



BELT DRIVE AIR HANDLING UNITS

INSTALLATION, OPERATION
AND MAINTENANCE MANUAL

BDAHU-IOM

June, 2001

©2001 Environmental Technologies
Largo, FL • Part No. PX-00-0039

SAFETY CONSIDERATIONS

The equipment covered by this manual is designed for safe and reliable operation when installed and operated within its design specification limits. To avoid personal injury or damage to equipment or property while installing or operating this equipment, it is essential that qualified, experienced personnel perform these functions using good judgement and safe practices. See the following cautionary statements.

DANGER

ELECTRICAL SHOCK HAZARDS. All power must be disconnected prior to installation and servicing this equipment. More than one source of power may be present. Disconnect all power sources to avoid electrocution or shock injuries.

MOVING PARTS HAZARDS. Motor and Blower must be disconnected prior to opening access panels. Motors can start automatically, disconnect all power and control circuits prior to servicing to avoid serious crushing or dismemberment injuries.

HOT PARTS HAZARDS. Electric Resistance heating elements must be disconnected prior to servicing. Electric Heaters may start automatically, disconnect all power and control circuits prior to servicing to avoid burns.

WARNING

Check that the unit assembly and component weights can be safely supported by rigging and lifting equipment.

All assemblies must be adequately secured during lifting and rigging by temporary supports and restraints until equipment is permanently fastened and set in its final location.

All unit temporary and permanent supports must be capable of safely supporting the equipment's weight and any additional live or dead loads that may be encountered. All supports must be designed to meet applicable local codes and ordinances.

All fastening devices must be designed to mechanically lock the assembly in place without the capability of loosening or breaking away due to system operation and vibration.

CAUTION

Secure all dampers when servicing damper, actuator or linkages. Dampers may activate automatically, disconnect control circuits or pneumatic control systems to avoid injury.

Protect adjacent flammable materials when brazing, Use flame and heat protection barriers where needed. Have fire extinguisher available and ready for immediate use.

PRE START-UP

WARNING: Improper installation, adjustment, alterations, service or maintenance can cause injury and property damage, as well as possible voiding of factory warranty. For assistance or additional information, consult a qualified contractor.

RECEIVING AND INSPECTING

- Thoroughly examine the exterior and interior of all units for transportation damage to the cabinet, piping, blower(s), motor(s), coil(s), electric heat and electrical components. Interior damage may occur, even with no visible exterior damage. If damage is found, immediately file a claim with the carrier. Note the damage on the bill of lading before signing for the shipment.
- Check the bill of lading for verification that all items shown (including loose items) have been received. Notify the manufacturer's representative of any shortages or items shipped in error.

UNIT RIGGING AND PLACEMENT

- Install ductwork to comply with ASHRAE Fundamentals Handbook, SMACNA, NFPA 90A and local code.
- The installation must conform with local building codes and the NATIONAL ELECTRIC CODE.
- Locate unit support in accordance with the mechanical and structural plans. If so equipped, locate the isolator placement and correct size as shown on the submittal drawing.
- Ceiling suspension of horizontal units have factory provisions for thru bolt hanger rods, except double wall units (which require external rigging). If floor mount isolators are required for either horizontal or vertical units, then factory or field provisions must be made for isolator attachment. Vertical units can be mounted directly to the floor or on a base rail. For units with isolators but no base rail, 6" legs are required and will need to be mounted to the base of the unit. If a base rail is provided, isolators can be installed in mounting holes provided on this base rail.
- Do not handle the unit using coil stubout connectors, as damage may occur at brazed joint(s).

CLEARANCE

- All units, including those with electric heat, are listed for zero clearance to combustibles.
- Sufficient clearance for normal servicing of this equipment is recommended.
- All electrical panels must have 36" working space in front of panel to meet NATIONAL ELECTRICAL CODE; however, local inspectors may waive this requirement if the hinged cover has a 90° free swing.

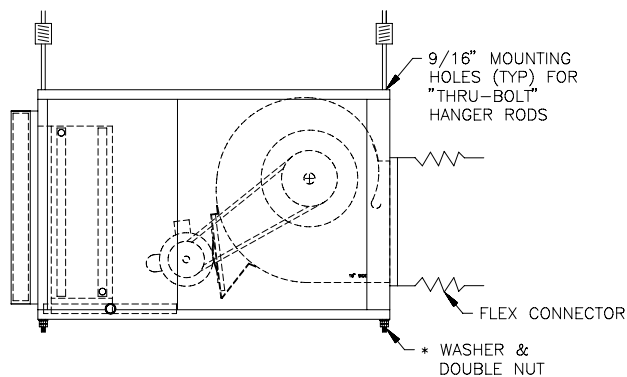


FIGURE 1

Horizontal unit (all sizes) with thru rod connection.

