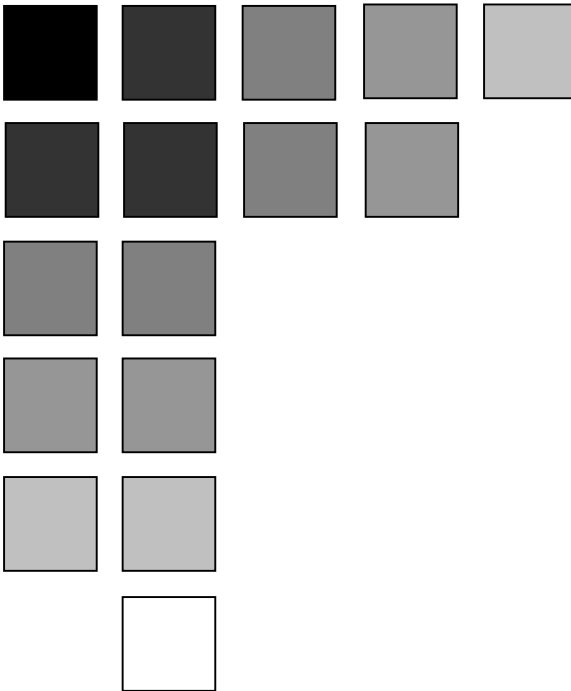


OMRON

F3SP-U2P

Muting Controller

Instruction Manual



Cat No. Z175-E1-01

Introduction

Thank you for purchasing the F3SP-U2P Muting Controller, (hereinafter referred to as "the F3SP").

This is the Instruction Manual describing the use of the F3SP.

Always heed the following points when using the F3SP:

- Read this manual and the light curtain's manual thoroughly and be sure you understand the information provided before attempting to operate the F3SP and light curtain.
- It is assumed that the F3SP will be used properly according to the installation environment, performance and function of the machine.
- Qualified personnel should conduct risk assessment on the machine and determine the suitability of this product before installation.
- Make sure that the personnel operating the F3SP are knowledgeable about its operation and the machine on which it is installed.
- Keep the manual in a secure and convenient location and refer to it as necessary.

Regulations and Standards

1. The F3SP conforms with the EC requirements in compliance with the following standards:
 - Low Voltage Directive 73/23/EEC
 - EMC Directive 89/336/EEC
 - Machinery Directive 98/37/EC
 - IEC 61496-1: 1997
 - DIN V VDE 0801: 1990 and Amendment A1: 1994
 - EN 50081-2: 1993
 - EN 55022: 1994
 - DIN EN 60204-1: 1993
 - EN50178: 1997
2. The F3SP received the following approvals from the Third Party Assessment Body UL:
 - Certificate of UL listing for US and Canadian safety standards
UL508 CSA C22.2 No.14

Notice

Give sufficient safety considerations and make enough allowance with regard to ratings and functions of the system when using the F3SP under following conditions:

- (1) Conditions or environment not specified in this manual
- (2) Applications to devices and facilities requiring special safety precautions, such as; nuclear energy control, railway, aircraft, vehicles, combustion facility, medical system, space development, large amusement machines, etc.

Precaution on Safety

● General conventions for safe use

The following conventions are used for precautionary items in this manual in order to ensure safe and proper use of the F3SP. Items listed here are critical for safety and must be heeded at all times.



WARNING

Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



Indicates prohibited actions.



WARNING

The F3SP has been designed to be used with the dedicated safety light curtain. It must not be connected to other safety light curtains.

The F3SP complies with the requirements for type 4 safety equipment in accordance with the international standards, IEC 61496-1. However, the safety system category depends on the safety light curtain's type as follows.

Type 4 safety light curtain:	Safety system category 4
Type 2 safety light curtain:	Safety system category 2

Do not use the F3SP on machines that cannot be stopped by electrical control in case of an emergency, such as a pressing machine with full-rotation clutch system. Serious injury may result if the machine does not stop before someone reaches the hazardous part.

Muting and Override function can disable the safety functions of a machine. The proper installation, checkout and operation of a machine and muting system in accordance with all applicable laws and standards, is critical to the safe operation of the machine.

Failure to comply with these instructions may result in severe injury to personnel.



WARNING

Muting sensors must be positioned so that they cannot be activated inadvertently by personnel.

The muting lamp for indication “active muting” or “active override” must be positioned in a place where it can be seen from any operative point.

Be sure to use the incandescent lamp for the muting lamp and the replacement light bulb.

Do not use LED lamp. Failure to do this may cause the F3SP to fail to detect the breakdown of the muting lamp and may result in serious injury.

The TEST and RESET buttons must be positioned in such a way

- that the operator can see the protected area when he carries out reset, test, or override operations.

- that it can not be activated from inside the hazardous area.

Always use the two OSSD outputs to configure the safety system.

Using only one OSSD of the safety system may result in serious injury when there is an output circuit failure.

Do not connect the F3SP to AC or DC power supply with higher voltage than nominal 24VDC.

Configuration of dip switch is must only carries out by qualified person.

A qualified person, as determined by regulations, must confirm that installation and inspection are implemented correctly.

Do not use the F3SP until the final inspections are completed (see chapter 5). Failure to do so may result in loss of life or serious injury.

DC power supply units must satisfy all of the conditions;

- The power supply voltage must be within specified ratings (24 VDC \pm 10 %).
- The power supply is connected only to the F3SP, light curtain, and muting sensors. The power supply must not be connected to other devices or machines.
- The power supply uses double or reinforced insulation between the primary and secondary circuits
- The power supply automatically resets overcurrent protection characteristics (voltage drop).
- The power supply maintains an output holding time of at least 20 ms.
- FG (frame ground terminal) must be connected to PE (protective earth) when using a commercially available switching regulator.
- The power supply must have output characteristics of Class 2 Circuit of Limited Voltage-Current Circuit as defined in UL508
- The power supply must conform to regulatory requirements and standards, regarding EMC and electrical equipment safety, of the country where the F3SP is installed and where machinery will be operated. Example: The EMC Directive (industrial environment) and the Low Voltage Directive in EU.

Notice

For your safety, always heed the followings

- (1) The procedures of installation and inspection in this manual should be read carefully.
- (2) Loads must satisfy all the conditions below:
 - Is not short-circuited.
 - Is not used with current higher than the rating.
- (3) Be sure to dispose of the F3SP as industrial waste.

