



风机产品使用说明书

Fan instructions

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非常感谢您使用“风力佳”品牌风机

Thank you very much for the use of "miger" brand fan

正确的安装和维护关系到风机性能及使用寿命。为此，谨请您仔细阅读本说明书并按要求操作。

Installation and maintenance related to the fan performance and service life of the right. Therefore, please carefully read this manual and according to the requirements of the operation.

一、安装概述

1、风机的安装场所

the installation site of fan

风机安装场所的选定请注意如下几点：

The selected place to install fan please note the following:

- (1)若风机处于露天场合，应具备防护设施加以保护； If the fan in the open air, should have safeguard
- (2)风机应置于方便管理及监护的地方（图1）； The fan should be placed to facilitate the management and monitoring of the place (Figure 1);
- (3)安装的场所应具有固定的基础。 The installation site should have a fixed base
- (4)特别是安装于高架结构上的风机，安装场所应是不诱发振动的结构。 Especially the fan installed on the overhead structure, the installation site should be structure induced vibration.

2、风机的安装空间要求 fan installation space requirements

安装通风机的场地面积，估算时应考虑如下几点： Install the fan site area, the following points should be considered when estimating (1)不妨碍相邻其他机器正常运转； It does not interfere with the normal operation of other adjacent machines (2)能安全而且方便地对通风机进行检修； The safety and convenience of ventilation machine overhaul

- (3)拆卸叶轮更换轴承时应由足够的空间 The replacement of bearings by disassembling the impeller enough space.

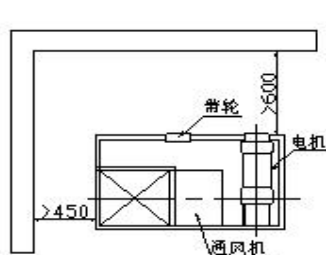


图1

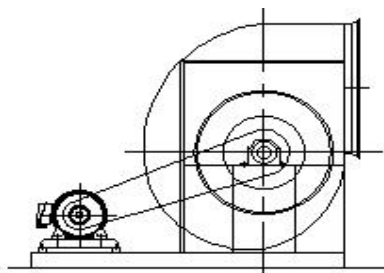


图2

3、各种安装方法及要求 various installation methods and requirements

(1)地面上安装 The ground installation

风机一般安装于混凝土基础上，但是对型号较小、且电机功率较小的小型通风机亦可不作基础直接安装于地面，即使如此也应该注意基础的强度（图2） The fan is installed on the concrete foundation, but for smaller, and the small fan can lower power motor not directly installed on the ground, even so should also pay attention to the basic strength (Figure 2).

(2)楼板（高台架）上安装 The floor (high rack installation)

应充分注意安装区的刚性及强度，以避免通风机运转时引起共振，否则必须采取加固措施（图3A） We should pay attention to the rigidity and strength of the installation area, in order to avoid the fan operation caused by resonance, otherwise, reinforcing measures must be taken (Figure 3A).

(3)装于箱内的风机 The fan is mounted in the box

为避免因结构刚度及强度不足而引起风机振动，故必须充分注意安装构架的强度。尤其使用减振橡胶（弹簧）等减振材料时，务必使风机和电机安装于公共底盘上（图3B） In order to avoid the fan vibration caused by the structural stiffness and strength is insufficient, so must pay full attention to installation of the frame strength. Especially the use of damping rubber (spring) such as damping material, make sure the fan and motor mounted on a common chassis (Figure 3B).

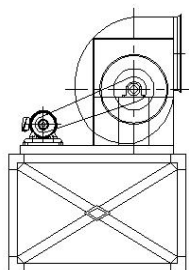


图3A

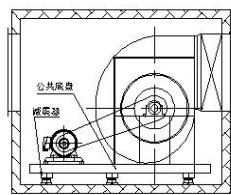


图3B

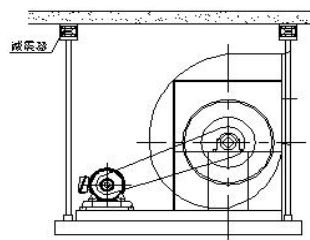


图4A

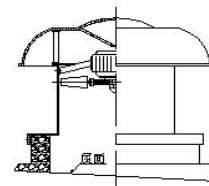


图4B

4、吊装于天棚的场合 hung from the ceiling

小型风机可简单地以螺栓吊装的安装型式(图4A),对于中型通风机其吊装型式应采用焊接的框架结构安装风机,并尽量采用地面安装为妥 The small fan can be simple to install type lifting bolt (Figure 4A), for medium-sized fan of the lifting type frame structure should be used in welding installation of the fan, and to maximize the use of ground mounted properly.

(1)挂壁式风机(排气扇)其安装壁必须强固 The hanging wall fan (fan) the installation wall must be strong.

(2)屋顶安装 The installation of the roof

安装屋顶风机,应充分考虑外界风暴和雨雪等外因对风机的影响,屋面倾斜时亦做到风机垂直安装(图4B) Install roof fan, should fully consider the influence of external and external factors such as rain and snow storm on the wind turbine, the roof tilt also do the fan installed vertically (Figure 4B).

二、基础 basic

1.混凝土基础 concrete foundation

(1)混凝土基础平面尺寸至少比风机底盘外缘尺寸大150~300毫米。小型风机基础区小值,但基础厚度至少150毫米,基础承重量约按大于通风机总重量的5~10倍考虑(图5) The concrete basic plane size than the size of fan border 150~300 mm. The basic area of small fan small value, but the thickness of the base of at least 150 mm, base bearing weight by about 10 times greater than the total weight of the fan 5 to consider (Figure 5).

(2)考虑到风机底盘会因积水而腐蚀,基础四周应设置排水沟(图6) Take into account the fan chassis due to water erosion, the foundation shall be installed around the drainage ditch (Figure 6).

(3)基础表面应平整、光滑。并充分考虑到预埋螺栓孔位置 The base surface should be flat, smooth. Considering the embedded position bolt hole.

