

OPERATION AND MAINTENANCE

AXIAL FAN



للحصول علي الاستخدام الأفضل ومن أجل سلامتك وسلامة الآخرين يرجى أتباع الإرشادات التالية ،
خطوة بخطوة مع وضع علامة أمام كل بند عند الانتهاء منه .
قبل بدء التشغيل :

1	الإطلاع علي البيانات الموجودة علي الوحدة
2	التأكد من خلو الوحدة والدكت الموصل عليها من أي مخلفات
3	التأكد باليد من حرية حركة الأمبلر والأجزاء المتحركة بالوحدة
4	التأكد علي الربط المحكم لمسامير تثبيت المروحة ، الموتور ، الأمبلر
5	التأكد من التشحيم لكل من الموتور والمروحة
6	التأكد من درجة شد السيور وأحكام ربط مسامير تثبيت الطنابير
7	التأكد من وجود الفلاتر وتأمينها في موضعها بأحكام
8	التأكد من تثبيت الوحدة علي قاعدتها وكذلك التوصيلات الميكانيكية
9	التأكد من الوصلات الكهربائية وفولت التيار طبقاً لمواصفات الموتور
10	التأكد من التوصيل السليم للوحدة مع نظام التسريب الأرضي
11	التأكد من وجود جميع حواجز الحماية والأمان في أماكنها
12	التأكد من وجود شبكة حماية لمدخل أو مخرج المروحة الغير موصل
13	التأكد من إغلاق أبواب الكشف والصيانة بإحكام

فور بدء التشغيل :

14	إيقاف الوحدة عند صدور صوت غير عادي لمعرفة السبب وإزالته
15	التأكد من أن اتجاه دوران المروحة مطابق للموضح علي المروحة
16	متابعة قراءة الأمبير وإيقاف الموتور إذا اعلي من المكتوب عليه
17	التأكد من عدم وجود اهتزاز بأي جزء من الوحدة

بعد ساعة من التشغيل:

18	تأكيد مرة أخرى من درجة شد السيور
19	راجع وأكد مرة أخرى علي إحكام ربط مسامير التثبيت لأجزاء الوحدة

يراعي إعادة الخطوات أعلا بعد كل عملية فك وتركيب للوحدة أو أجزائها

I. GENERAL SAFETY NOTES

1. Rotating parts including shaft and V-belt drives must be properly guarded to prevent personal injury.
2. Electrical wiring must be accomplished by a qualified electrician in accordance with all applicable codes.
3. Care should be taken:
 - Not to run fan above its safe speed
 - Not to operate in excessive temperatures
 - Not to operate in dangerous environments.
 - Read all instructions carefully.

II. Receiving Inspection

When unit is received, inspect immediately for damaged or missing parts. Even though all units are carefully inspected and prepared for shipment at the factory, rough handling en route may cause concealed damage or cause nuts, set screws, bolts or locking collars to work loose. Be certain all fasteners are tightened securely. Rotate prop by hand to verify that it rotates freely and that there are no obstructions.

III. HANDLING

Handle your equipment with care. Some fans are provided with lifting lugs or holes for easy handling. Others must be handled using nylon straps or well-padded chains and cables which protect the fan's coating and housing. Spreader bars should be used when lifting large parts.

Axial fans are best lifted using straps around the fan housing only.

DO NOT LIFT AXIAL FANS BY THE MOTOR, MOTOR BASE, MOTOR EYE BOLT, PROP OR FLANGES.

Roof ventilators should be lifted using straps around the fan housing or base only. Spreader bars should also be used to avoid damage to stack caps or hoods.

DO NOT LIFT ROOF VENTILATORS BY THE STACK CAP OR HOOD.

IV. GENERAL INSTALLATION INSTRUCTIONS

Foundations

Fan foundation must be flat, level and rigid. Where foundation is not completely flat, shims must be placed under fan support at each anchor bolt as required.

Bolting fan to an uneven foundation distorts alignment and causes vibration.

Structural steel foundations should be heavily cross-braced for load support.

V. OPERATION

Before Connecting Power

1. Inspect all fasteners and retighten if necessary:
 - a. Foundation bolts.
 - b. Set screws in fan and prop and V-belt drive
 - c. Housing, bearing and motor mounting.
2. Inspection doors should be tight and sealed.
3. Bearings should be checked for alignment and lubrication
4. Turn rotating assembly by hand to insure that it does not strike housing. If the prop strikes the housing, the prop may have moved on the shaft or the bearings may have shifted in transit. Correction *must* be made prior to start up.
5. Check motor to insure proper speed and electrical characteristics.
6. Check V-belt drive for alignment and correct belt tension.
7. After wiring, energize motor for one second to check for proper rotation.

