



## **Punch Press Mold Photoelectric Detection Device**

# **Instruction 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 photoelectric detecting device if you are an agent, a dealer or a machine manufacturer, because this document is important to guide the user correctly to install and operate.

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## Foreword

### **Thanks for choosing "LNTECH" Brand Punch Mold Photoelectric Detecting Device!**

Only use "Mold Detecting Device" in the manual for short (hereinafter called 'Detecting Device').

The detecting device is the essential advanced test device for punch automation, which features high test accuracy, simple operation, wide application.

The Device is used for detecting non-feeding, material extruding, material ejecting, feeding in position during the automatic feeding process to protect the mold, prevent defective products output.

It is unable to implement the safety function if the improper mounting or the operation not follow this manual and ordinance related to the safe operation or the execution of the machine have faults. Before installation and use the protector, please read this manual carefully and fully know its contents in particular apprehend the symbol "warning", "caution" and so on . During the operation, please understand correctly and fully the technical performance about the protector, operate strictly according to the requirements in the instruction manual, stipulate relevant security working rule.

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

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- 2) The contents contained in the manual is subject to the technical modification
- 3) Though we have carefully drawn up the contents of this instruction manual, if any error in the manual, please contact us .

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## 1.4 Terminology

### Cam Signal

Cam's rotation at the set certain angle generates off and on signal or Cam bugle provides proximity switch the induction signal.

### Infrared Curtain

The emitting units in photoelectric detector send out infrared light, directly to the reflector, then is reflected to the receiving units in the detector to form the sensing area.

### A(B) Motion Detection

place the toggle switch at A(B) position to implement the function .

### A(B) Motion Detecting Signal

place the switch at A(B) position, test rod on detecting signal.

### Detecting Height

The device can detect max height range.

## 1.5 Technical Parameters

Host Machine(SC-11)		Photoelectric Detector(SC-21)	
Detecting Circuit	4 independent detecting roads	Detecting Height	100mm
Shift	Memory/Synchronous	Resolution	2mm(set distance 0.5m)opaque object
Response Time	< 15ms	Detecting Distance	<500mm
Power Supply	AC85~264V	Power Voltage	DC12V (±10%)
Power Consumption	<9W	Power Consumption	<3W
Output	Safety Relay	Output Indicator	Power Indicator(red)、 Pass Indicator(green)
Output Contacts Capacity			subject to the size of object detected
Relay Life	AC250V/3A (COS φ=0.3) 时, 2000000 次 2,000,000 times	External Size	91L*32W*129H
External Size	213L*145W*100H	Cir. Temperature	-10℃~50℃
Cir. Temperature	-10℃~50℃	Environment Humidity	20℃, RH≤85%
Environment Humidity	20℃, RH≤85%	Shell	Steel Plate
Shell	steel plate	Filter	Plexiglas

## 1.6 Standard Configuration

Mold Detecting Device	
Configure	Quantity
Host Machine	1pc
Photoelectric Detector	1pc
Reflector	1pc
Test Rod	2pcs
Proximity Switch	1set
Cam signal cable	1pc
Photoelectric detector cable	1pc

