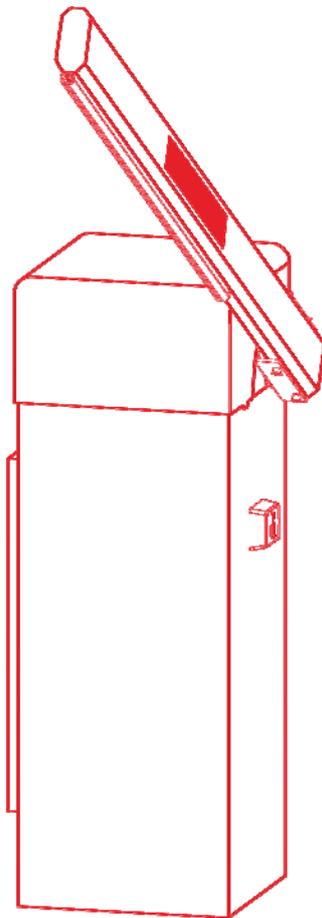


# Installation Manual (V1.6)

## **PAB-B Beyond Series**

### Barrier Gate



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# 1 Declaration

- The original language is English.
- Machine noise: less than 60db.
- Not more than 1000m above sea level, can not be used in explosive environment.
- EU single-phase voltage is 230V.

## **EC DECLARATION OF CONFORMITY**



According to the following EC Directives

- Low Voltage Directive: 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC

**The undersigned, Tan Qi Hua, representing Xiamen Dashou Technology Ltd./ The 4th Floor, No. 866, Yuan Shan South Road, Xiamen, China 361009. Declares that the machine described hereafter:**

**Product name: Barrier Gate**

**Model: PAB-B-NSN, PAB-B-NSL, PAB-B-HSN, PAB-B-HSL, PAB-B-NCN, PAB-B-NFN**

Provided that it is used and maintained in accordance with the general accepted codes of good practice and the recommendations of the instructions manual, meet the essential safety and health requirements of Low Voltage Directive and Electromagnetic Compatibility Directive.

Person authorised to compile the technical file: Qihua Tan, The 4th Floor, No. 866, Yuan Shan South Road, Xiamen, China 361009

For the most specific risks of this machine, safety and compliance with the essential requirements of the Directive has been based on elements of:

**EN 61000-6-1**

**EN 61000-6-3**

**EN 61000-3-2**

**EN 61000-3-3**

**EN 60335-2**

**EN60335-1**

Date: 2011-06-25

Signature: Tan Qi Hua

Qualification: General Manager

## 2 Safety

### 2.1 General safety information

This PAB-B Beyond series barrier was designed, built and tested using advanced technology and will have left our factory only after having satisfied stringent safety and reliability criteria. Nevertheless the barrier system can represent a risk to persons and property if it is not operated correctly. These operating instructions must therefore be read in their entirety and all safety information contained therein must be complied with.

The manufacturer shall refuse to accept liability and shall withdraw warranty cover if this barrier system is used incorrectly or is used for a purpose for which it was not intended.

### 2.2 Intended Use

The PAB-B Beyond series barriers are designed for use in controlling the entrance and exit lanes of car parks areas, multi-storey car parks and other vehicular access routes.

It is not permitted to use these barrier systems for any other purpose. Modifications or changes to the barrier or its control modules are prohibited. Only original Dashou spare parts and accessories may be used.

### 2.3 Operational Safety



A safe clearance distance, of at least 500 mm, must be provided between the tip of the barrier boom and the closest solid obstacle (building, wall, fence etc.). The barrier activating elements must be installed at a position that provides a direct

line of site to the barrier.

The motion of the barrier boom must be directly visible to the person operating the barrier. Whilst the barrier boom is in motion, persons, and other objects, are prohibited from being in the immediate vicinity of the barrier.

Automated systems must be provided with a specially marked pedestrian walkway (actual location to be determined on-site).

If the barrier and operating elements have been installed, and connected in a fixed mains power supply, an all-pole, lockable, electrical master switch must be used.

The assembly and installation instructions must be complied with in their entirety.

Permission must be sought from Dashou, prior to any alterations. The barrier boom fixture is designed to withstand wind velocities of up to a maximum of 10 on the Beaufort scale (= 500 N/m<sup>2</sup>). If higher wind velocities are anticipated, a modified barrier boom fixture must first be agreed to by Dashou.

Barrier booms longer than 3.5 m require a supporting bracket.

All electrical connections, wiring work and exchange of any components may only be performed by appropriately trained electrical technicians.

Before opening any electrical or electronic modules within the barrier, they must first be disconnected from the mains power supply.

Technical modifications or changes, to the barrier system, are prohibited.

## **2.4 Technical Developments**

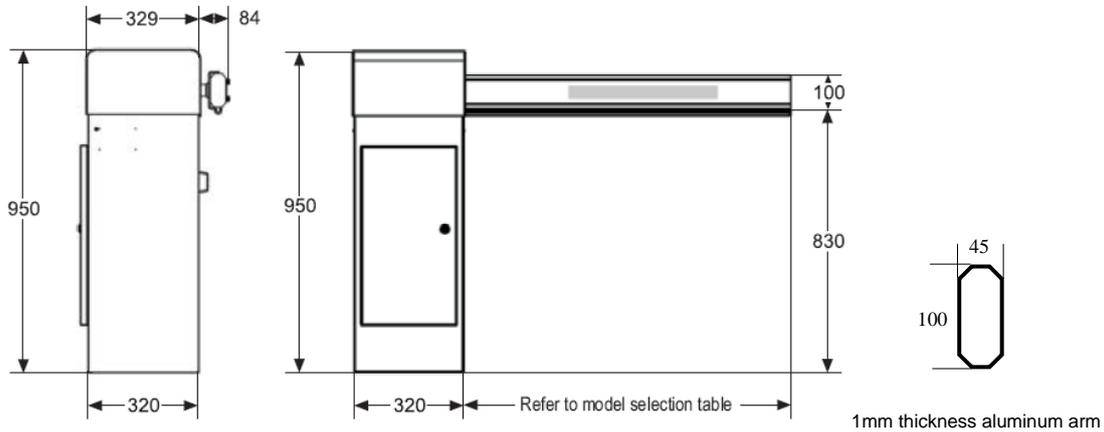
The manufacturer reserves the right to modify, without prior notice, the technical specifications in order to accommodate the latest technical developments. Dashou is willing to provide information on the status of existing operating instructions and on any alterations and extensions that may be relevant.