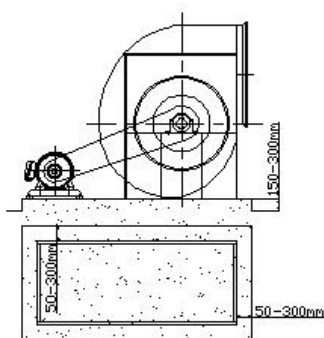


图5

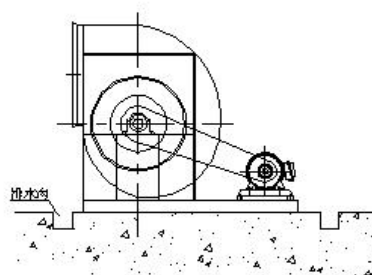


图6

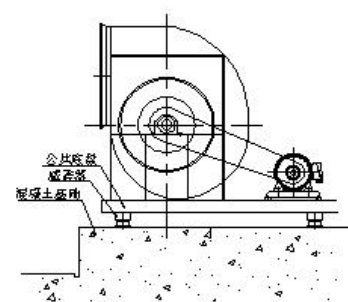


图7

(4)基础表面与通风机底盘间应以垫底片等调整,使其能充分接触后固定 The surface of the base and the fan chassis should be adjusted so that the pad plate, can fully contact after fixed.

2.减振元件 damping element

风机的减振元件种类有减振垫片,减振橡胶垫,减振弹簧座等(图7) Type of fan damper with damping gasket, rubber damping pad, a damping spring seat (Figure 7).

根据风机的重量及风机运行的频率,来选择合适的减振元件其效果较好。若风机处于低速运行或载荷较轻的情况,对此可用减振橡胶

According to the weight and the fan operation of the fan frequency, to select the appropriate damping element has better effect. If the fan runs in low speed or load lighter, the available damping rubber.

3.减振元件 damping element

- (1)使用减振元件时,必须满足风机和电机共同安装在有足够刚性的公共底盘上 The use of damping element, must satisfy the fan and motor mounted on the chassis has sufficient rigidity to the public.
- (2)为使各减振元件均匀受力,基础平面应是水平的。若有部分元件浮置于风机底盘下,则可能引起风机异常振动 It is the damping element in uniform stress, the basic plane should be level. If a component is arranged in the wind floating chassis, it may cause the abnormal vibration of the fan.
- (3)使用减振元件时,务必在通风机出口管道上安装软性接头 The use of components, you must install flexible joints in the outlet pipe of fan.
- (4)叶轮有可能积灰或异物附着,这样会较大地影响(破坏)叶轮的动平衡,在此情况下使用减振元件是不适当的 The impeller has dust or foreign matters, this will affect the dynamic balance of the impeller (destruction), in this case the use of the damping element is not appropriate.

三、搬运、储存、保管 handling, storage, custody

风机出厂前对风机的中心线校正、动平衡等均已给予充分的注意,并经运转合格后才准予出厂。因此,在客户现场搬运时应注意风机不被擦伤,甚至变形 The fan before the center line of the wind turbine, the dynamic balance correction have been given sufficient attention, and the operation after passing to the factory. Therefore, the customer should pay attention to handling the scene fan not to be scratched, and even deformation.

1.部件检查 parts inspection

- (1)检查风机有无损伤、变形、油漆是否完好 To check the fan without damage, deformation, paint is good.
- (2)风机的部件、备件是否有混杂、遗漏、搬运前后数量是否一致 The wind machine parts, spare parts are mixed, missing, before and after handling the number is consistent.

2.吊装及搬运 lifting and handling

- (1)风机搬运、就位、吊装时,请按吊装标识位置进行吊装 The fan in place, lifting, handling, please mark the location according to the lifting hoisting.
- (2)分体式机壳及转子吊装时,注意绳索和工件相接触部应以布或柔软的物件填入,特别是叶轮和轴,因为即使微小的变形也可能引起动平衡精度的降低,导致运转时风机振动 The split casing and the rotor lifting ropes and workpiece contact, attention should fill with cloth or soft objects, especially the impeller and shaft, because even small deformation may also be caused by reducing the dynamic balance precision, lead to running fan vibration.
- (3)带轮、黄油咀等在吊装时易受伤害,用索具时,应充分注意 The belt wheel, the butter nozzle and so vulnerable in hoisting, rigging with, full attention should be paid to..
- (4)设备在移动作用时,可能引起轴、皮带轮、叶轮很大的冲力,为此请注意转动部件应不受其害 The equipment in the mobile function, may cause the shaft, belt wheel, impeller great momentum, so please note that rotating parts should be being affected.

3.保管 custody

- (1)风机未安装前,应置风机于通风、干燥的场所,并定期检查以防止生锈和损伤。 The fan is not installed before, should the fan in ventilated, dry place, and regularly check to prevent rust and damage.
- (2)保管期内,每月至少二次对风机进行盘车,每次至少 10 转(并在原叶轮位置转过 180°处停放)。根据盘车时的感觉,注意轴承的润滑情况。其次,对调节门等可转动部件开、关数次,必要时注入润滑剂,以防生锈 The custody period, at least two times per month of the wind turbine turning gear, at least 10 RPM (and park in the original position of the impeller rotates 180 DEG at). According to the disk when feeling, pay attention to lubrication bearing. Secondly, the rotating parts such as adjustable door opening and closing several times, when necessary to inject lubricant, anti rust.

即使通风机安装已完工,但长时间停止运行,除按上述程序处理外,应打开轴承该仔细检查轴承的润滑情况,必要时更换新润滑脂。 Even if the fan installation has been completed, but a long time to stop running, in addition to treatment according to the above procedure, the bearing lubrication should be opened carefully check the bearing, replace the new grease when necessary.

