

safect

CE

SF3

MÀN SÁNG AN TOÀN



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MÀN SÁNG AN TOÀN

1. Mô tả sản phẩm



Màn an toàn loại không tiếp xúc dựa trên cảm biến quang dùng để ngăn chặn việc tiếp xúc gần với máy móc nguy hiểm, robot và những loại máy móc tự động khác

- ▶ Truyền thông quang, không yêu cầu dây đồng bộ giữa bộ truyền và bộ nhận
- ▶ Chiều cao phát hiện: 120 mm ~ 1880 mm
- ▶ Tăng cường sự an toàn nhờ công nghệ thời gian thực A/D
*Thời gian thực A/D: Bộ nhận được đồng bộ tự động thông qua tín hiệu cho phép của bộ truyền mà không bị tác động của ngắt khác
- ▶ Lens tối ưu áp dụng cho việc nhận diện ở khoảng cách xa
- ▶ Tháo lắp dễ dàng 4 hướng
- ▶ Đèn led chỉ thị hỗ trợ việc giám sát
- ▶ Chức năng TEST
- ▶ EDM (Giám sát ngoại vi)
- ▶ **Khởi động lại tự động/thủ công**

1) TEST: Nếu nút này được ấn quá 0.3 giây nó sẽ kiểm tra xem các màn chắn và các máy có hoạt động đúng không.

Ấn nút (để mờ tiếp điểm) thực chất là giả định có sự xâm nhập qua màn chắn an toàn xem liệu các máy có ngừng đúng thời điểm và đúng cách hay không. Nếu không thì đèn chỉ thị sẽ báo lỗi.

2) RESET: Khi thiết bị phát hiện vật thể và hệ thống dừng lại, chỉ cần bấm nút RESET trong 0.3 - 2 giây, hệ thống sẽ khởi động lại.

(1) Khởi động lại tự động: Màn sáng khởi động lại tự động sau khi vật thể được di chuyển đi

(2) Khởi động lại thủ công: Cần ấn nút RESET sau khi vật thể được di chuyển đi để hệ thống hoạt động trở lại

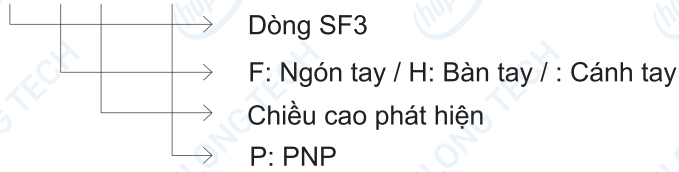
(3) A/M: Dùng để xác định chế độ khởi động lại thủ công hay tự động

(4) EDM: Dùng để giám sát hoạt động của ngoại vi

2. Sản phẩm

2.1 Cách để lựa chọn sản phẩm

SF3-F 0150 - P




2.2 Loại

Bộ phận	Chùm tia	Hình ảnh	Khoảng cảm biến	Số tia	Chiều cao phát hiện (mm)	Loại
						Đầu ra
Ngón tay	10mm		0.2-6m	16~64	150~630	SF3-F □□□□-P
Bàn tay	20mm		0.2-8m	8~64	140~1260	SF3-H □□□□-P
Cánh tay	40mm		0.2-8m	4~48	120~1880	SF3-A □□□□-P

. Loại SF3 - F

 Dòng SF3 - F (chùm tia 10mm)		
Sản phẩm	Chiều cao phát hiện	Số tia
SF3-F0150-P	150mm	16
SF3-F0230-P	230mm	24
SF3-F0310-P	310mm	32
SF3-F0390-P	390mm	40
SF3-F0470-P	470mm	48
SF3-F0550-P	550mm	56
SF3-F0630-P	630mm	64

