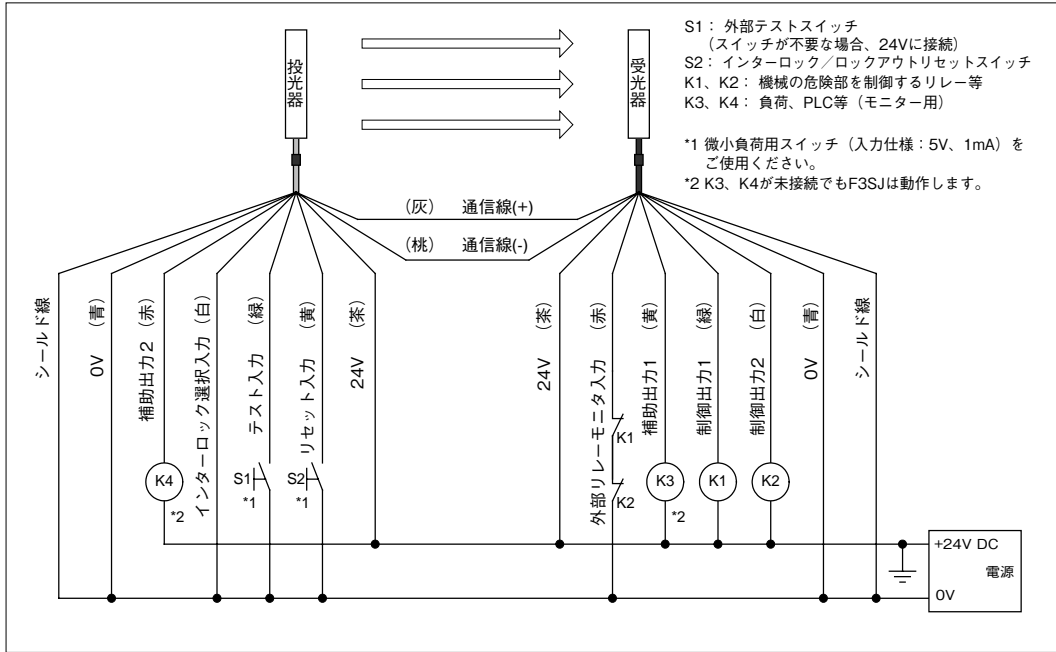


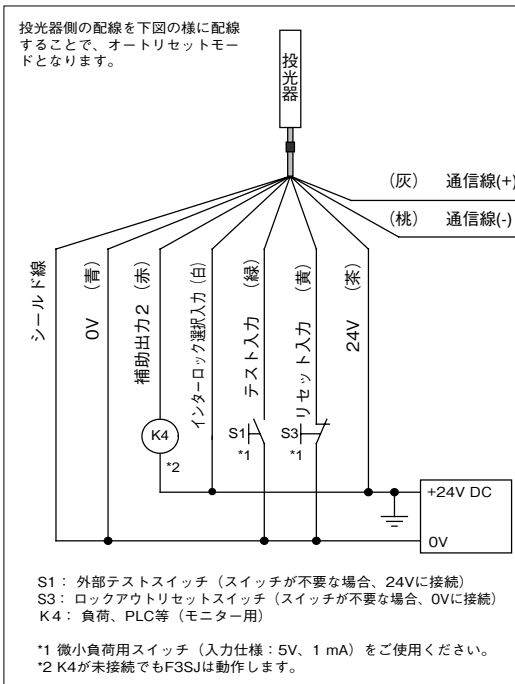
配線図

[ベーシックシステム]

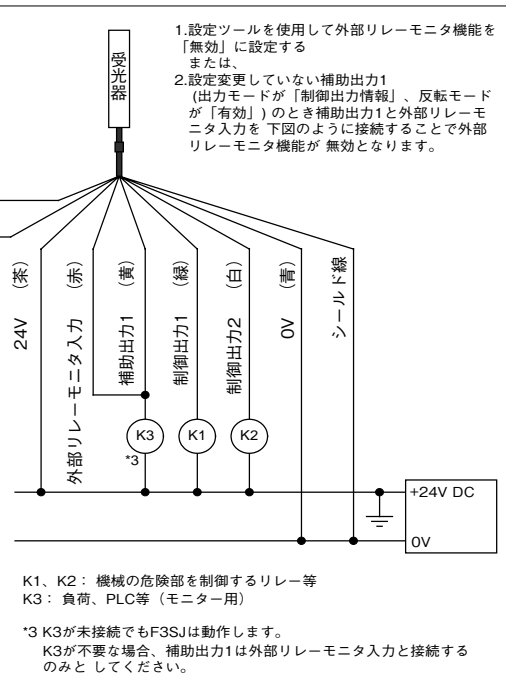
■マニュアルリセットモード、外部リレーモニタ機能を使用する場合の配線図



■オートリセットモードの配線図

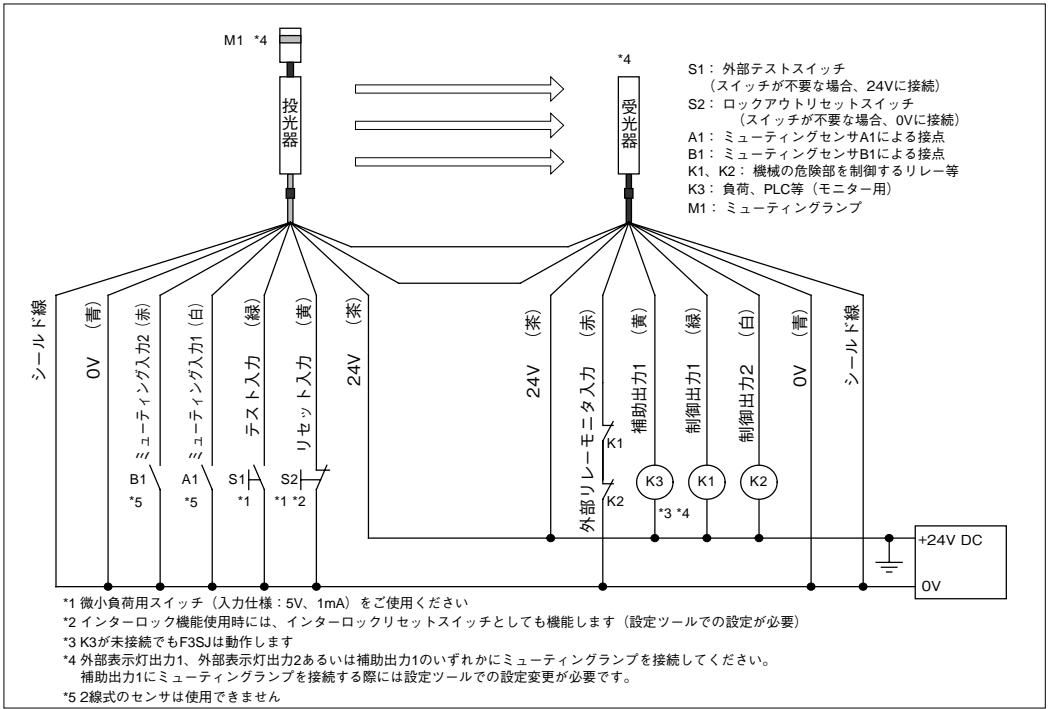


■外部リレーモニタ機能を使用しない場合の配線図



[ミュートシステム]