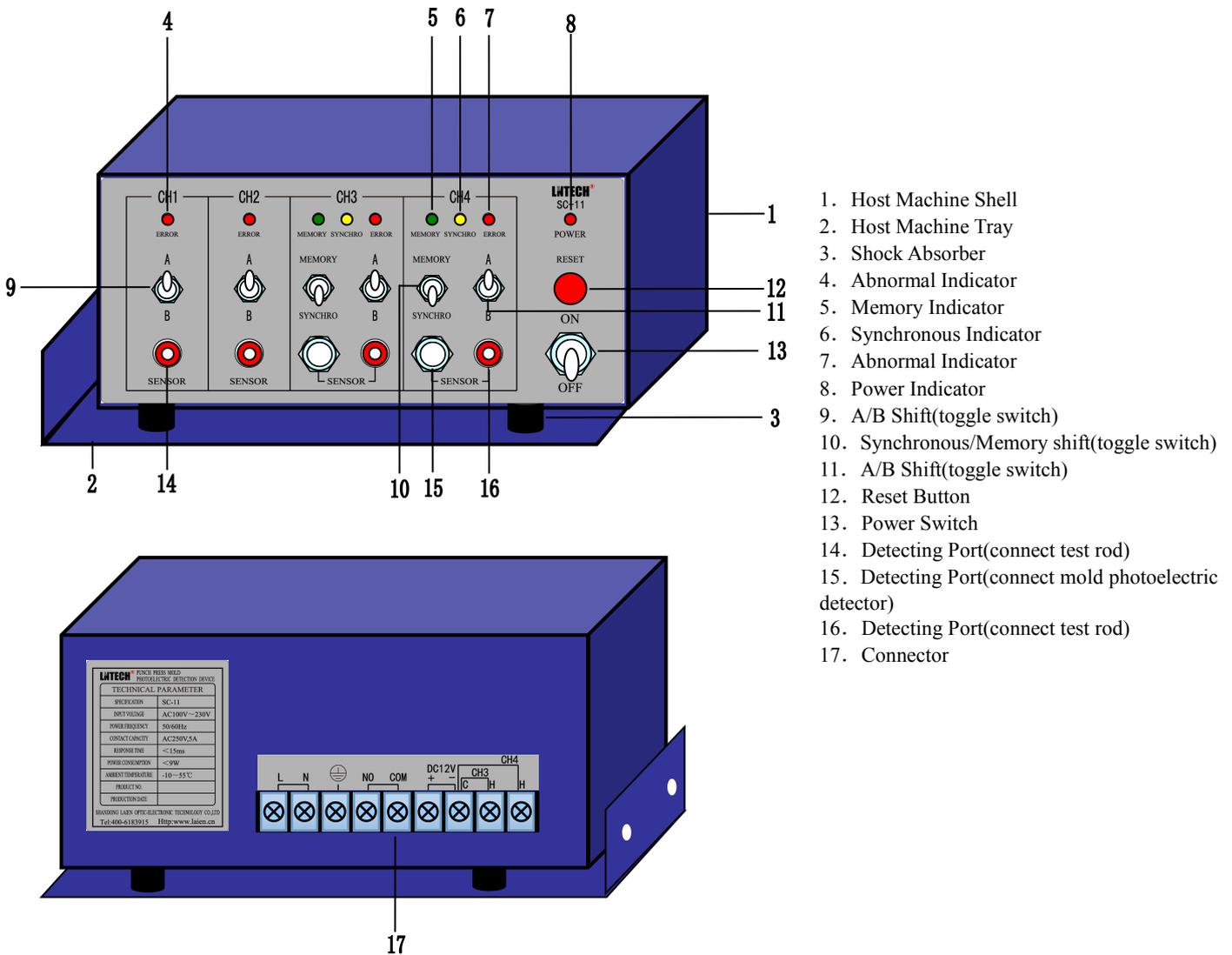
## 2 Main Parts

### 2.1 Host Machine SC-11

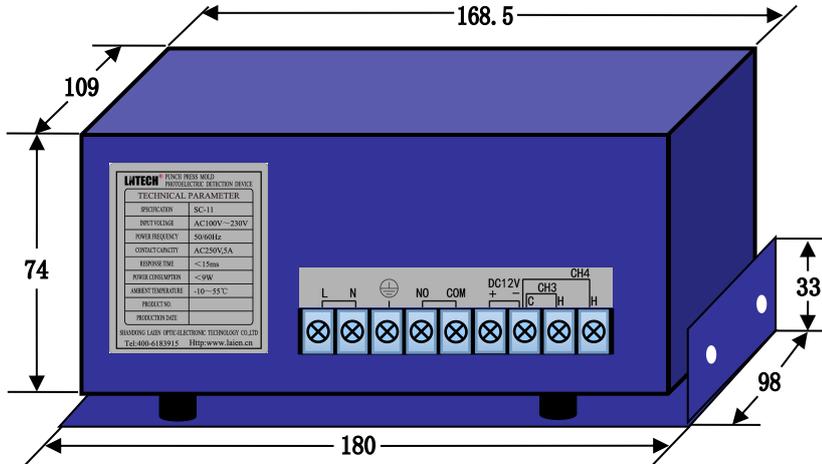
The host machine not only provides power supply to photoelectric detector and proximity switch, but process the signal from detector, test rod, proximity switch. By relay N/O or N/C output signal, control cable connecting with press stroke circuit or other equipment safeguarding circuit to protect mold.

#### 2.1.1 Parts Instruction

The Detecting Device has 4 roads output: CH1、CH2、CH3、CH4.



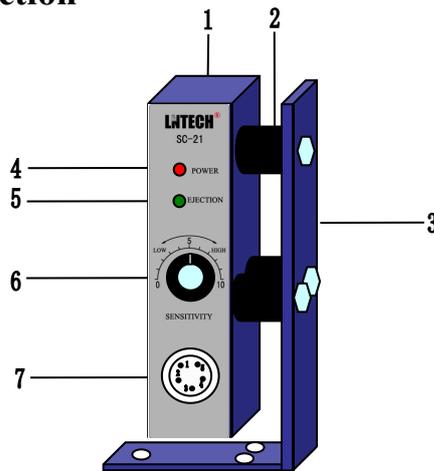
## 2.1.2 External Dimensions(Unit:mm)



## 2.2 Photoelectric Detector

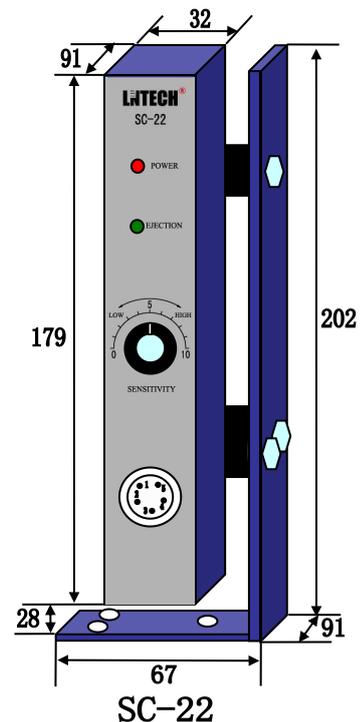
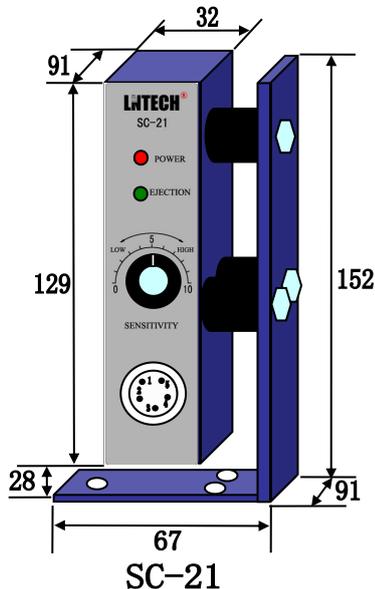
The detector sends out interrupting signal to host machine when the workpiece ejected through the detecting area, and work together with proximity switch to detect material ejects.

### 2.2.1 Parts Instruction



1. Shell
2. Shock Absorber
3. Fixed Mount
4. Power Indicator
5. Material Pass Indicator
6. Sensitivity Adjustment Knob Switch
7. Signal Cable Socket

