



**CFM**  
CONTINENTAL FAN

*better AIRFLOW by DESIGN™*



## ***Installation & Maintenance***



***INDUSTRIAL & OEM FANS***

READ AND SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

## SAFETY FIRST!

**⚠ WARNING** These instructions must be followed to ensure the safe and proper installation, operation and maintenance of a fan. They should be brought to the attention of all persons who install, operate or perform maintenance.

The operation and maintenance of machinery of any kind requires a person to be aware of the dangers that exist. Because fans and their accessories contain high-speed rotating parts, they present a hazard to installation and maintenance personnel.

Fans should only be installed, maintained, or replaced by trained, experienced personnel. Installations must meet all pertinent regulatory and local safety codes and OSHA requirements.

- **NEVER** allow an untrained person to work on a fan.
- **NEVER** remove **SAFETY** labels from a fan.
- **NEVER** operate a fan without all safety guards in place.

Every fan is designed to operate safely to a stated maximum speed and temperature. Do not exceed these limits! Exceeding these limits could result in death or serious injury.

A fan or impeller must not be allowed to operate with excessive vibration. Excessive vibration can lead to catastrophic fan or impeller failure, and could result in death or serious injury.

## WORK SAFELY!

1. Disconnect and lock out power supply before performing any installation or maintenance. Working on or near energized equipment could result in death or serious injury.
  - a. It is highly recommended that each worker have their own padlock and key.
2. Never apply power to a fan motor for any reason until:
  - a. The fan is installed in its system, has not been damaged and rotates freely;
  - b. The system has been inspected to ensure that no debris has been left in the ducts;
  - c. Safety guards on the equipment and openings of the air passages are in place.
3. Before applying full power to a fan, start (bump) the fan momentarily:
  - a. Observe the rotation of the fan impeller or the drive to ensure that it is correct;
  - b. Do not allow the fan to run backward, except momentarily.
4. Never turn any adjustment or mounting screws when a fan is running.
5. Never open access or inspection doors while a fan is running.
6. Do not block the entrance to or the discharge from a fan or its air passage system.
7. Never remove a safety guard unless the power supply has been locked out.
8. Never reach into a fan unless the power supply has been locked out.
9. Before unlocking the disconnect switch to resume fan operation, ensure that:
  - a. Bushing bolts, mounting bolts, and adjustment screw have been properly tightened;
  - b. No debris has been left in the air passage system and all tools have been removed;
  - c. Safety guards on the equipment and openings of the air system have been replaced;
  - d. Access doors have been closed and secured.
10. Before performing maintenance, read the instructions in this guide:
  - a. Please refer to the manufacturer's product information for additional instructions;
  - b. If in doubt, contact the factory for assistance.
11. Always use caution in every maintenance or operational procedure.
12. Be considerate and aware of those people working with and around you.

## SHIPPING AND RECEIVING

All equipment is inspected and prepared for shipment at the factory. During transport, concealed or visible damage may result from rough handling or parts working themselves loose. Upon receipt of equipment, carefully inspect the shipment before accepting delivery from the carrier.

All visible damage and any shortages discovered at time of delivery must be noted on the Bill of Lading. For any concealed damage or shortages discovered after delivery, file a report with the carrier immediately and notify the factory.

## HANDLING

**⚠ CAUTION** Do not lift fans by impellers, motors, or motor bases. Employ proper lifting techniques to ensure that goods are not damaged. Handle the equipment with care.

## STORAGE

If equipment is not installed and operated upon receipt, it is the responsibility of the buyer to arrange for proper storage of equipment to minimize deterioration and potential damage. Procedures for storage of equipment outlined below are intended as a general guide only. In addition to these instructions, common sense and practical experience should prevail.

