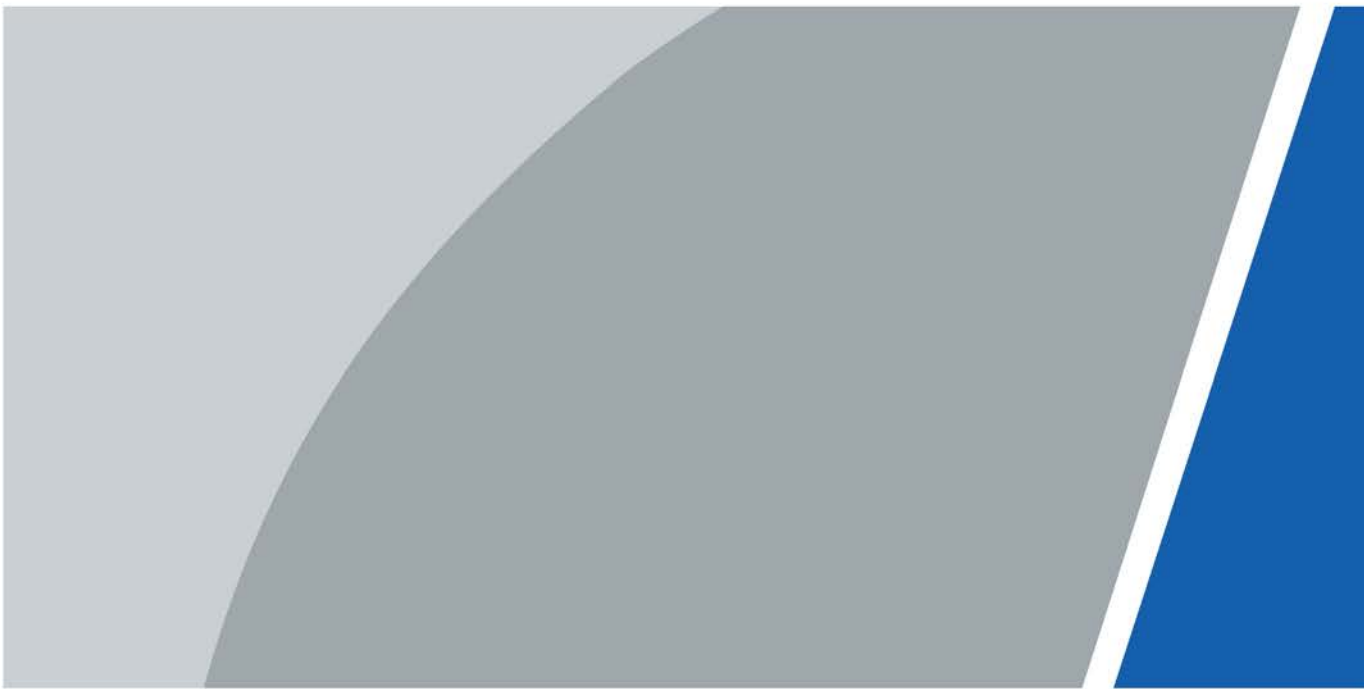# Tripod Turnstile

User's Manual

V1.0.2

Foreword

General

This manual introduces the functions and operations of the tripod turnstile (hereinafter referred to as the "turnstile").

Safety Instructions

The following categorized signal words with defined meaning might appear in the manual.

Signal Words	Meaning
⚠ DANGER	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.
⚠ CAUTION	Indicates a potential risk which, if not avoided, could result in property damage, data loss, lower performance, or unpredictable result.
⊙⚊ TIPS	Provides methods to help you solve a problem or save you time.
📖 NOTE	Provides additional information as the emphasis and supplement to the text.

Revision History

Version	Revision content	Release Time
V1.0.2	Updated the diagrams.	December 2021
V1.0.1	Updated networking figure.	June 2021
V1.0.0	First release.	May 2021

Privacy Protection Notice

As the device user or data controller, you might collect the personal data of others such as their face, fingerprints, and car plate number. You need to be in compliance with your local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures which include but are not limited: Providing clear and visible identification to inform people of the existence of the surveillance area and provide required contact information.

About the Manual

- The manual is for reference only. Slight differences might be found between the manual and the product.

- We are not liable for losses incurred due to operating the product in ways that are not in compliance with the manual.
- The manual will be updated according to the latest laws and regulations of related jurisdictions. For detailed information, see the paper user's manual, use our CD-ROM, scan the QR code or visit our official website. The manual is for reference only. Slight differences might be found between the electronic version and the paper version.
- All designs and software are subject to change without prior written notice. Product updates might result in some differences appearing between the actual product and the manual. Please contact customer service for the latest program and supplementary documentation.
- There might be errors in the print or deviations in the description of the functions, operations and technical data. If there is any doubt or dispute, we reserve the right of final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and company names in the manual are properties of their respective owners.
- Please visit our website, contact the supplier or customer service if any problems occur while using the device.
- If there is any uncertainty or controversy, we reserve the right of final explanation.

Important Safeguards and Warnings

This chapter describes content covering the proper handling of the turnstile, hazard prevention, and prevention of property damage. Read carefully before using the turnstile, comply with the guide when using it, and keep the manual safe for future reference.

⚠️ **WARNING**

- Pregnant women, the elderly, and children must be accompanied when passing through the turnstile.
- Children shorter than 1 m must pass through the turnstile in the arms of or alongside an adult.
- Do not stay or play in the passage.
- Make sure that your suitcase passes in the front or alongside you.
- Only one person can pass at a time by default. Do not trail, stay, or forcibly enter the passage.
- Violent impact might shorten the service life of the turnstile.
- Make sure that the turnstile is correctly grounded to prevent personal injury.
- Do not use the turnstile when thunder occurs, otherwise the turnstile might sustain damage.

⚠️

- After installation, remove the protective film and clean the turnstile.
- Perform regular maintenance on the turnstile to ensure it works properly.
- If the turnstile is installed near places like a swimming pool entrance, 50 km away from the sea, construction sites, and more, then the stainless cover must be maintained more frequently.
- Do not use paint thinner or any other organic agent during maintenance.
- When using a face recognition component, apply waterproof silicon sealant to the installation position.

Operation Requirements

- Do not expose the turnstile to direct sunlight or near heat sources.
- Keep the turnstile away from dampness, dust or soot.
- Install the turnstile horizontally or in a stable place to prevent it from falling.
- Do not drip or splash liquid onto the turnstile, and make sure that there is no object filled with liquid on the turnstile to prevent liquid from flowing into it.
- Install the turnstile in a well-ventilated place, and do not block its vent.
- Use the turnstile within the rated range of power input and output.
- Do not disassemble the turnstile by yourself.
- Transport, use and store the turnstile under the allowed humidity and temperature conditions.

Electrical Safety

- Improper battery use might result in fire, or explosion.
- Replace the battery with the same model.
- Use power cables that conform to your local requirements, and within rated specifications.
- Use the standard power adapter to avoid people injury and device damage.

- Use power supplies that meet ES1 but do not exceed PS2 limits defined in IEC 62368-1. For specific power supply requirements, refer to device labels.
- Connect the Device (type-I structure) to the power socket with protective earthing.
- The appliance coupler is a disconnection device. Keep at a convenient angle when using it.

Precautions

- Pass the turnstile as soon as possible after authorization. The arms will be closed after a specified time.
- When multiple people are entering, the continuous authorization interval is ≥ 1 s.
- Pay attention to the indicator of the turnstile. If it is a green arrow, passing in this direction is allowed; if it is a red cross, passing is not allowed.
- The turnstile supports anti-trailing and anti-reverse intrusion functions. If you force your way into the passage, the turnstile will lock the arms, which might result in personal injury.
- The turnstile will not correctly recognize an authorized card if it is used with other cards.
- Keep the authorized card safe to make sure it works properly.
- Do not move anything through the turnstile, otherwise, the turnstile will consider it unauthorized.
- If the turnstile is to be installed outdoors where water pooling is likely to occur, it must be installed on a 50 mm–150 mm cement base (adjust as needed). The passage also should be elevated to the same height of the cement base. Apply silicon sealant to the gap between the cement base and the turnstile to keep water out and condensation.

Table of Contents

1 Overview

1.1 Introduction

The turnstile controls access for locations such as hotels and government facilities. When the turnstile is powered off, the arms will normally unlock themselves, and people can pass freely. When the turnstile is powered on, you need to rotate the arms to pass.

1.2 Product Version

3 versions of the turnstile with different functions are available.

Table 1-1 Product version description

Version	Description
Enter and exit through swiping card	- IC card reader: 2 (included) - Access controller: 1 (included)
Enter with card swiping card or face recognition, and exit with card swiping	- IC card reader: 2 (included) - Face recognition access controller: 1 (required).
Enter and exit through swiping card or face recognition	- IC card reader: 2 (included) - Face recognition access controller: 2 (required).

1.3 Features

- Supports anti-collision.
- Supports setting passing time.
- The arms will be locked automatically if no one enters the turnstile after the specified time.
- The lock and unlock feature of the turnstile can be controlled by a remote controller (not provided).
- System parameters can be restored to default through the configuration application.
- Supports sound and light alarm prompts and volume adjustment.
- Data on the entry and exit of people can be collected. Also, the turnstile arms fall down automatically when powered off.
- When receiving fire alarm signals, the turnstile normally will open. The turnstile can also output alarm signals.
- 9 passing modes: Pass with identity verified, not allowed to pass, and pass without restrictions, and you can combine these to produce 9 passing modes.
- Supports integration of face, fingerprint, QR code, CPU card reader, ID card reader module and more to achieve a combination of multiple authentication methods.

1.4 Access Control Mode

You can set the passing mode based on the direction people enter or exit the controlled area.
- People can pass the turnstile using a card or their face.
- People can pass the turnstile freely without identity verification.
- No passage allowed.

2 Application

Cards and faces are collected and imported to turnstiles through the network.

