

Common Problems and Solutions for Turnstile

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1 Overview

1.1 ZKTeco turnstile product series

ZKTeco pedestrian turnstiles can be divided into tripod turnstiles, flap barrier turnstiles, swing barrier turnstiles, and full-height turnstiles by working mode. Each type has several product series as follows with different appearance and configuration:

- Tripod turnstiles: TS1000 series, TS2000 series, TS1000Pro series, and TS2000Pro series
- Flap barrier turnstiles: FBL1000 series, FBL2000 series, FBL4000 series, and FBL5000 series
- Swing barrier turnstiles: SBT1000S series, SBTL2000 series, SBTL3000 series, and SBTL5000 series
- Full-height turnstiles: FHT2300 series, FHT2400 series, FHT2300D series, and FHT2400D series

Each series has models with different access control systems, which are marked in their model names in a similar way. For example, access control configurations of models in the SBTL5000 series are as follows:

SBTL5000: No access control system. It requires an external control module.

SBTL5011: Controller C3-200 is installed to work with card reader KR100.

SBTL5022: Controller InBio260 is installed to work with the fingerprint reader FR1200.

SBTL5033: Facial recognition.

1.2 Characteristics and similarities of different turnstile series

1.2.1 Tripod turnstile

A tripod turnstile has three arms installed on a turn plate, which is controlled by an electromagnet. ZKTeco TS Pro series and TS series tripod turnstiles have similar appearances, except that TS Pro series is slightly bigger. The electronic control systems on the two product series are the same. Compared with the TS series, the Pro series adopts a more compact and reliable loader, which is easier to install and replace, and the electromagnet is installed on the loader to facilitate later maintenance and repair work. In addition, the structure of the stop base and lock rods have also been improved and enhanced.

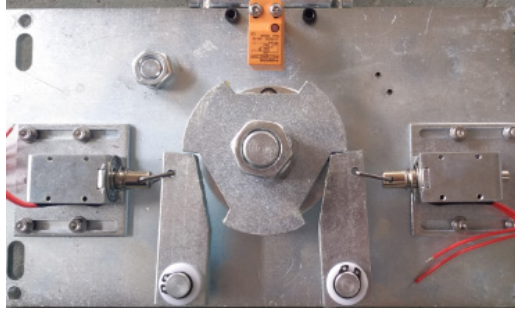


Figure 1 Loader on the TS Pro series

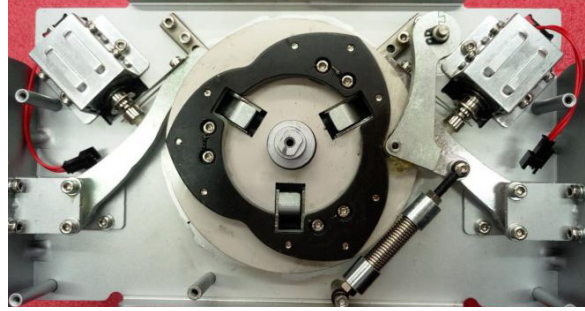


Figure 2 Loader on the TS series

In addition, TS Pro series adopts an arm-turn plate integrated structure, which locks the arms to the turn plate, enhances the firmness of the arms to prevent them from dropping under heavy workload. Also, more materials are used at the joint to withstand serious collision.



Figure 3 Turn plate of the TS Pro series



Figure 4 Arms of the TS series

1.2.2 Full-height turnstile series

Full-height turnstile features the highest security level among all turnstiles. They stop followers and climbers. Full-height turnstiles can be divided into tripod turnstiles and quadpod turnstiles. Quadpod turnstiles have smaller passage space and better access control effect. Tripod turnstiles offer larger passage space and are suitable for people with big sizes. Their working mode is similar to that of tripod turnstiles. The arms are controlled by the electromagnet. The only difference is that a tripod turnstile is locked when its electromagnet is powered off and unlocked when powered on, while a full-height turnstile is unlocked when its electromagnet is powered on and locked when powered on.

