135          |
| Dimension P  | 20  | Same as on the left          |             |                    |

\*1.N1 can be adjusted from 0 mm to 30 mm and N2 from 0 mm to 12 mm.

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

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

\*2.The Top/Bottom Adjustable Bracket is not useable together with the Standard Fixed Bracket. When it is necessary to use it with another bracket, only the combination with the Standard Adjustable Bracket is possible.

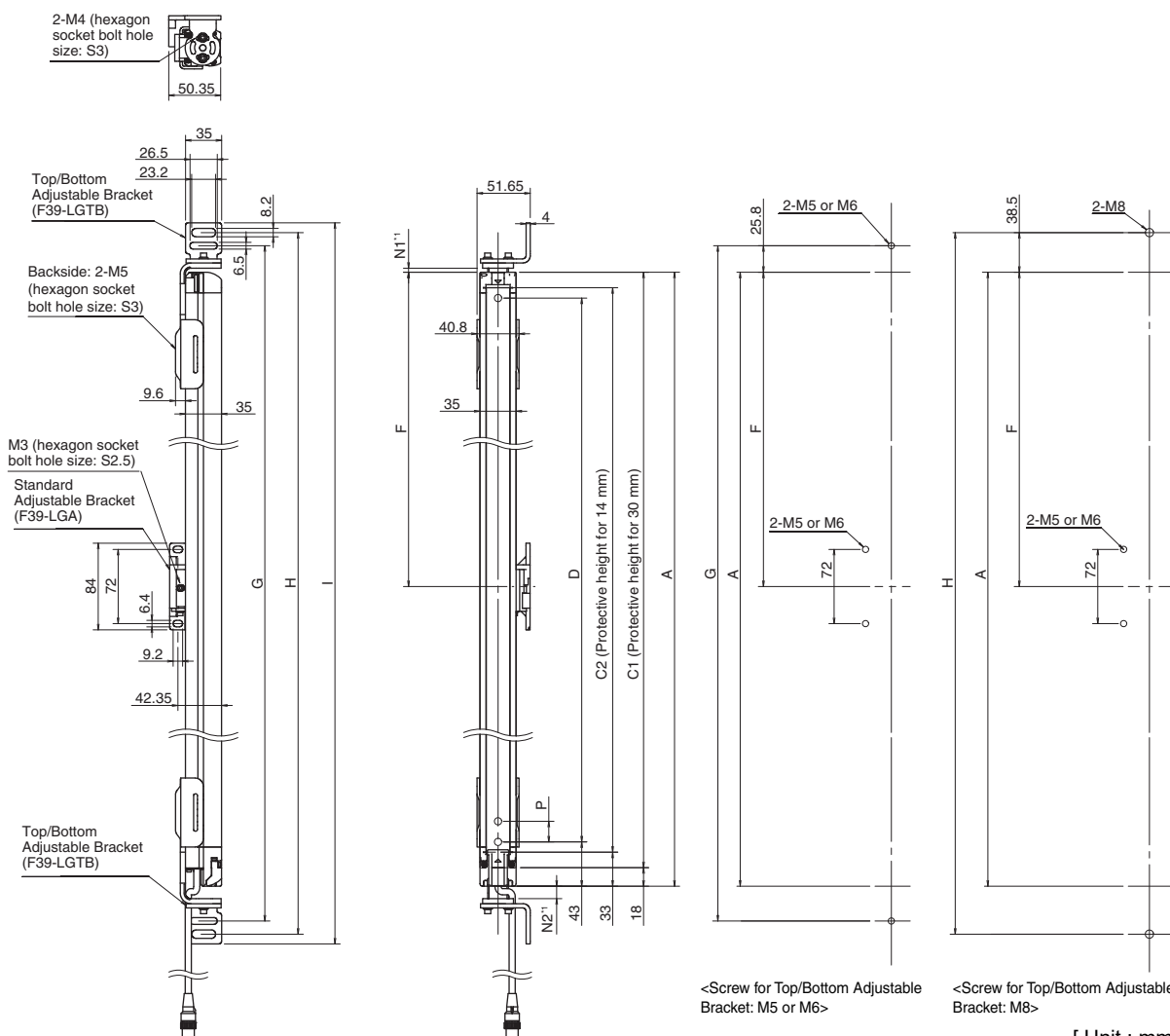
F3SG-□RA□□□□-14 Series

|              | Optional accessory not connected                    | Optional accessory connected |           |                    |
|--------------|---|------------------------------|-----------|--------------------|
|              |   | F39-JGR2W                    | F39-BT    | F39-LP<br>F39-BTLP |
| Dimension A  | C2+48   | Same as on the left          |           |                    |
| Dimension C2 | 4-digit number of the type name (Protective height) | Same as on the left          |           |                    |
| Dimension D  | C2-20   | Same as on the left          |           |                    |
| Dimension G  | C2+N1+N2+91.5                                       | C2+N2+98.5                   | C2+N2+109 | C2+N2+120.5        |
| Dimension H  | C2+N1+N2+117  | C2+N2+124                    | C2+N2+135 | C2+N2+146          |
| Dimension I  | C2+N1+N2+136  | C2+N2+143                    | C2+N2+154 | C2+N2+165          |
| Dimension P  | 10  | Same as on the left          |           |                    |

| Protective height (C2) | Number of Top/Bottom Adjustable Brackets *1 | Number of Standard Adjustable Brackets *1 *2 | 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



[ Unit : mm ]

F3SG-□RA□□□□-30 Series

|              | Optional accessory not connected                    | Optional accessory connected |             |                 |
|--------------|---|------------------------------|-------------|-----------------|
|              |   | F39-JGR2W                    | F39-BT      | F39-LP F39-BTLP |
| Dimension A  | C1+18   | Same as on the left          |             |                 |
| Dimension C1 | 4-digit number of the type name (Protective height) | Same as on the left          |             |                 |
| Dimension D  | C1-50   | Same as on the left          |             |                 |
| Dimension G  | C1+N1+N2+61.5                                       | C1+N2+68.5                   | C1+N2+79    | C1+N2+90.5      |
| Dimension H  | C1+N1+N2+87   | C1+N2+94                     | C1+N2+104.5 | C1+N2+116       |
| Dimension I  | C1+N1+N2+106  | C1+N2+113                    | C1+N2+123.5 | C1+N2+135       |
| Dimension P  | 20  | Same as on the left          |             |                 |

\*1. N1 can be adjusted from 0 mm to 30 mm and N2 from 0 mm to 12 mm.

| Protective height (C1) | Number of Top/Bottom Adjustable Brackets*1 | Number of Standard Adjustable Brackets *1 *2 | 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

|              | Optional accessory not connected                    | Optional accessory connected |           |                 |
|--------------|---|------------------------------|-----------|-----------------|
|              |   | F39-JGR2W                    | F39-BT    | F39-LP F39-BTLP |
| Dimension A  | C2+48   | Same as on the left          |           |                 |
| Dimension C2 | 4-digit number of the type name (Protective height) | Same as on the left          |           |                 |
| Dimension D  | C2-20   | Same as on the left          |           |                 |
| Dimension G  | C2+N1+N2+91.5                                       | C2+N2+98.5                   | C2+N2+109 | C2+N2+120.5     |
| Dimension H  | C2+N1+N2+117  | C2+N2+124                    | C2+N2+135 | C2+N2+146       |
| Dimension I  | C2+N1+N2+136  | C2+N2+143                    | C2+N2+154 | C2+N2+165       |
| Dimension P  | 10  | Same as on the left          |           |                 |

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

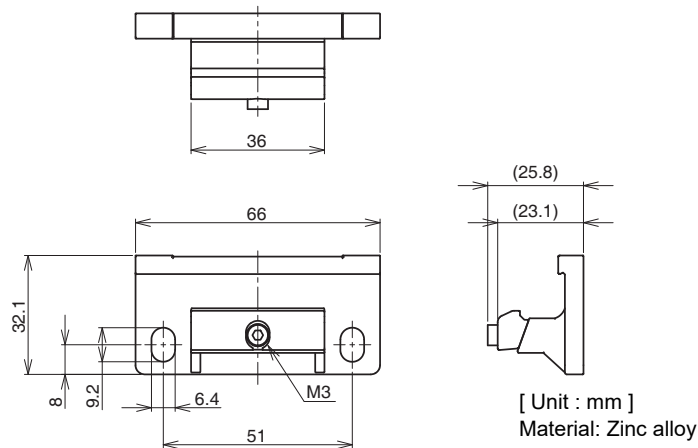
\*1.The number of brackets required to mount either one of emitter and receiver.

\*2.The Top/Bottom Adjustable Bracket is not useable together with the Standard Fixed Bracket. When it is necessary to use it with another bracket, only the combination with the Standard Adjustable Bracket is possible.

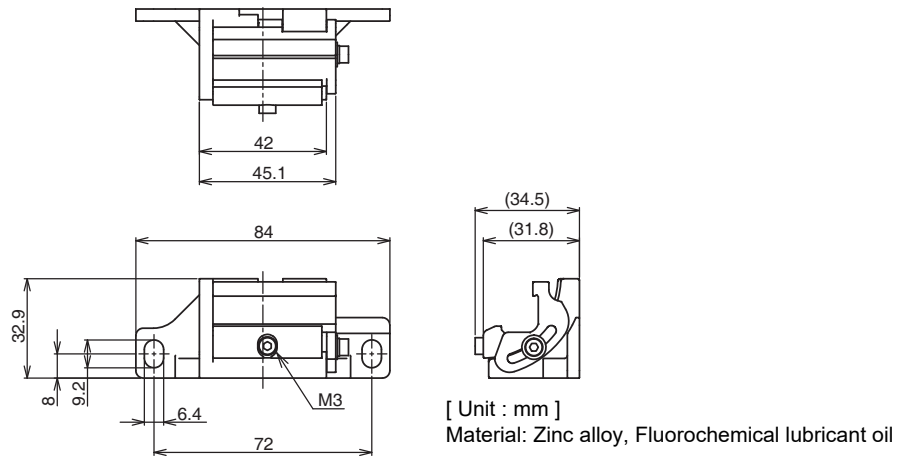
## Accessories

### Sensor Mounting Brackets

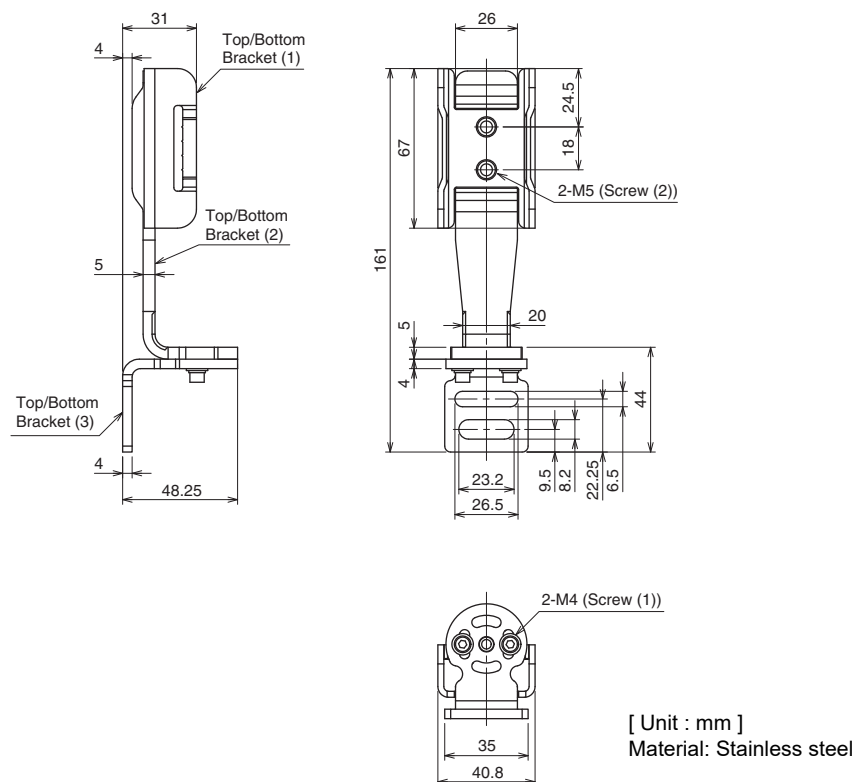
#### Standard Fixed Bracket (F39-LGF)



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

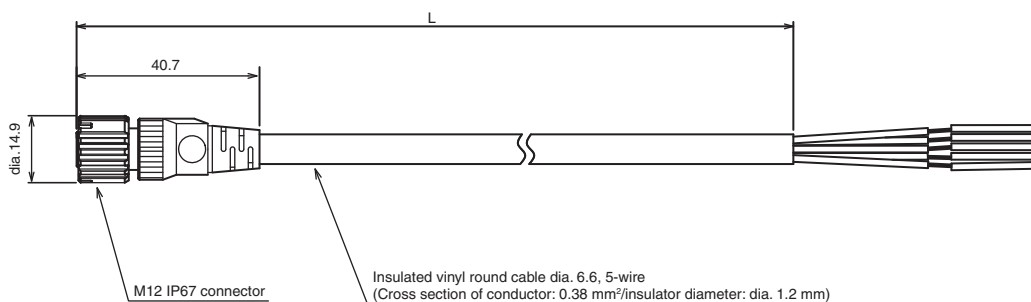


#### Top/Bottom Adjustable Bracket (F39-LGTB, sold separately)

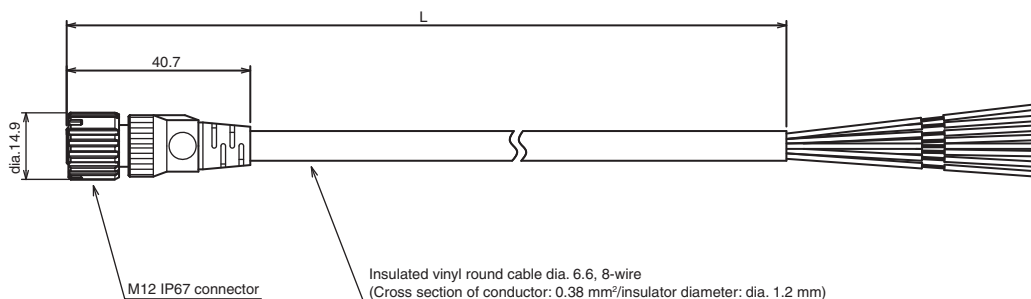


Safety light curtain connecting cable

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

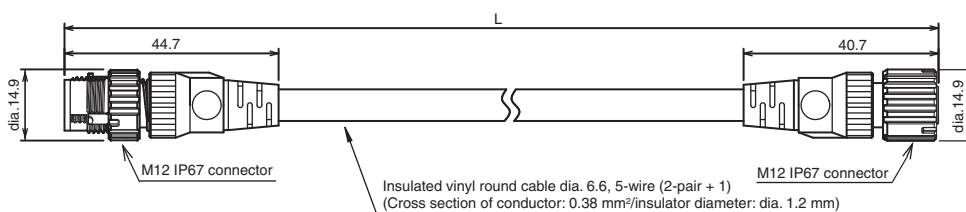


Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)

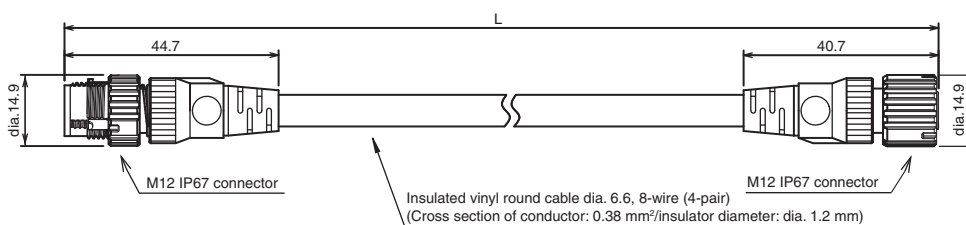


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JG3A-L           | F39-JG3A-D             | 3     |
| F39-JG7A-L           | F39-JG7A-D             | 7     |
| F39-JG10A-L          | F39-JG10A-D            | 10    |
| F39-JG15A-L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

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

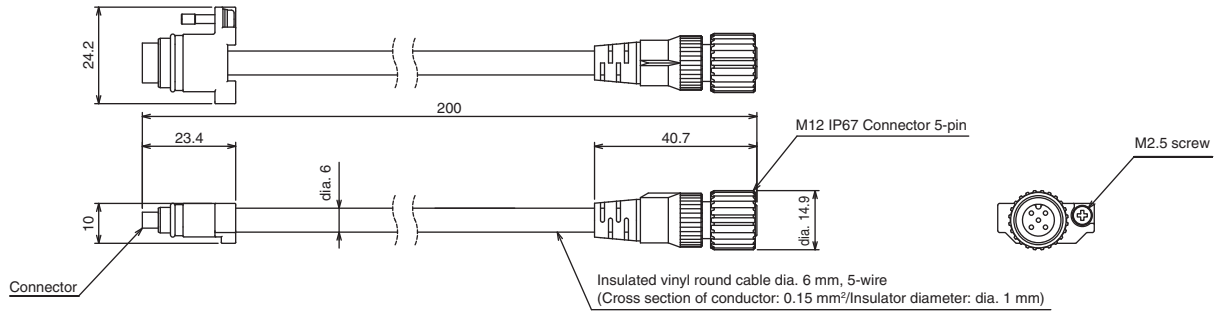


Double-Ended Cable for Receiver: Cable for extension (F39-JG□B-D, sold separately)

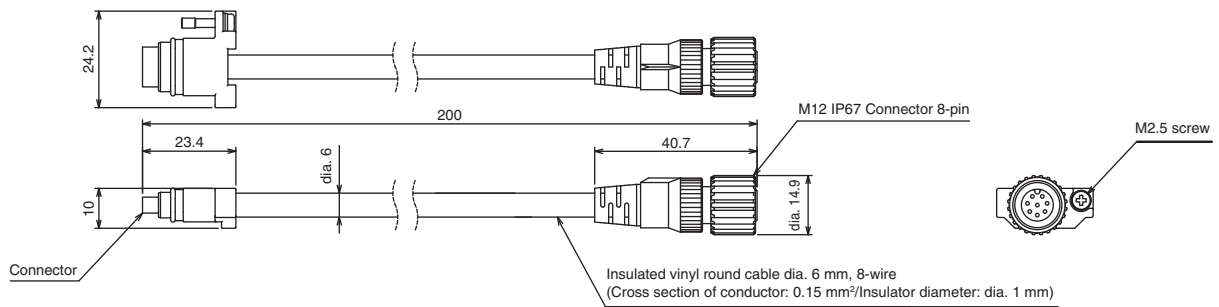


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JGR5B-L          | F39-JGR15B-D           | 0.5   |
| F39-JG1B-L           | F39-JG1B-D             | 1     |
| F39-JG3B-L           | F39-JG3B-D             | 3     |
| F39-JG5B-L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

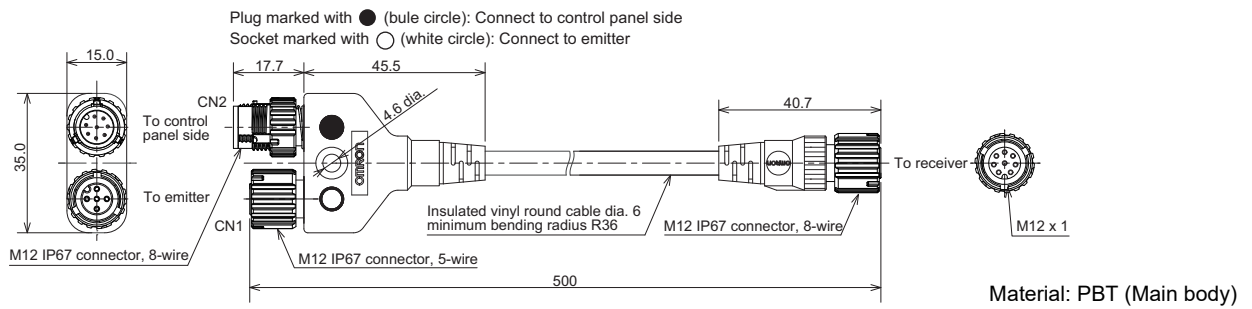
## Cascading Cable for Emitter (F39-JGR2W-L, sold separately)



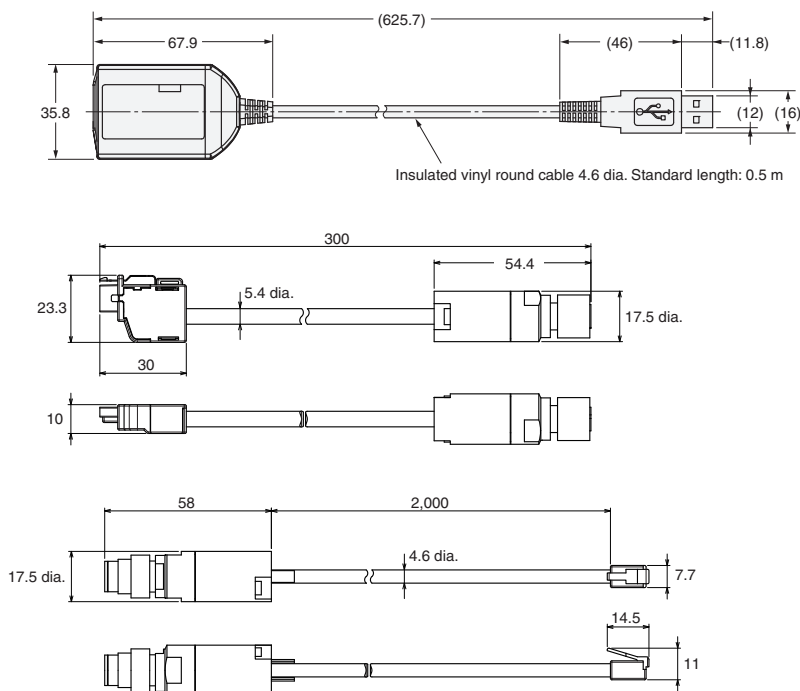
## Cascading Cable for Receiver (F39-JGR2W-D, sold separately)



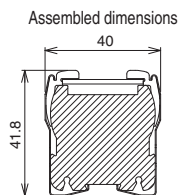
## Y-Joint Plug/Socket Connector (F39-GCNY2, sold separately)



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



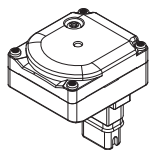
**Spatter Protection Cover (F39-HGA, sold separately)**



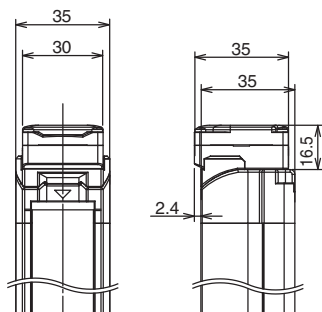
| Model       | Total length |
|-------------|--------------|
| F39-HGA□□□□ | □□□□+4       |
| F39-HGA0550 | 558          |

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

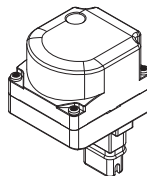
**Bluetooth Communication Unit (F39-BT, sold separately)**



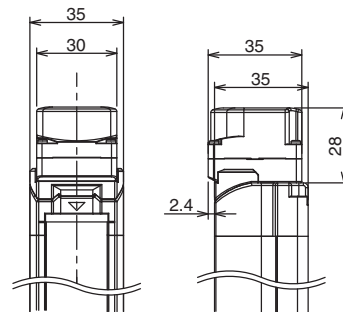
Material: PBT



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



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



**Related Manuals**

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



# Safety Light Curtain Robust type

# F3SG-RR

## Enhanced Cutting Oil Resistance

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

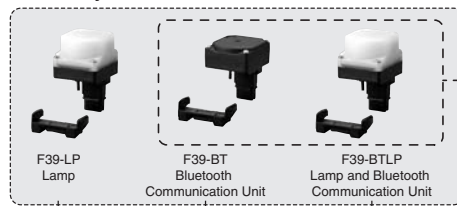


## System Configuration

### Mounting bracket

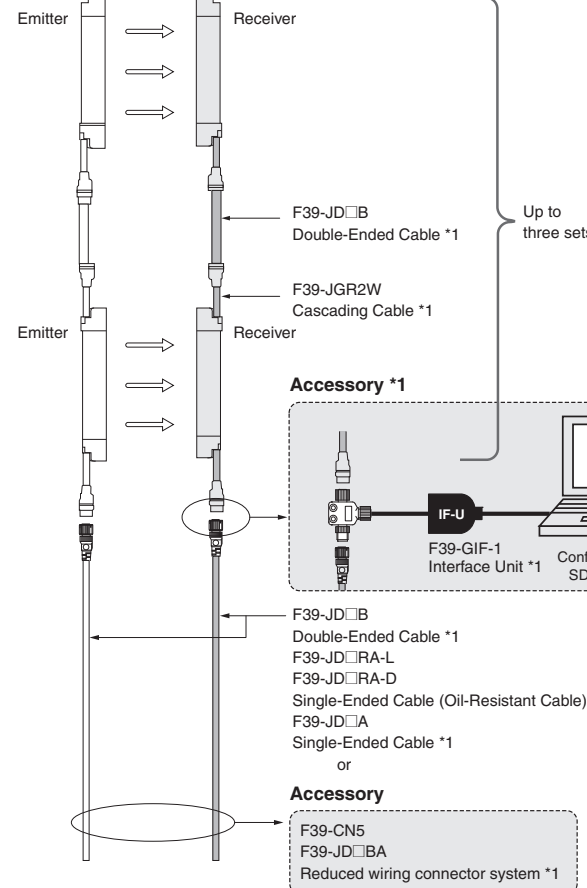


### Accessory \*1

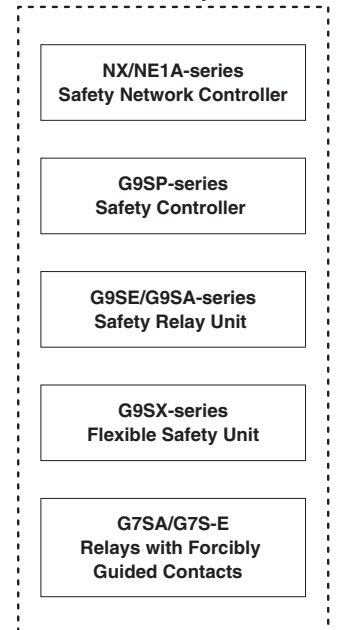


Bluetooth

### Accessory



### Recommended safety controller \*2



\*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


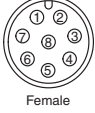
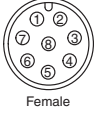
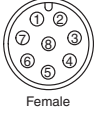
| Number of beams | Protective height (mm) | Model           |
|-----------------|------------------------|-----------------|
| 23              | 240                    | F3SG-4RR0240-14 |
| 31              | 320                    | F3SG-4RR0320-14 |
| 39              | 400                    | F3SG-4RR0400-14 |
| 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)

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

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

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


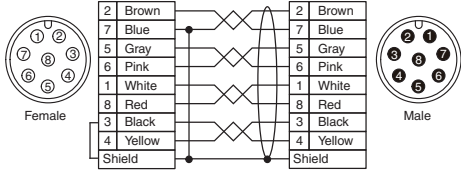
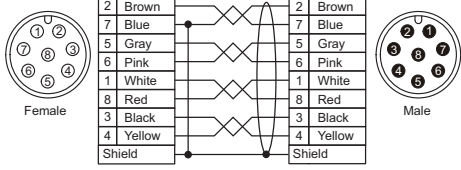
| Appearance  | Cable length  | Specifications  | Model    |        |          |       |         |         |       |        |      |        |        |          |      |                    |          |      |                    |          |      |       |       |     |           |          |  |      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

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

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

**Note:** 1. Use the F39-JD□RA-L/-D for applications where cutting oil resistance is required.  
2. To extend the cable length to more than 20 m, add the F39-JD□B Double-Ended Cable.

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

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

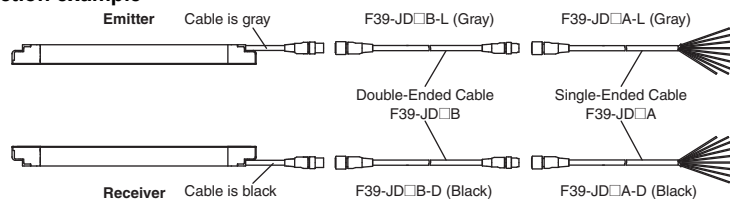
Double-Ended Cable for Emitter: F39-JD□B-L, Double-Ended Cable for Receiver: F39-JD□B-D

**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>**



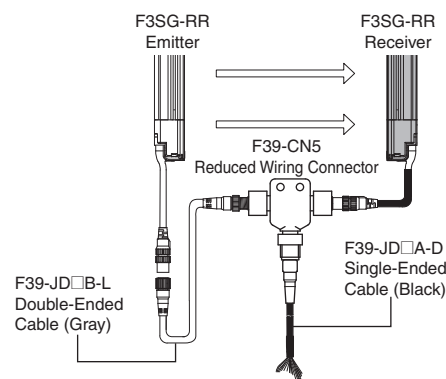
**Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)**  
**Reduced Wiring Connector**

| Appearance  | Specifications  | Model   |
|---|---|---------|
|  | IP67* rated when mated.<br>* 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)**


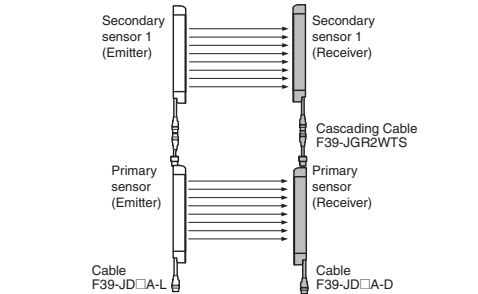
| Appearance  | Cable length                    | Specifications  | Remarks  | Model        |
|---|---------------------------------|---|--|--------------|
|  | Emitter: 3 m<br>Receiver: 3 m   | IP67* rated when mated.<br>* When the accessory is used, protect it from cutting oil. | Double-Ended Cable: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

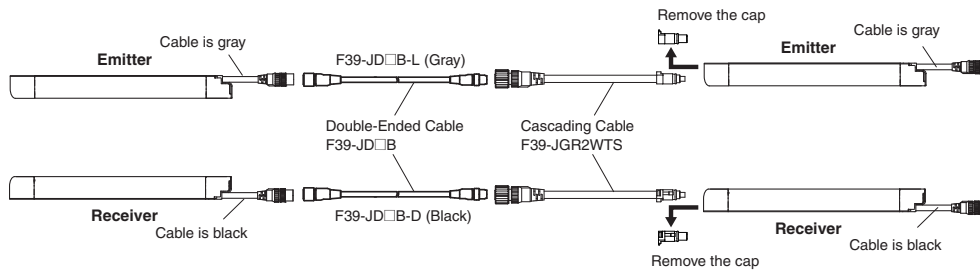
\* Double-Ended Cable for emitter and Single-Ended Cable for receiver.

# F3SG-RR





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

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

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



## Sensor Mounting Brackets

| Appearance  | Specifications                               | Application   | Model              |
|---|--|---|--------------------|
|  | Free-Location Bracket (Intermediate Bracket) | Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$ . Side mounting and backside mounting possible. (Sold separately as a set of 2 brackets. Refer to note *1 for the number of sets required for each model.)   | <b>F39-LGRA</b>    |
|  | Top/Bottom Bracket *2                        | Use this bracket at the top and bottom positions of the F3SG-RR. Beam alignment after mounting possible. The angle adjustment range is $\pm 22.5^\circ$ . Side mounting and backside mounting possible. (Sold separately as a set of 4 brackets.) | <b>F39-LGRTB</b>   |
|  | 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.) | <b>F39-LGRTB-2</b> |
|  | Top/Bottom Bracket *2                        | Select a bracket that fit into the existing mounting hole.  | <b>F39-LGRTB-3</b> |




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

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

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




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

| Appearance  | Type                         | Specifications  | Model            |
|---|------------------------------|---|------------------|
|  | SD Manager 2                 | The Configuration Tool SD Manager 2 is available to download from our website at <a href="http://www.ia.omron.com/f3sg-r_tool">http://www.ia.omron.com/f3sg-r_tool</a>  | -                |
|  | Interface Unit               | F39-GIF-1 interface unit to connect the F3SG-RR receiver to a USB port of the PC<br><br>Accessories:<br>F39-CN1 Branch Connector (1),<br>Connector Cap (1),<br>2-m Dedicated Cable (1),<br>Instruction Manual | <b>F39-GIF-1</b> |
|  | Bluetooth Communication Unit | F39-BT bluetooth unit to enable bluetooth on the F3SG-RR<br><br>IP67 rated when mated.  | <b>F39-BT</b>    |


\* 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. | <b>F39-LP</b>   |
|  | Lamp and Bluetooth Communication Unit | IP67 rated when mated.   | <b>F39-BTLP</b> |

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


**End Cap \*1 \*2**

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

\*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. | <b>F39-PTG</b> |

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

**Test Rod**

| Diameter   | Model            |
|------------|------------------|
| 14 mm dia. | <b>F39-TRD14</b> |
| 25 mm dia. | <b>F39-TRD25</b> |

# 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<br>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<br>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.<br>*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<br>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.<br>*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.)<br>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<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 6.5 mA) *<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 8.0 mA) *<br>NPN<br>ON voltage: 0 V to 3 V (short circuit current: approx. 8.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 6.5 mA) *                     |   |
|                                    |   |  | Muting input A/B  | PNP<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 3.0 mA) *<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 5.0 mA) *<br>NPN<br>ON voltage: 0 V to 3 V (short circuit current: approx. 5.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 3.0 mA) * |
|                                    |   | Test input   | 24 V Active setting:<br>ON voltage: 9 V to Vs (short circuit current: approx. 2.5 mA) *<br>OFF voltage: 0 V to 3 V or open (short circuit current: approx. 2.0 mA)<br>0 V Active setting:<br>ON voltage: 0 V to 3 V (short circuit current: approx. 2.0 mA)<br>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.<br>Total number of beams: 255 max.<br>Cable length between sensors: 10 m max. (not including cascading cable (F39-JGR2WTS) and power cable)  |   |   |
|                                    |   | Self-test (at power-on, and during operation)<br>External test (light emission stop function by test input)  |   |   |
|                                    | Safety-Related Functions  | Interlock<br>External device monitoring (EDM)<br>Pre-reset<br>Fixed blanking/Floating blanking<br>Reduced resolution<br>Muting/Override<br>Scan code selection<br>PNP/NPN selection<br>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<br>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)  |  | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: 5 to 150 Hz, Multiple amplitude of 7 mm, Acceleration of 1 G, 10 sweeps each in X, Y, and Z directions (no delay at resonant frequencies)   |  |
| Shock Resistance (IEC 61496-1) |   | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: Acceleration of 15 G, Pulse duration of 6 ms, 100 shocks for each in X, Y, and Z directions (600 shocks in total) |  |  |
| 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.<br>*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   |  |
|                                | 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   |  |
|                                | 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.<br>* 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   |  |
|                                | 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   |  |  |
| Extension of Power Cable       |   | 100 m max. (Emitter/Receiver)  |  |  |
| Material                       | Material  | Housing: Aluminum alloy<br>Cap: PBT resin<br>Front window: Acrylic resin<br>Cable: Fluororesin<br>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)  |  |  |
|                                | PFFh  | 1.1 × 10 <sup>-9</sup> (IEC 61508)   |  |  |
|                                | Proof test interval T <sub>M</sub>  | Every 20 years (IEC 61508)   |  |  |
|                                | SFF   | 99% (IEC 61508)  |  |  |
|                                | HFT   | 1 (IEC 61508)  |  |  |
| Classification                 |   | Type B (IEC 61508-2)   |  |  |

## Bluetooth Communication Unit

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

\* It depends on use environment conditions.

# F3SG-RR

## 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

|                              |   |
|------------------------------|---|
| <b>Main Unit</b>             | PC/AT compatible machine (computer that runs Microsoft Windows)                       |
| <b>Operating System (OS)</b> | Windows 7 (32-bit/64-bit), Windows 8, 8.1 (32-bit/64-bit), Windows 10 (32-bit/64-bit) |
| <b>Communication Port</b>    | USB port ×1   |
| <b>Ambient Temperature</b>   | Operating: -10 to 55°C, Storage: -30 to 70°C (non-icing and non-condensing)           |
| <b>Ambient Humidity</b>      | Operating: 35% to 85%, Storage: 35% to 95% (non-condensing)                           |

### Lamp

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

## Connections (Basic Wiring Diagram)

### Standalone F3SG-RR using PNP Outputs

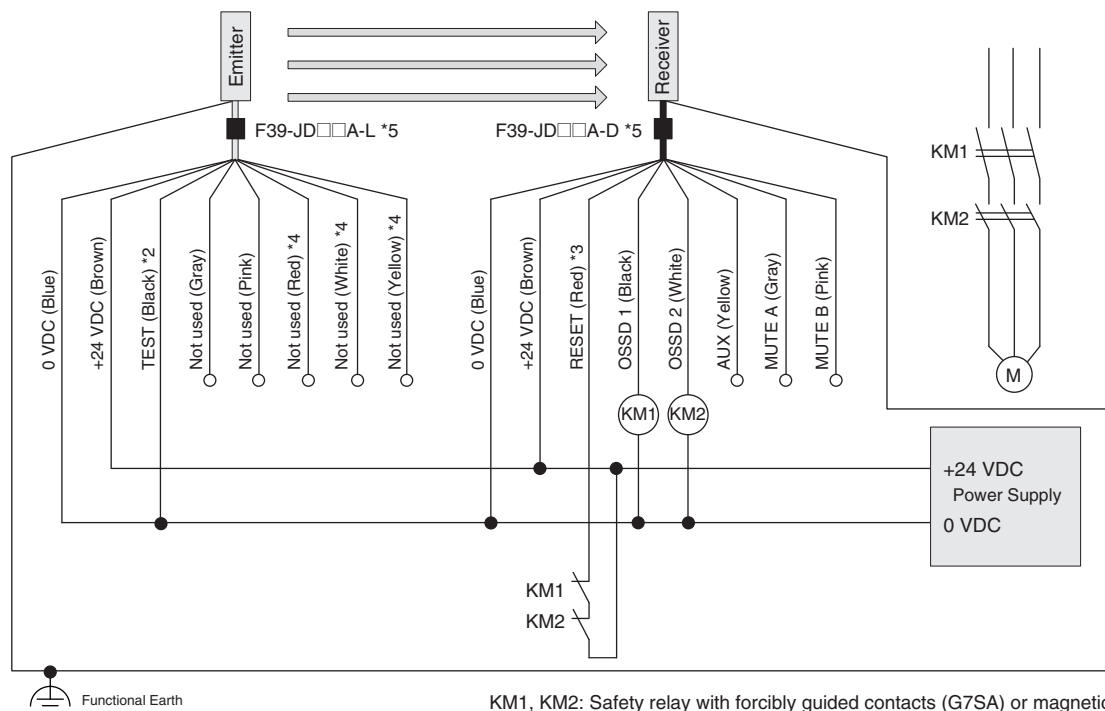
#### Auto Reset Mode, EDM enabled and PNP Outputs

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).

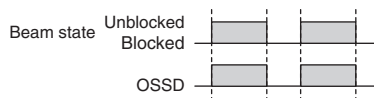
#### Settings

|          | 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) or magnetic contactor  
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 (NC 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

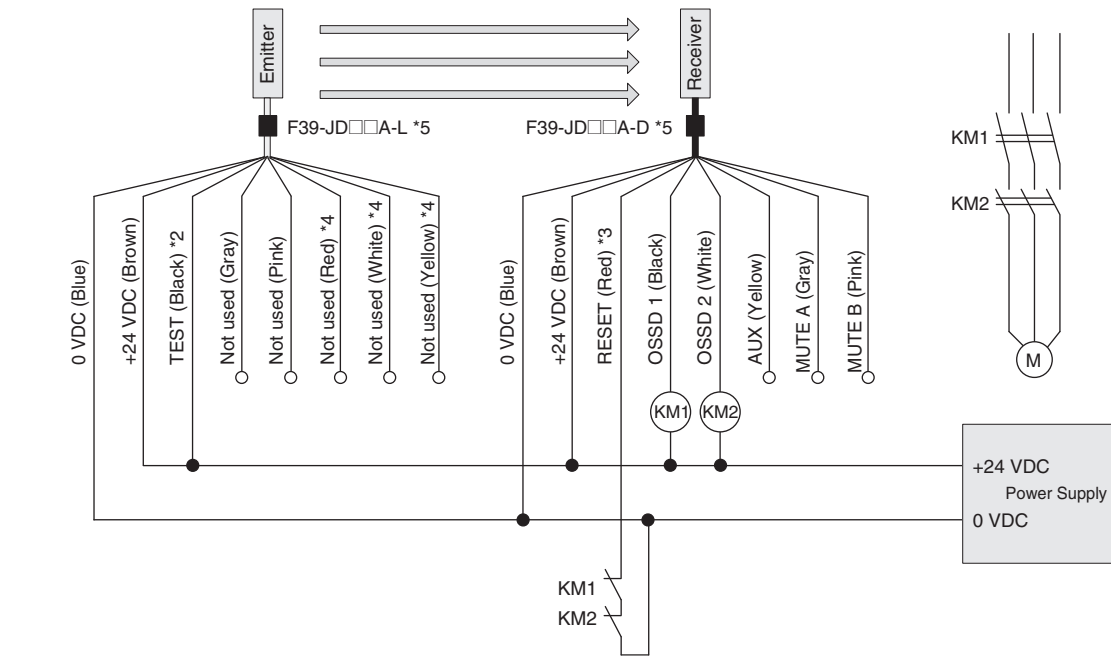
### Auto Reset Mode, EDM enabled and NPN Outputs

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).

