

User Manual

Saturn-T1000

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English



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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-T1000 Tripod Turnstile**.

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
	Dangers: Follow these safeguards to prevent serious injury or death.
	Cautions: 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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1 Overview

The Saturn-T1000 tripod turnstile boasts stable performance and outstanding waterproof effects, making it suitable for sheltered outdoor installation. The product is constructed from cold-rolled SPCC steel with powder coating (pearl white), and an integrally molded top cover, ensuring an aesthetically pleasing, compact design that is rust-proof and durable. The system is equipped with standard electrical interfaces to meet fire passage requirements. It is ideal for access control, attendance, consumption management, and special passage control at enterprises and institutions, as well as ticket verification at stations, docks, exhibition centers, swimming pools, and other venues.

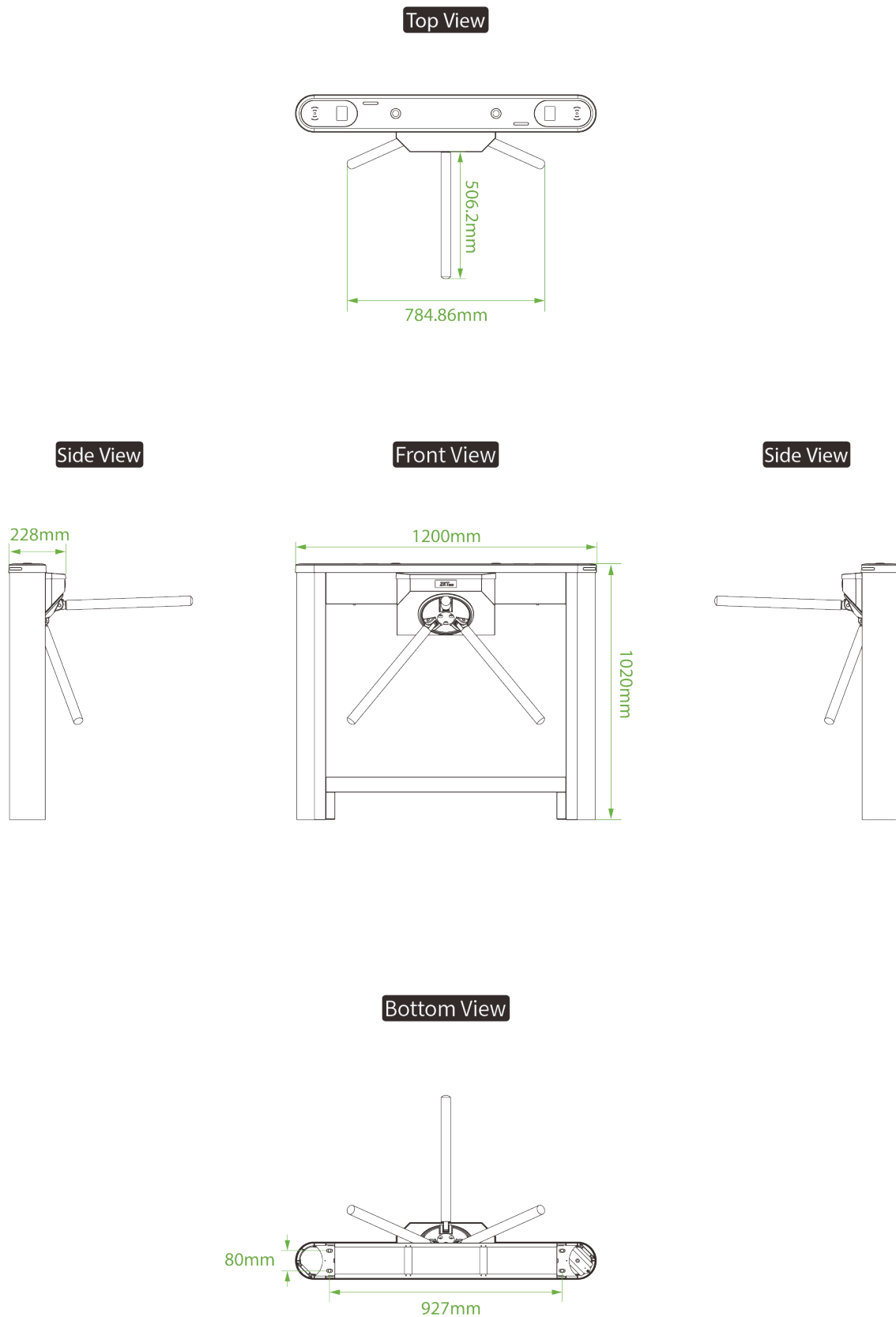


1.1 Key Features

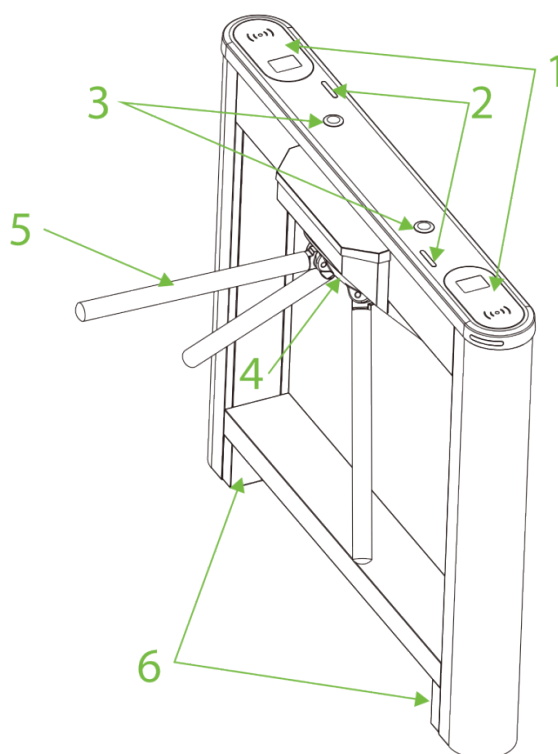
- Enhanced Waterproof Design: Passed the self-laboratory test which is equivalent to IPX4 protection rating. Ideal for indoor and outdoor (sheltered) operation.
- RS485 Communication Interface: Enables seamless system integration.
- Modular Construction: Simplified maintenance and component replacement.
- Compliant with IEC Wiring Standards: Optimized internal circuitry with clean, organized cable management.
- Power Failure Auto-Drop & Manual Reset: Bar automatically drops during power loss and can be manually reset, with full anti-tailgating protection.
- ZKTeco Multi-modal BioCV Technology: Supports multi-mode verification (facial recognition, QR code scanning, and card access) for enhanced security.
- External Control Support: Compatible with control signals, push buttons, or remote devices for configurable one-way/two-way access control.
- Intuitive Passage Indicators: Tri-color LED lights (blue: standby, green: passage granted, red: alarm/error).
- Quick and Easy Installation: Streamlined setup for efficient deployment.

1.2 Specification

1.2.1 Appearance



1.2.2 System Components



1. Authentication Units	2. Traffic Indicator
3. Facial Recognition Terminal Mounting Holes	4. Disk Wheel
5. Arm	6. Cover Plate

1.2.3 Technical Specifications

Model	Saturn-T1000
Audio Indicator	Buzzer
Visual Indicator	LED Indicator Blue=Standby Green=Access Granted Red=Alarm/Error
Lane Type	Single Lane (Support bi-directional entry/exit lane)