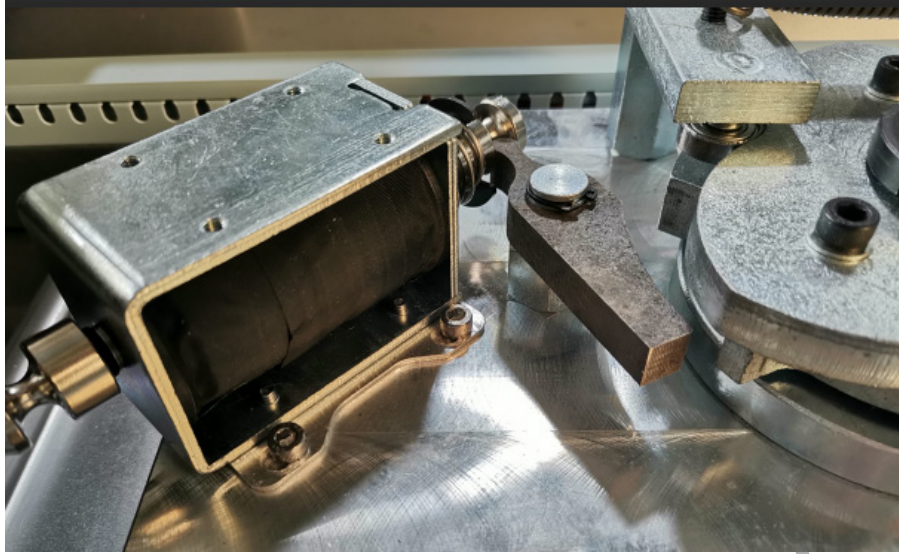


Figure 5 Full-height turnstile in standby state



Figure 6 Tripod turnstile in standby state

1.2.3 Flap barrier turnstile and swing barrier turnstile series

Both flap barrier turnstiles and swing barrier turnstiles are driven by a motor, but differ in the arm moving directions. After the gate is opened, the tripod turnstile closes the gate after the proximity switch detects arm rotation, while the flap barrier turnstile and swing barrier turnstile closes the gate after the infrared sensor detects people passing through the gate.

In terms of the driving components, electromagnets on both tripod turnstiles and full-height turnstiles do not require any auxiliary components for sucking and release, while the flap barrier turnstiles and swing barrier

turnstiles require position sensors, such as proximity sensors and encoders, to assist in detecting the position of their arms after the motors rotate into position (open or closed).

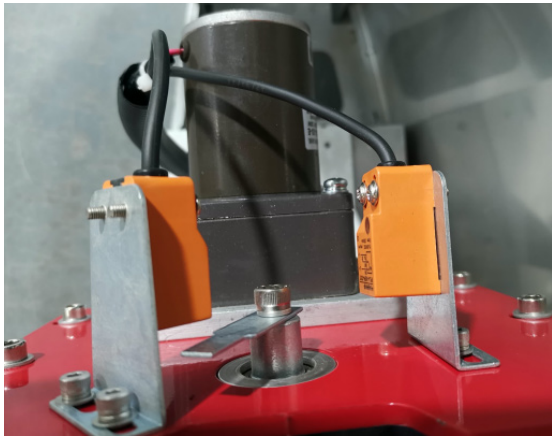


Figure 7 Arm position sensor on a flap barrier turnstile

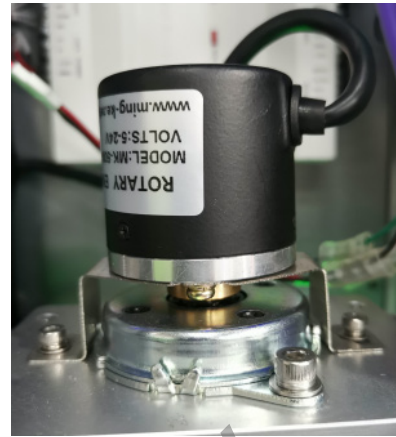


Figure 8 Arm position sensor on a swing barrier turnstile

Motorized gates enable a higher passing speed but its anti-tailing function is not powerful. If a person follows another passing through the gate in a short distance, with the first person still under the coverage of the last pair of infrared sensors and the second person blocking the first pair of infrared sensors, the gate will not close to stop the second person. The anti-tailing function fails in that case. Therefore, the customer needs to draw a warning line and place a warning note on the ground to remind pedestrians to keep a necessary distance.

