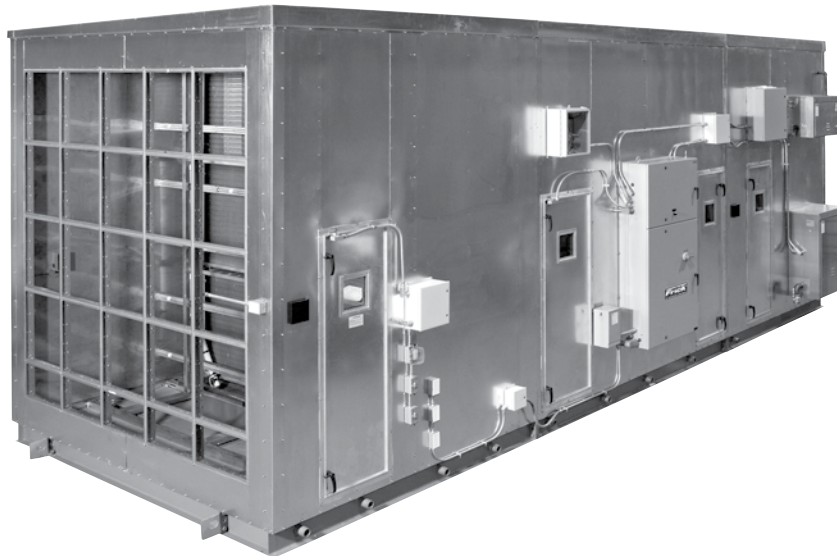


Installation - Operation - Maintenance

AcuAir[®]

Hygienic Air Units



THIS MANUAL CONTAINS RIGGING, ASSEMBLY, START-UP, AND MAINTENANCE INSTRUCTIONS. READ THOROUGHLY BEFORE BEGINNING INSTALLATION. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN DAMAGE OR IMPROPER OPERATION OF THE UNIT.

IMPORTANT!

READ BEFORE PROCEEDING!

GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, oils, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that this individual possesses independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to areas of potential hazard:



DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



CAUTION identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution. Usually an instruction will be given, together with a brief explanation.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



NOTICE (or **ASSEMBLY HINT**) is used to highlight additional information which may be helpful to you.

CHANGEABILITY OF THIS DOCUMENT

In complying with Johnson Controls policy for continuous product improvement, the information contained in this document is subject to change without notice. While Johnson Controls-Frick makes no commitment to update or provide current information automatically to the manual owner, that information, if applicable, can be obtained by contacting the nearest Frick Factor or the nearest Frick Sales office.

It is the responsibility of operating/service personnel to verify the applicability of these documents to the equipment in question. If there is any question in the mind of operating/service personnel as to the applicability of these documents, then prior to working on the equipment, they should verify with the owner whether the equipment has been modified and if current literature is available.

WARNING

External wiring, unless specified as an optional connection in the manufacturer's product line, is **NOT** to be connected inside the micro panel cabinet. Devices such as relays, switches, transducers and controls may **NOT** be installed inside the micro panel. **NO** external wiring is allowed to be run through the micro panel. All wiring must be in accordance with Johnson Controls-Frick's published specifications and must be performed **ONLY** by qualified Johnson Controls-Frick personnel. Johnson Controls-Frick will not be responsible for damages/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this will void the manufacturer's warranty and cause serious damage to property or injury to persons.

NOTE: For Product Warranty Support, call 717-762-2121

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INTRODUCTION

This manual, in combination with the appropriate controls related manuals, provides the information necessary to safely install and start up Frick AcuAir® equipment. Due to the custom nature of the AcuAir® products there may be areas beyond the scope of this manual. If there are any questions about a special application lacking the required information, please contact the installing contractor or your local Frick Sales Office.

SAFETY

The customer is responsible for providing qualified and trained personnel to install and operate the equipment. Consult all local building, occupational safety, electrical, gas, and other codes applicable to the installation.

A variety of optional safety features are available from the manufacturer; it is the responsibility of the owner to determine if the unit is equipped with all of the safety devices required for the particular application.

Safety considerations include:

1. The accessibility of the equipment to non-service personnel.
2. The provision of electrical lockout switches.
3. Maintenance procedures.
4. Automatic control sequences.

⚠ CAUTION

Users and installers of this equipment should be aware of all recommended safety procedures and information such as AMCA publication 410-90-Safety Practices.

⚠ CAUTION

Never open an access door while air unit is in operation.

WARRANTY

NOTICE

For Warranty Support with the Frick AcuAir unit, contact Frick Service at 717-762-2121.

⚠ CAUTION

A fan, even though locked out electrically, can rotate in a seemingly insignificant air flow. During maintenance the impeller should be secured to restrict rotation. Verify that the restrictive device is removed before putting the fan back into service.

⚠ CAUTION

Equipment wired to automatic control devices may start without warning, resulting in personal injury or property damage. In many instances, a unit will have multiple electrical connection points. To prevent unforeseen startup, prior to beginning work on a hygienic air unit, always lock out all power supplies.

⚠ CAUTION

Always replace any protective covers removed for servicing.

⚠ CAUTION

Always replace bolts or locks on latches of access doors that provide access to areas with moving parts. This mechanical protection from moving parts is required by UL 1995 (See Figure 1).

⚠ CAUTION

A number of additional safety issues are discussed throughout the manual. *Please read the complete manual prior to installing, operating, or servicing the equipment.*

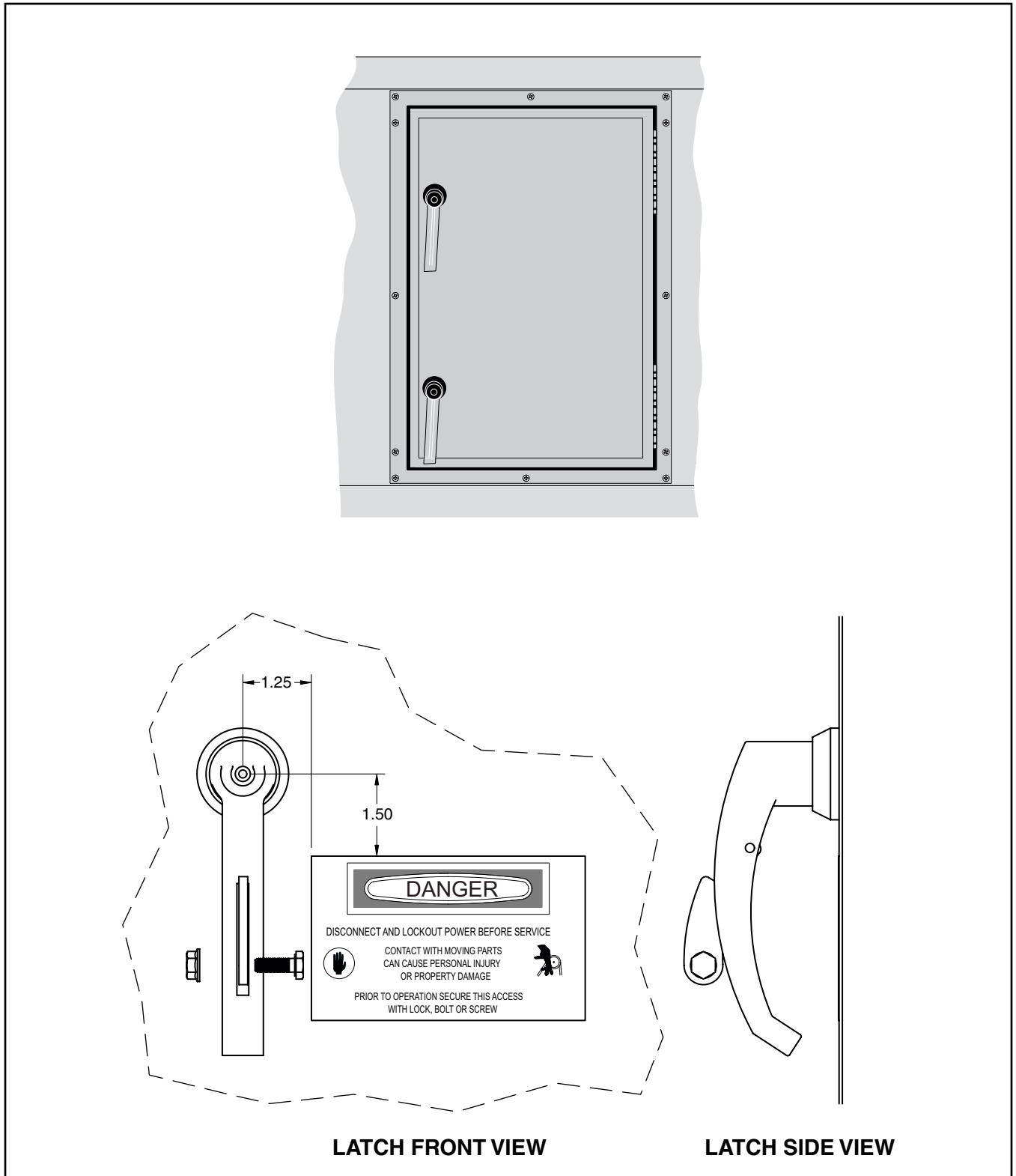


Figure 1 - Access Door Latch

Preinstallation Requirements

TRAINING & SAFETY CONSIDERATIONS

The AcuAir® precision-engineered hygienic air systems provided by Johnson Controls–Frick, utilize the finest in HVACR materials and corrosion protection to deliver dependable, consistent, and accurate control of temperature and humidity in process rooms. This manual provides the information needed for safe installation, operation, and maintenance. Close attention to the instructions and guidelines provided will ensure the longest possible system life and dependable, consistent performance.

⚠ CAUTION

Before installing, operating, or maintaining the system, it is recommended that only experienced HVACR contractors, operators, and maintenance technicians be used (in conjunction with formal training on the AcuAir® system's design and features). Reading and understanding of this manual should serve as the minimum application-specific training requirement.

AcuAir® system installation, operation, and maintenance involves heavy rotating machinery operating at high speed and high voltage. Normal operations and maintenance procedures may require working at elevations, enclosed space entry, or use of hand and power tools. Taking these considerations into account along with the hygienic nature of AcuAir® applications, it is clear that safety should always be the top priority.

We recommend that every AcuAir® system user analyze and develop an installation-specific safety regime that takes into account such variables as specific site/system features, personnel qualifications, hazard identification, etc.

The following elements of operational safety are recommended for inclusion in every client's AcuAir® system safety plan/requirements:

NOTICE

Configure all power switches and controls to provide an open, safe circuit before and during maintenance procedures, until the system is cleared by management for normal on-line operations. For extended shutdowns, it is recommended that a qualified technician remove fuses from "fused-disconnect panels" or otherwise open the circuit in an accepted, secure manner.

Fans – All fan covers, guards, and shaft retainers (if any) must be in place before applying power to an AcuAir® system. Always disengage and lock out power before allowing interior inspections. To prevent foreign objects from being sucked into rotating fan blades, **never** allow operation with the doors open.

Enclosed space inspections – Inspections of coils, filters, etc., requires machinery lockout and the use of a "lookout buddy" at a minimum – consult your internal safety policy and OSHA requirements for additional recommended safety procedures.

Vibration and noise – Discontinue or stop machinery that emits unusual vibration and noise. The source must be investigated, identified, and corrected before testing or placing the system back in operation.

Wet Surface Precautions – Poorly maintained and wetted machinery requires care to avoid electrical shocks from inadequate or loose field wiring and connections. All personnel must lock out and tag machinery before working on the unit. Proper safety precautions such as the use of insulating soles and gloves and a trained "lookout buddy" are indispensable. Ice formation in cold weather can present slip and fall hazards. Icing safety procedures should be mandatory when the daily ambient temperature falls below 40°F.

AcuAir® systems typically serve in a continuous-duty capacity and must be properly sited, installed, and connected in the field (by others) to appropriately sized and installed wiring for electrical power and controls, air ducting, refrigerant lines, and fuel piping. The engineering plans, piping layouts, etc. for all peripheral "field" work should be detailed in accordance with local and governing codes and the best industry standards and practices.

If you have any comments or questions regarding this manual or the AcuAir® system, you are urged to call your installing contractor and/or sales representative.

PRELIMINARY SITE LAYOUT CONSIDERATIONS

All AcuAir® systems must be located to minimize the effect of exhaust air recirculation. Prevailing winds, other structures or even other air handling units can cause exhausted air to be drawn back into the AcuAir® unit. Short cycling air in this manner can create an excess cooling load, condensation load or in cold climates, frost blockages. It is the owner's responsibility to properly locate each system and consult with a qualified engineer before laying out structural or foundation supports and installing the AcuAir® system.

Sufficient access must always be available to allow adequate airflow to the AcuAir® system fresh air inlet and exhaust louvers. In general, AcuAir® systems should always be placed on concrete pads, piers or structural steel so that exhaust air discharge of the fan orifice is at or above the elevation of nearby walls, structures, and equipment.

For other minimum spacing requirements see the generic layout in Figure 2 for examples showing an AcuAir® system installed next to a wall.

PRELIMINARY FIELD PIPING DESIGN CONSIDERATIONS

⚠ CAUTION

All AcuAir® systems require strongly supported and properly anchored field piping. NO field piping is to be supported by the AcuAir® system itself. Wind loading, temperature variation, etc., must be considered to allow for movement between the system, adjoining building, ducting, and field piping. A qualified cooling system design engineer should provide final field-piping plans and specifications.

Before finalizing piping installation plans, it is recommended that related plans for system and plant expansion be discussed with your refrigeration system designer and Johnson Controls–Frick® sales representative. Incorporating appropriate pipe and opening sizes now (for existing and future needs) allows for easier installation in the future.

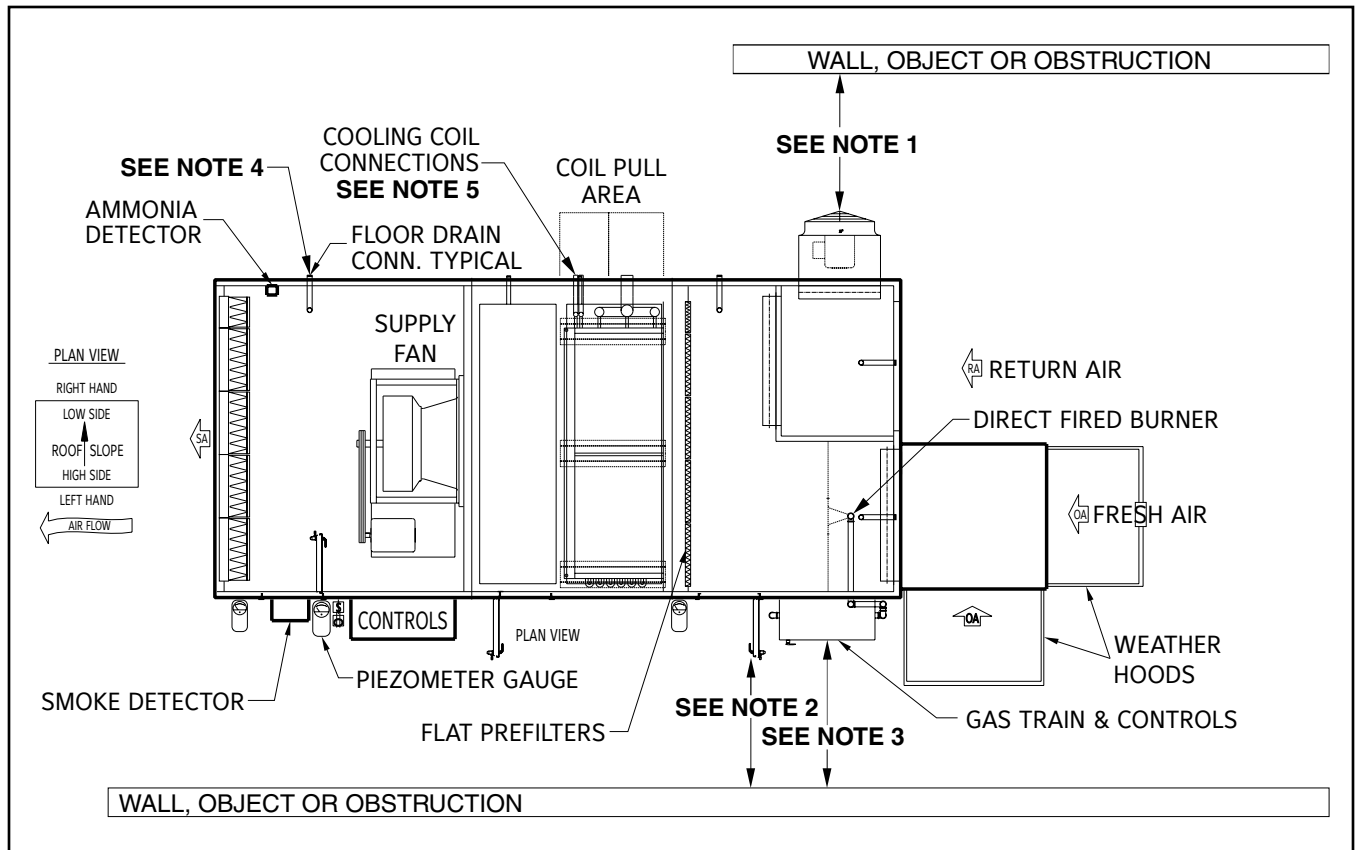


Figure 2 - AcuAir System-to-Wall Spacing Requirements (Generic unit layout shown here. Please consult the order specific unit layout drawing before beginning site engineering.)

NOTES:

1. The minimum distance from the exhaust fan housing to any sensitive object in the discharge air stream is 2 fan diameters. Any closer and the object may be damaged. The minimum recommended distance from the exhaust fan housing to an airflow obstruction (such as a wall) is 4 fan diameters for a single fan and 6 fan diameters for two stacked exhaust fans.
2. The minimum distance from an access door, in the open position, to an object is the door width, i.e. 24", plus 8".
3. The minimum distance from any electrical enclosure to an object is 48". The installation of the AcuAir unit must be in accordance with the codes of the authorities having jurisdiction.
4. The AcuAir hygienic unit will have sections under both positive and negative pressure with respect to ambient during normal operation. When piping the individual drain pan outlets to a common drain line AcuAir recommends individual p-traps. The piping design should take into account the pressure inside the specific section and the elevation required to create the necessary trap. See page 25 for help designing the drain piping.
5. Consult the refrigeration contractor as to how much space is required for the coil piping. A minimum walk space of 30" should be left between the final field piping to any object.
6. As with any large equipment placement consideration of maintenance, service and part/component replacement should be allowed when designing space for the unit.

Installation

RECEIVING & INSPECTION

Frick® AcuAir® units are inspected and tested prior to shipment, ensuring a high quality product. Upon receipt of the unit(s), inspect for any damage that may have occurred during shipment.

Upon delivery, compare items on the bill of lading with the items on the shipment to verify all parts have been received.

Any shortage, breakage or damage noticed at time of delivery should be indicated on the carrier's freight bill and signed by the driver or carrier's representative. Damage, noticed after delivery, should be reported to the carrier at once. Request their inspection of the shipment and fill out a concealed damage inspection report.

Located on the inside of fan section access door is a handwritten list of field install items shipped with the unit. Items typically shipped loose include:

FAN SECTION
Acu-Shield Roof Coating (see Figure 14) (optional)
Thermal Break Gasketing (see Figures 9, 11, 15 & 17)
Split Reconnect Hardware (Nuts, bolts, polyurethane caulking)
Extra Fan Belts (If Ordered)
Installation and Start-Up Manual
Lifting Lugs
Filters & Filter Clips (Typically Shipped Separately)
FILTER SECTION
HEPA Filter Latches ship loose and/or attached to HEPA filter frames

NOTICE

Shortage of field installed items must be reported within ten (10) days after receipt of order.

STORAGE

Short term storage is considered six (6) months or less from date of shipment. Storage maintenance during this time period is usually limited to the following:

Indoor Storage

1. Store units in dry, indoor protected area on a firm flat surface to prevent unit distortion.
2. Protect units from excessive vibration and accidental impact.
3. Do not store other equipment on top of or inside unit.

Outdoor Storage

Whenever possible, unit should be stored indoors or under cover. If unit must be stored more than 1 week outdoors, Johnson Controls-Frick recommends the following guidelines:

1. Cover all floor openings and secure all doors.
2. Tarp unit to protect unit from dust, rain, snow and rodents. (Tarp over the roof and down the side to the base channel and secure.)

3. Store on level surface. If unit must be raised off ground, supports under base channel and base channel cross supports at maximum interval of 5 feet.

