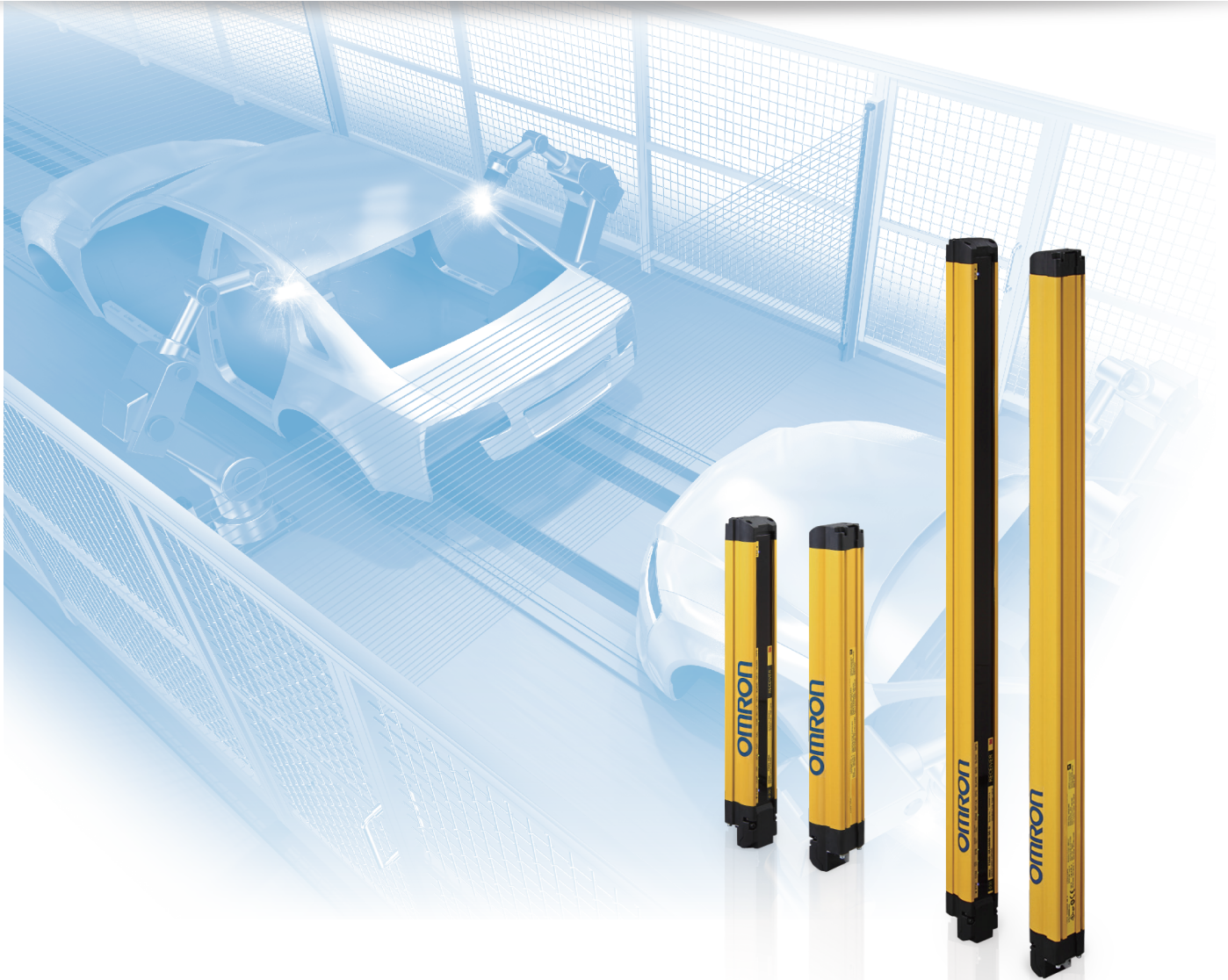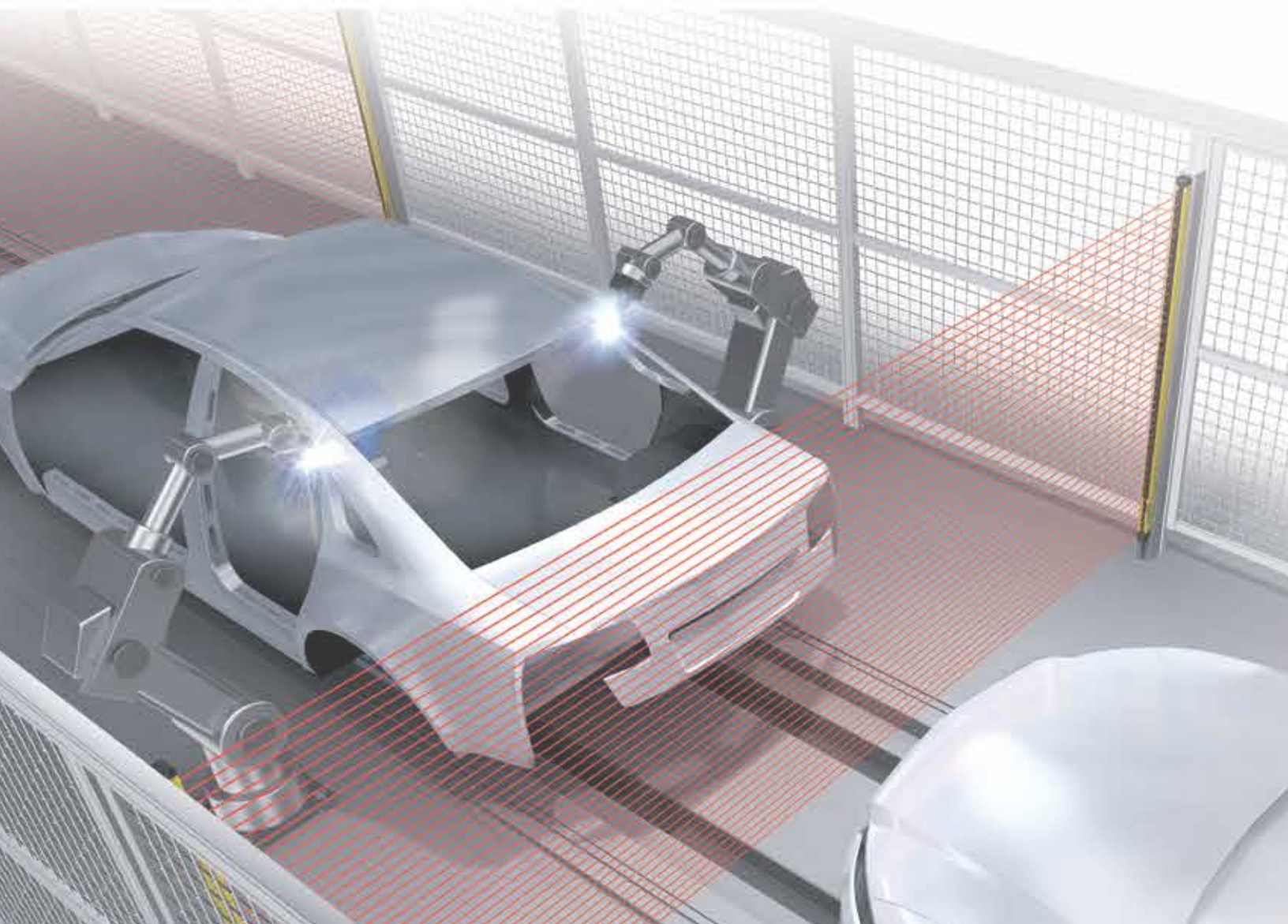# Superior machine safeguarding and operator protection

