

# User Manual

## Saturn-S2000 Series

**Applicable Model(s):** Saturn-S2000, Saturn-S2200

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English



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If there is any issue related to the product, please contact us.

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## About the Company

ZKTeco is one of the world's largest manufacturer of RFID and Biometric (Fingerprint, Facial, Finger-vein) readers. Product offerings include Access Control readers and panels, Near & Far-range Facial Recognition Cameras, Elevator/floor access controllers, Turnstiles, License Plate Recognition (LPR) gate controllers and Consumer products including battery-operated fingerprint and face-reader Door Locks. Our security solutions are multi-lingual and localized in over 18 different languages. At the ZKTeco state-of-the-art 700,000 square foot ISO9001-certified manufacturing facility, we control manufacturing, product design, component assembly, and logistics/shipping, all under one roof.

The founders of ZKTeco have been determined for independent research and development of biometric verification procedures and the productization of biometric verification SDK, which was initially widely applied in PC security and identity authentication fields. With the continuous enhancement of the development and plenty of market applications, the team has gradually constructed an identity authentication ecosystem and smart security ecosystem, which are based on biometric verification techniques. With years of experience in the industrialization of biometric verifications, ZKTeco was officially established in 2007 and now has been one of the globally leading enterprises in the biometric verification industry owning various patents and being selected as the National High-tech Enterprise for 6 consecutive years. Its products are protected by intellectual property rights.

## About the Manual

This manual introduces the operations of **Saturn-S2000 Series**.

All figures displayed are for illustration purposes only. Figures in this manual may not be exactly consistent with the actual products.

Features and parameters with ★ are not available in all devices.

## Safety Instruction

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss.

The precaution measure is divided into Dangers and Cautions:

**Dangers:** Neglecting any of the warnings may cause serious injury or death.

**Cautions:** Neglecting any of the cautions may cause injury or equipment damage.

### Symbols

Convention	Description
	<b>Dangers:</b> Follow these safeguards to prevent serious injury or death.
	<b>Cautions:</b> Follow these precautions to prevent potential injury or material damage.



#### **Dangers:**

- In the use of the product, you must be in strict compliance with the electrical safety regulations of the nation and region.
- The equipment must be connected to an earthed mains socket-outlet.
- Shock hazard! Disconnect all power sources before maintenance.
- Do not touch the bare metal contacts of the inlets after the circuit breaker is turned off. Electricity still exists.
- To prevent possible hearing damage, do not listen at high volume levels for long periods.
- All the electronic operation should be strictly compliance with the electrical safety regulations, fire prevention regulations and other related regulations in your local region.
- Please use the power adapter, which is provided by normal company. The power consumption cannot be less than the required value.
- Do not connect several devices to one power adapter as adapter overload may cause over-heat or fire hazard.
- Please make sure that the power has been disconnected before you wire, install or dismantle the device.
- If the top caps should be open and the device should be powered on for maintenance, make sure:
  1. Power off the fan to prevent the operator from getting injured accidentally.
  2. Do not touch bare high-voltage components.
  3. Make sure the switch's wiring sequence is correct after maintenance.
- Please make sure that the power has been disconnected before you wire, install or dismantle the device.

- If smoke, odors or noise rise from the device, turn off the power at once and unplug the power cable, and then please contact the service center.
- If the product does not work properly, please contact your dealer or the nearest service center. Never attempt to disassemble the device yourself. (We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.)
- The Terminal PE of the switch should be connected to a ground wire.

 **Cautions:**

- Instructions must be read before installation. Please follow these instructions carefully, incorrect installation could affect gate operation.
- When mounting and positioning this product please ensure the power cable is unplugged.
- The motor cover will need to be removed to mount the motor to the mounting plate. Electrical-related operation of the main unit can only be made by a licensed electrician.
- To prevent injury, this equipment must be securely attached to the floor/base of the turnstile in accordance with the installation instructions.
- Keep straight down when moving or using the equipment.
- Never place the equipment in an unstable location. The equipment may fall, causing serious personal injury or death.
- Cold-rolled SPCC steel may be corroded in some circumstances. You need to clean and care the device by using the stainless steel cleaner. It is suggested to clean the device every month.
- Do not drop the device or subject it to physical shock, and do not expose it to high electromagnetism radiation. Avoid the equipment installation on vibrations surface or places subject to shock (ignorance can cause equipment damage).
- Do not place the device in extremely hot (refer to the specification of the device for the detailed operating temperature), cold, dusty or damp locations, and do not expose it to high electromagnetic radiation.
- The device cover for indoor use shall be kept from rain and moisture.
- Exposing the equipment to direct sun light, low ventilation or heat source such as heater or radiator is forbidden (ignorance can cause fire danger).
- Do not aim the device at the sun or extra bright places. A blooming or smear may occur otherwise (which is not a malfunction however), and affecting the endurance of sensor at the same time.
- Please use the provided glove when open up the device cover, avoid direct contact with the device cover, because the acidic sweat of the fingers may erode the surface coating of the device cover.
- Please use a soft and dry cloth when clean inside and outside surfaces of the device cover, do not use alkaline detergents.
- Please keep all wrappers after unpack them for future use. In case of any failure occurred, you need to return the device to the factory with the original wrapper. Transportation without the original wrapper may result in damage on the device and lead to additional costs.

- Improper use or replacement of the battery may result in hazard of explosion. Replace with the same or equivalent type only. Dispose of used batteries according to the instructions provided by the battery manufacturer.
- Biometric authentication products are not 100% applicable to anti-spoofing environments. If you require a higher security level, use multiple authentication modes.
- Do not stay in the lane when the device is rebooting.
- RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.
- SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.
- The instructions shall require connection of the equipment protective earthing conductor to the installation protective earthing conductor.

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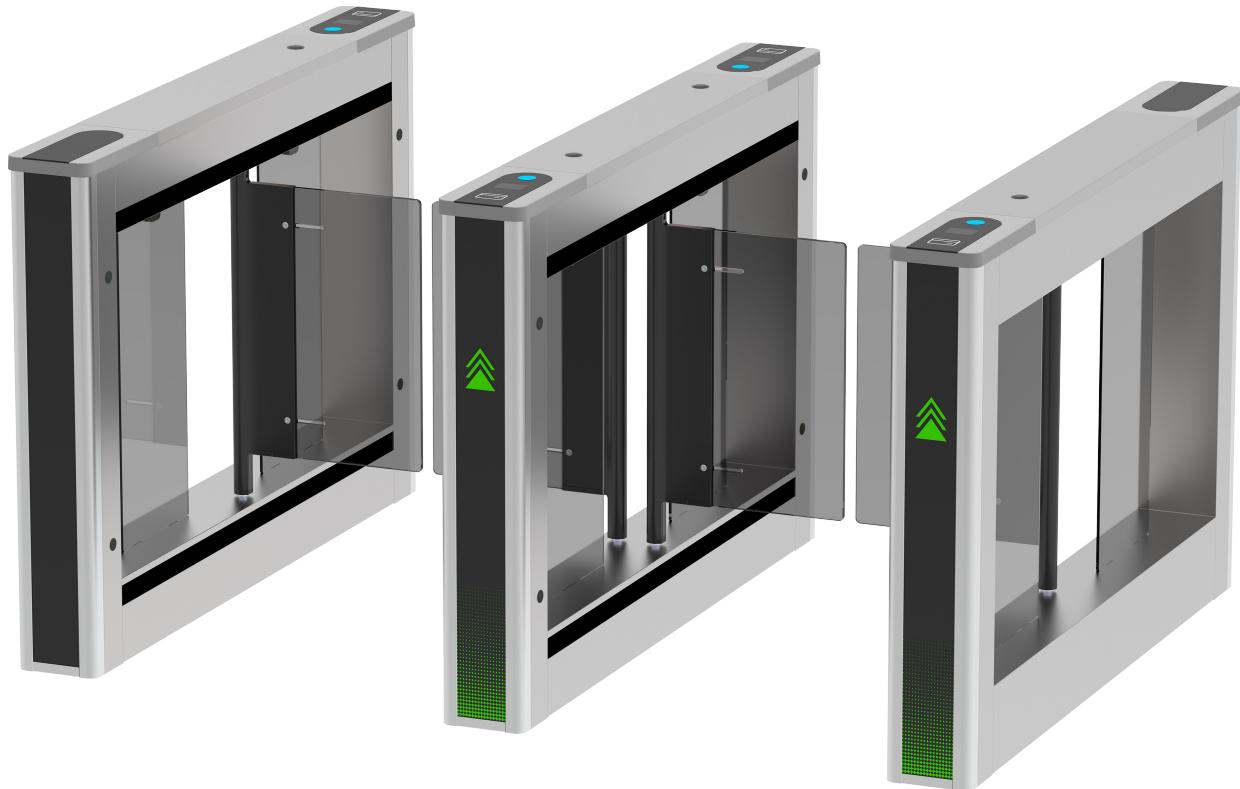
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## 1 Overview

Unveiling the ZKTeco Saturn-S2000, an innovative swing barrier turnstile designed for an unparalleled passage experience. The Saturn-S2000 offers two models (S2000 and S2200). Its chassis is mainly made from stainless steel material(SUS304), providing an IP54 protection rating that ensures it can withstand water and dust. Also, Saturn-S2000 is equipped with a clutch to enhance security.

The Saturn-S2000 has been upgraded with a notable feature: a standard 12 pairs of infrared sensors (expandable to 18 pairs) with integrated dual-zone pinch protection. It ensures enhanced safety and improved obstacle detection. Also, the authentication area is enhanced with 2.5D tempered glass for scratch resistance.

Saturn-S2000 maintains its multi-authentication flexibility as before, with facial, QR code and RFID card verification. Additionally, the pedestal removal design makes it easier to install.



### 1.1 Key Features

- **Durability**

The lid is made using an integrated molding process, achieves an IP54 protection rating, offering robust defense against water and dust. The product is designed to thrive in extreme conditions, maintaining functionality after an 8-hour period in sub-zero temperatures as low as -30° C.

### ● **Material Innovation**

The outer surface is treated with stainless steel brushing, steel surfaces with unique, uniform, and delicate filament - like textures, adding a sense of sophistication and a high - end look. The resulting soft luster is more comfortable to the eye compared to the intense reflection of mirror - finished stainless steel. In terms of durability, it significantly improves scratch and wear resistance, and also enhances corrosion resistance to some extent by optimizing the surface microstructure. The identification area is elegantly embedded with 2.5D tempered glass, which is resistant to scratches and wear, enhancing the clarity of the identification process.

### ● **DC Brushless Motor**

The Saturn-S2000 uses DC brushless motors, which are stable and reliable, and the movement life reaches 5 million MCBF. The barrier material is made of acrylic and the default lane width is 600mm, and an optional lane width 900mm is available.

\*When the lane width extends beyond 900mm to 1200mm, the barrier must be upgraded to stainless steel (replacing the acrylic material).

**\*Stainless steel barrier material required for lane widths exceeding 900mm.**

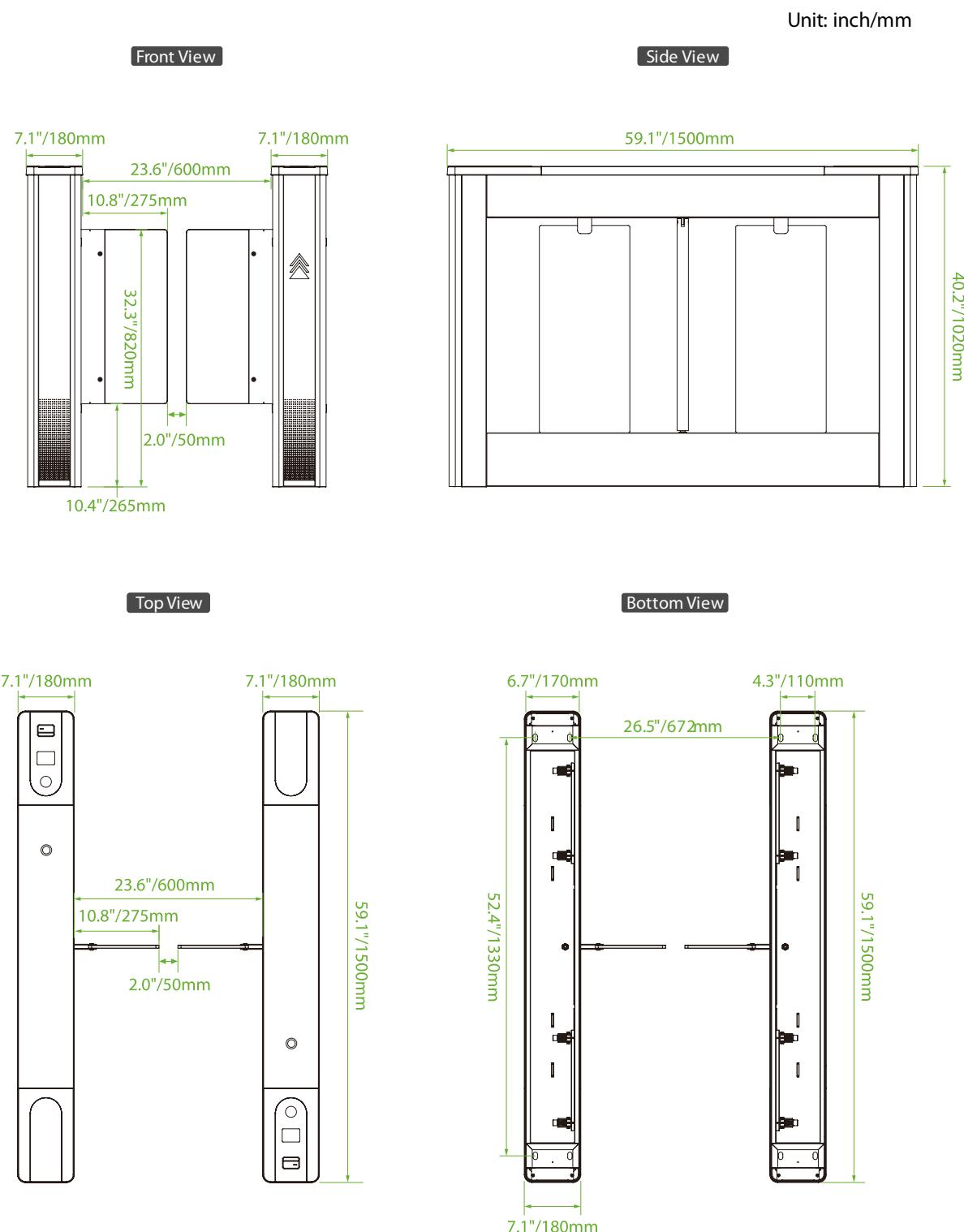
### ● **Safety and Security**

The safety features include opening the gate when power is cut, multiple anti-pinch functions, and the product has an emergency door - opening function. Whether there is a power outage or a fire incident, the device can be activated to the normally open mode. Regarding the anti - pinch feature, it not only has multiple pairs of infrared sensors to prevent pinching people, but also an internal clutch that can respond immediately to stop the device from further operation. It provides a standard of 12 pairs of infrared sensors, expandable to 18 pairs for enhanced coverage. This comprehensive detection system precisely identifies unauthorized access attempts including tailgating, reverse passage, and crawling incidents.