4. Fan wheels should be rotated by hand 90° every month. Lightly lubricate bearings every two (2) months.

5. A 200-watt light bulb needs to burn continually in each section to prevent water condensation inside unit.

6. Inspect and ventilate each section every 2 weeks to prevent them from getting musty and to ensure that unexpected problems are addressed immediately. Special care may be required for electrical or electronic components.

Storage of Units with Ammonia Sensors

WARNING

Ammonia detection electrochemical sensors are subject to degradation when stored in warm or humid conditions. Special storage measures recommended.

Chemical cell gas sensors (Ammonia Detectors) inside AcuAir hygienic units are sensitive to storage temperatures and humidity. The electrochemical sensor begins to degrade immediately upon manufacture. The degradation process is worsened in the presence of warm to hot temperatures as well as high humidity. For this reason gas detector sensor cell warranty is strictly based on time lapse from the date it is purchased from the manufacturer and irrespective of the date the AcuAir unit is placed into active duty. For optimal sensor life involving storage:

- Remove the electrochemical sensor cell
- Place the cell in a zip-lock style storage bag
- Store the bag with the cell in a refrigerator between 35°F and 40°F

Following these procedures does not extend warranty on any chemical sensor cell.

NOTICE

Gas detector electrochemical sensor cells are a degrading component irrespective of active service. Warranty on these sensor cells is strictly based on that extended by the manufacturer and is irrespective of when the air unit is placed into active service.

Lifting & Handling

The unit will ship (as specified on unit submittal) either assembled, as a subassembly (collection of parts), or as individual sections.

WARNING

When lifting individual AcuAir sections, weight may not be evenly distributed causing the section to be unbalanced or top heavy.

To prepare for safely lifting the air unit, estimate the approximate center of gravity. Internal placement of components may cause the weight to be unevenly distributed, with more weight in the coil and fan areas.

Removable lifting lugs are provided to rig the unit/sections into place. Spreader bars are required to prevent damage to the

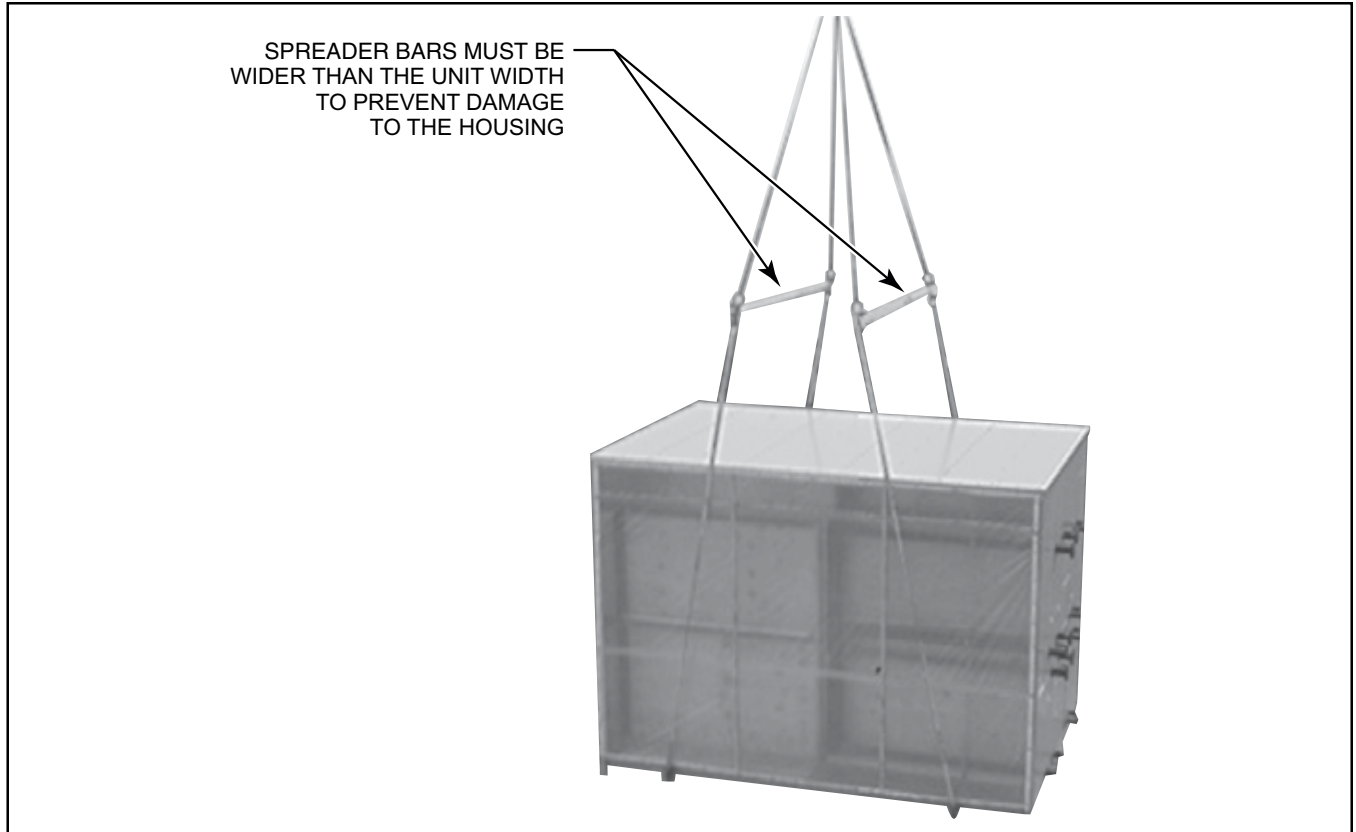


Figure 3 - Recommended Lifting With Four Lifting Points

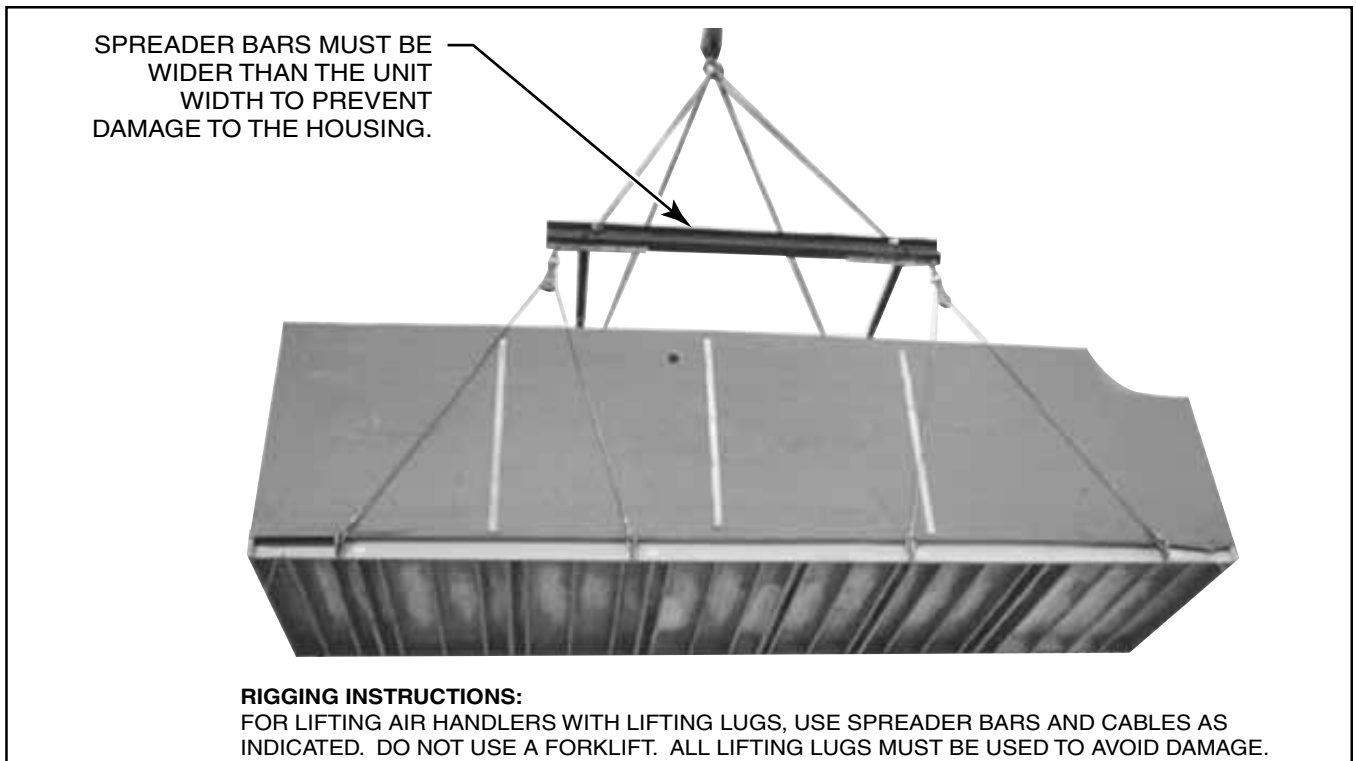


Figure 4 - Recommended Lifting With Multiple Points

cabinet and protruding components during a lift. The lugs are positioned at the face of the sections to facilitate lifting the sections at the factory for securing on truck trailers. Lifting lugs can be relocated to sides of the individual sections to facilitate

placement on site supports. Use all lifting lugs provided. Adjust the tension in each line for proper load distribution, (See **Figures 3 and 4 for recommended lifting**).

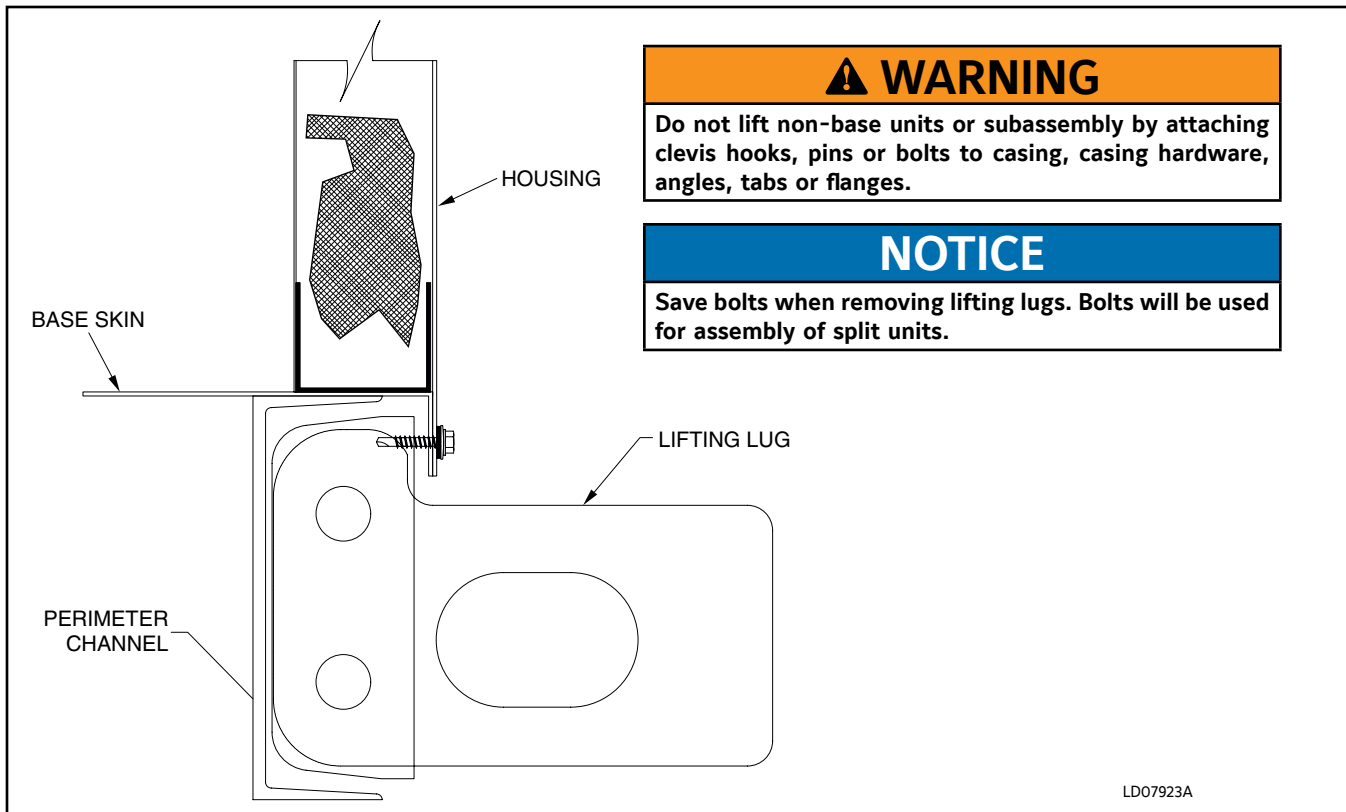


Figure 5 – Lifting Lugs

⚠ WARNING
When lifting; use all lifting lugs to avoid damage and/or personal injury. Lifting lugs are shown in Figure 5.

Do not lift non-base units or subassemblies by attaching clevis, hooks, pins, bolts, etc. to casing, casing hardware, angles, tabs or flanges. **See CAUTION!** Lift the air unit only in an upright position. Never lift or move a unit on its side or upside-down.

⚠ CAUTION
If you do not rig or lift the unit carefully, you could damage the unit, hurt yourself or others. USE CAUTION!

SUPPORT STRUCTURE INFORMATION

AcuAir® systems may be shipped in two or more sections. These sections must be anchored to a suitable support structure - concrete pads, concrete piers, or structural steel, capable of supporting the total system operating weight plus a significant safety margin as determined by a qualified structural engineer. The weight the support structure must support and the anchoring requirements will vary with live loads (expected snow/ice buildup) seismic, and wind loading. See Figures 6 and 7 for AcuAir unit support methods.

If the support structure is in the form of two or more parallel steel beams, the beams should be sized in accordance with standard engineering practices. The structure must be capable of supporting the shipping weight of the unit as provided on the order related documents. In addition it must also be able to carry any operating-duty-related loads such as: water or refrigerant within the cooling and heating coils; possible frost on the cooling coils; any applicable flooded refrigerant

surge vessel and associated piping; snow loads that could accumulate on the roof; horizontal wind loads; etc.

It is recommended that the structure be designed for at least 110% of the operating weight of the system distributed as a uniform load over the longitudinal beams, allowing for a maximum deflection of 1/360 of the length, not to exceed 1/2".

The support structure, whether concrete pads, concrete piers, or structural steel, on which the units are to be located should be rigid and level (shim if required).

Shims should be placed at intervals no greater than 5 feet apart and should not be used to compensate for significant surface slope. The sum total of any individual stack of shims should not exceed 1/2" and are to be used to compensate for surface irregularities only. On units more than 150 inches wide the foundation shall support not only the perimeter base channel, but also the midpoint of each unit split. (Reference Figure 6) Consult factory if housekeeping pad is not continuous.

The AcuAir unit must be secured to the Support structure. It is the installer's responsibility to be sure the unit is secured in accordance with applicable building and earthquake codes.

NOTICE
Shims may be used between the AcuAir unit and the supporting structure. When shims are used they should be spaced no more than 5 feet apart. Shim stacks should not exceed 1/2 inch in height.

ASSEMBLY HINT
Units must typically be SLID into final position. Applying grease to the support surface may make this easier.

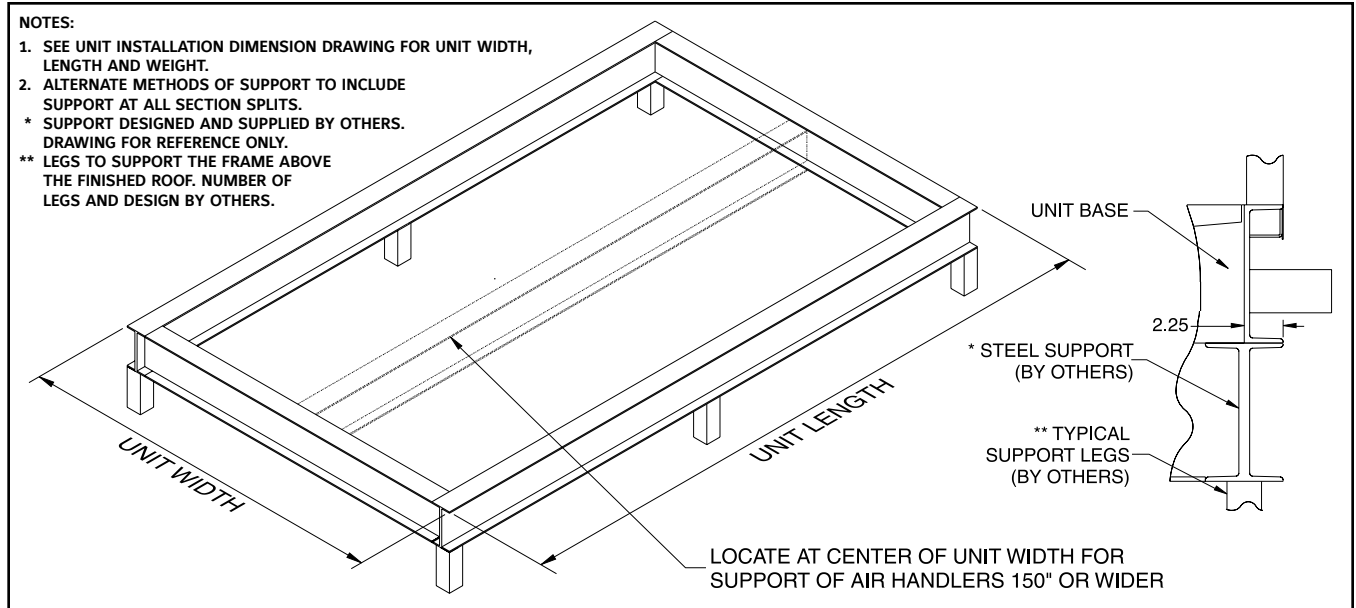


Figure 6 - Generic Structural Steel Support

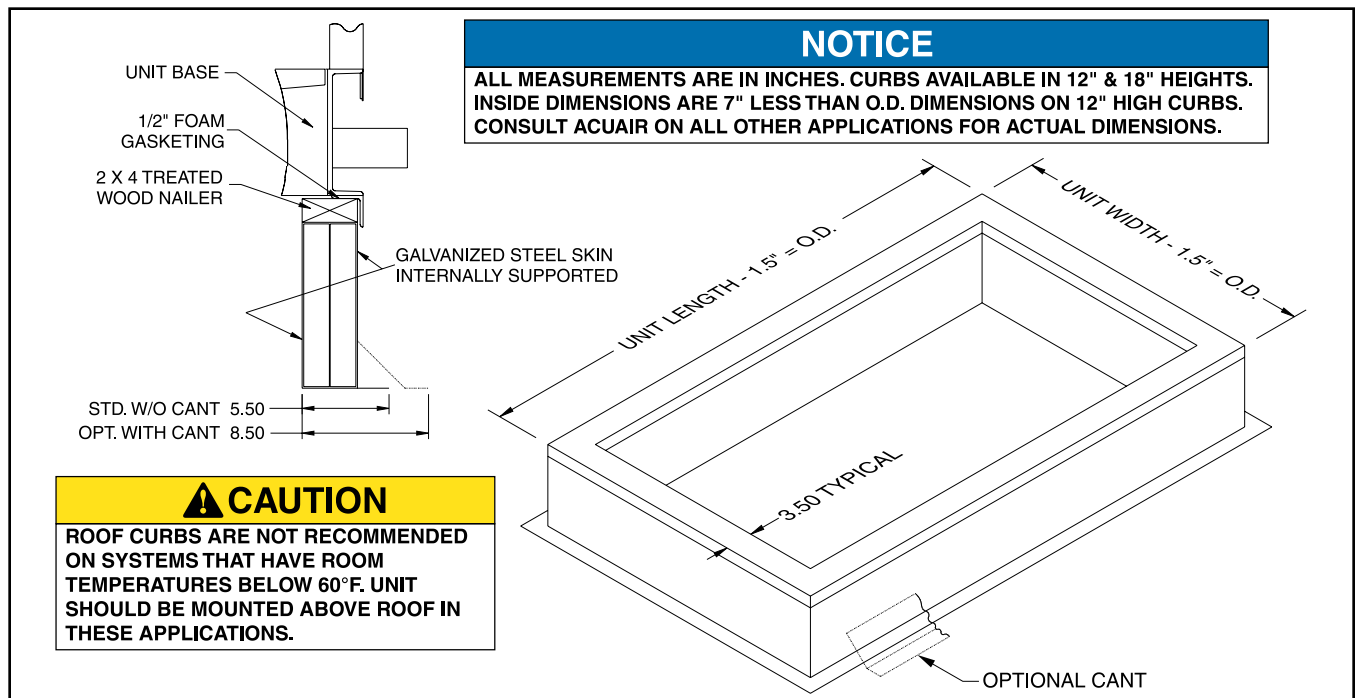


Figure 7 - Generic Roof Curb Support

SECTION RECONNECT SHIP LOOSE ITEMS

- AcuShield Roof Coating
- Joint Sealing Caulk
- Seal Gasket Tape
- 1/4" Bolts and Nuts
- Electrical Conduit Sealing Putty

INSTALLATION TOOLS

To complete the installation of an AcuAir® system, the following tools are required:

- Drift Pins
- 8-Foot Straight Edge
- Level
- Assorted Open-End Wrenches
- Socket Set
- Caulk Gun
- Tape Measure
- Chain Falls
- Screw Gun with Nut Drivers
- Paint Brush or Roller for Applying AcuShield Roof Coating

Roof Curb Assembly (Optional)

1. When supplied by Johnson Controls - AcuAir®, roof curbs ship either fully welded or in pieces. If bolted curb construction, bolt together.
2. Curb must be level (shim if required). Shims (at fractions of inch) should be placed at intervals no greater than 5 feet apart. Shims are not intended to compensate for roof pitch. Individual stacks if shims should not exceed 1/2" in height. On large units with splits, remember to shim at the split's midspan (see Figure 8).
3. The installer is responsible to secure the roof curb to the building structural support in accordance with local building and earthquake codes.
4. Seal all roof curb joints and seams with a suitable sealer/polyurethane caulk to prevent water leakage.

