

Industrial Automation Guide 2016



Industrial Products & Systems

industrial.omron.eu

Targeted Technologies

Creating maximum output with minimum input

By identifying the many ways of innovation in specific industries we developed the 'targeted technologies' concept. It's a way of thinking about technology in a prioritized format. Prioritized according to our customers' most pressing needs. The result? A set of solutions that make immediate impact on the core of our customers' businesses. A set of solutions that hit the target every time. Take a look at the examples on our website.

industrial.omron.eu/technologies



CAT 110 for Macintosh is designed for the latest addition to the line from the house of Dynamics.

Welcome to our world

Our best-in-class devices for your automation system

Welcome to Omron's world of advanced industrial automation. The INDUSTRIAL AUTOMATION GUIDE is your essential tool to select best-in-class devices for your automation system. It highlights our core competences in sensing, control, visualisation, motion and panel components.

Of course, Omron offers a much larger range of products than you can find on the attached DVD. For more information on services and company competence visit our website.

Here you will find:

- Latest product news
- Technical product specifications
- 2D / 3D CAD Library
- Customer references
- Technology concepts
- Supporting product documentation
- Knowledge Base - "myOmron"
- Events Calendar
- Contact information

Find information fast!

Quick Links shortens your search. Quick Links are unique codes assigned to Omron products listed in this guide. Enter Quick Link codes in the search box on industrial.omron.eu to access detailed information on products in this guide.



Industrial Automation Guide 2016

	Omron at a glance	3
	The 361° Approach	4
	Sysmac: A fully integrated platform	6
	Product selection table	8
Automation systems	Machine automation controller	12
	Programmable logic controllers (PLC)	26
	Remote I/O	54
	Human machine interfaces (HMI)	68
	I/O cables and terminal blocks	82
	Ethernet cables and accessories	91
Motion & Drives	Motion controllers	96
	Servo systems	112
	Robots	170
	Frequency inverters	202
Sensing	Photoelectric sensors	236
	Mark and Color sensors	278
	Lightcurtains and area sensors	284
	Fiber optic sensors and amplifiers	292
	Inductive sensors	324
	Mechanical sensors/Limit switches	344
	Rotary encoders	358
	Cable connectors	366
Quality control & Inspection	Inspection & Ident systems	370
	Measurement sensors	426
Safety	Emergency stop and control devices	462
	Safety limit switches	472
	Safety door switches	480
	Safety sensors	506
	Safety logic control systems	544
	Safety outputs	566
Control components	Temperature controllers	574
	Power supplies	596
	Uninterruptible power supplies (UPS)	614
	Timers	622
	Counters	632
	Programmable relays	642
	Digital panel indicators	650
	Energy monitoring devices	660
	Photovoltaic	674
Switching components	Electromechanical relays	682
	Solid state relays	696
	Low voltage switchgear	706
	Monitoring products	722
	Pushbutton switches	750
Software	Software	766
	Outline of Major Standards	772
	Index	775

“To the machine the work of the machine,
to man the thrill of further creation.”

Kazuma Tateisi, founder of Omron

Omron at a glance

200.000 products ranging
input, logic and output

Sensing, Control Systems, Visualization, Drives, Robots, Safety,
Quality Control & Inspection, Control and Switching Components

7%

Investment in Research & Development

Innovation track
record of 80 years

Top 150 global patent assignee

1.200 employees dedicated to R&D

11.000 + issued and pending patents

37.000

Employees worldwide

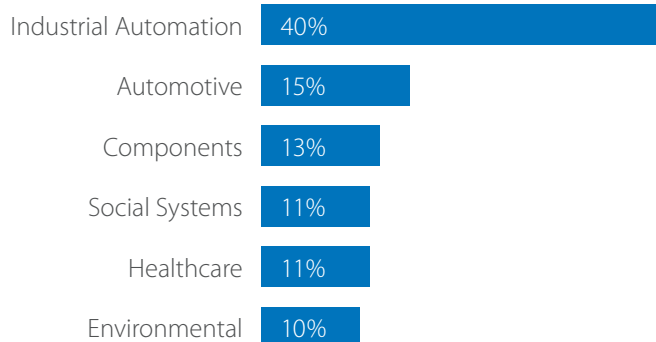
210

Locations worldwide

22

Countries in EMEA

Working for the
benefit of society



Close to your needs

Technical training & seminars, technical support, Automation Technology Centers, online community (MyOmron), online catalogues and technical documentation, customer service & sales support, inter-operability labs (Tsunagi), safety services, repairs.

Your needs, our focus

Solutions perfectly matching your needs

We asked ourselves: 'What do you need in sensors and components?' Well, first you need reliability. Then a variety and choice of performance levels. You may also want advanced functionality, with special features defined by you – or you may want standardized solutions, with highly competitive prices.

Whatever it is, it can all add up to a wish list that is difficult to fulfil. Until now. That's because our new 361° Approach not only provides a complete all-round offer without gaps, it also puts you at the very centre of the product selection process. It's an approach that leads to a Perfect Match – one with the extra degree of confidence that comes from choosing Omron.

361° in one view



Quality



Line-up



Application



Customization



Global availability



Specs

	Quality	Line-up	Application	Customization	Global availability	Specs
PRO^{plus}	Premium	Tailored	Special	Yes	Yes	Application oriented
PRO	Premium	Complete	Advanced	Yes	Yes	Above Standard
LITE	Premium	Standard	Basic	No	No	Basic
	'Quality' refers to the standard of manufacturing and the materials used – this translates into reliability	'Line-up' refers to the number of model types	'Application' indicates the complexity of the automation	'Customization' is the possibility to modify the product		'Specs' refers to the choice of performance levels

The extra degree of advantage

Three distinct lines of sensors and components

Three distinct lines

361° Approach offers three distinct lines within each sensor or component product category. LITE products are cost-effective without any compromise in quality. PRO products represent the “install & forget” option, offering longer lifetime, higher protection, and more features. While PROplus products are designed for specific applications or customer demands.

Optimized reliability

All three lines are backed by the Omron commitment to quality, so even when you need a price-competitive advantage, you can be confident that they will never let you down.

Solutions that perfectly match your needs

The 361° Approach ensures that you can quickly and easily identify the perfect match solution to your needs – nothing more, nothing less.

Optimized costs

Your sensor and component costs are also minimized – because it eliminates over-specification.

Why an extra 1°?

The extra degree is what you get when you do business with Omron, and that means different things to different customers – all depending on their needs. For example, if you need specification advice, the extra degree is ‘service’. But ultimately, to everyone it means “an extra degree of confidence in the perfect match”.



Sysmac: A fully integrated platform

Integration and Functionality

Sysmac is an integrated automation platform dedicated to providing complete control and management of your automation plant. At the core of this platform, the Machine Controller series offers synchronous control of all machine devices and advanced functionality such as motion, robotics and database connectivity. This multidisciplinary concept allows you to simplify solution architecture, reduce programming and optimize productivity.



Machine Automation Controller

FACTORY
AUTOMATION

MACHINE
CONTROL



Motion



Filling line

- Motion Control: Integrated within the IDE, and operating in real-time
- Standard PLCopen Function Blocks plus Omron generated motion FB's
- Direct Synchronous control for Position, Speed and Torque



Safety



Assembly

- All safety related data is synchronized with the whole network
- Safety functions such as muting, guard locking, EDM and valve monitoring are simple to manage

- ✓ **One Integrated Development Environment software** for Configuration, Programming, Simulation and Monitoring



Information



- Sysmac communicates in real-time with Databases such as SQL
- Secure Data: In the event of a server going down or losing communications, data is automatically stored in internal memory
- Sysmac operates with Databases at high speed [1000 table element/ 100 ms] ensuring realistic Big Data Processing to improve productivity and aid predictive maintenance etc.

✓ Integrated Automation Control:

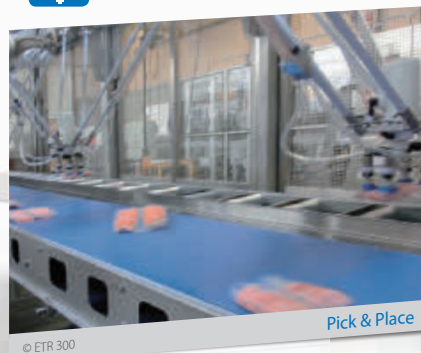
The Sysmac platform is scalable and provides the performance and functionality for a wide range of solutions from simple machines through to manufacturing cells

Vision



- Higher resolution images available without increasing the vision processing time
- Shape search technology: Provides more stable and accurate object detection for Pick & Place projects

Robotics



- Up to 8 Delta robots with one controller
- Time-based Robotic Function Blocks make programming easier

Sensing



- Full control of the process parameter setting and predictive maintenance functions
- High precision detection and positioning data synchronized on the network

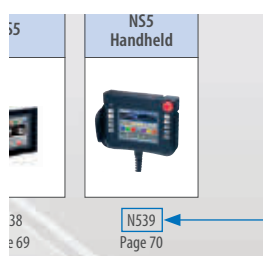
Product selection table

Automation systems				
	12 Machine automation controller	26 Programmable logic controllers (PLC)	54 Remote I/O	68 Human machine interfaces (HMI)
				
	96 Motion controllers	112 Servo systems	170 Robots	202 Frequency inverters
Sensing				
	236 Photoelectric sensors	278 Mark and Color sensors	284 Lightcurtains and area sensors	292 Fiber optic sensors and amplifiers
				
	370 Inspection & Ident systems	426 Measurement sensors		
Safety				
	462 Emergency stop and control devices	472 Safety limit switches	480 Safety door switches	506 Safety sensors
				
	574 Temperature controllers	596 Power supplies	614 Uninterruptible power supplies (UPS)	622 Timers
Switching components				
	682 Electromechanical relays	696 Solid state relays	706 Low voltage switchgear	722 Monitoring products
				
	766 Software			
Software				

Safety

Find information fast!

Quick Links shortens your search. Quick Links are unique codes assigned to Omron products listed in this guide. Enter Quick Link codes in the search box on industrial.omron.eu to access detailed information on products in this guide.



Quick Link

Safety

Emergency stop and control devices	462	G9SE	553
Selection table	464	Safety guard switching unit	
Standard pushbutton switches		G9SX-GS/A4EG	554
A16	753	Limited speed monitoring unit	
A22N	755	G9SX-LM	556
Emergency stop pushbutton switches		Standstill monitoring unit	
A16SE	467	G9SX-SM	558
A22E	468	Programmable safety controllers	
Rope pull emergency stop switches		G9SP-N_	559
ER-series rope pulls	469	NX-Safety stand alone modular I/O system	562
Safety limit switches	472	NE1A-SCPU_	563
Selection table	474	NX Safety distributed	564
Safety limit switch with metal housing		Compact non-contact door switch/flexible safety unit	
D4B	475	G9SX-NS	544
Safety limit switch with plastic housing		Safety outputs	566
D4N	477	Selection table	569
Safety door hinge switch		Free potential outputs	
D4NH	479	G7SA	570
Safety limit switch with manual reset		G7S_-E	571
D4N-_R	473	Motion	
Safety door switches	480	MX2	212
Selection table	482	Accurax G5	117
Non-contact switches			
F3S-TGR-N_C	484		
F3S-TGR-N_R	487		
F3S-TGR-N_M/-N_U	490		
F3S-TGR-S_A/-S_D	492		
F3S-TGR-N_X	495		
Safety door switches			
D4NS	497		
D4BS	498		
F3S-TGR-KM15/-KM16/-KH16	499		
Guard-lock safety door switch			
D4NL	501		
D4SL-N	502		
F3S-TGR-KHL1	504		
F3S-TGR-KHL3	505		
Compact non-contact door switch/flexible safety unit			
D40A/G9SX-NS	480		
Safety sensors	506		
Selection table	508		
Safety light curtain			
Slim housing			
F3SJ-E	510		
F3SJ-B	514		
F3SJ-A	518		
Robust housing			
F3S-TGR-CL	524		
F3SG-RA	529		
F3SG-RE	534		
F3S-TGR-CL_-K_	507		
F3S-TGR-CL_-K_C	507		
Muting actuators			
F39-TGR-MCL	538		
F3W-MA	539		
Safety laser scanner			
OS32C	541		
Safety logic control systems	544		
Selection table	546		
Safety relay units			
G9SA	549		
G9SB	550		
G9SR	551		
G9SX	552		

PROTECT OPERATORS AND PRODUCTION

Safety light curtains

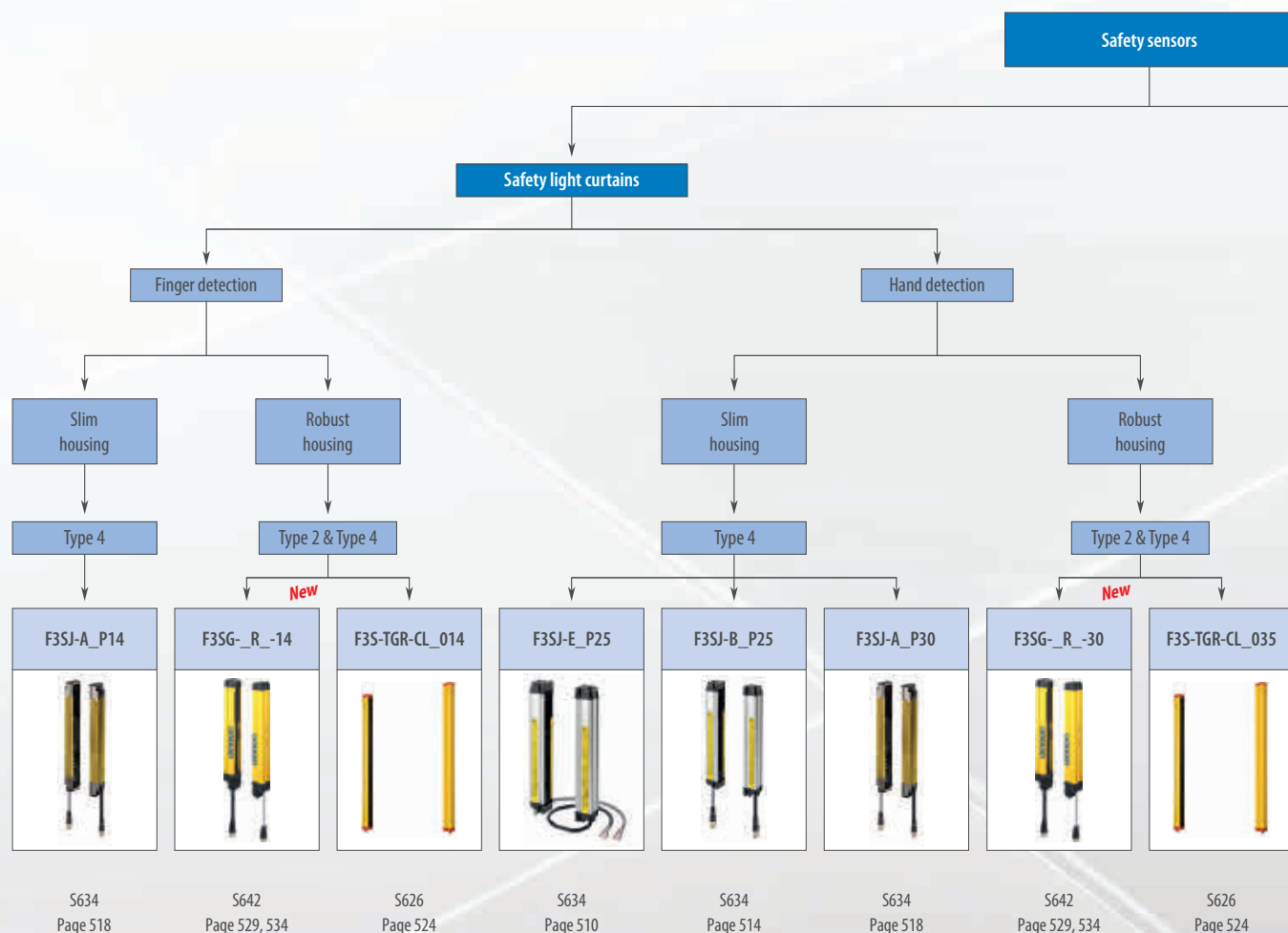
Dangerous points and hazardous areas are safeguarded with safety light curtains. Depending on the type, finger and hand protection are available with operating distances of up to 20m. They are available in safety categories 2 and 4 (according to IEC 61496).