## 1.2 Specification

### 1.2.1 Appearance

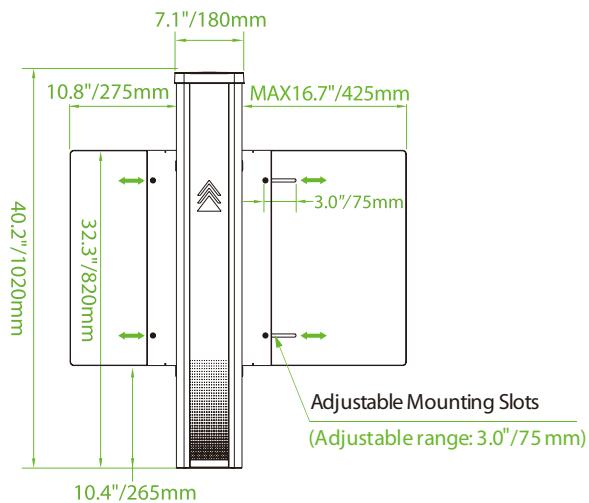
- **Saturn-S2000:**



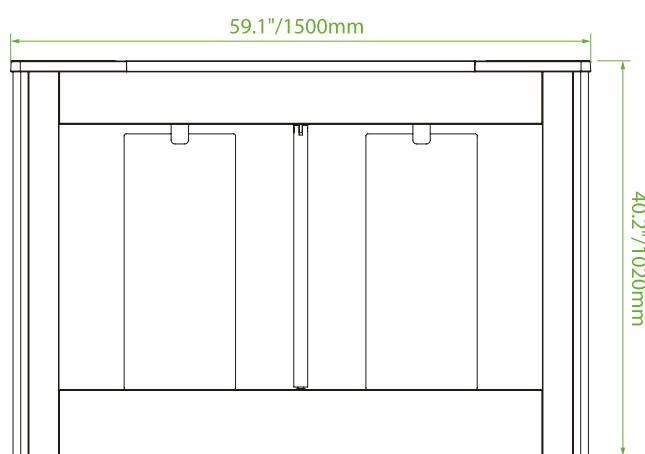
- **Saturn-S2200:**

Unit: inch/mm

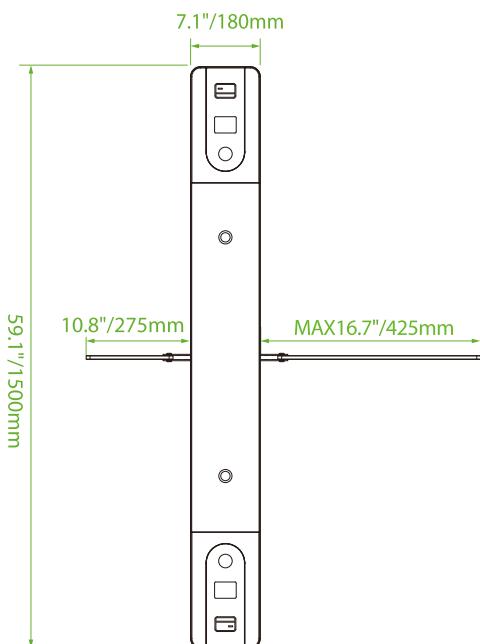
Front View



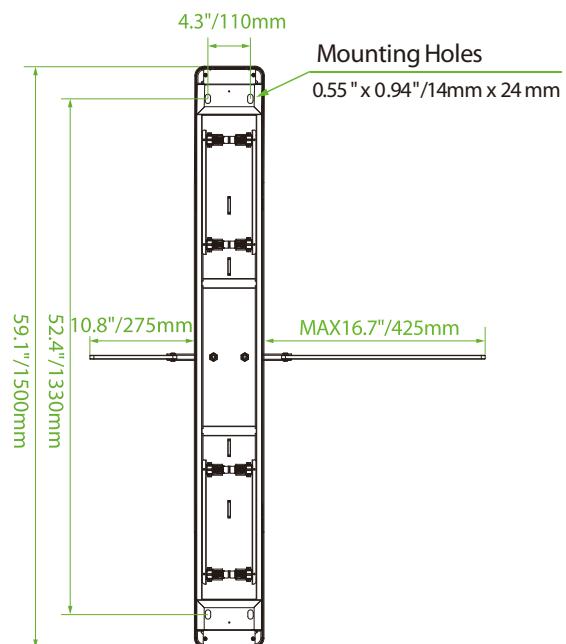
Side View



Top View



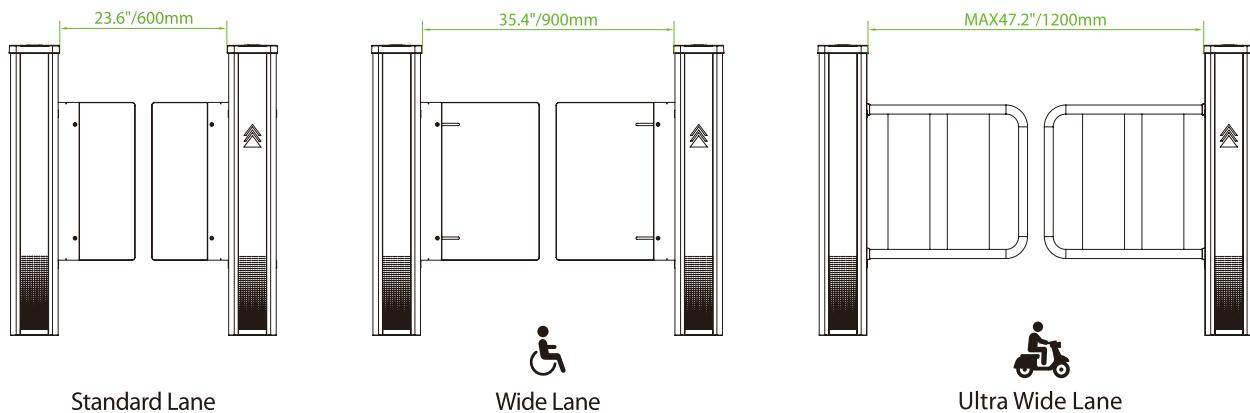
Bottom View



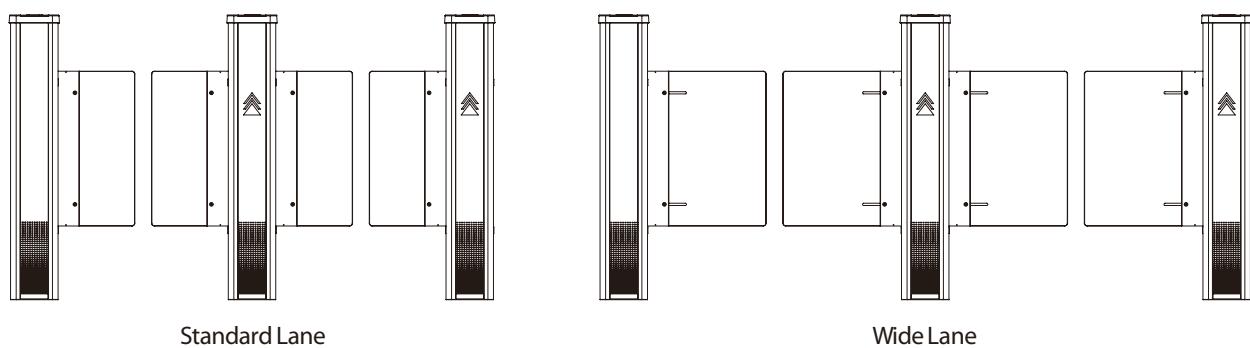
## ● Swing Barriers Specifications

The Saturn-S2000 and Saturn-S2200 can be combined to form a single, dual or multi-lane system, allowing the user to select the appropriate swing barrier size according to actual needs.

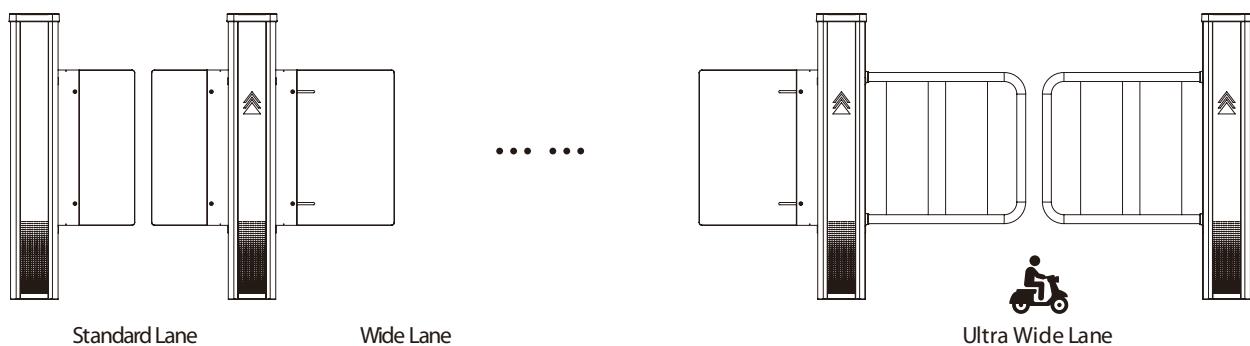
### 1) Single-lane



### 2) Dual-lane



### 3) Multi-lane

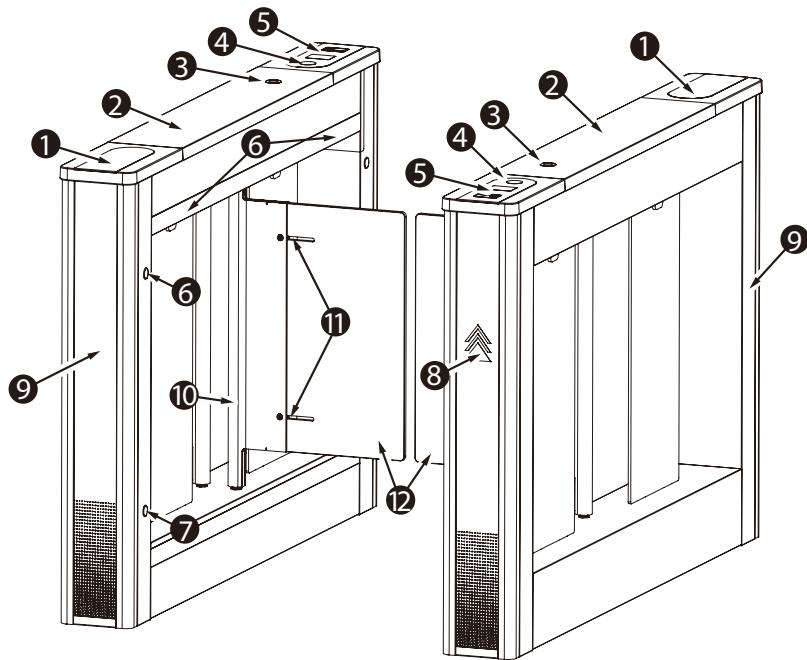


#### Notes:

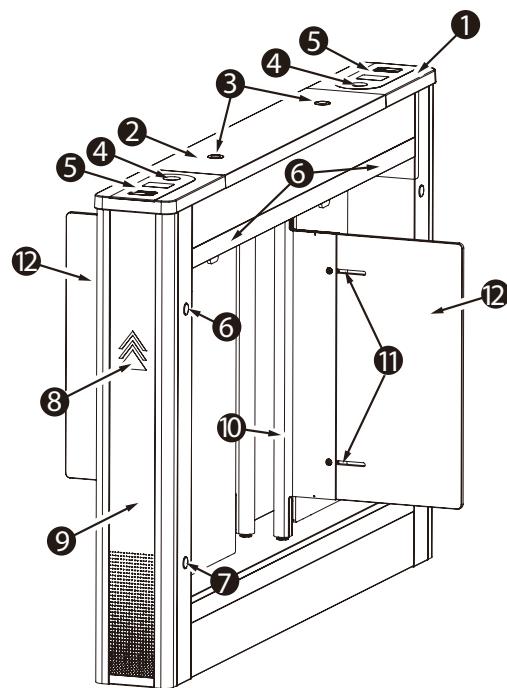
- 1) Standard lane range: 23.6 in - 29.5 in (600 mm - 750 mm)
- 2) Wide lane range: 29.5 in - 35.4 in (750 mm - 900 mm)
- 3) When the lane width is 35.4 in - 47.2in (900mm - 1200mm), stainless steel barriers are required.

## 1.2.2 System Components

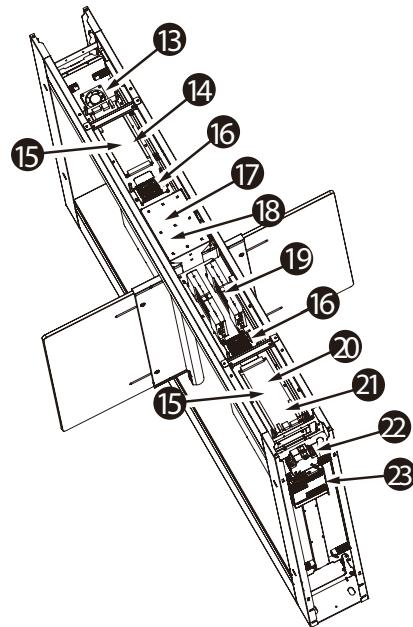
## ● **Saturn-S2000:**



## ● **Saturn-S2200:**



### ● Core Component



No.	Components	Descriptions
1	Authentication Panel	
2	Top Lid	Stainless steel sheet(SUS304)
3	Hole Plugs	Reserved mounting holes for facial authentication devices.
4	Traffic Indicator	Top LED indicator: Blue=Door closed/stand by Green=Door opening Red=Door closing/alarm
5	Verification Area	Card (RFID)/QR Code modules are available
6	Infrared Sensor	It detects the position of the pedestrian and plays a role in ensuring safety and protection.
7	Extended Infrared Sensor	Used to support addition of infrared sensors.
8	Visual Indicator	Side LED indicator: Green=Lane available Red=Lane unavailable
9	Side Lids	Acrylic
10	Shaft Roller	It supports the installation of the telescopic swing arm.
11	Adjustable Mounting Holes	For adjusting the width of the door over a range of 75 mm.
12	Barrier Material	Transparent gray acrylic (optional: Stainless steel SUS304)
13	Fan	Used for cooling.
14	Turnstile Controller Board	Sub Board, the system's control center
15	Supercapacitor	On the back of the turnstile controller board.

