

- Lineup includes Type-4 Sensors (F3SN-A/F3SH-A) and Type-2 Sensors (F3SN-B) with IEC, EN, and JIS standard certification.
- USA UL compliance for applications for the USA or Canada.
- Protective height equals the Sensor length to perfectly meet user needs.
- Protective height: 189 to 1,822 mm
- Operating range: 7 or 10 m
- Setting Console enabling setting parameters for any model.
- LED bar for beam alignment or easy confirmation in error mode.
- A complete lineup of accessories.



Be sure to read the "Safety Precautions" on page 28 and the "Precautions for All Safety Sensors".

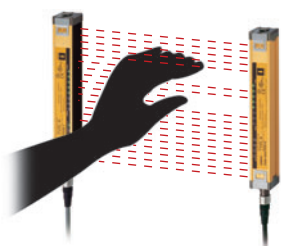
Features

Two Forms of Safety from OMRON: Safety Light Curtains and Multibeam Safety Sensors

Safety Light Curtains for Finger Protection

F3SN-A□□□□P14

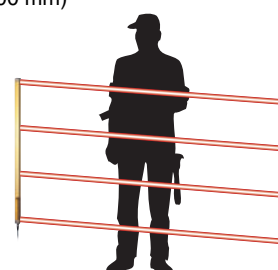
- Operating range: 7 m
- Smallest detectable object:
14 mm dia. (beam gap: 9 mm)
- Protective height: 189 to 1,125 mm



Multi-beam Safety Sensor for Body Protection

F3SH-A09P03

- Operating range: 10 m
- Number of beams: 4 (beam gap: 300 mm)



Presence Detection in Danger Zones (Horizontal Installation)

F3SN-A□□□□P40/P70

F3SN-B□□□□P40/P70

- Operating range: 10 m
- Smallest detectable object: 40 mm dia. (beam gap: 30 mm) or
70 mm dia. (beam gap: 60 mm)
- Protective height:
F3SN-A: 217 to 1,822 mm
F3SN-B: 217 to 1,777 mm

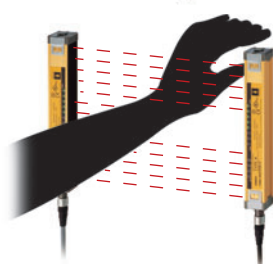


Safety Light Curtains for Hand Protection

F3SN-A□□□□P25

F3SN-B□□□□P25

- Operating range: 10 m
- Smallest detectable object:
25 mm dia. (beam gap: 15 mm)
- Protective height: 217 to 1,822 mm



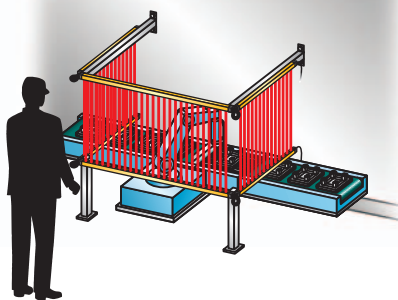
A New Concept to Meet User Needs

Connect Up To Three Sets in Series without Mutual Interference

Combine Standard Models with Linking Models with Connectors to connect up to three sets in series. Wiring is required only for one set instead of wiring all three sets, as would have been required previously, to enable protecting all sides of hazardous areas. Mutual interference protection is also provided.



Note: Use models with the following model number suffixes for series connection: -01, -03, -04, and -05



Many Connector Variations

Select the type of connector that best suits the machine. (Consult your OMRON representative.)

Standard: No model No. suffix	Model No. suffix: -01	Model No. suffix: -02	Model No. suffix: -03	Model No. suffix: -04	Model No. suffix: -05

Various Safety Functions Built into the Sensor. Supports Many Safety Circuit Configurations

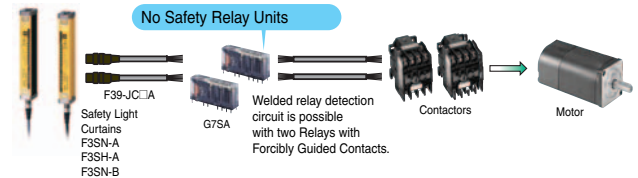
- Interlocks
- Auto-reset or manual reset
- External relay monitoring

Select the Safety Circuits for the Required Safety Standards

Build Circuits for Type 4 (F3SN-A/F3SH-A) or Type 2 (F3SN-B) with No Relay Units (2 Relays with Forcibly Guided Contacts)

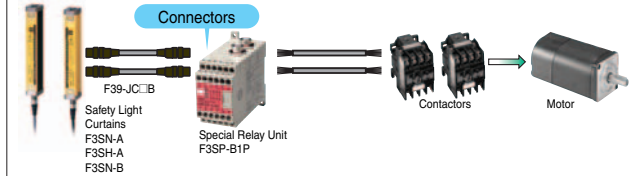
- Reduced Costs and Reduced Space Requirements

A built-in external relay monitor function eliminates the need for Safety Relay Units.



- Reduced Wiring and Easy Maintenance

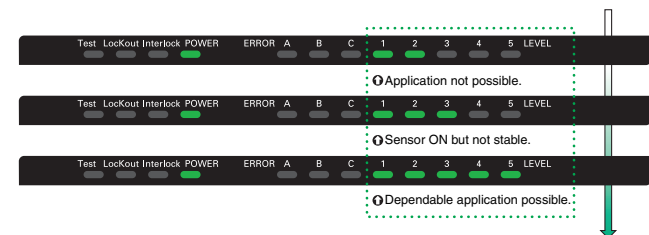
One-touch connection with connectors on both end to prevent wiring mistakes.



LED Bars for Easier Application

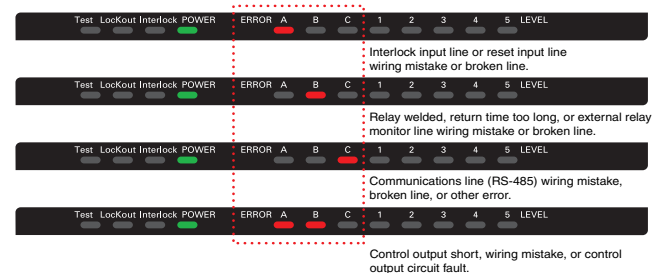
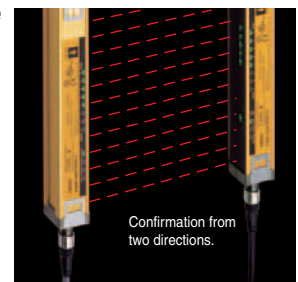
Align Beams with the LED Bar for Easier Installation

- Beam Alignment Indicators (Green Only)



Easily Discern Error Mode Displays to Back Up Safety

- Error Indication Example (Red Only)



Ordering Information

Main Units (Connecting Cables are not included with the Main Units. The connecting cables must be purchased separately.)

F3SN-A Safety Light Curtains (Type 4)

☐ Infrared

Detection capability	Beam gap	Appearance	Operating range	Number of beams	Protective height	Connector for series-connection	Model *1 *2
14 mm-dia. (for finger protection)	9 mm			21 to 125 (odd numbers only)	189 to 1125 mm (every 18 mm)	No	F3SN-A□□□□P14
						Yes	F3SN-A□□□□P14-01
25 mm-dia. (for hand protection)	15 mm			13 to 120	217 to 1822 mm (every 15 mm)	No	F3SN-A□□□□P25
						Yes	F3SN-A□□□□P25-01
40 mm-dia. (for presence protection)	30 mm			7 to 60	217 to 1807 mm	No	F3SN-A□□□□P40
						Yes	F3SN-A□□□□P40-01
70 mm-dia. (for presence protection)	60 mm			5 to 30	277 to 1777 mm	No	F3SN-A□□□□P70
						Yes	F3SN-A□□□□P70-01

*1. The □□□□ in the model numbers indicates the protective height (in mm). Refer to "Safety Light Curtain Model List" on page 4 for model number details.

*2. Safety Light Curtains with model numbers ending in -02 through -05, provided with different connector configurations, are also available as options. Refer to page 2 for details. Consult with your dealer or OMRON representative when ordering these models.

F3SN-B Safety Light Curtains (Type 2)

☐ Infrared

Detection capability	Beam gap	Appearance	Operating range	Number of beams	Protective height	Output *1	Connector for series-connection	Model *2 *3
25 mm-dia. (for hand protection)	15 mm			13 to 119 (non-continuous)	217 to 1807 mm	PNP transistor output	No	F3SN-B□□□□P25
							Yes	F3SN-B□□□□P25-01
40 mm-dia. (for presence detection)	30 mm			7 to 60 (non-continuous)	217 to 1807 mm		No	F3SN-B□□□□P40
							Yes	F3SN-B□□□□P40-01
70 mm-dia. (for presence detection)	60 mm			5 to 30	277 to 1777 mm		No	F3SN-B□□□□P70
							Yes	F3SN-B□□□□P70-01

*1. Models with NPN transistor outputs are also available as options. For details on the method for securing safety by using an NPN transistor for output, contact your OMRON representative.

*2. The □□□□ in the model numbers indicates the protective height (in mm). Refer to "Safety Light Curtain Model List" on page 4 for model number details.

*3. Safety Light Curtains with model numbers ending in -02 through -05, provided with different connector configurations, are also available as options. Refer to page 2 for details. Consult with your dealer or OMRON representative when ordering these models.

F3SH-A Multi-beam Safety Sensors (Type 4)

☐ Infrared

Beam gap	Appearance	Operating range	Number of beams	Outermost beam gap	Connector for series-connection	Model *
300 mm (for whole body protection)			4	900 mm	No	F3SH-A09P03
					Yes	F3SH-A09P03-01

* Safety Light Curtains of model numbers ending in -02 through -05, provided with different connector configurations, are also available as options. Refer to page 2 for details. Consult with your dealer or OMRON representative when ordering this model.

Safety Light Curtain Model List

 : F3SN-B□□□□P□□ safety light curtains are also available.

F3SN-A□□□□P14(-01)

Model	Protective height	Number of beams
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	Protective height	Number of beams
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	Protective height	Number of beams
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)	1017	113
F3SN-A1035P14(-01)	1035	115
F3SN-A1053P14(-01)	1053	117
F3SN-A1071P14(-01)	1071	119
F3SN-A1089P14(-01)	1089	121
F3SN-A1107P14(-01)	1107	123
F3SN-A1125P14(-01)	1125	125

F3SN-A□□□□P25(-01), F3SN-B□□□□P25(-01)

Model	Protective height	Number of beams
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	Protective height	Number of beams
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)	1012	66
F3SN-A1027P25(-01)	1027	67
F3SN-A1042P25(-01)	1042	68
F3SN-A1057P25(-01)	1057	69
F3SN-A1072P25(-01)	1072	70
F3SN-A1087P25(-01)	1087	71
F3SN-A1102P25(-01)	1102	72
F3SN-A1117P25(-01)	1117	73
F3SN-A1132P25(-01)	1132	74
F3SN-A1147P25(-01)	1147	75
F3SN-A1162P25(-01)	1162	76
F3SN-A1177P25(-01)	1177	77
F3SN-A1192P25(-01)	1192	78
F3SN-A1207P25(-01)	1207	79
F3SN-A1222P25(-01)	1222	80
F3SN-A1237P25(-01)	1237	81
F3SN-A1252P25(-01)	1252	82
F3SN-A1267P25(-01)	1267	83
F3SN-A1282P25(-01)	1282	84

Model	Protective height	Number of beams
F3SN-A1297P25(-01)	1297	85
F3SN-A1312P25(-01)	1312	86
F3SN-A1327P25(-01)	1327	87
F3SN-A1342P25(-01)	1342	88
F3SN-A1357P25(-01)	1357	89
F3SN-A1372P25(-01)	1372	90
F3SN-A1387P25(-01)	1387	91
F3SN-A1402P25(-01)	1402	92
F3SN-A1417P25(-01)	1417	93
F3SN-A1432P25(-01)	1432	94
F3SN-A1447P25(-01)	1447	95
F3SN-A1462P25(-01)	1462	96
F3SN-A1477P25(-01)	1477	97
F3SN-A1492P25(-01)	1492	98
F3SN-A1507P25(-01)	1507	99
F3SN-A1522P25(-01)	1522	100
F3SN-A1537P25(-01)	1537	101
F3SN-A1552P25(-01)	1552	102
F3SN-A1567P25(-01)	1567	103
F3SN-A1582P25(-01)	1582	104
F3SN-A1597P25(-01)	1597	105
F3SN-A1612P25(-01)	1612	106
F3SN-A1627P25(-01)	1627	107
F3SN-A1642P25(-01)	1642	108
F3SN-A1657P25(-01)	1657	109
F3SN-A1672P25(-01)	1672	110
F3SN-A1687P25(-01)	1687	111
F3SN-A1702P25(-01)	1702	112
F3SN-A1717P25(-01)	1717	113
F3SN-A1732P25(-01)	1732	114
F3SN-A1747P25(-01)	1747	115
F3SN-A1762P25(-01)	1762	116
F3SN-A1777P25(-01)	1777	117
F3SN-A1792P25(-01)	1792	118
F3SN-A1807P25(-01)	1807	119
F3SN-A1822P25(-01)	1822	120

F3SN-A□□□□P40(-01), F3SN-B□□□□P40(-01)

Model	Protective height	Number of beams
F3SN-A0217P40(-01)	217	7
F3SN-A0247P40(-01)	247	8
F3SN-A0277P40(-01)	277	9
F3SN-A0307P40(-01)	307	10
F3SN-A0337P40(-01)	337	11
F3SN-A0367P40(-01)	367	12
F3SN-A0397P40(-01)	397	13
F3SN-A0427P40(-01)	427	14
F3SN-A0457P40(-01)	457	15
F3SN-A0487P40(-01)	487	16
F3SN-A0517P40(-01)	517	17
F3SN-A0547P40(-01)	547	18
F3SN-A0577P40(-01)	577	19
F3SN-A0607P40(-01)	607	20
F3SN-A0637P40(-01)	637	21
F3SN-A0667P40(-01)	667	22
F3SN-A0697P40(-01)	697	23
F3SN-A0727P40(-01)	727	24
F3SN-A0757P40(-01)	757	25
F3SN-A0787P40(-01)	787	26
F3SN-A0817P40(-01)	817	27
F3SN-A0847P40(-01)	847	28
F3SN-A0877P40(-01)	877	29
F3SN-A0907P40(-01)	907	30
F3SN-A0937P40(-01)	937	31
F3SN-A0967P40(-01)	967	32
F3SN-A0997P40(-01)	997	33