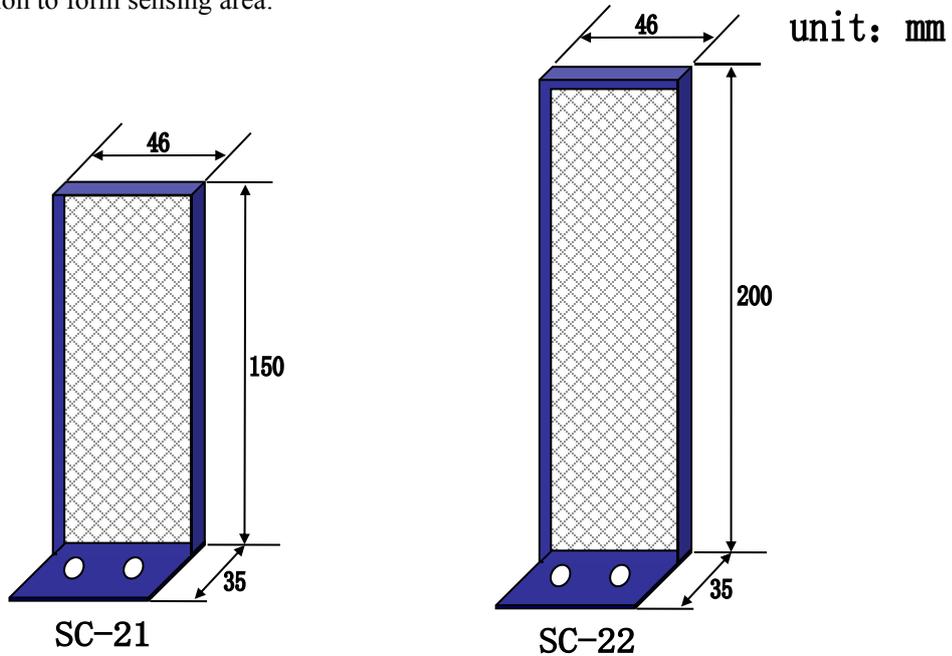
### 2.2.2 External Dimensions(unit: mm)



## 2.3 Other Parts

### 2.3.1 Reflector

Reflector consists of great number of array prism arranged in some certain regular pattern, used with mould photoelectric detection to form sensing area.



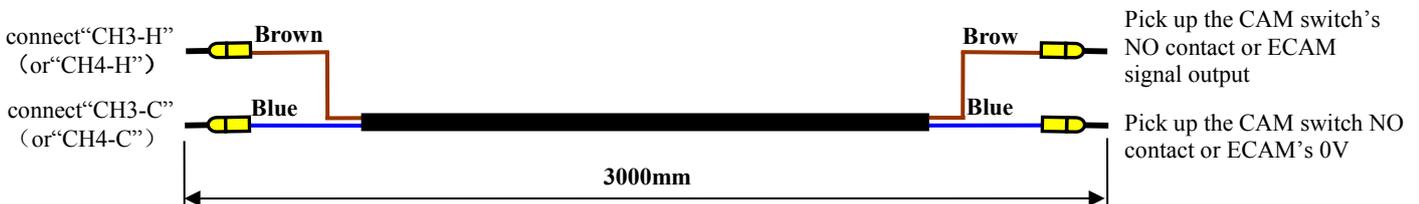
### 2.3.2 Proximity Switch

Proximity Switch is used for detecting the Cam signal, used with test rod, mold photoelectric detector to implement the function of detecting material ejection, material feeding in position.



### 2.3.3 Cam Signal Cable

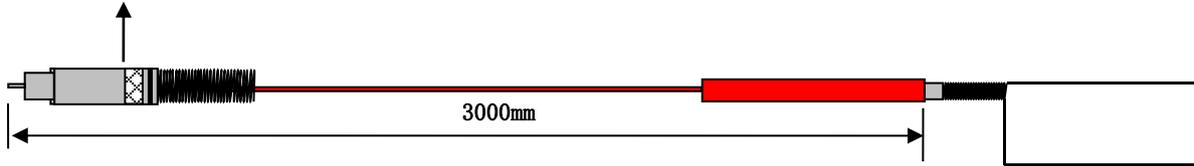
Cam signal cable is connected to Cam Switch, with the use of mold photoelectric detector, test rod to carry out detecting work piece ejection, feeding in position(similar function to proximity switch).



## 2.3.4 Test Rod

Under channel CH1,CH2 road, the test rod can detect the material extrusion and non-feeding; under CH3,CH4 used with proximity switch to detect the feeding in right position.

Signal plug (after testing interface)

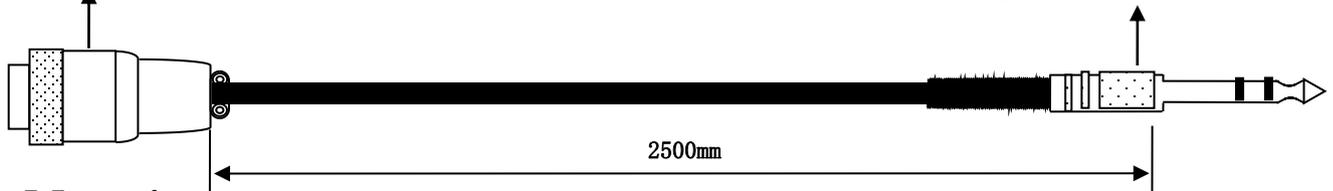


## 2.3.5 Photoelectric Signal Cable

Signal cable connected with host machine and mold photoelectric detector, transmit the signal when workpiece passing to the sensing area (light curtain) to host machine, meanwhile the host machine provide power supply to detector.

The photoelectric detection

To detection port in host interface



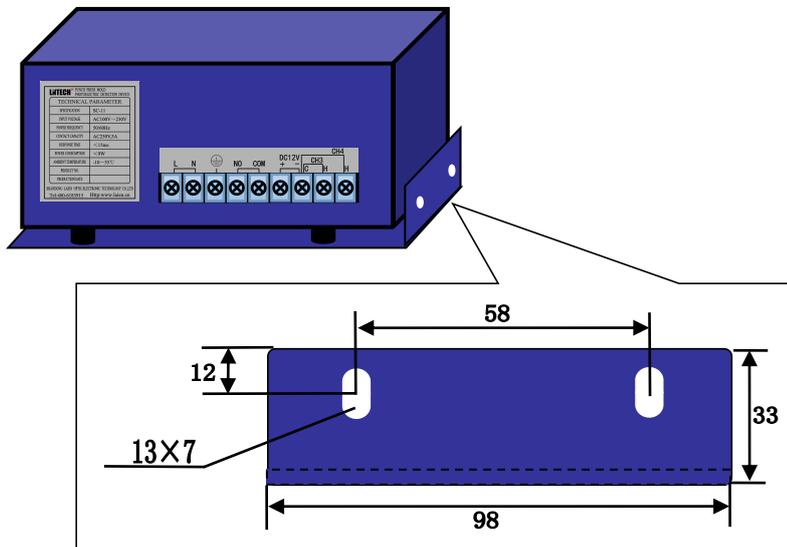
## 3. Mounting



Before installation, please to check the components right in box according to the packing list!  
During installation, please shut off power supply to avoid electric shock!

