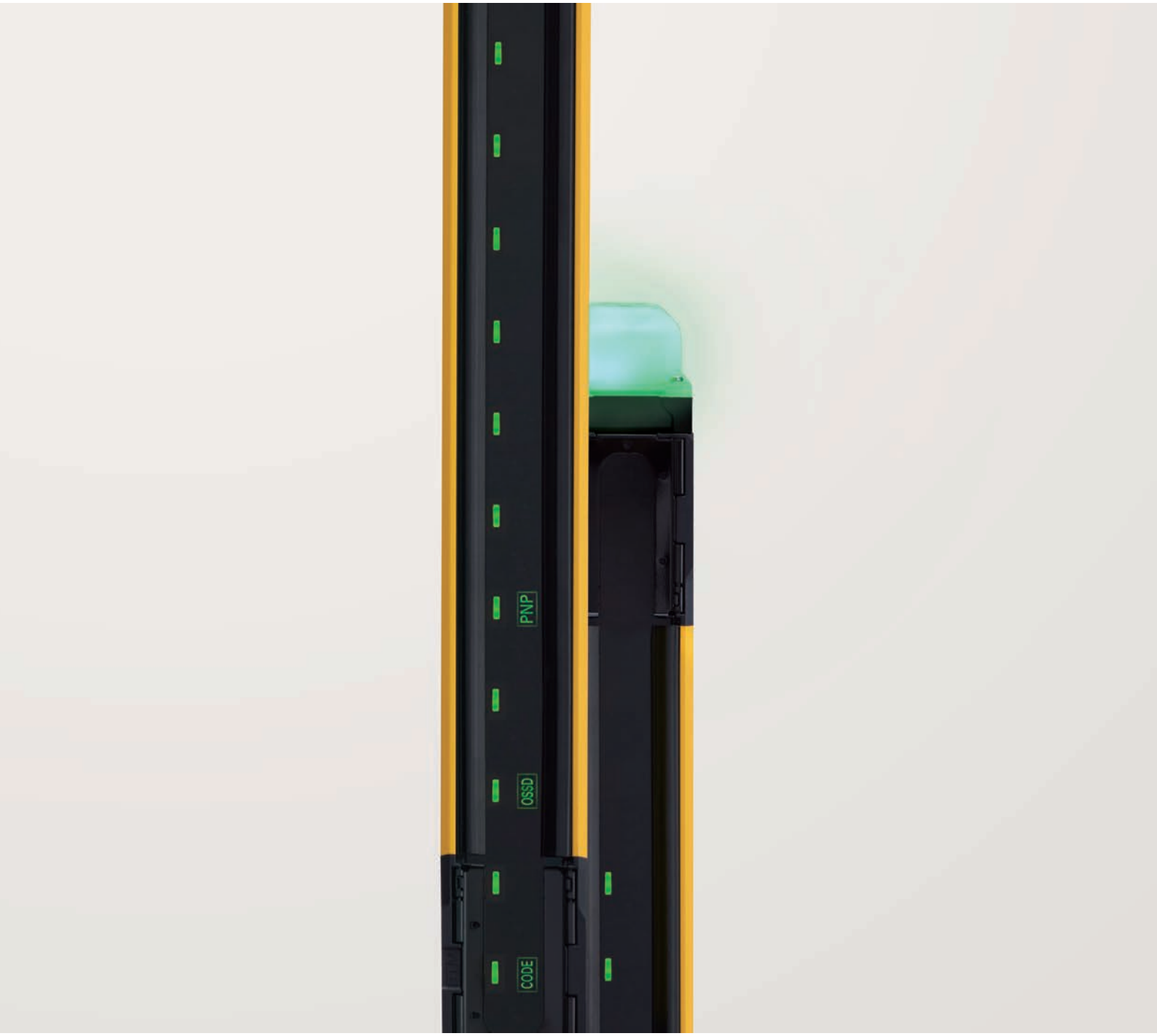
Safety Light Curtain/Safety Multi-Light Beam
F3SG-SR/PG SERIES

OMRON

# Easy to monitor and ready for IoT



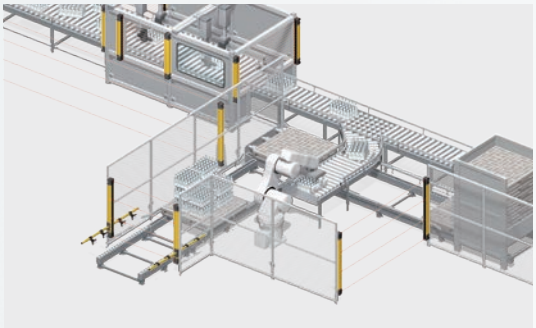

IO-Link

SAFETY, TECHNOLOGY & INNOVATION

# This series redefines safety at manufacturing sites

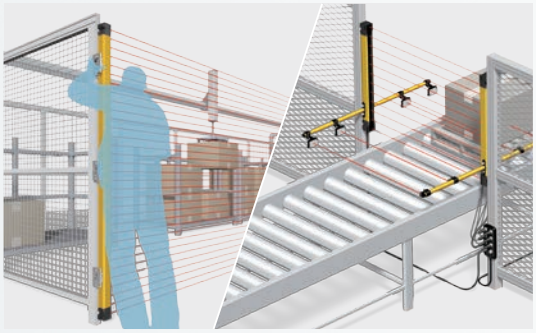
Manufacturers now need to manage
globalization and flexible production.
That's why we have
developed our F3SG-SR/PG Series.
This series offers a complete lineup
of light curtains that comply
with global safety standards
and a wide range of functionality
that covers all aspects
from design through to maintenance.
The F3SG-SR/PG Series
helps manufacturers build safety systems.

# Build flexible safety systems



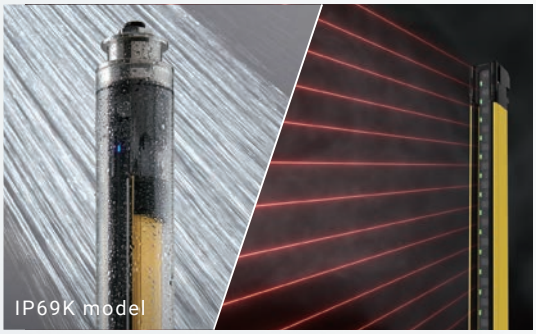
## Design





## Set-up





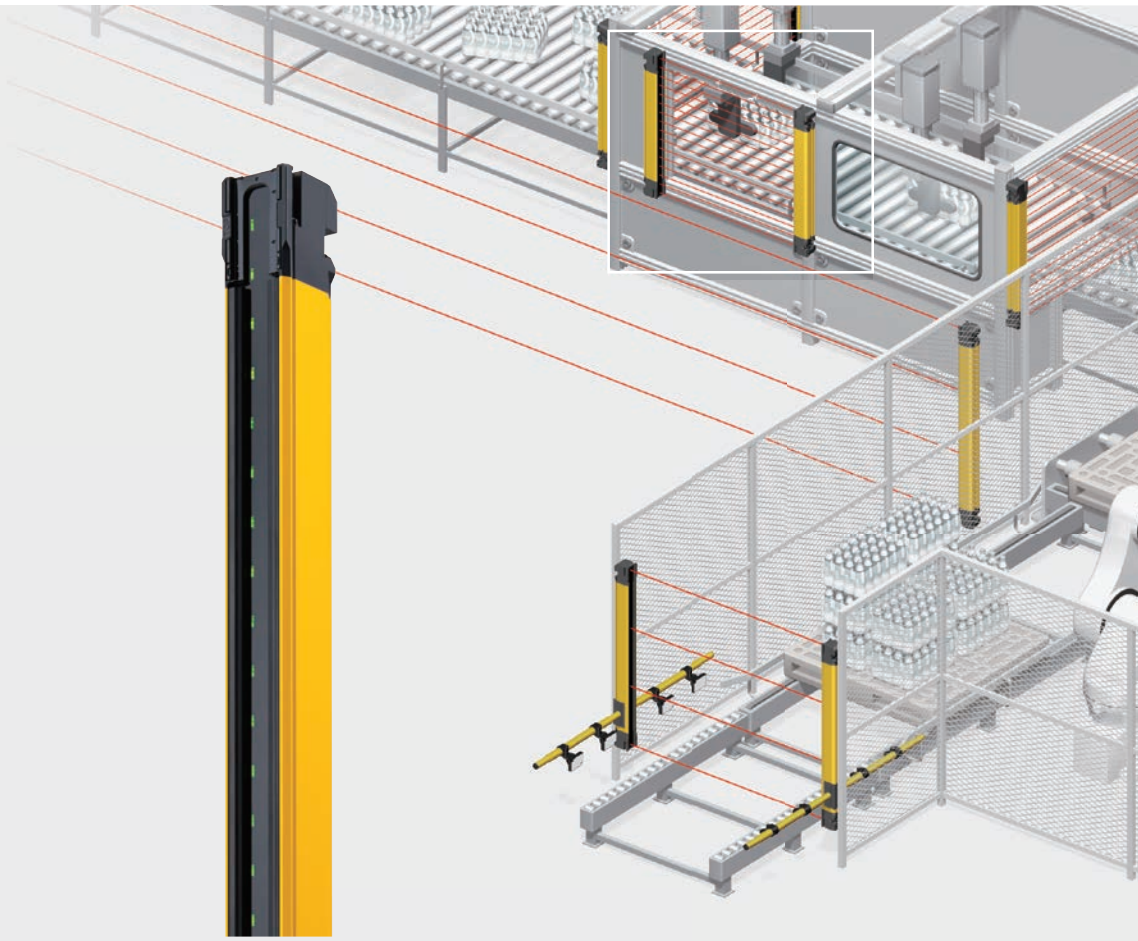

## Operation




## Maintenance

# One series covers all protection applications—from machine

Standardize mechanical design across production lines and eliminate complexity of selection and design.



## Protection at machine openings

Safety Light Curtain

## F3SG-SR

### Finger Protection

| | | |
|---|---|---|
| Beam gap | 10 mm | Detection capability 14-mm dia. |
| Protective height | 160 to 2,000 mm | |
| Max. operating range Min./Typ. | 10 m / 15 m | |

IP69K model available

### Hand Protection

| | | |
|---|---|---|
| Beam gap | 20 mm | Detection capability 25-mm dia. |
| Protective height | 160 to 2,480 mm | |
| Max. operating range Min./Typ. | 20 m / 30 m | |

IP69K model available

### Arm/Leg Protection

| | | |
|---|---|---|
| Beam gap | 40 mm | Detection capability 45-mm dia. |
| Protective height | 240 to 1,520 mm | |
| Max. operating range Min./Typ. | 20 m / 30 m | |

### Body Protection

| | | |
|---|---|---|
| Beam gap | 80 mm | Detection capability 85-mm dia. |
| Protective height | 280 to 920 mm | |
| Max. operating range Min./Typ. | 20 m / 30 m | |

## Common optional accessories including cables and brackets*

The light curtains share common optional accessories for ease of design and retrofitting of production lines.

Intelligent Tap
F39-SGIT-IL3

Bluetooth® Communication Unit
F39-SGBT

IO-Link
Bluetooth
USB Type-C™

Lamp
F39-SGLP
NEW

Muting Sensor Arm Mounter
F39-FMA
NEW

Muting Sensor Connection Box
F39-GCN5
NEW

Floor Mount Column
F39-ST
NEW

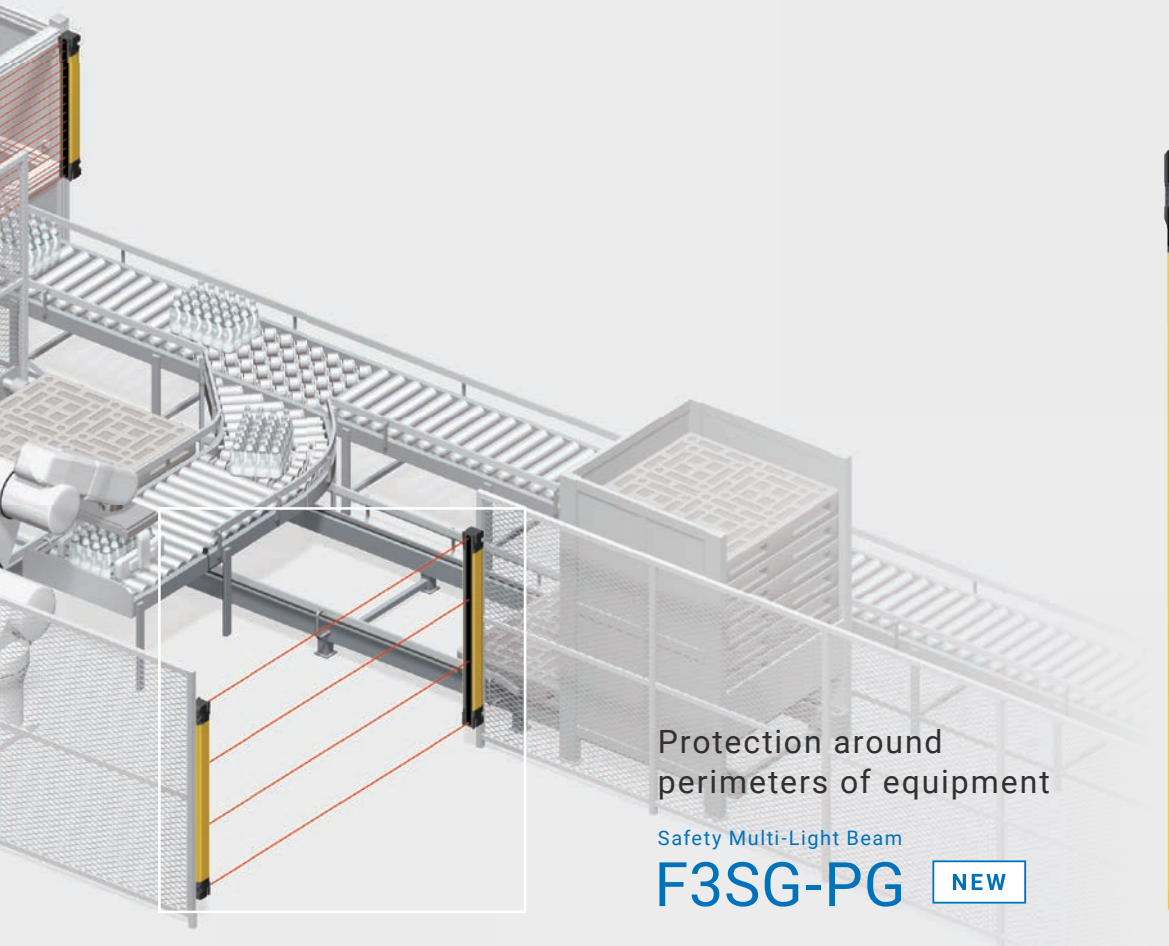
Mount-Column Adjustable Base
F39-STB
NEW

Mirror Column (for F3SG-SR Safety Light Curtain)
F39-SML
NEW

* Except for some optional accessories. See page 41 and following for details.

(The mount-column adjustable base is sold separately.)

# openings to perimeters of equipment



Protection around perimeters of equipment

Safety Multi-Light Beam

## F3SG-PG NEW

### Perimeter Access Guarding

| | |
|---|---|
| Beam gap | 300/400/500 mm |
| Product length | 670 to 1,370 mm |
| Max. operating range Min./Typ. | 20 m / 30 m |

### Perimeter Guarding Long Range

| | |
|---|---|
| Beam gap | 300/400/500 mm |
| Product length | 630 to 1,370 mm |
| Max. operating range Min./Typ. | 70 m / 110 m |

### Perimeter Guarding Passive Mirror

| | |
|---|---|
| Beam gap | 300/400/500 mm |
| Product length | 670 to 1,370 mm |
| Max. operating range Min./Typ. | 5 m / 8 m |

Mirror Column (for F3SG-PG Safety Multi-Light Beam) F39-PML

NEW

## Helps build safety systems for machines all over the world

This series conforms to worldwide safety standards*.

* We will apply for TS Mark, S Mark, and KCs Mark.

PNP/NPN selection by changing the wiring allows you to easily bring and install the light curtain across the world.

The unique tightly sealed structure meets IP67G water and oil resistance and IP69K*.

* (Safety Light Curtain IP69K model F3SG-SR-K)

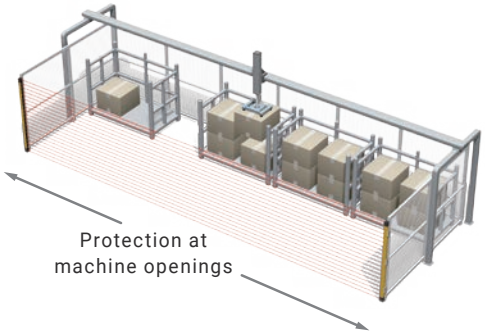
NEW

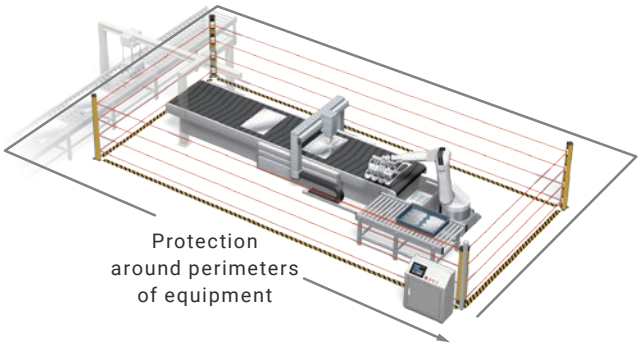
# A broad lineup for flexible production line design

Create flexible design plans to suit your equipment requirements.

## Long operating range thanks to unique optical design

The long-distance sensing capability enables reliable detection even in harsh environments.




Safety Light Curtain

### F3SG-SR

Series

20 m Min.
30 m Typ.

World's longest class*

The high-power optical system provides stable detection up to 20 m even in harsh environments.

* Except for detection capability of 14-mm dia.

Safety Multi-Light Beam

### F3SG-PG

Series

70 m Min.
110 m Typ.

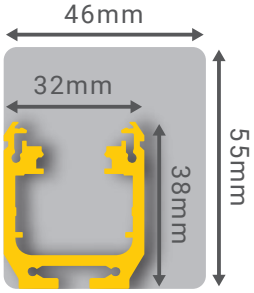
Patent pending

When mirror columns are installed in three corners:50m Min./80m Typ.

## Omron's unique compact design

The F3SG-SR Safety Light Curtain and F3SG-PG Safety Multi-Light Beam share the same compact housing. This makes mechanical design more flexible.

SLIM
50%*

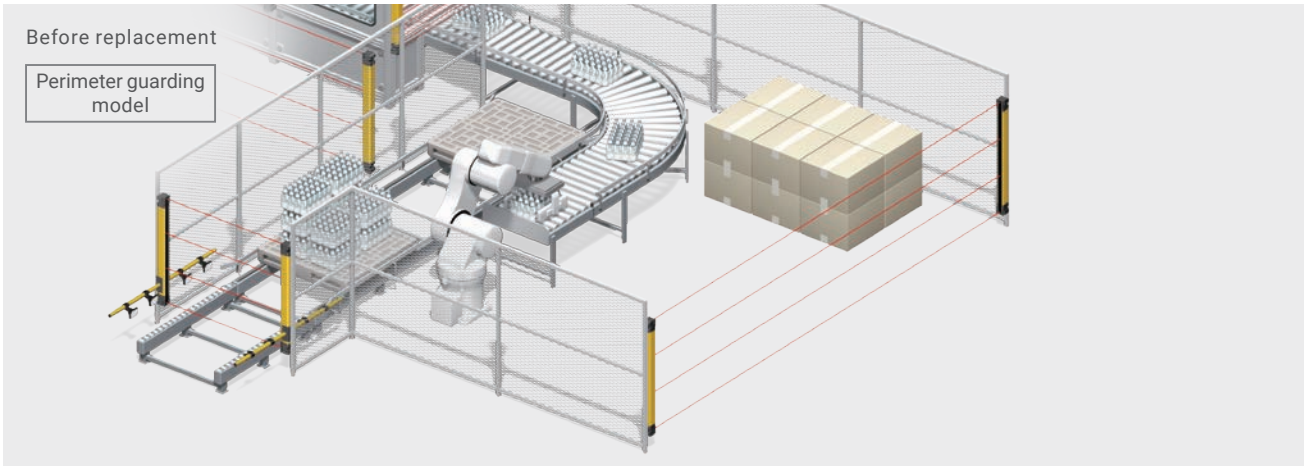


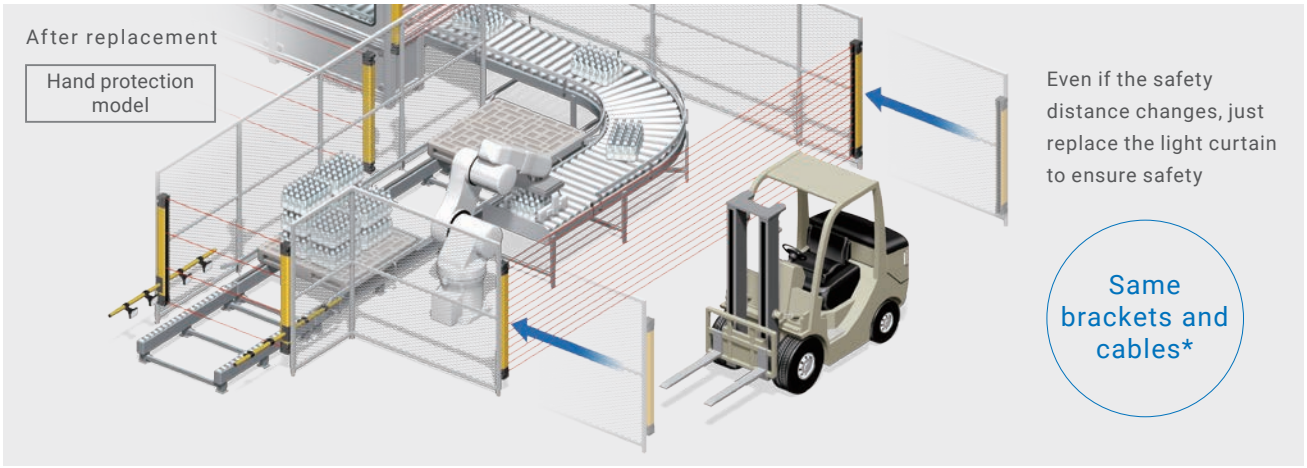

* Compared with OMRON Robotics and Safety Technologies, Inc's PA46 Perimeter Access Guarding Device. (Based on Omron investigation in June 2018)

## Easy line layout changes

Simply replace a light curtain using the same accessories because the F3SG-SR Series and F3SG-PG Series share the same housing. There is no need to select and install optional accessories for a new light curtain.

Example : In order to secure a working space by installing the light curtain closer to the machine, the perimeter guarding model is replaced with the hand protection model




## Just replace the light curtain with the same protective height*

### F3SG-SR Series lineup

● Standard model ○ Flexible height model (Increments of 40 mm)

| Protective height (mm) | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | 600 | 640 | 670 | 680 | 720 | 760 | 800 | 840 | 880 | 920 | 960 | 970 | 1000 | 1040 | 1070 | 1120 | 1200 | 1280 | 1360 | 1370 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Finger Protection | ● | ○ | ● | ○ | ● | ○ | ● | ○ | ● | ○ | ● | ○ | ● | | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | | ● | | | | ● | | | |
| Hand Protection | ● | ○ | ● | ○ | ● | ○ | ● | ○ | ● | ○ | ● | ○ | ● | | ○ | ● | ○ | ● | ○ | ● | ○ | ● | | ○ | ● | | ● | ● | ● | ● | |
| Arm/Leg Protection | | | ● | | | | ● | | | | ● | | | | | ● | | | | ● | | | | | | | | ● | | | |
| Body Protection | | | | ● | | | | ● | | | | ● | | | | | ● | | | | ● | | | | | | | | | | |

| Protective height (mm) | 1400 | 1440 | 1520 | 1600 | 1680 | 1760 | 1800 | 1840 | 1920 | 2000 | 2080 | 2280 | 2480 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Finger Protection | ● | | | ● | | | ● | | | ● | | | |
| Hand Protection | | ● | ● | ● | ● | ● | | ● | ● | | ● | ● | ● |
| Arm/Leg Protection | | | ● | | | | | | | | | | |
| Body Protection | | | | | | | | | | | | | |

### F3SG-PG Series lineup

| Product length (mm) | 160 | 200 | 240 | 280 | 320 | 360 | 400 | 440 | 480 | 520 | 560 | 600 | 640 | 670 | 680 | 720 | 760 | 800 | 840 | 880 | 920 | 960 | 970 | 1000 | 1040 | 1070 | 1120 | 1200 | 1280 | 1360 | 1370 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Perimeter Access Guarding | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | ● | | | | | ● |
| Perimeter Guarding Long Range | | | | | | | | | | | | | | ● | | | | | | | | | ● | | | ● | | | | | ● |
| Perimeter Guarding Passive Mirror | | | | | | | | | | | | | | ● | | | | | | | | | | | | ● | | | | | ● |

* Except for some models and optional accessories.See page 41 and following for details.

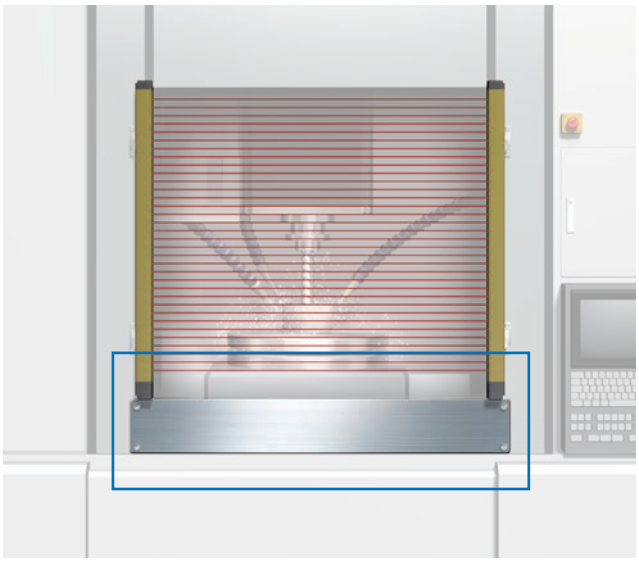
# Flexible installation

## Perfect fit

Protective heights are available in increments of 40 mm up to 1,000 mm*. The perfect protective height for any protected area ensures safety and eliminates the need for additional measures.

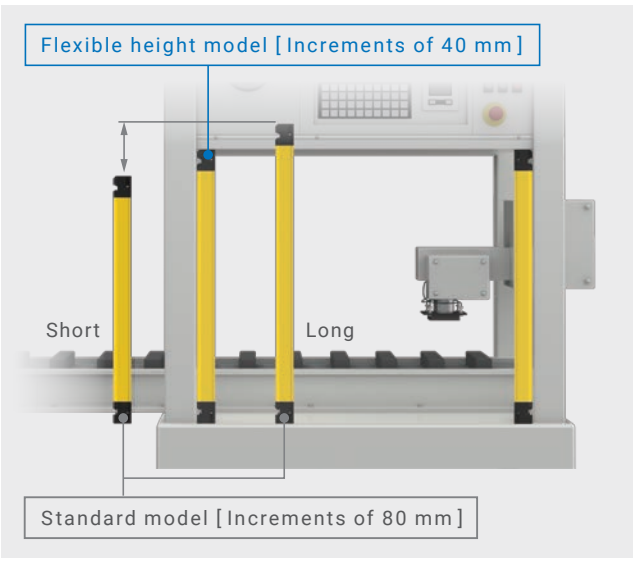
Problem

The light curtain that does not completely fit the protected area requires additional measures (e.g., adding a protection cover).



F3SG-SR*

The flexible height model requires no additional measures.



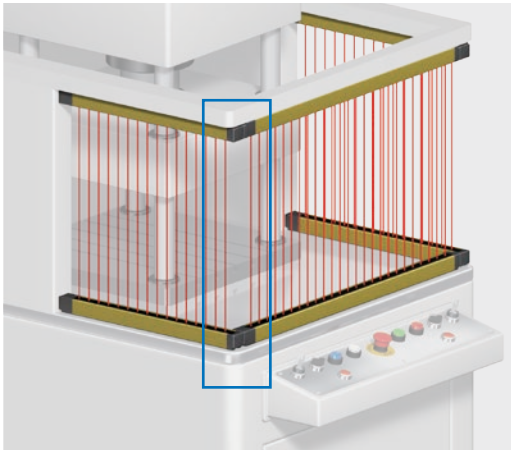

* F3SG-SR Finger and Hand Protection models only.

## Protection without dead space*

The F3SG-SR Series eliminates dead space that previously existed even when light curtains are series-connected or U-shape connected. Safer systems can be designed.

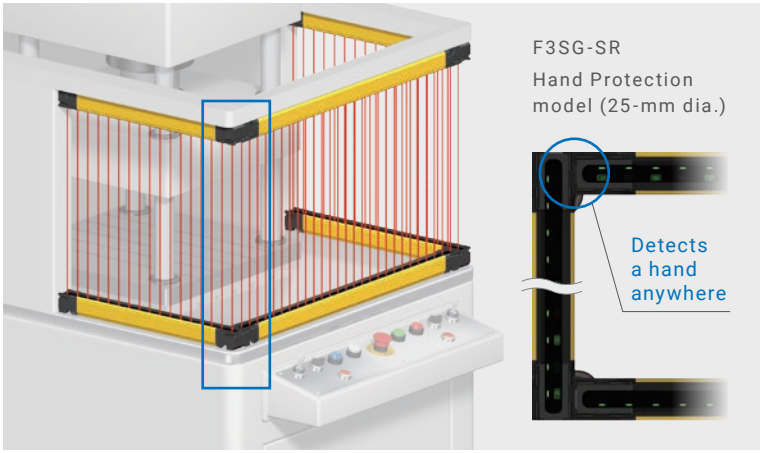
Problem

Dead space exists at the joint.



F3SG-SR*

Eliminates dead space and ensures safety.

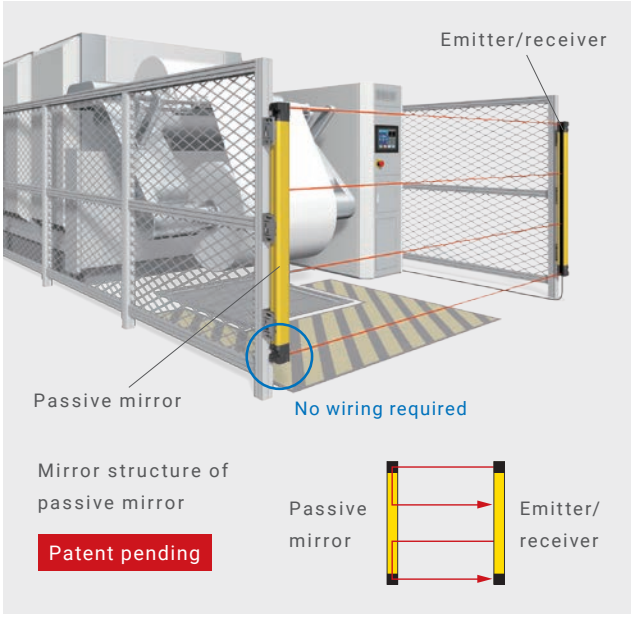



* Except for F3SG-SR Finger Protection models.

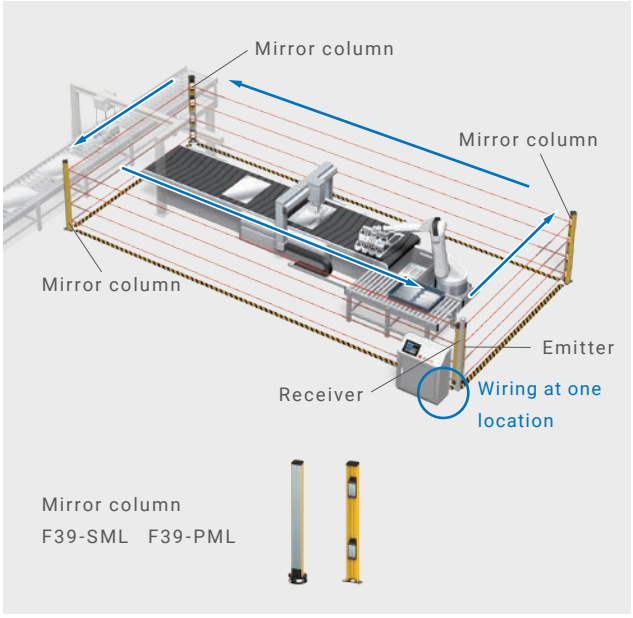
## Simple wiring for flexible design

The F3SG-PG-C Perimeter Guarding Passive Mirror requires wiring of only the emitter/receiver. The use of mirror columns allows wiring at one location for protection around perimeters of equipment. They reduce wiring duct design and wiring time.

Wiring only the emitter/receiver

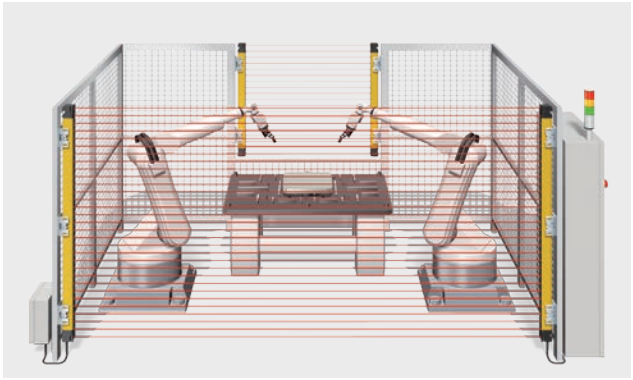



Wiring at one location for protection around perimeters of equipment




## Two different synchronization systems

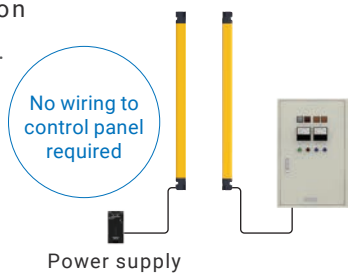
Choose from two different methods of synchronization between the emitter and receiver to suit your equipment.

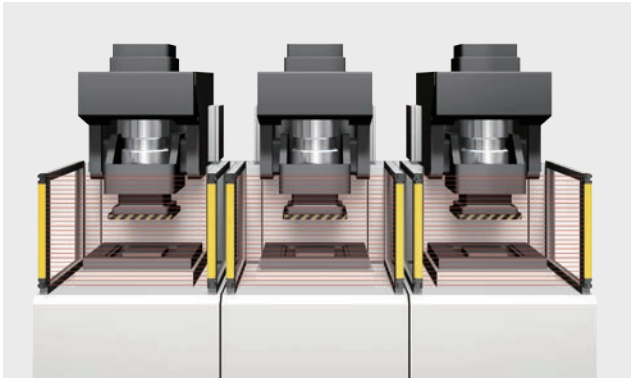


### Optical synchronization

No sync lines are required. Connect emitter only to power supply.

Mutual interference prevention : Up to 2 sets



### Wired synchronization

Mutual interference prevention : Up to 3 sets

# Color indication of beam status for quick and easy beam adjustment

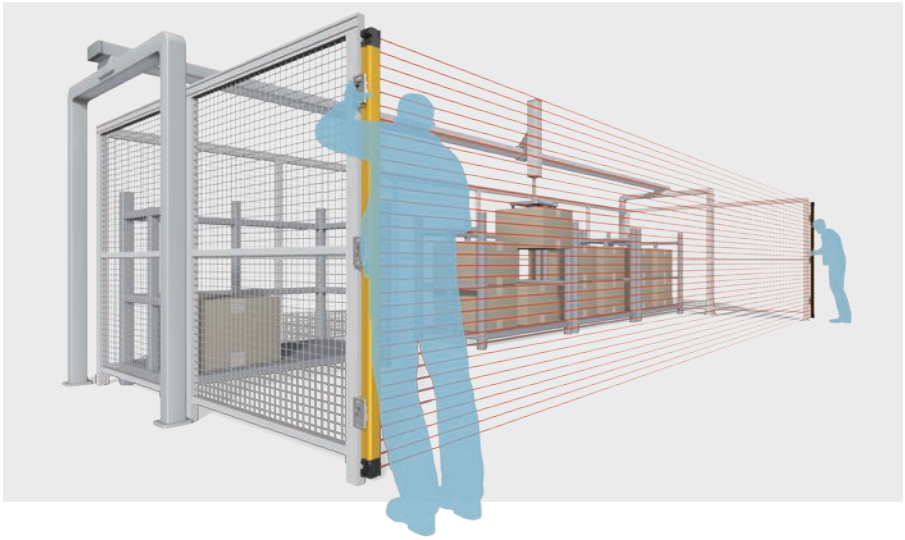
Reduce beam adjustment time.

## Area Beam Indicator (ABI) for an at-a-glance check of beam status

Patent pending

The ON or OFF state of the light curtain and low light intensity can be checked.
The ABI also facilitates fine adjustment of beams for long-distance sensing.

Easy to see



Stable state

Green :
Safety outputs ON

The beams
are unblocked.

Low light intensity

Orange :
Safety outputs ON

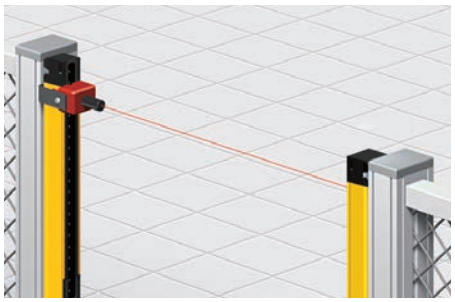
Adjust beams or check
if the light curtain is dirty.

Beams blocked

Red :
Safety outputs OFF*

The beams
in the area are blocked.

* The indicator of an unblocked area is OFF.
Note : Factory default setting.
The images of indicator illumination may vary somewhat from the actual products.



Laser Alignment Pointer
F39-PTG

Assists with beam adjustment. Easy-to-see laser beam shows the sensor orientation. It can be attached on the spatter protection cover.

# A variety of optional accessories for easy installation and angle adjustment

Reduce installation time and easily adjust beams after installation without relying on the expertise of experienced engineers.

## Easy beam adjustment after installation

Problem

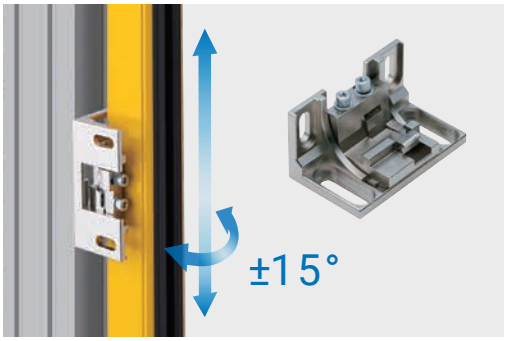
It is difficult to adjust beams after the light curtain is installed and the protection cover is attached.

F3SG-SR/PG

The rugged metal housing of the light curtain does not need a protection cover. Beams can be adjusted using optional brackets.

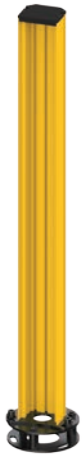

Adjustable Top / Bottom Bracket
F3SJ, F3SN Adapter
F39-LSGTB-SJ

This bracket used at the top and bottom of the light curtain provides horizontal adjustment of ±22.5º.




Adjustable Side-Mount Bracket
(Intermediate Bracket)
F39-LSGA

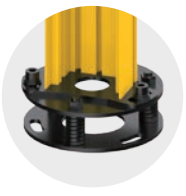
This bracket provides horizontal adjustment of ±15º as well as vertical position adjustment.



Floor Mount Column
F39-ST

This column can be installed independently of equipment or fences, almost anywhere.

Flexible protection



Mount-Column Adjustable Base
F39-STB

(The mount-column adjustable base is sold separately.)

Intelligent Tap
F39-SGIT-IL3

Settings can be copied and pasted between the same models of light curtains without using a PC, reducing time and effort to install many machines. Backed up settings are automatically restored at power on.

Setting without PC

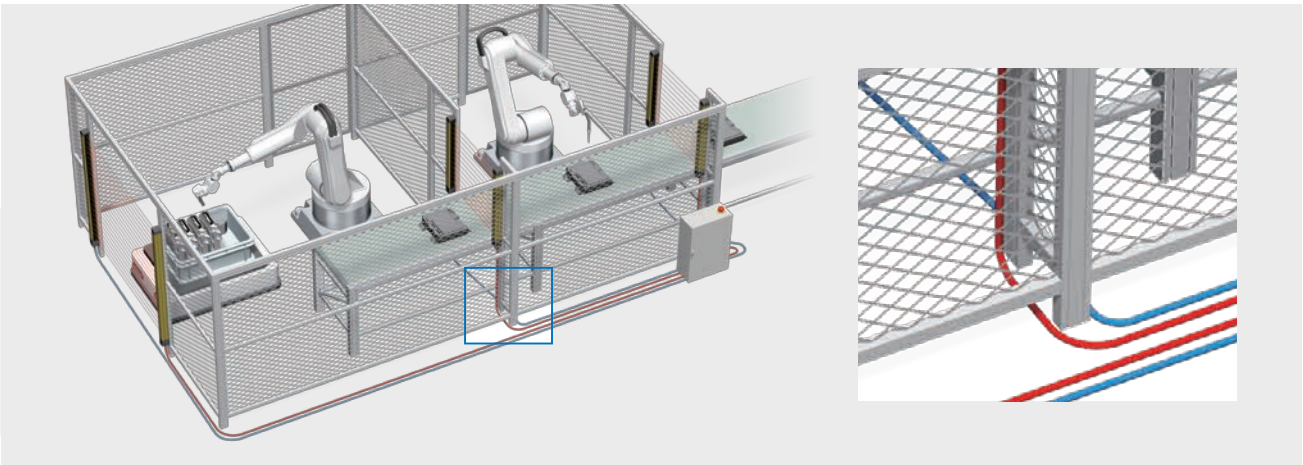
# Reduced wiring system for various equipment

Wiring work during line installation and maintenance can be greatly reduced.

## Simple wiring around large equipment

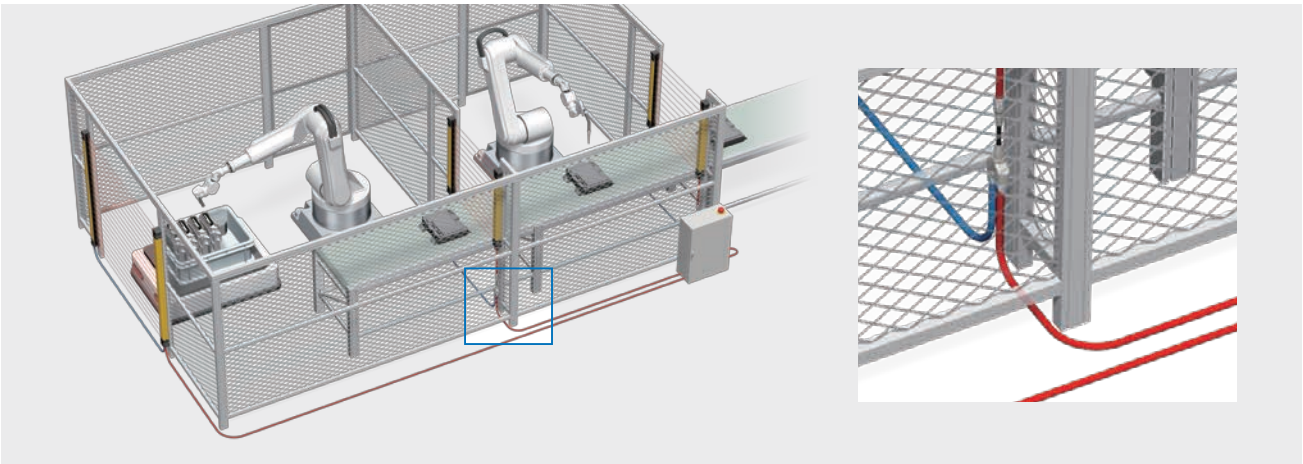
Problem

The distance of wiring around large facilities generally becomes long.



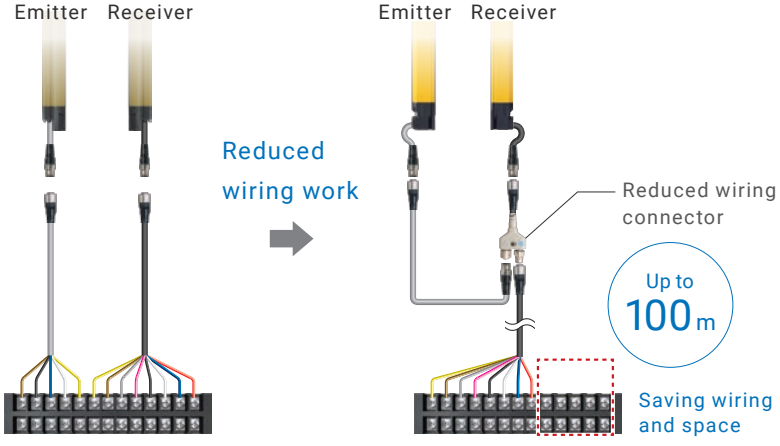
F3SG-SR/PG

The reduced wiring system reduces the number of cables and terminal blocks and wiring time.



Reduced wiring connector

Y-Joint Plug /
Socket Connector
F39-GCNY2



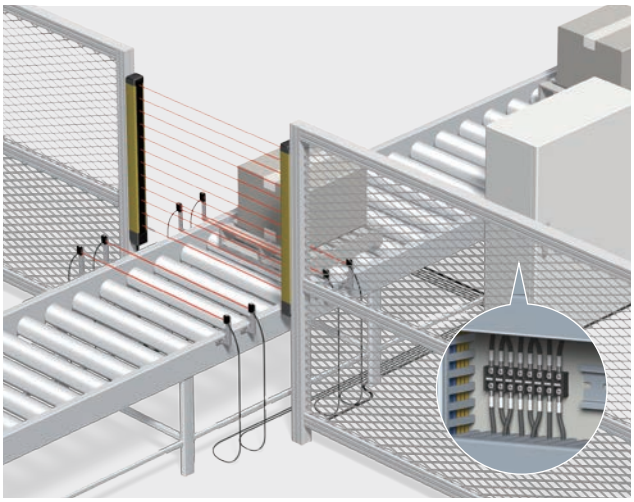

Note: Refer to the User's Manual (Cat. No. Z405) for more information on cable extension.

## One cable connection to control panel

Options provide simple wiring for muting.

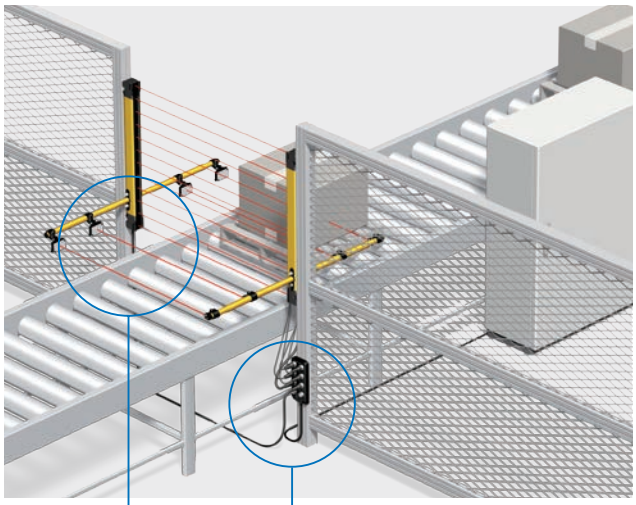
Problem

In order to maintain productivity, the light curtains are often used with muting sensors, which makes wiring in the control panel more complicated.



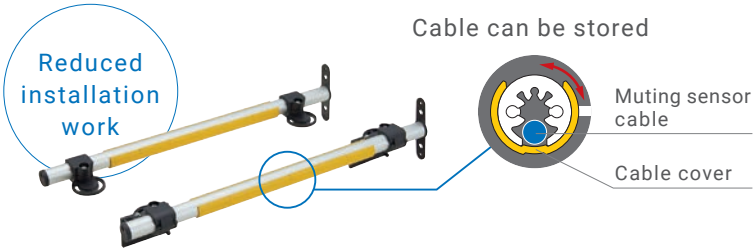
F3SG-SR/PG

Options to reduce wiring simplify wiring and installation of muting sensors.



### Muting Sensor Arm Mounter
### F39-FMA

The muting sensor arm mounter facilitates installation of a muting sensor.




### Muting Sensor Connection Box
### F39-GCN5

The connection box simplifies wiring for muting, and only one cable is used to connect to the control panel.


Note : The E3Z Muting Sensor is sold separately.

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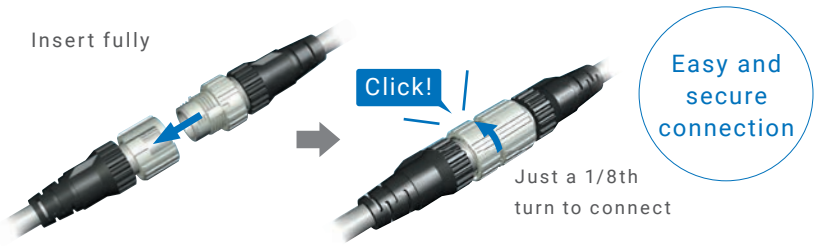
Smartclick connectors to quickly connect cables

Smartclick



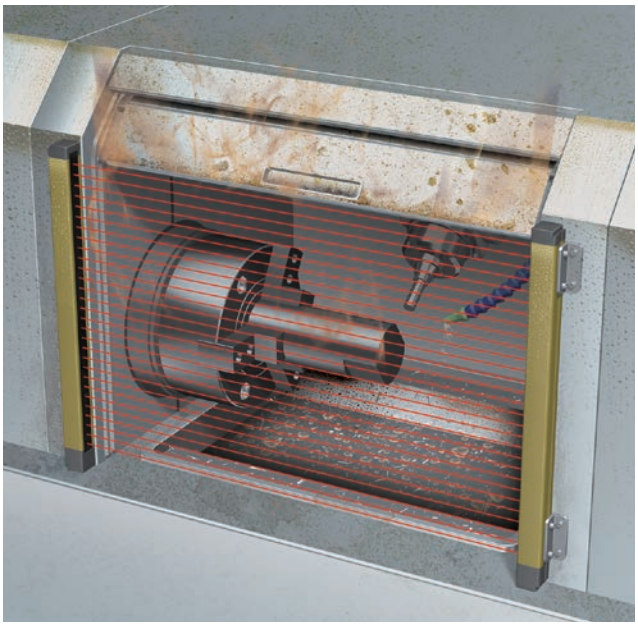
# Robustness for operation in harsh environments

Specifications suitable for use in any environment contribute to stable operation.

## Light curtains tend to malfunction in harsh environments where safety measures are required.

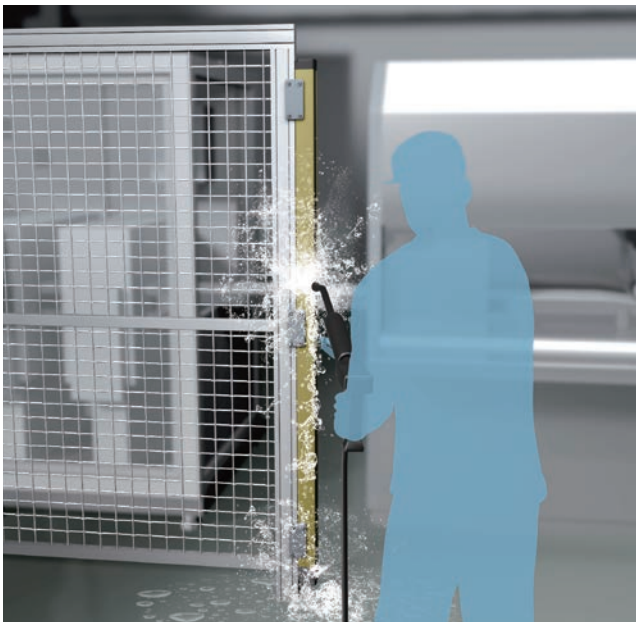
Cold storage warehouse

Safety measures cannot be implemented because there is no light curtain that can be used in cold environments.



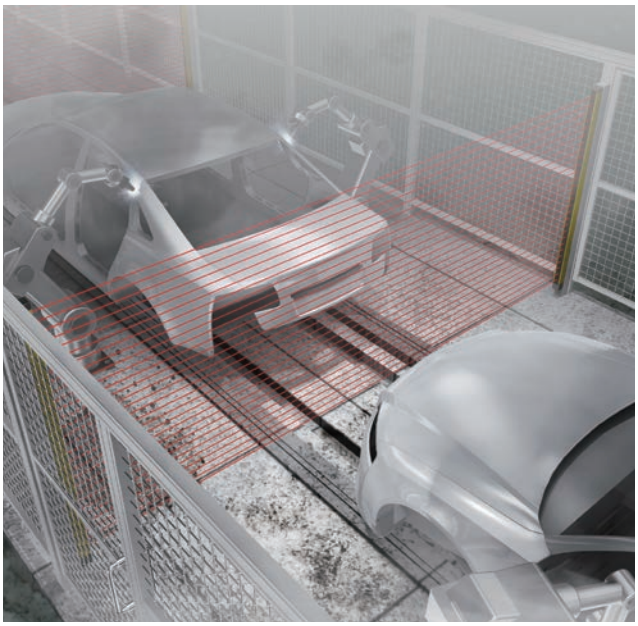
Metal working process

Oil that gets inside the light curtain causes failure at locations where oil mist is present.



Food processing line

Cleaning solution that gets inside the light curtain during machine wash-down causes failure.



Use in harsh environments

The spattered or dusty optical surface of the light curtain causes a malfunction or an unplanned machine stop.

Use in temperatures down to -30℃

Waterproof, oil resistance IP65/IP67 IP67G

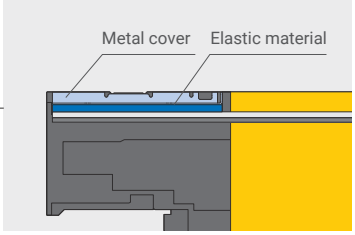
IEC 60529

JIS C 0920 Annex 1

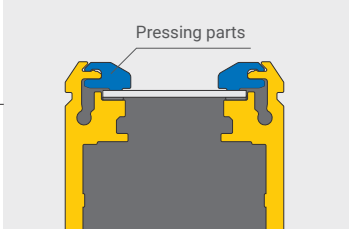
## Tightly sealed structure improved environmental resistance

The unique structure firmly presses the optical surface.Stable sealing performance resists penetration of liquid inside the light curtain, which improves environmental resistance of the housing.

Patent pending




Technology 1 to tightly seal the cap




Technology 2 to tightly seal the housing

## IP69K model for high-pressure wash-down applications

F3SG-SR-K

Waterproof IP69K

ISO 20653

## High-power optical system provides stable detection

The maximum operating range of the F3SG-SR Safety Light Curtain is 20 m and of the F3SG-PG Safety Multi-Light Beam 70 m.The high-power beam is robust in harsh environments.

## Metal housing increases ruggedness

## Laser marked information withstands harsh environments

# Easy maintenance

Even inexperienced operators can easily check status and replace light curtains.

## Easy error diagnosis with clear color indicators

The light curtain status can be checked at a glance.


### Status indicator

Clear LED indicators with labels help perform predictive maintenance by dirt detection and determine the optimal replacement timing.

### Colors and patterns indicate the status

| Status indicator* | Color | Status |
|---|---|---|
|  | Red/ Illuminated | LOCKOUT state due to a recoverable error |
| | Red/ Blinking | LOCKOUT state due to a replacement-recommended error |
|  | Orange/ Illuminated | Safety outputs are instantaneously turned OFF due to ambient light, vibration, or noise |
| | Orange/ Blinking | The Intelligent Tap is in LOCKOUT state |



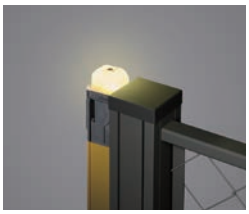
* The M status indicator is used for the 14-mm detection capablity model.

### Lamp

Output status can be checked at a glance.

F39-SGLP

Output information can be assigned to the lamp and ABI.



Status, such as light intensity drop, can be checked from a distance.

For information on other indicators, refer to *Indicator* on page 126 or *Troubleshooting* on page 130.

## Back up and restore settings with Intelligent Tap

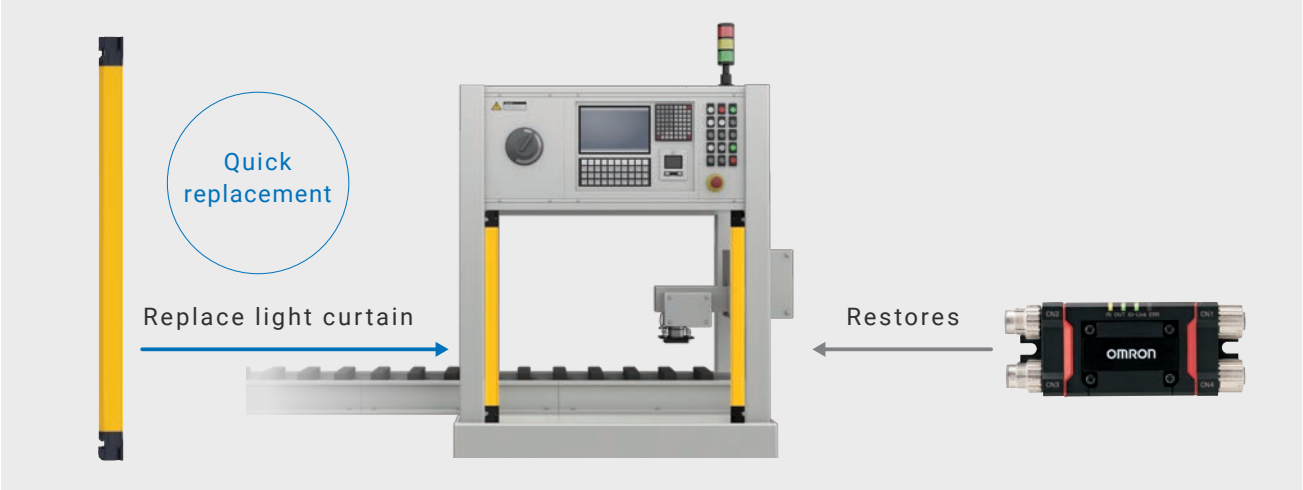
Replacement and setting time during maintenance can be reduced to 1/10 or less*.

### Plug & Work for quick replacement

Install the Intelligent Tap to automatically copy the settings of the replaced light curtain to a new one. Virtually anyone can easily replace light curtains and immediately restart the machine.

Replacement and setting time reduced to 1/10 or less*


Intelligent Tap
F39-SGIT-IL3




* Based on Omron investigation in June 2018.

# Preventive maintenance

The status of the light curtain is monitored, and the abnormal state is displayed.
This helps minimize machine downtime.

## Visualization of status

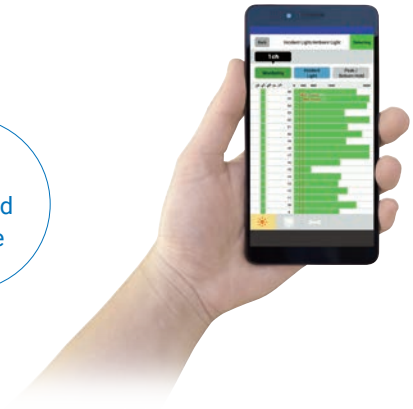
Various devices can be connected via IO-Link.*1
Low light intensity due to dirt on the light curtain can be displayed on the monitor, enabling preventive maintenance prior to erroneous detection.

IO-Link

No PC required on site

## Easy on-site monitoring

The Bluetooth communication unit allows you to monitor information about device stoppages on mobile devices.



Bluetooth®

SD Manager 3
Mobile APP

Note 1. Screen images for illustration purposes only.
2. You need to create screens.

### Process data

- Auxiliary output status *2
- Muting input status
- Sequence error information
- Unstable state information (each ch)
- Power voltage information
- OSSD output status
- Reset/EDM/override input status
- Instantaneous block information (each ch)
- Light curtain/Intelligent Tap lockout information

### Service data

- Light curtain information
- Light intensity information (1 byte : 0-255)
- Light curtain settings
- Light curtain internal status information
- Intelligent Tap power-on time information
- Intelligent Tap information
- Error log (4 errors)

### Requirements

Android™ 7.0 or higher


Startup screen

Error log screen

Light level monitoring

### System configuration example


Note 1. Screen images for illustration purposes only.
2. You need to create screens.