Figure 2-1 Application

Face image recording camera   Management platform   Card reader

Switch

—— USB cable

—— Ethernet cable
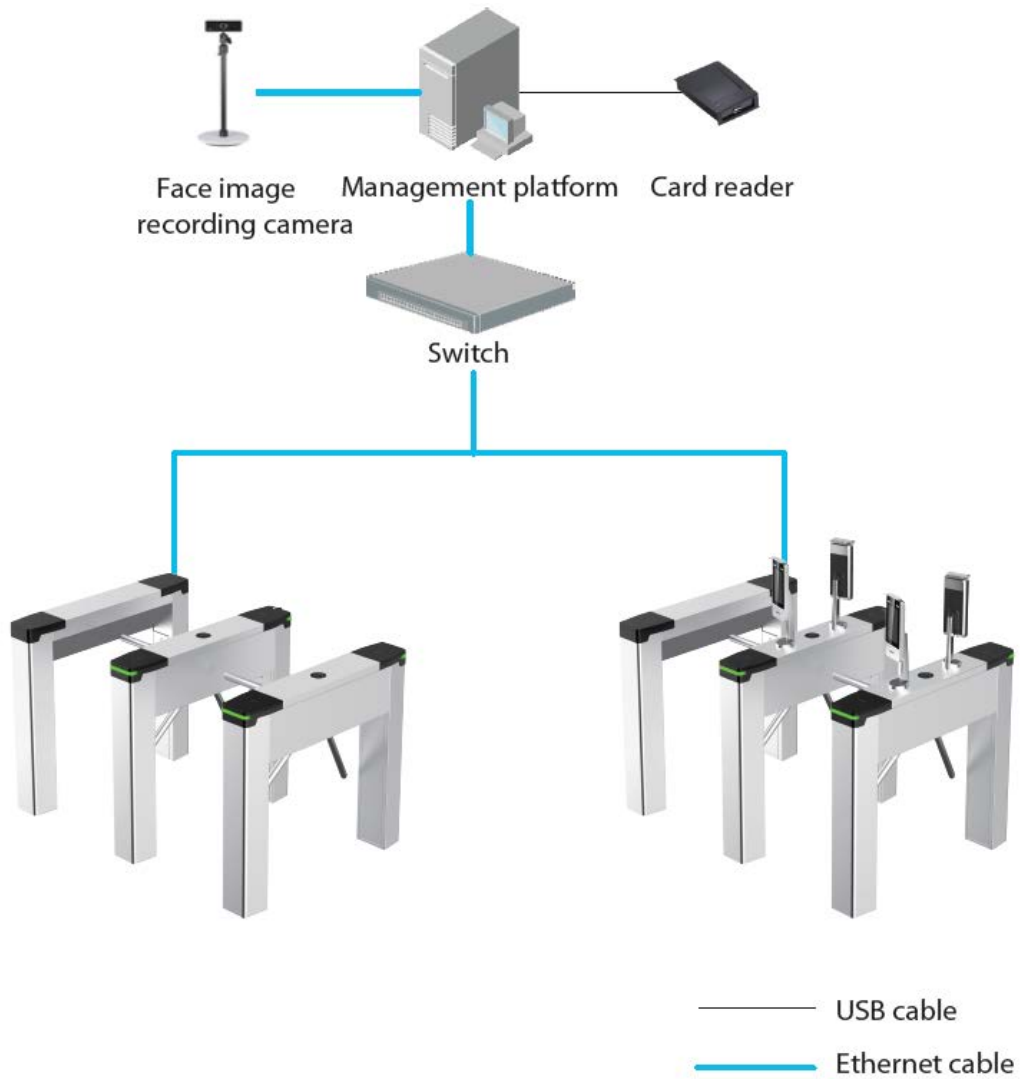
3 Structure

3.1 Appearance

Figure 3-1 Appearance (1)

Figure 3-2 Appearance (2)

3.2 Dimensions

Figure 3-3 Dimensions (mm[inch])

3.3 Inner Components

Figure 3-4 Inner components

Table 3-1 Component description

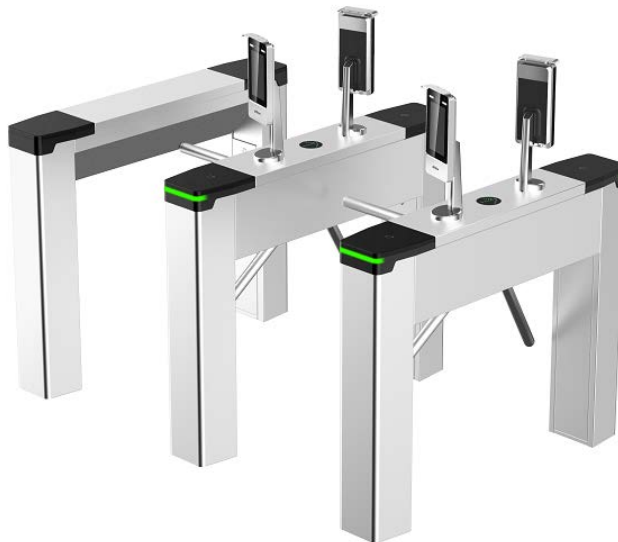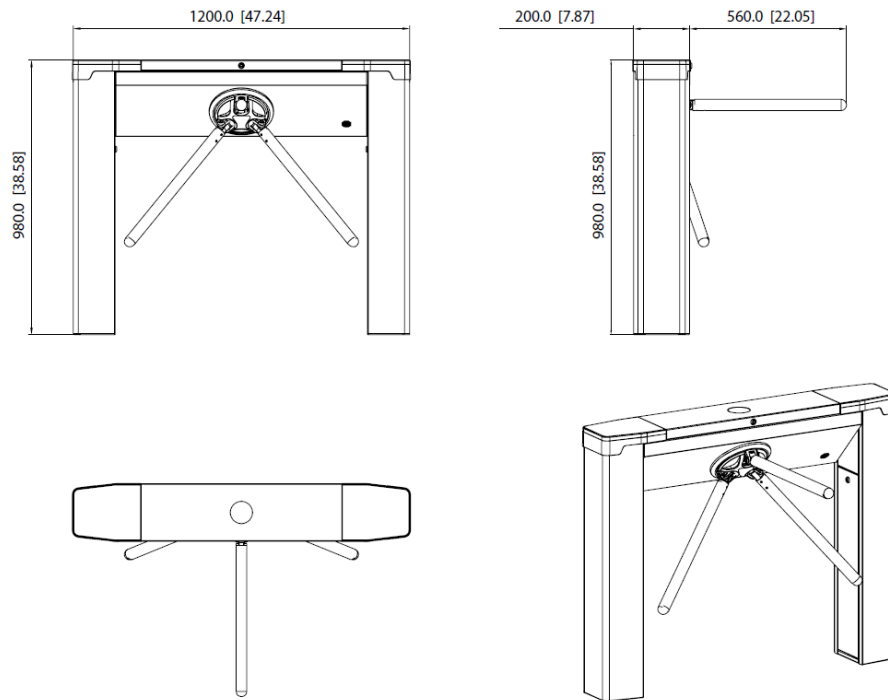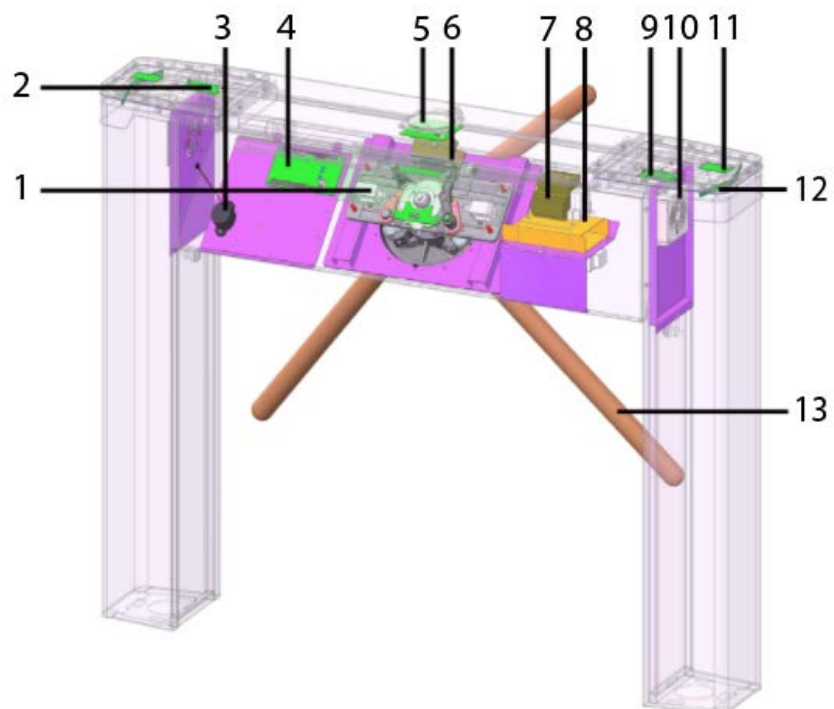| No.	Item	Description
1	Passing electromagnetic lock	Receives signals from the control board, and locks or unlocks the arms.
2	Access control panel	Receives signals from the card reader and controls the turnstile.
3	Speaker	Broadcast voice prompts.
4	Passage control panel.	Receives and processes signals from the access controller, and controls the electromagnets and direction indicator.
5	Direction indicator	- Two-way authorization. ◇ Solid red X: Stand by. ◇ Flashes a green arrow in passing direction: Authorization successful. The turnstile returns to standby mode when the person passed or it times out. ◇ Flashes a red X 3 times and broadcasts **Authorization failed**: Authorization failed. The turnstile returns to standby mode. - One-way authorization. ◇ Solid green arrow: Stand by. ◇ Flashes a green arrow: Authorization successful. The turnstile returns to standby mode when the person passed or it times out. ◇ Flashes a red X 3 times and broadcasts **Authorization failed**: Authorization failed. The turnstile returns to standby mode. - Free pass: Solid green arrow means the authorization succeeded.
6	Electromagnetic chuck lock	When the power is on, the arms can be set in a horizontal position by folding them to their maximum extent, and then lifting them up again. When the power is off, the arms will automatically fold themselves.
7	Circuit breaker	Protects the turnstile circuit.
8	Power switch	Convert the input voltage to 24 V AC power.
9	Card reader panel	Reads card information and sends the signal to access control.
10	Fan	Dissipates the heat caused by the turnstile.
11	Card-swiping panel	Sends the signal to the card reader when swiping a card.
12	Passage indicator	Indicates passing status.
13	Turnstile arm	Arms of the turnstile.

4 Installation

This chapter introduces the installation requirements, preparations, and installation procedures.

