

## Safety Light Curtain

# F3SJ Series

Three versions available to meet your exact safety needs.

All versions conform to the latest PLe/Safety Category 4 and SIL3 requirements.



» ADVANCED type supports finger protection, and complex blanking and muting functions

» **EASY type simple and affordable hand protection**

» BASIC type simple hand protection and simple muting functions

# Offering the best selection of safety light curtains for your guarding needs.

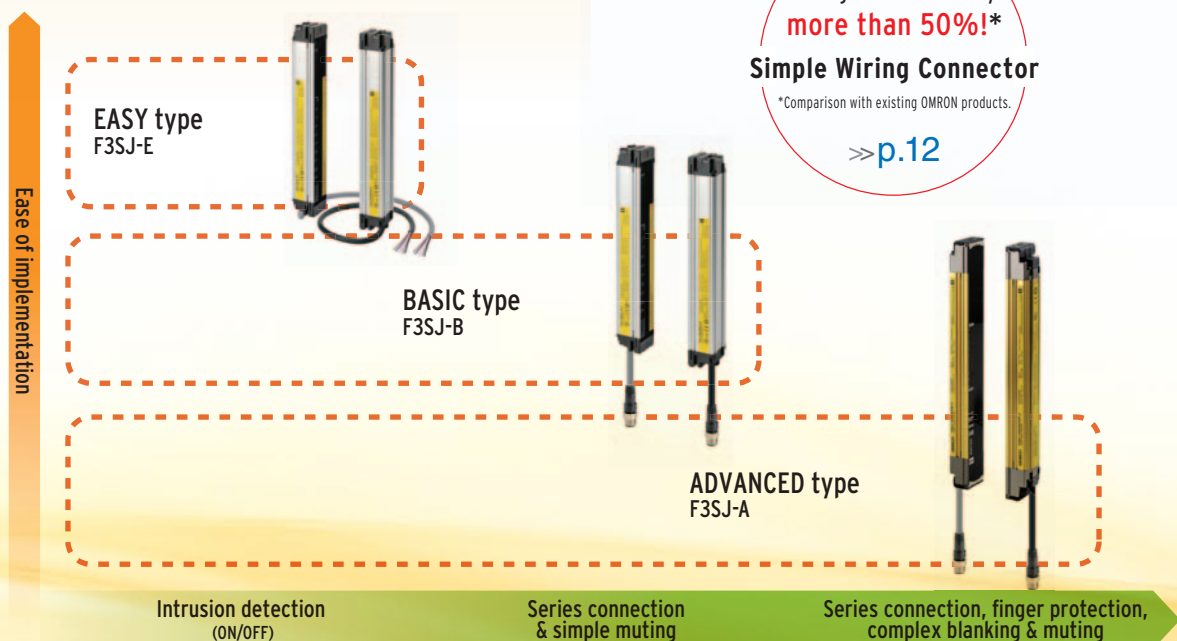
Three F3SJ types allow easy selection for your application.

Omron's new F3SJ series of safety light curtains offers a tailored approach for a variety of production environments. Conventional safety light curtains offer full-featured models, even when only simple intrusion detection is needed. The F3SJ series offers a product range that allows you to choose the best product according to your application needs.

The EASY type has been added for simple hand detection, while the BASIC type adds the potential for series connection and simple muting functions.

The F3SJ series now allows you to select the best safety light curtain for your application environment without paying for unused functions.

- For simple and affordable hand protection:  
The **EASY type (F3SJ-E)**
- For simple hand protection, series connection and muting functions:  
The **BASIC type (F3SJ-B)**
- For finger protection, series connection, complex blanking and muting functions:  
The **ADVANCED type (F3SJ-A)**





**[Applicable Standards]**  
 EN ISO 13849-1: PL/Safety Category 4  
 IEC 61496-1,-2: Type 4  
 IEC 61508-1 to 3: SIL3

Authenticated under major safety standards including European standards.



- 1/2 Mounting Time
- Global Support
- Fast Installation
- Easy-to-View Diagnostics



- Series Connection
- Global Support
- Simple muting
- Easy-to-View Diagnostics



- Series Connection
- Warning Zone
- Global Support
- Simple muting
- Blanking
- PC Setting Tool
- Finger Protection



**Easy to install**  
**EASY type (F3SJ-E)**

Can be used for simple hand intrusion detection. Mounting now takes less than half the man-hours that conventional models take. Despite its simplicity, the EASY type is a highly reliable safety light curtain.

**Easy to maintain**  
**BASIC type (F3SJ-B)**

The muting function allows use of the safety light curtain in a variety of manufacturing environments. The flexible mounting supports up to three sets of series-connected sensors.

**High functionality**  
**ADVANCED type (F3SJ-A)**

The detection capability supports finger protection through use of 14mm resolution. The ADVANCED type has a wide variety of muting and blanking functions to increase productivity.

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 · Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.  
 \* As the beams are infrared, they are invisible to the naked eye.

## Implementation cost reduction with 1/2\* the mounting time: Start with the "EASY type"

The EASY type safety light curtain well is suited for straight forward on/off detection applications.

\* Comparison with existing OMRON products.

By carefully selecting the available functions, we have reduced man hours necessary for installation by approximately 1/2 when compared with existing OMRON models.

Reduced installation time means added savings to your project's budget, start with the EASY type.

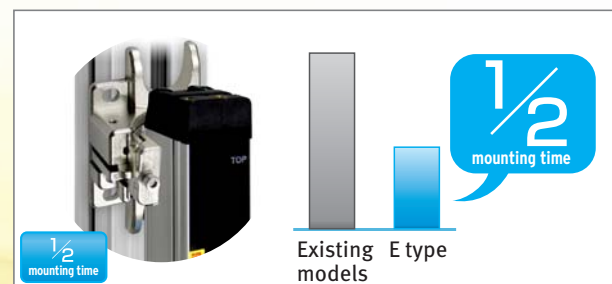


Easy-to-view blue LEDs make beam adjustment easier!



Machine safety first, narrowed down to the simplest functions:

Upon detection of personnel, the machine stops.  
Simple yet very optimal.

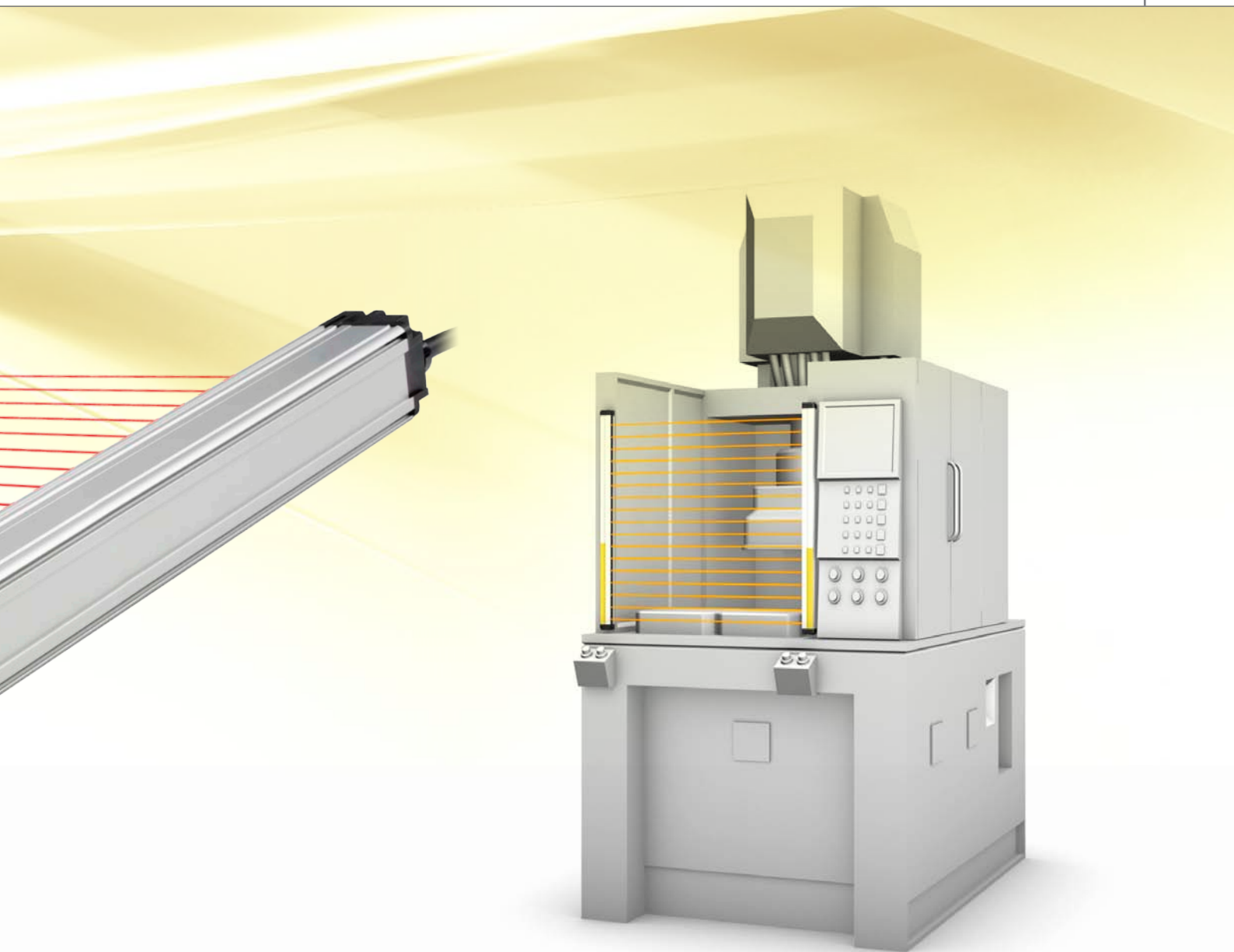


1/2 the mounting time

Fixed response time makes calculation of the safety distance is easier.

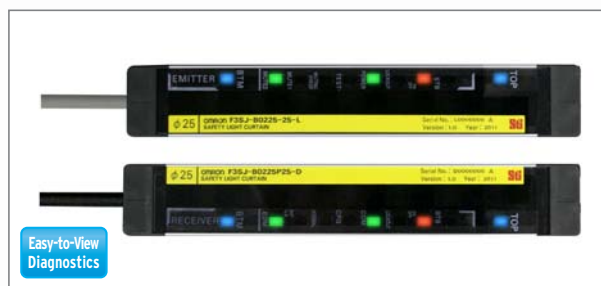
Reduced wiring, one-touch brackets and easy-to-view alignment beams all add up to cost savings.

Additionally, with one fixed response time, it is know easier to calculate the safety distance.