F3SG-R Series Safety Light Curtains

- Compact easy installation
- Robust even in severe environments
- Global reliable safety solutions
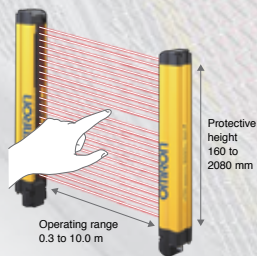
Next generation safety light

Advanced | Advanced type suitable for flexible production line applications
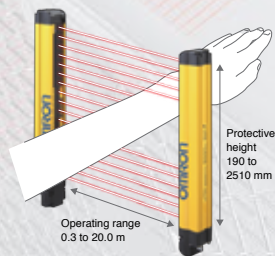

Protective height 160 to 2080 mm

Operating range 0.3 to 10.0 m

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

Protective height 160 to 2510 mm

Operating range 0.3 to 20.0 m

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

Economy | NEW | Economy type ideal for simple On/Off detection applications

Protective height 160 to 2080 mm

Operating range 0.3 to 10.0 m
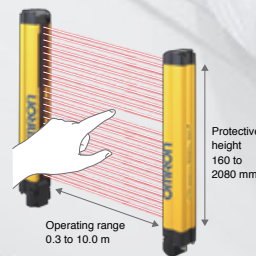
F3SG-4RE□□□-14
Detection capability: Dia. 14 mm

Protective height 190 to 2510 mm

Operating range 0.3 to 20.0 m
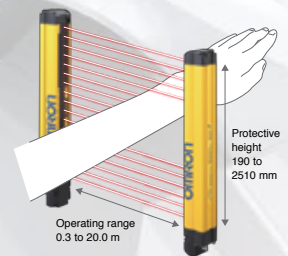
F3SG-4RE□□□-30
Detection capability: Dia. 30 mm

curtain packed with powerful features, offering both robustness and reliability

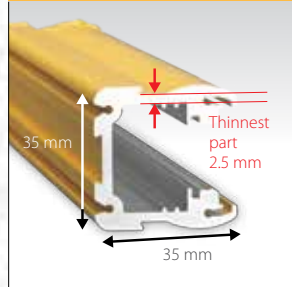**F3SG-R** | **Benefit** — If just one single safety light curtain can be used in a variety of environments, the time required for selection, installation, and maintenance can be reduced.

Selection & Design

35 mm

35 mm

Thinnest part 2.5 mm

Easy Selection & Design

In almost any environment

Waterproof and shock-resistant yet compact body. Conforms to major international standards.

Ensuring safety in various production lines

The dynamic muting function automatically sets a minimum muting zone according to workpiece height. It can be used for a variety of production lines.

Complete safety measures by detecting presence

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

Set-up
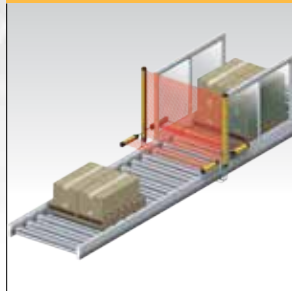
Easy Set-up

Drastically reduced set-up time and wiring

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

Simple, two-step optical adjustment

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

Flexible installation

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

Operation

Stable Operation

Quick troubleshooting and predictive maintenance

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

Mutual interference prevention

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

Robustness

Allows use in a variety of environments
## Protects itself and production sites

Robust and compact | Robust housing | Advanced Economy

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

Slim housing

35 mm

Thinnest part 2.5 mm

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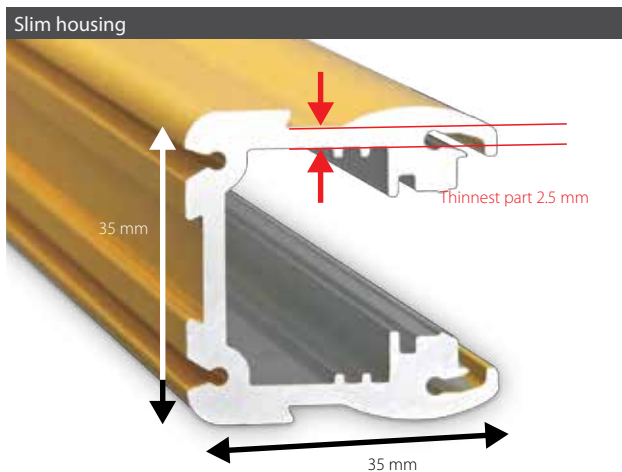
The housing structure is significantly improved to enhance resistance against shock and vibration and to reduce the thickness of the housing material from 3 mm to 2.5 mm.