*1. Refer to the IO-Link Series Catalog (Cat. No. Y229) for details. *2. Auxiliary output can be set using the SD Manager 3.

# Easy setting via PC software SD Manager 3

The configuration tool allows you to easily monitor status and make settings without using a safety controller.

## Manually loaded machining : PSDI

PSDI*, provided as standard,
reduces operator effort and increases productivity

There is no need for the operator to press a two-hand control switch, saving operating time and increasing operating efficiency.

### Single break

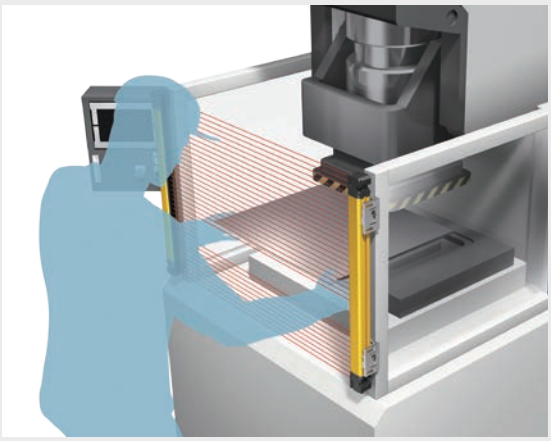
The machine restarts when the light curtain is interrupted and reset once.

Example : Manual loading and automatic unloading press

### Double break

The machine restarts when the interruption and reset are repeated twice.

Example : Manual loading and manual unloading press



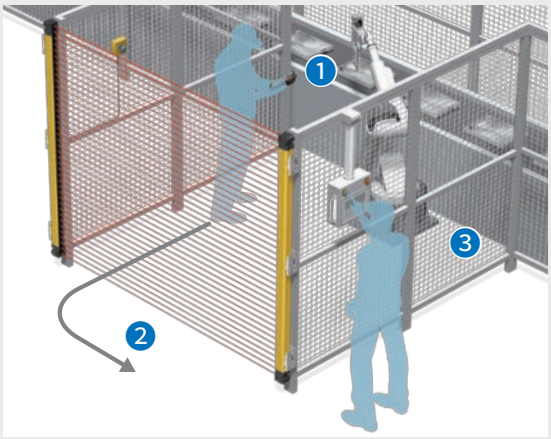
* PSDI : Presence Sensing Device Initiation
Read the *User's Manual* (Cat. No. Z405) before using.
Note: Comply with laws and regulations in the countries where the machine operates.

## Dangerous restart prevention : Pre-Reset

The Pre-Reset function
prevents possible accidents

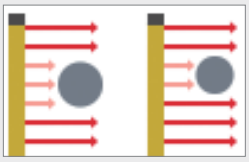
This function prevents the restart of equipment while an unseen worker is still near the robot, ensuring operators' safety.

1. Press the pre-reset switch inside the hazardous zone.
2. Get out of the hazardous zone.
3. Press the reset switch in the control panel to restart the light curtain.
   The machine is ready for restart.




The equipment cannot be restarted until the pre-reset switch of the light curtain is pressed and the light curtain is reset.

## Ignoring interrupted beams : Reduced Resolution

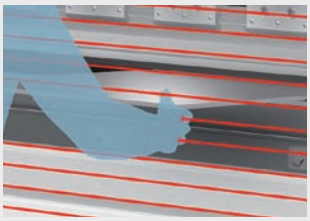


### Reduced Resolution changes the detection capability of the light curtain

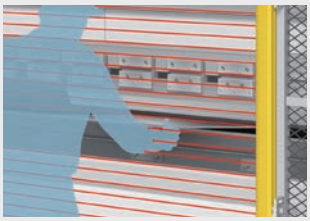
Even when objects (with a size of 1 to 3 interrupted beams) are present discontinuously, this function ignores them and keeps the safety outputs ON. This helps maintain productivity.

### Example : Arm and body protection

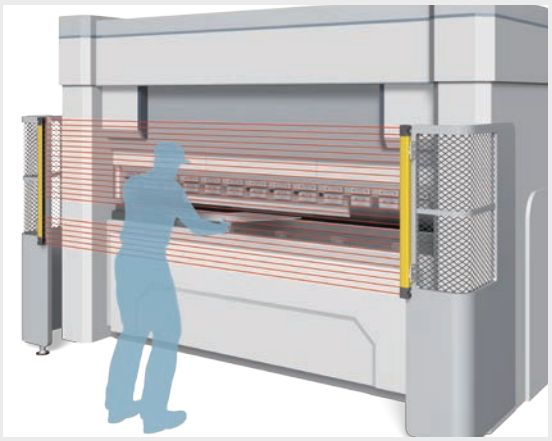
Safety output is kept ON even if worker's finger and an object interrupt 2 beams because they are allowed to enter.



When worker's arm or body, which interrupts 3 beams is detected, safety output is turned OFF.



Note : Ensure that the desired safety distance is maintained.

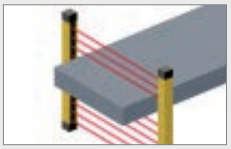


## Built-in standard safety functions

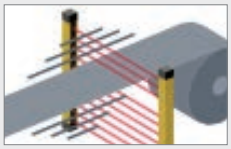
### Monitoring

Incident / Ambient Light Level Information

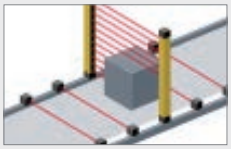
### Safety function setting



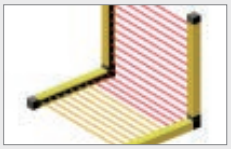
Fixed Blanking



Floating Blanking

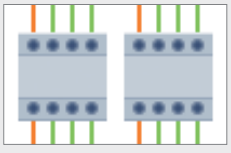


Muting/Override

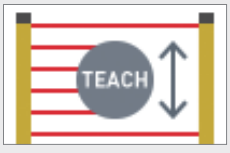


Warning Zone

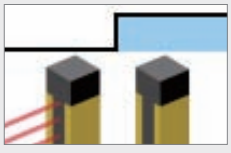
### I/O setting



Interlock / External Device Monitoring

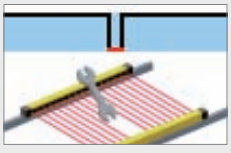



Teach-in Input



External Test Input

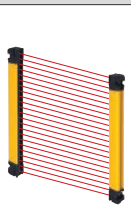
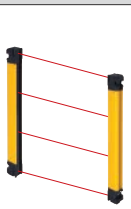
### Operation state change



Response Time Adjustment

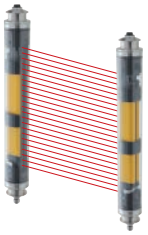
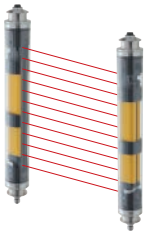
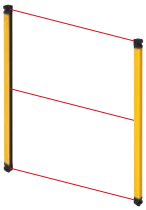
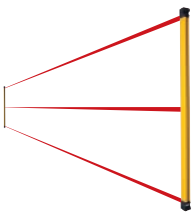
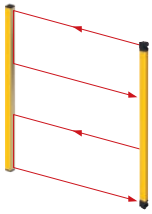

Operating Range Selection

# F3SG-SR/PG Series Features and specifications

| Series | | Protection at machine openings : | | | | |
|---|---|---|---|---|---|---|
| | | Advanced/Standard | | | | |
| | |  |  |  |  | |
| Application | Finger Protection | ● | | | | |
| | Hand Protection | | ● | | | |
| | Arm/Leg Protection | | | ● | | |
| | Body Protection | | | | ● | |
| Specification | Detection capability | 14-mm dia. | 25-mm dia. | 45-mm dia. | 85-mm dia. | |
| | Beam gap | 10 mm | 20 mm | 40 mm | 80 mm | |
| | Max. operating range Min./Typ. | 10 m / 15 m | 20 m / 30 m | 20 m / 30 m | 20 m / 30 m | |
| | Protective height (Product length) | 160 to 2,000 mm | 160 to 2,480 mm | 240 to 1,520 mm | 280 to 920 mm | |
| | Number of beams | 15 to 199 | 8 to 124 | 6 to 38 | 4 to 12 | |
| | Degree of protection | IP65, IP67, and IP67G | | | | |
| Feature | Mutual interference prevention | (No settings required for wired synchronization) | | | | |
| | PNP/NPN Selection | ● | | | | |
| | External Test | ● | | | | |
| | Interlock | ▮ / 💻 | | | | |
| | Lockout Reset | ● | | | | |
| | Pre-Reset | ▮ / 💻 | | | | |
| | PSDI | 💻 | | | | |
| | External Device Monitoring (EDM) | ▮ / 💻 | | | | |
| | Auxiliary Output | 💻 | | | | |
| | Muting | 💻 | | | | |
| | Blanking | ▮ / 💻 | | | | |
| | Reduced Resolution | 💻 | | | | |
| | Warning Zone | 💻 | | | | |
| | Operating Range Selection | ● / ▮ / 💻 | | | | |
| | Response Time Adjustment | 💻 | | | | |
| | Area Beam Indicator (ABI) | 💻 * Advanced models only | | | | |
| | Designated Beam Output | 💻 | | | | |
| Connection/ wiring | Cascade connection | Available | Available | Available | Available | |
| | Reduced wiring system*1 | Available | Available | Available | Available | |
| Optional accessory | Laser Alignment Pointer | Available | Available | Available | Available | |
| | Lamp NEW | Available | Available | Available | Available | |
| | Mirror Column NEW<br>Muting Sensor Arm Mounter/Connection Box | Available | Available | Available | Available | |

▮ Setting by DIP switch on Intelligent Tap 💻 Setting by configuration tool SD Manager 3 ● Setting by wiring

▮ Setting by end cap

| Safety Light Curtain F3SG-SR | | | Protection around perimeters of equipment : Safety Multi-Light Beam F3SG-PG NEW | | |
|---|---|---|---|---|---|
| | IP69K model, Standard NEW | | Perimeter Access Guarding | Perimeter Guarding Long Range | Perimeter Guarding Passive Mirror |
| |  |  |  |  |  |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | 14-mm dia. | 25-mm dia. | 30-mm dia. | | |
| | 10 mm | 20 mm | 300 mm/400 mm/500 mm | | |
| | 8 m / 12 m | 16 m / 24 m | 20 m / 30 m | 70 m / 110 m | 5 m / 8 m |
| | 320 to 1,800 mm | 320 to 1,840 mm | 670 to 1,370 mm | | |
| | 31 to 179 | 16 to 92 | 2, 3 and 4 | | 2 and 4 |
| | IP65, IP67, and IP69K | | IP65 and IP67 | | |
| | No settings required for wired synchronization | | (No settings required for wired synchronization) | | |
| | | | | | |
| | | | | | Not supported |
| | / *2 | | / | | |
| | | | | | |
| | / *2 | | / | | |
| | *2 | | Not supported | | |
| | / *2 | | / | | |
| | *2 | | | | |
| | *2 | | | | |
| | / *2 | | Not supported | | |
| | *2 | | Not supported | | |
| | *2 | | Not supported | | |
| | / / *2 | | Not supported | / / | Not supported |
| | *2 | | | | |
| | Not supported | | | | |
| | *2 | | | | |
| | Not available | | Not available | Not available | Not available |
| | Not available | | Available | Available | Available |
| | Not available | | Available | Available | Available |
| | Not available | | Available | Available | Available *3 |
| | Not available | | Available | Available | Available *4 |

*1. The reduced wiring system includes the Y-joint plug/socket connector, reset switch connector, muting sensor connection box, and muting sensor arm mounter. *2. When connecting F3SG-SR-K with open-ended cable to the intelligent tap, use a relay terminal block. *3. The lamp can be attached to the emitter/receiver. *4. The perimeter guarding passive mirror cannot be used with the mirror column.

Safety Light Curtain/Safety Multi-Light Beam

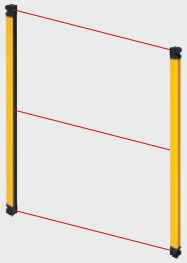
# F3SG-SR/PG Series Product selection

Choose your safety light curtain and optional accessories from our F3SG-SR/PG Series through a 4-step process.

## STEP 1

Choose a safety light curtain





## STEP 2

Choose a mounting bracket




## STEP 3*

Choose a wiring method



## STEP 4*

Choose the optional accessories you need


* There is no need to follow STEP 3 and STEP 4 when the IP69K model is selected.

| STEP 1 Choose a safety light curtain | Select a light curtain to suit your application. |
|---|---|

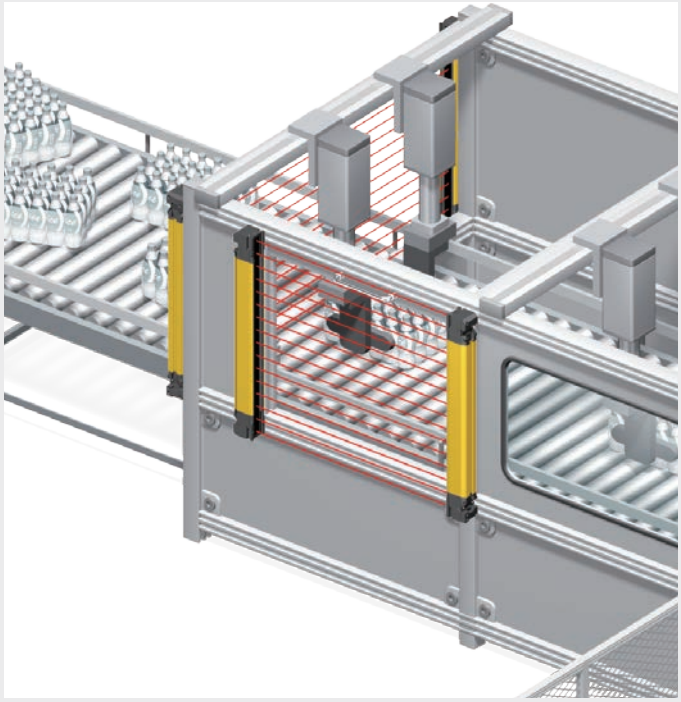
## Protection at machine openings

**SR**

Safety Light Curtain

F3SG-SR Page 24

IP69K model Page 32

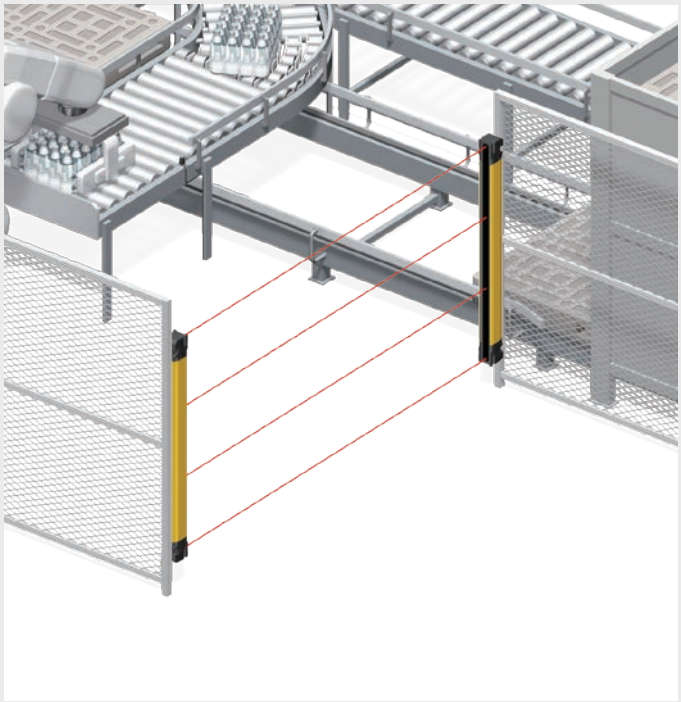


## Protection around perimeters of equipment

**PG**

Safety Multi-Light Beam

F3SG-PG Page 26



Protection at machine openings

SR

Safety Light Curtain

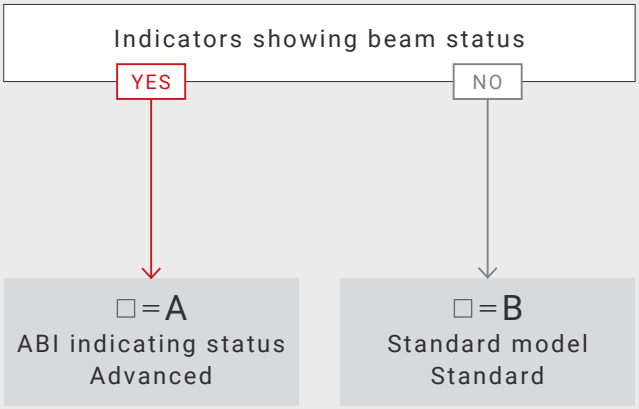
# F3SG-SR

## Complete the model number.

F3SG-4SR □ □□□□-□□-□-□

① ③ ② ④ ⑤

## ① Select an application.




## ② Select detection capability.

| Type | ② |
|---|---|
| Finger Protection<br>Detection capability<br>14-mm dia.  | □□=14 |
| Hand Protection<br>Detection capability<br>25-mm dia.  | □□=25 |
| Arm/Leg Protection<br>Detection capability<br>45-mm dia.  | □□=45 |
| Body Protection<br>Detection capability<br>85-mm dia.  | □□=85 |

## ③ Select protective height.*1

### Finger Protection

| Protective height (mm) | Number of beams | ③ |
|---|---|---|
| 160 | 15 | □□□□=0160 |
| 240 | 23 | □□□□=0240 |
| 320 | 31 | □□□□=0320 |
| 400 | 39 | □□□□=0400 |
| 480 | 47 | □□□□=0480 |
| 560 | 55 | □□□□=0560 |
| 640 | 63 | □□□□=0640 |
| 800 | 79 | □□□□=0800 |
| 1000 | 99 | □□□□=1000 |
| 1200 | 119 | □□□□=1200 |
| 1400 | 139 | □□□□=1400 |
| 1600 | 159 | □□□□=1600 |
| 1800 | 179 | □□□□=1800 |
| 2000 | 199 | □□□□=2000 |

### Arm/Leg Protection

| Protective height (mm) | Number of beams | ③ |
|---|---|---|
| 240 | 6 | □□□□=0240 |
| 400 | 10 | □□□□=0400 |
| 560 | 14 | □□□□=0560 |
| 720 | 18 | □□□□=0720 |
| 880 | 22 | □□□□=0880 |
| 1200 | 30 | □□□□=1200 |
| 1520 | 38 | □□□□=1520 |

### Body Protection

| Protective height (mm) | Number of beams | ③ |
|---|---|---|
| 280 | 4 | □□□□=0280 |
| 440 | 6 | □□□□=0440 |
| 600 | 8 | □□□□=0600 |
| 760 | 10 | □□□□=0760 |
| 920 | 12 | □□□□=0920 |

## Hand Protection

| Protective height (mm) | Number of beams | ❸ |
|---|---|---|
| 160 | 8 | □□□□=0160 |
| 240 | 12 | □□□□=0240 |
| 320 | 16 | □□□□=0320 |
| 400 | 20 | □□□□=0400 |
| 480 | 24 | □□□□=0480 |
| 560 | 28 | □□□□=0560 |
| 640 | 32 | □□□□=0640 |
| 720 | 36 | □□□□=0720 |
| 800 | 40 | □□□□=0800 |
| 880 | 44 | □□□□=0880 |
| 960 | 48 | □□□□=0960 |
| 1040 | 52 | □□□□=1040 |
| 1120 | 56 | □□□□=1120 |
| 1200 | 60 | □□□□=1200 |
| 1280 | 64 | □□□□=1280 |
| 1360 | 68 | □□□□=1360 |
| 1440 | 72 | □□□□=1440 |
| 1520 | 76 | □□□□=1520 |
| 1600 | 80 | □□□□=1600 |
| 1680 | 84 | □□□□=1680 |
| 1760 | 88 | □□□□=1760 |
| 1840 | 92 | □□□□=1840 |
| 1920 | 96 | □□□□=1920 |
| 2080 | 104 | □□□□=2080 |
| 2280 | 114 | □□□□=2280 |
| 2480 | 124 | □□□□=2480 |

## ❹❺ Select an option.*1

| Option 1 | ❹ |
|---|---|
| Set of emitter and receiver | Blank |
| Emitter *2 | □=L |
| Receiver *2 | □=D |

### Finger Protection and Hand Protection only

| Option 2 | ❺ |
|---|---|
| - | Blank |
| Flexible Height Model <Protective heights available in increments of 40 mm> | □=F |

*1. Representative models are listed. For other models, refer to page 38 and following.
*2. Emitters and receivers will be available separately.

Protection around perimeters of equipment

PG

Safety Multi-Light Beam

# F3SG-PG

Complete the model number.

F3SG-4PGA □□□□-□□-□

② ① ③

## ① Select an application and then select a beam gap and number of beams.

Select an application.

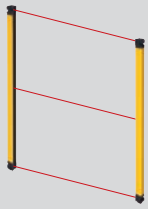
Protection around large equipment (operating range > 20 m)

NO → Protection around small equipment (operating range < 5 m)

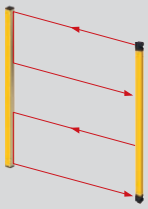
YES → Protection up to 70 m long Perimeter Guarding Long Range

NO → Standard model Perimeter Access Guarding

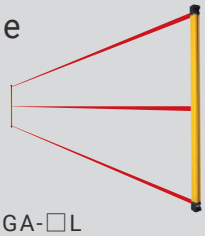
YES → Simple wiring Perimeter Guarding Passive Mirror



F3SG-PGA-□A



F3SG-PGA-□C



F3SG-PGA-□L

Select a beam gap and number of beams.

| Beam gap/ number of beams | ① |
|---|---|
| 500 mm/2 beams | □□=2A |
| 400 mm/3 beams | □□=3A |
| 300 or 400 mm/ 4 beams | □□=4A |

| Beam gap/ number of beams | ① |
|---|---|
| 500 mm/2 beams | □□=2C |
| - | - |
| 300 or 400 mm/ 4 beams | □□=4C |

| Beam gap/ number of beams | ① |
|---|---|
| 500 mm/2 beams | □□=2L |
| 400 mm/3 beams | □□=3L |
| 300 or 400 mm/ 4 beams | □□=4L |

## ❷ Select Product length.

| Product length (mm) | Number of beams | ❷ |
|---|---|---|
| 670 | 2 | □□□□=0670 |
| 970 | 3 | □□□□=0970 |
| 1070 | 4 | □□□□=1070 |
| 1370 | 4 | □□□□=1370 |

## ❸ Select an option.

| Option | ❸ |
|---|---|
| Set of emitter and receiver, or set of emitter/receiver and passive mirror | Blank |
| Emitter *1 | □=L |
| Receiver *1 | □=D |
| Emitter/receiver *1 (Perimeter Guarding Passive Mirror only) | □=LD |
| Passive mirror *1 (Perimeter Guarding Passive Mirror only) | □=M |

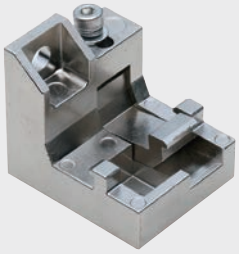
*1. Emitters, receivers, emitter/receivers, and passive mirrors will be available separately.

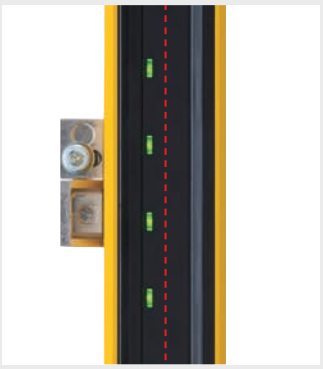
STEP 2 Choose an optional mounting bracket (sold separately)

See page 41 for details of mounting brackets.

## Brackets used when beam adjustment is not required after the light curtain is installed

Standard Bracket
(Intermediate Bracket)
F39-LSGF





- Side mounting and backside mounting
- Beams not adjustable after installation
- Two brackets per set

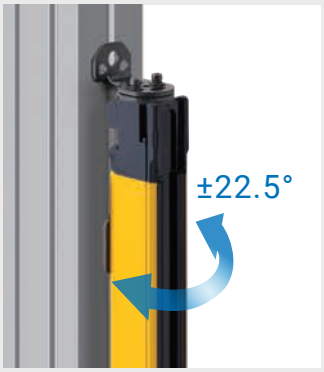
Suitable for mounting on an aluminum profile so that its center is aligned with the center of beams.

## Brackets that allow beam adjustment after the light curtain is installed

Adjustable Side-Mount Bracket
(Intermediate Bracket)
F39-LSGA


- Vertical adjustment
  Angle adjustment range : ±15°
- Side mounting and backside mounting
- Two brackets per set

Adjustable Top/
Bottom Bracket
F3SJ, F3SN Adapter
F39-LSGTB-SJ




- Used at the top and bottom of the light curtain
- Angle adjustment range : ±22.5°
- For replacement of F3SJ or F3SN Series
- Side mounting and backside mounting
- Two brackets per set

## Mounting brackets to easily replace your existing Omron light curtains are also available.

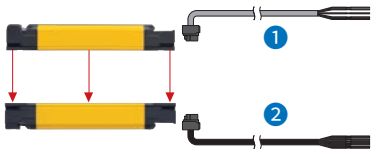
For replacement of
F3SG-RA/RE Series
Adjustable Top/Bottom Bracket
F3SG-RA/RE Adapter
F39-LSGTB-RE

For replacement of MS4800 Series
and F3SR-B Series
Adjustable Top/Bottom Bracket
MS4800/F3SR Adapter
F39-LSGTB-MS

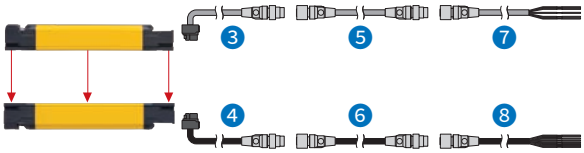
## STEP 3 Choose a wiring method

See page 42 and following for details of cables.

### One light curtain

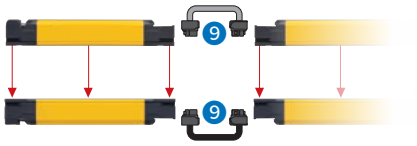



•Cable extension (up to 100 m)

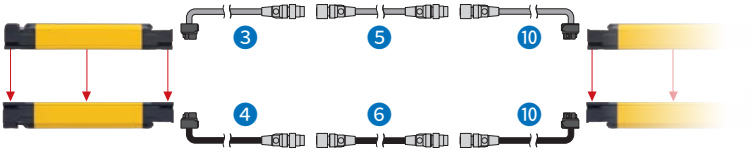



### Series-connected

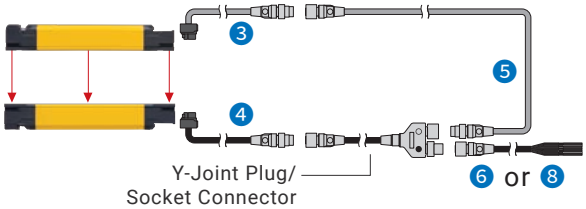
•Side-by-side cascading (12 cm)




•Cascading cable extension (up to 10 m)

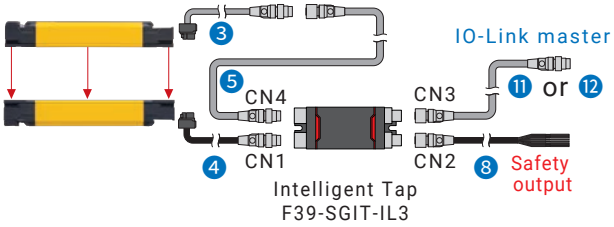



### Use of reduced wiring connector

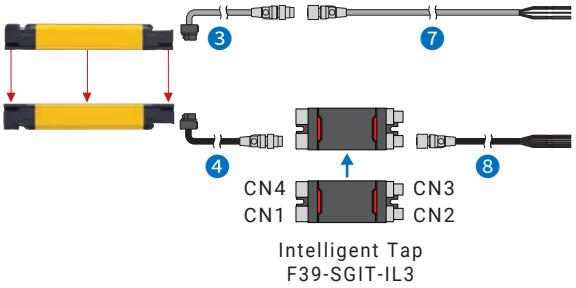



### Use of Intelligent Tap

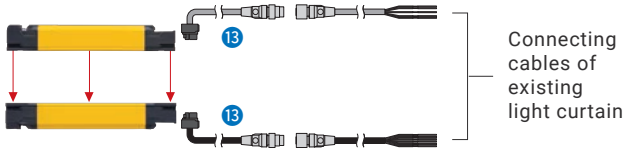
•Always connected (Wired synchronization)




•Connected for setting (optical synchronization)




### Replacement of Omron light curtain




Optional cables (sold separately)

| No. | Product name | Appearance | Model | Cable length | Remarks |
|---|---|---|---|---|---|
| 1 | Root-Straight Cable | | F39-JG□C-L | 3, 7, 10 m | For emitter, gray |
| 2 | | | F39-JG□C-D | 3, 7, 10 m | For receiver, black |
| 3 | Root-Plug Cable for Extended | | F39-JGR3K-L | 30 cm | For emitter, gray |
| 4 | | | F39-JGR3K-D | 30 cm | For receiver, black |
| 5 | Extended Plug-Socket Cable | | F39-JG□B-L | 3, 10, 20 m | For emitter, gray |
| 6 | | | F39-JG□B-D | 3, 10, 20 m | For receiver, black |
| 7 | Extended Socket-Straight Cable | | F39-JG□A-L | 3, 10 m | For emitter, gray |
| 8 | | | F39-JG□A-D | 3, 10 m | For receiver, black |
| 9 | Side-by-side Cascading Cable | | F39-JGR12L | 12 cm | For emitter and receiver, two cables per set |
| 10 | Cascading Cable for Extended | | F39-JGR3W | 30 cm | For emitter and receiver, two cables per set |
| 11 | Socket-Straight Cable for IO-Link | | F39-JG□B-L | 3, 10, 20 m | For connection to GX-ILM08C |
| 12 | Root-Straight Cable for IO-Link | | XS5F-D521-DJ0-IL | 2 m | For connection to NX-ILM400 |
| 13 | Conversion Cable | | F39-JGR3K-SJ | 30 cm | For use of wiring for F3SN, F3SJ-A/-B, or F3SR |
| | | | F39-JGR3K-RE | 30 cm | For use of wiring for F3SG-RE |
| | | | F39-JGR3K-MS | 30 cm | For use of wiring for MS4800 |

STEP 4 Choose the optional accessories (sold separately) you need

* See page 46 and following for details of optional accessories.

## Intelligent Tap and configuration tool SD Manager 3

Easy monitoring, setting, and IO-Link connection with external devices Page 46

Intelligent Tap
F39-SGIT-IL3


Configuration tool for PC
SD Manager 3

Note : Use the SD Manager 3 with the F39-SGIT-IL3 Intelligent Tap.

Bluetooth Communication Unit
F39-SGBT


Monitoring tool for smartphones and tablets
SD Manager 3 Mobile APP

Requirements
Android 7.0 or higher

For details, refer to your local Omron website.

## Reduced wiring system

Simple wiring of light curtains and reset switches Page 47

Y-Joint Plug/Socket Connector
F39-GCNY2

Reset Switch Connector
F39-GCNY3

Note : Please prepare a reset switch (NC contact).

## Muting system

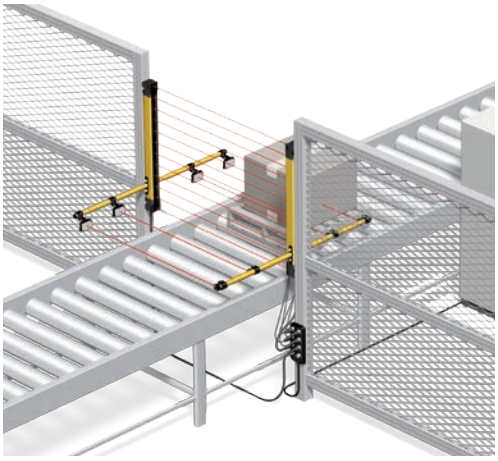
Easy installation and wiring of muting sensors Page 48

Muting Sensor Arm Mounter
F39-FMA☐☐☐T
(Through-beam)

F39-FMA☐☐☐R
(Retro-reflective)

Muting Sensor Connection Box
F39-GCN5

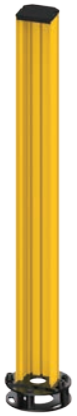
Muting Sensor Arm Mounter Bracket for SLC
F39-LMAF1
(The E3Z Muting Sensor is sold separately.)



## Floor mount system

Easy installation of light curtains and mirrors on floors Page 50

Floor Mount Column
F39-ST



Mount-Column
Adjustable Base
F39-STB

(The mount-column adjustable base is sold separately.)

Mirror Column
(For F3SG-SR/PG
Safety Light Curtain/
Safety Multi-Light Beam)
F39-SML

Mirror Column
(for F3SG-PG
Safety Multi-Light Beam)
F39-PML

(The mount-column adjustable base is sold separately.)

## Laser Alignment Pointer

Easy beam adjustment with laser beam Page 51

F39-PTG

## Lamp

At-a-glance check of light curtain status Page 51

F39-SGLP

Note: The Lamp does not support Bluetooth communication.

## Spatter Protection Cover

Protection of optical surfaces
against spatter Page 52

F39-HSG

Protection in high-pressure wash-down environments

SR

Safety Light Curtain

# F3SG-SR-K IP69K model

Complete the model number.

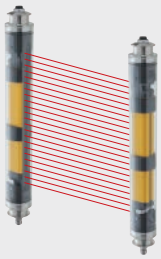
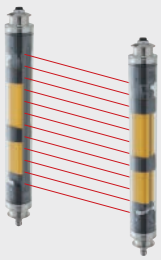
F3SG-4SRB □□□□-□□-K

② ①

## STEP 1 Choose a safety light curtain

Select detection capability and protective height.

### ① Select detection capability.

| Type | ① |
|---|---|
| **Finger Protection**<br>Detection capability<br>14-mm dia.<br>  | □□=14 |
| **Hand Protection**<br>Detection capability<br>25-mm dia.<br>  | □□=25 |

### ② Select protective height.

Finger Protection

| Protective height (mm) | Number of beams | ② |
|---|---|---|
| 320 | 31 | □□□□=0320 |
| 400 | 39 | □□□□=0400 |
| 480 | 47 | □□□□=0480 |
| 560 | 55 | □□□□=0560 |
| 640 | 63 | □□□□=0640 |
| 720 | 71 | □□□□=0720 |
| 800 | 79 | □□□□=0800 |
| 880 | 87 | □□□□=0880 |
| 960 | 95 | □□□□=0960 |
| 1000 | 99 | □□□□=1000 |
| 1200 | 119 | □□□□=1200 |
| 1400 | 139 | □□□□=1400 |
| 1600 | 159 | □□□□=1600 |
| 1800 | 179 | □□□□=1800 |

Hand Protection

| Protective height (mm) | Number of beams | ③ |
|---|---|---|
| 320 | 16 | □□□□=0320 |
| 400 | 20 | □□□□=0400 |
| 480 | 24 | □□□□=0480 |
| 560 | 28 | □□□□=0560 |
| 640 | 32 | □□□□=0640 |
| 720 | 36 | □□□□=0720 |
| 800 | 40 | □□□□=0800 |
| 880 | 44 | □□□□=0880 |
| 960 | 48 | □□□□=0960 |
| 1000 | 50 | □□□□=1000 |
| 1040 | 52 | □□□□=1040 |
| 1120 | 56 | □□□□=1120 |
| 1200 | 60 | □□□□=1200 |
| 1280 | 64 | □□□□=1280 |
| 1360 | 68 | □□□□=1360 |
| 1440 | 72 | □□□□=1440 |
| 1520 | 76 | □□□□=1520 |
| 1600 | 80 | □□□□=1600 |
| 1680 | 84 | □□□□=1680 |
| 1760 | 88 | □□□□=1760 |
| 1840 | 92 | □□□□=1840 |

## STEP 2 Choose an optional mounting bracket (sold separately)

### IP69K Model Mounting Bracket

F39-LSGTB-K

Two brackets per set

See page 105 for details of mounting brackets.

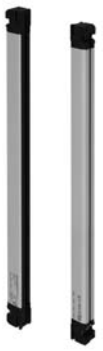
Note: When connecting F3SG-SR-K with open-ended cable to the intelligent tap, use a relay terminal block. Read the User's Manual (Cat .No. Z405) before using the intelligent tap for setting and monitoring.

# F3SG-SR/PG

## Easy to monitor and ready for IoT

- Conforms to major international standards
- Environmental resistance and rugged structure for use in any environment (IP67, IP67G *1, IP69K *2)
- A broad line-up, from finger protection to body protection
- Flexible height model for easy integration into machines and lines
- For diverse applications, from simple protection to data utilization

**✻1.** IEC 60529/JIS C 0920 Annex 1
**✻2.** Available with the F3SG-SR-K IP69K Model.



IO-Link

For the most recent information on models that have been certified for safety standards, refer to your local OMRON website.

## Key Features

| Feature | Availability | | | | | | Setting/monitoring by | | | | Factory default setting |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sensor | | Intelligent Tap | PC/Smartphone | |
| | F3SG-SRA | F3SG-SRB | F3SG-PG-A | F3SG-PG-L | F3SG-PG-C | F3SG-SRB-K | Wiring | End Cap | DIP Switch ✻1 | SD Manager 3/ SD Manger 3 Mobile APP ✻2 | |
| Mutual interference prevention | X | X | X | X | X | X ✻6 | X ✻4 | X ✻4 | --- | --- | Code A ✻4 |
| PNP/NPN selection | X | X | X | X | X | X | X | --- | --- | --- | --- |
| External test | X | X | X | X | X | X | X | --- | --- | --- | --- |
| Interlock | X | X | X | X | X | X | --- | --- | X | X | Auto reset |
| Pre-reset | X | X | X | X | X | X | --- | --- | X | X | Disabled |
| PSDI | X | X | --- | --- | --- | X | --- | --- | — | X | Disabled |
| External Device Monitoring (EDM) | X | X | X | X | X | X | --- | --- | X | X | Disabled |
| Auxiliary output | X | X | X | X | X | X | --- | --- | --- | X | Safety output information (Inverted signal output: Enabled) |
| Muting | X | X | X | X | X | X | --- | --- | --- | X | Enabled (Standard Muting) |
| Override | X | X | X | X | X | X | --- | --- | --- | X | Enabled |
| Fixed blanking | X | X | --- | --- | --- | X | --- | --- | X | X | Disabled |
| Floating blanking | X | X | --- | --- | --- | X | --- | --- | X | X | Disabled |
| Reduced resolution | X | X | --- | --- | --- | X | --- | --- | --- | X | Disabled |
| Warning zone | X | X | --- | --- | --- | --- | --- | --- | --- | X | Disabled |
| Operating range selection | X | X | --- | X | --- | X | X | --- | X | X | Long ✻5 |
| Response time adjustment | X | X | X | X | X | X | --- | --- | --- | X | Normal |
| Area Beam Indicator (ABI) | X | --- | X | X | X | --- | --- | --- | --- | X | Block/Unblock information |
| Designated beam output | X | X | X | X | X | X | --- | --- | --- | X | Disabled |
| Stable light threshold adjustment | X | X | X | X | X | X | --- | --- | --- | X | 170% |
| Light Level Monitoring/ Interference Light Display | X | X | X | X | X | X | --- | --- | --- | X | --- |
| Maintenance information | X | X | X | X | X | X | --- | --- | --- | X | --- |
| Operation status monitoring | X | X | X | X | X | X | --- | --- | --- | X | --- |
| Instantaneous block detection information | X | X ✻7 | X | X | X | --- | --- | --- | --- | X | Enabled |

**✻1.** DIP Switch is on the F39-SGIT-IL3 Intelligent Tap.
**✻2.** The F39-SGIT-IL3 Intelligent Tap is necessary to use the SD Manager 3 or SD Manager 3 Mobile APP.
**✻3.** Mutual interference can be prevented by Optical Synchronization or Wired Synchronization.
**✻4.** Mutual interference can be prevented by Scan Code Selection.
**✻5.** In the case of setting by DIP Switch or SD Manager 3. For the setting by wiring, it is selectable from the Long and Short modes.
**✻6.** Mutual interference cannot be prevented using the End Cap. The scan code is fixed to Code A.
**✻7.** The F3SG-SRB does not record vibration.

# Table of Contents

## Safety Light Curtain/Safety Multi-Light Beam

**F3SG-SR/PG**



## Safety Light Curtain F3SG-SR Series IP69K Model

**F3SG-SR-K**



## Common to Safety Light Curtain and Safety Multi-Light Beam

**Common to F3SG-SR and F3SG-PG**

# Model Number Legend

## Safety Light Curtain F3SG-SR

**F3SG-4SR □ □□□□ - □□ - □ - □**
(1) (2) (3) (4) (5) (6)

✻IFor details on the IP69K model, refer to page 104.

| No. | Classification | Code | Meaning | Remarks |
|---|---|---|---|---|
| (1) | ESPE | 4 | Type 4 | |
| (2) | Function | A | Advanced | |
| | | B | Standard | |
| (3) | Protective height | 0160 - 2000 | Protective height for finger protection (mm) | |
| | | 0160 - 2480 | Protective height for hand protection (mm) | |
| | | 0240 - 1520 | Protective height for arm/leg protection (mm) | |
| | | 0280 - 0920 | Protective height for body protection (mm) | |
| (4) | Detection capability | 14 | Finger protection (Detection capability: 14-mm dia.) | |
| | | 25 | Hand protection (Detection capability: 25-mm dia.) | |
| | | 45 | Arm/leg protection (Detection capability: 45-mm dia.) | |
| | | 85 | Body protection (Detection capability: 85-mm dia.) | |
| (5) | Option 1 | Blank | Set of emitter and receiver | |
| | | L | Emitter | |
| | | D | Receiver | |
| (6) | Option 2 | Blank | | |
| | | F | Flexible height model | Finger protection and hand protection: Protective heights are available in increments of 40 mm up to 1 m |

**Note: 1.** The purpose of this model number legend is to provide understanding of the meaning of specifications from the model number. Models are not available for all combinations of code numbers.
See *Ordering Information* on page 38 for details.
**2.** The bracket is not included. Order brackets sold separately.
**3.** Connection cables are not included with the safety light curtain. Order cables sold separately.

## Safety Multi-Light Beam F3SG-PG

**F3SG-4PG A □□□□ - □ □ - □ - □**
(1) (2) (3) (4) (5) (6) (7)

| No. | Classification | Code | Meaning | Remarks |
|---|---|---|---|---|
| (1) | ESPE | 4 | Type 4 | |
| (2) | Function | A | Advanced | |
| (3) | Product length | 0670 | Product length (mm) | |
| | | 0970 | | |
| | | 1070 | | |
| | | 1370 | | |
| (4) | Number of beams/ beam gap | 2 | 2 beams/500 mm | Product length: 670 mm |
| | | 3 ✻ | 3 beams/400 mm | Product length: 970 mm<br>✻ Perimeter guarding passive mirror |
| | | 4 | 4 beams/300 or 400 mm | Product length: 1,070 or 1,370 mm |
| (5) | Application | A | Perimeter access guarding | |
| | | L | Perimeter guarding long range | |
| | | C | Perimeter guarding passive mirror | |
| (6) | Option 1 | Blank | Set of emitter and receiver or set of emitter/receiver and passive mirror | |
| | | L | Emitter | |
| | | D | Receiver | |
| | | LD | Emitter/receiver | Perimeter guarding passive mirror only |
| | | M | Passive mirror | Perimeter guarding passive mirror only |
| (7) | Option 2 | Blank | | |

**Note: 1.** The purpose of this model number legend is to provide understanding of the meaning of specifications from the model number. Models are not available for all combinations of code numbers.
See *Ordering Information* on page 40 for details.
**2.** The bracket is not included. Order brackets sold separately.
**3.** Connection cables are not included with the safety multi-light beam. Order cables sold separately.

# Ordering Information

## Main Units

### Safety Light Curtain F3SG-SR

✻ Emitters and receivers will be available separately.
Example 1) Emitter: F3SG-4SRA0160-14-L, receiver: F3SG-4SRA0160-14-D
Example 2) Receiver (flexible height model) only: F3SG-4SRA0200-14-D-F

**Finger protection (Detection capability: 14-mm dia.)**

| Number of beams | Protective height (mm) | Advanced | Standard |
|---|---|---|---|
| | | Model | Model |
| 15 | 160 | **F3SG-4SRA0160-14** | **F3SG-4SRB0160-14** |
| 19 | 200 | **F3SG-4SRA0200-14-F** | **F3SG-4SRB0200-14-F** |
| 23 | 240 | **F3SG-4SRA0240-14** | **F3SG-4SRB0240-14** |
| 27 | 280 | **F3SG-4SRA0280-14-F** | **F3SG-4SRB0280-14-F** |
| 31 | 320 | **F3SG-4SRA0320-14** | **F3SG-4SRB0320-14** |
| 35 | 360 | **F3SG-4SRA0360-14-F** | **F3SG-4SRB0360-14-F** |
| 39 | 400 | **F3SG-4SRA0400-14** | **F3SG-4SRB0400-14** |
| 43 | 440 | **F3SG-4SRA0440-14-F** | **F3SG-4SRB0440-14-F** |
| 47 | 480 | **F3SG-4SRA0480-14** | **F3SG-4SRB0480-14** |
| 51 | 520 | **F3SG-4SRA0520-14-F** | **F3SG-4SRB0520-14-F** |
| 55 | 560 | **F3SG-4SRA0560-14** | **F3SG-4SRB0560-14** |
| 59 | 600 | **F3SG-4SRA0600-14-F** | **F3SG-4SRB0600-14-F** |
| 63 | 640 | **F3SG-4SRA0640-14** | **F3SG-4SRB0640-14** |
| 67 | 680 | **F3SG-4SRA0680-14-F** | **F3SG-4SRB0680-14-F** |
| 71 | 720 | **F3SG-4SRA0720-14-F** | **F3SG-4SRB0720-14-F** |
| 75 | 760 | **F3SG-4SRA0760-14-F** | **F3SG-4SRB0760-14-F** |
| 79 | 800 | **F3SG-4SRA0800-14** | **F3SG-4SRB0800-14** |
| 83 | 840 | **F3SG-4SRA0840-14-F** | **F3SG-4SRB0840-14-F** |
| 87 | 880 | **F3SG-4SRA0880-14-F** | **F3SG-4SRB0880-14-F** |
| 91 | 920 | **F3SG-4SRA0920-14-F** | **F3SG-4SRB0920-14-F** |
| 95 | 960 | **F3SG-4SRA0960-14-F** | **F3SG-4SRB0960-14-F** |
| 99 | 1,000 | **F3SG-4SRA1000-14** | **F3SG-4SRB1000-14** |
| 119 | 1,200 | **F3SG-4SRA1200-14** | **F3SG-4SRB1200-14** |
| 139 | 1,400 | **F3SG-4SRA1400-14** | **F3SG-4SRB1400-14** |
| 159 | 1,600 | **F3SG-4SRA1600-14** | **F3SG-4SRB1600-14** |
| 179 | 1,800 | **F3SG-4SRA1800-14** | **F3SG-4SRB1800-14** |
| 199 | 2,000 | **F3SG-4SRA2000-14** | **F3SG-4SRB2000-14** |

**Hand protection (Detection capability: 25-mm dia.)**

| Number of beams | Protective height (mm) | Advanced | Standard |
|---|---|---|---|
| | | Model | Model |
| 8 | 160 | **F3SG-4SRA0160-25** | **F3SG-4SRB0160-25** |
| 10 | 200 | **F3SG-4SRA0200-25-F** | **F3SG-4SRB0200-25-F** |
| 12 | 240 | **F3SG-4SRA0240-25** | **F3SG-4SRB0240-25** |
| 14 | 280 | **F3SG-4SRA0280-25-F** | **F3SG-4SRB0280-25-F** |
| 16 | 320 | **F3SG-4SRA0320-25** | **F3SG-4SRB0320-25** |
| 18 | 360 | **F3SG-4SRA0360-25-F** | **F3SG-4SRB0360-25-F** |
| 20 | 400 | **F3SG-4SRA0400-25** | **F3SG-4SRB0400-25** |
| 22 | 440 | **F3SG-4SRA0440-25-F** | **F3SG-4SRB0440-25-F** |
| 24 | 480 | **F3SG-4SRA0480-25** | **F3SG-4SRB0480-25** |
| 26 | 520 | **F3SG-4SRA0520-25-F** | **F3SG-4SRB0520-25-F** |
| 28 | 560 | **F3SG-4SRA0560-25** | **F3SG-4SRB0560-25** |
| 30 | 600 | **F3SG-4SRA0600-25-F** | **F3SG-4SRB0600-25-F** |
| 32 | 640 | **F3SG-4SRA0640-25** | **F3SG-4SRB0640-25** |
| 34 | 680 | **F3SG-4SRA0680-25-F** | **F3SG-4SRB0680-25-F** |
| 36 | 720 | **F3SG-4SRA0720-25** | **F3SG-4SRB0720-25** |
| 38 | 760 | **F3SG-4SRA0760-25-F** | **F3SG-4SRB0760-25-F** |
| 40 | 800 | **F3SG-4SRA0800-25** | **F3SG-4SRB0800-25** |
| 42 | 840 | **F3SG-4SRA0840-25-F** | **F3SG-4SRB0840-25-F** |
| 44 | 880 | **F3SG-4SRA0880-25** | **F3SG-4SRB0880-25** |
| 46 | 920 | **F3SG-4SRA0920-25-F** | **F3SG-4SRB0920-25-F** |
| 48 | 960 | **F3SG-4SRA0960-25** | **F3SG-4SRB0960-25** |
| 50 | 1,000 | **F3SG-4SRA1000-25-F** | **F3SG-4SRB1000-25-F** |
| 52 | 1,040 | **F3SG-4SRA1040-25** | **F3SG-4SRB1040-25** |
| 56 | 1,120 | **F3SG-4SRA1120-25** | **F3SG-4SRB1120-25** |
| 60 | 1,200 | **F3SG-4SRA1200-25** | **F3SG-4SRB1200-25** |
| 64 | 1,280 | **F3SG-4SRA1280-25** | **F3SG-4SRB1280-25** |
| 68 | 1,360 | **F3SG-4SRA1360-25** | **F3SG-4SRB1360-25** |
| 72 | 1,440 | **F3SG-4SRA1440-25** | **F3SG-4SRB1440-25** |
| 76 | 1,520 | **F3SG-4SRA1520-25** | **F3SG-4SRB1520-25** |
| 80 | 1,600 | **F3SG-4SRA1600-25** | **F3SG-4SRB1600-25** |
| 84 | 1,680 | **F3SG-4SRA1680-25** | **F3SG-4SRB1680-25** |
| 88 | 1,760 | **F3SG-4SRA1760-25** | **F3SG-4SRB1760-25** |
| 92 | 1,840 | **F3SG-4SRA1840-25** | **F3SG-4SRB1840-25** |
| 96 | 1,920 | **F3SG-4SRA1920-25** | **F3SG-4SRB1920-25** |
| 104 | 2,080 | **F3SG-4SRA2080-25** | **F3SG-4SRB2080-25** |
| 114 | 2,280 | **F3SG-4SRA2280-25** | **F3SG-4SRB2280-25** |
| 124 | 2,480 | **F3SG-4SRA2480-25** | **F3SG-4SRB2480-25** |

**Arm/Leg protection (Detection capability: 45-mm dia.)**

| Number of beams | Protective height (mm) | Advanced | Standard |
|---|---|---|---|
| | | Model | Model |
| 6 | 240 | **F3SG-4SRA0240-45** | **F3SG-4SRB0240-45** |
| 10 | 400 | **F3SG-4SRA0400-45** | **F3SG-4SRB0400-45** |
| 14 | 560 | **F3SG-4SRA0560-45** | **F3SG-4SRB0560-45** |
| 18 | 720 | **F3SG-4SRA0720-45** | **F3SG-4SRB0720-45** |
| 22 | 880 | **F3SG-4SRA0880-45** | **F3SG-4SRB0880-45** |
| 30 | 1,200 | **F3SG-4SRA1200-45** | **F3SG-4SRB1200-45** |
| 38 | 1,520 | **F3SG-4SRA1520-45** | **F3SG-4SRB1520-45** |

**Body protection (Detection capability: 85-mm dia.)**

| Number of beams | Protective height (mm) | Advanced | Standard |
|---|---|---|---|
| | | Model | Model |
| 4 | 280 | **F3SG-4SRA0280-85** | **F3SG-4SRB0280-85** |
| 6 | 440 | **F3SG-4SRA0440-85** | **F3SG-4SRB0440-85** |
| 8 | 600 | **F3SG-4SRA0600-85** | **F3SG-4SRB0600-85** |
| 10 | 760 | **F3SG-4SRA0760-85** | **F3SG-4SRB0760-85** |
| 12 | 920 | **F3SG-4SRA0920-85** | **F3SG-4SRB0920-85** |

## Safety Multi-Light Beam F3SG-PG

✻ Emitters and receivers will be available separately.
Example 1) Emitter: F3SG-4PGA0670-2A-L, receiver: F3SG-4PGA0670-2A-D
Example 2) Emitter/receiver: F3SG-4PGA0970-3C-LD, passive mirror: F3SG-4PGA0970-3C-M

**Perimeter access guarding (Beam gap: 300 to 500 mm)**

| Number of beams | Beam gap (mm) | Product length (mm) | Advanced |
|---|---|---|---|
| | | | Model |
| 2 | 500 | 670 | **F3SG-4PGA0670-2A** |
| 3 | 400 | 970 | **F3SG-4PGA0970-3A** |
| 4 | 300 | 1,070 | **F3SG-4PGA1070-4A** |
| 4 | 400 | 1,370 | **F3SG-4PGA1370-4A** |

**Perimeter guarding long range (Beam gap: 300 to 500 mm)**

| Number of beams | Beam gap (mm) | Product length (mm) | Advanced |
|---|---|---|---|
| | | | Model |
| 2 | 500 | 670 | **F3SG-4PGA0670-2L** |
| 3 | 400 | 970 | **F3SG-4PGA0970-3L** |
| 4 | 300 | 1,070 | **F3SG-4PGA1070-4L** |
| 4 | 400 | 1,370 | **F3SG-4PGA1370-4L** |

**Perimeter guarding passive mirror (Beam gap: 300 to 500 mm)**

| Number of beams | Beam gap (mm) | Product length (mm) | Advanced |
|---|---|---|---|
| | | | Model |
| 2 | 500 | 670 | **F3SG-4PGA0670-2C** |
| 4 | 300 | 1,070 | **F3SG-4PGA1070-4C** |
| 4 | 400 | 1,370 | **F3SG-4PGA1370-4C** |

# Accessories (Sold separately)

## Bracket Common to F3SG-SR and F3SG-PG

Side mounting and backside mounting are possible.

### For fixed mounting

| Application | Appearance | Type | Model |
|---|---|---|---|
| Bracket to mount the F3SG-SR/PG.<br>Side mounting and backside mounting possible.<br>Beam alignment after mounting of F3SG-SR/PG not possible.<br>Two brackets per set (See ✻ below for the number of sets required for each model.) |  | Standard Bracket<br>(Intermediate Bracket) | **F39-LSGF** |

✻ Protective height of 0160 to 1440: 2 set (4 brackets), protective height of 1520 to 2480: 3 sets (6 brackets)

The bracket allows beam adjustment after the F3SG-SR/PG is mounted on it.

| Application | Appearance | Type | Model |
|---|---|---|---|
| The angle adjustment range is ±15°.<br>Two brackets per set (See ✻1 below for the number of sets required for each model.) |  | Adjustable Side-Mount Bracket<br>(Intermediate Bracket) | **F39-LSGA** |
| Use this bracket at the top and bottom positions of the F3SG-SR/PG.<br>The angle adjustment range is ±22.5°.<br>Use this bracket when replacing an existing F3SJ or F3SN Safety Light Curtain.<br>Two brackets per set (See ✻2 below for the number of sets required for each model.) |  | Adjustable Top/Bottom Bracket<br>F3SJ, F3SN Adapter | **F39-LSGTB-SJ** |
| Use this bracket at the top and bottom positions of the F3SG-SR/PG.<br>The angle adjustment range is ±22.5°.<br>Use this bracket when replacing an existing F3SG-RA/RE Safety Light Curtain.<br>Two brackets per set (See *2 below for the number of sets required for each model.) |  | Adjustable Top/Bottom Bracket<br>F3SG-RA/RE Adapter | **F39-LSGTB-RE** |
| Use this bracket at the top and bottom positions of the F3SG-SR/PG.<br>The angle adjustment range is ±22.5°.<br>Use this bracket when replacing an existing MS4800 or F3SR Safety Light Curtain.<br>Two brackets per set (See *2 below for the number of sets required for each model.) |  | Adjustable Top/Bottom Bracket<br>MS4800, F3SR Adapter | **F39-LSGTB-MS** |

✻**1.** Protective height of 0160 to 0280: 1 set (2 brackets), protective height of 0320 to 1440: 2 sets (4 brackets), protective height of 1520 to 2480: 3 sets (6 brackets)

✻**2.** Using Adjustable Top/Bottom Brackets with Side-Mount Brackets (Intermediate Brackets) or Adjustable Side-Mount Brackets (Intermediate Brackets)
Protective height of 0840 or less:
The Side-Mount Bracket (Intermediate Bracket) or Adjustable Side-Mount Bracket (Intermediate Bracket) is not required. Use 2 sets of Adjustable Top/Bottom Brackets.
Protective height of 0880 to 1680:
Use 2 sets of Adjustable Top/Bottom Brackets and 1 set of Side-Mount Brackets (Intermediate Brackets) or Adjustable Side-Mount Brackets (Intermediate Brackets).
Protective height of 1760 to 2480:
Use 2 sets of Adjustable Top/Bottom Brackets and 2 sets of Side-Mount Brackets (Intermediate Brackets) or Adjustable Side-Mount Brackets (Intermediate Brackets).
Refer to *Dimensions* on page 71 and following.

## Connecting Cable Common to F3SG-SR and F3SG-PG

**[Root Cable]**

**Root-Straight Cable**

| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | For emitter<br>To sensors: dedicated connector,<br>To external: open-ended type 5 wires<br>Color: Gray | Brown 24V/0V<br>Black TEST<br>Blue 0V/24V<br>White COM(+)<br>Yellow OPERATING RANGE SELECT INPUT/COM(-)<br>IP67 and IP67G (JIS C 0920 Annex 1) rated when mated. | 3 m | **F39-JG3C-L** |
| | | | 7 m | **F39-JG7C-L** |
| | | | 10 m | **F39-JG10C-L** |
| | For receiver or<br>emitter/receiver of F3SG-PG<br>Perimeter Guarding Passive Mirror<br>To sensors: dedicated connector,<br>To external: open-ended type 8 wires<br>Color: Black | Yellow RESET/EDM<br>Brown 24V/0V<br>Gray MUTE A/PRE-RESET/PSDI/COM(+)<br>Pink MUTE B/COM(-)<br>Black OSSD 1<br>White OSSD 2<br>Blue 0V/24V<br>Red AUX<br>IP67 and IP67G (JIS C 0920 Annex 1) rated when mated. | 3 m | **F39-JG3C-D** |
| | | | 7 m | **F39-JG7C-D** |
| | | | 10 m | **F39-JG10C-D** |

**Note:** Cables are not included with the safety light curtain/safety multi-light beam.
Order the F39-JG□C-□ Root-Straight Cable or F39-JGR3K-L/-D Root-Plug Cable for Extended.

