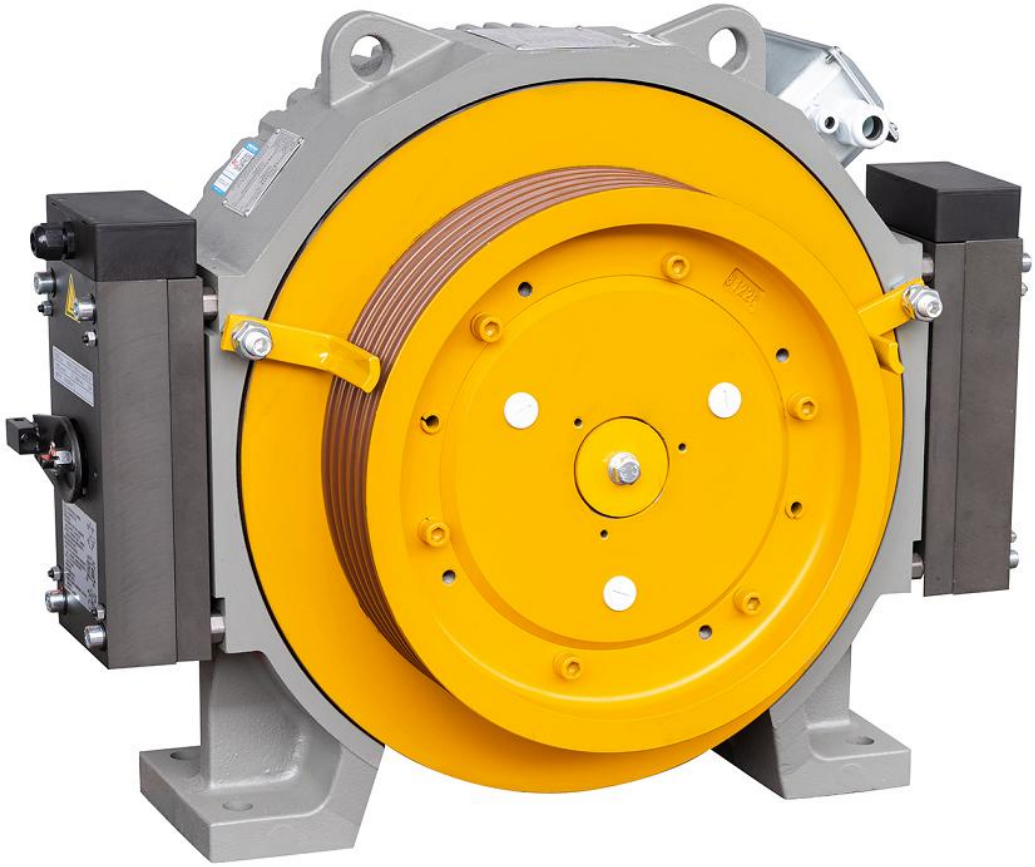
TORINDRIVE
通 润 驱 动

GTW9S.0A Series

Permanent magnet synchronous elevator traction machine

Spare parts replacement manual

S2022.10.9



SUZHOU TORIN DRIVE EQUIPMENT CO., LTD.

Catalogue

1. Preface

1.1. Safety declaration

Only qualified personnel are allowed to perform any planning, installation or maintenance work to GTW9S.0A series permanent magnet synchronous elevator traction machine. The personnel must be trained for the job and must be familiar with the installation, assembly, commissioning and operation of the product. Sufficient knowledge in lift construction is essential. Their commissioning is prohibited until the requirements of the directive are satisfied by or upon integration of the motor into the final product.

The regulations concerning operation, maintenance and inspection in accordance with the applicable safety regulations in lift construction such as GB/T 7588.1-2020 “Safety rules for the construction and installation of electric lifts”and other relevant. Regulations shall be strictly observed.

The operator is responsible for the proper installation of the escalator drive machines with regard to safety requirements as well as for its inspection and maintenance as specified in the applicable regulations. No liability can be assumed for any damage caused by improper handling or any other acts, which are not in conformity with these operating instructions and thus deter from the qualities of the product.

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1.2. GTW9S.0A traction machine spare parts list

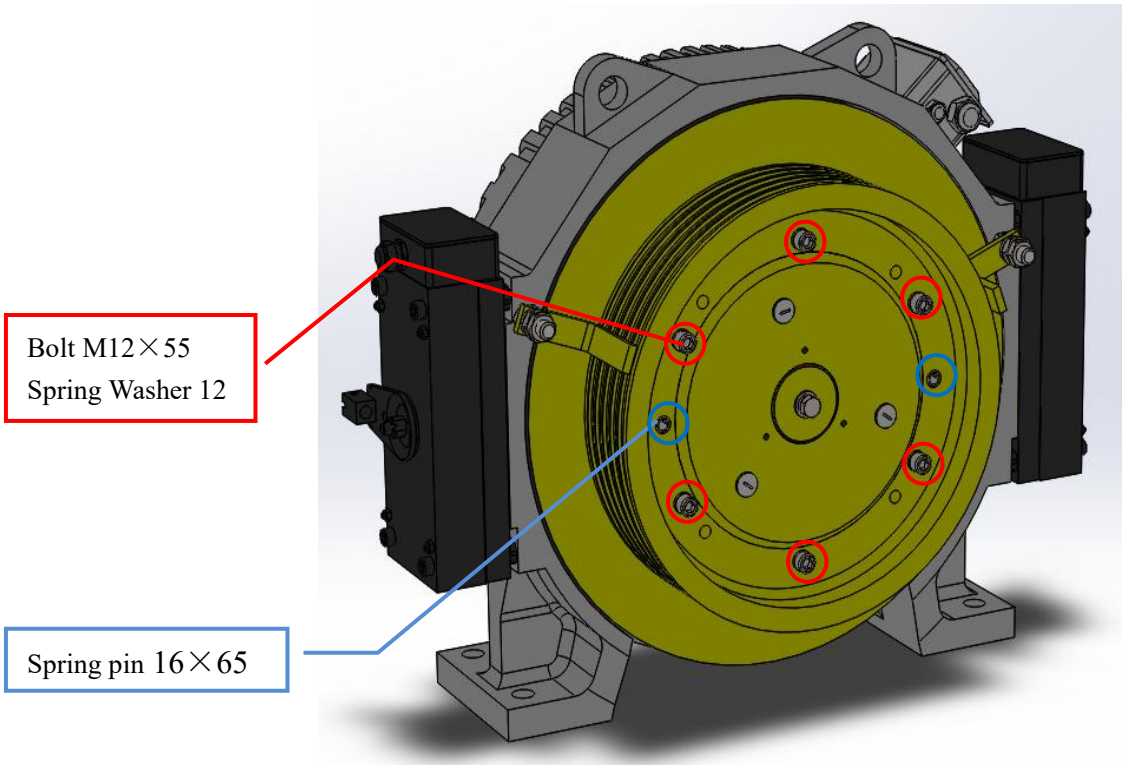
NO.	Type	Description	Quantity	Remark
1	GTW9S.1A.2/2A-3	Traction wheel	1	Selected
2	ERN1387	Encoder	1	
3	GB/T276	Bearing 6311-2RS	1	Main shaft bearing
4	GB/T288	Bearing BS2-2218-2RS	1	Main shaft bearing
5	GTW9.2A.1/1A	FZD12A/FZD12AB Brake	2	Selected
6	GTW9.2A.1.1	Friction components	2	
7	KCB_R-5	Travel switch	1	For hand wheel
8	V4NS	Micro switch	2	

2. Spare parts replacement

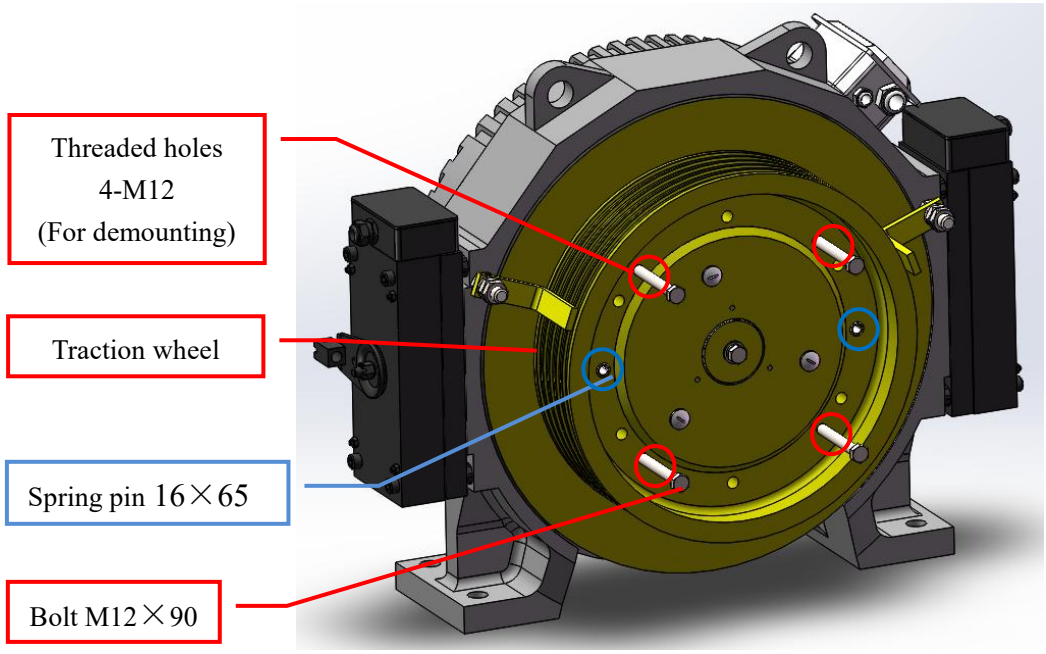
2.1. Traction wheel replacement

2.1.1. Remove the traction wheel

1. Loosen bolt M12×55 and Spring washer 12 with inner hexagon spanner (10mm)

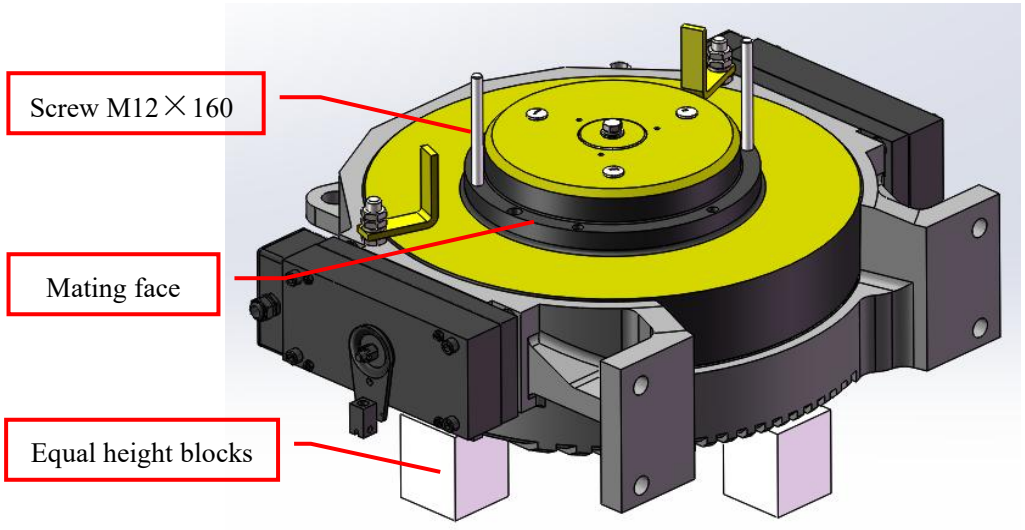


2. Screw in bolt M12×90 in the traction wheel 4-M12 removal screw hole, tighten the bolt diagonally with the wrench(16mm) until the top out of the piece traction wheel. Remove the traction wheel, remove the pin 16×65 (two pieces).



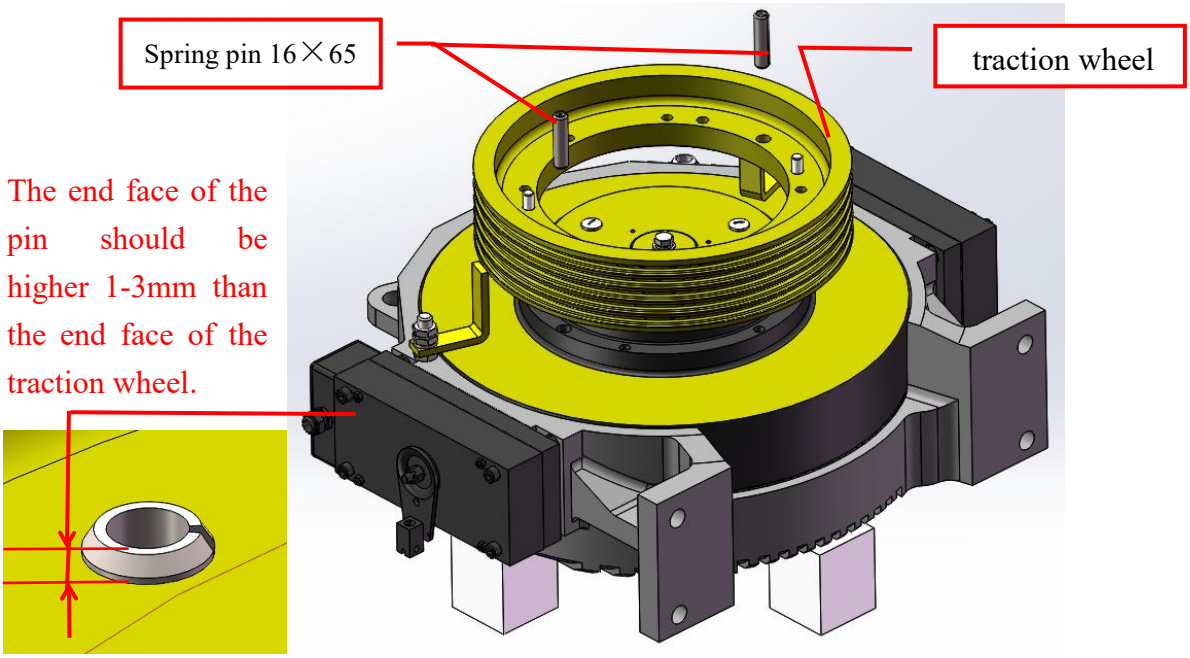
2.1.2. Install the traction wheel

1. Hoist the traction machine with lifting equipment and place it on the equal height blocks (pay attention to protect the other parts of the traction machine). Clean the mating face of the brake wheel, and screw two screws M12×160 into two diagonal threaded holes of the brake wheel.

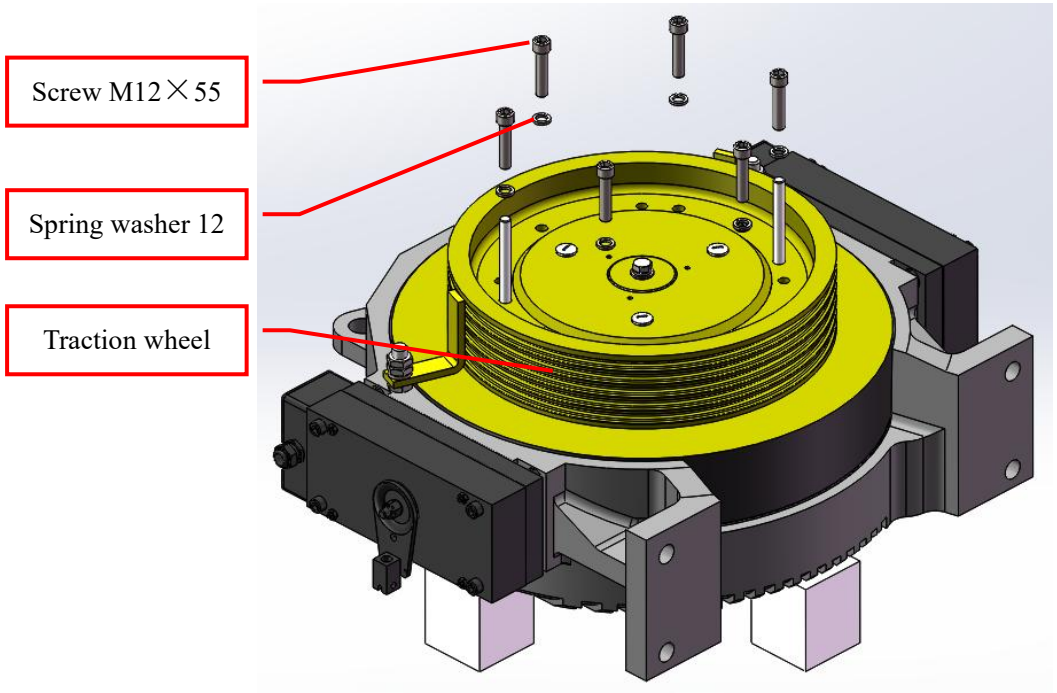


2. Check and clean the new traction wheel and heat it to 100℃. Hoist the traction wheel and make it pass through the screws M12×160 to join with the brake wheel

(notice: ensure the pin holes of the traction wheel align the pin holes of the brake wheel). Install the spring pins 16×65 into the pin holes, the end face of the pin should be higher 1-3mm than the end face of the traction wheel.