Lane Width	550mm
Barrier Movement Type	Rotating (Tripod)

Lid Material	Polycarbonate+2.5D tempered glass
Lid Options Authentication Methods	RFID / Facial Recognition / QR code (Dynamic / Static)
Chassis Material	Cold-rolled SPCC Steel (GB700) (with powder coating finishing)
Chassis Color	Pearl White (PWH)
Tripod Rod Material	SUS304 Stainless Steel
Motherboard Function	System mode configuration, Access mode configuration
Motherboard Communication	Fire Alarm Port (Relay)*1, RS485 Port*1
Controller	Access controller Options: C3, InBio series or third-party controller subject to turnstile chassis space
Credential Options	Post mount Facial Recognition Device: G4 Pro Under mount QR code Reader: QR500 Under mount RFID Reader: ProID10
Flow Rate	Face: 15 Passengers per minute RFID: 25 Passengers per minute QR code: 25 Passengers per minute
Power Supply	AC 110V~220V, 50/60Hz, DC 12V
Power Rating	Operating: 40W, Standby: 10W
Fire Signal	Input for voltage-free contact
Noise Level	< 65dB
MCBF	2 Million
Weight	25kg
Dimensions (L*W*H)	1200*734*1020mm
Dimensions with Packaging (L*W*H)	1300*305*1106mm
Operating Temperature	-20℃ to 70℃
Operating Humidity	20% to 80% RH (non-condensing)
Certifications	CE, FCC
Ingress Protection Rating	Self-laboratory test: equivalent to IPX4
Supported Software	ZKBio CVAccess/ ZKBio CVSecurity (Compatible with software only when connected to the control panel)
Safety Features	Auto drop arm during power failure and emergency

Security Features	Anti-tailgating
Product Delivery	Pre-assembled
Application Environment	Indoor/Outdoor (If sheltered)
Site Preparation	Flat and level finished floor (optional base plate for unfinished floors)
Security Level	Middle
Emergency Mode	Drop arm function engages during power outage or fire alarm events
Packing Material	Carton box

1.3 Mechanical System

The mechanical system of the tripod turnstile includes the chassis and the core component. The chassis serves as a carrier for the tri-color indicator, Reader, and Access controller. The core components primarily include the Motor, Frame, Bearing, Arm, and other essential elements.

1.4 Electronic Control System

The electronic control system of a tripod turnstile mainly consists of the Card Reader, Turnstile Control Board, Access Controller, Alarm and traffic Indicator.

Card Reader: The reader reads the data on the card and transmits it to the Access Controller.

Turnstile Control Board: The turnstile control board serves as the control center of the system, receiving signals from the access controller and photoelectric switch; and it makes logical judgments and processes these signals, then subsequently sends executive commands to the traffic indicator, motor, and alarm.

