



SND/E series safety light curtain

INSTALLATION AND USAGE MANUAL

Please read this document carefully and thoroughly before installation and operation, because the correct and optimum use of this product is important for the personal safety. Please give the user this document with the safety light curtain if you are an agent, a dealer or a machine manufacturer which forms a complete set, because this document is important to guide the user correctly to install and operate.

Foreword

Thanks for choosing LNTECH safety light curtain, this operating instruction manual is designed to address the technical personnel of the machine manufacturer or the machine operator in regards to safe mounting, wiring, commissioning, operation and maintenance of the safety light curtain.

The safety light curtain (herein after called “light curtain”) is electro-sensitive protective equipment (ESPE); it is also named “ opto-electronic sensor”.

It is mainly used in automotive manufacturing,packaging and other automation fields, prevent staff entering the danger zone and being injured.

The light curtain only protects the rectangular region of the light curtain. If it is installed improperly, either operation is not according to the instruction manual and the correlation security working rule, or the protected device have faults, or other possible causes, it is unable to exert the protective function.

Therefore, before install and operate the protector, please read carefully and understand fully related items in the instruction manual, in particular apprehend about the items stressed as “Warning”, “Attention” and so on.

In operating, please understand correctly and fully the operating performance about the protector, operate strictly according to the requests proposed in the instruction manual, stipulate the relevant security working rule.

The contents of this instruction manual are explained by Shandong Laien Optic-electronic Technology Limited Company, if you have any unclear items, please contact us.

Prohibitions:

It's prohibited to reproduce and reprint this installation and usage manual of some or all of the content without permission.

On the content, it will be modified because of the improved device or other reasons in the future. Please understand without notification in advance.

This manual is prepared professionally, but there is still something imperfect. If you have found the unclear contents, wrong pages or missing pages, etc, please contact the nearest distributor.

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1 Important Information

1.1 overview

This manual contains instruction, operation, installation, wiring, maintenance and troubleshooting of the SND/E series production.

This manual don't offer the instruction of the machine installed with the SND/E series. The instruction of related machine operation may refer to the instruction of machinery manufacture.

1.2 The Composition of This Manual

This manual contains following chapters:

- Important information contains emphasis information, the makeup of this manual, control dependability information, certificate, directive and so on.
- Basic introduction contains the usage, features, working schematic drawing and terminology, technical parameter data and specification of the SF series safety light curtain.
- Attentions for installation of the light curtain must be noticed contains calculating determination of placement position and attentions for neighboring placement.
The function of SF series parts and shell size.
Wiring drawings for NPN/PNP output, the wiring of safety relay with light curtain and so on.
Adjustment
Check and maintenance
Troubleshooting

1.3 Control reliability

"Control reliability" means that a component failure detected by or within the equipment, system or interface causes a stop signal to be sent to the guarded machine and puts the SND/E light curtain into a Lockout condition, then to restore until the fault removed.

SND/E light curtain come with redundant circuit and self-checking functions

The design comply with EN 61496-1-2013 and EN 61496-2-2013 (Type 4). A single or accumulated fault in any of these parts does not lead to the loss of the safety function, the safety function is still maintained

1.4 EU Directives Verification

Directives	No.
Machinery Directive	2006/42/EC
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU

15 EU Standards Verification

The installation and usage of the SF series must comply with applicable EU standards(not all list)

Directives	No.
EN ISO 13849-1	Safety of machinery -- Safety-related parts of control systems -- Part 1: General principles for design
EN 61496-1	Machinery safety-Electro-sensitive protective equipment-Part 1:General requirements and tests
EN 61496-2	Machinery safety-Electro-sensitive protective equipment-Part 2:Active opto-electronic protective devices
EN 60204-1	Machinery safety - Machinery electrical equipment
EN ISO 12100-1	Safety of machinery. Basic concepts,general principles for design. Part 1:Basic terminology,methodology Incorporates Amendment
EN ISO 12100-2	
EN ISO 14121-1	Safety of machinery - Risk assessment - Part 1: Principles
IEC 61508-1...-7	Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 62061	IEC 62061: Safety of machinery - Functional safety of electrical, electronic and programmable control systems
EN ISO 13855	Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body
EN ISO 13857	Safety of machinery -- Safety distances to prevent hazard zones being reached by upper and lower limbs

16 GB Standards Verification

The SND/E series must comply with the following GB standards

Directives	No.
GB 5226.1-2008	Machinery safety - Machinery electrical equipment
GB/T 16855-1-2008	Safety of machinery -- Safety-related parts of control systems -- Part 1: General principles for design
GB/T 19436-1-2013	Machinery safety-Electro-sensitive protective equipment-Part 1:General requirements and tests
GB/T 19436-2-2013	Machinery safety-Electro-sensitive protective equipment-Part 2:Active opto-electronic protective devices
GB/T 15706-2012	Safety of machinery - Basic concepts, general principles for design - Risk assessment and risk reduction
GB/T 20438-1...-7-2006	Functional safety of electrical/electronic/programmable electronic safety-related systems

2 Basic Introduction

2.1 Terminology

Emitter

The emitter consists of emitter units; it can emit the modulated light signal.

Sensor

The sensor consists of emitter units and (or) receiver units. It can emit and (or) accept the modulated light and form light curtain with a reflector (or through reflector/mirror). Output a light passing signal or light intercepting signal to controller. In order to be advantageous for the description, sometimes also refers to the emitter and (or) the receiver.

Reflector

The reflector used to reflect the modulated light from emitter units to receiver units.

Mirror

The mirror used to change the light direction of transmission from emitter units to receiver units, to form multi-sides protection light curtain.

Signal cable

The signal cable used to connect the emitter, receiver and the controller, or connect the sensor and controller.

Light curtain device

All the components that the sensor and the reflector of the reflection type, the emitter and the receiver of the direct protection type and the reflector, the emitter and the receiver of the multi-sides protection type, produce the light curtain.

Light beam

The emitter unit sends out the infrared light, forms a bunch of parallel light after passing optics part.

Beam center line

It is the middle line of the light beam.

Light intercepting

It is the output state of the light curtain when the light curtain is intercepted.

Light axis pitch

The distance of optical axis between the neighboring two bunches of light, uses to express the light beam density of light curtain, the optical axis spacing is smaller, and the light beam is more crowded.

Detection precision

The light curtains' ability to detect the size of test piece, it means when the light curtain is shaded anywhere, active opto-electronic protective device can have induction function and when the device keeps off state, it needs the diameter value of the smallest test piece.

Protective range

The light curtain can protect length scope.

Light beam number

It is quantity of the light beams that sending out from emitter, the same as the quantity of the emitter units in the emitter.

Light passing

It is the output state of the light curtain when the light curtain is not intercepted.

2.2 Application

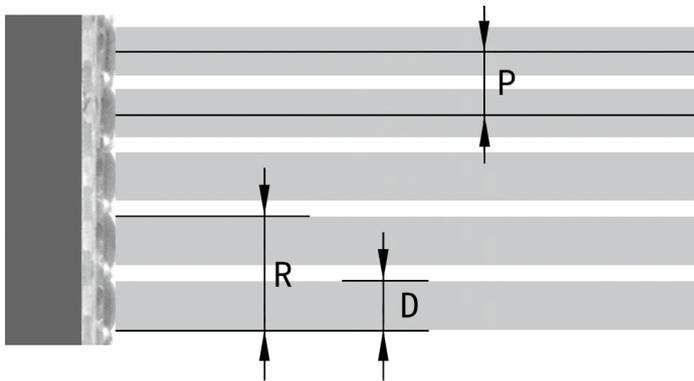
LNTECH safety light curtains and safety control products are widely used in the Punch&press machines、 Bending&cutting machines、 Automatic welding line、 Automatic assembly line、 Automatic packing line、 Automatic logistics line、 Paint line etc, designed for mechanical equipment with potential hazard to protect operator's personal safety.

Please contact us for more application, we will provide the optimal safety solutions based on your requirements and the on-site situation.

2.3 Characteristics

- ◆ Comply with type 4 certification
- ◆ Simple mounting and wiring, kinds of models for wide application
- ◆ Perfect self-checking function
- ◆ Good anti-interference to the surrounding lights and electromagnetic
- ◆ Good anti-vibration, water-proof and dust-proof performance
- ◆ The running, wiring, faults states indication and auxiliary alignment
- ◆ PNP*2 output with pulse-inversion
- ◆ Can choose 2-3 cascaded light curtain to have perimeters safeguarding
- ◆ EDM, auxiliary output function
- ◆ External testing, manual reset (optional)
- ◆ Fixed and floating muting(optional)
- ◆ Can be configured using handheld device or related software (optional)

