Tripod Turnstile

User's Manual

V1.0.0

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
V1.0.0	First release.	February 2021

About the Manual

- The manual is for reference only. If there is inconsistency between the manual and the actual product, the actual product shall prevail.
- We are not liable for any loss caused by the operations that do not comply with the manual.
- The manual would be updated according to the latest laws and regulations of related jurisdictions. For detailed information, refer to the paper manual, CD-ROM, QR code or our official website. If there is inconsistency between paper manual and the electronic version, the electronic version shall prevail.
- All the designs and software are subject to change without prior written notice. The product updates might cause some differences between the actual product and the manual. Please contact the customer service for the latest program and supplementary documentation.
- There still might be deviation in technical data, functions and operations description, or errors in print. 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 the company names in the manual are the properties of their respective owners.
- Please visit our website, contact the supplier or customer service if there is any problem occurring when using the device.
- If there is any uncertainty or controversy, we reserve the right of final explanation.

Important Safeguards and Warnings

This chapter describes the contents covering proper handling of the turnstile, hazard prevention, and prevention of property damage. Read these contents carefully before using the turnstile, comply with them when using, and keep them well for future reference.

WARNING

- Pregnant women, the elderly, and children must be accompanied when passing the turnstile.
- Children shorter than 1 m must pass 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 break in 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 be damaged.

- After the installation, remove the protective film and clean the turnstile.
- Maintain the turnstile regularly to ensure that the turnstile works properly.
- If the turnstile is installed near places like swimming pool entrance, within 50 km away from the sea, construction sites, and more, 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 source.
- 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 supply that meets ES1 but does 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 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 in the passage, the turnstile will lock the arms, which might cause personal injury.
- The turnstile will not correctly recognize the authorized card if it is used with other cards.
- Keep the authorized card well 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 (adjust according to the actual situation) cement base. 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.

Table of Contents

1 Overview

1.1 Introduction

The turnstile controls access in places like hotels, government facilities, and more. When the turnstile is powered off, the arms will be normally unlocked, 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	Two IC card readers and an access controller are provided.
Enter with card swiping card or face recognition, and exit with card swiping	Two IC card readers and one face recognition access controller are provided.
Enter and exit through swiping card or face recognition	Two IC card readers and two access controllers are provided.

1.3 Features

- Resistant to sunlight, low temperature, and high temperature.
- Anti-tailing to prevent multiple people passing at the same time.
- The arms will be locked automatically if no one entered the turnstile after the specified time.
- Works with other devices, such as a face recognition access controller.
- Provides directional guidance to prevent people from passing in the wrong direction.
- The arms will only be unlocked with valid authorization to prevent people from charging through the turnstile.
- When the turnstile is powered off, the arms will be automatically folded away, and people can pass freely.

1.4 Access Control Mode

Access Control Mode

People can pass the turnstile through swiping card or face recognition.

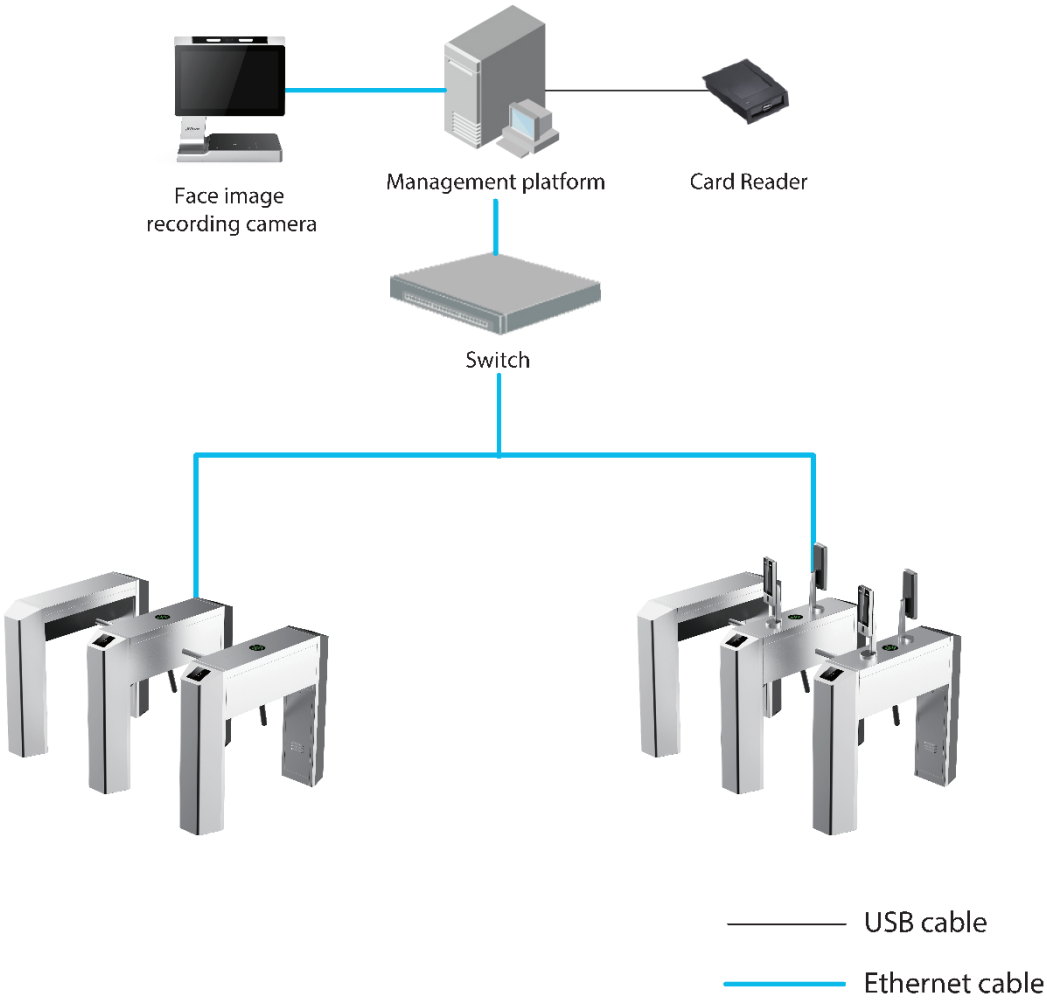
Passing Mode

Identity verification is needed when entering and exiting.