■外部リレーモニタ機能を使用する場合の配線図

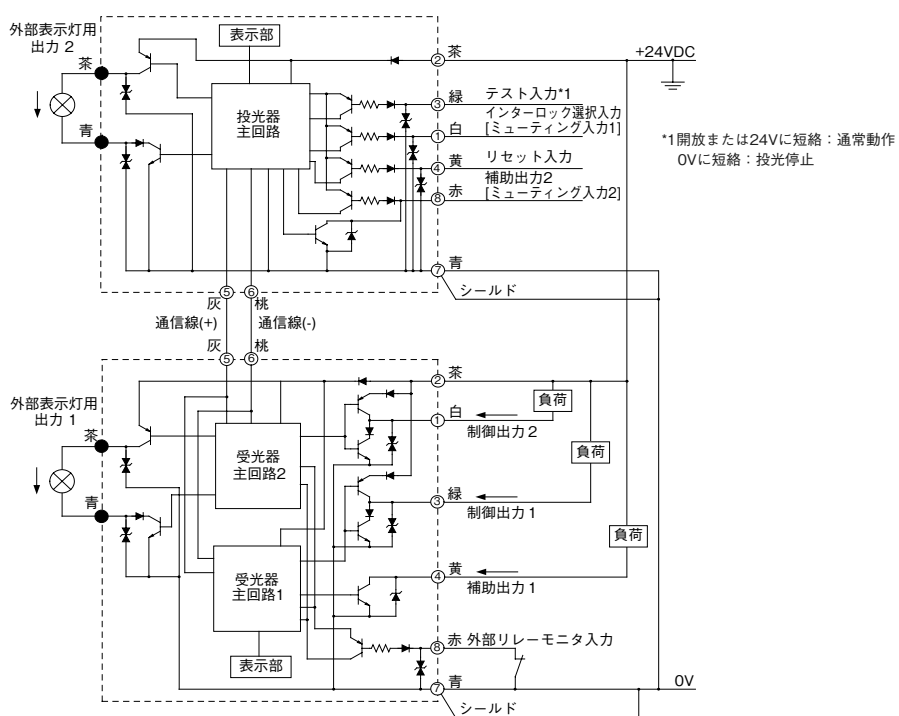


■外部リレーモニタ機能を使用しない場合の配線図

ベーシックシステムの「外部リレーモニタ機能を使用しない場合の配線」と同じです。

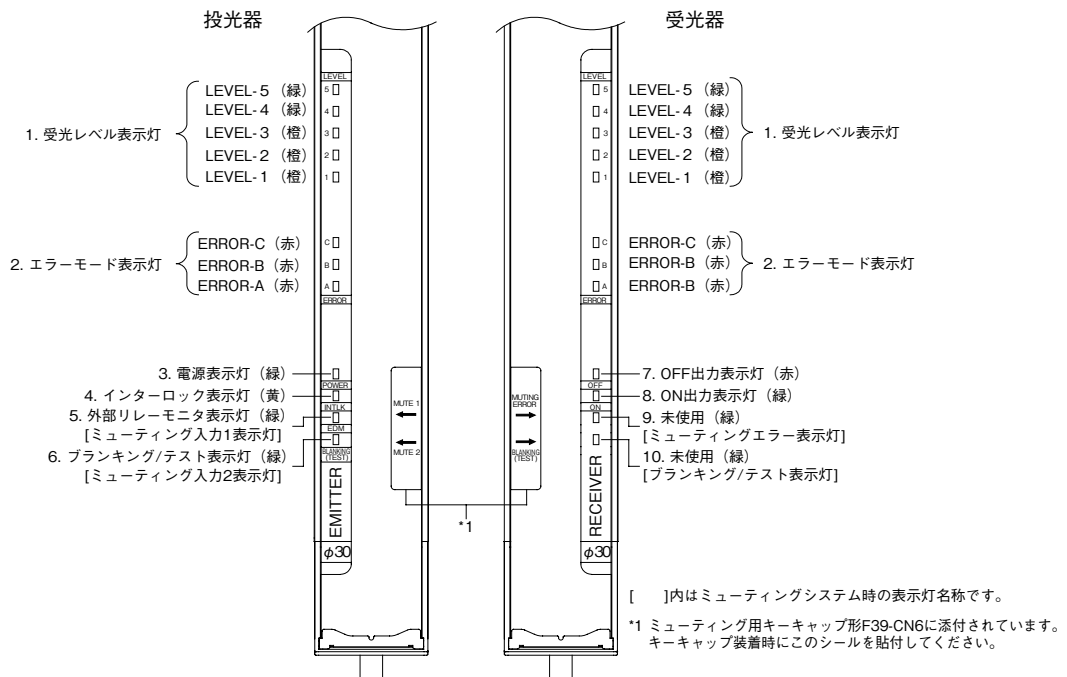
出力回路図

■入出力回路図
○内の数字は、コネクタのピンNo.を示します。●は、直列連結用のコネクタを示します。[]内はミュートシステム時の信号名を示します。



内部表示灯

■内部表示灯



■ベーシックシステム時の内部表示灯の点灯パターン

No.	内部表示灯	点灯/点滅	説明
1	受光レベル表示灯	LEVEL-1~5	1~5の点灯状態で、F3SJの受光状態を示します。
2	エラーモード表示灯	ERROR-A~C	F3SJがロックアウトした場合に点灯/点滅し、A~Cの状態によりエラー原因を示します。F3SJが直列連結されている場合はそれぞれのエラー内容に応じて点灯/点滅します。付属のエラーモードラベルをF3SJの近くに貼付けて使用すると、エラー発生時に原因を調べやすくなります。エラーモードの詳細については「■エラーモード表示灯の点灯パターン」を参照して下さい。
3	電源表示灯	POWER	電源が投入されているときに点灯します。
4	インターロック表示灯	INTLK	F3SJがインターロック状態の場合に点灯します。
5	外部リレーモニタ表示灯	EDM	外部リレーモニタ入力が入力があると点灯します。
6	ブランキング/テスト表示灯	BLANKING /TEST	ブランキング機能、警告エリア機能を有効に設定した場合に点灯します。外部テスト中に点滅します。
7	OFF出力表示灯	OFF	制御出力がOFFのときに点灯します。
8	ON出力表示灯	ON	制御出力がONのときに点灯します。
9	-	-	-
10	-	-	-

■ミュートシステム時の内部表示灯の点灯パターン(ベーシックシステム時と異なる表示灯のみ記載)