四、安装方法 the installation method

风机出厂前制造厂已对风机和电机进行了校正,但因运输原因及底座本身难免会产生弹性变形,因此风机安装到基础上之后,应再次进行校正 Fan factory has been on the fan and the motor was corrected, but due to the transport of reason and base itself will produce elastic deformation, so after the fan is mounted to the base, should be corrected again.

1.校正 Correcting

(1)一般情况 The general situation

a 风机水平原则上以轴为基准,轴流风机若垂直安装时(立式),也可以带轮、叶轮轮毂的加工面为基准 The level of a in principle to the fan shaft as a reference, if the vertical axial flow fan installation (vertical), machining surface can also belt wheel, impeller hub for reference.

b 风机置于平整的混凝土基础上以水平仪检查水平,水平校准可在风机和基础间垫上垫片。然后,灌入水泥浆使结合面充分接触。于此同时,可在基础螺栓预留孔内注入水泥浆,并使螺栓垂直并加以固定 The concrete foundation of B fan flat on a level to check the level, the level may be calibrated in the fan and foundation pad gasket. Then, pouring cement grout with full contact surface. At the same time, the foundation bolt reserved hole grouting, and the vertical and fixed bolt.

c 基础螺栓应均匀锁紧,局部螺栓过紧往会使轴中心偏移,引起轴承损伤 foundation bolt locking bolts should be uniform, local tight tend to make the shaft center offset, causing bearing damage.

(2)安装于组装箱内的风机 The CThe fan is arranged in the box assembly

a 风机安装于组装箱内,应考虑能方便地调换轴承;尽可能使风机整机原样装于箱内(不要拆卸) A fan installed in the assembled box should be considered, can easily change the bearing; as far as possible so that the wind machine is installed in the box (do not remove).

b 组装箱应设有调换和检查轴承的检视窗或门 The B assembly shall be provided with a replacement and check the bearing box view window or door.

2.轴承座的安装 bearing installation

在锁紧各安装螺栓时,应注意不要再轴方向对轴承造成不应有的轴向作用力 n the locking bolt installation, should take care not to the direction of the axis of the bearing axial force should not cause.

(1)使用轴承座的情况 The use of the bearing seat

轴承座上螺栓按(图8)所示程序锁紧:在底部二侧的螺栓 A 先行锁紧,对于水平中分型的轴承座先慢慢地锁紧自由侧的螺栓 B (轴承的自由侧一般取在非电动机一侧,但是对于 E 式传动及热风机亦有取在电机一侧的),然后再锁紧非自由侧螺栓 C The bearing seat by bolts (Figure 8) shows the locking bolt A program: at the bottom of the two sides of the first locking bolt, B for bearing type in the level of the first slowly locking free side (free side bearing the non motor side, but for the E type transmission and hot air also take on the motor side), and then the non locking free side bolt C.

高温风机应充分考虑轴的热膨胀伸长.

High temperature fan should fully consider the axial thermal expansion elongation.

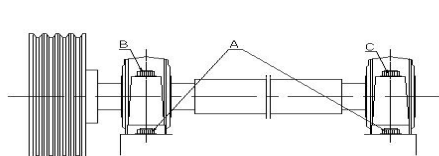


图8

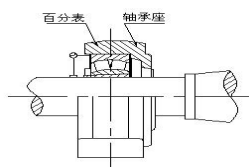


图9

轴承及轴的校正法 Bearing and shaft correction method

取下轴承侧盖在轴上装上百分表,测定点取轴承外圈(若取外圈不可能,则可取轴承座侧面加工的部分)。轻轻盘动轴,读出百分表的最大最小值,并记下;取其读数差的 1/2, 为偏摆值 T。若测点距轴心距离为 R,则可求得轴承对于轴的倾斜值(图9),并可计算出倾斜度。

Remove the bearing in the shaft is provided with a side cover indicator, determination of point bearing outer ring (if the outer ring is not possible, then the desirability of side processing bearing part). Gently disc shaft, read dial the maximum and minimum value, and record the readings; poor 1/2, as the deflection value of T. If the distance between the measured

point axis distance is R, can be obtained according to the T/R value for the bearing axis tilt values (Figure 9), and calculate the inclination.

表 1 轴承的容许倾斜度 Allow the tilt table 1 bearing

轴承形式 Bearing form	容许倾斜度(系列/度数) Allowable inclination (Series / degree)								
双列调心轴承 Doublerow self-aligning bearing	12/2°	13/2.5°	14/2.5°	22/2°	23/2.5°				
双列调心滚子轴承 Double row spherical roller bearing	213/1	222/1.°	232/2°	230/1.°	231/1.5°	232/1.5°	339/1.°	240/2°	241/2.°

注：表 1 为轴承在正常负荷及工作条件下，内圈转动时允许存在的容许倾斜度。能否安全达到此给定值，须依轴承配置设计及密封类型等条件决定 Table 1 shows the bearing under normal load and working conditions, the inner ring rotates to allow for the presence of allowable inclination. Can reach the given value, shall be in accordance with the configuration design of bearing and seal type conditions.

(2)使用轴承单元的情况 The use of the bearing unit

调心轴承单元具有自动调心的性能，具有 2°（带轴承盖的 1°）的调心范围，但由于单元支架构造简单，其轴向许容量小，为此安装时注意 Self-aligning bearing unit has the performance of automatic aligning, has 2 degrees (1 degrees with a bearing cap) of the self-aligning range, but because the unit bracket has the advantages of simple structure, the axial direction of Xu Rongliang: Small, so please pay attention:

a 止动螺钉向心球轴承单元 screw of ball bearing unit

使用该类轴承单元，轴承间间距调整后钻孔定位。因此，需注意定位孔应与要求的安装位置一致。风机日常使用时，应注意螺钉是否松动及位置是否变动；否则在运转中会产生振动，以致轴承内套与轴产生相对运动（图 10） The use of this type of bearing unit, bearing spacing after adjustment of drilling position. Therefore, the need to pay attention to the positioning hole should be consistent with the requirements of the installation position. Daily use of fan, should pay attention to whether the loosening of screw and whether the position change; otherwise it will produce vibration in the operation, so that the bearing sleeve and the shaft relative motion (Figure 10).

b 偏心固定轮向心球轴承单元 eccentric fixed wheel radial ball bearing unit

是利用斜楔原理，使轴承固定于轴，效果较好。将偏心环装到有偏心的加长部分上并沿机轴旋转方向旋转直至锁紧（图 11），并注意旋紧防松螺钉，否则会产生松动。 Is the use of wedge principle, the bearing is fixed on the shaft, the effect is good. The eccentric ring mounted to the eccentric part and extended along the rotating direction of the rotating shaft until the locking (Figure 11), and tighten the locking screws, otherwise it will loose.

