Safety Light Curtain / Multi-Beam Safety Sensor

F3SN-A/F3SH-A

- **Type 4 sensor complying with IEC and EN standards (IEC61496-1, -2, EN61496-1). Complies with EU machine directives (certified by BG/DEMKO).**
- **Detection height = Sensor length meets the user's requirements**
- **Detection height 189 to 1822 mm. Sensing distance 7 and 10 m.**
- **Various functions can be set by means of remote control.**
- **Equipped with a LED bar for easy adjustment of the optical axis and quick detection of failures.**

Features

Select the optimum safety sensor for the application. Omron provides two safety types, the "Safety Light Curtain" and the "Multi-Beam Safety Sensor".

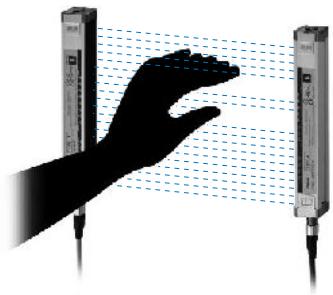
Finger protection

Safety light curtain

F3SN-A□□□□P14

Sensing distance : 7 m

- Minimum detectable object: 14 mm dia. (9 mm optical axis pitch)
- Detection height: 189 to 1125 mm



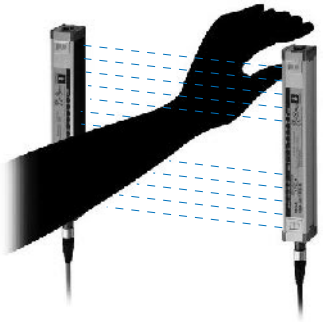
Hand protection

Safety light curtain

F3SN-A□□□□P25

Sensing distance : 10 m

- Minimum detectable object: 25 mm dia. (15 mm optical axis pitch)
- Detection height: 217 to 1822 mm



For presence inspection with a horizontal installation, types with minimum detectable object sizes of 40 mm (optical axis pitch: 30 mm) and 70 mm (optical axis pitch: 60 mm) can also be manufactured. (Please contact your dealer or us.)

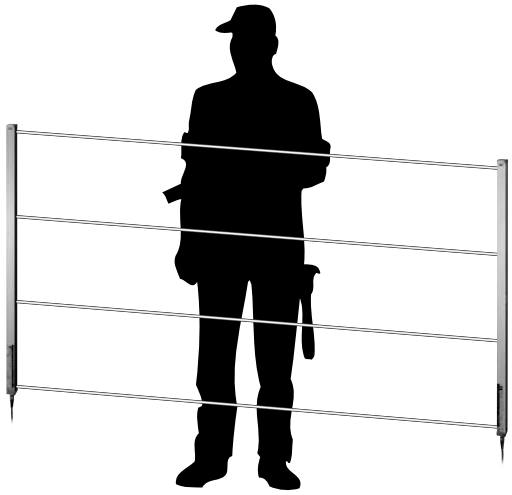
Body protection

Multi-beam safety curtain

F3SH-A09P03

Sensing distance : 10 m

- Number of optical axes: 4 beams (300 mm optical axis pitch)

