User Manual

TS1000 Plus/TS2000 Plus series

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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 **TS1000 Plus/TS2000 Plus series 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.

Document Conventions

Conventions used in this manual are listed below:

GUI Conventions

For Software	
Convention	**Description**
Bold font	Used to identify software interface names e.g. **OK**, **Confirm**, **Cancel**.
>	Multi-level menus are separated by these brackets. For example, File > Create > Folder.
For Device	
Convention	**Description**
< >	Button or key names for devices. For example, press <OK>.
[ ]	Window names, menu items, data table, and field names are inside square brackets. For example, pop up the [New User] window.
/	Multi-level menus are separated by forwarding slashes. For example, [File/Create/Folder].

Symbols

Convention	Description
	This represents a note that needs to pay more attention to.
	The general information which helps in performing the operations faster.
	The information which is significant.
	Care taken to avoid danger or mistakes.
	The statement or event that warns of something or that serves as a cautionary example.

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Revision History

Revision	Date	Author	Reviewer	Description
V1.0	01/08/2024	Yang Kaijin		Original Document

1   Overview

The TS1000 Plus/TS2000 Plus series tripod turnstile is part of ZKTeco's innovative semi-automatic series. Crafted from SUS304 stainless steel, it features a sleek design that seamlessly integrates with common access control systems. The device boasts a beautiful, clean appearance, is rust-proof, and operates smoothly and quietly. Additionally, it is energy-efficient with low power consumption.

The TS1000 Plus/TS2000 Plus series tripod turnstile offers the flexibility to choose between normally open and normally closed modes, supporting two-way traffic. In the normally closed mode, a variety of authentication methods are available, allowing authorized personnel legal access while restricting illegal entry. Upon detecting a valid card, the arm automatically unlocks and rotates with a simple push.

During emergencies or power outages, the turnstile's arm lever automatically drops, enabling the channel to open swiftly for rapid evacuation. This ensures a quick and unimpeded safe evacuation for users. When energized, the arm can be manually raised to create a safe passageway.
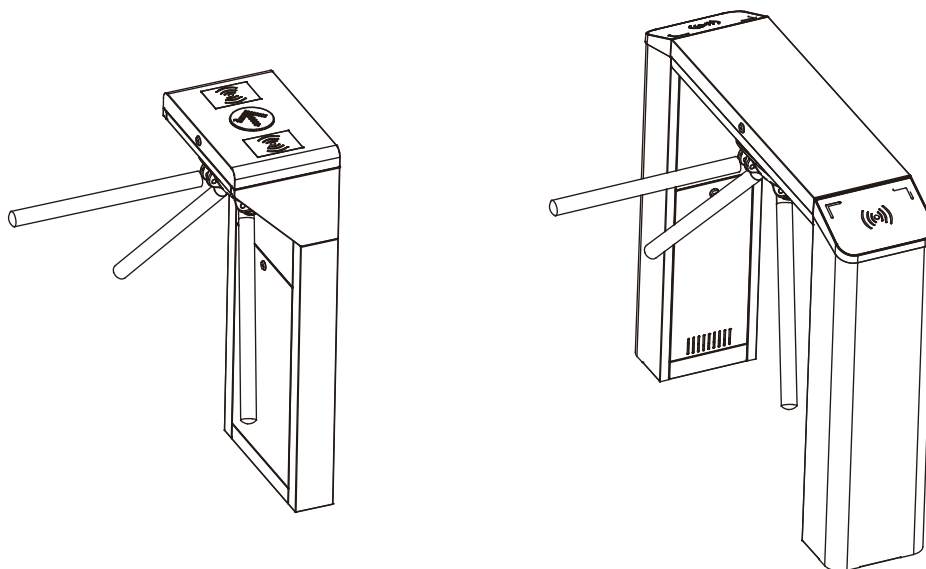
1.1   Features

- Long Service Life: The gate can open and close over 2 million times with regular maintenance.
- Anti-Collision Function: The disk wheel automatically locks when no signal is received to open the gate.
- Automatic Reset: After a valid card is read, if the pedestrian doesn't pass within the specified time, the system cancels their pass authority automatically.
- Anti-Tailgating: Only one person can pass at a time.
- Unified External Interface: Connects to various card readers and allows remote control and management through a management computer.

- Emergency Mode: Automatically drops the arm to allow passage during power failures or fire signals.
- Pass Status Indicator: Provides visual indication of pass status.
- Strong Anti-Interference: Limits abnormal gate operation caused by external factors like electromagnetic interference.

