

LNTECH[®]

Safety Light Curtain Controller

Instruction Manual

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Instruction

Application

- ◆ Supply Power To Safety Light Curtain
Input power is AC220V/AC110V, output power is DC12V to drive the safety light curtain.
Custom DC24V input power.
- ◆ Signal Process
Process the light-passing and interruption signal from the safety light curtain transmitted via the signal cable to control the relay output.
- ◆ Control Signal Output
Output the OFF and ON signal via the control cable connected with the machine control circuit, when light-passing, the relay contacts is ON, otherwise is OFF.
- ◆ Provide Grounding Point
Guarantee the safety power supply and prevent the electromagnetic interference effectively with the grounding point.

- ◆ Classification: WD, WS, N, ND
- ◆ WD type controls one set safety light curtain which installed at outside of the machine.
- ◆ WS type controls 2 sets safety light curtain in the meantime which installed at outside of the machine.
N/ND type controls 1 set safety light curtain which mostly installed in the cabinet.

Controller Classification

Two kinds as per the installation position: external and internal, also the one side and two sides guarding:

Series	Description
WD type	Installation Position: outside of the machine Material: steel plate with coating surface, Size: 80×241×205mm Control Cable: 2.5m, 7×0.5RVV Signal Cable Terminal: plug Control Cable Terminal: 7P finished Output Type: 2NO or 1NO+NC
WS type	Installation Position: outside of the machine Material: steel plate with coating surface, Size: 80×241×205mm Control Cable: 2.5m, 7×0.5RVV Signal Cable Terminal: plug Control Cable Terminal: 7P finished Output Type: 2NO or 1NO+NC
N type	Installation Position: internal cabinet Material: ABS Size: 89×79×111mm Control Cable: 1.0m, 7×0.5RVV Signal Cable Terminal: 12P plug Control Cable Terminal: 10P plug Output Type: 2NO or 1NO+1NC

Sereis	Description
ND type	Installation Position: internal cabinet Material: ABS Size:89×79×111mm Control Cable: 1.0m, 7×0.5RVV Signal Cable:12P plug Control Cable: 10P plug Output Type: 2NO or 1NO+1NC

Technical Parameters

Power	AC220/110V±15% 50/60Hz 或 DC24V±15%
Output Voltage	DC12V
Power Consumption	< 15W
Output Type	2NO or 1NO+1NC
Switch Capacity	safety output: AC250V5A, $\cos\phi=0.3$
	auxiliary output: DC30V 2A, AC125V 0.5A
Fuse Protection	5A
Response Time	<10ms
Insulation Resistance	>100MΩ
Dielectric Strength	AC1500V, 60s
Temperature	-10℃~55℃
Humidity	20℃, RH≤85%
Anti-vibration	IEC/EN 61496-1: 10-55Hz frequency,10.35±0.05mm amplitude
Relay Life	Mechanical Life≥10 million times
Housing Material	N、ND type controller: ABS; WD、WS type controller: steel plate
Protection Level	WD、WS type controller:IP54; N、ND type controller: IP20

Controller Specification

Series	Model	Input	Control Safety Light Curtain	Muting Function	Safety Light Curtain
WD	WDD	impulse signal	1 set	No	SNA、SNB、SNQ、STD、STQ、SQL
	WDA	impulse signal	1 set	Yes	
	WDN	NPN*2	1 set	Yes	SNA、SNB、SNC、SNQ、STD、STQ、SQL
	WDP	PNP*2	1 set	Yes	
WS	WSD	impulse signal	2 set	No	SNA、SNB、SNQ、STD、STQ、SQL
	WSA	impulse signal	2 set	Yes	
	WSN	NPN*2	2 set	Yes	SNA、SNB、SNC、SNQ、STD、STQ、SQL
	WSP	PNP*2	2 set	Yes	
N	N	impulse signal	1 set	No	SNA、SNB、SNQ、STD、STQ、SQL
ND	ND	NPN*2	1 set	No	SNA、SNB、SNC、SNQ、STD、STQ、SQL

Control Cable Length(standard)

Control Cable	WD type (external installation): 2.5m
	WS type (two sides guarding): 2.5m
	N type (internal installation): none
	ND type (internal installation): none

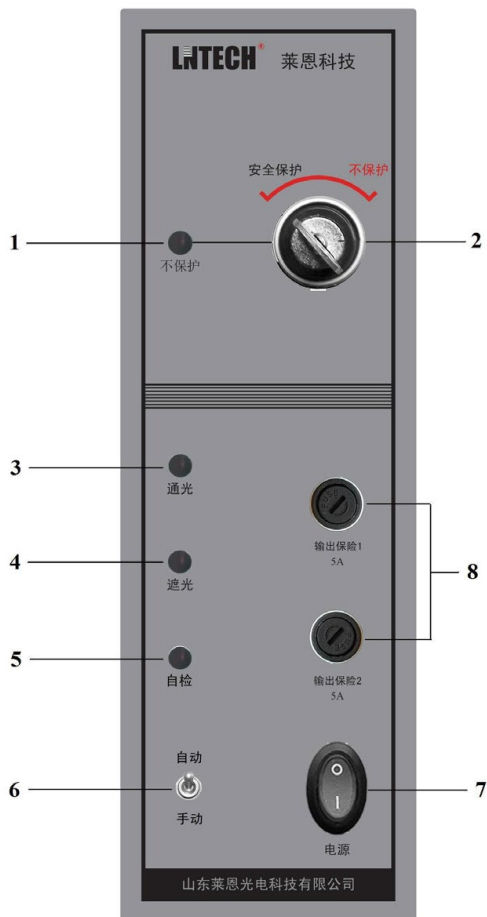
Note: custom cable length

Controller

WD type

WD controls one set safety light curtain which can be installed at outside of machine.

Panel Instruction



1. Non-protection Indicator (yellow)
 - ◆ place the key at "protection" position, provide the protection, "non-protection" indicator is OFF
 - ◆ place the key at "non-protection" position, the "non-protection" indicator is flashing, can't provide protection function, must take others guarding measures.
2. Controller Key: kept by the appointed person
3. Light-passing Indicator: Red
4. Light-interrupted Indicator: Red

Indicators		
Sensors	Light-passing	Light-interrupted
Light-passing	□	●
Light-interrupted	●	□

5. Self-checking Indicator: Red
6. Self-checking Switch
7. Power Switch(red indicator)
8. Output Fuse: output contacts OSSD1/OSSD2 overcurrent protection: 5A*2

Fig.2-1 WD Controller Panel

Muting Function Auxiliary Output

- ◆ Muting Function Auxiliary Output: keep the key at "non-protection" position, relay contacts (A01-A02) connected; otherwise disconnected.
- ◆ Auxiliary output (A01-02) taken as the warning indication which can't be used as the safety output.
- ◆ Controllers with the function: WDA, WDN, WDP

Self-checking and Power Switch

- ◆ Set the self-checking switch is to simulate the controller faults, the self-checking indicator will be flashing when the two relays in controller don't synchronize with the action, the output OSSD1, OSSD2 off-contact and will be connected till the faults removed.

