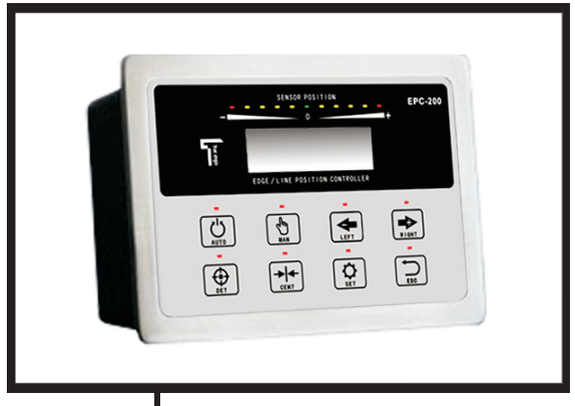
楚鷹科技®

EPC Controller Operating Instructions

EPC-200



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Directory

Chapter 1 Product Overview

1. 1 Overview

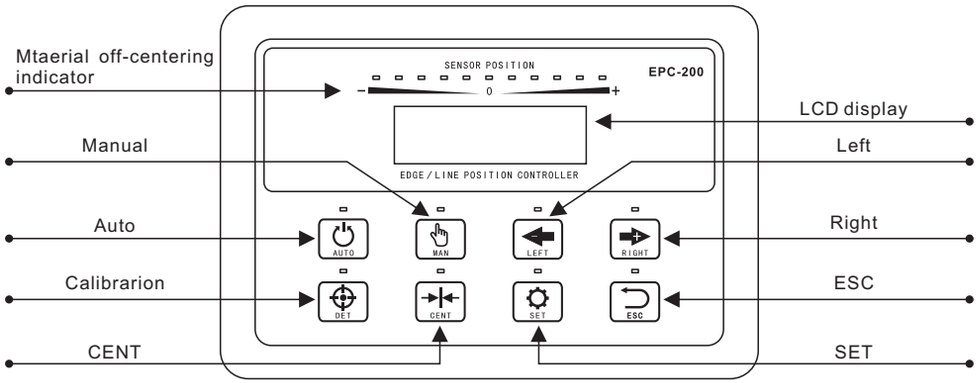
EPC200 servo edge position controller is a high precision controller with PI control, can choose a variety of detector, to trace edge, trace line. With ultrasonic, photoelectric detector, servo motor/drive cylinder servo system form a servo edge position control system, which can be widely used in printing, packaging, paper making, textile printing and dyeing industry of roll material in edge position control .

1. 2 Function

- Small size, compact structure, with internal control power supply
- Using panel membrane switches, simple operation, beautiful and generous
- Can select ultrasonic, photoelectric detector to trace edge and trace line, control automatically.
- The advanced PI algorithm , excellent man-machine interface, convenient for user
- The state of the system parameters have power-fail protection function
- With functions of RS485 communication interface, with PC, PLC collecting and distributing control system
- External can connect left and right position limit switch, External center offset adjustment can be performed
- Can adjust external center-deviation

1. 3 Panel diagram and key operation

（1）Panel



（2）Key 0peration

MAN Manual key	To enter manual mode, manual indicator light up.
AUTO Auto key	To enter automatic mode, automatic indicator light up. MC1disconnected in preparatory status, auto indicator light flicker; MC1 connected in working status, indicator light on.
LEFT Left/Decreasing key	In manual mode, press this button, pusher moving left. In parameter menu can move up maker, in setting mode can decrease value.
RIGHT Right/Increasing key	In manual mode, press this button, pusher moving right. In parameter menu can move down maker, in setting mode can increase value.
DET Calibration key	TIn manual mode short press 3 seconds to enter material selection menu. Long press 3 seconds to calibrate the current material.
CENT Cent key	In manual mode, short press this button to return back to the center, long press 3 seconds, to settle the current place as center.
SET Set/Confirm Key	Short press this button to enter password UI, press LEFT / RIGHT to input password 518, then press SET key to enter parameter UI.
ESC ESC/Clear Key	Press this button to exit parameter UI, back to the working interface. Press this button to stop alarm sound when machine warning

