风机产品使用说明

Fan Operating Instructions

无锡精恩风机有限公司

(无锡洛社江南风机厂)

WUXI JN FAN CO., LTD

无锡市惠山区洛社镇新雅路68号

68#XINYA ROAD,WUXI, JIANGSU,CHINA

电话TEL:+86 (0) 510 / 83830221 传真FAX: +86 (0) 510 / 83831687

电子邮件EMAIL:sales@jiagnnanfan.com

目　录
Content

页次 page

一、**安装概述** Summarize of installation……2
1.风机安装场所 Position……2
2.风机安装空间要求 Demands of space……2
3.各种安装方法及要求 Methods and demands of installation……2
4.吊装于天棚的场合 Situation of loaded on the ceiling……3
二、**基础** Basic……3
1.混凝土基础 Concrete bedrock……3
2.减振元件 Shakeproof element……4
3.减振元件的使用 Using of the shakeproof element……4
三、**搬运** Transit……4
1.部件检查 Check the parts……5
2.吊装及搬运 Hoist and transit……5
3.保管 Safekeeping……5
四、**安装方法** Methods of installation……5
1.水平校正 Plane emendation……6
2.轴承座的安装 Installation of bearing house……6
3.确认电机转向 Notarized the motor direction……8
4.带轮及胶带 Pulley and V-belt……8
5.联轴器校正 Shaft joint emendation……8
6.管道连接 Join of pipe……9
7.热风机的安装 Installation of hot-air blower……9
五、**试车** Commissioning……10
1.检查 Checking……10
2.加油 Put on steam……10
3.盘车 Jigger……10
4.送风系统 Air-feeding system……10
5.电气配件 Electric fittings……11
6.启动 Startup……11
7.运行确认 Notarized the running……11
六、**保养与管理** Maintenance and management……12
1.定期检查 Periodic check……12
2.日常检查 Daily check……15
3.轴承的保养和检查 Maintenance and checking of bearing……16
4.联轴器的保养和检查 Maintenance and checking of shaft joint……18
5.胶带及带轮的保养和检查 Maintenance and checking of pulley and V-belt……18
七、**安全须知** Safety caution……21

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。

For install and maintain the fan correctly, you should read this handbook carefully, according to it when operation must.

一、安装概述 Summarize of installation

1.风机的安装场所 Position of installation of the fan

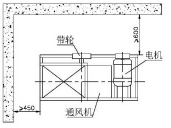


图 1

风机安装场所的选定请注意如下几点：

The notices of choosing position as follows:

⑴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, it must has safeguard.

⑵风机应置于方便管理及监护的地方（图 1）；

The fan should be installed in the location where is easy to manage and watch. See drawing 1.

⑶安装的场所应具有坚固的基础。

The location should be has solid basic.

⑷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 will be installed on the overhead frame, the location hasn't any factor of vibration must.

2.风机的安装空间要求 Demands of space

安装通风机的场地面积，估算时应考虑如下几点：

You should pay attention to estimate the acreage of installation as follows:

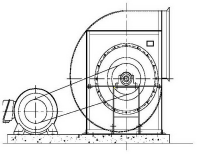


图 2

⑴ 不防碍相邻其他机器正常运转；

Don't disturb other machine around it.

⑵ 能安全而且方便地对通风机进行检修；

Examine and repair convenient.

⑶ 拆卸叶轮、更换轴承时，应有足够的空间。

There is enough space for take down impeller.

3. 各种安装方法及要求 Methods and demands of installation

⑴ 地面上安装 Be installed on the ground.

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做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）。

Fans are usually installed on the concrete bedrock except the fans are smaller with small type and motor power. Even so, you should pay attention to the intensity of basic. See drawing 2.

⑵ 楼板（高台架）上安装 Be installed on the hathpace.

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）。

You should pay attention to the angular rigidity and intensity of the installation area to avoid resonance, otherwise adopt measure of reinforce. See drawing 3A.

⑶ 装于箱内的风机 Be installed in the fan 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 libration which would be caused of lack in rigidity and intensity of the frame, you should pay attention to the intensity. Especially when use rubber or spring vibration damper, the fan and the motor would be installed on the same underpan. See drawing 3B.

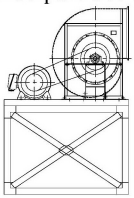


图 3A

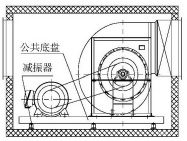


图 3B

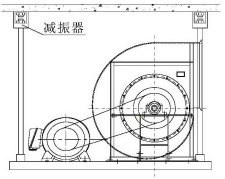


图 4A

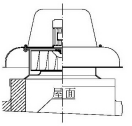


图 4B

4. 吊装于天棚的场合 Be hung on 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尽力采用焊接的框架结构安装风机，并尽量采用地面安装为妥。

Small fans should be installed with bolts simply, (See drawing 4A). Medium-sized fans should be installed with weldments of frame, but then installed on the ground to the best of your abilities.

