



YE4EJ 系列电磁制动三相异步电动机

YE4EJ SERIES BRAKING THREE-PHASE
ASYNCHRONOUS MOTORS

使用说明书

Operation Manual

安徽皖南电机股份有限公司
Anhui Wannan Electric Machine Co.,Ltd

衷心感谢您选购、使用皖南电机。

在使用电动机之前，请扫码仔细阅读本说明书，以便您正确的使用和维护。

一. 产品概述

YE4EJ 系列电磁制动三相异步电动机是在 YXEJ 系列基础上，按照 YE4 系列电机效率规范设计的新型高效节能电磁制动电动机。它是由高效率三相异步电动机、制动器和风扇三部分组成。适用于各类机床、印刷机械、锻压机、运输机械、包装机械、食品机械、建筑机械、木工机械等要求快速停止、准确定位、往复运转、防止滑行的各种机械中作主轴传动和辅助传动。

二. 制动器（失电制动）的工作原理

当电机与三相电源接通后，电机定子产生旋转磁场，同时制动器线圈得到励磁电流，产生磁拉力，将衔铁板（5）吸合，压缩弹簧（6）；使制动盘（4）脱离磨擦面，制动力矩消失，电机即开始运转。

当切断电源后，旋转磁场和电磁铁的电磁拉力同时消失，衔铁在压缩弹簧的压力作用下，压迫制动盘，使之与电机端盖的磨擦面接触，产生摩擦力矩，使得电机很快停止转动。

三. 安装前的准备

1. 检查电机铭牌数据和安装型式是否符合要求。
2. 仔细检查电机紧固件是否松动或脱落。
3. 扳动手动释放装置，在制动器释放状态下，轻轻转动电动机转轴，转动应轻快、灵活（注：装有骨架式橡胶油封的 IP55 电动机，转动时，相对较紧）。
4. 用 500 伏兆欧表测量电机及制动器的绝缘电阻，其值不得低于 5 兆欧，否则应进行干燥处理，干燥温度不允许超过 120℃。

注意

1. 该系列电动机为断电制动。
 2. 电磁制动器部分防护等级为 IP23。
- 检查过程中，若有疑问，应向专业技术人员请教或与我们联系。

四. 安装

电动机的安装应由技术人员来完成，对带底脚的电动机，安装平面应坚固，并保证底脚在一个平面上。如果底脚要加垫片，应保证在电动机底脚安装紧固过程中不被挤出。电动机允许采用联轴器、正齿轮及皮带轮传动。

联接电动机的电源线不宜过细、过长（否则，电源线压降过大，使电动机起动困难）。按接线图，将电源线与电动机牢固联接，同时接好接地线，然后接通电源，制动器应迅速动作并脱开，检查电动机旋转转速，旋转方向是否正确。断开电源时，电动机应迅速制动。

警告！



1. 电源电压的波动不得超过额定电压的 95% ~ 105%。
2. 严格按接线图接线。
3. 在通电前应取下轴伸上的轴套和平键，保持身体、衣物远离电动机运动部分。
4. 空载运行足够长的时间（一般在 30 ~ 40 分钟），以确保不会产生异常情况。
5. 若通电后，制动器不动作，则应立即断电，以免烧毁电动机。

注意：电磁制动器励磁电压应不低于额定电压的 85%。

五. 手动操作

80-180 机座号电机带有手动释放装置。失电时，如需用手拨动电机转轴，则应扳动手动释放装置（11），即手动解除制动，便于传动轴的安装与调节。松开手动释放装置（11），手动杆复位，则制动器恢复制动状态。

六. 检查及试运转

1. 电机和电磁制动器接线示意图可以在电机接线盒内找到。
2. 用户自供直流电源时应保证电机电源与制动器电源同步切换。
3. 电机应妥善接地。

4. 当电机制动器检查完毕，确认无误时，再接通电源进行空载运行，若电机接入电源后制动器仍未脱开，此时电机处于制动状态，必需立即切断电源，以免烧坏电机，检查电磁制动器的励磁电路，并予以纠正，再投入试运行。