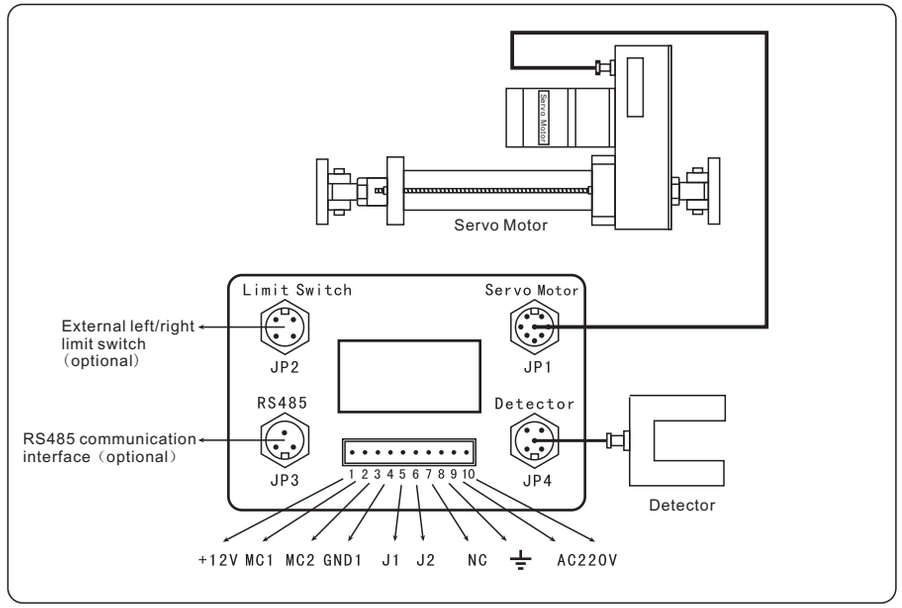
Quick operation remind: No need to enter the Menu, use the combined button key below, can operate some common operation quickly.

DET	In manual operation mode, short press this key button to enter material choose menu, long press 3 seconds, to calibrate the detector and current material.
CENT	In manual mode, short press this button to back to the center, long press 3 seconds, to settle the current place as center, meanwhile display “Cent place setting finished”
MAN + LEFT / RIGHT	In manual operation mode, press the combination buttons to set corotation / inversion, to change the moving direction.
AUTO + LEFT / RIGHT	In Auto operation mode, press the combination buttons to set corotation / inversion, to change the moving direction.
LEFT + RIGHT	In manual mode, press the two buttons at the same time can test the stroke, to confirm left/right limitation and stroke center.
SET + LEFT / RIGHT	In Auto mode, press this combination can adjust proportional gain P value.
ESC + LEFT / RIGHT	In Auto mode, press this combination can adjust the integral time I value.

Chapter 2 Installation and Electrical Connection

2. 1 Electrical connection

To connect controller, servo motor drive and detector as below picture:



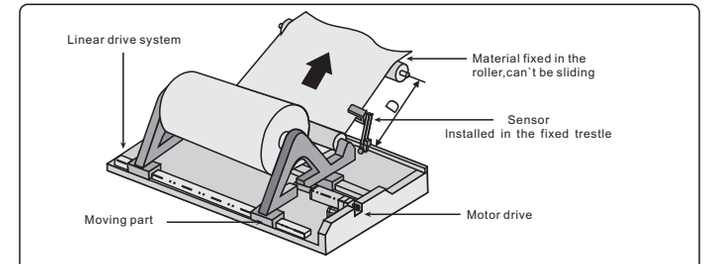
Introduction:

- MC1～+12V: connect to start control switch
- MC2～+12V: reserved control interface
- GND1: signal ground
- J1～J2: when trouble alarm warning the internal relay operation, the two interfaces connected.
- NC: not connected
- PE: safety ground
- AC220V: controller power supply
- 8 cores servo motor drive cable socket plug to JP1.
- 5 cores detector cable socket plug to JP4.
- External right/left limit switch, should be connect 4 pins JP2 if needed.
- RS485 communication interface, should be connected to 3 pins JP3 if needed.

2. 2 Detector connection

(A) movable unwinding edge position controller Installation

- Under the drive of motor, unwinding roller and guide roller moving together.
- Detector must be fixed in the trestle, located in the material entrance behind guide roller.
- Material on the guide roller can't be sliding, need to make sure that the angle of material and roller is big enough in case of sliding, if possible, the material moving direction is opposite with roller rotation direction, in case of sliding.
- Exit span (D) is as long as possible.



