



YBGS 系列隔爆型高速三相异步电动机
(机座号 160~180)

YBGS Series Flameproof High-speed
Three Phase Asynchronous Motors
(Frame 160~180)

使用说明书

Maintenance Instruction

安徽威能电机有限公司
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。

1 产品概述

YBGS 系列隔爆型高速三相异步电动机符合 Q/WN. 292-2022 《YBGS 系列隔爆型高速三相异步电动机技术条件（机座号 160 ~ 180）》要求，按照 GB 3836.1-2021 《爆炸性环境用电气设备第 1 部分通用要求》和 GB 3836.2-2021 《爆炸性环境用电气设备第 2 部分：由隔爆外壳“d”保护的的设备》以及 GB 3836.3-2021 《爆炸性环境用电气设备第 3 部分：增安型“e”》的要求，制成隔爆型。其防爆标志为 Ex db II AT4 Gb、Ex db II BT4 Gb。产品适用于工厂（Ex db II AT4、Ex db II BT4）含有 II 类 A、B 级 T1 ~ T4 组可燃性气体或蒸汽与空气形成的爆炸性混合物的场所。

2 电动机型号代表的意义



3 使用范围

3.1 适用常见可燃性气体、蒸汽级别、温度组别举例见表 1。

表 1

| 级别 | 引燃温度组别 | | | |
|------|-------------------------------------|---------------------------------|------------------------------------|----------------------|
| | T1 | T2 | T3 | T4 |
| II A | 甲烷、乙烷、丙烷、 苯乙烯、甲苯、二甲 苯、一氧化碳、醋酸 | 丁烷、丙烷、乙苯、 甲醇、乙醇、丙醇、 本醇 | 戊烷、己烷、庚烷、 辛烷、癸烷、环己烷 煤油、柴油、汽油 | |
| II B | 丙炔、环丙烷、 焦炉煤气 | 乙烯、1.3 丁 二烯环氧乙烷、1.2 一环氧丙烷 | 二甲醚、丙烯醛、甲 氢糠醇四氢呋喃、硫 化氢 | 乙基甲基醚 二乙醚 四氟乙烯 |

3.2 使用条件

3.2.1 海拔不超过 1000m。

3.2.2 环境空气温度随季节而变化，但最高不超过 40℃，最低为 -15℃。

3.2.3 环境空气最大相对湿度为 90%，同时该月月平均最低温度不高于 25℃。

3.2.4 电动机额定电压为 380V，额定频率为 150Hz，绝缘等级可制成 F 级或 H 级。

3.2.5 电动机接法为 Y 接法。

3.2.6 电动机的定额是以连续工作制（S1）为基准的连续定额，允许满压启动。

3.2.7 电动机运行时，电源电压和频率与额定值的偏差按 GB 755 的规定。

3.2.9 使用时应有 PT100 传感器对电动机轴承进行保护。

4 电动机结构说明

- 4.1 电动机的安装方式为 IMB3、IMB5、IMB35、IMV1。
- 4.2 电动机的安装尺寸和外型尺寸符合外形图的规定。
- 4.3 电动机的外壳防护等级 IP55。
- 4.4 电动机的冷却方式为 IC416。
- 4.5 电动机的机座和端盖全部采用钢板制成。
- 4.6 电动机的转轴采用 42CrMo 合金钢制成。
- 4.7 电动机前后端均采用陶瓷球轴承结构；轴承油脂牌号：LGHP2。
- 4.8 电动机后端应采用 GB 系列隔爆型轴流通风扇，其风机电压为 380V，功率为 60W，防爆标志为 Ex db II BT4 Gb，防护等级为：IP55。
- 4.9 电动机后端预留编码器安装接口等，用户如需加装编码器，应选用符合国家相关要求且为防爆型的编码器，其选用编码器的防爆标志应为 Ex db II BT4 Gb。
- 4.10 电动机的接线盒位于电动机顶部，制成三个接线端子。适用于橡胶套电缆（或塑料电缆）和钢管布线的两种结构，内设一个接地端子，并制成一个出线口。在接线盒座与接线盒盖的止口处加设“O”型密封圈，电动机的接线方式为 Y 接，接线方法如图 1。

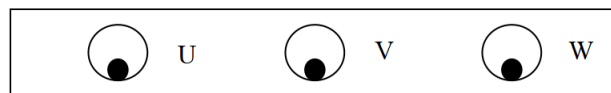


图 1（Y 接）

4.11 电动机的相序 U、V、W 须与接入外电源相序 A、B、C 相对应，电动机转向从轴伸端视之为顺时针方向，否则电动机将反转。

4.12 电缆的外径要与密封圈（图 2）的孔径相符，配合直径差不大于 1mm，当压紧接线头后，应保证密封圈与电缆之间及密封圈与接线盒座之间无间隙，否则将失去隔爆性能。

