Safety Light Curtain

F3SG-RA

Advanced Safety Light Curtain in Rugged, IP67 Rated Housing

- Rugged, IP67 rated housing resists washdown
- Space-saving slim profile of 35x35 mm (1.37 in.)
- Scan QR code with smart phone for local language support and troubleshooting guide
- Built-in muting; requires no external muting controller
- All models designed for global use. PNP/NPN output selection by DIP switch
- Resolution: 14 mm (finger protection) and 30 mm (hand and arm protection) models
- Cascaded designs possible: 3 segments, up to 255 beams
- “Smart click” 1/8 turn quick connect M12 cables: for fast installation and proper torque to ensure IP67 connection
- 14mm resolution up to 10.0 m (32 ft.) range in 160 to 2080 mm (6.3 to 81.9 inch) protective heights
- 30mm resolution up to 20.0 m (65 ft.) range in 190 to 2510 mm (7.3 to 81.9 inch) protective heights

Online Multilanguage Support

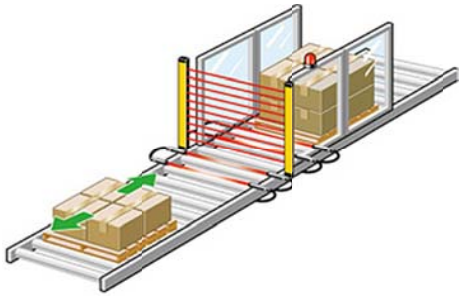
To access troubleshooting support for safety light curtain errors in your local language use your tablet or smartphone to scan a QR code sticker that can be applied to the machine.

Also accessible by computer, operators can check the error details in 8 languages and download manuals from a dedicated website.

The interactive diagnostics ask about error indicator color, indicator flashing frequency and DIP switch settings to thoroughly analyze the cause of an error.

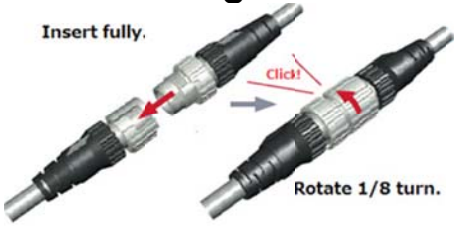
Languages include English, Spanish, French, Chinese, Korean, Japanese, German, and Italian.

Built-in Muting and Blanking



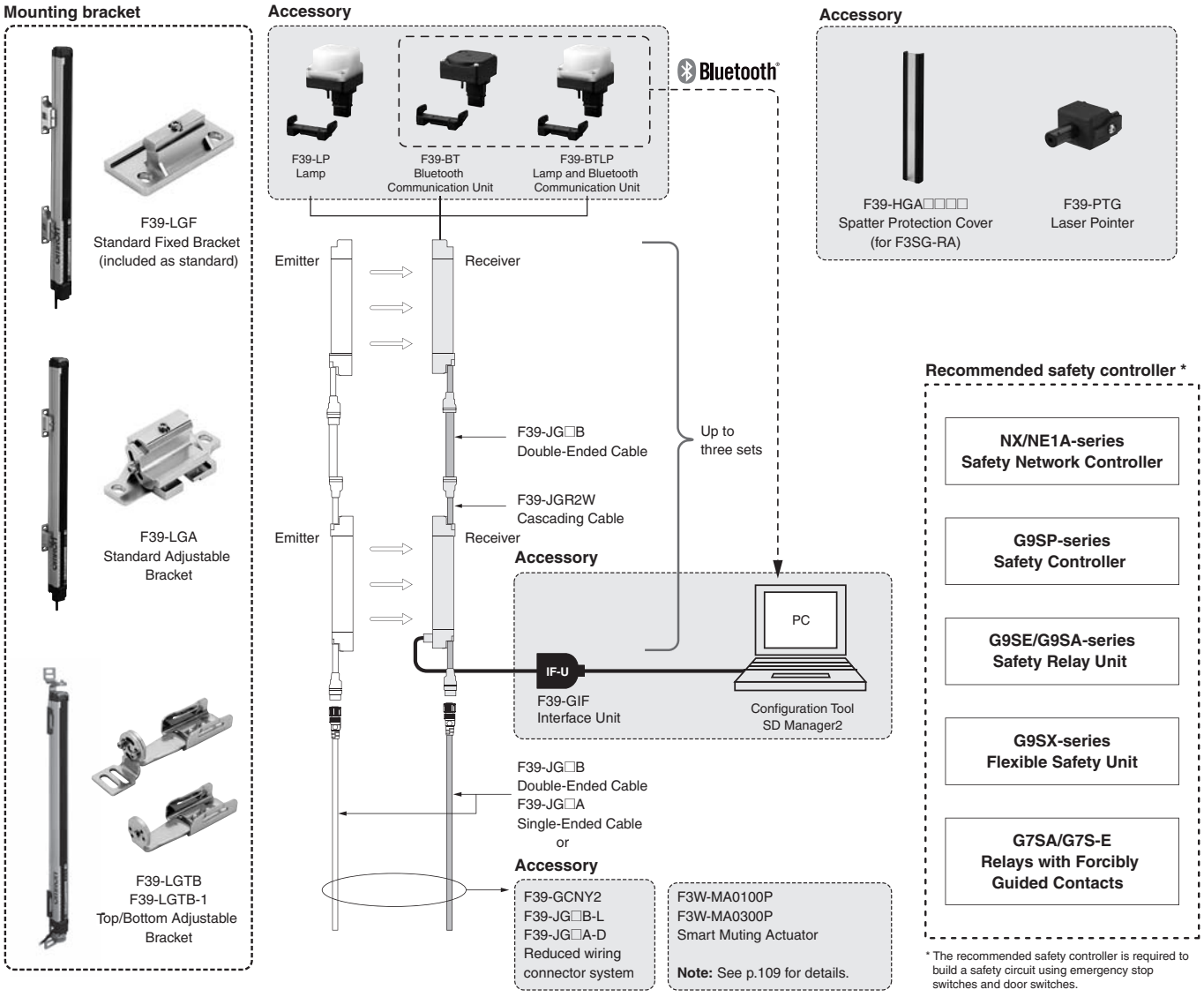
Built-in muting to pass through materials into the hazard zone requires no external muting controller. The blanking function disables specific beams of the safety light curtain. A warning zone can be set to alert people before they enter a danger zone using single or series-connected units when horizontally mounted.

Reduced Wiring Work



“Smart click” 1/8 turn quick-connect M12 cables allow fast installation and proper torque to ensure IP67 connection.

System Configuration



* The recommended safety controller is required to build a safety circuit using emergency stop switches and door switches.

Ordering Information

Main Units

Safety Light Curtain

Finger protection

Number of beams	Protective height (mm)	Model
15	160	**F3SG-4RA0160-14**
23	240	**F3SG-4RA0240-14**
31	320	**F3SG-4RA0320-14**
39	400	**F3SG-4RA0400-14**
47	480	**F3SG-4RA0480-14**
55	560	**F3SG-4RA0560-14**
63	640	**F3SG-4RA0640-14**
71	720	**F3SG-4RA0720-14**
79	800	**F3SG-4RA0800-14**
87	880	**F3SG-4RA0880-14**
95	960	**F3SG-4RA0960-14**
103	1040	**F3SG-4RA1040-14**
111	1120	**F3SG-4RA1120-14**
119	1200	**F3SG-4RA1200-14**
127	1280	**F3SG-4RA1280-14**
135	1360	**F3SG-4RA1360-14**
143	1440	**F3SG-4RA1440-14**
151	1520	**F3SG-4RA1520-14**
159	1600	**F3SG-4RA1600-14**
167	1680	**F3SG-4RA1680-14**
175	1760	**F3SG-4RA1760-14**
183	1840	**F3SG-4RA1840-14**
191	1920	**F3SG-4RA1920-14**
199	2000	**F3SG-4RA2000-14**
207	2080	**F3SG-4RA2080-14**

Hand and arm protection

Number of beams	Protective height (mm)	Model
8	190	**F3SG-4RA0190-30**
12	270	**F3SG-4RA0270-30**
16	350	**F3SG-4RA0350-30**
20	430	**F3SG-4RA0430-30**
24	510	**F3SG-4RA0510-30**
28	590	**F3SG-4RA0590-30**
32	670	**F3SG-4RA0670-30**
36	750	**F3SG-4RA0750-30**
40	830	**F3SG-4RA0830-30**
44	910	**F3SG-4RA0910-30**
48	990	**F3SG-4RA0990-30**
52	1070	**F3SG-4RA1070-30**
56	1150	**F3SG-4RA1150-30**
60	1230	**F3SG-4RA1230-30**
64	1310	**F3SG-4RA1310-30**
68	1390	**F3SG-4RA1390-30**
72	1470	**F3SG-4RA1470-30**
76	1550	**F3SG-4RA1550-30**
80	1630	**F3SG-4RA1630-30**
84	1710	**F3SG-4RA1710-30**
88	1790	**F3SG-4RA1790-30**
92	1870	**F3SG-4RA1870-30**
96	1950	**F3SG-4RA1950-30**
100	2030	**F3SG-4RA2030-30**
104	2110	**F3SG-4RA2110-30**
108	2190	**F3SG-4RA2190-30**
112	2270	**F3SG-4RA2270-30**
116	2350	**F3SG-4RA2350-30**
120	2430	**F3SG-4RA2430-30**
124	2510	**F3SG-4RA2510-30**

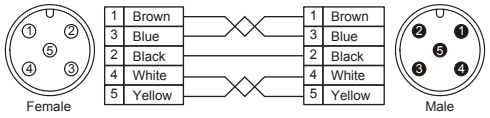
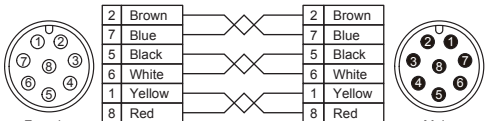
Accessories (Sold separately)

safety light curtain for Emitter (F39-JG_A-L, sold separately) and Receiver (F39-JG_A-D, sold separately) connecting cable
Single-Ended Cable

Appearance	Cable length	Specifications	Type	Model
	3 m	For emitter, M12 connector (5-pin), 5 wires, Color: Gray Connected to Power Cable or Double-Ended Cable  Female 1 +24 VDC Brown 2 TEST Black 3 0 VDC Blue 4 Not used White 5 Not used Yellow For receiver, M12 connector (8-pin), 8 wires, Color: Black Connected to Power Cable or Double-Ended Cable  Female 1 RESET Yellow 2 +24 VDC Brown 3 MUTE A Gray 4 MUTE B Pink 5 OSSD 1 Black 6 OSSD 2 White 7 0 VDC Blue 8 AUX Red	Emitter	F39-JG3A-L
			Receiver	F39-JG3A-D
	7 m		Emitter	F39-JG7A-L
			Receiver	F39-JG7A-D
	10 m		Emitter	F39-JG10-L
			Receiver	F39-JG10A-D
	15 m		Emitter	F39-JG15A-L
			Receiver	F39-JG15A-D
	20 m		Emitter	F39-JG20A-L
			Receiver	F39-JG20A-D

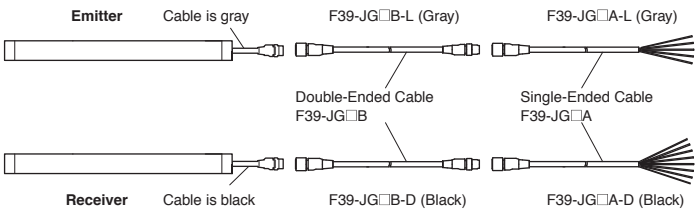
Note: To extend the cable length to more than 20 m, add the F39-JG□B Double-Ended Cable.

Double-Ended Cable for Emitter (F39-JG_B-L, sold separately) and Receiver (F39-JG_B-D sold separately)
For cable extension and simple wiring

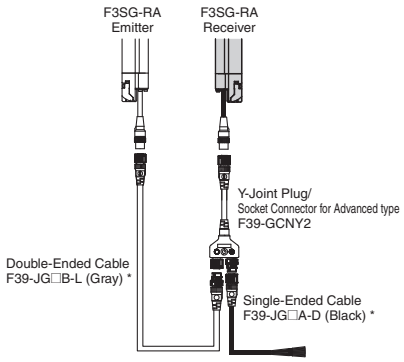
Appearance	Cable length	Specifications	Type	Model
	0.5m	For emitter, M12 connector (5-pin) on both ends, Color: Gray Connected to Power Cable or Double-Ended Cable Connected to Single-Ended Cable, or Double-Ended Cable  Female 1 Brown — 1 Brown 3 Blue — 3 Blue 2 Black — 2 Black 4 White — 4 White 5 Yellow — 5 Yellow Male For receiver, M12 connector (8-pin) on both ends, Color: Black Connected to Power Cable or Double-Ended Cable Connected to Single-Ended Cable, or Double-Ended Cable  Female 2 Brown — 2 Brown 7 Blue — 7 Blue 5 Black — 5 Black 6 White — 6 White 1 Yellow — 1 Yellow 8 Red — 8 Red 3 Gray — 3 Gray 4 Pink — 4 Pink Male	Emitter	F39-JGR5B-L
			Receiver	F39-JGR5B-D
	1m		Emitter	F39-JG1B-L
			Receiver	F39-JG1B-D
	3m		Emitter	F39-JG3B-L
			Receiver	F39-JG3B-D
	5m		Emitter	F39-JG5B-L
			Receiver	F39-JG5B-D
	7m		Emitter	F39-JG7B-L
			Receiver	F39-JG7B-D
	10m		Emitter	F39-JG10B-L
			Receiver	F39-JG10B-D
	15m		Emitter	F39-JG15B-L
			Receiver	F39-JG15B-D
	20m		Emitter	F39-JG20B-L
			Receiver	F39-JG20B-D

Note: To extend the cable length to more than 20 m, use the F39-JG□B Double-Ended Cables in combination.
Example: When using a cable of 30 m, connect the F39-JG10B Double-Ended Cable with the F39-JG20B Double-Ended Cable.

<Connection example>

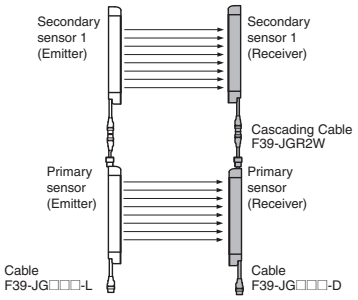


Y-Joint Plug/Socket Connector for F3SG-4RA□□□□-14/-4RA□□□□-30
For reduced wiring

Appearance	Type	Cable length	Specifications	Model
	M12 connectors. Used for reduced wiring.	0.5 m		**F39-GCNY2**

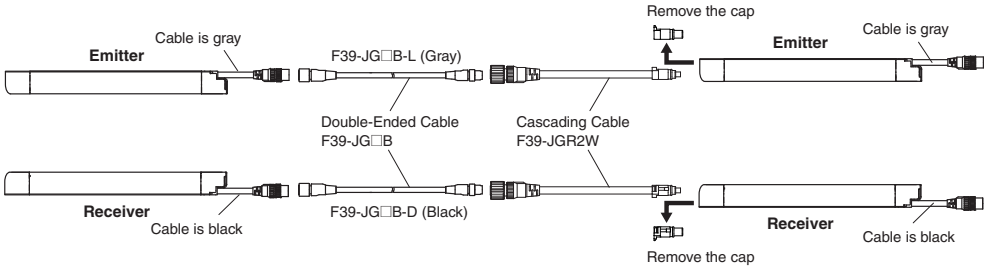
* Order the cable for emitter (end of model: -L) and the cable for receiver (end of model: -D).

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

Appearance	Type	Cable length	Specifications	Model
	Emitter cable: Cap (5-pin), M12 connector (5-pin) Receiver cable: Cap (8-pin), M12 connector (8-pin)	0.2 m		**F39-JGR2W**

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

<Connection example>



Sensor Mounting Brackets

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

*1. [for F3SG-4RA□□□□-14]
- Protective height of 0160 to 1200: 2 sets, Protective height of 1280 to 2080: 3 sets
[for F3SG-4RA□□□□-30]
- Protective height of 0190 to 1230: 2 sets, Protective height of 1310 to 2270: 3 sets, Protective height of 2350 to 2510: 4 sets

*2. Top/Bottom Adjustable Bracket cannot be used with the Standard Fixed Bracket. Use with the Standard Adjustable Bracket.
Using Top/Bottom Adjustable Brackets with Standard Adjustable Brackets
F3SG-4RA□□□□-14: Protective height of 1120 to 1920: 1 set of Top/Bottom Adjustable Brackets and 1 set of Standard Adjustable Brackets
Protective height of 2000 to 2080: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets
Protective height of 1040 or lower: Standard Adjustable Brackets cannot be used.
F3SG-4RA□□□□-30: Protective height of 1150 to 1950: 1 set of Top/Bottom Adjustable Brackets and 1 set of Standard Adjustable Brackets
Protective height of 2030 to 2510: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets
Protective height of 1070 or lower: Standard Adjustable Brackets cannot be used.

Interface units and configuration tool SD Manager 2

Appearance	Type	Specifications	Model
	SD Manager2	The Configuration Tool SD Manager 2 is available to download from our website at http://www.ia.omron.com/f3sg-r_tool. To change the settings of the F3SG-RA using SD Manager 2, it is necessary to set the receiver's two DIP switches No. 8 to ON.	–
	Interface Unit	F39-GIF interface unit to connect the F3SG-RA receiver to a USB port of the PC	**F39-GIF**
	Bluetooth Communication Unit	F39-BT bluetooth unit to enable bluetooth on the F3SG-RA IP67 rated when mated.	**F39-BT**

Lamp

Appearance	Type	Specifications	Model
	Lamp	The lamp can be connected to a receiver and turned ON based on the operation of F3SG-RA/RR. The lamp can indicate red, orange, and green colors, to which three different states can be assigned. IP67 rated when mated.	**F39-LP**
	Lamp and Bluetooth Communication Unit		**F39-BTLP**

End Cap

Appearance	Specifications	Model
	Housing color: Black For both emitter and receiver (Attached to the F3SG-R. The End Cap can be purchased if lost.) IP67 rated when mated.	**F39-CNM**

Laser Pointer for F3SG-R

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

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

Spatter Protection Covers include mounting brackets.
For Safety Light Curtain models of the protective height of 2,000 mm or longer, use two Spatter Protection Covers of different lengths.

Appearance	Safety Light Curtain Model		Model
	Finger protection	Hand and arm protection	
	F3SG-4RA0160-14	F3SG-4RA0190-30	F39-HGA0200
	F3SG-4RA0240-14	F3SG-4RA0270-30	F39-HGA0280
	F3SG-4RA0320-14	F3SG-4RA0350-30	F39-HGA0360
	F3SG-4RA0400-14	F3SG-4RA0430-30	F39-HGA0440
	F3SG-4RA0480-14	F3SG-4RA0510-30	F39-HGA0520
	F3SG-4RA0560-14	F3SG-4RA0590-30	F39-HGA0600
	F3SG-4RA0640-14	F3SG-4RA0670-30	F39-HGA0680
	F3SG-4RA0720-14	F3SG-4RA0750-30	F39-HGA0760
	F3SG-4RA0800-14	F3SG-4RA0830-30	F39-HGA0840
	F3SG-4RA0880-14	F3SG-4RA0910-30	F39-HGA0920
	F3SG-4RA0960-14	F3SG-4RA0990-30	F39-HGA1000
	F3SG-4RA1040-14	F3SG-4RA1070-30	F39-HGA1080
	F3SG-4RA1120-14	F3SG-4RA1150-30	F39-HGA1160
	F3SG-4RA1200-14	F3SG-4RA1230-30	F39-HGA1240
	F3SG-4RA1280-14	F3SG-4RA1310-30	F39-HGA1320
	F3SG-4RA1360-14	F3SG-4RA1390-30	F39-HGA1400
	F3SG-4RA1440-14	F3SG-4RA1470-30	F39-HGA1480
	F3SG-4RA1520-14	F3SG-4RA1550-30	F39-HGA1560
	F3SG-4RA1600-14	F3SG-4RA1630-30	F39-HGA1640
	F3SG-4RA1680-14	F3SG-4RA1710-30	F39-HGA1720
	F3SG-4RA1760-14	F3SG-4RA1790-30	F39-HGA1800
	F3SG-4RA1840-14	F3SG-4RA1870-30	F39-HGA1880
	F3SG-4RA1920-14	F3SG-4RA1950-30	F39-HGA1960
	F3SG-4RA2000-14	F3SG-4RA2030-30	F39-HGA1480
			F39-HGA0550
	F3SG-4RA2080-14	F3SG-4RA2110-30	F39-HGA1560
			F39-HGA0550
	–	F3SG-4RA2190-30	F39-HGA1640
			F39-HGA0550
	–	F3SG-4RA2270-30	F39-HGA1720
			F39-HGA0550
	–	F3SG-4RA2350-30	F39-HGA1800
			F39-HGA0550
	–	F3SG-4RA2430-30	F39-HGA1880
			F39-HGA0550
	–	F3SG-4RA2510-30	F39-HGA1960
			F39-HGA0550

Note: 1. The operating range of the Safety Light Curtain attached with the product is 10% shorter than the rating.
2. The product extends over the DIP Switch cover of the Safety Light Curtain. Be sure to use the product only after all required settings are made to the DIP Switch.

Test Rod

Diameter	Model
14 mm dia.	**STI-TO14**
30 mm dia.	**STI-TO30**

Ratings and Specifications

Main unit

			F3SG-4RA□□□□-14	F3SG-4RA□□□□-30
Type of ESPE (IEC 61496-1)		Type 4	F3SG-4RA□□□□ -14/-30	
Performance	Object Resolution (Detection Capability)		Opaque objects	
			14-mm dia.	30-mm dia.
	Beam Gap		10 mm	20 mm
	Number of Beams		15 to 207	8 to 124
	Lens Size		5.2 × 3.4 (W × H) mm	7-mm dia.
	Protective Height		160 to 2080 mm (6.3 to 81.9 inch)	190 to 2510 mm (7.3 to 98.7 inch)
	Operating Range	Long	0.3 to 10.0 m (1 to 32 ft.)	0.3 to 20.0 m (1 to 65 ft.)
		Short	0.3 to 3.0 m (1 to 10 ft.)	0.3 to 7.0 m (1 to 23 ft.)
	Response Time	ON to OFF	Normal mode: 8 to 18 ms max. *1 Slow mode: 16 to 36 ms max. *1 *2	
		OFF to ON	40 to 90 ms max. *1	
			*1. Response time when used in one segment system or in cascaded connection. Refer to page 25 for the one segment system. Refer to *Safety Light Curtain F3SG-R Series User's Manual (ManNo.: Z352)* for cascaded connection. *2. Selectable by Configuration Tool.	
	Effective Aperture Angle (EAA) (IEC 61496-2)	Type 4	±2.5° max., emitter and receiver at operating range of 3 m or greater	
	Light Source		Infrared LEDs, Wavelength: 870 nm	
	Startup Waiting Time		2 s max.	
Electrical	Power Supply Voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
	Current Consumption		Refer to page 25 .	
	Safety Outputs (OSSD)		Two PNP or NPN transistor outputs (PNP or NPN is selectable by DIP Switch.) Load current of 300 mA max., Residual voltage of 2 V max. (except for voltage drop due to cable extension), Capacitive load of 1 μF max., Inductive load of 2.2 H max. *1 Leakage current of 1 mA max. (PNP), 2 mA max. (NPN) *2 *1. The load inductance is the maximum value when the safety output frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger. *2. These values must be taken into consideration when connecting elements including a capacitive load such as a capacitor.	
	Auxiliary Output		One PNP or NPN transistor output (PNP or NPN is selectable by DIP Switch.) Load current of 100 mA max., Residual voltage of 2 V max .	
	Output Operation Mode	Safety Output	Light-ON (Safety output is enabled when the receiver receives an emitting signal.)	
		Auxiliary Output	Safety output (Inverted signal output:Enable) (default) (Cofigurable by Configuration Tool)	
	Input Voltage	ON Voltage	TEST: 24 V Active: 9 V to Vs (sink current 3 mA max.) * 0 V Active: 0 to 3 V (source current 3 mA max.) MUTE A/B: PNP: Vs to Vs-3 V (sink current 3 mA max.) * NPN: 0 to 3 V (source current 3 mA max.) RESET: PNP: Vs to Vs-3 V (sink current 5 mA max.) * NPN: 0 to 3 V (source current 5 mA max.)	
		OFF Voltage	TEST: 24 V Active : 0 to 1.5 V or open 0 V Active : 9 V to Vs or open MUTE A/B, RESET: PNP: 0 to 1/2 Vs, or open * NPN: 1/2 Vs to Vs, or open *	
			* The Vs indicates a supply voltage value in your environment.	
	Overvoltage Category (IEC 60664-1)		II	
	Indicators		Refer to page 27.	
	Protective Circuit		Output short protection, Power supply reverse polarity protection	
	Insulation Resistance		20 MΩ or higher (500 VDC megger)	
	Dielectric Strength		1,000 VAC, 50/60 Hz (1 min)	
Functional	Mutual Interference Prevention (Scan Code)		This function prevents mutual interference in up to two F3SG-RA systems.	
	Cascade Connection		Number of cascaded segments: 3 max. Total number of beams: 255 max. Cable length between sensors: 10 m max. (not including cascading cable (F39-JGR2W) and power cable)	
	Test Function		Self-test (at power-on, and during operation) External test (light emission stop function by test input)	
	Safety-Related Functions		Interlock External device monitoring (EDM) Pre-reset Fixed blanking/Floating blanking Reduced resolution Muting/Override Scan code selection PNP/NPN selection Response time adjustment	

			F3SG-4RA□□□□-14	F3SG-4RA□□□□-30
Environmental	Ambient Temperature	Operating	-10 to 55°C (14 to 131°F) (non-icing)	
		Storage	-25 to 70°C (-13 to 158°F)	
	Ambient Humidity	Operating	35% to 85% (non-condensing)	
		Storage	35% to 95%	
	Ambient Illuminance		Incandescent lamp: 3,000 lx max. on receiver surface Sunlight: 10,000 lx max. on receiver surface	
	Degree of Protection (IEC 60529)		IP65 and IP67	
	Vibration Resistance (IEC 61496-1)		10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes	
	Shock Resistance (IEC 61496-1)		100 m/s^2, 1000 shocks for all 3 axes	
	Pollution Degree (IEC 60664-1)		Pollution Degree 3	
Connections	Power cable	Type of Connection	M12 connectors: 5-pin emitter and 8-pin receiver, IP67 rated when mated, Cables prewired to the sensors	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	0.3 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R5 mm	
	Cascading cable	Type of Connection	M12 connectors: 5-pin emitter and 8-pin receiver, IP67 rated when mated	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	0.2 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R5 mm	
	Extension cable - Single-Ended Cable - Double-Ended Cable	Type of Connection	M12 connectors: 5-pin emitter and 8-pin receiver, IP67 rated when mated	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	Refer to page 18.	
		Cable Diameter	6.6 mm	
		Minimum Bending Radius	R36 mm	
	Extension of Power Cable		100 m max.	
Material	Material		Housing: Aluminum Cap: PBT Front window: PMMA Cable: Oil resistant PVC Mounting Bracket: ZDC2 FE plate: SUS	
	Weight (packaged)		Refer to page 25 .	
	Included Accessories		Safety Precautions, Quick Installation Manual, Standard Fixed Bracket *, Troubleshooting Guide Sticker, Warning Zone Label * The quantity of Standard Fixed Brackets included varies depending on the protective height. [F3SG-□RA□□□□ -14] - Protective height of 0160 to 1200: 2 sets - Protective height of 1280 to 2080: 3 sets [F3SG-□RA□□□□ -30] - Protective height of 0190 to 1230: 2 sets - Protective height of 1310 to 2270: 3 sets - Protective height of 2350 to 2510: 4 sets	
Conformity	Conforming standards		Refer to page 26.	
	Type of ESPE (IEC 61496-1)		Type 4	
	Performance Level (PL)/Safety category	Type 4	PL e/Category 4 (EN ISO 13849-1:2008)	
	PFHd		1.1×10^{-8} (IEC 61508)	
	Proof test interval T_M		Every 20 years (IEC 61508)	
	SFF		99% (IEC 61508)	
	HFT		1 (IEC 61508)	
	Classification		Type B (IEC 61508-2)	

List of Models/Response Time/Current Consumption/Weight

F3SG-4RA□□□□-14

Model	Number of Beams	Protective Height [mm]	Response Time [ms] *1			Current Consumption [mA]		Weight [kg] *3
			ON → OFF *2	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	
F3SG-4RA0160-14	15	160	8	40	140	40	75	1.8
F3SG-4RA0240-14	23	240	8	40	140	45	75	2.0
F3SG-4RA0320-14	31	320	8	40	140	55	75	2.2
F3SG-4RA0400-14	39	400	8	40	140	60	80	2.7
F3SG-4RA0480-14	47	480	13	65	165	50	80	2.9
F3SG-4RA0560-14	55	560	13	65	165	55	80	3.1
F3SG-4RA0640-14	63	640	13	65	165	60	85	3.3
F3SG-4RA0720-14	71	720	13	65	165	65	85	3.9
F3SG-4RA0800-14	79	800	13	65	165	65	90	4.1
F3SG-4RA0880-14	87	880	13	65	165	70	90	4.3
F3SG-4RA0960-14	95	960	13	65	165	75	90	4.5
F3SG-4RA1040-14	103	1040	13	65	165	80	95	4.7
F3SG-4RA1120-14	111	1120	13	65	165	85	95	4.8
F3SG-4RA1200-14	119	1200	13	65	165	90	100	5.0
F3SG-4RA1280-14	127	1280	13	65	165	95	100	5.2
F3SG-4RA1360-14	135	1360	13	65	165	95	105	5.6
F3SG-4RA1440-14	143	1440	18	90	190	85	105	5.8
F3SG-4RA1520-14	151	1520	18	90	190	90	105	6.0
F3SG-4RA1600-14	159	1600	18	90	190	90	110	6.6
F3SG-4RA1680-14	167	1680	18	90	190	95	110	6.8
F3SG-4RA1760-14	175	1760	18	90	190	100	115	7.0
F3SG-4RA1840-14	183	1840	18	90	190	100	115	7.2
F3SG-4RA1920-14	191	1920	18	90	190	105	120	7.3
F3SG-4RA2000-14	199	2000	18	90	190	105	120	7.5
F3SG-4RA2080-14	207	2080	18	90	190	110	125	8.1

*1. The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.
*2. The response times are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.
*3. The weight includes an emitter, a receiver and included brackets in a product package.

F3SG-4RA□□□□-30

Model	Number of Beams	Protective Height [mm]	Response Time [ms] *1			Current Consumption [mA]		Weight [kg] *3
			ON → OFF *2	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	
F3SG-4RA0190-30	8	190	8	40	140	35	75	1.8
F3SG-4RA0270-30	12	270	8	40	140	35	75	2.0
F3SG-4RA0350-30	16	350	8	40	140	40	75	2.2
F3SG-4RA0430-30	20	430	8	40	140	45	75	2.7
F3SG-4RA0510-30	24	510	8	40	140	50	75	2.9
F3SG-4RA0590-30	28	590	8	40	140	50	75	3.1
F3SG-4RA0670-30	32	670	8	40	140	55	75	3.3
F3SG-4RA0750-30	36	750	8	40	140	60	80	3.9
F3SG-4RA0830-30	40	830	8	40	140	65	80	4.0
F3SG-4RA0910-30	44	910	13	65	165	50	80	4.2
F3SG-4RA0990-30	48	990	13	65	165	50	80	4.4
F3SG-4RA1070-30	52	1070	13	65	165	55	80	4.6
F3SG-4RA1150-30	56	1150	13	65	165	55	85	4.8
F3SG-4RA1230-30	60	1230	13	65	165	55	85	4.9
F3SG-4RA1310-30	64	1310	13	65	165	60	85	5.1
F3SG-4RA1390-30	68	1390	13	65	165	60	85	5.6
F3SG-4RA1470-30	72	1470	13	65	165	65	85	5.8
F3SG-4RA1550-30	76	1550	13	65	165	65	90	6.0
F3SG-4RA1630-30	80	1630	13	65	165	70	90	6.5
F3SG-4RA1710-30	84	1710	13	65	165	70	90	6.7
F3SG-4RA1790-30	88	1790	13	65	165	70	90	6.9
F3SG-4RA1870-30	92	1870	13	65	165	75	90	7.1
F3SG-4RA1950-30	96	1950	13	65	165	75	95	7.3
F3SG-4RA2030-30	100	2030	13	65	165	80	95	7.4
F3SG-4RA2110-30	104	2110	13	65	165	80	95	8.0
F3SG-4RA2190-30	108	2190	13	65	165	85	95	8.2
F3SG-4RA2270-30	112	2270	13	65	165	85	100	8.4
F3SG-4RA2350-30	116	2350	13	65	165	85	100	8.8
F3SG-4RA2430-30	120	2430	13	65	165	90	100	8.9
F3SG-4RA2510-30	124	2510	13	65	165	90	100	9.1

*1. The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.
*2. The response times are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.
*3. The weight includes an emitter, a receiver and included brackets in a product package.

Legislation and Standards

1. The F3SG-R does not receive type approval provided by Article 44-2 of the Industrial Safety and Health Act of Japan. When using the F3SG-R in Japan as a "safety system for pressing or shearing machines" prescribed in Article 42 of that law, the machine control system must receive type approval.
2. The F3SG-R is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Index Annex V, Item 2.
3. EC Declaration of Conformity
   OMRON declares that the F3SG-R is in conformity with the requirements of the following EC Directives:
   Machinery Directive 2006/42/EC
   EMC Directive2014/30/EU
4. Conforming Standards
   (1) European standards
   EN61496-1 (Type 4 and Type 2 ESPE), EN 61496-2 (Type 4 and Type 2 AOPD), EN61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), EN ISO 13849-1:2008 (PL e, Category 4 for Type 4 and PL c, Category 2 for Type 2)
   (2) International standards
   IEC61496-1 (Type 4 and Type 2 ESPE), IEC61496-2 (Type 4 and Type 2 AOPD), IEC61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), ISO 13849-1:2006 (PL e, Category 4 for Type 4 and PL c, Category 2 for Type 2)
   (3) JIS standards
   JIS B 9704-1 (Type 4 and Type 2 ESPE), JIS B 9704-2 (Type 4 and Type 2 AOPD)
   (4) North American standards
   UL61496-1(Type 4 and Type 2 ESPE), UL61496-2(Type 4 and Type 2 AOPD), UL508, UL1998,
   CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
   (5) Chinese standards
   GB4584(Specification of active opto-electronic protective devices for presses)
5. Third-Party Certifications
   (1) TÜV SÜD
   - EC Type-Examination certificate:
     EU Machinery Directive, Type 4 and Type 2 ESPE (EN61496-1), Type 4 and Type 2 AOPD (EN 61496-2)
   - Certificate:
     Type 4 and Type 2 ESPE (EN61496-1), Type 4 and Type 2 AOPD (EN61496-2), EN 61508-1 through -4 (SIL 3 for Type 4 and SIL 1 for Type 2), EN ISO 13849-1:2008 (PL e, Category 4 for Type 4, and PL c, Category 2 for Type 2)

   (2) UL
   - UL Listing:
     Type 4 and Type 2 ESPE (UL61496-1), Type 4 and Type 2 AOPD (UL61496-2), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8

   (3) China National Casting and Forging Machines Quality Supervision and Inspection Center
   - Certificate:
     GB4584 (Specification of active opto-electronic protective devices for presses)
6. Other Standards
   The F3SG-R is designed according to the standards listed below. To make sure that the final system complies with the following standards and regulations, you are asked to design and use it in accordance with all other related standards, laws, and regulations. If you have any questions, consult with specialized organizations such as the body responsible for prescribing and/or enforcing machinery safety regulations in the location where the equipment is to be used.
   - European Standards: EN415-4, EN691-1, EN692, EN693, IEC/TS 62046
   - U.S. Occupational Safety and Health Standards: OSHA 29 CFR 1910.212
   - U.S. Occupational Safety and Health Standards: OSHA 29 CFR 1910.217
   - American National Standards: ANSI B11.1 to B11.19
   - American National Standards: ANSI/RIA R15.06
   - Canadian Standards Association CSA Z142, Z432, Z434
   - SEMI Standards SEMI S2
   - Japan Ministry of Health, Labour and Welfare "Guidelines for Comprehensive Safety Standards of Machinery", Standard Bureau's Notification No. 0731001 dated July 31, 2007.rms and Conditions Agreement
   - Chinese National Standards: GB17120, GB27607

Indicator

Emitter

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

Receiver

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

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

Interface Unit

Main unit	PC/AT compatible machine (computer that runs Microsoft Windows)
Operating system (OS)	Windows 7 (32-bit/64-bit), Windows 8, 8.1 (32-bit/64-bit), Windows 10 (32-bit/64-bit)
Communication port	USB port ×1
Ambient temperature	Operating: -10 to 55°C, Storage: -30 to 70°C (non-icing and non-condensing)
Ambient humidity	Operating: 35% to 85%, Storage: 35% to 95% (non-condensing)

Lamp

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

Connections (Basic Wiring Diagram)

Standalone F3SG-RA with Auto Reset mode and EDM disabled using PNP Outputs

The following is the example of Muting not used, External Device Monitoring disabled, Auto-Reset mode, PNP outputs and External Test not used.

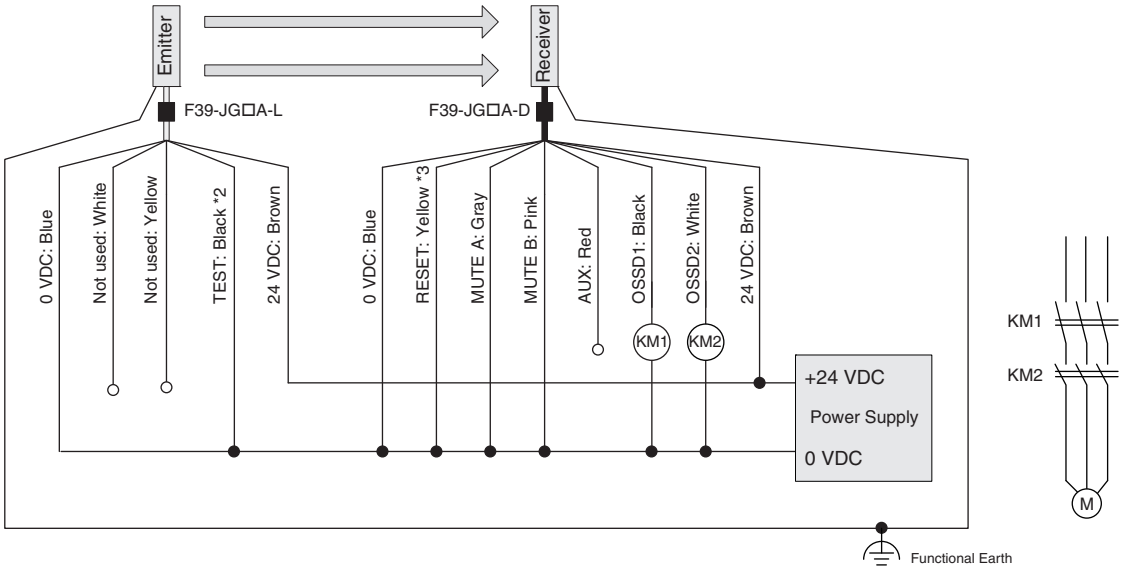
DIP Switch settings *1

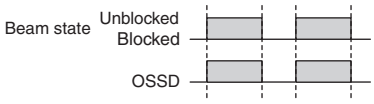
	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ON	2 ON
	Auto Reset (factory default setting)	3 ON	3 ON
		4 ON	4 ON
	PNP (factory default setting)	7 ON	7 ON
Emitter	External Test: 24 V Active (factory default setting)	4 ON	

□: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

Wiring Example





KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
or magnetic contactor
M: 3-phase motor

*1.The functions are configurable with DIP Switch. Refer to Safety Light Curtain F3SG-R Series User's Manual for more information on setting the functions by the DIP Switch.
*2.Connect the line to 24 V via a test switch (N.O. contact) if External Test is used.
*3.Connect the line to 24 V via a lockout reset switch (N.C. contact) if Lockout Reset is used.

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

Standalone F3SG-RA with Manual Reset mode and EDM enabled using PNP Outputs

The following is the example of Muting not used, External Device Monitoring enabled, Manual Reset mode, PNP output and External Test in 24 V Active.

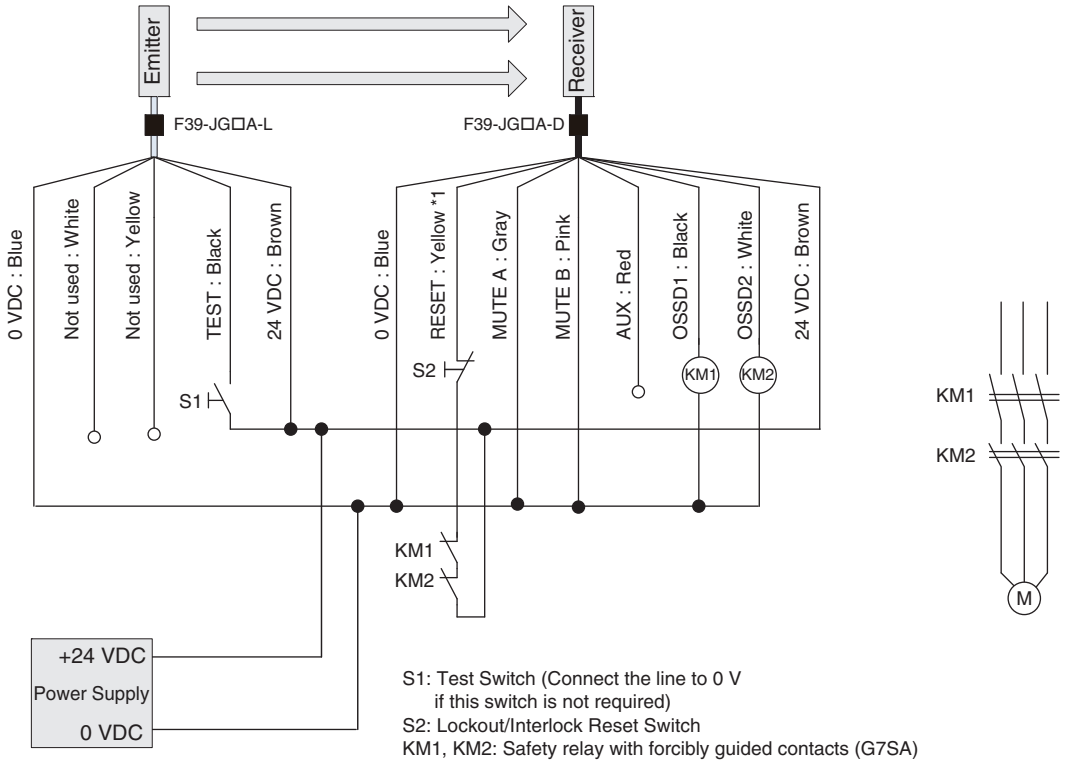
DIP Switch settings *2

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ■□ ON	2 ■□ ON
	Manual Reset	3 ■□ ON	3 ■□ ON
		4 □■ ON	4 □■ ON
	PNP (factory default setting)	7 □■ ON	7 □■ ON
Emitter	External Test: 24 V Active (factory default setting)	4 □■ ON	

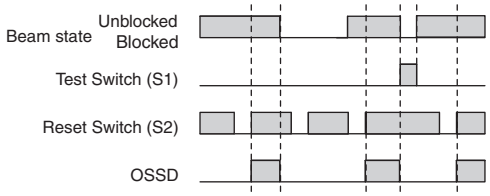
□: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 0 V if this switch is not required)
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
M: 3-phase motor
*1.Also used as EDM input line.
*2.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



Note: For the functional earth connection, refer to page 28.

Standalone F3SG-RA with Y-Joint Plug/Socket Connector using PNP outputs

The following is the example of Muting not used, External Device Monitoring enabled, Manual Reset mode, PNP output and External Test not used (*4).

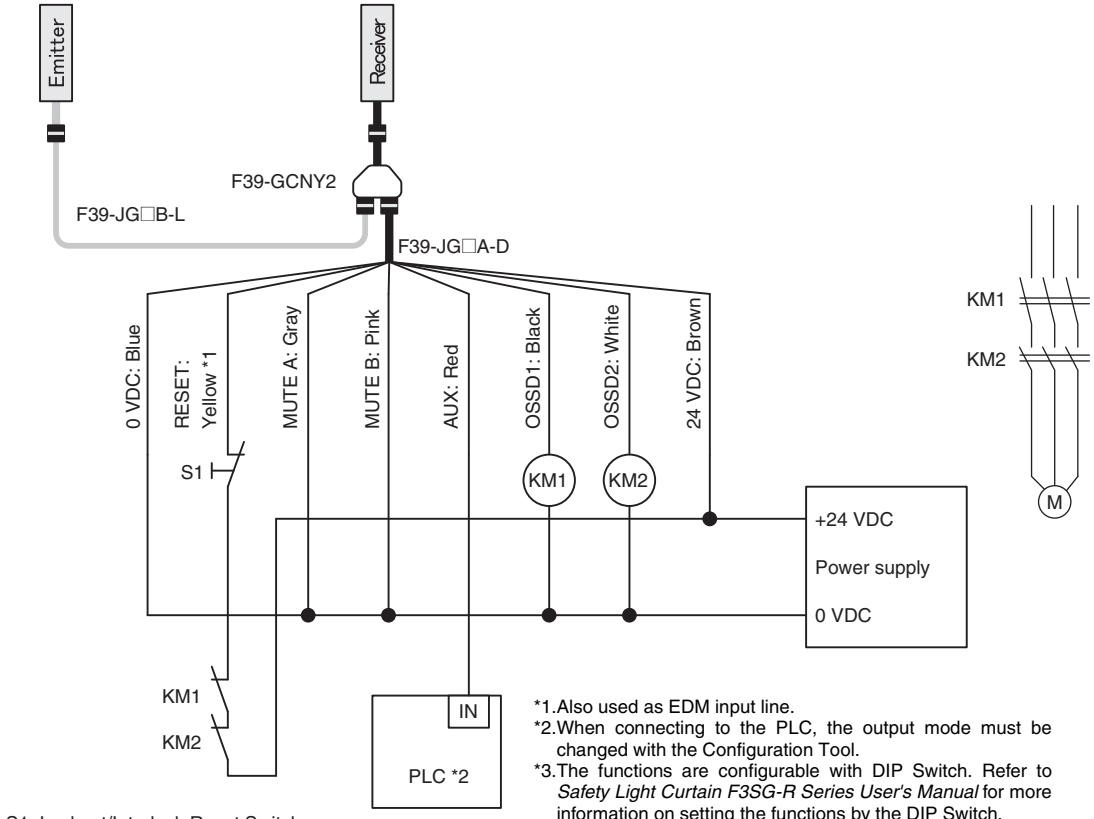
DIP Switch settings *3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ON	2 ON
	Manual Reset	3 ON	3 ON
		4 ON	4 ON
	PNP (factory default setting)	7 ON	7 ON
Emitter	External Test: 24 V Active (factory default setting) *4	4 ON	

□: Indicates a switch position.

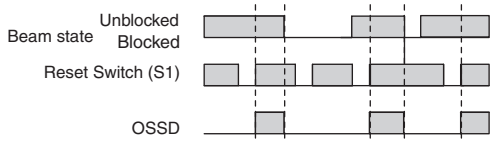
Configure functions with the DIP Switches before wiring.

Wiring Example



*1.Also used as EDM input line.
*2.When connecting to the PLC, the output mode must be changed with the Configuration Tool.
*3.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*4.When using the Y-Joint Plug/Socket Connector, the External Test is not available.

S1: Lockout/Interlock Reset Switch
KM1,KM2: External device feedback
M: 3-phase motor
PLC: Programmable controller
(Used for monitoring only. NOT related to safety system.)



Note: For the functional earth connection, refer to page 28.

F3SG-RA with Y-Joint Plug/Socket Connector in Standard Muting Mode/Exit-Only Muting Mode using PNP outputs

The following is the example of External Device Monitoring disabled, Auto-Reset mode, PNP outputs and External Test not used (*7).

