南华® WNM® 皖南电机®

皖南电机

TYLS 系列自起动三相永磁同步电动机

TYLS Auto-Start Permanent Magnet Synchronous 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

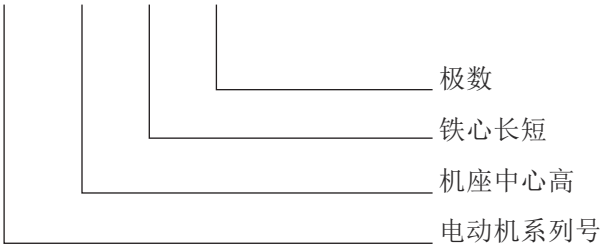
衷心感谢您选购、使用皖南电机。

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。

我公司生产的**TYLS系列自起动三相永磁同步电动机**，具有高效、节能、噪声低、振动小、结构紧凑、运行稳定、安装维护方便等优点，适合一般用途的各种机械，如风机、水泵、压缩机、磨机、破碎机等做原动机用。该系列效率符合GB30253-2013（1级能效）。

电动机型号的意义：

TYLS 132 - L — 8



一、运行使用条件

1．海拔不超过1000m。

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．最湿月月平均最高相对湿度为90%，同时该月月平均最低温度不高于25℃。

4．额定电压：380V，额定频率：50Hz。

5．电动机允许满压直接起动，但应注意，满压起动时起动瞬间电流较大。

6．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。

7. 电动机必须保持清洁，进风口及风道必须畅通无阻。

警告！

该类电机禁止频繁起动。

严禁热态起动，冷态连续起动次数不超过两次。

二、安装与使用

警告！

搬运电动机时，一定要小心谨慎！

强烈的摔、碰、震会严重损坏轴承及其他元件。

吊装带有吊攀的电动机时，一定要将吊攀旋紧。

1. 安装前的检查

注意 检查过程中，您若有疑问，请向有关专业技术人员请教或与我们联系。

• 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。

• 开箱后应清除电动机上的灰尘及轴伸部位的防锈层，不要损伤结合部位的密封和表面油漆。

• 轻轻转动电机转轴，转动应顺畅，检查润滑脂或润滑油是否变质，如变质，应更换同牌号润滑脂和润滑油。

• 检查各零部件应联接正确、装配良好，紧固件应无松动。

• 电机初次使用之前，绕组有可能受潮，需先检查绕组间和绕组对地绝缘阻值。用 500V 兆欧表测量电动机定子绕组绝缘电阻，所测值应不低于 1 MΩ，否则须先对电机进行干燥处理。

2. 安装

警告！

1. 电源电压的波动不得超出额定电压的 95% ～ 105%。
2. 严格按图接线。
3. 必须接好接地线。
4. 通电前应取下轴伸上的轴套和平键，保持身体、衣物远离电动机旋转部分。
5. 电机运行若有异常立即停机。

• 电动机的安装应由专业技术人员完成。

• 电动机允许采用弹性联轴器、正齿轮及皮带轮传动。

• 采用皮带轮传动是，电动及轴中心线与负载轴中心线平行且要求皮带中心线与轴中心线垂直，采用联轴器传动是，电动机中心线与负载中心线应重合。

• 对带底脚的电动机，安装平面应平整、坚固。

• 电动机的周围应留有足够空间方便维护，冷却空气应畅通流经电动机。

• 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，用户如需反转，可对调 U、V、W 的任两相。

• 电动机内、外接地螺栓必须可靠接地。

• 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，空载运行足够长的时间（一般在 30 ～ 40 分钟），并观察电机有无异常现象，待空转正常后投入负载运行。

• 该系列电机如果加装热保护装置，热保护装置引线必须接入相应装置后才能启动电机。

• 当电源的频率和铭牌上的数值偏差超过 1% 或电压偏差超过 5% 时，电动机不能保证连续输出额定功率。连续工作的电动机，不允许过载。

• 连接电机的电源线额定安培数须与电机的输出电流安培数相匹配。

三、维护与维修

警告！

1. 严禁缺相运行。
2. 反复多次起动会导致电机过热，甚至磁钢发生退磁。
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．电动机应定期检查和清扫，外壳不得堆积灰尘，不得用水喷射清扫电机。