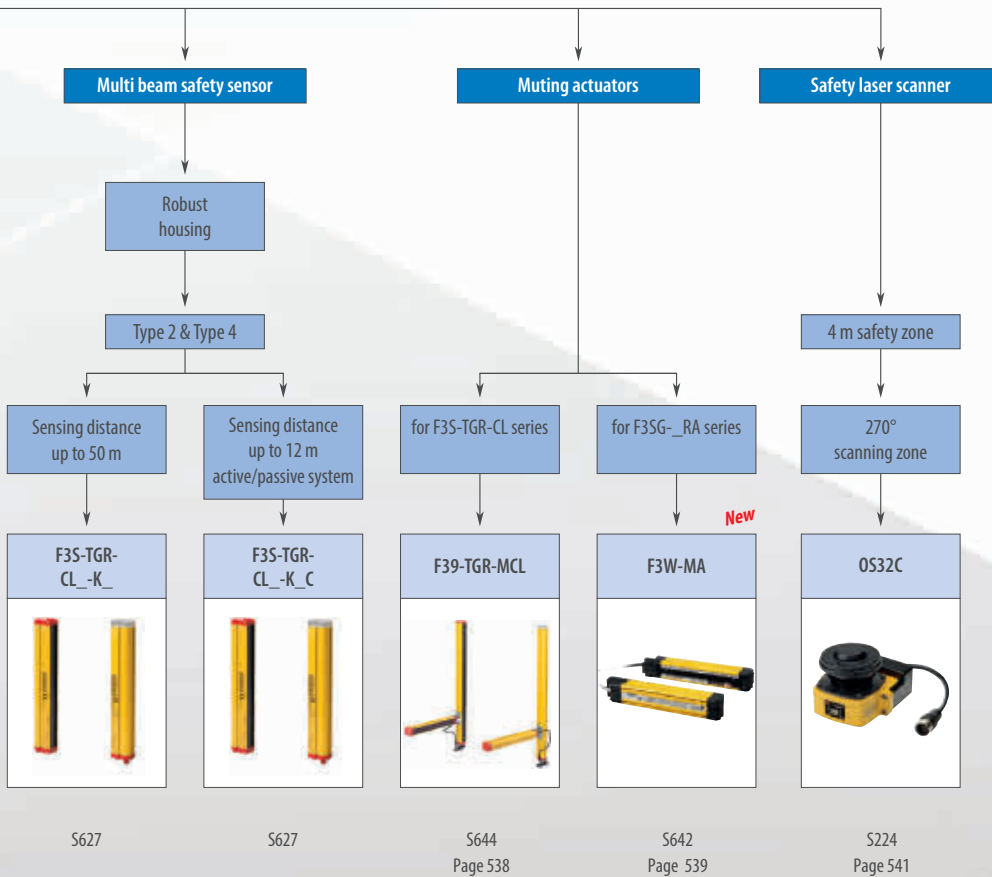
Multi beam safety sensor

Hazardous areas can be safeguarded by using multi-beam photoelectric safety guards. They are used as non-contact access guarding and consist of sender and receiver or can be implemented as an active/passive system to save wiring effort.


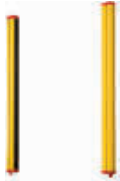

Safety laser scanner

Horizontal and vertical guarding of dangerous areas are the applications for safety laser scanners in mobile and stationary application. This covers collision avoidance on automated guided vehicles (AGVs) as well as presence and intrusion detection on access points of machinery by providing a wide safety scanning range of 3 m covering 270° around the sensor head.





Selection table

Safety light curtain						
						
Model	F3SG- RA	F3SG_RE	F3S-TGR-CL_A	F3S-TGR-CL_B	F3SJ-A	
Selection criteria	Type of ESPE (IEC 61496-1)	Type 2 & 4		Type 2 & 4		Type 4
	Resolution	14, 30 mm		14, 35 mm		14, 30 mm
	Beam pitch	–		–		–
	Protective height	160 to 2,080 mm (14) 190 to 2,510 mm (30)		150 to 2,400 mm		245 to 1,271 mm (14) 245 to 2,495 mm (30)
	Operating range	0.3 to 10.0 m (14) 0.3 to 20.0 m (30)		0.2 to 6.0 m (14) 0.2 to 14.0 m (35)		0.3 to 9.0 m (14) 0.3 to 9.0 m (30)
	Operating temperature	–10 to 55°C		–10 to 55°C		–10 to 55°C
	Degree of protection (IEC 60529)	IP65 and IP67		IP65		IP65
	Response time ON to OFF	8 to 18 ms	5 to 15ms	14 to 103 ms		10 to 25 ms
	Parameter setting	Dip switch	Software	Dip switch		Software
Features	EDM	■	●	–	■	●
	Interlock	■	●	–	■	○
	Pre-Reset	■	●	–	–	–
	External test	■	–	–	■	○
	PNP/NPN selection	■	–	–	–	–
	Scan code selection	■	–	–	■	–
	Operating range selection	■	–	○	■	–
	Fixed blanking	■	●	–	–	●
	Floating blanking	■	●	–	–	●
	SD/BD	–	–	–	–	–
	Muting	– ^{*1}	●	–	–	●
	Override	○	●	–	–	●
	Reduced resolution	–	●	–	–	–
	Warning zone	–	●	–	–	●
	Response time adjustment	–	●	–	–	–
In- and Outputs	Cascade connection	up to 3 sets	–	option	–	up to 4 sets
	Safety outputs (OSSD)	2 PNP transistor outputs		2 PNP transistor outputs		2 PNP transistor outputs
	Non-safety auxiliary output	1 PNP or NPN	–	–	–	2 PNP
	Test input	Yes	Yes	Yes	Yes	Yes
	EDM input	Yes	–	Yes	Yes	Yes
	Reset input	Yes	–	Yes	Yes	Yes
	Muting sensor input	Yes	–	Yes	–	–
	Communication	Bluetooth option	–	–	–	–
Page/Quick Link		529/S642	534/S642	524/S626		518/S634

^{*1} Factory default setting: Standard Muting mode

		Safety light curtain		Multi-beam safety sensors		Safety laser scanner
						
Model		F3SJ-B	F3SJ-E	F3S-TGR-CL_A-K	F3S-TGR-CL_B-K	OS32C
Selection criteria	Type of ESPE (IEC 61496-1)	Type 4	Type 4	Type 2 & 4		Type 3
	Resolution	25 mm	25 mm	–		30, 40, 50, 70 mm
	Beam pitch	–	–	300, 400, 500 mm		–
	Protective height	185 to 2,065 mm	185 to 1,105 mm	500 to 1,200 mm		–
	Operating range	0.2 to 7.0 m	0.2 to 7.0 m	0.2 to 40.0 m (K) 0.2 to 12.0 m (K2C)		3, 4m
	Operating temperature	–10 to 55°C	–10 to 55°C	–10 to 55°C		–10 to 55°C
	Degree of protection (IEC 60529)	IP65	IP65	IP65		IP65
	Response time ON to OFF	15 ms	15 ms	13 ms		80 to 680 ms
	Parameter setting	–	–	Dip switch		Software
Features	EDM	○	–	■	■	●
	Interlock	○	–	■	■	●
	Pre-Reset	–	–	■	–	–
	External test	○	○	■	■	–
	PNP/NPN selection	–	–	–	–	–
	Scan code selection	–	–	■	■	–
	Operating range selection	–	–	■	■	–
	Fixed blanking	–	–	–	–	–
	Floating blanking	–	–	–	–	–
	SD/BD	–	–	–	–	–
	Muting	○	–	■	–	–
	Override	○	–	○	–	–
	Reduced resolution	–	–	–	–	–
	Warning zone	–	–	–	–	●
	Response time adjustment	–	–	–	–	●
In- and Outputs	Cascade connection	up to 3 sets	–	–	–	–
	Safety outputs (OSSD)	2 PNP transistor outputs	2 PNP transistor outputs	2 PNP transistor outputs		2 PNP transistor outputs
	Non-safety auxiliary output	1 PNP	–	–	–	2 PNP or NPN
	Test input	Yes	Yes	Yes	Yes	–
	EDM input	Yes	–	Yes	Yes	Yes
	Reset input	Yes	–	Yes	Yes	Yes
	Muting sensor input	–	–	Yes	–	–
	Communication	–	–	–	–	Ethernet/IP option
Page/Quick Link		514/S634	510/S634	S627		541/S224



Easy type for simple and affordable hand protection

The F3SJ-E-family is a type 4 safety light curtain with an optical resolution of 25 mm. An operation range of up to 7 m and a protective height up to 1,105 mm are provided with no dead zone

- Detection height = sensor height
- Small housing
- Simple and affordable hand protection
- Reduced wiring, quick mount brackets and easy-to-view-alignment beams reduce mounting time
- Type 4 sensor complying with EN 61496-1 and up to PLe according EN ISO 13849

Ordering information

Application	Detection capability	Beam gap	Operating range	Protective height (mm)	Order code
Hand protection	Dia. 25 mm	20 mm	0.2 to 7 m	185 to 1,105	F3SJ-E____P25







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

Number of beams	Protective height (mm) ^{*1}	Order code
8	185	F3SJ-E0185P25
10	225	F3SJ-E0225P25
14	305	F3SJ-E0305P25
18	385	F3SJ-E0385P25
22	465	F3SJ-E0465P25
26	545	F3SJ-E0545P25
30	625	F3SJ-E0625P25
34	705	F3SJ-E0705P25
38	785	F3SJ-E0785P25
42	865	F3SJ-E0865P25
46	945	F3SJ-E0945P25
50	1,025	F3SJ-E1025P25
54	1,105	F3SJ-E1105P25

^{*1} Protective height (mm) = Total sensor length

Accessories (sold separately)

Sensor mounting bracket

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

^{*1} Combining F39-LJB2 and F39-LJB3-M6K makes F39-LJB3-M6.

^{*2} Combining F39-LJB2 and F39-LJB3-M8K makes F39-LJB3-M8.

Laser pointer

Appearance	Output	Order code
	Laser pointer for F3SJ	F39-PTJ

Specifications

Model		F3SJ-E P25
Sensor type		Type 4 safety light curtain
Setting tool connection ^{*1}		Parameter settings: Not available
Safety category		Safety purpose of category 4, 3, 2, 1, or B
Detection capability		Opaque objects 25 mm in diameter
Beam gap (P)		20 mm
Number of beams (n)		8 to 54
Protective height (PH)		185 to 1,105 mm
Lens diameter		Diameter 5 mm
Operating range ^{*2}		0.2 to 7 m
Response time (under stable light incident condition)	ON to OFF	15 ms max.
	OFF to ON	70 ms max.
Startup waiting time		2 s max.
Power supply voltage (Vs)		SELV/PELV 24 VDC±20% (ripple p-p 10% max.)
Consumption current (no load)		Emitter: Up to 22 beams: 41 mA max., 26 to 42 beams: 57 mA max., 46 to 54 beams: 63 mA max. Receiver: Up to 22 beams: 42 mA max., 26 to 42 beams: 47 mA max., 46 to 54 beams: 51 mA max.
Light source (emitted wavelength)		Infrared LED (870 nm)
Effective aperture angle (EAA)		Based on IEC 61496-2. Within ±2.5° for both emitter and receiver when the detection distance is 3 m or over
Safety outputs (OSSD)		Two PNP transistor outputs, load current 200 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), Leakage current 1 mA max., load inductance 2.2 H max. ^{*3} , Maximum capacity load 1 μF ^{*4}
Output operation mode		Safety output: On when receiving light
Input voltage		ON voltage: Vs-3 V to Vs, OFF voltage: 0 V to 1/2 Vs or open ^{*5}
Mutual interference prevention function		Mutual interference prevention algorithm prevents interference in up to 3 sets.
Test function		Self test (at power-ON and at power distribution) External test (emission stop function by test input)
Protection circuit		Output short-circuit protection, and power supply reverse polarity protection
Ambient temperature		Operating: -10 to 55°C (non-freezing), Storage: -25 to 70°C
Ambient humidity		Operating: 35% to 85% (no condensation), Storage: 35% to 95% RH
Operating ambient light intensity		Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC 50/60 Hz, 1 min
Degree of protection		IP65 (IEC 60529)
Vibration resistance		Malfunction: 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions
Shock resistance		Malfunction: 100 m/s ² , 1,000 times each in X, Y, and Z directions
Pollution degree		Pollution degree 3 (IEC 60664-1)
Power cable		Connection method: Pull-out type, cable length 3 m Number of wires: Emitter: 5 wires, receiver: 6 wires Cable diameter: Dia. 6 mm Allowable bending radius: R5 mm
Extension cable		30 m max. ^{*6}
Material		Case: Aluminum Cap: ABS resin, PBT Optical cover: PMMA resin (acrylic) Cable: Oil resistant PVC
Weight (packed state)		Weight (g) = (protective height) × 2.6 + 800
Accessories		Test rod, Instruction Manual, User's Manual (CD-ROM) ^{*7}
Applicable standards		IEC 61496-1, EN 61496-1 UL 61496-1, Type 4 ESPE (Electro-Sensitive Protective Equipment) IEC 61496-2, CLC/TS 61496-2, UL 61496-2, Type 4 AOPD (Active Opto-electronic Protective Devices) IEC 61508-1 to -3, EN 61508-1 to -3 SIL3 IEC 13849-1: 2006, EN ISO 13849-1: 2008 (PLe, Cat.4) UL 508, UL 1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8

^{*1} Do not use the support software and setting console for F3SJ-A. Operation cannot be guaranteed.

^{*2} Use of the spatter protection cover causes a 10% maximum sensing distance attenuation.

^{*3} The load inductance is the maximum value when the safety output frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger.

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

^{*5} The Vs indicates a voltage value in your environment.

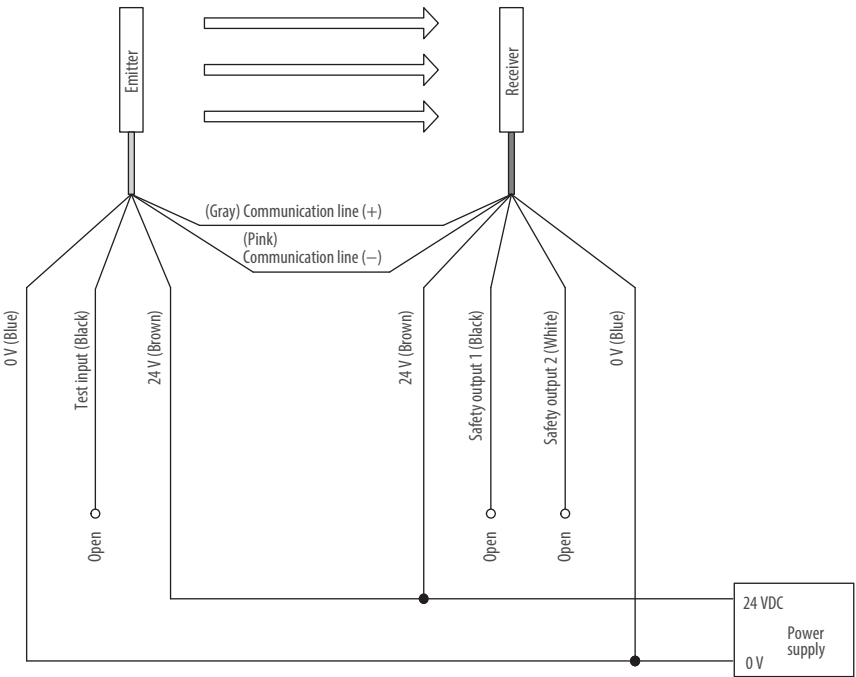
^{*6} To extend a cable of the F3SJ-E, refer to the user's manual (SCHG-733/732).

^{*7} Mounting brackets are sold separately.

Connections

Basic wiring diagram

Minimum wiring required to check the operation of the F3SJ-E





Basic type with a combination of performance and functionality

The F3SJ-B-family is a type 4 safety light curtain with an optical resolution of 25 mm. An operation range of up to 7 m and a protective height up to 2,065 mm are provided with no dead zone

- Detection height = sensor height
- Simple hand protection
- Muting function available
- Series connection up to three sets
- Type 4 sensor complying with EN 61496-1 and up to PLe according EN ISO 13849

Ordering information

Application	Detection capability	Beam gap	Operating range	Protective height (mm)	Order code
Hand protection	Dia. 25 mm	20 mm	0.2 to 7 m	185 to 2,065	F3SJ-B____P25

Number of beams	Protective height (mm) ^{*1}	Order code
8	185	F3SJ-B0185P25
10	225	F3SJ-B0225P25
14	305	F3SJ-B0305P25
18	385	F3SJ-B0385P25
22	465	F3SJ-B0465P25
26	545	F3SJ-B0545P25
30	625	F3SJ-B0625P25
34	705	F3SJ-B0705P25
38	785	F3SJ-B0785P25
42	865	F3SJ-B0865P25
46	945	F3SJ-B0945P25
50	1,025	F3SJ-B1025P25
54	1,105	F3SJ-B1105P25
58	1,185	F3SJ-B1185P25
62	1,265	F3SJ-B1265P25
66	1,345	F3SJ-B1345P25
70	1,425	F3SJ-B1425P25
74	1,505	F3SJ-B1505P25
78	1,585	F3SJ-B1585P25
82	1,665	F3SJ-B1665P25
86	1,745	F3SJ-B1745P25
90	1,825	F3SJ-B1825P25
94	1,905	F3SJ-B1905P25
98	1,985	F3SJ-B1985P25
102	2,065	F3SJ-B2065P25

^{*1} Protective height (mm) = Total sensor length







Accessories (sold separately)

Single-end connector cable (2 cables per set, for emitter and receiver)

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

Appearance	Cable length	Specifications	Order code
	3 m	M12 connector (8-pin)	F39-JD3A
	7 m		F39-JD7A
	10 m		F39-JD10A
	15 m		F39-JD15A
	20 m		F39-JD20A


Sensor mounting bracket

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

^{*1} Combining F39-LJB2 and F39-LJB3-M6K makes F39-LJB3-M6.

