



Shanghai BST Door System Co.,ltd

AC Permanent-magnet Synchronous Car Door System Installation

Manual

Model: J2511-T2A

Version: 2024.A

STATEMENT

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1. Safety Regulations

Safety Sign Description

1.1 This installation manual uses the following symbols as safety signs.



Danger

When this symbol appears, it must be noticed that there may be a significant risk of personal injury. The instructions marked with this symbol must be complied with.



Electric shock danger

When this symbol appears, it must be noticed that there is a significant risk of personal electric shock.



Warning

When this symbol appears, should be noticed that failure to follow the instructions marked with this symbol may result in personal injury or property damage. Warning sign must be complied with.



Note

This symbol should be taken seriously, the instructions marked with this symbol contain important operational instructions. Failure to comply may result in damage and fault of the elevator.



Inspection

This symbol should be taken seriously, the description of the symbol contains the inspection sequence information, it must be strictly enforced in any case, otherwise it may result in personal injury or property damage.

1.2 Safety measures under an emergency



Emergency unlock

Only those who are familiar with elevator safety regulations and trained personnel can open the landing door manually!

2. Product Introduction

2.1 Range of Application

Environmental Requirements	Working site	Free from direct sunlight, no dust, corrosive gases, flammable gases, oil mist, etc.
	Altitude	Below 1000 m
	Maximum operating temperature	-20°C ~ +50°C
	Humidity	< 90%RH, no condensing, no icing
	Vibration	< 5.9m/s ² (0.6g)
	Storage temperature	-40°C ~ +70°C
	Protection grade	IP0X

2.2 Technical specifications

Description	
Safety loop voltage and current	AC: Rated Voltage ≤AC 230V, Rated Current ≤AC 0.5A
	DC: Rated Voltage ≤DC 110V, Rated Current ≤DC 0.2A

3. Preparation of installation tools

The car door system installation tools mainly have the following types, as shown in Table 3-1.

Table 3-1 Installation tools

No.	Name	Speciafication	Quantity	Note
1	Circlip pliers	175mm	1 pc	
2	Levelling instrument	500mm	1 pc	
3	Plumb Bob	Steel material 1kg	1 pc	
4	Cross screwdriver	75-200mm (with suction)	2 pc	
5	Single-head wrench	7/13-24	2 sets/type	
6	Socket wrench	13/16/18/24	1 set /type	
7	Inner hexagonal wrench	3/4/5/6	1 set /type	
8	Plug ruler	100A21	1 pc	

4. Wearing parts of car door system

Refer to Table 4-1

Table 4-1 Wearing parts list

Part name	Use	Note
Door Slider Assembly	Car operator	
Contact Switch	Car operator contact	AZ06
Wire rope	Car operator	Door type and clear opening should be specified.
Encoder	Car operator	
Hanging door wheel $\phi 48$	Car operator	
Eccentric wheel	Car operator	
Drive wheel	Car operator	
Wire rope wheel	Car operator	

5. Installation of Car Door System

5.1 Components Description

The main parts of the car door refer to Figure 5-1

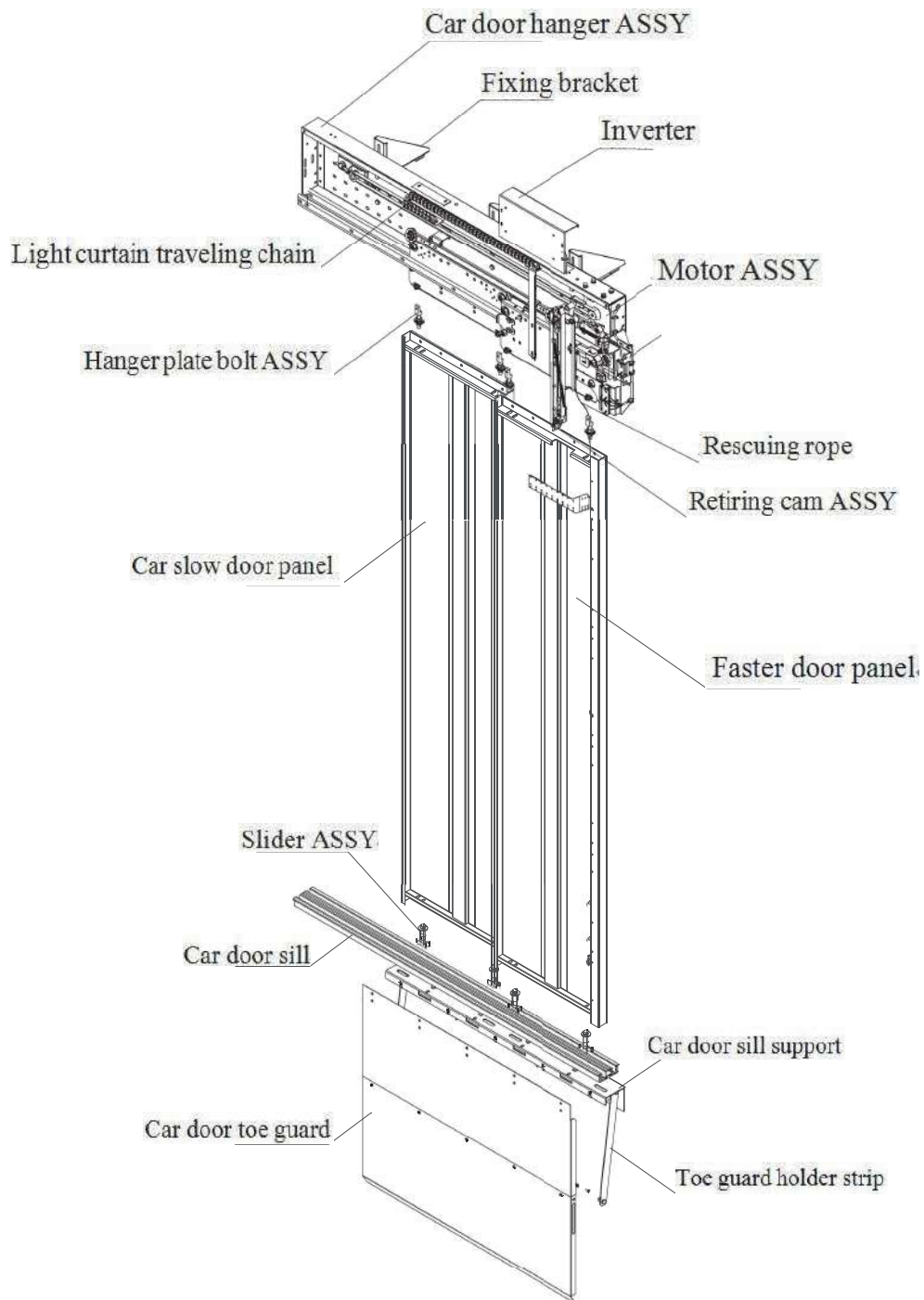


Figure 5-1 Assembly Drawing of AC Permanent-magnet Synchronous car door

5.2 Sill Assembly

- 1) Assemble the sill of car door, refer to Figure 5-2-1;

