YE3 YE4 series efficiency three-phase asynchronous motor

Frame（80~355）

Changzhou Yongzhuan Motor Co., LTD

Instruction Manual

Implementation standard：GB/T28575-2020

Power range：0.37~375KW

Protection class：IP55

Insulation class：F

Working system：S1

·Please read this manual carefully before use

·Please note to save

YE3 YE4 Series Three phase asynchronous motor operation and maintenance manual

1. Precautions before installation and use

1.1 It must be confirmed that the parameters shown on the motor nameplate meet your requirements;
1.2 Make sure that the motor has not received any damage;
1.3 Motor lifting ring screws and other lifting devices must be tightened before use, and only use the lifting motor itself.
If the motor has more than one ring, it must be used together to share the weight.
1.4 Remove any shaft extension pressure plate (but must be reinstalled before motor transport).
1.5 After confirmation, the installation mode of the motor is consistent with the indication on the nameplate of the motor, and the position of the drainage hole is suitable for the use of the occasion.
1.6 Extend the end of the rotating shaft slowly to confirm that the motor can rotate freely.

2. Please observe the following safety precautions

2.1 If the motor position is properly installed, operated and maintained, it will cause serious or fatal injury, and the personnel responsible for the installation, operation, maintenance and overhaul of the motor must undergo complete technical training to understand the danger to personnel and equipment.
2.2 Before motor maintenance and overhaul, all the power connected to the motor and its accessories must be cut off or even removed, and it must be confirmed that the motor has been completely stopped.
2.3 The motor must be reliably grounded, and the corresponding protection device must be connected to prevent the motor from causing danger during use or causing the motor to fail.
2.4 The motor must have proper protection to prevent access to its rotating body; When the motor is running, it is strictly forbidden to touch the rotating part. Do not touch live parts such as motor wiring. In the case of automatic start, automatic close or remote start, warning signs must be set up around the motor to warn that the motor may start unexpectedly.
2.5 When approaching the machine with high noise source, you must wear protective ear muffs. The noise value of the motor can be checked by the professional standards of the relevant products or by consulting the professional manufacturing factory.
2.6 Before starting the motor, it must be confirmed that all shaft keys have been firmly installed.
2.7 When installing the pulley or coupling, do not hit it with a hammer to avoid damage to the motor bearing.
2.8 It is strictly prohibited to use the motor over load and run without phase. In order to prevent this from happening, corresponding protection devices or winding temperature monitoring devices must be installed.
2.9 Prevent water and other liquids from entering the motor.
2.10 When the motor is used in a variable speed machine, it must be confirmed that it does not exceed the maximum safe speed of the motor (generally 120% of the speed indicated on the nameplate), and it must be confirmed that the motor does not cause overload use due to the reduction of self-fanning air cooling at low speed.

3. Use environment and working conditions

3.1 The operating environment of the motor should be dry, clean and free of corrosive gases, and the ventilation around the motor should be good.

3.2 The ambient air temperature shall not exceed 40℃, and the relative humidity of the air shall not exceed 90%.
3.3 The deviation between the frequency of the power supply and the value on the nameplate shall not exceed 1%, and the voltage deviation shall generally not exceed 5% (except for those agreed by both parties and specially designed).