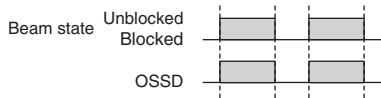
### Settings

|          | 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 (NC 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                                      |                       | G9SP-N10S          |
| G9SA-321-T□                                   |                       | G9SP-N10D          |
| G9SA-501                                      |                       | G9SP-N20S          |
| G9SB-200-B                                    | G9SX-AD322-T          | NE0A-SCPU01        |
| G9SB-200-D                                    | G9SX-ADA222-T         | NE1A-SCPU01        |
| G9SB-301-B                                    | G9SX-BC202            | NE1A-SCPU02        |
| G9SB-301-D                                    | G9SX-GS226-T15        | DST1-ID12SL-1      |
| G9SE-201                                      |                       | DST1-MD16SL-1      |
| G9SE-401                                      |                       | DST1-MRD08SL-1     |
| G9SE-221-T□                                   |                       | NX-SIH400          |
|   |                       | NX-SID800          |
|   |                       | F3SP-T01           |

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

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

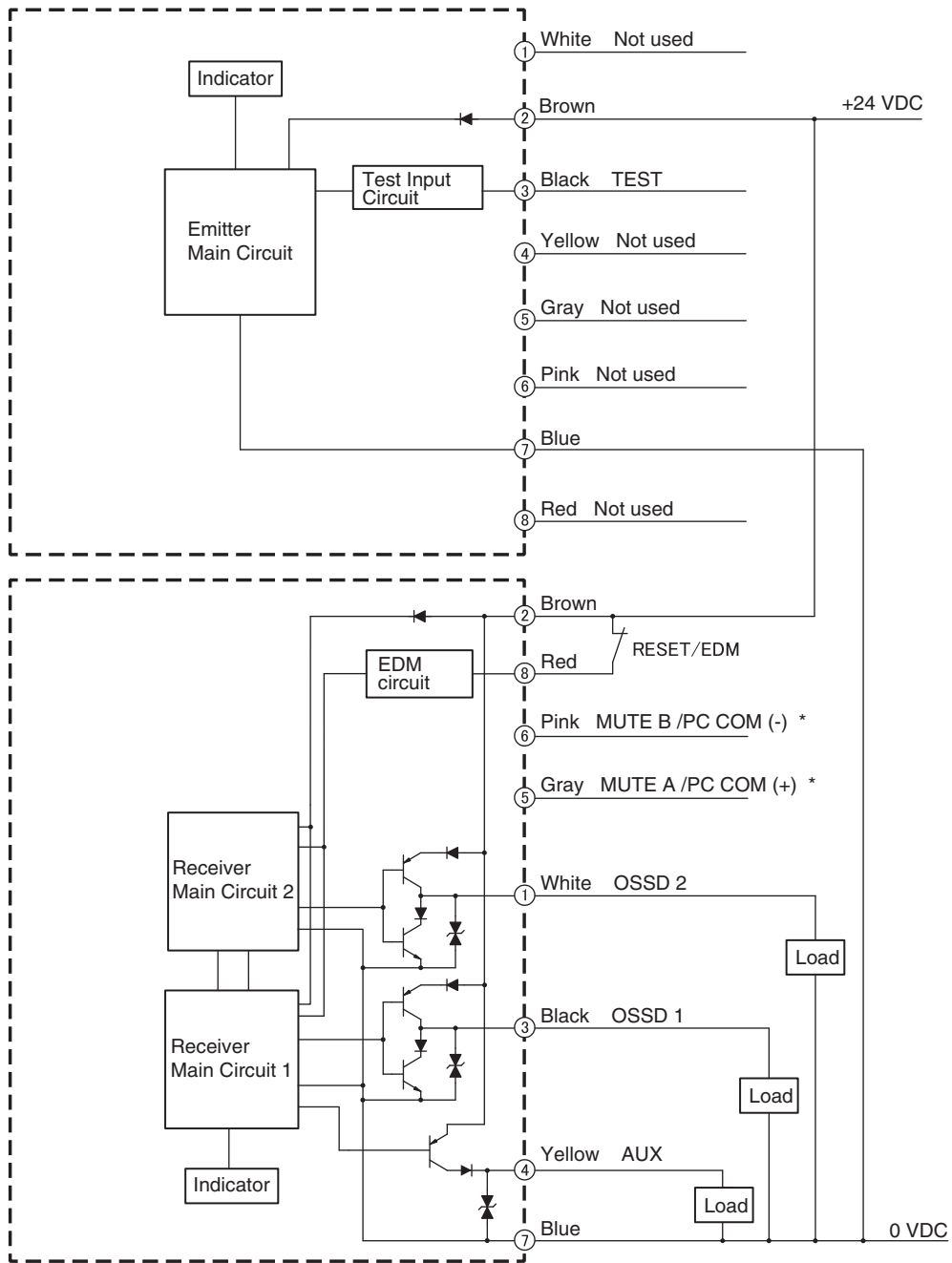
# F3SG-RR

## Input/Output Circuit

### Entire Circuit Diagram

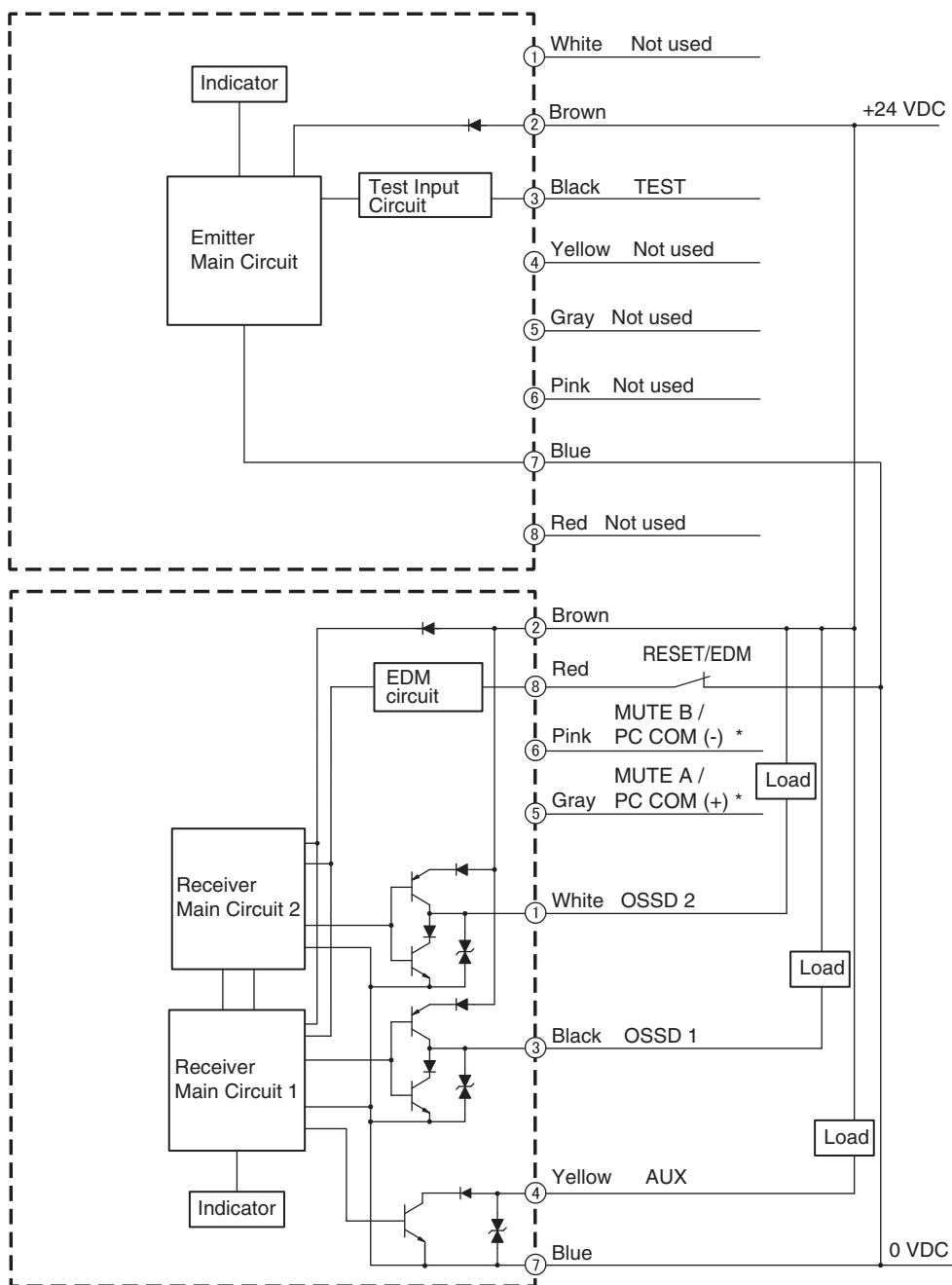
The entire circuit diagram of the F3SG-RR is shown below.  
The numbers in the circles indicate the connector's pin numbers.

### 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.

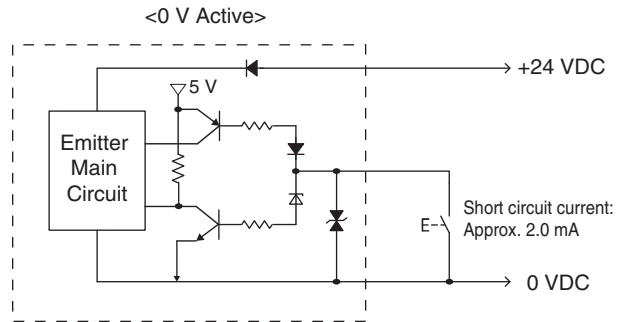
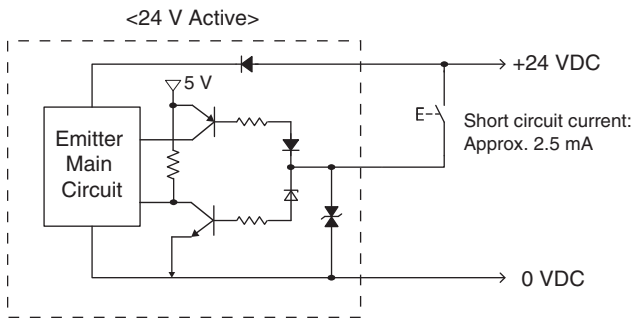
F3SG-RR



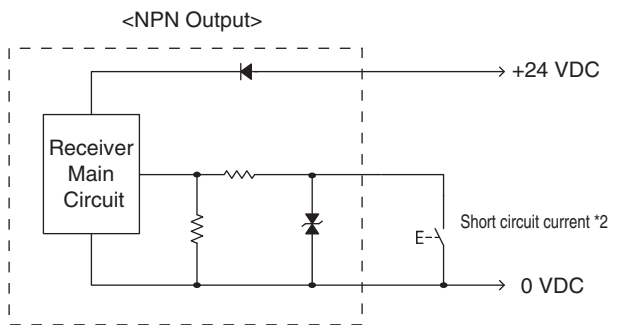
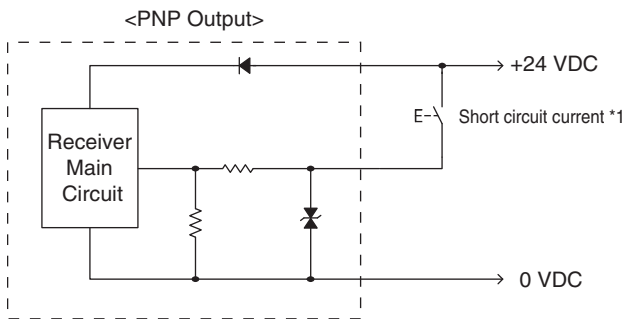
## Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

### TEST



### RESET/EDM, MUTE A/B

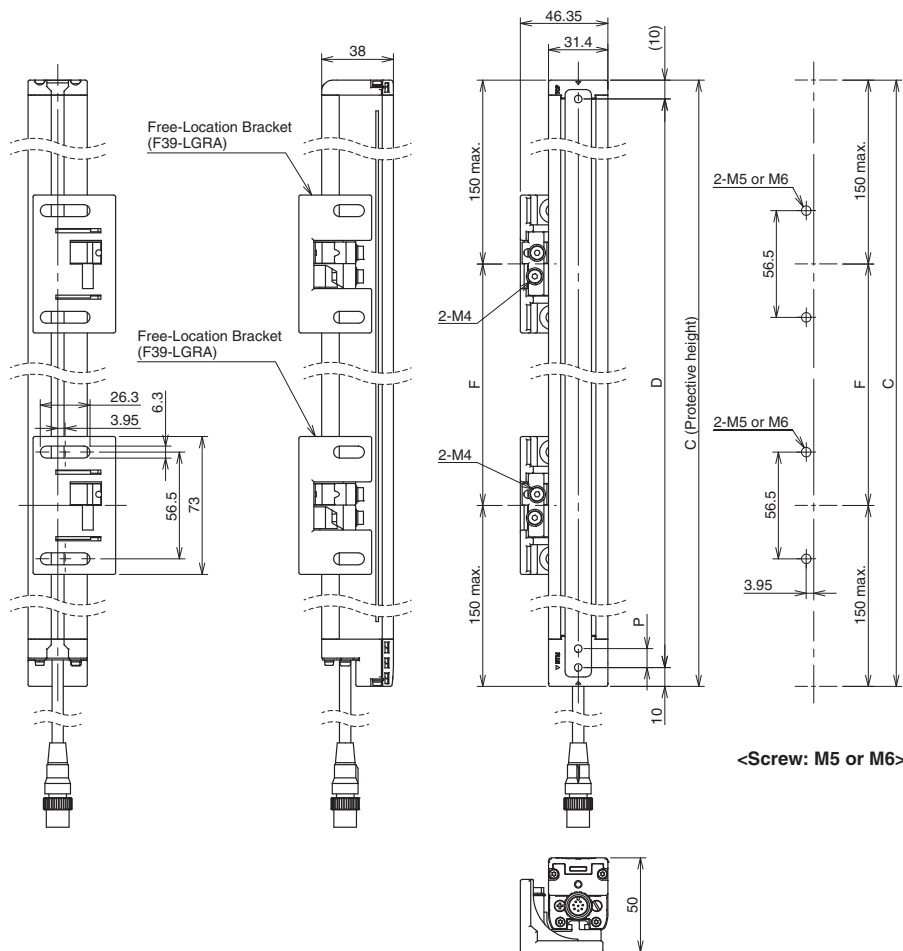


\*1. Short circuit current: approx. 6.5 mA (RESET/EDM), approx. 3.0 mA (MUTE A/B)

\*2. Short circuit current: approx. 8.0 mA (RESET/EDM), approx. 5.0 mA (MUTE A/B)

# Dimensions

## Mounted with Free-Location Brackets (F39-LGRA) Backside Mounting



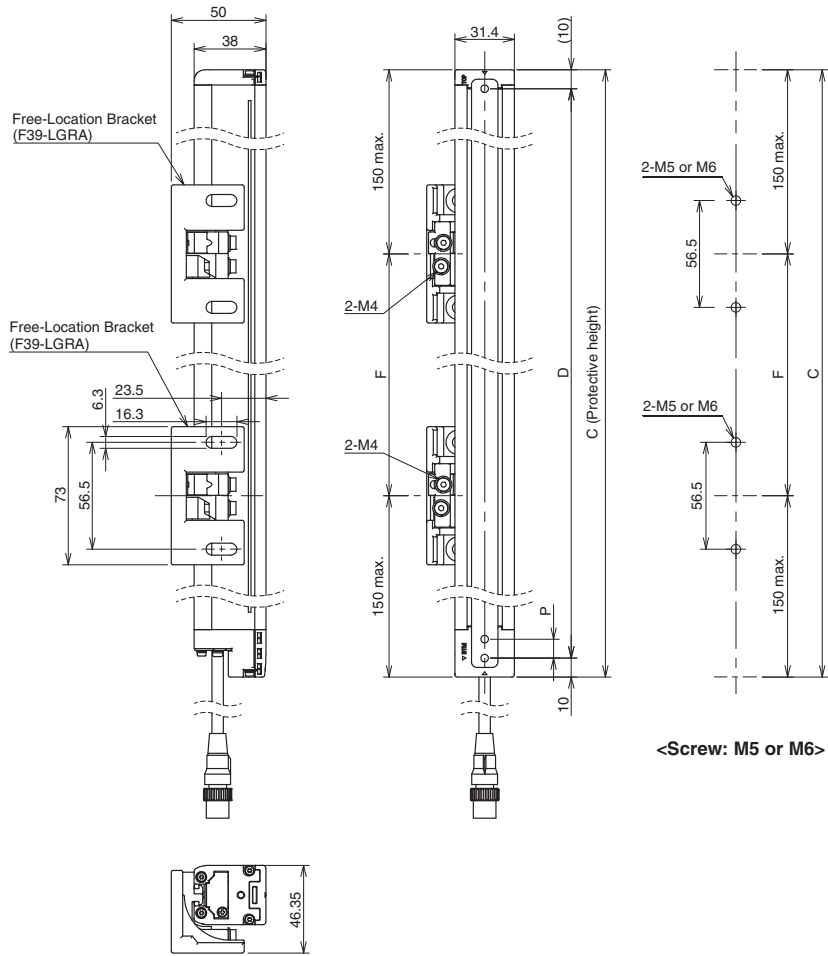
|                    |   |    |
|--------------------|---|----|
| <b>Dimension C</b> | 4-digit number of the type name (Protective height) |    |
| <b>Dimension D</b> | C-20  |    |
| <b>Dimension P</b> | F3SG-4RR□□□□-14                                     | 10 |
|                    | F3SG-4RR□□□□-25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



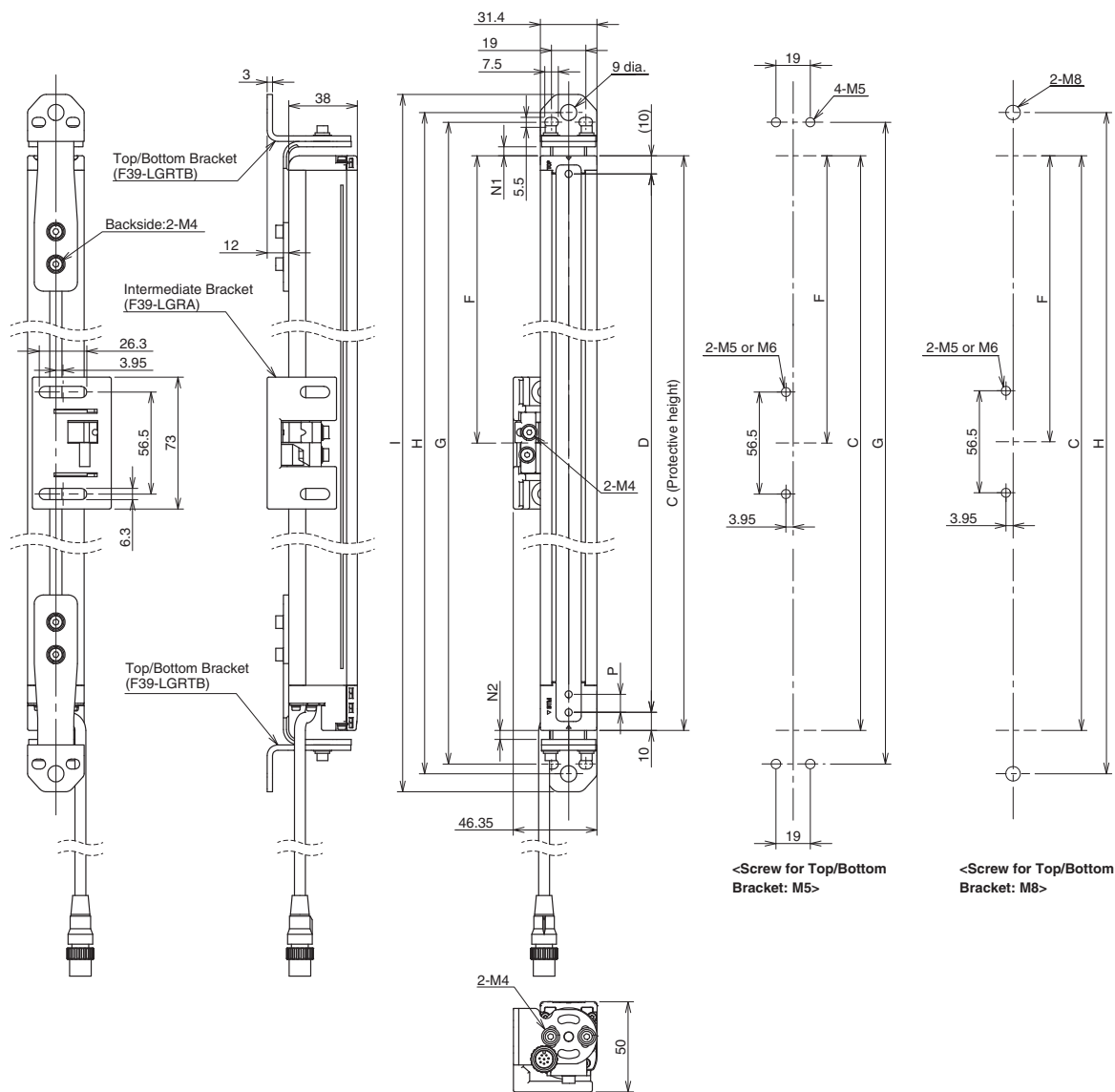
|                    |   |    |
|--------------------|---|----|
| <b>Dimension C</b> | 4-digit number of the type name (Protective height) |    |
| <b>Dimension D</b> | C-20  |    |
| <b>Dimension P</b> | F3SG-4RR□□□□-14                                     | 10 |
|                    | F3SG-4RR□□□□-25                                     | 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**



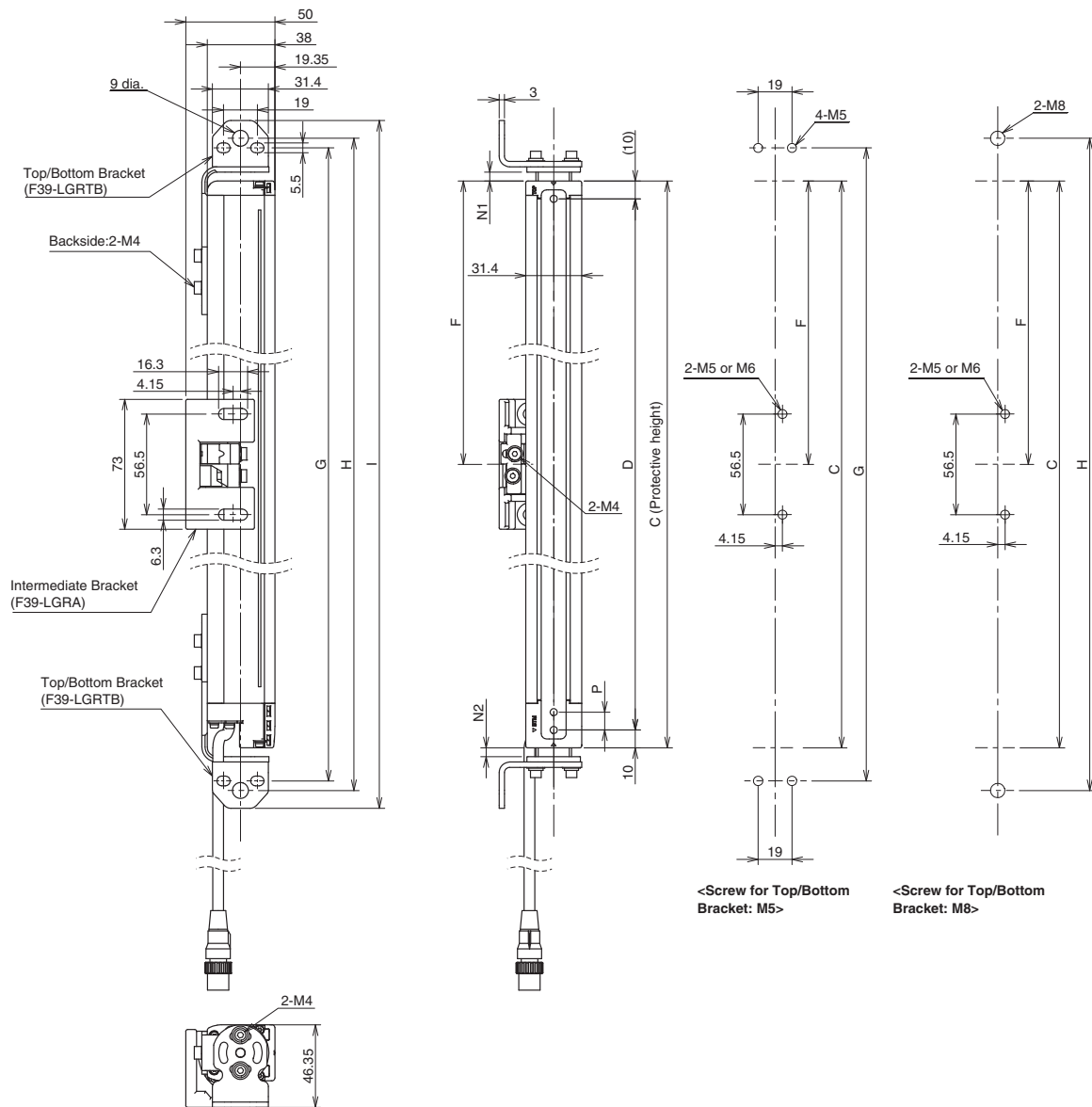
|                     |   |    |
|---------------------|---|----|
| <b>Dimension C</b>  | 4-digit number of the type name (Protective height) |    |
| <b>Dimension D</b>  | C-20  |    |
| <b>Dimension G</b>  | C+27.2+N1+N2  |    |
| <b>Dimension H</b>  | C+38+N1+N2  |    |
| <b>Dimension I</b>  | C+58+N1+N2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

F3SG-RR

## Side Mounting

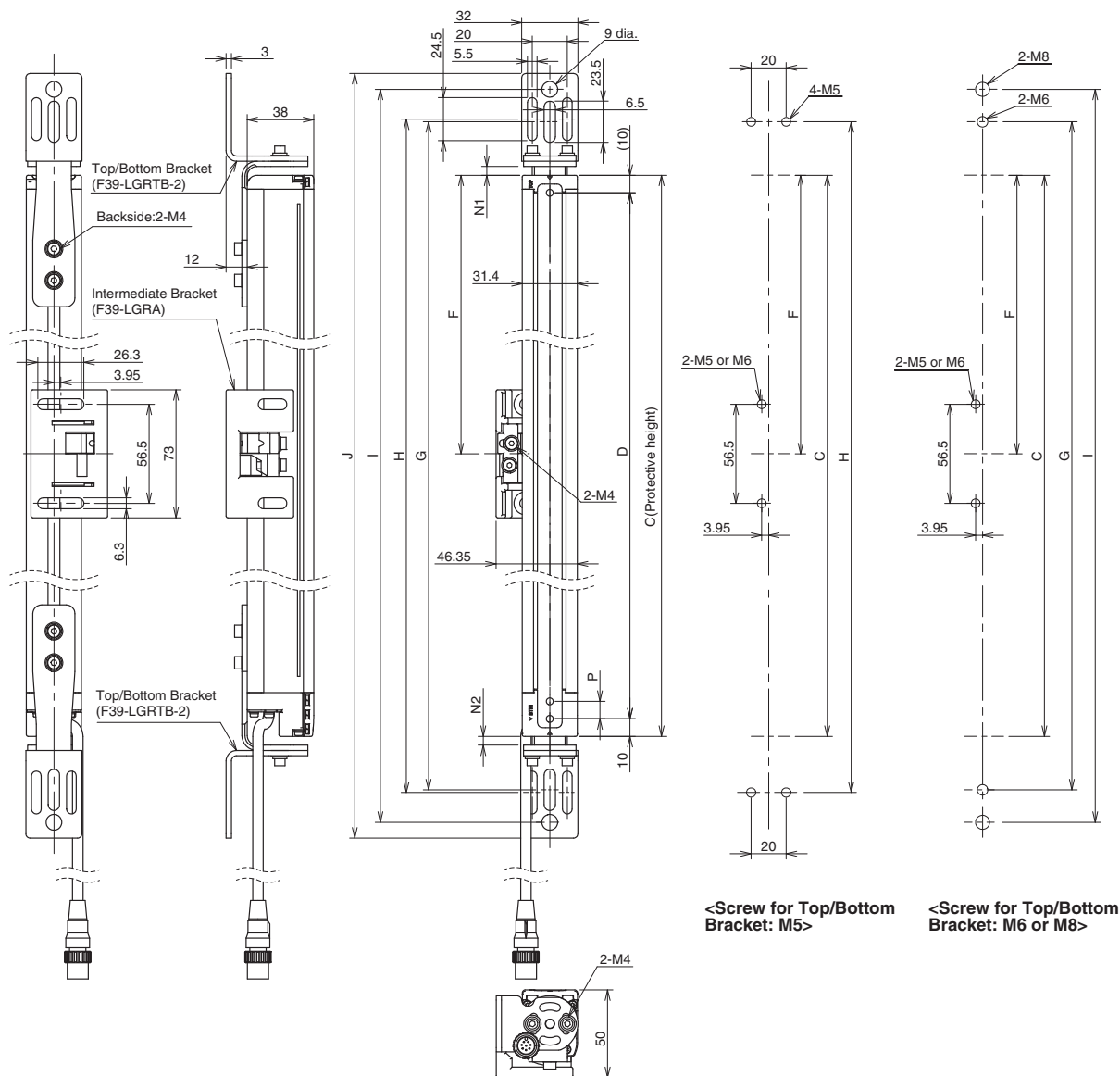


|                     |   |    |
|---------------------|---|----|
| <b>Dimension C</b>  | 4-digit number of the type name (Protective height) |    |
| <b>Dimension D</b>  | C-20  |    |
| <b>Dimension G</b>  | C+27.2+N1+N2  |    |
| <b>Dimension H</b>  | C+38+N1+N2  |    |
| <b>Dimension I</b>  | C+58+N1+N2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



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

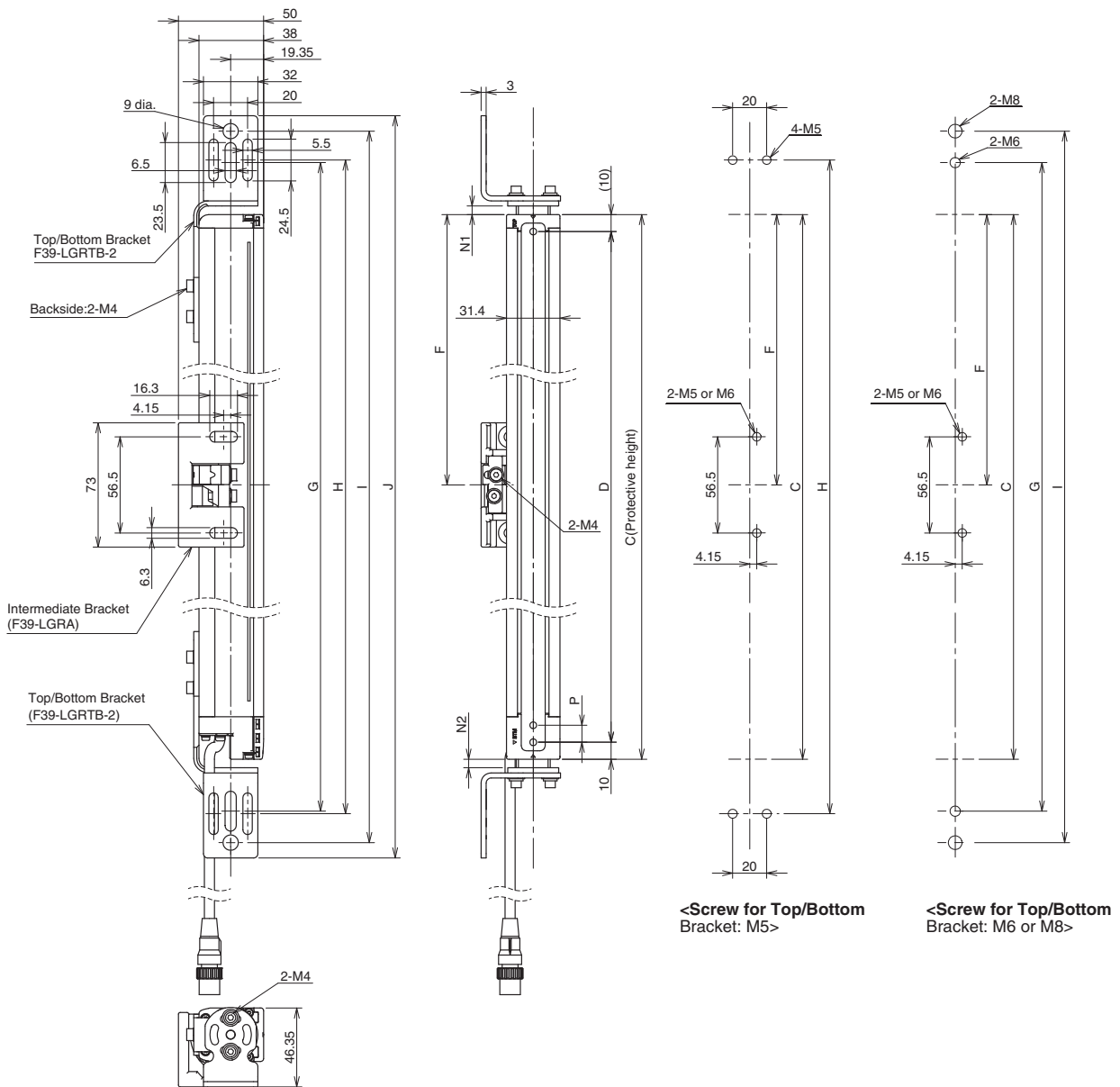
| Protective height (C) | Number of Top/Bottom Brackets * | Number of Intermediate Brackets * | Dimension F  |
|-----------------------|---------------------------------|-----------------------------------|--------------|
| 0240 to 1040          | 2                               | 0                 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

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

F3SG-RR



## Side Mounting

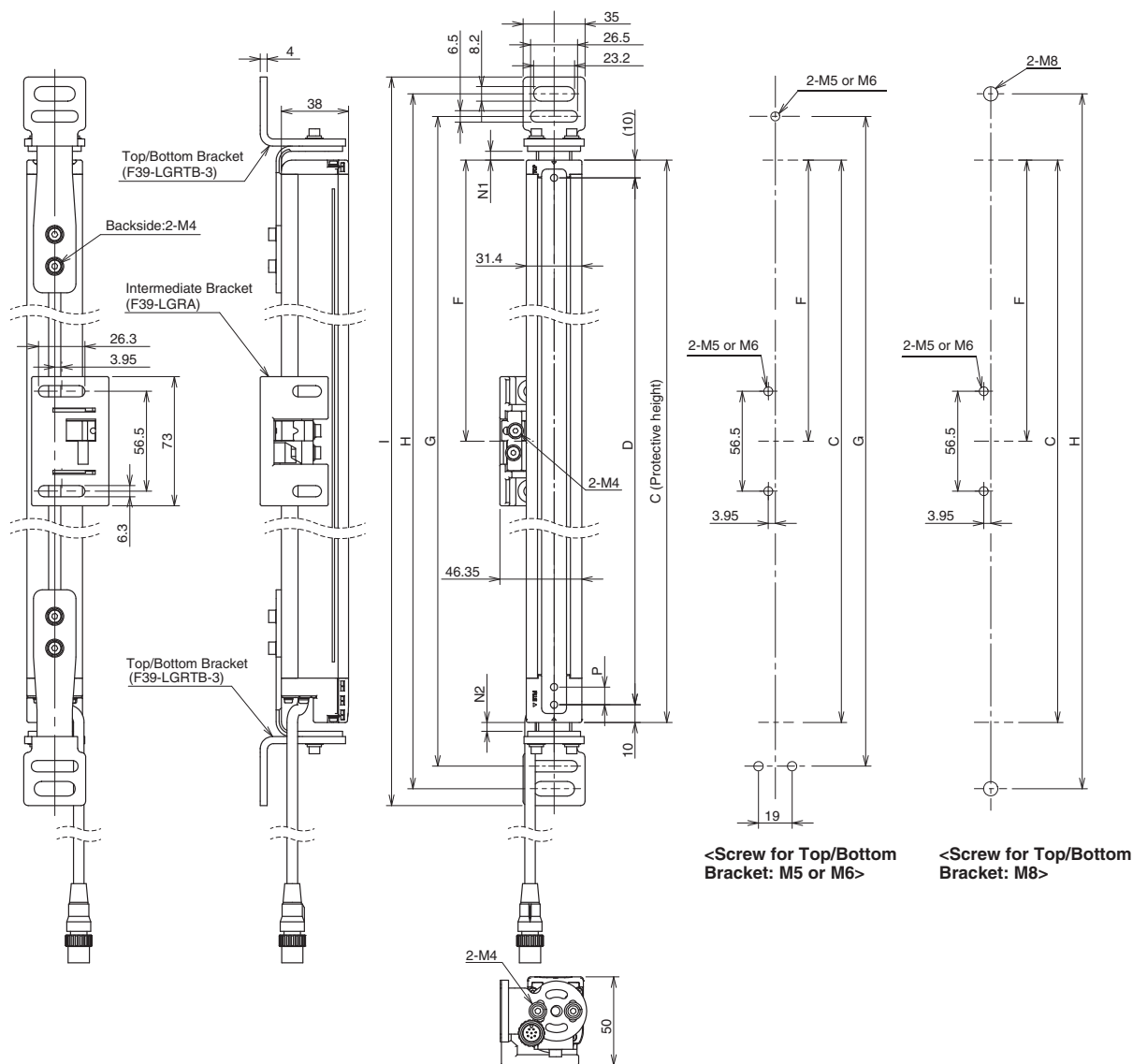


|                     |   |    |
|---------------------|---|----|
| <b>Dimension C</b>  | 4-digit number of the type name (Protective height) |    |
| <b>Dimension D</b>  | C-20  |    |
| <b>Dimension G</b>  | $C+51+N1+N2$  |    |
| <b>Dimension H</b>  | $C+54+N1+N2$  |    |
| <b>Dimension I</b>  | $C+88+N1+N2$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



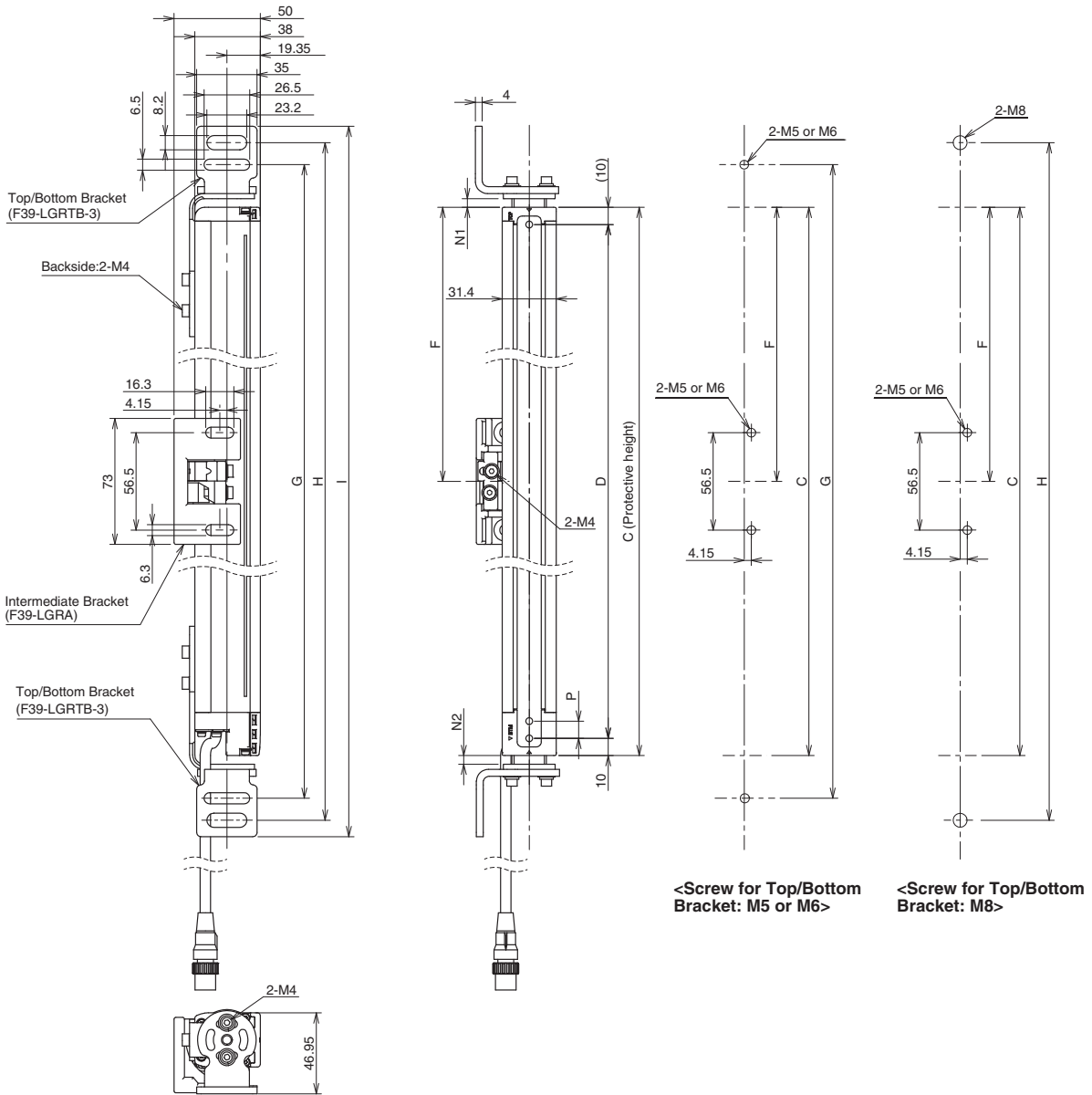
|                     |   |    |
|---------------------|---|----|
| <b>Dimension C</b>  | 4-digit number of the type name (Protective height) |    |
| <b>Dimension D</b>  | C-20  |    |
| <b>Dimension G</b>  | C+39.5+N1+N2  |    |
| <b>Dimension H</b>  | C+65+N1+N2  |    |
| <b>Dimension I</b>  | C+84+N1+N2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

F3SG-RR

## Side Mounting



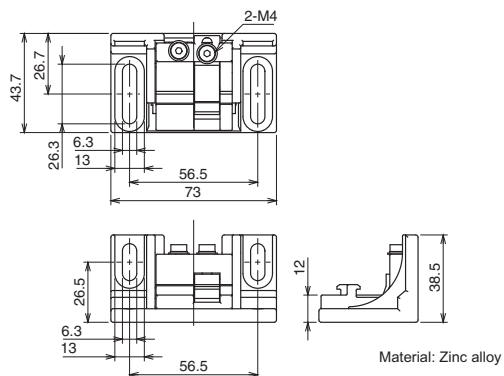
|                     |   |    |
|---------------------|---|----|
| <b>Dimension C</b>  | 4-digit number of the type name (Protective height) |    |
| <b>Dimension D</b>  | C-20  |    |
| <b>Dimension G</b>  | $C+39.5+N1+N2$                                      |    |
| <b>Dimension H</b>  | $C+65+N1+N2$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

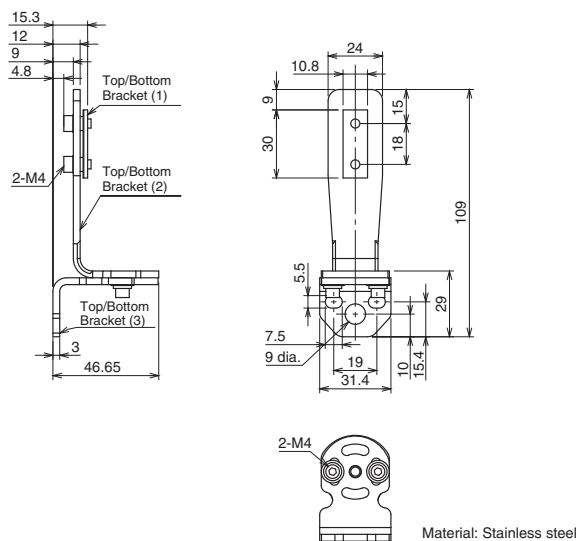
\* The number of brackets required to mount either one of emitter and receiver.