## **2.5 Warranty**

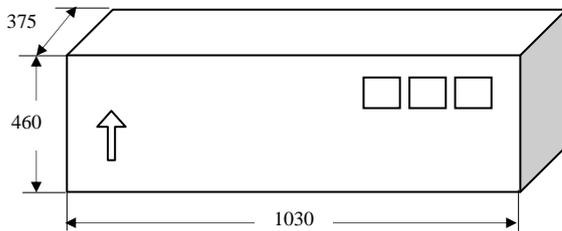
Dashou provides a warranty on its barriers that covers all mechanical and electrical components, but excludes specific parts subject to wear, for a period of 12 months warranty from discharging date of shipment, provided that the operating instructions have been complied with, no unauthorized servicing of machine components has taken place, and that no mechanical damage to the machines is evident. Warranty does not cover problems arising after above durations. Besides, the warranty terms agreed between the distributors and their customers are beyond the liability of DASHOU

### 3 Packing

PAB-B Beyond barrier housing uses 2cm thick honeycomb carton for packaging, and boom arm uses bubble plastic film for packaging (poly wood package will be provided upon customer`s cost if required). Below parts are the dimensions of the packing box and barrier:



**Dimensions of barrier housing & boom arm (mm)**



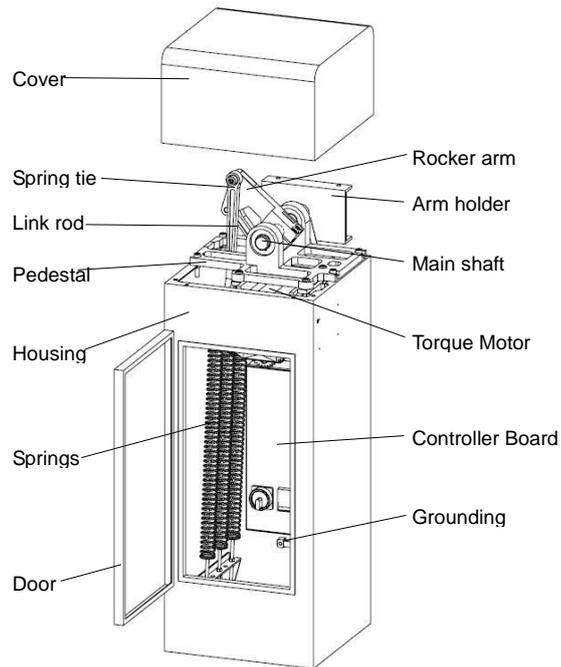
**Dimensions of packing box (mm)**

Following accessories should exist when open the package:

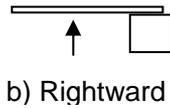
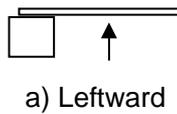
- 4PCS. M16 X 150mm expansion bolt used to fix barrier housing
- 4 PCS. M8 X 60mm or M8 X 20mm hexangular lock screw used to assembly boom
- 1PCS spared balance spring
- 1PCS Boom Lining for boom fixing
- 1PCS end cap of boom
- 2PCS. capacitors
- 1PCS key to barrier housing door
- Other optional accessories if customers buy

## 4 Installation

### 4.1 Structure Of Barrier

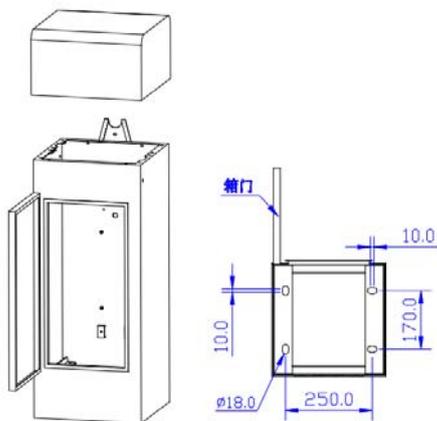


### 4.2 Arm Installation Direction

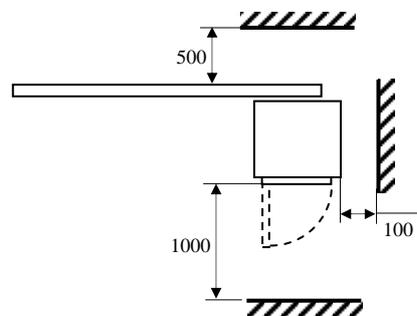


### 4.3 Foundation

To ensure that the barrier gate is working stably under all operating conditions, a foundation with the following dimensions must be provided:



Foundation diagram (mm)

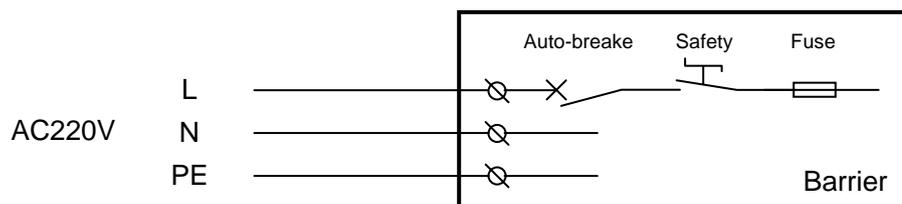


Minimum installation space

1. Fix those 4PCS expansion bolt (M16\*150) on the concrete island according to above Foundation Diagram in “4.3 Foundation”;
2. Align the bottom hole of the barrier to those 4PCS expansion bolt, lock and fasten them by nuts. Please be sure that the barrier can work steady.