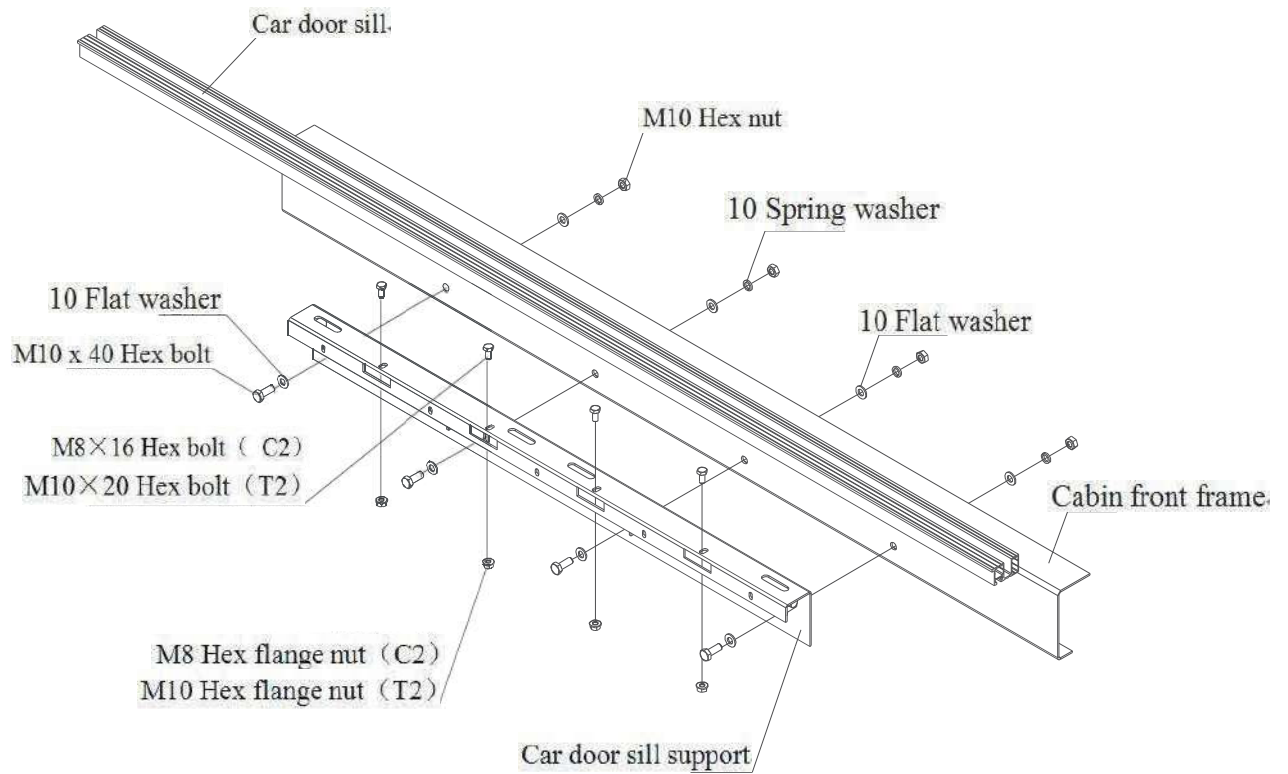


Figure 5-2-1 Connection between the car door sill and the sill bracket, and connection between sill bracket and the car front frame

2) Adjustment of Sill

- According to the cabin floor surface level, one end of the levelling instrument (1/600) is placed on the sill surface, and the other end is placed on the floor surface of the cabin. The horizontality is measured lengthways, and the horizontality is required to be $\leq 1/600$. Bolted the sill bracket of this section (hex bolt M10×40).
- Then place the levelling instrument in the middle of the sill, adjust the height of the other end bracket, so that the whole sill is horizontal, and the level of the whole sill is $\leq 1/600$. Bolted the others bolts of the sill brackets (hex bolt M10×40).
- Adjust the left and right direction of the sill, for 2 panels side opening doors, $C = 20 \pm 1\text{mm}$, refer to Figure 5-2-2

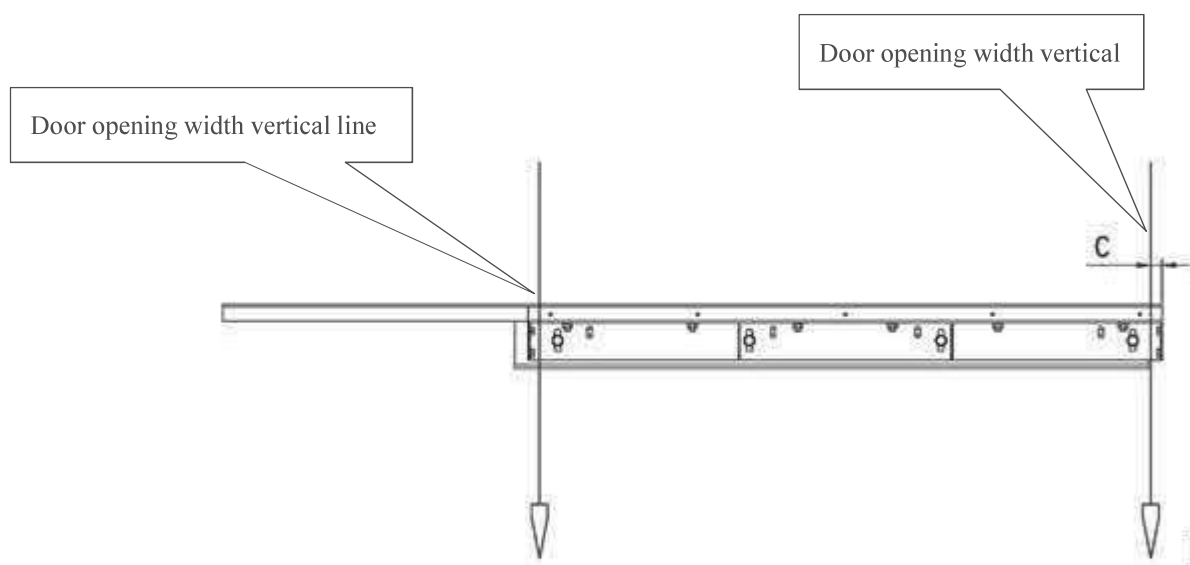


Figure 5-2-2 Adjust left and right position of car door sill (2 Panels side opening).

- d) Adjust the distance between the section of sill and the center of the vertical line, so that the outer section of the sill overlaps with the door opening width vertical line, refer to Figure 5-2-3. Bolted the sill and the sill bracket.

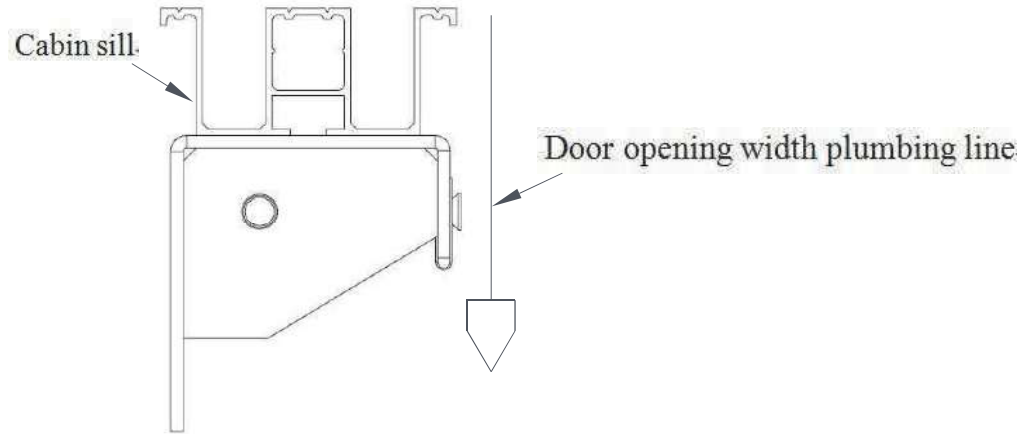


Figure 5-2-3 Sill and vertical line

- 3) The connection between the car door toe guard and the sill bracket refer to Figure 5-2-4