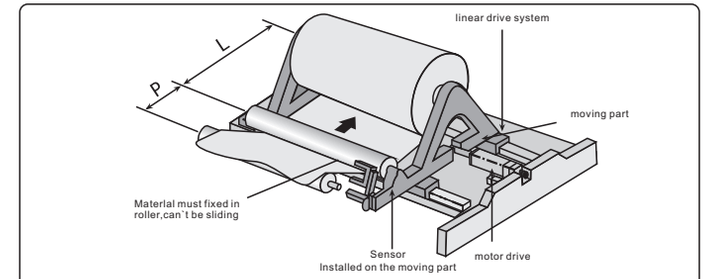
Unwinding edge deviation detector installation instruction

(B) movable rewinding edge position controller Installation

Detector must be fixed in the moving parts, detector and motor drive moving together, and located in the material entrance behind guide roller.

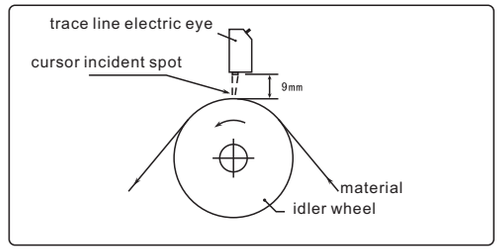
Material on the guide roller can't be sliding, need to make sure that the angle of material and roller is big enough in case of sliding.

Material pre-entrance span P must be smaller



rewind deviation detector installation instruction

(A) EPS-D shade guide detector installation.



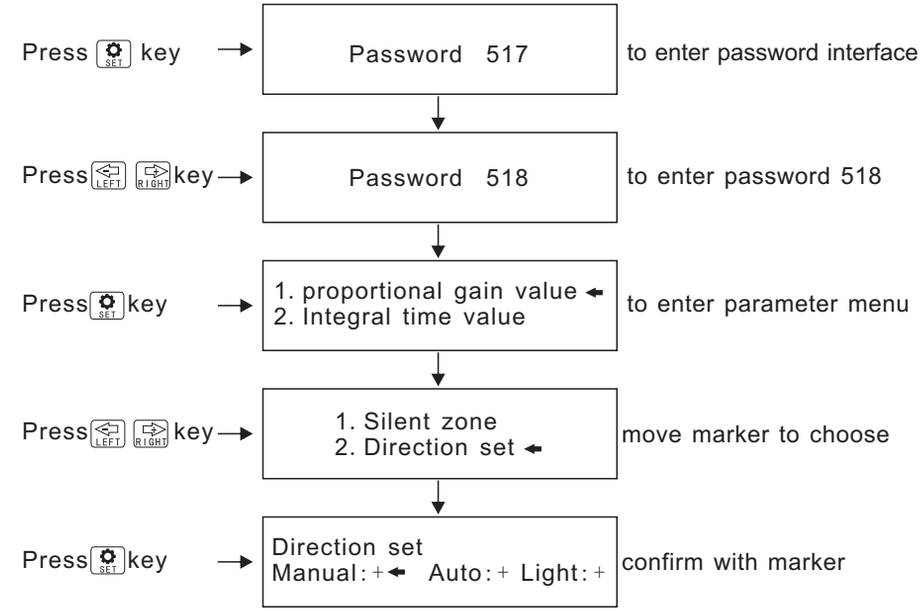
- The distance between electric eye detector with material is 9mm.
- Material must be coated on idler wheel, can't be floated.
- Electric eye must be fixed in trestle, can't be vibrated, otherwise the accuracy will be inaccuracy.
- Electric eye spot is based on vertical, and make the detected square cursor "▬" is vertical to the material's edge or line.

Chapter 3 Parameter interface and instruction

3.1 Parameter table

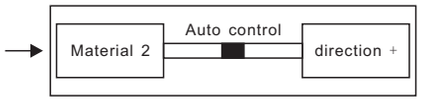
NO.	Parameter Name	Factory Default	Set Value
1	Deviation proportional gain	P = 70 %	P = 1～100%
2	Deviation Integral time	I = 9 %	I = 1～100 %
3	Silence Zone	Silence Zone= 0. 3 %	0. 1～10 %
4	Direction setting	+. +. +	Manual: +/-; Auto: +/-; Light: +/-
5	Off-centering value	Value=0%	-50%~+50%
6	Working stroke	Stroke=90%	1%~100%
7	Automatic stroke measurement	Factory Default	Detecting left limit/right limit/back to center
8	Detector type	photoelectric	Photoelectric/ultrasonic
9	Factory reset	non-restoring	Renew/non-restoring
10	Language	simplified Chinese	simplified Chinese ; Traditional Chinese; EN

3. 2 Parameter set



Press LEFT RIGHT key to change parameter

After modification, pressESCtwice to return operation UI,modified value save.