2.4 Relations of light axis pitch and resolution



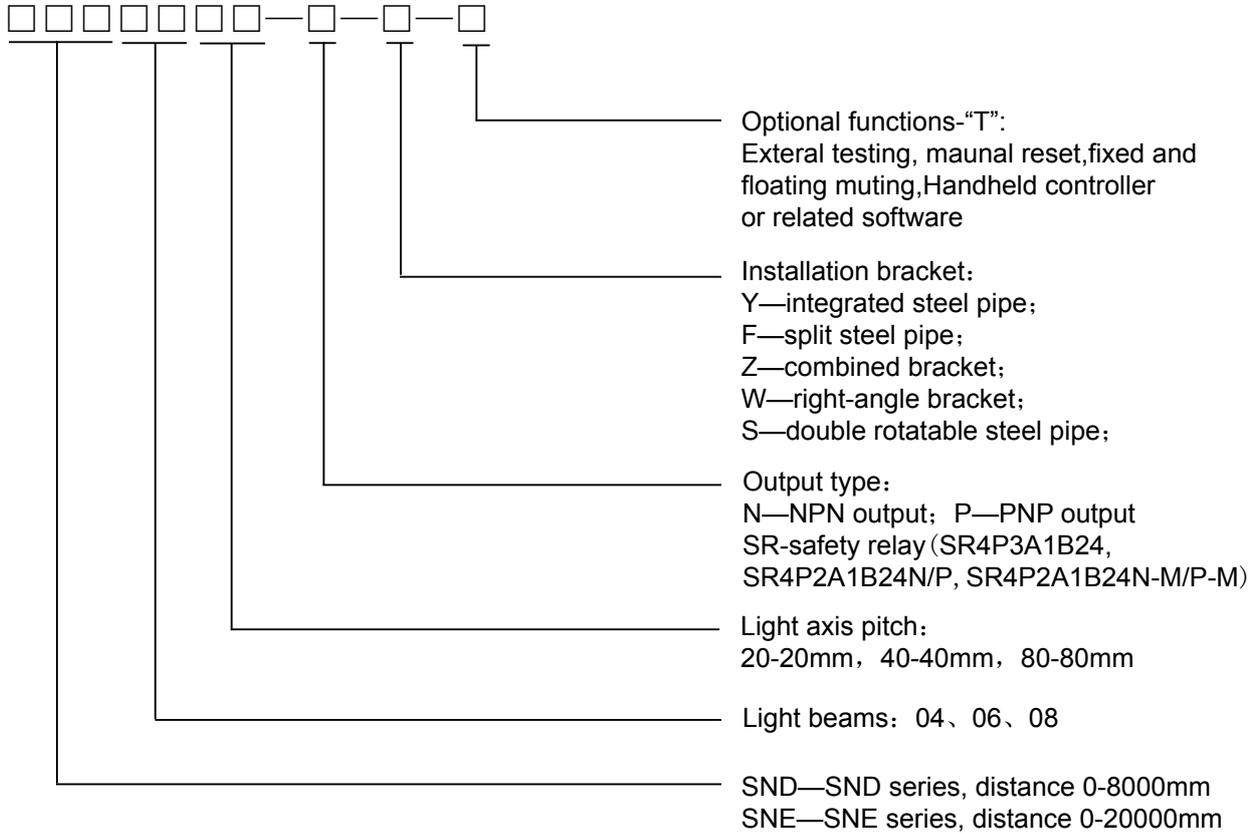
P: light axis pitch
R: detection capacity
D: lens' diameter
 $R=P+D$

2.5 Technical parameters

Performance		
Protective range	SND:0~8000mm, SNE:0~20000mm	
Protective height	$H=(\text{beams}-1)\times\text{light axis pitch}$	
Detection precision	D: 30mm,40mm,100mm; E: 40mm,50mm,100mm	
Light axis pitch	20mm,40mm,80mm	
Light source	Infrared light, 940nm	
DC	99%	
MTTFd	200a	
Safety level	Pl _e (EN ISO 13849)	
Sealing level	IP65	
Light immunity	10000Lux (angle of incidence $\geq 5^\circ$)	
Electrical characteristics		
Operating power	DC12V-DC24V	
Power consumption	<10W(without load)	
Safety output	short protection and cross monitoring circuit,loading current 200mA, remain volt<1.4V	
Auxiliary output	NPN output,loading current 200mA, remail volt<1.4V	
Response time	SND/E: $\leq 10\text{ms}$ (within 52 beams), $\leq 20\text{ms}$ (52-100 beams)	
Status indication	Emitter	SND/E:light-passing“- -”, light intercepted“ ”, fault codes for trouble
	Receiver	SND/E:light passing intensity (P1-P4) light intercepting indicate blocked beam,fault codes for trouble -
Noise immunity	IEC61000-4-4: level III/IEC61000-4-2: level III	
Insulating resistance	> 100M Ω	
Dielectric strength	AC1500V, 60s	
Physical characteristics		
Ambient temperature	-10 $^\circ\text{C}$ ~55 $^\circ\text{C}$	
Humidity	20 $^\circ\text{C}$,RH $\leq 85\%$	
Vibration	Frequency range: 10 to 55 Hz Sweep rate: 1 octave/min Amplitude: 0.35 \pm 0.05 mm. 1000 times for X,Y,Z direction	
Sealing	IP65	
Shell material	Sensor: Aluminium alloy; Light filter: PMMA	

2.6 Specifications

The specification of the light curtain includes six parts ,the first part denotes the series; the second part denotes the beams; the third part denotes light axis pitch; the fourth part denotes the output way; the fifth part denotes the installation type, the sixth part donates the optional functions.The each part separately by "--". e.g. SND0820-P-W: SND series, 8 beams, light axis pitch 20mm, PNP output, right-angle bracket



2.7 Schematic diagram

The light curtain consists of emitter,receiver,signal cables, it forms infrared light curtain, detects the signal of passing or intercepting, transmits the the signal of passing or intercepting light through the

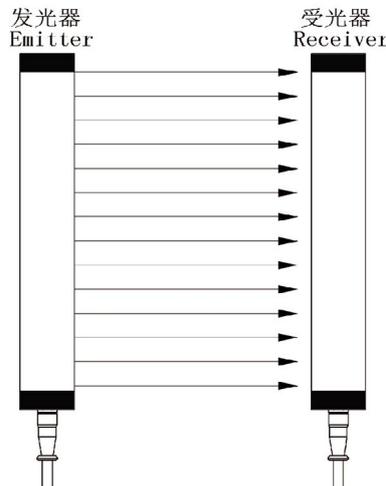


Fig.2-2 SND/E series sensors chematic diagram

2.8 Lables

LNTECH[®]	CE	SND****	Emitter		
Protection Height	<u>****mm</u>	Power Supply	<u>DC12V-24V</u>	Safety Catagory	<u>Typye 4</u>
Protection Range	<u>0-*m</u>	Current Consumption	<u>≤200mA</u>	Enclosure Rating	<u>IP65</u>
Detection Capability	<u>**mm</u>	Load Capacity	<u>120mA</u>	Executive Standard	<u>IEC61496-1/-2</u>
Response Time	<u>≤**ms</u>	Output Type	<u>NPN X 1</u>	Serial NO.	<u>F*****</u>
Shangdong Laien Optic-electronic Technology Co.,Ltd		www.sdlaien.cn	400-618-3915	MFG Date	<u>20**_**</u>

LNTECH[®]	CE	SND****	Receiver		
Protection Height	<u>****mm</u>	Power Supply	<u>DC12V-24V</u>	Safety Catagory	<u>Typye 4</u>
Protection Range	<u>0-*m</u>	Current Consumption	<u>≤200mA</u>	Enclosure Rating	<u>IP65</u>
Detection Capability	<u>**mm</u>	Load Capacity	<u>120mA</u>	Executive Standard	<u>IEC61496-1/-2</u>
Response Time	<u>≤10ms</u>	Output Type	<u>PNP X 2</u>	Serial NO.	<u>S*****</u>
Shangdong Laien Optic-electronic Technology Co.,Ltd		www.sdlaien.cn	400-618-3915	MFG Date	<u>20**_**</u>

3 Installation

3.1 Safety Distance

The safety distance is the minimum distance that must be maintained between the light curtain and the dangerous parts of the machine, so that the machine can be stopped before a human body or an object can reach the dangerous parts .

In order to guarantee the operator's personal safety, the light curtain's installment position must meet the requirements of the safety distance, otherwise a possible accident may occur.

3.1.1 The Formula 1

Regarding the press which the slide can stop in the optional position, its safety distance D_s computational method is given by the formula 1.

$D_s = KT + C$ Formula 1

In the formula:

D_s ---Safety distance, the unit is millimeter (mm);

K ---Intrusion velocity of operator's body or object, the unit is millimeter per second (mm/s);

T ---Total response time of equipment, the unit is second (s);

C ---Additional distance, the unit is millimeter (mm).

Before installation, please unpack the package box and checkup packing component according to the packing detailed list;

During installation, please shut off power supply to avoid electric shock.

3.1.2 K Value Determination

When the light curtain is installed in a horizontal position, taken as 1600mm/s for calculation.

When the light curtain is installed in a vertical position, and the safety distance is no longer than 500mm, taken as 2000mm/s; if the safety distance is longer than 500mm, then taken as 1600mm/s for calculation.

3.1.3 T Value Determination

The total response time of equipment T includes two parts, response time of the protector and maximum halting time of the equipment.

The response time of the protector is given by the supplier.

The maximum halting time of the equipment needs to be measured.

3.1.4 C Value Determination

Additional distance C is determined according to the distance that the operator's hands enter the light curtain and extend to hazard point by certain speed, until the protector is able to achieve protection condition.

When the press is not used the self-lock (start - restart locking) function by the protector, according to its examination precision, when calculating safety distance, should use the Table 3-1 stipulations at least.

Resolution/mm	C/mm	start the stroke by the device
≤14	0	Yes
> 14≤20	80	
> 20≤30	130	
> 30≤40	240	No
> 40	850	

If the light curtain self-protection function applied to press machines, $C=0$

3.2 Installation position

! Warning

Must guarantee the proper installation position

Make sure of access to the dangerous parts or area only through the safety light curtain sensing area.
Should ensure of the machines can't start automatically when the operator stay between sensing area and dangerous area.