## Accessories

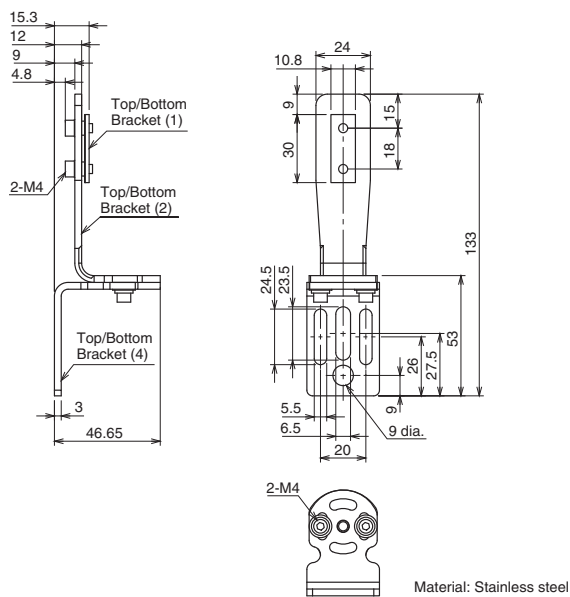
### Sensor Mounting Brackets Free-Location Bracket / Intermediate Bracket (F39-LGRA, sold separately)



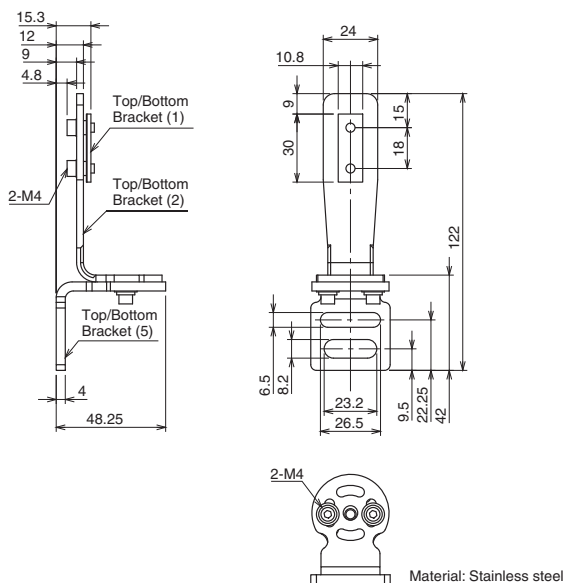
### Top/Bottom Bracket (F39-LGRTB, sold separately)



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



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

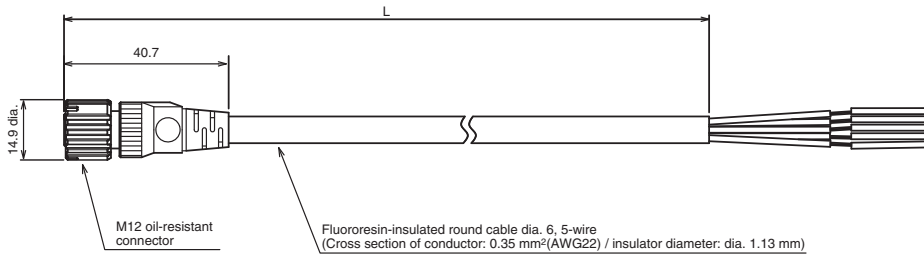


F3SG-RR

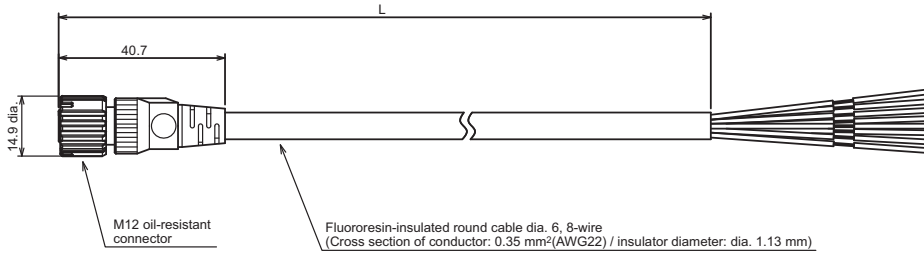
# F3SG-RR

## Safety light curtain connecting cable

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

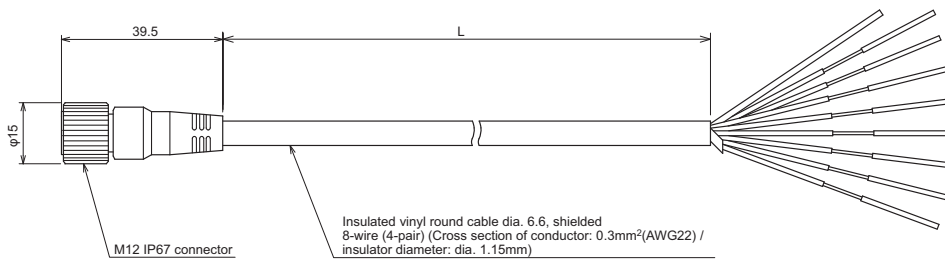


### Single-Ended Cable for Receiver (Oil-Resistant Cable) (F39-JD□RA-D, sold separately)

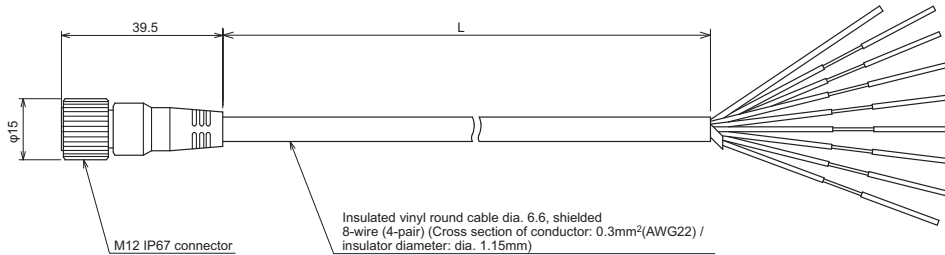


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JD3RA-L          | F39-JD3RA-D            | 3     |
| F39-JD7RA-L          | F39-JD7RA-D            | 7     |

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

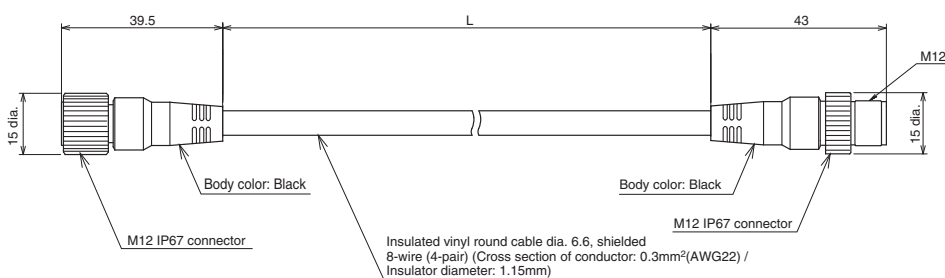


### Single-Ended Cable for Receiver (F39-JD□A-D, sold separately)

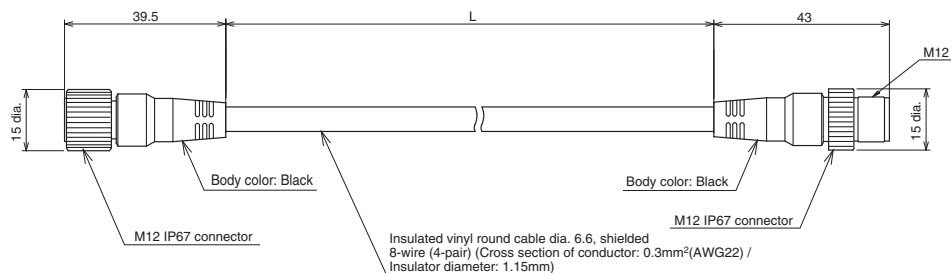


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JD3A-L           | F39-JD3A-D             | 3     |
| F39-JD7A-L           | F39-JD7A-D             | 7     |
| F39-JD10A-L          | F39-JD10A-D            | 10    |
| F39-JD15A-L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

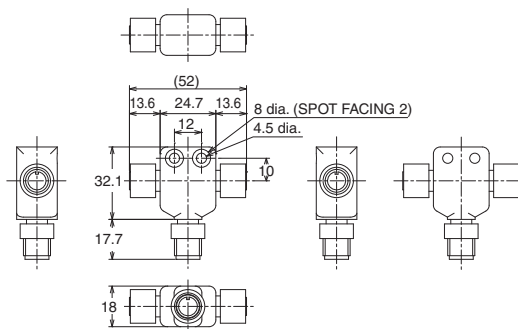


**Double-Ended Cable for Receiver: Cable for extension (F39-JD□B-D, sold separately)**

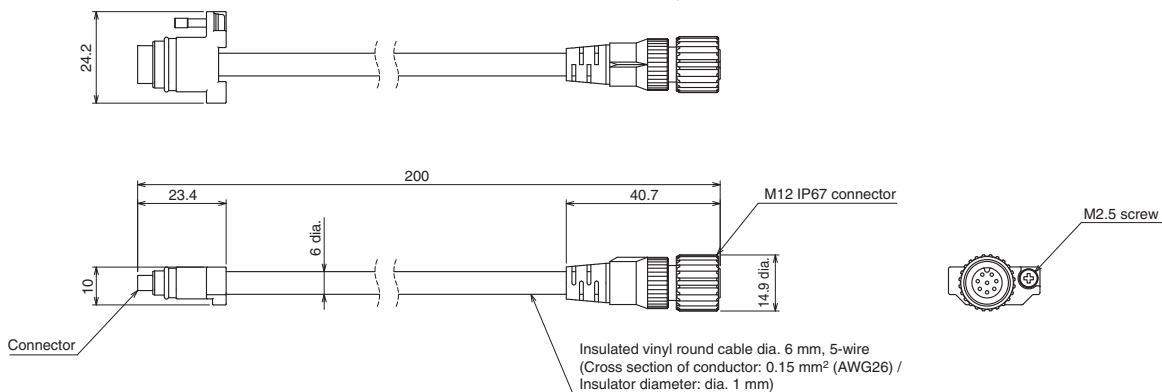


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JDR5B-L          | F39-JDR5B-D            | 0.5   |
| F39-JD1B-L           | F39-JD1B-D             | 1     |
| F39-JD3B-L           | F39-JD3B-D             | 3     |
| F39-JD5B-L           | 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    |

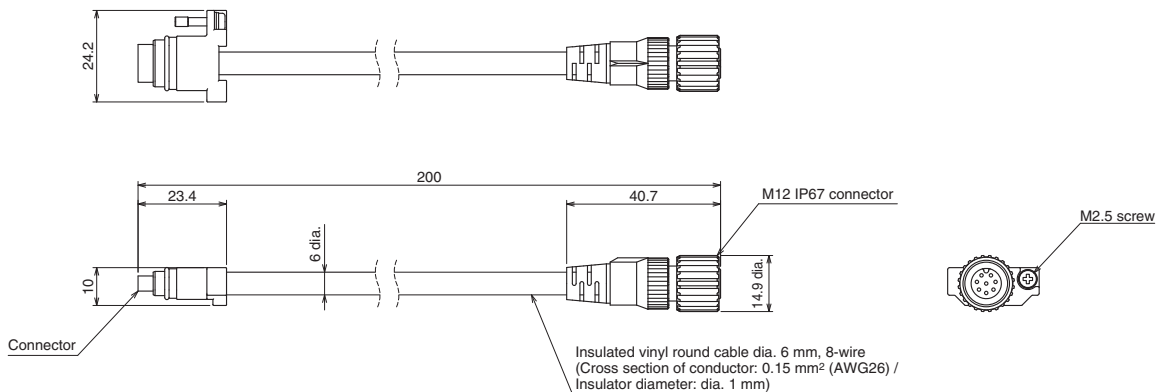
**Reduced Wiring Connector (F39-CN5, sold separately)**



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



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



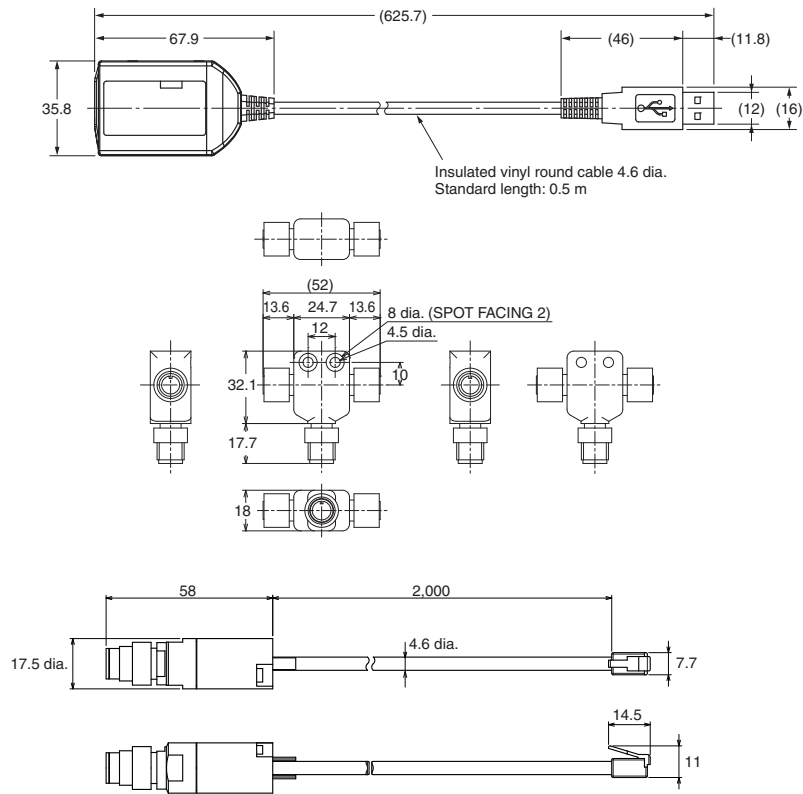
| Set model name | Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------|----------------------|------------------------|-------|
| F39-JGR2WTS    | F39-JGR2WTS-L        | F39-JGR2WTS-D          | 0.2   |

F3SG-RR

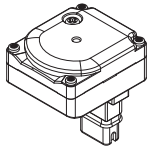


# F3SG-RR

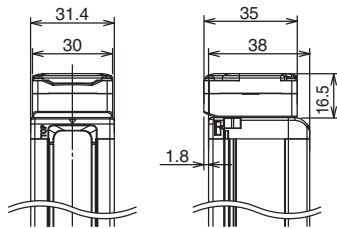
## Interface Unit (F39-GIF-1, sold separately)



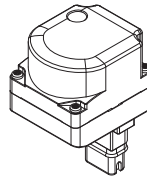
## Bluetooth Communication Unit (F39-BT, sold separately)



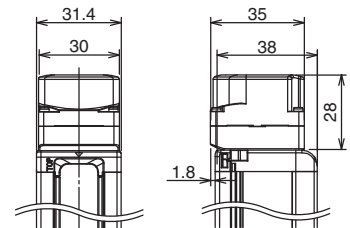
Material: PBT



## 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 |

# Safety Light Curtain Easy type

# F3SG-RE



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

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

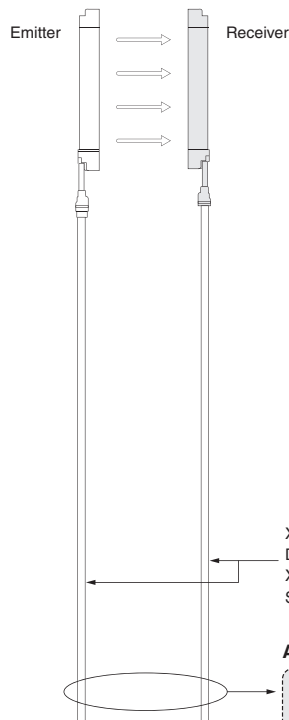


## System Configuration

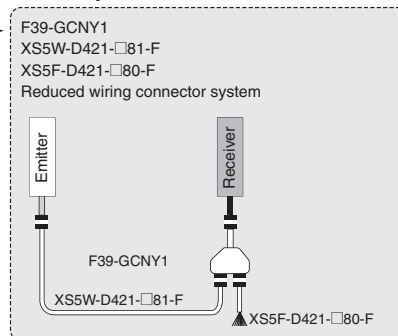
### Mounting bracket



### Accessory



### Accessory



### 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.

F3SG-RE

## 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          |  <table border="1" data-bbox="842 360 1166 456"> <thead> <tr> <th>PIN</th> <th>Emitter</th> <th>Receiver</th> <th>Color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+24 VDC</td> <td>+24 VDC</td> <td>Brown</td> </tr> <tr> <td>2</td> <td>Range setting</td> <td>OSSD 2</td> <td>White</td> </tr> <tr> <td>3</td> <td>0 VDC</td> <td>0 VDC</td> <td>Blue</td> </tr> <tr> <td>4</td> <td>Not used</td> <td>OSSD 1</td> <td>Black</td> </tr> </tbody> </table> | PIN           | Emitter  | Receiver | Color | 1 | +24 VDC | +24 VDC | Brown | 2 | Range setting | OSSD 2 | White | 3 | 0 VDC | 0 VDC | Blue | 4 | Not used | OSSD 1 | Black | XS5F-D421-C80-F |
|   |                                | PIN          |  | Emitter       | Receiver | Color    |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
|   |                                | 1            |  | +24 VDC       | +24 VDC  | Brown    |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
|   |                                | 2            |  | Range setting | OSSD 2   | White    |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
|   |                                | 3            |  | 0 VDC         | 0 VDC    | Blue     |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
|   |                                | 4            |  | Not used      | OSSD 1   | Black    |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
| 2 m   | XS5F-D421-D80-F                |              |  |               |          |          |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
| 3 m   | XS5F-D421-E80-F                |              |  |               |          |          |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
| 5 m   | XS5F-D421-G80-F                |              |  |               |          |          |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
| 10 m  | XS5F-D421-J80-F                |              |  |               |          |          |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |
| 20 m  | XS5F-D421-L80-F                |              |  |               |          |          |       |   |         |         |       |   |               |        |       |   |       |       |      |   |          |        |       |                 |

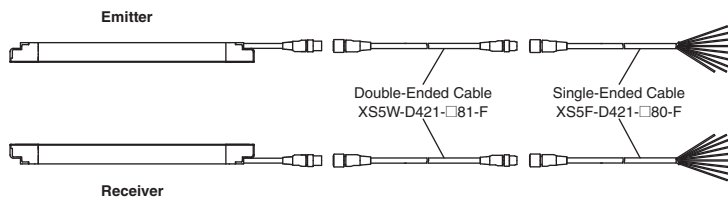
- Note:** 1. One cable that can be used for both emitter and receiver is provided. Order two cables for one set of safety light curtains.  
 2. To extend the cable length to 20 m or more, add the XS5W-D421-□81-F Double-Ended Cable.

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


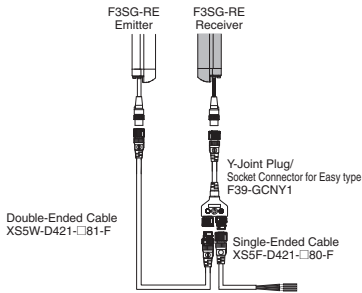
| Appearance  | Type                               | Cable length | Specifications   | Model           |       |       |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
|---|------------------------------------|--------------|--|-----------------|-------|-------|-------|---|-------|---|-------|---|------|---|------|---|-------|---|-------|-----------------|
|  | M12 connector (4-pin) on both ends | 1 m          |  <table border="1" data-bbox="842 701 1062 784"> <thead> <tr> <th>1</th> <th>Brown</th> <th>1</th> <th>Brown</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>White</td> <td>2</td> <td>White</td> </tr> <tr> <td>3</td> <td>Blue</td> <td>3</td> <td>Blue</td> </tr> <tr> <td>4</td> <td>Black</td> <td>4</td> <td>Black</td> </tr> </tbody> </table>  | 1               | Brown | 1     | Brown | 2 | White | 2 | White | 3 | Blue | 3 | Blue | 4 | Black | 4 | Black | XS5W-D421-C81-F |
|   |                                    | 1            |  | Brown           | 1     | Brown |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
|   |                                    | 2            |  | White           | 2     | White |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
|   |                                    | 3            |  | Blue            | 3     | Blue  |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
|   |                                    | 4            |  | Black           | 4     | Black |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
|   |                                    | 2 m          |  | XS5W-D421-D81-F |       |       |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
| 3 m   | XS5W-D421-E81-F                    |              |  |                 |       |       |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
| 5 m   | XS5W-D421-G81-F                    |              |  |                 |       |       |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
| 10 m  | XS5W-D421-J81-F                    |              |  |                 |       |       |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |
| 20 m  | XS5W-D421-L81-F                    |              |  |                 |       |       |       |   |       |   |       |   |      |   |      |   |       |   |       |                 |

- 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        |  <p>When using the reduced wiring connector system F39-GCNY1, the Operating Range Selection is fixed to Long Mode.</p> | F39-GCNY1 |

F3SG-RE

# F3SG-RE

## Sensor Mounting Brackets

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

\*1. [for F3SG-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. | <b>F39-PTG</b> |

## 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<br>F3SG-4RE□□□□□□14/30   | Type 2<br>F3SG-2RE□□□□□□14/30     |                                   |
|   | Object Resolution (Detection Capability) | Opaque objects  |                                   |                                   |
|   | Beam Gap                                 | 14-mm dia.  | 30-mm dia.                        |                                   |
|   | Number of Beams                          | 10mm  | 20mm                              |                                   |
|   | Lens Size                                | 15 to 207   | 8 to 124                          |                                   |
|   | Protective Height                        | 5.2 × 3.4 (W×H) mm  | 7-mm dia.                         |                                   |
|   | Operating Range                          | Long  | 160 to 2080 mm (6.3 to 81.9 inch) | 190 to 2510 mm (7.3 to 98.7 inch) |
|   |  | Short   | 0.3 to 10.0 m (1 to 32 ft.)       | 0.3 to 20.0 m (1 to 65 ft.)       |
|   | Response Time                            | ON to OFF   | 0.3 to 3.0 m (1 to 10 ft.)        | 0.3 to 7.0 m (1 to 23 ft.)        |
|   |  | OFF to ON   | 5 to 15ms *1                      | 25 to 75ms *1                     |
| 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 |                                   |                                   |

\*1.Response time when used in one segment system  
 Refer to page 79.



# F3SG-RE

|                                |   | 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.  |  |  |
| Electrical                     | 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<br>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<br>Leakage current of 1 mA max. (PNP), 2 mA max. (NPN) *2<br>*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.<br>*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   | Operating Range Select Input:<br>Long: 9 V to Vs (short circuit current: approx. 2.5 mA) *<br>Short: 0 to 3 V (short circuit current: approx. 2.0 mA)<br>The F3SG-RE enters the Long Mode when the Operating Range Select Input line is open.   |  |  |
|                                |   | * 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<br>Sunlight: 10,000 lx max. on receiver surface  |  |  |
|                                | Degree of Protection (IEC 60529)                          | IP65 and IP67   |  |  |
|                                | Vibration Resistance (IEC 61496-1)                        | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: 5 to 150 Hz, Multiple amplitude of 7 mm, Acceleration of 1 G, 10 sweeps each in X, Y, and Z directions (no delay at resonant frequencies)  |  |  |
|                                | Shock Resistance (IEC 61496-1)                            | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: Acceleration of 15 G, Pulse duration of 6 ms, 100 shocks for each in X, Y, and Z directions (600 shocks in total)  |  |  |
| 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                   |   |   |  |  |
| Extension of Power Cable       | Cable Diameter  |   |  |  |
|                                | Minimum Bending Radius                                    |   |  |  |
| Material                       | Material  | Housing: Aluminum alloy<br>Cap: PBT resin<br>Front window: Acrylic resin<br>Cable: Oil-resistant PVC resin<br>Standard Fixed Bracket (F39-LGF): Zinc alloy<br>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.<br>[F3SG-□RE□□□□14]<br>- Protective height of 0160 to 1200: 2 sets<br>- Protective height of 1280 to 2080: 3 sets<br>[F3SG-□RE□□□□30]<br>- Protective height of 0190 to 1230: 2 sets<br>- Protective height of 1310 to 2270: 3 sets<br>- 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 <sub>D</sub>  | 9.1 × 10 <sup>-9</sup> (IEC 61508)  |  |  |
|                                | Proof test interval T <sub>M</sub>                        | Every 20 years (IEC 61508)  |  |  |
|                                | SFF   | 99% (IEC 61508)   |  |  |
|                                | HFT   | 1 (IEC 61508)   |  |  |
| Classification                 | Type B (IEC 61508-2)                                      |   |  |  |

## 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.

## Legislation and Standards

For F3SG-RE laws, regulations, and standards, refer to F3SG-RA datasheet *Legislation and Standards* on page 26.

## LED Indicator Status

### Emitter

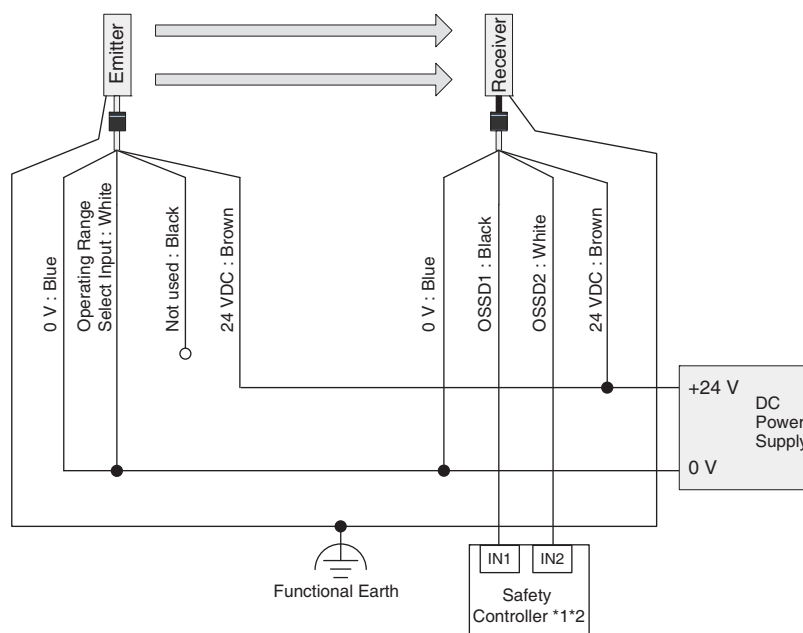
| Name of Indicator |         | Color | Illuminated                 | Blinking   |
|-------------------|---------|-------|-----------------------------|--|
| Operating range   | LONG    | Green | Long range mode is selected | Lockout state due to Operating range selection setting error |
| Power             | 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                               | –  |

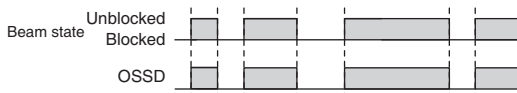
# Connections (Basic Wiring Diagram)

## Short Mode



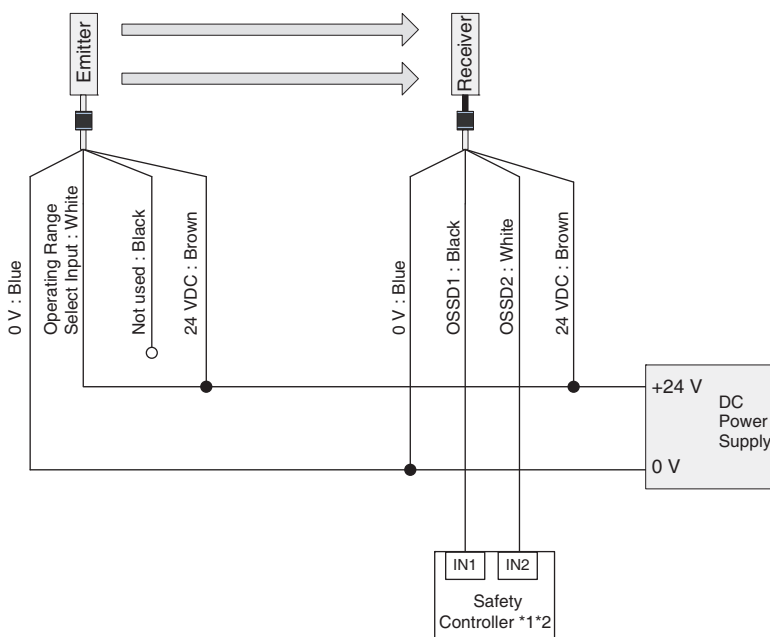
\*1.Refer to page 82 for more information.

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



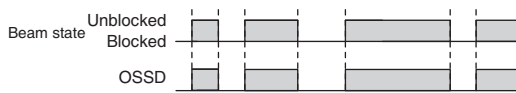
**Note:** Functional earth connection is unnecessary when you use the F3SG-RE in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-RE in an environment where there may be excessive noise from surroundings or stable power supply may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



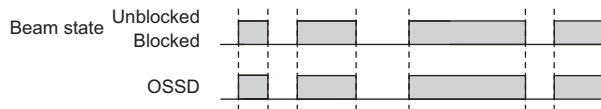
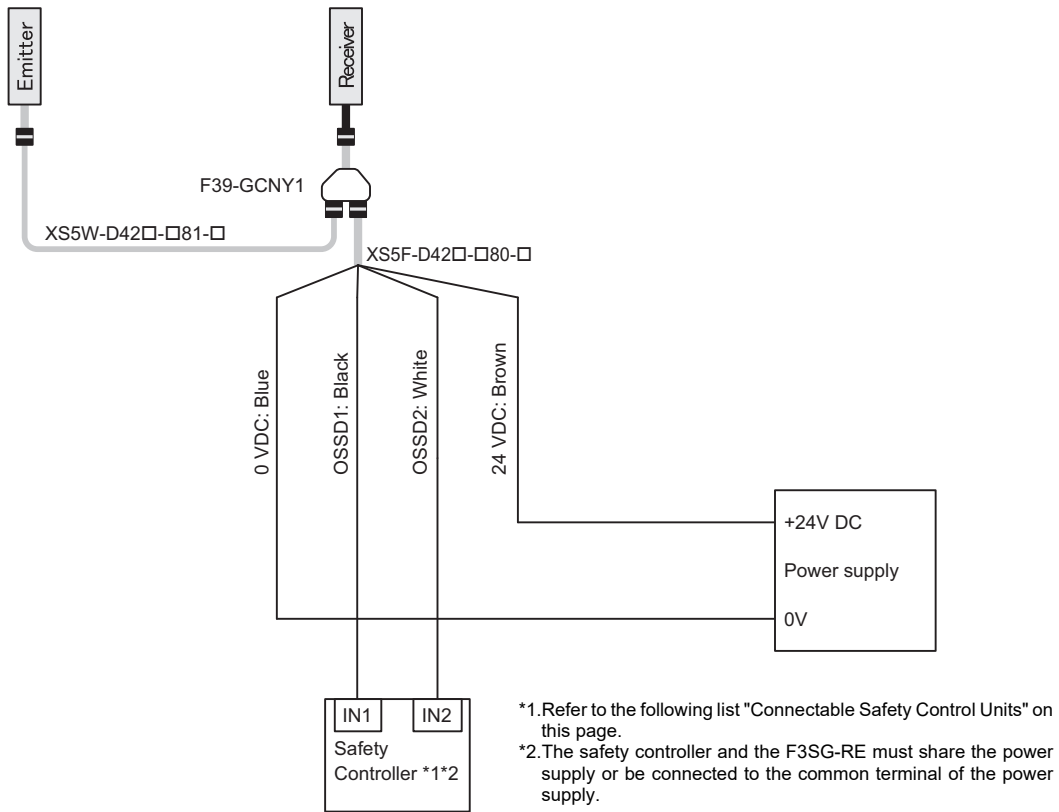
\*1.Refer to page 82 for more information.

\*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<br>G9SA-321-T□<br>G9SA-501<br>G9SB-200-B<br>G9SB-200-D<br>G9SB-301-B<br>G9SB-301-D<br>G9SE-201<br>G9SE-401<br>G9SE-221-T□ | G9SX-AD322-T<br>G9SX-ADA222-T<br>G9SX-BC202<br>G9SX-GS226-T15 | G9SP-N10S<br>G9SP-N10D<br>G9SP-N20S<br>NE0A-SCPU01<br>NE1A-SCPU01<br>NE1A-SCPU02<br>DST1-ID12SL-1<br>DST1-MD16SL-1<br>DST1-MRD08SL-1<br>NX-SIH400<br>NX-SID800<br>F3SP-T01 |

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

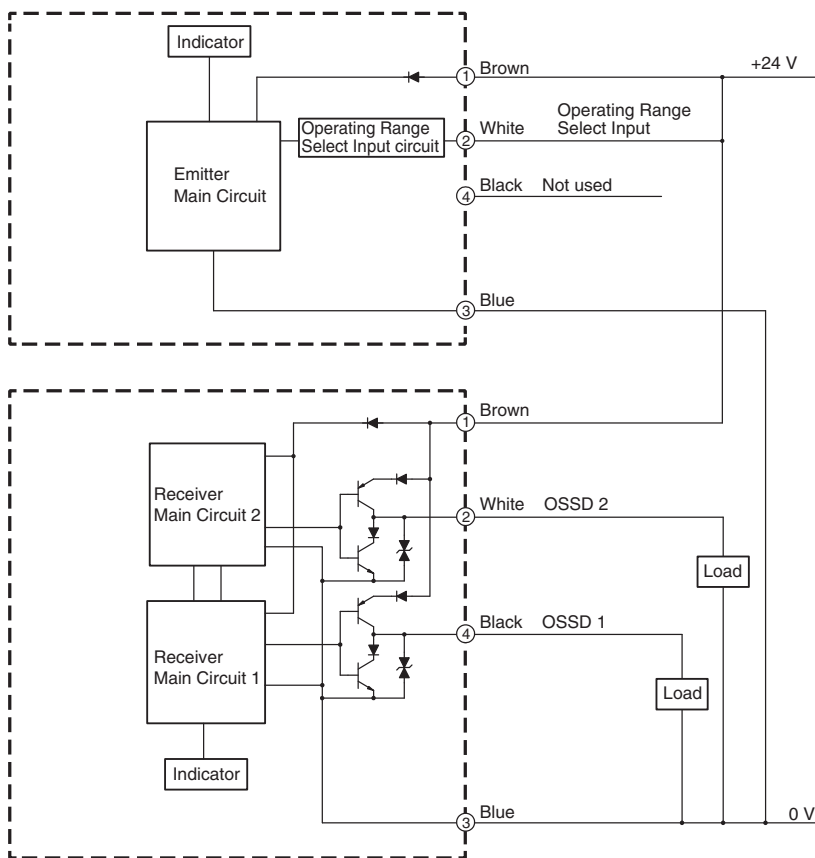
| Connectable Safety Control Units (NPN output) |
|---|
| Safety Relay Units                            |
| G9SA-301-P                                    |

# Input/Output Circuit

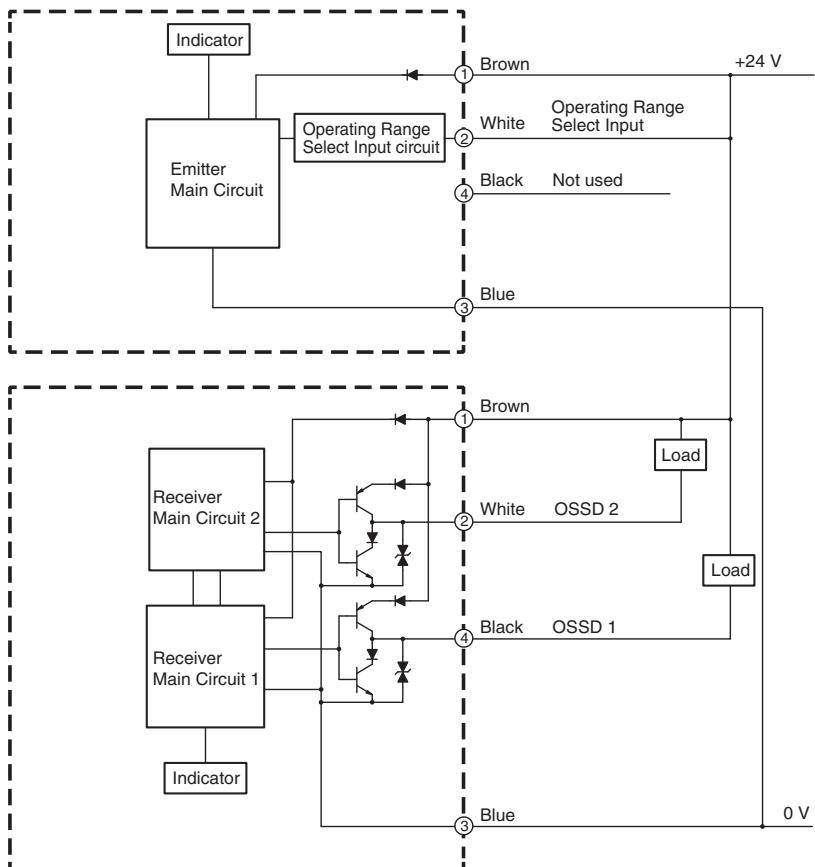
## Entire Circuit Diagram

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



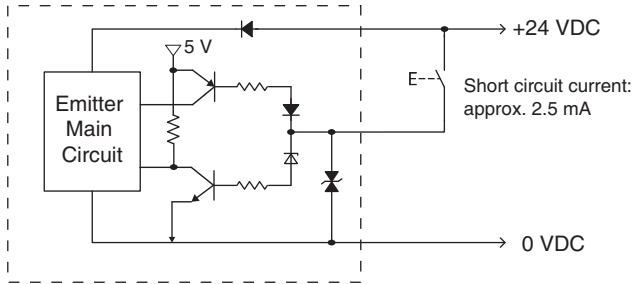
F3SG-RE

## Input Circuit Diagram by Function

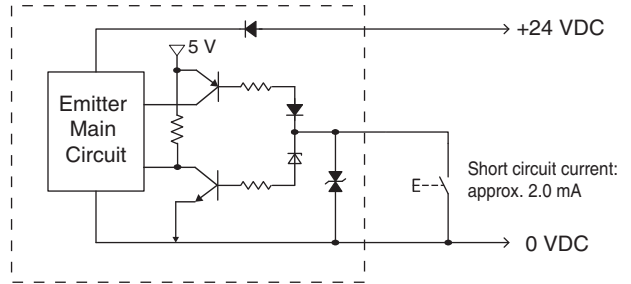
The input circuit diagrams of by function are shown below.