⑴ 挂壁式风机（排气扇） 其安装壁必须强固。

When exhaust fans should be installed on the wall, the wall must fastness.

⑵ 屋顶安装 Be installed on 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，屋面倾斜时亦应做到风机垂直安装（图 4B）。

You should think about the effects from storm, rain and snow. See drawing 4B.

二、基础 Basic

1. 混凝土基础 Concrete bedrock

⑴ 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。小型风机基础取小值，但基础厚度至少 150 毫米，基础重量约按大于通风机总重量的 5~10 倍考虑（图 5）。

The plane size of concrete bedrock is bigger 150~300mm than the size of fan border. The sizes of concrete bedrock for small fans take the minimum but its thickness is bigger than 150mm must and weight is bigger 5 ~10 multiples than the weight of total fan. See drawing 5

⑵ 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）。

You should mount a drain for no water in the basic, and that it will not eroded. See drawing 6.

⑶ 基础表面应平整、光顺，并充分考虑到预埋螺栓孔位置。

The surface of basic is smooth and trim, you should think about the holes for

installing the bolts beforehand.

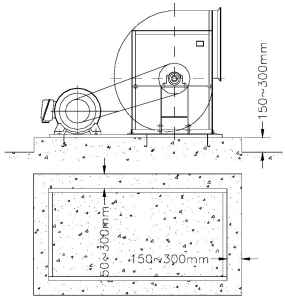


图 5

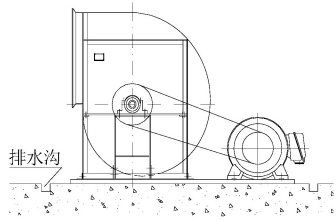


图 6

⑷ 基础表面与通风机底盘间应以垫片等调整，使其能充分接触后固定。

Regulate the basic surface and fan frame with gasket, then fixup after the basic come into contact with the gasket enough.

2. 减振元件 Shakeproof 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）。

Shakeproof elements include gaskets, rubber, spring and so on. See drawing 6.

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。

You'd better choose the correct shakeproof elements according to the weight and function frequency of the fan. If the fan runs in low speed or loads lightly, the shakeproof element can select rubber.

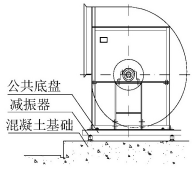


图 7

3. 减振元件的使用 Using of the shakeproof element

⑴ 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 underpan where has installed fan and motor has enough angular rigidity when you use the shakeproof element.

⑵ 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的振动。

The basic is aclinic for the sake of all shakeproof elements support equal. If there's anything under the frame, the fan would shaken unconventionally.

⑶ 使用减振元件时，务必在通风机接口管道上安装软性接头。

When use the shakeproof element, you must install inflatable tie-in in the pipe joint of the fan.

⑷ 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 balance of impeller will be destroyed when dust or eyewinker cling to the impeller, in this case, use shakeproof element is not correct.

三、搬运、储存、保管 Transit, deposited, safekeeping

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。

All the fans have checked out with center emendation, balance, running, then was qualified to leave factory, so the client must pay attention to abrade and distortion during transit.

1. 部件检查 Check the parts

⑴ 检查风机有无损伤、变形、油漆是否完好。

Check the fans whether or not have damnification, distortion, consummate paint.

⑵ 风机的部件、备件是否有混杂、遗漏、搬运前后数量是否一致。

Check the parts and spare parts.

2. 吊装及搬运 Hoist and transit

⑴风机搬运、就位、吊装时，请按吊装标识位置进行吊装。

Please use the hook when transiting, perching and hoisting.

⑵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。

When hoisting fission casing and rotors, fill in with soft where the rigging and workpiece touched, especially the impeller and shaft. Otherwise will debase the precision of balancing, result in the fan shaken.

⑶带轮、黄油咀等在吊装时易受伤害，用索具时，应充分注意。

Pay attention to fix the rigging for the pulley and brass lubrication nipples are vulnerable.

⑷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 move of equipment brings large impulsive force of shaft, pulley and impeller, please advert it.

3. 保管 Safekeeping

⑴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 should be placed at the ventilative place, dry location before installation, periodic check it, so avoid rustiness and scathe.

⑵在保管期内，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，必要时应注入润滑剂，以防生锈。

During the keeping period, insist on twice jigger per month at least, 10 turns every time and stop at the point of over 180° . At the same time, pay attention to the degree of bearing lubrication. Secondly, some times of open and close the rotor such as adjustable door, if necessary, immit the lube in order to prevent rustiness.