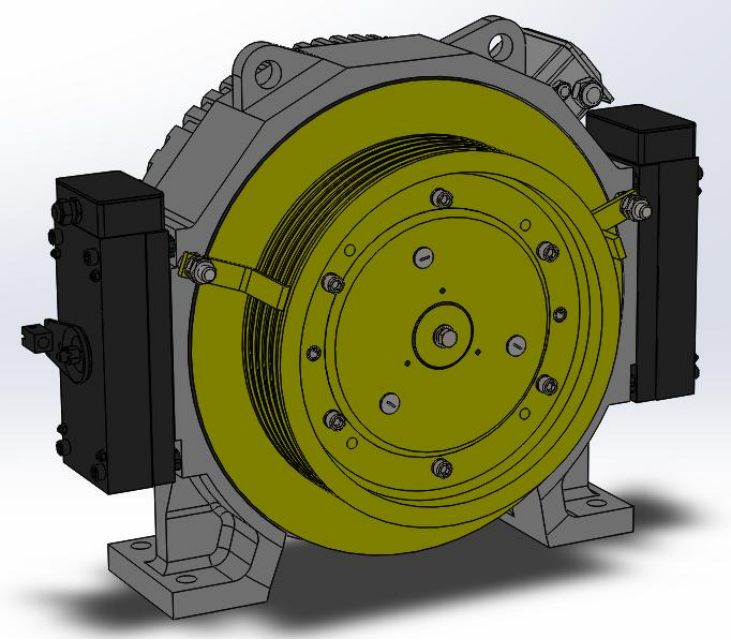
3. Screw M12×55 and washer 12 fixed for traction wheel, fastening with inner six angle wrench (10mm).Remove the screws M12×160, then screw into ten screws M12×55 and spring washers 12 to fasten the traction wheel (the screws should be tightened diagonally). Tighten the screws again after cooling the traction wheel, the tightening torque is 70Nm.



4. Turn over the traction machine with lifting equipment and make it stand up, then

turn on the power of the brake, rotate the traction wheel one lap and above, meanwhile detect radial runout of the traction wheel rope groove with dial indicator, the radial runout should be less than 0.15mm, also make sure that the rotor rotates smoothly, bearing has no noise and there is no interference between rotor and stator.

5. Turn on the power of the traction machine, and test run.

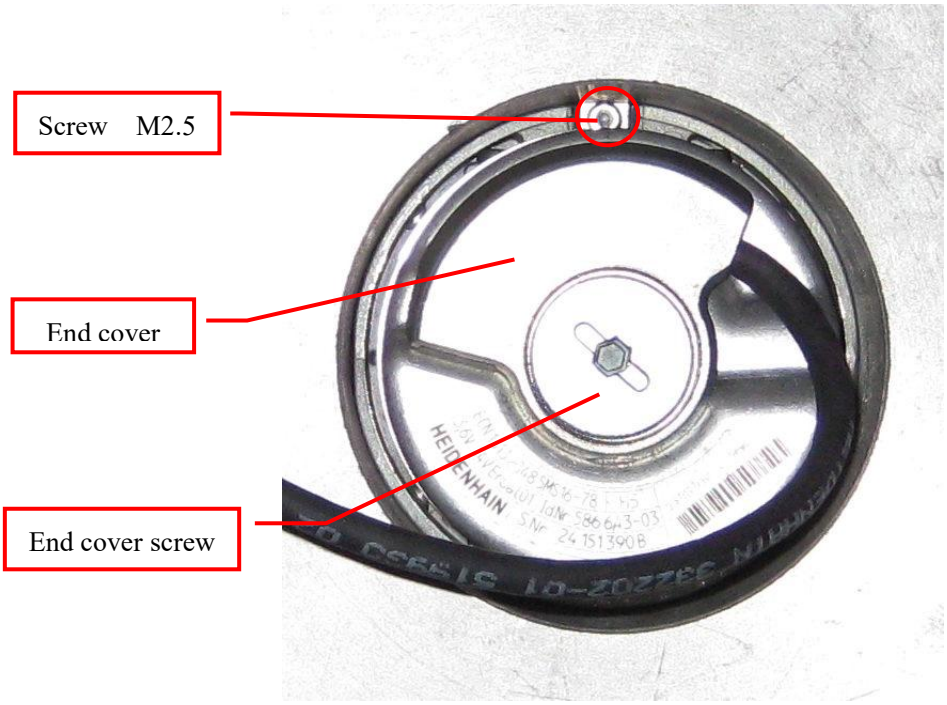


2.2. Encoder replacement

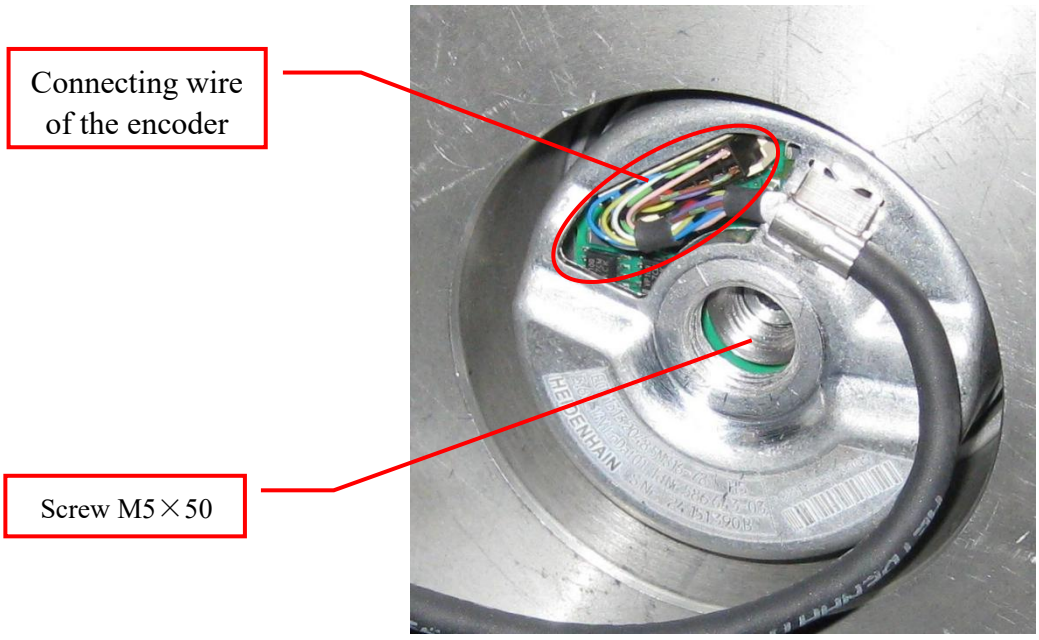
Recommendation： Wear an anti-static wrist strap before replacing the encoder.

2.2.1. Remove the encoder

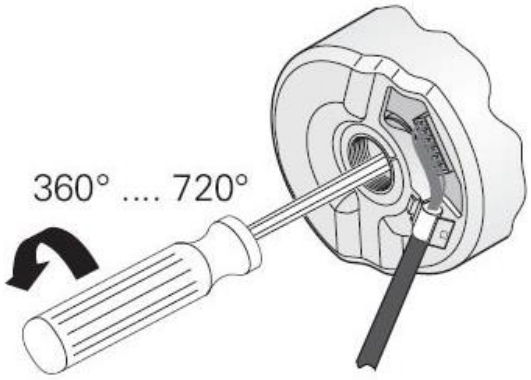
1. Loosen the connecting wire of the encoder.
2. Screw out the end cover screw of the encoder with inner hexagon spanner (4mm), then remove the end cover of the encoder.
3. Loosen clamping screw M2.5 with inner hexagon spanner (2mm).

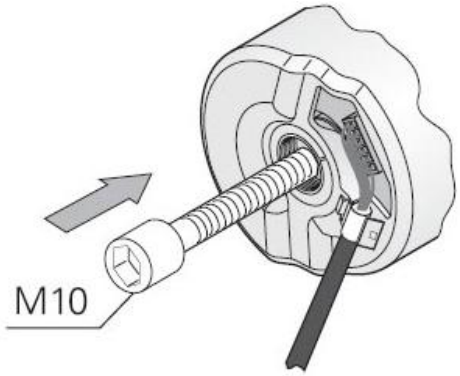


4. Pull out the connecting wire of the encoder.
5. Screw out the screw M5×50 with inner hexagon spanner (4mm), then remove the encoder.



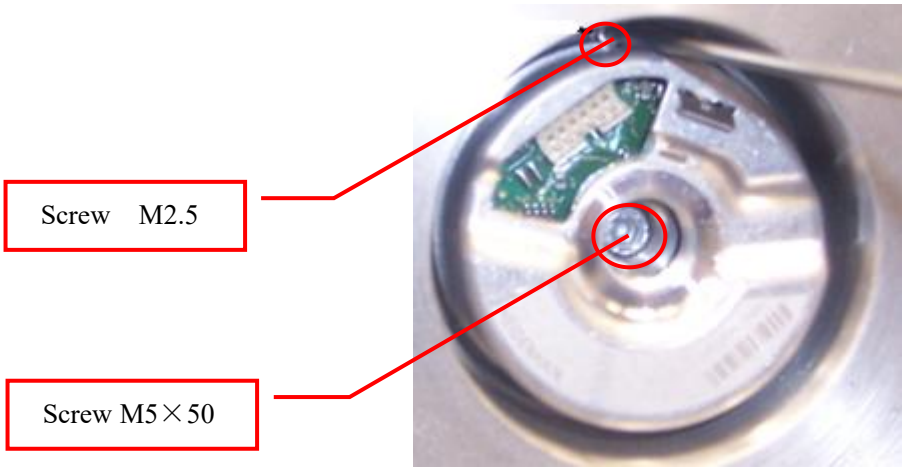
Note:If the encoder cannot be removed after screwing out the screw M5, then screw into the screw M5 again and tighten it, next loosen 1 ~ 2 laps (screw counter clockwise 360°～720°), and then screw into the screw M10 with inner hexagon spanner(8mm), tighten the screw M10 slowly to loosen the encoder, then remove the screw M5 and M10, and take out the encoder.





2.2.2. Install the encoder

1. Clean the main shaft and The connecting shaft of the encoder.
2. Install the encoder into the taper hole of the main shaft (the encoder socket should be upward), and screw into the screw M5×50 to fix the encoder, the tightening torque is 5Nm.
3. Tighten the clamping screw M2.5 with inner hexagon spanner (in horizontal or vertical direction), the tightening torque is 1.25Nm， fixed the encoder.

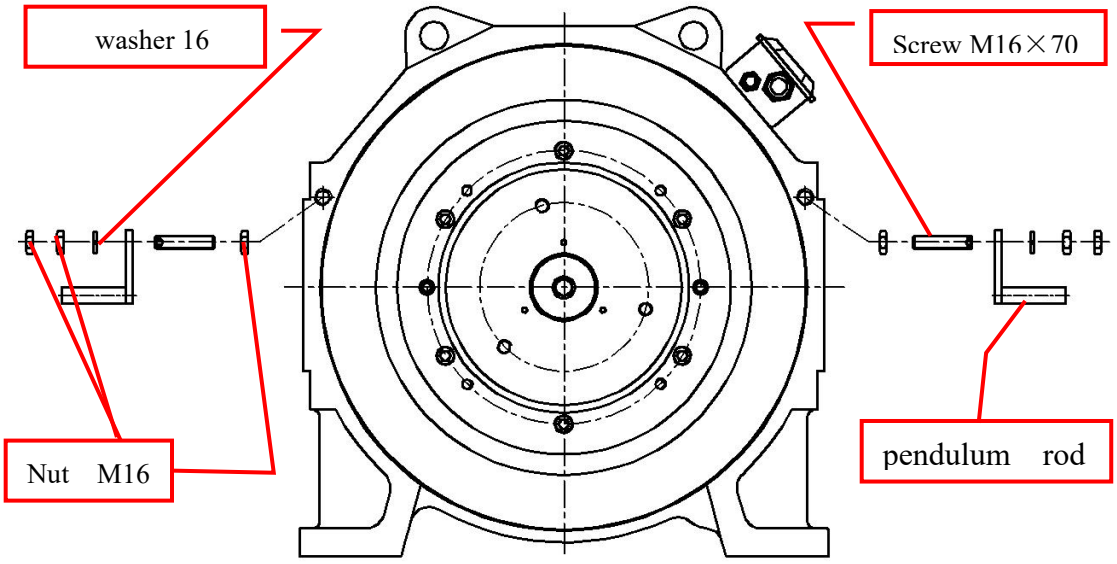


4. Insert the connecting wire of the encoder， Attach the end cover and tighten it by the end cover screws

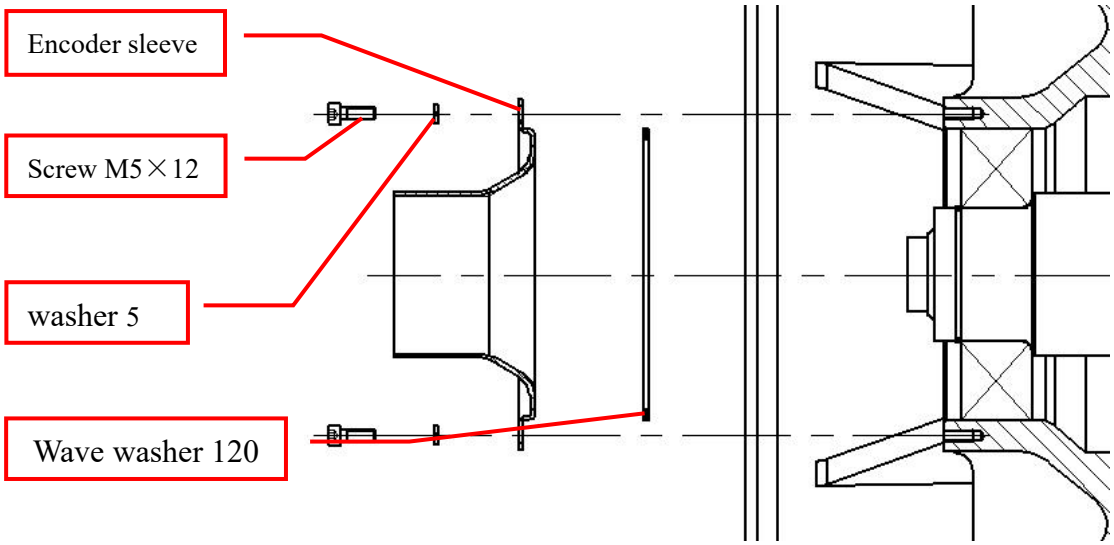
2.3. Bearing BS2-2218-2RS and bearing 6311-2RS replacement

2.3.1. Remove the Bearing BS2-2218-2RS and bearing 6311-2RS

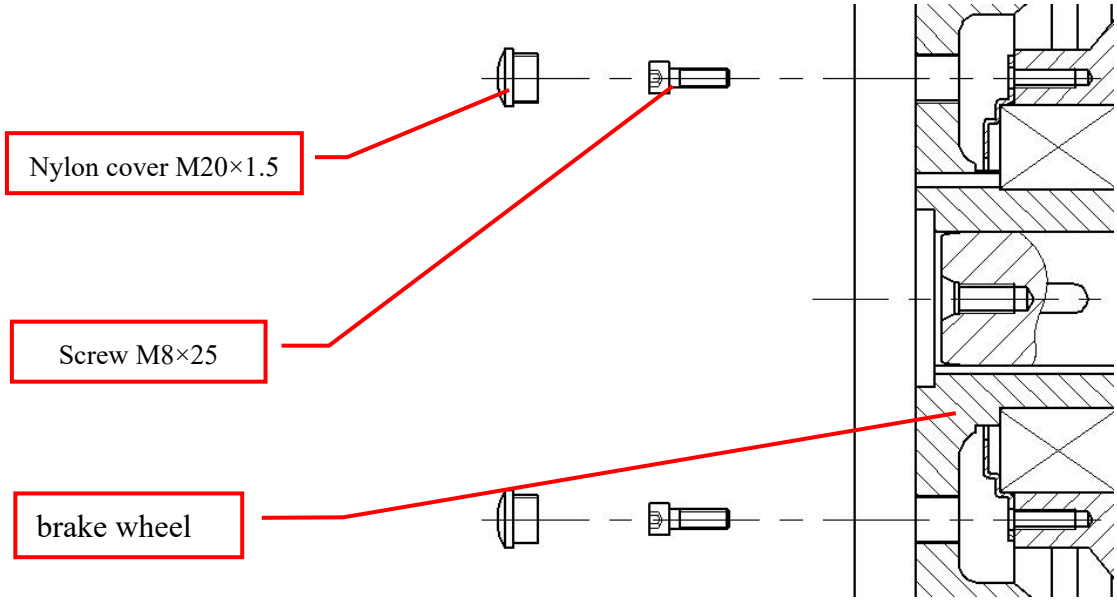
1. Remove brake (refer to GTW9S.0A permanent magnet synchronous elevator tractor spare parts replacement manual - brake replacement and adjustment method).
2. Remove the encoder (refer to the spare parts replacement manual of GTW9S.0A permanent magnet synchronous elevator tractor - encoder replacement method).
3. Loosen two nuts M16 with an open-end wrench (24mm), remove the pendulum rod and washer 16, loosen one nut M16 with an open-end wrench (24mm), and remove screws M16×70 with inner hexagon spanner(8mm).