5. 在电机空载运行一段时间后，应停机检查一次，观察各机械连接部分有无松动、轴承有无过热漏油现象、制动器是否完全脱开。

6. 若空载运行中有任何不正常现象和声响，应立即停车检查，并作必要的调整和修复，然后再进行负载运行。

7. 制动器试验

按接线图接线，接通电源，则制动器线圈得电，制动器打开，此时用手拨动电机转轴，应能灵活旋转，不应有拨不动的现象。然后对制动器输入电源进行开合操作，重复数次，制动器衔铁应能保持同步吸合，声音应清脆、明确，吸合应灵活，不应存在卡住现象。

如果制动器吸不上，或出现“嗒嗒”的噪声，则应作如下检查：

- 7.1 电源连接是否正确。
- 7.2 制动器衔铁间隙“ δ ”是否均匀。
- 7.3 弹簧压力（序号 6）是否太大，或弹簧压力是否均匀。
8. 电机如需配备变频器运行，制动器需单独连接至工频电源。

七. 运行与维护



警告！

1. 严禁缺相运行。
2. 反复多次起动会导致电机过热，甚至烧毁电机（特别是连续带负载直接起动）。
3. 防止过载，过载会导致过热，过热将缩短绝缘寿命，降低电动机的可靠性。

1. 电动机使用的最高环境温度为 40℃，最低不低于 -15℃，海拔不超过 1000m。
2. 电动机允许满压或降压起动，但应注意，满压起动时起动电流为额定电流的 3.3 ~ 7.5 倍。降压起动时，因转矩与电压的平方成正比，电压下降时转矩也随之降低。故当静负荷相当大时只能用满压起动。
3. 电动机不得用于含有易燃性气体、化学腐蚀性气体或其它有害气体的环境中。
4. 电动机必须经常保持清洁，进风口及风道必须畅通无阻。
5. 电机运转时，如发现制动器打不开导致电机堵转或超载运行，应立即停车检查，不得继续使用。
6. 电动机在运行中若发现异常，如制动速度慢、怪声、过热、焦味或轴承发热等，应立即停机检查，待故障排除后方可使用。
7. 经过一段时期使用后，制动器中的制动盘将磨损，从而影响了制动时间，减小了制动力矩。故制动盘工作行程（ δ ）应定期调整，以 0.3 ~ 0.8mm 为宜。当摩擦片单边磨损 2.5mm 以上时，需更换新制动盘。
8. 电动机在运行过程中应保证润滑良好，一般在电机运行 5000 小时左右，即应补充或更换润滑脂（封闭轴承在使用寿命期内不必更换润滑脂）。另外，在运行中发现轴承过热或润滑脂变质时，应及时更换轴承或更换润滑脂。更换时应先清除陈脂，并将轴承、轴承盖、轴承室洗净，然后加入新润滑脂，以加到轴承容腔的 1/2 左右为宜。润滑脂推荐采用 2 号中小型电机专用润滑脂。
9. 为保证电动机的正常运行，应根据实际使用情况对电动机进行定期检查，并需每年检修一次。
10. 电动机存放过久，可能会导致油脂硬化，在刚启动时会有异响。需空载运行半小时以上，使油脂润滑。

八. 制动器间隙的调整

1. 制动器的磨擦面经过长期使用后，将受到磨损，而使间隙增大，引起电磁铁与衔铁间的气隙增大和弹簧工作长度的增加，降低了弹簧压力，减小了制动力矩，同时由于气隙的增大，使衔铁吸合时电流值上升，严重时将使衔铁不能吸合，导致电机堵转、烧坏。因此需经常检查气隙，进行调整或更换摩擦片。

2. 间隙“ δ ”的调整步骤如下：（参考附图）

2.1 拆去操作杆（11）和风罩（8）。

2.2 调节螺栓（10），移动静铁心（7），调整“ δ ”。

2.3 用塞尺检查电磁铁与衔铁间的气隙圆周各点一致，并符合要求。

2.4 重新装上风罩（8）及操作杆（11），调整完毕。

3. 更换摩擦片

摩擦片属易损件，使用过程中磨损后，气隙增加，当气隙超过最大工作气隙时，应重新调整，一般为4个月，否则影响正常工作，甚至烧坏制动器，就需要更换新的摩擦片，步骤如下：