<b>16</b>	IR Sensor Board	Used to control sensors.
<b>17</b>	Core Component	Operating components of the turnstile
<b>18</b>	Clutch	Electromagnetic clutch
<b>19</b>	Access controller	To verify if the credential is valid. If successful, sends a door open signal to the turnstile controller. Otherwise will not.
<b>20</b>	Turnstile Controller Board	Main Board, the system's control center
<b>21</b>	Speaker	To play alarms or alert voices. (On the back of the turnstile controller board.)
<b>22</b>	Air Switch	It provides reliable protection by automatically disconnecting the circuit in the event of overload, short circuit, under voltage, or power loss.
<b>23</b>	Power Supply	110V / 220V ±10% AC @50Hz/ 60Hz

### 1.2.3 Technical Specifications

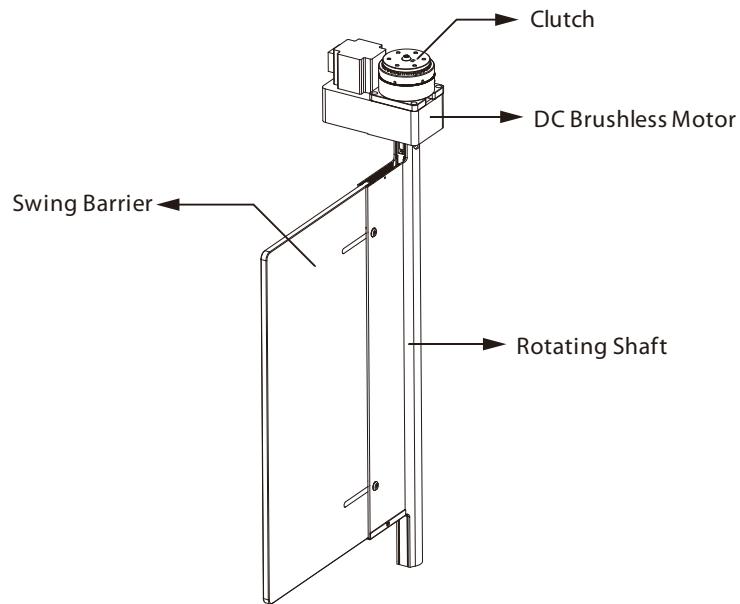
Model	Saturn-S2000	Saturn-S2200
<b>Audio Indicator</b>	Internal speaker	
<b>Visual Indicator</b>	Top LED indicator: Blue=Door closed /stand by Green=Door opening Red=Door closing/alarm	Slide LED indicator: Green=Lane available Red=Lane unavailable
<b>Display</b>	NA	
<b>Lane Type</b>	Single lane	Dual Swing(for additional lane)
<b>Lane Width</b>	600~900mm(Optional)(Acrylic) Maximum 1200mm(Optional)(Stainless steel)	
<b>Barrier Movement Type</b>	Swing	
<b>Motor</b>	DC brushless motor	
<b>Movement Speed</b>	Average 1s per movement (Adjustable open/close timing)	
<b>Movement Accuracy</b>	Middle	
<b>Clutch</b>	Equipped	
<b>Lid Material</b>	Stainless steel & Polycarbonate	
<b>Lid Options</b>	Streamlined under mount options: QR Code / RFID	
<b>Authentication Methods</b>	Surface mount option: Facial Authentication	
<b>Chassis Material</b>	Stainless steel(SUS304) (Chassis Body) / Aluminum Alloy (Gate Column)	
<b>Chassis Colour</b>	Gray(Standard)	
<b>Barrier Material</b>	Light gray transparent acrylic(305*555*10mm)(standard)/Light gray transparent acrylic(380*555*10mm)(optional) When the lane width is 900-1200mm, stainless steel barriers are required.	

<b>IR Sensors</b>	12 pairs (standard) ;18 pairs (Optional)	
<b>Motherboard Function</b>	System configuration, access control	
<b>Motherboard Communication</b>	Fire alarm port (relay)*1, RS485 port*1	
<b>Controller</b>	Compatible with C3 / InBio Series or 3rd-party controller	
<b>Credential Options</b>	Under mount RFID reader: (support model: Pro ID Series, KR Series) Under mount fingerprint reader: FR1200/FR1500S	
<b>Flow Rate</b>	Facial Authentication: 15 passengers per minute QR Code: 30 passengers per minute RFID: 35 passengers per minute	
<b>Accessibility</b>	Adult, children(with care), Disability(with care)	
<b>Power Supply</b>	110V / 220V ±10% AC @50Hz/60Hz	
<b>Power Rating</b>	20VA(Standby)40VA(Operation)	
<b>Fire Signal</b>	Input for voltage free contact	
<b>Noise Level</b>	Less than 60dB	
<b>MTTR</b>	Less than 60 minutes	
<b>MCBF</b>	5 million	
<b>Weight</b>	100Kg(Net weight) 140Kg(Gross weight)	60Kg(Net weight) 100Kg(Gross weight)
<b>Dimension (L*W*H)</b>	1500*180*1020mm	
<b>Dimensions With Packing(L*W*H)</b>	1580 * 340 * 1270 (mm) (2pcs)	1580 * 340 * 1270 (mm)
<b>Operating Temperature</b>	-30°C to 70°C	
<b>Operating Humidity</b>	5% to 90% RH (Non-condensing)	
<b>Certifications</b>	CE, FCC	
<b>Ingress Protection Rating</b>	IP54 (water & dust proof)	
<b>Supported Software</b>	ZKBio CVAccess / ZKBio CVSecurity (Depends on equipped access controller)	
<b>Safety Features</b>	Voltage free contact input for fire alarm fail state automatic swing barrier open during power off	
<b>Security Features</b>	Anti-tailgating, anti-pinch	
<b>Product Delivery</b>	Pre-assembled	
<b>Application Environment</b>	Indoor / outdoor (if sheltered)	
<b>Site Preparation</b>	Flat & level finished floor (base plate in options for unfinished floor)	
<b>Security Level</b>	Medium	
<b>Emergency Mode</b>	Support (swing barrier open automatically)	
<b>Packing Material</b>	Wooden	

## 1.3 Mechanical System

The mechanical system of the turnstile includes the chassis and the core component.

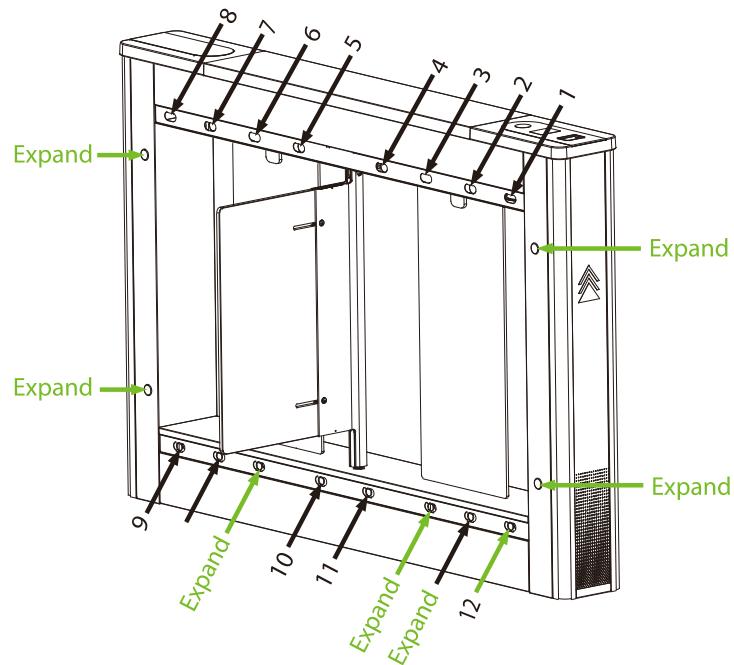
- **Chassis:** It is a carrier where the Visual Indicator and Infrared Sensor are installed.
- **Core Component:** The core component mainly consists of the Frame, DC Brushless Motor, Rotating Shaft, Clutch and Swing Barrier.



## 1.4 Electronic Control System

The electronic control system of a turnstile is mainly composed of the Motor Driver, Infrared Sensor, Turnstile Control Board, Traffic Indicator and Alarm.

- **Power supply:** connected with AC power and converting to DC power for turnstile operating system.
- **Access control system★:** including various types of readers such as RFID readers, QR code readers, and facial authentication devices, and access controllers.
- **Turnstile Control Board:** The Turnstile control board is the system's control center that receives signals from the access controller. The IR performs logical calculation and processing of these signals and then sends executive commands to the Traffic Indicator, Motor, and the alarm.
- **Traffic Indicator:** The system will light up the red indicator when the gate is closed. When someone passes the verification, the system will light up the green indicator.
- **Alarm:** The alarm gives the voice and light alarm if the system detects any unauthorized entry to the passage, false direction entry, anti-tailgate and other violations.
- **Infrared Sensor:** It detects the position of the pedestrian and plays the role of safety protection. The exact location is shown below:

**Description:**

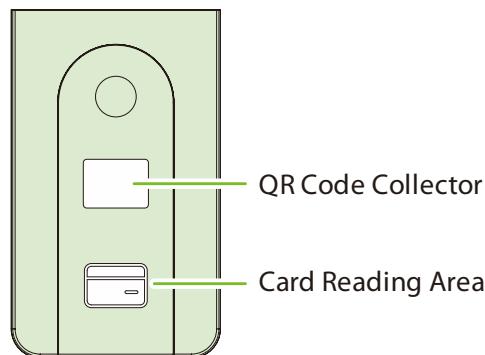
- ✧ **1-12:** 12 pairs of infrared sensors as standard.
- ✧ **Main device:** Odd number as receiver, even number as transmitter.
- ✧ **Sub device:** even number as transmitter, odd number as receiver.
- ✧ **Expand:** represents expandable infrared sensors, supports customised infrared sensors.

## 2 Authentication Methods

Users can freely choose to configure the authentication module according to actual needs. The following options are included.

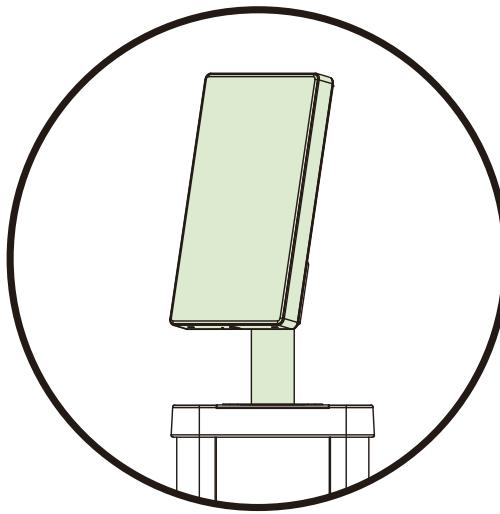
### **Streamlined Under Mount Options:**

RFID only,RFID & QR Code.



### **Surface Mount Option:**

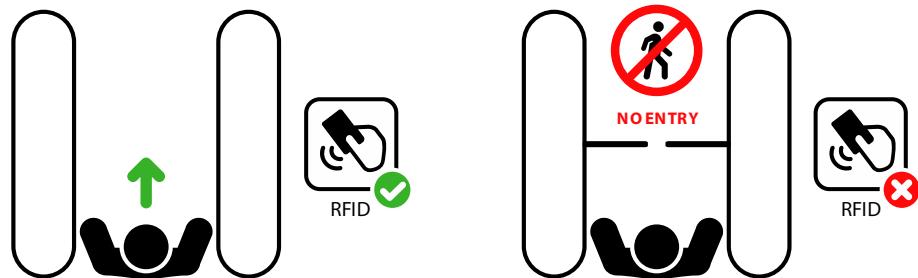
Mounting Pole (Compatible with ProFace X series / SpeedFace V5L / Elite Pass).



### 2.1 **Card Verification**★

When the device is configured with a card reader module, the Card Verification mode compares the card number in the card induction area with all of the card number data registered in the device and sends it to the Access Controller.

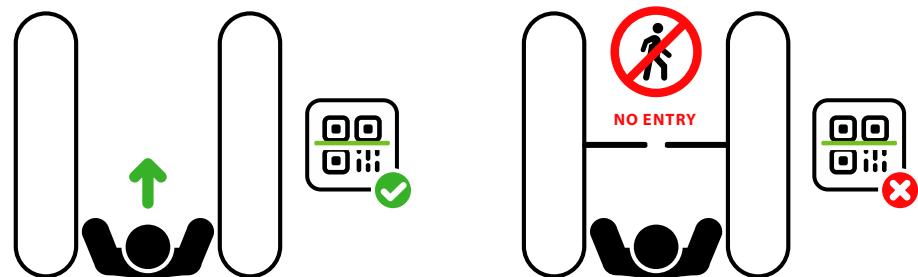
When a user presses his / her card on the card reading area, the device enters card authentication mode.



## 2.2 QR Code Verification★

The QR code Verification mode is to scan the QR code on the user's mobile phone through the QR code scanner and compare the data with the registered QR code, and then sends it to the Access Controller.

When the user places the mobile phone displaying with the QR code on top of the QR code scanner, the device enters the QR code authentication mode.