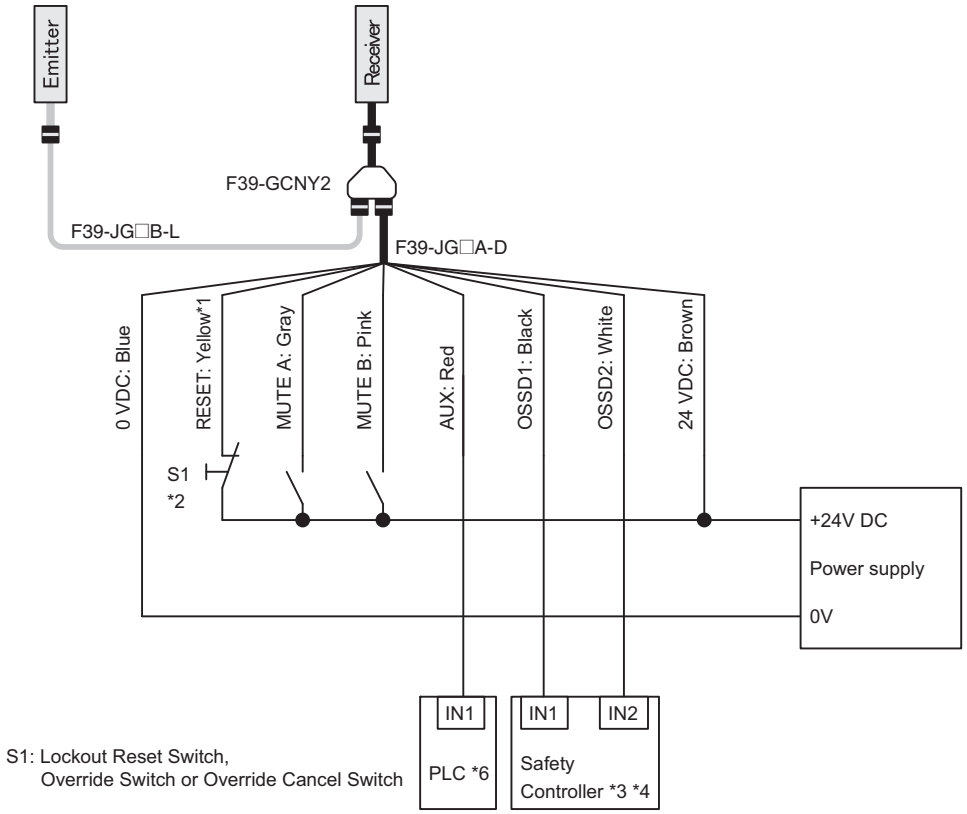
DIP Switch settings *5

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ■ ON	2 ■ ON
	Auto Reset (factory default setting)	3 ■ ON	3 ■ ON
		4 ■ ON	4 ■ ON
	PNP (factory default setting)	7 ■ ON	7 ■ ON
Emitter	External Test: 24 V Active (factory default setting) *7	4 ■ ON	

□: Indicates a switch position.

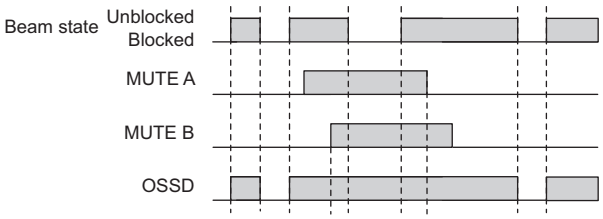
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Lockout Reset Switch,
Override Switch or Override Cancel Switch

*1.Also used as EDM input line.
*2.Make sure to connect an override cancel switch to the Reset line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.Refer to page 35 for more information.
*4.The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.
*5.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*6.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.
*7.When using the Y-Joint Plug/Socket Connector, the External Test is not available.



Note: For the functional earth connection, refer to page 28.

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

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

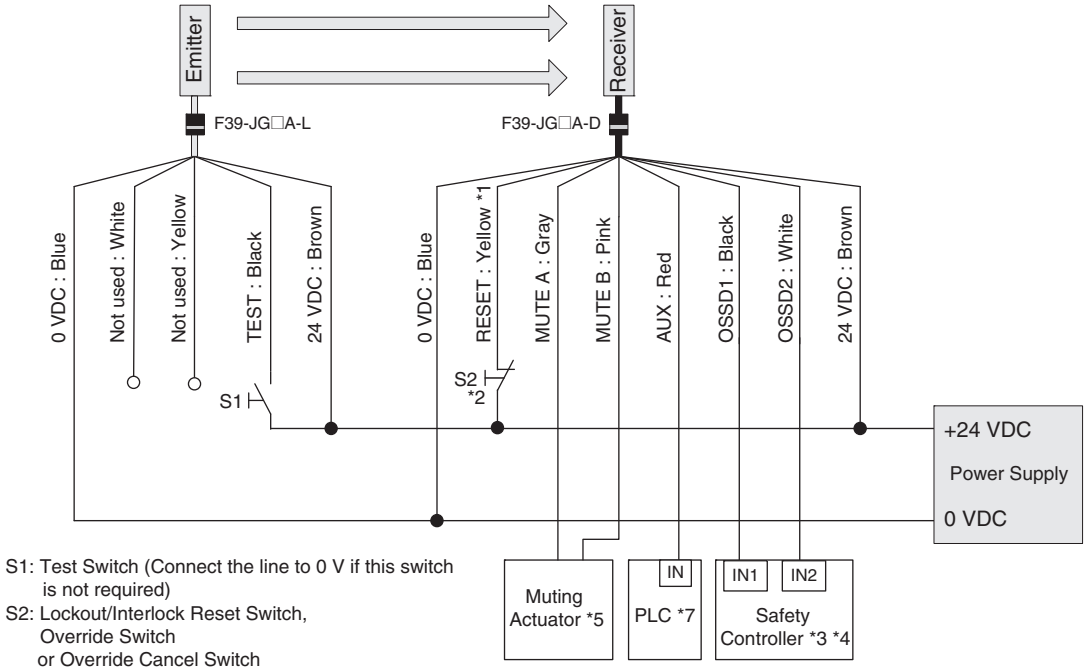
DIP Switch settings *6

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ON	2 ON
	Auto Reset (factory default setting)	3 ON	3 ON
		4 ON	4 ON
	PNP (factory default setting)	7 ON	7 ON
Emitter	External Test: 24 V Active (factory default setting)	4 ON	

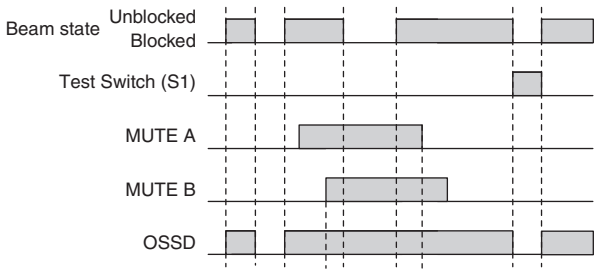
□: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 0 V if this switch is not required)
S2: Lockout/Interlock Reset Switch, Override Switch or Override Cancel Switch



*1.Also used as Override input line.
*2.Make sure to connect an override cancel switch to the Reset line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.Refer to page 35 for more information.
*4.The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.
*5.Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.
*6.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*7.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.

Note: For the functional earth connection, refer to page 28.

Standard Muting Mode/Exit-Only Muting Mode with two Muting Sensors using PNP Outputs

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

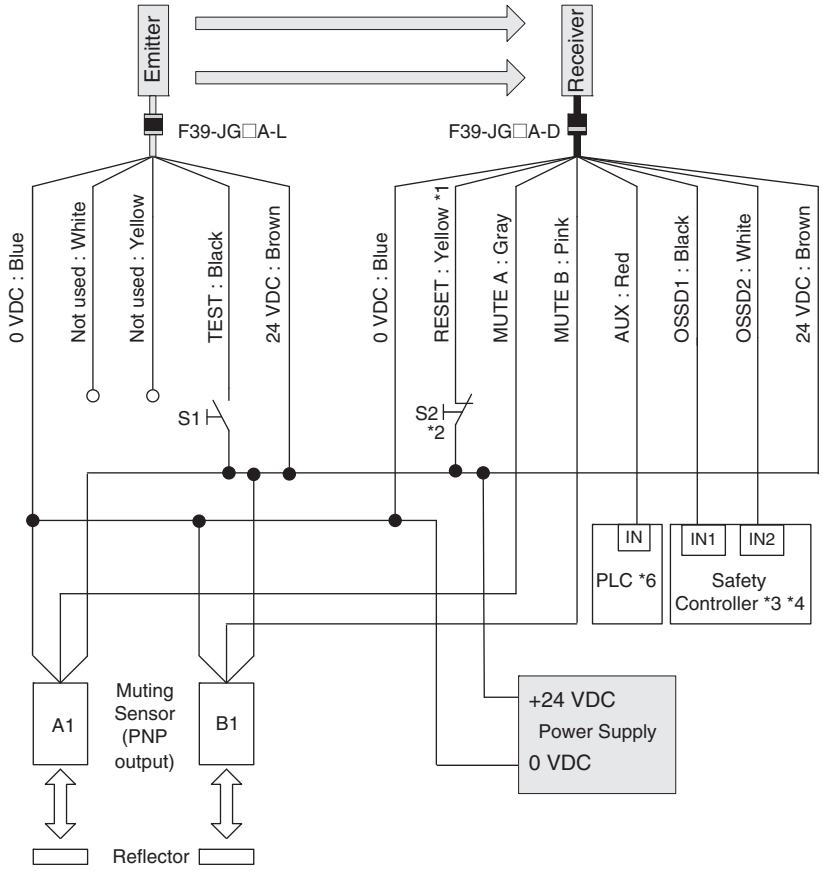
DIP Switch settings *5

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ON	2 ON
	Auto Reset (factory default setting)	3 ON	3 ON
		4 ON	4 ON
	PNP (factory default setting)	7 ON	7 ON
Emitter	External Test: 24 V Active (factory default setting)	4 ON	

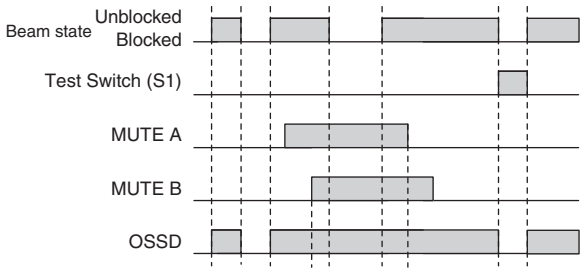
□: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 0 V if this switch is not required)
S2: Lockout/Interlock Reset Switch,Override Switch or Override Cancel Switch
A1, B1: Muting sensor



*1.Also used as Override input line.
*2.Make sure to connect an override cancel switch to the Reset line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.Refer to page 35 for more information.
*4.The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.
*5.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*6.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.

Note: For the functional earth connection, refer to page 28.

Standard Muting Mode with four Muting Sensors using PNP Outputs

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

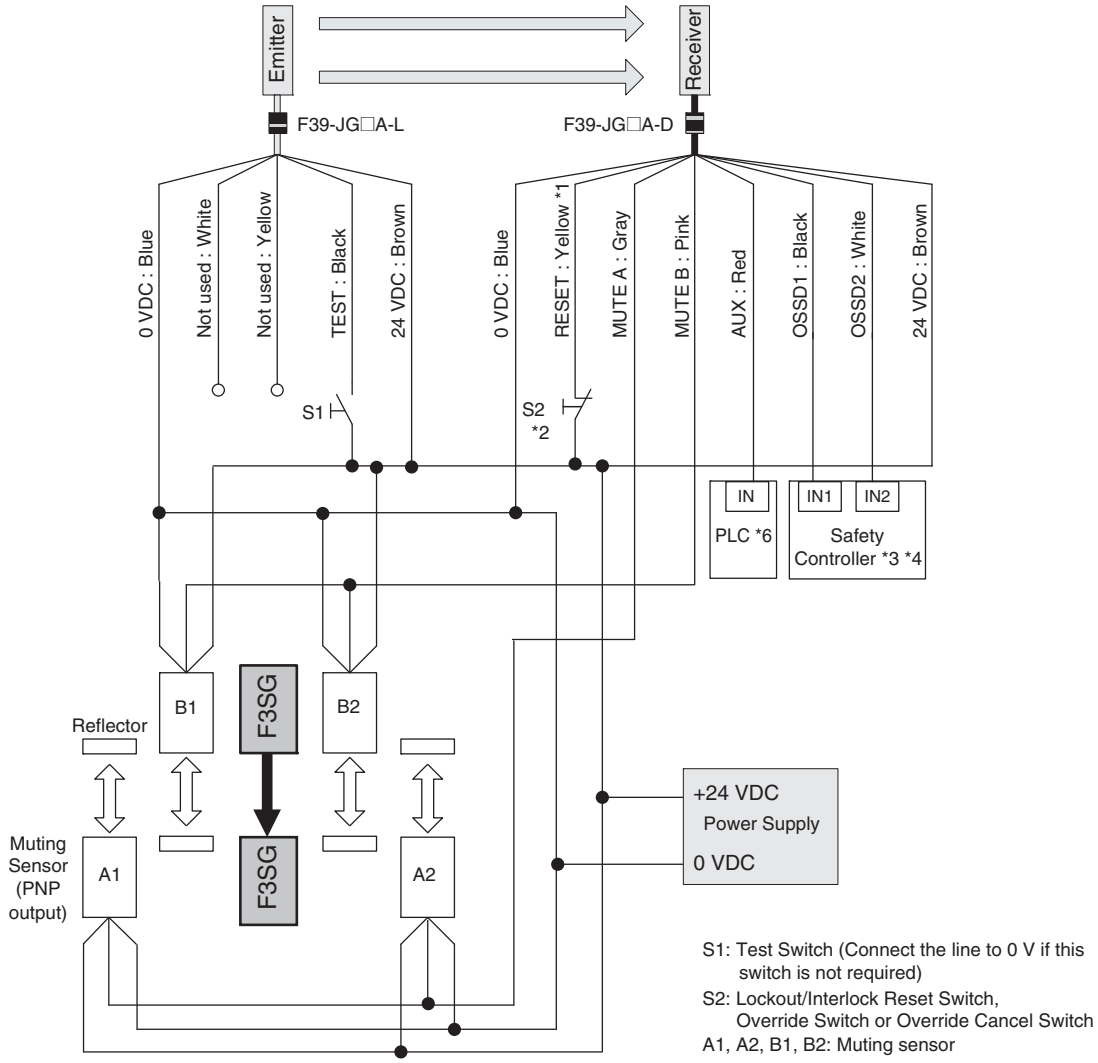
DIP Switch settings *5

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ON	2 ON
	Auto Reset (factory default setting)	3 ON	3 ON
		4 ON	4 ON
	PNP (factory default setting)	7 ON	7 ON
Emitter	External Test: 24 V Active (factory default setting)	4 ON	

□: Indicates a switch position.

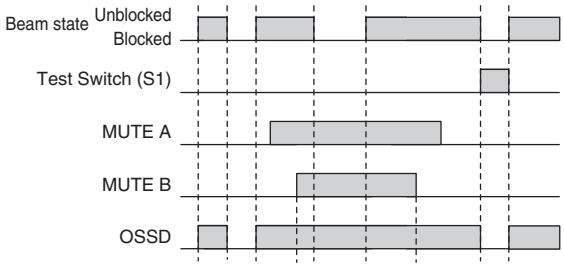
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 0 V if this switch is not required)
S2: Lockout/Interlock Reset Switch, Override Switch or Override Cancel Switch
A1, A2, B1, B2: Muting sensor

*1.Also used as Override input line.
*2.Make sure to connect an override cancel switch to the Reset line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.Refer to page 35 for more information.
*4.The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.
*5.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*6.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.



Note: For the functional earth connection, refer to page 28.

Pre-Reset Mode using PNP Output

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

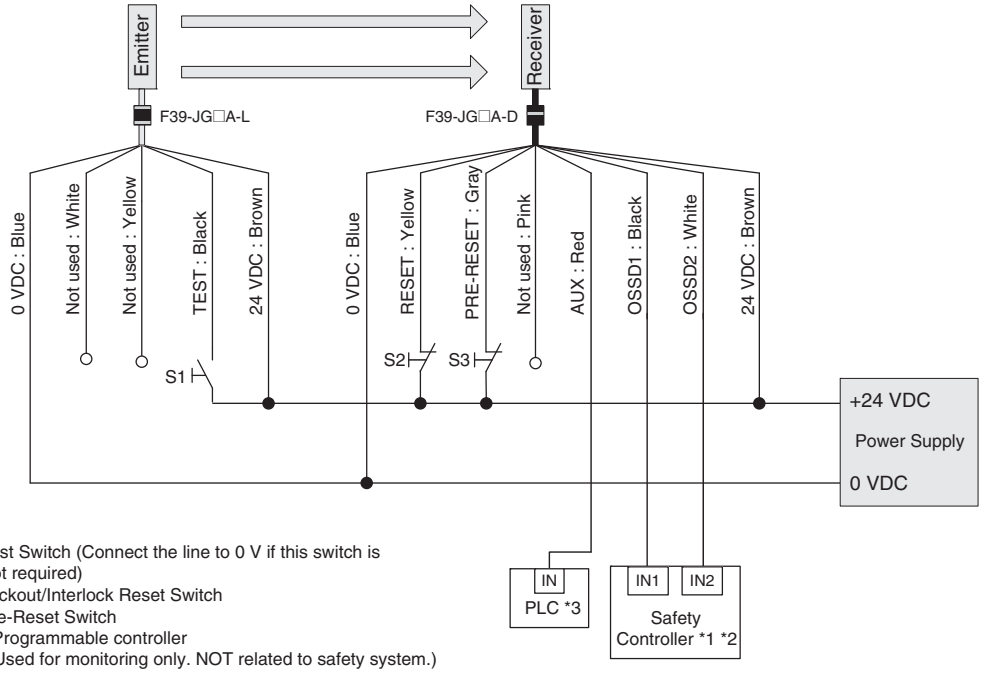
DIP Switch settings *4

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ON	2 ON
	Pre-Reset	3 ON	3 ON
		4 ON	4 ON
	PNP (factory default setting)	7 ON	7 ON
Emitter	External Test: 24 V Active (factory default setting)	4 ON	

□: Indicates a switch position.

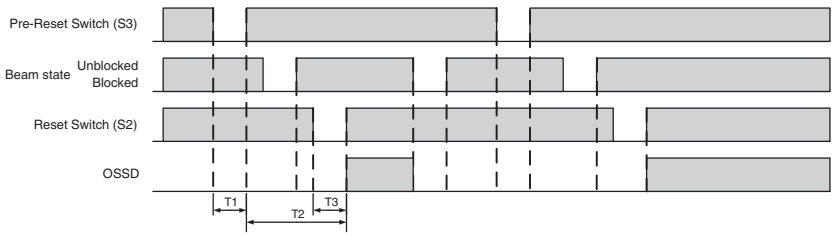
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 0 V if this switch is not required)
S2: Lockout/Interlock Reset Switch
S3: Pre-Reset Switch
PLC: Programmable controller
(Used for monitoring only. NOT related to safety system.)

*1.Refer to the following list "Connectable Safety Control Units" on this page.
*2.The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.
*3.When connecting to the PLC, the output mode must be changed with the Configuration Tool.
*4.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



T1: Push time: must be T1 >= 300ms
T2: Pre-reset limit time between Pre-reset and Reset: must be T2 <= 60s
T3: Push time: must be T3 >= 300ms

Note: For the functional earth connection, refer to page 28.

Connectable Safety Control Units

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

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

Standalone F3SG-RA with Auto Reset mode and EDM disabled using NPN Outputs

The following is the example of Muting not used, External Device Monitoring disabled, Auto-Reset mode, NPN outputs and External Test not used.

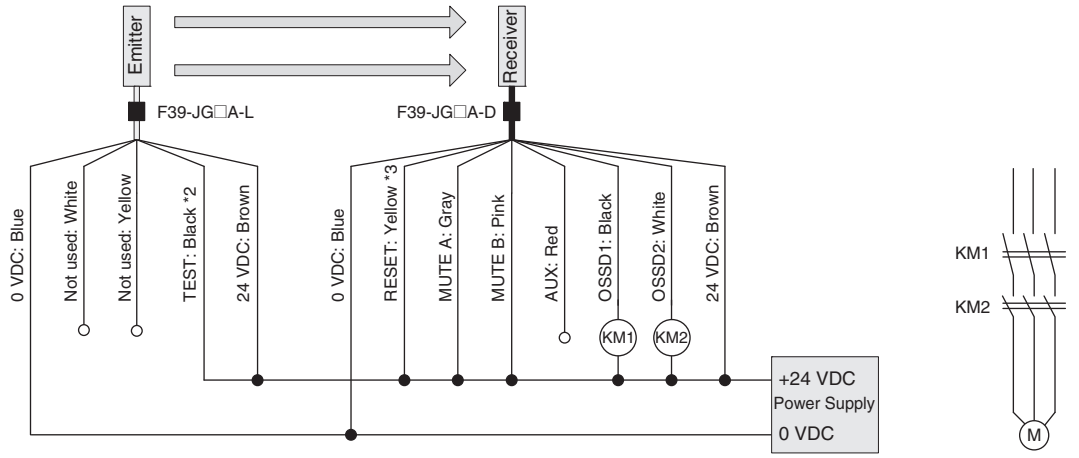
DIP Switch settings *1

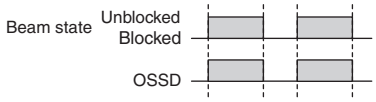
	Function	DIP-SW1	DIP-SW2
Receiver	EDM Disabled (factory default setting)	2 ON	2 ON
	Auto Reset (factory default setting)	3 ON	3 ON
		4 ON	4 ON
	NPN	7 ON	7 ON
Emitter	External Test: 0 V Active	4 ON	

□: Indicates a switch position.

Configure functions with the DIP Switches before wiring.

Wiring Example





KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
M: 3-phase motor

*1.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*2.Connect the line to 0 V via a test switch (N.O. contact) if External Test is used.
*3.Connect the line to 0 V via a lockout reset switch (N.C. contact) if Lockout Reset is used.

Note: For the functional earth connection, refer to page 28.

Standalone F3SG-RA with Manual Reset mode and EDM enabled using NPN Outputs

The following is the example of Muting not used, External Device Monitoring enabled, Manual Reset mode, NPN output and External Test in 0 V Active.

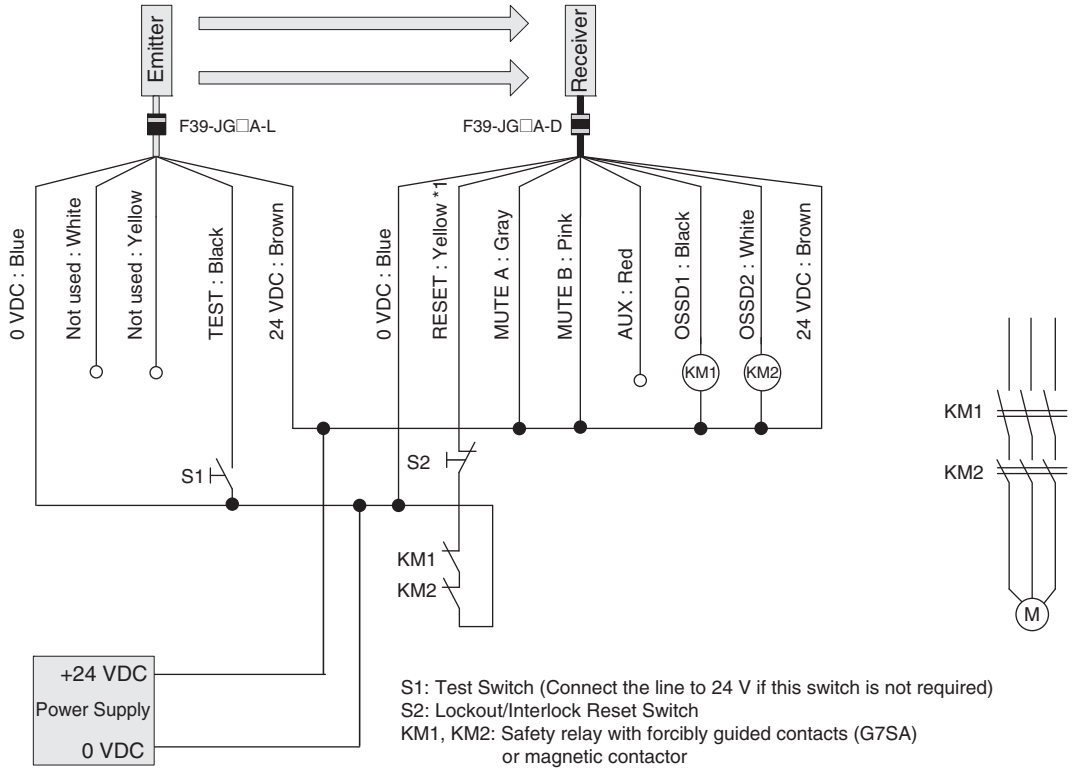
DIP Switch settings *2

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ■□ ON	2 ■□ ON
	Manual Reset	3 ■□ ON	3 ■□ ON
		4 □■ ON	4 □■ ON
	NPN	7 ■□ ON	7 ■□ ON
Emitter	External Test: 0 V Active	4 ■□ ON	

□: Indicates a switch position.

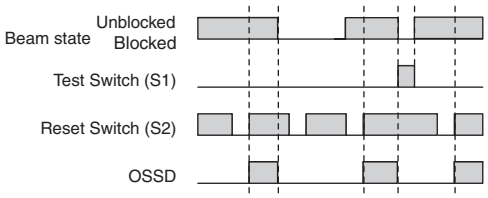
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
or magnetic contactor
M: 3-phase motor

*1.Also used as EDM input line.
*2.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



Note: For the functional earth connection, refer to page 28.

Standalone F3SG-RA with Y-Joint Plug/Socket Connector using NPN outputs

The following is the example of Muting not used, External Device Monitoring enabled, Manual Reset mode, NPN output and External Test not used (*4).

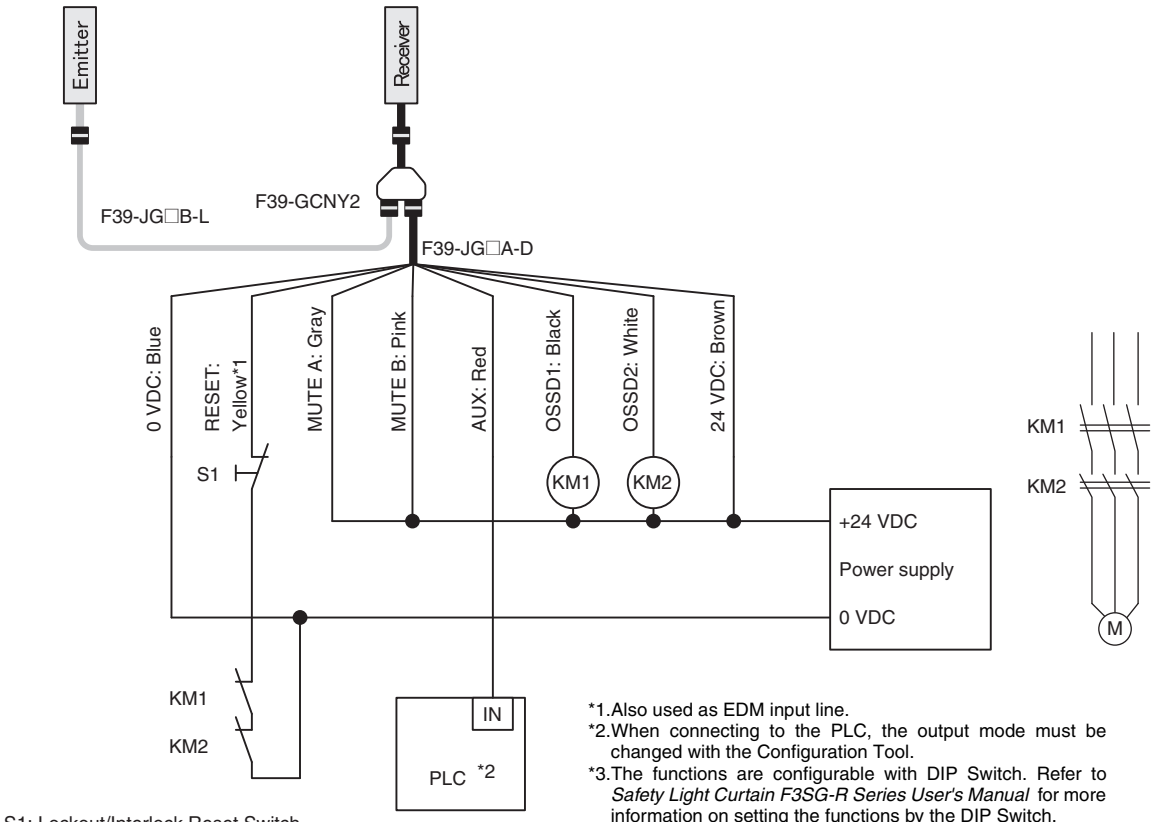
DIP Switch settings *3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ■□ ON	2 ■□ ON
	Manual Reset	3 ■□ ON	3 ■□ ON
		4 □■ ON	4 □■ ON
	NPN	7 ■□ ON	7 ■□ ON
Emitter	External Test: 24 V Active (factory default setting) *4	4 □■ ON	

□: Indicates a switch position.

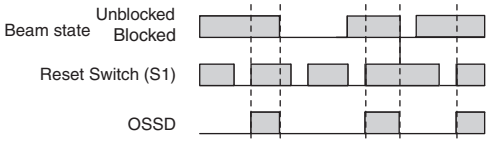
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Lockout/Interlock Reset Switch
KM1,KM2: External device feedback
M: 3-phase motor
PLC: Programmable controller
(Used for monitoring only. NOT related to safety system.)

*1.Also used as EDM input line.
*2.When connecting to the PLC, the output mode must be changed with the Configuration Tool.
*3.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*4.When using the Y-Joint Plug/Socket Connector, the External Test is not available.



Note: For the functional earth connection, refer to page 28.

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

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

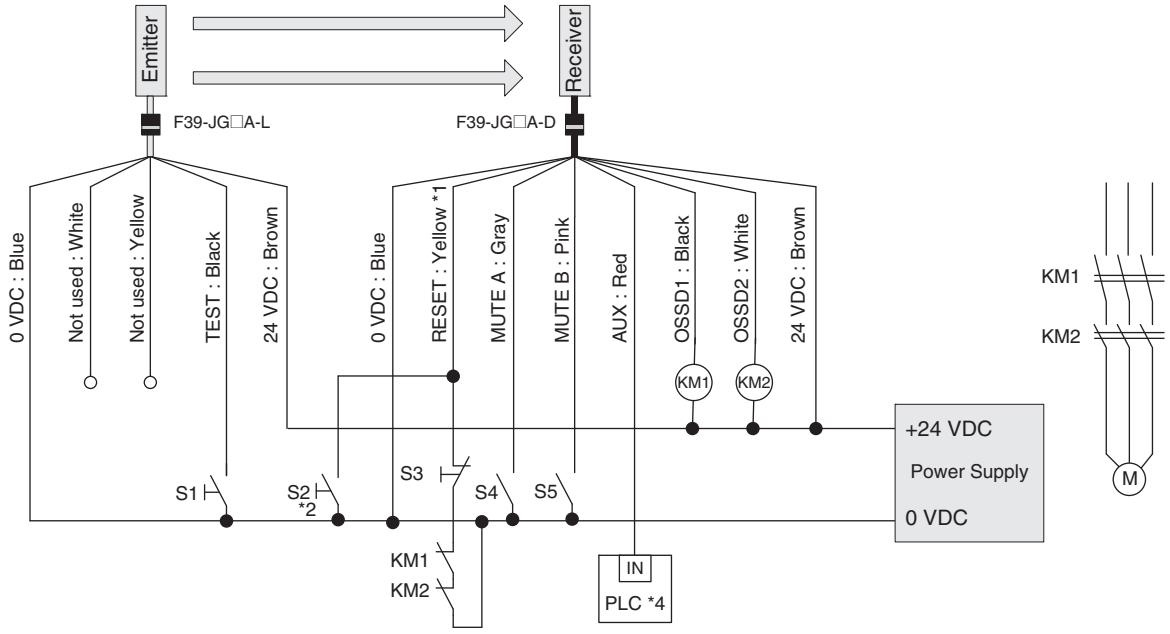
DIP Switch settings *3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ON	2 ON
	Auto Reset (factory default setting)	3 ON	3 ON
		4 ON	4 ON
	NPN	7 ON	7 ON
Emitter	External Test: 0 V Active	4 ON	

□: Indicates a switch position.

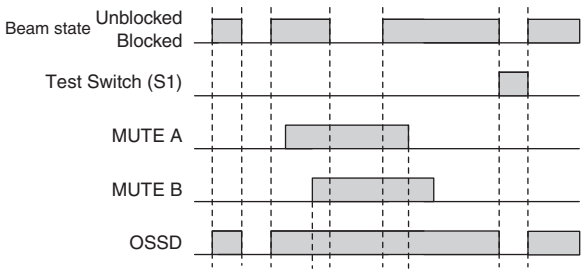
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)
S2: Override Cancel Switch
S3: Lockout/Interlock Reset Switch or Override Switch
S4, S5: Muting sensor
KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
M: 3-phase motor

*1.Also used as Override input line.
*2.Make sure to connect an override cancel switch to the Reset line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*4.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.



Note: For the functional earth connection, refer to page 28.

Standard Muting Mode/Exit-Only Muting Mode with two Muting Sensors using NPN Outputs

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

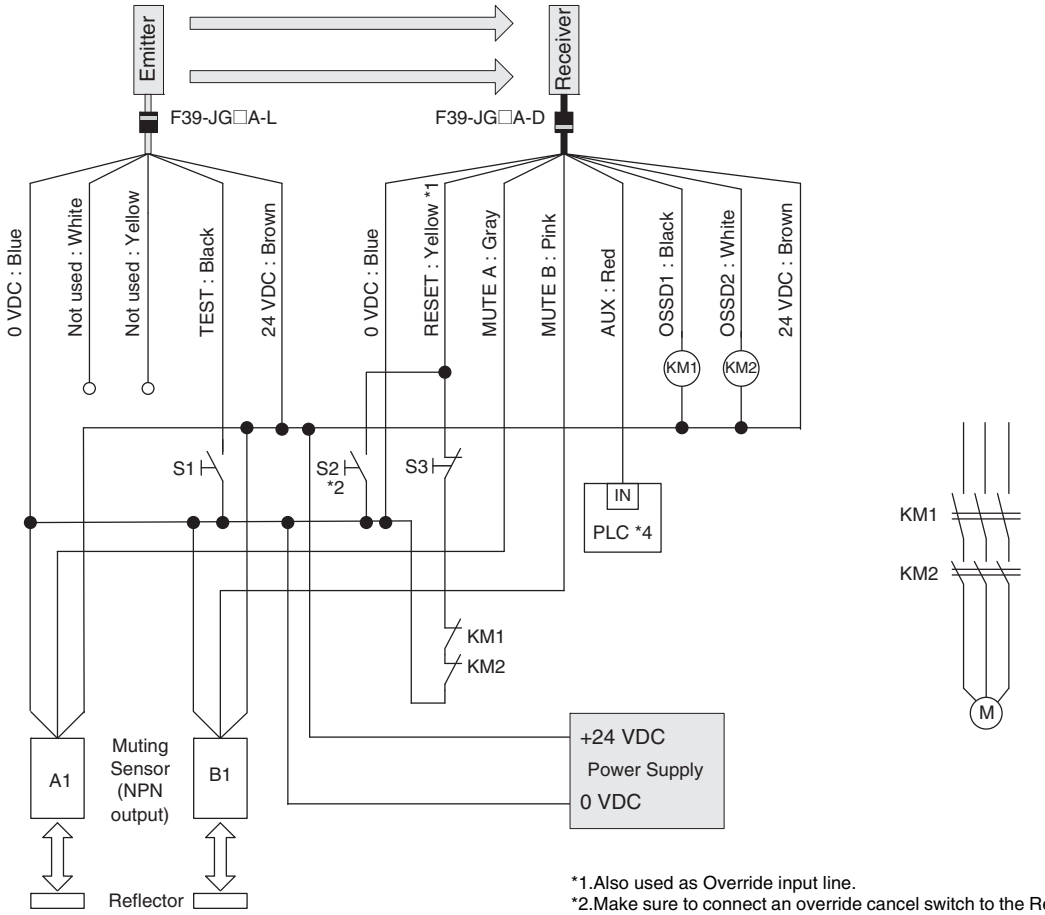
DIP Switch settings *3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ON	2 ON
	Auto Reset (factory default setting)	3 ON	3 ON
		4 ON	4 ON
	NPN	7 ON	7 ON
Emitter	External Test: 0 V Active	4 ON	

□: Indicates a switch position.

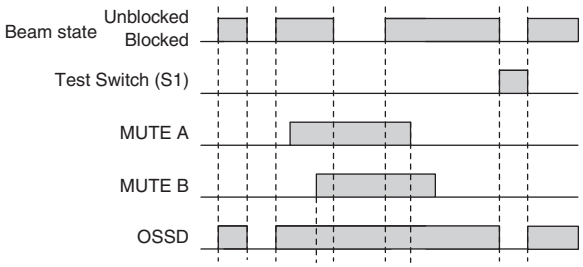
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)
S2: Override Cancel Switch
S3: Lockout/Interlock Reset Switch or Override Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
M: 3-phase motor
A1, B1: Muting sensor

*1.Also used as Override input line.
*2.Make sure to connect an override cancel switch to the Reset line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*4.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.



Note: For the functional earth connection, refer to page 28.

Standard Muting Mode with four Muting Sensors using NPN Outputs

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

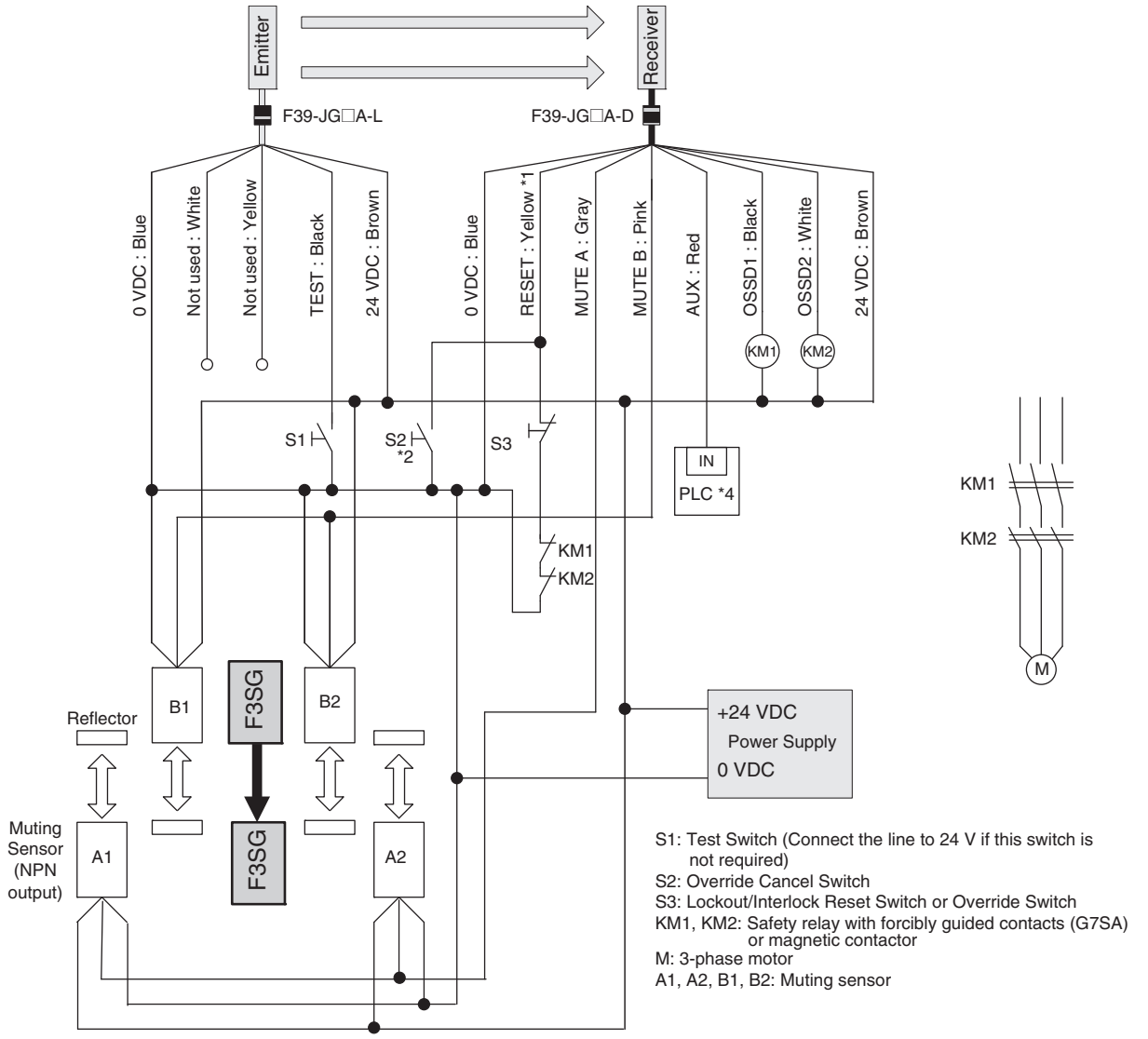
DIP Switch settings *3

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ■□ ON	2 ■□ ON
	Auto Reset (factory default setting)	3 □■ ON	3 □■ ON
		4 □■ ON	4 □■ ON
	NPN	7 ■□ ON	7 ■□ ON
Emitter	External Test: 0 V Active	4 ■□ ON	

□: Indicates a switch position.

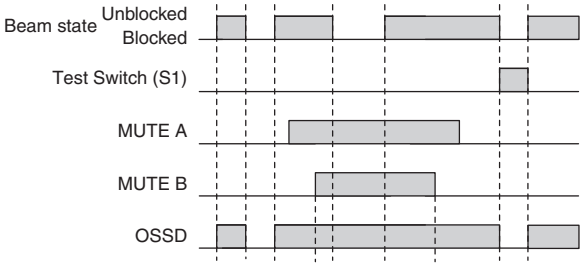
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)
S2: Override Cancel Switch
S3: Lockout/Interlock Reset Switch or Override Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor
M: 3-phase motor
A1, A2, B1, B2: Muting sensor

*1.Also used as Override input line.
*2.Make sure to connect an override cancel switch to the Reset line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.
*4.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.



Note: For the functional earth connection, refer to page 28.

Pre-Reset Mode using NPN Output

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

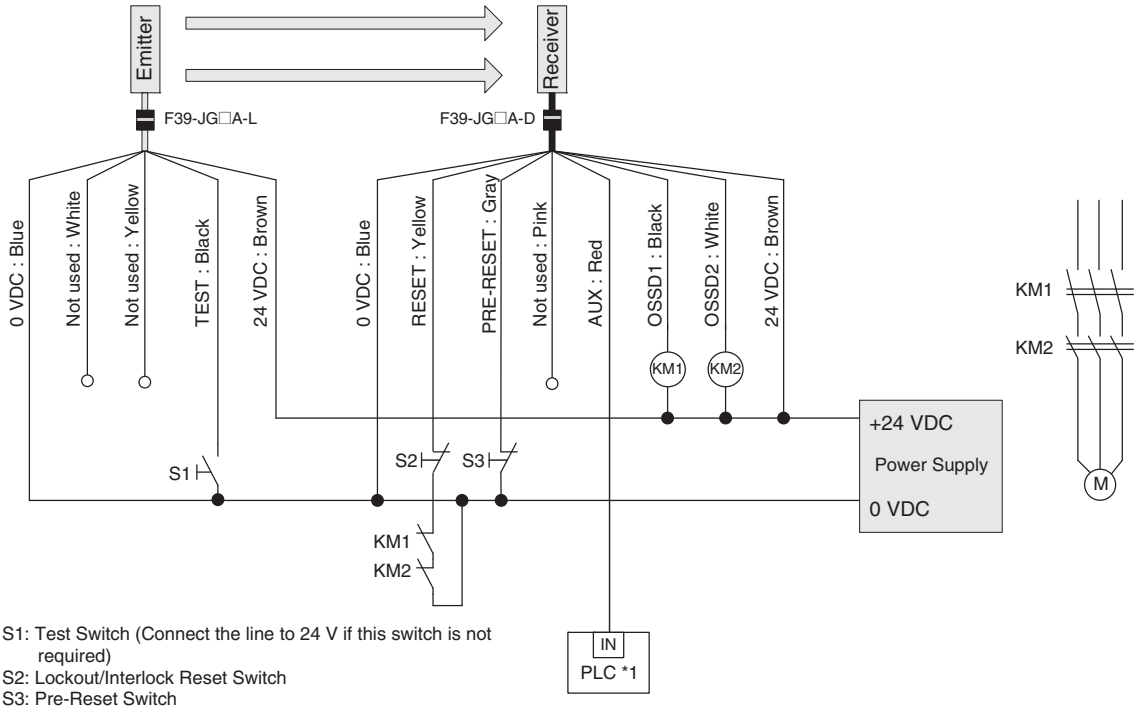
DIP Switch settings *2

	Function	DIP-SW1	DIP-SW2
Receiver	EDM Enabled	2 ON	2 ON
	Pre-Reset	3 ON	3 ON
		4 ON	4 ON
	NPN	7 ON	7 ON
Emitter	External Test: 0 V Active	4 ON	

□: Indicates a switch position.

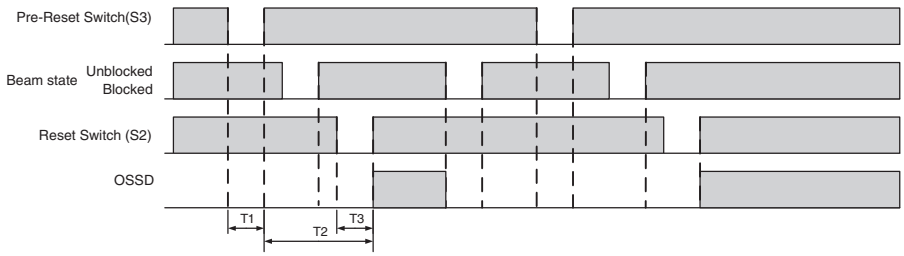
Configure functions with the DIP Switches before wiring.

Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)
S2: Lockout/Interlock Reset Switch
S3: Pre-Reset Switch
KM1, KM2: External device feedback
M: 3-phase motor
PLC: Programmable controller
(Used for monitoring only. NOT related to safety system.)

*1.When connecting to the PLC, the output mode must be changed with the Configuration Tool.
*2.The functions are configurable with DIP Switch. Refer to *Safety Light Curtain F3SG-R Series User's Manual* for more information on setting the functions by the DIP Switch.



T1: Push time: must be T1 >= 300ms
T2: Pre-reset limit time between Pre-reset and Reset: must be T2 <= 60s
T3: Push time: must be T3 >= 300ms

Note: For the functional earth connection, refer to page 28.