**Root-Plug Cable for Extended**

| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | For emitter<br>To sensors: dedicated connector,<br>To external: M12 connector type (5-pin)<br>Color: Gray | 1 Brown 24V/0V<br>2 Black TEST<br>3 Blue 0V/24V<br>4 White COM(+)<br>5 Yellow OPERATING RANGE SELECT INPUT/COM(-)<br>IP67 and IP67G (JIS C 0920 Annex 1) rated when mated.<br>  <br>Male | 0.3 m | **F39-JGR3K-L** |
| | For receiver or<br>emitter/receiver of F3SG-PG<br>Perimeter Guarding Passive Mirror<br>To sensors: dedicated connector,<br>To external: M12 connector type (8-pin)<br>Color: Black | 1 Yellow RESET/EDM<br>2 Brown 24V/0V<br>3 Gray MUTE A/PRE-RESET/PSDI/COM(+)<br>4 Pink MUTE B/COM(-)<br>5 Black OSSD 1<br>6 White OSSD 2<br>7 Blue 0V/24V<br>8 Red AUX<br>IP67 and IP67G (JIS C 0920 Annex 1) rated when mated.<br>  <br>Male | 0.3 m | **F39-JGR3K-D** |

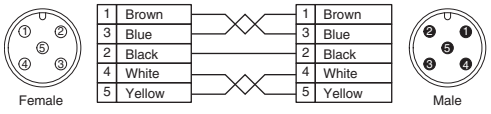
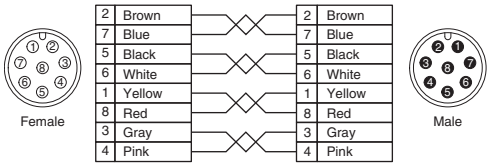
**Note: 1.** Cables are not included with the safety light curtain/safety multi-light beam.
Order the F39-JG□C-□ Root-Straight Cable or F39-JGR3K-L/-D Root-Plug Cable for Extended.
**2.** Use with the F39-JG□A-□ Extended Socket-Straight Cable or F39-JG□B-□ Extended Plug-Socket Cable.

**[Extension Cable]**
**Extended Socket-Straight Cable**

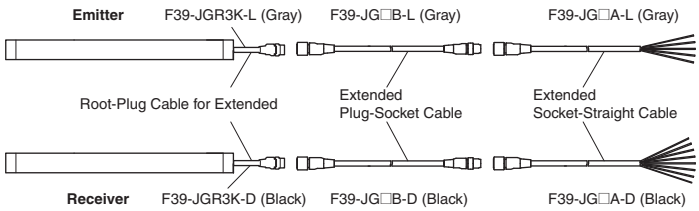
| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | For emitter<br>M12 connector (5-pin),<br>5 wires<br>Color: Gray | Connected to root cable or Extended Plug-Socket Cable<br>  <br>Female<br>1 Brown 24V/0V<br>2 Black TEST<br>3 Blue 0V/24V<br>4 White COM(+)<br>5 Yellow OPERATING RANGE SELECT INPUT/COM(-)<br>IP67* rated when mated. | 3 m | **F39-JG3A-L** |
| | | | 10 m | **F39-JG10A-L** |
| | For receiver or<br>emitter/receiver of F3SG-PG<br>Perimeter Guarding Passive<br>Mirror<br>M12 connector (8-pin),<br>8 wires<br>Color: Black | Connected to root cable or Extended Plug-Socket Cable<br>  <br>Female<br>1 Yellow RESET/EDM<br>2 Brown 24V/0V<br>3 Gray MUTE A/PRE-RESET/PSDI/COM(+)<br>4 Pink MUTE B/COM(-)<br>5 Black OSSD 1<br>6 White OSSD 2<br>7 Blue 0V/24V<br>8 Red AUX<br>IP67* rated when mated. | 3 m | **F39-JG3A-D** |
| | | | 10 m | **F39-JG10A-D** |

✻When the accessory is used, protect it from cutting oil.
**Note: 1.** Use with the F39-JGR3K-L/-D Root-Plug Cable for Extended.
**2.** To extend the cable length to more than 10 m, connect the F39-JG□B-□ Extended Plug-Socket Cable to the F39-JG□A-□ Extended Socket-Straight Cable.
**3.** Also available in 7, 15 and 20 m. For detail, contact your Omron representative.

**Extended Plug-Socket Cable**

| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | For emitter<br>M12 connector (5-pin) on<br>both ends<br>Color: Gray | Connected to Root-Plug Cable for Extended or Extended Plug-Socket Cable / Connected to Extended Socket-Straight Cable or Extended Plug-Socket Cable<br>  <br>Female: 1 Brown, 3 Blue, 2 Black, 4 White, 5 Yellow — Male: 1 Brown, 3 Blue, 2 Black, 4 White, 5 Yellow<br>Twisted pair wires are brown and blue, and white and yellow.<br>IP67✻ rated when mated. | 3 m | **F39-JG3B-L** |
| | | | 10 m | **F39-JG10B-L** |
| | | | 20 m | **F39-JG20B-L** |
| | For receiver or<br>emitter/receiver of F3SG-PG<br>Perimeter Guarding Passive<br>Mirror<br>M12 connector (8-pin) on<br>both ends<br>Color: Black | Connected to Root-Plug Cable for Extended or Extended Plug-Socket Cable / Connected to Extended Socket-Straight Cable or Extended Plug-Socket Cable<br>  <br>Female: 2 Brown, 7 Blue, 5 Black, 6 White, 1 Yellow, 8 Red, 3 Gray, 4 Pink — Male: 2 Brown, 7 Blue, 5 Black, 6 White, 1 Yellow, 8 Red, 3 Gray, 4 Pink<br>Twisted pair wires are brown and blue, black and white, yellow and red, and gray and pink.<br>IP67✻ rated when mated. | 3 m | **F39-JG3B-D** |
| | | | 10 m | **F39-JG10B-D** |
| | | | 20 m | **F39-JG20B-D** |

✻When the accessory is used, protect it from cutting oil.
**Note: 1.** Use with the F39-JGR3K-L/-D Root-Plug Cable for Extended.
**2.** To extend the cable length to more than 30 m, connect two or more F39-JG□B-□ Extended Plug-Socket Cable to the F39-JG□A-□ Extended Socket-Straight Cable.
Example: To extend the cable length to 50 m, connect two F39-JG20B-□ (20 m) Extended Plug-Socket Cables and one F39-JG10A-□ (10 m) Extended Socket-Straight Cable.




**3.** Also available in 0.5, 1, 5, 7 and 15 m. For detail, contact your Omron representative.

**[Cascading Cable]**
**Side-by-side Cascading Cable (Two cables per set, one for emitter and one for receiver)**

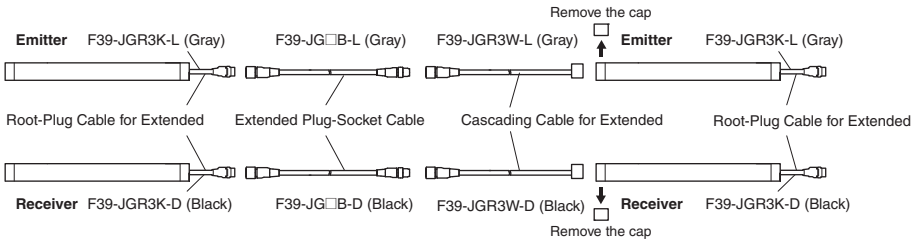
| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | For emitter<br>To sensors: dedicated connector 1,<br>To cascading sensors: dedicated connector 2<br>Color: Gray<br>For receiver<br>To sensors: dedicated connector 1,<br>To cascading sensors: dedicated connector 2<br>Color: Black | Used to series-connect sensors with the minimum cable length of 12 cm.<br>IP67 and IP67G (JIS C 0920 Annex 1) rated when mated. | 12 cm | **F39-JGR12L** |

**Note:** To extend the cable length between the series-connected sensors to more than 12 cm, add the F39-JGR3W Cascading Cable for Extended.

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

| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | For emitter<br>To sensors: dedicated connector,<br>To cascading sensors: M12 connector type (5 pin)<br>Color: Gray<br>For receiver<br>To sensors: dedicated connector,<br>To cascading sensors: M12 connector type (8 pin)<br>Color: Black | Used together with the F39-JGR3K Root-Plug Cable for Extended to extend the cable length between the series-connected sensors to more than 12 cm.<br>IP67 and IP67G (JIS C 0920 Annex 1) rated when mated. | 0.3 m | **F39-JGR3W** |

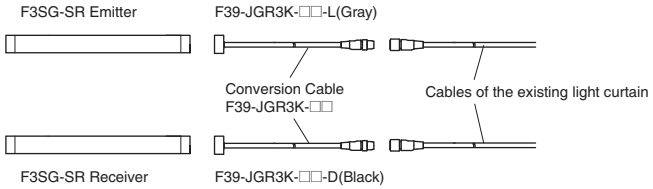
**Note:** To extend the cable length between the series-connected sensors to more than 60 cm, connect the F39-JG□B-□ Extended Plug-Socket Cable (up to 10 m: F39-JG10B-□) to the F39-JGR3W Cascading Cable for Extended.
Extension cable between sensors: 10 m max. (not including Cascading Cable for Extended (F39-JGR3W) and Root Cable (F39-JGR3K-L/-D).)



**[Conversion Cable: Converting Wiring for Existing Light Curtain]**
**Conversion Cable**

| Appearance | Specifications | Type | Cable length | Model |
|---|---|---|---|---|
|  | Used to convert the wiring for F3SJ-B/-A, F3SR-B or F3SN Safety Light Curtain to that for the F3SG-SR. | F3SJ-B/A Conversion Cable<br>For emitter<br>To sensor: dedicated connector 1,<br>To wires for F3SJ-B/-A, F3SR or F3SN:<br>M12 connector type (8 pin)<br>Color: Gray | 0.3 m | **F39-JGR3K-SJ-L** |
| | | F3SJ-B/A Conversion Cable<br>For receiver<br>To sensor: dedicated connector 1,<br>To wires for F3SJ-B/-A, F3SR or F3SN:<br>M12 connector type (8 pin)<br>Color: Black | | **F39-JGR3K-SJ-D** |
| | Used to convert the wiring for F3SG-RE Safety Light Curtain to that for the F3SG-SR. | F3SG-RE Conversion Cable<br>For emitter<br>To sensor: dedicated connector 1,<br>To wires for F3SG-RE:<br>M12 connector type (4 pin)<br>Color: Gray | 0.3 m | **F39-JGR3K-RE-L** |
| | | F3SG-RE Conversion Cable<br>For receiver<br>To sensor: dedicated connector 1,<br>To wires for F3SG-RE:<br>M12 connector type (4 pin)<br>Color: Black | | **F39-JGR3K-RE-D** |
| | Used to convert the wiring for MS4800 Safety Light Curtain to that for the F3SG-SR. | MS48 Conversion Cable<br>For emitter<br>To sensor: dedicated connector 1,<br>To wires for MS4800:<br>M12 connector type (5 pin)<br>Color: Gray | 0.3 m | **F39-JGR3K-MS-L** |
| | | MS48 Conversion Cable<br>For receiver<br>To sensor: dedicated connector 1,<br>To wires for MS4800:<br>M12 connector type (8 pin)<br>Color: Black | | **F39-JGR3K-MS-D** |

**Note: 1.** Cables are not included with the safety light curtain/safety multi-light beam.
When connecting to the cables of the existing light curtain, order the conversion cables.
Conversion cables are only for PNP connection. To use for NPN, connect the 24 VDC line and the 0 VDC line in reverse. For details, refer to *User's Manual* (Man. No. Z405).




**2.** Do not connect the Conversion Cable for the following purposes. Failure to do so may result in failure.
1. Connecting with the F39-SGIT-IL3, F39-GCNY2, F39-GCNY3 or F39-GCN5
2. Connecting between the F3SG-SR's

## Configuration Tool SD Manager 3 and Intelligent Tap

### Configuration tool SD Manager 3

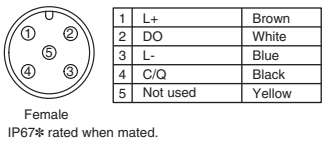
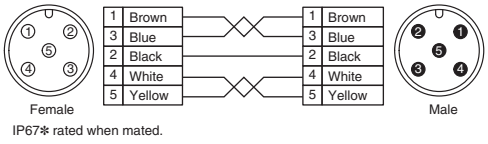
| Type | Specifications |
|---|---|
| SD Manager 3 | Configuration tool running on a PC.<br>Use with the Intelligent Tap. (The Bluetooth® communication unit is required to connect using Bluetooth®.)<br>For details, refer to your local Omron website. |
| SD Manager 3 Mobile APP | Monitoring tool running on a smartphone.<br>Use with the Intelligent Tap and Bluetooth® communication unit.<br>For details, refer to your local Omron website. |

### Intelligent Tap ✻

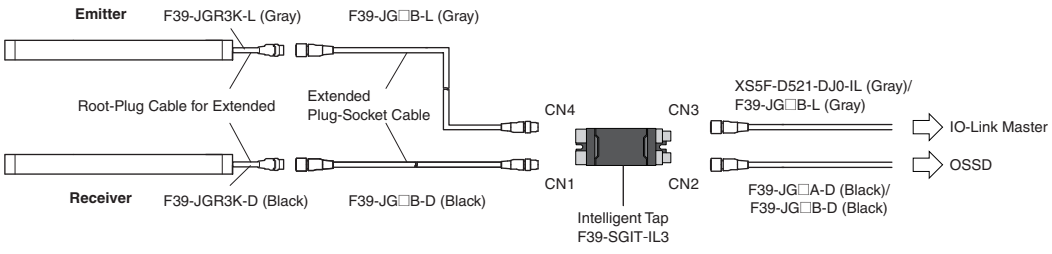
| Appearance | Specifications | Type | Model |
|---|---|---|---|
|  | Used to configure the F3SG-SR/PG and connect external devices via IO-Link. The F3SG-SR/PG can be configured on a PC or with the DIP switch on the Intelligent Tap.<br>IP67 and IP67G (JIS C 0920 Annex 1) rated when mated. | Intelligent Tap | **F39-SGIT-IL3** |
|  | Mounted to the Intelligent Tap to connect with the SD Manager 3 via Bluetooth®.<br>IP67 and IP67G (JIS C 0920 Annex 1) rated when mated.<br>✻ For the regions where the Bluetooth® Communication Unit can be used, refer to *Legislation and Standards* on page 140. | Bluetooth® Communication Unit | **F39-SGBT** |
|  | Bracket to mount the Intelligent Tap on a DIN track. | Intelligent Tap Bracket For DIN in Panel | **F39-LITF1** |

**Note:** Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).
✻ Use the F39-SGBT Bluetooth® Communication Unit or a commercially available USB Type-C™ cable to connect to a PC.

### Intelligent Tap-to-IO-Link Master Cable

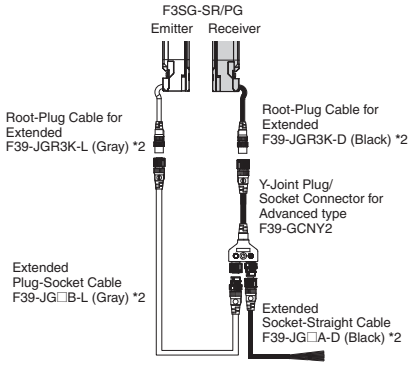
| Omron IO-Link master unit | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
| NX-ILM400 | Single-ended cable<br>M12 connector (5-pin), 5 wires<br>Color: Gray |  | 2 m | **XS5F-D521-DJ0-IL** |
| GX-ILM08C | Double-ended cable<br>M12 connector (5-pin), 5 wires<br>Color: Gray |  | 3 m | **F39-JG3B-L** |
| | | | 10 m | **F39-JG10B-L** |
| | | | 20 m | **F39-JG20B-L** |

✻ When the accessory is used, protect it from cutting oil.
**Note:** Use the F39-JG□A-D Extended Socket-Straight Cable or F39-JG□B-D Extended Plug-Socket Cable for safety output (OSSD).



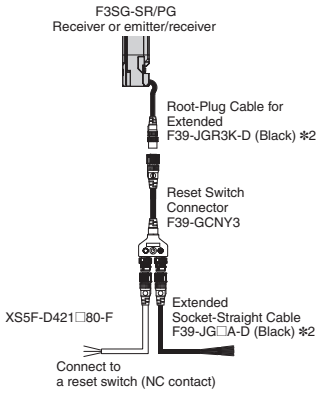
## Reduced Wiring System

### Y-Joint Plug/Socket Connector

| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | M12 connectors.<br>Used for reduced wiring.<br>IP67✻**1** rated when mated. |  | 0.5 m | **F39-GCNY2** |

✻**1.** When the accessory is used, protect it from cutting oil.
✻**2.** Order the cable (root-plug cable for extended and extended cable) for emitter (end of model: -L) and the cable for receiver (end of model: -D).

### Reset Switch Connector

| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | M12 connectors.<br>Used for reduced wiring.<br>IP67✻**1** rated when mated. |  | 0.5 m | **F39-GCNY3** |

**Note:** Purchase a reset switch (NC contact) separately.
✻**1.** When the accessory is used, protect it from cutting oil.
✻**2.** Order the extended socket-straight cable for receiver (end of model: -D).
✻**3.** The External Device Monitoring (EDM) function cannot be used with this accessory.

### Reset Switch Connector-to-Reset Switch Cable

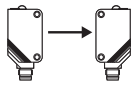
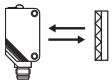
Connector Connected to Cable, Socket on One Cable End

| Appearance | Type | Specifications | Cable length | Model |
|---|---|---|---|---|
|  | M12 connector (4-pin), 4 wires |  | 1 m | **XS5F-D421-C80-F** |
| | | | 2 m | **XS5F-D421-D80-F** |
| | | | 3 m | **XS5F-D421-E80-F** |
| | | | 5 m | **XS5F-D421-G80-F** |
| | | | 10 m | **XS5F-D421-J80-F** |
| | | | 20 m | **XS5F-D421-L80-F** |

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

## Muting System

### Muting Sensor E3Z (M8 Connector)

| Sensing method | Sensing distance | Mounter | Output | Model |
|---|---|---|---|---|
| Through-beam  | 10 m (Red light) | F39-FMA□□□T | NPN output | **E3Z-T66A** |
| | | | PNP output | **E3Z-T86A** |
| Retro-reflective ✻1  | 4 m ✻2 (Red light) | F39-FMA□□□R | NPN output | **E3Z-R66** |
| | | | PNP output | **E3Z-R86** |
| | | | Reflectors | **E39-R1S** |

**Note:** The muting sensor arm mounter is not included with the muting sensor. Order the muting sensor arm mounter.
✻**1.** The reflector is not included with the muting sensor. Order the E39-R1S Reflector when using the E3Z-R□6 Retroreflective Muting Sensor.
✻**2.** The minimum required distance between the E3Z Muting Sensor and reflector is 100 mm.
**For details, refer to your local Omron website.**

### Muting Sensor Arm Mounter (Two mounters per set, for emitter and receiver)

| Appearance | Application | Length | Model |
|---|---|---|---|
|  | The through-beam muting sensor can be mounted easily. | 150 mm | **F39-FMA150T** |
| | | 400 mm | **F39-FMA400T** |
| | The retroreflective muting sensor can be mounted easily. | 150 mm | **F39-FMA150R** |
| | | 400 mm | **F39-FMA400R** |

**Note: 1.** The muting sensor is not included with the muting sensor arm mounter. Order the Muting Sensor.
**2.** When mounting the muting sensor arm mounter to the safety light curtain, order the F39-LMAF1 Muting Sensor Arm Mounter Bracket for SLC. When the muting sensor arm mounter is mounted to the floor mount column, no brackets are required.

### Muting Sensor Arm Mounter Bracket for SLC (Two brackets per set, for emitter and receiver) ✻

| Appearance | Application | Model |
|---|---|---|
|  | For F3SG-SR/PG | **F39-LMAF1** |

**Note:** The F39-LMAF1 Muting Sensor Arm Mounter Bracket for SLC cannot be used for the F3SG-SR/PG with a product length smaller than 280 mm.
✻ Order when mounting the muting sensor arm mounter to the safety light curtain. When the muting sensor arm mounter is mounted to the floor mount column, no brackets are required.

### Muting Sensor Connection Box

| Appearance | Application | Specifications | Cable Length | Model |
|---|---|---|---|---|
|  | Speeds up wiring muting sensors. | PNP/NPN selection<br>Main Unit: M12 socket (5 pin) ×7, M12 socket (8 pin) ×1<br>Cable: M12 plug (8 pin) ×1<br>IP67✻1 rated when mated. | 0.5 m | **F39-GCN5** |

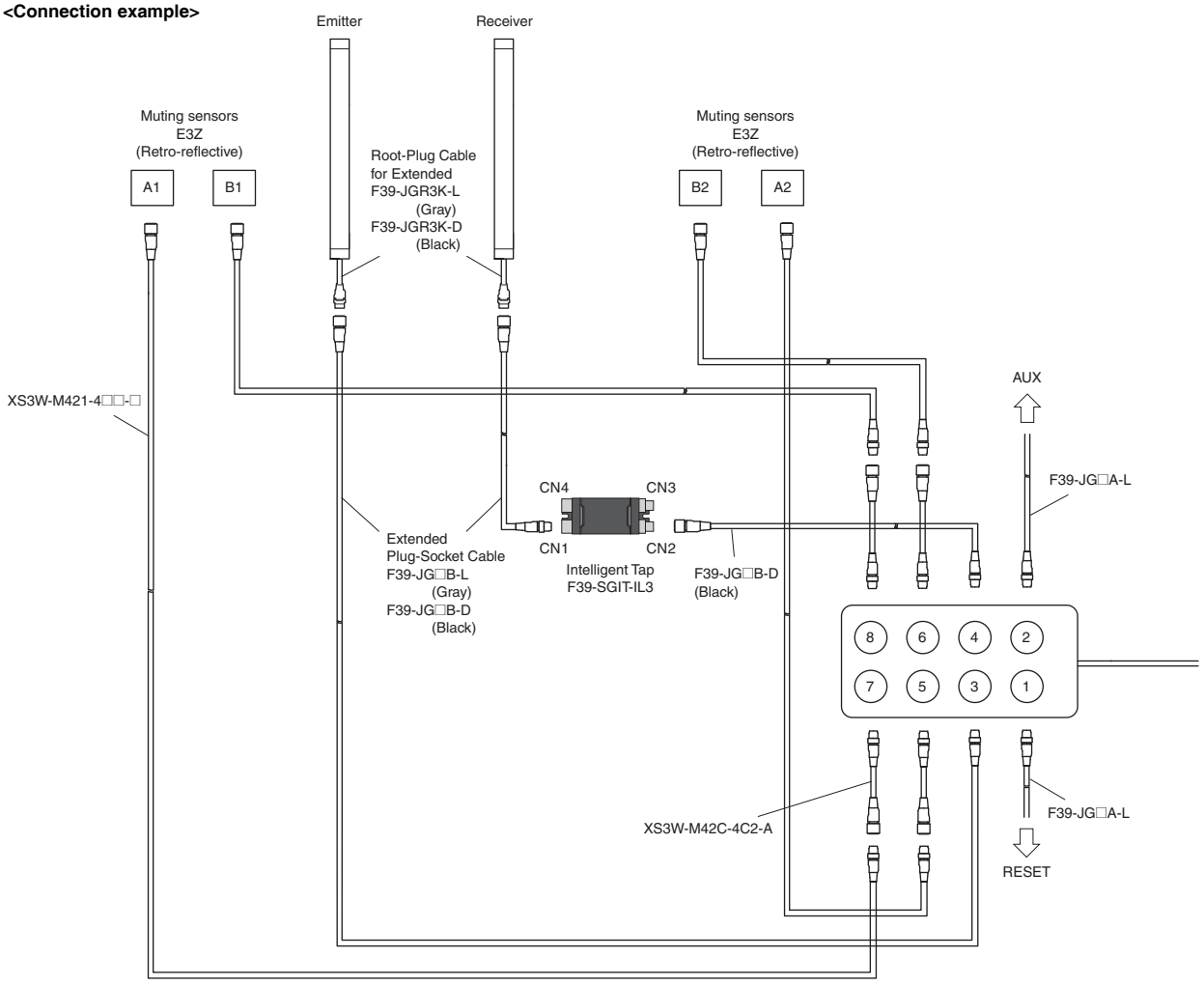
**✻1.** When the accessory is used, protect it from cutting oil.
**✻2.** When using four muting sensors, order the E3Z-R□□ Muting Sensor (Retro-reflective) that can be connected to the F39-GCN5 Muting Sensor Connection Box.

### Connection Cable for Muting Sensor Connection Box

| Appearance | Application | Specifications | Cable Length | Model |
|---|---|---|---|---|
|  | Cable to connect the Muting Sensor and F39-GCN5 Muting Sensor Connection Box. | Connectors connected to cable, M8 socket and M12 plug on cable ends (4 pin) | 0.2 m | **XS3W-M42C-4C2-A** |
|  | Sensor I/O Connectors<br>Connectors with Cables, Connectors on Both Cable Ends (Socket/Plug) | Connectors connected to cable, M8 socket and M8 plug on cable ends (4 pin)<br>Straight (socket, plug) | 1 m | **XS3W-M421-401-R** |
| | | | 2 m | **XS3W-M421-402-R** |
| | | | 5 m | **XS3W-M421-405-R** |
| | | | 10 m | **XS3W-M421-410-R** |
|  | Sensor I/O Connectors<br>Connectors with Cables, Connectors on Both Cable Ends (Socket/Plug)<br>Used together with the XS3W-M42C-4C2-A when the space to connect to the connector of the E3Z Muting Sensor is between 40 and 80 mm. | Connectors connected to cable, M8 socket and M8 plug on cable ends (4 pin)<br>Right-angle (socket)/straight (plug) | 2 m | **XS3W-M424-402-R** |
| | | | 5 m | **XS3W-M424-405-R** |

**Note: 1.** Select the same output type for both the safety light curtain/safety multi-light beam (PNP/NPN selection by wiring) and muting sensor (PNP or NPN model).
**2. For details of the XS3W, refer to your local OMRON website.**
**3.** Use the F39-JG□B-D Extended Plug-Socket Cable to connect the muting sensor connection box with the Intelligent Tap.
The connection example for optical synchronization is shown below.

**<Connection example>**



## Floor Mount System

### Floor Mount Column

| Appearance | Applicable light curtain | | Column height | Model |
|---|---|---|---|---|
| | F3SG-SR Safety Light Curtain | F3SG-PG Safety Multi-Light Beam | | |
|  | Protective height up to 0880 | F3SG-4PGA0670-2□ | 990 mm | **F39-ST0990** |
| | Protective height up to 1280 | F3SG-4PGA0970-3A/3L<br>F3SG-4PGA1070-4□ | 1,310 mm | **F39-ST1310** |
| | Protective height up to 1520 | F3SG-4PGA1370-4□ | 1,630 mm | **F39-ST1630** |
| | Protective height up to 1840 | --- | 1,950 mm | **F39-ST1950** |
| | Protective height up to 2080 | --- | 2,270 mm | **F39-ST2270** |

**✻1.** Floor Mount Column, Mirror Column, Mount-Column Adjustable Base: Each model includes one product.
**✻2.** The mount-column adjustable base is sold separately.

### Mirror Column

| Appearance | Applicable light curtain | | Column height | Model |
|---|---|---|---|---|
| | F3SG-SR Safety Light Curtain | F3SG-PG Safety Multi-Light Beam | | |
|  (Operating range becomes 15% shorter than the rating) | Protective height up to 0880 | F3SG-4PGA0670-2A/2L | 990 mm | **F39-SML0990** |
| | Protective height up to 1200 | F3SG-4PGA0970-3A/3L<br>F3SG-4PGA1070-4A/4L | 1,310 mm | **F39-SML1310** |
| | Protective height up to 1520 | F3SG-4PGA1370-4A/4L | 1,630 mm | **F39-SML1630** |
| | Protective height up to 1840 | --- | 1,950 mm | **F39-SML1950** |
|  (Operating range becomes 10% shorter than the rating) | --- | F3SG-4PGA0670-2A/2L | 990 mm | **F39-PML0990-2** |
| | --- | F3SG-4PGA0970-3A/3L | 1,310 mm | **F39-PML1310-3** |
| | --- | F3SG-4PGA1070-4A/4L | | **F39-PML1310-4** |
| | --- | F3SG-4PGA1370-4A/4L | 1,630 mm | **F39-PML1630-4** |

**Note:** The F3SG-SR Safety Light Curtain with the protective height of 1920 or more cannot be used.
**✻1.** Floor Mount Column, Mirror Column, Mount-Column Adjustable Base: Each model includes one product.
**✻2.** The mount-column adjustable base is sold separately.

### Mount-Column Adjustable Base

| Appearance | Application | Model |
|---|---|---|
|  | Mounted to the floor mount column or mirror column.<br>The angle and height of the column can be adjusted. | **F39-STB** |

**✻1.** Floor Mount Column, Mirror Column, Mount-Column Adjustable Base: Each model includes one product.
**✻2.** The floor mount column and mirror column are sold separately.

## Other Optional Accessories Common to F3SG-SR and F3SG-PG

### Laser Alignment Pointer

| Appearance | Specifications | Model |
|---|---|---|
|  | The laser alignment pointer is attached on the optical surface of the F3SG-SR/PG to help coarse adjustment of beams. | **F39-PTG** |

### Lamp

| Appearance | Specifications | Model |
|---|---|---|
|  | The lamp can be connected to emitter, receiver, or emitter/receiver and turned ON based on the operation of F3SG-SR/PG.<br>The lamp can indicate red, orange, and green colors, to which three different states can be assigned.<br>IP67 ✻ rated when mated. | **F39-SGLP** |

✻When the accessory is used, protect it from cutting oil.
**Note:** The Lamp does not support Bluetooth® communication.

## Optional Accessories for F3SG-SR (Note: Cannot be used on F3SG-PG.)

**Spatter Protection Cover**
**(2 covers per set, one for emitter and one for receiver)**

| Appearance | Safety light curtain | | | Model |
|---|---|---|---|---|
| | Finger protection | Hand protection | Arm/leg protection | |
|  (Operating range becomes 10% shorter than the rating) | F3SG-4SR□0160-14 | F3SG-4SR□0160-25 | --- | **F39-HSG0160** |
| | F3SG-4SR□0240-14 | F3SG-4SR□0240-25 | F3SG-4SR□0240-45 | **F39-HSG0240** |
| | F3SG-4SR□0320-14 | F3SG-4SR□0320-25 | --- | **F39-HSG0320** |
| | F3SG-4SR□0400-14 | F3SG-4SR□0400-25 | F3SG-4SR□0400-45 | **F39-HSG0400** |
| | F3SG-4SR□0480-14 | F3SG-4SR□0480-25 | --- | **F39-HSG0480** |
| | F3SG-4SR□0560-14 | F3SG-4SR□0560-25 | F3SG-4SR□0560-45 | **F39-HSG0560** |
| | F3SG-4SR□0640-14 | F3SG-4SR□0640-25 | --- | **F39-HSG0640** |
| | --- | F3SG-4SR□0720-25 | F3SG-4SR□0720-45 | **F39-HSG0720** |
| | F3SG-4SR□0800-14 | F3SG-4SR□0800-25 | --- | **F39-HSG0800** |
| | --- | F3SG-4SR□0880-25 | F3SG-4SR□0880-45 | **F39-HSG0880** |
| | F3SG-4SR□0960-14-F | F3SG-4SR□0960-25 | --- | **F39-HSG0960** |
| | --- | F3SG-4SR□1040-25 | --- | **F39-HSG1040** |
| | --- | F3SG-4SR□1120-25 | --- | **F39-HSG1120** |
| | F3SG-4SR□1200-14 | F3SG-4SR□1200-25 | F3SG-4SR□1200-45 | **F39-HSG1200** |
| | --- | F3SG-4SR□1280-25 | --- | **F39-HSG1280** |
| | --- | F3SG-4SR□1360-25 | --- | **F39-HSG1360** |
| | --- | F3SG-4SR□1440-25 | --- | **F39-HSG1440** |
| | --- | F3SG-4SR□1520-25 | F3SG-4SR□1520-45 | **F39-HSG1520** |
| | F3SG-4SR□1600-14 | F3SG-4SR□1600-25 | --- | **F39-HSG1600** |
| | --- | F3SG-4SR□1680-25 | --- | **F39-HSG1680** |
| | --- | F3SG-4SR□1760-25 | --- | **F39-HSG1760** |
| | --- | F3SG-4SR□1840-25 | --- | **F39-HSG1840** |
| | --- | F3SG-4SR□1920-25 | --- | **F39-HSG1920** |

**Note:** Two or more spatter protection covers can be attached to the safety light curtain with a protective height not listed above. The F39-HSG0360 is also available for use together with other spatter protection covers.

**Test Rod ✻**

| Appearance | Diameter | Model |
|---|---|---|
| --- | 14 mm | **F39-TRD14** |
| | 25 mm | **F39-TRD25** |
| | 30 mm | **F39-TRD30** |

✻ When you need a test rod larger than 30 mm in diameter, prepare it by yourself.

**MEMO**

# Ratings and Specifications

## Safety Light Curtain/Safety Multi-Light Beam
## F3SG-SR/PG Main Unit

□□□□ in the model number indicates the protective height or product length in millimeters.

| Model | | | | Safety Light Curtain | | | |
|---|---|---|---|---|---|---|---|
| | | | | F3SG-□SRA□□□□-14<br>F3SG-□SRB□□□□-14 | F3SG-□SRA□□□□-25<br>F3SG-□SRB□□□□-25 | F3SG-□SRA□□□□-45<br>F3SG-□SRB□□□□-45 | F3SG-□SRA□□□□-85<br>F3SG-□SRB□□□□-85 |
| Performance | Object resolution (Detection capability) | | | Opaque objects | | | |
| | | | | 14-mm dia. | 25-mm dia. | 45-mm dia. | 85-mm dia. |
| | Beam gap | | | 10 mm | 20 mm | 40 mm | 80 mm |
| | Number of beams | | | 15 to 199 | 8 to 124 | 6 to 38 | 4 to 12 |
| | Lens size | | | 4.4 × 3.4 mm (W × H) | 6.7 × 4.5 mm (W × H) | | |
| | Protective height | | | 160 to 2,000 mm | 160 to 2,480 mm | 240 to 1,520 mm | 280 to 920 mm |
| | Product length | | | --- | | | |
| | Operating range | Long | | 0.3 to 10.0 m (Typ. 15.0 m) ✻ | 0.3 to 20.0 m (Typ. 30.0 m) | | |
| | | Short | | 0.3 to 3.0 m (Typ. 4.5 m) ✻ | 0.3 to 7.0 m (Typ.10.5 m) | | |
| | | ✻ When operating at an ambient temperature of -10 to -30 °C, use the F3SG-SR with the operating range of 0.3 to 5.0 m in Long Mode and 0.3 to 1.5 m in Short Mode. | | | | | |
| | Response time ✻1 | Normal mode | ON to OFF | Optical synchronization: 8 to 18 ms<br>Wired synchronization: 10 to 21 ms | Optical synchronization: 8 to 13 ms<br>Wired synchronization: 10 to 17 ms | Optical synchronization: 8 ms<br>Wired synchronization: 10 ms | |
| | | | OFF to ON | Optical synchronization: 40 to 90 ms<br>Wired synchronization: 50 to 105 ms | Optical synchronization: 40 to 65 ms<br>Wired synchronization: 50 to 85 ms | Optical synchronization: 40 ms<br>Wired synchronization: 50 ms | |
| | | ×2 Slow mode ✻2 | ON to OFF | Optical synchronization: 16 to 36 ms<br>Wired synchronization: 20 to 42 ms | Optical synchronization: 16 to 26 ms<br>Wired synchronization: 20 to 34 ms | Optical synchronization: 16 ms<br>Wired synchronization: 20 ms | |
| | | | OFF to ON | Optical synchronization: 80 to 180 ms<br>Wired synchronization: 100 to 210 ms | Optical synchronization: 80 to 130 ms<br>Wired synchronization: 100 to 170 ms | Optical synchronization: 80 ms<br>Wired synchronization: 100 ms | |
| | | ×4 Slow mode ✻2 | ON to OFF | Optical synchronization: 32 to 72 ms<br>Wired synchronization: 40 to 84 ms | Optical synchronization: 32 to 52 ms<br>Wired synchronization: 40 to 68 ms | Optical synchronization: 32 ms<br>Wired synchronization: 40 ms | |
| | | | OFF to ON | Optical synchronization: 160 to 360 ms<br>Wired synchronization: 200 to 420 ms | Optical synchronization: 160 to 260 ms<br>Wired synchronization: 200 to 340 ms | Optical synchronization: 160 ms<br>Wired synchronization: 200 ms | |
| | | ×8 Slow mode ✻2 | ON to OFF | Optical synchronization: 64 to 144 ms<br>Wired synchronization: 80 to 168 ms | Optical synchronization: 64 to 104 ms<br>Wired synchronization: 80 to 136 ms | Optical synchronization: 64 ms<br>Wired synchronization: 80 ms | |
| | | | OFF to ON | Optical synchronization: 320 to 720 ms<br>Wired synchronization: 400 to 840 ms | Optical synchronization: 320 to 520 ms<br>Wired synchronization: 400 to 680 ms | Optical synchronization: 320 ms<br>Wired synchronization: 400 ms | |
| | | ✻1. Response time when used in one segment system. Refer to page 63. Refer to *the User's Manual* (Man. No. Z405) for cascaded connection.<br>✻2. Selectable by SD Manager 3. | | | | | |
| | 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 | | | 3 s max. | | | |

| Safety Multi-Light Beam | | | Model | | |
|---|---|---|---|---|---|
| F3SG-4PGA□□□□-□A | F3SG-4PGA□□□□-□L | F3SG-4PGA□□□□-□C | | | |
| Opaque objects | | | Object resolution (Detection capability) | | Performance |
| 30-mm dia. | | | | | |
| F3SG-4PGA0670-2□: 500 mm<br>F3SG-4PGA0970-3□: 400 mm<br>F3SG-4PGA1070-4□: 300 mm<br>F3SG-4PGA1370-4□: 400 mm | | F3SG-4PGA0670-2C: 500 mm<br>F3SG-4PGA1070-4C: 300 mm<br>F3SG-4PGA1370-4C: 400 mm | Beam gap | | |
| F3SG-4PGA0670-2□: 2<br>F3SG-4PGA0970-3□: 3<br>F3SG-4PGA1070-4□: 4<br>F3SG-4PGA1370-4□: 4 | | F3SG-4PGA0670-2C: 2<br>F3SG-4PGA1070-4C: 4<br>F3SG-4PGA1370-4C: 4 | Number of beams | | |
| 8.1 × 12.8 mm (W × H) | | | Lens size | | |
| --- | | | Protective height | | |
| 670 mm/970 mm/1070 mm/1370 mm | | | Product length | | |
| 0.3 to 20.0 m (Typ. 30.0 m) | 20.0 to 70.0 m (Typ. 110.0 m) | 0.3 to 5.0 m (Typ. 8.0 m) | Long | Operating range | |
| --- | 0.5 to 20.0 m (Typ. 30.0 m) | --- | Short | | |
| Optical synchronization: 8 ms<br>Wired synchronization: 10 ms | | | ON to OFF | Normal mode | Response time ✻ |
| Optical synchronization: 40 ms<br>Wired synchronization: 50 ms | | | OFF to ON | | |
| Optical synchronization: 16 ms<br>Wired synchronization: 20 ms | | | ON to OFF | ×2 Slow mode ✻2 | |
| Optical synchronization: 80 ms<br>Wired synchronization: 100 ms | | | OFF to ON | | |
| Optical synchronization: 32 ms<br>Wired synchronization: 40 ms | | | ON to OFF | ×4 Slow mode ✻2 | |
| Optical synchronization: 160 ms<br>Wired synchronization: 200 ms | | | OFF to ON | | |
| Optical synchronization: 64 ms<br>Wired synchronization: 80 ms | | | ON to OFF | ×8 Slow mode ✻2 | |
| Optical synchronization: 320 ms<br>Wired synchronization: 400 ms | | | OFF to ON | | |
| ✻ Selectable by SD Manager 3. | | | | | |
| ±2.5° max. ✻ Emitter, receiver, and Emitter/receiver at operating range of 3 m or greater.<br>Passive mirror not applicable | | | Effective aperture angle (EAA) (IEC 61496-2) | | |
| Infrared LEDs, Wavelength: 870 nm | | | Light source | | |
| 3 s max. | | | Startup waiting time | | |

| Model | | | Safety Light Curtain | | | |
|---|---|---|---|---|---|---|
| | | | F3SG-□SRA□□□□-14<br>F3SG-□SRB□□□□-14 | F3SG-□SRA□□□□-25<br>F3SG-□SRB□□□□-25 | F3SG-□SRA□□□□-45<br>F3SG-□SRB□□□□-45 | F3SG-□SRA□□□□-85<br>F3SG-□SRB□□□□-85 |
| Electrical | Power supply voltage (Vs) | | SELV/PELV 24 VDC ±20% (ripple p-p 10% max.) | | | |
| | Current consumption | | Refer to page 63. | | | |
| | Safety outputs (OSSD) | | Two PNP or NPN transistor outputs (PNP or NPN is selectable by wiring of power supply.)<br>Load current: 300 mA max., Residual voltage: 2 V max. (except for voltage drop due to cable extension), Capacitive load: 1 µF max., Inductive load: 2.2 H max. ✻1✻2✻3<br>Leakage current: 1 mA max.(PNP), 2 mA max. (NPN) ✻4<br>✻1. For the F3SG-4SRA, the load current is 150 mA max. in 2-segment cascade and 80 mA max. in 3-segment cascade.<br>✻2. The residual voltage is 3 V max. when the Intelligent Tap is connected to the sensor.<br>✻3. 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>✻4. These values must be taken into consideration when connecting elements including a capacitive load such as a capacitor. | | | |
| | Auxiliary output | | Two PNP or NPN transistor 1 outputs (PNP or NPN is selectable by wiring of power supply.)<br>Load current: 100 mA max., Residual voltage: 2 V max. ✻<br>✻ The residual voltage is 3 V max. when the Intelligent Tap is connected to the sensor. | | | |
| | Output operation mode | Safety output | Light-ON (Safety outputs are turned to the ON state when the receiver receives an emitting signal.) | | | |
| | | Auxiliary output | Safety output (Inverted signal output: Enable) (default) (Configurable by SD Manager 3) | | | |
| | Input voltage | TEST | Light emission stops when connected to 24 VDC<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 5.0 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 6.0 mA) ✻<br>Light emission stops when connected to 0 V<br>ON voltage: 0 to 3 V (short circuit current: approx. 6.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 5.0 mA) ✻ | | | |
| | | OPERATING RANGE SELECT INPUT | Long: 12 V to Vs (short circuit current: approx. 4.2 mA) ✻ or open<br>Short: 0 to 3 V (short circuit current: approx. 4.2 mA) | | | |
| | | RESET/EDM | PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 9.5 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 13.0 mA) ✻<br>NPN ON voltage: 0 to 3 V (short circuit current: approx. 13.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 9.5 mA) ✻ | | | |
| | | MUTE A/B, RE-RESET, PSDI | PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 4.5 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 7.0mA) ✻<br>NPN ON voltage: 0 to 3 V (short circuit current: approx. 7.0mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 4.5mA) ✻ | | | |
| | | ✻ The Vs indicates a supply voltage value in your environment. | | | | |
| | Overvoltage category (IEC 60664-1) | | II | | | |
| | Indicators | | Refer to page 126. | | | |
| | Protective circuit | | Output short-circuit protection | | | |
| | Insulation resistance | | 20 M or higher (500 VDC megger) | | | |
| | Dielectric strength | | 1,000 VAC, 50/60 Hz (1 min) | | | |
| Functional | Mutual interference prevention | | Optical synchronization by Scan Code: in up to 2 sets<br>Wired synchronization: in up to 3 sets | | | |
| | Cascade connection | | Number of cascaded segments: 3 max.<br>Total number of beams: 255 max. | | | |
| | 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>PSDI<br>Fixed Blanking/Floating Blanking<br>Reduced Resolution<br>Muting/Override<br>Mutual Interference Prevention<br>PNP/NPN Selection<br>Response Time Adjustment | | | |

| Safety Multi-Light Beam | | | Model | | |
|---|---|---|---|---|---|
| F3SG-4PGA□□□□-□A | F3SG-4PGA□□□□-□L | F3SG-4PGA□□□□-□C | | | |
| SELV/PELV 24 VDC ±20% (ripple p-p 10% max.) | | | Power supply voltage (Vs) | | Electrical |
| Refer to page 63. | | | Current consumption | | |
| Two PNP or NPN transistor outputs (PNP or NPN is selectable by wiring of power supply.)<br>Load current: 300 mA max., Residual voltage: 2 V max. (except for voltage drop due to cable extension), Capacitive load: 1 μF max., Inductive load: 2.2 H max.<br>Leakage current: 1 mA max. (PNP), 2 mA max. (NPN)<br>✻1. The load current is 150 mA max. when the operating ambient temperature is between 45°C and 55°C.<br>✻2. The residual voltage is 3 V max. when the Intelligent Tap is connected to the sensor.<br>✻3. 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>✻4. These values must be taken into consideration when connecting elements including a capacitive load such as a capacitor. | | | Safety outputs (OSSD) | | |
| Two PNP or NPN transistor 1 outputs (PNP or NPN is selectable by wiring of power supply.)<br>Load current: 100 mA max., Residual voltage: 2 V max. ✻<br>✻ The residual voltage is 3 V max. when the Intelligent Tap is connected to the sensor. | | | Auxiliary output | | |
| Light-ON (Safety outputs are turned to the ON state when the receiver receives an emitting signal.) | | | Safety output | Output operation mode | |
| Safety output (Inverted signal output: Enable) (default) (Configurable by SD Manager 3) | | | Auxiliary output | | |
| Light emission stops when connected to 24 VDC<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 5.0 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 6.0mA)<br>Light emission stops when connected to 0 V<br>ON voltage: 0 to 3 V (short circuit current: approx. 6.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 5. 0mA) ✻ | | --- | TEST | Input voltage | |
| --- | Long: 12V to Vs (short circuit current: approx. 4.2 mA) ✻ or open<br>Short: 0 to 3V (short circuit current: approx. 4.2 mA) | --- | OPERATING RANGE SELECT INPUT | | |
| PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 9.5 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 13.0 mA) ✻<br>NPN ON voltage: 0 to 3 V (short circuit current: approx. 13.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 9.5 mA) ✻ | | | RESET/EDM | | |
| PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 4.5 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 7.0mA) ✻<br>NPN ON voltage: 0 to 3 V (short circuit current: approx. 7.0mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 4.5mA) ✻ | | | MUTE A/B, RE-RESET, PSDI | | |
| ✻ The Vs indicates a supply voltage value in your environment. | | | | | |
| II | | | Overvoltage category (IEC 60664-1) | | |
| Refer to page 126. | | | Indicators | | |
| Output short-circuit protection | | | Protective circuit | | |
| 20 M or higher (500 VDC megger) | | | Insulation resistance | | |
| 1,000 VAC, 50/60 Hz (1 min) | | | Dielectric strength | | |
| Optical synchronization by Scan Code: in up to 2 sets<br>Wired synchronization: in up to 3 sets | | | Mutual interference prevention | | Functional |
| --- | | | Cascade connection | | |
| Self-test (at power-on, and during operation)<br>External test (light emission stop function by test input) | | Self-test (at power-on, and during operation) | Test function | | |
| Interlock<br>External Device Monitoring (EDM)<br>Pre-Reset<br>Muting/Override<br>Mutual Interference Prevention<br>PNP/NPN Selection<br>Response Time Adjustment | | | Safety-related functions | | |

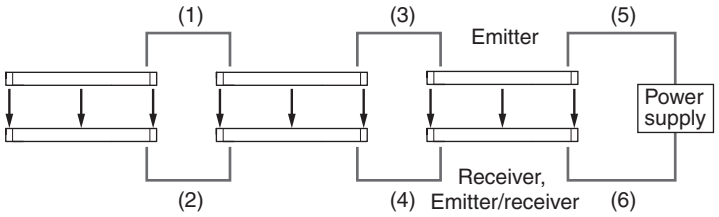
| Model | | | Safety Light Curtain | | | |
|---|---|---|---|---|---|---|
| | | | F3SG-□SRA□□□□-14<br>F3SG-□SRB□□□□-14 | F3SG-□SRA□□□□-25<br>F3SG-□SRB□□□□-25 | F3SG-□SRA□□□□-45<br>F3SG-□SRB□□□□-45 | F3SG-□SRA□□□□-85<br>F3SG-□SRB□□□□-85 |
| Environmental | Ambient temperature | Operating | -30 to 55 °C (non-icing) | | | |
| | | Storage | -30 to 70 °C | | | |
| | 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) | | 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes | | | |
| | Shock resistance (IEC 61496-1) | | 100 m/s$^2$, 1000 shocks for all 3 axes | | | |
| | Pollution degree (IEC 60664-1) | | 3 | | | |
| Connections | Root cable | Type of connection | To sensors: dedicated connector, To external: M12 connector type (5-pin emitter and 8-pin receiver) or open-ended type IP67 and IP67G (JIS C 0920 Annex 1) ✻ rated when mated.<br>✻ The F3SG-SR meets the degree of protection when the root cable is correctly connected with the F3SG-SR. 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 42. | | | |
| | | Cable diameter | 6 mm | | | |
| | | Minimum bending radius | R5 mm | | | |
| | Cascading cable | Type of connection | To sensors: dedicated connector, To cascading sensors: M12 connector type (5-pin emitter and 8-pin receiver) or dedicated connector IP67 and IP67G (JIS C 0920 Annex 1) ✻ rated when mated.<br>✻ The F3SG-SR meets the degree of protection when the cascading cable is correctly connected with the F3SG-SR and the root 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 44. | | | |
| | | Cable diameter | 6 mm | | | |
| | | Minimum bending radius | R5 mm | | | |
| | Extension cable<br>- Extended Socket-Straight Cable<br>- Extended Plug-Socket Cable | Type of connection | M12 connector type (5-pin emitter and 8-pin receiver), IP67 ✻ rated when mated<br>✻ The extension cable meets the degree of protection when the root cable is correctly connected with the extension 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 43. | | | |
| | | Cable diameter | 6.6 mm | | | |
| | | Minimum bending radius | R36 mm | | | |
| | Cable extension | | Refer to page 60 for restrictions on cable extension. | | | |
| | | Root cable | In optical synchronization: 100 m max. ✻ between power supply and emitter and between power supply and receiver<br>In wired synchronization: 100 m max. ✻ between power supply and emitter, between power supply and receiver, and between emitter and receiver<br>✻ When the Intelligent Tap (F39-SGIT-IL3) is connected to the sensor, this applies in the case of the rated power supply of 24 VDC to 24 VDC +20%. | | | |
| | | Cascade connection | Extension cable between sensors: 10 m max. (not including Cascading Cable for Extended ✻1 and Root Cable ✻2.)<br>✻**1.** F39-JGR3W<br>✻**2.** F39-JGR3K | | | |
| Material | | | Housing: Aluminum alloy<br>Cap: PBT resin<br>Front window: Acrylic resin<br>FE plate: Stainless steel | | | |
| Weight | | | Refer to page 60. | | | |
| Included accessories | | | Instruction Sheet, Quick Installation Manual, Troubleshooting Guide Sticker, Warning Zone Label<br>End Cap (for switching Scan Code Selection function) | | | |
| Conformity | Conforming standards | | Refer to page 140. | | | |
| | Type of ESPE (IEC 61496-1) | | Type 4 | | | |
| | Performance Level (PL)/ Safety category | | PL e/Category 4 (EN ISO 13849-1:2015) | | | |
| | $PFH_D$ | | $1.1\times10^{-8}$ max. (IEC 61508) | | | |
| | Proof test interval $T_M$ | | Every 20 years (IEC 61508) | | | |
| | SFF | | 99% (IEC 61508) | | | |
| | HFT | | 1 (IEC 61508) | | | |
| | Classification | | Type B (IEC 61508-2) | | | |

| Safety Multi-Light Beam | | | Model | | |
|---|---|---|---|---|---|
| F3SG-4PGA□□□□-□A | F3SG-4PGA□□□□-□L | F3SG-4PGA□□□□-□C | | | |
| -30 to 55 °C (non-icing) | | | Operating | Ambient temperature | Environmental |
| -30 to 70 °C | | | Storage | | |
| 35% to 85% (non-condensing) | | | Operating | Ambient humidity | |
| 35% to 95% | | | Storage | | |
| Incandescent lamp: 3,000 lx max. on receiver surface<br>Sunlight: 10,000 lx max. on receiver surface | | | Ambient illuminance | | |
| IEC 60529: IP65 and IP67 | | | Degree of protection (IEC 60529) | | |
| 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes | | | Vibration resistance (IEC 61496-1) | | |
| 100 m/s$^2$, 1000 shocks for all 3 axes | | | Shock resistance (IEC 61496-1) | | |
| 3 | | | Pollution degree (IEC 60664-1) | | |
| To sensors: dedicated connector, To external: M12 connector type (5-pin emitter and 8-pin receiver) or open-ended type IP67 and IP67G (JIS C 0920 Annex 1) ✻ rated when mated.<br>✻ The F3SG-SR meets the degree of protection when the root cable is correctly connected with the F3SG-SR. The degree of protection is not satisfied with the part where cable wires are uncovered. | | | Type of connection | Root cable | Connections |
| Emitter: 5, Receiver: 8, Emitter/receiver: 8 | | | Number of wires | | |
| Refer to page 42. | | | Cable length | | |
| 6 mm | | | Cable diameter | | |
| R5 mm | | | Minimum bending radius | | |
| --- | | | Type of connection | Cascading cable | |
| --- | | | Number of wires | | |
| --- | | | Cable length | | |
| --- | | | Cable diameter | | |
| --- | | | Minimum bending radius | | |
| M12 connector type (5-pin emitter and 8-pin receiver), IP67 ✻ rated when mated<br>✻ The extension cable meets the degree of protection when the root cable is correctly connected with the extension cable. The degree of protection is not satisfied with the part where cable wires are uncovered. | | | Type of connection | Extension cable - Extended Socket-Straight Cable - Extended Plug-Socket Cable | |
| Emitter: 5, Receiver: 8, Emitter/receiver: 8 | | | Number of wires | | |
| Refer to page 43. | | | Cable length | | |
| 6.6 mm | | | Cable diameter | | |
| R36 mm | | | Minimum bending radius | | |
| Refer to page 60 for restrictions on cable extension. | | | | | |
| In optical synchronization: 100 m max. ✻ between power supply and emitter and between power supply and receiver<br>In wired synchronization: 100 m max. ✻ between power supply and emitter, between power supply and receiver, and between emitter and receiver<br>✻ When the Intelligent Tap (F39-SGIT-IL3) is connected to the sensor, this applies in the case of the rated power supply of 24 VDC to 24 VDC +20%. | | | Root cable | Cable extension | |
| --- | | | Cascade connection | | |
| Housing: Aluminum alloy<br>Cap: PBT resin<br>Front window: Acrylic resin<br>FE plate: Stainless steel | | | Material | | |
| Refer to page 60. | | | Weight | | |
| Instruction Sheet, Quick Installation Manual, Troubleshooting Guide Sticker,<br>End Cap (for switching Scan Code Selection function) | | | Included accessories | | |
| Refer to page 140. | | | Conforming standards | | Conformity |
| Type 4 | | | Type of ESPE (IEC 61496-1) | | |
| PL e/Category 4 (EN ISO 13849-1:2015) | | | Performance Level (PL)/ Safety category | | |
| 1.1×10$^{-8}$ max. (IEC 61508) | | | PFH$_D$ | | |
| Every 20 years (IEC 61508) | | | Proof test interval T$_M$ | | |
| 99% (IEC 61508) | | | SFF | | |
| 1 (IEC 61508) | | | HFT | | |
| Type B (IEC 61508-2) | | | Classification | | |

## Restrictions on cable extension

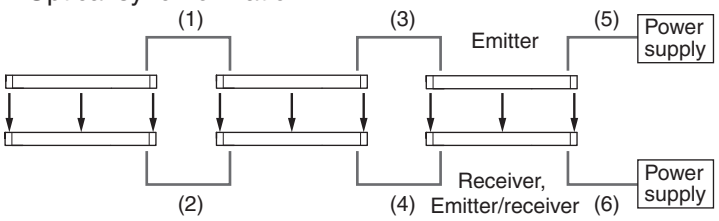
For the cable extension of the F3SG-SR/PG, refer to the following diagrams. For the cable extension of the F3SG-SR/PG with the Intelligent Tap, refer to *User's Manual* (Man. No. Z405).

- Wired synchronization




| Maximum extension length |
|---|
| (1) to (4): 10 m each * |
| (5) to (6): 100 m each |

- Optical synchronization




| Maximum extension length |
|---|
| (1) to (4): 10 m each * |
| (5) to (6): 100 m each |

* Not including the F39-JGR3W Cascading Cable for Extended and F39-JGR3K Root-Plug Cable for Extended. Cascade connection is not available for the F3SG-PG and F3SG-SR-K Series.

## Intelligent Tap F39-SGIT-IL3

| Model | | | F39-SGIT-IL3 |
|---|---|---|---|
| **Applicable sensor** | | | F3SG-SR/PG |
| **Performance** | **Response time** | | Output ON to OFF and OFF to ON: 44 ms max. each ✻<br>✻ The response time is the time interval between the changes of the states of the sensor OSSD's and the DO (pin 2). |
| | **Startup waiting time** | | 3 s max. |
| **Electrical** | **Power supply voltage (Vs)** | | Supplied from external power source: SELV/PELV 24 VDC±20% (ripple p-p 10% max.)<br>USB bus powered: 5 VDC |
| | **Current consumption** | | 85 mA max. (When connecting 24 VDC power supply and IO-Link Master) |
| | **Safety outputs (OSSD) /Auxiliary output** | | Refer to the ratings and specifications of the F3SG-SR/PG. The safety outputs and auxiliary output of the Intelligent Tap are directly connected to those of the F3SG-SR/PG. |
| | **Digital output for pin 2 (IO-Link) ✻** | | One PNP transistor output<br>Load current: 100 mA max., Residual voltage: 2 V max., Leakage current: 1 mA max.<br>The DO is in the OFF state when the safety outputs are in the ON state. The DO is in the ON state when the safety outputs are in the OFF state. (Regardless of the PNP/NPN setting of the F3SG-SR) |
| | ✻ For the DO (pin 2) of CN3 | | |
| | **Input voltage** | **RESET, EDM** | PNP<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 9.5 mA) ✻2<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 13.0 mA) ✻2<br>NPN<br>ON voltage: 0 to 3 V (short circuit current: approx. 13.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 9.5 mA) ✻2 |
| | | **MUTE A/B, PRE-RESET, PSDI ✻1** | PNP<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 4.5 mA) ✻2<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 7.0 mA) ✻2<br>NPN<br>ON voltage: 0 to 3 V (short circuit current: approx. 7.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 4.5 mA) ✻2 |
| | | **✻1.** PSDI is only available for F3SG-SR.<br>**✻2.** The Vs indicates a supply voltage value in your environment. | |
| | **Overvoltage category (IEC 60664-1)** | | II |
| | **Protective circuit** | | Output short-circuit protection, Output reverse polarity protection |
| | **Insulation resistance** | | 20 MΩ or higher (500 VDC megger) |
| | **Dielectric strength** | | 1,000 VAC, 50/60 Hz (1 min) |
| **Functional** | **Maintenance Information** | | Error Log<br>Power-ON Time |
| **Environmental** | **Ambient temperature** | **Operating** | -30 to 55 °C (non-icing) |
| | | **Storage** | -30 to 70 °C |
| | **Ambient humidity** | **Operating** | 35% to 85% (non-condensing) |
| | | **Storage** | 35% to 85% |
| | **Degree of protection (IEC 60529)** | | IP65, IP67 and IP67G (Covers and cables connected with the Intelligent Tap.) |
| | **Vibration resistance (IEC 61496-1)** | | 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes |
| | **Shock resistance (IEC 61496-1)** | | 100 $m/s^2$, 1000 shocks for all 3 axes |
| | **Pollution degree (IEC 60664-1)** | | 3 |
| **Connections** | **To sensors, control box and IO-Link** | | M12 connectors: 8-pin (CN1: receiver and CN2: control box) and 5-pin (CN3: IO-Link and CN4: emitter), IP67 and IP67G (JIS C 0920 Annex 1) ✻ rated when mated.<br>✻ The F3SG-SR meets the degree of protection when the root cable of the F3SG-SR is correctly connected with the F3SG-SR. |
| | **Connection** | | USB Type-C |
| | **Cable extension** | | 20 m max. between IO-Link Master and Intelligent Tap, 4 m max.✻ between PC and Intelligent Tap via USB cable<br>✻ It is not guaranteed that the Intelligent Tap is connectable to any PC or USB cable. Verify the connection with the USB cable you use. |
| **IO-Link communications** | **IO-Link version** | | Version 1.1 |
| | **Baud rate** | | COM3: 230.4 kbps |
| | **Data length** | | PD: 4 bytes, OD: 32 bytes (M-sequence type: TYPE_2_V) |
| | **Minimum cycle time** | | 22 ms |
| **Material** | | | PBT resin |
| **Weight** | | | F39-SGIT-IL3: 180 g (when packaged), F39-LITF1: 50 g (when packaged) |
| **Included accessories** | | | Instruction Sheet and M12 Connector Cover (2 pcs) |

## Bluetooth® Communication Unit F39-SGBT

| Model | F39-SGBT |
|---|---|
| **Applicable sensor** | F3SG-SR/PG |
| **Power supply voltage (Vs)** | 24 VDC±20%, ripple p-p 10% max. (shares power supply of Intelligent Tap) |
| **Current consumption** | 30 mA max. (shares power supply of Intelligent Tap) |
| **Ambient temperature** | Operating: -30 to 55 °C (non-icing)<br>Storage: -30 to 70 °C |
| **Ambient humidity** | Operating: 35% to 85% (non-condensing)<br>Storage: 35% to 85% |
| **Degree of protection** | IP65, IP67 and IP67G (rated when connected to Intelligent Tap) |
| **Vibration resistance** | 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes |
| **Shock resistance** | 100m/s$^2$, 1000 shocks for all 3 axes |
| **Type of connection** | To be connected to Intelligent Tap |
| **Communication system** | Bluetooth® Version 3.0 |
| **Communication profile** | SPP (Serial Port Profile) |
| **Transmission distance** | Approx. 10 m max. (Output power: Class 2) ✻ |
| **Material** | PBT resin |
| **Weight** | 70 g (when packaged) |

✻ It depends on use environment conditions.