. Loại SF3 - H

 Dòng SF3 - H (chùm tia 20mm)		
Sản phẩm	Chiều cao phát hiện	Số tia
SF3-H0140-P	140mm	8
SF3-H0180-P	180mm	10
SF3-H0220-P	220mm	12
SF3-H0260-P	260mm	14
SF3-H0300-P	300mm	16
SF3-H0340-P	340mm	18
SF3-H0380-P	380mm	20
SF3-H0420-P	420mm	22
SF3-H0460-P	460mm	24
SF3-H0500-P	500mm	26
SF3-H0540-P	540mm	28
SF3-H0580-P	580mm	30
SF3-H0620-P	620mm	32
SF3-H0660-P	660mm	34
SF3-H0700-P	700mm	36
SF3-H0740-P	740mm	38
SF3-H0780-P	780mm	40
SF3-H0820-P	820mm	42
SF3-H0860-P	860mm	44
SF3-H0900-P	900mm	46
SF3-H0940-P	940mm	48
SF3-H0980-P	980mm	50
SF3-H1020-P	1020mm	52
SF3-H1060-P	1060mm	54
SF3-H1100-P	1100mm	56
SF3-H1140-P	1140mm	58
SF3-H1180-P	1180mm	60
SF3-H1220-P	1220mm	62
SF3-H1260-P	1260mm	64

. Loại SF3 - A

 Dòng SF3 - A (chùm tia 40mm)		
Sản phẩm	Chiều cao phát hiện	Số tia
SF3-A0120-P	120mm	4
SF3-A0200-P	200mm	6
SF3-A0280-P	280mm	8
SF3-A0360-P	360mm	10
SF3-A0440-P	440mm	12
SF3-A0520-P	520mm	14
SF3-A0600-P	600mm	16
SF3-A0680-P	680mm	18
SF3-A0760-P	760mm	20
SF3-A0840-P	840mm	22
SF3-A0920-P	920mm	24
SF3-A1000-P	1000mm	26
SF3-A1080-P	1080mm	28
SF3-A1160-P	1160mm	30
SF3-A1240-P	1240mm	32
SF3-A1400-P	1400mm	36
SF3-A1560-P	1560mm	40
SF3-A1720-P	1720mm	44
SF3-A1880-P	1880mm	48

3. Cấu trúc

3.1 Cấp bậc



Mỗi bên được đánh dấu như là một bộ truyền và một bộ nhận

4. Chuẩn

4.1 Chuẩn

- ▶ 2006/42/EC
- ▶ 2014/35/EU
- ▶ 2014/30/EU
- ▶ EN IEC 61496-1
- ▶ EN IEC 61496-2
- ▶ EN ISO 12100
- ▶ EN ISO 13849-1
- ▶ EN IEC 62061
- ▶ EN IEC 60204-1

Nhãn	Chuẩn
CE	EN IEC 61496-1 EN IEC 61496-2 EN ISO 12100 EN ISO 13849-1 EN IEC 62061 EN IEC 60204-1

4.2 Thông số kỹ thuật

Loại	Đầu PNP	SF3-F□□□□-P	SF3-H□□□□-P	SF3-A□□□□-P
Loại	Màn sáng an toàn (Loại 2, SIL2)			
Cấp an toàn	Lên đến cấp 3, 2, 1, B			
Chùm tia	10mm	20mm	40mm	
Đường kính lens (Φ)	10 Φ	14 Φ	14 Φ	
Kích thước vật bé nhất	20mm	34mm	54mm	
Dài phát hiện	0.2 - 6m	0.2 - 8m	0.2 - 8m	
Thời gian đáp ứng	4-34ms (TR=(2+0.5*N)ms(N:Số lượng trục tia)			
Nguồn cấp	DC24V ±10%w			
Nguồn sáng	IRLED (Bước sóng 950nm)			

