Safety Light Curtain Robust type

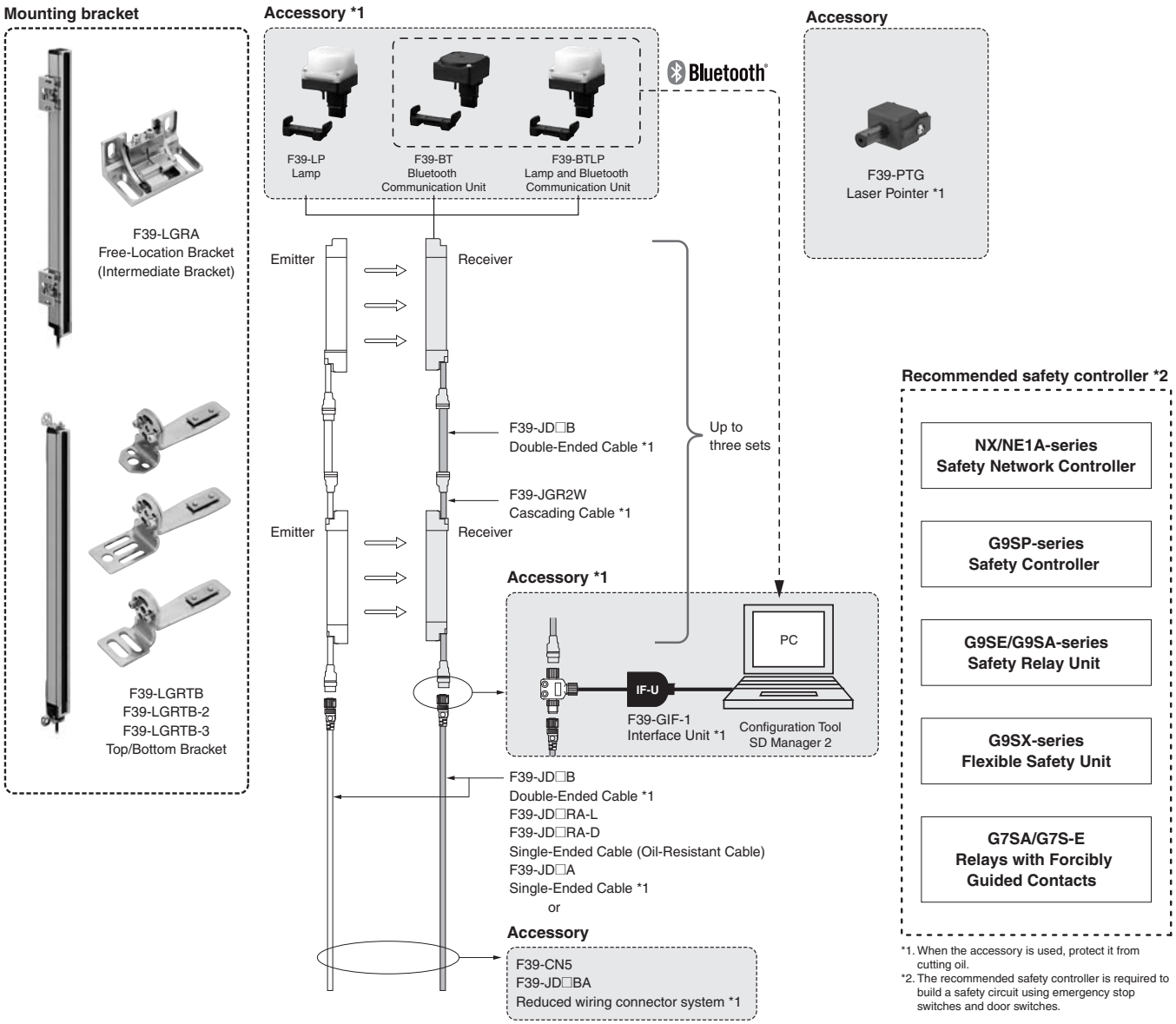
F3SG-RR

Enhanced Cutting Oil Resistance

- Mechanical seal structure prevents cutting oil from getting inside
- Special materials and cables significantly enhanced cutting 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)

Safety light curtain connecting cable
Single-Ended Cable (Oil-Resistant Cable)

<table>
<tr><th>Appearance</th><th>Type</th><th>Cable length</th><th>Specifications</th><th>Model</th></tr>
<tr><td rowspan="4">  </td><td rowspan="2">For emitter
M12 connector
(8-pin), 5 wires
Color: Gray</td><td>3 m</td><td rowspan="2">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 MUTE A /PC COM (+)
6 Pink MUTE B /PC COM (-)
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.</td><td>F39-JD3RA-L</td></tr>
<tr><td>7 m</td><td>F39-JD7RA-L</td></tr>
<tr><td rowspan="2">For receiver
M12 connector
(8-pin), 8 wires
Color: Black</td><td>3 m</td><td>F39-JD3RA-D</td></tr>
<tr><td>7 m</td><td>F39-JD7RA-D</td></tr>
</table>

Note: To extend the cable length to more than 7 m, add the F39-JD□B Double-Ended Cable.
When the Double-Ended Cable is used, protect it from cutting oil.

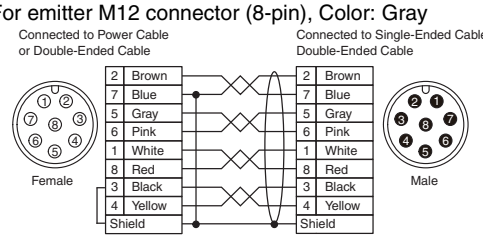
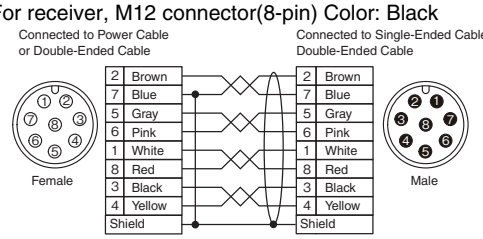
Single-Ended Cable (2 cables per set, one for emitter and one for receiver) *

<table>
<tr><th>Appearance</th><th>Cable length</th><th>Specifications</th><th>Model</th></tr>
<tr><td rowspan="5">  </td><td>3 m</td><td rowspan="5">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
Shield
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 MUTE A /PC COM (+)
6 Pink MUTE B /PC COM (-)
7 Blue 0 VDC
8 Red RESET/EDM
Shield
IP67* rated when mated.
* When the accessory is used, protect it from cutting oil.</td><td>F39-JD3A</td></tr>
<tr><td>7 m</td><td>F39-JD7A</td></tr>
<tr><td>10 m</td><td>F39-JD10A</td></tr>
<tr><td>15 m</td><td>F39-JD15A</td></tr>
<tr><td>20 m</td><td>F39-JD20A</td></tr>
</table>

* 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: 1. Use the F39-JD□RA-L/-D for applications where cutting oil resistance is required.
2. To extend the cable length to more than 20 m, add the F39-JD□B Double-Ended Cable.

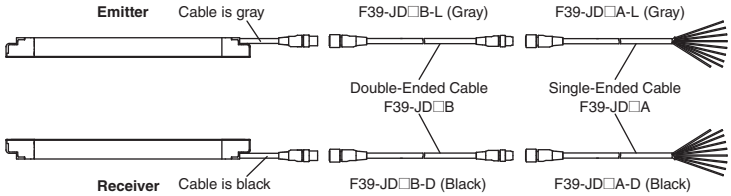
Double-Ended Cable (2 cables per set, one for emitter and one for receiver) *

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, add the F39-JD□B Double-Ended Cable to the F39-JD□A Single-Ended Cable.
To extend the cable length to more than 40 m, add several Double-Ended Cables to the Single-Ended Cable.
Example: To extend the cable length to 50 m, connect two F39-JD20B (20 m) cables and one F39-JD10A (10 m) cable.

<Connection example>



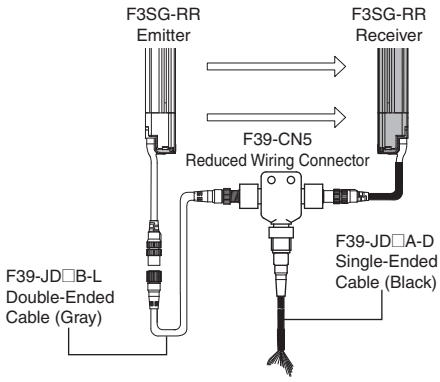
Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)

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.

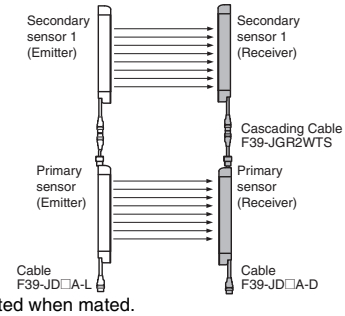


Cable for Reduce Wiring* (2 cables per set, one for emitter and one for receiver)

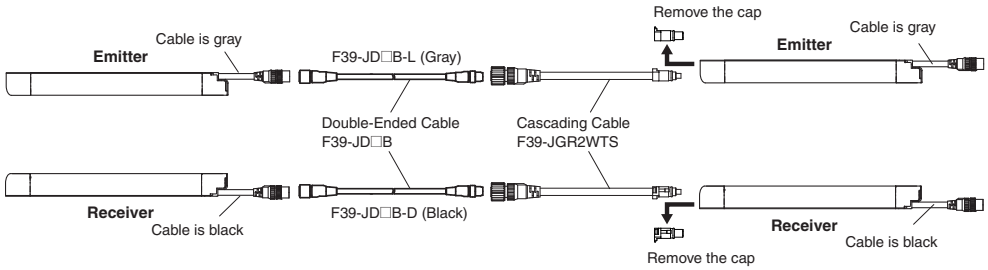
Appearance	Cable length	Specifications	Remarks	Model
 	Emitter: 3 m Receiver: 3 m	IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	Double-Ended Cable: F39-JD3B-L Single-Ended Cable: F39-JD3A-D	F39-JD0303BA
	Emitter: 3 m Receiver: 7 m		Double-Ended Cable: F39-JD3B-L Single-Ended Cable: F39-JD7A-D	F39-JD0307BA
	Emitter: 3 m Receiver: 10 m		Double-Ended Cable: F39-JD3B-L Single-Ended Cable: F39-JD10A-D	F39-JD0310BA
	Emitter: 5 m Receiver: 3 m		Double-Ended Cable: F39-JD5B-L Single-Ended Cable: F39-JD3A-D	F39-JD0503BA
	Emitter: 5 m Receiver: 7 m		Double-Ended Cable: F39-JD5B-L Single-Ended Cable: F39-JD7A-D	F39-JD0507BA
	Emitter: 5 m Receiver: 10 m		Double-Ended Cable: F39-JD5B-L Single-Ended Cable: F39-JD10A-D	F39-JD0510BA
	Emitter: 10 m Receiver: 3 m		Double-Ended Cable: F39-JD10B-L Single-Ended Cable: F39-JD3A-D	F39-JD1003BA
	Emitter: 10 m Receiver: 7 m		Double-Ended Cable: F39-JD10B-L Single-Ended Cable: F39-JD7A-D	F39-JD1007BA
	Emitter: 10 m Receiver: 10 m		Double-Ended Cable: F39-JD10B-L Single-Ended Cable: F39-JD10A-D	F39-JD1010BA

Note: A combination of emitter and receiver cables of other lengths than the above is also available. For details, contact your Omron representative.
* Double-Ended Cable for emitter and Single-Ended Cable for receiver.

