

# Tripod Turnstile



**Series No.DWT-100**

**TECHNICAL MANUAL**

**Verb 1.0**

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# 1. SAFETY INSTRUCTIONS

ATTENTION! To ensure the safety of people, it is important that you read all the following instructions. Incorrect installation or incorrect use of the product could cause serious harm to people.

1. Carefully read the instructions before beginning to install the product.
2. Do not leave the packing materials (plastic, polystyrene, etc.) within reach of children as such materials are potential sources of danger.
3. Store this user guide for future reference.
4. This product was designed and built strictly for the use indicated in this documentation. Any other use, not expressly indicated here, could compromise the good condition/operation of the product and/or be a source of danger.
5. DELOS declines all liability caused by improper use or use other than that for which the automated system was intended.
6. Do not install the equipment in an explosive atmosphere: the presence of inflammable gas or fumes is a serious danger to safety.
7. For non-EU countries, to obtain an adequate level of safety, the Standards mentioned above must be observed, in addition to national legal regulations.
8. DELOS is not responsible for failure to observe Good Technique in the installation of the DELOS products and relating accessories or for any deformation that may occur during use.
9. Installation must be preformed in compliance with the currently Ruling Standards.
10. Before attempting any job on the system, cut out electrical power.
11. Make sure that the earthing system is perfectly constructed, and connect metal parts to it.
12. The safety devices (EN 12978 standard) protect any danger areas against mechanical movement risks.
13. Do not in any modify the components of the DELOS automated system.
14. The installer shall supply technical support, including manual operation of the turnstile

in case of an emergency, and shall hand over to the user the warnings handbook supplied with the product.

15. Do not allow children or adults to stay near the turnstile while it is operating.

16. The user must not attempt any kind of repair or direct action whatever and contact qualified personnel only.

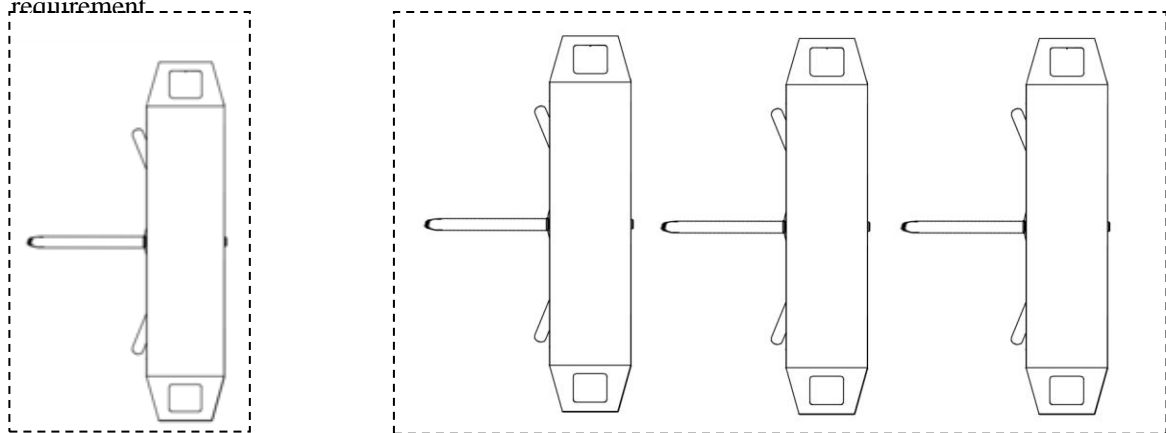
17. Anything not expressly specification in these instructions is not permitted.

## 2. DESCRIPTION

### 2.1 Description of the series and definitions

This product has been designed to control access to a site with a high level of security, can manage be-direction passenger flow in security and standard.

This tripod turnstile includes single site and or multi-machine, assembles cording project requirement.

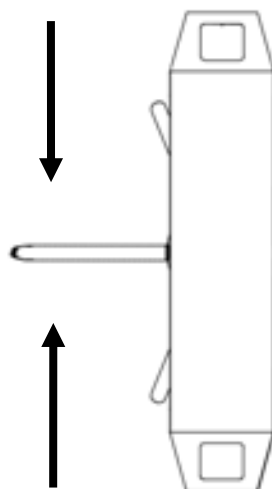


A Single machine

B Multi machine

Face the arms, we defined the left side as in direction and right side as out direction.