Correct Usage

1. Muting lamp is required for operation of F3SP, even if you don't use muting function. Be sure to prepare and install muting lamp. (Please refer to Section 1-3 Ratings and Performance)
2. Installation Environment
 - Do not install the F3SP in the following environments:
 - (1) Areas exposed to corrosive gases
 - (2) Areas exposed to vibration or shock levels higher than specification provisions.
 - (3) Areas where the F3SP may come in direct contact with water.
 - (4) In flammable or explosive environments.
 - Do not use radio equipment, such as cellular phones, walkie-talkies, or transceivers with high power, near the F3SP.
3. Wiring and Mounting
 - (1) Be sure to turn OFF the power prior to wiring.
 - (2) Be sure to route the F3SP cable separate from high-potential power lines or through an exclusive conduit.
4. Do not use any solvents such as paint thinners, benzene or acetone to clean the F3SP because it will dissolve resin and paint.
5. Do not disassemble, repair, and modify the F3SP. The F3SP does not contain parts subject to maintenance.

Contents

Section 1 Description	1
1-1 Features	1
1-2 Functions	2
1-2-1 Interlock function	2
1-2-2 Test function	2
1-2-3 Muting function	3
1-2-4 Override function	3
1-3 Ratings and Performance	4
1-4 Indicators and switches	6
Section 2 Wiring and Mounting	7
2-1 Installation conditions	7
2-2 Mounting	8
2-3 Wiring	8
2-3-1 Power supply	9
2-3-2 Terminal block assignment	10
2-3-3 Wiring examples	11
Section 3 Alignment	15
Section 4 Operation	16
4-1 Dip-switches configuration	16
4-2 Muting function	17
4-2-1 Installation Criteria	17
4-2-2 Muting operations	18
4-3 Override function	21
4-3-1 Override operations	21
Section 5 Final Checks	22
Section 6 Daily inspection	23
Section 7 Status Indication codes	24
7-1 Normal Operation	24
7-2 Lockout	24
Section 8 Dimensions	25

Section 1 Description

1-1 Features

The F3SP has two independent microprocessors forming a “dual system” and can be used up to system with safety category 4.

One or two light curtains can be input to the F3SP, and input state will be displayed with four input indicators (Green LEDs).

When one or both safety light curtains are interrupted, the F3SP opens both safety output contacts.

Status indicator (7-segment display) supplies information on the state and on probable failures.

The F3SP has both muting and override function, which forces system operation not relate to light curtain status.

The muting function makes it possible to inactivate one or both light curtains in order to allow, for instance, the objects passage without stopping the machine.

The override function allows the system to be manually overridden allowing material to be cleared from the muting area if a fault has occurred.

Both the muting and the override functions force the system to work. Therefore, activating these functions needs some precautions to avoid the reduction in safety (Please refer to section 4-2 and 4-3).

Section 1 Description

1-2 Functions

1-2-1 Interlock function

The auto reset mode and the manual reset mode are selectable features of the F3SP. The selection will be done by dip switch (Please refer to Section 4-1 for selection of dip switch).

[Note]: While the F3SP is connected to power, do not change any dip switch to avoid influence on the system safety.

1) Auto reset mode

The F3SP automatically starts after power-ON and automatically restarts after the object in the detection zone is removed.

2) Manual reset mode

Returns to the normal operating mode only after the object has been removed and the RESET button has been pressed.

1-2-2 Test function

1) Self-test

After power ON, the F3SP performs a complete self-test. In addition, it performs a self-test periodically during operation.

2) External test

This is used to check if the whole system works effectively. By pressing the TEST button ^(NOTE1), this simulates the interruption of one or both safety light curtains. This operation makes the machine stop, so the system checks can be made according to the established time and modes.

[Note1]: TEST button must be pressed more than 100ms.

3) Error detection and restoration (Lockout condition)

If an error is detected by the self-test the F3SP enters the lockout condition, keeps the in their OFF-state and displays the error code^(*) in status indicator.

Turning the power ON again, or applying the pressing RESET button, resets the lockout condition.

*1. Refer to Section 7 Status indication codes for the indicating patterns.

1-2-3 Muting function

The muting function makes it possible to inactivate one or both light curtains in order to allow, for instance, the objects passage without stopping the machine.

The F3SP has muting sensor inputs for the activation of this function. The muting sensor A and B controls light curtain 1, as well as muting sensor C and D controls light curtain 2.

For muting sensor, PNP transistor output type or N.O. contact output type is applicable (photoelectric sensor, proximity sensor, etc.)

It is necessary to position and connect the muting sensors in order to avoid undesired muting inputs.

It is important to remember that the muting function forces the system to work and for this reason it must be used with care.

For detail, refer to 4-2 Muting function.

1-2-4 Override function

This function makes it possible to force a muting condition, if necessary by starting the machine despite one or both safety light curtains having been interrupted by the object. Thus enabling removal of the material from the protected area, when it has been stuck in the beam of the safety light curtains due to a failure.

Suppose that a pallet has stopped before the light curtains; the conveyor belt cannot be started again because the F3SP - after having detected one or more interrupted light curtains- will not close the output contacts, thus making it impossible to free the controlled area.

By starting the override function, it will be possible to carry out this operation.

It is important to remember that the override function, as well as muting function, forces the system to work and for this reason it must be used with care.

For detail, refer to 4-3 Override function.

Section 1 Description

1-3 Ratings and Performance

Item \ Type	F3SP-U2P
Number of light curtains	2 pairs max. ^(NOTE1)
Supply voltage (Vs)	24 VDC ±10% (ripple p-p 10% max.)
Power consumption	8W max. (without muting lamp and sensors) ^(NOTE1)
Response time	30ms max.
Applicable light curtain	OMRON make F3SN series, F3SH series, F3SL series, F3SS series
Outputs	2 N.O contacts, 250VAC, 2.5 A max.
Inputs	TEST input: N.C. contact switch
	RESET input: N.O. contact switch
	Max. 4 mute sensor inputs: PNP transistor output type or N.O contact output type.
Indicators	Output indicator (Red/Green LED): Red lit when output OFF, Green lit when output ON.
	Input indicator (Green LED x4): Lit when 24V input.
	Status indicator (1digit):Indicates status of the F3SP
Test functions	Self-test (After power ON, and during operation) External test (by TEST input)
Safety-related functions	Auto reset / manual reset Muting function, Override function
Applicable Muting lamp	Incandescent lamp 24V, 3W to 7W ^{(NOTE1) (NOTE2)}
Ambient temperature	During operation: -10 to 50°C (with no freezing) During storage: -30 to 70°C
Ambient humidity	15 to 95% RH (with no condensation)
Degree of protection	IP20 (IEC60529)
Vibration resistance	10 to 55 Hz, double amplitude 0.7 mm, X, Y and Z directions 20 sweeps
Shock resistance	100 m/s ² , X,Y and Z directions 1000 times
Weight	600g (control unit only)
Accessories	Instruction manual

Section 1 Description

NOTE1: Total power consumption shall not exceed 24W because of internal resettable fuse of F3SP. This includes the consumption of;

- the light curtains,
- the muting lamp (3 to 7W), and,
- the F3SP without load (8W).