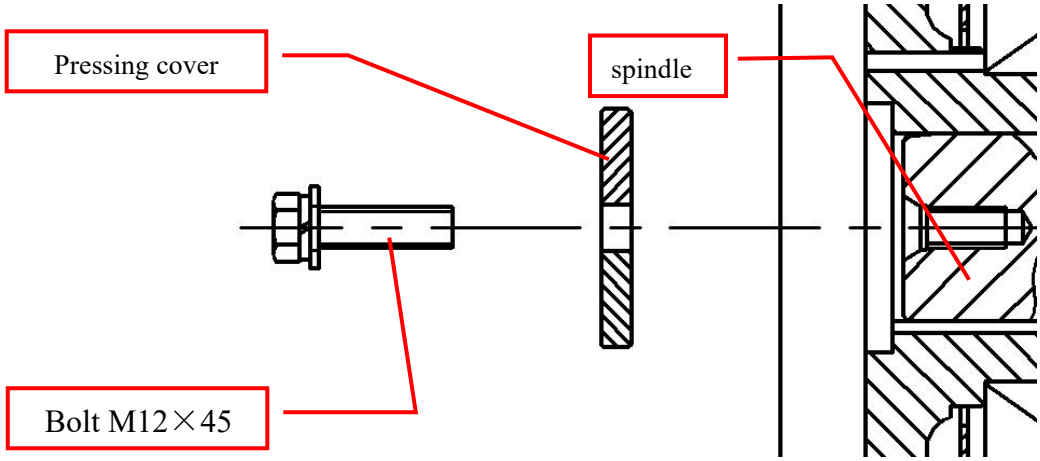
4. Loosen the screws M5×12 and washer 5 with inner hexagon spanner (4mm), and remove the encoder sleeve and wave washer 120.



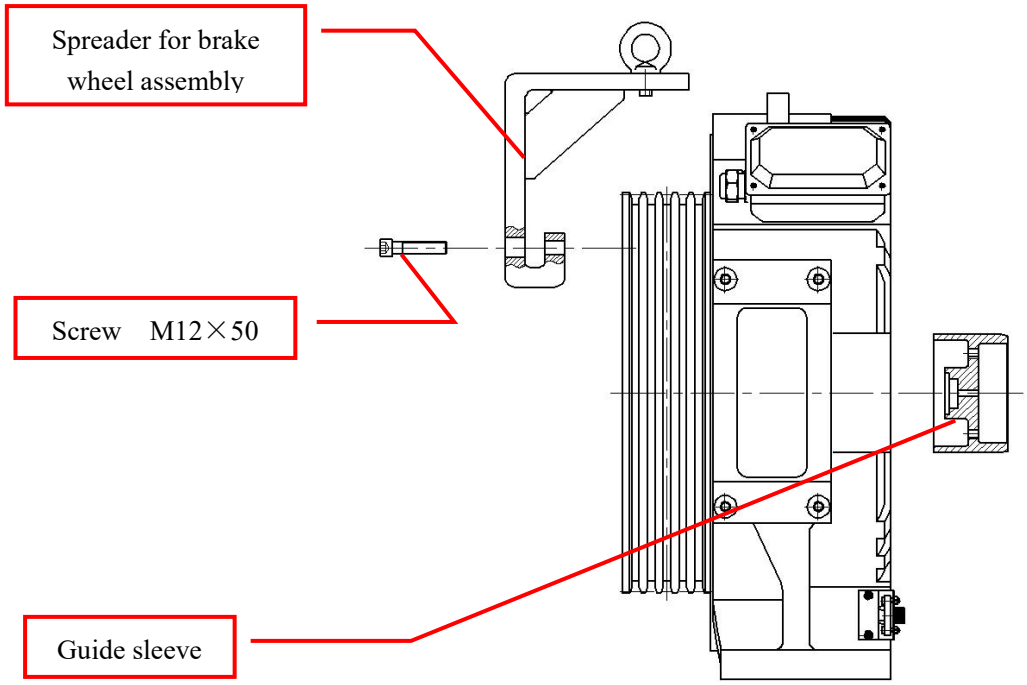
5. Remove the nylon cover M20×1.5 from the end face of the brake wheel with a one-word screwdriver, and remove the screw M8×25 with an hexagon wrench (6mm) through the hole of the nylon cover.



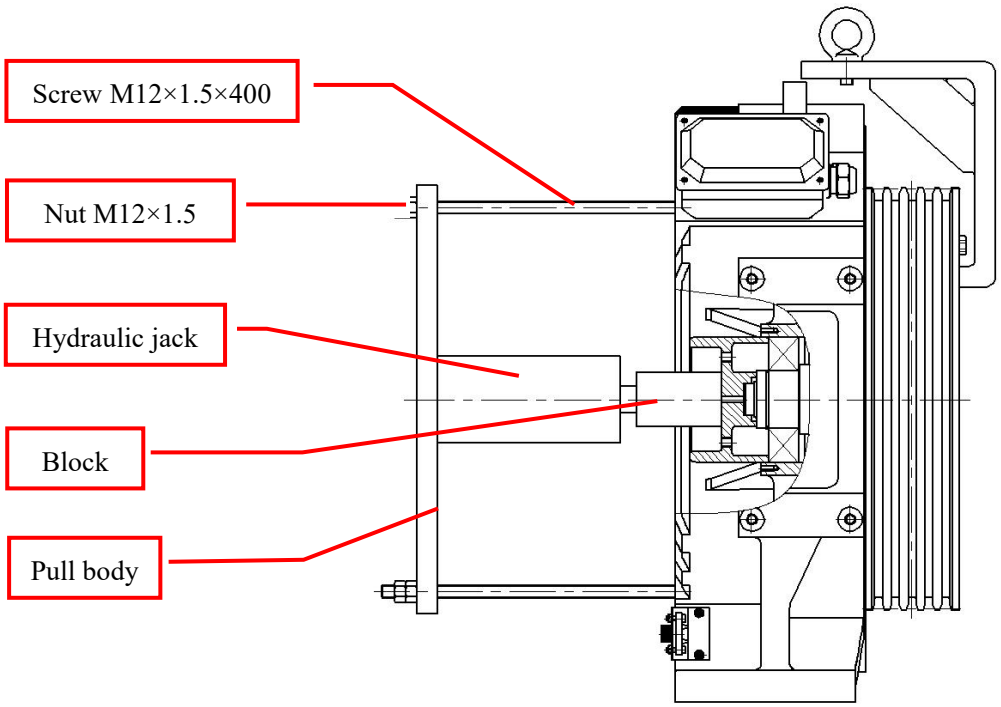
6. Loosen the hexagon combination bolt (flat gasket + spring pad) M12×45 with an open-end wrench (18mm) and remove the pressing-cove.



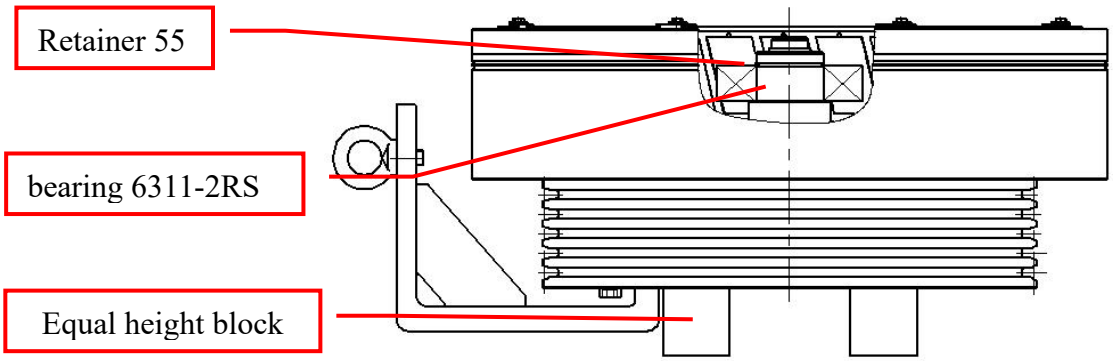
7. Install the brake wheel assembly spreader to the end of the traction wheel, fix it with screw M12×50, and tighten it with hexagon wrench (10mm). Install a guide sleeve in the bearing hole of the frame.



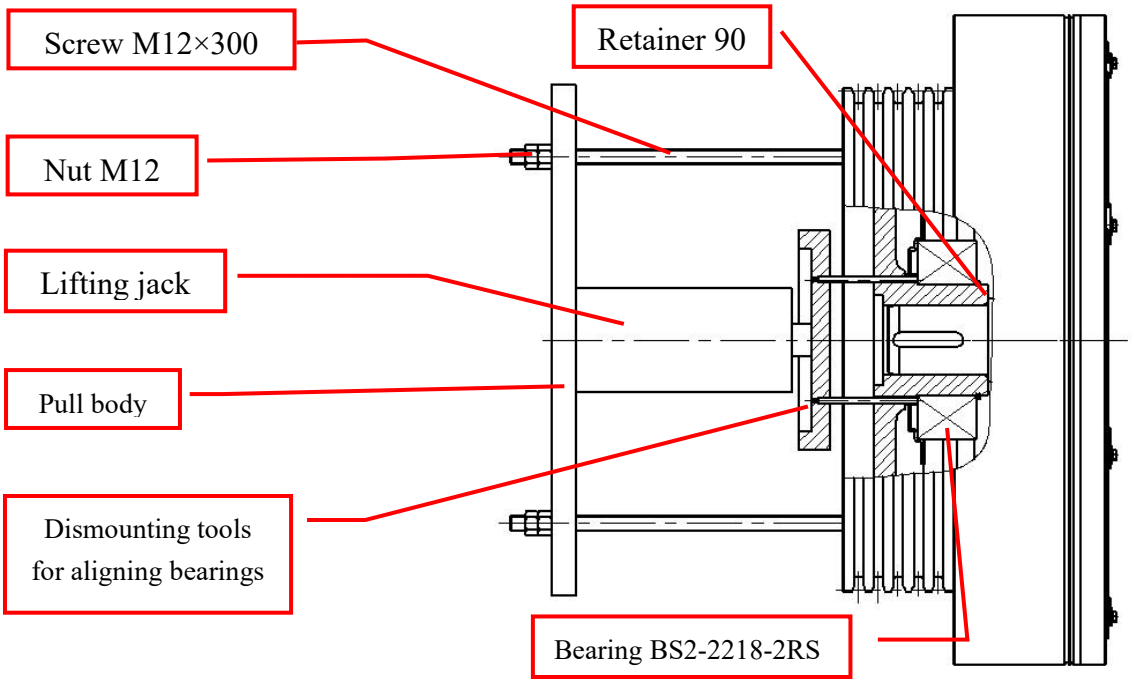
8. Screw two pieces of screw M12×1.5×400 diagonally into the corresponding screw hole of the machine base, pass the pull body (rotor assembly removed) through the screw to the appropriate position, and fix it with nut M12×1.5. Place the jacks and pads in the shown position and operate the jacks to separate the rotor assembly from the stator assembly. Remove jacks, inserts, pullers, screws and nuts.



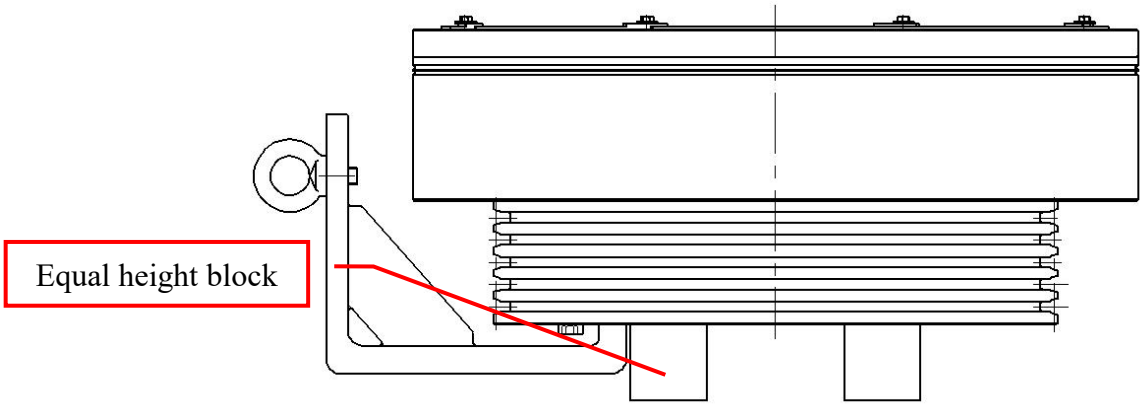
9. Lay the rotor assembly flat to an equal height block. Remove retainer 55 from bearing end with circlip pliers, and remove bearing 6311-2RS with bearing puller.



10. Remove retainer 90 from bearing end with circlip pliers. Then screw two screw M12×300 diagonally into the corresponding screw hole of the rotor assembly, pass the pull body through the screw to the appropriate position, and fix it with nut M12.Put the lifting jack and dismounting tools for aligning bearings into the position shown in the figure. Operate the jack to push the spindle and bearing out of the rotor assembly (note to protect the magnetic steel). Remove jacks, pulling body, dismounting tools for aligning bearings, tooling, screws and nuts.