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
	Free-Location Bracket (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	Select a bracket that fit into the existing mounting hole.	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 1040 or less: The Intermediate Bracket is not required. Please purchase 1 set of Top/Bottom Brackets (F39-LGRTB(-2/-3)).
Protective height of 1120 to 1920: Please purchase 1 set of Top/Bottom Brackets (F39-LGRTB(-2/-3)) and 1 set of Intermediate Brackets (F39-LGRA).

Interface units and configuration tool SD Manager 2 *

Appearance	Type	Specifications	Model
	SD Manager 2	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 Accessories: F39-CN1 Branch Connector (1), Connector Cap (1), 2-m Dedicated Cable (1), Instruction Manual	**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 *1 *2

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

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

Test Rod

Diameter	Model
14 mm dia.	**F39-TRD14**
25 mm dia.	**F39-TRD25**

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 52. *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 52 .	
	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 54.	
	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	
	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 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 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 46.	
		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 46 and 47.	
		Cable Diameter	6.6 mm	
		Minimum Bending Radius	R36 mm	
	Extension of Power Cable		100 m max. (Emitter/Receiver)	
Material	Material		Housing: Aluminum alloy Cap: PBT resin Front window: Acrylic resin Cable: Fluororesin FE plate: Stainless steel	
	Weight		Refer to page 52 .	
	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 53.	
	Performance Level (PL)/Safety category		PL e/Category 4 (EN ISO 13849-1:2015)	
	PFH_D		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)	

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]	
			ON → OFF *2	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	Net *3	Gross *4
F3SG-4RR0240-14	23	240	8	40	140	45	75	0.7	1.5
F3SG-4RR0320-14	31	320	8	40	140	55	75	0.9	1.7
F3SG-4RR0400-14	39	400	8	40	140	60	80	1.1	2.0
F3SG-4RR0480-14	47	480	13	65	165	50	80	1.3	2.3
F3SG-4RR0560-14	55	560	13	65	165	55	80	1.5	2.5
F3SG-4RR0640-14	63	640	13	65	165	60	85	1.7	2.8
F3SG-4RR0720-14	71	720	13	65	165	65	85	1.9	3.1
F3SG-4RR0800-14	79	800	13	65	165	65	90	2.1	3.4
F3SG-4RR0880-14	87	880	13	65	165	70	90	2.4	3.6
F3SG-4RR0960-14	95	960	13	65	165	75	90	2.6	3.9
F3SG-4RR1040-14	103	1040	13	65	165	80	95	2.8	4.2
F3SG-4RR1120-14	111	1120	13	65	165	85	95	3.0	4.4
F3SG-4RR1200-14	119	1200	13	65	165	90	100	3.2	4.7
F3SG-4RR1280-14	127	1280	13	65	165	95	100	3.4	5.0
F3SG-4RR1360-14	135	1360	13	65	165	95	105	3.6	5.3
F3SG-4RR1440-14	143	1440	18	90	190	85	105	3.8	5.5
F3SG-4RR1520-14	151	1520	18	90	190	90	105	4.0	5.8
F3SG-4RR1600-14	159	1600	18	90	190	90	110	4.2	6.1
F3SG-4RR1680-14	167	1680	18	90	190	95	110	4.4	6.3
F3SG-4RR1760-14	175	1760	18	90	190	100	115	4.6	6.6
F3SG-4RR1840-14	183	1840	18	90	190	100	115	4.8	6.9
F3SG-4RR1920-14	191	1920	18	90	190	105	120	5.0	7.2

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

F3SG-4RR□□□□-25

Model	Number of Beams	Protective Height [mm] (Overall length)	Response Time [ms] *1			Current Consumption [mA]		Weight [kg]	
			ON → OFF *2	OFF (Synchronized) → ON	OFF (Not synchronized) → ON	Emitter	Receiver	Net *3	Gross *4
F3SG-4RR0240-25	12	240	8	40	140	35	75	0.7	1.6
F3SG-4RR0320-25	16	320	8	40	140	40	75	0.9	1.9
F3SG-4RR0400-25	20	400	8	40	140	45	75	1.1	2.1
F3SG-4RR0480-25	24	480	8	40	140	50	75	1.3	2.4
F3SG-4RR0560-25	28	560	8	40	140	50	75	1.5	2.7
F3SG-4RR0640-25	32	640	8	40	140	55	75	1.7	3.0
F3SG-4RR0720-25	36	720	8	40	140	60	80	1.9	3.2
F3SG-4RR0800-25	40	800	8	40	140	65	80	2.1	3.5
F3SG-4RR0880-25	44	880	13	65	165	50	80	2.3	3.8
F3SG-4RR0960-25	48	960	13	65	165	50	80	2.5	4.0
F3SG-4RR1040-25	52	1040	13	65	165	55	80	2.7	4.3
F3SG-4RR1120-25	56	1120	13	65	165	55	85	2.9	4.6
F3SG-4RR1200-25	60	1200	13	65	165	55	85	3.1	4.9
F3SG-4RR1280-25	64	1280	13	65	165	60	85	3.3	5.1
F3SG-4RR1360-25	68	1360	13	65	165	60	85	3.5	5.4
F3SG-4RR1440-25	72	1440	13	65	165	65	85	3.7	5.7
F3SG-4RR1520-25	76	1520	13	65	165	65	90	3.9	5.9
F3SG-4RR1600-25	80	1600	13	65	165	70	90	4.1	6.2
F3SG-4RR1680-25	84	1680	13	65	165	70	90	4.3	6.5
F3SG-4RR1760-25	88	1760	13	65	165	70	90	4.5	6.7
F3SG-4RR1840-25	92	1840	13	65	165	75	90	4.7	7.0
F3SG-4RR1920-25	96	1920	13	65	165	75	95	4.9	7.3

*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 net weight is the weight of an emitter and a receiver.
*4. The gross weight is the weight of an emitter, a receiver, included accessories and a 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 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

F3SG-RR

Indicator

Emitter

Name of Indicator		Color	Illuminated	Blinking
Test	TEST	Green	–	External Test is being performed
Operating range	LONG	Green	Always illuminated	Lockout state due to Scan code 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	–
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/RR's terminal connector
Material	Lighting element: PC, Other body parts: PBT
Weight	45 g (when packaged)

Connections (Basic Wiring Diagram)

Standalone F3SG-RR using PNP Outputs

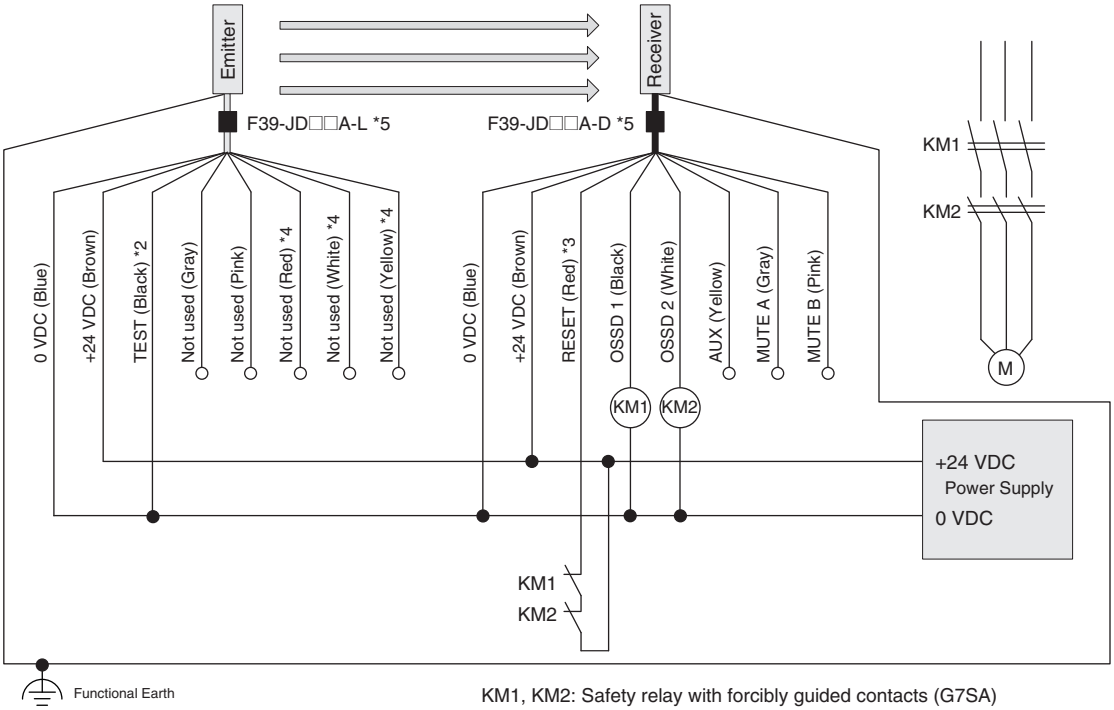
Auto Reset Mode, EDM enabled and PNP Outputs

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).