^{*2} Combining F39-LJB2 and F39-LJB3-M8K makes F39-LJB3-M8.

Laser pointer

Appearance	Output	Order code
	Laser pointer for F3SJ	F39-PTJ

Specifications

Model		F3SJ-B P25
Sensor type	Type 4 safety light curtain	
Setting tool connection ^{*1}	Parameter settings: Not available	
Safety category	Safety purpose of category 4, 3, 2, 1, or B	
Detection capability	Opaque objects 25 mm in diameter	
Beam gap (P)	20 mm	
Number of beams (n)	8 to 102	
Protective height (PH)	185 to 2,065 mm	
Lens diameter	Diameter 5 mm	
Operating range ^{*2}	0.2 to 7 m	
Response time (under stable light incident condition)	ON to OFF	15 ms max. (response time at 1 set connection, series connection of 2 sets or 3 sets)
	OFF to ON	70 ms max. (response time at 1 set connection, series connection of 2 sets or 3 sets)
Startup waiting time	2 s max.	
Power supply voltage (Vs)	SELV/PELV 24 VDC±20% (ripple p-p 10% max.)	
Consumption current (no load)	Emitter: Up to 22 beams: 52 mA max., 26 to 42 beams: 68 mA max., 46 to 62 beams: 75 mA max., 66 to 82 beams: 88 mA max., 86 to 102 beams: 101 mA max. Receiver: Up to 22 beams: 45 mA max., 26 to 42 beams: 50 mA max., 46 to 62 beams: 56 mA max., 66 to 82 beams: 61 mA max., 86 to 102 beams: 67 mA max.	
Light source (emitted wavelength)	Infrared LED (870 nm)	
Effective aperture angle (EAA)	Based on IEC 61496-2. Within ±2.5° for both emitter and receiver when the detection distance is 3 m or over	
Safety outputs (OSSD)	Two PNP transistor outputs, load current 200 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), Leakage current 1 mA max., load inductance 2.2 H max. ^{*3} , Maximum capacity load 1 μF ^{*4}	
Auxiliary output 1	One PNP transistor outputs, load current 100 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), leak current 1 mA max.	
Output operation mode	Safety output: On when receiving light Auxiliary output: – Reverse output of safety output for a basic system – ON when muting/override for a muting system	
Input voltage	ON voltage: Vs-3 V to Vs, OFF voltage: 0 V to 1/2 Vs or open ^{*5}	
Mutual interference prevention function	Mutual interference prevention algorithm prevents interference in up to 3 sets.	
Series connection	Time division emission by series connection Number of connections: up to 3 sets (between F3SJ-Bs only) Other models cannot be connected. Total number of beams: up to 192 beams Maximum cable length for 2 sets: no longer than 7 m	
Test function	Self test (at power-ON and at power distribution) External test (emission stop function by test input)	
Safety-related functions	Interlock (basic system) External device monitoring (basic system) Muting (muting system) Override (muting system)	
Connection type	Connector method (M12, 8-pin)	
Protection circuit	Output short-circuit protection, and power supply reverse polarity protection	
Ambient temperature	Operating: -10 to 55°C (non-freezing), Storage: -25 to 70°C	
Ambient humidity	Operating: 35% to 85% (no condensation), Storage: 35% to 95% RH	
Operating ambient light intensity	Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.	
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	1,000 VAC 50/60 Hz, 1 min	
Degree of protection	IP65 (IEC 60529)	
Vibration resistance	Malfunction: 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions	
Shock resistance	Malfunction: 100 m/s ² , 1,000 times each in X, Y, and Z directions	
Pollution degree	Pollution degree 3 (IEC 60664-1)	
Power cable	Connection method: Prewired connector cable, cable length 0.3 m, connector type (M12, 8-pin), connector: IP67 rated (when mated) Number of wires: 8 wires Cable diameter: Dia. 6 mm Allowable bending radius: R5 mm	
Extension cable	30 m max.	
Material	Case: Aluminum Cap: ABS resin, PBT Optical cover: PMMA resin (acrylic) Cable: Oil resistant PVC	
Weight (packed state)	Weight (g) = (protective height) × 2.7 + 500	
Accessories	Test rod, Instruction manual, User's manual (CD-ROM) ^{*6}	
Applicable standards	IEC 61496-1, EN 61496-1 UL 61496-1, Type 4 ESPE (Electro-sensitive protective equipment) IEC 61496-2, CLC/TS 61496-2, UL 61496-2, Type 4 AOPD (Active opto-electronic protective devices) IEC 61508-1 to -3, EN 61508-1 to -3 SIL3 IEC 13849-1: 2006, EN ISO 13849-1: 2008 (PLe, Cat.4) UL 508, UL 1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8	

^{*1} Do not use the support software and setting console for F3SJ-A. Operation cannot be guaranteed.

^{*2} Use of the spatter protection cover causes a 10% maximum sensing distance attenuation.

^{*3} The load inductance is the maximum value when the safety output frequently repeats ON and OFF. When you use the safety output at 4 Hz or less, the usable load inductance becomes larger.

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

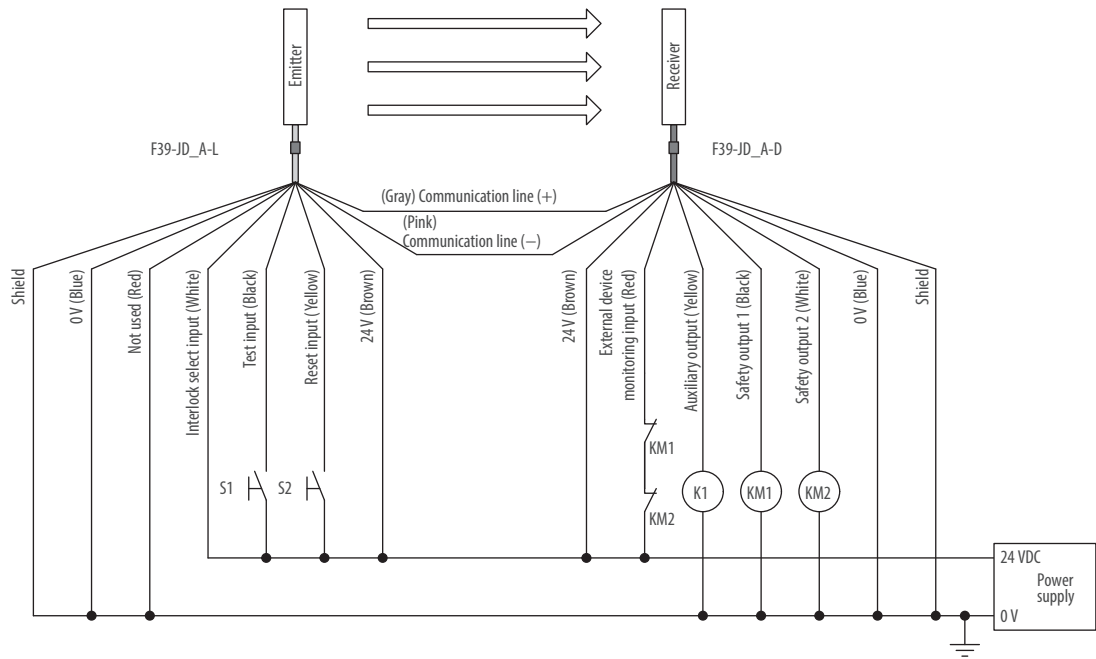
^{*5} The Vs indicates a voltage value in your environment.

^{*6} Mounting brackets are sold separately.

Connections

Basic Wiring Diagram

Wiring when using manual reset mode, external device monitoring (F3SJ-B____P25) (PNP output)



- S1 : External test switch (connect to 0 V if a switch is not required)
- S2 : Interlock/lockout reset switch
- KM1, KM2 : Safety relay with force-guided contact (G7SA) or magnetic contactor
- K1 : Load or PLC, etc. (for monitoring)



Advanced type for complex safety solutions

The F3SJ-A-family is a type 4 safety light curtain with a optical resolution of 14 mm and 30 mm. An operating range of up to 9 m and protective heights up to 2,495 mm providing end to end detection with zero dead zone.

- Detection height = sensor height
- Muting and blanking function available
- Series connection up to 4 Sets
- LED bar for easy alignment and diagnosis
- Type 4 sensor complying with EN 61496-1 and up to PLe according EN ISO 13849-1

Ordering information

Application	Detection capability	Beam gap	Operating range	Protective height (mm)	Order code
Finger protection	Dia. 14 mm	9 mm	0.2 to 9 m	245 to 1,631	F3SJ-A____P14
Hand/arm protection	Dia. 30 mm	25 mm	0.2 to 9 m	245 to 1,620	F3SJ-A____P30
			0.2 to 7 m	1,745 to 2,495	

Safety light curtain model list

F3SJ-A14 series (9 mm gap), F3SJ-A14 TS series (9 mm gap)

Number of beams	Protective height (mm) ^{*1}	Order code
26	245	F3SJ-A0245P14
28	263	F3SJ-A0263P14
34	317	F3SJ-A0317P14
42	389	F3SJ-A0389P14
50	461	F3SJ-A0461P14
60	551	F3SJ-A0551P14
68	623	F3SJ-A0623P14
76	695	F3SJ-A0695P14
80	731	F3SJ-A0731P14
88	803	F3SJ-A0803P14
96	875	F3SJ-A0875P14
108	983	F3SJ-A0983P14
116	1,055	F3SJ-A1055P14
124	1,127	F3SJ-A1127P14
132	1,199	F3SJ-A1199P14
140	1,271	F3SJ-A1271P14

^{*1} Protective height (mm) = Total sensor length

F3SJ-A30 series (25 mm gap)


Number of beams	Protective height (mm) ^{*1}	Order code
10	245	F3SJ-A0245P30
12	295	F3SJ-A0295P30
16	395	F3SJ-A0395P30
19	470	F3SJ-A0470P30
21	520	F3SJ-A0520P30
22	545	F3SJ-A0545P30
23	570	F3SJ-A0570P30
25	620	F3SJ-A0620P30
29	720	F3SJ-A0720P30
32	795	F3SJ-A0795P30
35	870	F3SJ-A0870P30
37	920	F3SJ-A0920P30
38	945	F3SJ-A0945P30
41	1,020	F3SJ-A1020P30
44	1,095	F3SJ-A1095P30
45	1,120	F3SJ-A1120P30
48	1,195	F3SJ-A1195P30
51	1,270	F3SJ-A1270P30
56	1,395	F3SJ-A1395P30
65	1,620	F3SJ-A1620P30
70	1,745	F3SJ-A1745P30
75	1,870	F3SJ-A1870P30
80	1,995	F3SJ-A1995P30
90	2,245	F3SJ-A2245P30
95	2,370	F3SJ-A2370P30
100	2,495	F3SJ-A2495P30

^{*1} Protective height (mm) = Total sensor length


Accessories (sold separately)

Single-end connector cable (2 cables per set, for emitter and receiver)








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

Appearance	Cable length	Specifications	Order code
	3 m	M12 connector (8-pin)	F39-JD3A
	7 m		F39-JD7A
	10 m		F39-JD10A
	15 m		F39-JD15A
	20 m		F39-JD20A


Setting Tools

Appearance	Type	Remarks	Order code
	"SD Manager" Setting support software for the F3SJ	Accessories: SD Manager CD-ROM (1), F39-CN1 branch connector (1), Connector cap (1), 2-m Dedicated cable (1), 0.3-m Dedicated cable with plug (1), Instruction manual	F39-GWUM

Sensor Mounting Brackets (Sold separately)

Appearance	Specifications	Application	Remarks	Order code
	Standard mounting bracket (for top/bottom)	(provided with the F3SJ)	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ1
	Flat side mounting bracket	Use these small-sized brackets when performing side mounting with standard mounting brackets, so that they do not protrude from the detection surface.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ2
	Free-location mounting bracket (also used as standard intermediate bracket)	Use these brackets for mounting on any place without using standard bracket.	Two brackets per set	F39-LJ3
	Top/bottom bracket B (mounting hole pitch 19 mm)	Mounting bracket used when replacing existing area sensors (other than F3SN or F3WN) with the F3SJ. For front mounting. Suitable for mounting hole pitch of 18 to 20 mm.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ4
	Bracket for replacing short-length F3SN	Mounting bracket used when an F3SN with protective height of 300 mm or less is replaced by an F3SJ.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ5
	Space-saving mounting bracket	Use these brackets to mount facing inward. Length is 12 mm shorter than the standard F39-LJ1 bracket.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ8
	Top/bottom bracket C (mounting hole pitch 13 mm)	Mounting bracket used when replacing existing area sensors having a mounting pitch of 13 mm with the F3SJ.	2 for an emitter, 2 for a receiver, total of 4 per set	F39-LJ11

Laser pointer

Appearance	Output	Order code
	Laser pointer for F3SJ	F39-PTJ

Specifications

F3SJ-A ____ P14/P30

Model	F3SJ-A ____ P14	F3SJ-A ____ P30
Sensor type	Type 4 safety light curtain	
Version	Ver. 2	
Setting tool connection	Connectable	
Safety category	Safety purpose of category 4, 3, 2, 1, or B	
Detection capability	Opaque objects 14 mm in diameter	Opaque objects 30 mm in diameter
Beam gap (P)	9 mm	25 mm
Number of beams (n)	26 to 180	10 to 100
Protective height (PH)	245 to 1,631 mm	245 to 2,495 mm
Lens diameter	Diameter 5 mm	
Operating range	0.2 to 9 m (protective height 1,640 mm max.), 0.2 to 7 m (protective height 1,655 mm min.) (Depending on the setting tool, the detection distance can be shortened to 0.5 m.)	
Response time (under stable light incident condition)	ON to OFF	1 set, 0245 to 983: 11 ms to 17.5 ms max. 1,055 or higher: 20 ms to 25 ms max.
	OFF to ON	1 set, 0245 to 983: 44 ms to 70 ms max. 1,055 or higher: 80 ms to 100 ms max.
Startup waiting time	2 s max. (2.2 s max. for series connection)	
Power supply voltage (Vs)	24 VDC±20% (ripple p-p10% max.)	
Current consumption (no load)	Emitter	To 50 beams: 76 mA max., 51 to 100 beams: 106 mA max., 101 to 150 beams: 130 mA max., 151 to 180 beams: 153 mA max., 201 to 234 beams: 165 mA max.
	Receiver	To 50 beams: 68 mA max., 51 to 100 beams: 90 mA max., 101 to 150 beams: 111 mA max., 151 to 180 beams: 128 mA max., 201 to 234 beams: 142 mA max.
Light source (emitted wavelength)	Infrared LED (870 nm)	
Effective aperture angle (EAA)	Based on IEC 61496-2. Within ±2.5° for both emitter and receiver when the detection distance is 3 m or over	
Safety outputs (OSSD)	Two PNP transistor outputs, load current 300 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), allowable capacity load 2.2 µF, leak current 1 mA max. (This can be different from traditional logic (ON/OFF) because safety circuit is used.)	
Auxiliary output 1 (Non-safety output)	One PNP transistor output, load current 300 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), leak current 1 mA max.	
Auxiliary output 2 (Non-safety output. Function for Basic System.)	One PNP transistor output, load current 50 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension), leak current 1 mA max.	
External indicator output (Non-safety output)	Available indicators Incandescent lamp: 24 VDC, 3 to 7 W LED lamp: Load current 10 mA to 300 mA max., leak current 1 mA max. (To use an external indicator, an F39-JJ3N universal indicator cable or an F39-A01P-PAC dedicated external indicator kit is required.)	
Output operation mode	Receiver	Safety output 1, 2: ON when receiving light Auxiliary output 1: Inverse of safety output signals (Operation mode can be changed with the setting tool.) External indicator output 1: Inverse of safety output signals for a basic system (Operation mode can be changed with the setting tool.), ON when muting/override for a muting system (Operation mode can be changed with the setting tool.)
	Emitter	Auxiliary output 2: Turns ON when the point of 30,000 operating hours is reached (Operation mode can be changed with the setting tool.) External indicator output 2: ON when lock-out for a basic system (Operation mode can be changed with the setting tool.) ON when muting/override for a muting system (Operation mode can be changed with the setting tool.)