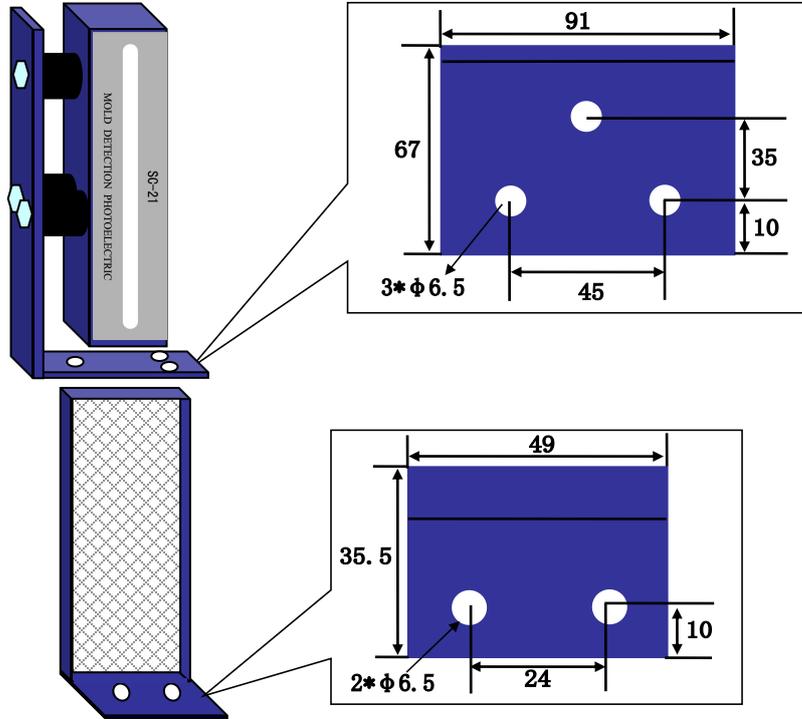
### 3.1 Host Machine Mounting

Please mount the machine onto the suitable position of punch equipment in according to machine's external dimension(prevent collision, operation and maintenance for ease), see below chart(unit: mm):



## 3.2 Photoelectric Detector Mounting

The detector should be be mounted on the material ejection outlets. (unit: mm)



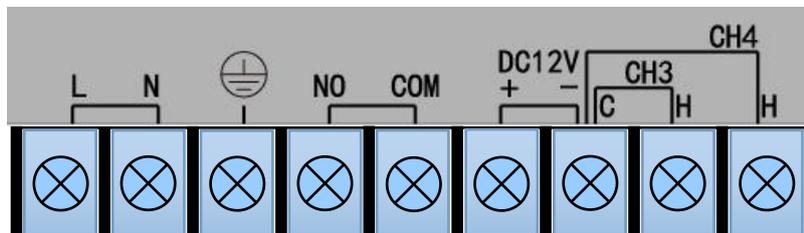
1. On the premise of the photoelectric detector is not collided with mold or without interrupt error, please try to mount close to the mold so as to detect the work piece on priority.
2. The distance between detector and reflector can be adjustable, not much long; when turn down the detector's induction, don't set high sensitivity to prevent maloperation

## 4. Wiring



Before wiring, you must shut off the power supply to punch to prevent electric shock, need connect the cable strictly as the wiring chart!  
Any inner circuit change in the device is prohibited!

### 4.1 Host Machine Wiring

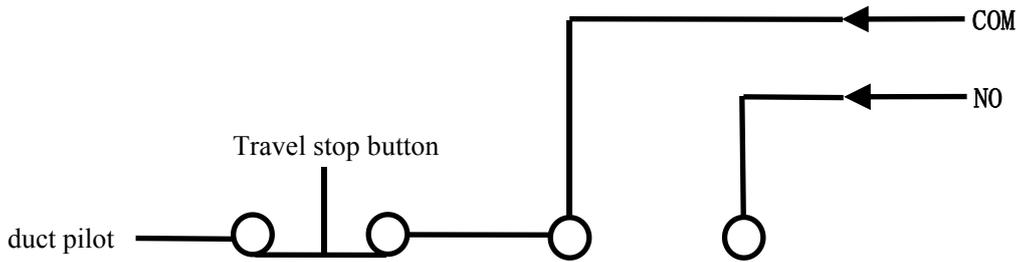


- (1) L、N wire connected with the power: AC90~230V.

**Note: ensure of the correct connection according to the wiring symbol.**

- (2) PE is PE, need connect tightly with punch PE. **Note: workable PE**

- (3) COM、NO wire is the NO output contact: COM and NO should be connected with punch stroke braking control circuit strictly as below drawing. Under working, COM,NO is closed, punch runs normally, COM、NO is open against faults detected, punch stops running.



(4) “12V + ”、“12V-”is 12V output: provides power to external proximity switch

(5) “CH3-C”、“CH3-H”、“CH4-C”、“CH4-H” is synchronous signal input: connected with cam,provide cam signal to host machine



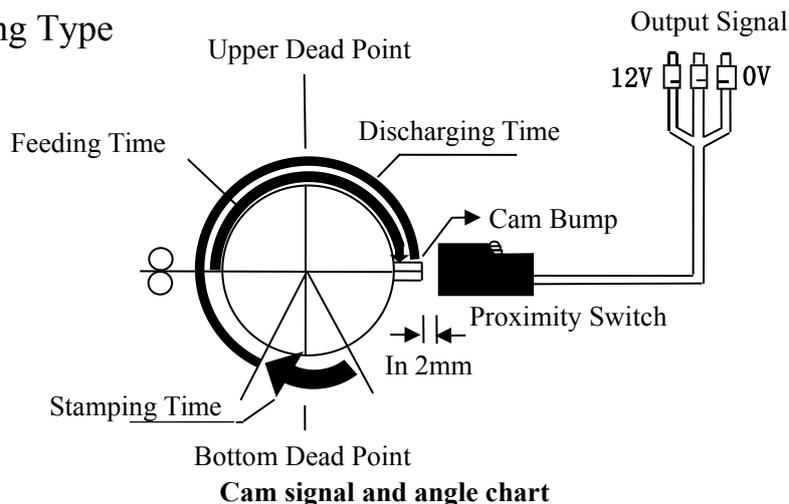
警告

**1. PE wire must be properly connected with punch electric PE!**  
**2. When connect with power, must check the voltage used in punch if conforms to the input volt (AC90~230V) !**

## 4.2 Cam Wiring Type

There are two kinds of cam connection: close switch connection mode and cam signal wire connection mode.