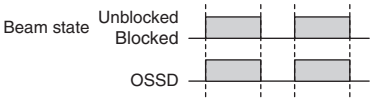
Settings

	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: 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. Also used as EDM input line. Connect a lockout reset switch (N.C. contact) to this line in series with the KM1 and KM2 if Lockout Reset is used.
*4. The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant 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: 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.

Standalone F3SG-RR using NPN Outputs

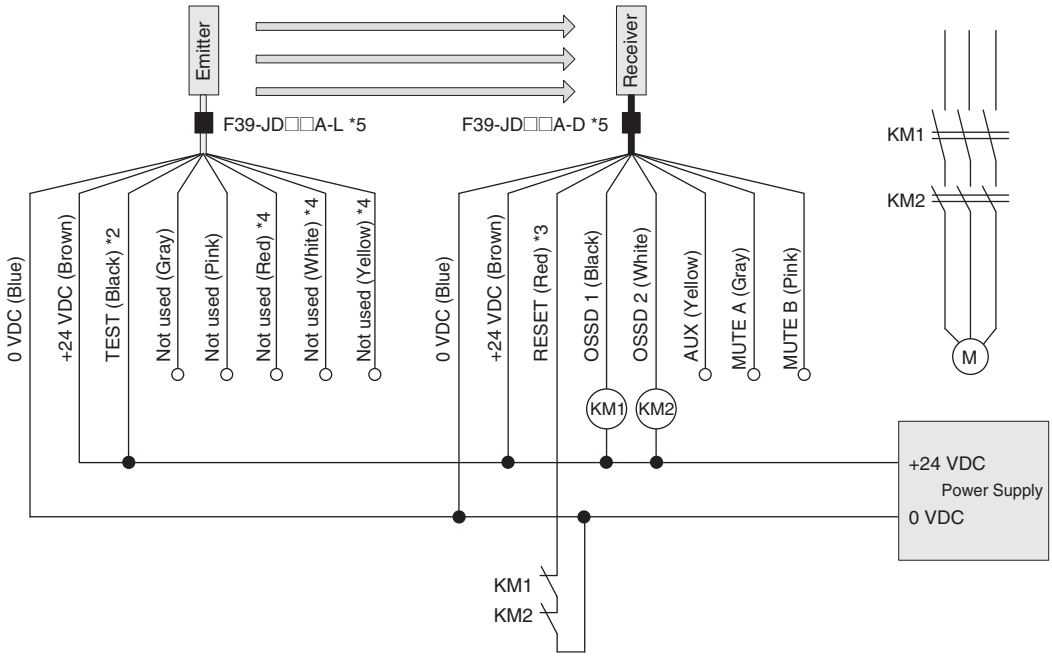
Auto Reset Mode, EDM enabled and NPN Outputs

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: 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.Also used as EDM input line. Connect a lockout reset switch (N.C. contact) to this line in series with the KM1 and KM2 if Lockout Reset is used.
*4.The F39-JD□RA-L Single-Ended Cable for Emitter (Oil-Resistant 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 55.

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-T□ 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-R with NPN output can be connected to the safety control units listed in the table below.

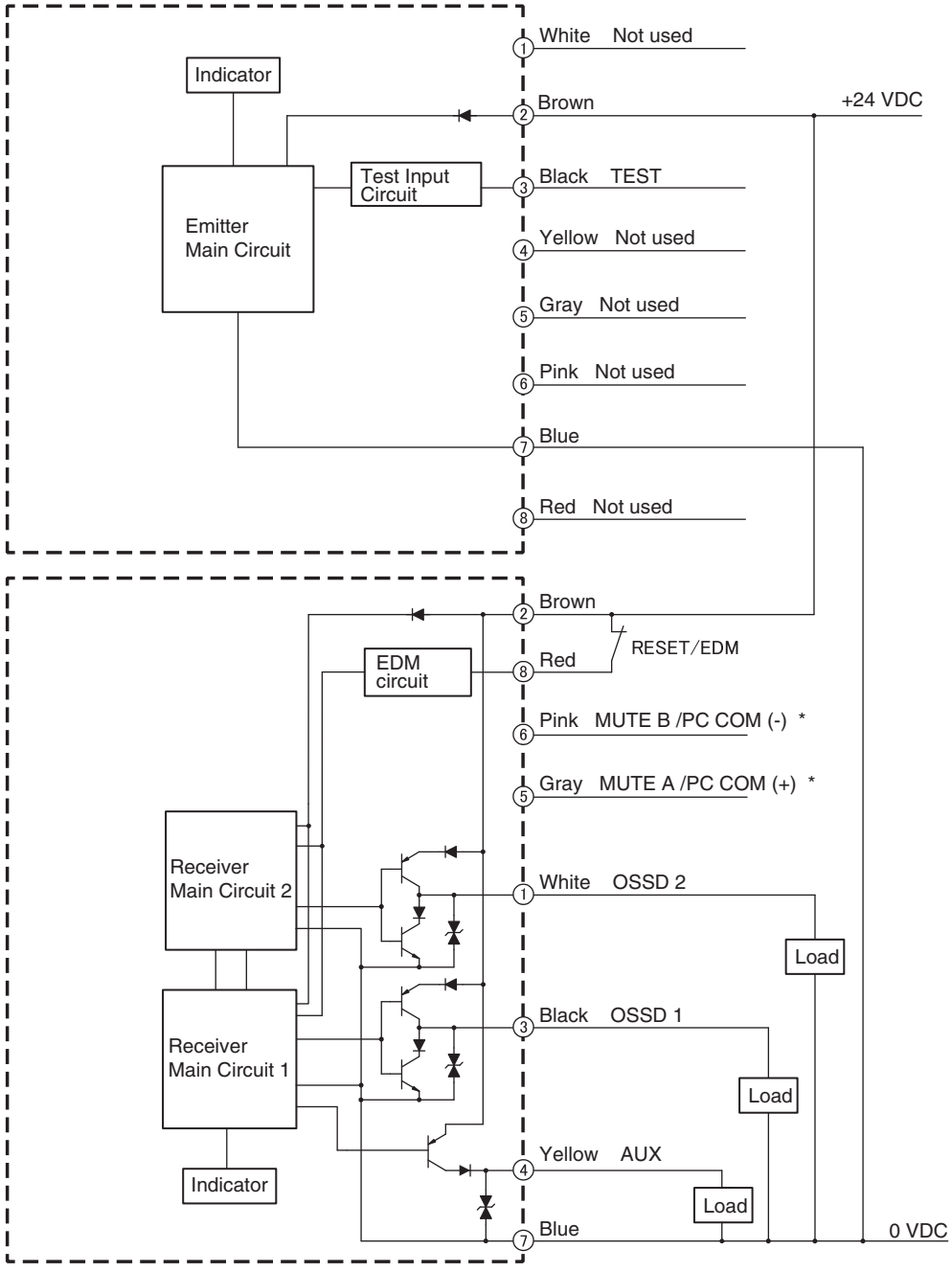
Connectable Safety Control Units (NPN output)
Safety Relay Units
G9SA-301-P

Input/Output Circuit

Entire Circuit Diagram

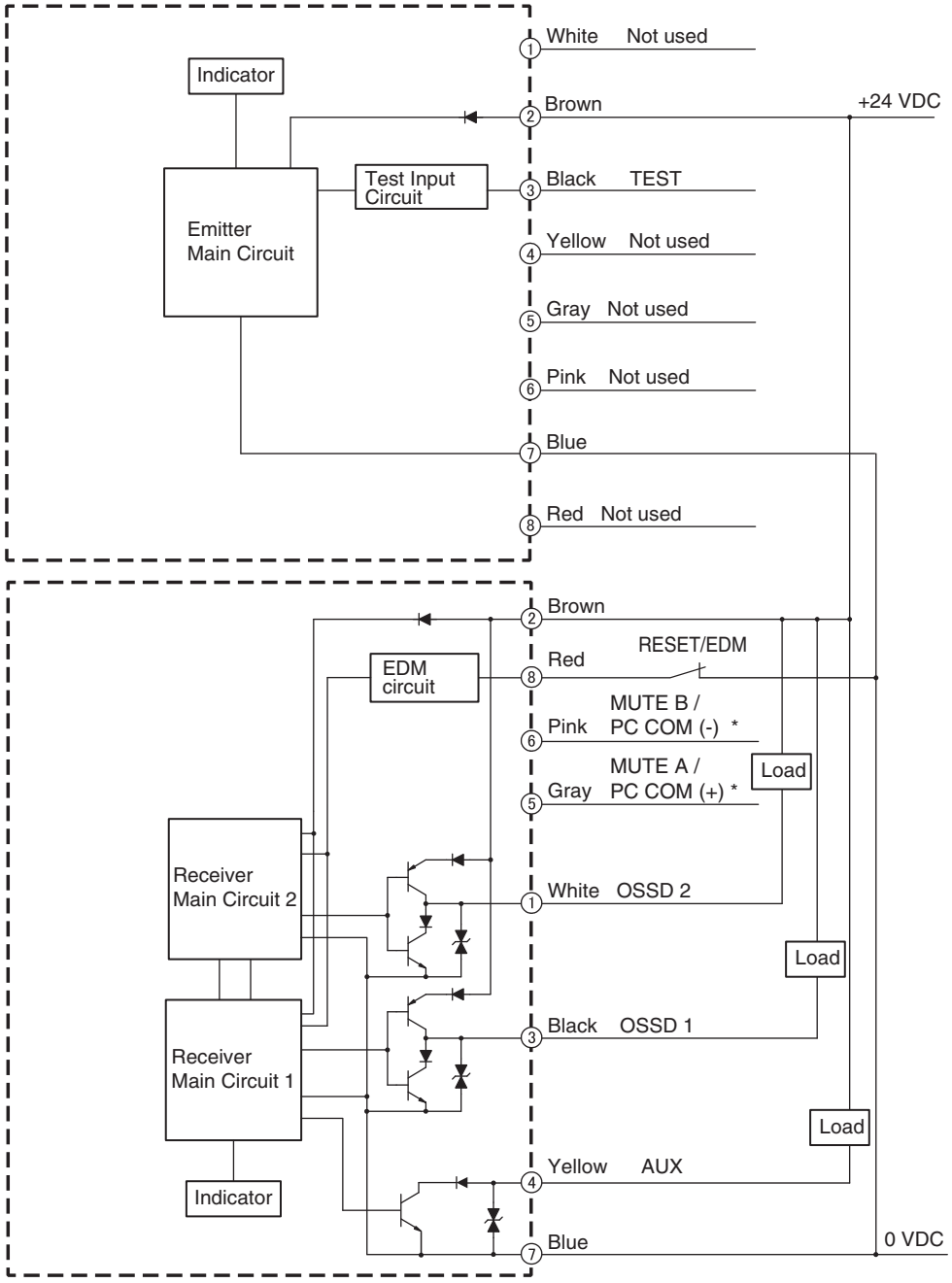
The entire circuit diagram of the F3SG-RR is shown below.
The numbers in the circles indicate the connector's pin numbers.