Model		F3SJ-A P14	F3SJ-A P30
Input voltage		Test input, interlock selection input, reset input, and muting input are all ON voltage: 9 to 24 V (Vs) (sink current: 3 mA max.), OFF voltage: 0 to 1.5 V, or open External device monitoring input ON voltage: 9 to 24 V (Vs) (sink current: 5 mA max.), OFF voltage: 0 to 1.5 V, or open	
Indicator	Emitter	Light intensity level indicators (green LED × 2, orange LED × 3): ON based on the light intensity Error mode indicators (red LED × 3): Blink to indicate error details Power indicator (green LED × 1): ON while power is on Interlock indicator (yellow LED × 1): ON while under interlock, blinks at lockout. External device monitoring indicator (muting input 1 indicator), Blanking/test indicator (muting input 2 indicator) (green LED × 2): ON/flash according to function	
	Receiver	Light intensity level indicators (green LED × 2, orange LED × 3): ON based on the light intensity Error mode indicators (red LED × 3): Blink to indicate error details OFF output indicator (red LED × 1): ON when safety output is OFF, blinks at lockout. ON output indicator (green LED × 1): ON while safety output is ON Muting error indicator, Blanking/test indicator (green LED × 2): ON/flash according to function	
Mutual interference prevention function		Interference light prevention algorithm, sensing distance change function	
Series connection		Time division emission by series connection Number of connections: up to 4 sets (F3SJ-A only) F3SJ-E, F3SJ-B and F3SJ-TS cannot be connected. Total number of beams: up to 400 beams Maximum cable length for 2 sets: no longer than 15 m	
Test function		Self test (at power-ON and at power distribution) External test (emission stop function by test input)	
Safety-related functions		Start interlock, restart interlock (Must be set with a setting tool when the muting function is used.) External device monitor Muting (Lamp burnout detection, override function included. F39-CN6 key cap for muting is required.) Fixed blanking (must be set by a setting tool) Floating blanking (must be set by a setting tool)	
Connection method		Connector method (M12, 8-pin)	
Protection circuit		Output short-circuit protection, and power supply reverse polarity protection	
Ambient temperature		Operating: -10 to 55°C (no icing), Storage: -30 to 70°C	
Ambient humidity		Operating: 35% to 85% (no condensation), Storage: 35% to 95%	
Operating ambient light intensity		Incandescent lamp: receiving-surface light intensity of 3,000 lx max., Sunlight: receiving-surface light intensity of 10,000 lx max.	
Insulation resistance		20 MΩ min. (at 500 VDC)	
Withstand voltage		1,000 VAC 50/60 Hz, 1 min	
Degree of protection		IP65 (IEC 60529)	
Vibration resistance		Malfunction: 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps in X, Y, and Z directions	
Shock resistance		Malfunction: 100 m/s ² , 1,000 times each in X, Y, and Z directions	
Material		Casing (including metal parts on both ends): Aluminum, zinc die-cast Cap: ABS resin, Optical cover: PMMA resin (acrylic), Cable: Oil resistant PVC	
Weight (packaged)		Calculate using the following expressions: (1) For F3SJ-A 14, weight (g) = (protective height) × 1.7 + α (2) F3SJ-A 30, weight (g) = (protective height) × 1.5 + α The values for α are as follows: Protected height 245 to 596 mm: = 1,100 protected height 1,660 to 2,180 mm: = 2,400 Protected height 600 to 1,130 mm: = 1,500 protected height 2,195 to 2,500 mm: = 2,600 Protected height 1,136 to 1,658 mm: = 2,000	
Accessories		Test rod (*1), instruction manual, standard mounting bracket (F39-LJ1 bracket for top/bottom mounting), mounting brackets (intermediate) (*2), error mode label, User's Manual (CD-ROM) *1. The F3SJ-A 55 is not included. *2. Number of intermediate brackets depends on protective height of F3SJ. For protective height from 600 to 1,130 mm: 1 set for each of the emitter and receiver is included For protective height from 1,136 to 1,658 mm: 2 sets for each of the emitter and receiver are included For protective height from 1,660 to 2,180 mm: 3 sets for each of the emitter and receiver are included For protective height from 2,195 to 2,500 mm: 4 sets for each of the emitter and receiver are included	
Applicable standards		IEC 61496-1, EN 61496-1 UL 61496-1, Type 4 ESPE (Electro-Sensitive Protective Equipment) IEC 61496-2, CLC/TS 61496-2, UL 61496-2, Type 4 AOPD (Active Opto-electronic Protective Devices) IEC 61508-1 to -3, EN 61508-1 to -3 SIL3 IEC 13849-1: 2006, EN ISO 13849-1: 2008 (PLe, Cat.4) UL 508, UL 1998, CAN/CSA C22.2 No.14, CAN/CSA C22.2 No.0.8	

Response Time

Model	Protected height (mm)	Number of beams	Response time ms (ON to OFF)	Response time ms (OFF to ON)
F3SJ-A____14 Series	245 to 263	26 to 28	11	44
	281 to 389	30 to 42	12	48
	407 to 497	44 to 54	13	52
	515 to 605	56 to 66	14	56
	623 to 731	68 to 80	15	60
	767 to 983	84 to 108	17.5	70
	1,055 to 1,271	116 to 140	20	80
	1,343 to 1,559	148 to 172	22.5	90
	1,631	180	25	100
F3SJ-A____30 Series	245 to 395	10 to 16	10	40
	420 to 720	17 to 29	11	44
	745 to 1,045	30 to 42	12	48
	1,070 to 1,295	43 to 52	13	52
	1,395 to 1,620	56 to 65	14	56
	1,745 to 1,995	70 to 80	15	60
	2,120 to 2,495	85 to 100	17.5	70

Note: Use the following expressions for series connection.

- For 2-set series connection:
Response time (ON to OFF): Response time of the 1st unit + Response time of the 2nd unit – 1 (ms), Response time (OFF to ON): Response time calculated by the above × 4 (ms)
- For 3-set series connection:
Response time (ON to OFF):
Response time of the 1st unit + Response time of the 2nd unit + Response time of 3rd unit – 5 (ms), Response time (OFF to ON): Response time calculated by the above × 5 (ms)
For models with the “-TS” suffix, multiply the response time obtained by the above × 5 (ms), or use 200 ms, whichever is less.)
- For 4-set series connection:
Response time (ON to OFF): Response time of the 1st unit + Response time of the 2nd unit + Response time of the 3rd unit + Response time of the 4th unit – 8 (ms)
Response time (OFF to ON): Response time calculated by the above × 5 (ms)

Cable extension length

Total cable extension length must be no greater than the lengths described below.

When the F3SJ and an external power supply are directly connected, or when the F3SJ is connected to a G9SA-300-SC.

Condition	1 set	2 sets	3 sets	4 sets
Using incandescent lamp for auxiliary output and external indicator output	45 m	40 m	30 m	20 m
Not using incandescent lamp	100 m	60 m	45 m	30 m

When connected to the F3SP-B1P

Condition	1 set	2 sets	3 sets	4 sets
Using incandescent lamp for external indicator output 2	40 m	30 m	25 m	20 m
Using incandescent lamp for external indicator output 1	60 m	45 m	30 m	20 m
Using incandescent lamp for auxiliary output 1				
Not using incandescent lamp	100 m	60 m	45 m	30 m

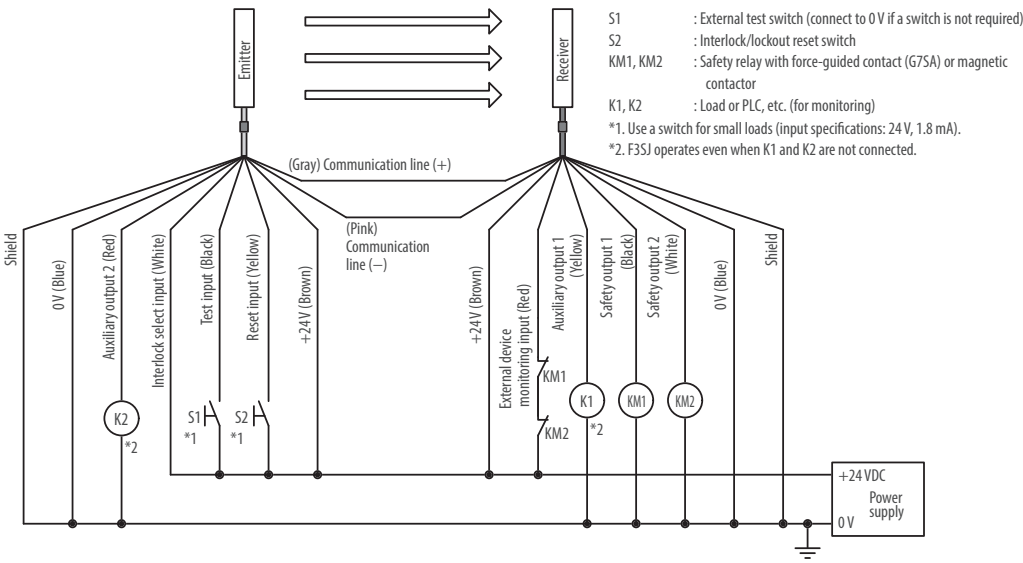
Note: Keep the cable length within the rated length. Failure to do so is dangerous as it may prevent safety functions from operating normally.

Connections

Basic Wiring Diagram

PNP Output

Wiring when using manual reset mode, external device monitoring.





Multi-beam, finger- and hand protection safety sensor

The F3S-TGR-CL multi-beam, finger- and hand protection safety sensors satisfying with integrated safety control functions selectable via built-in dip-switches.

- Type 2 or type 4 acc. EN61496-1
- PL c or PL e acc. ISO13849
- Family concept in wiring and mounting
- All models with dip-switch setup for external device monitoring, interlock function, range setting (short and long range) and optical or wired coding
- Advanced models with pre-reset function, T-, L- or X- muting function and muting lamp integrated

Ordering information

Multi-beam safety sensors

F3S-TGR-CL2_-K_ (Type 2)

System	Sensing distance	Detection capability	Order code	
			Basic feature set ^{*1}	Advanced feature set ^{*2}
Active/passive	0.5 m to 12 m	500	F3S-TGR-CL2B-K2C-500	F3S-TGR-CL2A-K2C-500
	0.5 m to 8 m	400	F3S-TGR-CL2B-K3C-800	F3S-TGR-CL2A-K3C-800
	0.5 m to 7 m	300	F3S-TGR-CL2B-K4C-900	F3S-TGR-CL2A-K4C-900
		400	F3S-TGR-CL2B-K4C-1200	F3S-TGR-CL2A-K4C-1200
Active/active	0.5 m to 40 m	500	F3S-TGR-CL2B-K2-500	F3S-TGR-CL2A-K2-500
		400	F3S-TGR-CL2B-K3-800	F3S-TGR-CL2A-K3-800
		300	F3S-TGR-CL2B-K4-900	F3S-TGR-CL2A-K4-900
		400	F3S-TGR-CL2B-K4-1200	F3S-TGR-CL2A-K4-1200
Active/active, long distance	25 m to 50 m	500	F3S-TGR-CL2B-K2-500-LD	F3S-TGR-CL2A-K2-500-LD
		400	F3S-TGR-CL2B-K3-800-LD	F3S-TGR-CL2A-K3-800-LD
		300	F3S-TGR-CL2B-K4-900-LD	F3S-TGR-CL2A-K4-900-LD
		400	F3S-TGR-CL2B-K4-1200-LD	F3S-TGR-CL2A-K4-1200-LD

F3S-TGR-CL4_-K_ (Type 4)

System	Sensing distance	Detection capability	Order code	
			Basic feature set ^{*1}	Advanced feature set ^{*2}
Active/passive	0.5 m to 12 m	500	F3S-TGR-CL4B-K2C-500	F3S-TGR-CL4A-K2C-500
	0.5 m to 8 m	400	F3S-TGR-CL4B-K3C-800	F3S-TGR-CL4A-K3C-800
	0.5 m to 7 m	300	F3S-TGR-CL4B-K4C-900	F3S-TGR-CL4A-K4C-900
		400	F3S-TGR-CL4B-K4C-1200	F3S-TGR-CL4A-K4C-1200
Active/active	0.5 m to 40 m	500	F3S-TGR-CL4B-K2-500	F3S-TGR-CL4A-K2-500
		400	F3S-TGR-CL4B-K3-800	F3S-TGR-CL4A-K3-800
		300	F3S-TGR-CL4B-K4-900	F3S-TGR-CL4A-K4-900
		400	F3S-TGR-CL4B-K4-1200	F3S-TGR-CL4A-K4-1200
Active/active, long distance	25 m to 50 m	500	F3S-TGR-CL4B-K2-500-LD	F3S-TGR-CL4A-K2-500-LD
		400	F3S-TGR-CL4B-K3-800-LD	F3S-TGR-CL4A-K3-800-LD
		300	F3S-TGR-CL4B-K4-900-LD	F3S-TGR-CL4A-K4-900-LD
		400	F3S-TGR-CL4B-K4-1200-LD	F3S-TGR-CL4A-K4-1200-LD

^{*1} Basic feature set: Manual/automatic restart, coding

^{*2} Advanced feature set: Basic + Muting + integrated Muting lamp + Pre-reset

Safety sensors

F3S-TGR-CL2_ (Type 2)

Feature set	Master/Slave	Sensing distance	Detection capability	Length	Order code
Basic ^{*1}	Standalone	0.2 m to 6 m	14 mm	150 mm to 2,400 mm ^{*3}	F3S-TGR-CL2B-014-__
		0.2 m to 14 m	35 mm		F3S-TGR-CL2B-035-__
Advanced ^{*2}	Standalone	0.2 m to 6 m	14 mm		F3S-TGR-CL2A-014-__
		0.2 m to 14 m	35 mm		F3S-TGR-CL2A-035-__
	Master	0.2 m to 6 m	14 mm	150 mm to 2,250 mm ^{*3}	F3S-TGR-CL2A-014-_M
		0.2 m to 14 m	35 mm		F3S-TGR-CL2A-035-_M
	Slave	0.2 m to 6 m	14 mm		F3S-TGR-CL2A-014-_S
		0.2 m to 14 m	35 mm		F3S-TGR-CL2A-035-_S
			70 mm	300 mm to 2,100 mm	F3S-TGR-CL2A-070-_S

F3S-TGR-CL4_ (Type 4)

Feature set	Master/Slave	Sensing distance	Detection capability	Length	Order code
Basic ^{*1}	Standalone	0.2 m to 6 m	14 mm	150 mm to 2,400 mm ^{*3}	F3S-TGR-CL4B-014-__
		0.2 m to 14 m	35 mm		F3S-TGR-CL4B-035-__
Advanced ^{*2}	Standalone	0.2 m to 6 m	14 mm		F3S-TGR-CL4A-014-__
		0.2 m to 14 m	35 mm		F3S-TGR-CL4A-035-__
	Master ^{*4}	0.2 m to 6 m	14 mm	150 mm to 2,250 mm ^{*3}	F3S-TGR-CL4A-014-_M
		0.2 m to 14 m	35 mm		F3S-TGR-CL4A-035-_M
	Slave ^{*4}	0.2 m to 6 m	14 mm		F3S-TGR-CL4A-014-_S
		0.2 m to 14 m	35 mm		F3S-TGR-CL4A-035-_S
			70 mm	300 mm to 2,100 mm	F3S-TGR-CL4A-070-_S

^{*1} Basic feature set: Manual/automatic restart, coding

^{*2} Advanced feature set: Basic + Muting + integrated Muting lamp + Pre-reset

^{*3} Available length (in mm): 150, 300, 450, 600, 750, 900, 1,050, 1,200, 1,350, 1,500, 1,650, 1,800, 1,950, 2,100, 2,250, (2,400 mm, only standalone versions)

^{*4} Master/slave system: A master/slave system cannot exceed the total length of 2,400 mm

F3S-TGR-CL-__M/S Master-Slave Series

- A Master-Slave cascade system is made of one master segment and one slave segment.
- The length of the total protective field can vary from minimum 300 mm till maximum 2,400 mm.

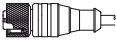
- The interconnect cable length limitation between master and slave segment is in total max. 0,9 m.