## 2.3 Facial Verification★

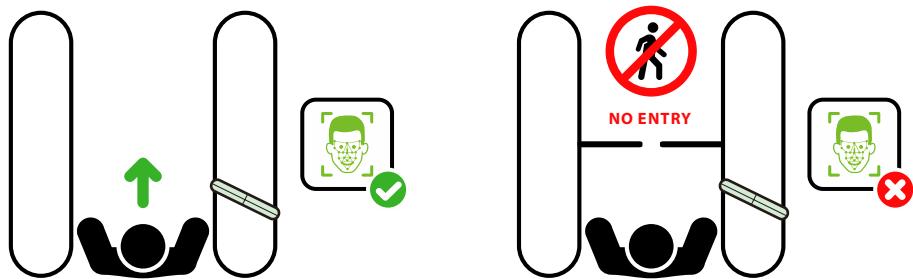
In this verification mode, the device compares the collected facial images with all face data registered in the device and then sends it to the Access Controller.

Try to keep the face in the centre of the screen during authentication. Please face towards the camera and stay still during face registration.

Recommended Standing Posture and Facial Expression:



**Note:** Please keep your facial expression and standing posture natural while enrollment or verification.



## 3 Installation

### 3.1 Installation Tools

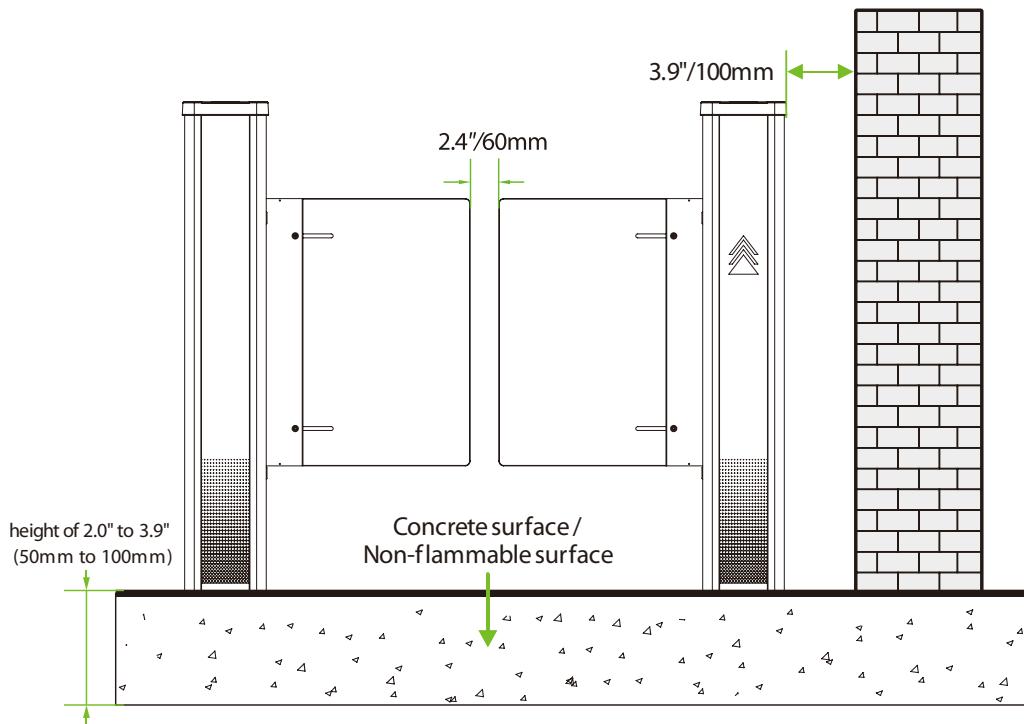
- Tapeline
- Marker Pen
- Pencil
- Percussion Drill
- Screwdriver
- Wrench
- Hex Wrench
- Cutting Machine

### 3.2 Installation Requirements

1. It is recommended that the turnstile must be installed on a horizontal solid platform with a height of **2.0" to 3.9"(50mm to 100mm)**.
2. It is recommended that the turnstile should not be used in the corrosive environment.
3. Make sure that the ground wire of the system is securely connected to avoid personal injuries or other accidents.
4. After installation, check if the connection has been done correctly at the connecting points of the ground wire, at the connector assemblies and wiring points of the circuits, as well as at each movable part of the turnstile. Any loose nuts, screws and other fasteners should be tightened in time to avoid any failures caused by long-time operations.

### 3.3 Installation Environment

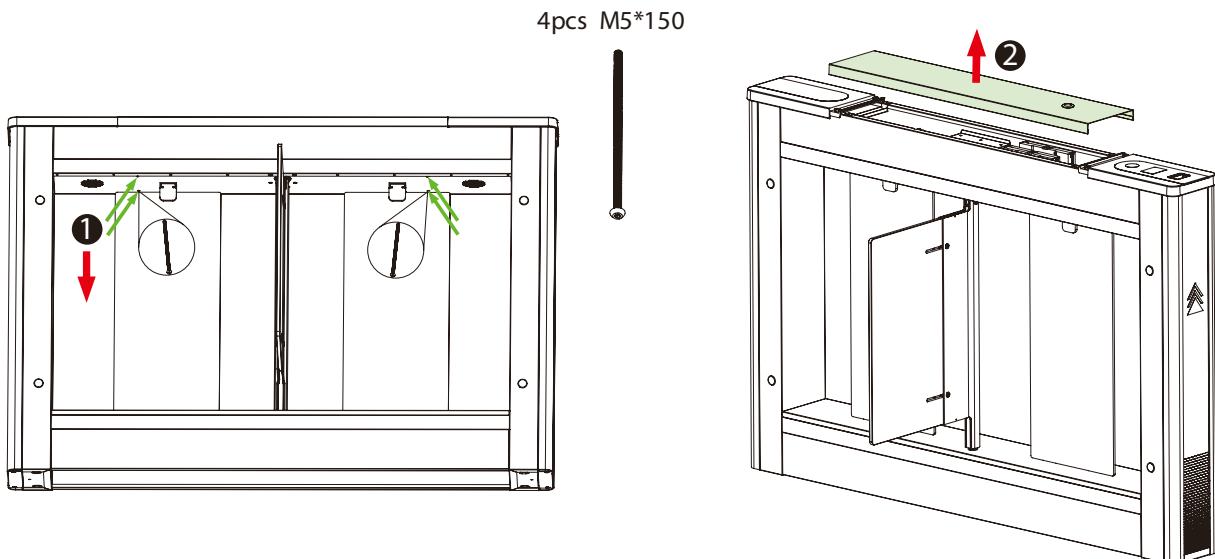
1. Before installation begins, prepare installation tools, check the device and the accessories, and clear the installation base.
2. Make sure that the appliance is mounted on a concrete surface or other non-flammable surfaces.
3. The installation position of the turnstile depends on its size. A distance of **3.9"(100mm)** between the turnstile and the wall needs to be reserved for ease of opening the top lid of the turnstile to perform maintenance and adjustment. The reference figure is shown below:



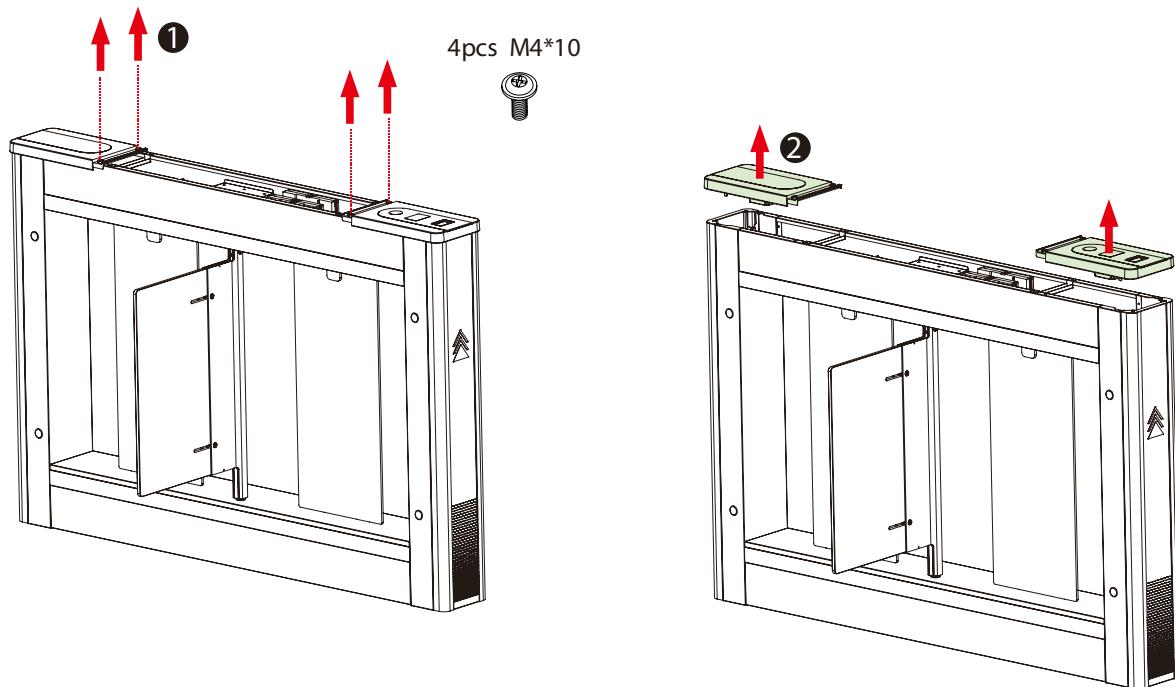
### 3.4 Installation Cabinet

#### Step 1 Remove the Top Lid and Authentication Panel

1. Loosen the four M5\*150 screws with an Allen key in the position shown in the following figure. Then remove the top cover upwards.

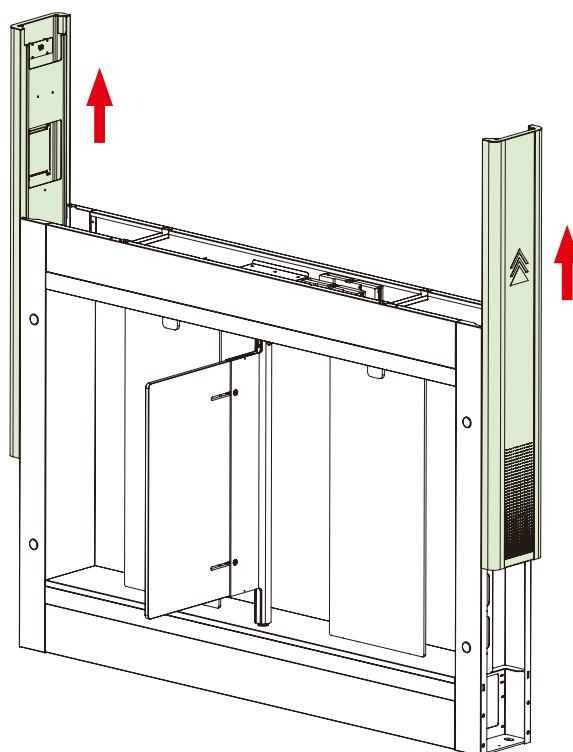


2. In the position shown below, use a Phillips screwdriver to unscrew the four fixing screws (round head Phillips screws with washers) of the authentication panel.



### Step 2 Remove the Side Lid

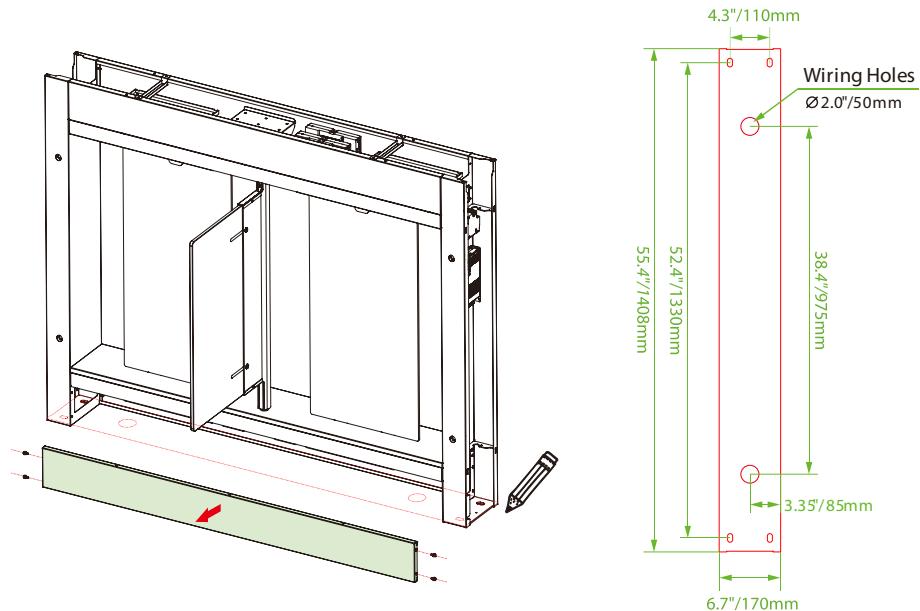
1. Push the side lids on both sides upward and then remove them.



## Step 3 Marker Position

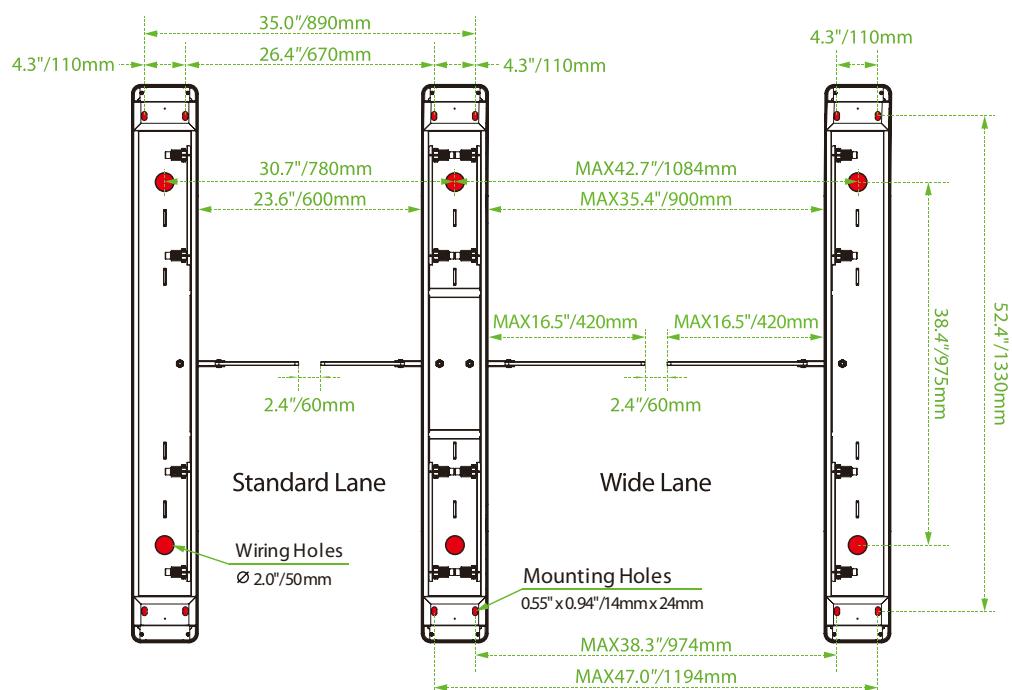
Draw the location of the cabinet with a marker and mark each location of the mounting holes. There will be a total of four mounting holes and two wire holes per cabinet.