1.3 Optional modules

Currently, QR code readers, card collectors, and coin acceptor are available. These components can be mounted directly on the turnstile or on a pole off the turnstile. Pole installation is a supplementary measure for models that do not support direct installation. Theoretically, all optional modules and readers can be installed on poles. The customer can choose the installation mode as required.

1.3.1 QR code reader

The turnstile series that support direct QR code reader installation include the TS series, TS Pro series, FBL series, SBTL series (one-way installation for SBT1000S), and FHT series.

The QR code reader needs to communicate with the controller but the controller cannot perform RS232 communication. Therefore, an RS232-to-Wiegand converter is required for communication signal conversion. The following compares two different QR code readers:

FM25: cost-effective

FM30: higher reading accuracy and broader view angles



Figure 9 FM25 QR code reader

1.3.2 Card collector

The turnstile series that support direct card collector installation include the TS1000&TS1000 Pro (one-way installation only), TS2000&TS2000 Pro, FBL series, and SBTL series (except for SBT1000S).

ZKTeco card collector is a mechanical card collecting module without readers. Therefore, an additional card reader is required.



Figure 10 Card collector

1.3.3 Coin acceptor

The series that support coin acceptors include the TS2000&TS2000 Pro, FBL series (except for FBL5000), and SBTL2000&SBTL3000.

The coin acceptor is directly connected to the main board and transfers gate opening signals to the main board.

The coin acceptor does not need to be connected to the controller.

1.4 Fault classification

There are two major types of fault concerning turnstiles. One is the faults that occur after long-term use. This type of fault can be solved by replacing parts. The other is the faults caused by incorrect motherboard or software settings. This can be solved by changing the settings. The following table lists the fault types.

Fault Type	Symptom	Cause	Solution	Proportion
Software settings	The gate opens 2~3 times.	The lock drive duration is not set to 1s.	Set the lock drive duration to 1s.	30%
Proximity switch	The turnstile is locked immediately after it is unlocked (not locked in 5s), or the motorized gate is not closed after being opened or cannot be opened.	The proximity switch is damaged.	Replace the proximity switch.	15%
Infrared sensor	The motorized gate does not close.	The pair of sensors are not aligned with each other or are damaged.	Commission the sensors.	15%
Main board	The gate of the tripod turnstile is kept open, or the motorized gate cannot be opened or experiences other exceptions.	Parts on the main board are damaged.	Replace the main board.	15%
Others				25%

1.5 Common turnstile problems

1.5.1 Dirty gate surface

ZKTeco turnstile housing is made of USU 304 stainless steel. The stainless steel housing needs to be coated with a layer of anti-rust oil before shipment to strengthen the anti-rust performance. The turnstile surface gets dirty because the dust inside the package is mixed in the oil. To prevent this problem, the film is no longer removed before shipment. If there is such a problem with the previous shipment, you can use WD40 anti-rust oil to wipe the surface again.



Figure 11 WD40 anti-rust oil

1.5.2 Turnstile surface scratches

ZKTeco turnstiles' surface is made of Brushed stainless steel. Any shallow surface scratches can be removed by brushing the surface in the direction of the pattern using brushing cloth and anti-rust oil. If there is a deep scratch, it can be removed by using a brushing machine.



Figure 12 Brushing cloth



Figure 13 Brushing machine

1.5.3 Software setup problems

If the turnstile is integrated with a ZKTeco access control system, there is a mismatch between the lock drive duration (opening signal duration) configured in the access control settings to 5 seconds by default and the normal passing time of 2~3 seconds, so the lock drive duration should be changed to 1 second. In the case that the lock drive duration is not changed, the tripod turnstile and full-height turnstile allows two to three persons to pass after each verification, while the flap barrier turnstile or swing barrier turnstile quickly opens and closes the gate after a person passes.

