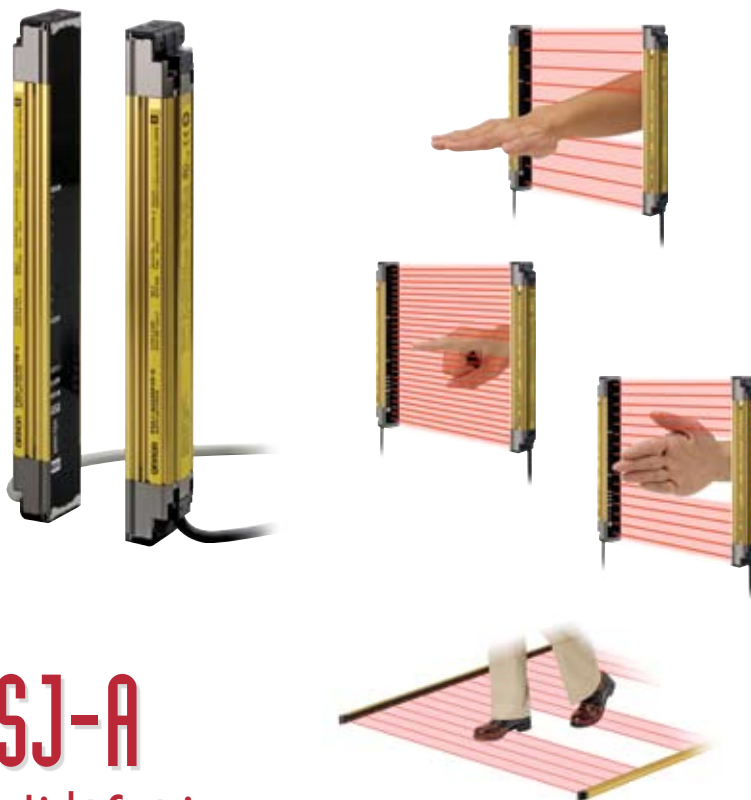




F3SJ-A

Safety Light Curtain

- Resolution: 14 mm (0.55 in.), 20 mm (0.79 in.), 30 mm (1.18 in.), or 55 mm (2.17 in.)
- Range: 7 m (23 ft.) or 9 m (29.5 ft.) dependent on minimum object resolution and protected height
- Protected heights: 14 mm protected heights from 245 to 1631 mm (9.6 to 64 in.), 20 mm and 30 mm protected heights from 245 to 2495 mm (9.6 to 98 in.), 55 mm from 270 to 2470 mm (10.6 to 97 in.)
- Very compact size – 30 x 24 mm (1.18 x 0.94 in.)
- Cascaded designs possible – 4 segments, up to 400 beams
- Warning zone function
- Partial muting
- Position detection muting
- Fixed blanking
- Floating blanking – up to four beams
- External Device Monitoring
- Two PNP safety outputs
- One NPN auxiliary output
- Cross-talk prevention
- Range selection

Options

- Handheld setting console
- SD manager programming software
- F3SP/F3SX Safety Controller
- Weld shields
- IP67 enclosures
- Multiple mounting options

Description

The F3SJ-A system is a full-featured safety light curtain that meets demanding and complex guarding requirements.

Inside its compact housing the F3SJ-A combines several features which allow it to be used in a variety of ways. These features include a warning zone function, as well as fixed and floating blanking. Also included is a valuable feature known as “partial muting”.

For complete safety, External Device Monitoring (EDM) is included and cross-talk prevention features are standard.

For ease of use, the F3SJ-A can be configured by using either a handheld setting console or by connecting to a computer running the convenient and comprehensive SD Manager programming software.



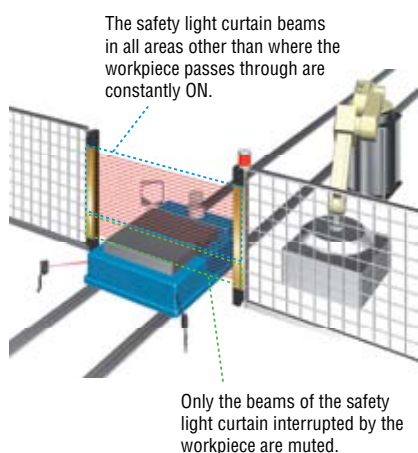
Go to the Engineering Guide
For in-depth information on safety standards and use.



Muting Functions

Muting temporarily disables the F3SJ-A when an object must pass through the detection zone, such as when supplying a workpiece to your equipment.

Partial muting increases the level of safety by only muting the beams of the safety light curtain where the workpiece passes through, while preventing muting in all other areas.



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

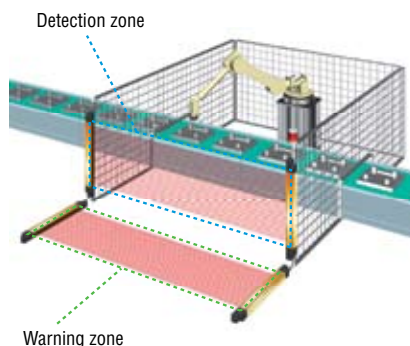


Warning Zone Function

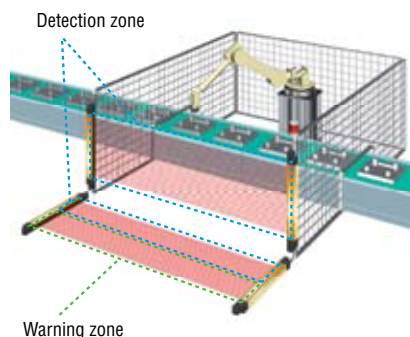
With the F3SJ-A part of the detection zone can be used as a warning zone to generate an alarm when someone approaches the danger zone. If the person then enters the danger zone the F3SJ-A will send a stop signal to the guarded machine. In addition, the auxiliary output can be used to activate a flashing lamp to alert the person in the warning zone.

The detection zone for a single F3SJ-A can be divided into two zones or set a single warning zone for multiple, cascaded F3SJ-A units.