Model	Protective height	Number of beams
F3SN-A1027P40(-01)	1027	34
F3SN-A1057P40(-01)	1057	35
F3SN-A1087P40(-01)	1087	36
F3SN-A1117P40(-01)	1117	37
F3SN-A1147P40(-01)	1147	38
F3SN-A1177P40(-01)	1177	39
F3SN-A1207P40(-01)	1207	40
F3SN-A1237P40(-01)	1237	41
F3SN-A1267P40(-01)	1267	42
F3SN-A1297P40(-01)	1297	43
F3SN-A1327P40(-01)	1327	44
F3SN-A1357P40(-01)	1357	45
F3SN-A1387P40(-01)	1387	46
F3SN-A1417P40(-01)	1417	47
F3SN-A1447P40(-01)	1447	48
F3SN-A1477P40(-01)	1477	49
F3SN-A1507P40(-01)	1507	50
F3SN-A1537P40(-01)	1537	51
F3SN-A1567P40(-01)	1567	52
F3SN-A1597P40(-01)	1597	53
F3SN-A1627P40(-01)	1627	54
F3SN-A1657P40(-01)	1657	55
F3SN-A1687P40(-01)	1687	56
F3SN-A1717P40(-01)	1717	57
F3SN-A1747P40(-01)	1747	58
F3SN-A1777P40(-01)	1777	59
F3SN-A1807P40(-01)	1807	60

F3SN-A□□□□P70(-01), F3SN-B□□□□P70(-01)

Model	Protective height	Number of beams
F3SN-A0277P70(-01)	277	5
F3SN-A0337P70(-01)	337	6
F3SN-A0397P70(-01)	397	7
F3SN-A0457P70(-01)	457	8
F3SN-A0517P70(-01)	517	9
F3SN-A0577P70(-01)	577	10
F3SN-A0637P70(-01)	637	11
F3SN-A0697P70(-01)	697	12
F3SN-A0757P70(-01)	757	13
F3SN-A0817P70(-01)	817	14
F3SN-A0877P70(-01)	877	15
F3SN-A0937P70(-01)	937	16
F3SN-A0997P70(-01)	997	17
F3SN-A1057P70(-01)	1057	18
F3SN-A1117P70(-01)	1117	19
F3SN-A1177P70(-01)	1177	20
F3SN-A1237P70(-01)	1237	21
F3SN-A1297P70(-01)	1297	22
F3SN-A1357P70(-01)	1357	23
F3SN-A1417P70(-01)	1417	24
F3SN-A1477P70(-01)	1477	25
F3SN-A1537P70(-01)	1537	26
F3SN-A1597P70(-01)	1597	27
F3SN-A1657P70(-01)	1657	28
F3SN-A1717P70(-01)	1717	29
F3SN-A1777P70(-01)	1777	30

Accessories (Optional)

Control Unit

Appearance	Output	Model	Remarks
	Relay, 3NO + 1NC	F3SP-B1P	For connection with the F3SN-A, F3SN-B, and F3SH-A, use F39-JC□B cables fitted with connectors at both ends.

OMRON offers many Safety Application Controllers to help you build safety circuits.
Refer to Safety Application Controller Product Selection and specifications.

Setting Console

Appearance	Model	Accessories
	F39-MC11	Branching Connector (1), Connector Cap (1), Special Cable (2 m), Instruction Manual

Maintenance Tool *

Appearance	Model	Applicable Sensors	Accessories
	F39-MT11	F3SN-A series F3SN-B series F3SH-A series	Branching Connector (1), Connector Cap (1), Special Cable (2 m), Special Cable with Plug (0.3 m), Instruction Manual

* For detail, see the product datasheet (Cat. No. E355).

Branching Connector

Appearance	Model	Remarks
	F39-CN1	Purchase this connector when needed additionally for installing the F39-MC11.

Cable with Connector on One End (for Emitter and Receiver Set)

Appearance	Cable length	Specification	Model
	0.5 m	M12 connector (8 pin)	F39-JCR5A
	3 m		F39-JC3A
	7 m		F39-JC7A
	10 m		F39-JC10A
	15 m		F39-JC15A

Cables with Connectors on Both Ends (for Emitter and Receiver Set)

Appearance	Cable length	Specification	Model	Application
	0.2 m	M12 connector (8 pins)	F39-JCR2B	Series connection or connection with F3SP-B1P
	0.5 m		F39-JCR5B	
	1 m		F39-JC1B	
	3 m		F39-JC3B	
	5 m		F39-JC5B	Connection with F3SP-B1P *1
	7 m		F39-JC7B	
	10 m		F39-JC10B	
	15 m		F39-JC15B	
	20 m		F39-JC20B	
	30 m		F39-JC30B	
	40 m		F39-JC40B	
	0.2 m	M12 connector (8 pins)	F39-JCR2C	Connection with G9SA-300-SC *1 *2
	1 m		F39-JC1C	
	3 m		F39-JC3C	
	7 m		F39-JC7C	
	10 m		F39-JC10C	
	15 m		F39-JC15C	

*1. Cannot be used for series-connection purpose.

*2. When two or more cables have to be used for connection with the G9SA-300-SC, connect the necessary number of F39-JC□C cables to one F39-JC□C cable.

(Example) When a 35 m long cable is required, connect two F39-JC10B cables to one F39-JC15C.

External Indicators (Separate Models for Emitters and Receivers)

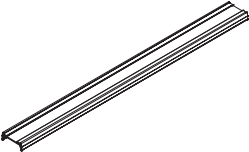
Appearance	Specification	Indicator	Type	Model
	M12 connector for PNP output	Red	Emitter	F39-A01PR-L
			Receiver	F39-A01PR-D
		Green	Emitter	F39-A01PG-L
			Receiver	F39-A01PG-D

Note: These indicators are used for connecting with series-connection type emitters/receivers (models ending in -01). (The Indicator must be secured separately for models ending in -04 or -05.) The desired turn-ON timing (type of signal) can be selected on setting console.

Mirrors (Reduce Operating Range by 12% with Each Unit)

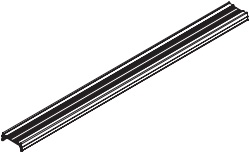
Mirror material	Width (mm)	Depth (mm)	Length (mm)	Model
Glass mirror	145	32	406	F39-MLG0406
			610	F39-MLG0610
			711	F39-MLG0711
			914	F39-MLG0914
			1,067	F39-MLG1067
			1,219	F39-MLG1219
			1,422	F39-MLG1422
			1,626	F39-MLG1626
			1,830	F39-MLG1830
			2,134	F39-MLG2134

Spatter Protection Covers (Include Two Pieces for Emitter and Receiver) (Reduces Operating Range by 10% with Each Unit)

Appearance	Applicable sensor	Model
	F3SN-A□□□□P14	F39-HN□□□□-14
	F3SN-A□□□□P25(-01)	F39-HN□□□□-25
	F3SN-A□□□□P40(-01)	
	F3SN-A□□□□P70(-01)	
	F3SN-B□□□□P25	
	F3SN-B□□□□P40	
	F3SN-B□□□□P70	
	F3SH-A09P03(-01)	F39-HH09-03

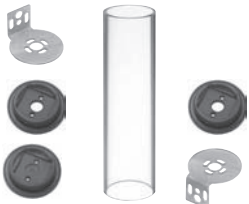
Note: The same 4-digit numbers as the protective heights (□□□□ in the light curtain type names) are substituted by □□□□ in the model names.

Spatter Protection Slit Covers (Include Two Pieces for Emitter and Receiver) *

Appearance	Applicable sensor	Model	
		Slit width: 1.15 mm	Slit width: 0.6 mm
	F3SN-A□□□□P14(-01)	F39-HS□□□□A-14	F39-HS□□□□B-14
	F3SN-A□□□□P25(-01)	F39-HS□□□□A-25	F39-HS□□□□B-25
	F3SN-A□□□□P40(-01)		
	F3SN-A□□□□P70(-01)		
	F3SN-B□□□□P25		
	F3SN-B□□□□P40		
	F3SN-B□□□□P70		
	F3SH-A09P03(-01)	F39-HSH09A-03	F39-HSH09B-03

* Operating range will decrease substantially. Refer to "Specifications" on page 12 for details.

Environment-resistant Enclosures (Package of a Pipe, Gasket, and Bracket) *

Appearance	Applicable sensor	Model
	F3SN-A□□□□P14(-01)	F39-HP□□□□-14
	F3SN-A□□□□P25(-01)	F39-HP□□□□-25
	F3SN-A□□□□P40(-01)	
	F3SN-A□□□□P70(-01)	
	F3SN-B□□□□P25	
	F3SN-B□□□□P40	
	F3SN-B□□□□P70	
	F3SH-A09P03(-01)	F39-HPH09-03

* Purchase 2 sets when using both an emitter and a receiver.

Multi-beam Sensor Support Stands/Mirror Stands

Appearance	Specification	Model	Remarks
	Stand unit Materials Base:STKM (base) SUS304 (leaf spring) Pipe, bolts and nuts: SUS304 Weight: 11.8 kg	F39-ST1	Minimum order quantity: 1 pc. (In total, 2 stands are required for each F3SH-A: one for the emitter and the other for the receiver.)
	Mounting bracket Materials: Aluminum Weight: 250 g	F39-L22	Minimum order quantity: 1 pc. (In total, 6 brackets are required for each F3SH-A: 3 units each for emitter and receiver. These brackets are not required for the F39-MLG series reflection mirrors, since these mirrors are supplied together with a specially designed adapter.)

Mounting Brackets for Sensors (Optional)

Appearance	Specification	Model	Remarks
	Free-location bracket Materials: Zinc die-cast (zinc plating) Note: Not provided with an angle deflection mechanism for beam control.	F39-L19	Minimum order quantity: 1 pc.
	Free-location bracket Materials Sensor fixing element: Zinc die-cast (zinc plating) Mounting bracket: Iron (zinc plating) Note: Provided with an angle deflection mechanism for beam control	F39-L20	Minimum order quantity: 1 pc.

* Use these brackets for sensors having an operating range where no intermediate bracket is required (with an operating range of less than 640 mm).

Test Rods (Optional)

Appearance	Applicable sensor	Specification	Model
	F3SN-A□□□□P14(-01)	14 mm-dia. (provided with the sensor)	F39-TR14
		Used for checking the setting condition of single-beam floating blanking	F39-TR23
		Used for checking the setting condition of two-beam floating blanking	F39-TR32
	F3SN-A□□□□P25(-01)	25 mm-dia. (provided with the sensor)	F39-TR25 *1
		Used for checking the setting condition of single-beam floating blanking	F39-TR40 *2

*1. Also provided with the F3SN-B□□□□P25.

*2. Also provided with the F3SN-A□□□□P40 and F3SN-B□□□□P40.

Specifications (For details, refer to the instruction manual.)

Main Units

F3SN-A/F3SH-A

Model *8	Stand- alone	F3SN-A□□□□P14 *1	F3SN-A□□□□P25 *1	F3SN-A□□□□P40 *1	F3SN-A□□□□P70 *1	F3SH-A09P03
Item	Series connection	F3SN-A□□□□P14-01 *1 *2	F3SN-A□□□□P25-01 *1	F3SN-A□□□□P40-01 *1	F3SN-A□□□□P70-01 *1	F3SH-A09P03-01
Sensor type		Type 4 Safety Light Curtain				
Setting tool connection		Connectable				
Safety category		Category 4, 3, 2, 1, or B				
Detection capability		Opaque objects: 14 mm in diameter	Opaque objects: 25 mm in diameter	Opaque objects: 40 mm in diameter	Opaque objects: 70 mm in diameter	---
Beam gap (P)		9 mm	15 mm	30 mm	60 mm	300 mm
Number of beams (n)		21 to 125 (odd numbers only)	13 to 120	7 to 60	5 to 30	4
Protective height (PH)		189 to 1125 mm PH = n × P	217 to 1822 mm PH = (n – 1) × P + 37	217 to 1807 mm PH = (n – 1) × P + 37	277 to 1777 mm PH = (n – 1) × P + 37	---
Outermost beam gap		---				900 mm
Lens diameter		9 mm × 4.6 mm	Diameter 9 mm			
Operating range		0.2 to 7 m	0.2 to 10 m			
Response time (under stable light incident condition)		ON to OFF: 10 to 15.5 ms max. OFF to ON: 40 to 62 ms max.				ON to OFF: 10 ms max. OFF to ON: 40 ms max.
Startup waiting time		1 s max.				
Power supply voltage (Vs)		24 VDC ±10% (ripple p-p 10% max.)				
Current consumption (no load)	Emitter	Up to 50 beams: 140 mA max., 51 to 85 beams: 155 mA max., 86 beams and more: 170 mA max.				140 mA max.
	Receiver	Up to 50 beams: 100 mA max., 51 to 85 beams: 110 mA max., 86 beams and more: 120 mA max.				100 mA max.
Light source (emitted wavelength)		Infrared LED (870 nm)				
Effective aperture angle (EAA)		Within ±2.5° for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2				
Control 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 0.075 μ F, leak current 2 mA max.				
Auxiliary output (non-safety output)		One PNP transistor output, load current 50 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension)				
External indicator output (non-safety output) *3		One PNP transistor output, load current 40 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension)				
Output operation mode		Control output: Light-ON Auxiliary output: Dark-ON (can be changed by the F39-MC11) External indicator output: Light-ON (can be changed by the F39-MC11) *3				
Input voltage		Test input, interlock selection input, reset input, and external relay monitor input voltages; ON voltage: 9 to 24 V (with a sink current 3 mA max.), OFF voltage: 0 to 1.5 V or open				
Indicators	Emitter	Power indicator (green), interlock indicator (yellow), lockout indicator (red), test indicator (orange), error mode indicator (3 red), light intensity level indicator (green: 5 levels)				
	Receiver	OFF-state indicator (red), ON-state indicator (green), lockout indicator (red), blanking indicator (green: F3SN-A only), Power indicator (green: F3SH-A only), error mode indicator (3 red), light intensity level indicator (green: 5 levels)				
Mutual interference prevention function *3		Time-shared beam projection system by series connection				
Series connections		• Number of series connected light curtains: Up to 3 sets • Number of beams: Up to 240 beams • Length of the series connection cable: 3 m max.				
Test functions		• Self test (when power is turned ON and while power is supplied, one cycle during response time) • External test (emission stop function by test input)				
Safety functions		• Auto-reset/manual reset (interlock) *4 • EDM (External Device Monitor) • Fixed blanking *5 • Floating blanking *5				• Auto-reset/manual reset (interlock) *4 • EDM (External Device Monitor)
Connection method		M12 connector (8 pins)				
Protective circuits		Output short-circuit protection, power supply reverse polarity protection				
Ambient temperature		Operating: –10 to 55°C, storage: –30 to 70°C (with no icing or condensation)				
Ambient humidity		Operating/storage: 35% to 95% (with no condensation)				
Ambient operating light intensity		Incandescent lamp: 3000 lx max. (light intensity on the receiver surface) Sunlight: 10000 lx max. (light intensity on the receiver surface)				
Insulation resistance		20 MΩ min. (at 500 VDC)				
Dielectric strength		1000 VAC 50/60 Hz 1 min.				
Degree of protection		IEC Standard IP65				
Vibration resistance		Malfunction: 10 to 55 Hz, 0.7-mm double amplitude, 20 sweeps in X, Y and Z directions				
Shock resistance		Malfunction: 100 m/s², 1000 times in X, Y and Z directions				