VI. GENERAL MAINTENANCE

CAUTION

Before any maintenance or service is performed, assure that unit is disconnected or locked out from power source to prevent accidental starting

The key to good fan maintenance is a regular and systematic inspection of all fan parts. Severity of the application should determine frequency of inspection.

The components requiring service are generally the moving parts which include bearings, fan propeller, belts, sheaves and motor.

Cast Aluminum & Metal Parts

Cast aluminum and steel parts usually do not require maintenance during the life of the unit except painted metal surfaces that may require periodic repainting. In a severe, dirty operation, the prop should be cleaned with a wire brush to prevent an accumulation of foreign matter that could result in fan unbalance. After cleaning prop, inspect for possible cracks or excessive wear, which can cause unbalance. **DO NOT** operate a prop that is cracked, chipped, has broken blades or excessive wear. Belts on V-belt drive units require periodic inspection and replacement when worn. For multiple belt drives, belts should be replaced with matched sets.

Motor Maintenance

1. Disconnect or lock out power to motor.
2. Removing dust and dirt: Blow out open type motor windings with low pressure air to remove dust or dirt. Air pressure above 50 P.S.I. should not be used as high pressure may damage insulation and blow dirt under loosened tape. Dust accumulation can cause excessive insulation temperatures.
3. Lubrication: The motor bearings and the fan Bearings on the belt drive fans should be greased at regular intervals. Motor manufacturers' greasing instructions and recommendations should be followed closely.

Avoid the use of a pressure greasing system which tends to fill the bearing chamber completely. Do not overgrease. Use only 1 or 2 shots with a hand gun in most cases. Maximum hand gun rating 40 P.S.I.

Rotate bearings during lubrication where good safety practice permits. NOTE: On motors with nonregreasable sealed bearings, no lubrication is required for the life of the bearings. To prevent rusting of bearing parts, the rotor must be rotated at regular intervals (30 days) to assure these parts are well covered with oil or grease.

VII. V-BELT DRIVES

Care should be taken not to overtighten V-belt drive. Excessive belt tension overloads fan and motor bearings. It is much less expensive to replace belts worn from slippage than to replace bearings damaged from excessive loading.

Fans shipped completely assembled have had V-belt drive aligned at the factory. Alignment should be rechecked before operation as a precaution due to handling during shipment.

CAUTION

A WORD OF CAUTION ABOUT MOTORS

Using your hand to test the running temperature of a motor can be a very painful experience:

Normal body temperature	98.6° F
Threshold of pain caused by heat.....	120.0° F
Average temperature of hot tap water.....	140.0° F
Average temperature of hot coffee.....	180.0° F
Normal operating temperature of a fully loaded electric motor open type, 70° F ambient temperature	174.0° F

1. Be sure sheaves are locked in position.
2. Key should be seated firmly in keyway.
3. Place straight edge or taut cord across faces of driving and driven sheaves to check alignment. The motor and fan shafts must be parallel with V- belts and at right angles to the shafts.
4. Start the fan. Check for proper rotation. Run fan at full speed. A slight bow should appear on slack side of belt. Disconnect power and adjust belt tension by adjusting motor on its sliding base. All belts must have some slack on one side.
5. If belts squeal at start up, they may be too loose.
6. When belts have had time to seat in the sheave grooves, then readjust belt tension.

V-belt drive assembly can be mounted as follows:

1. Clean motor and fan shafts. Be sure they are Free from corrosive material. Clean bore of sheaves and coat with heavy oil for ease of shaft entry. Remove oil, grease, rust or burrs from sheave grooves.
2. Place fan sheave on fan shaft and motor sheave on its shaft. **Do not pound sheaves on** as this may damage bearings.
3. Move motor on slide base so belts can be placed in grooves of both sheaves without forcing. Do not roll belts or use a tool to force belts over the grooves.
4. Align fan and motor shafts so they are parallel. The belts should be at right angles to the shafts. A straight edge or taut cord placed across the face of the sheaves will aid in alignment.
5. Tighten belts by adjusting motor base. Correct Tension gives the best drive efficiency. Excessive Tension causes undue bearing pressure.
6. Start the fan and run it at full speed. Adjust belt tension until only a slight bow appears on the slack side of the belts. If slippage occurs, a squeal will be heard at start-up. Eliminate this squeal by **disconnecting or locking out motor from power source** and then tightening up the belts.
7. Give belts a few days running time to become Seated in sheave grooves, then readjust belt tension.

If the shafts become scratched or marked, carefully remove sharp edges and high spots such as burrs with fine emery cloth or honing stone. Avoid getting emery dust in the bearings.

Do not apply any belt dressing unless it is recommended by the drive manufacturer. V-belts are designed for frictional contact between the grooves and sides of the belts. Dressing will reduce this friction.