Dividing the zone between series-connected sensors

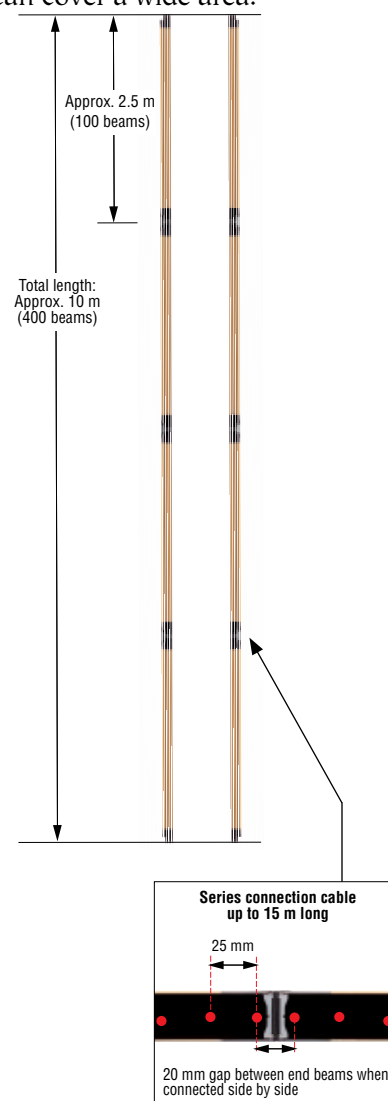


A single sensor can also be divided



Convenient Serial Connection

Sensors with protected heights of almost 2.5 m are available. If you want to make changes in the future, you can always extend the protective height with series connections. Up to four sets (400 beams) can be series connected and with series-connection cables up to 15 m in length, applications can cover a wide area.



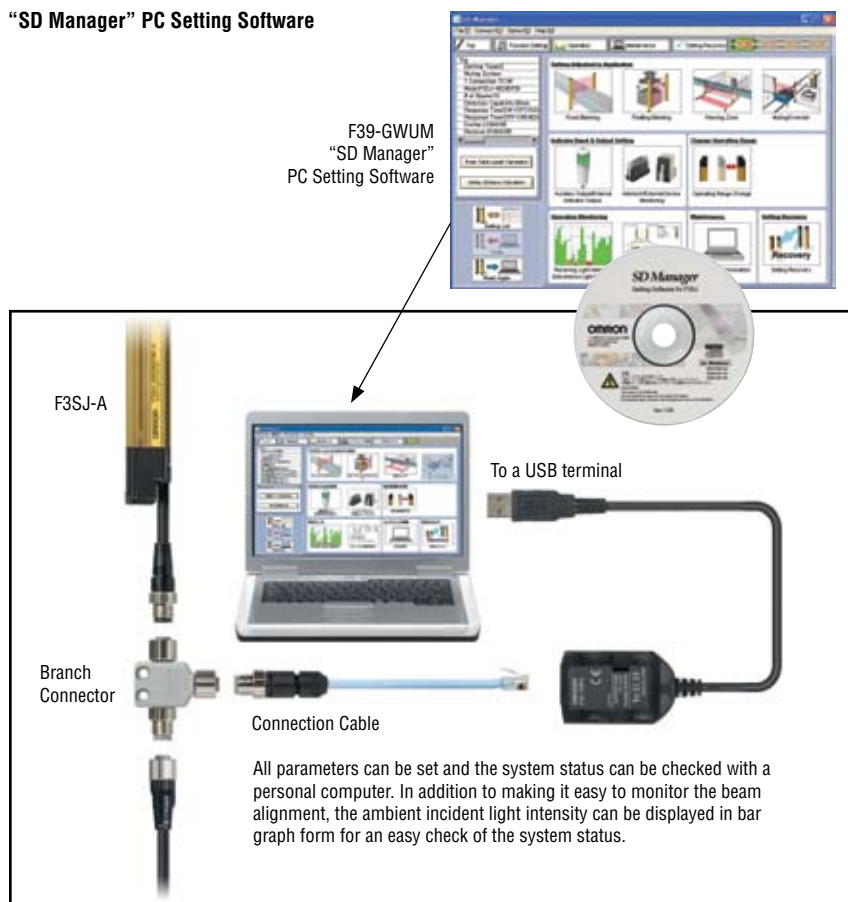
■ Description (continued)

Programming Options

Using the SD Manager software, all features of the F3SJ-A can be set and checked. Features include:

- Display of system specifications:
 - Model
 - Number of beams
 - Minimum object resolution
 - Response time
- Settings for:
 - Fixed blanking
 - Floating blanking
 - Warning zone configuration
 - Muting – Both partial and position detection
 - External indicator function
 - Auxiliary outputs
 - EDM parameters
 - Operating range
- Monitoring of received and ambient light intensity
- Maintenance information:
 - Power on time
 - OSSD switching frequency
- Recovery of settings
- Safety distance calculations based on parameters for connected system

“SD Manager” PC Setting Software



When you don't want to take a computer into the field with you the F39-MC21 setting console is a convenient way to set parameters and check the system status.

Setting Console



A Go to the Engineering Guide
For in-depth information on safety standards and use.

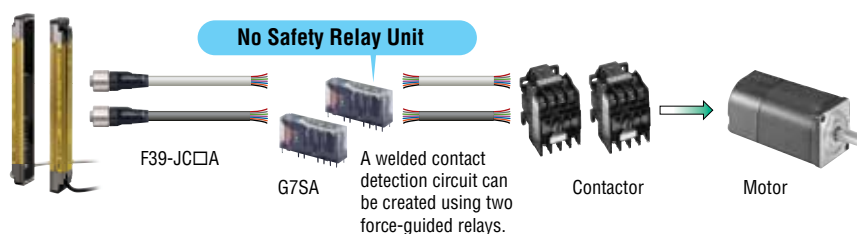
■ Applications

With built-in muting and blanking functions, the F3SJ-A is can be employed in a wide variety of applications from robotic work cells to small machines. The potential for cascaded design and a broad selection of minimum object resolutions adds to this versatility.