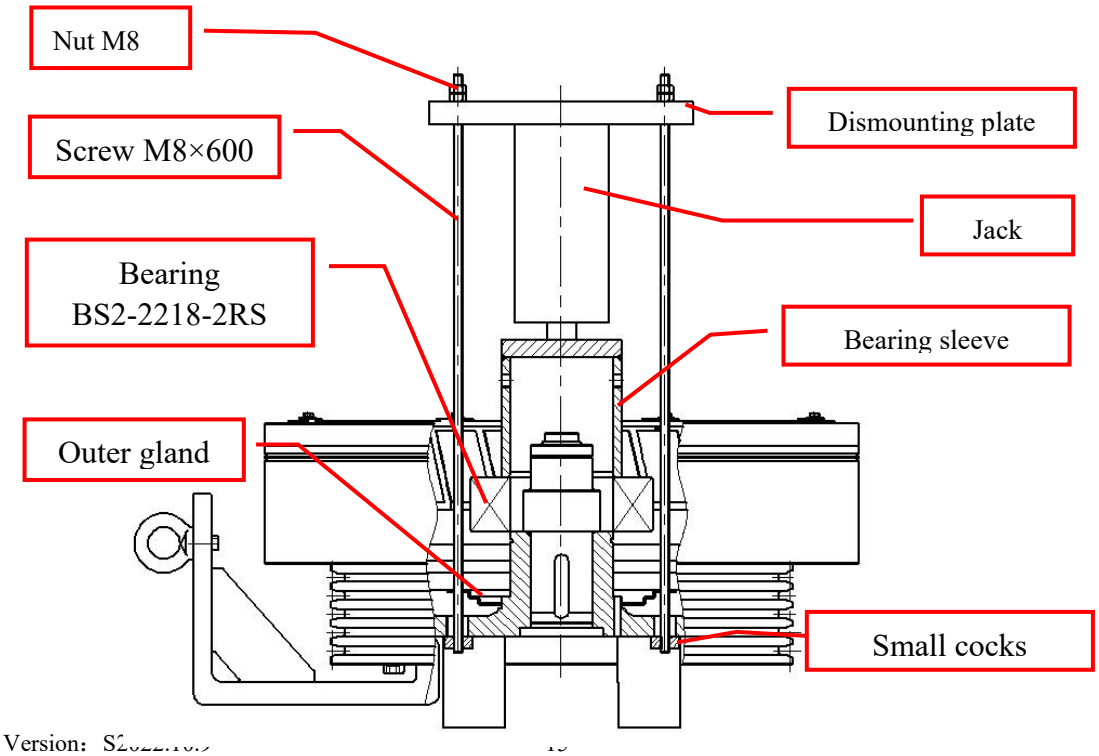


11. Lay the rotor assembly flat to an equal height block.

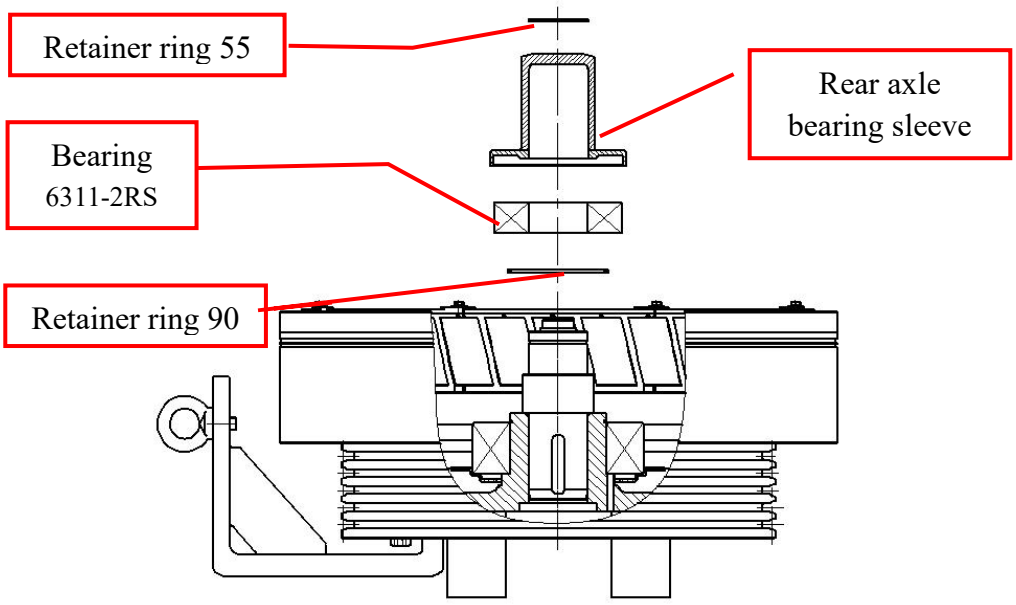


2.3.2.Install the bearing BS2-2218-2RS and bearing 6311-2RS

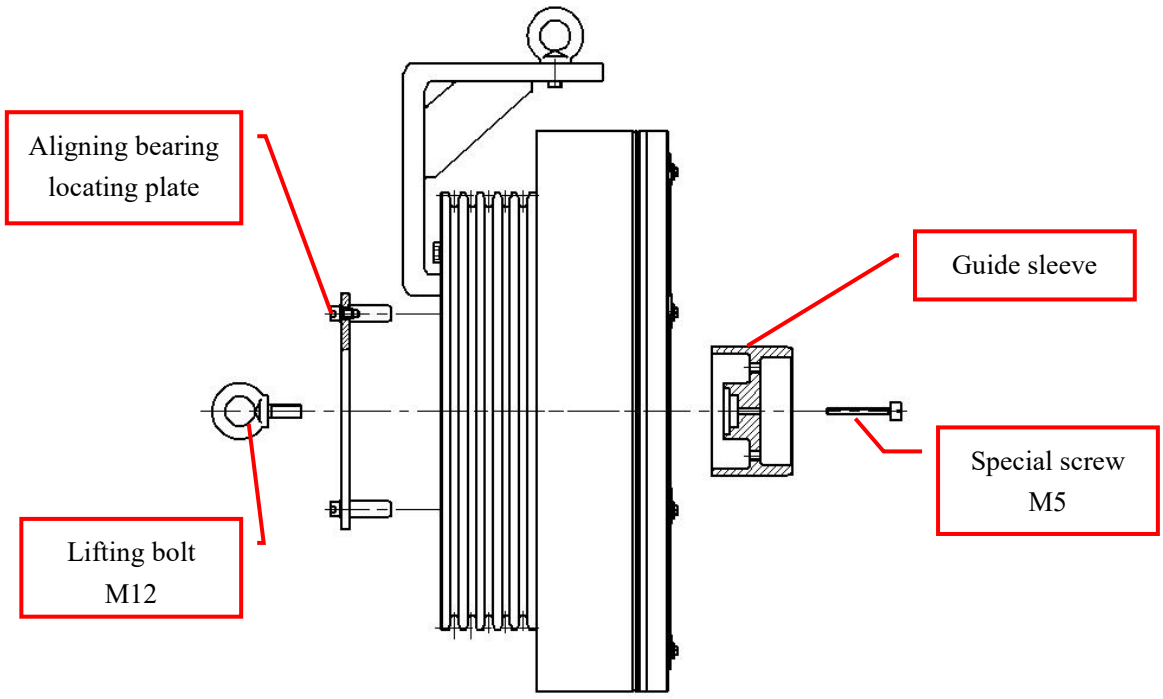
1. Deburr the rotor bearing and clean it. Put the outer gland into the inner hole of the rotor assembly, and evenly apply an appropriate amount of Cosaixin 1222 thread glue to the bearing gear of the rotor assembly (the lower part of the retaining ring groove).
2. Screw 3 small thongs into the screw M8×600. As shown, and then three pieces of nut M8 together through the brake wheel 3 - M20 at the bottom of the hole and the outer gland of 3 - Φ 8.5holes. Put the bearing BS2-2218-2RS into the brake wheel bearing ,block on bearing pressure sleeve, jack and removal plate, and fix it with nut M8. Operate the jack to press the bearing BS2-2218-2RS into position. Remove jacks, install tooling, screws and nuts.



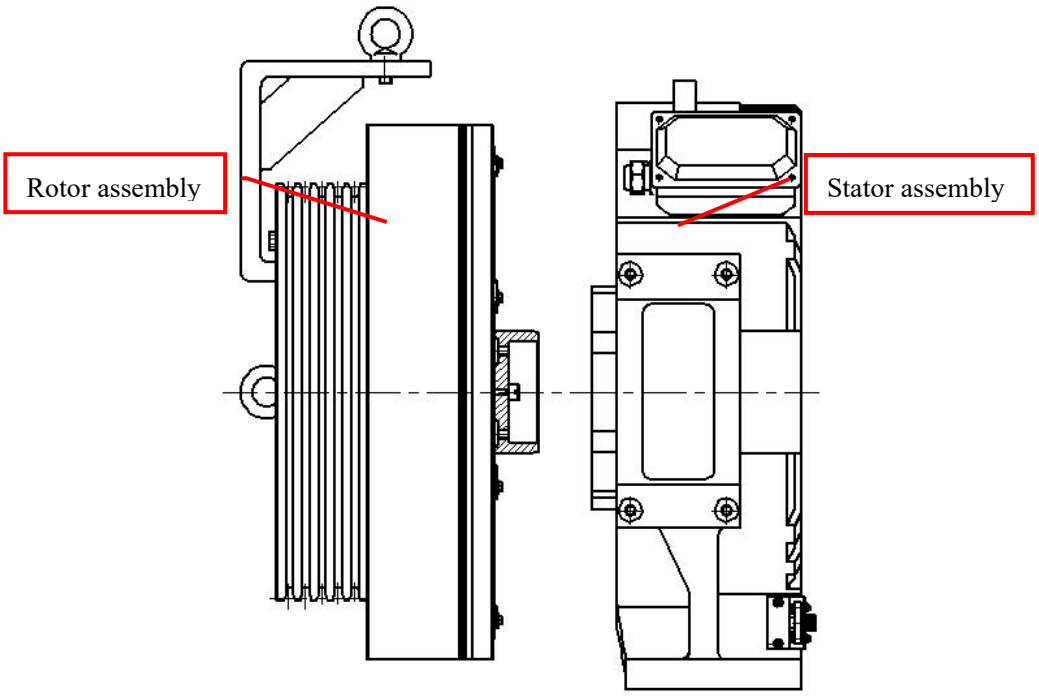
3. Install the retainer ring 90 into the retainer groove corresponding to the brake wheel with circlip clamp and fix the bearing 22218. Put bearing 6311-2RS into the main shaft bearing gear, put the rear axle bearing sleeve, and hit it in place with copper hammer. Install the retainer 55 into the retainer groove corresponding to the spindle with circlip pliers and fix the bearing 6311-2RS.



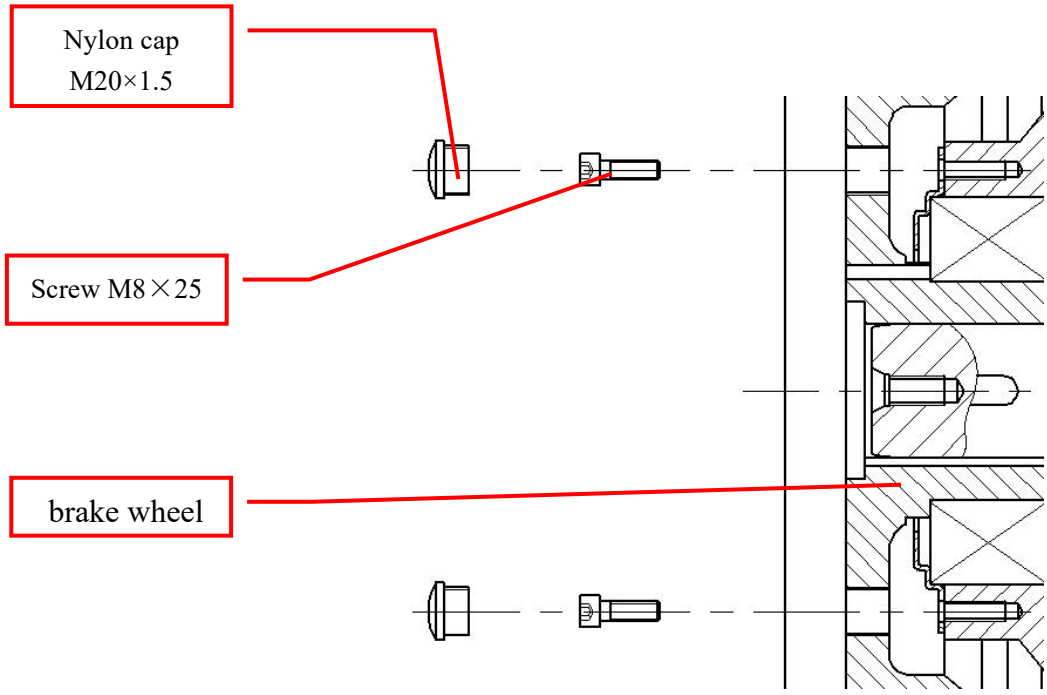
4. The guide sleeve into the spindle and secured with knurled screws M5. The ligning bearing locating plate is installed on the end face of the brake wheel and fixed with lifting bolt M12.



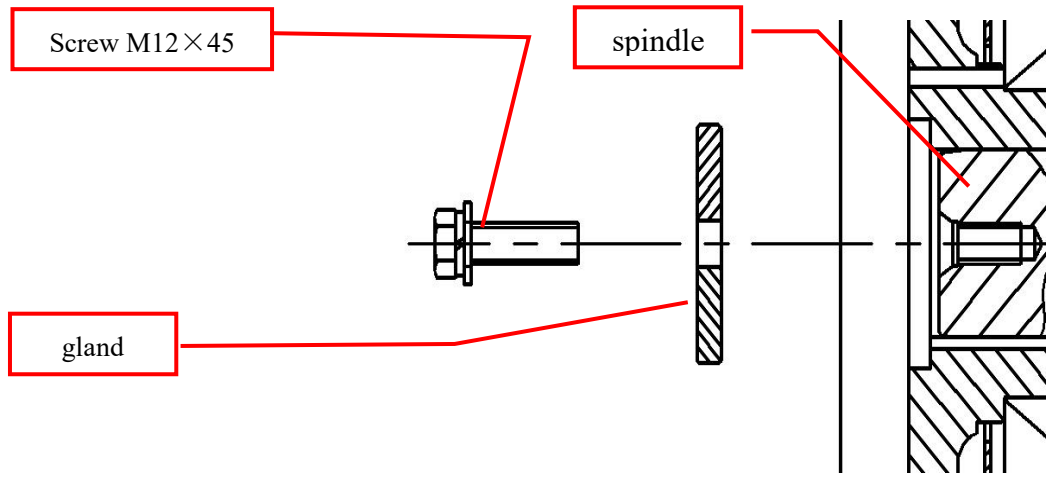
5. Lift the rotor assembly parallel to the bearing hole of the frame, align the guide sleeve with the bearing hole of the frame, and the outer circle of the brake wheel with the matching hole of the frame, push the rotor assembly into the frame, and ensure that the bearing and the bearing hole of the frame are in place. Remove the special lifting ring screw M12 and aligning bearing positioning plate.



6. Drive the traction wheel to find the matching screw hole between the outer gland and the frame. Use screw M8×25 to tighten the outer gland and the machine base (screw should be tightened diagonally) with a tightening torque of 20Nm.Install the nylon cover M20×1.5 to the end face of the brake wheel and tighten it with a word screw driver.

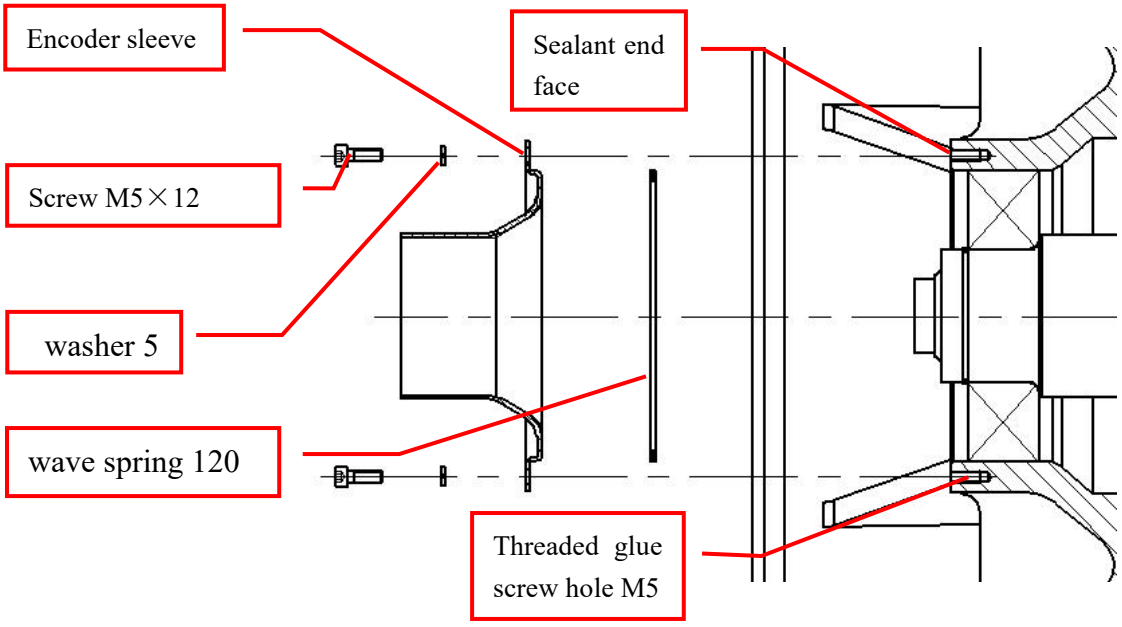


7. Remove guide sleeve and brake wheel assembly spreader. Use an open-end wrench (18mm) to tighten the hexagon combination bolt (flat gasket + spring pad) M12×45 to the gland and spindle.

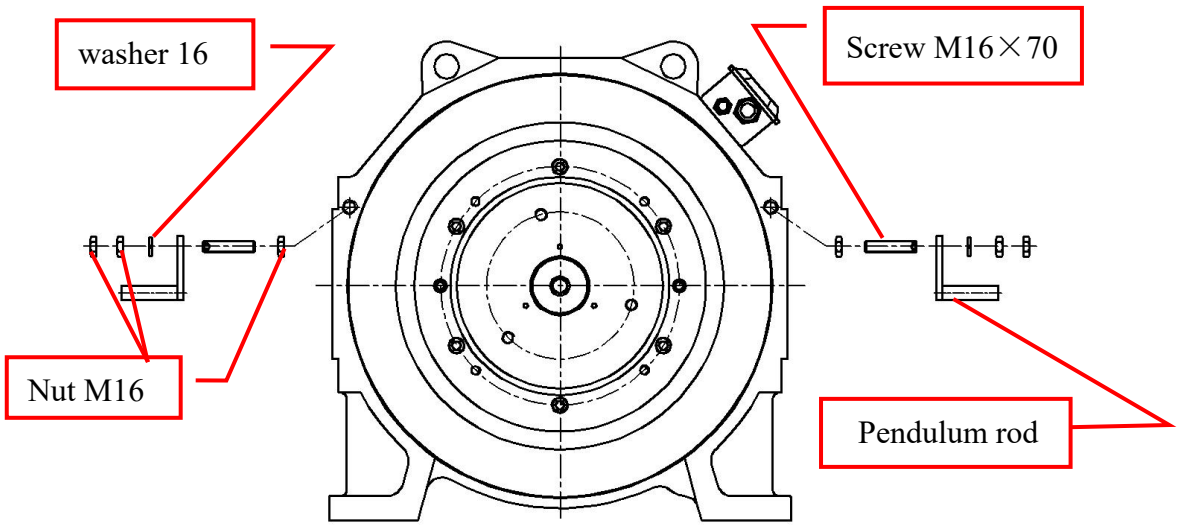


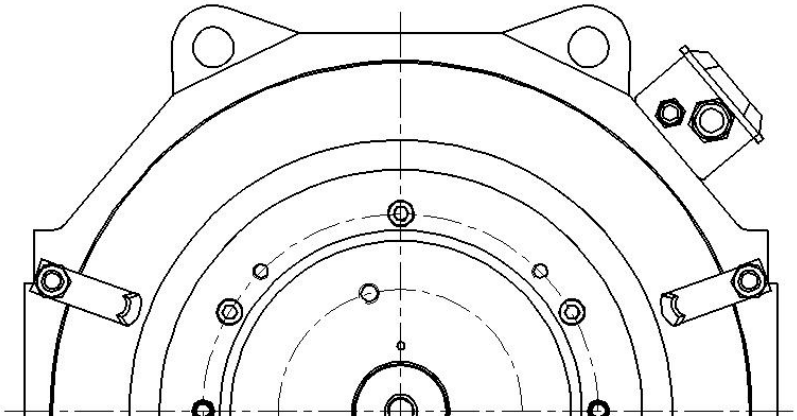
8. Coat an appropriate amount of Tianshan 1222 thread glue and Tianshan 1598 silicone rubber plane sealant in the screw hole M5 and the end face of the frame (the sealant should be coated into a continuous closed rubber line), the wave spring 120 and the encoder sleeve are set to the corresponding position of the

frame, and the screw M5×12 is tightened together with the washer 5, and the screw tightening torque is 5Nm.