Belt tension on an adjustable pitch drive is obtained by moving the motor, not by changing the pitch diameter of the adjustable sheave.

VIII. BEARING MAINTENANCE

sealed bearings and do not require lubrication.

Sealed for life bearings are pre-lubricated with the correct amount of manufacturer approved ball bearing grease, and are designed for application where relubrication is not required.

Relubricatable Bearings

The motor bearings and fan bearings on belt drive fans should be greased at regular intervals. Motor manufacturers greasing instructions and recommendations should be followed closely. Avoid the use of a pressure greasing system which tends to fill the bearing chamber completely. Do not over grease.

NOTE: On motors with non-regreasable, sealed bearings, no lubrication is required for the life of the bearing.

Conditions Around Bearing	Operating Temperature of Fan	**Greasing Intervals
Fairly Clean	up to 120 °F	6-12 months
	120°-160°F	2-3 months
	160°-200°F plus*	1-2 months
Moderate to Extremely Dirty	up to 160°F	1-2 months
	160°-200°F plus*	2-4 weeks
Cold Storage Room		every defrosting period or no more than 4 months

*For fan applications over 200°F: greasing intervals should be from several days to 2 weeks, depending on the temperature.
**For vertical installations, greasing intervals should be twice as frequent as table values.

IX. ORDERING REPLACEMENT

Replacement or spare parts may be ordered through after Sales Service Department The following information should accompany parts orders:

1. Motor horsepower, frame size, motor speed, voltage, phase, cycle and enclosure. Motor manufacturer's model number from motor nameplate.
2. Fan Speed (if V-belt driven).
3. Fan serial **and** model numbers from the **fan** nameplate and a complete description of the part.

An adequate stock of repair parts is maintained where possible. **If your fan is vital to production or to plant operation, it is advisable to have all spare parts on hand to minimize downtime.**

X. TROUBLE SHOOTING

In the event that trouble is experienced in the field, the following are the most common fan difficulties. These points should be checked in order to prevent needless delay and expense.

1. CAPACITY OR PRESSURE BELOW RATING

- a. Incorrect direction of prop rotation.
- b. Speed too slow.
- c. Dampers not properly adjusted.
- d. Poor fan inlet or outlet conditions (elbows, restrictions).
- e. Air leaks in system.
- f. Damaged prop.
- g. Total resistance of system higher than anticipated.
- h. Prop mounted backwards on shaft.
- i. Fan not properly selected for a high temperature and/or high altitude application.

2. VIBRATION AND NOISE

- a. Misalignment of bearings, coupling, prop or V-belt drive.
- b. Unstable foundation or supports.
- c. Foreign material in fan causing unbalance.
- d. Worn bearings.
- e. Damaged prop or motor.
- f. Broken or loose bolts and set screws.
- g. Bent shaft.
- h. Worn coupling.
- i. Fan prop or drive unbalanced.
- j. 120 cycle magnetic hum due to electrical input. Check for high or unbalanced voltage.
- k. Fan delivering more than rated capacity.
- l. Loose dampers.
- m. Speed too high or fan rotating in wrong direction.
- n. Vibration transmitted to fan from some other source.

3. OVERHEATED BEARINGS

- a. Check bearing lubrication.
- b. Poor alignment.
- c. Damaged prop or drive.
- d. Bent shaft.
- e. Abnormal end thrust.
- f. Dirt in bearings.
- g. Excessive belt tension.

4. OVERLOAD ON MOTOR

- a. Speed too high.
- b. Fan over capacity due to existing system resistance being lower than original rating.
- c. Specific gravity or density of gas above design value.
- d. Wrong direction of prop rotation.
- e. Shaft bent.
- f. Poor belt alignment.
- g. Prop wedging or binding on fan housing.
- h. Bearings improperly lubricated.
- i. Motor improperly wired.
- j. Defective motor. Motor must be tested by motor manufacturer's authorized repair shop.

Maintenance

Maintenance shall be performed every three months

Activity	Execution	
	Periodical	As required
<u>Fans:</u> Check for dirt , damage , Corrosion and correct mounting	×	
Check impeller balance.	×	
Check bearing for noise	×	
Lubricate bearing	×	
Check flexible connection for tightness.	×	
Check function of vibration dampers.	×	
Check function of fan guard.	×	
Check function of water drain .	×	
Clean .		×
<u>Electric motors</u> Check for dirt, damage, corrosion secures fixing and direction of rotation.	×	
Check the bearings for noise.	×	
Lubricate the bearings.	×	
Clean.		×
<u>Belt drives</u> Check for dirt, damage, wear , functiong , bealt tension and tight fit of screws	×	
Adjust.		×
Replace belts		×
Check quard for functioning, damage and secure fixing.	×	
Clean.		×