### 4.2.1 Cam Wiring Type

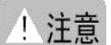


There are three cable at the end of proximity switch, brown, blue, black color. Brown cable connected with 12V+, blue cable connected with 12V-, black cable connected with CH3-H(or CH4-H).

The other end of proximity switch is induction head, installed beside the cam protuberant location, Angle (30) fixed to 1 o'clock to 3 o'clock direction (90) between the advisable (that is, the CAM bulge at the time of nearly induction switch sensing head), fixed on CAM, then tighten the switch.

### 4.2.2 CAM Signal Wiring

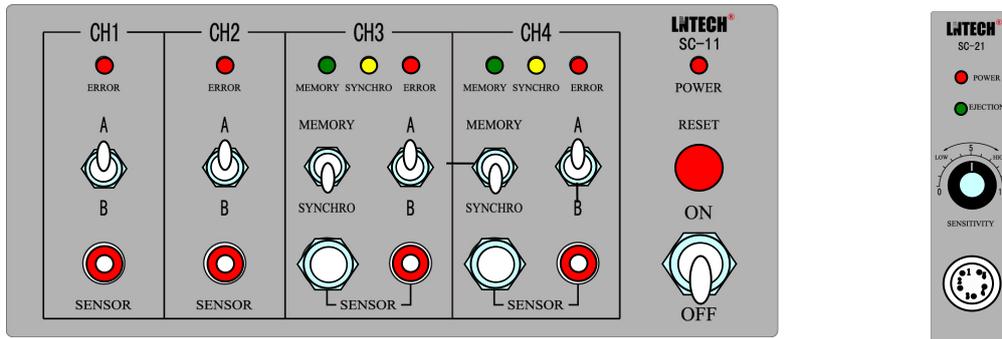
One end of cam signal cable: brown cable connected with CH3 (or CH4) blue cable connected with CH3-C(or CH4-C), the other end of cam cable respectively access to punch spare CAM switch is normally open point (point (30) fixed to 1 o'clock to 3 o'clock direction (90) between advisable).



注意

**1、 Proximity switch function is same as the CAM signal's, which are cam detection cam, choose the one for mounting.**  
**2、 CAM signal (check signal) of the CAM Angle setting at a short time.**

## 5 Device Use



### 5.1 Indicator

#### Host Machine Indicators:

- 1) Memory Indicator: green light, is on when detect material ejects, work piece passing, feeding in position and test rod get off contact with feeding machine, otherwise light off.
- 2) Synchronous Indicator: yellow light, is on when cam signal is detected, otherwise light off.
- 3) Fault Indicator: red light, is on when machine has faults happen, while relay is open; light off when runs normally, relay is closed.
- 4) Power Indicator: red light, brightens when switch is at "ON" position.

#### Mold Photoelectric Detector Indicators:

- 1) Power Indicator: red light, is on when power supplied, otherwise is off.
- 2) Ejection Indicator: green light, brightens only when there has work piece passing to the detecting curtain.

### 5.2 Switch Setting

- 1) Power Switch: electrify placing at "ON" position, off-power at "OFF" position.
- 2) Reset Switch: when punch stops running as faults happen, need press down reset switch after trouble eliminating to restart punch movement.
- 3) A/B Shift Switch, Memory/Synchronous Shift Switch: shift subjects to the detecting function.



警告

**Power switch at "off" position, no protection function for the machine guarded**

### 5.3 Host Machine Interface Setting

1、Interface Operation as follows:

The device has 4 roads output including: CH1、CH2、CH3、CH4. The CH1 and CH2 have the same function, both of the two can carry out the function of material extrusion and non-feeding detection; CH4 can detect material ejection and CH3 detects the material fed in position.

(1) CH1、CH2: ① Turn the toggle switch on "A" position, test rod on "off" contact state, device runs normally; when touch the material (device's PE connected with punch electric circuit PE), fault is detected, punch stops moving, the procedure is called material extrusion detection.

② Turn the toggle switch at "B" position, test rod touching the material while device works well, when "off" contact "device detect the fault to brake the punch (adverse to the A movement), the procure named non-feeding detection.

(2) CH3: ① turn the toggle switch separately at "Synchro"、"A"(B), also can carry out the detection of extrusion(non-feeding) using the test rod.

② Turn the toggle switch separately at "Synchro"、"B", proximity switch and test rod work together to execute the detection of feeding in the position.

③ Turn the toggle switch separately at "memory"、"A",proximity switch and test rod work together to execute the detection of feeding in the position and memory function.

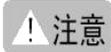
④ Turn the toggle switch separately at "memory"、"B",proximity switch and test rod work together to execute the

detection of feeding in the position and memory function.

CH4: Turn the toggle switch separately at "memory"、"B", proximity switch and photoelectric detector(or cam switch signal cable) work together to execute the material ejection.