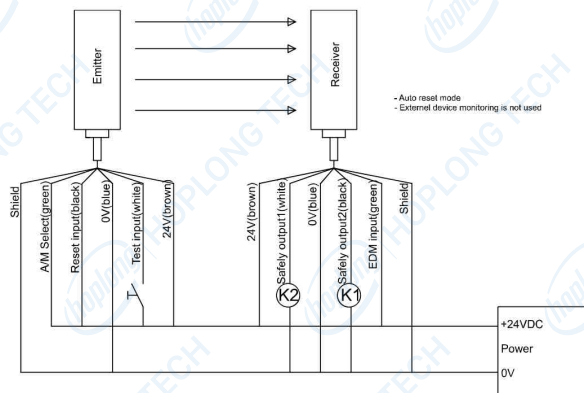
Góc khẩu độ hiệu quả (EAA)		±5° theo IEC/EN 61496-2, 3m giữa bộ truyền và nhận
OSSD	Đầu ra PNP	2 X PNP, dòng ≤ 200mA
LED	Bộ truyền	LED (A : Xanh, B : Vàng) LED chỉ thị (C1 ~ C4 : Đỏ)
	Bộ nhận	LED (A : Xanh, B : Đỏ) LED chỉ thị (C1 ~ C4 : Vàng / Trắng)
Kết nối		Đầu nối kích thước M12 với 3m dây cáp có bảo vệ
Bảo vệ mạch		Ngắn mạch, nối điện áp ngược, dây chuyển đổi cáp
Nhiệt độ		-10 °C đến +55 °C
Độ ẩm		35~85% RH (không đóng băng)
Cường độ ánh sáng		Đèn dây tóc: Tối đa 3000 Lux; Ánh sáng mặt trời: Tối đa 3000 Lux Góc nhận ≥5 °C
Điện trở cách điện		≥100MΩ
Khả năng cách điện		AC 1000V/min
Độ cao		Tối đa 2000 m so với mực nước biển
Cấp an toàn	PLd (EN ISO 13849-1)	-Category 3 - MTTFd cao - DCavg cao
	SIL 2 (EN IEC 62061)	-PFHd 1.03 x 10 ⁻⁷
Cấp bảo vệ		IP65
Vật liệu		Khung : Nhôm, Kẽm diecast Cap : AB Optic : Phủ nhựa PMMA (acrylic) Code : Nhựa PVC chống dầu
Phụ kiện		Giá đỡ (2ea), bu-lông cố định (M5X10) 8ea, đai ốc (M5) 8ea, vòng đệm (M5) 8ea, 1 bộ dây cáp (5m), sách hướng dẫn

* Thực hiện đánh giá rủi ro trước khi lựa chọn thiết bị an toàn

5. Circuit diagram

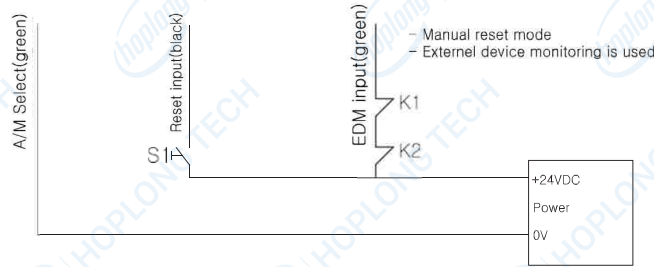
5.1 Standard wiring (PNP output)

► Auto Reset Mode

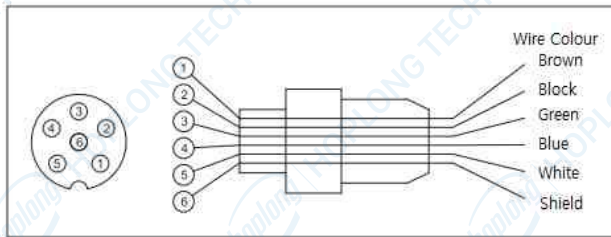


- Connect 0V to Shield for both Transmitter/Receiver
- If TEST function is not required, White wire to be unwired or connected to 0V