### FAN EQUIPMENT

1. Equipment must be stored in a clean, dry, and climate-controlled protected location.
2. Rotate fan impellers every 30 days to circulate lubricants and prevent bearing damage.
3. Bearings must be kept clean, dry, and lubricated by purging and re-lubricating every 60 days.
4. Machined parts must be protected by renewing grease or other oil base coatings every 90 days.
5. Store V-belt drives in matched sets and clearly marked cartons with fan identification.
6. Do not stack items on equipment.
7. Protect equipment from vibration, dust, moisture, and debris with tarps.
8. Record storage maintenance procedures in a log.

### MOTORS

1. Motors must be stored in a clean, dry, and climate-controlled protected location.
2. Maintain motor windings at a temperature of 10F-20F above ambient to prevent condensation.
3. If motors are equipped with internal heaters, they should be energized during storage.
4. Motor rotors must be rotated a minimum of five turns every 30 days to circulate motor lubricant and help prevent oxidation and damage to the bearings.
5. Record storage maintenance procedures in a log.

Please refer to the motor manufacturer's operation and maintenance manuals for additional instructions.

**NOTE:** If extended factory warranty provisions are part of a purchase order, a log of the storage maintenance procedures **MUST** be maintained, listing date, name of personnel and actions taken.

## BEFORE INSTALLATION

Although equipment is balanced, inspected and prepared for shipment at the factory, parts may work loose during transport and result in concealed damage or fan imbalance.

**NOTICE** Before proceeding with installation, it is the installer's responsibility to:

1. Inspect the equipment for any shipping damage.
2. Remove any foreign material such as tags or packing from the fan.
3. Read any enclosed motor manufacturer's installation, operation & maintenance instructions.
4. Furnish electrical components consistent with motor's locked rotor & starting characteristics.
5. Provide a properly designed and reinforced rigid support structure for mounting the fan.
6. Allow adequate space and provisions to facilitate inspection, maintenance and lubrication.

## INSTALLATION INSTRUCTIONS

**⚠ WARNING** Disconnect and lock out power supply before performing any installation or maintenance. Working on or near energized equipment could result in death or serious injury.

**⚠ WARNING** Every fan is designed to operate safely to a stated maximum speed and temperature. Do not exceed these limits! Exceeding these limits could result in death or serious injury.

**⚠ WARNING** A fan or impeller must not be allowed to operate with excessive vibration. Excessive vibration can lead to catastrophic fan or impeller failure, and could result in death or serious injury.

1. Ensure that fan is securely mounted to a flat, level and rigid structure. Shim where necessary.
2. Tighten and confirm that all setscrews, locking collars and bearing mounting bolts are secure.
3. Check clearance of access doors, belt guards and inlet and outlet guards and secure.
4. Turn motor, drive, and impeller by hand to see that it rotates freely and has not been damaged.
5. Check V-belt drive for proper alignment and belt tension.
6. Ensure that the voltage, frequency, and phase stamped on the motor matches the current characteristics of the line to which the motor is to be connected.
  - a. Electric motors can burn out and fail immediately if improperly connected.
7. Inspect the air passage system to ensure that no debris has been left in the fan or ducts;
8. Confirm that guards at the entrance and discharge of the air passage system are in place.
9. Complete wiring connections to fan. Reattach all electrical box covers.
10. Before applying full power to the fan:
  - a. 'Bump' the fan electrically to observe the rotation of the wheel or the drive.
  - b. If required, rewire connections to obtain proper rotation, as indicated by arrow on fan.
  - c. Do not allow the impeller to run backwards.
11. Start the fan and observe its operation at normal operating speed.
  - a. If excessive heat, noise or vibration exists, stop fan immediately and determine cause.
12. Record motor-running amp reading and compare with motor nameplate amp rating.
  - a. Running amps should not exceed (motor nameplate amps) x (service factor).
13. After the fan has run for eight (8) hours, stop it and inspect as follows:
  - a. Check V-belt drive for proper alignment and belt tension; adjust if necessary.
  - b. Ensure that all setscrews, locking collars and bearing mounting bolts are secure.
  - c. Inspect all bearings; check all bolts, screws, and fasteners; tighten if necessary.
14. Resume normal operation.

