



ZDTB 系列隔爆型永磁直驱电动机  
(Ex db II BT4 Gb)

ZDTB SERIES FLAMEPROOF  
PERMANENT MAGNET DIRECT  
DRIVE MOTOR  
(Ex db II BT4 Gb)

# 使用说明书

Maintenance Instruction

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

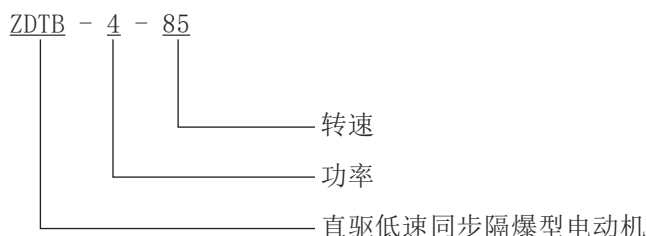
衷心感谢您选购、使用皖南电机。

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。

## 1 产品概述

我公司生产的 ZDTB 系列隔爆型永磁直驱电动机符合 Q/WN. 305-2022 《ZDTB 系列隔爆型永磁直驱电动机技术条件》要求，按照 GB/T3836.1-2021 《爆炸性环境用电气设备第 1 部分通用要求》和 GB/T3836.2-2021《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/T3836.3-2021《爆炸性环境用电气设备第 3 部分：增安型“e”保护的的设备》的要求，制成隔爆型。其防爆标志为 Ex db II BT4 Gb。产品适用于工厂含有 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。

### 产品型号及名称



## 2 使用范围及使用条件

3.1 适用常见爆炸性气体、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 运行使用条件

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 22.67Hz，绝缘等级为 F 级。

3.2.5 电动机接法为 Y 接法 (380V)。

- 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，允许满压起动。
- 3.2.7 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 130℃。
- 3.2.8 电动机运行时，电源电压和频率与额定值的偏差按 GB/T755-2019 的规定。

## 4 电动机安装结构型式

电动机的结构及安装型式见表 2

表 2

型 号	结构及安装代号（IM）
ZDTB-4-85	V1

## 5 主要结构


- 5.1 电动机的接线盒位于电动机顶部，制成六个接线端子。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。在接线盒座与接线盒盖的止口处加设“O”型密封圈。
- 5.2 电动机转轴旋转部位采用“V”型轴封环保护。
- 5.3 电动机轴承采用开启式轴承，电动机设置了不停机注、排油装置。
- 5.4 电动机主体结构见图 1、接线盒结构见图 2。

## 6 防爆要点

- 6.1 本系列电动机为隔爆型。若电动机内部的可燃易爆性混合物爆炸时，隔爆型电动机外壳不应损坏或产生影响隔爆性能的变形；内部爆炸火焰不允许通过电机的隔爆接合面引起外部爆炸性混合物的爆炸。
- 6.2 隔爆型电动机的元件（如机座、端盖、轴承内盖、接线盒盖、接线盒座等），精加工后须经压力为 1.5Mpa，加压时间为 10S+2 的静压试验，以不滴水为合格。
- 6.3 隔爆接合面的长度、间隙、表面粗糙度、接线盒内部裸露导体之间、裸露导体与金属外壳之间的电气间隙及爬电距离应符合 GB/T3836.3-2021 的规定。
- 6.4 联接隔爆外壳的螺栓均装有弹簧垫圈，防止自行松脱。
- 6.5 机座、端盖、轴承内盖、接线盒盖、接线盒座、接线螺栓、端子套（或接线板）、轴、橡胶密封圈是隔爆元件。
- 6.6 该电机隔爆外壳紧固螺栓应保证抗拉强度 $\geq 800\text{MPa}$ ，屈服强度 $\geq 640\text{MPa}$ 的紧固件。

## 7 安装与使用

**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。

## 7.1 安装前的准备

- 7.1.1 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。
- 7.1.2 电动机是否有防爆标志、防爆合格证编号和生产许可证。
- 7.1.3 隔爆外壳各零部件联接正确，紧固可靠无松动。
- 7.1.4 所有隔爆元件应无裂纹或影响隔爆性能的缺陷。
- 7.1.5 取下接线盒盖检查电动机定子绕组冷态绝缘电阻应不低于 5 MΩ。