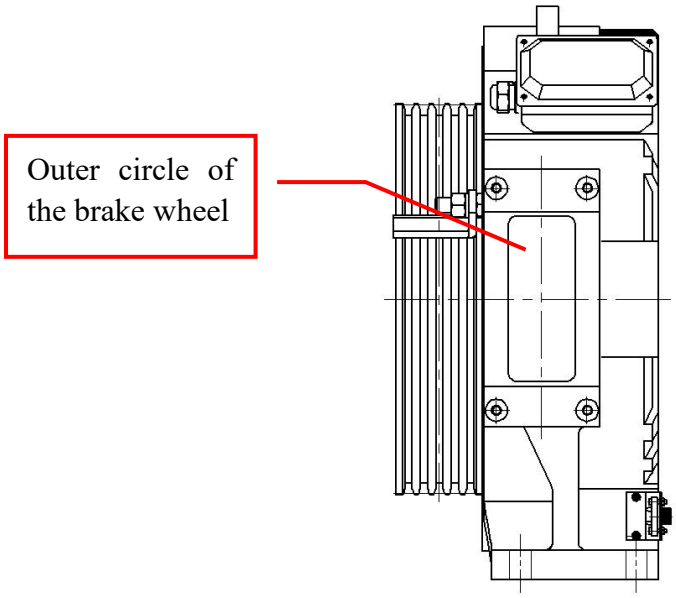


9. If the rope stop rod is installed: use an Allen wrench (8mm) and an open-end wrench (24mm) to screw a nut M16×70, and then load it into the corresponding screw hole of the base (the screw depth is about 25mm), use a nut M16 to tighten the lock screw M16×70, and then install the pendulum rod to the screw M16×70, and lock it with two nuts M16 together with the washer 16 (note: It is advisable for the rope bar not to touch the Traction pulleys).

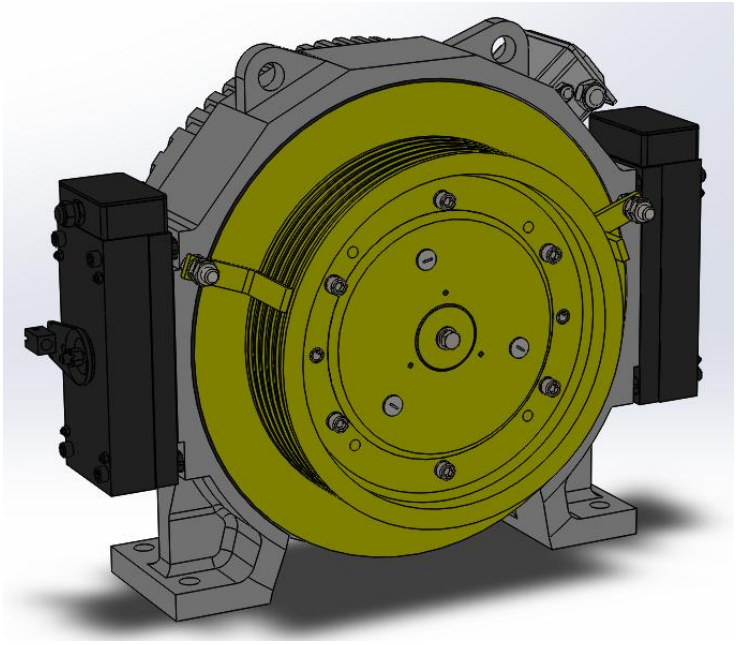




10. Detected by dial gauge: the radial runout of the outer circle of the brake wheel is ≤ 0.08mm, and the components are required to rotate flexibly, the bearing has no noise, and the rotor and stator have no interference.



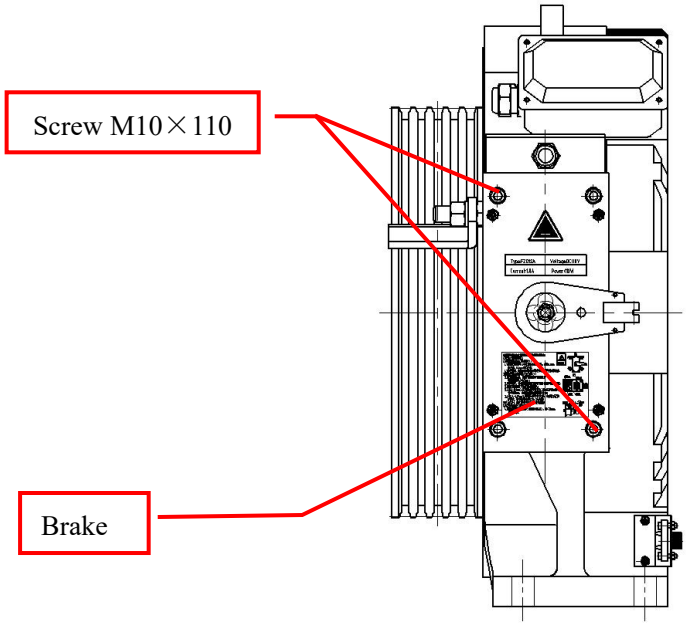
11. Install encoder (refer to GTW9S.0A permanent magnet synchronous elevator tractor spare parts replacement manual - encoder replacement method).
12. Power on the whole traction machine and run the whole machine test.



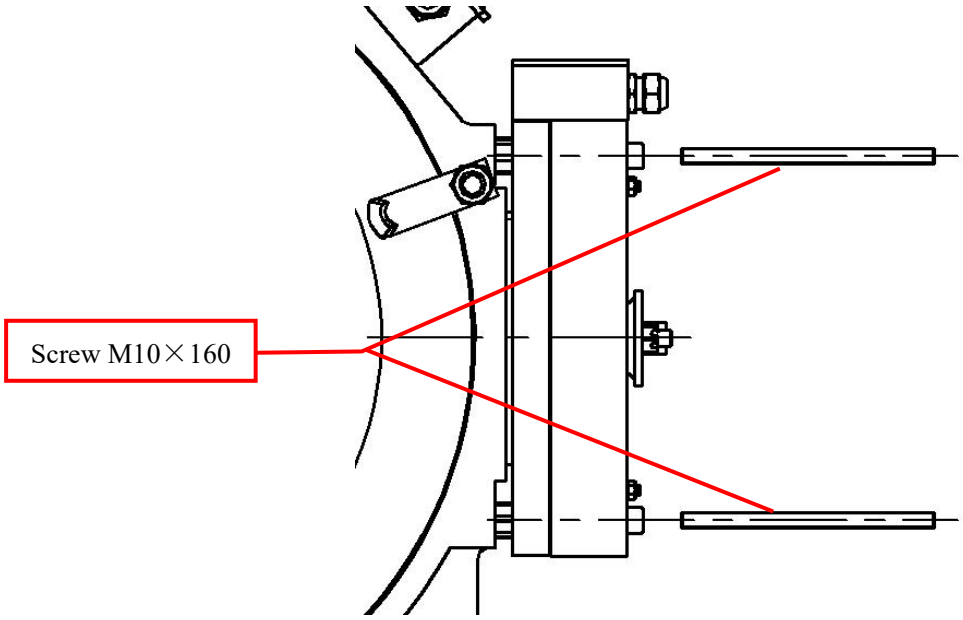
2.4. Brake FZD12A/FZD12AB replacement（take right side brake for example）

2.4.1.Remove the brake FZD12A/FZD12AB

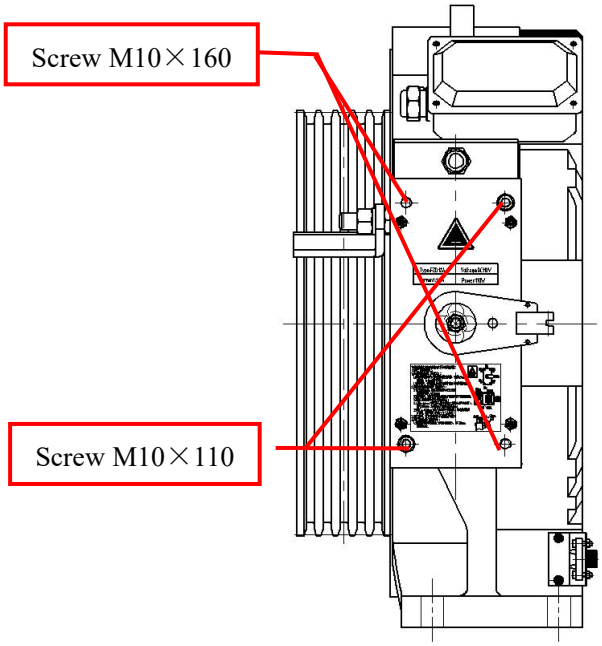
1. Screw out two diagonal screws M10×110 with inner hexagon spanner (8mm).



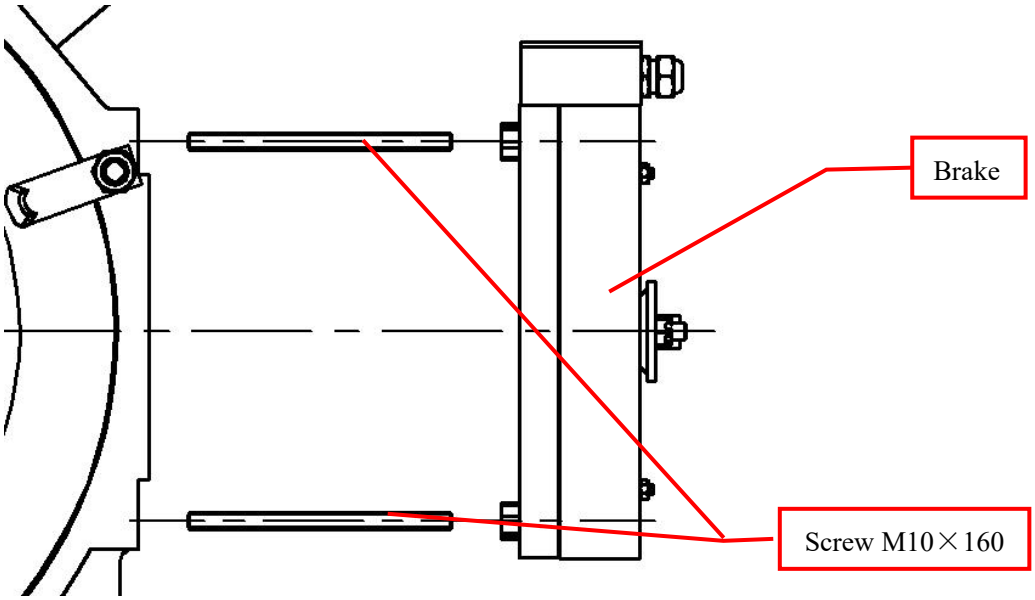
2. Screw into two screws M10×160.



3. Screw out the remaining screws M10×110 with inner hexagon spanner (8mm).

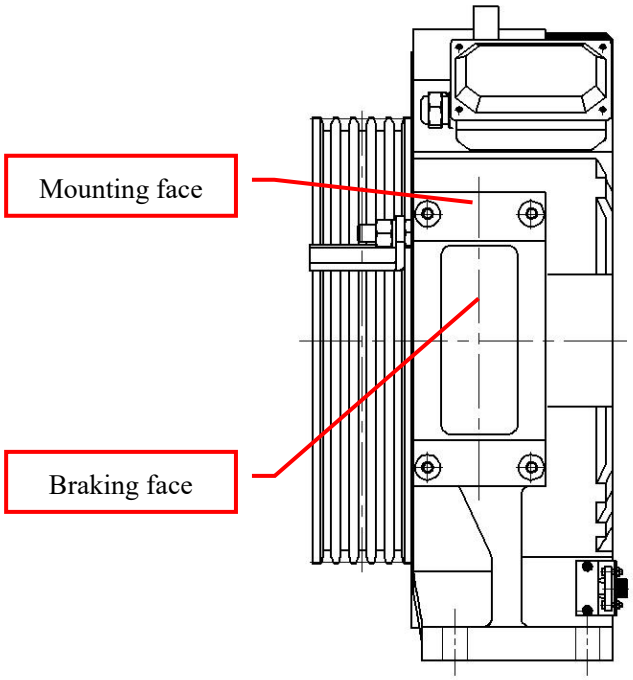


4. Remove the brake and screws M10×160.

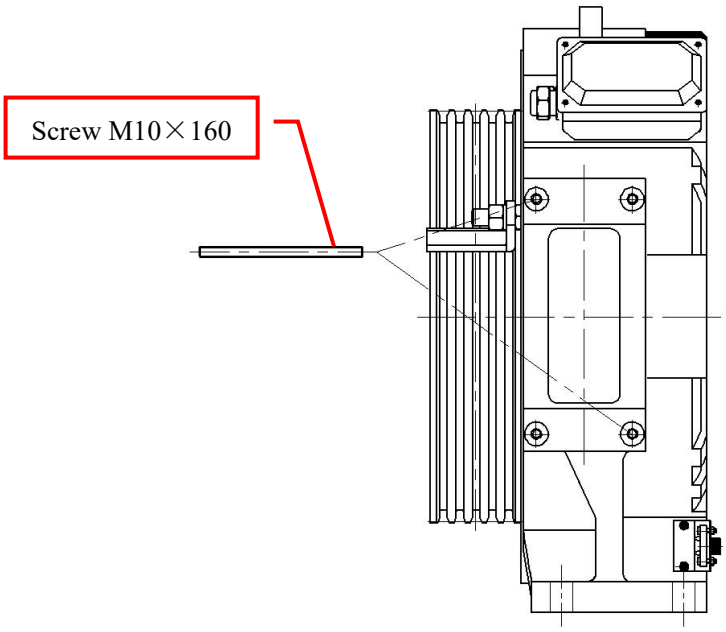


2.4.2.Install and adjust the brake FZD12A/FZD12AB

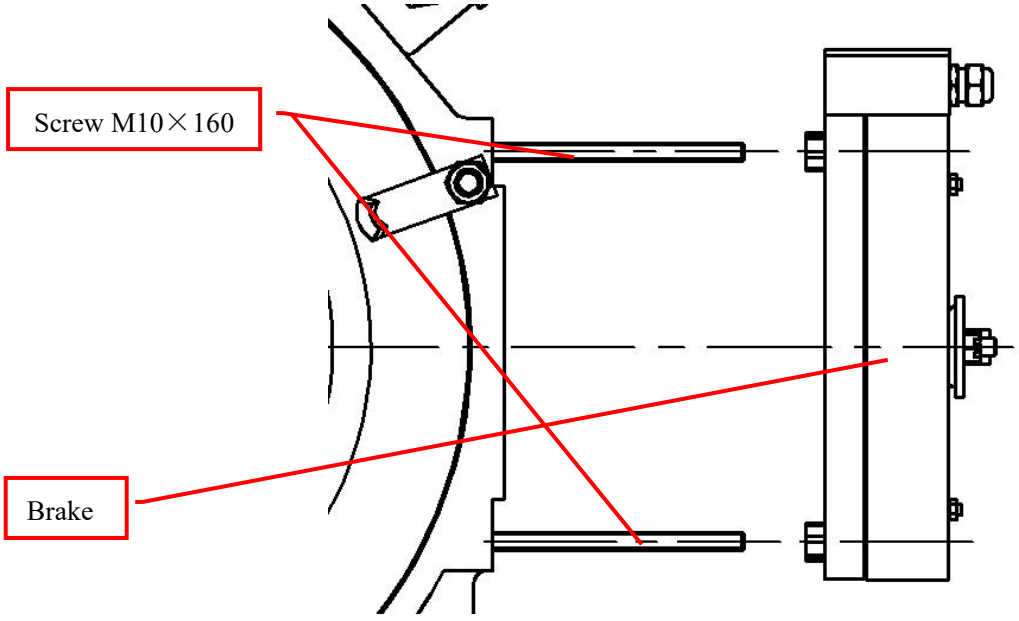
1. Clean the mounting face and the braking face of the brake wheel with anhydrous alcohol.



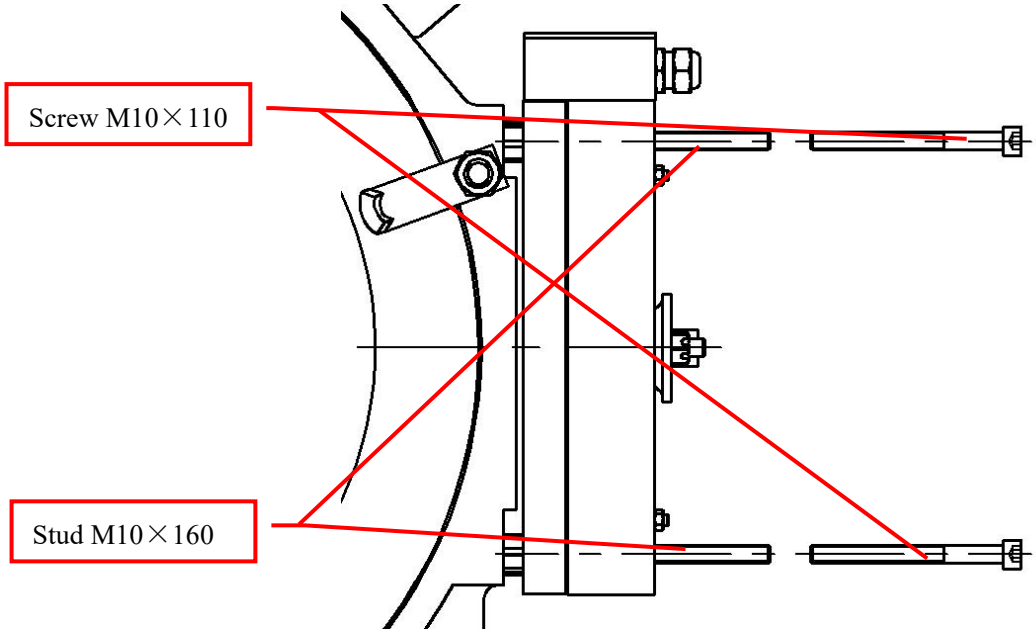
2. Screw two screws M10×160 into two diagonal threaded holes on the mounting face.