Left, in direction



Right, out direction

## 2.2 Location of the Components

### 2.2.1 outside parts



- 1 Top cover
- 2 Operate symbols (reader windows)
- 3 Orientation symbols
- 4 Front cover
- 5 Arms
- 6 Lock

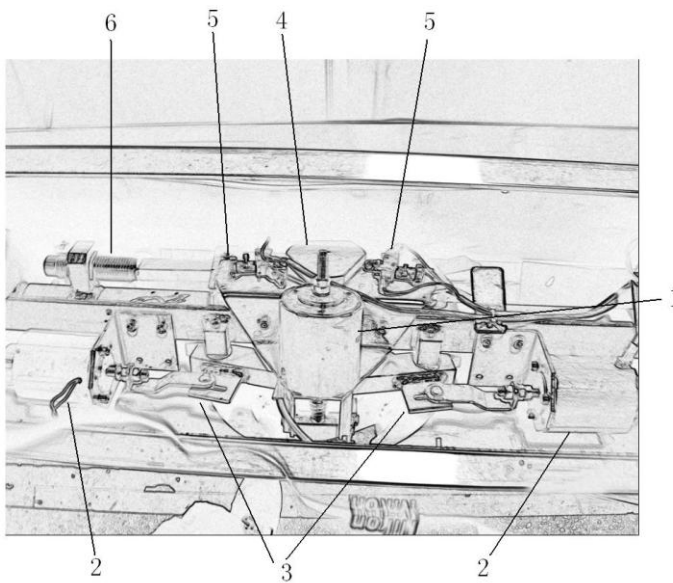
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#### Remark

This product doesn't include reader in fault, user can purchase reader by DELOS or other brand.  
More detail, see 3.2.2

Top cover only can be removed if 2 locks in top cover have been released, front only can be removed if top cover has been removed.

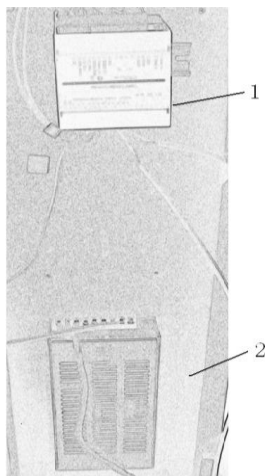
### 2.2.2 Inside mechanism



- 1 Release electromagnets
- 2 Limiter electromagnets
- 3 Limiter arms
- 4 Position cams
- 5 Counter buttons
- 6 Hydraulic buffers

More detail, see 3.3 description of mechanism.

### 2.2.3 Control parts



- 1 Main board
- 2 Power suppliers

## 2.3 Symbols Instruction

This product has two types of pictograms:

**Operate symbols (can install reader under it)** indicating the state of the authorized feedback to the user. They are located on the top cover: green track (authorized successfully) or red crosses (waiting authorization).



**Orientation symbols:** Indicating the access situation to user. This is located on the front cover and consists of a symbol representing the illuminated in 3 different situation:

- Red crosses: Passage forbidden until authorization succeeds



- Green track: Authorization succeeds, waiting the valid passage.



### 3. INSTRUCTIONS

#### 3.1 Working mode

This product has 4 types of working mode:

##### 3.1.1 Single direction authorization

Single direction authorization can be able to be divided into 4 types:

a) Free in ‘in direction’, authorization in ‘out direction’.

In this mode, the symbols like this:

Before Authorization	In	Out	After Authorization	In	Out	After Pass	In	Out
Operate symbols	↑	X		↑	↑		↑	X
Orientation symbols	↙	↘		↙	↘		↙	↘

Pass in ‘in direction’ freely, the operate symbols in ‘Out direction’ will turn green arrow after authorize successfully and turn red cross after finishing passing.

b) Free in ‘out direction’, authorization in ‘in direction’.