1.2   Appearance and System Components
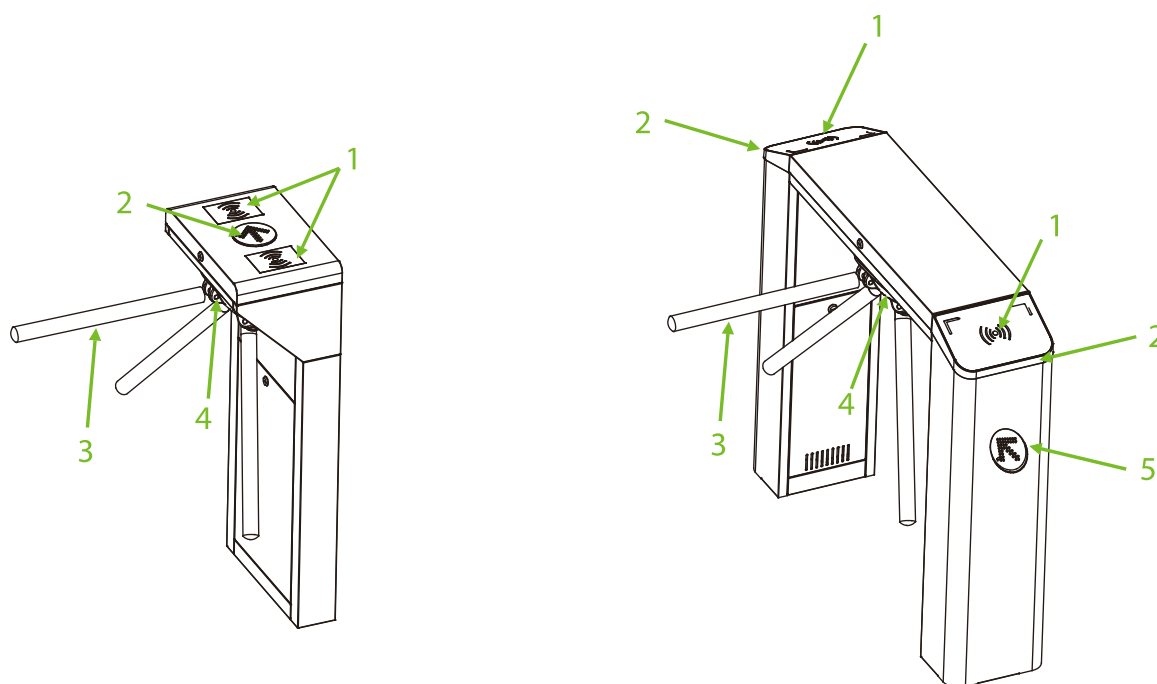
1.2.1 Appearance

The figure below illustrates the appearance and dimensions of the TS1000 Plus/TS2000 Plus:
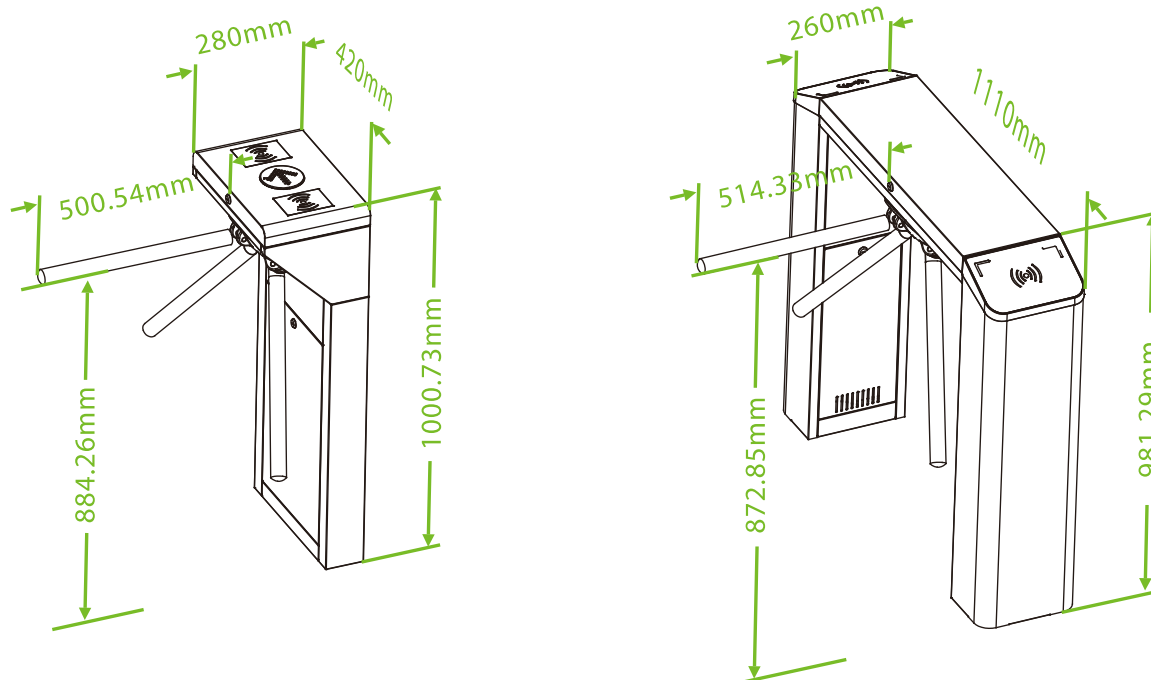
1.2.2 System Components