2 Application

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

Figure 2-1 Application



3 Structure

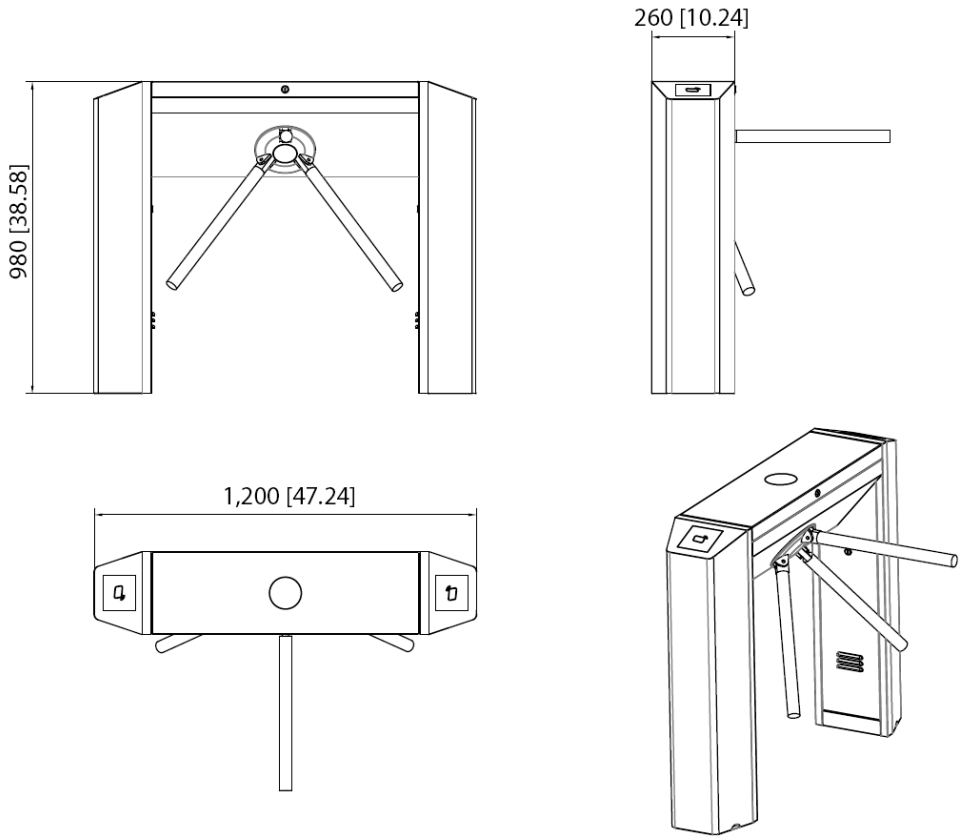
3.1 Appearance

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

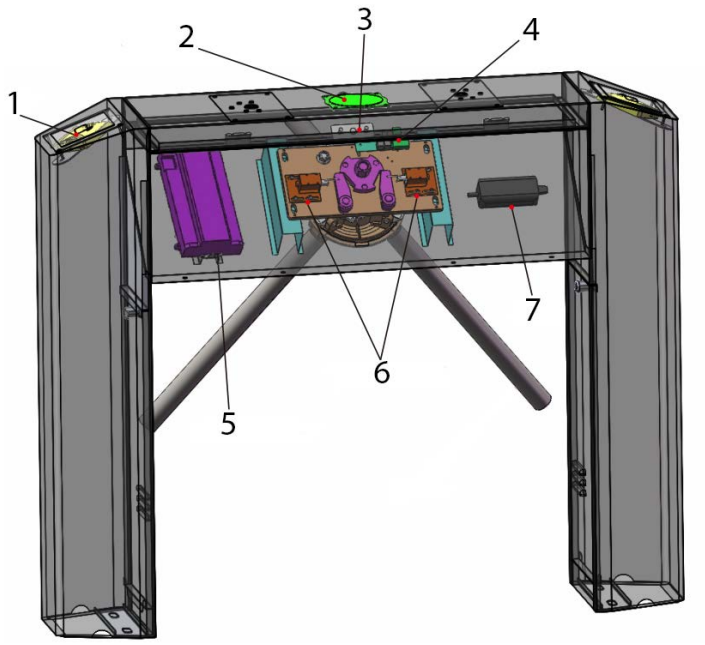


Table 3-1 Component description

No.	Item	Description
1	Card reader	Reads if a card has valid authorization, and sends the signal to the access controller. The turnstile does not come with a card reader. You need to purchase one or two as needed.
2	Direction indicator	• Passing allowed: A red X sign will be displayed. • Passing allowed: A green arrow will be displayed
3	Arm electromagnet	When the power is on, the arms can be fixed horizontally by folding them to the maximum extent, and then lifting them up again. When the power is off, the arms will be automatically folded.
4	Control board	Receives and processes signals from the access controller, and controls the electromagnets and direction indicator.
5	Access controller	Receives signals from the card reader and other devices, and then sends signal to the control board, which will power off the unlocking electromagnets to unlock the arms. • A two-door two-way access controller and a 12 V power supply are needed. • The turnstile does not come with an access controller. You need to purchase one
6	Unlocking electromagnets	Receives signals from the control board, and locks or unlocks the arms.
7	Power supply	A 12 V DC power supply for the control board.

4 Installation

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

4.1 Safety Instructions

WARNING

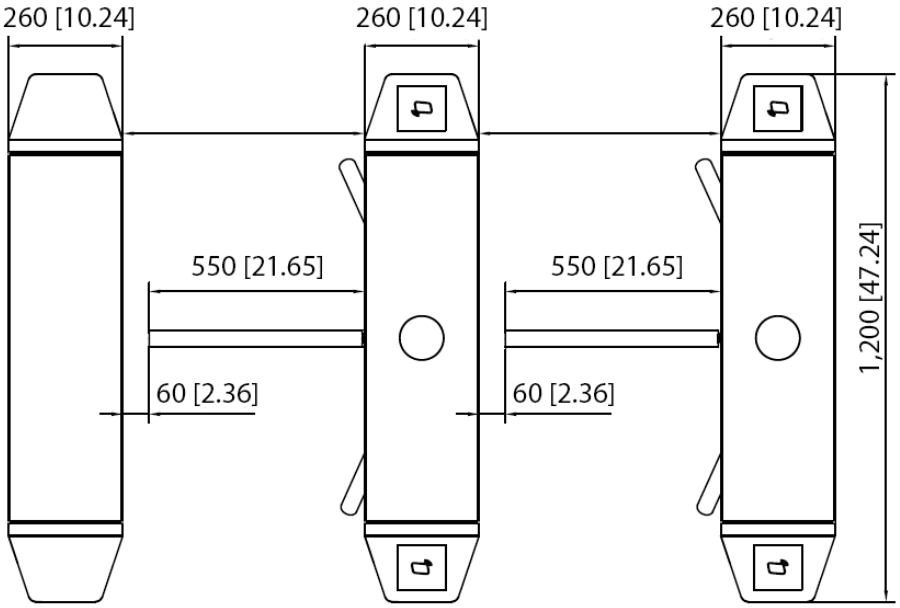
- Strictly confirm to requirements in the manual during installation; otherwise we will not be responsible for any loss occurred.
- Incorrect installation or improper operation might bring damages to humans or objects.
- Security devices and control devices used must confirm to EN12978.
- Before installing, wiring, and 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 fix 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 in the passage after 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 (adjust according to the actual situation) cement base. 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 out water. 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 (calibrate the levelness of the passage), hammer, wrench, angle grinder or cutting machine, and screwdriver.
- Marble and ceramic.
  Because marble and ceramic ground are fragile, use the pistol drill to drill a hole first, apply cooling water, and then keep drilling until the hole is deeper. 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 in 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 out water.
- The PVC pipes must be able to go through the cable entry of the installation base.