Self-checking Switch:

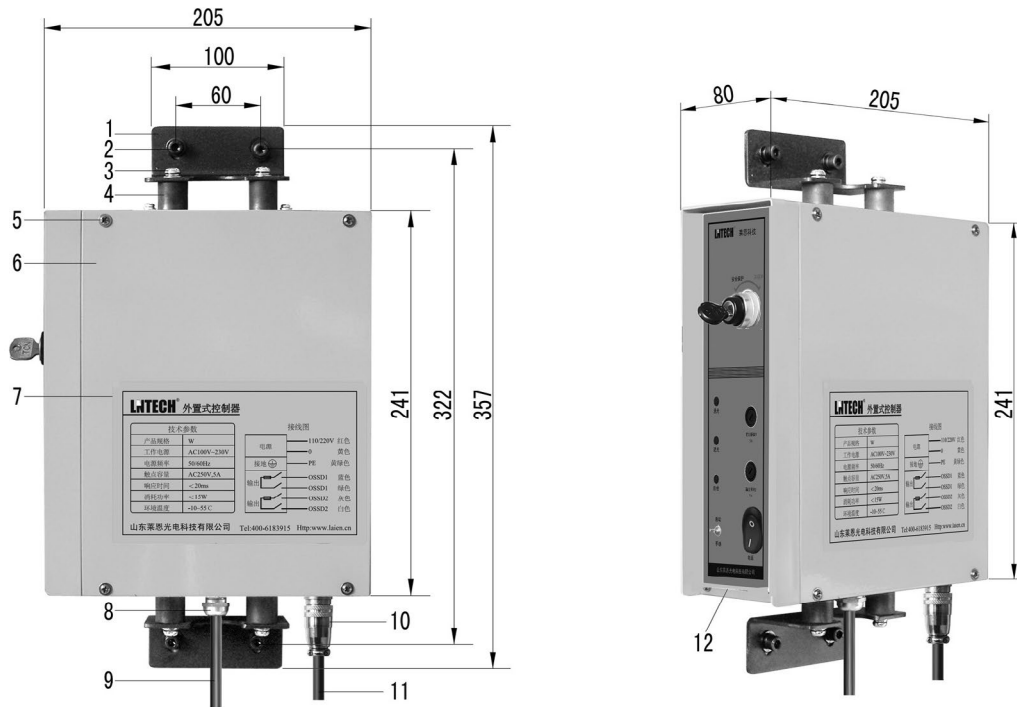
①WDD/WDA type: keep the self-checking switch at the "manual" position, then block the light curtain, self-checking indicator is flashing, the output OSSD1, OSSD2 is off-contact, will recover till the faults removed which means the self-checking function works normally.

②WDN/WDP type: keep the self-checking switch at the "manual" position, the block the light curtain, self-checking indicator is flashing, the output OSSD1, OSSD2 is off-contact, connection recovery after power on again and removing the faults.

In normal working mode, should keep the self-checking switch at "manual" position. Power switch at "1" position, controller is powered, at "0" no power supplied to the controller, the OSSD1, OSSD2 is off-contact.

WD Type Controller Parts and Installation

Determine the right installation position at outside of the machine according to the controller size to prevent the colliding and for simple operation and maintenance. It should be far away from the strong electromagnetic interference sources such as frequency converter, high-cycle wavemachine, etc around which will effect the controller function.



- | | | |
|----------------------|-----------------------|-----------------------|
| 1 bracket | 2. M6×16 screw | |
| 3. M6×12 screw | 4. Φ20×20 shock pad | 5. M4×6 screw |
| 6. cover | 7. parameter label | 8. control cable plug |
| 9. control cable | 10. signal cable plug | 11. signal cable |
| 12. controller panel | | |

Fig.2-2 WD Type Controller Dimension and Panel

WD controller wiring

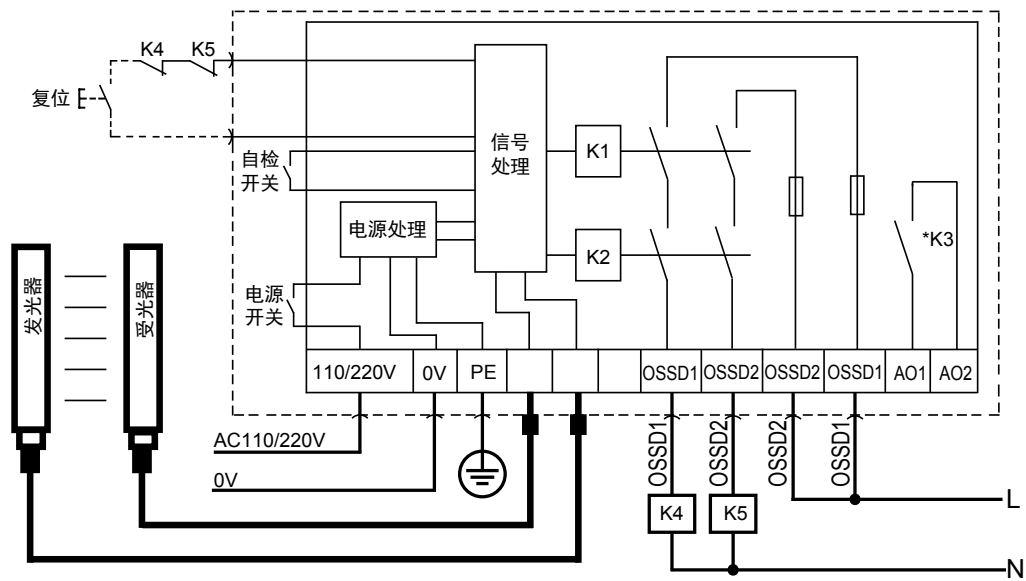


Fig.2-3 2NO Output

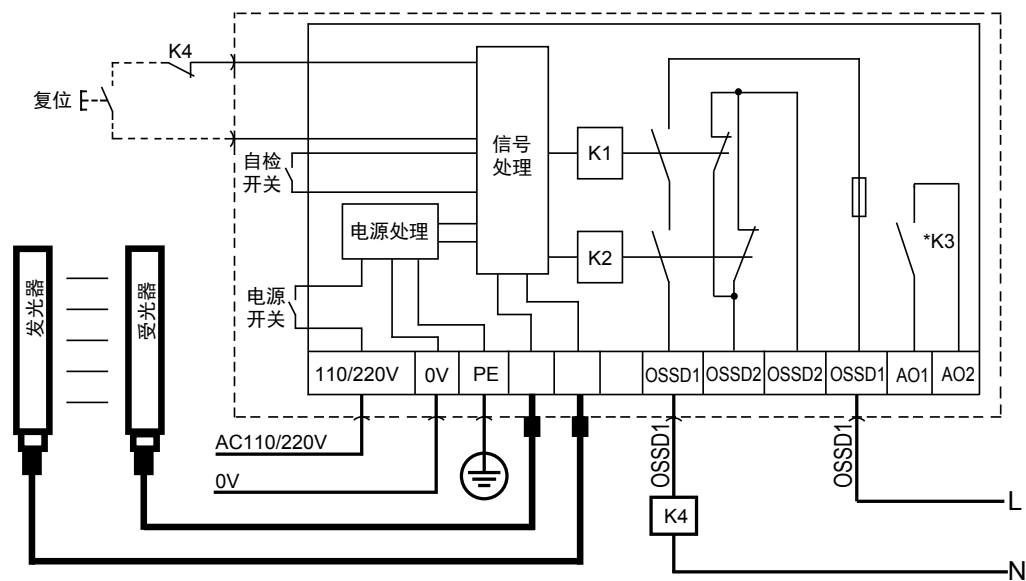


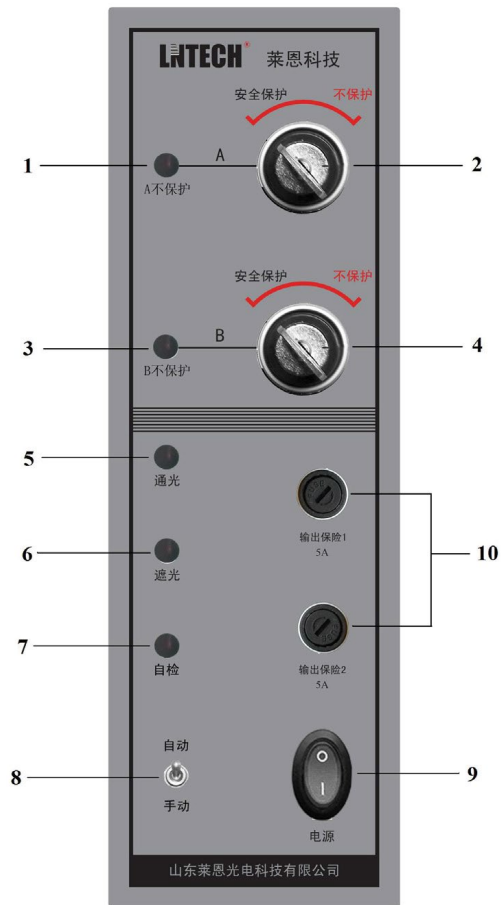
Fig.2-4 1NO+1NC Output

Note: * is muting function auxiliary output for WDA,WDN,WDP type controller.