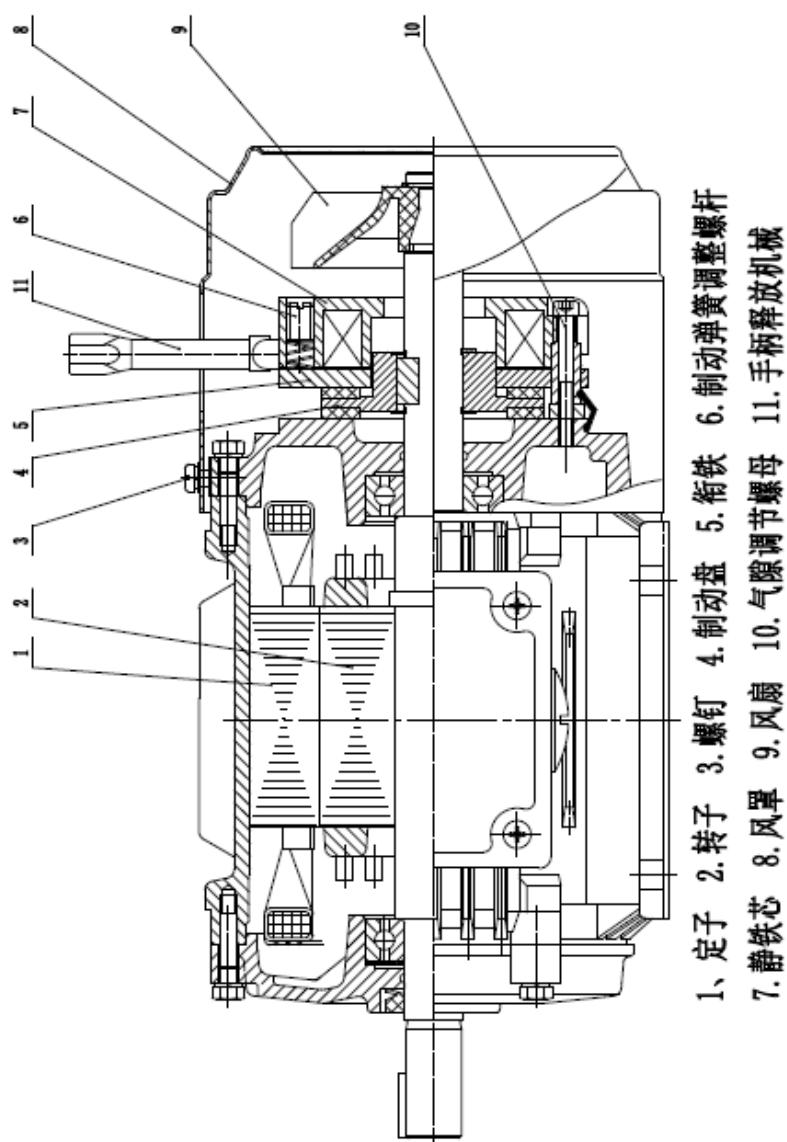
- 3.1 取下释放柄
- 3.2 取下风罩（8）。
- 3.3 取下风扇（9）。
- 3.4 松开螺母（10），和螺栓（6）。
- 3.5 旋下螺栓（6）。
- 3.6 将制动器线圈引接线拆下。
- 3.7 将电磁铁和衔铁一同拆下。
- 3.8 取下制动盘（4），便可更换摩擦片。
- 3.9 再按3.8到3.1的拆卸时的反顺序恢复原样。