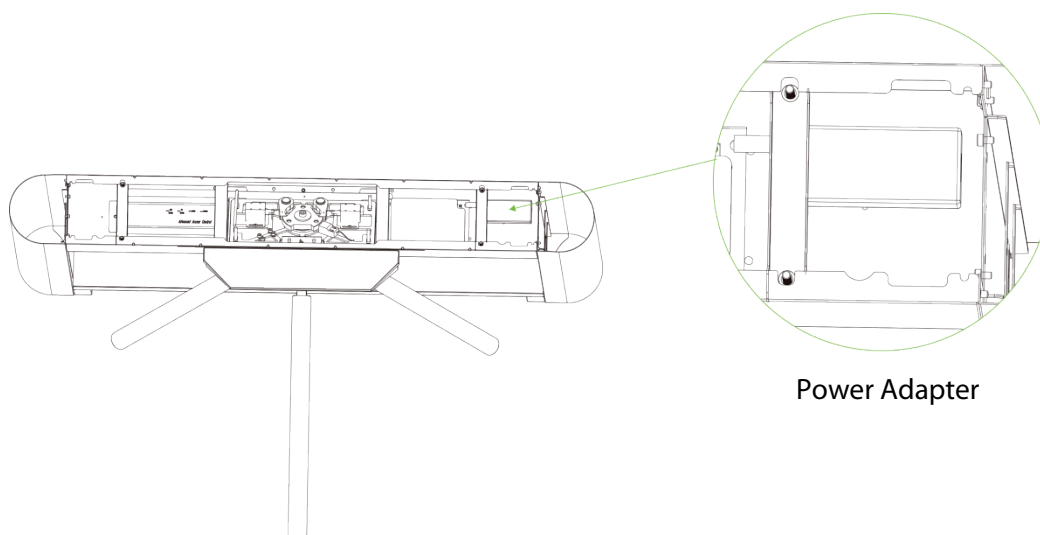
Access Controller: This component enhances convenience for authorized personnel by facilitating entry while simultaneously restricting access for unauthorized individuals.

Tri-color Indicator: Displays the current passage status of the channel and guiding pedestrians to pass through the channel in a safe and orderly manner. (**Normal status:** Blue; **Passage allowed:** Green; **Abnormal/Error status:** Red)

Alarm: This system issues an alarm alert when the system detects unauthorized entry or illegal access by pedestrians.

1.5 Working Principle

1. When connected to power, the tripod turnstile undergoes a Power-On Self-Test. If no issues are detected during this process, the turnstile will operate normally.



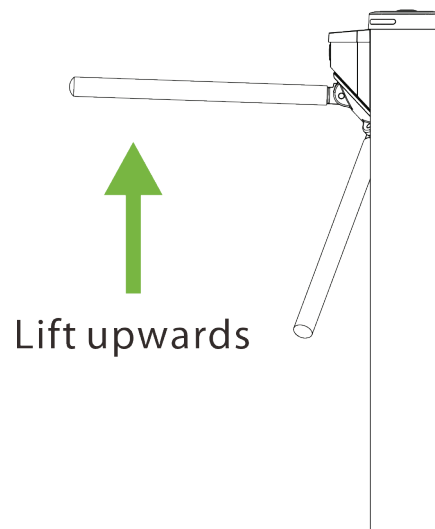
Power Adapter

2. When the card reader successfully reads a valid card, the peak buzzer emits a pleasant sound, signalling to pedestrians that the card reading is successful. Simultaneously, the system processes the information from the card, sending a signal to the turnstile control board to request passage.
3. The turnstile control board receives the signal from the card reader, processes it comprehensively, and sends an effective control signal to the indicator and motor. The traffic indicator turns green, and the control board activates the electromagnet to open the gate. Pedestrians can gently push the unlocked arm, and it will automatically rotate, allowing them to pass through the channel following the guidance of the traffic indicator.
4. If a pedestrian enters the passage without successfully verifying their identification or with an invalid card, the system will not grant passage. Only when a valid card is successfully confirmed will the pedestrian be allowed to pass through the passage.

Note: Make sure the ground wire of the system is securely connected to avoid personal injuries or other accidents.

1.6 Power-On Self-Test

1. Connect the tripod turnstile's power adapter to a 220V mains power source. Important: Ensure that the tripod turnstile is properly grounded.
2. Power on the tripod turnstile and wait 30s to complete the self-check program.
3. Lift the arms manually, as shown in the diagram below:

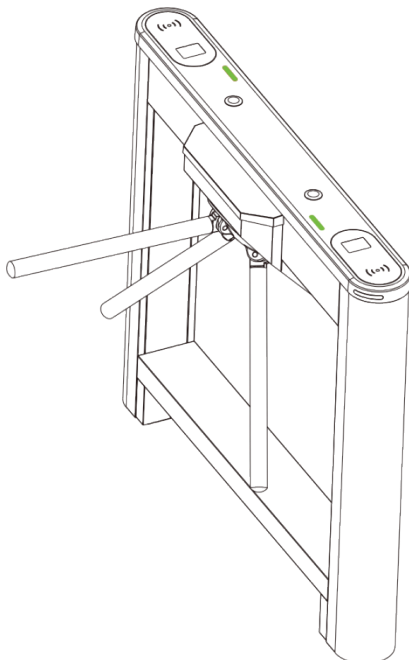


4. Use a two-way switch to test the proper functioning of the tripod turnstile, and ensure to check that the traffic indicators are working correctly. In case of any issues, please contact the supplier for assistance.