Edit	
Device Name*	192.168.1.248
Door Name*	192.168.1.248-1
Verification Mode*	Finger Vein
Operate Interval*	0 second(0-254)
Anti-Passback Duration of Entrance	minute(0-120)
Duress Password	(Maximum 6 Bit Integer)
Emergency Password	(8 Bit Integer)
Disable Alarm	☒
Door Number*	1
Active Time Zone*	24-Hour Accessible
Lock Open Duration*	5 second(1-254)
Door Sensor Type*	None
Door Sensor Delay	second(1-254)
Passage Mode Time Zone	
The above settings are copied to	
OK Cancel	

Figure 14 Setting of the lock drive duration

1.5.4 Install fingerprint readers on a turnstile

The standard fingerprint reader for turnstiles is FR1200, which communicates using RS485. Two readers are connected in parallel to the 485 port of the controller, and the DIP switches on the readers are used to set machine numbers. If an opposite gate is opened when verification is performed at a reader or if a gate is opened no matter which reader performs verification, check the settings of the DIP switches of the readers. 1 or 2 should be turned on on one of the readers, and 3 or both 1 and 2 be turned on on another reader.



Figure 15 Setting of a DIP switch

1.5.5 Two readers control the same gate or their opposite gates

If fingerprint readers are installed, check the DIP switch settings of the fingerprint readers. Refer to [1.5.4 Install fingerprint readers on a turnstile](#). If card readers are installed, check whether controller connections are correct. There are four ports on the controller for connecting to card readers, namely, Reader1, Reader2, Reader3 and Reader4. Among them, Reader1 and Reader2 control Lock1, Reader3 and Reader4 control Lock2. One reader should be connected to Reader1 or Reader2, and the other connected to Reader3 or Reader4. If the connections are correct, check whether the software is used for linkage setting. When a linkage setting is configured, the input point and output point should be linked to the correct reader and gate. If any reader and gate are selected, the two readers control the same gate, resulting in the aforesaid problem.



Figure 16 Reader ports

1.5.6 Mismatch between the passing indicator and card reader

When verification at a card reader is successful, the indicator for the opposite passage direction turns on. First check whether the reader or indicator connection is incorrect. If the tripod turnstile can rotate in the intended direction or the motorized gate emits no alarm, the reader is connected correctly. In that case, correct the wiring of the indicator. If the tripod turnstile cannot be rotated or the motorized gate emits an alarm, the reader is not connected correctly. In that case, refer to [1.5.4](#) or [1.5.5](#) to correct the connection.



Figure 17 Passage indicator

1.5.7 No 24 V power supply from the turnstile

The machine does not respond after the air switch is turned on. Use a multimeter to measure the 220 V input and 24 V output of the 24 V power supply. Before measurement, disconnect the 24 V output terminal, because the 24 V power supply has short-circuit protection. When the output terminal is short-circuited, the power supply stops generating the 24 V output to protect the power supply. If there is a voltage at the 24 V output terminal, the main board is short-circuited; otherwise, replace the 24 V power supply.

2 Common Faults and Solutions

2.1 Tripod turnstile

2.1.1 The gate is locked immediately after being opened

1) Symptom

When verification succeeds, the electromagnet is heard opening the gate and then closing it.

2) Cause

The proximity switch keeps finding metals (detection malfunction).

3) Troubleshooting procedure

- a) Check whether the indicator behind the proximity switch is steady on. If yes, check whether the metal plate is installed in the reverse direction or whether the metal plate is detected by the proximity switch. Normally, the metal plate under the proximity switch should be installed as shown in the figure on the right. If the metal plate is installed correctly, go to step 2.



- b) Unmount the proximity switch from the loader and keep it away from the metal plate. If the indicator is still on, the proximity switch is damaged and needs to be replaced.
- c) Unmount the proximity switch from the main board and replace it. If the problem persists, replace the main board.

2.1.2 Two to three persons can pass at a time

1) Symptom

After verification succeeds, two to three persons can pass tripod turnstile.

2) Cause

The controller lock drive duration is not set to 1s, or the proximity switch is damaged and cannot detect the rotation of the metal plate.

3) Troubleshooting procedure

- a) First check the setting of the controller lock drive duration. Refer to [1.5.3 Software setup problems](#). If there is no problem with the software settings, go to the next step.
- b) If the proximity switch is dislocated and cannot detect the metal plate or the proximity switch is damaged, it does not send signals to the main board when the metal plate is rotated. Unmount the proximity switch from the loader and move it close to the metal plate. If the indicator on the switch turns on, the proximity switch is too far away from the metal plate. In that case, reinstall the switch. If the indicator does not turn on, replace the proximity switch.
- c) If the proximity switch is working properly, replace the main board.