Ensure of the machines can't restart when the operator stay in the dangerous area

Place the restart switch in the place where can have clear view of dangerous area

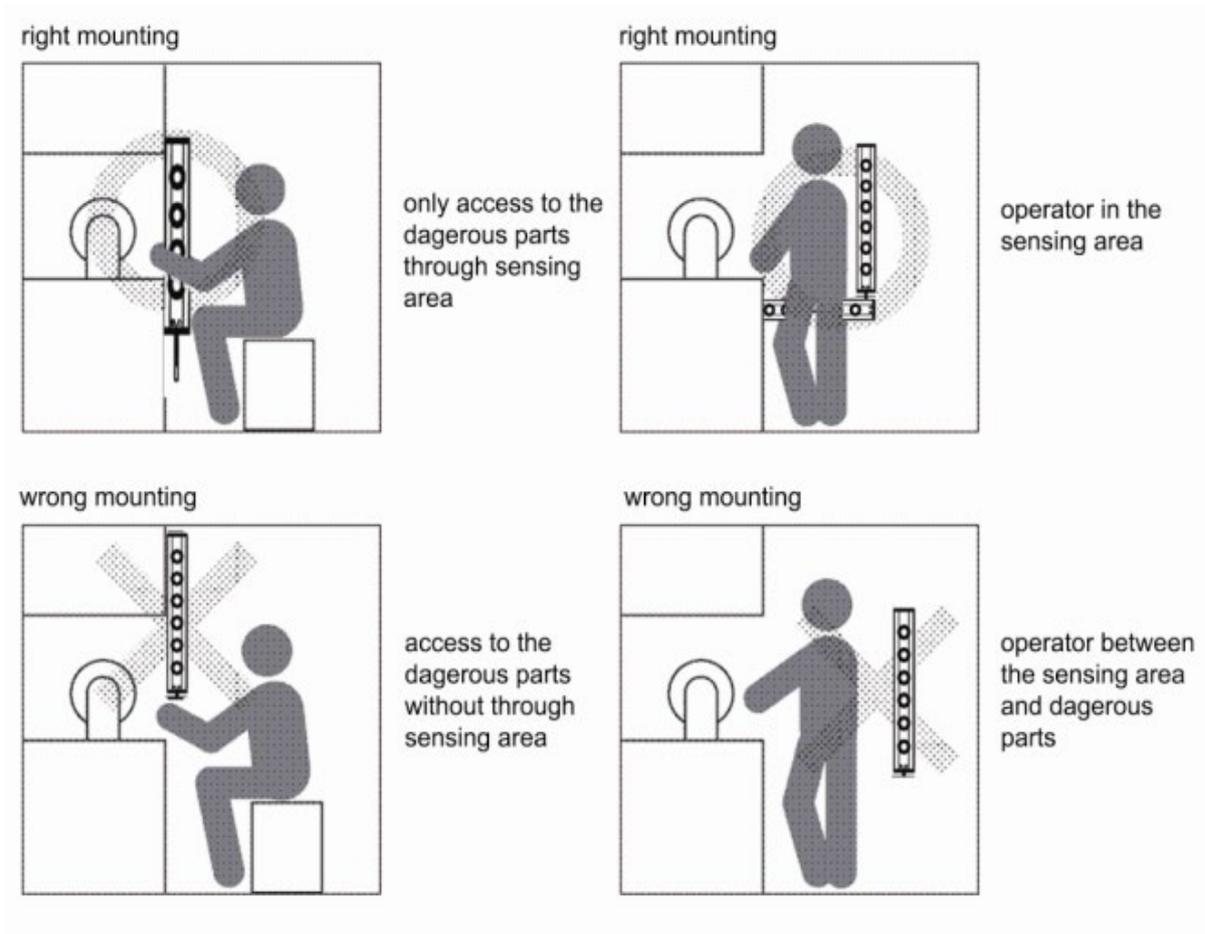


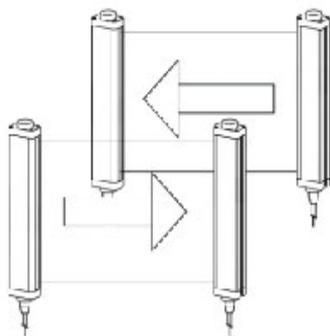
Fig.3-1 light curtain installation position diagram

! Warning

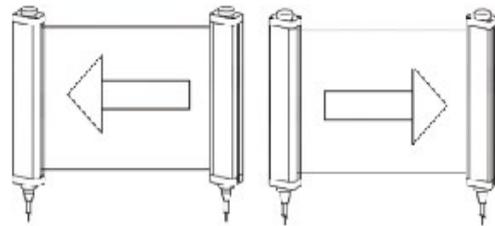
if the guarded machine brake can't run properly, must take timely checking, otherwise, even though the right installation position placed, the light curtain can't ensure of the safety function, safety distance > 400mm, apart from the light curtain, also need take other guardign measures

3.3 Installation of multiple protectors

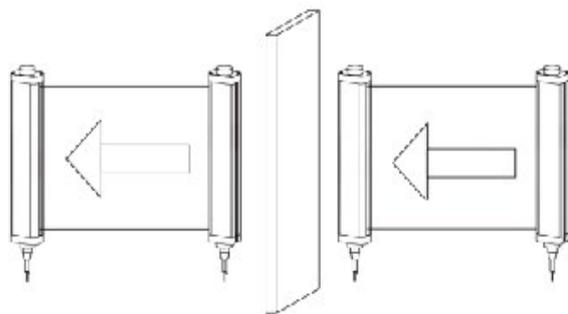
When two or more light curtains are installed one close to another, which will be interferred mutually between the light curtains. In order to avoid the interference, it should place the light curtain at right postion as below demonstration.



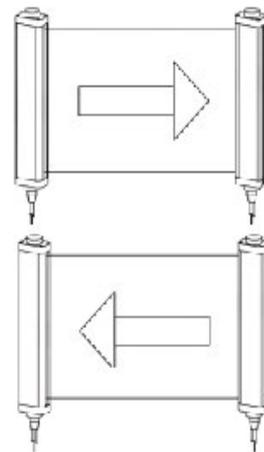
Emitter Relative Placement



Emitter Back Placement



Keep Apart



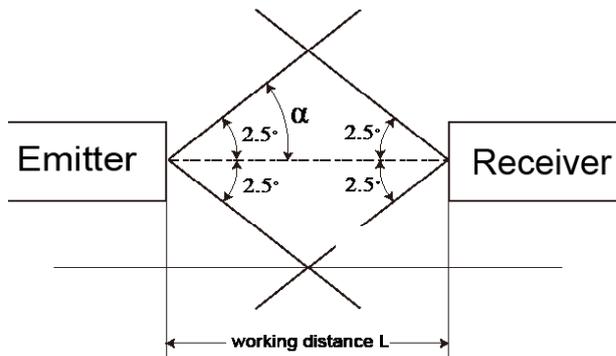
Emitter Relative Upper and Bottom Placement

! Warning

- A. The mutual interference between the light curtains can affect the protection function.
- B. For security guarantee, please take correct placement method to eliminate the interference

3.4 Reflecting Surface Influence around the light curtain

If there is the smooth reflecting surface around the light curtain, like the metal plate, the floor, the ceiling, the workpiece, the cover, the partition board, the glass plate and so on, the distance from light curtain placement position to the reflecting surface is farther than value A (m), value A can be calculated by the formula in form, or be consulted from the coordinates chart.

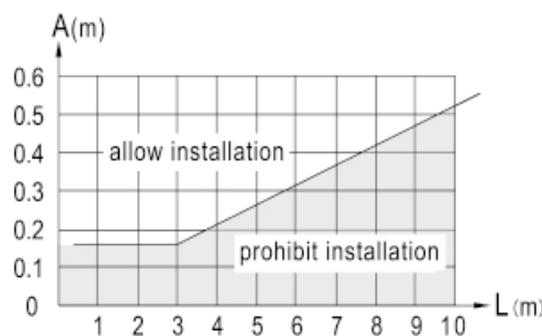


The cone has a aperture Angle alpha, it formed between the optical axis and a light beam on the edge of the cone.

Alpha = aperture Angle of the light beam

L = the distance between the emitter and receiver

Protection range L	Permitted distance A
0.3 to 3m	0.16m
>3m	$L \times \tan 2.5^\circ = L \times 0.052$



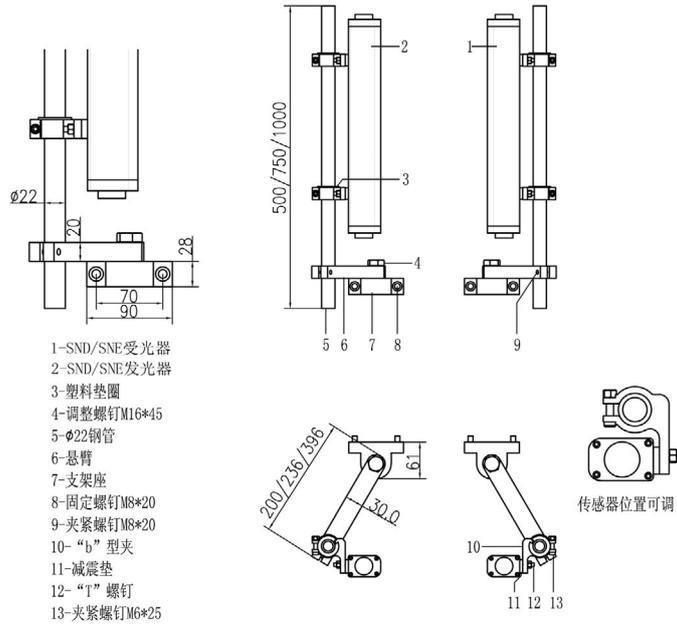
! Warning

- A. The smooth reflection surface around the light curtain can affect it's function, even protection failure
- B. The placement position of the protector, must be as far as possible away from the reflection object, or cover up the reflection object to eliminates the disturbance around the light curtain

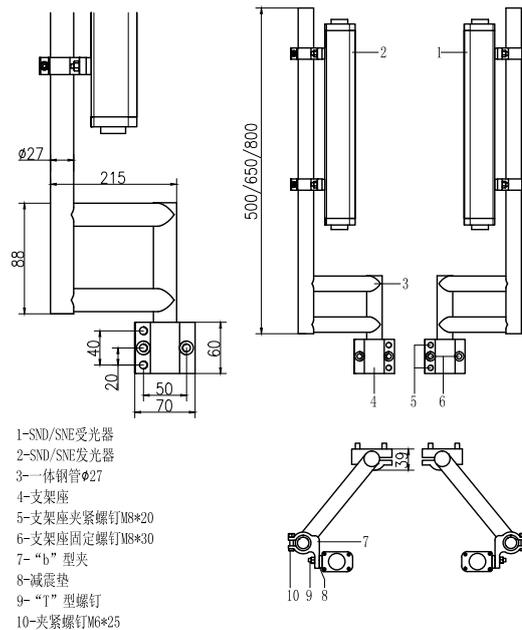
3.5 Installation

There are three regular brackets: split steel pipe, integrated steel pipe, combined bracket, which can meet the customer's requirement.