九. 一般故障及消除方法

故障情况	故障原因	处理方法
电动机空载时不能起动	1- 接法错误 2- 定子绕组有一相开路 3. 定子绕组匝间及相间短路 4- 制动器未动作	1- 按铭牌上规定的接法和接线图，查出定子绕组接法，纠正错误联接。 2- 检查定子绕组，查出断路处，加以修复。 3. 测量定子绕组每相电阻和各相空载电流是否平衡，查出原因，加包绝缘。 4. - 检查制动器及其电器
电动机在负载时不能起动	1- 过载保护的设定值太低 2. 定子绕组有匝间短路 3- 过载	1- 重新设定 2- 检查各相电阻和各相电流 3- 检查电机负载电流
电动机温升过高	1. 过载 2. 缺相运行 3. 电动机接法错误 4. 电机定子绕组匝间短路 5 定、转子相擦 6. 通风不畅 7. 制动器动作迟缓	1- 用电流表测量定子电流，发现过载，应减轻负载。 2- 检查电动机定子接线，并加以修复。 3- Δ 接法误接成 Y 接法或相反，必须立即断电改接。 4. 检查找出短路和通地的部分，进行修复。 5- 检查轴承装配有无松动，定转子装配有无不良情况，加以修复。 6. 检查风叶是否损坏，风道是否阻塞。 7- 检查制动器间隙和直流励磁电压。
三相电流不平衡	1. 匝间短路 2. 接法错误 3. 三相电源电压不平衡	1- 修理绕组 2- 改正接线 3- 改善供电质量
故障情况	故障原因	处理方法
绝缘电阻低或击穿	1- 绝缘老化或损伤 2- 不清洁 3- 绕组或接线板受潮 4- 电机过热	1- 检修绝缘 2- 用干燥的压缩空气吹净内部 3- 拆开烘干或处理后再使用 4- 停机检修、防止继续发热

轴承发响或过热	1- 轴承损坏 2- 轴承润滑脂 过多、过少或有杂质 3- 轴承与轴、轴承与端盖配合过松、过紧 4. 皮带安装过松或过紧，或联轴器装配不良。	1- 更换轴承 2- 调整或更换润滑脂 3- 检查轴承和前后端盖的装配情况，修整到合适的配合 4- 调整到合适的安装状态，调整皮带松紧或联轴器的安装
制动失灵	1- 摩擦片磨损较大 2- 弹簧失效 3- 动作迟缓 4- 直流器损坏 5- 制动线路故障	1- 调整气隙 2- 调换弹簧 3- 调整气隙 ，检查励磁电压 4- 调换整流器 5- 排除控制线路故障

注：对疑难故障，当采用上述建议无法找到解决办法时，请向专业技术人员请教或直接与制造厂商联系。



We are truly grateful for your purchasing of Wannan Motors. Before using the motor, please scan the QR code to read the manual so as to use and maintain the motor in a right way.

I . Summary

YE4EJ series brake motor which is developed on YXEJ series motor is designed and manufactured according to efficiency standard of YE4 series. The motor contains three parts: high efficiency motor, brake and cooling fan. The series motor can be applied for driving different kinds of machine tools like printing machines, forging press, transport machinery, packing machinery, food processing machinery, construction machinery whose requirement are fast stop, accurate position, back and forth moving and anti sliding.

II . Operational principle of the brake (power off braking)

When switch on, there will be a rotating magnetic field in the winding, which will produce field current in coil immediately, as a result the magnetic force will be generated and then pull up the iron plate (5), compress spring (6). Then the brake disc (4) gets away from friction face, braking torque disappear, motor start to work.

When switch off, rotating magnetic field and magnetic force will disappear at the same time, so iron plate(5) will press on the braking disc under the pressure of the spring, and grind the motor's bracket; friction torque will stop the motor quickly.

III . Prepare before installation1.

1. Check the nameplate date and mounting type to see whether they are consistent with actual requirement.

2. Check and ensure all fastener parts are in good condition.

3. Release the manual release device to make the brake in free condition and then rotate the motor shaft gently with hands. The rotation ought to be smooth and flexible (note: Motor of IP55 protection class with lip seal on the shaft, the rotation will be a little harder).

4. Measure the insulation resistance of the motor and the brake with 500V Meg-Ohmmeter, the resistance should be no lower than $5M\Omega$; otherwise the motor should be dried with temperature lower than 120°C

Note: 1. The motor will be braked when power off.

2. The protection class of the brake is IP23.

If you have any doubt during the process, please contact us or consult technician.