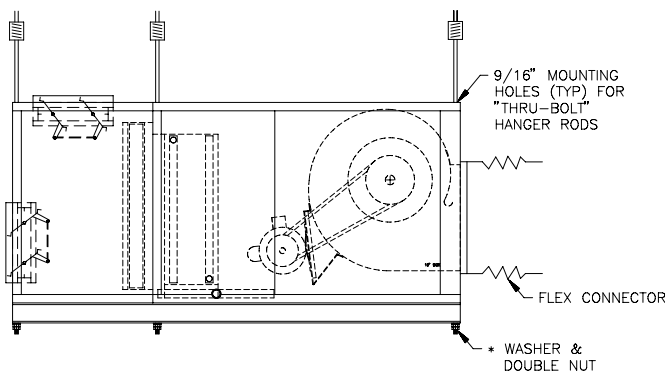


FIGURE 2

Typical units with factory installed base rail. Suspension will still be through unit holes provided.

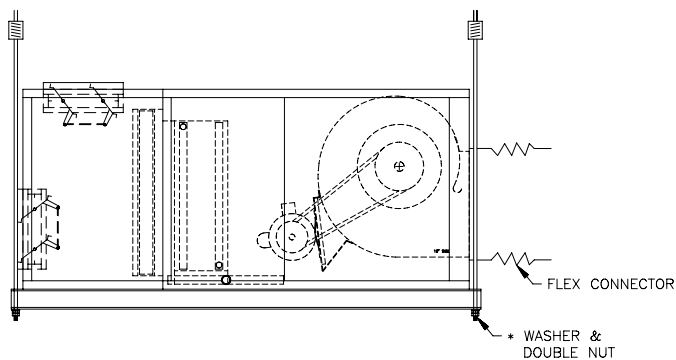


FIGURE 3

Double wall unit with base rail. Note that suspension rods are external to the unit casing.

*** CAUTION:** It is critical to the installation of the AHU unit that the mechanical fastener used form a "mechanical lock" so that it is incapable of backing off due to vibration. Serious injury and/or property damage may occur if not properly addressed.

FIELD WIRING

NOTE: Prior to installing any wiring, check the unit name plate for main power voltage, control voltage, transformer sizing and any fuse sizing. All field wiring must comply with NATIONAL ELECTRIC CODE and local code requirements.

- Tighten all wiring lugs and terminals prior to connecting power to the unit, as they may loosen during transportation.
- Route the power lines to the power distribution terminals inside the control enclosure. If a factory wired disconnect switch is installed, then connect the power lines to the line side of the switch.
- Mount and wire any field installed items as indicated on the factory supplied wiring diagram. When mounting field installed components, do not jumper out or rewire any factory wiring without written approval from Environmental Technologies. Violation will void warranty.

BELTS, DRIVES, AND BEARINGS

NOTE: For safety, please turn off all power before checking belt tension.

- Prior to starting the unit, tighten all set screws on the fan(s), sheaves and bearings where applicable. Set screws may loosen during transportation.
- Sheaves must be in line. Use a straight edge to verify.
- General belt tension rules for V-Belt drives:
 - Ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
 - Check tension frequently during the first 24-48 hours of operation.
 - Over tensioning shortens belt and bearing life.
 - Keep belts free from foreign material which may cause slip.
 - Make V-Belt inspection on a periodic basis. Tension when slipping. Never apply belt dressing, as this will damage the belt and cause early failure.
 - The resilient blower bearing must not deflect laterally once belt is tightened.

DETERMINING DEFLECTION FORCE (see diagram below)

Example

Belt Span = 20"

Belt Type – A, new, unnotched

RPM = 1000

Small Sheave Diameter = 4.0"

Solution

Deflection = $20 \div 64 = .313$ " (round to 5/16")

Referring to table on page 6, deflection force at calculated deflection is 6.8lbs.

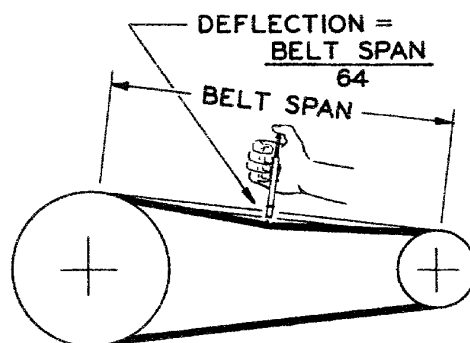


FIGURE 5

See table on opposite page for deflection force in pounds.

DEFLECTION FORCE — LBS.

Belt Type	Smallest Sheave Diameter Range	RPM Range	Super Gripbelts and Unnotched Gripbands		Gripnotch Belts and Notched Gripbands	
			Used Belt	New Belt	Used Belt	New Belt
A, AX	3.0 - 3.6"	1000 - 2500	3.7	5.5	4.1	6.1
	3.8 - 4.8"	1000 - 2500	4.5	6.8	5.0	7.4
	5.0 - 7.0"	1000 - 2500	5.4	8.0	5.7	9.4
B, BX	3.4 - 4.2"	860 - 2500	Not Recommended		4.9	7.2
	4.4 - 5.6"	860 - 2500	5.3	7.9	7.1	10.5
	5.8 - 8.6"	860 - 2500	6.3	9.4	8.5	12.6

REPLACEMENT PARTS

- Replacement parts may be ordered from the local ENVIRO-TEC® representative. Factory replacement parts should be used wherever possible to maintain agency listings. Should replacement parts not be purchased from the factory, use only parts duplicating the exact type, size, voltage and other operating characteristics of the original part. Contact the local representative before using any substitute part or making unit modifications. Any substitutions and/or modifications not authorized by the factory will void the unit warranty and could result in personal injury and/or property damage.