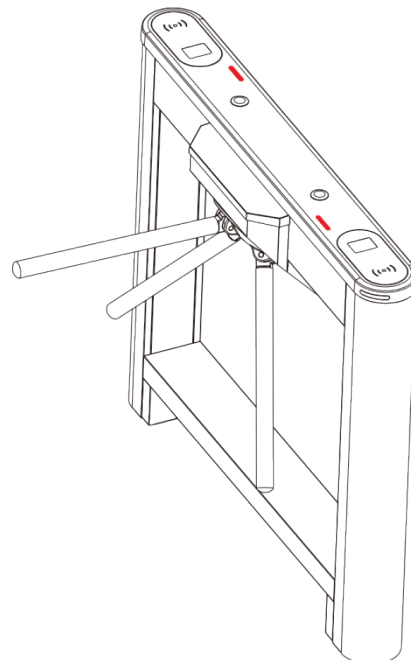
1.7 Status of Traffic Indicator

The tripod turnstile is in working state after power-on self-test. The traffic indicators provide pedestrians with the appropriate passage indications.

Passage allowed:



Abnormal/Error:

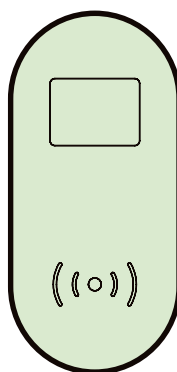


2 Authentication Methods

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

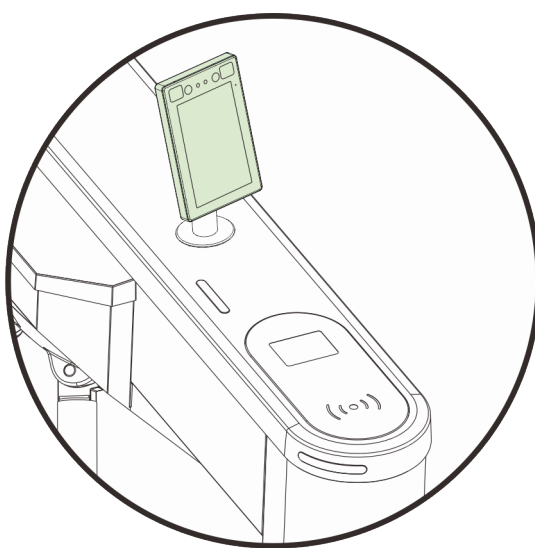
Streamlined Under Mount Options:

RFID only, RFID & QR Code.



Surface Mount Option:

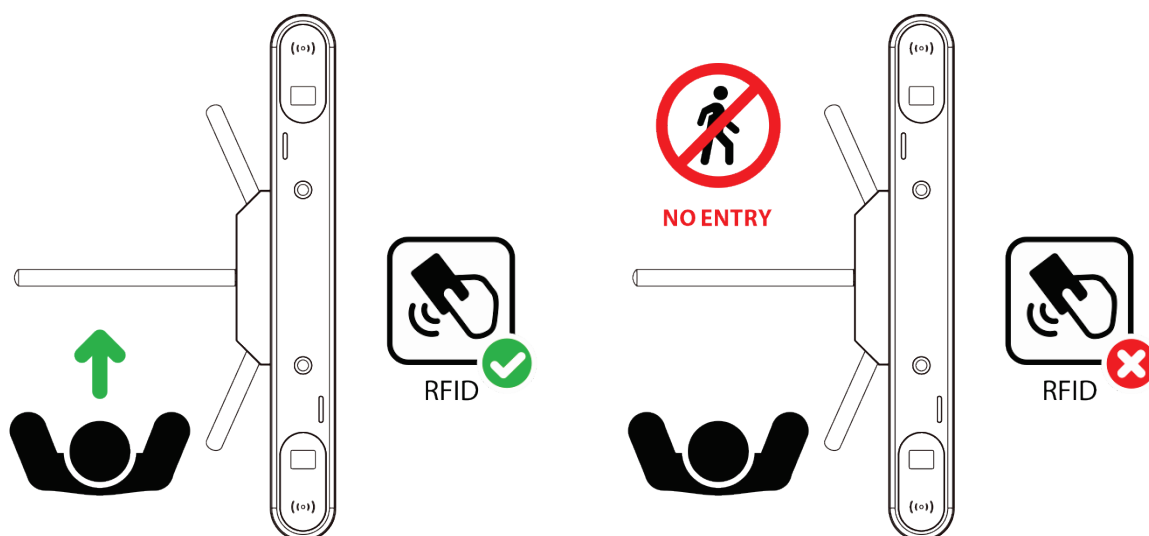
Mounting Pole (Compatible with ProFace X series / SpeedFace V5L / Elite Pass).



2.1 Card Verification★

When the device is configured with a card swipe 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.