WS Type Controller

This controller can control 2 sets safety light curtain at the same time which installed at the outside of the machine.

Panel Instruction



1. A side non-protection indicator(yellow)
2. A side controller switch A
3. B side non-protection indicator(yellow)
4. B side controller switch B
 - ◆ the key at "protection" position,indicator is off,provide protection
 - ◆ the key at "non-protection" position, the indicator is flashing,can't provide protection meanwhile must take other guarding measures.
 - ◆ the key should be kept by the appoined person
5. Light-passing indicator(green)
6. Light-interrupted indicator(red)

Light Curtain and Indicator States		
light curtain	passing light	interruption light
light-passing	□	●
light-interrupted	●	□

7. Self-checking indicator(red)
8. Self-checking switch
9. Power switch with indicator (red)
10. Output fuse: OSSD1, OSSD2 overcurrent protection, 5A*2

Fig.2-5 WS Type Controller

Muting Function Auxiliary Output

- ◆ Any switch at "non-protection" position,the relay contacts (A01-A02) connected; the two switch at "protection" position, the relay contacts(A01-A02) disconnected.
- ◆ Muting function auxiliary output(A01-A02) is not the safety control output, only used as the alert.
- ◆ WSA,WSN,WSP type controller with the function.

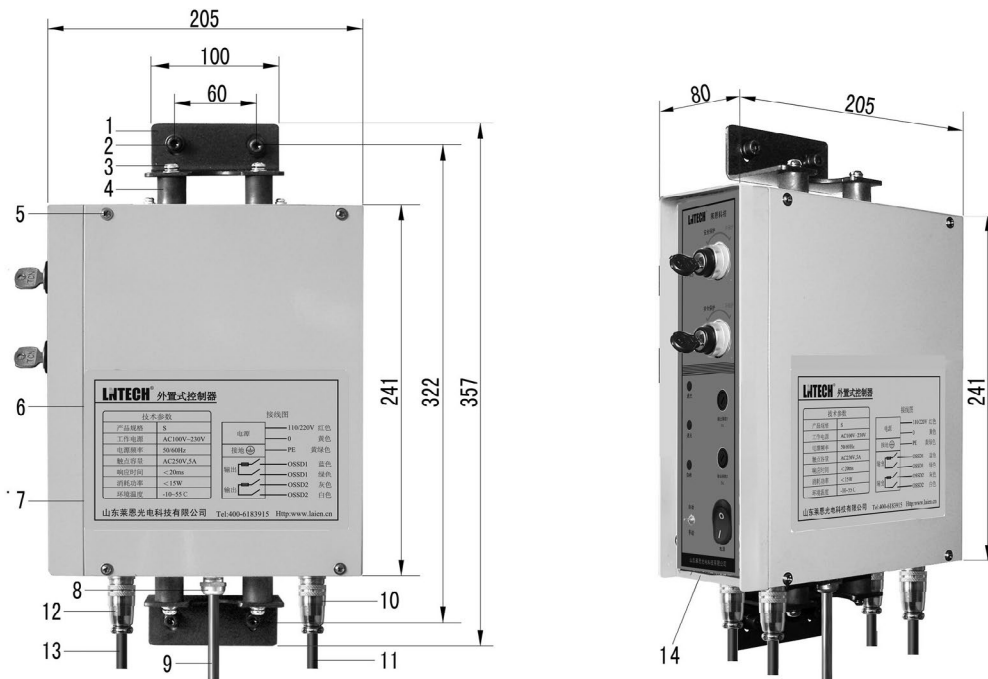
Self-check and Power Switch

- ◆ The self-checking switch is intended for simulate the controller faults,the self-checking indicator is flashing when the two relays are out of sychronous.
- ◆ Self-checking Switch Application:
 - ①WSD/WSA type controller, self-checking switch at "manual" position, when block the light curtain,self-checking indicator is flashing,relay output contacts(OSSD1,OSSD2) disconnected,will recover till the faults removed.
 - ②WSN/WSP type controller, self-checking switch at "manual" position,when block the light curtain,self-checking indicator is flashing, relay output contacts(OSSD1,OSSD2) disconnected, will recover after power on again and faults removed

- ◆ Should keep the switch at "auto" position when work normally.
- ◆ Power switch at "1" power on, at "0" no power

WS Type Controller Parts and Installation

- ◆ Determine the installation position at outside of the machine according to the controller size which will prevent the colliding and be for simple operation and maintainance.
- ◆ If there are strong electromagnetic interference sources (such as frequency converter, high-cycle wave machine, etc.) around, it should be as far away as possible to avoid the interference of the controller.



- | | | |
|------------------------|-----------------------------|-----------------------------|
| 1. bracket | 2. M6×16 screw | |
| 3. M6×12 screw | 4. Φ20×20 shock pad | |
| 5. M4×6 screw | 6. cover | 7. technical label |
| 8. control cable plug | 9. control cable | 10.A side signal cable plug |
| 11.A side signal cable | 12.B side signal cable plug | |
| 13.B side signal cable | 14. controller panel | |