**Global Support**

OMRON will support you through our global network

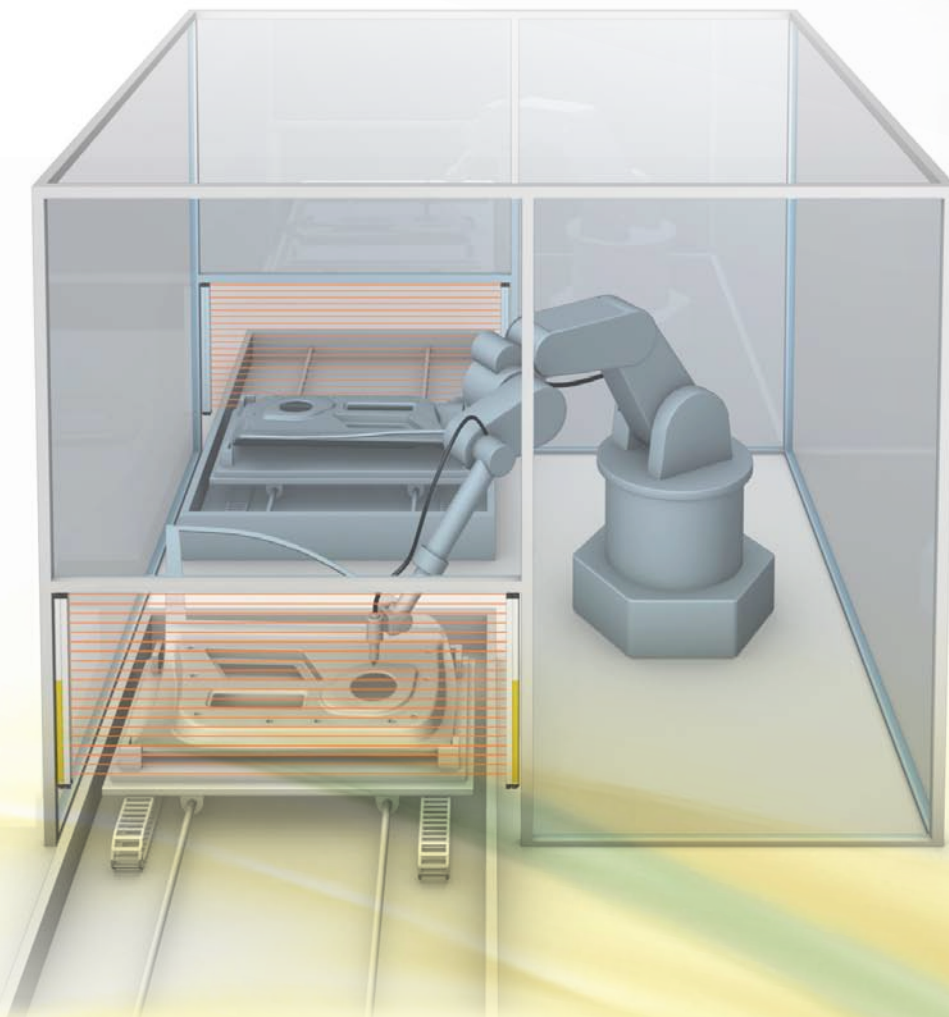


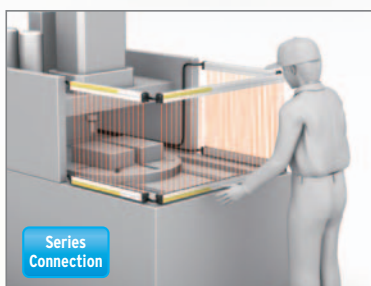
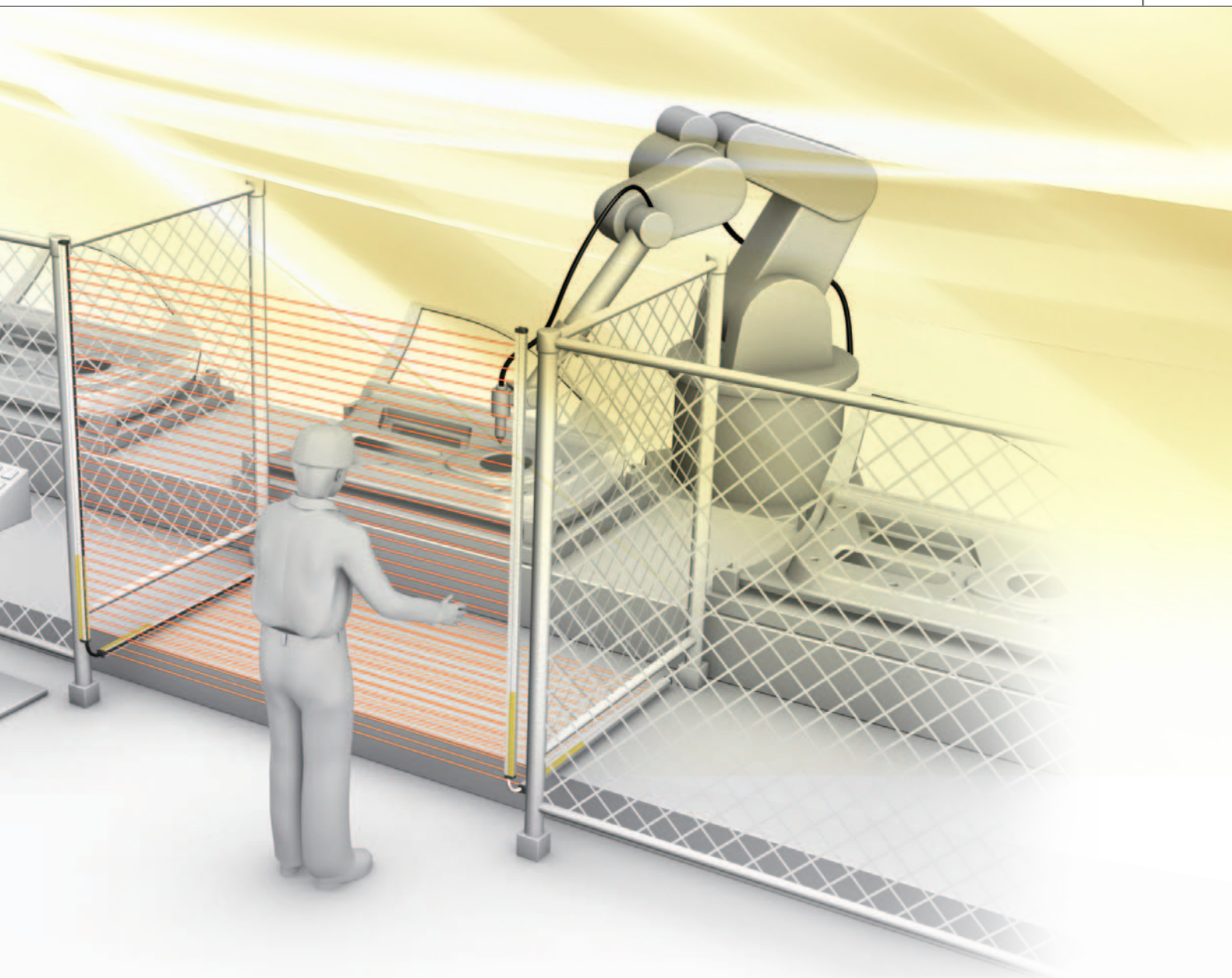
**Easy-to-view Diagnostics**

These indicators enable you to intuitively know the status and cause of any error. Allowing you faster installation while reducing machine down time.

## Fits any site, equipped with muting functions and series connection: Use the **"BASIC type"**

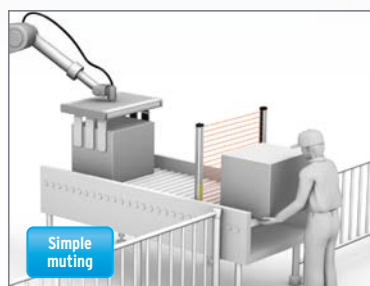
In addition to the simple functions inherited from the EASY type, such as global support, easy-to-view indicators, the BASIC type includes series connection and simple muting functions. This enables the BASIC type to satisfy installations that require multiple safety light curtains.





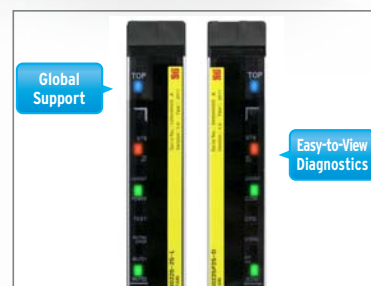
#### Up to three sets-connected in series

It is possible to connect up to three sets of safety light curtains in series. These sensors can be placed in a U-shaped or L-shaped pattern with a single power line, thus requiring less wiring.



#### Instant visibility of process trouble during muting

The BASIC type includes a muting function which temporarily disables the safety light curtain when a workpiece passes through. In the event of any trouble occurring, the error can be instantly recognized from the pattern of the LED indicators, allowing for a fast solution.



#### Functions inherited from the EASY type

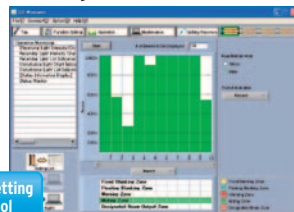
Simple functions such as universal power voltage specification, easy-to-view diagnostics, a fixed response time have been inherited from the EASY type. As a result, expect reduced work-hours at each stage of use, from design and installation to operation.

## Multi-functional for special applications such as finger protection: the "ADVANCED" type

The detection capability supports finger protection through use of 9 mm resolution. The ADVANCED type is equipped with various functions such as blanking, muting and the programming of warning zones. All settings can be done via an easy to use software tool. This Tool simplifies installations that were previously complicated, again our way of reducing cost and increasing productivity.



- Beam alignment is easier.



PC Setting Tool

Tool for setting parameters and checking the system status

With the ADVANCED type (F3SJ-A) "SD Manager", all parameters can be set and the system status can be checked with a personal computer. Complex settings are now simple to configure

- Detection capability: 9 mm

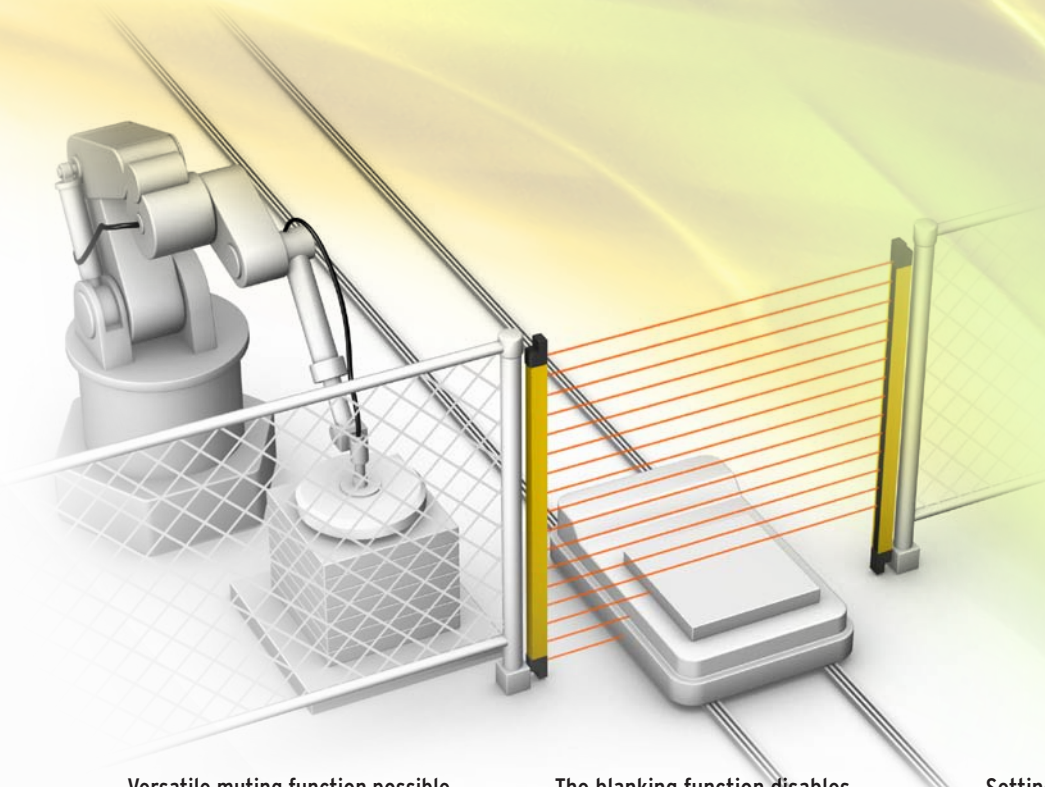


Finger Protection

Detection capability supports finger-protection

Even if the distance from the hazard is short, we have prepared a lineup that includes safety light curtains with a detection capability of 14 mm.





### Versatile muting function possible

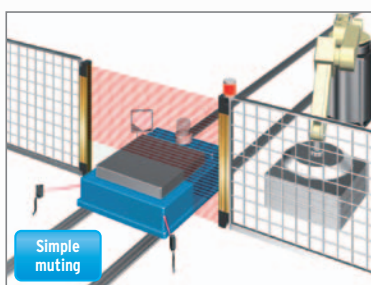
Equipped with partial muting that disables only the beams where a workpiece passes through, and position detection muting that disables the beams while detecting the position of a machine or robot.

### The blanking function disables specific beams of the Safety Light Curtain

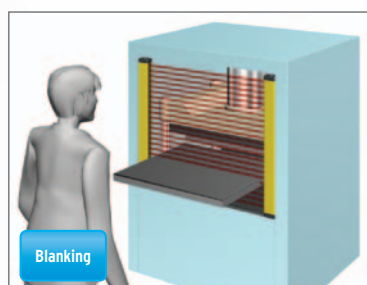
If a part of the mechanical equipment is within the detection zone of the Safety Light Curtain, the relevant beams can be disabled. This is possible not only with non-moving parts but also with moving parts.

### Setting up a warning zone to prevent unnecessary stoppage

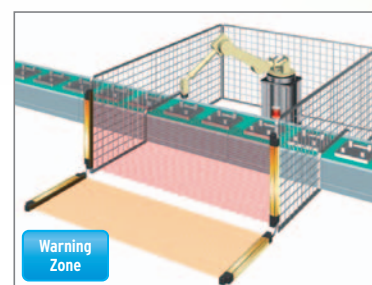
Under normal use, if an intrusion occurs in the safety zone, the machine will stop immediately. However, use of a warning zone will only notify the operator that an intrusion has occurred. This can be used to prevent carelessness resulting in machine stoppage on the part of the operator.