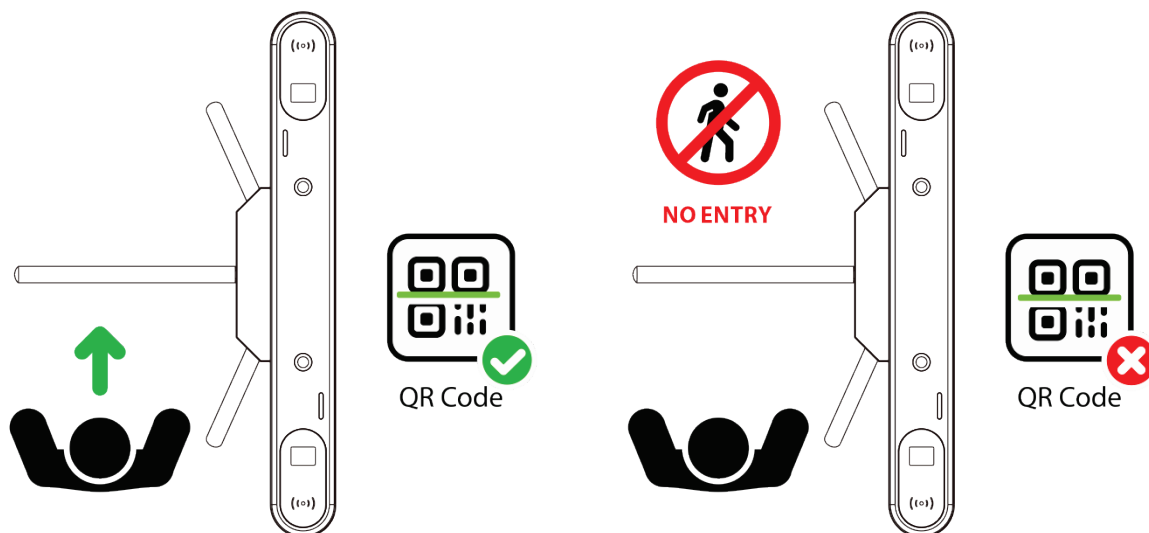
When a user presses his / her card on the card reading area, the device enters card authentication mode.



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★

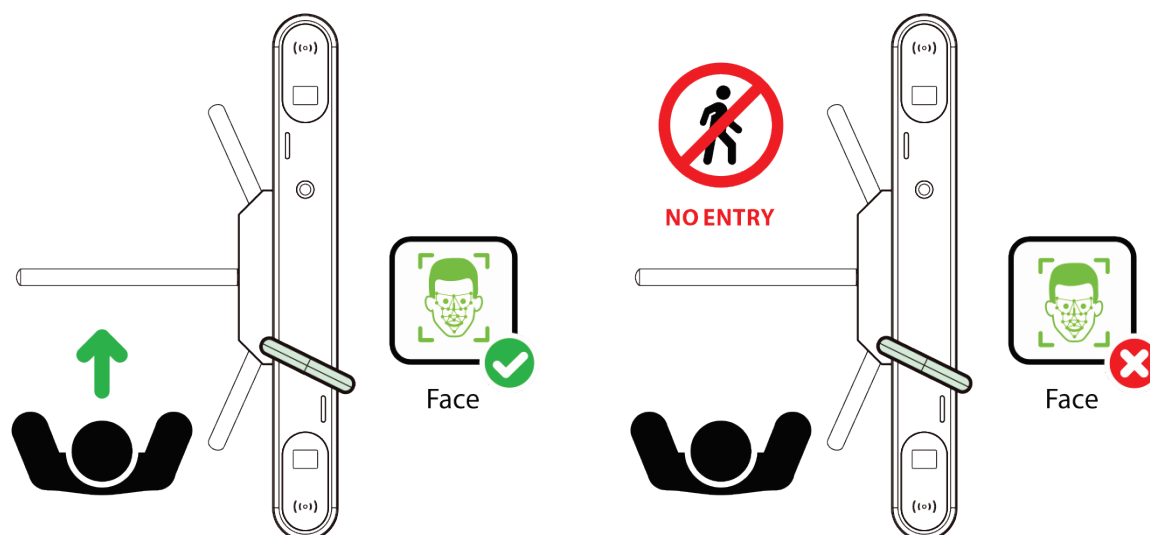
In this verification mode, the device compares the collected facial images with all face data registered in the device and then sends it to the Access Controller.

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:

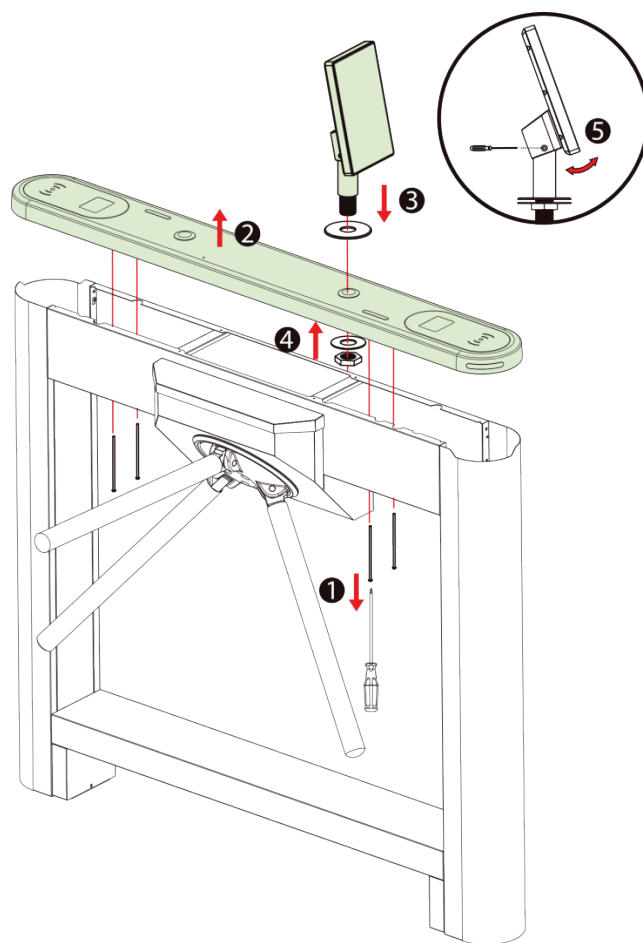


Note: Please keep your facial expression and standing posture natural while enrollment or verification.