4.1 Safety Instructions

⚠️ **WARNING**

- Strictly conform with the requirements of the manual during installation, otherwise we will not be responsible for any loss occurred.
- Incorrect installation or improper operation might bring damages to humans or objects.
- Security devices and control devices used must confirm to EN12978.
- Before installing, wiring, or disassembling the turnstile, unplug the power supply first.
- The turnstile consists of various mechanical and electrical devices, any negligence during installation might cause damage.
- In case of smoke, unpleasant odor, or strange noise, unplug the turnstile immediately, and then contact technical support.
- Pay extra attention when you are operating inner components that are electrically charged or can cause the arms to move.
- Do not disassemble the turnstile unless necessary, otherwise people injury or property damage might occur.

⚠️

- Firmly attach the turnstile.
- Make sure that the ground cable works properly before powering on the turnstile.
- Before making the turnstile operational, make sure that people can see the turnstile completely and clearly to avoid injury.
- Do not operate the turnstile while standing in the passage when it is powered on.

4.2 Preparations

- Make sure that the turnstile is installed on a flat surface.
- If the turnstile is to be installed outdoors where water pooling is likely to occur, it must be installed on a 50 mm–150 mm cement base (adjust according to the actual situation). The passage also should be elevated to the same height of the cement base. Apply silicon sealant to the gap between the cement base and the turnstile to keep out water and condensation.
- Make sure that the PVC pipe is buried more than 60 mm under the ground, and the height of the PVC pipe above the ground should be more than 50 mm. Bend the PVC pipe end that is above the ground to keep water out. Keep the installation surface dry.
- Clean the installation surface.
- Confirm the installation position.

Figure 4-1 Installation position (mm[inch])
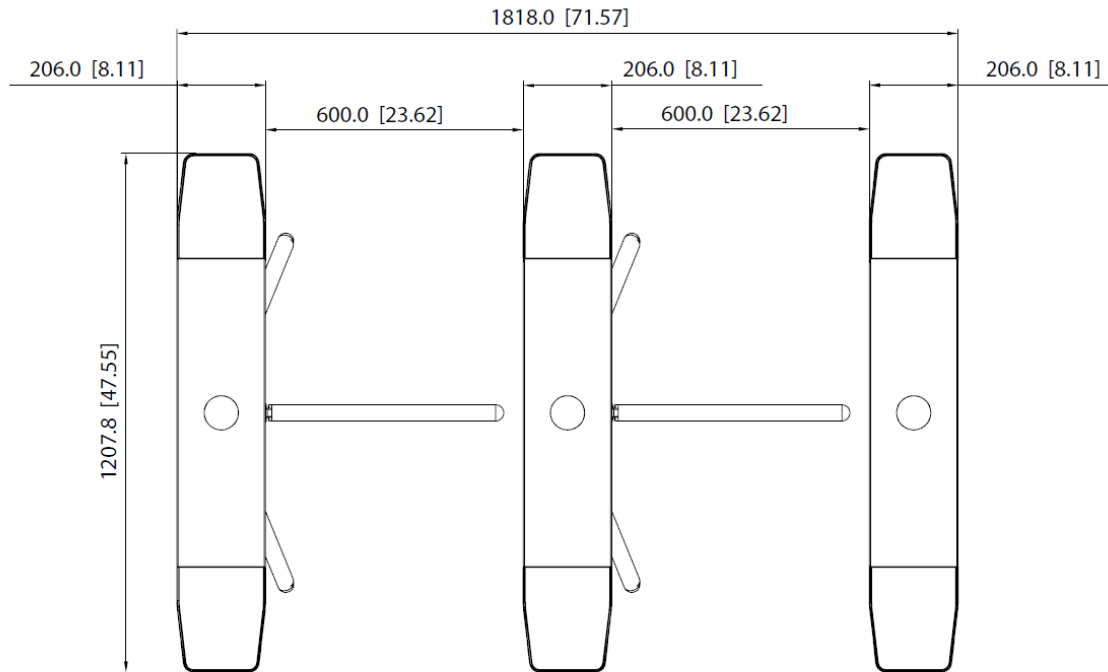
4.2.1 Tools

Tools might vary based on different installation surfaces.
- Cement.
  Percussion drill, drill No.16 and No. 32, marking pen, tape measure, spirit level, plumb bob (for calibrating the levelness of the passage), hammer, wrench, angle grinder or cutting machine, and screwdriver.
- Marble and ceramic.
  Because marble and ceramic grounds are fragile, use the pistol drill to drill a hole first, apply cooling water, and then keep drilling until the hole is deep enough. Remove the dust inside the hole with water, and then use the percussion drill for the dimensions you need.

4.2.2 Wiring

- Check if the labels on the cables are clear. If not, make them clear.
- AC power cables and communication cables cannot be on the same pipe.
- PVC pipes should be buried under the ground for more than 150 mm to avoid damage from expansion bolts. The pipe above the ground should be longer than 50 mm to keep water out.
- The PVC pipes must be able to go through the cable entry of the installation base.

Figure 4-2 PVC pipe layout (mm[inch])
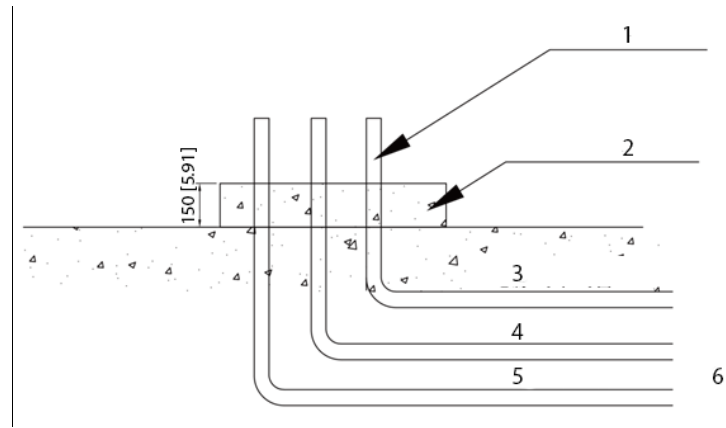
Table 4-1 PVC pipe layout description

No.	Name
1	1" PVC pipe
2	425# concrete base
3	Power cable pipe
4	Signal cable pipe
5	Communication cable pipe
6	Signal and communication cables are connected to the security booth

For needed cables and their specification, see the figures and table below.

Figure 4-3 Wiring for two card readers and one face recognition access controller
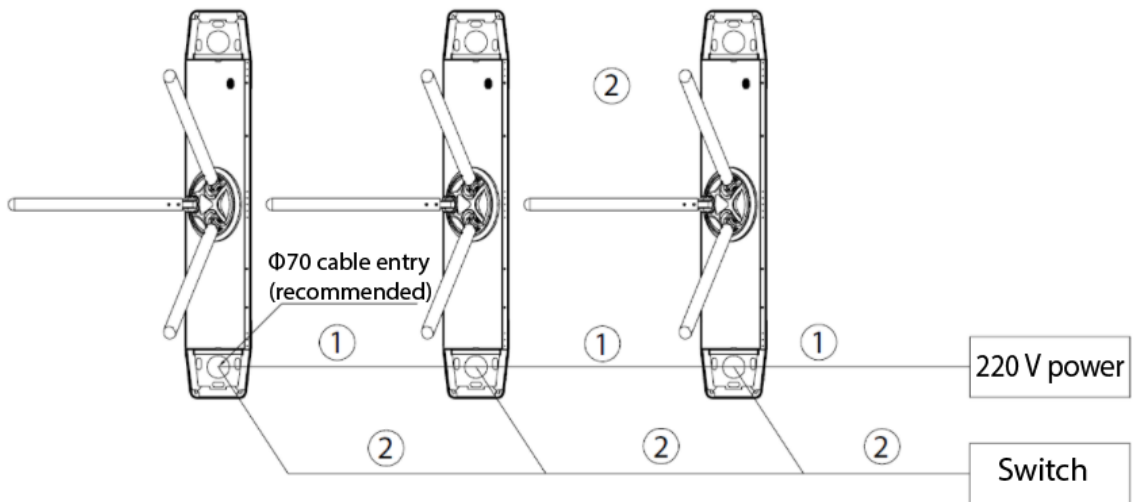
Figure 4-4 Wiring for two card readers and two face recognition access controllers
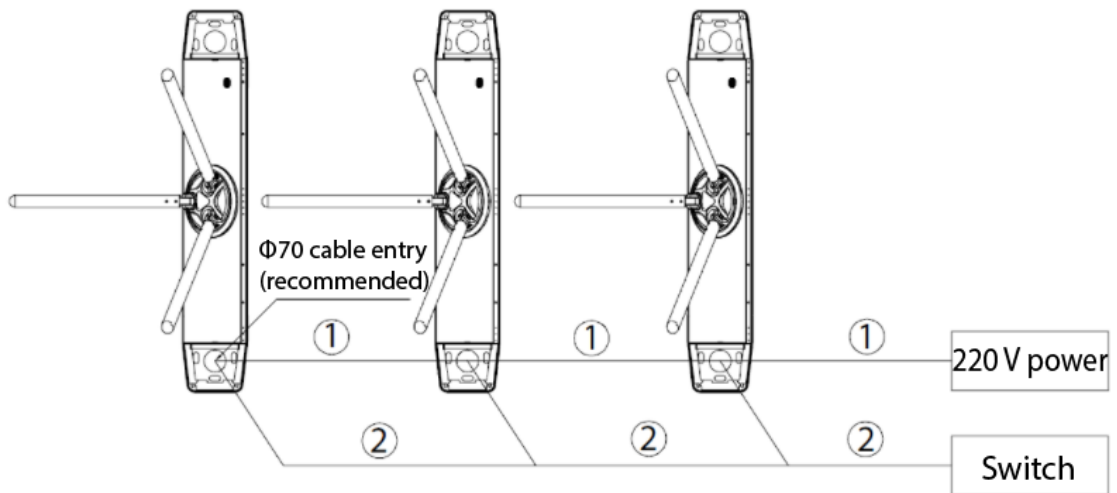
Table 4-2 Cable description

No.	Type	Description
1	Power cable	One 220 V RVV3 × 2.5 power cable for each turnstile. Reserve 3 m of the cable outside the cable entry.
2	Ethernet cable	• One Cat5 Ethernet cable for two card readers and one face recognition access controller. Reserve 3 m of the cable outside the cable entry. • Two Cat5 Ethernet cables for two card readers and two face recognition access controllers. Reserve 3 m of each cable outside the cable entry.