Protection cover
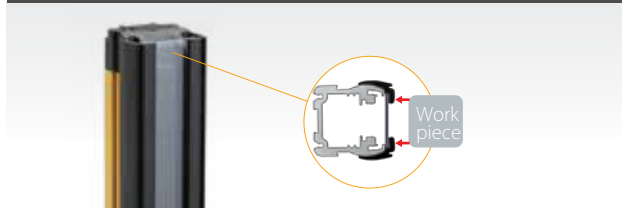
Work piece

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

Downsized

MS48

F3SR

F3SG-R

The robust housing can be used in harsh conditions and withstand shocks caused by sudden human contact or a dropped tool. The scratch-resistant material is used for the optical surface to prevent unexpected machine stops.
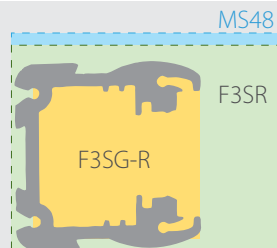
Cross-section is
Approx. 60%
of previous model

In almost any environment | For global use |

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

For global use — Advanced

NPN Global PNP

GB
International Standard
IEC   ISO

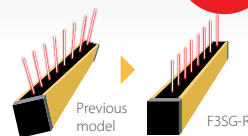PNP or NPN can be selected with the DIP switch. The same cables are used.

The F3SG-R conforms to major international standards.

For harsh environments — Advanced Economy

Secured against torsion

5 times more torsion resistant*

Previous model   F3SG-R

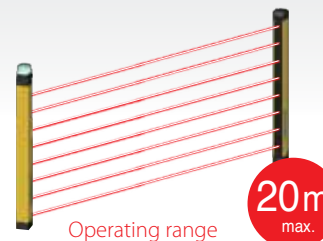The risk of optical axis misalignment due to vibration or aging is greatly reduced.

*Compared to OMRON previous model in December 2014.

IP67

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

Reliable even in harsh environments — Advanced Economy

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

*Based on OMRON investigation in December 2014.

Operating range

20m max.

New muting functionality
## Increases both productivity and safety
Easily distinguishes between workers and objects

Increasing both productivity and safety
| Muting function | Advanced

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

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

Previously…

Vibration

Photoelectric Sensor

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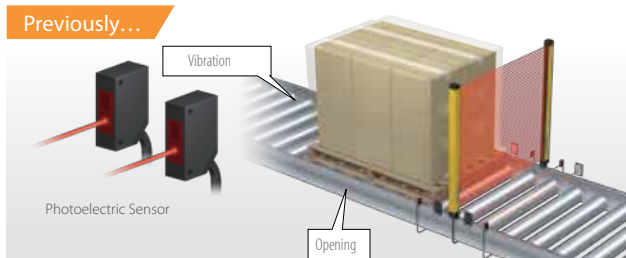
The point detection muting sensor mistakenly disabled muting while a workpiece was passing, which led to unexpected machine stops.

Smart muting actuator

Smart muting actuator

Automatically and flexibly detect even in unstable conveying conditions.

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

Adjustment time reduced by 80%*
### | Smart muting actuator | Advanced

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

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

Installation ▮ Wiring ▮ Adjustment ▮ Troubleshooting ▮ Maintenance ▮

Previous model

F3SG-R

Reduced by 80%

0   10   20   30   40   50   60   70   80   90   100

Previously… Many processes including programming and adjustment were required

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

F3SG

PLC

B1

Reflector

A2

Sensor A1

5
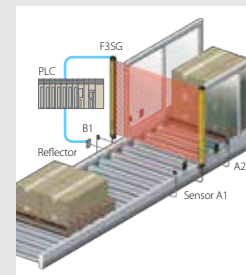
Powerful features

Prevent unexpected machine stops
## Ensure stable operation

Auto-configuration of muting zone
| Dynamic Muting | `Advanced`

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

Automatically minimizes muting zone according to workpiece size

**1** When the muting sensor detects that a workpiece passes, all beams are muted.
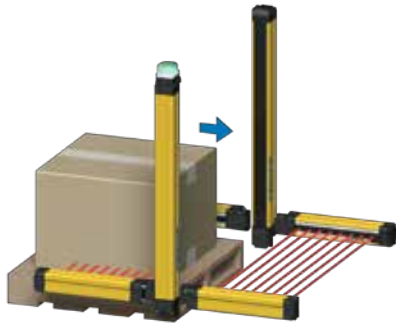
2 The only beams interrupted by the workpiece are kept muted and other beams are released from the muting state three seconds after the workpiece pass through the safety light curtain. Muting is disabled after the workpiece has passed.