When total power consumption exceeds 24W by connecting two light curtains, one of them shall be powered directly from DC power supply unit. (see page B-14)

NOTE2: Muting lamp is always required for operation of F3SP.

Recommended muting lamps are as follows (both have power consumption of 5W);

- Type PS-24-Y B0568: Made by PATLITE Corporation
< Replacement Light bulb: Type D02400503-F1 >
(Note: Do not use type DE-24S which is LED type.)
- Type ASSC-24: Made by Asahi Electric Co. Ltd.
< Replacement Light bulb: Type D09 >



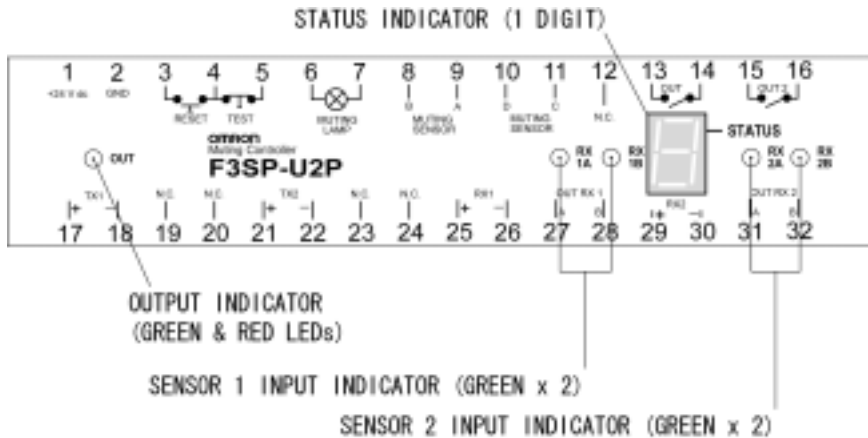
WARNING

Be sure to use the incandescent lamp for the muting lamp and the replacement light bulb.

Do not use LED lamp. Failure to do this may cause the F3SP to fail to detect the breakdown of the muting lamp and may result in serious injury.

Section 1 Description

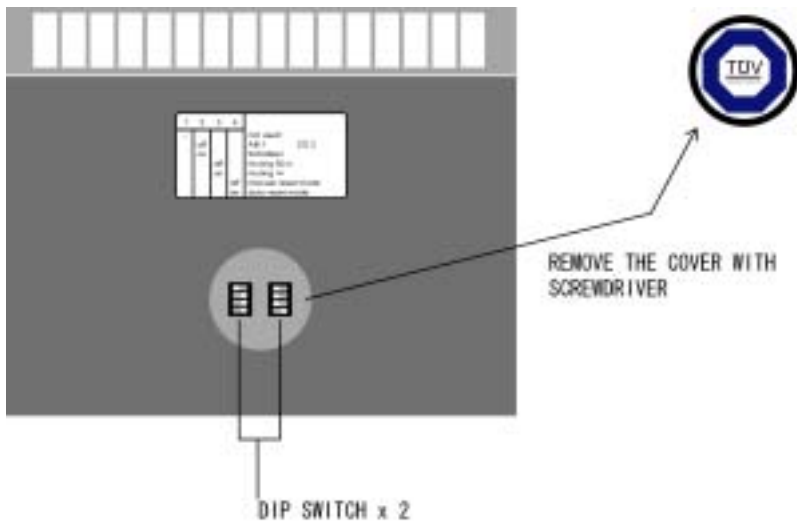
1-4 Indicators and switches



OUTPUT indicator: Red lit when output OFF, Green lit when output ON.

INPUT indicator: Green lit when 24V input.

STATUS indicator: Indicates the status of F3SP.



DIP SWITCH is used for changing operating mode of the F3SP.

For DIP SWITCH configuration, please refer to Section 4-1.

Section 2 Wiring and Mounting

2-1 Installation conditions

WARNING

The F3SP has been designed to be used with the dedicated safety light curtain. It must not be connected to other safety light curtains.

The F3SP complies with the requirements for type 4 safety equipment in accordance with the international standards, IEC 61496-1. However, the safety system category depends on the safety light curtain's type as follows.

Type 4 safety light curtain: Safety system category 4

Type 2 safety light curtain: Safety system category 2

A qualified person, as determined by local regulations, must confirm that installation and inspection are implemented correctly.

Do not use the F3SP on machines that cannot be stopped by electrical control in case of an emergency, such as a pressing machine with full-rotation clutch system. Serious injury may result if the machine does not stop before someone reaches the hazardous part.

Muting sensors must be positioned so that they cannot be activated inadvertently by personnel.

The muting lamp for indication "active muting" or "active override" must be positioned in a place where it can be seen from any operative point.

The TEST and RESET buttons must be positioned in such a way

- that the operator can see the protected area when he carries out reset, test, or override operations.
- that it can not be activated from inside the hazardous area.

Applicable light curtains (as of Apr. 2002) are;

- | | |
|-----------------------------------|-------|
| - F3SN-A safety light curtain | Type4 |
| - F3SH-A multi-beam safety sensor | Type4 |
| - F3SL safety light curtain | Type4 |
| - F3SS single beam safety sensor | Type4 |
| - F3SN-B safety light curtain | Type2 |

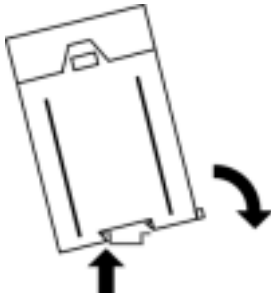
The F3SP must be located in a cabinet with protection degree of at least IP54. For the installation of muting sensors, be sure to refer to section 4-2.

Section 2 Wiring and Mounting

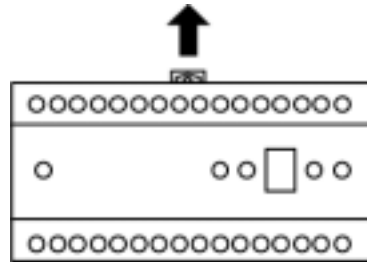
2-2 Mounting

Mount the F3SP on DIN rail with 35mm width.

- When Mounting;
Hang the one end of DIN rail to the F3SP, and push the F3SP until it is locked.



- When Unmounting;
Pull out the hook located at the bottom of F3SP, using screw driver.



2-3 Wiring



WARNING

Always use the two OSSD outputs to configure the safety system. Using only one OSSD of the safety system may result in serious injury when there is an output circuit failure.

Do not connect the F3SP to AC or DC power supply with higher voltage than nominal 24VDC.

[Note]: Make sure to connect the muting lamp, otherwise the F3SP is locked.

[Note]: Use the following to wire the F3SP.

- Wire size: 14 – 24 AWG, Solid / Stranded wire
- Wire type: copper (Cu) conductor

Appropriate terminal tightening torque: 2 N m

The cable shield braids must be all earthed on the F3SP side.