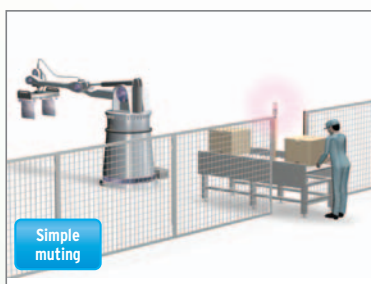
Partial muting



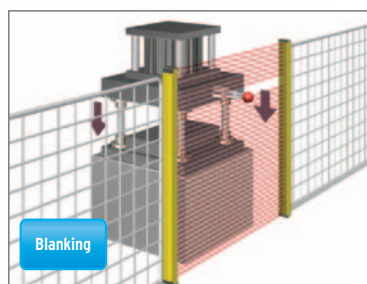
Fixed blanking



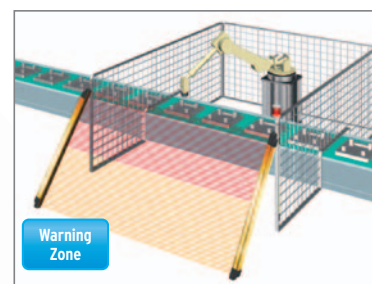
Dividing the zone between series-connected sensors



Position detection muting



Floating blanking



A single sensor zone can also be divided

## Easy and fast mounting with one-touch brackets\*

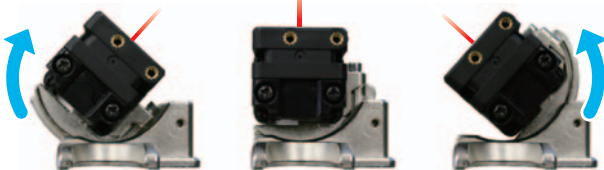
EASY BASIC

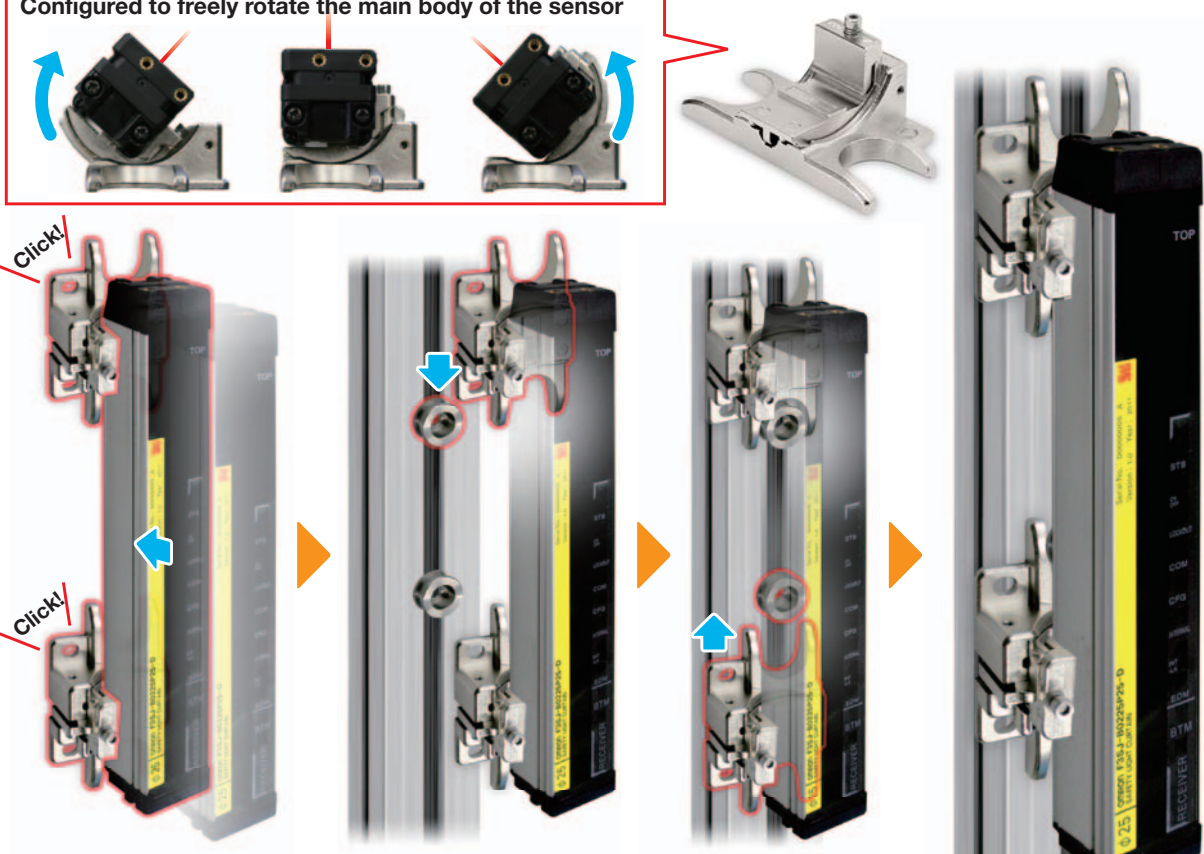
\* Sold separately

Patented

OMRON has developed "one-touch" brackets which speed mounting to aluminum framing and reduce mounting time in half, when compared with existing models. This unique design allows for smooth horizontal movement, beam alignment is easy.

**Configured to freely rotate the main body of the sensor**





**Mount the one-touch brackets to the main sensor body. Use the clamps to tightly clamp the upper body of the sensor while lightly clamping the lower body.**

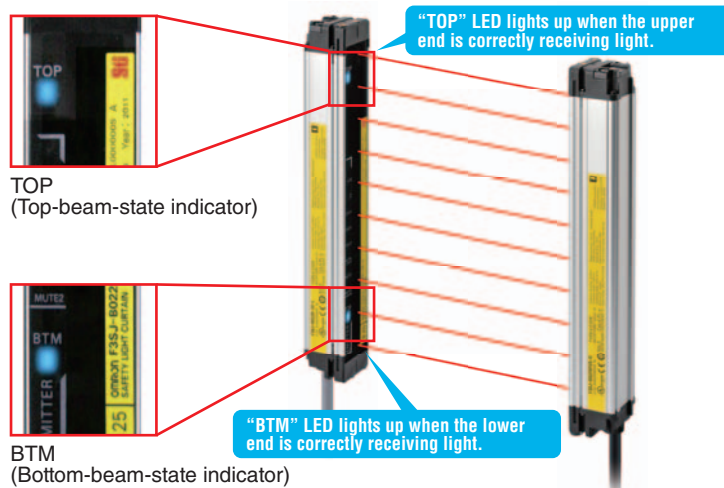
**Fix the circular fixtures to the surface of the aluminum frame and set the upper bracket onto the upper circular fixture.**

**Slide the lower bracket up towards the lower circular fixture and tightly clamp the lower body of the sensor. Once done, mounting is concluded.**

## Top and bottom blue LEDs enabling beam alignment

EASY BASIC

Simple positional alignment can be done using the blue LEDs at the top (TOP) and bottom (BTM) of the emitter and receiver. With the blue LEDs ON, you can see at a glance that the beams' positions are correctly aligned.



TOP  
(Top-beam-state indicator)

"TOP" LED lights up when the upper end is correctly receiving light.

BTM  
(Bottom-beam-state indicator)

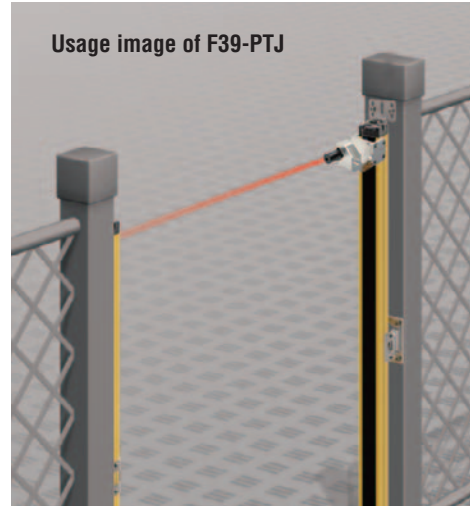
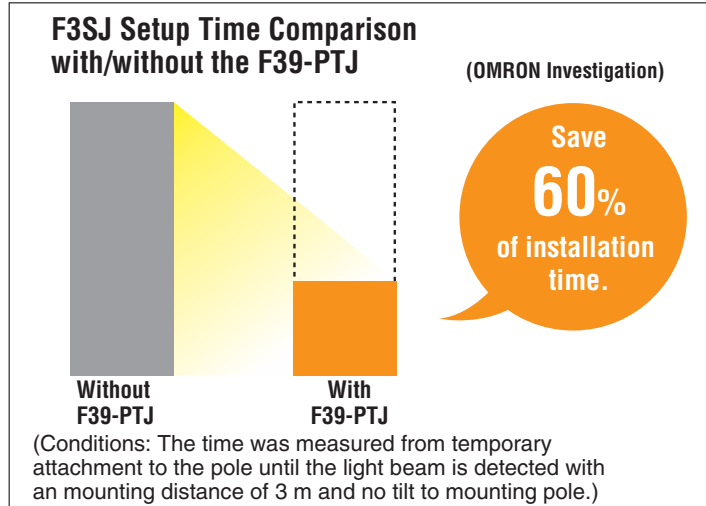
"BTM" LED lights up when the lower end is correctly receiving light.

## Laser pointer used to easily align the beams\*

EASY BASIC ADVANCED

Use of the laser pointer allows simple alignment of the beams especially across long distances. This saves approximately 60% of installation time.

\* Sold separately

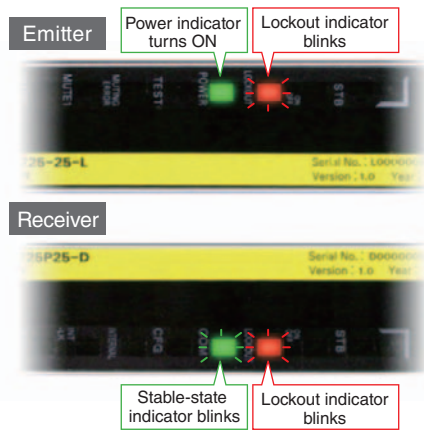


## Easy-to-understand diagnostics

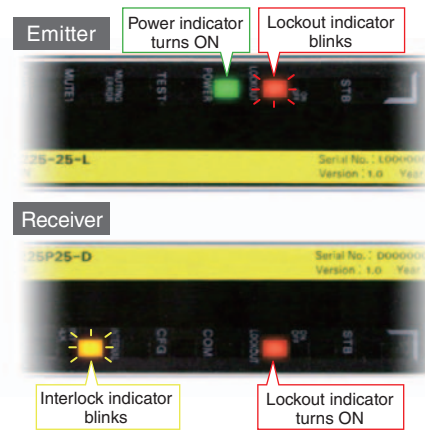
EASY BASIC

Light curtain status can be immediately determined as the LED will light to indicate the status or possible error.

Communication error (EASY/BASIC type)



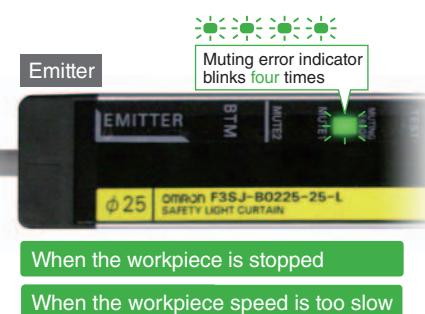
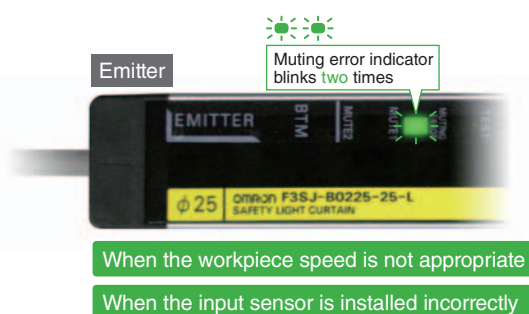
Input error (BASIC type)



## Industry First! Error indication while muting is in progress.

BASIC

The days of searching through user manuals to find the cause of certain muting errors are long gone. Now these errors and their causes can be well understood.



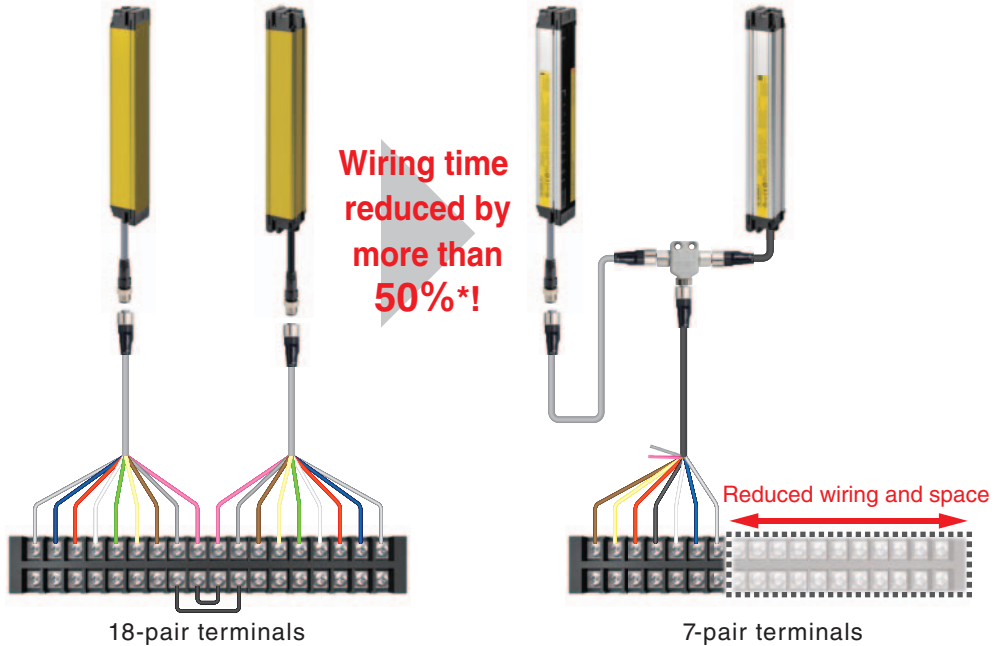
"Simple wiring connector" used to reduce wiring work by more than 50%\*

BASIC ADVANCED

The connector can be used to easily connect between an emitter and a receiver, reducing the required wiring time by more than 50%.  
Less wiring also reduces the width of the terminal block, saving valuable space in the control panel.

Note: The simple wiring connector can be used for F3SJ-A/B in auto reset mode only, not for F3SJ-E.

\*Comparison with existing OMRON products.



Tool for setting parameters and checking the system status

ADVANCED

"SD Manager" PC Setting Support Software (For F3SJ-A)

To a USB terminal

Branch Connector

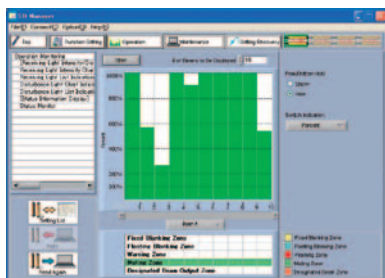
Connection cable

All parameters can be set and the system status can be checked with a personal computer. In addition to making it easy to monitor the beam alignment, the ambient incident light intensity can be displayed in bar graph form for an easy check of the system status.