## 7.2 安装

- 7.2.1 电动机的安装应由专业技术人员完成。
- 7.2.2 电动机宜采用弹性联轴器传动。
- 7.2.3 电动机轴中心与被传动的主机轴中心要保持一致。
- 7.2.4 对带底脚的电动机，安装平面应平整、坚固。
- 7.2.5 联接电动机的电源线（电缆）不宜过细、过长。

7.2.6 电缆的外径要与密封圈（图 3）的孔径相符。使用电缆最小直径为 D1，最大直径为 D5，密封圈材质为橡胶 XH-21，规格及尺寸见表 4（可根据引入电缆外径大小剥去密封圈同心圆）。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。

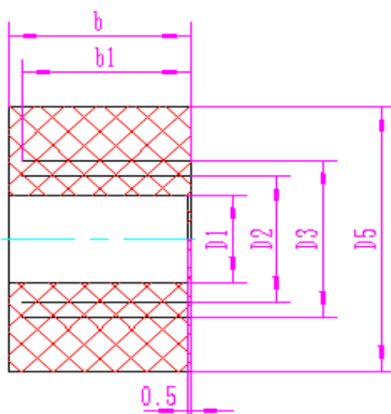


图 3

表 4

型号	进线方式	密封圈形式	D1	D2	D3	D5	b1	b
ZDTB-4-85	橡套电缆	图 3	φ 14	φ 20	φ 25	φ 42 0 - 0.74	24	26

7.2.7 引入的电缆芯线要接在两弓型垫圈之间，注意芯线的飞刺不要突出，引入接线孔时应防止线芯损伤，引入电缆还须用接线压板和弓形垫圈压紧固定，防止窜动。

7.2.8 对有两个进线口的接线盒，当引入一根多芯电缆只使用一个进线口时，另一个进线口的堵棒不得拿掉，否则将失去防爆性能。

7.2.9 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。

7.2.10 电动机内、外接地螺栓必须可靠接地。

7.2.11 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。

## 8 保养与维修

8.1 电动机应定期检查和清洁，外壳不得堆积灰尘，不得用水龙头喷射清扫电机。

8.2 电动机运行时轴承允许温度不得超过 95 °C（温度计法），轴承每运行 2500 小时（约半年）至少检查一次，如发现轴承润滑脂变质必须及时更换，更换前，须将轴承外盖、贮油盒内的废油以及排油装置的油管、油杯清理干净，并用汽油将轴承清洗干净，润滑脂推荐采用锂基润滑脂 3 号（GB 7324-1994），加脂量为轴承室容积的 2/3。轴承牌号见表 5。

8.3 拆装电动机时应注意保护隔爆面。拆卸电动机时，应先拆掉风机、再拆掉轴伸端的“V”型轴封环，拆去前端盖、后端盖的固定螺栓，将后端盖连同转子、风扇连体抽出。装配时，所有隔爆面需涂 204-1 防锈脂。

