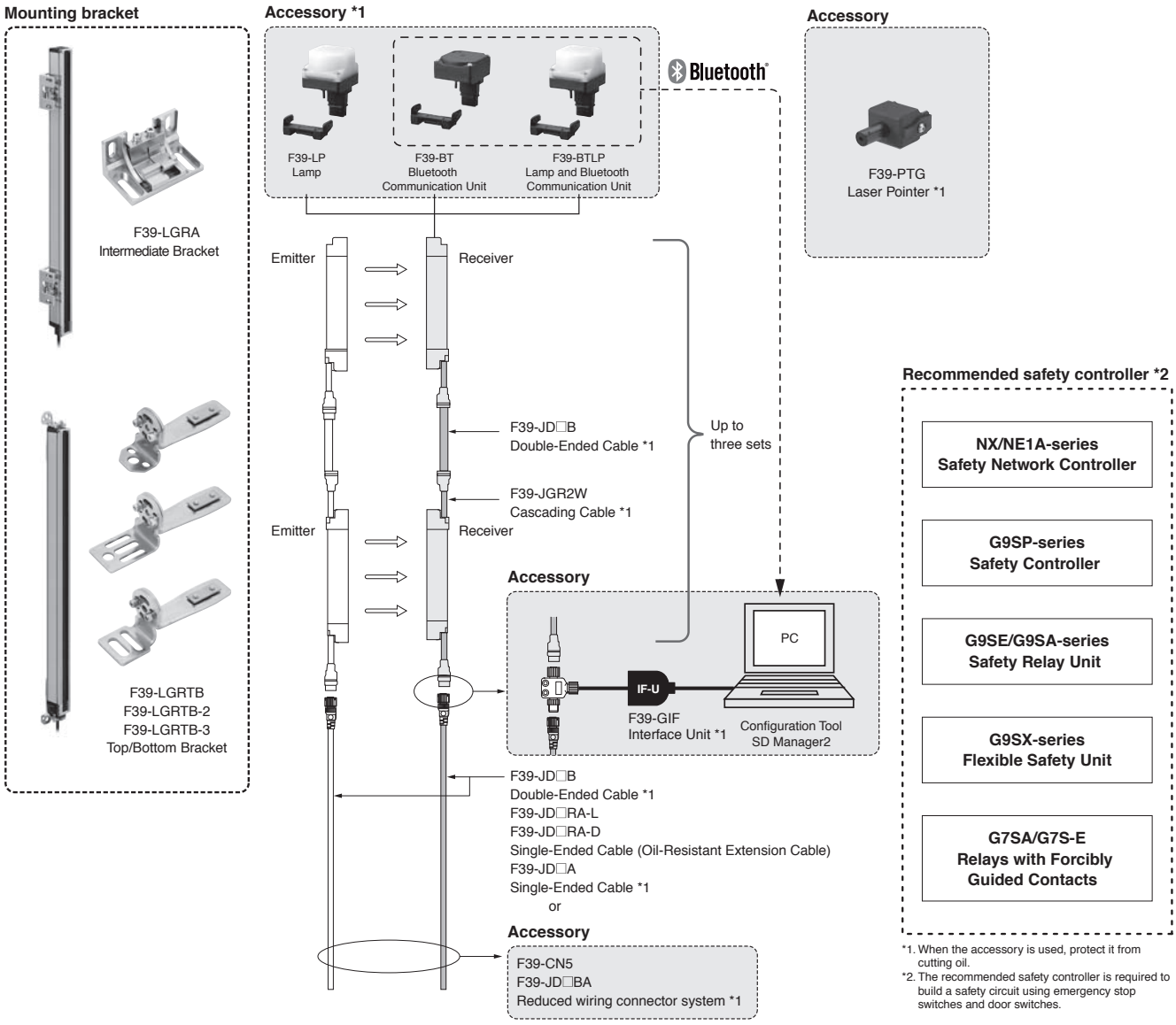
Safety Light Curtain Rugged type
F3SG-RR

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.

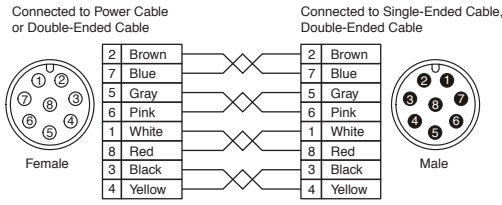
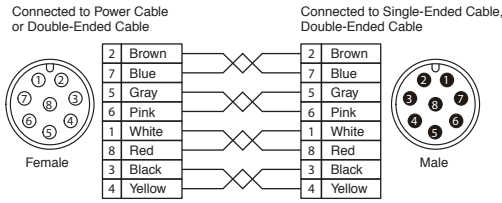
Single-Ended Cable (2 cables per set, one for emitter and one for receiver) *

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.

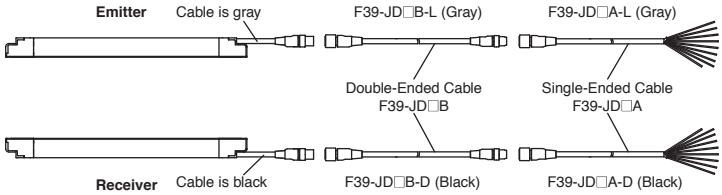
Double-Ended Cable (2 cables per set, one for emitter and one for receiver) *

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>



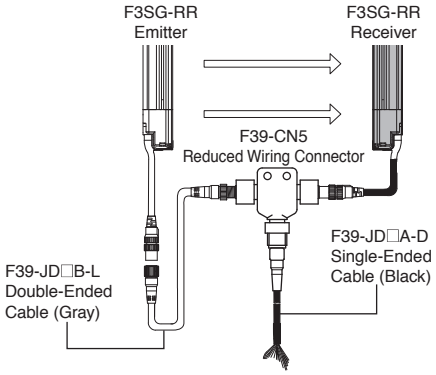
Reduced Wiring Connector System (Order the F39-CN5 and Cables for Reduce Wiring.)

Reduced Wiring Connector

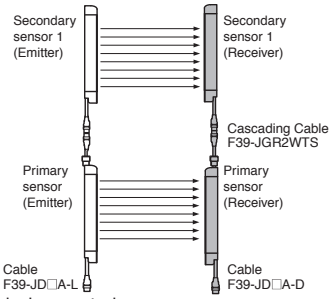
Appearance	Specifications	Model
	IP67* rated when mated. * When the accessory is used, protect it from cutting oil.	**F39-CN5**

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

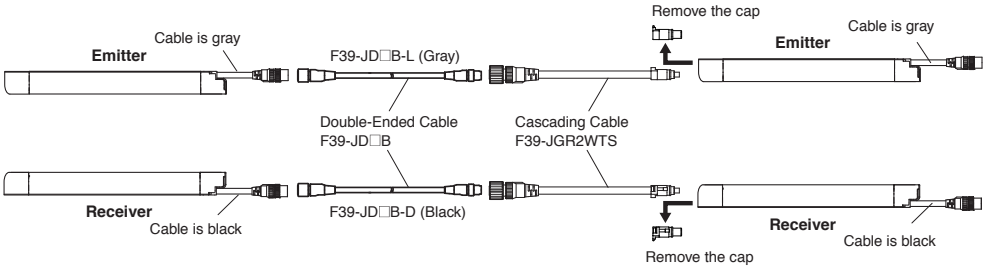
Make sure to keep the settings in the factory default.



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.