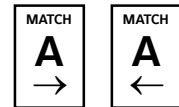
Roof Curb Installation

1. Verify that the curb is level and secured to the roof.
2. Verify that there is adequate height between the base of the unit and the roof to allow for drain trapping.
3. Install a 1/8" thick neoprene gasket on the top of the curb to provide a seal between the unit and the roof curb. If the unit or unit sections must be slid into place, a polyurethane sealant may be used in lieu of the gasket.
4. Lift the unit in place.
5. The installer is responsible to secure installation in accordance with the local building and earthquake codes.

GENERAL SPLIT UNIT REASSEMBLY

Units which are shipped in sections, must be installed on a proper foundation and carefully assembled to provide the required unit performance.

- AcuAir units are assembled in one piece in our factory and split prior to shipping.
- AcuAir units must be level for reassembly.
- All bolts, nuts, washers, *split covers* and polyurethane caulking (if required) can be found in supply fan section.
- All splits are identified with welded letters on the base channel (A-A, B-B, for example) to indicate which sections are to match up for reassembly.



REMOVABLE LIFTING LUGS

You will be provided with removable lifting lugs along either the width or length of the various sections of the unit. (Lifting lugs may be repositioned prior to lifting). Once the sections have been placed as close as possible to each other, remove any lifting lugs in the reconnect split. A hand-actuated winch or a come-along can be used to bring the unit sections together for final bolting. Attach the hand winch or come-along to each side of the base using the lifting lugs relocated to the alternate side locations and draw the sections together.

ELECTRICAL WIRING/PIPING

It is the installer's responsibility to reconnect all internal and external electrical or piping splits. All wires are colored and/or numbered to designate which wires should be joined at each split. Before turning on power, check all electrical circuits for continuity.

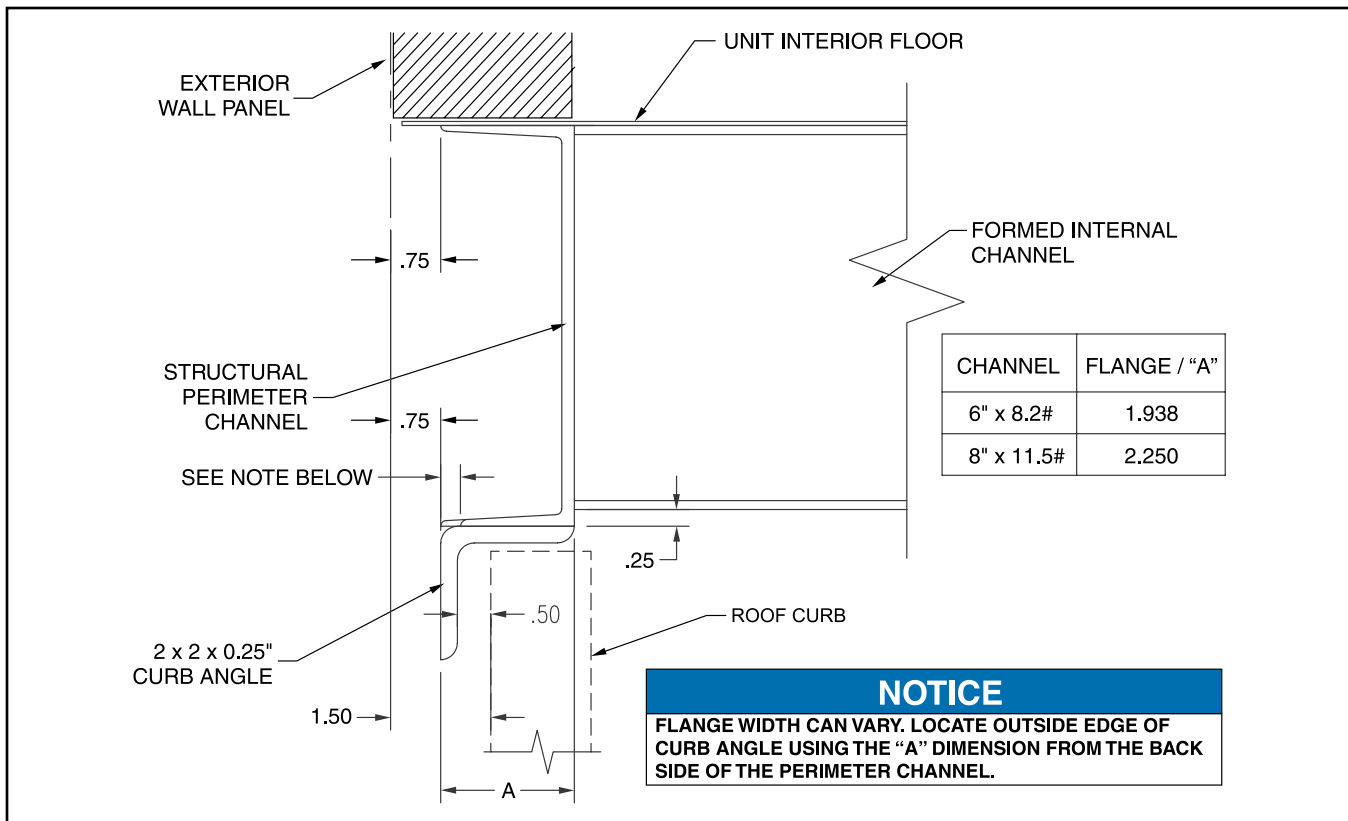


Figure 8 – Roof Curb Detail

PERFORMANCE GRADE CONNECTIONS

REASSEMBLY PROCEDURE FOR SPLIT UNIT PERFORMANCE SERIES ONLY

1. Position sections on level surface.
2. Install the foam gasket on one of the mating surfaces of one of the sections to be reconnected as indicated in Figure 11. Gasket material to be shipped loose.

ASSEMBLY HINT

It may be advantageous to install gasket material on the ends of the sections while the sections are still on the truck. This will allow the crane to set the sections as close as possible during the lift.

3. Apply polyurethane caulk on either side of the foam gasket and across the lower reconnect flange as indicated in Figures 9 and 11.
4. Attach hand winches to either side of the base via relocated lifting lugs and pull the sections together. Bolt base per Figure 9.

ASSEMBLY HINT

It may be advantageous to locate the first section in its final position and attach it to the support structure before pulling the next section into position.

5. Install the reconnect flange attachment hardware starting from the middle of the bottom angle working around to the middle of the top angle, making use of a drift pin to align the holes. Bar clamps may be needed to align the roofs together. If bar clamps are needed, use wood for protection in between the bar clamp and unit.
6. Split seams that have internal access to both sides of split will be reattached with bolts and nuts. Split seams with internal access to only one side of split will have cage nuts

on the blind side and bolts installed from accessible side. All bolt holes require a bolt.

7. If bolt holes do not align, it may be due to racking during transit to job site. Use jack to lift one side until holes on the wall of the opposite side align. Bolt this wall together and then remove jack from opposite side. As the unit settles, the out-of-square racking caused during transit should realign.

8. Once the sections are drawn together and the reconnect flanges are aligned and attached, apply two parallel beads of caulk along either side of the reconnect seam on the exterior of the AcuAir unit as shown in Figure 13.

9. Install the shipping split covers as shown in Figure 13 using the #10 TEK screws and washers provided. Apply a fine bead of caulk to either edge of the split cover and allow time to dry.

10. Once the shipping cover is in place and the caulk has had time to set, apply the roof coating as shown in Figure 14.

11. INSPECT all splits to see if polyurethane caulk was applied and split was bolted properly.

12. Reconnect all electrical conduit and wiring at the reconnect junction boxes. Use electrical conduit sealing putty to seal all conduit openings into and out of the junction box to prevent the migration of moisture. (reference the information on page 42)

13. INSPECT all splits to see if all electrical and piping connections are complete and correct.

NOTICE

Temporary roof supports and diagonal (shipping) supports should not be removed until the split sections are completely reassembled. See Page 18 for Food Grade and Sanitary Connections!

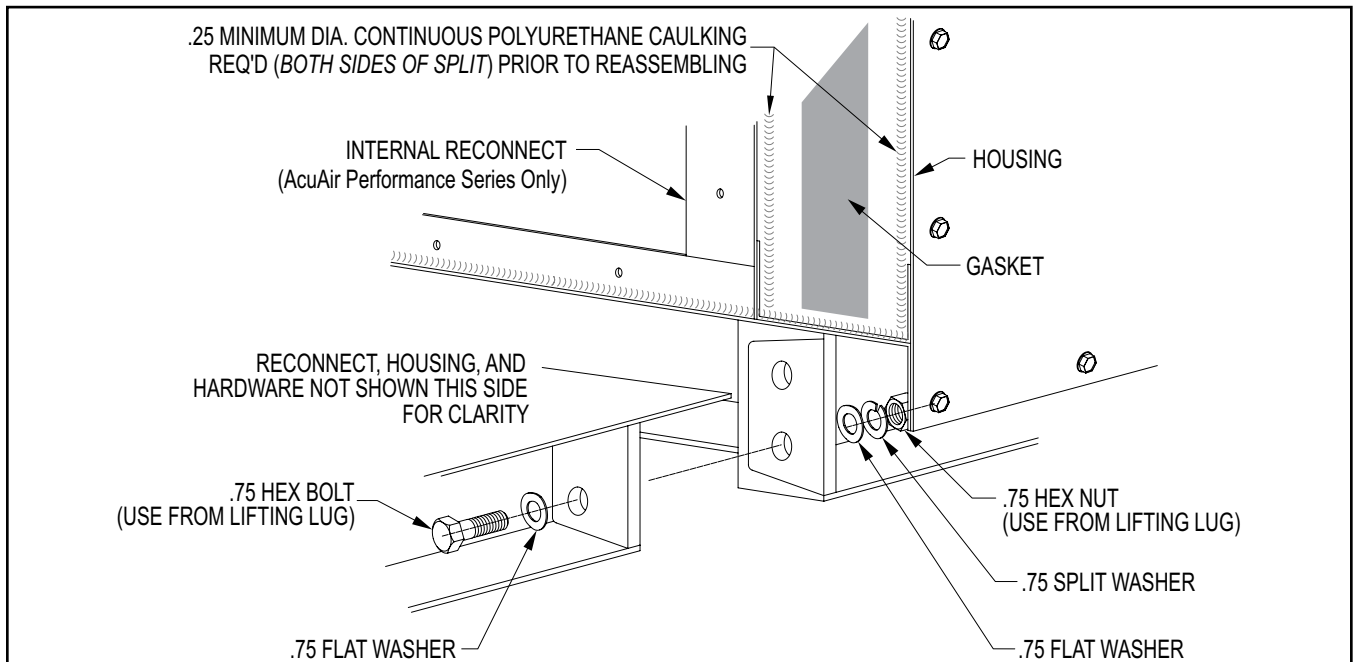


Figure 9 – Base Assembly Attachment - Relates to AcuAir Performance Series Unit Only

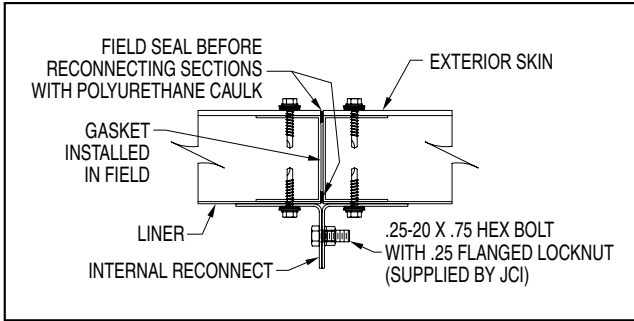


Figure 10 - Cross Section Of Split Wall Assembly -
AcuAir Performance Series Only

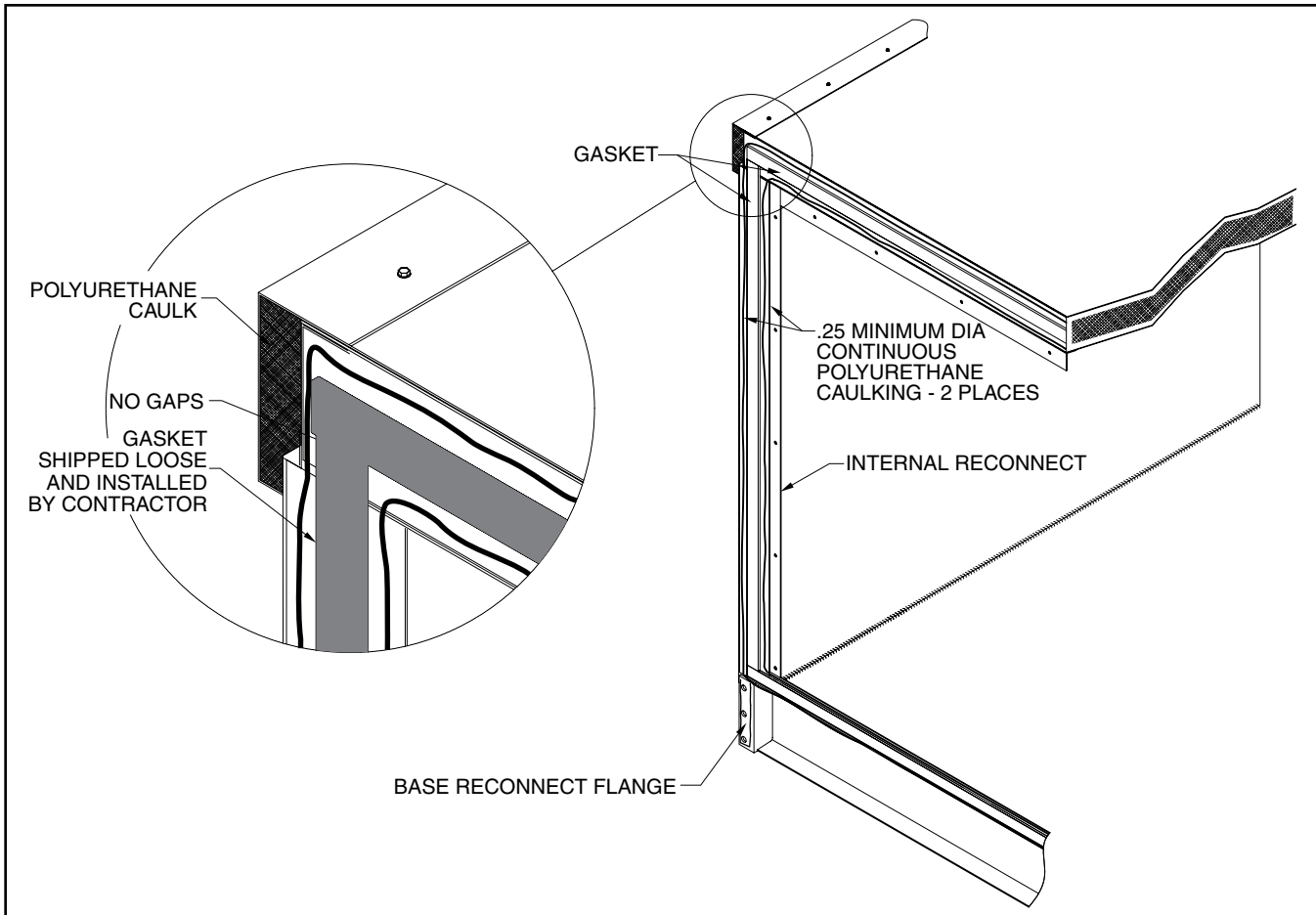


Figure 11 - Multi-Section Gasket Installation On AcuAir Performance Series Units

INSULATION OF THE BASE RECONNECT SEAM OF AN ACUAIR PERFORMANCE SERIES UNIT

When two AcuAir unit sections are drawn together the base channels of the two sections form an uninsulated cavity that under certain conditions could produce condensation. AcuAir provides a ship loose foam insulation kit to fill this cavity as part of the reconnect procedure.

On the Performance Series air units this insulation must be injected from underneath the unit after the sections have been securely joined.

Follow the instructions in the section "FOAM KIT 15 USE GUIDELINES" on page 21 for preparing the two part foam mixture and the injection kit. Take special note of the 30 second inactivity limit after which the injection nozzle may become permanently clogged.

Foam should be injected into the cavity at a rate of 3 - 4 bd-ft per linear foot of seam. This will mean a 15 bd-ft can of expanding foam will fill between 4 - 5 linear ft of AcuAir reconnect seam.

NOTICE
INJECT THE FOAM INTO THE OPEN SEAM AFTER THE AIR UNIT SECTIONS HAVE BEEN SECURELY RECONNECTED.

NOTICE
IF FOAM DISPENSING HAS STOPPED FOR MORE THAN 30 SECONDS, REPLACE THE NOZZLE WITH THE EXTRA PROVIDED.

