



## Fan installation and maintenance

### **Circuit Protection:**

Fuses in the circuit should be regarded as protecting the wiring to the motor and not motor overload protection. Single phasing protection and current overload protection must be provided. Failure to provide this protection will void the warranty. The overload protection devices must be correctly set to protect the motor. Motors fitted with thermistor or thermostatic overheat protection (wires marked "TK") must be suitably wired into the control circuit to interrupt motor power supply on winding temperature rise.

### **Motors:**

All standard motors are suitable for operation in air temperatures between -20° and +40°. If higher temperatures are required, contact your nearest Pacific HVAC Engineering representatives for advice.

### **Starting:**

All fans are suitable for direct-on-line starting manually or automatically up to and including 5.5kW. The number of starts should be limited to no more than four direct-on-line starts per hour or, no more than eight starts per hour for motors up to 1kW.

### **Maintenance Checking:**

Inspection of the fan is recommended initially after 3 months to ensure that there is no build up of dirt or other matter that would cause overheating of the motor. Standard motors are not suitable to handle saturated air containing water droplets or some corrosive fumes. For severe applications, special motors and finishes may be required. For axial fans the blades and motor should be clean and the tightness of the fastenings should be checked. Overloads should be inspected to ensure correct operation. Due to the different periods of operation from the time of installation and conditions of use, no rigid inspection and maintenance periods can be recommended. It is suggested that the inspection and if necessary cleaning / bearing check should be carried out at regular intervals of a maximum of six months.

### **Note:**

Before proceeding with routine maintenance ensure that:-

- ◆ the fan and speed control, if fitted, are electrically isolated.
- ◆ sufficient time is allowed for impeller to stop completely

It is recommended that all Pacific HVAC Engineering products are maintained in accordance with the HVAC "Standard Maintenance Specification for Mechanical Services in Buildings" - Volume II Ventilating and Air Conditioning.

### **Maintenance Instructions:**

To obtain maximum service life of your fans, it is recommended the following maintenance be implemented and recorded in a plant log book.

1. Ensure air intake space is unobstructed to avoid overheating the motors.
2. On a weekly basis use an air hose to ensure all airways are clear and free of dust if the fans are not used.

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3. Do not wash the fan motor down unless the motor is IP66 rated.
4. On a quarterly basis
  1. Check motor terminals for tightness and contact.
  2. If terminal lugs are discoloured, re-terminate.
  3. Check the operation of starting equipment, ensuring all terminations are tight.
  4. Check mechanical operation of thermistor relay (if fitted).
  5. Motors are provided with sealed for life bearings and require no maintenance up to a frame size of 160.  
For large frame motors grease lines are provided to lubricate the motor bearings.
    - i. Standard Motors – Shell Alvania EP (LF) or equivalent.
    - ii. High Temperature Motors – Shell Albida EP or equivalent. (For smoke spill fans use only grease nominated on the motor nameplate).
5. On a six (6) monthly basis, in addition to the above in item 4
  1. Check stator resistance (compare to original and enter in log book).
  2. Check supply voltage at motor terminals.
  3. Check bearings for noise / overheating.
  4. Check the tightness of fastening.
6. On an annual basis, in addition to the above in items 4 and 5
  1. Strip motor out and clean thoroughly.
  2. Check bearings for wear / damage - Replace as necessary.
  3. Check all fastenings and impeller blades for cracks or damage - Replace as necessary.
  4. After re-assembly, check and record:
    - Full load Current
    - Full load Voltages
    - Full load Speed
7. Ensure plant log book records commissioning data and compare maintenance data to original.
8. Contact your nearest Pacific HVAC Engineering office for any part replacement.

### Cleaning Impellers

It is recommended that a stiff brush be used to remove any build up of dirt. Care should be taken not to damage or distort the impeller blades. If thorough cleaning on site is not possible, proceed as follows:-

1. Remove the impeller by removing retaining screw to take impeller out from motor shaft while retaining motor shaft key. External Rotor Motor Axial and Centrifugal fan impellers cannot be removed from motor and they have to be cleaned on site.
2. Remove all loose dirt using a stiff brush
3. Sponge the impeller with warm soapy water
4. Rinse thoroughly in clean water and wipe dry

DO NOT USE SOLVENTS OR CAUSTIC FLUIDS  
UNDER NO CIRCUMSTANCES MUST THE MOTOR BE SUBMERGED IN WATER

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### Anticipated Service Life:

The service life of fan motors will vary widely depending on frequency and methods of start (direct on line or soft start with speed control), the ambient temperature and the load applied. Motors selected by Pacific HVAC Engineering are of the highest available quality and provided they are maintained in accordance with this guide will provide many years of reliable service.