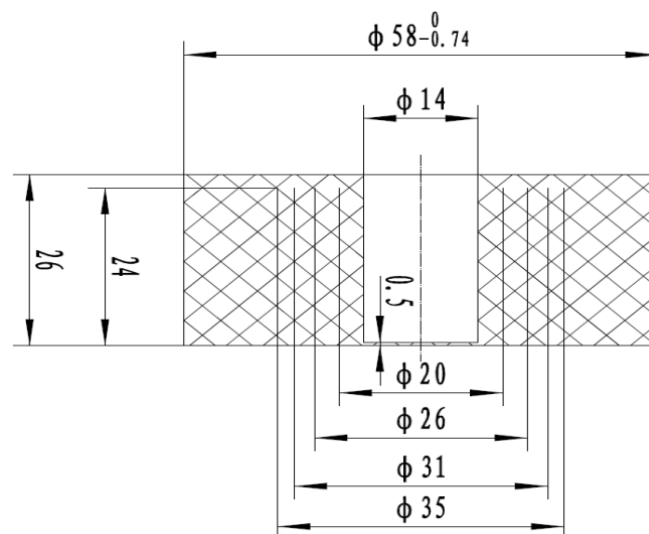


图 2

4.13 电动机主体结构见图 3，接线盒结构见图 4。

5 隔爆要点

5.1 电动机内部的爆炸性混合物产生爆炸时，隔爆外壳应不损坏，且内部火焰不能通过隔爆外壳接合面，引起外部爆炸性混合物爆炸。

5.1.1 组成隔爆外壳的零件均按 GB3836.1 的规定作了水压试验。

5.1.2 各零件的隔爆配合面（长度、间隙、表面粗糙度）足以保证内部火焰不能通过隔爆面传到外部。

5.1.3 连接隔爆外壳的螺栓装有弹簧垫圈以防止螺栓自行松脱。

5.1.4 机座、端盖、轴、轴承内盖、接线盒、接线螺栓、轴流风机、端子套、橡皮垫圈均属隔爆零件。

5.2 电动机外壳最高表面温度（温度计法）在规定允许最不利的工作条件下应不超过 135℃。

5.3 进线口处的温度不得高于所用电缆的允许温度，以保证电缆正常使用。

6 本电机安装与试车前的准备



警告！

严禁带电开盖！

搬运电动机时，应小心谨慎！

强烈的摔、碰、震会严重损坏轴承及隔爆元件。

吊装带有吊攀的电机时，一定要将吊攀旋紧。

6.1 仔细检查电动机外观是否完好、核对电动机铭牌内容是否与实际需求相符。

6.2 用兆欧表检查电动机是否受潮，如受潮应采用下列方法之一进行干燥；

6.2.1 短路电流干燥法：把电动机安装在固定底座上，将转子堵住，在定子绕组上施以一定的电压，使此时的定子电流逐渐达到额定值的 40 ~ 60%，利用电动机的铜耗来加热干燥，干燥时电动机要可靠接地以确保安全。

6.2.2 鼓风机干燥法：将电动机端盖拆开，让鼓风机吹出的热风从电动机的一端吹入，从另一端排出，热风在进入电动机前需进行滤尘处理，以防尘土和杂物吹入电动机内部，热风的温度应控制在 90℃ 左右。

无论使用何种干燥方法，在干燥过程中，必须使电动机绕组的温度逐渐升高，且不超过绕组规定的最高温度值（若使用温度计法测量时，温度值应较电阻法降低 20℃），在干燥时应绘制绝缘电阻—时间及绕组温度—时间曲线，以便正确判断绕组的干燥情况。

6.3 电动机安装时，允许采用刚性联轴器连接，两连接轴的同心度应保证小于 0.03mm。若负载有轴向游动量，应使联轴器的串动间隙 = 最大游动量 + 2mm。

6.5 电动机与负载连接后，应进行手动盘车试验以确保连接的正确性。

6.5 当电动机直联负载的工作温度较高（高于 60℃）时，应在电动机和负载之间采取隔热措施，以防止电动机的轴承和绕组散热发生困难。

6.6 电动机内、外接地螺栓必须可靠接地。

6.7 电动机接好线，经检查确认无误后，方可接通电源进行空载试运转，并观察电机有无异常现象，待空转正常后方可投入负载运行。

警告!