PNP Output



* This line is used for communication with a PC using the F39-GIF-1 Interface Unit.

NPN Output

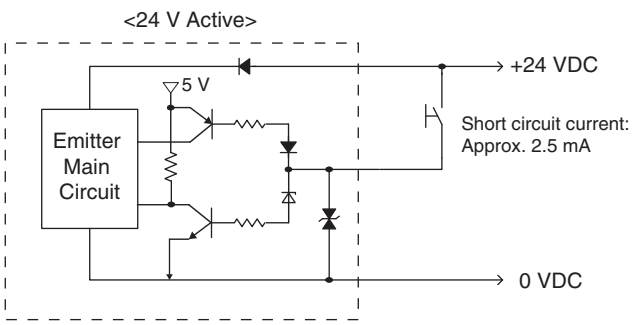


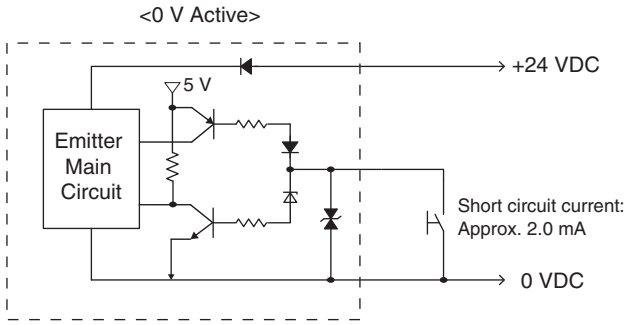
* This line is used for communication with a PC using the F39-GIF-1 Interface Unit.

Input Circuit Diagram by Function

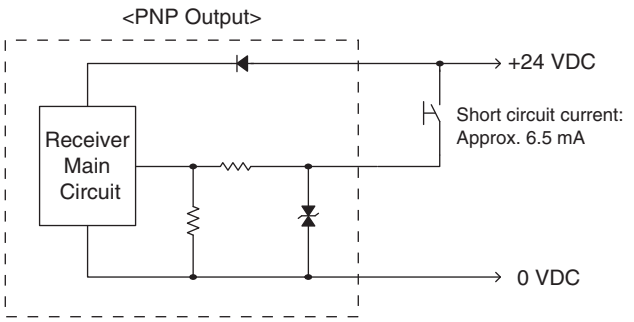
The input circuit diagrams of by function are shown below.

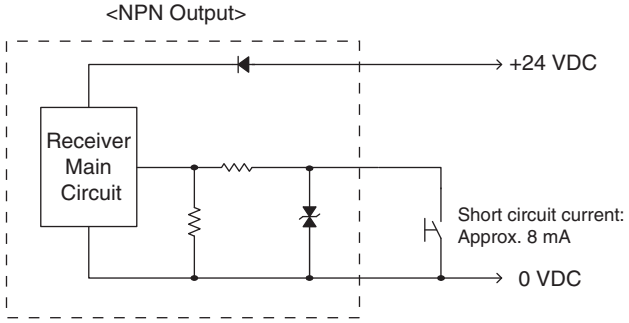
Test Input





Reset/EDM



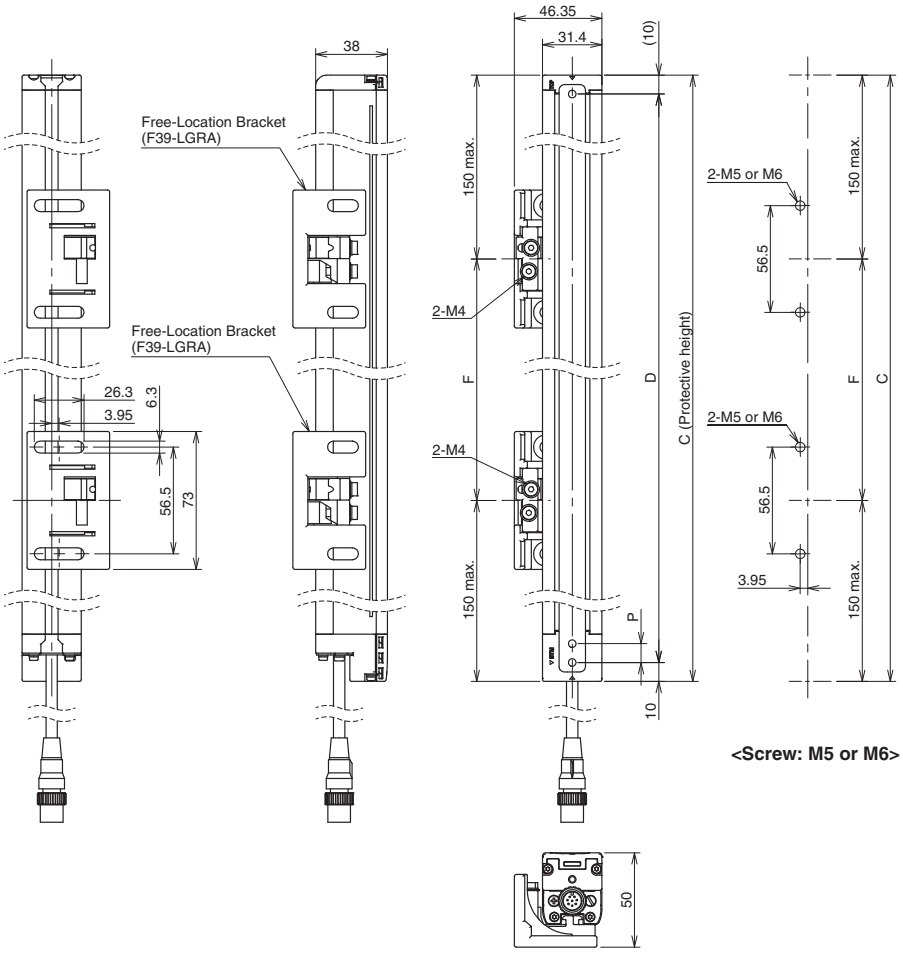


Dimensions

(Unit: mm)

Mounted with Free-Location Brackets (F39-LGRA)

Backside Mounting

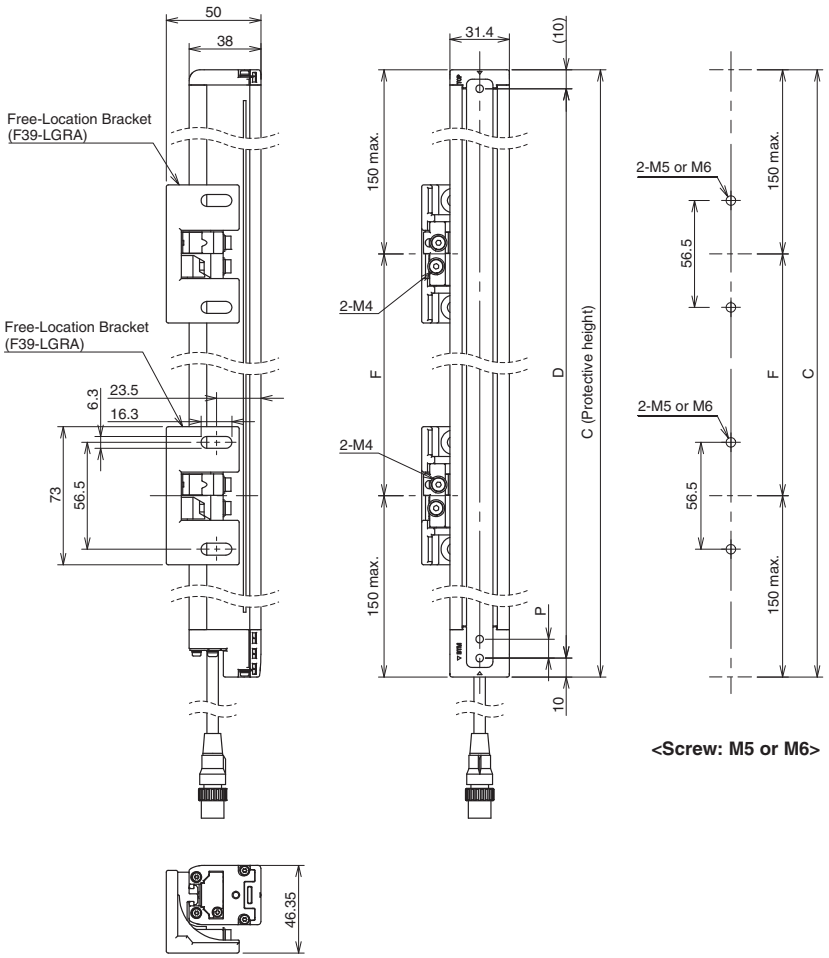


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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