In this mode, the symbols like this:

Before Authorization	In	Out	After Authorization	In	Out	After Pass	In	Out
Operate symbols	X	↑		↑	↑		X	↑
Orientation symbols	↙	↘		↙	↘		↙	↘

Pass in ‘out direction’ freely, the operate symbols in ‘in direction’ will turn green arrow after authorize successfully and turn red cross after finishing passing.

c) Forbid in ‘in direction’, authorization in ‘out direction’

In this mode, the symbols like this:

Before Authorization	In	Out	After Authorization	In	Out	After Pass	In	Out
Operate symbols	X	X		X	↑		X	X
Orientation symbols	X	↘		X	↘		X	↘

Pass in ‘in direction’ is forbidden, the operate symbols in ‘Out direction’ will turn green arrow after authorize successfully and turn red cross after finishing passing.

d) Forbid in ‘out direction’, authorization in ‘in direction’

In this mode, the symbols like this:

Before Authorization	In	Out	After Authorization	In	Out	After Pass	In	Out
Operate symbols	X	X		↑	X		X	X
Orientation symbols	↙	↘		↙	X		↙	↘

Pass in ‘out direction’ is forbidden, the operate symbols in ‘in direction’ will turn green arrow

after authorize successfully and turn red cross after finishing passing.

### 3.1.2 Bi-direction authorization (default mode)

In this mode, both in and out need authorization.

When authorize in ‘in direction’, the symbol like that:

Before Authorization	In	Out	After Authorization	In	Out	After Pass	In	Out
Operate symbols	↑	X		↑	↑		↑	X
Orientation symbols	↙	↙		↙	↙		↙	↙

Operate symbols in ‘in direction’ turn green and orientation symbols turn red, means can pass by ‘in direction’; After pass finish, the operate symbols in ‘in direction’ resume red and orientation symbols turn green. Similar in ‘out direction’ pass by.

### 3.1.3 Emergency Open

In this mode, the tripod arm will drop down and all symbols will turn green.

Change mode by signal input from administrator or integration.

Emergency Open mode		
Operate symbols	↑	↑
Orientation symbols	↙	↙

### 3.1.4 Emergency Close

In this mode, the tripod arm will be locked, forbid any pass by. All symbols turn red.

Change mode by signal input from administrator or integration.

Emergency Open mode		
Operate symbols	X	X
Orientation symbols	X	X

#### Remark

More detail, see 3.4 Adjustment.

The valid time of authorization is 10s in default, if passenger doesn’t pass in 10s, device will cancel this authorization.

### 3.2 Important Notice

- 1) When reading cards, passengers are prohibited to crowd, lean against or push the arm if the light is still red, to avoid the normal operation of the device.
- 2) When the device is not in use, people are prohibited to sit on or lean against the arm to avoid unnecessary damage.
- 3) Do not directly use the device in open air or wet, corrosive environment, so as to avoid rain, moisture or corrosion to damage the device. When the device is used outdoors, rain-protection facilities such as big umbrella should be installed.
- 4) When passing, passengers only need to slightly push the arm instead of exerting too much.
- 5) When power off, people are prohibited to stand under the arm to avoid hurt if the arm falls.
- 6) Do not allow child or pet pass through alone.
- 7) Do not use this device when thunders, as to avoid its damage.
- 8) Do make sure that the grounding terminal is reliable, so as not to harm personal safety.

## 4. INSTALLATION AND DEBUGGING

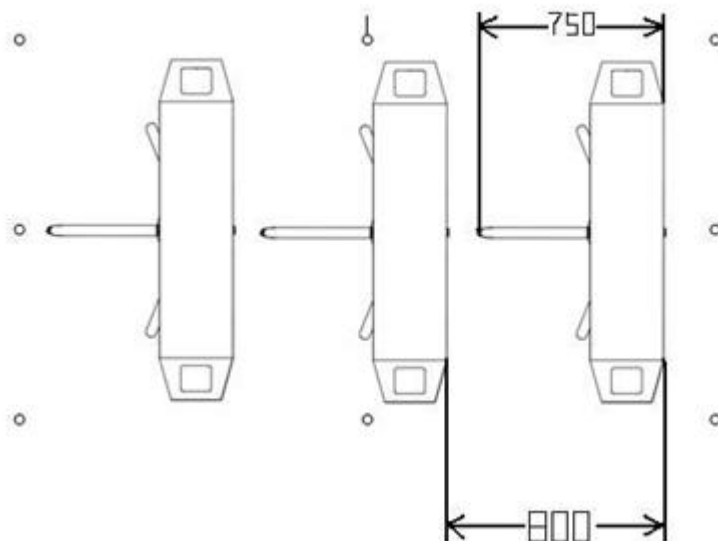
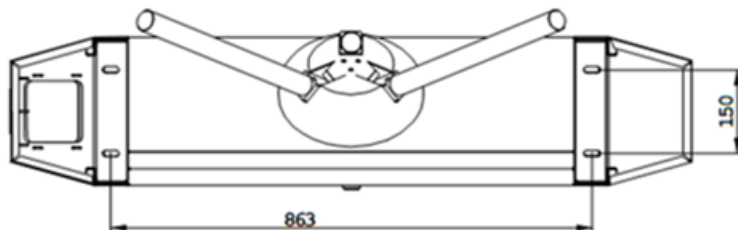
### 4.1 Installation environment and requirements