Selecting the Best Configuration

Space Efficient and Low Cost

The built-in external device monitoring function eliminates the need for a safety relay unit.

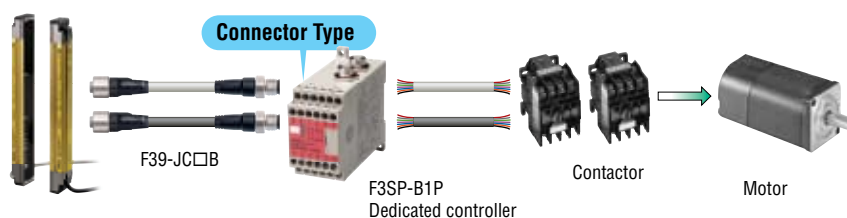


D

safety light curtains

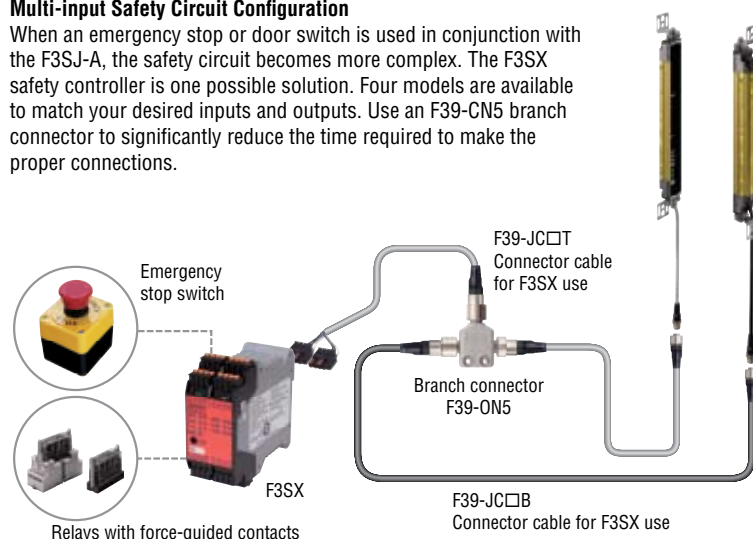
Reduced Wiring and Easy Maintenance

Cables with connectors on both ends simplify connections and prevent wiring errors.



Multi-input Safety Circuit Configuration

When an emergency stop or door switch is used in conjunction with the F3SJ-A, the safety circuit becomes more complex. The F3SX safety controller is one possible solution. Four models are available to match your desired inputs and outputs. Use an F39-CN5 branch connector to significantly reduce the time required to make the proper connections.

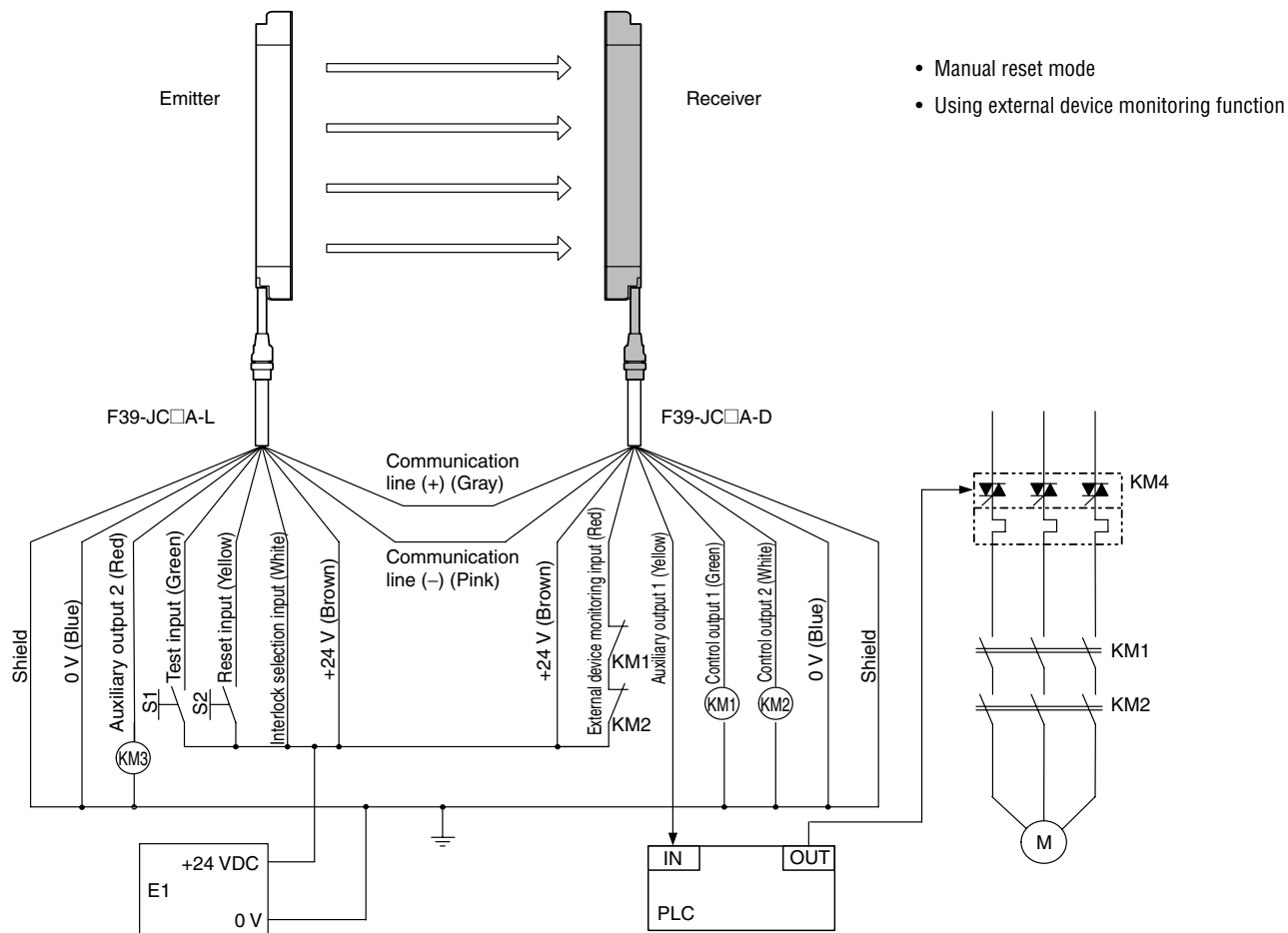


■ Wiring

Wiring for Single F3SJ-A Application

Detection of a welded relay contact is possible without a controller relay unit.