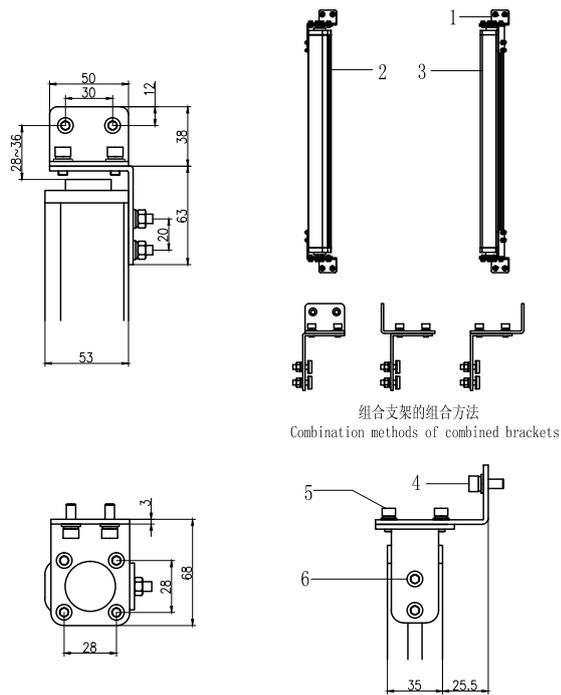
【Split steel pipe bracket】



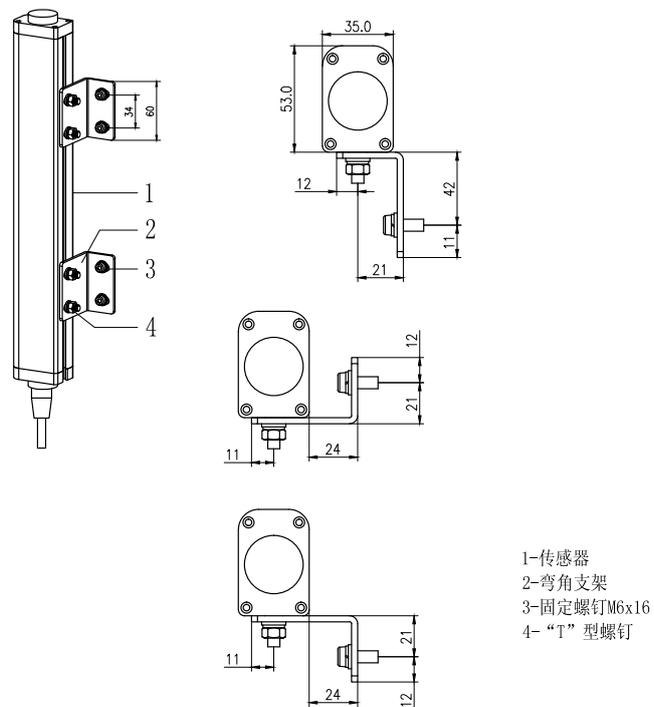
【Integrated steel pipe bracket】



【combined bracket】



【right-angle bracket】



3.6 Installation tools

Electric drill,bit(Φ 4.2, Φ 5.0, Φ 6.8, Φ 10)

Screw tap(Size:M6)

Crosshead and A"screwdriver

Sechskant-Schraubendreher(Size:5mm,6mm)

long flat nose pliers and so on

- Need Φ 5.0 drill and M6 screw tap to mount right-angle bracket;
- Need Φ 10 drill bit for wiring hole.

4 External dimension

SND/E safety light curtain compose of emitter and receiver,emitter send out the infrared beam through the emitting units direct to receiver,form the light curtain for sensing area.

4.1 Reflecting Surface Influence around the light curtain

1. sensor housing
2. LED indicator:
 - (1) receiver indicators: show the blocked beams, light passing shows the align intensity(P1-P4)-|- fault codes for error
 - (2) emitter indicators: light passing shows“- -”, light intercepting“ ”,fault codes for error
3. Indicators: green for light passing, red for interception
4. sensor's bottom cover
5. connector between sensor and cable

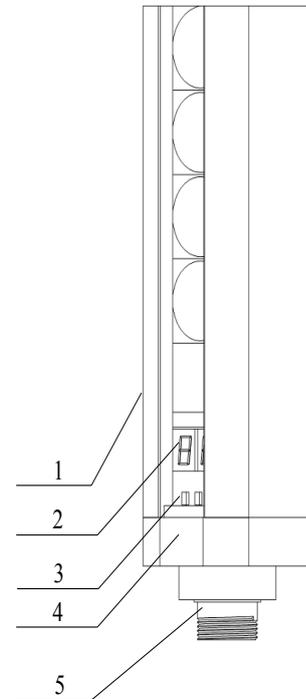
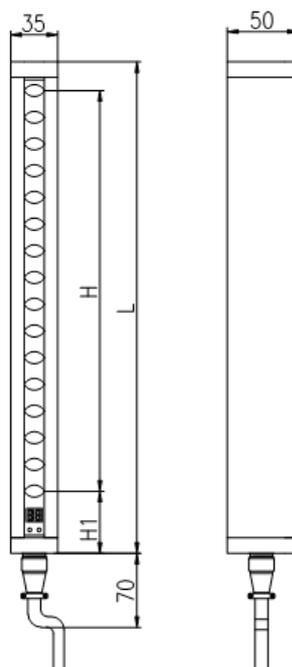


Fig.4-1 SND/E series function parts illustration

4.2 Dimension



L:sensor's height
 H:protection height
 H1=47mm,distance from 1st beam to bottom cover

Fig.4-2 SND/E series external size

4.3 Specification

light axis pitch 20mm				light axis pitch 40mm			light axis pitch 80mm		
beam	specification	H	L	specification	H	L	specification	H	L
02							SND0280	80	210
04				SND0440	120	210	SND0480	240	370
06				SND0640	200	290	SND0680	400	530
08	SND0820	140	210	SND0840	280	370	SND0880	560	690
10				SND1040	360	450	SND1080	720	850
12	SND1220	220	290	SND1240	440	530	SND1280	880	1010
14				SND1440	520	610	SND1480	1040	1170
16	SND1620	300	370	SND1640	600	690	SND1680	1200	1330
18				SND1840	680	770	SND1880	1360	1490
20	SND2020	380	450	SND2040	760	850	SND2080	1520	1650
22				SND2240	840	930			
24	SND2420	460	530	SND2440	920	1010			
26				SND2640	1000	1090			
28	SND2820	540	610	SND2840	1080	1170			
30				SND3040	1160	1250			
32	SND3220	620	690	SND3240	1240	1330			
34				SND3440	1320	1410			
36	SND3620	700	770	SND3640	1400	1490			
40	SND4020	780	850	SND4040	1560	1650			
44	SND4420	860	930	SND4440	1720	1810			
48	SND4820	940	1010	SND4840	1880	1970			
52	SND5220	1020	1090	SND5240	2040	2130			
56	SND5620	1100	1170	SND5640	2200	2290			
60	SND6020	1180	1250	SND6040	2360	2450			
64	SND6420	1260	1330	SND6440	2520	2610			
68	SND6820	1340	1410	SND6840	2680	2770			
72	SND7220	1420	1490	SND7240	2840	2930			
76	SND7620	1500	1570						
80	SND8020	1580	1650						
84	SND8420	1660	1730						
88	SND8820	1740	1810						
92	SND9220	1820	1890						
96	SND9620	1900	1970						
100	SND10020	1980	2050						

5 Wiring

 **Warning**

- ◆ Before wiring, must switch off the guarded machine and wiring as per the diagram properly
- ◆ Any change is prohibited in the circuit
- ◆ The user has the responsibility to ensure that all local, state, and national laws, rules, codes, or regulations relating to the wiring. If the wiring is not followed properly, the device cannot provide the protection for which it was designed.

Remark: the wiring to the guarded machine by Qualified Persons, in accordance with this manual and applicable safety regulations.

The power device need meet below requirements:

- 1) local verified power device
- 2) comply with EMS directs(for CE certification)
- 3) comply with low-volt directives,output power below 100VA
- 4) output holding time >20ms
- 5) when electric surge occur,need use SPD
- 6) In line with CLASS 2 (comply with UL/cUL)

<SUPPLEMENTARY> As IEC 60536 regulation that the power device with double insulation or reinforced insulation distance.