8.4 电机受潮后，必须经干燥处理后方可使用。干燥处理可采用烘干或短路电流法。在烘焙过程中，温度应逐渐升高，但不可超过 145°C。

8.5 更换绕组时，须记下原绕组的型式、尺寸、线规、匝数。当失落这些数据时，应向我公司索取。随意改变设计绕组会使电动机某项或几项性能恶化，以致不能使用。

8.6 防爆零部件维修、更换，须由专业技术人员按有关技术标准进行维修、验收。

表 5

Frame	DE	NDE
ZDTB-4-85	6313	6313

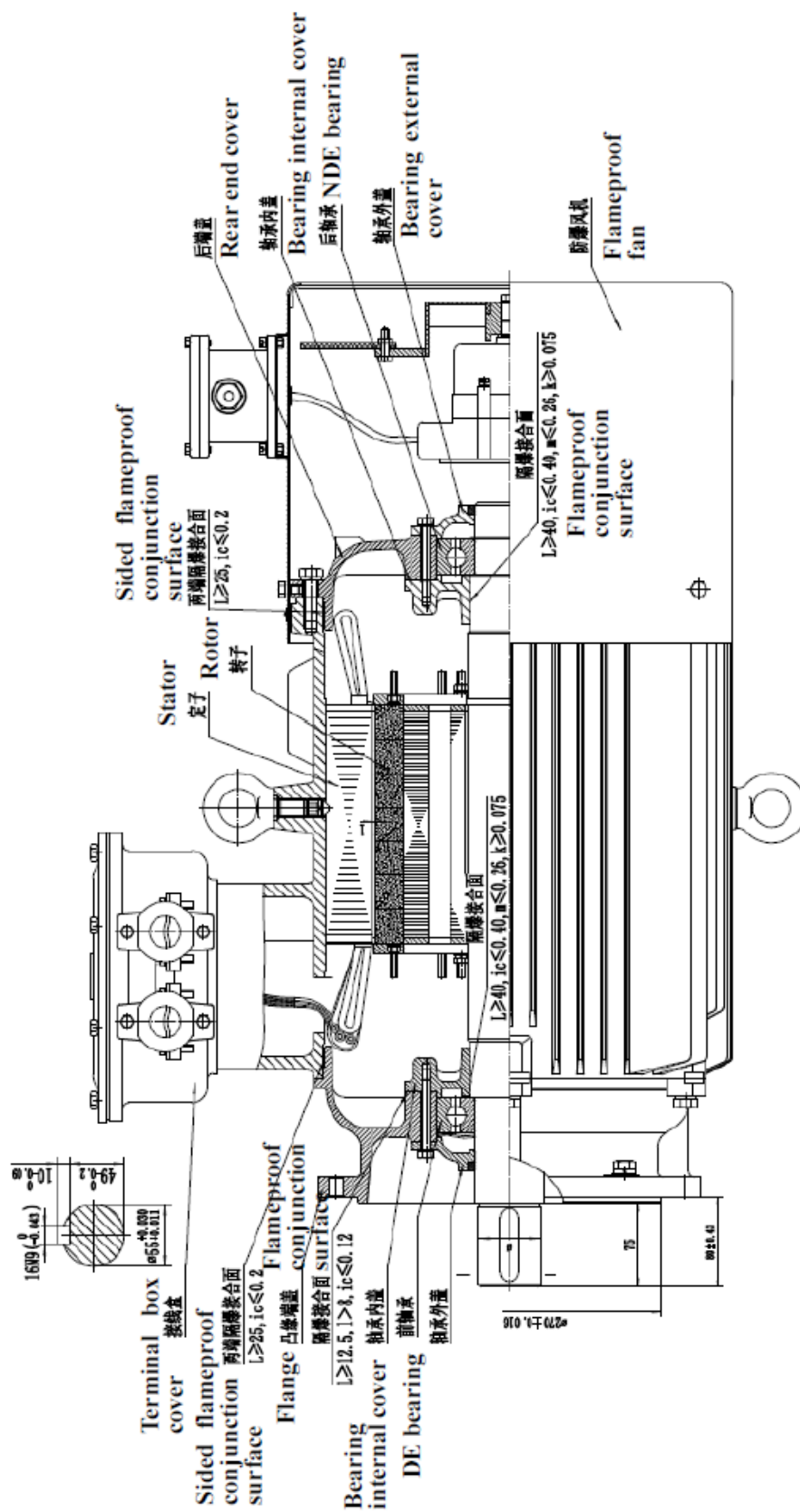


图2 ZDTB-4-85 电机主体结构 (VI)

Fig 1 Motor structure (VI)