The following figure displays the system components of the TS1000 Plus/TS2000 Plus:

1. Authentication	2. Traffic Indicator
3. Arm	4. Disk Wheel
5. Channel Mode Light	

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 Indicator, Reader, and a basic 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, Limit Switch 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.

Traffic Indicator: Displays the current passage status of the channel and guiding pedestrians to pass through the channel in a safe and orderly manner.

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

Limit Switch: Controls the position of the gate rotation.

1.5   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:


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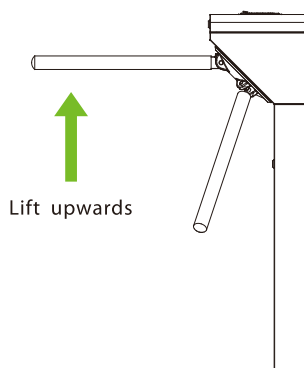
4.   Use a two-way switch to test the proper functioning of the tripod turnstile, and ensure to check that the traffic indicators are working correctly. In case of any issues, please contact the supplier for assistance.
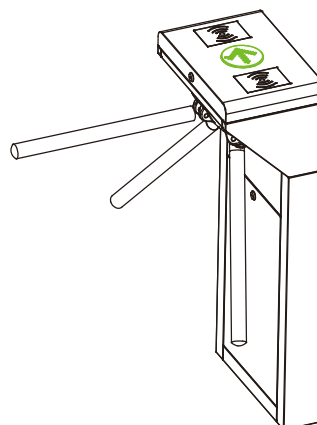
1.6   Status of Traffic Indicator

The tripod turnstile is in working state after power-on self-test. The traffic indicators provide pedestrians with the appropriate passage indications. The following is an example of the TS1000 Plus:
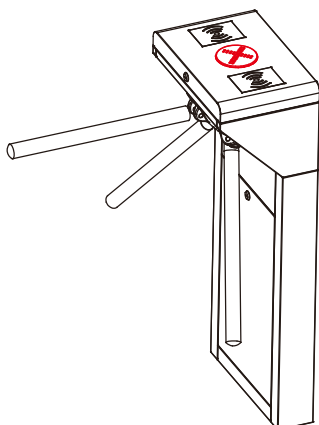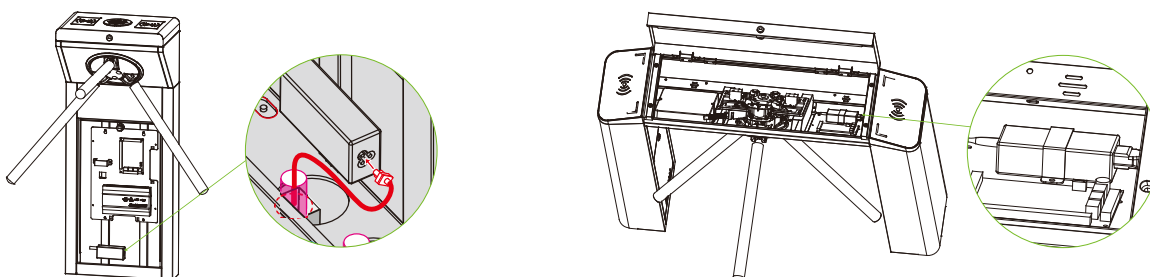
Standby: ✖   **Pass-through (In/Out):** ⬆

1.7   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.