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

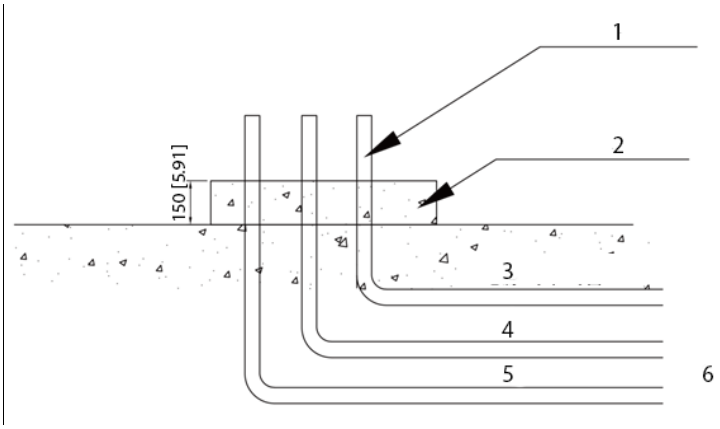


Table 4-1 PVC pipe layout description

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 (mm[inch])

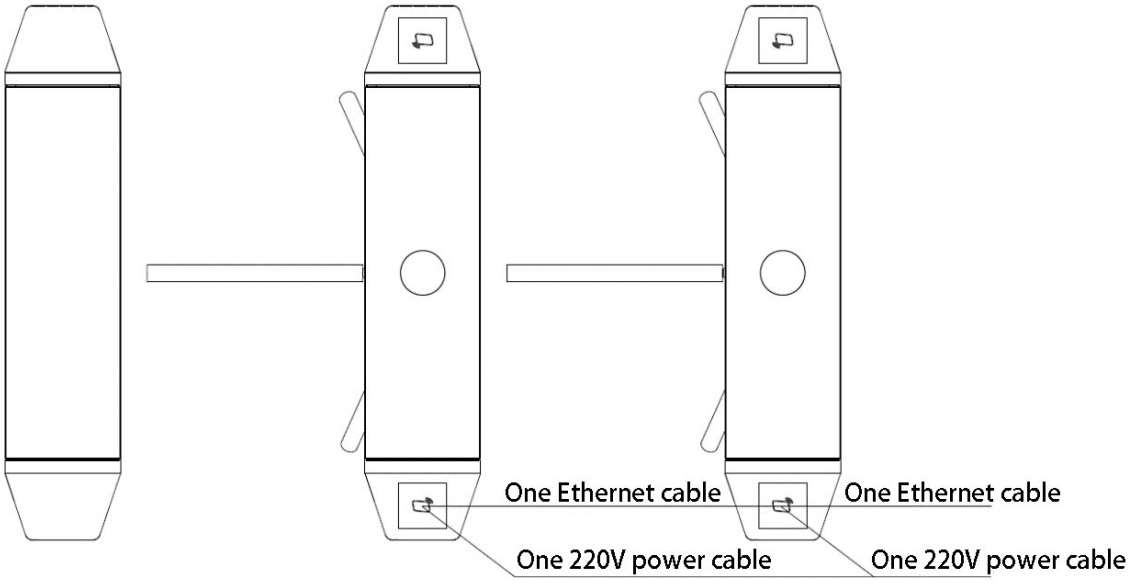


Figure 4-4 Wiring for two card readers and two face recognition access controllers (mm[inch])

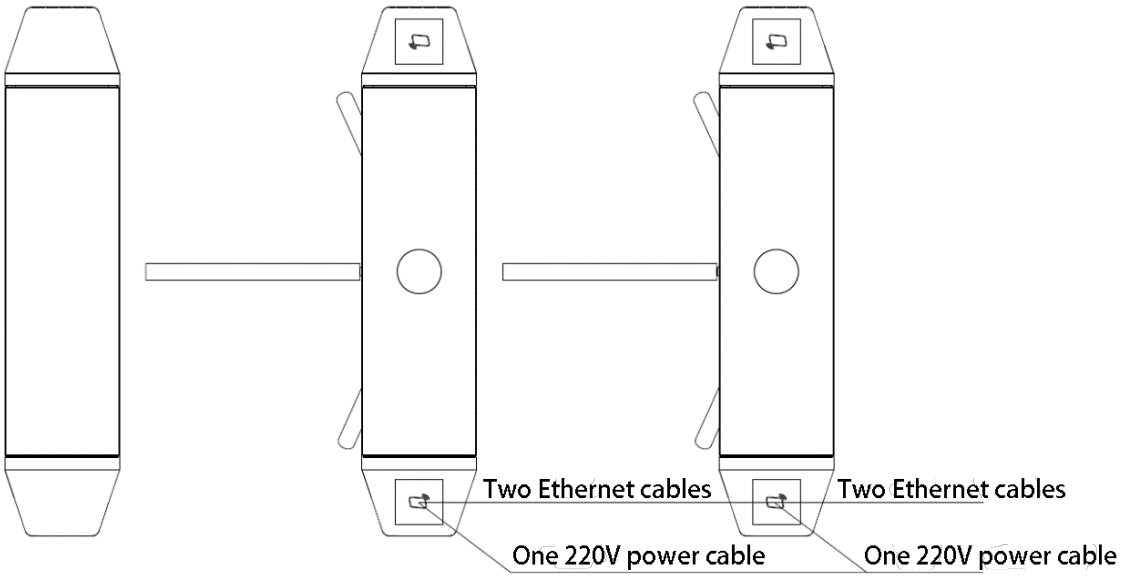


Table 4-2 Cable description

Type	Description
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 cable for two card readers and two face recognition access controllers. Reserve 3 m of each cable outside the cable entry.
Power cable	One 220 V RVV3×2.5 power cable for each turnstile. Reserve 3 m of the cable outside the cable entry.

4.2.3 Cable Layout

For recommended cable layout, see Figure 4-5. If you incorrectly lay cables like Figure 4-6, the turnstile might not be firmly installed, and the cables might be broken when hammering the expansion bolts.

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

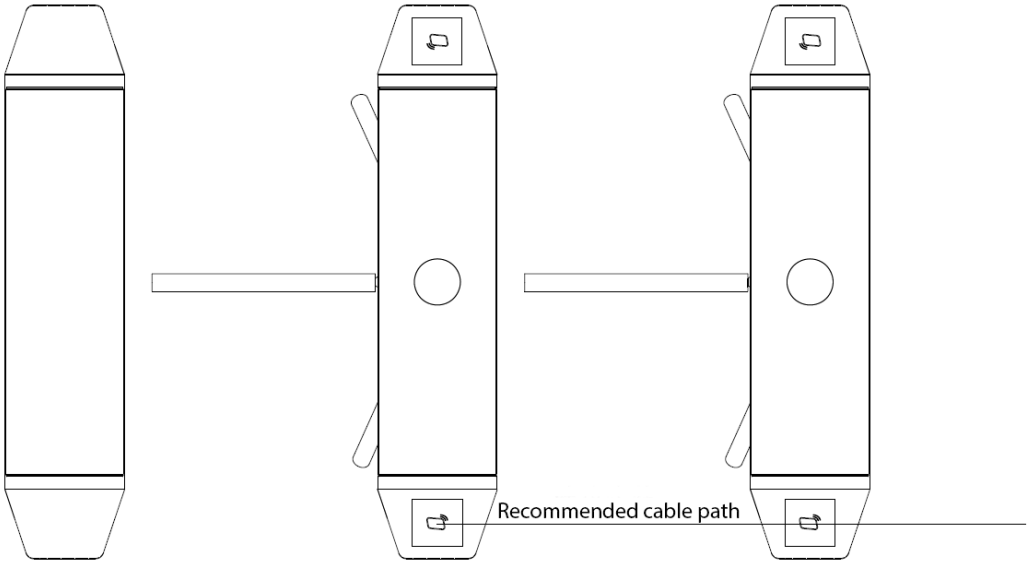
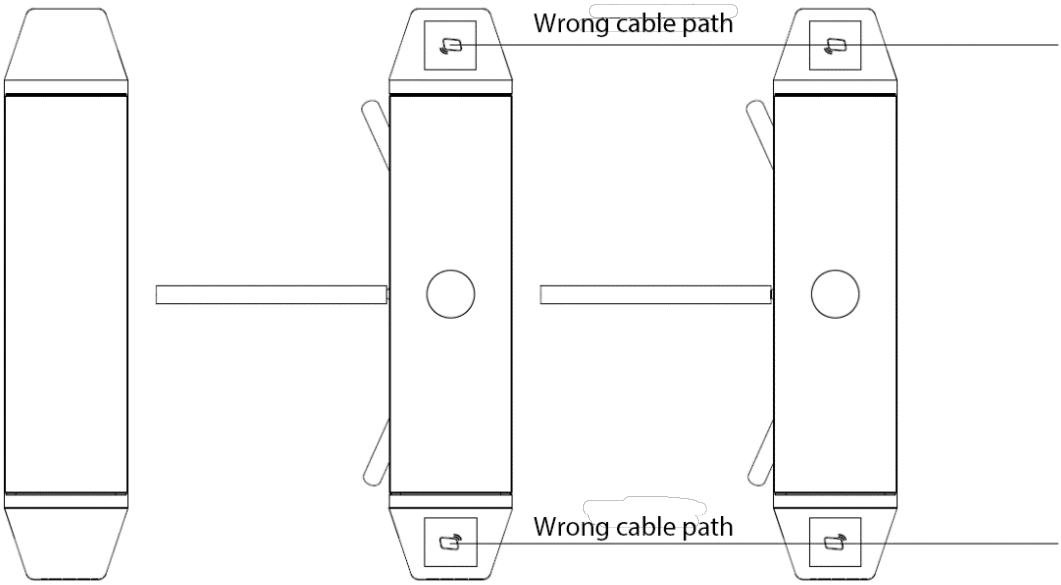


