GREENHECK
Building Value in Air.

Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. 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!

Isolator Mounting

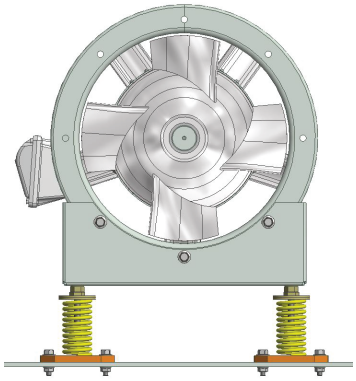
Upon receiving fan, check for any damage and report it immediately to the shipper. Also, check to see that all accessory items are accounted for.

Move fan to the desired location and determine the position in which the fan is to be mounted.

The efficiency of an isolator system can be seriously impaired if the system is connected to rigid pipes, electrical conduits, ducts or shafts. It is essential that such external connections be as flexible as possible, not only to prevent transmission of vibration through the connections and allow the system freedom of movement, but also to avoid possible failure of connections.

For use in adverse outdoor locations or corrosive atmospheres, some additional protection may be required. Consult your application engineer about problem installation areas.

Open Spring Isolators



Rated Load	Color Code	Torque	Deflection/ Rated Load (mm/kg)
30	Yellow	40 ft lb *(54 N-m)*	25/30
60	Green		25/60
100	Blue		25/100

Each size of isolator is identified by the color coded spring. Although these isolators have excellent finishes, they are not usually suitable for prolonged use in adverse outdoor locations or corrosive atmospheres without further protection. Consult with your application engineer about problem installation areas.

1. The structure beneath the fan should be constructed to form a rigid and reasonably level seating for each group of isolators.
2. The isolators should be examined to ensure they are of the correct size, and if appropriate, the positions for different sizes should be located in accordance with the drawings.
3. After the isolators are in position, the fan base should be levelled and supported just clear of the adjusting screw fixed nut, (see Figure 1), using jacks or blocks ensuring alignment between isolator screw and machine base fixing holes.

Open Spring Isolator Positioning

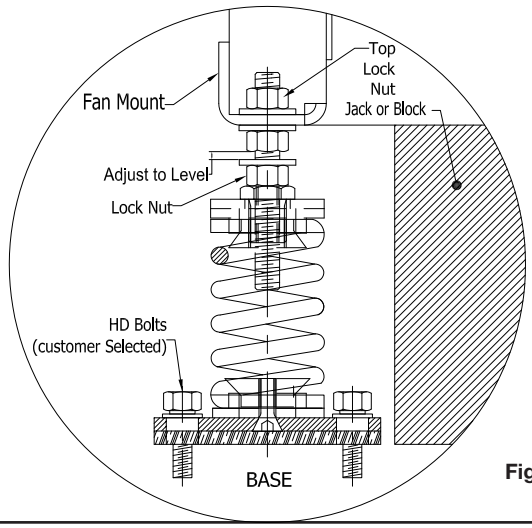


Figure 1

At this stage, isolator H.D. bolts (supplied by others) can be loosely fitted to maintain isolator positions during final lowering of fan base, but it is important these do not strain the isolator in any direction.

4. Isolator screws should then be wound up until contact with fan under base is made. After removal of blocks that fan base can be carefully lowered evenly across supported area, transferring full weight to the isolators. Further fan height adjustment can be achieved by relieving

load on isolators and winding adjusting screw up or down. Isolator H.D. bolts and top lock nuts should now be fully tightened. Ensure at least 3 full threads are left protruding below the upper plate.

NOTE

Use self-locking nut to ensure bolts do not back out.

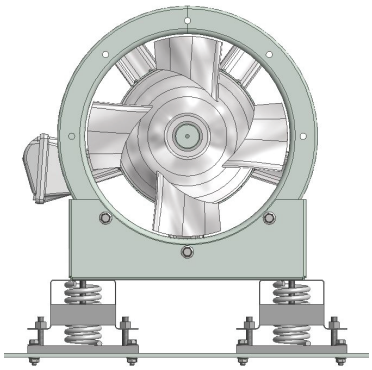
5. Do not use open spring mounts for external applications without independent restraints.
6. For applications where control of transient motion is required, e.g. during start up and run down of large fans, additional mass and/or viscous dampers may be necessary.
7. Ribbed rubber seating pads should always be used when the mounting is seated on concrete or other rough surfaces.