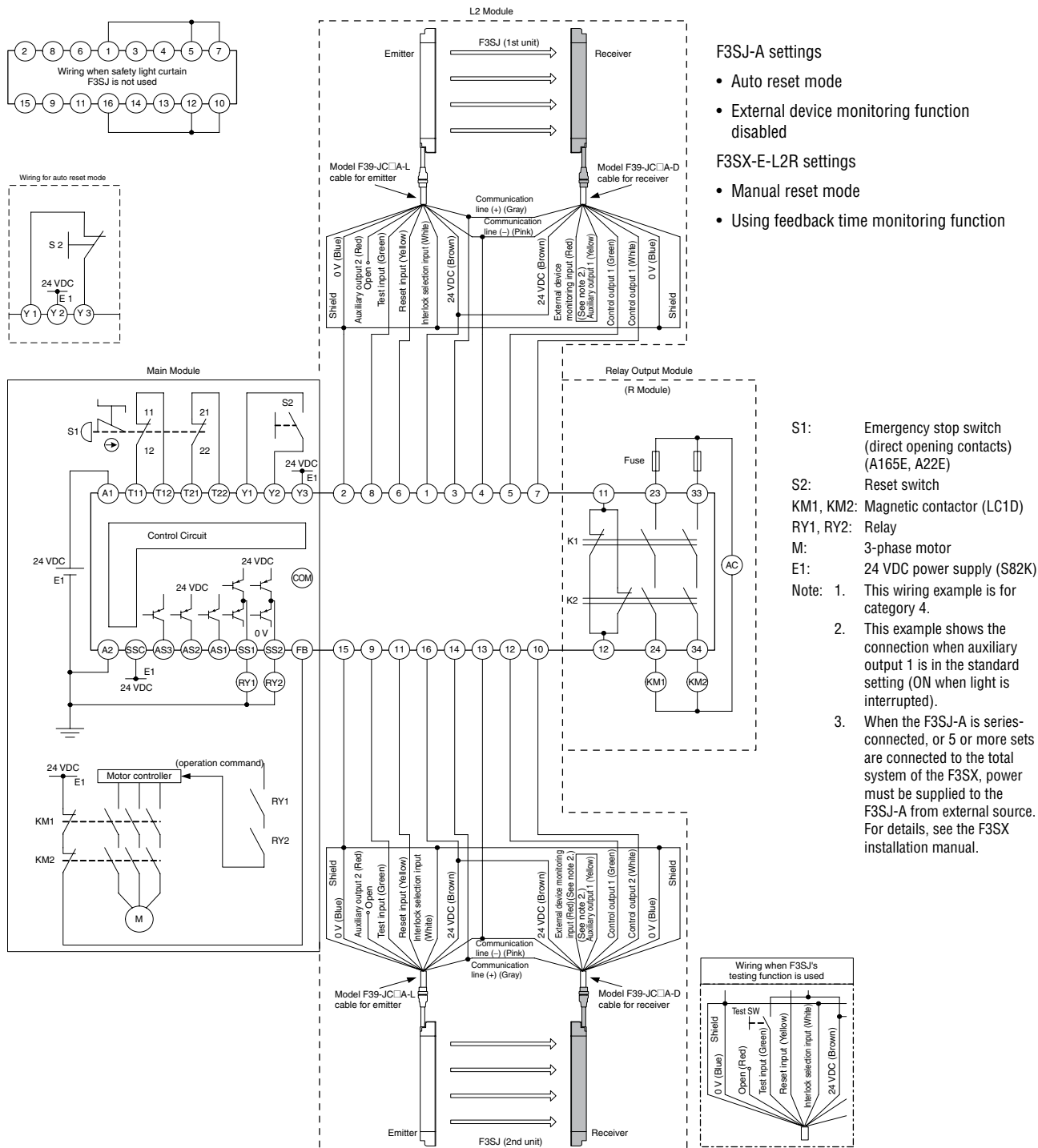
D
safety light curtains



A Go to the Engineering Guide
For in-depth information on
safety standards and use.

Wiring Connection with an F3SX-E-L2R Controller (Category 4)