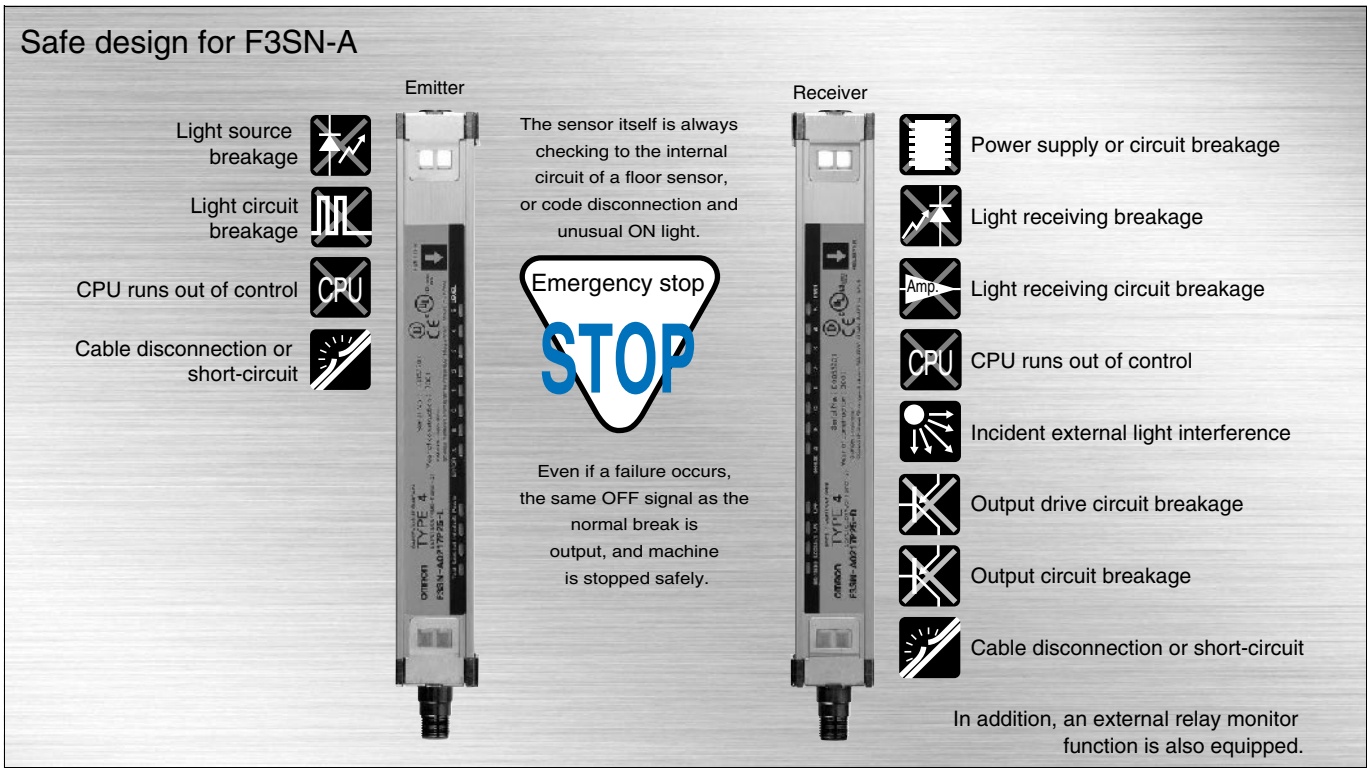


Features

A superior standard of safety design prevents machine accidents.

Wide-range implementation of fail-safe design.

Self-failure diagnosis triggers output shut off.

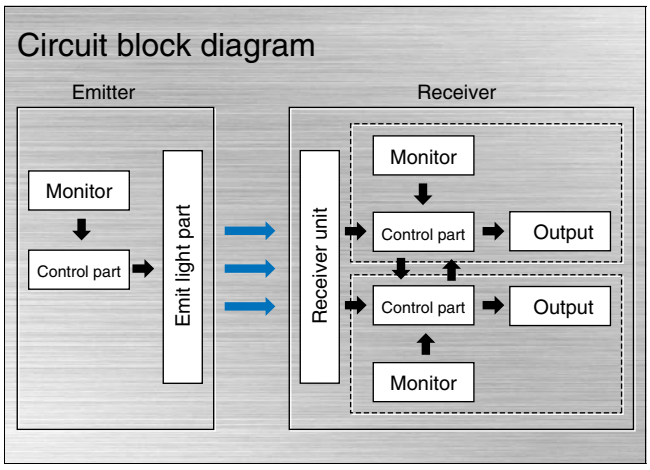


Technology-supported safety design

Safety is top priority based on the maximum standards of safety design and FMEA analysis.

Fail-safe design based on dual CPUs for mutual checking and duplex signal processing and output circuits. Relentless pursuit of safety based FMEA analysis * to prove safe operation.

* FMEA: Failure Mode and Effects Analysis



Meets global safety standards for safety sensors.

Type 4 sensors complying with IEC and EN standards

Complies with international standards IEC61496-1 and IEC61496-2, and EN standard EN61496-1, which are state-of-the-art "musts" for safety sensors.

Complies with EU directives

Certification of compliance with EC testing and EMC directives received from DEMKO and BG.

Received UL certification for models for the U.S. and Canada.

(Can be used in machines subject to OSHA rules and ANSI standards.)

Received UL listing and UL listing for Canadian safety standards based on UL508 and IEC61496-1/2. Can be used in machines subject to OSHA directives (29 CFR 1910.212), which are directives related to labor safety in the U.S. Meets also the requirements of ANSI/RIA R15.06-1999, a U.S. standard for industrial robots.

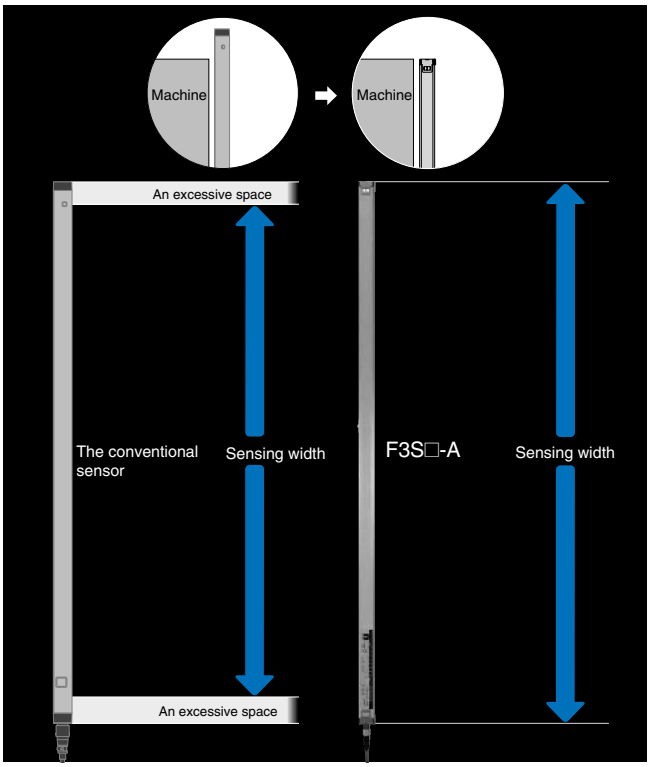
UL CE IEC61496-1 IEC61496-2 Type 4

Features

We provide the perfect size for use in hazardous areas.

A new concept that perfectly fits the needs of the user.

The detection height equals to the sensor length.
Excess space has been minimized.