Comply with low-volt directives and output power<100VA

5.1 SND/E light curtain I/O wiring

 **Warning**

- 1.If don't use EDM function,please short the red and black-green cable in emitter
- 2.Must insulate the unuse cable ends
- 3.Should take into account pulse-inversion effect to PLC
- 4.Fig.5-1,5-2 K1,K2 and K3, Fig.5-5,5-6,5-7,5-8,5-9 K3 and K4 is the external device, should take the forced guide safety relay or magnetic contact

NPN output waveform

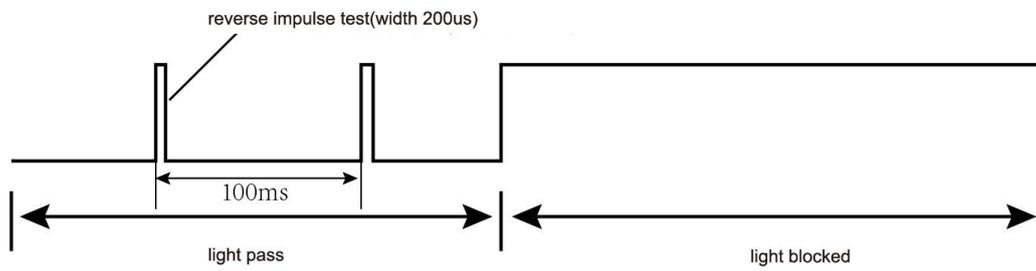


Fig.5-3 NPN output waveform

PNP output waveform

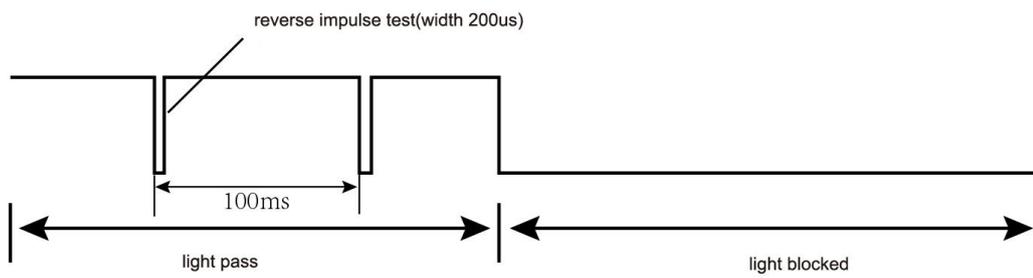


Fig.5-4 PNP output waveform

5.2 SND/E wiring with safety relay

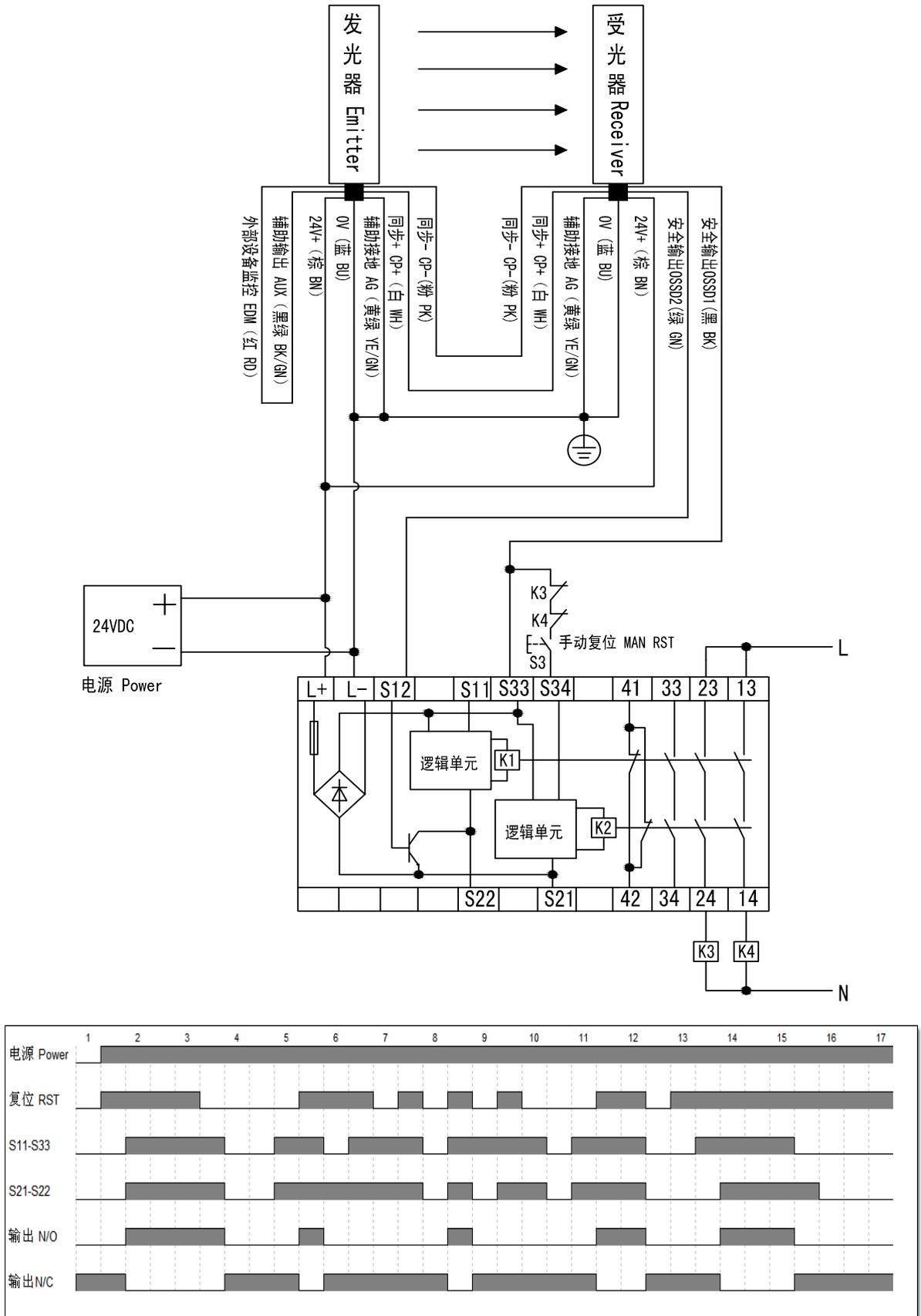


Fig.5-5 SND/E wiring and time graphic with safet relay SR4P3A1B24

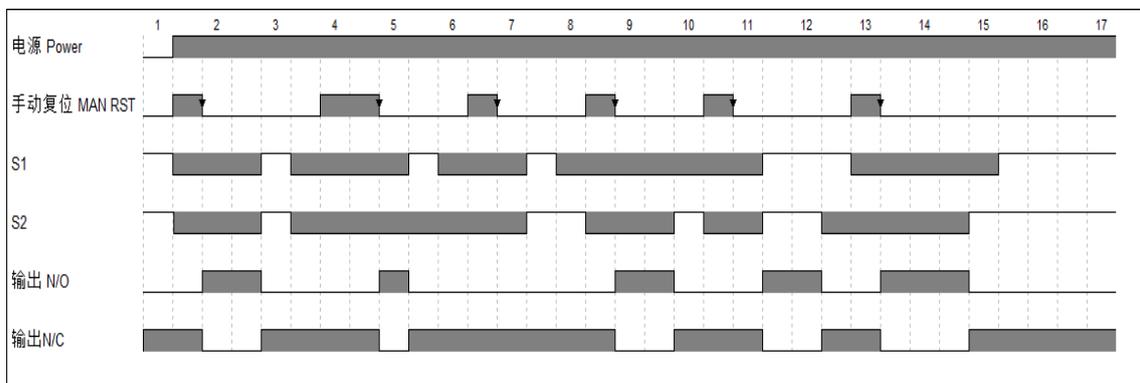
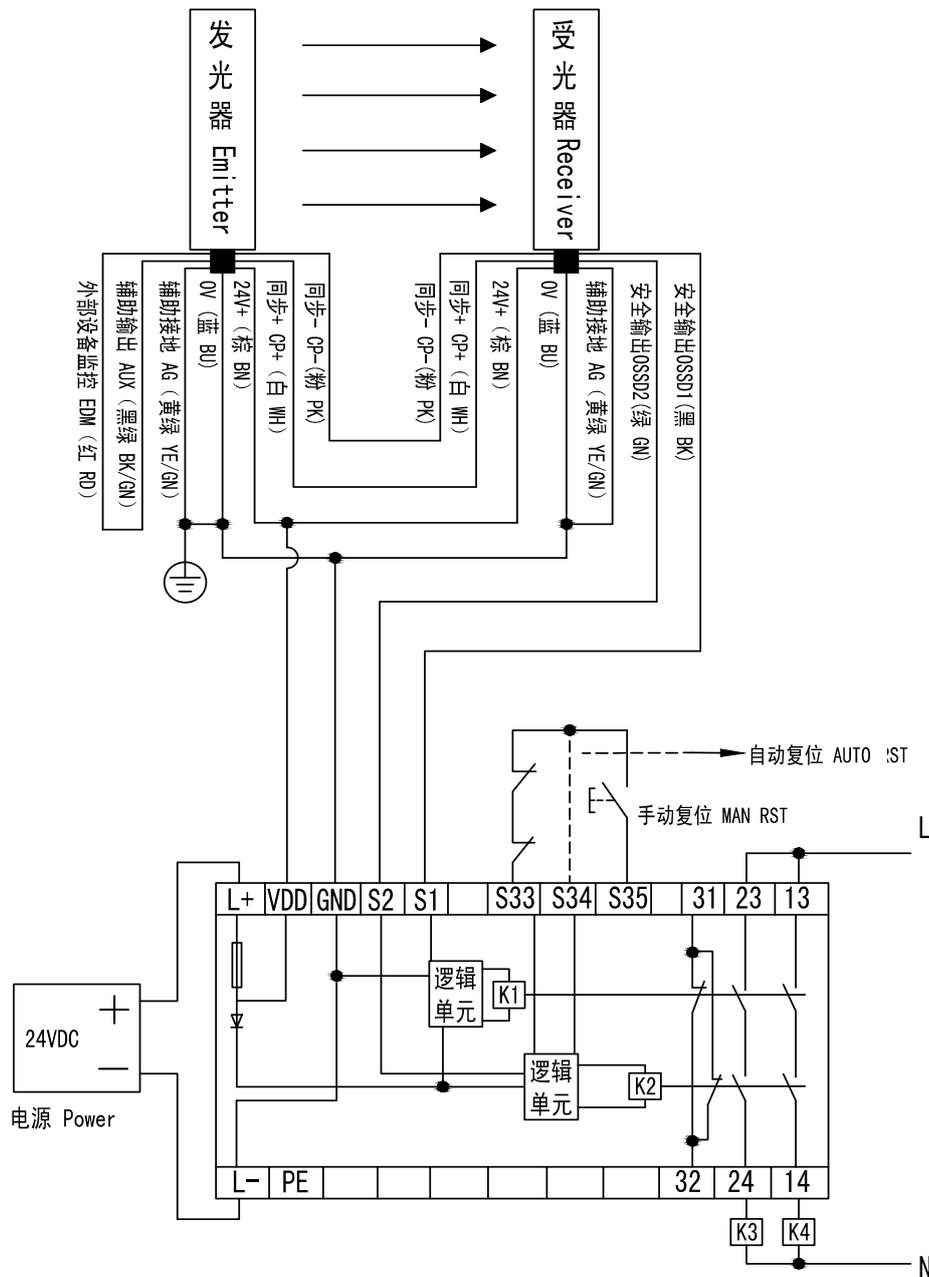