[Note]: Be sure to route the F3SP cable separately from high-potential power lines or through an exclusive conduit.

2-3-1 Power supply



WARNING

DC power supply units must satisfy all of the conditions below;

- The power supply voltage must be within specified ratings (24 VDC \pm 10 %).
- The power supply uses double or reinforced insulation between the primary and secondary circuits
- The power supply automatically resets overcurrent protection characteristics (voltage drop).
- The power supply maintains an output holding time of at least 20 ms.
- FG (frame ground terminal) must be connected to PE (protective earth) when using a commercially available switching regulator.
- The power supply must have output characteristics of Class 2 Circuit of Limited Voltage-Current Circuit as defined in UL508 (see “Remark”).
- The power supply must conform to regulatory requirements and standards, regarding EMC and electrical equipment safety, of the country where the F3SP is installed and where machinery will be operated. Example: The EMC Directive (industrial environment) and the Low Voltage Directive in EU.

[Remark] The power supply must conform to the following requirement (1) or (2) regarding a secondary circuit, in accordance with UL 508, to avoid a fire.

- (1) The power supply includes a limited voltage/current circuit supplied by an isolating source like the secondary winding of an isolating type transformer. And, in the limited voltage/current circuit,
- the current available is limited to a value not exceeding 8 A (including the case of short-circuit), or
 - a secondary fuse or other such secondary circuit protective device used to limit the available current shall be rated at not more than a value 4.2 amperes (for the power supply voltage of 24VDC)

Recommended power supply: S82K (15 W, 30 W, 50 W, 90 W type) made by OMRON.

- (2) The power supply includes a Class 2 circuit supplied by an isolating source that complies with the requirement in the Standard for Class 2 Power Units, UL 1310, or the requirements in the Standard for Class 2 and Class 3 Transformers, UL 1585.

Section 2 Wiring and Mounting

2-3-2 Terminal block assignment

TERMINAL	OUTER CONNECTION
1 - 2	Connect to the 24 VDC power supply, note the polarity indicated on the label.
3 - 4	RESET button; connect a normally opened contact (N.O.).
4 - 5	TEST button; connect a normally closed (N.C.).
6 - 7	Connect the muting lamp. If the lamp has the polarity, make sure that connect the positive terminal to the terminal 6, and connect the negative terminal to the terminal 7.
8	Input of the muting B sensor (For controlling light curtain 1). Connect to the N.O. contact or PNP transistor output of the muting sensor (photoelectric switch, proximity switch, other).
9	Input of the muting A sensor (For controlling light curtain 1). Connect to the N.O. contact of the muting sensor (photoelectric switch, proximity switch, other).
10	Input of the muting D sensor (For controlling light curtain 2). Connect to the N.O. contact of the muting sensor (photoelectric switch, proximity switch, others)
11	Input of the muting C sensor (For controlling light curtain 2). Connect to the N.O. contact of the muting sensor (photoelectric switch, proximity switch, others)
12	Terminal not used.
13 - 14	(OUT1) safety output 1 with N.O. contact.
15 - 16	(OUT2) safety output 2 with N.O. contact.
17 - 18	Power supply transmitters (TX1) for light curtain 1. 24VDC wire to terminal 17, 0V wire to terminal 18.
19 - 20	Terminal not used.
21 - 22	Power supply transmitters (TX2) for light curtain 2. 24VDC wire to terminal 21, 0V wire to terminal 22.
23 - 24	Terminal not used.
25 - 26	Power supply receivers (RX1) for light curtain 1. 24VDC wire to terminal 25, 0V wire to terminal 26.
27 - 28	Connect to the PNP output of the receivers (RX1) of light curtain. Control output 1 wire and Control output 2 wire to terminal 27 and 28. (Two control outputs must be used.)
29 - 30	Power supply receivers (RX2) for light curtain 2. 24VDC wire to terminal 29, 0V wire to terminal 30
31 - 32	Connect to the PNP output of the receivers (RX2) of light curtain 2 Control output 1 wire and Control output 2 wire to terminal 31 and 32. (Two control outputs must be used.)

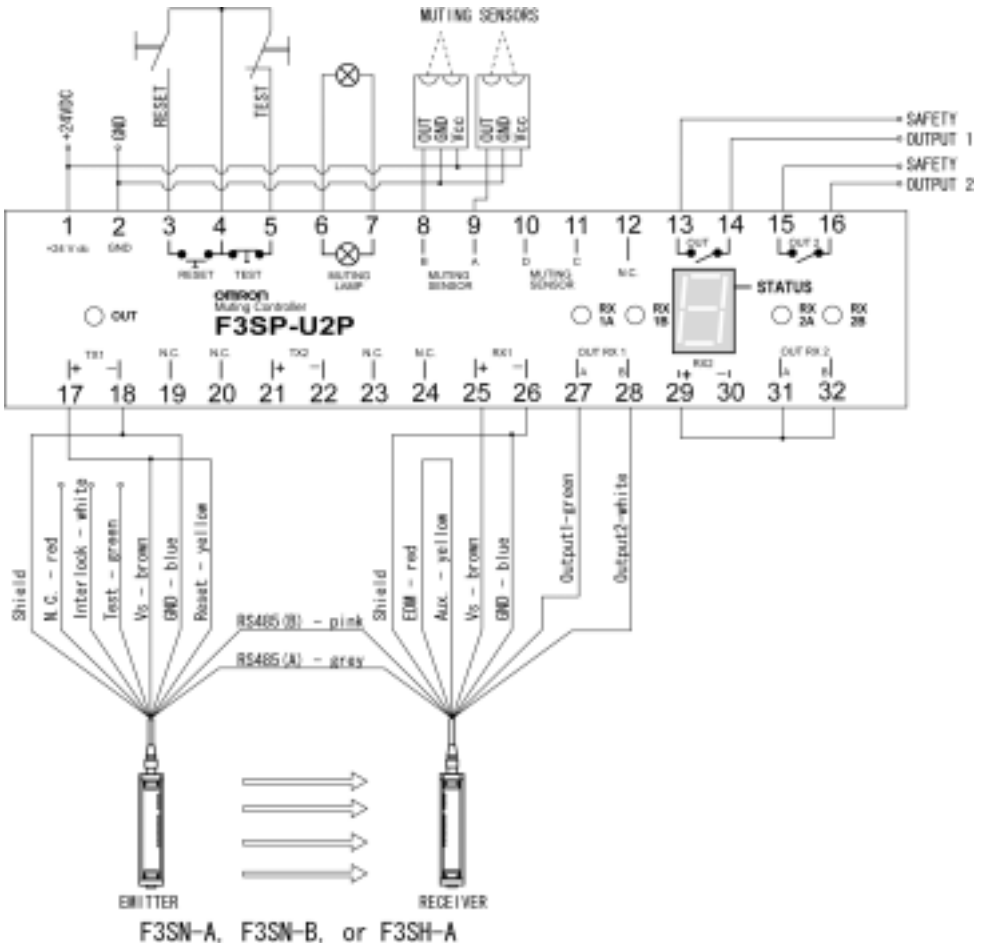
[Note]: If only one set of light curtain is used, connect 24VDC line to unused light curtain input terminals. Otherwise, the F3SP locked.