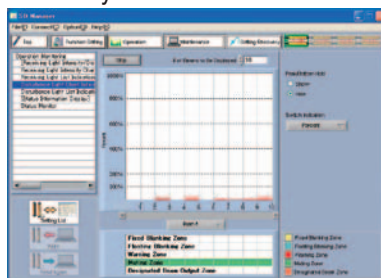
**F39-GWUM "SD Manager" PC Setting Support Software**

The "SD Manager" PC Setting Support Software helps reduce the time required for installing and troubleshooting the Safety Light Curtain.

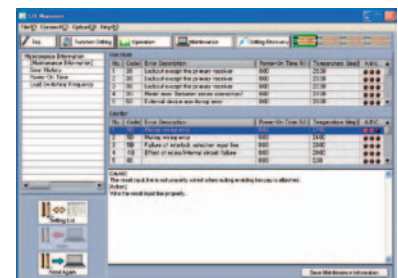
- Beam alignment is easier.
- The ambient incident light intensity can be checked.
- The error log can be displayed.



The incident light level can be displayed in a bar graph for each beam.



The incident light level when the light emission of the Safety Light Curtain is stopped is displayed in a bar graph.



The cause of the errors and countermeasures are both displayed.

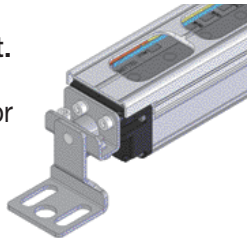
Added the ENVIRONMENT RESISTANT type (F3SJ-B□□□□P25-02TS) to the E3SJ series.

## The coolant-resistant structure supports use in a severe work environment

ENVIRONMENT RESISTANT

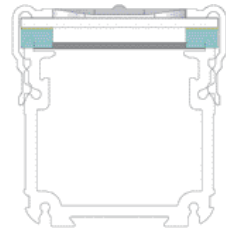
Protects the sensor unit from direct exposure to the coolant.

The aluminum frame and transparent plate protect the sensor unit from direct exposure to the coolant. The cover protects the sensor's detection surface from collision with a workpiece, etc.



Protects the sensor from entry of the coolant that runs around the sensor.

The coolant-resistant H-NBR sponge used inside the cover protects the sensor from entry of the coolant that runs around the sensor.



Note: The sensor may be affected depending on the type of the cutting oil. Check the oil type before use.

## Achieving muting function without a controller

BASIC ADVANCED

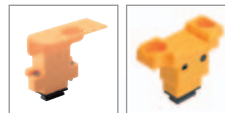
The muting function temporarily disables the light curtain when an object must pass through the detection zone, such as when supplying a workpiece to your equipment. In the past, this function required a dedicated muting controller, but now it is built into the F3SJ. To use the muting function, purchase the Muting Key Cap (for F3SJ-B: F39-CN10 and for F3SJ-A: F39-CN6) (sold separately). The muting function is enabled simply by replacing the Unit's cap with this Key Cap. In addition, a muting sensor that determines the muting timing, as well as a muting lamp that notices the muting status to other operators, should be connected to the F3SJ. The muting time for the F3SJ-A can be set via the software tool.

Use example of a muting key cap for F3SJ-A

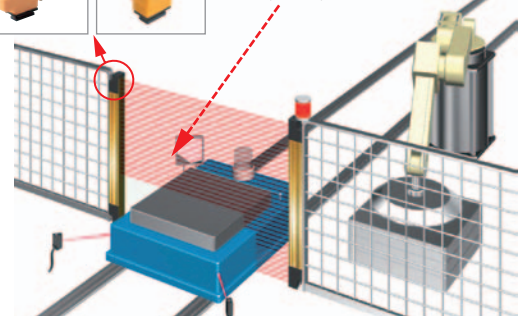
### Built-in muting function

No controller required. Simply attach the Key Cap (sold separately) to the sensor.

Key caps for muting  
F39-CN6 (for F3SJ-A)      F39-CN10 (for F3SJ-B)



The Safety Light Curtain can be disabled when an AGV carrying a workpiece passes through.



## Equipped with two muting functions

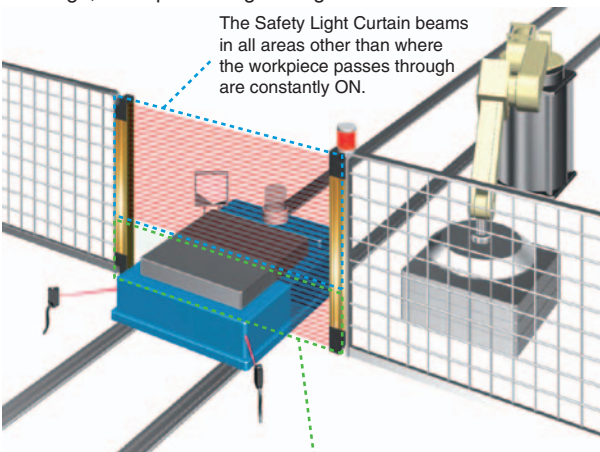
ADVANCED

With F3SJ-A, the muting function temporarily disables the Safety Light Curtain when an object must pass through the detection zone, such as when supplying a workpiece to your equipment. "Partial muting," which further heightens the level of safety, and "position detection muting," which allows muting when the safety status can be determined by the position of a machine (such as a robot), have been newly added to the muting function.

### Partial muting

Partial muting raises safety by muting only the beams of the Safety Light Curtain in the area where the workpiece passes through, while preventing muting in all other areas.

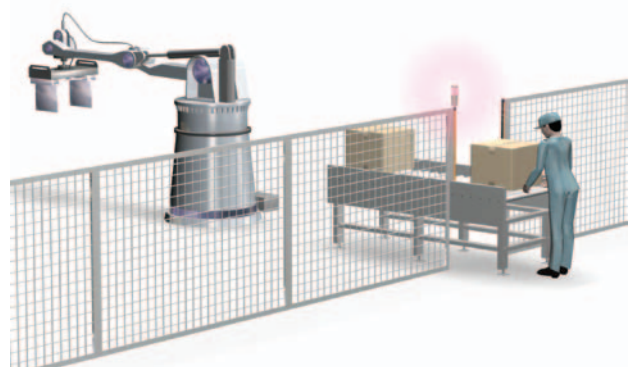
The Safety Light Curtain beams in all areas other than where the workpiece passes through are constantly ON.



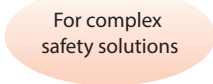


Only the beams of the Safety Light Curtain that would be interrupted by the workpiece are muted.

### Position detection muting

This is used in applications where the workpiece is set in position each time by an operator, and then a turntable or positioning robot moves the workpiece to the area where the work is done. A limit switch or other means is used to detect when the robot is in a safe position, and muting is then applied.

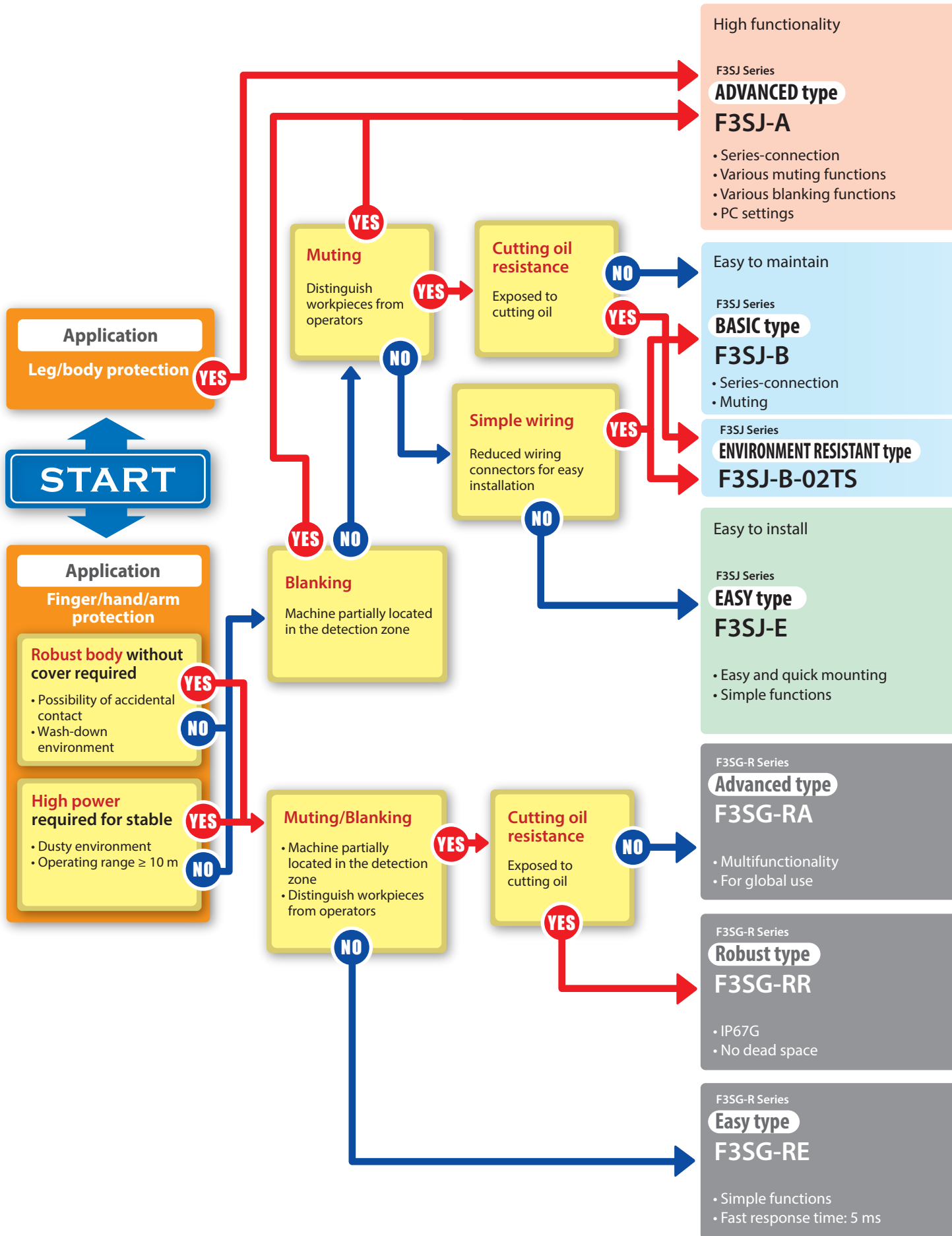


		EASY type	BASIC type			ADVANCED type		
		F3SJ-E	F3SJ-B	F3SJ-B-01TS	F3SJ-B-02TS	F3SJ-A		
		 <p>For simple hand protection</p>	 <p>A combination of performance and functionality</p>			 <p>For complex safety solutions</p>		
Application	Finger protection					●		
	Hand and arm protection	●	●	●	●		●	
	Body protection							
Specification	Detection capability	25-mm dia.	25-mm dia.			14-mm dia.	20-mm dia.	
	Beam gap	20 mm	20 mm			9 mm	15 mm	
	Operating range	0.2 to 7 m	0.2 to 7 m		0.2 to 6 m	0.2 to 9 m*1		
	Protective height	185 to 1,105 mm	185 to 2,065 mm		225 to 1,985 mm	245 to 1,271 mm	245 to 1,505 mm	
	Number of beams	8 to 54	8 to 102		10 to 98	26 to 140	16 to 100	
Feature	PNP/NPN Selection	–	–			–		
	External Test	☐	☐			☐		
	Interlock	–	☐	–		☐ ☐		
	Pre-Reset	–	–			–		
	External Device Monitoring (EDM)	–	☐			☐ ☐		
	Auxiliary Output	–	–			☐		
	Muting	–	☐	–	☐	☐ / ☐+☐		
	Blanking	–	–			☐		
	Reduced Resolution	–	–			–		
	Warning Zone	–	–			☐		
	Scan Code Selection	(Not required for wired synchronization)						
	Operating Range Selection	–	–			☐		
	Response Time Adjustment	–	–			–		
Designated Beam Output	–	–			☐			
Connection/wiring	Cascade Connection	–	☐			☐		
	Simple wiring connector	–	☐			☐		
Environmental resistance	Degree of protection	IP65	IP65			IP65		
Accessory	Lamp	–	–			●		
	Bluetooth communication unit	–	–			–		
	SD Manager	–	–			●		
	Laser pointer	●	●	–		●		
More information		Page 18		Page 30		Page 66		




\*1. Varies depending on the protective height.