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.

1.8   Technical Specifications

Feature	Specification	
Communication	TCP/IP, RS485	
Input Voltage	AC110V/240V, 50/60Hz	
Input Control Signal	Relay Signal	
Output Voltage	DC 12V	
Protection Level	IPX4	
Operating Humidity	5% to 85% (non-condensing)	
Operating Temperature	-20℃ to 70℃	
Flow Rate	RFID: 25 passengers per minute Fingerprint: 20 passengers per minute	
Drive Unit	Semi-automatic movement	
Visual Indicator	Steady green = normal use Steady red = door closed	
Application Environment	Indoor and outdoor	
Dimension (mm) (L*W*H)	TS1000 Plus	280 x 420 x 1000.73
	TS2000 Plus	260 x 1110 x 981.29
Weight	TS1000 Plus	36kg (±5kg)
	TS2000 Plus	42kg (±5kg)
Noise	65dB	

MCBF	2 million
Certifications	CE, FCC, UKCA, ISO9001

2   Function Introduction

2.1   Card Authentication

In card authentication mode, the device compares the card number in the card induction area with all the card number data registered in the device and sends it to the access controller. When the user brings the card close to the card reading area, the device enters the card authentication mode. When the validation is successful, the traffic indicator of the device turns green, the arm can be pushed, and passage is allowed. In case of validation failure, the traffic indicator turns red, preventing the arm from being pushed, and at the same time, an alarm sounds, and passage is prohibited. The following is an example of TS2000 Plus:
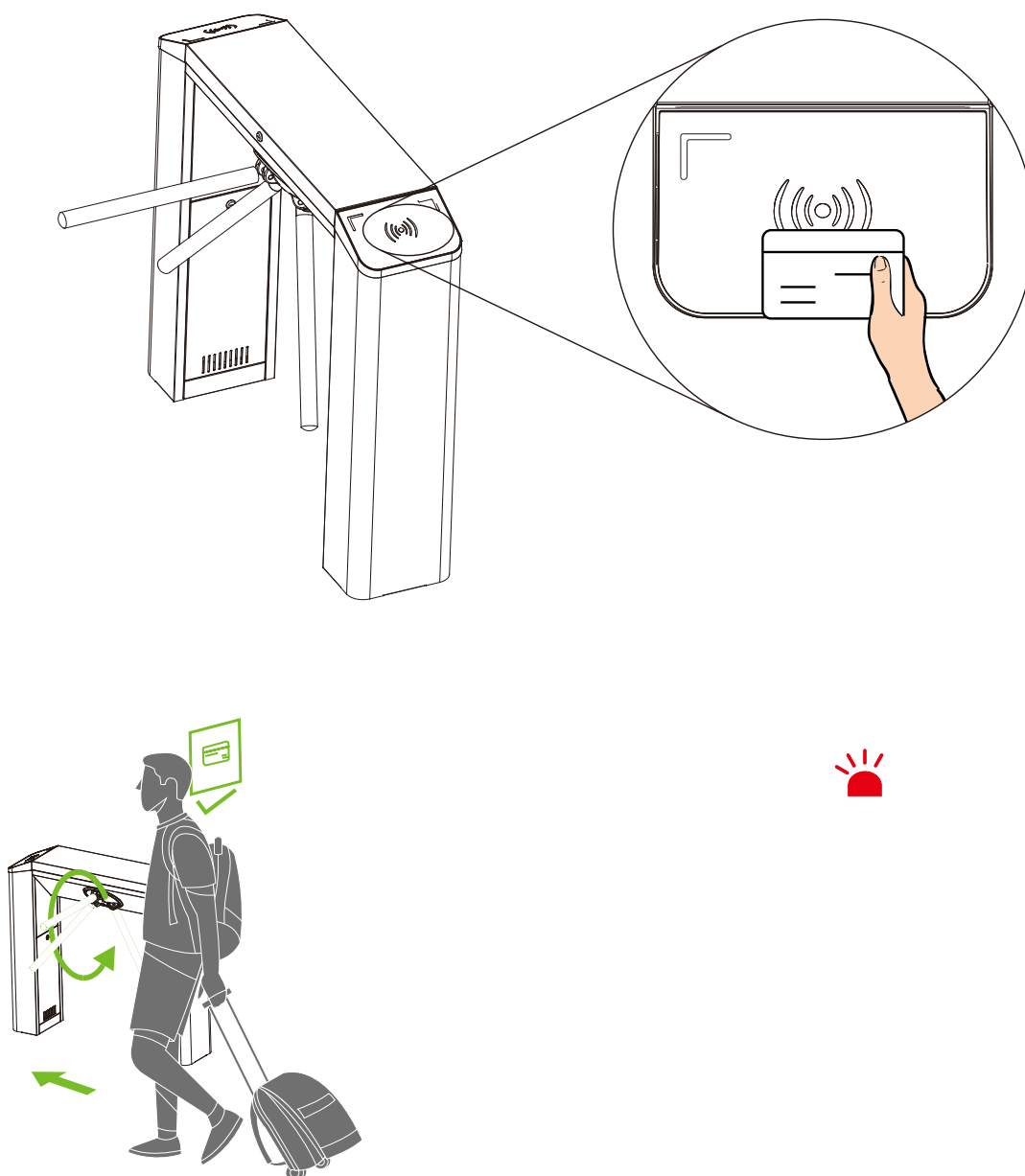
2.2   Face Template Authentication