The nominal rated life of motor types is listed below.

External Rotor Motor (single and three phase)	30,000 Hours
Class F TEFC Motor (single and three phase)	30,000 Hours
Class H TEFC Motor (single and three phase)	60,000 Hours

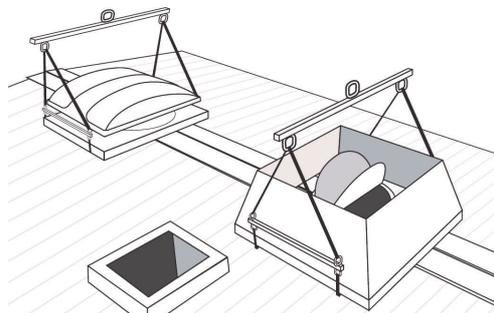
### Guidelines for Lifting Fans

1. Follow all relevant regulation and legislation for lifting in your local area. (For example Worksafe Regulations for Dogging)
2. Ensure that all Sling Angles, Chain/Sling capabilities, shackles etc. are checked against the weight of the unit and the local regulations.
3. Slings should always be used in line with good rigging practice and as per the manufacturer's recommendations.
4. Incorrect sling use could result in a dangerous situation that could cause property damage, serious injury or death.
5. Increasing the included angle of multiple leg sling assemblies de-rates the sling. Therefore higher capacity slings will be required.
6. Never use a sling with an included angle in excess of 120 degrees.

The information shown here is a guide only and final decisions on lifting are the responsibility of qualified dogging operators based on the site requirements.

### Guidelines for lifting Roof Units

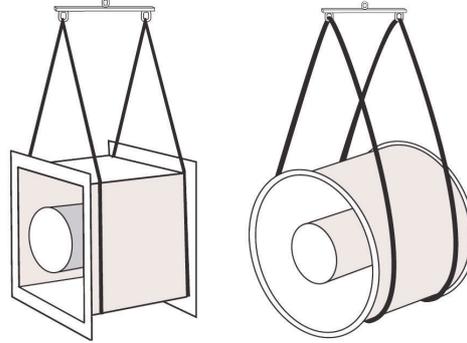
Recommend Basket Hitch Sling with Spreader Bars for all Vertical Discharge, Down Discharge and Roof Supply Air units.



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### Guidelines for lifting In Line Units

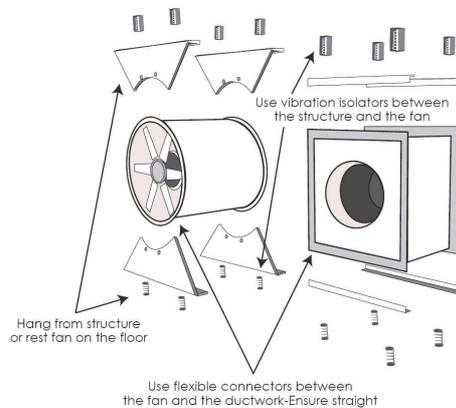
Recommend Basket Hitch with Spreader Bar for Round Inline and Rectangular Inline Units.



**Sling Capacity, Shackle Capacity and Sling Angles all to be based on the weight of the fan being lifted.**

### Guidelines for Positioning Inline Fans

1. Use vibration isolators and flexible connections to ductwork to minimise vibration in the system.
2. For free intake conditions use an inlet cone and guard to improve inlet conditions and safety for personnel.
3. For free outlet conditions use a discharge diffuser or evasé of 1D long and 1.26D in diameter at the outlet.
4. Podded or rectangular silencers should be >1D from the fan.
5. Bends should be >1D from the fan.
6. Obstructions at the inlet or outlet of the fan shall be > 1D from the inlet/ outlet.

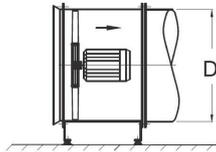


Note 1D = 1 Fan Diameter.

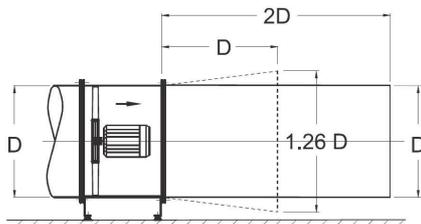
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### Guidelines for Positioning Inline Fans (continued)

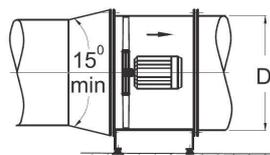
1. Install inlet cones to fan inlet if no duct connection to fans.