2．当电机的热保护及短路保护连续发生动作时，应查明故障来自电动机还是超负荷或者保护装置设定值太低。故障消除后，放可投入运行。

3．电动机运行时轴承允许温度不得超过 95 ℃（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，并将轴承清洗干净。润滑脂推荐采用 ZL3 锂基润滑脂小型电动机专用润滑脂，油脂添加量以加到轴承容腔的 1/3 ～ 1/2 左右为宜。轴承牌号见表。

4．拆卸电动机时，以轴伸端或非轴伸端取出转子都可以。如果无需卸下风扇，建议从非轴伸端取出转子。从定子中抽出转子时，应防止损坏定子绕组或绝缘。

5．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。在烘培过程中，温度应逐渐升高，但不可超过 145℃。用短路电流法干燥时（严重受潮的电机不宜用此方法，以免发生电解现象。），电机处于短路状态，其输入电流取 0.6 ～ 0.8 倍额定电流值为宜。

6．更换绕组时，须记下原绕组的型式、尺寸、线规、匝数。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。

7．由于永磁电机的转子具有强大磁场，非专业人员或未经本公司培训的人员严禁拆装电机，以防转子相吸损坏电动机的绕组及配件，更不允许非专业人员擅自拆解转子，以防磁钢弹出，造成人员受伤。电机零部件的维修、更换须由专业技术人员按有关技术标准进行维修、验收。

8．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。

9. 对于存储半年的电动机，建议每 2 个月将电机轴旋转 180 度。

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。

四、运行中的故障及其主要原因

在运行中必须经常检查电动机，以便能及时发现各种故障而消除之。不然这些故障能引起事故。下面叙述最常见到的故障和原因：

1. 机械的故障

·轴承过热：可能是由于油量不足，油不清洁，油的品质降低，水滴侵入，油环卡住，转轴或轴衬表面的故障，在转轴颈与轴衬间的间隙缩小，轴承歪斜，轴颈压力过度及产生轴电流等所引起。滚珠及滚柱轴承的过热，可能是由于润滑油不足或过多，转轴弯斜，转轴磨擦过大，润滑油内有杂质及外来物品以及钢珠损坏等所引起。

·漏油及机内积油：是由于轴承内油量过多，轴承所有油质不良或粘度不对等所引起。也可能是由于轴承油槽内压力和轴承盖下压力不均匀所致。

·电动机振动的厉害：机组的轴线没有对准，电动机在底板上的位置不正，转轴弯曲或轴颈振动，联轴器配合不良，转子皮带盘及联轴器平衡不良，轴颈与轴衬间的间隙过大，鼠笼转子断裂，转子铁

心振动，底板不均匀的下沉，底板钢度不够，底板的振动周期与电动机（机组）的振动周期一样或接近，皮带轮粗糙或皮带轮装置不正，传动机构工作不良及有碰撞，轴承超过其运行寿命等等。

·转子偏心：可能是由于轴衬松掉、轴承位移，转子及定子铁心变形，转轴弯曲及转子平衡不良等所引起的。

2. **电气的故障：**

·启动时不正常：由于接线错误、线路断路、工作电压不对、负载力矩过高或静力矩过大和启动设备有故障等所引起。

·电机过热：由于线路电压高于和低于额定值、过负荷、冷却空气量不足、电机环境温度过高、匝间短路及电动机不清洁等所引起。

·绝缘损坏：可能由于工作电压过高，酸性、碱性、氯气等有腐蚀性气体的损坏、太脏、过热、机械碰伤、温度过高，在温度小于 0℃下保藏和水分侵入等所引起。

·绝缘电阻：由于不清洁、湿度太大，因温度变化过甚，以致表面凝集水滴，绝缘磨损和老化等所引起。

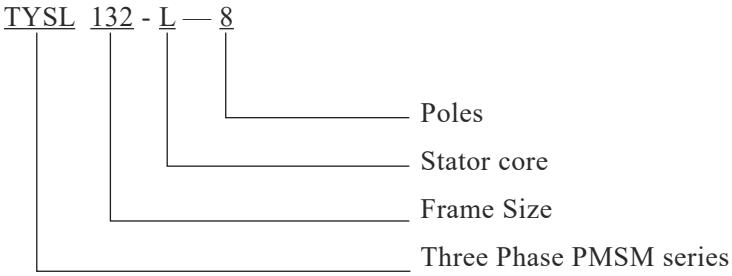
机座号	轴伸端	非轴伸端
132	6208-2RZ	6208-2RZ
160	6309-2RZ	6309-2RZ
180	6311-2RZ	6311-2RZ
200	6312-2RZ	6312-2RZ
225	6313-2RZ	6312-2RZ
250	6313	6313
	6314	6313
280	6314	6314
	6317	6314
315	6317	6317
	6319	6319
	NU319	6319
355	6319	6319
	6322	6322
	NU322	6322

注：电机用轴承型号以实物使用型号为准，恕不另行通知

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.