### Operating Range Select Input

<Long Mode>



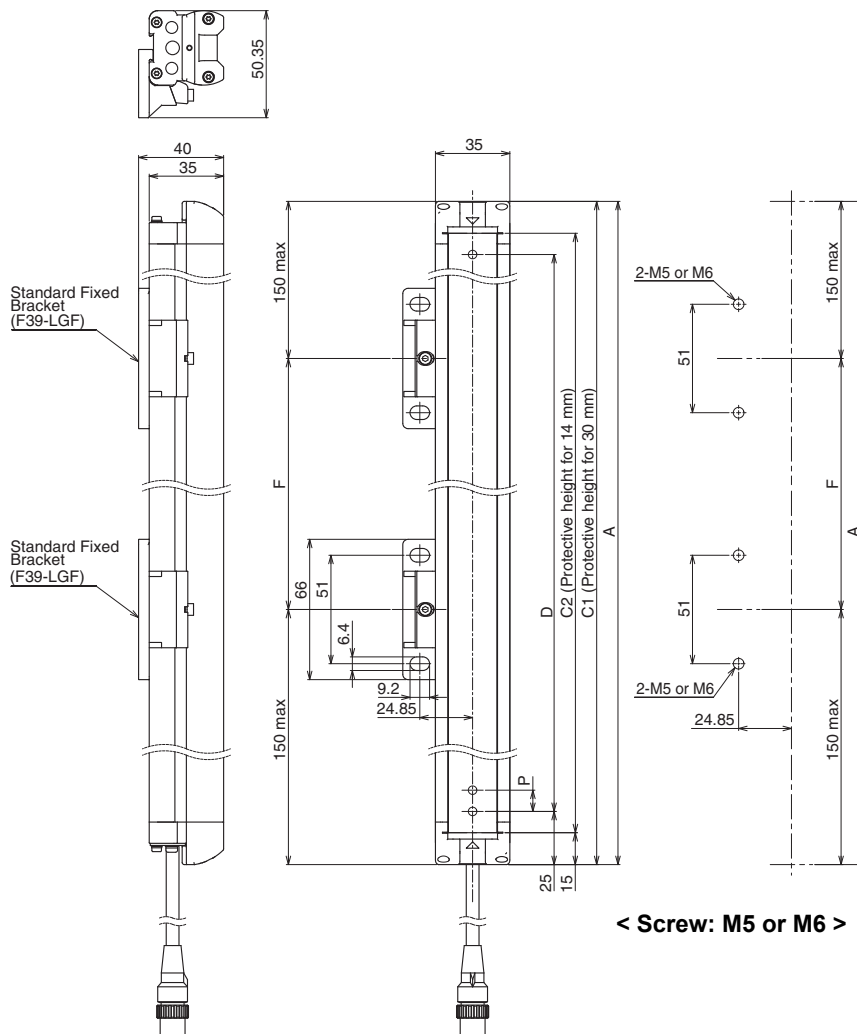
<Short Mode>





# Dimensions

## 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   |

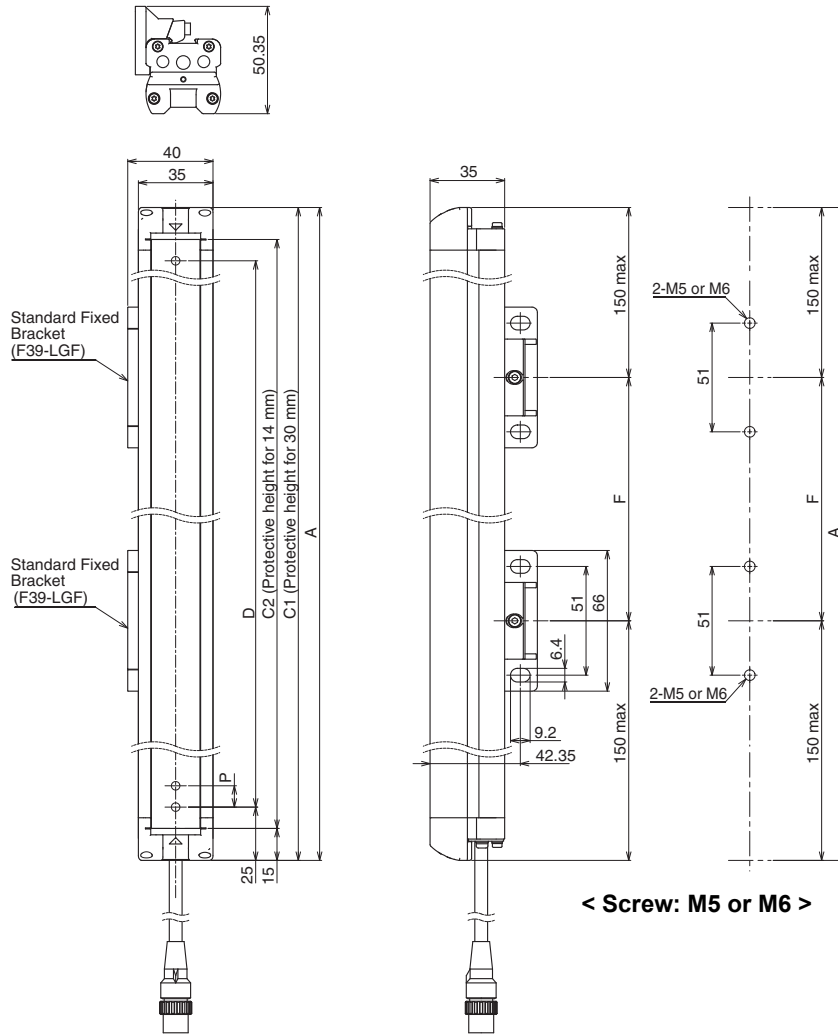
| Protective height (C2) | Number of Standard Fixed Brackets *1 | Dimension F  |
|------------------------|--------------------------------------|--------------|
| 0160 to 1200           | 2 *2                                 | 1000 mm max. |
| 1280 to 2080           | 3                             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

F3SG-RE

## 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

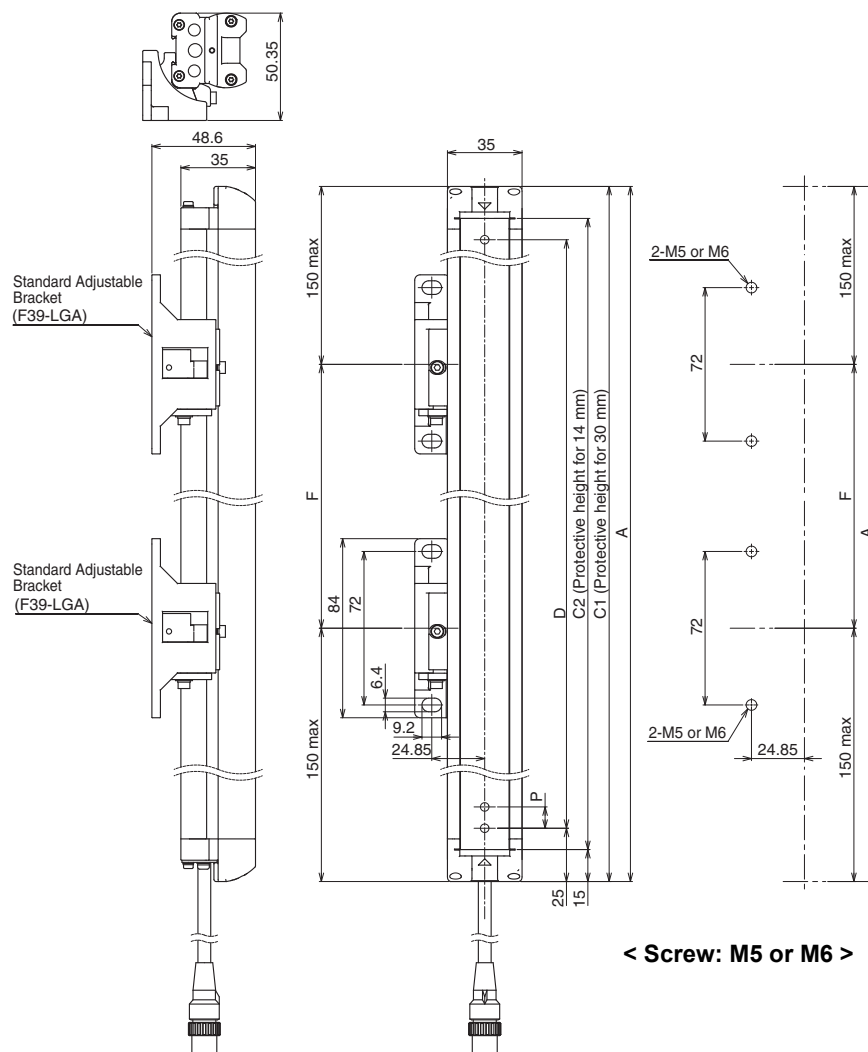
|              |   |
|--------------|---|
| Dimension A  | C2+30   |
| Dimension C2 | 4-digit number of the type name (Protective height) |
| Dimension D  | C2-20   |
| Dimension P  | 10  |

| 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**

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

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

**F3SG-4RE□□□□□14 Series**

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

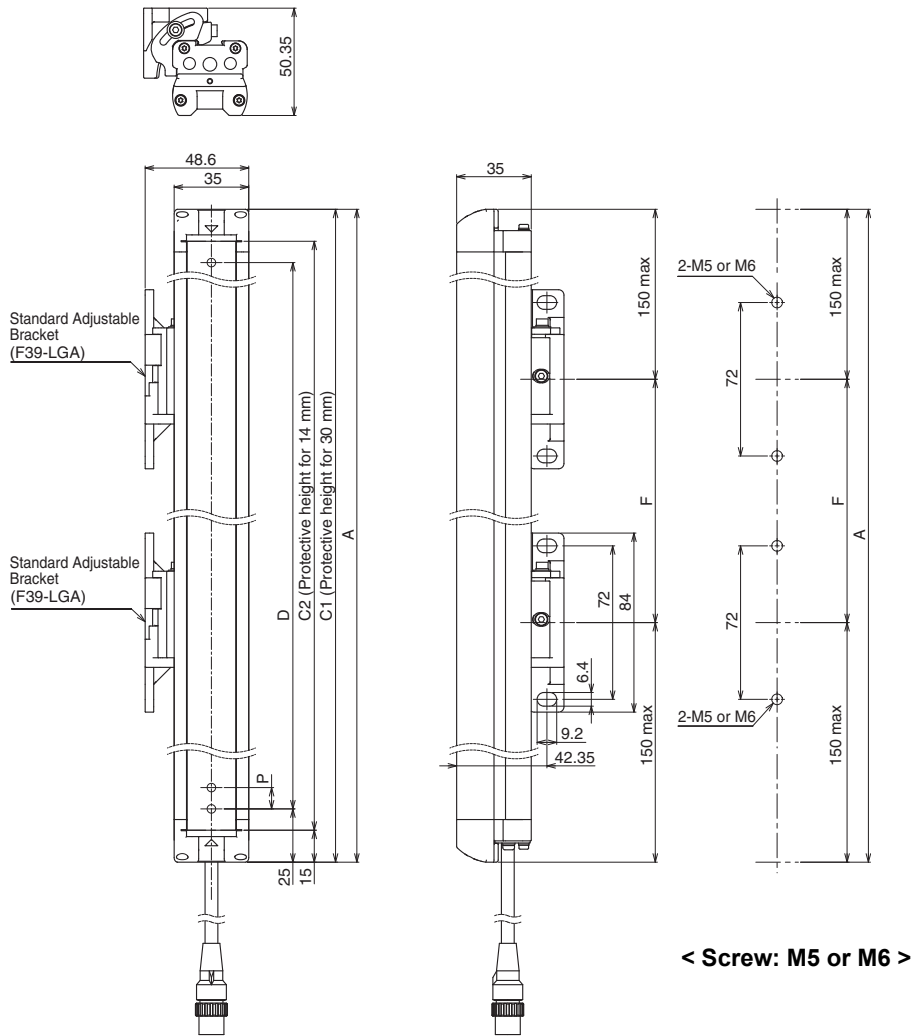
| Protective height (C2) | Number of Standard Adjustable Brackets *1 | Dimension F  |
|------------------------|---|--------------|
| 0160 to 1200           | 2 *2                                      | 1000 mm max. |
| 1280 to 2080           | 3   | 1000 mm max. |

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

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

F3SG-RE

## Side Mounting



### F3SG-4RE□□□□30 Series

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

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

### F3SG-4RE□□□□14 Series

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

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

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

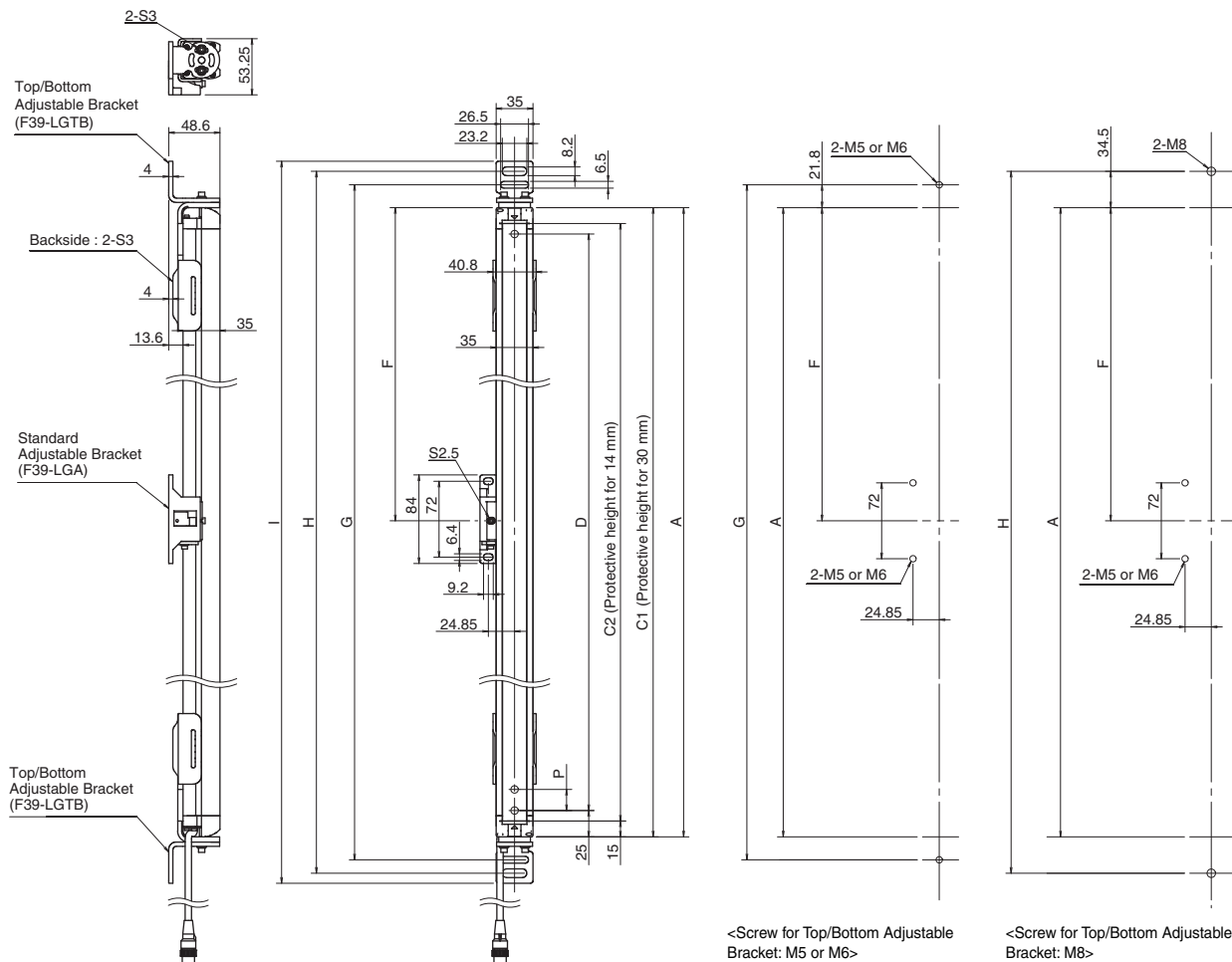
\*2. Mounting an emitter or receiver with one bracket is possible for the models of protective height of 0160 to 0270. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

## 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 *1 | Number of Standard Adjustable Brackets *1 *2 | 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

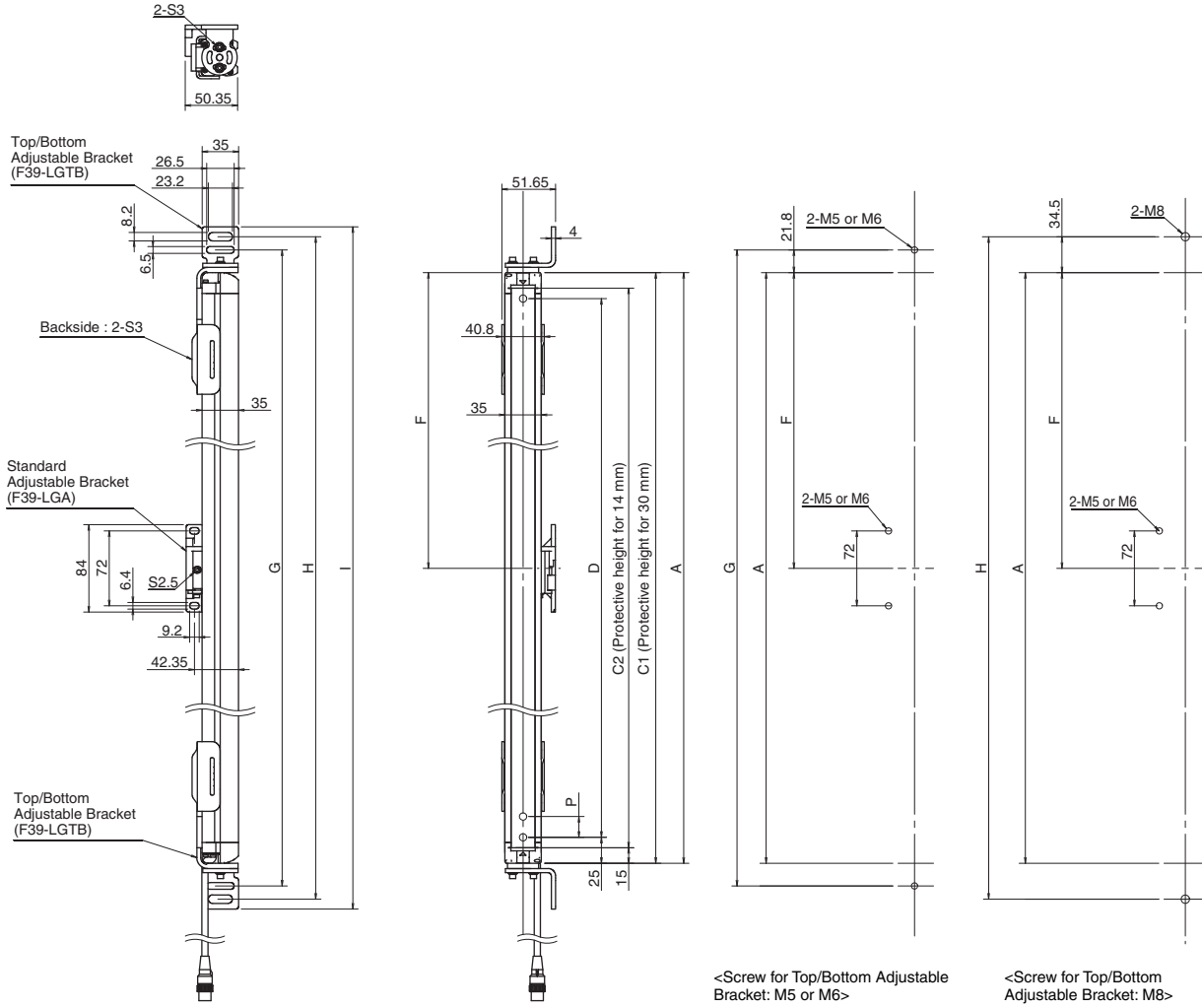
|              |   |
|--------------|---|
| Dimension A  | C2+30   |
| Dimension C2 | 4-digit number of the type name (Protective height) |
| Dimension D  | C2-20   |
| Dimension G  | C2+73.5   |
| Dimension H  | C2+99   |
| Dimension I  | C2+118  |
| Dimension P  | 10  |

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

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

\*2.The Top/Bottom Adjustable Bracket is not useable together with the Standard Fixed Bracket. When it is necessary to use it with another bracket, only the combination with the Standard Adjustable Bracket is possible.

## Side Mounting



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

<Screw for Top/Bottom Adjustable Bracket: M8>

### F3SG-4RE□□□□30 Series

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

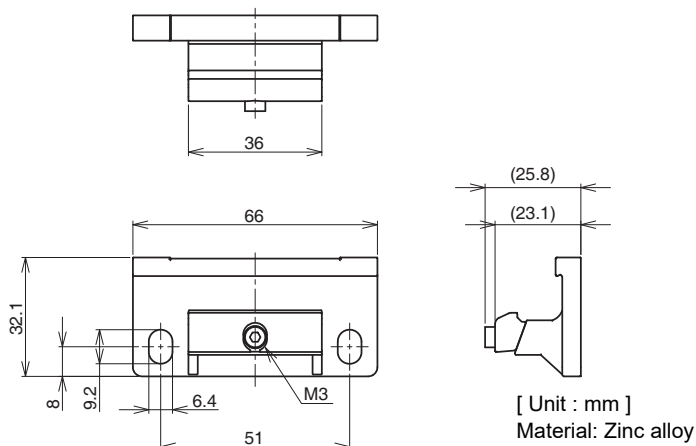
|                     |   |
|---------------------|---|
| <b>Dimension A</b>  | C2+30   |
| <b>Dimension C2</b> | 4-digit number of the type name (Protective height) |
| <b>Dimension D</b>  | C2-20   |
| <b>Dimension G</b>  | C2+73.5   |
| <b>Dimension H</b>  | C2+99   |
| <b>Dimension I</b>  | C2+118  |
| <b>Dimension P</b>  | 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. |

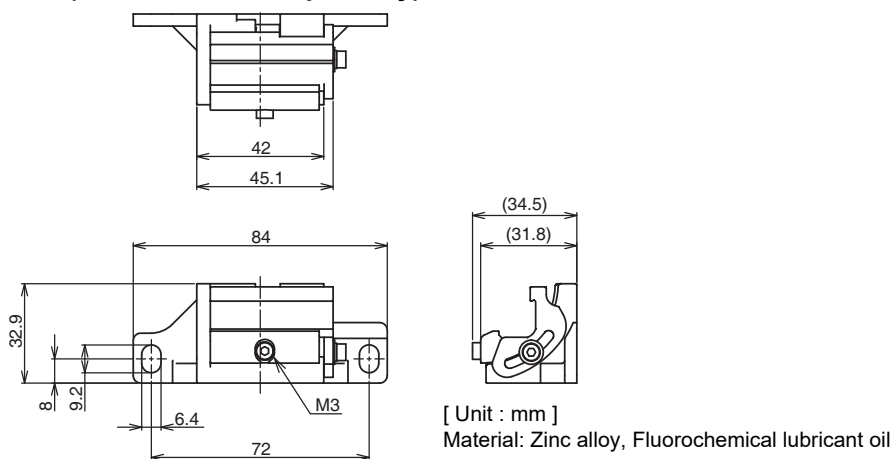
## Accessories

### Sensor Mounting Brackets

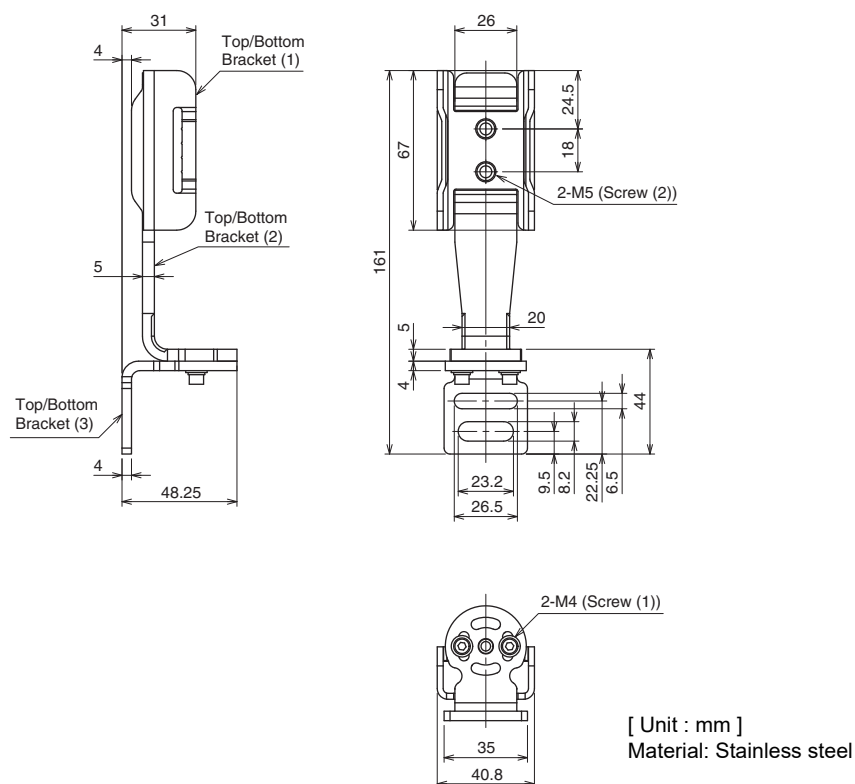
#### Standard Fixed Bracket (F39-LGF)



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



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



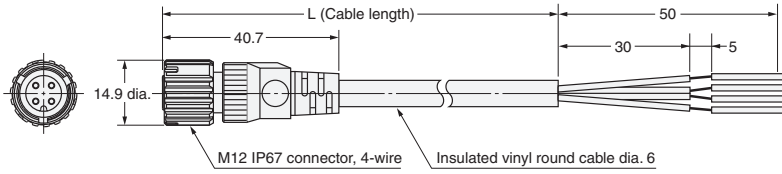
F3SG-RE



# F3SG-RE

## Safety light curtain connecting cable

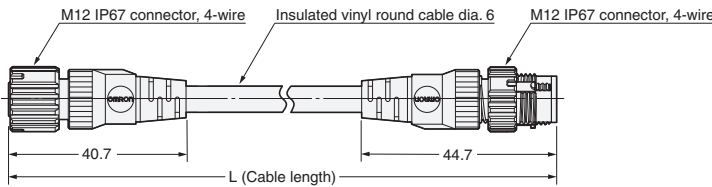
### Round Water-resistant Connector: Connector Connected to Cable, Socket on One Cable End (XS5F-D421-□80-F, sold separately)



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    |

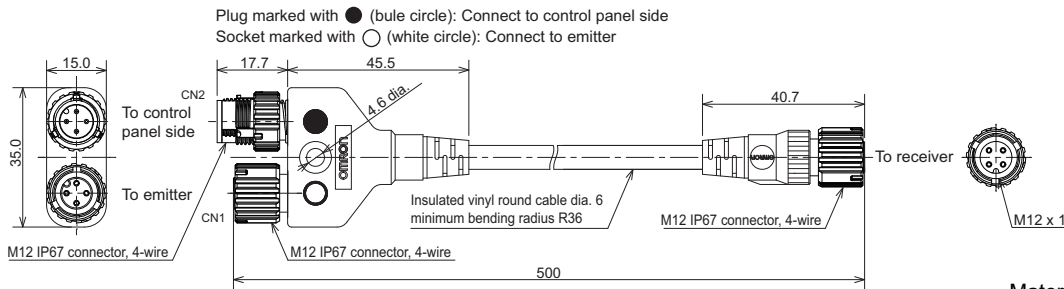
### Round Water-resistant Connector: Connectors Connected to Cable, Socket and Plug on Cable Ends (XS5W-D421-□81-F, sold separately)



Material: Insulated vinyl round cable

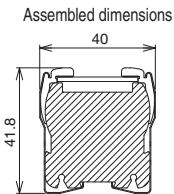
| Specification               | Model           | L (m) |
|-----------------------------|-----------------|-------|
| Fire-retardant, Robot cable | XS5W-D421-C81-F | 1     |
|                             | XS5W-D421-D81-F | 2     |
|                             | XS5W-D421-E81-F | 3     |
|                             | 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<br>F3SG-□R Series User's Manual |

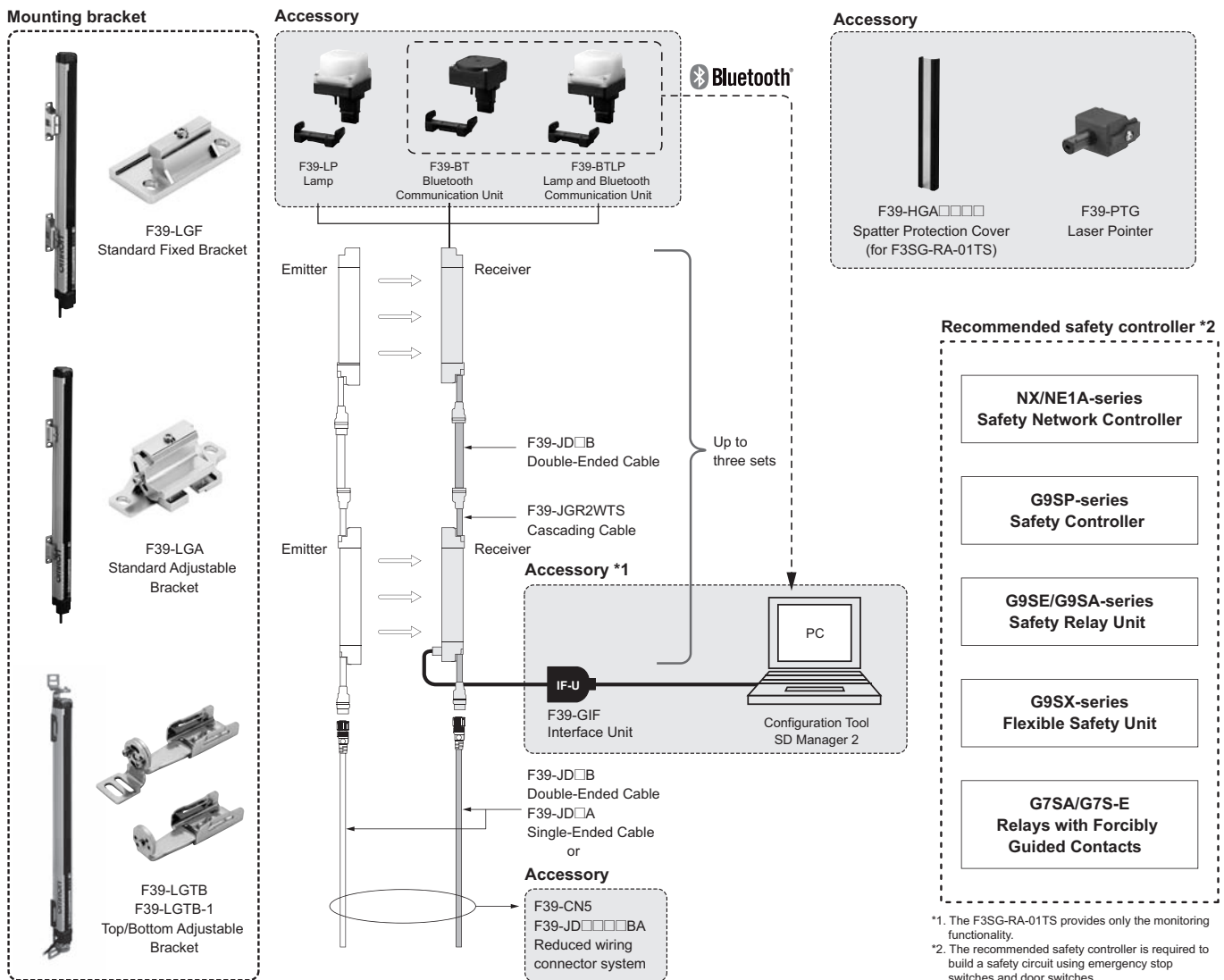
# Safety Light Curtain F3SG-RA-01TS

## 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.

F3SG-RA-01TS

# F3SG-RA-01TS

## 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) \*


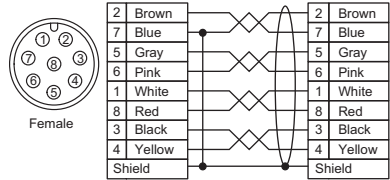
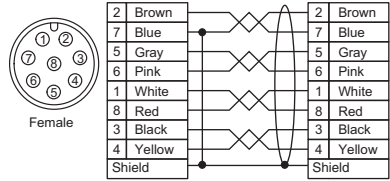
| Appearance  | Cable length  | Specifications   | Model  |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
|---|---|--|--------|----------|-------|---------|---------|-------|--------|-------|-------|-----|----------|--------|----------|----------|------|----------|----------|------|-------|-------|------|-----|----------|--------|--------|--|----------|----------|
|  | 3m  | For emitter M12 connector (8-pin), Color: Gray<br>Connected to Power Cable or Double-Ended Cable<br> <table border="1"> <tr><td>1</td><td>Not used</td><td>White</td></tr> <tr><td>2</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>3</td><td>TEST</td><td>Black</td></tr> <tr><td>4</td><td>Not used</td><td>Yellow</td></tr> <tr><td>5</td><td>Not used</td><td>Gray</td></tr> <tr><td>6</td><td>Not used</td><td>Pink</td></tr> <tr><td>7</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>8</td><td>Not used</td><td>Red</td></tr> <tr><td colspan="3">Shield</td></tr> </table> | 1      | Not used | White | 2       | +24 VDC | Brown | 3      | TEST  | Black | 4   | Not used | Yellow | 5        | Not used | Gray | 6        | Not used | Pink | 7     | 0 VDC | Blue | 8   | Not used | Red    | Shield |  |          | F39-JD3A |
|   | 1   | Not used   | White  |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
|   | 2   | +24 VDC  | Brown  |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
|   | 3   | TEST   | Black  |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
|   | 4   | Not used   | Yellow |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
| 5   | Not used  | Gray   |        |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
| 6   | Not used  | Pink   |        |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
| 7   | 0 VDC   | Blue   |        |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
| 8   | Not used  | Red  |        |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
| Shield  |   |  |        |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
| 7m  | For receiver M12 connector (8-pin), Color: Gray<br>Connected to Power Cable or Double-Ended Cable<br> <table border="1"> <tr><td>1</td><td>OSSD 2</td><td>White</td></tr> <tr><td>2</td><td>+24 VDC</td><td>Brown</td></tr> <tr><td>3</td><td>OSSD 1</td><td>Black</td></tr> <tr><td>4</td><td>AUX</td><td>Yellow</td></tr> <tr><td>5</td><td>Not used</td><td>Gray</td></tr> <tr><td>6</td><td>Not used</td><td>Pink</td></tr> <tr><td>7</td><td>0 VDC</td><td>Blue</td></tr> <tr><td>8</td><td>EDM</td><td>Red</td></tr> <tr><td colspan="3">Shield</td></tr> </table> | 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-JD7A |          |
| 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  |   |  |        |          |       |         |         |       |        |       |       |     |          |        |          |          |      |          |          |      |       |       |      |     |          |        |        |  |          |          |
| 10m   |   | 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   | <b>F39-JDR5B</b> |
|   | 1 m          |    | <b>F39-JD1B</b>  |
|   | 3 m          |  | <b>F39-JD3B</b>  |
|   | 5 m          | For receiver M12 connector (8-pin), Color: Black<br>Connected to Power Cable or Double-Ended Cable<br> | <b>F39-JD5B</b>  |
|   | 7 m          |  | <b>F39-JD7B</b>  |
|   | 10 m         |  | <b>F39-JD10B</b> |
|   | 15 m         |  | <b>F39-JD15B</b> |
|   | 20 m         | <b>F39-JD20B</b>   |                  |

\* 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.

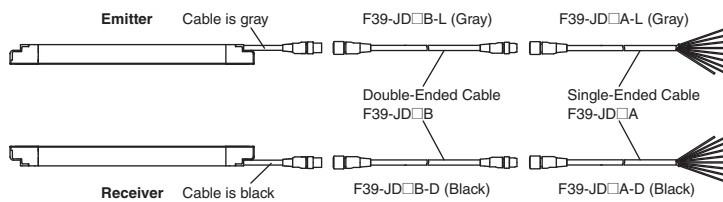
Double-Ended Cable for Emitter: F39-JD(R)□B-L, Double-Ended Cable for Receiver: F39-JD(R)□B-D

**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.


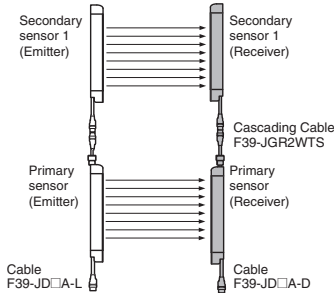
To extend the cable length to more than 40 m, add several Double-Ended Cables to the Single-Ended Cable.

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>**

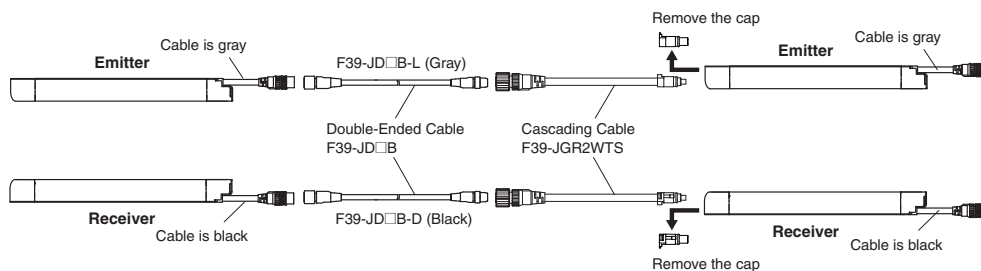


**Cascading Cable (2 cables per set, for emitter and receiver)**

| Appearance  | Type                               | Cable length | Specifications   | Model              |
|---|------------------------------------|--------------|--|--------------------|
|  | Cap (8-pin), M12 connector (8-pin) | 0.2m         |  | <b>F39-JGR2WTS</b> |

**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>**



F3SG-RA-01TS

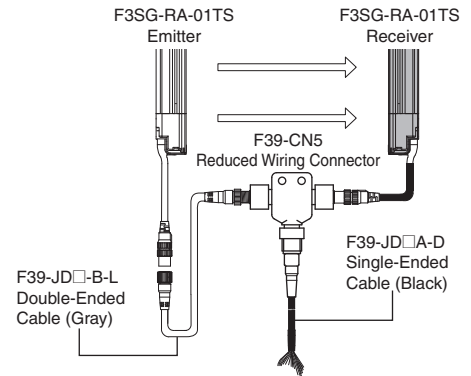
# F3SG-RA-01TS

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


| Appearance  | Specifications         | Model          |
|---|------------------------|----------------|
|  | IP67 rated when mated. | <b>F39-CN5</b> |

**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<br>Receiver: 3 m   | IP67 rated when mated. | Double-Ended Cable: F39-JD3B-L<br>Single-Ended Cable: F39-JD3A-D   | <b>F39-JD0303BA</b> |
|  | Emitter: 3 m<br>Receiver: 7 m   |                        | Double-Ended Cable: F39-JD3B-L<br>Single-Ended Cable: F39-JD7A-D   | <b>F39-JD0307BA</b> |
|  | Emitter: 3 m<br>Receiver: 10 m  |                        | Double-Ended Cable: F39-JD3B-L<br>Single-Ended Cable: F39-JD10A-D  | <b>F39-JD0310BA</b> |
|  | Emitter: 5 m<br>Receiver: 3 m   |                        | Double-Ended Cable: F39-JD5B-L<br>Single-Ended Cable: F39-JD3A-D   | <b>F39-JD0503BA</b> |
|  | Emitter: 5 m<br>Receiver: 7 m   |                        | Double-Ended Cable: F39-JD5B-L<br>Single-Ended Cable: F39-JD7A-D   | <b>F39-JD0507BA</b> |
|  | Emitter: 5 m<br>Receiver: 10m   |                        | Double-Ended Cable: F39-JD5B-L<br>Single-Ended Cable: F39-JD10A-D  | <b>F39-JD0510BA</b> |
|  | Emitter: 10 m<br>Receiver: 3 m  |                        | Double-Ended Cable: F39-JD10B-L<br>Single-Ended Cable: F39-JD3A-D  | <b>F39-JD1003BA</b> |
|  | Emitter: 10 m<br>Receiver: 7 m  |                        | Double-Ended Cable: F39-JD10B-L<br>Single-Ended Cable: F39-JD7A-D  | <b>F39-JD1007BA</b> |
|  | Emitter: 10 m<br>Receiver: 10 m |                        | Double-Ended Cable: F39-JD10B-L<br>Single-Ended Cable: F39-JD10A-D | <b>F39-JD1010BA</b> |

**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.)  | <b>F39-LGF</b>    |
|  | Standard Adjustable Bracket                                    | Bracket to mount the F3SG-RA-01TS. Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$ . Side mounting and backside mounting possible. (Sold separately as a set of two Brackets. Refer to note *1 for the number of sets required for each model.)   | <b>F39-LGA</b>    |
|  | Top/Bottom Adjustable Bracket *2                               | Bracket to mount the F3SG-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 $\pm 22.5^\circ$ . Side mounting and backside mounting possible. (Sold separately. 4 brackets per set.) | <b>F39-LGTB</b>   |
|  | Top/Bottom Adjustable Bracket *2 (For user-made mounting part) | Top/Bottom Adjustable Bracket without a bracket to mount to the wall. Use the user's own wall mounting part to suit the machine. (Sold separately. 4 brackets per set.)  | <b>F39-LGTB-1</b> |

\*1. 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 <a href="http://www.ia.omron.com/f3sg-r_tool">http://www.ia.omron.com/f3sg-r_tool</a> .                    | —              |
|  | Interface Unit               | F39-GIF interface unit to connect the F3SG-RA-01TS receiver to a USB port of the PC<br><br>Accessories:<br>0.3-m Dedicated Cable 1 (1),<br>2-m Dedicated Cable 2 (1),<br>Instruction Manual | <b>F39-GIF</b> |
|  | Bluetooth Communication Unit | F39-BT bluetooth unit to enable bluetooth on the F3SG-RA<br><br>IP67 rated when mated.  | <b>F39-BT</b>  |

\* 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.<br><br>The lamp output pattern is set as follows:<br>Red (ON): Inverted signal of safety output information<br>Orange (Blink once): Inverted signal of stable-state information | <b>F39-LP</b>   |
|  | Lamp and Bluetooth Communication Unit | Green (ON): Safety output information<br><br>IP67 rated when mated.  | <b>F39-BTLP</b> |

**End Cap \***

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

\* 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. | <b>F39-PTG</b> |

F3SG-RA-01TS

# F3SG-RA-01TS

## 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 | Model       |
|---|----------------------------|-------------|
|   | Hand protection            |             |
|  | 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<br>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.<br>Refer to page 101 for the one segment system. Refer to <i>Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual (ManNo.: Z380)</i> 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.)<br>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<br>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.<br>*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)<br>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<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 6.5 mA) *<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 8.0 mA) *  |  |
|                       |   |  | NPN<br>ON voltage: 0 to 3 V (short circuit current: approx. 8.0 mA) *<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 6.5 mA) *   |  |
|                       |   | Test input   | 24 V inactive setting<br>ON voltage: 0 to 3 V or open (short circuit current: approx. 2.0 mA)<br>OFF voltage: 9 V to Vs (short circuit current: approx. 2.5 mA) *<br>0 V inactive setting<br>ON voltage: 9 V to Vs or open (short circuit current: approx. 2.5 mA)<br>OFF voltage: 0 to 3 V (short circuit current: approx. 2.0 mA)<br>* 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.<br>Total number of beams: 255 max.<br>Cable length between sensors: 10 m max.<br>(not including cascading cable (F39-JGR2WTS) and power cable)   |   |  |
|                       | Test Function   | Self-test (at power-on, and during operation)<br>External test (light emission stop function by test input)  |   |  |
|                       | Safety-Related Functions  | External device monitoring (EDM)<br>Scan code selection<br>PNP/NPN selection   |   |  |



# F3SG-RA-01TS

|                                |   |  | 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<br>Sunlight: 10,000 lx max. on receiver surface   |
|                                | Degree of Protection (IEC 60529)                                |  | IP65 and IP67  |
|                                | Vibration Resistance (IEC 61496-1)                              |  | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: 5 to 150 Hz, Multiple amplitude of 7 mm, Acceleration of 1 G, 10 sweeps each in X, Y, and Z directions (no delay at resonant frequencies) |
| Shock Resistance (IEC 61496-1) |   | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: Acceleration of 15 G, Pulse duration of 6 ms, 100 shocks for each in X, Y, and Z directions (600 shocks in total) |  |
| 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  |
|                                |   | Minimum Bending Radius   | R5 mm  |
|                                | Extension cable<br>- Single-Ended Cable<br>- 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.  |
|                                |   | Minimum Bending Radius   | R36 mm   |
| Extension of Power Cable       |   |  | 100 m max.(Emitter/Receiver)   |
| Material                       | Material  | Housing: Aluminum alloy<br>Cap: PBT resin<br>Front window: Acrylic resin<br>Cable: Oil-resistant PVC resin<br>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 <sub>D</sub>  | 1.1 × 10 <sup>-8</sup> (IEC 61508)   |  |
|                                | Proof test interval T <sub>M</sub>                              | Every 20 years (IEC 61508)   |  |
|                                | SFF   | 99% (IEC 61508)  |  |
|                                | HFT   | 1 (IEC 61508)  |  |
| Classification                 | Type B (IEC 61508-2)  |  |  |

## Bluetooth Communication Unit

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

\* It depends on use environment conditions.