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

Keeps the zone muted when a workpiece passes.
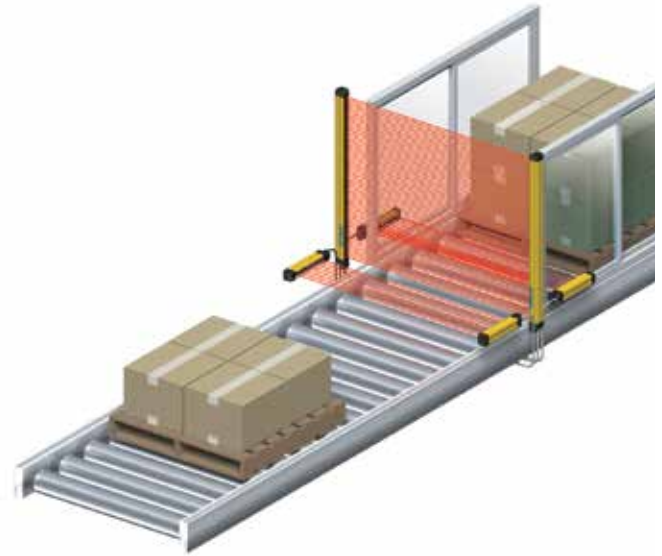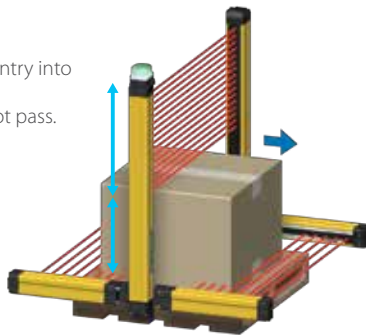
Minimizing setting and detection errors
| Configuration Tool SD Manager2 | `Advanced`

The function to log the muting sensor operating conditions of the F3SG-R visualizes the installation position and setting conditions of the sensor to achieve reliable configuration. The stop due to the muting error can be analyzed using the data stored in the F3SG-R. Quick identification of the cause can reduce unexpected machine downtime.
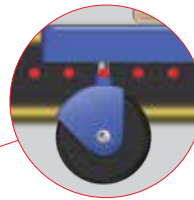
Visualized data makes adjustment smooth!
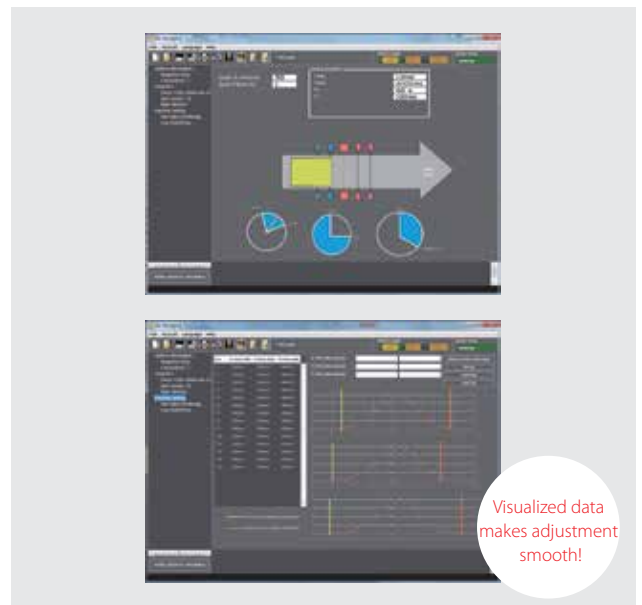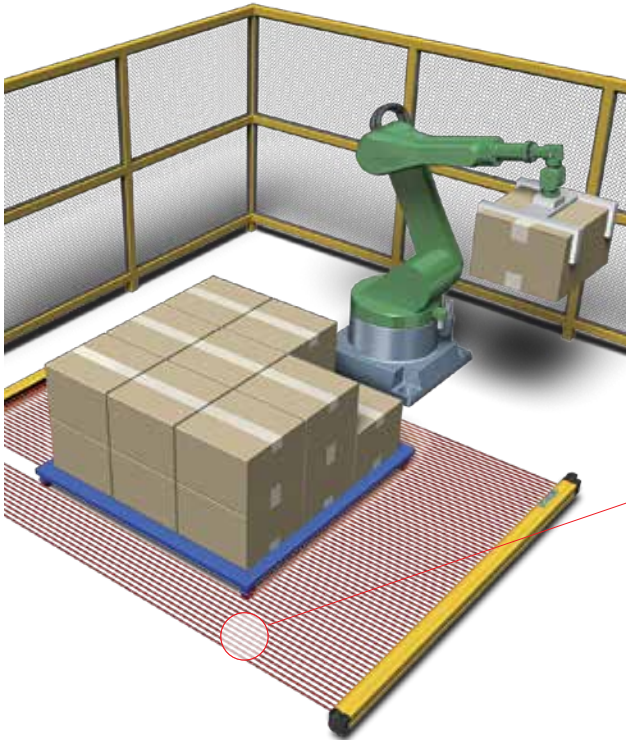
Detecting both objects and workers
| Reduced Resolution | `Advanced`