Fig.5-6 SND/E wiring and time graphic with safet relay SR4P2A1B24N

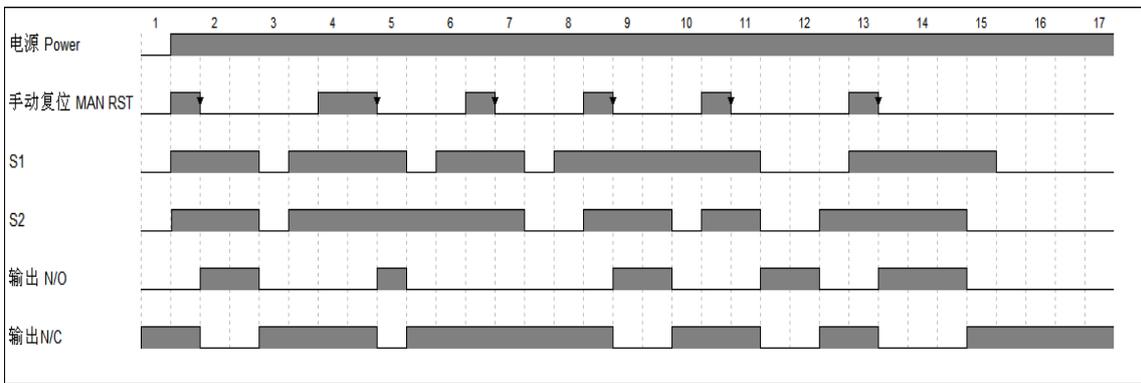
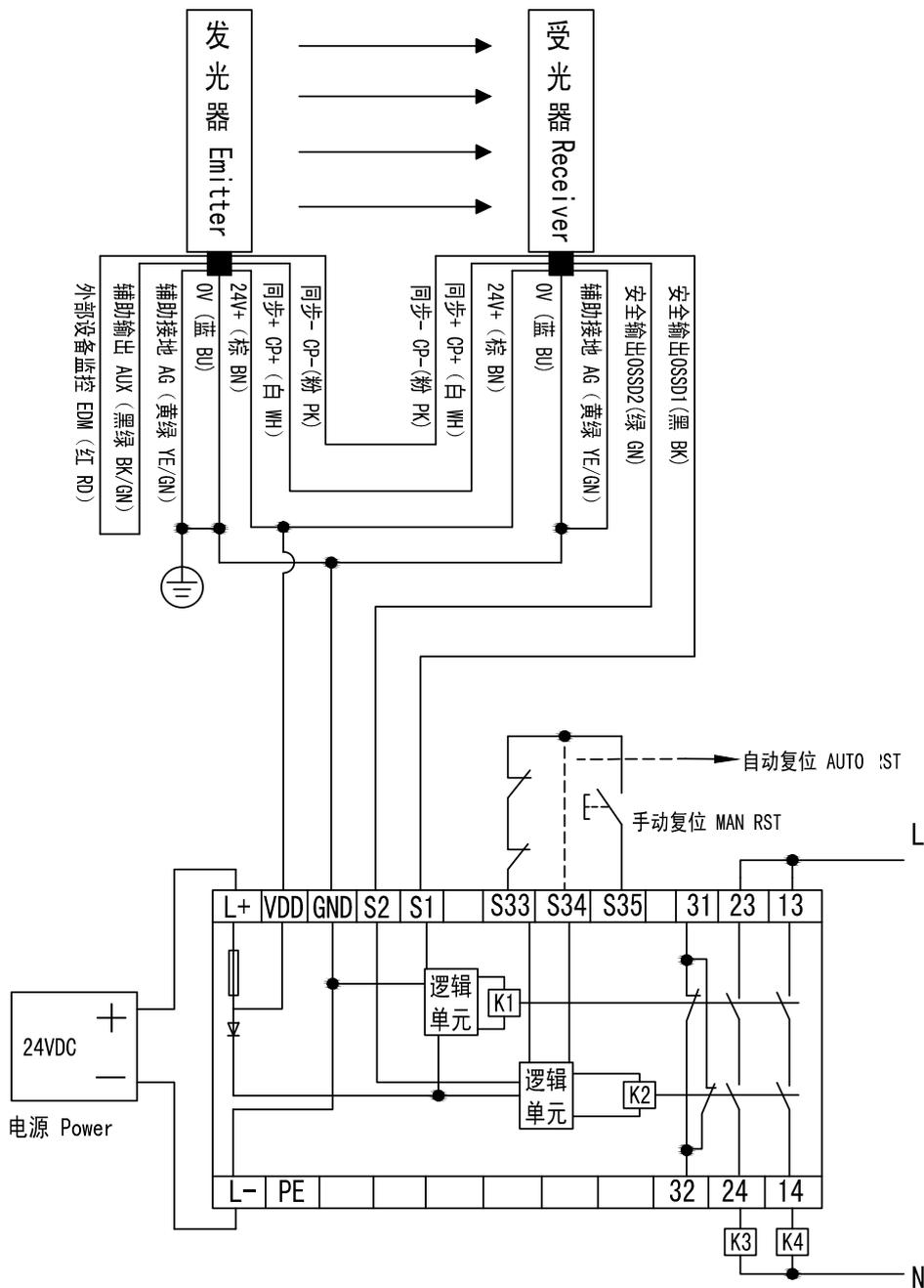