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

| 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

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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. EU Declaration of Conformity  
OMRON declares that the F3SG-RA-01TS is in conformity with the requirements of the following EU Directives:  
Machinery Directive 2006/42/EC  
EMC Directive 2014/30/EU
4. Conforming Standards
  - (1) European standards  
EN61496-1 (Type 4 and Type 2 ESPE), EN 61496-2 (Type 4 and Type 2 AOPD), EN61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), EN ISO 13849-1:2015 (PL e, Category 4 for Type 4 and PL c, Category 2 for Type 2)
  - (2) International standards  
IEC61496-1 (Type 4 and Type 2 ESPE), IEC61496-2 (Type 4 and Type 2 AOPD), IEC61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), ISO 13849-1:2015 (PL e, Category 4 for Type 4 and PL c, Category 2 for Type 2)
  - (3) JIS standards  
JIS B 9704-1 (Type 4 and Type 2 ESPE), JIS B 9704-2 (Type 4 and Type 2 AOPD)
  - (4) North American standards  
UL61496-1 (Type 4 and Type 2 ESPE), UL61496-2 (Type 4 and Type 2 AOPD), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
5. 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 x1   |
| Ambient temperature   | Operating: -10 to 55°C, Storage: -30 to 70°C(non-icing and non-condensing)            |
| Ambient humidity      | Operating: 35% to 85%, Storage: 35% to 95%(non-condensing)                            |

### Lamp

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

# F3SG-RA-01TS

## 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.

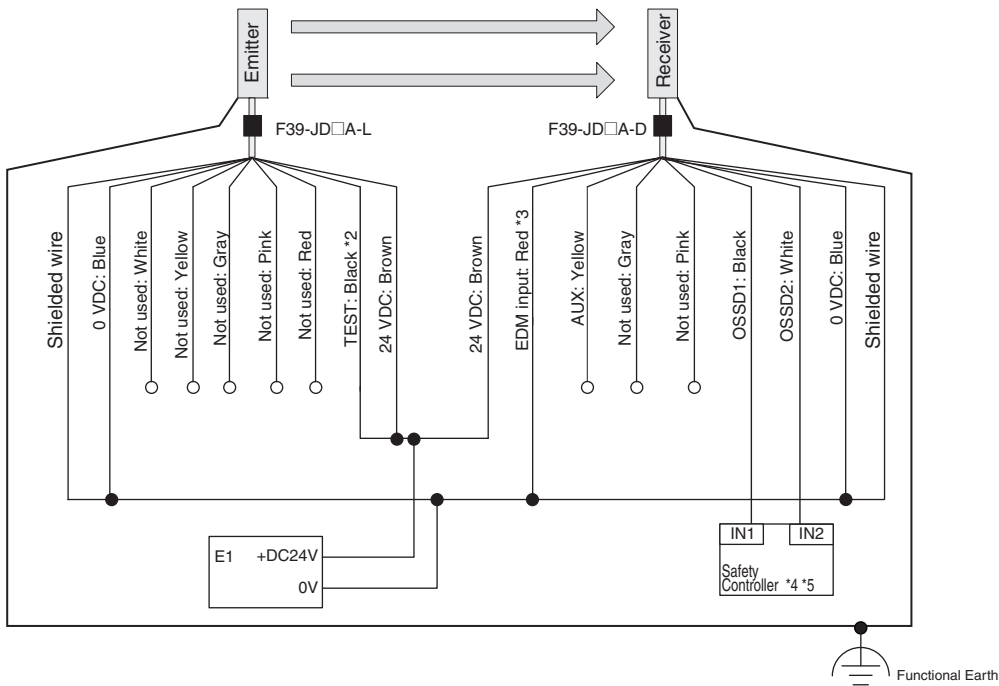
#### DIP Switch settings \*1

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

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

#### Wiring Example



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

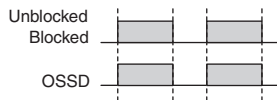
\*2. When the external test function is used, connect to 24V via the test switch (NC contact).

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

\*4. Refer to page 106 for more information.

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

E1: 24VDC power supply (S8VS)



**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.

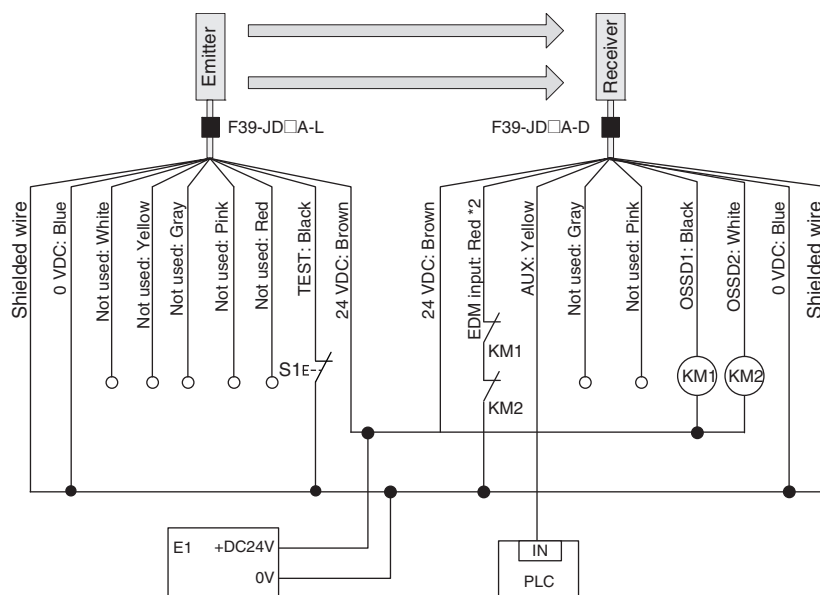
#### DIP Switch settings \*1

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

: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

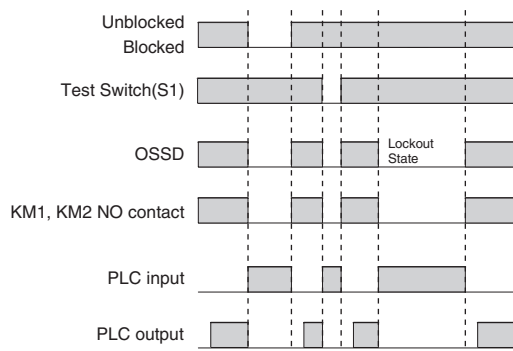
#### Wiring Example



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

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

- S1: 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.

F3SG-RA-01TS

# F3SG-RA-01TS

## 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<br>G9SA-321-T□<br>G9SA-501<br>G9SB-200-B<br>G9SB-200-D<br>G9SB-301-B<br>G9SB-301-D<br>G9SE-201<br>G9SE-401<br>G9SE-221-T□ | G9SX-AD322-T<br>G9SX-ADA222-T<br>G9SX-BC202<br>G9SX-GS226-T15 | G9SP-N10S<br>G9SP-N10D<br>G9SP-N20S<br>NE0A-SCPU01<br>NE1A-SCPU01<br>NE1A-SCPU02<br>DST1-ID12SL-1<br>DST1-MD16SL-1<br>DST1-MRD08SL-1<br>NX-SIH400<br>NX-SID800<br>F3SP-T01 |

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

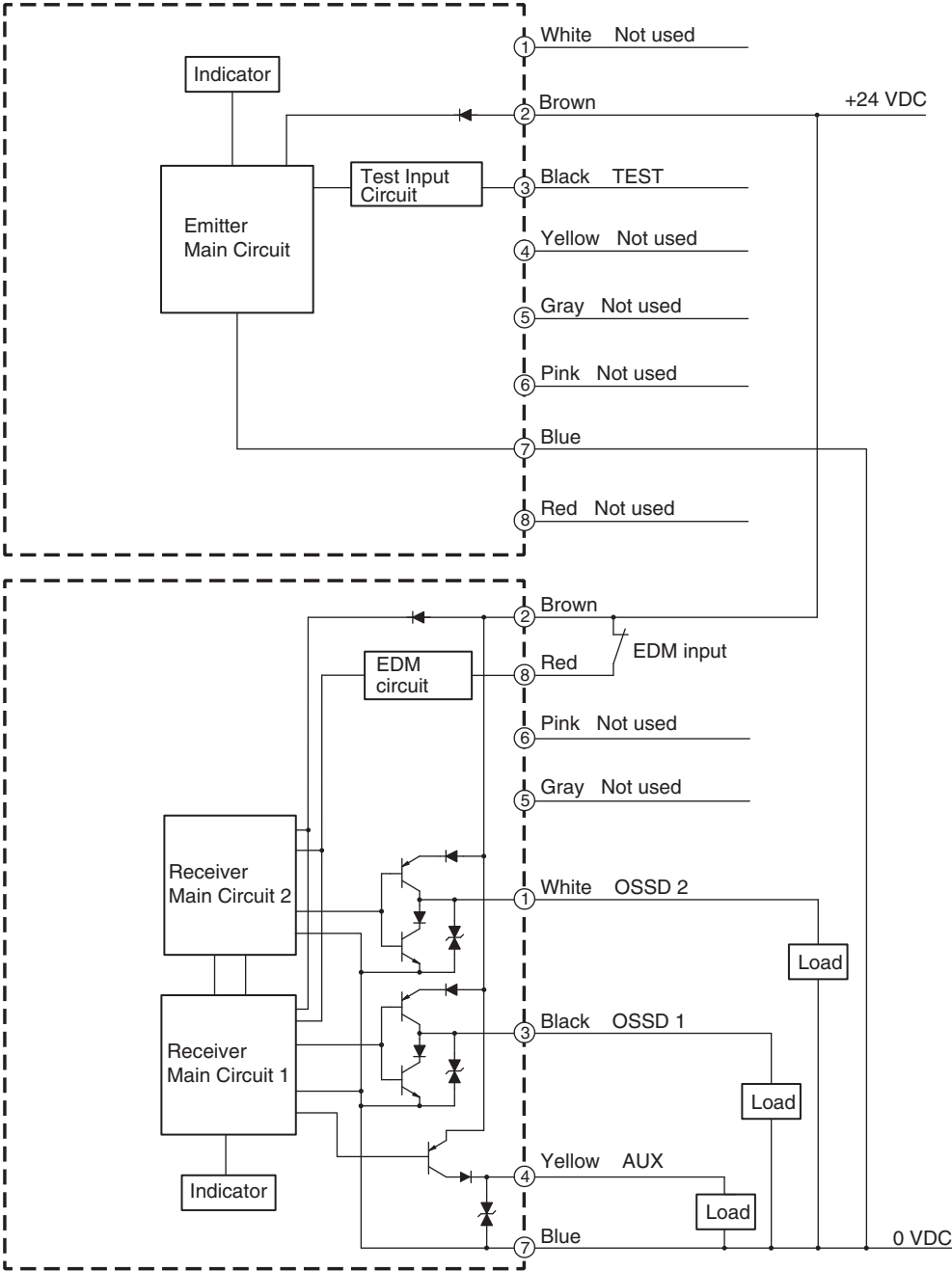
| Connectable Safety Control Units (NPN output) |
|---|
| Safety Relay Units                            |
| G9SA-301-P                                    |

# 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.

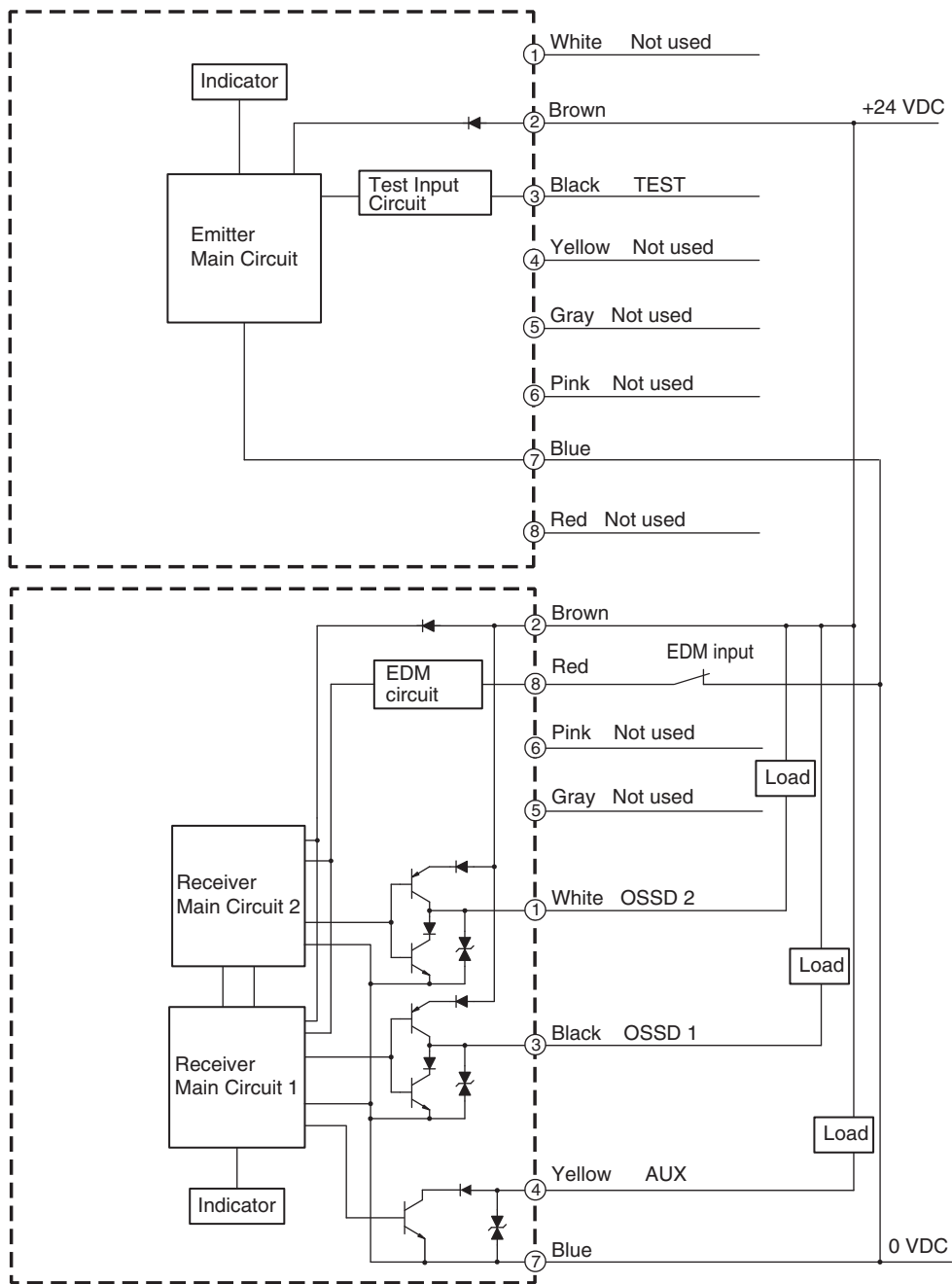
## PNP Output



F3SG-RA-01TS



## NPN Output

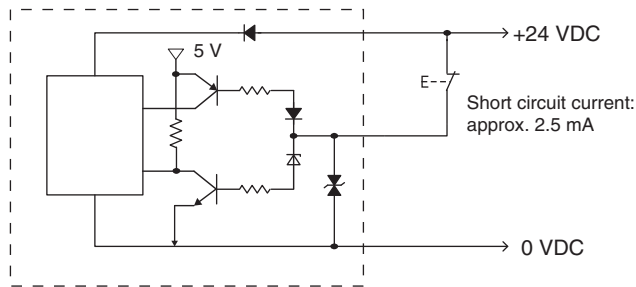


**Input Circuit Diagram by Function**

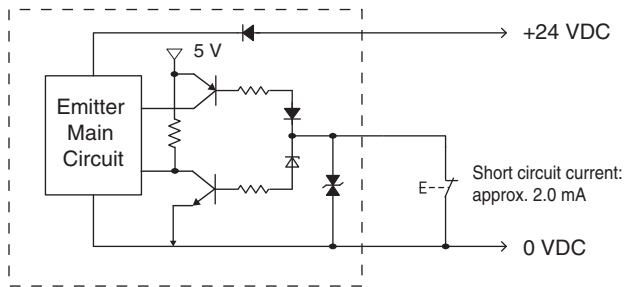
The input circuit diagrams of by function are shown below.

**TEST**

<24 V Inactive>

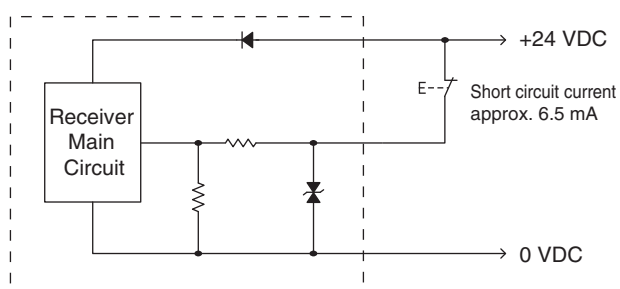


<0 V Inactive>

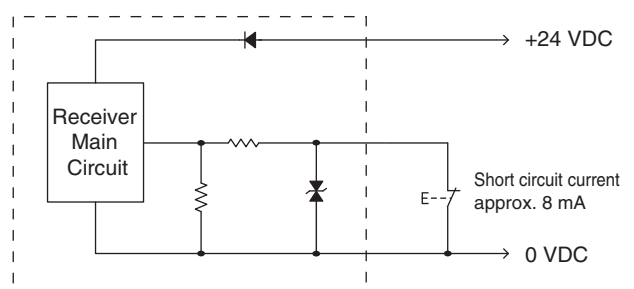


**EDM**

<PNP Output>

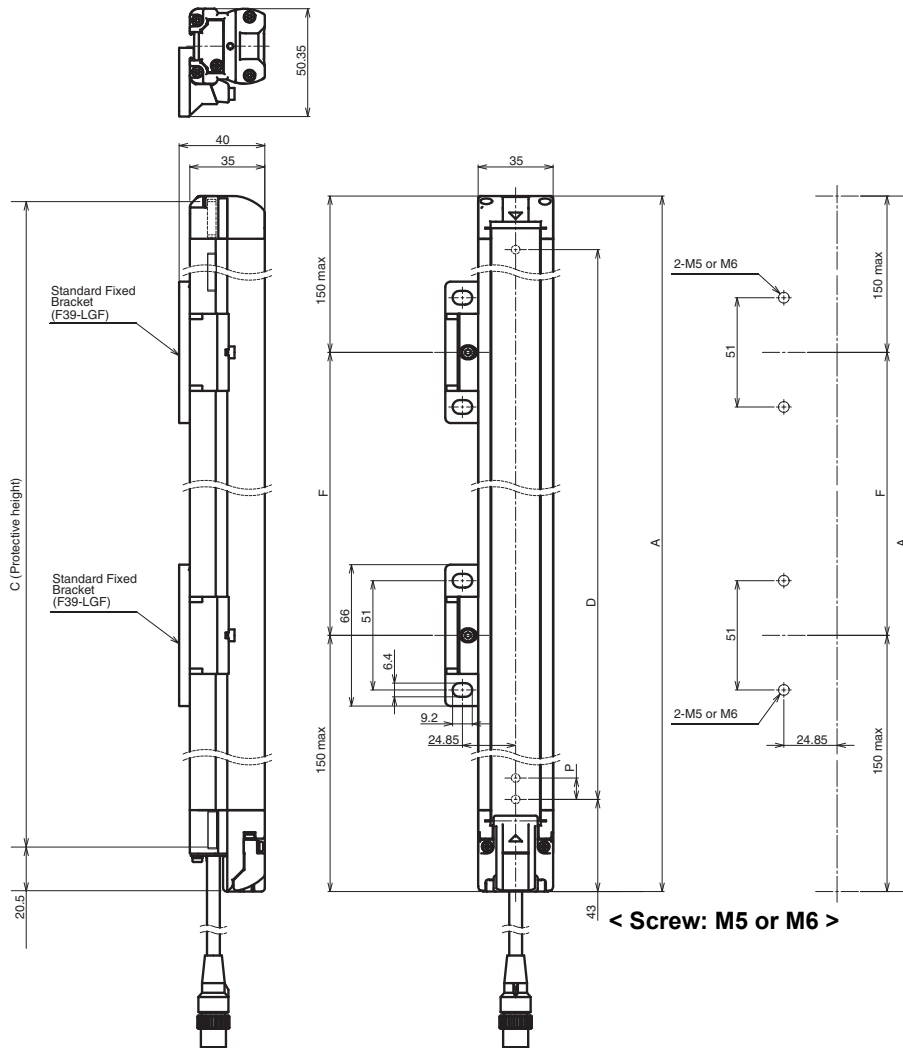


<NPN Output>



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

#### Backside Mounting



#### F3SG-4RA□□□□-25-01TS Series

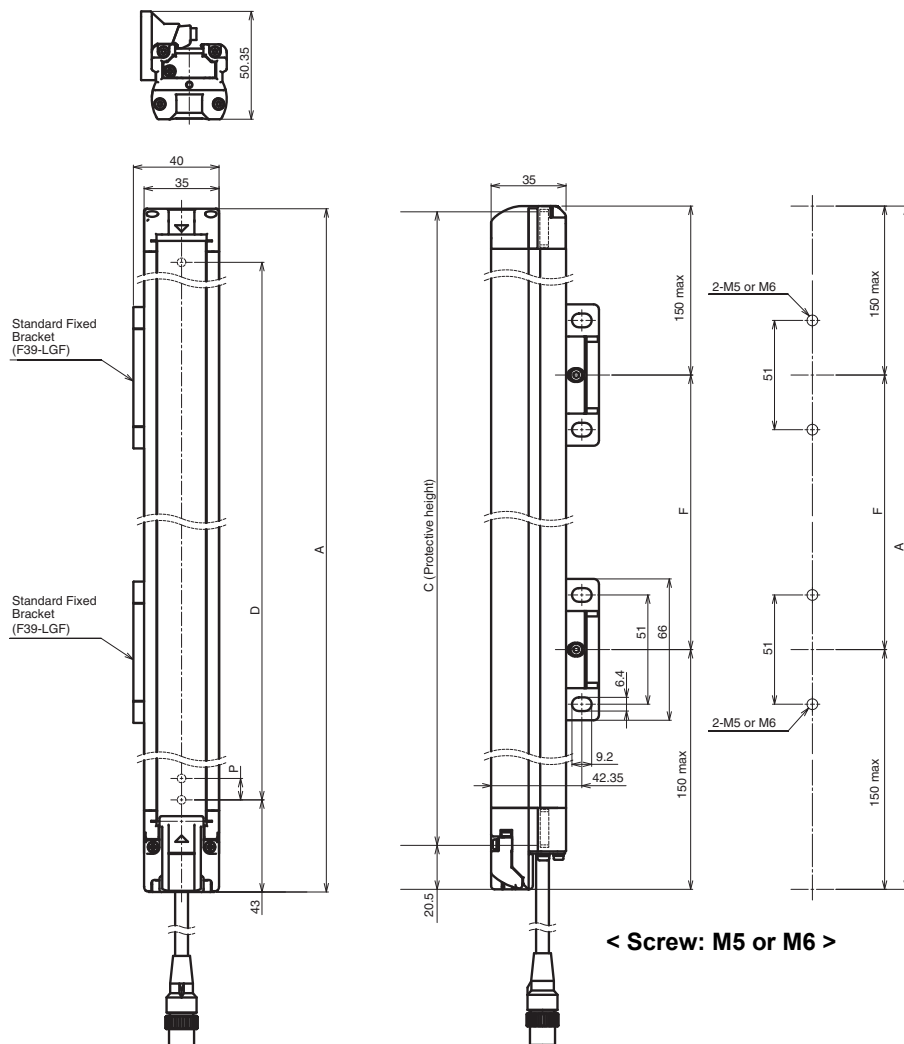
|             |  |
|-------------|--|
| Dimension A | C+23   |
| Dimension C | 4-digit number of the type name<br>(Protective height) |
| Dimension D | C-45   |
| Dimension P | 20   |

| 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

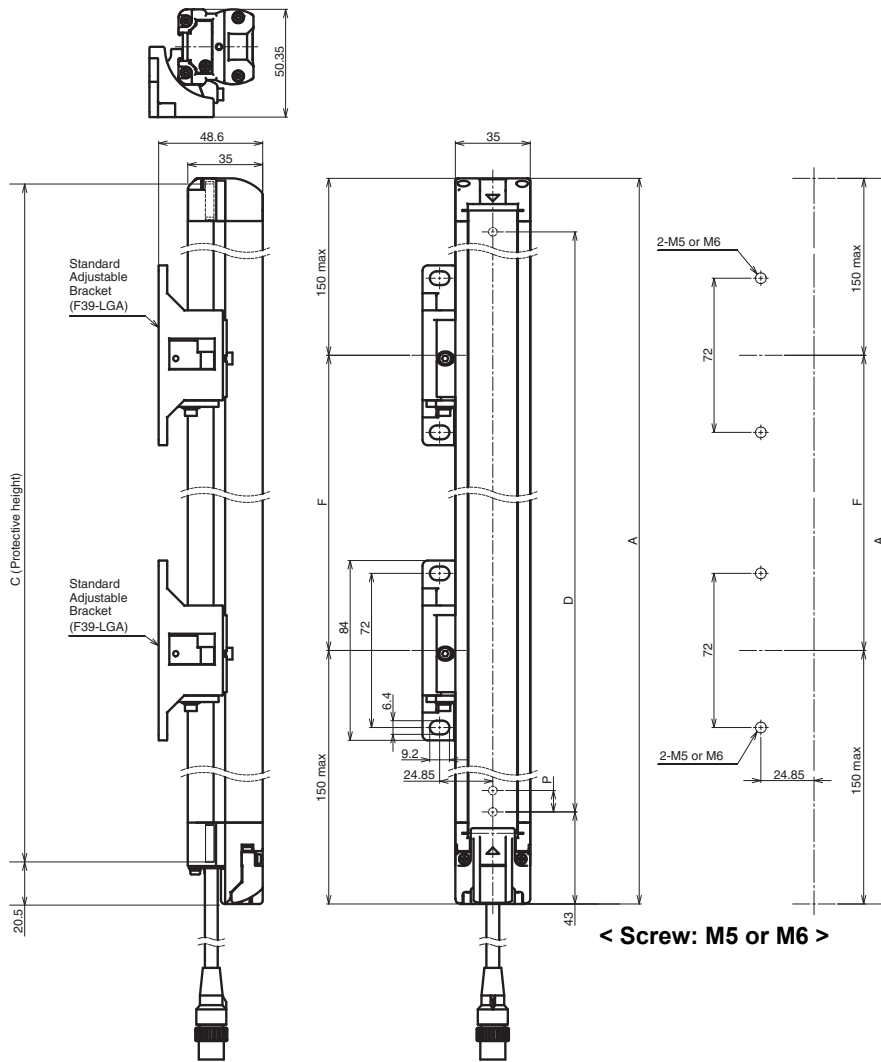
|             |   |
|-------------|---|
| Dimension A | C+23  |
| Dimension C | 4-digit number of the type name (Protective height) |
| Dimension D | C-45  |
| Dimension P | 20  |

| 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).

F3SG-RA-01TS

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



### F3SG-4RA□□□□-25-01TS Series

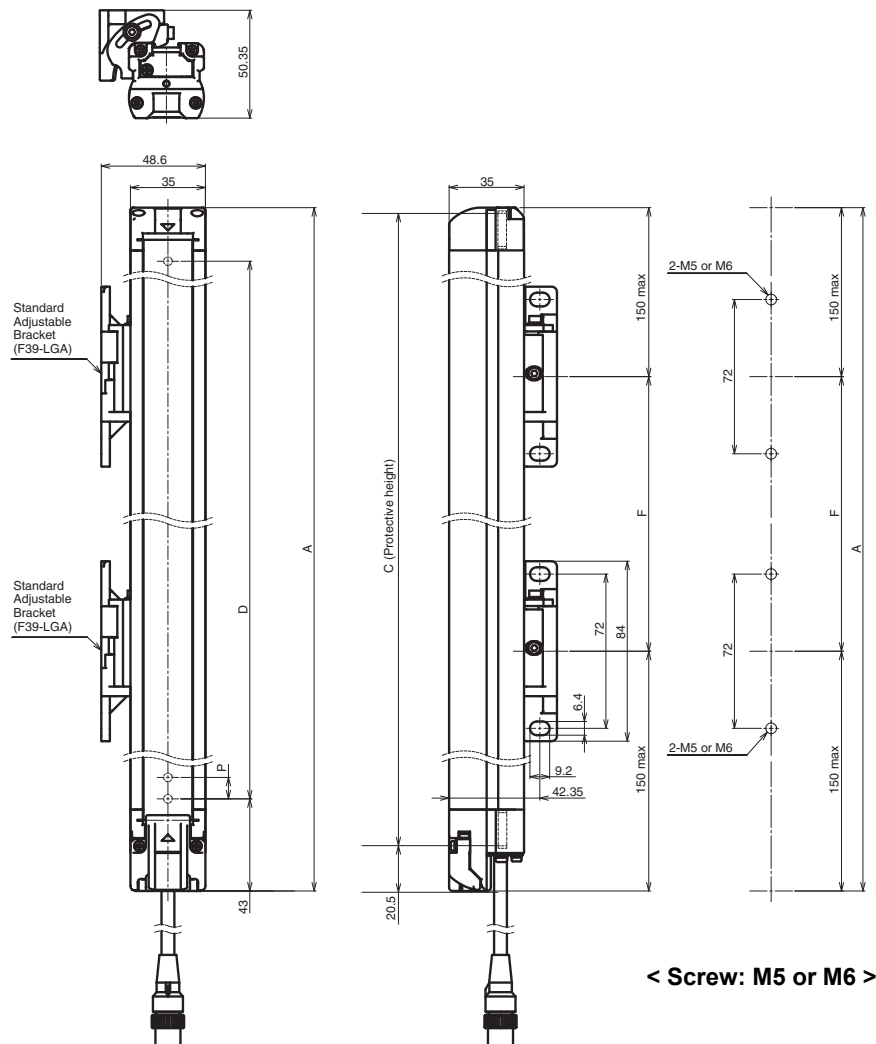
|             |  |
|-------------|--|
| Dimension A | C+23   |
| Dimension C | 4-digit number of the type name<br>(Protective height) |
| Dimension D | C-45   |
| Dimension P | 20   |

| 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).

F3SG-RA-01TS

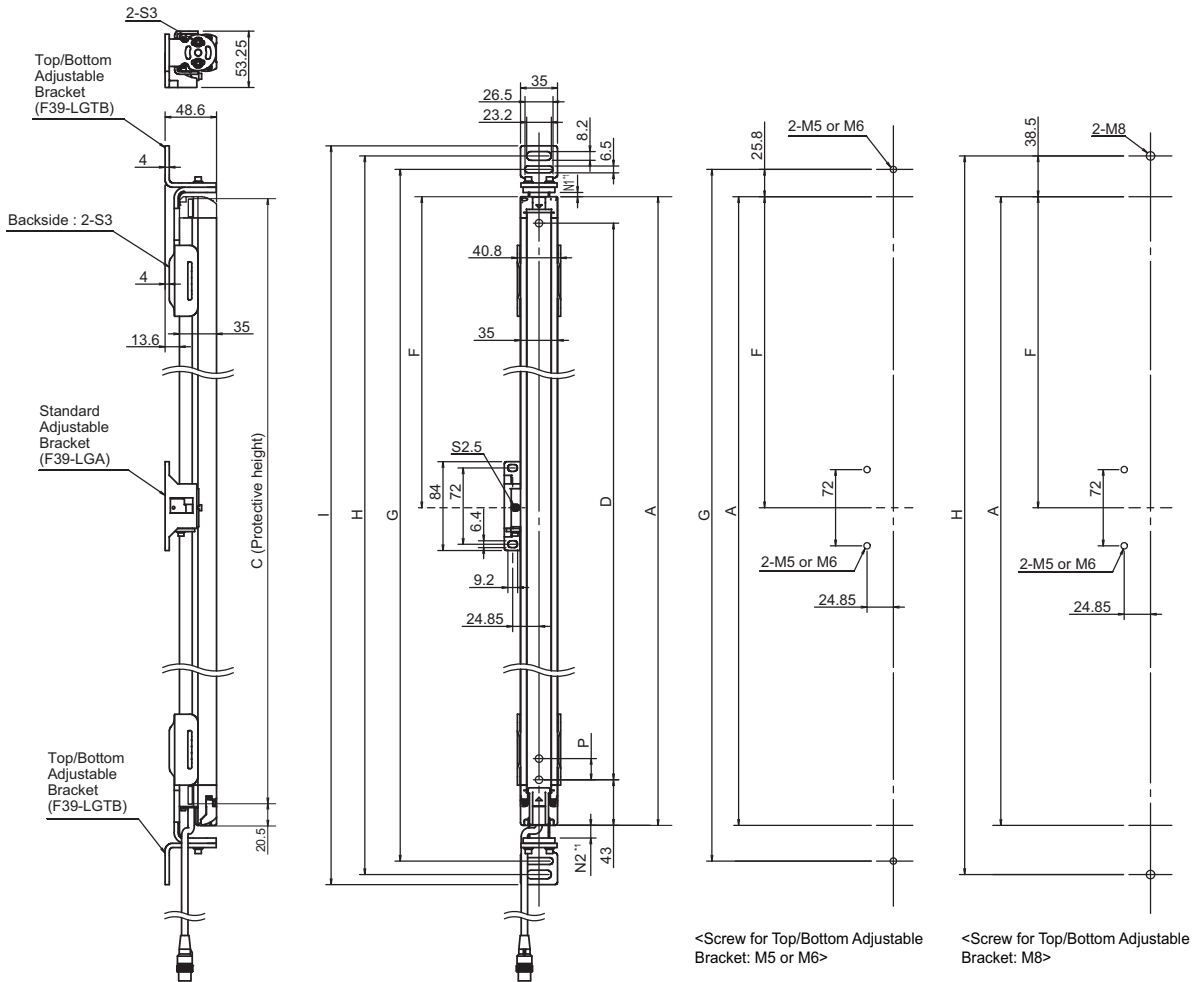
# F3SG-RA-01TS

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

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

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

### Backside Mounting



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

<Screw for Top/Bottom Adjustable Bracket: M8>

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

|             | Optional accessory not connected                    | Optional accessory connected *2 |            |                    |
|-------------|---|---------------------------------|------------|--------------------|
|             |   | F39-JGR2WTS                     | F39-BT     | F39-LP<br>F39-BTLP |
| Dimension A | C+23  | Same as on the left             |            |                    |
| Dimension C | 4-digit number of the type name (Protective height) | Same as on the left             |            |                    |
| Dimension D | C-45  | Same as on the left             |            |                    |
| Dimension G | C+N1+N2+66.5  | C+N2+73.5                       | C+N2+84    | C+N2+95.5          |
| Dimension H | C+N1+N2+92.0  | C+N2+99                         | C+N2+109.5 | C+N2+121           |
| Dimension I | C+N1+N2+111.0                                       | C+N2+118                        | C+N2+128.5 | C+N2+140           |
| Dimension P | 20  | Same as on the left             |            |                    |

\*1.N1 can be adjusted from 0 mm to 30 mm and N2 from 0 mm to 12 mm.

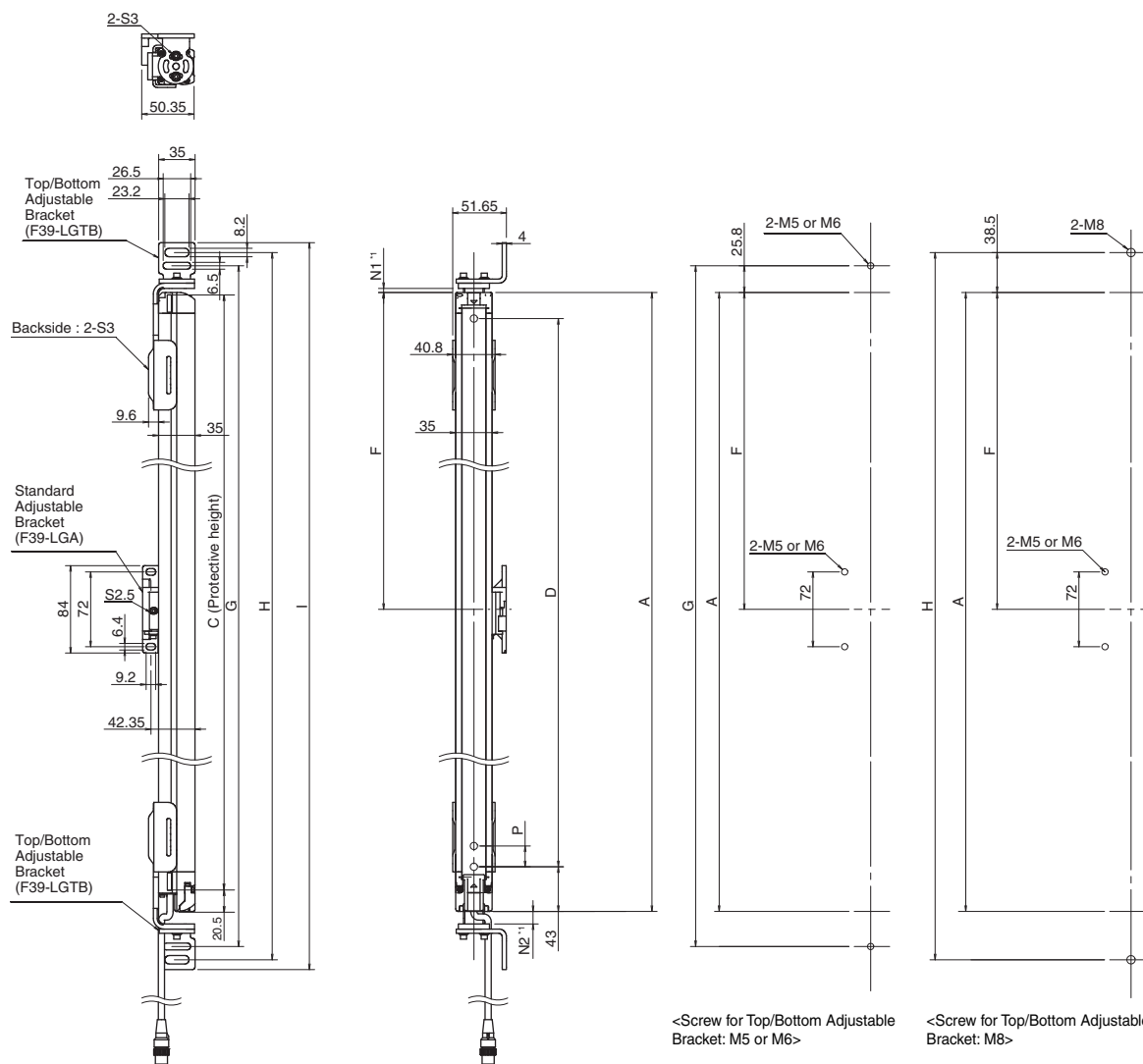
\*2.Refer to *Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual* for more information on the dimensions when optional accessories are connected to the F3SG-RA.

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

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

\*2.The Top/Bottom Adjustable Bracket is not useable together with the Standard Fixed Bracket. When it is necessary to use it with another bracket, only the combination with the Standard Adjustable Bracket is possible.

Side Mounting



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

|             | Optional accessory not connected                    | Optional accessory connected *2 |            |                    |
|-------------|---|---------------------------------|------------|--------------------|
|             |   | F39-JGR2WTS                     | F39-BT     | F39-LP<br>F39-BTLP |
| Dimension A | C+23  | Same as on the left             |            |                    |
| Dimension C | 4-digit number of the type name (Protective height) | Same as on the left             |            |                    |
| Dimension D | C-45  | Same as on the left             |            |                    |
| Dimension G | C+N1+N2+66.5  | C+N2+73.5                       | C+N2+84    | C+N2+95.5          |
| Dimension H | C+N1+N2+92.0  | C+N2+99                         | C+N2+109.5 | C+N2+121           |
| Dimension I | C+N1+N2+111.0                                       | C+N2+118                        | C+N2+128.5 | C+N2+140           |
| Dimension P | 20  | Same as on the left             |            |                    |

\*1.N1 can be adjusted from 0 mm to 30 mm and N2 from 0 mm to 12 mm.

\*2.Refer to *Safety Light Curtain F3SG-4RA□□□□-25-01TS Series User's Manual* for more information on the dimensions when optional accessories are connected to the F3SG-RA.

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

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

\*2.The Top/Bottom Adjustable Bracket is not useable together with the Standard Fixed Bracket. When it is necessary to use it with another bracket, only the combination with the Standard Adjustable Bracket is possible.