2.1.3 Continuous pass

1) Symptom

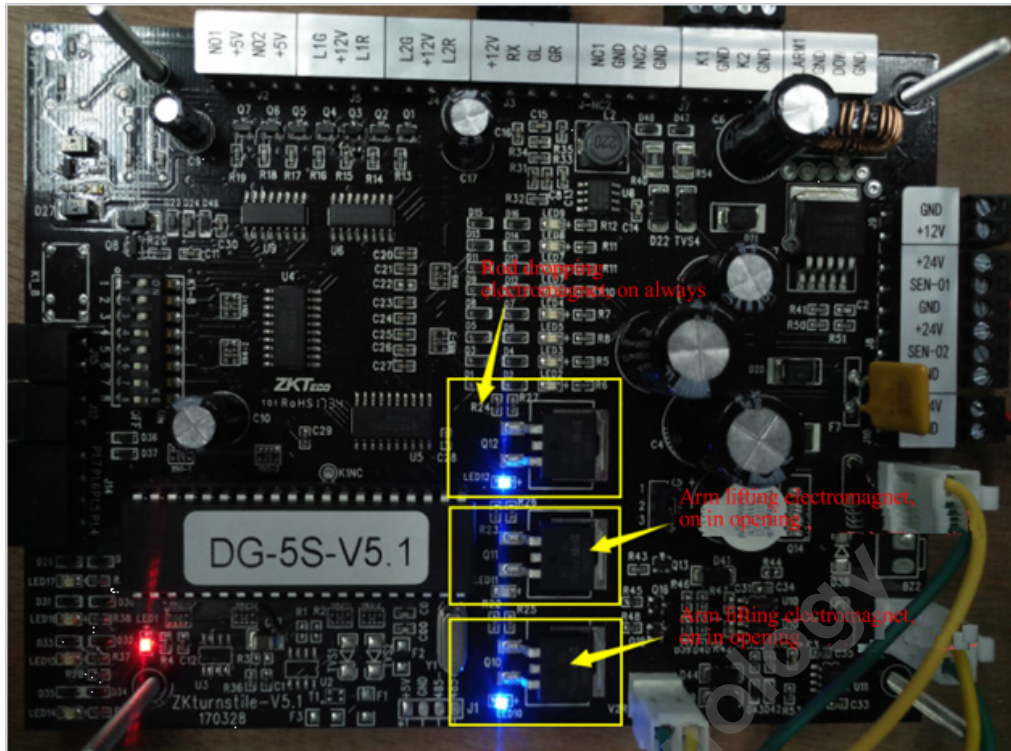
The gate is kept open without verification.

2) Cause

Parts on the main board are damaged, keeping the electromagnet powered on. The electromagnet lifts the lock rod to unlock the turn plate and enable the arms to rotate. Alternatively, the spring inside the electromagnet is broken, so the electromagnet cannot drop the lock rod.

3) Troubleshooting procedure

- a) Use a multimeter to check whether there is voltage on the electromagnet output port of the main board. If yes, there is a problem with the main board. In that case, replace the main board. If no, go to the next step. In addition, you can check whether the turnstile-opening electromagnet indicator on the main board is steady blue. If yes, the electromagnet is kept powered on.



- b) Remove the loader cover of the tripod turnstile and check whether the lock rod is worn. If it is worn heavily, replace it.



- c) Otherwise, power on the machine and send the turnstile opening signal to see if the electromagnet can pick up and drop the lock rod. If the lock rod cannot be dropped smoothly, replace the entire electromagnet or the spring inside the electromagnet.

2.2 Full-height turnstile

2.2.1 The gate is locked immediately after being opened

- 1) Symptom

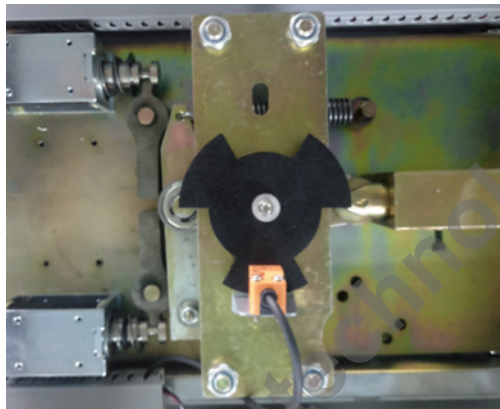
When verification succeeds, the electromagnet is heard opening the gate and then closing it.