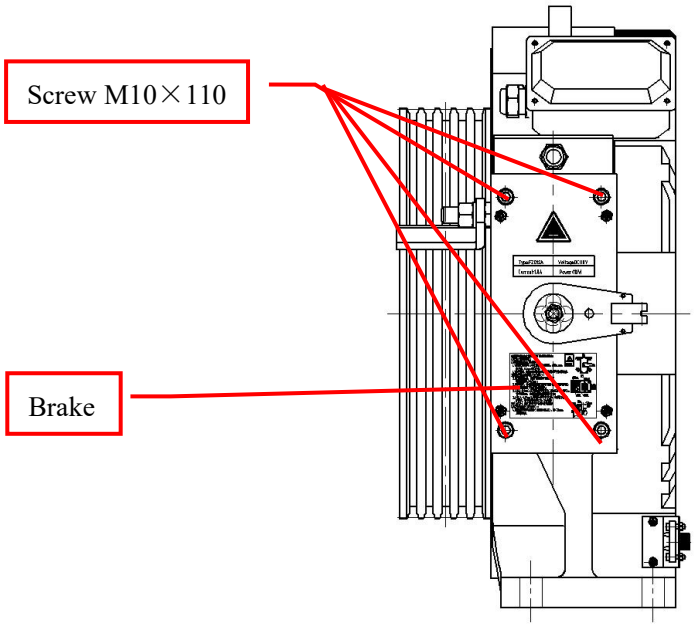
3. Install the brake through the stud M10×160 to the end face of the brake.



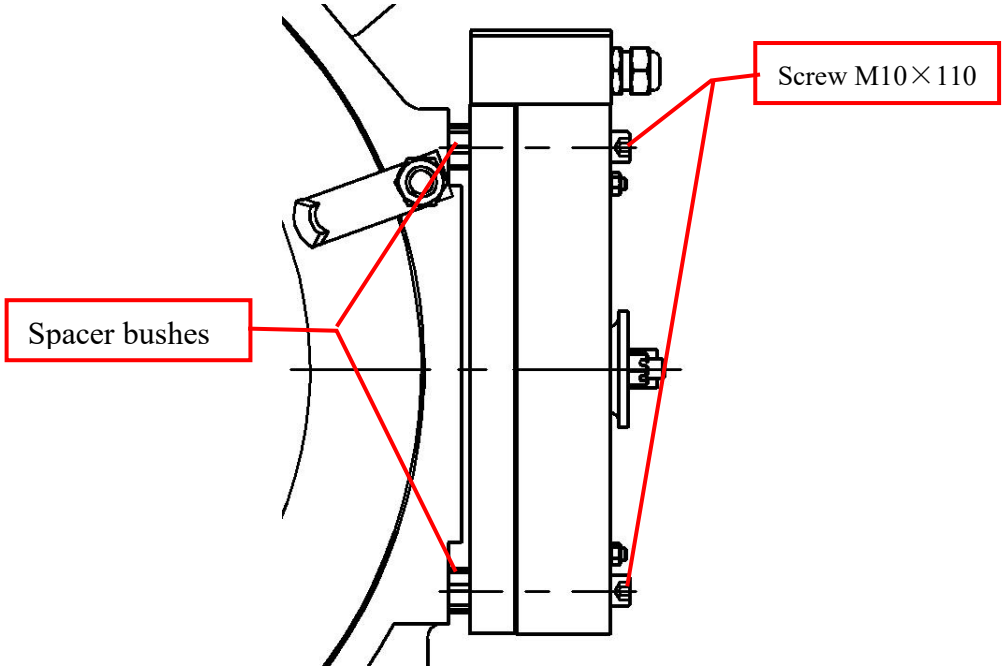
4. Screw into two screws M10×110 and pre-tighten them with inner hexagon spanner (8mm) (smear some threaded glue onto the screws).



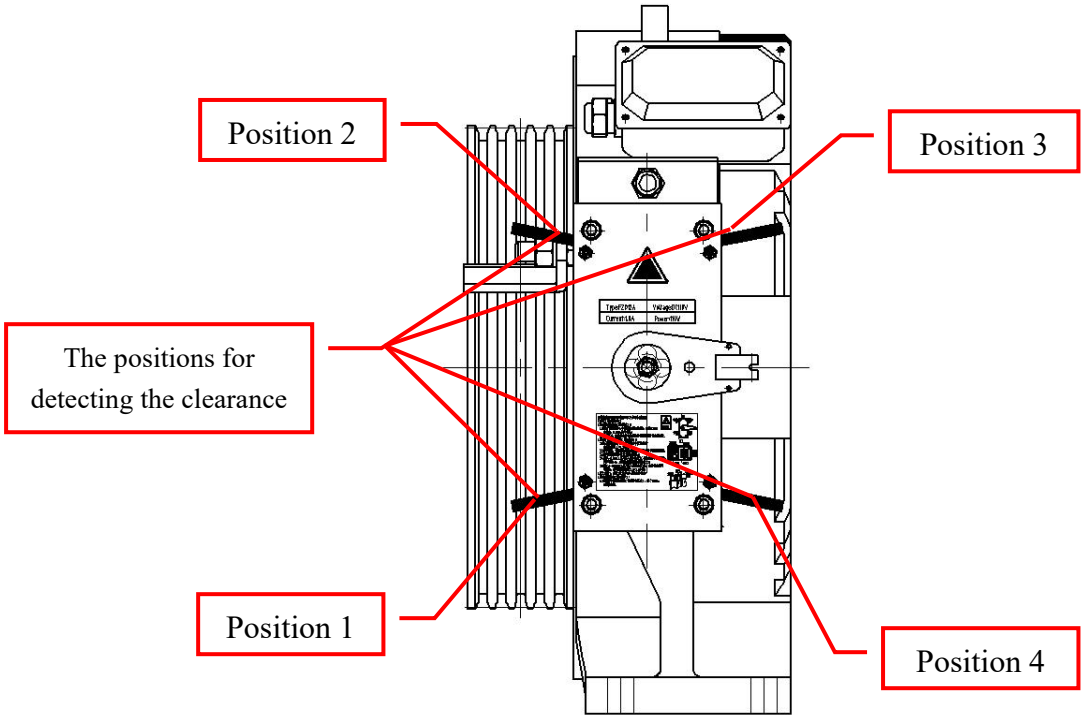
5. Remove the two pieces of stud M10×160, apply the remaining two pieces of screws M10×110 with an appropriate amount of Tianshan 1243 thread glue diagonally to fix the brake, and preload them with an inner hexagon spanner (8mm)(a total of four pieces of screws M10×110)



6. Check and adjust the spacer bushes, make sure that the end faces of the spacer bushes do not touch the mounting face.



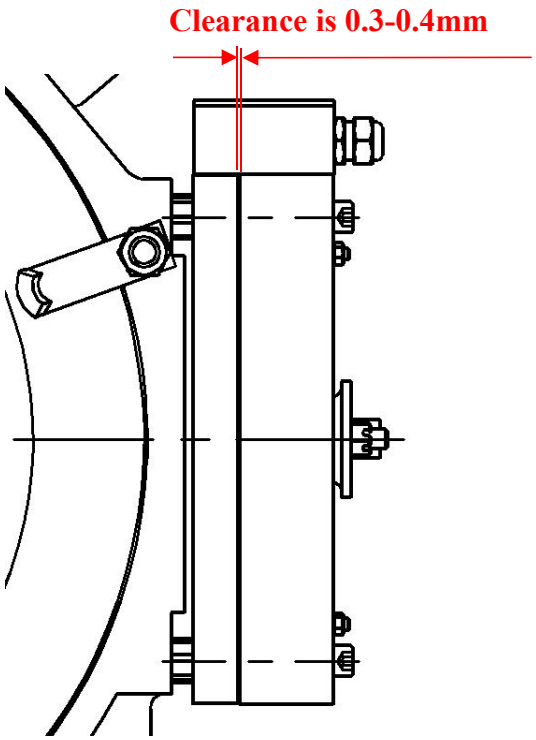
7. Adjust the screws M10×110 with Inner hexagon spanner(8mm), and detect the clearance between moving plate and static plate with feeler gauge, the clearance is 0.35mm **(notice: the positions for detecting the clearance as shown, first detect the clearance in positions 2 and 4, then in positions 3 and 1).**



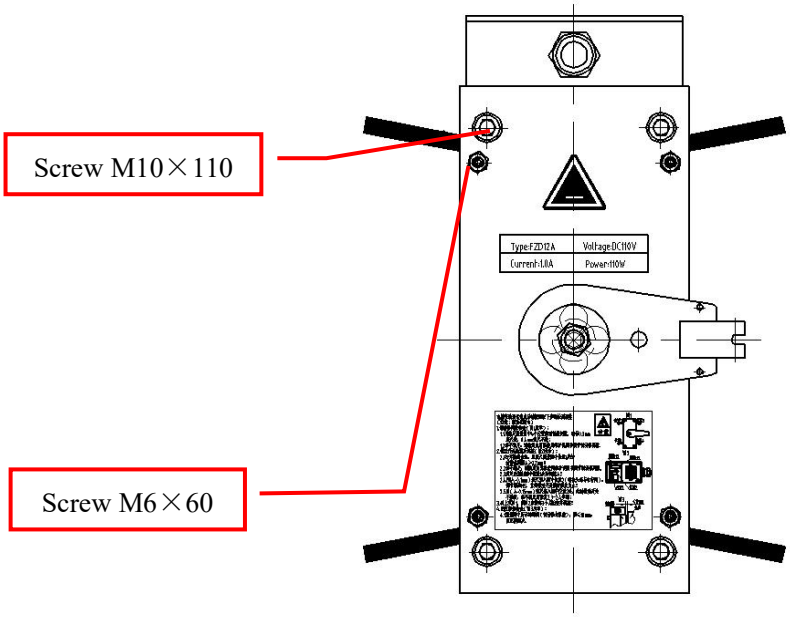
8. Adjust the spacer bushes with the wrench(21mm) to make them touch the mounting face, then detect the clearance between moving plate and static plate

with feeler gauge, the clearance is 0.40-0.41mm **(notice: first detect the clearance in positions 2 and 4, then in positions 3 and 1).**

9. Tighten the screws M10×110 with torque spanner, the tightening torque is 40Nm (the screws should be tightened diagonally), then recheck the clearance between moving plate and static plate, the clearance is 0.30-0.40mm.



Notice: as shown, the positions 1,2,3,4 are between the screw M10×110 and the adjusting screw M6×60.



10. Turn on the power of the traction machine, and test run.

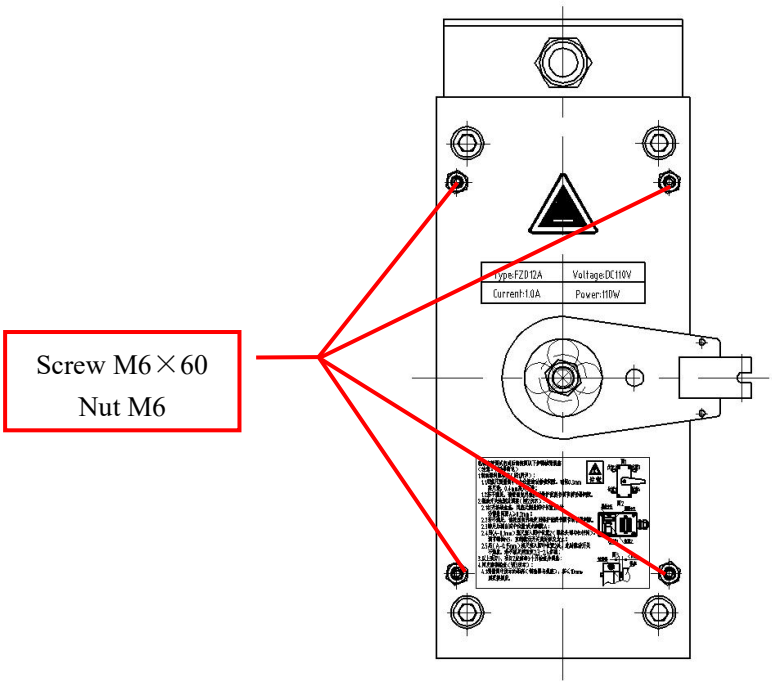
2.4.3.Adjust the braking noise

In general, the brake movement noise problem has been controlled within the range at the factory, and there is no need to make adjustments when starting to use.

In daily maintenance, if the brake movement noise is found to be too large, first adjust and confirm that the brake static and static iron core clearance is within the specified range, and confirm that the brake release circuit is intact, and then adjust the shock absorption adjustment screw according to the following steps.

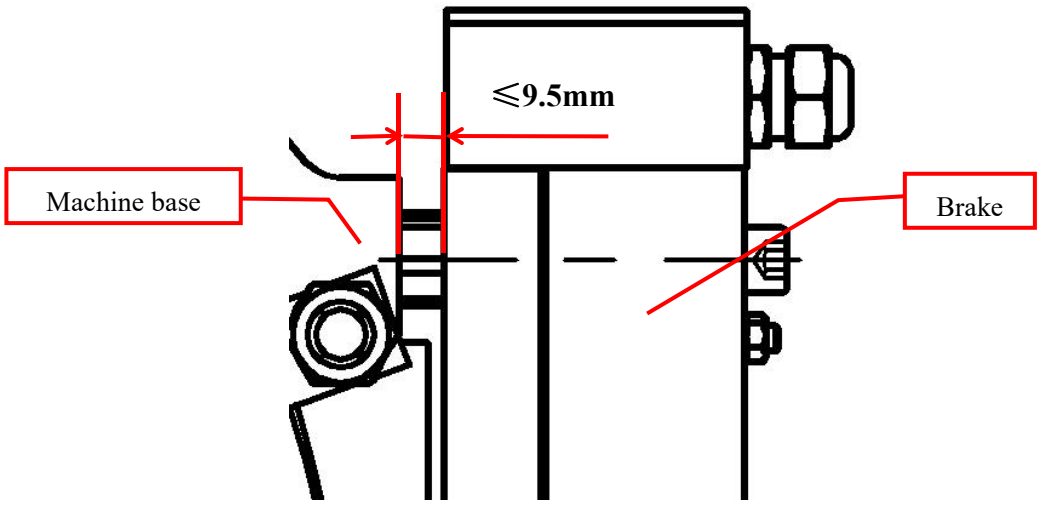
Over-adjustment of the noise reduction mechanism will cause the risk of incomplete engagement of the brake, so after the adjustment of the silent mechanism, it must be tested by power to ensure that the brake is completely engaged (after the power is turned on, the 0.05mm feeler gauge cannot be plugged in).

1. Check the clearance between moving plate and static plate, make sure that the clearance meets the requirement.
2. Loosen the nut M6 with an Open-end wrench (10mm).
3. Turn off the power of the brake, then fine tuning the screws M6x60 until the braking noise meets the requirement (the screws in four positions should be adjusted uniformly and simultaneously)
4. Tighten the nuts M6 after finishing the adjustment, then turn on the power of the brake, and detect the clearance between moving plate and static plate, the clearance should be less than 0.05mm (0.05mm feeler gauge cannot be inserted in).
5. Checking the holding voltage after the adjustment canl keep the brake on.



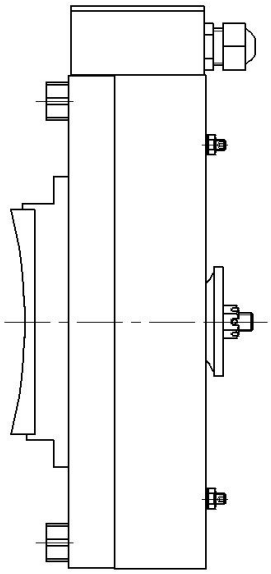
2.5.Friction components replacement

The measurements have shown the figure in the distance (brake and base), if ≤9.5mm, the need for the brake shoe adjustment, check once every 3 months.

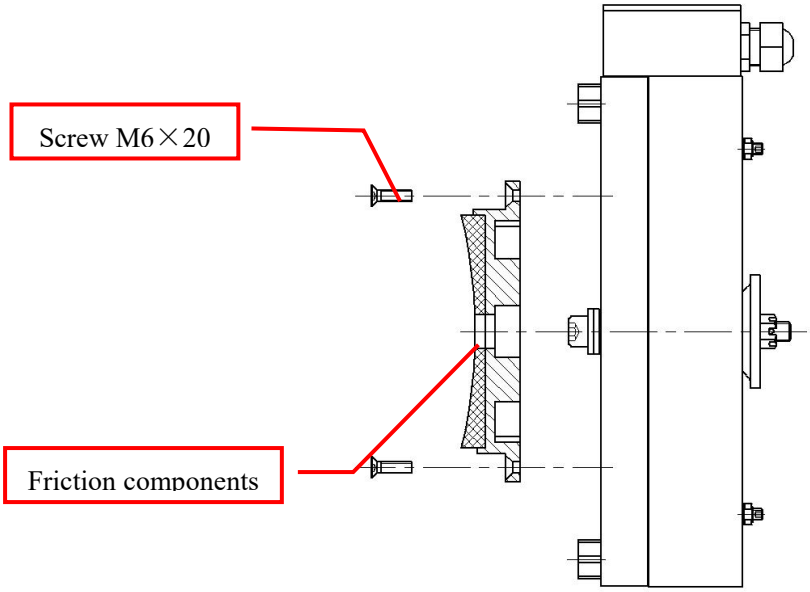


2.5.1.Remove the friction components

1. Remove the brake FZD12A /FZD12AB(Refer to GTW9S.0A elevator traction machine spare parts replacement manual---brake replacement).