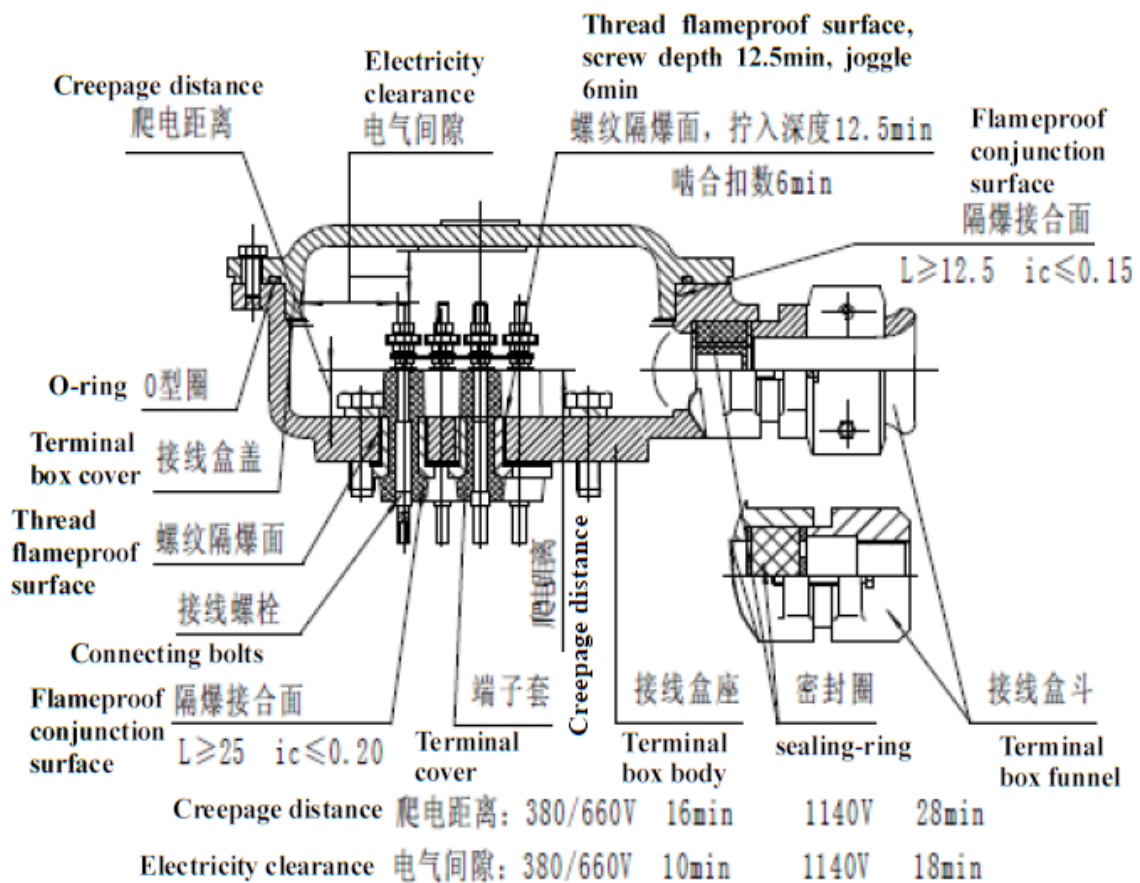


图2 接线盒结构

Fig 2 Terminal box structure

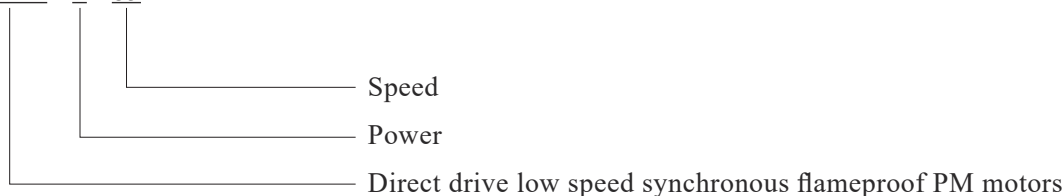
We are truly grateful for your purchasing of Wannan Motors. Before using the motor, please scan the QR code to read the manual so as to use and maintain the motor in a right way.

## 1. Summary

ZDTB series flameproof permanent magnet direct drive motors are found to be in conforming to the requirements of standard Q/WN.305-2022 “The requirement of ZDTB series flameproof permanent magnet direct drive motor”. The explosion-proof motor is manufactured according to the standard of GB/T3836.1-2021 “Electrical equipment used in explosive environment-Part 1 General Requirement” and GB/T3836.2-2021 “Electrical equipment used in explosive environment-Part 2: The Apparatus with the flameproof enclosure ‘d’” and GB/T3836.3-2021 “Electrical equipment used in explosive environment-Part 3: Increased-Safety ‘e’”. The products marked with Ex db II BT4 Gb can be used in workshop where there is Category II Class A and B flammable gas or the flammable mixture of air and steam in Temperature Group T1~T4.