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，应打开轴承盖仔细检查轴承的润滑情况,必要时更换新润滑脂.

To check the libricate after open the bearing cover if the fan haven't run for a long time, add the new lube if necessary.

四、安装方法 Methods of installation

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。

Though the fan and the motor has proofread before leave factory, you should proofread again after the fan will installed on the base because of transit and the flexible distortion of the base per se.

1. 校正 Emendation

⑴ 一般情况 common circs

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。

In principle, the fan plane takes benchmark with shaft, but when the axile fan will be installed by standing type, the plane also takes benchmark with cover of V-belt or impeller hub.

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，灌入水泥浆使接合面充分接触。与此同时，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。

Check the plane with gradienter after park the fan on the smooth concrete base, calibrate the plane with gaskets among the fan and the base, then fill the grout. At the same time, fill the grout into the prepared bolts holes beforehand, and fixup the bolts vertically.

c 基础螺栓应均匀锁紧，局部螺栓过紧往往会使轴中心偏移，引起轴承损伤。

Tighten the basal bolts equably, or else will lead excursion of the shaft center and scathe of the bears.

⑵ 安装于组装箱内的风机 Fans are installed in the box

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（不要再拆卸）。

In this connection, you'd better think about exchange bearings expediently and don't take down the fan try your best.

b 组装箱应设有调换和检查轴承的检视窗或门。

Set up window or door for inspecting and exchanging bearings.

2. 轴承座的安装 Installation of bearing box

在锁紧各安装螺栓时，应注意不要在轴方向对轴承造成不应有的轴向作用力。

You should notice the axile direction power has no effect to the bearings when tighten all the bolts.

⑴ 使用轴承座的情况 Using of bearing house

轴承座上螺栓按（图 8）所示程序锁紧：在底部二侧的螺栓①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②（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③。

Tighten the bolts where on the bearing house according to drawing 8. After tighten the bottom bolts, for the plane midsplit bearing house, first tighten the free side bolts slowly, usually, we take the motor side as the fetterless side, for the hot fan and the fan driven by type E also choose the side hasn't motor, then tighten the bolts at the fetterless side.

高温风机应充分考虑轴的热膨胀伸长。

Must think about expanse of high temperature fan.

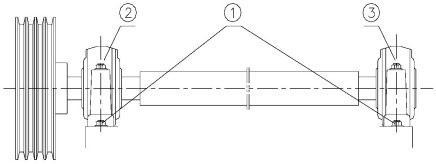


图 8

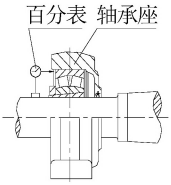


图 9

轴承及轴的校正法 Methods of emendation of shaft and bearings

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，则可根据 T/R 值求得轴承对于轴的倾斜值（图 9）,并可计算出倾斜度。

Put down the lateral cover, load a centesimal watch, take the determine point with periphery of bearings(if it is impossible, take the side of bearing house). Turn the shaft lightly, and then read and mark the largest and smallest value. Then we get the wiggle value T, this value equals up and down value minus right and left value. If the distance from test point to axes is R, T divided R equals gradient value.

表 1 轴承的容许倾斜度

Sheet 1 The admit gradient of bearing

轴承形式 bearing type	容许倾斜度（系列/度数） admit gradient (series/degree)								
双列调心球轴承 double ball bearing	12/2°	13/2.5°	14/2.5°	22/2°	23/2.5°				
双列调心滚子轴承 double roller bearing	213/1°	222/1.5°	223/2°	230/1.5°	231/1.5°	232/1.5°	339/1.5°	240/2°	241/2.5°

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许容倾斜度。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。

Remark: The value in this sheet are conditioned by natural burthen and running. The designs of bearings and seal type determined whether or not will obtain the value.

⑵ 使用轴承单元的情况 Using of bearing

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：

Though the bearings have 2° adjustable range with its automatic performance, you'd better pay attention to installation because the bracket of this unit is too simply:

a 止动螺钉向心球轴承单元 Unit of bearing with stop moving bolts

使用该类轴承单元，轴承间间距调整好后钻孔定位。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）。

Make a bore and orientation after adjusted the distance between bearings. The orientation position holes must as same with request. You should pay attention to start and change of the bolts day-to-day. Otherwise brings opposite sports between inside cover and bearings. See drawing 10.

b 偏心固定轮向心球轴承单元 Unit of bearing with eccentricity fixed wheel

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。

In wedge principle, purpose of to fix the bearings on the shaft is good. Put the eccentricity ring on the lengthen part where with eccentricity, then tighten it. At the same time, notice the bolt. See drawing 11.