		More rugged – F3SG-R Series				
		F3SG-RA	F3SG-RR	F3SG-RE		
		●	●	●	Finger protection	Application
●		●	●	●	Hand and arm protection	
	●				Body protection	
30-mm dia.	55-mm dia.	14-mm dia./30-mm dia.	14-mm dia./25-mm dia.	14-mm dia./30-mm dia.	Detection capability	Specification
25 mm	50 mm	10 mm/20 mm	10 mm/20 mm	10 mm/20 mm	Beam gap	
		0.3 to 10 m/0.3 to 20 m	0.3 to 10 m/0.3 to 17 m	0.3 to 10 m/0.3 to 20 m	Operating range	
245 to 2,495 mm	270 to 2,470 mm	160 to 2,080 mm/190 to 2,510 mm	240 to 1,920 mm	160 to 2,080 mm/190 to 2,510 mm	Protective height	
10 to 100	6 to 50	15 to 207/8 to 124	23 to 191/12 to 96	15 to 207/8 to 124	Number of beams	
				–	PNP/NPN Selection	
		*2	*2	–	External Test	
				–	Interlock	
				–	Pre-Reset	
				–	External Device Monitoring (EDM)	
				–	Auxiliary Output	
				–	Muting	
				–	Blanking	
				–	Reduced Resolution	
				–	Warning Zone	
				–	Scan Code Selection	
			–		Operating Range Selection	
				–	Response Time Adjustment	
				–	Designated Beam Output	
				–	Cascade Connection	Connection/ wiring
					Simple wiring connector	
		IP67	IP67, IP67G	IP67	Degree of protection	Environmental resistance
		●	●	–	Lamp	Accessory
		●	●	–	Bluetooth communication unit	
		SD Manager2	SD Manager2	–	SD Manager	
		●	●	●	Laser pointer	
Refer to the F3SG-R Catalog (Cat. No. F094).					More information	




\*2. Supports PNP/NPN by switching between 0 V and 24 V active.








Protective height	Specifications	Brackets	Cable	Accessories (sold separately)
 <p>14-mm dia. 245 to 1,271 mm (26 to 140 beams)</p> <p>* When the minimum object resolution is 14 mm and the beam gap is 9 mm.</p>	<p><b>Detection capability</b></p> <p>14-mm dia. -</p> <p><b>Beam gap</b></p> <p>9 mm -</p> <p><b>Operating range</b></p> <p>0.2 to 9 m</p>	<p><b>Included</b></p> <ul style="list-style-type: none"> <li>• Standard bracket</li> </ul>  <p><b>Sold separately</b></p> <ul style="list-style-type: none"> <li>• Side flat bracket</li> <li>• Free location bracket</li> <li>• Space-saving mounting bracket</li> </ul>	<p><b>Connector</b></p> 	<ul style="list-style-type: none"> <li>Control unit (Cannot be used as a muting system in the controller connection)</li> <li>Laser pointer</li> <li>Dedicated external indicator set</li> <li>Spatter protection cover</li> <li>SD Manager</li> <li>Protective bar</li> <li>Environment-resistant case</li> <li>Simple wiring connector</li> </ul> <p>See <a href="#">p.66</a> for details.</p>

 <p>25-mm dia. 185 to 2,065 mm (8 to 102 beams)</p> <p>* ENVIRONMENT RESISTANT type Protective height: 225 to 1,985 mm Operating range: 0.2 to 6 m</p>	<p><b>Detection capability</b></p> <p>25-mm dia.</p> <p><b>Beam gap</b></p> <p>20 mm</p> <p><b>Operating range</b></p> <p>0.2 to 7 m</p>	<p><b>Sold separately</b></p> <ul style="list-style-type: none"> <li>• Top/bottom bracket</li> <li>• One-touch bracket</li> </ul>  <p>• Compatible bracket</p>	<p><b>Connector</b></p> 	<ul style="list-style-type: none"> <li>Control unit (Cannot be used as a muting system in the controller connection)</li> <li>Laser pointer</li> <li>Spatter protection cover</li> <li>Protective bar</li> <li>Simple wiring connector</li> </ul> <p>* The F3SJ-8□□□P25-01TS/-02TS has different specifications. See <a href="#">page 30</a> for details.</p> <p>See <a href="#">p.30</a> for details.</p>
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 <p>25-mm dia. 185 to 1,105 mm (8 to 54 beams)</p>	<p><b>Detection capability</b></p> <p>25-mm dia.</p> <p><b>Beam gap</b></p> <p>20 mm</p> <p><b>Operating range</b></p> <p>0.2 to 7 m</p>	<p><b>Sold separately</b></p> <ul style="list-style-type: none"> <li>• Top/bottom bracket</li> <li>• One-touch bracket</li> </ul>  <p>• Compatible bracket</p>	<p><b>Pre-wired</b></p> 	<ul style="list-style-type: none"> <li>Laser pointer</li> <li>Spatter protection cover</li> <li>Protective bar</li> </ul> <p>See <a href="#">p.18</a> for details.</p>
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 <p>14-mm dia. 160 to 2,080 mm (15 to 207 beams) 30-mm dia. 190 to 2,510 mm (8 to 124 beams)</p>	<p><b>Detection capability</b></p> <p>14-mm dia./30-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/ 0.3 to 20 m</p>
---	---

 <p>14-mm dia. 240 to 1,920 mm (23 to 191 beams) 25-mm dia. 240 to 1,920 mm (12 to 96 beams)</p>	<p><b>Detection capability</b></p> <p>14-mm dia./25-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/ 0.3 to 17 m</p>
---	---

 <p>14-mm dia. 160 to 2,080 mm (15 to 207 beams) 30-mm dia. 190 to 2,510 mm (8 to 124 beams)</p>	<p><b>Detection capability</b></p> <p>14-mm dia./30-mm dia.</p> <p><b>Beam gap</b></p> <p>10 mm/20 mm</p> <p><b>Operating range</b></p> <p>0.3 to 10 m/ 0.3 to 20 m</p>
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Refer to the F3SG-R Series Catalog (Cat. No. F094) or visit the Omron website for details of the F3SG-R Series.



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

F3SG-R

Search



# Safety Light Curtain

# F3SJ-E

## EASY type reduces implementation costs with 1/2 the mounting time.

- In pursuit of simple functions: Upon detection of personnel, the machine stops.
- Can be used for simple hand intrusion detection.
- Implementation costs can be significantly reduced.

### Related information

Dimensions : Page 56 to 65  
 Function List : Page 99 to 100  
 Safety Precautions : Page 101  
 Precautions on Safety : Page 102 to 107

## Ordering Information

### Main Units

#### Safety Light Curtain

Application	Detection capability	Beam gap	Operating range	Protective height (mm)	Model	
					PNP output	NPN output
Hand protection	Dia. 25 mm	20 mm	0.2 to 7 m	185 to 1,105	F3SJ-E□□□□P25 *1	F3SJ-E□□□□N25

Note: F3SJ-E uses a 3 m prewired discrete cable.

\*1. For S-mark compatible model, the suffix "-S" is added to the model name.  
 (Example) F3SJ-E0185P25-S

#### Safety Light Curtain Model List

Please contact our sales representative.

#### F3SJ-E Series (20 mm pitch)



Model		Number of beams	Protective height [mm] *2
PNP output *1	NPN output		
F3SJ-E0185P25	F3SJ-E0185N25	8	185
F3SJ-E0225P25	F3SJ-E0225N25	10	225
F3SJ-E0305P25	F3SJ-E0305N25	14	305
F3SJ-E0385P25	F3SJ-E0385N25	18	385
F3SJ-E0465P25	F3SJ-E0465N25	22	465
F3SJ-E0545P25	F3SJ-E0545N25	26	545
F3SJ-E0625P25	F3SJ-E0625N25	30	625
F3SJ-E0705P25	F3SJ-E0705N25	34	705
F3SJ-E0785P25	F3SJ-E0785N25	38	785
F3SJ-E0865P25	F3SJ-E0865N25	42	865
F3SJ-E0945P25	F3SJ-E0945N25	46	945
F3SJ-E1025P25	F3SJ-E1025N25	50	1,025
F3SJ-E1105P25	F3SJ-E1105N25	54	1,105

\*1. For S-mark compatible model, the suffix "-S" is added to the model name.  
 (Example) F3SJ-E0185P25-S


\*2. Protective height (mm) = Total sensor length

## Accessories (Sold separately)

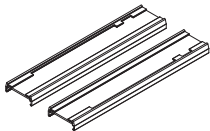
### Relays with Forcibly Guided Contacts

Type	Appearance	Specifications	Model	Remarks
G7SA Relays with Forcibly Guided Contacts		<ul style="list-style-type: none"> <li>Nodes: 4</li> <li>Contact type: 2A2B</li> <li>Rated switch load: 250 VAC 6A, 30 VDC 6A</li> </ul>	<b>G7SA-2A2B</b>	For details on other models or socket models, refer to the OMRON's website.
		<ul style="list-style-type: none"> <li>Nodes: 4</li> <li>Contact type: 3NO+1NC</li> <li>Rated switch load: 250 VAC 6A, 30 VDC 6A</li> </ul>	<b>G7SA-3A1B</b>	
G7S-□-E Relays with Forcibly Guided Contacts		<ul style="list-style-type: none"> <li>Nodes: 6</li> <li>Contact type: 4NO+2NC</li> <li>Rated switch load: 250 VAC 10 A, 30 VDC 10 A</li> </ul>	<b>G7S-4A2B-E</b>	For details on other models or socket models, refer to the OMRON's website.
		<ul style="list-style-type: none"> <li>Nodes: 6</li> <li>Contact type: 3NO+3NC</li> <li>Rated switch load: 250 VAC 10 A, 30 VDC 10 A</li> </ul>	<b>G7S-3A3B-E</b>	

### Laser Pointer


Appearance	Output	Model
	Laser Pointer for F3SJ	<b>F39-PTJ</b>

### Spatter Protection Cover (2 covers per set, one for emitter and one for receiver) (10% Operating Range Attenuation)

Appearance	Model
	<b>F39-HB□□□□ *</b>

\* The same 4-digit numbers as the protective heights (□□□□ in the light curtain model names) are substituted by in the model names.

### Protective Bar

Appearance	Model	Remarks
	<b>F39-PB□□□□ *1</b>	<ul style="list-style-type: none"> <li>2 Light Curtain brackets</li> <li>4 mounting brackets</li> <li>0 to 4 intermediate brackets for backside mounting (quantity required for the sensing width)</li> <li>0 to 4 intermediate brackets for mounting to the sides (quantity required for the sensing width)</li> </ul>
	<b>F39-PB□□□□-S *1 *2</b>	<ul style="list-style-type: none"> <li>1 Light Curtain bracket</li> <li>2 mounting brackets</li> <li>0 to 2 intermediate brackets for backside mounting (quantity required for the sensing width)</li> <li>0 to 2 intermediate brackets for mounting to the sides (quantity required for the sensing width)</li> </ul>

**Note:** The following are not provided with the Protective Bars.

- Safety Light Curtain
- Safety Light Curtain Top/Bottom Brackets
- Wall Mounting Screw Unit


\*1. The same four digits indicating protective height that are used in the Sensor model number (□□□□) are used in the part of the Protector model number.

\*2. Purchase the F39-PB□□□□ (which contains two sets of brackets) to use Protective Bars for both the Emitter and Receiver.







### Test rod (Sold separately)

Diameter	Model
14mm dia.	<b>F39-TRD14</b>
20mm dia.	<b>F39-TRD20</b>
25mm dia.	<b>F39-TRD25</b>
30mm dia.	<b>F39-TRD30</b>

## Mirrors (12% Operating Range Attenuation)

Appearance	Mirror material	Width (mm)	Thickness (mm)	Length L (mm)	Model	Remarks
	Glass mirror	145	32	445	F39-MLG0406	2 sets of cylinder mounting brackets and 4 screws are included.
				648	F39-MLG0610	
				749	F39-MLG0711	
				953	F39-MLG0914	
				1,105	F39-MLG1067	
				1,257	F39-MLG1219	
				1,499	F39-MLG1422	
				1,702	F39-MLG1626	
				1,905	F39-MLG1830	
				2,210	F39-MLG2134	

## Sensor Mounting Bracket (Sold separately)

Appearance	Specifications	Model	Application	Remarks
	Top/bottom bracket	F39-LJB1	Top/bottom bracket for F3SJ-E/B	2 for an emitter, 2 for a receiver, total of 4 per set
	Intermediate bracket	F39-LJB2 *1 *2	In combination use with top/bottom bracket for F3SJ-E/B Can be used as free-location bracket.	1 set with 2 pieces
	One-touch bracket	F39-LJB3-M6 *1	One-touch bracket for F3SJ-E/B Supports M6 slide nut for aluminum frame.	1 set with 2 pieces
		F39-LJB3-M8 *2	One-touch bracket for F3SJ-E/B Supports M8 slide nut for aluminum frame.	
	One-touch M6 bracket One-touch M8 bracket	F39-LJB3-M6K *1	Bracket to mount an intermediate bracket to the aluminum frame with a single touch.	Hexagon socket head cap screws (M6 x 10) are included.
		F39-LJB3-M8K *2		Hexagon socket head cap screws (M8 x 14) are included.
	Compatible mounting bracket	F39-LJB4	Mounting bracket used when replacing existing area sensors (F3SJ-A or F3SN) with the F3SJ-E/B.	2 for an emitter, 2 for a receiver, total of 4 per set
	Contact mount bracket	F39-LJB5	Bracket to closely contact the back side of the Sensor.	2 for an emitter, 2 for a receiver, total of 4 per set

**Note:** All the sensor mounting brackets for F3SJ-E are sold separately.

\*1. Combining F39-LJB2 and F39-LJB3-M6K makes F39-LJB3-M6.

\*2. Combining F39-LJB2 and F39-LJB3-M8K makes F39-LJB3-M8.