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

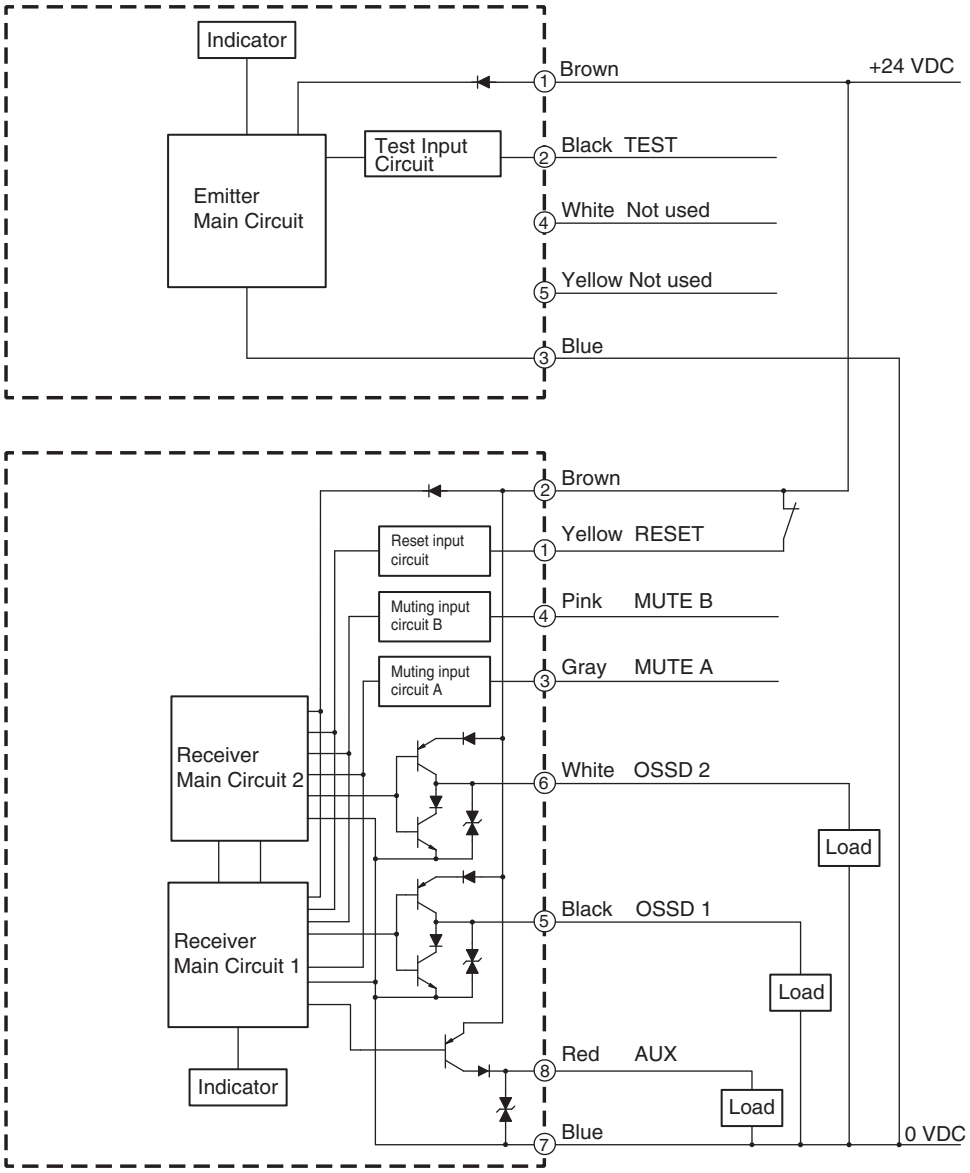
Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

Input/Output Circuit

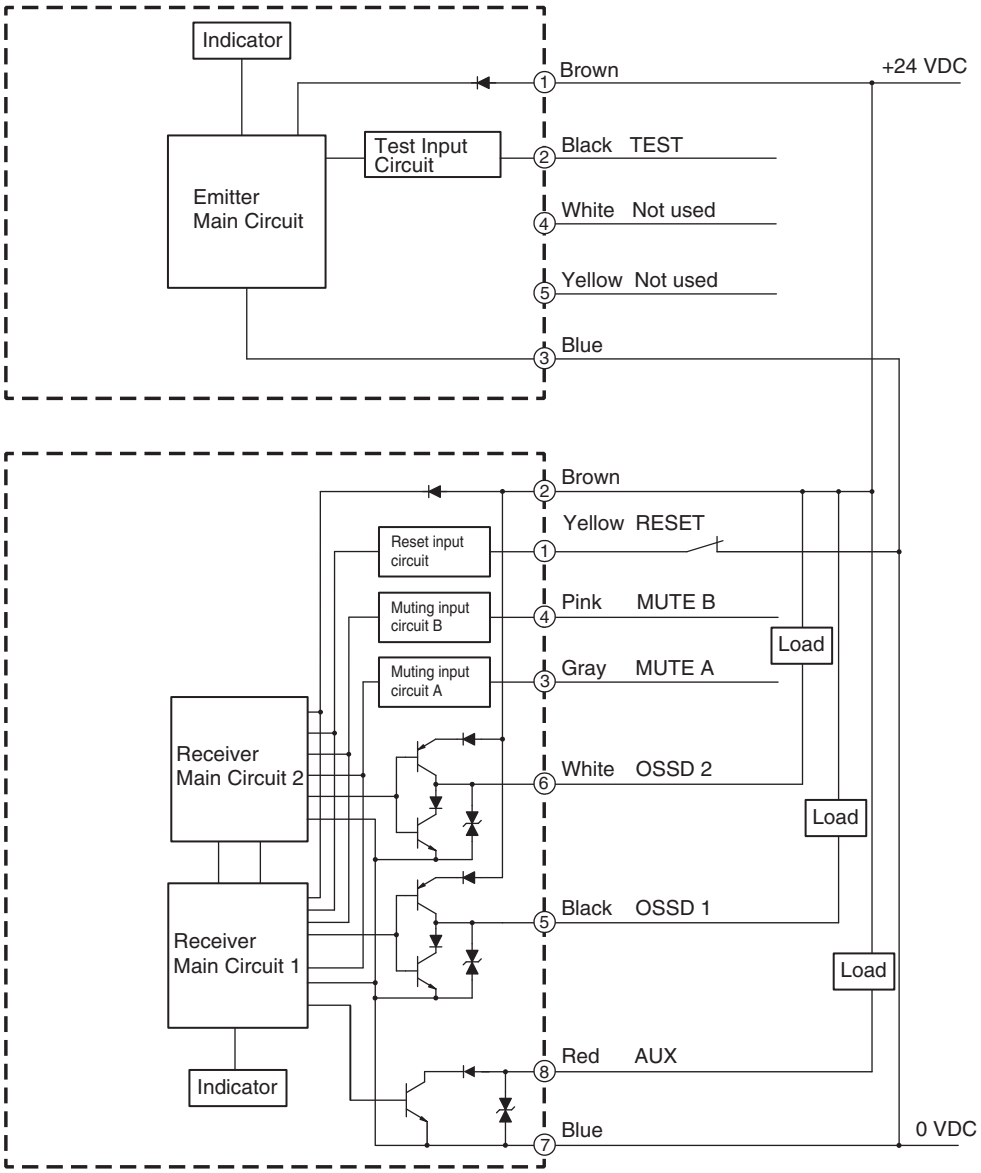
Entire Circuit Diagram

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

PNP Output



NPN Output

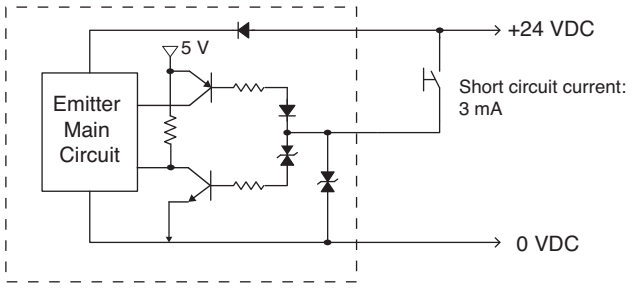

Indicator
Brown
+24 VDC
Test Input Circuit
Black TEST
Emitter Main Circuit
White Not used
Yellow Not used
Blue
Brown
Yellow RESET
Reset input circuit
Muting input circuit B
Pink MUTE B
Load
Muting input circuit A
Gray MUTE A
Receiver Main Circuit 2
White OSSD 2
Load
Black OSSD 1
Receiver Main Circuit 1
Load
Red AUX
Indicator
Blue
0 VDC

Input Circuit Diagram by Function

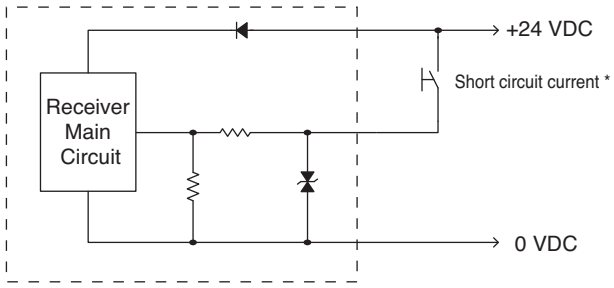
The input circuit diagrams of by function are shown below.

PNP Output

<Input circuit (Test input)>

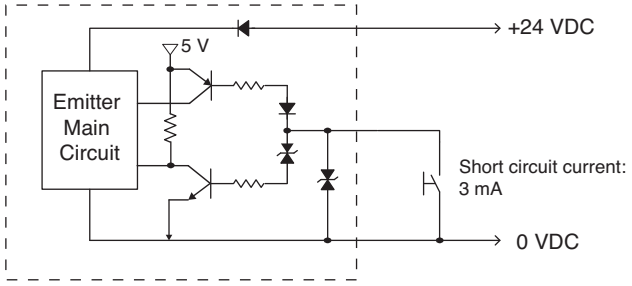


<Input circuit (Reset input, Muting inputs A/B)>

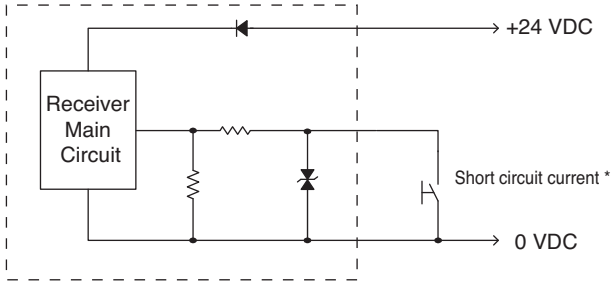


NPN Output

<Input circuit (Test input)>



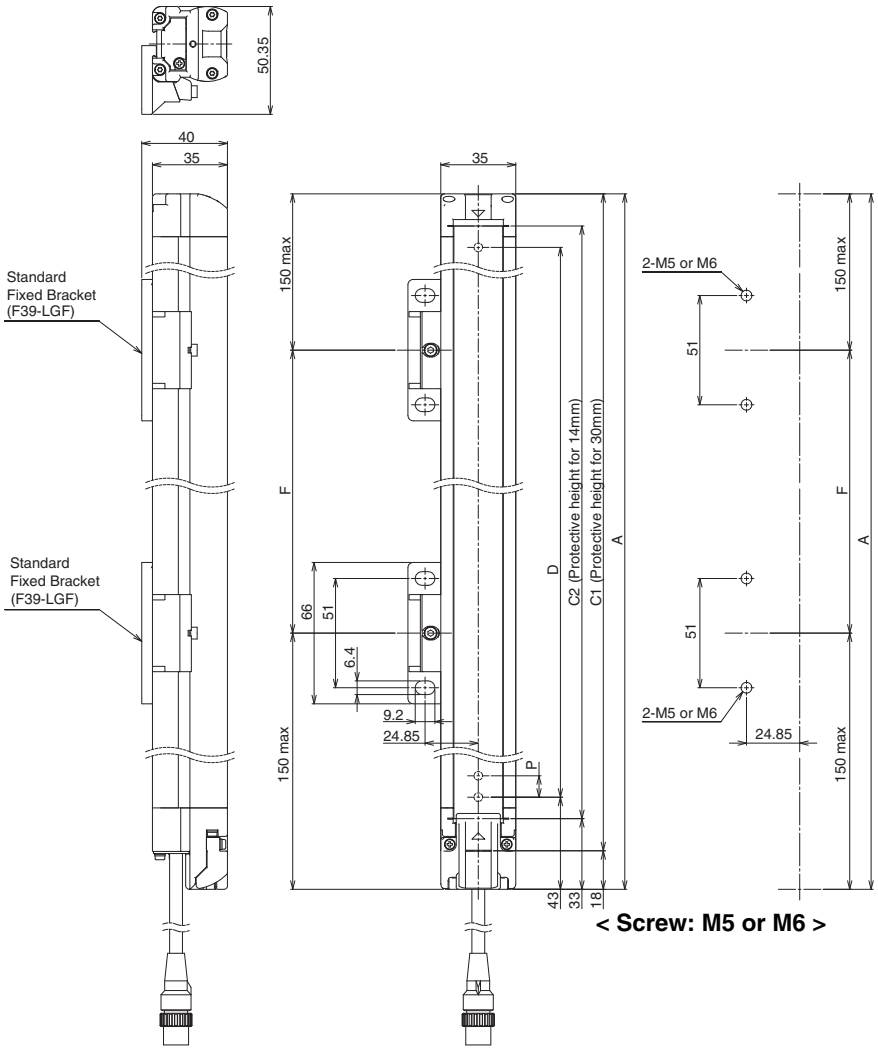
<Input circuit (Reset, Muting inputs A/B)>



*Short circuit current: 5mA (Reset input), 3mA (Muting inputs A/B)

Mounted with Standard Fixed Brackets (F39-LGF)

Backside Mounting



F3SG-□RA□□□□-30 Series

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

F3SG-□RA□□□□-14 Series

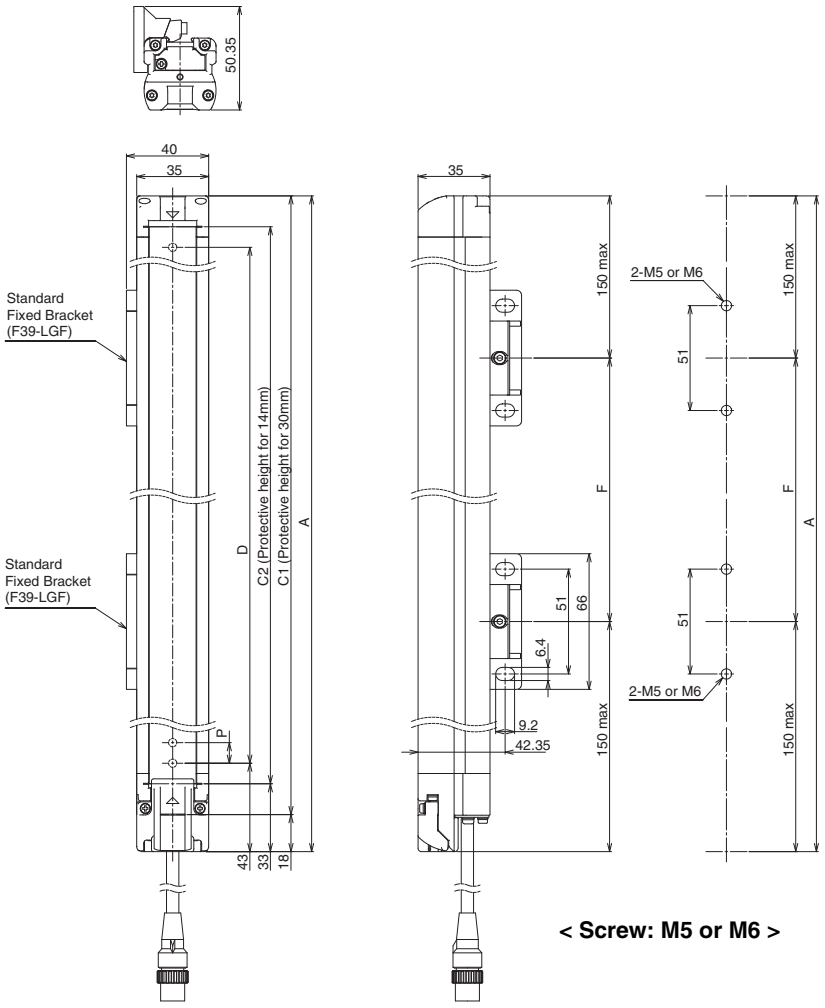
Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

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

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

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

Side Mounting



F3SG-□RA□□□□-30 Series

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

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

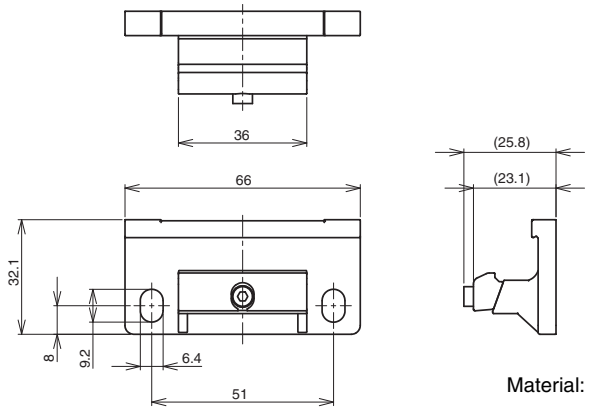
F3SG-□RA□□□□-14 Series

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

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

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

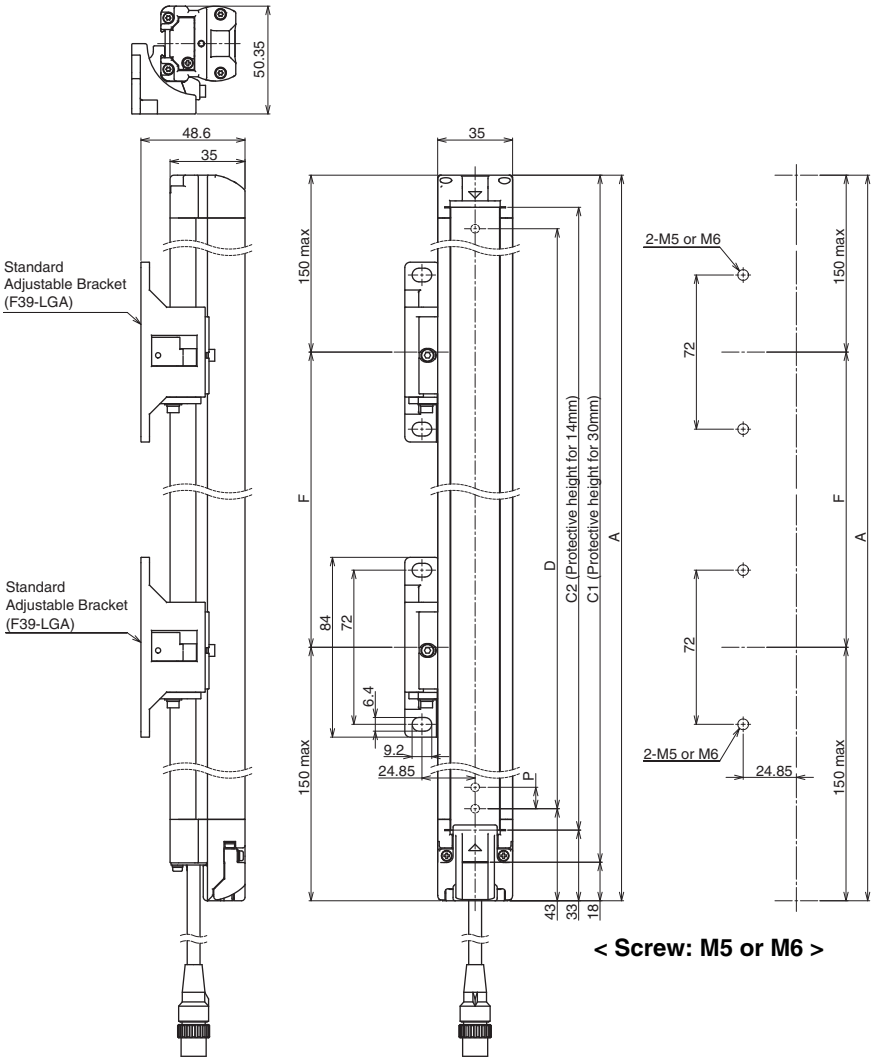
Standard Fixed Bracket (F39-LGF)



Material: ZDC2

Mounted with Standard Adjustable Brackets (F39-LGA)

Backside Mounting



F3SG-□RA□□□□-30 Series

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

F3SG-□RA□□□□-14 Series

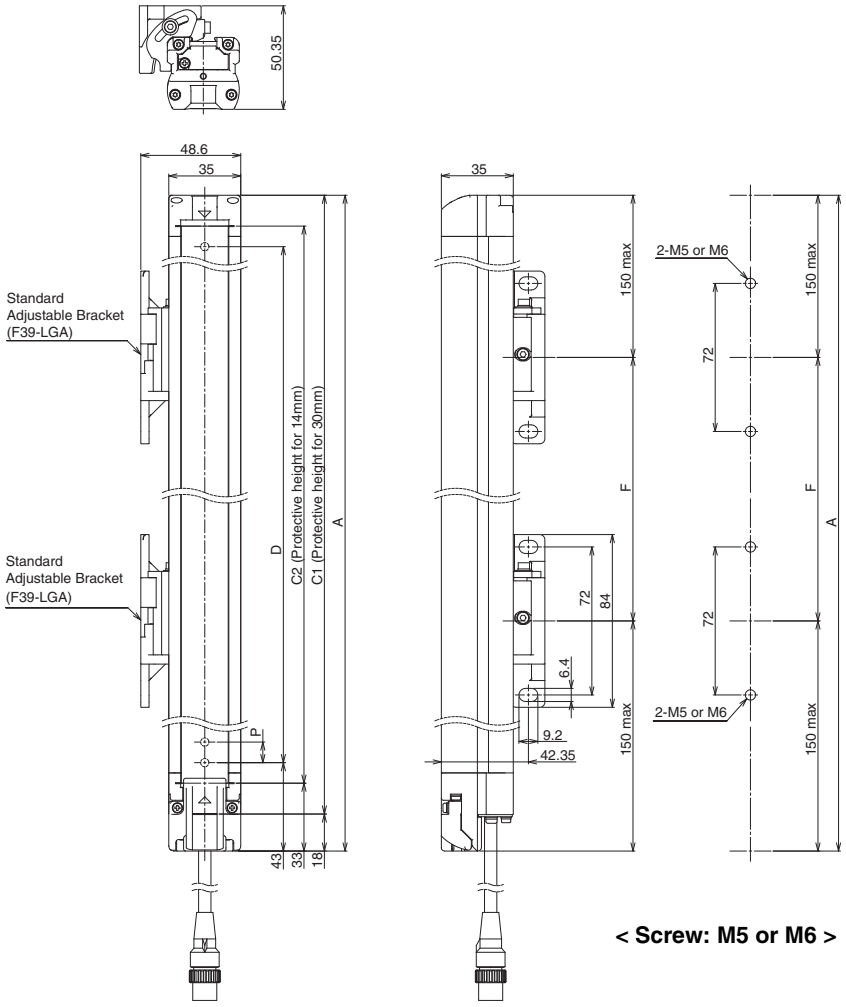
Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension P	10

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

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

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

Side Mounting



< Screw: M5 or M6 >

F3SG-□RA□□□□-30 Series

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

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

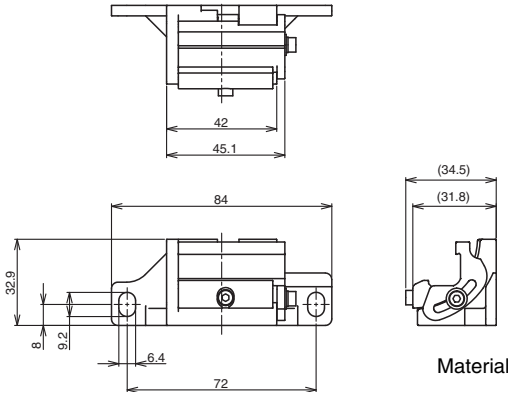
F3SG-□RA□□□□-14 Series

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

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

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

Standard Adjustable Bracket (F39-LGA)

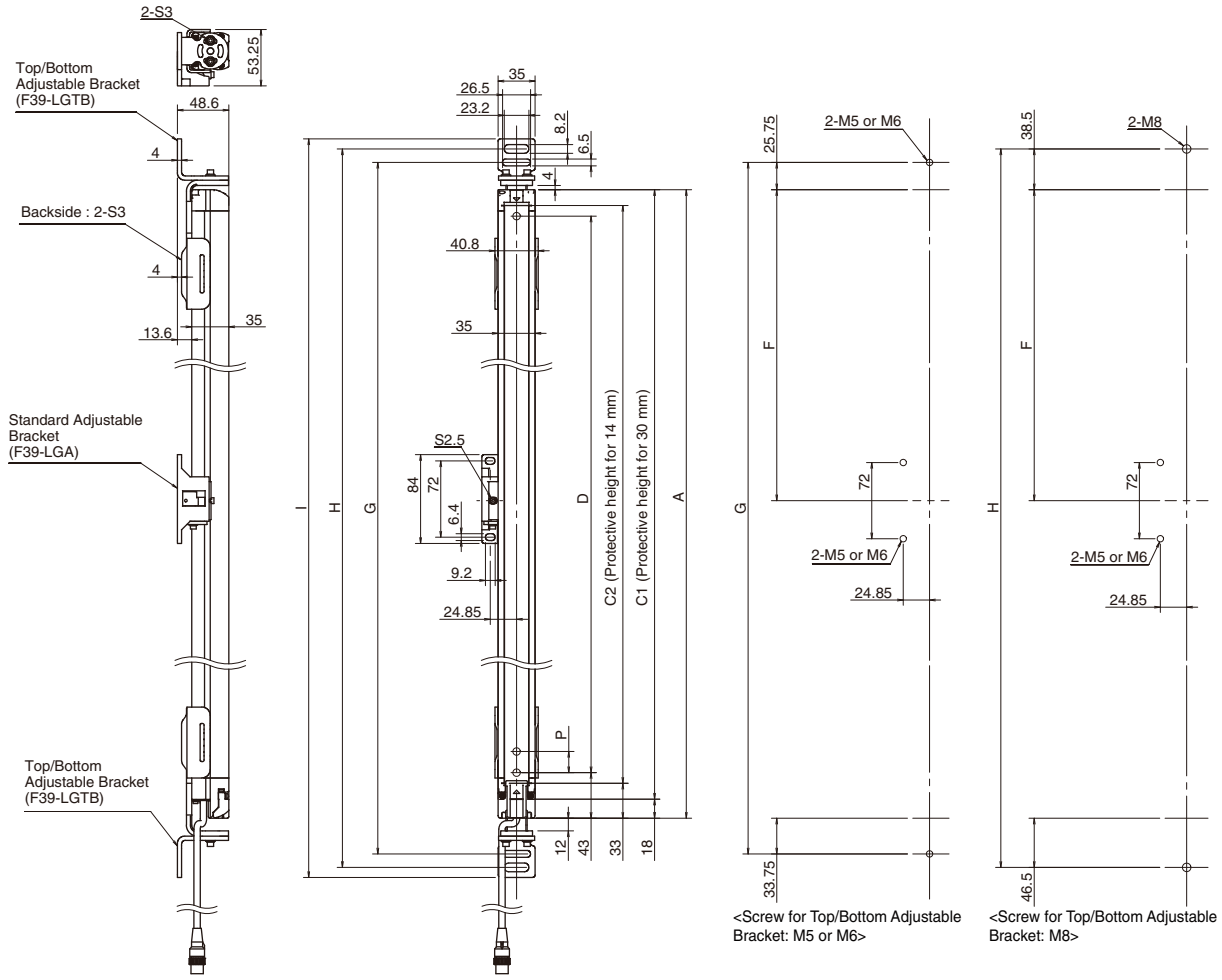


Material: ZDC2 ,Fluorochemical lubricant oil

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

Dimensions when using the F3SG-RA Series except the F3SG-4RA0190-30 and F3SG-4RA0160-14
Refer to *Safety Light Curtain F3SG-R Series User's Manual* for the dimensions when using the F3SG-4RA0190-30 and F3SG-4RA0160-14.

Backside Mounting



F3SG-□RA□□□□-30 Series

Dimension A	C1+18
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension G	C1+77.5
Dimension H	C1+103
Dimension I	C1+122
Dimension P	20

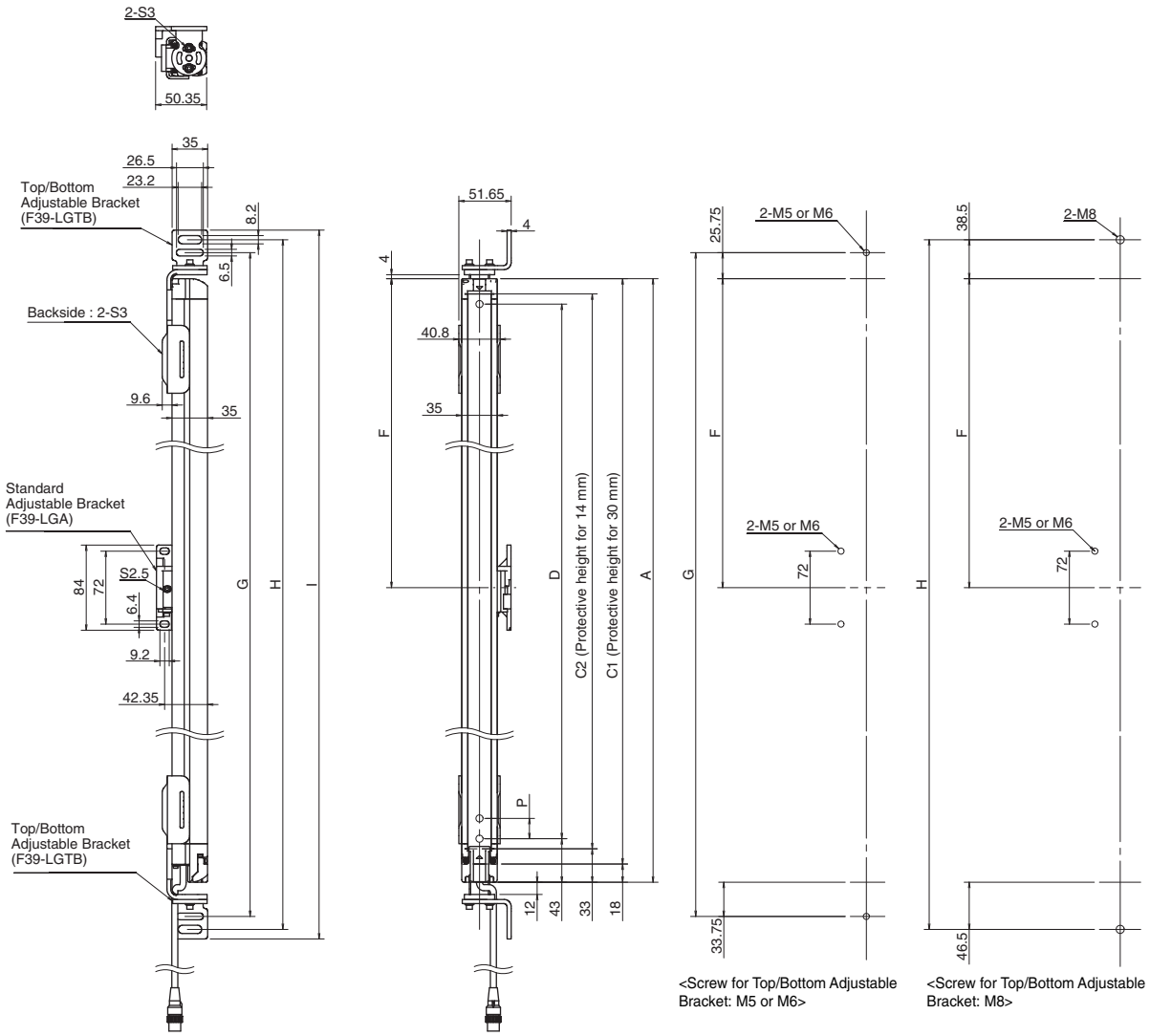
F3SG-□RA□□□□-14 Series

Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension G	C2+107.5
Dimension H	C2+133
Dimension I	C2+152
Dimension P	10

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

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

Side Mounting



F3SG-□RA□□□□-30 Series

Dimension A	C1+18
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension G	C1+77.5
Dimension H	C1+103
Dimension I	C1+122
Dimension P	20

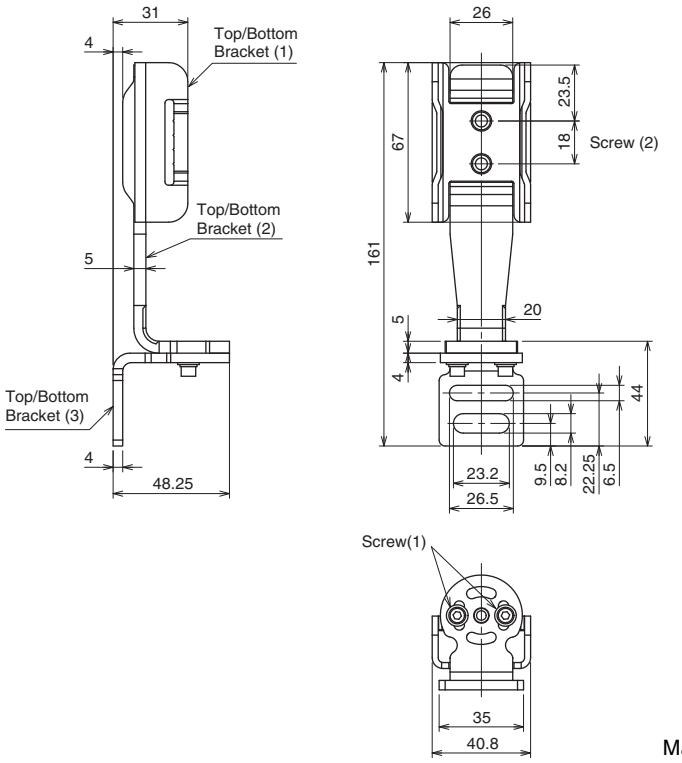
Protective height (C1)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0270 to 1070	2	0	–
1150 to 1950	2	1	1000 mm max.
2030 to 2510	2	2	1000 mm max.

F3SG-□RA□□□□-14 Series

Dimension A	C2+48
Dimension C2	4-digit number of the type name (Protective height)
Dimension D	C2-20
Dimension G	C2+107.5
Dimension H	C2+133
Dimension I	C2+152
Dimension P	10

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

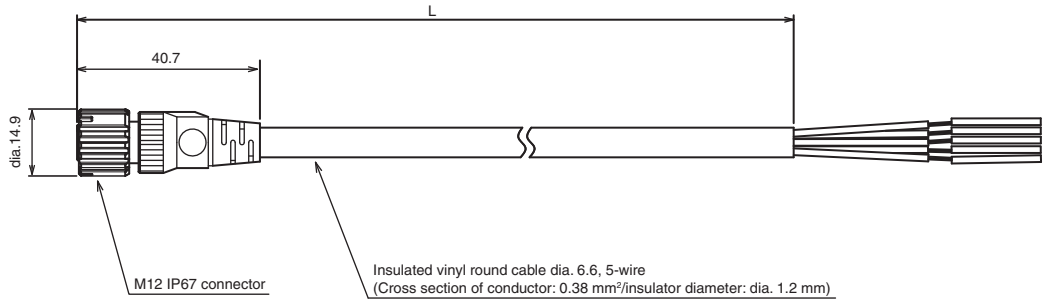
Top/Bottom Adjustable Bracket (F39-LGTB)



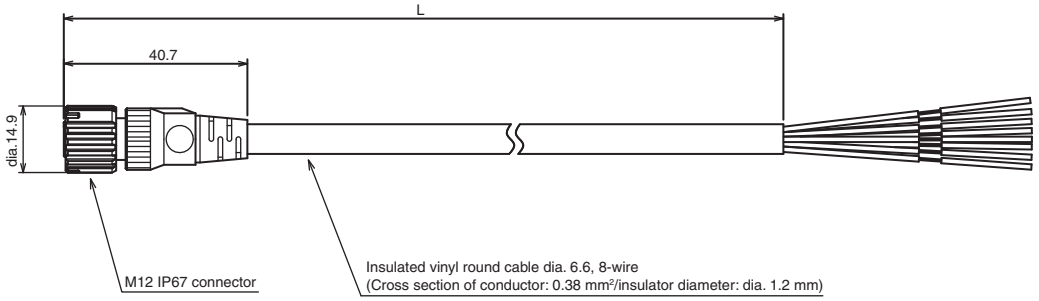
Material: SUS304

Accessories

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

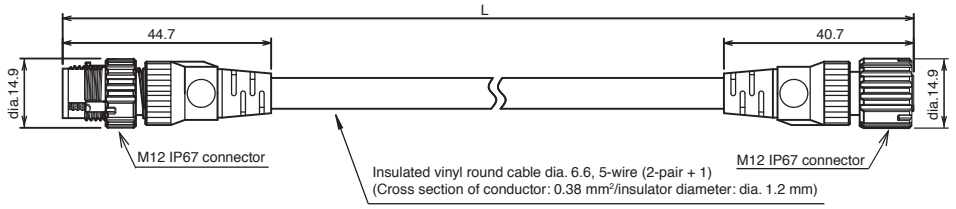


Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)

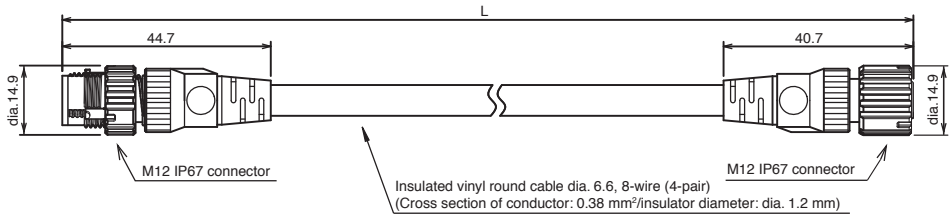


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JG3A-L	**F39-JG3A-D**	3
F39-JG7A-L	**F39-JG7A-D**	7
F39-JG10A-L	**F39-JG10A-D**	10
F39-JG15A-L	**F39-JG15A-D**	15
F39-JG20A-L	**F39-JG20A-D**	20

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

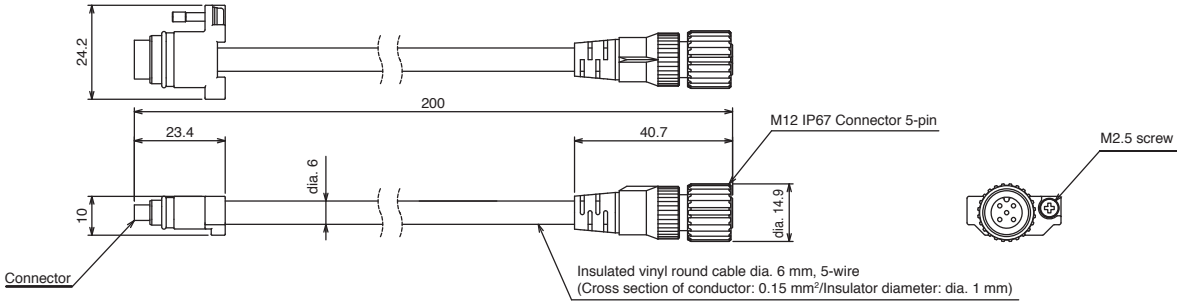


Double-Ended Cable for Receiver: Cable for extension (F39-JG□ B-D, sold separately)

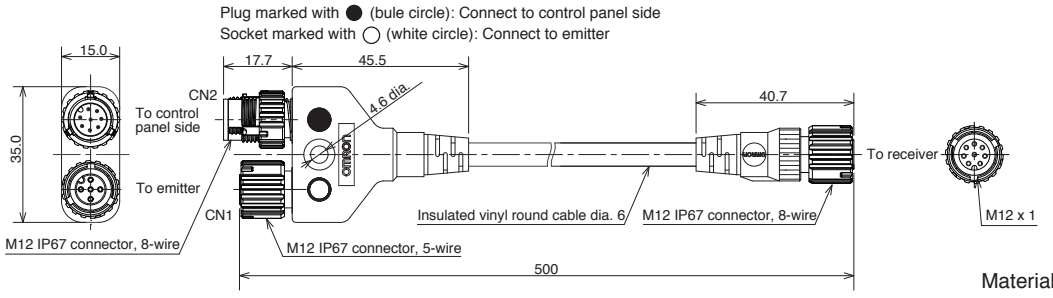


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR5B-L	**F39-JGR15B-D**	0.5
F39-JG1B-L	**F39-JG1B-D**	1
F39-JG3B-L	**F39-JG3B-D**	3
F39-JG5B-L	**F39-JG5B-D**	5
F39-JG7B-L	**F39-JG7B-D**	7
F39-JG10B-L	**F39-JG10B-D**	10
F39-JG15B-L	**F39-JG15B-D**	15
F39-JG20B-L	**F39-JG20B-D**	20

Cascading Cable for Emitter (F39-JGR2W, sold in pairs)

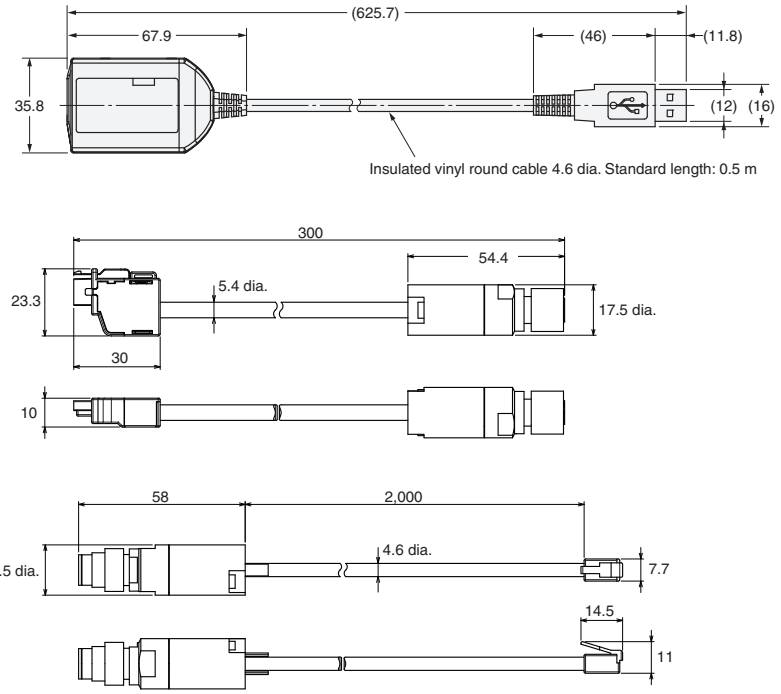


Y-Joint Plug/Socket Connector (F39-GCNY2, sold separately)

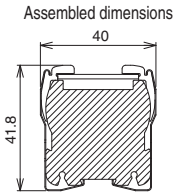


Material: PBT (Main body)

Interface Unit (F39-GIF)



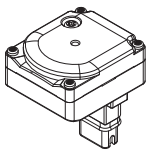
Spatter Protection Cover (F39-HGA)



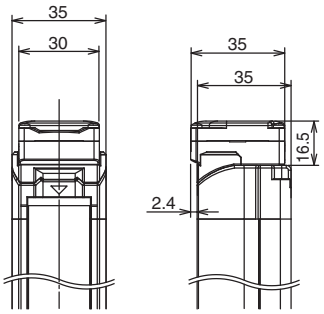
Model	Total length
F39-HGA□□□□	□□□□+4
F39-HGA0550	558

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

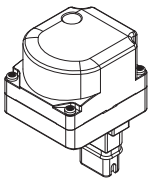
Bluetooth Communication Unit (F39-BT)



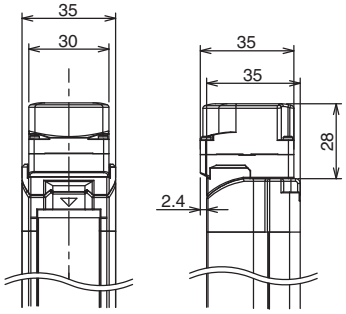
Material: PBT



Lamp and Bluetooth Communication Unit (F39-BTLP)
Lamp (F39-LP)



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



Related Manuals

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

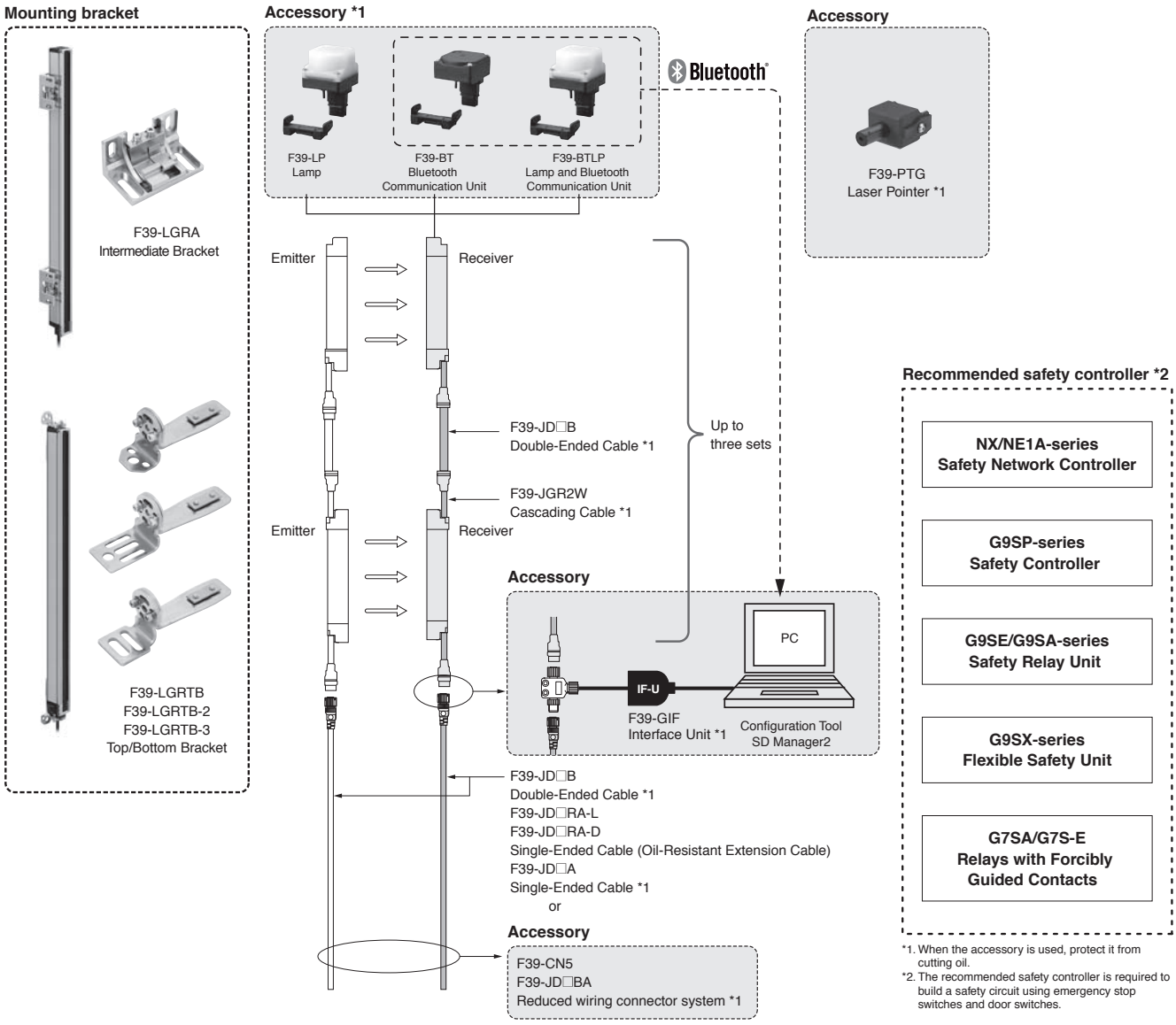
Safety Light Curtain Rugged type
F3SG-RR

Enhanced Oil Resistance

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

NEW

System Configuration



*1. When the accessory is used, protect it from cutting oil.
*2. The recommended safety controller is required to build a safety circuit using emergency stop switches and door switches.

