

**CENTRAL PLANT UNITS, MULTIZONE UNITS, SPRAY COILS UNITS,
HEATING AND VENTILATING UNITS
ROOF TOP AIR HANDLERS – RTA, RTM, RTAH**

INTRODUCTION

The purpose of this material is to help you obtain the efficient and dependable service your Thermal Air Handling Equipment is capable of producing.

The Engineering Staff of Thermal Corporation will be glad to assist you in any problems, which may arise regarding installation, operation, and maintenance, which may not be covered in this brochure.

ASSEMBLY AND ERECTION

Depending on size, units are shipped "assembled" or partially "knocked down." All units, regardless of how shipped, have first been completely assembled, balanced and had bearings aligned at factory before shipment.

A conditioner shipped assembled should be moved to its foundation as a single piece, with care being taken to prevent distortion. If the unit is shipped in sections, assemble with bolts supplied with unit especially for this purpose.

Canvas connections should be provided between fan outlets and ductwork and at the inlets of the units.

If units are equipped with water or steam coils, adequate venting end draining must be provided in the piping system. All necessary protective measures should be taken to prevent damage from freezing.

Zone mixing dampers on multizone units should be checked to make sure that all linkages operate properly.

Install electrical connections, providing flexible connection at the motor movement as required for belt adjustment.

FOUNDATIONS

Allow ample space around the air-handling unit for the removal of coils, servicing of fillers, and lubrication of blower bearings.

Rigid level foundations are essential for smooth, quiet operation, good performance, and low maintenance cost of fan equipment. Improperly constructed or inadequate foundations may cause vibration and possible

misalignment of fans and motors. Poured concrete foundations are preferred to those of steel, brick, or wood.

When suspending units, it is recommended that compression type vibration isolators be used to prevent vibration from being transmitted to the structure. Vertical units are not designed for suspended mounting. After erection, check units to make sure they are level so that drip pans and coils can drain properly.

INSTALLATION

If installation of units is delayed and storage is made outdoors, cover units completely with tarpaulins. Bearings should be tightly covered to prevent the entrance of water. Periodically, the units

should be inspected to make sure no corrosion is occurring.

When units are stored or installed within a building still under construction, the entrance of dirt and construction material into the fans and bearings should be prevented. Bearings should be covered, and sealed with tape.

If extended storage is expected, coil headers should be plugged or taped to prevent debris from entering. Expansion valves should be securely wired in place in order to prevent breakage of the distributor lines.

Coil headers, valves or extensions from the units should never be used to lift or move the units.

INITIAL OPERATION

Prior to starting up unit, all foundation bolts and set screws should be inspected and tightened if necessary.

Make certain that the bearings are properly lubricated. (See the section on Bearings.)

Check alignment of shafts, couplings, and belts and, realign if necessary. (See the section on Flexible Couplings.)

Check to see that fan wheels are correctly located in fan inlets. In all units the fans should be located centrally in their inlets.

Turn fans over by hand, checking to see that they run free, and do not bind or strike housings at any point. If assemblies do bind, this may be due to distortion of housings, or bearings being drawn down unevenly. Check bearing thrust collars to see that they have not slipped. Shim bearings if necessary to level shafts.

Check connections from units to duct work, making certain that the fan outlets are not distorted. The ducts should never be, supported by the units.

Apply power momentarily to turn fans and check for correct direction of rotation.

Units may now be placed in operation; however, a close watch should be kept on fan motor power consumption, on vibration, on overheating of bearings and motors, etc. On the units with multi-speed motors it is desirable to check initial operation at the lowest speed first, and run at high speed only after slow operation is found to be satisfactory.

At the first indication of any trouble, or undue vibration, shut down units, and re-check for cause of difficulty. Excessive vibration could be caused by the following:

- (a) Fan wheels out of balance, due to shipping damage, or due to foreign material lodged in fans.
- (b) Fan drives or fan motors out of balance.
- (c) Misalignment of bearings, couplings or fan drives.
- (d) Loose anchor bolts.
- (e) Loose set screws on fan wheels.

- (f) Loose bearing mounting bolts.
- (g) Damaged parts (such as sprung shafts).
- (h) Improper foundations.
- (i) Pulsation in systems, or vibration in ducts.
- (j) Vibration transmitted to unit from other machines.