No.	内部表示灯	点灯/点滅	説明
5	ミュート入力1表示灯	MUTE1	ミュート入力1が入力があると点灯します。
6	ミュート入力2表示灯	MUTE2	ミュート入力2が入力があると点灯します。
9	ミュートエラー表示灯	MUTING ERROR	ミュートエラー中に点滅します。
10	ブランキング/テスト表示灯	BLANKING /TEST	ブランキング機能を有効に設定した場合に点灯します。外部テスト中に点滅します。

■受光レベル表示灯の点灯パターン

1	2	3	4	5	受光レベル
●	●	●	●	●	制御出力ONレベルの170%以上
●	●	●	●	■	制御出力ONレベルの130~170%未満
●	●	●	■	■	制御出力ONレベルの100~130%未満
●	●	■	■	■	制御出力ONレベルの75~100%未満
●	■	■	■	■	制御出力ONレベルの50~75%未満
■	■	■	■	■	制御出力ONレベルの50%未満

● 点灯
■ 点滅

受光レベル100%以上で動作しますが、安定して使用するには5個点灯した状態で使用してください。

■エラーモード表示灯の点灯パターン

A	B	C	エラー主要原因
●	●	●	相互干渉、外乱光の侵入。
●	●	■	F3SJの電源電圧が定格から外れている。電源の電流容量不足など。
●	●	■	ブランキング光軸に入光した。
●	■	■	通信線の断線、配線ミス、直列連結コード外れ、ノイズの影響、その他異常。
●	■	■	投光器でF3SJの形式、直列連結数が異なる。
●	■	■	設定ツールで設定した機能設定値が、有効範囲から外れている。
●	■	■	キャップ未装着。F3SJ内部回路の故障。
●	■	■	リレーの溶着、復帰時間が長い。外部リレーモニタ線の配線ミス、断線。
●	■	■	インターロック選択入力線、またはリセット入力線の配線ミス、断線。
●	■	■	ミュートシステム時、リセット入力線の配線ミス、断線。
●	■	■	制御出力1もしくは制御出力2の配線ミス。制御出力回路の故障。
●	■	■	直列連結コードの配線ミス、断線。
●	■	■	外部表示灯出力の配線ミス、断線。
●	■	■	補助出力1の短絡、断線。
●	■	■	直列連結コードの断線。
●	■	■	通信線の配線ミス、断線。
●	■	■	ノイズの影響。F3SJ内部回路の故障。

● 点灯
■ 点滅
■ 消灯

詳しくはF3SJユーザーズマニュアルを参照してください。

応答時間/電源コード長さ

■応答時間

検出幅 [mm]	光軸数	応答時間 (ON→OFF) [ms]	応答時間 (OFF→ON) [ms]
245~272	26~29	11	44
281~389	30~42	12	48
398~506	43~55	13	52
515~614	56~67	14	56
623~731	68~80	15	60
740~1019	81~112	17.5	70
1028~1307	113~144	20	80
1316~1595	145~176	22.5	90
1604~1883	177~208	25	100
1892~2117	209~234	27.5	110

検出幅 [mm]	光軸数	応答時間 (ON→OFF) [ms]	応答時間 (OFF→ON) [ms]
260~320	13~16	10	40
340~580	17~29	11	44
600~840	30~42	12	48
860~1100	43~55	13	52
1120~1340	56~67	14	56
1360~1600	68~80	15	60
1620~2240	81~112	17.5	70
2260~2500	113~125	20	80

検出幅 [mm]	光軸数	応答時間 (ON→OFF) [ms]	応答時間 (OFF→ON) [ms]
270~770	6~16	10	40
820~1420	17~29	11	44
1470~2070	30~42	12	48
2120~2470	43~50	13	52

■電源コード長さ

電源コードの延長は、下記の表以下としてください。

条件	単独	2連結	3連結	4連結
白熱表示灯を補助出力、外部表示灯出力に使用する	45m	40m	30m	20m
白熱表示灯を使用しない	100m	60m	45m	30m

F3SJ-A-□□□□N20シリーズ

検出幅 [mm]	光軸数	応答時間 (ON→OFF) [ms]	応答時間 (OFF→ON) [ms]
245	16	10	40
260~440	17~29	11	44
455~635	30~42	12	48
650~830	43~55	13	52
845~1010	56~67	14	56
1025~1205	68~80	15	60
1220~1685	81~112	17.5	70
1700~2165	113~144	20	80
2180~2495	145~166	22.5	90

F3SJ-A-□□□□N30シリーズ

検出幅 [mm]	光軸数	応答時間 (ON→OFF) [ms]	応答時間 (OFF→ON) [ms]
245~395	10~16	10	40
420~720	17~29	11	44
745~1045	30~42	12	48
1070~1370	43~55	13	52
1395~1670	56~67	14	56
1695~1995	68~80	15	60
2020~2495	81~100	17.5	70

直列連結の場合は、次のように計算します。

- *2セットの直列の場合
-応答時間 (ON→OFF): プライマリセンサの応答時間+セカンダリセンサ1の応答時間-1 [ms]
- 応答時間 (OFF→ON): 応答時間 (ON→OFF) × 4 [ms]
- *3セットの直列の場合
-応答時間 (ON→OFF): プライマリセンサの応答時間+セカンダリセンサ1の応答時間+セカンダリセンサ2の応答時間-5 [ms]
- 応答時間 (OFF→ON): 応答時間 (ON→OFF) × 5 [ms]
- *4セットの直列の場合
-応答時間 (ON→OFF): プライマリセンサの応答時間+セカンダリセンサ1の応答時間+セカンダリセンサ2の応答時間+セカンダリセンサ3の応答時間-8 [ms]
- 応答時間 (OFF→ON): 応答時間 (ON→OFF) × 5 [ms]

Original instructions

Model **F3SJ-A** □ □ □ □ □ □ **N** □ □ □ □
(Version 2)

SAFETY LIGHT CURTAIN

INSTRUCTION SHEET

Please read and understand this instruction sheet before storing, installing, programming, operating, maintaining, or disposing of the products. Please consult your OMRON representative if you have any questions or comments.

Please refer to the User's Manual for detailed instructions on usage.

(Representative in EU)

Wegalaan 67-69, 2132 JD Hoofddorp

The NETHERLANDS



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(2/2)

PRECAUTIONS ON SAFETY

Regarding the alert symbols and meanings used for the safe uses

In order for our customers to use the F3SJ in safety, precautions are indicated in this manual with the alert symbols and statements such as the followings. Those safety precautions relate to the important descriptions that must be obeyed for the safe uses and operations. Be sure to obey the precautions. The following indications and symbols are used for the descriptions.

	WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
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Alert Statements in this Manual

For Users

	WARNING
The F3SJ must be installed, configured, and incorporated into a machine control system by a sufficiently trained and qualified person. An unqualified person may not be able to perform these operations properly, which may cause a person to go undetected, resulting in serious injury.	
When changes are made to each function using the setting tool (F39-GWUM or F39-MC21), the administrator must manage the details of the changes and perform the changes. Accidental functional setting change may cause failure of human body detection, resulting in a serious injury.	