- 1) Since the running state of this system requires preciseness, the ground needs to be level and without any obvious hollow, whether indoor or outdoor.
- 2) Good rain and sun protection measures are needed outdoors.
- 3) Necessary pre-construction work of civil engineering pipeline are needed.

### 4.2 Installation

#### 4.2.1 The fixation of casing

1. Check out the parts and accessories according to the packing list.
2. Determine the installation location, depending on the service site and system components.
3. As showed in the following two diagrams, determine the installation hole sites and embed four M10 expansion bolts at the installation location.



- 4) Put the cable in PVC pipe line, then bury it with cement to the appropriate location.

 Remark

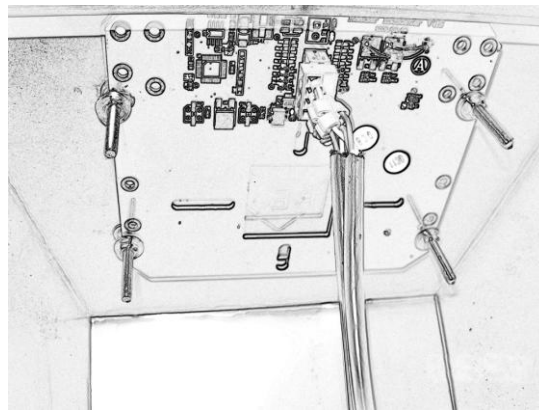
The depth of buried PVC pipe line should be more than 60mm and the height above ground should be more than 50mm. The outlet should be back bending in order to prevent water inflowing the pipe line.

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- 5) Put the special keys into the two keyholes at the top cover, press in and then counter-clockwise rotation by 90 °, remove the top cover, unload the sleeve, aim the base bolt holes to the foundation bolt, and finally tighten the screw nut.
- 6) Connect the pre-embedded 220V power cord to the turnstiles' power source, and positive and negative can be judged by the marks of the power supply.

#### 4.2.2 Other Installation

1) Screw out the nuts which under the lamp at the top of the sleeve, then fix the card readers and other external devices to the lamp, finally tighten the screws.



2) Set the sleeve back to the body case, put the top cover, infix the key into the keyhole, and clockwise rotate by 90 ° clockwise to lock up when pressing.