Only work in operation UI

3. 3 Parameter Instruction

1) Proportional gain value P range: 1~100%, P is greater, deviation speed is sooner, but if P is too big will cause system oscillation, have effect on system accuracy.

2) Integral time value I range: 1~100%, I is smaller, integral effect is stronger, appropriate integral time can speed system respond time, and short deviation difference, improve system accuracy, but if it is too small will cause system oscillation.

3) Silent zone range 0.1~10%. Silent area is referring to settle a small area inthe detector detecting area, when coiled material enter this special area, theactuator will stop moving, when coil material is out of this area, actuator willbegin deviation work again. The parameter is used to specify the this area percentage in detector detecting area, main function is to eliminate nonsense deviation while the material roll is burr or ragged.

Caution

The above 3 parameters have a huge impact on deviation accuracy and quality, can set in the following way:

- In the circumstance of system doesn't oscillation, please settle appropriate P and I value to your desired speed. If there's system oscillation, please decreased proportional gain P value, increased integral time I value, and enlarge silent zone accordingly, until the system respond speed is match and no oscillation.
- Different machine tools have different structure and machine inertia, so there's no unified appropriate parameter. In order to achieve best deviation control, you have to set these 3 parameter separately and patiently based on different system.
- P/I value will be saved automatically under shortcut circumstance, effect immediately. So you don't have to exit parameter interface until you are satisfied with the effects.

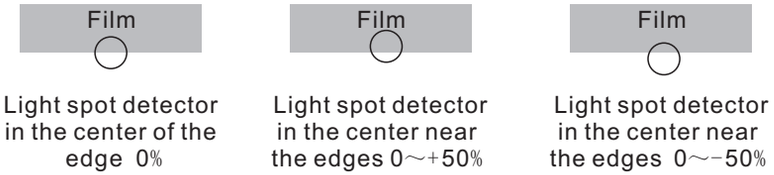
4) Direction set range:+/−

This parameter is to set manually/automatically deviation pusher's direction and deviation indicator light.

While setting this parameter, press [SET], move marker ▶ to choose [LEFT] [RIGHT] manual, auto, pressto set "+" or "−".

5) Off-centering value range: −50%~+50%.

After detector calibration, automatically set the center of detected range as center of deviation, and this parameter is used to trimming the left/right off-centering value.



Light spot detector in the center of the edge 0%

Light spot detector in the center near the edges 0~+50%

Light spot detector in the center near the edges 0~−50%

Attention:

This parameter is stored in the respective coil parameters,for 0 ~ 9 different coil, the parameter values are independent of each other,can be set separately.

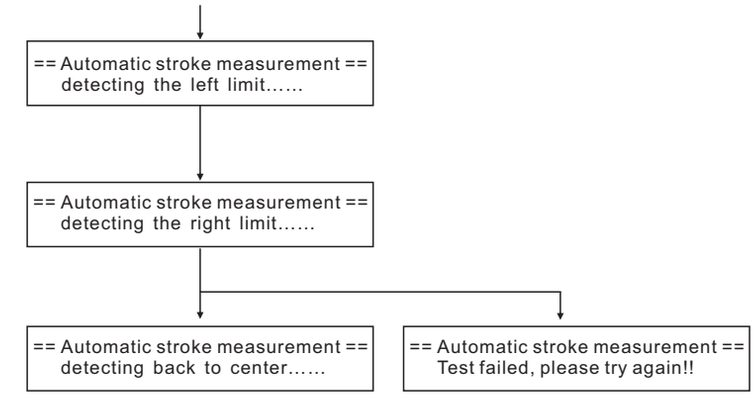
6) Operating stroke:Set range: 1% ~ 100%

This parameter can change the driver left, right stroke limit position, reduce the parameter values can reduce the working stroke range of the drive.