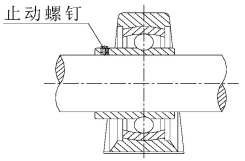


图 10

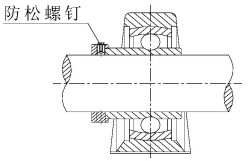


图 11

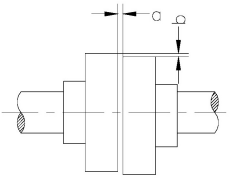


图 12

a 的误差＜0.05~0.08mm
b 的误差＜0.03~0.05mm

3. 确认电机转向 Notarize the direction of motor

⑴ 安装电机时，以手盘动，确认无异常情况。

Notarize no abnormity when install the motor.

⑵ 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。

Notarize the direction of motor is correct before hang on the V-belt or install the shaft joint.

4.带轮及胶带 V-belt and pulley

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)。

Check the V-belt and pulley before the fan startup, revise the center between two pulleys and adjust the strain of V-belt.

See the sixth chapter about maintenance and checking of belt wheel and V-belt.

5. 联轴器校正 Shaft joint emendation

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，一边检查径向与端面摆动的偏差。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。

When install the fan driven by shaft joint, the emendation with shaft joint. At first demount the bolts, put down the pin, turn the flange trays, checking the windage at the

same time. In common, usually, the windage range has shown in drawing 12.

6. 管道连接 Join of pipe

⑴ 原则上风机和管道间应以柔性接管相连，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 fan are joined with flexible pipe, tighten the bolts equably, get the consistent center, otherwise, anamorphic casing will arouse attrition between inlet and impeller.

⑵ 管道与风机连接前应仔细检查其内部，若有异物应清除。

Check the fan inside before join, must clean out the eyewinker.

⑶ 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。

Set a safety net with enough intensity on the inlet when the fan will not be jointed with pipe.

⑷ 叶轮和进风口间的间隙 clearance between impeller and inlet

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）。

At the end of installation, check the clearance between impeller and inlet, ensure the clearance is symmetrical and consistent. See drawing 15

7. 热风机的安装 Installation of hot-air blower

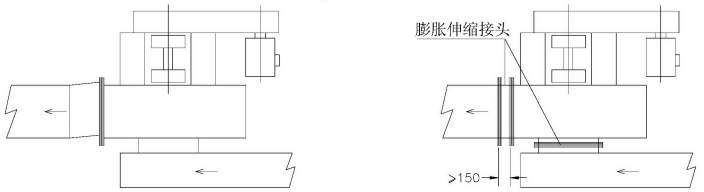
应着重防止热膨胀对风机运行的影响。

To avoid the effect of expand with heat to the fan.

⑴ 进出口管道连接 Joint of inlet and outlet

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℃，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元件碰擦，甚至损坏（图 13）。

Must use the inflatable tie-in, the heat stress is not charged with fan. For the armor plate structure pipe, the temperature changes 100℃ every 1000mm, the volume of distortion is about 1.3mm. See drawing 13.



差　　好

图 13

⑵ 轴承部件的冷却 Cooling of bearing

为减少介质温度对轴承的影响，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℃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）。

For reduce the effect of medium temperature, install a exhaust fan (for the gas temperature less than 250 ℃). And don't wall up the outside of the fan. See drawing

14.

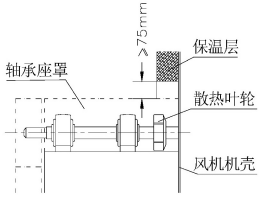


图 14

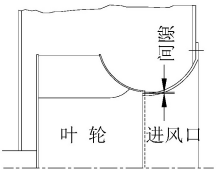


图 15

五、试车 Commissioning

按下述程序进行试车。The process as follows:

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，将使轴磨损及轴承损伤。

Tighten each bolts and nuts equably, or else arose noise, libration, air divulgence and abrasion of bearings and shaft.

2. 加油 Put on steam

⑴ 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。若润滑油脂质量差甚至不洁净，则将会引起轴承的伤害。

The bearings has put on suitable lubricant, if you want put on again, must insure the quality of lubricant.

⑵ 稀油润滑的场合，请按油标的指示加油。

Put on steam according to the direction.

⑶ 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。

Please see the sixth chapter for replenishment of lubricant.

3. 盘车 Jigger

以手盘动叶轮时，请注意如下要点：

Please pay attention to follow when turn the impeller:

⑴ 听声音 listen the sound

接触摩擦的声音，碰触异物等的声音的有无。

If the sound listens unusually, please notice.

⑵ 其他 other

a 胶带的张紧； The stretch of V-belt.

b 盘车时手感是否太重或太轻。The feeling is too weightily of jigger.

4. 送风系统 Air-feeding system

⑴ 装置内各部件是否按要求正常配置。

All the parts are meet the demand.