## Specifications (For details, refer to the instruction manual or User's manual.)

### Main Units

F3SJ-E□□□□P25/N25

Model	PNP output	F3SJ-E□□□□P25
	NPN output	F3SJ-E□□□□N25
<b>Sensor type</b>	Type 4 safety light curtain	
<b>Setting tool connection #1</b>	Parameter settings: Not available	
<b>Safety category</b>	Safety purpose of category 4, 3, 2, 1, or B	
<b>Detection capability</b>	Opaque objects 25 mm in diameter	
<b>Beam gap (P)</b>	20 mm	
<b>Number of beams (n)</b>	8 to 54	
<b>Protective height (PH)</b>	185 to 1,105 mm	
<b>Lens diameter</b>	Diameter 5 mm	
<b>Operating range #2</b>	0.2 to 7 m	
<b>Response time (under stable light incident condition)</b>	<b>ON to OFF</b>	15 ms max.
	<b>OFF to ON</b>	70 ms max.
<b>Startup waiting time</b>	2 s max.	
<b>Power supply voltage (Vs)</b>	SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
<b>Consumption current (no load)</b>	<b>PNP output</b>	Emitter : Up to 22 beams: 41 mA max., 26 to 42 beams: 57 mA max., 46 to 54 beams: 63 mA max. Receiver : Up to 22 beams: 42 mA max., 26 to 42 beams: 47 mA max., 46 to 54 beams: 51 mA max.
	<b>NPN output</b>	Emitter : Up to 22 beams: 41 mA max., 26 to 42 beams: 57 mA max., 46 to 54 beams: 63 mA max. Receiver : Up to 22 beams: 40 mA max., 26 to 42 beams: 45 mA max., 46 to 54 beams: 48 mA max.
<b>Light source (emitted wavelength)</b>	Infrared LED (870 nm)	
<b>Effective aperture angle (EAA)</b>	Based on IEC 61496-2. Within ±2.5° for both emitter and receiver when the detection distance is 3 m or over	
<b>Safety outputs (OSSD)</b>	<b>PNP output</b>	Two PNP transistor outputs, load current 200 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), Leakage current 1 mA max., load inductance 2.2 H max. *3, Maximum capacity load 1 µF *4
	<b>NPN output</b>	Two NPN transistor outputs, load current 200 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), Leakage current 1 mA max., load inductance 2.2 H max. *3, Maximum capacity load 1 µF *4
<b>Output operation mode</b>	Safety output: On when receiving light	
<b>Input voltage</b>	<b>PNP output</b>	Test input: ON voltage: Vs-3 V to Vs (short circuit current: approx. 3.0 mA) *5 OFF voltage: 0 V to 1/2 Vs or open (short circuit current: approx. 4.0 mA) *5
	<b>NPN output</b>	Test input: ON voltage: 0 to 3 V (short circuit current: approx. 4.0 mA) OFF voltage: 1/2 Vs to Vs or open (short circuit current: approx. 3.0 mA) *5
<b>Mutual interference prevention function</b>	Mutual interference prevention algorithm prevents interference in up to 3 sets.	
<b>Test function</b>	<ul style="list-style-type: none"> <li>• Self test (at power-ON and at power distribution)</li> <li>• External test (emission stop function by test input)</li> </ul>	
<b>Protection circuit</b>	Output short-circuit protection, and power supply reverse polarity protection	
<b>Ambient temperature</b>	Operating: -10 to 55°C (non-freezing), Storage: -25 to 70°C	
<b>Ambient humidity</b>	Operating: 35% to 85% (no condensation), Storage: 35% to 95% RH	
<b>Operating ambient light intensity</b>	Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.	
<b>Insulation resistance</b>	20 MΩ min. (at 500 VDC)	
<b>Dielectric strength</b>	1,000 VAC 50/60 Hz, 1 min	
<b>Degree of protection</b>	IP65 (IEC 60529)	
<b>Vibration resistance</b>	Malfunction: 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions	
<b>Shock resistance</b>	Malfunction: 100 m/s <sup>2</sup> , 1,000 times each in X, Y, and Z directions	
<b>Pollution degree</b>	Pollution degree 3 (IEC 60664-1)	
<b>Power cable</b>	Connection method: Pull-out type, cable length 3 m Number of wires: Emitter: 5 wires, receiver: 6 wires Cable diameter: Dia. 6 mm Allowable bending radius: R5 mm	
<b>Extension cable</b>	30 m max. *6	
<b>Material</b>	Case: Aluminum Cap: ABS resin, PBT Optical cover: PMMA resin (acrylic) Cable: Oil resistant PVC	
<b>Net Weight #7</b>	Weight (g) = (protective height) x 1.59 + 330	
<b>Gross Weight #8</b>	Weight (g) = (protective height) x 2.6 + 800	
<b>Accessories</b>	Instruction Manual, Quick Installation Manual (QIM) *9	
<b>Applicable standards</b>	IEC 61496-1, EN 61496-1, UL 61496-1, Type 4 ESPE (Electro-Sensitive Protective Equipment) IEC 61496-2, EN 61496-2, UL 61496-2, Type 4 AOPD (Active Opto-electronic Protective Devices) IEC 61508-1 to -3, EN 61508-1 to -3 SIL3 ISO 13849-1: 2015, EN ISO 13849-1: 2015 (PLe/Safety Category 4) UL 508, UL 1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8	

\*1. Do not use the Support Software and Setting Console for F3SJ-A. Operation cannot be guaranteed.

\*2. Use of the Spatter Protection Cover causes a 10% maximum sensing distance attenuation.

\*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.

\*4. These values must be taken into consideration when connecting elements including a capacitive load such as capacitor.

\*5. The Vs indicates a voltage value in your environment.

\*6. To extend a cable of the F3SJ-E, refer to the User's Manual (SCHG-733/732).

\*7. The net weight is the weight of an emitter and a receiver.

\*8. The gross weight is the weight of an emitter, a receiver, included accessories and a package.

\*9. Mounting brackets and test rod are sold separately.

## Indicator

### Emitter

Name of indicator	Label	ON	Blinking
Top-beam-state indicator	TOP	Turns ON when the top beam is receiving light.	---
Stable-state indicator	STB	Turns ON when incidence level is more than 170% of the output ON threshold.	Blinks when the safety output is turned OFF due to disturbance light or vibration.
ON/OFF-state indicator	ON OFF	Green: Turns ON when safety output is ON. Red: Turns OFF when safety output is OFF.	Red: Blinks when the F3SJ-E enters a lockout due to a safety output error.
Lockout indicator	LOCKOUT	Turns ON when the F3SJ-E enters a lockout on the receiver.	Blinks when the F3SJ-E enters a lockout on the emitter.
Power indicator	POWER	Turns ON while the power of the emitter is ON.	Blinks when the F3SJ-E enters a lockout due to power voltage/noise.
Test indicator	TEST	---	Blinks when external test is being performed.
Bottom-beam-state indicator	BTM	Turns ON when the bottom beam is receiving light.	---

### Receiver

Name of indicator	Label	ON	Blinking
Top-beam-state indicator	TOP	Turns ON when the top beam is receiving light.	---
Stable-state indicator	STB	Turns ON when incidence level is more than 170% of the output ON threshold.	Blinks when the safety output is turned OFF due to disturbance light or vibration.
ON/OFF-state indicator	ON OFF	Green: Turns ON when safety output is ON. Red: Turns OFF when safety output is OFF.	Red: Blinks when the F3SJ-E enters a lockout due to a safety output error.
Lockout indicator	LOCKOUT	Turns ON when the F3SJ-E enters a lockout on the emitter.	Blinks when the F3SJ-E enters a lockout on the receiver.
Communication indicator	COM	Turns ON when communication between emitter and receiver is established.	Blinks when the F3SJ-E enters lockout due to a communication error between receiver and emitter.
Configuration indicator	CFG	---	Blinks when the F3SJ-E enters lockout due to a model type error between receiver and emitter.
Internal error indicator	INTERNAL	---	Blinks when the F3SJ-E enters a lockout due to an internal error.
Bottom-beam-state indicator	BTM	Turns ON when the bottom beam is receiving light.	---

## Accessories

### Laser Pointer

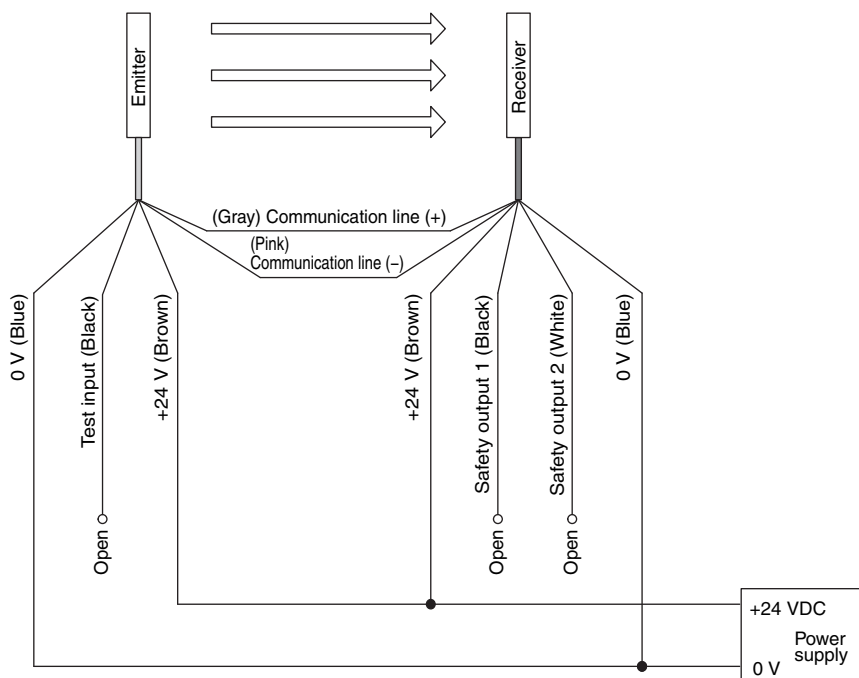
Item	Model	F39-PTJ
Applicable sensor	F3SJ Series	
Power supply voltage	4.65 or 4.5 VDC	
Battery	Three button batteries (SR44 or LR44)	
Battery life *	SR44: 10 hours of continuous operation, LR44: 6 hours of continuous operation	
Light source	Red semiconductor laser (wavelength: 650 nm, 1 mW max. JIS class 2, EN/IEC class 2, FDA class II)	
Spot diameter (typical value)	6.5 mm at 10 m	
Ambient temperature	Operating: 0 to 40°C Storage: -15 to 60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Material	Laser module case: aluminum Mounting bracket: aluminum and stainless	
Weight	Approx. 220 g (packed)	
Accessories	Laser safety standard labels (EN: 1, FDA: 3) Button batteries (SR44: 3), instruction manual	

\* Battery life varies depending on a battery used.

## Connections

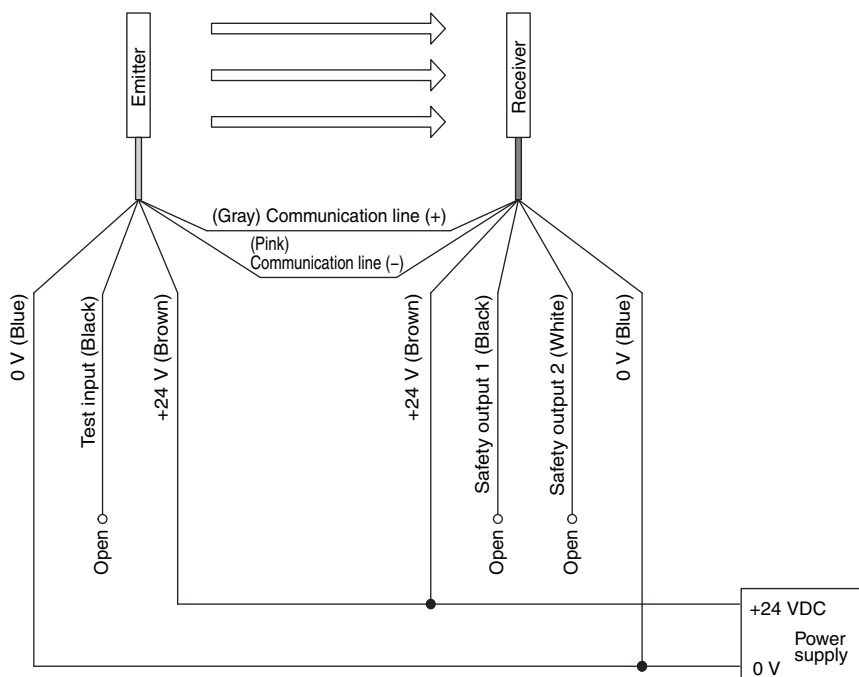
### Basic Wiring Diagram

Minimum wiring required to check the operation of the F3SJ-E [PNP Output]



**Note:** This circuit diagram is used for operation check. For an actual circuit example, refer to page 25.

Minimum wiring required to check the operation of the F3SJ-E [NPN Output]