- 1、电源电压的波动不得超过额定电压的 95% ~ 105%。
- 2、必须接好接地线。
- 3、电机运行若有异常立即停机。
- 4、保持身体、衣物远离电动机运转部分。

6.8 电动机首次使用前，应在空载下试运行 0.5 ~ 1h，此间应注意：

6.8.1 轴承与电动机内部有无异常的摩擦声和杂音。

6.8.2 电动机轴承温度的稳定值是否符合有关规定。

6.8.3 电动机的振动速度有效值是否超过有关标准。

6.9 电动机故障及排除方法见表 1。

表 1

| 故障 | 可能原因 | 排除方法 |
|-----------|---|--|
| 电动机不能起动 | a. 短路。 b. 终点电压低。 c. 电动机转动件与固定件相碰。 d. 变频器起动参数设置不当。 | 1) 用万用表查找线路故障点，排除后重新起动。 1) 更换大容量的变压器。 2) 增加中间调压器。 3) 从变压器输出端直接引出电源。 4) 检查电路是否有虚接或受潮现象，若受潮应做干燥处理。 1) 检查电动机内是否有异物进入，如确有异物，排除。 2) 检查电动机的轴承是否损坏，若已损坏，需更换新轴承。 1) 调整变频器的设置。 |
| 异常噪声 | a. 电动机轴承损伤。 b. 电动机平衡垫片松脱。 c. 电源电压或电流不平衡。 | 1) 更换新轴承。 1) 更换平衡垫片，并重新做转子平衡。 1) 消除造成不平衡因素。 |
| 振动异常 | a. 电动机与负载的同轴度超差。 b. 电动机转子或负载转动部分不平衡。 c. 电动机轴承损坏。 | 1) 重新找正。 2) 检查地基是否有不平或下沉。 1) 重新做动平衡。 1) 更换新轴承。 |
| 轴承温度高 | a. 轴承室内润滑油太多或太少。 b. 轴承受到来自负载的径向力。 c. 因负载温度较高使散热发生困难。 | 1) 打开轴承外盖，按规定减少或增加润滑脂。 1) 设法减小负载径向力。 1) 在电动机和负载之间采取隔热措施。 |
| 机壳或绕组温度过高 | a. 电动机过载。 b. 因负载温度较高使散热发生困难。 c. 电源电压过低或过高。 d. 电源电压或电流不平衡。 f. 变频器运行参数设置不当。 | 1) 消除负载故障。 1) 在电动机和负载间采取隔热措施。 1) 消除电源故障。 2) 采取稳压措施。 1) 查找并消除不平衡因素。 1) 重新设置变频器运行参数。 |
| 电动机机壳带电 | a. 接地不良。 b. 绕组受潮。 c. 引接线绝缘或绕组绝缘破损。 | 1) 将接地线用螺栓可靠接地。 1) 对绕组进行干燥处理。 1) 修复绝缘。 |