Possible combinations of master and slave are in this table:

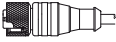
		Slave models																					
		14 mm or 35 mm resolution																70 mm resolution					
		150	300	450	600	750	900	1,050	1,200	1,350	1,500	1,650	1,800	1,950	2,150	2,250	300	600	900	1,200	1,500	1,800	2,100
Master models (14 mm or 35 mm resolution)	150	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	300	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	450	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	600	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	750	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	900	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	1,050	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	1,200	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	1,350	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	1,500	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	1,650	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	1,800	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	1,950	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	2,100	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	2,250	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Accessories


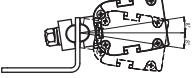
Receiver cables (M12-8pin, shielded, flying leads)

Shape	Description	Remark	Order code
	Sensor connector with open cable end M12-8pin, outer shielding layer	Receiver cable, 2 m length	Y92E-M12PURSH8S2M-L
		Receiver cable, 5 m length	Y92E-M12PURSH8S5M-L
		Receiver cable, 10 m length	Y92E-M12PURSH8S10M-L
		Receiver cable, 25 m length	Y92E-M12PURSH8S25M-L

Transmitter cables (M12-4pin, shielded, flying leads)



Shape	Description	Remark	Order code
	Sensor connector with open cable end M12-4pin, outer shielding layer	Transmitter cable, 2 m length	Y92E-M12PURSH4S2M-L
		Transmitter cable, 5 m length	Y92E-M12PURSH4S5M-L
		Transmitter cable, 10 m length	Y92E-M12PURSH4S10M-L
		Transmitter cable, 25 m length	Y92E-M12PURSH4S25M-L

Mounting brackets

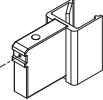
Shape	Description	Remark	Order code
	Mounting bracket	Mounting bracket × 1, SLC mounting screws × 1 set	F39-TGR-ST-SB ^{*1}
	Adjustable bracket	Adjustable bracket × 1, Bracket mounting screws × 1 set	F39-TGR-ST-ADJ

^{*1} Brackets amount included in shipment is shown in table of Dimensions

Master-Slave accessories

Shape	Description	Remark	Order code
	Male-male extension connector M12-8pin, outer shielding layer	Connection cable, 0.3 m length	Y92E-M12MSM12MSPURSH80.3M-L
		Connection cable, 0.9 m length	Y92E-M12MSM12MSPURSH80.9M-L (included in slave system)
	Alignment kit – end cap	To support alignment of a Master-Slave system	F39-TGR-CL-MSA (included in slave system)

Laser alignment kit

Shape	Description	Remark	Order code
	Laser alignment kit	Scanning range: ≤ 60 m Batteries: 2 × 1.5 V Micro/AAA Laser Class 2 (IEC 60825)	F39-TGR-CL-LLK

Mounting systems and mirrors

Adjustable stands

		Order code
Adjustable stand, 1,200 mm high	Safety sensors, Mirror systems	F39-TGR-AS-B1200
Adjustable stand, 1,600 mm high	Safety sensors, Mirror systems, Muting applications	F39-TGR-AS-B1600

Mirror system for multi-beam safety sensors (F3S-TGR-CL-K)

		Order code
Mirror mounting plate	2-, 3- and 4-beam systems ≤ 900 mm	F39-TGR-AS-MM1
	4-beam system 1,200 mm	F39-TGR-AS-MM2
Adjustable mirror kit	Use 1 pcs F39-TGR-AS-AM1 for each beam of the safety sensor	F39-TGR-AS-AM1

Muting accessories

		Order code
Mounting system for muting sensors	For L-muting	F39-TGR-AS-MA-MBL
	For X- and T-muting	F39-TGR-AS-MA-MBXT
Mounting bracket for muting sensors	For OMRON E3Z and E3G-family	F39-TGR-AS-MA-MSM
Mounting bracket for reflectors	For OMRON E39-R1S	F39-TGR-AS-MA-MRM

Cable cover

		Order code
Cable cover	For 1,200 mm stand	F39-TGR-AS-MA-CC12
	For 1,600 mm stand	F39-TGR-AS-MA-CC16

Specifications

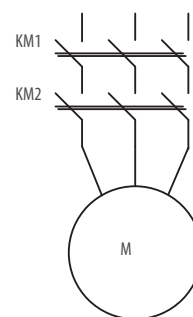
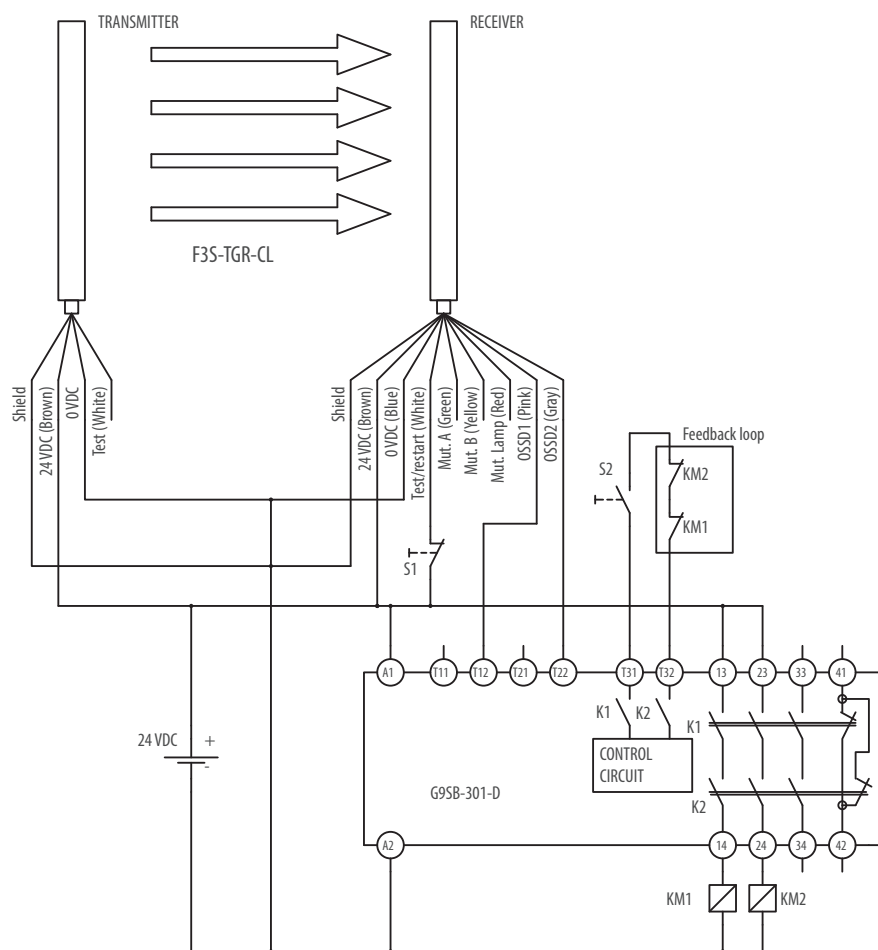
Multi-beam safety sensors

Item	F3S-TGR-CL2_-0__	F3S-TGR-CL4_-0__
Sensor type	Type 2	Type 4
Protective height	500 mm, 800 mm, 900 mm or 1,200 mm	
Operating range	F3S-TGR-CL__-K__ 0.5 to 20 m or 20 to 40 m (Dip switch option) F3S-TGR-CL__-K__-LD 25 to 50 m F3S-TGR-CL__-K2C-500 0.5 to 12 m F3S-TGR-CL__-K3C-800 0.5 to 8 m F3S-TGR-CL__-K4C- 0.5 to 7 m	
Beam pitch	F3S-TGR-CL__-K2_-500: 2 beams, 500 mm F3S-TGR-CL__-K3_-800: 3 beams, 400 mm F3S-TGR-CL__-K4_-900: 4 beams, 300 mm F3S-TGR-CL__-K4_-1200: 4 beams, 400 mm	
Effective aperture angle (EAA)	Within $\pm 5^\circ$	Within $\pm 2.5^\circ$
	for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2	
Light source	Infrared LED (880 nm), power dissipation <3 mW, Class 1 per EN 60825-1	
Supply voltage	24 VDC \pm 20%, according EN 60204-1 able to cover a drop of voltage of at least 20 ms	
OSSD	2 PNP transistor outputs, load current 2 \times 250 mA max	
Test functions	Self test (after power ON and during operation)	
Safety-related functions	All models with dip-switch setup for external device monitoring, interlock function, range setting (short and long range) and optical or wired sync. Advanced models with selectable pre-reset function, T-, L- or X- muting function (timeout or infinite muting dip switch option) and muting lamp integrated (only for the non master-slave systems)	
Response time	ON to OFF: Maximum: 13 ms	
Ambient temperature	Operating: -10 to 55°C, Storage: -25 to 70°C (no icing, no condensation)	
Ambient humidity	95% not condensing	
Degree of protection	IP 65 (IEC 60529)	
Materials	Housing: Painted aluminum, Yellow, RAL 1018 Front Window: Acrylic Lexan Red end cap: PA6 (Standalone models), Transparent end cap: PC (Advanced standalone models), Sealing Gasket: EPDM Mounting Bracket: Cold rolled Steel	
Suitable for safety control systems	PLc (ISO 13849-1)	PLe (ISO 13849-1)
Category	Categorie 2	Categorie 4
PFHd	2.5×10^{-9}	
Proof test interval	every 20 years	

Finger- and hand safety protection sensors

Item	F3S-TGR-CL2_-0__	F3S-TGR-CL4_-0__
Sensor type	Type 2	Type 4
Protective height	150 mm to 2,400 mm	
Operating range (short setting or long setting)	F3S-TGR-CL__-014: 0.2 m to 3 m or 3 m to 6 m (Dip switch option) F3S-TGR-CL__-035: 0.2 m to 7 m or 7 m to 14 m (Dip switch option) F3S-TGR-CL__-070: 0.2 m to 7 m or 7 m to 14 m (Dip switch option)	
Detection capability	F3S-TGR-CL__-014: Opaque objects 14 mm in diameter F3S-TGR-CL__-035: Opaque objects 35 mm in diameter F3S-TGR-CL__-070: Opaque objects 70 mm in diameter	
Effective aperture angle (EAA)	Within $\pm 5^\circ$	Within $\pm 2.5^\circ$
	for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2	
Light source	Infrared LED (880 nm), power dissipation <3 mW, Class 1 per EN 60825-1	
Supply voltage	24 VDC \pm 20%, according EN 60204-1 able to cover a drop of voltage of at least 20 ms	
OSSD	2 PNP transistor outputs, load current 2 \times 250 mA max	
Series connection	Number of connections: One master and one slave safety light curtain Total number of beams \leq 336 Maximum interconnect cable length: 900 mm	
Test functions	Self test (after power ON and during operation)	
Safety-related functions	All models with dip-switch setup for external device monitoring, interlock function, range setting (short and long range) and optical or wired sync. Advanced models with selectable pre-reset function, T-, L- or X- muting function (timeout muting), blanking, single / double brake function and muting lamp integrated (only for the non master-slave systems)	
Response time	ON to OFF: 14 ms to 103 ms	
Ambient temperature	Operating: -10 to 55°C, Storage: -25 to 70°C (no icing, no condensation)	
Ambient humidity	95% not condensing	
Degree of protection	IP 65 (IEC 60529)	
Materials	Housing: Painted aluminum, Yellow, RAL 1018 Front Window: Acrylic Lexan Red end cap: PA6 (Standalone models), Transparent end cap: PC (Advanced standalone models), Die cast aluminum (Master-, Slave models) Sealing Gasket: EPDM Mounting Bracket: Cold rolled Steel	
Suitable for safety control systems	PLc (ISO 13849-1)	PLe (ISO 13849-1)
Category	Categorie 2	Categorie 4
PFHd	2.5×10^{-9}	
Proof test interval	every 20 years	

F3S-TGR-CL and G9SB-301-D in manual reset



Note: This circuit achieves up to PLe according to EN ISO 13849-1 with F3S-TGR-CL4 and up to PLc according to EN ISO 13849-1 with F3S-TGR-CL2.



Advanced type for complex safety solutions

The F3SG-RA advanced safety light curtain provides simplicity in mounting, daily operation and maintenance.

- Torsion-resistant for fast and simple alignment
- Smart-click cable connection for fast set-up and correct torque to ensure IP67
- QR code indication for easy online troubleshooting
- PNP/NPN output selection by DIP switch
- Cascading connection up to 3 segments and up to 255 beams
- Built in blanking, muting and reset functions

Ordering information

Sensors

Application	Type	Detection capability	Operating range	Protective height	Order code
Finger detection	Type 4 / Type 2	14 mm	0.3 to 10 m	160 to 2,080 mm	F3SG-__RA__-14
Hand detection	Type 4 / Type 2	30 mm	0.3 to 20 m	190 to 2,510 mm	F3SG-__RA__-30

F3SG-RA_14 models (14 mm detection capability)




Protective height	Number of beams	Order code	
		Type 4	Type 2
160 mm	15	F3SG-4RA0160-14	F3SG-2RA0160-14
240 mm	23	F3SG-4RA0240-14	F3SG-2RA0240-14
320 mm	31	F3SG-4RA0320-14	F3SG-2RA0320-14
400 mm	39	F3SG-4RA0400-14	F3SG-2RA0400-14
480 mm	47	F3SG-4RA0480-14	F3SG-2RA0480-14
560 mm	55	F3SG-4RA0560-14	F3SG-2RA0560-14
640 mm	62	F3SG-4RA0640-14	F3SG-2RA0640-14
720 mm	71	F3SG-4RA0720-14	F3SG-2RA0720-14
800 mm	79	F3SG-4RA0800-14	F3SG-2RA0800-14
880 mm	87	F3SG-4RA0880-14	F3SG-2RA0880-14
960 mm	95	F3SG-4RA0960-14	F3SG-2RA0960-14
1040 mm	103	F3SG-4RA1040-14	F3SG-2RA1040-14
1120 mm	111	F3SG-4RA1120-14	F3SG-2RA1120-14
1200 mm	119	F3SG-4RA1200-14	F3SG-2RA1200-14
1280 mm	127	F3SG-4RA1280-14	F3SG-2RA1280-14
1360 mm	135	F3SG-4RA1360-14	F3SG-2RA1360-14
1440 mm	143	F3SG-4RA1440-14	F3SG-2RA1440-14
1520 mm	151	F3SG-4RA1520-14	F3SG-2RA1520-14
1600 mm	159	F3SG-4RA1600-14	F3SG-2RA1600-14
1680 mm	167	F3SG-4RA1680-14	F3SG-2RA1680-14
1760 mm	175	F3SG-4RA1760-14	F3SG-2RA1760-14
1840 mm	183	F3SG-4RA1840-14	F3SG-2RA1840-14
1920 mm	191	F3SG-4RA1920-14	F3SG-2RA1920-14
2000 mm	199	F3SG-4RA2000-14	F3SG-2RA2000-14
2080 mm	207	F3SG-4RA2080-14	F3SG-2RA2080-14

F3SG-RA_30 models (30 mm detection capability)


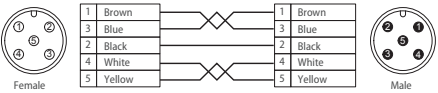
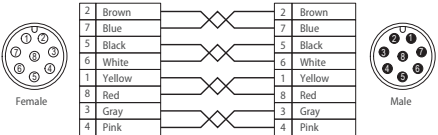
Protective height	Number of beams	Order code	
		Type 4	Type 2
190 mm	8	F3SG-4RA0190-30	F3SG-2RA0190-30
270 mm	12	F3SG-4RA0270-30	F3SG-2RA0270-30
350 mm	16	F3SG-4RA0350-30	F3SG-2RA0350-30
430 mm	20	F3SG-4RA0430-30	F3SG-2RA0430-30
510 mm	24	F3SG-4RA0510-30	F3SG-2RA0510-30
590 mm	28	F3SG-4RA0590-30	F3SG-2RA0590-30
670 mm	32	F3SG-4RA0670-30	F3SG-2RA0670-30
750 mm	36	F3SG-4RA0750-30	F3SG-2RA0750-30
830 mm	40	F3SG-4RA0830-30	F3SG-2RA0830-30
910 mm	44	F3SG-4RA0910-30	F3SG-2RA0910-30
990 mm	48	F3SG-4RA0990-30	F3SG-2RA0990-30
1070 mm	52	F3SG-4RA1070-30	F3SG-2RA1070-30
1150 mm	56	F3SG-4RA1150-30	F3SG-2RA1150-30
1230 mm	60	F3SG-4RA1230-30	F3SG-2RA1230-30
1310 mm	64	F3SG-4RA1310-30	F3SG-2RA1310-30
1390 mm	68	F3SG-4RA1390-30	F3SG-2RA1390-30
1470 mm	72	F3SG-4RA1470-30	F3SG-2RA1470-30
1550 mm	76	F3SG-4RA1550-30	F3SG-2RA1550-30
1630 mm	80	F3SG-4RA1630-30	F3SG-2RA1630-30
1710 mm	84	F3SG-4RA1710-30	F3SG-2RA1710-30
1790 mm	88	F3SG-4RA1790-30	F3SG-2RA1790-30
1870 mm	92	F3SG-4RA1870-30	F3SG-2RA1870-30
1950 mm	96	F3SG-4RA1950-30	F3SG-2RA1950-30
2030 mm	100	F3SG-4RA2030-30	F3SG-2RA2030-30
2110 mm	104	F3SG-4RA2110-30	F3SG-2RA2110-30
2190 mm	108	F3SG-4RA2190-30	F3SG-2RA2190-30
2270 mm	112	F3SG-4RA2270-30	F3SG-2RA2270-30
2350 mm	116	F3SG-4RA2350-30	F3SG-2RA2350-30
2420 mm	120	F3SG-4RA2430-30	F3SG-2RA2430-30
2510 mm	124	F3SG-4RA2510-30	F3SG-2RA2510-30