Fig.2-6 WS Controller Parts

WS Type Controller Wiring

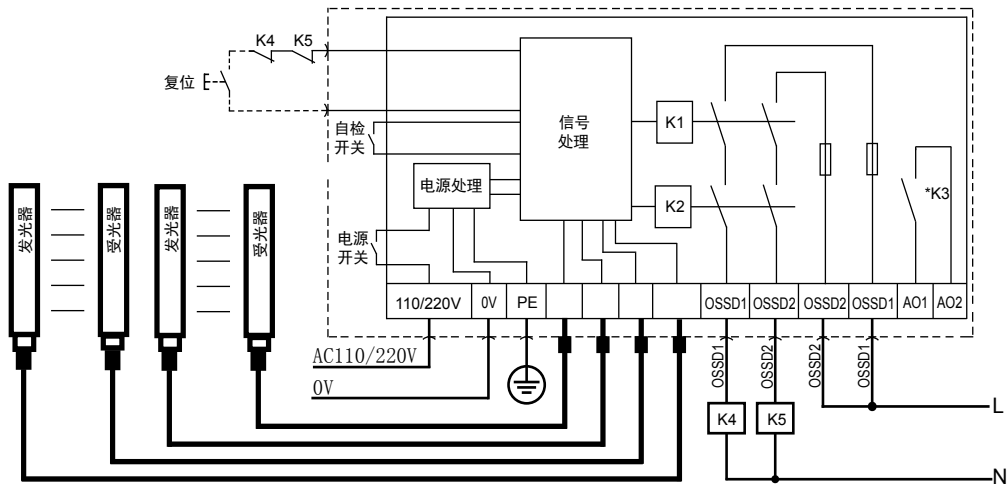


Fig.2-7 2NO Wiring

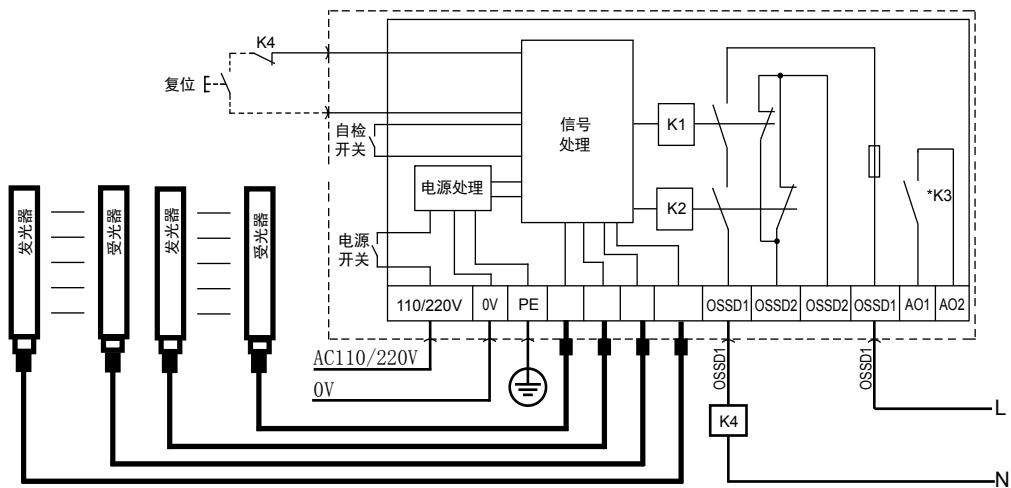
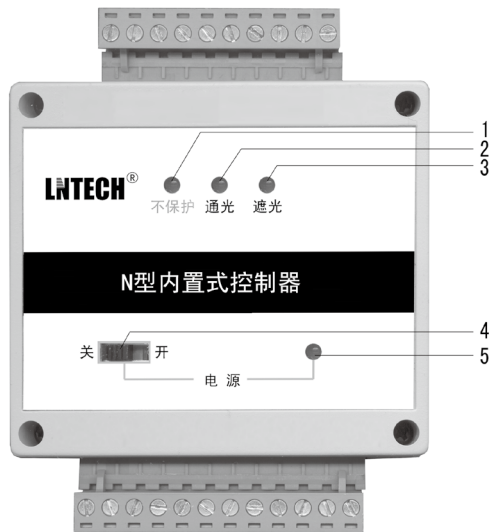


Fig.2-8 1NO+1NC Wiring

Note: * means the muting function auxiliary output which is designed for WSA,WSN,WSP controller.

N Type Controller

Control one set safety light curtain and installed in cabinet.
N controller panel



- 1. non-protection indicator(yellow)
- 2. light-passing indicator(green)
- 3. light-interrupted indicator(red)
- 4. power switch at "on" into the protection, at "off" without protection, OSSD1 and OSSD2 disconnected.
- 5. power indicator(red)

switch and indicator state			
power switch	on		off
power indicator	☐		●
non protection indicator	●		●
protection	protection		protection
light curtain	passing	interruption	not work
light-passing indicator	☐	●	●
light-interrupted indicator	●	☐	●

Fig.2-9 N Type Controller Panel

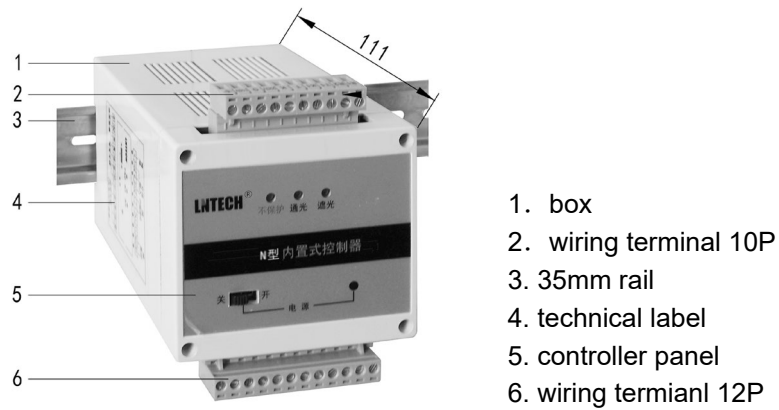
! Attention

- ◆ When power switch on, B1 and B2 shorted, non-protection indicator(yellow) is flashing, power indicator and light passing indicator is ON, light-interrupted indicator is OFF.
- ◆ B1,B2 is the remained muting contacts which can be shorted if need and take other guarding measures for safety, OSSD1,OSSD2 connected, the safety function disabled and can't provide the protection,so need take care of shorting the contacts.

! Warn

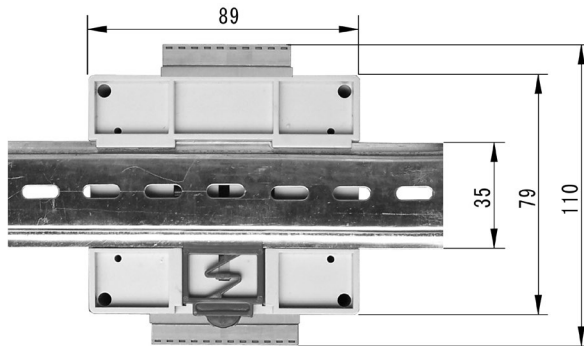
Short the B1, B2 contacts is not allowed without any other guarding measures taken.

N Type Controller Parts and Installation



1. box
2. wiring terminal 10P
3. 35mm rail
4. technical label
5. controller panel
6. wiring terminal 12P

Fig.2-10 N Type Controller



- ◆ Install onto 35mm rail in the distribution cabinet
- ◆ Keep as far away as possible from the interference sources such as the electromagnetic.