4.2.3 Cable Layout

For recommended cable layout, see Figure 4-5. If you incorrectly lay cables like in Figure 4-6, the turnstile can end up being installed in an unstable position causing cables to break when expansion bolts are being hammered in.

Figure 4-5 Recommended cable layout (mm[inch])
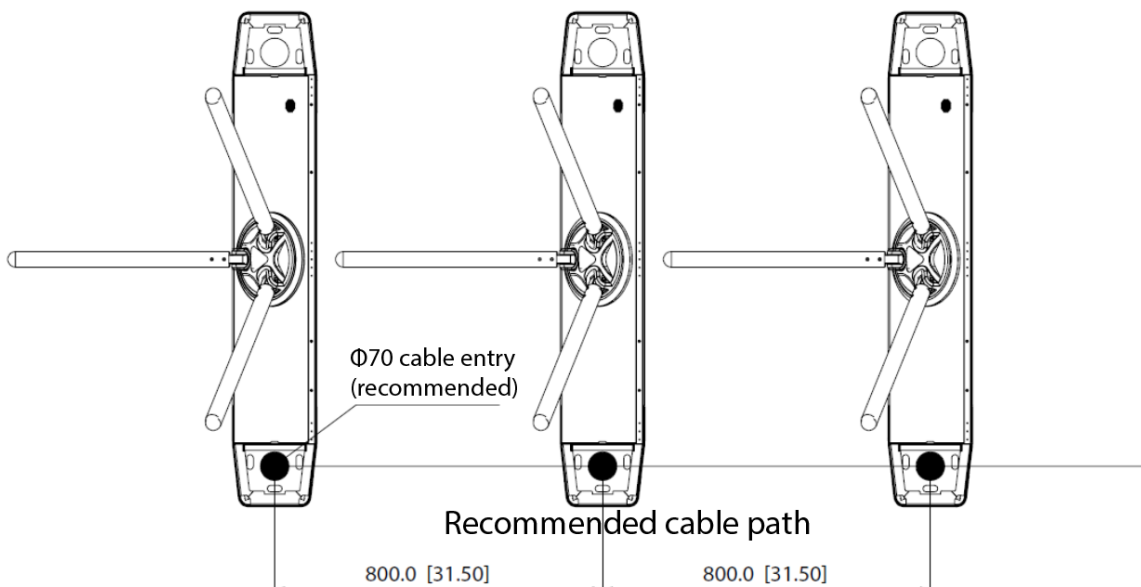
Figure 4-6 Wrong cable layout

Wrong cable path
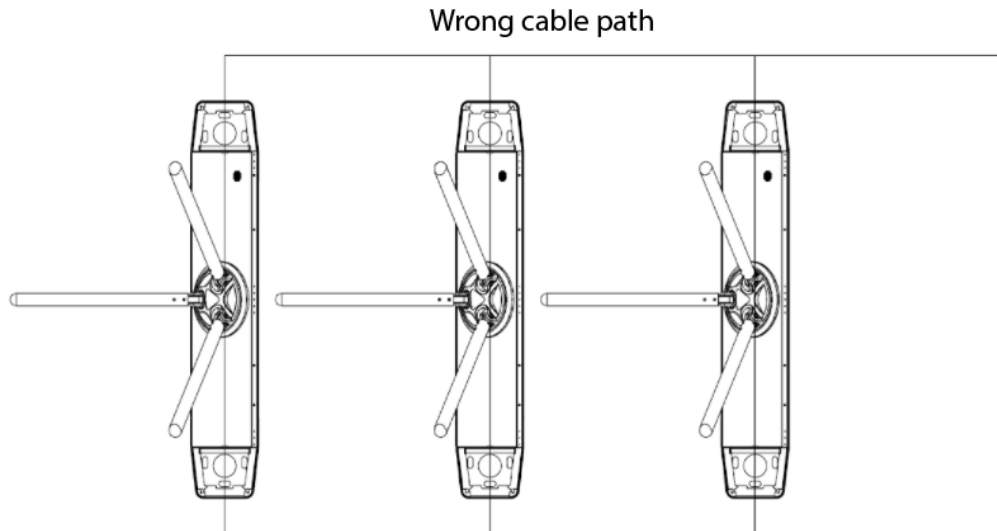
4.3 Installation Procedure

4.3.1 Drilling Holes

Before installing the turnstiles, make sure that the distance "M" between buildings and the turnstile is no less than 60 mm, and no more than 100 mm. Adjust it according to the actual situation. This is for maintenance purposes and not for allowing people to pass through.

Figure 4-7 Install turnstiles next to buildings
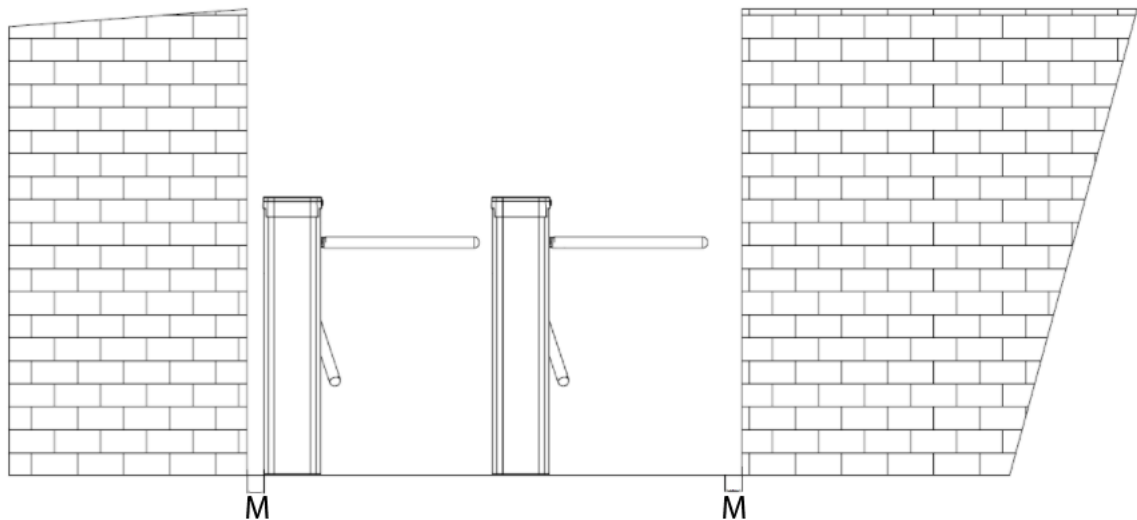
Step 1   Adjust all turnstiles to face the same direction.
Step 2   Confirm the distance between buildings and the turnstiles.
Step 3   Confirm the installation position and mark the holes.

Figure 4-8 Mark the holes on the installation surface (mm[inch])
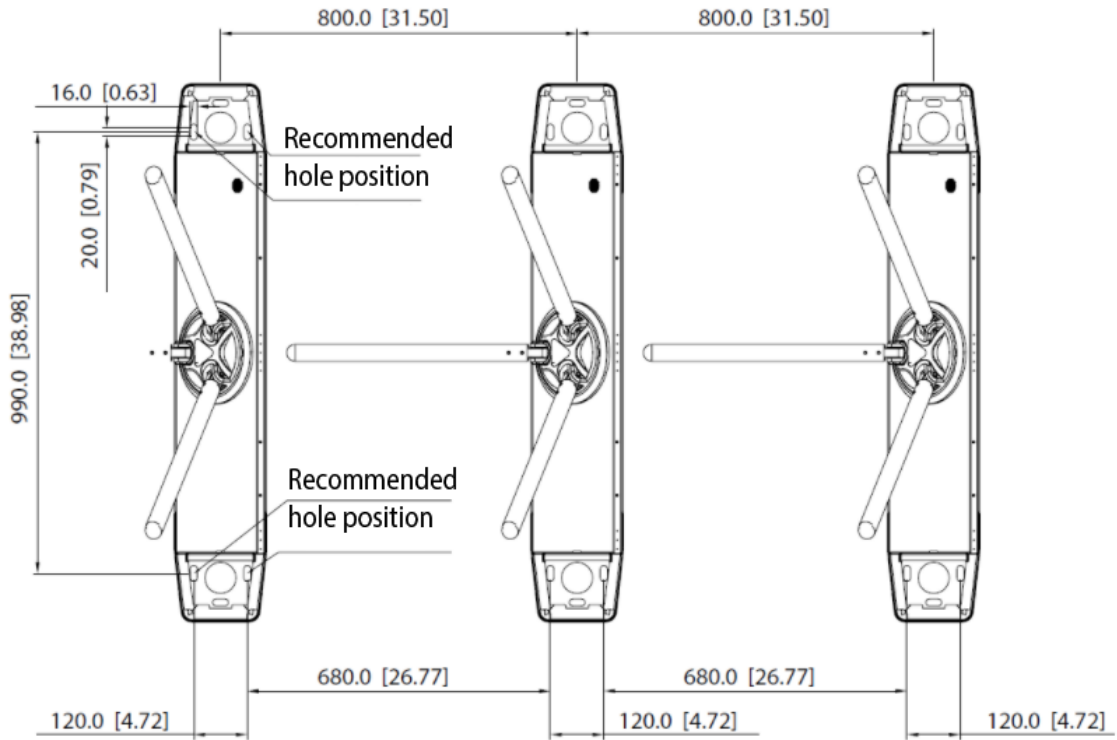
Step 4   Drill holes. See the table below for hole diameters and depth, and expansion bolt diameters.

Table 4-3 Expansion bolt specification

Item	Dimension
Expansion bolt	M12 × 120
Hole depth	95 mm
Hole diameter	16 mm

Step 5   Use compressed air to remove the dust in the holes. Repeat this step no less than three times.

Step 6   Hammer the expansion bolts into the bottom of the hole.

Step 7   Use a wrench to tighten the nuts, and then hammer the expansion bolts again.

4.3.2 Adjusting Turnstile Position

Step 1   Use the key to open the top panel.