NOTE

Isolators are not designed to accommodate angular misalignment, excessive horizontal or tensile forces, and must not be used for tensile or shear loading applications.

8. No adjustment is possible when using Base Mount Spring Isolators but small variations e.g. 2-3 mm can be resolved with the use of thin steel or other rigid packing pieces between fan base and spring top washer.
9. The efficiency of an isolator system can be seriously impaired if the system is connected to rigid pipes, electrical conduits, ducts or shafts. It is essential that such external connections be as flexible as possible, not only to prevent transmission of vibration through the connections and allow the system freedom of movement, but also to avoid possible failure of the connections.

Restrained Spring Isolators (Standard Temperature)



Rated Load	Color Code	Torque	Deflection/ Rated Load (mm/kg)
30	Yellow	40 ft lb *(54 N-m)*	25/30
60	Green		25/60
100	Blue		25/100
160	White		25/160
250	Red		25/250
300	Purple	165 ft lb *(223 N-m)*	25/300
400	Grey		25/400
500	Orange		25/500
600	Brown		25/600
650	Yellow		25/650
800	Green		25/800

Each size of isolator is identified by the color coded spring. The isolators should be installed generally in accordance with the following procedure:

1. The structure beneath the fan should be constructed to form a rigid and reasonably level seating for each group of isolators.
2. The isolators should be examined to ensure they are of the correct size, and if appropriate, the positions for different sizes should be located in accordance with drawings.
3. After the isolators are in position, the fan base should be levelled and supported just clear of the isolator tops using jacks or blocks, ensuring alignment between upper isolator adjustment screw and machine base fixing holes.
4. At this stage, isolator H.D. bolts (supplied by others) can be loosely fitted to maintain isolator positions during final lowering of fan base, but it is important these do not strain the isolator in any direction.
5. Isolator height should now be adjusted until contact with the underside of the fan frame is made. To do this, it will be necessary to release the restraining nuts on either side of the isolator and set them at an approximate clearance height

of 10mm (see Figure 2). The upper adjustment locknut should then be released with the upper adjustment screw turned clockwise, raising the isolator top plate until contact with the underside of the fan base.

Adjusting Isolator Height

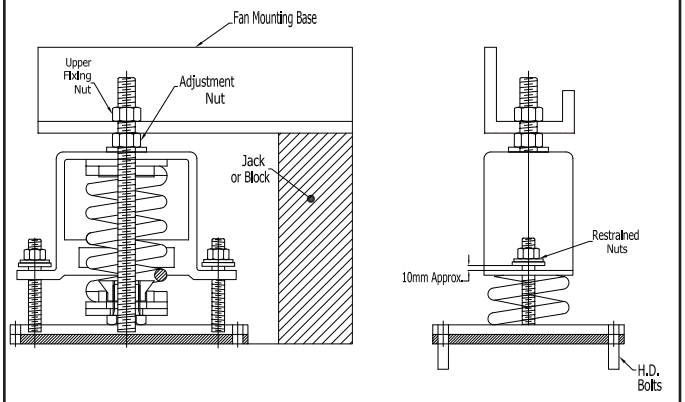


Figure 2

NOTE

If isolators have been preloaded before installation, no adjustment must be made until full fan load has been transferred to isolators. Variations in heights should be taken out using steel or other solid packing.

6. After removal of blocks, the fan base can be carefully lowered evenly across supported area transferring full weight to the isolators. Further fan height adjustment can be achieved by adjustment of the upper isolator screw (clockwise - up, counterclockwise - down), but isolator must not be adjusted above free height in its loaded condition.

   Isolator H.D. bolts and upper adjustment locknuts should now be fully tightened.