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

・Keep the safety outputs ON even when an object like a transport vehicle (with the size of 1 to 3 beams) is present intermittently.
・Turn safety outputs OFF when an object with the size over 3 beams, like an ankle.

Preventing accidental stops due to small debris
### | Response Time Adjustment | `Advanced`

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

Ensuring safe restart
| Pre-reset | `Advanced`

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

Helps prevent workers from being trapped
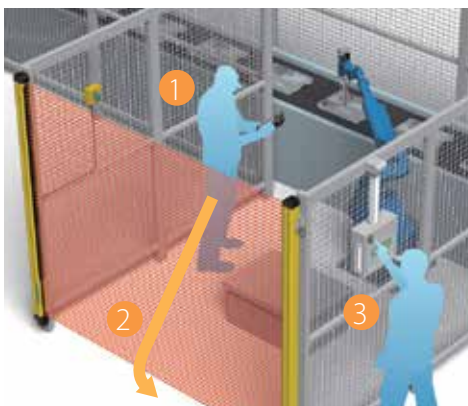
1 Press the pre-reset switch in the hazardous zone (safety fence)

2 Get out of the hazardous zone (safety fence)

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

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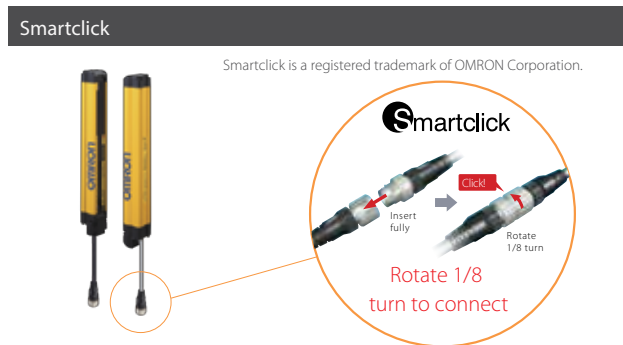
Smart

Wiring , beam adjustment, and operation check
Facilitate installation

No torque control required
| Smartclick | `Advanced` `Economy`

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

Smartclick

Smartclick is a registered trademark of OMRON Corporation.

Insert fully

Click!