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 Remark

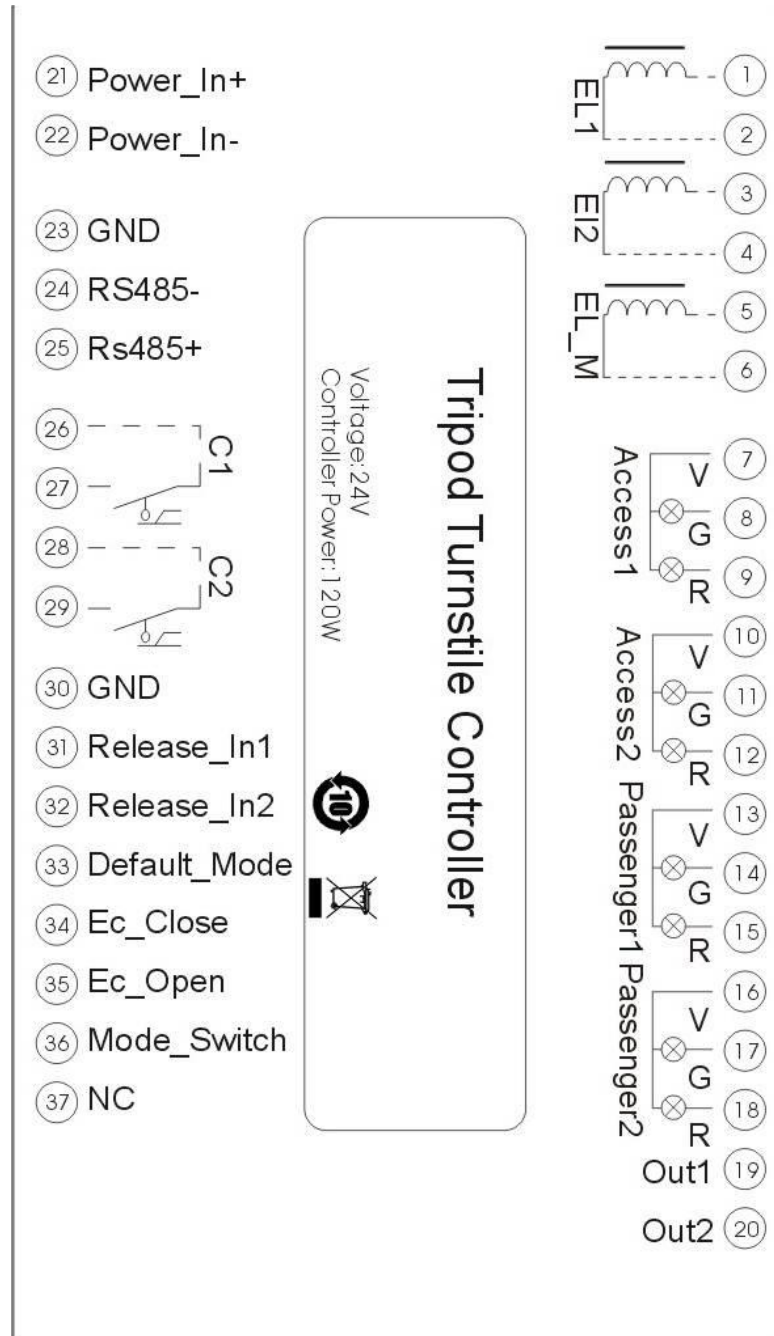
1) All of the above operations shall be operated in case of power- down, and should ensure that the earth wire be correctly and solidly connected

2) When the selected devices are used outdoors, a 100mm ~ 200mm high cement installation platform should be build at the place where the installation will take place, for the purpose of moist insulation. At the same time, rain protection facilities such as big umbrella should be installed at the top of the equipments. is It is strictly prohibited to directly place the device in the open.

3) Be careful not to damage the connection between body case, aisle light and passage light when remove the sleeve, and the connection can be disconnect according to the actual situation.

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### 4.2.3 Wiring Instructions of the Control Board



1	24V Output (Direction One: Electromagnet +) P3.31	2	Direction One Electromagnet (Direction One: Electromagnet -) P3.31
3	24V Output (Direction Two: Electromagnet +) P3.31	4	Direction Two: Electromagnet (Direction Two: Electromagnet-) P3.31
5	24V Output (Drop Arm Electromagnet +) P3.31	6	Pole electromagnet (Arm electromagnet -) P3.31
7	24V Output	8	Direction One Operate Symbol Green
9	Direction One Operate Symbol Red	10	24V Output
11	Direction Two Operate Symbol Green	12	Direction Two Operate Symbol Red
13	24V Output	14	Direction One Orientation Symbols Green
15	Direction One Orientation Symbols Red	16	24V Output
17	Direction Two Orientation Symbols Green	18	Direction Two Orientation Symbols Red
19	Direction One Pass By Output	20	Direction Two Pass By Output
21	24V+ Input (circuit board main power supply input port)	22	24V- Input (circuit board main power supply input port)
23	GND	24	RS485- (communication port, connect PC 485-)
25	RS485+ (communication port, connect PC 485+)	26	GND
27	Direction One: Count In (connect to the counter switch above the electromagnet)	28	Direction Two: Count In (connect to the counter switch above the electromagnet)
29	GND	30	GND
31	Direction One Open Signal Input	32	Direction Two Open Signal Input
33	Default Mode	34	Emergency Close
35	Emergency Open	36	Switch to one-way mode
37	NC (Reserve function, undefined)		

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 Remark

Input signal requirements: dry contact signal, TTL signal, or a low pulse signal with pulse width greater than 100 milliseconds.

