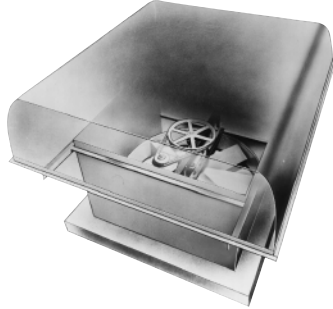




Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

PENN BARRY

Powered Airette: Axial Flow Hooded Roof Ventilators: Direct & Belt Drive



Receiving and Handling

PennBarry fans are carefully inspected before leaving the factory. When the unit is received, inspect for any signs of tampering. Inspect the unit for any damage that may have occurred during transit and check for loose, missing or damaged parts. Mishandled units can void the warranty provisions. PennBarry is not responsible for damages incurred during shipment.

Avoid severe jarring and/or dropping. Handle units with care to prevent damage to components or special finishes.

Storage

Long-term storage requires special attention. Units should be stored on a level, solid surface, preferably indoors. If outside storage is necessary, protect the units against moisture and dirt by encasing in plastic or some similar weatherproof material. Periodically inspect units and rotate wheel to spread bearing lubricant. If unit will be stored for extended time, remove belts.

Installation

INSTALLING THE DAMPERS

When required, install dampers prior to mounting the unit on the curb or frame. Secure dampers to the inside of the curb without undue twisting, which may distort the damper frame. Damper frame must be reasonably level on all sides. Check for free operation. If dampers are motor operated type, ascertain that proper voltage is impressed on motor terminals.

POSITIONING AND RUNNING POWER LINES

When power lines are brought up to the unit, provide a generous amount of slack to allow for motor deflections and to permit movement of motor for belt tension adjustments. Ground motor adequately and securely. Protect power lines from sharp objects. Do not kink power line or permit it to contact hot surfaces, chemicals, grease or oil. Use only UL recognized electrical parts, rated for proper voltage, load and environment.

Power is normally brought from within the building and placed inside one corner of the curb. Feed power line through the clearance hole provided in the damper and in turn through the ventilator to the disconnect switch, if furnished, and motor.

ANCHORING OR SECURING THE UNIT

Whenever possible, anchor the fan by fastening through the vertical portion of the mounting flange. The type, size and number of fasteners depends upon the unit size and curb construction. If code or specification prescribes fastening through the top (horizontal portion) of the mounting flange, use neoprene or lead washers under the head of each fastener to prevent water leaks.

CAUTION Guy down large units installed in areas subject to high winds or unusual field conditions.

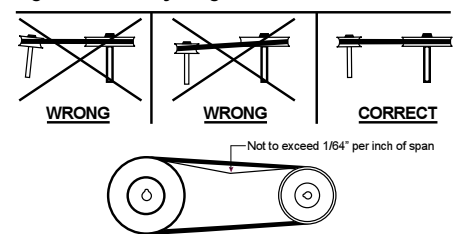
If the contractor removes ventilator parts to facilitate installation and electrical connections, all parts should be reassembled by replacing all spacers, washers, nuts, bolts, fasteners and components exactly as they were found prior to removal. All fasteners are to be drawn tight and secure. The ventilator is now ready for service.

Start-Up and Operation

Carefully inspect the unit before start-up. All motor fasteners should be securely tightened. Propeller should be rotated by hand to insure free movement. (NOTE: Before placing hand on propeller or belts, lock out power source.) Check all set-screws and keys. Tighten when necessary.

Check the condition of belts and the amount of tension prior to start-up. DO NOT over tighten, as bearing damage will occur. Recommended belt tension should permit deflection of 1/64" of the belt on each side of the belt measured halfway between the pulley centerline. Exercise extreme care when adjusting belts as not to misalign the pulleys. Any misalignment will cause a sharp reduction in belt life and produce squeaky, annoying noises. On units equipped with two or three groove pulleys, adjustments must be made so that there is equal tension on all belts.

Figure 2: Pulley Alignment



CAUTION Whenever belts are removed or installed, never force belts over pulleys without loosening motor first to relieve belt tension.

Make sure inlets and approaches to the unit are free from obstruction.

Before putting fan into operation, complete the following checklist:

- Turn off power source.
- Make sure installation is in accordance with manufacturer's instructions.
- Check and tighten all fasteners.
- Spin centrifugal wheel to see if rotation is free.
- Check all set-screws and keys - tighten if necessary.
- Check belt for alignment (use recommended belt tension gauges).