#### 4.4 Power Connection

PAB-B Beyond barrier uses AC 220±10% & 50/60HZ input as its power supply. A fuse has integrated by barrier controller unit. For the safety and ease of maintenance and repair, barrier has set the auto-breaker and safety switch in power supply circuit.



### 5 Specification, Features & Function

#### 5.1 Technical specification

<b>Power</b>	AC 220±10%, 50/60HZ, Max.0.5A
<b>Motor (AC 220±10%)</b>	70W concreted decelerating torque motor
<b>Control unit</b>	Intel 80C51 MCU, 40Mhz basic frequency, controlled silicon motor control, multiplexing 0~5V switch input, multi relay output; RS485 interface, WatchDog shut down protect.
<b>Loop detector input</b>	Either active or passive input; 0~0.5V or short as logic 0, 3V~24V or open as logic 1. The input has RC hardware filter and 10 ms software filter, the width of pulse required to be over 100 ms, 1 fall to 0 trig to protect from crash to obstructer, and 0 to 1 trig barrier boom to move up.
<b>Infrared Photocell input</b>	Either active or passive input, 0~0.5V or short as logic 0, 3V~24V or open as logic 1. The input has RC hardware filter and 10 ms software filter, the width of pulse required to be over 100 ms, 1 fall to 0 trig to protect from crash to obstructer, and 0 to 1 trig barrier boom to move up.
<b>Up &amp; Down input</b>	Either active or passive input, 0~0.5V or short as logic 0, 3V~24V or open as logic 1. The input has RC hardware filter and 10 ms software filter, the width of pulse required to be over 100 ms, 1 fall to 0 trig to protect from crash to obstructer, and 0 to 1 trig barrier boom to move up.

<b>Traffic light output</b>	AC 220V traffic power output, maximum current 0.5A. Barrier boom move >2/3 relay works and <2/3 release.
<b>Loop detector Syn.output</b>	Relay NO output, AC 220V/0.5A, DV 12/1A
<b>Wireless remoter(optional)</b>	Two button remote transmitter, distance > 20m
<b>RS 485 interface</b>	Semi-duplex RS485 interface, switch time 10 ms, 8 data bits, 1 stop bit, no checksum, 9600 bps, ASCII decimal code.
<b>Opening/closing time</b>	0.8 / 1.5 / 2 / 3 / 4 second optional
<b>Spring</b>	Barrier boom will keep balance in 30~45°, >45° will move 'up' automatically, <30° will move 'down' automatically
<b>Arm</b>	45x100mm Aluminum alloy, max. 6m
<b>Arm direction</b>	Leftward or rightward optional
<b>Housing</b>	2mm cold-roller sheet, anti-UV light and static plating, IP 54
<b>Housing dimension</b>	950mmx329mmx320mm
<b>Gross Weight</b>	Around 55 KG
<b>Operating temperature</b>	-25℃ -55℃
<b>Humidity</b>	10%-95%

## 5.2 Function & Features

### 5.2.1 Automatically check the operation status and report failure.

List of failure code as below:

E1---Pulse angle sensor or motor failure;

E3---'up' input failure (input remains more than 10 sec. regarding as fail)

E4---'down' input failure (input remains more than 10 sec. regarding as fail)

E5---"1# Loop Detector" input failure (input remain more than 10 sec. regarding as fail)

E6---"Infrared photo cell" input failure (input remain more than 10 sec. regarding as fail)

E7---Stop button of remoter transmitter failure (keeping pressing stop button more than 10 sec. regarding as fail)

EF---Always-on mode

### 5.2.2 Up and Down control

Be able to go up (down) when the barrier boom is moving down (up) without stop process. Three ways to control the barrier movement:

- 'Up' and 'Down' inputs by a push button
- Remote control
- RS485 serial command.

### **5.2.3 Anti-collision protects boom arm (optional)**

Once anti-collision mechanism installed, it will protect the boom arm not to be damaged once boom arm was collided by a vehicle.

### **5.2.4 Safety--- Anti-hit by pressure resistance bounce**

While moving down, boom arm will immediately go back to vertical position once it is obstructed by an imposed force, which protects the vehicle or person not to be hit by boom arm. The sensitivity is adjustable.

**Note:** This function does not work when the angle is  $<9^\circ$  both in vertical and horizontal position.

### **5.2.5 Safety--- Anti-hit by Loop Detector (Optional)**

Suppose 1# loop detector is connected to the barrier gate. While barrier boom moving down, if a coming vehicle was detected to be existing on the ground induction coil (to be connected to 1# loop detector), the barrier boom will go back to vertical position immediately until loop input was dismissed and then the barrier boom will go down immediately.

**Note:** This function does not work when barrier boom horizontal angle is  $<9^\circ$ .

### **5.2.6 Safety--- Anti-hit by IR photocell (Optional)**

Suppose a Photo Cell is connected to the barrier gate. While barrier boom moving down, if infrared transportation between transmitter and receiver is blocked by human or vehicle, the barrier arm will go back to vertical position immediately. The arm will automatically close once the infrared transportation recovers.

**Note:** This function does not work when barrier boom horizontal angle is  $<9^\circ$ .

### **5.2.7 Double safety--- Anti-hit by Loop Detector & IR photocell (Optional)**

To double protect a vehicle by connecting a loop detector and a IR photocell to barrier gate. While barrier boom moving down, if the infrared transportation between transmitter and receiver was blocked by a coming vehicle, or the coming vehicle was detected to be existing on the ground induction coil, or both happened, the barrier arm will go back to vertical position immediately. The arm will automatically & immediately close once the infrared transportation recovers and at the same time the vehicle has already passed through the ground induction coil.