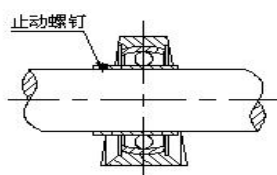


图 10

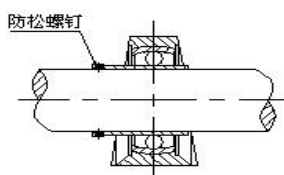
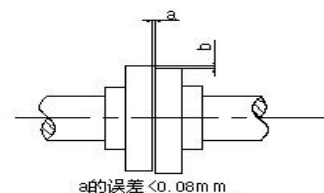


图 11



a的误差 <0.08mm
b的误差 <0.03-0.05mm

图 12

3.确认电机转向 confirm the motor steering

- (1)安装电机时，以手盘动，确认无异常情况 The installation of the motor, with the hand disc, confirm no abnormality.
- (2)在挂上胶带或安装联轴器联接柱前，确认电机转向符合风机转向要求 The tape or install the coupling column hung up before, confirm with the fan motor steering steering requirements.

4.带轮及胶带 belt wheel and belt

风机试运转前，对胶带、带轮进行检查，校正两带轮直线度及轴线平行度，调整胶带张力（详见第六章《保养与管理》中有关带轮及胶带的保养和检查） Fan before commissioning, on tape, belt wheel inspection, correction of parallelism of belt wheel and axis straightness, adjust the belt tension (see Chapter sixth "maintenance and management" in the

5.联轴器校正 coupling correction

安装联轴器驱动的风机时，可用联轴器进行校正。首先，卸掉联轴器的柱销，一边用手转动两侧半联轴器，一边检查径向与断面摆动的偏差。在多数情况下，上下左右摆动偏差调整至满足图 12 中所示的范围 Install the fan coupling drive, available coupling correction. First, remove the pin coupling, while hand rotation on both sides of the half couplings, check the radial section and deviation side swing. In most cases, on the swing deviation adjusted to meet the range shown in figure 12.

6. 管道连接 pipe connection

- (1) 原则上风机和管道间以柔性接管相连，且使其中心相一致。否则可能导致机壳变形，使进风口与叶轮相擦 The principle of wind machine and pipe with flexible nozzle connected, and the center is consistent. Otherwise it may lead to casing deformation, so that the air inlet and impeller rub.
- (2) 管道与风机链接前应仔细检查其内部，若有异物应清除 Link the pipeline and fan should be carefully examined before the internal, if the foreign body should be removed.
- (3) 若风机进口不接管道，应于吸入口侧装置具有足够强度的防护网，以防异物吸入风机 If the fan inlet is not connected with pipes, should be on the suction side of the device has sufficient strength of the protective net, to prevent foreign body inhalation fan.
- (4) 叶轮和进风口间的间隙安装终结后，应检查并确认叶轮和进风口间上下、左右间隙基本均匀一致（图 15） The gap between the impeller and the air inlet end of the installation, should check and confirm the impeller and the air inlet between the upper and lower, left and right gap uniform (Figure 15).

7. 热风机的安装 hot air machine installation

应着重防止热膨胀对风机运行的影响 Should focus on preventing the thermal expansion effect on fan operation.

(1) 进出口管道连接 The connection pipeline of import and export

因温度变化产生的热应力，不应直接让风机本体承担，必须使用膨胀伸缩接头。对于钢板结构管道，温度变化每 100°C，每 1000mm 长度其变形量约为 1.3mm；若进出口膨胀力直接施加于风机，则引起大的变形以致叶轮和进风口元件碰擦，甚至损坏（图 13） Due to the temperature change of the thermal stress, should not directly let the fan bear, must use the expansion joint. For the steel pipe, the temperature change every 100 degrees, each 1000mm length of the deformation is about 1.3mm; if the import and export expansion force in the fan applied directly, causing a large deformation of the impeller and the air inlet element that grazing, or even damage (Figure 13).

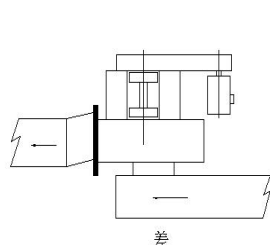


图13

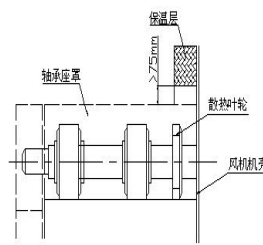
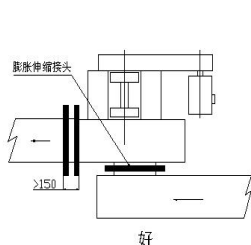


图14

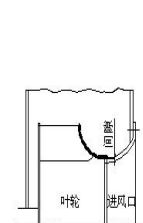


图15

(2) 轴承部件的冷却 The bearing parts cooling

为减少介质对轴承的影响，机壳与轴承间为保护轴承应配有散热风扇（气体温度小于 250°C 时）。对于散热风扇由于周围的空气冷却较小，故请注意不要把风扇外端的流通部分堵塞（图 14） In order to reduce the effect of medium on bearing, casing and bearing protection for the bearing should be equipped with a cooling fan (gas temperature lower than 250 DEG C). For the cooling fan due to cooling of the air around the small, so please keep the circulation fan part of the outer end of the block (Figure 14).