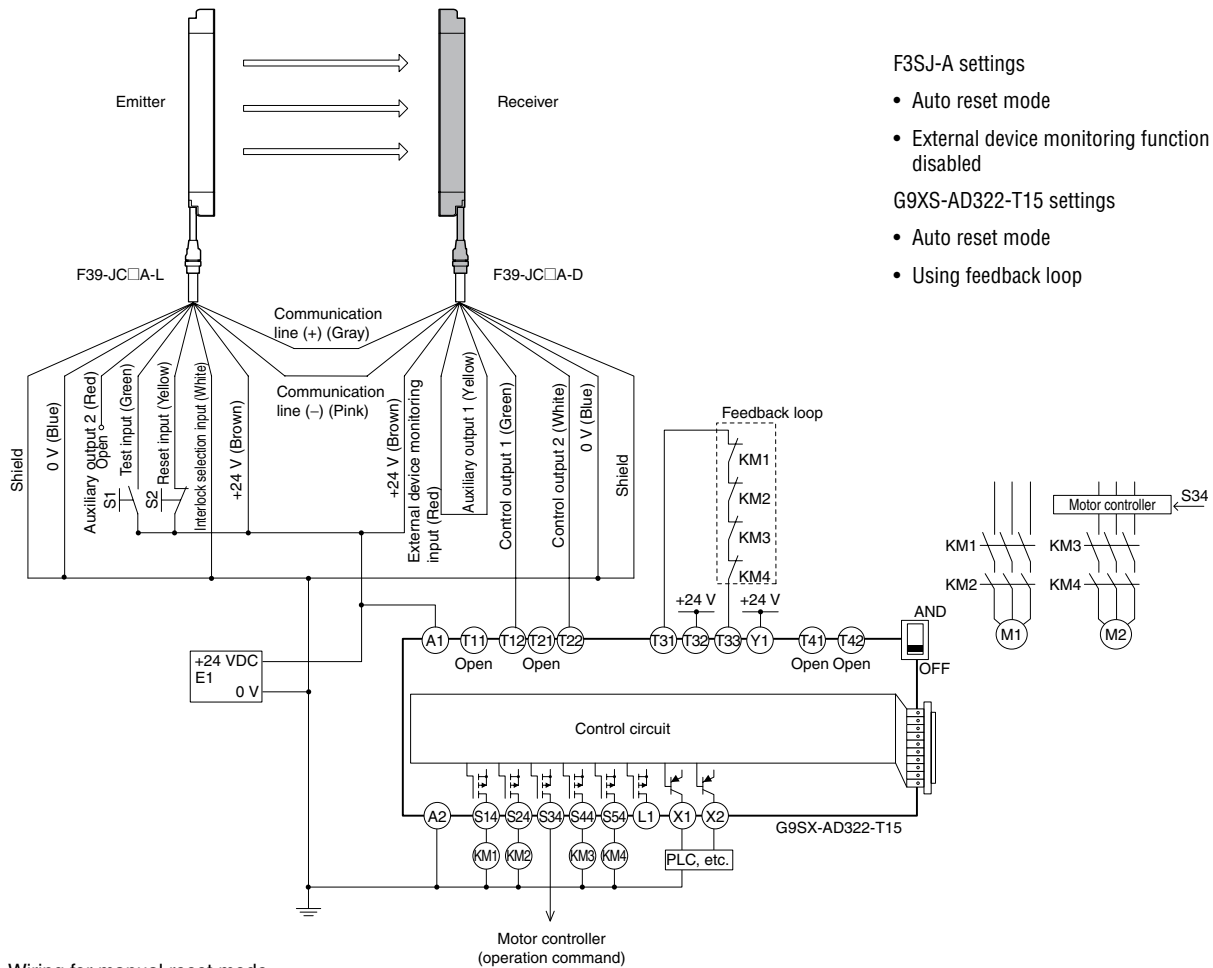
An emergency stop switch, door switch, two-hand control, single beam or relay unit can be used in conjunction with the F3SX. Various settings can be changed and input/output terminals can be monitored using the setting support software for F3SX.



■ Wiring (continued)

Wiring Connection with a G9SX-AD322-T15 Controller (Category 4)

D safety light curtains



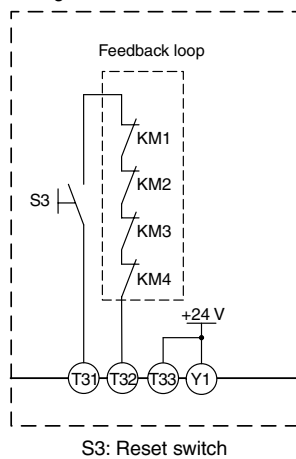
F3SJ-A settings

- Auto reset mode
- External device monitoring function disabled

G9XS-AD322-T15 settings

- Auto reset mode
- Using feedback loop

Wiring for manual reset mode



- S1: External test switch (connect to 0 V if the switch is not necessary)
- S2: Lockout reset switch (connect 24 V if the switch is not necessary)
- KM1 to KM4: Magnetic contactor
- M1, M2: 3-phase motor
- E1: 24 VDC power supply (S82K)
- PLC: Programmable controller (used for monitoring, not related to safety system)



Go to the Engineering Guide
For in-depth information on safety standards and use.

■ Specifications

Performance	
Resolution:	14 mm, 20 mm, 30 mm, 55 mm
Protected Height:	14 mm – 245 to 1631 mm (9.6 to 64.2 in.) 20 mm and 30 mm – 245 to 2495 mm (9.6 to 98.2 in.) 55 mm – 270 to 2470 mm (10.6 to 97.2 in.)
Operating Range:	0.2 to 9 m for: 14 mm (all protected heights) 20 mm resolution up to 1505 mm (59.3 in.) protected height 30 mm and 55 mm resolution up to 1620 mm (63.8 in.) protected height 0.2 to 7 m for: 20 mm resolution 1655 to 2495 mm (65.2 to 98.2 in.) protected height 30 mm resolution 1745 to 2495 mm (68.7 to 98.2 in.) protected height 55 mm resolution 1670 to 2470 mm (65.7 to 97.2 in.) protected height
Effective Aperture Angle:	±2.5° maximum, transmitter and receiver at operating range greater than 3 m (9.8 ft.)
Response Time:	For 14 mm resolution systems up to 983 mm (38.7 in.) protected height ≤17.5 ms For 14 mm resolution systems above 983 mm (38.7 in.) protected height ≤25 ms For 20 mm resolution systems up to 1205 mm (47.4 in.) protected height ≤15 ms For 20 mm resolution systems above 1205 mm (47.4 in.) protected height ≤22.5ms For 30 mm resolution systems, all protected heights ≤17.5 ms For 55 mm resolution systems, all protected heights ≤13 ms
Safety Output Rating:	Two PNP outputs sourcing 300 mA max.
Auxiliary (Non-Safety) Output Ratings:	One PNP output sourcing 300 mA max.
Light Source:	Infrared LED, 870 nm
Light Source Life:	NA
Indicators:	Transmitter: 5 LED Light Level Indicators, 3 LED Error Indicators, Power, Interlock, EDM, Blanking/Test Receiver: 5 LED Light Level Indicators, 3 LED Error Indicators, Machine Run, Machine Stop
Mechanical	
Enclosure:	Anodized aluminum housing
Cable Length:	Optional cables are available up to 20 m(65.6 ft.) in length
Transmitter and Receiver Cable Connections:	M12, 8-pin
Electrical	
Power Supply:	24 VDC
Environmental	
Protection Rating:	IP65
Operating Temperature:	-10 to 55°C (14 to 131°F)
Storage Temperature:	-30 to 70°C (-22 to 158°F)
Relative Humidity:	35 to 85% non-condensing
Vibration:	10 to 55 Hz, double amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions
Shock:	100 m/s ² , 1000 times each in X, Y and Z directions
Conformity/Approvals	
Approvals:	All F3SJ-A systems have been EC type examined to the requirements of IEC 61496-1, -2 for a Type 4 ESPE
Conforming to Standards:	ANSI/RIA R15.06-1999; ANSI B11.19-2003; OSHA 1910.217(c); OSHA 1910.212.A

Specifications are subject to change without notice.