Model *8	Stand- alone	F3SN-A□□□□P14 *1	F3SN-A□□□□P25 *1	F3SN-A□□□□P40 *1	F3SN-A□□□□P70 *1	F3SH-A09P03
Item	Series connection	F3SN-A□□□□P14-01 *1 *2	F3SN-A□□□□P25-01 *1	F3SN-A□□□□P40-01 *1	F3SN-A□□□□P70-01 *1	F3SH-A09P03-01
Materials		Case: Aluminum, end cap: Zinc die-cast, optical cover: PMMA (acrylic resin), Cable: Oil-resistant PVC				
Weight (packed state)		Weight (g) = (Detection width) × 2.4 + α + β Detection width of 189 to 639 mm: α = 700, Detection width of 652 to 1,267 mm: α = 800, Detection width of 1,282 to 1,822 mm: α = 900, Model with no suffix or -01: β = 0, Model with suffix -02, -03, or -05: β = 100, Model with suffix -04: β = 200				
Accessories		Test rod *6, instruction manual, error mode label, mounting brackets (top and bottom), mounting brackets (intermediate) *7				
Applicable standards		IEC61496-1, EN61496-1 Type 4 ESPE (Electro-Sensitive Protective Equipment) IEC61496-2 Type 4 AOPD (Active Opto-electronic Protective Devices)				

*1. The 4 digits in □□□□ in the model number represent the protective height. Use the formula given in the information on protective height specifications to calculate the height.

For example, if the beam gap is 9 mm, and the No. of beams is 21, the protective height will be $9 \times 21 = 189$ mm. The model with this protective height is F3SN-A0189P14.

*2. F3SN-A□□□□P14-01 is a customized model. Consult with your dealer or OMRON representative when ordering this model.

*3. Only models ending in -01, -03, -04, or -05 have this output and functionality.

*4. For the factory setting, the manual reset mode is set to the "start/restart" interlock.

Using the F39-MC11 can select either the start interlock or the restart interlock.

*5. For the factory setting, the function is not set. It can be enabled with the F39-MC11.

*6. Not provided with the F3SN-A□□□□P70 and F3SH-A.

*7. The intermediate mounting bracket is supplied with the following types:

Types which have the total length of the light curtain from 640 mm to 1280 mm: 1 set for each of emitter and receiver.

Types which have the total length of the light curtain over 1280 mm: 2 sets for each of emitter and receiver.

*8. Models with different connector configurations are also available as options. Refer to "Many Connector Variations" on page 2.

F3SN-B (Different from specifications of F3SN-A)

Model *6		F3SN-B P25	F3SN-B P40	F3SN-B P70
Item				
Sensor type		Type 2 Safety Light Curtain		
Setting tool connection		Not connectable		
Safety category		Category 2, 1, or B		
Detection capability		Opaque objects: 25 mm in diameter	Opaque objects: 40 mm in diameter	Opaque objects: 70 mm in diameter
Beam gap (P)		15 mm	30 mm	60 mm
Number of beams (n)		13 to 119 (noncontinuous)	7 to 60 (noncontinuous)	5 to 30
Protective height (PH)		217 to 1807 mm $PH = (n - 1) \times P + 37 \text{ mm}$	217 to 1807 mm $PH = (n - 1) \times P + 37 \text{ mm}$	277 to 1777 mm $PH = (n - 1) \times P + 37 \text{ mm}$
Lens diameter		Diameter 9 mm		
Operating range		0.2 to 10.0 m		
Response time (under stable light incident condition)		ON to OFF: 10 to 15 ms max. OFF to ON: 40 to 60 ms max.		
Startup waiting time		1 s max.		
Power supply voltage (Vs)		24 VDC $\pm 10\%$ (ripple p-p 10% max.)		
Current consumption (no load)	Emitter	Up to 50 beams: 140 mA max., 51 to 85 beams: 155 mA max., 86 beams and more: 170 mA max.		
	Receiver	Up to 50 beams: 100 mA max., 51 to 85 beams: 110 mA max., 86 beams and more: 120 mA max.		
Light source (emitted wavelength)		Infrared LED (870 nm)		
Effective aperture angle (EAA)		Within $\pm 5^\circ$ for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2		
Control outputs (OSSD) *1		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 0.075 μ F, leak current 2 mA max.		
Auxiliary output (non-safety output)		One PNP transistor output, load current 50 mA max., residual voltage 2 V max. (except for voltage drop due to cable extension)		
Output operation mode *1		Control output: Light-ON, Auxiliary output: Dark-ON		
Input voltage		For test input, interlock selection input, reset input, and external relay monitor input voltages; ON voltage: 9 to 24 V (sink current: 3 mA max.), OFF voltage: 0 to 1.5 V or open		
Indicators	Emitter	Power indicator (green), interlock indicator (yellow), lockout indicator (red), test indicator (orange), error mode indicator (3 red), light intensity level indicator (green: 5 levels)		
	Receiver	OFF-state indicator (red), ON-state indicator (green), lockout indicator (red), Optional function indicator (green), error mode indicator (3 red), light intensity level indicator (green: 5 levels)		
Mutual interference prevention function		Time-shared beam projection system by series connection		
Series connections		- Number of series connected light curtains: Up to 3 sets - Number of beams: Up to 240 beams - Length of the series connection cable: 3 m max.		
Test functions		- Self test (when power is ON and period is 1 s or less) - External test (light emission stop function by test input)		
Safety functions *2 *3		- Auto-reset/manual reset (start/restart interlock) - EDM (External Device Monitor)		
Connection method		M12 connector (8 pins)		
Protective circuits		Output short-circuit protection, reverse polarity protection		
Ambient temperature		Operating: -10 to 55°C , storage: -30 to 70°C (with no icing or condensation)		
Ambient humidity		Operating/storage: 35% to 95% (with no condensation)		
Ambient operating light intensity		Incandescent lamp: 3000 lx max. (light intensity on the receiver surface) Sunlight: 10000 lx max. (light intensity on the receiver surface)		
Insulation resistance		20 M Ω min. (at 500 VDC)		
Dielectric strength		1000 VAC 50/60 Hz 1 min.		
Degree of protection		IEC Standard IP65		
Vibration resistance		Malfunction: 10 to 55 Hz, 0.7-mm double amplitude, 20 sweeps in X, Y and Z directions		
Shock resistance		Malfunction: 100 m/s ² , 1000 times in X, Y and Z directions		
Materials		Case: Aluminum, end cap: Zinc die-cast, optical cover: PMMA (Acrylic resin)		
Weight (packed state)		Weight (g) = (Detection width) $\times 2.4 + \alpha + \beta$ Detection width of 189 to 639 mm: $\alpha = 700$, Detection width of 652 to 1,267 mm: $\alpha = 800$, Detection width of 1,282 to 1,822 mm: $\alpha = 900$, Model with no suffix or -01: $\beta = 0$, Model with suffix -02, -03, or -05: $\beta = 100$, Model with suffix -04: $\beta = 200$		
Accessories		Test rod *4, instruction manual, mounting brackets (top and bottom), mounting brackets (intermediate) *5, error mode label		
Applicable standards		IEC61496-1, EN61496-1 Type 2 ESPE (Electro-Sensitive Protective Equipment) IEC61496-2 Type 2 AOPD (Active Opto-electronic Protective Devices)		

*1. A safety circuit has been adopted. Please note that the control logic (ON/OFF) may differ from conventionally used logic.

*2. The manual reset mode is set to the "start/restart" interlock. It is impossible to select interlock only or restart interlock only.

*3. No floating blanking or fixed blanking function is provided.

*4. Not provided with the F3SN-B P70.

*5. The intermediate mounting bracket is supplied with the following types:

Types which have the total length of the light curtain from 640 mm to 1280 mm: 1 set for each of emitter and receiver.

Types which have the total length of the light curtain over 1280 mm: 2 sets for each of emitter and receiver.

*6. Models with different connector configurations are also available as options. Refer to "Many Connector Variations" on page 2.

Accessories

Control Units

Item		Model	F3SP-B1P	G9SA-300-SC *
Applicable sensor			F3SN-A, F3SN-B, F3SH-A	
Supply voltage			24 VDC $\pm 10\%$	
Power consumption			1.7 W DC max. (does not include the sensor's current consumption)	24 VDC: 0.7 W DC max. (does not include the sensor's current consumption)
Operating time			100 ms max. (does not include the sensor's response time)	300 ms max. (does not include the sensor's response time and bounce time)
Response time			10 ms max. (does not include the sensor's response time)	10 ms max. (does not include the sensor's response time and bounce time)
Relay output	No. of contact		3 NO + 1 NC	3 NO
	Rated load		25 VAC, 5 A (cos diameter = 1), 30 VDC, 5 A L/R = 0 ms	250 VAC, 5 A
	Rated carry voltage		5 A	
Connection method	Between sensor's		M12 connector (8 pins)	
	Other		Terminal block	
Weight (packed state)			Approx. 280 g	Approx. 300 g
Accessory			Instruction manual	

* For further details on the G9SA-300-SC, refer to the G9SA-300-SC instruction manual.

Setting Console

Item		Model	F39-MC11
Applicable sensor			F3SN-A, F3SH-A
Supply voltage			24 VDC $\pm 10\%$ (provided from the sensor)
Connection method			Cable (included)
Weight (packed state)			360 g
Accessories			One branching connector, 2-m cable, one connector cap, instruction manual

For details on the setting console, refer to the instruction manual provided with the product.

External Indicators

Item		Model	F39-A01PR-L (Emitter) F39-A01PR-D (Receiver)	F39-A01PG-L (Emitter) F39-A01PG-D (Receiver)
Applicable sensor			F3SN-A□□□□P□□(-01, -03, -04, -05) * F3SH-A09P03-01	
Light source			Red LED	Green LED
Supply voltage			24 VDC $\pm 10\%$ (provided from the sensor)	
Current consumption			50 mA max. (provided from the sensor)	
Connection method			M12 connector (8 pins)	
Weight (packed state)			Approx. 80 g	

* The indicator must be secured separately for models ending in "-04" or "-05." For the F3SN-B, only light-ON mode can be used.

Spatter Protection Slit Covers

Item		Model	F39-HS□□□□A-14	F39-HS□□□□B-14	F39-HS□□□□A-25 F39-HSH09A-03	F39-HS□□□□B-25 F39-HSH09B-03
Applicable sensor			F3SN-A□□□□P14(-01)		F3SN-A□□□□P□□(-01), F3SN-B□□□□P□□(-01), F3SH-A09P03(-01)	
Operating range (typical value) *	When one cover is used		3 m	2 m	5.5 m	3.5 m
	When two covers are used		1 m	0.5 m	2 m	1 m
Distance that does not cause mutual interference (typical value)	When one cover is used		6.5 m	4.8 m	12.2 m	7.8 m
	When two covers are used		2.4 m	1.2 m	4.4 m	2.1 m

* The maximum distance that can turn ON all of the five light intensity level indicators.

Environment-resistant Enclosures

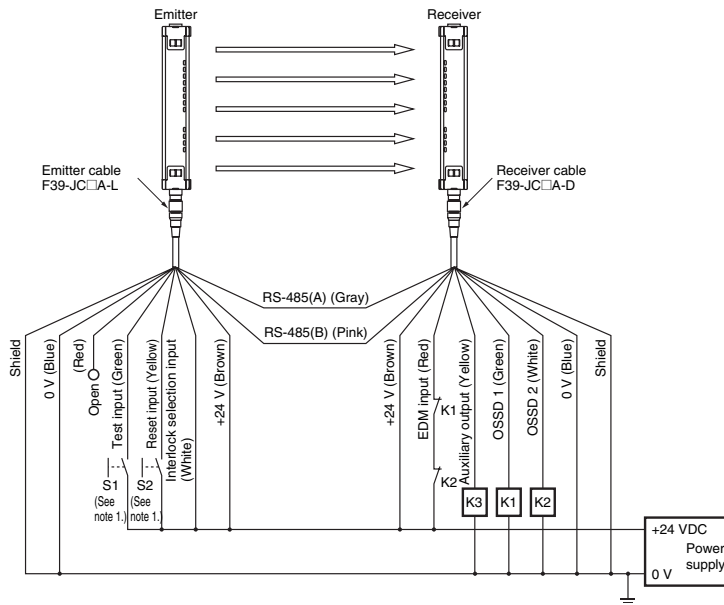
Item		Model	F39-HP□□□□-14	F39-HP□□□□-25 F39-HPH09-03
Applicable sensor			F3SN-A□□□□P14(-01)	F3SN-A□□□□P□□(-01), F3SN-B□□□□P□□(-01), F3SH-A09P03(-01)
Operating range characteristics			0.2 to 6 m	0.2 to 10 m
Degree of protection *			IP67 (IEC60529)	
Materials			Case: Acrylic resin, rubber: NBR60, mounting bracket: SUS316L, screw: SUS316L	

* To conform to IP67, tighten the screws according to the "Cautions for Use" as described in the manual packaged together with the product.