4. Installation and start of motor

4.1 Check the motor before installation.
4.1.1 Check whether the motor random files are complete and correct.
4.1.2 Check whether the motor is damp.
4.1.3 Check whether the motor is deformed or damaged during transportation, and whether fasteners are loose or fall off. Rotate the rotor slowly by hand to check whether the rotor can rotate freely, whether there is any friction phenomenon or abnormal sound.
4.1.4 Check whether the value shown on the motor nameplate meets the requirements for use, and whether the motor wiring is consistent with the nameplate or wiring indication.
4.1.5 Use a megohm meter to measure the insulation resistance of the motor, and its value should not be less than 1 megohm, otherwise the stator coil should be dried. The temperature of drying treatment is not allowed to exceed 120℃ (Class B insulation), 145℃ (class F insulation).
4.1.6 For a long storage time (generally more than one year), the grease condition of the motor bearing oil must be checked.
4.1.7 Remove dust and debris on the motor, as well as anti-rust coating on the shaft extension.
4.2 Installation of motor
4.2.1 The installation foundation of the motor should be solid, strong and have a certain stiffness. If it is not installed together with other machinery, reliable quality concrete should be used as the foundation, and the installation surface should be smooth. As for the motor that is often moved, a suitable installation structure should be adopted. It must be noted that the installation foundation or structure must ensure sufficient stiffness and strength to avoid abnormal vibration and noise during the operation of the motor, resulting in bearing damage, personal or equipment accidents.
4.2.2 The installation site should be spacious to facilitate daily operation, maintenance and maintenance. The motor hood should be sufficiently distant from the wall (or other machinery and equipment) to ensure that the air flow cools the motor.
4.2.3 The motor is allowed to be driven by coupling, spur gear and pulley. However, for 2-pole motors above 4 kW and 4-pole motors above 30 kW, flat belt transmission should not be used. If a small belt pulley is selected, the transmission range of the triangle belt can be expanded. The fan end of the two-shaft extension motor is only allowed to be driven by a coupling. The length of the pulley used when driving with a pulley should not exceed the length of the shaft extension, otherwise it will cause the shaft head to bend or break.
4.2.4 When the pulley is used to drive, the center line of the motor shaft and the center line of the load shaft shall be parallel, and the center line of the belt shall be perpendicular to the center line of the shaft. When the coupling is used, the center line of the motor shaft coincides with the center line of the load shaft.
4.3 Starting of the motor
4.3.1 Wiring of the motor: the wiring board of the motor has 6 terminals (or 6 direct wiring), respectively marked with U1, V1, W1, U2, V2, W2. According to the wiring symbol or wiring diagram on the nameplate (or in the junction box), the motor can be connected to Y or △ respectively, as shown in Figure 1 and Figure 2.

If the motor's junction board has 3 terminals (or 3 direct leads), marked with U, V, and W, only press A-U, B-V, and C-W.

After the above phase sequence connection, generally viewed from the shaft extension end, the motor turns clockwise, arbitrarily switch the phase sequence of the two phases in the three-phase power supply, and the motor rotates in reverse.

4.3.2 Check whether the bolts and pins of the coupling are tight, whether the belt is connected well, whether the belt is tight and loose, whether the unit is flexible, and whether there is stuck, channeling and abnormal sound.

4.3.4 The motor is allowed to start at full voltage or buck, but it should be noted that the starting current is 5-8 times the rated current when starting at full voltage, and the starting torque is proportional to the square of the voltage when starting at buck. When the power grid capacity is insufficient, the voltage reduction starting is used, and the motor should be started under no-load or light load. When the static load is quite large, it can only be started with full pressure.

4.3.5 No-load test run: After the above steps are checked and confirmed to be correct, the motor can be no-load test run.

The steering of the motor should be checked during the test run, which should generally be carried out in a state separate from the dragged machinery, and should be stopped immediately when the steering is inconsistent. No-load operation for 2-3 hours, during which to observe whether there are abnormal phenomena, abnormal noise, vibration, such as bearing overheating or oil leakage, it should be handled in time before load operation.

4.3.6 According to the technical requirements of the motor, the number of continuous starts of the motor should be limited, and the cold start should not exceed 3-5 times. When the motor runs to the hot state for a long time, it should be started after stopping for a period of time, and it should not be started 2-3 times continuously, otherwise it is easy to burn the motor.

4.3.7 When several motors share a transformer, they cannot be started at the same time, and should be started one by one from large to small.

5. Maintenance of the motor in operation

5.1 Stop the machine immediately when the following situations occur:

a) An electric shock occurs;

b) the motor or starting device smoke and fire;

c) The motor vibrates violently;

d) Motor driving equipment is damaged;

e) motor bearing intense heat;

f) The motor has shaft impact, sweeping, speed suddenly drops, and temperature rises rapidly.

5.2 The motor should always be kept clean and prevent oil, water and other dirt from entering the motor.

5.3 The ventilation of the motor must be good, and the ventilation and outlet air must be kept unimpeded, and the air hood mesh should be cleaned frequently to prevent obstruction.

5.4 During operation, it should be monitored frequently (especially the bearing part). If there is abnormal noise, it should be shut down immediately for inspection. After the fault is rectified, it can be put into

operation. When abnormal vibration, abnormal noise, and temperature are significantly higher than usual in the bearing part, lubricating oil must be added. If the lubricating oil is not improved, the bearing should be disassembled to check whether the lubricating oil or bearing needs to be replaced. This monitoring cycle is usually 1-2 times a day.

5.5 It is necessary to ensure the good lubrication of the bearings of the motor during operation, and regularly supplement the lubricating grease. Generally, the motor runs for about 2000 hours (for special motors, please follow the time indicated on the motor bearing indicator or label), and the pressure rod type oil gun should be used to supplement the grease. The supplementary lubricating oil is generally ZL-2 lubricating oil (the grease grade and oil amount of the special motor should be indicated by the bearing indicator or label).