2-3-3 Wiring examples

- Connection of one safety light curtain Type F3SN-A, Type F3SN-B, or one multi-beam safety sensor Type F3SH-A to the F3SP with two muting sensors.

F3SN-A, F3SN-B, or F3SH-A function mode;

- Auto-reset mode
- Auxiliary output set to “Dark on output”

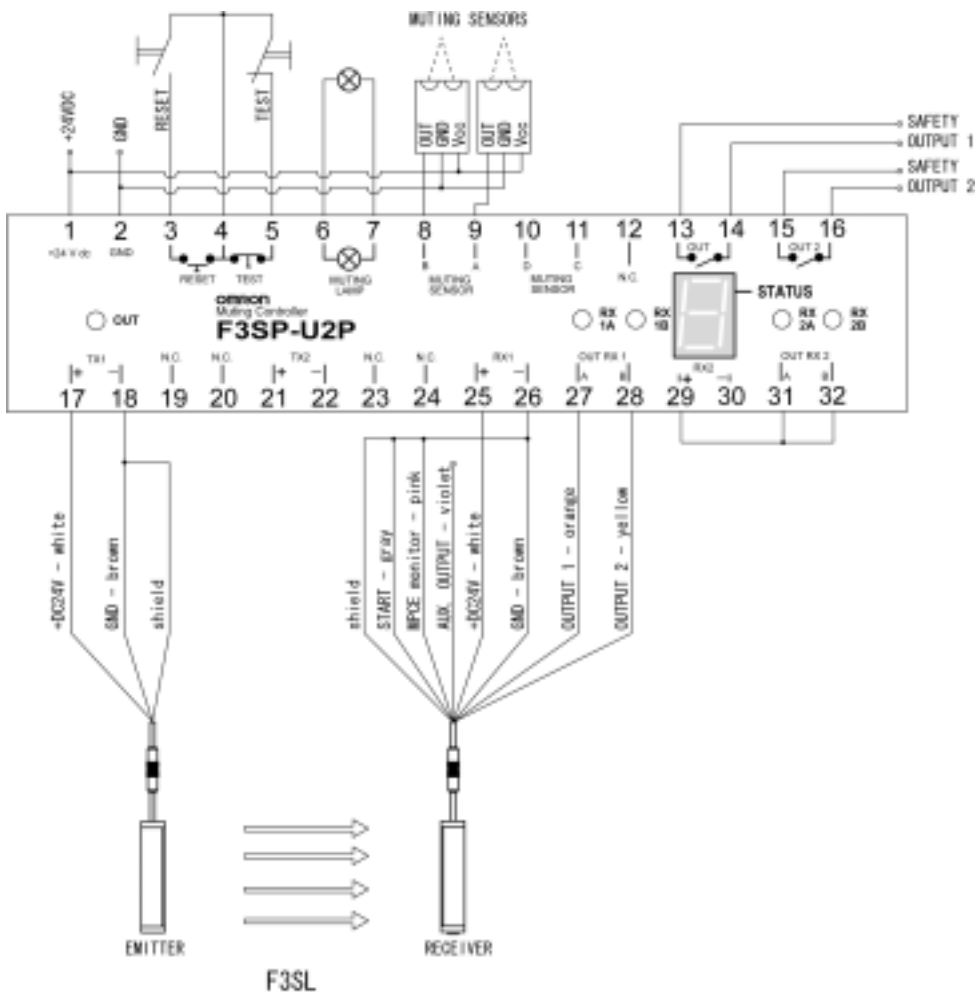


Section 2 Wiring and Mounting

- Connection of one safety light curtain Type F3SL to the F3SP with two muting sensors.

F3SL function mode

- Auto-start mode
- MPCE monitoring deactivated

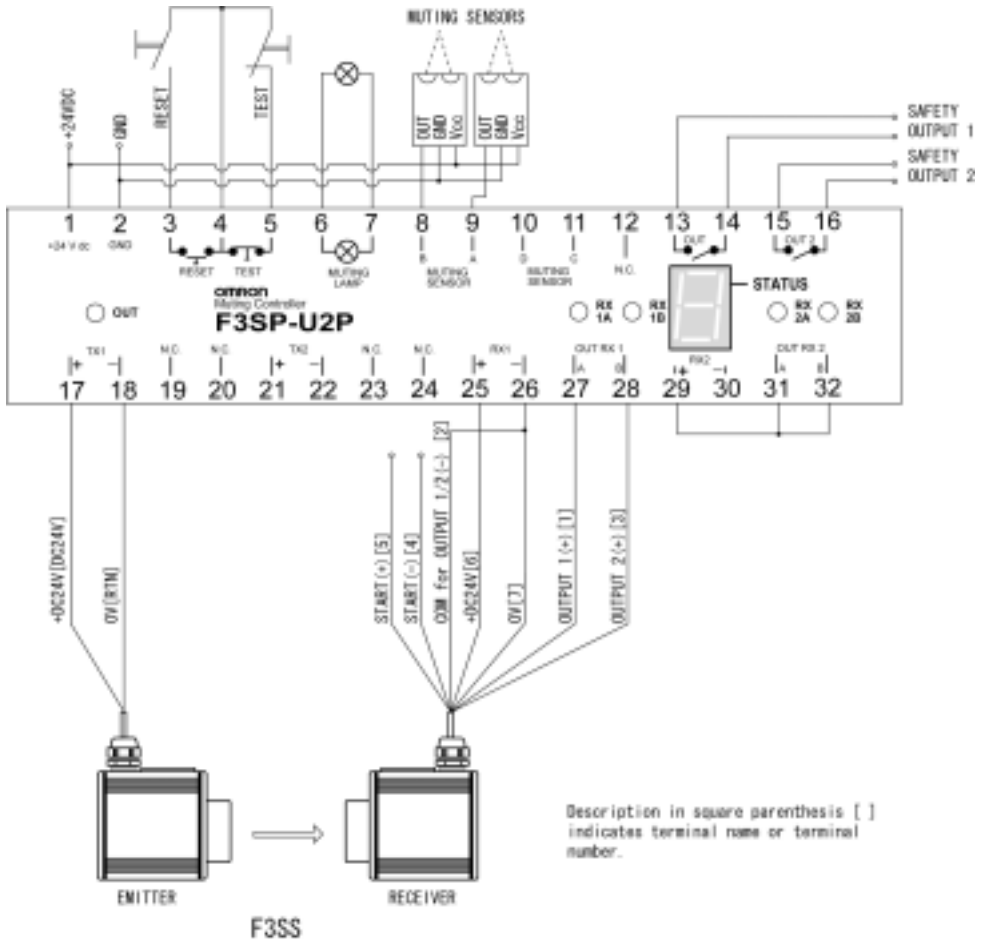


Section 2 Wiring and Mounting

- Connection of one single beam safety sensor Type F3SS to the F3SP with two muting sensors.