D

safety light curtains

■ Specifications (continued)

Control Unit

Power Supply Voltage: 24 VDC $\pm 10\%$
Power Consumption: DC1.7 W max (not including sensor's current consumption)
Operation Time: 100 ms max. (not including the sensor's response time)
Response Time: 10 ms max. (not including the sensor's response time)
Relay Output
Number of Contacts: 3 N/O + 1 N/C
Rated Load: 25 VAC 5 A ($\cos = 1$); 30 VDC 5 A L/R = 0 ms
Rated Current: 5 A
Connection Type
Between Sensors: M12 connector (8-pin)
Others: Terminal block
Weight: Approx. 280 g (9.9 oz.)

Specifications are subject to change without notice.



Go to the Engineering Guide
For in-depth information on
safety standards and use.



Technical drawing of the M12 Waterproof connector, showing side, front, and detail views with dimensions and labels.

Side View (Left):

- Intermediate mounting bracket
- 2-Top/bottom mounting brackets
- 2-Mounting holes
- 1
- 24
- 300
- 6 dia.
- 43
- 15 dia.
- M12 Waterproof connector

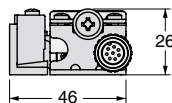
Front View (Middle):

- 2-Top/bottom mounting brackets
- 2-Mounting holes
- 5.5
- 20
- 16.5
- 3.75
- 6.25
- 30
- 31
- 22
- 7
- 5.5
- 53
- 42
- 2-Mounting holes
- Beam
- 4-Mounting holes
- 10
- 37
- 6.5 dia.
- 2-Mounting holes
- 9 dia.
- 13.75
- A
- B
- E
- D
- C (Protective height)

Detail View (Right):

- Mounting Screw Holes
- 4-M5
- 20
- 22
- 2-M5
- 42
- E
- B

E = see chart below



*Use E = 530 or less when none of the E values shown above are used.

The minimum components required for an F3SJ-A system are a emitter receiver set and a set of single or double-ended connector cables. See the table below for an overview of the versions available. The pages which follow provide specific part numbers and accessory descriptions.

F3SJ-A0745P30	30	745	F3SJ-A1245P30	50	1245	F3SJ-A0570P55	12	570	F3SJ-A1570P55	32	1570
F3SJ-A0770P30	31	770	F3SJ-A1270P30	51	1270	F3SJ-A0620P55	13	620	F3SJ-A1620P55	33	1620
F3SJ-A0795P30	32	795	F3SJ-A1295P30	52	1295	F3SJ-A0670P55	14	670	F3SJ-A1670P55	34	1670
F3SJ-A0820P30	33	820	F3SJ-A1395P30	56	1395	F3SJ-A0720P55	15	720	F3SJ-A1720P55	35	1720
F3SJ-A0845P30	34	845	F3SJ-A1495P30	60	1495	F3SJ-A0770P55	16	770	F3SJ-A1770P55	36	1770
F3SJ-A0870P30	35	870	F3SJ-A1620P30	65	1620	F3SJ-A0820P55	17	820	F3SJ-A1820P55	37	1820
F3SJ-A0895P30	36	895	F3SJ-A1745P30	70	1745	F3SJ-A0870P55	18	870	F3SJ-A1870P55	38	1870
F3SJ-A0920P30	37	920	F3SJ-A1870P30	75	1870	F3SJ-A0920P55	19	920	F3SJ-A1920P55	39	1920
F3SJ-A0945P30	38	945	F3SJ-A1995P30	80	1995	F3SJ-A0970P55	20	970	F3SJ-A1970P55	40	1970
F3SJ-A0970P30	39	970	F3SJ-A2120P30	85	2120	F3SJ-A1020P55	21	1020	F3SJ-A2020P55	41	2020
F3SJ-A0995P30	40	995	F3SJ-A2245P30	90	2245	F3SJ-A1070P55	22	1070	F3SJ-A2070P55	42	2070
F3SJ-A1020P30	41	1020	F3SJ-A2370P30	95	2370	F3SJ-A1120P55	23	1120	F3SJ-A2120P55	43	2120
F3SJ-A1045P30	42	1045	F3SJ-A2495P30	200	2495	F3SJ-A1170P55	24	1170	F3SJ-A2170P55	44	2170
F3SJ-A1070P30	43	1070	F3SJ-A55 Series			F3SJ-A1220P55	25	1220	F3SJ-A2220P55	45	2220
F3SJ-A1095P30	44	1095	F3SJ-A0270P55	6	270	F3SJ-A1270P55	26	1270	F3SJ-A2270P55	46	2270
F3SJ-A1120P30	45	1120	F3SJ-A0320P55	7	320	F3SJ-A1320P55	27	1320	F3SJ-A2320P55	47	2320
F3SJ-A1145P30	46	1145	F3SJ-A0370P55	8	370	F3SJ-A1370P55	28	1370	F3SJ-A2370P55	48	2370
F3SJ-A1170P30	47	1170	F3SJ-A0420P55	9	420	F3SJ-A1420P55	29	1420	F3SJ-A2420P55	49	2420
F3SJ-A1195P30	48	1195	F3SJ-A0470P55	10	470	F3SJ-A1470P55	30	1470	F3SJ-A2470P55	50	2470
F3SJ-A1220P30	49	1220	F3SJ-A0520P55	11	520	F3SJ-A1520P55	31	1520			

*The suffix "-TS" is attached to the model number of models with fixed auto reset.