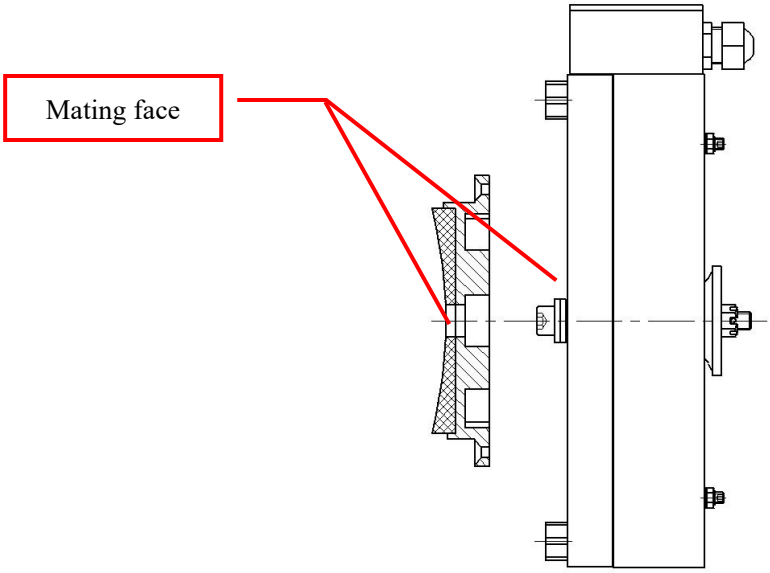


2. Screw out the screws M6×20 with inner hexagon spanner (5mm), then remove the friction components.

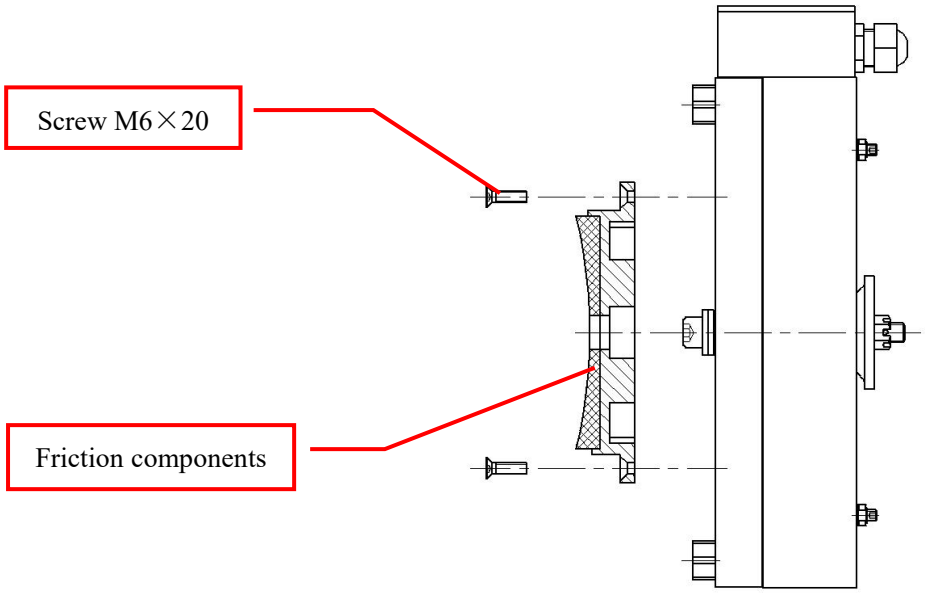


2.5.2.Install the friction components

1. Clean the mating face of the friction components and brake with anhydrous alcohol.



2. Install the friction components and screw into the screw M6×20 to fix (smear some threaded glue onto the screws), then tighten the screws M6×20, and the tightening torque is 6-8Nm.

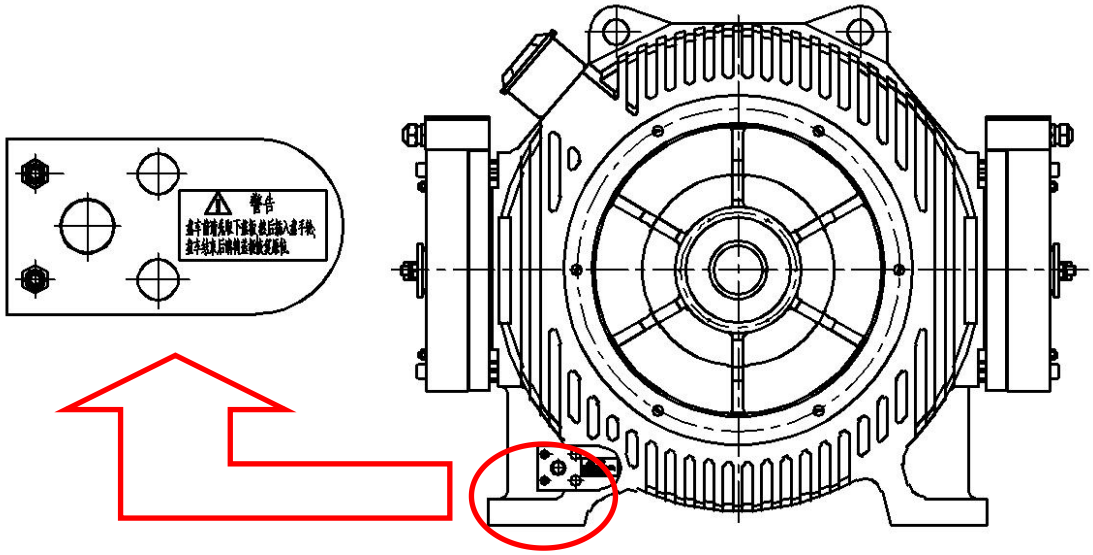


3. Install and adjust the brake FZD12A/FZD12AB (Refer to GTW9S.0A elevator traction machine spare parts replacement manual---brake FZD12A/FZD12AB replacement).
4. Turn on the power of the traction machine, and test run.

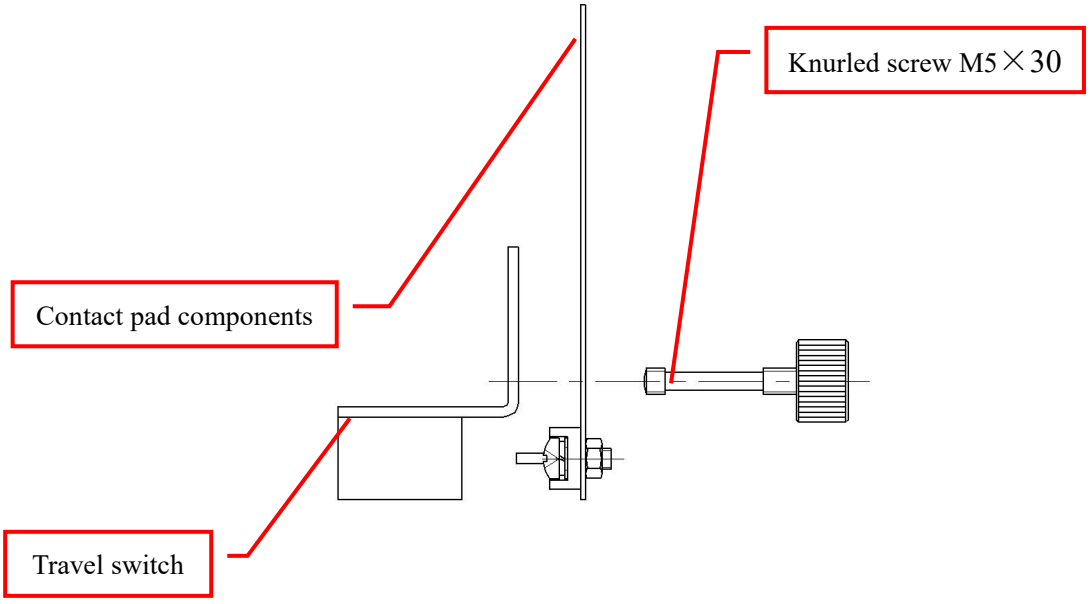
2.6.Travel switch replacement

2.6.1.Remove the travel switch

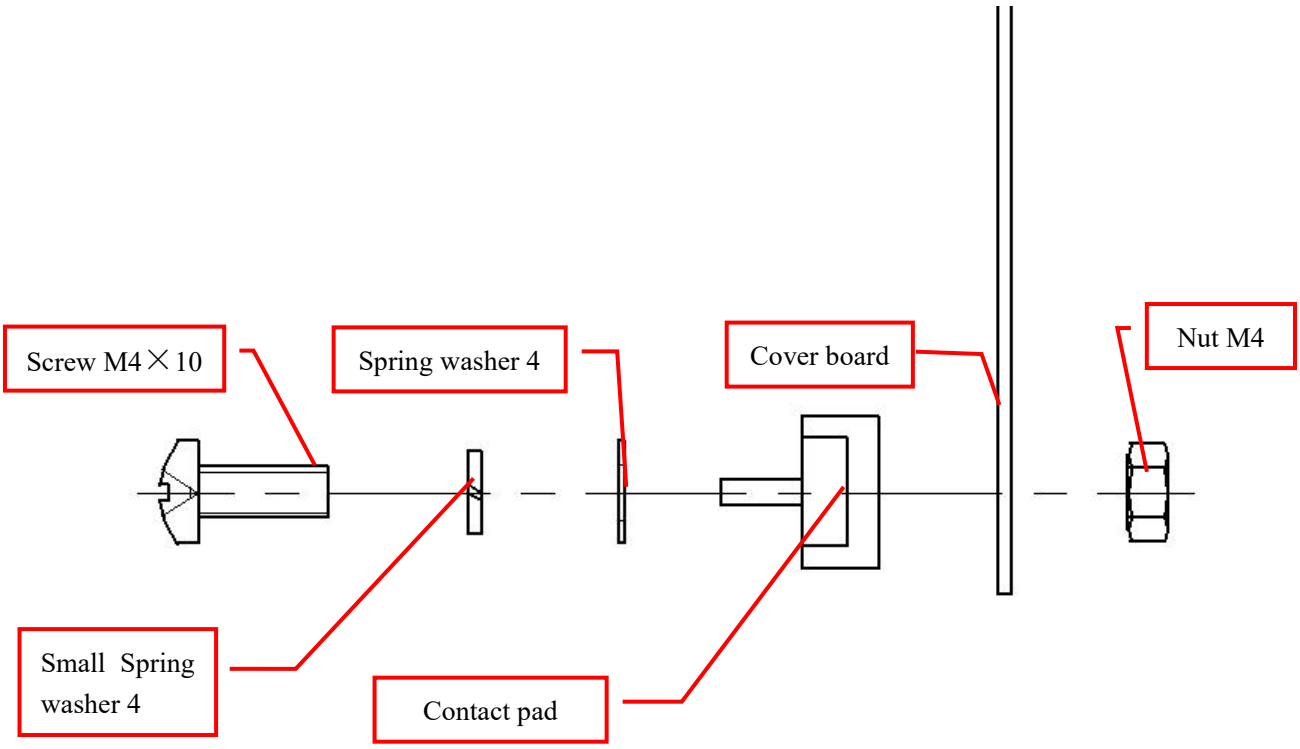
1. Remove the connecting wires of the travel switch.



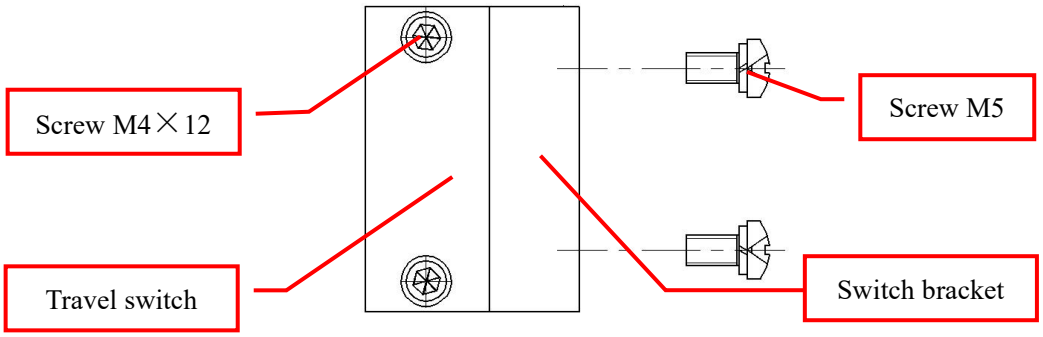
2. Loosen the knurled screw M5×30, and then remove the contact pad components.



3. Screw out nuts M4, then remove screws M4×10, spring washers 4 and contact pad.

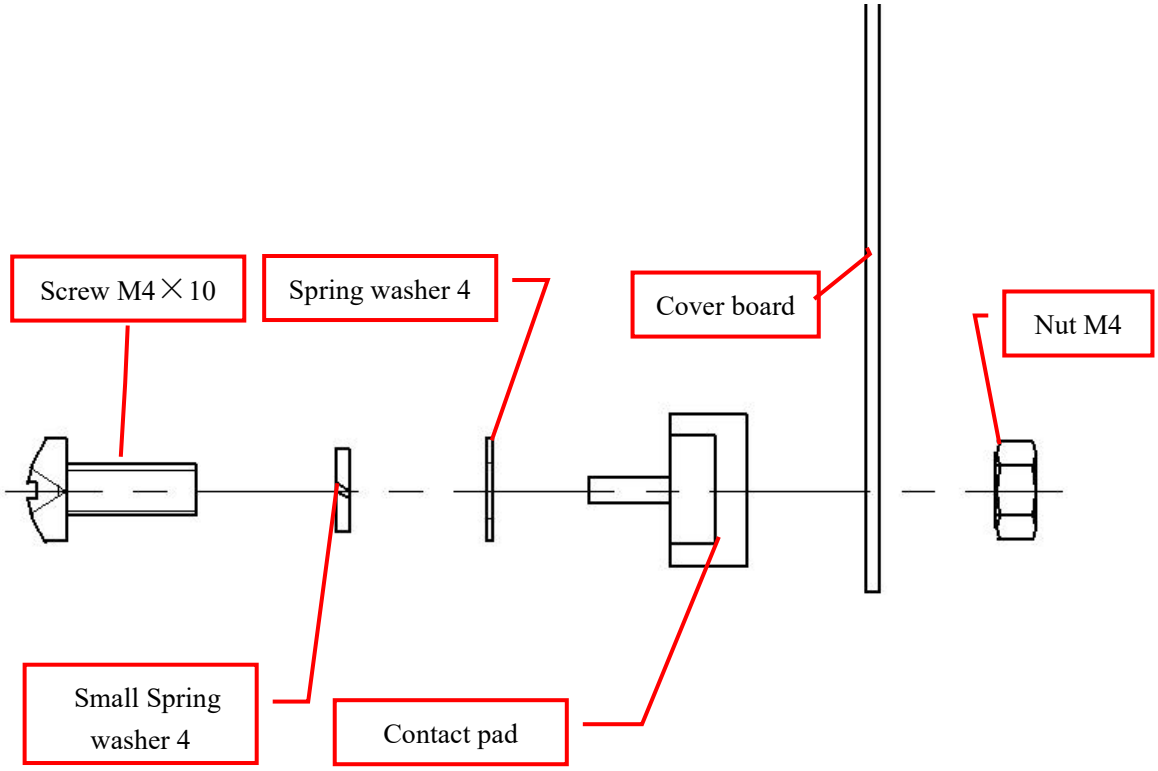


4. Screw out screws M5×10 and spring washers 5 with cross screwdriver, then remove the switch bracket and travel switch. Screw out screws M4×12 with cross screwdriver, then remove the travel switch.