Accessories (Sold separately)


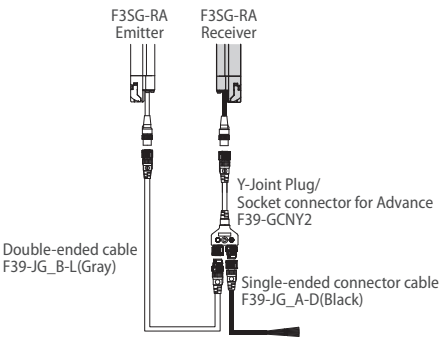
Single-end connector cable

Appearance	Type	Specification	Cable length	Order code																								
	Emitter cable M12 connector 5-Pin Color: Gray	 Female	<table border="1"><tr><td>1</td><td>+ 24 VDC</td><td>Brown</td></tr><tr><td>2</td><td>TEST</td><td>Black</td></tr><tr><td>3</td><td>0 VDC</td><td>Blue</td></tr><tr><td>4</td><td>Not used</td><td>White</td></tr><tr><td>5</td><td>Not used</td><td>Yellow</td></tr></table>	1	+ 24 VDC	Brown	2	TEST	Black	3	0 VDC	Blue	4	Not used	White	5	Not used	Yellow	3 m	F39-JG3A-L								
			1	+ 24 VDC	Brown																							
			2	TEST	Black																							
			3	0 VDC	Blue																							
			4	Not used	White																							
	5	Not used	Yellow																									
	7m	F39-JG7A-L																										
	10 m	F39-JG10A-L																										
	15 m	F39-JG15A-L																										
	20 m	F39-JG20A-L																										
Receiver cable M12 connector 8-Pin Color: Black	 Female	<table border="1"><tr><td>1</td><td>Reset</td><td>Yellow</td></tr><tr><td>2</td><td>+ 24 VDC</td><td>Brown</td></tr><tr><td>3</td><td>MUTE A</td><td>Gray</td></tr><tr><td>4</td><td>MUTE B</td><td>Pink</td></tr><tr><td>5</td><td>OSSD 1</td><td>Black</td></tr><tr><td>6</td><td>OSSD 2</td><td>White</td></tr><tr><td>7</td><td>0 VDC</td><td>Blue</td></tr><tr><td>8</td><td>AUX(Lamp)</td><td>Red</td></tr></table>	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(Lamp)	Red	3 m	F39-JG3A-D
			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(Lamp)	Red																										
7m	F39-JG7A-D																											
10 m	F39-JG10A-D																											
15 m	F39-JG15A-D																											
20 m	F39-JG20A-D																											


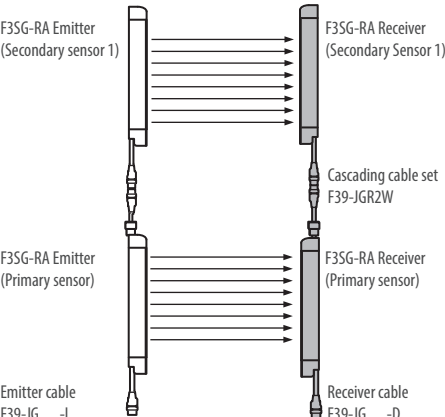
Double-end connector cable

Appearance	Type	Specification	Cable length	Order code
	Emitter cable M12 connector 5-Pin Color: Gray	<p>Connected to power cable or double-ended cable</p> <p>Connected to single-ended cable, or double-ended cable</p> 	0.5 m	F39-JGR5B-L
			1 m	F39-JG1B-L
			3 m	F39-JG3B-L
			5 m	F39-JG5B-L
			7m	F39-JG7B-L
			10 m	F39-JG10B-L
			15 m	F39-JG15B-L
			20 m	F39-JG20B-L
	Receiver cable M12 connector 8-Pin Color: Black	<p>Connected to power cable or double-ended cable</p> <p>Connected to single-ended cable, or double-ended cable</p> 	0.5 m	F39-JGR5B-D
			1 m	F39-JG1B-D
			3 m	F39-JG3B-D
			5 m	F39-JG5B-D
			7m	F39-JG7B-D
			10 m	F39-JG10B-D
			15 m	F39-JG15B-D
			20 m	F39-JG20B-D




Y-joint Plug/Socket Connector

Appearance	Type	Specification	Cable length	Order code
	M12 connectors. Used for reduced wiring.	 <p>Double-ended cable F39-JG_B-L(Gray)</p> <p>Single-ended connector cable F39-JG_A-D(Black)</p>	0.5 m	F39-GCNY2

Cascading cable

Appearance	Type	Specification	Cable length	Order code
	Cascading cable set Set including: Emitter cable: Cap (5-pin), M12 connector (5-pin) Receiver cable: Cap (8-pin), M12 connector (8-pin)	 <p>F39-JG_RA Emitter (Secondary sensor 1)</p> <p>F39-JG_RA Receiver (Secondary Sensor 1)</p> <p>F39-JG_RA Emitter (Primary sensor)</p> <p>F39-JG_RA Receiver (Primary sensor)</p> <p>Emitter cable F39-JG__-L</p> <p>Receiver cable F39-JG__-D</p>	0.2 m	F39-JGR2W

Mounting brackets




Appearance	Type	Specification	Order code
	Standard fixed bracket set (Two brackets per set)	Bracket to mount the F3SG-R. Side mounting and backside mounting possible. (Included in the F3SG-R product package ^{*1})	F39-LGF
	Standard adjustable bracket set (Two brackets per set)	Bracket to mount the F3SG-R. Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$. Side mounting and backside mounting possible.	F39-LGA
	Top/Bottom adjustable bracket set ^{*2} (Four brackets per set)	Bracket to mount the F3SG-R at the top and bottom position. Beam alignment after mounting possible. The angle adjustment range is $\pm 22.5^\circ$. Can be used in combination with the standard adjustable brackets.	F39-LGTB

^{*1} 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

^{*2} Optional available F39-LGTB-1 Top/Bottom adjustable bracket set (4 pcs.) without angle bracket to mount to the wall.

Interface units and configuration tool SD Manager 2

Appearance	Type	Specification	Order code
	SD Manager2	The configuration tool SD Manager2 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 unit	F39-BT bluetooth unit to enable bluetooth on the F3SG-RA	F39-BT

Lamp and Bluetooth

Appearance	Type	Specification	Order code
	Lamp unit	The lamp unit can be connected to a F3SG-RA receiver. The lamp can indicate red, orange, and green colors, to which three different states can be assigned.	F39-LP
	Bluetooth + Lamp unit	The bluetooth + lamp unit can be connected to a F3SG-RA receiver to enable bluetooth on the F3SG-RA. The lamp can indicate red, orange, and green colors, to which three different states can be assigned.	F39-BTLP


Test rod

Appearance	Type	Specification	Order code
	Test rod 14mm	14 mm diameter	F39-TRD14
	Test rod 30mm	30 mm diameter	F39-TRD30


Spatter protection cover (Two covers per set, for emitter and 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		Order code
	Finger protection	Hand and arm protection	
	F3SG-_RA0160-14	F3SG-_RA0190-30	F39-HGA0200
	F3SG-_RA0240-14	F3SG-_RA0270-30	F39-HGA0280
	F3SG-_RA0320-14	F3SG-_RA0350-30	F39-HGA0360
	F3SG-_RA0400-14	F3SG-_RA0430-30	F39-HGA0440
	F3SG-_RA0480-14	F3SG-_RA0510-30	F39-HGA0520
	F3SG-_RA0560-14	F3SG-_RA0590-30	F39-HGA0600
	F3SG-_RA0640-14	F3SG-_RA0670-30	F39-HGA0680
	F3SG-_RA0720-14	F3SG-_RA0750-30	F39-HGA0760
	F3SG-_RA0800-14	F3SG-_RA0830-30	F39-HGA0840
	F3SG-_RA0880-14	F3SG-_RA0910-30	F39-HGA0920
	F3SG-_RA0960-14	F3SG-_RA0990-30	F39-HGA1000
	F3SG-_RA1040-14	F3SG-_RA1070-30	F39-HGA1080
	F3SG-_RA1120-14	F3SG-_RA1150-30	F39-HGA1160
	F3SG-_RA1200-14	F3SG-_RA1230-30	F39-HGA1240
	F3SG-_RA1280-14	F3SG-_RA1310-30	F39-HGA1320
	F3SG-_RA1360-14	F3SG-_RA1390-30	F39-HGA1400
	F3SG-_RA1440-14	F3SG-_RA1470-30	F39-HGA1480
	F3SG-_RA1520-14	F3SG-_RA1550-30	F39-HGA1560
	F3SG-_RA1600-14	F3SG-_RA1630-30	F39-HGA1640
	F3SG-_RA1680-14	F3SG-_RA1710-30	F39-HGA1720
	F3SG-_RA1760-14	F3SG-_RA1790-30	F39-HGA1800
	F3SG-_RA1840-14	F3SG-_RA1870-30	F39-HGA1880
	F3SG-_RA1920-14	F3SG-_RA1950-30	F39-HGA1960
	F3SG-_RA2000-14	F3SG-_RA2030-30	F39-HGA1480
	F3SG-_RA2080-14	F3SG-_RA2110-30	F39-HGA0550
			F39-HGA1560
	—	F3SG-_RA2190-30	F39-HGA0550
			F39-HGA1640
	—	F3SG-_RA2270-30	F39-HGA0550
			F39-HGA1720
	—	F3SG-_RA2350-30	F39-HGA0550
			F39-HGA1800
	—	F3SG-_RA2430-30	F39-HGA0550
			F39-HGA1880
	—	F3SG-_RA2510-30	F39-HGA0550
			F39-HGA1960
			F39-HGA0550

Note: The operating range of the safety light curtain attached with the product is 10% shorter than the rating.**Spare parts**

Appearance	Type	Specification	Order code
	End cap	Housing color: Black For both emitter and receiver (Attached to the F3SG-R. The end cap can be purchased if lost.)	F39-CNM

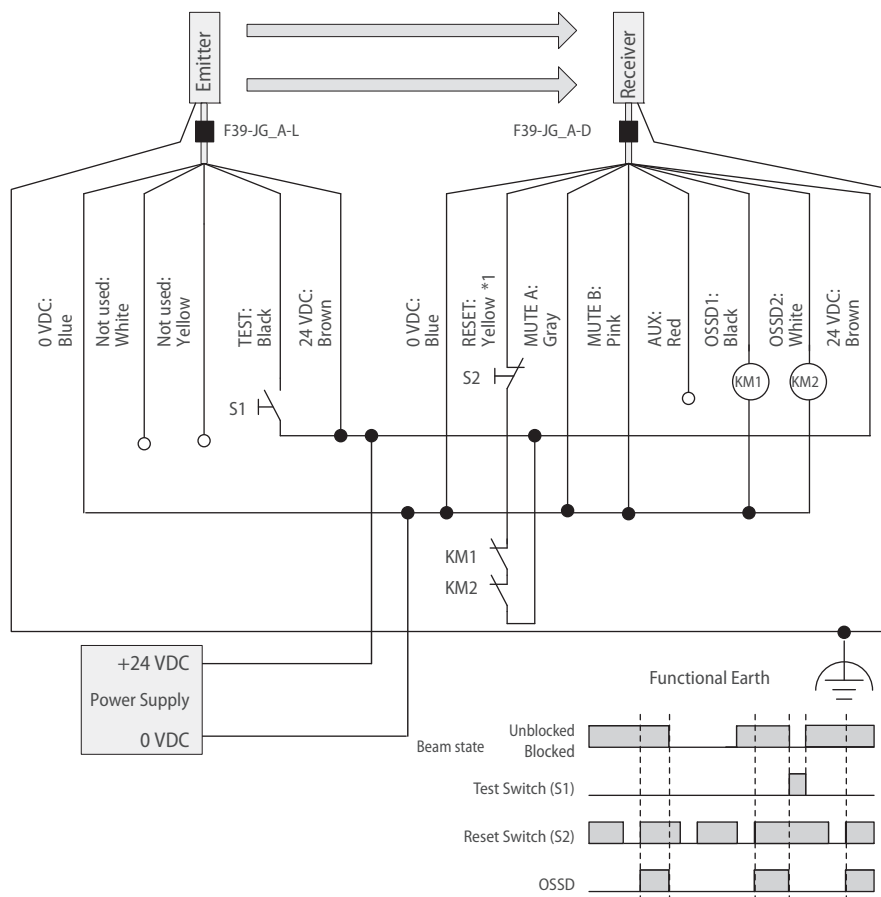
Specifications

Item		F3SG-4RA ____-14 F3SG-2RA ____-14	F3SG-4RA ____-30 F3SG-2RA ____-30
Type of ESPE (IEC 61496-1)	Type 4	F3SG-4RA ____-14/-30	
	Type 2	F3SG-2RA ____-14/-30	
Detection capability (Opaque objects)		14 mm dia.	30 mm dia.
Protective height		160 to 2080 mm	190 to 2510 mm
Operating range (Dip switch option)		0.3 to 3.0 m or 0.3 to 10.0 m	0.3 to 7.0 m or 0.3 to 20.0 m
Effective aperture angle (EAA) (IEC 61496-2)	Type 4	±2.5° max., emitter and receiver at operating range of 3 m or greater	
	Type 2	±5.0° max., emitter and receiver at operating range of 3 m or greater	
Light source		Infrared LEDs, Wavelength: 870 nm	
Power supply voltage (Vs)		SELV/PELV 24 VDC ±20% (ripple p-p 10% max.)	
Safety outputs (OSSD)		2 PNP or NPN transistor outputs (PNP or NPN selectable by DIP switch), load current of 300 mA max.	
Cascade connection		Number of cascaded segments: 3 max., total number of beams: 255 max. Total sum of cable lengths between sensors: 10 m max.	
Test function		Self-test (at power-on, and during operation), External test (light emission stop function by test input)	
Safety-related functions		Interlock, pre-reset, external device monitoring (EDM), fixed blanking/floating blanking, reduced resolution, muting/override, scan code selection, PNP/NPN selection, response time adjustment	
Response time		ON to OFF (normal mode): 8 to 18 ms max., OFF to ON: 40 to 90 ms max.	
Ambient temperature	Operating	-10 to 55°C (non-icing)	
	Storage	-25 to 70°C	
Ambient humidity	Operating	35% to 85% (non-condensing)	
	Storage	35% to 95%	
Degree of protection (IEC 60529)		IP65 and IP67	
Material		Housing: Aluminum, Cap: PBT, Front window: PMMA, Cable: Oil resistant PVC, Mounting bracket: ZDC2, FE plate: SUS	
Performance level (PL)/ Safety category	Type 4	PLe/Category 4 (EN ISO 13849-1:2008)	
	Type 2	PLc/Category 2 (EN ISO 13849-1:2008)	
PFHd		≤ 9.9 × 10 ⁻⁸ (IEC 61508)	
Proof test interval T _M		Every 20 years (IEC 61508)	

Note: For more information, please check the user manual Z352-E1

Connections (Basic wiring diagram)

Standalone F3SG-RA using PNP outputs



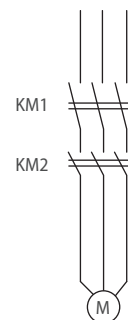
[DIP Switch settings]*2

Receiver:

- Manual Reset Mode
- EDM enabled
- PNP output

Emitter:

- 24 V Active



S1: Test Switch
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.