- g. Check belt for proper sheave selection.
- h. Make sure there is no foreign, loose material in ductwork leading to and from fan or in the fan itself.
- j. Properly secure all safety guards.
- k. Secure all access doors to fan and ductwork.
- l. Check line voltage with motor nameplate.
- m. Check wiring.

CAUTION *On single phase motors, the terminal block must be set up in accordance with the nameplate instructions and/or wiring diagram. This set up must match the line voltage. If the motor is multi-speed or multi-voltage, the winding leads must be grouped and connected as shown on the motor wiring diagram. The line voltage must correspond with proper grouping of motor leads. The wiring diagram must be followed explicitly or serious motor or starter damage will occur.*

Switch on electrical supply and allow fan to reach full speed. Check carefully for:

1. Correct rotation of the propeller.

CAUTION *Incorrect rotation overloads motor severely and results in serious motor damage. To change rotation of three phase units, interchange any 2 of the 3 line leads. On single phase units, change the terminal block set-up following the wiring diagram on the motor.*

2. Check motor and bearing temperatures for excessive heat.

CAUTION *Use care when touching the exterior of an operating motor. Modern motors normally run hot. They are designed to operate at higher temperatures. This is a normal condition but they may be hot enough to be painful or injurious to the touch.*

If any problem is indicated, TURN OFF POWER TO UNIT IMMEDIATELY. Lock out the electrical supply, check carefully for the cause of the trouble and correct as needed. Even if the fan appears to be operating satisfactorily, shut down after a brief period and check all fasteners, set-screws and keys for tightness.

During the first eight (8) hours of operation, check the fan periodically for excessive vibration or noise. At this time, also check motor input current and motor bearing temperatures to insure that they do not exceed manufacturer's recommendations. After eight (8) hours of satisfactory operation, shut down the fan and lock out the electrical power to check the following items and adjust if necessary:

- a. All set-screws, keys and fasteners.
- b. Drive coupling alignment.
- c. Belt alignment.
- d. Belt tension.

NOTE: Take care to follow all local electrical, safety and building codes. Follow provisions of the National Electrical Code as well as the Occupational Safety and Health Act.

Always disconnect power source before working on the unit.

Guard and protect all moving parts.

All motors are checked prior to shipment. However, if motor defects should develop, prompt service can be obtained from the nearest authorized service station of the motor manufacturer under the warranty. Exchange, repair or replacement will be provided on a no charge basis if the motor is defective within the warranty period. Do not return defective motors to Penn Ventilation, Inc. **WARNING:** Motor guarantee is void unless overload protection is provided in motor wiring circuit.

Maintenance

Do not attempt maintenance on a fan until the electrical supply has been completely disconnected. Lubrication is a primary maintenance responsibility. Check all bearings periodically. Inspect belts for tightness. If the fan is installed in a corrosive or dirty atmosphere, periodically clean the centrifugal wheel, inlet, motor housing and other moving parts.

FAN SHAFT LUBRICATION

Fan shaft bearing pillow blocks are furnished in either the pre-lubricated sealed-for-life type or the greasable type depending on what was ordered. The pre-lubricated type requires no servicing for 7 to 10 years of normal use and the greasable type are factory greased eliminating the need for greasing initially. Follow the lubricating schedule recommended by the factory. This practice should not supersede any safety considerations.

CAUTION *Use low pressure grease guns only. High pressure guns tend to blow out or unseat bearing seals, leaving the bearing open to collect grime, dust and foreign particles.*

LUBRICATION SCHEDULE

- a. Under average conditions where ambient temperatures do not exceed 120°F, lubrication is required 1 to 2 times a year.
- b. Under dirt laden atmosphere where there is a temperature range of 120°F to 150°F, lubrication is required from 3 to 6 times a year.
- c. Under extreme temperature conditions and extremely dirty atmospheres, lubrication should be scheduled at least once or twice a month.
- d. Belt driven units maximum temperature should not exceed 160°F. Direct driven models have temperature range stamped on motor.