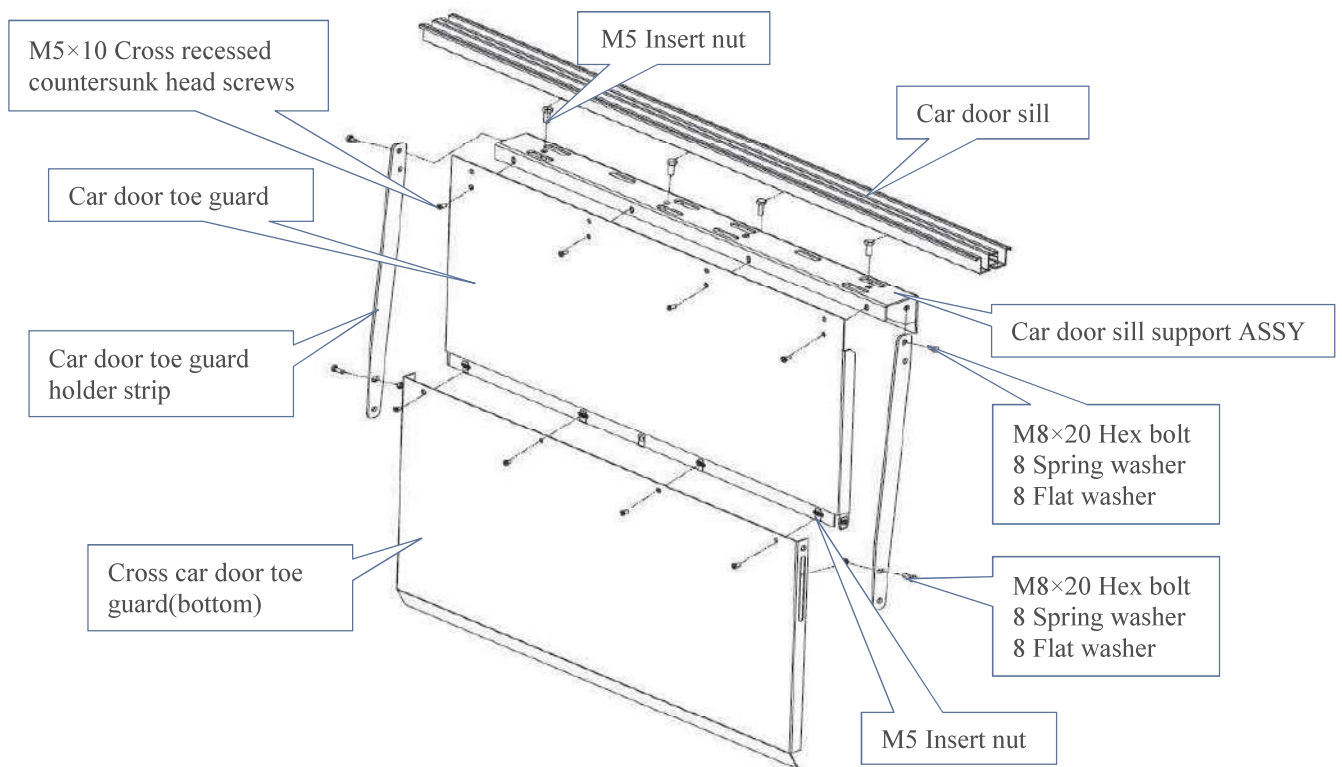


Figure 5-2-4 The connection between the car door toe guard and the sill bracket

5.3 Installation of Car Door Hanging Components

- 1) Installation of car door hanging components refer to Figure 5-3-1

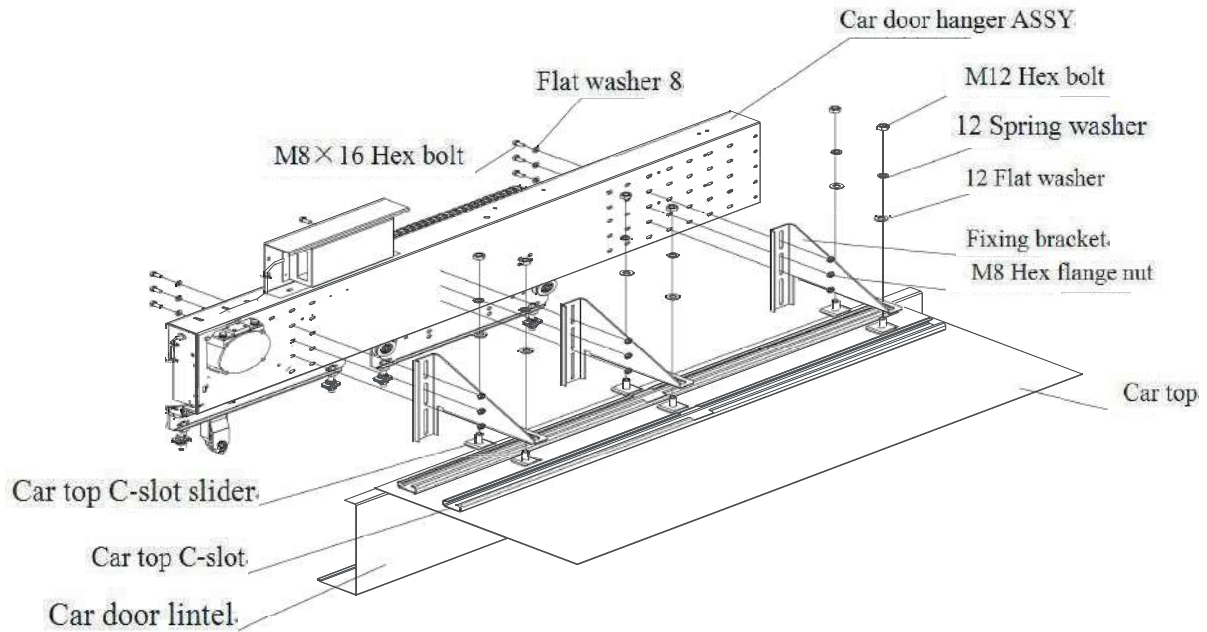


Figure 5-3-1 Car door hanging components installation (2 Panels side opening)

2) Adjustment of Car Door Hanging Components

- a) After the car operator is installed, adjust the horizontal positions of the car door hanging components. For the 2 panels side opening doors, so that the distance from the end of the motor close to the vertical line of the door opening $A = 24 \pm 1\text{mm}$, refer to Figure 5-3-2;
- b) Adjust the vertical positions of the car door hanging components so that the distance from the car door hanging components lower end surface of guide rail to the sill surface is $C=D=(\text{opening net height} + 210) \pm 1$, refer to Figure 5-3-2
- c) Adjust the longitudinal position of the car door hanging components. For the 2 panels side opening doors, the distance between the door head back panel of the car door hanging components and the door opening width vertical line is $120 \pm 1\text{mm}$, refer to Figure 5-3-2;
- d) Adjust the position of the door hanging panels of the car door hanging components. Move the hanging door panels to the ends of the door operator to adjust the left and right positions of the door closing limit baffle. For the 2 panels side opening doors, the distance between the section of the hanging door and the vertical line is $B=15 \pm 1\text{mm}$, refer to Figure 5-3-2