图2-11 N Type Controller Size

N Type Controller Wiring

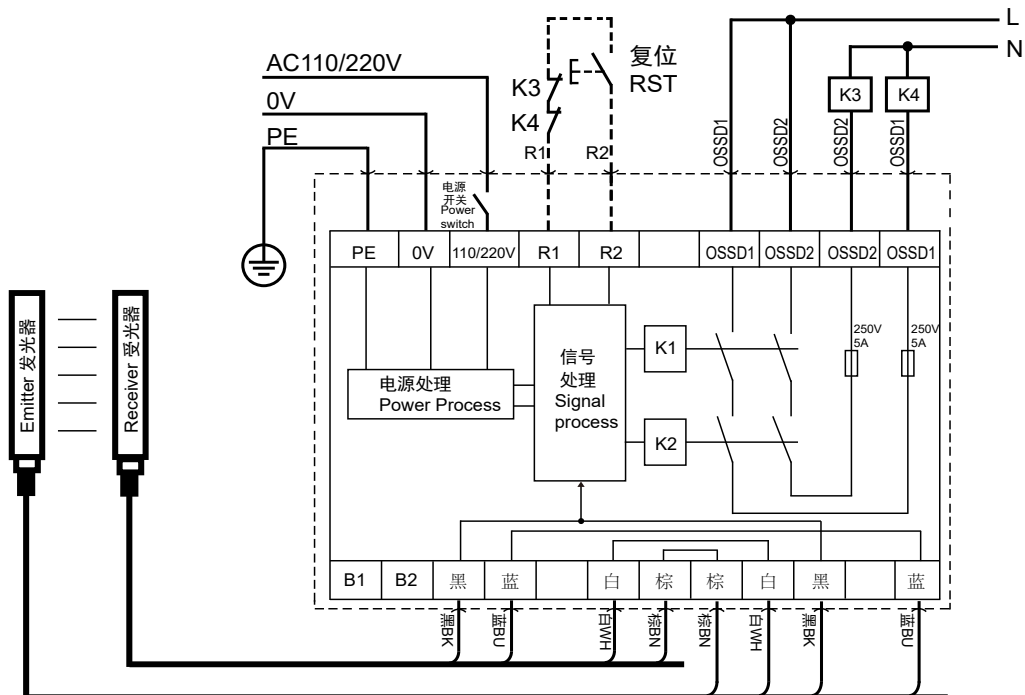


Fig.2-12 2NO Output

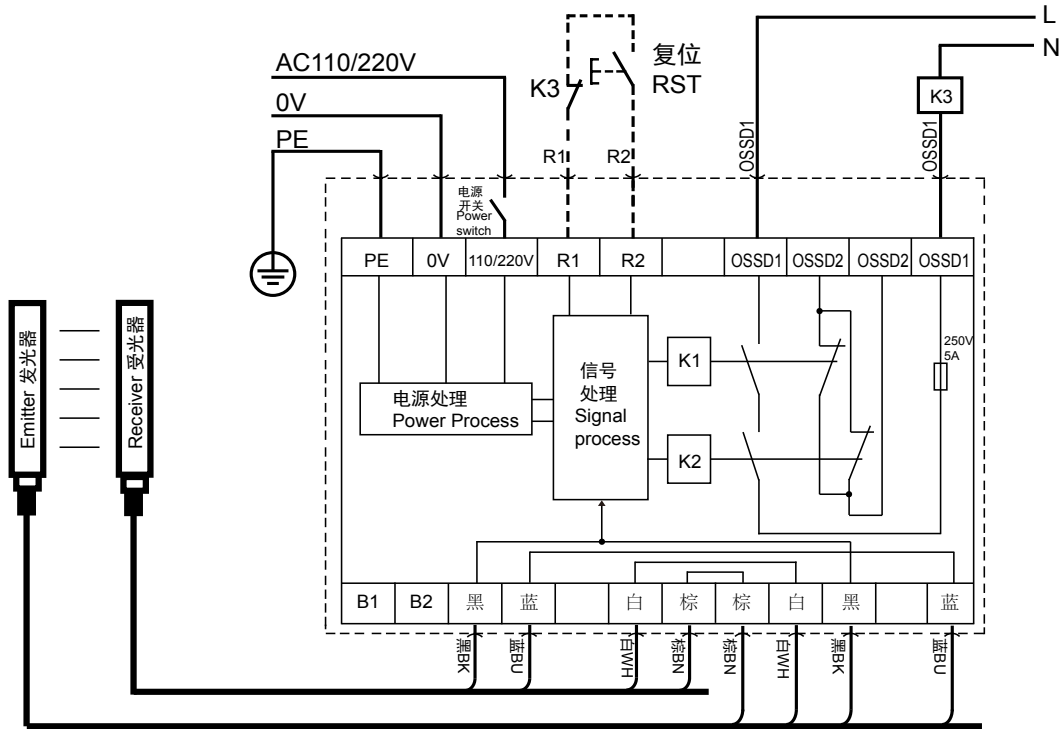
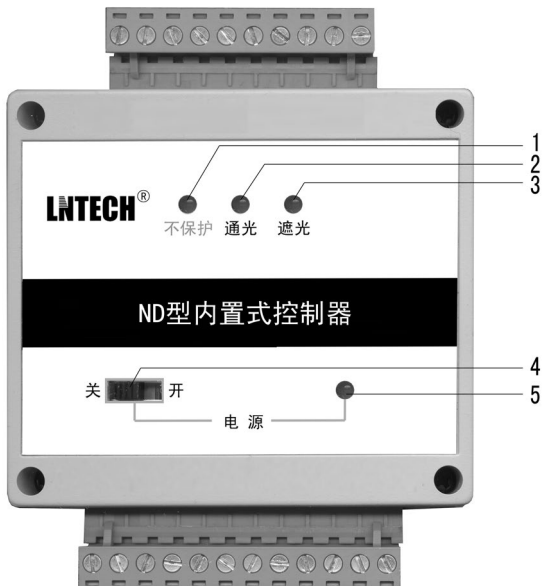


Fig.2-13 1NO+1NC

ND Type Controller

Installed in the distribution cabinet to control one set light curtain panel instruction



1. non-protection indicator(yellow)
2. light-passing indicator(green)
3. light-interrupted indicator(red)
4. power switch at "on" into the protection,
at "off" without protection, OSSD1
and OSSD2 disconnected.
5. power indicator(red)

switch and indicator state			
power switch	on		off
power indicator	☐		●
non protection indicator	●		●
protection	protection		protection
light curtain	passing	interruption	not work
light-passing indicator	☐	●	●
light-interrupted indicator	●	☐	●

Fig.2-14 ND Type Controller



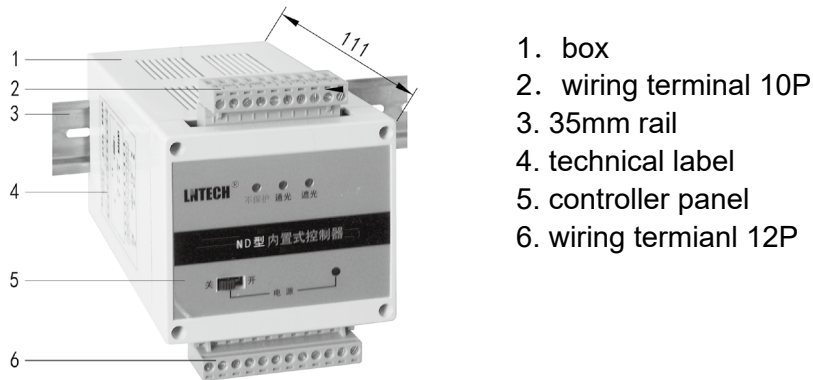
Attention

- ◆ When power switch on, B1 and B2 shorted, non-protection indicator(yellow) is flashing, power indicator and light passing indicator is ON, light-interrupted indicator is OFF.
- ◆ B1,B2 is the remained muting contacts which can be shorted if need and take other guarding measures for safety, OSSD1,OSSD2 connected, the safety function disabled and can't provide the protection,so need take care of shorting the contacts.



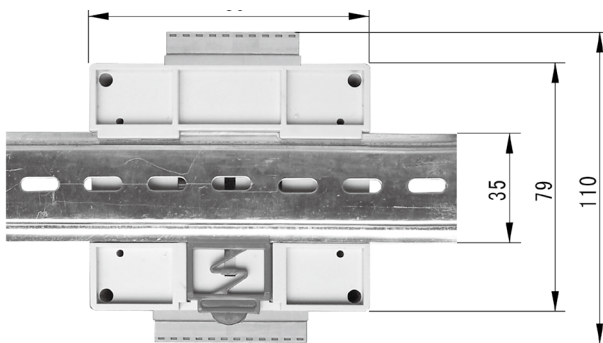
Warn Short the B1, B2 contacts is not allowed without any other guarding measures

taken.



1. box
2. wiring terminal 10P
3. 35mm rail
4. technical label
5. controller panel
6. wiring terminal 12P

Fig.2-15 ND Type Controller Parts and Size



- ◆ Install onto 35mm rail in the distribution cabinet
- ◆ Keep as far away as possible from the interference sources such as the electromagnetic.