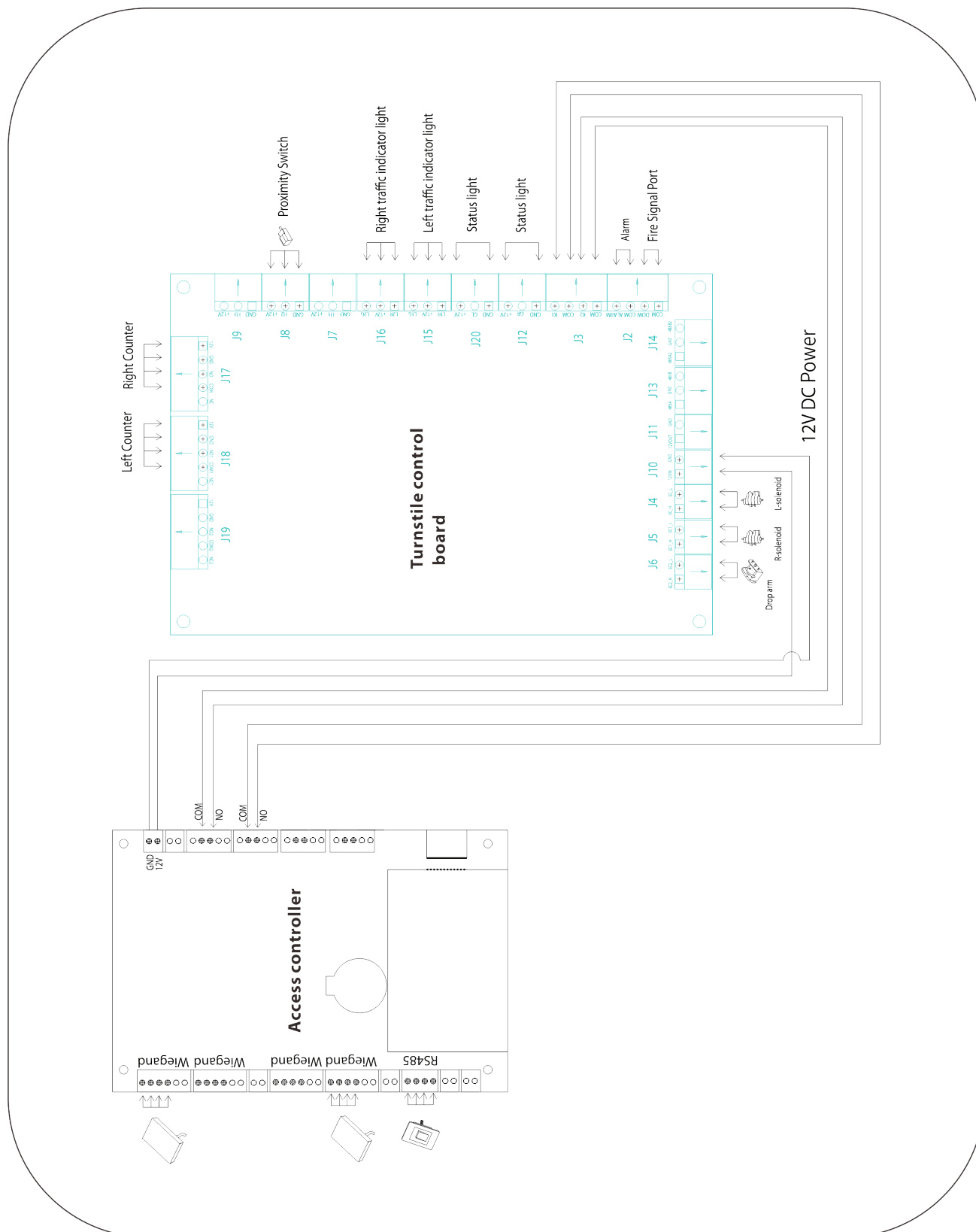
Facial Authentication Terminal Installation:

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.

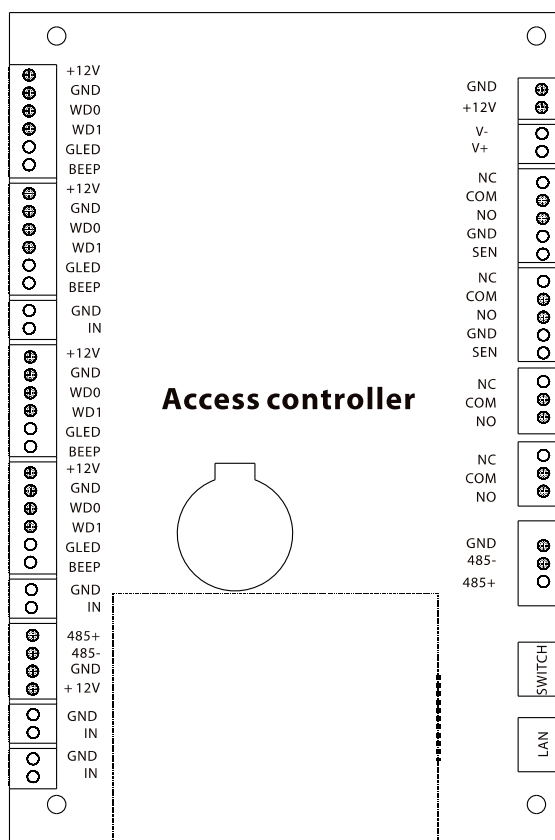


3 Control System Description

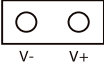
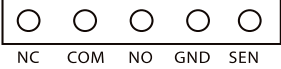
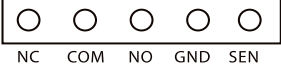
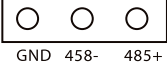
3.1 Wiring Diagram