## 2. Designation and types

ZDTB - 4 - 85



## 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℃ ~+40℃。

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℃

3.2.4 Motor's rated voltage is 380V, rated frequency 22.67Hz, F insulation class.

3.2.5 Motor of Y connection(380V)。

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 Allowable maximum surface temperature of motor casing (by thermometer method) shall be not higher than 130℃ even under the most unfavorable condition permitted by provision.

3.2.8 Deviation of voltage and frequency from the rating value should be in accordance with the rule of GB/T 755-2019 at the motor running time.

## 4. Main installation type see table 2

Table 2

Model	Structure and installation code (IM)
ZDTB-4-85	V1

## 5. Motor Structure

5.1 Terminal box is on the top of the motor, with 6 connecting terminals. This series motor has 2 kinds of cable structure, rubber-sheathed cable wiring (or plastic cable wiring) and steel pipe wiring, each is with one grounding terminal in it. At the front edge between connection box body and its cover an o-sealing ring will be fitted

5.2 V-sealing ring is adopted at the rotation part of motor shaft for protection.

5.3 Motors are equipped with open bearing and on-the-go oil filling/discharging device.

5.4 Subject structure of the motor see figure 1, and the structure of terminal box see figure 2.

## 6. Explosion-proof highlight

6.1 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.

6.2 Components of the explosion-proof motor (such cover, bearing inner cover, connection box cover, connection box body etc) shall be tested with 1.5Mpa static pressure for 10S+2. The motor will be checked as qualified one only by without dripping in or after the test.

6.3 The length of the explosion-proof conjunction surface, clearance, roughness of the surface, the electric clearance between the exposed conductors, the electric clearance between bare conductor and metal casing all should be in accordance with GB3836.3-2021.

6.4 Spring washer is fitted to prevent the bolts releasing down from explosion-proof casing.

6.5 Frame, end closure, bearing inner cover, terminal box cover, terminal box body, connection bolt, terminal lug (or connection board), bearing, rubber seal ring all are explosion components.

6.6 Flameproof casing fixing bolts are guaranteed to have  $\geq 800\text{Mpa}$  tensile strength and  $\geq 640\text{MPa}$  yield strength.

## 7. Operation and installation



### Warning!

Open the cover with power on is forbidden.

Handle the motor with care

Strong fall, impact, vibration will heavily damage bearing and flameproof component.

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

### 7.1 Preparation

7.1.1 Check and ensure the appearance of the motor is in good order. Check and ensure that the motor nameplate is consistent with actual requirement.

7.1.2 Inspect the motor's ex-code, and ex-certificate No and manufacture license.

7.1.3 Check and guarantee parts of explosion-proof casing have been connected correctly and tightly.

7.1.4 Check and guarantee that all explosion-proof components are without any crack or defect, as that may affect their explosion-proof performance.

7.1.5 Check and measure the insulation resistance of the stator winding, and ensure that the resistance value is no less than  $5\text{M}\Omega$ .

### 7.2 Installation

7.2.1 Installation shall be performed by technician.

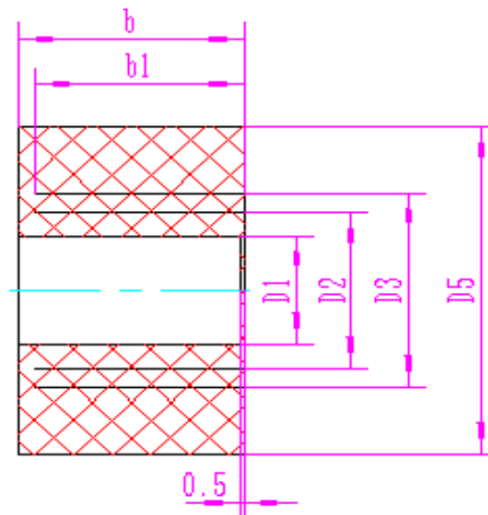
7.2.2 Spring coupling is recommended be used to drive machine.