# Models/Response Time/Current Consumption/Weight

## F3SG-SR

## Finger protection (Detection capability: 14-mm dia.)

### Models and Response Times

| Model | | Number of beams | Protective height [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|---|
| | | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4SR□0160-14 | F3SG-2SRB0160-14 | 15 | 160 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0200-14-F | --- | 19 | 200 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0240-14 | F3SG-2SRB0240-14 | 23 | 240 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0280-14-F | --- | 27 | 280 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0320-14 | F3SG-2SRB0320-14 | 31 | 320 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0360-14-F | --- | 35 | 360 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0400-14 | F3SG-2SRB0400-14 | 39 | 400 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0440-14-F | --- | 43 | 440 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0480-14 | F3SG-2SRB0480-14 | 47 | 480 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0520-14-F | --- | 51 | 520 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0560-14 | F3SG-2SRB0560-14 | 55 | 560 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0600-14-F | --- | 59 | 600 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0640-14 | F3SG-2SRB0640-14 | 63 | 640 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0680-14-F | --- | 67 | 680 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0720-14-F | --- | 71 | 720 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0760-14-F | --- | 75 | 760 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0800-14 | F3SG-2SRB0800-14 | 79 | 800 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0840-14-F | --- | 83 | 840 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0880-14-F | --- | 87 | 880 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0920-14-F | --- | 91 | 920 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0960-14-F | --- | 95 | 960 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1000-14 | F3SG-2SRB1000-14 | 99 | 1000 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1200-14 | F3SG-2SRB1200-14 | 119 | 1200 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1400-14 | F3SG-2SRB1400-14 | 139 | 1400 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1600-14 | F3SG-2SRB1600-14 | 159 | 1600 | 18 | 90 | 190 | 21 | 105 |
| F3SG-4SR□1800-14 | F3SG-2SRB1800-14 | 179 | 1800 | 18 | 90 | 190 | 21 | 105 |
| F3SG-4SR□2000-14 | F3SG-2SRB2000-14 | 199 | 2000 | 18 | 90 | 190 | 21 | 105 |

**Note: 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 of "Optical synchronization" are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.

## Models, Current Consumption and Weight

| Model | Number of beams | Protective height [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| **F3SG-4SRA0160-14** | 15 | 160 | 68 | 106 | 0.4 | 0.8 |
| **F3SG-□SRB0160-14** | 15 | 160 | 69 | 97 | 0.4 | 0.8 |
| **F3SG-4SRA0200-14-F** | 19 | 200 | 71 | 108 | 0.5 | 0.9 |
| **F3SG-4SRB0200-14-F** | 19 | 200 | 70 | 97 | 0.5 | 0.9 |
| **F3SG-4SRA0240-14** | 23 | 240 | 74 | 111 | 0.6 | 1 |
| **F3SG-□SRB0240-14** | 23 | 240 | 71 | 98 | 0.6 | 1 |
| **F3SG-4SRA0280-14-F** | 27 | 280 | 77 | 114 | 0.7 | 1.1 |
| **F3SG-4SRB0280-14-F** | 27 | 280 | 73 | 99 | 0.7 | 1.1 |
| **F3SG-4SRA0320-14** | 31 | 320 | 81 | 117 | 0.8 | 1.2 |
| **F3SG-□SRB0320-14** | 31 | 320 | 74 | 100 | 0.8 | 1.2 |
| **F3SG-4SRA0360-14-F** | 35 | 360 | 84 | 119 | 0.9 | 1.4 |
| **F3SG-4SRB0360-14-F** | 35 | 360 | 75 | 100 | 0.9 | 1.4 |
| **F3SG-4SRA0400-14** | 39 | 400 | 87 | 122 | 1 | 1.5 |
| **F3SG-□SRB0400-14** | 39 | 400 | 77 | 101 | 1 | 1.5 |
| **F3SG-4SRA0440-14-F** | 43 | 440 | 90 | 125 | 1.1 | 1.6 |
| **F3SG-4SRB0440-14-F** | 43 | 440 | 78 | 102 | 1.1 | 1.6 |
| **F3SG-4SRA0480-14** | 47 | 480 | 93 | 128 | 1.2 | 1.7 |
| **F3SG-□SRB0480-14** | 47 | 480 | 79 | 103 | 1.2 | 1.7 |
| **F3SG-4SRA0520-14-F** | 51 | 520 | 96 | 131 | 1.3 | 1.8 |
| **F3SG-4SRB0520-14-F** | 51 | 520 | 81 | 103 | 1.3 | 1.8 |
| **F3SG-4SRA0560-14** | 55 | 560 | 99 | 133 | 1.4 | 1.9 |
| **F3SG-□SRB0560-14** | 55 | 560 | 82 | 104 | 1.4 | 1.9 |
| **F3SG-4SRA0600-14-F** | 59 | 600 | 103 | 136 | 1.5 | 2.1 |
| **F3SG-4SRB0600-14-F** | 59 | 600 | 83 | 105 | 1.5 | 2.1 |
| **F3SG-4SRA0640-14** | 63 | 640 | 106 | 139 | 1.6 | 2.2 |
| **F3SG-□SRB0640-14** | 63 | 640 | 85 | 106 | 1.6 | 2.2 |
| **F3SG-4SRA0680-14-F** | 67 | 680 | 109 | 142 | 1.7 | 2.3 |
| **F3SG-4SRB0680-14-F** | 67 | 680 | 86 | 106 | 1.7 | 2.3 |
| **F3SG-4SRA0720-14-F** | 71 | 720 | 112 | 144 | 1.8 | 2.4 |
| **F3SG-4SRB0720-14-F** | 71 | 720 | 87 | 107 | 1.8 | 2.4 |
| **F3SG-4SRA0760-14-F** | 75 | 760 | 115 | 147 | 1.9 | 2.5 |
| **F3SG-4SRB0760-14-F** | 75 | 760 | 89 | 108 | 1.9 | 2.5 |
| **F3SG-4SRA0800-14** | 79 | 800 | 118 | 150 | 2 | 2.6 |
| **F3SG-□SRB0800-14** | 79 | 800 | 90 | 109 | 2 | 2.6 |
| **F3SG-4SRA0840-14-F** | 83 | 840 | 121 | 153 | 2.1 | 2.7 |
| **F3SG-4SRB0840-14-F** | 83 | 840 | 91 | 109 | 2.1 | 2.7 |
| **F3SG-4SRA0880-14-F** | 87 | 880 | 124 | 155 | 2.2 | 2.8 |
| **F3SG-4SRB0880-14-F** | 87 | 880 | 93 | 110 | 2.2 | 2.8 |
| **F3SG-4SRA0920-14-F** | 91 | 920 | 128 | 158 | 2.3 | 3 |
| **F3SG-4SRB0920-14-F** | 91 | 920 | 94 | 111 | 2.3 | 3 |
| **F3SG-4SRA0960-14-F** | 95 | 960 | 131 | 161 | 2.4 | 3.1 |
| **F3SG-4SRB0960-14-F** | 95 | 960 | 95 | 112 | 2.4 | 3.1 |
| **F3SG-4SRA1000-14** | 99 | 1000 | 134 | 164 | 2.5 | 3.2 |
| **F3SG-□SRB1000-14** | 99 | 1000 | 97 | 112 | 2.5 | 3.2 |
| **F3SG-4SRA1200-14** | 119 | 1200 | 150 | 178 | 3.1 | 3.8 |
| **F3SG-□SRB1200-14** | 119 | 1200 | 103 | 116 | 3.1 | 3.8 |
| **F3SG-4SRA1400-14** | 139 | 1400 | 165 | 191 | 3.6 | 4.3 |
| **F3SG-□SRB1400-14** | 139 | 1400 | 110 | 120 | 3.6 | 4.3 |
| **F3SG-4SRA1600-14** | 159 | 1600 | 181 | 205 | 4.1 | 4.9 |
| **F3SG-□SRB1600-14** | 159 | 1600 | 117 | 124 | 4.1 | 4.9 |
| **F3SG-4SRA1800-14** | 179 | 1800 | 197 | 219 | 4.6 | 5.5 |
| **F3SG-□SRB1800-14** | 179 | 1800 | 124 | 128 | 4.6 | 5.5 |
| **F3SG-4SRA2000-14** | 199 | 2000 | 212 | 233 | 5.1 | 6.1 |
| **F3SG-□SRB2000-14** | 199 | 2000 | 130 | 131 | 5.1 | 6.1 |

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

## Hand protection (Detection capability: 25-mm dia.)

### Models and Response Times

| Model | | Number of beams | Protective height [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|---|
| | | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4SR□0160-25 | F3SG-2SRB0160-25 | 8 | 160 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0200-25-F | --- | 10 | 200 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0240-25 | F3SG-2SRB0240-25 | 12 | 240 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0280-25-F | --- | 14 | 280 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0320-25 | F3SG-2SRB0320-25 | 16 | 320 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0360-25-F | --- | 18 | 360 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0400-25 | F3SG-2SRB0400-25 | 20 | 400 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0440-25-F | --- | 22 | 440 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0480-25 | F3SG-2SRB0480-25 | 24 | 480 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0520-25-F | --- | 26 | 520 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0560-25 | F3SG-2SRB0560-25 | 28 | 560 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0600-25-F | --- | 30 | 600 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0640-25 | F3SG-2SRB0640-25 | 32 | 640 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0680-25-F | --- | 34 | 680 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0720-25 | F3SG-2SRB0720-25 | 36 | 720 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0760-25-F | --- | 38 | 760 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0800-25 | F3SG-2SRB0800-25 | 40 | 800 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0840-25-F | --- | 42 | 840 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0880-25 | F3SG-2SRB0880-25 | 44 | 880 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0920-25-F | --- | 46 | 920 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□0960-25 | F3SG-2SRB0960-25 | 48 | 960 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1000-25-F | --- | 50 | 1000 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1040-25 | F3SG-2SRB1040-25 | 52 | 1040 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1120-25 | F3SG-2SRB1120-25 | 56 | 1120 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1200-25 | F3SG-2SRB1200-25 | 60 | 1200 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1280-25 | F3SG-2SRB1280-25 | 64 | 1280 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1360-25 | F3SG-2SRB1360-25 | 68 | 1360 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1440-25 | F3SG-2SRB1440-25 | 72 | 1440 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1520-25 | F3SG-2SRB1520-25 | 76 | 1520 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1600-25 | F3SG-2SRB1600-25 | 80 | 1600 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1680-25 | F3SG-2SRB1680-25 | 84 | 1680 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1760-25 | F3SG-2SRB1760-25 | 88 | 1760 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1840-25 | F3SG-2SRB1840-25 | 92 | 1840 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□1920-25 | F3SG-2SRB1920-25 | 96 | 1920 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□2080-25 | F3SG-2SRB2080-25 | 104 | 2080 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□2280-25 | F3SG-2SRB2280-25 | 114 | 2280 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SR□2480-25 | F3SG-2SRB2480-25 | 124 | 2480 | 13 | 65 | 165 | 17 | 85 |

**Note: 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 of "Optical synchronization" are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.

## Models, Current Consumption and Weight

| Model | Number of beams | Protective height [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| **F3SG-4SRA0160-25** | 8 | 160 | 63 | 105 | 0.4 | 0.8 |
| **F3SG-□SRB0160-25** | 8 | 160 | 61 | 96 | 0.4 | 0.8 |
| **F3SG-4SRA0200-25-F** | 10 | 200 | 65 | 108 | 0.5 | 0.9 |
| **F3SG-4SRB0200-25-F** | 10 | 200 | 62 | 96 | 0.5 | 0.9 |
| **F3SG-4SRA0240-25** | 12 | 240 | 68 | 110 | 0.6 | 1 |
| **F3SG-□SRB0240-25** | 12 | 240 | 63 | 97 | 0.6 | 1 |
| **F3SG-4SRA0280-25-F** | 14 | 280 | 71 | 112 | 0.7 | 1.1 |
| **F3SG-4SRB0280-25-F** | 14 | 280 | 64 | 97 | 0.7 | 1.1 |
| **F3SG-4SRA0320-25** | 16 | 320 | 74 | 115 | 0.8 | 1.2 |
| **F3SG-□SRB0320-25** | 16 | 320 | 65 | 97 | 0.8 | 1.2 |
| **F3SG-4SRA0360-25-F** | 18 | 360 | 76 | 117 | 0.9 | 1.4 |
| **F3SG-4SRB0360-25-F** | 18 | 360 | 65 | 98 | 0.9 | 1.4 |
| **F3SG-4SRA0400-25** | 20 | 400 | 79 | 119 | 1 | 1.5 |
| **F3SG-□SRB0400-25** | 20 | 400 | 66 | 98 | 1 | 1.5 |
| **F3SG-4SRA0440-25-F** | 22 | 440 | 82 | 121 | 1.1 | 1.6 |
| **F3SG-4SRB0440-25-F** | 22 | 440 | 67 | 98 | 1.1 | 1.6 |
| **F3SG-4SRA0480-25** | 24 | 480 | 84 | 124 | 1.2 | 1.7 |
| **F3SG-□SRB0480-25** | 24 | 480 | 68 | 99 | 1.2 | 1.7 |
| **F3SG-4SRA0520-25-F** | 26 | 520 | 87 | 126 | 1.3 | 1.8 |
| **F3SG-4SRB0520-25-F** | 26 | 520 | 69 | 99 | 1.3 | 1.8 |
| **F3SG-4SRA0560-25** | 28 | 560 | 90 | 128 | 1.4 | 1.9 |
| **F3SG-□SRB0560-25** | 28 | 560 | 70 | 99 | 1.4 | 1.9 |
| **F3SG-4SRA0600-25-F** | 30 | 600 | 92 | 131 | 1.5 | 2.1 |
| **F3SG-4SRB0600-25-F** | 30 | 600 | 71 | 100 | 1.5 | 2.1 |
| **F3SG-4SRA0640-25** | 32 | 640 | 95 | 133 | 1.6 | 2.2 |
| **F3SG-□SRB0640-25** | 32 | 640 | 72 | 100 | 1.6 | 2.2 |
| **F3SG-4SRA0680-25-F** | 34 | 680 | 98 | 135 | 1.7 | 2.3 |
| **F3SG-4SRB0680-25-F** | 34 | 680 | 73 | 100 | 1.7 | 2.3 |
| **F3SG-4SRA0720-25** | 36 | 720 | 100 | 137 | 1.8 | 2.4 |
| **F3SG-□SRB0720-25** | 36 | 720 | 74 | 101 | 1.8 | 2.4 |
| **F3SG-4SRA0760-25-F** | 38 | 760 | 103 | 140 | 1.9 | 2.5 |
| **F3SG-4SRB0760-25-F** | 38 | 760 | 75 | 101 | 1.9 | 2.5 |
| **F3SG-4SRA0800-25** | 40 | 800 | 106 | 142 | 2 | 2.6 |
| **F3SG-□SRB0800-25** | 40 | 800 | 76 | 101 | 2 | 2.6 |
| **F3SG-4SRA0840-25-F** | 42 | 840 | 109 | 144 | 2.1 | 2.7 |
| **F3SG-4SRB0840-25-F** | 42 | 840 | 77 | 101 | 2.1 | 2.7 |
| **F3SG-4SRA0880-25** | 44 | 880 | 111 | 147 | 2.2 | 2.8 |
| **F3SG-□SRB0880-25** | 44 | 880 | 78 | 102 | 2.2 | 2.8 |
| **F3SG-4SRA0920-25-F** | 46 | 920 | 114 | 149 | 2.3 | 3 |
| **F3SG-4SRB0920-25-F** | 46 | 920 | 79 | 102 | 2.3 | 3 |
| **F3SG-4SRA0960-25** | 48 | 960 | 117 | 151 | 2.4 | 3.1 |
| **F3SG-□SRB0960-25** | 48 | 960 | 80 | 102 | 2.4 | 3.1 |
| **F3SG-4SRA1000-25-F** | 50 | 1000 | 119 | 154 | 2.5 | 3.2 |
| **F3SG-4SRB1000-25-F** | 50 | 1000 | 81 | 103 | 2.5 | 3.2 |
| **F3SG-4SRA1040-25** | 52 | 1040 | 122 | 156 | 2.6 | 3.3 |
| **F3SG-□SRB1040-25** | 52 | 1040 | 82 | 103 | 2.6 | 3.3 |
| **F3SG-4SRA1120-25** | 56 | 1120 | 127 | 160 | 2.9 | 3.5 |
| **F3SG-□SRB1120-25** | 56 | 1120 | 84 | 104 | 2.9 | 3.5 |
| **F3SG-4SRA1200-25** | 60 | 1200 | 133 | 165 | 3.1 | 3.8 |
| **F3SG-□SRB1200-25** | 60 | 1200 | 86 | 104 | 3.1 | 3.8 |
| **F3SG-4SRA1280-25** | 64 | 1280 | 138 | 170 | 3.3 | 4 |
| **F3SG-□SRB1280-25** | 64 | 1280 | 88 | 105 | 3.3 | 4 |
| **F3SG-4SRA1360-25** | 68 | 1360 | 144 | 174 | 3.5 | 4.2 |
| **F3SG-□SRB1360-25** | 68 | 1360 | 90 | 106 | 3.5 | 4.2 |

| Model | Number of beams | Protective height [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| **F3SG-4SRA1440-25** | 72 | 1440 | 149 | 179 | 3.7 | 4.4 |
| **F3SG-□SRB1440-25** | 72 | 1440 | 92 | 106 | 3.7 | 4.4 |
| **F3SG-4SRA1520-25** | 76 | 1520 | 154 | 183 | 3.9 | 4.7 |
| **F3SG-□SRB1520-25** | 76 | 1520 | 93 | 107 | 3.9 | 4.7 |
| **F3SG-4SRA1600-25** | 80 | 1600 | 160 | 188 | 4.1 | 4.9 |
| **F3SG-□SRB1600-25** | 80 | 1600 | 95 | 107 | 4.1 | 4.9 |
| **F3SG-4SRA1680-25** | 84 | 1680 | 165 | 192 | 4.3 | 5.2 |
| **F3SG-□SRB1680-25** | 84 | 1680 | 97 | 108 | 4.3 | 5.2 |
| **F3SG-4SRA1760-25** | 88 | 1760 | 170 | 197 | 4.5 | 5.4 |
| **F3SG-□SRB1760-25** | 88 | 1760 | 99 | 109 | 4.5 | 5.4 |
| **F3SG-4SRA1840-25** | 92 | 1840 | 176 | 202 | 4.7 | 5.6 |
| **F3SG-□SRB1840-25** | 92 | 1840 | 101 | 109 | 4.7 | 5.6 |
| **F3SG-4SRA1920-25** | 96 | 1920 | 181 | 206 | 4.9 | 5.8 |
| **F3SG-□SRB1920-25** | 96 | 1920 | 103 | 110 | 4.9 | 5.8 |
| **F3SG-4SRA2080-25** | 104 | 2080 | 192 | 215 | 5.3 | 6.3 |
| **F3SG-□SRB2080-25** | 104 | 2080 | 107 | 111 | 5.3 | 6.3 |
| **F3SG-4SRA2280-25** | 114 | 2280 | 205 | 227 | 5.8 | 6.9 |
| **F3SG-□SRB2280-25** | 114 | 2280 | 112 | 113 | 5.8 | 6.9 |
| **F3SG-4SRA2480-25** | 124 | 2480 | 219 | 238 | 6.3 | 7.4 |
| **F3SG-□SRB2480-25** | 124 | 2480 | 117 | 114 | 6.3 | 7.4 |

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

## Arm/leg protection (Detection capability: 45-mm dia.)

### Models and Response Times

| Model | | Number of beams | Protective height [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|---|
| | | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4SR□0240-45 | F3SG-2SRB0240-45 | 6 | 240 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0400-45 | F3SG-2SRB0400-45 | 10 | 400 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0560-45 | F3SG-2SRB0560-45 | 14 | 560 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0720-45 | F3SG-2SRB0720-45 | 18 | 720 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0880-45 | F3SG-2SRB0880-45 | 22 | 880 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□1200-45 | F3SG-2SRB1200-45 | 30 | 1200 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□1520-45 | F3SG-2SRB1520-45 | 38 | 1520 | 8 | 40 | 140 | 10 | 50 |

**Note: 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 of "Optical synchronization" are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.

### Models, Current Consumption and Weight

| Model | Number of beams | Protective height [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| F3SG-4SRA0240-45 | 6 | 240 | 60 | 107 | 0.6 | 1.0 |
| F3SG-□SRB0240-45 | 6 | 240 | 52 | 95 | 0.6 | 1.0 |
| F3SG-4SRA0400-45 | 10 | 400 | 71 | 116 | 1 | 1.5 |
| F3SG-□SRB0400-45 | 10 | 400 | 56 | 95 | 1 | 1.5 |
| F3SG-4SRA0560-45 | 14 | 560 | 82 | 124 | 1.4 | 1.9 |
| F3SG-□SRB0560-45 | 14 | 560 | 60 | 96 | 1.4 | 1.9 |
| F3SG-4SRA0720-45 | 18 | 720 | 93 | 133 | 1.8 | 2.4 |
| F3SG-□SRB0720-45 | 18 | 720 | 64 | 96 | 1.8 | 2.4 |
| F3SG-4SRA0880-45 | 22 | 880 | 104 | 141 | 2.2 | 2.8 |
| F3SG-□SRB0880-45 | 22 | 880 | 68 | 97 | 2.2 | 2.8 |
| F3SG-4SRA1200-45 | 30 | 1200 | 125 | 158 | 3.1 | 3.8 |
| F3SG-□SRB1200-45 | 30 | 1200 | 75 | 98 | 3.1 | 3.8 |
| F3SG-4SRA1520-45 | 38 | 1520 | 147 | 175 | 3.9 | 4.7 |
| F3SG-□SRB1520-45 | 38 | 1520 | 83 | 99 | 3.9 | 4.7 |

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

## Body protection (Detection capability: 85-mm dia.)

### Models and Response Times

| Model | | Number of beams | Protective height [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|---|
| | | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4SR□0280-85 | F3SG-2SRB0280-85 | 4 | 280 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0440-85 | F3SG-2SRB0440-85 | 6 | 440 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0600-85 | F3SG-2SRB0600-85 | 8 | 600 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0760-85 | F3SG-2SRB0760-85 | 10 | 760 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SR□0920-85 | F3SG-2SRB0920-85 | 12 | 920 | 8 | 40 | 140 | 10 | 50 |

**Note: 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 of "Optical synchronization" are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.

### Models, Current Consumption and Weight

| Model | Number of beams | Protective height [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| F3SG-4SRA0280-85 | 4 | 280 | 63 | 111 | 0.7 | 1.1 |
| F3SG-□SRB0280-85 | 4 | 280 | 50 | 95 | 0.7 | 1.1 |
| F3SG-4SRA0440-85 | 6 | 440 | 72 | 120 | 1.1 | 1.6 |
| F3SG-□SRB0440-85 | 6 | 440 | 52 | 95 | 1.1 | 1.6 |
| F3SG-4SRA0600-85 | 8 | 600 | 81 | 128 | 1.5 | 2.1 |
| F3SG-□SRB0600-85 | 8 | 600 | 54 | 96 | 1.5 | 2.1 |
| F3SG-4SRA0760-85 | 10 | 760 | 91 | 136 | 1.9 | 2.5 |
| F3SG-□SRB0760-85 | 10 | 760 | 56 | 96 | 1.9 | 2.5 |
| F3SG-4SRA0920-85 | 12 | 920 | 100 | 145 | 2.3 | 3.0 |
| F3SG-□SRB0920-85 | 12 | 920 | 58 | 96 | 2.3 | 3.0 |

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

## F3SG-PG

## Perimeter access guarding (Operating range: 20 m)

### Models and Response Times

| Model | Number of beams | Beam gap [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|
| | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4PGA0670-2A | 2 | 500 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4PGA0970-3A | 3 | 400 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4PGA1070-4A | 4 | 300 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4PGA1370-4A | 4 | 400 | 8 | 40 | 140 | 10 | 50 |

### Models, Current Consumption and Weight

| Model | Number of beams | Beam gap [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| F3SG-4PGA0670-2A | 2 | 500 | 45 | 120 | 1.7 | 2.2 |
| F3SG-4PGA0970-3A | 3 | 400 | 55 | 130 | 2.5 | 3.1 |
| F3SG-4PGA1070-4A | 4 | 300 | 65 | 140 | 2.7 | 3.3 |
| F3SG-4PGA1370-4A | 4 | 400 | 65 | 140 | 3.5 | 4.2 |

## Perimeter guarding long range (operating range: 70 m)

### Models and Response Times

| Model | Number of beams | Beam gap [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|
| | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4PGA0670-2L | 2 | 500 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4PGA0970-3L | 3 | 400 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4PGA1070-4L | 4 | 300 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4PGA1370-4L | 4 | 400 | 8 | 40 | 140 | 10 | 50 |

### Models, Current Consumption and Weight

| Model | Number of beams | Beam gap [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| F3SG-4PGA0670-2L | 2 | 500 | 45 | 120 | 1.7 | 2.2 |
| F3SG-4PGA0970-3L | 3 | 400 | 55 | 130 | 2.5 | 3.1 |
| F3SG-4PGA1070-4L | 4 | 300 | 65 | 140 | 2.7 | 3.3 |
| F3SG-4PGA1370-4L | 4 | 400 | 65 | 140 | 3.5 | 4.2 |

## Perimeter guarding passive mirror (operating range: 5 m)

### Models and Response Times

| Model | Number of beams | Beam gap [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|
| | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4PGA0670-2C | 2 | 500 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4PGA1070-4C | 4 | 300 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4PGA1370-4C | 4 | 400 | 8 | 40 | 140 | 10 | 50 |

### Models, Current Consumption and Weight

| Model | Number of beams | Beam gap [mm] | Current consumption [mA] | Weight [kg] | |
|---|---|---|---|---|---|
| | | | Emitter/Receiver | Net | Gross |
| F3SG-4PGA0670-2C | 2 | 500 | 140 | 1.6 | 2.1 |
| F3SG-4PGA1070-4C | 4 | 300 | 150 | 2.6 | 3.2 |
| F3SG-4PGA1370-4C | 4 | 400 | 150 | 3.3 | 4.0 |

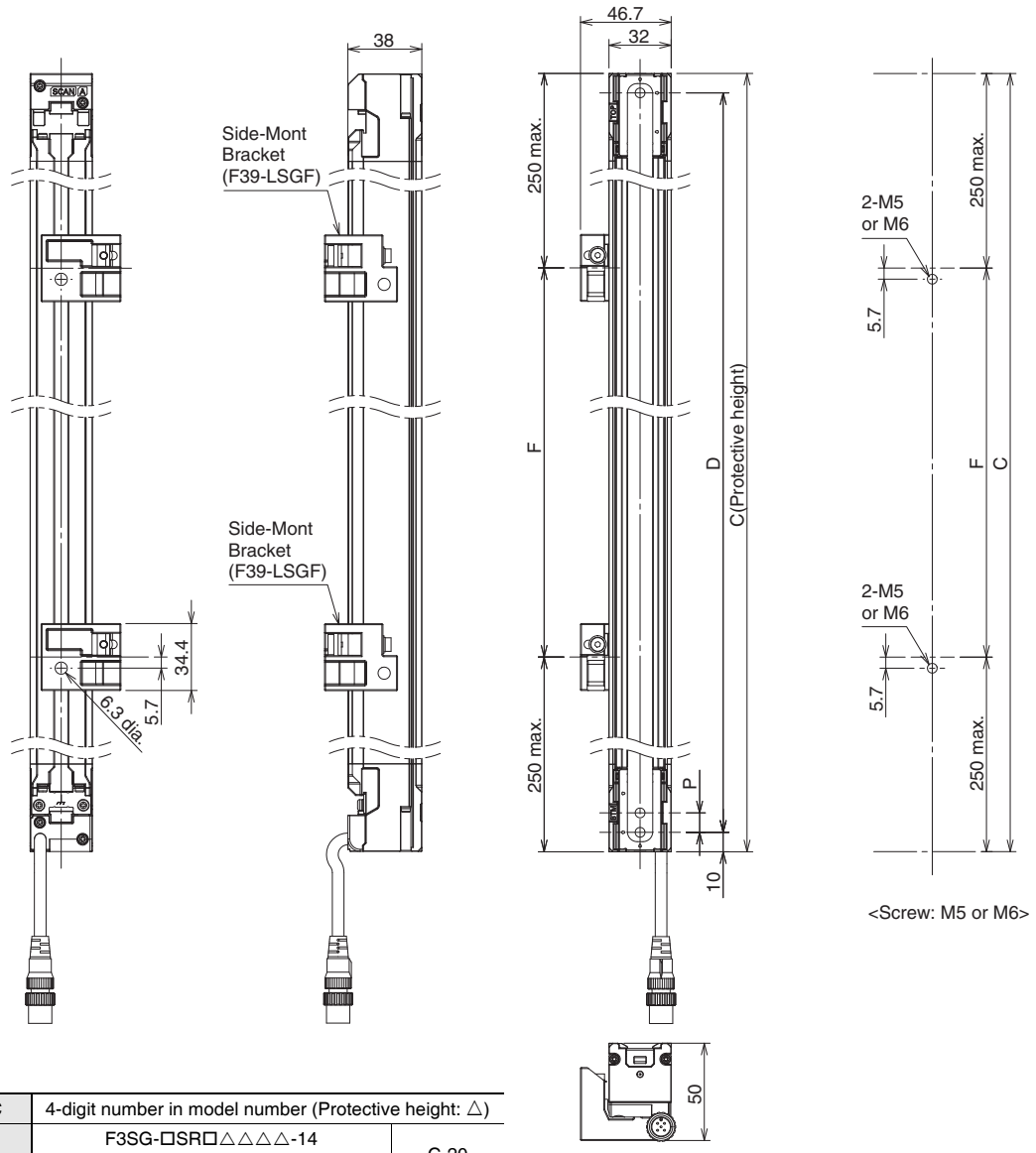
# Dimensions

(Unit: mm)

## F3SG-SR Main Unit

### Mounted with Side-Mount Brackets (Intermediate Brackets) (F39-LSGF)

**Backside Mounting**



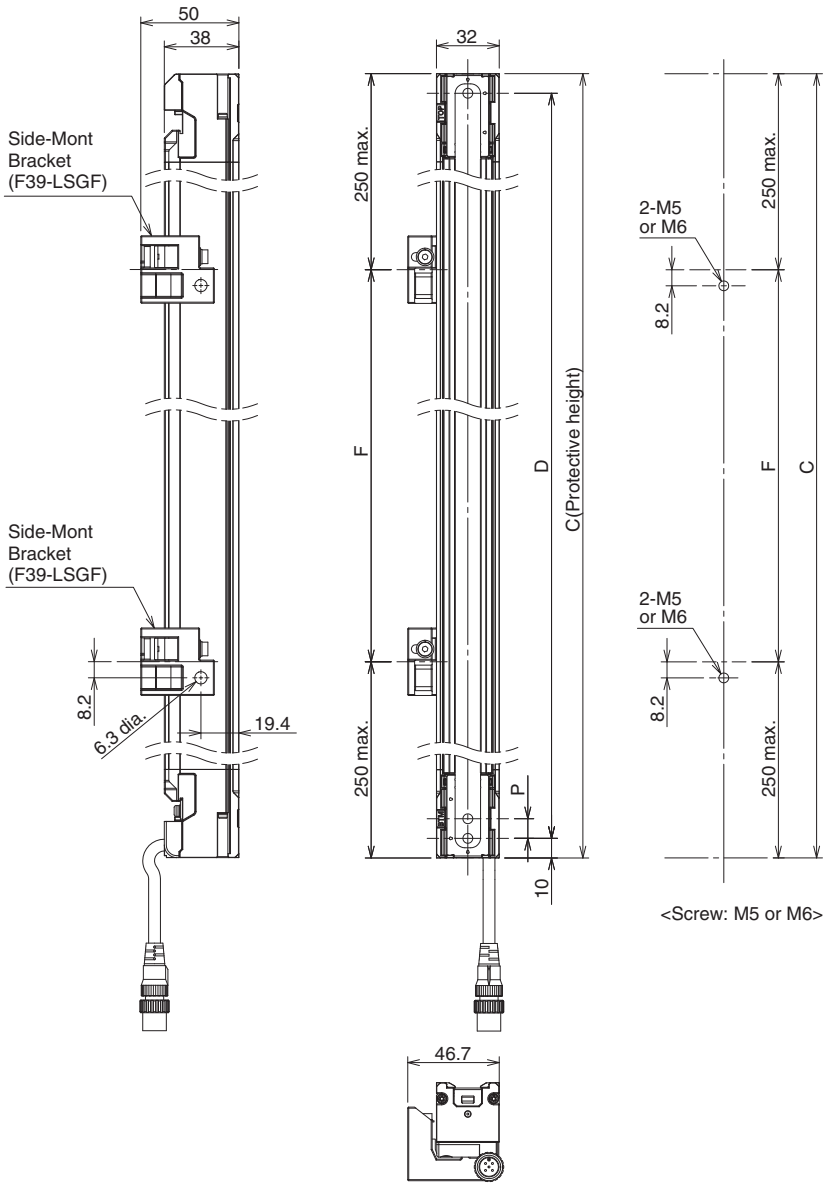

| Dimension C | 4-digit number in model number (Protective height: △) | |
|---|---|---|
| Dimension D | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△-25 | |
| | F3SG-□SR□△△△△-45 | C-40 |
| | F3SG-□SR□△△△△-85 | |
| Dimension P | F3SG-□SR□△△△△-14 | 10 |
| | F3SG-□SR□△△△△-25 | 20 |
| | F3SG-□SR□△△△△-45 | 40 |
| | F3SG-□SR□△△△△-85 | 80 |

| Protective height (Dimension C) | Number of Side-Mount Brackets ✻ | Dimension F |
|---|---|---|
| 0160 to 1440 | 2 | 1000 mm max. |
| 1520 to 2480 | 3 | 1000 mm max. |

✻ The number of brackets required to mount each unit (emitter, receiver).

## Mounted with Side-Mount Brackets (Intermediate Brackets) (F39-LSGF)

### Side Mounting



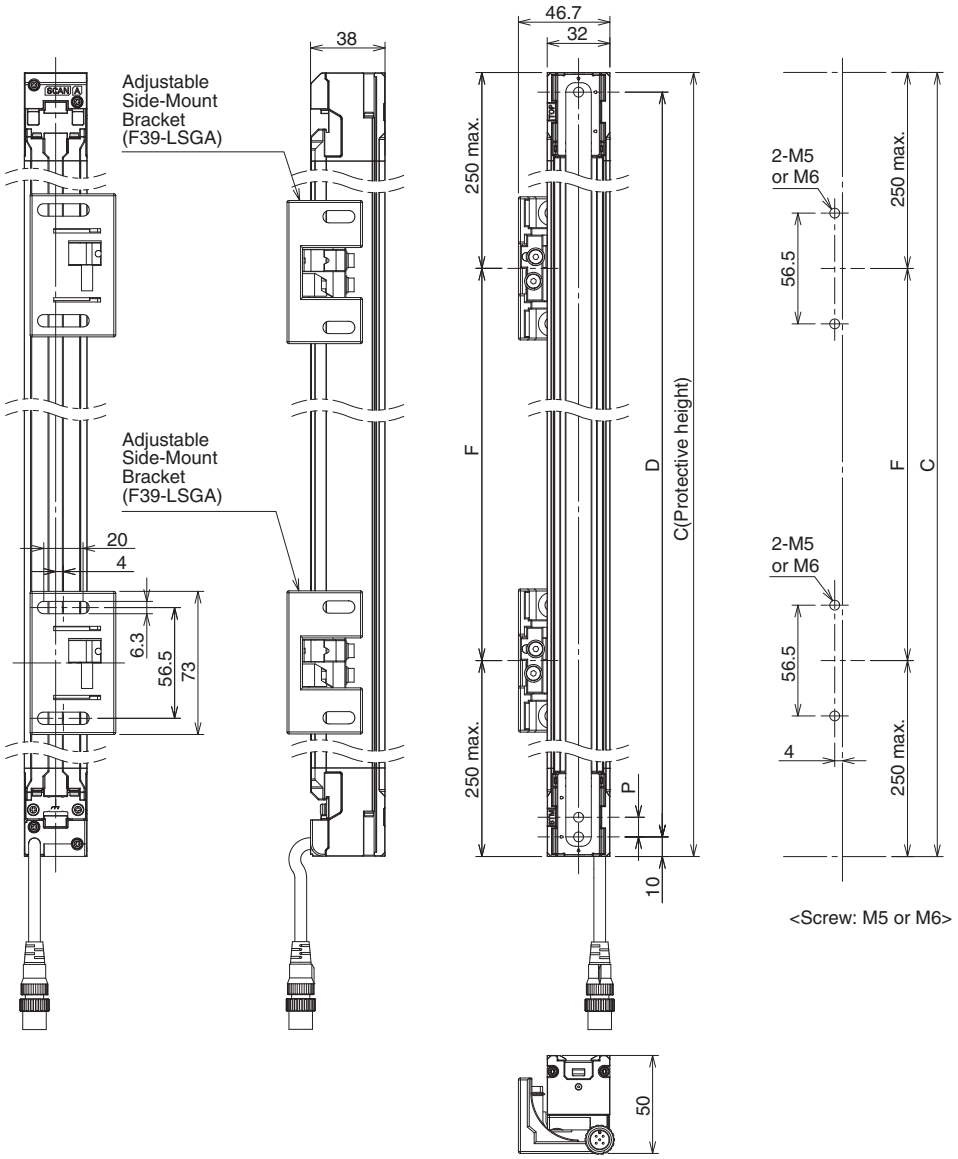

| Dimension C | 4-digit number in model number (Protective height: △) | |
|---|---|---|
| Dimension D | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△-25 | |
| | F3SG-□SR□△△△△-45 | C-40 |
| | F3SG-□SR□△△△△-85 | |
| Dimension P | F3SG-□SR□△△△△-14 | 10 |
| | F3SG-□SR□△△△△-25 | 20 |
| | F3SG-□SR□△△△△-45 | 40 |
| | F3SG-□SR□△△△△-85 | 80 |

| Protective height (Dimension C) | Number of Side-Mount Brackets ✻ | Dimension F |
|---|---|---|
| 0160 to 1440 | 2 | 1000 mm max. |
| 1520 to 2480 | 3 | 1000 mm max. |

✻ The number of brackets required to mount each unit (emitter, receiver).

## Mounted with Adjustable Side-Mount Brackets (Intermediate Brackets) (F39-LSGA)

### Backside Mounting



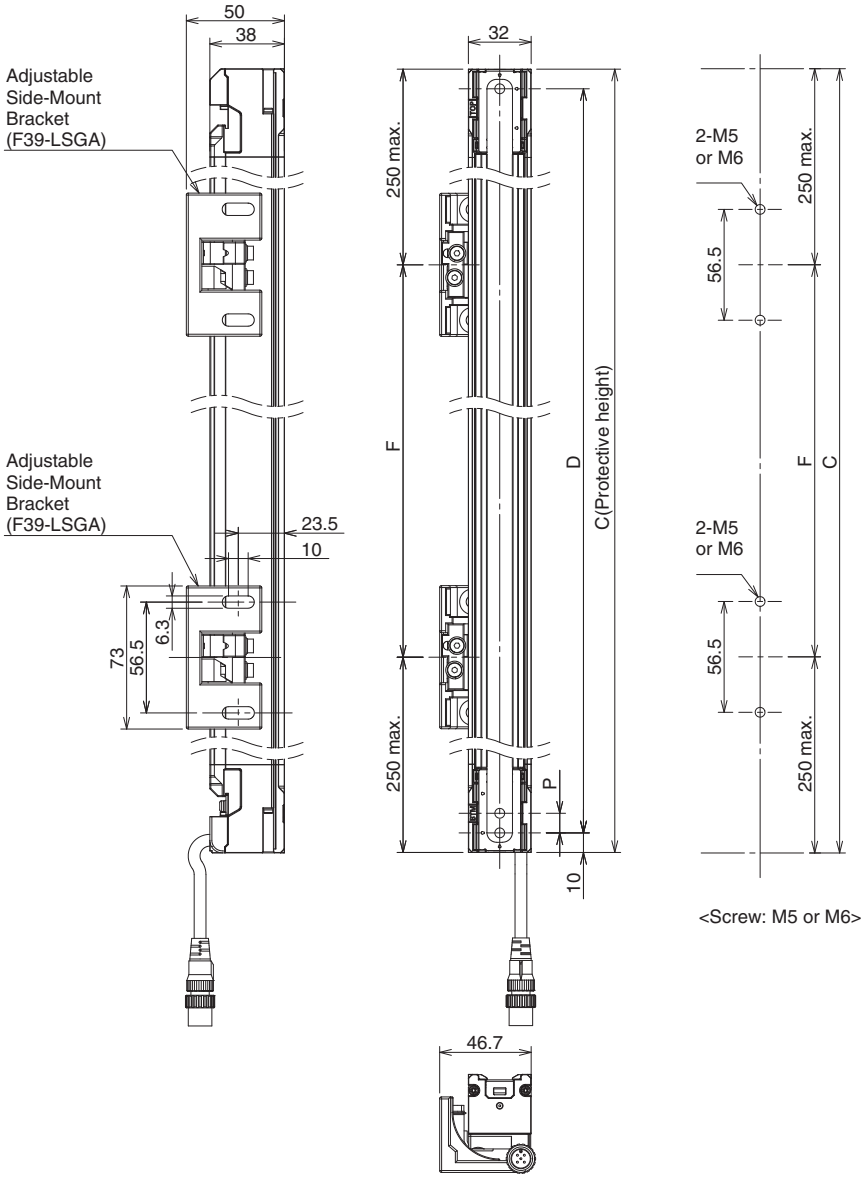

| Dimension C | 4-digit number in model number (Protective height: △) | |
|---|---|---|
| Dimension D | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△-25 | |
| | F3SG-□SR□△△△△-45 | C-40 |
| | F3SG-□SR□△△△△-85 | |
| Dimension P | F3SG-□SR□△△△△-14 | 10 |
| | F3SG-□SR□△△△△-25 | 20 |
| | F3SG-□SR□△△△△-45 | 40 |
| | F3SG-□SR□△△△△-85 | 80 |

| Protective height (Dimension C) | Number of Adjustable Side-Mount Brackets ✻ | Dimension F |
|---|---|---|
| 0160 to 0280 | 1 | 1000 mm max. |
| 0320 to 1440 | 2 | 1000 mm max. |
| 1520 to 2480 | 3 | 1000 mm max. |

✻ The number of brackets required to mount each unit (emitter, receiver).

## Mounted with Adjustable Side-Mount Brackets (Intermediate Brackets) (F39-LSGA)

### Side Mounting



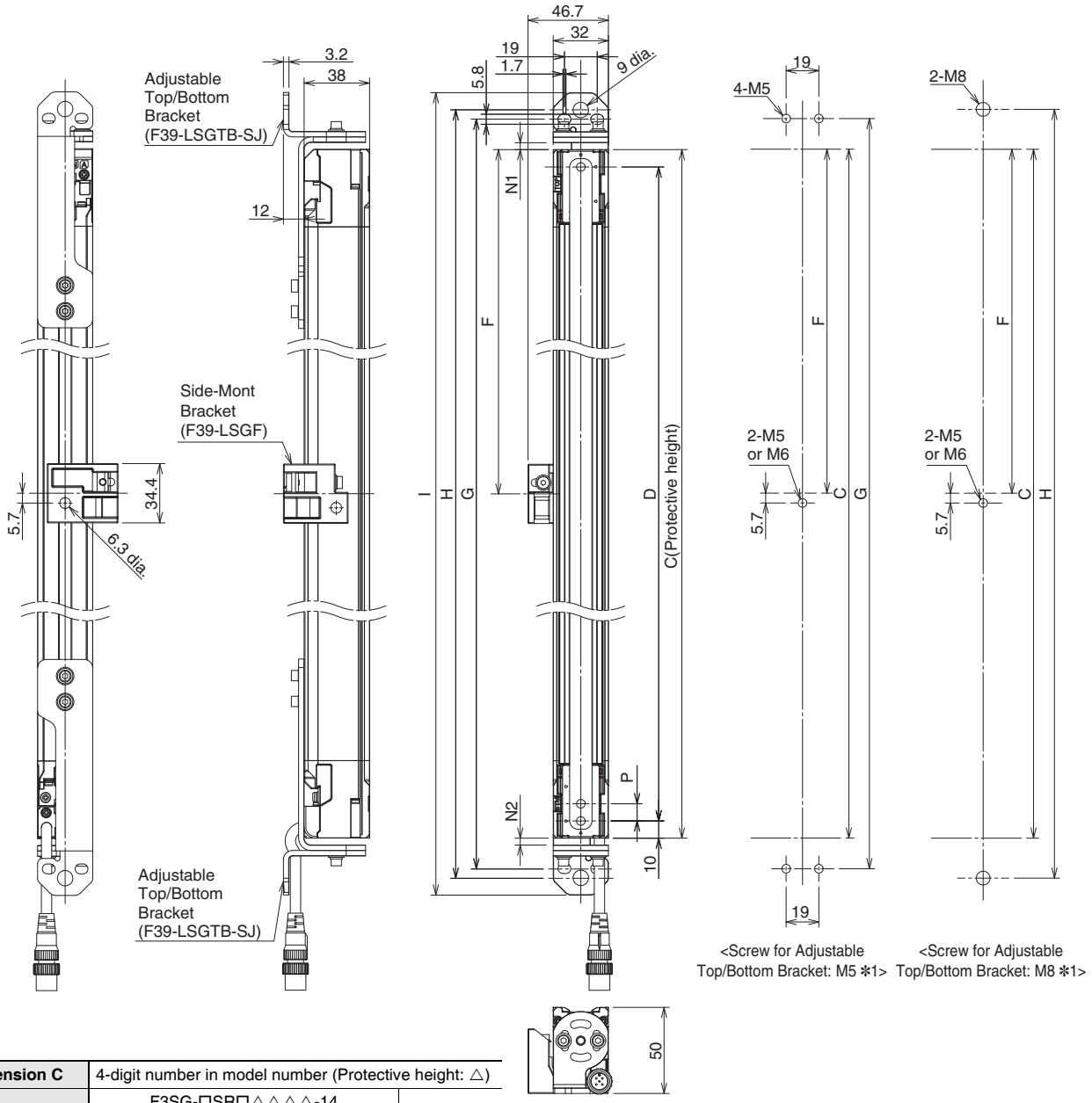

| Dimension C | 4-digit number in model number (Protective height: △) | |
|---|---|---|
| Dimension D | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△-25 | |
| | F3SG-□SR□△△△△-45 | C-40 |
| | F3SG-□SR□△△△△-85 | |
| Dimension P | F3SG-□SR□△△△△-14 | 10 |
| | F3SG-□SR□△△△△-25 | 20 |
| | F3SG-□SR□△△△△-45 | 40 |
| | F3SG-□SR□△△△△-85 | 80 |

| Protective height (Dimension C) | Number of Adjustable Side-Mount Brackets ✻ | Dimension F |
|---|---|---|
| 0160 to 0280 | 1 | 1000 mm max. |
| 0320 to 1440 | 2 | 1000 mm max. |
| 1520 to 2480 | 3 | 1000 mm max. |

✻ The number of brackets required to mount each unit (emitter, receiver).

## Mounted with Adjustable Top/Bottom Brackets (F3SJ, F3SN Adapter) (F39-LSGTB-SJ) and Side-Mount Brackets (Intermediate Brackets) (F39-LSGF)

### Backside Mounting



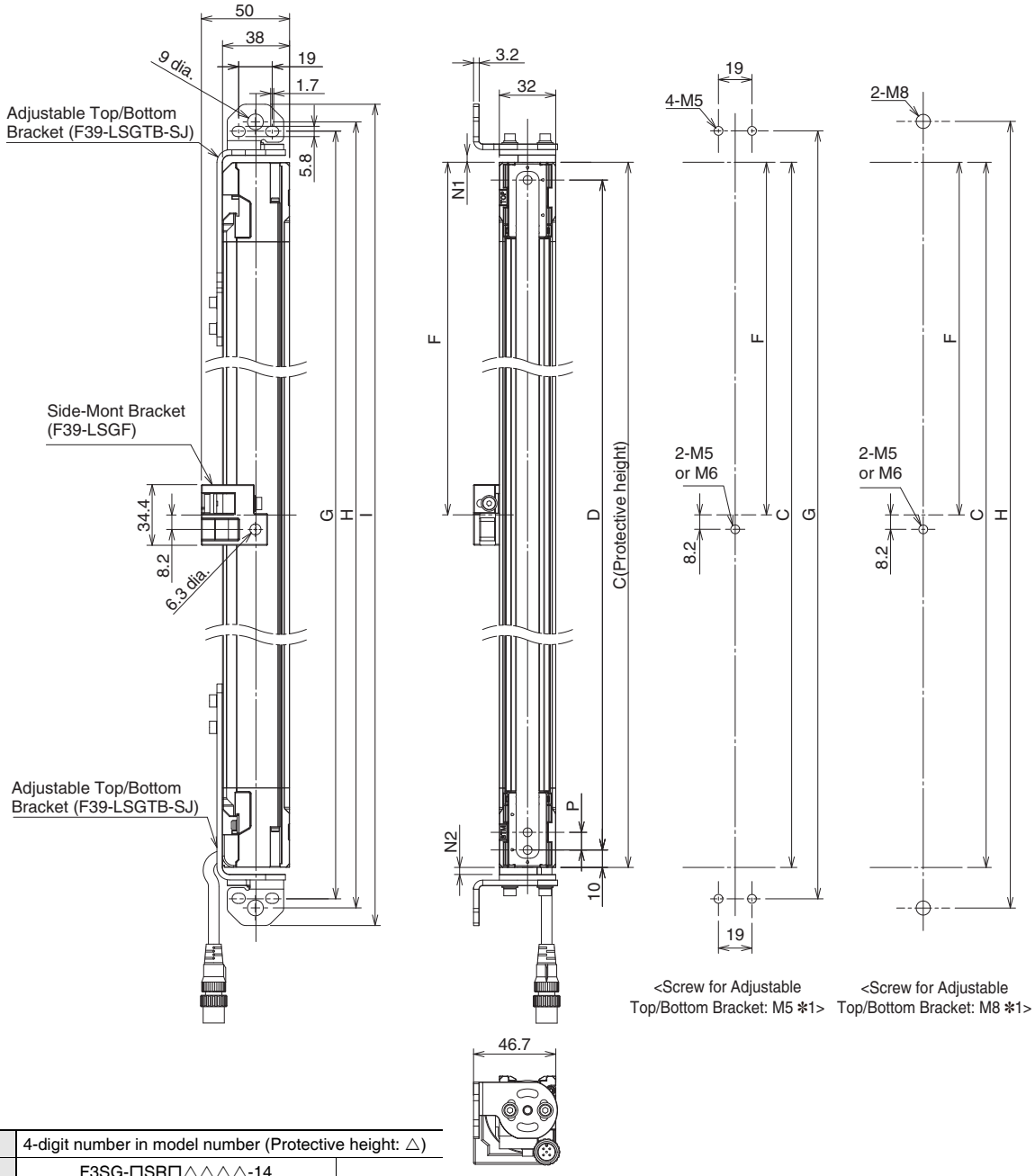

| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number (Protective height: △) | |
| **Dimension D** | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△25 | |
| | F3SG-□SR□△△△△-45 | C-40 |
| | F3SG-□SR□△△△△-85 | |
| **Dimension G** | C+27.2+N1+N2 | |
| **Dimension H** | C+38+N1+N2 | |
| **Dimension I** | C+58+N1+N2 | |
| **Dimension N1** | 0 to 30 ✻2 | |
| **Dimension N2** | 0 to 30 ✻2 | |
| **Dimension P** | F3SG-□SR□△△△△-14 | 10 |
| | F3SG-□SR□△△△△-25 | 20 |
| | F3SG-□SR□△△△△-45 | 40 |
| | F3SG-□SR□△△△△-85 | 80 |

| Protective height (Dimension C) | Number of Adjustable Top/Bottom Brackets ✻3 | Number of Intermediate Brackets ✻3 | Dimension F |
|---|---|---|---|
| 0160 to 0840 | 2 | 0 | --- |
| 0880 to1680 | 2 | 1 | 1000 mm max. |
| 1760 to 2480 | 2 | 2 | 1000 mm max. |

✻1. Side-Mount Bracket: M5 or M6
✻2. For the model with a protective height of 0160, the dimensions N1 and N2 are 20 to 30 mm.
✻3. The number of brackets required to mount each unit (emitter, receiver).

## Mounted with Adjustable Top/Bottom Brackets (F3SJ, F3SN Adapter) (F39-LSGTB-SJ) and Side-Mount Brackets (Intermediate Brackets) (F39-LSGF)

### Side Mounting



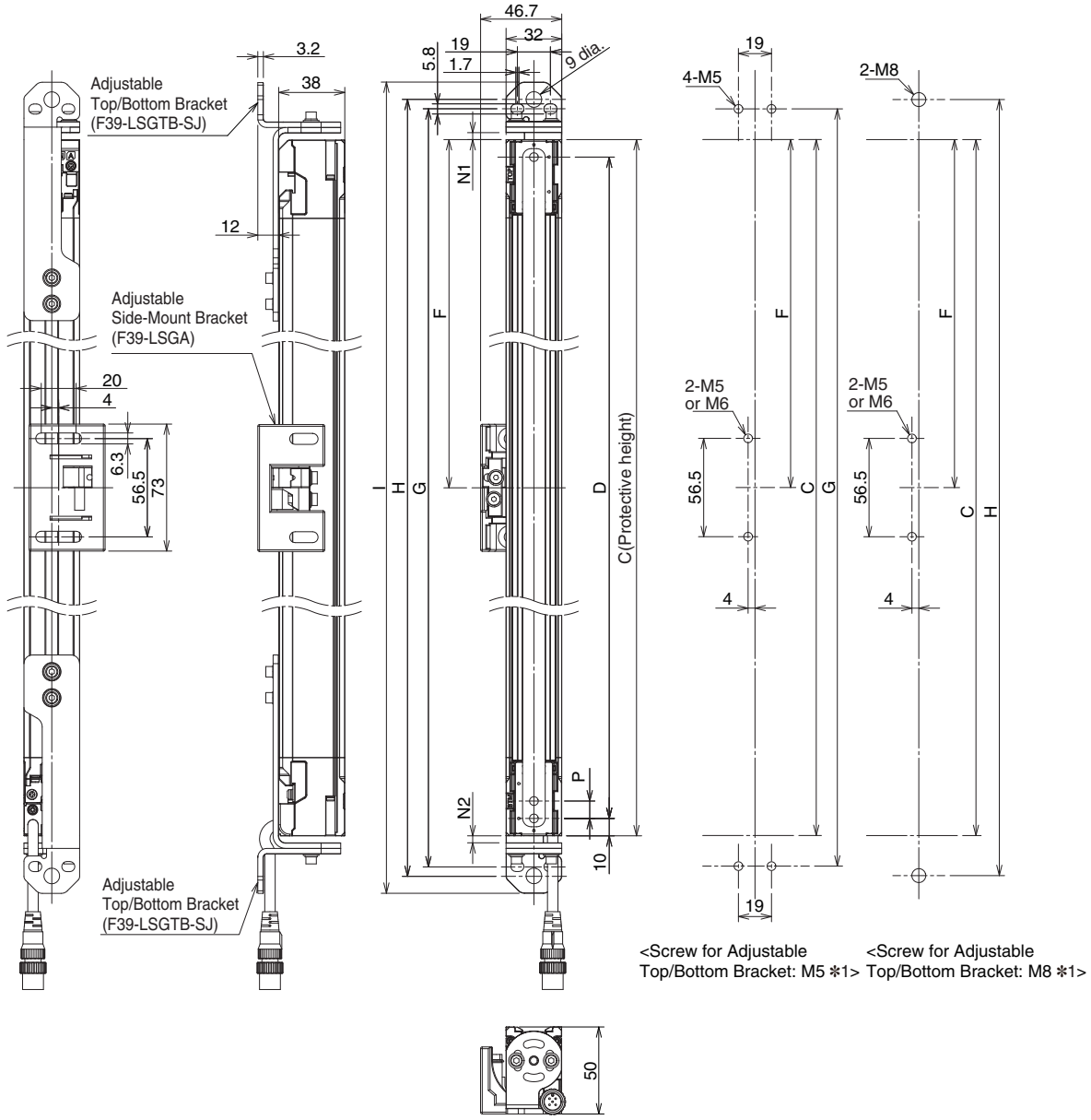

| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number (Protective height: △) | |
| **Dimension D** | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△25 | |
| | F3SG-□SR□△△△△-45 | C-40 |
| | F3SG-□SR□△△△△-85 | |
| **Dimension G** | C+27.2+N1+N2 | |
| **Dimension H** | C+38+N1+N2 | |
| **Dimension I** | C+58+N1+N2 | |
| **Dimension N1** | 0 to 30 ✻2 | |
| **Dimension N2** | 0 to 30 ✻2 | |
| **Dimension P** | F3SG-□SR□△△△△-14 | 10 |
| | F3SG-□SR□△△△△-25 | 20 |
| | F3SG-□SR□△△△△-45 | 40 |
| | F3SG-□SR□△△△△-85 | 80 |

| Protective height (Dimension C) | Number of Adjustable Top/Bottom Brackets ✻3 | Number of Intermediate Brackets ✻3 | Dimension F |
|---|---|---|---|
| 0160 to 0840 | 2 | 0 | --- |
| 0880 to1680 | 2 | 1 | 1000 mm max. |
| 1760 to 2480 | 2 | 2 | 1000 mm max. |

✻1. Side-Mount Bracket: M5 or M6
✻2. For the model with a protective height of 0160, the dimensions N1 and N2 are 20 to 30 mm.
✻3. The number of brackets required to mount each unit (emitter, receiver).