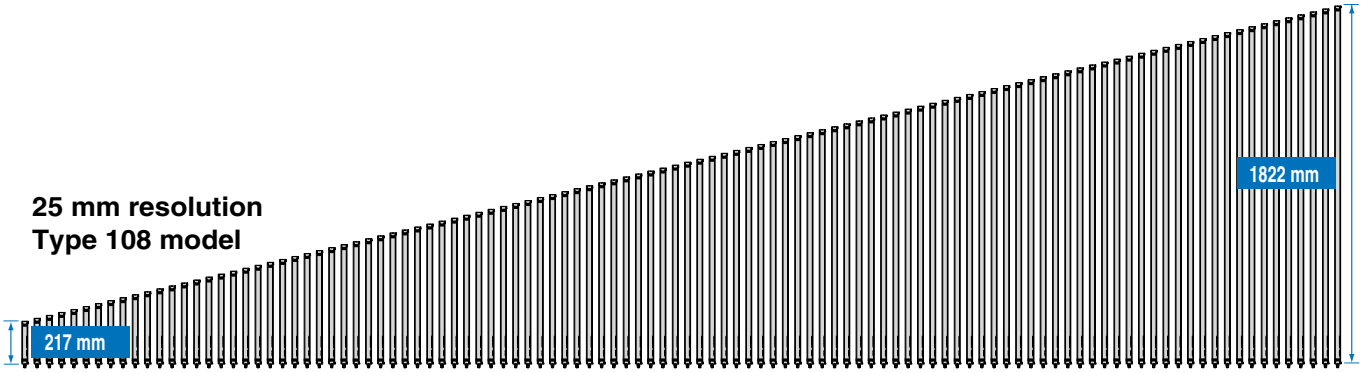


Up to 3 sets can be connected in series. Mutual interference can be prevented.

A standard type and a link-up type with a connector can be combined to connect up to 3 sets in series.

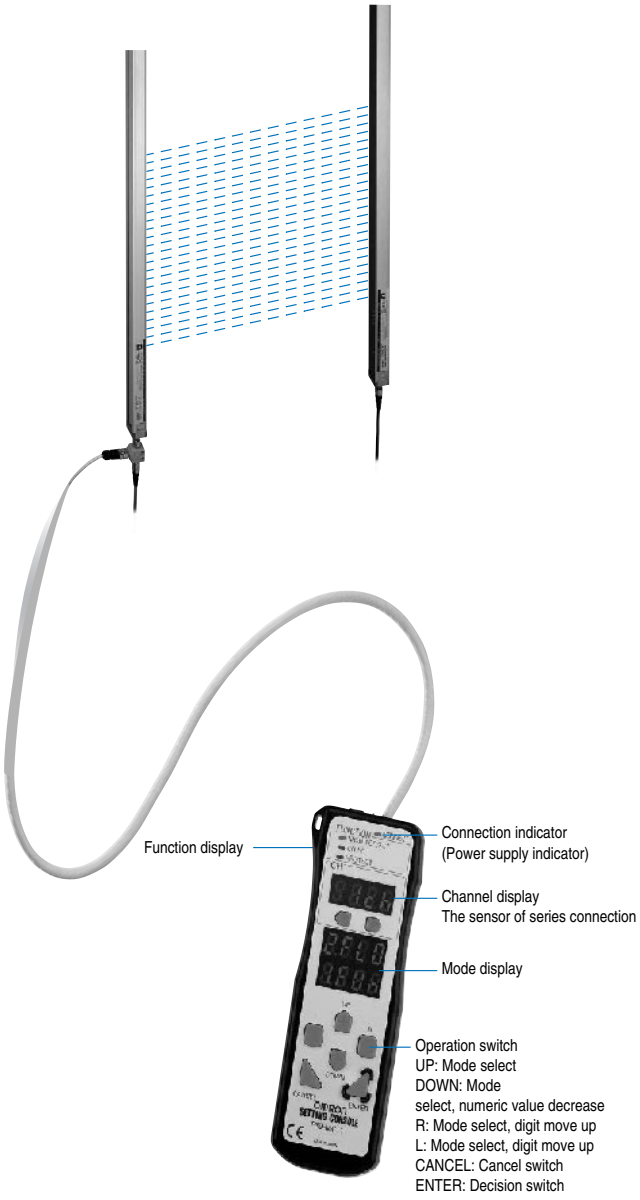
Note: When you order for a series connection type, please place an order with form-name F3 N-A □ □ □ □ P □ □ -01.

Select the optimum length



Features

The setting console--the first in the industry--allows you an easy and safe setting of various functions.



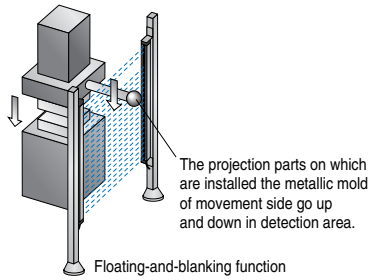
Includes two types of blanking functions

Blanking function for changing the detection pattern of the safety light curtain.

Basic pattern 1: Floating blanking function

This function allows you to disable an unspecified 1, 2, or 3 optical axes. If more than the set optical axes go Dark, the output shuts off.

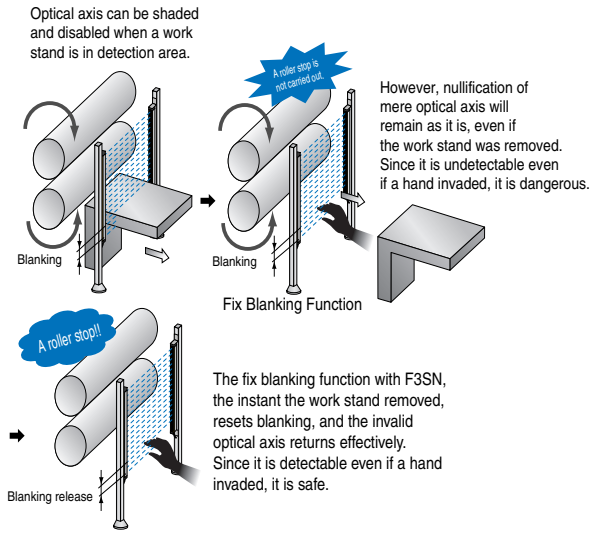
(Example of floating blanking function)



Basic pattern 2: Fixed blanking function

Specific optical axes are masked by teaching and disabled.