五、试车 test

按下述程序进行试车 The following procedure test.

1. 检查 check

螺栓、螺母的锁紧应均匀、对称地逐个锁紧；若局部过紧或过松，将引起空气泄漏、噪声及振动 Bolt, nut locking should be uniform, symmetrical by locking; if locally too tight or too loose, will cause air leakage, noise and vibration

2. 加油 gas

(1) 使用润滑脂的轴承，在出厂时风机轴承内已加入适量的润滑脂。倘若要再次补充润滑脂，应确保润滑脂质量。若润滑脂质量差

甚至不洁净,则将会引起轴承的伤害 The bearing grease in the bearing factory, the fan has added the amount of grease. If you want to replenish grease, should ensure that the quality of lubricating grease. If the grease of poor quality or even not clean, it will cause bearing damage.

(2)稀又润滑的场合,请按油标的指示加油 The dilute and lubrication occasions, please press the oil standard gas indicator.

(3)轴承补给润滑脂,请按第六章中《轴承的保养与检查》中叙述的指示补给 The bearing grease supply, please press sixth chapter "bearing maintenance and inspection" described in the instructions.

3.盘车 turning

以手盘动叶轮时,请注意如下要点 The hand disc impeller, please note the following points:

(1)听声音 接触摩擦的声音,碰触异物等的声音的有无 Listen to the voice of the contact friction sound, touch the sound has no foreign body.

(2)其他 The other a 胶带的张紧 tape tension; b 盘车时手感是否太重或太轻 disk when the feel is too heavy or too light.

4.送风系统 air supply system

(1)装置内各部件是否按要求正常配置 The device components are required in the normal configuration.

(2)进出风口附近、风机装置内部有否异物 The internal air inlet and outlet near the fan device, whether the foreign body.

(3)风机进出口附近,送风或引风时是否有不安全因素存在(如被吸入或吹落的东西) The fan near the presence of import and export, the unsafe factors of air or air when (if inhaled or blown things).

5.电器配件 electrical accessories

(1)系统是否有短路或易断路的接头 The system is easy to short circuit or open circuit connector.

(2)对于接线闸内的连接应仔细检查。 For the connection of the wiring inside the gates should be carefully examined.

6.启动 start

(1)在确认通风系统,电气系统及其他机械均处于正常状态,可进入运转。首先,合上电闸 3~6 秒后即切断,确认其转向及是否存在不正常声音、振动等 In confirmation of the ventilation system, electrical system and other machinery are in the normal state, can enter the operation. First of all, close the gates 3 to 6 seconds after the cut, confirm its steering and whether there are abnormal sound, vibration etc.

(2)若在瞬时运转时,发现存有异常情况,则据前述过程检查机组并修正后,再进行试运转 If the instantaneous operation, it was found that there is abnormal situation, according to the inspection unit and fixed, and then try to run.

(3)一般风机、电机启动时的电流为其额定电流的 5~7 倍,然后渐渐降低。若电流回落速度过慢则停止运行,检查电机供电系统 The electric fan and motor startup for the rated current of 5~7 times, and then gradually decreased. If the current rate of decline is too slow to stop running, check the motor power supply system.

7.运行确认 operation.

(1)据电流表的指示值,慢慢地调整节门,使开闭角度达到规定位置 According to the current table indicating value, slowly adjusting section door, the open and close to the required position angle.

a 记录电流、电压值 records, current voltage value;

b 检查轴承的振动、温度、声响 Vibration, temperature, sound check bearing;

(2)风机开始运转起一周内请注意下述事项 The fan start within one week please pay attention to the following matters operation.

a 旋转部分的碰擦 rotating part scoop:

叶轮和进口间的碰擦; 叶轮和机壳间的碰擦; 轴和机壳间的碰擦; 胶带和罩壳间的碰擦 And between the impeller and the inlet scoop, the impeller and the casing; grazing; and between the shaft and the casing rub; and tape and cover the scoop.

b 胶带的状态 tape state

·胶带的直线度检查; ·胶带的张紧情况; ·胶带的磨损; c 联轴器的摆动 d 多叶调节阀的偏向 tape straightness inspection; - tape tension; and adhesive wear; C coupling swing D multi leaf valve bias

e 其他 Other

·异物吸入与否·风机本体的振动 Vibration, or foreign body aspiration in fan body.

(3)试运转后,应对胶带的松紧进行调整。新胶带会发生伸长,若出现上述情况,应停车调整其松紧 The test run, to adjust the tightness of the tape. The new tape will occur if the elongation, above all, should adjust the tightness of parking.

- (4)检查轴承的润滑状态及润滑油脂的状态 The lubrication grease and check the status of bearing.
- (5)对于高温风机应待风机内的气体温度降至 100℃后才可停车 For the high temperature fan should be gas temperature inside the fan is reduced to 100 C after parking.
- (6)风机不得任意增加转速来改变风机的性能参数,否则可能发生安全事故 No fan performance parameters shall not arbitrarily increase the speed to change the fan, otherwise the accident may occur.

六、保养与管理 maintenance and management

为使风机无故障连续运行, 保养和管理是非常重要的。发生事故前, 必然有振动及温度上升等现象。风机的检查应重视上述情况, 日常的检查是能早期发现事故苗头的重要手段 In order to make the fan trouble free running, maintenance and management is very important. Before the accident occurred, there must be the vibration and temperature rise phenomenon. Fan examination should pay attention to the above situation, the daily inspection is an important means of early detection of signs of the accident.

1.定期检查 regular inspection

试运行风机平稳运转后, 则每间隔 2 ~ 3 周按表 2 定期检查表, 实行定期检查。Try to run the fan running smoothly after each interval of 2 to 3 weeks according to table 2 regular inspection table, carry out regular checks.