2) Cause

The proximity switch keeps finding metals (detection malfunction).

3) Troubleshooting procedure

- a) Check whether the indicator behind the proximity switch is off. If yes, check whether the metal plate is installed in the reverse direction or whether the proximity switch is installed too far away and cannot detect the metal plate. Normally, the metal plate under the proximity switch should be installed as shown in the figure on the right. If the metal plate is installed correctly, go to the next step.



- b) Disconnect the cables of the proximity switch and re-open the gate. If the machine closes the gate after 5 seconds instead of immediately, the proximity switch is damaged. In that case, replace the proximity switch. If the problem persists, go to the next step.
- c) Main board parts or program problems result in the abnormal power-off time of the turnstile-opening electromagnet. Replace the main board to resolve the problem.

2.2.2 Two to three persons can pass at a time

1) Symptom

After verification succeeds, two to three persons can pass full-height turnstile.

2) Cause

The controller lock drive duration is not set to 1s, or the proximity switch is damaged and cannot detect the rotation of the metal plate.

3) Troubleshooting procedure

- a) First check the setting of the controller lock drive duration. Refer to [1.5.3 Software setup problems](#). If

there is no problem with the software settings, go to the next step.

- b) Rotate the arms to check whether the indicator on the proximity switch flashes during the rotation. If no, replace the proximity switch.
- c) If the proximity switch works properly, replace the main board to resolve the problem.

2.2.3 Continuous pass

1) Symptom

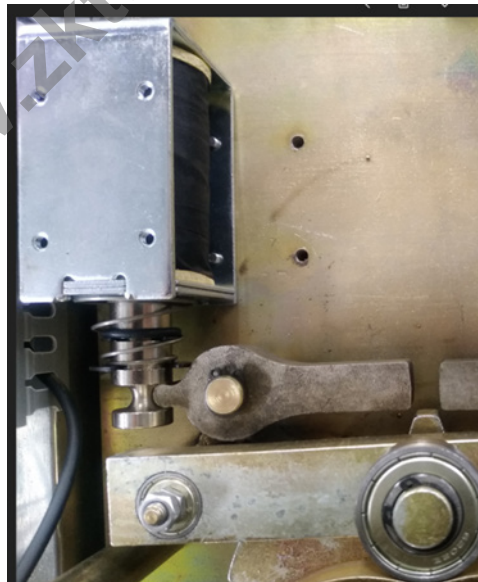
The gate is kept open without verification.

2) Cause

The main board or the electromagnet is faulty.

3) Troubleshooting procedure

The electromagnet will drop the lock rod when being powered off to enable the gate to be rotated. Therefore, if many persons can pass after a successful verification, it can be inferred that the electromagnet does not pick up the lock rod. You can use a multimeter to check whether there is voltage on the electromagnet output port of the main board. If yes, there is a problem with the electromagnet. In that case, replace the electromagnet. Otherwise, replace the main board.



2.2.4 The passing is not smooth after a successful verification

1) Symptom

After a successful verification, the person needs to use a large force to push the arms to rotate.

2) Cause

The connection blocks on the arms are not properly installed, or the damping ratio of the damper is set too large.

3) Troubleshooting procedure

- a) If the arms are difficult to rotate in power-off, set the damping ratio of the damper smaller by loosening the small screw on the damper and turning the ring clockwise. If the problem persists, proceed to the next step.



- b) Disassemble the upper and lower fixing blocks of the arm and check whether the friction between the arm and the fixing blocks is severe. Check the wear of the parts after they are disassembled. If there is no serious wear, reinstall it. Make sure that the arm is installed in position properly.

2.2.5 The arm cannot be rotated after a successful verification

1) Symptom

After a successful verification, the arm fails to be rotated.

2) Cause

Another electromagnet blocks the turn plate, the main board is damaged, or the cable connection between the controller and the main board is incorrect.