(Example of fixed blanking function)



Other functions to be set with the remote control

- Auxiliary outputs: Outputs such as ON at Dark, ON at Light, light intensity diagnosis, and lockout can be selected.
- Large indicator lamp outputs: large indicator lamp outputs can be selected from ON at Dark, ON at Light, light intensity diagnosis, and lockout.
- External device monitoring function: Allows you to monitor the contact external relays.
- Interlock function: Interlocks can be set at power-on and restart.
- Setting copy function: Allows you to copy the settings of one sensor to another sensor.
- Protect function: Changing of sensor settings can be prohibited and restricted.

F3SH-A
Multi-beam safety sensor

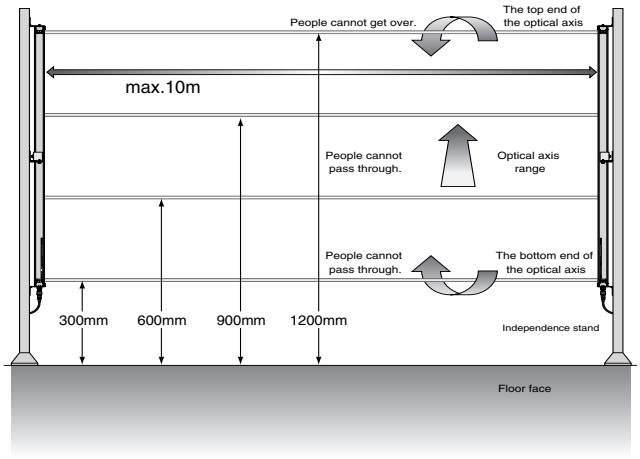
Recommended dimensions of EN standard for F3SH-A (4-optical axis multi-beam)
Human body detection achieved

4 optical axes at a 300 mm pitch. Detects break by entire body.

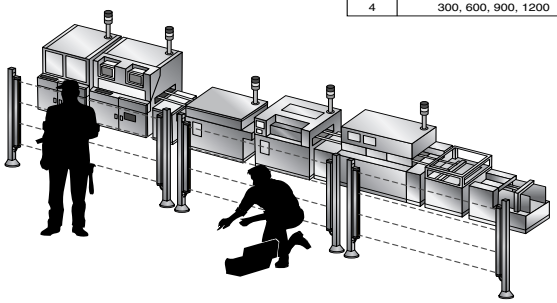
In EN Standard EN999 (machine safety: positioning of protective devices in relation to the approach speed of human body parts), the values in the following table are recommended as the most effective regarding the height from the reference surface (floor, etc.) of each optical axis of the 4 optical axis multi-beam sensor.

The optical axis pitch of the F3SH-A matches the recommended pitch, and, thus, in the installation shown in the following diagram, every type of intrusion is detected, including intrusion by passing under the lowest optical axis and intrusion by passing over the highest optical axis.

(Installation example based on EN999 recommended dimensions for multi-beam safety sensors)



The number of optical axis	Height from datum plane (floor etc.) (mm)
4	300, 600, 900, 1200



Easy safety application

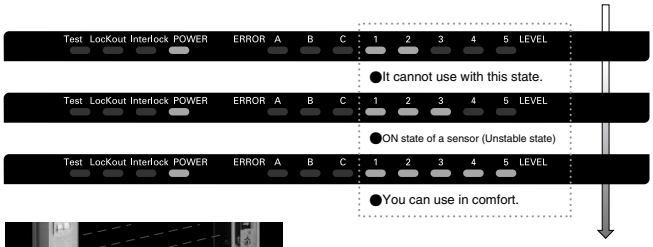
Various safety functions are implemented. Can be adapted to various safety circuit system configurations.

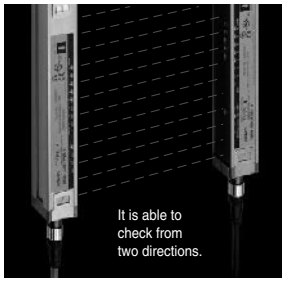
- Interlock function
- Auto reset / manual reset can be selected
- External device monitoring function

Equipped with LED bar for easy use.

Easy optical axis adjustment using LED displays. Enables certain installation.

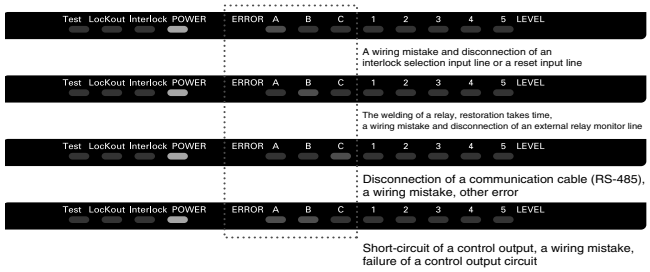
- Optical axis adjustment indicator (green only)





Error modes can be clearly indicated to provide a safety backup.