7 本电动机的维护

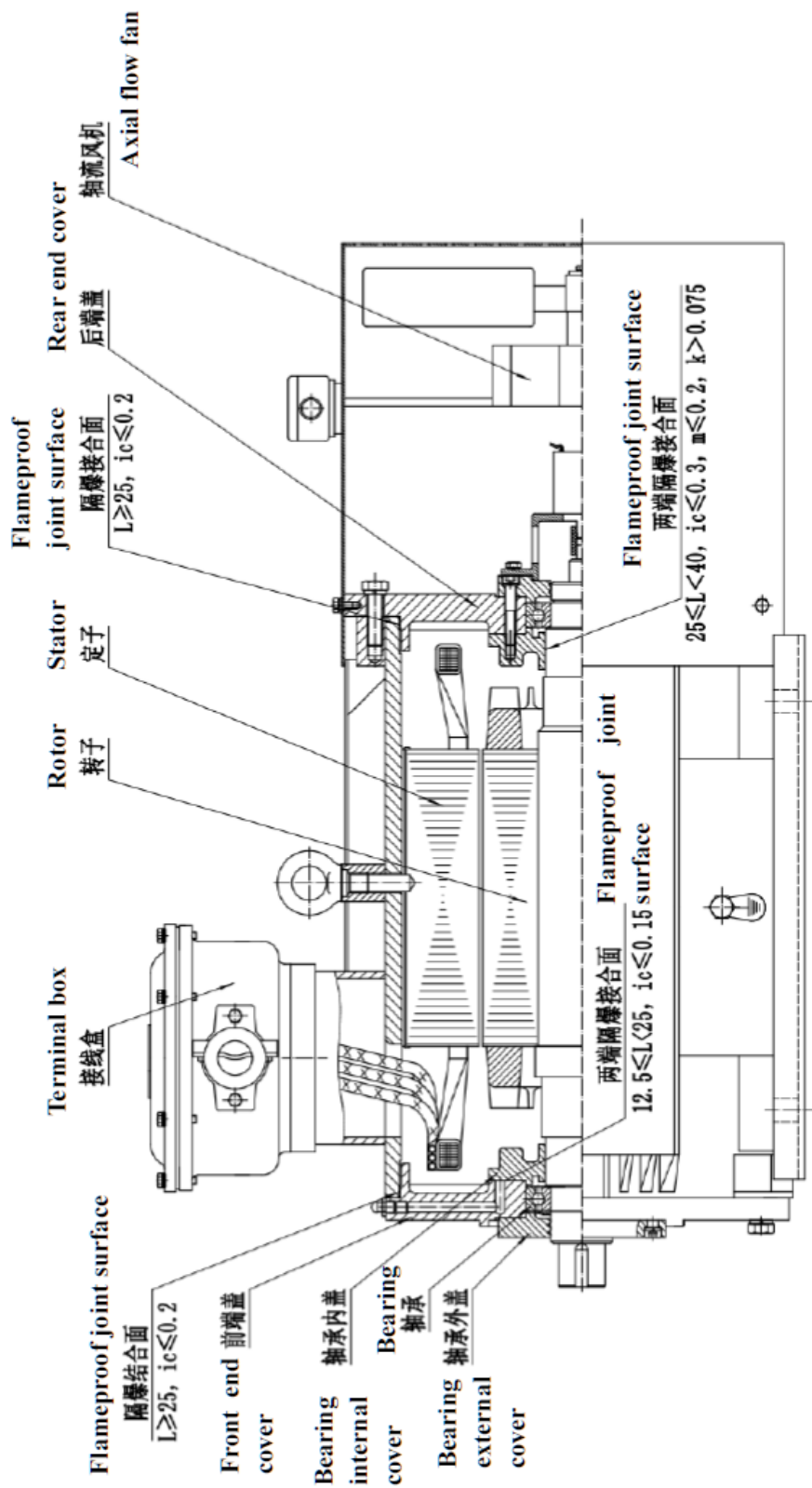
7.1 电动机如不立即使用。请勿将包装箱拆开，并存放在空气干燥，通风良好，温度在 3℃ 以上的库房或室内。对久置不用的电动机应进行临时涂封处理，并每隔半年检查一次。

7.2 电动机轴承，在每高速运行 500h 后需添加润滑脂，每次添脂量约为 16g。

7.3 电动机的润滑脂应定期更换，至少每年应检查一次并彻底更换润滑脂，更换前轴承必须用汽油清洗干净，添脂量为轴承室净空间的 1/3。油脂牌号为 LGHP2。

7.4 在电动机吊装时，应正确的使用电动机或包装箱上的吊攀，避免磕碰损伤。

本电动机为专利产品未经我公司同意不得将此说明书公示。



H160-180

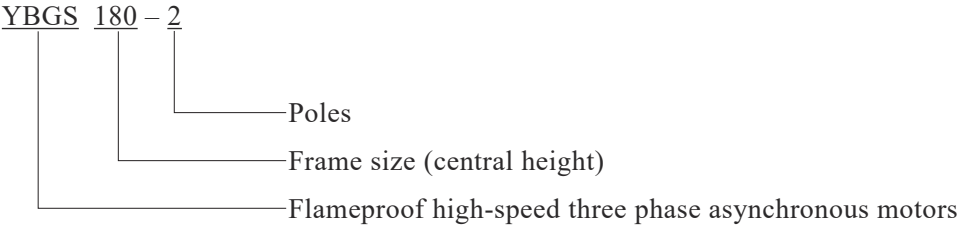
图3 电动机主体结构
Fig 3 Motor structure

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.

1. Overview

YBGS series flameproof high-speed asynchronous motors are produced in conforming to Q/WN.292-2022 “Specification for flameproof high-speed three phase asynchronous motors (frame 160~180)”, GB 3836.1-2021 “Electrical equipment used in explosive environment- Part 1 General Requirement”, GB3836.2-2021 “Electrical equipment used in explosive environment: The Apparatus with the flameproof enclosure -Part 2 ‘d’” GB3836.3-2021 “Electrical equipment used in explosive environment-Part3: The Apparatus with the flameproof enclosure ‘e’” and GB3836.3-2021 “Explosive atmosphere—Part 3 Equipment protection by increased safety ‘e’. With Ex-marking “Ex db II AT4 Gb、 Ex db II BT4 Gb”. This series motors are suitable for workshop where Category II Class A and B flammable gas or the flammable mixture with air and steam of Temperature Group T1~T4 exists in.