MAINTENANCE

To insure continuous trouble-free operation, a definite time schedule for inspection and lubrication of bearing should be established at the outset. (Refer to section on Bearings.)

Alignment of bearings should be checked at regular intervals to see that they remain in correct relative positions. Misalignment will cause overheating, excessive wear to seals, and premature bearing failure.

Periodically, foundation bolts and all set screws should be inspected to see that they have not loosened.

Couplings should be checked for alignment from time to time as described in section on Flexible Couplings.

In cases where solid materials pass through fans, it will be necessary to provide shutdown periods to clean the wheels and interiors of the housings. Even where fans handle air only, considerable dirt will accumulate on the wheels and housing, and it is well to check the fans at frequent intervals, to determine if cleaning is required.

Repainting of exterior and interior parts of the units will materially prolong the life of installation. In selecting a paint, choose one that will withstand the temperature of the air the units handle. For normal installations, a good machinery paint should be used. Never apply paint to the wheels of the fans (unless the wheels are to be rebalanced). For units handling corrosive fumes, competent advice should be secured to obtain a suitable paint for the conditions involved.

Never run unbalance fan wheels, since this may cause premature failure of bearings, springing of shafts, or other serious damage. Such wheels should be balanced immediately.

BEARINGS

Central plant type air conditioning units, multizone units and heating and ventilating units are equipped with self-aligning ball bearings or with Randall bronze self-aligning sleeve bearings.

Oil cups on sleeve bearings should be filled at time the conditioners are installed. Ball bearings come already grease filled.

Under normal operating conditions, ball bearings will also operate trouble-free, if they are lubricated at the beginning of the cooling season and at the beginning of the heating season. Ball bearings should be inspected every two months to determine whether additional lubrication is required.

When lubricating ball bearings, add grease slowly until a slight head forms between the seals. Wherever possible relubricate ball bearings with the shaft revolving. When the bearings are filled to capacity, there will be a rise of approximately 30°F in operating temperature. If the standard grease fittings on the

bearings are replaced by another type, an adaptor fitting must be provided. Grease lubricants recommended for ball bearings are as follows:

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| Sinclair Oil Company | - Itholene |
| Texas Company | - Multi-fac #2 |
| Standard Oil Company of New York | - Armvac 781 |
| Standard Oil Company of Indiana | - Stanolith – 57 |
| Union Oil Company of California | - Unoba EP-1 |
| Shell Oil Company | - Alvania #2 |

Under normal operating conditions, sleeve bearings will have ample lubrication if the reservoirs are filled at the beginning of the cooling season, and at the beginning of the heating season. However, sleeve bearings should be inspected periodically during each operating season to determine whether or not additional lubrication is required.

Oil grades recommended for sleeve bearings are:

Temperature (°F)	Any Good Oil
Air Handled in Units	This Viscosity
0 - + 30	SAE 10W
+35 - + 70	SAE 30
+75 - +110	SAE 50

CAUTION: Do not disturb graphite in sleeve bearings. Do not use detergent oils. On the two-piece iron pillow blocks, do not tighten cap bolts, as this will prohibit alignment of all assembly.

FLEXIBLE COUPLINGS

When flexible couplings are used to connect the two shafts of the blowers they cannot be considered as universal joints. The same care should be taken in aligning flexible couplings as would be taken in aligning rigid couplings.

Flexible couplings are provided with hub faces at right angles to the bore and with shoulders concentric to the bore. These surfaces should be used in determining the alignment. Hub faces and shoulders should be aligned by using thickness gauges between the faces and a straight edge to the shoulders.

Alignment of hub faces and shoulders should be checked at four points, 90° apart. Care must be taken when you make the alignment to be sure that any end play in the shafts is always taken up in the same direction.

V-BELT DRIVES

Correct alignment is an important consideration in the case of V-belt drives. Fan and motor shafts should be parallel, and the grooves in the motor and fan sheaves should be in line. When checking this alignment use a straight edge.

Although V-belts should run under slight tension, too much tension will cause rapid wear of the belts and impose an additional load on the bearings. It should be remembered that belts often stretch, and require readjustment for proper tension. When a worn belt is being replaced, never pry, or use force on the new one onto the sheaves. Instead, shift motor on its rails enough to permit the belt to slip into position easily. Belts for multiple groove drives should always be replaced in sets to maintain equal tension on the belts.



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Dimensions are in inches (mm).