Ordering Information

Main Units

Safety Light Curtain

Finger protection

Number of beams	Protective height (mm)	Model
23	240	**F3SG-4RR0240-14**
31	320	**F3SG-4RR0320-14**
39	400	**F3SG-4RR0400-14**
47	480	**F3SG-4RR0480-14**
55	560	**F3SG-4RR0560-14**
63	640	**F3SG-4RR0640-14**
71	720	**F3SG-4RR0720-14**
79	800	**F3SG-4RR0800-14**
87	880	**F3SG-4RR0880-14**
95	960	**F3SG-4RR0960-14**
103	1040	**F3SG-4RR1040-14**
111	1120	**F3SG-4RR1120-14**
119	1200	**F3SG-4RR1200-14**
127	1280	**F3SG-4RR1280-14**
135	1360	**F3SG-4RR1360-14**
143	1440	**F3SG-4RR1440-14**
151	1520	**F3SG-4RR1520-14**
159	1600	**F3SG-4RR1600-14**
167	1680	**F3SG-4RR1680-14**
175	1760	**F3SG-4RR1760-14**
183	1840	**F3SG-4RR1840-14**
191	1920	**F3SG-4RR1920-14**

Hand and arm protection

Number of beams	Protective height (mm)	Model
12	240	**F3SG-4RR0240-25**
16	320	**F3SG-4RR0320-25**
20	400	**F3SG-4RR0400-25**
24	480	**F3SG-4RR0480-25**
28	560	**F3SG-4RR0560-25**
32	640	**F3SG-4RR0640-25**
36	720	**F3SG-4RR0720-25**
40	800	**F3SG-4RR0800-25**
44	880	**F3SG-4RR0880-25**
48	960	**F3SG-4RR0960-25**
52	1040	**F3SG-4RR1040-25**
56	1120	**F3SG-4RR1120-25**
60	1200	**F3SG-4RR1200-25**
64	1280	**F3SG-4RR1280-25**
68	1360	**F3SG-4RR1360-25**
72	1440	**F3SG-4RR1440-25**
76	1520	**F3SG-4RR1520-25**
80	1600	**F3SG-4RR1600-25**
84	1680	**F3SG-4RR1680-25**
88	1760	**F3SG-4RR1760-25**
92	1840	**F3SG-4RR1840-25**
96	1920	**F3SG-4RR1920-25**

Accessories (Sold separately)

Single-Ended Cable (Oil-Resistant Extension Cable)

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

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

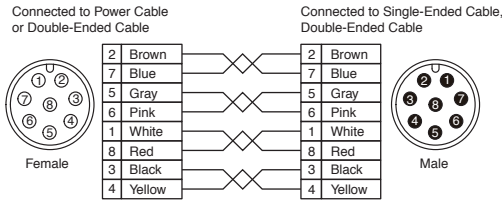
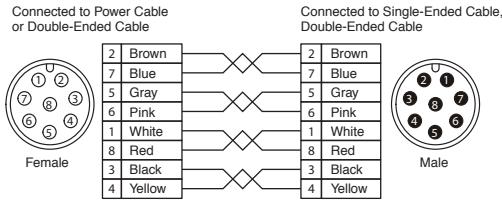
Single-Ended Cable (2 cables per set, one for emitter and one for receiver) *

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

* The cable for emitter and the cable for receiver are available separately. Add '-L' for emitter or '-D' for receiver to the end of the model number when you order.
Single-Ended Cable for Emitter: F39-JD□A-L, Single-Ended Cable for Receiver: F39-JD□A-D

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

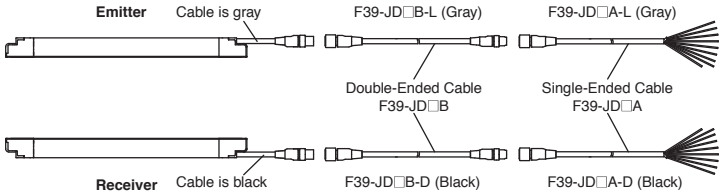
Double-Ended Cable (2 cables per set, one for emitter and one for receiver) *

Appearance	Cable length	Specifications	Model
	0.5 m	For emitter M12 connector (8-pin), Color: Gray  For receiver, M12 connector(8-pin) Color: Black  IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	**F39-JDR5B**
	1 m		**F39-JD1B**
	3 m		**F39-JD3B**
	5 m		**F39-JD5B**
	7 m		**F39-JD7B**
	10 m		**F39-JD10B**
	15 m		**F39-JD15B**
	20 m		**F39-JD20B**

* The cable for emitter and the cable for receiver are available separately. Add '-L' for emitter or '-D' for receiver to the end of the model number when you order.
Double-Ended Cable for Emitter: F39-JD□B-L, Double-Ended Cable for Receiver: F39-JD□B-D

Note: To extend the cable length to more than 20 m, use the F39-JD□B Double-Ended Cables in combination.
Example: When using a cable of 30 m, connect the F39-JD10B Double-Ended Cable with the F39-JD20B Double-Ended Cable.

<Connection example>



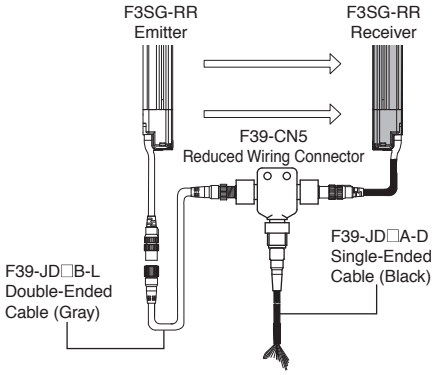
Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)

Reduced Wiring Connector

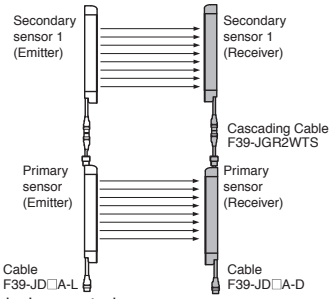
Appearance	Specifications	Model
	IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	**F39-CN5**

Note: When using the Reduced Wiring Connector (F39-CN5), the following functions are not available.
- Manual Reset
- External Device Monitoring
- Auxiliary Output

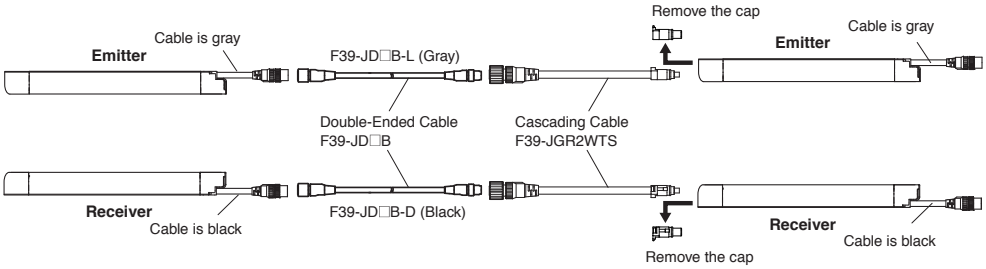
Make sure to keep the settings in the factory default.



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

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

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



Sensor Mounting Brackets

Appearance	Specifications	Application	Model
	Intermediate Bracket	Beam alignment after mounting possible. The angle adjustment range is ±15°. Side mounting and backside mounting possible. (Sold separately as a set of 2 brackets. Refer to note *1 for the number of sets required for each model.)	**F39-LGRA**
	Top/Bottom Bracket *2	Use this bracket at the top and bottom positions of the F3SG-RR. Beam alignment after mounting possible. The angle adjustment range is ±22.5°. Side mounting and backside mounting possible. (Sold separately as a set of 4 brackets.)	**F39-LGRTB**
	Top/Bottom Bracket *2	The part of this bracket to contact with a wall surface has a different shape from the F39-LGRTB Top/Bottom Bracket. Use this bracket when replacing an existing safety light curtain with the F3SG-RR. (Sold separately as a set of 4 brackets.)	**F39-LGRTB-2**
	Top/Bottom Bracket *2	The part of this bracket to contact with a wall surface has a different shape from the F39-LGRTB Top/Bottom Bracket. Use this bracket when replacing an existing safety light curtain with the F3SG-RR. (Sold separately as a set of 4 brackets.)	**F39-LGRTB-3**

*1. Protective height of 0240 to 1200 mm: 2 sets, Protective height of 1280 to 1920 mm: 3 sets
*2. Use the Top/Bottom Bracket in combination with the Intermediate Bracket.
Protective height of 1120 to 1920 mm: 1 set of Top/Bottom Bracket and 1 set of Intermediate Bracket
Protective height of 1040 mm or less: The Intermediate Bracket is not required.

Interface units and configuration tool SD Manager 2

Appearance	Type	Specifications	Model
	SD Manager2	The Configuration Tool SD Manager 2 is available to download from our website at http://www.ia.omron.com/f3sg-r_tool	–
	Interface Unit	F39-GIF-1 interface unit to connect the F3SG-RR receiver to a USB port of the PC	**F39-GIF-1**
	Bluetooth Communication Unit	F39-BT bluetooth unit to enable bluetooth on the F3SG-RR IP67* rated when mated.	**F39-BT**

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

Lamp

Appearance	Type	Specifications	Model
	Lamp	The lamp unit can be connected to a receiver and turned ON based on the operation of F3SG-RA/RR. The lamp can indicate red, orange, and green colors, to which three different states can be assigned. IP67* rated when mated.	**F39-LP**
	Lamp and Bluetooth Communication Unit		**F39-BTLP**

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

End Cap

Appearance	Specifications	Model
	Housing color: Black For both emitter and receiver (Attached to the F3SG-R. The End Cap can be purchased if lost.) IP67*1 *2 rated when mated.	**F39-CNM**

*1. This accessory can also be used with the F3SG-RA.
*2. When the accessory is used, protect it from cutting oil.

Laser Pointer for F3SG-R

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

Test Rod

Diameter	Model
14 mm dia.	**STI-TO14**
25 mm dia.	**STI-TO24**

Ratings and Specifications

Main unit

The □□□□ in the model names indicate the protective heights in millimeters.

			F3SG-4RR□□□□-14	F3SG-4RR□□□□-25
Performance	Object Resolution (Detection Capability)		Opaque objects	
			14-mm dia.	25-mm dia.
	Beam Gap		10 mm	20 mm
	Number of Beams		23 to 191	12 to 96
	Lens Size		5.2 × 3.4 (W × H) mm	6.0 × 5.0 (W × H) mm
	Protective Height		240 to 1920 mm	
	Operating Range		0.3 to 10.0 m	0.3 to 17.0 m
	Response Time	ON to OFF	Normal mode: 8 to 18 ms *1 Slow mode: 16 to 36 ms *1 *2	
		OFF to ON	Normal mode: 40 to 90ms (synchronized), 140 to 190ms (not synchronized) *1	
			*1. Response time when used in one segment system or in cascaded connection. Refer to page 63. *2. Selectable by Configuration Tool.	
	Effective Aperture Angle (EAA) (IEC 61496-2)		±2.5° max., emitter and receiver at operating range of 3 m or greater	
	Light Source		Infrared LEDs, Wavelength: 870 nm	
	Startup Waiting Time		2 s max.	
Electrical	Power Supply Voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
	Current Consumption		Refer to page 63 .	
	Safety Outputs (OSSD)		Two PNP or NPN transistor outputs (PNP or NPN is selectable by Configuration Tool.)	
			Load current of 300 mA max., Residual voltage of 2 V max. (except for voltage drop due to cable extension), Capacitive load of 1 μF max., Inductive load of 2.2 H max. *1 Leakage current of 1 mA max. (PNP), 2 mA max. (NPN) *2 *1. The load inductance is the maximum value when the safety output frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger. *2. These values must be taken into consideration when connecting elements including a capacitive load such as a capacitor.	
	Auxiliary Output		One PNP or NPN transistor output (PNP or NPN is selectable by Configuration Tool.)	
			Load current of 100 mA max., Residual voltage of 2 V max .	
	Output Operation Mode	Safety Output	Light-ON (Safety output is enabled when the receiver receives an emitting signal.)	
		Auxiliary Output	Safety output (Inverted signal output:Enable) (default) (Cofigurable by Configuration Tool)	
	Input Voltage	External device monitoring input (Lockout reset input)	PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 6.5 mA) * OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 8.0 mA) * NPN ON voltage: 0 V to 3 V (short circuit current: approx. 8.0 mA) OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 6.5 mA) *	
		Muting input A/B	PNP ON voltage: Vs-3 V to Vs (short circuit current: approx. 3.0 mA) * OFF voltage: 0 V to 1/2 Vs, or open (short circuit current: approx. 5.0 mA) * NPN ON voltage: 0 V to 3 V (short circuit current: approx. 5.0 mA) OFF voltage: 1/2 Vs to Vs, or open (short circuit current: approx. 3.0 mA) *	
		Test input	24 V Active setting: ON voltage: 9 V to Vs (short circuit current: approx. 2.5 mA) * OFF voltage: 0 V to 1.5 V or open (short circuit current: approx. 2.0 mA) 0 V Active setting: ON voltage: 0 V to 3 V (short circuit current: approx. 2.0 mA) OFF voltage: 9 V to Vs or open (short circuit current: approx. 2.5 mA) *	
		* The Vs indicates a supply voltage value in your environment.		
	Overvoltage Category (IEC 60664-1)		II	
	Indicators		Refer to page 65.	
	Protective Circuit		Output short protection, Power supply reverse polarity protection	
	Insulation Resistance		20 MΩ or higher (500 VDC megger)	
	Dielectric Strength		1,000 VAC, 50/60 Hz (1 min)	
Functional	Mutual Interference Prevention (Scan Code)		This function prevents mutual interference in up to two F3SG-RR systems.	
	Cascade Connection		Number of cascaded segments: 3 max.	
			Total number of beams: 255 max. Cable length between sensors: 10 m max. (not including cascading cable (F39-JGR2WTS) and power cable)	
	Test Function		Self-test (at power-on, and during operation) External test (light emission stop function by test input)	
	Safety-Related Functions		Interlock External device monitoring (EDM) Pre-reset Fixed blanking/Floating blanking Reduced resolution Muting/Override Scan code selection PNP/NPN selection Response time adjustment	

			F3SG-4RR□□□□-14	F3SG-4RR□□□□-25
Environmental	Ambient Temperature	Operating	-10 to 55°C (14 to 131°F) (non-icing)	
		Storage	-25 to 70°C (-13 to 158°F)	
	Ambient Humidity	Operating	35% to 85% (non-condensing)	
		Storage	35% to 95%	
	Ambient Illuminance		Incandescent lamp: 3,000 lx max. on receiver surface Sunlight: 10,000 lx max. on receiver surface	
	Degree of Protection (IEC 60529)		IEC 60529: IP65 and IP67, JIS C 0920 Annex 1: IP67G * *The IP67G is the degree of protection which is defined according to the JIS (Japanese Industrial Standards). The IP67 indicates the same level of protection as defined by the IEC, and the G indicates that a device has resistance to oil.	
	Vibration Resistance (IEC 61496-1)		10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes	
	Shock Resistance (IEC 61496-1)		100 m/s^2, 1000 shocks for all 3 axes	
	Pollution Degree (IEC 60664-1)		Pollution Degree 3	
Connections	Power cable	Type of Connection	M12 connectors: 8-pin emitter and receiver. Cables prewired to the sensors. IP67 and IP67G (JIS C 0920 Annex 1) * rated when mated. *F3SG-RR meets the degree of protection when it is correctly connected with an F39-JD□□RA-□ Oil-resistant extension cable.	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	0.3 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R36 mm	
	Cascading cable	Type of Connection	M12 connectors: 8-pin emitter and receiver. IP67 rated when mated.	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	0.3 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R5 mm	
	F39-JD□RA-□ Oil-resistant extension cable - Single-Ended Cable	Type of Connection	M12 connectors: 8-pin emitter and receiver. Cables prewired to the sensors. IP67 and IP67G (JIS C 0920 Annex 1)* rated when mated. * F3SG-RR meets the degree of protection when it is correctly connected with the power cable. The degree of protection is not satisfied with the part where cable wires are uncovered.	
		Number of Wires	Emitter: 5, Receiver: 8	
		Cable Length	Refer to page 57.	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R36 mm	
	Extension cable - Single-Ended Cable (F39-JD□A) - Double-Ended Cable (F39-JD□B)	Type of Connection	M12 connectors: 8-pin emitter and receiver. IP67 rated when mated.	
		Number of Wires	Emitter: 8, Receiver: 8	
		Cable Length	Refer to page 57.	
		Cable Diameter	6.6 mm	
		Minimum Bending Radius	R36 mm	
	Extension of Power Cable		100 m max. (Emitter/Receiver)	
Material	Material		Housing: Aluminum Cap: PBT Front window: PMMA Cable: Fluororesin cable FE plate: SUS	
	Weight (packaged)		Refer to page 63 .	
	Included Accessories		Safety Precautions, Quick Installation Manual, Troubleshooting Guide Sticker, Warning Zone Label, End Cap (for switching External Test Input function)	
Conformity	Conforming standards		Refer to page 64.	
	Performance Level (PL)/Safety category		PL e/Category 4 (EN ISO 13849-1:2015)	
	PFHd		9.9×10^{-8} (IEC 61508)	
	Proof test interval T_M		Every 20 years (IEC 61508)	
	SFF		99% (IEC 61508)	
	HFT		1 (IEC 61508)	
	Classification		Type B (IEC 61508-2)	

Bluetooth Communication Unit

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

* It depends on use environment conditions.

List of Models/Response Time/Current Consumption/Weight

F3SG-4RR□□□□-14

Model	Number of Beams	Protective Height [mm] (Overall length)	Response Time [ms] *1			Current Consumption [mA]		Weight [kg] *3
			ON → OFF *2	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	
F3SG-4RR0240-14	23	240	8	40	140	45	75	1.3
F3SG-4RR0320-14	31	320	8	40	140	55	75	1.7
F3SG-4RR0400-14	39	400	8	40	140	60	80	1.9
F3SG-4RR0480-14	47	480	13	65	165	50	80	2.1
F3SG-4RR0560-14	55	560	13	65	165	55	80	2.3
F3SG-4RR0640-14	63	640	13	65	165	60	85	2.7
F3SG-4RR0720-14	71	720	13	65	165	65	85	2.9
F3SG-4RR0800-14	79	800	13	65	165	65	90	3.1
F3SG-4RR0880-14	87	880	13	65	165	70	90	3.3
F3SG-4RR0960-14	95	960	13	65	165	75	90	3.4
F3SG-4RR1040-14	103	1040	13	65	165	80	95	4.1
F3SG-4RR1120-14	111	1120	13	65	165	85	95	4.2
F3SG-4RR1200-14	119	1200	13	65	165	90	100	4.4
F3SG-4RR1280-14	127	1280	13	65	165	95	100	4.6
F3SG-4RR1360-14	135	1360	13	65	165	95	105	4.8
F3SG-4RR1440-14	143	1440	18	90	190	85	105	4.9
F3SG-4RR1520-14	151	1520	18	90	190	90	105	5.1
F3SG-4RR1600-14	159	1600	18	90	190	90	110	5.8
F3SG-4RR1680-14	167	1680	18	90	190	95	110	6.0
F3SG-4RR1760-14	175	1760	18	90	190	100	115	6.1
F3SG-4RR1840-14	183	1840	18	90	190	100	115	6.3
F3SG-4RR1920-14	191	1920	18	90	190	105	120	6.5

*1. The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.
*2. The response times are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.
*3. The weight includes an emitter, a receiver and included accessories in a product package.

F3SG-4RR□□□□-25

Model	Number of Beams	Protective Height [mm] (Overall length)	Response Time [ms] *1			Current Consumption [mA]		Weight [kg] *3
			ON → OFF *2	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	
F3SG-4RR0240-25	12	240	8	40	140	35	75	1.3
F3SG-4RR0320-25	16	320	8	40	140	40	75	1.7
F3SG-4RR0400-25	20	400	8	40	140	45	75	1.9
F3SG-4RR0480-25	24	480	8	40	140	50	75	2.1
F3SG-4RR0560-25	28	560	8	40	140	50	75	2.3
F3SG-4RR0640-25	32	640	8	40	140	55	75	2.7
F3SG-4RR0720-25	36	720	8	40	140	60	80	2.9
F3SG-4RR0800-25	40	800	8	40	140	65	80	3.1
F3SG-4RR0880-25	44	880	13	65	165	50	80	3.2
F3SG-4RR0960-25	48	960	13	65	165	50	80	3.4
F3SG-4RR1040-25	52	1040	13	65	165	55	80	4.0
F3SG-4RR1120-25	56	1120	13	65	165	55	85	4.2
F3SG-4RR1200-25	60	1200	13	65	165	55	85	4.4
F3SG-4RR1280-25	64	1280	13	65	165	60	85	4.5
F3SG-4RR1360-25	68	1360	13	65	165	60	85	4.7
F3SG-4RR1440-25	72	1440	13	65	165	65	85	4.9
F3SG-4RR1520-25	76	1520	13	65	165	65	90	5.1
F3SG-4RR1600-25	80	1600	13	65	165	70	90	5.7
F3SG-4RR1680-25	84	1680	13	65	165	70	90	5.9
F3SG-4RR1760-25	88	1760	13	65	165	70	90	6.1
F3SG-4RR1840-25	92	1840	13	65	165	75	90	6.3
F3SG-4RR1920-25	96	1920	13	65	165	75	95	6.4

*1. The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.
*2. The response times are values when Scan Code is set at Code B. The response times for Code A are 1 ms shorter than these values.
*3. The weight includes an emitter, a receiver and included accessories in a product package.

Legislation and Standards

1. The F3SG-RR does not receive type approval provided by Article 44-2 of the Industrial Safety and Health Act of Japan. When using the F3SG-RR in Japan as a "safety system for pressing or shearing machines" prescribed in Article 42 of that law, the machine control system must receive type approval.
2. The F3SG-RR is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Index Annex V, Item 2.
3. EC/EU Declaration of Conformity
   OMRON declares that the F3SG-RR is in conformity with the requirements of the following EC/EU Directives:
   Machinery Directive 2006/42/EC
   EMC Directive 2014/30/EU
4. Conforming Standards
   (1) European standards
   EN61496-1 (Type 4 ESPE), EN 61496-2 (Type 4 AOPD), EN61508-1 through -4 (SIL 3), EN ISO 13849-1:2015 (PL e, Category 4)
   (2) International standards
   IEC61496-1 (Type 4 ESPE), IEC61496-2 (Type 4 AOPD), IEC61508-1 through -4 (SIL 3), ISO 13849-1:2015 (PL e, Category 4)
   (3) JIS standards
   JIS B 9704-1 (Type 4 ESPE), JIS B 9704-2 (Type 4 AOPD)
   (4) North American standards
   UL61496-1 (Type 4 ESPE), UL61496-2 (Type 4 AOPD), UL508, UL1998,
   CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
5. Third-Party Certifications
   (1) TÜV SÜD
   - EC Type-Examination certificate:
     EU Machinery Directive, Type 4 ESPE (EN61496-1), Type 4 AOPD (EN 61496-2)
   - Certificate:
     Type 4 ESPE (EN61496-1), Type 4 AOPD (EN61496-2), EN 61508-1 through -4 (SIL 3), EN ISO 13849-1:2015 (PL e, Category 4)

   (2) UL
   - UL Listing:
     Type 4 and ESPE (UL61496-1), Type 4 AOPD (UL61496-2), UL508, UL1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8
6. Other Standards
   The F3SG-RR is designed according to the standards listed below. To make sure that the final system complies with the following standards and regulations, you are asked to design and use it in accordance with all other related standards, laws, and regulations. If you have any questions, consult with specialized organizations such as the body responsible for prescribing and/or enforcing machinery safety regulations in the location where the equipment is to be used.
   - European Standards: EN415-4, EN691-1, EN692, EN693, IEC/TS 62046
   - U.S. Occupational Safety and Health Standards: OSHA 29 CFR 1910.212
   - U.S. Occupational Safety and Health Standards: OSHA 29 CFR 1910.217
   - American National Standards: ANSI B11.1 to B11.19
   - American National Standards: ANSI/RIA R15.06
   - Canadian Standards Association CSA Z142, Z432, Z434
   - SEMI Standards SEMI S2
   - Japan Ministry of Health, Labour and Welfare "Guidelines for Comprehensive Safety Standards of Machinery", Standard Bureau's Notification No. 0731001 dated July 31, 2007.rms and Conditions Agreement

Indicator

Emitter

Name of Indicator		Color	Illuminated	Blinking
Test	TEST	Green	–	External Test is being performed
Operating range	LONG	Green	Always illuminated	–
Power	POWER	Green	Power is ON.	Error due to noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in emitter

Receiver

Name of Indicator		Color	Illuminated	Blinking
Top-beam-state	TOP	Blue	The top beam is unblocked	Muting/Override state, or Lockout state due to Cap error or Other sensor error
PNP/NPN mode	NPN	Green	NPN mode is selected	–
Response time	SLOW	Green	Response Time Adjustment is enabled	–
Sequence error	SEQ	Yellow	–	Sequence error in Muting or Pre-reset mode
Blanking	BLANK	Green	Blanking, Warning Zone or Reduced Resolution is enabled	Blanking Monitoring error
Configuration	CFG	Green	–	Zone measurement being performed by Dynamic Muting, or Lockout state due to Parameter error or Cascading Configuration error
Interlock	INT-LK	Yellow	Interlock state	Pre-reset mode *2
External device monitoring	EDM	Green	RESET input is in ON state *1	Lockout state due to EDM error
Internal error	INTERNAL	Red	–	Lockout state due to Internal error, or error due to abnormal power supply or noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in receiver
Stable-state	STB	Green	Incident light level is 170% or higher of ON-threshold	Safety output is instantaneously turned OFF due to ambient light or vibration
ON/OFF	ON/OFF	Green	Safety output is in ON state	–
		Red	Safety output is in OFF state	Lockout state due to Safety Output error, or error due to abnormal power supply or noise
Communication	COM	Green	Synchronization between emitter and receiver is maintained	Lockout state due to Communication error, or error due to abnormal power supply or noise
Bottom-beam-state	BTM	Blue	The bottom beam is unblocked	Muting/Override state, or Lockout state due to Scan code setting error

Note: TOP, CFG, LOCKOUT, STB and ON/OFF indicators are illuminated when the receiver of the F3SG-RR is in Setting mode.
*1. The EDM indicator is illuminated when the EDM input is in the ON state regardless of the use of the EDM function.
*2. Refer to *Safety Light Curtain F3SG-□RR Series User's Manual (ManNo.: Z383)* for more information of blinking patterns.

Interface Unit

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

Lamp

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

Standalone F3SG-RR using PNP Outputs

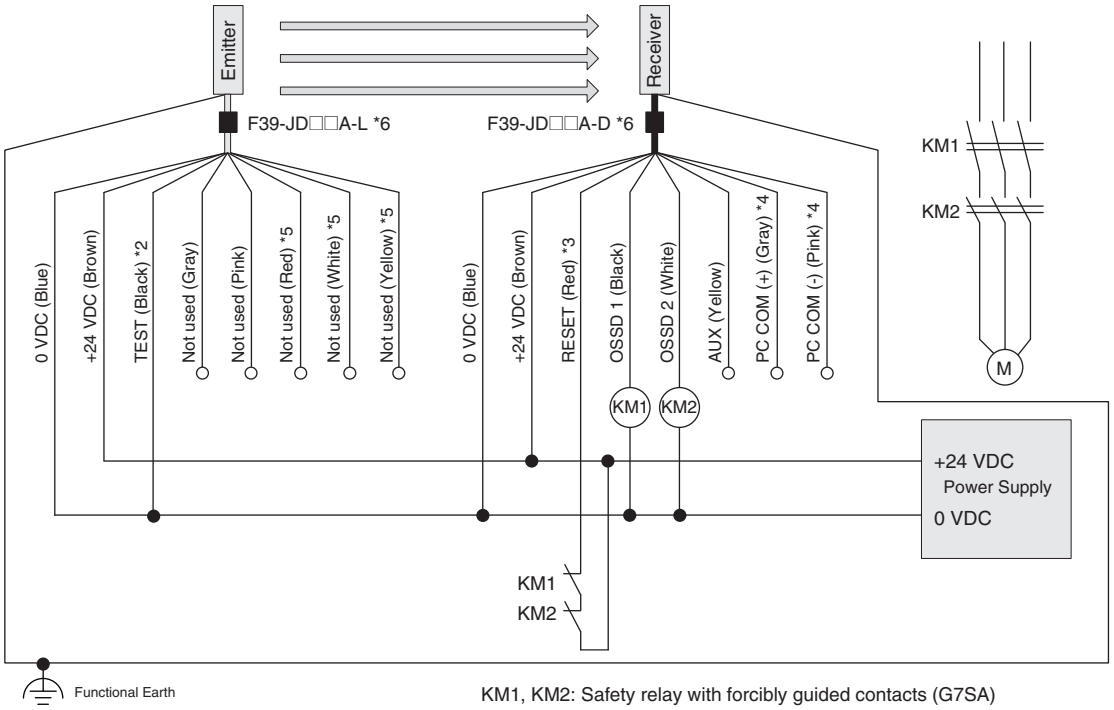
Auto Reset Mode, EDM enabled and PNP Outputs

The following is the example of Muting not used, External Device Monitoring enabled, Auto Reset Mode, PNP outputs and External Test in 24 V Active (not used).

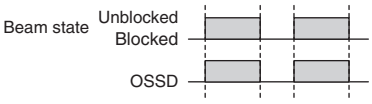
Settings

	Function
Receiver	EDM Enabled (factory default setting) *1
	Auto Reset (factory default setting) *1
	PNP (factory default setting) *1
Emitter	External Test: 24 V Active (End Cap: Black) (factory default setting)

Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: 3-phase motor



*1.The functions are configurable with Configuration Tool. Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*2.Connect the line to 24 V via a test switch (N.O. contact) if External Test is used.
*3.Connect a lockout reset switch (N.C. contact) to this line in series with the KM1 and KM2 if Lockout Reset is used.
*4.Used as MUTE A and B lines when Muting is used.
*5.The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant Extension Cable) does not have the red, white and yellow wires.
*6.For the F39-JD□A-□ Single-Ended Cable, connect the shield line to 0 V.

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

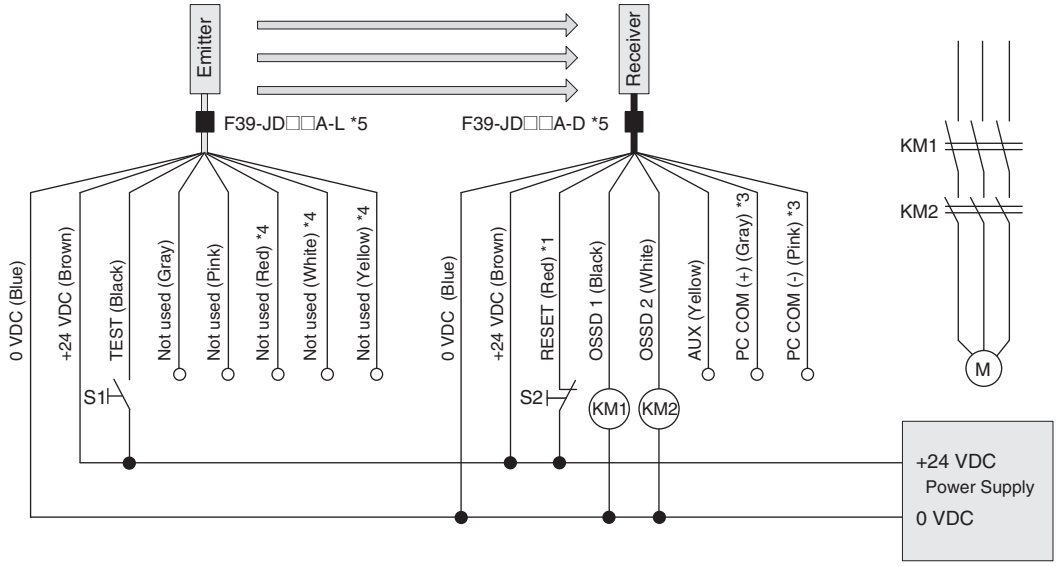
Manual Reset Mode, EDM disabled and PNP Outputs

The following is the example of Muting not used, External Device Monitoring disabled, Manual Reset Mode, PNP outputs and External Test in 24 V Active (used).

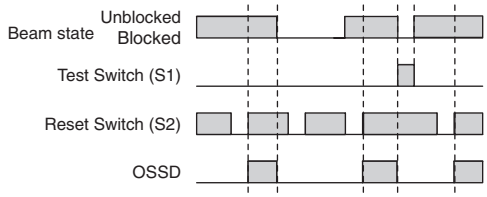
Settings

	Function
Receiver	EDM Disabled *2
	Manual Reset *2
	PNP (factory default setting) *2
Emitter	External Test: 24 V Active (End Cap: Black) (factory default setting)

Wiring Example



S1: Test Switch (Connect the line to 0 V if this switch is not required)
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: 3-phase motor



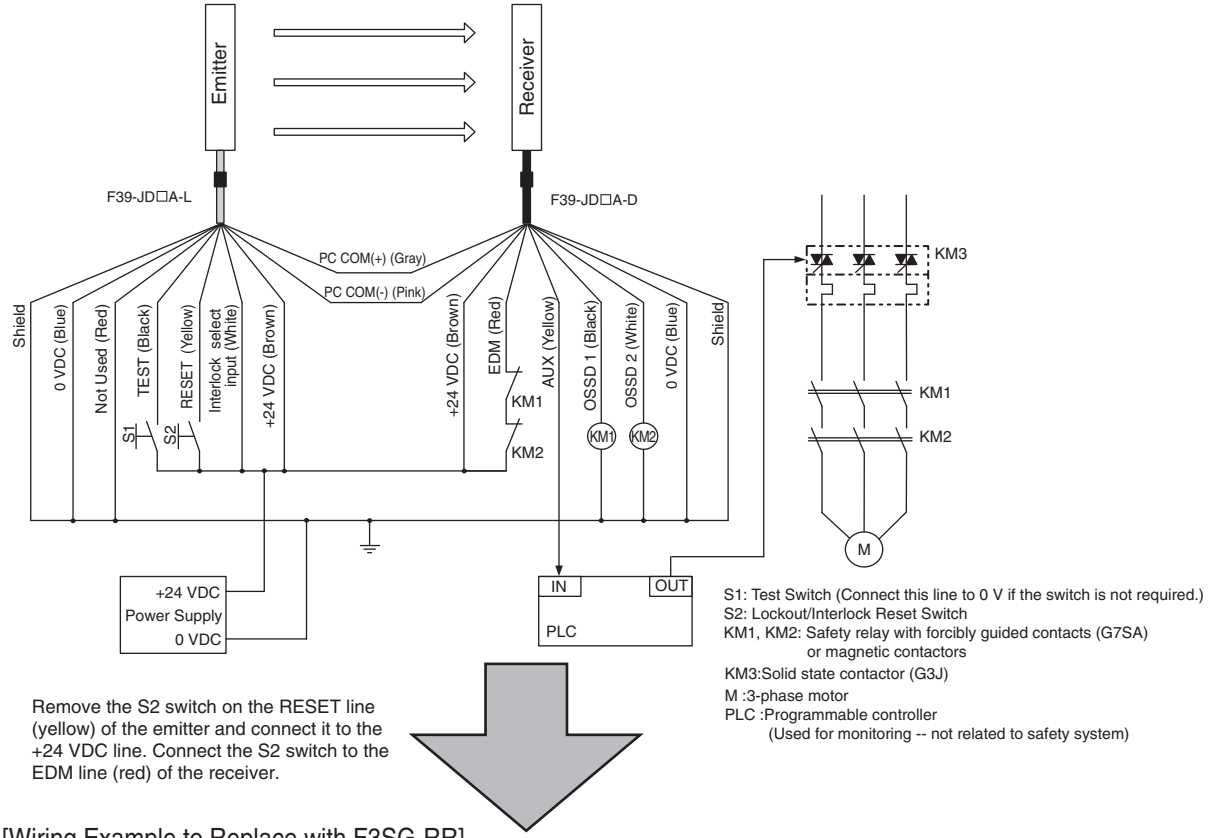
*1.Also used as EDM line.
*2.The functions are configurable with Configuration Tool. Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*3.Used as MUTE A and B lines when Muting is used.
*4.The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant Extension Cable) does not have the red, white and yellow wires.
*5.For the F39-JD□A-□ Single-Ended Cable, connect the shield line to 0 V.

Note: For the functional earth connection, refer to page 66.

Replacing the F3SJ-B Safety Light Curtain with F3SG-RR

The following is the example of External Device Monitoring enabled, Manual Reset Mode, PNP outputs and External Test in 24 V Active (used). When replacing the F3SJ-B with F3SG-RR, change the wiring as shown below if using the Interlock/Lockout Reset function with the RESET line (yellow) of the F3SJ-B emitter.

[F3SJ-B Wiring Example]

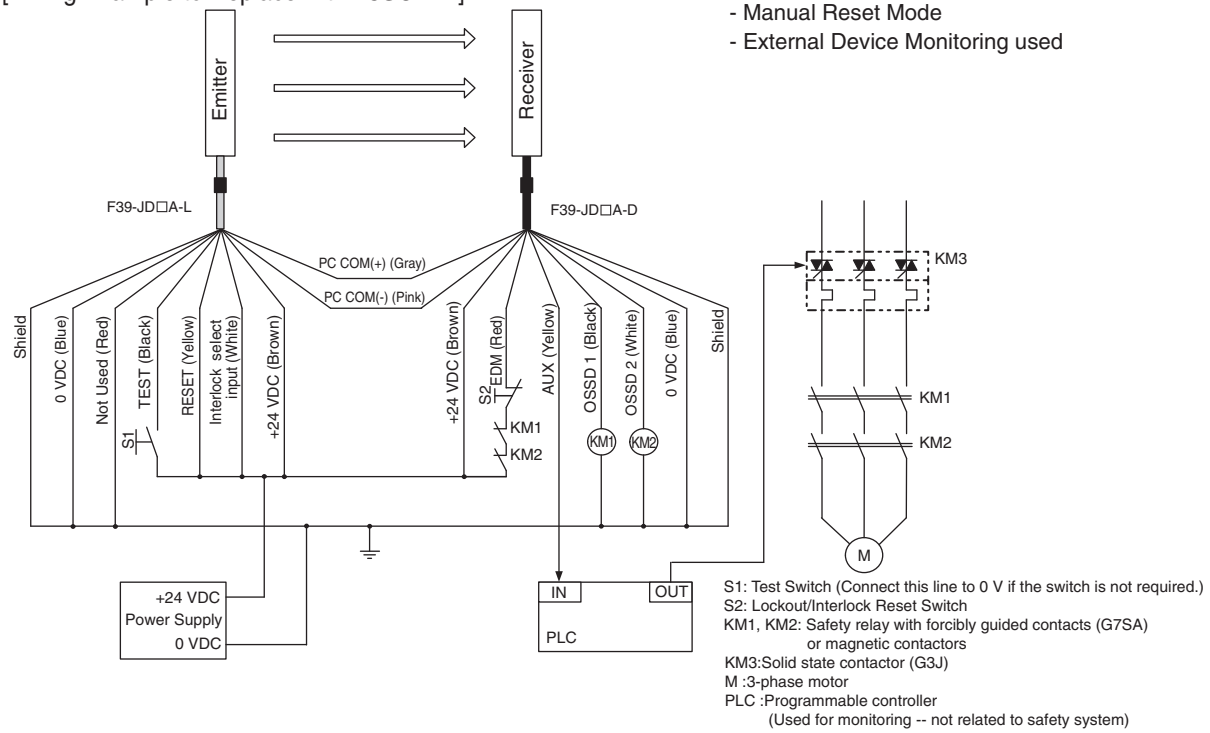


S1: Test Switch (Connect this line to 0 V if the switch is not required.)
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
or magnetic contactors
KM3:Solid state contactor (G3J)
M :3-phase motor
PLC :Programmable controller
(Used for monitoring -- not related to safety system)

Remove the S2 switch on the RESET line (yellow) of the emitter and connect it to the +24 VDC line. Connect the S2 switch to the EDM line (red) of the receiver.

[Wiring Example to Replace with F3SG-RR]

- Manual Reset Mode
- External Device Monitoring used



S1: Test Switch (Connect this line to 0 V if the switch is not required.)
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
or magnetic contactors
KM3:Solid state contactor (G3J)
M :3-phase motor
PLC :Programmable controller
(Used for monitoring -- not related to safety system)

Note: 1. Connect the RESET line (yellow) used for the F3SJ-B emitter to +24 VDC line directly. This connection is not needed when using the Auto Rest Mode.

2. For the functional earth connection, refer to page 66.

F3SG-RR with Reduced Wiring Connector and PNP Outputs

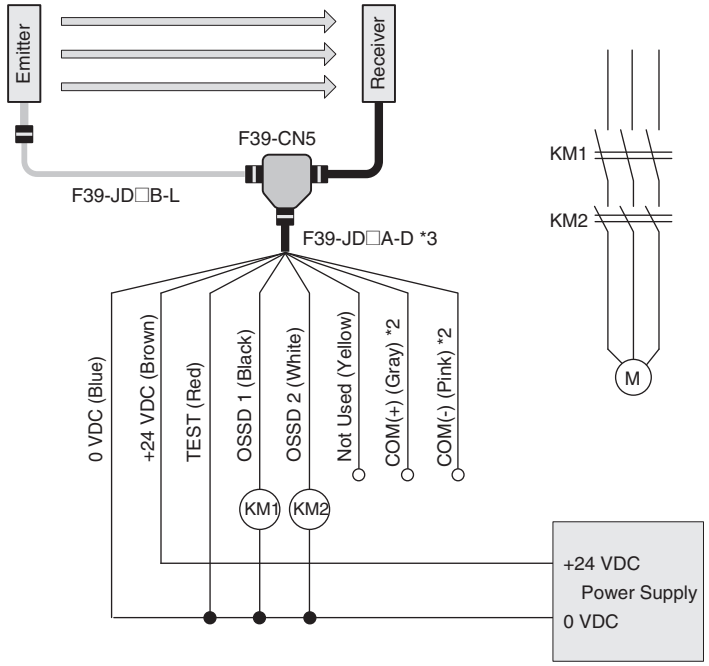
The following is the example of Muting not used, External Device Monitoring enabled, Auto Reset Mode, PNP outputs and External Test in 24 V Active (not used).

Settings

	Function
Receiver	EDM Enabled (factory default setting) *1
	Auto Reset (factory default setting) *1
	PNP (factory default setting) *1
Emitter	External Test: 24 V Active (End Cap: Black) (factory default setting)

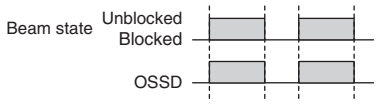
The reduced wiring system can be achieved by using the Reduced Wiring Cables (F39-JD□BA) and the Reduced Wiring Connector (F39-CN5).

Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: 3-phase motor

*1.The functions are configurable with Configuration Tool. Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*2.Used as MUTE A and B lines when Muting is used.
*3.Connect the shield line to 0 V.



Note: 1. When using the Reduced Wiring Connector (F39-CN5), the following functions are not available.
- Manual Reset
- External Device Monitoring
- Auxiliary Output

Make sure to keep the settings in the factory default.

2. For the functional earth connection, refer to page 66.

Muting using PNP Outputs

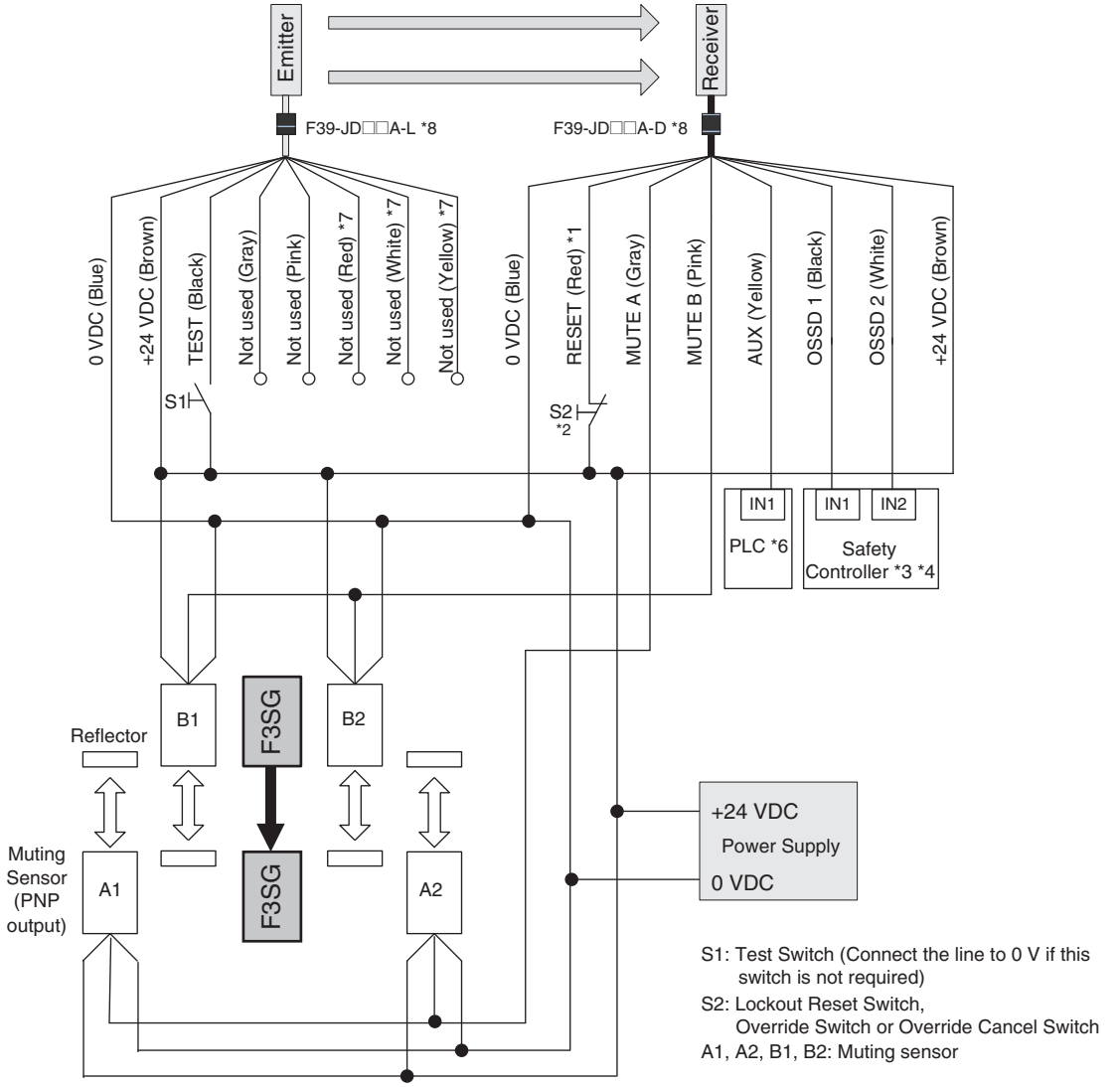
Standard Muting Mode with four Muting Sensors using PNP Outputs

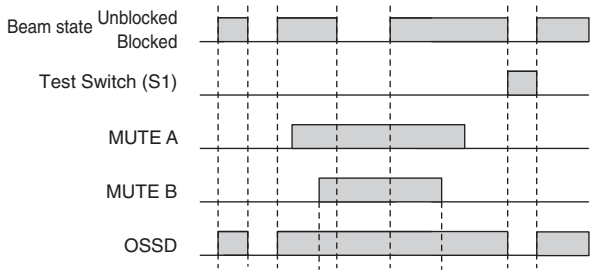
The following is the example of External Device Monitoring disabled, Auto Reset Mode, PNP outputs and External Test in 24 V Active (used).

Settings

	Function
Receiver	EDM Disabled *5
	Auto Reset (factory default setting) *5
	PNP Output (factory default setting) *5
Emitter	External Test: 24 V Active (End Cap: Black) (factory default setting)

Wiring Example





*1.Also used as Override input line.
*2.Make sure to connect an override cancel switch to the RESET line when using the override function. Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.Refer to 74 page "Connectable Safety Control Units" for more information.
*4.The safety controller and the F3SG-RR must share the power supply or be connected to the common terminal of the power supply.
*5.The functions are configurable with Configuration Tool. Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*6.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.
*7.The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant Extension Cable) does not have the red, white and yellow wires.
*8.For the F39-JD□A-□ Single-Ended Cable, connect the shield line to 0 V.

Note: For the functional earth connection, refer to page 66.

Standalone F3SG-RR using NPN Outputs

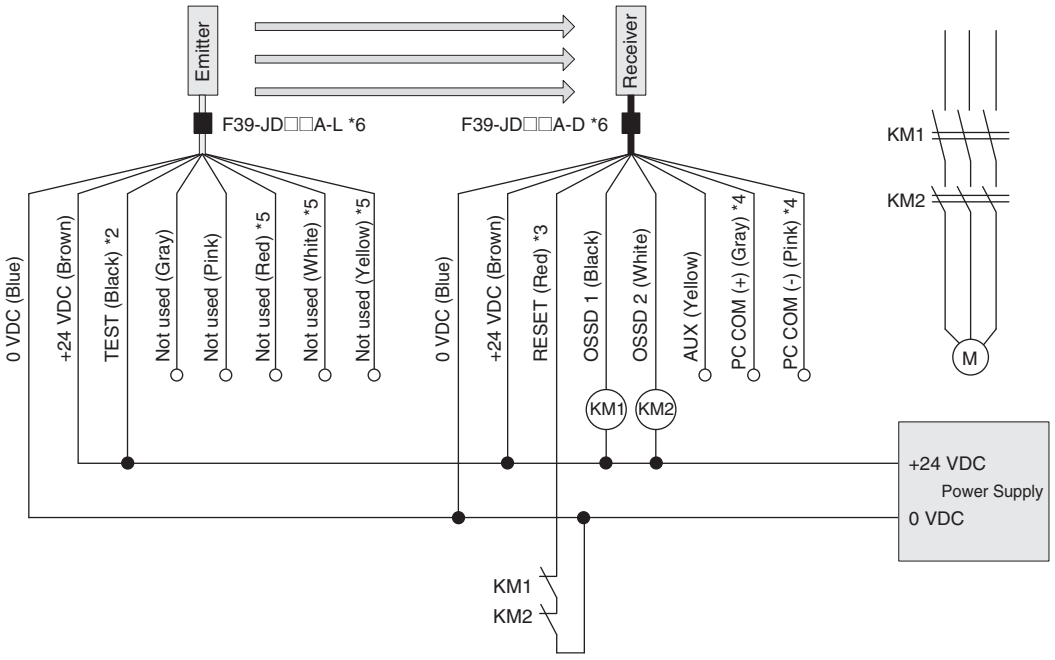
Auto Reset Mode, EDM enabled and NPN Outputs

The following is the example of Muting not used, External Device Monitoring enabled, Auto Reset Mode, NPN outputs and External Test in 0 V Active (not used).