2. Designation and types



3. Application circumstance

3.1 The applicable common inflammable gas, steam and temperature groups are listed in the table 1 below:

Table 1

| Type | Temperature Groups | | | |
|------|--|--|--|--|
| | T1 | T2 | T3 | T4 |
| II A | Methane, ethane, propane, styrene, toluene, xylene, carbon monoxide, acetic acid | Butane, propane, ethyl benzene, methanol, ethanol, propyl alcohol, Benzene alcohol | Pentane, hexane, heptane, octane, decane, cyclohexane kerosene, diesel oil, gasoline | |
| II B | Propine, cyclopropane, coke oven gas | Ethylene, butadiene epoxy ethane, epoxy propane | Dimethylether, propylene aldehyde, ydrogen furfuryl alcohol furan, hydrogen sulfide | ethyl methyl ether, diethyl ether, tetrafluoroethylene |

3.2 Operating condition

3.2.1 Not exceed 1000m above the sea level.

3.2.2 Ambient temperature varies as seasonal variation, but the temperature shall not beyond the range -15°C ~+40°C。

3.2.3 The maximum environment relative humidity shall be no more than 90%, besides mean minimum temperature of this month shall be no higher than 25°C .

3.2.4 Motor's rated voltage is 380V, rated frequency 150Hz, F/H insulation class.

3.2.5 Y connection。

3.2.6 The rating here refers to the continuous rating power on the basis of S1 operation system, the motor allows direct starting.

3.2.7 Deviation of voltage and frequency from the rating value at the motor running time shall be in accordance with the standard of GB/T 755.

3.2.9 PT100 is necessary for motor bearing protection in operation.

4. Motor structure

4.1 Common installation types are: IMB3、IMB5、IMB35、IMV1。

4.2 Installation and outline dimension refer to relevant drawings or technical specification.

4.3 Motor casing IP55 protection grade

4.4 Motor cooling method IC416。

4.5 Motor frame and end cover are made of steel plate

4.6 Motor shaft is made of ally 42CrMo。

4.7 Motor are fitted with china ball bearing for DE/NDE. Bearing grease type: LGHP2.

4.8 A special GB series flameproof axial flow fan is fitted for each motor at rear end. The blower is 380V 60W, Ex db II BT4 Gb ex-proof type, IP55 protection grade.

4.9 Encoder mounting interface is previous prepared. Clients shall choose Ex-proof encoders which are conforming to national standard and of Ex db II BT4 Gb ex-proof type when the encoder is needed.

4.10 Terminal box is on the top of the motor, with 3 connecting terminals. This series motor is of rubber-sheathed cable (or plastic cable) wiring type. One grounding terminal in each connection box, on which there is one outlet. At the front edge between connection box body and its cover an o-sealing ring will be fitted. Y connection diagram is as following:

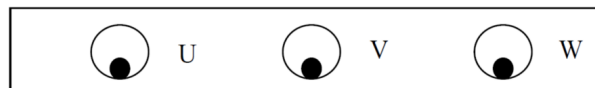


Fig 1 Y connection diagram

4.11 U、V、W phase sequence of the motor should match A、B、C phase sequence. Shaft rotates clockwise from the view of DE.

4.12 External diameter of the cable should fit bore diameter of the seal ring (Figure 2). The diameter gap should not exceed 1mm. Clamp the connection plug and ensure that there is no clearance between seal ring and power cable as well as between seal ring and connection box body, otherwise the motor will lose its explosion-proof function.

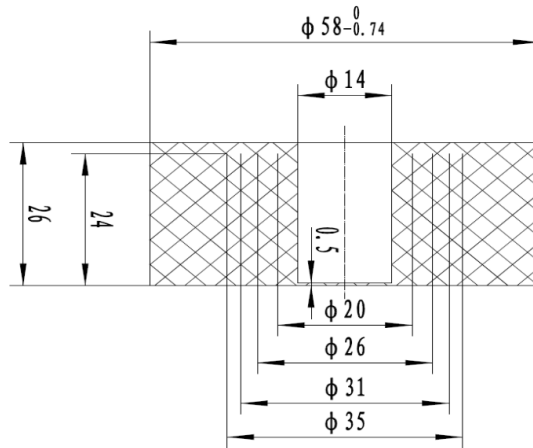


Fig 2

4.13 Subject structure of the motor see figure 3, and the structure of terminal box see figure 4.

5 Explosion-proof highlight

5.1 The series motor highlights its explosion-proof feature. If the explosive mixture inside the motor explodes, the motor shall not be damaged or deformed to the extent that may affect its explosion-proof performance. The flame inside should not pass through conjunction plane to explode the flammable mixture outside the motor.