7. Isolator restraining nuts can now be adjusted to provide a minimum of 3 mm clearance, as shown on Figure 3.

NOTE

Use self-locking nut to ensure bolts do not back out.

Adjusting Isolator Restraining Nuts

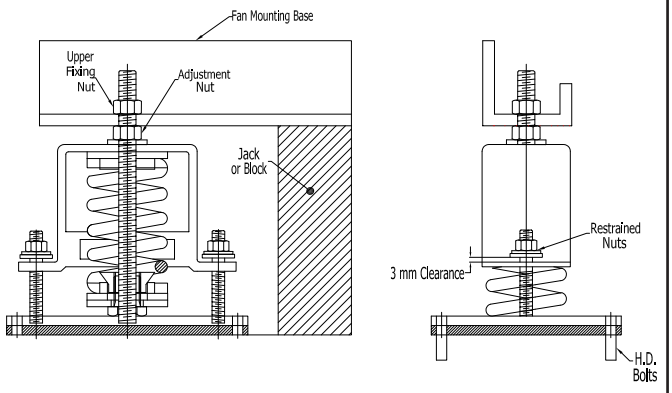


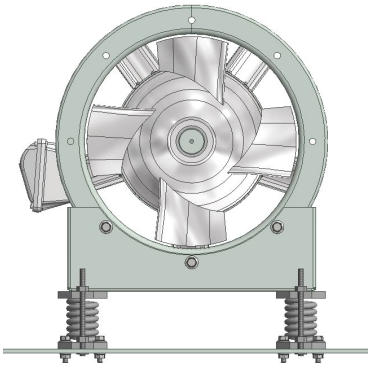
Figure 3

8. Adjustments must not be used to rectify major variations in floor levels, i.e. greater than 5 mm between isolator positions. Steel or other solid packing should be used between the mounting and fan frame or in extreme cases on concrete floors a new screed may be necessary.

NOTE

Isolators are not designed to accommodate angular misalignment.

Restrained Spring Isolators (High Temperature)



Rated Load	Color Code	Torque	Deflection/ Rated Load (mm/kg)
30	Yellow	40 ft lb *(54 N-m)*	25/30
60	Green		25/60
100	Blue		25/100
160	White		25/160
250	Red		25/250
300	Purple	165 ft lb *(223 N-m)*	25/300
400	Grey		25/400
500	Orange		25/500
600	Brown		25/600
650	Yellow		25/650
800	Green		25/800

Each size of isolator is identified by the color coded spring. The Restrained Spring Isolators (High Temperature) should be installed generally in accordance with the following procedure:

1. The structure beneath the fan should be constructed to form a rigid level seating either smooth floated or preferably levelled steel supports. We recommend a supporting structure finish of at least +/-3 mm under a one meter straight edge.
2. The isolators should be examined to ensure they are of the correct size, and if appropriate, the positions for different sizes should be located in accordance with drawings and selections.
3. After Restrained Spring Isolators (High Temperature) are in position, the fan base should be levelled and supported just clear of the adjusting screw fixing nuts, (see Figure 4), using jacks or blocks ensuring alignment between Restrained Spring Isolator (High Temperature) screws and machine base fixing holes.

Levelling and Supporting Fan Base

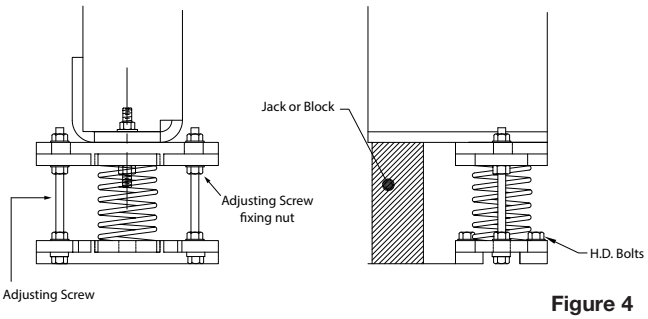


Figure 4

4. At this stage, HT Base Mount Restrained Spring Isolator H.D. bolts (supplied by others) can be loosely fitted to maintain positioning during final lowering of fan base, but it is important these do not strain the isolator in any direction.
5. Isolator screws should then be wound up until contact with fan under base is made. After removal of blocks, the fan base can be carefully lowered evenly across supported area, transferring full weight to the isolators. Further fan height adjustment can be achieved by relieving load on isolators and winding adjusting screw up or down, with additional shims. Isolator H.D. bolts and top lock nuts should now be fully tightened.