### **5.2.8 Safety--- Anti-hit by "Opening Priority"**

If a vehicle is coming while boom arm moving down, the boom arm will immediately go back to vertical position once a manual open command is given by guard by the push button or remote transmitter, which protect the vehicle not to be hit by boom arm.

### **5.2.9 Closing Priority**

While boom arm moving up, the boom arm will immediately go down once a manual close command is given by guard by the push button or remote transmitter.

#### **5.2.10 Automatically close after the given time**

Once this function is set "ON", the barrier will automatically close after given time (1-90 seconds adjustable) if there is no vehicle passed after barrier open.

#### **5.2.11 Automatically Close by 1# loop detector (Optional)**

If 1# loop detector is connected to barrier gate (connect 1# loop detector to "Loop 1" terminal of controller board. Refer to 6.4 for details), after vehicle passed the barrier will automatically close once the loop input was triggered

#### **5.2.12 Automatically open by 2# loop detector (Optional)**

If 2# loop detector is connected to barrier gate (connect 2# loop detector to "Loop 2" terminal of controller board. Refer to 6.4 for details), when barrier boom is in horizontal position, the barrier boom will go up immediately once the loop input was triggered

#### **5.2.13 Always-open mode (Optional)**

Keep continuously pressing "Stop" button of remote transmitter for 3 seconds, boom arm will go up to vertical position and stay there until again keep pressing "Close" button of remoter transmitter for 3 sec. to finish always-open mode.

Or RS485 command was set at always-open mode, the barrier will ignore all 'close' command and stay at the vertical position , unless the status changed.

#### **5.2.14 Traffic light control (Optional)**

When barrier boom go up more than 2/3, the relay shorted, the port connected to the green light output will be AC 220V, the port connected to the red light will no output; When barrier boom go down more than 1/3, the green light will no output, and the red light output will be AC 220V.

#### **5.2.15 Manually control in case of no power**

Once power is off, just open the cabinet and manually control the barrier by a gear mechanism. Also barrier boom can be manually locked in any position between horizontal and vertical by pulling out the black plastic "lock/unlock rod" which is located at the back of motor, the lock status will remain until unlock manually. Push down the black plastic "lock/unlock rod" to unlock the barrier.

**Warning:** Not allowed to use the function when power on, may hurt you hand and damage the motor.

#### **5.2.16 Boom to open up fully or close down in case of power failure (Optional)**

If power is suddenly off while boom closing, boom will automatically close down fully if the angle between boom and vertical plane beyond 45 degree. If power failure occurs during boom opening, boom will automatically continue to open up fully if the angle between boom and level surface beyond 45 degrees.

### 5.2.17 Anti-condensation in cold climate

The barrier remains low power consumption even without closing and opening input, which will keep the motor in normal temperature. The lubricant will not be frozen so that the barrier will keep working in frozen environment

### 5.2.18 Transparent plastic covers on Control Board

A transparent plastic covers on the Control Board to makes Control Board water proof and dust proof, also protects operator.

## 6 Operation

### 6.1 Safety tips

Prevent smashing by boom arm: don't stand under the boom arm while it is moving down.



Prevent electric shock: barrier using non-secure AC220V as power supply, the wiring terminals and control board will be electrified with non-secure voltage after power, don't touch these parts after power.

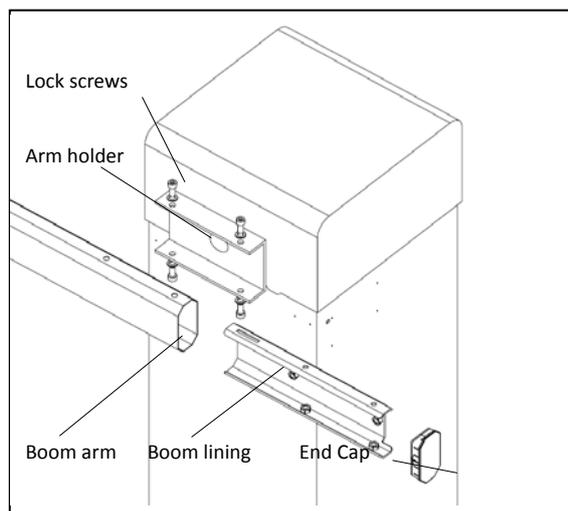


Prevent mechanical injury: there are many exposed mechanical parts will have dislocation movement while barrier is at work. don't touch these parts while at work.



### 6.2 Boom arm assembly

Insert the boom lining into the boom arm and align the four mounting holes at the upper and lower. Then, put the boom arm into the boom holder and re-align the four mounting holes at the upper and lower. Lock and fasten the boom arm using 4pcs boom locking screws, and finally push the boom cover into the boom arm.