For Machines

	WARNING
Do not use this sensor for machines that cannot be stopped by electrical control. For example, do not use it for a pressing machine that uses full-rotation clutch. Otherwise, the machine may not stop before a person reaches the hazardous part, resulting in serious injury.	
Do not use the auxiliary output or external indicator output for safety applications. Human body may not be detected when F3SJ fails, resulting in serious injury.	

For Installation

	WARNING
Make sure to test the operation of the F3SJ after installation to verify that the F3SJ operates as intended. Make sure to stop the machine until the test is complete. Unintended function settings may cause a person to go undetected, resulting in serious injury.	
Make sure to install the F3SJ at the safe distance from the hazardous part of the equipment. Otherwise, the machine may not stop before a person reaches the hazardous part, resulting in serious injury.	
Install a protective structure so that the hazardous part of a machine can only be reached by passing through the sensor's detection zone. Install the sensors so that part of the person is always present in the detection zone when working in a machine's hazardous areas. If a person is able step into the hazardous area of a machine and remain behind the F3SJ's detection zone, configure the system with an interlock function that prevents the machine from being restarted. Failure to do so may result in serious injury.	
Install the interlock reset switch in a location that provides a clear view of the entire hazardous area and where it cannot be activated from within the hazardous area.	
The F3SJ cannot protect a person from an object flying from a hazardous area. Install protective cover(s) or fence(s).	
To prevent personnel approach to dangerous part of the machine through an area disabled by the fixed blanking function, you must install a protective structure to cover the whole disabled area. Failure to do so may cause failure of human body detection, resulting in a serious injury.	
You must ensure that a test rod is detected for all detection areas except where fixed blanking function is used. Failure to do so may cause failure of human body detection, resulting in a serious injury.	
Detection capability gets larger when fixed/floating blanking function is used. You must use the detection capability for fixed and floating blanking functions. Failure to do so may cause failure of machine stop before reaching the machine's dangerous part, resulting in a serious injury.	
The muting and override functions disable the safety functions of the device. You must ensure safety using other method when these functions are operating.	
Install muting sensors so that they can distinguish between the object that is being allowed to pass through the detection zone and a person. If the muting function is activated by the detection of a person, it may result in serious injury.	
Muting lamps (external indicators) that indicate the state of the muting and override functions must be installed where they are clearly visible to workers from all the operating positions.	
Muting related time must be properly configured for its application by a sufficiently trained and qualified person, and the person must have responsibility for settings, especially when setting the muting time limit to infinite.	
Use independent 2 input devices for muting inputs.	
You must install F3SJ, muting sensor, and physical barrier, and configure time settings for muting so that an operator should not enter hazardous zone.	
Install the switch that activates the override in a location that provides a clear view of the entire hazardous area and where it cannot be activated from within the hazardous area. Make sure that nobody is in the hazardous area before activating the override function.	
Install the sensor system so that it is not affected by the reflective surface of the F3SJ.	
When using more than 1 set of F3SJ, install them so that mutual interference does not occur, such as by configuring series connections or using physical barriers between adjacent sets.	
Make sure that the F3SJ is securely mounted and its cables and connectors are properly connected.	
Make sure that foreign material such as water, oil, or dust does not enter the F3SJ or the connector while the cap is removed.	
Do not use the sensor system with mirrors in a retro-reflective configuration. Doing so may hinder detection. It is possible to use mirrors to "bend" the detection zone to a 90-degree angle.	
Perform an inspection for all F3SJ as described in "Chapter 6 Checklists" of User's manual. When using series connections, perform inspections for every connected F3SJ.	

For Wiring

	WARNING
Connect the load between the output and 24V line (NPN output). Connecting the load between the output and 0V line will result in a dangerous condition because operation is reversed to "ON when blocked".	
Do not short-circuit the output line to the 0V line. Otherwise, the output is always ON. Also, the +24V of the power supply must be grounded so that output does not turn ON due to grounding of the output line.	
Configure the system by using the optimal number of safety outputs that satisfy the requirements of the necessary safety category.	
Do not connect each line of F3SJ to a DC power supply of more than 24VDC+20%. Also, do not connect to an AC power supply. Failure to do so may result in electric shock.	
For the F3SJ to comply with IEC 61496-1 and UL 508, the DC power supply unit must satisfy all of the following conditions: <ul style="list-style-type: none">• Must be within the rated power voltage (24V DC ± 20%)• Must have tolerance against the total rated current of devices if it is connected to multiple devices• Must comply with EMC directives (industrial environment)• Double or reinforced insulation must be applied between the primary and secondary circuits• Automatic recovery of overcurrent protection characteristics (reversed L sagging)• Output holding time must be 20ms or longer• Must satisfy output characteristic requirements for class 2 circuit or limited voltage current circuit defined by UL508• Must comply with laws and regulations, regarding EMC and electrical equipment safety, of the country or region where the F3SJ is used (Ex: In EU, the power supply must comply with the EMC Directive and the Low Voltage Directive.)	
Double or reinforced insulation from hazardous voltage must be applied to all input and output lines. Failure to do so may result in electric shock.	
Extension of the cable must be within a specified length. If it isn't, safety function may not work properly, resulting in danger.	

Other

	WARNING
To use the F3SJ in PSDI mode (Reinitiation of cyclic operation by the protective equipment), you must configure an appropriate circuit between the F3SJ and the machine. For details about PSDI, refer to OSHA1910.217, IEC61496-1, and other relevant standards and regulations.	
Do not try to disassemble, repair, or modify this product. Doing so may cause the safety functions to stop working properly.	
Do not use the F3SJ in environments where flammable or explosive gases are present. Doing so may result in explosion.	
Perform daily and 6-month inspections for the F3SJ. Otherwise, the system may fail to work properly, resulting in serious injury.	

PRECAUTIONS FOR SAFE USE

Make sure to observe the following precautions that are necessary for ensuring safe use of the product.

- Thoroughly read this manual and understand the installation procedures, operation check procedures, and maintenance procedures before using the product.
- Loads must satisfy both of the following conditions:
 - Not short-circuited
 - Not used with a current that is higher than the rating
- Do not drop the product.
- Dispose of the product in accordance with the relevant rules and regulations of the country or area where the product is used.

PRECAUTIONS FOR CORRECT USE

Observe the precautions described below to prevent operation failure, malfunctions, or undesirable effects on product performance.

■ Installation environment

- Do not install the F3SJ in the following types of environments:
 - Areas exposed to intense interference light, such as direct sunlight
 - Areas with high humidity where condensation is likely to occur
 - Areas where corrosive gases are present
 - Areas exposed to vibration or shock levels higher than in the specification provisions
- Areas where the product may come into contact with water
- Areas where the product may get wet with oil that can solve adhesive
- Do not use radio equipment such as cellular phones, walkie-talkies, or transceivers near the F3SJ.
- This is a class A product. In residential areas it may cause radio interference, in which case the Responsible Person may be required to take adequate measures to reduce interference.
- Wiring and installation
 - Make sure to perform wiring while the power supply is OFF. Otherwise, the F3SJ may fail to operate due to the diagnosis function.
 - Do not short-circuit output lines to 0V line. Otherwise a fault of F3SJ may occur.