Easy type for simple ON/OFF detection applications

The F3SG-RE easy safety light curtain provides simplicity in mounting, operation and maintenance.

- Torsion-resistant for fast and simple alignment
- Smart-click cable connection for fast set-up and correct torque to ensure IP67
- QR code indication for easy online troubleshooting

Ordering information

Sensors

Application	Type	Detection capability	Operating range	Protective height	Order code
Finger detection	Type 4 / Type 2	14 mm	0.3 to 10 m	160 to 2,080 mm	F3SG-RE__-14
Hand detection	Type 4 / Type 2	30 mm	0.3 to 20 m	190 to 2,510 mm	F3SG-RE__-30

F3SG-RE_P14 models (PNP and 14 mm detection capability)

Protective height	Number of beams	Order code	
		Type 4	Type 2
160 mm	15	F3SG-4RE0160P14	F3SG-2RE0160P14
240 mm	23	F3SG-4RE0240P14	F3SG-2RE0240P14
320 mm	31	F3SG-4RE0320P14	F3SG-2RE0320P14
400 mm	39	F3SG-4RE0400P14	F3SG-2RE0400P14
480 mm	47	F3SG-4RE0480P14	F3SG-2RE0480P14
560 mm	55	F3SG-4RE0560P14	F3SG-2RE0560P14
640 mm	62	F3SG-4RE0640P14	F3SG-2RE0640P14
720 mm	71	F3SG-4RE0720P14	F3SG-2RE0720P14
800 mm	79	F3SG-4RE0800P14	F3SG-2RE0800P14
880 mm	87	F3SG-4RE0880P14	F3SG-2RE0880P14
960 mm	95	F3SG-4RE0960P14	F3SG-2RE0960P14
1040 mm	103	F3SG-4RE1040P14	F3SG-2RE1040P14
1120 mm	111	F3SG-4RE1120P14	F3SG-2RE1120P14
1200 mm	119	F3SG-4RE1200P14	F3SG-2RE1200P14
1280 mm	127	F3SG-4RE1280P14	F3SG-2RE1280P14
1360 mm	135	F3SG-4RE1360P14	F3SG-2RE1360P14
1440 mm	143	F3SG-4RE1440P14	F3SG-2RE1440P14
1520 mm	151	F3SG-4RE1520P14	F3SG-2RE1520P14
1600 mm	159	F3SG-4RE1600P14	F3SG-2RE1600P14
1680 mm	167	F3SG-4RE1680P14	F3SG-2RE1680P14
1760 mm	175	F3SG-4RE1760P14	F3SG-2RE1760P14
1840 mm	183	F3SG-4RE1840P14	F3SG-2RE1840P14
1920 mm	191	F3SG-4RE1920P14	F3SG-2RE1920P14
2000 mm	199	F3SG-4RE2000P14	F3SG-2RE2000P14
2080 mm	207	F3SG-4RE2080P14	F3SG-2RE2080P14



F3SG-RE_P30 models (PNP and 30 mm detection capability)

Protective height	Number of beams	Order code	
		Type 4	Type 2
190 mm	8	F3SG-4RE0190P30	F3SG-2RE0190P30
270 mm	12	F3SG-4RE0270P30	F3SG-2RE0270P30
350 mm	16	F3SG-4RE0350P30	F3SG-2RE0350P30
430 mm	20	F3SG-4RE0430P30	F3SG-2RE0430P30
510 mm	24	F3SG-4RE0510P30	F3SG-2RE0510P30
590 mm	28	F3SG-4RE0590P30	F3SG-2RE0590P30
670 mm	32	F3SG-4RE0670P30	F3SG-2RE0670P30
750 mm	36	F3SG-4RE0750P30	F3SG-2RE0750P30
830 mm	40	F3SG-4RE0830P30	F3SG-2RE0830P30
910 mm	44	F3SG-4RE0910P30	F3SG-2RE0910P30
990 mm	48	F3SG-4RE0990P30	F3SG-2RE0990P30
1070 mm	52	F3SG-4RE1070P30	F3SG-2RE1070P30
1150 mm	56	F3SG-4RE1150P30	F3SG-2RE1150P30
1230 mm	60	F3SG-4RE1230P30	F3SG-2RE1230P30
1310 mm	64	F3SG-4RE1310P30	F3SG-2RE1310P30
1390 mm	68	F3SG-4RE1390P30	F3SG-2RE1390P30
1470 mm	72	F3SG-4RE1470P30	F3SG-2RE1470P30
1550 mm	76	F3SG-4RE1550P30	F3SG-2RE1550P30
1630 mm	80	F3SG-4RE1630P30	F3SG-2RE1630P30
1710 mm	84	F3SG-4RE1710P30	F3SG-2RE1710P30
1790 mm	88	F3SG-4RE1790P30	F3SG-2RE1790P30
1870 mm	92	F3SG-4RE1870P30	F3SG-2RE1870P30
1950 mm	96	F3SG-4RE1950P30	F3SG-2RE1950P30
2030 mm	100	F3SG-4RE2030P30	F3SG-2RE2030P30
2110 mm	104	F3SG-4RE2110P30	F3SG-2RE2110P30
2190 mm	108	F3SG-4RE2190P30	F3SG-2RE2190P30
2270 mm	112	F3SG-4RE2270P30	F3SG-2RE2270P30
2350 mm	116	F3SG-4RE2350P30	F3SG-2RE2350P30
2420 mm	120	F3SG-4RE2430P30	F3SG-2RE2430P30
2510 mm	124	F3SG-4RE2510P30	F3SG-2RE2510P30




Note: Optional NPN models are available for the F3SG-RE easy types. Please contact your OMRON representative.

Accessories (Sold separately)


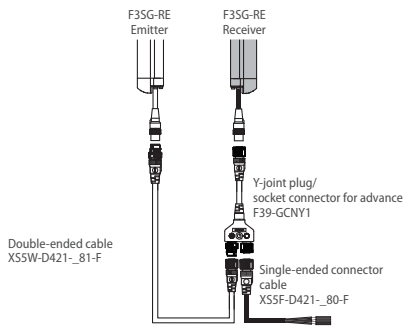
Single-end connector cable

Appearance	Type	Specification	Cable length	Order code																					
	Emitter/receiver cable M12 connector 4-Pin Color: Gray	 Female																							
			<table><tr><th>PIN</th><th>Emitter</th><th>Receiver</th><th>Color</th></tr><tr><td>1</td><td>+24 VDC</td><td>+24 VDC</td><td>Brown</td></tr><tr><td>2</td><td>Range setting</td><td>OSSD 2</td><td>White</td></tr><tr><td>3</td><td>0 VDC</td><td>0 VDC</td><td>Blue</td></tr><tr><td>4</td><td>Not used</td><td>OSSD 1</td><td>Black</td></tr></table>	PIN	Emitter	Receiver	Color	1	+24 VDC	+24 VDC	Brown	2	Range setting	OSSD 2	White	3	0 VDC	0 VDC	Blue	4	Not used	OSSD 1	Black	1 m	XS5F-D421-C80-F
			PIN	Emitter	Receiver	Color																			
			1	+24 VDC	+24 VDC	Brown																			
			2	Range setting	OSSD 2	White																			
			3	0 VDC	0 VDC	Blue																			
4	Not used	OSSD 1	Black																						
2m	XS5F-D421-D80-F																								
3 m	XS5F-D421-E80-F																								
5 m	XS5F-D421-G80-F																								
10 m	XS5F-D421-J80-F																								




Double-end connector cable

Appearance	Type	Specification	Cable length	Order code																
	Emitter/receiver cable M12 connector 4-Pin Color: Gray	<div><table><tr><td>1</td><td>Brown</td><td>1</td><td>Brown</td></tr><tr><td>2</td><td>White</td><td>2</td><td>White</td></tr><tr><td>3</td><td>Blue</td><td>3</td><td>Blue</td></tr><tr><td>4</td><td>Black</td><td>4</td><td>Black</td></tr></table><div>FemaleMale</div></div>	1	Brown	1	Brown	2	White	2	White	3	Blue	3	Blue	4	Black	4	Black	1 m	XS5W-D421-C81-F
			1	Brown	1	Brown														
			2	White	2	White														
			3	Blue	3	Blue														
			4	Black	4	Black														
			2m	XS5W-D421-D81-F																
3 m	XS5W-D421-E81-F																			
5 m	XS5W-D421-G81-F																			
10 m	XS5W-D421-J81-F																			

Y-joint Plug/Socket Connector

Appearance	Type	Specification	Cable length	Order code
	M12 connector (4-pin) on both ends	 <p>Double-ended cable XS5W-D421-B1-F</p> <p>F3SG-RE Emitter</p> <p>F3SG-RE Receiver</p> <p>Y-joint plug/ socket connector for advance F39-GCNY1</p> <p>Single-ended connector cable XS5F-D421-B0-F</p> <p>Using the Y-joint connector the F3SG-RE is set to long operation mode</p>	0.5 m	F39-GCNY1

Mounting brackets

Appearance	Type	Specification	Order code
	Standard fixed bracket set (Two brackets per set)	Bracket to mount the F3SG-R. Side mounting and backside mounting possible. (Included in the F3SG-R product package ^{*1})	F39-LGF
	Standard adjustable bracket set (Two brackets per set)	Bracket to mount the F3SG-R. Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$. Side mounting and backside mounting possible.	F39-LGA
	Top/Bottom adjustable bracket set ^{*2} (Four brackets per set)	Bracket to mount the F3SG-R at the top and bottom position. Beam alignment after mounting possible. The angle adjustment range is $\pm 22.5^\circ$. Can be used in combination with the standard adjustable brackets.	F39-LGTB

^{*1} 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

^{*2} Optional available F39-LGTB-1 Top/Bottom adjustable bracket set (4 pcs.) without angle bracket to mount to the wall.


Test rod

Appearance	Type	Specification	Order code
	Test rod 14mm	14 mm diameter	F39-TRD14
	Test rod 30mm	30 mm diameter	F39-TRD30

Spatter protection cover (Two covers per set, for emitter and 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		Order code
	Finger protection	Hand and arm protection	
	F3SG-_RE0160-14	F3SG-_RE0190-30	F39-HGB0180
	F3SG-_RE0240-14	F3SG-_RE0270-30	F39-HGB0260
	F3SG-_RE0320-14	F3SG-_RE0350-30	F39-HGB0340
	F3SG-_RE0400-14	F3SG-_RE0430-30	F39-HGB0420
	F3SG-_RE0480-14	F3SG-_RE0510-30	F39-HGB0500
	F3SG-_RE0560-14	F3SG-_RE0590-30	F39-HGB0580
	F3SG-_RE0640-14	F3SG-_RE0670-30	F39-HGB0660
	F3SG-_RE0720-14	F3SG-_RE0750-30	F39-HGB0740
	F3SG-_RE0800-14	F3SG-_RE0830-30	F39-HGB0820
	F3SG-_RE0880-14	F3SG-_RE0910-30	F39-HGB0900
	F3SG-_RE0960-14	F3SG-_RE0990-30	F39-HGB0980
	F3SG-_RE1040-14	F3SG-_RE1070-30	F39-HGB1060
	F3SG-_RE1120-14	F3SG-_RE1150-30	F39-HGB1140
	F3SG-_RE1200-14	F3SG-_RE1230-30	F39-HGB1220
	F3SG-_RE1280-14	F3SG-_RE1310-30	F39-HGB1300
	F3SG-_RE1360-14	F3SG-_RE1390-30	F39-HGB1380
	F3SG-_RE1440-14	F3SG-_RE1470-30	F39-HGB1460
	F3SG-_RE1520-14	F3SG-_RE1550-30	F39-HGB1540
	F3SG-_RE1600-14	F3SG-_RE1630-30	F39-HGB1620
	F3SG-_RE1680-14	F3SG-_RE1710-30	F39-HGB1700
	F3SG-_RE1760-14	F3SG-_RE1790-30	F39-HGB1780
	F3SG-_RE1840-14	F3SG-_RE1870-30	F39-HGB1860
	F3SG-_RE1920-14	F3SG-_RE1950-30	F39-HGB1940
	F3SG-_RE2000-14	F3SG-_RE2030-30	F39-HGB1460
	F3SG-_RE2080-14	F3SG-_RE2110-30	F39-HGA0550
			F39-HGB1540
	–	F3SG-_RE2190-30	F39-HGA0550
			F39-HGB1620
	–	F3SG-_RE2270-30	F39-HGA0550
			F39-HGB1700
	–	F3SG-_RE2350-30	F39-HGA0550
			F39-HGB1780
	–	F3SG-_RE2430-30	F39-HGA0550
			F39-HGB1860
	–	F3SG-_RE2510-30	F39-HGA0550
			F39-HGB1940
			F39-HGA0550

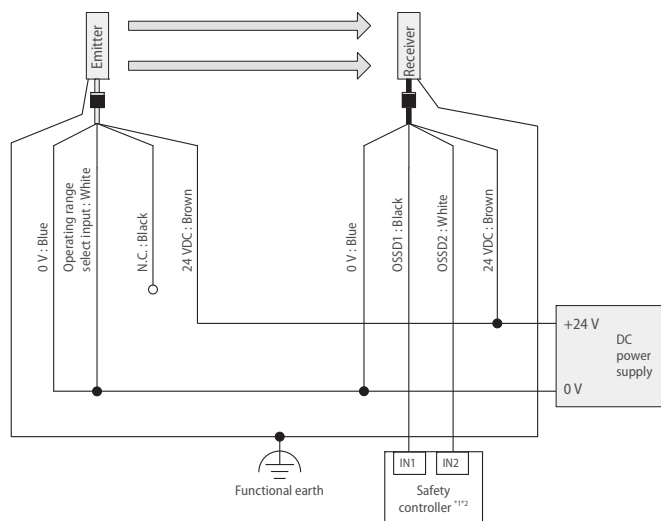
Specifications

Item		F3SG-4RE ____-14 F3SG-2RE ____-14	F3SG-4RE ____-30 F3SG-2RE ____-30
Type of ESPE (IEC 61496-1)	Type 4	F3SG-4RE ____-14/30	
	Type 2	F3SG-2RE ____-14/30	
Detection capability (Opaque objects)		14 mm dia.	30-mm dia.
Protective height		160 to 2080 mm	190 to 2510 mm
Operating range (Wiring connection option)		0.3 to 3.0 m or 0.3 to 10.0 m	0.3 to 7.0 m or 0.3 to 20.0 m
Effective aperture angle (EAA) (IEC 61496-2)	Type 4	$\pm 2.5^\circ$ max., emitter and receiver at operating range of 3 m or greater	
	Type 2	$\pm 5.0^\circ$ max., emitter and receiver at operating range of 3 m or greater	
Light source		Infrared LEDs, Wavelength: 870 nm	
Power supply voltage (Vs)		SELV/PELV 24 VDC $\pm 20\%$ (ripple p-p 10% max.)	
Safety outputs (OSSD)		F3SG-RE ____P ____: 2 PNP transistor outputs, load current of 300 mA max. F3SG-RE ____N ____: 2 NPN transistor outputs, load current of 300 mA max.	
Test function		Self-test (at power-on, and during operation)	
Response time		ON to OFF (normal mode): 5 to 15ms, OFF to ON: 25 to 75ms	
Ambient temperature	Operating	-10 to 55°C (non-icing)	
	Storage	-25 to 70°C	
Ambient humidity	Operating	35% to 85% (non-condensing)	
	Storage	35% to 95%	
Degree of protection (IEC 60529)		IP65 and IP67	
Material		Housing: Aluminum, Cap: PBT, Front window: PMMA, Cable: Oil resistant PVC, Mounting bracket: ZDC2, FE plate: SUS	
Performance level (PL)/ Safety category	Type 4	PLe/Category 4 (EN ISO 13849-1:2008)	
	Type 2	PLc/Category 2 (EN ISO 13849-1:2008)	
PFHd		$\leq 9.9 \times 10^{-8}$ (IEC 61508)	
Proof test interval T_M		Every 20 years (IEC 61508)	

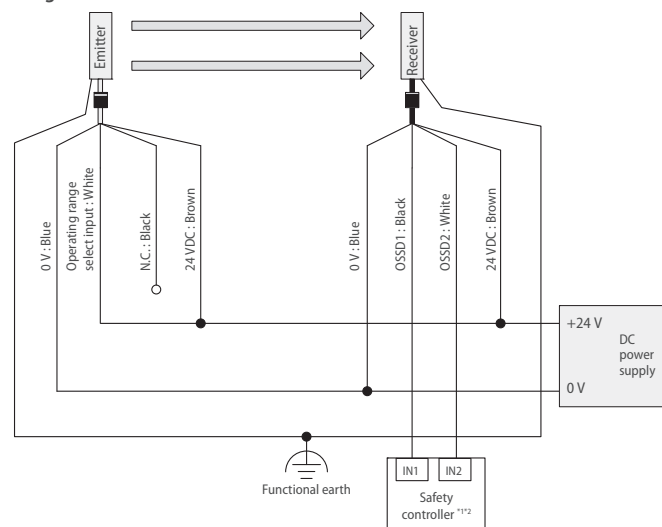
Note: For more information, please check the user manual Z352-E1

Connections (Basic wiring diagram)

Short mode



Long mode



*1 Refer to user's manual Z352-E1 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.