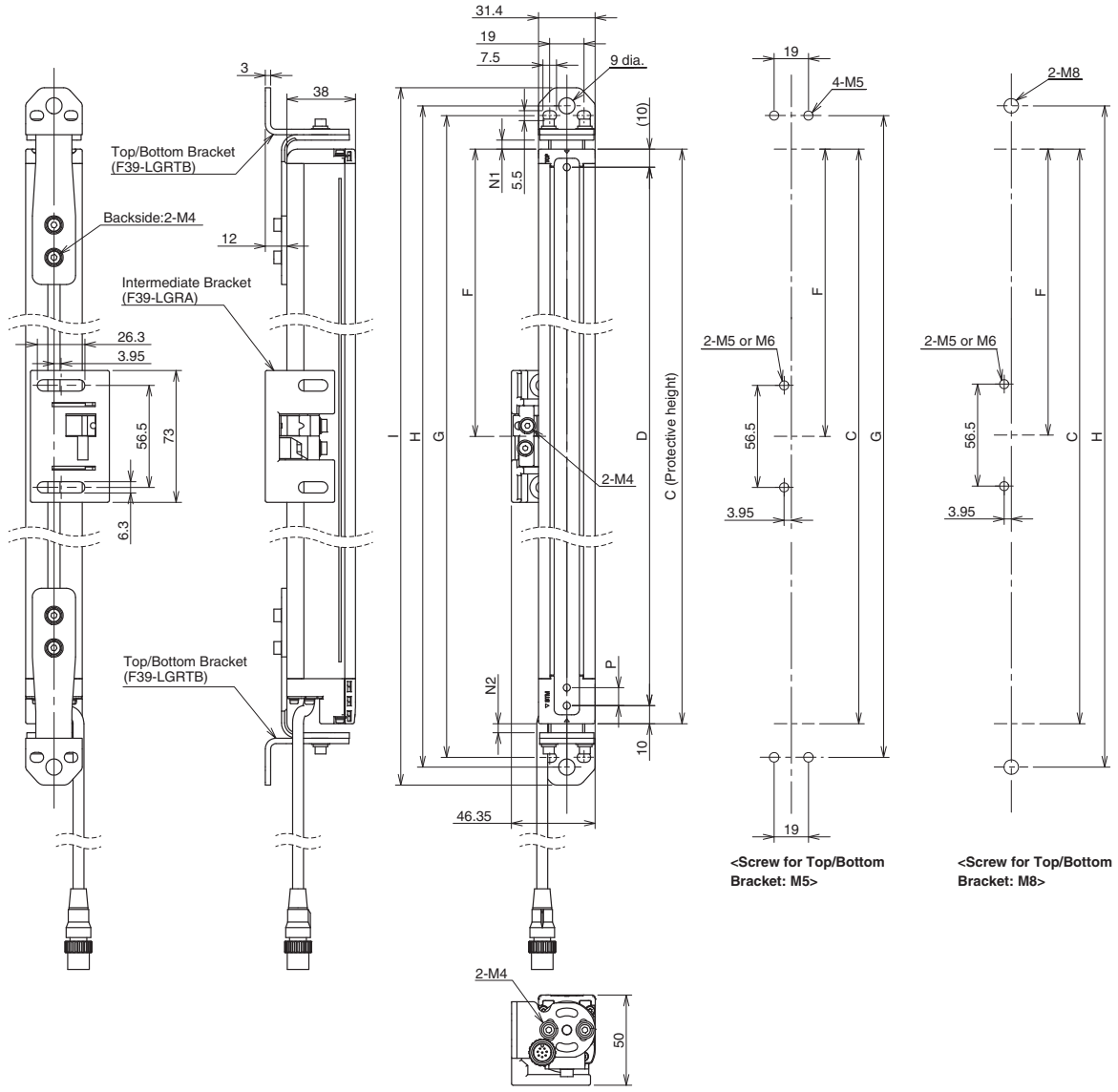
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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

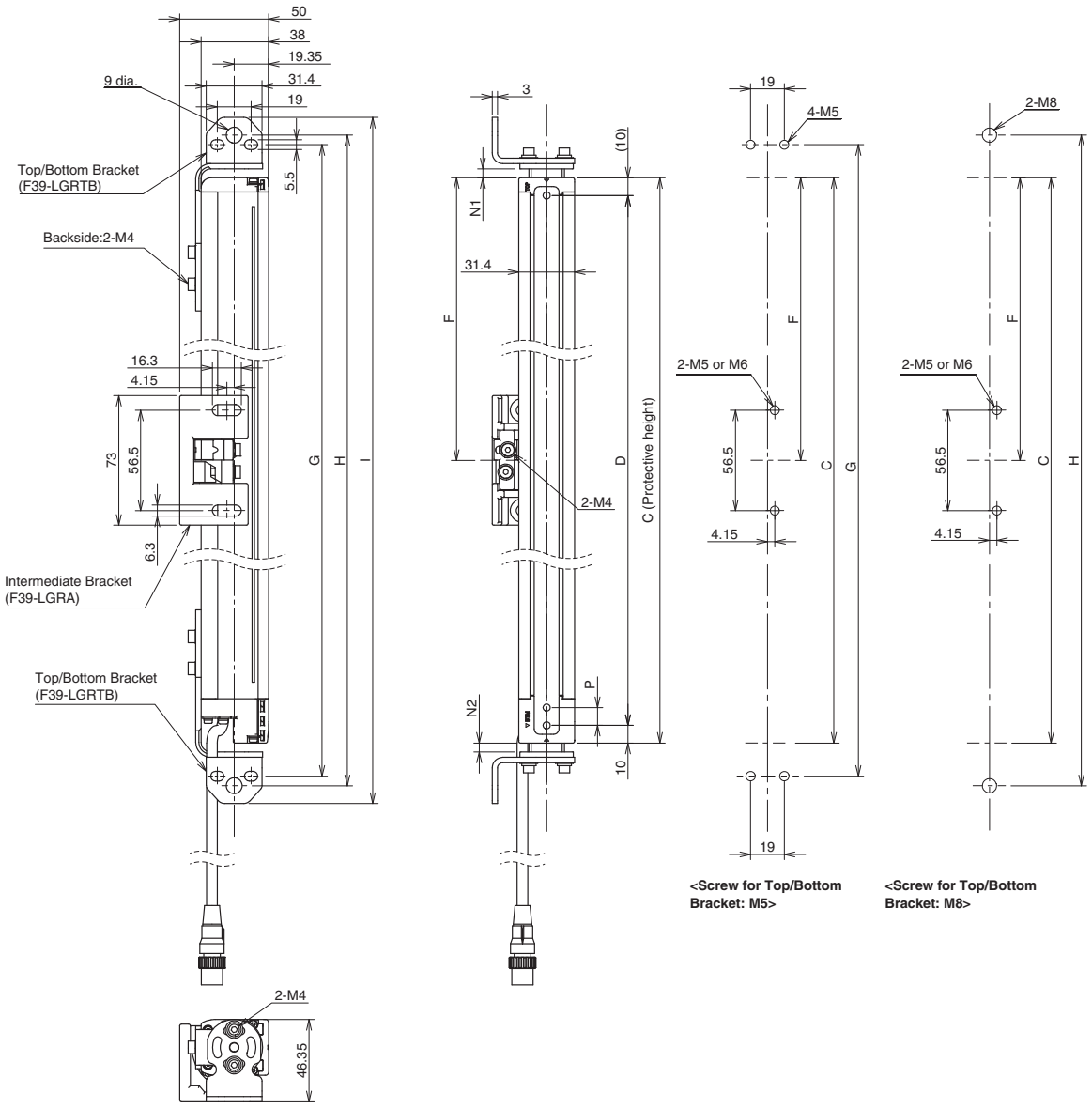


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+27.2+N1+N2	
Dimension H	C+38+N1+N2	
Dimension I	C+58+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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



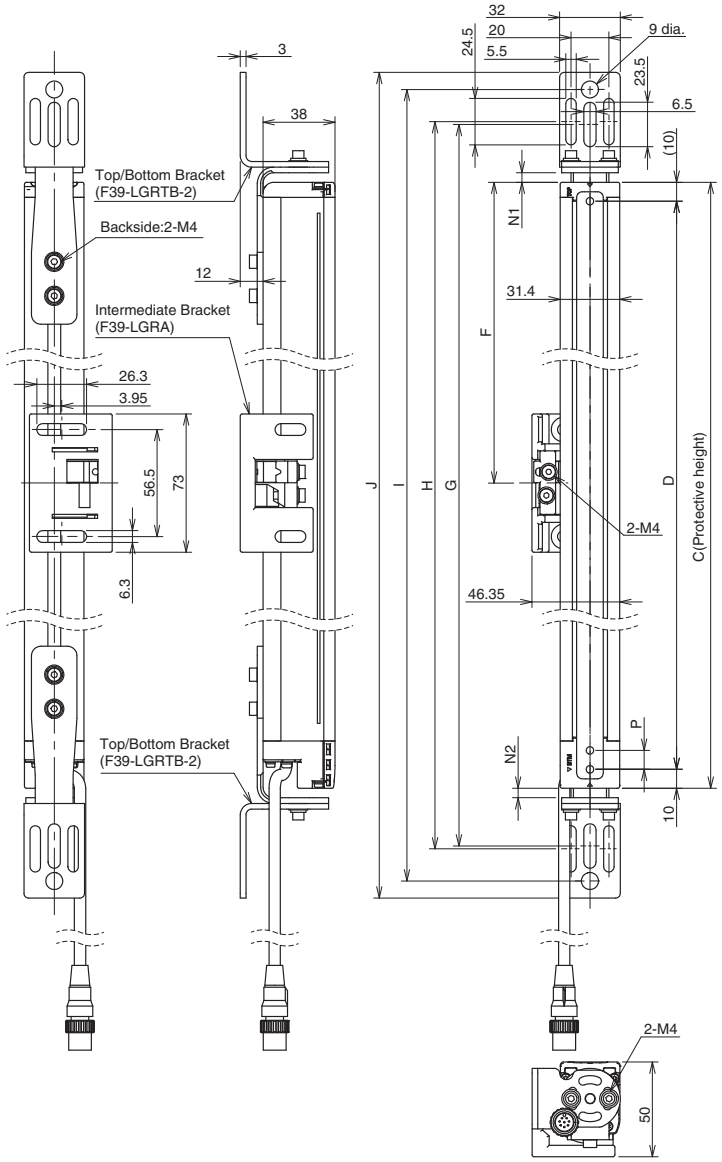
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+27.2+N1+N2	
Dimension H	C+38+N1+N2	
Dimension I	C+58+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

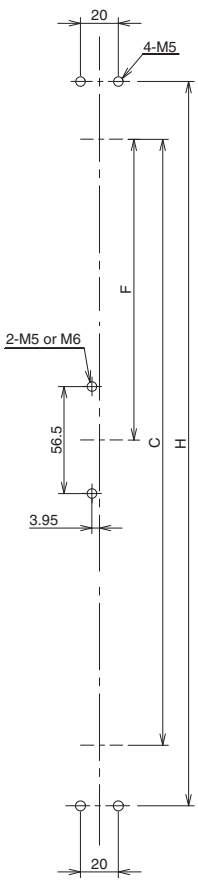
Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