## Mounted with Adjustable Top/Bottom Brackets (F3SJ, F3SN Adapter) (F39-LSGTB-SJ) and Adjustable Side-Mount Brackets (Intermediate Brackets) (F39-LSGA)

**Backside Mounting**



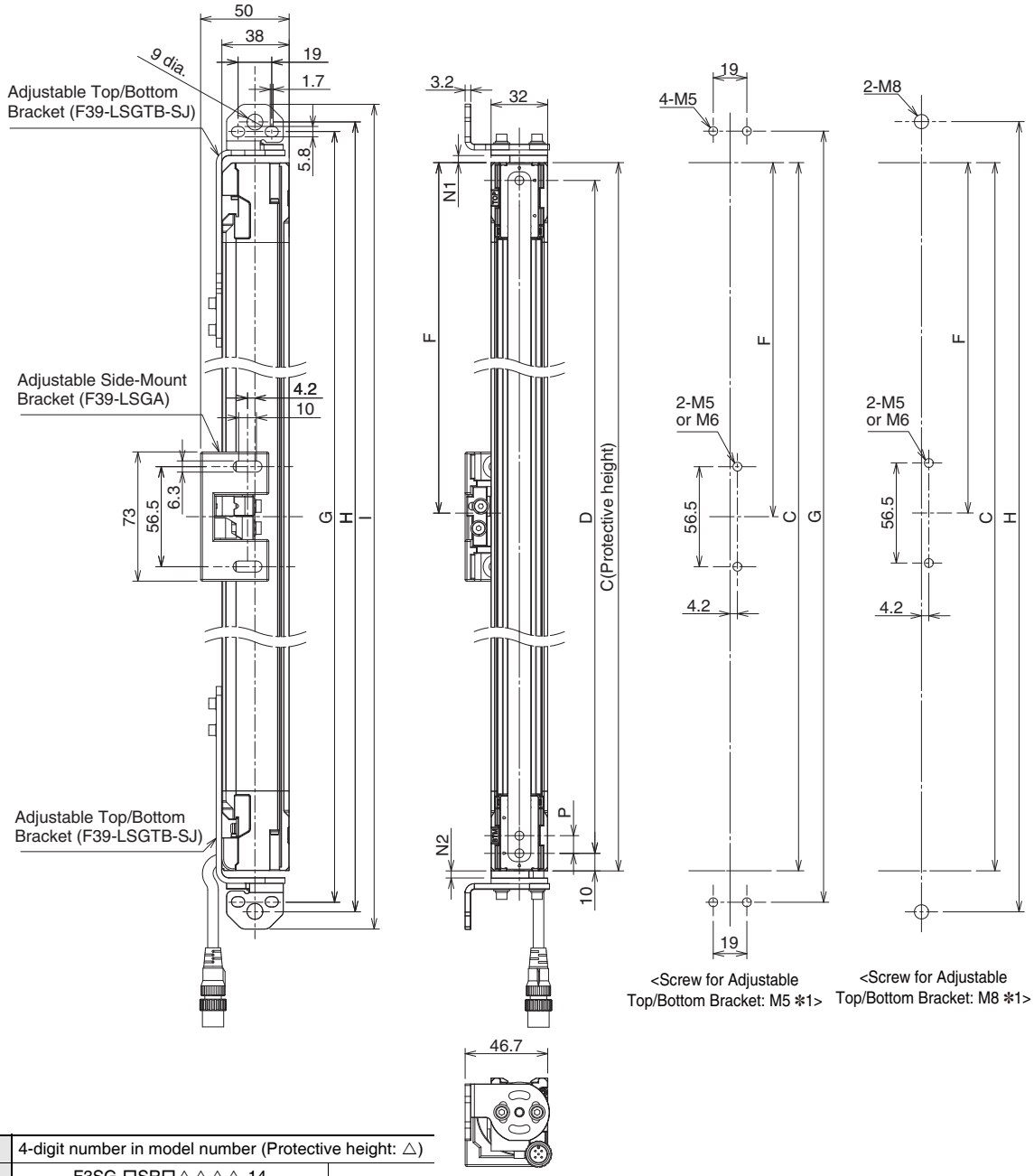

| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number (Protective height: △) | |
| **Dimension D** | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△25 | |
| | F3SG-□SR□△△△△-45 | C-40 |
| | F3SG-□SR□△△△△-85 | |
| **Dimension G** | C+27.2+N1+N2 | |
| **Dimension H** | C+38+N1+N2 | |
| **Dimension I** | C+58+N1+N2 | |
| **Dimension N1** | 0 to 30 ✻2 | |
| **Dimension N2** | 0 to 30 ✻2 | |
| **Dimension P** | F3SG-□SR□△△△△-14 | 10 |
| | F3SG-□SR□△△△△-25 | 20 |
| | F3SG-□SR□△△△△-45 | 40 |
| | F3SG-□SR□△△△△-85 | 80 |

| Protective height (Dimension C) | Number of Adjustable Top/Bottom Brackets ✻3 | Number of Intermediate Brackets ✻3 | Dimension F |
|---|---|---|---|
| 0160 to 0840 | 2 | 0 | --- |
| 0880 to1680 | 2 | 1 | 1000 mm max. |
| 1760 to 2480 | 2 | 2 | 1000 mm max. |

✻1. Adjustable Side-Mount Bracket: M5 or M6
✻2. For the model with a protective height of 0160, the dimensions N1 and N2 are 20 to 30 mm.
✻3. The number of brackets required to mount each unit (emitter, receiver).

## Mounted with Adjustable Top/Bottom Brackets (F3SJ, F3SN Adapter) (F39-LSGTB-SJ) and Adjustable Side-Mount Brackets (Intermediate Brackets) (F39-LSGA)

### Side Mounting




| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number (Protective height: △) | |
| **Dimension D** | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△25 | |
| | F3SG-□SR□△△△△-45 | C-40 |
| | F3SG-□SR□△△△△-85 | |
| **Dimension G** | C+27.2+N1+N2 | |
| **Dimension H** | C+38+N1+N2 | |
| **Dimension I** | C+58+N1+N2 | |
| **Dimension N1** | 0 to 30 ✻2 | |
| **Dimension N2** | 0 to 30 ✻2 | |
| **Dimension P** | F3SG-□SR□△△△△-14 | 10 |
| | F3SG-□SR□△△△△-25 | 20 |
| | F3SG-□SR□△△△△-45 | 40 |
| | F3SG-□SR□△△△△-85 | 80 |

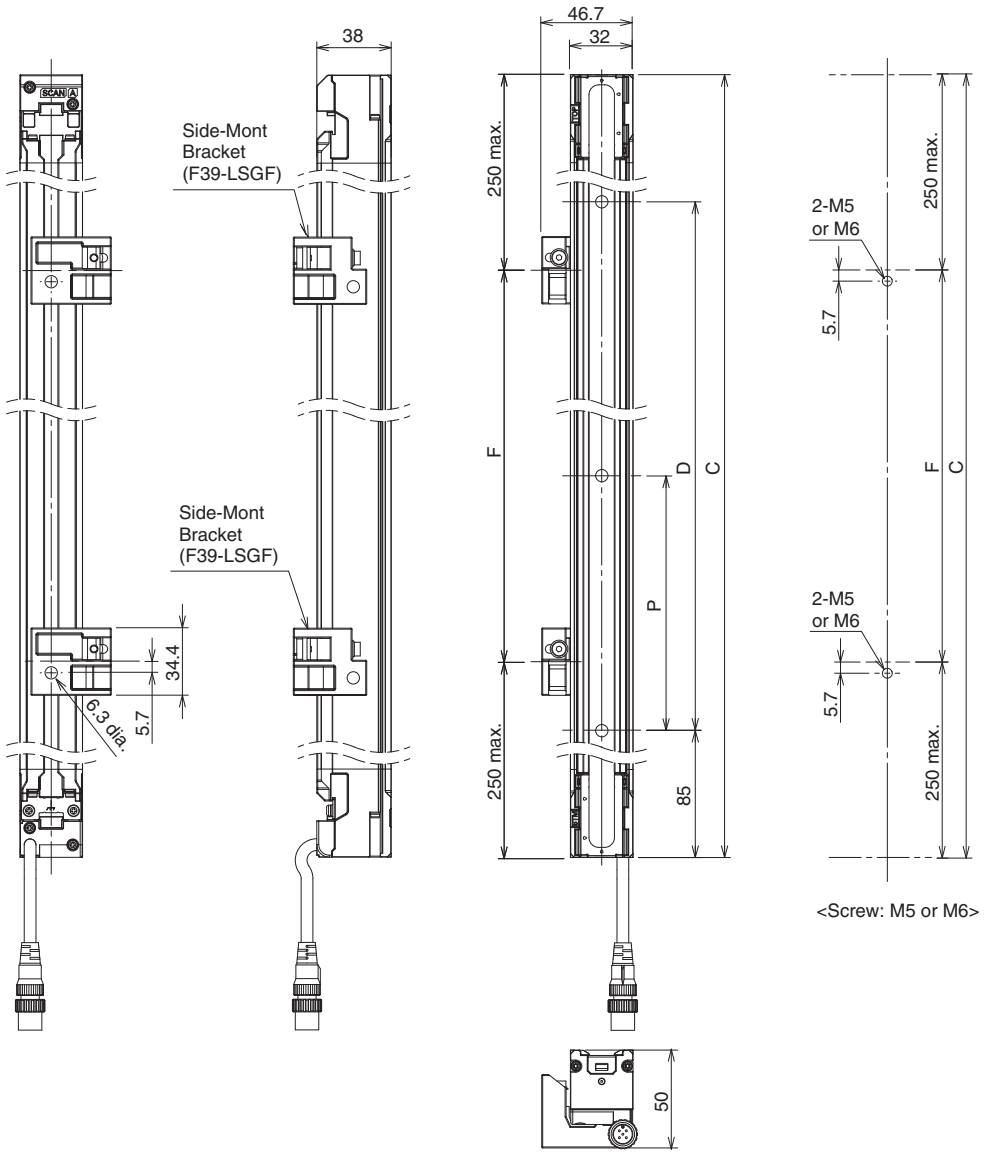
| Protective height (Dimension C) | Number of Adjustable Top/Bottom Brackets ✻3 | Number of Intermediate Brackets ✻3 | Dimension F |
|---|---|---|---|
| 0160 to 0840 | 2 | 0 | --- |
| 0880 to1680 | 2 | 1 | 1000 mm max. |
| 1760 to 2480 | 2 | 2 | 1000 mm max. |

✻1. Adjustable Side-Mount Bracket: M5 or M6
✻2. For the model with a protective height of 0160, the dimensions N1 and N2 are 20 to 30 mm.
✻3. The number of brackets required to mount each unit (emitter, receiver).

## F3SG-PG Main Unit

### Mounted with Side-Mount Brackets (Intermediate Brackets) (F39-LSGF)

**Backside Mounting**



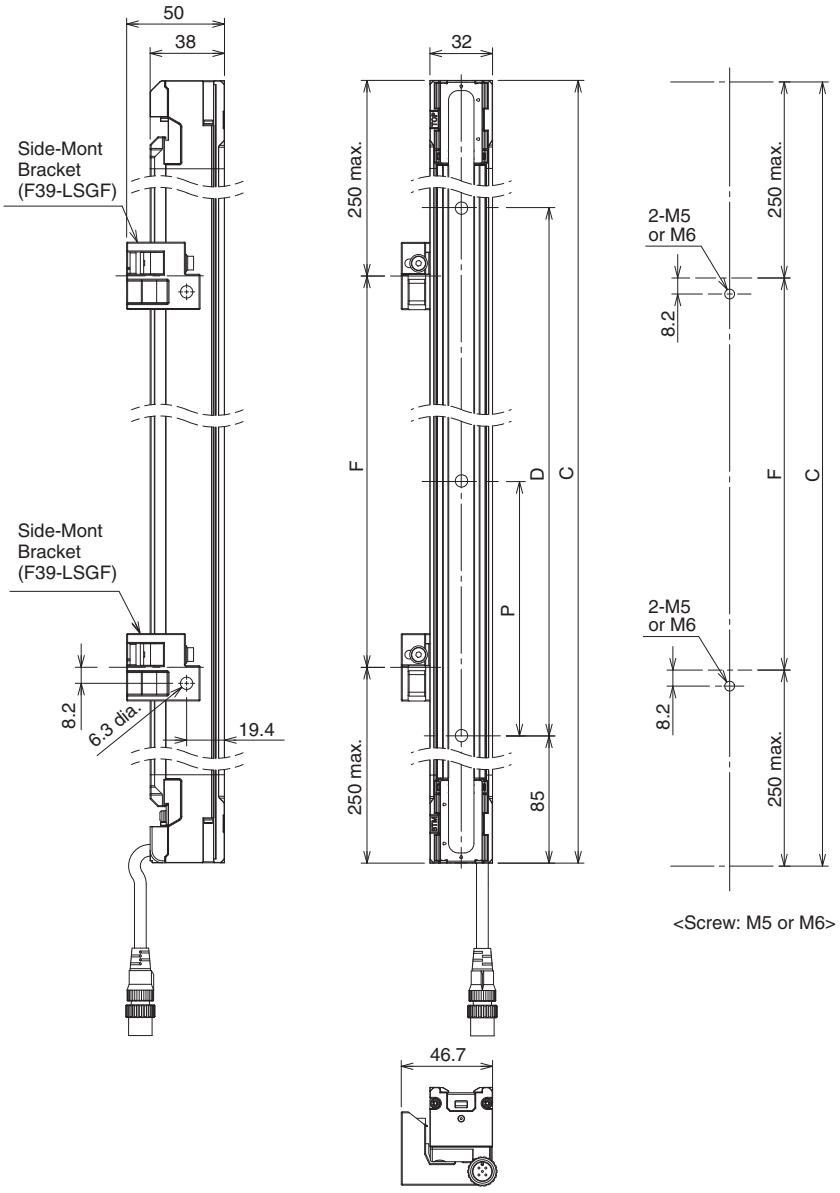

| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number | |
| **Dimension D** | C-170 | |
| **Dimension P** | F3SG-4PGA0670-2☐ | 500 |
| | F3SG-4PGA0970-3☐ | 400 |
| | F3SG-4PGA1070-4☐ | 300 |
| | F3SG-4PGA1370-4☐ | 400 |

| Product length (Dimension C) | Number of Side-Mount Brackets ✻ | Dimension F |
|---|---|---|
| 0670 to 1370 | 2 | 1000 mm max. |

✻ The number of brackets required to mount each unit (emitter, receiver, emitter/receiver, passive mirror).

## Mounted with Side-Mount Brackets (Intermediate Brackets) (F39-LSGF)

### Side Mounting



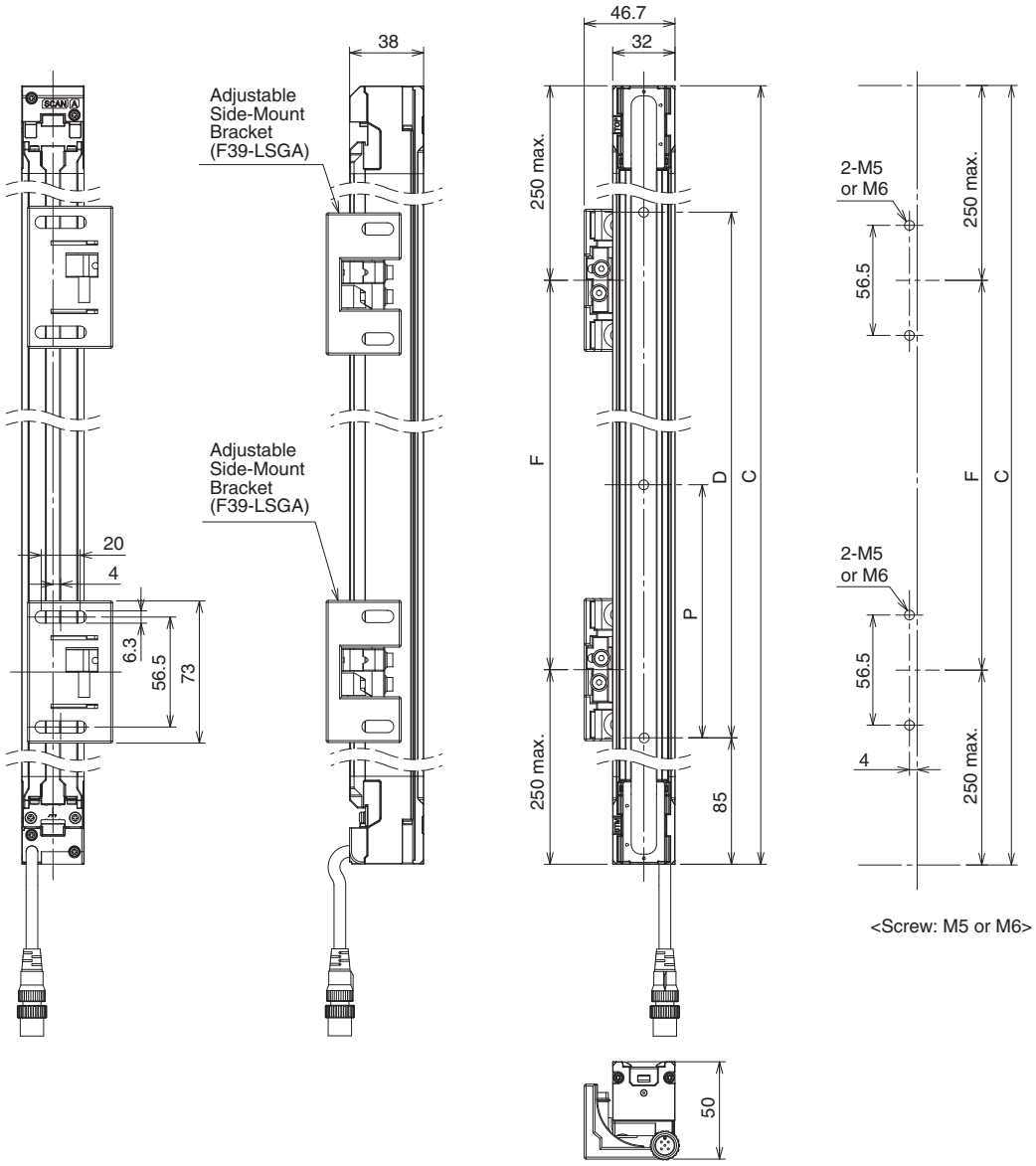

| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number | |
| **Dimension D** | C-170 | |
| **Dimension P** | F3SG-4PGA0670-2☐ | 500 |
| | F3SG-4PGA0970-3☐ | 400 |
| | F3SG-4PGA1070-4☐ | 300 |
| | F3SG-4PGA1370-4☐ | 400 |

| Product length (Dimension C) | Number of Side-Mount Brackets ✻ | Dimension F |
|---|---|---|
| 0670 to 1370 | 2 | 1000 mm max. |

✻ The number of brackets required to mount each unit (emitter, receiver, emitter/receiver, passive mirror).

## Mounted with Adjustable Side-Mount Brackets (Intermediate Brackets) (F39-LSGA)

### Backside Mounting



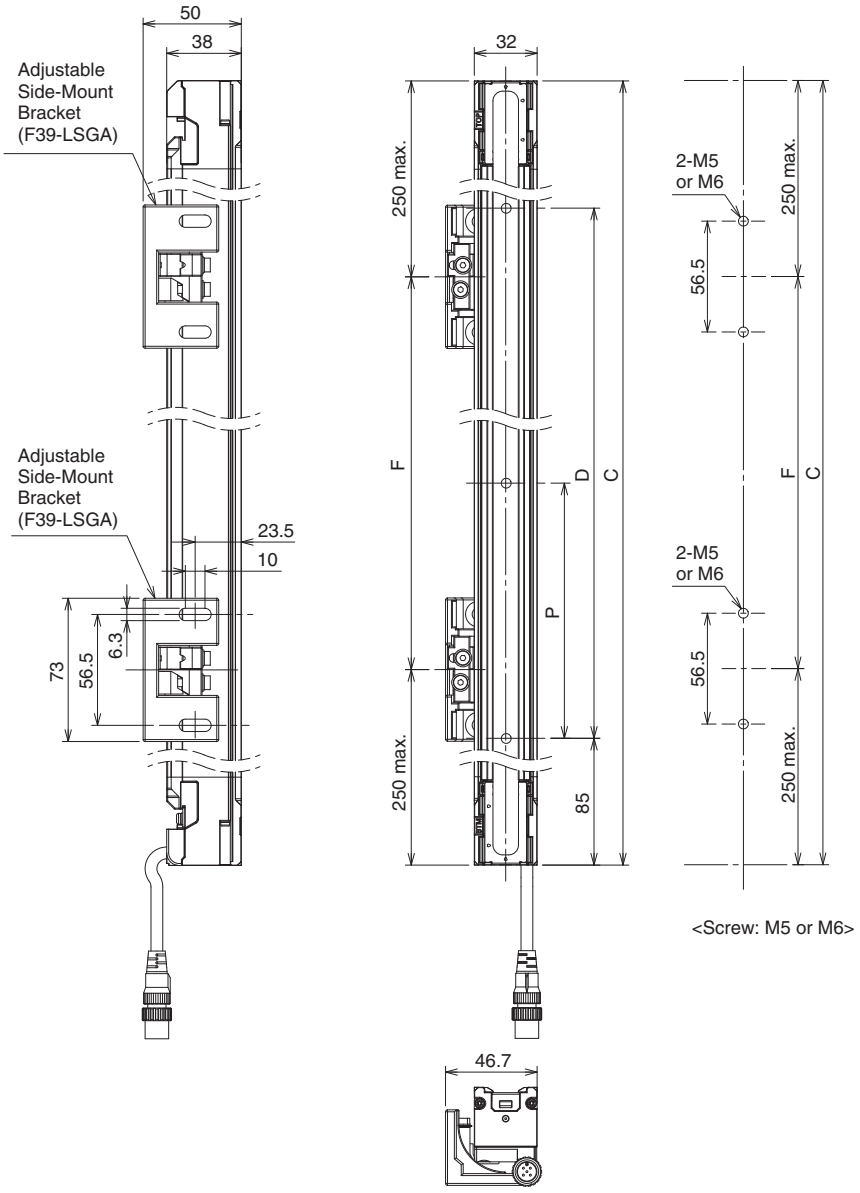

| Dimension C | 4-digit number in model number | |
|---|---|---|
| Dimension D | C-170 | |
| Dimension P | F3SG-4PGA0670-2☐ | 500 |
| | F3SG-4PGA0970-3☐ | 400 |
| | F3SG-4PGA1070-4☐ | 300 |
| | F3SG-4PGA1370-4☐ | 400 |

| Product length (Dimension C) | Number of Adjustable Side-Mount Brackets ✻ | Dimension F |
|---|---|---|
| 0670 to 1370 | 2 | 1000 mm max. |

✻ The number of brackets required to mount each unit (emitter, receiver, emitter/receiver, passive mirror).

## Mounted with Adjustable Side-Mount Brackets (Intermediate Brackets) (F39-LSGA)

### Side Mounting



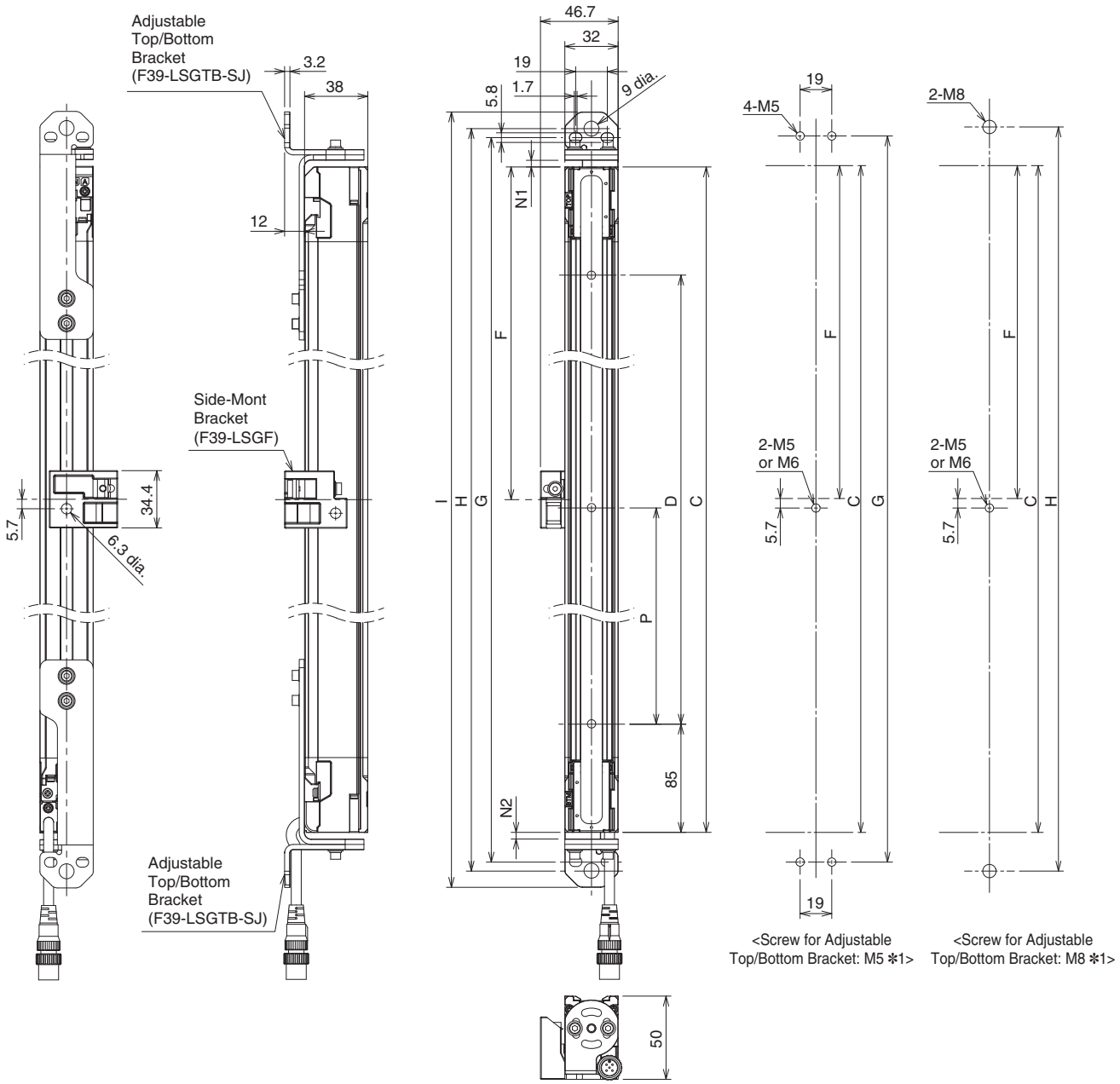

| Dimension C | 4-digit number in model number | |
|---|---|---|
| Dimension D | C-170 | |
| Dimension P | F3SG-4PGA0670-2☐ | 500 |
| | F3SG-4PGA0970-3☐ | 400 |
| | F3SG-4PGA1070-4☐ | 300 |
| | F3SG-4PGA1370-4☐ | 400 |

| Product length (Dimension C) | Number of Adjustable Side-Mount Brackets ✻ | Dimension F |
|---|---|---|
| 0670 to 1370 | 2 | 1000 mm max. |

✻ The number of brackets required to mount each unit (emitter, receiver, emitter/receiver, passive mirror).

## Mounted with Adjustable Top/Bottom Brackets (F3SJ, F3SN Adapter) (F39-LSGTB-SJ) and Side-Mount Brackets (Intermediate Brackets) (F39-LSGF)

### Backside Mounting



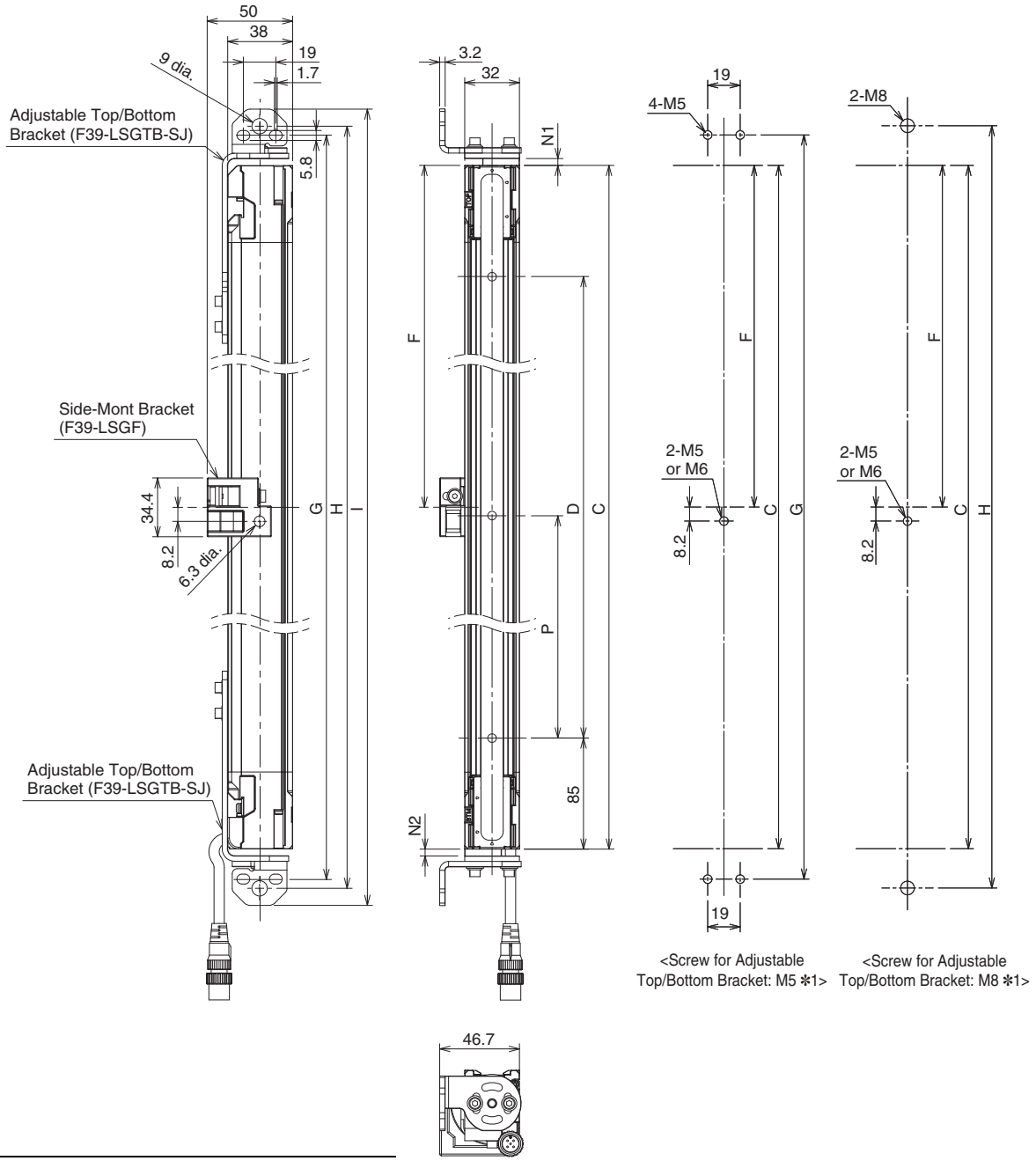

| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number | |
| **Dimension D** | C-170 | |
| **Dimension G** | C+27.2+N1+N2 | |
| **Dimension H** | C+38+N1+N2 | |
| **Dimension I** | C+58+N1+N2 | |
| **Dimension N1** | 0 to 30 | |
| **Dimension N2** | 0 to 30 | |
| **Dimension P** | F3SG-4PGA0670-2☐ | 500 |
| | F3SG-4PGA0970-3☐ | 400 |
| | F3SG-4PGA1070-4☐ | 300 |
| | F3SG-4PGA1370-4☐ | 400 |

| Product length (Dimension C) | Number of Adjustable Top/Bottom Brackets ✻2 | Number of Intermediate Brackets ✻2 | Dimension F |
|---|---|---|---|
| 0670 | 2 | 0 | --- |
| 0970 to 1370 | 2 | 1 | 1000 mm max. |

✻**1.** Side-Mount Bracket: M5 or M6
✻**2.** The number of brackets required to mount each unit (emitter, receiver, emitter/receiver, passive mirror).

## Mounted with Adjustable Top/Bottom Brackets (F3SJ, F3SN Adapter) (F39-LSGTB-SJ) and Side-Mount Brackets (Intermediate Brackets) (F39-LSGF)

### Side Mounting



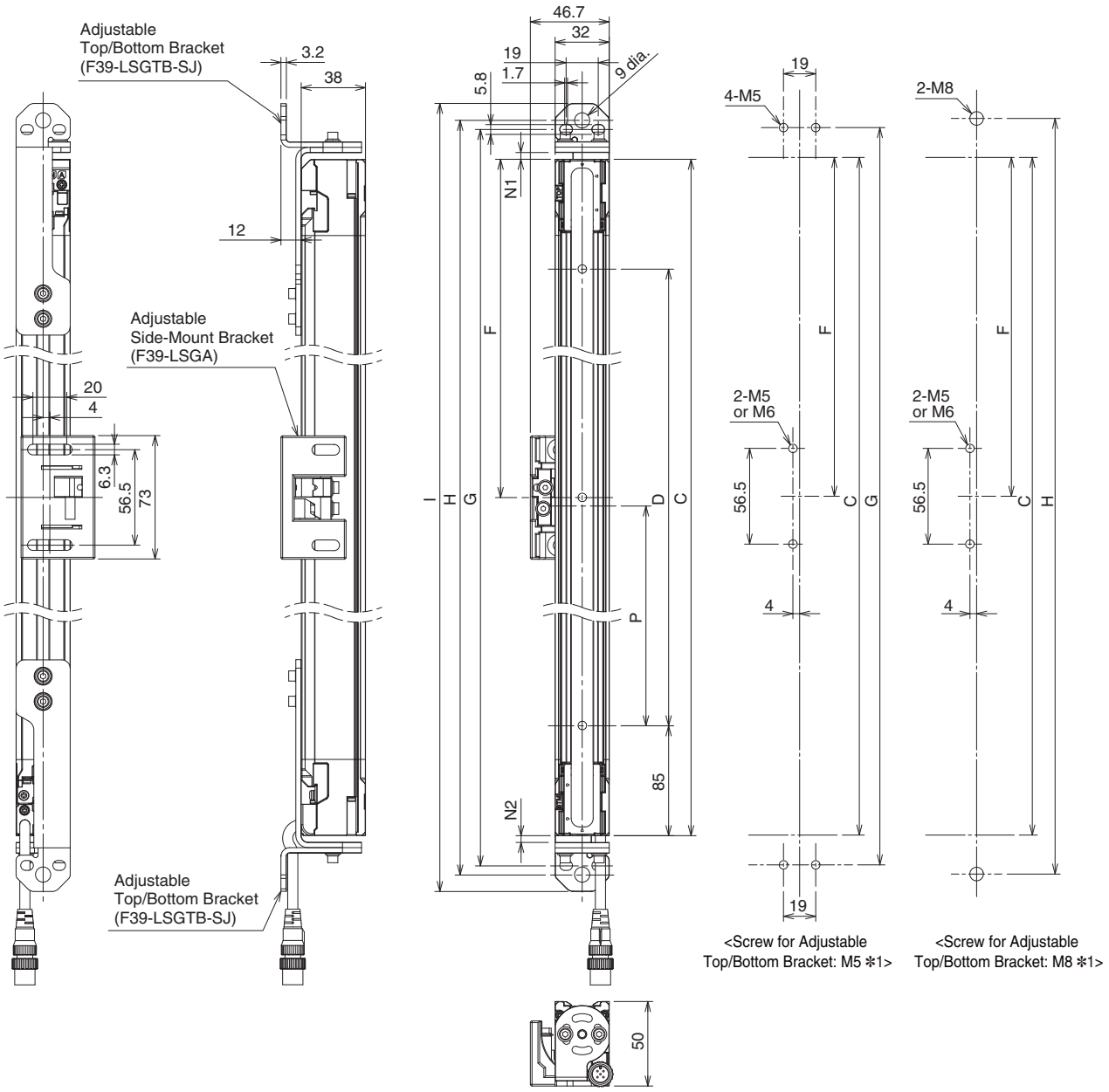

| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number | |
| **Dimension D** | C-170 | |
| **Dimension G** | C+27.2+N1+N2 | |
| **Dimension H** | C+38+N1+N2 | |
| **Dimension I** | C+58+N1+N2 | |
| **Dimension N1** | 0 to 30 | |
| **Dimension N2** | 0 to 30 | |
| **Dimension P** | F3SG-4PGA0670-2☐ | 500 |
| | F3SG-4PGA0970-3☐ | 400 |
| | F3SG-4PGA1070-4☐ | 300 |
| | F3SG-4PGA1370-4☐ | 400 |

| Product length (Dimension C) | Number of Adjustable Top/Bottom Brackets ✻2 | Number of Intermediate Brackets ✻2 | Dimension F |
|---|---|---|---|
| 0670 | 2 | 0 | --- |
| 0970 to 1370 | 2 | 1 | 1000 mm max. |

**✻1.** Side-Mount Bracket: M5 or M6
**✻2.** The number of brackets required to mount each unit (emitter, receiver, emitter/receiver, passive mirror).

## Mounted with Adjustable Top/Bottom Brackets (F3SJ, F3SN Adapter) (F39-LSGTB-SJ) and Adjustable Side-Mount Brackets (Intermediate Brackets) (F39-LSGA)

### Backside Mounting



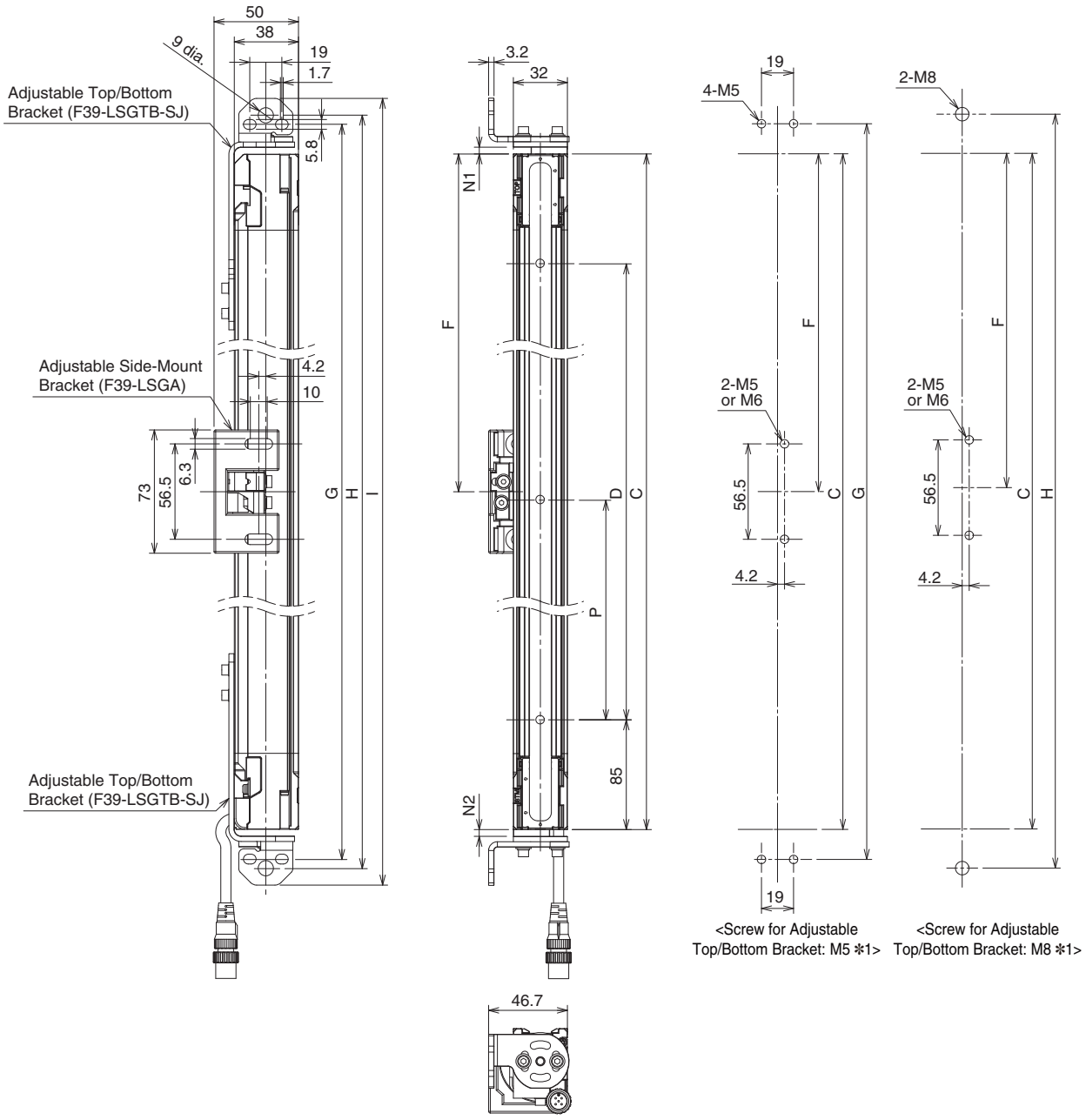

| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number | |
| **Dimension D** | C-170 | |
| **Dimension G** | C+27.2+N1+N2 | |
| **Dimension H** | C+38+N1+N2 | |
| **Dimension I** | C+58+N1+N2 | |
| **Dimension N1** | 0 to 30 | |
| **Dimension N2** | 0 to 30 | |
| **Dimension P** | F3SG-4PGA0670-2☐ | 500 |
| | F3SG-4PGA0970-3☐ | 400 |
| | F3SG-4PGA1070-4☐ | 300 |
| | F3SG-4PGA1370-4☐ | 400 |

| Product length (Dimension C) | Number of Adjustable Top/Bottom Brackets ✻2 | Number of Intermediate Brackets ✻2 | Dimension F |
|---|---|---|---|
| 0670 | 2 | 0 | --- |
| 0970 to 1370 | 2 | 1 | 1000 mm max. |

**✻1.** Adjustable Side-Mount Bracket: M5 or M6
**✻2.** The number of brackets required to mount each unit (emitter, receiver, emitter/receiver, passive mirror).

## Mounted with Adjustable Top/Bottom Brackets (F3SJ, F3SN Adapter) (F39-LSGTB-SJ) and Adjustable Side-Mount Brackets (Intermediate Brackets) (F39-LSGA)

### Side Mounting




| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number | |
| **Dimension D** | C-170 | |
| **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 30 | |
| **Dimension P** | F3SG-4PGA0670-2☐ | 500 |
| | F3SG-4PGA0970-3☐ | 400 |
| | F3SG-4PGA1070-4☐ | 300 |
| | F3SG-4PGA1370-4☐ | 400 |

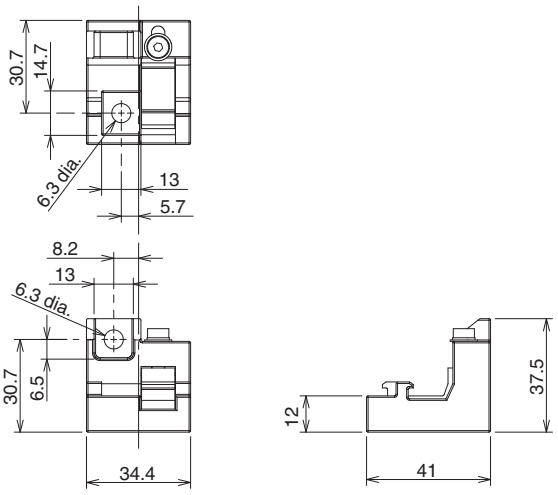
| Product length (Dimension C) | Number of Adjustable Top/Bottom Brackets ✻2 | Number of Intermediate Brackets ✻2 | Dimension F |
|---|---|---|---|
| 0670 | 2 | 0 | --- |
| 0970 to 1370 | 2 | 1 | 1000 mm max. |

**✻1.** Adjustable Side-Mount Bracket: M5 or M6
**✻2.** The number of brackets required to mount each unit (emitter, receiver, emitter/receiver, passive mirror).

## Accessories

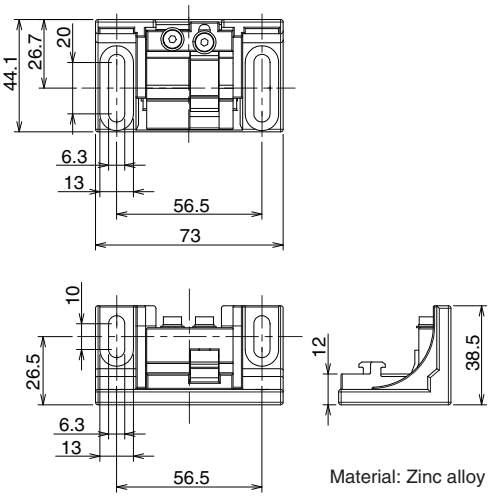
### Bracket

**Side-Mount Bracket (Intermediate Bracket) (F39-LSGF, sold separately)**



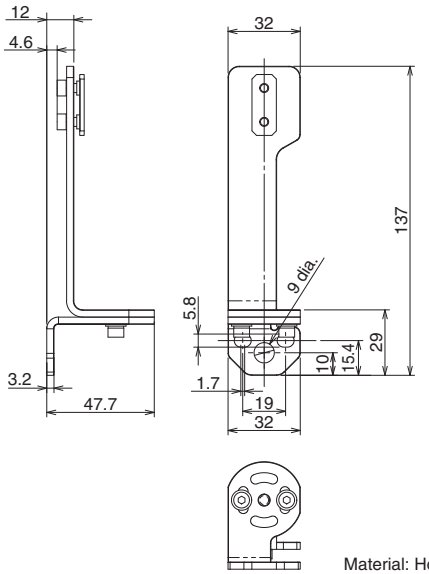

Material: Zinc alloy

**Adjustable Side-Mount Bracket (Intermediate Bracket) (F39-LSGA, sold separately)**



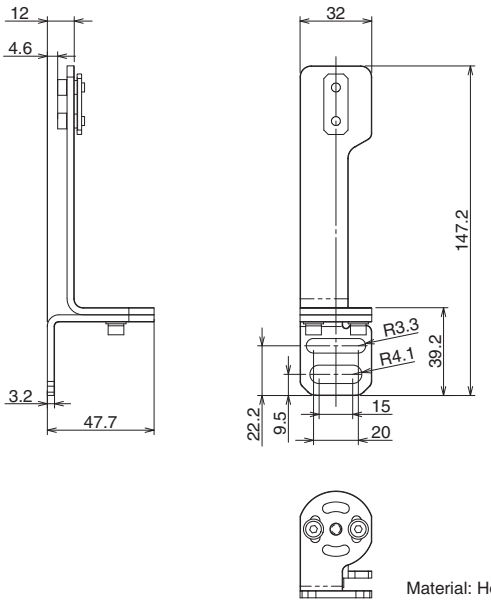

Material: Zinc alloy

**Adjustable Top/Bottom Bracket (F3SJ, F3SN Adapter) (F39-LSGTB-SJ, sold separately)**



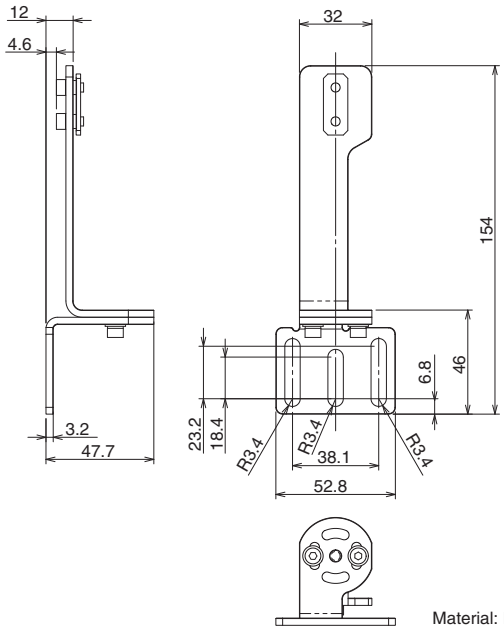

Material: Hot rolled steel (SPHC)

**Adjustable Top/Bottom Bracket (F3SG-RA/RE Adapter) (F39-LSGTB-RE, sold separately)**




Material: Hot rolled steel (SPHC)

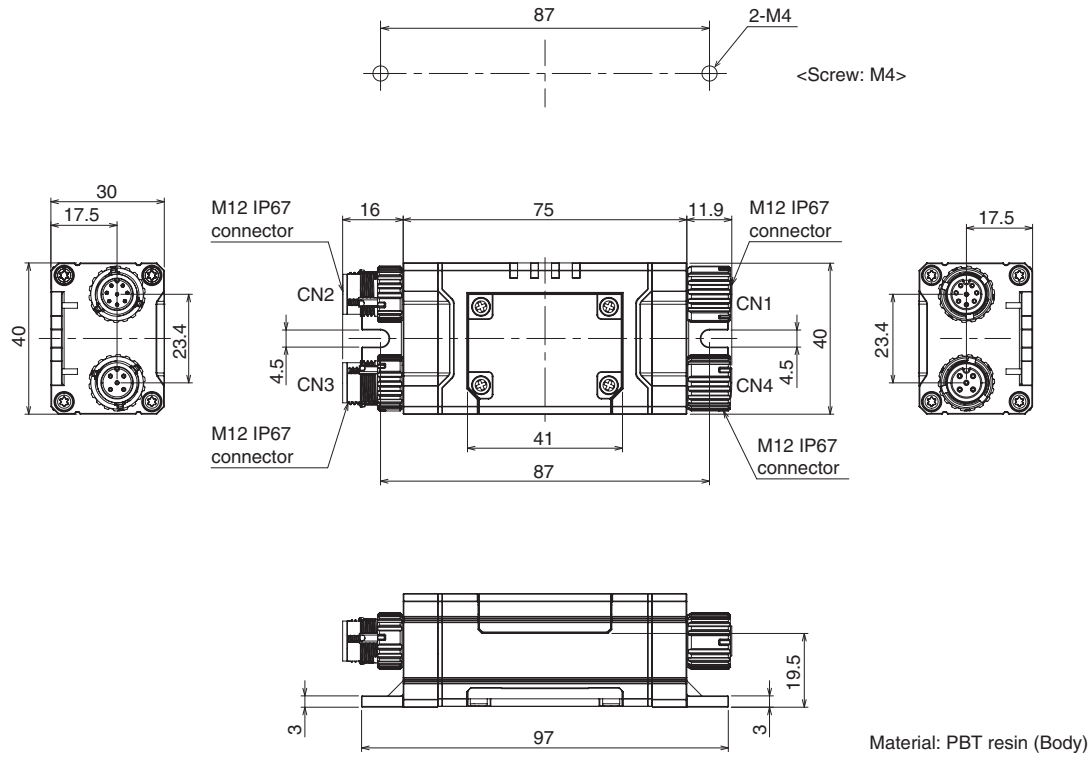
**Adjustable Top/Bottom Bracket (MS4800, F3SR Adapter) (F39-LSGTB-MS, sold separately)**




Material: Hot rolled steel (SPHC)

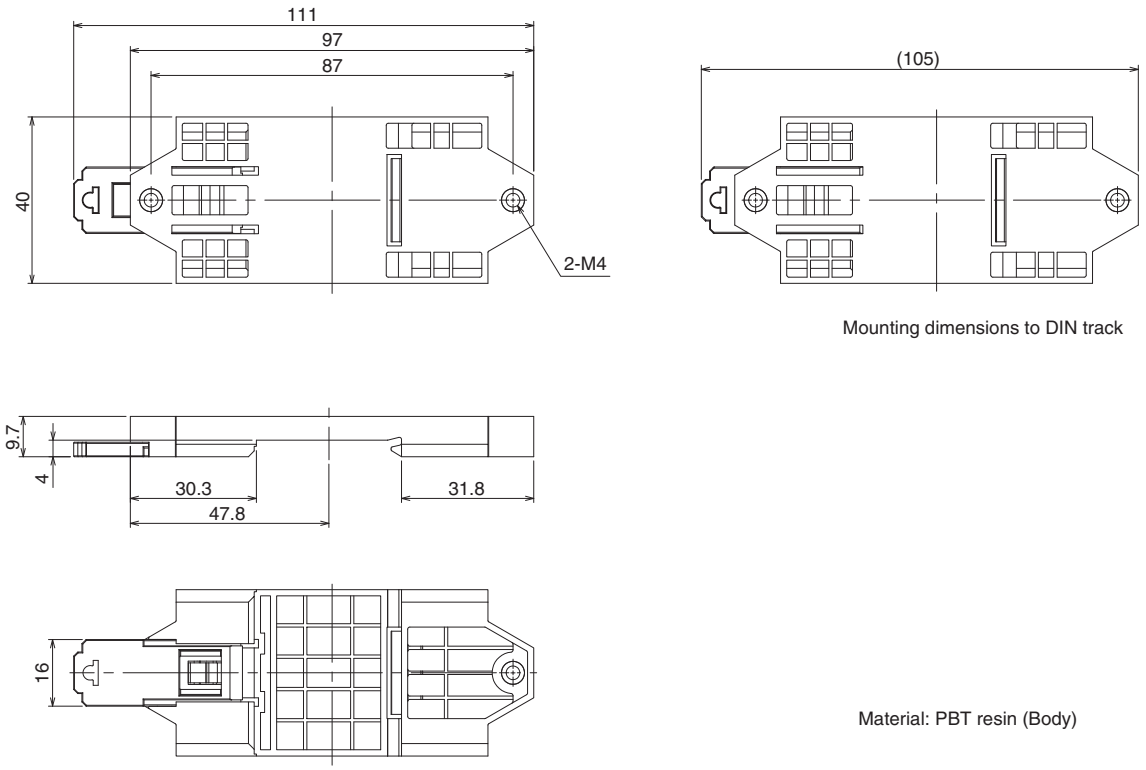
## Intelligent Tap

### Intelligent Tap (F39-SGIT-IL3, sold separately)




Material: PBT resin (Body)

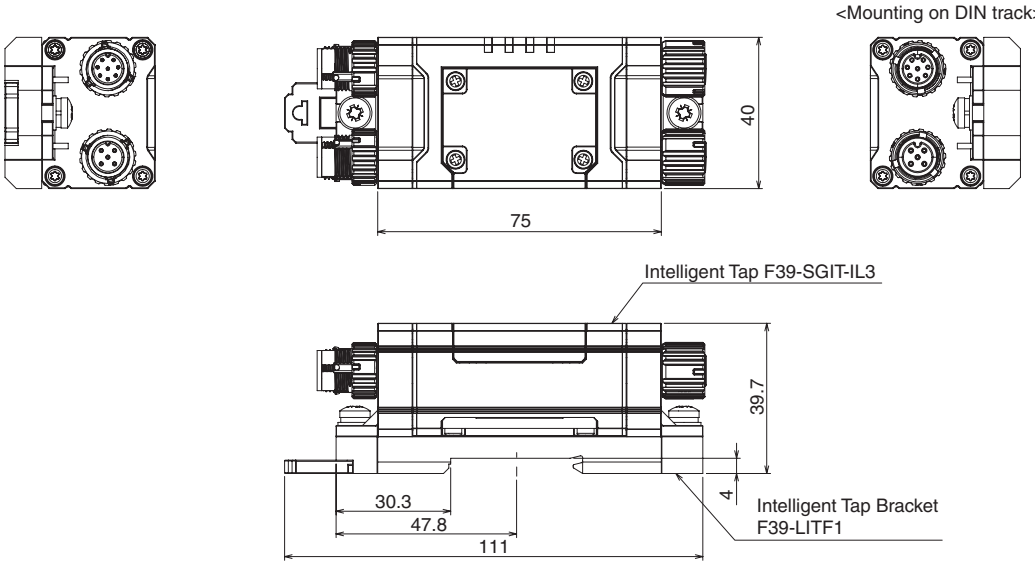
### Intelligent Tap Bracket (F39- LITF1, sold separately)




Mounting dimensions to DIN track

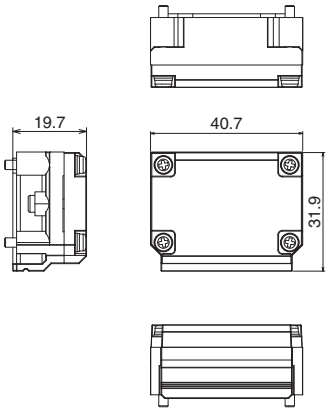
Material: PBT resin (Body)

## Assembly Dimensions (Intelligent Tap/ Intelligent Tap Bracket)



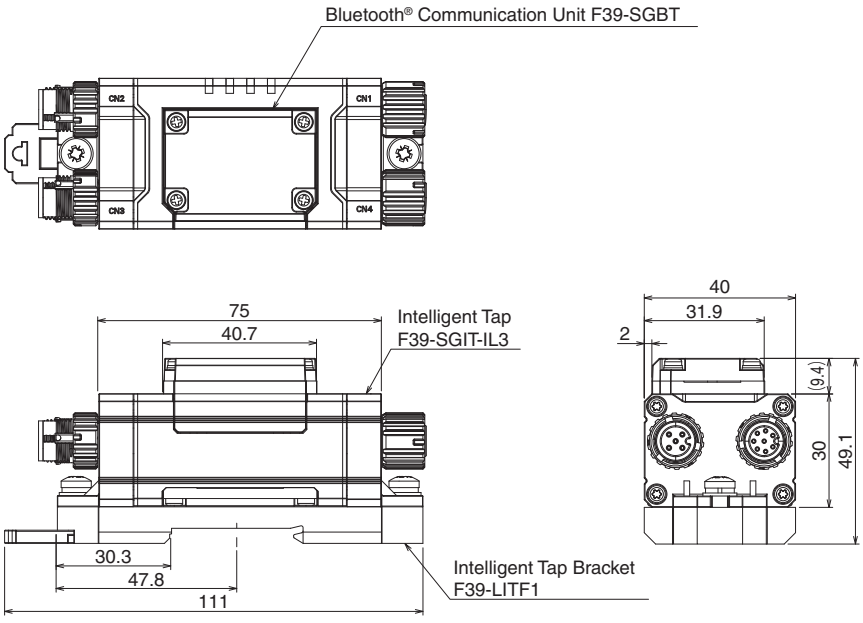

Material: PBT resin (Body)

## Bluetooth® Communication Unit (F39-SGBT, sold separately)



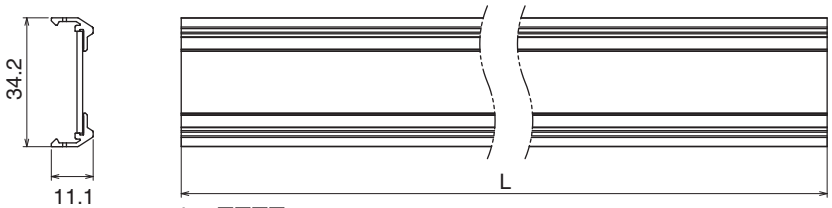

Material: PBT resin (Body)

## Assembly Dimensions (Intelligent Tap/Bluetooth® Communication Unit/Intelligent Tap Bracket)



## Spatter Protection Cover

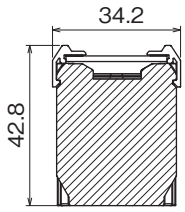
**Spatter Protection Cover (F39-HSG□□□□, sold separately)**




L = □□□□

Material: PC resin (Transparent cover)
ABS resin (Side)