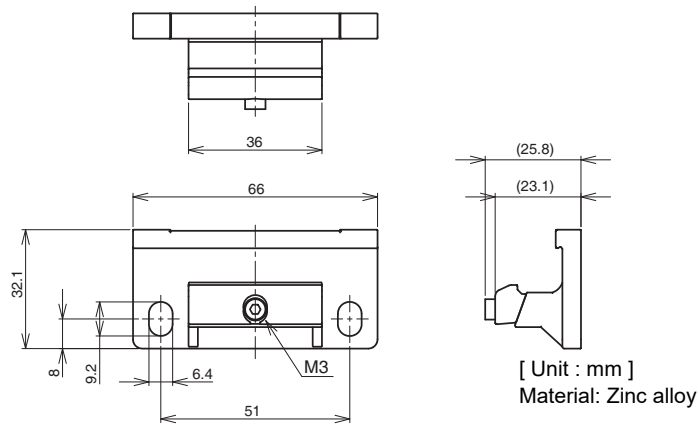
F3SG-RA-01TS



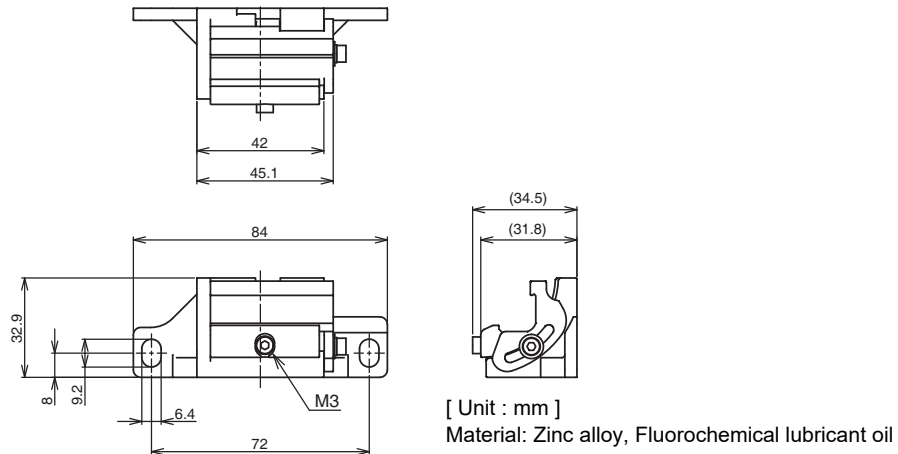
## Accessories

### Sensor Mounting Brackets

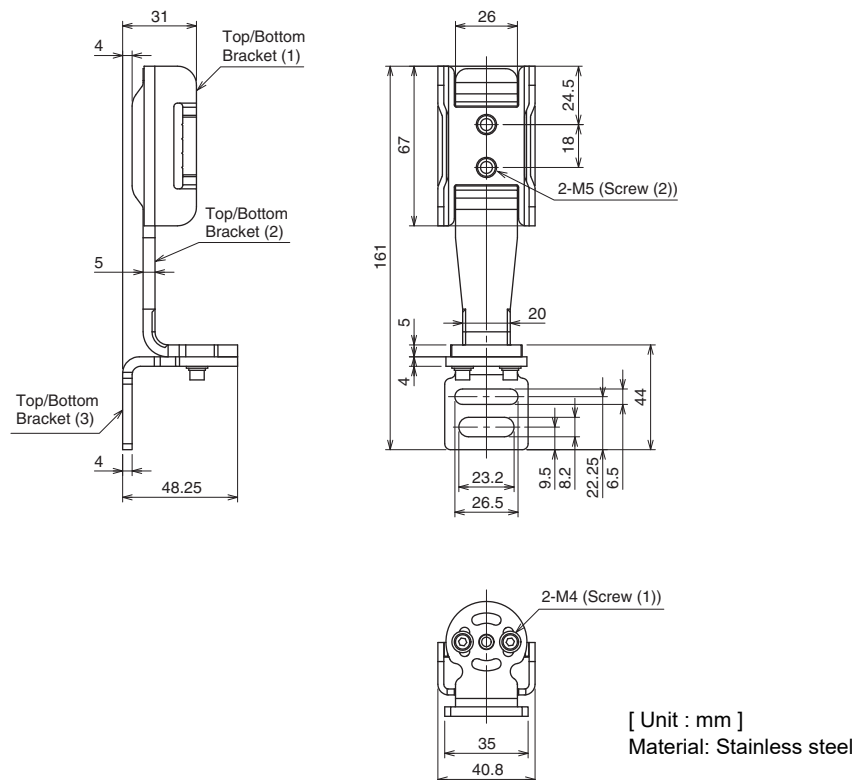
#### Standard Fixed Bracket (F39-LGF)



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

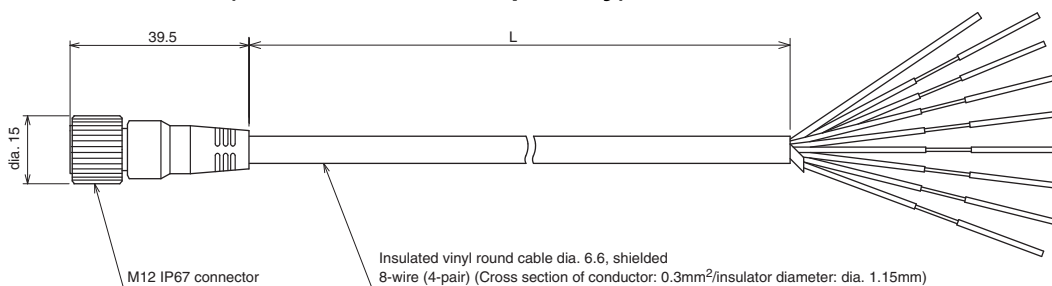


#### Top/Bottom Adjustable Bracket (F39-LGTB, sold separately)

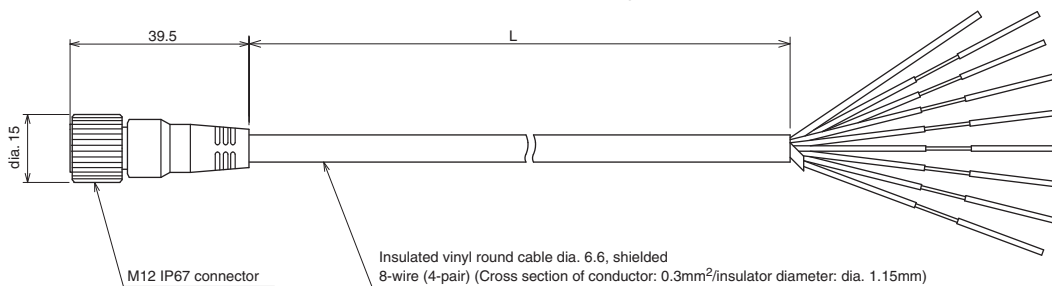


Safety light curtain connecting cable

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

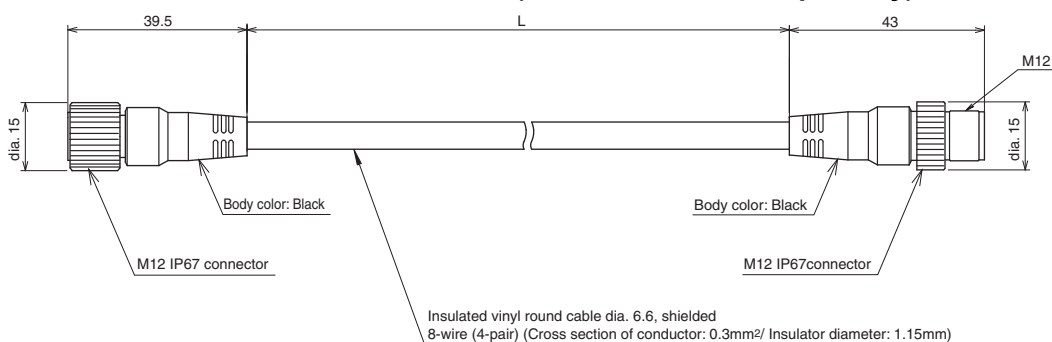


Single-Ended Cable for Receiver (F39-JD□A-D, sold separately)

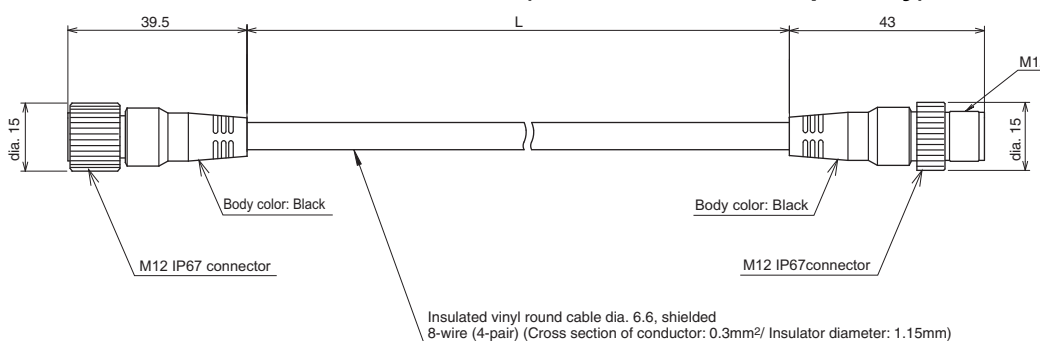


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JD3A-L           | F39-JD3A-D             | 3     |
| F39-JD7A-L           | F39-JD7A-D             | 7     |
| F39-JD10A-L          | F39-JD10A-D            | 10    |
| F39-JD15A-L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

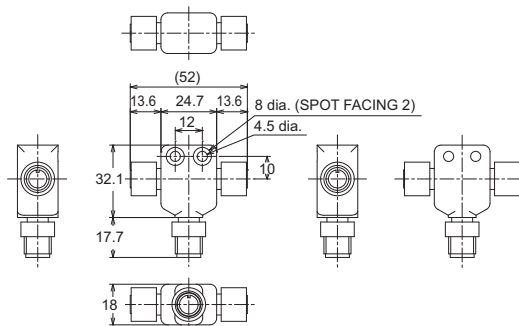


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JDR5B-L          | F39-JDR5B-D            | 0.5   |
| F39-JD1B-L           | F39-JD1B-D             | 1     |
| F39-JD3B-L           | F39-JD3B-D             | 3     |
| F39-JD5B-L           | 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    |

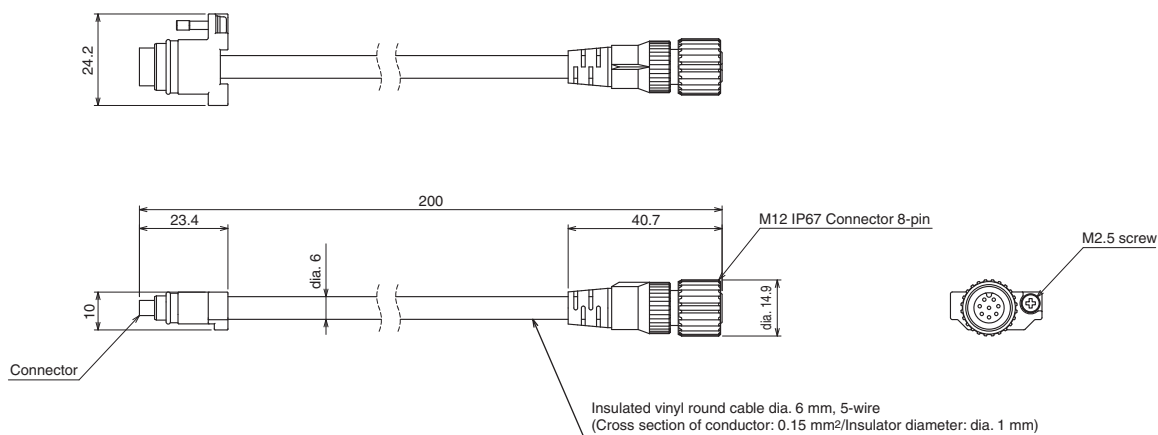
F3SG-RA-01TS

# F3SG-RA-01TS

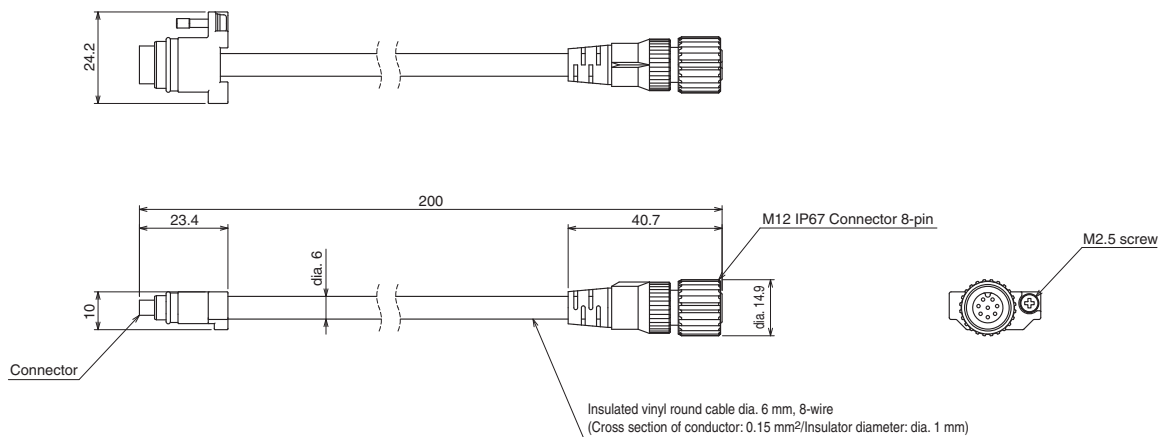
## Reduced Wiring Connector (F39-CN5, sold separately)



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

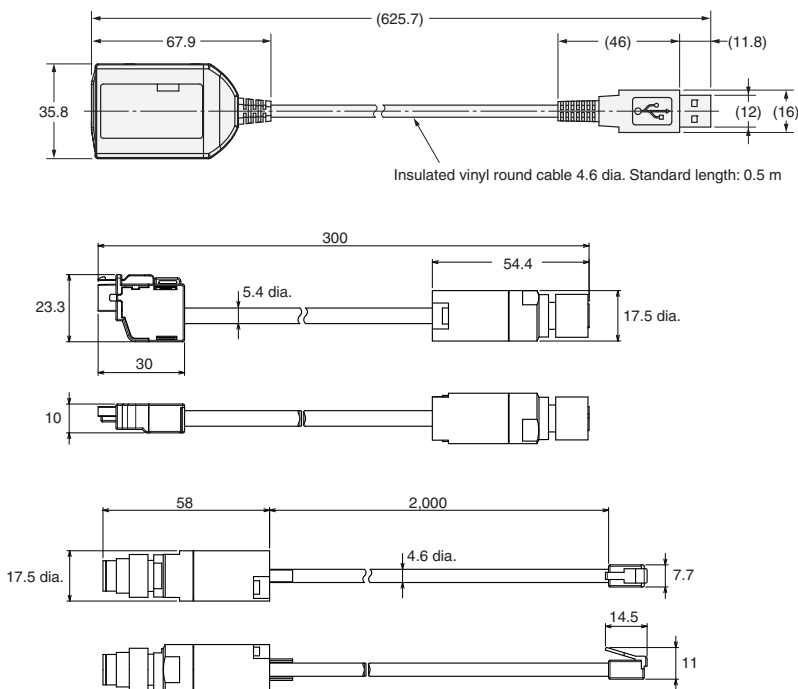


## Cascading Cable for Receiver (F39-JGR2WTS-D, sold separately)

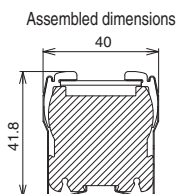


| Set model name | Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------|----------------------|------------------------|-------|
| F39-JGR2WTS    | F39-JGR2WTS-L        | F39-JGR2WTS-D          | 0.2   |

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



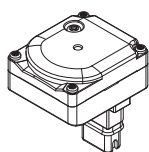
**Spatter Protection Cover (F39-HGA, sold separately)**



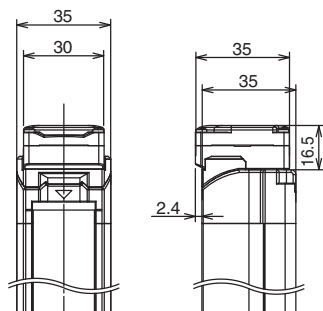
| Model       | Total length |
|-------------|--------------|
| F39-HGA□□□□ | □□□□+4       |
| F39-HGA0550 | 558          |

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

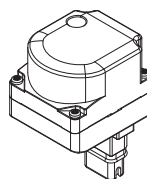
**Bluetooth Communication Unit (F39-BT, sold separately)**



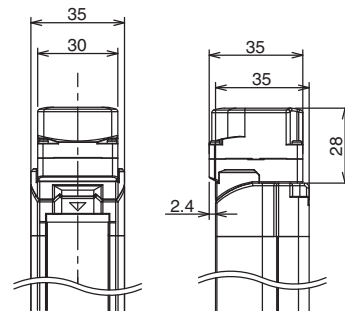
Material: PBT



**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 |

F3SG-RA-01TS

# Safety Light Curtain

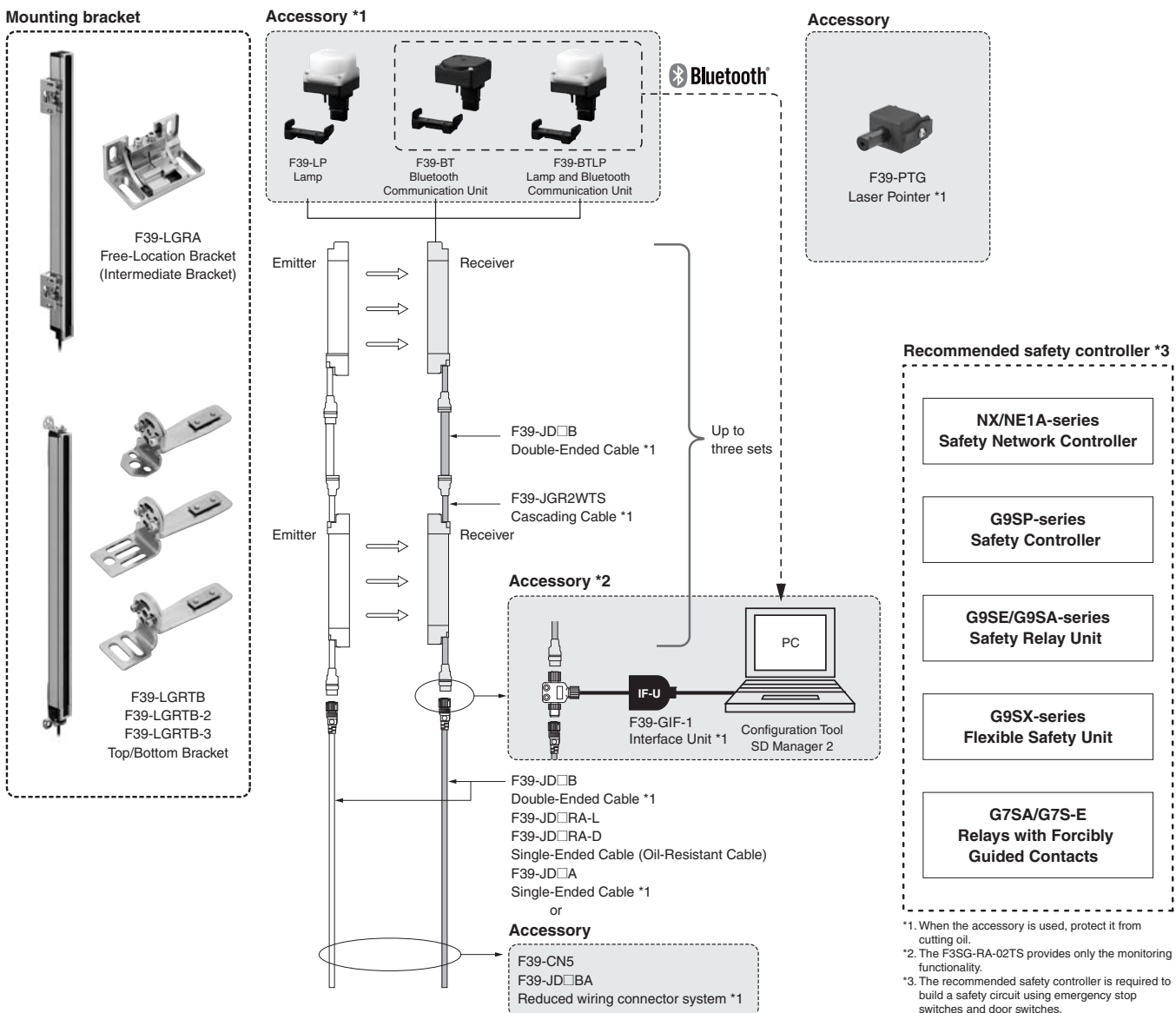
# F3SG-RA-02TS

## 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)



## 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


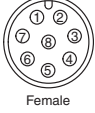
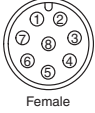
Hand and arm protection

| 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 |

# F3SG-RA-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<br>Connected to Power Cable or Double-Ended Cable<br><br>Female<br><table border="1" data-bbox="762 398 970 555"> <tr><td>1</td><td>-</td><td>Not used</td></tr> <tr><td>2</td><td>Brown</td><td>+24 VDC</td></tr> <tr><td>3</td><td>Black</td><td>TEST</td></tr> <tr><td>4</td><td>-</td><td>Not used</td></tr> <tr><td>5</td><td>Gray</td><td>Not used</td></tr> <tr><td>6</td><td>Pink</td><td>Not used</td></tr> <tr><td>7</td><td>Blue</td><td>0 VDC</td></tr> <tr><td>8</td><td>-</td><td>Not used</td></tr> </table> | 1        | - | Not used | 2       | Brown | +24 VDC | 3      | Black | TEST   | 4   | - | Not used | 5          | Gray | Not used | 6          | Pink | Not used | 7     | Blue | 0 VDC | 8   | -           | Not used | F39-JD3RA-L |
|   |  | 1   | -  | Not used |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
|   | 2  | Brown   | +24 VDC  |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
|   | 3  | Black   | TEST   |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
| 4   | -  | Not used  |  |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
| 5   | Gray   | Not used  |  |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
| 6   | Pink   | Not used  |  |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
| 7   | Blue   | 0 VDC   |  |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
| 8   | -  | Not used  |  |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
| 7m  | For receiver, M12 connector (8-pin), Color: Black<br>Connected to Power Cable or Double-Ended Cable<br><br>Female<br><table border="1" data-bbox="762 622 1050 779"> <tr><td>1</td><td>White</td><td>OSSD 2</td></tr> <tr><td>2</td><td>Brown</td><td>+24 VDC</td></tr> <tr><td>3</td><td>Black</td><td>OSSD 1</td></tr> <tr><td>4</td><td>Yellow</td><td>AUX</td></tr> <tr><td>5</td><td>Gray</td><td>PC COM (+)</td></tr> <tr><td>6</td><td>Pink</td><td>PC COM (-)</td></tr> <tr><td>7</td><td>Blue</td><td>0 VDC</td></tr> <tr><td>8</td><td>Red</td><td>EDM</td></tr> </table> | 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-JD7RA-L |          |             |
| 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   |  |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
| For receiver M12 connector (8-pin), 8 wires Color: Black                          | 3m   | IP67 and IP67G (JIS C 0920 Annex 1)* rated when mated.<br>* 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-JD3RA-D  |          |   |          |         |       |         |        |       |        |     |   |          |            |      |          |            |      |          |       |      |       |     |             |          |             |
|   | 7m   |   | 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<br>Connected to Power Cable or Double-Ended Cable<br><br>Female<br><table border="1" data-bbox="746 1122 954 1279"> <tr><td>1</td><td>White</td><td>Not used</td></tr> <tr><td>2</td><td>Brown</td><td>+24 VDC</td></tr> <tr><td>3</td><td>Black</td><td>TEST</td></tr> <tr><td>4</td><td>Yellow</td><td>Not used</td></tr> <tr><td>5</td><td>Gray</td><td>Not used</td></tr> <tr><td>6</td><td>Pink</td><td>Not used</td></tr> <tr><td>7</td><td>Blue</td><td>0 VDC</td></tr> <tr><td>8</td><td>Red</td><td>Not used</td></tr> </table> | 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 | F39-JD3A |
|   | 1   | White  | Not used |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
|   | 2   | Brown  | +24 VDC  |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
|   | 3   | Black  | TEST     |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
|   | 4   | Yellow   | Not used |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
| 5   | Gray  | Not used   |          |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
| 6   | Pink  | Not used   |          |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
| 7   | Blue  | 0 VDC  |          |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
| 8   | Red   | Not used   |          |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
| 7m  | For receiver M12 connector (8-pin), Color: Black<br>Connected to Power Cable or Double-Ended Cable<br><br>Female<br><table border="1" data-bbox="746 1346 1034 1503"> <tr><td>1</td><td>White</td><td>OSSD 2</td></tr> <tr><td>2</td><td>Brown</td><td>+24 VDC</td></tr> <tr><td>3</td><td>Black</td><td>OSSD 1</td></tr> <tr><td>4</td><td>Yellow</td><td>AUX</td></tr> <tr><td>5</td><td>Gray</td><td>PC COM (+)</td></tr> <tr><td>6</td><td>Pink</td><td>PC COM (-)</td></tr> <tr><td>7</td><td>Blue</td><td>0 VDC</td></tr> <tr><td>8</td><td>Red</td><td>EDM</td></tr> </table> | 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-JD7A |          |
| 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  |          |        |          |       |         |         |       |        |      |        |        |          |      |            |          |      |            |          |      |       |       |     |     |          |          |
| 10m   | IP67* rated when mated.<br>* When the accessory is used, protect it from cutting oil.   | 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:** 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<br>Connected to Power Cable or Double-Ended Cable<br>Connected to Single-Ended Cable, or Double-Ended Cable | F39-JDR5B   |
|            | 1m           |  | F39-JD1B  |
|            | 3m           |  | F39-JD3B  |
|            | 5m           |  | F39-JD5B  |
|            | 7m           |  | F39-JD7B  |
|            | 10m          |  | F39-JD10B   |
|            | 15m          |  | F39-JD15B   |
|            | 20m          |  | F39-JD20B   |
|            |              |  | For receiver, M12 connector(8-pin) Color: Black<br>Connected to Power Cable or Double-Ended Cable<br>Connected to Single-Ended Cable, or Double-Ended Cable |

\* 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.

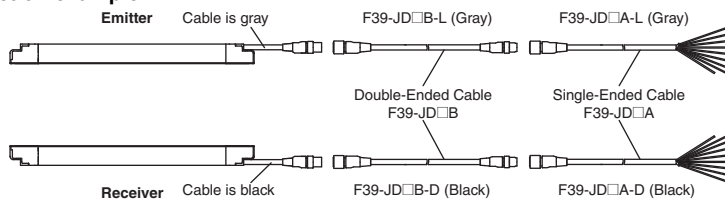
Double-Ended Cable for Emitter: F39-JD□B-L, Double-Ended Cable for Receiver: F39-JD□B-D

**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>**

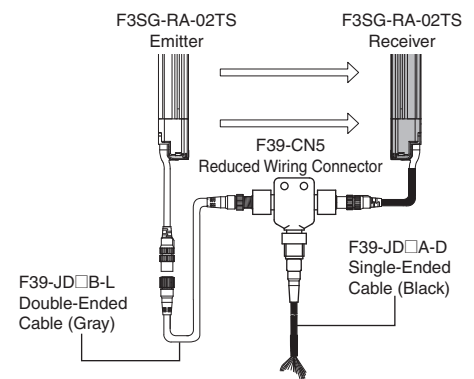


**Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)**  
**Reduced Wiring Connector**

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


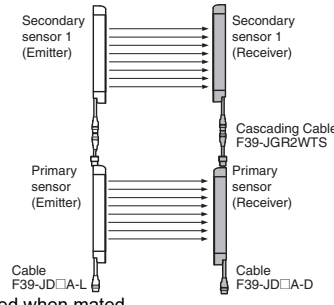
**Note:** A combination of emitter and receiver cables of other lengths than the above is also available. For details, contact your Omron representative.

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

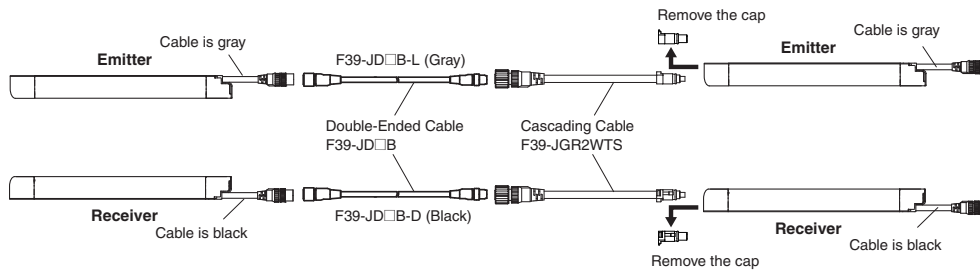


# F3SG-RA-02TS





## 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         |  <p>IP67* rated when mated.<br/>* When the accessory is used, protect it from cutting oil.</p> | <b>F39-JGR2WTS</b> |

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



## Sensor Mounting Brackets




| Appearance  | Specifications                               | Application  | Model              |
|---|--|--|--------------------|
|  | Free-Location Bracket (Intermediate Bracket) | Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$ . Side mounting and backside mounting possible. (Sold separately as a set of 2 brackets. Refer to note *1 for the number of sets required for each model.)        | <b>F39-LGRA</b>    |
|  | 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 $\pm 22.5^\circ$ . Side mounting and backside mounting possible. (Sold separately as a set of 4 brackets.) | <b>F39-LGRTB</b>   |
|  | 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.) | <b>F39-LGRTB-2</b> |
|  | Top/Bottom Bracket *2                        | Select a bracket that fit into the existing mounting hole.   | <b>F39-LGRTB-3</b> |

\*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 <a href="http://www.ia.omron.com/f3sg-r_tool">http://www.ia.omron.com/f3sg-r_tool</a>   | -                |
|  | Interface Unit               | F39-GIF-1 interface unit to connect the F3SG-RA-02TS receiver to a USB port of the PC<br><br>Accessories:<br>F39-CN1 Branch Connector (1),<br>Connector Cap (1),<br>2-m Dedicated Cable (1),<br>Instruction Manual | <b>F39-GIF-1</b> |
|  | Bluetooth Communication Unit | F39-BT bluetooth unit to enable bluetooth on the F3SG-RA<br><br>IP67 rated when mated.   | <b>F39-BT</b>    |

\*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.<br>The lamp output pattern is set as follows:<br>Red (ON): Inverted signal of safety output information<br>Orange (Blink once): Inverted signal of stable-state information | <b>F39-LP</b>   |
|   | Lamp and Bluetooth Communication Unit | Green (ON): Safety output information<br><br>IP67 rated when mated.  | <b>F39-BTLP</b> |

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


**End Cap \*1 \*2**

| Appearance  | Specifications   | Model          |
|---|--|----------------|
|  | Housing color: Black<br>For both emitter and receiver<br>(Attached to the F3SG-RA-02TS. The End Cap can be purchased if lost.)<br><br>IP67 rated when mated. | <b>F39-CNM</b> |

\*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. | <b>F39-PTG</b> |

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

**Test Rod**

| Diameter   | Model            |
|------------|------------------|
| 25 mm dia. | <b>F39-TRD25</b> |

# 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<br>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.<br>Refer to page 128 for the one segment system. Refer to <i>Safety Light Curtain F3SG-4RA□□□□-25-02TS Series User's Manual (ManNo.: Z391)</i> 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<br>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<br>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.<br>*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<br>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) *<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 8.0 mA) *   |
|                                |  | Test input   | 24 V Active setting:<br>ON voltage: 9 V to Vs (short circuit current: approx. 2.5 mA) *<br>OFF voltage: 0 V to 3 V or open (short circuit current: approx. 2.0 mA)<br>0 V Active setting:<br>ON voltage: 0 V to 3 V (short circuit current: approx. 2.0 mA)<br>OFF voltage: 9 V to Vs or open (short circuit current: approx. 2.5 mA) *<br>* 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.<br>(only among F3SG-4RA□□□□-25-02TS's)   |   |
|                                |  | Total number of beams: 255 max.<br>Cable length between sensors: 10 m max.<br>(not including cascading cable (F39-JGR2WTS) and power cable)  |   |
|                                | Test Function  | Self-test (at power-on, and during operation)<br>External test (light emission stop function by test input)  |   |
| Safety-Related Functions       | External device monitoring (EDM)<br>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<br>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)   | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: 5 to 150 Hz, Multiple amplitude of 7 mm, Acceleration of 1 G, 10 sweeps each in X, Y, and Z directions (no delay at resonant frequencies)   |   |
|                                | Shock Resistance (IEC 61496-1)   | Class 3M4 (IEC TR 60721-4-3)<br>Operation limit: Acceleration of 15 G, Pulse duration of 6 ms, 100 shocks for each in X, Y, and Z directions (600 shocks in total)   |   |
| 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.<br>* 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  |
|                          |   | Minimum Bending Radius   | R5 mm  |
|                          | F39-JD□RA-□<br>Oil-Resistant cable<br>- Single-Ended<br>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.<br>* 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<br>- Single-Ended<br>Cable (F39-JD□A)<br>- Double-Ended<br>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.   |  |
| Minimum Bending Radius   |   | R36 mm   |  |
| Extension of Power Cable |   | 100 m max. (Emitter/Receiver)  |  |
| Material                 | Material  | Housing: Aluminum alloy<br>Cap: PBT resin<br>Front window: Acrylic resin<br>Cable: Fluororesin<br>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 <sub>d</sub>  | 1.1 × 10 <sup>-8</sup> (IEC 61508)   |  |
|                          | Proof test interval T <sub>M</sub>  | Every 20 years (IEC 61508)   |  |
|                          | SFF   | 99% (IEC 61508)  |  |
|                          | HFT   | 1 (IEC 61508)  |  |
| Classification           |   | Type B (IEC 61508-2)   |  |

## Bluetooth Communication Unit

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

\* It depends on use environment conditions.

# F3SG-RA-02TS

## 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

|                              |   |
|------------------------------|---|
| <b>Main Unit</b>             | PC/AT compatible machine (computer that runs Microsoft Windows)                       |
| <b>Operating System (OS)</b> | Windows 7 (32-bit/64-bit), Windows 8, 8.1 (32-bit/64-bit), Windows 10 (32-bit/64-bit) |
| <b>Communication Port</b>    | USB port ×1   |
| <b>Ambient Temperature</b>   | Operating: -10 to 55°C, Storage: -30 to 70°C (non-icing and non-condensing)           |
| <b>Ambient Humidity</b>      | Operating: 35% to 85%, Storage: 35% to 95% (non-condensing)                           |

### Lamp

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

## Connections (Basic Wiring Diagram)

### Standalone F3SG-RA-02TS

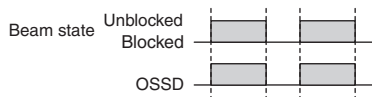
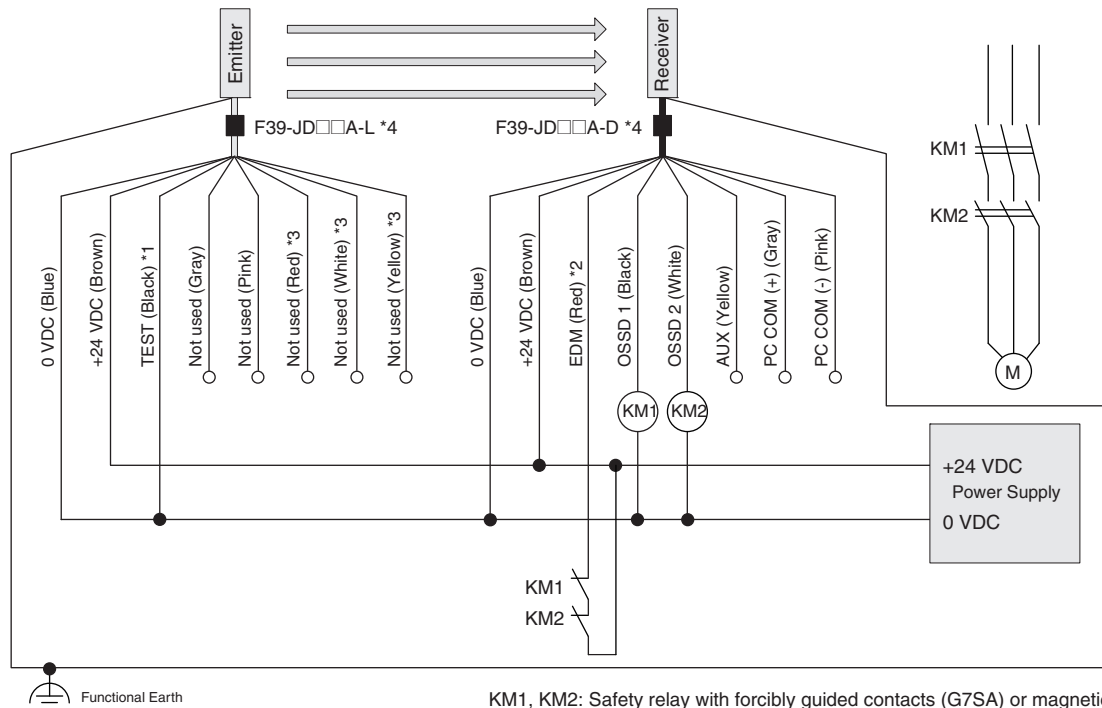
#### EDM used and External Test in 24V Active not used

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) or magnetic contactor  
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 (NC 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

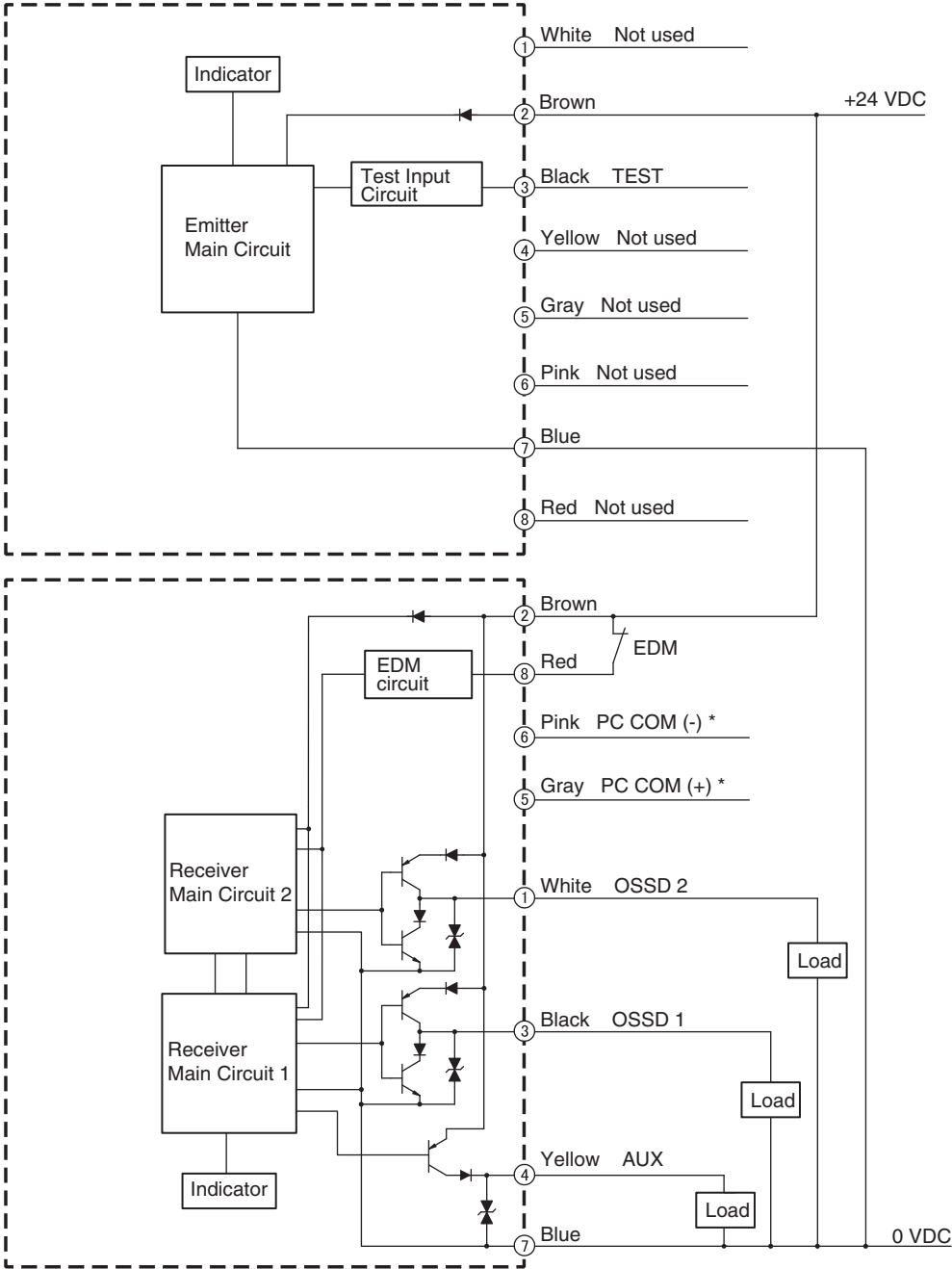
The F3SG-RA-02TS can be connected to the safety control units listed in the table below.

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

# 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.



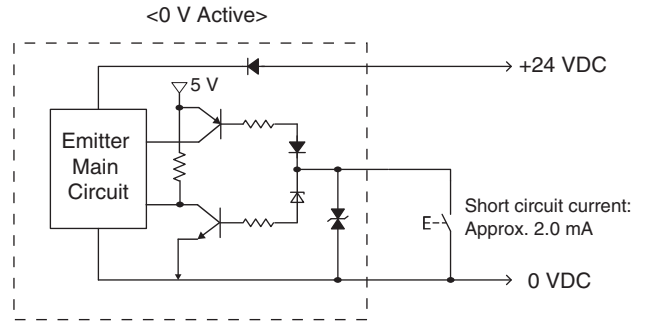
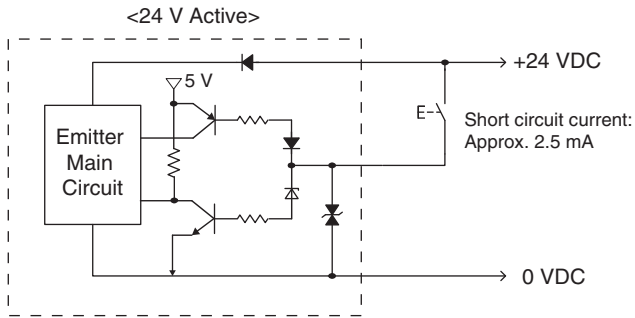
\* This line is used for communication with a PC using the F39-GIF-1 Interface Unit.