F3SS function mode

- Auto-start mode



Section 2 Wiring and Mounting

- Connection of two safety light curtains F3SN-A, F3SN-B, or two multi-beam safety sensors F3SH-A to the F3SP with four muting sensors.

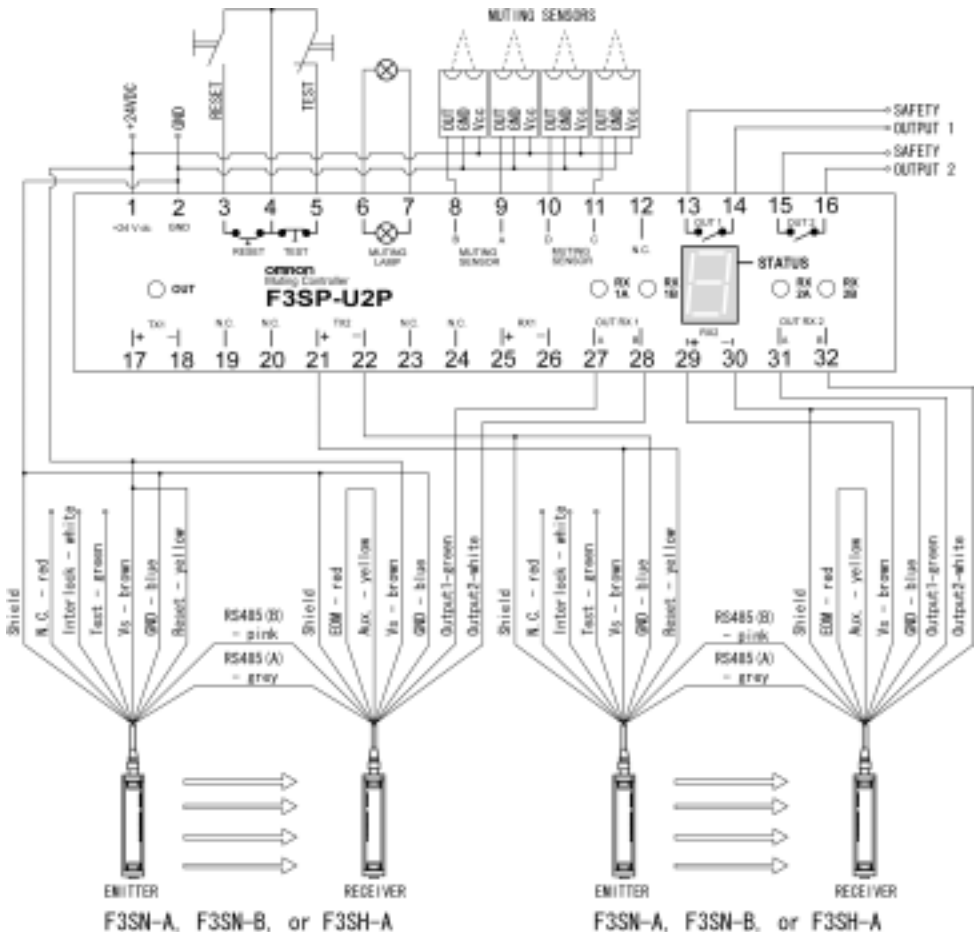
F3SN-A, F3SN-B, or F3SH-A function mode

- Auto-reset mode
- Auxiliary output set to “Dark on output”

[Note]: Mutual interference between 2 light curtains shall be prevented.

[Note]: Total power consumption shall not exceed 24W (see page B-5).

When total power consumption exceeds 24W, one of light curtains shall be powered directly from DC power supply unit, as shown in the following.



Section 3 Alignment

After having carried out the correct mechanical assembly and the correct connections as described in the previous paragraphs, it is necessary to align the light curtains. Follow the operating guide as follows:

1. Turn off the power supplying the F3SP.
2. Open the TEST contact.
3. Power the F3SP.
4. Align the light curtain by observing the input indicators on the F3SP: If the alignment of the light curtain 1 is correct, the sensor 1 input indicator (RX1A and RX1B) are turned on. If the alignment of the light curtain 2 is correct, the sensor 2 input indicator (RX2A and RX2B) are turned on.
5. After the alignment, turn off the power supplying the F3SP, close the TEST contact and power the F3SP again.
6. Wait for the F3SP to carry out the initial tests, visualising on the display a count-down which indicates the F3SP activity.
7. At the end of this operation, the status indicator will visualise letter 'A' indicating the active state of the F3SP. (In case of manual reset mode, press and release of reset button is necessary.)
8. Carry out all the checks described in the final checks and in the routine inspection operations.

During aligning operations or normal working, check that the light curtains connected to the same or other units do not interfere with each other. Modifying their mutual position for instance by positioning emitter on the other receiver side.

For avoidance of mutual interference, please refer to instruction manual of light curtain.

[Note]: If the muting sensors are installed very near to the light curtains, be sure to avoid mutual interference between muting sensors and light curtains.

Section 4 Operation

4-1 Dip-switches configuration



WARNING

Configuration of dip switch is must only carries out by qualified person.

The configuration shown in the table below must be selected on both sets of dip-switches on the internal board. The description corresponding to the pre-chosen selection is shown below.

To configure dip-switch, remove the lateral plastic cover with screwdriver.

No.	ON/OFF	FUNCTION
1	X	not used
2	OFF	Muting A-B act on the light curtain 1 Muting C-D act on the light curtain 2 (default setting)
	ON	Forbidden
3	OFF	Muting 60 seconds (min.) (default setting)
	ON	Muting ∞ (infinity)
4	OFF	Manual reset mode
	ON	Auto reset mode (default setting)



Note: Configure the two dip switch in the same way, otherwise code '8' is displayed, which means a failure.

Note: SW2 is mounted upside down against SW1.

[Note]: While the F3SP is connected to power, do not change any dip switch to avoid influence on the system safety.