When the grease is supplemented 2-3 times or the grease is found to be deteriorated, the grease should be replaced. When replacing the grease, the old grease should be removed, and the oil groove of the bearing and bearing cover should be cleaned with gasoline, and then the corresponding grade of grease should be filled with 1/2 (for pole 2) or 2/3 (for pole 4, 6, 8, 10, 12) of the cavity between the inner and outer rings of the bearing.

5.6 When the life of the bearing ends, the vibration and noise of the motor during operation will be significantly increased, or rust or markings are found in the motor bearing during disassembly, that is, the new bearing of the same type and specification as the old bearing should be replaced. For the disassembly method of bearings, see section 6.2.

5.7 For high-power motors, frequency meters, voltmeters, ammeter should be installed to monitor the quality of the power supply and load, when the frequency of the power supply and the value on the nameplate deviation of more than 1%, voltage deviation of more than 5% (except for the two sides have agreed and specially designed), the load current exceeds the rated value (may use the value), the motor will overheat. If the protection device does not act in time, it will cause the motor to burn. When the three-phase voltage imbalance of the power supply will cause the three-phase current imbalance, the electric machine will overheat or other abnormal phenomena. When the motor is running without phase, the motor winding will burn out.

6. Motor maintenance and repair

6.1 The motor should be maintained periodically, and the fault should be dealt with in time. Generally, small maintenance is carried out once a month, and large maintenance is carried out once a year.

6.1.1 Minor maintenance items include:

a) Remove motor dust and measure insulation resistance;

b) Check, clean and tighten the wiring terminals of the motor;

c) Check whether the fixing bolts (nails) and the grounding wire are firm;

d) Check the sound and lubrication during operation;

e) Check and clean the starting device and insulated terminals;

f) Air hood mesh is cleared to ensure that air inlet and outlet are unimpeded.

6.1.2 Major maintenance items:

a) All minor maintenance items;

b) Motor internal cleaning and inspection, clean stator windings clean, no oil dirt, no bare copper, bearing rust, markings, lubrication grease deterioration or filling; Other parts neat, good condition, etc.

6.2 Disassembly of the motor

Due to the need for maintenance and repair, sometimes need to disassemble the motor, if improper disassembly, will damage the parts of the motor, affecting the maintenance, repair effect and normal use of the motor. Before disassembling the motor, the motor must be removed from all external electrical connections.

6.2.1 Removal of pulley or coupling

Before disassembly, first make a positioning mark on the shaft end of the pulley or coupling, and then loosen the fastening bolts or dowel that the pulley or coupling has and can be removed, and then slowly pull the pulley or coupling down with a pull horse. When pulling, pay attention to the force of the pulley or coupling, so that the resultant force along the axis direction, and in the pulley or coupling and shaft extension part of the penetration of kerosene, so as not to pull the pulley or coupling. If not, the belt pulley or coupling can be heated quickly with emergency fire, pay attention to uniform heat when heating, and then pull, you can also pull side heating. When using other methods to disassemble should ensure that the motor shaft elongation is not damaged.

6.2.2 Remove motor end cap, bearing cap, V-ring or skeleton seal, rotor

First mark the connection between the frame and the end cover, loosen the fastening bolts of the end cover and bearing cover, then remove the bearing cover, V-ring or skeleton seal, and then knock the end cover with an aluminum rod or copper rod to remove the end cover. Avoid excessive knocking to avoid damage to the end cover.

When removing the motor rotor, the rotor can be removed from the shaft extension end or the non-shaft extension end, depending on which end, the rotor should be removed from the stator to prevent damage to the stator winding or insulation.

6.2.3 Disassembly, cleaning and inspection of bearings

The method of disassembling the rolling bearing and waterproof ring is the same as that of disassembling the pulley or coupling, but the size of the selected puller should be appropriate, the puller foot should be tightly fastened to the inner steel ring of the bearing as far as possible, and the bearing should be slowly pulled out.

When cleaning the bearing, first scrape out the waste oil on the bearing or bearing cover with a soft tool, wash the remaining oil with gasoline or kerosene, and then dry with a clean cloth (can not use cotton yarn head).

After the bearing is washed, rotate the outer steel ring of the bearing by hand to check whether its rotation is flexible and there is no difference in sound, and carefully observe the raceway surface, roller (ball) surface, cage for rust and markings with the light. If there is, it should not be used again and must be replaced with a new bearing.