## INSTALLATION INSTRUCTIONS

15. After the fan has run for 100 hours, stop it and inspect as follows:
  - a. Check V-belt drive for proper alignment and belt tension; adjust if necessary.
  - b. Ensure that all setscrews, locking collars and bearing mounting bolts are secure.
  - c. Inspect all bearings; check all bolts, screws, and fasteners; tighten if necessary.
16. Resume normal operation.
17. Thereafter, a preventive maintenance program is recommended.

## SPLIT TAPER BUSHINGS

**NOTE:** Before starting, check the fit of the key in both the drive shaft and bushing keyways. Ensure that drive shaft, bushing barrel, hub bore, key and keyways are smooth and free of any grease and oil.

**⚠ WARNING** Do not use anti-seize compound on these tapered components, as friction is required to ensure a compressive fit.

### INSTALLATION INSTRUCTIONS FOR SPLIT TAPER BUSHINGS

**NOTE:** The non-threaded holes are used for installation; the threaded holes, for removal.

1. Insert bushing bolts through the clearance (non-threaded) holes in the bushing flange, and place bushing loosely into impeller hub. Place the lock nuts into the pockets on the backside of the impeller hub.
2. Start bushing bolts by hand, turning them just enough to engage threads in the lock nuts. Do not use a wrench at this time. The bushing should move freely in the impeller hub.
3. Slide impeller and bushing assembly onto drive shaft and position impeller by aligning keyways. Fit key into keyway.
4. Using a torque wrench, take a part turn on each bolt sequentially, as in mounting an automobile wheel, until all are tight. Tighten bushing bolts evenly and progressively to the recommended torque value shown in the Recommended Torque Value Table. Do not attempt to tighten the bushing flange flush to the hub.
5. Check the installation gap. There must be a gap between the bushing flange and the impeller hub. If there is no gap between them, disassemble the parts (see 'Removal of Impeller from Drive Shaft') and determine the reason(s) for the faulty assembly.

**NOTICE** Tightening the bushing bolts to a torque higher than that shown in the table below may lead to bushing damage or impeller failure.

### Recommended Torque Value

BUSHING NO.	BOLT SIZE	TORQUE		
		LBS. IN.	LBS. FT.	N-m
QT/QH/L/H	1/4 - 20 UNC	95	8	11
P-1	5/16 - 18 UNC	192	16	22
Q-1 / Q-2	3/8 - 16 UNC	348	29	40
R-2	3-8 - 16 UNC	348	29	40

## PREVENTIVE MAINTENANCE

To ensure trouble free operation and long life for a fan assembly, a preventive maintenance program that includes regularly scheduled inspections and lubrication is recommended. The frequency of inspection and lubrication depends upon the fan, its components and operating conditions.

**⚠ WARNING** Disconnect and lock out power supply before performing any installation or maintenance. Working on or near energized equipment could result in death or serious injury.

### PERIODIC INSPECTIONS

1. Check for obstructions or debris in fan and air passage system.
2. Check for belt wear, belt tension and alignment of sheaves.
3. Inspect fan impeller for dust or dirt accumulation; clean if necessary.
4. Inspect fan impeller for cracks. If found, remove fan from service immediately.
5. Check fan impeller for proper rotation.
6. Check and tighten all bolts and set screws.
7. Check all bearings for excessive temperature or chatter.
8. Check that all surfaces, coatings or paint are in good condition.
9. Check the alignment of impeller, inlet cone, fan bearings and shafts.
10. Check that motor is not overloaded.
11. Blow out open motor windings to remove dust or dirt.

### MOTORS

Motors furnished with sealed bearings have no provision for lubrication, and require no maintenance.