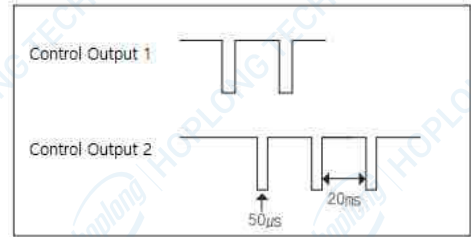
► Manual Reset Mode



5.2 Pinmap

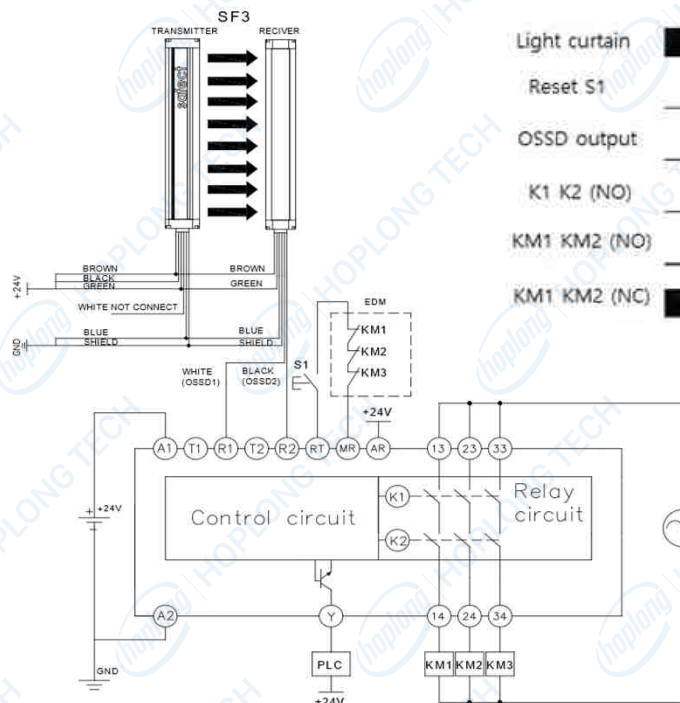


5.3 Control output wave

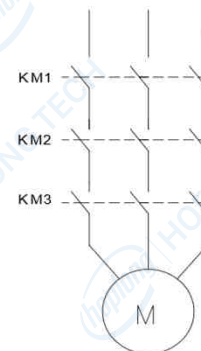
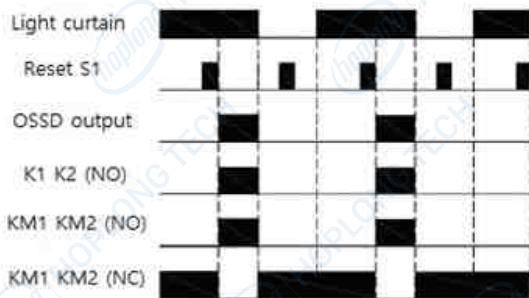


5.4 Circuit diagram example

Light curtain + SSM-MG3(manual reset mode)



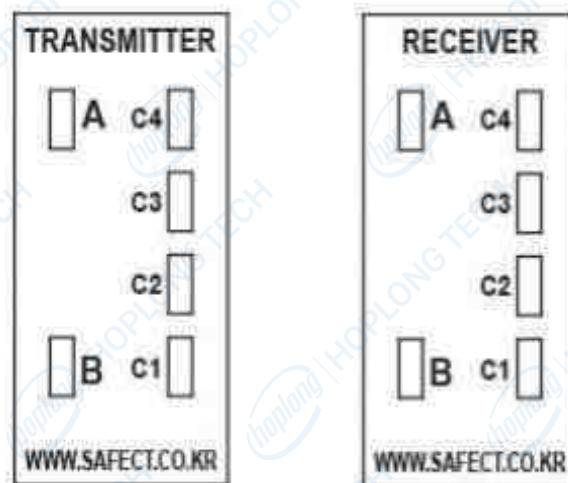
TIME CHART



6. Operation

6.1 LED indication

You can check easily operation status via Two LED "A", "B" + six LED C1 ~ C4 on Transmitter, and Two LED A, B + Four LED "C1~C4" on Receiver



1) Transmitter LED indication

(1) A (Green):

During normal operation : LED "ON"

During TEST : LED "BLINKS"

Stopped during TEST: LED "OFF"

(2) B (Yellow) : RESET LED

Auto Reset : LED "ON"

Manual Reset : LED "OFF"

Pushing Manual Reset for 2second: LED "BLINKS"

(3) C1~C4 (Red) :

TEST : Indicating tested optic axis, if normal C1~C4 is ON one after the other on both Transmitter and Receiver. If not, there is a problem on product or installation.

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2) Receiver LED indication

(1) A (Green):

When OSSD is ON : LED "ON"

(2) B (Red):

When OSSD is OFF : LED "ON"

(3) C1~C4 (Green/Red):

When OSSD is ON : indicating sensitivity level of Receiver (Green LED)

Max. sensitive : all C1~C4 LED "ON"

Strong : C1~C3 LED "ON"

Middle : C1~C2 LED "ON"

Weak : C1 LED "ON"

When OSSD is OFF : Showing location of object (Red LED)

There are 4 section in vertical section. Each section is divided as C1 ~ C4 lamp.

If interrupted, the interruption section is distinguished C1~C4 by changing color to Red. If bottom section is interrupted, C1~C4 Led light ON at the same time.

6.2 Error message by LED

As a result of self-diagnosis, LED indicates an error.