In facial authentication mode, the device compares the facial template captured by the camera with all the facial data registered in the device and sends it to the access controller. When the authentication is successful, he traffic indicator of the device turns green, the arm can be pushed, allowing passage; In case of authentication failure, the traffic indicator turns red, preventing the arm from being pushed and an alarm sounds, prohibiting passage. The following is an example of TS2000 Plus:

During the authentication process, please try to center your face on the screen. When registering facial information, please make sure your face is facing the camera and remain still.

Recommended Standing Posture and Facial Expression:

Note: Maintain a natural facial expression and standing posture during both enrollment and authentication processes.

Installation on the tripod turnstile:

a) Before installation, insert the wire through the bracket.

b) At the top center of the tripod turnstile, punch a 34mm diameter mounting hole.

c) Insert the bracket into the hole and fix it with a nut.

d) Adjust the angle of the device.
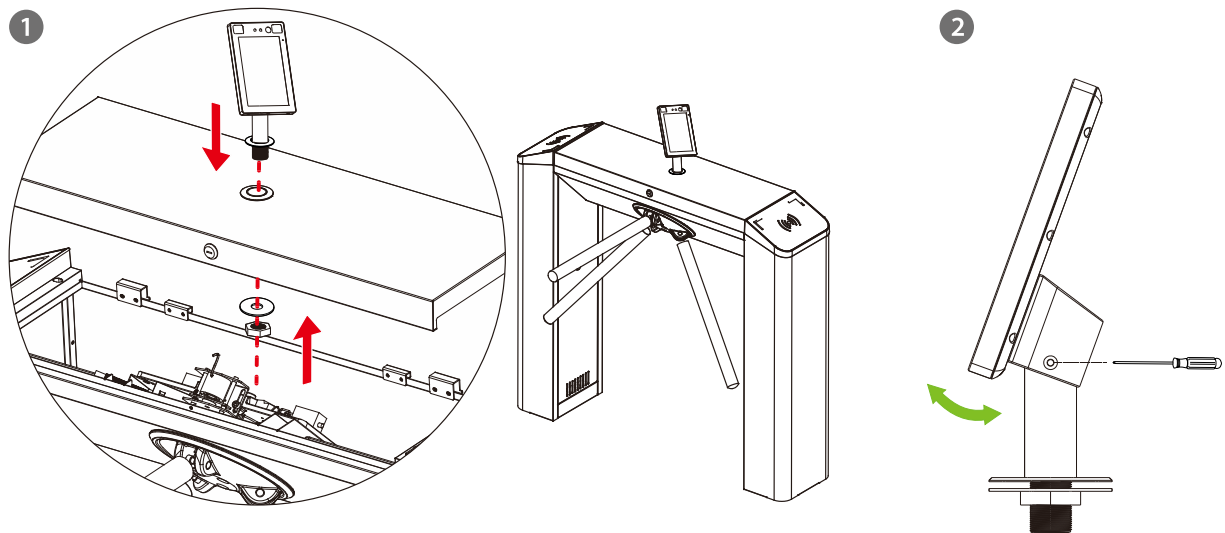
3   Control System Introduction
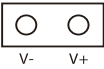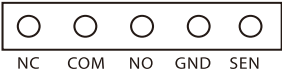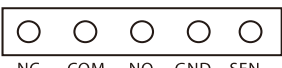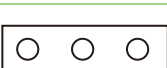
3.1   Wiring Diagram
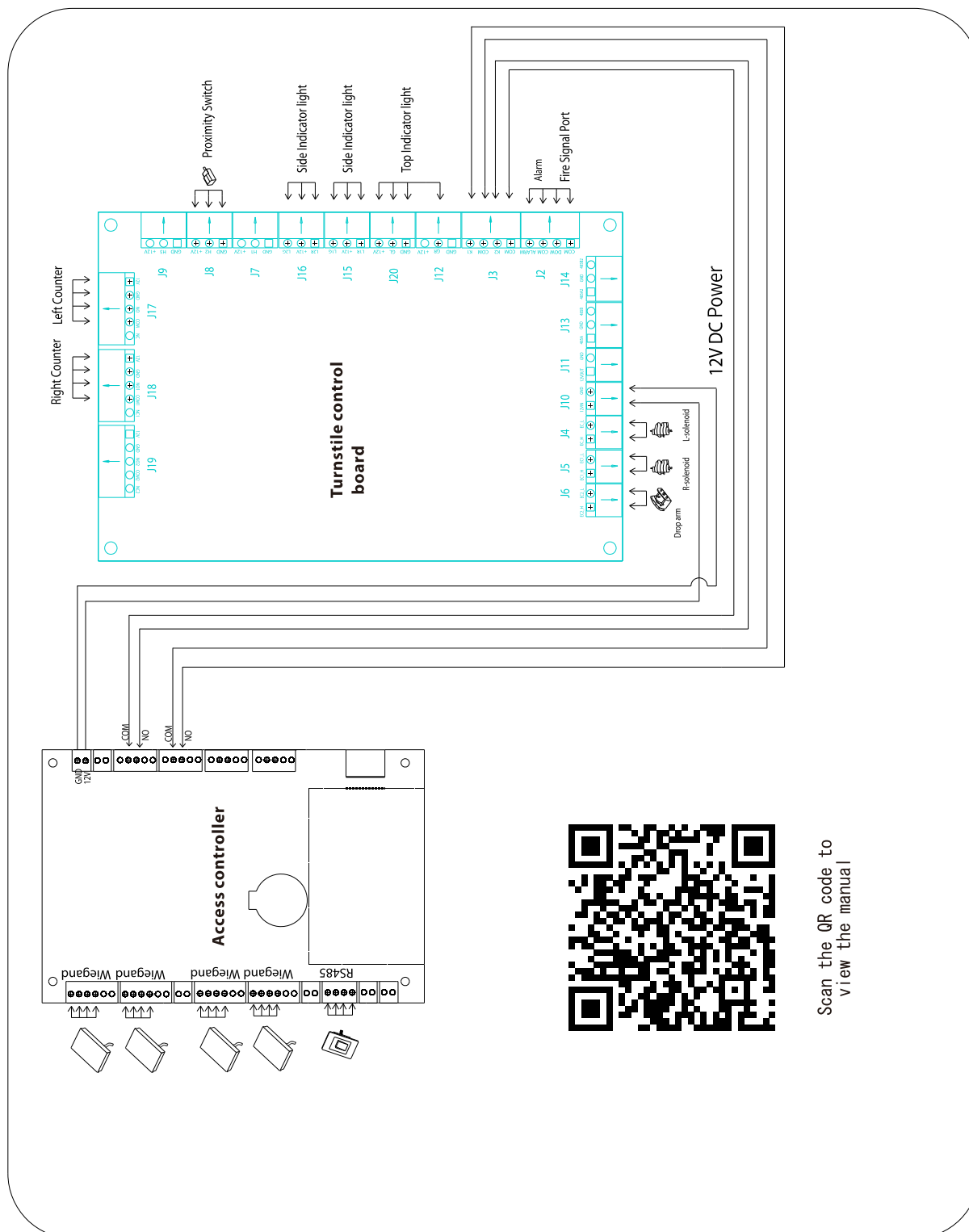
3.2   Access Control Board

Terminal	Description
+12V GND WD0 WD1 GLED BEEP	Reader
+12V GND WD0 WD1 GLED BEEP	Reader
GND IN	Reserve
+12V GND WD0 WD1 GLED BEEP	Reader
+12V GND WD0 WD1 GLED BEEP	Reader
GND IN	Reserve

○ ○ ○ ○ 485+ 485- GND +12V	RS485
○ ○ GND IN	Reserve
○ ○ GND IN	Reserve
○ ○ GND +12V	Power In
○ ○ V- V+	Lock
○ ○ ○ ○ ○ NC COM NO GND SEN	Lock
○ ○ ○ ○ ○ NC COM NO GND SEN	Lock
○ ○ ○ NC COM NO	Auxiliary Output
○ ○ ○ NC COM NO	Auxiliary Output
○ ○ ○ GND 458- 485+	485 Connections
SWITCH	Switch
LAN	Ethernet

3.2.1 Dial Code Description

The DIP switch is divided in eight dial codes from KE-1 to KE-8. Move the switch Up to turn ON and down to turn OFF.