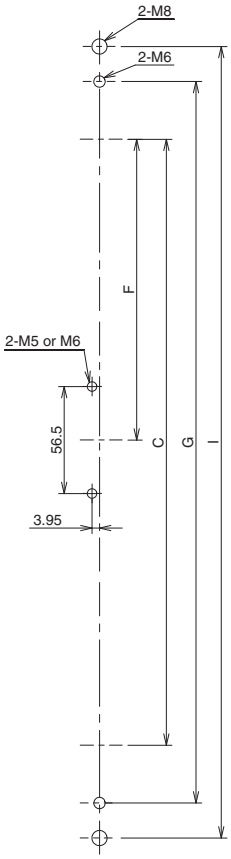
Mounted with Top/Bottom Brackets (F39-LGRTB-2) and Intermediate Bracket (F39-LGRA)

Backside Mounting





<Screw for Top/Bottom Bracket: M5>



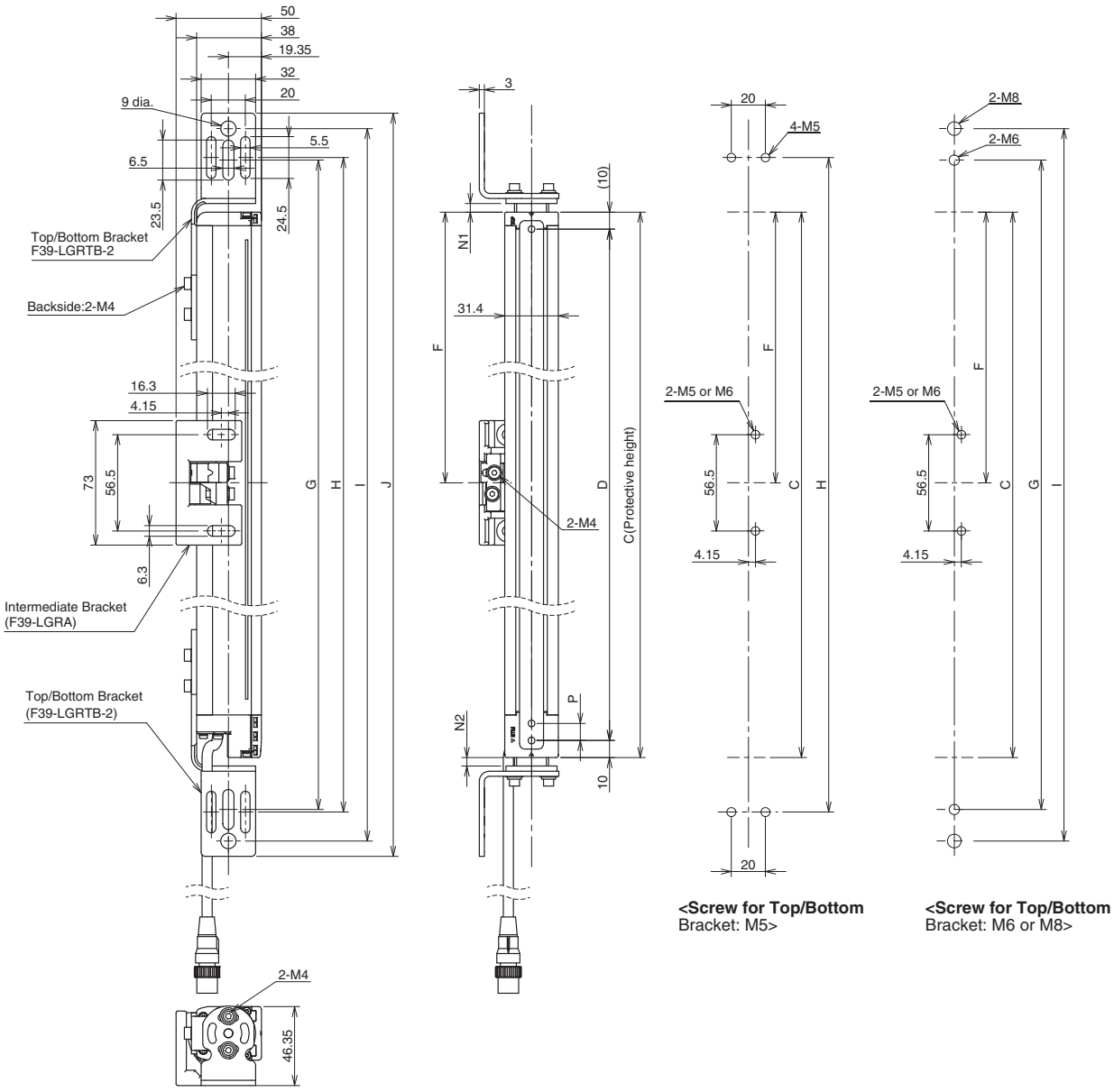
<Screw for Top/Bottom Bracket: M6 or M8>

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



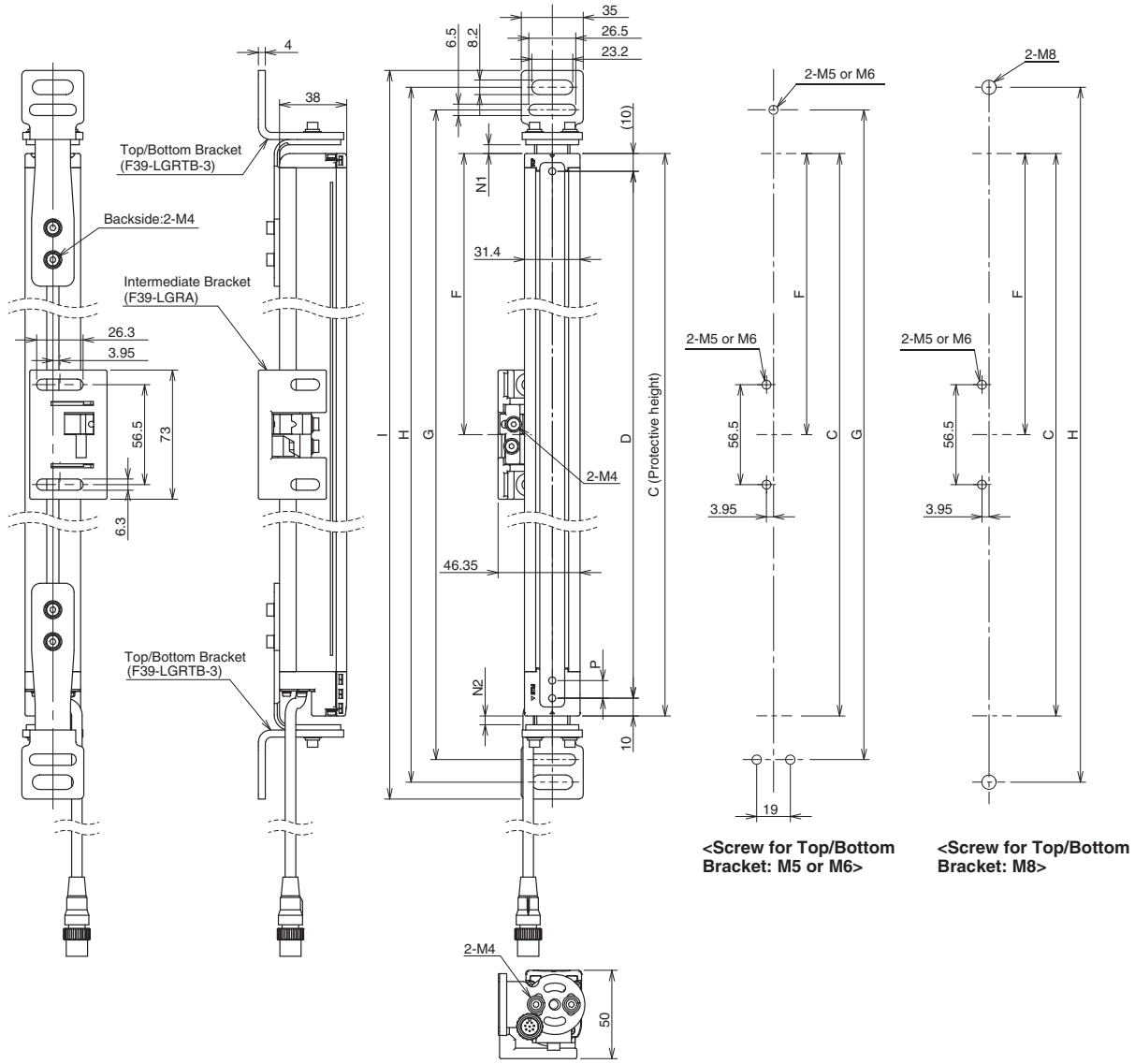
Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+51+N1+N2	
Dimension H	C+54+N1+N2	
Dimension I	C+88+N1+N2	
Dimension J	C+106+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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