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 Remark

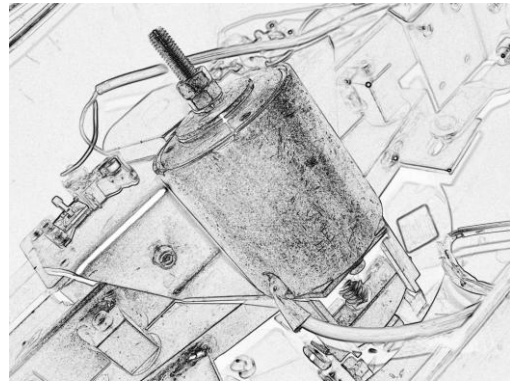
When click the black button in the control panel, the operation of the turnstile can be carried out (for debugging). Press once and the rod will rotate by 120° in a specified direction within an effective time (means one person can be passed). Shell panels have the specific eagle logos of

each input and output port.

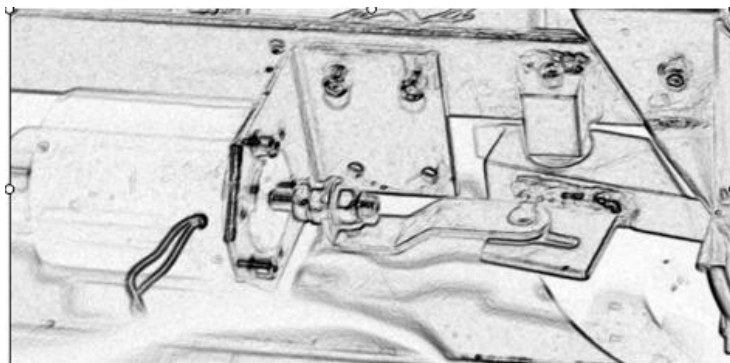
## 4.3 Mechanism Description

### 4.3.1 Drop Arm Electromagnet

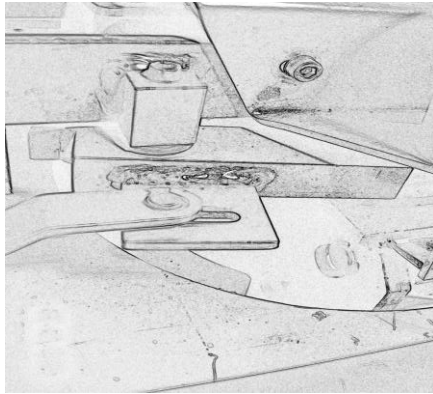
There are three electromagnets, with one drop electromagnet and the other two limiter electromagnets. The drop electromagnet is used to control the falling of the arm. When starting the turnstile, this electromagnet will always be energized, which means that the electromagnet is magnetic. Rise arm in this time will fix the arm in horizontal position. When power off, the electromagnet loses its magnetism, the arm will automatically fall under gravity



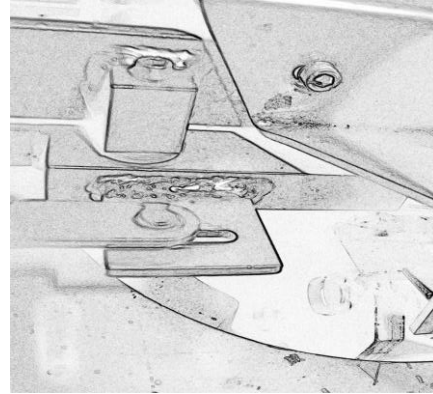
### 4.3.2 Limiter Arm and Limiter Electromagnet



From the above picture we can see that the limiter arm is a rectangular piece of iron that connects with the central axis of the electromagnet, which is used to limit the rotation of the turntable. When it is not energized, the arm will be pulled up at the driving of the central axis (see picture 2-1) and there will be no touch between the arm and rolling ball of the turntable, which means that the limitation can not take place. When the electromagnet is energized, it can not drive to pull up the arm and the arm will always in a horizontal position under gravity (seen figure 2-2). Now, the limiter arm will limit the rotation of the turntable, thus the arm.