RATINGS

■ Ratings/Specifications

In type names in this table, the **** contain the 4 digits indicating the protective height (mm).

	F3SJ-A****N14	F3SJ-A****N20	F3SJ-A****N25	F3SJ-A****N30	F3SJ-A****N55
Detection capability	Opaque objects Diameter 14mm	Opaque objects Diameter 20mm	Opaque objects Diameter 25mm	Opaque objects Diameter 30mm	Opaque objects Diameter 55mm
Beam gap	9mm	15mm	20mm	25mm	50mm
Number of beams	26 to 234	16 to 166	13 to 125	10 to 100	6 to 50
Protective height	245 to 2,117mm	245 to 2,495mm	260 to 2,500mm	245 to 2,495mm	270 to 2,470mm
Lens diameter	Diameter 5mm				
Operating range	0.2 to 9m (for protective height up to 1649 mm) 0.2 to 7m (for protective height 1655 mm or greater) (Operating range can be reduced to 0.5m through the setting tool)				
Response time	ON to OFF: 10ms to 27.5ms max., OFF to ON: 40ms to 110ms max. (when incidence is stable). Refer to the reverse side for details.				
Startup waiting time	2s max. (2.2s max in case of series connection)				
Power supply voltage(Vs)	24VDC ± 20% (ripple p-p10% max.)				
Current consumption (no load)	Emitter	Up to 50 beams: 76 mA max., 51 to 100 beams: 106 mA max., 101 to 150 beams: 130 mA max., 151 to 200 beams: 153 mA max., 201 to 234 beams: 165 mA max.			
	Receiver	Up to 50 beams: 68 mA max., 51 to 100 beams: 90 mA max., 101 to 150 beams: 111 mA max., 151 to 200 beams: 128 mA max., 201 to 234 beams: 142 mA max.			
Light source	Infrared LED (870nm wavelength)				
Effective aperture angle (EAA)	Within ±2.5° for the emitter and receiver at a detection distance of at least 3 m according to IEC61496-2				
Safety outputs(OSSD)	NPN transistor outputs x 2, Load current 300mA max, Residual voltage 2V max. (except for voltage drop due to cable extension)(including inductance load), Maximum capacity load 2.2 μF, Leakage current 2 mA max. (This may be different from previously used logic (ON/OFF) because safety circuit is used.)				
Auxiliary output 1 (Non-safety output)	NPN transistor output x 1, Load current 300mA max., Residual voltage 2V max. (except for voltage drop due to cable extension), Leakage current 1mA max.				
Auxiliary output 2 (non-safety output, afunction for a basic system)	NPN transistor output x 1, Load current 50mA or less, Residual voltage 2V or less (excluding influence by cable extension), Leakage current 1mA or less				
External indicator output (Non-safety output)	Connectable external indicator - Incandescent lamp : 24VDC, 3 to 7W - LED lamp : Load current 10 to 300mA max. Leakage current 1mA max.(An indicator cable F39-JJ3N or F39-A01P*PAC is required when using an external indicator.)				
Output operation mode	Safety outputs : ON when receiving light Auxiliary output 1 : Reverse output of safety output (operation mode can be changed by the setting tool) Auxiliary output 2 : Turns ON when 30,000 hours of power-on time passes (operation mode can be changed by the setting tool) External indicator output 1 : Reverse output of safety output (for basic system), ON during muting/override (for muting system) (Operation mode can be changed by the setting tool) External indicator output 2 : ON in lockout (for basic system), ON during muting/override (for muting system) (operation mode can be changed by the setting tool)				
Input voltage	Test input, interlock selection input, reset input, and muting input are all: ON voltage: 0 to 1.5V (short-circuit current 3mA max.) OFF voltage: 9 to 24Vs, or open External device monitoring input is: ON voltage: 0 to 1.5V (short-circuit current 5mA max.) OFF voltage: 9 to 24Vs, or open				
Indicators	Emitter	Incident light level indicators (green LED x 2, orange LED x 3): ON based on the amount of incident light Error mode indicators (red LED x 3): Blink to indicate error details Power indicator (green LED x 1): ON while power is ON Interlock indicator (yellow LED x 1): ON when in interlock/Blinks when in lockout External device monitoring indicator [muting input 1 indicator], Blanking/ Test indicator [muting input 2 indicator] (green LED x2): ON/Blink according to function			
	Receiver	Incident light level indicators (green LED x 2, orange LED x 3): ON based on the amount of incident light Error mode indicators (red LED x 3): Blink to indicate error details OFF-state indicator (red LED x 1): ON when safety outputs are OFF/ Blinks when in lockout ON-state indicator (green LED x 1): ON when safety outputs are ON Muting error indicator, Blanking/Test indicator (green LED x 2): ON/Blink according to function			
Mutual interference prevention function	Interference light avoidance algorithm, Operating range change function				
Series connection	Time division emission by series connection - Number of connections: Up to 4 sets - Total number of beams: Up to 400 - Maximum cable length between 2 sets of sensors: 15m				
Test function	- Self-test (After power ON, and during operation) - External test (light emission stop function by test input)				
Safety-related functions	- Start interlock, restart interlock (The setting tool is required when muting function is used) - External device monitoring - Muting (Includes lamp breakage detection and override functions. F39-CN6 key cap for muting is required) - Fixed blanking (configuration by the setting tool is required) - Floating blanking (configuration by the setting tool is required)				
Connection method	Connector method (M12, 8-pin)				
Protection circuit	Output short-circuit protection, and power supply reverse polarity protection				
Ambient temperature	During operation: -10 to 55°C (without freezing), During storage: -30 to 70°C				
Ambient humidity	During operation: 35 to 85%RH (no condensation), During storage: 35 to 95%RH				
Ambient light intensity	Incandescent lamp: receiving-surface light intensity of 3,000 lx max., Sunlight: receiving-surface light intensity of 10,000 lx max.				
Insulation resistance	20MΩ or higher (500VDC)				
Dielectric strength voltage	1, 000VAC, 50/60Hz, 1min				
Degree of protection	IP65 (IEC60529)				
Vibration resistance	Malfunction: 10 to 55Hz, Multiple amplitude of 0.7mm, 20 sweeps each in X, Y, and Z directions				
Shock resistance	Malfunction: 100m/s ² , 1,000 times each in X, Y, and Z directions				
Connection cable, Series connection cable (F39-JJR* _L , JJR3W)	Dia. 6 mm, 8-wire (0.15mm ² x 8) with braided shield, Allowable bending radius R5mm				
Extension cable (F39-JC* _A , JC* _B)	Dia. 6.6 mm, 8-wire (0.3mm ² x 4P, conductor resistance 0.058 ohm/m), with braided shield, Allowable bending radius of R36mm. (To extend a cable, use an equivalent or higher-performance cable (twisted-pair wire) , and do not use the cable in the same duct as that for high-voltage cables or power cables) For details about extension lengths (Power Cable Length), refer to next page				
Material	Casing (including metal parts on both ends): Aluminum, zinc die-cast Cap: ABS resin Optical cover: PMMA resin (acrylic) Cable: Oil resistant PVC				
Weight (packaged)	- F3SJ-A****N14 Weight (g)=(protective height) x 1.7+ α - F3SJ-A****N20/F3SJ-A****N25/F3SJ-A****N30 Weight (g)=(protective height) x 1.5+ α - F3SJ-A****N55 Weight (g)=(protective height) x 1.4+ α The values for α are as follows: When protective heights between 245 and 596mm, α=1100 When protective heights between 600 and 1130mm, α=1500 When protective heights between 1136 and 1658mm, α=2000 When protective heights between 1660 and 2180mm, α=2400 When protective heights between 2195 and 2500mm, α=2600				
Accessories	*Test rod(*1), instruction sheet, top and bottom mounting brackets, intermediate mounting brackets (*2), error mode label, user's manual (CD-ROM) *1 F3SJ-A****N55 does not include test rod. *2 The number of intermediate mounting brackets depends on the total length of the F3SJ. - F3SJ total length is from 600 to 1,130mm: 1 set for each the emitter and receiver is included - F3SJ total length is from 1136 to 1,658mm: 2 sets for each the emitter and receiver are included - F3SJ total length is from 1660 to 2,180mm: 3 sets for each the emitter and receiver are included - F3SJ total length is from 2195 to 2500mm: 4 sets for each the emitter and receiver are included				
Applicable standards	IEC61496-1, EN61496-1, UL61496-1 Type 4ESPE (Electro-Sensitive Protective Equipment) IEC61496-2, prEN61496-2, UL61496-2 Type 4AOPD (Active Opto-electronic Protective Devices) IEC61508, EN61508 SIL3				