7) Automatic stroke measurement

This parameter is used to test left, right limit position and stroke center of cylinder stroke.

Manual mode, enter "Automatic stroke measurement" parameter, press [SET] button:



Attention:

- Under Manual mode, also can use P2 , press [LEFT]、[RIGHT] buttons at meantime
- to do Automatic stroke measurement, that's "back to center'' Operation .

If you want to change "back to center " position, move to manual mode in advance, press [LEFT] or [RIGHT] button, move the push rod to a certain position, then press [CENT] more than 3s, then this place is "back to center " position.

- Change "back to center " position, it is just trim stroke center position, if change too big, deviate too far away from center position, it is adverse to edge position control system.

8) Detector type

For EPS-B photoelectric sensor and EPS-D color code sensor use press [LEFT]、[RIGHT] move cursor select "photo electric"

For EPS-C ultrasonic sensor use [LEFT]、[RIGHT]move cursor select “ultrasonic”
All detectors need press [SET] 3s under manual model to do Detector calibration.

8) Factory reset

*This parameter is used to set all state and restore of the system to the factory value.

Attention:

After this operation, it needs to detect automatical stroke and detect calibration again.

9) Language selection

Press [LEFT] [RIGHT] buttons to move cursor ▶ to select simplified Chinese , traditional Chinese , English three languages

3. 4 Abnormity warning

When the system appears a serious abnormal,such as motor stuck and cannot turn,electric current too large and ect phenomenon, these will trigger the Abnormity warning, and the system will stop working automatically,LCD screen will prompt information system exceptions, buzzer will send out the shedding, at the same time relay contact J1 and J2 will connect.After the user trouble shooting, press “ESC “button to cancel alarm, return back to normal running condition.

When the motor move to left. right limit position, buzzer send out intermittent short hum,this is just as a reminder, the system will not stop working, and relay contact J1 and J2 will not connect.

Chapter 4 operation steps

4.1 Preparation

1) Finish wire connection and installtion:

According to 2. 1 and 2. 2 part wiring and installtion requirements to do all electrical connection and assembly of detector and the entire system.

2) Push rod movement and direction checking

Under manual mode, press [LEFT]、[RIGHT] buttons, push rod can move left and right: enter to No. 4 “direction setting” parameter, change manual “+” or “–” , The direction of push rod will change accordingly, and you can also use P2 shortcut button to change direction of push rod.

3) Automatic stroke” measurement and “back to center” operation:

Under manual mode, enter No. 7 ” Automatic stroke” to measure parameter, press [SET] to do a ” Automatic stroke” measurement（back to center）

4) Detector type selection

According to detector typeof the edge position system enter No. 8, ” detector type” parameter select “photoelectric” or “ultrasonic”. If use EPS-B, D, dectector select “photoelectric”, if use EPC-S detector select “ultrasonic”.

5) Detector calibrating , coil features memory

Under Manual mode, short press [DET] button enter to “coil selecting” interface, press [LEFT] 、[RIGHT] to select coil model, and press [ESC] Exit “coil” menu, and then long press [DET] 3s and follow below procedures to detector calibrating and memory the calibrated value to selected coil model.

Key opearion	LCD display	EPS-B. EPS-C To edge detector position	EPS-D To line detector position
Long press DET key	Please remove material, and press SET key		
Then Press SET key	Calibrating..... please don’t move material	Press [LEFT] or [RIGHT] to move material, move material out of spot	Press [LEFT] or [RIGHT] to move material, making spot reflected to the material
5 seconds later	Please move material to detection area and then press SET key		
Press SET key	Calibrating..... please don’t move material	Press [LEFT] or [RIGHT] to move material, block the detector spot entirely	Press [LEFT] or [RIGHT] to move material,making the spot reflected to the line
5 seconds later select No and press SET	Calibration succeed, save to material NO. 3	• Now press SET key Detector calibrataed value of the coil will memory to selected coil model. • If calibration failed, please check the detector connection and then operate agian.	

Attentions:

*EPS-B. EPS-C detectors are used to do chasing edge detection, EPS-D detector is used to do chasing line , chasing edge detection.

*if use EPS-D detector to do line detection of two kinds colour boundary , the detector calibration shall be respectively in two kinds of color area. If for edge detection, it should do detector calibration. within and Outside the coil respectively.

6) After detector calibration, manual mode, press 、 key to to move coil edge or line to detector spot.