3) Troubleshooting procedure

- a) Check that the controller is wired to the main board correctly. If the two are connected correctly, proceed to the next step.
- b) Open the top cover and check whether the electromagnet releases the lock rod after a successful verification. If not, replace the main board. If the lock rod is released, proceed to the next step.
- c) Check whether the electromagnet on the other side has blocked the turn plate when the arm rotates. If yes, readjust the installation position of the electromagnet.

2.3 Flap barrier turnstile

2.3.1 The gate does not close after opening

1) Symptom

The gate performs self-test after power-on and does not close after opening.

2) Cause

The sensors are abnormal.

3) Troubleshooting procedure

- a) In the power-on state, open the panel on the flap barrier turnstile and check whether it tries to close the gate. If not, the covers on the sensors on the door panel are smudged or are under poor light transmittance. If the problem persists after cleansing, replace it with a new one. If the problem persists, proceed to the next step.
- b) Check the prompt on the main board display. If "left infrared", "right infrared", or "middle infrared" appears, the sensor is blocked. Check the indicator behind the receiving end of the involved sensor. If the indicator is on in red while no person or object is blocking the channel, adjust the installation position of the sensor. If the problem persists, replace the sensor (whose emitting terminal may be damaged).
- c) If the prompt is "infrared error", check the sensor in the corresponding area. If the turnstile is restored after the sensor pair is removed, the sensor pair is faulty and must be replaced.

2.3.2 One wing arm opens normally and the other does not

1) Symptom

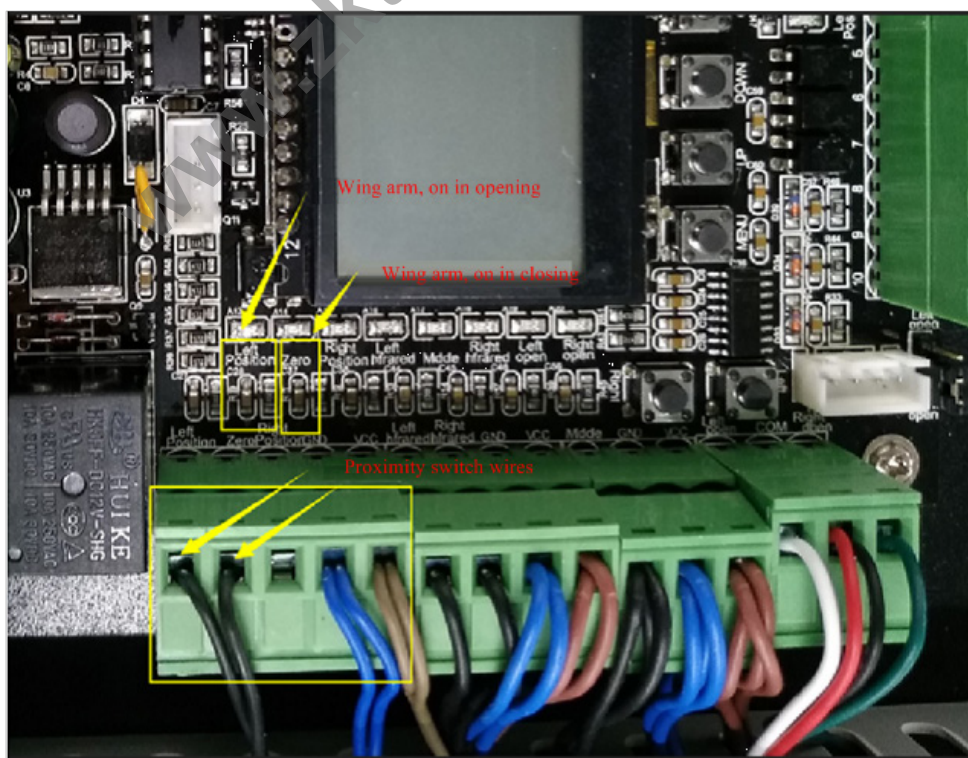
One of the wing arms functions normally, while the other one fails to open or fails to close after opening.

2) Cause

The proximity switch is abnormal, or the motor is wired reversely.