⑵ 进出风口附近、风机装置内部有否异物。

Eyewinker near the in-outlet or in the fan.

⑶ 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）。When running, if there's insecurity around the in-outlet.

5. 电气配件 Electric fittings

⑴ 系统是否有短路或易断路的接头。

Insure there's no open circuit in the system.

⑵ 对于接线匣内的连接应仔细检查。

Go over the connection in the junction box.

6. 启动 Startup

⑴ 在确认通风系统，电气系统及其他机械均处于正常状态时，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。

Startup after insured the order of fan system, electric system and other machines. Turn on the switch, turn off after 3~6 seconds, insure the turning, libration and sound are correct.

⑵ 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。

In this instantaneous runing, examine and repair according to forward narrate if there's abnormity, then startup again.

⑶ 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 current has 5~7 times to rating electric current of fan ad motor when startup, then debase gradually. If the electric current will debase very slowly, you should check the electric system.

7. 运行确认 Notarized the running

⑴ 据电流表的指示值，慢慢地调整调节门，使开闭角度到达规定位置。

If necessary, open or close the adjustive door slowly after you got the value on the amperometer.

a 记录电流、电压值；Mark the electric current and pressure

b 检查轴承的振动、温度、声响；

Check the libration, temperature and sound of bearings.

⑵ 风机开始运转起一周内请注意下述事项。

During a week from the fan startup, please pay attention to the follows:

a 旋转部分的碰擦：Friction of rotors

• 叶轮和进口间的碰擦；Between impeller and inlet

• 叶轮和机壳间的碰擦；Between impeller and casing

• 轴和机壳间的碰擦；Between shaft and casing

• 胶带和罩壳间的碰擦。Between V-belt and belt cover

b 胶带的状态 Fettle of V-belt

• 胶带的直线度检查；Check the balance of V-belt

• 胶带的张紧情况；Strain of V-belt

• 胶带的磨损。Abrasion of V-belt

c 联轴器的摆动 Swing of shaft joint

d 多叶调节阀的偏向 Deflection of foliose regulating valve.

e 其他 Other

• 异物吸入与否；Inhalation of eyewinkers

• 风机本体的振动。Libration of fan self

⑶ 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。

After test run, shut down the system to adjust the V-belt.

⑷ 检查轴承的润滑状态及润滑油脂的状态。

Check the bearings with its lubricator withal.

⑸ 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 without jigger, shut down the system when the inside temperature reduce to100℃.

⑹ 风机不得任意增加转速来改变风机的性能参数，否则可能发生事故。

The performance can not be changed through increase rotate speed. Otherwise brings accident.

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子的重要手段。

The inspection split into periodic check and daily check. You'd better pay attention to the part of transmission in daily check.

1. 定期检查 Periodic check

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。

If the fan runs placidly during running-in, eriodic check according to sheet 2 for a 2~3 weeks distance.

表 2　定期检修表

Sheet 2　Periodic check table

检修点 check part	项目 item	检查内容 content
仪表 meter	电流表 amperometer 电压表 voltmeter 转速表 tachometer	仪表有无异常 Whether the meter has abnormity? 显示有无异常 whether the vision has abnormity?
机壳 casing	振动 shake	螺栓有无松动 Whether the bolts become flexible? 机壳、支架表面焊接有无开裂 Whether the jointing with surface and frame was collapsed?
	漏气 blowby	机壳连接面密封有无破损 Whether the seal was destroyed?
叶轮 impeller	与机壳碰擦 rub with casing	进风口的间隙是否均匀 Whether the clearance in inlet is equality? 和机壳间的间隙（轴流风机）是否均匀或变形 Whether the clearance with casing is equality?(axial fan) 电机和机壳是否保持垂直或水平 Whether the motor keeps plumbed with casing?

	振动 shake	污染情况（积灰、积尘）是否严重 Whether the dust accumulated badly? 动平衡是否失衡 unbalance 轮毂安装螺栓是否松动 Whether the bolts of hub become flexible?
	叶轮变形 distortion of impeller	腐蚀、磨损、弯曲变形是否严重 Cauterization abrasion and distortion fearful
	主轴变形 distortion of impeller	轴承安装部位、轴套安装是否受损 Whether the part of installed bearings and the bearing cover were destroied?
轴承 bearing 轴承座 bearing house	振动、发热、声响 shake, heat, noise	螺栓、止动垫片是否松动 Whether the bolts and gaskets become flexible? 轴承是否受损 Whether the bearings were damaged? 漏油是否存在 Whether the oil leaked? 密封是否过紧 If the seal is excessive? 润滑脂装填是否过量及异物是否混入 Whether the lubrication is excessive and unclean? 以听诊器检查是否异常 Check the noise with stethoscope. 手感检查温度及用表测定温度是否偏高 Whether the temperature is higher touch with hand and thermometer? 如果采用 Dodge GTAH 轴承座，需检查圆螺母及其紧定螺钉的松动情况 If Dodge GTAH bearing pedestal is used, check the looseness of round nut and its set screw.
基础 base	振动 shake	地脚螺栓是否松动 Whether the bottom bolts become flexible? 基础是否不良 Whether the base is good?