7.2.3 Keep the motor shaft's center and driven machine shaft's center at the same level.

7.2.4 For the motor with feet, all the feet shall be fixed to sound and flat plane.

7.2.5 Power wires shall be neither too thin nor too long.

7.2.6 External diameter of the cable should fit bore diameter of the seal ring (Figure 3). Cable's min diameter is  $D_1$ , max is  $D_5$ ; seal ring is made of rubber XH-21, specification and dimension see table 5 (concentric-ring of seal gasket can be stripped off to fit inner diameter of lead-in cable). 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 flameproof function.



**Fig 3**

**Table4**

Frame	Cable	Sealing ring	D1	D2	D3	D5	b1	b
ZDTB-4-85	Rubber-sheathed cable	Fig 3	φ14	φ20	φ25	φ42 0 -0.74	24	26

7.2.7 The cable core shall be attached between arched washers, and thorn on the cable core can't be protruding in case of core damaging when pulling it out through cable entrance. The lead-in cable shall be fixed by connection board and arched washer.

7.2.8 Some motors have 2 outlets for cable, when one multi-core cable is introduced into one of the inlet holes, the blank cover of the other unused hole can't be removed; otherwise the motor will lose its explosion-proof function.

7.2.9 Motor will rotate clockwise viewed from DE if the terminals U,V,W are connected to power line phase A, B, C respectively. Otherwise the motor will rotate anti-clockwise.

7.2.10 Internal and external grounding screw bolts need to be grounded.

7.2.11 Correctly connect all wires, turn on power for no-load trial-operation. Only when the motor runs smoothly in the test-running, can it be put into load operation.

**Warn!**



1. Supply voltage fluctuation shall not go beyond the range 95% ~105% of the rated voltage.
2. Ground wire must be connected
3. Turn off the motor immediately when abnormal problem occurs.
4. Keep body and clothes far away from rotating parts of motor.

## 8. Maintenance and inspection

8.1 Examined and clean the motor periodically, ensure that no dust accumulated on motor casing,

spraying with tap for cleaning is not allowed.

8.2 The permitted maximum temperature of bearing is 95°C during its operation (by thermometer method), inspect at least once every 2500-hour running (approximate half a year). Bearing lubrication grease shall be replaced when it is found to be spoiled. Before that the waste grease at bearing external cover, storage box, grease discharging device including oil tube and oil cup should be cleaned up, and clean the bearing with gasoline. No.3 (GB 7324-1994) Lithium-base lubricating grease is recommended to fill 2/3 volume of grease chamber. Bearing specification see table 5.

8.3 Take care of the explosion-proof surface if the motor need to be dismantled. Frame H80~132 Motors have no internal and external shaft cover, so windshield should be removed at first, then remove the V-shape shaft sealing ring, knock down the fastener on front and rear end closure, and take out rear end closure together with the rotor and fan. Explosion proof plane of the motor has been painted with 204-1 rust protection grease when assembled.

8.4 Motor must be dried before use if the motor has been affected with damp, either by means of drying in the oven or short-circuit current. If dried in the oven the temperature should be increased gradually but not exceed 145°C . And when the motor adopt short-circuit method, it should be connected as short circuit whose input current is 0.6-0.8 times rated current. However the short-circuit method is not suitable if the motor is heavily damped, since it may cause the electrolysis.

8.5 When the winding need to be changed, please keep such data as the type size, wire gage, number of turns of the original winding firmly in mind. Contact us and ask for the date in case they are lost. Winding should not be optionally changed, otherwise some of the motor's properties may be deteriorated and even affect its running.

8.6 Explosion-proof components should be repaired, replaced, tested by technician following relevant technical standards.