Figure 4-9 Open the top panel
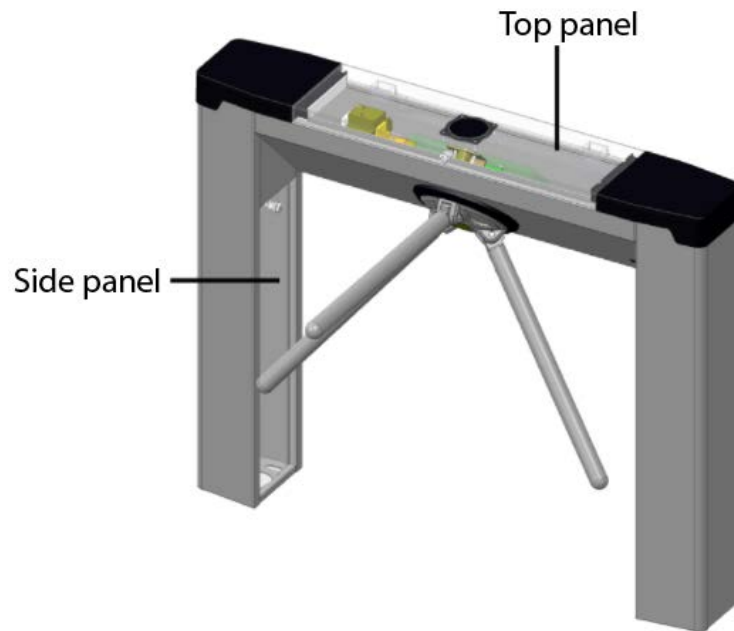
Step 2 Tug all the cables inside the turnstile through the cable entry, and keep them organized to avoid damage.

Figure 4-10 Cable entry
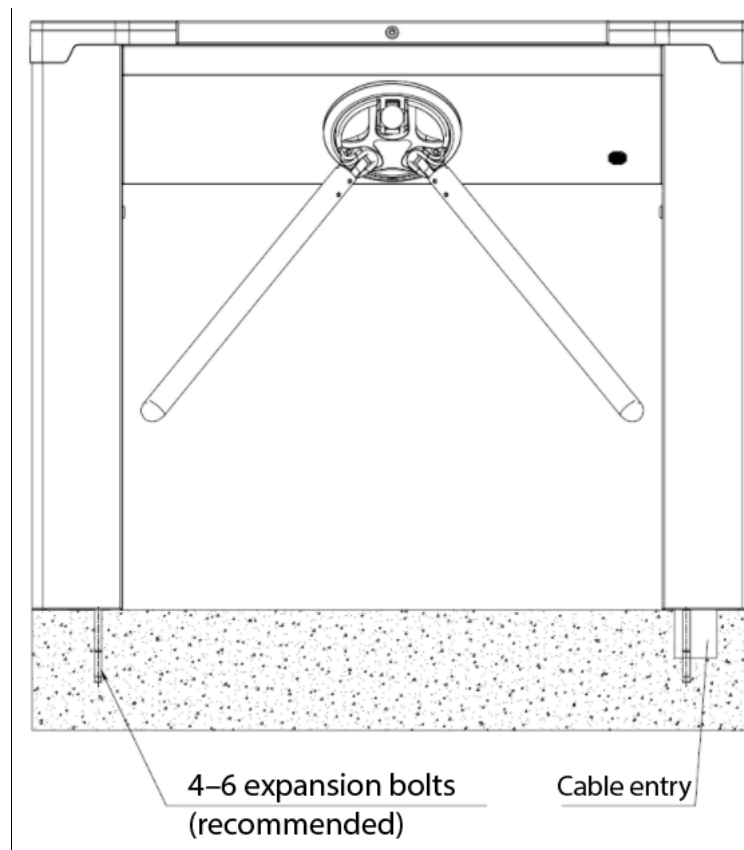
Step 3 Carefully lift the turnstile up and adjust its position, overlap the holes on the turnstile with the expansion bolts, and then place the turnstile on the ground.

Step 4 Use gaskets to level the turnstile.

Step 5 Mark three evenly separated points on the installation surface horizontally or vertically along the turnstile. Use a gradienter to measure the angle of inclination of the three points. See the figure below for the acceptable flatness error.

Figure 4-11 Acceptable flatness error
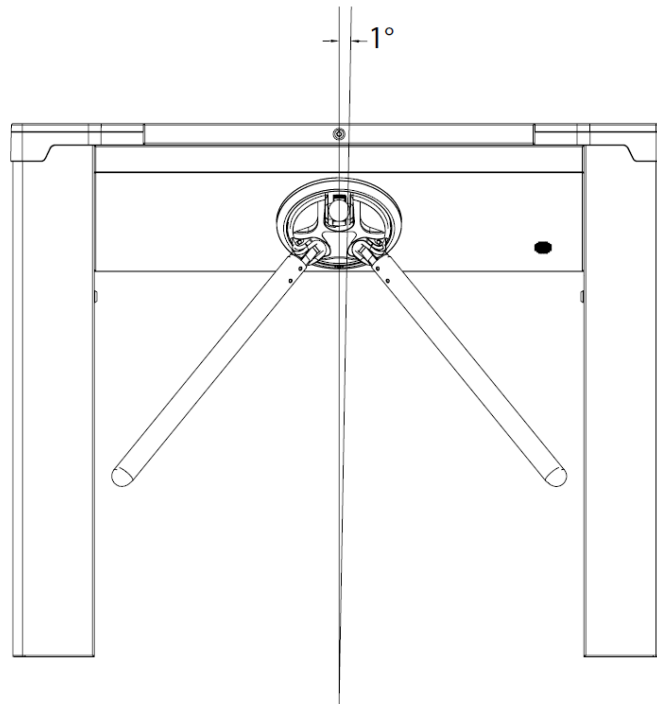
Step 6   Repeat Step 1–Step 5 to install other turnstiles.

☷

- The arms of different turnstiles must face the same direction.
- Make sure that the turnstiles are aligned within deviation.

Figure 4-12 Align the turnstiles within deviation (mm[inch])
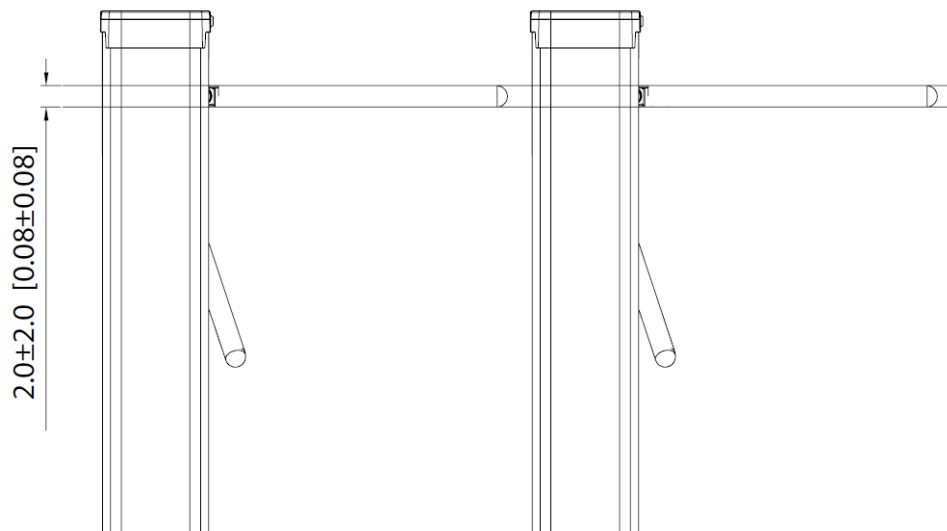
4.3.3 Fixing the Turnstiles

Step 1   After adjusting the turnstile position, put an M12 flat gasket, M12 spring gasket, and an M12 nut on the expansion bolt, and then manually tighten the nut.

Step 2   Tighten all the nuts with a wrench.

Step 3   Apply silicone sealant to the gap between the turnstile and the ground to avoid water leakage.

Figure 4-13 Attach the turnstiles

M12 hexagon nut
M12 spring gasket
M12 flat gasket
Expansion bolts
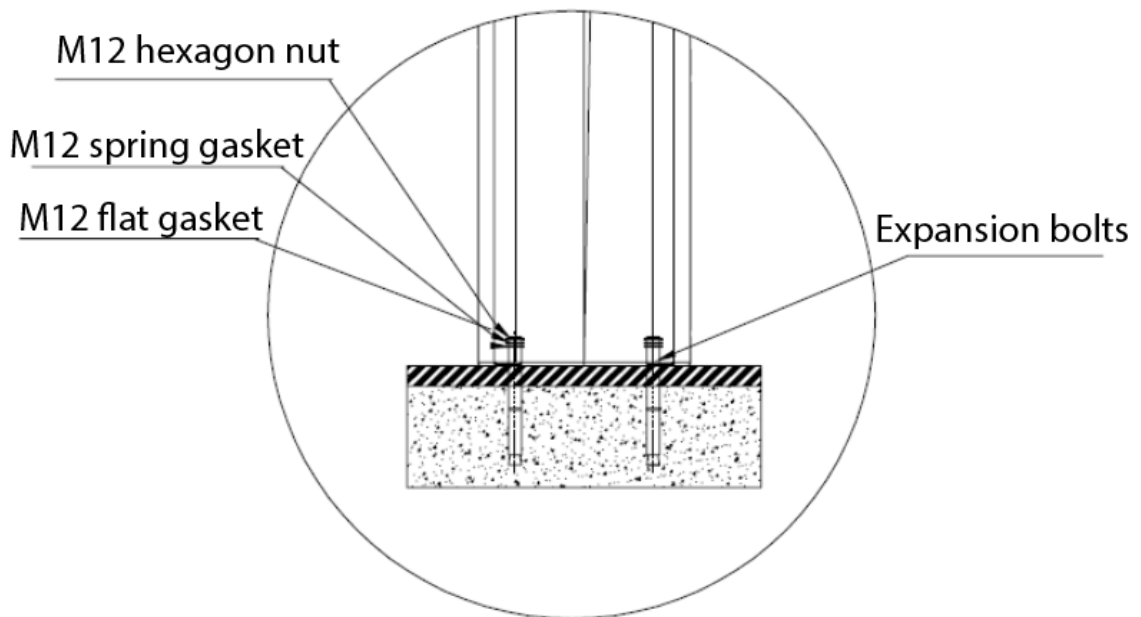
4.3.4 Drilling for a Face Recognition Access Controller

If you need to install a face recognition access controller, you need to drill a hole on the top cover of the turnstile.

Prerequisites

- Installation of the turnstile is complete.
- The turnstile works normally during commissioning. See "6 Commissioning".
- Power off the turnstile.
- Only simple brackets and converters of the face recognition module need to have holes drilled on site (the cable entry of the face recognition module is waterproof).

Procedures

Step 1 Open the top cover, and then lay a piece of paper over all the inner components to prevent the iron dust from damaging them.