1) TRANSMITTER

(1) "C1 flashing" – Power supply is too high or too low

(2) "C2 flashing" – Error or TEST button (Test line is wrongly wired to 24V)

(3) "C3 flashing" – Error of Reset button(Reset line connected to 24V in Manual mode)

(4) "C4 flashing" – Internal circuit has an error

2) RECEIVER

(1) "C1 flashing" – Power supply is too high or too low

(2) "C2 flashing" – OSSD short circuit failure

(3) "C3 flashing" – EDM error

(4) "C4 flashing" – Internal circuit has an error

6.3 Bean arrangement

Follow below procedures for correct Beam arrangement.

- 1) Power OFF
- 2) If Reset mode, close Reset switch (make NC status)
- 3) Power ON
- 4) Move Transmitter/Receiver to set correct position each where both C1~C4 show Red LED as many as possible for best sensitivity.
- 5) Fix position by bolt.
- 6) Push Reset switch.
- 7) LED B change color from Red to Green on Receiver.
- 8) Light curtain operates normal
- 9) Test normal operation by test rod.
 - (1) Move test rod vertical direction from middle position of Transmitter and Receiver.
 - (2) The interrupted optic axis(section) turn color Green to Red and stop OSSD.
- 10) For 6.4 Final checking and Periodical checking should be double checked.

6.4 Final Check

Check and remove any obstacle in protection area. Verify light curtain operates properly against Specified obstacle and stop OSSD properly.

6.5 Periodical check point

Please refer to below for periodical check point.

- 1) Check all beams detects Test rod and stop OSSD right away.
- 2) Check Test/Reset contact is open first, and Safety relay output works properly. When Test button is pushed, Machine should stop immediately and Safety light curtain indicates Red color LED on Receiver B.
- 3) Train operator to keep away from dangerous zone which is not covered by light curtain, and refer to 6.1 and 6.2 to keep safety distance for correct installation
- 4) Keep preventing any person stays in the protection area while operating dangerous machine
- 5) Pay high attention not to impact light curtain mechanically and electronically.

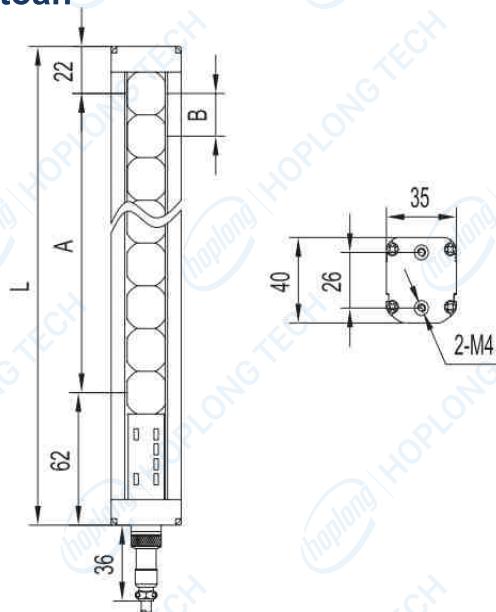
* Checking term varies as per application and environment. Follow relevant law per countries for proper checking term. Consult safety consultant to verify any doubt. In general , 1 time check per day is recommended.

Front cover(made of acrylic) needs cleansing. Use soft cloth and do not use chemical and any hard material risky of scratch. Polluted cover may interrupt normal operation. Thus periodical cleaning is required and recorded.

* Depending on installation environment, pollution on the cover may degrade normal safety operation and stop operation.

7. Kích thước

7.1 Màn sáng an toàn



7.2 Kích thước cụ thể

. Sản phẩm SF3 - F

Dòng SF3 - F (chùm tia 10mm)		
Sản phẩm	A	L (A+62+22)
SF3-F0150-P	150	234
SF3-F0230-P	230	314
SF3-F0310-P	310	394
SF3-F0390-P	390	474
SF3-F0470-P	470	554
SF3-F0550-P	550	634
SF3-F0630-P	630	714