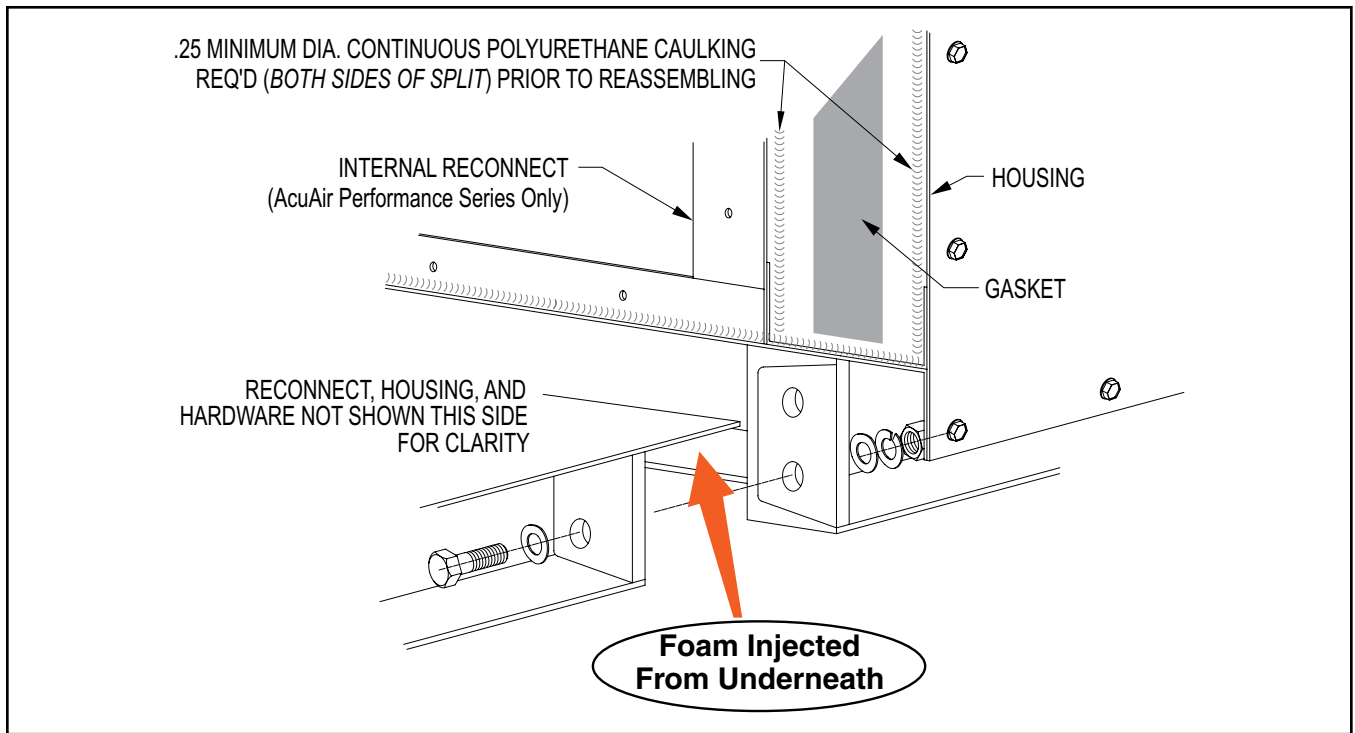


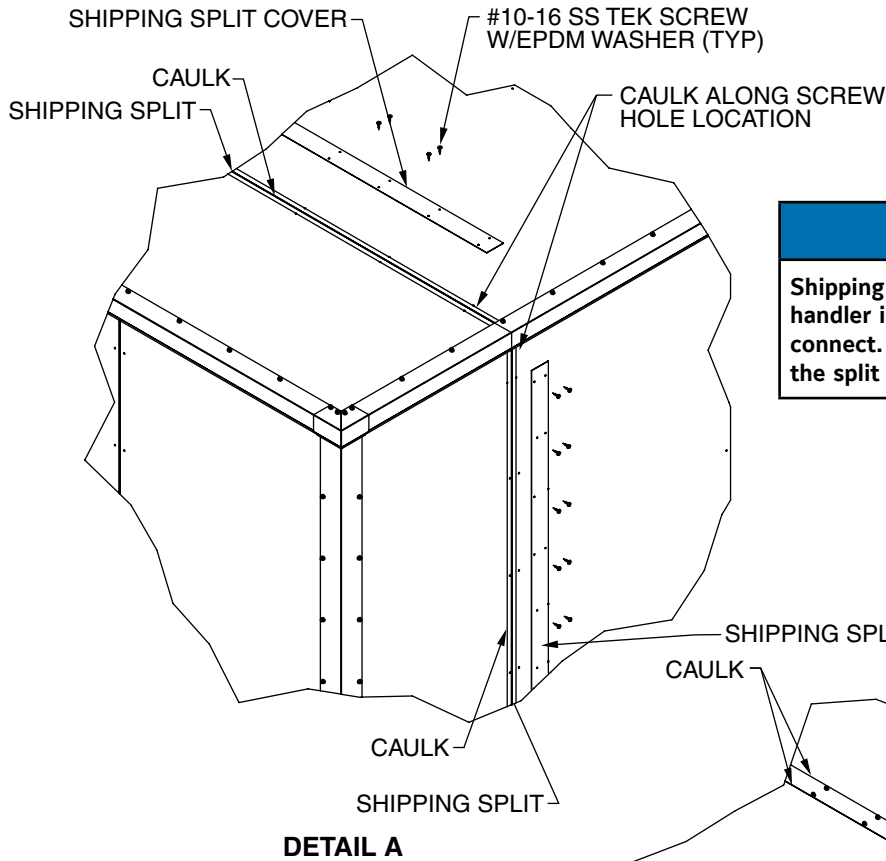
Figure 12 - Foam Injection Underneath Base Assembly Attachment - Relates to AcuAir Performance Series Unit Only

NOTICE

Only use caulking shipped with unit.

CAUTION

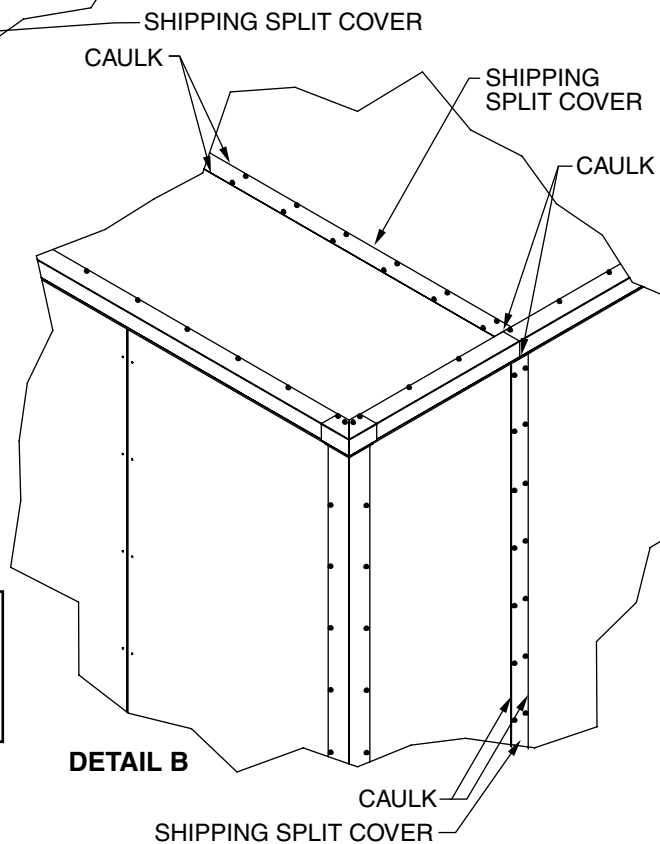
Do not use silicone caulking on field reconnects or on shipping split covers.



DETAIL A

NOTICE

Shipping split covers ship with the air handler installed to one side of the reconnect. Remove cover and install across the split as shown on Detail A & B.



DETAIL B

Acceptable Polyurethane Caulking:
Manus-bond, Gray, P/N 013-02966-001 or
Sikaflex, Gray, P/N 013-03317-050 or
Sikaflex, Champagne P/N 013-03317-040

Figure 13 – Split Reassembly Procedure For AcuAir Performance Series Units Only

**ACUAIR PERFORMANCE SERIES
ROOF SEALANT PROCEDURE**
(See Figure 14)

1. The mechanical joint between sections must be bolted and sealed with polyurethane caulking.
2. Acu-Shield Roof Coating can be applied after polyurethane caulking is dry and when surface temperature is between 45°F and 108°F. Below 45°F, extra steps must be taken to keep the polyurethane caulking, Acu-Shield, and metal reconnect surfaces heated for proper application during installation. Contact Product Service for further direction.
3. Do not apply when inclement weather is imminent within a 24 hour period.

4. Do not apply to wet, ice, or snow covered surfaces.
5. Before applying, clean surface with wire brush or solvent wipe (not provided).
6. Apply Acu-Shield Roof Coating with 3 inch wide roller or 3 inch wide paintbrush (not provided).
7. One quart applied at 45 mils is equal to a 3 inch wide X 33 foot long section.
8. Cure time will vary with temperature and humidity. Under normal conditions, a rubber coating can be expected within a 24 hour period.

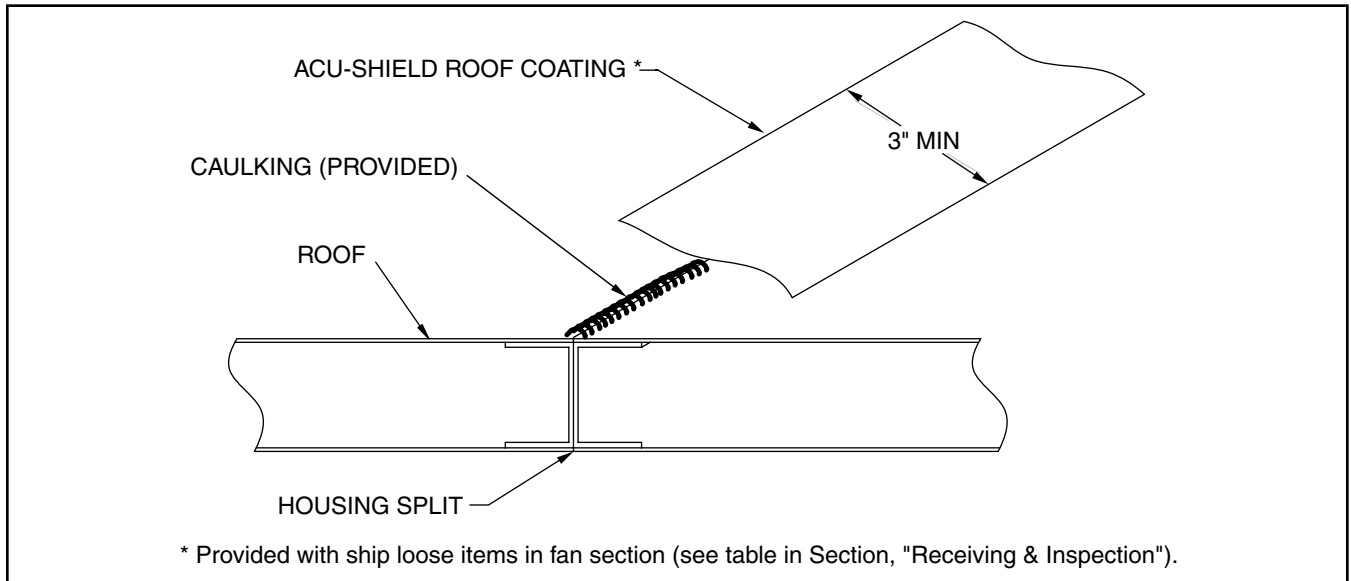


Figure 14 – Outdoor Split Roof Sealant Procedure - AcuAir Performance Series Only

FOOD GRADE AND SANITARY CONNECTIONS

RECONNECT INSTALLATION PROCEDURE

1. Position sections on level surface.
2. Install the foam gasket on one of the mating surfaces of one of the sections to be reconnected as indicated in Figure 17. Gasket material and caulk are shipped loose in boxes located in the blower section of the air unit.
3. Apply a bead of polyurethane caulk to either side of the foam gasket and across the lower reconnect flange as indicated in Figure 17.

ASSEMBLY HINT

It may be advantageous to install gasket material on the ends of the sections while the sections are still on the truck. This will allow the crane to set the sections as close as possible during the lift.

4. Attach hand winches to either side of the base via relocated lifting lugs and pull the sections together. Bolt the base flanges per Figure 15.

ASSEMBLY HINT

It may be advantageous to locate the first AcuAir unit section in its final position and attach it to the support structure before pulling the next section into position against it.

5. The factory installed unit reconnect flanges will be joined using 1/4" bolts and nuts shipped loose in a container in the blower section of the unit. All bolt holes require a bolt.

If bolt holes do not align, it may be due to racking during transit to job site. Use a jack to lift one side until holes on the wall of the opposite side align. Bolt this wall together and then remove jack from opposite side. As the unit settles, the out-of-square racking caused during transit should realign. Continue assembly with bolting other side, base, and roof, making use of a drift pin to align the holes. Bar clamps may be needed to align the roofs together. If bar clamps are needed, use wood for protection in between the bar clamp and unit.

6. Check to see if all bolts are secured properly, and apply polyurethane caulk to all exterior seams per Figures 18.

ASSEMBLY HINT

It is recommended that the base flange bolts be only loosely fitted prior to fitting all 1/4" reconnect external flange bolts. Once all of the 1/4" flange bolts are in place, tighten the base flange bolts and finish tightening all of the reconnect flange bolts. This sequence will help make alignment of the reconnect flange holes a bit easier.

7. Apply gasket tape to either side of the section joint on the interior floor of the unit as indicated in the details of Figure 15.
8. Center the split cover over the gasket tape and the joint to be covered. Attach the cover using the #12 TEK screws. It may be necessary to predrill holes through the base flange for the TEK screws.
9. Seal the edges of the split cover with beads of caulk as shown in Figure 15.
10. Inspect all splits to see if polyurethane caulk was applied and split was bolted properly.

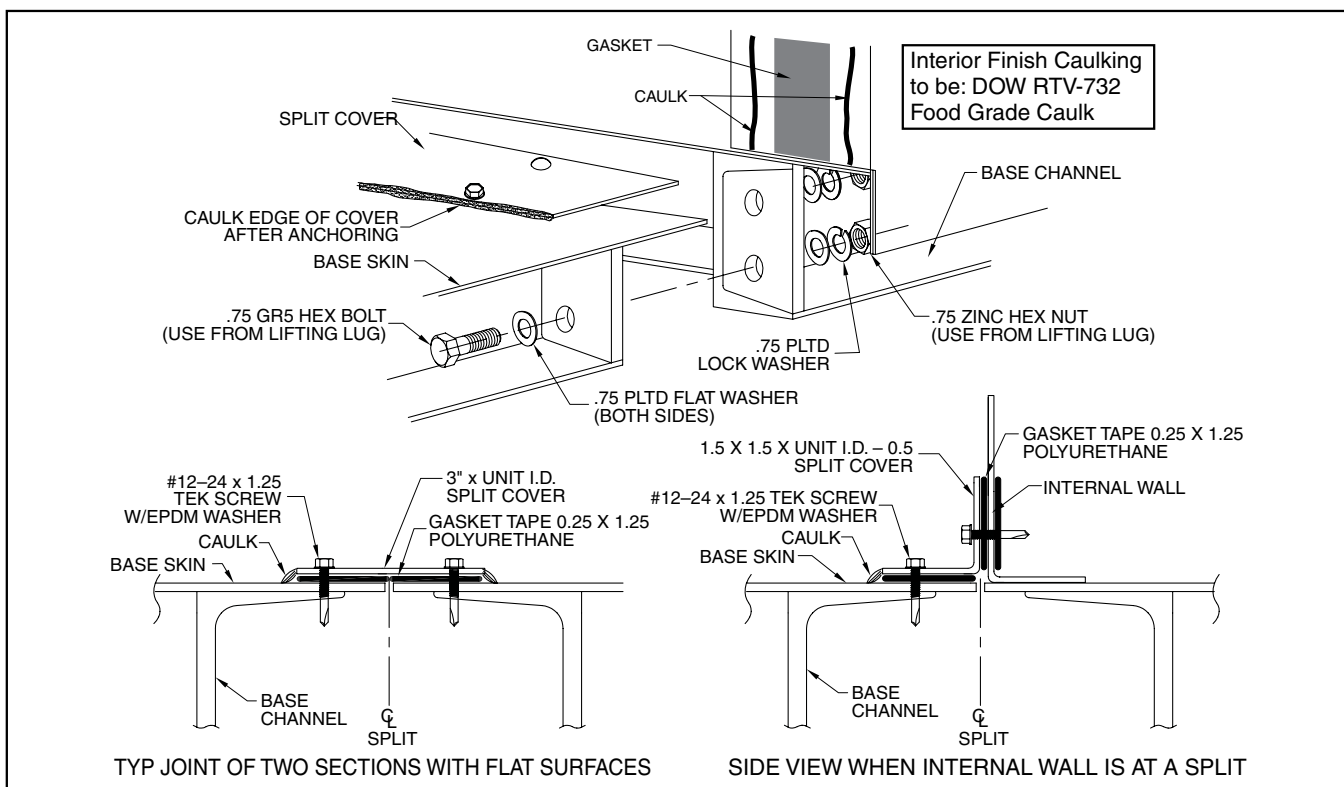


Figure 15 – Base Split Reassembly Procedure

11. Reconnect all electrical conduit and wiring at the reconnect junction boxes. Use electrical conduit sealing putty to seal all conduit openings into and out of the junction box to prevent the migration of moisture. (reference the information on page 42)

12. Inspect all splits to see if all electrical and piping connections are complete and correct.

NOTICE

Temporary roof supports and diagonal (shipping) supports should not be removed until the split sections are completely reassembled.

**ACUAIR FOOD GRADE OR SANITARY SERIES
ROOF RECONNECT FINISH**

1. The mechanical joint between the unit sections must be bolted and sealed with polyurethane caulking prior to applying the roof coating.

2. Acu-Shield Roof Coating can be applied to the roof reconnect after any exposed polyurethane caulking is dry and when surface temperature is between 45°F and 108°F. Below 45°F, extra steps must be taken to keep the polyurethane caulking, Acu-Shield, and metal reconnect surfaces heated for proper application during installation. Contact Product Service for further direction.

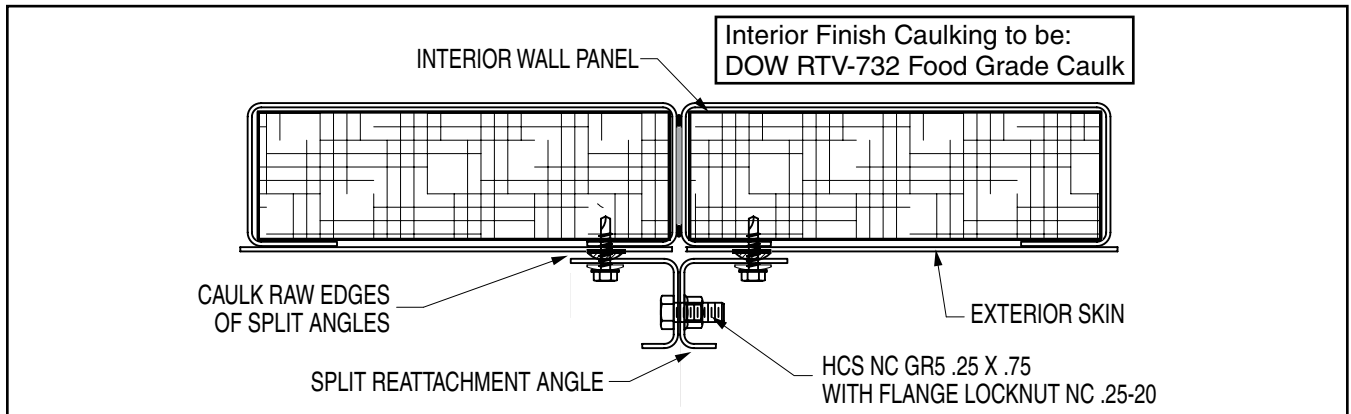


Figure 16 – Cross Section Of Split Wall Assembly

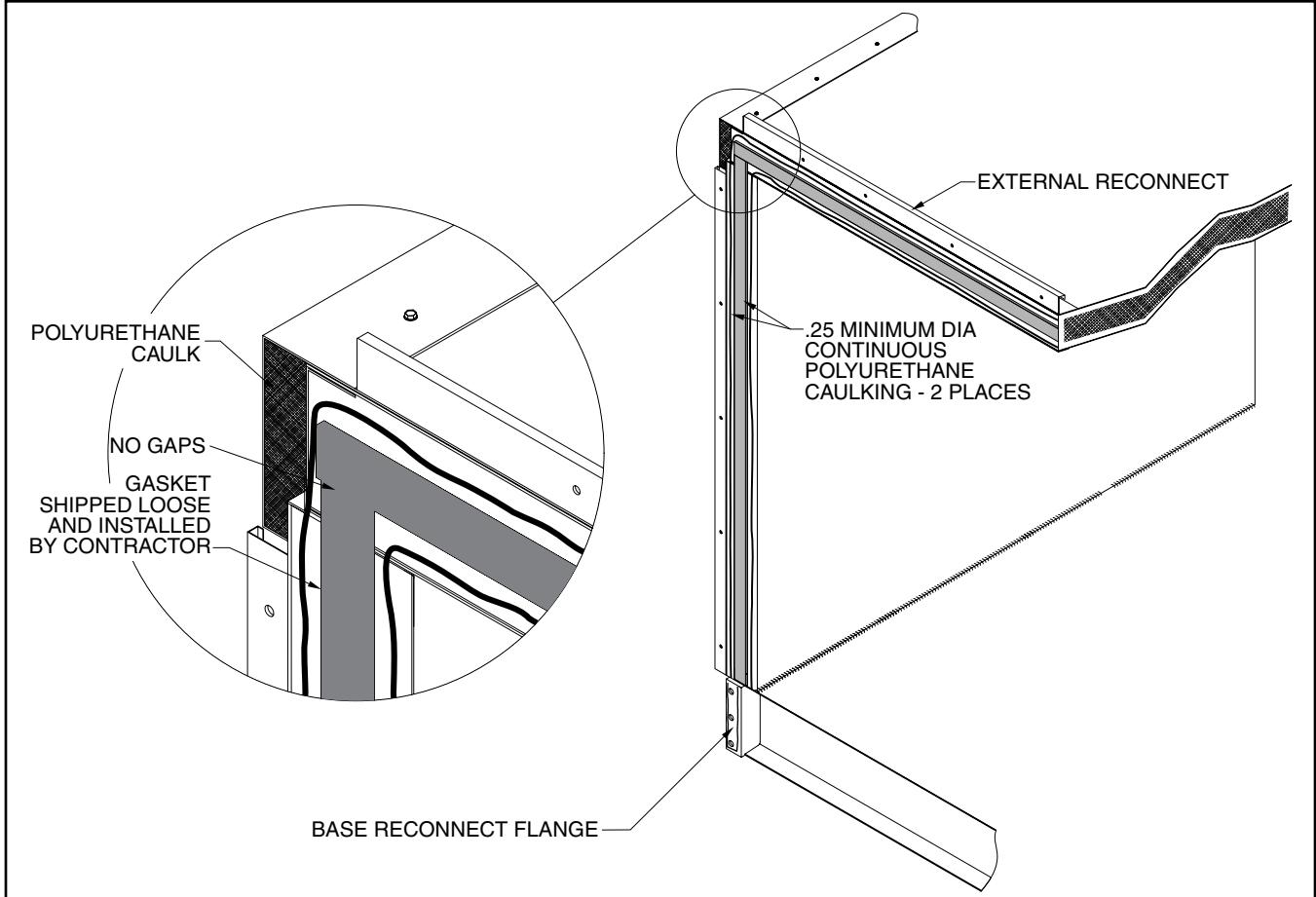


Figure 17 – Multi-Section Gasket Installation On AcuAir Food Grade and Sanitary Series Units

3. Do not apply roof coating when inclement weather is imminent within a 24 hour period.
4. Do not apply to wet, ice, or snow covered surfaces.
5. Before applying, clean surface with wire brush or solvent wipe (not provided).
6. Apply Acu-Shield Roof Coating with a good quality synthetic bristle paintbrush (not provided).
7. One quart applied at 45 mils is equal to a 3 inch wide x 33 foot long section.
8. Cure time will vary with temperature and humidity. Under normal conditions, a rubber coating can be expected within a 24 hour period.