表 2 定期检查修表

检修点	项目	检查内容
仪表	电流表	仪表有无异常
	电压表 转速表	显示有无异常
机壳	振动	螺栓有无松动 机壳、支架表面焊接有无开裂
	漏气	机壳连接面密封有无破损
叶轮	与机壳碰擦	进风口的间隙是否均匀 和机壳间的间隙 (轴流风机) 是否均匀或变形 电机和机壳是否保持垂直或水平
	振动	污染情况 (积灰、积尘) 是否严重 动平衡是否失衡 轮毂安装螺栓是否松动
	叶轮变形	腐蚀、磨损、弯曲变形是否严重
	主轴变形	轴承安装部位、轴套安装是否受损
轴承 轴承座	振动、发热 声响	螺栓、止动垫片是否松动 轴承是否受损 漏油是否存在 密封是否过紧 润滑脂装填是否过量及异物是否混入 以听诊器检查是否异常 手感检查温度及用表测定温度是否偏高
基础	振动	地脚螺栓是否松动 基础是否不良
带轮 胶带 联轴器 其他	飘移、发热	胶带是否打滑、磨损 风机轮直线度是否一致 键配合是否松动 带轮是否磨损 胶带的张力是否合适

		胶带的长度是否一致 联轴器同轴度是否超差 安装螺栓是否松动
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为寻求风机运行时故障的原因，请根据表 3 调研，表 3 是一份由表面现象较容易地把病因找出来的指示表。

表 3 异常情况的发现及处理

异常情况	原因	处理
风量太小	设计静压过小 系统风管漏风及阻力过大 调节门开度过小 转向错误 胶带打滑，转速降低	对装置的设计重新评估 检查后调整 调整 纠正转向 调整胶带张力
电机超载	胶带过紧 电机功率选用过小 设计静压过大 调节门调整过大 电机故障	调整胶带张力 调换 降低转速 重新调整 修理或调换
发生异常音响	垃圾混入轴承 轴承裂纹或伤痕 轴磨损 叶轮碰擦 轴承锁紧螺母松动 轴窜动 管道系统不良、风机选型不当、气流喘振 管道连接不良 混入异物 风速过大	调换 调换 调轴 紧固、调整螺栓，修整接触部位 加力锁紧 找出原因进行修正 系统重新改造或再选配风机 重新调整 去除 改造管道系统
温度急剧上升	轴承因故障发热 轴承安装不良 叶轮动平衡不良 油脂充填过量 油脂量不足、变质、混入异物、油脂选用不当 电机超载、绝缘不良 密封部碰擦	调整游隙或调换轴承 调整中心、锁紧安装螺栓 校正叶轮动平衡 去除多余部分（轴承座内充填 1/3 ~ 1/2 为佳） 补充油脂，分解洗净，换上合格新油脂 调整负荷，修理电机回复绝缘调整或重新安装

振动	基础 基础用材料强度（刚度）不够 基础设计不良 基础螺栓松动 叶轮不平衡（垃圾、涂料等异物黏附在叶轮上） 轴承损坏 轴磨损 胶带打滑 外部振动传递所致 联轴器摆动超差 风机选型不当	加固，改善 锁紧 清洁叶轮并校正动平衡 调换 调换 调整胶带松紧 使用减振垫，以柔性接管减振 重新校正 重新选型
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注：上述异常音响应具有有一定时间经验的技术人员进行判断

Note: the above abnormal sound should be technical personnel with a certain time experience to judge

2. 日常检查 daily check

风机的异常情况，一般都是异常的音响，振动或者温度的上升，为此日常的检查至关重要 The abnormal situation of the wind turbine, are generally abnormal sound, vibration or temperature rise, this vital daily check.

(1) 振动 The vibration

以电机及风机轴承座的中心线为准，在 X、Y、Z 三方向上测定振动值并做记录，以标准 JB/T8689-1998《通风机振动检测及其限值》为准进行判定。该标准的合格标准是“风机振动速度的有效值（均方根速度 V_{rms} ，对刚性支承 $V_{rms} \leq 4.6 \text{ mm/s}$ ，对挠性支承 $V_{rms} \leq 7.1 \text{ mm/s}$ ）。”又规定“在测试振动速度时，外部或周围环境对底座或试车台的影响，应符合下列规定：风机运转时的振动速度与风机静止时的振动速度的差须大于 3 倍以上，当差数小于此值时风机需采取避免外界影响的措施。”否则将进行适当修正（也可通过协商）The center line of a motor and a fan bearing seat shall prevail, determination of vibration value and recorded in the X, Y, Z three direction, with the standard JB/T8689-1998 "fan vibration detection and its limited value for judging". Standard of the standard is the "effective value of fan vibration velocity (RMS velocity V_{rms} , the rigid support $V_{rms} = 4.6 \text{ mm/s}$, $V_{rms} = 7.1 \text{ mm/s}$ for flexible support)." And that in the test of vibration velocity, or external environment on the base or the test effect, shall comply with the following provisions: vibration velocity and vibration velocity of a fan **when the fan is running** when the difference must be greater than 3 times, when the number is less than this value when the wind machine need to take measures to avoid the external influence." Otherwise it will be modified (also through consultation).

不希望风机运行在标准规定以下，即使是公认尚可使用的通风机 Don't want fan operation in the standard, even recognized fan still used.

(2) 声响 The sound

风机在运转时，若有异常声响发生，应立即确定其原因。请注意胶带打滑，连接部的松动，异物的侵入，轴承，电机的故障等情况。特别是轴承的检查，如润滑不良，轴承破裂等情况若早期发现可避免发生事故 The fan is running, if there is abnormal sound occurs, should immediately determine its cause. Please note that the tape skid, the connecting part of the loose, the intrusion of foreign objects, bearing, motor fault etc.. Especially the bearing inspection, such as poor lubrication, bearing rupture if early detection can avoid the accident.