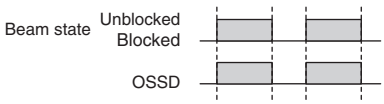
Settings

	Function
Receiver	EDM Enabled (factory default setting) *1
	Auto Reset (factory default setting) *1
	NPN *1
Emitter	External Test: 0 V Active (End Cap: White)

Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: 3-phase motor



*1.The functions are configurable with Configuration Tool. Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*2.Connect the line to 0 V via a test switch (N.O. contact) if External Test is used.
*3.Connect a lockout reset switch (N.C. contact) to this line in series with the KM1 and KM2 if Lockout Reset is used.
*4.Used as MUTE A and B lines when Muting is used.
*5.The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant Extension Cable) does not have the red, white and yellow wires.
*6.For the F39-JD□A-□ Single-Ended Cable, connect the shield line to 0 V.

Note: For the functional earth connection, refer to page 66.

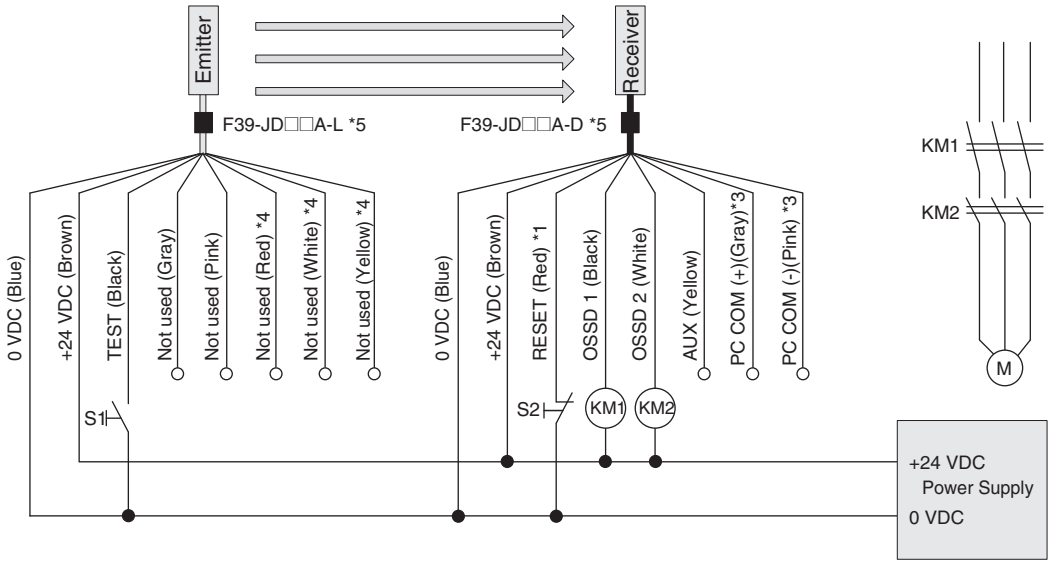
Manual Reset Mode, EDM disabled and NPN Outputs

The following is the example of Muting not used, External Device Monitoring disabled, Manual Reset Mode, NPN outputs and External Test in 0 V Active (used).

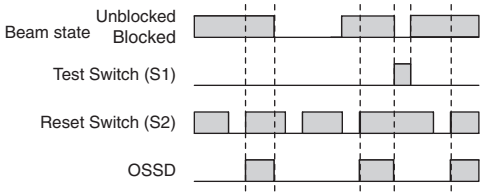
Settings

	Function
Receiver	EDM Disabled *2
	Manual Reset *2
	NPN *2
Emitter	External Test: 0 V Active (End Cap: White)

Wiring Example



S1: Test Switch (Connect the line to 24 V if this switch is not required)
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: 3-phase motor



*1.Also used as EDM line.
*2.The functions are configurable with Configuration Tool.
Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*3.Used as MUTE A and B lines when Muting is used.
*4.The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant Extension Cable) does not have the red, white and yellow wires.
*5. For the F39-JD□A-□ Single-Ended Cable, connect the shield line to 0 V.

Note: For the functional earth connection, refer to page 66.

F3SG-RR with Reduced Wiring Connector and NPN Outputs

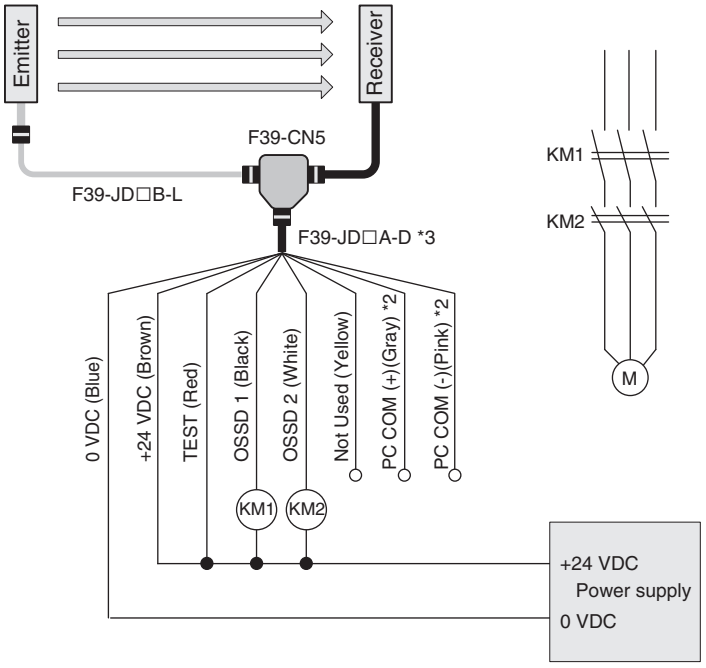
The following is the example of Muting not used, External Device Monitoring enabled, Auto Reset Mode, NPN outputs and External Test in 0 V Active (not used).

Settings

	Function
Receiver	EDM Enabled (factory default setting) *1
	Auto Reset (factory default setting) *1
	NPN *1
Emitter	External Test: 0 V Active (End Cap: White)

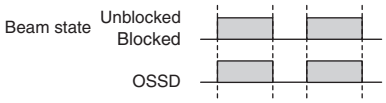
The reduced wiring system can be achieved by using the Reduced Wiring Cables (F39-JD□BA) and the Reduced Wiring Connector (F39-CN5).

Wiring Example



KM1, KM2: Safety relay with forcibly guided contacts (G7SA)
M: 3-phase motor

*1.The functions are configurable with Configuration Tool.
Refer to *Safety Light Curtain Configuration Tool for Model F3SG (SD Manager 2) User's Manual* for more information on setting the functions by the Configuration Tool.
*2.Used as MUTE A and B lines when Muting is used.
*3.Connect the shield line to 0 V.



Note: 1. When using the Reduced Wiring Connector (F39-CN5), the following functions are not available.
- Manual Reset
- External Device Monitoring
- Auxiliary Output

Make sure to keep the settings in the factory default.

2. For the functional earth connection, refer to page 66.

Connectable Safety Control Units

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

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

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

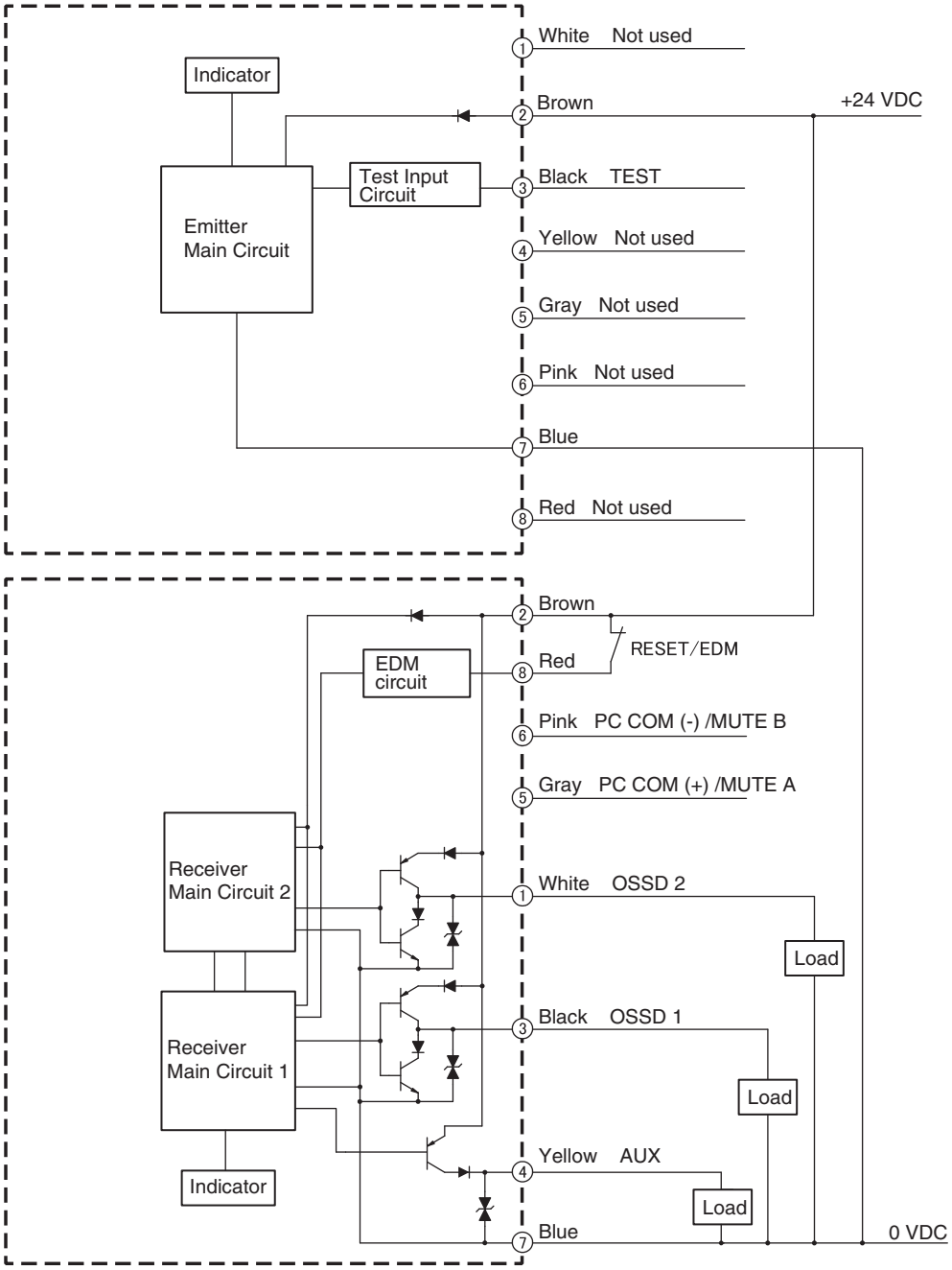
Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

Input/Output Circuit

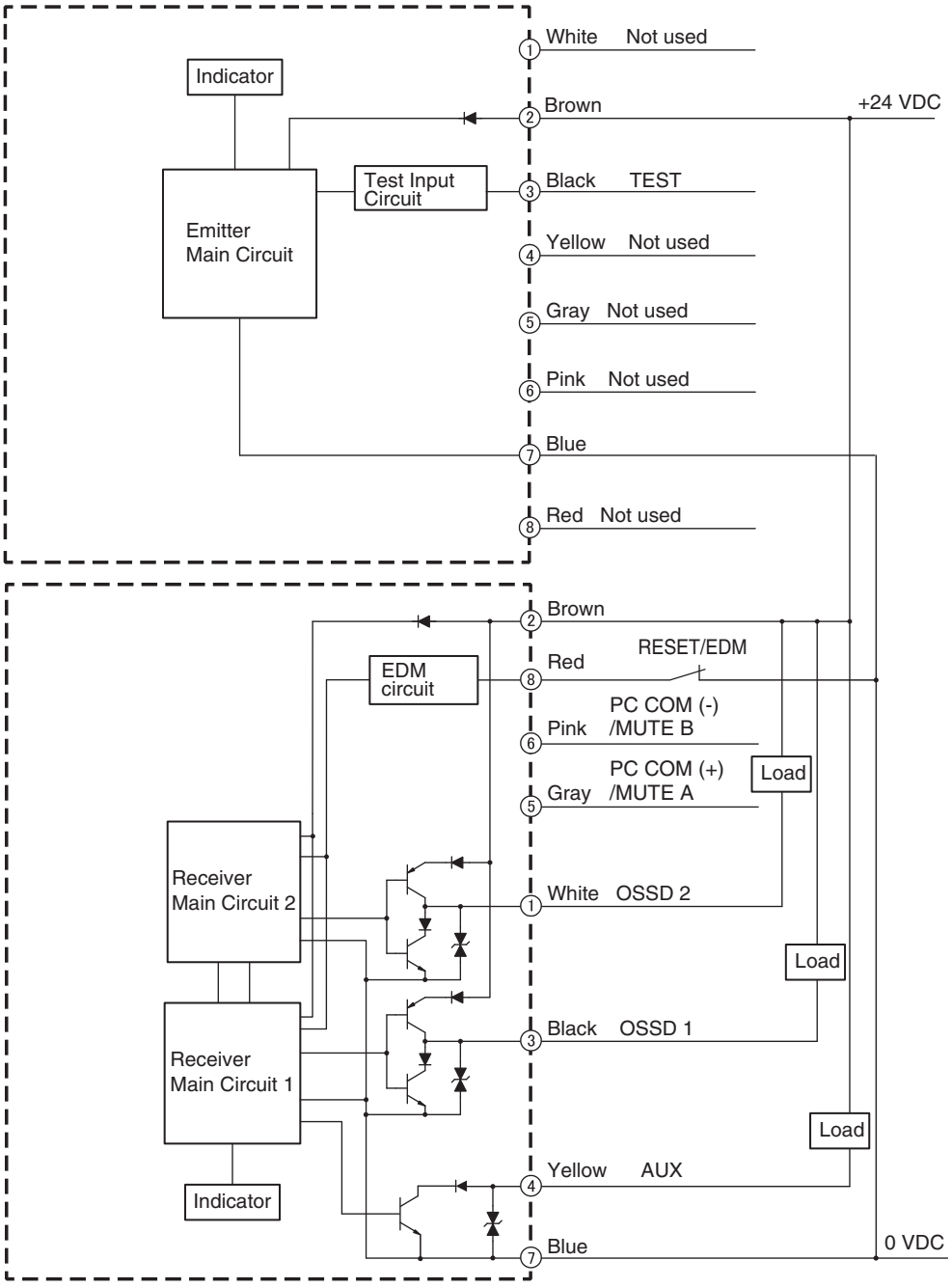
Entire Circuit Diagram

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

PNP Output



NPN Output

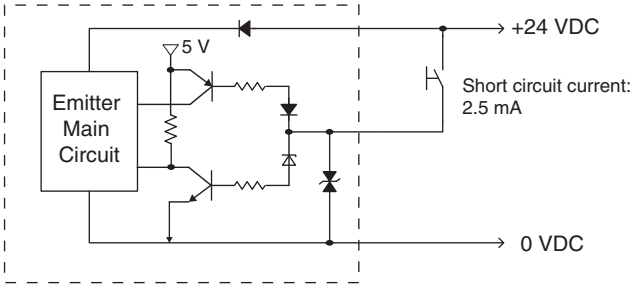

White Not used
Indicator
Brown
+24 VDC
Test Input Circuit
Black TEST
Emitter Main Circuit
Yellow Not used
Gray Not used
Pink Not used
Blue
Red Not used
Brown
RESET/EDM
Red
EDM circuit
PC COM (-)
Pink /MUTE B
PC COM (+)
Load
Gray /MUTE A
Receiver Main Circuit 2
White OSSD 2
Load
Receiver Main Circuit 1
Black OSSD 1
Load
Yellow AUX
Indicator
Blue
0 VDC

Input Circuit Diagram by Function

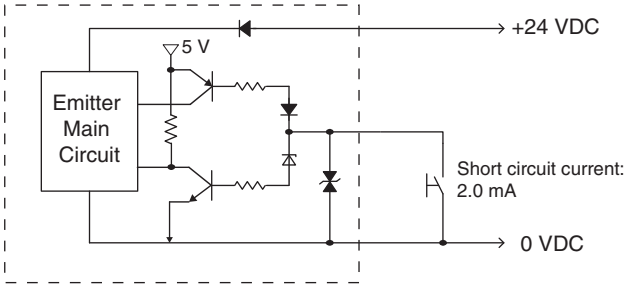
The input circuit diagrams of by function are shown below.

Test Input

<24 V Active>

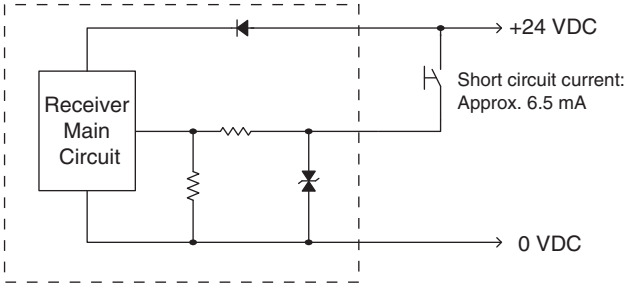


<0 V Active>

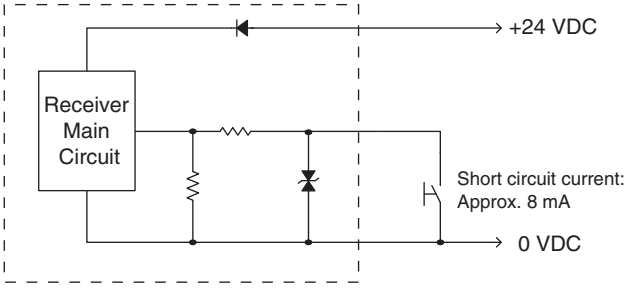


Reset/EDM

<PNP Output>



<NPN Output>

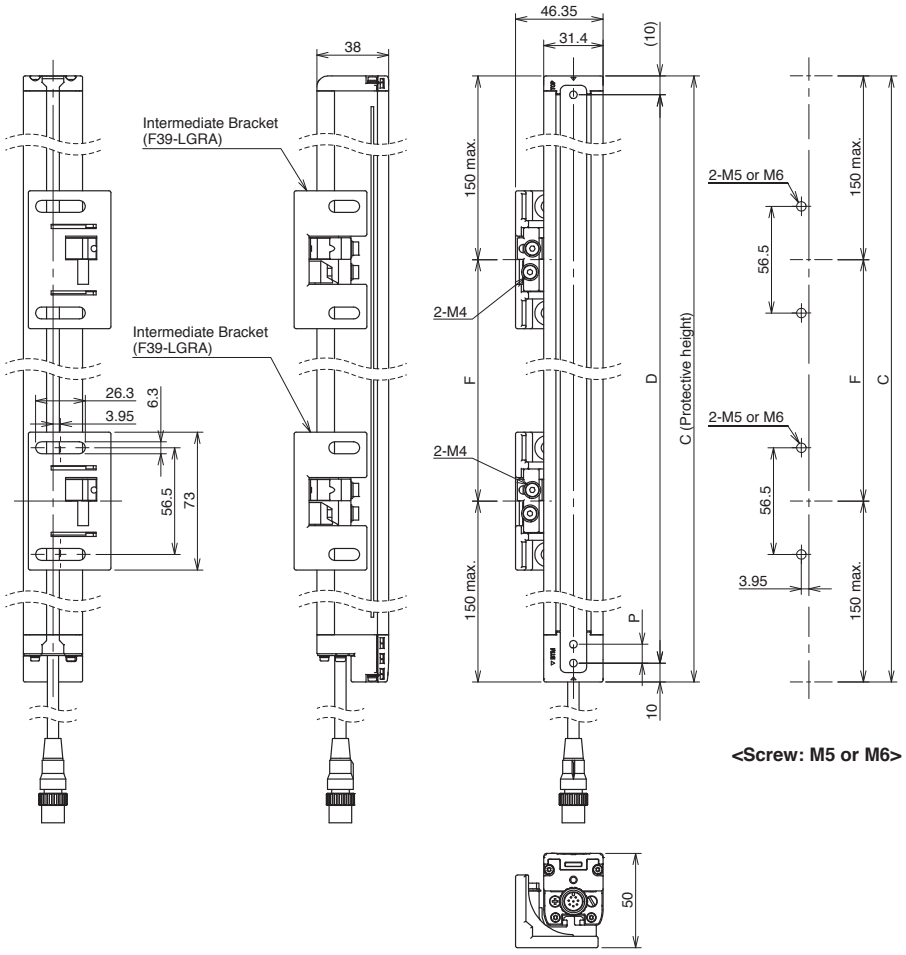


Dimensions

(Unit: mm)

Mounted with Intermediate Brackets (F39-LGRA)

Backside Mounting

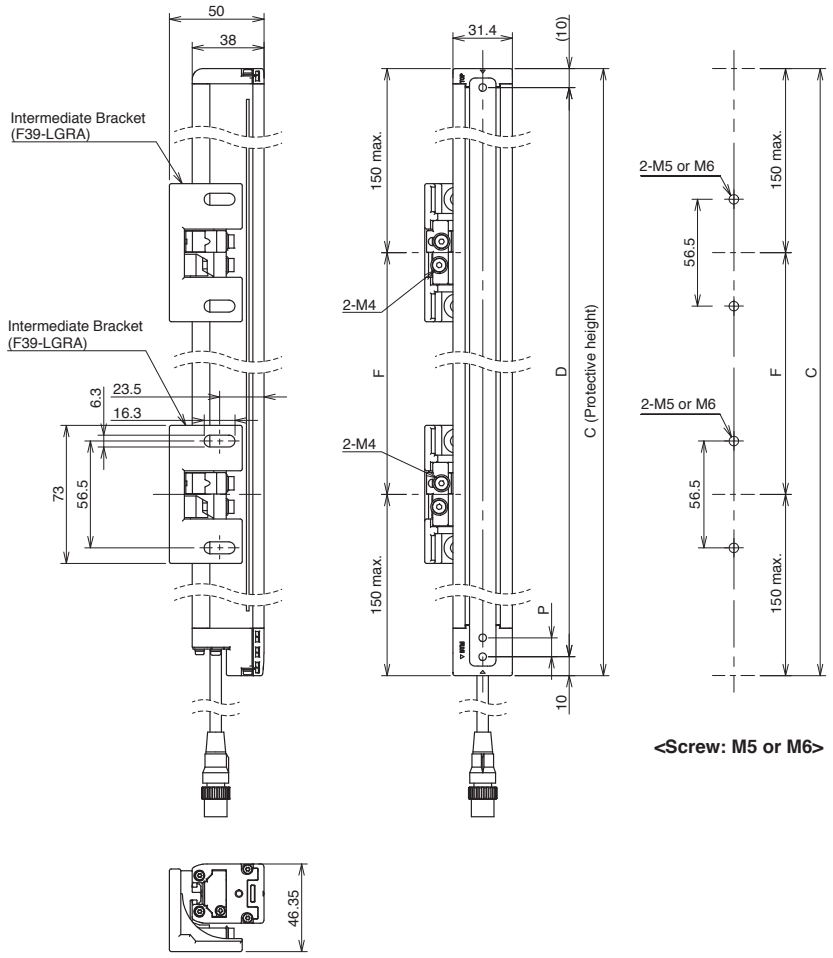


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

Protective height (C)	Number of Free-Location Brackets *1	Dimension F
0240 to 1200	2 *2	1000 mm max.
1280 to 1920	3	1000 mm max.

*1. The number of brackets required to mount either one of emitter and receiver.
*2. Mounting an emitter or receiver with one bracket is possible for the model of protective height of 0240. In this case, locate this bracket at half the Dimension C (or at the center of the sensor length).

Side Mounting



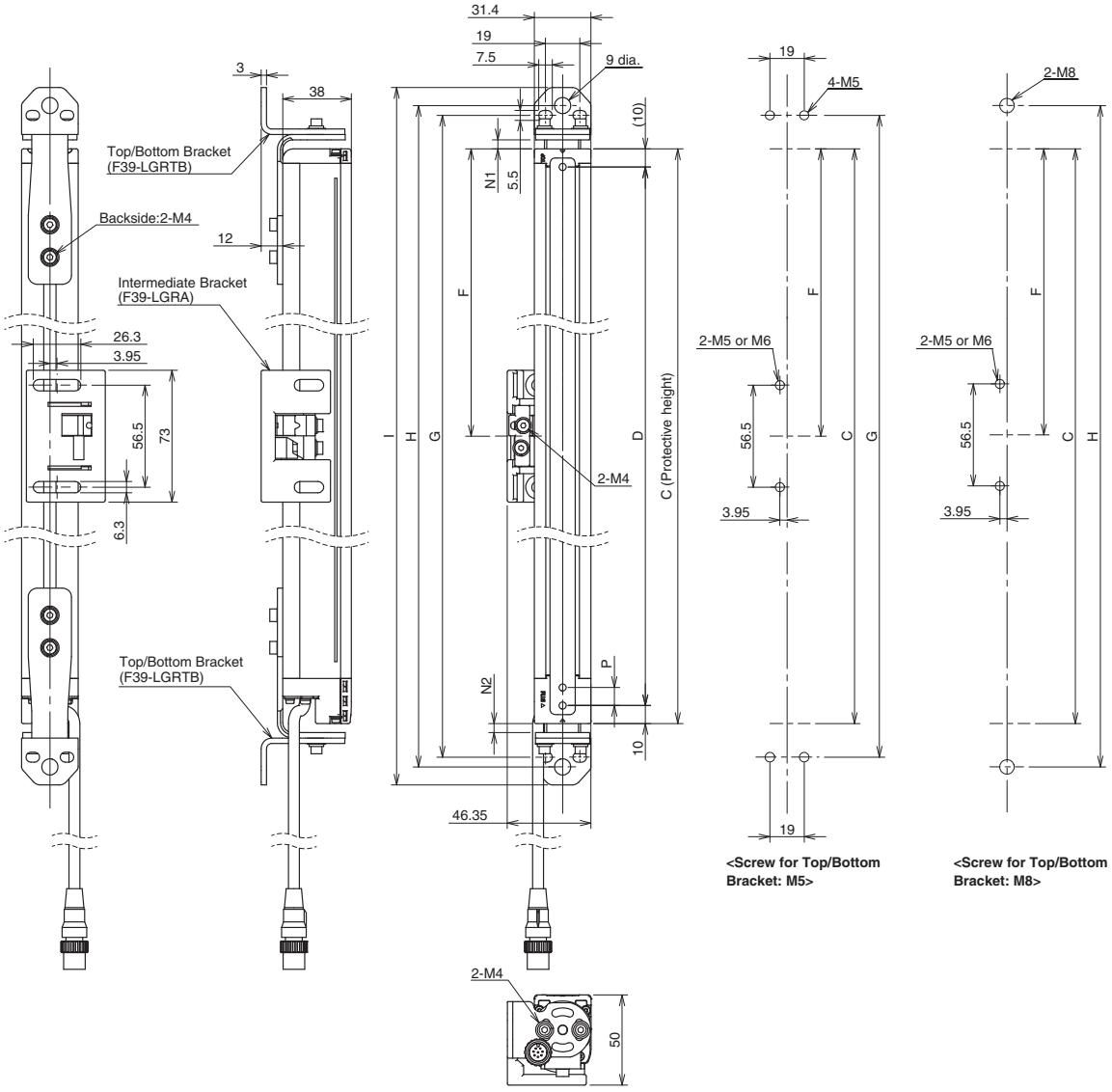
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

Protective height (C)	Number of Free-Location Brackets *1	Dimension F
0240 to 1200	2 *2	1000 mm max.
1280 to 1920	3	1000 mm max.

*1. The number of brackets required to mount either one of emitter and receiver.
*2. Mounting an emitter or receiver with one bracket is possible for the model of protective height of 0240. In this case, locate this bracket at half the Dimension C (or at the center of the sensor length).

Mounted with Top/Bottom Brackets (F39-LGRTB) and Intermediate Bracket (F39-LGRA)

Backside Mounting

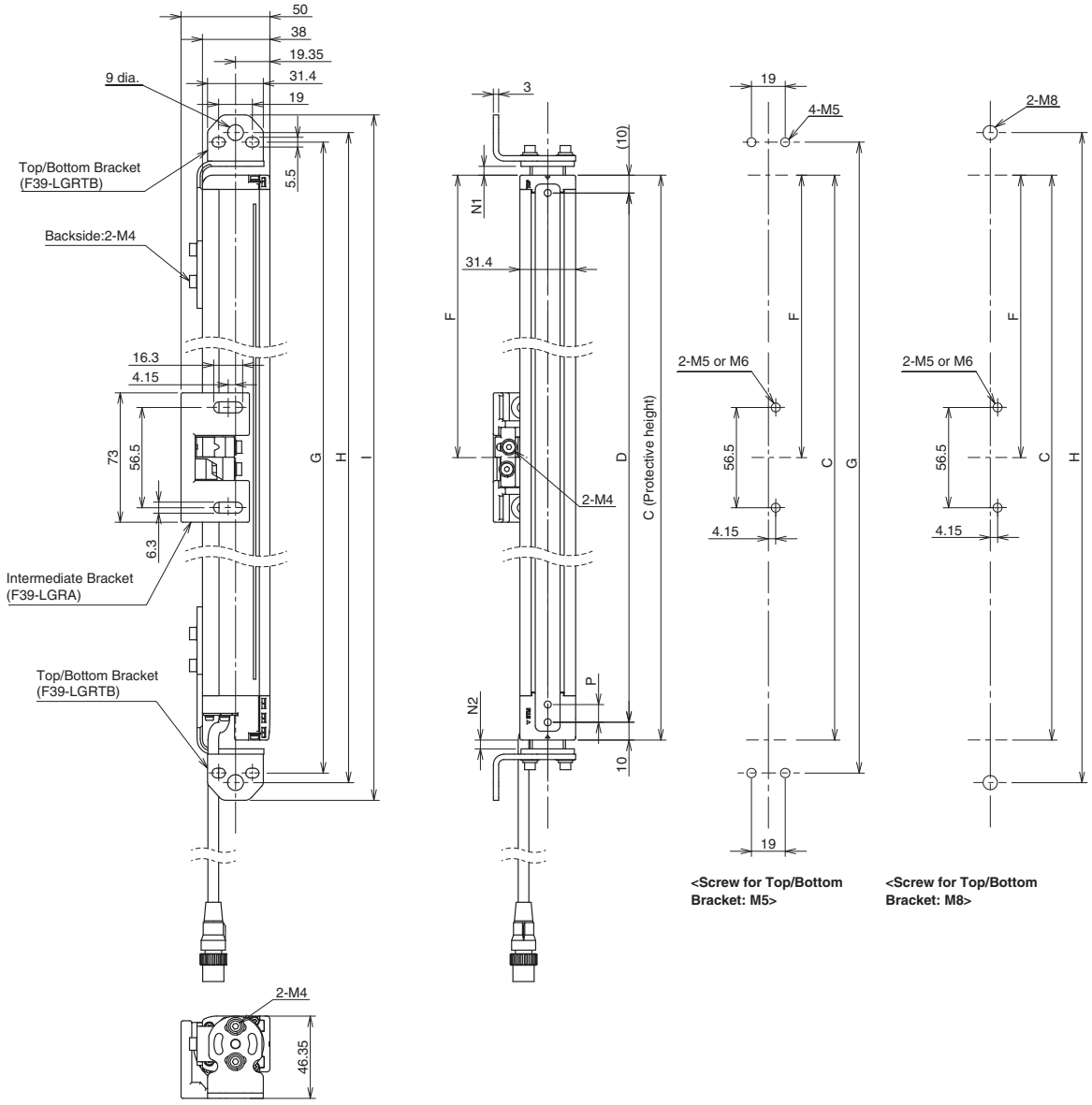


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+27.2+N1+N2	
Dimension H	C+38+N1+N2	
Dimension I	C+58+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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

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

Side Mounting



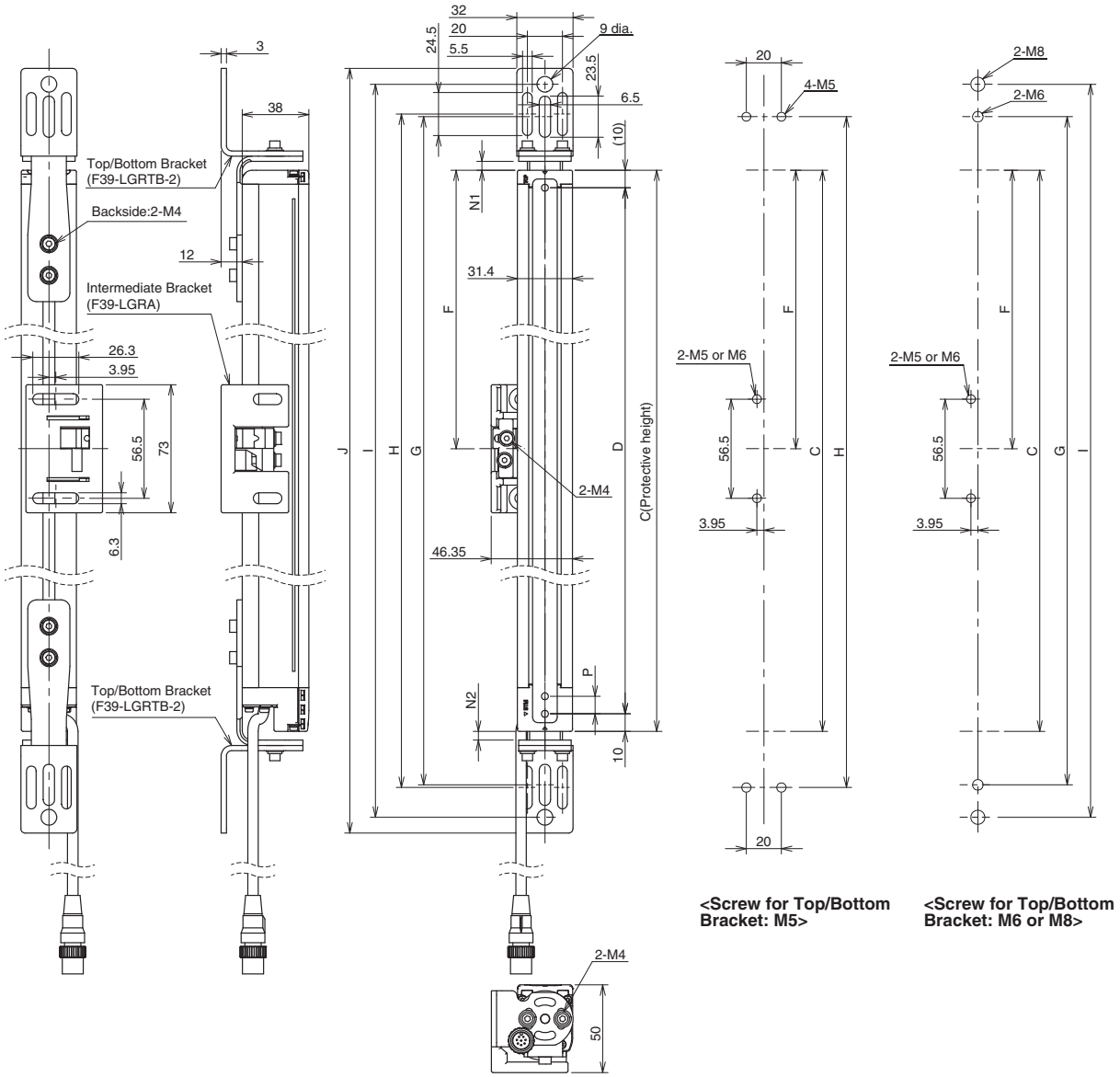
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+27.2+N1+N2	
Dimension H	C+38+N1+N2	
Dimension I	C+58+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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

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

Mounted with Top/Bottom Brackets (F39-LGRTB-2) and Intermediate Bracket (F39-LGRA)

Backside Mounting



<Screw for Top/Bottom Bracket: M5>

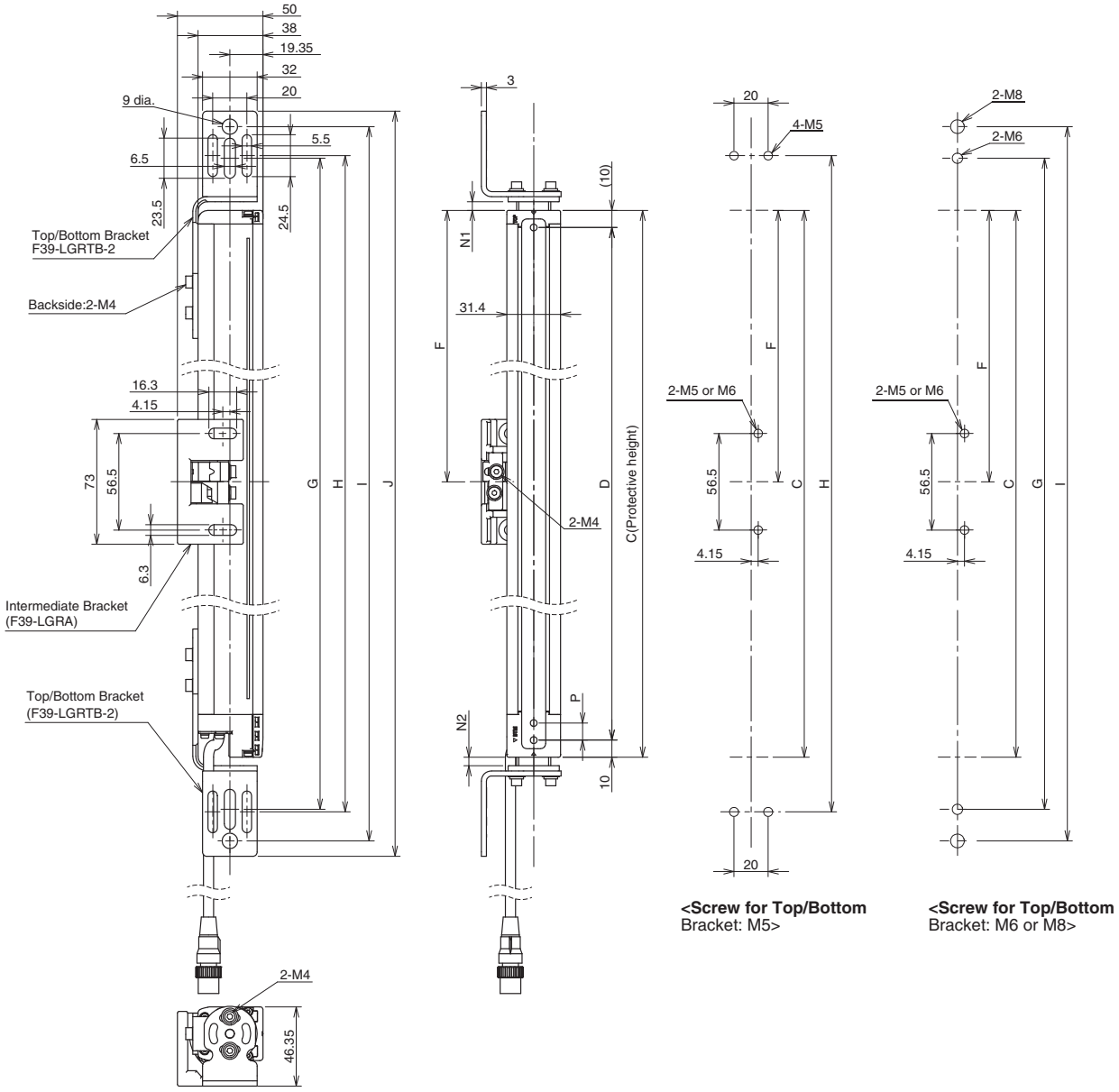
<Screw for Top/Bottom Bracket: M6 or M8>

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

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

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

Side Mounting



<Screw for Top/Bottom Bracket: M5>

<Screw for Top/Bottom Bracket: M6 or M8>

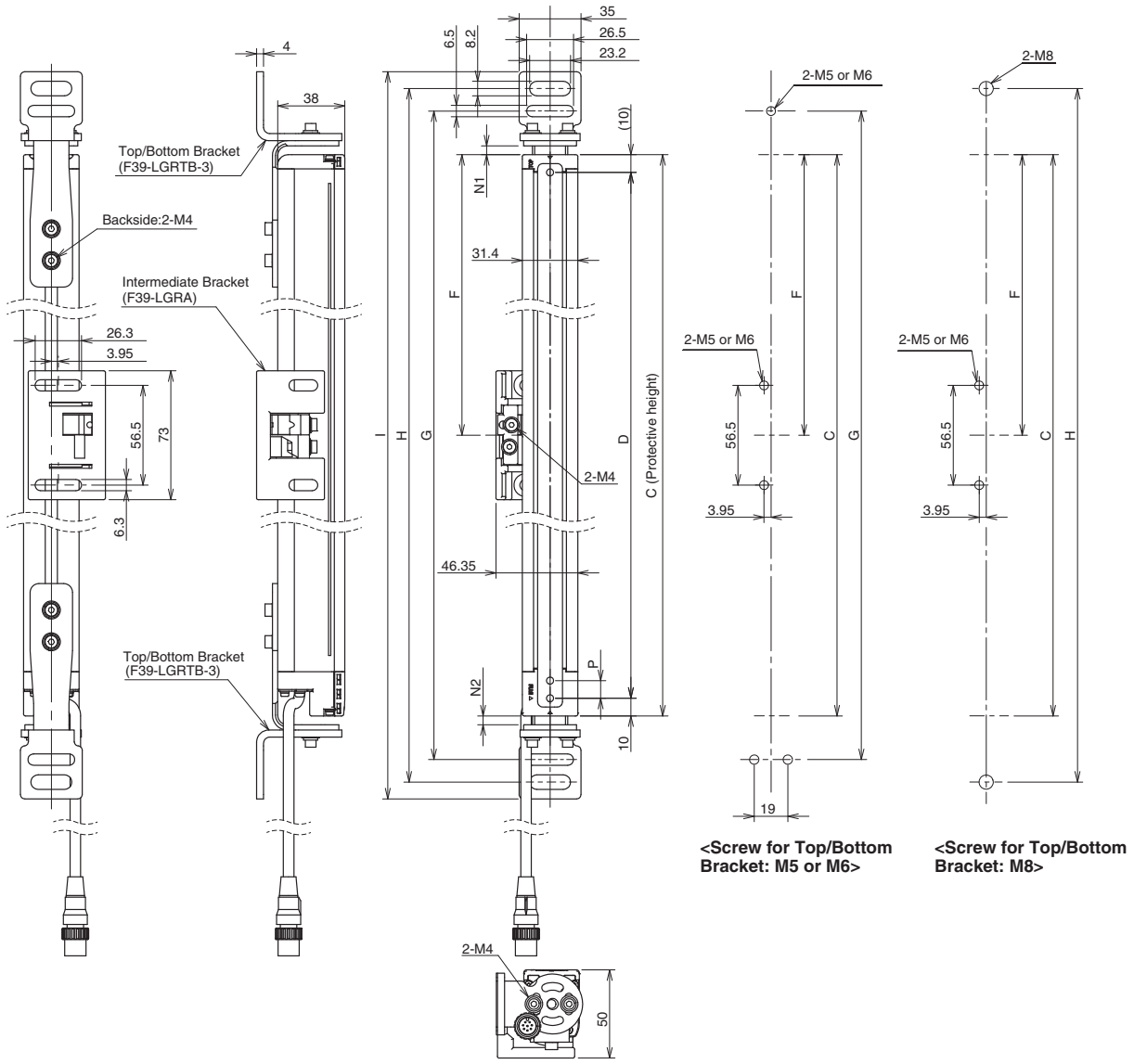
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+51+N1+N2	
Dimension H	C+54+N1+N2	
Dimension I	C+88+N1+N2	
Dimension J	C+106+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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

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

Mounted with Top/Bottom Brackets (F39-LGRTB-3) and Intermediate Bracket (F39-LGRA)

Backside Mounting

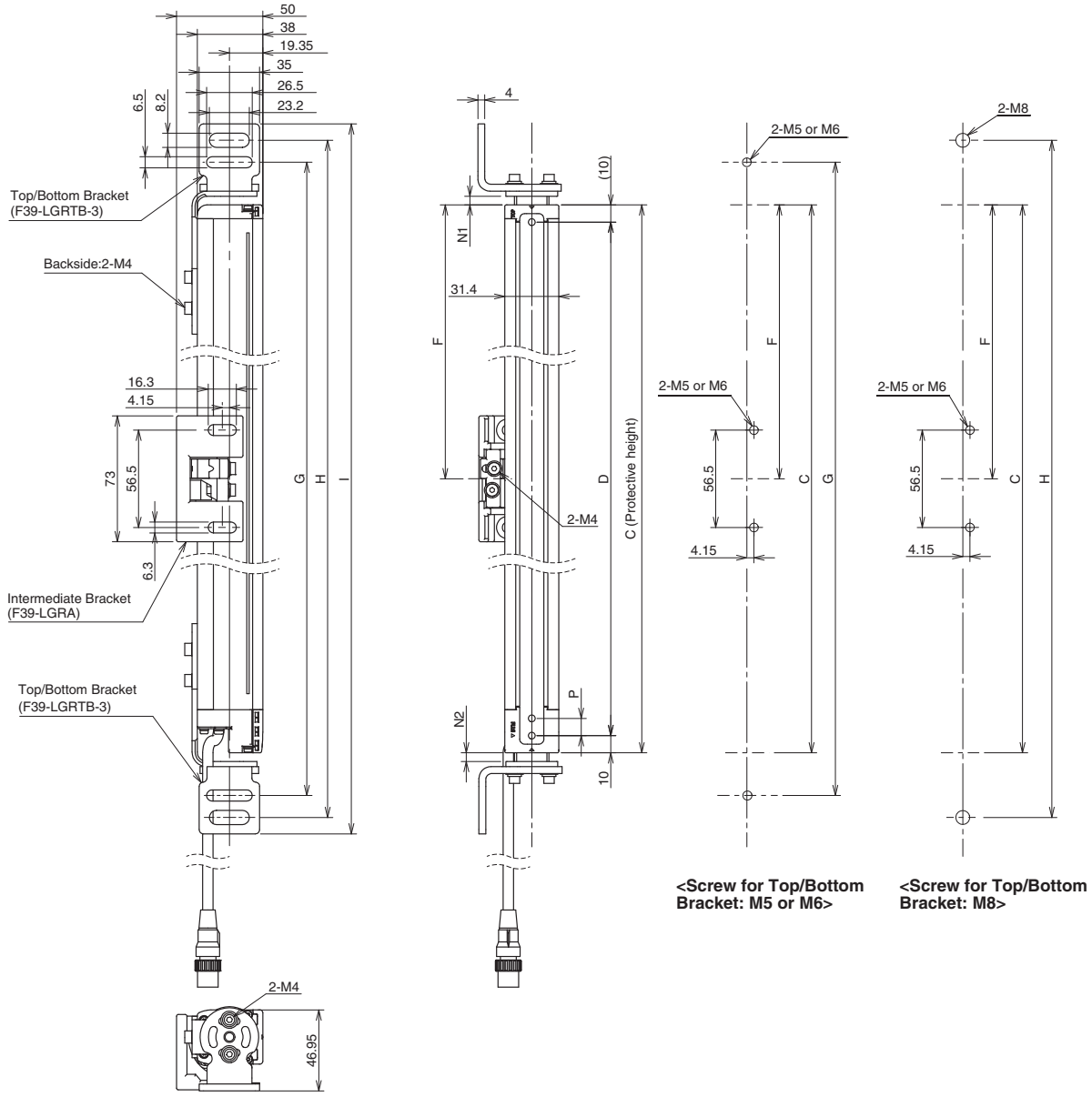


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+39.5+N1+N2	
Dimension H	C+65+N1+N2	
Dimension I	C+84+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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

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

Side Mounting



Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+39.5+N1+N2	
Dimension H	C+65+N1+N2	
Dimension I	C+84+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

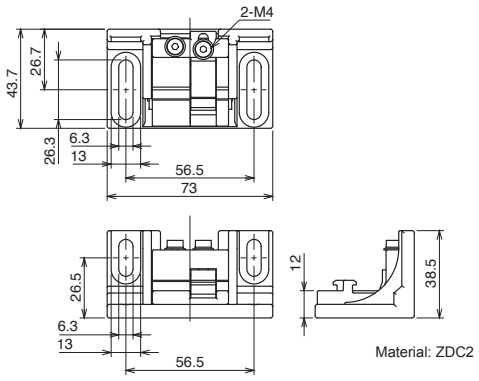
Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Accessories