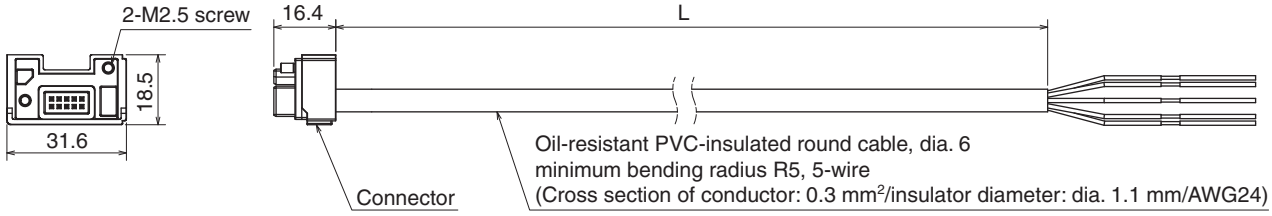
**Assembly Dimensions**



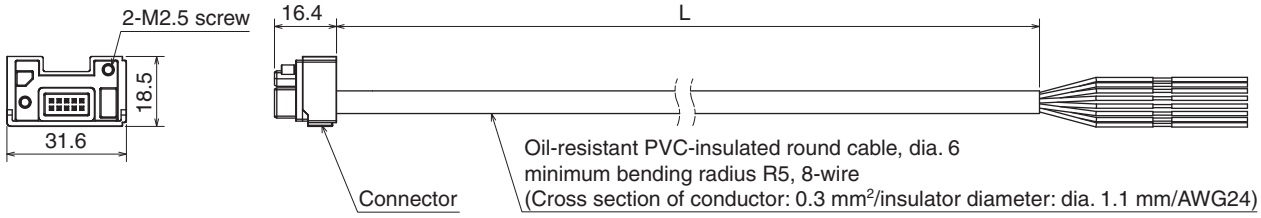

# Connecting Cables

## Root-Straight Cable

**Root-Straight Cable for Emitter (F39-JG□C-L, sold separately)**



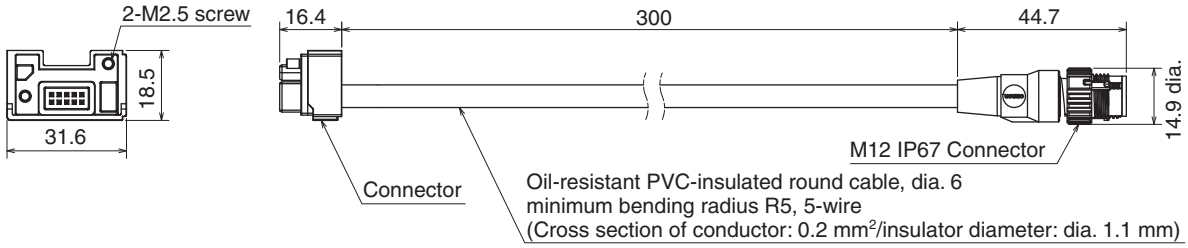

**Root-Straight Cable for receiver or emitter/receiver of F3SG-PG Perimeter Guarding Passive Mirror (F39-JG□C-D, sold separately)**



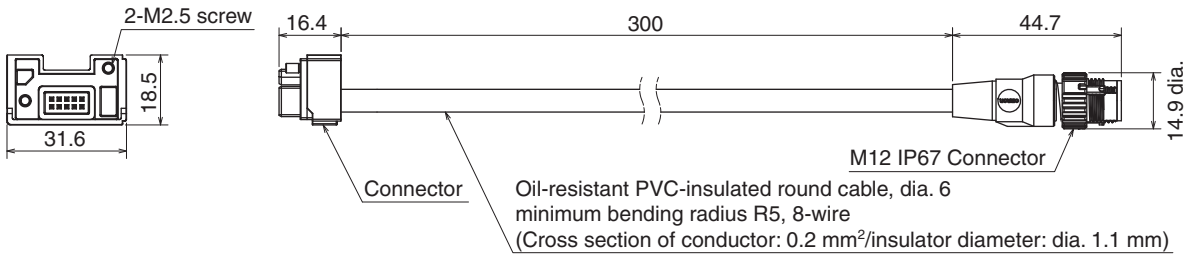

| Emitter cable (Gray) | Receiver cable (Black) | Length (L) |
|---|---|---|
| F39-JG3C-L | F39-JG3C-D | 3 m |
| F39-JG7C-L | F39-JG7C-D | 7 m |
| F39-JG10C-L | F39-JG10C-D | 10 m |

## Root-Plug Cable for Extended

**Root-Plug Cable for Extended for Emitter (F39-JGR□K-L, sold separately)**



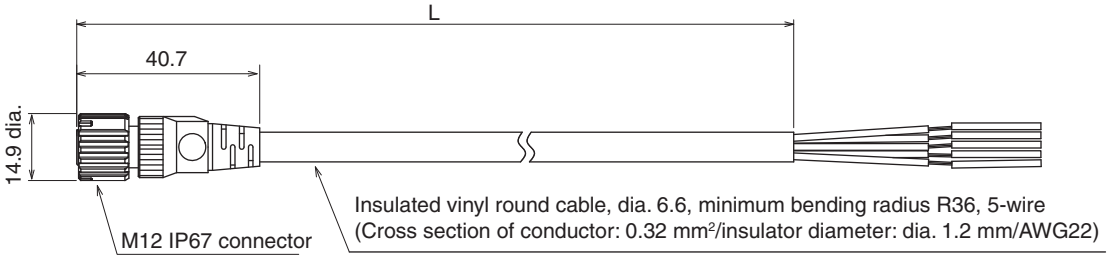

**Root-Plug Cable for Extended for receiver or emitter/receiver of F3SG-PG Perimeter Guarding Passive Mirror (F39-JGR□K-D, sold separately)**



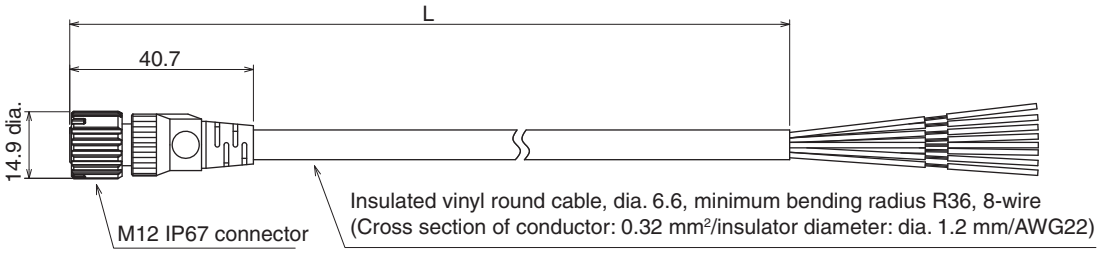

| Emitter cable (Gray) | Receiver cable (Black) | Length |
|---|---|---|
| F39-JGR3K-L | F39-JGR3K-D | 0.3 m |

## Extended Socket-Straight Cable

**Extended Socket-Straight Cable for Emitter (F39-JG□A-L, sold separately)**



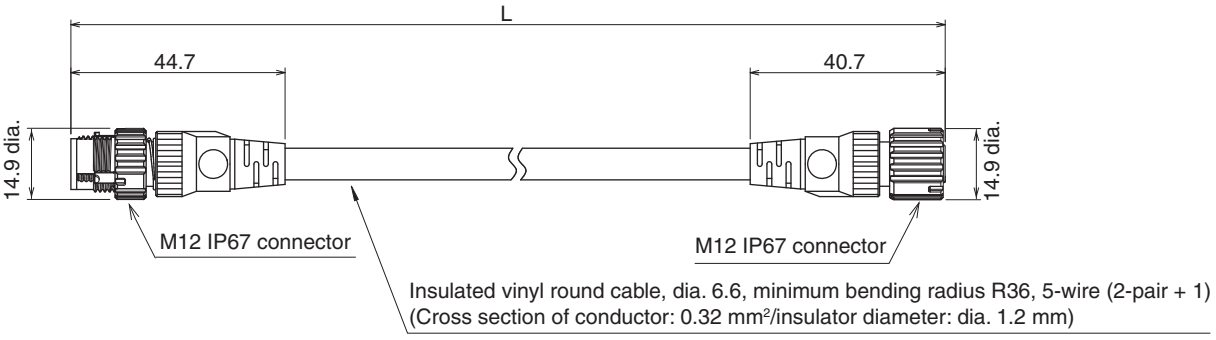

**Extended Socket-Straight Cable for receiver or emitter/receiver of F3SG-PG Perimeter Guarding Passive Mirror (F39-JG□A-D, sold separately)**



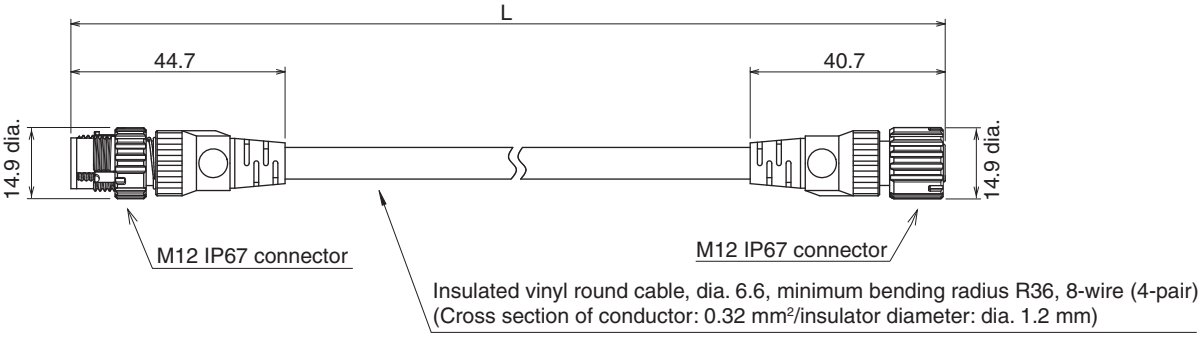

| Emitter cable (Gray) | Receiver cable (Black) | Length (L) |
|---|---|---|
| **F39-JG3A-L** | **F39-JG3A-D** | 3 m |
| **F39-JG10A-L** | **F39-JG10A-D** | 10 m |

## Extended Plug-Socket Cable

**Extended Plug-Socket Cable for Emitter: Cable for extension (F39-JG□B-L, sold separately)**



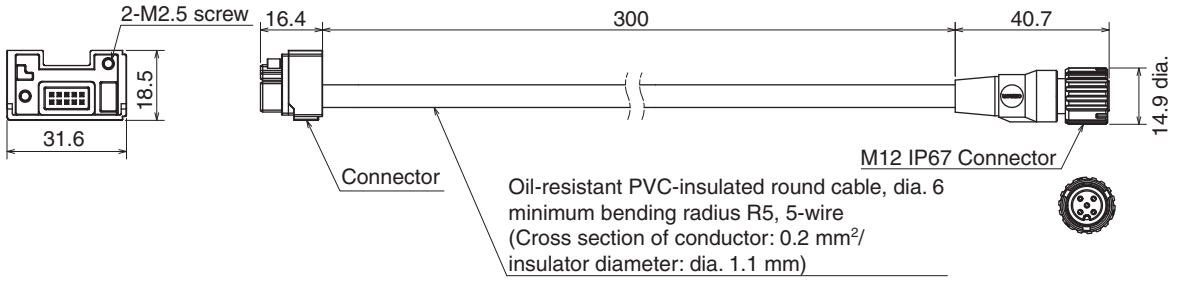

**Extended Plug-Socket Cable for receiver or emitter/receiver of F3SG-PG Perimeter Guarding Passive Mirror: Cable for extension (F39-JG□B-D, sold separately)**



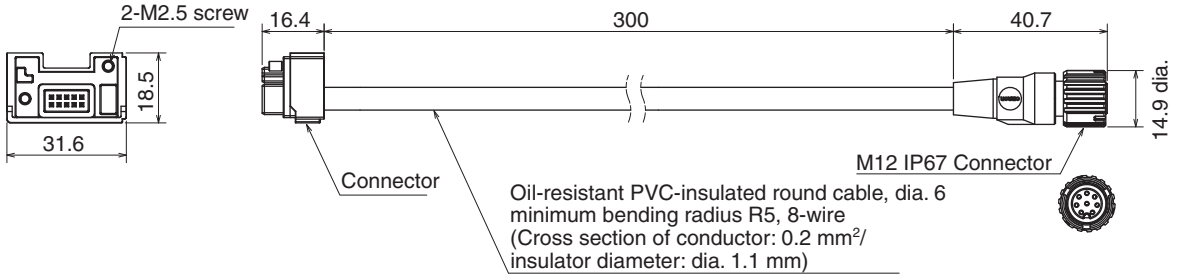

| Emitter cable (Gray) | Receiver cable (Black) | Length (L) |
|---|---|---|
| **F39-JG3B-L** | **F39-JG3B-D** | 3 m |
| **F39-JG10B-L** | **F39-JG10B-D** | 10 m |
| **F39-JG20B-L** | **F39-JG20B-D** | 20 m |

## Cascading Cable for Extended (F39-JGR3W, sold separately) (two cables per set, one for emitter and one for receiver)

### Emitter Cascading Cable for Extended



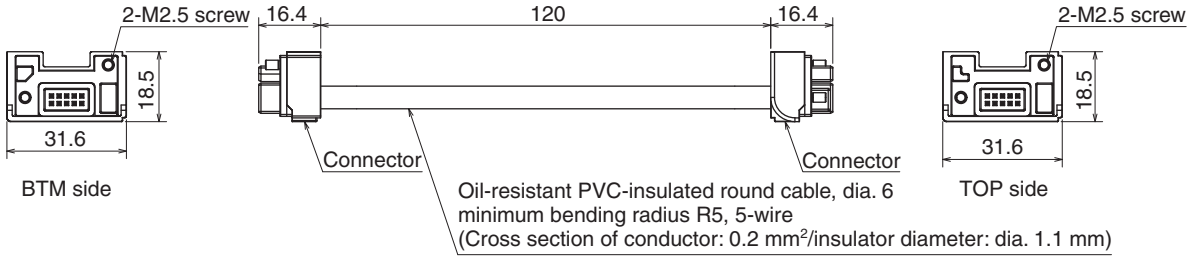

### Receiver Cascading Cable for Extended



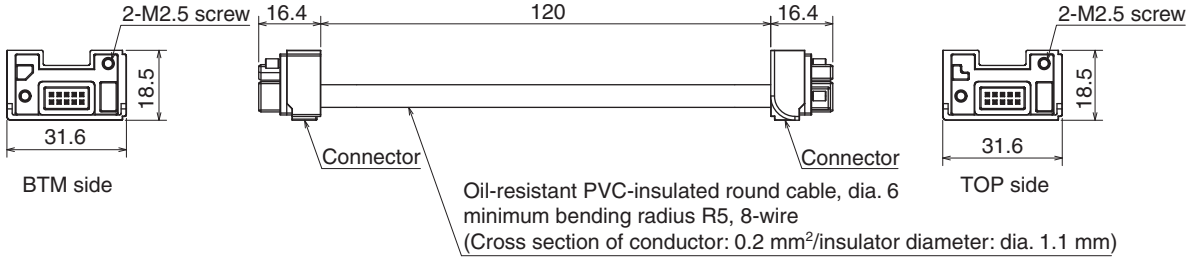

| Set model name | Emitter cable (Gray) | Receiver cable (Black) | Length |
|---|---|---|---|
| F39-JGR3W | F39-JGR3W-L | F39-JGR3W-D | 0.3 m |

## Side-by-side Cascading Cable (F39-JGR12L, sold separately) (two cables per set, one for emitter and one for receiver)

### Side-by-side Cascading Cable for Emitter



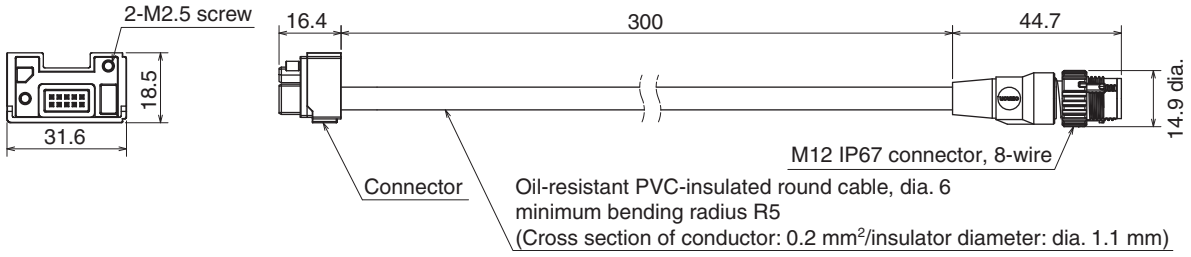

### Side-by-side Cascading Cable for Receiver



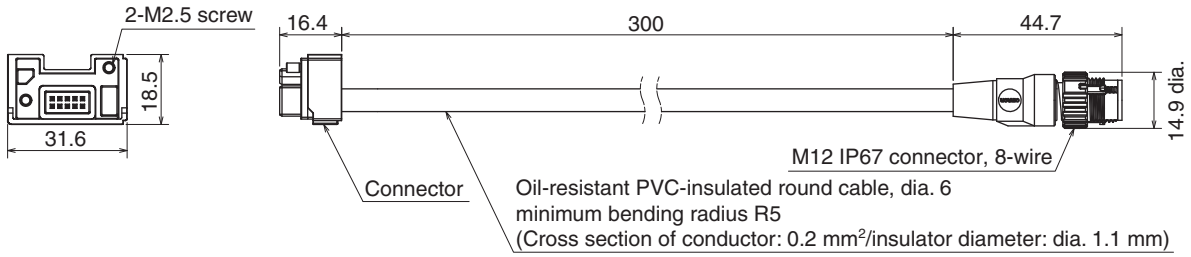

| Set model name | Emitter cable (Gray) | Receiver cable (Black) | Length |
|---|---|---|---|
| F39-JGR12L | F39-JGR12L-L | F39-JGR12L-D | 12 cm |

## Conversion Cable

### F3SJ-B/A Conversion Cable for Emitter (F39-JGR3K-SJ-L, sold separately)

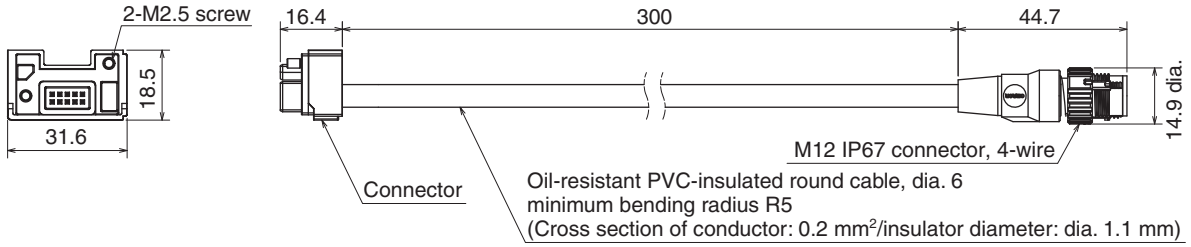


### F3SJ-B/A Conversion Cable for Receiver (F39-JGR3K-SJ-D, sold separately)

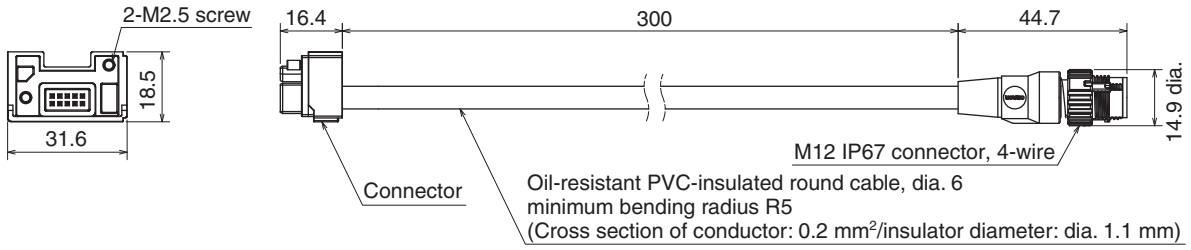



| Emitter cable (Gray) | Receiver cable (Black) | Length |
|---|---|---|
| F39-JGR3K-SJ-L | F39-JGR3K-SJ-D | 0.3 m |

### F3SG-RE Conversion Cable for Emitter (F39-JGR3K-RE-L, sold separately)

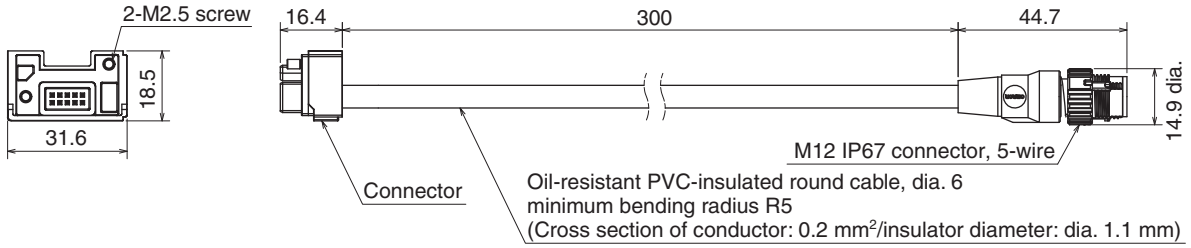



### F3SG-RE Conversion Cable for Receiver (F39-JGR3K-RE-D, sold separately)

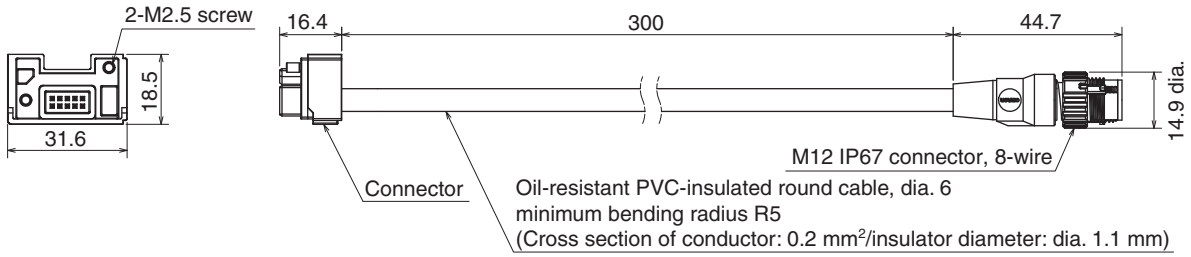



| Emitter cable (Gray) | Receiver cable (Black) | Length |
|---|---|---|
| F39-JGR3K-RE-L | F39-JGR3K-RE-D | 0.3 m |

### MS48 Conversion Cable for Emitter (F39-JGR3K-MS-L, sold separately)



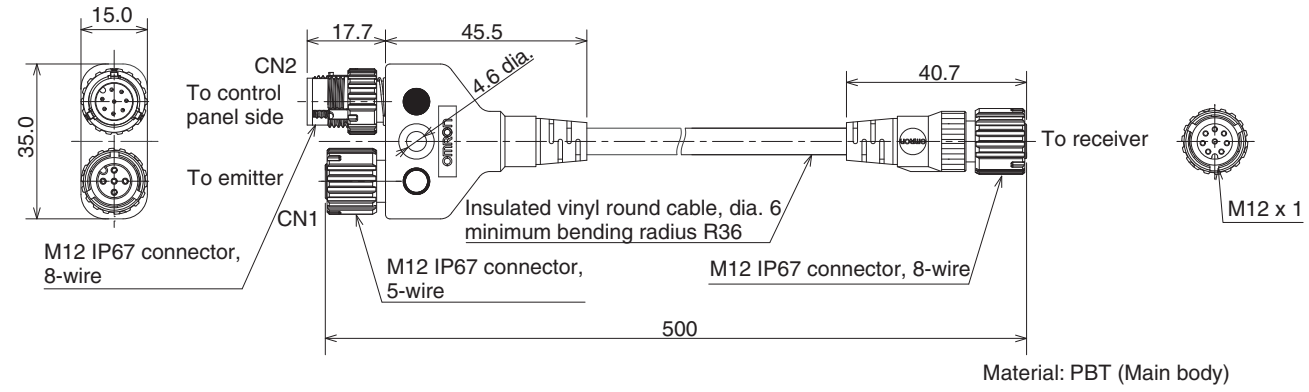

### MS48 Conversion Cable for Receiver (F39-JGR3K-MS-D, sold separately)




| Emitter cable (Gray) | Receiver cable (Black) | Length |
|---|---|---|
| F39-JGR3K-MS-L | F39-JGR3K-MS-D | 0.3 m |

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

Plug marked with ● (blue circle): Connect to control panel side
Socket marked with ○ (open circle): Connect to emitter

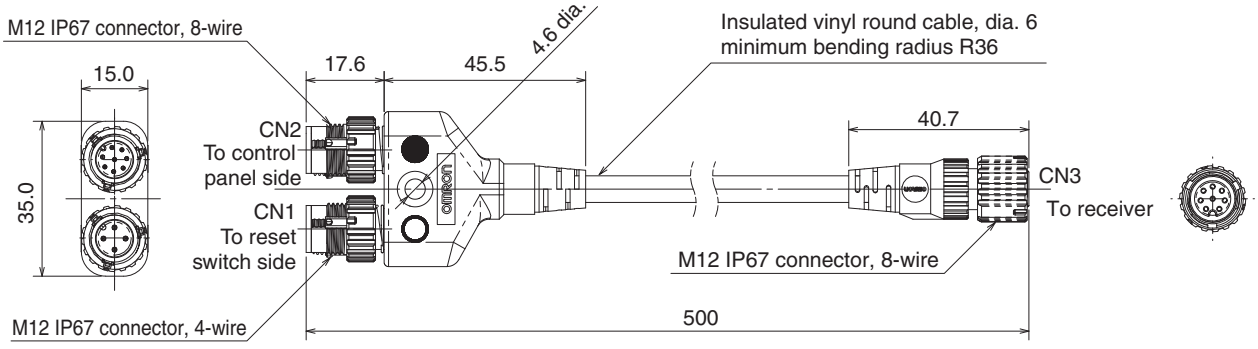



Material: PBT (Main body)

| Model | Length |
|---|---|
| **F39-GCNY2** | 0.5 m |

## Reset Switch Connector (F39-GCNY3, sold separately)

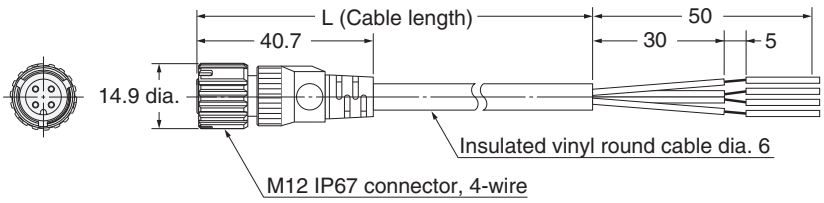
Plug marked with ● (blue circle): Connect to control panel side
Plug marked with ○ (open circle): Connect to reset switch side




Material: PBT (Main body)

| Model | Length |
|---|---|
| **F39-GCNY3** | 0.5 m |

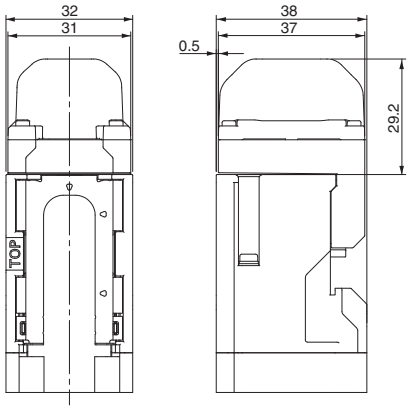
## Connector Connected to Cable, Socket on One Cable End (XS5F-D421-□80-F, sold separately)




| Model | Length (L) |
|---|---|
| **XS5F-D421-C80-F** | 1 m |
| **XS5F-D421-D80-F** | 2 m |
| **XS5F-D421-E80-F** | 3 m |
| **XS5F-D421-G80-F** | 5 m |
| **XS5F-D421-J80-F** | 10 m |
| **XS5F-D421-L80-F** | 20 m |

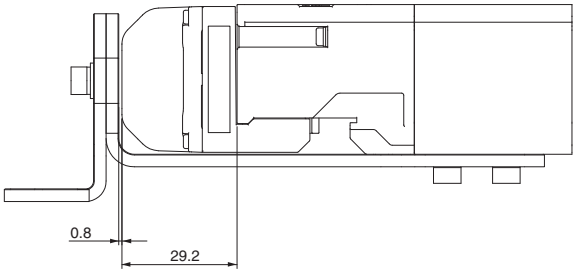
## Lamp

### Lamp
**(F39-SGLP, sold separately)**



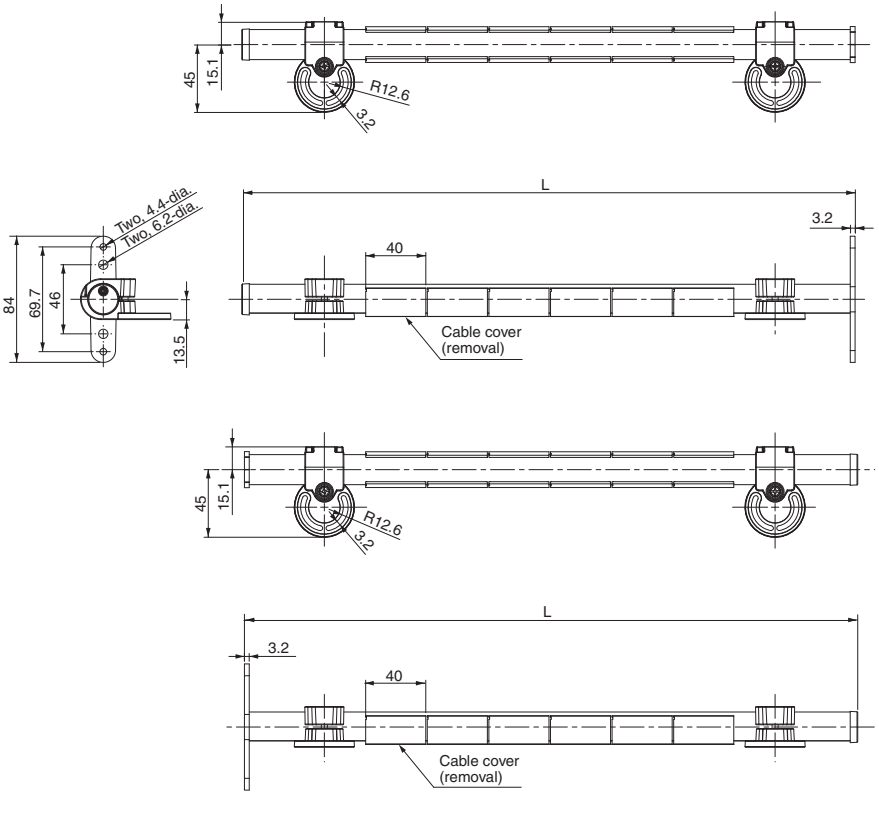

Material: PC resin (Transparent cover)
PBT resin (Base)

**• Assembly Dimensions**




## Muting Sensor Arm Mounter

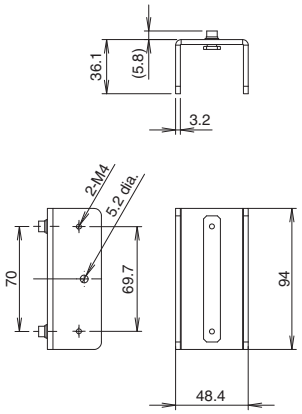
### Muting Sensor Arm Mounter
**(F39-FMA□□□□, sold separately)**




Material: PBT resin (Sensor Mounting)
PC resin (Cable cover)
Hot rolled steel (Base)
Aluminum alloy (Arm)

| Model | Dimension L |
|---|---|
| **F39-FMA150□** | 158.2 |
| **F39-FMA400□** | 408.2 |

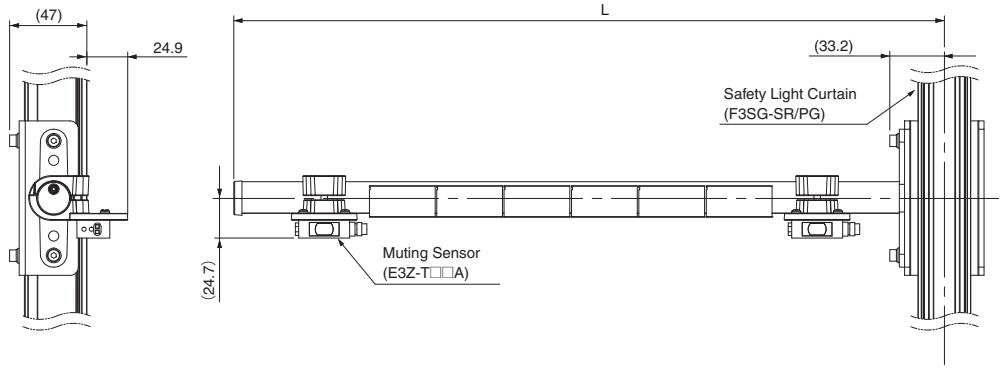
**Muting Sensor Arm Mounter Bracket for SLC (F39-LMAF1, sold separately)**




Material: Hot rolled steel

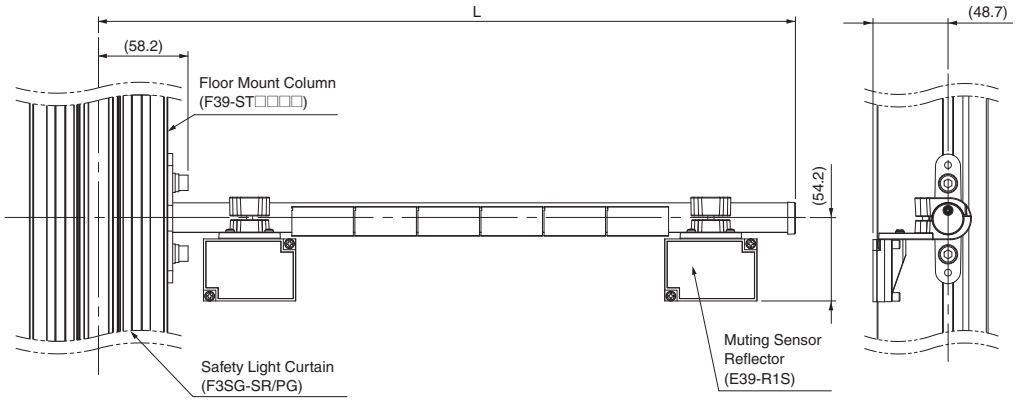
**• Assembly Dimensions**

**Mounting F39-FMA□□□□-T on the Muting Sensor Arm Mounter Bracket for SLC (F39-LMAF1)**




| Model | Dimension L |
|---|---|
| F39-FMA150□ | 182.4 |
| F39-FMA400□ | 432.4 |

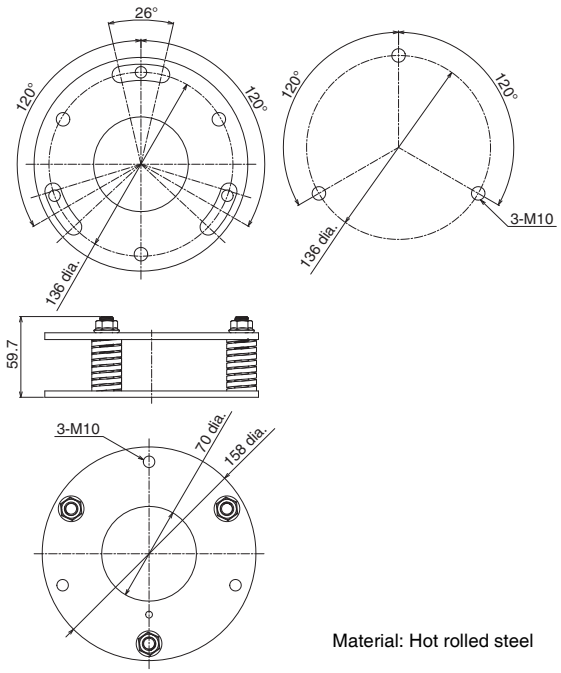
**Mounting F39-FMA□□□□-R on the Floor Mount Column (F39-ST□□□□)**




| Model | Dimension L |
|---|---|
| F39-FMA150□ | 203.2 |
| F39-FMA400□ | 453.2 |

## Mount-Column Adjustable Base

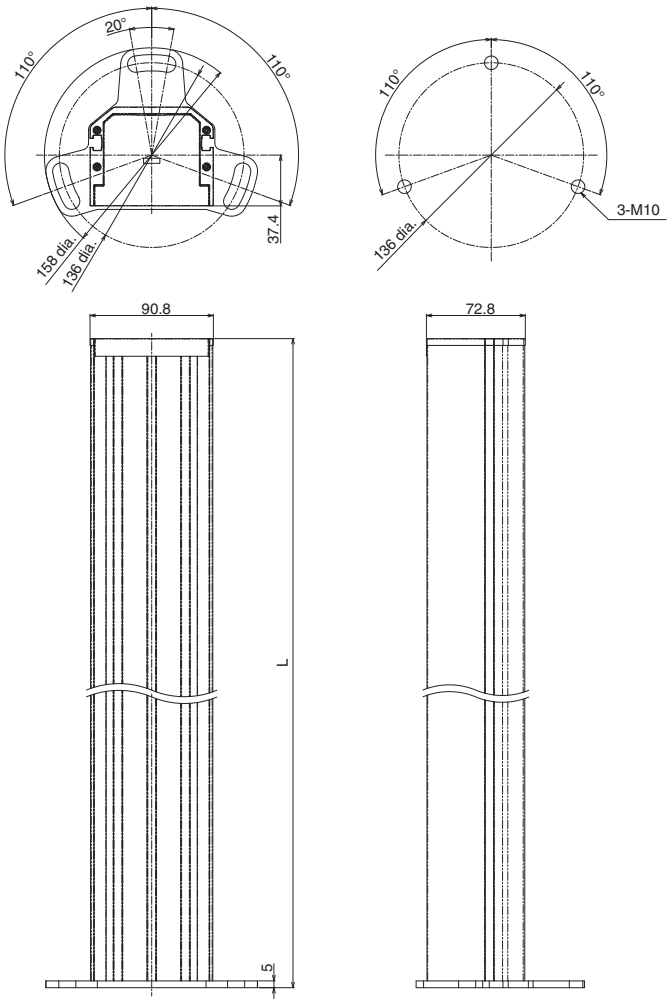
**F39-STB**




Material: Hot rolled steel

## Floor Mount Column

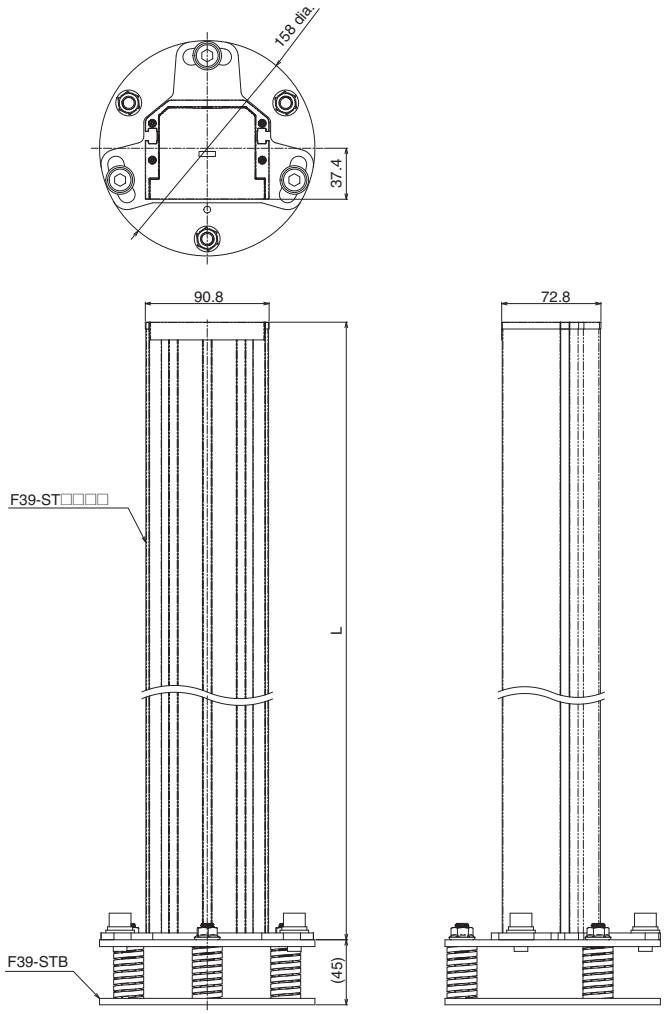
**F39-ST□□□□**




Material: Aluminum alloy (Housing)
Hot rolled steel (Base)
PBT resin (Cap)

| Model | Dimension L |
|---|---|
| **F39-ST0990** | 990 |
| **F39-ST1310** | 1310 |
| **F39-ST1630** | 1630 |
| **F39-ST1950** | 1950 |
| **F39-ST2270** | 2270 |

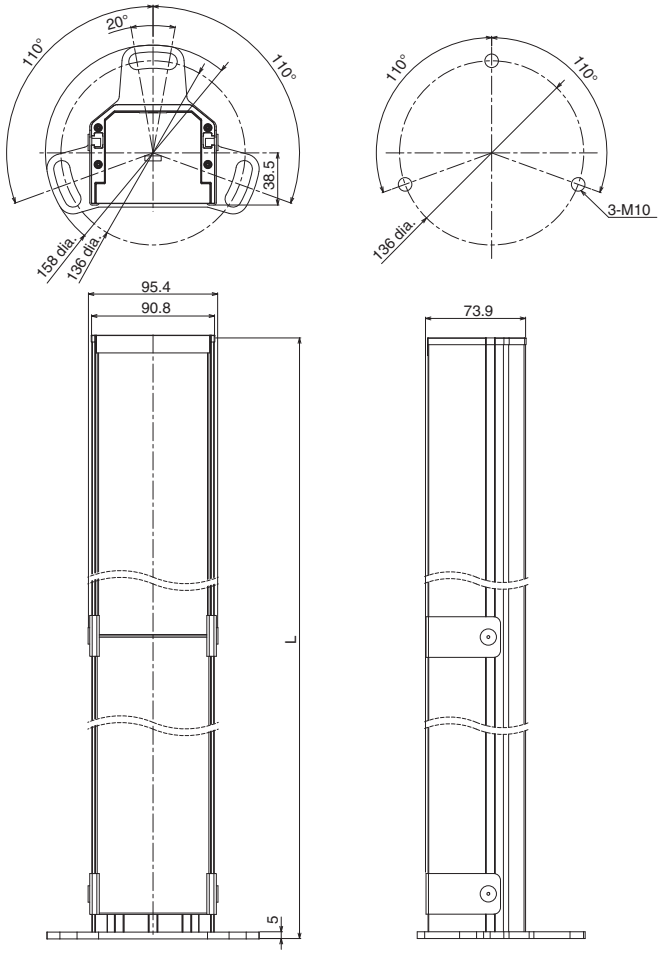
**• Assembly Dimensions (Mount-Column Adjustable Base /Floor Mount Column)**
**F39-STB/F39-ST□□□□**




| Model | Dimension L |
|---|---|
| **F39-ST0990** | 990 |
| **F39-ST1310** | 1310 |
| **F39-ST1630** | 1630 |
| **F39-ST1950** | 1950 |
| **F39-ST2270** | 2270 |

## Mirror Column

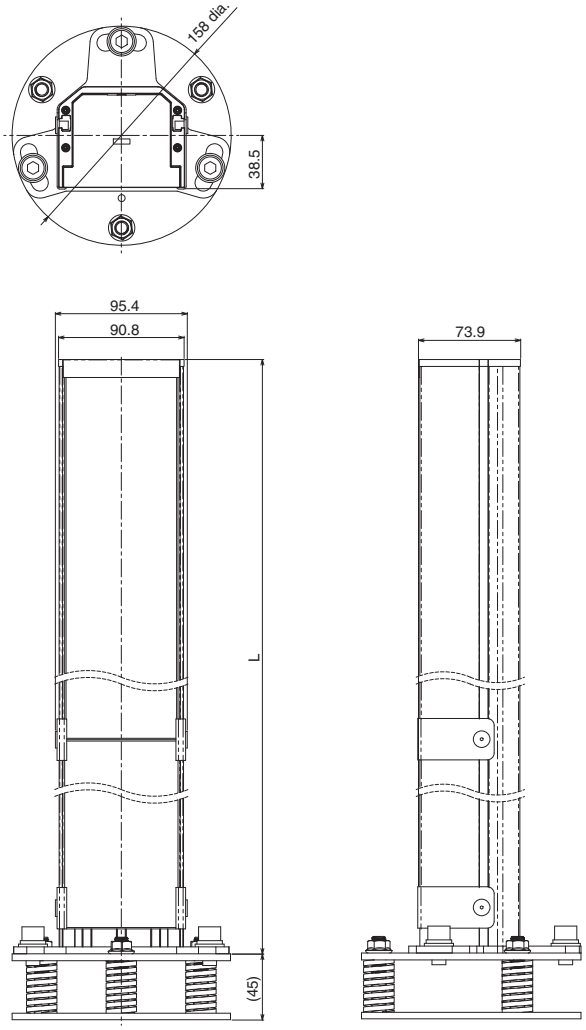
**F39-SML□□□□**




Material: Aluminum alloy (Housing)
Hot rolled steel (Base)
PBT resin (Cap)
Glass mirror (Mirror)

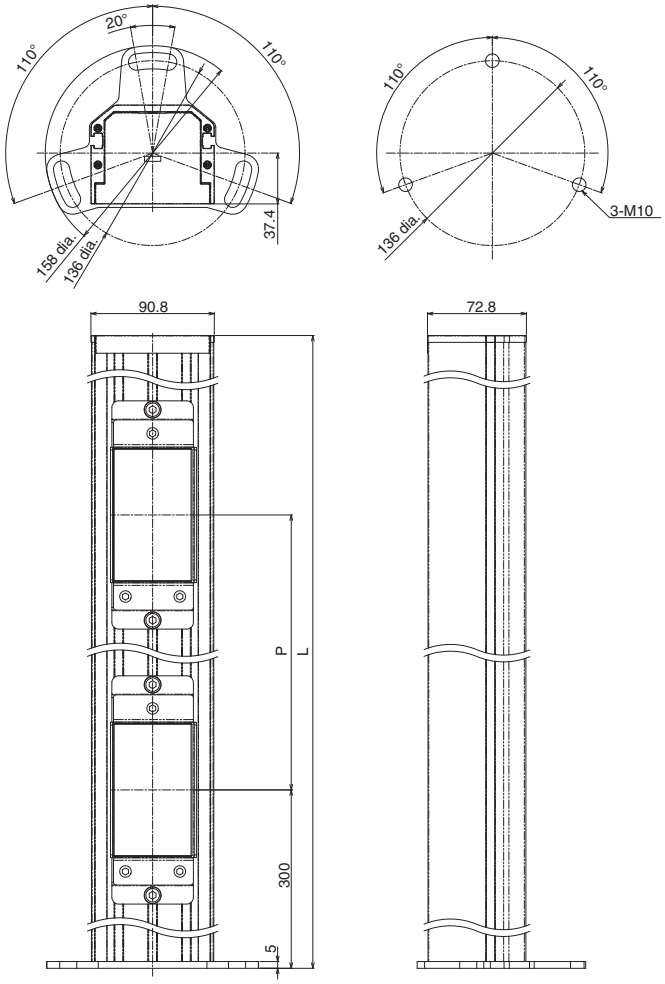
| Model | Dimension L |
|---|---|
| **F39-SML0990** | 990 |
| **F39-SML1310** | 1310 |
| **F39-SML1630** | 1630 |
| **F39-SML1950** | 1950 |

**• Assembly Dimensions (Mount-Column Adjustable Base /Mirror Column)**
**F39-STB/F39-SML□□□□**




| Model | Dimension L |
|---|---|
| **F39-SML0990** | 990 |
| **F39-SML1310** | 1310 |
| **F39-SML1630** | 1630 |
| **F39-SML1950** | 1950 |

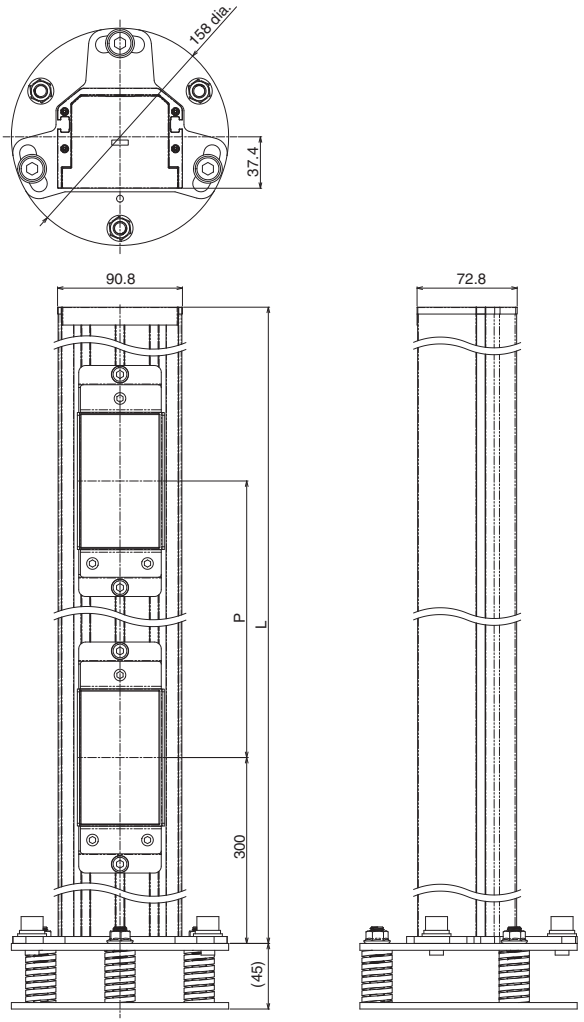
**F39-PML□□□□**




Material: Aluminum alloy (Housing)
Hot rolled steel (Base, Mirror base)
PBT resin (Cap)
Glass mirror (Mirror)

| Model | Dimension L | Dimension P | Mirror Q'ty |
|---|---|---|---|
| **F39-PML0990-2** | 990 | 500 | 2 |
| **F39-PML1310-3** | 1310 | 400 | 3 |
| **F39-PML1310-4** | | 300 | 4 |
| **F39-PML1630-4** | 1630 | 400 | 4 |

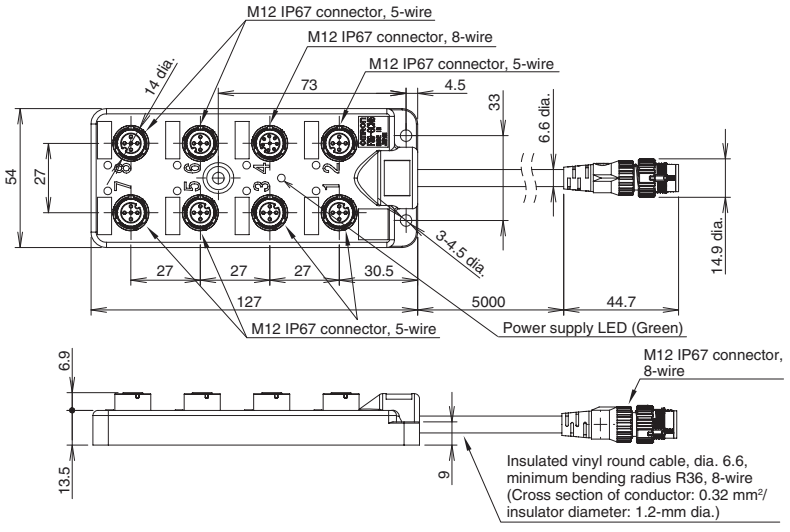
**• Assembly Dimensions (Mount-Column Adjustable Base /Mirror Column)**
**F39-STB/F39-PML□□□□**




| Model | Dimension L | Dimension P | Mirror Q'ty |
|---|---|---|---|
| **F39-PML0990-2** | 990 | 500 | 2 |
| **F39-PML1310-3** | 1310 | 400 | 3 |
| **F39-PML1310-4** | | 300 | 4 |
| **F39-PML1630-4** | 1630 | 400 | 4 |

## Muting Sensor Connection Box

**F39-GCN5**



## Safety Light Curtain F3SG-SR Series IP69K Model

# F3SG-SR-K

## IP69K protection for high-pressure wash-down applications

- Offers the same specifications and functionality as F3SG-4SRB□□ standard model.
  Detection capability of 14- and 25-mm dia.
- Conforms to major international standards

For the most recent information on models that have been certified for safety standards, refer to your local OMRON website.

**F3SG-SR-K**

## Model Number Legend

### IP69K Model F3SG-SR-K

**F3SG-4SRB □□□□ - □□ - □ - K**
(1) (2) (3) (4) (5) (6)

| No. | Classification | Code | Meaning | Remarks |
|---|---|---|---|---|
| (1) | ESPE | 4 | Type 4 | |
| (2) | Function | B | Standard | |
| (3) | Protective height | 0320 - 1800 | Protective height for finger protection (mm) | |
| | | 0320 - 1840 | Protective height for hand protection (mm) | |
| (4) | Detection capability | 14 | Finger protection (Detection capability: 14-mm dia.) | |
| | | 25 | Hand protection (Detection capability: 25-mm dia.) | |
| (5) | Option 1 | Blank | Set of emitter and receiver | |
| | | L | Emitter | Not for sale |
| | | D | Receiver | Not for sale |
| (6) | Option 2 | K | Water/oil resistance IP69K | |

**Note: 1.** The purpose of this model number legend is to provide understanding of the meaning of specifications from the model number. Models are not available for all combinations of code numbers.
See *Ordering Information* on page 105 for details.
**2.** The bracket is not included. Order brackets sold separately.
**3.** Connection cables are integrated with the safety light curtain.