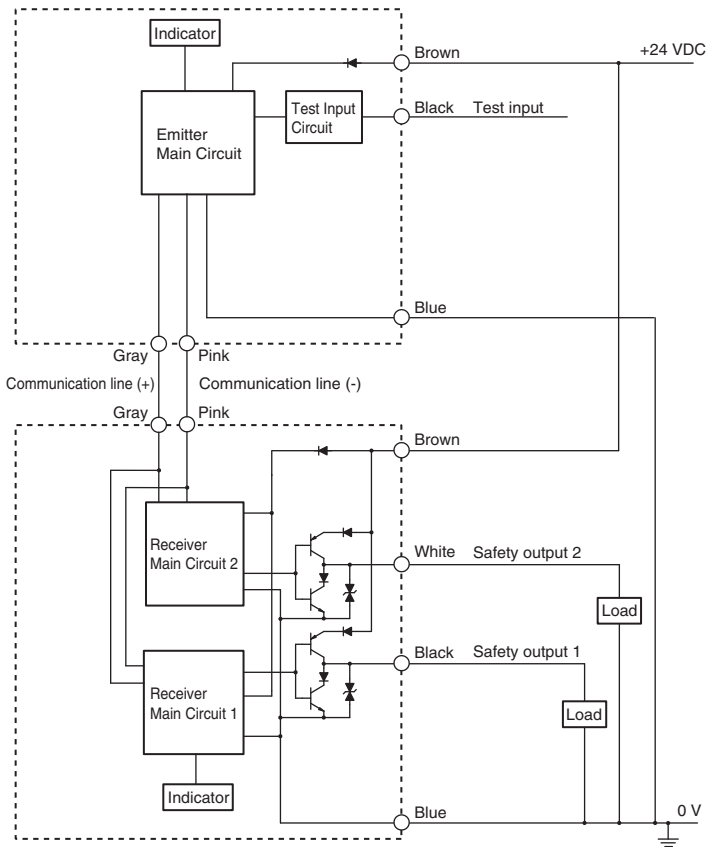


**Note:** This circuit diagram is used for operation check. For an actual circuit example, refer to page 25.

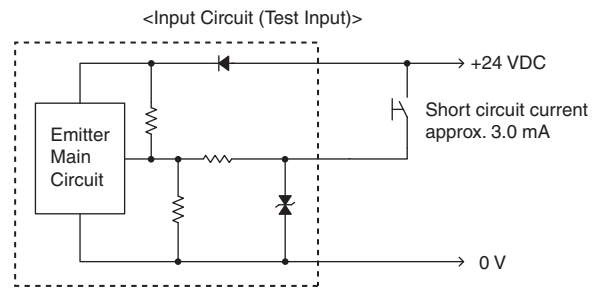
# Input/Output Circuit Diagram

**[PNP Output]**

**Entire Circuit Diagram**

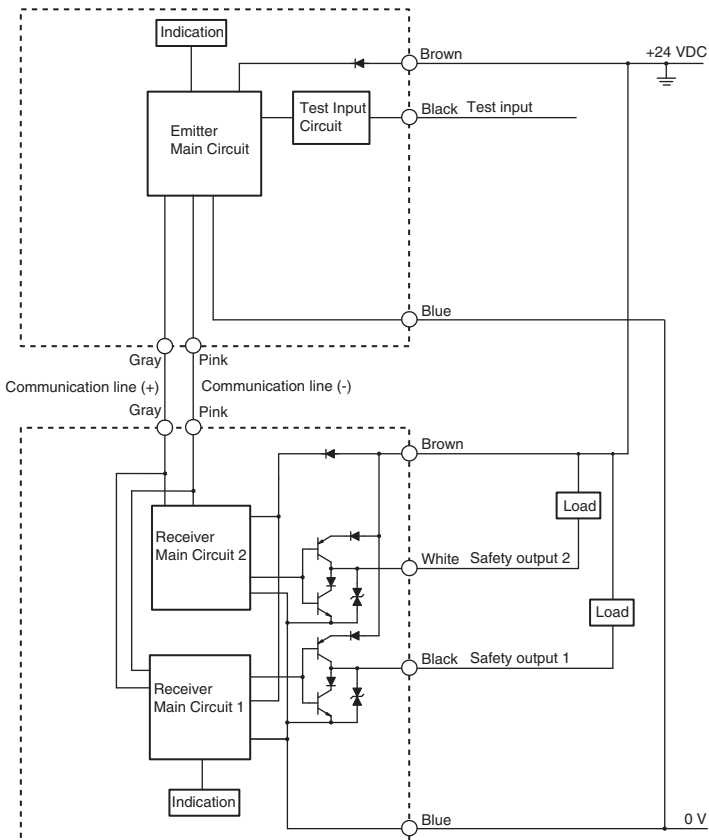


**Input circuit diagram by function**

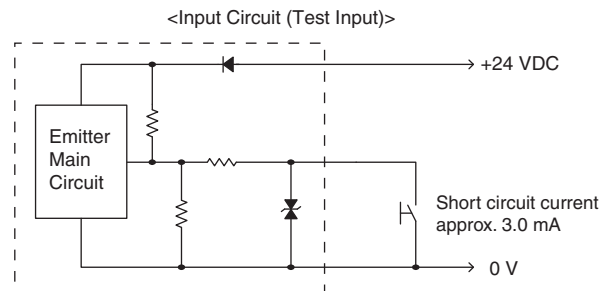


**[NPN Output]**

**Entire Circuit Diagram**



**Input circuit diagram by function**





# Connection Circuit Examples

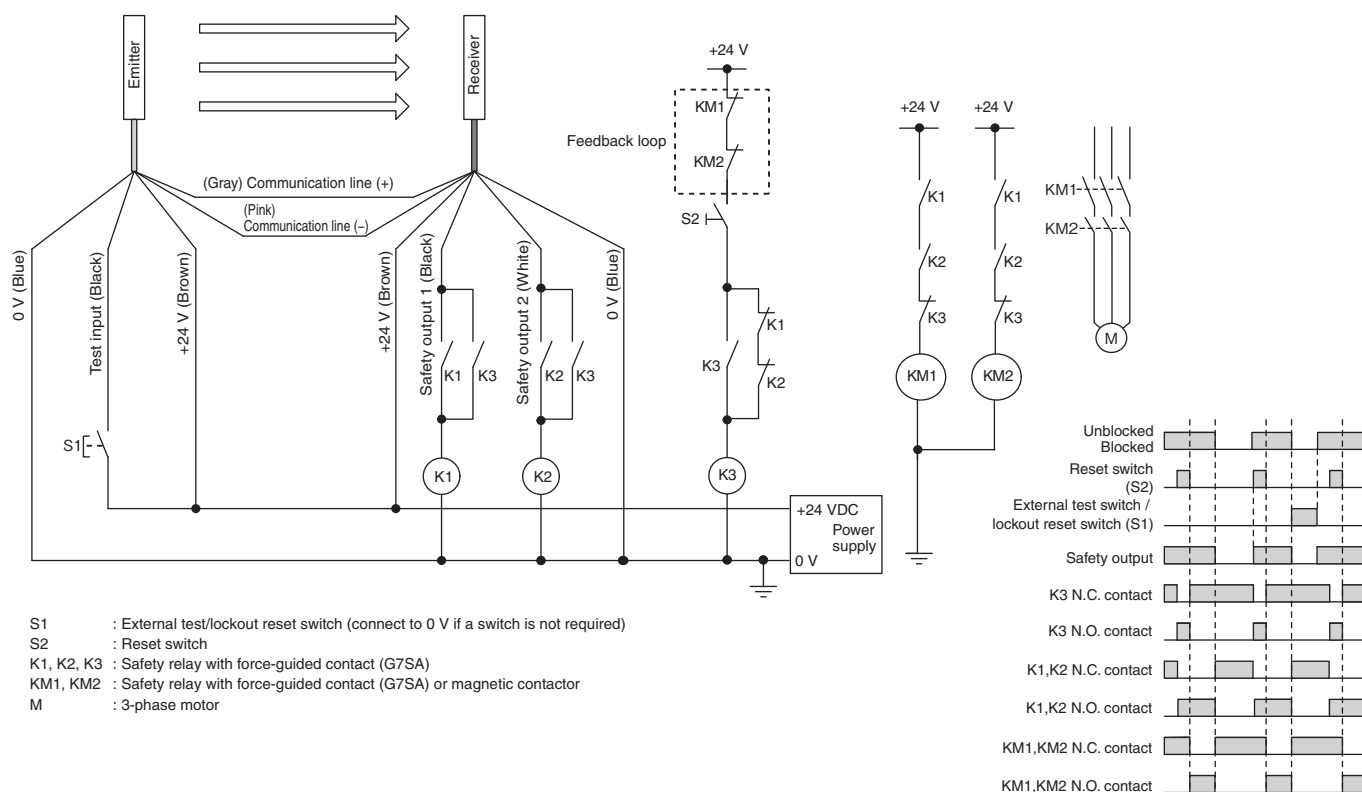
## Wiring for single F3SJ-E application [PNP Output]

Highest achievable PL/ safety category	Model	Stop category	Reset
PLe/4 equivalent	Safety Light Curtain F3SJ-E□□□□P25 Safety Relay G7SA	0	Manual

**Note:** The above PL is only the evaluation result of the example. The PL must be evaluated in an actual application by the customer after confirming the usage conditions.

### ● Application Overview

- The power supply to the motor M is turned OFF when the beam is blocked.
- The power supply to the motor M is kept OFF until the beams are unblocked and the reset switch S2 is pressed.



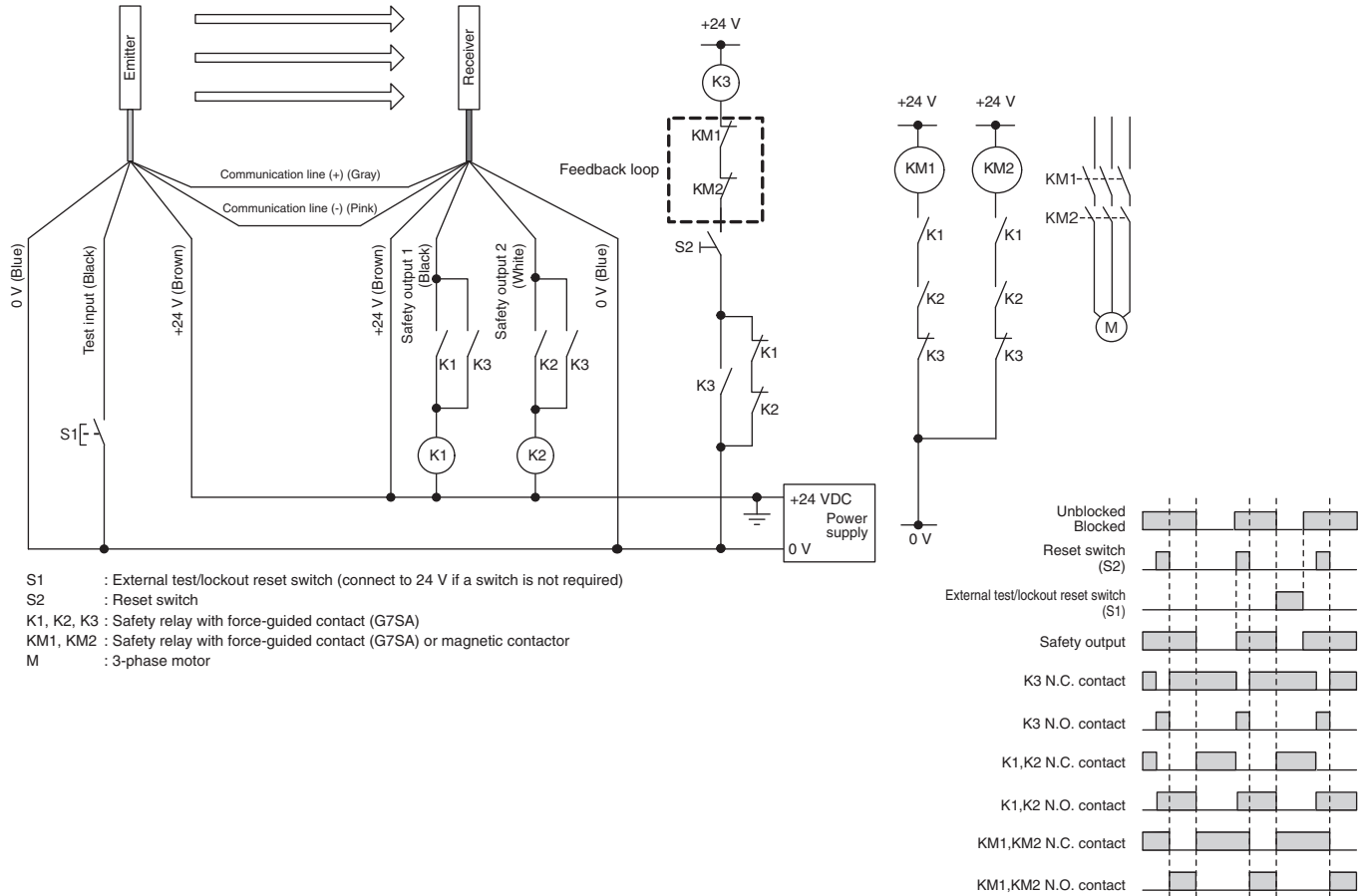
## Wiring for single F3SJ-E application [NPN Output]

Highest achievable PL/ safety category	Model	Stop category	Reset
PLe/4 equivalent	Safety Light Curtain F3SJ-E□□□□N25 Safety Relay G7SA	0	Manual

**Note:** The above PL is only the evaluation result of the example. The PL must be evaluated in an actual application by the customer after confirming the usage conditions.

### ● Application Overview

- The power supply to the motor M is turned OFF when the beam is blocked.
- The power supply to the motor M is kept OFF until the beams are unblocked and the reset switch S2 is pressed.