2、toggle switch position with host machine unused

CH1	CH2	CH3	CH4
A (UP)	A (UP)	Sync、 A (DOWN、 UP)	Sync、 A (DOWN、 UP)

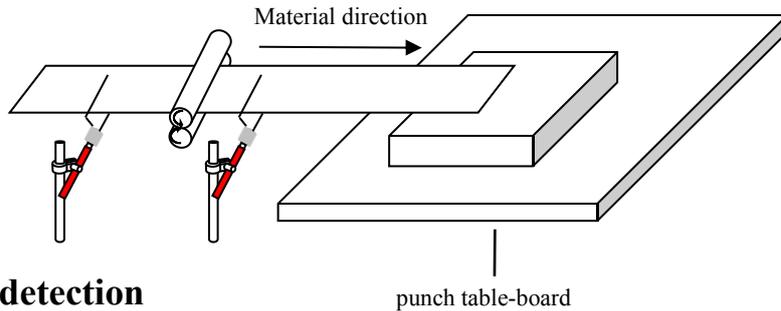


- 1、 Under material ejection detection, set the induction knob at 6' position (adjustable).
- 2、 When punch stops abnormally, first need to reset the punch after the troubleshooting by using the "reset" button in the device, then punch restart working well.
- 3、 To execute the ejection detection, should interrupt the photoelectric detector when power on and reset each time, the memory indicator lights on, the device will send the next movement signal to the punch.
- 4、 Please power off when the device can be reset, and get the punch travel off the angle of cam signal, then start the punch to run normally.

## 6 Device Application Example

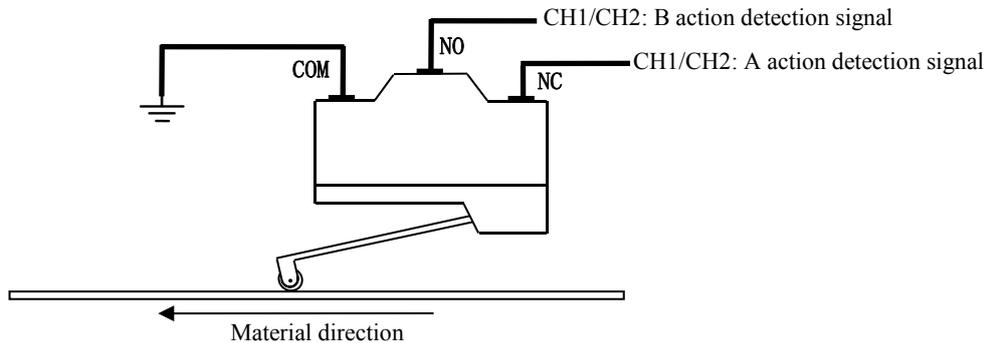
### 6.1 Extruded material detection

Test rod used for the material extrusion

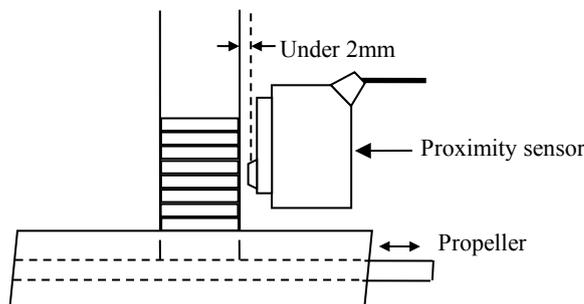


### 6.2 No material detection

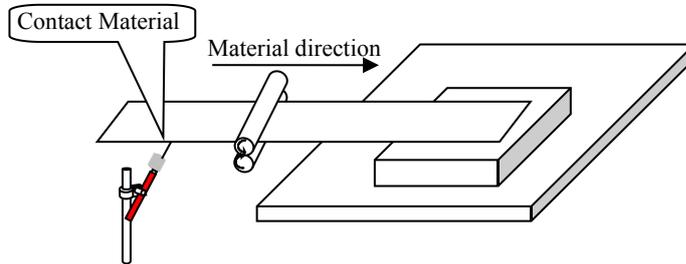
1、 Micro switch used for no material detection



2、 Proximity switch used for no material detection

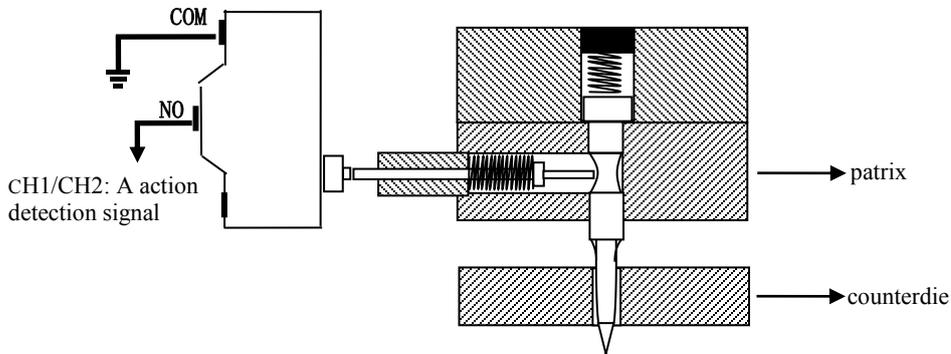


3、 Test rod used for no material detection

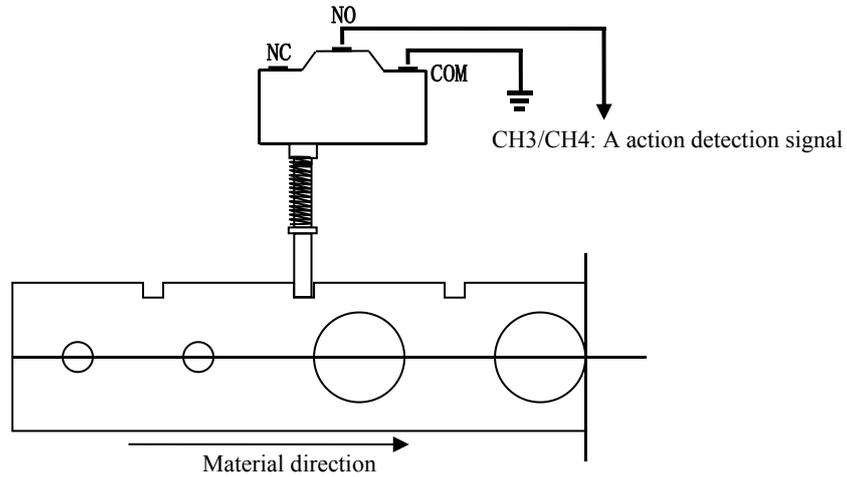


## 6.3 Material fed in place

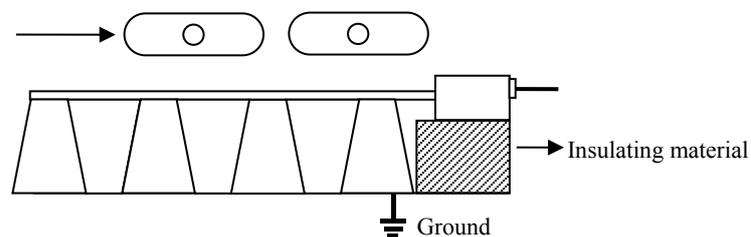
1、 Micro switch used for detecting the material fed in place by upper mold guide