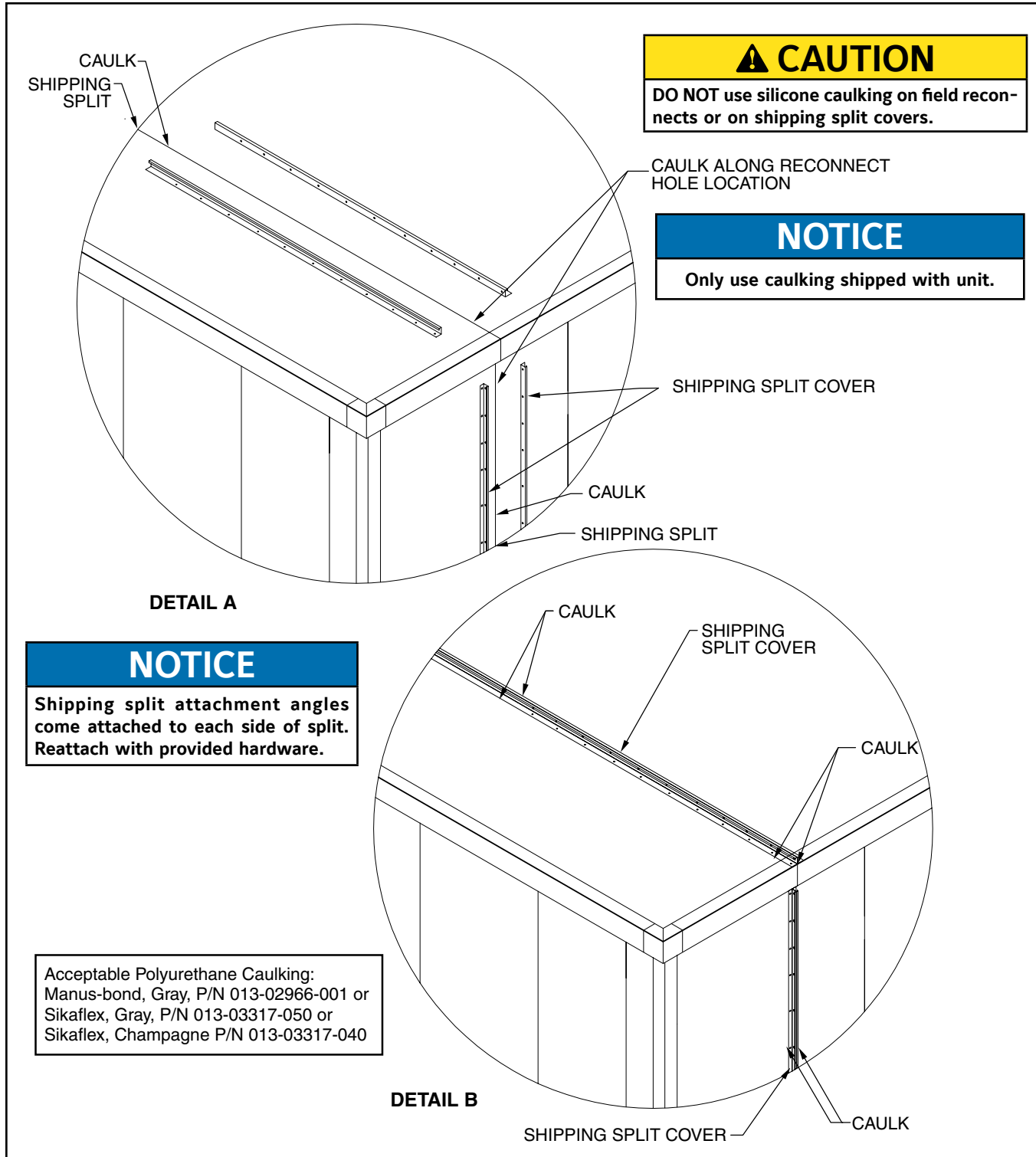


Figure 18 – Split Reassembly Procedure For AcuaiR Food Grade and Sanitary Series Units Only

**INSULATION OF THE BASE RECONNECT SEAM
OF AN ACUAIR FOOD GRADE OR
SANITARY SERIES UNIT**

When two AcuAir unit sections are drawn together the base channels of the two sections form an uninsulated cavity that under certain conditions could produce condensation. AcuAir provides a ship loose foam insulation kit to fill this cavity as part of the reconnect procedure.

The insulation may be injected either from the top of the cavity prior to installing the reconnect split cover strip, or from underneath the unit provided the reconnect joint is not positioned directly over a support structure cross member.

Follow the instructions provided by the foam manufacturer for preparing the two part foam mixture and the injection kit. Take special note of the 30 second inactivity limit after which the injection nozzle may become permanently clogged.

Foam should be injected into the cavity at a rate of 3-4 brd-ft per linear foot of seam. This will mean a 15 brd-ft can of expanding foam will fill between 4-5 linear feet of AcuAir reconnect seam.

When filling the reconnect seam from the top (inside the AcuAir unit), it may be advisable to cover the bottom of the opening with duct tape to prevent the foam from dropping out before it has a chance to expand and attach itself to the cavity walls.

NOTICE
Inject the foam into this open seam after the sections are joined and before the seam cover is installed.

NOTICE
If foam dispensing has stopped for more than 30 seconds, replace the nozzle with the extra provided.

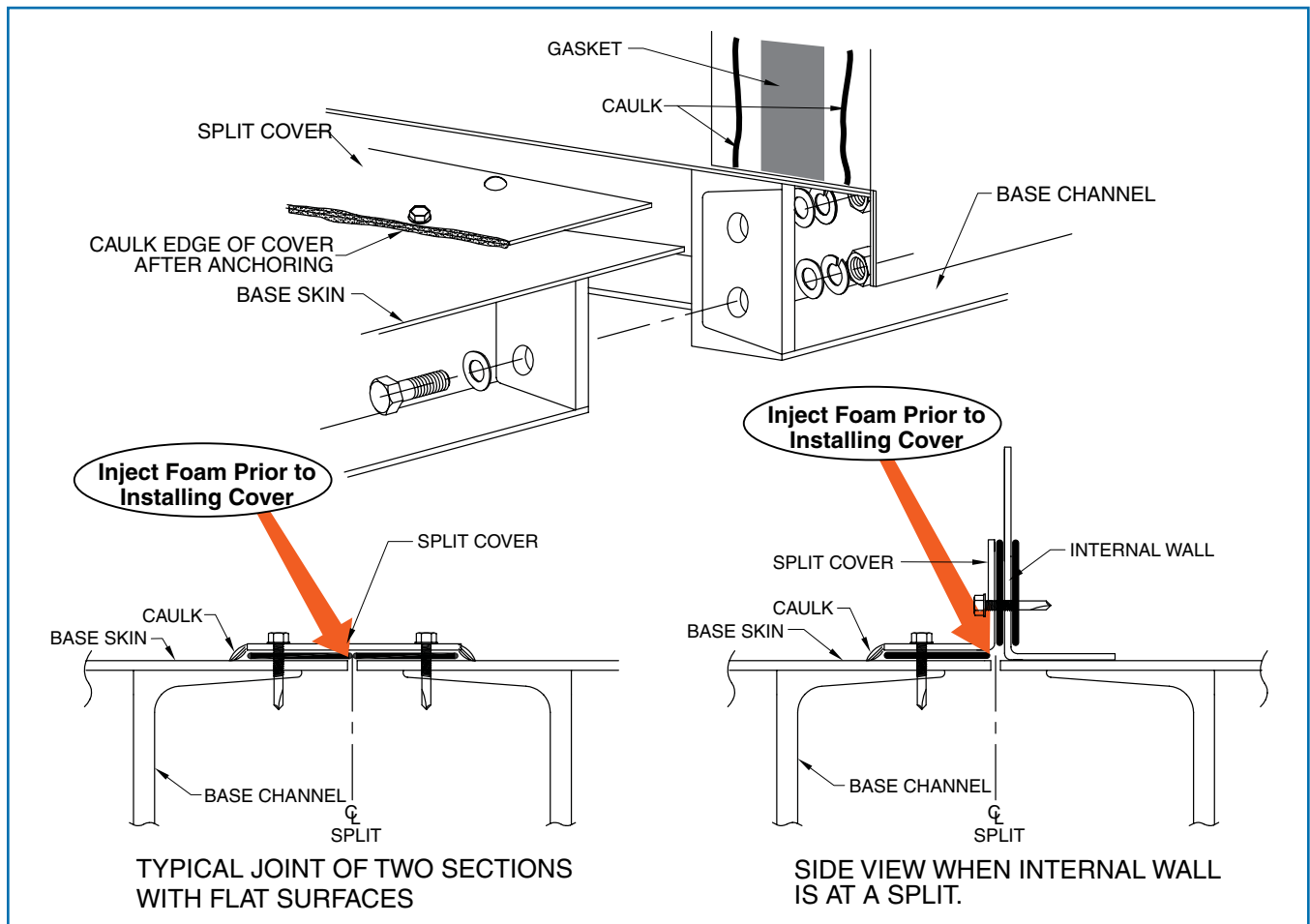


Figure 19 – Insulation of the Base Reconnect Seam

FOAM KIT 15 USE GUIDELINES ACUAIR UNIT BASE RECONNECT INSULATION

Always review and follow the directions provided in your foam kit. The below instructions are a general overview, meant to accompany the reference photos. Ensure you follow all safety Precautions including wearing protective eyewear and gloves.

Foam kit 15 assembly instructions:

- Tear open the back of the box (Figure 20).
- Without forcing, remove hoses and applicator to full length (Figure 21).
- Ensure gun safety is on (roller is locked toward end of applicator).
- Pull yellow tab to remove black plastic valve lock. Discard. (Figure 22)
- Activate valves by pulling black strap up and insert strap into slit (marked in yellow) on back of box. Hoses will partially fill with chemicals.
- Hold unit upside down, move roller to “on” position (Towards hoses), and dispense foam. Adjust roller to increase/decrease flow.
- If dispensing is stopped for more than 30 seconds, replace nozzle with the extra provided.
- Foam can be trimmed, painted, sanded or plastered after curing completely.



Figure 20 – Opening the Foam Kit Box



Figure 21 – Remove Hoses and Applicator to Full Length



Figure 22 – Pull Yellow Tab to Remove the Valve Lock

ACUAIR FRESH AIR INTAKE PLENUM

1. The fresh air intake plenum and hoods will be shipped as an assembly on smaller cfm units. The plenums will arrive with one set of hoods unmounted for larger cfm units.
2. The plenums and all hoods are assembled in the factory prior to preparing for shipment. (Not all of the attachment screws are installed in hoods that will ship unattached)
3. For those unit arriving with unattached hoods, reattach the hoods starting with a hood in the bottom position first. Use the factory attached hoods as a model as well as the existing screw holes to finalize locations.
4. When a set of detached hoods is shipped separately, one hood will have an opening in the side for mounting the fresh air temperature sensor. Be sure to locate this hood such that the sensor wiring on the unit can reach this mounting location.
5. Prior to placing the hood in the mounting position, apply a continuous bead of polyurethane caulking on the face of each vertical hood flange and across the face of the top flange.
6. The Plenum and hood assembly can be lifted using the lifting lugs provided on the top if the plenum
7. On the blank wall of the plenum is an access panel. This panel can be removed to provide access to the inside of the plenum when attaching it to the fresh air opening on the AcuAir unit.
8. Apply continuous beads of polyurethane caulking on the face of the plenum flanges. The caulking should be on the outside of the factory drilled attachment screw holes. This caulking will prevent rain water from reaching the attachment screw penetrations once the plenum is mounted to the AcuAir unit. See Figure 23.

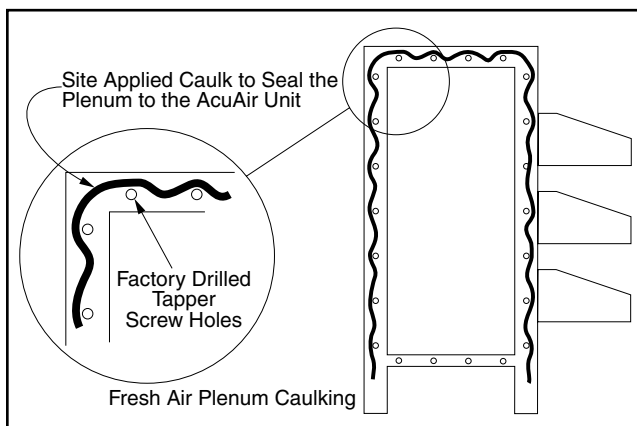


Figure 23 - Applying Caulk to Plenum

9. Using a crane, lift the plenum with mounted hoods into position for attaching to the AcuAir unit.
10. The two outer legs under the plenum must rest securely on site structural supports.
11. When the plenum is plumb and level, use the screws that were provided to attach the plenum section to the AcuAir unit. (The screws are shipped loose and can be found in the blower section). The predrilled holes indicated in the plenum frame show the location and number of attachment points



Figure 24 - Fresh Air Intake Plenum Ready for Shipping



Figure 25 - Detached Intake Hoods Ready for Shipping



Figure 26 - Fresh Air Intake Plenum and Hoods Preassembled in the Factory

required. The plenum assembly must be securely screwed to the unit.

12. Replace the access panel, being sure that all screws are in place.

NOTICE

Any penetration of cabinet skin will cause water and air leakage. Thoroughly seal any screw, piping or electrical holes with appropriate sealant. Self tapping screws are not weathertight.

FAN HOLD-DOWN / SPRING ISOLATOR SETUP (OPTIONAL)

If fans are supplied with internal spring isolation, they will be bolted down (see Figure 27) for unit shipping. After the unit is in place, assembled and leveled, the fan mounts can be disassembled by removing two (2) nuts and one (1) washer from each side. Remove tubes from wire and discard wire.

Place tubes on studs and place shoulder washer (shoulder up) on studs. Place one (1) nut on each stud and tighten it on shoulder washer.

Place remaining nuts on studs and tighten to lower nut to lock in place.

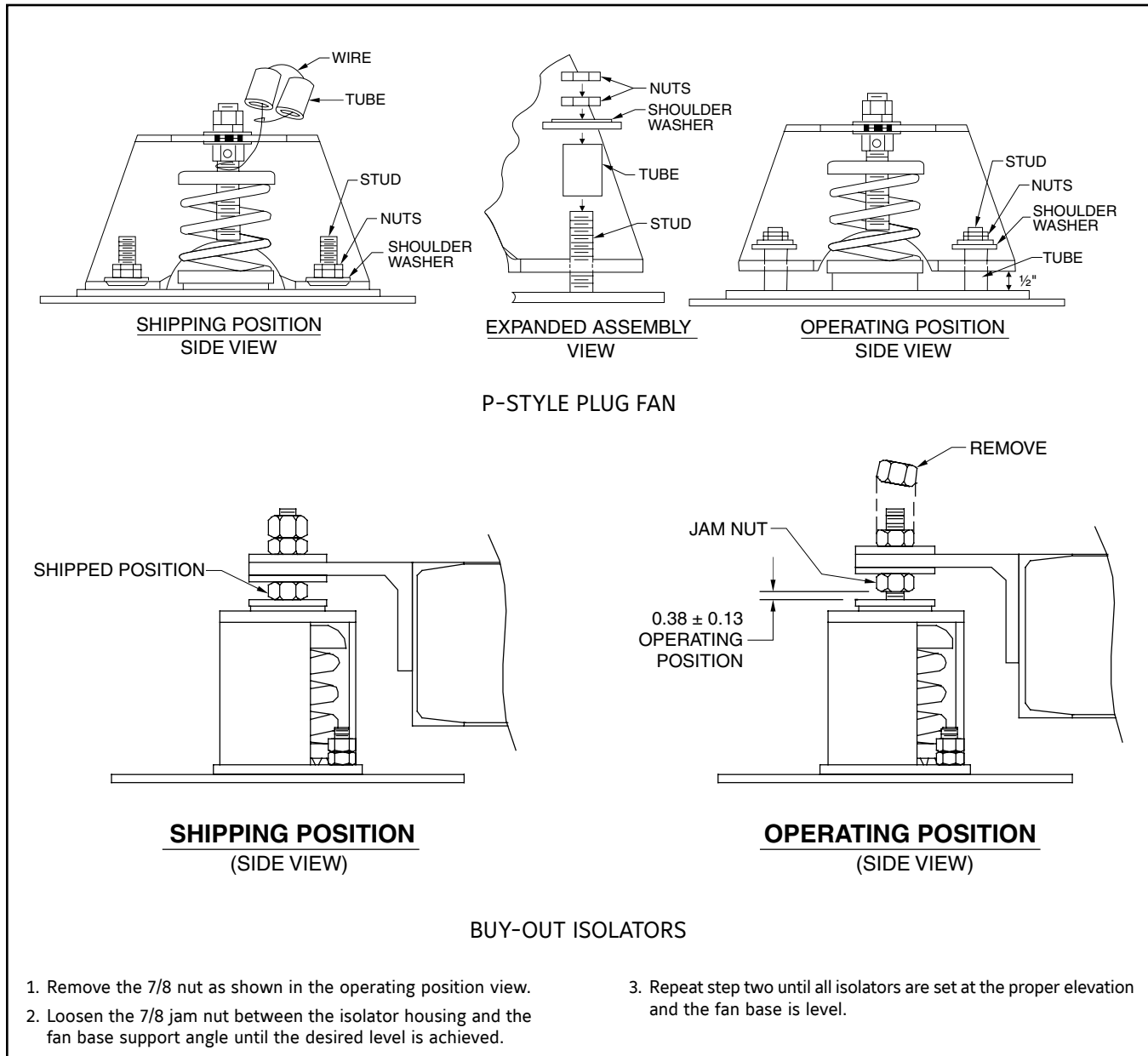


Figure 27 – Spring Isolator Setup

CONDENSATE DRAIN TRAP SIZING

All condensate drain connections and floor drains must be trapped at the job site location. Failure to properly trap a drain will result in flooding of the drain pan and potential water damage to the air-handling unit and other building facilities.

To design the drain traps, reference Figure 28 as well as the total static pressure (TSP) associated with the main fan and motor as indicated on the applicable AcuAir data drawing.

DRAIN PAN CONSTRUCTION

AcuAir recessed hygienic drain pans are triple sloping and have a minimum depth of 3" at the drain connection. Drain pans and pipe stub outlet connection are constructed of 304 stainless steel unless specified otherwise. The cooling coil supports are constructed of material similar to the air unit interior liner and may not be stainless steel.