Fig.2-16 ND Type Controller Installation

ND Type Controller Wiring

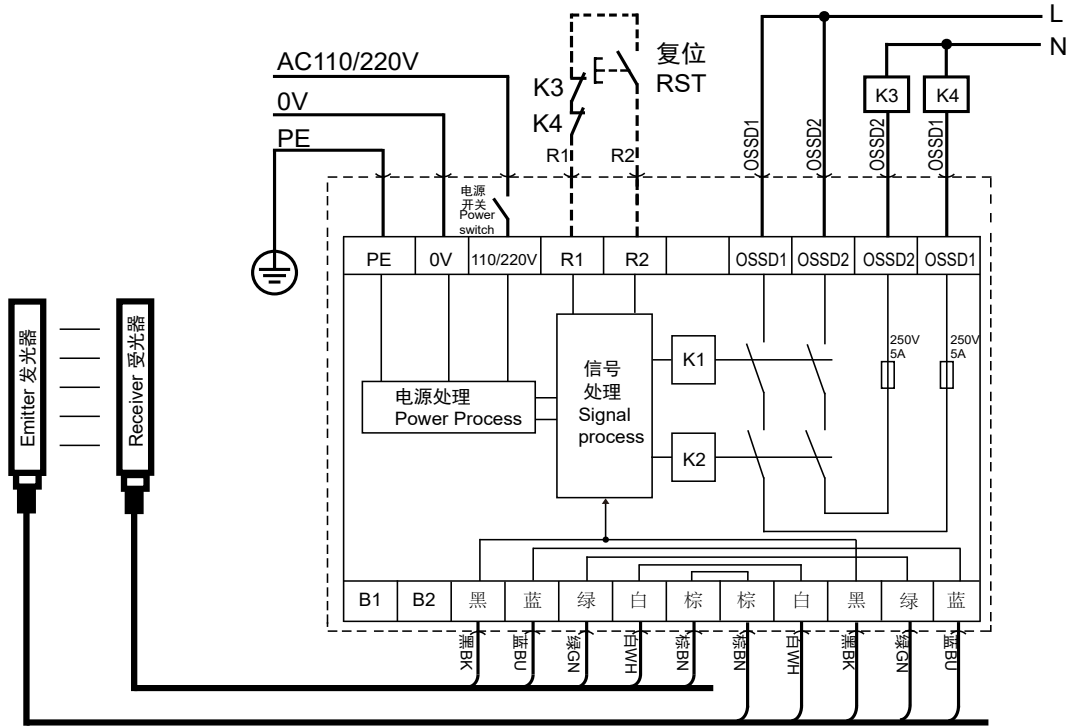


Fig.2-17 2NO Output

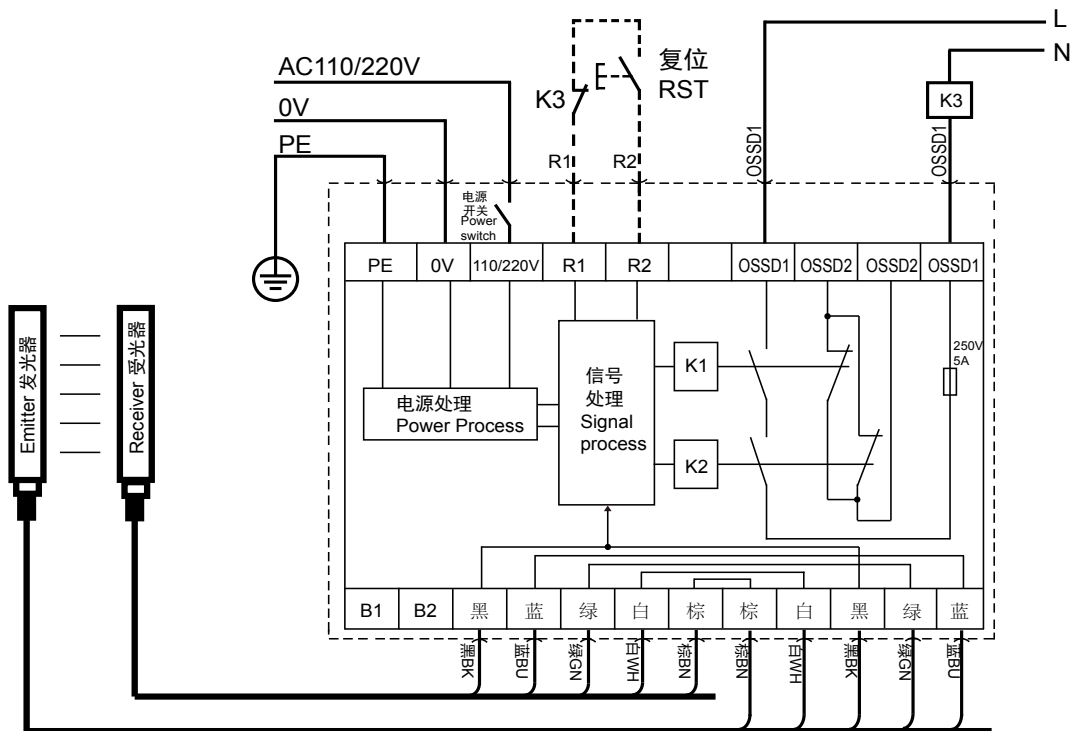


Fig.2-18 1NO+1NC

Wiring



- ◆ Must shut off the power before connection and connect as per the wiring drawing.
- ◆ Any change to the internal circuit is not allowed.

Connection Between The Controller and Safety Light Curtain

WD,WS type controller connection with safety light curtain

- ◆ The two ends of signal cable with plugs for quick connection, one of which connected with controller and the other connected with safety light curtain
- ◆ WD controller with 2 sockets for connection with receiver and emitter at disposal.
- ◆ WS controller with 4 sockets for connection with 2 emitters and 2 receivers(2 set safety light curtains for two sides guarding: A side and B side which labeled on the controller)

N,ND type controller connection with safety light curtain

- ◆ The one end of signal cable with plug (N:5P,ND:7P) connected with safety light curtain,the other end with terminal connected with controller
- ◆ Connect the terminal as per the color mark match with the signal cable color

Controller Connection Instruction

WD,WS type controller



1.WD,WD type controller power supply is AC220V/110V before leave factory, if need DC24V please mark the power in the order.