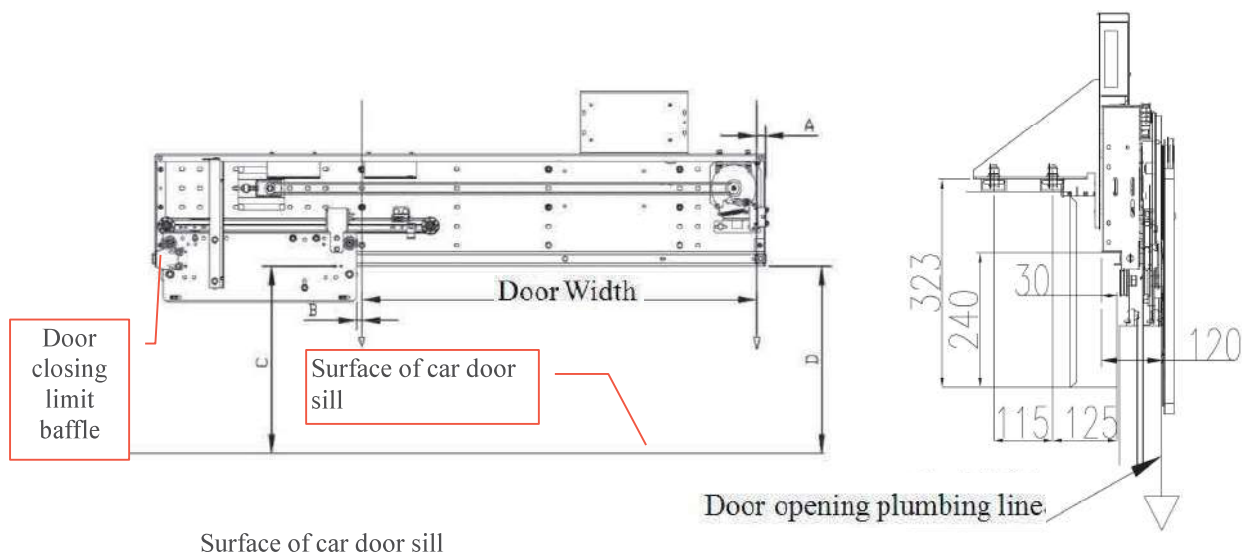


Figure 5-3-2 Adjust hanging components (2 Panels side opening doors)

5.4 Installation of Car Door Panels and Sliders

- 1) Car door panels and sliders installation, refer to Figure 5-4-1

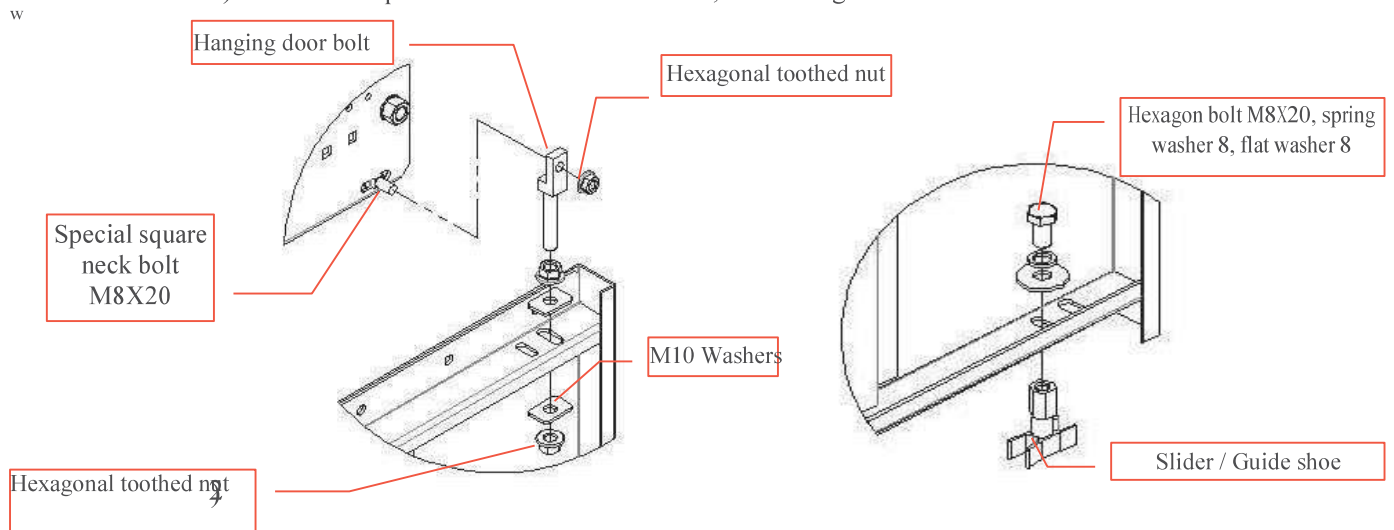


Figure 5-4-1 Installation of Sliders and Hanging Door Bolt

3) Adjustment of Car Door Panels

- a) Horizontal adjustment: Loosen the M8 hexagonal toothed nut on the hanging bolt assembly, and adjust the horizontal positions of the two door panels separately, refer to Figure 5-4-2.

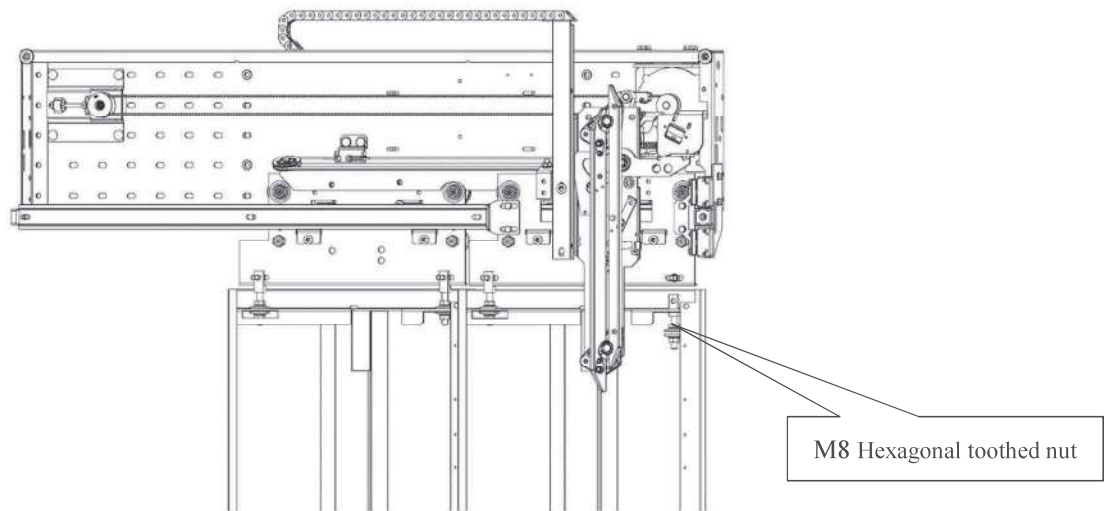


Figure 5-4-2 Adjustment of horizontal positions of the car door panels

- b) Vertical adjustment and gap adjustment: Loosen the M10 hexagonal toothed nut on the hanging bolt assembly. Adjust the vertical and horizontal position of the two door panels separately, as shown in Figure 5-4-3.

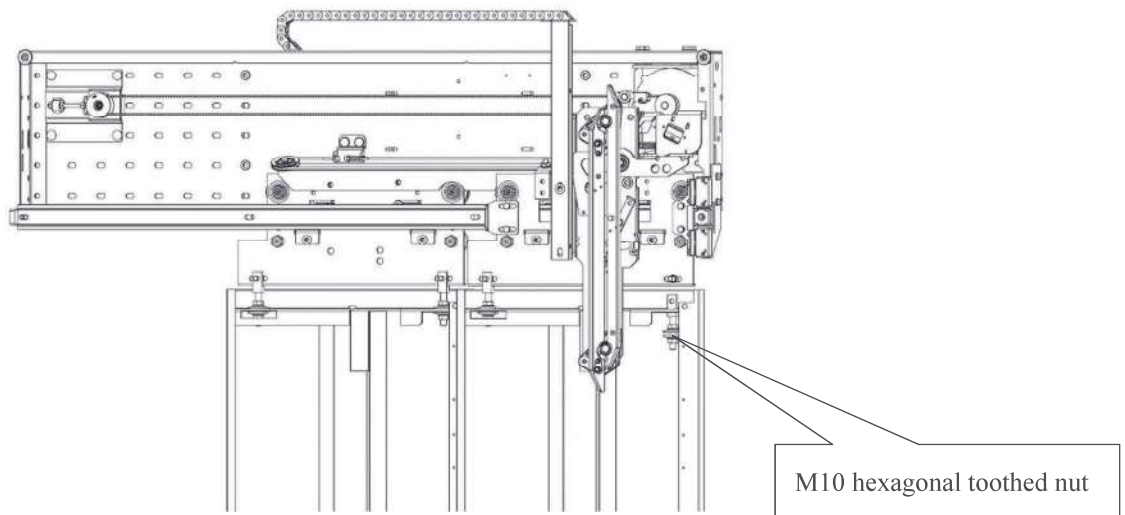


Figure 5-4-3 Adjustment of vertical and horizontal positions of the car door panels