Error display example (red only)

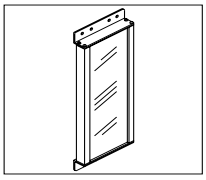


Full lineup of accessories (optional)

●Large-sized display indicator F39-A

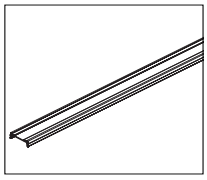
When connecting, a series connection model (model end number -01) is required.The setting console can select the kind of signal.

●Reflecting mirror F39-MDG



When the optical axis from an emitter is reflected at the angle of 90 degrees with using a mirror, the 2nd plane and the 3rd plane can be protected by one set of sensors. Sensing distance is lowered 15% per mirror.

●Spatter protection cover F39-HN



Ordering information

Sensors

Safety light curtain

Infrared ray

Minimum detection object	Optical axis pitch	Shape	Sensing distance	Number of optical axes	Detection width	Series connection, connector	Model*1
14 mm dia. (Finger protection)	9 mm		0.2 to 7m	21 to 125 (odd numbers only)	189 to 1,125 mm (18 mm each)	No	F3SN-A□□□□P14
						Yes	F3SN-A□□□□P14-01 *2
25 mm dia. (Hand protection)	15 mm		0.2 to 10m	13 to 120	217 to 1,822 mm (25 mm each)	No	F3SN-A□□□□P25
						Yes	F3SN-A□□□□P25-01

*1. □□□□ in the model name indicates the detection width (mm).
*2. F3SN-A□□□□P14-01is a customized model. For order placement, please contact your dealer or us.

Multi-beam safety sensor

Infrared ray

Optical axis pitch	Shape	Sensing distance	Number of optical axes	Distance between optical axes at each end	Series connection, connector	Model
30 mm (Body protection)		0.2 to 10m	4	900 mm	No	F3SH-A09P03
					Yes	F3SH-A09P03-01

Accessories (Order Separately)

Control unit

Shape	Output	Model
	Relay, 3a + 1b	F3SP-B1P

Setting console

Shape	Model	Accessories
	F39-MC11	Branch connector (1), connector cap (1), special cable (2 m), operation manual

One-side connector cable (for Emitter and receiver, 1 set of 2 cables)

Shape	Cable length	Specifications	Model
	3 m	M12 connector (8-pin)	F39-JC3A
	7 m		F39-JC7A
	10 m		F39-JC10A
	15 m		F39-JC15A

Two-side connector cable (for Emitter and receiver, 1 set of 2 cables)

Shape	Cable length	Specifications	Model	Application
	0.2 m	M12 connector (8-pin)	F39-JCR2B	Series connection or connection with F3SP-B1P
	3 m		F39-JC3B	
	7 m		F39-JC7B	Connection with F3SP-B1P *
	10 m		F39-JC10B	
	15 m		F39-JC15B	

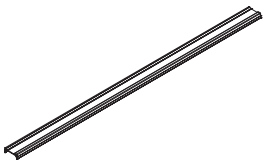
* Cannot be used for series connection.

Large indicator lamps (separate models for Emitter and receiver)

Shape	Specifications	Indicator color	Item	Model
	M12 connector, only for PNP output	Red	For emitter	F39-A01PR-L
			For receiver	F39-A01PR-D
		Green	For emitter	F39-A01PG-L
			For receiver	F39-A01PG-D

Note: For connection with series connection types (models ending with "-01"). Illumination timing (signal type) can be selected using the remote control.

Sputter protection covers (1 set of 2 covers for both Emitter and receiver)

Shape	Applicable models	Model
	F3SN-A□□□□P14	F39-HN□□□□-14
	F3SN-A□□□□P25 F3SN-A□□□□P25-01	F39-HN□□□□-25
	F3SH-A09P03	F39-HH09-03

Note: □□□□ in the model name indicates the 4-digit sensor detection width (in sensor models).

Refection mirror (15% sensing distance attenuation)

Mirror material	Width (mm)	Thickness (mm)	Length (mm)	Model
Glass mirror	125	31	310	F39-MDG0310
			460	F39-MDG0460
			607	F39-MDG0607
			750	F39-MDG0750
			907	F39-MDG0907
			1,057	F39-MDG1057
			1,207	F39-MDG1207
			1,357	F39-MDG1357
			1,500	F39-MDG1500
			1,657	F39-MDG1657

Note: Other sizes are available upon request

List of Safety Light Curtains

F3SN-A□□□□P14, F3SN-A□□□□P14-01

Model	Detection height	Number of optical axes
F3SN-A0189P14 (-01)	189	21
F3SN-A0207P14 (-01)	207	23
F3SN-A0225P14 (-01)	225	25
F3SN-A0243P14 (-01)	243	27
F3SN-A0261P14 (-01)	261	29
F3SN-A0279P14 (-01)	279	31
F3SN-A0297P14 (-01)	297	33
F3SN-A0315P14 (-01)	315	35
F3SN-A0333P14 (-01)	333	37
F3SN-A0351P14 (-01)	351	39
F3SN-A0369P14 (-01)	369	41
F3SN-A0387P14 (-01)	387	43
F3SN-A0405P14 (-01)	405	45
F3SN-A0423P14 (-01)	423	47
F3SN-A0441P14 (-01)	441	49
F3SN-A0459P14 (-01)	459	51
F3SN-A0477P14 (-01)	477	53
F3SN-A0495P14 (-01)	495	55