**Table 5**

Frame	DE	NDE
ZDTB-4-85	6313	6313

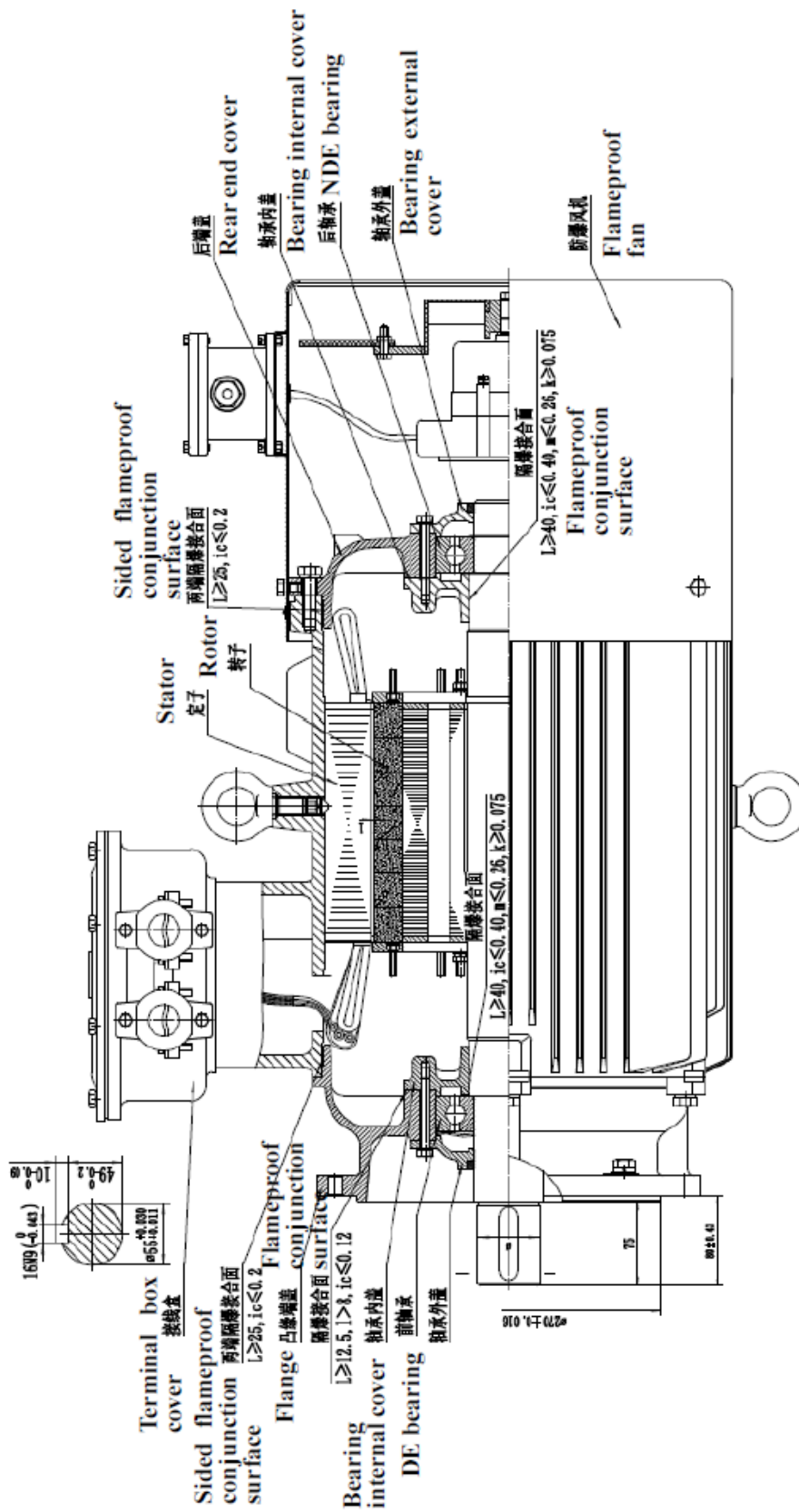


图2 ZDTB-4-85 电机主体结构 (VI)

Fig 1 Motor structure (VI)