Connections

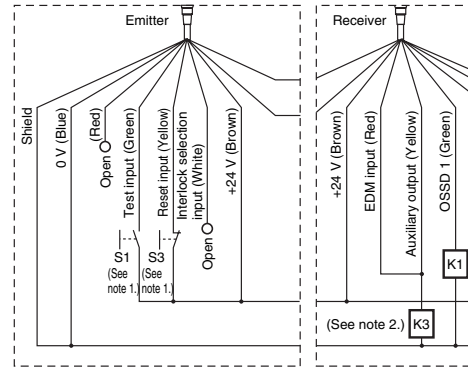
Wiring for Sensor Only Configuration

Wiring for the Manual Reset Mode and the EDM Function



- S1: External test switch
 S2: Interlock/lockout reset switch
 S3: Lockout reset switch (If the switch is not necessary, connect between the reset input and +24 VDC.)
 K1, K2: Relay that control the dangerous zone, etc.
 K3: Load, PLC, etc. (used for monitoring)

Wiring for the Auto-reset Mode



When the EDM is Not Used

When the EDM is not necessary

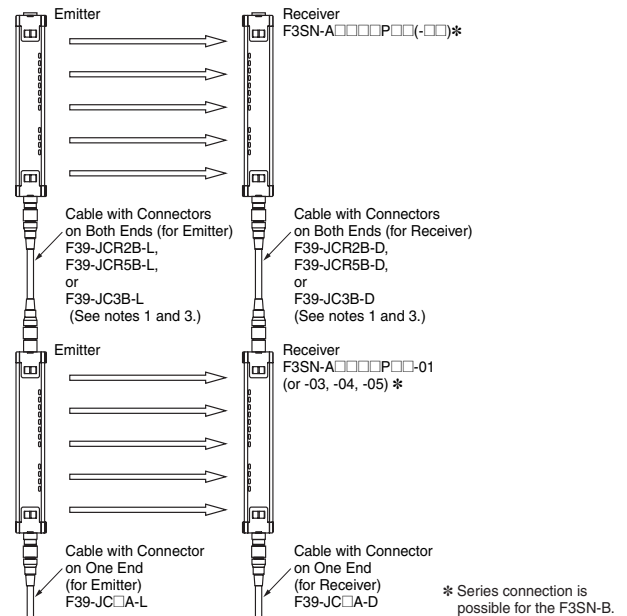
- (1) Use the F39-MC11 to disable the EDM.
- or
- (2) Disable the EDM by changing the wiring as shown in the figure below, when the auxiliary output is Dark ON.

- Note:** 1. Use very low load type switches.
 2. If K3 is not necessary, short-circuit the auxiliary output with the EDM input.

Series Connection (Up to 3 Sets)

Using series connection models (model numbers ending in -01, -03, -04, -05) enables series connection as shown in the figure at the right. Either stand-alone models and the series connection models can be used for the light curtains located at the top end.

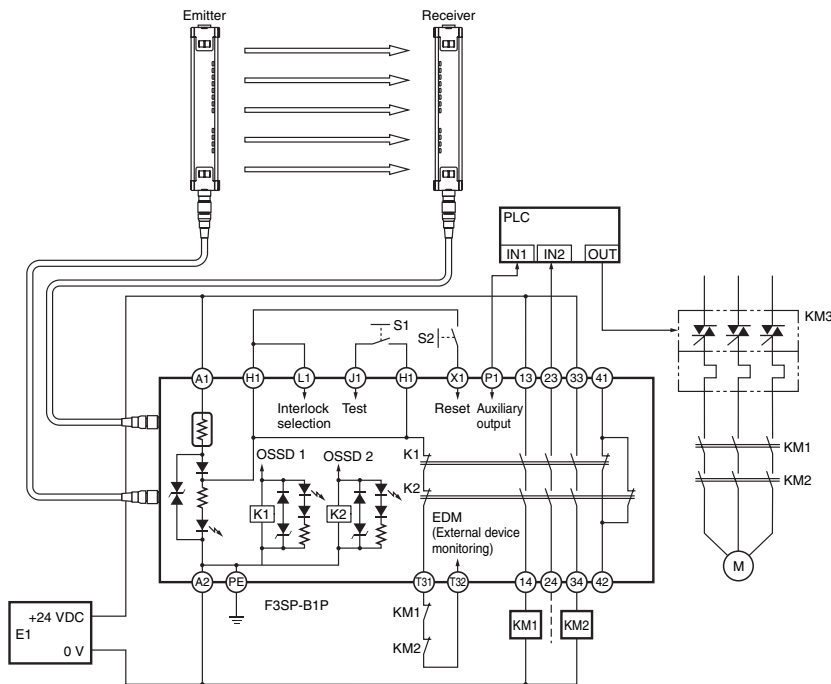
- Note:** 1. To maintain sensor performance, please use double-ended connector cables for series connection which are the length of F39-JC3B or shorter. Double-ended connector cables that are longer than F39-JC7B cannot be used for series connection.
 2. The F3SN and F3SH cannot be connected in series.
 3. Series connection is possible for model numbers ending in -04 or -05 (with 0.2 m cable with connectors). Refer to page 2.



* Series connection is possible for the F3SN-B.

An Example of Safety Circuits Where the F3SP-B1P Controller is Used

For category 4 rating (F3SN-A, F3SH-A)/category 2 rating (F3SN-B)

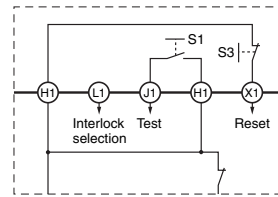


Applicable operation mode

• Manual reset mode

- S1: External test switch
- S2: Interlock/lockout reset switch
- S3: Lockout reset switch (If the switch is not necessary, connect between X1 and H1.)
- KM1, KM2: Magnetic contactor
- KM3: Solid-state contactor (G3J)
- M: 3-phase motor
- E1: 24 VDC power supply (S82K)
- PLC: Programmable controller (Used for monitoring. This is not a part of a safety system.)

Wiring for the Auto-reset mode

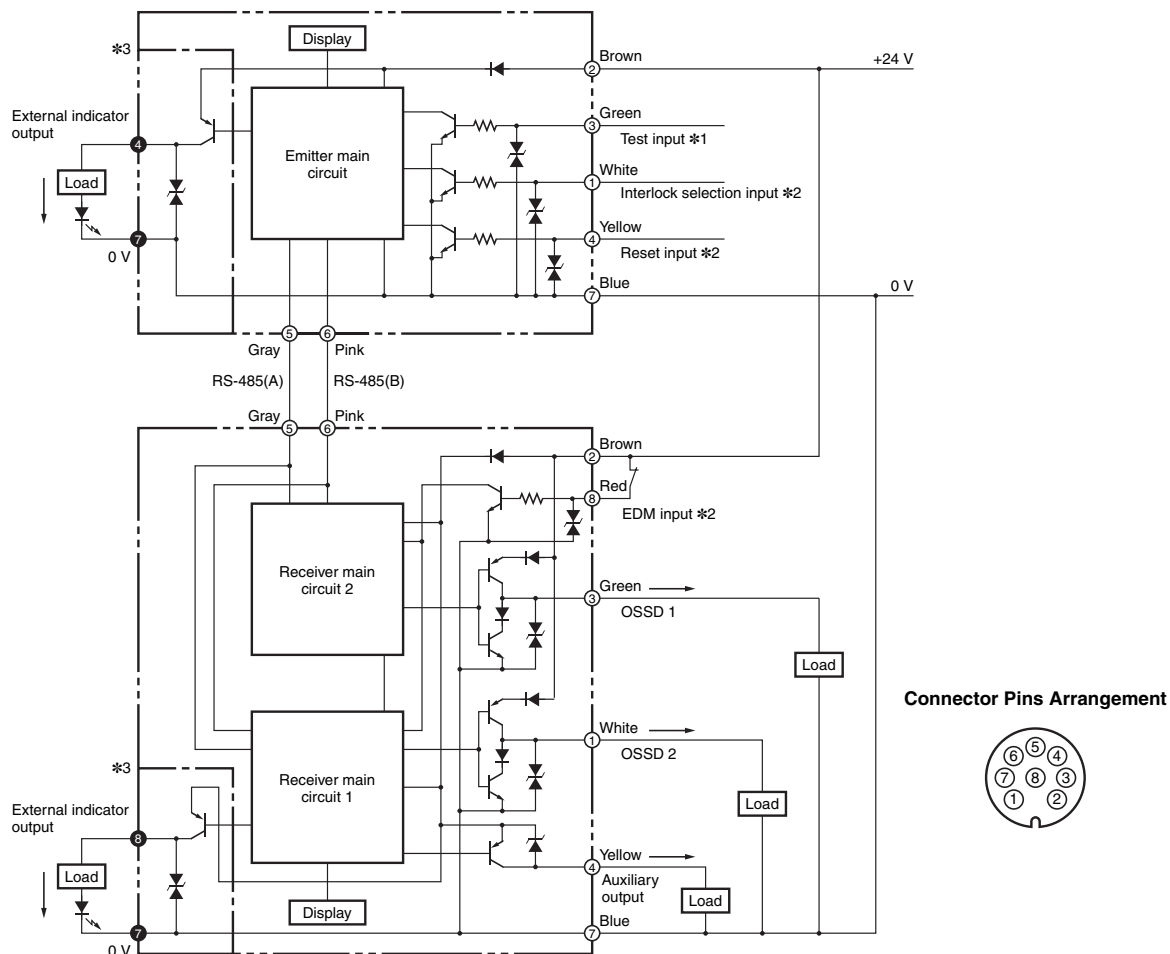


Note: 1. If the EDM is not necessary, short-circuit T31 and T32.

2. For the number and arrangement of all terminals on the F3SP-B1P, see the instruction manual packaged together with the F3SP-B1P.

I/O Circuit Diagrams

Internal Circuit Diagram



Note: The numbers in ○ indicate pin numbers of the connectors.

The numbers in ● indicate pin numbers of the series connection connectors.

*1. Open: normal light emission, short to the +24 VDC: stops light emission

***2.** Refer to “Connections”, “Wiring for Sensor Only Configuration” on page 13.

***3.** The section encircled with the dashed line is applied for models ending in -01, -03, -04, or -05 only.

Cables with Connector on One End

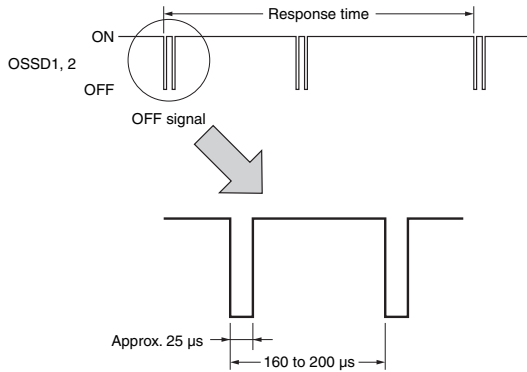
Model	Internal wiring	Pin No.	Wire color	Signal name	
				Receiver	Emitter
F39-JCR5A (0.5 m) F39-JC3A (3 m) F39-JC7A (7 m) F39-JC10A (10 m) F39-JC15A (15 m)		1	White	OSSD 2	Interlock selection input
		2	Brown	+24 V	+24 V
		3	Green	OSSD 1	Test input
		4	Yellow	Auxiliary output	Reset input
		5	Gray	RS-485(A)	RS-485(A)
		6	Pink	RS-485(B)	RS-485(B)
		7	Blue	0 V	0 V
		8	Red	EDM input	N.C.

Output waveform of the OSSD outputs

The OSSD outputs will be OFF as shown in the following figure in order to perform the OSSD circuit self-test when the light curtain is in the ON-state.

The OSSD circuit diagnosis is correct when this OFF signal is fed back. If the output signal does not contain an OFF signal, the receiver determines that there is an output circuit or wiring failure and goes into the lockout condition.

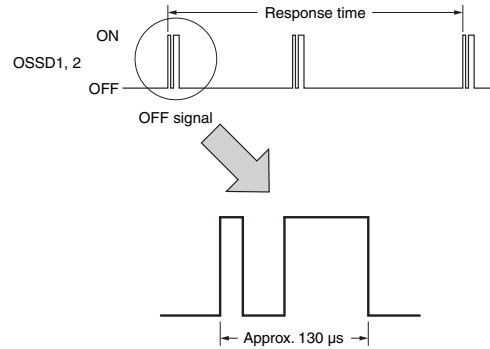
The number of OFF signals depends on the number of light curtains



connected in series. (See the chart at left.)

In the same way, the OSSD outputs will be ON as shown in the following figure, to perform the OSSD circuit self-test when the light curtain is in the OFF-state. (See the chart below.)

Check the input response time of a machine connected to the F3SN-A carefully to ensure the machine will not malfunction due to the OFF signal.



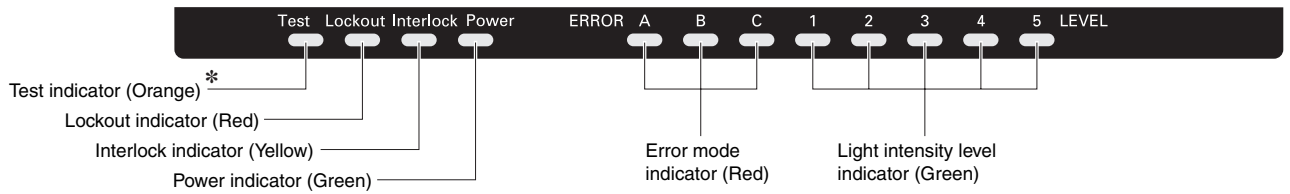
Note: This chart indicates the instance of 2 light curtains series connection.