Accessories

Model Description

Single-End Connector Cable (2 cables per set, for emitter and receiver)

For wiring with safety circuit such as single safety relay, safety relay unit, and safety controller

F39-JC3A	M12 connector (8-pin), 3 m (9.8 ft.)
F39-JC7A	M12 connector (8-pin), 7 m (23.0 ft.)
F39-JC10A	M12 connector (8-pin), 10 m (32.8 ft.)
F39-JC15A	M12 connector (8-pin), 15 m (49.2 ft.)
F39-JC20A	M12 connector (8-pin), 20 m (65.6 ft.)

Double-End Connector Cable (2 cables per set, for emitter and receiver)

For connection with F3SP-B1P control unit, and for extension when series-connected. Note: To extend the cable length under series connection, use F39-JJR3W and F39-JC□B in combination.

F39-JCR5B	M12 connector (8-pin), 0.5 m (1.6 ft.)
F39-JC1B	M12 connector (8-pin), 1 m (3.3 ft.)
F39-JC3B	M12 connector (8-pin), 3 m (9.8 ft.)
F39-JC5B	M12 connector (8-pin), 5 m (16.4 ft.)
F39-JC7B	M12 connector (8-pin), 7 m (23.0 ft.)
F39-JC10B	M12 connector (8-pin), 10 m (32.8 ft.)
F39-JC15B	M12 connector (8-pin), 15 m (49.2 ft.)
F39-JC20B	M12 connector (8-pin), 20 m (65.6 ft.)

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

F39-JJR3W	Series connection cable ³ or when using water-resistant case ⁴ , 0.3 m (1.0 ft.)
F39-JC□B	Extension cable, 0.5 to 15 m (1.6 to 49.2 ft.) To change series connection length in combination with F39-JJR3W
F39-JJR06L	Side-by-side series connection cable, 0.06 m (2.4 in.) Dedicated series connection cable with minimum length, used in place of the sensor's cable with connector
F39-JJR15L	Side-by-side series connection cable, 0.15 m (5.9 in.) Dedicated series connection cable with minimum length, used in place of the sensor's cable with connector

³ Total cable length of series connection is 0.6 m to connect to connector cable of the main sensor unit. For series connection with minimum length, use the F39-JJR06L or F39-JJR15L.

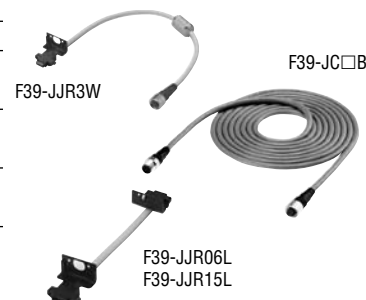
⁴ When using the F39-EJ□□□□□□-L/D water-resistant case in series connection configurations, use the special series connection cables for the water-resistant case.



F39-JC7A



F39-JC15B



F39-JC□B

F39-JJR3W

F39-JJR06L
F39-JJR15L

■ Ordering (continued)

Accessories (continued)

Model	Description
Safety Controller	
F3SX-EL2	Can connect 2 sets of F3SJ-As and emergency stop switch DC semiconductor safety output
F3SX-E-L2L2	Can connect 4 sets of F3SJ-As and emergency stop switch DC semiconductor safety output
F3SX-N-L2R	Can connect 2 sets of F3SJ-As and emergency stop switch Relay output (2 N/O + 2 N/C)
F3SX-N-L2L2R	Can connect 4 sets of F3SJ-As and emergency stop switch Relay output (2 N/O + 2 N/C)
Connection Cable for F3SX (F3SX to F39-CN5)	
F39-JC1T	F3SX connection cable, 1 m (3.3 ft.)
F39-JC3T	F3SX connection cable, 3 m (9.8 ft.)
F39-JC5T	F3SX connection cable, 5 m (16.4 ft.)
F39-JC7T	F3SX connection cable, 7 m (23.0 ft.)
F39-JC10T	F3SX connection cable, 10 m (32.8 ft.)
F39-JC15T	F3SX connection cable, 15 m (49.2 ft.)
Branch Connector for F3SX (F39-JC□T to F39-JC□B)	
F39-CN5	Branch connector for F3SX



F3SX

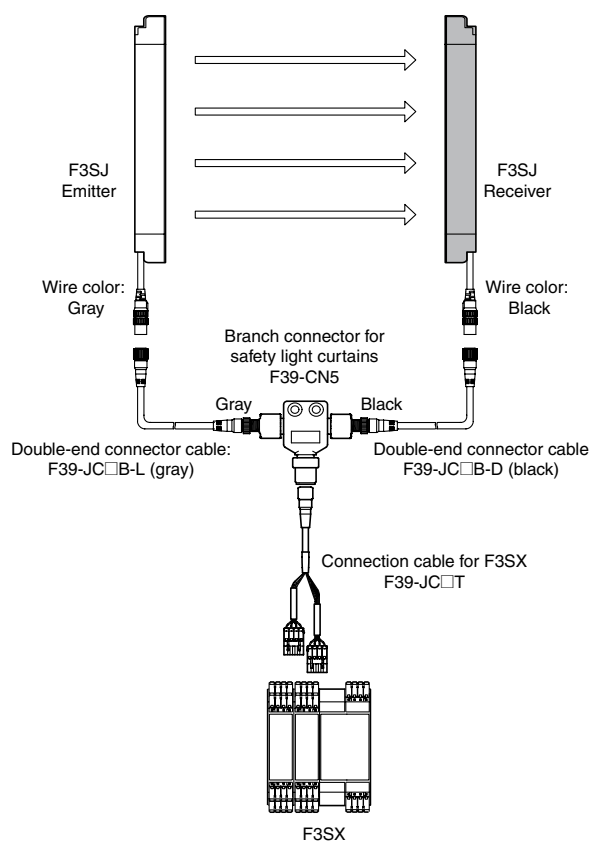


F39-JC-10T



F39-CN5

Accessory connection example



Go to the Engineering Guide
For in-depth information on
safety standards and use.