4-2 Muting function

WARNING

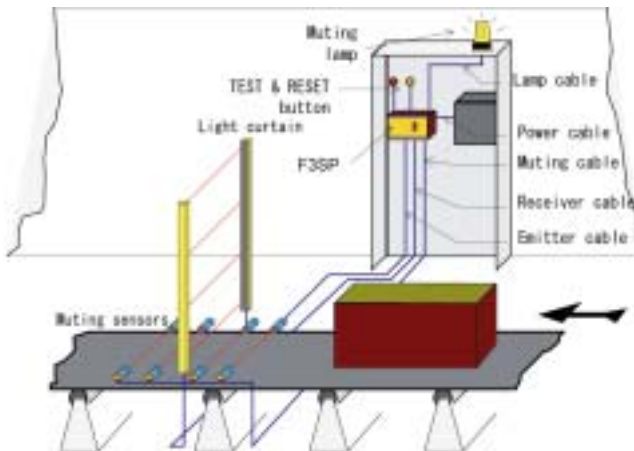
Muting and Override function can disable the safety functions of a machine. The proper installation, checkout and operation of a machine and muting system in accordance with all applicable laws and standards, is critical to the safe operation of the machine.

Failure to comply with these instructions may result in severe injury to personnel.

Muting sensors must be positioned so that they cannot be activated inadvertently by personnel.

The muting lamp for indication “active muting” or “active override” must be positioned in a place where it can be seen from any operative point.

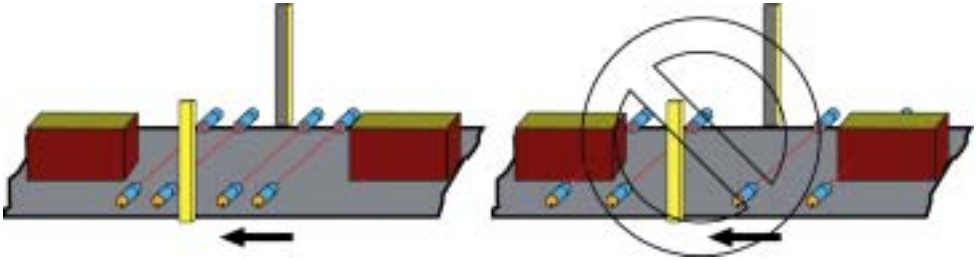
4-2-1 Installation Criteria



- 1 The muting sensors must recognise the material (namely pallets, vehicles, etc.) over its full length.
- 2 The sensors must be arranged in such a way that the material is recognised even when it is on a pallet or other transporting medium.
- 3 In case of different transport speeds through the muting area, consideration must be used on the muting duration.

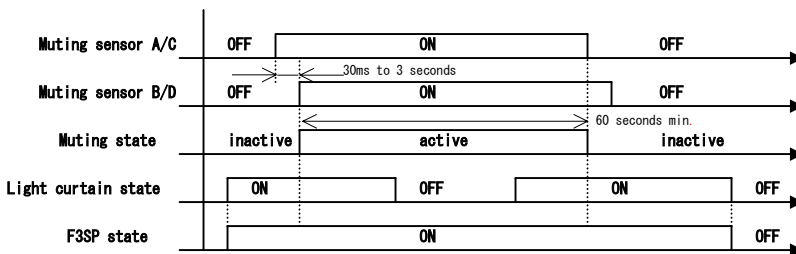
Section 4 Operation

- All the light curtains and the muting sensors must be arranged in such a way that the previous material has already passed the last muting sensor before the new material has reached the first muting sensors. Moreover, all the light curtains and the muting sensors must be arranged in such a way that a person cannot enter the dangerous zone inadvertently during the muting condition.

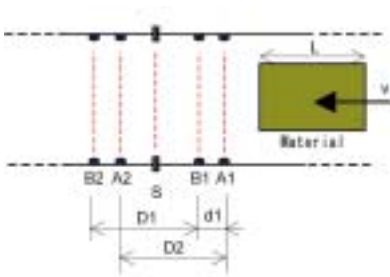


4-2-2 Muting operations

- The muting function will be activated by the following sequence;
 - Muting sensor A or C becomes ON
 - Within 30ms to 3seconds after (1), muting sensor B or D becomes ON.
- The muting function will be deactivated by the either methods below;
 - One or both muting sensors becomes OFF
 - 60 seconds (this restriction can be deactivated by DIP switch configuration. Please refer to section 4-1).
- Muting function will not become activated if the light curtain is interrupted and the output contacts are in the opened state.
- A wrong sequence on muting sensors activation will cause lockout condition of the F3SP.

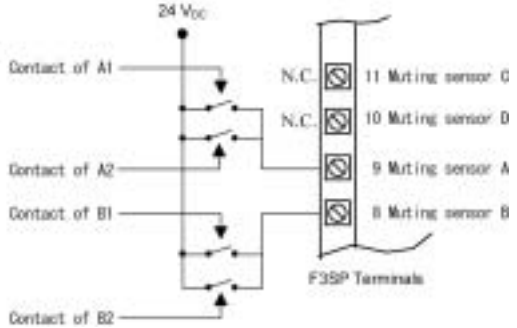


Application with four muting sensors:

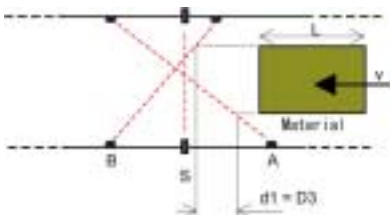


A1, A2, B1, B2 : Muting sensor
 S : Light curtain
 L : Length of material
 v : Moving speed of material

Muting sensor connection:

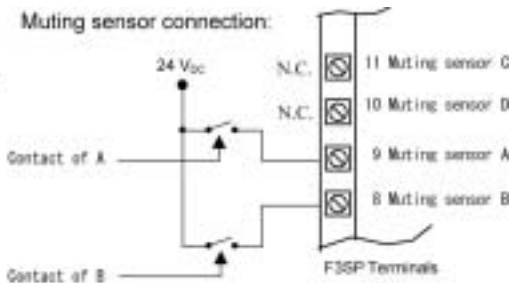


Application with two muting sensors:



A, B : Muting sensor
 S : Light curtain
 L : Length of material
 v : Moving speed of material

Muting sensor connection:



In the above application with two muting sensors, the crossing point of beams from two muting sensors (A and B) is set behind the protective area of the light curtain. This arrangement prevents the light curtain from being muted by a person passing through the crossing point.