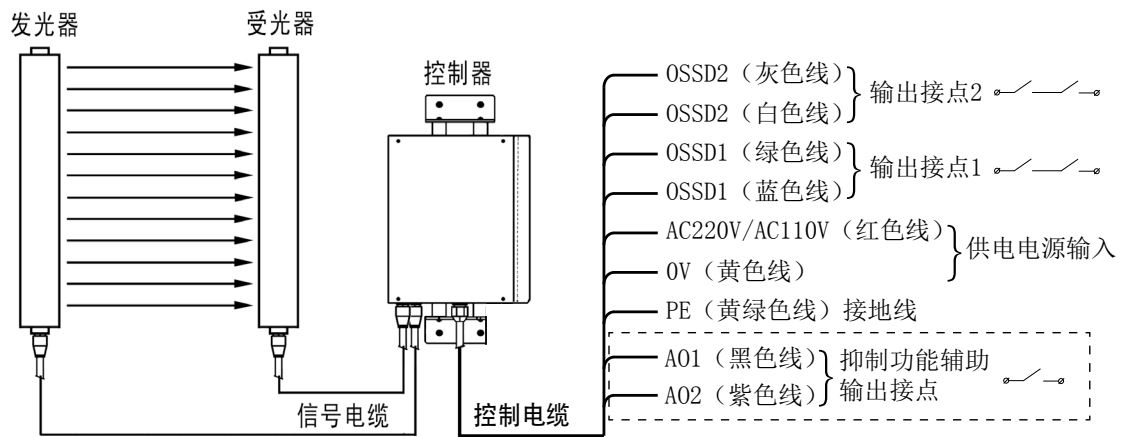


Fig.3-1 WD Controller With 2NO Output

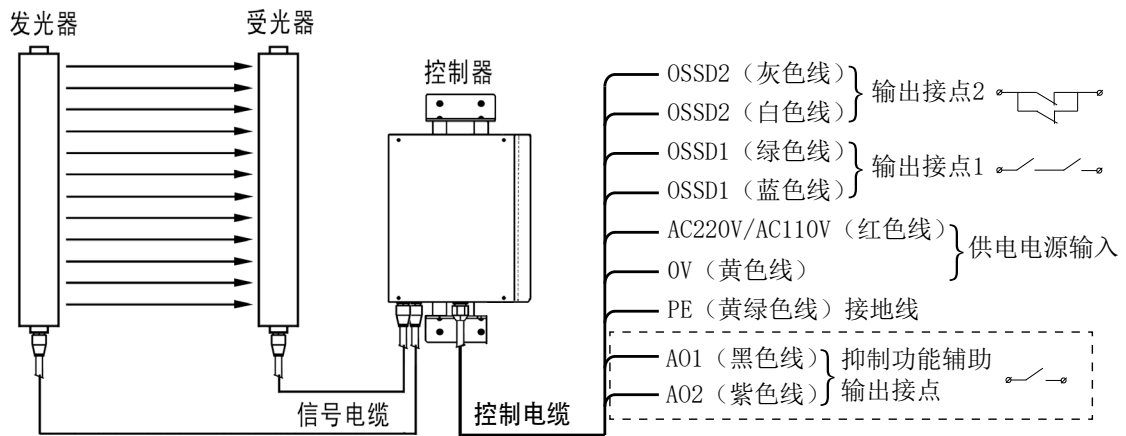


Fig.3-2 WD Controller With 1NO+1NC Output

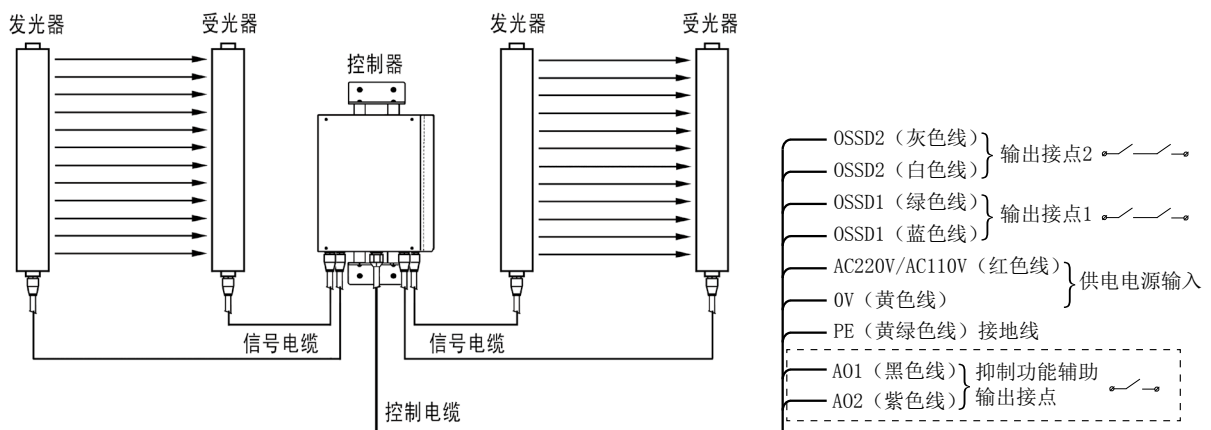


Fig.3-3 WS Controller With 2NO Output

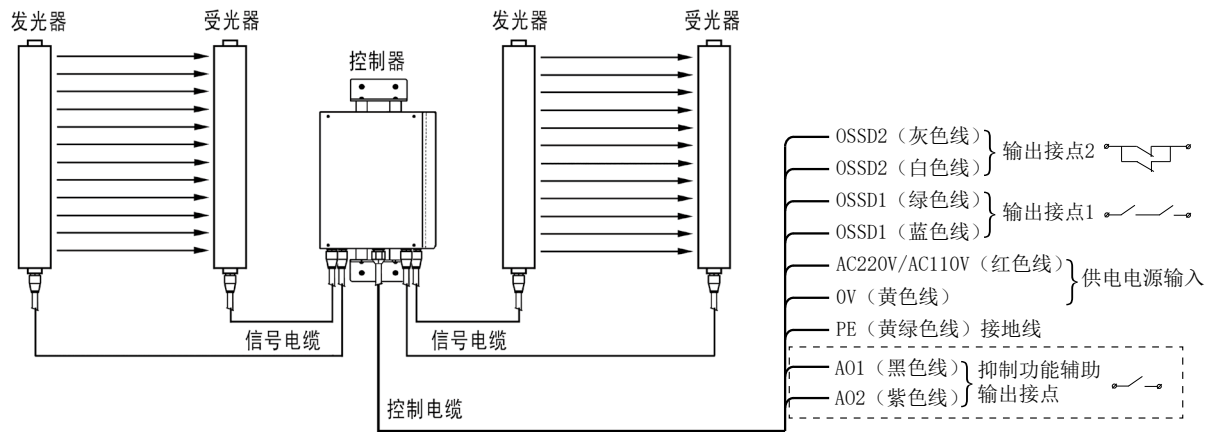


Fig.3-4 WS Controller With 1NO+1NC

N,ND Type Controller Wiring

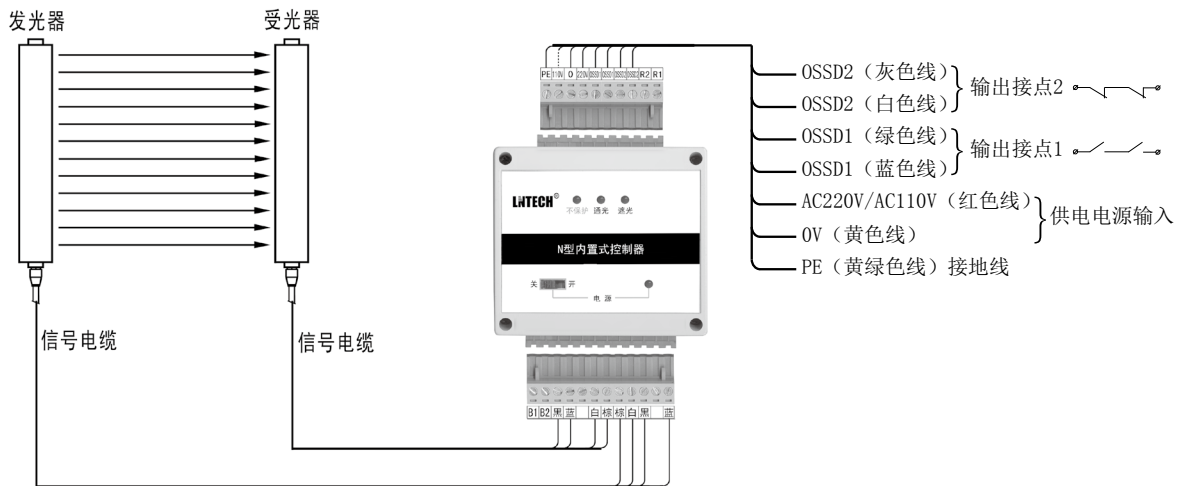


Fig. 3-5 2NO Output

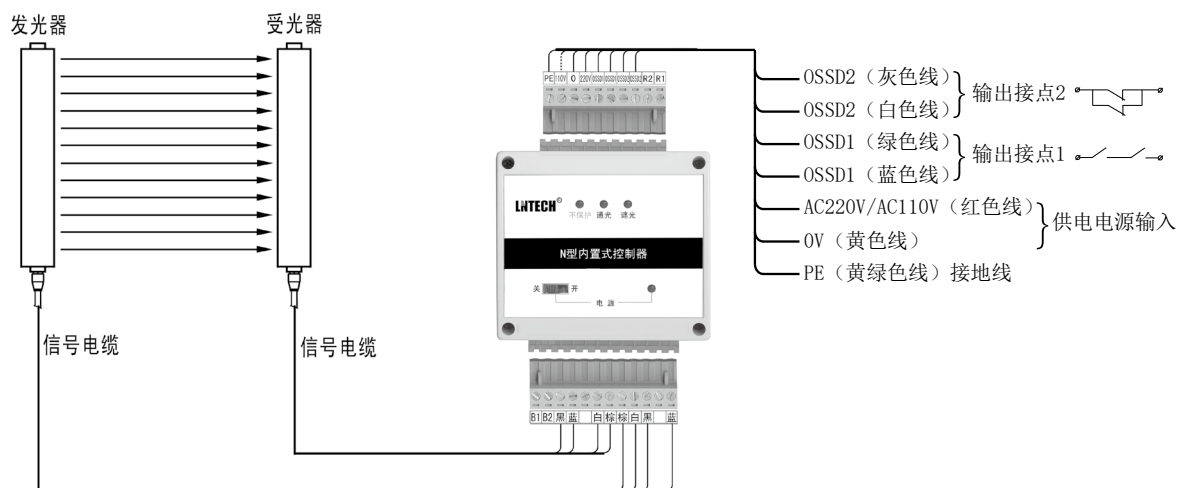


Fig.3-6 1NO+1NC Output

Note: ND type controller wiring with safety light curtain is same as the N controller