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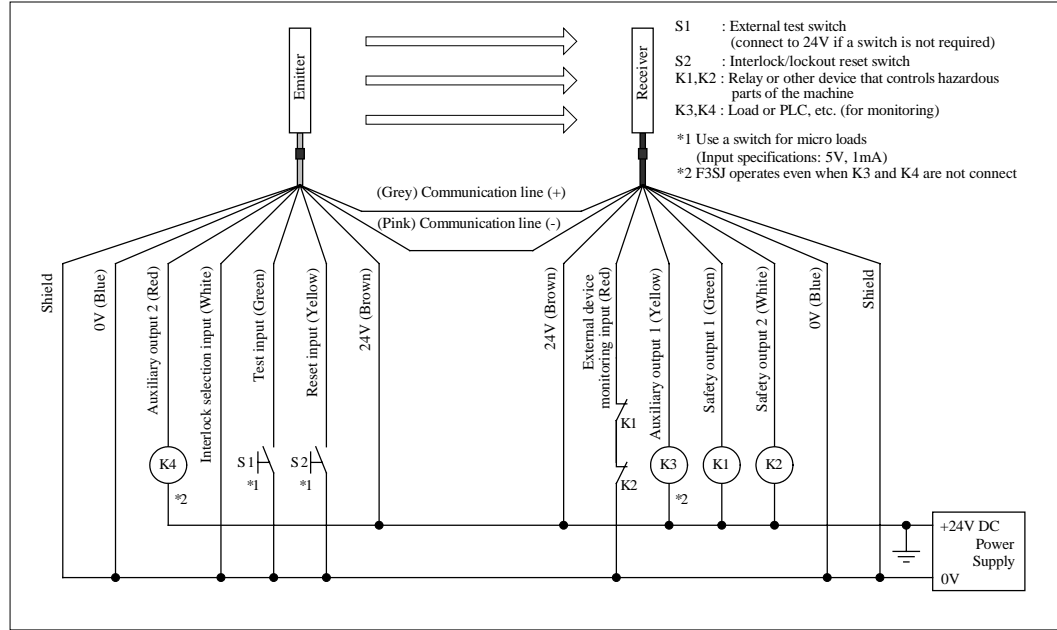
OMRON Corporation
Shiokoji Horikawa, Shimogyo-ku, Kyoto, 600-8530 JAPAN
Tel: (81)75-344-7093 / Fax: (81)75-344-8197

OMRON EUROPE B.V
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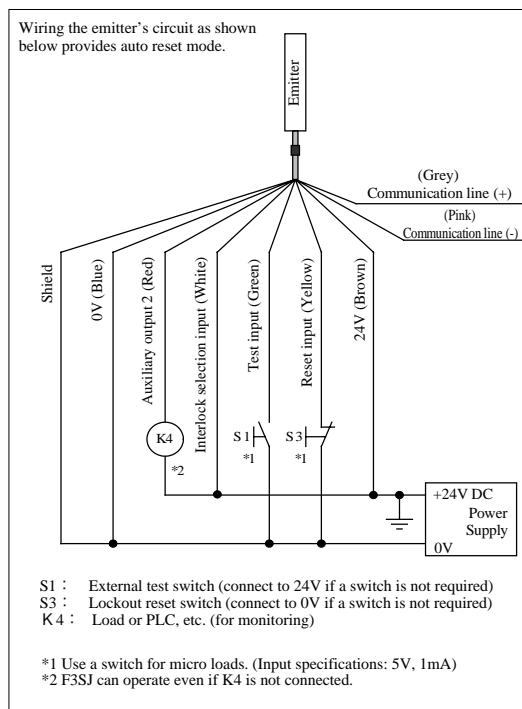
Wiring Diagrams

[Basic System]

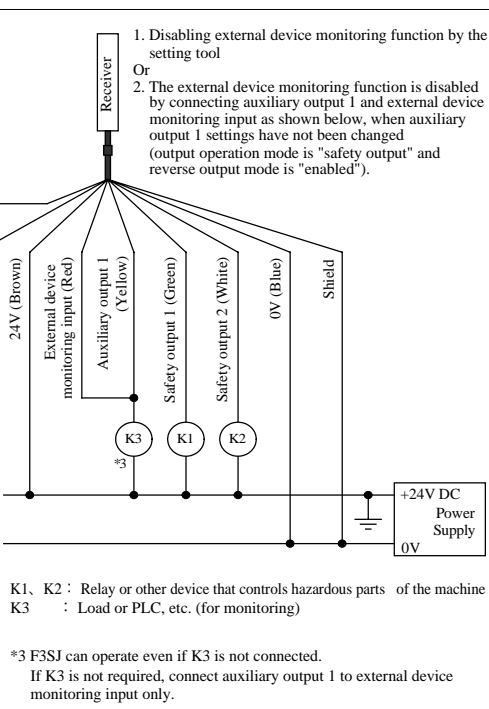
Wiring using manual reset mode, external device monitoring