Figure 4-6 Wrong cable layout (mm[inch])

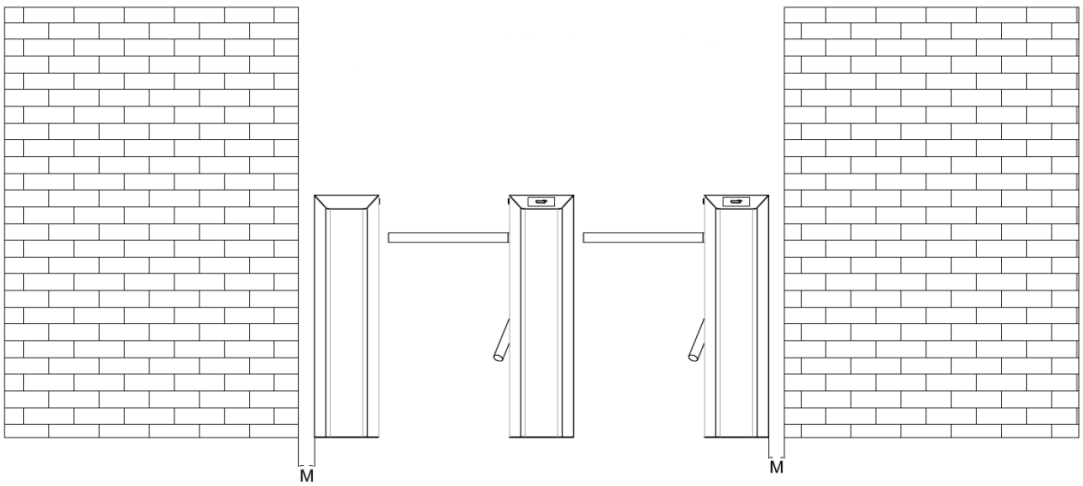


4.3 Installation Procedure

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. It is for maintenance purpose and also not enough for passing through.

Figure 4-7 Install turnstiles next to buildings

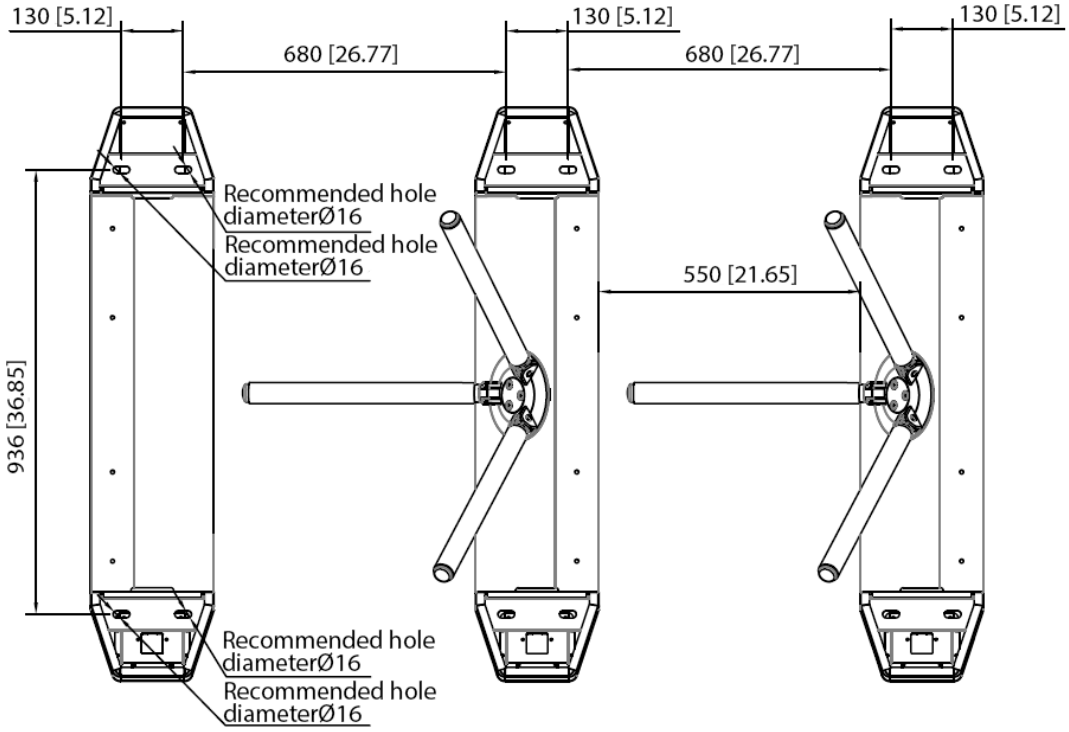


Step 1 Adjust all turnstiles to face the same direction.

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 × 100
Hole depth	75 mm
Hole diameter	14 mm

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

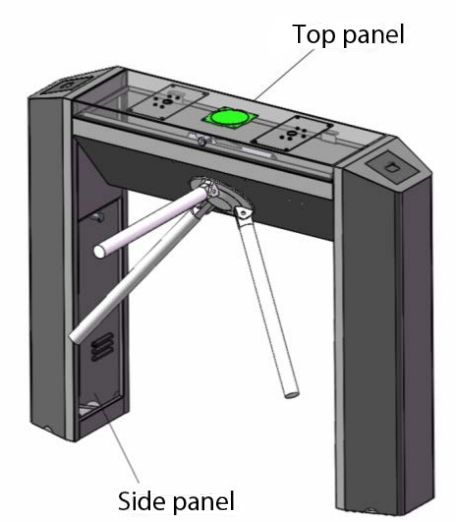
Step 6 Hammer the expansion bolts into the bottom of the hole.

Step 7 Use a wrench to tighten the nut, and then hammer the expansion bolt again.