Muting actuators

The F39-TGR-MCL-__ muting actuators are plug-and-play accessories for the F3S-TGR-CL Safety Sensors. Easy wiring of the entire muting system is provided by connection boxes managing all connections needed.

- Active/active and active/passive systems supported
- T- and L- shape muting by using same parts
- Selectable muting sensor sequence
- Pre-installed mounting brackets
- Pre-wired connection cables
- Supporting Type 2 and Type 4 applications

Ordering information

Muting actuators (mounting brackets are included)

		Order code
Transmitter + Receiver set	active/active	F39-TGR-MCL
Receiver only	active/active	F39-TGR-MCL-D
Transmitter only	active/active	F39-TGR-MCL-L
Transceiver + Reflector set	active/passive	F39-TGR-MCL-R
Transceiver only	active/passive	F39-TGR-MCL-R-A
Reflector only	active/passive	F39-TGR-MCL-R-P

Connection boxes

	Order code
Connection box for Receivers and Transceivers	F39-TGR-MCL-CMD
Connection box for Transmitters	F39-TGR-MCL-CML

Mounting brackets

	Order code
Mounting bracket for one muting actuator	F39-TGR-MCL-ST

Specifications

Power supply		24 VDC \pm 20%
Consumption		5 W max (F39-TGR-MCL-__ only)
Ambient temperature		During operation; -10 to + 55°C (with no dew condensation)
Cable connector	Length	30 cm pre-wired
	RX	M12 5-pin female
	TX	M12 5-pin female
Degree of protection		IP65
Distance between muting beams		250mm
F39-TGR-MCL	Optical data	Through-beam system
	Operating distance	0 ... 7 m; max. 0 ... 8,4 m
	Light source	Red emitting LEDs, Wavelength 630 nm
F39-TGR-MCL-R	Optical data	Polarized retro-reflective system
	Operating distance	0 ... 4 m; max. 0 ... 4,8 m
	Light source	Red emitting LEDs, Wavelength 660 nm

Configuration examples

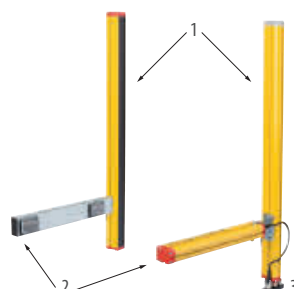
L-muting, active/active

- 1) Safety sensor (e.g. F3S-TGR-CL4A-K2-500)
- 2) Muting actuators F39-TGR-MCL
- 3) Connector box F39-TGR-MCL-CML
- 4) Connector box F39-TGR-MCL-CMD



L-muting, active/passive

- 1) Safety Sensor (e.g. F3S-TGR-CL4A-K2C-500)
- 2) Muting actuators F39-TGR-MCL-R
- 3) Connection box F39-TGR-MCL-CMD




Smart actuator for muting applications

The F3W-MA smart muting actuator is an integrated sensor system utilizing multiple-beam sensor technology to configure muting systems in combination with the safety light curtain.

- Point-to-point detection mode for workpieces with constant shape
- Chattering/void space prevention mode to prevent impact of small object holes






Ordering information


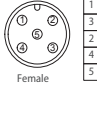
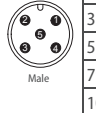
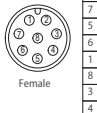
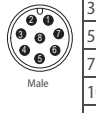
Application	Type	Specification	Order code
	Smart muting actuator for small objects detection	100 mm beam gap between muting trigger beams	F3W-MA0100P
	Smart muting actuator for objects detection	300 mm beam gap between muting trigger beams in accordance with EN/IEC TS 62046	F3W-MA0300P

Accessories (Sold separately)


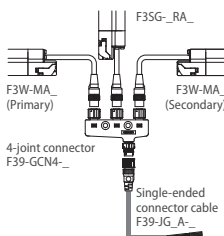
Single-end connector cable

Appearance	Type	Specification	Cable length	Order code																									
	Emitter cable M12 connector 5-Pin Color: Gray	 Female	<table><tr><td>1</td><td>+ 24 VDC</td><td>Brown</td></tr><tr><td>2</td><td>TEST</td><td>Black</td></tr><tr><td>3</td><td>0 VDC</td><td>Blue</td></tr><tr><td>4</td><td>Not used</td><td>White</td></tr><tr><td>5</td><td>Not used</td><td>Yellow</td></tr></table>	1	+ 24 VDC	Brown	2	TEST	Black	3	0 VDC	Blue	4	Not used	White	5	Not used	Yellow	3 m	F39-JG3A-L									
			1	+ 24 VDC	Brown																								
			2	TEST	Black																								
			3	0 VDC	Blue																								
			4	Not used	White																								
			5	Not used	Yellow																								
7m	F39-JG7A-L																												
10 m	F39-JG10A-L																												
15 m	F39-JG15A-L																												
20 m	F39-JG20A-L																												
	Receiver cable M12 connector 8-Pin Color: Black	 Female	<table><tr><td>1</td><td>Reset</td><td>Yellow</td></tr><tr><td>2</td><td>+ 24 VDC</td><td>Brown</td></tr><tr><td>3</td><td>MUTE A</td><td>Gray</td></tr><tr><td>4</td><td>MUTE B</td><td>Pink</td></tr><tr><td>5</td><td>OSSD 1</td><td>Black</td></tr><tr><td>6</td><td>OSSD 2</td><td>White</td></tr><tr><td>7</td><td>0 VDC</td><td>Blue</td></tr><tr><td>8</td><td>AUX(Lamp)</td><td>Red</td></tr></table>	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(Lamp)	Red	3 m	F39-JG3A-D
			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(Lamp)	Red																											
7m	F39-JG7A-D																												
10 m	F39-JG10A-D																												
15 m	F39-JG15A-D																												
20 m	F39-JG20A-D																												




Double-end connector cable

Appearance	Type	Specification	Cable length	Order code
	Emitter cable M12 connector 5-Pin Color: Gray	Connected to power cable or double-ended cable:  Connected to single-ended cable, or double-ended cable: 	0.5 m	F39-JGR5B-L
			1 m	F39-JG1B-L
			3 m	F39-JG3B-L
			5 m	F39-JG5B-L
			7m	F39-JG7B-L
			10 m	F39-JG10B-L
			15 m	F39-JG15B-L
			20 m	F39-JG20B-L
	Receiver cable M12 connector 8-Pin Color: Black	Connected to power cable or double-ended cable:  Connected to single-ended cable, or double-ended cable: 	0.5 m	F39-JGR5B-D
			1 m	F39-JG1B-D
			3 m	F39-JG3B-D
			5 m	F39-JG5B-D
			7m	F39-JG7B-D
			10 m	F39-JG10B-D
			15 m	F39-JG15B-D
			20 m	F39-JG20B-D

4-joint plug/socket connector for connection of F3W-MA and F3SG-RA

Appearance	Type	Specification	Order code
	4 joint connector set Includes one each of: F39-GCN4-D for receiver F39-GCN4-L for emitter		F39-GCN4

Mounting brackets

Appearance	Type	Specification	Order code
	Standard fixed bracket set (Two brackets per set)	Bracket to mount the F3SG-R. Side mounting and backside mounting possible. (Included in the F3SG-R product package)	F39-LGF
	Standard adjustable bracket set (Two brackets per set)	Bracket to mount the F3SG-R. Beam alignment after mounting possible. The angle adjustment range is $\pm 15^\circ$. Side mounting and backside mounting possible.	F39-LGA
	Top/Bottom adjustable bracket set ^{*1} (Four brackets per set)	Bracket to mount the F3SG-R at the top and bottom position. Beam alignment after mounting possible. The angle adjustment range is $\pm 22.5^\circ$. Can be used in combination with the standard adjustable brackets.	F39-LGTB

^{*1} Optional available F39-LGTB-1 Top/Bottom adjustable bracket set (4 pcs.) without angle bracket to mount to the wall.

Specifications

Item		F3W-MA0300P	F3W-MA0100P
Beam gap between muting trigger beams		300 mm	100 mm
Operating range (Dip switch option)		0.3 to 7.0 m or 0.3 to 20.0 m	
Light source		Infrared LEDs, Wavelength: 870 nm	
Power supply voltage (Vs)		SELV/PELV 24 VDC $\pm 20\%$ (ripple p-p 10% max.)	
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	
Ambient temperature	Operating	-10 to 55°C (non-icing)	
	Storage	-25 to 70°C	
Ambient humidity	Operating	35% to 85% (non-condensing)	
	Storage	35% to 95%	
Degree of protection (IEC 60529)		IP65 and IP67	
Material		Housing: Aluminum, Cap: PBT, Front window: PMMA, Cable: Oil resistant PVC, Mounting bracket: ZDC2, FE plate: SUS	

Note: For more information, please check the user manual Z355-E1



OS32C Safety laser scanner

- Type 3 safety laser scanner complies with IEC61496-1/-3
- 70 sets of safety zone and warning zone combinations are available, supporting complicated changes in working environments
- A safety radius up to 4 m and warning zone(s) radius up to 10 m can be set
- 8 Individual sector indicators and various LED indications allow the user to determine scanner status at a glance
- Reference boundary monitoring function prevents unauthorized changes in the scanner position
- Configurable minimum object resolution of 30, 40, 50 or 70 mm, for hand and arm detection applications

Ordering information

Description	Max. operating range	Order code
OS32C with back location cable entry	3 m	OS32C-BP
	4 m	OS32C-BP-4M
OS32C with side location cable entry ^{*1}	3 m	OS32C-SP1
	4 m	OS32C-SP1-4M
OS32C with back location cable entry EtherNet/IP capable for status measurement data reporting	3 m	OS32C-BP-DM
	4 m	OS32C-BP-DM-4M
OS32C with side location cable entry ^{*1} EtherNet/IP capable for status measurement data reporting	3 m	OS32C-SP1-DM
	4 m	OS32C-SP1-DM-4M

^{*1} Each connector is located on the left as viewed from the back of the I/O block.

Description	Remarks	Order code
Configuration tool	CD-ROM OS supported: Windows 2000, XP, Vista, Windows 7	included

Specifications

Sensors

Sensor type	Type 3 safety laser scanner
Safety category	Category 3, performance level d (ISO13849-1: 2006)
Detection capability	Configurable; Non-transparent with a diameter of 30, 40, 50 or 70 mm (1.8% reflectivity or greater)
Monitoring zone	Monitoring zone set count: (Safety zone + 2 warning zones) × 70 sets
Operating range	Safety Zone: 4.0 m (min. obj. resolution of 70mm, only OS32C-_-4M types) 3.0 m (min. obj. resolution of 50 mm or 70 mm) 2.5 m (min. obj. resolution of 40 mm) 1.75 m (min. obj. resolution of 30 mm) Warning Zone: 10.0 m (15.0 m for OS32C-_-4M types)
Detection angle	270°
Response time	Response time from ON to OFF: From 80 ms (2 scans) to 680 ms (up to 17 scans) ^{*1} Response time from OFF to ON: Response time from ON to OFF + 100 ms to 60 s (configurable)
Line voltage	24 VDC +25%/−30% (ripple p-p 2.5 V max.)
Power consumption	Normal operation: 5 W max., 4 W typical (without output load) ^{*2} Standby mode: 3.75 W (without output load)
Safety output (OSSD)	PNP transistor × 2, load current of 250mA max., residual voltage of 2 V max., load capacity of 2.2 μf max., leak current of 1 mA max. ^{*2,*3,*4}
Auxiliary output (Non-safety)	NPN/PNP transistor × 1, load current of 100 mA max., residual voltage of 2 V max., leak current of 1 mA max. ^{*3,*4,*5}
Warning output (Non-safety)	NPN/PNP transistor × 1, load current of 100 mA max., residual voltage of 2 V max., leak current of 1 mA max. ^{*3,*4,*5}
Output operation mode	Auto start, start interlock, start/restart interlock
Input	External Device Monitoring (EDM) ON: 0 V short (input current of 50 mA), OFF: Open
	Start ON: 0 V short (input current of 20 mA), OFF: Open
	Zone select ON: 24 V short (input current of 5 mA), OFF: Open
	Stand-by ON: 24 V short (input current of 5 mA), OFF: Open
Connection type	Power cable: 18-pin mini-connector (pigtail) Communication cable: M12, 4-pin connector
Connection with PC	Communication: EtherNet/IP
Indicators	RUN indicator: Green, STOP indicator: Red, Interlock indicator: Yellow, Warning output indicator: Orange, Status/diagnostic display: 2 × 7-segment LEDs, Intrusion indicators: Red LED × 8
Enclosure rating	IP65 (IEC60529)
Dimensions (W × H × D)	133.0 × 104.5 × 142.7 mm (except cable)
Weight (Main Unit only)	1.3 kg
Approvals	Certified by: TÜV Rheinland, UL Major standards: IEC61496-1/-3 (Type 3), IEC61508 (SIL2), ISO13849-1:2008 (Category 3, performance level d), UL508, UL1998

^{*1} Pollution Tolerance will add 6 ms to each scan time.

^{*2} Rated current of OS32C is 1.025 A max. (OS32C 210 mA + OSSD A load + OSSD B load + auxiliary output load + warning output load + functional Inputs). Where functional inputs are: EDM input ... 50 mA, Start input ... 20 mA, Standby input ... 5 mA, Zone X input ... 5 mA × 8 (eight zone set select inputs).


^{*3} Output voltage is input voltage − 2.0 VDC.

^{*4} Total consumption current of 2 OSSDs, auxiliary output, and warning output must not exceed 700 mA.


^{*5} Output polarity (NPN/PNP) is configurable via the configuration tool.

Accessories (sold separately)

Power cable







Appearance	Description	Remarks	Order code
	Cable length: 3 m	One cable is required per sensor	OS32C-CBL-03M
	Cable length: 10 m		OS32C-CBL-10M
	Cable length: 20 m		OS32C-CBL-20M
	Cable length: 30 m		OS32C-CBL-30M

Ethernet cable

Appearance	Description	Remarks	Order code
	Cable length: 2 m	Required for configuration and monitoring	OS32C-ECBL-02M
	Cable length: 5 m		OS32C-ECBL-05M
	Cable length: 15 m		OS32C-ECBL-15M







Note: An ethernet cable with an M12, 4-pin connector is required.

Mounting brackets

Appearance	Description	Remarks	Order code
	Bottom/side mounting bracket	Bottom/side mounting bracket × 1, unit mounting screws × 4 sets	OS32C-BKT1
	XY axis rotation mounting bracket	XY axis rotation mounting bracket × 1, unit mounting screws × 6 sets, bracket mounting screws × 1 set (must be used with OS32C-BKT1)	OS32C-BKT2
	Simple mounting bracket	Simple mounting brackets × 2, unit mounting screws × 4 sets ^{*1}	OS32C-BKT3
	Protective cover for window		OS32C-BKT4
	Mounting stand	When using a mounting stand, use an OS32C with side location cable entry (OS32C-SP1). The OS32C with back location cable entry (OS32C-BP) cannot be mounted. Use with mounting brackets (OS32C-BKT1 and OS32C-BKT2).	OS32C-MT
	Hardware kit for mounting stand	Mounting screws × 3 sets Use this when mounting a bracket to the mounting stand.	OS32C-HDT

^{*1} There are eight OS32C mounting screws: four screws for singular use, and four screws for protective cover for window.

Miscellaneous

Appearance	Description		Remarks	Order code
	Scan window		Spare for replacement	OS32C-WIN-KT
	Sensor block without I/O block Max. operating range: 3 m		Spare for replacement	OS32C-SN
	Sensor block without I/O block Max. operating range: 4 m			OS32C-SN-4M
	Sensor block without I/O block for EtherNet/IP Max. operating range: 3 m		Spare replacement for EtherNet/IP	OS32C-SN-DM
	Sensor block without I/O block for EtherNet/IP Max. operating range: 4 m			OS32C-SN-DM-4M
	I/O block	With cable access from the back	Spare for replacement	OS32C-CBBP
		With cable access from the left side	Spare for replacement	OS32C-CBSP1
	Window cleaning kit, anti-static cleaner		Accessory	WIN-CLN-KT

Connection

Basic connection with single OS32C unit
Category 3, performance level d (ISO13849-1)