TYSL series Auto-start permanent synchronous motor are conform to GB30253-2013 (Level 1 efficiency), featuring on its super-high efficiency, energy saving performance, little vibration, compact structure, stable operation and easy maintenance. The motors are ideal for the application on general machine like blower, pump, compressor, mill and crusher.

Motor type designation:



1. Usage

1.1 The altitude exceeds not 1000m above sea level.

1.2 The ambient temperature is neither higher than 40 ℃ nor lower than -15 ℃ although it is always changing with season.

1.3 The average highest relative humidity of wet month is 90%, the lowest temperature in this month should be no more than 25℃ ..

1.4 Rated voltage:380V , rated frequency: 50Hz

1.5 DOL start is allowable, but notice that the start current is relatively large.

1.6 The motor cannot be applied in the circumstance where contains inflammable gases, chemical corrosive gases and other harmful gases or steam.

1.7 Keep the motor clean and in good ventilation.

Warning!

Frequent start is not allowable

Hot starting is not allowable, and continuous cold start shall be no more than 2 times.

2. Installation & operation

Warning!

Be careful when handing motor !

Strong falling, bumping or shaking will damage bearing and other elements.

Make sure the eyebolt is tightened before lifting up the motor.

2.1 Inspection before installation

Notice	If you have any question during the inspection, please consult a professional technician or contact us.

2.1.1Check and make sure the appearance of the motor is in good order. Check and ensure that the motor nameplate is consistent with the actual requirement.

2.1.2 Clean away dust and rust protection oil carefully, but not damage compound plate sealing and and paint.

2.1.3 Check lubrication grease. The bearing grease should be replaced immediately with same model if the grease is found to be spoiled

2.1.4 Ensure that all parts have been connected correctly and tightly.

2.1.5 Open terminal box cover and measure insulation resistance of the winding with 500v meg-ohmmeter, the value should be no less than 1MΩ. If not, the motor shall be dried first.

2.2 Installation

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. Connect grounding wire safely.
4. Remove the sleeve and key on the shaft end before power up, keep body and clothes far away from rotating parts of motor.
5. Stop the motor immediately if any abnormal problem occurs.

2.2.1 Installation should be performed by technician.

2.2.2 Coupling, spur gear and belt pulley are allowed to be used for transmission.

2.2.3 The shaft center of the motor must keeps consisting with that of the driven machine.

2.2.4 If motor has mounting feet, ensure that the mounting face should be flat and solid.

2.2.5 Leave enough space for regular maintenance work and make it in good air ventilation to enable heat dissipation

2.2.6 Motor will rotate clockwise viewed from driving shaft end if the terminal U,V,W is connected respectively to power line A, B, C. Otherwise the motor will rotate anticlockwise. Provided the reverse rotation is need, interchange any two of the three terminal U, V, W.

2.2.7 Ensure the internal & external grounding bolts have been safely grounded.

2.2.8 After checking all the connections, turn on power for no-load operation test for 30-40 min, and then put into with-load operation.

2.2.9 If the motor had thermal protective device, only when the leading cable of the thermal protection device connected to inverter can the motor start to run.

2.2.10 The voltage deviation exceed 5% or frequency deviation exceed 1%, the motor output power may be lower than its rated value. Continuous duty motors are not allowed to overload operation.

2.2.11 Choose proper power cable whose bearing capacity shall fit motor's output current.

3. Maintenance

Warning!

1. Non-full phase operation is prohibited.
2. Repeat starting will cause overheat of motor, or even damage motor.(In particular, start with the load directly).
3. Avoid overload. Overload will cause overheat, and overheating will shorten the insulation life. As a result, it will reduce motor reliability.