带轮 pulley 胶带 V-belt 联轴器 shaft joint 其他 other	飘移、发热 flap, heat	胶带是否打滑、磨损 Whether the belts are skid and attrite? 风电轮直线度是否一致 Whether the pulleys are balanced? 键配合是否松动 Whether the keys become flexible? 带轮是否磨损 Whether the belt wheels are attrite? 胶带的张力是否合适 The strain of belt isn't enough. 胶带的长度是否一致 The lengths of all belts aren't alike. 联轴器同轴度是否超差 Whether the swing of shaft joint overrun the tolerance? 安装螺栓是否松动 Whether the fixed bolts become flexible?

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。

The sheet 3 will show you to find out the faults easily.

表 3　异常情况的发现及处理

Sheet 3 discover and dispose the faults

异常情况 fault	原因 reason	处理 disposal
风量太小 volume too small	设计静压过小 static pressure designed too small 系统风管漏风及阻力过大 pipes air leak and resistance is too large 调节门开度过小 adjustive door opened too small 转向错误 the turning is error 胶带打滑，转速降低 the speed reduce because the skid of belts	对装置的设计重新评估 transvaluation of the design 检查后调整 adjust after inspection 调整 adjust 纠正转向 put right in time 调整胶带张力 adjust the strain of belts
电机超载 over loading of motor	胶带过紧 belts are too tight 电机功率选用过小 mistake of motor choosen 设计静压过大 static pressure designed too large 调节门调整过大 adjustive door adjusted bad 电机故障　faults of motor	调整胶带张力 adjust the strain of belts 调换 change 降低转速 reduce the rotate speed 重新调整 adjust again 修理或调换　fix or change
发生异常音响 exceptional sound	垃圾混入轴承　interfused rubbish: 轴承裂纹或伤痕 crack or scar 轴磨损　abrasion of the shaft 叶轮碰擦	调换 change 调换 change 调轴 change 紧固、调整螺栓,修整接触部位

	friction of impeller 轴承锁紧螺母松动 locknut of bearings become flxible 轴窜动 shaft shake 管道系统不良、风机选型不当、气流喘振 bad pip system fan type is false the airflow flow gaspingly 管道连接不良 joints of pipes are bad 混入异物 interfused eyewinkers 风速过大 air volume is too large	tighten the bolts 加力锁紧 tighten the bolts again 找出原因进行修正 find out the reason and fix 系统重新改造或再选配风机 rebuilt the system or choose fan again 重新调整 adjust over again 去除 remove 改造管道系统 rebuilt the pipe sysytem
温度急剧上升 temperature hoik	轴承因故障发热 bearing heat with faults 轴承安装不良 badness of installation 叶轮动平衡不良 impeller badness of balance 油脂充填过量 excessive lubrication 油脂量不足、变质、混入异物、油脂选用不当 lacking lubrication and the lubrication type is false 电机超载、绝缘不良 motor over loading, badness of isolation 密封部碰擦 friction in sealed parts	调整游隙或调换轴承 adjust crack or change bearing 调整中心、锁紧安装螺栓 adjust the center and tighten the fixed bolts 校正叶轮动平衡 revise the balance of impeller 去除多余部分(轴承座内充填1/3~1/2为佳) wipe off the spilth 补充油脂，分解洗净，换上合格新油脂 supply lipin, exchange new lubrication 调整负荷，修理电机恢复绝缘 adjust the load, repair isolation 调整或重新安装 adjust or install again
振动 libration	基础 基础用材料强度(刚度)不够 base intensity is not enough 基础设计不良 badness of design 基础螺栓松动 the bottom bolts become flexible 叶轮不平衡(垃圾、涂料等异物黏附在叶轮上) imbalance of impeller 轴承损坏 damage of the bearings 轴磨损 abrasion of the shaft 胶带打滑 skid of belts 外部振动传递所致 effect from outside libration 联轴器摆动超差 the swing of shaft joint overrun the tolerance 风机选型不当 the fan type is false	加固，改善 reinforce, improve 锁紧 tighten 清洁叶轮并校正动平衡 clean the impeller, revise the balance 调换 exchange 调换 exchange 调整胶带松紧 adjust the elasticity 使用减振垫，以柔性接管减振 use the shakeproof gasket 重新校正 emendate again 重新选型 choose again

注：上述异常音响应由具有一定实践经验的技术人员进行判断

Remark: these sounds should be estimated by the technicians has abundant experience.