Rotate 1/8 turn

Rotate 1/8 turn to connect

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

Previously… Faulty connection and need of torque control

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

Long-distance wiring
| Maximum 100 m cable length | `Advanced` `Economy`

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

Simple wiring
| Simple wiring connector | `Advanced` `Economy`

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

Previously…

Cables of the emitter and receiver
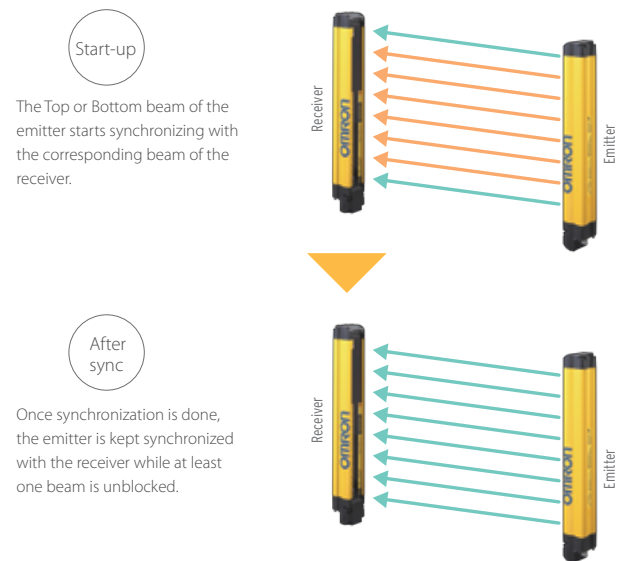
Only one cable
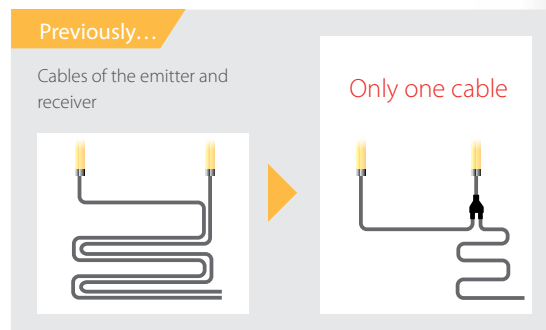
No limitation in wiring
| Optical synchronization | `Advanced` `Economy`

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

Flexible, new method

High ambient light immunity

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

Start-up

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

Receiver

Emitter

After sync

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

Receiver

Emitter

Previously… Limitations imposed by synchronization wiring

• Wiring between the emitter and receiver were required.

• With the previous synchronization function, if the Top or Bottom beam was blocked, synchronization was not maintained.
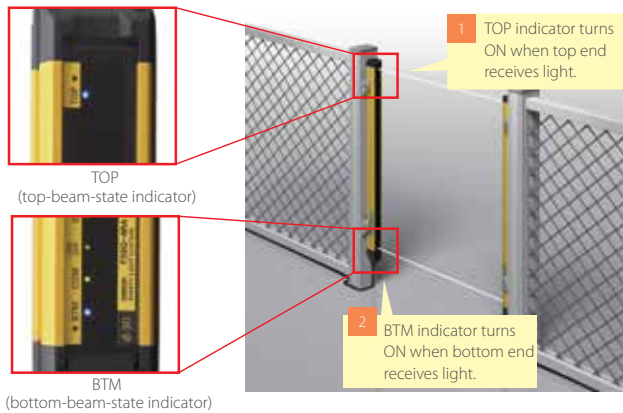
100m max.
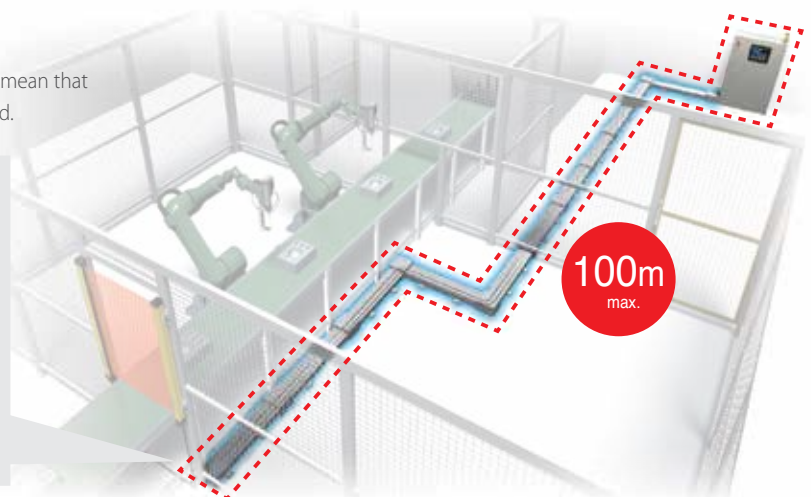
Simple two steps | Beam adjustment | `Advanced`

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

Simple adjustment: Coarse adjustment → positional alignment

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

TOP
(top-beam-state indicator)

BTM
(bottom-beam-state indicator)

1. TOP indicator turns ON when top end receives light.

2. BTM indicator turns ON when bottom end receives light.

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

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

Easy adjustment after mounting
| Mounting bracket | `Advanced` `Economy`

Two types of mounting brackets are available.