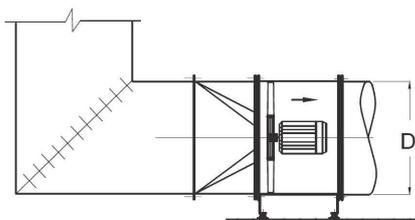
2. Fans should be mounted at least one fan diameter 'D' from any obstruction.



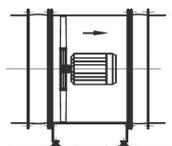
3. Fans should never be terminated abruptly at the discharge outlet. Install a two diameter 'D' duct piece or 1.26 diameter 'D' and one diameter 'D' length expander.



4. Expanders at inlet side of fans should not have an inclusive angle greater than 15° and a duct should be installed at the outlet of fans.



5. In confined spaces do not connect 90° small radius circular bends. A square bend with turning vanes is preferable.

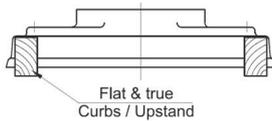


6. Flexible duct connectors either side of fans should be reasonably taut.

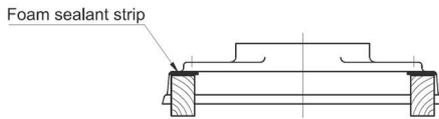
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### Guidelines for Positioning Roof Fans

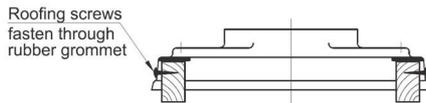
1. Fans shall be positioned on upstands built into the roof specifically for the purchased fan.
2. Upstands shall be built to maximise the cross sectional area of ductwork to the base of the fan.
3. Place upstands in a position where any future maintenance and inspection can be carried out with minimum disruption to other plant and equipment.
4. Do not place the fan in a position where it will experience high prevailing winds as this will adversely affect performance.
5. Do not place the fan at  $>30^\circ$  from horizontal.
6. Flaps on fans (where fitted) shall be aligned with the fall of the roof to ensure they will fall in an identical manner.
7. Use an airtight seal between the fan and the upstand to ensure that all exhaust/supply air is moving from/to the correct area.



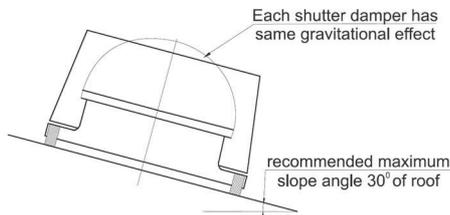
8. Ensure that curbs / upstands are flat true square.



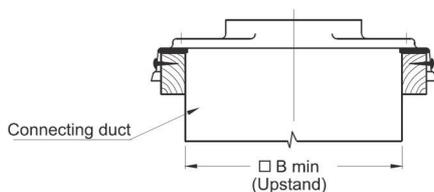
9. Ensure a suitable foam sealant strip to fix on top of curbs / upstands to prevent air leakage through the gap between the curbs / upstands and the fan bases.



10. Ensure roofing screws are fastened securely through the side midway through the skirt to prevent water leakage to the building.



11. Ensure roof vertical discharge fans with shutter dampers are installed with the hinge line parallel with the slope of the roof.



12. Ensure the connecting duct size matches the specified size for the fan.

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### **Guidelines for fans fitted with Damper Fail Open Device. (Smoke-Spill vertical discharge fans)**

The purpose of the stainless steel cable, linkages, weights and fusible link is to hold the dampers in an open position in the event of air temperature through the fan exceeding 71°C (in the event of a fire). The dampers will operate normally, i.e. open and close with operation of the fan when used for general ventilation or in test mode.

With the fan operating normally (dampers open) an air temperature rise to > 71°C will cause the fusible link to break thereby allowing the weights to drop. As these are attached to the dampers through the stainless steel cable, the dampers will remain in the open position even when the fan stops operating.

The weights will not open the dampers from a closed position.

### **NOTES (For the Commissioning Technician)**

1. The fans are shipped from the factory with the dampers tied down to the base/inlet cone. This is to prevent damage in transit. Ensure the dampers are free to open prior to operation of the fan.
2. The weights suspended from the fusible link are tied to the lifting lug on the base of the fan. This is to prevent damage to the wind-band in transit. Ensure the weights have been released prior to fan operation.
3. Do not tamper with any of the components of the Damper Fail Open Device. All cables, lugs, weights and linkages have been sized and positioned for proper operation when the fan is used for general ventilation or during test mode.
4. The weights must remain suspended from the fusible link at all times. The weights must not move when the fan is used for general ventilation or during testing.