Description of Function Setting:

- Dial 0 to turn OFF.
- Dial 1 to turn ON.

Dial Code Function Item:

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

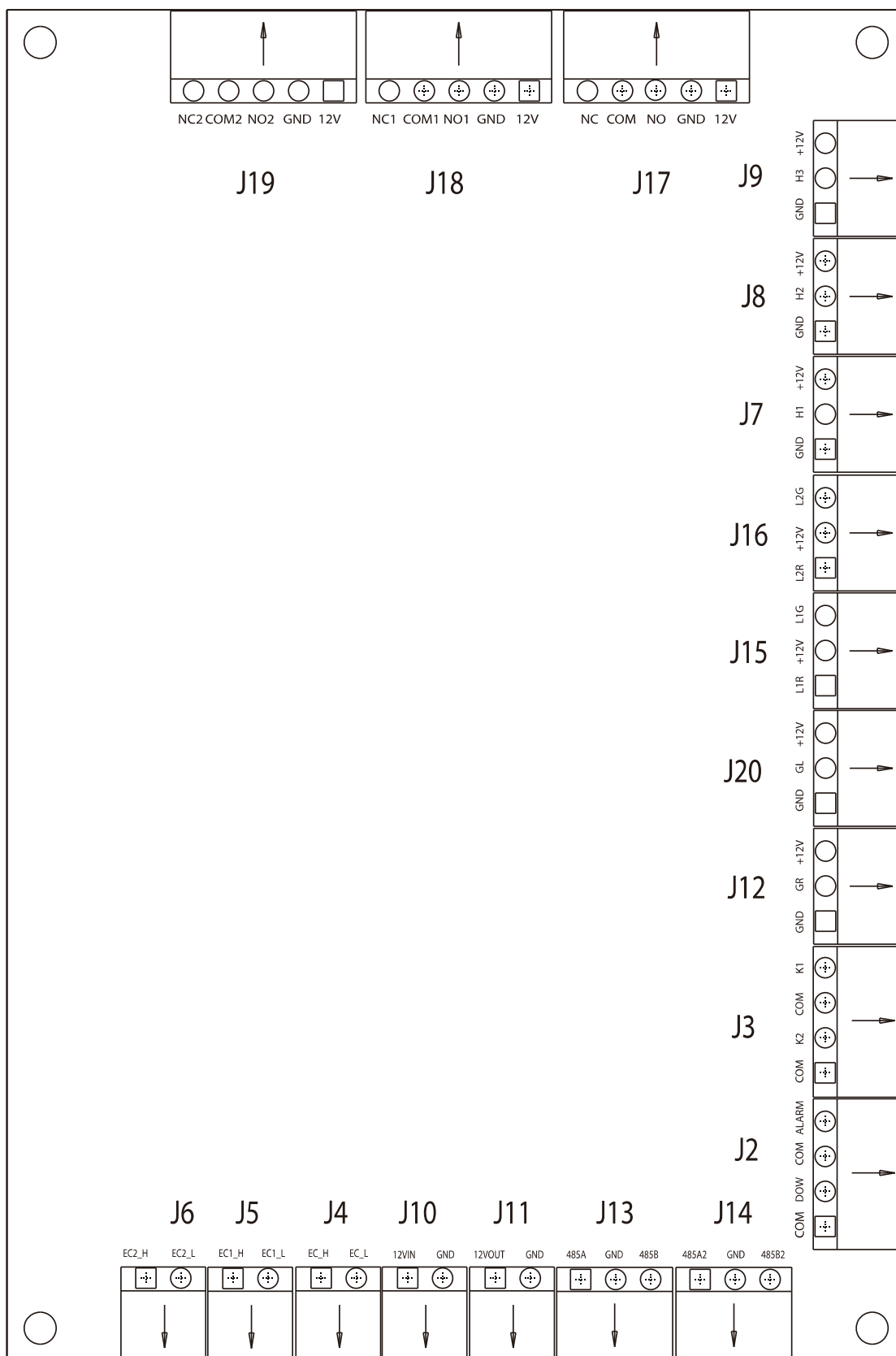| Switch Status	Time Period
000 OFF OFF OFF	5s (Default)
001 OFF OFF ON	10s
010 OFF ON OFF	15s
011 OFF ON ON	20s
100 ON OFF OFF	30s
101 ON OFF ON	40s
110 ON OFF ON	50s
111 ON ON ON	60s