Model	Detection height	Number of optical axes
F3SN-A0513P14 (-01)	513	57
F3SN-A0531P14 (-01)	531	59
F3SN-A0549P14 (-01)	549	61
F3SN-A0567P14 (-01)	567	63
F3SN-A0585P14 (-01)	585	65
F3SN-A0603P14 (-01)	603	67
F3SN-A0621P14 (-01)	621	69
F3SN-A0639P14 (-01)	639	71
F3SN-A0657P14 (-01)	657	73
F3SN-A0675P14 (-01)	675	75
F3SN-A0693P14 (-01)	693	77
F3SN-A0711P14 (-01)	711	79
F3SN-A0729P14 (-01)	729	81
F3SN-A0747P14 (-01)	747	83
F3SN-A0765P14 (-01)	765	85
F3SN-A0783P14 (-01)	783	87
F3SN-A0801P14 (-01)	801	89
F3SN-A0819P14 (-01)	819	91

Model	Detection height	Number of optical axes
F3SN-A0837P14 (-01)	837	93
F3SN-A0855P14 (-01)	855	95
F3SN-A0873P14 (-01)	873	97
F3SN-A0891P14 (-01)	891	99
F3SN-A0909P14 (-01)	909	101
F3SN-A0927P14 (-01)	927	103
F3SN-A0945P14 (-01)	945	105
F3SN-A0963P14 (-01)	963	107
F3SN-A0981P14 (-01)	981	109
F3SN-A0999P14 (-01)	999	111
F3SN-A1017P14 (-01)	1,017	113
F3SN-A1035P14 (-01)	1,035	115
F3SN-A1053P14 (-01)	1,053	117
F3SN-A1071P14 (-01)	1,071	119
F3SN-A1089P14 (-01)	1,089	121
F3SN-A1107P14 (-01)	1,107	123

F3SN-A□□□□P25, F3SN-A□□□□P25-01

Model	Detection height	Number of optical axes
F3SN-A0217P25 (-01)	217	13
F3SN-A0232P25 (-01)	232	14
F3SN-A0247P25 (-01)	247	15
F3SN-A0262P25 (-01)	262	16
F3SN-A0277P25 (-01)	277	17
F3SN-A0292P25 (-01)	292	18
F3SN-A0307P25 (-01)	307	19
F3SN-A0322P25 (-01)	322	20
F3SN-A0337P25 (-01)	337	21
F3SN-A0352P25 (-01)	352	22
F3SN-A0367P25 (-01)	367	23
F3SN-A0382P25 (-01)	382	24
F3SN-A0397P25 (-01)	397	25
F3SN-A0412P25 (-01)	412	26
F3SN-A0427P25 (-01)	427	27
F3SN-A0442P25 (-01)	442	28
F3SN-A0457P25 (-01)	457	29
F3SN-A0472P25 (-01)	472	30
F3SN-A0487P25 (-01)	487	31
F3SN-A0502P25 (-01)	502	32
F3SN-A0517P25 (-01)	517	33
F3SN-A0532P25 (-01)	532	34
F3SN-A0547P25 (-01)	547	35
F3SN-A0562P25 (-01)	562	36
F3SN-A0577P25 (-01)	577	37
F3SN-A0592P25 (-01)	592	38
F3SN-A0607P25 (-01)	607	39
F3SN-A0622P25 (-01)	622	40
F3SN-A0637P25 (-01)	637	41
F3SN-A0652P25 (-01)	652	42
F3SN-A0667P25 (-01)	667	43
F3SN-A0682P25 (-01)	682	44
F3SN-A0697P25 (-01)	697	45
F3SN-A0712P25 (-01)	712	46
F3SN-A0727P25 (-01)	727	47
F3SN-A0742P25 (-01)	742	48

Model	Detection height	Number of optical axes
F3SN-A0757P25 (-01)	757	49
F3SN-A0772P25 (-01)	772	50
F3SN-A0787P25 (-01)	787	51
F3SN-A0802P25 (-01)	802	52
F3SN-A0817P25 (-01)	817	53
F3SN-A0832P25 (-01)	832	54
F3SN-A0847P25 (-01)	847	55
F3SN-A0862P25 (-01)	862	56
F3SN-A0877P25 (-01)	877	57
F3SN-A0892P25 (-01)	892	58
F3SN-A0907P25 (-01)	907	59
F3SN-A0922P25 (-01)	922	60
F3SN-A0937P25 (-01)	937	61
F3SN-A0952P25 (-01)	952	62
F3SN-A0967P25 (-01)	967	63
F3SN-A0982P25 (-01)	982	64
F3SN-A0997P25 (-01)	997	65
F3SN-A1012P25 (-01)	1,012	66
F3SN-A1027P25 (-01)	1,027	67
F3SN-A1042P25 (-01)	1,042	68
F3SN-A1057P25 (-01)	1,057	69
F3SN-A1072P25 (-01)	1,072	70
F3SN-A1087P25 (-01)	1,087	71
F3SN-A1102P25 (-01)	1,102	72
F3SN-A1117P25 (-01)	1,117	73
F3SN-A1132P25 (-01)	1,132	74
F3SN-A1147P25 (-01)	1,147	75
F3SN-A1162P25 (-01)	1,162	76
F3SN-A1177P25 (-01)	1,177	77
F3SN-A1192P25 (-01)	1,192	78
F3SN-A1207P25 (-01)	1,207	79
F3SN-A1222P25 (-01)	1,222	80
F3SN-A1237P25 (-01)	1,237	81
F3SN-A1252P25 (-01)	1,252	82
F3SN-A1267P25 (-01)	1,267	83
F3SN-A1282P25 (-01)	1,282	84