IV . Installation

The installation of the motor should be performed by the technician. If the motor has mounting

feet, the mounting face should be flat and solid and ensure that all feet will be fixed onto the same mounting face. If the adjusting spacer is needed, ensure that the spacer will not be extruded during the installation. The motor can be transmitted by coupling, spur gear and belt pulley.

The power line should be neither too thin nor too long; otherwise the large voltage drop large will make it difficult to start the motor. Connect the motor as the connection diagram, wire grounding line, and switch on, the brake will be free immediately and start to work. Check motor's speed, rotation direction. Switch off the power, the motor will be braked and stop immediately.

Warning!



1. Voltage fluctuation of the supplied power should not exceed 95% ~ 105% of the rated voltage.
2. Connect the motor according to connection diagram strictly
3. Remove the sleeve and key on the shaft end before power up, keep body and clothes far away from rotating parts of motor
4. Conduct no-load test operation for sufficient time(usually 30~40 mins)
5. If the brake doesn't work when power on, switch off the power immediately.

Note: Field voltage of the brake should be no lower than 85% of the rated value.

V Manual operation

The motors of frame 80 ~180 have the manual release device If the motor's shaft need to be rotated by hand for installation or adjustment when power off, the manual release set (11) should firstly be pulled for releasing the brake Don't forget to reset the manual release set (11) before motor restart, keeping the brake device in braking status.

VI. Inspection and test running

1. The connection diagram of the motor and the brake are in the motor terminal box.
2. If the brake is powered by a separate DC power, ensure the DC power should work in the same pace with the power of the motor.
3. Check and ensure that the motor have grounded safely.
4. Switch on the power for no-load test running. If the brake cannot work or be released when power on, switch off the power immediately since the motor will be easily damaged or even burned. Check the field circuit of the brake and remove the failure then re-start the motor for the test running once again.
5. After a period of no load running test, the motor should be stopped and checked to see whether are there loose connection parts, overheat and bearing grease leakage or brake release failure.
6. If there is any abnormal problems and strange noise during the no-load test running, stop the motor immediately to have inspection. Correct the problem, and then put into no load test run once again.
7. Braking test

Connect the brake in according with connection diagram, switch on the power, and then the brake will be open. Rotate the motor's shaft by hand to check its rotation, the rotation ought to be flexible and smooth. Switch on and switch off the brake by several times, check and make sure whether the iron plate can work in the same pace with the motor. Its sound should be clear.

If the iron plate cannot close or the sounds "Ta-Ta" occurs, following are the possible causes:

- 3.1 Whether the power line is correctly and properly connected or not.
- 3.2 Whether the gap "δ" between the brake is balanced or not.
- 3.3 Whether the pressure on spring is too large or unbalanced (10).
8. The brake device need to be separately connected to power supply.

VII. Operation and maintenance



Warning!

1. never make the motor working in the condition of open phase.
2. starting repeatedly will superheat the motor, even burn it up.
3. prevent the motor against overload, or it will be superheated, and this will shorten it's insulation life and reduce it's reliability.

1. Normal ambient temperature limits is -15°C to 40°C . Altitude should be no higher than 1000m above sea level.

2. Motor can be started at full voltage or reduced voltage. Starting current is 3.3-8.0 times rated current if it starts with full voltage. As torque is proportional to voltage square, the torque will be reduced when the motor is started at reduced voltage. So if the static load is fairly large, the motor can be only started with full voltage.

3. The motor cannot to be used in the circumstance where contains inflammable gases, chemical corrosive gases or other damageable gases.

4. Clear the motor periodically, keep the motor in good ventilation.

5. If the motor is kept in braking status or keep the motor overloaded running the brake as result of brake releasing failure, stop and check the motor immediately.

6. Any abnormal problems occur during the operation, such as braking slowly, strange sounds, overheat, burning smell or bearing overheat, the motor should be stopped and checked immediately.

7. The braking disc will wear down after a period of operation, which will affect the braking time and will lower the braking torque. So the operating gap of the brake (δ) should be adjusted periodically, keep it at 0.3~0.8mm. If the friction plate losses large than 2.5mm in single way, it should be replaced immediately.