Table 1: Recommended Lubricants

Manufacturer	Product	Temp. Range
BP	LG-#P-1	Below 32°F (0°C)
Gulf	Gulfcrown EP-1	
Imperial Oil	Unirex EP-1	
Shell	Alvania R-1	32°F to 150°F (0°C to 66°C)
BP	Energrease, MPMK11	
Gulf	Gulfcrown EP-2	
Imperial Oil	Unirex EP-2	
Shell	Alvania R-3	
Sun Oil	Sun Prestige 42	
Texaco	Regal AFB2	

MOTOR LUBRICATION

In general, standard motors are furnished with prelubricated, sealed-for-life ball bearings which require no lubrication for 7 to 10 years of normal service. Where motors have been ordered with greasable bearings, these bearings are factory lubricated and require no attention for one year under normal conditions. If grease relief fittings are provided, remove them when performing maintenance to allow grease to flow out. Whenever possible, apply grease while the motor is running. This practice should not supersede any safety considerations. **DO NOT OVER GREASE**, as most lubricants deteriorate motor windings, thereby reducing motor life and presenting a fire hazard.

Hidden Danger

In addition to the normal dangers of rotating machinery, fans present an additional hazard in their ability to suck in not only air, but loose material as well. Solid objects can pass through the fan and be discharged by the impeller as potentially dangerous projectiles. Therefore, screen intake to ductwork, whenever possible, to prevent the accidental entrance of solid objects. Never open access doors to a duct system with the fan running.

When starting the fan for the first time, completely inspect the ductwork and interior of the fan (with the power locked off), to make certain there is no foreign material which can be sucked into or blown through the ductwork.

Where the fan is accessible to untrained personnel or the general public, use maximum safety guards, even at the cost of some performance loss.

CAUTION *Unprotected fans located less than 7' above the floor also require guarding as specified in the Occupational Safety and Health Act (OSHA).*

Guards

All fans have moving parts which require guarding in the same way as other moving machinery. In areas which are accessible only to experienced personnel, a standard industrial type guard may be adequate. This type of guard will prevent the entry of thrown or dropped objects with a minimum restriction of air flow.

Where the fan is accessible to untrained personnel or the general public, use maximum safety guards, even at the cost of some performance loss. Unprotected fans located less than 7" above the floor also require guarding as specified in the Occupational Safety and Health Act (OSHA). Roof mounted equipment will require guards when access is possible.

Axial fans may be connected directly to ductwork which will prevent contact with the internal moving parts, but when the inlet or outlet is exposed, install a suitable guard. Accordingly, roof openings for PennBarry Axial units can be easily and neatly fitted with framed safety guards. PennBarry recommends the use of guards on all exposed non-ducted fans, ceiling and wall mounted.

Fans may be driven from the motor shaft or through a belt drive. In every case where the bearing assembly, rotating shaft, sheaves or belts are exposed, a suitable guard should be provided.

Special Purpose Systems

Explosive, corrosive, high temperatures, etc. may require special construction, inspection and maintenance. It is necessary to observe the fan manufacturer's recommendations and limitations concerning the type of material to be handled by the fan and its application to special conditions.

Parts Replacements

If replacing parts, do so with properly selected components which duplicate the original parts correctly. Incorrectly sized shafts, belts, pulleys, centrifugal wheels, etc. can damage the fan.

Troubleshooting Checklist

Symptom	Possible Cause(s)	Corrective Action
Excessive noise	<ol style="list-style-type: none"> 1. Defective or loose motor bearings 2. Ventilator base not securely anchored 3. Loose or unbalanced wheel/propeller 4. Misaligned pulleys or shaft 5. Loose or damaged wheel/propeller 6. Wheel running in wrong direction 	<ol style="list-style-type: none"> 1. Replace motor with same frame size, RPM, HP 2. Reset properly 3. Tighten screws, remove build-up, balance wheel/propeller 4. correct alignment 4. Replace wheel/propeller 6. Reverse direction
Fan inoperative	<ol style="list-style-type: none"> 1. Blown fuse or open circuit breaker 2. Loose or disconnected wiring 3. Defective motor 4. Broken belts 	<ol style="list-style-type: none"> 1. Replace fuses or circuit breaker 2. Shut off power and check wiring for proper connections 3. Repair or replace motor 4. Replace belts
Insufficient airflow	<ol style="list-style-type: none"> 1. Open access doors or loose sections of ducts 2. Clogged filters 3. Operation in wrong direction 4. Insufficient make-up air direction 	<ol style="list-style-type: none"> 1. Check for leakage 2. Clean filters 3. Correct rotation of wheel/propeller 4. Add make-up fan or louver opening
Water leaking into ductwork or collection of grease under fan	<ol style="list-style-type: none"> 1. Fan installed with slope in the wrong direction 2. Clogged drain spout 3. Cooling tube or motor dome top removed 4. Grease container full 	<ol style="list-style-type: none"> 1. Slope should be fitted in the direction of the drainage opening or grease collection box and drain spout 2. Clean drain spout 3. Install new cooling tube with gasket and dome top 4. Empty grease box
Motor overheating	<ol style="list-style-type: none"> 1. Belt slippage 2. Overvoltage or under voltage 3. Operation in wrong direction 4. Fan speed too high 5. Incorrect motor (service factor 1.0, low ambient temperature) 6. Blocked cooling tube or leaky gasket 7. Insufficient airflow to kitchen hood fan operating on low speed with kitchen in full operation 8. Undersized motor 	<ol style="list-style-type: none"> 1. Adjust tension or replace bad belts 2. Contact power supply company 3. Reverse direction of motor 4. Slow down fan by opening variable pitch pulley on motor shaft 5. Replace motor with correct open, NEMA service factors (1.15 or higher) with 40 degrees ambient 6. Remove blockage and seal cooling tube in place 7. Check airflow under hood and adjust kitchen equipment output 8. Check motor ratings with catalog speed and air capacity chart