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。

Usually, faults of fan are noise, libration and hot temperature, therefore, daily check is important.

⑴ 振动 Libration

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作记录，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 Vrms，对刚性支承 Vrms≤4.6mm/s，对挠性支承 Vrms≤7.1mm/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）。

With the center line of motor and bearing house, determine and mark the libration value on X, Y, Z direction according to the standard JB/T8689-1998.

If the result is different to the standard, revise suitability.

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。

We don’t hope the fan running less than the standard, even if the unspent fan recognized.

⑵ 音响 Sound

风机在运转时，若有异常音响发生，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。

If the fan has exceptional sound, ensure the causations in time as follows: skid of belts, joints become flexible, eyewinker, bearings, motor. Especially check the bearings.

⑶ 温度上升 Temperature

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 pay attention to the temperature of bearings house and casing. If you insist on 3~4 seconds when touch the surface, here and now the temperature is 60℃.

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 级绝缘使用温度为 100℃。

Motor’s running temperatures are different due to the isolation grade. The limited temperature of winding: grade B is 80℃ ,grade F is 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。

The belt wheels on the high side of temperature will arouse slippage of belt when the fan stopped. You should adjust the strain.

3. 轴承的保养和检查 Maintenance and checking of bearing

⑴ 轴承的性能请参照相应的样本

Please refer to the stylebook about the bearing performance.

⑵ 轴承的安装、拆卸请参照本说明书的相关内容进行。

Please refer to this and the manufactory's specification about installation and disassembly.

⑶轴承寿命 Natural life of bearing

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 bearing load, domestic and foreign standards, the natural life of bearings is 20000~30000 hours commonly beside special case.

⑷润滑脂、油牌号、补充间隔、填充量 Trademark, supplement interval, quantity of lube

a 润滑脂、油牌号 Trademark

如表 4 所示，但对高转速和高温环境则牌号需特殊考虑。

If the common situation same with endure heat degree, see the sheet 4.Think over the trademark for high rotate speed and high temperature especially.

表 4

油脂 lube / 内容 content	深沟球轴承 Ball bearing			调心滚子轴承 Roller bearing		
	润滑油 lubricating	润滑脂 lubricating		润滑油 lubricating	润滑脂 lubricating	
特性 characteristic	一般用 common	一般用 common	高温用 high temperature	一般用 common	一般用 common	高温用 high temperature
标准号 standard mark	GB443-89	GB7324-94	美孚	GB443-89	长城	长城
代号 code	L-AN46	2#	EM	L-AN46	BME	BME
名称 name	机械油 engine oil	锂基脂 Li fat	聚脲基 polyurea	机械油 engine oil	复合锂基脂 Li complex	复合锂基脂 Li complex

b 润滑脂补充间隔 supplement 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。

In common, supplement according to the sheet 5. If in the execrable situation or the system runs continuously in 24 hours or runs in dust and aquosity, the supplement interval is half with sheet 5, also deploy a shield upon the bearings.

润滑脂应在低速转动，或手动盘车情况下均匀、缓慢地注入。

Infuse the lube slowly when the fan runs in low speed or jigger with hand.

润滑脂填充量应为轴承或轴承座型腔容积的 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。

Quantities of append lube are one third to half of bearing or bearing house cubage. Nimiety is adverse.

加注润滑油计划表（月）

轴直径 (mm)	转速 (RPM)								
	500	1000	1500	2000	2500	3000	3500	4000	4500
25–35	6	4	4	2	1	1	1	1	1/2
40–55	4	2	1 1/2	1	1/2	1/2	1/2	1/2	1/2
60–85	3	1.5	1	1/2	1/2	1/4			
90–125	2 1/2	1	1/2	1/4					

理想工作条件下的建议润滑间隔。如安全状况允许，请在运转时重新润滑，直到密封处出现溢出现象。请根据油脂的溢出状况适当调整润滑频率。对于竖轴应用或24小时运转的状况。请采用所列间隔的一半。运转时长、温度和周围环境都将影响所需的重新润滑频率。

c 轴承组的开箱检查及调换润滑脂 open the bearing box to exchange the lube

即使风机运转正常每年至少一次打开轴承箱盖进行检查（轴承单元除外）。

In any case, open the bearing box cover to check one time every year at least. (Beside bearings)

• 轴承各面和部位有无伤痕、裂痕 Are there any scars and cracks in the bearings?

• 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

Did the bearing brim tie in with bearing box well? Does the free part move normally?

• 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）。

Lube supplement of bearing box according to the oil lever line window(see the NOTE mark).