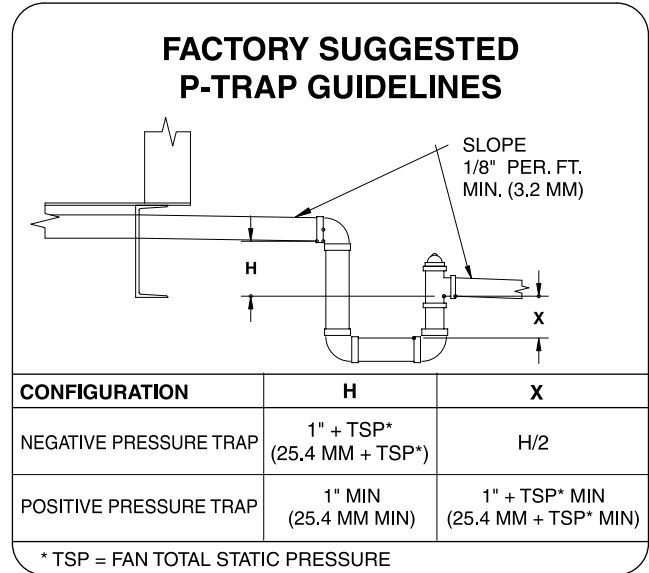


Figure 28 - Condensate Drain Trap Sizing

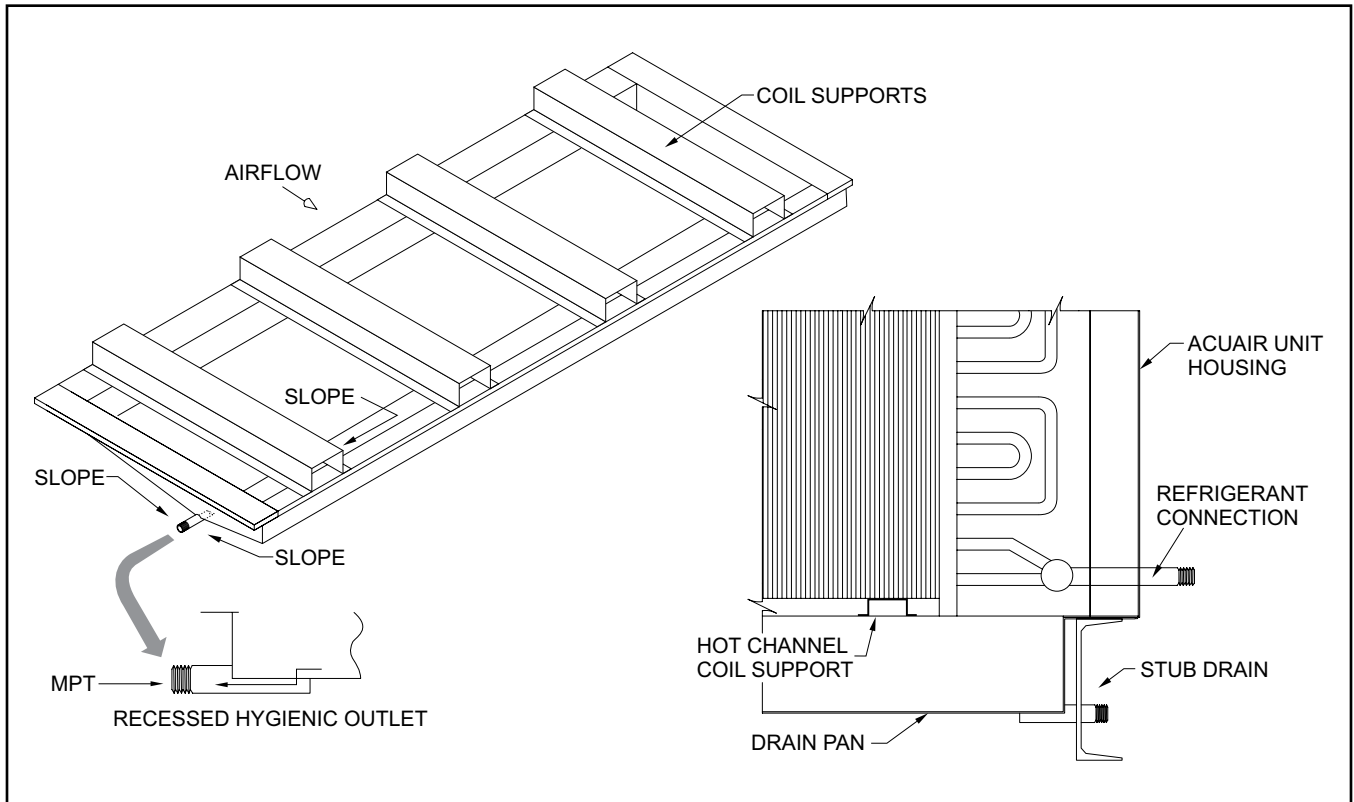


Figure 29 - Drain Pan Detail

FIELD PIPING REQUIREMENTS

1. General – Every effort must be made in field piping to keep the stresses to a minimum on the coil connections.

- a. Allow for thermal expansion and contraction of all field piping.
- b. Do not rely on the coil connections to support the weight of the field piping.
- c. Design piping to minimize transmittal of vibration through the piping to the unit coils.

2. Steam Piping – When a steam coil is supplied, the steam piping must be installed in accordance with state and local codes and accepted industry practices. Please refer to the supplied piping diagram for specific information.

Prior to shipment, steam coils are pressure tested for a maximum operating pressure of 150 PSI. It is recommended that the steam pressure be reduced to 15-50 PSI or lower for maximum steam coil life and optimum control operation.

3. Refrigerant Piping – When a cooling coil is supplied, all refrigeration piping must be installed in accordance with all state and local codes and standard industry practices.

There must be sufficient flexibility in the piping so that any vibration from the unit is not transmitted to the building and so that the piping joints at the unit are not stressed. All refrigeration lines must be secured to prevent wear or vibration at all operating conditions.

4. Evaporator Coils – Evaporator coils are designed and tested to a designated maximum allowable operating pressure (PSIG). It is the contractor's and/or customer's responsibility to provide controls and reliefs on the refrigeration system to prevent internal pressures from becoming higher than the tested operating pressure.

⚠ CAUTION
Halocarbon refrigeration coils may not have been fully evacuated or totally dried at the factory. It is the customer's/contractor's responsibility to provide adequate evacuation of the evaporator coil and ensure that the coil is dry and water free before start-up of the system.

5. Water or Glycol Coils – It is essential that the piping for the system be done so that all lines can be drained and there are no traps or pockets in the system where water or glycol can collect and freeze. All piping should be pitched away from the unit coil. The piping should be installed in a manner which will allow the coil to be filled with an antifreeze solution, if necessary.

DUCT CONNECTIONS (See Figures 30 and 31)

Make duct connections to the casing by screwing flanged ducts directly to the casing with self-tapping sheet metal screws.

Duct connections to collar-type openings can be made with "S" cleats or overlapping joints.

Apply polyurethane caulking around the duct connection. It is important to seal all duct connections to prevent air-leakage and system performance problems.

It is recommended that all duct connections to the AcuAir unit be insulated to minimize condensation.

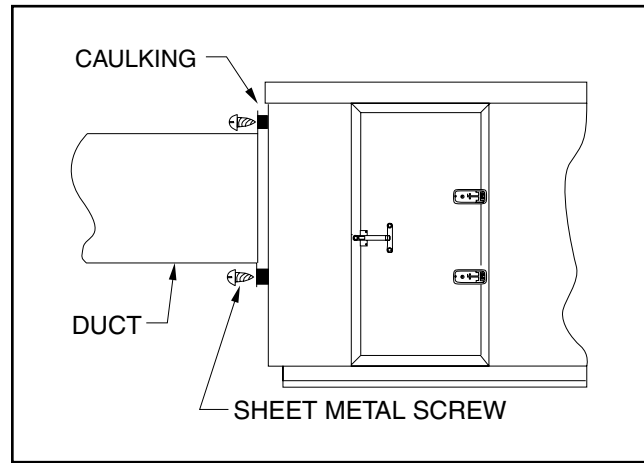


Figure 30 – Detail of Duct Connection

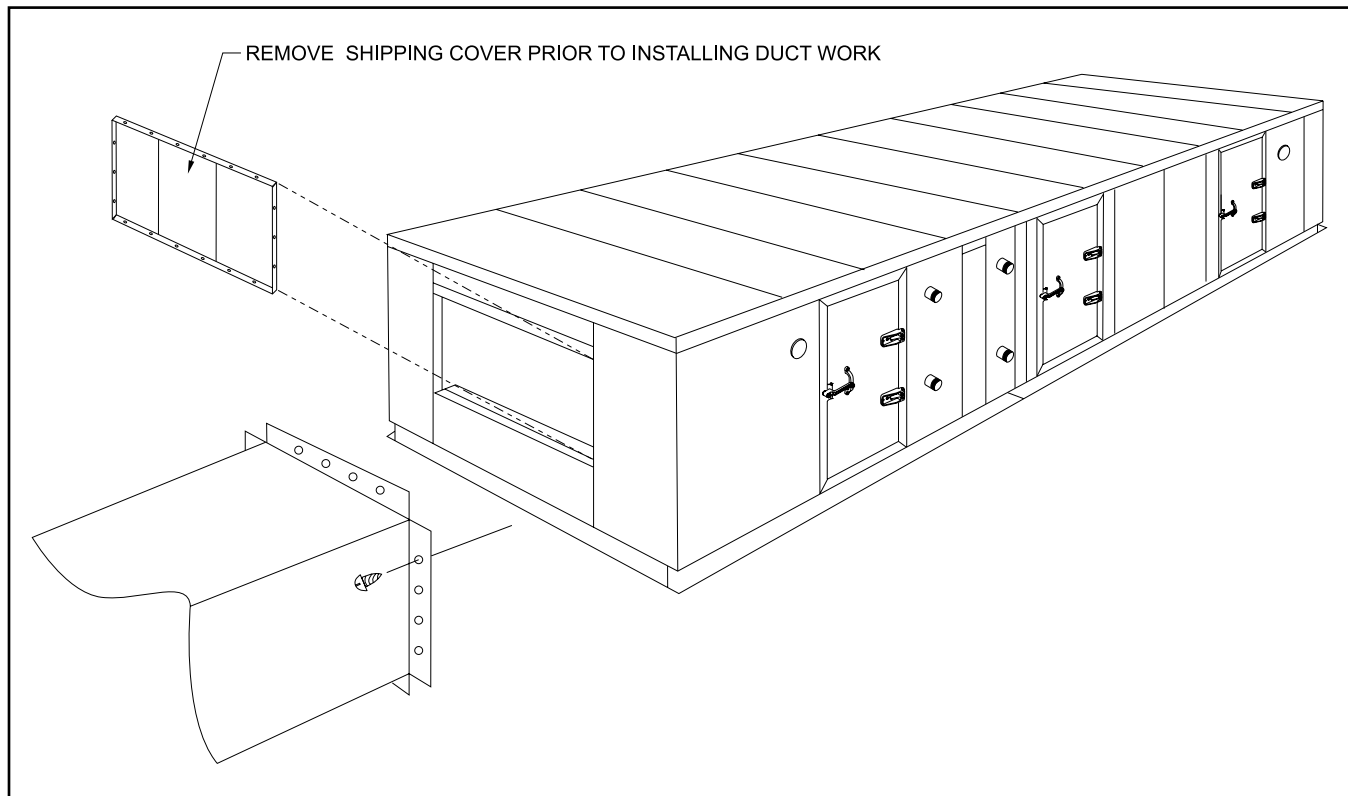


Figure 31 – Connection of Duct

**WEATHER HOOD CONNECTION DIRECT TO
THE ACUAIR FRESH AIR OPENING**

(See Figures 32 and 33)

1. Apply polyurethane caulking to the flange of the hood.
2. Align the hood over the opening. Check for adequate clearance to doors and other openings on the air-handling unit.
3. Attach the hood to the unit using sheet metal screws through the unit casing. On openings requiring multiple hoods, repeat this procedure for each of the hoods.
4. Carefully, remove excess polyurethane caulking from around the flange of the hood.

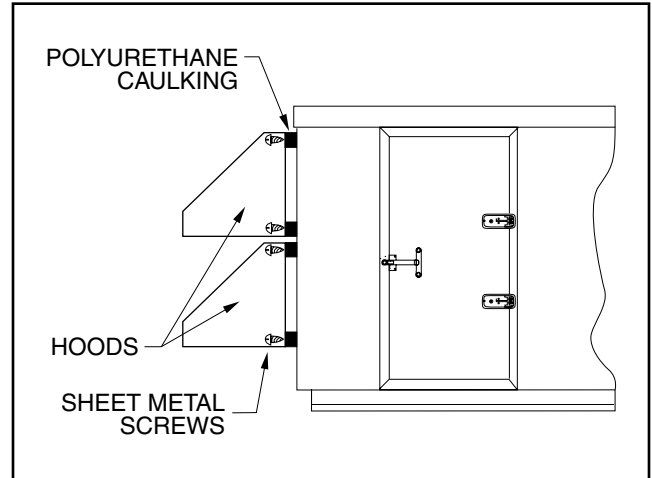


Figure 32 - Connection of Weather Hood(s) to Unit

NOTICE

Any penetration of cabinet skin will cause water and air leakage. Thoroughly seal any screw, piping or electrical holes with appropriate sealant. Self tapping screws are not weather tight.

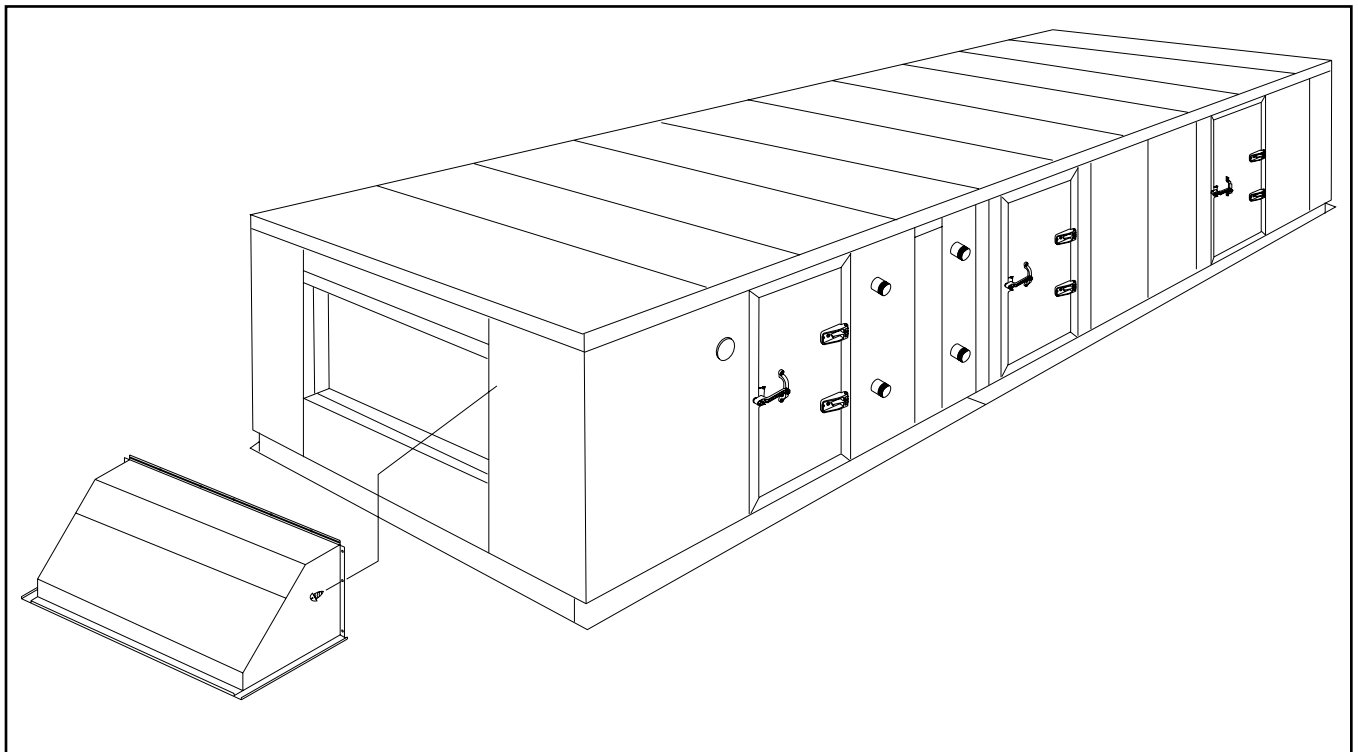


Figure 33 - Weather Hood Installation

HORIZONTAL AND VERTICAL TUBE STEAM HEAT COIL WITH INTEGRAL FACE AND BYPASS DAMPERS



Figure 34 – Integral Face and Bypass Coil (Horizontal; Tubes, Steam Shown)

The Vertical Tube Integral Face and Bypass (VIFB) or the Integral Face and Bypass (IFB) operates with full steam pressure or water flow at all times when the air is at or below 35°F. This prevents freeze-up and temperature stratification.

CAUTION

VIFB lower header must be free to float. After the coil has been piped, remove the yellow colored bolts to allow header to float. Always support on the coil connections when installing fittings.

CAUTION

VIFB Warranty will be voided should return piping on lower header (inlet and return on two-row header) not include flexible connector(s) and if lower header(s) bolts are not removed prior to use.

NOTICE

See the IFB and VIFB coil unit manufacturer's IOM for additional piping details. A custom IOM is created for each AcuAir order and the IFB and VIFB coil unit manufacturer's information is included in this document that is available after the air handler is built and shipped.

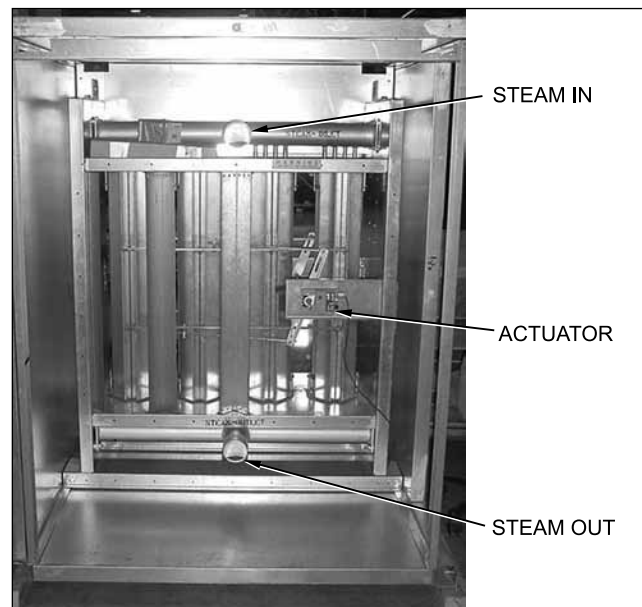


Figure 35 – Vertical Integral Face and Bypass Coil (Face-Mounted Actuator Shown)

Shipping Bolts (VIFB Only)

Headers, whether return steam condensate or hot water supply and return, are securely bolted to lower mounting brackets to prevent damage to header and tubes during shipment and piping of the coils. These bolts **MUST** be removed before applying steam or hot water but after all piping connections are made.

Piping Suggestions (VIFB and IFB)

NOTICE

See "Field Penetrations for Piping and Electrical Connections."

Steam and hot water field piping must be supported separately after the flexible connector to isolate piping strains and additional expansion from the coils.

Internal steam manifolds and piping should be insulated.

Steam traps should be sized for three times the calculated condensate loading at the coil design conditions. The calculation should be based on the pressure differential across the trap, **not the boiler pressure**. Traps should be of types that pass condensate and vapor at saturated steam temperature. Inverted bucket traps should incorporate thermostatic air vents.

Make return connection full size as required and reduce only at trap. Do not use reducing bushing on coil return connection.

Flexible Connectors (VIFB Only)

Return steam condensate headers, hot water supply, and return headers must be free to float. A flexible connector **MUST** be installed as close as possible to the coil to accommodate a minimum of 1/2" expansion movement of the headers.

Failure to install connectors will restrict expansion of the headers. This can result in bowing of tubes, bending of fins, interference with damper operation, or eventually tube breakage.

Freezing Conditions

NOTICE

Antistratification baffles are standard on all IFB and VIFB coils mounted in units.

The outside air and return air must be thoroughly mixed before passing over the coil. When air below 32°F enters only part of the coil, it creates a greater hazard than when the airflow entering the coil is of a uniform temperature.

Coils used in series with respect to the airflow must have individual controls with ample space between the coils for sensing devices, when required. Coils with two or more rows are more sensitive to freezing than single row coils.

On 100% O.A. capable applications, locate low limit at least 24" downstream of leaving edge of VIFB/IFB casing. Low limit element must cross both face and bypass areas, parallel to headers.

FIELD PENETRATIONS FOR PIPING AND ELECTRICAL CONNECTIONS

⚠ WARNING

Use only metal cutting hole saws and/or blades to make penetrations thru panels. Never use a cutting torch due to foam insulation.

NOTICE

For small sizes such as 1/2" iron pipe, 1/2" conduit or 5/8" O.D. copper and smaller; it is acceptable to use caulk instead of a grommet.

NOTICE

Electrical conduits must be sealed internally to prevent airflow and moisture condensation.