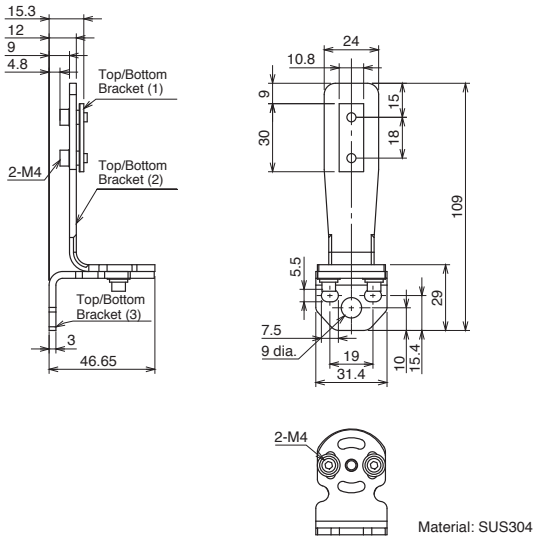
Sensor Mounting Brackets

Intermediate Bracket (F39-LGRA, sold separately)



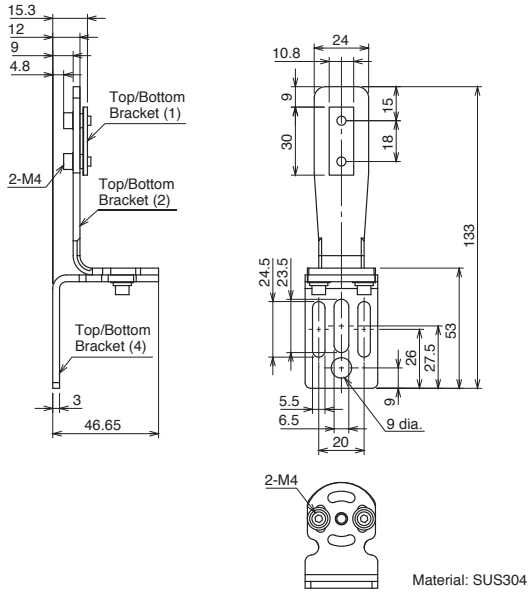
Material: ZDC2

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



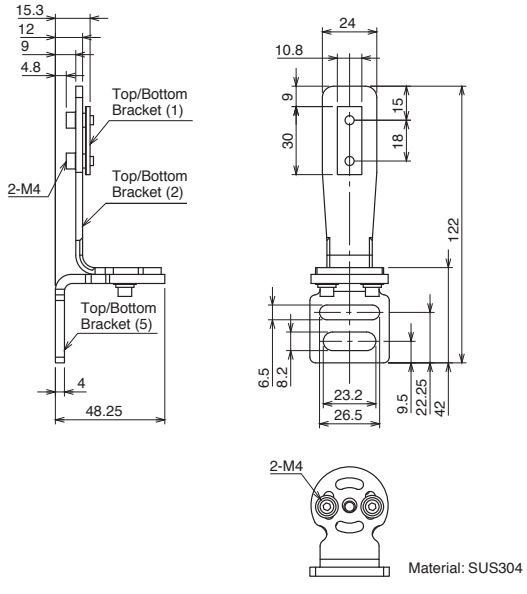
Material: SUS304

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



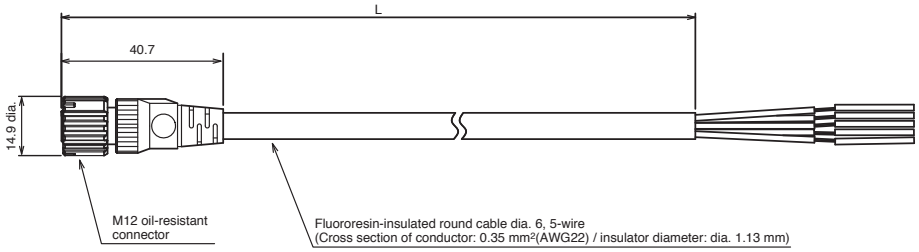
Material: SUS304

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

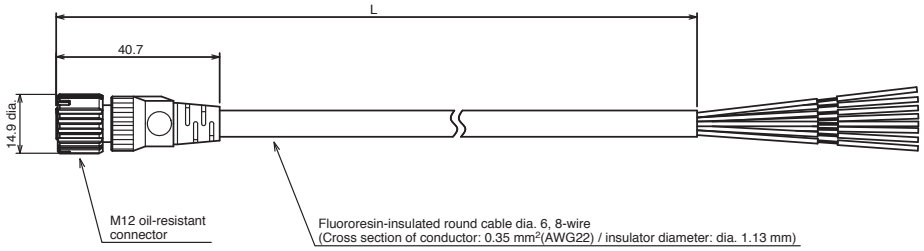


Material: SUS304

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

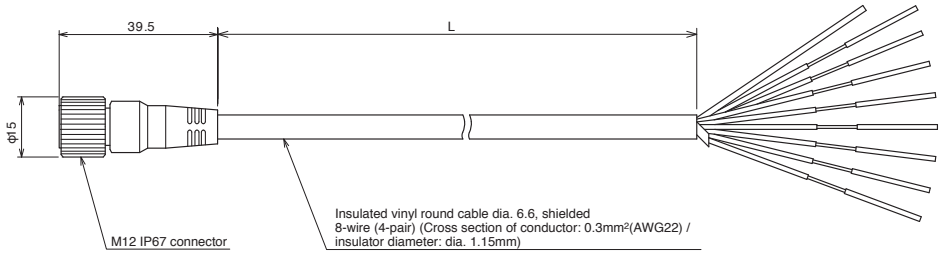


Single-Ended Cable for Receiver (Oil-Resistant Extension Cable) (F39-JD□RA-D, sold separately)

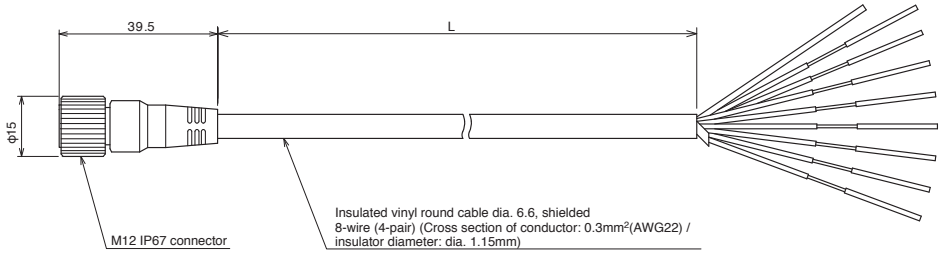


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3RA-L	F39-JD3RA-D	3
F39-JD7RA-L	F39-JD7RA-D	7

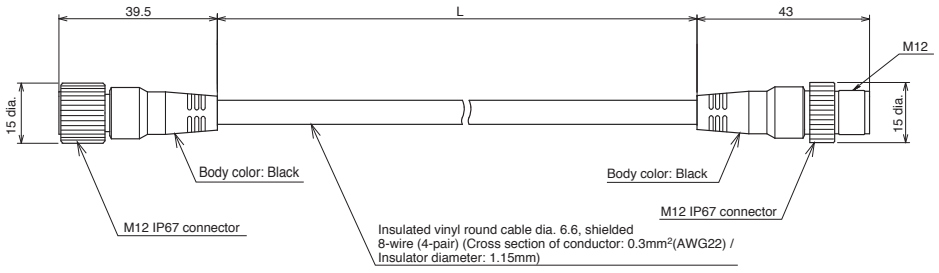
Single-Ended Cable for Emitter (F39-JD□A (sold in pairs), see page 43 for details)



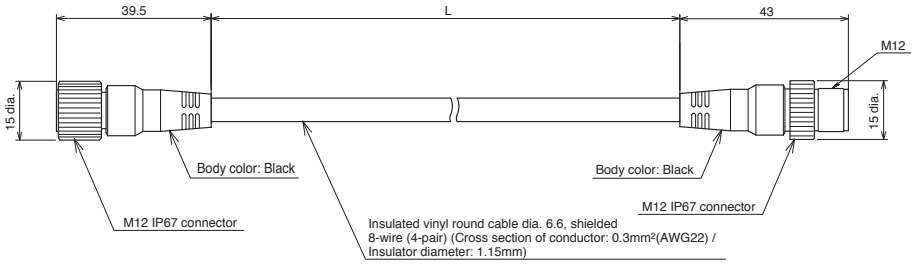
Single-Ended Cable for Receiver (F39-JD□A (sold in pairs), see page 43 for details)



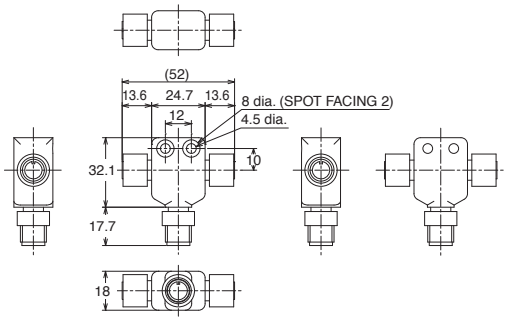
Double-Ended Cable for Emitter: Cable for extension (F39-JD□B (sold in pairs), see page 44 for details)



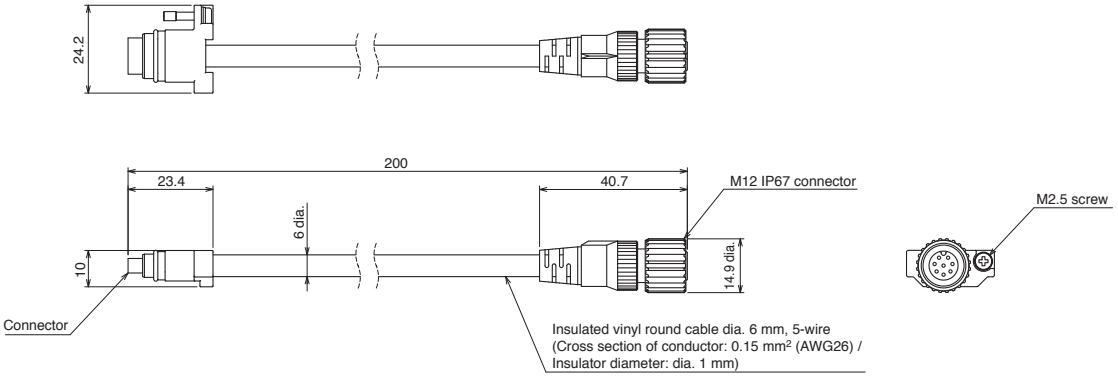
Double-Ended Cable for Receiver: Cable for extension (F39-JD□B (sold in pairs), see page 44 for details)



Reduced Wiring Connector (F39-CN5, sold separately)

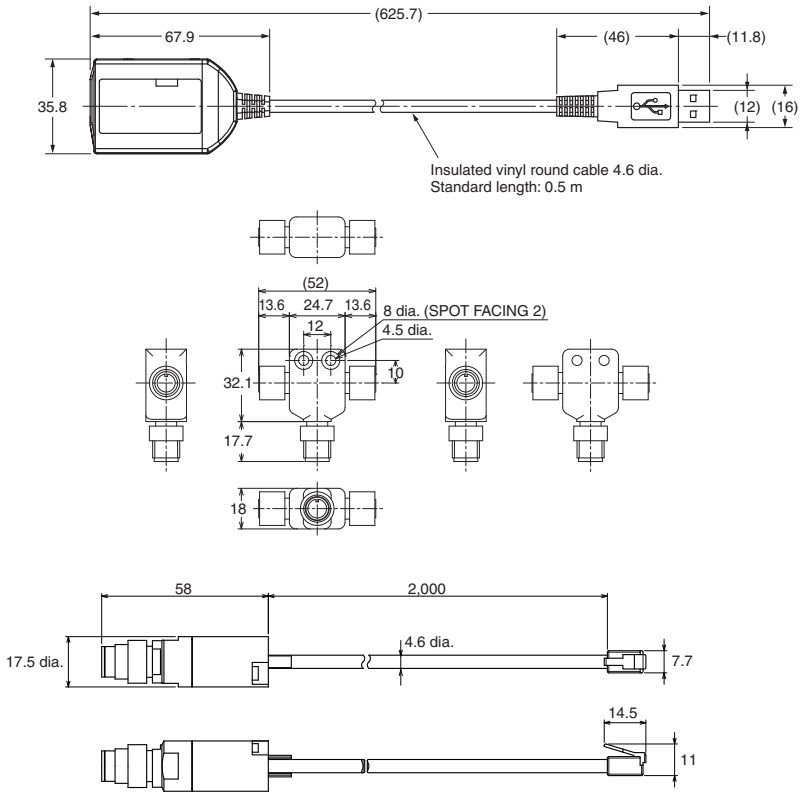


Cascading Cable (F39-JGR2WTS, sold in pairs)

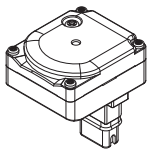


Set model name	Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR2WTS	F39-JGR2WTS-L	F39-JGR2WTS-D	0.2

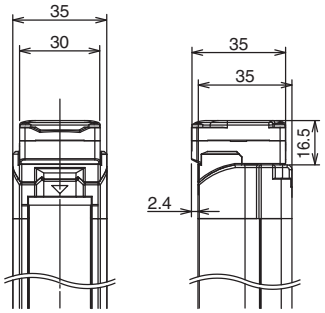
Interface Unit (F39-GIF-1, sold separately)



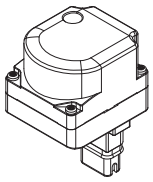
Bluetooth Communication Unit (F39-BT, sold separately)



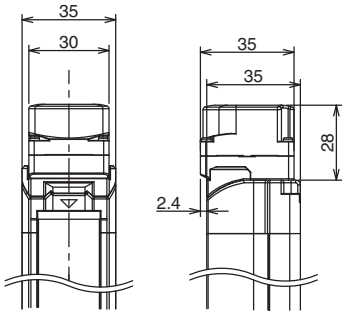
Material: PBT



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



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



Related Manuals

ManNo.	Model	Manual name
Z383	**F3SG-□RR□□□□□□□□□□□□**	Safety Light Curtain F3SG-□RR Series User's Manual

Safety Light Curtain Easy type
F3SG-RE

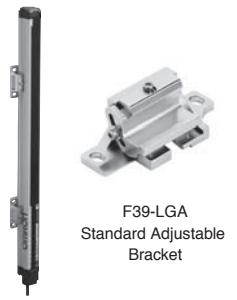
Easy-to-use Safety Sensor Ideal for Simple On/Off Detection Applications

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

System Configuration

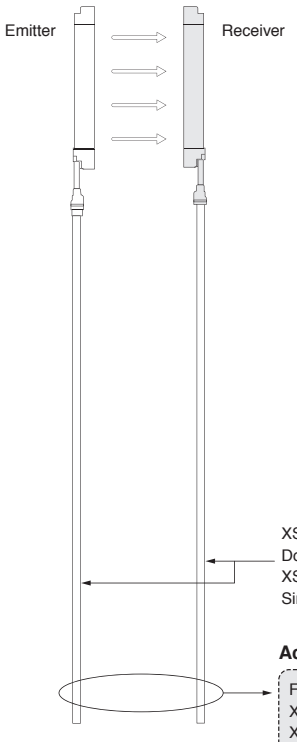
Mounting bracket

F39-LGF
Standard Fixed Bracket
(included as standard)



F39-LGA
Standard Adjustable Bracket

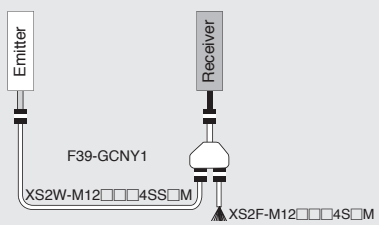
F39-LGTB
F39-LGTB-1
Top/Bottom Adjustable Bracket



XS2W-M12□□□4SS□M
Double-Ended Cable
XS2F-M12□□□4S□M
Single-Ended Cable
or

Accessory

F39-GCNY1
XS2W-M12□□□4SS□M
XS2F-M12□□□4S□M
Reduced wiring connector system



Accessory

F39-HGB□□□□
Spatter Protection Cover
(for F3SG-RE)

F39-PTG
Laser Pointer

Recommended safety controller *

- **NX/NE1A-series Safety Network Controller**
- **G9SP-series Safety Controller**
- **G9SE/G9SA-series Safety Relay Unit**
- **G9SX-series Flexible Safety Unit**
- **G7SA/G7S-E Relays with Forcibly Guided Contacts**

* The recommended safety controller is required to build a safety circuit using emergency stop switches and door switches.

Main Units

Safety Light Curtain
Finger protection

Number of beams	Protective height (mm)	Model	
		PNP output	NPN output
15	160	F3SG-4RE0160P14	F3SG-4RE0160N14
23	240	F3SG-4RE0240P14	F3SG-4RE0240N14
31	320	F3SG-4RE0320P14	F3SG-4RE0320N14
39	400	F3SG-4RE0400P14	F3SG-4RE0400N14
47	480	F3SG-4RE0480P14	F3SG-4RE0480N14
55	560	F3SG-4RE0560P14	F3SG-4RE0560N14
63	640	F3SG-4RE0640P14	F3SG-4RE0640N14
71	720	F3SG-4RE0720P14	F3SG-4RE0720N14
79	800	F3SG-4RE0800P14	F3SG-4RE0800N14
87	880	F3SG-4RE0880P14	F3SG-4RE0880N14
95	960	F3SG-4RE0960P14	F3SG-4RE0960N14
103	1,040	F3SG-4RE1040P14	F3SG-4RE1040N14
111	1,120	F3SG-4RE1120P14	F3SG-4RE1120N14
119	1,200	F3SG-4RE1200P14	F3SG-4RE1200N14
127	1,280	F3SG-4RE1280P14	F3SG-4RE1280N14
135	1,360	F3SG-4RE1360P14	F3SG-4RE1360N14
143	1,440	F3SG-4RE1440P14	F3SG-4RE1440N14
151	1,520	F3SG-4RE1520P14	F3SG-4RE1520N14
159	1,600	F3SG-4RE1600P14	F3SG-4RE1600N14
167	1,680	F3SG-4RE1680P14	F3SG-4RE1680N14
175	1,760	F3SG-4RE1760P14	F3SG-4RE1760N14
183	1,840	F3SG-4RE1840P14	F3SG-4RE1840N14
191	1,920	F3SG-4RE1920P14	F3SG-4RE1920N14
199	2,000	F3SG-4RE2000P14	F3SG-4RE2000N14
207	2,080	F3SG-4RE2080P14	F3SG-4RE2080N14

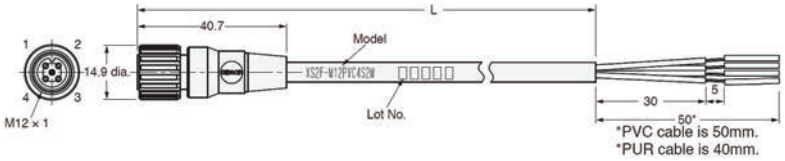
Hand and arm protection

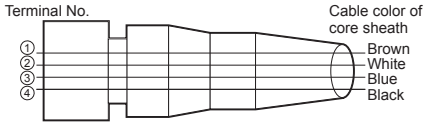
Number of beams	Protective height (mm)	Model	
		PNP	NPN
8	190	F3SG-4RE0190P30	F3SG-4RE0190N30
12	270	F3SG-4RE0270P30	F3SG-4RE0270N30
16	350	F3SG-4RE0350P30	F3SG-4RE0350N30
20	430	F3SG-4RE0430P30	F3SG-4RE0430N30
24	510	F3SG-4RE0510P30	F3SG-4RE0510N30
28	590	F3SG-4RE0590P30	F3SG-4RE0590N30
32	670	F3SG-4RE0670P30	F3SG-4RE0670N30
36	750	F3SG-4RE0750P30	F3SG-4RE0750N30
40	830	F3SG-4RE0830P30	F3SG-4RE0830N30
44	910	F3SG-4RE0910P30	F3SG-4RE0910N30
48	990	F3SG-4RE0990P30	F3SG-4RE0990N30
52	1,070	F3SG-4RE1070P30	F3SG-4RE1070N30
56	1,150	F3SG-4RE1150P30	F3SG-4RE1150N30
60	1,230	F3SG-4RE1230P30	F3SG-4RE1230N30
64	1,310	F3SG-4RE1310P30	F3SG-4RE1310N30
68	1,390	F3SG-4RE1390P30	F3SG-4RE1390N30
72	1,470	F3SG-4RE1470P30	F3SG-4RE1470N30
76	1,550	F3SG-4RE1550P30	F3SG-4RE1550N30
80	1,630	F3SG-4RE1630P30	F3SG-4RE1630N30
84	1,710	F3SG-4RE1710P30	F3SG-4RE1710N30
88	1,790	F3SG-4RE1790P30	F3SG-4RE1790N30
92	1,870	F3SG-4RE1870P30	F3SG-4RE1870N30
96	1,950	F3SG-4RE1950P30	F3SG-4RE1950N30
100	2,030	F3SG-4RE2030P30	F3SG-4RE2030N30
104	2,110	F3SG-4RE2110P30	F3SG-4RE2110N30
108	2,190	F3SG-4RE2190P30	F3SG-4RE2190N30
112	2,270	F3SG-4RE2270P30	F3SG-4RE2270N30
116	2,350	F3SG-4RE2350P30	F3SG-4RE2350N30
120	2,430	F3SG-4RE2430P30	F3SG-4RE2430N30
124	2,510	F3SG-4RE2510P30	F3SG-4RE2510N30

Accessories (Sold separately)

Single-Ended Cable (Round Water-resistant Connector: Connected Connected to Cable, Socket on One Cable End) (XS2F-M12□□□4S□M, sold separately)

(Unit: mm)

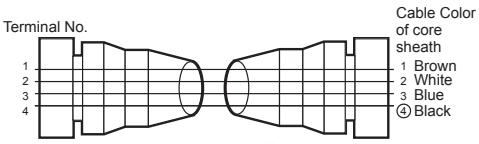


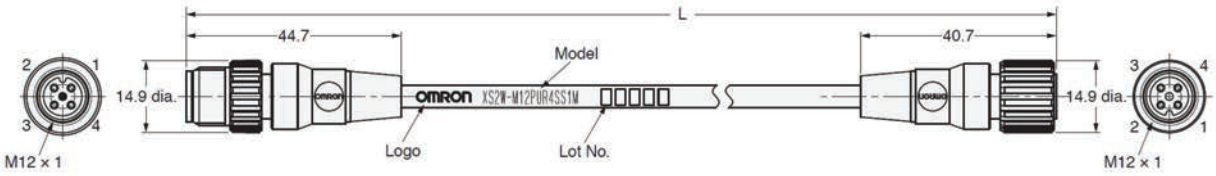


Appearance	Sheath material	Cable length	Model	Specifications
	PVC	2 m	**XS2F-M12PVC4S2M**	M12 connector (4-pin), 4 wires
	PVC	5 m	**XS2F-M12PVC4S5M**	
	PVC	10 m	**XS2F-M12PVC4S10M**	
	PUR	2 m	**XS2F-M12PUR4S2M**	
	PUR	5 m	**XS2F-M12PUR4S5M**	
	PUR	10 m	**XS2F-M12PUR4S10M**	

Double-Ended Cable (Round Water-resistant Connector: Connectors Connected to Cable, Socket and Plug on Cable Ends) (XS2W-M12□□□4SS□M, sold separately)

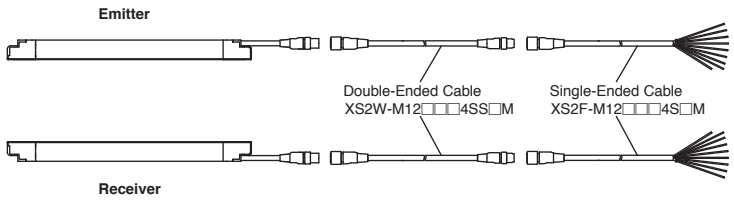
(Unit: mm)



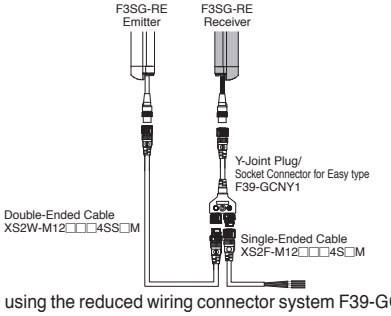


Appearance	Sheath material	Cable length	Model	Specifications
	PVC	2 m	**XS2W-M12PVC4SS2M**	M12 connector (4-pin), on both ends
	PVC	5 m	**XS2W-M12PVC4SS5M**	
	PVC	10 m	**XS2W-M12PVC4SS10M**	
	PUR	2 m	**XS2W-M12PUR4SS2M**	
	PUR	5 m	**XS2W-M12PUR4SS5M**	
	PUR	10 m	**XS2W-M12PUR4SS10M**	

<Connection example>



Y-Joint Plug/Socket Connector for Easy type F3SG-RE

Appearance	Type	Cable length	Specifications	Model
	M12 connectors. Used for reduced wiring.	0.5 m	 When using the reduced wiring connector system F39-GCNY1, the Operating Range Selection is fixed to Long Mode.	**F39-GCNY1**

Sensor Mounting Brackets

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

*1. [for F3SG-4RE□□□□□14] Protective height of 0160 to 1200: 2 sets, Protective height of 1280 to 2080: 3 sets
[for F3SG-4RE□□□□□30] Protective height of 0190 to 1230: 2 sets, Protective height of 1310 to 2270: 3 sets, Protective height of 2350 to 2510: 4 sets

*2. Top/Bottom Adjustable Bracket cannot be used with the Standard Fixed Bracket. Use with the Standard Adjustable Bracket.
Using Top/Bottom Adjustable Brackets with Standard Adjustable Brackets
F3SG-4RE□□□□□14: Protective height of 1120 to 1920: 1 set of Top/Bottom Adjustable Brackets and 1 set of Standard Adjustable Brackets
Protective height of 2000 to 2080: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets
Protective height of 1040 or lower: Standard Adjustable Brackets cannot be used.
F3SG-4RE□□□□□30: Protective height of 1150 to 1950: 1 set of Top/Bottom Adjustable Brackets and 1 set of Standard Adjustable Brackets
Protective height of 2030 to 2510: 1 set of Top/Bottom Adjustable Brackets and 2 sets of Standard Adjustable Brackets
Protective height of 1070 or lower: Standard Adjustable Brackets cannot be used.

Laser Pointer for F3SG-R

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

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

Spatter Protection Covers include the mounting brackets.
For Safety Light Curtain models of the protective height of 2,000 mm or longer, use two Spatter Protection Covers of different lengths.

Appearance	Safety Light Curtain Model		Model
	Finger protection	Hand and arm protection	
	F3SG-4RE0160□14	F3SG-4RE0190□30	F39-HGB0180
	F3SG-4RE0240□14	F3SG-4RE0270□30	F39-HGB0260
	F3SG-4RE0320□14	F3SG-4RE0350□30	F39-HGB0340
	F3SG-4RE0400□14	F3SG-4RE0430□30	F39-HGB0420
	F3SG-4RE0480□14	F3SG-4RE0510□30	F39-HGB0500
	F3SG-4RE0560□14	F3SG-4RE0590□30	F39-HGB0580
	F3SG-4RE0640□14	F3SG-4RE0670□30	F39-HGB0660
	F3SG-4RE0720□14	F3SG-4RE0750□30	F39-HGB0740
	F3SG-4RE0800□14	F3SG-4RE0830□30	F39-HGB0820
	F3SG-4RE0880□14	F3SG-4RE0910□30	F39-HGB0900
	F3SG-4RE0960□14	F3SG-4RE0990□30	F39-HGB0980
	F3SG-4RE1040□14	F3SG-4RE1070□30	F39-HGB1060
	F3SG-4RE1120□14	F3SG-4RE1150□30	F39-HGB1140
	F3SG-4RE1200□14	F3SG-4RE1230□30	F39-HGB1220
	F3SG-4RE1280□14	F3SG-4RE1310□30	F39-HGB1300
	F3SG-4RE1360□14	F3SG-4RE1390□30	F39-HGB1380
	F3SG-4RE1440□14	F3SG-4RE1470□30	F39-HGB1460
	F3SG-4RE1520□14	F3SG-4RE1550□30	F39-HGB1540
	F3SG-4RE1600□14	F3SG-4RE1630□30	F39-HGB1620
	F3SG-4RE1680□14	F3SG-4RE1710□30	F39-HGB1700
	F3SG-4RE1760□14	F3SG-4RE1790□30	F39-HGB1780
	F3SG-4RE1840□14	F3SG-4RE1870□30	F39-HGB1860
	F3SG-4RE1920□14	F3SG-4RE1950□30	F39-HGB1940
	F3SG-4RE2000□14	F3SG-4RE2030□30	F39-HGB1460
			F39-HGA0550
	F3SG-4RE2080□14	F3SG-4RE2110□30	F39-HGB1540
			F39-HGA0550
	–	F3SG-4RE2190□30	F39-HGB1620
			F39-HGA0550
	–	F3SG-4RE2270□30	F39-HGB1700
			F39-HGA0550
	–	F3SG-4RE2350□30	F39-HGB1780
			F39-HGA0550
	–	F3SG-4RE2430□30	F39-HGB1860
			F39-HGA0550
	–	F3SG-4RE2510□30	F39-HGB1940
			F39-HGA0550

Note: The operating range of the Safety Light Curtain attached with the product is 10% shorter than the rating.

Test Rod

Diameter	Model
14 mm dia.	**STI-TO14**
30 mm dia.	**STI-TO30**

Ratings/Specifications

Main unit

The □□□□ in the model names indicate the protective heights in millimeters.

			F3SG-4RE□□□□-14	F3SG-4RE□□□□-30
Performance	Type of ESPE (IEC 61496-1)	Type 4	F3SG-4RE□□□□□14/30	
	Object Resolution (Detection Capability)		Opaque objects	
			14-mm dia.	30-mm dia.
	Beam Gap		10mm	20mm
	Number of Beams		15 to 207	8 to 124
	Lens Size		5.2 ×3.4 (W×H) mm	7-mm dia.
	Protective Height		160 to 2080 mm (6.3 to81.9 inch)	190 to 2510 mm (7.3 to98.7 inch)
	Operating Range	Long	0.3 to 10.0 m (1 to 32 ft.)	0.3 to 20.0 m (1 to 65 ft.)
		Short	0.3 to 3.0 m (1 to 10 ft.)	0.3 to 7.0 m (1 to 23 ft.)
	Response Time	ON to OFF	5 to 15ms *1	
		OFF to ON	25 to 75ms *1	
			*1.Response time when used in one segment system Refer to page 96.	
	Effective Aperture Angle (EAA) (IEC61496-2)	Type 4	±2.5° max., emitter and receiver at operating range of 3 m or greater	

			F3SG-4RE□□□□-14	F3SG-4RE□□□□-30
Performance	Light Source		Infrared LEDs, Wavelength: 870 nm	
	Startup Waiting Time		2 s max.	
Electricall	Power Supply Voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
	Current Consumption		Refer to page 96	
	Safety Outputs (OSSD)		F3SG-□RE□□□□P□□: Two PNP transistor outputs F3SG-□RE□□□□N□□: Two NPN transistor outputs	
			Load current of 300 mA max., Residual voltage of 2 V max. (except for voltage drop due to cable extension), Capacitive load of 1 μF max., Inductive load of 2.2 H max. *1 Leakage current of 1 mA max. (PNP), 2 mA max. (NPN) *2 *1.The load inductance is the maximum value when the safety output frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger. *2.These values must be taken into consideration when connecting elements including a capacitive load such as a capacitor.	
	Output Operation Mode	Safety Output	Light-ON (Safety output is enabled when the receiver receives an emitting signal.)	
	Input Voltage	ON Voltage	Operating Range Select Input: Long: 9 V to Vs (sink current 3 mA max.) * Short: 0 to 3 V (source current 3 mA max.)	
		OFF Voltage		
		*	The Vs indicates a supply voltage value in your environment.	
	Overvoltage Category (IEC60664-1)		II	
	Indicators		Refer to page 97	
	Protective Circuit		Output short protection, Power supply reverse polarity protection	
	Insulation Resistance		20 MΩ or higher (500 VDC megger)	
	Dielectric Strength		1,000 VAC, 50/60 Hz (1 min)	
Functional	Test Function		Self-test (at power-on, and during operation)	
Environmental	Ambient Temperature	Operating	-10 to 55°C (14 to 131°F) (non-icing)	
		Storage	-25 to 70°C (-13 to 158°F)	
	Ambient Humidity	Operating	35% to 85% (non-condensing)	
		Storage	35% to 95%	
	Ambient Illuminance		Incandescent lamp: 3,000 lx max. on receiver surface Sunlight: 10,000 lx max. on receiver surface	
	Degree of Protection (IEC 60529)		IP65 and IP67	
	Vibration Resistance (IEC 61496-1)		10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes	
	Shock Resistance (IEC 61496-1)		100 m/s^2, 1000 shocks for all 3 axes	
	Pollution Degree (IEC 60664-1)		Pollution Degree 3	
Connections	Power cable	Type of Connection	M12 connectors: 4-pin, IP67 rated when mated,Cables prewired to the sensors	
		Number of Wires	Emitter: 4, Receiver: 4	
		Cable Length	0.3 m	
		Cable Diameter	6 mm	
		Minimum Bending Radius	R5 mm	
	Extension cable - Single-Ended Cable - Double-Ended Cable	Type of Connection	Use the XS2□-M12□□□4S□□M	
		Number of Wires		
		Cable Length		
		Cable Diameter		
		Minimum Bending Radius		
	Extension of Power Cable		100 m max.	
Material	Material		Housing: Aluminum Cap: PBT Front window: PMMA Cable: Oil resistant PVC Mounting Bracket: ZDC2 FE plate: SUS	
	Weight (packaged)		Refer to page 96.	
	Included Accessories		Safety Precautions, Quick Installation Manual, Standard Fixed Bracket*1, Troubleshooting Guide Sticker *1.The quantity of Standard Fixed Brackets included varies depending on the protective height. [F3SG-□RE□□□□14] - Protective height of 0160 to 1200: 2 sets - Protective height of 1280 to 2080: 3 sets [F3SG-□RE□□□□30] - Protective height of 0190 to 1230: 2 sets - Protective height of 1310 to 2270: 3 sets - Protective height of 2350 to 2510: 4 sets	
Conformity	Conforming standards		Refer to page 26	
	Performance Level (PL)/Safety category	Type 4	PL e/Category 4 (EN ISO 13849-1:2008)	
	PFHd		9.1×10^{-9} (IEC 61508)	
	Proof test interval T_M		Every 20 years (IEC 61508)	
	SFF		99% (IEC 61508)	
	HFT		1 (IEC 61508)	
	Classification		Type B (IEC 61508-2)	

List of Models/Response Time/Current Consumption/Weight

F3SG-□RE□□□□□-14

Model	Number of Beams	Protective Height [mm]	Response Time [ms] *1			Current Consumption [mA]		Weight [kg] *2
			ON→OFF	OFF (Synchronized) →ON	OFF (Not synchronized) →ON	Emitter	Receiver	
F3SG-□RE0160□14	15	160	5	25	125	45	50	1.7
F3SG-□RE0240□14	23	240	5	25	125	55	55	1.9
F3SG-□RE0320□14	31	320	7	35	135	55	55	2.1
F3SG-□RE0400□14	39	400	7	35	135	65	60	2.6
F3SG-□RE0480□14	47	480	7	35	135	70	60	2.8
F3SG-□RE0560□14	55	560	7	35	135	80	60	3.1
F3SG-□RE0640□14	63	640	7	35	135	85	65	3.3
F3SG-□RE0720□14	71	720	9	45	145	80	65	3.8
F3SG-□RE0800□14	79	800	9	45	145	85	70	4.0
F3SG-□RE0880□14	87	880	9	45	145	90	70	4.2
F3SG-□RE0960□14	95	960	9	45	145	95	75	4.4
F3SG-□RE1040□14	103	1040	9	45	145	100	75	4.6
F3SG-□RE1120□14	111	1120	11	55	155	90	75	4.7
F3SG-□RE1200□14	119	1200	11	55	155	95	80	4.9
F3SG-□RE1280□14	127	1280	11	55	155	100	80	5.1
F3SG-□RE1360□14	135	1360	11	55	155	105	85	5.6
F3SG-□RE1440□14	143	1440	11	55	155	110	85	5.7
F3SG-□RE1520□14	151	1520	13	65	165	100	90	5.9
F3SG-□RE1600□14	159	1600	13	65	165	105	90	6.5
F3SG-□RE1680□14	167	1680	13	65	165	110	95	6.7
F3SG-□RE1760□14	175	1760	13	65	165	115	95	6.9
F3SG-□RE1840□14	183	1840	13	65	165	115	95	7.1
F3SG-□RE1920□14	191	1920	15	75	175	110	100	7.3
F3SG-□RE2000□14	199	2000	15	75	175	115	100	7.4
F3SG-□RE2080□14	207	2080	15	75	175	115	105	8.0

*1. The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.
*2. The weight includes an emitter, a receiver and included brackets in a product package.

F3SG-□RE□□□□□30

Model	Number of Beams	Protective Height [mm]	Response Time [ms] *1			Current Consumption [mA]		Weight [kg] *2
			ON→OFF	OFF (Synchronized) →ON	OFF (Not synchronized) →ON	Emitter	Receiver	
F3SG-□RE0190□30	8	190	5	25	125	40	50	1.7
F3SG-□RE0270□30	12	270	5	25	125	45	50	1.9
F3SG-□RE0350□30	16	350	5	25	125	50	50	2.1
F3SG-□RE0430□30	20	430	5	25	125	55	55	2.6
F3SG-□RE0510□30	24	510	5	25	125	60	55	2.8
F3SG-□RE0590□30	28	590	7	35	135	50	55	3.0
F3SG-□RE0670□30	32	670	7	35	135	55	55	3.2
F3SG-□RE0750□30	36	750	7	35	135	60	60	3.8
F3SG-□RE0830□30	40	830	7	35	135	65	60	4.0
F3SG-□RE0910□30	44	910	7	35	135	65	60	4.2
F3SG-□RE0990□30	48	990	7	35	135	70	60	4.4
F3SG-□RE1070□30	52	1070	7	35	135	75	60	4.5
F3SG-□RE1150□30	56	1150	7	35	135	80	65	4.7
F3SG-□RE1230□30	60	1230	7	35	135	85	65	4.9
F3SG-□RE1310□30	64	1310	7	35	135	85	65	5.1
F3SG-□RE1390□30	68	1390	9	45	145	75	65	5.5
F3SG-□RE1470□30	72	1470	9	45	145	80	65	5.7
F3SG-□RE1550□30	76	1550	9	45	145	80	70	5.9
F3SG-□RE1630□30	80	1630	9	45	145	85	70	6.4
F3SG-□RE1710□30	84	1710	9	45	145	85	70	6.6
F3SG-□RE1790□30	88	1790	9	45	145	90	70	6.8
F3SG-□RE1870□30	92	1870	9	45	145	95	75	7.0
F3SG-□RE1950□30	96	1950	9	45	145	95	75	7.2
F3SG-□RE2030□30	100	2030	9	45	145	100	75	7.3
F3SG-□RE2110□30	104	2110	9	45	145	100	75	7.9
F3SG-□RE2190□30	108	2190	11	55	155	90	75	8.1
F3SG-□RE2270□30	112	2270	11	55	155	95	80	8.2
F3SG-□RE2350□30	116	2350	11	55	155	95	80	8.7
F3SG-□RE2430□30	120	2430	11	55	155	95	80	8.8
F3SG-□RE2510□30	124	2510	11	55	155	100	80	9.0

*1. The maximum speed of movement of a test rod up to which the detection capability is maintained is 2.0 m/s.
*2. The weight includes an emitter, a receiver and included brackets in a product package.

LED Indicator Status

Emitter

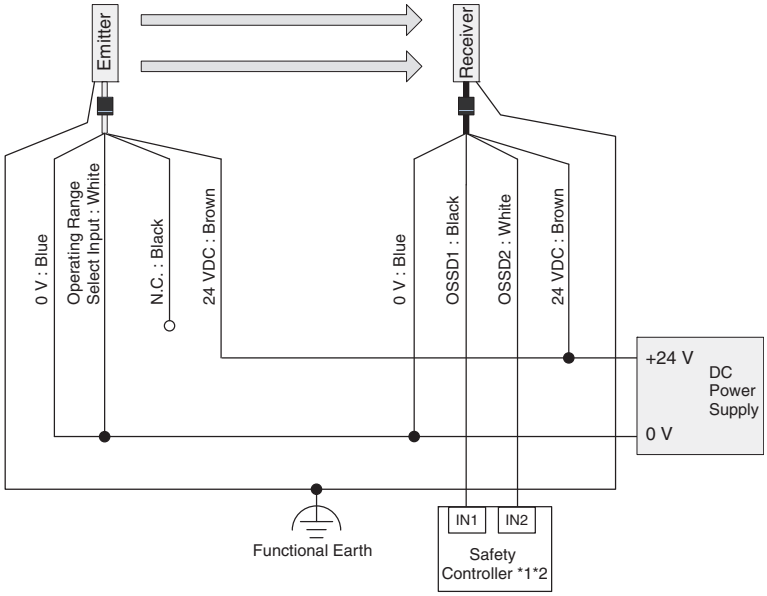
Name of Indicator		Color	Illuminated	Blinking
Operating range	LONG	Green	Long range mode is selected	Lockout state due to Operating range selection setting error
Power	POWER	Green	Power is ON.	Error due to noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in emitter

Receiver

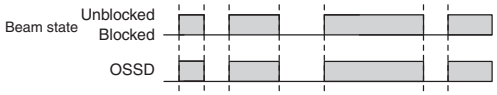
Name of Indicator		Color	Illuminated	Blinking
Top-beam-state	TOP	Blue	The top beam is unblocked	–
Internal error	INTERNAL	Red	–	Lockout state due to Internal error, or error due to abnormal power supply or noise
Lockout	LOCKOUT	Red	–	Lockout state due to error in receiver
Stable-state	STB	Green	Incident light level is 170% or higher of ON threshold	Safety output is instantaneously turned OFF due to ambient light or vibration
ON/OFF	ON/OFF	Green	Safety output is in ON state	–
		Red	Safety output is in OFF state	Lockout state due to Safety Output error, or error due to abnormal power supply or noise
Communication	COM	Green	Synchronization between emitter and receiver is maintained	Lockout state due to Communication error, or error due to abnormal power supply or noise
Bottom-beam-state	BTM	Blue	The bottom beam is unblocked	–

Connections (Basic Wiring Diagram)

Short Mode

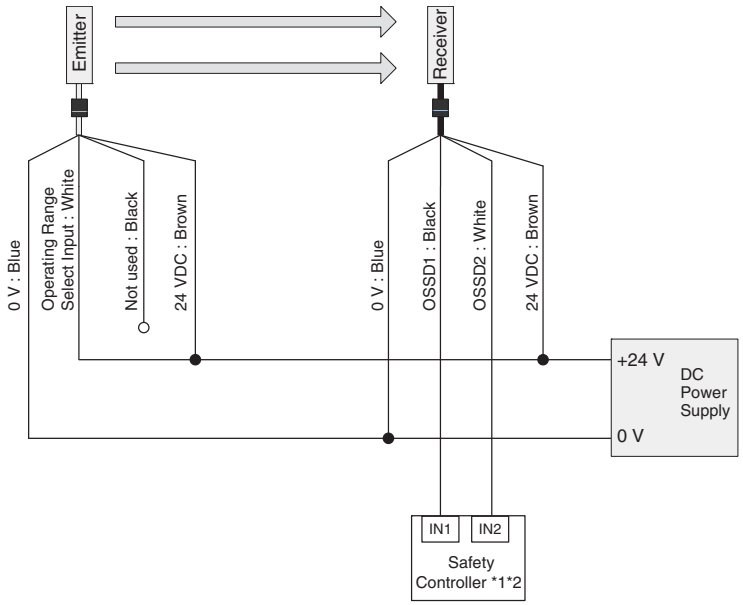


*1.Refer to page 99 for more information.
*2.The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.

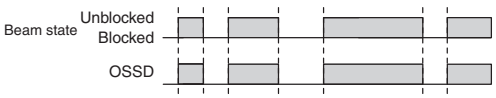


Note: Functional earth connection is unnecessary when you use the F3SG-R in a general industrial environment where noise control or stable power supply is considered. However, when you use the F3SG-R in an environment where there may be excessive noise from surroundings or stable power supply may be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

Long Mode

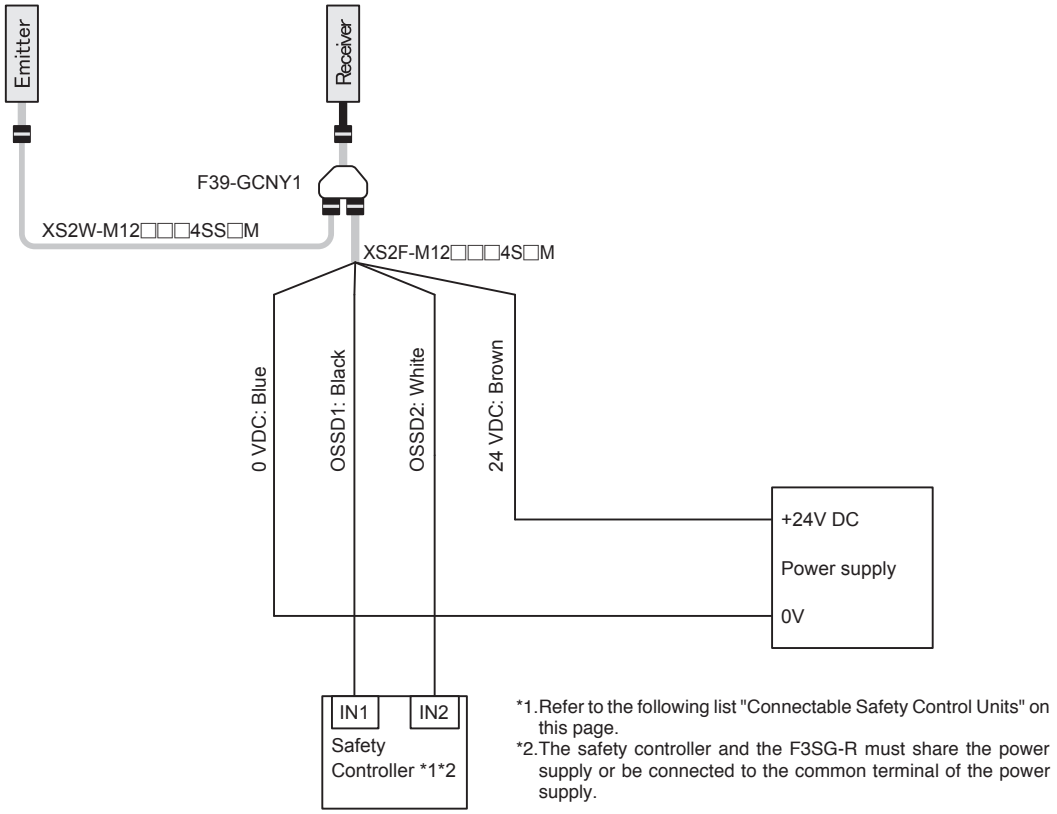


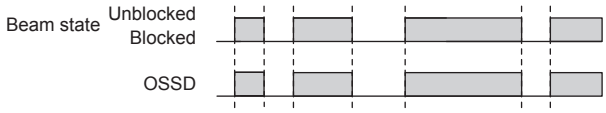
*1.Refer to page 99 for more information.
*2.The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.



Note: For the functional earth connection, refer to the Short Mode example.

Standalone F3SG-RE with Y-Joint Plug/Socket Connector





Note: 1. When using the reduced wiring connector system F39-GCNY1, the Operating Range Selection is fixed to Long Mode.
2. For the functional earth connection, refer to the Short Mode example.