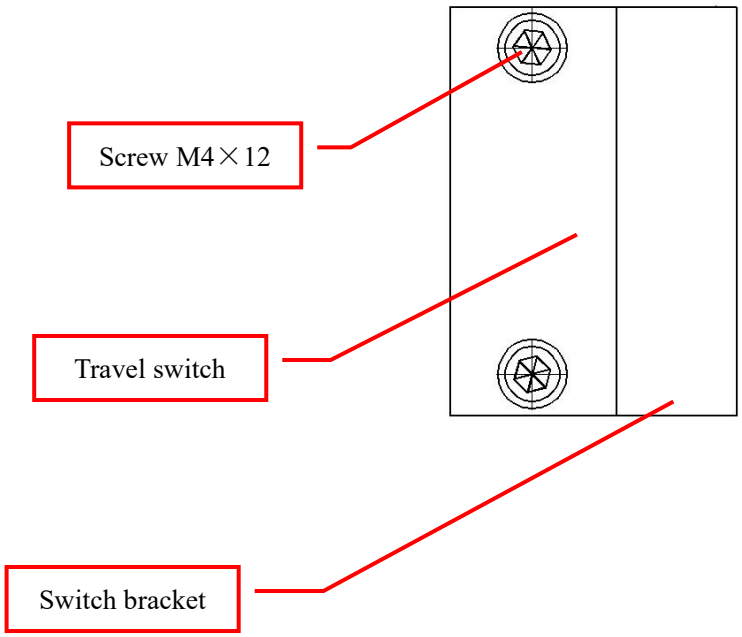


2.6.2.Install the travel switch

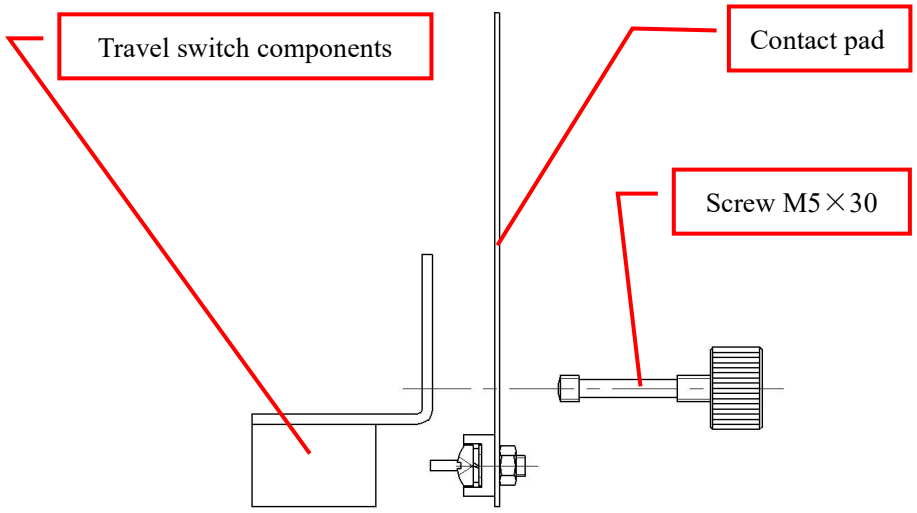
1. Install the contact pad onto the cover board and fix it with screws M4×10, spring washers 4 and nuts M4.



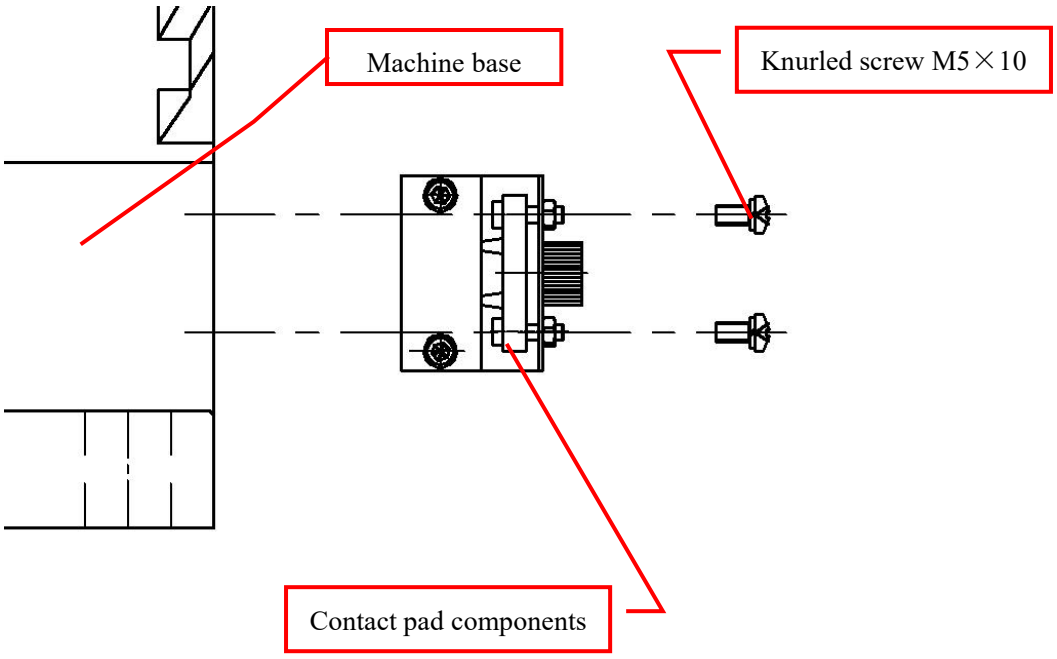
2. Install the travel switch onto the switch bracket, and then screw into the screws M4×12 to fix.



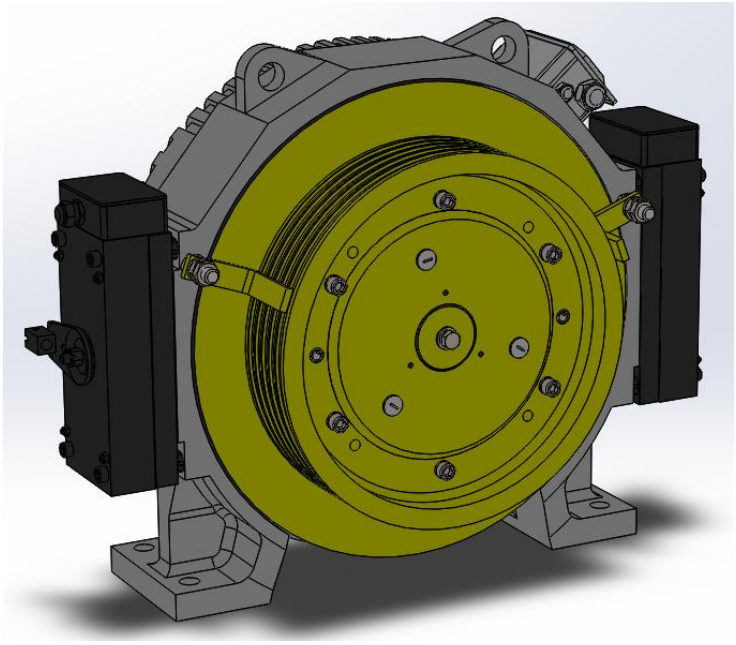
3. Install the switch bracket onto the traction machine, and then screw into screws M5×30 and spring washers 5 to fix.



4. Install the contact pad components, then screw into knurled screw M5×30 to fix.



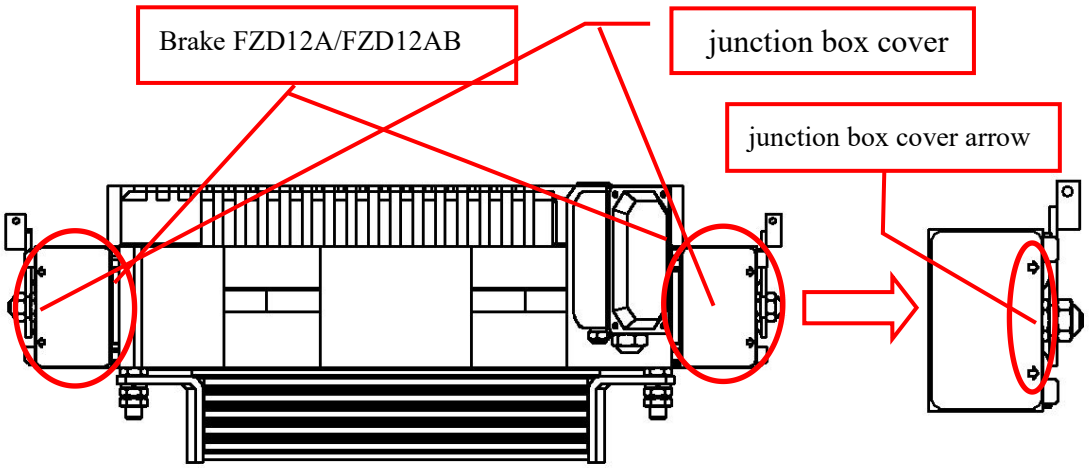
5. Connect the connecting wires of the travel switch.
6. Turn on the power of the traction machine, and test run.



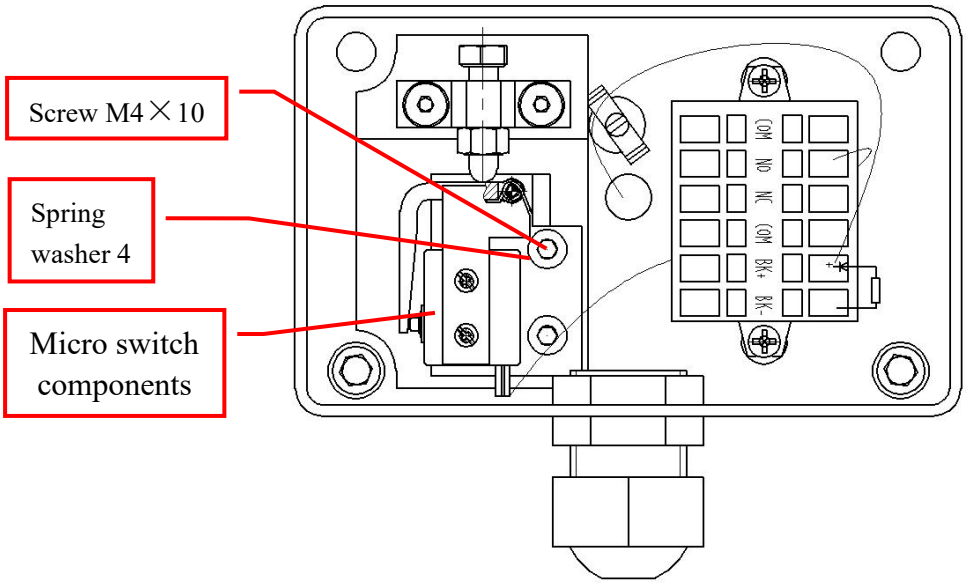
2.7.Micro switch replacement

2.7.1.Remove the micro switch

1. Remove the junction box cover with screwdriver.

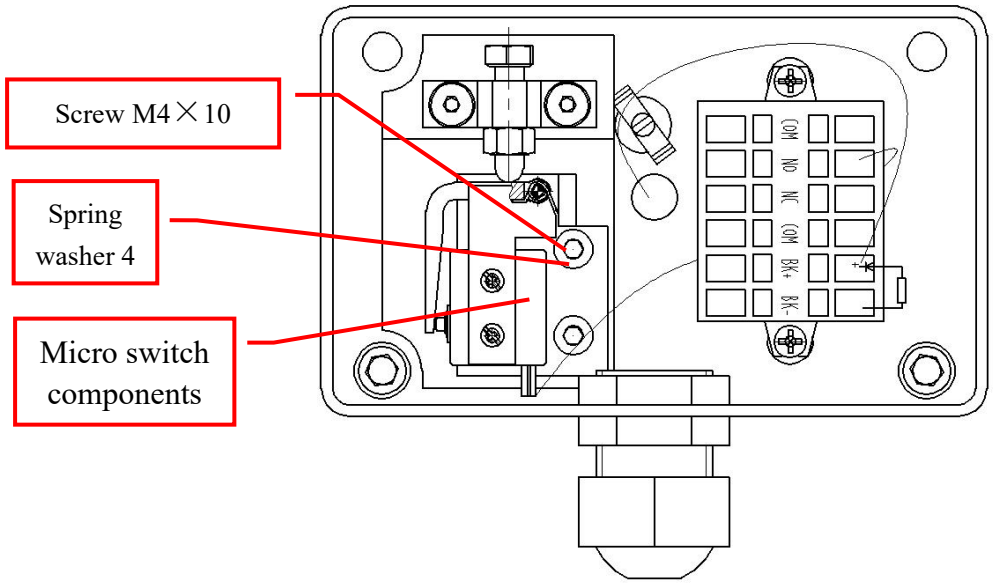


2. Loosen and remove the connecting wires of the micro switch (NO, NC, COM). Screw out the screws M4×10 and spring washers 4 with inner hexagon spanner (3mm), then remove the micro switch components.



2.7.2.Install and adjust the micro switch

1. Clean the mounting face, then install the micro switch components onto the mounting face and screw into screws M4×10 and spring washers 4 to fix (notice: the micro switch cannot be skew). Connect the connecting wires of the micro switch to the corresponding terminals (according to the labels on the wires).



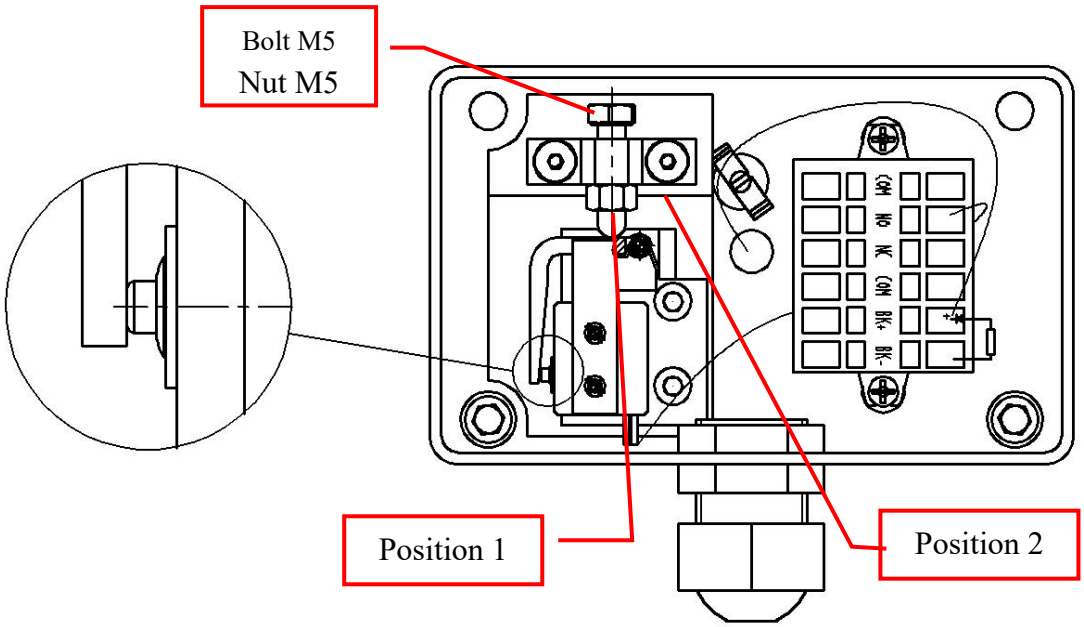
2. Install and adjust the micro switch:

Detect: Use the feeler gauge to check that the clearance of the dynamic and static disc meets the requirements (refer to the adjustment of the brake)

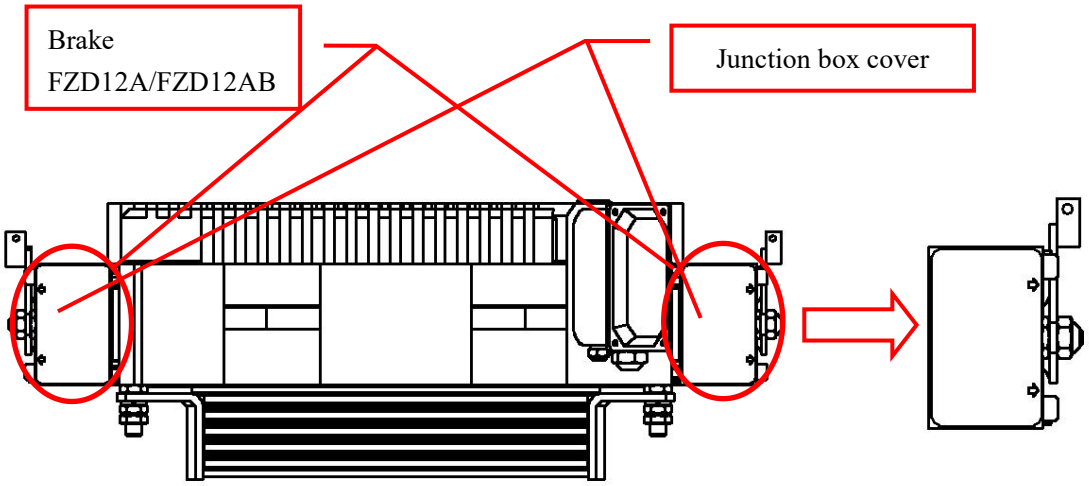
Adjust: Connect the wires of multimeter to the corresponding terminals (NO, COM), and then turn the switch of multimeter to the corresponding position. Turn off the power of the brake,Use a feeler gauge (0.32mm) to stuff the position 1 (between the head of bolt M5 and the lever) in the figure, slowly adjust the bolt M5 with an open wrench (8mm) to make the lever contact with the switch, when the micro switch just happens to act (the multimeter displays the number and chirps), then screw the bolt M5 clockwise about 1/6 turn. Apply thread glue to the fit of nut M5 and bolt M5 and lock it. Lock nut M5 with another piece of open-end wrench (8mm).

Check: if inset a feeler gauge(0.1mm) in position 2,Power on the brake to confirm that the micro switch can be triggered, and insert the 0.2mm feeler gauge into the dynamic and static core (position 2) to power on the brake to confirm that the micro switch cannot be triggered.

Turn on and turn off the power of the brake repeatedly after finishing the adjustment, make sure that the micro switch and electrical detection work normally. If the micro switch and electrical detection cannot work normally, then adjust again according to the above method until they work normally



3. Install the junction box cover.



4. Turn on the power of the traction machine, and test run.