Step 2 Use a marker to mark the drilling position.

Figure 4-14 Drilling position (mm [inch])
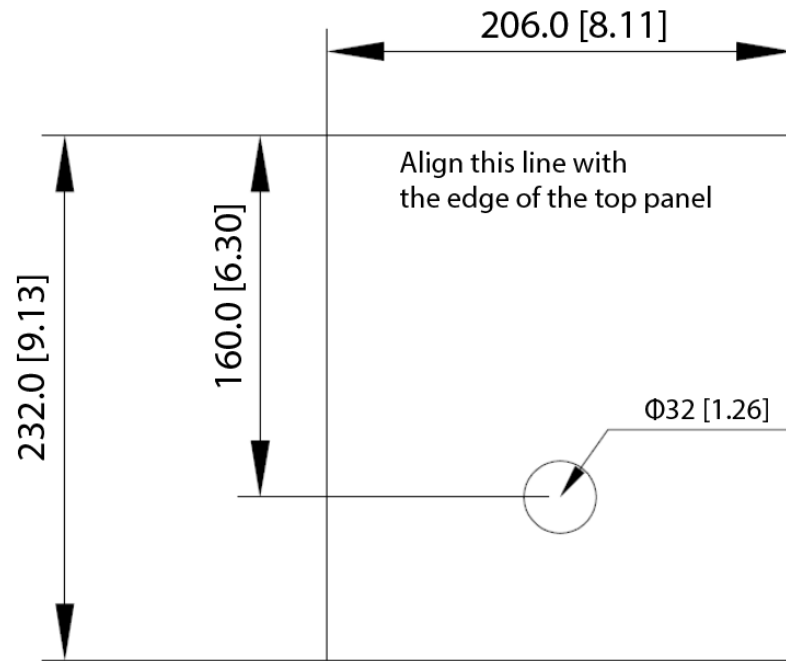
Step 3   Drill a hole on the mark with the diameter shown above.

Step 4   Use a file to clean off the burrs around the hole and remove the iron dust inside the turnstile.

Step 5   Install and fix the face recognition module to the turnstile.

5 Cable Connection

5.1 Control Board Port Description

Figure 5-1 Control board ports
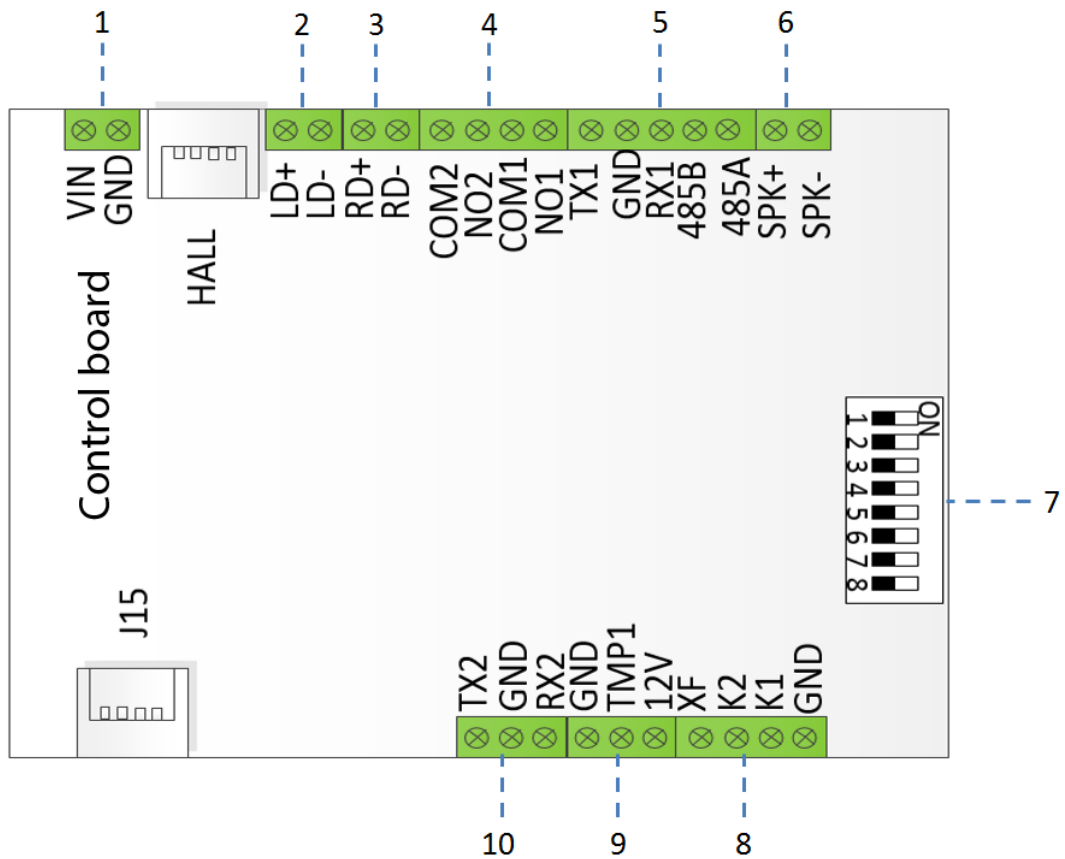
Table 5-1 Port description

No.	Port	Description
1	GND, VIN	24 V DC/6.5 A power input for control board.
2	LD+, LD–	Providing operating voltage for card reader or face recognition module.
3	RD+ RD–	
4	COM1/NO1	Entry signal. 📖 Both relay outputs can be set to the alarm output signal.
	COM2/NO2	Exit signal.
5	TX1, GND, RX1	RS-232.
	485A, 485B	RS-485.

No.	Port	Description
6	SPK+, SPK−	Speaker.
7	DIP switch	It is 00000000 by default (eight 0s).
8	K2, GND	Signal port for opening the turnstile on exit. It can receive the open turnstile signal from the control board or the face recognition module.
	K1, GND	Signal port for opening the turnstile on entry. It can receive the open turnstile signal from the control board or the face recognition module.
	XF, GND	Fire alarm signal input port. When a signal is received, the turnstile arm automatically falls down. To power on the turnstile, you need to manually push the arm down, and then lift it up to a level position.
9	TMP1, GND	Reserved port.
	12 V, GND	Provides operating voltage for the fan.
10	TX2, GND, RX2	RS-232.

5.2 Control Board Cable Connection

$\square$

- For 2 IC card readers, set the DIP switch on the access control panel to 00000000 (default).
- Set the DIP switch on the face recognition module panel to 00000001.
- The default IP of the access control is 192.168.1.108. The default username and password are admin and admin123 respectively.

5.2.1 For Two IC Card Readers and One Access Controller

Figure 5-2 Cable connection for two IC card readers and one access controller
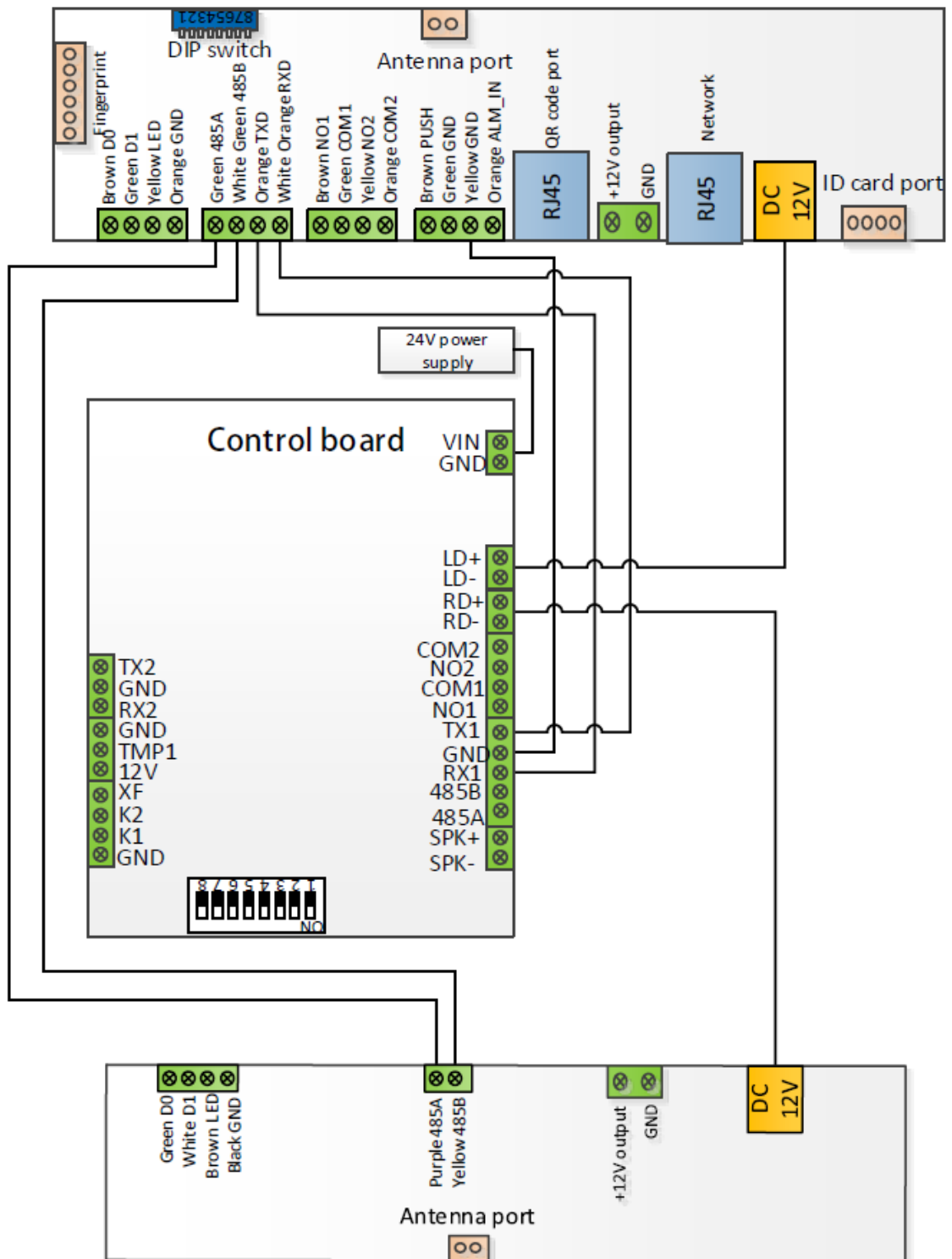
5.2.2 For Two IC Card Readers and One ASI7/8 Series Face Recognition Access Controller