Standard fixed bracket
(Included)

Standard adjustable bracket
(sold separately)

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

In addition to vertical adjustment, the angle can be adjusted up to ±15°.adjusted up to ±15°.

Standard fixed bracket
The bracket is included in the F3SG-R.

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

Quick troubleshooting
# and predictive maintenance

Eliminate machine downtime to ensure stable operation

For global operators
| Multilingual troubleshooting | `Advanced` `Economy`

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

Troubleshooting Web

* English, Chinese, Italian, Korean, French, German, Spanish, and Japanese
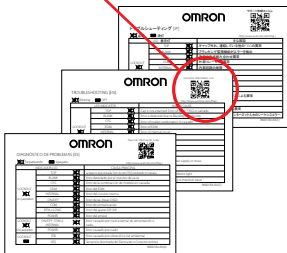
Troubleshooting guide sticker

Reducing stops due to mutual interference
| Operating Range Selection | `Advanced` `Economy`

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

Operating range

Short 7m

Long 20m

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

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

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

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

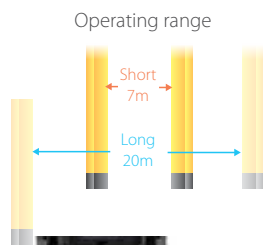* The Interface Unit F39-GIF is required to connect with a personal computer.

Quick troubleshooting | Data logging 1 | `Advanced`

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

Systematic maintenance based on trend management
| Data logging 2 | `Advanced`

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

Easy-to-use safety sensor
Ideal for simple on/off detection applications

NEW **Economy**

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

Simple wiring

Only four wires are required for the minimum configuration, which is as simple as wiring a photoelectric sensor. Simple connection with a safety controller makes it easy to build a safety circuit. Commerically available M12 connector cables can be used for extension cables.
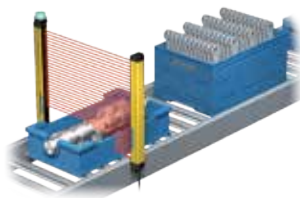
Fast response time of 5 ms

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

F3SG-R Line-up

Advanced type F3SG-RA   **Economy** type F3SG-RE

For flexible production lines

For small machines

List of Feature

Feature	Advanced type F3SG-RA	Economy type F3SG-RE	Factory default setting
PNP/NPN Selection	◖ DIP		PNP output
External Test	◖ DIP		24 V Active
Interlock	◖ DIP ▭ Config		Auto Reset Mode
Pre-Reset	◖ DIP ▭ Config		Disabled
External Device Monitoring(EDM)	◖ DIP ▭ Config		Disabled
Auxiliary Output	▭ Config		Muting /Override information
Muting	▭ Config		Standard Muting mode
Override	▭ Config		Enabled
Fixed Blanking	◖ DIP ▭ Config		Disabled
Floating Blanking	◖ DIP ▭ Config		Disabled
Reduced Resolution	▭ Config		Disabled
Warning Zone	▭ Config		Disabled
Scan Code Selection	◖ DIP		CodeA (F3SG-RA only)
Operating Range Selection	◖ DIP	● Wiring	Short mode
Response Time Adjustment	▭ Config		Standard mode
Lamp	▭ Config		Red:Disabled Orange:Disabled Green:Muting/Override information
Designated Beam Output	▭ Config		Disabled

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

Authorized Distributor:

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• Ultrasonic Sensors • Vision Sensors

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• Limit and Basic Switches • Timers • Counters • Metering Devices
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  Controllers • Light Curtains • Safety Relays • Safety Interlock Switches