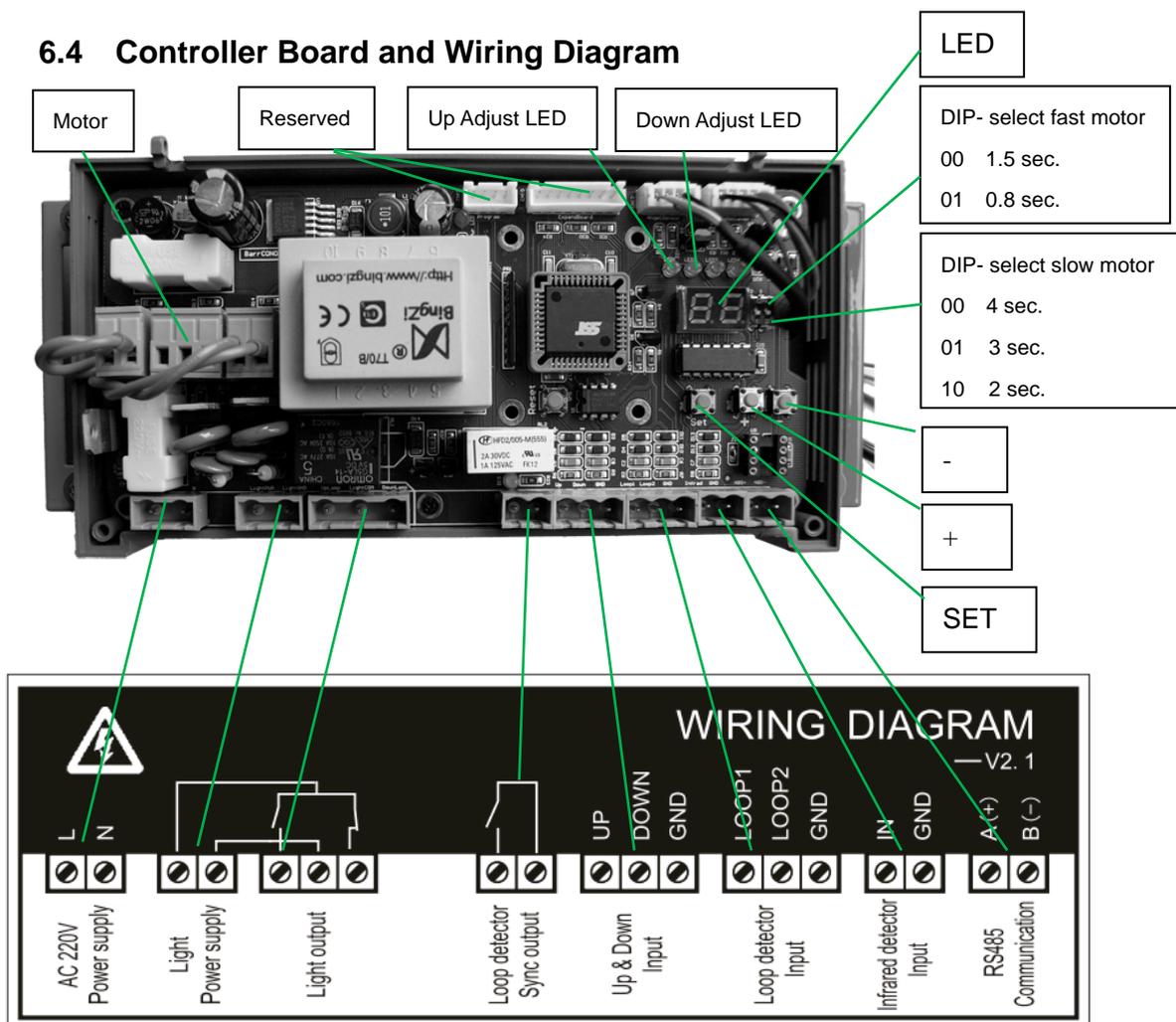


### 6.3 Adjust the boom length

In the factory, boom length and running parameters have been adjusted and programmed well according to the boom length of customer requirements. If you need re-adjust the boom length, you must firstly adjust the spring balance and then program the parameters according to the following steps.

- 1) Under status of Power-off, remove the boom from the barrier gate and cut boom to desired length and then assembled to barrier gate. (Refer to 6.2 Boom arm assembly)
- 2) Power-off the barrier gate, select the appropriate quantity of balance spring according to boom length and adjust the spring tightness so that the boom can maintain static balance at 45 degrees.
- 3) Program parameters: power-on the barrier gate, repeatedly control the barrier up and down till the barrier gate work steadily. The controller board will automatically adjust the parameter values till it reaches its optimal level. At first, the boom movement may not be stable because of inappropriate parameter values, with the up and down times increasing, the boom movement will be gradually smooth. It means that parameters have been automatically programmed well when both Up-adjust and Down-adjust LED indicator goes out.

### 6.4 Controller Board and Wiring Diagram



## 6.5 Parameter programming

There are three buttons saying "SET", "+", "-" on the control unit.

In normal condition '+' used for manually 'up' control, '-' used for manually 'down' control, numeric LED shows the barrier arm movement status ('0' for vertical, around '96' for horizontal) or the failure code.

- **Enter Programming mode:** Switch on 'SET' first and then '+' to start the program set up, the first default display will be function '1' (F1);
- **Select function:** In the status of '1', every time you switch on 'SET', the No. will add 1, from 1 to 9 and cycling. See below function code.
- **Set Parameter:** Under the selected function, within 10 sec. switch on '+' to increase parameter value, or switch on '-' to decrease value. Switch on 'SET' to save and return to "select function" status.
- **Exit Programming mode:** Firstly switch on 'SET' and then '-' to exit programming mode, or it will exit automatically if no input for more than 30s during programming.

Function code:

**F1---'UP' optimize** (users no need to set, wrong or inappropriate value may result in arm strong shaking)

**F2---'Down' optimize;** (users no need to set, wrong or inappropriate value may result in arm strong shaking)

**F3---Threshold value of pressure resistance bounce.** Value 12~99, the sensitivity decreases with the value increasing, this function shut down at 99. (Default: 50)

**F4---Address:** 1~99. (Default: 99)

**F5---Automatic close in given time.** Value 1-99 sec., this function shut down at 91-99 sec. (Default 99)

**F9--- Activate or close function of "Automatic adjusting parameter":**

0=automatic adjusting parameter; 1=no automatic adjusting parameter

## 6.6 Circuit self-test

Controller self-test the exception automatically while at work and report it according to the priority. Fault codes are as follows:

E1---Pulse angle sensor or motor failure;

E3---'up' input failure (input remains more than 10 sec. regarding as fail)

E4---'down' input failure (input remains more than 10 sec. regarding as fail)

E5---"1# Loop Detector" input failure (input remain more than 10 sec. regarding as fail)

E6---"Infrared photo cell" input failure (input remain more than 10 sec. regarding as fail)

E7---Stop button of remoter transmitter failure (keeping pressing stop button more than 10 sec. regarding as fail)

EF---Always-on mode

## 6.7 Manual lock the boom arm

Barrier's boom arm can be locked in anywhere between horizontal and vertical, pull out the black plastic "lock/unlock rod" that is at the back of the motor to the locked position while motor stopped, the boom arm then is locked even if powered. To release the locked arm, should push in the black plastic "lock/unlock rod" while in power off state.