No. of light curtains connected in series	No. of OFF signals within the response time
No	1
2 light curtains	2
3 light curtains	3

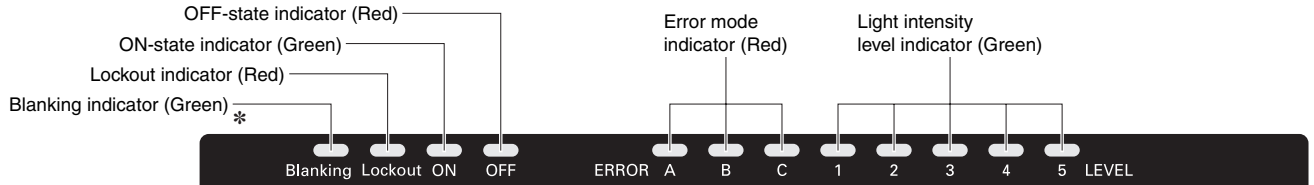
No. of light curtains connected in series	No. of ON signals within the response time
No	1
2 light curtains	2
3 light curtains	3

Names and Functions of Parts

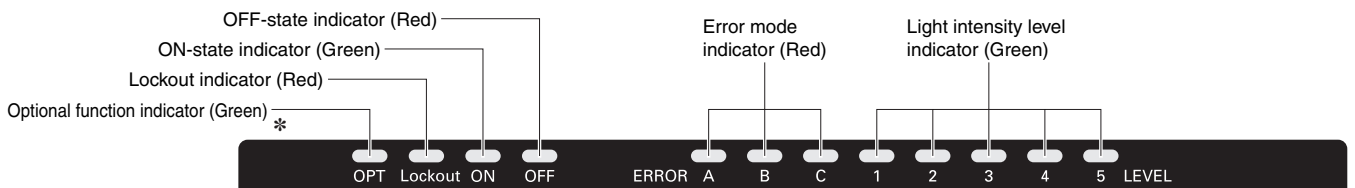
Emitter (F3SN-A/ F3SN-B/ F3SH-A)



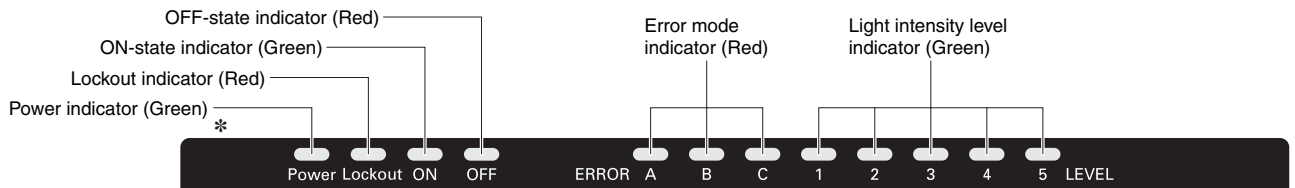
Receiver (F3SN-A)



Receiver (F3SN-B)



Receiver (F3SH-A)

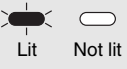


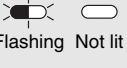
* These indicators flash to indicate the need for preventive maintenance when the total ON time exceeds 30,000 hours. (Models without this flashing function are also available as options. An "-NT" to the model number. Ask your OMRON representative for details.)

Function

Power indicator	Lit when power is supplied (always lit): F3SN-A, F3SH-A Emitter Lit when power is supplied, flashing when the F39-MC11 is connected: F3SH-A Receiver *
Interlock indicator	Lit during interlock condition
Lockout indicator	Flashing during lockout condition
Test indicator	Lit during external test *
ON-state indicator	Lit when OSSD outputs are in ON-state
OFF-state indicator	Lit when OSSD outputs are in OFF-state
Blanking indicator (F3SN-A only)	Lit when blanking is set, flashing when the F39-MC11 is connected *
Optional function indicator (F3SN-B only)	Flashing after a lapse of 30,000 hours

* These indicators flash to indicate the need for preventive maintenance when the total ON time exceeds 30,000 hours. (Models without this flashing function are also available as options. An “-NT” to the model number. Ask your OMRON representative for details.)

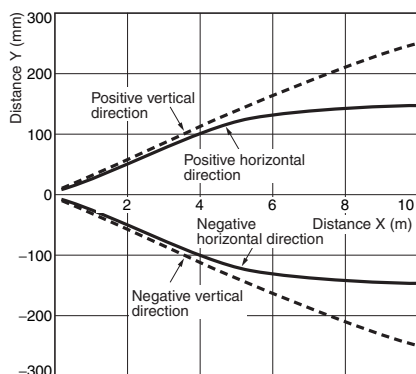
	1	2	3	4	5	Light intensity level
Light intensity level indicator 						200% and above of ON threshold level
						150 to 200% of ON threshold level
						100 to 150% of ON threshold level
						75 to 100% of ON threshold level
						50 to 75% of ON threshold level
						Less than 50% of ON threshold level

	A	B	C	Cause of error
Error mode indicator 				The Interlock selection input line or the reset input line is not wired correctly or became open.
				Relay contact is welded. Releasing time of the relay takes too long. The EDM input line is not wired correctly or became open.
				Communication line (RS-485) is not wired correctly, became open, or causes other errors.
				One of the OSSD outputs is shorted or is not wired correctly. Other failure in OSSD outputs.
				Mutual interference. Interference light is received.
				Types of the receiver and emitter are not the same. Numbers of the receiver and emitter connected in series are not the same.
				External noise. Internal hardware failure of the receiver or the emitter.

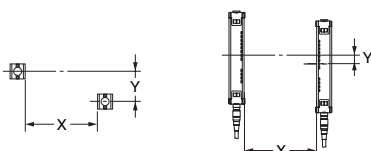
Engineering Data (Typical Examples)

Parallel operating range

F3SN-A1107P14

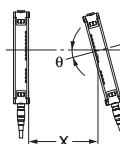
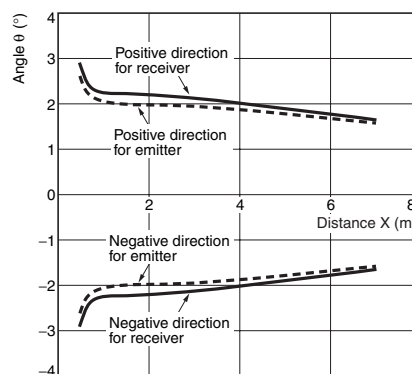


Horizontal direction Vertical direction



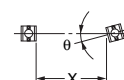
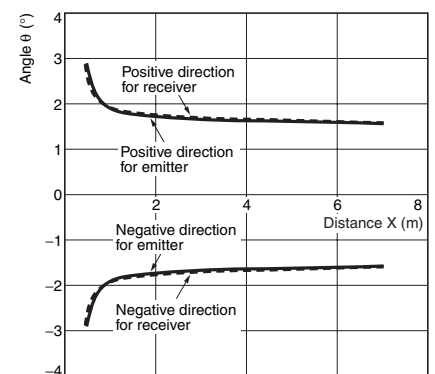
Angular range (Angle of elevation)

F3SN-A1107P14



Angular range (Angle of rotation)

F3SN-A1107P14



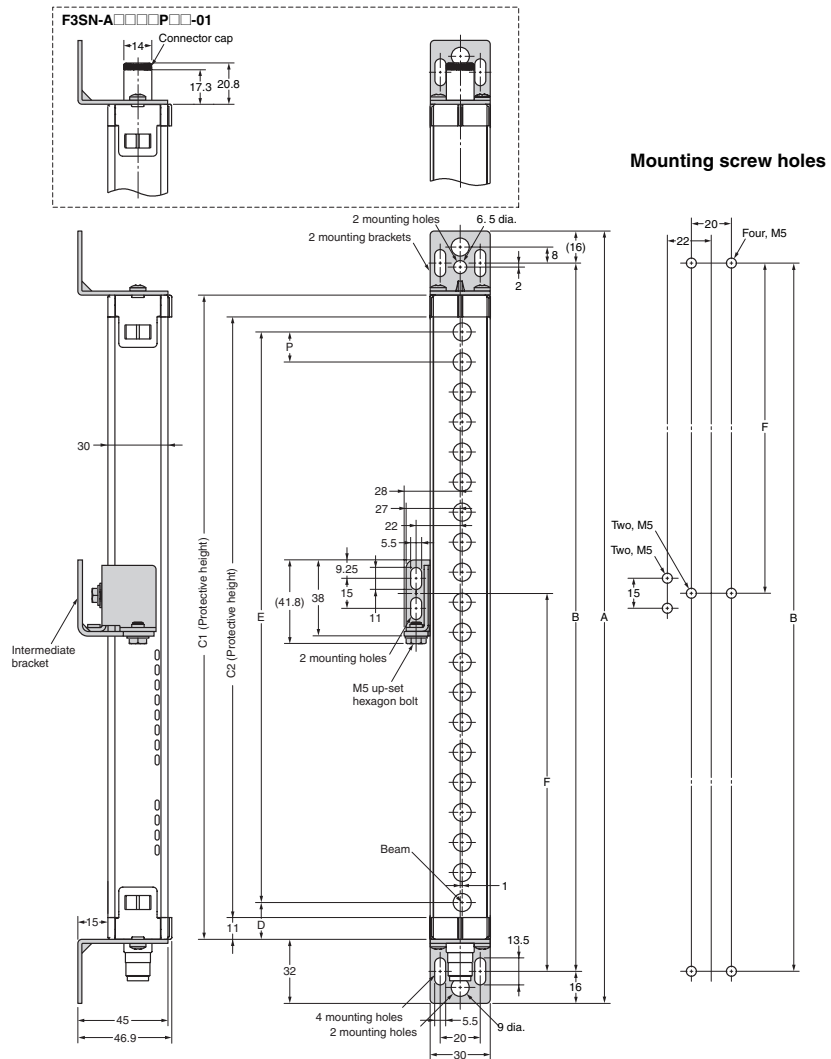
Dimensions

(Unit: mm)

Main Units Refer to the User's Manual (SCEE-713) for the dimensions of models with different connector configurations (model numbers ending in "-02" to "-05").

F3SN-A□□□□P□□(-01)

F3SN-B□□□□P□□(-01)



Dimensions according to the model can be calculated by using the following equations.

- | | |
|--|--|
| <ul style="list-style-type: none"> F3SN-A□□□□P14(-01)
 Dimension C2 (protective height): 4 digits in the model name
 Dimension A = C2 + 86
 Dimension B = C2 + 54
 Dimension D = 15.5
 Dimension E = C2 – 9
 Dimension F: See the table below.
 Dimension P = 9 | <ul style="list-style-type: none"> F3SN-A□□□□P25(-01)/P40(-01)/P70(-01), F3SN-B□□□□P25(-01)/P40(-01)/P70(-01)
 Dimension C1 (protective height): 4 digits in the model name
 Dimension A = C1 + 64
 Dimension B = C1 + 32
 Dimension D = 18.5
 Dimension E = C1 – 37
 Dimension F: See the table below. |
|--|--|

C2 (protective height)	Number of intermediate Mounting Bracket	Dimension F (See note.)
to 0620	0	---
0621 to 1125	1	F = B/2

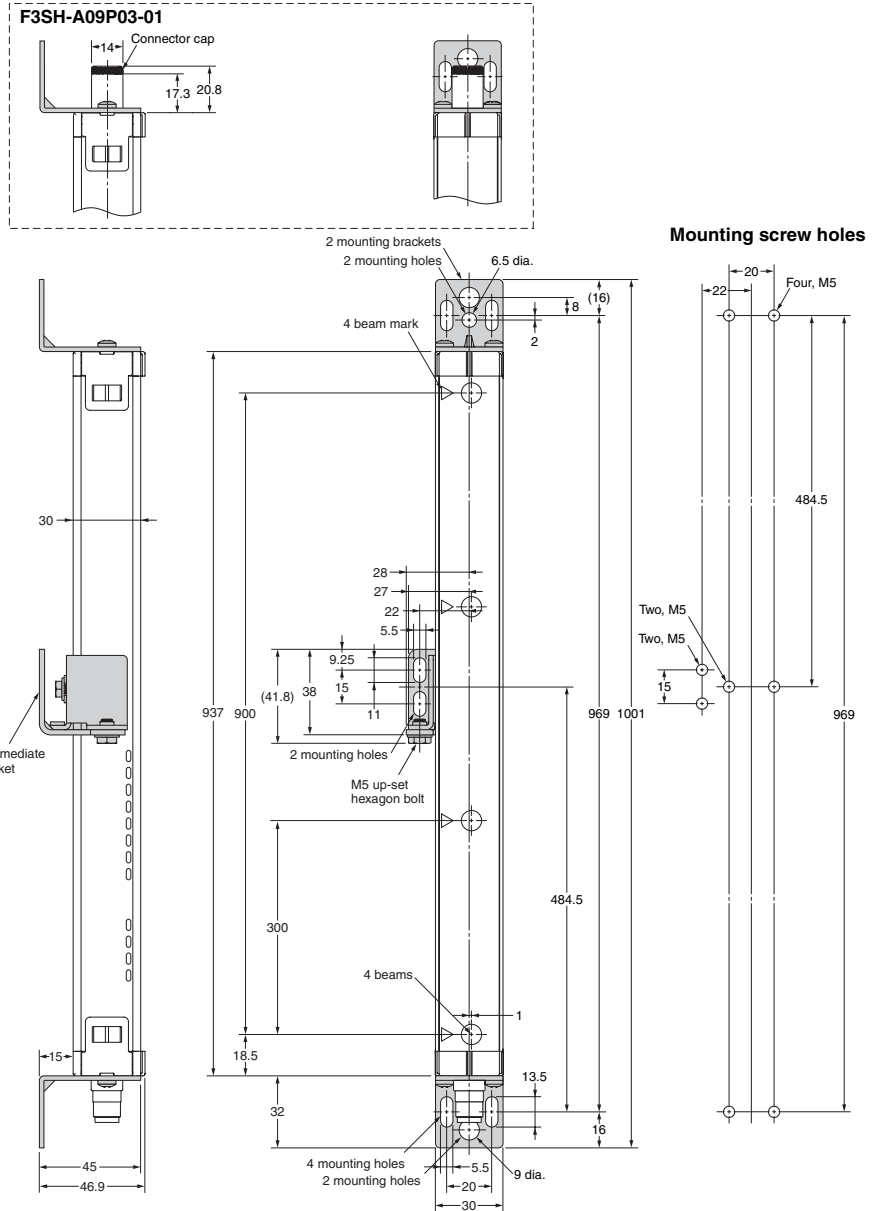
Note: If value F obtained from the above equation is not used, set F to 670 mm or less.

C1 (protective height)	Number of intermediate Mounting Bracket	Dimension F (See note.)
to 0640	0	---
0641 to 1280	1	F = B/2
1281 to 1822	2	F = B/3

Dimension P: See the table below.