4.3.2 Adjusting Turnstile Position

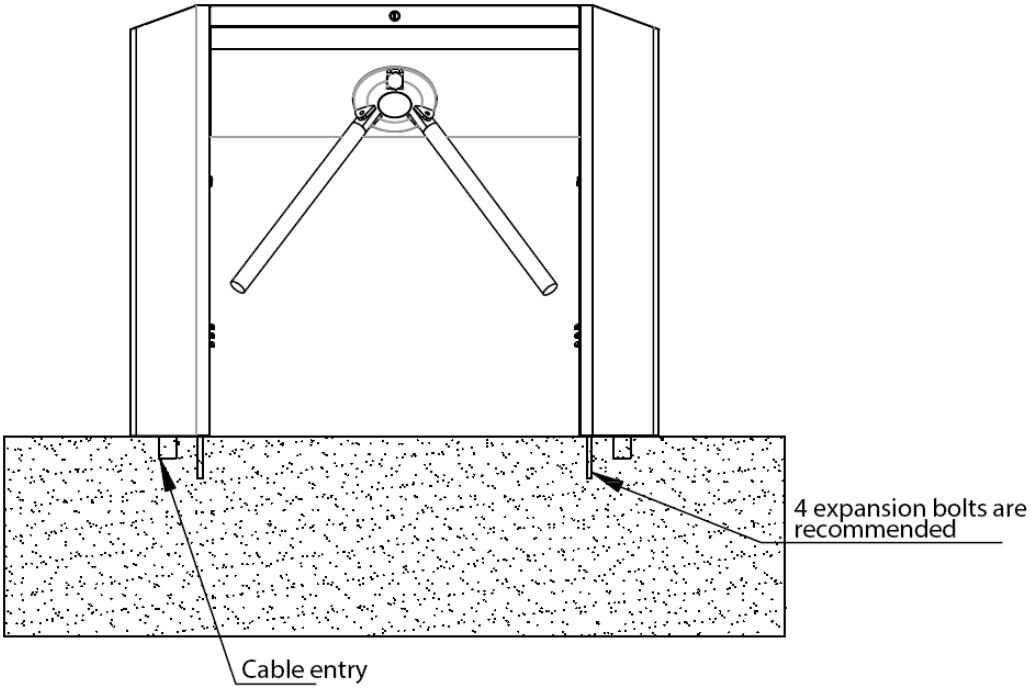
Step 1 Use the key to open the top panel.

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

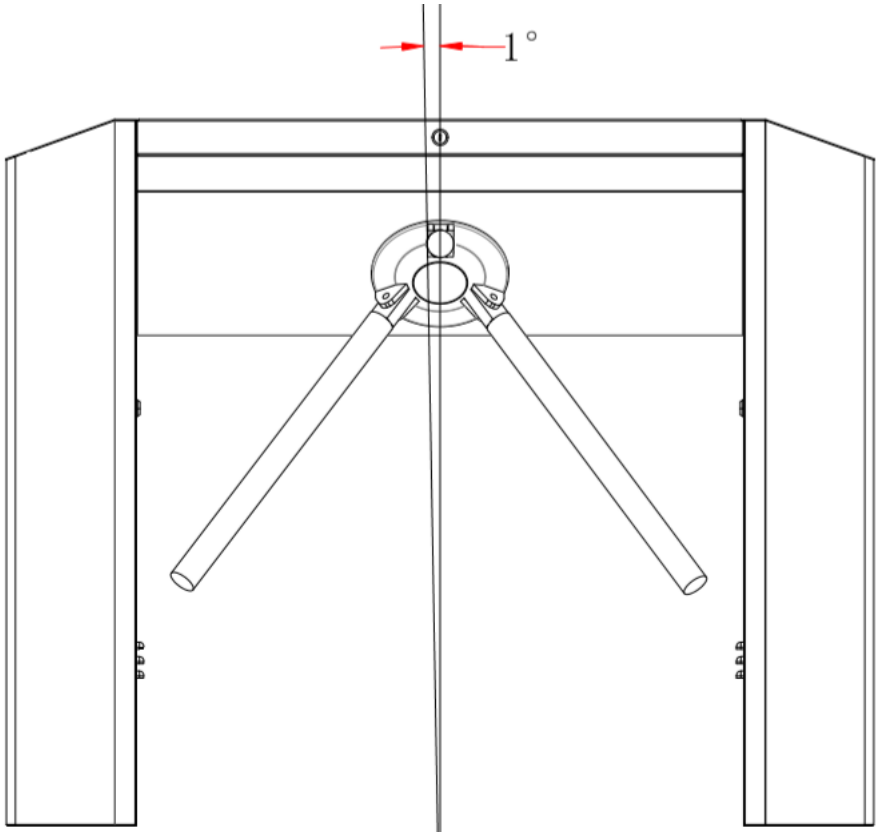


Step 3 Carefully lift the turnstile up and adjust its position, overlap the holes on the turnstile with the expansion bolts, and then place the turnstile on the ground.

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 acceptable flatness error.

Figure 4-11 Acceptable flatness error (mm[inch])

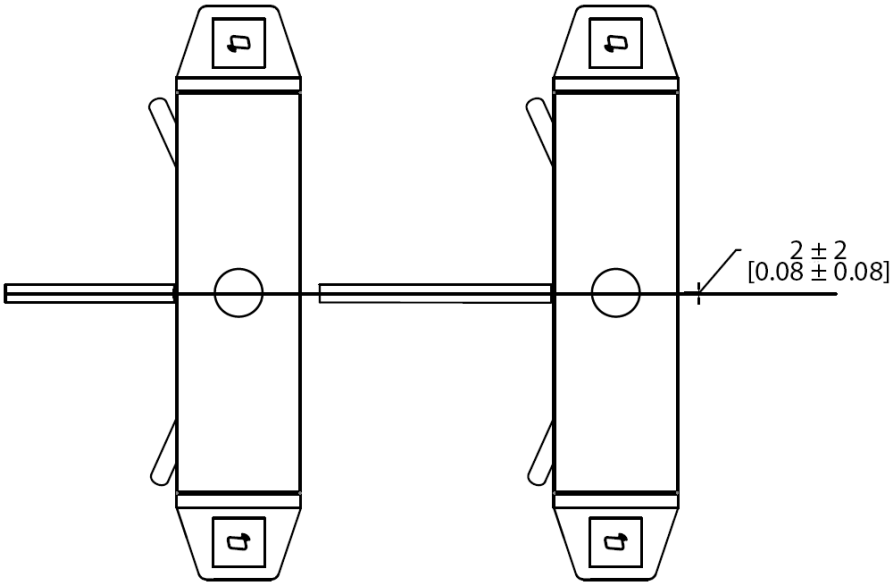


Step 6 Repeat Step 1–Step 5 to install other turnstiles.

The arms of different turnstiles must be facing the same direction.

Make sure that the turnstiles are aligned within the deviation.