3) Troubleshooting procedure

- a) Check whether the problem is caused by the master machine or slave machine. If the issue occurs on the slave machine, check the wiring order of the wires between the machines.
- b) If the issue occurs on the master machine, check the position of the proximity switch on the loader.
Under normal circumstances, the indicator is on in red when the metal piece is on the left of the proximity switch. If the indicator is not on in red, it indicates that the proximity switch fails to detect the metal piece. In this case, adjust the position of the metal piece. If the proximity switch fails to detect the metal piece regardless of the position of the metal piece, the proximity switch is damaged. In this case, replace the proximity switch and adjust the position of the metal piece to make it able to be sensed by the proximity switch (with the indicator on in red). The problem is solved after a restart. If there is no problem with the sensing position of the proximity switch, proceed to the next step to check the wiring.
- c) Check the indicator on the main board. As shown in the figure, the zero null position indicator is on when the gate is closed, and the left position indicator is on when the gate is on. If the position indicated by the indicator does not match the wing arm, exchange the two black signal wires of the proximity switch. If they match each other, exchange the host motor wires.



- d) If the issue occurs on the slave machine, check whether the wiring order of the wires connecting the machines is consistent.

2.3.3 Fire protection function failure

1) Symptom

The wing arms do not lift with the backup battery in a power failure.

2) Cause

The fire protection battery is faulty due to the version of the main board.

3) Troubleshooting procedure

Check the battery output voltage with a multimeter. If the output voltage is 12 V, replace the main board or purchase a firmware writer from your local store to write the new firmware to the main board. For details, contact the channel technical engineers.

2.3.4 The wing arms do not open in power-off

1) Symptom

The wing arms do not lift with the backup battery in a power failure.

2) Cause

The fire protection battery is faulty due to the version of the main board.

3) Troubleshooting procedure

Check the output voltage with a multimeter. If the output voltage is 12 V, replace the main board or purchase a firmware writer from your local store to write the new firmware to the main board. For details, contact the channel technical engineers.

2.4 Swing barrier turnstile

2.4.1 "motor error" appears on the main board display

1) Symptom

The wing arm does not close after rotating 180° in power-on self-test or in closing and opening or after a successful

verification. "motor error" appears on the main board display.

2) Cause

The null/left/right position detection, main board, or encoder is faulty.

3) Troubleshooting procedure

- a) Check whether the null, left, and right position status bits on the main board are correct. Go to the menu of the main board, locate the "correct barrier position" option, and set the status bits of the null/left/right position. Then, restart the turnstile for a self-test. If the problem persists, proceed to the next step.
- b) Replace the main board and set the status bits. If the problem persists, replace the encoder.

2.4.2 "pendulum rod is hit!" appears on the main board display

1) Symptom

"pendulum rod is hit! Wait for the pendulum rod reset. Access control signal is invalid!" appears on the main board display. The wing arm fails to rotate.

2) Cause

The belt or encoder is loose.

3) Troubleshooting procedure

- a) Check whether the belt is tight by pulling the belt out by hand.
- b) Shake the encoder by hand to see if the encoder is loose.
- c) Use a small flat-bit screwdriver to tighten the two screws on the copper post under the encoder.

2.4.3 The two wing arms fail to lift or drop

1) Symptom

One of the wing arms functions normally, while the other one fails to open or fails to close after opening.

2) Cause

The sensor pair is abnormal, or the machine number is set incorrectly on the main board.

3) Troubleshooting procedure

- a) The procedure for checking the sensor pairs on the swing barrier turnstile is the same as that of the flap barrier turnstile. For details, see [2.3.1 The gate does not close after opening](#).

- b) If the sensor pair is normal, check the first menu item on the main board to see whether the master machine is set correctly as the master one.

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3 Summary

This document is applicable to engineers in and outside China for troubleshooting entrance products. Do not disseminate the document to non-ZKTeco technical service personnel without authorization of the Entrance Control & Security Inspection Department. Entrance products feature highly flexible customization and configuration. Therefore, some faults or solutions may not be found in this document. If you encounter problems that are not listed above or cannot be solved according to the above solutions, contact the entrance control technical colleagues for help. This document is subject to updates along with product updates. The latest version shall prevail.

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ZK Building, Wuhe Road, Gangtou, Bantian, Buji Town,
Longgang District, Shenzhen China 518129

Tel: +86 755-89602345

Fax: +86 755-89602394