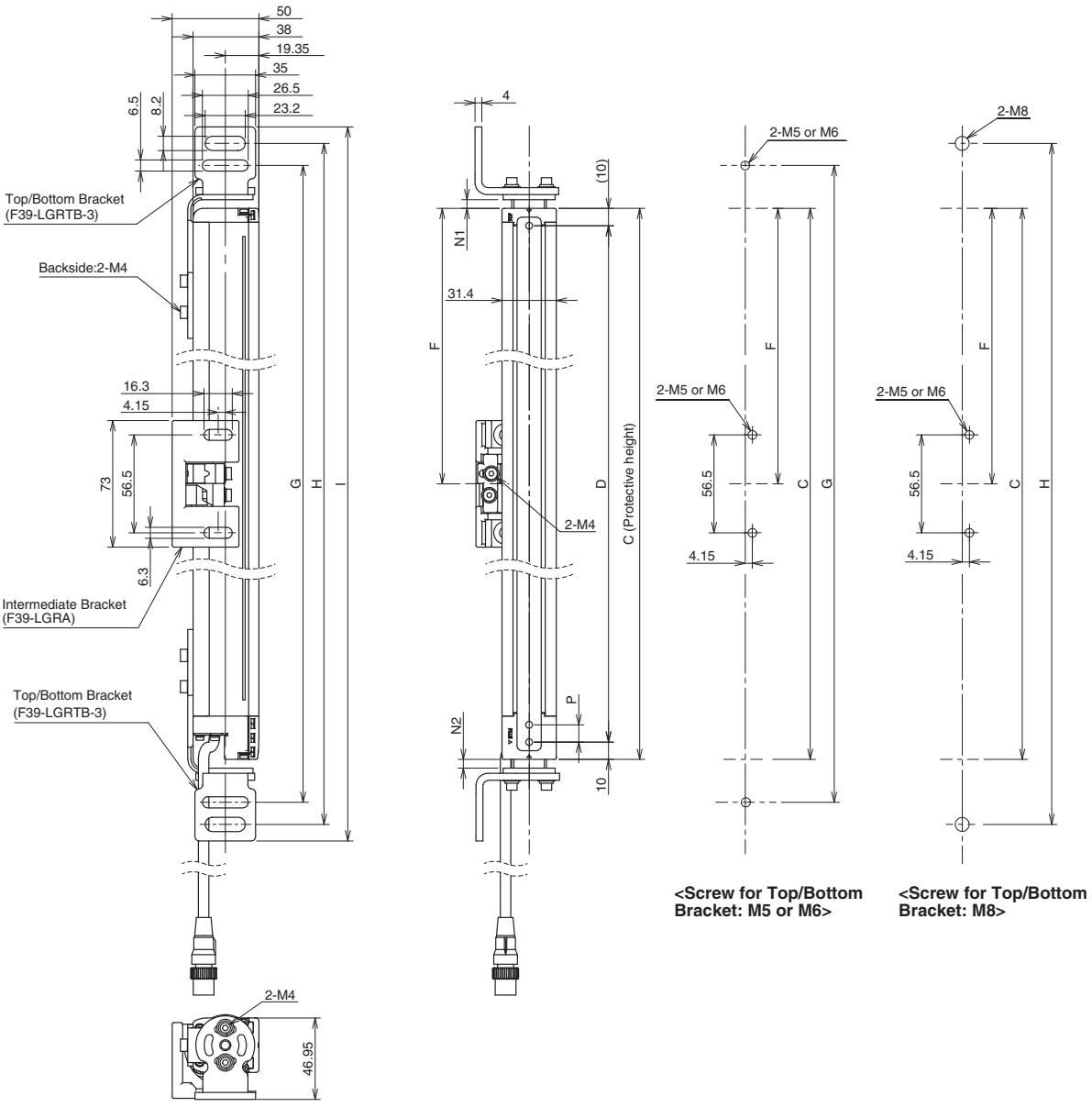


Dimension C	4-digit number of the type name (Protective height)	
Dimension D	C-20	
Dimension G	C+39.5+N1+N2	
Dimension H	C+65+N1+N2	
Dimension I	C+84+N1+N2	
Dimension N1	0 to 30	
Dimension N2	0 to 13	
Dimension P	F3SG-4RR□□□□-14	10
	F3SG-4RR□□□□-25	20

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

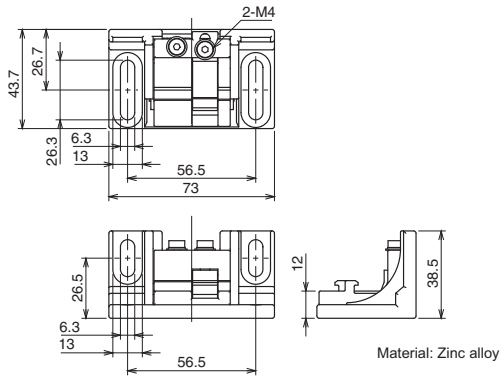
Protective height (C)	Number of Top/ Bottom Brackets *	Number of Intermediate Brackets *	Dimension F
0240 to 1040	2	0	–
1120 to 1920	2	1	1000 mm max.

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

Accessories

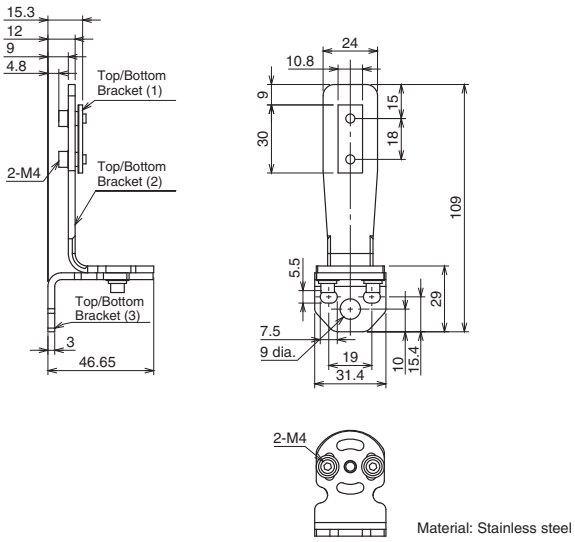
Sensor Mounting Brackets

Free-Location Bracket / Intermediate Bracket (F39-LGRA, sold separately)



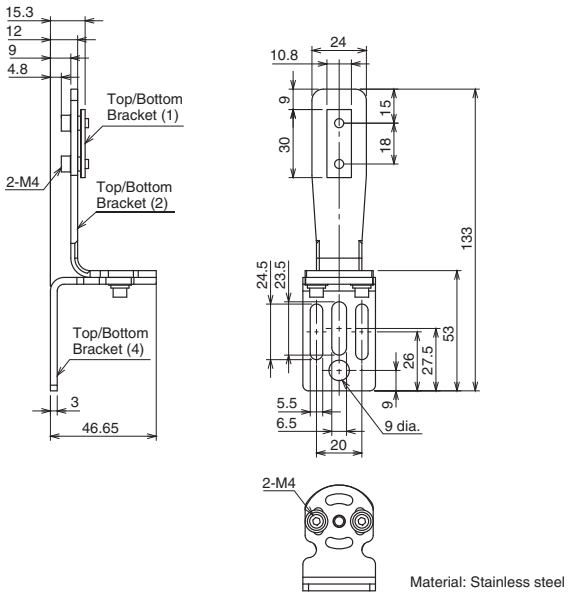
Material: Zinc alloy

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



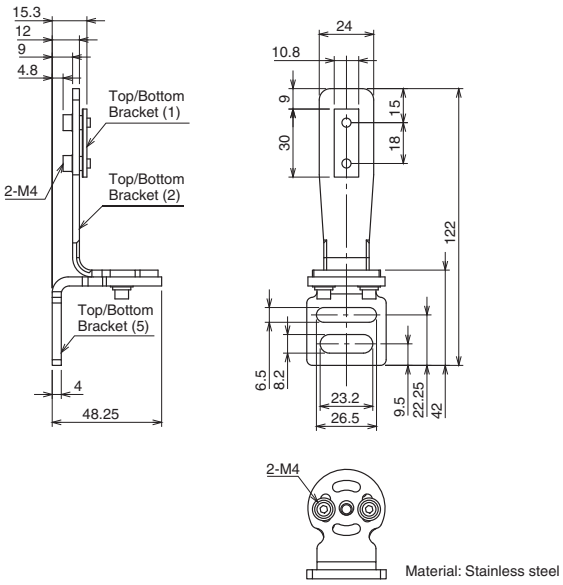
Material: Stainless steel

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



Material: Stainless steel

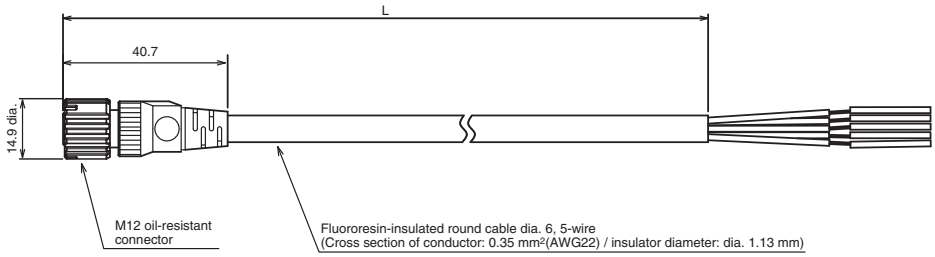
Top/Bottom Bracket (F39-LGRTB-3, sold separately)



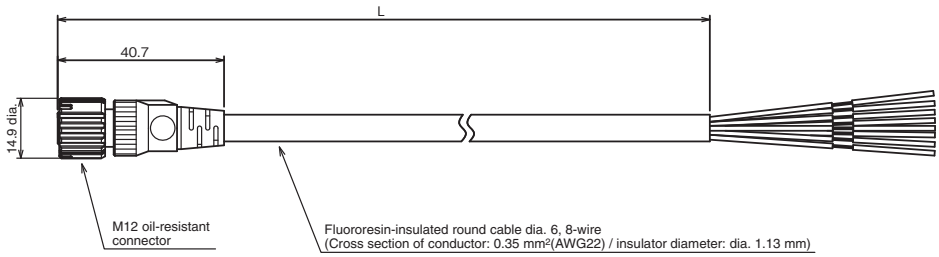
Material: Stainless steel

Safety light curtain connecting cable

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

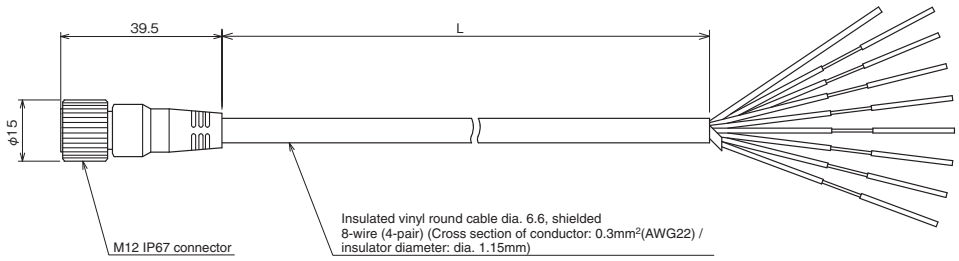


Single-Ended Cable for Receiver (Oil-Resistant Cable) (F39-JD□RA-D, sold separately)