(3) 温度上升 The temperature rise

请注意风机轴承座，电机外壳温度，若用手指触摸表面仅能坚持 3~4 秒钟，则此表面温度约 60℃；为对异常温升有一个精确判断，应用仪表正确测定 Please note that the fan bearing seat, motor shell temperature, if the finger touch surface can only hold 3 to 4 seconds, the surface temperature of about 60 DEG C; the abnormal temperature rise has a precise judgment, correct determination instrument application.

电机运行温度按电机绝缘等级高低而不同。按电机行业标准，采用电阻法测量电机绕组的温度限值：B 级绝缘允许使用温度为 80℃；F 级绝缘允许使用温度为 100℃。风机停车后，带轮若温度偏高，则可能胶带打滑引起，应进行张力测定并调整 Motor temperature according to motor insulation level and different. According to the motor industry standard, measuring method used in motor winding resistance temperature limits: B grade insulation allows the use of a temperature of 80 DEG C; F class



insulation allows the use of temperature to 100 degrees. The fan belt wheel parking, if the temperature is too high, it may cause slipping, tension should be determined and adjusted.

3.轴承的保养和检查 bearing maintenance and inspection

(1)轴承的性能请参照相应的样本 The performance of the bearings, please refer to the corresponding sample

(2)轴承的安装、拆卸请参照本说明书的相关内容 The bearing installation and disassembly please refer to the instructions related content.

(3)轴承寿命 The bearing life

据有关轴承动静载荷及额定寿命的设计方法及参照国内外有关标准，我们对轴承寿命的设计标准一般为 20000 ~ 30000 小时（特殊要求除外） According to the design method about the bearing load and rating life and with reference to the relevant standards at home and abroad, we design the bearing life standard is generally 20000 to 30000 hours (except special requirement).

(4)润滑脂、油牌号、补充间隔、填充量 The grease, oil type, supplementary interval, filling quantity

a 润滑脂、油牌号 如表 4 所示，但对高转速和高温环境则牌号需特殊考虑。

Agrease, oil grade are shown in Table 4, but for high speed and high temperature environment grades required special consideration.

油脂 内容	国产轴承			进口轴承		
	润滑油	润滑脂		润滑油	润滑脂	
特性	一般用	一般用	高温用	一般用	一般用	高温用
标准号	GB443-89	GB7324-94	壳牌〈爱万利〉	GB443-89	壳牌〈爱万利〉	壳牌〈爱万利〉
代号	L-AN45	2#	R3	L-AN46	R2	R3
名称	机械油	锂基脂	锂基脂	机械油	锂基脂	锂基脂

b 润滑脂补充间隔 grease replenishment interval

由于轴承单元及轴承座能把润滑脂密封于轴承腔内，故在运转条件良好的环境，油脂可保持较长的运行时间，请按表 5 要求给以补充油脂；但在运转环境恶劣的情况下，特别是 24 小时连续运行，尘埃、潮湿较明显的场合则按表 5 的补充间隔应缩短一半，其次应对轴承座组件配置防护罩壳 The bearing unit and the bearing seat can put grease seal in the bearing cavity, so the operating conditions of a good environment, maintain the long running time of the oil can, please according to the requirements in Table 5 to replenish the oil; but in operation under harsh environmental conditions, especially the 24 hours of continuous operation, dust, damp and obvious occasions according to the table of the interval of 5 should be cut in half, then deal with the bearing seat assembly configuration of protective cover shell.

润滑脂应在低速转动，或手动盘车情况下均匀、缓慢地注入 Grease should be rotates at low speed, injection or manual turning under the condition of uniform, slowly.

润滑脂填充量应为轴承或轴承座腔容积的 1/3 ~ 1/2 左右，过多的填充润滑脂对轴承运行也会带来不利影响。

Grease filling for bearings or bearing cavity volume of 1/3 ~ 1/2, too much filling grease will adversely affect the operation of the bearing.

表 5 轴承单元、轴承座的润滑脂补充间隔 Table 5 grease bearing unit, bearing the replenishment interval

轴承运转温度℃	转速 r/min		
	≤ 1500	> 1500 ~ 3000	> 3000
≤ 60	4 个月	3 个月	2 个月
> 60 ≤ 70	2 个月	1.5 个月	1 个月
> 70	轴承温度每升高 10℃，补充周期减半（允许温升 ≤ 40℃）		

c 轴承组的开箱检查及调换润滑脂 check out of the box and replace the grease in bearing group

即使风机运转正常每年至少一次打开轴承箱进行检查（轴承单元除外） Even if the fan is operating normally at least once a year to open the box to check the bearing (bearing unit except).

轴承各面和部位有无伤痕、裂痕 The bearing surface and the parts have no cracks, scars

轴承外圈和轴承箱配合面的配合、自由端的游动情况是否正常 The bearing outer ring and bearing box with the swimming with the free end, whether it is normal

轴承箱润滑的补充，按轴承箱视窗油位线及时补充（详见“注意”标贴说明） Supplement - bearing box lubrication, timely supplement according to the bearing box window level line (see the "note" label instructions).

轴和轴承座的中心，各装配螺栓是否松动，间隙调整垫片等是否正常 The shaft and the bearing seat of the center, the assembling bolt is loose, the gap adjusting shim is normal

在轴承清洗后，按要求加入新油脂 In bearing cleaning, according to the requirements of adding new oil

(5)运转温度 The operating temperature

通常于轴承座表面环境温度在常温加 40°C 或小于 70°C 的情况均属正常，若超过 70°C 则需及时处置 Usually in the bearing surface at room temperature and ambient temperature of 40 C or less than 70 degrees Celsius conditions are normal, if more than 70 DEG C for timely disposal.

4.联轴器的保养和检查 coupling maintenance and inspection

应严格将同轴度偏差控制在要求以下；磨损失准的柱销应及时更换 The coaxiality deviation should be strictly control requirements in the following; wear misalignment pin should be replaced.