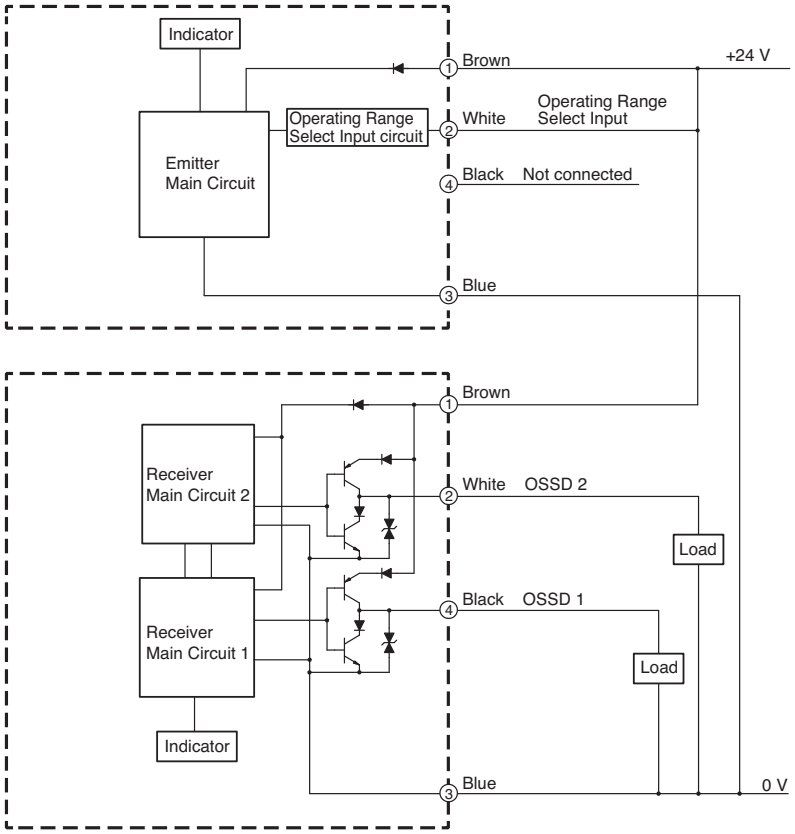
Connectable Safety Control Units

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

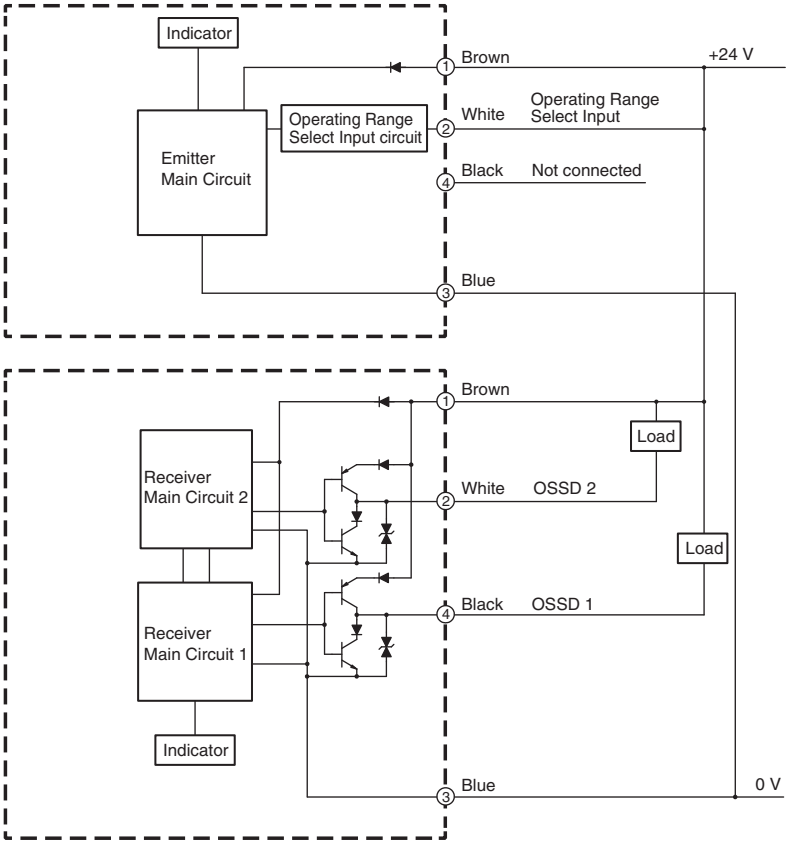
Connectable Safety Control Units (PNP output)		
Safety Relay Units	**Flexible Safety Units**	**Safety Controllers**
G9SA-301 **G9SA-321** **G9SA-501** **G9SB-200-B** **G9SB-200-D** **G9SB-301-B** **G9SB-301-D** **G9SE-201** **G9SE-401** **G9SE-221-T□**	**G9SX-AD322-T** **G9SX-ADA222-T** **G9SX-BC202**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

Input/Output Circuit

PNP Output



NPN Output

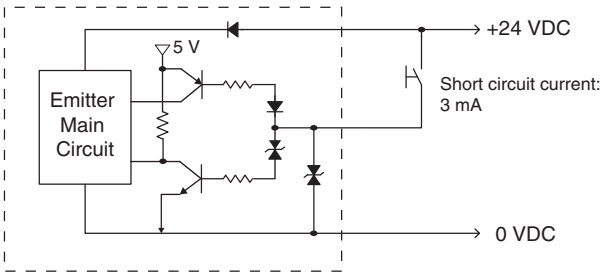


Input Circuit Diagram by Function

The input circuit diagrams of by function are shown below.

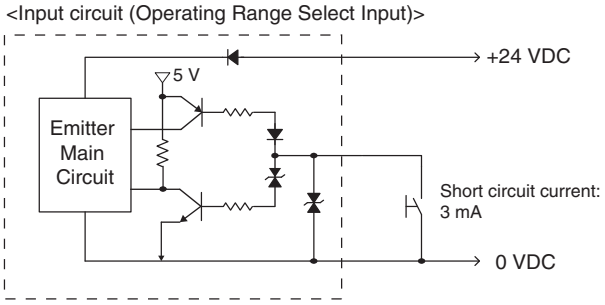
PNP Output

<Input circuit (Operating Range Select Input)>



NPN Output

<Input circuit (Operating Range Select Input)>

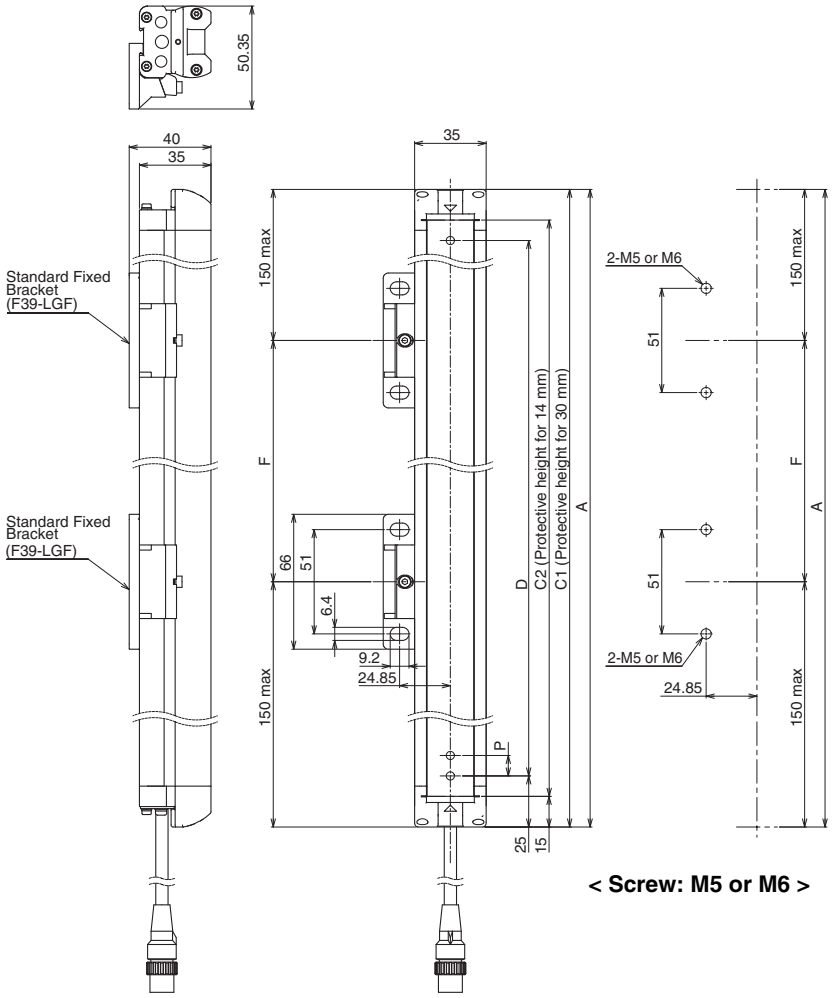


Dimensions

(Unit: mm)

Mounted with Standard Fixed Brackets (F39-LGF)

Backside Mounting



F3SG-4RE□□□□□30 Series

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

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

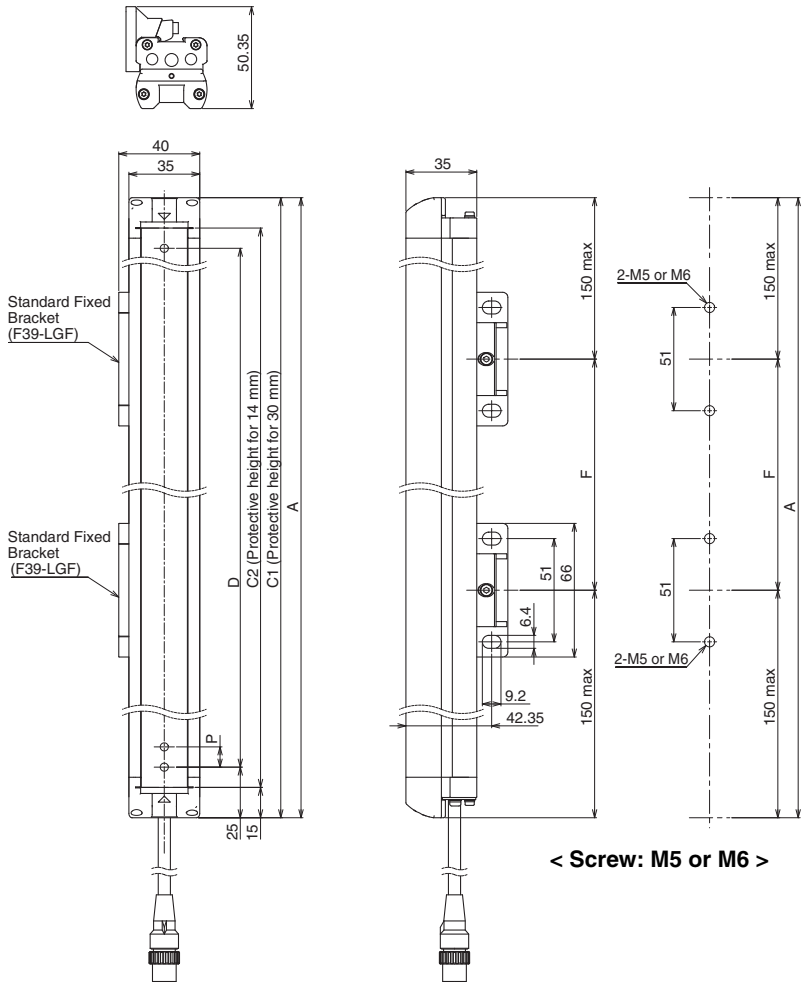
F3SG-4RE□□□□□14 Series

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

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

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

Side Mounting



F3SG-4RE□□□□□30 Series

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

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

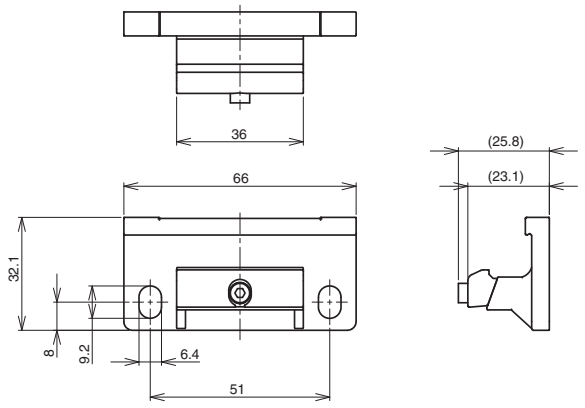
F3SG-4RE□□□□□14 Series

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

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

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

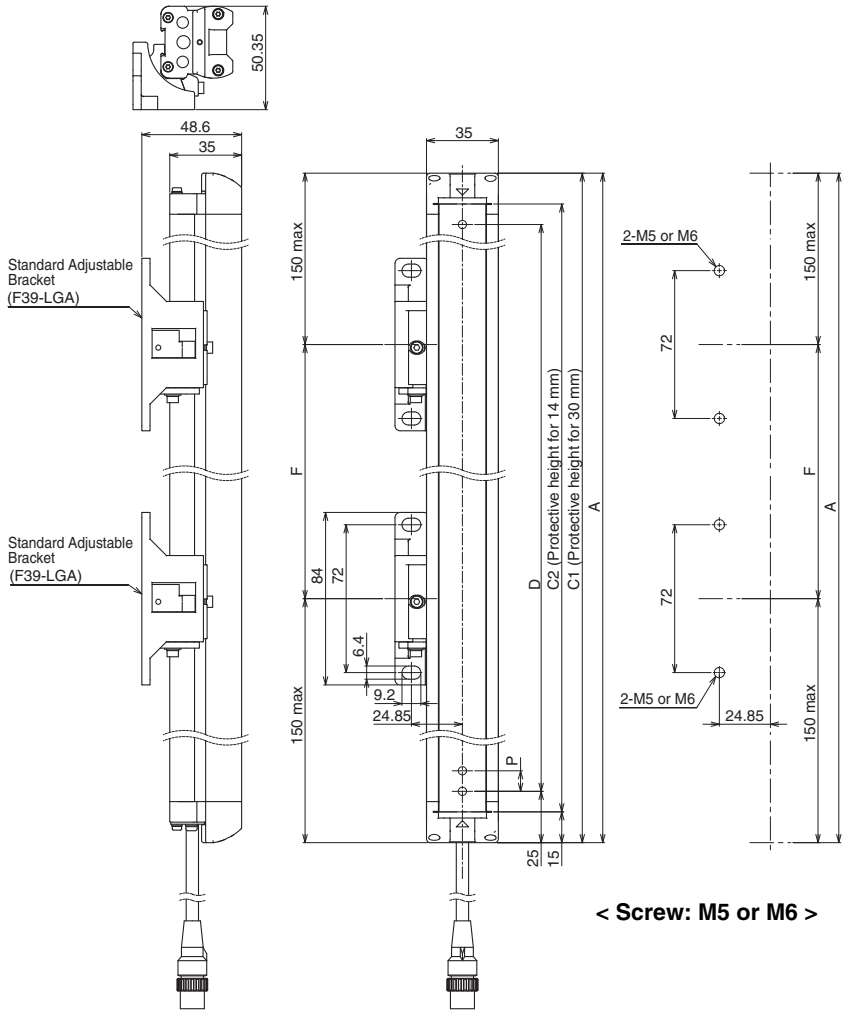
Standard Fixed Bracket(F39-LGF)



Material: ZDC2

Mounted with Standard Fixed Brackets (F39-LGA)

Backside Mounting



F3SG-4RE□□□□30 Series

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

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

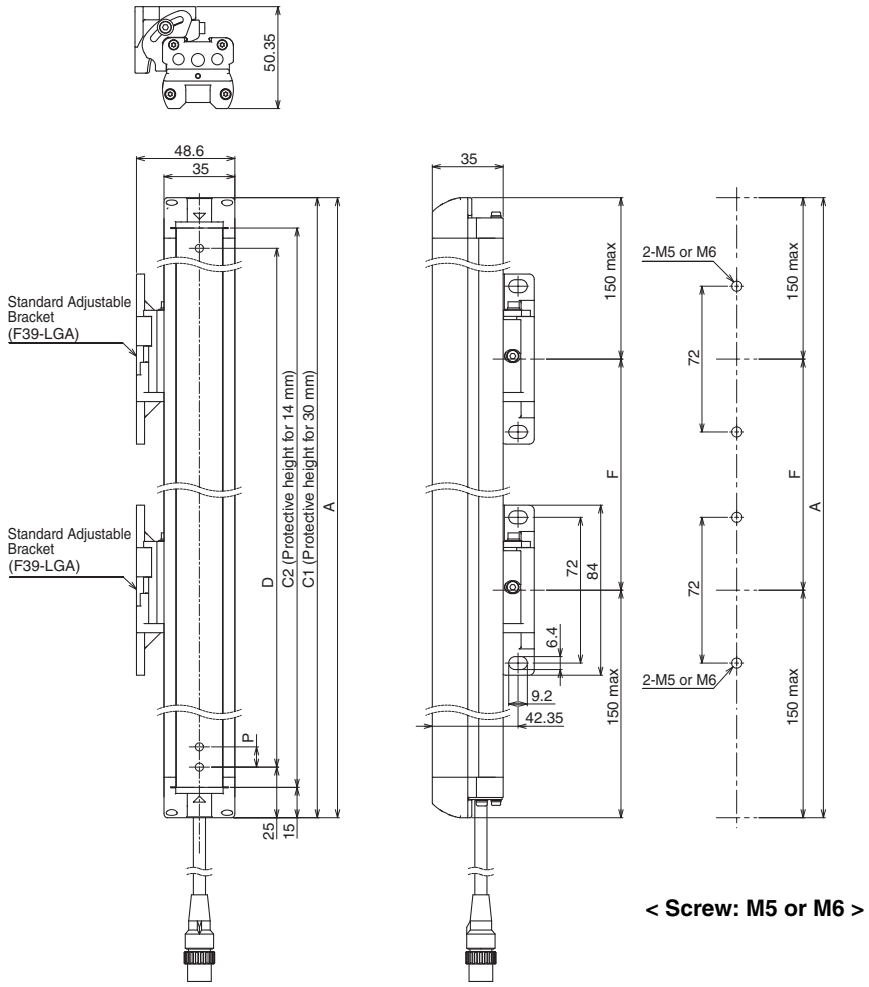
F3SG-4RE□□□□14 Series

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

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

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

Side Mounting



< Screw: M5 or M6 >

F3SG-4RE□□□□□30 Series

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

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

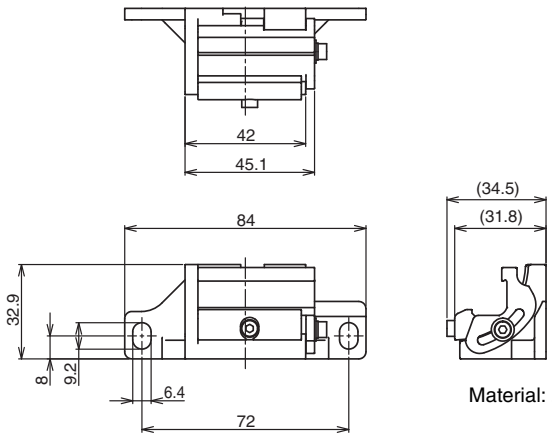
F3SG-4RE□□□□□14 Series

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

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

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

Standard Fixed Bracket (F39-LGA)

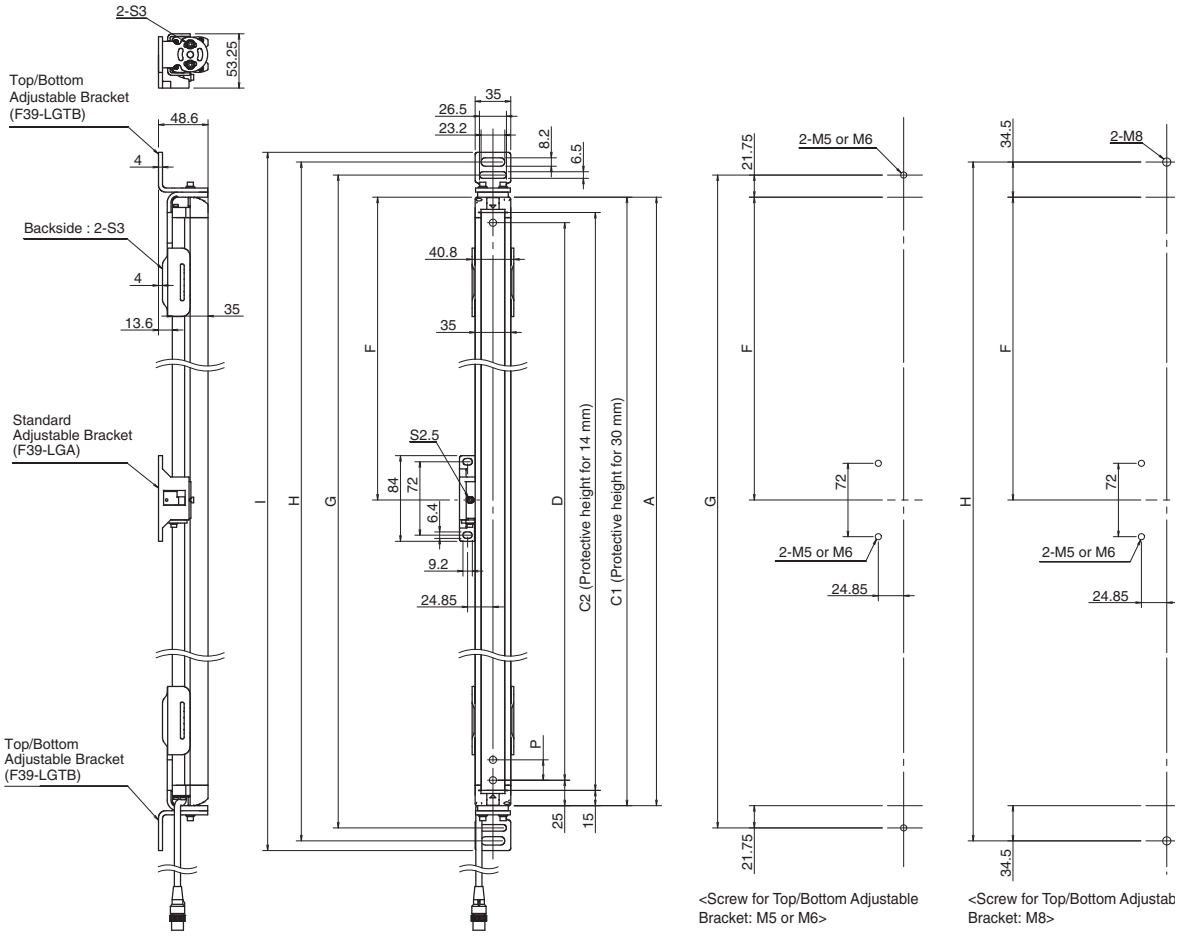


Material: ZDC2, Fluorochemical lubricant oil

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

Dimensions when using the F3SG-RE Series except the F3SG-4RE0190□30 and F3SG-4RE0160□14
Refer to *Safety Light Curtain F3SG-R Series User's Manual* for the dimensions when using the F3SG-4RE0190□30 and F3SG-4RE0160□14.

Backside Mounting



F3SG-4RE□□□□30 Series

Dimension A	C1
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension G	C1+43.5
Dimension H	C1+69
Dimension I	C1+88
Dimension P	20

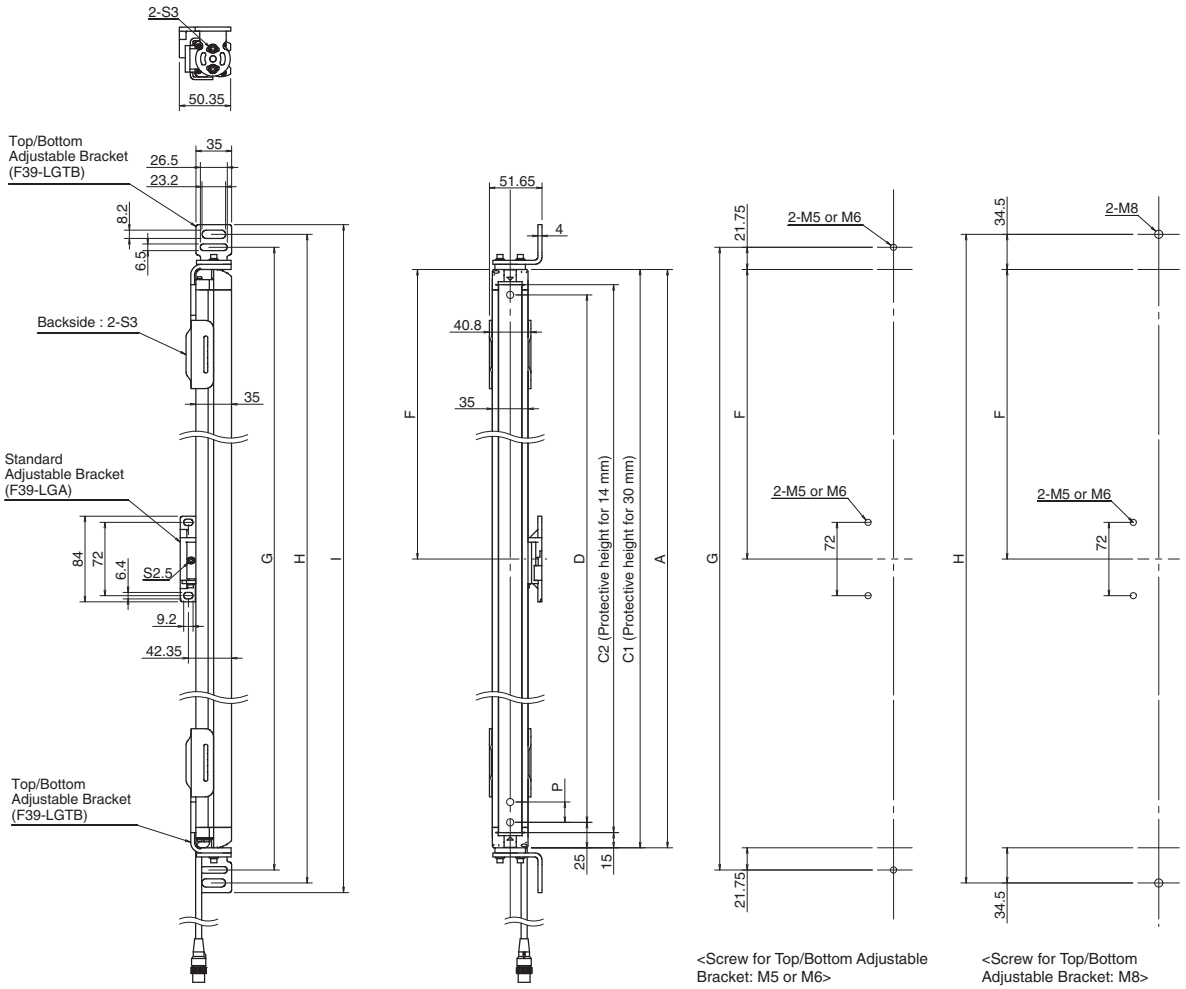
Protective height (C1)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0270 to 1070	2	0	–
1150 to 1950	2	1	1000 mm max.
2030 to 2510	2	2	1000 mm max.

F3SG-4RE□□□□14 Series

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

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

Side Mounting



F3SG-4RE□□□□30 Series

Dimension A	C1
Dimension C1	4-digit number of the type name (Protective height)
Dimension D	C1-50
Dimension G	C1+43.5
Dimension H	C1+69
Dimension I	C1+88
Dimension P	20

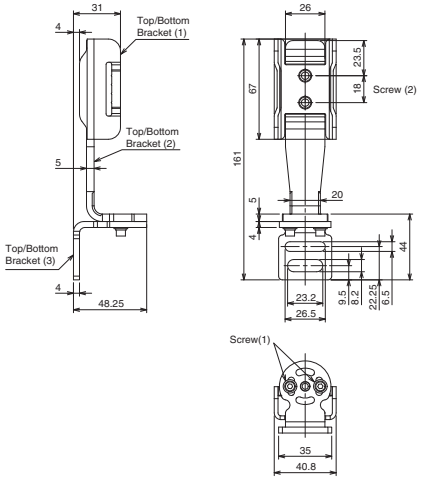
Protective height (C1)	Number of Top/Bottom Adjustable Brackets	Number of Standard Adjustable Brackets	Dimension F
0270 to 1070	2	0	–
1150 to 1950	2	1	1000 mm max.
2030 to 2510	2	2	1000 mm max.

F3SG-4RE□□□□14 Series

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

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

Top/Bottom Adjustable Bracket (F39-LGTB)

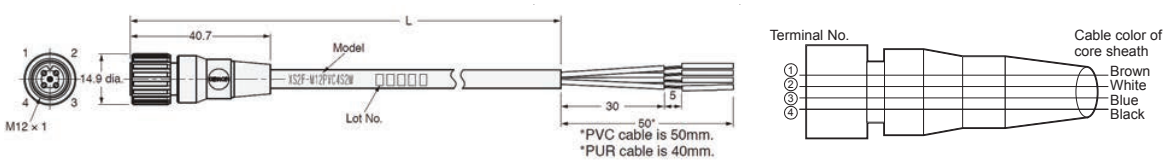


Material: SUS304

Accessories

Single-Ended Cable (Round Water-resistant Connector: Connected Connected to Cable, Socket on One Cable End)
(XS2F-M12□□□4S□M, sold separately)

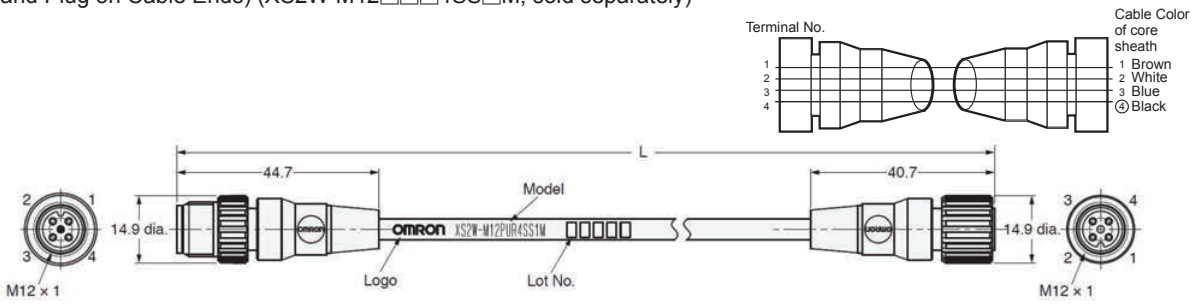
(Unit: mm)



Appearance	Sheath material	Cable length	Model	Specifications
	PVC	2 m	**XS2F-M12PVC4S2M**	M12 connector (4-pin), 4 wires
	PVC	5 m	**XS2F-M12PVC4S5M**	
	PVC	10 m	**XS2F-M12PVC4S10M**	
	PUR	2 m	**XS2F-M12PUR4S2M**	
	PUR	5 m	**XS2F-M12PUR4S5M**	
	PUR	10 m	**XS2F-M12PUR4S10M**	

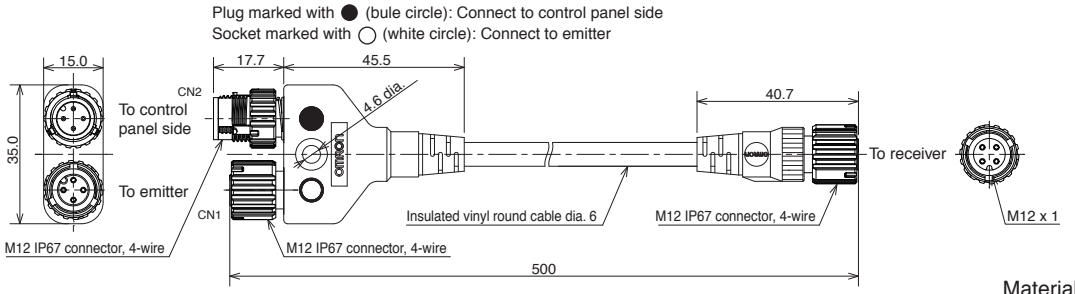
Double-Ended Cable (Round Water-resistant Connector: Connectors Connected to Cable, Socket and Plug on Cable Ends) (XS2W-M12□□□4SS□M, sold separately)

(Unit: mm)



Appearance	Sheath material	Cable length	Model	Specifications
	PVC	2 m	**XS2W-M12PVC4SS2M**	M12 connector (4-pin), on both ends
	PVC	5 m	**XS2W-M12PVC4SS5M**	
	PVC	10 m	**XS2W-M12PVC4SS10M**	
	PUR	2 m	**XS2W-M12PUR4SS2M**	
	PUR	5 m	**XS2W-M12PUR4SS5M**	
	PUR	10 m	**XS2W-M12PUR4SS10M**	

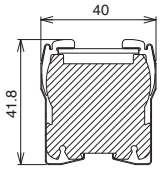
Y-Joint Plug/Socket Connector (F39-GCNY1, sold separately)



Material: PBT (Main body)

Spatter Protection Cover(F39-HGA/-HGB)

Assembled dimensions



Model	Total length
F39-HGB□□□□	□□□□+6
F39-HGA0550	558

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

Related Manuals

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

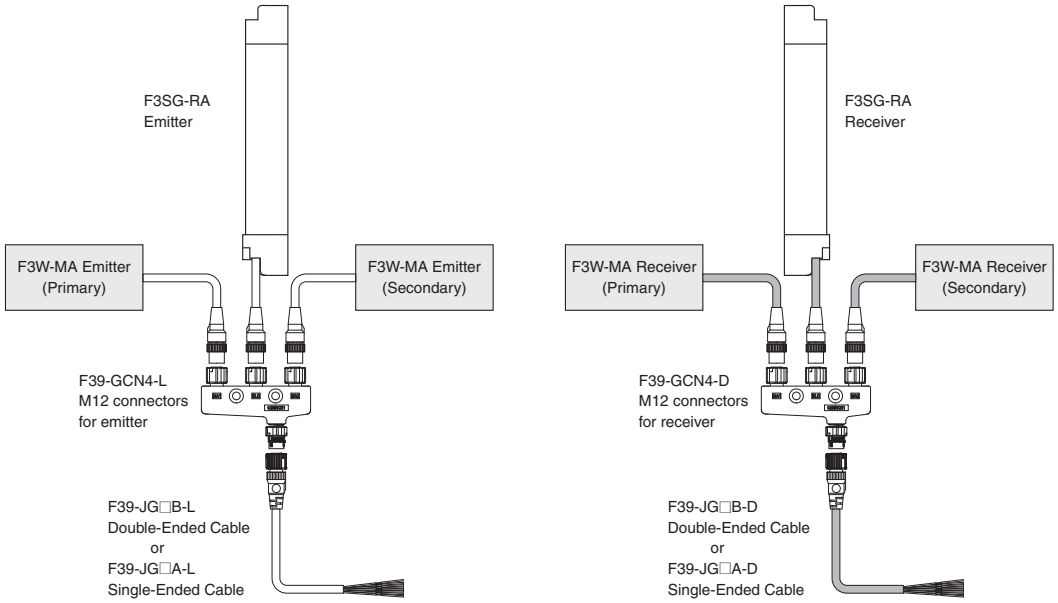
Smart Muting Actuator

F3W-MA

Integrated muting sensor based on multi-beam photoelectric sensor

- A muting system can be configured easily in combination with the safety light curtain.
- Muting functions can be stably performed even when workpieces with holes pass.

System Configuration



Ordering Information

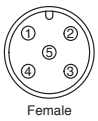
Smart Muting Actuator

Appearance	Beam Gap between Muting Trigger Beams	output	Number of Beams	Model
	100 mm	PNP output	8	**F3W-MA0100P**
	300 mm		20	**F3W-MA0300P**

Note: Use with the PNP output model safety light curtain.

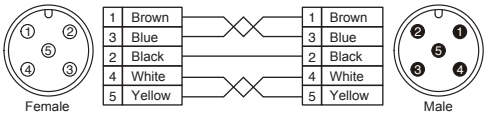
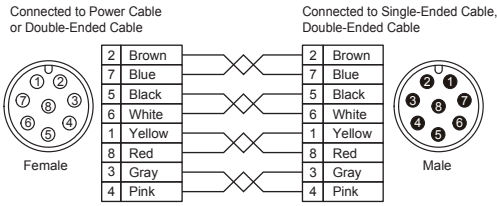
Accessories (Sold separately)

Single-Ended Cable

Appearance	Cable length	Specifications	Type	Model
	3 m	For emitter, M12 connector (5-pin), 5 wires Color: Gray Connected to Power Cable or Double-Ended Cable  Female 1 +24 VDC Brown 2 CFG In Black 3 0 VDC Blue 4 COM+ White 5 COM- Yellow	**Emitter**	**F39-JG3A-L**
			Receiver	**F39-JG3A-D**
	7 m		**Emitter**	**F39-JG7A-L**
			Receiver	**F39-JG7A-D**
	10 m	For receiver, M12 connector (8-pin), 8 wires Color: Black Connected to Power Cable or Double-Ended Cable  Female 1 Mute Enable / CFG In / Reset Yellow 2 +24 VDC Brown 3 COM+ Gray 4 COM- Pink 5 Muting Output A Black 6 Muting Output B White 7 0 VDC Blue 8 CFG Out Red	**Emitter**	**F39-JG10-L**
			Receiver	**F39-JG10A-D**
	15 m		**Emitter**	**F39-JG15A-L**
			Receiver	**F39-JG15A-D**
	20 m		**Emitter**	**F39-JG20A-L**
			Receiver	**F39-JG20A-D**

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

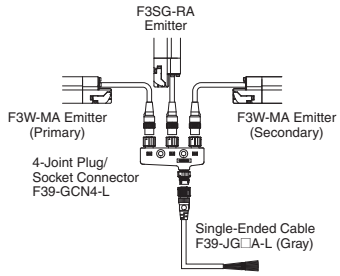
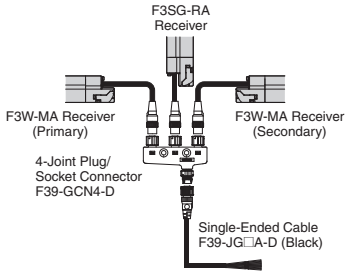
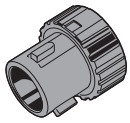
Double-Ended Cable

Appearance	Cable length	Specifications	Type	Model
	0.5 m	For emitter, M12 connector (5-pin) on both ends, Color: Gray Connected to Power Cable or Double-Ended Cable / Connected to Single-Ended Cable, or Double-Ended Cable  Female: 1 Brown, 3 Blue, 2 Black, 4 White, 5 Yellow Male: 1 Brown, 3 Blue, 2 Black, 4 White, 5 Yellow	**Emitter**	**F39-JGR5B-L**
			Receiver	**F39-JGR5B-D**
	1 m		**Emitter**	**F39-JG1B-L**
			Receiver	**F39-JG1B-D**
	3 m		**Emitter**	**F39-JG3B-L**
			Receiver	**F39-JG3B-D**
	5 m	For receiver, M12 connector (8-pin) on both ends, Color: Black Connected to Power Cable or Double-Ended Cable / Connected to Single-Ended Cable, or Double-Ended Cable  Female: 2 Brown, 7 Blue, 5 Black, 6 White, 1 Yellow, 8 Red, 3 Gray, 4 Pink Male: 2 Brown, 7 Blue, 5 Black, 6 White, 1 Yellow, 8 Red, 3 Gray, 4 Pink	**Emitter**	**F39-JG5B-L**
			Receiver	**F39-JG5B-D**
	7 m		**Emitter**	**F39-JG7B-L**
			Receiver	**F39-JG7B-D**
	10 m		**Emitter**	**F39-JG10B-L**
			Receiver	**F39-JG10B-D**
	15 m		**Emitter**	**F39-JG15B-L**
			Receiver	**F39-JG15B-D**
	20 m		**Emitter**	**F39-JG20B-L**
			Receiver	**F39-JG20B-D**

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

4-Joint Plug/Socket Connector

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

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

Sensor Mounting Brackets

Appearance	Specification	Application	Remarks	Model
	Standard Fixed Bracket	Bracket to mount the F3W-MA. Side mounting and backside mounting possible.	Two brackets per set	**F39-LGF**
	Standard Adjustable Bracket	Bracket to mount the F3W-MA. Beam alignment after mounting possible.The angle adjustment range is ±15°. Side mounting and backside mounting possible.	Two brackets per set	**F39-LGA**
	F3W-MA Bracket	Bracket to fix the F3W-MA to the F3SG-RA. F39-LGMAL: L-shaped configuration F39-LGMAT: T-shaped configuration Beam alignment after mounting possible. When using the F3W-MA Bracket, it is necessary to add an extra Standard Adjustable Bracket (F39-LGA) to the F3SG-RA. * Please also purchase Standard Adjustable Bracket (F39-LGA).	Two brackets per set	**F39-LGMAL**
				**F39-LGMAT**

Note: When mounting an F3W-MA0300P in the L-shaped configuration, the shock resistance becomes as follows.
Shock resistance: 50 m/s^2, 1000 shocks for all 3 axes
For mounting an F3W-MA0300P under a shock environment exceeding this, the F3W-MA Bracket cannot be used. Use a Standard Adjustable Bracket (F39-LGA).

* When using F39-LGMA□, there are some restrictions on the brackets to mount the F3SG-RA. This bracket is not usable together with F39-LGF. When using together with the F39-LGA, the protective height of the F3SG-RA must be 270 mm or longer. When using together with F39-LGTB, the protective height of the F3SG-RA must be 400 mm or longer. An extra F39-LGA is required for reinforcement, depending on the mounting position of the F39-LGMA□. Refer to "Dimensions" on page 125 for details.

Ratings/Specifications

			F3W-MA0100P	F3W-MA0300P
Performance	Beam Gap between Muting Trigger Beams		100 mm	300 mm
	Number of Beams		8	20
	Standard Detection Object		30 mm	
	Operating Range	Long	0.3 to 20.0 m (1 to 65 ft.)	
		Short	0.3 to 7.0 m (1 to 23 ft.)	
	Response Time	Operation	13 ms max.	
		Reset	26 ms max. (Synchronized) 78 ms max. (Not synchronized)	
	Effective Aperture Angle		±2.5° max., emitter and receiver at operating range of 3 m or greater	
	Light Source		Infrared LEDs, Wavelength: 870 nm	
	Startup Waiting Time		2 s max.	
Electrical	Power Supply Voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
	Current Consumption	Emitter	35 mA	45 mA
		Receiver	75 mA	75 mA
	Muting Outputs		Two PNP transistor outputs. * Load current of 300 mA max., Residual voltage of 2 V max. (except for voltage drop due to cable extension)j	
		* This product is a PNP output model. Use with the PNP output model safety light curtain.		
	Output Operation Mode	Muting Output A	Dark-ON (Muting Output A is enabled when MuteA trigger beam is blocked.)	
		Muting Output B	Dark-ON (Muting Output B is enabled when MuteB trigger beam is blocked.)	
	Input Voltage	ON Voltage	[MuteEnable] Vs to Vs-3 V (sink current 5 mA max.) *	
		OFF Voltage	[Mute Enable] 0 to 1/2 Vs, or open *	
		* The Vs indicates a supply voltage value in your environment.		
	Indicators		Refer to page 114. LED Indicator Status	
	Protective Circuit		Protective Circuit Output short protection, Power supply reverse polarity protection	
	Insulation Resistance		20 MΩ or higher (500 VDC megger)	
	Dielectric Strength		1,000 VAC, 50/60 Hz (1 min)	
Functional	Functions		- Scan Code Selection - Operation Mode Selection (Point to Point Detection/ Chattering and Void Space Prevention) - Off-Delay - Muting Enable - Muting Trigger Beam Allocation - Operating Range Selection	
Environmental	Ambient Temperature	Operating	-10 to 55°C (13 to 131°F) (non-icing)	
		Storage	-25 to 70°C (-13 to 158°F)	
	Ambient Humidity	Operating	35% to 85% (non-condensing)	
		Storage	35% to 95%	
	Ambient Illuminance		Incandescent lamp: 3,000 lx max. on receiver surface Sunlight: 10,000 lx max. on receiver surface	
	Degree of Protection (IEC 60529)		IP65 and IP67	
	Vibration Resistance (IEC 61496-1)		10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes	
	Shock Resistance (IEC 61496-1)		100 m/s^2, 1000 shocks for all 3 axes	
	Pollution Degree (IEC 60664-1)		Pollution Degree 3	
Connections	Extension of Power Cable		100 m max. Note: For T-Shaped configuration with COM lines, the length of cable extension is 30m max.	
Material			Housing: Aluminum, Cap: PBT, Front Window: PMMA, Cable: Oil resistant PVC, FE plate: SUS	
Weight (packaged)			1.8 kg max.	2.8 kg max.
Included Accessories			Instruction Sheet	

LED Indicator Status

Shown below are indication statuses of F3W-MA LED indicators when you purchased.

Emitter

Name of Indicator		Color	Illuminated	Blinking
Operating range	LONG	Green	Long Range mode is selected by DIP Switch.	-
Running	RUN	Green	Power is ON.	-
Error	ERR	Red	-	Error in emitter. Generic error happens.

Receiver

Name of Indicator		Color	Illuminated	Blinking
Top-beam-state	TOP	Blue	The top beam is unblocked.	-
Muting output A	MUTE A	Green	Muting Output A is activated.	-
Muting output B	MUTE B	Green	Muting Output B is activated.	-
Off-Delay	DELAY	Yellow	Off-Delay function is enabled by DIP Switch.	-
Chattering/ Void space	CHAT	Green	Chattering and Void Space Prevention mode is selected by DIP Switch.	-
Muting Enable	MUTE DISABLE	Red	The Muting Enable function is enabled and Muting Enable input is turned OFF by DIP Switch.	-
Error	ERR	Red	-	Error in receiver. Generic error happens.
Stable-state	STB	Green	Incident light level is 170% or higher of ON-threshold	-
Running	RUN	Green	Power is ON.	-
Communication	COM	Green	Synchronization between emitter and receiver is maintained.	[Primary sensor] - Start-up (for approx. 3 s) - Synchronization between emitter and receiver is lost
Bottom-beamstate	BTM	Blue	The bottom beam is unblocked.	-

Wiring Examples

Standard Muting Mode with F3SG-R (T-Shaped Configuration with COM lines)

The following is the example of F3W-MA with Scan Code B, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable disabled.

DIP Switch settings *1

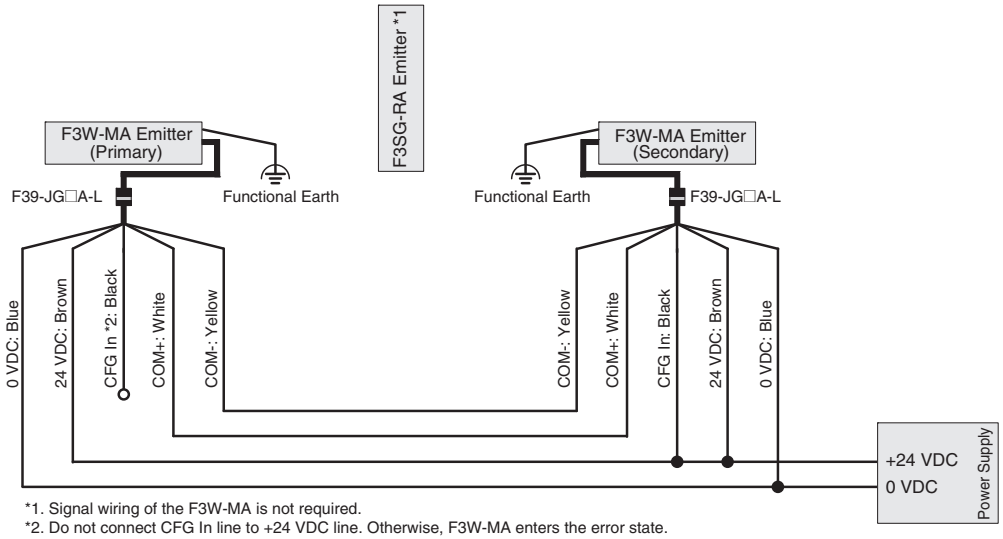
		Function	DIP-SW1	DIP-SW2 *2
F3W-MA Primary	Receiver	Scan Code B (factory default setting)	1 ON	1 ON
		Chattering and Void Space Prevention 1	2 ON 3 ON	2 ON 3 ON
		Off-Delay 100 ms	4 ON 5 ON	4 ON 5 ON
		Muting Enable Disabled (factory default setting)	6 ON	6 ON
	Emitter	Scan Code B (factory default setting)	1 ON	–
F3W-MA Secondary	Receiver Emitter	–	No setting required	No setting required

□: Indicates a switch position.

*1.Configure functions with the DIP Switches before wiring. Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.
*2.DIP Switch Bank 2 is not used.