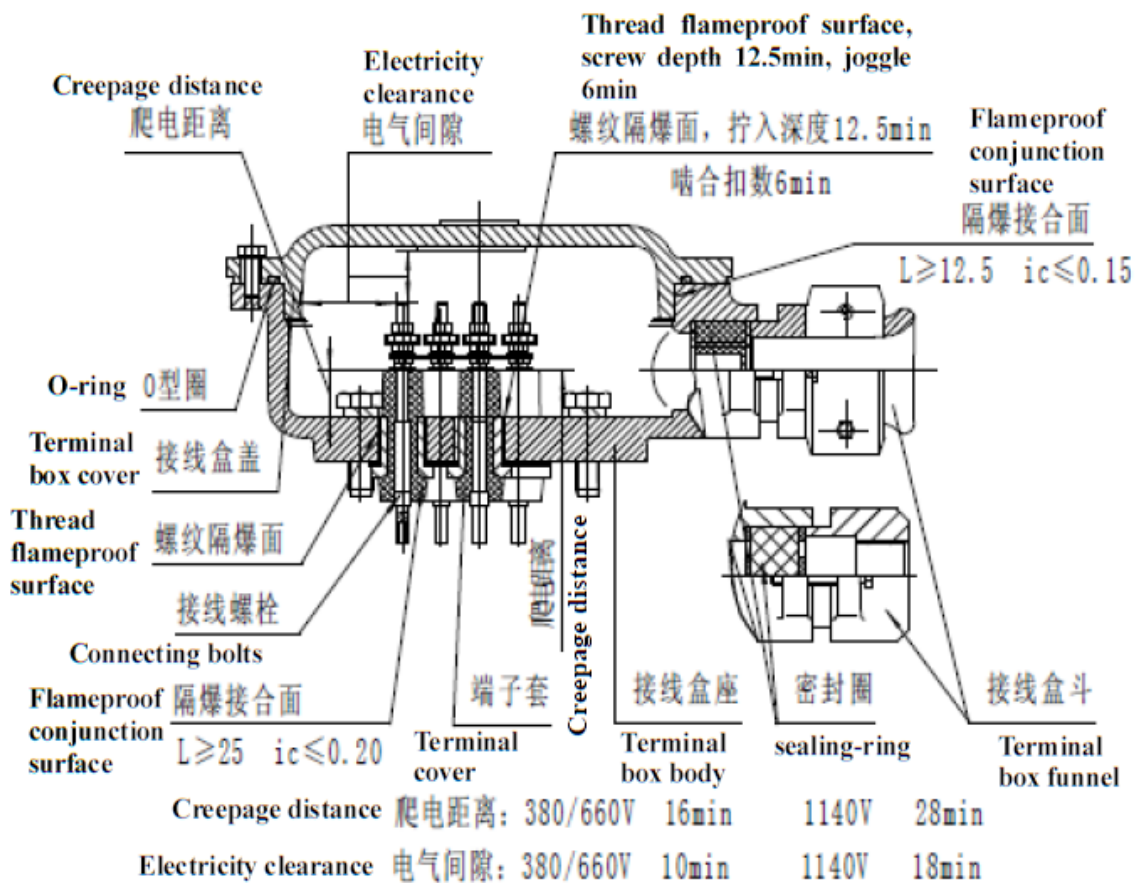


图2 接线盒结构

Fig 2 Terminal box structure

## 敬告用户：

请您按照本使用说明书的规定，正确地使用和储存电动机，我们将为您提供优质、快捷的服务。

在电动机使用过程中，您如有什么疑惑请与我们联系，我们将及时给予您满意的解答；您有什么良好的建议请向我们提出，以便我们改进，为您提供优质、快捷的服务。

安徽皖南电机股份有限公司对本使用说明书保留最终解释权。

请勿在未事先获得安徽皖南电机股份有限公司书面许可的情况下向第三方复制、公布或者使用本使用说明书内容。

## Dear user,

Please use and store the motor right following the instruction of the manual. We will make our effort to provide you with high-quality and prompt service. Contact us if you had any questions in application, and we will offer you timely and effective resolution; let us know if you had any advices or suggestions, with which we can improve ourselves and make service better. Anhui Wannan Motor Co., Ltd. reserves the right of final interpretation of the user manual. No copy, disclosing or using of the content of this user manual to third parties prior to written permission from Anhui Wannan Motor Co., Ltd.

## 安徽皖南电机股份有限公司

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