Figure 5-3 Cable connection for two IC card readers and one ASI7/8 series face recognition access controller
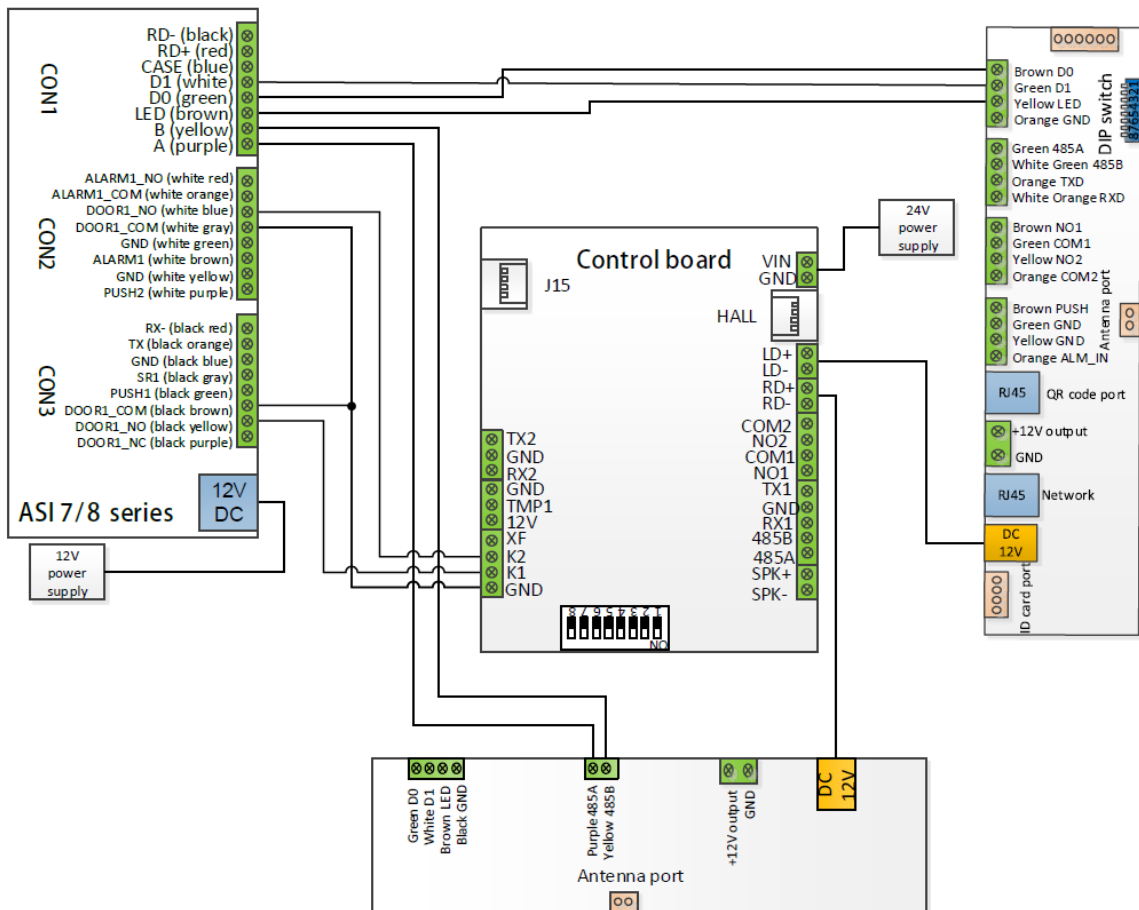
5.2.3 For Two IC Card Readers and Two ASI7/8 Series Face Recognition Access Controllers

Figure 5-4 Cable connection for two IC card readers and two ASI7/8 series face recognition access controllers
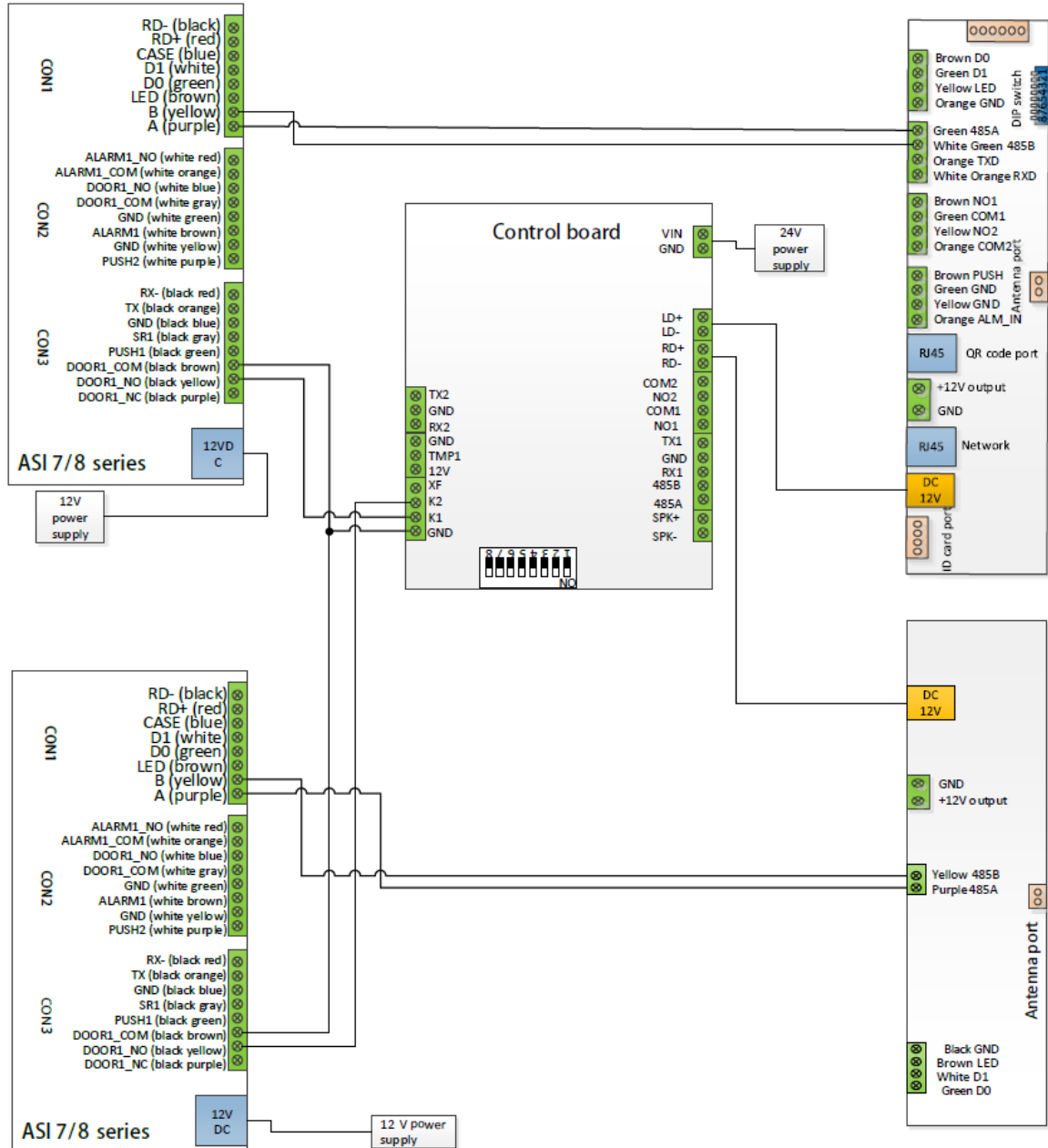
6 Commissioning

6.1 DIP Switch on Control Board Setting

Figure 6-1 DIP switch
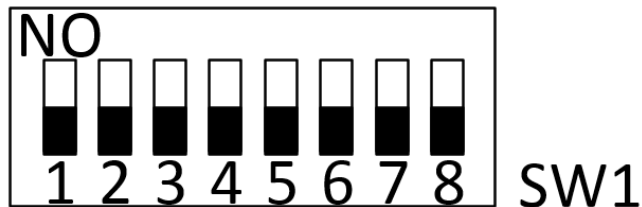
- : 1.

- : 0.

6.1.1 Setting Work Mode

Set working mode through the DIP switch or the configuration application.

Table 6-1 Buttons description

SW1–1	Description
0	Normal mode
1	Test mode

6.1.2 Setting Memory Mode

Set memory mode through the DIP switch or the configuration application.

Table 6-2 Buttons description

SW1–2	Description
0	Close (default)
1	Enable

6.1.3 Setting Passing Mode

Set passing mode through the DIP switch or the configuration application. It takes effect after 1 second of the DIP switch being configured.

Table 6-3 Buttons description

SW1–3	SW1–4	SW1–5	SW1–6	Description
0	0	0	0	In&Out-ID (default)
0	0	0	1	In-ID/Out Free
0	0	1	0	In-ID/Out Banned
0	0	1	1	In-Free/Out-ID
0	1	0	0	In&Out-Free
0	1	0	1	In-Free/Out Banned
0	1	1	0	In-Banned/Out-ID
0	1	1	1	In-Banned/Out-Free
1	0	0	0	In & Out Banned

6.1. 4 Setting Passing Time

Table 6-4 Buttons description

SW1–7	SW1–8	Description
0	0	5 s (default)
0	1	10 s
1	0	30 s
1	1	60 s

Setting Turnstile Type

Set the turnstile type to tripod through the configuration application.

Restoring to factory settings will not result in data loss.

Setting Voice Volume

Set the voice volume level among 1–8 through the configuration application.

Setting In&Out Broadcast

You can set in&out broadcast through the configuration application.

6.2 Debug

- All components of the turnstile work normally. The turnstile has been tested but the component connection might still be slightly different.
- The cable is properly connected.

- Power on the turnstile after completing above operations. Because the arm will automatically fall when powered off, you need to push the arm down and then lift it to a level position to restore the turnstile to it normal status when powered on.
- Set the passing mode to In&Out Free, and people can manually turn the arm to pass from either direction. The turnstile closes automatically after people pass.
- Check whether the electromagnetic chuck works properly and the turnstile arms fall normally when powered off.
- After issuing card or granting face permissions, run the turnstile a few times. Check the authorization and then check whether the arms can rotate in the authorized direction and rotate smoothly.