**Warning: Do not use this function under power on, if not, it will make hand injury and serious motor damages.**

## 7 Serial control command

No-isolate semi-duplex RS485 interface, switch time 10 ms, 8 data bits, 1 stop bit, no checksum, 9600 bps, ASCII decimal code.

Response time <20 ms(the time between receiving the command and response). The response defect rate is below 1000 ppm.

"\$" is the start character, "!" is the start character of answer, "\r" is the end character of frame. "00" is the address for broadcasting, only execute no answer.

- 'Up': \$AAU\r. AA is the address.  
Answer: !AA\r. AA is the address.
- 'Down': \$AAD\r AA is the address.  
Answer: !AA\r. AA is the address.
- Go through mode: \$AAP1\r. AA is the address.  
Answer: !AA\r. AA is the address.
- Exit go through mode: \$AAP0\r. AA is the address.  
Answer: !AA\r. AA is the address.
- Position check: \$AAK\r. AA is the address. (Do not support the broadcasting address)  
Answer: !AADNN\r. AA is the address. D shows the mode( U 'up', D 'down', P 'go through'), NN shows the position angle(0~96, 0 is vertical position and 96 is the horizontal position)
- Parameter check: \$AARN\r, AA is the address. N is the function number (Do not support the broadcasting address)  
Answer: !AAXX\r. AA is the address. XX is parameter numbers.
- Parameter Set up: \$AASNXX\r, AA is the address. N N is the function number, XX is the parameter. (Do not support the broadcasting address)

Answer: !AA\r. AA is the address. (Do not support software set up)

- Name check: \$AAM\r, AA is the address. (Do not support the broadcasting address)  
Answer: !AAPAB\_B\r. AA is the address. PAB\_B is barrier model.

- Version check: \$AAV\r, AA is the address. (Do not support the broadcasting address)  
Answer: !AAXXYYZZ\r. AA is the address, XXX is the main version number, YY is no sign character, ZZ is secondary version number.

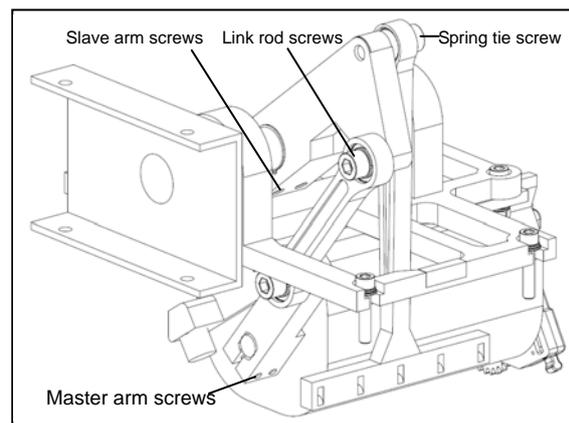
## 8. Maintenance and Repair

### 8.1 Maintenance

Check the following items on a regular basis every **three months**:

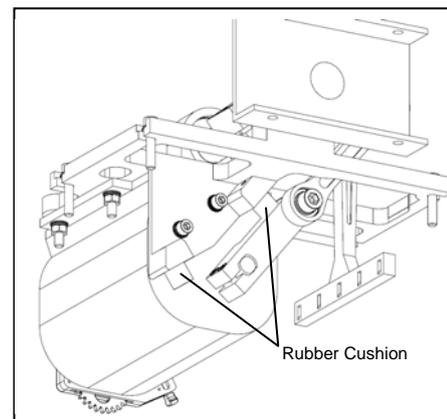
#### 1) Screws loosening

Open the barrier's top cover and control the barrier up and down. Visually check if the active arm screws, the slave arm screws, the link rod screws and the spring tie screw loose, especially the loosening of link rod screws will lead to serious boom arm shock. If loose, firstly turn the power off, then manually lock the boom arm at the vertical position, and remove the springs, the pedestal and the drive mechanism from the barrier housing. Finally fasten the loosed screws, put it back to situ, load springs, and fasten the cover.



#### 2) Rubber Cushion damaging

Open the barrier's top cover, control the barrier up and down. Visually check whether the Rubber Cushion is damaged while active arm hit it. If damaged, should spin out the old damaged Rubber Cushion and replace it with a new one.



#### 3) Springs balancing

Turn the power off temporarily, put the boom arm at the position between 30 and 40 degrees angle to the vertical and check whether the boom arm can keep static hanging

balance. If can not keep balance, need to adjust the springs balance (Refer to 6.3 Adjust boom length)

#### 4) Controller Board displaying

While barrier is working, visually check whether the controller Board's numeral LED normally displays angle value barrier boom arm moving. If there is fault code displaying, find the reason and deal it. (Refer to 6.6 Circuit Self-test)

## 8.2 FAQs and Troubleshooting

**FAQ 1:** Turn back halfway while the boom arm is moving down.

**Possibility:** (1) If F3 value is less than 25, maybe the pressure resistance rebound threshold is too sensitive, so triggered it by boom inertia or wind blowing.

(2) Maybe springs tension is too tight, so triggered the resistance rebound function.

**Solution:** (1) Increases the threshold value of pressure resistance rebound to 50.

(2) Reduce the spring tension according to balance adjusting instructions.