Model	Detection height	Number of optical axes
F3SN-A1297P25 (-01)	1,297	85
F3SN-A1312P25 (-01)	1,312	86
F3SN-A1327P25 (-01)	1,327	87
F3SN-A1342P25 (-01)	1,342	88
F3SN-A1357P25 (-01)	1,357	89
F3SN-A1372P25 (-01)	1,372	90
F3SN-A1387P25 (-01)	1,387	91
F3SN-A1402P25 (-01)	1,402	92
F3SN-A1417P25 (-01)	1,417	93
F3SN-A1432P25 (-01)	1,432	94
F3SN-A1447P25 (-01)	1,447	95
F3SN-A1462P25 (-01)	1,462	96
F3SN-A1477P25 (-01)	1,477	97
F3SN-A1492P25 (-01)	1,492	98
F3SN-A1507P25 (-01)	1,507	99
F3SN-A1522P25 (-01)	1,522	100
F3SN-A1537P25 (-01)	1,537	101
F3SN-A1552P25 (-01)	1,552	102
F3SN-A1567P25 (-01)	1,567	103
F3SN-A1582P25 (-01)	1,582	104
F3SN-A1597P25 (-01)	1,597	105
F3SN-A1612P25 (-01)	1,612	106
F3SN-A1627P25 (-01)	1,627	107
F3SN-A1642P25 (-01)	1,642	108
F3SN-A1657P25 (-01)	1,657	109
F3SN-A1672P25 (-01)	1,672	110
F3SN-A1687P25 (-01)	1,687	111
F3SN-A1702P25 (-01)	1,702	112
F3SN-A1717P25 (-01)	1,717	113
F3SN-A1732P25 (-01)	1,732	114
F3SN-A1747P25 (-01)	1,747	115
F3SN-A1762P25 (-01)	1,762	116
F3SN-A1777P25 (-01)	1,777	117
F3SN-A1792P25 (-01)	1,792	118
F3SN-A1807P25 (-01)	1,807	119
F3SN-A1822P25 (-01)	1,822	120

Highlighted products are prefered stock types

Rating/Performance (see the operation manual for details)

Sensors

Series connection, no connector	F3SN-A□□□□P14*1	F3SN-A□□□□P25	F3SH-A09P03
Series connection, with connector	F3SN-A□□□□P14-01*2	F3SN-A□□□□P25-01	F3SH-A09P03-01
Sensing distance	0.2 to 7 m	0.2 to 10 m	
Optical axis pitch (P)	9 mm	15 mm	300 mm
Number of optical axes (n)	21 to 125 (odd numbers only)	13 to 120	4
Detection width (PH)	189 to 1,125 mm PH = n x P	217 to 1,822 mm PH = (n - 1) x P + 37	---
Distance between optical axes at each end	---		900 mm
Min. sensing object	Opaque object, diameter of 14 mm	Opaque object, diameter of 25 mm	---
Effective opening angle (EAA)	Based on IEC61496-2. ±2.5° or less if detection distance is 3 m or more for both transmitter and receiver.		
Light source (wave length)	Infrared LED (870 nm)		
Supply voltage (Vs)	24 V DC ±10%, ripple (p-p) 10% or less		
Current (with no-load) Emitter	50 optical axes or less: 140 mA or less, 51 to 85 optical axes: 155 mA or less, 86 or more optical axes: 170 mA or less		140 mA max.
Current (with no-load) Receiver	50 optical axes or less: 100 mA or less, 51 to 85 optical axes: 110 mA or less, 86 or more optical axes: 120 mA or less		100 mA max.
Control output (OSSD)	PNP transistor outputs x2, load current 300 mA or less, residual voltage 2 V or less (excluding voltage drop due to cable extension)		
Auxiliary output (non-safety output)	PNP transistor outputs x1, load current 50 mA or less, residual voltage 2 V or less (excluding voltage drop due to cable extension)		
Outputs for large indicator lamps (non-safety outputs)	PNP transistor output x1, load current 40 mA or less, residual voltage 2 V or less (excluding voltage drop due to cable extension)		
Output operation mode	Control output: when light ON, auxiliary output: when dark ON (change possible using F39-MC11), outputs for large indicator lamps: light ON (change possible using F39-MC11)*3		
Test function	• Self test (when power is turned on and while power is on) • External test (illumination stop function using test input)		
Mutual interference prevention function	Time splitting illumination method using series connection • Connections: up to 3 sets • Total number of optical axes: up to 240		
Safety functions	• Auto reset / manual reset (interlock)*4 • External device monitoring • Fixed blanking*5 • Floating blanking		• Auto reset / manual reset (interlock) • External device monitoring
Protective circuits	Output load short circuit protection, reverse power connection protection		
Response time (when light is stable)	ON → OFF: 10 to 15.5 ms or less OFF → ON: 40 to 62 ms or less		ON → OFF: 10 ms or less OFF → ON: 40 ms or less
Startup time after power is turned on	1 s max.		
Ambient illuminance	Incandescent lamp: 3,000 lux max. Sunlight 10,000 lux max.		
Ambient temperature	Operating: -10°C to 55°C, Storage: -30°C to 70°C (with no icing or condensation)		
Ambient humidity	Operating/Storage: 35% to 95%RH (with no condensation)		
Insulation resistance	20 M Ω min. at 500 VDC		
Dielectric strength	1,000 VAC at 50/60 Hz for 1 minute		
Vibration	10 to 55 Hz, amplitude 0.7 mm, 20 sweeps in X, Y, and Z directions		
Shock	Peak amplitude: 100 m/s2 for 1,000 times each in X, Y, and Z directions		
Degree of protection	IEC Standard IP65		
Connection method	M12 connector type (8-pin)		
Weight (Packed state)	Weight (g) = (Detection width + 100) x 2 + a; when detection width is 189 to 738 mm, a = 1,300; when detection width is 747 to 1,402 mm, a = 1,700; when detection width is 1,417 to 1,822 mm, a = 2,100		
Material	Case: aluminum, end cap: diecast zinc, optical cover: PMMA resin (acrylic)		
Accessories	Test load*6, operation manual, error mode label, mounting clamps (upper/lower), mounting clamps (middle)*7		
Applicable standards	IEC61496-1, EN61496-1 Type 4 ESPE iElectro-Sensitive Protective Equipment) IEC61496-2 Type 4 AOPDiActive Opto-electronic Protective Devices)		