● **Memory Swipe Mode (KE-6):**
  ✧ Dial 1 (ON) to turn on.
  ✧ Dial 0 (OFF) to turn off.
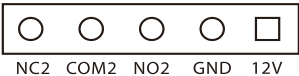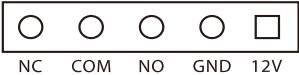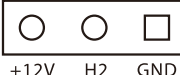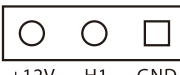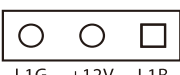
● **Turn on Alarm Mode (KE-8):**
  ✧ Dial 1 (ON) to turn on.
  ✧ Dial 0 (OFF) to turn off.

3.3   Turnstile Control Board

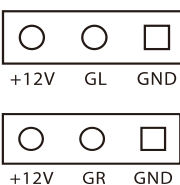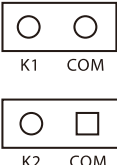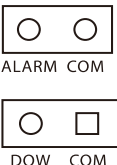| Terminal	Description
○ ○ ○ ○ □ NC2 COM2 NO2 GND 12V **J19**	Reserved
○ ○ ○ ○ □ NC1 COM1 NO1 GND 12V **J18**	Right Counter
○ ○ ○ ○ □ NC COM NO GND 12V **J17**	Left Counter
○ ○ □ +12V H3 GND **J9**	Reserved
○ ○ □ +12V H2 GND **J8**	Proximity Switch
○ ○ □ +12V H1 GND **J7**	Reserved
○ ○ □ L2G +12V L2R **J16**	Side Indicator light
○ ○ □ L1G +12V L1R **J15**	Side Indicator light
○ ○ □ +12V GL GND ○ ○ □ +12V GR GND **J20 / J12**	Top Indicator 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**	L-solenoid
EC1_H EC1_L	**J5**	R-solenoid
EC2_H EC2_L	**J6**	Drop Arm

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℃.

    b) Proper installation makes it equivalent to IPX4 waterproof, but it cannot withstand regions prone to typhoons.

    c) For temperatures below -30℃, 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 will break down first. This is a safety feature to prevent damage to the entire equipment and ensure the safety of passers-by.
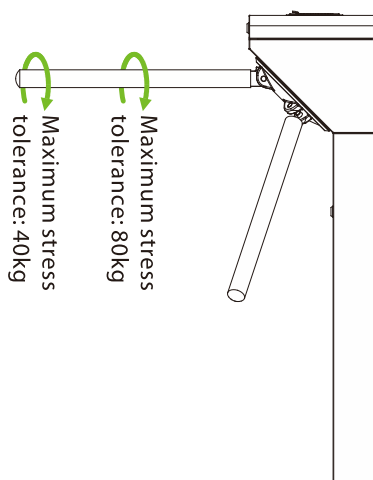
In case of emergencies

The equipment is designed to automatically lower the arms during a power failure, enabling open passage for the public. 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. It's crucial to note that after power is restored, waiting for more than 6 seconds is important before manually lifting the arms.

6   Maintenance

6.1   Chassis Maintenance

The chassis is made of SUS304 stainless steel or cold rolled sheet steel. 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. Additionally, apply a coat of anti-rut oil to the surface, ensuring not to cover the infrared sensor.

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.
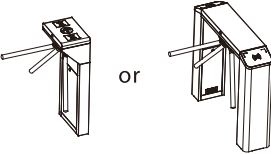
6.3   Power Supply Maintenance

- 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   <u>Packing List</u>

The package consists of the following items:

or	TS1000 Plus/TS2000 Plus	1
	Power Cable	1
	Card	1
	Keys	2
	Expansion Screw M12*100	4
	Washer	4
	Expansion Screw Washers	4
	Stainless Steel Maintenance Wipes	1
	Hex Wrench	1

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