2-1

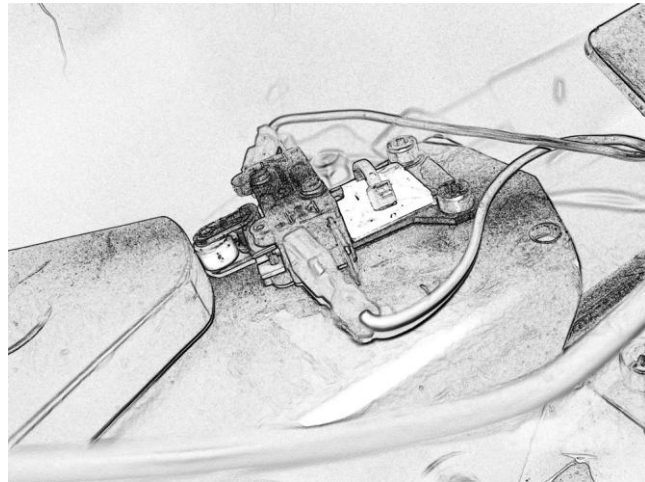


2-2

### 4.3.3 Count Switch and Positioning Cam

Count switch includes a travel switch and a counter. Travel switch, also known as limit switch or position switch, is a control machine which switches the circuit working states according to the location of the moving parts.

The action principle is similar with the control button. Counter is the electronic device used for counting, when the trip switch is triggered once, the counter counts plus 1.



Count switch is used to count the number of passing people. The rotation of the arm will drive the rotation of position cam, and when the cam angle touches the travel switch of that direction (i.e. the arm rotates by  $60^\circ$ ), the trip switch is triggered and the counter counts plus one. When the count reaches the allowed passing number, a signal will be given to energize the limiter electromagnet to realize the effect of limiting passing. For example, when two people swipe cards in a row, there will be a two-people-passing permission. When the first passed, the counter counts plus one, no signal will be given; when the second passed, the enumerated data equals to the allowed passing number, and the limiter arm will be locked when the electromagnetic lock accepts the limiting signal, now the third person cannot pass through.

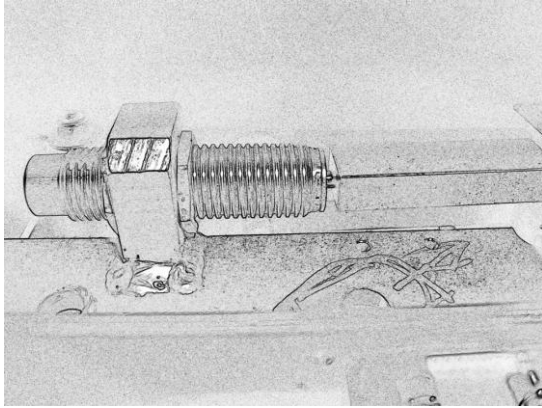
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#### Remark

When the arm rotates by  $60^\circ$  and triggers the count switch, it can not be able to return to the original

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#### 4.3.4 Hydraulic Shock Absorber

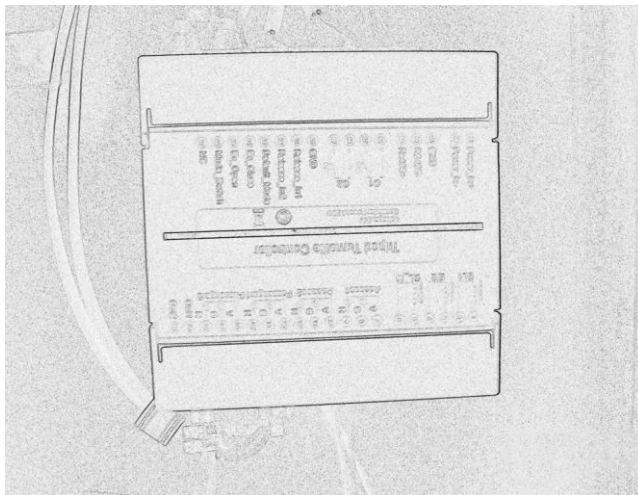


Shock absorber is mainly composed by springs and dampers, which is used for reducing vibration. As for different materials, damper can be mainly classified as hydraulic and pneumatic. There is also a variable-damping shock absorber. This product uses a hydraulic damper, so the absorber is hydraulic. Spring reduces immediately after the external shock and restores immediately when the external shock disappears,

which shake the arm. Damper functions to adjust the spring force, and buffer the whole rotating process. During the first half of the rotation (the lifting of the position cam), damper expands; while in the latter half of the rotation process (down), damper contracts. Throughout the rotation process, the damper plays a buffer role in proportion according to rotation speed, and can adjust the scale of oil pressure according to the force size. With the help of hydraulic shock absorber, during the process of rotation, the arm will be quiet, non-impact and quick slow-down.