- c) Adjustment requirements for car door and door panels, refer to Figure 5-4-4, 5-4-5

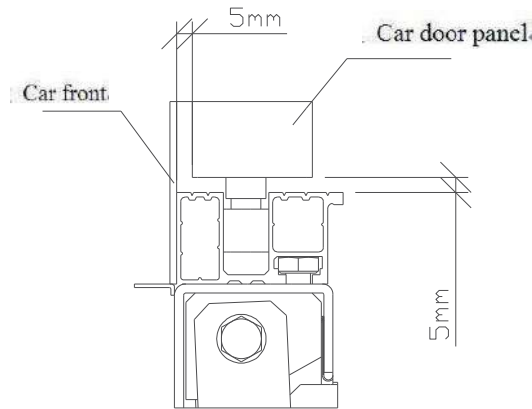


Figure 5-4-4 Adjustment requirements of car door and door panels

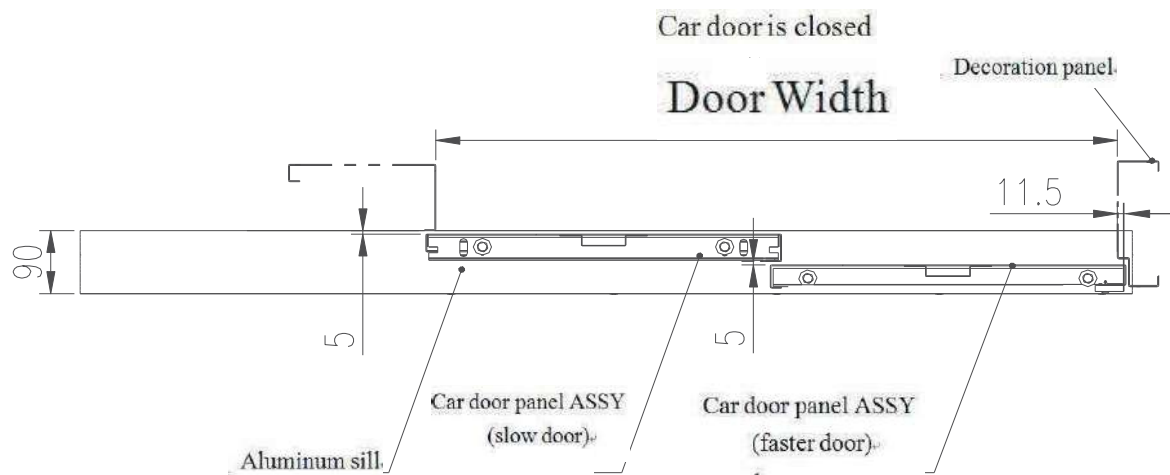


Figure 5-4-5 Adjustment requirements of car door and door panels (2 Panels side opening)

5.5 Adjustment of Eccentric Wheel

Pulley and the guide rail gap have been adjusted before leaving the factory. During operation, if the gap was found too large or too small, it can be adjusted by adjusting the lower pulley (eccentric wheel). Correct adjustment: make sure the gap between the lower pulley (eccentric wheel) and the guide rail is between 0.2~0.5 mm, and then bolted M10 nut, refer to Figure 5-5-1.

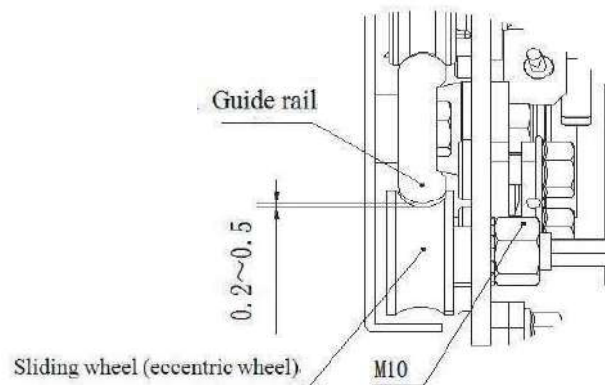


Figure 5-5-1 Eccentric wheel adjustment

5.6 Perpendicularity adjustment of hanging door panel

After installing the door panel on worksite, if it is found that the hanging door panel is not vertical, you can use adjustment gasket of the hanging door panel to adjust the verticality of the hanging door panel, refer to Figure 5-6-1.



Figure 5-6-1 Perpendicularity adjustment of hanging door panel

5.7 Installation of Car Door Skate

- 1) Install the car door skate, remove the circlip on the back of the skate, and use 3 pcs hexagonal flange bolts and 3 pcs gaskets to fix the skate to the hanging door panel, refer to Figure 5-7-1.

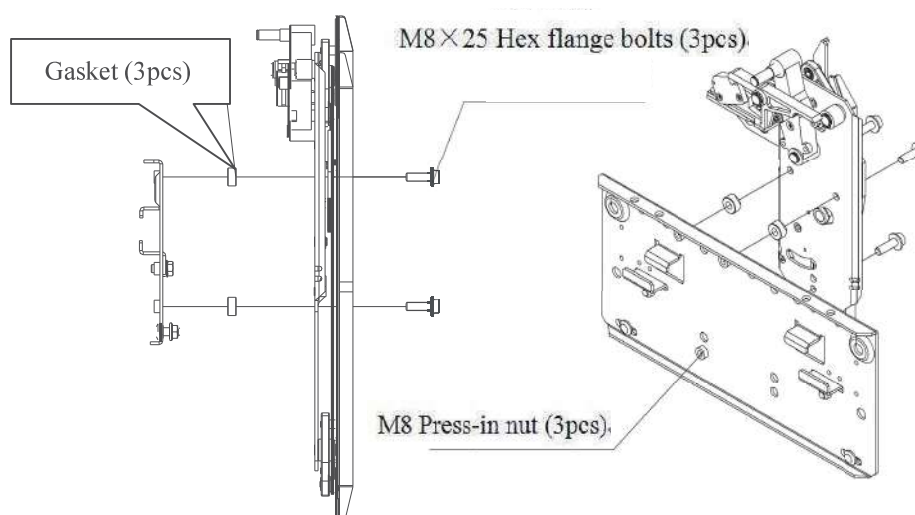


Figure 5-7-1 Installation of car door skate

- 2) Adjustment of the skate starter refer to Figure 5-7-2.

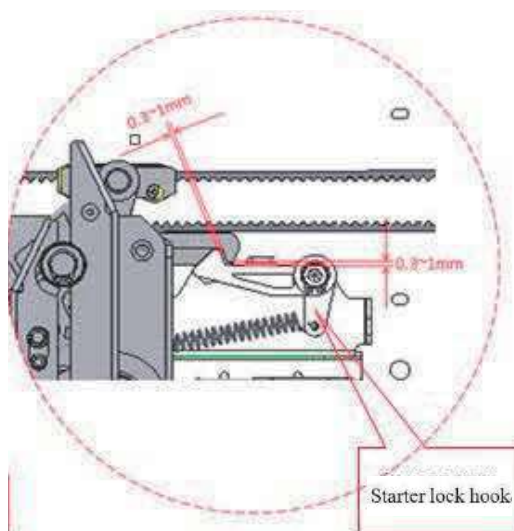


Figure 5-7-2 The adjustment of the skate starter

- 3) Install the fixed hook assembly and install the hole as shown in Figure 5-7-3, to pre-tighten the fixed hook assembly on the door header panel of the car operator, as shown Figure 5-7-4.