**FAQ 2:** Boom arm move down very slowly and pressure resistance rebound function does not work.

**Judging steps:** If F2 value is less than 60, maybe springs tension is too loose, lead to down slow-down comes too early.

**Solution:** Increase the spring tension according to balance adjusting instructions.

**FAQ 3:** Boom arm shock hardly while it reaches the vertical position and horizon position.

**Judging steps:** The link-rod screw is loose.

**Solution:** Fasten the loosed screws

**FAQ 4:** Boom jitters up & down continuously for more than 10sec. while it reaches horizon position.

**Judging steps:** Motor's starting capacitor becomes old.

**Solution:** Replace the capacitor with a new one.

**FAQ 5:** Only can control up, can't control down.

**Judging steps:** The Up's SCR is damaged.

**Solution:** Replace damaged SCR with a new one.

**FAQ 6:** Can't control both up and down, also controller LED display E1 fault code.

**Judging steps:** 1. If boom rises slowly after power on and controller displays moving angle value, indicate that the both Up and Down's SCR are damaged.

2. If boom arm can't move up after power on and manual moving it can make the controller display the moving angle value, indicates that the motor is damaged.

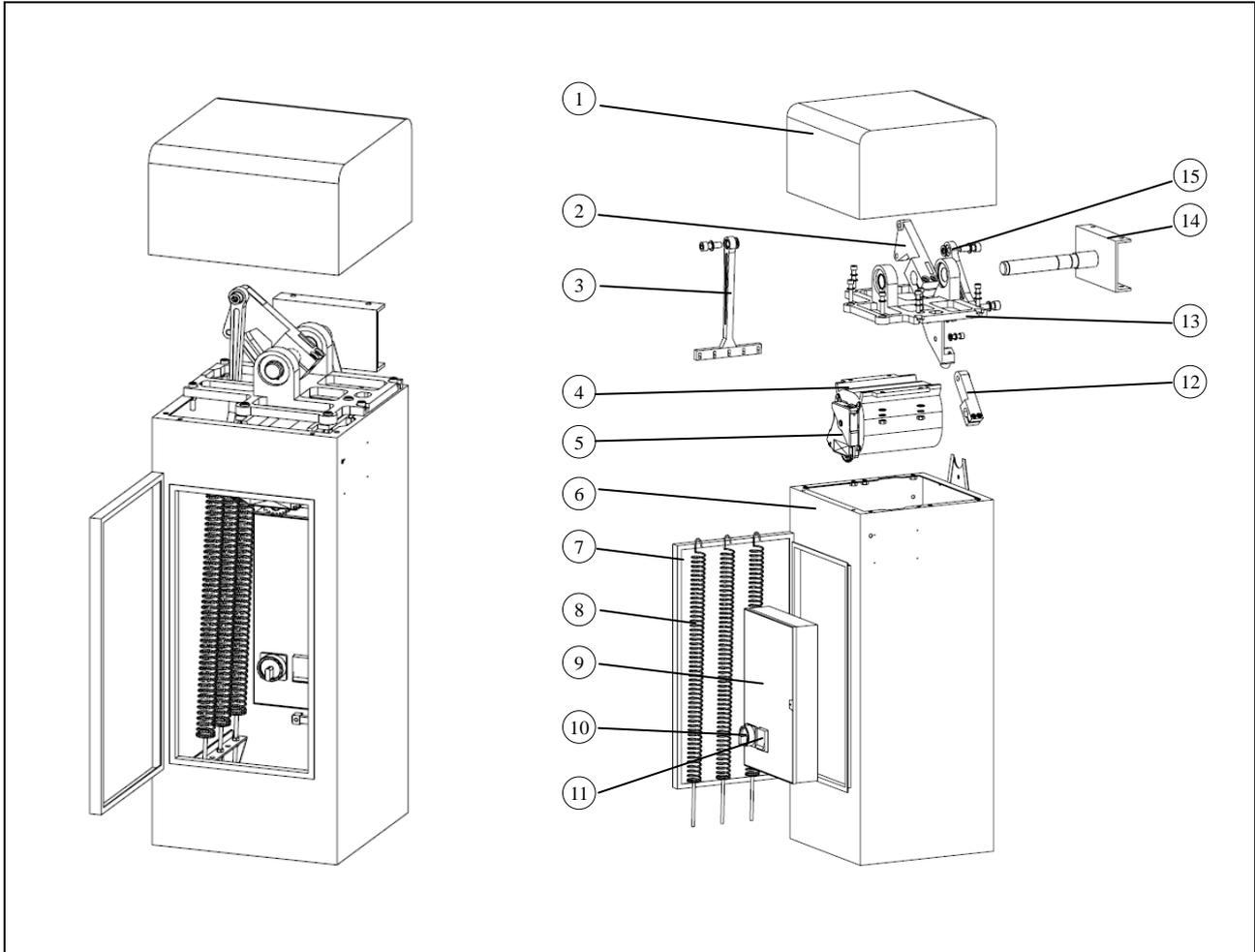
3. If boom arm moves up slowly, but controller does not display the moving angle value, indicates that the pulse angle sensor is damaged.