Tools Required

- Drill motor.
- Pilot starter bit.
- Hole saws—approximately 2½", 3¼" & 4½" diameter for holes.
- Power cords as required.

Material Required

- Neoprene grommet, 2½", 3¼", 4½" or 5½" as required.
- Cold galvanized paint.
- Touchup spray paint, champagne, P/N 044-03504-000 (for outdoor unit exterior only).
- Caulk, P/N 013-03317-050 aluminum gray or 013-03317-040 for outdoor units with champagne paint.
- X-acto® knife.
- Clean up supplies.

Procedure

See Figure 36 - Penetration Details.

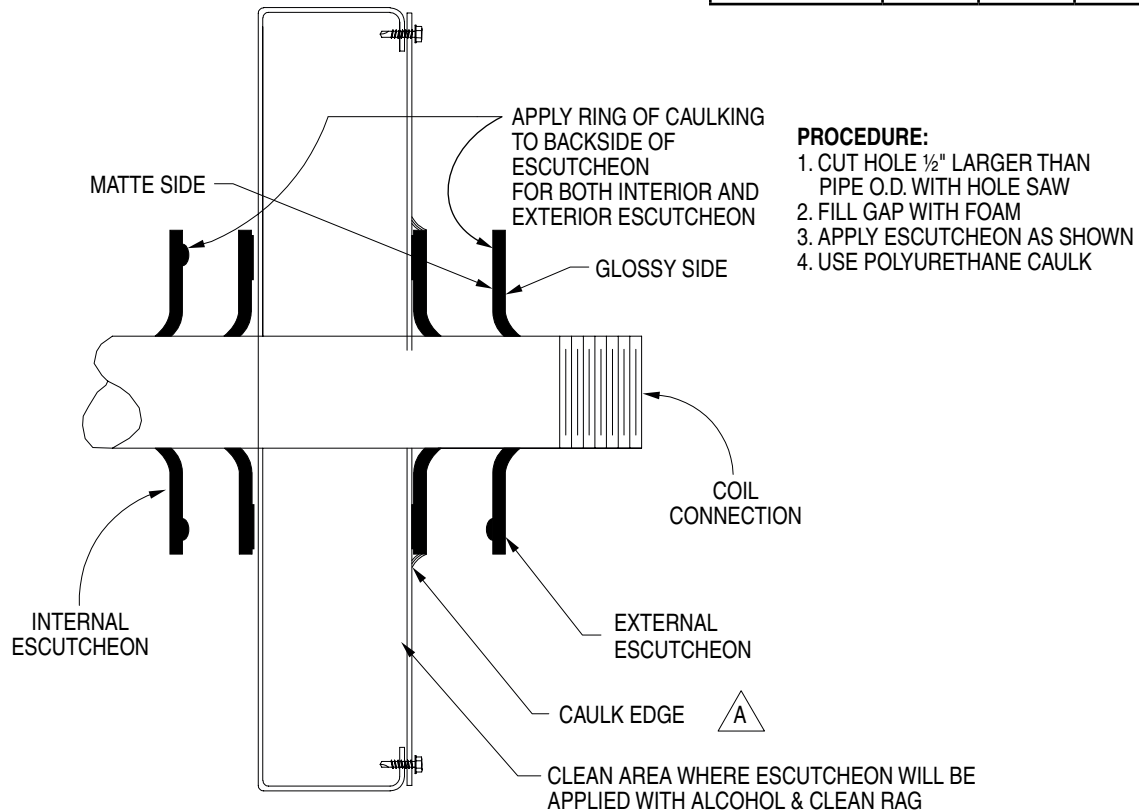
1. Make sure any components; bulkheads or other obstructions are disconnected from panel inside and out.
2. Layout location and dimensions of hole opening to be cut. Do this on both sides of double wall panels.
3. Carefully cut correct hole size for the application in panel, ensuring cuts on both sides line up and a smooth clean cut is made.
4. Paint raw edges of sheet metal with cold galvanized paint.
5. Select appropriate grommet for new panel hole and cut out appropriate hole diameter for penetration with an X-acto knife.
6. After paint dries, install grommet into panel hole opening.
7. Apply sealant all around new hole opening behind lip of grommet, on both sides of panel.
8. Run pipe or conduit through grommet and make appropriate connections.

9. All modified panels must provide integrity equal to original equipment specifications.
10. Reconnect any components, bulkheads or other fixtures that were disconnected from panel in step # 1.
11. Thoroughly clean up inside and outside air unit.

WATER & STEAM COILS		
NOMINAL PIPE SIZE	ESCUTCHEON DIMENSIONS	
	O.D.	I.D.
0.50	3.0	0.550
0.75	3.0	0.815
1.00	3.0	0.815
1.50	6.0	1.400
2.00	6.0	1.875
2.50	6.0	2.375
3.00	6.0	3.000
4.00	7.0	4.000

DX/REFRIGERANT COILS		
CONNECTION SIZE	ESCUTCHEON DIMENSIONS	
	O.D.	I.D.
0.500	3.0	0.175
0.625	3.0	0.550
0.875	3.0	0.550
1.125	3.0	0.815
1.375	3.0	1.000
1.625	6.0	1.315
2.125	6.0	1.875
2.625	6.0	2.375
3.125	6.0	2.875

ESCUTCHEON			
JCI PART NO.	O.D.	I.D.	THICKNESS
028 14910 001	3.0	0.175	0.125
028 14910 002	3.0	0.550	0.125
028 14910 003	3.0	0.815	0.125
028 14910 004	3.0	1.000	0.125
028 14910 005	6.0	1.315	0.125
028 14910 006	6.0	—	0.125
028 14910 007	6.0	1.400	0.125
028 14910 008	6.0	1.875	0.125
028 14910 009	6.0	2.375	0.125
028 14910 010	6.0	2.875	0.125
028 14910 011	6.0	3.000	0.125
028 14910 012	7.0	4.000	0.125



PART	PART NUMBER
Caulking Gray	013-03317-050
Champagne	013-03317-040
Champagne Touch-up Spray Paint	044-03504-000

⚠ WARNING

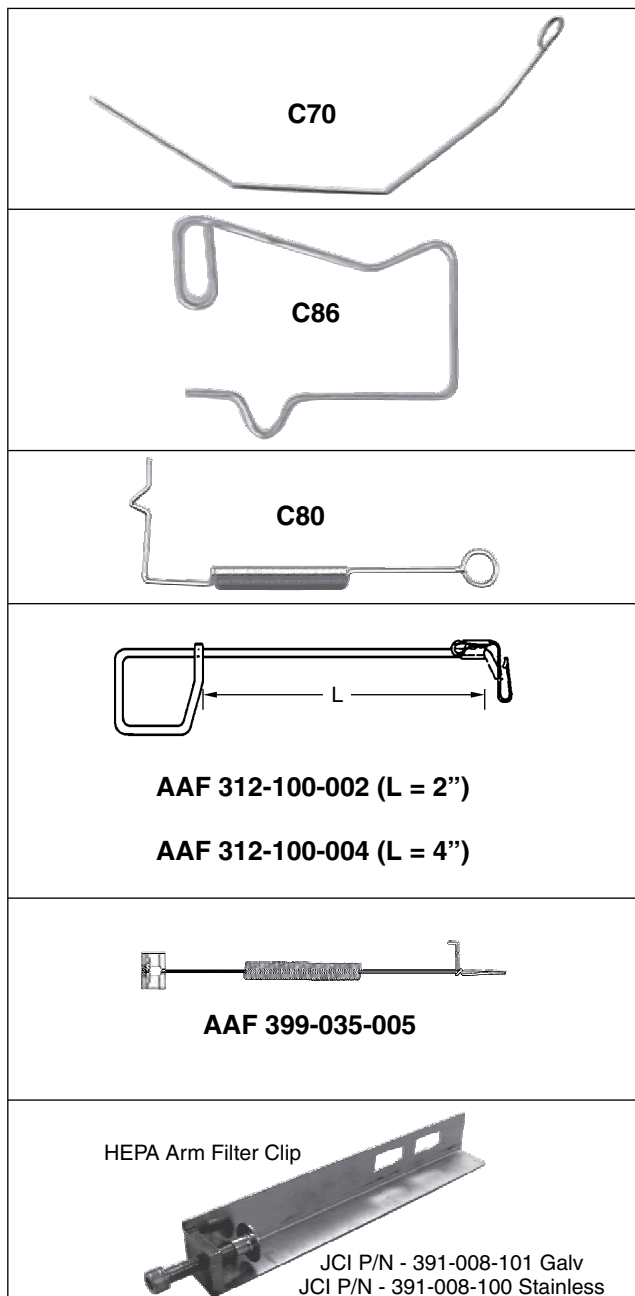
Use only metal cutting hole saws and/or blades to make penetrations through panels. Never use a cutting torch due to foam insulation.

Figure 36 – Penetrations Details

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FILTER LATCHES



Use with a 2" pleated panel filter (prefilter) or with a single header (SH) rigid filter (final Filter), either one installed in a standard type 8 filter frame.

Use with a 4" pleated panel filter (Prefilter) installed in a standard type 8 filter frame.

Use with a 12" DH Double Headered Rigid Filter installed in a standard type 8 filter frame.

Use with a 2" pleated panel (pre)filter in a smooth (notch free) type 8 style filter rack.

Use with a 4" pleated panel (pre)filter in a smooth (notch free) type 8 style filter rack.

Use with a 12" rigid DH (final)filter in a smooth (notch free) type 8 style filter rack.

Used to attach HEPA Filters to Holding Frame.

NOTICE
Typically when filters are supplied by others, so are the filter clips.

Figure 37 - Filter Latches

ACUAIR SINGLE FILTER APPLICATION (NON HEPA FILTER)

Filter Holding Clips to be used with Filter Styles	2" Pleated Panel Prefilter	4" Pleated Panel Prefilter	12" Rigid Final Filter - Single Header Style	12" Rigid Final Filter - Double Header Style
C70	X		X	
C86		X		
C80				X

Filter, Clip, and Frame Description	AAF Part Number	JCI Part Number
Filter Holding Clips		
C70 Stainless Steel	AAF 315-004-003	JCI 026-35778-000
2" SS Knock-on Clip*	AAF 312-100-002	<i>Special Order</i>
C86 Galvanized	AAF 315-004-000	JCI 026-35778-007
C86 Stainless Steel	AAF 315-004-100	JCI 026-35778-024
4" SS knock-on Clip*	AAF 312-100-004	<i>Special Order</i>
C80 Galvanized	AAF 315-004-001	JCI 026-35778-006
C80 Stainless Steel	AAF 315-004-101	JCI 026-35778-023
12" SS knock-on Clip**	AAF 399-035-005	<i>Special Order</i>
Type 8 Filter Frames		
Notchless frames require knock-on clips		
12" X 24"-16 ga. Galvanized	AAF 312-600-600	JCI 026-3577-000
12" X 24"-18 ga. Stainless Steel	AAF 312-600-100	JCI 026-35777-010
12" X 24"-18 ga. SS Notchless	AAF 399-035-005***	<i>Special Order</i>
24" X 24"-16 ga. Galvanized	AAF 312-600-606	JCI 026-35777-006
24" X 24"-18 ga. Stainless Steel	AAF 312-600-106	JCI 026-35777-016
24" X 24"-18 ga. SS Notchless	AAF 399-035-005***	<i>Special Order</i>
MERV 7 Pleated		
Filters are Designated: Width x Height x Depth		
12" X 24" X 2"	AAF 140-102-319	<i>Special Order</i>
24" X 24" X 2"	AAF 140-102-863	<i>Special Order</i>
12" X 24" X 4"	AAF 140-104-319	JCI 026-35723-001
24" X 24" X 4"	AAF 140-104-863	JCI 026-35723-008
MERV 8 Pleated		
Filters are Designated: Width x Height x Depth		
12" X 24" X 2"	AAF 148-802-319	JCI 026-35728-212
24" X 24" X 2"	AAF 148-802-863	JCI 026-35728-224
12" X 24" X 4"	AAF 148-804-319	JCI 026-35728-412
24" X 24" X 4"	AAF 148-804-863	JCI 026-35728-424
MERV 13 Mini-Pleat		
Filters are Designated: Width x Height x Depth		
12" X 24" X 4"	AAF 332-510-001	JCI 026-32410-008
24" X 24" X 4"	AAF 332-510-008	JCI 026-32410-014
Filters are Designated: Width x Height x Depth		
MERV 13 Rigid		
Single Header = SH, Double Header = DH		
12" X 24" X 12" SH	AAF 331-765-150	JCI 026-32404-003
24" X 12" X 12" SH	Same as above	Same as above
24" X 24" X 12" SH	AAF 331-765-148	JCI 026-32404-010
12" X 24" X 12" DH	AAF 331-300-108	JCI 026-35730-001
24" X 12" X 12" DH	Same as above	Same as above
24" X 24" X 12" DH	AAF 331-300-107	JCI 026-35730-007
MERV 14 Rigid		
Single Header = SH, Double Header = DH		
12" X 24" X 12" SH	AAF 331-946-150	JCI 026-32404-009
24" X 12" X 12" SH	Same as above	Same as above
24" X 24" X 12" SH	AAF 331-946-148	JCI 026-32404-011
12" X 24" X 12" DH	AAF 331-300-102	JCI 026-35731-001
24" X 12" X 12" DH	Same as above	Same as above
24" X 24" X 12" DH	AAF 331-300-101	JCI 026-35731-007

NOTICE
Typically when filters are supplied by others, so are the filter clips.

NOTICE
Filter Pleats Must Be Installed Vertically When Possible

Single Header



Double Header

- * Clip part is SS, not latch wire
- ** Total SS Construction; Product description must follow p/n for entry.
- *** Product description and size must follow p/n for entry.

HEPA FILTER APPLICATION

Filter and Frame Description	AAF Part Number	JCI Part Number
AcuAir HEPA Filter Frames	Filter Frame Is Designated: Height X Width	
24" X 24"-14 ga. Galvanized	AAF 312-400-003	JCI 026-35789-001
24" X 12"-14 ga. Galvanized	AAF 312-400-004	JCI 026-35789-002
12" X 24"-14 ga. Galvanized	AAF 312-400-005	JCI 026-35789-003
24" X 24"-14 ga. Stainless Steel	AAF 312-401-003	JCI 026-35790-001
24" X 12"-14 ga. Stainless Steel	AAF 312-401-004	JCI 026-35790-002
12" X 24"-14 ga. Stainless Steel	AAF 312-401-005	JCI 026-35790-003
99.97% HCX Hepa, Galv.	Filters are Designated: Height x Width x Depth (H x W x D - Opposite of Ashrae dims) Filter Pleats Must Be Installed Vertically	
23.375" X 23.375" X 11.5"	AAF 905-000-029	<i>Special Order</i>
23.375" X 11.375" X 11.5"	AAF 92A20H1T2A0	<i>Special Order</i>
11.375" X 23.375" X 11.5"	AAF 91A20H1T2A0	<i>Special Order</i>
99.99% HCX Hepa, Galv.	Filters are Designated: Height x Width x Depth (H x W x D - Opposite of Ashrae dims) Filter Pleats Must Be Installed Vertically	
23.375" X 23.375" X 11.5"	AAF 905-000-128	<i>Special Order</i>
23.375" X 11.375" X 11.5"	AAF 92A20H1T2H0	<i>Special Order</i>
11.375" X 23.375" X 11.5"	AAF 91A20H1T2H0	<i>Special Order</i>
Non-HEPA Filters in HEPA Frames		
MERV 13 Rigid w/ Gasket ALS	Filters are Designated: Width x Height x Depth Filter Pleats Must Be Installed Vertically When Possible	
24" X 24" X 12" DH	AAF 331-300-107-GL	<i>Special Order</i>
12" X 24" X 12" DH	AAF 331-300-108-GL	<i>Special Order</i>
MERV 14 Rigid w/ Gasket ALS	Filters are Designated: Width x Height x Depth Filter Pleats Must Be Installed Vertically When Possible	
24" X 24" X 12" DH	AAF 331-300-101-GL	<i>Special Order</i>
12" X 24" X 12" DH	AAF 331-300-102-GL	<i>Special Order</i>

NOTICE

HEPA Filters must always be installed with the pleats oriented vertically

NOTICE

Non-HEPA Filters should be installed with the pleats oriented vertically whenever possible

INSTALLATION OF 2" PLEATED PANEL (PRE)FILTERS

⚠ CAUTION

Care should be taken to prevent contamination of the filter media prior to placement in the filter racks. Fresh filters should never be placed on dirty surfaces such as roofs or floors.

These instructions are for installing 2" panel filters into type 8 holding frames.

- Latches needed for these applications are four (4) clips as indicated in the **ACUAIR SINGLE FILTER APPLICATION** table.
- A single latch should be installed at each of the four (4) corners of the frame.
- The latch fits into the set of knockouts, which consists of two (2) rows of three (3) knockouts. The row of knockouts closest to the gasketing should be used for nominal 1" filters or filters with a 13/16" single header. The second set of knockouts should be used for nominal 2" filters.

Installation of Spring Latches

1. Insert the straight end of the latch between the two (2) knockouts furthest from the corner.
2. Using a moderate amount of pressure, force the latch over the third knockout.
3. The latch installation should now be complete. The latch should now be "trapped" within the three (3) knockouts, but should be able to freely rotate (see Figure 38). Repeat the installation process with the remaining latches in the other three corners.

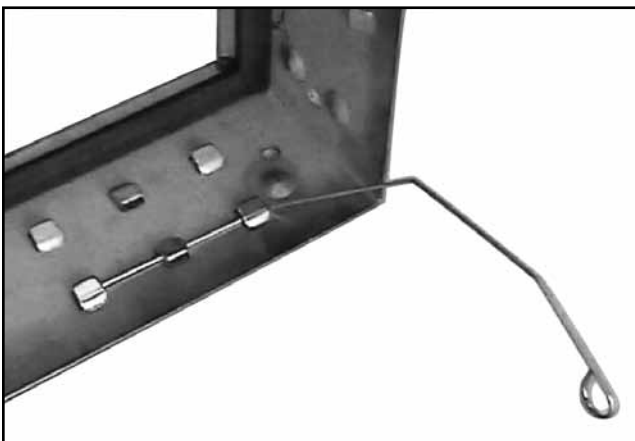


Figure 38 – Correctly installed latch; AAF 315-004-003 shown as an example.

4. Rotate all of the latches outward, and insert the filter into the frame making certain that the pleats run vertical.
5. After the filter has been placed into the frame, grasp the circular end of the latch and rotate it across the corner of the filter.

Push the end of the latch towards the filter, until the latch catches beneath the knockout on the frame.

Repeat for the remaining latches.

6. The filter should now be securely installed into the frame (see Figure 39).

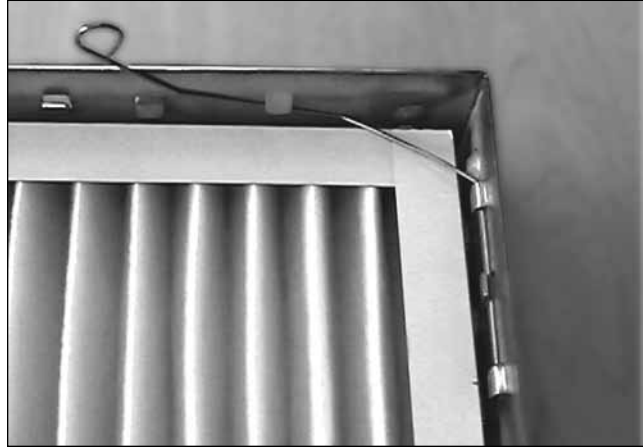


Figure 39 – Fully installed filter

INSTALLATION OF 4" PLEATED PANEL (PRE)FILTERS

These instructions are for installing 4" panel filters into type 8 holding frames.

- Latches needed for these applications are four (4) clips as indicated in the table on page 32.
- A single latch should be installed at each of the four (4) corners of the frame.
- The latch fits into the set of knockouts, which consists of two (2) rows of three (3) knockouts. The row of knockouts closest to the gasketing should be used for filters with a 13/16" single header in combination with a nominal 2" prefilter. The second set of knockouts should be used for nominal 4" filters.

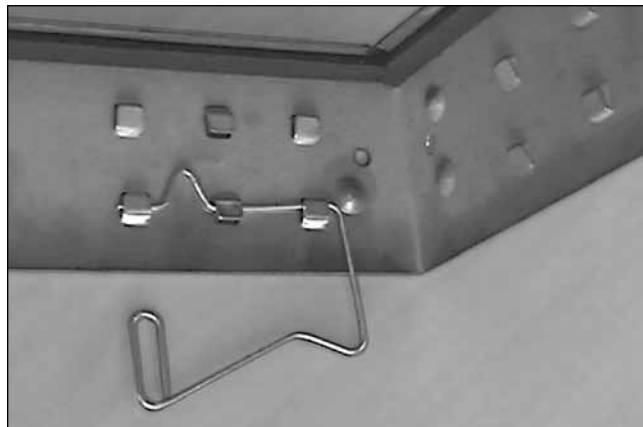


Figure 40 – Correctly installed latch AAF 315-004-000 shown as an example

Installation of Spring Latches

1. Insert the straight end of the latch between the two (2) knockouts furthest from the corner.
2. Using a moderate amount of pressure, force the latch over the third knockout.