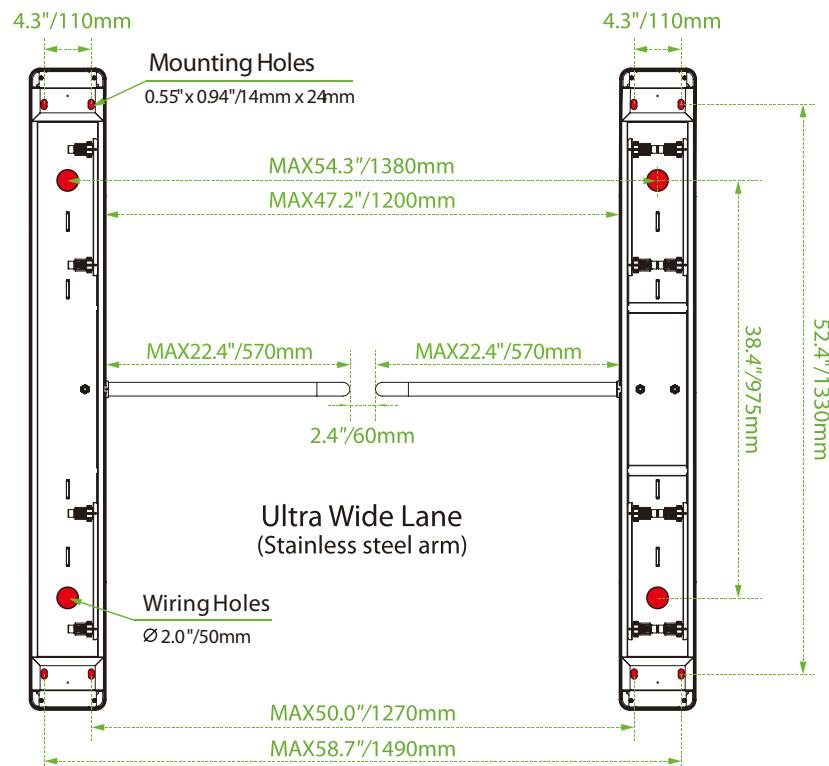
**Tip:** You can open the bottom flap for easier handling.



## Step 4 Determine the Mounting Location

1. Please refer to the user's manual and complete the power-on self test operation before installation.
2. Then place the cabinet according to the mounting distances shown in the diagram below. Take care to measure the distance between the bottom inside walls of the cabinets on the entrance side and exit side of the channel and make sure that the measurements are consistent.



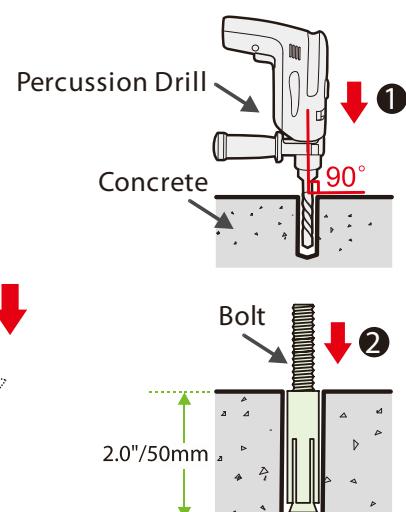
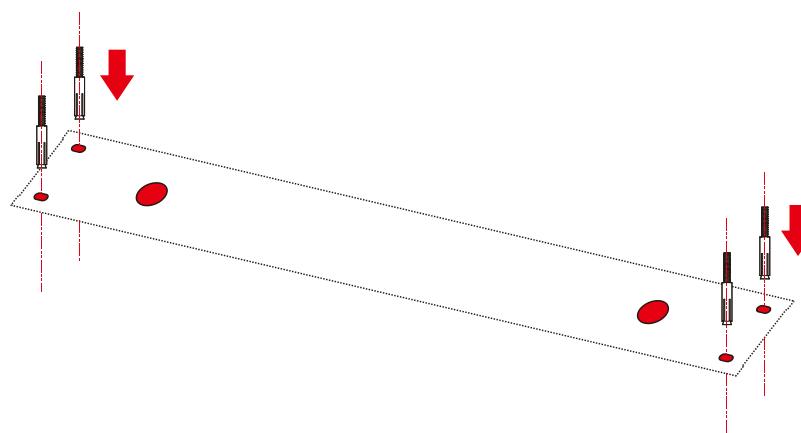


**Note:** When the lane width is 35.4 in - 47.2in (900mm - 1200mm), stainless steel barriers are required.

## Step 5 Drill Holes and Place Bolts

1. Using a concrete drill bit, drill the mounting holes **2.0" (50mm)** in depth at the center of each marked location.
2. Then insert the bolts vertically into the mounting holes as shown at right.
3. Make sure the bolts are placed in place. Use a hammer to tap the bolts into place, if needed.

Place bolts into mounting holes



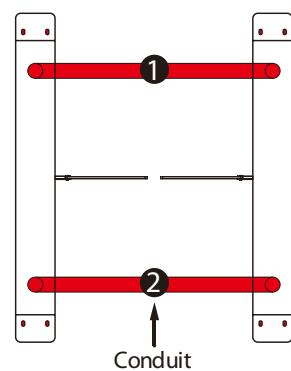
## Step 6 Wireway Laying

1. Dig a recess of **2.0" (50mm)** depth between the wire holes on both sides of the channel with the dimensions shown below. Recesses can be dug at positions **①** and **②**.
2. Then lay two **0.8" to 1.0" (20 to 25mm)** diameter PVC pipes as shown below.
3. After threading the cable out of the PVC pipe, pour concrete to fix it in place.

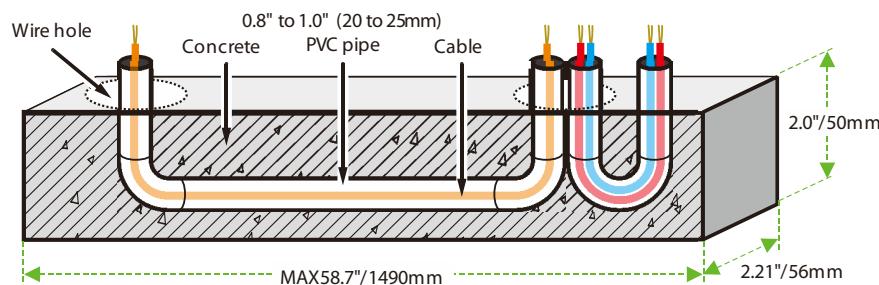
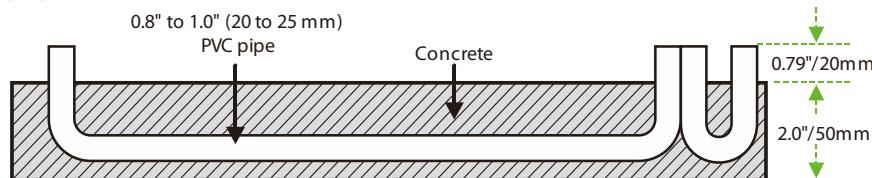
**Top View**



Position of the notch:



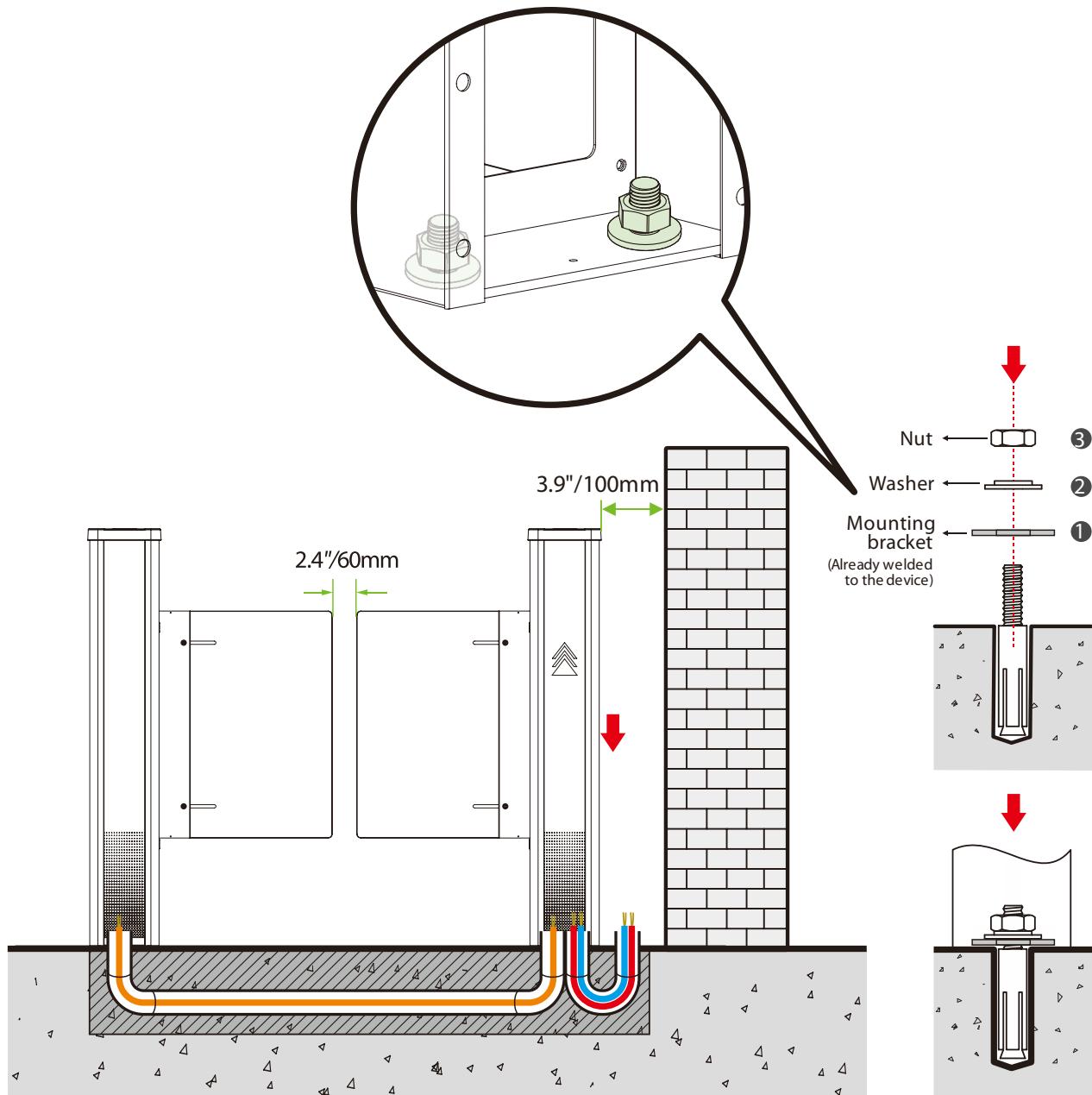
**Side View**



- ECU-panel connection wire
- Ethernet cable / Access control cable
- Power cable

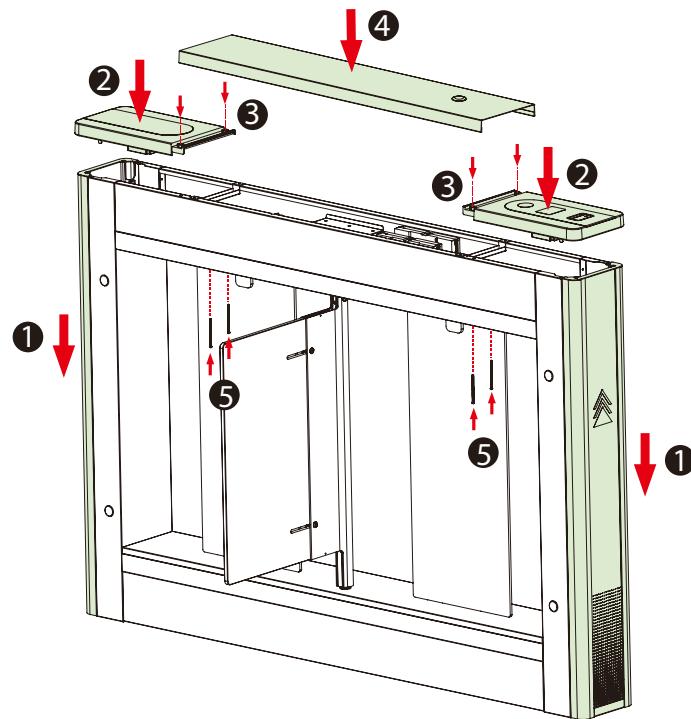
### Step 7 Fixed Cabinet

1. After laying the PVC pipe, place the cabinet alignment bolts back into the mounting position.
2. Then insert the four washers and nuts into the bolts one by one.
3. Tighten the nuts to hold the cabinet in place. Don't tighten it completely until after you're sure it won't move anymore. The finished result is shown below:



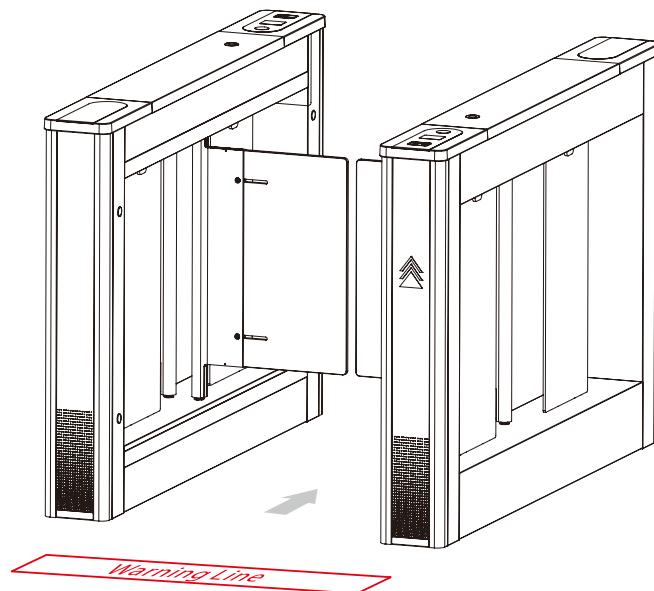
### Step 8 Close the Top Lid, Swipe Panel and Side Lid

Close the top lid, swipe panel and side lid as show below, then secure the top lid with screws.