Fig.5-7 SND/E wiring and time graphic with safet relay SR4P2A1B24P

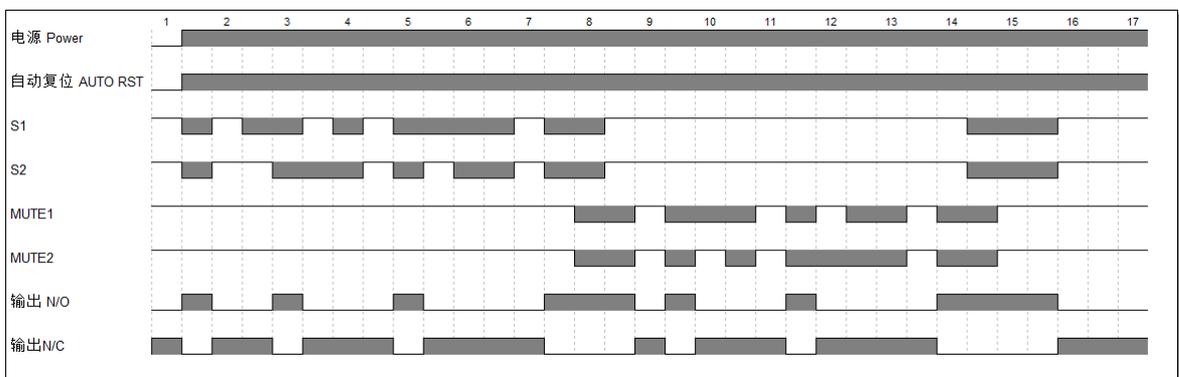
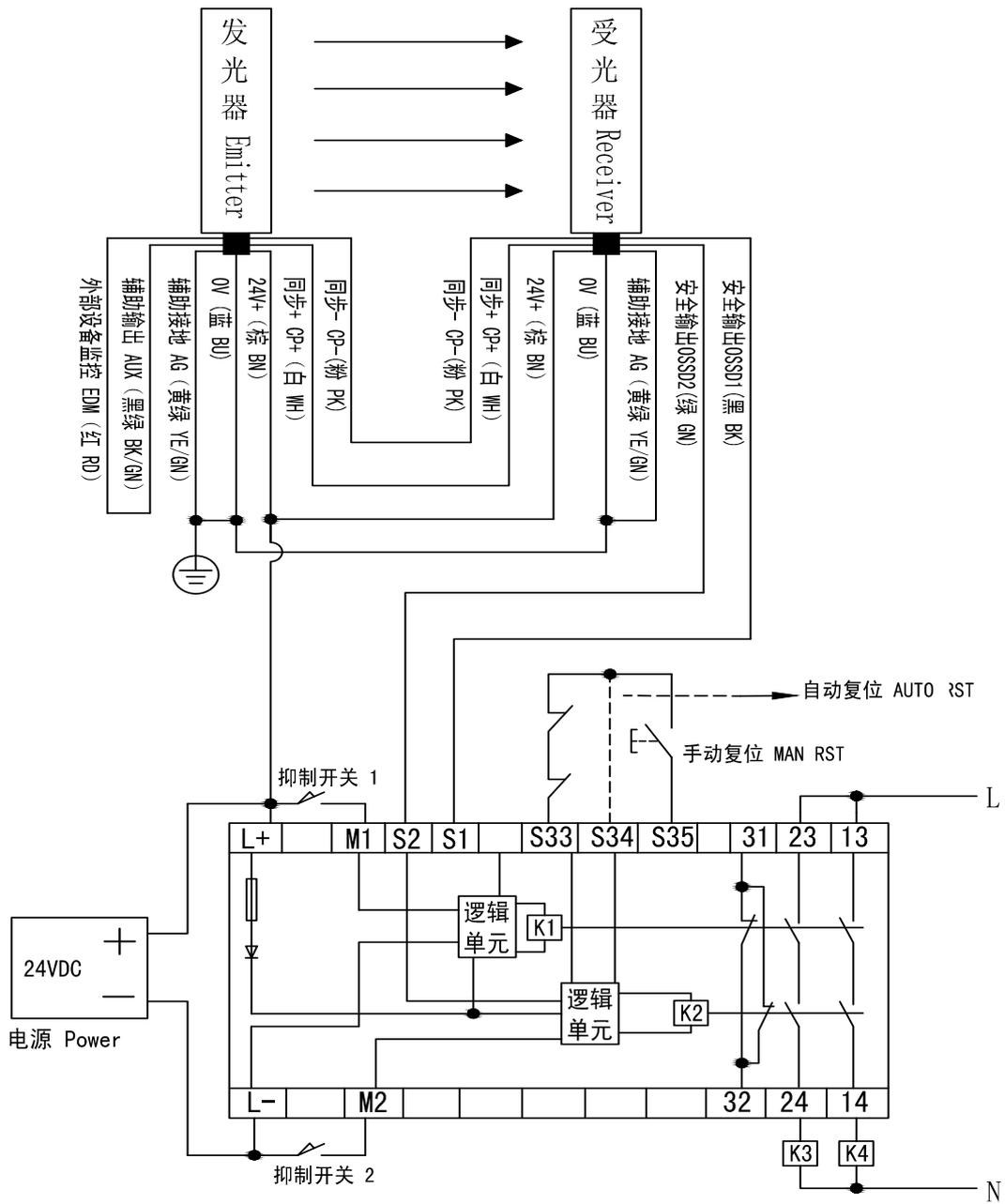
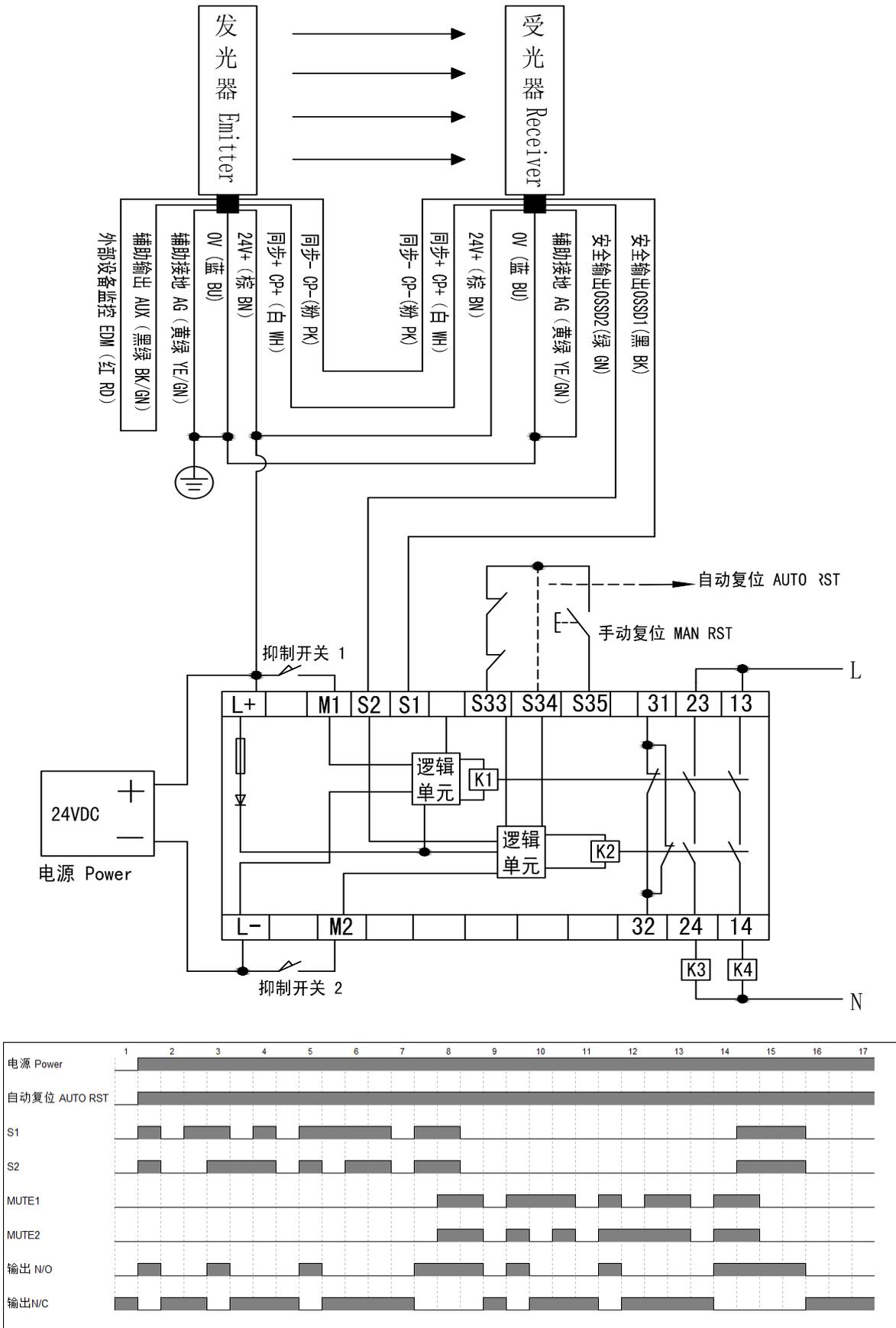


Fig.5-8 SND/E wiring and time graphic with safet relay SR4P2A1B24P-M



SND/E wiring and time graphic with safety relay SR4P2A1B24P-M

5.3 Signal cable

Standard configured cable

Part	Pins NO.	Color	Description	Remark
Emitter	1	Blue	0V	GND
	2	Brown	DC12-24V	VCC
	3	Red	EDM	External device monitoring
	4	Yellow/Green	AUX	Auxiliary output
	5	Pink	CP-	Synchronous cable
	6	White	CP+	Synchronous cable
	7	Yellow/Green	AG	Auxiliary grounding
Receiver	1	Blue	0V	GND
	2	Brown	DC12-24V	VCC
	3	Black	OSSD1	NPN/PNP output
	4	Green	OSSD2	NPN/PNP output
	5	Pink	CP-	Synchronous cable
	6	White	CP+	Synchronous cable
	7	Yellow/Green	AG	Auxiliary grounding
	8			
	9			

Advanced configured cable

Part	Pins NO.	Color	Description	Remark
Emitter	1	Blue	0V	GND
	2	Brown	DC12-24V	VCC
	3	Red	EDM	External device monitoring
	4	Grey	TEST	Testing cable
	5	Yellow/Green	AUX	Auxiliary output
	6	Pink	CP-	Synchronous cable
	7	White	CP+	Synchronous cable
	8	Yellow/Green	AG	Auxiliary grounding
	9			
Receiver	1	Blue	0V	GND
	2	Brown	DC12-24V	VCC
	3	Yellow	TEST	Testing cable
	4	Purple	END	cascaded light curtain muting cable
	5	Black	OSSD1	NPN/PNP output
	6	Green	OSSD2	NPN/PNP output
	7	Pink	CP-	Synchronous cable
	8	White	CP+	Synchronous cable
	9	Yellow/Green	AG	Auxiliary grounding

5.4 Wiring cautions

It's prohibited to connect the OSSD1 and OSSD2 together, ensure the two output separately, otherwise the light curtain can't provide protection for which it was designed