When ordering parts, the following information must be supplied to ensure proper part identification:

- 1) Complete unit model number
- 2) ET number from the unit nameplate
- 3) Complete parts description, including any identification numbers

PIPING

- All piping must comply with applicable state and local codes.
- On water coils, the piping must be in a counterflow configuration; water inlet on the leaving air side of the coil and at the bottom of the coil to provide the necessary purging of air.
- All water piping should be designed and installed to meet the job requirements.
- Where applicable, freeze protection should be used.
- Supply and return water piping should be supported. Do not suspend piping, controls, and/or shutoff valves from coil headers.
- All refrigerant piping (split systems) should be designed and installed in accordance with ARI and ASHRAE. Leak testing should be performed before any startup procedures are initiated. On refrigeration systems, follow recommended system evacuation from the condenser unit manufacturer.

CONDENSATE DRAIN AND TRAPS

- Drain lines should be at least the same size as the drain pan connection. Properly sized traps should be used to allow the condensate from the coils to drain from the drain pan. See **FIGURES 4A - 4E** below.

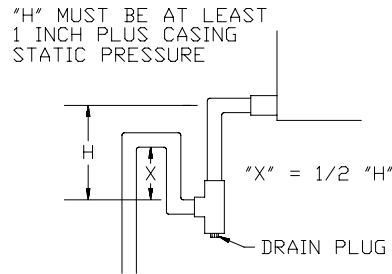


FIGURE 4A
*Trap detail for negative
cabinet static pressure*

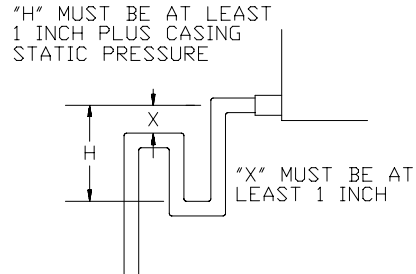


FIGURE 4B
*Trap detail for positive
cabinet static pressure*

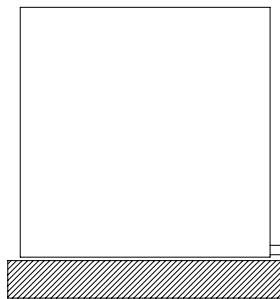


FIGURE 4C

- No base rail
- Housekeeping pad
*Required to accommodate
trap height*

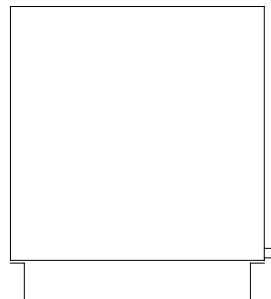


FIGURE 4D

- With base rail
- Depending on static
pressure, housekeeping
pad may not be needed
for trap installation

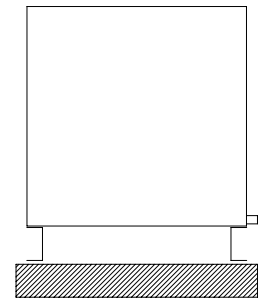


FIGURE 4E

- With base rail and
housekeeping pad

GENERAL BELT AND BEARING MAINTENANCE

- Frequency of bearing relubrication depends upon the operating conditions. The proper amount of lubricant in the bearings is very important. Both excessive and inadequate lubrication may cause failure. The bearings should be relubricated while they are rotating (if it is safe to do so); the grease should be pumped in slowly until a slight bead forms around the seals. It is solely the owner’s responsibility for maintaining a proper lubrication schedule. Failure to do so may cause substantial unit damage and voiding of the factory warranty. Note that only those bearings equipped with a grease fitting can be relubricated.
- The following is a generic guide intended for standard equipment used in common situations.

MAINTENANCE TO BE PERFORMED	EVERY 3 MONTHS OF OPERATION (MINIMUM)	EVERY FALL
Filters (as required)	x	
Grease Bearings	x	
Inspect & Clean Blower Wheel		x
Lubricate Fan Motor <i>(if applicable)</i>		x
Check Belt Tension	x	
Check Electrical Connections		x
Check Bearings, Drives & Blower Wheel for Tightness		x

Normal operation is based on 8 hours a day. If unit runs more than this, adjust accordingly.

RECOMMENDED TORQUE FOR TIGHTENING SETSCREWS		
Set Screw Diameter	Minimum Recommended Torque	
	Inch lbs.	Foot lbs.
#10	28	2.3
1/4	66	5.5
5/16	126	10.5
3/8	228	19.0
7/16	348	29.0
1/2	504	42.0
5/8	1104	92.0

THIS MANUAL IS NOT INTENDED TO SUPPLANT REGULATIONS OR LOCAL CODES HAVING JURISDICTION. IT IS RECOMMENDED THAT THESE ITEMS BE REVIEWED AND COMPLETED PRIOR TO INITIATING EQUIPMENT START-UP.