# Ordering Information

## Safety Light Curtain IP69K Model

## Main Unit F3SG-SR-K

**Finger protection (Detection capability: 14-mm dia.)**

| Number of beams | Protective height (mm) | Standard |
|---|---|---|
| | | Model |
| 31 | 320 | **F3SG-4SRB0320-14-K** |
| 39 | 400 | **F3SG-4SRB0400-14-K** |
| 47 | 480 | **F3SG-4SRB0480-14-K** |
| 55 | 560 | **F3SG-4SRB0560-14-K** |
| 63 | 640 | **F3SG-4SRB0640-14-K** |
| 71 | 720 | **F3SG-4SRB0720-14-K** |
| 79 | 800 | **F3SG-4SRB0800-14-K** |
| 87 | 880 | **F3SG-4SRB0880-14-K** |
| 95 | 960 | **F3SG-4SRB0960-14-K** |
| 99 | 1,000 | **F3SG-4SRB1000-14-K** |
| 119 | 1,200 | **F3SG-4SRB1200-14-K** |
| 139 | 1,400 | **F3SG-4SRB1400-14-K** |
| 159 | 1,600 | **F3SG-4SRB1600-14-K** |
| 179 | 1,800 | **F3SG-4SRB1800-14-K** |

**Note:** Connection cables are integrated with the safety light curtain.

**Hand protection (Detection capability: 25-mm dia.)**

| Number of beams | Protective height (mm) | Standard |
|---|---|---|
| | | Model |
| 16 | 320 | **F3SG-4SRB0320-25-K** |
| 20 | 400 | **F3SG-4SRB0400-25-K** |
| 24 | 480 | **F3SG-4SRB0480-25-K** |
| 28 | 560 | **F3SG-4SRB0560-25-K** |
| 32 | 640 | **F3SG-4SRB0640-25-K** |
| 36 | 720 | **F3SG-4SRB0720-25-K** |
| 40 | 800 | **F3SG-4SRB0800-25-K** |
| 44 | 880 | **F3SG-4SRB0880-25-K** |
| 48 | 960 | **F3SG-4SRB0960-25-K** |
| 50 | 1,000 | **F3SG-4SRB1000-25-K** |
| 52 | 1,040 | **F3SG-4SRB1040-25-K** |
| 56 | 1,120 | **F3SG-4SRB1120-25-K** |
| 60 | 1,200 | **F3SG-4SRB1200-25-K** |
| 64 | 1,280 | **F3SG-4SRB1280-25-K** |
| 68 | 1,360 | **F3SG-4SRB1360-25-K** |
| 72 | 1,440 | **F3SG-4SRB1440-25-K** |
| 76 | 1,520 | **F3SG-4SRB1520-25-K** |
| 80 | 1,600 | **F3SG-4SRB1600-25-K** |
| 84 | 1,680 | **F3SG-4SRB1680-25-K** |
| 88 | 1,760 | **F3SG-4SRB1760-25-K** |
| 92 | 1,840 | **F3SG-4SRB1840-25-K** |

**Note:** Connection cables are integrated with the safety light curtain.

# Accessories (Sold separately)

## Optional Accessories for F3SG-SR-K

**Bracket**

| Appearance | Type | Application | Model |
|---|---|---|---|
| Bracket to mount the F3SG-SR-K.<br>360° mounting including side mounting and backside mounting possible.<br>Beam alignment after mounting of F3SG-SR/PG not possible. |  | IP69K Model Mounting Bracket<br>(Top/Bottom Bracket) | **F39-LSGTB-K** |

# Ratings and Specifications

## Safety Light Curtain IP69K Model
## Main Unit F3SG-SR-K

□□□□ in the model number indicates the protective height in millimeters.

| Model | | | | F3SG-4SRB□□□□-14-K | F3SG-4SRB□□□□-25-K |
|---|---|---|---|---|---|
| Performance | Object resolution (Detection capability) | | | Opaque objects | |
| | | | | 14-mm dia. | 25-mm dia. |
| | Beam gap | | | 10 mm | 20 mm |
| | Number of beams | | | 31 to 179 | 16 to 92 |
| | Lens size | | | 4.4 × 3.4 mm (W × H) | 6.7 × 4.5 mm (W × H) |
| | Protective height | | | 320 to 1,800 mm | 320 to 1,840 mm |
| | Operating range | Long | | 0.3 to 8.0 m (Typ. 12.0 m) | 0.3 to 16.0 m (Typ. 24.0 m) |
| | | Short | | 0.3 to 2.4 m (Typ. 3.6 m) | 0.3 to 5.6 m (Typ. 8.4 m) |
| | | ✻ When operating at an ambient temperature of -10 to -30 °C, use the F3SG-SR with the operating range of 0.3 to 4.0 m in Long Mode and 0.3 to 1.2 m in Short Mode. | | | |
| | Response time | Normal mode | ON to OFF | Optical synchronization: 8 to 18 ms<br>Wired synchronization: 10 to 21 ms | Optical synchronization: 8 to 13 ms<br>Wired synchronization: 10 to 17 ms |
| | | | OFF to ON | Optical synchronization: 40 to 90 ms<br>Wired synchronization: 50 to 105 ms | Optical synchronization: 40 to 90 ms<br>Wired synchronization: 50 to 85 ms |
| | | ×2 Slow mode ✻ | ON to OFF | Optical synchronization: 16 to 36 ms<br>Wired synchronization: 20 to 42 ms | Optical synchronization: 16 to 26 ms<br>Wired synchronization: 20 to 34 ms |
| | | | OFF to ON | Optical synchronization: 80 to 180 ms<br>Wired synchronization: 100 to 210 ms | Optical synchronization: 80 to 130 ms<br>Wired synchronization: 100 to 170 ms |
| | | ×4 Slow mode ✻ | ON to OFF | Optical synchronization: 32 to 72 ms<br>Wired synchronization: 40 to 84 ms | Optical synchronization: 32 to 52 ms<br>Wired synchronization: 40 to 68 ms |
| | | | OFF to ON | Optical synchronization: 160 to 360 ms<br>Wired synchronization: 200 to 420 ms | Optical synchronization: 160 to 260 ms<br>Wired synchronization: 200 to 340 ms |
| | | ×8 Slow mode ✻ | ON to OFF | Optical synchronization: 64 to 144 ms<br>Wired synchronization: 80 to 168 ms | Optical synchronization: 64 to 104 ms<br>Wired synchronization: 80 to 136 ms |
| | | | OFF to ON | Optical synchronization: 320 to 720 ms<br>Wired synchronization: 400 to 840 ms | Optical synchronization: 320 to 520 ms<br>Wired synchronization: 400 to 680 ms |
| | | ✻ Selectable by SD Manager 3. | | | |
| | 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 | | | 3 s max. | |

| Model | | | F3SG-4SRB□□□□-14-K | F3SG-4SRB□□□□-25-K |
|---|---|---|---|---|
| Electrical | Power supply voltage (Vs) | | SELV/PELV 24 VDC ±20% (ripple p-p 10% max.) | |
| | Current consumption | | Refer to page 109. | |
| | Safety outputs (OSSD) | | Two PNP or NPN transistor outputs (PNP or NPN is selectable by wiring of power supply.)<br>Load current: 300 mA max., Residual voltage: 2 V max. (except for voltage drop due to cable extension),<br>Capacitive load: 1 µF max., Inductive load: 2.2 H max. ✻1✻2<br>Leakage current: 1 mA max. (PNP), 2 mA max. (NPN) ✻3<br>✻1. The residual voltage is 3 V max. when the Intelligent Tap is connected to the sensor.<br>✻2. 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>✻3. These values must be taken into consideration when connecting elements including a capacitive load such as a capacitor. | |
| | Auxiliary output | | Two PNP or NPN transistor 1 outputs (PNP or NPN is selectable by wiring of power supply.)<br>Load current: 100 mA max., Residual voltage: 2 V max. ✻<br>✻ The residual voltage is 3 V max. when the Intelligent Tap is connected to the sensor. | |
| | Output operation mode | Safety output | Light-ON (Safety outputs are turned to the ON state when the receiver receives an emitting signal.) | |
| | | Auxiliary output | Safety output (Inverted signal output: Enable) (default) (Configurable by SD Manager 3) | |
| | Input voltage | TEST | Light emission stops when connected to 24 VDC<br>ON voltage: Vs-3 V to Vs (short circuit current: approx. 5.0 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 6.0 mA) ✻<br>Light emission stops when connected to 0 VDC<br>ON voltage: 0 to 3 V (short circuit current: approx. 6.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 5.0 mA) ✻ | |
| | | OPERATING RANGE SELECT INPUT | Long: 12 V to Vs (short circuit current: approx. 4.2 mA) ✻ or open<br>Short: 0 to 3 V (short circuit current: approx. 4.2 mA) | |
| | | RESET/EDM | PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 9.5 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 13.0 mA) ✻<br>NPN ON voltage: 0 to 3 V (short circuit current: approx. 13.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 9.5 mA) ✻ | |
| | | MUTE A/B, RE-RESET, PSDI | PNP ON voltage: Vs-3V to Vs (short circuit current: approx. 4.5 mA) ✻<br>OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 7.0 mA) ✻<br>NPN ON voltage: 0 to 3 V (short circuit current: approx. 7.0 mA)<br>OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 4.5 mA) ✻ | |
| | | ✻ The Vs indicates a supply voltage value in your environment. | | |
| | Overvoltage category (IEC 60664-1) | | II | |
| | Indicators | | Refer to page 126. | |
| | Protective circuit | | Output short-circuit protection | |
| | Insulation resistance | | 20 M or higher (500 VDC megger) | |
| | Dielectric strength | | 1,000 VAC, 50/60 Hz (1 min) | |

| Model | | | F3SG-4SRB□□□□-14-K | F3SG-4SRB□□□□-25-K |
|---|---|---|---|---|
| Functional | Mutual interference prevention | | Optical synchronization: The scan code is fixed to Code A.<br>Wired synchronization: in up to 3 sets | |
| | 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>PSDI<br>Fixed Blanking/Floating Blanking<br>Reduced Resolution<br>Muting/Override<br>Mutual Interference Prevention<br>PNP/NPN Selection<br>Response Time Adjustment | |
| Environmental | Ambient temperature | Operating | -30 to 55 °C (non-icing) | |
| | | Storage | -30 to 70 °C | |
| | 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, ISO 20653: IP69K | |
| | Vibration resistance (IEC 61496-1) | | 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes | |
| | Shock resistance (IEC 61496-1) | | 100 m/s$^2$, 1000 shocks for all 3 axes | |
| | Pollution degree (IEC 60664-1) | | 3 | |
| Connections | Root cable | Type of connection | Open-ended type | |
| | | Number of wires | Emitter: 5, Receiver: 8 | |
| | | Cable length | 15 m | |
| | | Cable diameter | 6 mm | |
| | | Minimum bending radius | R5 mm | |
| | Cable extension | Refer to page 60 for restrictions on cable extension. | | |
| | | Root cable | In optical synchronization: 100 m max. ✻ between power supply and emitter and between power supply and receiver<br>In wired synchronization: 100 m max. ✻ between power supply and emitter, between power supply and receiver, and between emitter and receiver<br>✻ When the Intelligent Tap (F39-SGIT-IL3) is connected to the sensor, this applies in the case of the rated power supply of 24 VDC to 24 VDC +20%. | |
| Material | | | Pipe: Acrylic resin<br>Cap: SUS316L | |
| Weight | | | Refer to page 109. | |
| Included accessories | | | Instruction Sheet, Quick Installation Manual, Troubleshooting Guide Sticker | |
| Conformity | Conforming standards | | Refer to page 140. | |
| | Type of ESPE (IEC 61496-1) | | Type 4 | |
| | Performance Level (PL)/ Safety category | | PL e/Category 4 (EN ISO 13849-1:2015) | |
| | $PFH_D$ | | 1.1×10$^{-8}$ max. (IEC 61508) | |
| | Proof test interval $T_M$ | | Every 20 years (IEC 61508) | |
| | SFF | | 99% (IEC 61508) | |
| | HFT | | 1 (IEC 61508) | |
| | Classification | | Type B (IEC 61508-2) | |

# Models/Response Time/Current Consumption/Weight

## Finger protection (Detection capability: 14-mm dia.)

### Models and Response Times

| Model | Number of beams | Protective height [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|
| | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4SRB0320-14-K | 31 | 320 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0400-14-K | 39 | 400 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0480-14-K | 47 | 480 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB0560-14-K | 55 | 560 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB0640-14-K | 63 | 640 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB0720-14-K | 71 | 720 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB0800-14-K | 79 | 800 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB0880-14-K | 87 | 880 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB0960-14-K | 95 | 960 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1000-14-K | 99 | 1000 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1200-14-K | 119 | 1200 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1400-14-K | 139 | 1400 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1600-14-K | 159 | 1600 | 18 | 90 | 190 | 21 | 105 |
| F3SG-4SRB1800-14-K | 179 | 1800 | 18 | 90 | 190 | 21 | 105 |

### Models, Current Consumption and Weight

| Model | Number of beams | Protective height [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| F3SG-4SRB0320-14-K | 31 | 320 | 74 | 100 | 5.2 | 6.7 |
| F3SG-4SRB0400-14-K | 39 | 400 | 77 | 101 | 5.5 | 7.0 |
| F3SG-4SRB0480-14-K | 47 | 480 | 79 | 103 | 5.8 | 7.4 |
| F3SG-4SRB0560-14-K | 55 | 560 | 82 | 104 | 6.1 | 7.7 |
| F3SG-4SRB0640-14-K | 63 | 640 | 85 | 106 | 6.4 | 8.1 |
| F3SG-4SRB0720-14-K | 71 | 720 | 87 | 107 | 6.7 | 8.5 |
| F3SG-4SRB0800-14-K | 79 | 800 | 90 | 109 | 7.0 | 8.8 |
| F3SG-4SRB0880-14-K | 87 | 880 | 93 | 110 | 7.3 | 9.2 |
| F3SG-4SRB0960-14-K | 95 | 960 | 95 | 112 | 7.6 | 9.6 |
| F3SG-4SRB1000-14-K | 99 | 1000 | 97 | 112 | 7.7 | 9.8 |
| F3SG-4SRB1200-14-K | 119 | 1200 | 103 | 116 | 8.5 | 10.6 |
| F3SG-4SRB1400-14-K | 139 | 1400 | 110 | 120 | 9.2 | 11.5 |
| F3SG-4SRB1600-14-K | 159 | 1600 | 117 | 124 | 10.0 | 12.5 |
| F3SG-4SRB1800-14-K | 179 | 1800 | 124 | 128 | 10.7 | 13.4 |

## Hand protection (Detection capability: 25-mm dia.)

### Models and Response Times

| Model | Number of beams | Protective height [mm] | Response time (Optical synchronization) [ms] | | | Response time (Wired synchronization) [ms] | |
|---|---|---|---|---|---|---|---|
| | | | ON to OFF | OFF (synchronized) to ON | OFF (not synchronized) to ON | ON to OFF | OFF to ON |
| F3SG-4SRB0320-25-K | 16 | 320 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0400-25-K | 20 | 400 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0480-25-K | 24 | 480 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0560-25-K | 28 | 560 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0640-25-K | 32 | 640 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0720-25-K | 36 | 720 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0800-25-K | 40 | 800 | 8 | 40 | 140 | 10 | 50 |
| F3SG-4SRB0880-25-K | 44 | 880 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB0960-25-K | 48 | 960 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1000-25-K | 50 | 1000 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1040-25-K | 52 | 1040 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1120-25-K | 56 | 1120 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1200-25-K | 60 | 1200 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1280-25-K | 64 | 1280 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1360-25-K | 68 | 1360 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1440-25-K | 72 | 1440 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1520-25-K | 76 | 1520 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1600-25-K | 80 | 1600 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1680-25-K | 84 | 1680 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1760-25-K | 88 | 1760 | 13 | 65 | 165 | 17 | 85 |
| F3SG-4SRB1840-25-K | 92 | 1840 | 13 | 65 | 165 | 17 | 85 |

### Models, Current Consumption and Weight

| Model | Number of beams | Protective height [mm] | Current consumption [mA] | | Weight [kg] | |
|---|---|---|---|---|---|---|
| | | | Emitter | Receiver | Net | Gross |
| F3SG-4SRB0320-25-K | 16 | 320 | 65 | 97 | 5.2 | 6.7 |
| F3SG-4SRB0400-25-K | 20 | 400 | 66 | 98 | 5.5 | 7.0 |
| F3SG-4SRB0480-25-K | 24 | 480 | 68 | 99 | 5.8 | 7.4 |
| F3SG-4SRB0560-25-K | 28 | 560 | 70 | 99 | 6.1 | 7.7 |
| F3SG-4SRB0640-25-K | 32 | 640 | 72 | 100 | 6.4 | 8.1 |
| F3SG-4SRB0720-25-K | 36 | 720 | 74 | 101 | 6.7 | 8.5 |
| F3SG-4SRB0800-25-K | 40 | 800 | 76 | 101 | 7.0 | 8.8 |
| F3SG-4SRB0880-25-K | 44 | 880 | 78 | 102 | 7.3 | 9.2 |
| F3SG-4SRB0960-25-K | 48 | 960 | 80 | 102 | 7.6 | 9.6 |
| F3SG-4SRB1000-25-K | 50 | 1000 | 81 | 103 | 7.7 | 9.8 |
| F3SG-4SRB1040-25-K | 52 | 1040 | 82 | 103 | 7.9 | 9.9 |
| F3SG-4SRB1120-25-K | 56 | 1120 | 84 | 104 | 8.2 | 10.3 |
| F3SG-4SRB1200-25-K | 60 | 1200 | 86 | 104 | 8.5 | 10.6 |
| F3SG-4SRB1280-25-K | 64 | 1280 | 88 | 105 | 8.8 | 11.0 |
| F3SG-4SRB1360-25-K | 68 | 1360 | 90 | 106 | 9.1 | 11.4 |
| F3SG-4SRB1440-25-K | 72 | 1440 | 92 | 106 | 9.4 | 11.7 |
| F3SG-4SRB1520-25-K | 76 | 1520 | 93 | 107 | 9.7 | 12.1 |
| F3SG-4SRB1600-25-K | 80 | 1600 | 95 | 107 | 10.0 | 12.5 |
| F3SG-4SRB1680-25-K | 84 | 1680 | 97 | 108 | 10.3 | 12.8 |
| F3SG-4SRB1760-25-K | 88 | 1760 | 99 | 109 | 10.6 | 13.2 |
| F3SG-4SRB1840-25-K | 92 | 1840 | 101 | 109 | 10.9 | 13.5 |

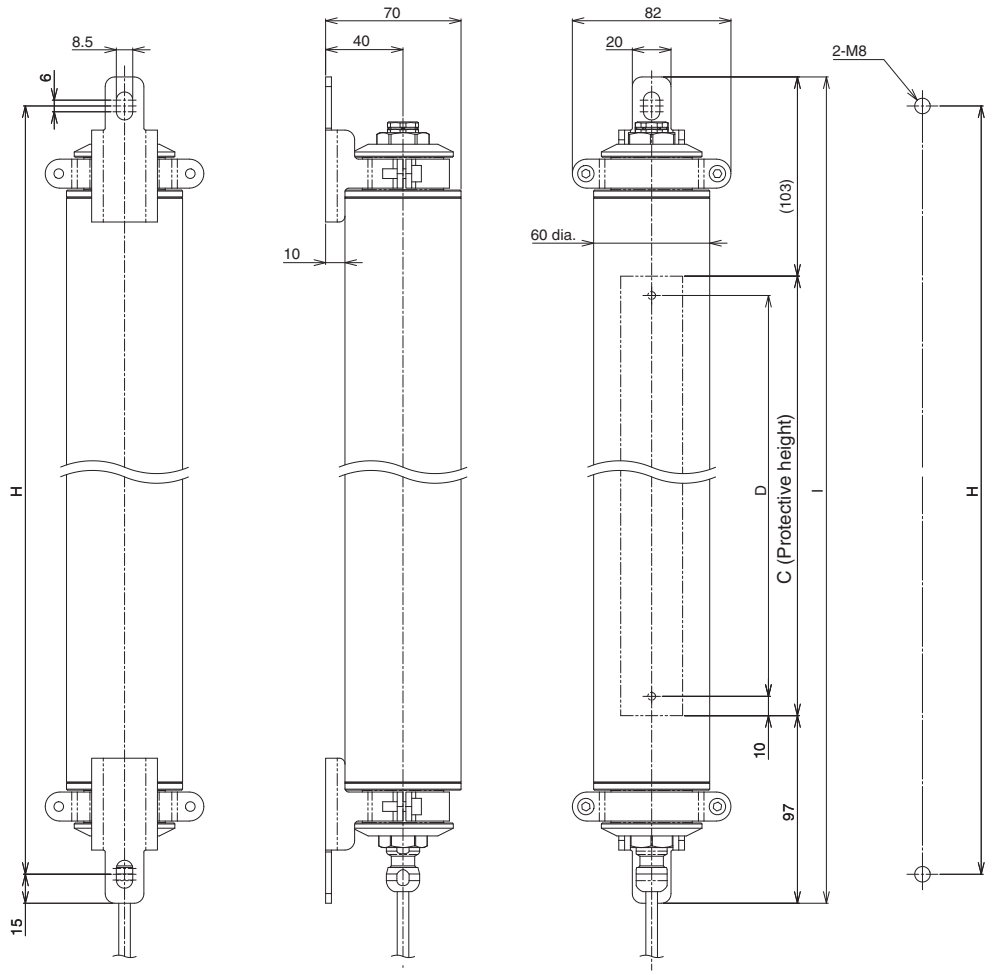
# Dimensions

(Unit: mm)

## F3SG-SR-K Main Unit

### Mounted with IP69K Model Mounting Brackets (F39-LSGTB-K)

**Side mounting and backside mounting**

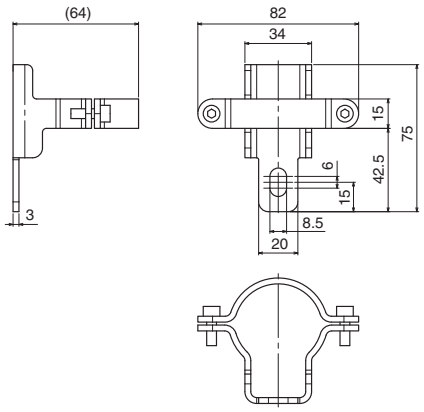



| | | |
|---|---|---|
| **Dimension C** | 4-digit number in model number (Protective height: △) | |
| **Dimension D** | F3SG-□SR□△△△△-14 | C-20 |
| | F3SG-□SR□△△△△-25 | |
| **Dimension H** | C+170 | |
| **Dimension I** | C+200 | |

## Accessories

### Bracket

**IP69K Model Mounting Bracket (F39-LSGTB-K, sold separately)**




Material: SUS316L

Common to F3SG-SR and F3SG-PG

# Connectable Safety Control Units

The F3SG-SR/PG in the PNP system can be connected to the safety control units listed in the table below.

| Connectable safety control units (PNP output) | | |
|---|---|---|
| G9SA-301 | G9SX-AD322-T | G9SP-N10S |
| G9SA-321-T□ | G9SX-ADA222-T | G9SP-N10D |
| G9SA-501 | G9SX-BC202 | G9SP-N20S |
| G9SB-200-B | G9SX-GS226-T15 | NE0A-SCPU01 |
| G9SB-200-D | | NE1A-SCPU01 |
| G9SB-301-B | | NE1A-SCPU02 |
| G9SB-301-D | | DST1-ID12SL-1 |
| G9SE-201 | | DST1-MD16SL-1 |
| G9SE-401 | | DST1-MRD08SL-1 |
| G9SE-221-T□ | | NX-SIH400 |
| F3SP-T01 ✻ | | NX-SID800 |
| | | GI-SMD1624 |
| | | GI-SID1224 |

✻ F3SP-T01 was discontinued at the end of March 2020.

The F3SG-SR/PG in the NPN system can be connected to the safety control unit listed in the table below.

| Connectable safety control units (NPN output) |
|---|
| G9SA-301-P |

For the connection to IO-Link with the Intelligent Tap, the F3SG-SR/PG can be connected to the IO-Link master unit listed in the table below.

| Connectable IO-Link master units ✻ |
|---|
| NX-ILM400 |
| GX-ILM08C |

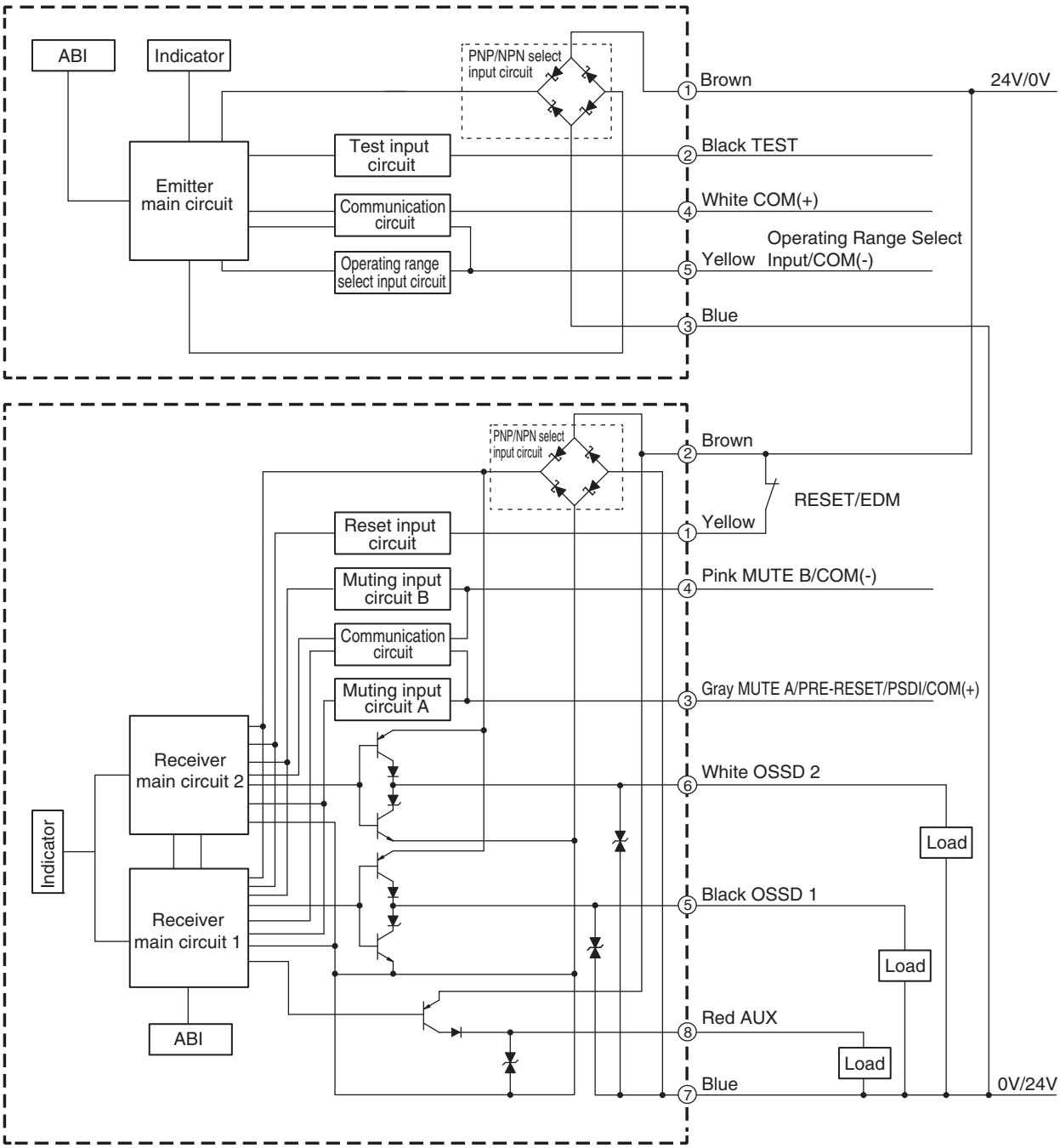
✻ Connectable to units supporting IO-Link Version 1.1.

# Input/Output Circuit

## Entire Circuit Diagram

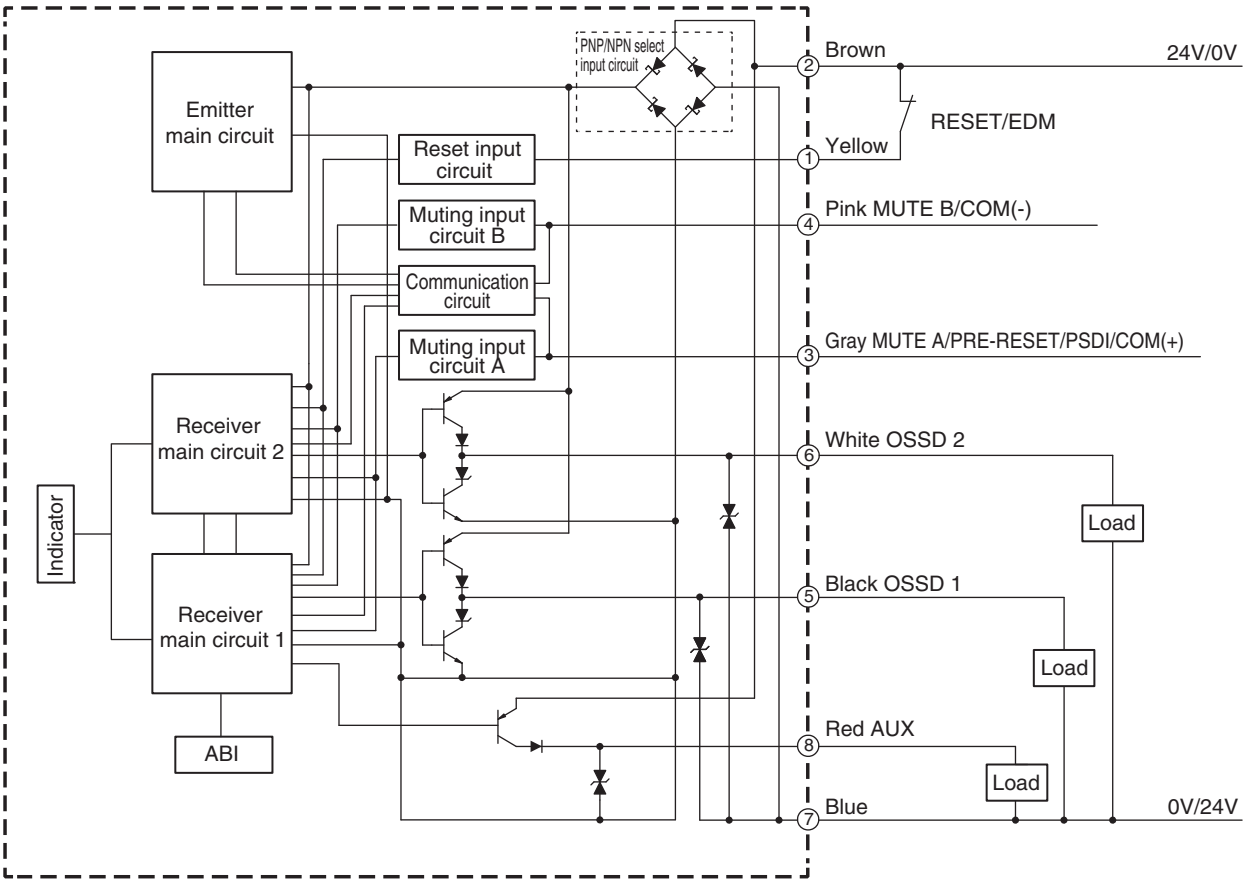
### F3SG-SR and F3SG-PGA-A/-L

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



## F3SG-PGA-C

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

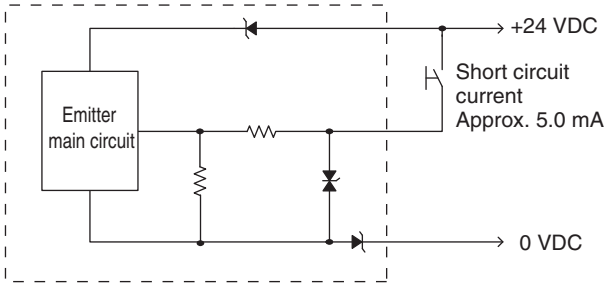


## Input Circuit Diagram by Function

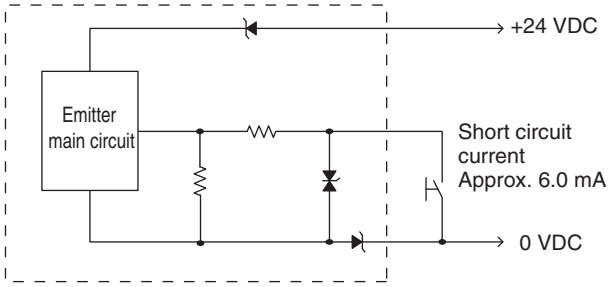
The input circuit diagrams of by function are shown below.

### Test Input ✻1

<Light emission stops when connected to 24 VDC>



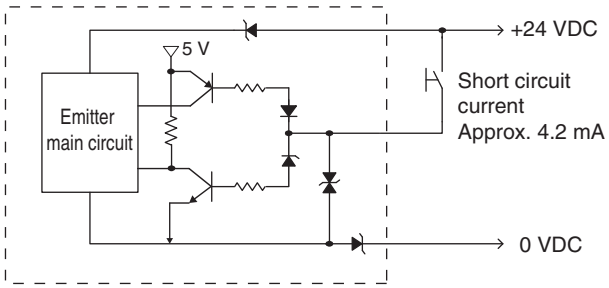

<Light emission stops when connected to 0 V>



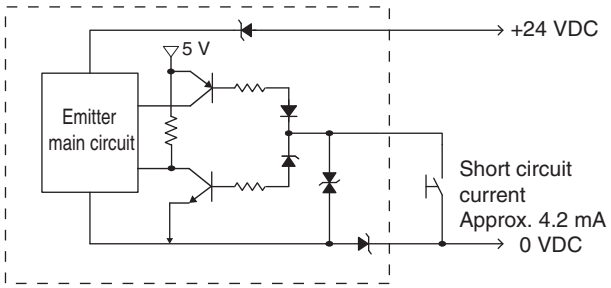

**✻1.** The F3SG-PGA-C does not have a test input function.

### Operating Range Select Input ✻2

<Long>



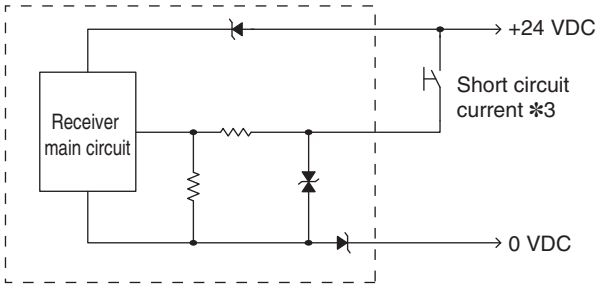

<Short>



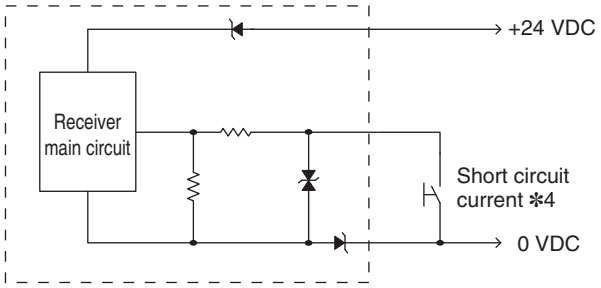

**✻2.** The F3SG-PGA-A/-C do not have an operation range select input function.

### RESET/EDM, MUTE A/B

<PNP>




<NPN>




✻3. Short circuit current: approx. 9.5 mA (RESET/EDM), approx. 4.5 mA (MUTE A/B)

✻4. Short circuit current: approx. 13.0 mA (RESET/EDM), approx. 7.0 mA (MUTE A/B)

# Common to F3SG-SR and F3SG-PG

# Connections (Basic Wiring Diagram)

## F3SG-SR/PG

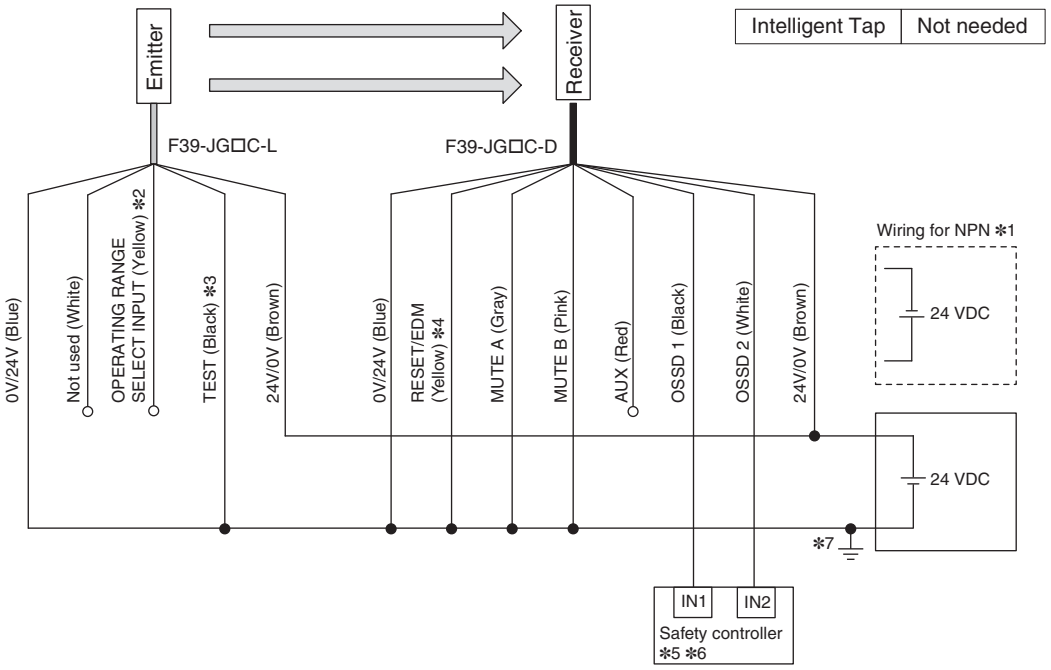
Examples of a motor control system using the F3SG-SR/PG are shown below. The examples are equivalent to up to PLe, Category 4 (ISO 13849-1).

### Non-Muting System Wiring Examples

**Auto Reset Mode with Optical Synchronization and EDM Unused**

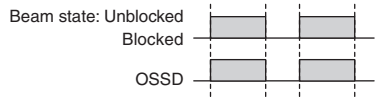
**[Wiring Example 1 (F3SG-SR and F3SG-PGA-A/-L)]**

| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Available |
| F3SG-SRB | Available | F3SG-PGA-C | Available |




| Function | Setting |
|---|---|
| EDM | EDM Disabled (factory default setting) |
| Interlock | Auto Reset (factory default setting) |
| Operating Range Selection | Long : Open the OPERATING RANGE SELECT INPUT line of the emitter or connect the line to 24 VDC. |
| Non-Muting system | Perform wiring according to the wiring diagram. |
| External Test not used | Connect the TEST line of the emitter to 0V/24V of the emitter. |
| Optical Synchronization | Do not connect the COM(+) and COM(-) lines of the of emitter and receiver with each other. |

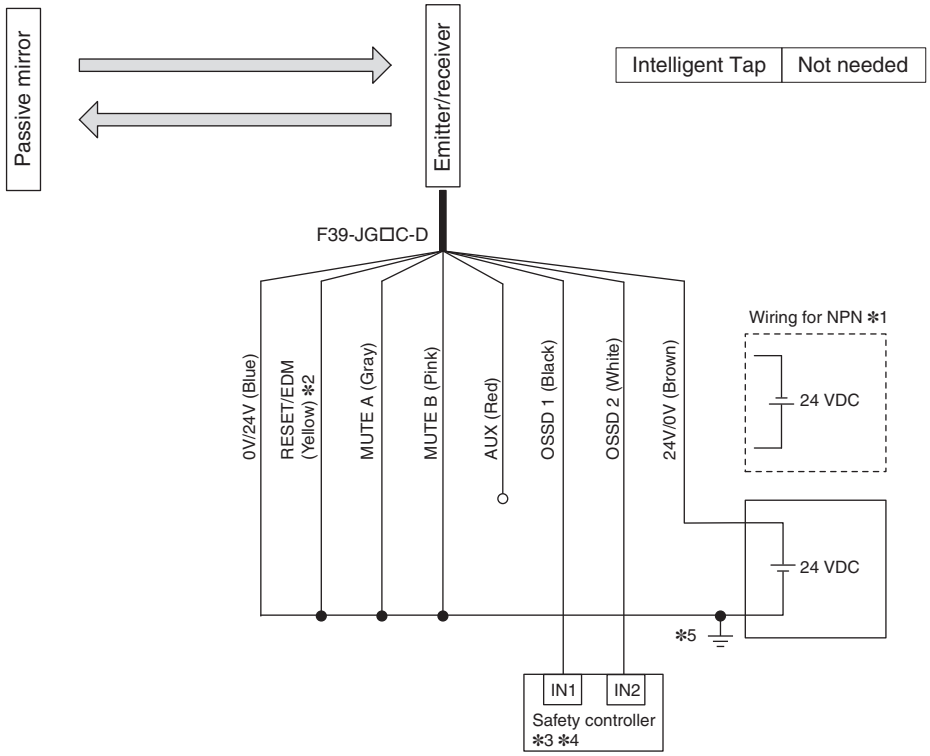
Timing chart




**✻1.** Reverse the polarity of the power supply when using in the NPN system. Select a safety controller of PNP or NPN type according to the system of your application.
**✻2.** Connect the line to 0 V if F3SG-SR or F3SG-PGA-L is used in Short Mode.
**✻3.** If External Test is used, refer to the *User's Manual* (Man.No.Z405).
**✻4.** Connect the line to 24V/0V (brown) of the receiver via a lockout reset switch (NC contact) if Lockout Reset is used.
**✻5.** Refer to page 112 for more information.
**✻6.** The safety controller and the F3SG-SR/PG must share the power supply or be connected to the common terminal of the power supply.
**✻7.** This is the case for a PELV circuit.

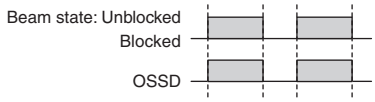
**Note:** Functional earth connection to the F3SG-SR/PG housing is unnecessary when you use the F3SG-SR/PG in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-SR/PG in an environment where there may be excessive noise from surroundings or stable power supply may be interfered, it is recommended the F3SG-SR/PG be connected to functional earth.
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 the *User's Manual* (Man.No.Z405) for more information.

**[Wiring Example 2 (F3SG-PGA-C)]**




| Function | Setting |
|---|---|
| EDM | EDM Disabled (factory default setting) |
| Interlock | Auto Reset (factory default setting) |
| Non-Muting system | Perform wiring according to the wiring diagram. |
| Optical Synchronization | --- |

Timing chart



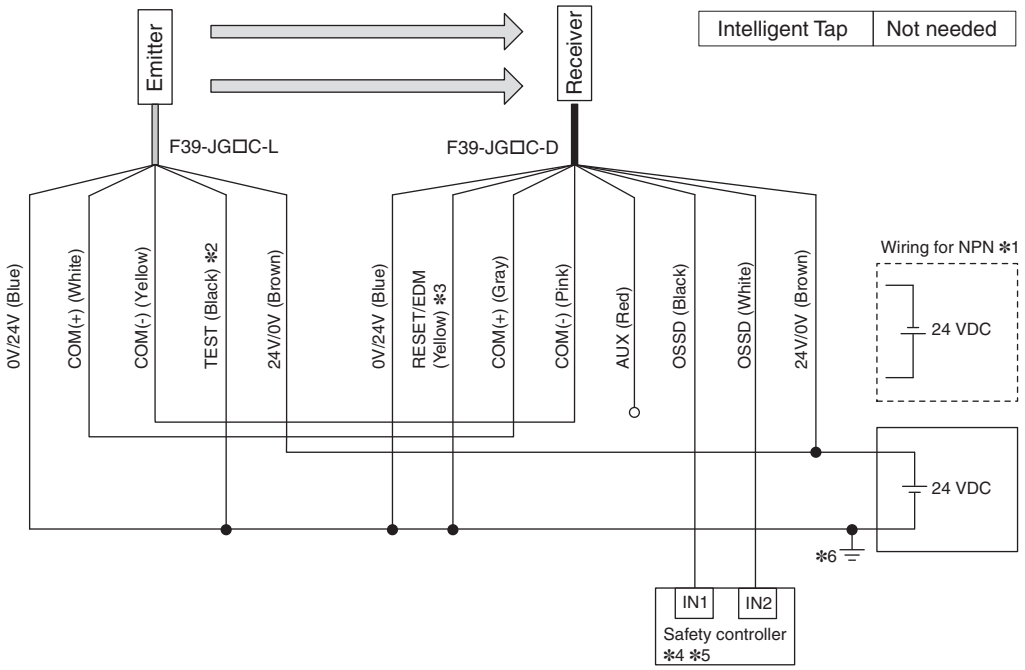

**✻1.** Reverse the polarity of the power supply when using in the NPN system. Select a safety controller of PNP or NPN type according to the system of your application.
**✻2.** Connect the line to 24V/0V (brown) of the receiver via a lockout reset switch (NC contact) if Lockout Reset is used.
**✻3.** Refer to page 112 for more information.
**✻4.** The safety controller and the F3SG-SR/PG must share the power supply or be connected to the common terminal of the power supply.
**✻5.** This is the case for a PELV circuit.

**Note:** Functional earth connection to the F3SG-SR/PG housing is unnecessary when you use the F3SG-SR/PG in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-SR/PG in an environment where there may be excessive noise from surroundings or stable power supply may be interfered, it is recommended the F3SG-SR/PG be connected to functional earth.
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 the *User's Manual* (Man.No.Z405) for more information.

### Auto Reset Mode with Wired Synchronization and EDM Unused

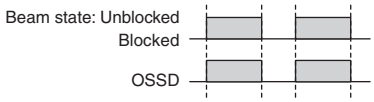
| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Available |
| F3SG-SRB | Available | F3SG-PGA-C | Not available |

**[Wiring Example]**




| Function | Setting |
|---|---|
| EDM | EDM Disabled (factory default setting) |
| Interlock | Auto Reset (factory default setting) |
| Operating Range Selection | Long (factory default setting) |
| Non-Muting system | Perform wiring according to the wiring diagram. |
| External Test not used | Connect the TEST line of the emitter to 0V/24V of the emitter. |
| Optical Synchronization | Connect the COM(+) and COM(-) line of the emitter and receiver with each other. |

Timing chart



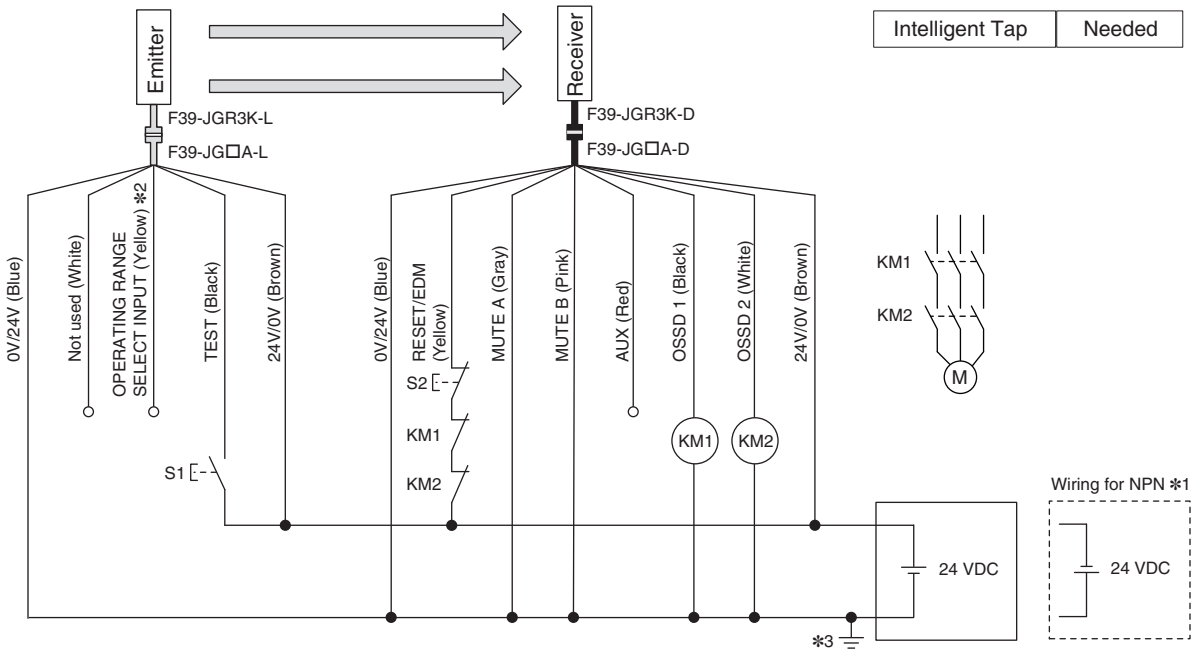

**✻1.** Reverse the polarity of the power supply when using in the NPN system. Select a safety controller of PNP or NPN type according to the system of your application.
**✻2.** If External Test is used, refer to the *User's Manual* (Man.No.Z405).
**✻3.** Connect the line to 24V/0V (brown) of the receiver via a lockout reset switch (NC contact) if Lockout Reset is used.
**✻4.** Refer to page 112 for more information.
**✻5.** The safety controller and the F3SG-SR/PG must share the power supply or be connected to the common terminal of the power supply.
**✻6.** This is the case for a PELV circuit.

**Note:** For the functional earth connection, refer to page 116.

## Manual Reset Mode with EDM

| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Available |
| F3SG-SRB | Available | F3SG-PGA-C | Available ✻6 |

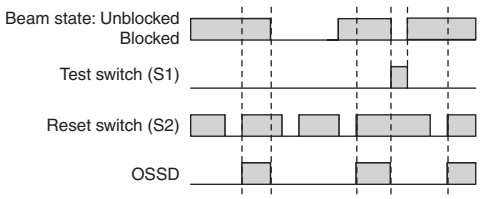
**[Wiring Example]**




□: Indicates a switch position.

| Function | Setting | |
|---|---|---|
| | DIP switch | SD Manager 3 |
| EDM ✻4 | EDM Enabled 3 ON | [External device monitoring] : Enable |
| Interlock ✻4 | Manual Reset (Start/ Restart Interlock) 4 ON 5 ON | [Start interlock] : Enable<br>[Restart interlock] : Enable |
| Operating Range Selection | Long : Open the OPERATING RANGE SELECT INPUT line of the emitter or connect the line to 24 VDC. | |
| Non-Muting system | Perform wiring according to the wiring diagram. | |
| | N/A | [Muting]: Disable ✻4 |
| External Test used ✻7 | Connect the TEST line of the emitter to 24V/0V of the emitter via a test switch (NO contact).✻5 | |
| | N/A | [External test signal inversion] : Disable |
| Optical Synchronization | Do not connect the COM(+) and COM(-) lines of the of emitter and receiver with each other. | |

Timing chart




S1: Test switch
S2: Lockout/interlock reset switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
M: Motor

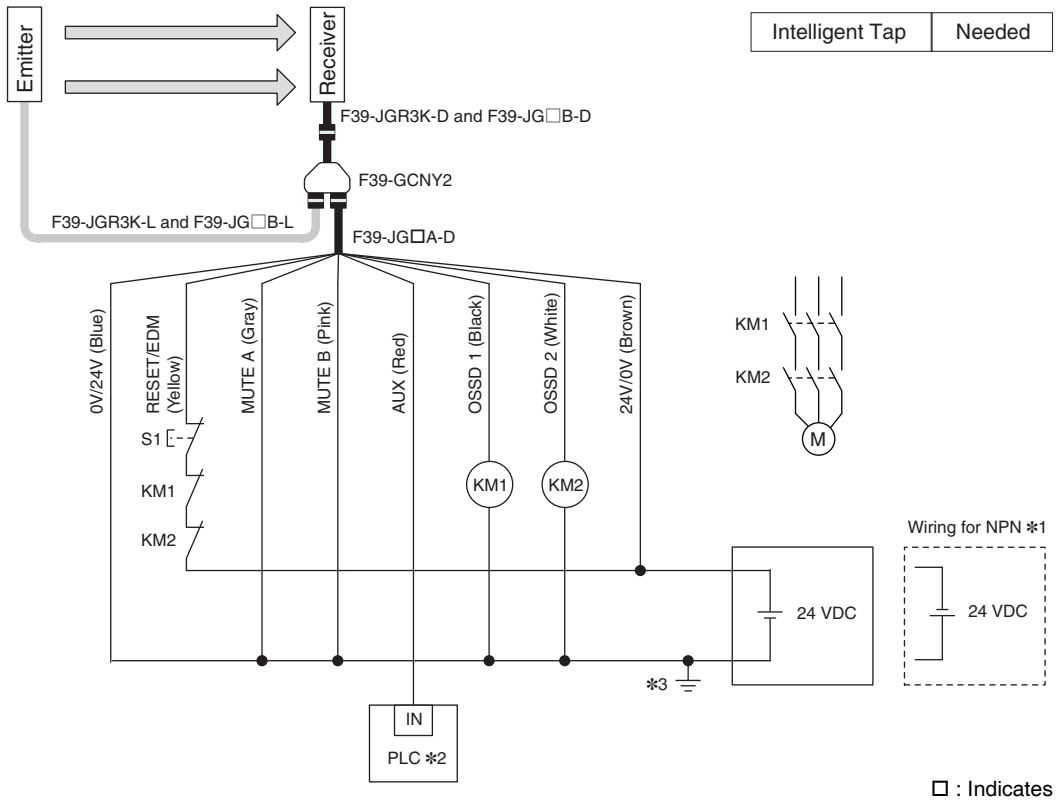
**✻1.** Reverse the polarity of the power supply when using in the NPN system.
**✻2.** Connect the line to 0 VDC if Operating Range Selection is used in Short Mode.
**✻3.** This is the case for a PELV circuit.
**✻4.** Set the function with the DIP Switches on the Intelligent Tap or the SD Manager 3, restore the settings to the F3SG-SR/PG, and perform wiring according to the wiring diagram.
**✻5.** This wiring example shows light emission stop when connected to 24 VDC with PNP setting, and light emission stop when connected to 0 VDC with NPN setting. If TEST switch is not needed, refer to the *User's Manual* (Man. No. Z405).
**✻6.** When wiring the emitter/receiver of the F3SG-PGA-C, follow the same wiring as for the receiver in the figure above. Wiring of the emitter side is not required.
**✻7.** The F3SG-PGA-C does not support the external test function.

**Note:** For the functional earth connection, refer to page 116.

## Manual Reset Mode with EDM and Y-Joint Plug/Socket Connector

| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Available |
| F3SG-SRB | Available | F3SG-PGA-C | Not available |

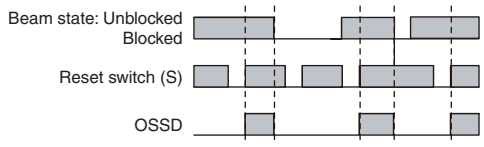
**[Wiring Example]**




□ : Indicates a switch position.

| Function | Setting | | |
|---|---|---|---|
| | DIP switch | | SD Manager 3 |
| EDM ✻4 | EDM Enabled | 3 ON | [External device monitoring] : Enable |
| Interlock ✻4 | Manual Reset (Start/ Restart Interlock) | 4 ON<br>5 ON | [Start interlock] : Enable<br>[Restart interlock] : Enable |
| Operating Range Selection | Long | | |
| Non-Muting system | Perform wiring according to the wiring diagram. | | |
| | N/A | | [Muting] : Disable ✻4 |
| External Test not used | N/A | | |
| Optical Synchronization | Connect the wires according to the diagram above. | | |

Timing chart




S1: Lockout/interlock reset switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
M: Motor
PLC: Programmable logic controller (Used for monitoring only. NOT related to safety system.)

**✻1.** Reverse the polarity of the power supply when using in the NPN system. Select a PLC of PNP or NPN type according to the system of your application.
**✻2.** When connecting to the PLC, the output mode must be changed with the SD Manager 3 according to your application. For the setting this function, refer to the *User's Manual* (Man.No.Z405).
**✻3.** This is the case for a PELV circuit.
**✻4.** Set the function with the DIP Switches on the Intelligent Tap or the SD Manager 3, restore the settings to the F3SG-SR/PG, and perform wiring according to the wiring diagram.

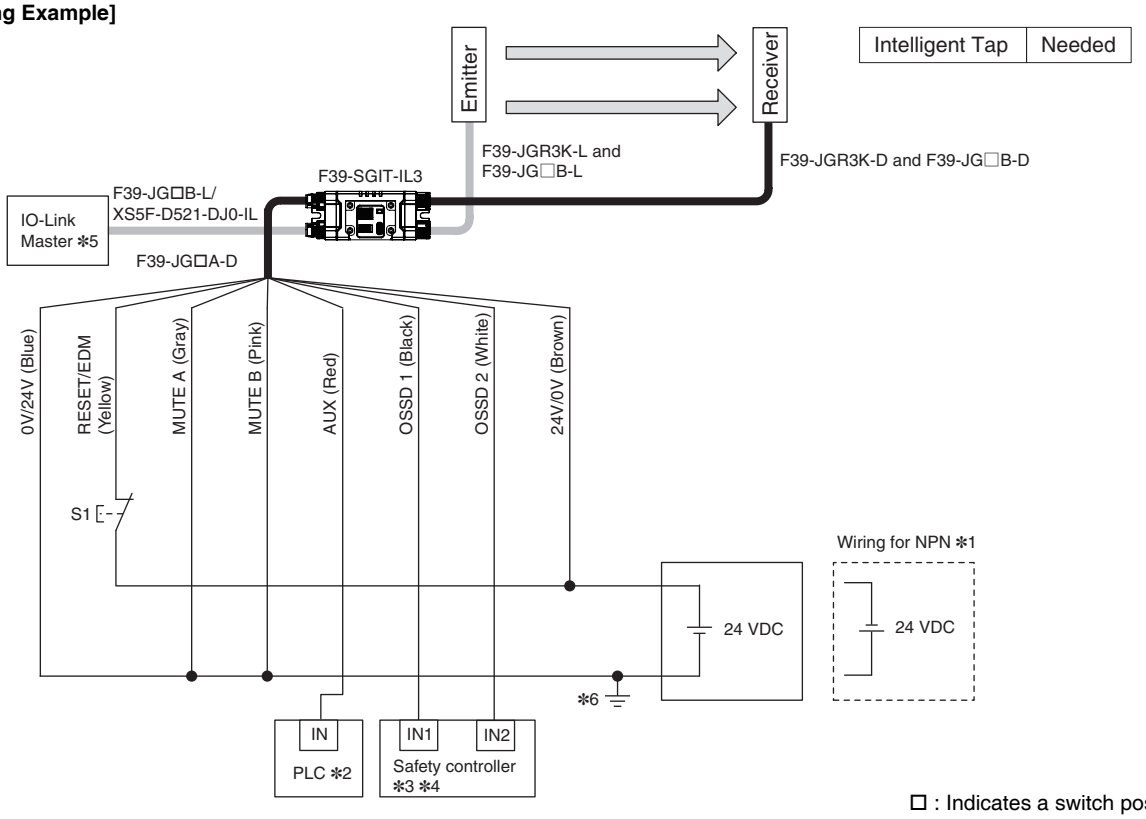
**Note: 1.** When using the Y-Joint Plug/Socket Connector (F39-GCNY2), the following functions are not available.
- External Test
- Operating Range Selection by wiring
- Wired Synchronization

**2.** For the functional earth connection, refer to page 116.

## Manual Reset Mode with Intelligent Tap

| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Available |
| F3SG-SRB | Available | F3SG-PGA-C | Available ✻9 |

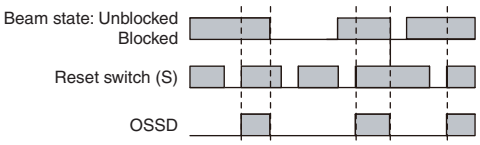
**[Wiring Example]**




□ : Indicates a switch position.

| Function | Setting | |
|---|---|---|
| | DIP switch | SD Manager 3 |
| EDM | EDM Disabled 3 ■□ ON | [External device monitoring] : Disable |
| Interlock ✻7 | Manual Reset (Start/ Restart Interlock) 4 ■□ ON, 5 □■ ON | [Start interlock] : Enable<br>[Restart interlock] : Enable |
| Operating Range Selection ✻8 | Long 8 ■□ ON | [Operating Range Selection] : Long mode |
| Non-Muting system | Perform wiring according to the wiring diagram. | |
| | N/A | [Muting] : Disable ✻7 |
| Test Input | N/A | |
| Wired Synchronization | Connect the emitter and receiver with the Intelligent Tap. | |

Timing chart




S1: Lockout/interlock reset switch
PLC: Programmable logic controller (Used for monitoring only. NOT related to safety system.)

**✻1.** Reverse the polarity of the power supply when using in the NPN system. Select a PLC and a safety controller of PNP or NPN type according to the system of your application.
**✻2.** When connecting to the PLC, the output mode must be changed with the SD Manager 3 according to your application. For the setting this function, refer to the *User's Manual* (Man.No.Z405).
**✻3.** Refer to page 112 for more information.
**✻4.** The safety controller and the F3SG-SR/PG must share the power supply or be connected to the common terminal of the power supply.
**✻5.** For connecting with the IO-Link Master unit, refer to an instruction manual of the IO-Link Master unit you use.
**✻6.** This is the case for a PELV circuit.
**✻7.** Set the function with the DIP Switches on the Intelligent Tap or the SD Manager 3, restore the settings to the F3SG-SR/PG, and perform wiring according to the wiring diagram.
**✻8.** To set the Short mode, set the function with the DIP Switches on the Intelligent Tap or the SD Manager 3, restore the settings to the F3SG-SR/PG, and perform wiring according to the wiring diagram.
**✻9.** When wiring the emitter/receiver of the F3SG-PGA-C, follow the same wiring as for the receiver in the figure above. Wiring of the emitter side is not required

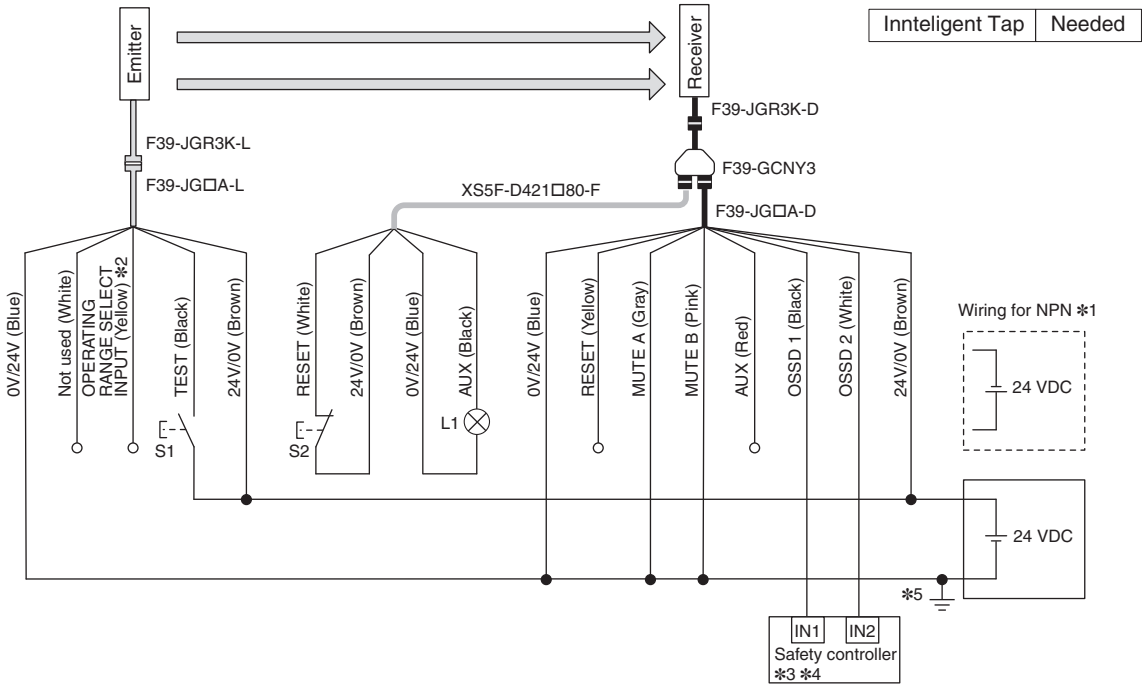
**Note: 1.** When using the Intelligent Tap (F39-SGIT-IL3) with the emitter and receiver connected, the following functions are not available.
- External Test
- Operating Range Selection by wiring
- Optical Synchronization

**2.** For the functional earth connection, refer to page 116.

### Manual Reset Mode with Reset Switch Connector

| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Available |
| F3SG-SRB | Available | F3SG-PGA-C | Available ✻9 |

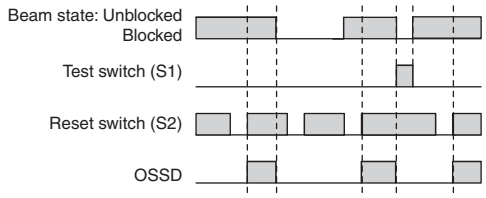
**[Wiring Example]**




□ : Indicates a switch position.

| Function | Setting | |
|---|---|---|
| | DIP switch | SD Manager 3 |
| EDM | EDM Disabled (factory default setting) | [External device monitoring] : Disable |
| Interlock ✻6 | Manual Reset (Start/ Restart Interlock) 4 □■ ON 5 ■□ ON | [Start interlock] : Enable [Restart interlock] : Enable |
| Operating Range Selection | Long : Open the OPERATING RANGE SELECT INPUT line of the emitter or connect the line to 24 VDC. | |
| Non-Muting system | Perform wiring according to the wiring diagram. | |
| | N/A | [Muting] : Disable ✻6 |
| External Test used ✻8 | Connect the TEST line of the emitter to 24V/0V of the emitter via a test switch (NO contact). ✻7 | |
| | N/A | [External test signal inversion] : Disable |
| Optical Synchronization | Open the COM(+) and COM(-) lines of the emitter. | |

Timing chart




S1: Test switch
S2: Lockout/interlock reset switch
L1: Lamp

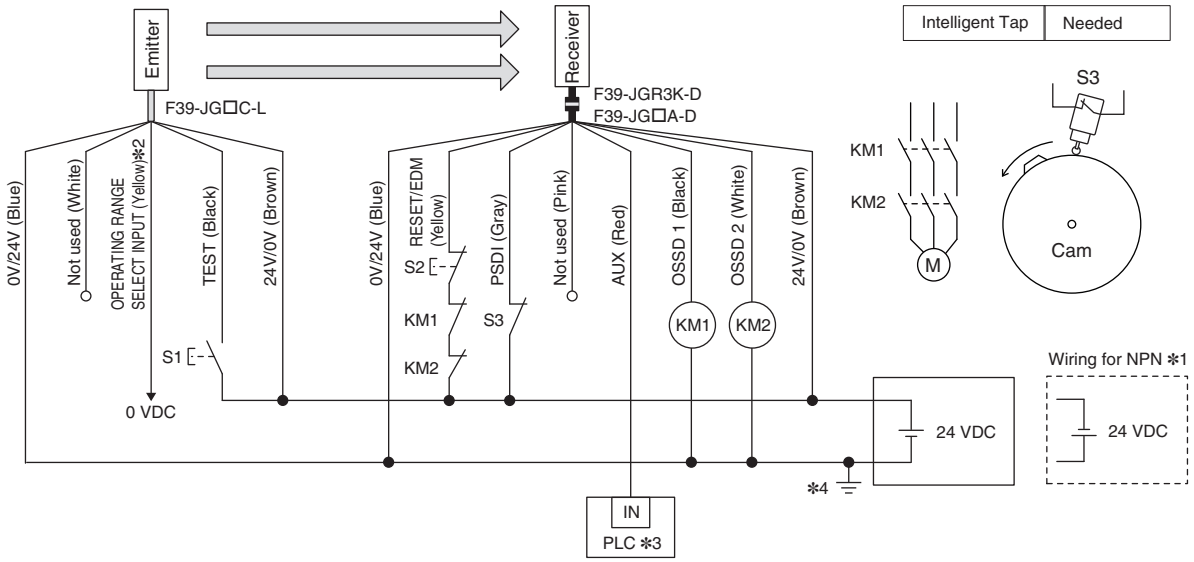
**✻1.** Reverse the polarity of the power supply when using in the NPN system. Select a PLC and a safety controller of PNP or NPN type according to the system of your application.
**✻2.** Connect the line to 0 V.
**✻3.** Refer to page 112 for more information.
**✻4.** The safety controller and the F3SG-SR/PG must share the power supply or be connected to the common terminal of the power supply.
**✻5.** This is the case for a PELV circuit.
**✻6.** Set the function with the DIP Switches on the Intelligent Tap or the SD Manager 3, restore the settings to the F3SG-SR/PG, and perform wiring according to the wiring diagram.
**✻7.** This wiring example shows light emission stop when connected to 24 VDC with PNP setting, and light emission stop when connected to 0 VDC with NPN setting. If TEST switch is not needed, refer to the *User's Manual* (Man. No. Z405).
**✻8.** The F3SG-PGA-C does not support the external test function.
**✻9.** When wiring the emitter/receiver of the F3SG-PGA-C, follow the same wiring as for the receiver in the figure above. Wiring of the emitter side is not required.