*1. □□□□ in the model name indicates the 4-digit detection width (mm). For the equation for the detection width, see the detection width column in the specifications. For example, if the pitch is 9 mm and there are 21 optical axes, PH = 9 mm x 21 optical axes = 189 mm, and the model is the F3SN-A0189P14.
*2. Customized model. For order placement, please contact your dealer.
*3. Type -01 only
*4. Start/restart interlock is initially set for manual restart. F39-MC11 permits to select start interlock only or restart interlock only.
*5. Initially not set. Setting possible with F39-MC11.
*6. Only included with F3SN.
*7. Middle clamps are only included with the following types. Overall length 640 to 1,280 mm or less: 1 set is included. Overall length over 1,280 mm: 2 sets

Accessories

Control unit

Item	Model	F3SP-B1P
Applicable sensor		F3SN-A, F3SH-A
Supply voltage		24 VDC ±10%
Power consumption		1.7 W DC or less (not including sensor current)
Operating time		100 ms or less (not including sensor response time)
Response time		10 ms or less (not including sensor response time)
Relay contact output	Number of contacts	3a + 1b
	Rated load	25 V AC 5 A (cosϕ=1), 30 V DC 5 A L/R = 0 ms
	Conventional thermal current	5A
	Maximum value of contact voltage	25 V AC, 60 V DC
Connection method	Between sensors	M12 connector (8-pin)
	Other Accessories	Terminal block
Weight (Packed state)		280 g
Accessories		Instruction manual

Note: ask for alternative control units: G9SB, G9SA

Setting console

Item / Model	F39-MC11
Applicable sensor	F3SN-A, F3SH-A
Supply voltage	24 V DC ±10% (supplied from sensor)
Connection method	Special cable (accessory)
Weight (Packed state)	360 g
Accessories	Branch connector (1), special cable (2 m), connector cap (1), operation manual

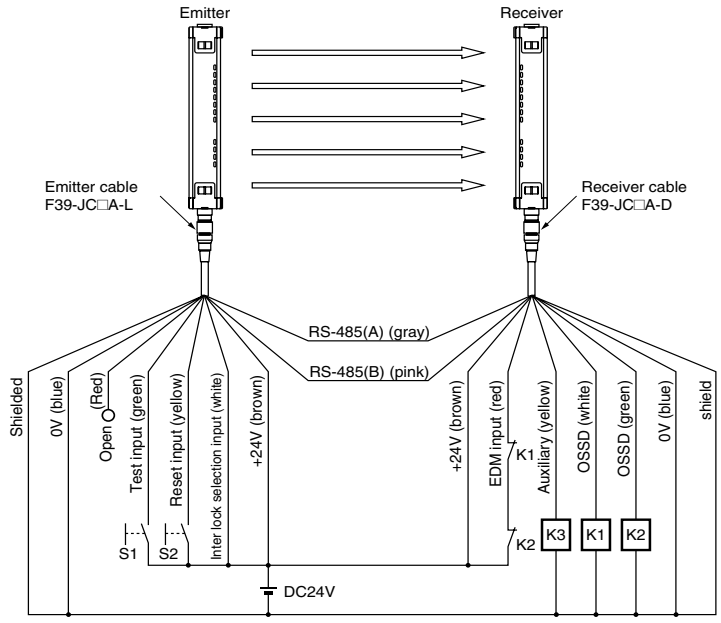
For details on the remote control, see the manual included with the product.

Large indicator lamps

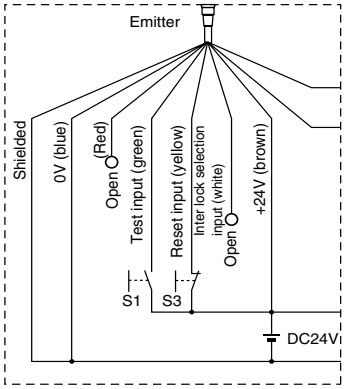
Item / Model	F39-A01PR-L (for projector) F39-A01PR-D (for light receiver)	F39-A01PG-L (for projector) F39-A01PG-D (for light receiver)
Applicable sensor	F3SN-A□□□□P□□-01 F3SH-A09P03-01	
Light source	Red LED	Green LED
Supply voltage	24 V DC ±10% (supplied by sensor)	
Current consumption	40 mA or less (supplied by sensor)	
Connection method	M12 connector (8-pin)	
Weight (Packed state)	80 g	

Connection

Using a manual reset function and an external device monitoring function



When using a auto reset function



S1: External test switch
S2: Interlock/lockout reset switch
S3: Lock-out reset switch (if the switch is not needed, connect to 24 V DC)
K1, K2: Relays for control of dangerous parts of machine.
K3: Load, PLC, etc. (for monitor)

Note: If you do not intend to use the external relay monitor, connect the auxiliary output that is set for dark: ON operation to the external relay monitor input, or use F39-MC11 to disable the external relay monitor function.