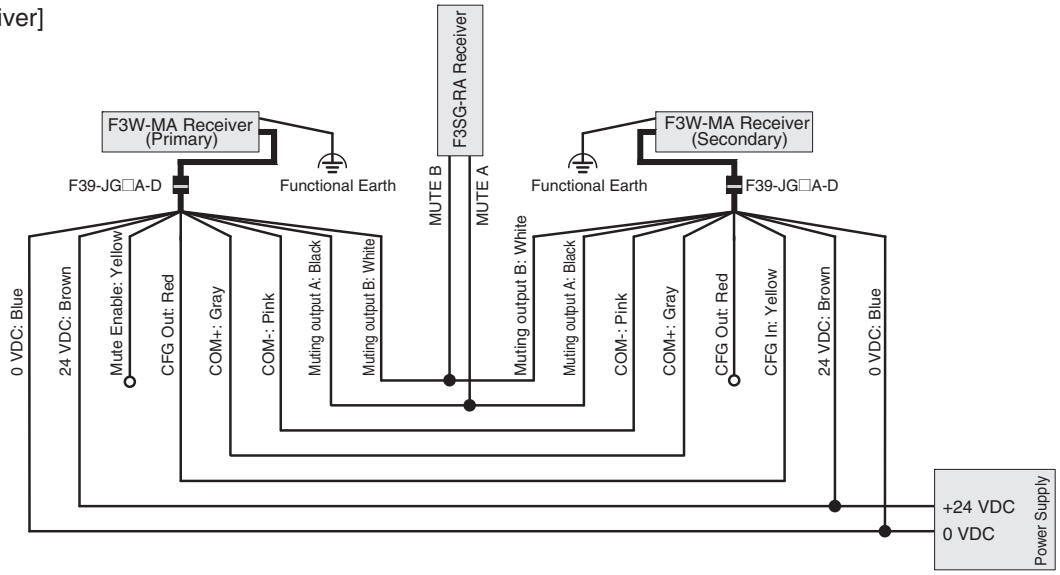
Wiring example

[Emitter]



*1. Signal wiring of the F3W-MA is not required.
*2. Do not connect CFG In line to +24 VDC line. Otherwise, F3W-MA enters the error state.

[Receiver]



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

Standard Muting Mode with F3SG-R (T-Shaped Configuration with 4-Joint Connector)

The following is the example of F3SG-RA with Scan Code B, External Device Monitoring disabled, Auto Reset mode, PNP output and External Test in 24 V Active, and F3W-MA with Scan Code A, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable disabled.

DIP Switch settings *1

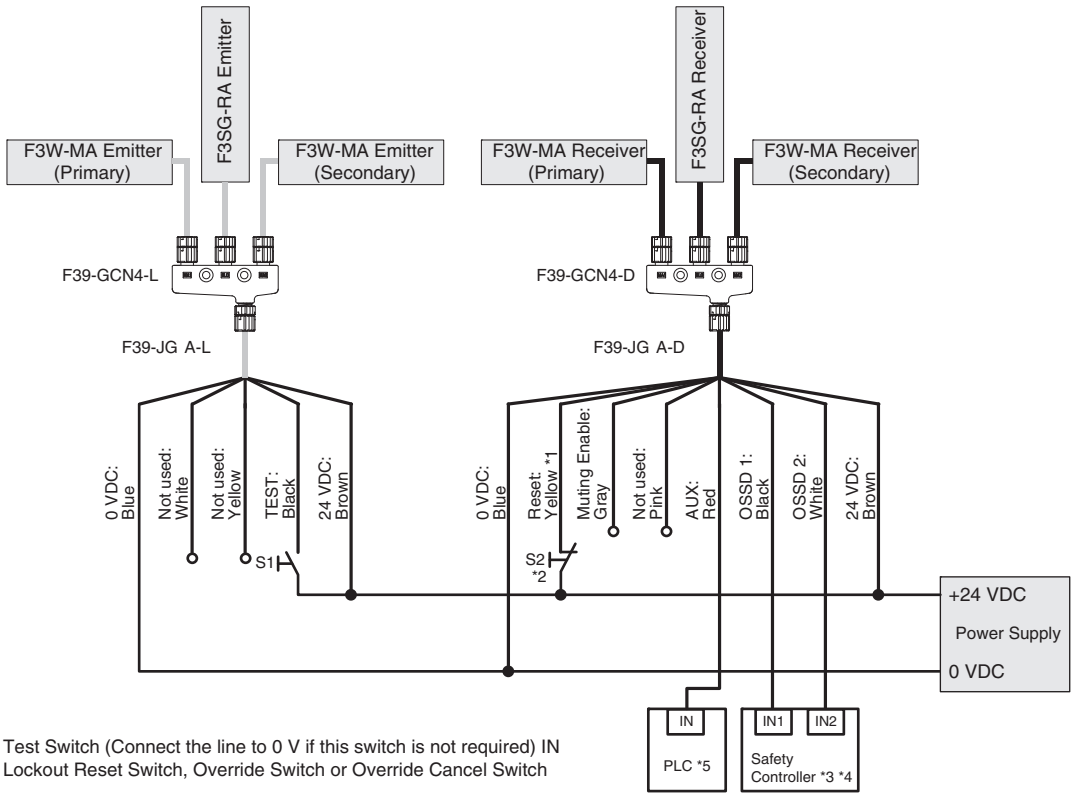
		Function	DIP-SW1	DIP-SW2
F3SG-RA	Receiver	Scan Code B	1 ■□ ON	1 ■□ ON
		EDM Disabled (factory default setting)	2 □■ ON	2 □■ ON
		Auto Reset (factory default setting)	3 □■ ON	3 □■ ON
			4 □■ ON	4 □■ ON
		PNP (factory default setting)	7 □■ ON	7 □■ ON
	Emitter	Scan Code B	1 ■□ ON	–
		External Test: 24 V Active (factory default setting)	4 □■ ON	–
F3W-MA Primary	Receiver	Scan Code A	1 ■□ ON	1 ■□ ON*2
		Chattering and Void Space Prevention 1	2 ■□ ON 3 ■□ ON	2 ■□ ON*2 3 ■□ ON*2
		Off-Delay 100 ms	4 ■□ ON 5 ■□ ON	4 ■□ ON*2 5 ■□ ON*2
		Muting Enable Disabled (factory default setting)	6 □■ ON	6 □■ ON*2
	Emitter	Scan Code A	1 ■□ ON	–
F3W-MA Secondary	Receiver Emitter	–	No setting required	No setting required

□: Indicates a switch position.

*1.Configure functions with the DIP Switches before wiring. For the DIP Switch of the F3W-MA, refer to *Smart Muting Actuator F3W-MA Series User's Manual*. For the DIP Switch of the F3SG-RA, refer to the *Safety Light Curtain F3SG-R Series User's Manual.*

*2.DIP Switch Bank 2 of F3W-MA receiver is not used.

Wiring example



S1: Test Switch (Connect the line to 0 V if this switch is not required) IN
S2: Lockout Reset Switch, Override Switch or Override Cancel Switch

*1.Also used as Override input line.
*2.Make sure to connect an override cancel switch to the Reset line when using the override function.
Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3.Refer to page 35, Connectable Safety Control Units for more information.
*4.The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.
*5.When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.

Exit-Only Muting Mode with F3SG-R (L-Shaped Configuration)

The following is the example of F3W-MA with Scan Code A, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable enabled.

DIP Switch settings *1

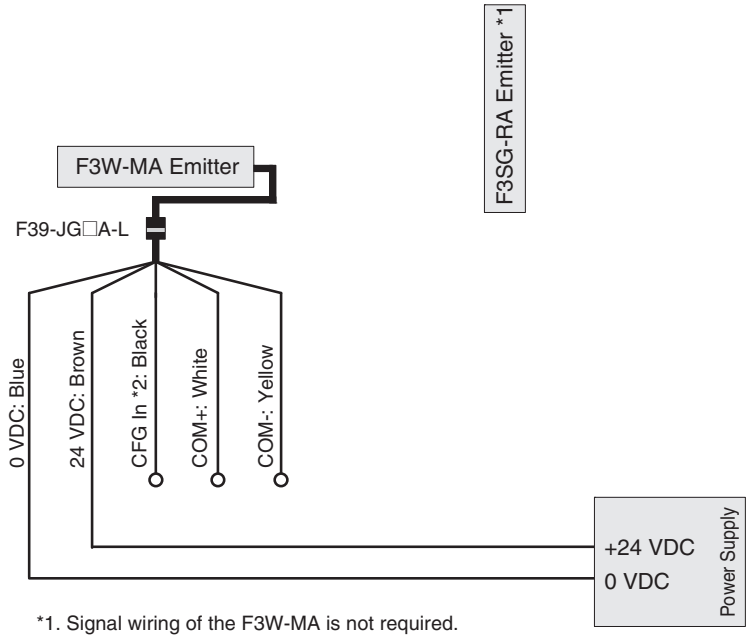
		Function	DIP-SW1	DIP-SW2 *2
F3W-MA	Receiver	Scan Code A	1 ON	1 ON
		Chattering and Void Space Prevention 1	2 ON 3 ON	2 ON 3 ON
		Off-Delay 100 ms	4 ON 5 ON	4 ON 5 ON
		Muting Enable Enabled	6 ON	6 ON
	Emitter	Scan Code A	1 ON	–

□: Indicates a switch position.

*1.Configure functions with the DIP Switches before wiring. Refer to *Smart Muting Actuator F3W-MA Series User's Manual* for more information.
*2.DIP Switch Bank 2 is not used.

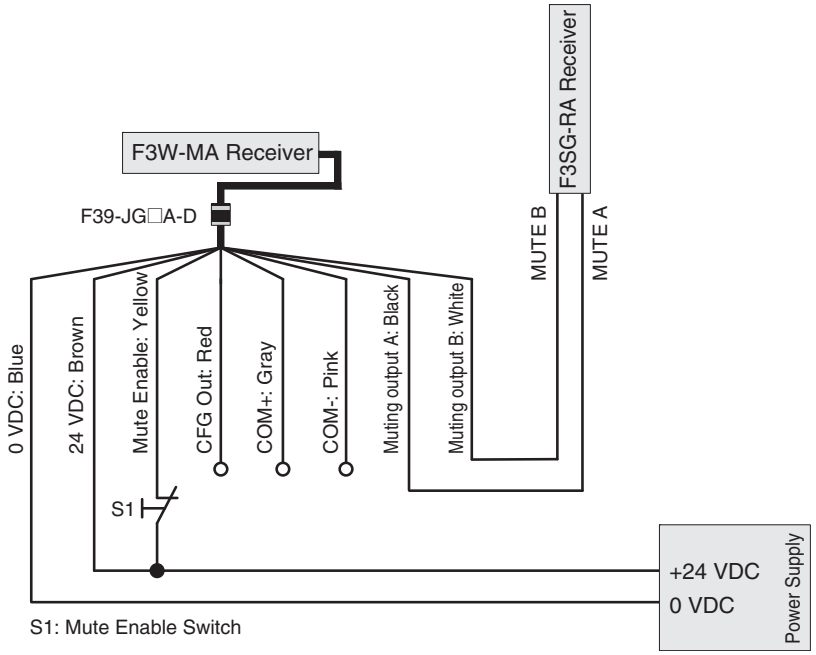
Wiring example

[Emitter]



*1. Signal wiring of the F3W-MA is not required.
*2. Do not connect CFG In line to +24 VDC line. Otherwise, F3W-MA enters the error state.

[Receiver]



S1: Mute Enable Switch

Exit-Only Muting Mode with F3SG-R (L-Shaped Configuration with 4-Joint Connector)

The following is the example of F3SG-RA with Scan Code A, External Device Monitoring disabled, Auto Reset mode, PNP output and External Test in 24 V Active, and F3W-MA with Scan Code B, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable enabled.

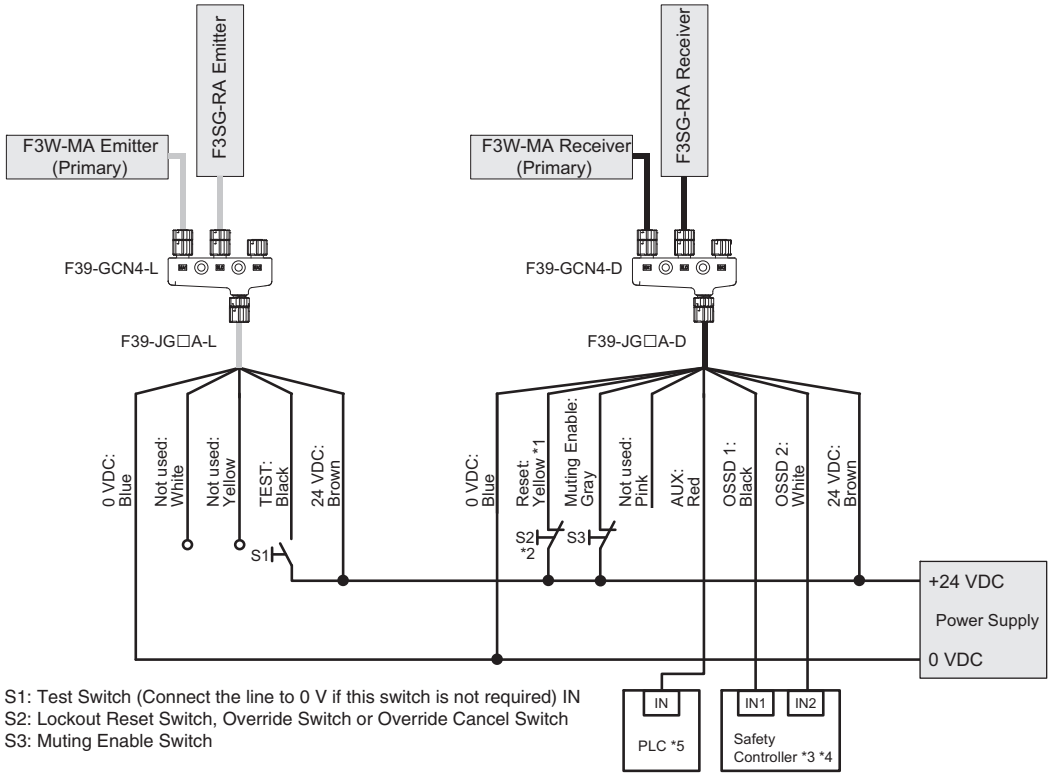
DIP Switch settings *1

		Function	DIP-SW1	DIP-SW2
F3SG-RA	Receiver	Scan Code A (factory default setting)	1 ON	1 ON
		EDM Disabled (factory default setting)	2 ON	2 ON
		Auto Reset (factory default setting)	3 ON	3 ON
			4 ON	4 ON
		PNP (factory default setting)	7 ON	7 ON
	Emitter	Scan Code A (factory default setting)	1 ON	–
		External Test: 24 V Active (factory default setting)	4 ON	–
F3W-MA	Receiver	Scan Code B (factory default setting)	1 ON	1 ON*2
		Chattering and Void Space Prevention 1	2 ON 3 ON	2 ON*2 3 ON*2
		Off-Delay 100 ms	4 ON 5 ON	4 ON*2 5 ON*2
		Muting Enable Enabled	6 ON	6 ON*2
	Emitter	Scan Code B (factory default setting)	1 ON	–

□: Indicates a switch position.

*1.Configure functions with the DIP Switches before wiring. For the DIP Switch of the F3W-MA, refer to *Smart Muting Actuator F3W-MA Series User's Manual*. For the DIP Switch of the F3SG-RA, refer to the *Safety Light Curtain F3SG-R Series User's Manual*.
*2.DIP Switch Bank 2 of F3W-MA receiver is not used.

Wiring example



S1: Test Switch (Connect the line to 0 V if this switch is not required) IN
S2: Lockout Reset Switch, Override Switch or Override Cancel Switch
S3: Muting Enable Switch

*1. Also used as Override input line.
*2. Make sure to connect an override cancel switch to the Reset line when using the override function.
Otherwise the override state may not be released by the override cancel switch, resulting in serious injury.
*3. Refer to 34, *Connectable Safety Control Units* for more information.
*4. The safety controller and the F3SG-R must share the power supply or be connected to the common terminal of the power supply.
*5. When connecting to the PLC, the output mode must be changed with the Configuration Tool according to your application.

Standard Muting Mode with Other Safety Component (T-Shaped Configuration)

The following is the example of F3W-MA 1 with Scan Code A, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable enabled, and F3W-MA 2 with Scan Code B, Chattering and Void Space Prevention 1, Off-Delay 100 ms and Muting Enable enabled.

DIP Switch settings *1

		Function	DIP-SW1	DIP-SW2 *2
F3W-MA 1	Receiver	Scan Code A	1 ■□ ON	1 □■ ON
		Chattering and Void Space Prevention 1	2 ■□ ON 3 □■ ON	2 □■ ON 3 □■ ON
		Off-Delay 100 ms	4 ■□ ON 5 □■ ON	4 □■ ON 5 □■ ON
		Muting Enable Enabled	6 ■□ ON	6 □■ ON
	Emitter	Scan Code A	1 ■□ ON	–
F3W-MA 2	Receiver	Scan Code B (factory default setting)	1 □■ ON	1 □■ ON
		Chattering and Void Space Prevention 1	2 ■□ ON 3 □■ ON	2 □■ ON 3 □■ ON
		Off-Delay 100 ms	4 ■□ ON 5 □■ ON	4 □■ ON 5 □■ ON
		Muting Enable Enabled	6 ■□ ON	6 □■ ON
	Emitter	Scan Code B (factory default setting)	1 □■ ON	–

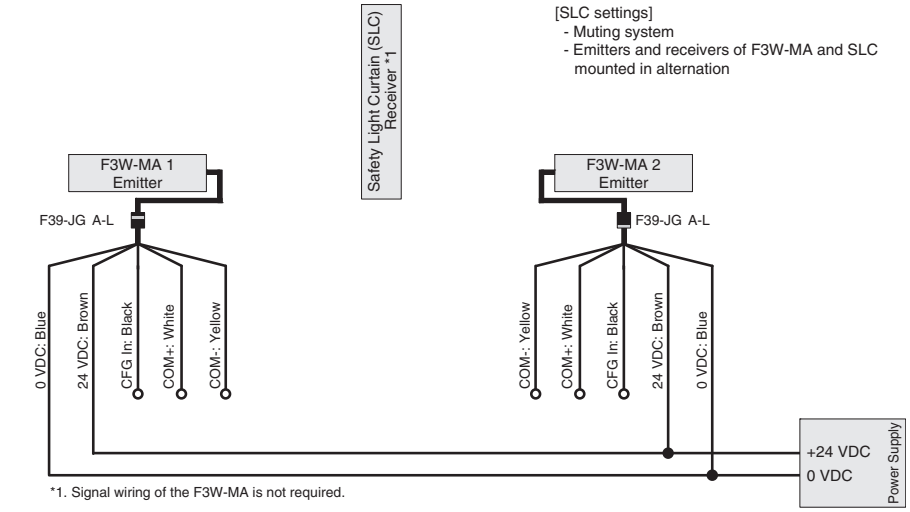
□: Indicates a switch position.

*1.Configure functions with the DIP Switches before wiring. For the DIP Switch of the F3W-MA, refer to *Smart Muting Actuator F3W-MA Series User's Manual*. For the DIP Switch of the F3SG-RA, refer to the *Safety Light Curtain F3SG-R Series User's Manual*.

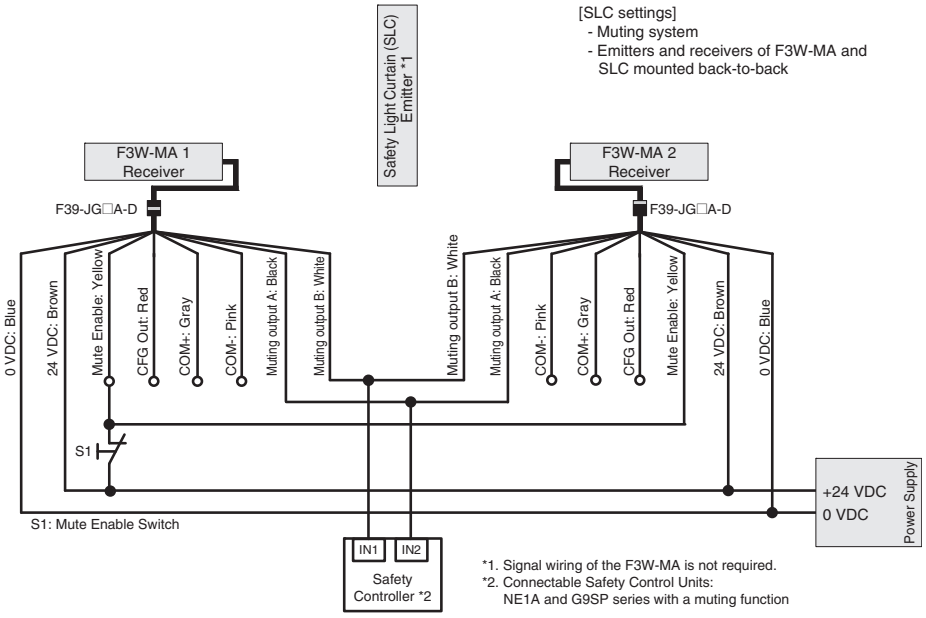
*2.DIP Switch Bank 2 is not used.

Wiring example

[Emitter]

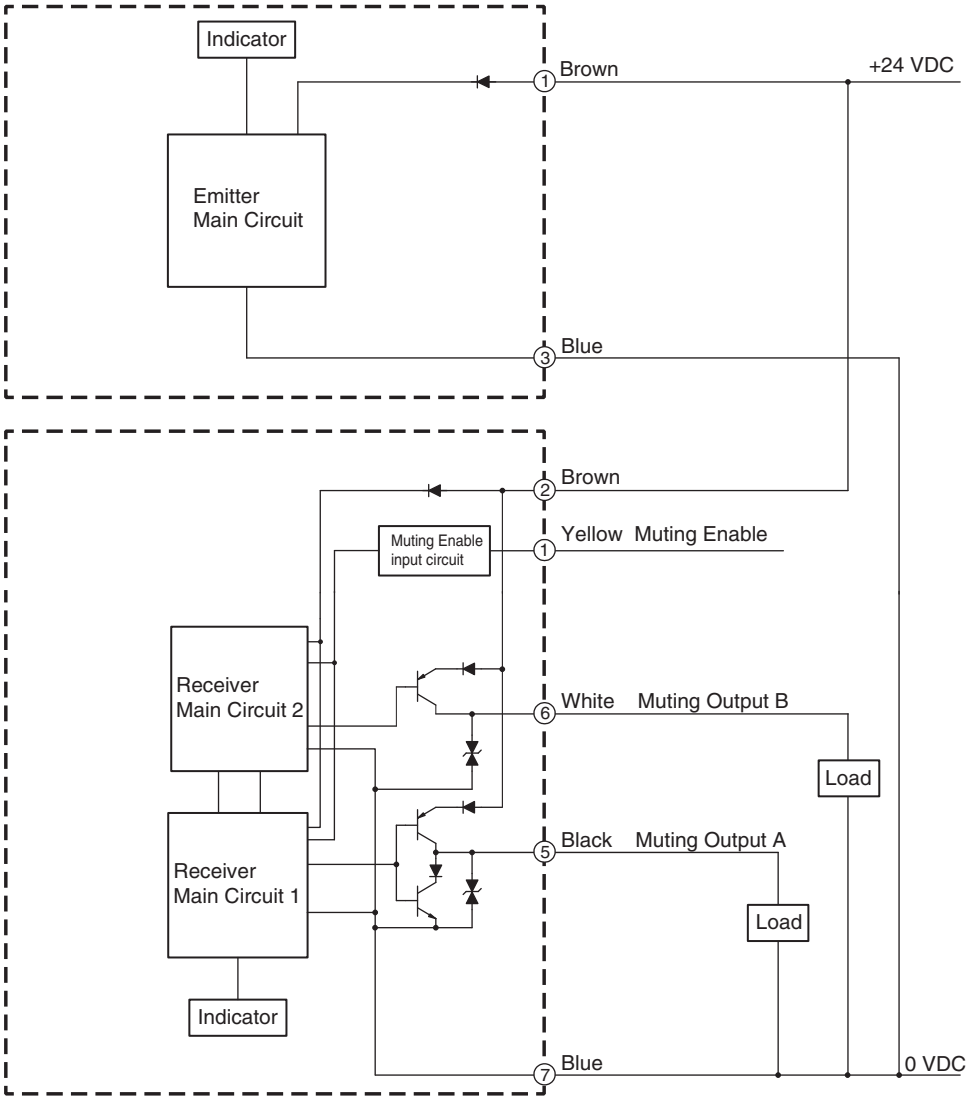


[Receiver]



Input/Output Circuit

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

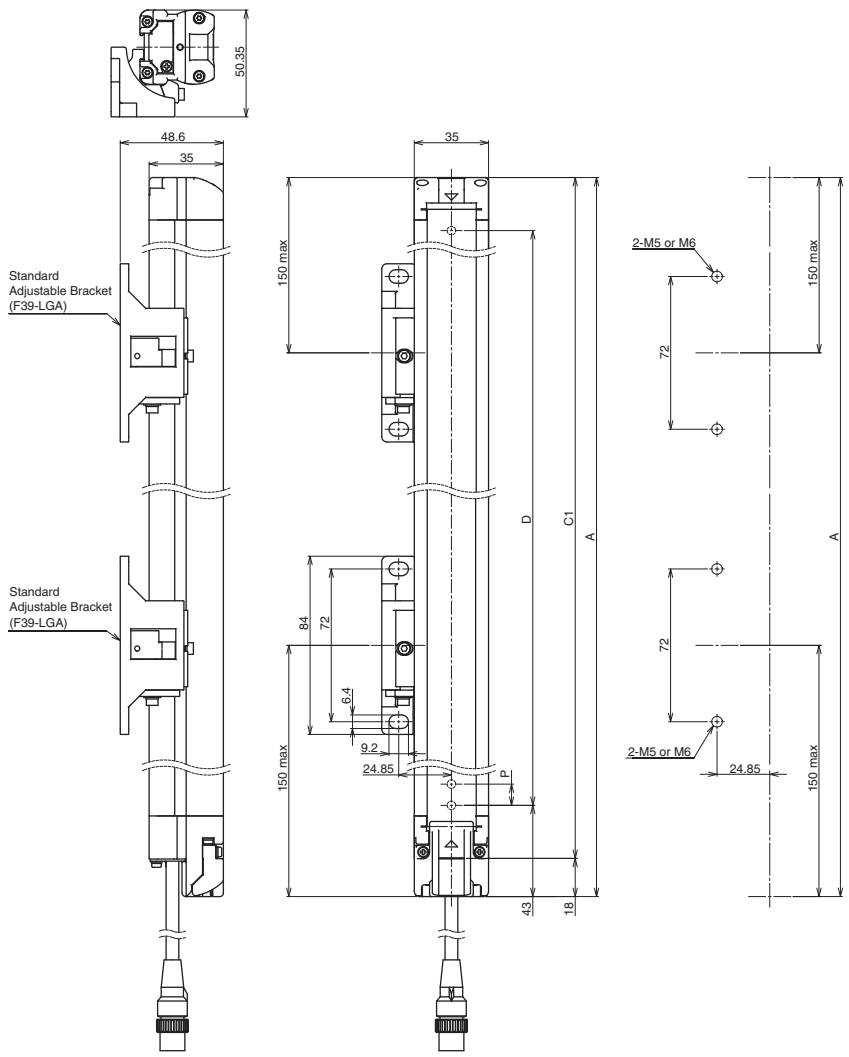


Dimensions

(Unit: mm)

Mounted with Standard Adjustable Brackets (F39-LGA)

Backside Mounting

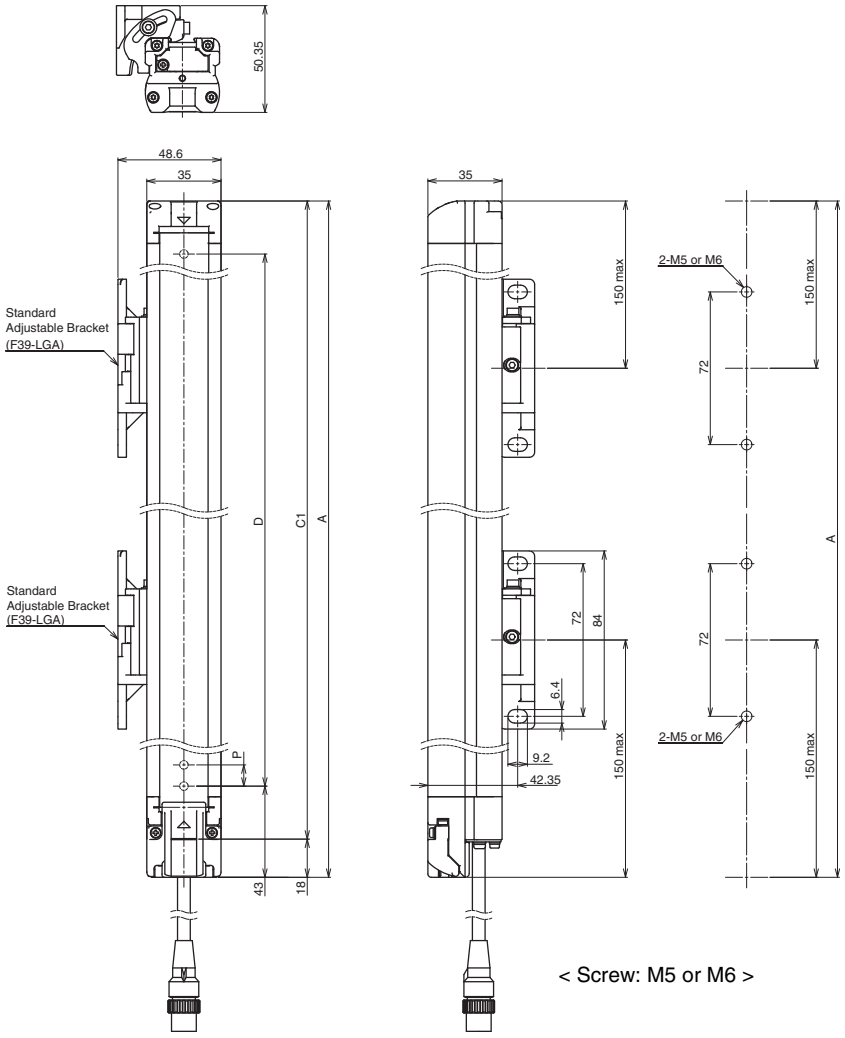


< Screw: M5 or M6 >

Model	F3W-MA0100P	F3W-MA0300P
Dimension A	208	448
Dimension C1	190	430
Dimension D	140	380
Dimension P	20	20
Number of Standard Adjustable Brackets *1	2 *2	2

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

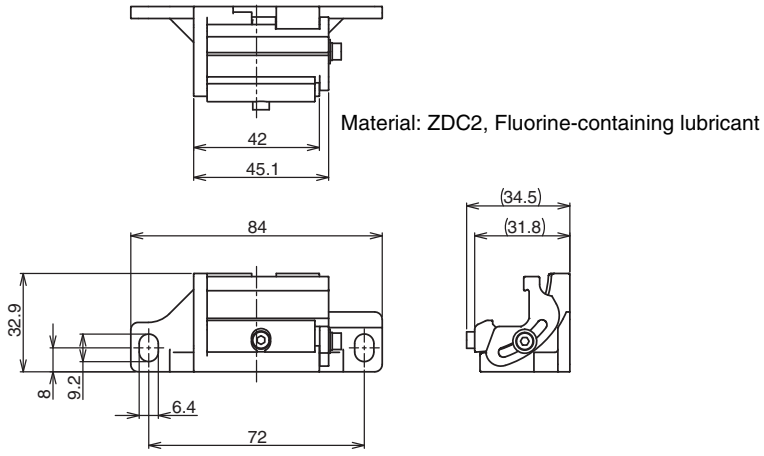
Side Mounting



Model	F3W-MA0100P	F3W-MA0300P
Dimension A	208	448
Dimension C1	190	430
Dimension D	140	380
Dimension P	20	20
Number of Standard Adjustable Brackets *1	2 *2	2

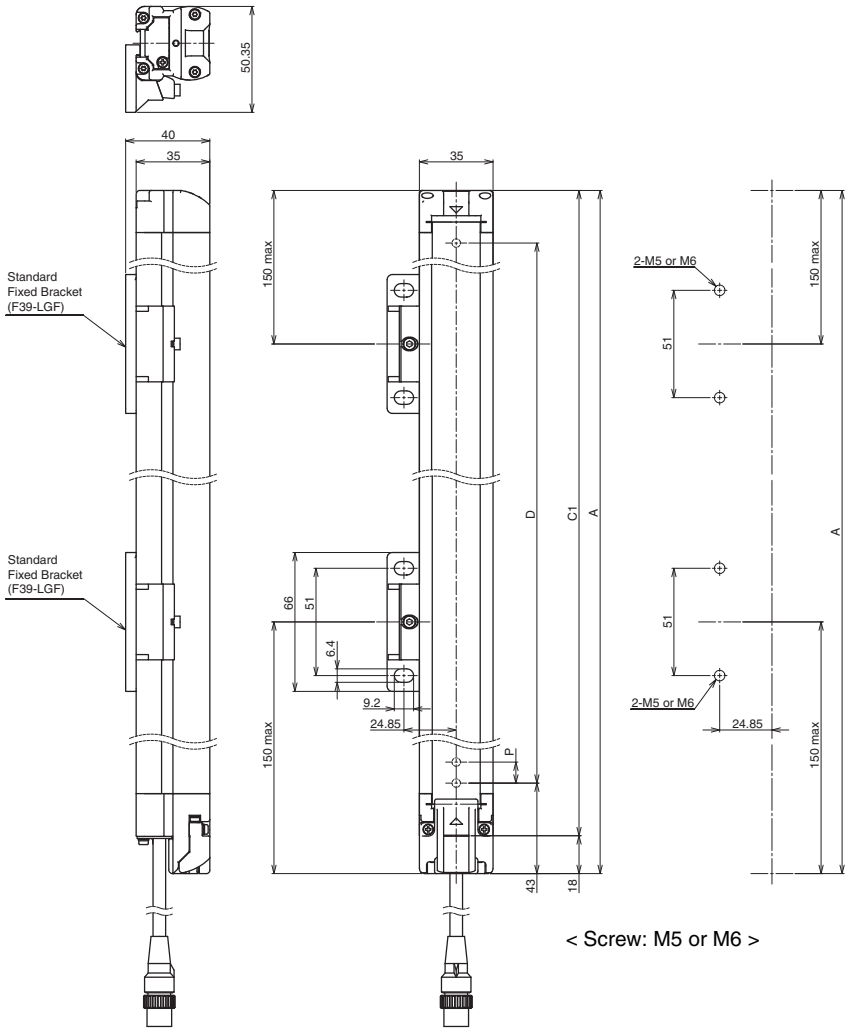
*1. The number of brackets required to mount either one of emitter and receiver.
*2. Mounting an emitter or receiver with one bracket is possible. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Standard Adjustable Bracket (F39-LGA)



Mounted with Standard Fixed Brackets (F39-LGF)

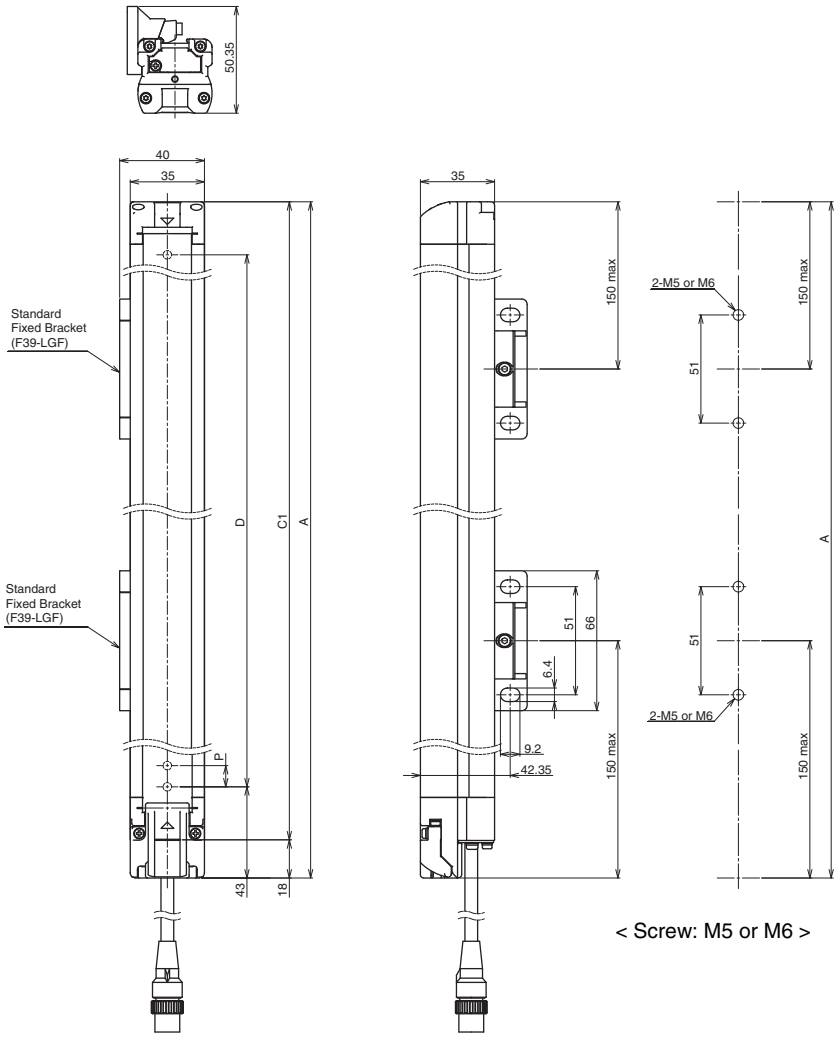
Backside Mounting



Model	F3W-MA0100P	F3W-MA0300P
Dimension A	208	448
Dimension C1	190	430
Dimension D	140	380
Dimension P	20	20
Number of Standard Fixed Brackets *1	2 *2	2

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

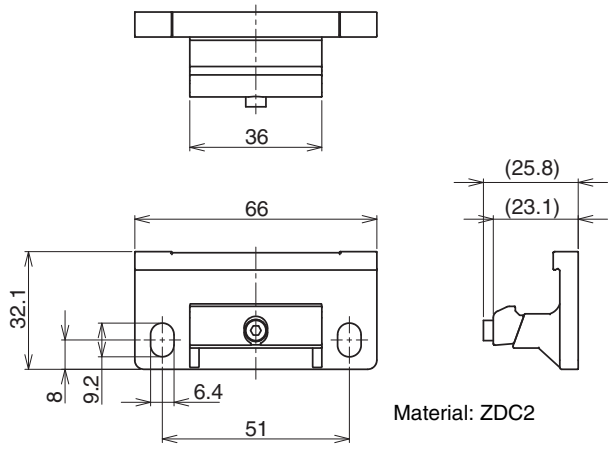
Side Mounting



Model	F3W-MA0100P	F3W-MA0300P
Dimension A	208	448
Dimension C1	190	430
Dimension D	140	380
Dimension P	20	20
Number of Standard Fixed Brackets *1	2 *2	2

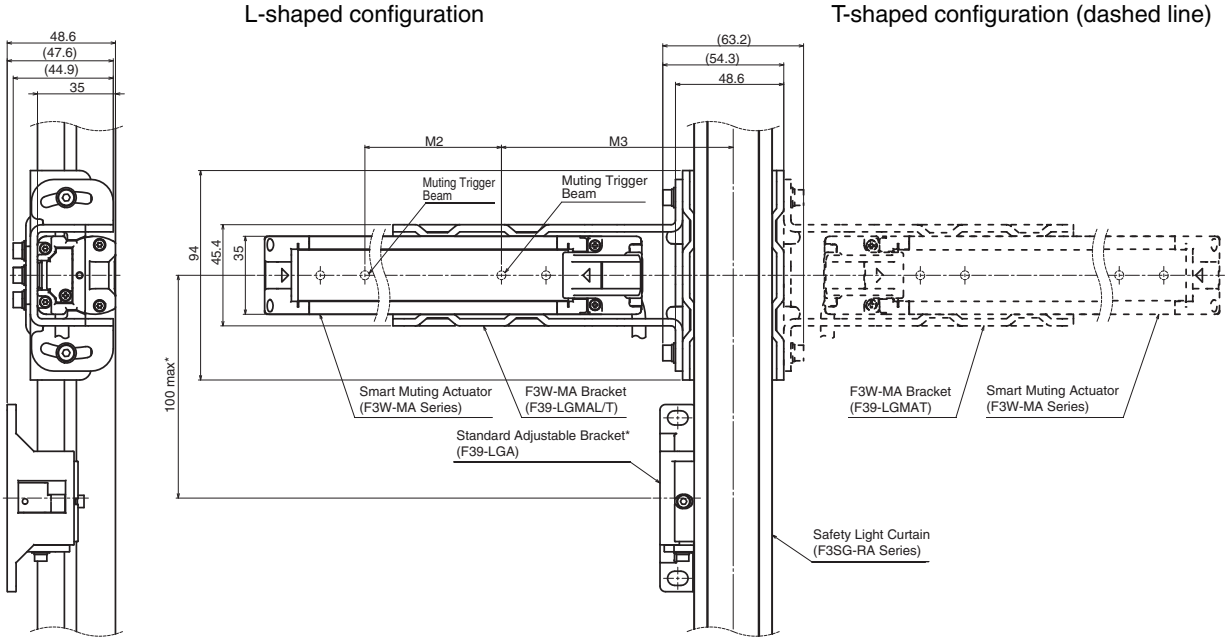
*1. The number of brackets required to mount either one of emitter and receiver.
*2. Mounting an emitter or receiver with one bracket is possible. In this case, locate this bracket at half the Dimension A (or at the center of the sensor length).

Standard Fixed Bracket (F39-LGF)



Material: ZDC2

Mounted with F3W-MA Bracket (F39-LGMA□) and Standard Adjustable Bracket (F39-LGA) on F3SG-RA



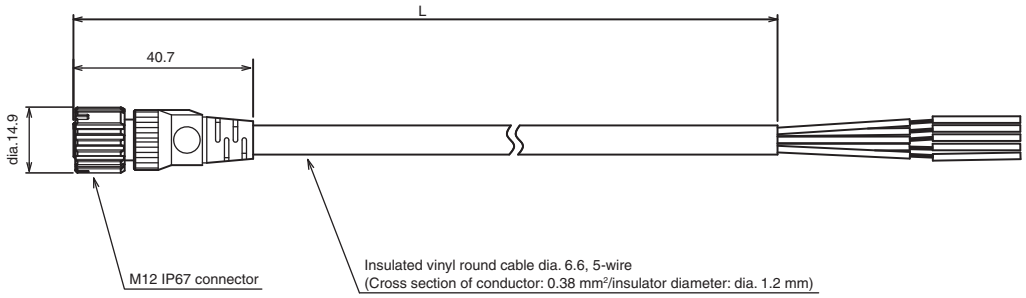
Note: When mounting an F3W-MA0300P in the L-shaped configuration, the shock resistance becomes as follows.
Shock resistance: 50 m/s^2, 1000 shocks for all 3 axes
For mounting an F3W-MA0300P under a shock environment exceeding this, the F3W-MA Bracket cannot be used. Use a Standard Adjustable Bracket (F39-LGA).

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

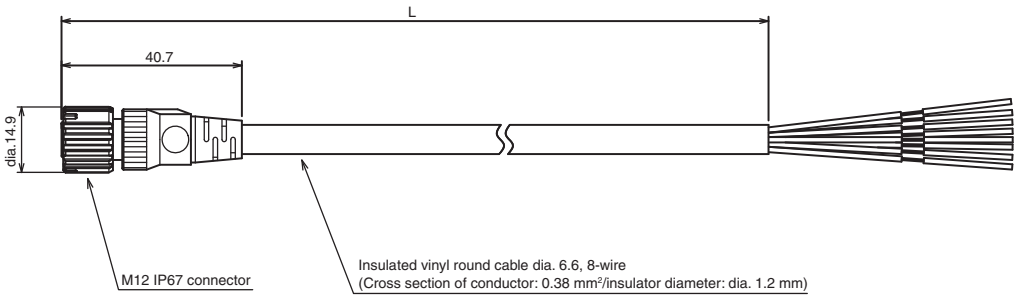
Model	F3W-MA0100P	F3W-MA0300P
Dimension M2	100	300
Dimension M3	104	124

Accessories

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

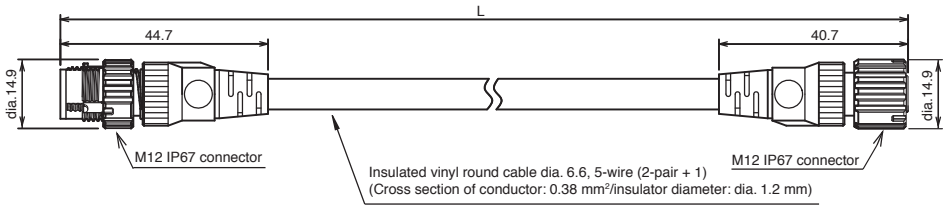


Single-Ended Cable for Receiver (F39-JG□A-D, sold separately)

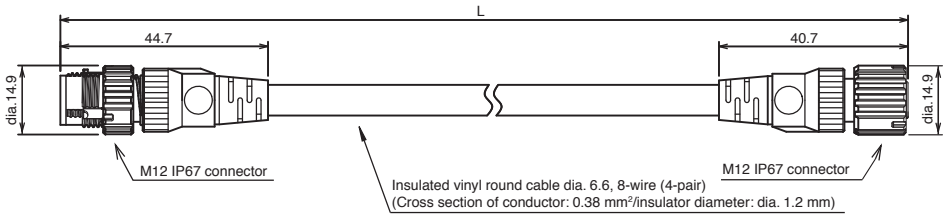


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JG3A-L	**F39-JG3A-D**	3
F39-JG7A-L	**F39-JG7A-D**	7
F39-JG10A-L	**F39-JG10A-D**	10
F39-JG15A-L	**F39-JG15A-D**	15
F39-JG20A-L	**F39-JG20A-D**	20

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

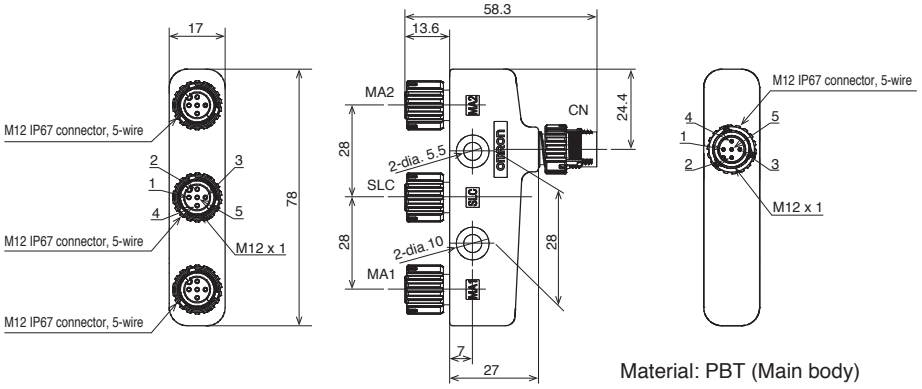


Double-Ended Cable for Receiver: Cable for extension (F39-JG□B-D, sold separately)



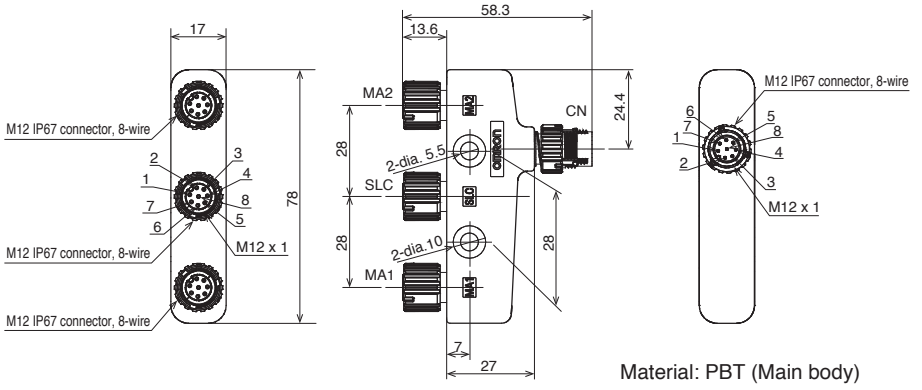
Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR5B-L	**F39-JGR5B-D**	0.5
F39-JG1B-L	**F39-JG1B-D**	1
F39-JG3B-L	**F39-JG3B-D**	3
F39-JG5B-L	**F39-JG5B-D**	5
F39-JG7B-L	**F39-JG7B-D**	7
F39-JG10B-L	**F39-JG10B-D**	10
F39-JG15B-L	**F39-JG15B-D**	15
F39-JG20B-L	**F39-JG20B-D**	20

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



Material: PBT (Main body)

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



Material: PBT (Main body)

Related Manuals

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

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