**Note: 1.** When using the Reset Switch Connector (F39-GCNY3), the following functions are not available.
• External Device Monitoring (EDM)
**2.** For the functional earth connection, refer to page 116.

## Double Break with EDM

| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Not available |
| F3SG-SRB | Available | F3SG-PGA-C | Not available |

**[Wiring Example]**

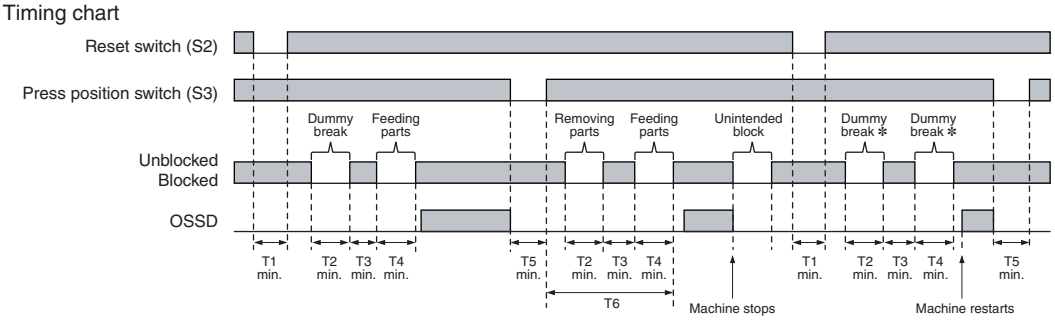



| Function | Setting | |
|---|---|---|
| | DIP switch | SD Manager 3 |
| EDM | - | [External device monitoring] : Enable *5 |
| Operating Range Selection | Short : Connect the OPERATING RANGE SELECT INPUT line of the emitter to 0 VDC. | |
| PSDI | N/A | [PSDI] : Double break *5 |
| Non-Muting system | Perform wiring according to the wiring diagram. | |
| | N/A | [Muting] : Disable *5 |
| External Test used | Connect the TEST line of the emitter to 24V/0V of the emitter via a test switch (NO contact). *6 | |
| | N/A | [External test signal inversion] : Disable |
| Optical Synchronization | Do not connect the COM(+) and COM(-) lines of the of emitter and receiver with each other. | |

S1: Test switch
S2: Reset switch
S3: Press position switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
PLC: Programmable logic controller (Used for monitoring only. NOT related to safety system.)
M: Motor

***1.** Reverse the polarity of the power supply when using in the NPN system. Select a PLC of PNP or NPN type according to the system of your application.
***2.** Open or connect the line to 24 VDC if Operating Range Selection is used in Long Mode.
***3.** When connecting to the PLC, the output mode must be changed with the SD Manager 3 according to your application. For the setting this function, refer to the *User's Manual* (Man.No.Z405).
***4.** This is the case for a PELV circuit.
***5.** Set the function with the SD Manager 3, restore the settings to the F3SG-SR/PG, and perform wiring according to the wiring diagram.
***6.** This wiring example shows light emission stop when connected to 24 VDC with PNP setting, and light emission stop when connected to 0 VDC with NPN setting. If TEST switch is not needed, refer to the *User's Manual* (Man. No. Z405).

Timing chart




T1: Minimum pressing time of reset switch. Configurable from 100 to 500 ms in 100-ms increments by SD Manager 3.
T2: Minimum break time (300 ms)
T3: Minimum unblocked time during the time from removing to feeding parts. T3 = T1
T4: Minimum break time (300 ms)
T5: Minimum pressing time of press position switch. T5 = T1
T6: Wait time until double break is complete (30 s or less)

* When the machine is stopped by unintended block in the middle of pressing of parts, operation of the reset switch (S1) and then double dummy break are needed for reinitiation of the machine cycle.

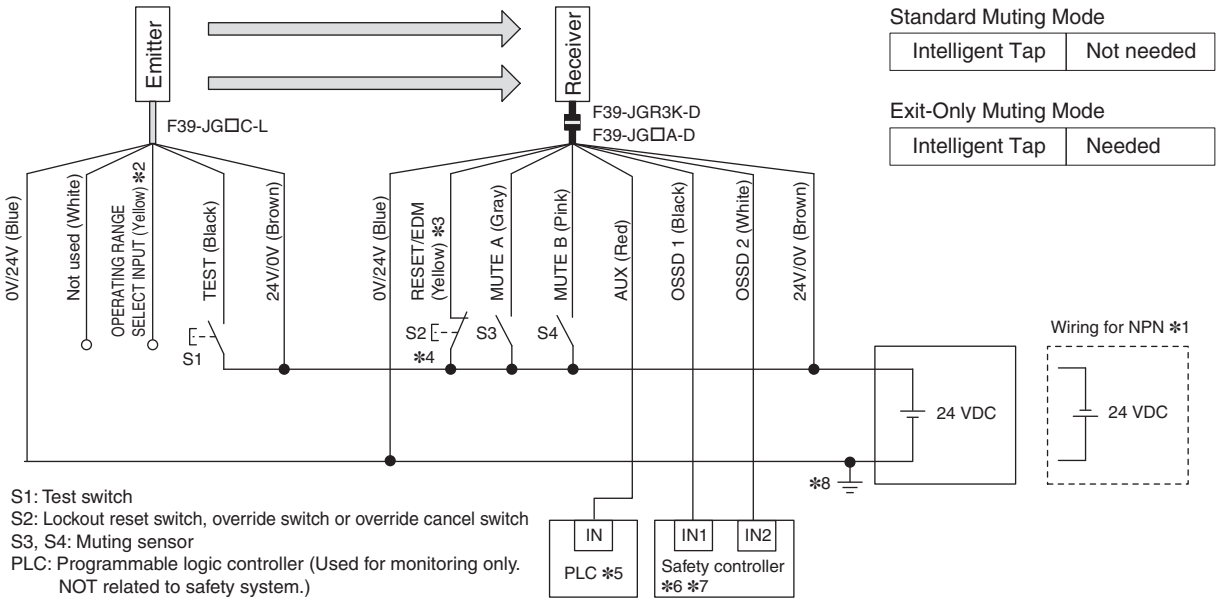
**Note:** For the functional earth connection, refer to page 116.

## Muting System Wiring Examples

### Standard Muting Mode/Exit-Only Muting Mode

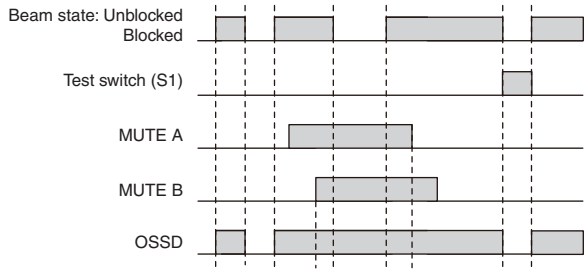
| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Available |
| F3SG-SRB | Available | F3SG-PGA-C | Available ✻12 |

**[Wiring Example]**




| Function | Setting | |
|---|---|---|
| | DIP switch | SD Manager 3 |
| EDM | EDM Disabled (factory default setting) | [External device monitoring] : Disable |
| Interlock | Auto Reset (factory default setting) | |
| | - | [Start interlock] : Disable<br>[Restart interlock] : Disable |
| Operating Range Selection | Long : Open the OPERATING RANGE SELECT INPUT line of the emitter or connect the line to 24 VDC. | |
| Standard Muting Mode | When not using the Intelligent Tap or the SD Manager 3, perform wiring according to the wiring diagram. (factory default setting) | |
| | N/A | [Muting] : Enable<br>[Muting mode] : Standard Muting (Installation Example1/2) ✻9 |
| Exit-Only Muting Mode | N/A | [Muting] : Enable<br>[Muting mode] : Exit-Only Muting ✻9 |
| External Test used ✻11 | Connect the TEST line of the emitter to 24V/0V of the emitter via a test switch (NO contact). ✻10 | |
| | N/A | [External test signal inversion] : Disable |
| Optical Synchronization | Open the COM(+) and COM(-) lines of the emitter. | |

Timing chart



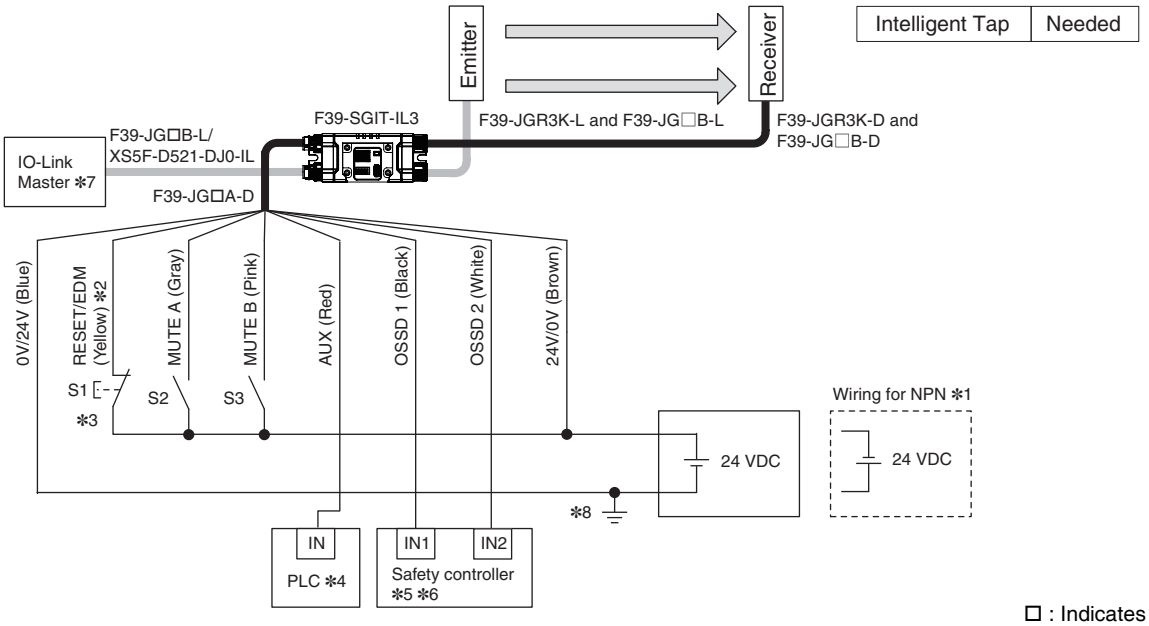

**✻1.** Reverse the polarity of the power supply when using in the NPN system.
**✻2.** Connect the line to 0 VDC if Operating Range Selection is used in Short Mode.
**✻3.** Also used as OVERRIDE INPUT line.
**✻4.** Make sure to connect an override cancel switch to the RESET line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
**✻5.** When connecting to the PLC, the output mode must be changed with the SD Manager 3 according to your application. For the setting this function, refer to the *User's Manual* (Man.No.Z405).
**✻6.** Refer to page 112 for more information.
**✻7.** The safety controller and the F3SG-SR/PG must share the power supply or be connected to the common terminal of the power supply.
**✻8.** This is the case for a PELV circuit.
**✻9.** Set the function with the SD Manager 3, restore the settings to the F3SG-SR/PG, and perform wiring according to the wiring diagram.
**✻10.** This wiring example shows light emission stop when connected to 24 VDC with PNP setting, and light emission stop when connected to 0 VDC with NPN setting. If TEST switch is not needed, refer to the *User's Manual* (Man. No. Z405).
**✻11.** The F3SG-PGA-C does not support the external test function.
**✻12.** When wiring the emitter/receiver of the F3SG-PGA-C, follow the same wiring as for the receiver in the figure above. Wiring of the emitter side is not required.

**Note:** For the functional earth connection, refer to page 116.

## Standard Muting Mode/Exit-Only Muting Mode with Intelligent Tap

| | | | |
|---|---|---|---|
| F3SG-SRA | Available | F3SG-PGA-A/-L | Available |
| F3SG-SRB | Available | F3SG-PGA-C | Available ✻11 |

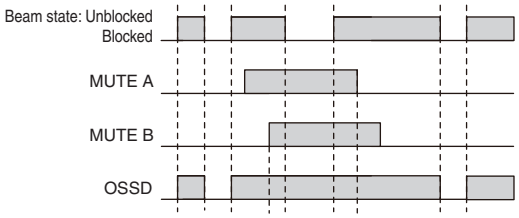
**[Wiring Example]**




□ : Indicates a switch position.

| Function | Setting | |
|---|---|---|
| | DIP switch | SD Manager 3 |
| EDM ✻9 | EDM Disabled 3 ■□ ON | [External device monitoring] : Disable |
| Interlock ✻9 | Auto Reset 4 ■□ ON<br>5 ■□ ON | [Start interlock] : Disable<br>[Restart interlock] : Disable |
| Operating Range Selection ✻10 | Long 8 ■□ ON | [Operating Range Selection] : Long mode |
| Standard Muting Mode | N/A | [Muting] : Enable<br>[Muting mode] : Standard Muting (Installation Example1/2) |
| Exit-Only Muting Mode | N/A | [Muting] : Enable<br>[Muting mode] : Exit-Only Muting |
| Test Input | N/A | |
| Wired Synchronization | Connect the emitter and receiver with the Intelligent Tap. | |

Timing chart




S1: Lockout reset switch, override switch or override cancel switch
S2, S3: Muting sensor
PLC: Programmable logic controller (Used for monitoring only. NOT related to safety system.)

**Note: 1.** When using the Intelligent Tap (F39-SGIT-IL3), the following functions are not available.
- External Test
- Operating Range Selection by wiring
- Optical Synchronization

**2.** For the functional earth connection, refer to page 116.

**✻1.** Reverse the polarity of the power supply when using in the NPN system. Select a PLC and a safety controller of PNP or NPN type according to the system of your application.
**✻2.** Also used as OVERRIDE INPUT line.
**✻3.** 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.
**✻4.** When connecting to the PLC, the output mode must be changed with the SD Manager 3 according to your application. For the setting this function, refer to the *User's Manual* (Man.No.Z405).
**✻5.** Refer to page 112 for more information.
**✻6.** The safety controller and the F3SG-SR/PG must share the power supply or be connected to the common terminal of the power supply.
**✻7.** For connecting with the IO-Link Master unit, refer to an instruction manual of the IO-Link Master unit you use.
**✻8.** This is the case for a PELV circuit.
**✻9.** Set the function with the DIP Switches on the Intelligent Tap or SD Manager 3.
**✻10.** Set the function with the DIP Switches on the Intelligent Tap or SD Manager 3 and wire according to the wiring diagram after restoring the settings to the FE3SG-SR/PG when the F3SG-SR/PG or F3SG-PGA-L is used in Short Mode. The F3SG-PGA-A/-C do not support the operating range selection function.
**✻11.** When wiring the emitter/receiver of the F3SG-PGA-C, follow the same wiring as for the receiver in the figure above. Wiring of the emitter side is not required.

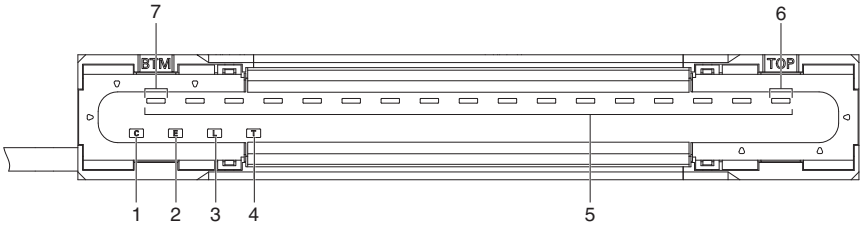
# Indicator

## LED Indicators on F3SG-SR/PG

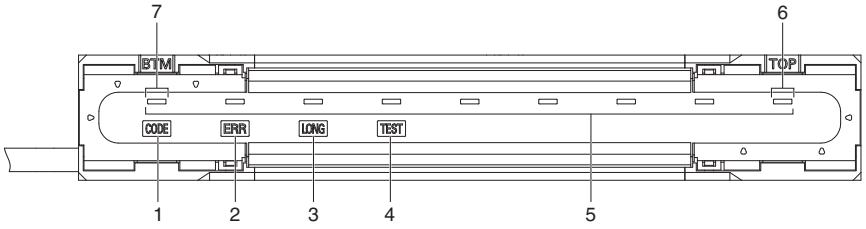
### F3SG-SR

<Emitter>

F3SG-□SR□□□□□-14

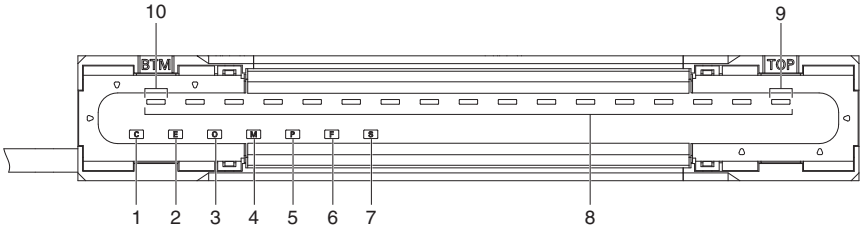



F3SG-□SR□□□□□-25/-45/-85

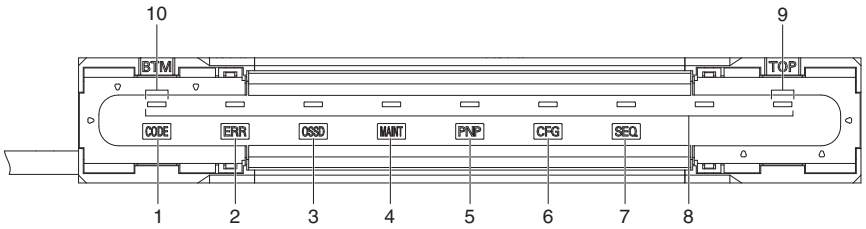



<Receiver>

F3SG-□SR□□□□□-14



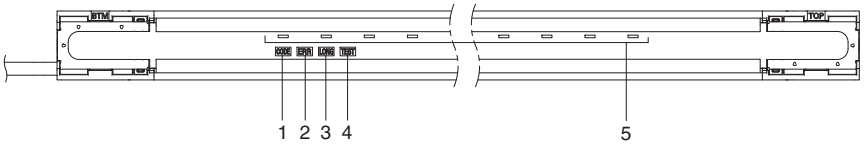

F3SG-□SR□□□□□-25/-45/-85




### F3SG-PG

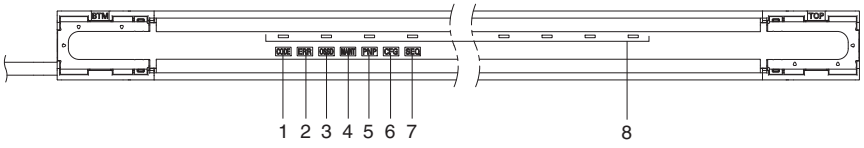
<Emitter>

F3SG-4PGA□□□□-□A/□L




<Receiver, Emitter/receiver>

F3SG-4PGA□□□□-□A/□L/□C



Shown below are indication statuses of the LED indicators on the F3SG-SR/PG when you purchased.

### Emitter (F3SG-SR/PG)

| Location | Indicator | Name | Color | Illuminated | Blinking | F3SG-SRA | F3SG-SRB | F3SGPG-A | F3SGPG-L |
|---|---|---|---|---|---|---|---|---|---|
| 1 | C or CODE | Scan code | Green | Code A is selected | --- | X | X | X | X |
| | | | Orange | Code B is selected | | | | | |
| | | | OFF | Automatic interference prevention by wired synchronization being performed | | | | | |
| 2 | E or ERR | Lockout | Red | LOCKOUT state. The indicator is illuminated in the emitter of another sensor segment than that having a lockout error (when in cascade connection or between the emitter and receiver in the Wired Synchronization) | LOCKOUT state. The indicator is illuminated in the emitter of a sensor segment having a lockout error | X | X | X | X |
| 3 | L or LONG | Operating range | Green | Long Mode is selected | LOCKOUT state due to Operating range selection setting error | X | X | --- | X |
| | | | OFF | Short Mode is selected | --- | | | | |
| 4 | T or TEST | Test | Yellow | --- | External Test is being performed | X | X | X | X |
| 5 | --- | Area Beam Indicator (ABI) (✻1) | Green | The target beams of the ABI are unblocked and the safety outputs are turned ON | MUTING or OVERRIDE state. In the MUTING state, only the ABI indicators in the muting zone are blinking. Or the target beams of the ABI are blocked instantaneously | X | --- | X | X |
| | | | Orange | Incident light level of the target beams of the ABI is 170% (factory default setting (✻2)) or less of ON-threshold (for 5 to 10 s) | Incident light level of the target beams of the ABI is 170% (factory default setting (✻2)) or less of ON threshold<br>5 to 10 s after illuminated when incident light level of the target beams of the ABI is 170% (factory default setting (✻2)) or less of ON threshold. Or one muting input becomes the ON state and the MUTING state has not been started yet, or one muting input becomes the OFF state and the other is not in the OFF state yet. (✻3) | | | | |
| | | | Red | The target beams of the ABI are blocked | LOCKOUT state due to Cap error or Other sensor error (✻4), or Lockout state due to DIP Switch setting error (✻5 ✻6) | | | | |
| | | | OFF | The target beams of the ABI are unblocked (The ABI then will be illuminated in green when the safety outputs are turned ON.) | --- | | | | |
| 6 | TOP | Top-beam-state (✻1) | Blue | The top beam is unblocked | MUTING/OVERRIDE state, or LOCKOUT state due to Cap error or Other sensor error | --- | X | --- | --- |
| 7 | BTM | Bottom-beam-state (✻1) | Blue | The bottom beam is unblocked | MUTING/OVERRIDE, or LOCKOUT state due to DIP Switch setting error (✻6) | --- | X | --- | --- |

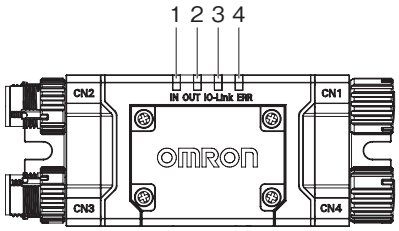
**✻1.** The indicator of the emitter is illuminated only in the case the Wired Synchronization is enabled and is off in the case the Optical Synchronization is enabled.
**✻2.** Configurable by SD Manager 3.
**✻3.** This is the case for the Standard Muting mode. For other muting modes, refer to *User's Manual* (Man.No.Z405).
**✻4.** The Area Beam Indicator closer to the "TOP" mark on the F3SG-SR/PG blinks.
**✻5.** The Area Beam Indicator closer to the "BTM" mark on the F3SG-SR/PG blinks.
**✻6.** DIP switches is on the Intelligent Tap.

### Receiver (F3SG-SR/PG)

| Location | Indicator | Name | Color | Illuminated | Blinking | F3SG-SRA | F3SG-SRB | F3SG-PG |
|---|---|---|---|---|---|---|---|---|
| 1 | C or CODE | Scan code | Green | Code A is selected | --- | X | X | X |
| | | | Orange | Code B is selected | | | | |
| | | | OFF | Automatic interference prevention by wired synchronization being performed | | | | |
| 2 | E or ERR | Lockout | Red | LOCKOUT state. The indicator is illuminated in the receiver of another sensor segment than that having a lockout error (when in cascade connection or between the emitter and receiver in the Wired Synchronization) | LOCKOUT state. The indicator is illuminated in the receiver of a sensor segment having a lockout error | X | X | X |
| 3 | O or OSSD | ON/OFF | Green | Safety outputs are in ON state | --- | X | X | X |
| | | | Red | Safety outputs are in OFF state | LOCKOUT state due to Safety output error, or error due to abnormal power supply or noise | X | X | X |
| 4 | M or MAINT | Maintenance | Red | LOCKOUT state due to a recoverable error (When in cascade connection, the indicator of only the sensor segment having the error is illuminated) | LOCKOUT state due to a replacement-recommended error (When in cascade connection, the indicator of only the sensor segment having the error blinks) | X | X | X |
| | | | Orange | Safety outputs are instantaneously turned OFF due to ambient light, vibration or noise. Or sequence error in Muting, Pre-Reset or PSDI | Intelligent Tap is in the LOCKOUT state | X | X | X |
| 5 | P or PNP | PNP/NPN mode | Green | PNP is configured | Polarity of PNP is changed to NPN, or vice versa, during operation, and internal circuit is defective | X | X | X |
| | | | OFF | NPN is configured | --- | | | |
| 6 | F or CFG | Configuration | Green | Fixed or Floating Blanking, Reduced Resolution, Warning Zone or Slow mode of Response Time Adjustment is enabled. Or after the Muting zone is determined by the Dynamic Muting function. | TEACH-IN mode, zone measurement being performed by Dynamic Muting, or LOCKOUT state due to Blanking monitoring error, Configuration error or Parameter error | X | X | X |
| 7 | S or SEQ | Sequence | Yellow | INTERLOCK state | Sequence or sequence error in Muting, Pre-Reset or PSDI (✻1) or Teach-in error | X | X | X |
| 8 | --- | Area Beam Indicator (ABI) | Green | The target beams of the ABI are unblocked and the safety outputs are turned ON | MUTING or OVERRIDE state. In the MUTING state, only the ABI indicators in the muting zone are blinking. Or the target beams of the ABI are blocked instantaneously | X | --- | X |
| | | | Orange | Incident light level of the target beams of the ABI is 170% (factory default setting (✻2)) or less of ON-threshold (for 5 to 10 s) | Incident light level of the target beams of the ABI is 170% (factory default setting (✻2)) or less of ON threshold 5 to 10 s after illuminated when incident light level of the target beams of the ABI is 170% (factory default setting (✻2)) or less of ON threshold. Or one muting input becomes the ON state and the MUTING state has not been started yet, or one muting input becomes the OFF state and the other is not in the OFF state yet. (✻3) | | | |
| | | | Red | The target beams of the ABI are blocked | LOCKOUT state due to Cap error or Other sensor error (✻4), or LOCKOUT state due to DIP Switch setting error (✻5✻6) | | | |
| | | | OFF | The target beams of the ABI are unblocked (The ABI then will be illuminated in green when the safety outputs are turned ON.) | --- | | | |
| 9 | TOP | Top-beam-state | Blue | The top beam is unblocked | MUTING/OVERRIDE state, or LOCKOUT state due to Cap error or Other sensor error | --- | X | --- |
| 10 | BTM | Bottom-beam-state | Blue | The bottom beam is unblocked | MUTING/OVERRIDE state, or LOCKOUT state due to DIP Switch setting error (✻6) | --- | X | --- |

**✻1.** Refer to *Troubleshooting* on page 130 for more information on blinking patterns.
**✻2.** Configurable by SD Manager 3.
**✻3.** This is the case for the Standard Muting mode. For other muting modes, refer to *User's Manual* (Man.No.Z405).
**✻4.** The Area Beam Indicator closer to the "TOP" mark on the F3SG-SR/PG blinks.
**✻5.** The Area Beam Indicator closer to the "BTM" mark on the F3SG-SR/PG blinks.
**✻6.** DIP switches is on the Intelligent Tap.
**Note:** In the SETTING state to make settings with the SD Manager 3, the TEST, LONG and CODE indicators on the emitter and the CFG, PNP and CODE indicators on the receiver blink. (TEST: Yellow, LONG/CODE: Green, CFG/PNP/CODE: Green)
For more information on the statuses of the LED indicators in the SETTING state, refer to User's Manual (Man.No.Z405).

## LED Indicators on Intelligent Tap




Shown below are indication statuses of LED indicators on the Intelligent Tap when you purchased.

| Location | Indicator | Name | Color | Illuminated | Blinking |
|---|---|---|---|---|---|
| 1 | IN | Sensor status | Yellow | Safety outputs of the F3SG-SR/PG are in the ON state | The F3SG-SR/PG is in the LOCKOUT state. Or the Intelligent Tap is waiting for Push Switch operation (in the Backup) or the Intelligent Tap and F3SG-SR/PG are waiting for restart (in the Backup). Or communication error in the Backup or between the F3SG-SR/PG and the Intelligent Tap. Or the Restoration failed |
| 2 | OUT | Output status | Green | Outputs of the Intelligent Tap are in the ON state(✻1) | The Restoration failed.<br>Or in the Restoration, the Intelligent Tap has communication error, is waiting for Push Switch operation or transferring data, or the Intelligent Tap and F3SG-SR/PG are waiting for restart. |
| | | | Red | Outputs of the Intelligent Tap are in the OFF state (✻2) | Communication error between the F3SG-SR/PG and the Intelligent Tap |
| 3 | IO-Link | IO-Link | Green | --- | Intelligent Tap communicates with IO-Link Master. Or IO-Link circuit error |
| 4 | ERR | Lockout | Red | The Intelligent Tap is in the LOCKOUT state, or has communication error, DIP Switch circuit error at startup, communication error in the Backup or Restoration, restoration failure, IO-Link circuit error, power supply voltage error or other errors | --- |

**✻1.** When the safety outputs of the F3SG-SR/PG are in the ON state, the outputs of the Intelligent Tap are in the ON state.
**✻2.** When the safety outputs of the F3SG-SR/PG are in the OFF state, the outputs of the Intelligent Tap are in the OFF state.
**Note:** In the SETTING state to make settings with the SD Manager 3, the IN, OUT indicators blink. (IN: Yellow, OUT: Green)
For more information on the statuses of the LED indicators in the SETTING state, refer to User's Manual (Man.No.Z405).

# Troubleshooting

## F3SG-SR/PG
## LOCKOUT State

Identify an error according to the combination of the indicators when the error occurs. See the following troubleshooting tables to take measures. For detail, Refer to *User's Manual* (Man. No. Z405).

Illuminated Blink

<Indicator status at lockout: Receiver>

Combination of indicators and error description

| ERR indicator | MAINT indicator | Other indicators | Error description |
|---|---|---|---|
| E or ERR Blinking once | M or MAINT [Error description] Recoverable error / Red blinking : Replacement-recommended error | O or OSSD | Safety Output error |
| | | P or PNP | Error due to change of PNP/NPN polarity during operation |
| | | F or CFG | Blanking monitoring error<br>Configuration error<br>Parameter error |
| | | TOP ✻1 | Cap error<br>Other sensor error |
| E or ERR Blinking twice | | BTM ✻2 | DIP Switch setting error |
| | | O or OSSD | Safety output error due to power supply voltage or noise |
| E or ERR Blinking once | | --- | Communication error<br>External device monitoring error<br>Error other than those above |
| --- | M or MAINT Orange blinking | --- | Intelligent Tap error |

✻1. For the F3SG-SRA and F3SG-PG, the Area Beam Indicator closer to the "TOP" mark on the housing blinks.
✻2. For the F3SG-SRA and F3SG-PG, the Area Beam Indicator closer to the "BTM" mark on the housing blinks.

<Indicator status at lockout: Emitter>

Combination of indicators and error description

| ERR indicator | Other indicators | Error description |
|---|---|---|
| E or ERR Blinking once | L or LONG | Operating range selection setting error |
| | TOP ✻1 ✻3 | Cap error<br>Other sensor error |
| | BTM ✻2 ✻3 | DIP Switch setting error |
| | --- | Communication error<br>Error other than those above |

✻1. For the F3SG-SRA and F3SG-PG, the Area Beam Indicator closer to the "TOP" mark on the housing blinks.
✻2. For the F3SG-SRA and F3SG-PG, the Area Beam Indicator closer to the "BTM" mark on the housing blinks.
✻3. The indicator blinks only in the case the Wired Synchronization is enabled and is off in the case the Optical Synchronization is enabled.

| Description | Checking by | | Error code (hex) *1 | Cause and measures |
|---|---|---|---|---|
| | Indicator | SD Manager 3/ SD Manager 3 Mobile APP | | |
| Safety output error | X | X | 60, 6B, 6C | The OSSD lines may be short-circuited to each other or another signal line may be short-circuited to the OSSD line.<br>Wire the OSSD lines properly. |
| | | | 56 | The polarity does not match between the power supply and the OSSD lines.<br>Check if a correct polarity is selected for the PNP/NPN setting according to your application. Also check:<br>• if the power supply (0 VDC or 24 VDC) of the Intelligent Tap and F3SG-SR/PG is wired as intended.<br>• if the OSSD lines are properly wired. |
| Recoverable error | X | --- | --- | The error may occur due to a temporary cause. Identify the cause by the status of the other LED indicator and take measures. |
| Replacement-recommended error | | | | The error may occur due to a product failure. If the measure according to the status of the other LED indicator does not work, it is recommended to replace the F3SG-SR/PG. |
| Intelligent Tap error | X | --- | --- | An error due to noise may have occurred in the internal circuit of the Intelligent Tap.<br>Check the noise level in the environment. |
| | | | | The internal circuit of the Intelligent Tap may be defective.<br>Replace the Intelligent Tap. |
| Error due to change of PNP/NPN polarity during operation | X | X | E7 | An error due to noise may have occurred in the internal circuit.<br>Check the noise level in the environment. |
| | | | | The internal circuit may be defective.<br>Replace the F3SG-SR/PG. |
| Blanking monitoring error | X | X | EC | An error is detected by the Fixed Blanking Monitoring function or the Floating Blanking Monitoring function. |
| Configuration error | X | X | 39, 3A, 3B | The cascading cable may be short-circuited, broken, or disconnected. Check that the cascading cable should be tightly connected. If the cascading cable is broken, replace it. |
| | | | | The number of connected sensors or beams may have exceeded the maximum value due to cascading.<br>Check the configuration. |
| | | | 3C, 3E, 3F | A model name does not match between emitter and receiver. Check that the emitter and receiver are the same model. |
| | | | 34 | An error may have occurred to the internal information of the model name of the F3SG-SR/PG due to effect of noise.<br>If other devices using the same power supply generate noise, do not share the same power supply with other devices, and use a separate power supply exclusively for the safety components.<br>The inductive noise tends to be induced especially if the power supply line of the machine guarded and the power supply line of the Intelligent Tap are arranged in parallel.<br>Arrange the exclusive power supply near the Intelligent Tap or lay the power supply line of the Intelligent Tap away from the power supply line of the machine guarded.<br>If the power supply for the Intelligent Tap is located near the power supply of the machine guarded and it shares the same grounding wire, it is subject to the influence of common mode noise.<br>Separate the grounding point or use it as the exclusive ground. |
| | | | | An error may have occurred in the internal circuit.<br>Replace the F3SG-SR/PG. |
| Parameter error | X | X | F1 | The settings do not match between the Intelligent Tap and F3SG-SR/PG. Perform the Backup. |
| | | | 40 | The settings of the F3SG-SR/PG may be faulty. Check if the settings are correct. |

| Description | Checking by | | Error code (hex) *1 | Cause and measures |
|---|---|---|---|---|
| | Indicator | SD Manager 3/ SD Manager 3 Mobile APP | | |
| Cap error | X | X | 4F | A cap may be detached. Attach the cap properly. |
| Other sensor error | X | X | 38 | Other sensor being cascaded caused an error. Check the indicator of the sensor. |
| DIP Switch setting error | X | X | E7, E8 | A DIP Switch on the Intelligent Tap setting may have been changed during operation.<br>Check if a DIP Switch setting was changed or not. |
| Communication error | --- | X | 30, 32 | The communication lines or other lines may be short-circuited or broken.<br>Check if the cascading or extension cables. If the cascading cable or extension cables is broken, replace it. |
| | | | 31 | An error may have occurred to the communication due to effect of noise.<br>If other devices using the same power supply generate noise, do not share the same power supply with other devices, and use a separate power supply exclusively for the safety components.<br>The inductive noise tends to be induced especially if the power supply line of the machine guarded and the power supply line of the Intelligent Tap are arranged in parallel.<br>Arrange the exclusive power supply near the Intelligent Tap or lay the power supply line of the Intelligent Tap away from the power supply line of the machine guarded.<br>If the power supply for the Intelligent Tap is located near the power supply of the machine guarded and it shares the same grounding wire, it is subject to the influence of common mode noise.<br>Separate the grounding point or use it as the exclusive ground. |
| | | | | An error may have occurred in the internal circuit.<br>Replace the F3SG-SR/PG. |
| Safety output error due to power supply voltage or noise | X | X | 19 | The power supply voltage may have dropped temporarily when the F3SG-SR/PG is in operation. Check for temporary power supply voltage drop (by about 12 VDC) by the influence of the inductive load, etc.<br>If the exclusive power supply is not used, check the power consumption of other connected devices for enough capacity. |
| | | | | Power supply voltage may be outside the rated range.<br>Connect the F3SG-SR/PG to a 24 VDC±20% power supply voltage. |
| | | | | Voltage fluctuation may have occurred due to insufficient power supply capacity.<br>Replace the power supply with one that has a larger capacity. |
| | | | | Instantaneous break or instantaneous stop may have occurred due to power sharing with other devices. Do not share the power supply with other devices. Connect the F3SG-SR/PG to a power supply that is dedicated to electro-sensitive protective devices for electro-sensitive protective equipment such as the F3SG-SR/PG, safety controller, etc. |
| | | | 1A | Effect of noise may be excessive.<br>If other devices using the same power supply generate noise, do not share the same power supply with other devices, and use a separate power supply exclusively for the safety components.<br>The inductive noise tends to be induced especially if the power supply line of the machine guarded and the power supply line of the F3SG-SR/PG are arranged in parallel.<br>Arrange the exclusive power supply near the F3SG-SR/PG or lay the power supply line of the F3SG-SR/PG away from the power supply line of the machine guarded.<br>If the power supply for the F3SG-SR/PG is located near the power supply of the machine guarded and it shares the same grounding wire, it is subject to the influence of common mode noise.<br>Separate the grounding point or use it as the exclusive ground. |

| Description | Checking by | | Error code (hex) ∗1 | Cause and measures |
|---|---|---|---|---|
| | Indicator | SD Manager 3/ SD Manager 3 Mobile APP | | |
| Operating range selection setting error | X | X | EB | The setting of the operating range selection may be incorrect.<br>• When the Intelligent Tap is connected, check if the Operating Range Selection of the DIP Switch is properly set.<br>• When the Intelligent Tap is not connected, check if the Operating Range Select Input line is properly wired. |
| External device monitoring error | ---<br>∗2 | X | 52 | Relay may be welded. Replace the relay. |
| | | | | The relay and the RESET line may not be properly wired. Check the wiring with the relay. |
| | | | | The relay response time may be exceeding the allowable delay time. Change the allowable delay time or replace the relay with one that has an appropriate response time. |
| Error other than those above | ---<br>∗2 | X | Error code other than those above | An error may have occurred in the internal circuit. Replace the F3SG-SR/PG. |

**∗1.** You can check the error codes by SD Manager 3 or SD Manager 3 Mobile APP.
**∗2.** Other indicators than the ERR and MAINT indicators are not illuminated. For details of the error, refer to [Code] and [Error description] displayed in [Error Log] in the SD Manager 3.

## Warning

Identify an error according to the combination of the indicators when the error occurs. See the following troubleshooting tables to take measures. For detail, Refer to *User's Manual* (Man. No. Z405).


<Indicator status at warning: Receiver ✻1>

Combination of indicators and error description

| ERR indicator | MAINT indicator | Other indicators | Error description |
|---|---|---|---|
| | M or MAINT ■ | F or CFG<br>S or SEQ | Teach-in error |
| E or ERR ■ | | S or SEQ ✻2 | Muting sequence error, Interlock sequence error or PSDI sequence error |
| | M or MAINT Orange | Area Beam Indicator Green | Malfunction due to ambient light or vibration |
| | | Area Beam Indicator Orange → After 5 to 10 s | Low incident light level |

**✻1.** In the warning state, no indicators on the emitter are illuminated or blink.
**✻2.** There are several illumination patterns to identify a faulty sequence.

| Description | Checking by | | Warning code (hex) ✻1 | Cause and measures |
|---|---|---|---|---|
| | Indicator | SD Manager 3/ SD Manager 3 Mobile APP | | |
| Teach-in error | X | X | ED | Teach-in failed. Perform the Teach-in again. |
| Muting sequence error | X | X | 2C, 2D, 2F | Muting input may have been applied in the incorrect order. Check the pattern of illumination of the LED indicator to identify the cause. |
| Interlock sequence error | X | --- | --- | When using the Pre-Reset function, the reset signals for interlock may be input in the wrong order. Check the pattern of illumination of the LED indicator to identify the cause. |
| PSDI sequence error | X | X | 2A, 2B | PSDI input may have been applied in the correct order. Check if the pattern of illumination of the LED indicator to identify the cause. |
| Malfunction due to ambient light or vibration | X | X (SD Manager 3 Mobile APP is not applicable) ✻2 | --- | Malfunction may have occurred due to ambient light or instantaneous beam misalignment from vibration. Check the installation condition. |
| Low incident light level | X | X | 12 | The incident light level may be low due to dirty front window or misaligned beams caused by vibration. Clean the front window and check the alignment of the beams. |
| Low communications quality | --- ✻3 | X | F0 | Retries of communications may have been generated due to noise. Check the noise level in the proximity of the communication lines. |
| | | | | Retries of communications may have been generated due to short-circuit of the communication lines. Check the cables connected. |

**✻1.** You can check the warning codes by SD Manager 3 or SD Manager 3 Mobile APP.
**✻2.** You can check by instantaneous block detection logs in [Instantaneous Block Detection Information].
**✻3.** The indicators are not illuminated. For details of the warning, refer to [Code] and [Warning description] displayed in [Warning Log] in the SD Manager 3.

## Muting Sequence Error Indication

The following table is applied only when the muting function is being enabled.

| SEQ indicator | Cause and measures |
|---|---|
| Blinking: Once | Power supply may have been turned ON with muting input A or B being ON.<br>Check the condition of the muting sensors and the F3SG-SR/PG. |
| | Muting input B may have been turned ON before muting input A was turned ON.<br>Check the condition of the muting sensors. |
| | Muting input A and B may have been turned ON at the same time.<br>• Check the arrangement of the muting sensors.<br>• Check if the wiring of muting input A and B is short-circuited. |
| | Either muting input A or B may have been turned ON with the F3SG-SR/PG being blocked or INTERLOCK State.<br>Check the condition of the F3SG-SR/PG. |
| Blinking: Twice | Muting input B may have been turned ON within T1min (= 0.1 s✻) after muting input A was turned ON.<br>• Check that if the muting sensors are installed too close each other.<br>• Check that if the speed of the workpiece is too fast. |
| | It may have taken T1max (= 4 s ✻) or longer for muting input B to be turned ON after muting input A was turned ON.<br>• Check that if the muting sensors are installed too far each other.<br>• Check that if the speed of the workpiece is too slow. |
| | The F3SG-SR/PG may have been blocked after muting input A was turned ON but before muting input B was turned ON.<br>Check the condition of the F3SG-SR/PG. |
| Blinking: Four times | The F3SG-SR/PG may have been blocked within 0.08 s after muting input A and B were normally turned ON.<br>• Check that if the muting sensor and the F3SG-SR/PG are installed too close each other.<br>• Check that if the speed of the workpiece is too fast. |
| | Muting may have been released after the F3SG-SR/PG entered the MUTING state but before a workpiece blocked the F3SG-SR/PG.<br>• Check that the workpiece still remains.<br>• Check that the speed of the workpiece is too slow. |
| Blinking: Five times | The F3SG-SR/PG entered the MUTING state, but muting may have then been released while a workpiece passes through the F3SG-SR/PG.<br>• Check that the workpiece still remains.<br>• Check that if the speed of the workpiece is too slow.<br>• Check that the muting sensors have been installed upstream and downstream of the F3SG-SR/PG with the size of workpieces taken into account. (Using four muting sensors) |
| Blinking: Six times | Muting may have been released with muting input A and B remained ON after a workpiece passed through the F3SG-SR/PG.<br>• Check that the workpiece still remains.<br>• Check that the speed of the workpiece is too slow. |
| Blinking: Seven times | The next muting sequence may have started after muting was released but before the initial muting condition was established.<br>• Check that if a next workpiece has not entered before the current workpiece passes through the F3SG-SR/PG.<br>• Check that if the interval between workpieces are too narrow. |

✻ Factory default setting

## Interlock Sequence Error Indication

The following table is applied only when the pre-reset function is being enabled.

| SEQ indicator | Cause and measures |
|---|---|
| Blinking: Once | The reset or pre-reset switch may have been pressed before the F3SG-SR/PG receives light.<br>Check the wiring of the reset and pre-reset signals. |
| | The F3SG-SR/PG may have been blocked or the pre-reset switch may have been pressed before the pre-reset switch is pressed.<br>Check the status of the F3SG-SR/PG and the wiring of the pre-reset signal. |
| Blinking: Twice | After the pre-reset switch was pressed, the pre-reset or reset switch may have been pressed before the F3SG-SR/PG is blocked.<br>Check the installation environment of the F3SG-SR/PG. |
| Blinking: Three times | After the pre-reset switch was pressed and the F3SG-SR/PG was blocked, the pre-reset switch may have been pressed before the reset switch is pressed.<br>Check the wiring of the pre-reset signal. |
| | After the pre-reset switch was pressed, a time period from the block of the F3SG-SR/PG to the press of the reset switch may have exceeded the allowable time.<br>Check the installation environment of the F3SG-SR/PG as well as pre-reset and reset switches. |
| | The number of blocks of the F3SG-SR/PG may have exceeded the allowable value after the pre-reset switch was pressed and before the reset switch is pressed.<br>Check the installation environment of the F3SG-SR/PG. |

## PSDI Sequence Error Indication

The following table is applied only when the PSDI function is being enabled.

| SEQ indicator | Error condition | Cause and measures |
|---|---|---|
|  Blinking: Once | ● | Power supply may have been turned ON with PSDI input being OFF.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ● | Power supply may have been turned ON with the light curtain blocked.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ● | Power supply may have been turned ON with RESET input being OFF.<br>Check the condition of the light curtains and RESET input wiring. |
| | ● | PSDI input may have been turned OFF before RESET input was turned OFF.<br>Check the PSDI input wiring. |
| | ● | The light curtain may have been blocked before RESET input was turned ON.<br>Check the condition of the light curtains and RESET input wiring. |
| | ● | The PSDI input may have turned OFF while the RESET input is OFF.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ● | The light curtain may have been blocked before RESET input was turned ON.<br>Check the condition of the light curtains and RESET input wiring. |
|  Blinking: Twice | ● | After RESET input , the light curtain may not be blocked longer than T2 and the PSDI input may have turned OFF.<br>Check the condition of the light curtains and RESET input wiring. |
| | ● | The PSDI input may have turned OFF with the light curtain blocked.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ◎ | PSDI input may have turned OFF before the light curtain blocked twice.<br>Check the condition of the light curtains and PSDI input wiring. |
|  Blinking: Three times | ● | The light curtain was blocked before the PSDI input turned OFF.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ● | The light curtain was blocked while the PSDI input turned OFF.<br>Check the condition of the light curtains and PSDI input wiring. |
|  Blinking: Four times | ● | PSDI input may have turned OFF during the period from when the PSDI state is canceled until the light curtain blocked.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ● | The PSDI input may have turned OFF with the light curtain blocked.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ○ | It may have taken T4 (= 30 s) or longer for PSDI input to be turned OFF after the light curtain blocked.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ◎ | It may have taken T6 (= 30 s) or longer for PSDI input to be turned OFF after the light curtain blocked.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ◎ | The PSDI input may have turned OFF again before the light curtain blocked.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ◎ | It may have taken T6 (= 30 s) or longer for PSDI input to be turned OFF after the light curtain blocked twice.<br>Check the condition of the light curtains and PSDI input wiring. |
| | ◎ | PSDI input may have turned OFF before the light curtain blocked again.<br>Check the light curtain status and PSDI input wiring. |

Notations
○...Single Break
◎...Double Break
●...Common

## Intelligent Tap

If the Intelligent Tap detects any failure, it transitions to the LOCKOUT state. Under the LOCKOUT state, the ERR indicator is turned ON. Identify an error according to the combination of the indicators when the error occurs. See the following troubleshooting tables to take measures.
For detail, Refer to *User's Manual* (Man. No. Z405).


Combination of indicators and error description

| ERR (Red) | IN (Yellow) | OUT (Green/Red) | IO-Link (Green) | Error description |
|---|---|---|---|---|
| | --- | --- | --- | Communication error<br>DIP Switch circuit error at startup |
| | | | --- | Communication error in Backup |
| | | Green | --- | Communication error in Restoration |
| | | Red | --- | Communication error between the F3SG-SR/PG and the Intelligent Tap |
| | | Green | --- | Restoration failed |
| | | Red | --- | LOCKOUT state of the F3SG-SR/PG |
| | --- | --- | | IO-Link circuit error |
| | --- | --- | --- | Power supply voltage error, or other errors |

**Note: 1.** The signals output to IO-Link or IN and OUT indicators show the statuses of the F3SG-SR/PG or Intelligent Tap except their LOCKOUT state.
**2.** The muting inputs A and B are kept in the OFF state when the LOCKOUT state occurs due to the power supply voltage error.

| Description | Checking by | | Error code (hex) ✻ | Cause and measures |
|---|---|---|---|---|
| | Indicator | SD Manager 3/ SD Manager 3 Mobile APP | | |
| Communication error | X | X | 1D | The communication lines or other lines may be short-circuited or broken.<br>Check the cables for cascading or extension cables.<br>If the wiring is extended with cables other than specified, the cables used for extension may not have performance equivalent or greater than the specified cables. Use cables with the same performance or more than the specified cables. |
| Communication error in Backup | X | X | 1E | The communication lines or other lines may be short-circuited or broken.<br>Check the cables for cascading or extension cables.<br>If the wiring is extended with cables other than specified, the cables used for extension may not have performance equivalent or greater than the specified cables. Use cables with the same performance or more than the specified cables. |
| | | | | Effect of noise may be excessive.<br>If other devices using the same power supply generate noise, do not share the same power supply with other devices, and use a separate power supply exclusively for the safety components.<br>The inductive noise tends to be induced especially if the power supply line of the machine guarded and the power supply line of the Intelligent Tap are arranged in parallel.<br>Arrange the exclusive power supply near the Intelligent Tap or lay the power supply line of the Intelligent Tap away from the power supply line of the machine guarded.<br>If the power supply for the Intelligent Tap is located near the power supply of the machine guarded and it shares the same grounding wire, it is subject to the influence of common mode noise.<br>Separate the grounding point or use it as the exclusive ground. |
| | | | | The internal circuit of the Intelligent Tap may be defective.<br>Replace the Intelligent Tap. |

| Description | Checking by | | Error code (hex) ✻ | Cause and measures |
|---|---|---|---|---|
| | Indicator | SD Manager 3/ SD Manager 3 Mobile APP | | |
| Communication error in Restoration | X | X | 1F | The communication lines or other lines may be short-circuited or broken.<br>Check the cables for cascading or extension cables.<br>If the wiring is extended with cables other than specified, the cables used for extension may not have performance equivalent or greater than the specified cables. Use cables with the same performance or more than the specified cables. |
| | | | | Effect of noise may be excessive.<br>If other devices using the same power supply generate noise, do not share the same power supply with other devices, and use a separate power supply exclusively for the safety components.<br>The inductive noise tends to be induced especially if the power supply line of the machine guarded and the power supply line of the Intelligent Tap are arranged in parallel.<br>Arrange the exclusive power supply near the Intelligent Tap or lay the power supply line of the Intelligent Tap away from the power supply line of the machine guarded.<br>If the power supply for the Intelligent Tap is located near the power supply of the machine guarded and it shares the same grounding wire, it is subject to the influence of common mode noise.<br>Separate the grounding point or use it as the exclusive ground. |
| | | | | The internal circuit of the Intelligent Tap may be defective.<br>Replace the Intelligent Tap. |
| Communication error between the F3SG-SR/ PG and the Intelligent Tap | X | --- | --- | The F3SG-SR/PG may be disconnected from the Intelligent Tap, the communication line of the F3SG-SR/PG may be broken, or the internal circuit of the Intelligent Tap may be defective. Check the connection and cable wiring between the Intelligent Tap and the F3SG-SR/PG. In the case of defective internal circuit, replace the Intelligent Tap. |
| F3SG-SR/PG LOCKOUT state | X | --- | --- | The F3SG-SR/PG is in the LOCKOUT state. For details of the error of the F3SG-SR/PG, check the indicator status or error code of the F3SG-SR/PG. |
| Restoration failed | X | --- | --- | The sensor configuration (sensor model, connection configuration, etc.) stored in the Intelligent Tap by the Backup process does not match the sensor configuration of the connected F3SG-SR/PG. Connect the F3SG-SR/PG with the same sensor configuration as the backed-up sensor configuration, or perform the Backup process of the connected F3SG-SR / PG. Error codes are not recorded. |
| Power supply voltage error, or other errors | X | X | A3 | The muting inputs A and B are kept in the OFF state when the LOCKOUT state occurs due to the power supply voltage error.<br>The power supply voltage may have dropped temporarily when the F3SG-SR/ PG is in operation. Check for temporary power supply voltage drop (by about 12 VDC) by the influence of the inductive load, etc.<br>If the exclusive power supply is not used, check the power consumption of other connected devices for enough capacity. |
| | | | | Power supply voltage may be outside the rated range.<br>Connect the F3SG-SR/PG to a 24 VDC±20% power supply voltage. |
| | | | | Voltage fluctuation may have occurred due to insufficient power supply capacity.<br>Replace the power supply with one that has a larger capacity. |
| | | | | Instantaneous break or instantaneous stop may have occurred due to power sharing with other devices. Do not share the power supply with other devices.<br>Connect the F3SG-SR/PG to a power supply that is dedicated to electro-sensitive protective devices for electro-sensitive protective equipment such as the F3SG-SR/PG, safety controller, etc. |
| DIP Switch circuit error at startup | X | X | BC | The internal circuit may be defective.<br>Replace the Intelligent Tap. |
| IO-Link circuit error | X | X | BD | The internal circuit may be defective.<br>Replace the Intelligent Tap. |
| Internal error | X | X | Others | The internal circuit may be defective.<br>Replace the Intelligent Tap. |

✻ You can check the error codes by SD Manager 3 or SD Manager 3 Mobile APP.

## Bluetooth® Communication Unit

See the following troubleshooting table to take measures if any of the phenomena in the table occurs when in the connection with the Bluetooth® Communication Unit.

| Status | Measures |
|---|---|
| Communications cannot be established | Check if Bluetooth® Communication Unit is properly mounted. |
| | Check if Bluetooth® function is enabled on the device you use for SD Manager 3. |
| | Check if Bluetooth® Communication Unit is not being paired with another device. |
| | Check if Bluetooth® Communication Unit and the device you use for SD Manager 3 are properly paired (or the connection is verified). ✻ |
| | Check if Bluetooth® function of the device you use for SD Manager 3 supports SPP (Serial Port Profile). |
| | Check if a COM port is properly configured. |
| | Check the noise level in the environment. |
| | Check if there is any device that uses 2.4 GHz band. |
| | Check if there is any obstruction between Bluetooth® Communication Unit and the device you use for SD Manager 3. The maximum permissible line-of-sight distance is approximately 10 m. |
| | The F3SG-SR/PG is under the SETTING state. Turn OFF and ON the power of the F3SG-SR/PG. |
| Files cannot be read from the outside while the sensor is connected | The sensor model in the saved file does not match the sensor model in the file that you are about to read in. Check the sensor model. |
| | If a file is saved by SD Manager 3 of a newer version than your SD Manager 3, the file is not usable on your SD Manager 3. Check the SD Manager 3 version. |
| F3SG-SR/PG does not go back to normal state after terminating SD Manager 3 | Restart F3SG-SR/PG. If SD Manager 3 does not operate normally even after restarted, use the setup recovery function to restore to the factory default settings again. |

✻ The procedure depends on the device you use for SD Manager 3. Refer to instruction manuals of the device.

# Common to F3SG-SR and F3SG-PG

# Legislation and Standards

**1.** The F3SG-SR/PG does not receive type approval provided by Article 44-2 of the Industrial Safety and Health Act of Japan. When using the F3SG-SR/PG 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-SR/PG 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-SR/PG 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)
(Models: F3SG-4SR□□□□□-14/-25 in the case of the ON to OFF response time not exceeding 20 ms max.)

The following configurations of the F3SG-SR are compliant with GB/T 4584.
Configurations using the F3SG-SR with detection capability of 14-mm or 25-mm dia. and 20 ms max. of the ON to OFF response time

| Detection capability | Protective height | Number of beams | Configuration | Synchronization method | Response Time Adjustment | ON to OFF response time |
|---|---|---|---|---|---|---|
| 14-mm dia. | 160 to 2000 mm | - | Single | Optical | Normal | 18 ms max. |
| 14-mm dia. | 160 to 1400 mm | - | Single | Wired | Normal | 17 ms max. |
| 25-mm dia. | 160 to 2480 mm | - | Single | Optical/Wired | Normal | 17 ms max. |
| Combination of 14-mm 25-mm dia. In cascade connection | - | 255 max. | Cascaded | Optical | Normal | 18 ms max. ✻ |
| Combination of 14-mm 25-mm dia. In cascade connection | - | 140 max. | Cascaded | Wired | Normal | 15 ms max. ✻ |

✻ Refer to *User's Manual* (Man.No.Z405) for more information on the response time for the F3SG-SR in cascade connection.
**Note:** The F3SG-SR's with detection capability of 45-mm and 85-mm dia. are not compliant with GB/T 4584. Refer to *Ratings and Specifications* on page 54 for more information on the ratings and specifications by model.

**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)
  (Models: F3SG-4SR□□□□□-14/-25 in the case of the ON to OFF response time not exceeding 20 ms max.)

**6.** Other Standards
The F3SG-SR/PG 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

**7.** Meaning of mark according to EU WEEE Directive

Dispose in accordance with applicable regulations.

**8.** Regions where F39-SGBT can be used
The product can be used in Japan, the United States, Canada, and EU member state. The use in other countries may conflict with radio laws of the countries. For the regions where the F39-SGBT can be used, refer to the following instruction manuals of the F39-SGBT.

| Document Title | No. |
|---|---|
| F39-SGBT Instruction Sheet | 4615743-0 |
| F39-SGBT Regulations and Standards | 4615744-8 |

## Related Manuals

| Man.No. | Model | Manual Name |
|---|---|---|
| Z405 | F3SG-□SR□□□□□-□□-□□<br>F3SG-□PG□□□□□-□□-□□ | Safety Light Curtain F3SG-□SR□ Series<br>Safety Multi-Light Beam F3SG-□PG□ Series<br>User's Manuals |

Be sure to read *Safety Warning* at the following URL: http://www.ia.omron.com/.

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**Note: Do not use this document to operate the Unit.**


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