8. Check and ensure the good lubrication of the bearing during the operation. Normally bearing should be re-lubricated every 5000hours operation, (the sealed bearing may not be re-lubrication during the life time). Thoroughly clean off the grease, clear the bearing, bearing cap and bearing chamber carefully, add fresh grease to 1/2 capacity of the bearing house (recommended No.2 lubricating grease for small medium size motor)

9. To ensure the proper operation of the motor, check the motor regularly and overhaul the motor at least once per year.

10. Grease may harden in long-time idling. When abnormal sounds occur at the beginning of operation, the motor need to be operated without load for half an hour so as to soften grease and restore its function.

VIII. Adjust the operating clearance of the brake (δ)

1. After a period operation, the friction face of the brake will be wear down. The gap between the electromagnet and the iron plate will be larger, whereas the pressure of spring and the braking torque will be reduced. However, the larger gap (δ) will cause higher current in the brake, and will let the iron plate cannot to be sucked in, and caused the locked rotor and even the broken of the motor finally. So it is necessary to check the gap (δ) periodically, adjust or replace the iron plate in time.

2. Adjusting steps are below (take reference to the drawing)

2.1 Take down the handle rod (11) and fan cover (8).

2.2 Adjust the bolts (10), take down the static core (7), adjust the “ δ ”.

2.3 Measure the air gap between the electromagnets and armature with feeler and be sure that the air gap at all point in circle is even as well up to standard.

2.4 Fix the fan cover (8) and handle rod (11).

3. Replace the friction plate

Friction plate is wearing part as the air gap will be increasing by operation. Friction plate should be replaced immediately when its losses large than its limit value by following steps:

3.1 take down the handle release rod.

3.2 Take down the fan cover (8)

3.3 Take down the fan (9)

3.4 Loosen the nut (10) and bolts (6)

3.5 Take down the bolts (6)

3.6 Take down the coils of the brake.

3.7 Take down the electromagnet and the iron plate together.

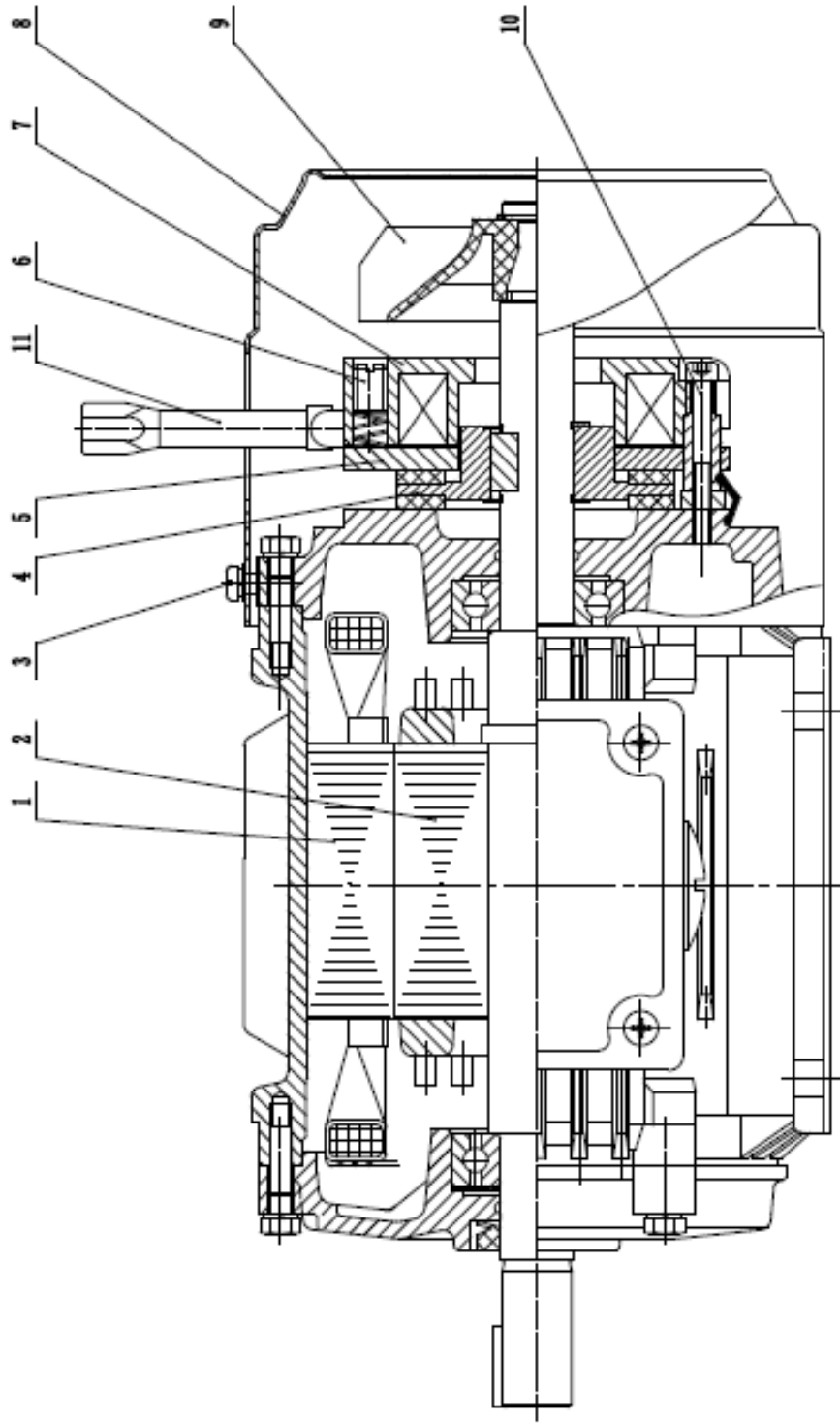
3.8 Take down the braking disc (4), replace a new one.