F3SG-RA-02TS

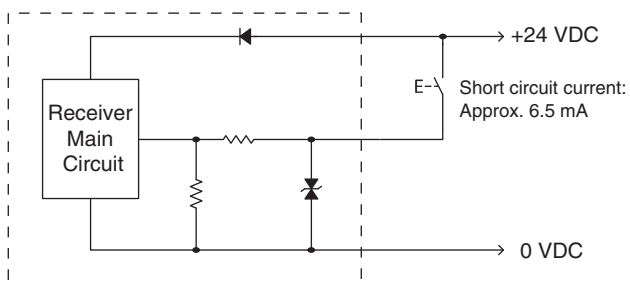
## Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

### Test Input



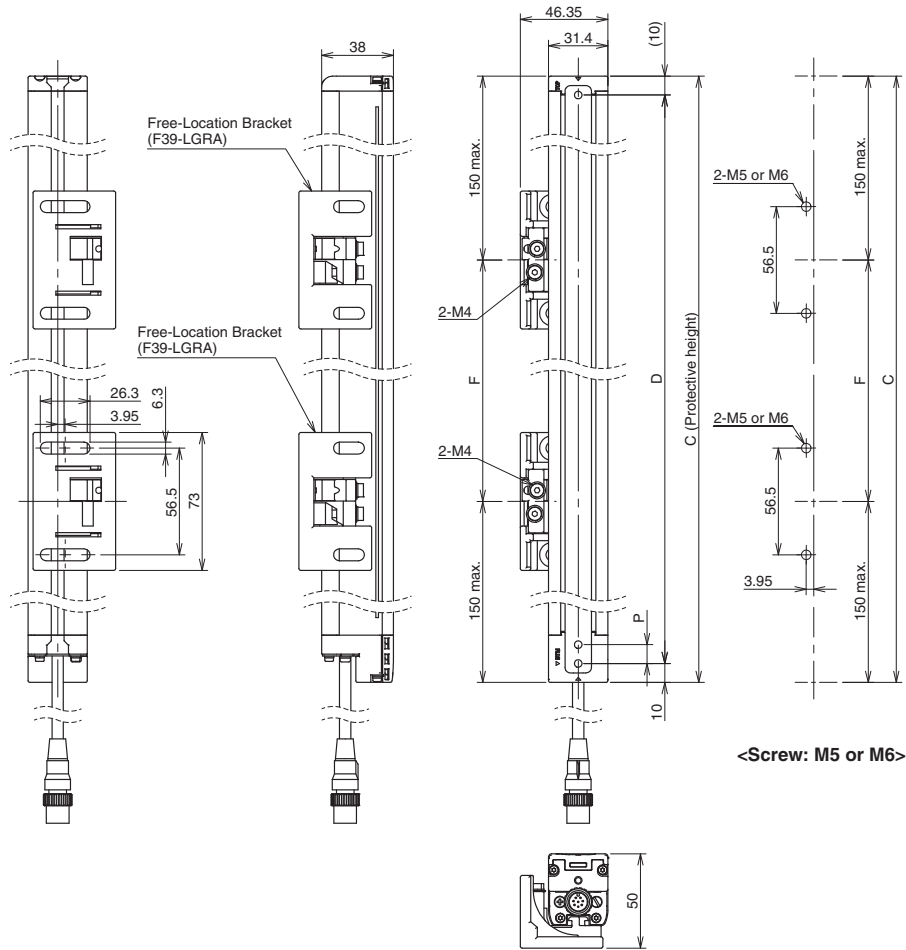
### EDM



# Dimensions

## Mounted with Free-Location Brackets (F39-LGRA)

### Backside Mounting



#### F3SG-4RA-□□□□-25-02TS Series

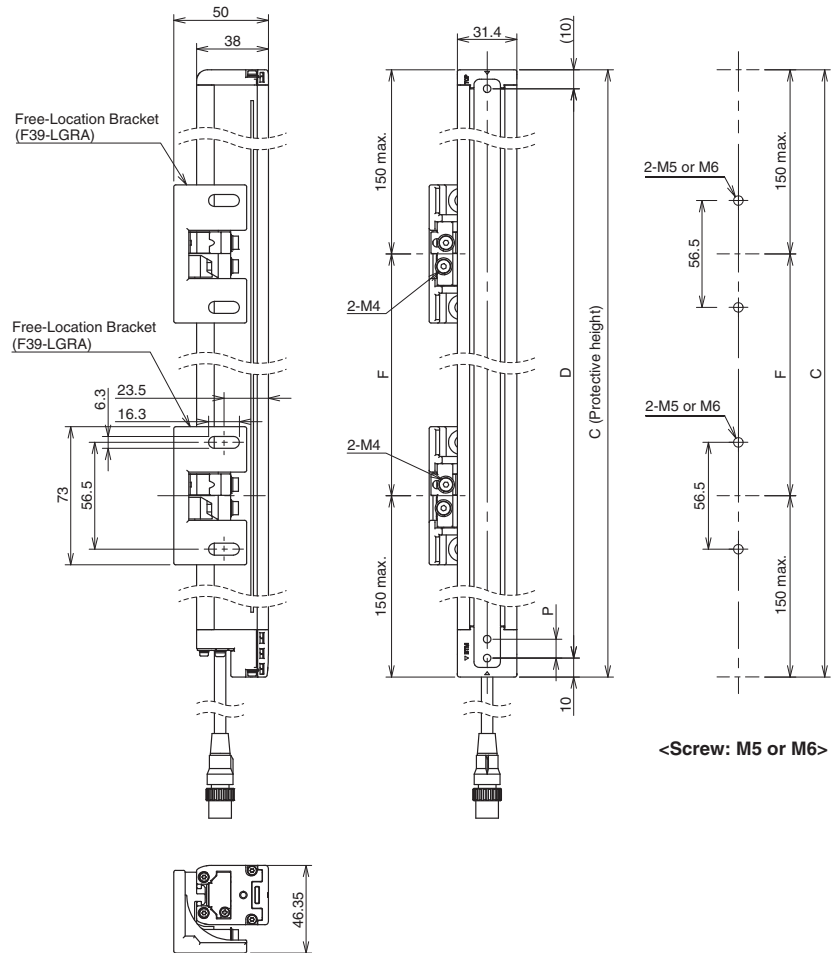
|             |   |
|-------------|---|
| Dimension C | 4-digit number of the type name (Protective height) |
| Dimension D | C-20  |
| Dimension P | 20  |

| 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

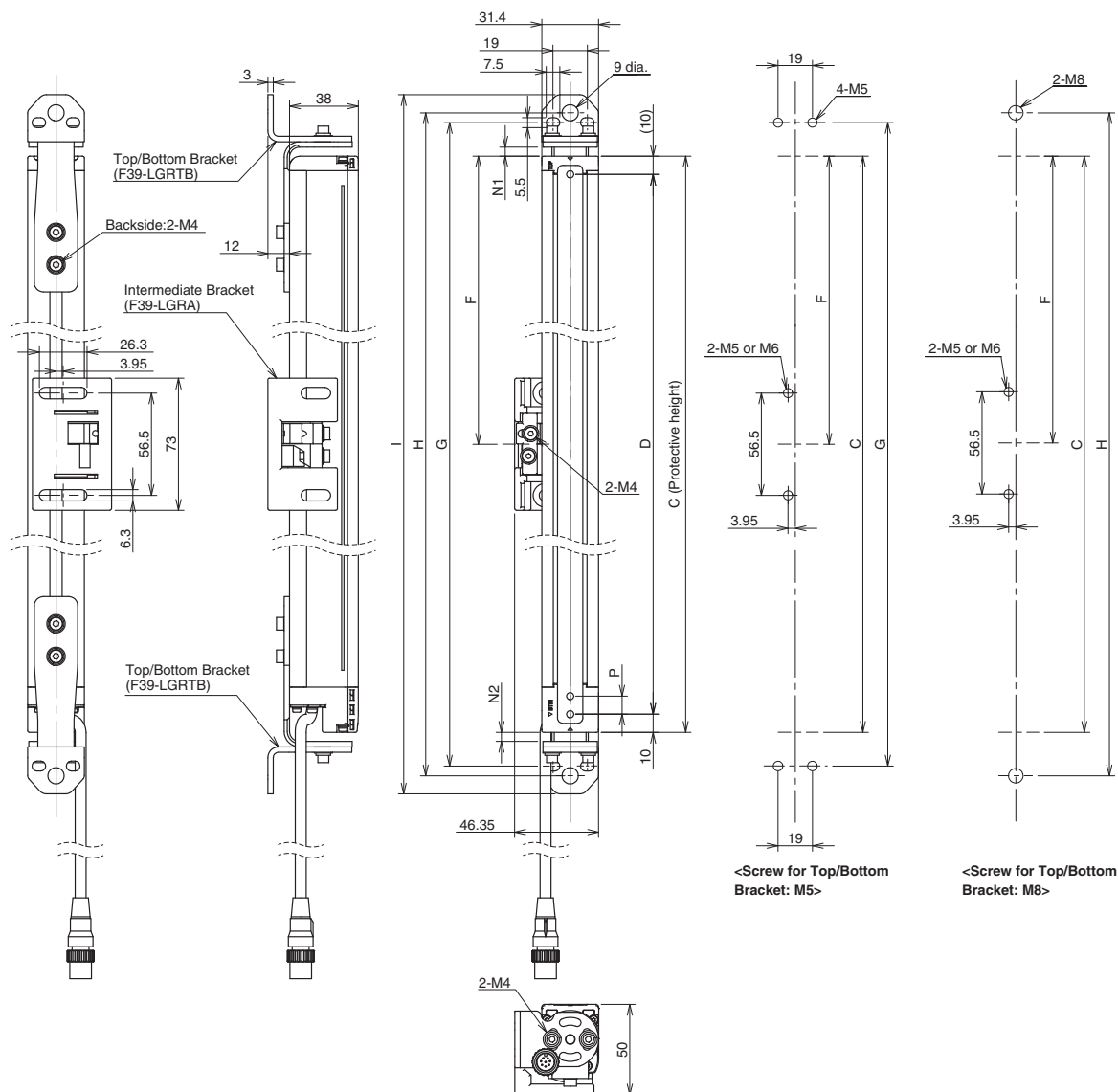
|             |   |
|-------------|---|
| Dimension C | 4-digit number of the type name (Protective height) |
| Dimension D | C-20  |
| Dimension P | 20  |

| 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  |

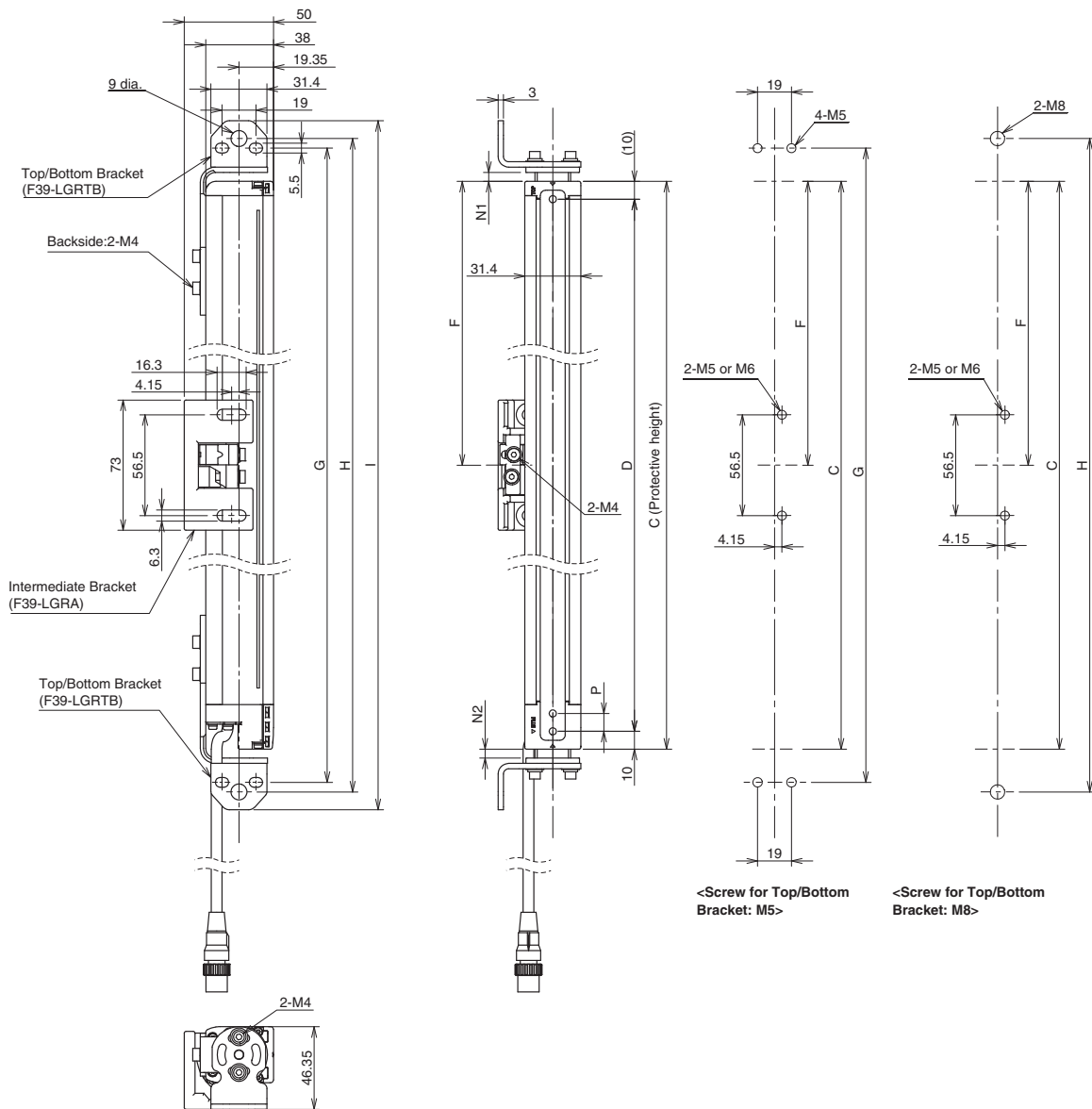
| Protective height (C) | Number of Top/Bottom Brackets * | Number of Intermediate Brackets * | Dimension F  |
|-----------------------|---------------------------------|-----------------------------------|--------------|
| 0240 to 1040          | 2                               | 0                 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

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

F3SG-RA-02TS

# F3SG-RA-02TS

## Side Mounting



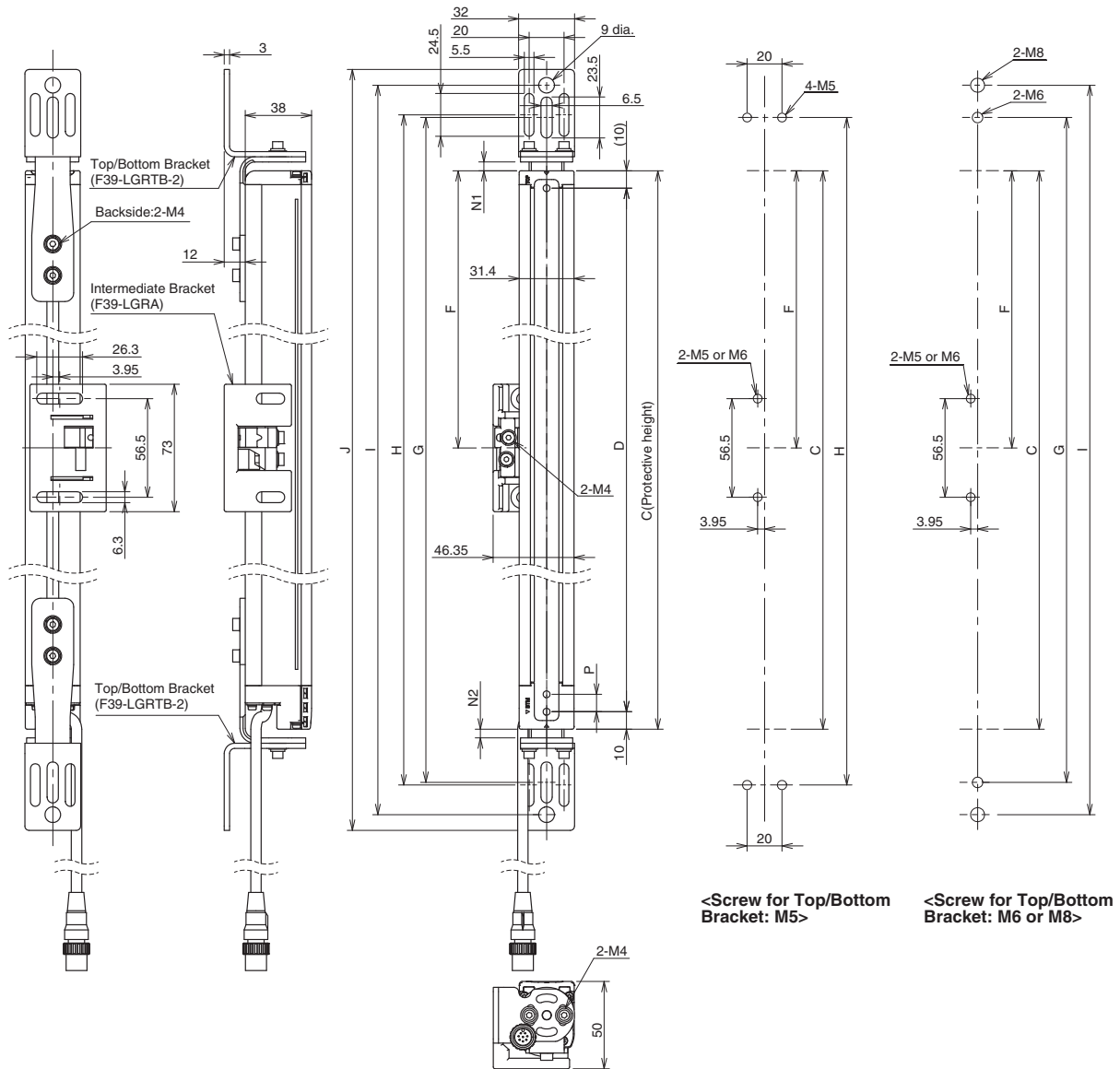
### F3SG-4RA-□□□□-25-02TS Series

|              |   |
|--------------|---|
| 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**

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

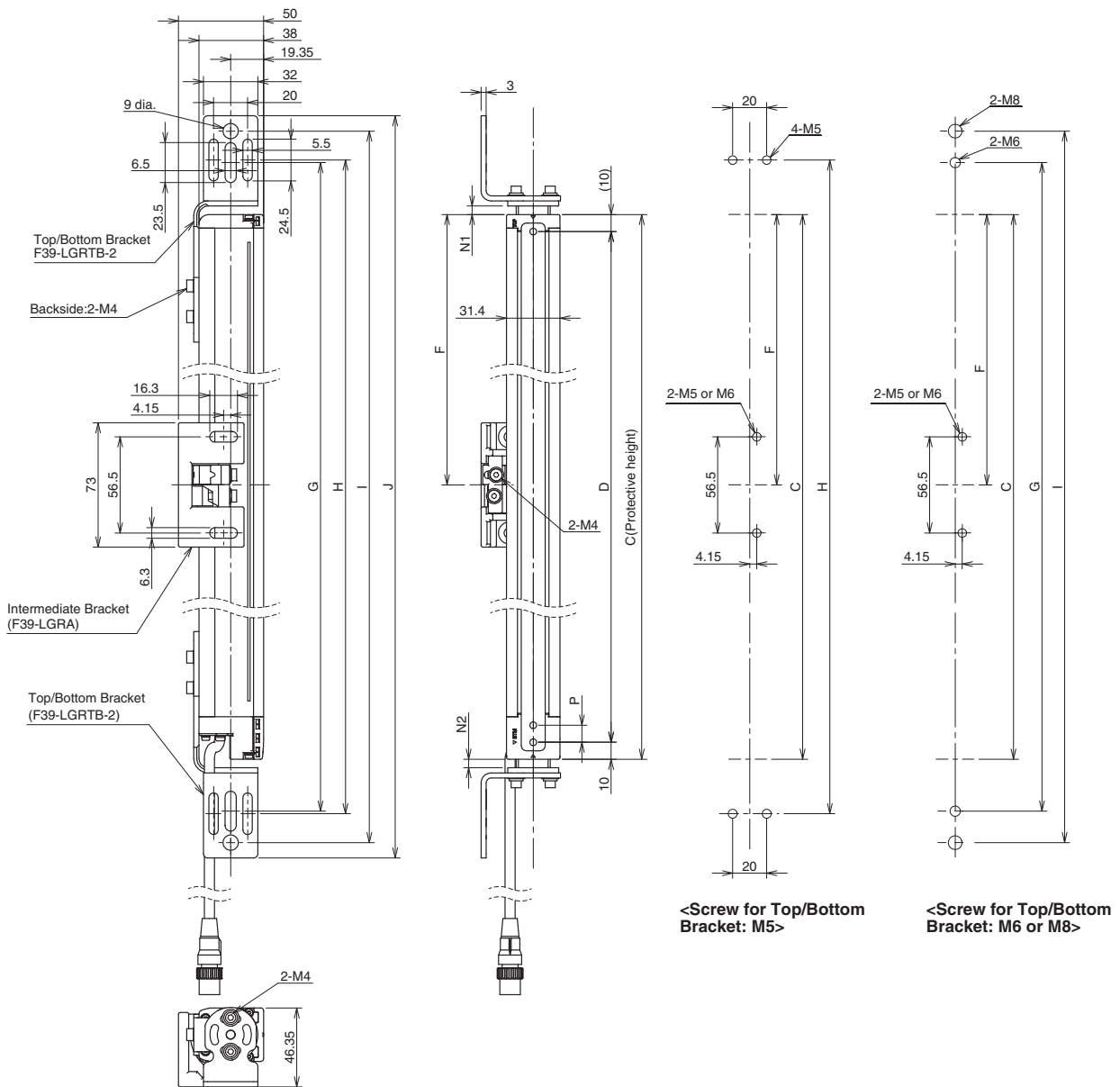
\* The number of brackets required to mount either one of emitter and receiver.

F3SG-RA-02TS



# F3SG-RA-02TS

## Side Mounting



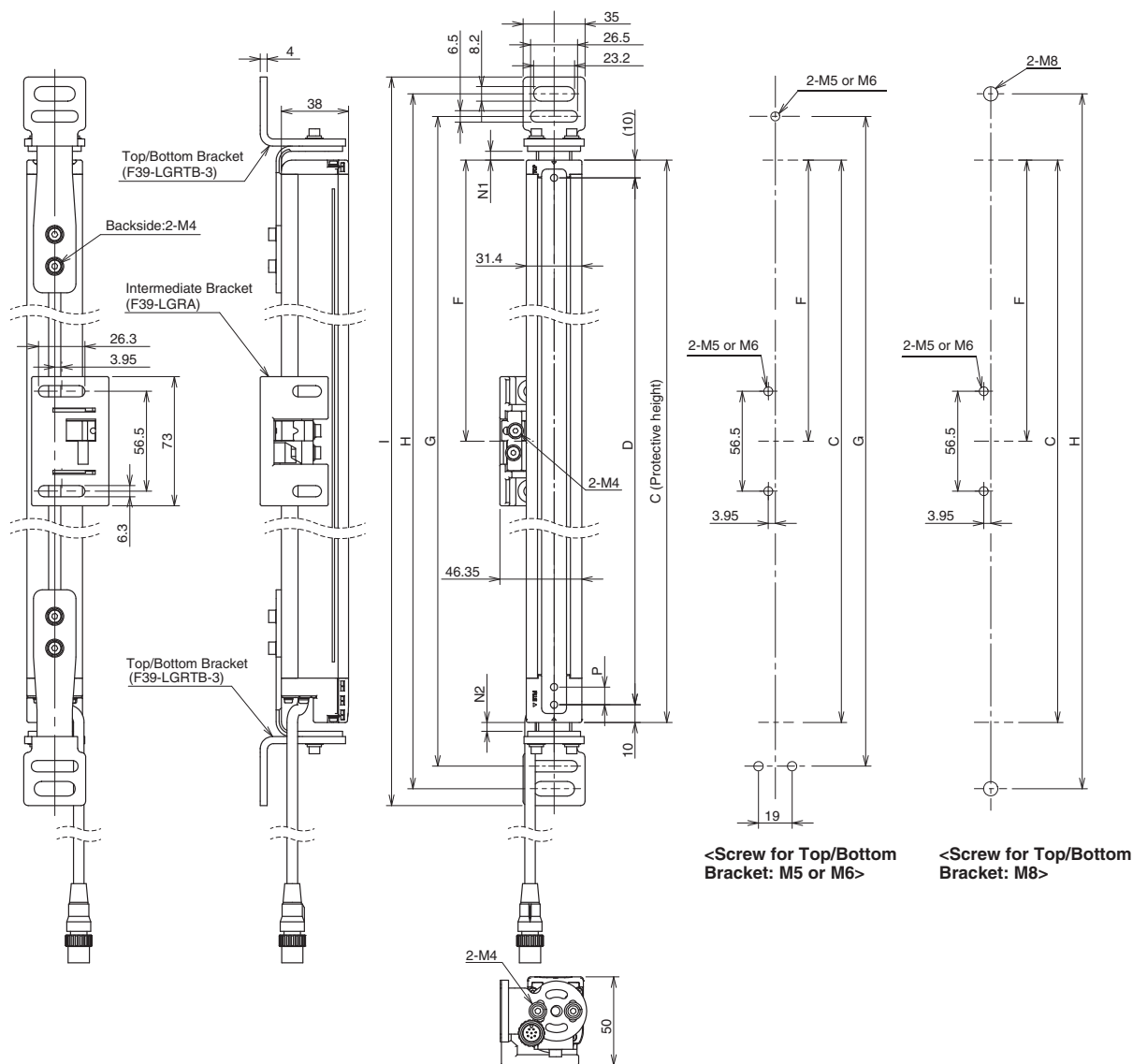
### F3SG-4RA-□□□□-25-02TS Series

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

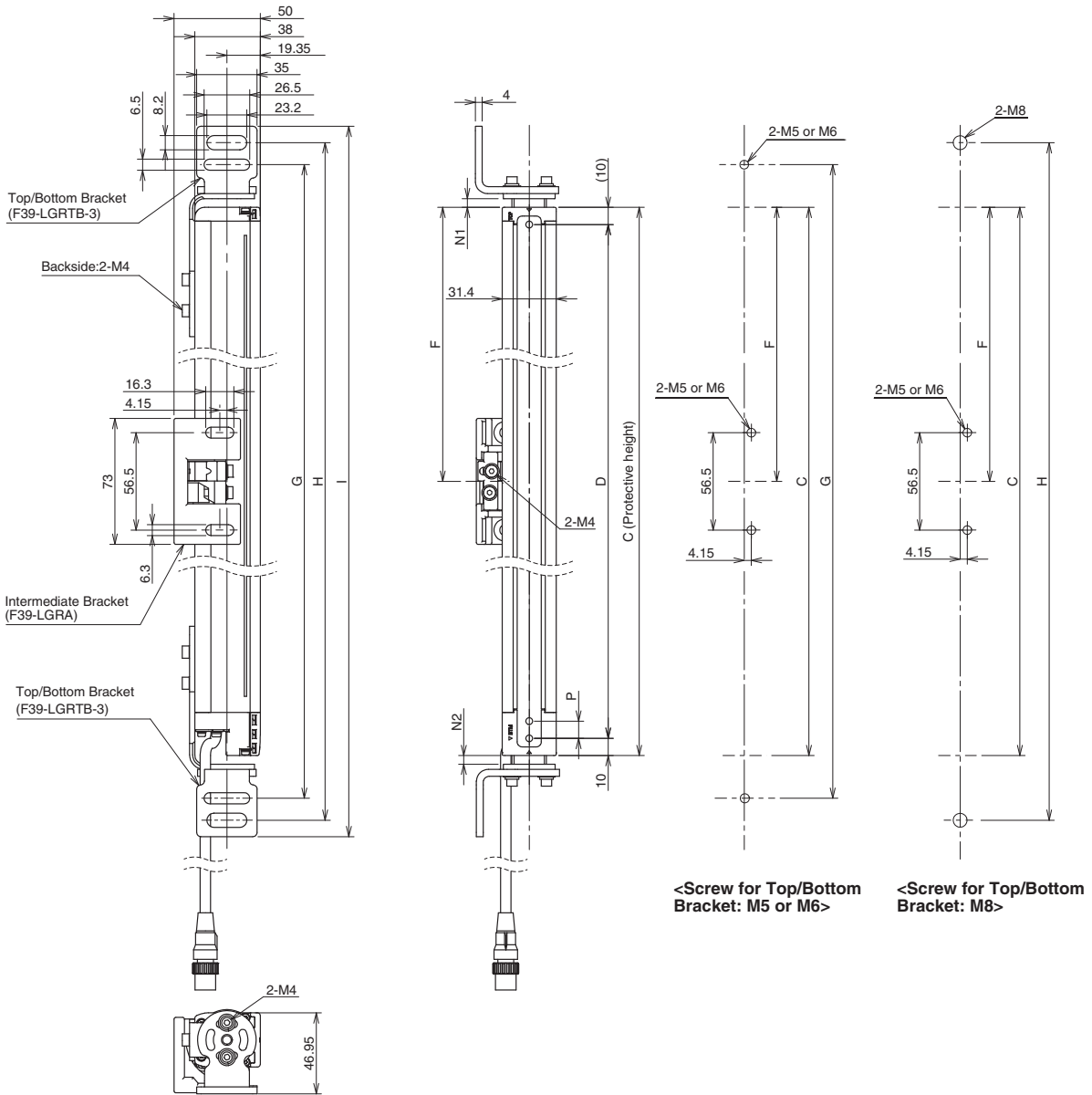
| Protective height (C) | Number of Top/Bottom Brackets * | Number of Intermediate Brackets * | Dimension F  |
|-----------------------|---------------------------------|-----------------------------------|--------------|
| 0240 to 1040          | 2                               | 0                 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

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

F3SG-RA-02TS

# F3SG-RA-02TS

## Side Mounting



### F3SG-4RA-□□□□-25-02TS Series

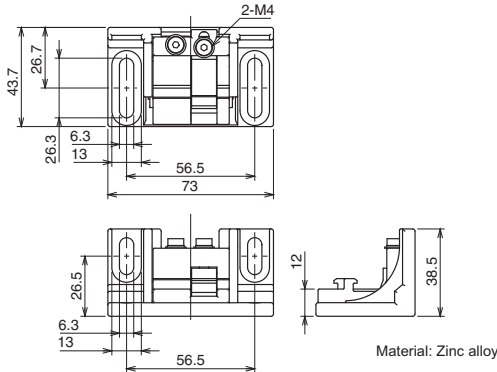
|              |   |
|--------------|---|
| Dimension C  | 4-digit number of the type name (Protective height) |
| Dimension D  | C-20  |
| Dimension G  | $C+39.5+N1+N2$                                      |
| Dimension H  | $C+65+N1+N2$  |
| Dimension I  | $C+84+N1+N2$  |
| Dimension N1 | 0 to 30 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

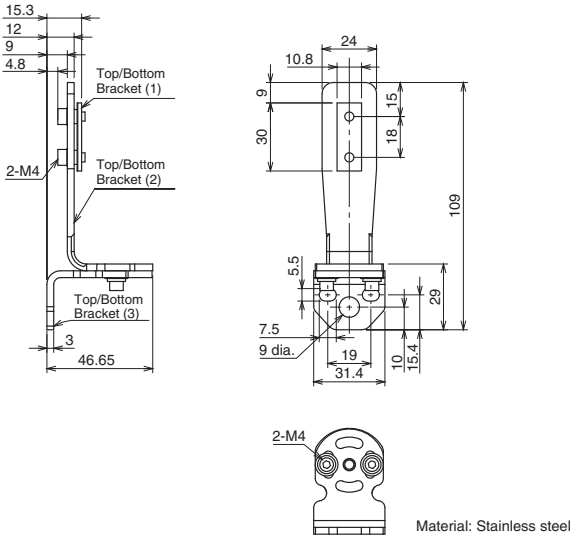
\* The number of brackets required to mount either one of emitter and receiver.

Accessories

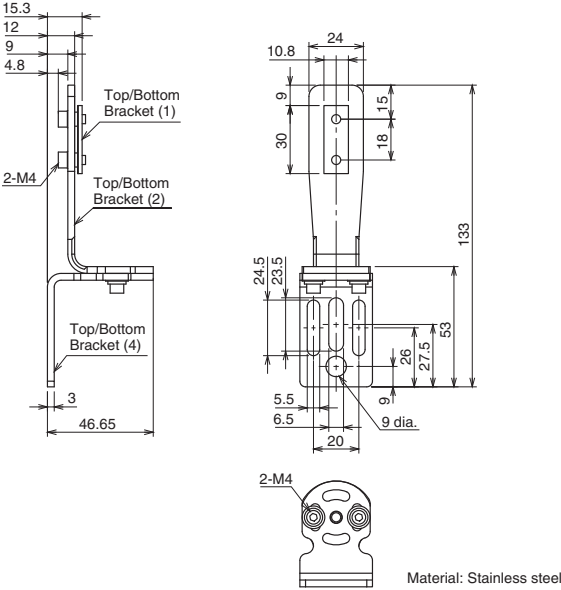
Sensor Mounting Brackets  
 Free-Location Bracket / Intermediate Bracket  
 (F39-LGRA, sold separately)



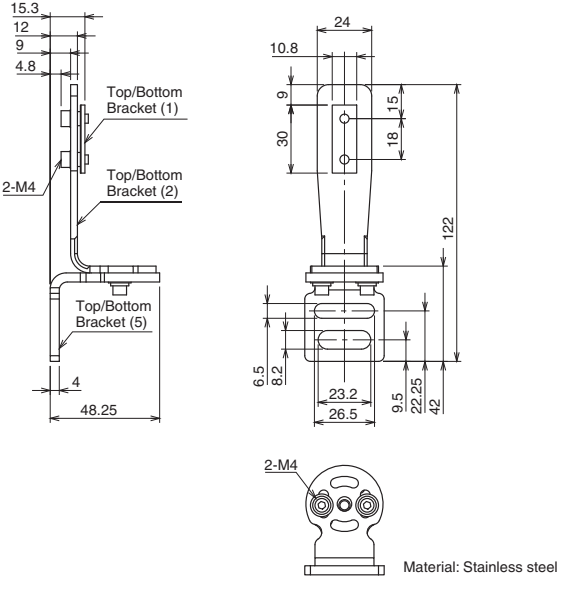
Top/Bottom Bracket  
 (F39-LGRTB, sold separately)



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



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

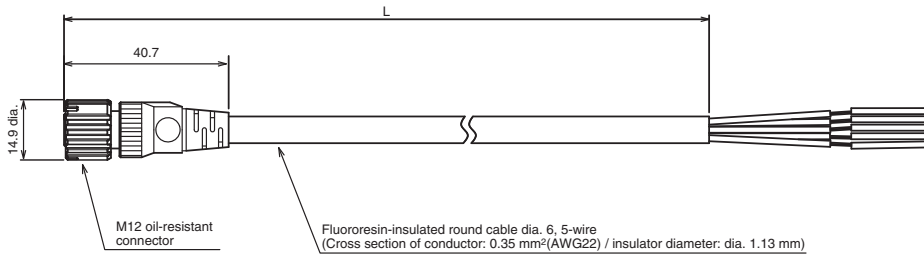


F3SG-RA-02TS

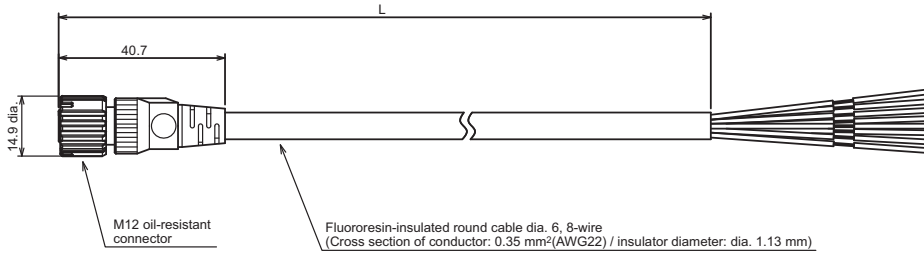
# F3SG-RA-02TS

## Safety light curtain connecting cable

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

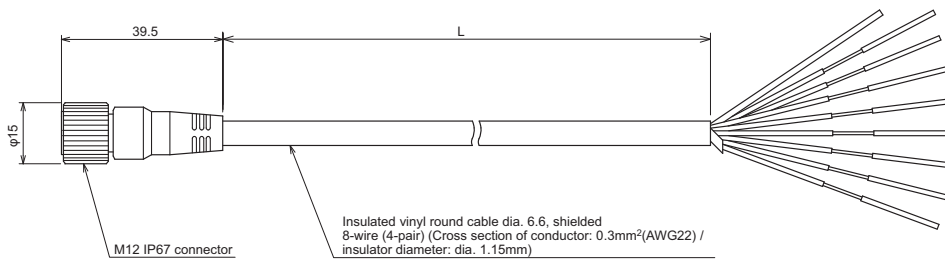


### Single-Ended Cable for Receiver (Oil-Resistant Cable) (F39-JD□RA-D, sold separately)

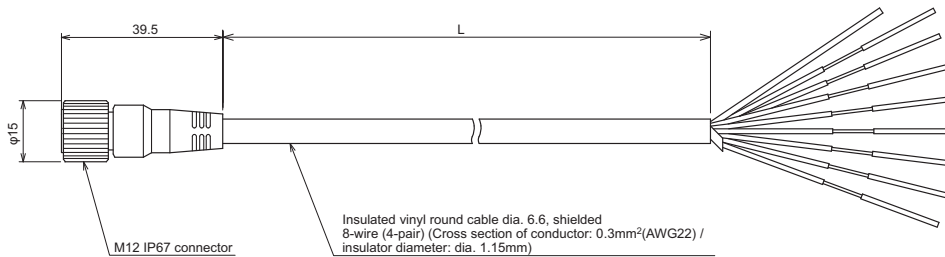


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JD3RA-L          | F39-JD3RA-D            | 3     |
| F39-JD7RA-L          | F39-JD7RA-D            | 7     |

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

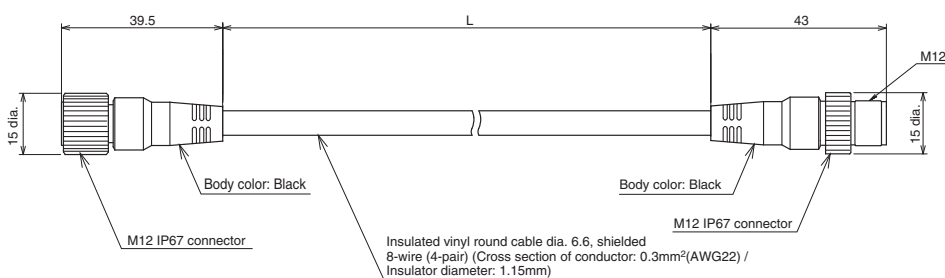


### Single-Ended Cable for Receiver (F39-JD□A-D, sold separately)

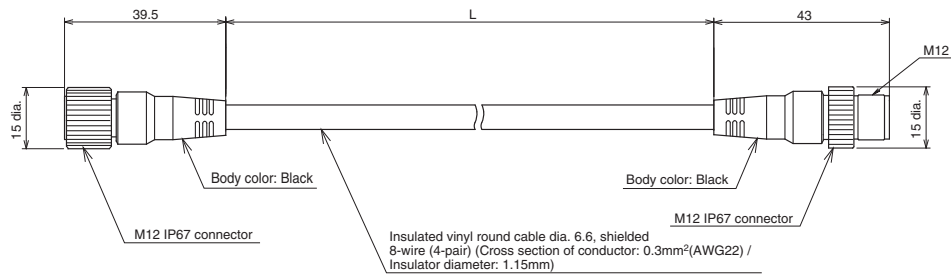


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JD3A-L           | F39-JD3A-D             | 3     |
| F39-JD7A-L           | F39-JD7A-D             | 7     |
| F39-JD10A-L          | F39-JD10A-D            | 10    |
| F39-JD15A-L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

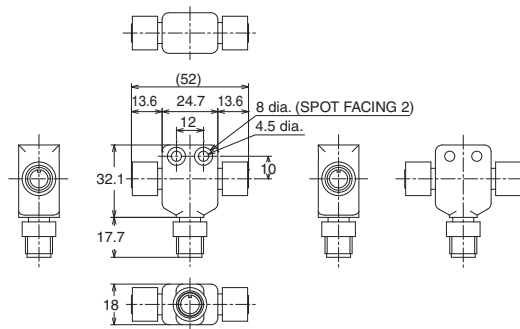


**Double-Ended Cable for Receiver: Cable for extension (F39-JD□B-D, sold separately)**

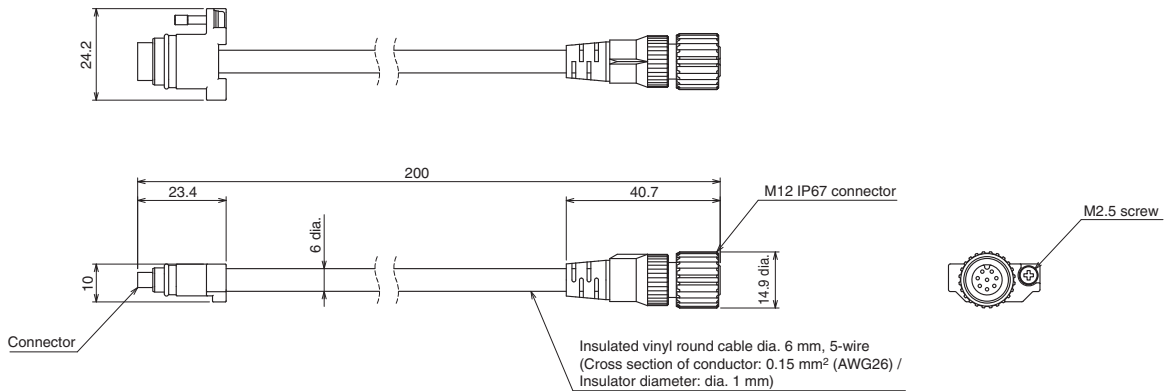


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JDR5B-L          | F39-JDR5B-D            | 0.5   |
| F39-JD1B-L           | F39-JD1B-D             | 1     |
| F39-JD3B-L           | F39-JD3B-D             | 3     |
| F39-JD5B-L           | 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    |

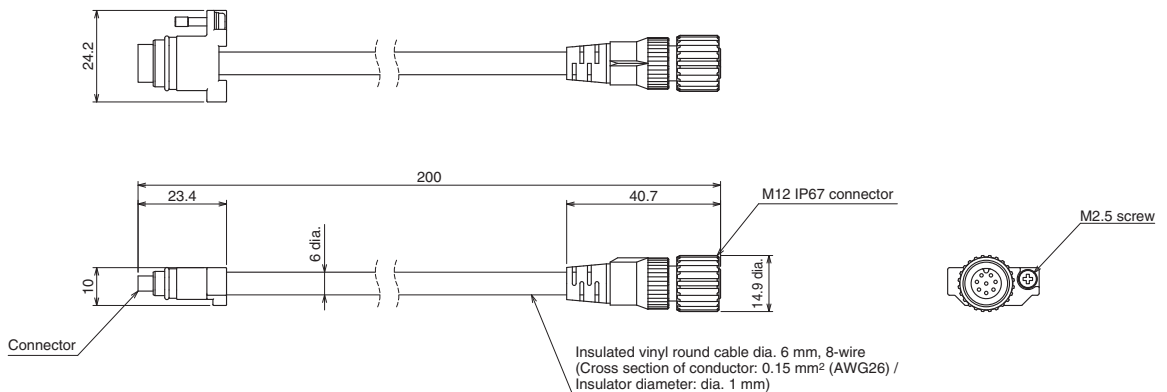
**Reduced Wiring Connector (F39-CN5, sold separately)**