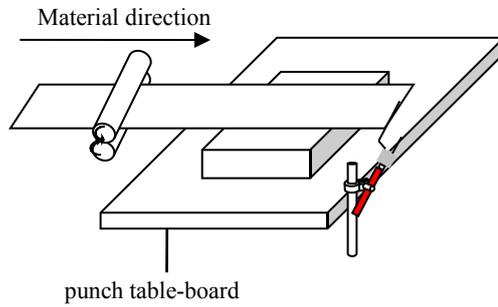
2、 Micro switch used for detecting the material fed in place by material cutting angle



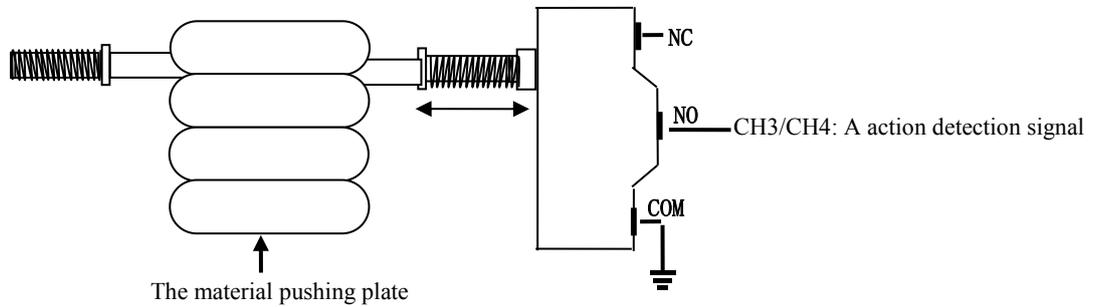
3、 Use position baffle to detect the material fed in place



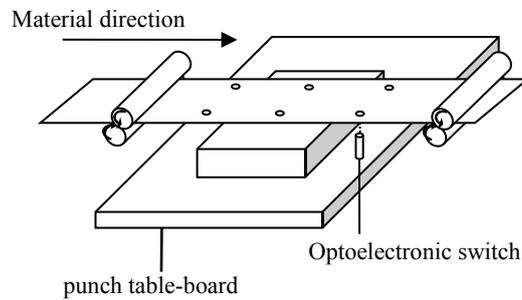
4、 Test rod used for detecting the material fed in place