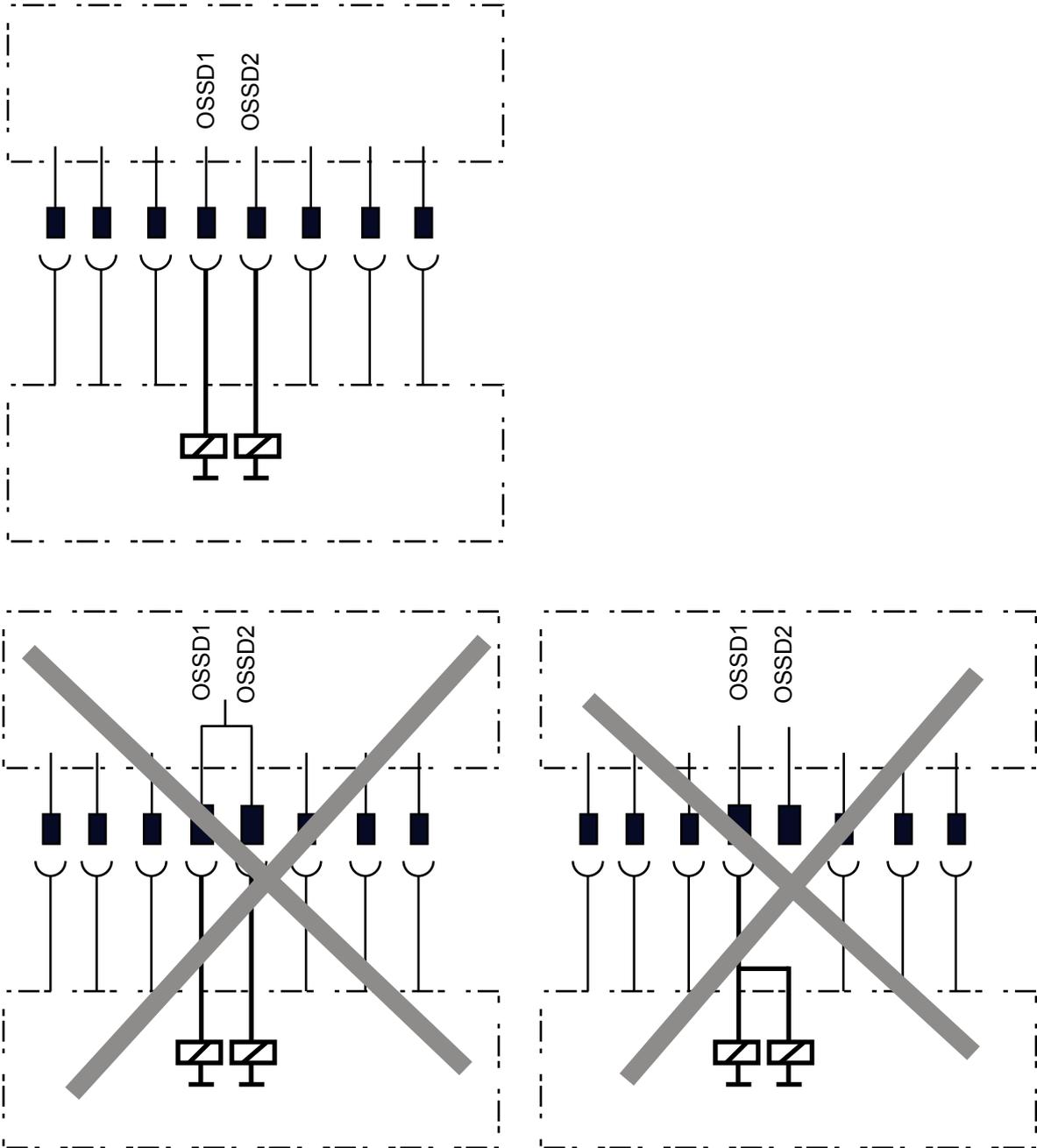


Fig.5-10 Cautions for wiring

5.5 Cascaded light curtain

SNC/E cascaded light curtain can be upto 3 light curtains in series for workplace protection

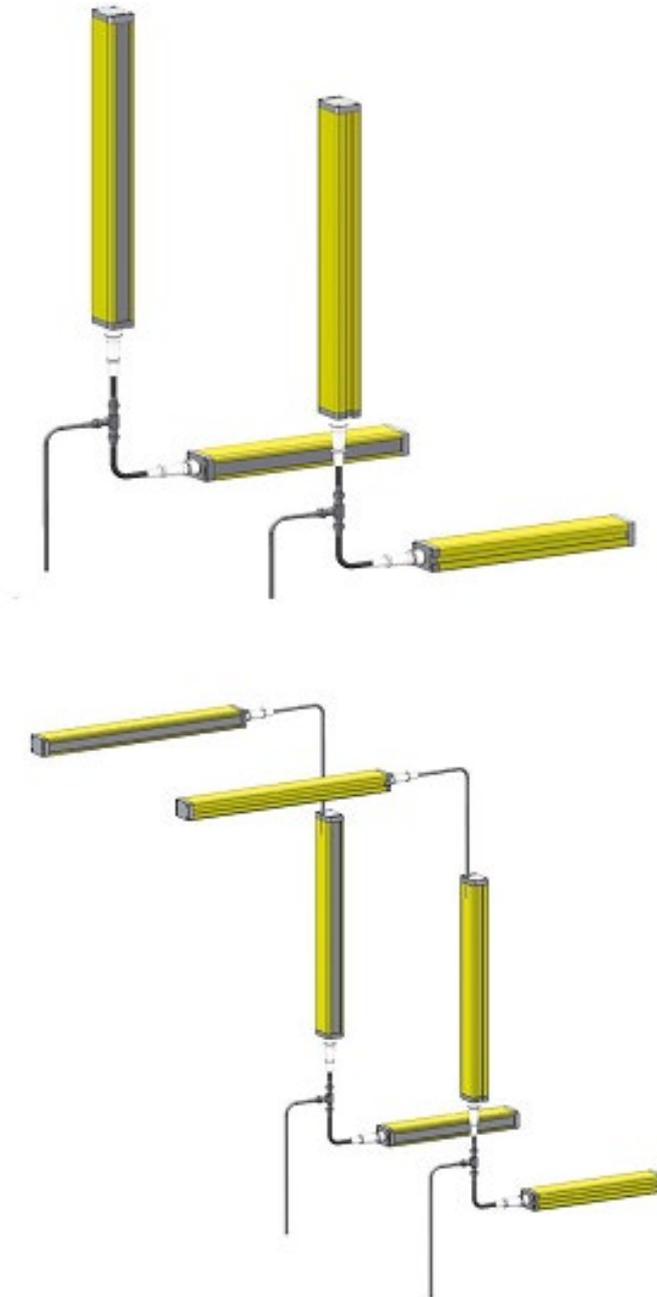
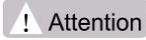


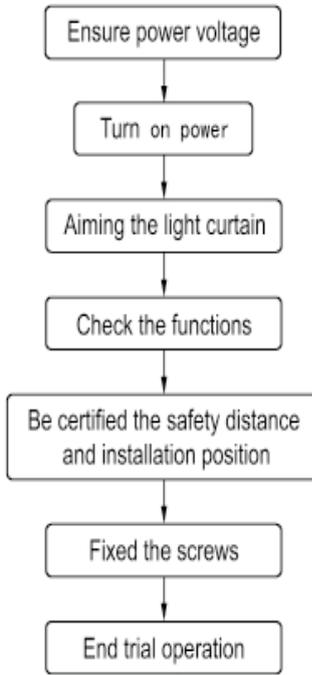
Fig.5-11 SND/E cascaded light curtain

6 Debugging

6.1 Cautions



Check carefully the wiring to ensure that all connections are correct after installation, then switch on and debug



1. Check power voltage
Ensure the power voltage conforming to that in technical label, the range is less than $\pm 15\%$.
2. Power on
3. Alignment
Adjust the position and angle of the emitter and receiver, until the green light on in the receiver and emitter
4. Check
Block every light beam with test bar to confirm light curtain running well,
Intercepting, the red indicator"OFF" is on, green indicator"ON" is off
Passing, the green indicator"ON" is on, red indicator"OFF" is off
5. Ensure safety distance and mounting position
6. fix the screw
- 7, debugging finish

6.2 Trial operation

6.2.1 Operation test of entire system is to ensure safety after finishing check and before normal operation.

Intercept light curtain and observe indicators if they display as the form 6.1.

Form 6.1

Light curtain state	receiver indicators		emitter indicators	
	Green	Red	Green	Red
Light passing	☐	●	☐	●
Light intercepted	●	☐	●	☐

“☐” means ON, “●” means OFF

6.2.2 Block the light curtain, the guarded machine should be stopped immediately or send alarm.

7 Operation, Check and Maintenance

7.1 Cautions

- A. Before put into operation, check the light curtain to ensure it can control the equipment normally.
- B. Do not change the position of light curtain
- C. When changed the protected device, the position of light curtain should be adjusted by authorized person.
- D. When a malfunction happened, only professional technicians are allowed to repair.
- E. Before replacing or installing light curtain and transmitting wires cables, power to light curtain should be switched off. it is operated only by professional technicians.
- F. If the light curtain runs abnormally, please stop immediately to use it

7.2 Check and Maintenance

It's necessary to keep eriodical check and maintenance. not only it's important to the operator's safety, but can prolong the safety light shelflife, do that follow form 7.1

Form 7.1

Item	Contents	Means	Check cycle
Check	Check light curtain housing	check and confirm clean, not broken	Before operation
	Interception test(check every light beam)	Block the light beam one by one ; check if indication state is normal	Before operation
	Protection function test	block light curtain, protected device should stop immediately	Before operatino
	Check screws	Confirmation of all screws tightly fixed	Six months
	Check wiring	Confirmation of all screws tightly fixed, and good connection	Six months
Maintenance	Light curtain housing	Clean with soft cotton yarn soaked water or detergent, prohibit cleaning with organic solvent	Implement based on conditions
	Filter replacement	If filter is broken, replace it immediately. Unpack the end cover of sensor, pull out the broken filter, insert the new one, and then fix the end cover	Implement based on conditions
	Fix and replace screws	Fix loosen screws tightly, replace the damaged ones	Implement based on conditions

Inspection is carried out before operation apart from the periodic inspection

8 Troubleshooting

8.1 Distinguish light curtain and guarded machine faults

fault phenomenon	fault reason	solution
light curtain not work ,all indicators off	no power supply	check power
	wrong connection with power	right wiring,can restore
The light curtain works intermittently, indicators flickering	improper alignment	ensure alignment properly
	exceed the protection range	place the light curtain within the protection range
The light curtain indicate normally, but the guarded device can not run normally	output wiring disconnection or light curtain output faults	do output wiring again or return to factory
	electric fault in guarded machine	check the electric circuit
emitter indicates "F2"	inner fault in light curtain	return to factory
emitter indicates "F3"	EDM function fault	check EDM wiring well or not
emitter indicates "F5"	light curtain wiring fault	no connection with receiver or white/pink wiring off or broken
receiver indicates "F1"	OSSD1 or OSSD2 output fault	check the OSSD1 or OSSD2 short or not, return to factroy
receiver indicates "F2"/"F3"/F6"	inner fault in light curtain	return to factory

Note: can check the faults for the light curtain mounted in other guarded machines as per the above table.

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