3.1 Check and clean the motor periodically, make sure no dust cover on the motor. Do not inject water to clean the motor.

3.2 When motor's thermal protection or short circuit protection enables, the causes may from overload for the motor or improper protection setting value for the inverter.

3.3 Bearing temperature should not exceed 95℃ (Thermometer method) during operation. The bearing should be inspected every 2500h (about half a year) operation. The bearing grease should be replaced immediately if the grease is found to be spoiled. It's proper to fill 1/3~1/2 capacity of the bearing chamber with lubrication grease. No.2 Lithium-base lubricating grease is recommended. **(Bearing model is listed in the table attached)**

3.4 Rotor can be taken out from DE or NDE when dismantling the motor, but extracting the rotor from NED is recommend if fan is not to be dismantled. Be careful not to spoil the resistance or stator core when dismantling.

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

3.6 If the winding needs to be replaced, the original winding's type, dimensions, diameter and turns of coil should be recorded. Arbitrarily changing of winding will decrease the performance of the motor, and even to damage the motor.

3.7 As permanent magnet motor rotor produces strong magnet field, any maintenance or replacement of its components must be done by professional people. User is not allowed to mantle or dismantle motor, otherwise the rotor's intense magnet force may spoil winding or other components. When rotor need to be taken out, this work must be finished by professional career, since the ferrite may bounce out and cause personal injury.

3.8 The motor need to be periodically inspected according to its actual operation, overhaul at least

once a year.

3.9 Turn the shaft by 180° with hand every 2 month for the motor which has been stored half year

3.10 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.

4. Failures & causes

Check motors frequently in order to remove the possible failure in advance. The common failures are as follows:

4.1 Mechanical fault:

• Bearing overheat: lack of grease, dirty grease, low quality grease, water intrusion, oil ring stuck, surface fault of bushing, narrow distance between shaft and bushings, excessive pressure on shaft journal and axis current and so on.

• Leakage of grease: too much grease in bearing, grease of bad quality or incorrect viscosity, any unbalanced pressure between bearing oil container and the bearing cover.

• Strong vibration: inconsistent center line of the shaft between motor and the driven machine, incorrect mounting position on base plate, shaft bending, bad cooperation of coupling, unbalance of pulley or coupling, large space between shaft journal and bushing, broken rotor bar, vibration of stator core, uneven surface of base plate, inadequate rigidity of base plate, similar or same vibration cycle of the motor and the base plate, rough belt coupling, incorrect position of the belt coupling, poor operation of the transmission or the collision of the motor, etc.

• Eccentric of rotor: loose bushing, bearing displacement, the deformation of rotor and stator, bend of the shaft and poor balance of the rotor.

4.2 Electrical Fault：

• Abnormal starting: incorrect connection, open circuit, incorrect voltage, too high load torque and too high static torque, starting device failure and so on.

• Motor overheating: much higher or lower than rated voltage, overload, lack of cooling air, too high ambient temperature, short circuit or uncleanness of the motor, etc.

• Insulation damage: high working voltage, damage from corrosive gases like acid gas, alkaline gas and chlorine, too dirty, overheat, mechanical damage, excessive temperature, storage in environment whose temperature is lower than 0℃ and water penetrating.

• Poor insulation resistance: uncleanness, high humidity, surface condensation as result of sharp temperature variation, worn-out and aging of insulation material, etc.

• Inverter: ① over-current alarm: possible causes are foreign matter in motor or worn-out cable. ② “short circuit to ground” alarm: Measure the resistance of three phase and ground to see whether there is short circuit ③ overheating alarm: check temperature sensor wire and signal feedback.

Attachment: Bearing model table

Frame size	Drive end	Non–drive end
132	6208-2RZ	6208-2RZ
160	6309-2RZ	6309-2RZ
180	6311-2RZ	6311-2RZ
200	6312-2RZ	6312-2RZ
225	6313-2RZ	6312-2RZ
250	6313	6313
	6314	6313
280	6314	6314
	6317	6314
315	6317	6317
	6319	6319
	NU319	6319
355	6319	6319
	6322	6322
	NU322	6322

Note: When changing bearing, take the nameplate of the actually assembled bearing as standard.

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。

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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.

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本说明书内容如有变动，恕不另行通知。

Content in the manual may be changed without prior notice.