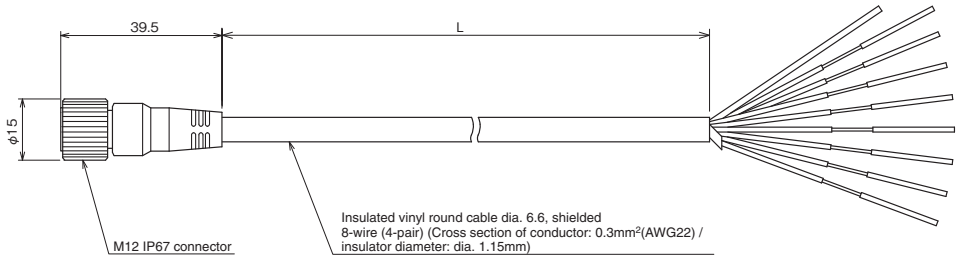


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3RA-L	F39-JD3RA-D	3
F39-JD7RA-L	F39-JD7RA-D	7

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

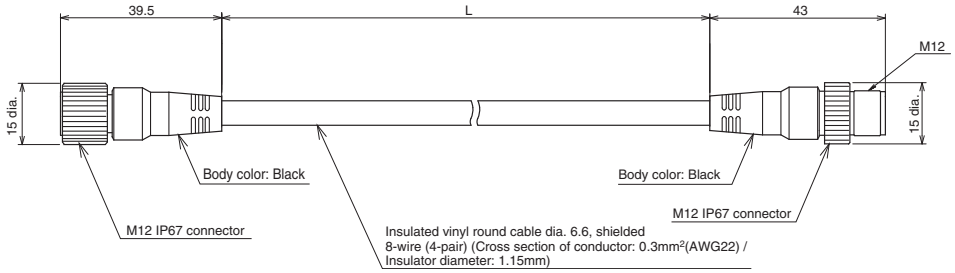


Single-Ended Cable for Receiver (F39-JD□A-D, sold separately)

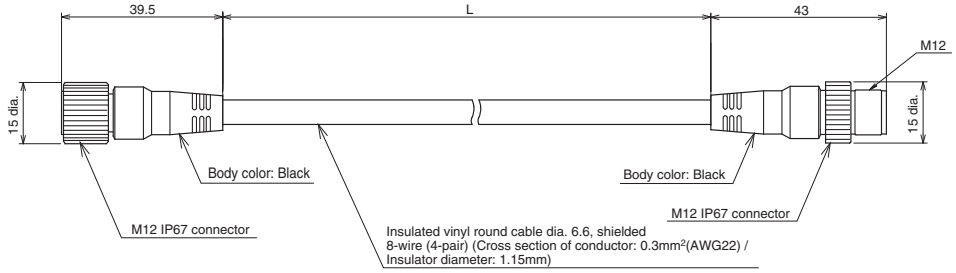


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JD3A-L	F39-JD3A-D	3
F39-JD7A-L	F39-JD7A-D	7
F39-JD10A-L	F39-JD10A-D	10
F39-JD15A-L	F39-JD15A-D	15
F39-JD20A-L	F39-JD20A-D	20

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

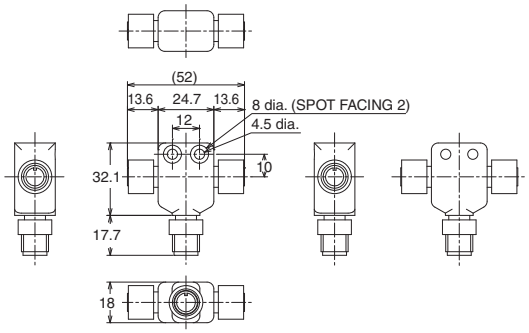


Double-Ended Cable for Receiver: Cable for extension (F39-JD□B-D, sold separately)

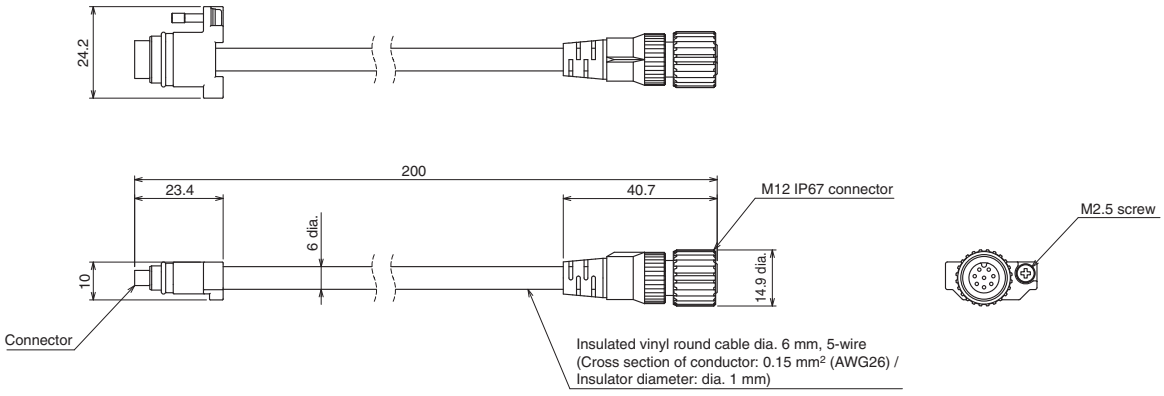


Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JDR5B-L	F39-JDR5B-D	0.5
F39-JD1B-L	F39-JD1B-D	1
F39-JD3B-L	F39-JD3B-D	3
F39-JD5B-L	F39-JD5B-D	5
F39-JD7B-L	F39-JD7B-D	7
F39-JD10B-L	F39-JD10B-D	10
F39-JD15B-L	F39-JD15B-D	15
F39-JD20B-L	F39-JD20B-D	20

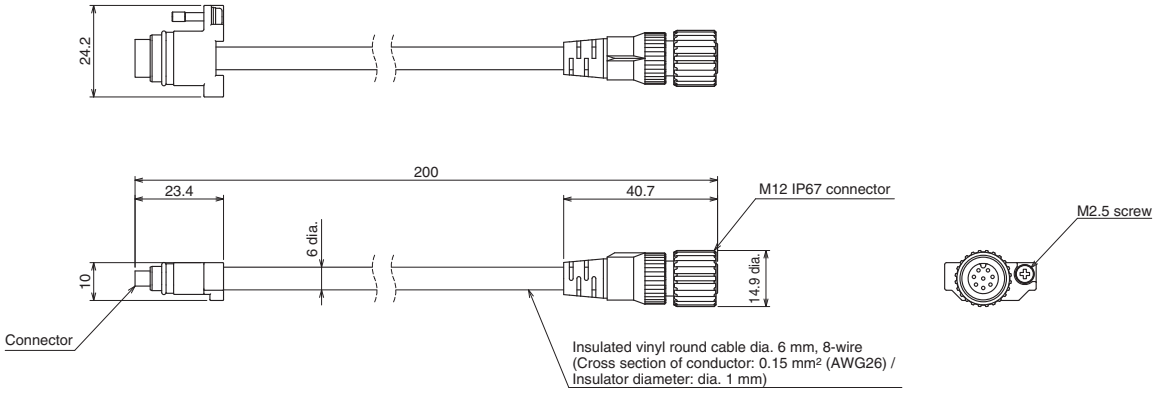
Reduced Wiring Connector (F39-CN5, sold separately)



Cascading Cable for Emitter (F39-JGR2WTS-L, sold separately)

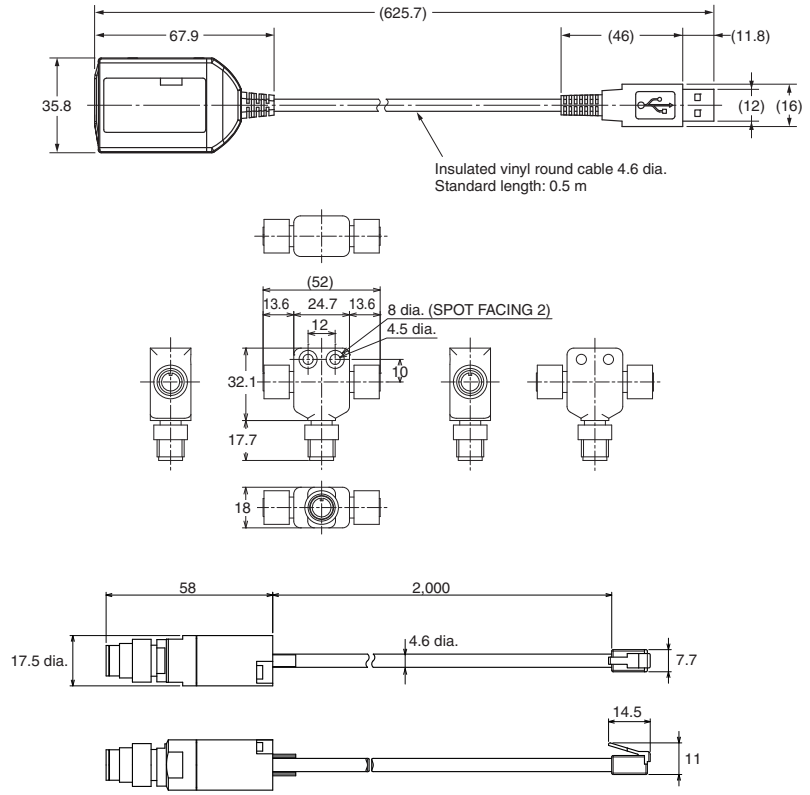


Cascading Cable for Receiver (F39-JGR2WTS-D, sold separately)

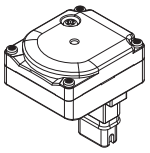


Set model name	Emitter cable (Gray)	Receiver cable (Black)	L (m)
F39-JGR2WTS	F39-JGR2WTS-L	F39-JGR2WTS-D	0.2

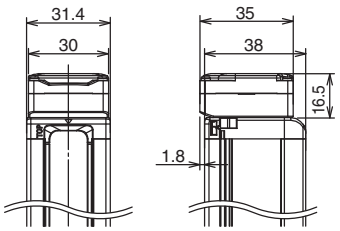
Interface Unit (F39-GIF-1, sold separately)



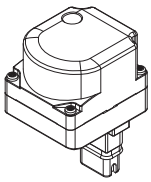
Bluetooth Communication Unit (F39-BT, sold separately)



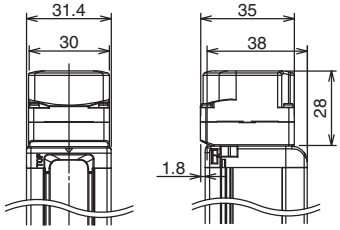
Material: PBT



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