**Solution:** 1. Replace damaged SCRs with new one.

2. Replace motor.

3. Replace pulse angle sensor.

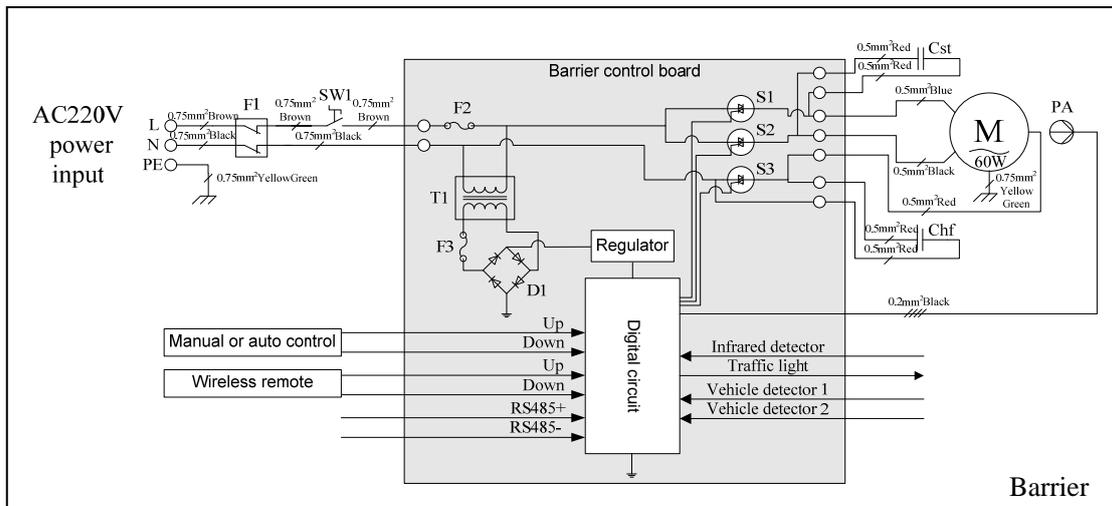
## 9. Mechanical Explosion Drawings and Parts List



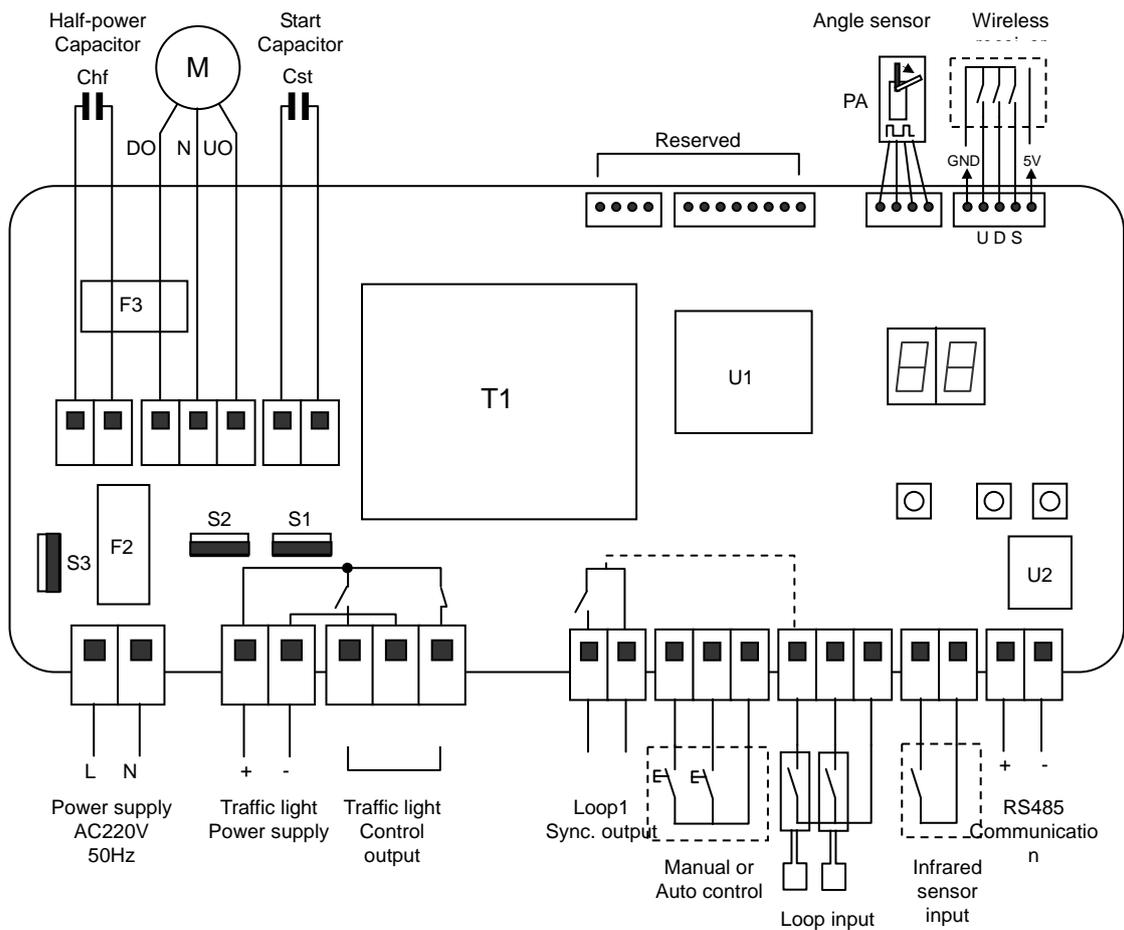
Mechanical parts list

Serial	Part name	Serial	Part name
1	Top cover	14	Arm holder (include main shaft)
2	Slave rocker arm	15	Link rod
3	Springs tie		
4	Integrated gear torque motor		
5	Pulse angle sensor		
6	Housing		
7	Door		
8	Springs		
9	Controller Board		
10	Safety switch		
11	Auto-breaker		
12	Master Rocker arm		
13	Pedestal		

## 10. Block Diagram of Electrical Circuits and Control



## 11. Electrical Diagram and Parts List



Circuit parts list

<b>Code</b>	<b>Name</b>	<b>Code</b>	<b>Name</b>
F1	Auto-breaker	Chf	Half-power capacitor
SW1	Safety switch	Cst	Start capacitor
F2	Fuse	M	Motor
T1	Transformer	PA	Pulse angle sensor
F3	Fuse	U1	MCU IC
D1	Rectifier bridge	U2	RS485 transceiver IC
S1	Up SCR		
S2	Down SCR		
S3	Half-power SCR		