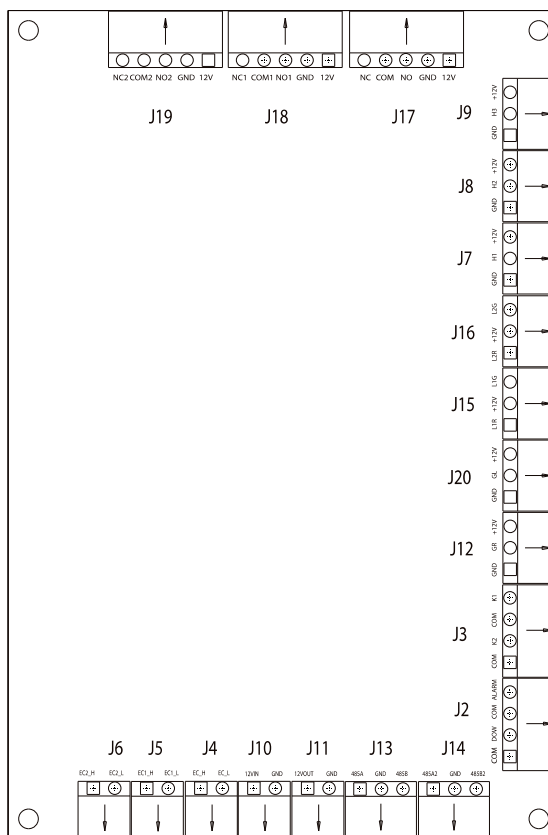
3.2 Access Control Board



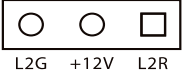
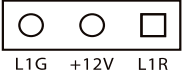
Terminal	Description
	Reader
	Reader
	Reserve
	Reader
	Reader
	Reserve
	RS485

	Reserve
	Reserve
	Power In
	Lock
	Lock
	Lock
	Auxiliary Output
	Auxiliary Output
	485 Connections
	Switch
	Ethernet

3.3 Turnstile Control Board



Terminal		Description
	J19	Reserved
	J18	Left Counter
	J17	Right Counter
	J9	Reserved
	J8	Proximity Switch
	J7	Reserved

 L2G +12V L2R	J16	Right traffic indicator light
 L1G +12V L1R	J15	Left traffic indicator light
 +12V GL GND  +12V GR GND	J20 / J12	Status light
 K1 COM  K2 COM	J3	Right Open / Left Open (In / Out)
 ALARM COM  DOW COM	J2	Alarm / Fire Signal Interface
 485A2 GND 485B2	J14	RS485
 485A GND 485B	J13	RS485
 12VOUT GND	J11	12V Power Supply Output
 12VIN GND	J10	12V Power Supply Input
 EC_H EC_L	J4	R-solenoid
 EC1_H EC1_L	J5	L-solenoid
 EC2_H EC2_L	J6	Drop-arm solenoid

3.3.1 Mainboard Function Description

The DIP switch is divided in eight dial codes from KE-1 to KE-8.

Dial 0 to turn OFF.

Dial 1 to turn ON.

Mainboard Function Item:

- **Unmanned passage time (KE-1, KE-2, KE-3):**

Switch Status	Time Period
000 (OFF OFF OFF)	5s (Default)
001 (OFF OFF ON)	10s
010 (OFF ON OFF)	15s
011 (OFF ON ON)	20s
100 (ON OFF OFF)	30s
101 (ON OFF ON)	40s
110 (ON OFF ON)	50s
111 (ON ON ON)	60s

- **Passage Mode**

The passage mode can be controlled through an RS485-connected wire control box, with selectable modes: Authorized, Free, Blocked, and Always Open.

- **Memory Swipe Mode (KE-6):**

- ✧ Dial 1 (ON) to turn on.
- ✧ Dial 0 (OFF) to turn off.

- **Electromagnet Duty Cycle Switching (KE-7):**

- ✧ **When set to ON:**

If unmanned passage time $\leq 15s$: Both left/right electromagnets maintain 100% duty cycle after release;

If unmanned passage time $> 15s$: 100% duty cycle for first 15s after release, then reduces to 95%.

- ✧ **When set to OFF:**

If unmanned passage time $\leq 15s$: Both left/right electromagnets maintain 100% duty cycle

after release;

If unmanned passage time >15s: 100% duty cycle for first 15s after release, then reduces to 85%.

- **Alarm Mode (KE-8):**

- ✧ Dial 1 (ON) to turn on.
- ✧ Dial 0 (OFF) to turn off.