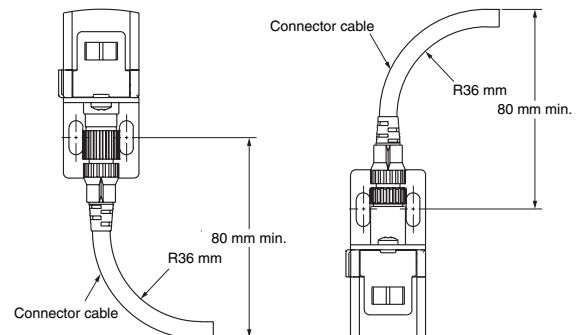
Detection capability	Dimension P
25	15
40	30
70	60

F3SH-A09P03 F3SH-A09P03-01

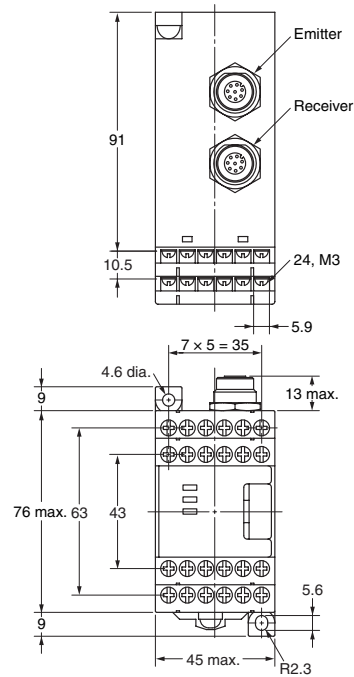


Mounting Precautions

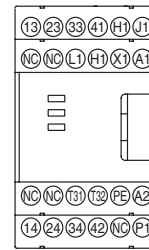
1. The intermediate bracket (3) (see Mounting brackets (intermediate)) is shown on the left-hand side of the sensor as an example. If the intermediate bracket (3) is on the right-hand side of the sensor then the mounting holes must also be on the right-hand side.
2. When using with the cable bent, allow at least the dimensions shown on the right. (Minimum bending radius of cable: R36 mm.)



Control Unit F3SP-B1P

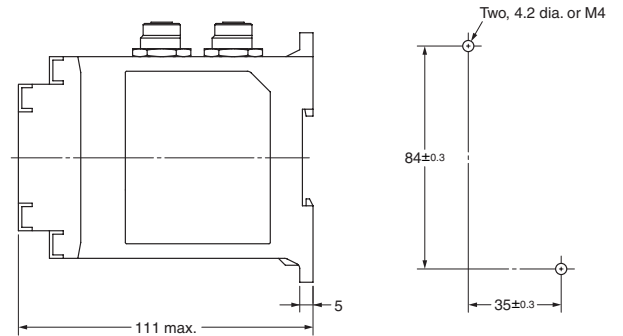


Terminal Allocations

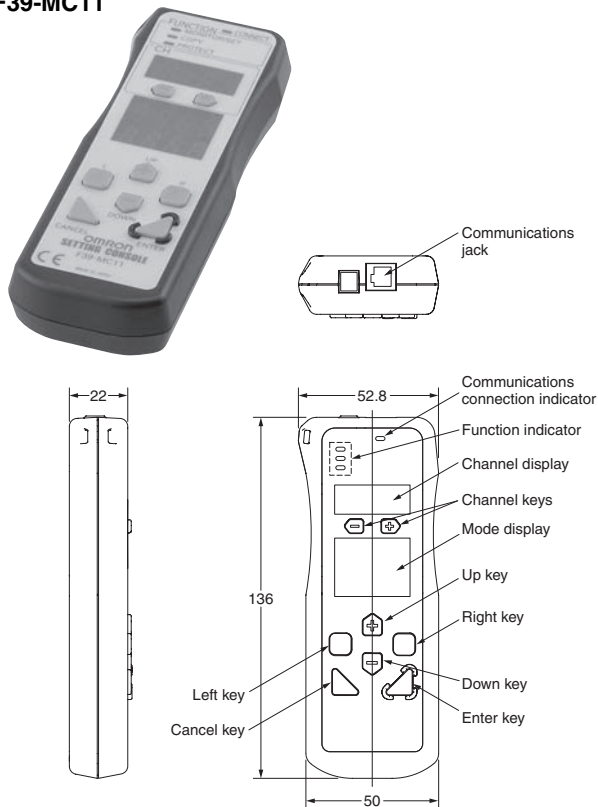


Indicators:
PWR (green), K1 (orange), K2 (orange)

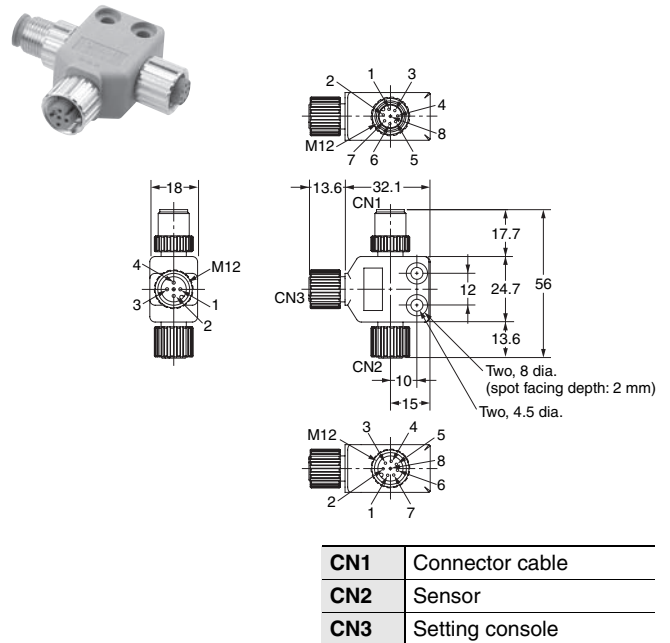
Mounting screw holes



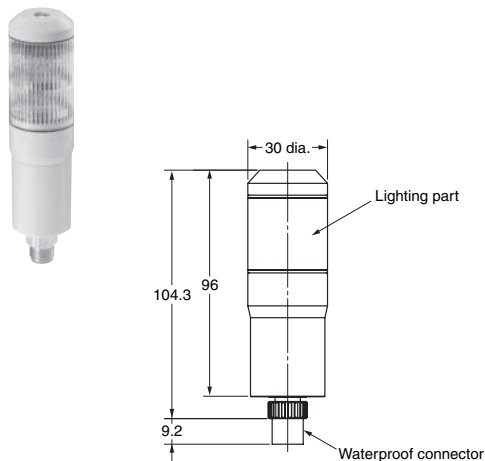
Setting Console F39-MC11



Branching Connector (supplied with F39-MC11) F39-CN1



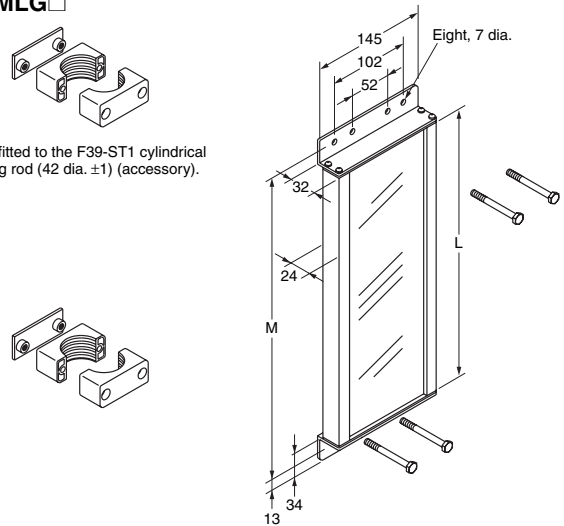
External Indicators F39-A01PR-L/D F39-A01PG-L/D



Mirrors

F39-MLG

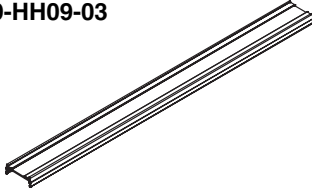
Can be fitted to the F39-ST1 cylindrical mounting rod (42 dia. ± 1) (accessory).



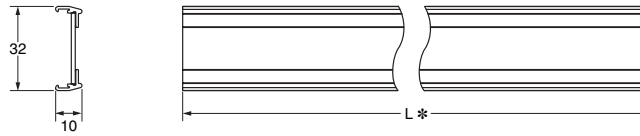
Model	L (mm)	M (mm)
F39-MLG0406	445	487
F39-MLG0610	648	690
F39-MLG0711	749	792
F39-MLG0914	953	995
F39-MLG1067	1105	1148
F39-MLG1219	1257	1300
F39-MLG1422	1461	1503
F39-MLG1626	1664	1706
F39-MLG1830	1867	1910
F39-MLG2134	2172	2214

Spatter Protection Covers

F39-HN□□□□-14
F39-HN□□□□-25
F39-HH09-03



Protection cover



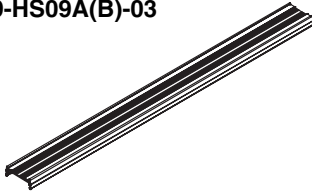
* L is as follows.

F39-HN□□□□-14 F39-HS□□□□A(B)-14	L = □□□□ mm
F39-HN□□□□-25 F39-HS□□□□A(B)-25	L = □□□□ - 22 mm
F39-HH09-03 F39-HS09A(B)-03	L = 915 mm

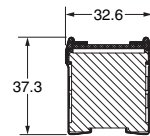
Materials: PC (transparent area)
ABS (non-transparent area)

Spatter Protection Slit Covers

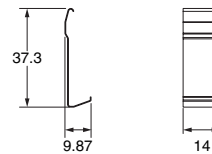
F39-HS□□□□A(B)-14
F39-HS□□□□A(B)-25
F39-HS09A(B)-03



Mounting dimensions



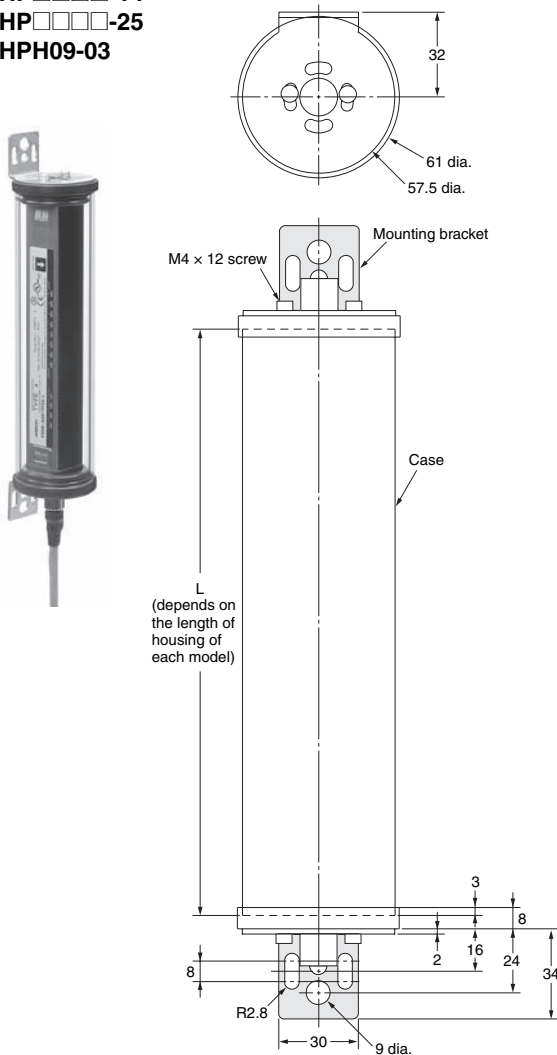
Fixing bracket



Materials: SUS

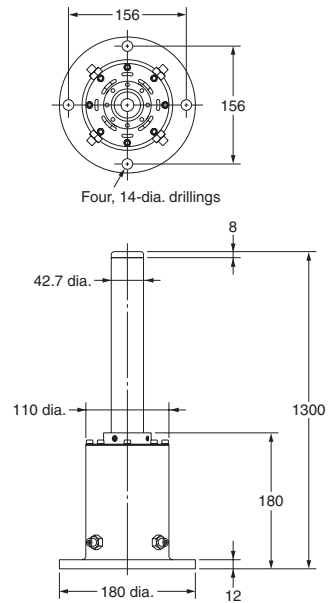
Water-resistant Case

F39-HP□□□□-14
F39-HP□□□□-25
F39-HPH09-03



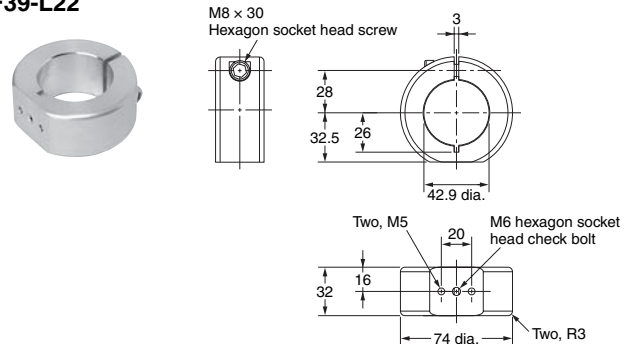
Multi-beam Sensor Support Stand/Mirror Stand

F39-ST1



Mounting Bracket

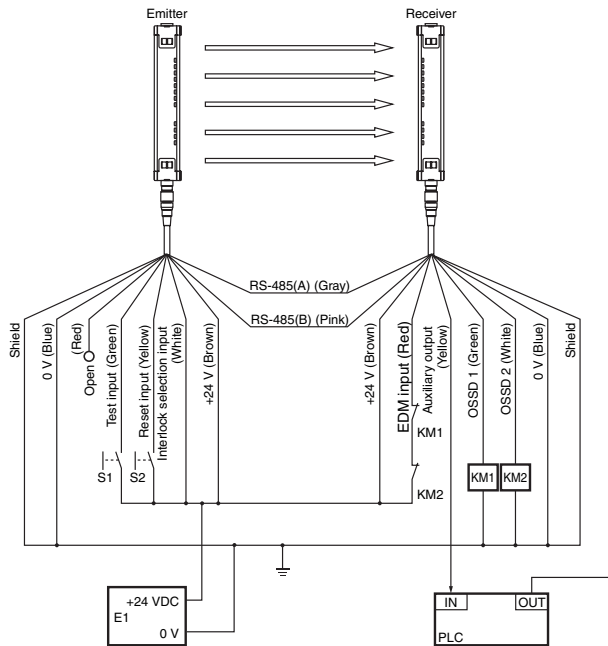
F39-L22



Connection Circuit Examples

An Example of Safety Circuits Where No Controller Is Used

For Category 4 Rating (F3SN-A, F3SH-A)/Category 2 Rating (F3SN-B)



Applicable operation mode

- Manual reset mode
- Using the EDM function

S1: External test switch

S2: Interlock/lockout reset switch

KM1, KM2: Safety relay with forcibly guided contacts (G7SA) or magnetic contactor

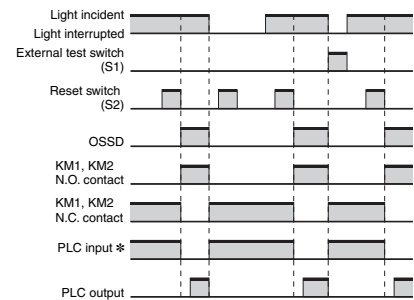
KM3: Solid-state contactor (G3J)

M: 3-phase motor

E1: 24 VDC power supply (S82K)

PLC: Programmable controller
(Used for monitoring. This is not a part of a safety system.)