! Warn

- ◆ R1,R2 is the remained reset termianls which can be set the "self-protection fuction"
- ◆ B1,B2 is the remained muting terminals which is shorted to disable the protection function(forbidden to short the termianls)
- ◆ N,ND controller power supply: 220V,0,110V, connect the power as per the termianl label
- ◆ DC24V available

! Attention

ND controller connection with safety light curtain

Item	12P terminal	function	mark
ND controller	black	S1	NPN/PNP input
	blue	GND	-
	green	S2	NPN/PNP input
	white	CP	synchronous cable
	brown	VCC	+

Connection Of Controller and Machine Circuit

Power Supply

◆ WD,WS,N,ND type controller power cable: AC220V/110V(red) and 0V(yellow)

◆ Custom the DC24V power

GND

⊥ PE cable(green-yellow)

! Warn Ensure of the promper grounding

OSSD1,OSSD2 output wiring and how to disable the protection during the return trip.

◆ single return control wiring

OSSD1(green and blue), OSSD2(grey and white) connected with machine control circuit as below drawing, light-passing, OSSD1,OSSD1 is ON, the machine running, otherwise OSSD1,OSSD2 is OFF to stop the machine.

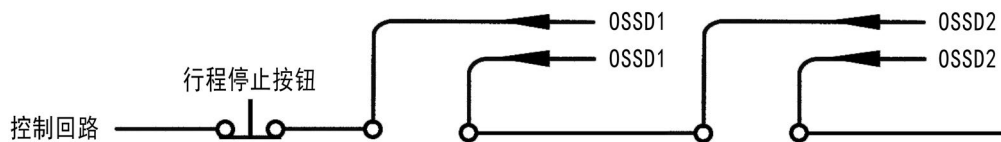


Fig.3-7 Single Return Control OSSD1,OSSD2 Connection

◆ double return control wiring

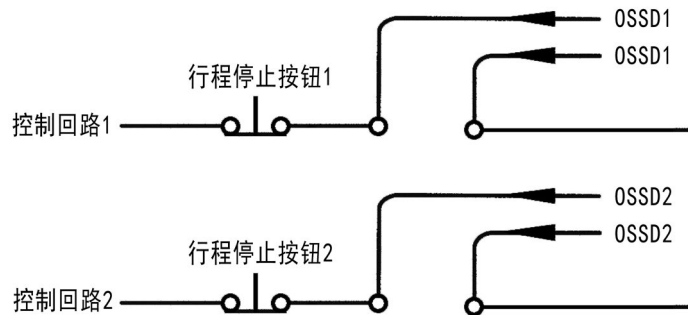


Fig.3-8 Double Return Control OSSD1,OSSD2 Connection

◆ The press machine designed with the return without protection function so don't need extra wiring

◆ If the press machine is not designed with the return without protection function,need apply with the cam contact to have the function,connect the cam's 2NO contacts with OSSD1,OSSD2 respectively.

! Warn

A. The cam contact must be the passive contact

B. The improper cam angle or cam with faults that will lead to severe damage

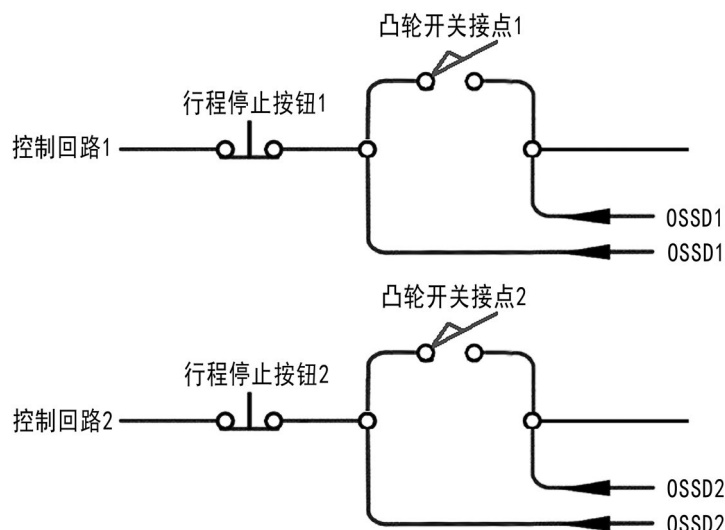


Fig.3-9 Return Control Without Protection OSSD1,OSSD2 Connection

Return without protection angle adjustment

If safety condition allowed,must adjust the cam angle to have the return without protection

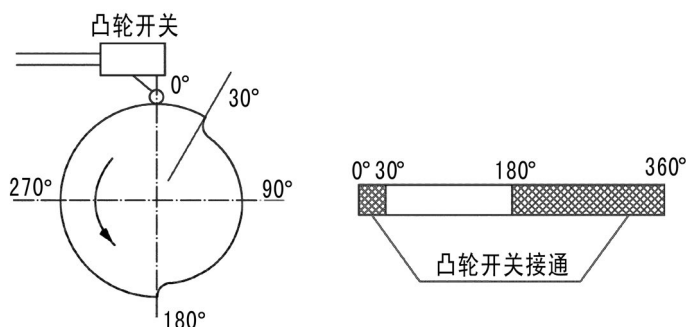


Fig.3-10 Cam Switch Structure and States Indication



The unprotected zone depends on the cam angle which relates the operator's safety,please take care of the angle.

"self-protection" is the "reset function" set. N, ND type controller remained R1,R2 terminal is intended for simple setting. The R1,R2 is closed before leave factory,if need please contact us.

Also need contact us to set the funtion for WD,WS type controller

Remained Muting Contacts

B1,B2 is the remained muting contact,if need and taken other guarding measures,can mute the protection function,to short the contact and OSSD1,OSSD2 is on,the safety light curtain protection function disabled,must take care of the muting.



Forbidden to short the B1 and B2 contact without other guarding measures

Application, Checkout and Maintenance

Caution

- The controller key should be kept by the special person.
- Need professional person to carry out the remove the faults
- Should shut off power before uninstal the controller and cable by the professional person
- The relay life time in controller is 10 million times which also can be replaced



Operation as below to disable the safety light curtain if need.

- ◆ With power on to rotate the WD,WS controller key at "no protection" position
- ◆ For N,ND controller need to short the B1 and B2 muting contacts

Need take other guarding measures when the protection function is disabled

Check and Maintenance

Form 4.1

Item	Content	Method	Period
Check	fasteners	tight connection	6 months
	terminals	ensure of tight installation	6 months
	relays	ensure of the relay mounted tightly	6 months
Maintenance	relay replacement	loosen the ribbon and replace the new relay	till life time
	tighten fastener	fasten the screws	it depends
	periodic checkout as well as before operation		

Troubleshooting

Controller Faults and Repair

From 5.1

Faults	Reason	Resolution
1. doesn't work and all indicators OFF	power fault	check the control cable connection
	power switch is broken	replace the switch
2. the sensor works well but press machine doesn't work	output contacts disconnected	replace the same fuse: 5×20/5A
	relay contacts ageing	replace the same relay
3. abnormal indicating or output	controller fault	replace new controller and contact us

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