Wiring for auto reset mode

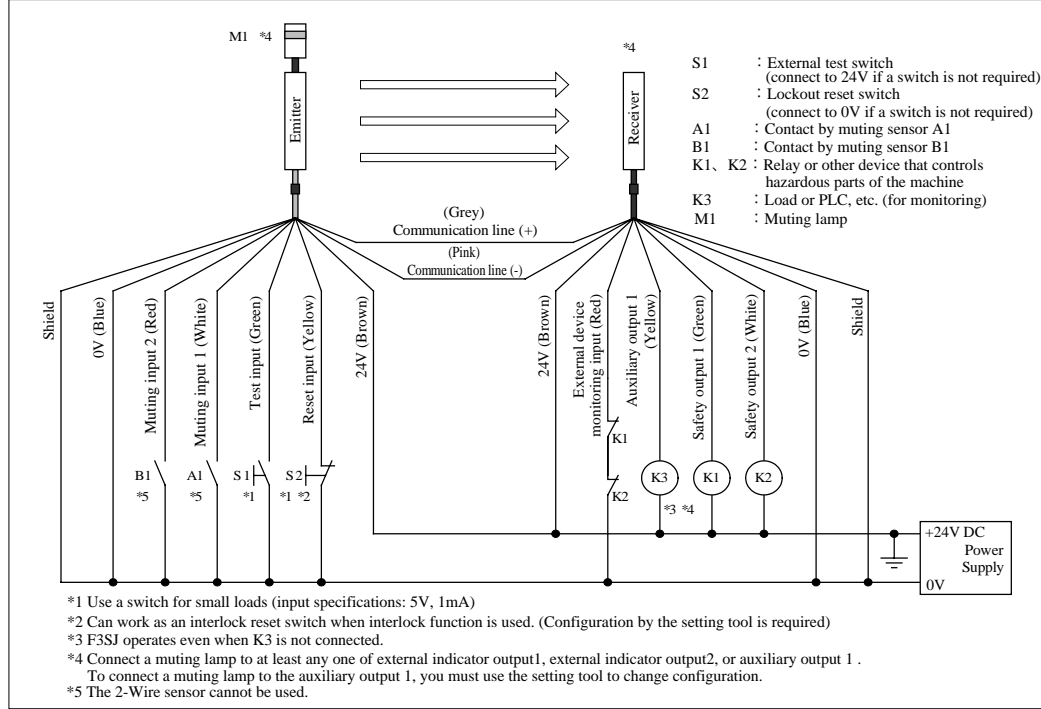


Wiring when external device monitoring function is not used



[Muting System]

Wiring when using muting and external device monitoring functions



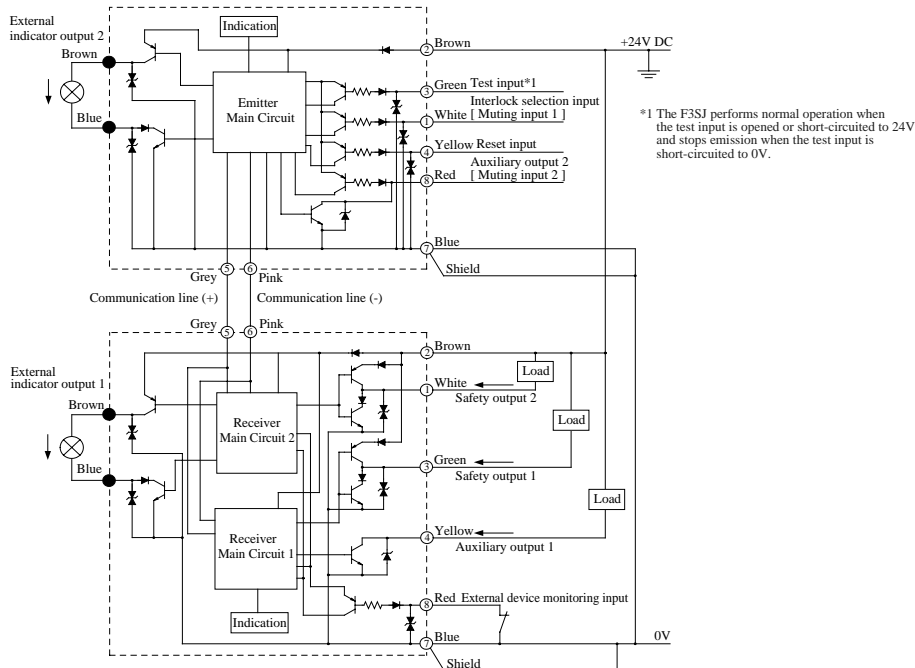
Wiring when external device monitoring function is not required

Wiring diagram is the same as that for "Wiring when external device monitoring function is not used" of the basic system.

Input/Output Circuit

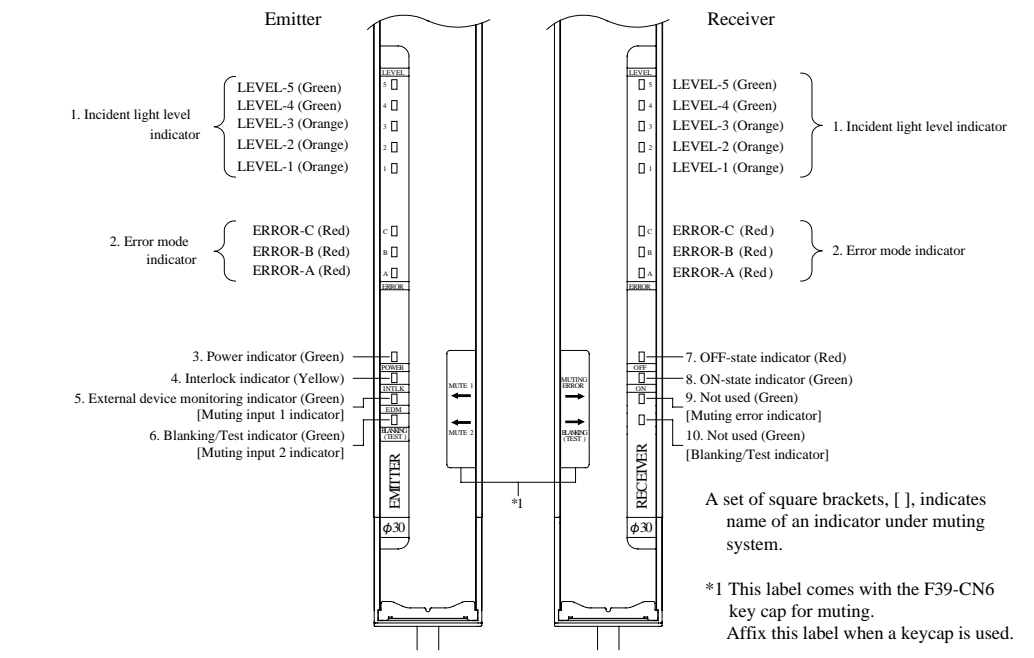
Input/output circuit

The numbers in white circles indicate the connector's pin numbers.
 The black circles indicate connectors for series connection.
 The words in brackets [] indicate the signal name for muting system.