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#### 4.4 Debugging



Turn the bottom of the panel as showed in the above figure up, you can see a small black button on the main control board. It is used for debugging, press the button once, release one into the direction.

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#### Debugging Process :

1. After the line is correctly connected, start the energizing. The turnstile activates as the default

mode (that is, mutual authentication mode), then the lights in both directions are green, and the operate symbols are red.

2. Take down the panel of the main control board, press the test button (the black button on the control board), and the entering direction can only allow one person to pass. The changes of the lights can consult the bi-directional mod (figure 2.1.2) .
3. Offer a valid signal to the cutover port of no.36 mode, means grounding no.36, then the turnstile will be switched to one way mode, four situations will be appeared:

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  - a) Enter release and exit swiping card.
  - b) Enter swiping card and exit release.
  - c) Enter forbid and exit swiping card.
  - d) Enter swiping card and exit forbid.

---
4. When that port receives the fifth signal, the turnstile will return to the default mode.
5. Offer a valid signal to NO.34 Emergency Close port, means grounding no.34 (can connect a button), and the turnstile will change to emergency close mode and no one is allowed to pass through.
6. Offer No.35 Emergency Open interface a valid signal, means grounding no.35 (can connect a button),and the turnstile will change to emergency open mode. Now, the arm will automatically fall and the both direction is pass free.
7. Offer NO.33 Emergency Open interface a valid signal, means grounding no.33 (can connect a button), and the turnstile changes to default mode.

The turnstile work is in good working order if the above operations are normal

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### Remark

The above modes switches will not be saved up when power off, it means that the turnstile activates in default mode when restart.

The changes through software will be saved, which means that the working mode changed by the software will still be used when restarting.

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## 5. DAILY MAINTENANCE

- 1).For the outside shell is made of stainless steel, you must often use soft fabric to wipe it to make it clean and bright. Not use hard object to wipe the shell for it will cause some scratches and affect the appearance. Water washing should be prohibited so as to avoid short-circuit of the electric control system and protect the equipment.
- 2).Regularly inspecting the connecting situation of each moving device. If you have found loose nuts, screws and other fasteners, tighten them in time to avoid operating failure caused by long-time running.
- 3)Regular inspection grounding terminal to ensure reliable access.
- 4) Regularly check the connection of the line connector and the wiring point to ensure reliable connection.

## 6. COMMON FAULTS AND SOLUTIONS

### 1) When energizing, operate symbols, orientation symbols cannot operate and the certification can not be progressed.

This fault is mainly caused by the power system. You should carefully check to make sure that whether the protective tube is damaged, the connector is loosed and the power cable is disconnected.

### 2) The arm cannot lift normally when energizing or the arm falls down when in operation

This fault is mainly caused by the damage of drop electromagnet or disconnection. You should check whether the drop electromagnet is in normal operation, if do, it must be hot.

### 3) One card-swiping can allow many people to pass through

This fault is caused mainly by the two following reasons:

Limiting electromagnet and arm

First to check whether the electromagnet lock is in normal operation, if do, it must be hot. Then to check whether the limiter arm is stuck and whether can normally fall down.

Position cam and count switch

Check whether the contact between position cam and count switch is good, whether the count switch can be effectively triggered when the position cam is rotating.

### 4) Cannot be normally certificated


This fault is mainly caused by the loosening of the connection between authentication devices and main controller, or the damage of authentication devices. If the connection has no problem, just replace the card reader or other devices, and the problem can be solved.

### 5) The verification is permitted, orientation symbols indicates passing, but you can still not pass through

Check carefully whether the limiting electromagnet is in normal operation, whether the limiter arm is stuck. If the magnet is in normal operation, it must be hot.

### 6) Other irregular situations

Check whether the flat cable is loosed.

 Remark

If you come across any unresolved issues during the process of using, please contact us. Our technical staff will be patient to answer your questions and help you solve the problems.

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