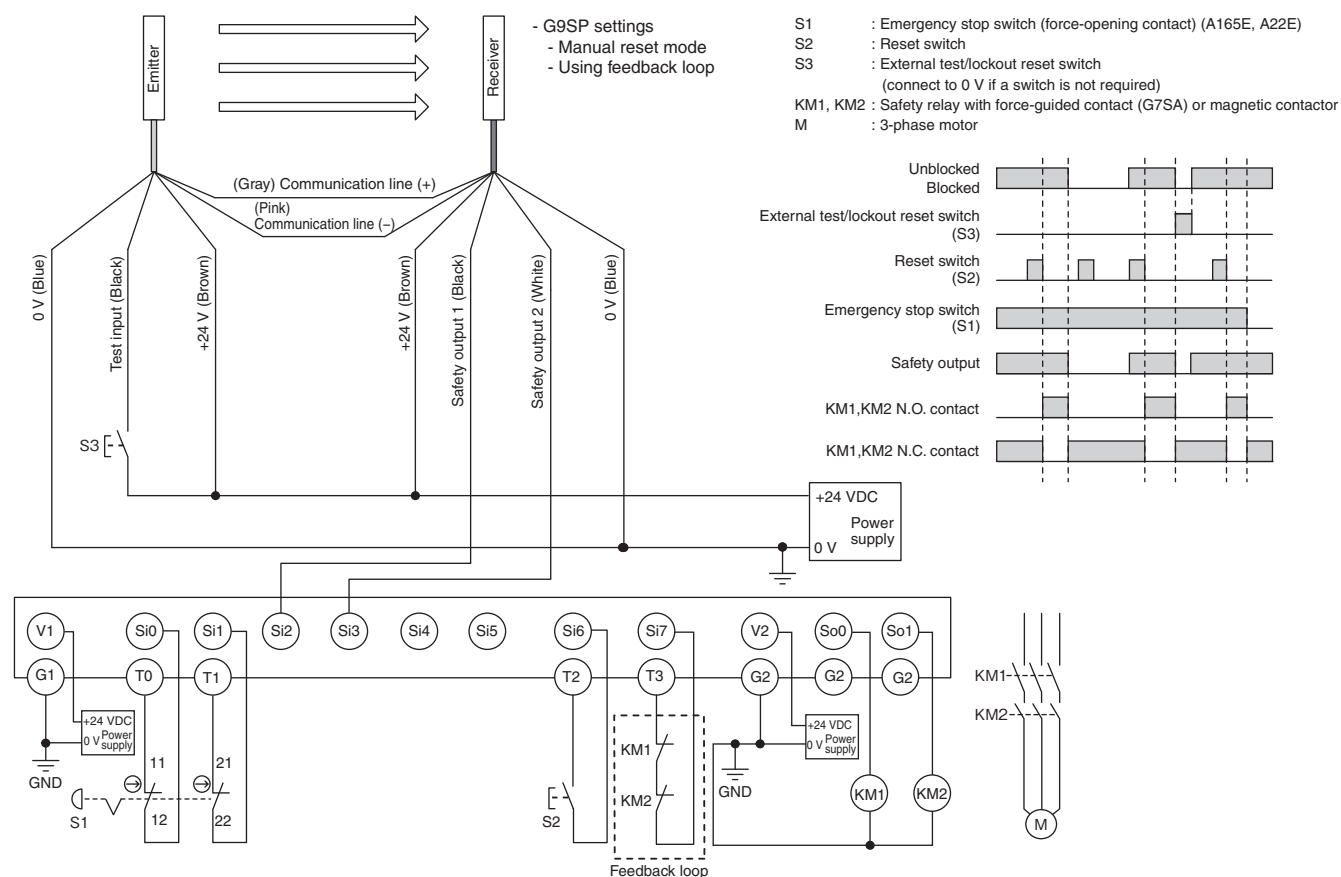
Wiring to connect a F3SJ-E with a controller G9SP [PNP Output]

Highest achievable PL/ safety category	Model	Stop category	Reset
PLe/4 equivalent	Safety Light Curtain F3SJ-E□□□□P25 Safety Controller G9SP Safety Relay G7SA Emergency Stop Switch A165E/A22E	0	Manual

**Note:** The above PL is only the evaluation result of the example. The PL must be evaluated in an actual application by the customer after confirming the usage conditions.

● Application Overview

- The power supply to the motor M is turned OFF when the beam is blocked.
- The power supply to the motor M is turned OFF when the emergency stop switch is pressed.
- The power supply to the motor M is kept OFF until the beams are unblocked and the reset switch S2 is pressed while the emergency stop switch is released.



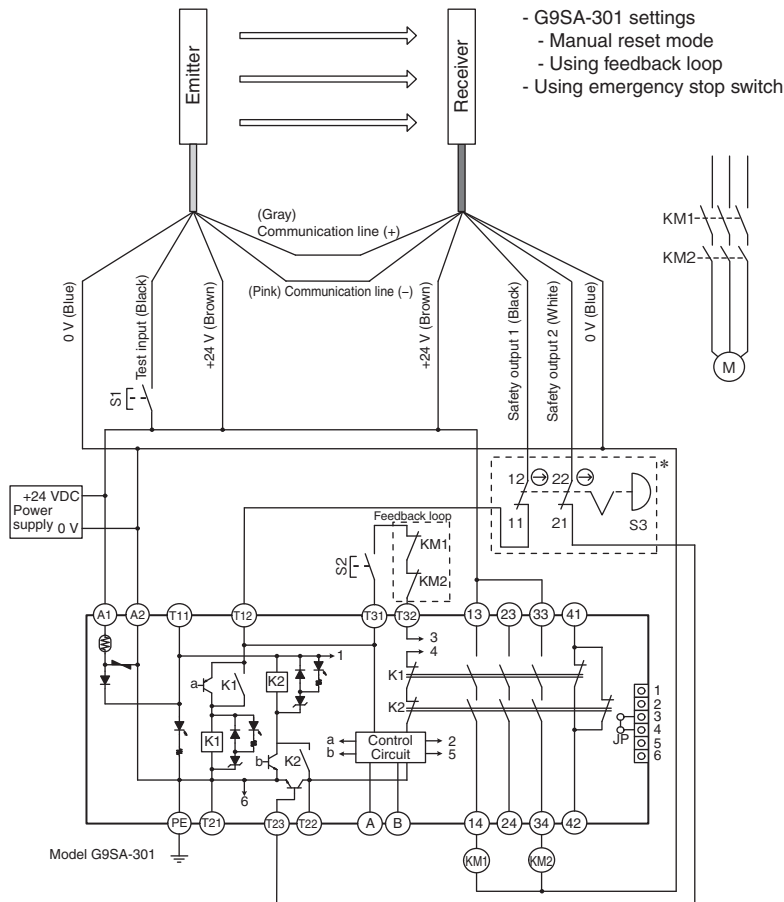
## Wiring to connect a F3SJ-E with a controller G9SA-301 [PNP Output]

Highest achievable PL/ safety category	Model	Stop category	Reset
PLe/4 equivalent	Safety Light Curtain F3SJ-E□□□□P25 Safety Relay Unit G9SA-301 24V AC/DC Safety Relay G7SA Emergency Stop Switch A165E/A22E	0	Manual

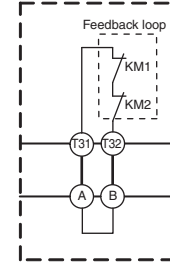
**Note:** The above PL is only the evaluation result of the example. The PL must be evaluated in an actual application by the customer after confirming the usage conditions.

### ● Application Overview

- The power supply to the motor M is turned OFF when the beam is blocked.
- The power supply to the motor M is turned OFF when the emergency stop switch is pressed.
- The power supply to the motor M is kept OFF until the beams are unblocked and the reset switch S2 is pressed while the emergency stop switch is released.

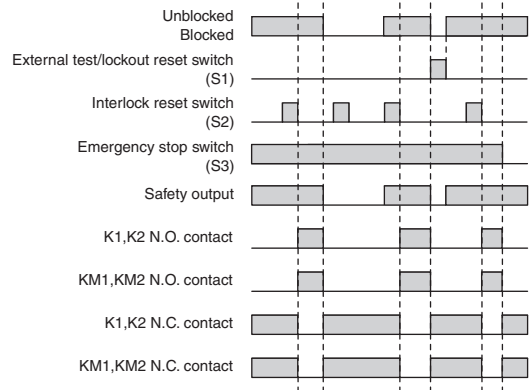


Wiring for auto reset mode



\* If an emergency stop switch is not used, connect safety output 1 to T12 terminal and safety output 2 to T23 directly.

- S1: External test/lockout reset switch (connect to 0 V if a switch is not required)
- S2: Interlock reset switch
- S3: Emergency stop switch (force-opening contact) (A165E, A22E)
- KM1, KM2: Safety relay with force-guided contact (G7SA) or magnetic contactor
- M: 3-phase motor



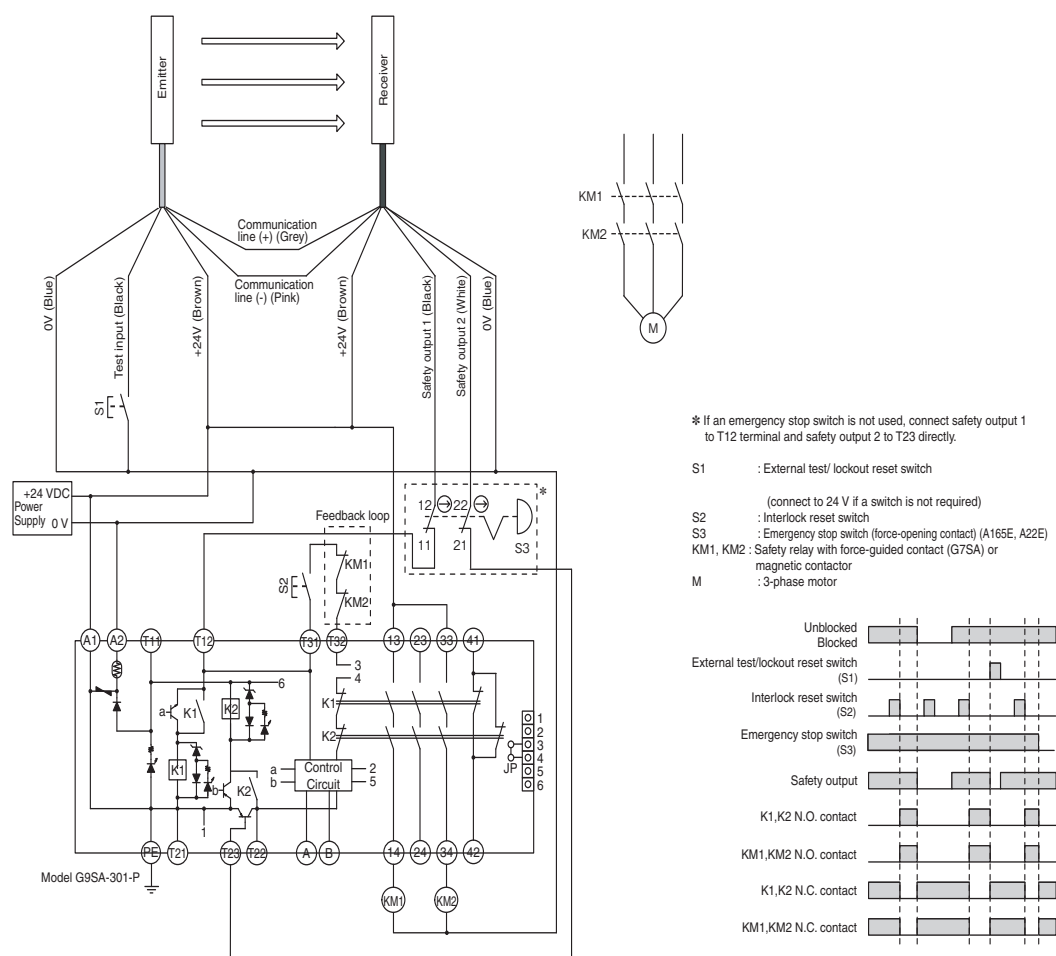
Wiring to connect a F3SJ-E with a controller G9SA-301-P [NPN Output]

Highest achievable PL/ safety category	Model	Stop category	Reset
PLe/4 equivalent	Safety Light Curtain F3SJ-E□□□□N25 Safety Relay Unit G9SA-301-P 24V DC Safety Relay G7SA Emergency Stop Switch A165E/A22E	0	Manual

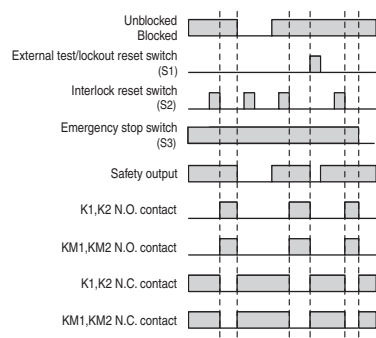
**Note:** The above PL is only the evaluation result of the example. The PL must be evaluated in an actual application by the customer after confirming the usage conditions.

● Application Overview

- The power supply to the motor M is turned OFF when the beam is blocked.
- The power supply to the motor M is turned OFF when the emergency stop switch is pressed.
- The power supply to the motor M is kept OFF until the beams are unblocked and the reset switch S2 is pressed while the emergency stop switch is released.



- \* If an emergency stop switch is not used, connect safety output 1 to T12 terminal and safety output 2 to T23 directly.
- S1 : External test/ lockout reset switch
- (connect to 24 V if a switch is not required)
- S2 : Interlock reset switch
- S3 : Emergency stop switch (force-opening contact) (A165E, A22E)
- KM1, KM2 : Safety relay with force-guided contact (G7SA) or magnetic contactor
- M : 3-phase motor



- Note:**
1. As the G9SP Safety Controller is a PNP output type, it cannot be connected to the F3SJ-E□□□□N25. Also, a Safety Controller with PNP output cannot be connected to the F3SJ-E□□□□N25.
  2. The G9SA-301-P is a safety relay unit only for NPN output.