5.1.1 Each component of the flameproof casing shall be tested as qualified in pressure test as stipulation of GB3836.1

5.1.2 The flameproof conjunction plan between each component, specifically their length, gap, and roughness, is able to cut off outside from flame source inside.

5.1.3 Spring washer on fastening bolt can prevent the bolts releasing down from explosion-proof casing.

5.1.4 Frame, end closure, shaft, bearing inner cover, terminal box cover, terminal box body, connection bolt, axial flow fan, terminal lug, bearing, rubber seal ring all are explosion-proof components.

5.2 The maximum temperature on its casing is 135°C (by thermometer method) even in the most unfavorable condition as stipulation.

5.3 Temperature at cable inlet shall be no higher than the cable allowable temperature.

6. Installation and trial operation

Warning!



Motor cover is forbidden to open with power on.

Handle the motor with care.

Strong fall, impact, vibration will heavily damage bearing or explosion proof components.

Fasten onto the lifting hook tightly if the motor is moved by the crane.

6.1 Check the appearance of the motor to see whether it is in good condition, and check the nameplate to see whether the data is conform to actual requirement.

6.2 Check the insulation resistance with Megger. If the motor is found to be dampened, it must be dried either by means of short-circuit current or air-blower.

6.2.1 By short-circuit current: Fix the motor and lock the shaft, supply with a certain voltage which is less than rating till motor current reaches 40~60% the rated value. By this the motor will be died by its own heat. Grounding bolts must be well-connected when drying for the consideration of safety.

6.2.2 By air blower: Remove motor end covers, and blow hot air against one end, then the air will go through motor and leave from the other end. The blowing air is recommended to kept around 90°C and must be purified firstly so as the dust or sundries will not getting into motors.

By whichever method the wiring temperature shall slowly get higher and not exceed max allowable temperature(the measurement by resistance method is 20 °C higher than by thermometer method). Insulation resistance-timing/wiring temperature curve is favorable for wiring drying judgment.

6.3 Rigid coupling is allowable to connect with motor. Concentricity of two coupling is surely to be less than 0.03mm. Coupling clearance shall be kept equal to max axial momentum+2mm, if the axial momentum exists in the motor load

6.4 Rotate the rotor by hand for trial running when the motor has been connected with the driven machine.

6.5 Add the heat insulation for motor when the driven equipment's operation temperature is higher than 60°C . Otherwise motor's bearing and wiring may get overheat and even affect its performance.

6.6 Motor internal and external grounding bolts shall be well-connected.

6.7 Check the motor first and do not power on until the motor has been confirmed to be no problems, and then conduct no-load running test. When all runs smoothly the motor can be put into load operation.

Warning!



1. Supply voltage fluctuation should not go beyond the range±5% the rated voltage.
2. Ground wire must be connected
3. Turn off the motor when abnormal problem occurs.
4. Keep the person and clothe away from the rotation part.

6.8 For new machine, no-load trial operation of 0.5~1h is needed before routine running, during which following matters shall be concerned

6.8.1 Whether there is abnormal friction sound or other noise about bearing.

6.8.2 Whether the bearing temperature stable value is conforming to the standard.

6.8.3 Whether the vibration limits are conforming to the standard

6.9 Motor common faults and solutions see table 1

Table 1

| Error | Possible cause | Solution |
|---------------------------|--|---|
| Start failure | a. Short current b. Low voltage c. Motor rotation parts failure d. Inverter setting improper | 1) detect the failure with AVO meter and restart . 1) change larger voltage transformer 2) add intermediate voltage regulator 3) Draw out power supply from voltage transformer. 4) Inspect circuit to detect if it gets dampened or has virtual connection. 1) Remove the sundries in motors, if any. 2) Replace a new bearing if the old one is found to be broken. 1) Reset inverter. |
| Noise | a. Bearing broken b. Balancing gaskets get loosed c. Unbalanced voltage or current | 1) Replace new bearing 1) Replace balancing gaskets and rotor re-balanced 1) Remove unbalancing factors. |
| Vibration | a. Poor coaxiality between motor and driven equipment b. Motor rotor or driven parts unbalanced. c. Bearing broken | 1) Adjust 2) Check the base or support 1) Rebalancing 1) Replace new bearing |
| Bearing overheat | a. Too much or less grease b. Radial force from load on bearing c. Poor cooling caused by heat from driven equipment. | 1) Open external bearing cover to add or reduce grease 1) Reduce radial force 1) Add heat insulation between motor and load. |
| Casing or wiring overheat | a. Over load b. Poor cooling caused by heat from driven equipment. c. High or low supply voltage d. Unbalanced voltage or current f. Inverter improper setting | 1) Correct load 1) Add heat insulation between motor and load. 1) Eliminate supply erro 2) Add voltage stabilizing device 1) Detect and remover unbalancing 1) Reset inverter data |
| Casing charged | a. Poor grounding b. Wiring get dampened c. Broken insulation in cable or wiring | 1) Ground bolts well connected 1) Drying wiring 1) Mend insulation |