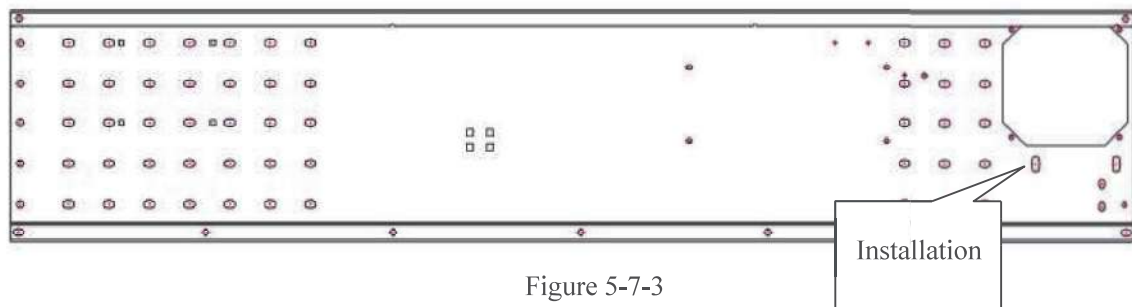


Figure 5-7-3

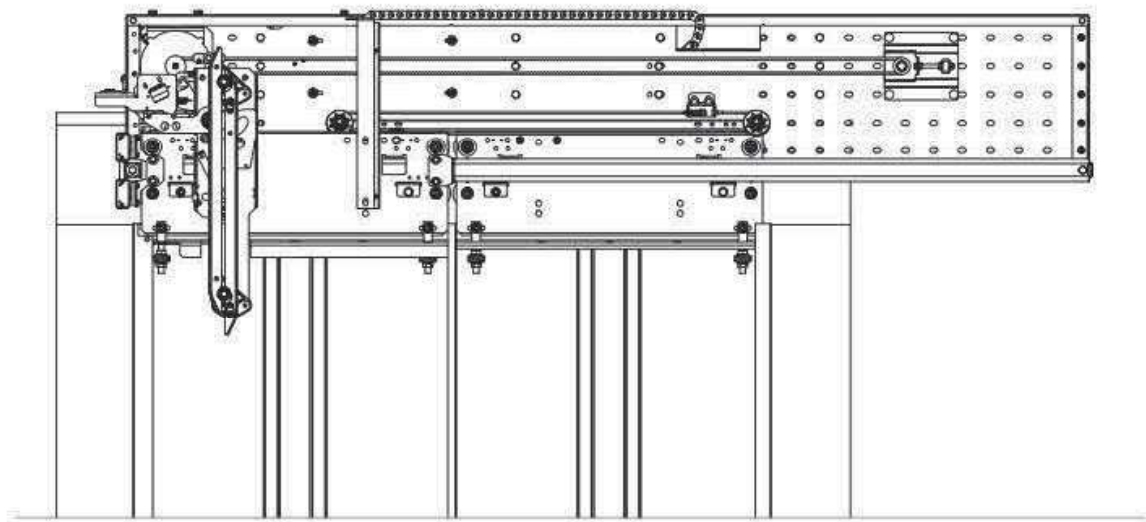


Figure 5-7-4

- 4) Bolted all the bolts after adjusting the fixed hook assembly to the state as shown in Figure 5-7-5.

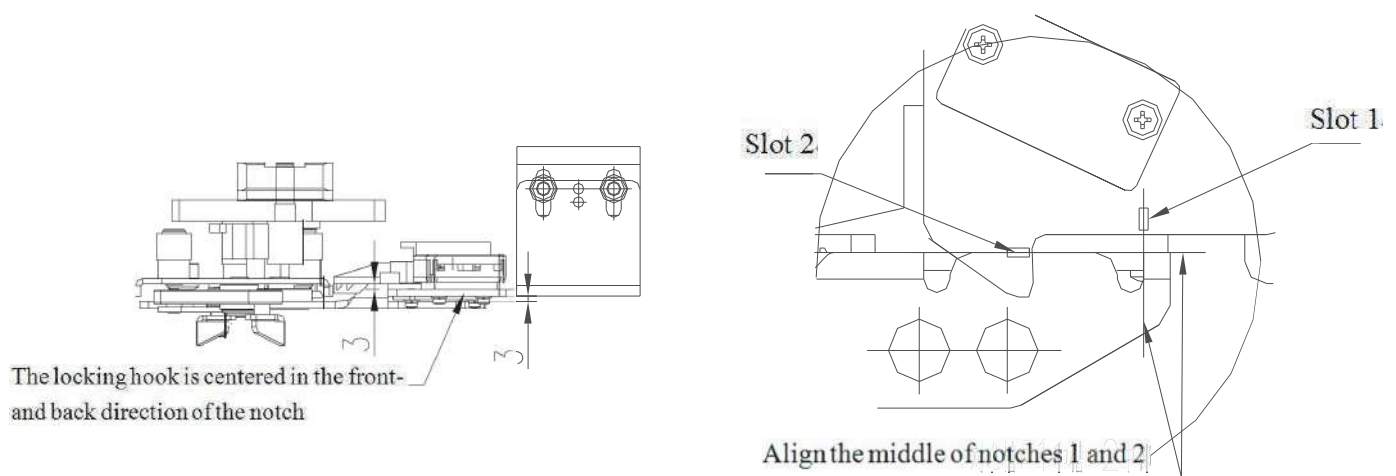


Figure 5-7-5

- 5) Rescuing rope installation, pass the rescuing rope through the long waist hole on the door panel, and along down the door panel use 2 pcs guide sleeves, 2 pcs M4×10 cross recessed pan head screws, 2 pcs M4 The hex nut fixes the rescuing rope on the bent side of the door panel (fixed at 1/3 and 2/3 position of the panel), and finally fixes the rescuing rope with the rescuing rope fixing sleeve, as shown in Figure 5-7-6.

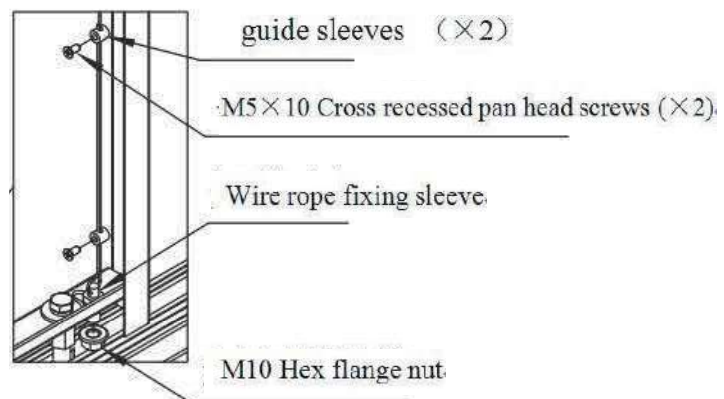
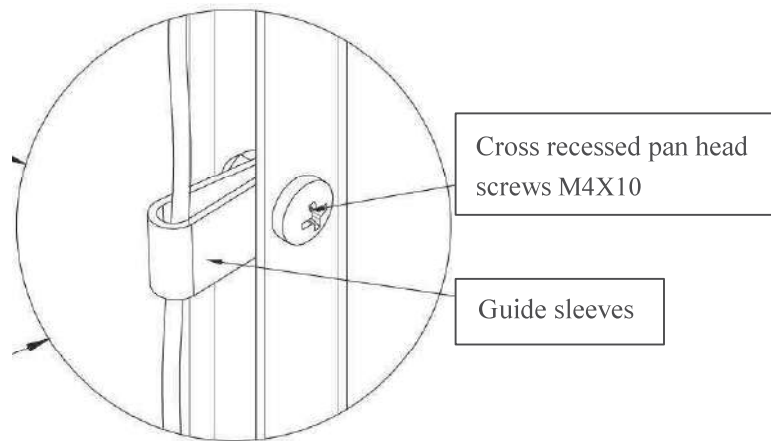


Figure 5-7-6 Rescuing rope installation

6. Fault solution

6.1 The cooperation problem of the skate and the door lock starter roller cause the door panels collides.

6.1.1 Description and analysis of trouble:

The elevator door has a impact phenomenon in door closing at some landing. After checking, it is caused the gap between the back door ball and the door skate arm was too large, when the door was closed, the landing door was closed earlier than the car door, as shown in Figure 6-1-1.