- **Reserved Dial Code:** KE-4, KE-5

4 Troubleshooting

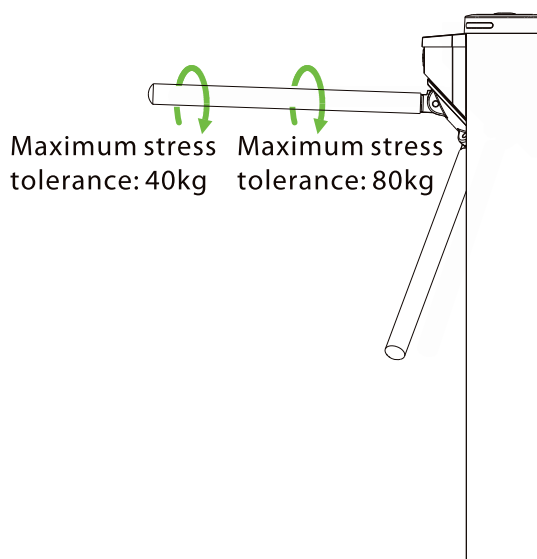
Failure Description	Solution
The light indicator doesn't illuminate when the equipment is turned on	Check for power supply or circuit issues. Examine the connection and power cables for damage or loose wiring.
The device arm can't be manually lifted after powering on	● Check whether the limit seat is properly aligned with the disk wheel when lifting the arm. ● Check whether the arm drop magnet is working properly, open the upper cover of the chassis, open the movement cover with a hexagonal screwdriver and check the working status of the electromagnet.
No gate opening after authentication	● Verify user permissions. ● Refer to the 3.1 wiring diagram to check the wiring.
After opening the gate, the passage is not smooth, and there's high resistance in the push rod, making rotation difficult	Adjust the tension spring by tweaking the live joint bolt at the tension spring.
Dropping the arm during use	● Check if the limit seat is correctly aligned or if there is a gap. ● Ensure the arm drop magnet is fully engaged; if not, power off for 2 minutes and then power on.
Continuous single-sided passage during use without locking the lever.	● Inspect the gate opening magnet by opening the top cover and movement cover with a hexagonal screwdriver. ● Check for any sticking or disconnection in the gate opening magnet or shrapnel.

5 Precaution

1. It is recommended to purchase optional accessories to use in outdoor environment.
 - a) Install optional cooling fans if the working temperature frequently exceeds 50°C.
 - b) Proper installation makes it equivalent to IPX4 waterproof, but it cannot withstand regions prone to typhoons.
 - c) For temperatures below -30°C, consider installing a heating plate. Allow time for automatic self-checking during power-on in extreme cold conditions.
 - d) Note that using the equipment in coastal areas or regions with acid rain may reduce its service life.
2. When power and signal cables are correctly connected, the equipment can be submerged up to a depth of 250 mm in water. Do not power on the equipment when submerged in water to prevent operational issues.
3. It is highly recommended to set up a card swiping warning line to prompt passers-by to swipe cards properly. Establish a reasonable passage width to prevent illegal squeezing by passers-by.
4. It is recommended to place a warning sign at a conspicuous position. The sign should prompt: "Please swipe your card outside the warning line and pass in order. Thank you!"

The maximum tolerance of the tripod turnstile's arms

Note that the maximum stress tolerance at the center of the arm is 80kg, while at the ends of the arm, it is 40kg. In the event of an impact force reaching the designed limit on the tripod turnstile, the arms are engineered to detach first as a safety mechanism. This is a safety feature to prevent damage to the entire equipment and ensure the safety of passers-by.



In case of emergencies

The equipment is designed to automatically drop the arms during a power failure, enabling open passage for safe egress. Furthermore, the turnstile control board offers an interface to connect an emergency switch (Drop Arm), maintaining the tripod turnstile in an open position during emergencies. Note: After power is restored, wait at least 6 seconds before manually lifting the arms.

6 Maintenance

6.1 Chassis Maintenance

The chassis is made of SPCC steel (GB700) with powder coating. If it has been used for a long time, the surface may develop rust stains. It is recommended to clean the surface regularly with a clean cloth.

6.2 Movement Maintenance

Before performing maintenance, ensure the power is turned off. Open the door, wipe away surface dust, and apply lubricant for smooth movement.

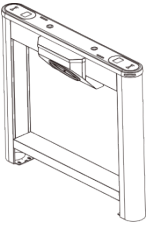
6.3 Power Supply Maintenance

- Switch off the power supply before conducting maintenance.
- Check the power plug connection; if loose, securely fix it..
- Do not change any connection position randomly.
- Periodically check the insulation of the external power supply.
- Conduct regular checks for any potential leakage.
- Check if the technical parameters of interface are normal.
- Check the service life of the electronic components and replace accordingly.

Caution: All maintenance procedures for the swing barrier mentioned above should be carried out by a professional technician, especially when handling movement and electric control components. To guarantee operational safety, it is crucial to switch off the power supply when the barrier is not in use.

7 Packing List

The package consists of the following items:

	Saturn-T1000	1
	Cover Plate	2
	Arm Assembly	1
	Power Adapter	1
	Expansion Screw	4
	Washer	4
	Expansion Screw Washers	4
	Hex Wrench	1
	Hex Socket Cap Screw M10x60 (Used to fix the arm assembly)	3
	Stainless Steel Maintenance Wipes	1

Revision History

Revision	Date	Author	Reviewer	Description
V1.0	09/01/2025	Stella Xia		Original Document

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