### Step 9 Marking the Warning Line

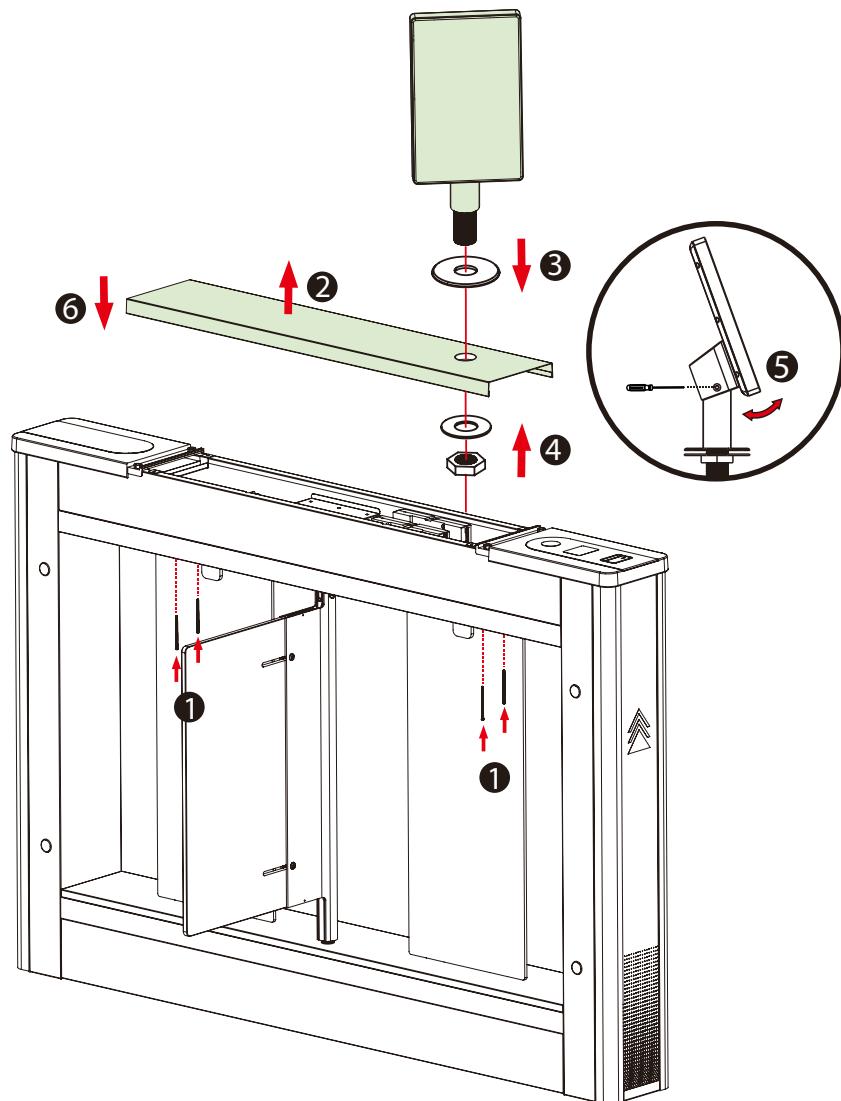
1. It is recommended that warning lines be marked on the ground and used to alert users.
2. A warning line can alert users to wait outside the line until the previous user completes the verification process and passes through the turnstile.



## 3.5 Accessory Installation

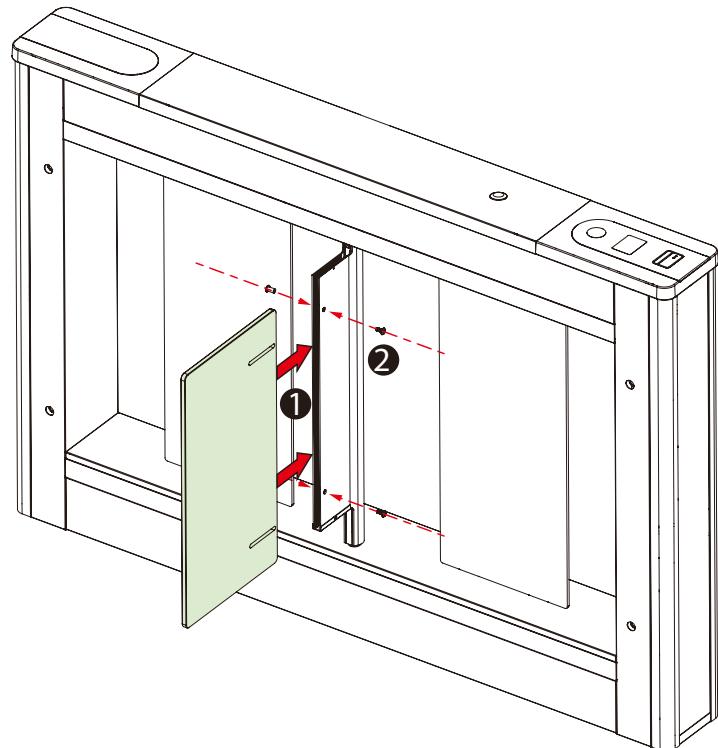
### 3.5.1 Facial Authentication Terminal Installation

1. Remove the top cover plate and route the unit's cables through the pre-drilled mounting holes.
2. Pass the mounting bracket through the mounting holes.
3. Place the gasket and nut and tighten the nut to secure the unit.
4. Adjust the unit to a suitable angle.
5. Once this is done put the top cover back on with the unit installed and lock the screws.



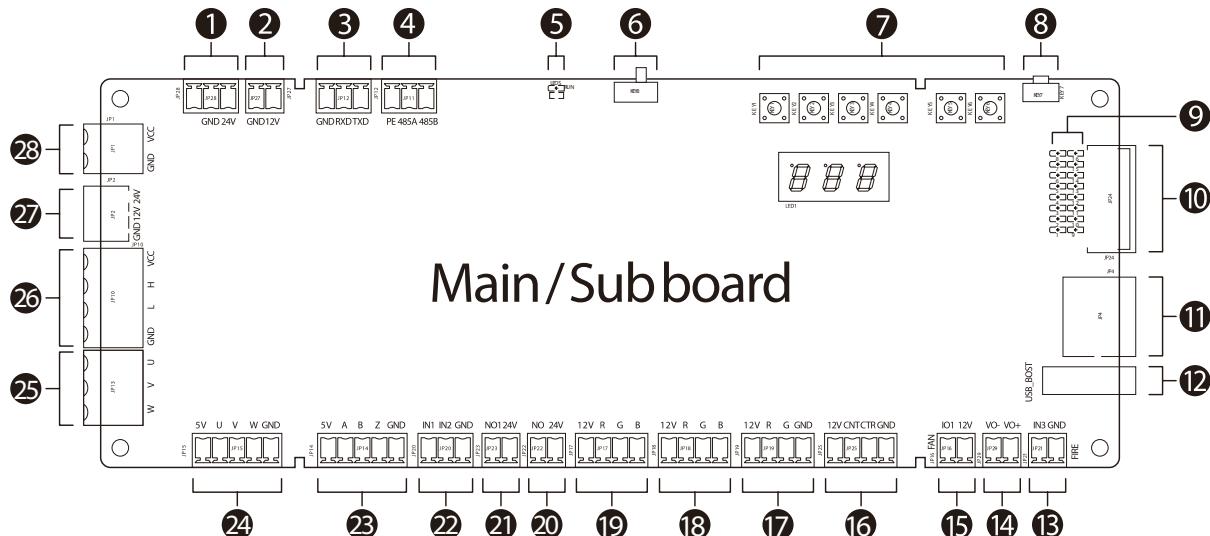
### 3.5.2 Swing Barrier Installation

1. Push the swing barrier into the clamping block.
2. Lock the swing barrier with the screws.



## 4 Terminal Description

## 4.1 Main and Sub Board



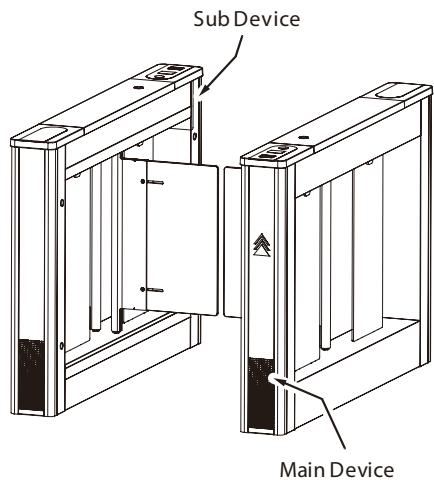
NO.	Terminal	Descriptions
1	/, GND, 24V	24V DC power supply output
2	GND, 12V	12V DC power supply output
3	GND, RXD, TXD	RS232 communication
4	GND, 485A, 485B	RS485 communication
5	LEDS	RUN indicator
6	KEY8	DIP switch Used to switch between the main and sub boards. When dialled to <b>1</b> it is the main board and when dialled to <b>ON</b> it is the sub device.
7	KEY1-6	Operation keys KEY1: Return, exit menu KEY2: Decrease the value until the lower limit KEY3: Incremental value up to the upper limit KEY4: Start menu/Confirm KEY5: In KEY6: Out
8	KEY7	Restore Default Key 1. Press and hold the key for more than <b>3</b> seconds to restore the default settings. 2. Reboot the device and press the key briefly.
9	1-16	Infrared indicator The ordinal number corresponds to the terminal pins, and the corresponding indicator lights up when the IR alignment is abnormal.

10	Upperlayer Lowerlayer	<table border="1"> <tr><td>GND</td><td>GND</td></tr> <tr><td>8</td><td>16</td></tr> <tr><td>7</td><td>15</td></tr> <tr><td>6</td><td>14</td></tr> <tr><td>5</td><td>13</td></tr> <tr><td>4</td><td>12</td></tr> <tr><td>3</td><td>11</td></tr> <tr><td>2</td><td>10</td></tr> <tr><td>1</td><td>9</td></tr> <tr><td>12V</td><td>12V</td></tr> </table>	GND	GND	8	16	7	15	6	14	5	13	4	12	3	11	2	10	1	9	12V	12V	Interface board infrared communication interface
GND	GND																						
8	16																						
7	15																						
6	14																						
5	13																						
4	12																						
3	11																						
2	10																						
1	9																						
12V	12V																						
11	/		Network interface																				
12	USB_BOST		<p>Program download port</p> <p><b>Operation: Upgrade Firmware</b></p> <p>a. Press and hold the <b>KEY1</b> button continuously, then power off and restart the device, or press the <b>KEY7</b> button once.</p> <p>b. At this time, the <b>RUN</b> light on the motherboard will slow down its flashing, indicating that the device has entered the <b>Program Download Mode</b>. You can now release the <b>KEY1</b> button.</p> <p>c. Then insert the <b>USB</b> drive containing the upgrade program. The <b>RUN</b> light will flash rapidly. Once the rapid flashing ends and returns to the normal flashing state, it indicates that the upgrade has been successful. You can then remove the <b>USB</b> drive. <b>*Note:</b> Do not remove the <b>USB</b> drive during the upgrade process.*</p>																				
13	IN3, GND		Fire interface																				
14	VO-, VO+		Speaker																				
15	GND, 12V		Fan																				
16	12V, CNT, CLR, GND		Counter																				
17	12V, R, G, GND		Dot Matrix Board LED																				
18	12V, R, G, B		Traffic Indicator																				
19	12V, R, G, B		Visual Indicator																				
20	NO, 24V		Clutch / Push-pull solenoid 1																				
21	NO1, 24V		Push-pull solenoid 2																				
22	IN1, IN2, GND		Door opening signal input																				
23	5V, A, B, Z, GND		Encoder Interface																				
24	5V, U, V, W, GND		Hall interface																				
25	U, V, W		Motor cable interface																				
26	VCC, H, L, GND		Over machine communication line																				
27	24V, 12V, GND		Super capacitor input																				
28	VCC, GND		Power input																				

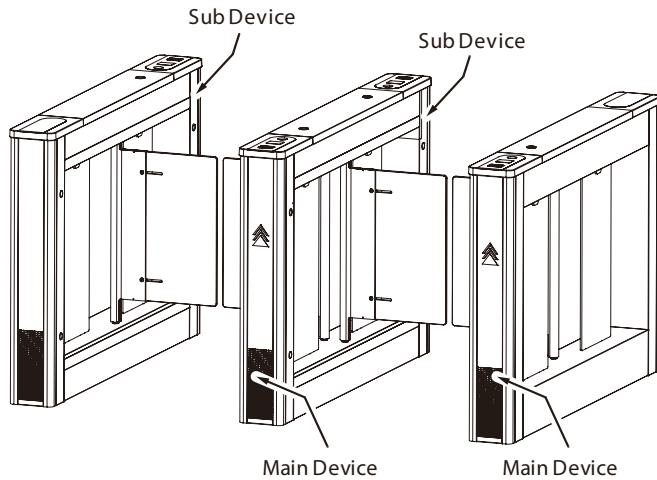
## 5 Wiring Instructions

### 5.1 Main-sub Location

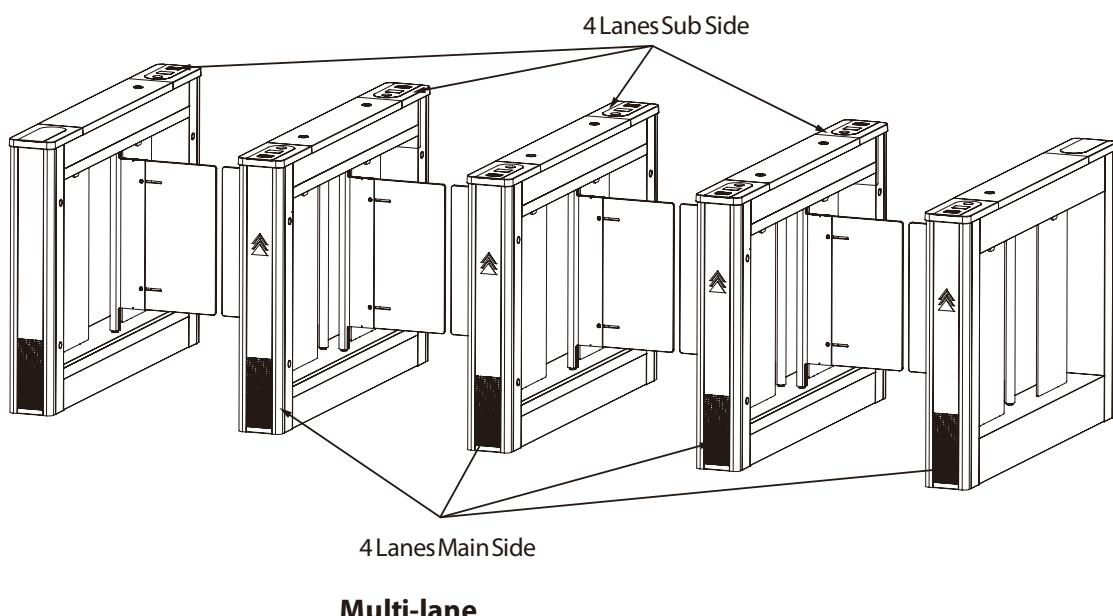
The positions of the main and sub corresponding to single-lane, dual-lane and multi-lane are shown in the figure below.