NOTE

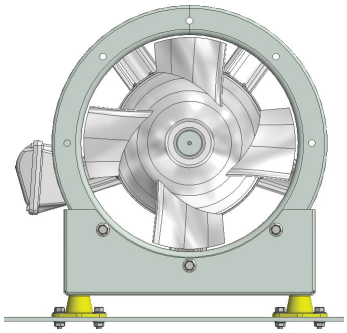
Use self-locking nut to ensure bolts do not back out.

Isolators are not designed to accommodate angular misalignment.

6. The efficiency of an isolator system can be seriously impaired if the system is connected to rigid pipes, electrical conduits, ducts or shafts. It is essential that such external connections be flexible as possible, not only to prevent transmission of vibration through the connections and allow the system freedom of movement, but also to avoid possible failure of the connections.

Base Mount Neoprene Isolators

1. Jack up equipment to be isolated high enough to place mount under equipment mounting brackets.
2. Attach mount to equipment mounting bracket with bolt and washer (provided). A nut is not necessary as the equipment mounting hole is threaded. Rotate mount as necessary to ensure isolator mounting holes are accessible after mounting to equipment (see Figure 5).



Rated Load	Color Code	Torque	Deflection/ Rated Load (mm/kg)
80	Grey	260 ft lb *(352 N-m)*	5.6/80
120	Brown		5.6/120
160	Green		5.6/160
240	Blue		5.6/240
320	Red		5.6/320
280	Grey	330 ft lb *(447 N-m)*	6.4/280
550	Brown		6.4/550
850	Green		6.4/850
1040	Blue		6.4/1040
1580	Red		6.4/1580

NOTE

Use self-locking nut to ensure bolts do not back out.

Rotating Mount for Accessibility

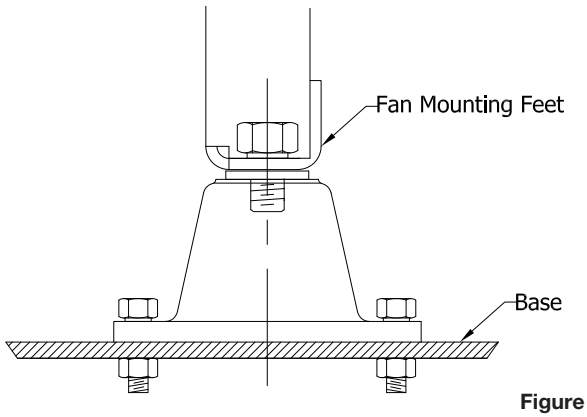
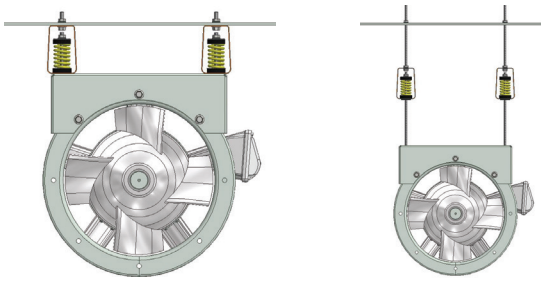


Figure 5

Hanging Spring Isolators and Hanging Neoprene Isolators



Rated Load	Color Code	Torque	Deflection/ Rated Load (mm/kg)
15	Yellow	40 ft lb *(54 N-m)*	25/15
20	Grey		25/20
40	Light Blue		25/40
60	Green		25/60
100	Green	55 ft lb *(75 N-m)*	25/100
160	Orange		25/160
200	Red		25/200
250	Purple		25/250
300	Grey	165 ft lb *(223 N-m)*	25/300
400	Orange		25/400

Each size of isolator is identified by the color coded spring or color coded identification spot.