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



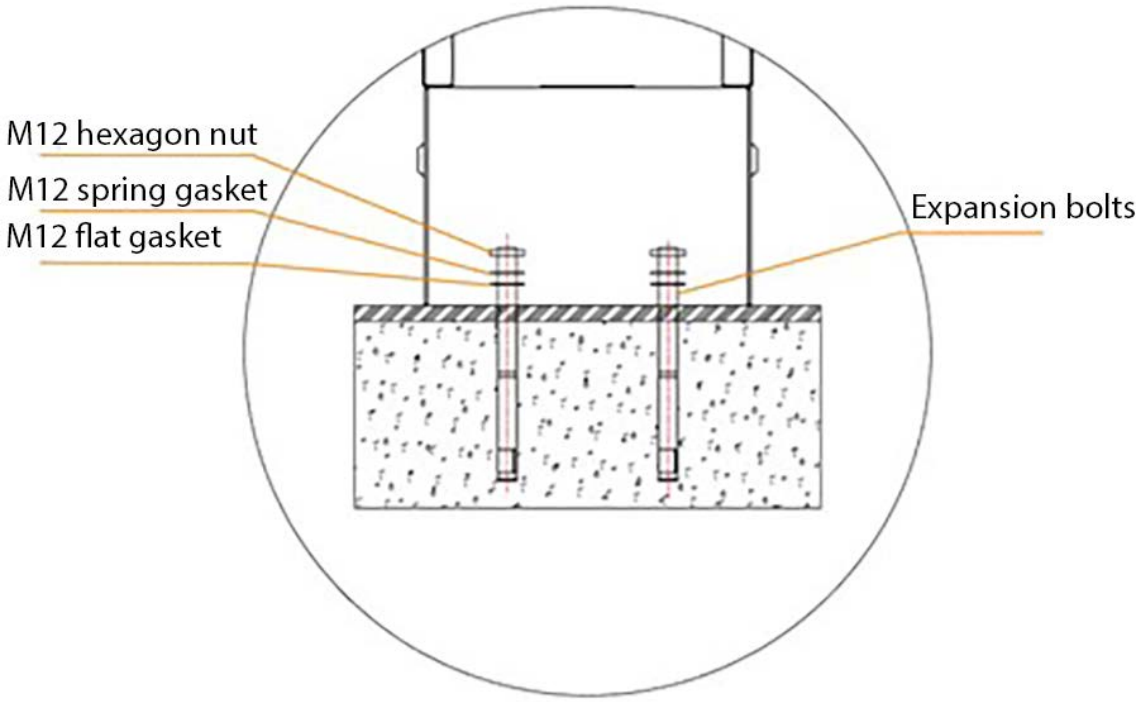
4.3.3 Fixing the Turnstiles

Step 1 After adjusting the turnstile position, put a M12 flat gasket, M12 spring gasket, and a 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 Fix the turnstiles



4.3.4 (Optional) 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.

Prerequisite

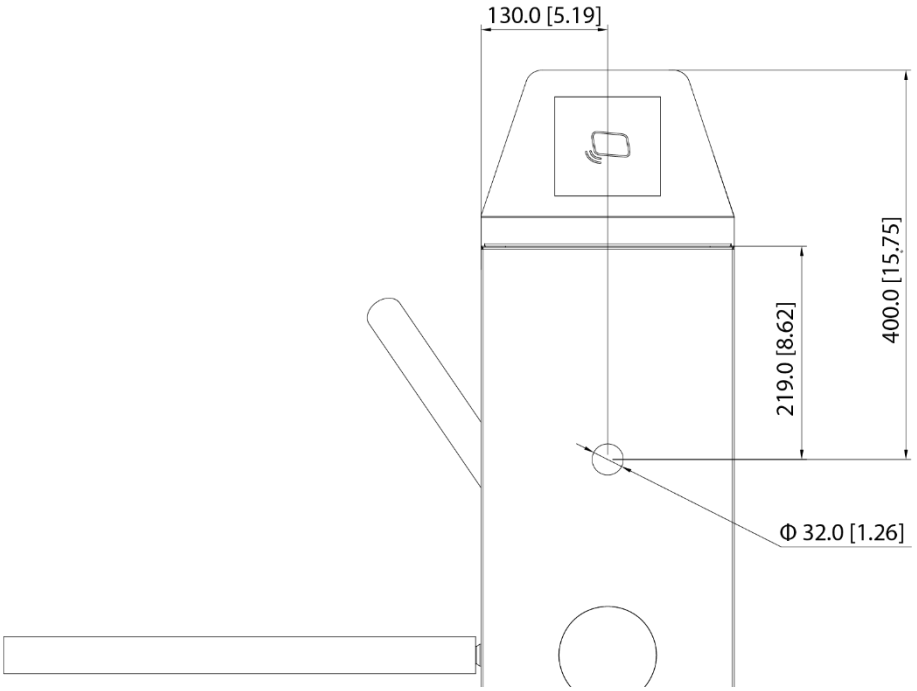
- Installation of the turnstile is complete.
- The turnstile works normally during commissioning. See "6 Commissioning".
- Power off the turnstile.

Procedure

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 down the position for drilling.

Figure 4-14 Position for drilling (mm[inch])



Step 3 Drill a hole on the mark with a diameter shown above.

Step 4 Use a file to clean off the burrs around the hole.

Step 5 Remove the iron dust inside the turnstile.

5 Cable Connection

5.1 Control Board Port Description

Figure 5-1 Control board ports

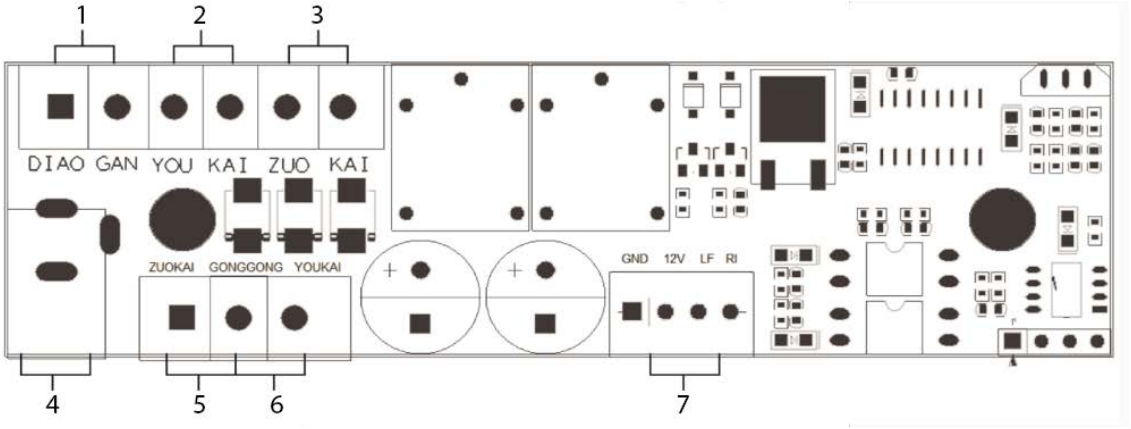
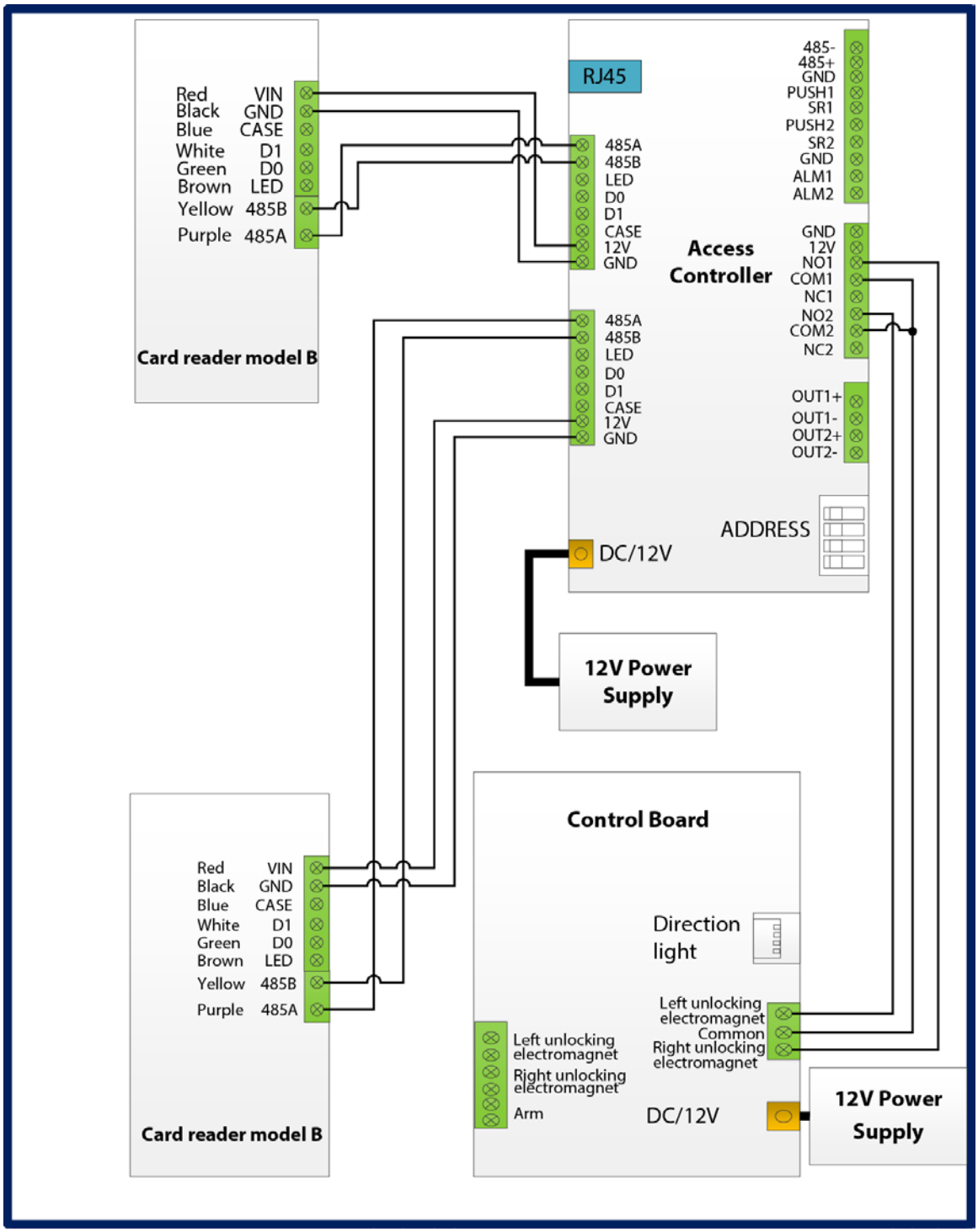