6.2.4 The assembly and disassembly steps of the motor are in reverse order. Before assembly, it is necessary to check whether there is dirt inside the stator, whether the winding is bare copper, and whether the rust at the coordination place is removed, and it can be assembled after there is no problem. During assembly, the components should be reset according to the mark, and check whether the V-ring or skeleton seal, bearing and shaft and end cap fit. After assembly, rotate the rotor by hand to see whether the rotation is flexible and whether there is friction. If the position of the end cover and bearing cover is not correct, or the tightness of the bolts is not mastered, the motor will not operate normally.

When the motor bearing is assembled, a special sleeve can be tapped in or heated in. However, the size of the special sleeve must be consistent with the bearing inner steel ring; The heating temperature of the bearing cannot exceed 100℃ when the heating sleeve is inserted, otherwise the life of the bearing will be affected.

6.3 The replacement of other parts or windings must be recorded in the original form, size, etc. It is strictly prohibited to change the original parameters, otherwise it will worsen the performance of the motor or even cannot be used.

7. Transport and storage of electric motors

7.1 During the transportation of the motor, tilt, inversion, rain, etc., should be prevented.

7.2 The motor should be stored in a clean, dry, acid-free or other corrosive gas warehouse to avoid drastic changes in ambient temperature.
7.3 The storage time of the motor should not be too long, and it should not be stacked too high to avoid damage to the motor.

8. Analysis and elimination of common faults of motor

Motor common failure and analysis elimination

No.	Common fault	Cause analysis	Elimination method
1	Startup failure	1. The power supply is disconnected. 2. The stator winding is faulty. 3. The load is too large or the transmission machinery is stuck. 4. The control device is improperly connected.	1. Check the switches, fuses, pairs of contacts and leads to find the fault. 2. Professional check whether there is winding break, short circuit, grounding, etc., find out and repair. 3. Choose a large-capacity motor or reduce the load; If the transmission machinery is stuck, check the machinery to remove obstacles. 4. Correct cable connections.
2	The speed of the motor under load is below the rated value	1. The power supply voltage is too low. 2. The load is too large.	1. Check the power supply voltage at the input end of the motor with a voltmeter and a multimeter. 2. Choose a large capacity motor to reduce the load.
3	Ground failure, motor housing has power	1. The power cable is wrong with the ground cable. 2. The motor winding is aging due to moisture insulation or the lead wire collides with the wire cover.	1. Rectify the ground cable 2. Dry the motor winding, replace the winding or lead wire if the insulation aging is serious.
4	The sound is abnormal when the motor is running	1. The rotor is rubbed with the stator or insulating paper 2. The motor is running without phase. 3. Bearing damage or serious lack of oil.	1. Check the inner cavity of the motor, whether the insulating paper has a protruding part, whether the bearing goes to the outer ring or the inner ring, and repair it after finding out. 2. Check the switches, fuses, contactors, and cables. 3. Clean or replace bearings and replace lubricating oil.
5		1. The rotor dynamic balance is not qualified.	1. More dynamic balance than rotor

	Motor vibration anomaly	2. Belt disc shaft hole eccentricity or static balance is not qualified. 3. Shaft elongation and bending. 4. The foot is loose.	2. Correct eccentricity and static balance. 3. Straighten or replace. 4. Tighten the anchor bolts.
6	Bearing overheating	1. Bearing damage 2. Bearing grease quality is not good or improper filling 3. The belt is too tight or the coupling is not installed well. 4. Bearing chamber or shaft wear serious deformation. 5. The end caps or bearing caps on both sides of the motor are not installed flat.	1. Replace the bearing. 2. Replace the grease, and the filling amount should not exceed 70% of the bearing volume. 3. Adjust belt tension and correct coupling. 4. Repair worn parts by inserting or coating. 5. Install and align the end cover or bearing cover according to the stop, and tighten the bolts or screws.
7	The temperature of the motor rises too high or smoke is emitted	1. The load is large. 2. Two-phase operation. 3. Motor air duct is blocked. 4. The ambient temperature increases. 5. The power supply voltage is too low or too high.	1. Choose large capacity motor or reduce load. 2. Check the fuse and switch contact points and remove them. 3. Remove oil dirt and dust from air duct. 4. Take cooling measures. 5. Professional maintenance of stator windings. 6. Check the power supply voltage at the input end of the motor with a voltmeter and a multimeter.

Changzhou Yongzhuan Motor Co., LTD

Wechat /Cell /WhatsApp: +86-15861132046

E-Mail: rylee@vmttech.com

Add: No.70 Chenyang, Jiaze Wujin Changzhou City, Jiangsu Province, China

Zip Code: 213153

Website: https://www.victory-motor.com/