Indicator Display Patterns

Indicators



Indicator display patterns for a basic system

No.	Indicators	ON/Blinking	Description	
1	Incident light level indicator	LEVEL-1 to 5	ON	Indication status of LEVEL-1 to 5 shows the incident light level status of the F3SJ.
2	Error mode indicator	ERROR-A to C	ON/Blinking	Turns ON or blinks only when the F3SJ enters lockout, and the cause of the error is indicated by the status of ERROR-A to C indicators. When F3SJ are series-connected, the error mode indicator lamps turn ON or blink according to the details of each error. Affix the error mode label (included) near the F3SJ to allow for quick trouble shooting when errors occur. For details about error mode, refer to " ■ Indication patterns of error mode indicator".
3	Power indicator	POWER	ON	Turns ON while the power is ON.
4	Interlock indicator	INTLK	Blinking	Blinks under maintenance status.
5	External device monitoring indicator	EDM	ON	Turns ON when F3SJ is in interlock state.
6	Blanking/Test indicator	BLANKING /TEST	Blinking	Blinks when in lockout.
7	OFF-state indicator	OFF	ON	Turns ON when safety outputs are OFF.
8	ON-state indicator	ON	Blinking	Blinks at following states ; - Lockout state - One or more beams are blocked during the maintenance status.
9	-	-	-	-
10	-	-	-	-

Indicator display patterns for a muting system (Indicator display different from a basic system are described.)

No.	Indicators	ON/Blinking	Description	
5	Muting input 1 indicator	MUTE1	ON	Turns ON when an input is given to muting input 1.
6	Muting input 2 indicator	MUTE2	Blinking	Blinks under muting/override.
9	Muting error indicator	MUTING ERROR	ON	Turns ON when an input is given to muting input 2.
10	Blanking/Test indicator	BLANKING /TEST	Blinking	Blinks under muting/override.

Indication patterns of the incident light level indicator

ON	OFF	Incident light level
ON	OFF	170% or higher of safety output ON level
ON	OFF	From 130 to less than 170% of safety output ON level
ON	OFF	From 100 to less than 130% of safety output ON level
ON	OFF	From 75 to less than 100% of safety output ON level
ON	OFF	From 50 to less than 75% of safety output ON level
ON	OFF	Less than 50% of safety output ON level

Operation is possible with incident light level of 100% or more, but to ensure stability, operate when all incident light level indicators

Indication patterns of error mode indicator

A	B	C	Main cause of error
ON	ON	ON	Mutual interference or disturbance light.
ON	ON	ON	Power supply voltage of F3SJ is out of rated range. Insufficient current capacity of power supply.
ON	ON	ON	Light incidence to a blanking beam.
ON	ON	ON	Breakage, incorrect wiring of communication line, disconnection of series-connection cable, influence of noise, or other errors.
ON	ON	ON	The models of the emitter and receiver in a set are different.
ON	ON	ON	Function setting value configured by the setting tool is out of valid range.
ON	ON	ON	End cap is not attached. Failure of internal circuit of F3SJ.
ON	ON	ON	Relay is welded or recovery time is too long. Incorrect wiring or breakage of external device monitoring line.
ON	ON	ON	Incorrect wiring or breakage of interlock selection input line or reset input line.
ON	ON	ON	Incorrect wiring or breakage of reset input line for a muting system.
ON	ON	ON	Incorrect wiring of safety output 1 or 2. Failure of safety output circuit.
ON	ON	ON	Incorrect wiring or breakage of series-connection cable.
ON	ON	ON	Incorrect wiring or circuit breakage of external indicator output.
ON	ON	ON	Auxiliary output 1 is detached or broken.
ON	ON	ON	Broken series-connection cable.
ON	ON	ON	Incorrect wiring or breakage of communication line.
ON	ON	ON	Effect of noise. F3SJ Failure of internal circuit.

Refer to F3SJ User's manual for details.

Response Times / Power Cable Length

Response times

Protective height [mm]	Number of beams	Response time (ON to OFF) [ms]	Response time (OFF to ON) [ms]
245~272	26~29	11	44
281~389	30~42	12	48
398~506	43~55	13	52
515~614	56~67	14	56
623~731	68~80	15	60
740~1019	81~112	17.5	70
1028~1307	113~144	20	80
1316~1595	145~176	22.5	90
1604~1883	177~208	25	100
1892~2117	209~234	27.5	110

F3SJ-A****N14

Protective height [mm]	Number of beams	Response time (ON to OFF) [ms]	Response time (OFF to ON) [ms]
260~320	13~16	10	40
340~580	17~29	11	44
600~840	30~42	12	48
860~1100	43~55	13	52
1120~1340	56~67	14	56
1360~1600	68~80	15	60
1620~2240	81~112	17.5	70
2260~2500	113~125	20	80

F3SJ-A****N25

Protective height [mm]	Number of beams	Response time (ON to OFF) [ms]	Response time (OFF to ON) [ms]
270~770	6~16	10	40
820~1420	17~29	11	44
1470~2070	30~42	12	48
2120~2470	43~50	13	52

F3SJ-A****N55

Protective height [mm]	Number of beams	Response time (ON to OFF) [ms]	Response time (OFF to ON) [ms]
270~770	6~16	10	40
820~1420	17~29	11	44
1470~2070	30~42	12	48
2120~2470	43~50	13	52

Power cable length

Extension of power cable must be the length shown below or shorter:

Condition	Single	2 connected	3 connected	4 connected
Incandescent display lamps are used by auxiliary output and/or external indicator output	45m	40m	30m	20m
Incandescent display lamps are not used	100m	60m	45m	30m

F3SJ-A****N20

Protective height [mm]	Number of beams	Response time (ON to OFF) [ms]	Response time (OFF to ON) [ms]
245	16	10	40
260~440	17~29	11	44
455~635	30~42	12	48
650~830	43~55	13	52
845~1010	56~67	14	56
1025~1205	68~80	15	60
1220~1685	81~112	17.5	70
1700~2165	113~144	20	80
2180~2495	145~166	22.5	90

F3SJ-A****N30

Protective height [mm]	Number of beams	Response time (ON to OFF) [ms]	Response time (OFF to ON) [ms]
245~395	10~16	10	40
420~720	17~29	11	44
745~1045	30~42	12	48
1070~1370	43~55	13	52
1395~1670	56~67	14	56
1695~1995	68~80	15	60
2020~2495	81~100	17.5	70

For series connections, use the calculations below.

When 2 sets are series-connected
 Response time (ON to OFF):
 Response time of 1st unit + Response time of 2nd unit - 1 (ms)
 Response time (OFF to ON):
 Response time from the above calculation x 4 (ms)

When 3 sets are series-connected
 Response time (ON to OFF):
 Response time of 1st unit + Response time of 2nd unit + Response time of 3rd unit - 5 (ms)
 Response time (OFF to ON):
 Response time from the above calculation x 5 (ms)

When 4 sets are series-connected
 Response time (ON to OFF):
 Response time of 1st unit + Response time of 2nd unit + Response time of 3rd unit + Response time of 4th unit - 8 (ms)
 Response time (OFF to ON):
 Response time from the above calculation x 5 (ms)