6.1.2 Solutions

Make sure that the door skate and the back door ball gap are equal to the front door ball and skate gap.

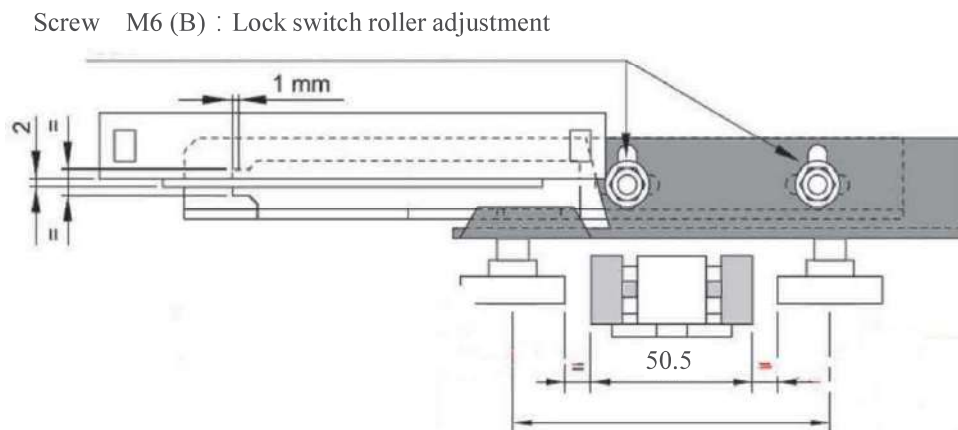


Figure 6-1-1

6.2 The door panels gap was too small cause the door panels impact in door closing.

6.2.1 Description and analysis of trouble:

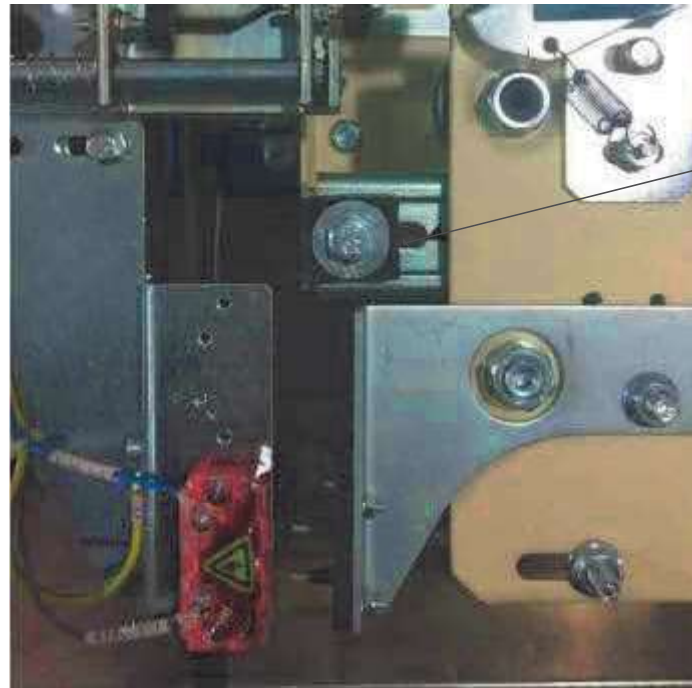
There is a impact sound, when the door is closed in place. After checking, when the door is closed in place, the limit rubber block for closing the door is not in contact with the hanging door panel, during the process of closing the door, there is no limit function to the closing of the door. When the two doors are closed, there is no gap, and the doors were directly closed at the end of the closing door cause the impact sound. In some cases, the door panel gap is not equal, so that a slight collision may occur at the upper or lower end of the door panel when the door is closed. See Figure 6-2-1.

6.2.2 Solutions

After the door is completely closed, confirm that the limit rubber block and the hanging door panel are in full contact, re-adjust the door plate gap to 1-2mm, and the upper and lower gaps are equal, and then re-learning.

6.2.3 Prevention solutions and suggestions:

When installing the door panel, pay attention to adjust the door panel gap to 1-2mm, vertical, and the upper and lower gaps are equal.



The limit rubber block is not in contact with the hanging door panel

Figure 6-2-1

6.3 Mechanical resistance caused the door is not completely opened

6.3.1 Description and analysis of trouble:

- a) The eccentric wheel presses the door guide rail tightly, and the door running resistance is too large;
- b) The resistance between the door slider and the sill is too large
- c) The door slider collides with the bottom of the sill, and the door panel collides with the sill;
- d) Nudging spring tension is too large;
- e) The wire rope and the toothed belt are too tight, which increases the running resistance.

6.3.2 Solutions:

- a) Adjust the gap between the eccentric wheel and the door guide to 0.2 ~ 0.5 mm;
- b) Clean the sill, correct the door panel, adjust the slider to make it run smoothly;
- c) Adjust the gap between the door panel and the sill to be 5mm;
- d) Move the fixed bolt position of spring to reduce the spring force;
- e) Adjust the tightness of the wire rope and the toothed belt;
- f) If the above adjustments cannot resolve the problem, apply for us service.

6.3.3 Prevention solutions and suggestions:

- a) Please read the details in the operation manual during installation;
- b) Pay attention to check the running resistance of the door operator during installation.

6.4 The skate is not stretched completely cause the door collides during opening.

6.4.1 Description and analysis of trouble:

When the door was opened, the skate was not fully stretched and approach to limit rubber block for opening the door, there was no low-speed crawling process, so that the doors will collide when the door was completely opened.

When the door operator open and close the doors, the car door and the landing door are completely synchronized. During the door opening process, before the skate drives the landing door running, the skate should be completely stretched firstly, and the landing door lock is opened at the same time, and then the toothed belt dragged the car door and the landing door are simultaneously operated. The toothed belt drive skate completely stretched need 7mm distance of travel. In this case, because of the skate is not completely stretched, and the travel distance of the toothed belt is less than 7mm during stretch the skate, caused the door is actually opened to the limit position but the toothed belt still continue to drag the door running at a faster speed, so there is an impact when the door is opened.

6.4.2 Solutions:

Check and adjust the possible resistance of the skate mechanism. Referring to Figure 6-1-1, check the cooperation of the skate and the door lock opening roller. Adjust the gap between the front wheel of door lock opening roller and the door skate arm and the gap between the back wheel and the door skate arm to be equal.

6.5 The landing door lock failed in the closure, causing the elevator not running

6.5.1 Description of trouble:

Elevator door is closed but car is not running, after checking found that when the car door drives the landing door closing, landing door lock is not completely closed, the safety loop is not closed, causing the elevator is not running.

6.5.2 Analysis of trouble:

The landing door lock is a gravity type structure. In normal condition, after the door skate is closed the landing door lock can keep in closed situation. See Figure 6-5-1 The factors that cause the landing door lock cannot be completely closed:

- a) The gap between the contact bracket and the hall door lock tip is too small, and the friction collides, cause the landing door lock cannot be completely closed;
- b) The main support shaft of the landing door lock is not flexible, cause the landing door lock in failure to close normally.

6.5.3 Solutions:

- a) Adjust the gap between the landing door lock tip and the landing door bracket;
- b) Clean the supporting shaft of the landing door lock and add lubricant.