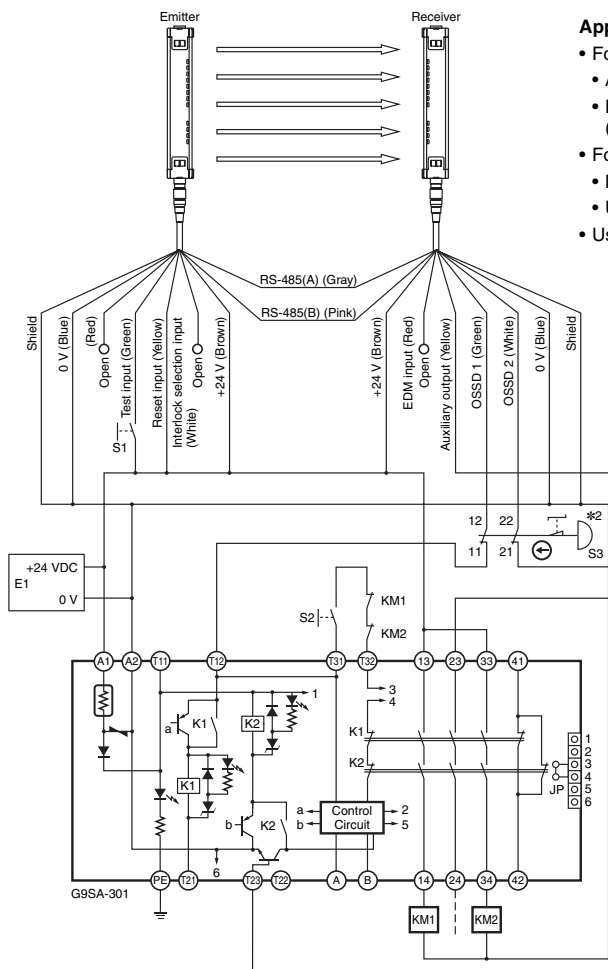
Timing Chart



* The output operation mode of the auxiliary output is the Dark-ON output mode.

An Example of Safety Circuits Where the G9SA-301 Safety Relay Unit is Connected

For category 4 rating (F3SN-A, F3SH-A)/category 2 rating (F3SN-B)



Applicable operation mode

- For sensor
- Auto-reset mode
- Disable the EDM monitor function (by setting on the F39-MC11, *1.)
- For safety relay unit
- Manual reset mode
- Use the feedback loop
- Use the emergency stop switch #2

*1. The F39-MC11 setting console cannot be connected to the F3SN-B. Therefore, short-circuit the auxiliary output terminal and the EDM input.

*2. If emergency stop switch is not necessary, connect the OSSD 1 directly to T12 terminal and connect the OSSD 2 directly to T23 terminal.

S1: External test switch

S2: Reset switch

S3: Emergency stop switch
(direct opening contacts)
(A165E or A22E)

KM1, KM2: Magnetic contactor

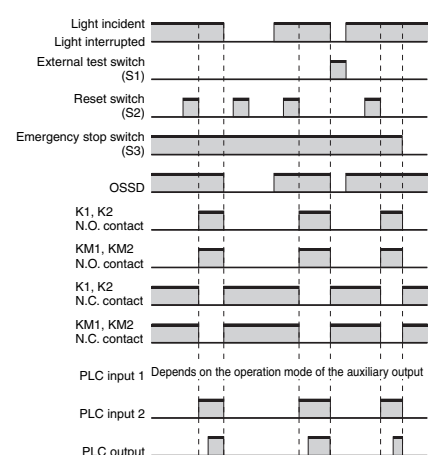
KM3: Solid-state contactor (G3J)

M: 3-phase motor

E1: 24 VDC power supply (S82K)

PLC: Programmable controller
(Used for monitoring.
This is not a part of a safety system.)

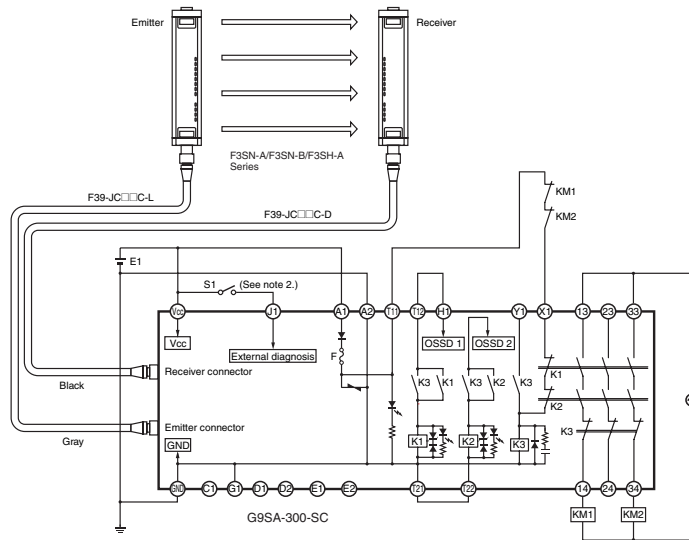
Timing Chart



Examples of Safety Circuits Where G9SA-300-SC Safety Relay Unit is Connected

(1) For only safety light curtain in auto-reset mode

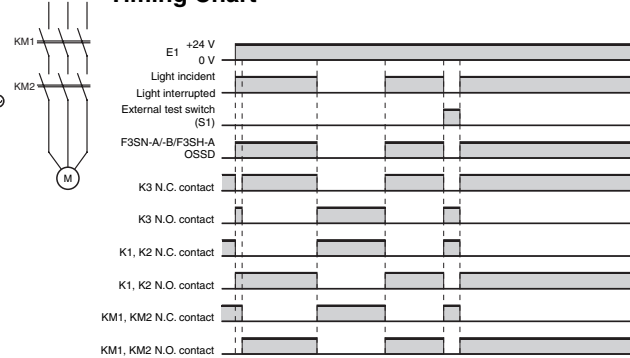
For category 4 rating (F3SN-A, F3SH-A)/category 2 rating (F3SN-B)



S1: External test switch
KM1, KM2: Magnetic contactor
M: 3-phase motor
E1: 24 VDC power supply (S82K)

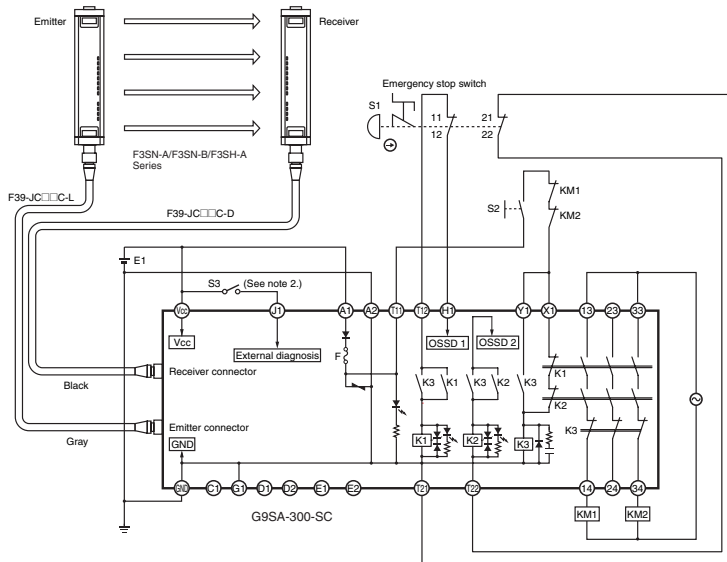
- Note:**
1. F3SN-A's EDM function and auxiliary output cannot be used.
 2. Normal operation is performed when the switch S1 is released, and external diagnosis is performed when it is short-circuited.
 3. Do not connect anything to the C1, D1, D2, E1, and E2 terminals.

Timing Chart



(2) Safety light curtain connected with two channel emergency stop switch inputs in manual reset mode

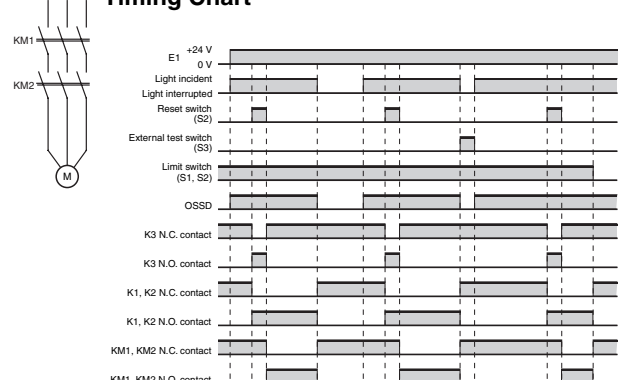
For category 4 rating (F3SN-A, F3SH-A)/category 2 rating (F3SN-B)



S1: Emergency stop switch ⊖
S2: Reset switch (momentary action switch)
S3: External test switch
KM1, KM2: Magnetic contactor
M: 3-phase motor
E1: 24 VDC power supply (S82K)

- Note:**
1. F3SN-A's EDM function and auxiliary output cannot be used.
 2. Normal operation is performed when the switch S3 is released, and external diagnosis is performed when it is short-circuited.
 3. Do not connect anything to the C1, D1, D2, E1, and E2 terminals.

Timing Chart



Safety Precautions

This catalog is intended as a guide for product selection. Be sure to use the instruction manual provided with the product for actual operation.

Regulations and Standards

F3SN-A/F3SH-A

1. "Type Certification" specified in the Chapter 44. 2 of the Industrial Safety and Health Law in Japan does not apply to independent F3SN-A/F3SH-A Sensors. This law applies to systems incorporating the Sensor. When using the F3SN-A/F3SH-A Sensor in Japan as a "safety device for presses or shearing machines," as specified in the Chapter 42 of the same law, apply for certification for the overall system.
2. (1) The F3SN-A/F3SH-A is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Annex IV, B, Safety Components, Item 1.
 (2) The F3SN-A/F3SH-A complies with the following regulations and standards:
 1. EU Regulations
 - Machinery Directive: Directive 98/37/EC
 - EMC Directive: Directive 2004/108/EC
 2. European standards: EN61496-1 (TYPE 4 ESPE), prEN61496-2 (TYPE 4 AOPD)
 3. International standards: IEC61496-1 (TYPE 4 ESPE), IEC61496-2 (TYPE 4 AOPD)
 4. American standards: UL61496-1 (TYPE 4 ESPE), UL61496-2 (TYPE 4 AOPD), UL508, UL1998, CAN/CSA22.2 No. 14, CAN/CSA22.2 No. 0.8
 5. JIS standards: JIS B9704-1 (TYPE 4 ESPE), JIS B9704-2 (TYPE 4 AOPD)
- (3) The F3SN-A/F3SH-A received the following certification from the Third Party Assessment Body UL:
 - Certificate of UL listing for US and Canadian safety standards
Both of which are: TYPE 4 ESPE (UL61496-1), TYPE 4 AOPD (UL61496-2)
3. The F3SN-A/F3SH-A is designed according to the following standards. To make sure that the F3SN-A/F3SH-A complies with the following standards and regulations, you are asked to design and use it as provided by any other related standards, laws, and regulations. (Underlined regulations are applicable to the F3SN-A only.)
 Consult UL or other standardization bodies if you have any questions.
 - EN415-4, prEN691, EN692, prEN693 (European standards)
 - OSHA 29 CFR 1910.212 (US Industrial Safety and Health Regulation)
 - OSHA 29 CFR 1910.217 (US Industrial Safety and Health Regulation)
 - ANSI B11.1 - B11.19 (US standard)
 - ANSI/RIA 15.06 (US standard)
 - Guideline Concerning Failsafe Methods for Control Mechanisms in Machine Tools, 28 July 1998 (The Announcement No. 464, Ministry of Health, Labour and Welfare)

F3SN-B

1. "Type Certification" specified in the Chapter 44. 2 of the Industrial Safety and Health Law in Japan does not apply to independent units of the F3SN-B sensor. This law applies to systems incorporated with the sensors.
 When using the F3SN-B sensor in Japan as a "safety device for presses or shearing machines" as specified in the Chapter 42 of the same law, apply for certification as a system.
2. (1) The F3SN-B is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Annex IV, B, Safety Components, Item 1.
 (2) The F3SN-B complies with the following regulations and standards:
 1. EU Regulations
 - Machinery Directive: Directive 98/37/EC
 - EMC Directive: Directive 2004/108/EC
 2. European standards: EN61496-1 (TYPE 2 ESPE), prEN61496-2 (TYPE 2 AOPD)
 3. International standards: IEC61496-1 (TYPE 2 ESPE), IEC61496-2 (TYPE 2 AOPD)
 4. American standards: UL61496-1 (TYPE 2 ESPE), UL61496-2 (TYPE 2 AOPD), UL508, UL1998, CAN/CSA22.2 No. 14, CAN/CSA22.2 No. 0.8
 5. JIS standards: JIS B9704-1 (TYPE 2 ESPE), JIS B9704-2 (TYPE 2 AOPD)
- (3) The F3SN-B received the following certification from the Third Party Assessment Body UL:
 - Certificate of UL listing for US and Canadian safety standards
Both of which are: Type 2 ESPE (UL61496-1), Type 2 AOPD (UL61496-2)
3. The F3SN-B is designed according to the following standards. To make sure that the F3SN-B complies with the following standards and regulations, you are asked to design and use it as provided by any other related standards, laws, and regulations.
 Consult UL or other standardization bodies if you have any questions.
 - EN415-4 (European standard)
 - OSHA 29 CFR 1910.212 (US Industrial Safety and Health Regulation)
 - ANSI/RIA 15.06 (US standard)
 - Guideline Concerning Failsafe Methods for Control Mechanisms in Machine Tools, 28 September 1998 (The Announcement No. 464, Ministry of Health, Labour and Welfare)

⚠ WARNING**Detection Zone and Intrusion Path**

Refer to “*Precautions for All Safety Sensors*” for the installation conditions of Safety Light Curtains.