Motors furnished with grease-lubricated bearings require periodic re-greasing. The maintenance schedule for re-greasing will vary widely depending on motor size, speed, environment and operating conditions. Please refer to the manufacturer's product information and instructions.

### V-BELTS & BELT TENSION

**NOTICE** Replace belts in matched sets only.

Proper belt tension is critical to the proper operation of a fan and the service life of a V-belt drive. A new fan will normally ship with belts properly adjusted; however, belts do stretch in the first hours of operation.

After eight hours of running, it will be necessary to readjust the belt tension. After 100 hours, the belts should again be adjusted. Thereafter, a preventive maintenance program is recommended so belts may be adjusted or replaced when necessary. For installation and adjustment of belts, please refer to the manufacturer's product information and instructions.

V-belts should be replaced when they have become visibly worn. A badly-worn belt will cause undue wear on sheaves, to the point of needing replacement. Never install new belts on a badly-worn sheave.

## PREVENTIVE MAINTENANCE

### VARIABLE PITCH SHEAVES

Many belt drive fans are furnished with variable-pitch motor sheaves. For installation and adjustment of sheaves, please refer to the manufacturer's product information and instructions.

Sheaves may be adjusted to lower fan speeds without concern for overloading motors. However, if increased fan speed is desired, please contact the factory to ensure that:

1. The maximum safe speed of the fan is not exceeded.
2. The increased fan speed does not overload the motor.

#### **NOTICE**

Running amps should not exceed motor nameplate amps x service factor.

### FAN BEARINGS

For lubrication, cleaning, adjustment, or replacement of fan bearings, please refer to the manufacturer's product information and instructions.

When servicing fan bearings, it is important to inspect the shaft for wear at the bearing mounting positions. Replace as necessary. Ensure that old grease is purged from lines before reconnecting to new bearings.

### REMOVING A FAN IMPELLER FROM A DRIVE SHAFT

#### **NOTICE**

Never use a wheel puller to remove a fan impeller from a drive shaft. This may lead to impeller damage or failure.

For a fan impeller secured to a shaft with a split taper bushing:

1. Remove all bushing bolts from the bushing and hub assembly.
2. Insert the bushing bolts into the threaded holes in the bushing flange.
3. Tighten each bolt evenly and sequentially until the bushing disengages from hub.
4. Slide the bushing off the drive shaft. If the bushing has seized on shaft, it may be necessary to use a wheel puller to remove the BUSHING ONLY from the drive shaft.
5. Remove the fan impeller from the drive shaft.

**NOTE:** The removal holes on a bushing are threaded; the installation holes are not.

## COMMON CAUSES OF FAN VIBRATION

1. Damage during shipping, handling or installation.
2. Addition of drive components in the field (for units furnished less final drive components).
3. Support structure not sufficiently rigid or level.
4. Vibration amplified by resonance in duct work or support structure.
5. V-belt drive or shaft misalignment.
6. Belt tension too tight or too loose.
7. Bearing locking collar or mounting bolts loose.
8. Impeller setscrew loose.
9. Dust or particulate build-up on impeller.
10. Impeller rubbing on casing.
11. Fan operating in the 'STALL' region of its performance curve.

## CORROSIVE APPLICATIONS

**⚠ WARNING** Exposure to corrosive environments can be hazardous to health.

**NOTICE** Exposure to corrosive environments can lead to mechanical failure and property damage.

When installing or performing maintenance on systems designed for corrosive environments:

1. Use proper safety clothing and gear when working in corrosive environments.
2. Ensure that all joints in the air passage system are tight and properly sealed.
3. Ensure there is proper pick up at the inlet hood(s).
4. Ensure discharge is properly connected to fume scrubber or exhausted to atmosphere.
5. Regularly inspect fan and air passage system for corrosion.
6. Replace corroded parts as necessary.

## WARRANTY

Go to [www.continentalfan.com](http://www.continentalfan.com) for complete warranty information.

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