Set the passing mode to the targeted mode after completing all these procedures.

6.3 Self-checking

⚠

You need to manually push the arms down and then lift them up to a level position every time turnstile restarts for it to work normally.

7 FAQ

The power indicator light is not on after the turnstile is powered on.
- Check whether the air switch is turned on.
- Check whether the power input of the switch is normal.
- Check whether the cables are properly connected.

After swiping a card, the electromagnetic chuck is still locked.
- Check whether the card is valid.
- Check whether the user permission is issued successfully.
- Check whether the cable connection between the information collection board and access controller is normal.

No voice prompts when passing.
- Check whether the cable connection of the speaker is correct.
- Check whether the audio prompts are successfully configured through the configuration application.

The direction indicator is not on.

Check whether the cables of the direction indicator are correctly connected.

The arms are not folded after the turnstile is powered off.

Check whether the fixing screw of the electromagnetic chuck module is loose.

The arms cannot be lifted up after the turnstile is powered on.
- Manually push the arms down to their lower limit and then lift them up to a level position.
- Adjust the position of the electromagnetic chuck bracket before fixing it to the turnstile.

The arms cannot be rotated after swiping a card, or they can be rotated without swiping a card.
- Check for any loose nuts or screws.
- Apply lubricant to the moving parts of the electromagnets.
- Adjust the position of the direction electromagnet bracket before fixing it to the turnstile.

Appendix 1 Maintenance Cycle

Maintain the turnstile regularly to ensure long service life.

Cleaning the Surface

- Maintenance cycle for a good environment (adjustable according to the on-site environment):
    - ◇ Outdoor: Once every five days, and every time after it rains.
    - ◇ Indoor: Once every seven days.
- Maintenance content: Clean the surface and the arms.
    - ◇ Use a piece of soft cloth soaked with a neutral detergent or clean water, and then clean the surface and arms of the turnstile. If the turnstile is covered in rain, clean after it is dry.
    - ◇ High salinity and humidity environment, acid rain, and sweat will corrode the surface made of stainless steel. Use scour pads to clean the rust first (you can also use rust remover at the same time), and then use a piece of soft cloth soaked in a neutral detergent or clean water to clean the surface and arms of the turnstile.

Cleaning the Interior

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Do not use water to clean the interior, otherwise a short circuit might occur.
- Once every three months.
- Maintenance content:
    - ◇ Disconnect the power supply, open the top panel, and then remove the dust inside the turnstile.
    - ◇ Make sure that the motor, bearing, fastening pieces, connection bars, and screws are all tightened.
    - ◇ Apply anti-corrosive lubricant to the bearing rods, gears, and other moving parts.
    - ◇ Check if there are any loose connections. If yes, wrap the cables together, tighten the connectors, or follow any other similar measures that should be applied. Replace bad cables if any.
    - ◇ Regularly check if all the functions are normal.

Appendix 2 Maintenance Methods

Appendix 2.1 Rust and Adhesive Failure Prevention

Rusty stainless steel and adhesive failure will only happen if the turnstile is used or maintained inappropriately, or in harsh environments.

Rust Prevention

Do not expose the turnstile to substances that might cause it to rust.
- Ions, sulfur oxide, acidic substances that contain HCL and H_2SO_4, or substances that produce acidic substances (such as SO_4, salt, and HCLO) after dissolving in water will damage the passive film on the stainless steel.
- Substances like soot and dust will disturb the regeneration of the passive film on the stainless steel.
- Metal powder that mostly contains iron will stick to the stainless steel and get rusty.

Adhesive Failure Prevention

- After applying protective film to the stainless steel, ensure to protect it from UV rays (direct sunlight), heat, and pressure to avoid adhesive failure.
- After installing a face recognition access controller, apply silicon sealant to the installation hole to prevent water leakage, and reapply it every two years.

Appendix 2.2 Removing Marks and Rust

Removing Marks from Taking off the Protective Film

Use a sponge or cloth dipped with alcohol, naphtha, banana oil, or a mixed solution of ethyl alcohol and methylbenzene (or acetone) to clean marks left behind from removing the protective film. These chemicals are in ascending order of intensity. Use a clean cloth to scrub the stainless steel until the solution dries up. You can also use any other stainless steel cleaner. No matter which method you use, clean the surface thoroughly afterwards with clean water.

Removing Palm Marks

A neutral detergent or soap should be enough; otherwise, use an organic solution (such as alcohol, and naphtha). After scrubbing the surface with a solution, use a clean and dry cloth to wipe off the solution. Stainless steel cleaner is recommended.

Removing a Small Amount of Rust

Use a stainless steel cleaner.

Removing a Larger Amount of Rust

If metal powder rusts on top of the stainless steel and is not removed in time, the stainless steel will get rusty itself. Also, if rust caused by salts or other rust-inducing items are not removed in time, it will get worse. For these two situations, you have to use the specialized stainless steel cleaner. If the cleaner is not strong enough, use sand papers or a stainless steel brush to remove some of the rust, and be careful not to damage the stainless steel surface, and then apply the cleaner.

Appendix 2.3 Cautions

Cleaning Requirements

- Cut off the power supply before cleaning the turnstile. Make sure that water cannot make contact with the components inside.
- The detergent you use must not contain abrasive matter, otherwise the turnstile surface will be damaged.
- Clean along the lines on the surface.
- Use cloth to dry the surface after using detergent and clean water.

Detergent Requirements

- Choose a stainless steel cleaner according to the actual situation. The ones with over 30% active ingredients are recommended.
- Do not use acidic substances, especially sulfuric acid, sulfurous acid, and those that contain chlorine.
- If there is adhesive failure, use organic solutions that have no oxidative capacity. Alcohol, dimethylbenzene, and acetone are normally used.
- For stainless steel with a processed surface (mirror finish or titanium coating), make sure that you use a neutral detergent containing no abrasive matter.

Appendix 3 Cybersecurity Recommendations

Cybersecurity is more than just a buzzword: it's something that pertains to every device that is connected to the internet. IP video surveillance is not immune to cyber risks, but taking basic steps toward protecting and strengthening networks and networked appliances will make them less susceptible to attacks. Below are some tips and recommendations on how to create a more secured security system.

Mandatory actions to be taken for basic device network security:

1. **Use Strong Passwords**

   Please refer to the following suggestions to set passwords:
   - The length should not be less than 8 characters;
   - Include at least two types of characters; character types include upper and lower case letters, numbers and symbols;
   - Do not contain the account name or the account name in reverse order;
   - Do not use continuous characters, such as 123, abc, etc.;
   - Do not use overlapped characters, such as 111, aaa, etc.;

2. **Update Firmware and Client Software in Time**
   - According to the standard procedure in Tech-industry, we recommend to keep your device (such as NVR, DVR, IP camera, etc.) firmware up-to-date to ensure the system is equipped with the latest security patches and fixes. When the device is connected to the public network, it is recommended to enable the "auto-check for updates" function to obtain timely information of firmware updates released by the manufacturer.
   - We suggest that you download and use the latest version of client software.

"Nice to have" recommendations to improve your device network security:

1. **Physical Protection**

   We suggest that you perform physical protection to device, especially storage devices. For example, place the device in a special computer room and cabinet, and implement well-done access control permission and key management to prevent unauthorized personnel from carrying out physical contacts such as damaging hardware, unauthorized connection of removable device (such as USB flash disk, serial port), etc.

2. **Change Passwords Regularly**

   We suggest that you change passwords regularly to reduce the risk of being guessed or cracked.

3. **Set and Update Passwords Reset Information Timely**

   The device supports password reset function. Please set up related information for password reset in time, including the end user's mailbox and password protection questions. If the information changes, please modify it in time. When setting password protection questions, it is suggested not to use those that can be easily guessed.

4. **Enable Account Lock**

   The account lock feature is enabled by default, and we recommend you to keep it on to guarantee the account security. If an attacker attempts to log in with the wrong password several times, the corresponding account and the source IP address will be locked.

5. **Change Default HTTP and Other Service Ports**

   We suggest you to change default HTTP and other service ports into any set of numbers between 1024~65535, reducing the risk of outsiders being able to guess which ports you are using.

6. **Enable HTTPS**

   We suggest you to enable HTTPS, so that you visit Web service through a secure communication channel.

7. **MAC Address Binding**

   We recommend you to bind the IP and MAC address of the gateway to the device, thus reducing the risk of ARP spoofing.

8. **Assign Accounts and Privileges Reasonably**

   According to business and management requirements, reasonably add users and assign a minimum set of permissions to them.

9. **Disable Unnecessary Services and Choose Secure Modes**

   If not needed, it is recommended to turn off some services such as SNMP, SMTP, UPnP, etc., to reduce risks.

   If necessary, it is highly recommended that you use safe modes, including but not limited to the following services:

   - SNMP: Choose SNMP v3, and set up strong encryption passwords and authentication passwords.
   - SMTP: Choose TLS to access mailbox server.
   - FTP: Choose SFTP, and set up strong passwords.
   - AP hotspot: Choose WPA2-PSK encryption mode, and set up strong passwords.

10. **Audio and Video Encrypted Transmission**

    If your audio and video data contents are very important or sensitive, we recommend that you use encrypted transmission function, to reduce the risk of audio and video data being stolen during transmission.

    Reminder: encrypted transmission will cause some loss in transmission efficiency.

11. **Secure Auditing**

    - Check online users: we suggest that you check online users regularly to see if the device is logged in without authorization.
    - Check device log: By viewing the logs, you can know the IP addresses that were used to log in to your devices and their key operations.

12. **Network Log**

    Due to the limited storage capacity of the device, the stored log is limited. If you need to save the log for a long time, it is recommended that you enable the network log function to ensure that the critical logs are synchronized to the network log server for tracing.

13. **Construct a Safe Network Environment**

    In order to better ensure the safety of device and reduce potential cyber risks, we recommend:

    - Disable the port mapping function of the router to avoid direct access to the intranet devices from external network.
    - The network should be partitioned and isolated according to the actual network needs. If there are no communication requirements between two sub networks, it is suggested to use VLAN, network GAP and other technologies to partition the network, so as to achieve the network isolation effect.
    - Establish the 802.1x access authentication system to reduce the risk of unauthorized access to private networks.
    - Enable IP/MAC address filtering function to limit the range of hosts allowed to access the device.

ENABLING A SAFER SOCIETY AND SMARTER LIVING