5.胶带及带轮的保养和检查 belt and belt wheel maintenance and inspection

(1)胶带 The tape

a 在多槽带轮的情况下，请注意胶带牌号及胶带形状尺寸是否在容许误差范围内（胶带组的确认） in the multi groove pulley, please note that the type and shape of the tape size is in the range of allowable error (confirm tape group).

若胶带长度偏差相互间较大，则对胶带的疲劳、机组的振动和寿命造成影响 if the tape length deviation between the larger, the impact fatigue of the tape unit, vibration and life.

请不要新旧胶带混用。 please do not mix old and new tape

安装胶带时应先松开电机底座下的支撑螺栓，使二带轮中心靠近后安装，若不按上述方法硬把胶带撬入槽内，则将引起胶带损伤，形成早期皮带断裂 The installation of D tape support bolt should first loosen the motor base under the two belt wheel center near after installation, if not by the method of hard tape pry into the tank, it will cause the tape damage, the formation of early fracture belt.

请注意胶带表明不能沾上油污，粘附油污将可能引起运转胶带打滑，不仅不能充分发挥其传递动力的功能，而且因发热会使胶带寿命降低 Please note that the e tape can not be stained with oil, the oil will likely cause operation of adhesion belt slip, not only can not give full play to the power transmission function, and will reduce the life of the belt due to fever,

(2)带轮中心调整 (图 16) The belt wheel center adjustment (Figure 16)

安装带轮的两轴线中心平行如不符合标准，则引起胶带单边磨损，胶带的耐久性显著降低。请把带轮的不平行度调整在 1/3° 以内 (图 17)。 Install pulley two axis parallel as center does not meet the standards, is caused by unilateral tape wear, durability of adhesive tape decreased significantly. Please take the rough pulley adjustment in 1/3 degrees (Figure 17).



图 16



图 17

(3)胶带张力调整 The tape tension adjustment

胶带运转开始后 24 小时内，其伸长量可达胶带总伸长量之 80 ~ 90 % （初期拉伸） Tape running within 24 hour after the start, the elongation can reach 80 of the total elongation of tape to 90 (initial tension).

为此，运转开始后 2 天内，每天一次检查胶带张力。如胶带过松，容易打滑，引起磨损而致报废。如胶带过紧，对轴和轴承会引起异常负荷，因此胶带必须松紧适当。胶带张力调整周期建议如表 6 所示 Therefore, after the start of operation within 2 days, once

a day to check the belt tension. If the belt is too loose, easy to slip, caused by wear and scrap. If the tape is too tight, the shaft and the bearing will cause abnormal load, so the tape must be proper tightness. The belt tension adjustment cycle is recommended as shown in Table 6

表 6

时间	试车运转开始 2 天内	以后两周内	以后两个月内	以后每满二个月
调整次数	应每天一次	每周一次	每月一次	一次

a 胶带张力的调整一般要求 tape tension adjustment in general requirements

●于胶带中央以指尖按压具有适当的弹力●运转中松动边适度地有弯曲●启动时无打滑现象●带轮不发热 in central to tape by pressing the appropriate elastic force with fingertips - running loose edge moderately bent - start no slip - belt wheel fever
调整胶带的程序 adjustment program tape

●如图 18 于带轮二中心距间中央给予规定挠曲力 PK 视其挠度 Figure 18 - to two belt wheel center distance between the central to the provisions of PK depending on the deflection of bending force .

表 7 列出挠曲力的概略 PK 值, 由于 PK 值与传递功率、胶带速度有关, 若有必要进一步了解其精确值可向胶带制造厂咨询。Table PK lists the 7 general flexural force value, since the PK value and transfer of power, belt speed, if it is necessary to further understand the exact value to tape factory Consulting.

按表 8 即可知胶带的合适挠度 δ ,用以判定胶带的松、紧 According to table 8, the proper deflection of the tape, the tape used to determine the loose and tight.

●带轮的寿命 The belt wheel of life

由于胶带张力不足产生夹带打滑, 带轮将加剧磨损, 使带轮槽宽增大, 在此情况下即使胶带张力正常, 启动时无打滑声响, 但运行中胶带有很大的磨损, 故此种带轮应调换。Due to lack of the belt tension pulley will produce entrainment slip, increased wear, the belt groove width increases, in this case even if the belt tension is normal, startup without slipping sound Loud, but running in tape has great wear, so a belt wheel should be changed.

●胶带的寿命 The tape of life

在合适的拉力作用下连续运行, 胶带的寿命一般可达 8000 小时以上, 约一年左右更换一次。

In continuous operation under suitable tension, belt life can reach 8000 hours, about a year about a replacement.

表7 给予的挠曲力PK

带型	小带轮直径 (mm)	PK (kg)
A型	80-140	2.5-3.6
	140-200	3.6-4.6
B型	112-240	4.6-6.6
	240-320	6.6-8.7
C型	220-360	8.7-11.7
	360-500	11.7-15.3
D型	>300	15.3-20.4

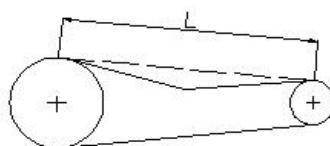


图18

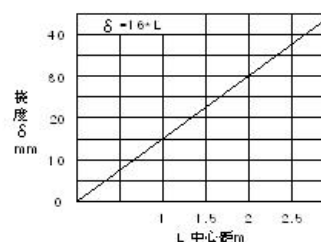


表8

安全须知

Security must know

请注意风机设备上所贴的警告、注意标贴, 并执行之 This note posted by the fan on the device, pay attention to warning labels, and execute.

未仔细阅读和理解本说明书及不熟悉操作规程者不得上岗 I did not read and understand the instructions and are not familiar with the operating procedures shall not take the post.

应遵循使用说明书所规定的运行、安装、调试和维修保养的安全要求及合格的使用条件; 否则, 故障可能会导致风机损坏和人员受伤。You should follow the instructions specified in the operation, installation, commissioning and maintenance of the safety requirements for maintenance and use of qualified conditions; otherwise, the failure may be

Lead to fan damage and injuries.