1. Fan must be supported using a solid scaffolding or suitable arrangement or hung using wires, ropes or chains for initial positioning.
2. Spring or rubber hanger brackets should then be securely fixed to upper ceiling or steel gantry at correct spacing to suit hanger load capability.
3. Drop rods should then be cut to size and fastened into connector coupling on spring hangers or through underside of mount on rubber hangers (see Figure 6).

Installation of Drop Rods

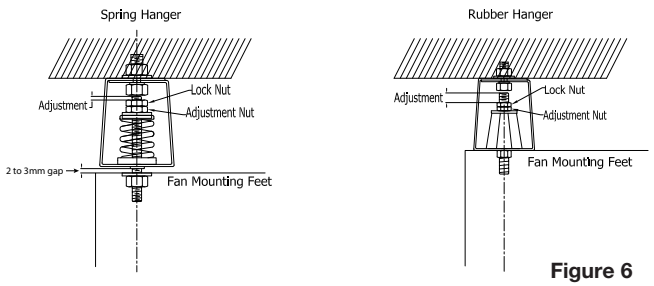


Figure 6

4. Once the fan end of the drop rod has been secured, the solid scaffolding or supporting wires can be removed, allowing the fan to be taken by the hangers.

5. Depending on the amount of deflection, either by design or as required by specification, drop rods will require adjustment. This should be done on spring hangers by slackening top locknuts on drop rod inside hanger and then adjusting lower nut until correct height of pipe work required is achieved.

   It is important that on the spring type hangers a gap of 2 to 3 mm is maintained between the lower washer and underside of frame (see Figure 6).

   Adjustment on rubber hangers should be done by slackening locknut on drop rod inside hanger and then releasing load on element by lifting pipe or equipment and then fastening drop rod further through element.

6. If adjustment of spring mounts after installation is not desired or possible, pre-compression of springs can be made prior to installation by slackening top locknut and adjusting lower nut until spring is compressed by required amount (max. 25 mm) (see Figure 7).

   Measure the pre-deflected length and length after deflection of the isolator spring to ensure that the total deflection between open spring and compressed spring is limited to 25 mm.

Pre-Compressing Springs

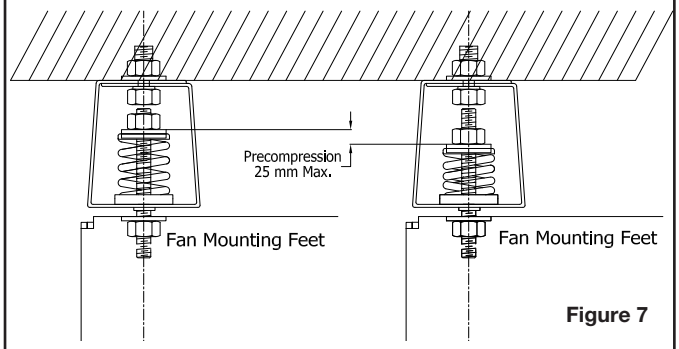


Figure 7

7. Hangers can also be fitted into drop rod length as per Figure 8, but care must be taken to ensure misalignment of hanger does not occur.

   In this type of installation, the fan needs to be restrained via another means to prevent the thrust loading on the isolator.

Fitting Hangers into Drop Rod Length

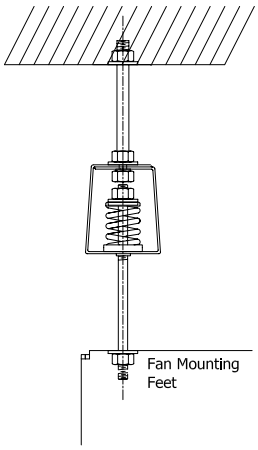


Figure 8

8. Ensure hangers are not overloaded when installed. Check springs are not coil bound or elements deflected more than limits allowed.

   Make sure drop rods are centrally positioned within hanger brackets and are not misaligned (see Figure 9).