**Single-lane**



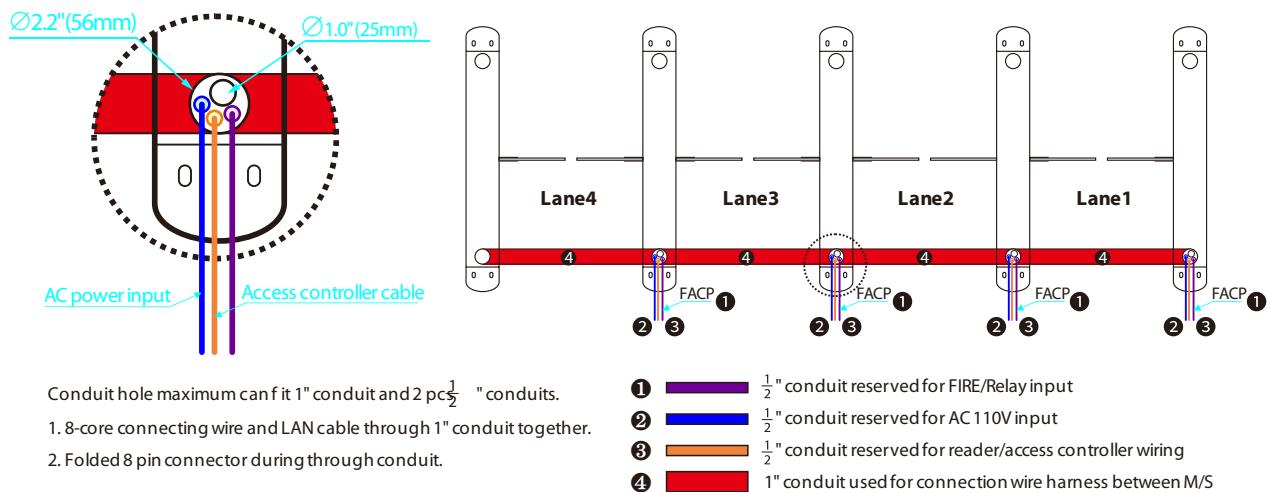
**Dual-lane**



**Multi-lane**

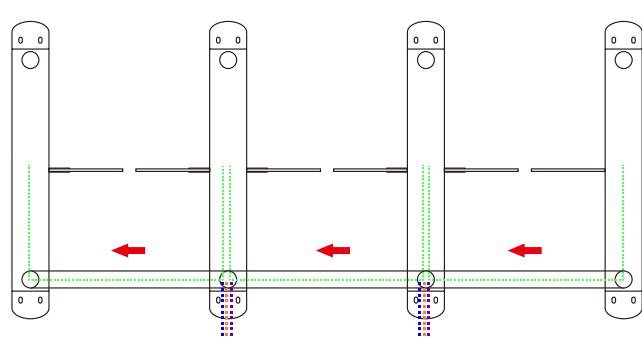
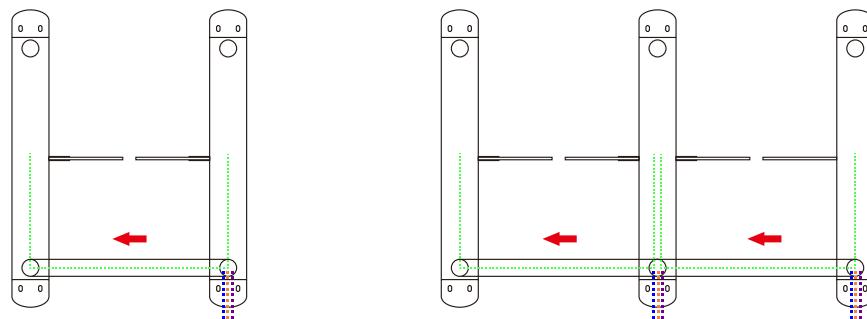
## 5.2 Slotting Position

For the different channels, the slotted locations are shown below.



## 5.3 Wiring Methods

The wiring principle is to connect the main device to the sub device and communicate via the ECU-panel connection wire. Each main device is then powered individually. The following diagram shows how the different channels are wired.

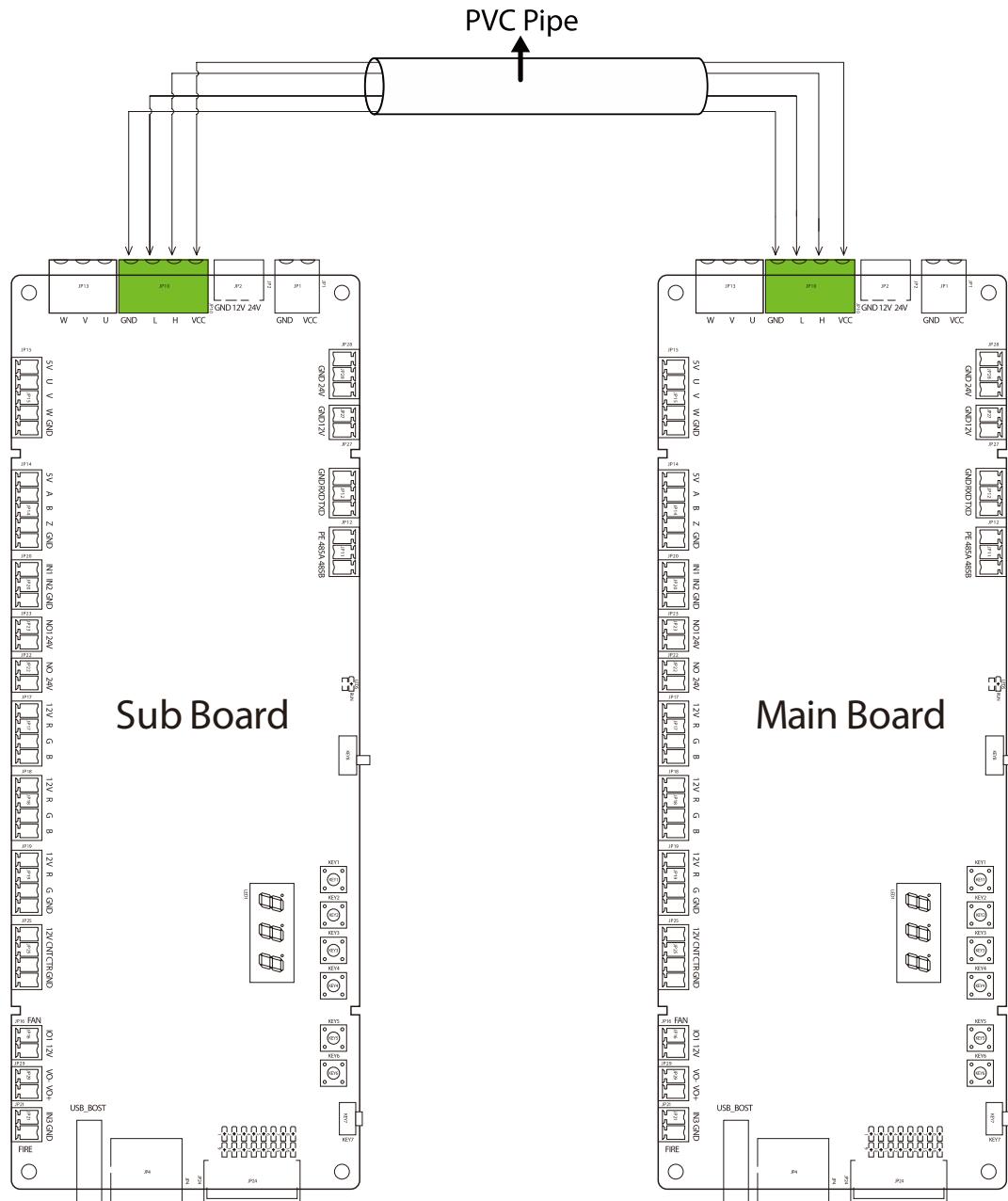


### Wiring Instructions

- 5-core connecting wire(M-S)
- AC110/220V input
- FACP(Fire alarm)
- Access controller cable

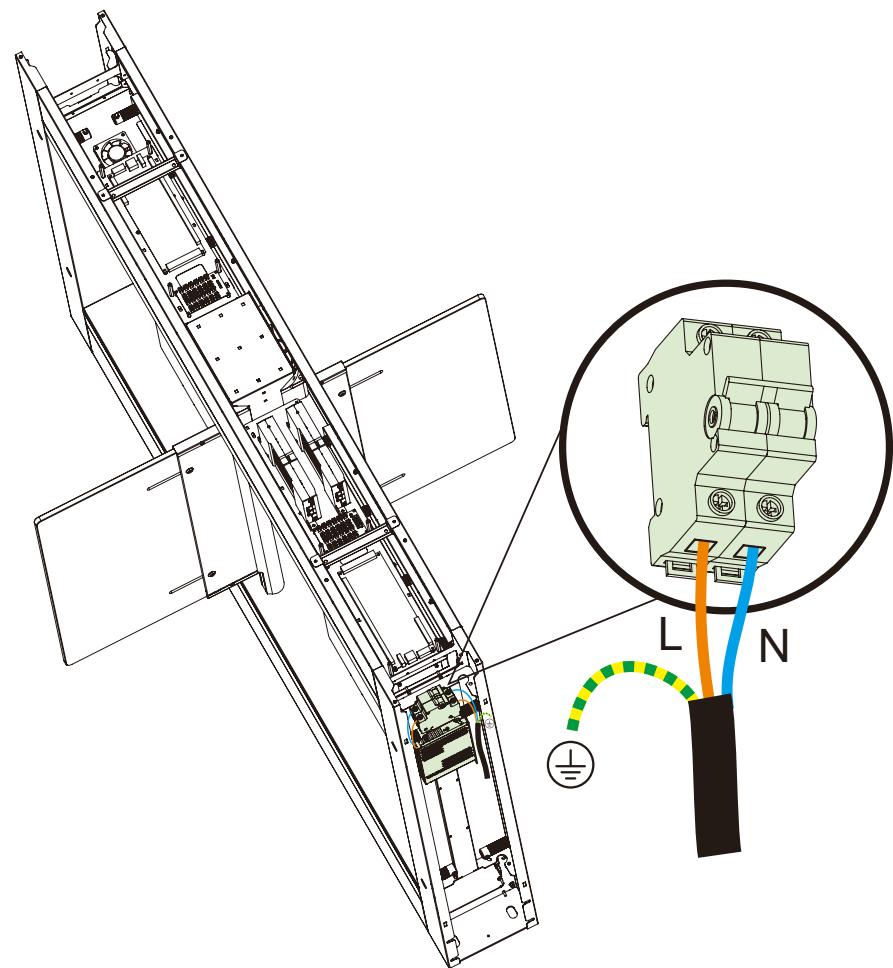
## 5.4 Main and Sub Connection Cable

Pass the Main and sub connecting wires through the PVC tubing and then plug them into the J41 ports respectively to communicate as shown below.