Table 5-1 Port description

No.	Description
1	Connects to the arm electromagnet.
2	Connects to the right unlocking electromagnet.
3	Connects to the left unlocking electromagnet.
4	Connects to 12 V DC power supply.
5	Connects to signal to unlock the left unlocking electromagnet.
6	Connects to signal to unlock the right unlocking electromagnet.
7	Connects to the direction indicator.

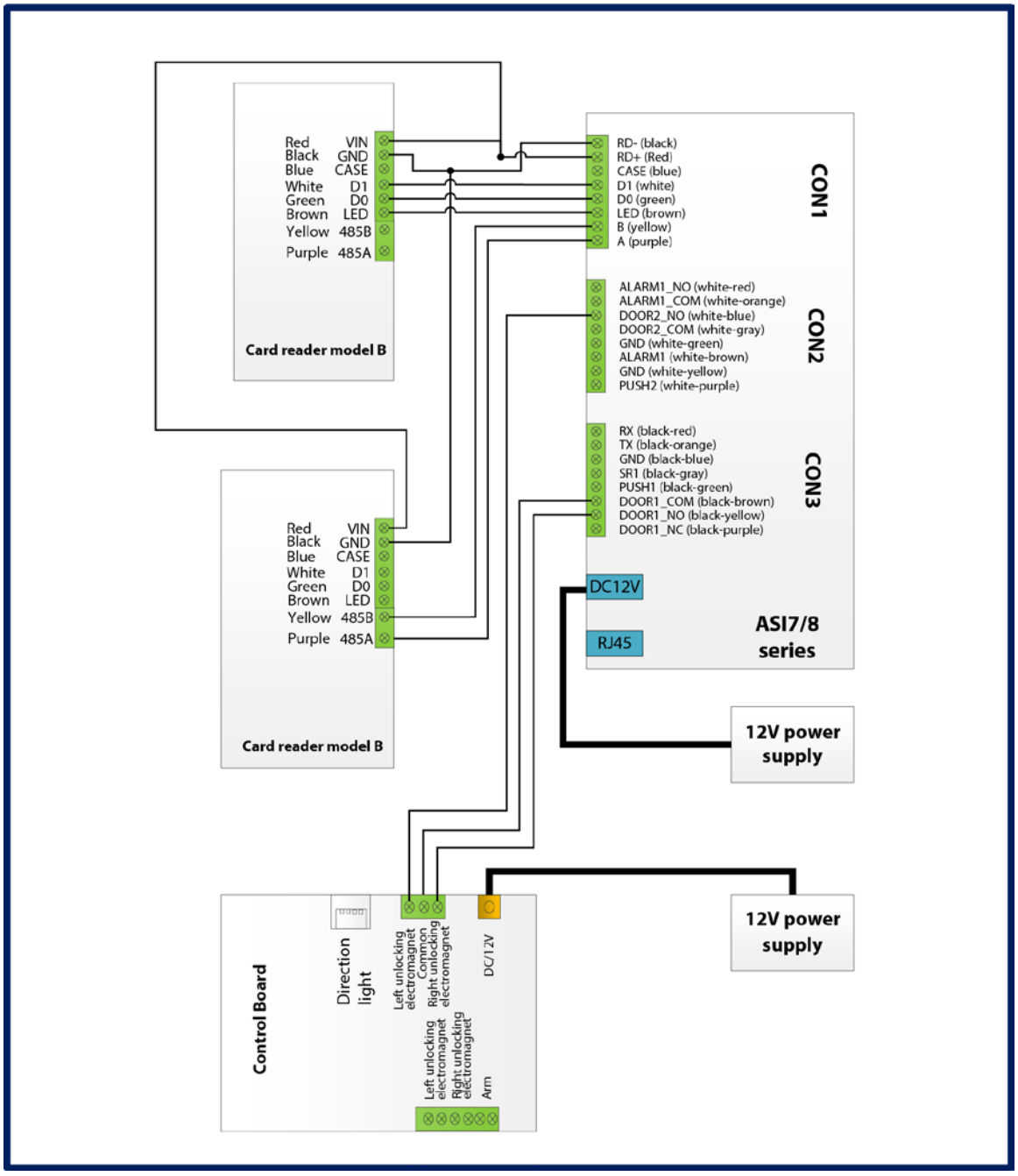
5.2 For Two IC Card Readers and One Access Controller