4. 2 Automatic Rectifying-deviation

Let MC1 switch off or Disconnect , then press AUTO key tp change manual mode to Auto mode work condition, then you can do Automatic Rectifying -deviation.

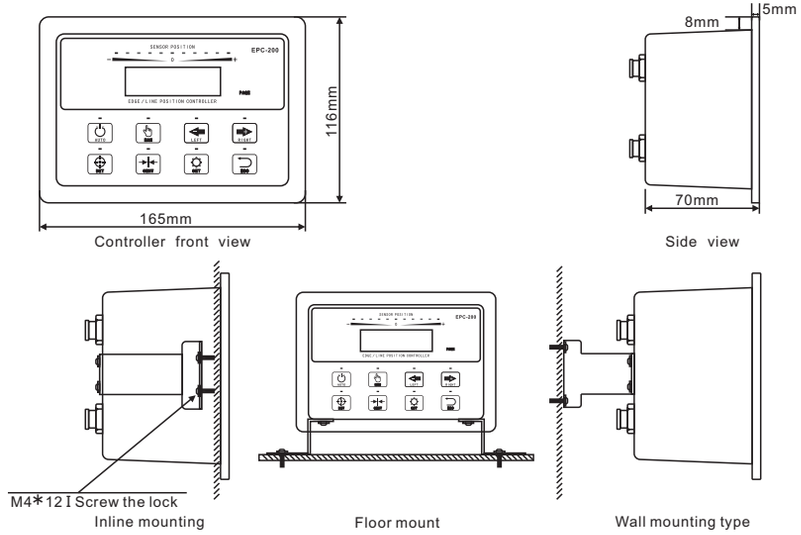
Attention

If change to Auto, then motor drive move opposite direction of chasing line or chasing edge, you can press AUTO + LEFT or RIGHT, quick change motor moving direction, in order to automatically chasing edge or line.

During automatical chasing edge or line , work is not too smooth, appear phenomenon of volatility, you can press SET + LEFT or RIGHT to change P value, or press ESC + LEFT or RIGHT to change I value in order to get to best condition of chasing edge or line.

When automatically chasing edge or line, if there's an emergency, you can connect MC1 switch, then stop hasing edge or line.

Chapter 5 installation dimension



Attention: Inline mounting hole size 151*102mm
Floor, wall mounting hole size 165*45mm

Appendix:Correction system selection

introduction

Rectifying control system is divided into two categories: analog rectification and digital correction. Analog rectification system detector output analog signal, use PI adjusting algorithm, Correction of high precision;digital correction system detector output digital switch signal, not that precision , but it can use double electric eyes to increase precision, and can also customize a high-precision single electric eye digital correction system

6.1 Analog edge position control system constitute

1. Controller: EPC200 Analog edge position controller
2. Detector:

No.	EPS-B	EPS-C	EPS-D	EPS-E
Detection type	Photoelectric correlation	Ultrasonic correlation	Aberration correlation	CCD correlation
Chasing type	Chasing edge	Chasing edge	Chasing line, edge	Chasing edge

EPS-B, EPS-D, EPS-E are photoelectric detector, EPS-C is ultrasonic detector

3. Motor drive: (suggestion)

Model	Stroke	Precision	Push power	Rated load	Max speed
EPD-202	150mm	±0.1mm	200kg	2t	16mm/s

6. 2 Digital edge position control system constitute

1. Controller: EPC100 digital edge position controller
2. Detector:

No.	EPS-B	EPS-C	EPS-A
Detection type	Photoelectric correlation	Ultrasonic correlation	Photoelectric reflection
Chasing type	Chasing edge	Chasing edge	Chasing edge

2. Motor drive:（suggestion）

Model	Stroke	Precision	Push power	Rated load	Max speed
EPD-102	150mm	≤ 1mm	150kg	1. 5t	10mm/s
EPD-103	150mm	≤ 1mm	250kg	2. 5t	10mm/s

6. 3 The application coil of ultrasonic and photoelectric sensor

Coil model	Ultrasonic sensor	Photoelectric sensor
Transparent film	√	Transparent ＜ 90%
Not transparent film	√	√
Paper	√	√
Foil	√	√
Sheet metal	√	√
Textile		√
Ventilate Material		√
Light-sensitive materials	√	
More dust environment	√	