3.9 Restore to original condition by the reverse process above (3.8-3.1)

IX Troubleshooting chart

TROUBLE	POSSIBLE CAUSE	WHAT TO DO
Insulation resistance is low or broken down	1- insulation aging or damaged 2- dirty 3- winding or terminal board 4- dampness motor overheat	1- repair insulation 2- clean off with dry compression air 3- dismantle to dry or fix 4- dismantle and repair
Being overheated.	1- bearing failure 2- excessive, insufficient and contaminated bearing grease 3- the clearance between bearing and shaft or between bearing and end cover too wide or too narrow 4- belt is too loose or tight, or improper coupling assembly	1- replace bearing 2- fill or replace grease 3- refit 4- refit and adjust the belt or coupling
brake failure	1- friction disc worn 2- spring failure 3- brake delay 4- rectifier damaged 5- brake circuit failure	1- adjust air gap 2- replace spring 3- adjust air gap and check the excitation voltage 4- replace rectifier 5- properly check brake circuit failure
Fails to start with load	1- rated value of the overload protection is too low 2- interturn short-circuits of stator winding. 3- overloading	1- reset 2- check phase resistance and current 3- check loading current.
Higher temperature rise	1- overloading 2- one phase missing 3- incorrect line connections 4- interturn or phase short-circuit of stator winding 5- friction between stator and rotor 6- poor ventilation 7- brake delay	1- measure stator current with ammeter, and repair. 2- check connections of stator windings, and repair. 3- star connection is mistaken for delta connection and vice versa. Power off and correct connections 4- find out short-circuit, and repair. 5- check bearing for loose, or check stator and rotor for improper assembly and repair. 6- check blade if damaged and vent channel if blocked. 7- check the air gap of brake and DC excitation voltage.
Unbalance current	1- interturn short-circuit 2- improper line connections 3- three phase voltage unbalance	1- repair winding 2- correct the connection 3- improve power supply

Note: General failures of the motor may be accrued during running shown as follows. If you can't remove the failure, please inquire it to technicians or contact with our company.



1. stator 2. rotor 3. bolt 4. brake spring regulating screw
 5. armature 6. brake 7. static core 8. fan cover 9. fan 10. air gap regulating nut 11. hand release lever

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