Figure 5-2 Cable connection for two IC card readers and one access controller



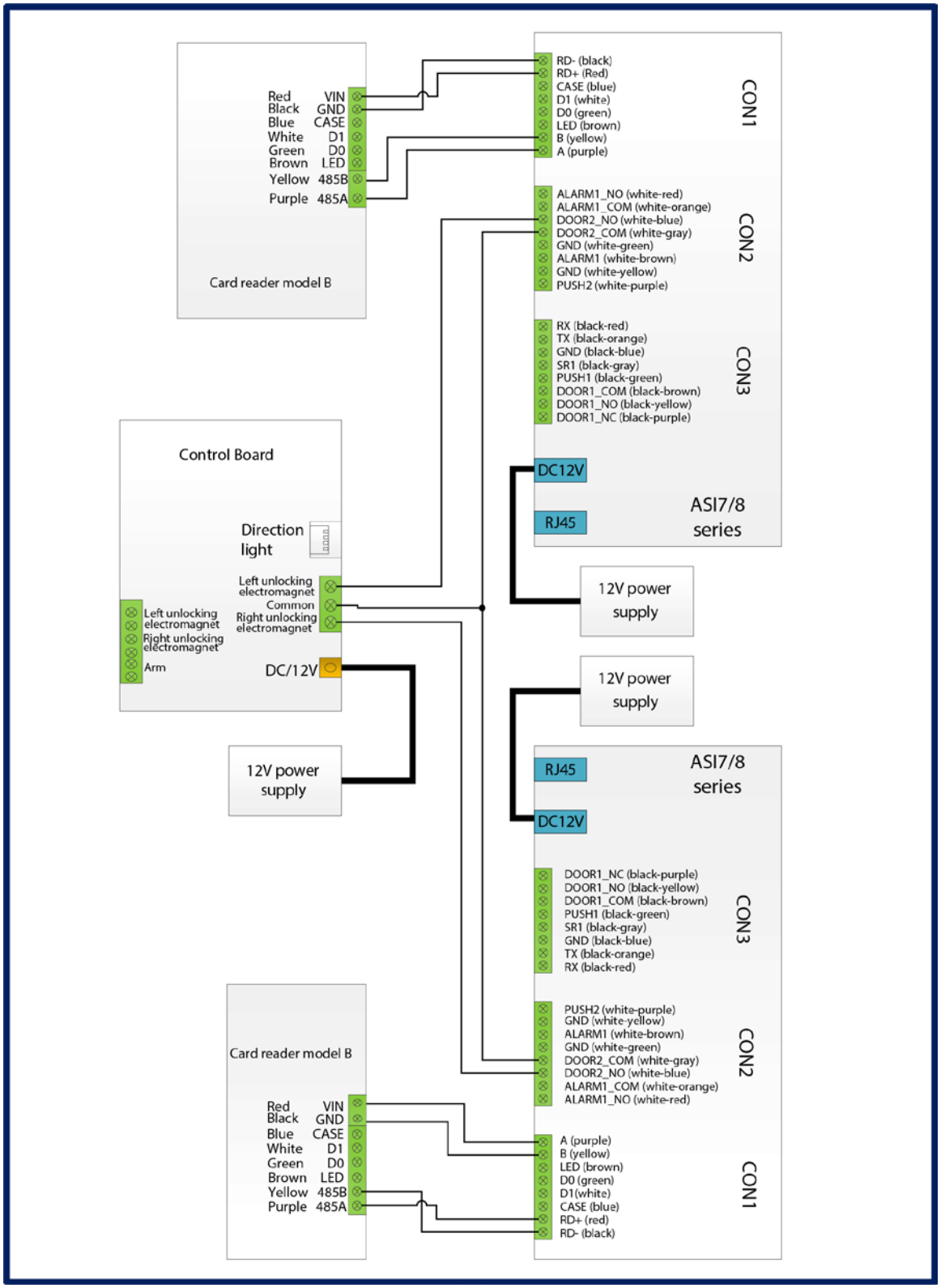
5.3 For Two IC Card Readers and One ASI7/8 Series Face Recognition Access Controller

Figure 5-3 Cable connection for two IC card readers and one ASI7/8 series face recognition access controller



5.4 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

- Before commissioning, check if all the components are normal.
- Check if all the cables are properly connected.
- The turnstile will start working 3 seconds after being powered on. Also, it can only be powered on 30 seconds after being powered off.
- Check if the arms can be lifted up normally, and cannot be folded. If the arms cannot be lifted up, you need to move the arm electromagnet to the appropriate position by adjust the screws on it.
- Check if the arms can be folded away after the turnstile is powered off, and can be fixed horizontally after the turnstile is powered on, by folding them to the maximum extent, and then lifting them up again.
- Swipe a card or verify a face, and then check if the arms can be unlocked and rotated normally.

After completing all the steps above, the arms of the turnstile can only be unlocked with valid authorization.

7 FAQ

The power indicator is not on after the turnstile is powered on.

- Check if the 12 V power supply is working properly, and connected to 220V power supply.
- Check if there is signal when the turnstile is unlocked.
- Check if the cables of the unlocking electromagnets are properly connected.

The arms are not folded after the turnstile is powered off, or the arms cannot be lifted up after the turnstile is powered on.

Move the arm electromagnet to the appropriate position by adjusting the screws on it.

The direction indicator is not on.

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

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.
- Move the arm electromagnet to the appropriate position by adjusting the screws on it.

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 rain.
  - ◇ Indoor: Once every seven days.
- Dusty and high salinity and humidity environments, such as within 50 km from the sea or 20 km from a chemical factory, or near a construction site, we recommend:
  - ◇ Outdoor: Once every two days, and every time after rain.
  - ◇ Indoor: Once every five days.

Removing Rust on the Surface

- Maintenance cycle for a good environment (adjustable according to the on-site environment):
  - ◇ Outdoor: Once every 15 days, and every time after rain.
  - ◇ Indoor: Once every 30 days.
- Dusty and high salinity and humidity environments, such as within 50 km from the sea or 20 km from a chemical factory, or near a construction site, we recommend:
  - ◇ Outdoor: Once every seven days, and every time after rain.
  - ◇ Indoor: Once every 15 days.

Cleaning the Interior

Once every three months.

Appendix 2 Maintenance Methods

Preventing Rust

Do not expose the turnstile to the following substances that might cause rust to happen:

- Ions, sulfur oxide, acidic substances that contains HCL and H_2SO_4, or substances that produce acidic substances (such as gas with 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.

Precautions

- Cut off the power supply before cleaning the turnstile. Make sure that water will not contact the components inside.
- The detergent you use must not contain abrasive matter; otherwise the turnstile surface will be damaged.
- Clean along lines on the surface.

Maintaining and Cleaning the Surface

- Use scour pads to clean the surface, apply stainless steel maintenance agent along the lines on the surface, and then use scour pads to clean the surface again.
- If certain rust cannot be removed, see the Precautions section above.

Removing Rust on the Surface

Step 1 Use scour pads to clean the surface.

Step 2 Spray stainless steel rust remover (we recommend WD40) on the surface

Step 3 Use scour pads to clean the surface along the lines again.

Step 4 Dip the scour pads in water, and then clean the surface along the lines.

Step 5 When the surface is dry, apply anti-rust spray on the surface.

Do not touch the surface until the anti-rust spray is dry, which usually takes about three to five hours.

Interior

Do not use water to clean the interior; otherwise the circuit might be shorted.

- Disconnect the power supply, open the top panel, and then remove the dust inside the turnstile.
- Check for silicon failure when the turnstile is installed outdoors with a face recognition device. If yes, remove the silicon sealant, and then apply it again on a sunny day. We recommend using any

silicon sealant dedicated for outdoor use. If silicon sealant is also applied on a card swiping area, check for failure as well. If yes, see the above to repair it.

- Check if the screws of the arms are loose. If yes, tighten them.
- Check if the motor, bearing, fastening pieces, and drive shaft are loose. If yes, tighten them.
- Apply anti-corrosion grease to the linkage, gears, and other moving parts.
- Check if the circuit, cables and connectors are out in the open or loose. If yes, wrap them to organize them, and tighten them.

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.