Note: Care should be taken to follow all local electrical, safety and building codes. Provisions of the National Electric Code (NEC), as wells as the Occupational Safety and Health Act (OSHA) should be followed.

All motors are checked prior to shipment. If motor defects should develop, prompt service can be obtained from the nearest authorized service station of the motor manufacturer while under warranty. Exchange, repair or replacement will be provided on a no charge basis if the motor is defective within the warranty period. The PennBarry representative in your area will provide a name and address of an authorized service station if requested. **WARNING:** Motor guarantee is void unless overload protection is provided in motor wiring circuit.

Limited Warranty

What Products Are Covered

PennBarry Fans and Ventilators (each, a "PennBarry Product")

One Year Limited Warranty For PennBarry Products

PennBarry warrants to the original commercial purchaser that the PennBarry Products will be free from defects in material and workmanship for a period of one (1) year from the date of shipment.

Exclusive Remedy

PennBarry will, at its option, repair or replace (without removal or installation) the affected components of any defective PennBarry Product; repair or replace (without removal or installation) the entire defective PennBarry Product; or refund the invoice price of the PennBarry Product. In all cases, a reasonable time period must be allowed for warranty repairs to be completed.

What You Must Do

In order to make a claim under these warranties:

1. You must be the original commercial purchaser of the PennBarry Product.
2. You must promptly notify us, within the warranty period, of any defect and provide us with any substantiation that we may reasonably request.
3. The PennBarry Product must have been installed and maintained in accordance with good industry practice and any specific PennBarry recommendations.

Exclusions

These warranties do not cover defects caused by:

1. Improper design or operation of the system into which the PennBarry Product is incorporated.
2. Improper installation.
3. Accident, abuse or misuse.
4. Unreasonable use (including any use for non-commercial purposes, failure to provide reasonable and necessary maintenance as specified by PennBarry, misapplication and operation in excess of stated performance characteristics).
5. Components not manufactured by PennBarry.

Limitations

1. In all cases, PennBarry reserves the right to fully satisfy its obligations under the Limited Warranties by refunding the invoice price of the defective PennBarry Product (or, if the PennBarry Product has been discontinued, of the most nearly comparable current product).
2. PennBarry reserves the right to furnish a substitute or replacement component or product in the event a PennBarry Product or any component of the product is discontinued or otherwise unavailable.
3. PennBarry's only obligation with respect to components not manufactured by PennBarry shall be to pass through the warranty made by the manufacturer of the defective component.

General

The foregoing warranties are exclusive and in lieu of all other warranties except that of title, whether written, oral or implied, in fact or in law (including any warranty of merchantability or fitness for a particular purpose).

PennBarry hereby disclaims any liability for special, punitive, indirect, incidental or consequential damages, including without limitation lost profits or revenues, loss of use of equipment, cost of capital, cost of substitute products, facilities or services, downtime, shutdown or slowdown costs.

The remedies of the original commercial purchaser set forth herein are exclusive and the liability of PennBarry with respect to the PennBarry Products, whether in contract, tort, warranty, strict liability or other legal theory shall not exceed the invoice price charged by PennBarry to its customer for the affected PennBarry Product at the time the claim is made.

Inquiries regarding these warranties should be sent to: PennBarry, 1401 North Plano Road, Richardson, TX 75081.