Positioning Drop Rods within Hanger Brackets

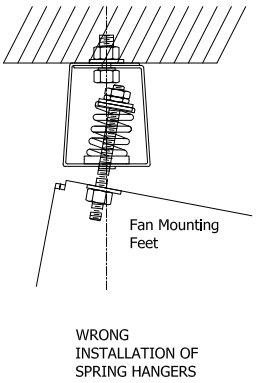
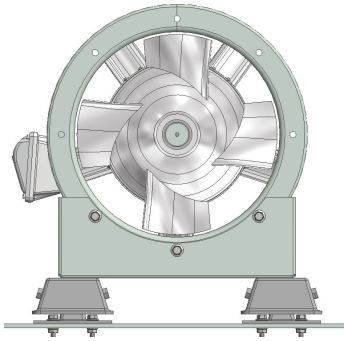


Figure 9

NOTE

Surface corrosion is likely without additional protection for external applications.

Rubber Easy Mount Neoprene Isolators



Rated Load	Color Code	Torque	Deflection/ Rated Load (mm/kg)
28	Yellow	16 ft lb *(22 N-m)*	6/28
50	Blue		6/50
80	Red		6/80
110	Yellow	40 ft lb *(54 N-m)*	8/110
180	Blue		8/180
280	Red		8/280
150	Yellow	55 ft lb *(75 N-m)*	8/150
260	Blue		8/260
400	Red		8/400

Each type of isolator is made in a range of sizes and rubber elements which are identified either by labels, color coding or part numbers.

NOTE

These isolators are manufactured from natural rubber bonded to steel components.

Finishes vary but are not usually suitable for prolonged use in adverse outdoor locations or corrosive atmospheres without further protection. Exposure/contamination by mineral oils will cause natural rubber to swell and deteriorate, thus reducing working life. Please consult application engineers about problem installation areas.

Isolators should be installed generally in accordance with the following procedure:

1. The structure beneath the fan should be constructed to form a rigid and reasonably level seating for each group of isolators.
2. The isolators should be examined to ensure they are of the correct size and rubber compounds. If appropriate, the positions for different rubber compounds should be located in accordance with drawings.
3. Either bolt the isolators to the underside of the fan base or position them upon the prepared seating before lowering the machine into position.
4. Jacks or blocks should be used to support the fan in a level state with a small clearance above or below each isolator. The clearances must be measured and if they vary by more than 1 mm then steel or other rigid packing pieces should be fitted before transferring the fan weight onto the isolators. These packing pieces may be fitted above or below the isolators and should be of adequate size.
5. Isolator H.T. bolts (supplied by others) should now be fitted (if applicable). These must not strain the isolator in any direction. The isolators are not designed to accommodate angular misalignment, variations in level, excessive horizontal forces or tensile forces.
6. It is recommended that isolator top fixing bolts material grade 8.8 (supplied by others) be tightened to their correct torque values.

NOTE

Use self-locking nut to ensure bolts do not back out.

These isolators are not designed for tensile or shear loading applications, and should only be installed in accordance with what is recommended.

7. The efficiency of an isolator system can be seriously impaired if the system is connected to rigid pipes, electrical conduits, ducts or shafts. It is essential that such external connections be as flexible as possible, not only to prevent transmission of vibration through the connections and allow the system freedom of movement, but also to avoid possible failure of the connections (see Figure 10).

External Connections

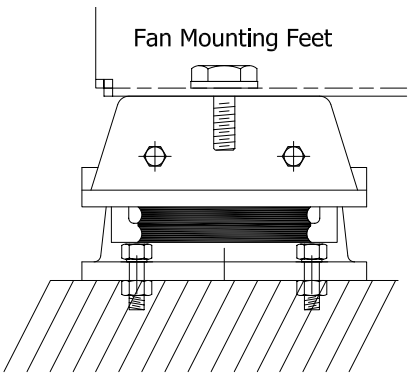


Figure 10

Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Specific Greenheck product warranties are located on greenheck.com within the product area tabs and in the Library under Warranties.

Greenheck's High Performance Axial Fan catalog, Model RA, provides additional information describing the equipment, fan performance, available accessories, and specification data.

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at www.amca.org.

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