F3SH-A Multi-beam Safety Sensor

Install protective structures around the machine so that you must pass through the detection zone of the F3SH-A to reach a hazardous part of the machine.

If it is possible for an operator to get between the sensor's detection zone and the hazardous part of the machine, design the system so that machinery cannot start up automatically. Make sure that machinery cannot restart while the operator is in the hazardous area. Position the switch for restarting machinery in a location from which the status of the hazardous area can be seen clearly. The switch position location must be a place where the switch cannot be operated from within the hazardous area. Failure to do so may result in serious injury.

**Use of the Fixed Blanking Function (F3SN-A only)**

After setting the fixed blanking, check that the F3SN-A detects a test rod at any position in the detection zone through which a person can reach the hazardous part of the machine. If any positions are found by check above, install protective structures to prevent intrusion, which the F3SN-A can not detect. Failure to do so may result in serious injury.

**Safety Distance**

Always maintain a safe distance (S) between the light curtain and a hazardous part of a machine. Failure to do so causes the machine to fail to stop before an operator reaches the dangerous area and may result in serious injury.



Use of the floating blanking increases the size of the detection capability. To calculate a safety distance, be sure to use the increased size of the detection capability. Failure to do so causes the machine to fail to stop before an operator reaches the dangerous area and may result in serious injury.



Refer to the “*Precautions for All Safety Sensors*” for calculating the Safety distance.

Response Time Table

Model	Protective height (mm)	Number of beams	Response time	
			ON to OFF	OFF to ON
F3SNA□□□□ P14(-01)	180 to 450	20 to 50	10.0	40
	459 to 765	51 to 85	12.5	50
	774 to 1,080	86 to 120	15.0	60
	1,089 to 1,125	121 to 125	15.5	62

Model	Protective height (mm)	Number of beams	Response time	
			ON to OFF	OFF to ON
F3SN-A□□□□ P25(-01) F3SN-B□□□□ P25	217 to 772	13 to 50	10.0	40
	787 to 1,297	51 to 85	12.5	50
	1,312 to 1,822	86 to 120	15.0	60

Model	Protective height (mm)	Number of beams	Response time	
			ON to OFF	OFF to ON
F3SN-A□□□□ P40(-01)	217 to 757	7 to 25	10.0	40
F3SN-B□□□□ P40	787 to 1,297	26 to 43	12.5	50
	1,327 to 1,807	44 to 60	15.0	60

Model	Protective height (mm)	Number of beams	Response time	
			ON to OFF	OFF to ON
F3SN-A□□□□ P70(-01)	277 to 757	5 to 13	10.0	40
F3SN-B□□□□ P70	817 to 1,297	14 to 22	12.5	50
	1,357 to 1,777	23 to 30	15.0	60

- Response time for series connected types is calculated as follows: (F3SN-A)

For 2 sets:

Response time (ON to OFF): Response time of Light curtain 1 + Response time of Light curtain 2 + 3 ms

Response time (OFF to ON): Response time of Light curtain 1 + Response time of Light curtain 2 + 12 ms

For 3 sets:

Response time (ON to OFF): Response time of Light curtain 1 + Response time of Light curtain 2 + Response time of Light curtain 3 + 4 ms

Response time (OFF to ON): Response time of Light curtain 1 + Response time of Light curtain 2 + Response time of Light curtain 3 + 16 ms

- Response time of F3SP-B1P is 10 ms, operation time is 100 ms.

Note: When using the F3SP-B1P, determine the safety distance by adding the response time of the F3SP-B1P to that of the F3SN given in the table above.

Precautions for Correct Use

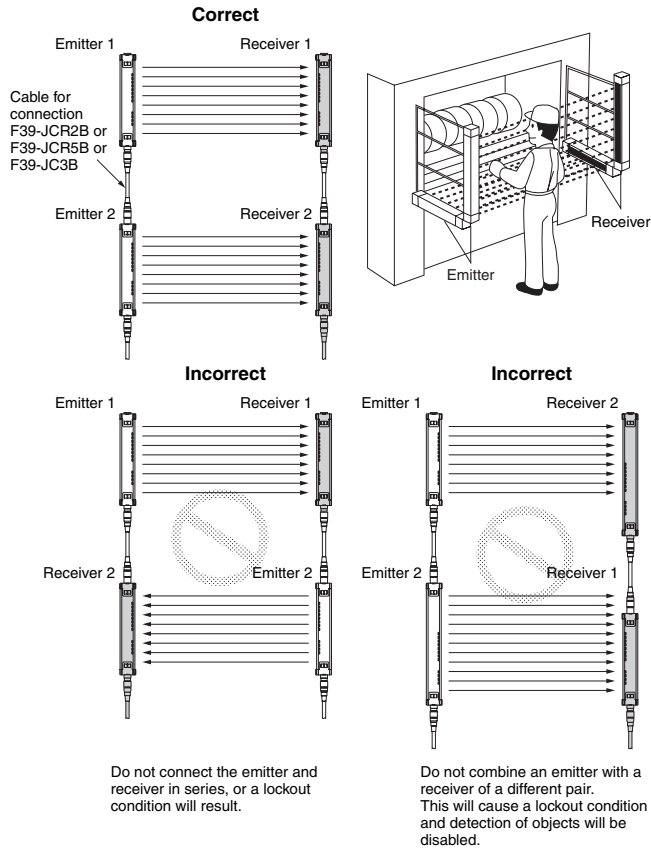
Do not use the product in atmospheres or environments that exceed product ratings.

Installation

How to Prevent Mutual Interference

Series connection (Up to 3 sets, 240 beams, sensor models ending in -01, -03, -04, and -05 are required for series connection)

Two or more pairs of the F3SN-A can be connected in series. When connected in series, the F3SN-A sensors generate beams in a time-sharing manner. Thus, they prevent mutual interference and ensure safety.



When not connected

Refer to "Precautions for All Safety Sensors" for information on preventing mutual interference of Safety Light Curtains that are not connected in series.

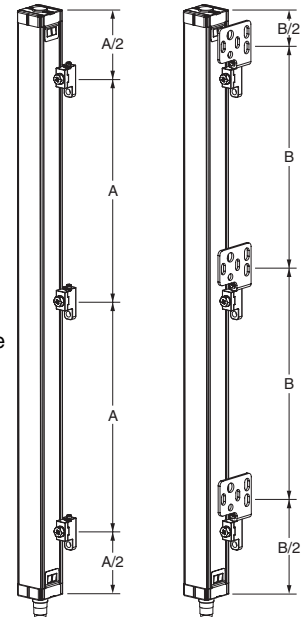
Installation

How to attach Mounting Bracket (F39-L19/L20)

To fully utilize the performance of sensors, locate the F39-L19/L20 mounting brackets in the number satisfying the dimensions "A" and "B" in the sensor longitudinal direction.

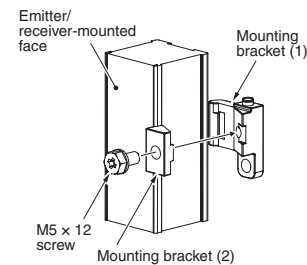
- For the F39-L19
Spacing "A": 670 mm max.
- For the F39-L20
Spacing "B": 400 mm max.

Note: When installing sensors at locations susceptible to vibration and shock, increase the number of mounting brackets.



Mounting bracket	Screw × length (mm)	Tightening torque
F39-L19	M5 × 12 screw	2.0 N·m
F39-L20	M4 × 8 screw	1.2 N·m

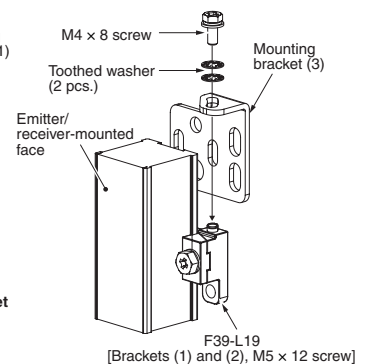
F39-L19



Brackets and screws included in one set

- Mounting bracket (1)1
- Mounting bracket (2)1
- M5 × 12 screw1

F39-L20



Brackets and screws included in one set

- Mounting bracket (1)1
- Mounting bracket (2)1
- M5 × 12 screw1
- Mounting bracket (3)1
- M4 × 8 screw1
- Toothed washer2

Safety-related Functions

Interlock Function

The auto-reset mode and the manual reset mode are wire selectable features of the F3SN-A/F3SN-B/F3SH-A.

Auto-reset Mode

After the power is turned ON and none of the beams are interrupted, the OSSD (Output Signal Switching Device) outputs will go to their ON-state.

Manual Reset Mode

For the factory setting, the start/restart interlock is selected in the manual reset mode. When the light curtain enters the interlock condition, it keeps the OSSD outputs in the OFF-state. Even if all beams become free, the OSSD outputs will not go to the ON-state. When none of the beams are interrupted in the detection zone, applying the reset input resets the interlock condition and the OSSD outputs go to the ON-state.

- Start/restart interlock
After the power is turned ON, or when at least one beam is interrupted, the light curtain enters the interlock condition.
- Start interlock
Only after power ON, the light curtain enters the interlock condition.
- Restart interlock
Only when at least one beam is interrupted, the light curtain enters the interlock condition.

Diagnostic Functions

Self-test

After power ON, the F3SN-A/F3SN-B/F3SH-A performs a complete self-test within 1 second. In addition, it performs a self-test (within response time) periodically during operation.

External Test

This function stops the emission of light from the light curtain using an external signal and checks that the light curtain operates properly.

Lockout Condition

If an error is detected by the self-test, the light curtain enters the lockout condition, keeps the OSSD outputs in their OFF state and displays the error mode. Lockout condition can be cleared either by resetting the power or by changing the setting of the reset switch from closed to open (open to closed for auto-reset). (With some errors, the lockout condition is automatically reset when the light curtain confirms that the cause of the error has been removed.)

Fixed Blanking Function (F3SN-A only)

This function is set with the F39-MC11 setting console.

This is a function provided to disable a specific area of the light curtain's detection zone. Fixed blanking can be set for any desired number of beams. If an object enters the disabled detection zone, the OSSD outputs status will not change. This function is used when there is a stationary object in the detection zone that needs to be ignored.

Floating Blanking Function (F3SN-A only)

This function is set with the F39-MC11 setting console.

During normal operation when floating blanking is disabled, and at least one beam is interrupted, the light curtain will go to the OFF-state. However, using this function prevents the light curtain from going to the OFF-state until multiple beams (*1, *2, and *3) are interrupted.

- *1. The number of the floating blanking beams can be selected in the range of 1 to 3 beams.
- *2. This function can be set to be active only if the interrupted beams are adjacent to each other.
- *3. This function can be set so that the top and bottom beams cannot be set for the function.

EDM (External Device Monitoring)

This function monitors the state of the NC contacts. Connect the NC contact of the MPCEs to the EDM input line of the receiver. If the correct logical relationship between the OSSD outputs and the EDM input is not kept, the light curtain immediately enters the lockout condition and the OSSD outputs will go to their OFF-state.

The light curtain's normal operation is up to 300 ms max. (*), this allows for the delay time caused by the release of the MPCEs. To ensure the correct usage of this function, the MPCEs must be safety-certified types with forcibly guided contacts.

When the EDM is not used

In the case the EDM input is not used, connect the auxiliary output in the Dark-ON output mode to the EDM input line, or disable the EDM with the F39-MC11 setting console.

- * The value can be changed by the F39-MC11.
(It is impossible to connect the F39-MC11 to the F3SN-B.)

Non-safety Output

Auxiliary Output

The default of this output is the reverse signal of the safety outputs (Dark-ON output). This output can be used for monitoring purposes by connecting it to a device such as a PLC.

The auxiliary output can be selected to give one of the following output operation modes by the F39-MC11. (F39-MC11 cannot be connected to the F3SN-B.)

- Dark-ON output mode (fixed for the F3SN-B)
- Light-ON output mode
- Light diagnosis mode
- Lockout mode
- Outermost-beam monitoring mode
- Specified-beam mode
- Blanking monitoring mode (F3SN-A only)

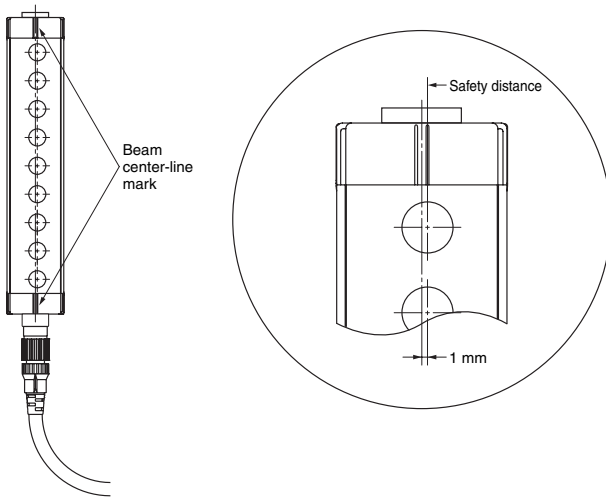
External Indicator Output

(Series-connection type only)

This output can be connected to an external indicator to display one of the operation modes as selected by the F39-MC11. The default of this output is Light-ON output. A desired output operation mode can be selected by using the F39-MC11. (F39-MC11 cannot be connected to the F3SN-B.)

Beam Center-line

The beam center-line is the line going through all of the beams. (See diagram below.) This position is a reference line for measuring safety distance. Use the line closer to the hazardous area as a reference line for the safety distance.



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