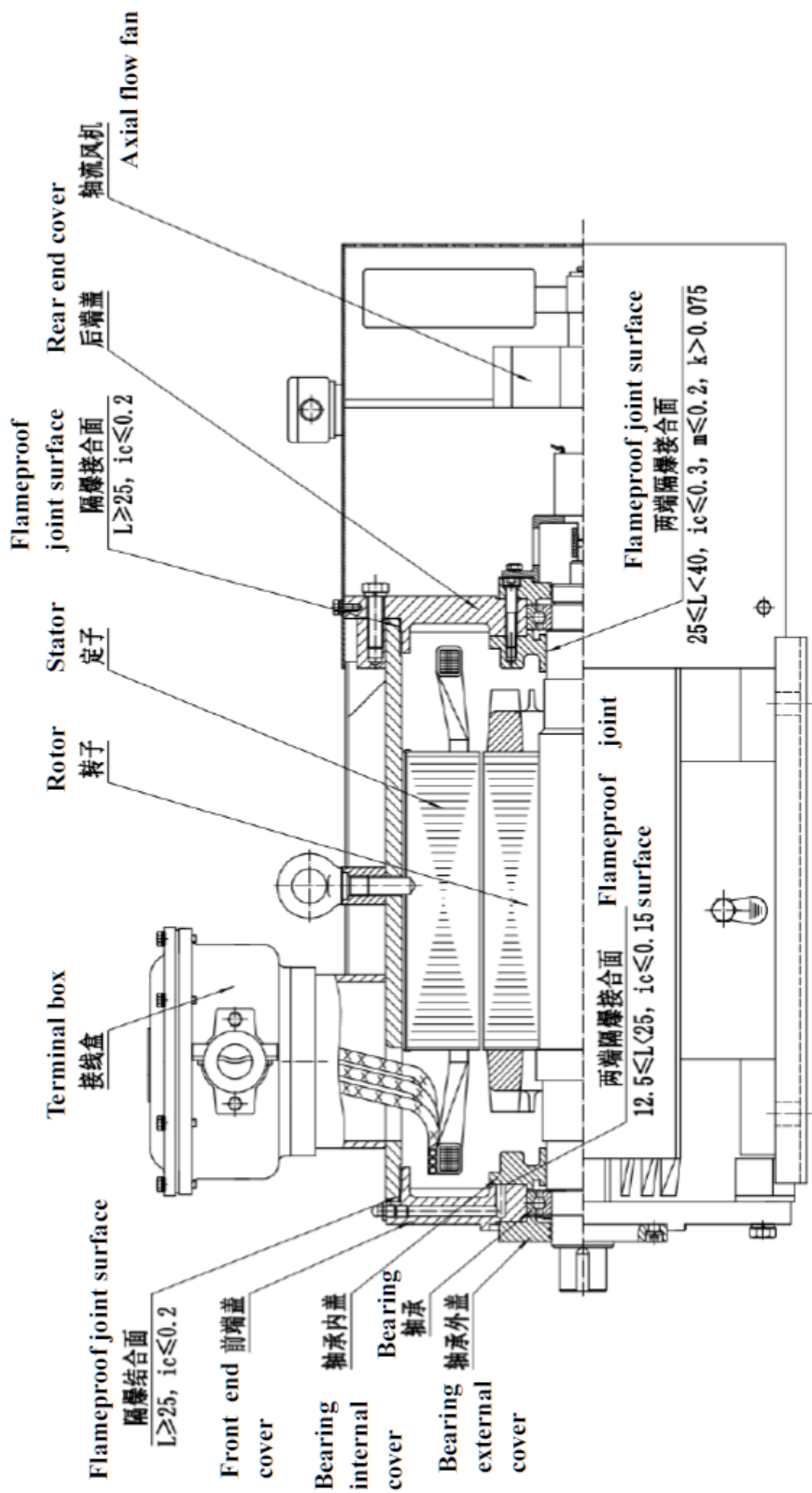
7. Maintenance

7.1 Motor shall be stored in dry, ventilated place and keep the ambient temperature above 3°C . Do not unwrap the package until the motor is to be put into application. For the spare motors, it need to be sealed with coating and inspected every half-year.