5、 Micro switch used with pushing plate to detect the material fed in place

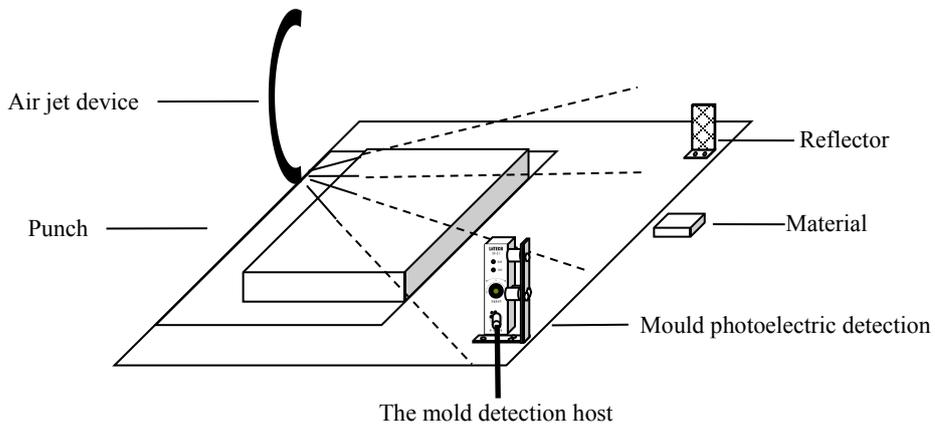


6、 Optoelectronic switch used for detecting the material fed in place

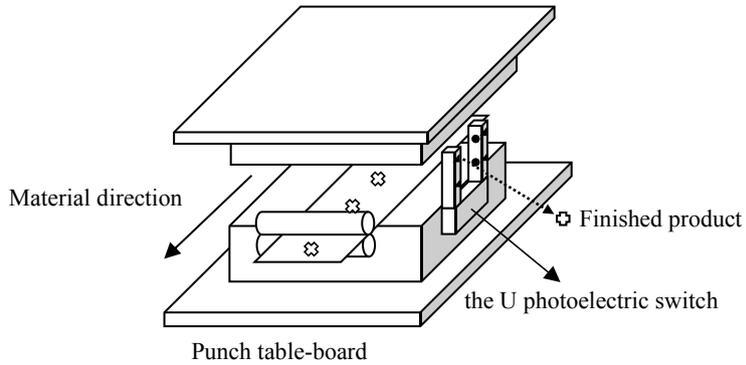


## 6.4 Material Ejection Detection

1、 Photoelectric device used for detecting material ejection

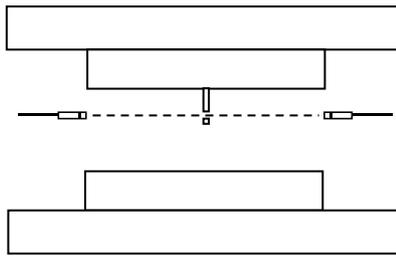


## 2、 Shaped photoelectric switch used for detecting material ejection

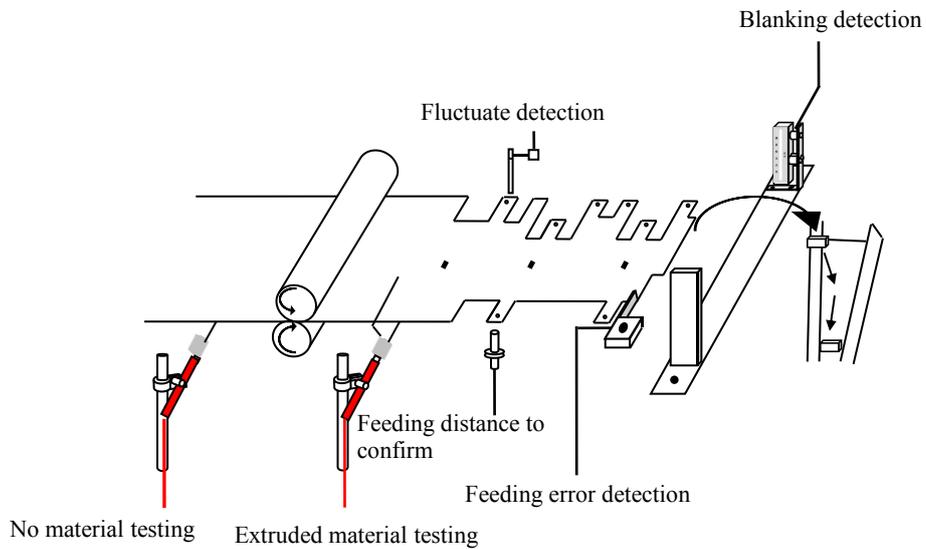


## 6.5 Others

Photoelectric switch used for broken needle



## 6.6 Comprehensive application examples of various testing function



## 7. Debugging and Trial Operation



**Check carefully the wiring to ensure that all connections are correct after installation. If all wiring is right, then electrify and debug.**

Before the operation, need to debug and operate to ensure everything is going smoothly. Referring to below form 6.1 to debug and operate the device, it's normal if runs in accordance with the contents in form:

### Chart 7.1 Debugging and Trial Operation

Road	All parts	Function	Method
CH1	Test Rod	Extruded material detection	Place the toggle switch on "A" position, device runs normally when test rod does not touch material, otherwise abnormal signal is detected.
		Non-feeding detection	Place the toggle switch on "B" position, device runs normally when test rod does not touch material, otherwise abnormal signal is detected.
CH2	same as CH1	Same as CH1	same as CH1
CH3	Photoelectric detector(Cam signal cable) and Proximity switch	Material ejection detection	Respectively place toggle switches on "Memory"、"B" position, to detect material discharging by matching the detector(cam signal cable) to proximity switch, there must be workpiece pass to detecting curtain at every punch stroke while the memory indicator brightens to make record, punch keep moving, the memory is eliminated against the synchro indicator brightens(memory indicator off), device works normally, which is defined as a stroke. When no workpiece pass to detecting curtain, memory indicator is off, punch keep running, synchro indicator is on, punch stop moving as fault happens.
	Test rod and Proximity switch	Feeding in position detection	<p>Detect feeding in position matching test rod to proximity switch.</p> <p>Place respectively toggle switches on "memory"、"A" position, when material is fed in right position, feeding machine has contact with test rod, memory indicator brightens, then feeding machine off contact with rod, synchro indicator brightens a time while memory indicator is off, this is a stroke, device runs smoothly. Machine stops moving once faults detected when mistaken feeding(feeding machine does not touch rod).</p> <p>Place switches on "Memory"、"B" position, punch runs while memory indicator brightens to make record. Feeding machine contacts with test rod and memory indicator is off when material feeding in right position. Memory indicator brightens again to store waiting next feeding when feeding machine gets off contact with rod, synchro indicator brightens a time, device runs normally, this is a stroke. Machine stops moving as faults detected when mistaken feeding(feeding machine does not touch rod).</p> <p>When place the switches on "Synchro"、"B" position, also can exert the function of detecting if the feeding in position, but can't run memory function.</p>
CH4	same as CH3	same as CH3	
Proximity switch, photoelectric detector switch, micro switch and so on can be replaced with that sold in market.			

## 8. Application, Checkout and Maintenance

### 8.1 Notes

- Before put into operation check if the device controls the press normally, refer to the Debugging-Operation Test Chart 7.1.
- During operation, do not change the position of photoelectric detector.
- When a malfunction happened, only professional technicians are allowed for repairing.
- Before uninstalling device and wire cables, must turn off the power first. It is operated only by professional technicians.
- During operation, do not let work pieces, tools or waste matters hit the protector.
- When a device with a reset button is applied, the slide of press stops at once every time when fault detected; only by pressing reset button, the slide could move downward (or press re-start).

## 8.2 Checkout and Maintenance

It's important to check and make maintenance for the device so as to ensure operator's safety. Periodical check and maintenance shall be made. A detail for check and maintenance is showed as below Form:

Item	Content	Method	Time
Check	Filter	ensure of the clean and intact surface	before operation
	Reflector	ensure of clean and intact surface	before operation
	Toggle Switch	Ensure of the switch runs normally	before operation
	Fastener	Check and ensure of all fasteners fixed tightly	6 months
Maintenance	Photoelectric detector surface clearing	Clean with soft cotton yarn soaked water or detergent(prohibi cleaning with organic solvent).	based on the condition
	Replace Photoelectric detector filter	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.	based on the condition
	Fixed screw	fix the loose crew tightly	based on the condition

## 9 Troubleshooting

Phenomenon	Reason	Solution
Device does not work, indicators are OFF	no power supply	Check power supply and cable, provide correct power
	fuse melts	Replace the same fuse, automatically recover after faults removed
	Power transformer broken down	replace transformer
Device works, punch does not work	disconnection between host machine	renew wiring, ensure wire fastened
	Punch electric faults	check punch electric circuit
Device works, indicator light off and on	Power cable connection is not good	Fasten power wire/terminal crew
Detect faults, punch does not stop running	Control circuit shorts between output contacts	Check punch circuit between output contacts
All indicators OFF and the device doesn't work	Signal cable disconnection	Replace signal cable
	loose connection between host machine and detector	fasten the connection



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