*Dung sai ±1mm

. Sản phẩm SF3 - H

Dòng SF3 - H (chùm tia 20mm)		
Sản phẩm	A	L (A+62+22)
SF3-H0140-P	140	224
SF3-H0180-P	180	264
SF3-H0220-P	220	304
SF3-H0260-P	260	344
SF3-H0300-P	300	384
SF3-H0340-P	340	424
SF3-H0380-P	380	464
SF3-H0420-P	420	504
SF3-H0460-P	460	544
SF3-H0500-P	500	584
SF3-H0540-P	540	624
SF3-H0580-P	580	664
SF3-H0620-P	620	704
SF3-H0660-P	660	744
SF3-H0700-P	700	784
SF3-H0740-P	740	824
SF3-H0780-P	780	864
SF3-H0820-P	820	904
SF3-H0860-P	860	944
SF3-H0900-P	900	984
SF3-H0940-P	940	1024
SF3-H0980-P	980	1064
SF3-H1020-P	1020	1104
SF3-H1060-P	1060	1144
SF3-H1100-P	1100	1184
SF3-H1140-P	1140	1224
SF3-H1180-P	1180	1264
SF3-H1220-P	1220	1304
SF3-H1260-P	1260	1344

*Dung sai ±1mm

. Sản phẩm SF3 - A


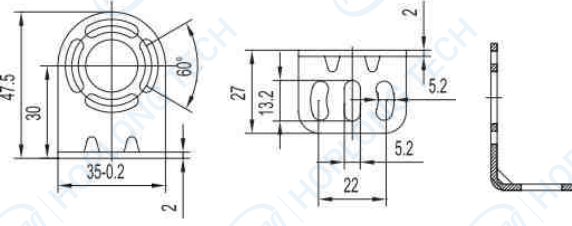
Dòng SF3 - A (chùm tia 40mm)		
Sản phẩm	A	L (A+62+42)
SF3-A0120-P	120	224
SF3-A0200-P	200	304
SF3-A0280-P	280	384
SF3-A0360-P	360	464
SF3-A0440-P	440	544
SF3-A0520-P	520	624
SF3-A0600-P	600	704
SF3-A0680-P	680	784
SF3-A0760-P	760	864
SF3-A0840-P	840	944
SF3-A0920-P	920	1024
SF3-A1000-P	1000	1104
SF3-A1080-P	1080	1184
SF3-A1160-P	1160	1264
SF3-A1240-P	1240	1344
SF3-A1400-P	1400	1504
SF3-A1560-P	1560	1664
SF3-A1720-P	1720	1824
SF3-A1880-P	1880	1984

*Dung sai ±1mm

7.3 Khung gắn

* Yêu cầu lắp đặt và vận hành đúng.



* Sản phẩm bao gồm Khung gắn 2ea, bu-lông cố định (M5X10), đai ốc (M5), vòng đệm (M5).t

Hình ảnh	Kích thước
	

7.4 Dây cáp

* Yêu cầu lắp đặt và vận hành đúng.

* Phụ kiện được đi kèm là 5m, có thể lựa chọn cáp 10m.

Hình ảnh	Sản phẩm	Chiều dài	Thông số kỹ thuật
	SFC-TBC5, SFC-TBC10	5m, 10m	Bộ truyền, M12, đen
	SFC-RGC5, SFC-RGC10	5m, 10m	Bộ nhận, M12, xám