7.2 Motor bearing shall be re-greased every 500-hour operation for about 16g lubrication grease.

7.3 Inspect bearing and replace grease thoroughly every half-year operation. Fill the 1/3 volume of bearing chamber with lubrication grease of LGHP2 after the chamber is completely cleaned with gasoline.

7.4 Fasten onto the lifting hook tightly if the motor is moved by the crane.



H160-180

图3 电动机主体结构
Fig 3 Motor structure

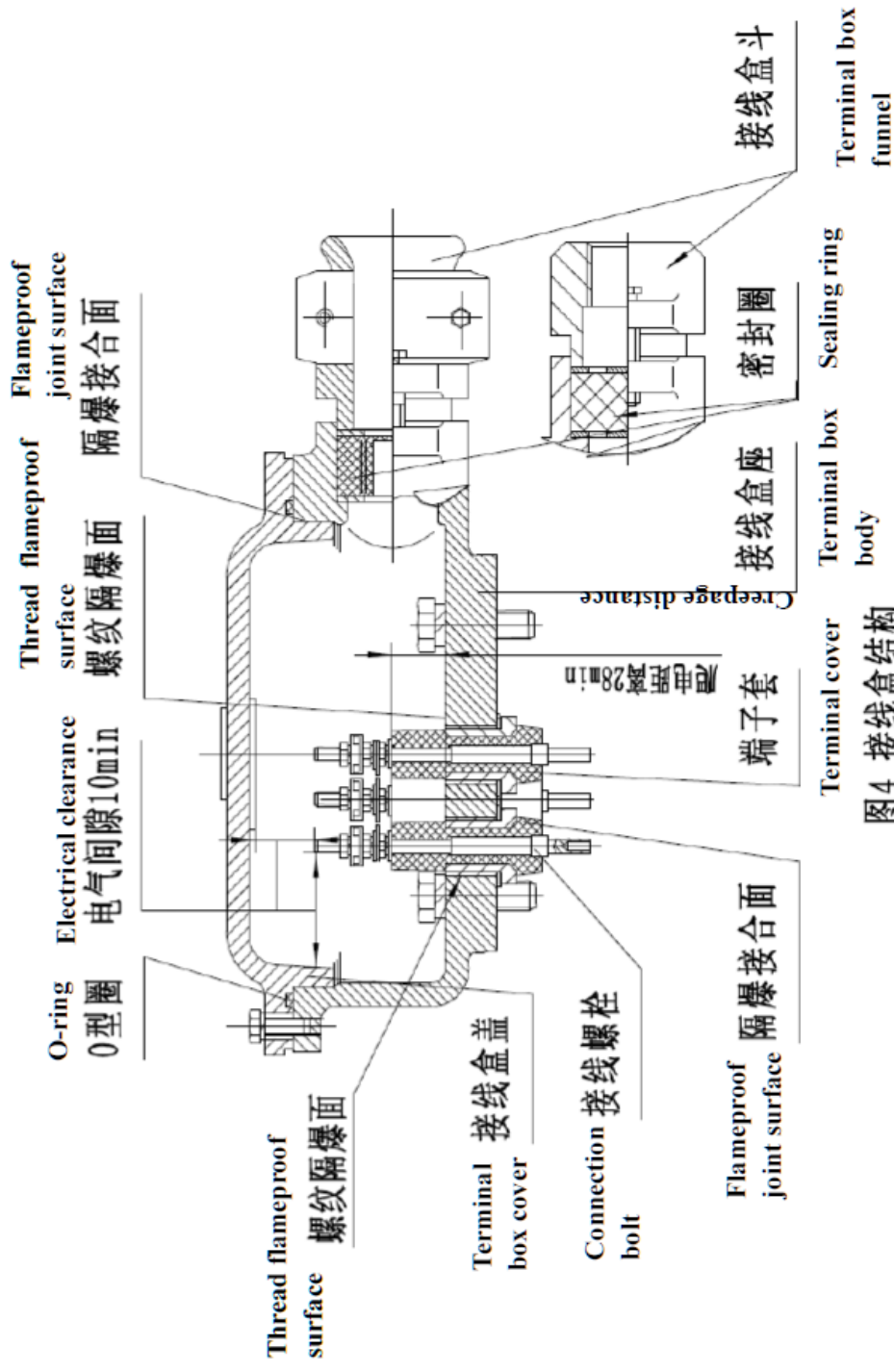


图4 接线盒结构

Fig 4 Terminal box structure

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