D1, D2, D3: minimum distance so that the muting sensors keep active the request; it depends on the parcel length:

$$D1, D2, D3 < L$$

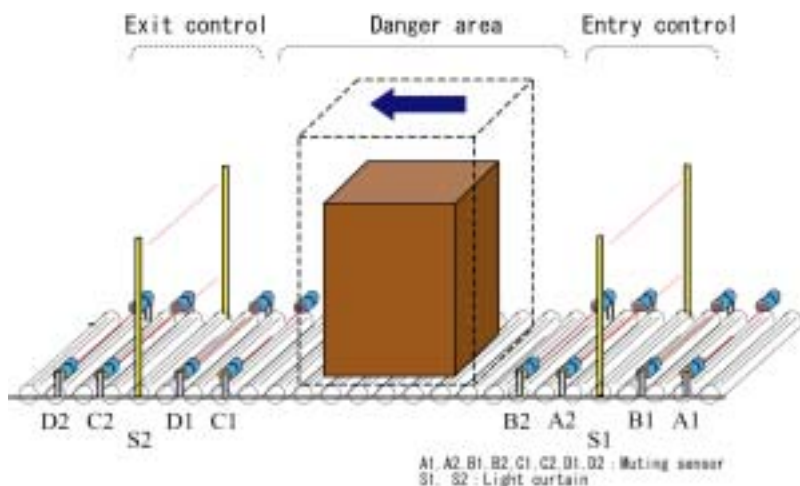
d1: necessary maximum distance so that the muting request is accepted; it depends on object speed:

$$d_{\max} [\text{cm}] = v[\text{m/s}] \times 3[\text{s}] \times 100$$

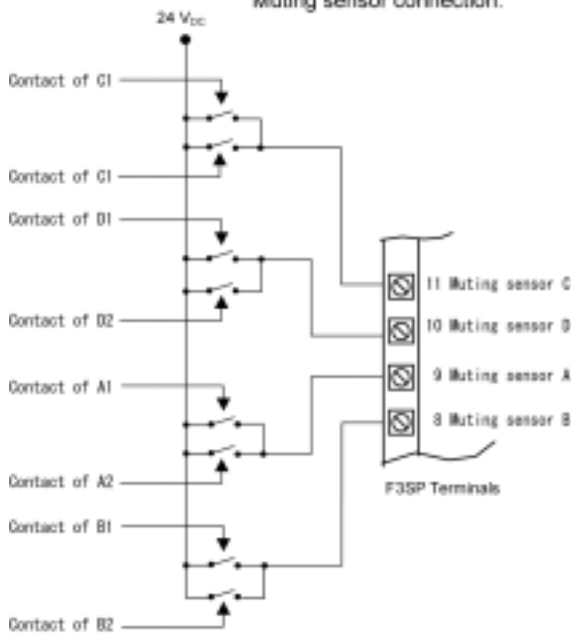
This distance must not allow both sensors and the muting cycle with the passage of a person.

Section 4 Operation

Application with eight muting sensors for output and input control



Muting sensor connection:



4-3 Override function



WARNING

Muting and Override function can disable the safety functions of a machine. The proper installation, checkout and operation of a machine and muting system in accordance with all applicable laws and standards, is critical to the safe operation of the machine.

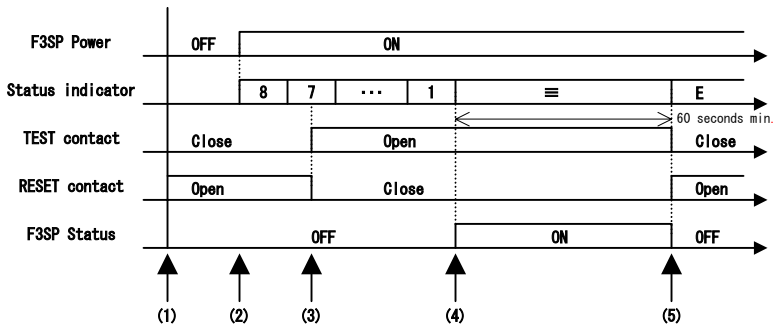
Failure to comply with these instructions may result in severe injury to personnel.

The muting lamp for indication “active muting” or “active override” must be positioned in a place where it can be seen from any operative point.

The TEST and RESET buttons must be positioned in such a way
 - that the operator can see the protected area when he carries out reset, test, or override operations.
 - that it can not be activated from inside the hazardous area.

4-3-1 Override operations

- (1) Switch off the F3SP.
- (2) Switch on the F3SP
- (3) During the countdown displayed, press together the TEST and RESET buttons and keep pressing. (Do not press the buttons before the countdown. Otherwise a failure occurs, because a self-test is carried out to check that the buttons are not locked).
- (4) The override function has been activated. The status display shows character ‘≡’ which indicates override active. The muting lamp blinks to signal the light curtain is not active.
- (5) The minimum duration of the override function amounts to 60 seconds. If the buttons are released before this time has elapsed, the override function will be immediately stopped.



Section 5 Final Checks



WARNING

Do not use the F3SP until the following inspections are completed. Failure to do so may result in loss of life or serious injury.

A qualified person, as determined by local regulations, must confirm that installation and inspection are implemented correctly.

Check that the area protected by the light curtain is free from any obstacle; check the correct triggering of the output contacts opening by interrupting the protection rays (OUTPUT indicator red is lit, controlled machine stopped).

If the OUTPUT indicator red LED switches on and off, check the correct mechanical installation.

[Note]: This check must be repeated each time you move or mechanically re-align the light curtains and muting sensors.

Section 6 Daily inspection



WARNING

A qualified person, as determined by local regulations, must confirm that installation and inspection are implemented correctly.

Be sure to conduct inspection checks as below regularly.

1. Check that there is no person in the hazardous area before operator turns ON the power.
2. Check that the F3SP locks by inserting an object through the detection zone of each and every light curtain.
3. By opening the TEST contact, check that the output contacts are opened (red LED switched on and machine stopped).
4. Make sure the installation satisfies one of following conditions;
 - 1) the machine connected to the F3SP has an interlock function.
 - 2) The F3SP uses manual reset mode.
 - 3) It is not possible for a person to stop between the safety light curtain and the hazardous parts of the machine.
5. Make sure that there is no outer damage to the F3SP and/or the outer electrical connections.
6. Make sure that the response time, including the safety light curtain and the machines, does not exceed the established limits.

The frequency of these operations depends on the special applications and operative conditions.

Also see instruction manual of light curtain for further inspection items.

Section 7 Status Indication codes

7-1 Normal Operation

CODE	DESCRIPTION
-	Initial test is activated
8 -> 1	Count-down during the initial test.
U	Test button is pressed. Output contacts are opened.
≡	Override function is activated.
A	Normal cycle: Output contacts are closed.
E	Light curtain is interrupted in automatic mode: Output contacts are opened.
F	Interlocked condition: Output contacts are opened.

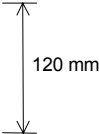
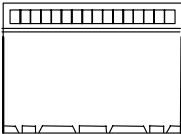
7-2 Lockout

If lockout codes are shown on the display, the user must only carry out the procedures indicated in the action column.

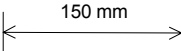
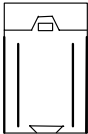
CODE	DESCRIPTION	Action
7	Error of muting lamp	Check that the muting lamp is not blown or incorrectly connected, otherwise contact OMRON.
8	Irreversible system error or error on the output contacts.	This type of failure means that the unit cannot be used and it is necessary to contact OMRON.
9	Wrong muting sequence request.	Check the correct wiring and sensor positioning for muting sequence

Section 8 Dimensions

FRONT VIEW



SIDE VIEW



TOP VIEW