*Chiều dài cáp tối đa: 100m, 0.6tSQ

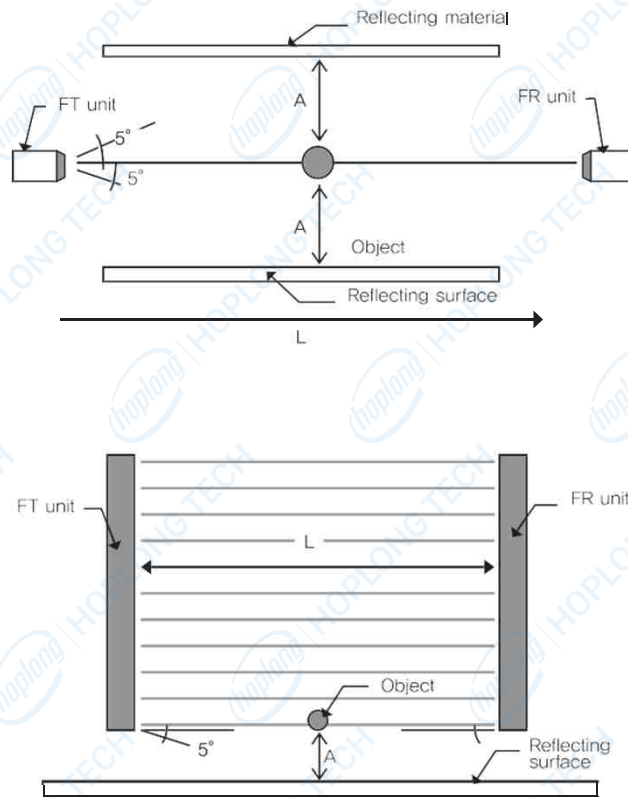
8. Installation

8.1 Preparation action and installation criteria

Installation should be considered where meets requirement of safety light curtain. Please consider ambient light and heat source do not interrupt its normal operation. Safety distance should refer to EN ISO 13855 và EN 62046.

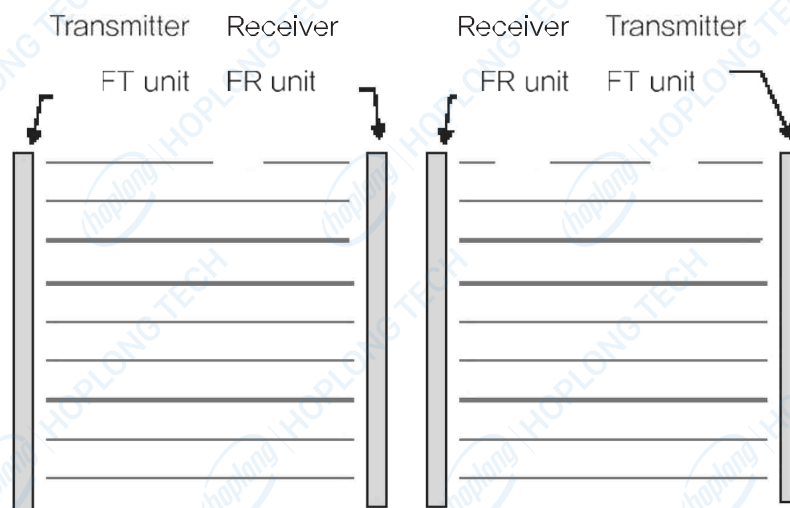
1) Calculation of minimum safety distance

Safety distance "S" is minimum distance that must be away between safety barrier and dangerous area/position of machine. Safety distance must guarantee that operator cannot reach danger zone before machine moving part stops. Safety distance calculation is as below.

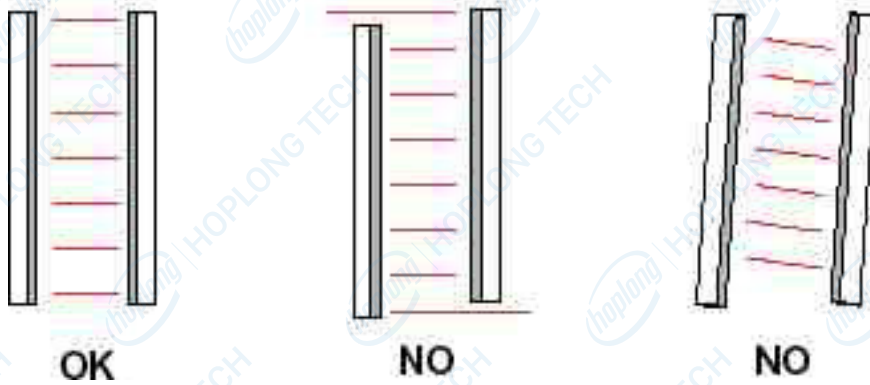


3) Installation

If several safety light curtain are installed, each transmitter does not interrupt Transmitter nearby. They should be in reverse way direction.



Please apply genuine mount bracket in order to complete correct installation.



9. Precaution

All operators should keep in mind with safety concept. Safety device installation should follow its regulation. For any doubt or question on safety device installation, please contact us.

SF3 safety light curtain is warranty for 12 months from delivery. Malfunction due to misuse or damage from environmental causes and natural disaster is not covered by warranty policy.

Warning sign

To ensure safe use of SF3, warning message and alert symbol is used as below. Please read carefully and keep it mind the meaning for your safety.



This 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.



User

Please install SF3 by authorized engineer with good training. Failure to making correct setting may fail to detect people and result serious injury.