6.5.4 Prevention solutions and suggestions:

- a) Familiar with the related details of the operation manual;
- b) Pay attention to the flexibility of the door hinge during daily maintenance, and add grease to the shaft periodically (1 year)

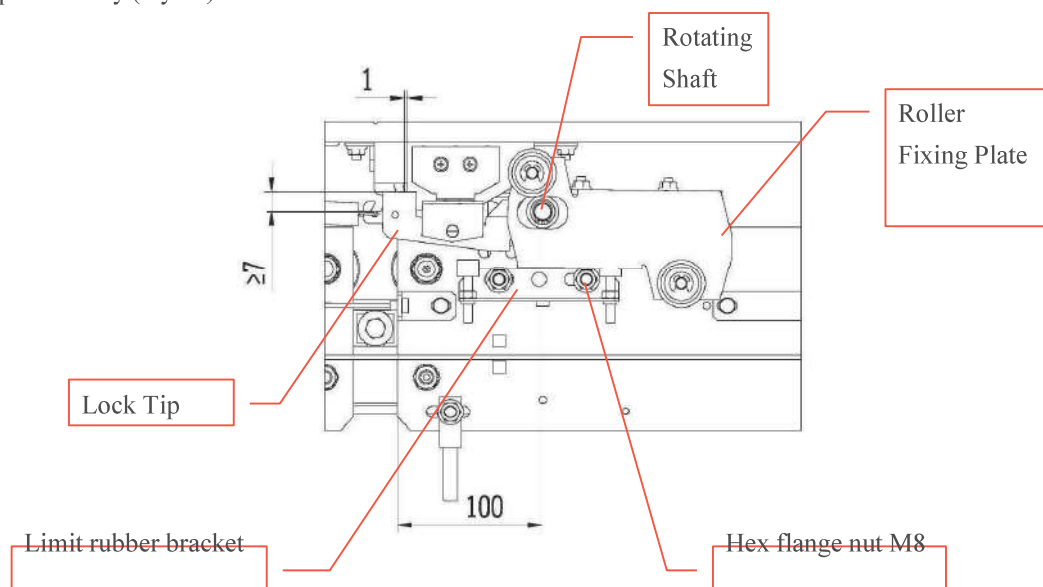


Figure 6-5-1

6.6 Fault description and analysis of door guide rail coated lube:

After lube coated the door guide rails, it will absorb dirt and debris, resulting in increased resistance.

6.6.1 Description and analysis of trouble:

The door guide rails cannot be oil-lubricated (including various greases and liquids), and the oil-coated (fat) rails are easily contaminated by dust and debris, thereby aggravating the wear of the door wheel and the guide rail. Some worksite due to the oil-coated guide rails absorb dust, and the scale layer is formed after drying, so that the door wheel runs unevenly and smoothly, and the noise is increased.

6.6.2 Solutions:

Clean the guide rails and door wheels.

6.7 Slight rebound after the door is closed

6.7.1 Description of trouble

In some cases, there is a slight (1-2mm) rebound after the door is closed.

6.7.2 Analysis of trouble

- a) The lock hook gap of the door skate starter is greater than 1mm;
- b) The door closing limit rubber block is too soft.

6.7.3 Solutions:

- a) Re-adjust the mounting dimensions. After fixing the skate according to the size, adjust the skate starter to ensure the gap between the starter and hook at 0.3mm~1mm, refer to Figure 6-7-1.
- b) Replace the door limit rubber block and re-learning.

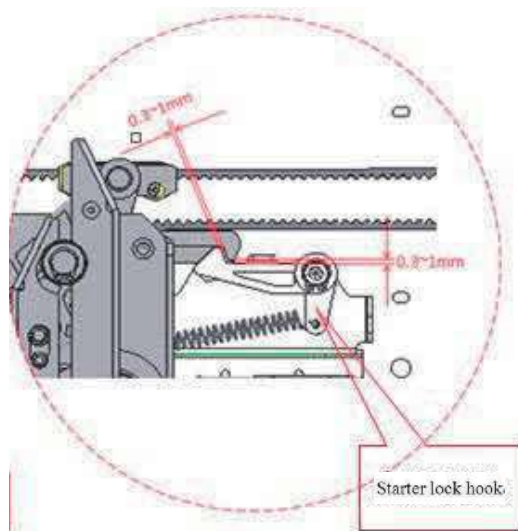


图 6-7-1

6.8 Door skate lock hook gap is too large, cause the door panels impact in door closing

6.8.1 Description of trouble

When the door panel is nearly completely closed, there is a significant acceleration phenomenon, sometimes causing a door closing impact. When the door skate is opened, it will be self-locking, and it needs to cooperate with the

door skate starter to complete the closing operation. If the lock hook gap is too large, the door skate starter touches the lock hook which will cause the door skate be closed in advance during the process of closing the door. In normal operation, there will be 3-4mm low speed crawling at the end of the closing door, when the door is completely closed, the skate starter will just touch the skate lock hook to start the closing. When the skate is closed, the motor will drive the toothed belt at a faster speed drag the skate to complete the arm closing action. Early closing of the skate will result in a reduction in the actual low-speed creeping distance of the door. The closing of the door will be closed at a relatively fast speed (programmed to speed the skate), and the door panel has obvious acceleration and sometimes appear impact sound.

6.8.2 Solutions:

Adjust the gap of the door lock hook to 0.3mm~1mm

6.8.3 Prevention solutions and suggestions:

Get familiar with the operating manual and understand the key dimensions.

7 Notes for Maintenance

- 7.1 Read the installation manual carefully before installation. Read the inverter debugging manual carefully before starting up.
- 7.2 The inverter should be given the shielding protection of the door opening and closing signal to avoid interference from the high-power system.
- 7.3 Measures should be taken to avoid the impurity(especially metals and sweepings) entering into the electrical control part on the door operator.
- 7.4 The motor bearings that drive the car door should be periodically filled with lithium grease.
- 7.5 During maintenance, clean the rail. Check the wearing amount of the door pulley frequently. If the wearing amount is bigger than 1.5mm, it should be replaced in time.
- 7.6 Check the wire rope and the tension of the timing belt during each maintenance (refer to Figure 7-1).
- 7.7 Frequently check the tightness of the standard parts for each maintenance.
- 7.8 Lubricate all the sliding parts surface of the operator.
- 7.9 Check all the door operation frequently. Fault of switch location may lead to door machine unable to run normally.

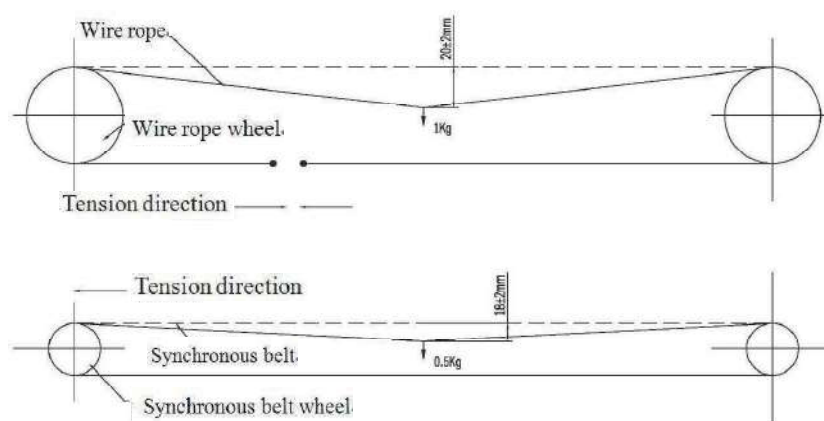


Figure 7-1

7.10 The door slider of the landing door, the wear of the flying wing type door slider at the thinnest part side does not exceed 0.7mm, otherwise it will be replaced immediately.