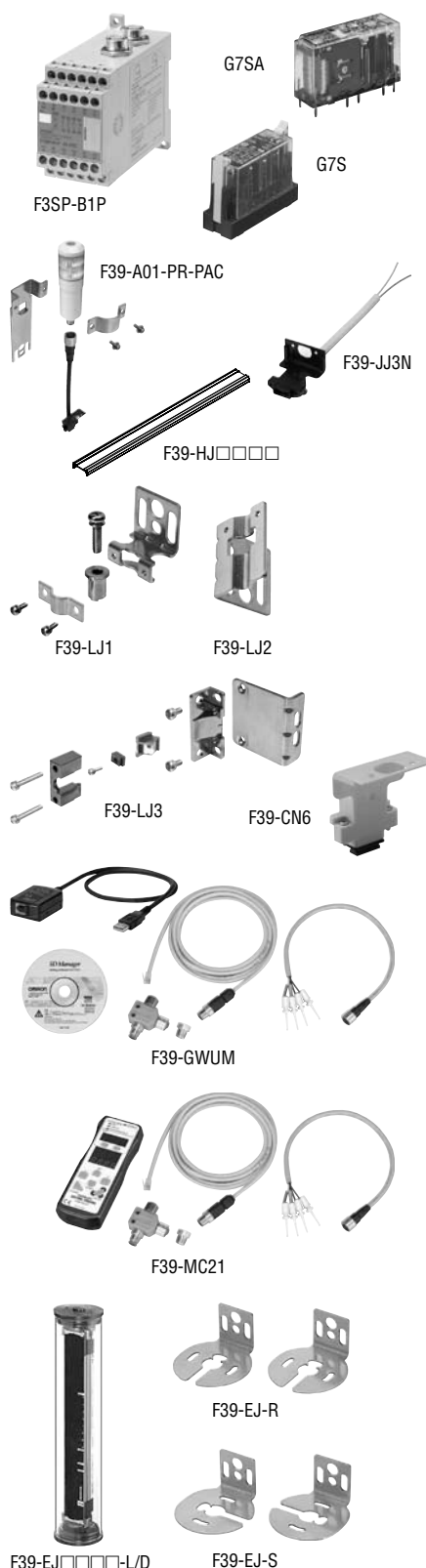


Accessories (continued)

Model	Description
Control Unit	
F3SP-B1P	Relay, 3 N/O + 1 N/C output, for connection with F3SJ-A, use an F39-JC□□B double-end connector cable
Force-Guided Relays	
G7SA-2A2B	4 contacts, 2 N/O + 2 N/C, Rated switch load: 250 VAC 6 A, 30 VDC 6 A
G7SA-3A1B	4 contacts, 3 N/O + 1 N/C, Rated switch load: 250 VAC 6 A, 30 VDC 6 A
G7S-4A2B-E	6 contacts, 4 N/O + 2 N/C, Rated switch load: 250 VAC 10 A, 30 VDC 10 A
G7S-3A3B-E	6 contacts, 3 N/O + 3 N/O, Rated switch load: 250 VAC 10 A, 30 VDC 10 A
Dedicated External Indicator Set (Can be connected to either an emitter or a receiver)	
F39-A01PR-PAC	Indicator (red), mounting bracket (1 set), and dedicated connection cable (0.1 m)
F39-A01PG-PAC	Indicator (green), mounting bracket (1 set), and dedicated connection cable (0.1 m)
F39-A01PY-PAC	Indicator (yellow), mounting bracket (1 set), and dedicated connection cable (0.1 m)
General External Indicator Cable	
F39-JJ3N	Cable to connect top of the main unit and an off-the-shelf external indicator (2-wire), 3 m (9.8 ft.)
Spatter Protection Cover	
F39-HJ□□□□	For F3SJ-A series sensor, reduces operating range by 10%, includes two pieces for emitter and receiver
Sensor Mounting Brackets (sold separately)	
F39-LJ1	Standard mounting bracket (for top/bottom), included with main unit, 2 for emitter and 2 for receiver (total of 4 per set)
F39-LJ2	Flat side mounting bracket, Use these small-sized brackets when performing side mounting with standard mounting brackets so that they do not protrude from the detection surface, 2 for emitter and 2 for receiver (total of 4 per set)
F39-LJ3	Free-location mounting bracket (also used as standard intermediate bracket), Use these brackets for mounting any place without using standard bracket, 1 set with 2 pieces
Key Cap for Muting	
F39-CN6	Cap attaches to the main unit to enable muting function, attach to either an emitter or a receiver, orange case
Setting Tools⁵	
F39-GWUM	"SD Manager" Setting Support Software for the F3SJ-A Accessories: SD Manager CD-ROM, F39-CN1 Branch Connector, Connector Cap, 2 m Dedicated Cable, 0.3 m Dedicated Cable with Plug, Instruction Manual
F39-MC21	Setting Console Accessories: F39-CN1 Branch Connector, Connector Cap, 2 m Dedicated Cable, 0.3 m Dedicated Cable with Plug, Instruction Manual
Water-Resistant Case (Set of 1 tube, packing, and dedicated connector cable)	
When using for both emitter and receiver, order two sets.	
F39-EJ□□□□-L	Water-resistant case for emitter, includes gray cable for emitter
F39-EJ□□□□-D	Water-resistant case for receiver, includes black cable for receiver
F39-EJ-R ⁶	Rear mounting brackets, top/bottom 1 each, total of 2
F39-EJ-S ⁶	Side mounting brackets, top/bottom 1 each, total of 2
F39-JJR3WE-L	Series connection cable for emitter, purchase additionally for series connection when using the water-resistant case
F39-JJR3WE-D	Series connection cable for receiver, purchase additionally for series connection when using the water-resistant case

⁵ The setting tools described above can be connected only to F3SJ-A models with built-in software of Ver. 2 or later. Note that the setting tools cannot be used with products shipped prior to December 2005. The setting tools cannot be used for setting parameters on the F3SJ-A□-TS series, but the monitoring function can be used.

⁶ Be sure to purchase brackets with the case to match the mounting direction (rear or side).



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safety light curtains