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



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

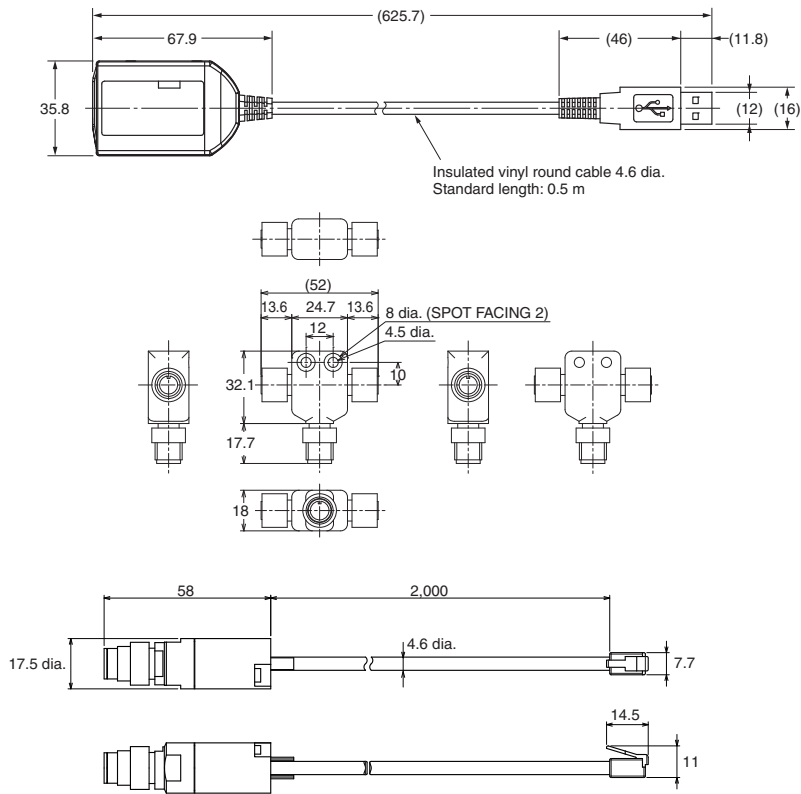


| Set model name | Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------|----------------------|------------------------|-------|
| F39-JGR2WTS    | F39-JGR2WTS-L        | F39-JGR2WTS-D          | 0.2   |

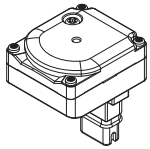
F3SG-RA-02TS

# F3SG-RA-02TS

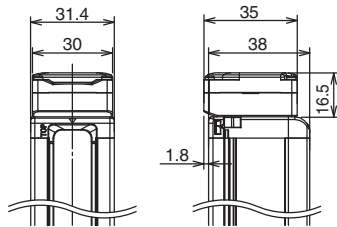
## Interface Unit (F39-GIF-1, sold separately)



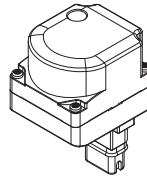
## Bluetooth Communication Unit (F39-BT, sold separately)



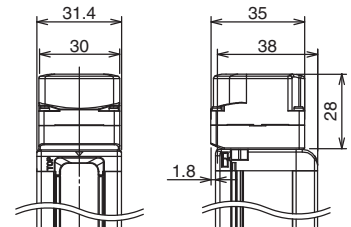
Material: PBT



## 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

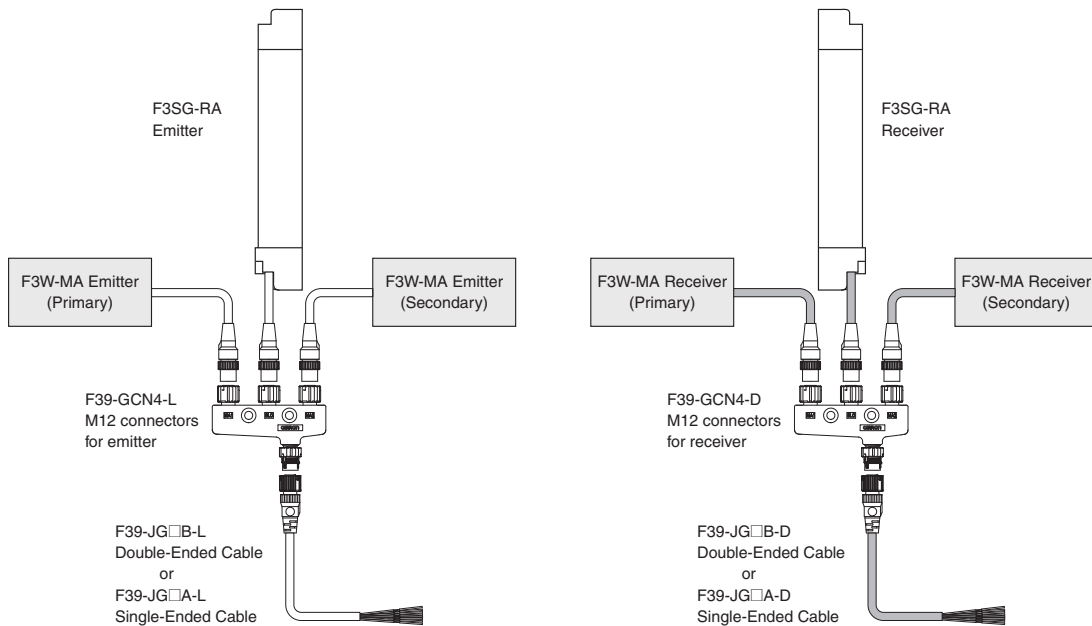
## Integrated muting sensor based on multi-beam photoelectric sensor



- 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






# F3W-MA

## 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.


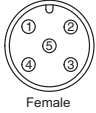
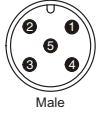
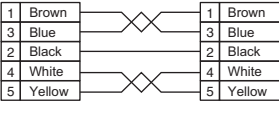


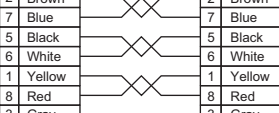
### Accessories (Sold separately)

#### Single-Ended Cable \*

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

\* 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)


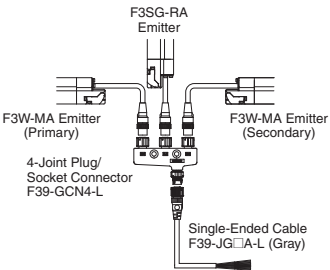

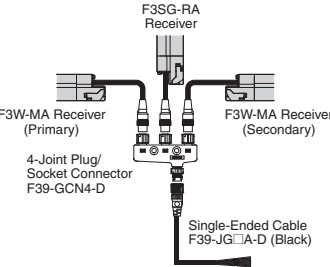

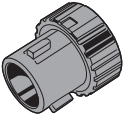


#### Double-Ended Cable \*

| Appearance   | Type   | Cable length | Specifications   | Model       |
|--|--|--------------|--|-------------|
|  | M12 connector (5-pin) on both ends<br>Color: Gray  | 0.5 m        | Connected to Power Cable or Double-Ended Cable<br><br>Female<br>Connected to Single-Ended Cable, or Double-Ended Cable<br><br>Male<br> | 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<br>Color: Black | 0.5 m        | Connected to Power Cable or Double-Ended Cable<br><br>Female<br>Connected to Single-Ended Cable, or Double-Ended Cable<br><br>Male<br> | 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)





**4-Joint Plug/Socket Connector**

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

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

# F3W-MA

## 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 | <b>F39-LGF</b>   |
|  | Standard Adjustable Bracket | Bracket to mount the F3W-MA. Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$ . Side mounting and backside mounting possible.  | Two brackets per set | <b>F39-LGA</b>   |
|  | F3W-MA Bracket              | Bracket to fix the F3W-MA to the F3SG-RA.<br>F39-LGMAL: L-shaped configuration<br>F39-LGMAT: T-shaped configuration<br>Beam alignment after mounting possible.<br>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 | <b>F39-LGMAL</b> |
|  |                             |  |                      | <b>F39-LGMAT</b> |

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

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

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

\* When using F39-LGMA□, there are some restrictions on the brackets to mount the F3SG-RA. This bracket is not usable together with F39-LGF. When using together with 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)<br>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. *<br>Load current of 300 mA max.,<br>Residual voltage of 2 V max. (except for voltage drop due to cable extension))   |  |       |
|                                |   | * This product is a PNP output model. Use with the PNP output model safety light curtain.   |  |       |
|                                | Output Operation Mode   | Muting Output A   | Dark-ON<br>(Muting Output A is enabled when MUTE A trigger beam is blocked.)                     |       |
|                                |   | Muting Output B   | Dark-ON<br>(Muting Output B is enabled when MUTE B trigger beam is blocked.)                     |       |
|                                | Input Voltage   | ON Voltage  | [MUTE Enable]<br>Vs to Vs-3 V (sink current 5 mA max.) *   |       |
|                                |   | OFF Voltage   | [MUTE Enable]<br>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   | <ul style="list-style-type: none"> <li>- Scan Code Selection</li> <li>- Operation Mode Selection (Point to Point Detection/ Chattering and Void Space Prevention)</li> <li>- Off-Delay</li> <li>- Muting Enable</li> <li>- Muting Trigger Beam Allocation</li> <li>- Operating Range Selection</li> </ul> |  |       |
| Environmental                  | Ambient Temperature   | Operating   | -10 to 55°C (13 to 131°F) (non-icing)  |       |
|                                |   | Storage   | -25 to 70°C (-13 to 158°F)   |       |
|                                | Ambient Humidity  | Operating   | 35% to 85% (non-condensing)  |       |
|                                |   | Storage   | 35% to 95%   |       |
|                                | Ambient Illuminance   | Incandescent lamp: 3,000 lx max. on receiver surface<br>Sunlight: 10,000 lx max. on receiver surface  |  |       |
|                                | Degree of Protection (IEC 60529)  | IP65 and IP67   |  |       |
|                                | Vibration Resistance (IEC 61496-1)  | 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes   |  |       |
| Shock Resistance (IEC 61496-1) | 100 m/s <sup>2</sup> , 1000 shocks for all 3 axes   |   |  |       |
| Pollution Degree (IEC 60664-1) | Pollution Degree 3  |   |  |       |
| Connections                    | Power Cable   | Type of Connection  | M12 connectors: 5-pin emitter, 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.<br>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.

# F3W-MA

## 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]<br>- Start-up (for approx. 3 s)<br>- 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 <input checked="" type="checkbox"/> ON   | 1 <input checked="" type="checkbox"/> ON   |
|                  |                     | Chattering and Void Space Prevention 1           | 2 <input checked="" type="checkbox"/> ON<br>3 <input checked="" type="checkbox"/> ON | 2 <input checked="" type="checkbox"/> ON<br>3 <input checked="" type="checkbox"/> ON |
|                  |                     | Off-Delay 100 ms                                 | 4 <input checked="" type="checkbox"/> ON<br>5 <input checked="" type="checkbox"/> ON | 4 <input checked="" type="checkbox"/> ON<br>5 <input checked="" type="checkbox"/> ON |
|                  |                     | Muting Enable Disabled (factory default setting) | 6 <input checked="" type="checkbox"/> ON   | 6 <input checked="" type="checkbox"/> ON   |
|                  | Emitter             | Scan Code B (factory default setting)            | 1 <input checked="" type="checkbox"/> ON   | -  |
| F3W-MA Secondary | Receiver<br>Emitter | -  | No setting required  | No setting required  |

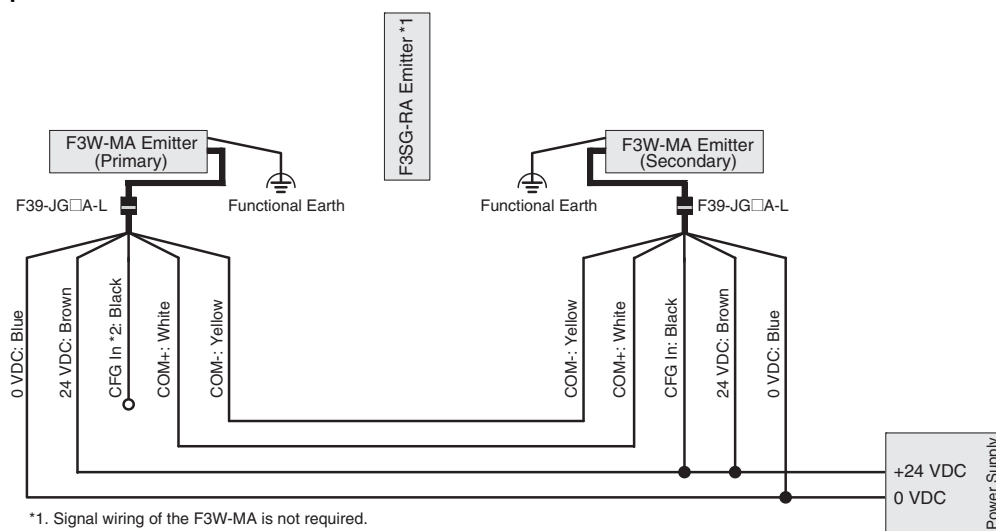
: Indicates a switch position.

\*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

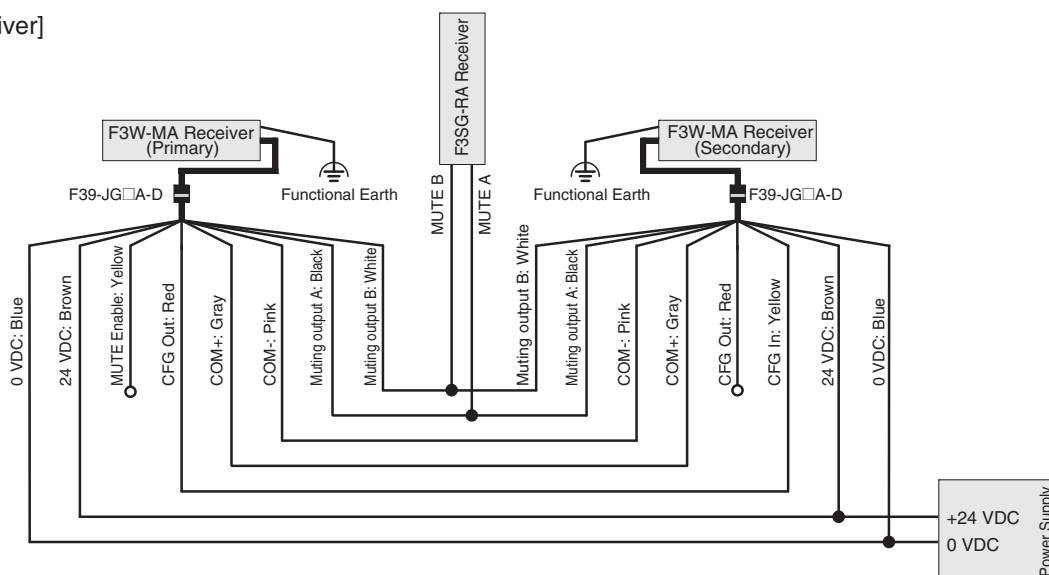
[Emitter]



\*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]

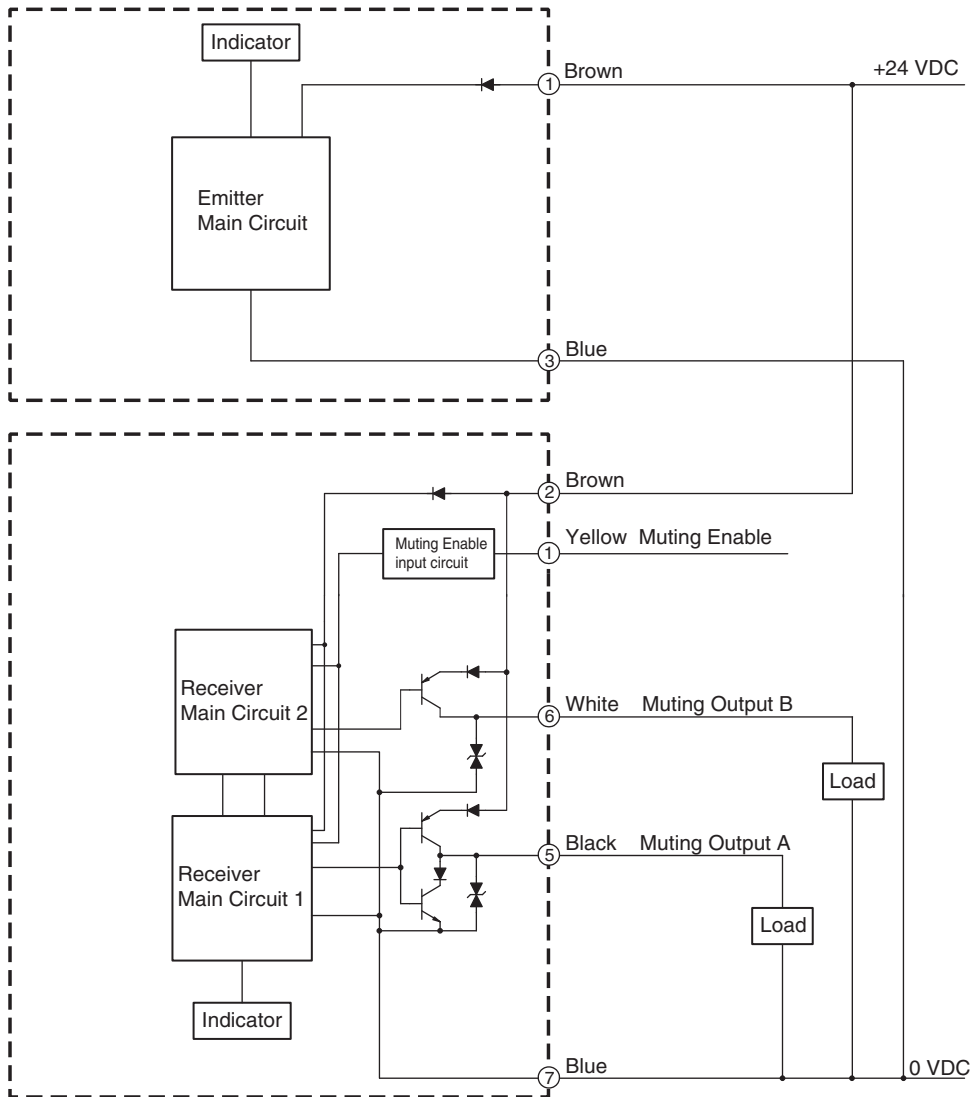


**Note:** The wiring examples in later pages do not indicate functional earth. To use functional earth, wire an earth cable according to the example above. Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.

# F3W-MA

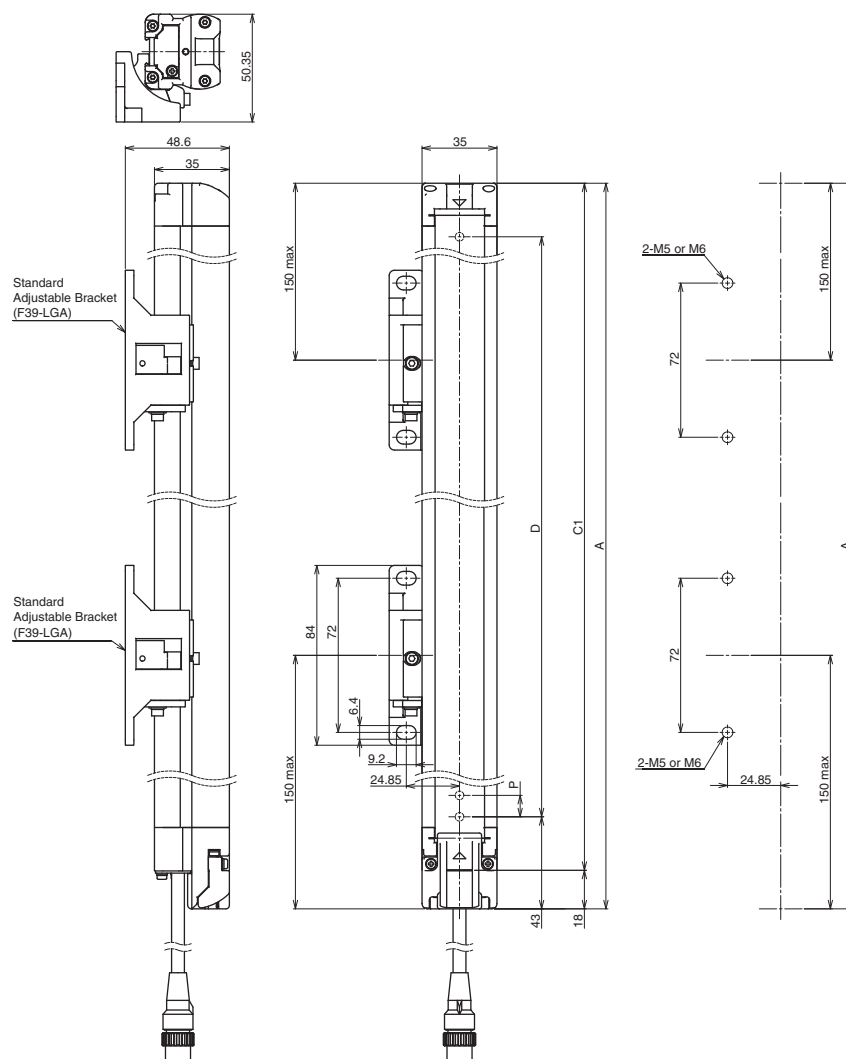
## Input/Output Circuit

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



# Dimensions

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



< Screw: M5 or M6 >

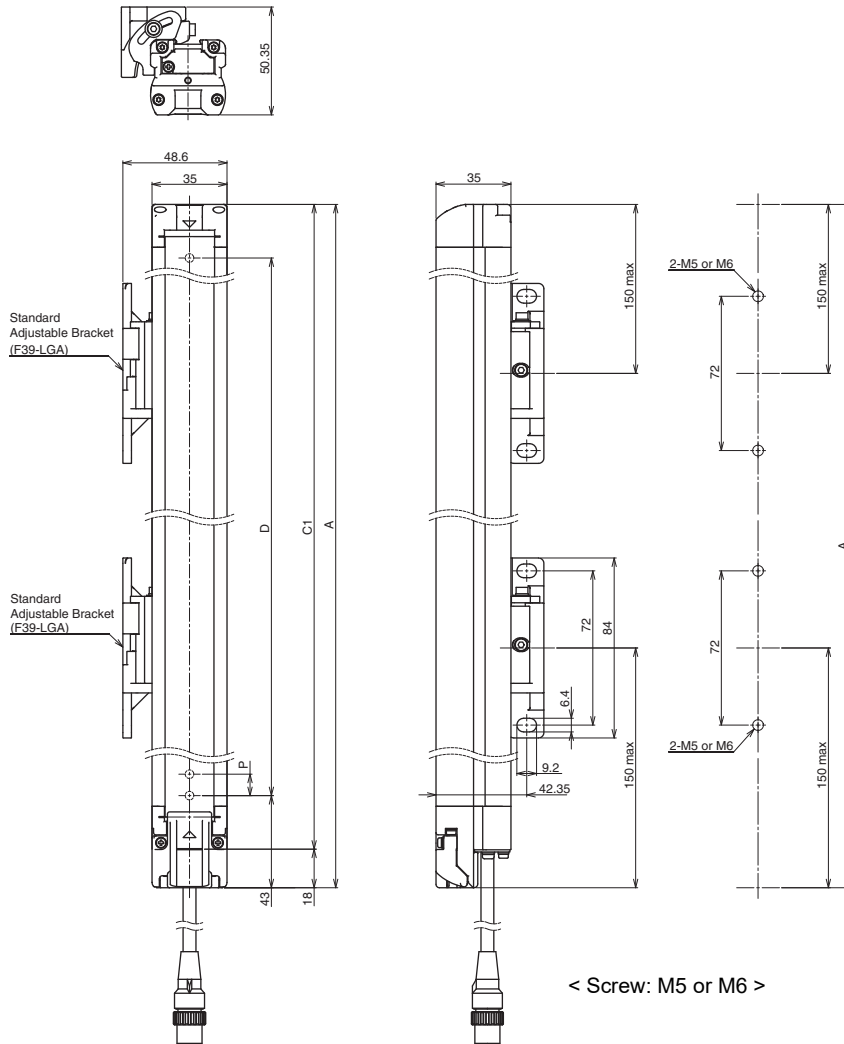
| Model                                     | F3W-MA0100P | F3W-MA0300P |
|---|-------------|-------------|
| Dimension A                               | 208         | 448         |
| Dimension C1                              | 190         | 430         |
| Dimension D                               | 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).



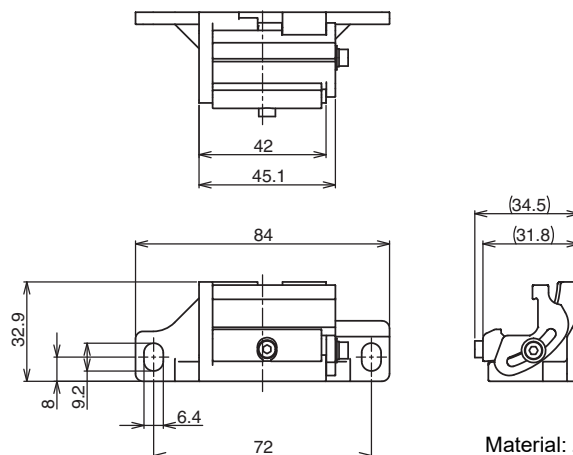
## Side Mounting



| 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           |

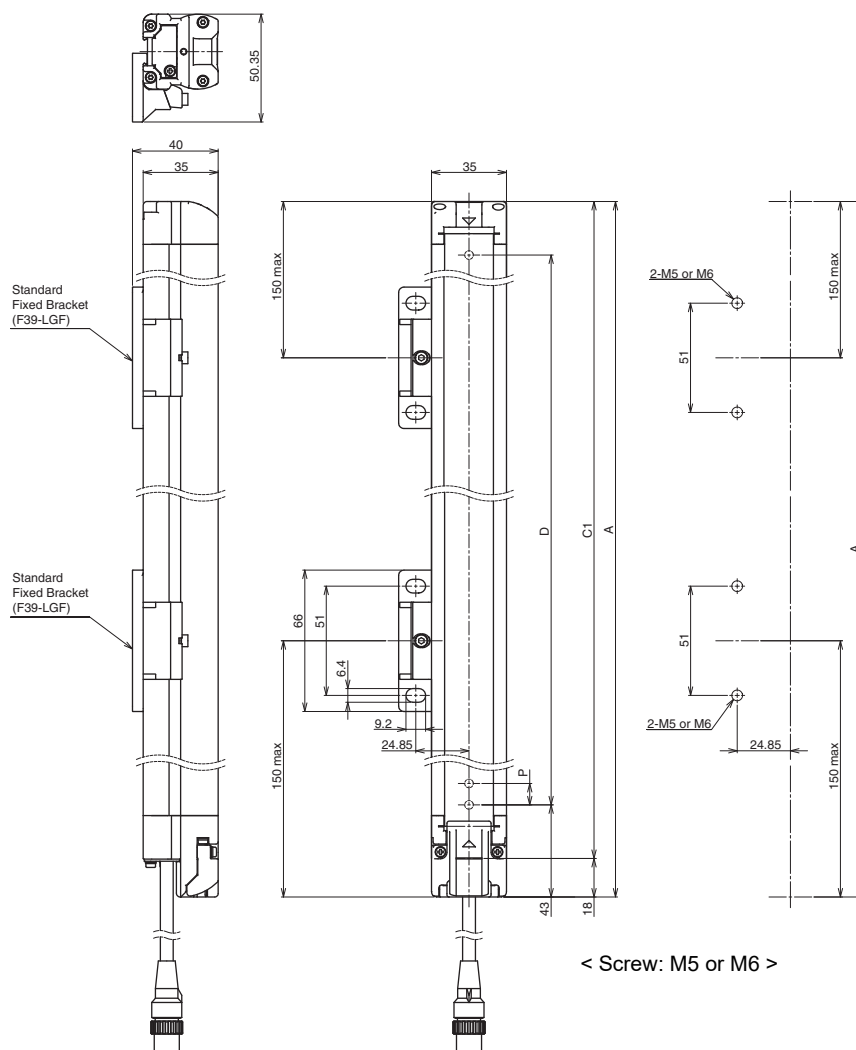
- \*1. The number of brackets required to mount either one of emitter and receiver.
- \*2. Mounting an emitter or receiver with one bracket is possible. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

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



Material: Zinc alloy, Fluorine-containing

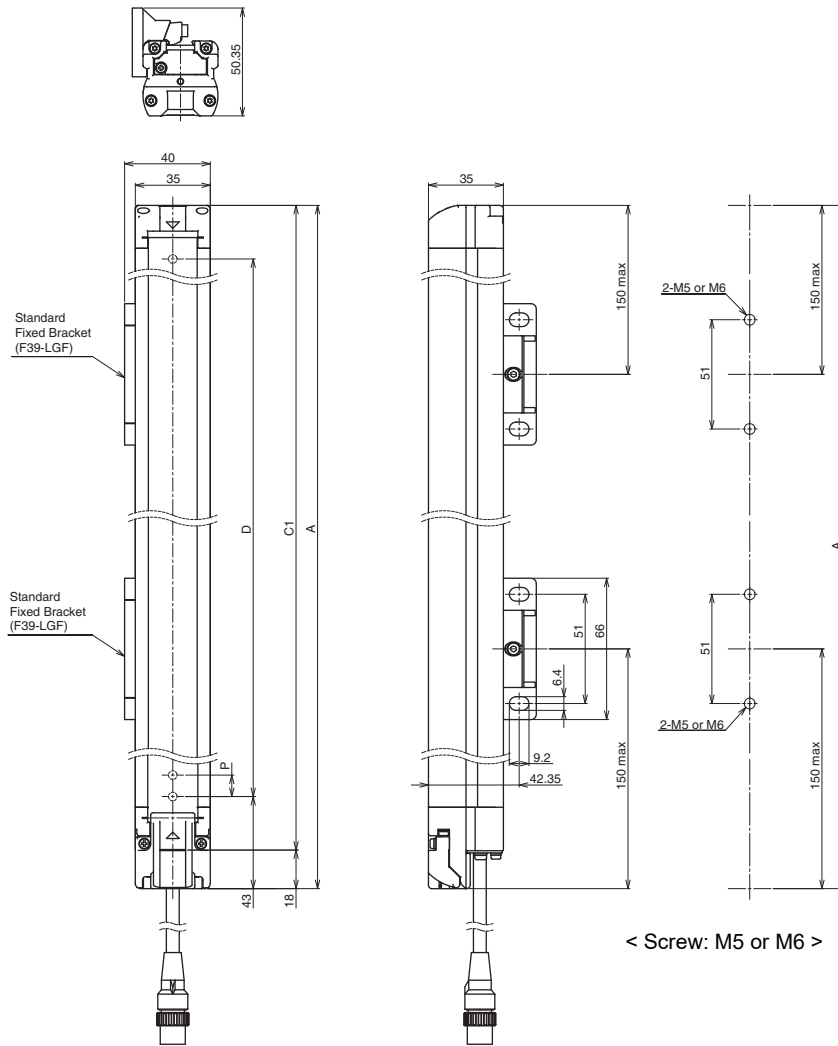
### Mounted with Standard Fixed Brackets (F39-LGF) Backside Mounting



| 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).

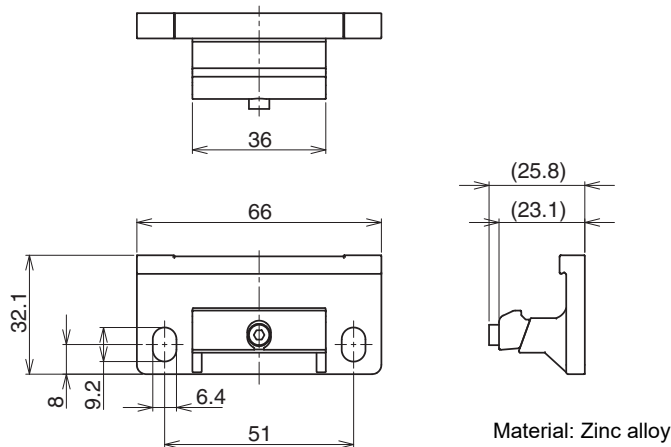
## Side Mounting



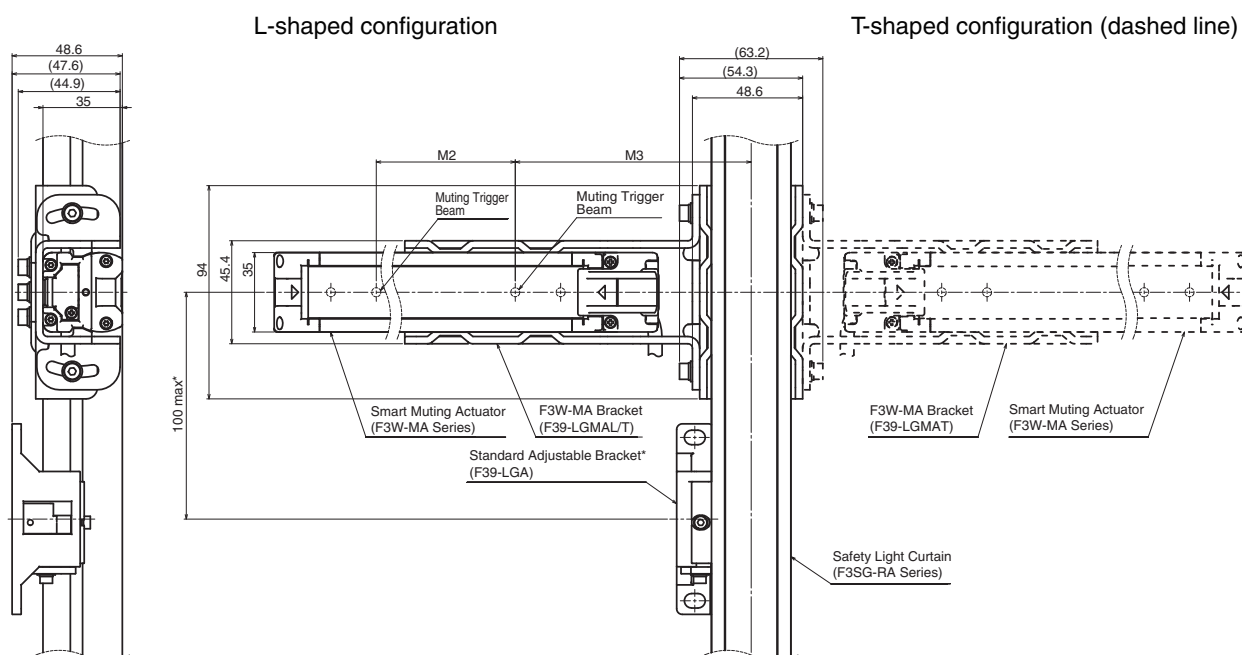
| Model                                | F3W-MA0100P | F3W-MA0300P |
|--------------------------------------|-------------|-------------|
| Dimension A                          | 208         | 448         |
| Dimension C1                         | 190         | 430         |
| Dimension D                          | 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)



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<sup>2</sup>, 1000 shocks for all 3 axes

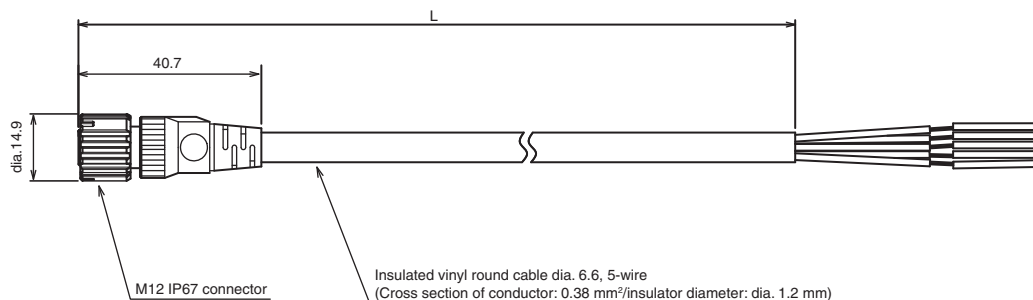
For mounting an F3W-MA0300P under a shock environment exceeding this, the F3W-MA Bracket cannot be used. Use a Standard Adjustable Bracket (F39-LGA).

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

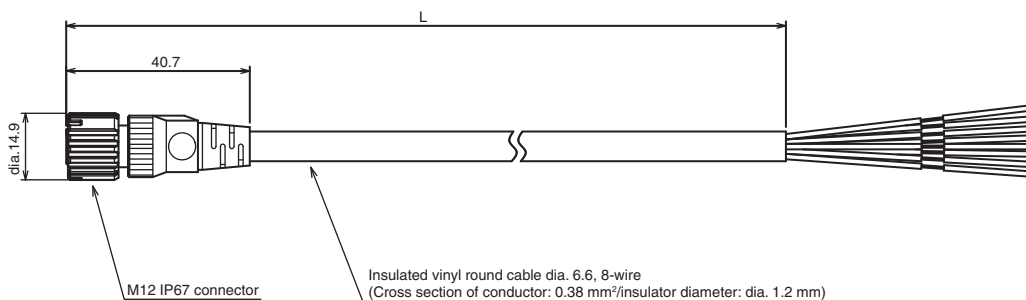
| Model        | F3W-MA0100P | F3W-MA0300P |
|--------------|-------------|-------------|
| Dimension M2 | 100         | 300         |
| Dimension M3 | 104         | 124         |

**Accessories**

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



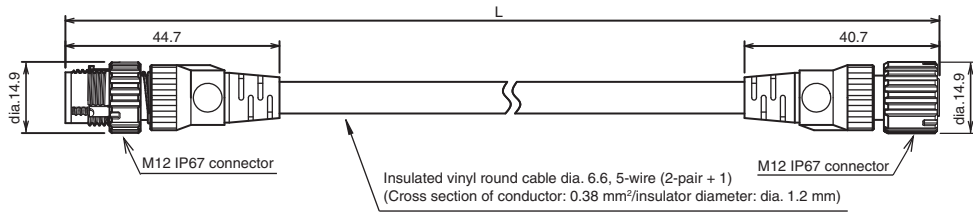
**Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)**



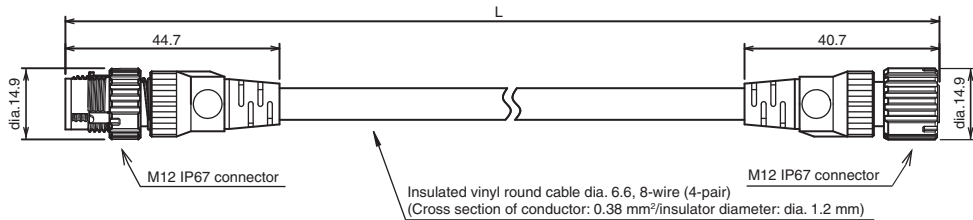
| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JG3A-L           | F39-JG3A-D             | 3     |
| F39-JG7A-L           | F39-JG7A-D             | 7     |
| F39-JG10A-L          | F39-JG10A-D            | 10    |
| F39-JG15A-L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

# F3W-MA

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

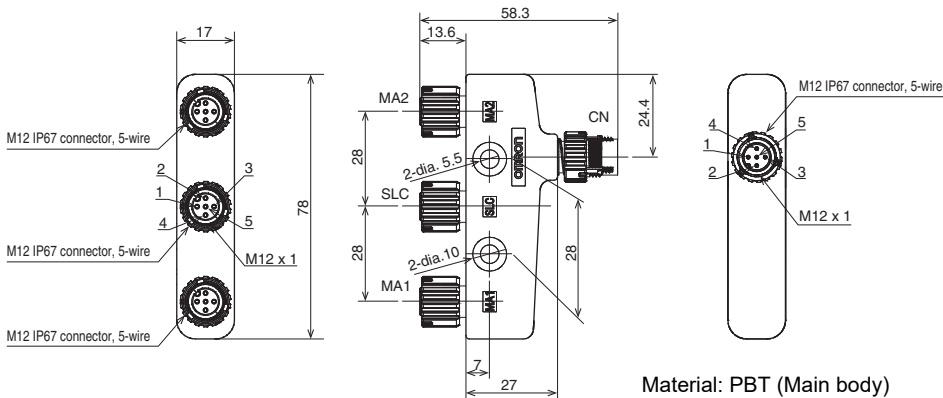


## Double-Ended Cable for Receiver: Cable for extension (F39-JG□B-D, sold separately)

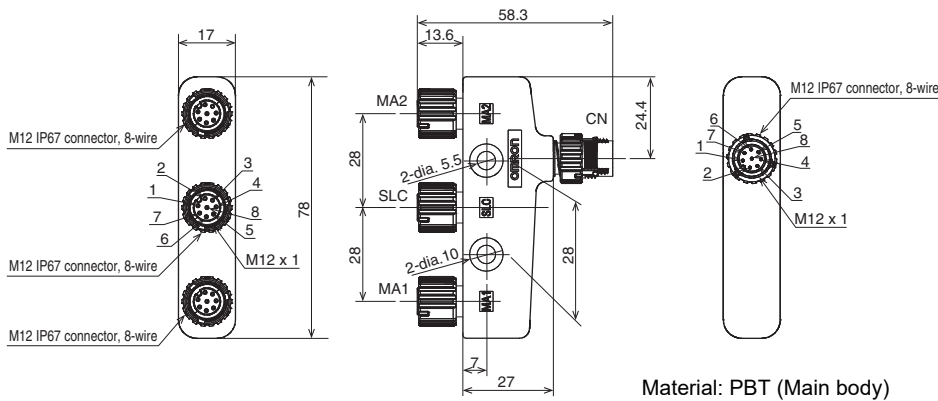


| Emitter cable (Gray) | Receiver cable (Black) | L (m) |
|----------------------|------------------------|-------|
| F39-JGR5B-L          | F39-JGR15B-D           | 0.5   |
| F39-JG1B-L           | F39-JG1B-D             | 1     |
| F39-JG3B-L           | F39-JG3B-D             | 3     |
| F39-JG5B-L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

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



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



## Related Manuals

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





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