• 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

In the center of shaft and bearing house, all the bolts and gaskets are tight.

• 在轴承清洗后，按要求加入新油脂

Infuse the new lube after washed the bearings.

⑸ 运转温度 running temperature

通常于轴承座表面环境温度在常温加 40℃或小于 70℃的情况均属正常，若超过 70℃则需及时处置。

The temperature about 40℃~70℃ on the bearing surface is natural, otherwise, when the temperature bigger than 70℃, must check it in time.

4. 轴器的保养和检查 Maintenance and checking of shaft joint

应严格将同轴度偏差控制在要求以下 Control the swing windage in request strictly.

磨损失准的柱销应及时更换 Replacing the worn pin in time.

5.胶带及带轮的保养和检查 Maintenance and checking of pulley l and V-belt

⑴胶带 V-belt

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）。

The errors must in the allowable bound when the wheels have some slots.

b 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。

Big length error affects the tiredness, libration and natural life.

c 请不要新旧胶带混用。

Don't use the new and old V-belt at the same time.

d 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。

Loosen the bolts where under the motor base, install the belts after you get a narrow center distance, if you prize the belts into the slots, the belts will rupture.

e 请注意胶带表面不能沾上油污，粘附油污将可能引起运转时胶带打滑，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。

To reduce the natural life when the belts were stained with oil or dust, in particular oil.

⑵带轮中心调整（图 16）adjust the wheel center(drawing 16)

安装带轮的两轴线中心平行如不合标准，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）。

The two axes must parallel, otherwise, the wear will be decline.

Please adjust the imbalance less than 1/3°. (See drawing 17)

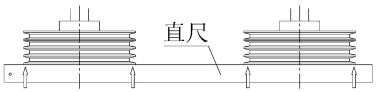


图 16

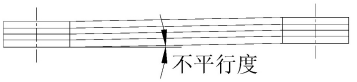


图 17

⑶ 胶带张力调整 adjust the strain

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）。

80~90% of the total extension elongation is the extension elongation in the incipient 24 hours.

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。

Therefore, check the strain one time each day in two days after operation begin, one time each week later. The degree of tightness must be suitable.

胶带张力调整周期建议如表 6 所示 Periods of adjust the strain, see sheet 6

表 6

sheet 6

时间 while	试车运转开始 2 天内 in two days begin running	以后两周内 in two weeks later	以后两个月内 in two months later	以后每满二个月 expire two months
调整次数 times	应每天一次 one time each day	每周一次 one time each week	每月一次 one time a mounth	一次 one time

a 胶带张力的调整一般要求 Generic requests of adjusting the strain.

- 于胶带中央以指尖按押具有适当的弹力
  Proper bounce in the center of belts.
- 运转中松边适度地有弯曲 Curve measurably in running.
- 启动时无打滑现象 Without skid sound in startup.
- 带轮不发热 Pulley won't heat.

b 调整胶带的程序
Process of adjust the v-belt

- 如图 18 于带轮二中心距间中央给于规定挠曲力 Pk 视其挠度。

The flexibility means put stated load in the center distance of two pulleys centers, we mark it Pk. See drawing 18.

表 7 列出挠曲力的概略值 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。

In sheet 7, the compendium values of Pk related with impress power and speed, if you want to know the detail, refer the manufactory.

- 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 the sheet 8, you will get the suitable flexibility which marked it δ, then determine whether the belts are loose or tight.

- 带轮的寿命 natural life of pulley

由于胶带张力不足产生胶带打滑，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。

The friction coefficient will reduce and the wheel depth will augment when the belts hasn't enough strain, the skid belts will fret the pulleys rapidly.

If the new belts under with the wheel slots, you should exchange the belts even if they have natural strain.

- 胶带的寿命 natural life of V-belt

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 the natural situation, the natural life of V-belt is 8000 hours, about one year. You should exchange the belts when many cracks and abrasion on the surface.

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

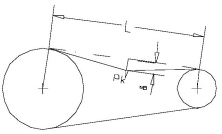


图 18

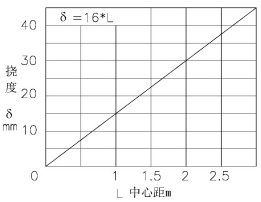


表 8

安 全 须 知
SAFTY CAUTION

✧ 请注意风机设备上所贴的警告、注意标贴，并执行之。
Pay attention to the warnings where were adhibited on the fan and administer them.

✧ 未详细阅读和理解本说明书及不熟悉操作规程者不得上岗。
Don’t mount guard before read this handbook particular and aren’t familiar with operation.

✧ 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伤亡事故。
Must follow the requests about transit, installation, debugging, maintenance and eligible using conditions in this book, otherwise faults will cause some accidents like destroy the fan and casualty.