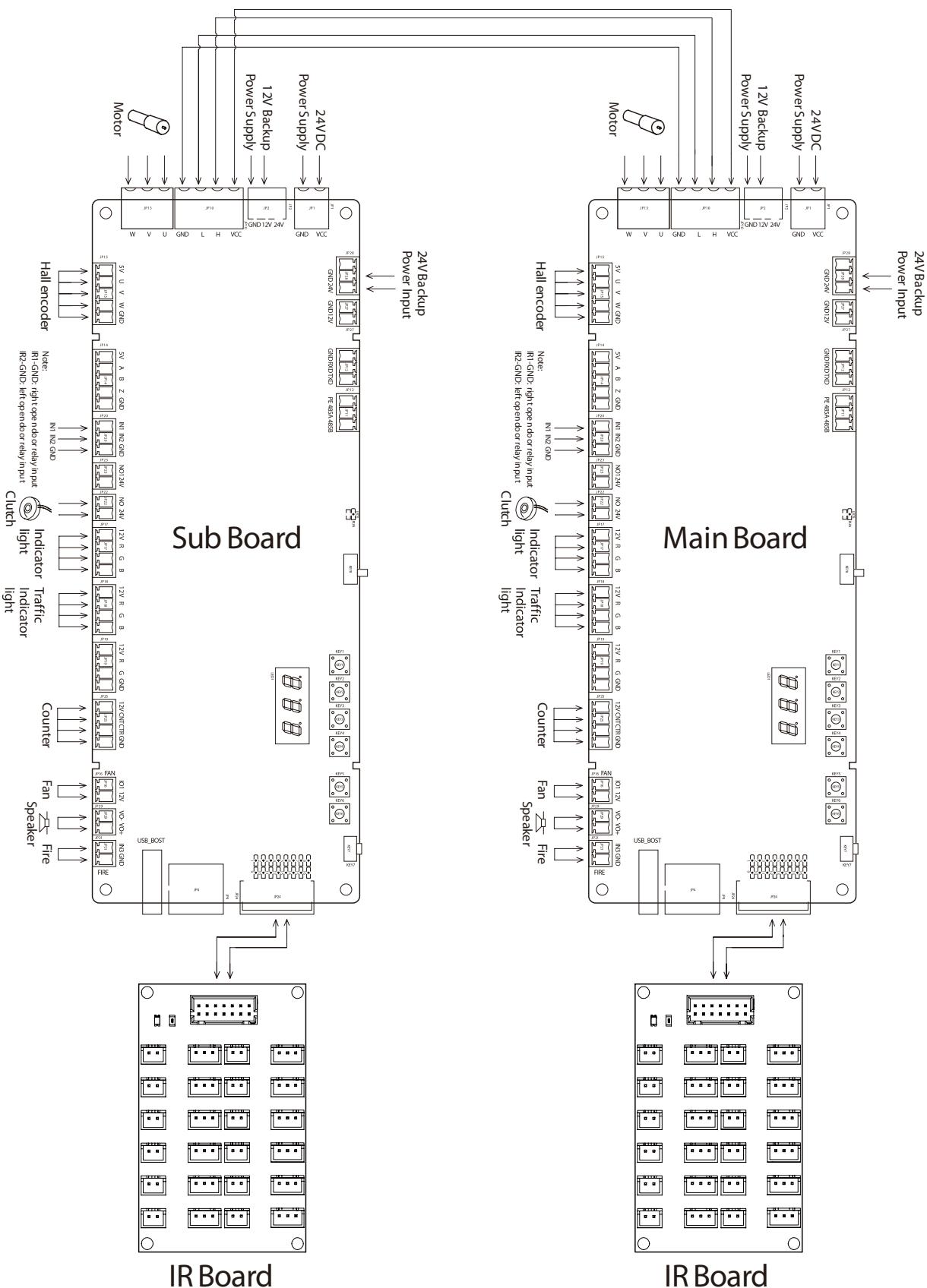


## 5.5 Power and Air Switch Wiring

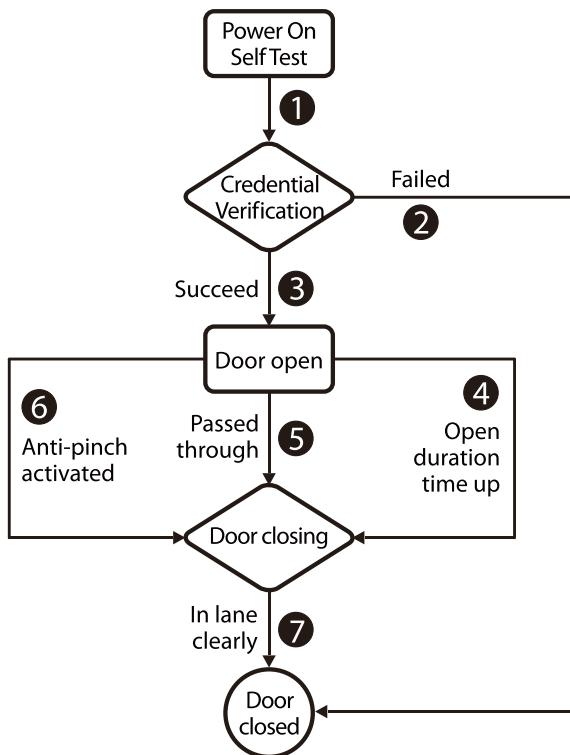
120VAC and 240VAC primary power must be hard wired in place (Note: must be grounded). It is strongly recommended that a licensed electrician perform this procedure in accordance with applicable local codes.



## 5.6 System Wiring Diagram



## 6 Operation Process

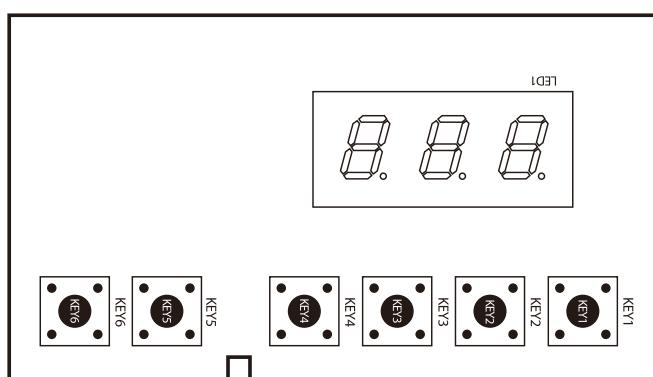


### 1. POST (Power On Self Test)

When powering up the unit, wait 30 seconds for the system to perform a POST (Power On Self Test) procedure. If no problems are detected, the unit will operate normally. If a fault is detected, the system will display a relevant message on the LCD display so that the user can quickly understand and solve the problem. (Reference [5.5 Power and air switch wiring](#) for connecting the air switch and power supply.)

### 2. Credential Verification

After the unit's power on self test is complete, you can test the door opening by pressing the **KEY 2** / **KEY 3** button on the motherboard.



When the user presses the **KEY 2/ KEY 3** button on the main board, it is equivalent to recognizing a valid card. The LCD display will show success and a buzzer will give a positive audible indication to the pedestrian that it has been successfully validated. The card reader then sends a signal to the access controller requesting permission to pass through the channel. The access controller will send a signal to the revolving door control panel. After receiving the signal from the card reader and the Infrared Sensor, the Turnstile Control Board will send valid control signals to the servo motor driver.

### **1) Verification Success**

When the verification is successful, the door is opened.

### **2) Validation Failure**

When verification fails, the door remains closed.

**Note:** At this time, if the system is in forbidden passing mode, the mode indicator light will turn red, and the Turnstile Control Board will not accept signals of card.

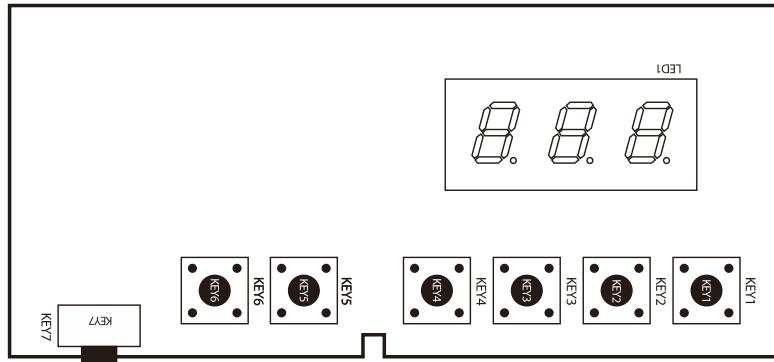
### **3. Passed Through**

After the passenger passes the channel according to the opening direction of the swing arm, the Infrared Sensor will keep detecting the movement of the pedestrian throughout the passage and continue to deliver signals to the Turnstile Control Board until the pedestrian passes through the passage.

If the pedestrian enters without ID or an invalid card, the system will prompt an audible alarm. The alarm signal will not be canceled until the passenger retreats from the passage. The pedestrian can pass through the passage only after a valid card is successfully verified.

## 7 Machine Operation

### 7.1 Operation Buttons Description



There are six menu operation buttons on the main/sub board.

#### Operation Buttons Description:

- **KEY1:** Return, exit menu
- **KEY2:** Decrease the value until the lower limit
- **KEY3:** Incremental value up to the upper limit
- **KEY4:** Start menu/Confirm
- **KEY5:** In
- **KEY6:** Out
- **KEY7:** Restore Defaults/Reboot

#### Note:

1. **KEY5, KEY6, KEY7** buttons on the sub device are not available.
2. Long press **KEY4** for more than **1** second to enter the menu option page (starts with letter C, followed by 2 digits). Red colour indicates the default value.
3. Long press key **KEY7** for more than **3** seconds to restore default settings, short press for reboot.

### 7.2 Menu Parameter Settings

Menu	Parameter Definition	Default Value	Range Value
<b>C01</b>	Motor Type	0	0: Null Type 1: GPG G2BLD40-24-18S 2: FAD 106-WS60L-20-4030 3: LINIX 60ZWN24-55-C/80JC60G3024
<b>C02</b>	Set Door Closing Position	0	0: Ignore 1: Effective

<b>C03</b>	Set Right Door Opening Position	0	0: Ignore 1: Effective
<b>C04</b>	Set Left Door Opening Position	0	0: Ignore 1: Effective
<b>C05</b>	Aging Test	0	0: Exit, 1: Enable
<b>C06</b>	Fan	0	0: Close 1: Open
<b>C07</b>	Passage Mode	1	1. Entry authorized, exit authorized 2. Entry authorized, exit free 3. Entry free, exit authorized 4. Entry free, exit free 5. Entry authorized, exit prohibited 6. Entry prohibited, exit authorized 7. Entry free, exit prohibited 8. Entry prohibited, exit free 9. Entry prohibited, exit prohibited 10. Right always open 11. Left always open 12. Entry peak, exit authorized 13. Entry peak, exit free 14. Entry peak, exit prohibited 15. Entry authorized, exit peak 16. Entry free, exit peak 17. Entry prohibited, exit peak <b>Note:</b> In peak mode, it automatically switches to non-pinch mode at the beginning and end.
<b>C08</b>	Memory Gate Opening	0	0: Off 1: On
<b>C09</b>	Card Swiping Outside the Passage	1	0: in-channel authentication is allowed 1: in-channel validation not allowed
<b>C10</b>	Set Door Opening Speed	100	0 to 100 <b>Note:</b> The door opening speed setting parameters 50-100 will not change the operating speed value. The effective parameters are 0-50.
<b>C11</b>	Set Door Closing Speed	100	0 to 100 <b>Note:</b> The closing speed setting parameters from 50 to 100 will not change the operating speed value. The effective parameters range from 0 to 50.

<b>C12</b>	Passage Timeout	5	5 to 60 seconds
<b>C13</b>	Door Closing Delay	0	0 to 60 seconds
<b>C14</b>	Dwell Time	10	5 to 60 seconds
<b>C15</b>	Electric Lock Type	0	0: No lock 1: Clutch 2: Electromagnet
<b>C16</b>	Reverse Intrusion Setting	0	0: Alarm on Door Closure 1: Alarm 2: Ignore <b>Note:</b> When C16 is set to 0, it will automatically switch to non-squeeze mode at the beginning and end.
<b>C17</b>	Tailgating Setting	1	0: Alarm on Door Closure 1: Alarm 2: Ignore <b>Note:</b> When C17 is set to 0, it automatically switches to non-pinching mode at the beginning and end.
<b>C18</b>	Anti-Pinch Setting	1	0: Flap stops 1: Flap stops and reverses to open 2: Ignore <b>Note:</b> a. When parameter C16 or C17 is set to 0, the reverse opening function of anti-pinch setting option 1 is invalid. b. When the parameter is set to 1, during the door closing process, if a pedestrian enters from the opposite direction, triggering the anti-pinch function will only stop the door without opening it to avoid causing injury.
<b>C19</b>	Anti-pinch Zone	0	0: All Infrared 1: Excluding First and Last Infrared
<b>C20</b>	Fire Mode	0	0: Open Right Door 1: Open Left Door 2: Ignore

<b>C21</b>	Door Closing Mode	1	0: Close the door after exiting the lane 1: Close the door after passing through the anti-pinch zone <b>Note:</b> When C21 is set to 0, C19 must be set to 0. When C21 is set to 1, C19 must be set to 1.
<b>C22</b>	Alarm Sound Setting	1	0: Close 1: Open
<b>C23</b>	Voice Switching	1	0: Voice Announcement 1: Alert Tone
<b>C24</b>	Voice Volume	80	0 to 100, Default 80
<b>C25</b>	Inbound Voice	0	0 to 30, Default 0 <b>Note:</b> Inbound voice options 0 to 21 are valid, 22 to 30 are reserved.
<b>C26</b>	Outbound Voice	17	0 to 30, Default 17 <b>Note:</b> Outbound voice options 0 to 21 are valid, 22 to 30 are reserved.
<b>C27</b>	Inbound Passage Count Reset	0	0: No 1: Yes
<b>C28</b>	Outbound Passage Count Reset	0	0: No 1: Yes
<b>C29</b>	Developer Mode	0	0: No 1: Yes (Ignore, used for obtaining exception data)

## 8 Maintenance

### 8.1 Chassis Maintenance

The chassis is made up of stainless steel(SUS304) (Chassis Body). If it is used for substantial period, then there may be rust stains on its surface. Regularly clean the surface with a clean cloth carefully. Coat the surface with anti-rust oil and do not cover the infrared sensor.

### 8.2 Movement Maintenance

Before doing maintenance, turn off the power. Open the door, wipe the surface dust, and apply lubricant for smooth movement.

### 8.3 Power Supply Maintenance

- **Switch off the power supply before maintenance.**
- **Check the power plug connection, if found loose, fix it properly.**
- **Do not change any connection position randomly.**
- **Check the external power supply insulation periodically.**
- **Do periodic check for any kind of leakage.**
- **Check if the technical parameters of interface are normal.**
- **Check the service life of the electronic components and replace accordingly.**

**Caution:** All the above-mentioned maintenance methods for swing barrier must be carried out by a professional technician, especially the movement and the electric control part. For ensuring operational safety, first switch off the power supply when the barrier is not in use. Perform the safety check on a weekly basis to ensure that the turnstile is safe and ready for user operation.

## 9 Troubleshooting

No.	Failure Descriptions	Analysis and Solution
1	The mode indicator light does not respond or the indication is incorrect.	Check that the control panel mode indicator wiring is correct or that the contact is poor.
2	After swiping the card, there is only a speed gate unlocked.	Check the mode setting of the main and sub devices and the 8-core, 2-core connection lines. See the wiring diagram for the specific connection circuit.
3	The barrier doesn't close when the opening delay time is ended.	Check to see if the opening delay time is too long or whether the IR sensor is covered.
4	When the gate is self-tested, the swing arm is not in the normal closing position!	In the process of self-test, there are obstacles, please remove the obstacles, restart the self-test after power-on!

## 10 Packing List

The package consists of the following items:

● **Saturn-S2000:**

	Saturn-S2000 (Main and Sub)	2
	Power Cable	1
	Expansion Screw M12*100	8
	Stainless Steel Maintenance Wipes	1
	Hex Wrench	1

● **Saturn-S2200:**

	Saturn-S2200	1
	Power Cable	1
	Expansion Screw M12*100	4
	Stainless Steel Maintenance Wipes	1
	Hex Wrench	1

## Revision History

Revision	Date	Author	Reviewer	Description
V1.0	01/27/2026	Julia Huang		Original Document

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