 For machine

Do not use SF3 for machine that cannot possibly be stopped instantly by electrical control. For example, do not use it for a press machine that use full-rotation clutch. Since press may not completely stop before person reach to hazardous area, resulting in serious injury.

 Installation

1. Make sure to verify normal operation of SF3 after installation. Do not operate machine until test has been completed and SF3 operation has been verified. Unintended function setting may cause person to go undetected, resulting in serious injury.
2. Before maintenance, turn power OFF. Otherwise unexpected machine running may occur.
3. Make sure to secure safety distance between SF3 and dangerous machine. Otherwise, machine may not stop before person reach to dangerous zone, resulting in serious injury.
4. Install protective structure around dangerous area so that dangerous part of machine can only be reached by passing through protection zone. Install Safety light curtain so that part of person is always present in detection zone when working in machine's dangerous zone.
5. Safety system should play a role as interlock system which stop machine's restart while a person is detected by light curtain. Otherwise it may result in serious injury
6. Install Interlock Reset switch in a location where it provides clear view for entire hazardous area and where it cannot be activated from within hazardous area.
7. SF3 cannot protect person from flying object from hazardous area. Install protective cover or fence accordingly. Otherwise serious injury may occur.
8. Install SF3 where is not affective by reflective surface. Failure to do so may hinder detection, result in serious injury.
9. For installation of several SF3, install them where each SF3 does not interrupt operation. Locate in a way reverse direction or put physical cover in between.
10. Finish installation body and connector fasten firmly.
11. Make sure no foreign material, such as water, oil or dust enter inside of SF3
12. Perform daily check and every 6 month check. otherwise, system may fail to work properly resulting in serious injury.

**Wiring**

1. Do not connect any single wire of SF3 with DC power source exceeding than DC 24V and AC. There is risk of electronic shock.
2. For SF3 to comply with EN IEC 61496-1, DC power supply unit must satisfy all of following conditions.
 - 1) Power supply to be DC24V
 - 2) There should be some tolerance against total rated current of devices,, if it is connected to multiple devices.
 - 3) Must comply with EMC directive(Industrial environment)
 - 4) Double or enhanced insulation must be applied between primary and secondary circuit
 - 5) Must comply with EMC, laws and regulation of country or region where SF3 is used.
(EX: in EU power supply must comply with EMC low voltage directive)
3. 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 cable must be within specified length. Otherwise safety function may not work properly, resulting in dangerous result.
4. Do not attempt to disassemble, repair or modify. It can fail to perform normal safety performance.
5. Do not use SF3 in environment where flammable or explosive gas is present.
6. Always keep away from any obstacle around 1 m³ from installation position.
7. For electronic equipment to be used at altitude 1000m~2000m, it is necessary to take into account reduction of dielectric strength and cooling effect of air.

Detection area and access path

- 1 . Install protective structure so that hazardous part of machine can only reach by passing through SF3 detection zone. Install SF3 so that part of person is always present in detection zone when working in machine's hazardous area.
2. If a person step into hazardous area via SF3 detection zone, use interlock system to hold machine restart. Otherwise serious injury may occur. Interlock Reset switch location should be on spot where one can easily see whole area and outside of dangerous zone.
3. SF3 cannot protect from flying object in hazardous area. Install protective cover or fence if necessary.



Precaution for use

Make sure to observe the following precautions that are necessary for ensuring safe use of the product. For SF3 to comply with Category 2, IEC 61496 must satisfy all of the following conditions.

1. Not used with a current that is higher than the rated specification. Otherwise, the safety system may fail to work properly, resulting in serious injury.
2. Please consider correct wiring to be done the OSSD is not fused to supply power or load power.
3. Do not drop the product or expose to abnormal vibration.
4. Do not install or storage the product in the following environments:
 - Area exposed to intense interference light, such as sunlight
 - Area where corrosive or flammable gas is present
 - Area exposed to vibration or shock levels higher than in the specification provisions
 - Area where the product may come into contact with water
 - Area where the product may get wet with oil that can solve adhesive
 - Area where the ambient temperature is more than -10~55°C
5. Additional measures may be necessary to ensure that the product does not fail to danger when other forms of light radiation are present in a particular application (for example, use of cableless control devices on cranes, radiation form weld spatter or effects from stroboscopic light).