Repeat the installation process with the remaining latches.

4. Insert the filter into the frame making sure that the pleats are vertical.

5. After the filter has been placed into the frame, grasp the loose end of the latch and place it over the filter frame, so that the latch secures the filter into the frame (see Figure 41).

Repeat for the remaining latches.

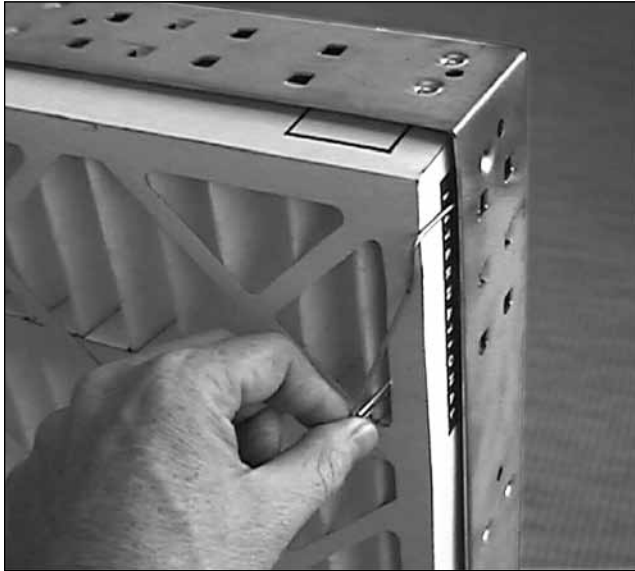


Figure 41 – Place the end of the latch over the filter frame, securing the filter to the frame.

6. The filter should now be securely installed into the frame (see Figure 42).

INSTALLATION OF SH SINGLE HEADERED FILTERS

These instructions are for installing single-header rigid filters into type 8 holding frames.

⚠ CAUTION

Care should be taken to prevent contamination of the filter media prior to placement in the filter racks. Fresh filters should never be placed on dirty surfaces such as roofs or floors.

- Latches needed for these applications are four (4) clips as indicated in the table on page 32.
- A single latch should be installed at each of the four (4) corners of the frame.
- The latch fits into the set of knockouts, which consists of two (2) rows of three (3) knockouts. The row of knockouts closest to the gasketing should be used for nominal 1" filters or filters with a 13/16" single header. The second set of knockouts should be used for nominal 2" filters.

Installation of Latches

1. Insert the straight end of the latch between the two (2) knockouts furthest from the corner.
2. Using a moderate amount of pressure, force the latch over the third knockout.

3. The latch installation should now be complete. The latch should now be "trapped" within the three (3) knockouts, but should be able to freely rotate.

Repeat the installation process with the remaining latches.

4. Rotate all of the latches outward, and insert the SH filter into the frame. The bulk of the filter should be inserted through the frame, protruding out the backside. Only the header of the filter should be contacting the flange of the frame.

5. After the filter has been placed into the frame, grasp the circular end of the latch and rotate it across the corner of the filter.

Push the end of the latch towards the filter, until the latch catches beneath the knockout on the frame.

Repeat for the remaining latches.



Figure 42 – Fully installed filter

6. The filter should now be securely installed into the frame (see Figure 42).

INSTALLATION OF A RIGID DH DOUBLE-HEADERED FILTER

These instructions are for the installation of a Rigid DH Double-Headered filter (nominal 12" deep double header) into a type 8 holding frame.

- The latches needed for this application are four (4) clips as indicated in the table on page 32.
- Two latches should be attached on each side of the frame.
- The latches should only be installed, two (2) per side of the frame. There should be no latches used on the top or bottom. This is done to match the holes in the filter frame, used to secure the latch to the filter. See Figure 43 for the sets of knockouts that should be used for the latches.

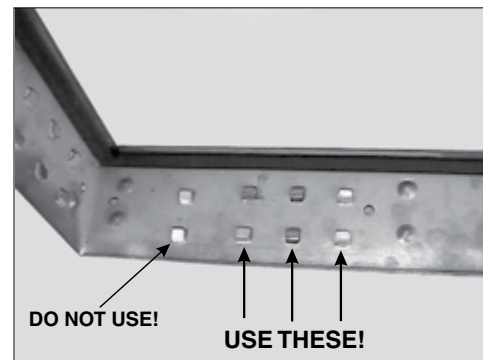


Figure 43 – Correct Use of Knockouts

Installation of Spring Latches

1. Insert the straight end of the latch between the knockouts furthest from the corner.
2. Using a moderate amount of pressure, force the latch over the third knockout.
3. The latch installation should now be complete. The latch should now be "trapped" within the three (3) knockouts.



Figure 44 – Correct latch/knockout configuration.

4. Repeat the latch installation with the remaining latches. **Note the orientation of the latch to the knockouts in Figure 44.**

After the latches have been installed, the frame should be configured like that shown in Figure 45.



Figure 45 – Frame with 4 latches installed.

5. Insert the rigid DH filter into the frame. While holding the filter in the frame, grasp the loop on the end of the latch and pull it until it stretches over the header and rests into the pre-drilled hole in the header of the filter (see Figure 46). Repeat this with the remaining latches.

6. The filter should now be securely installed into the frame.



Figure 46 – Spring latch should be pulled and fastened in hole in the header of the filter.

⚠ CAUTION

Care should be taken to prevent contamination of the filter media prior to placement in the filter racks. Fresh filters should never be placed on dirty surfaces such as roofs or floors.

⚠ CAUTION

Pleated filters must be installed with the pleats running vertical whenever possible.

NOTICE

The frame contains 2 latches per side, none on the top or bottom.

HEPA FILTERS

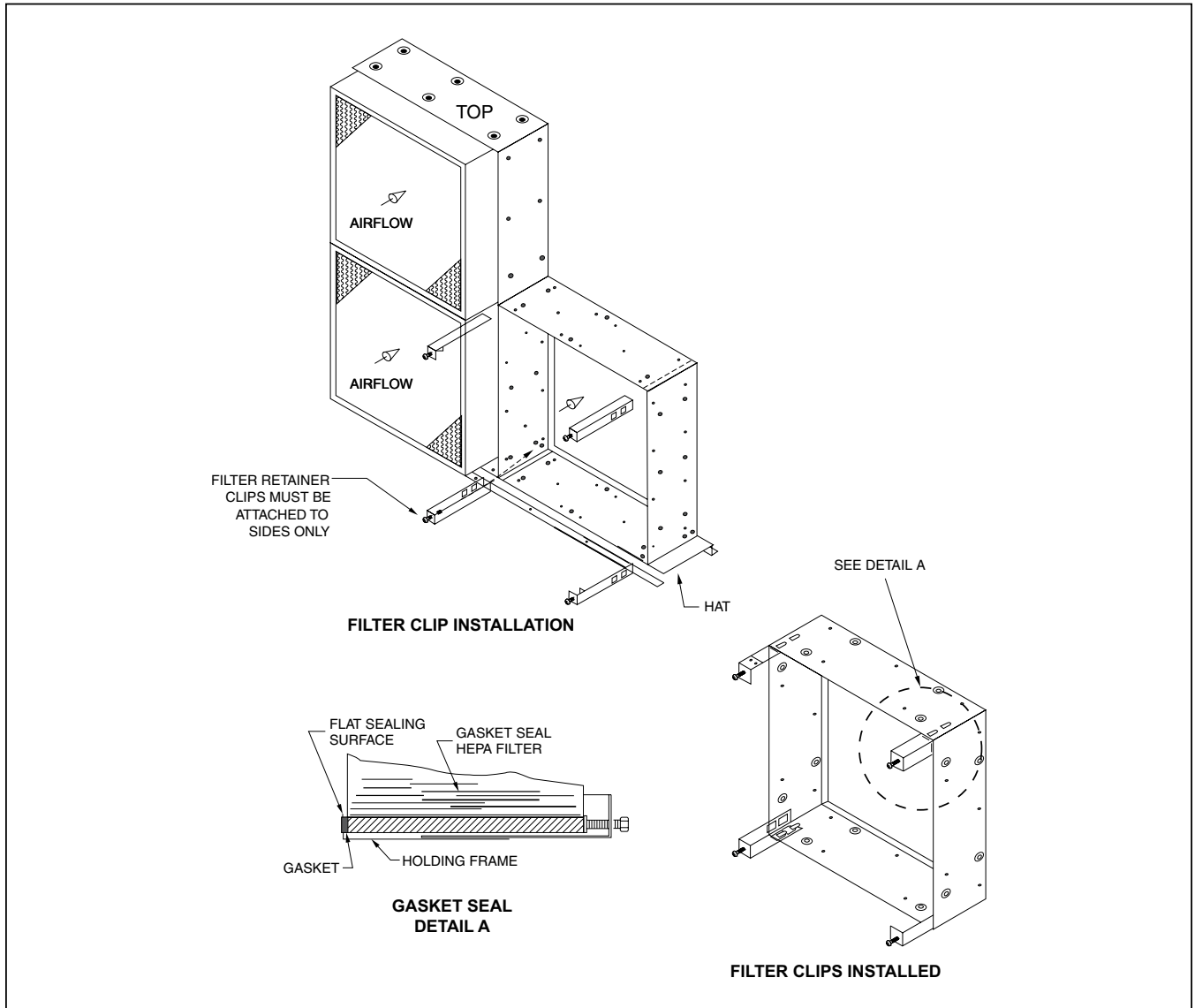


Figure 47 – Installation of Hepa Filters

High-efficiency particulate air (HEPA) filters are installed in hygienic air units when extreme control of discharge airborne particles is required. These filters are rated on the percentage of 3 micron size particulates they capture. In order to achieve the desired filtration success the filter manufacturer checks each filter for integrity prior to shipment.

For ultimate success, the HEPA filters must be handled properly, installed correctly and the final installation verified.

1. HEPA filters must be handled such that neither the air entering nor the air leaving side of the filters are subjected to poking pressures. Sharp objects may directly compromise the filtration media. General concentrated pressure may compromise the media by forcing it against the internal aluminum pleat separators.

If unprotected HEPA filters are placed on dirty surfaces prior to installing them in the AcuAir unit filter frames they become subjected to unnecessary contamination and possibly long term hygienic compromise.

2. In order for HEPA filtration to properly control discharge air particulate count bypass air must be eliminated. AcuAir HEPA filters include gaskets to seal between the filter and the filter rack. During the installation process it is important to verify the cleanliness of both the gasket and the filter frame to assure a continuous seal.

HEPA filters must be installed with the filter pleats running vertically. Contrary to the installation of other rigid filters where vertical pleats are a best practice, for HEPA filters this orientation is a must.

3. Although the HEPA filter manufacture inspects every HEPA filter prior to leaving the factory, it is necessary to scan HEPA filters after installation to verify that there are no pinhole leaks and no bypass air. Most pinhole leaks and bypass holes can be repaired in the field.

Start-up

Before attempting to start up and operate any electrical cooling equipment such as an AcuAir® system unit, it is essential that all personnel associated with it have a basic knowledge of how and why the unit operates in normal conditions. The following description outlines a standard unit's general features, operation, and controls.

An AcuAir® system (Hygienic air unit) is an engineered heat transfer device that provides some or all of the listed functions: cooling, dehumidification, pressurization, filtration, heating, exhaust, and condensation control. Each unit is engineered and designed for a specific application.

Safeties and controls vary with each AcuAir® system installation and may be interfaced with ancillary equipment or system controls. All operators should be thoroughly trained in an integrated cooling system's sequence of operations and safeties.

INITIAL START-UP

After installation of the AcuAir unit, controls and necessary ancillary and auxiliary equipment, the entire system should be verified before placing the hygienic system on-line for the first time. Specifically, the following prestart measures must be completed to ensure the readiness of the AcuAir system.

NOTICE

Do not attempt any inspection or maintenance unless the electrical supply has been completely disconnected and locked out.

Inspection

Do not start the unit until the following inspections verify operational readiness. Avoid accidents or equipment failure by rectifying any unsatisfactory condition.

- Inspect general condition of unit, e.g., structural integrity, anchors/supports, etc.
- Confirm that all conduit openings through the walls of the AcuAir unit, as well as conduit openings into electrical panels, are sealed with electrical putty.
- Confirm drive assembly condition and alignment of motor, bearings/collars, and fan/shaft.
- Confirm proper belt condition and tension. (See **Maintenance** section)
- Verify there are no obstructions at the fans and fan guards.
- Verify the correct rotation of the fans.
- Understand and prepare for first 24 hour operation measures e.g., new belt run-in procedures. (See **New Belt Run-in** section)
- Understand and prepare the unit prestart-up checklist. See Appendix A for the prestart-up form.

Blower, Motor, Drives

1. Mechanical Tightness

- a. Verify tightness of fan bearing bolts.
- b. Verify tightness of blower wheels to shafts.

- c. Verify tightness of blower, motor, and sheave.
- d. Verify tightness of all motor mounting bolts.

2. Belt Tension

- a. Adjust belt tension if slipping is evident.
- b. Verify belt tension after 50 hours of operation and again after 100 hours of operation.

NEW BELT RUN-IN

During initial start-up of new belts, a belt run-in procedure is recommended. During start-up, follow these instructions:

1. Listen and look for unusual noise or vibration.
2. After shutting down and locking out the starter, check the bearings and motor. If they feel hot, the belt tension may be too tight.
3. Run the drive under full load for 24 hours of continuous operation. Running the belts under full load allows them to seat themselves into the grooves.
4. After running the drive, verify the tension of the belts. Re-tension to the recommended values.

This run-in procedure will reduce the future need for re-tensioning and will help extend the life of the belts.

CONTROL DAMPERS INSTALLATION, OPERATION, AND MAINTENANCE

1. Location – Wall or panel openings for dampers must be properly sized. Do not force a factory damper into undersized field ductwork or attempt to fill an oversized opening. This will bend the frames causing air leakage. Dampers must also be installed plumb and square. Twisted and distorted frames develop stresses causing linkage to bind and correlating improper blade operation. All control damper seams must be caulked air and watertight.

2. Obstructions – Configuration of damper frames permits the use of screws, rivets, or welding to attach damper(s) to ducts or housings. Fastener ends must not protrude in any way, which can interfere with blade movement. Correctly mounted dampers allow free and smooth operation from completely closed to fully open.

3. Multiple Assemblies – Where dampers consist of more than one section, sections are mounted together to form larger damper assemblies. Matching frame members must be tightly welded or bolted together in the field. Multiple sections require additional structural support (provided on site by others) to ensure complete rigidity. Horizontally mounted dampers may sag unless supported adequately. Blade motion is transmitted between adjacent panels by common blade shaft couplings and jackshafts. It is important that all shafts are accurately aligned, otherwise blade edges will bind and prevent a good seal.

4. Actuators – Operation of dampers may be manual using locking quadrant handles, chain operators or other devices. For automatic operation, electric or pneumatic actuators can be connected to dampers either internally or externally. Dampers constructed with multiple panels require individual actuators or jackshafts. Actuators or multiple actuators should be of adequate torque capacity to effectively open and close the damper according to its type, size, location, and

its function in the system (relative to air velocity and static pressure requirements).

5. Lubrication – Before initial operation, all moving parts of dampers should be first cleaned and then thoroughly lubricated. Dampers furnished with stainless steel side seals should also have the seals lubricated generously. Dampers should then be manually operated several times until linkages and blades operate freely.

Filters

The AcuAir unit is supplied with all filter racks in place. The filters and filter clips are shipped separately, direct from the filter supplier. Once the unit is completely installed and thoroughly cleaned, the prefilters and final filters should be installed in their respective holding frames. Once the final filters have been installed, the final filter section and the supply air ductwork should be cleaned and sanitized.

On units equipped with final filters, a final filter pressure gauge is shipped mounted. The high-pressure tube is connected to the gauge at the factory. *The secondary port on the gauge needs to be field routed to the ductwork downstream of the final filters using the tubing supplied.*

Cooling Coils

All refrigeration coils must be evacuated to remove moisture prior to charging. Do not leave system or coils open and idle prior to start-up. Internal corrosive damage can result.

Make sure piping is properly supported. Evaporators are not designed to support external piping. Evaporator piping and distributor tubing is not to be used for support or stepped on during the construction process.

The use of threading compounds at coil flanges with particles of metals (i.e. copper) embedded in the compounds can cause corrosion due to contact of dissimilar metals. Verify the compatibility of your construction materials with the coil material of construction.

Refrigerant sensing devices should be employed in the hygienic air system. These sensors should be selected and located based on the refrigerant within the system. When the refrigerant is ammonia, the sensors work well when placed inside the AcuAir unit immediately downstream of the cooling coil.

Examine your environment. If structure, equipment, or other elements of your facility show rust or corrosive effects, the evaporator coils are not likely to be impervious to the same effects of the environment. Consider this when formulating your maintenance program.

GAS HEAT START-UP

1. Close the manual gas shutoff valve external to the burner.
2. Turn off the electrical power to the furnace.
3. Set the temperature to the lowest possible setting.
4. Set the burner controls to the OFF position.
5. Wait five minutes to clear out any gas. Then smell for gas, including near the floor.
6. Set the burner controls to the ON position.

7. Close the door on the front of the gas manifold.
8. Open the manual gas valve external to the furnace.
9. Turn on the electrical power supply to the furnace.
10. Set the controls to the desired temperature.

NOTICE

This heater is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

NOTICE

There is an approximate 30 second delay between controls energizing and burner firing.

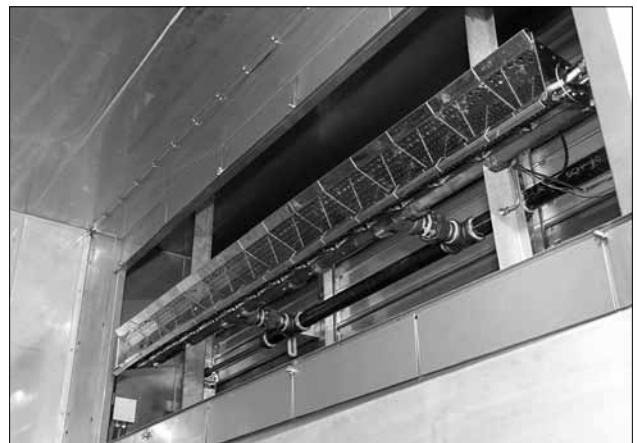


Figure 48 - AcuAir Direct Fired Gas Burner

GAS HEAT SHUTDOWN

1. Set the controls to lowest setting.
2. Turn off the electrical power supply to the furnace.
3. Set the burner controls to the OFF position.
4. Close the manual gas shutoff valve external to the furnace.



Figure 49 - AcuAir Gas Burner Wrapper

24-Hour Run-In

After 24 hours of operation under load, the following services should be performed:

1. Examine the unit for any unusual noise or vibration.
2. Readjust fan belt tension if required.

START-UP AFTER PROLONGED SHUTDOWN

It is imperative that maintenance personnel conduct a thorough start-up before running the unit after a prolonged shutdown.

At minimum, the following checks must be performed:

1. Clean any debris from guards, fans, eliminators, heat transfer coils, and filters.
2. Turn the fan(s) by hand to ensure rotation without obstruction.
3. Verify and, if necessary, adjust the fan belt tension. (See **Belt Replacement and Tensioning** section)
4. Prior to start-up, lubricate the fan shaft and motor bearings. The ball bearings are factory lubricated, but should be relubricated if the unit has been sitting on site for more than a year before start-up.
5. Check the locking collar on each fan shaft bearing and tighten if necessary.
6. Verify the voltage and current of all three legs of the fan motors. The current should not exceed the rated service factor. After prolonged shutdowns, the motor insulation should be checked with a Megger Tester prior to restarting the motors.
7. Start the fan(s) and verify proper rotation as indicated by sticker on unit.

MAINTENANCE

DAILY OPERATION AND ROUTINE MAINTENANCE

The unit should be inspected, cleaned, and lubricated on a periodic basis. The required services and recommended frequency for each are summarized in the Operation and Maintenance Schedule in this manual.

A daily AcuAir® system operations log is a good method to assure that no problems develop that may go unchecked. Entries to this log should be made once each shift. Any notations should be entered as they occur (or internal policy dictates). It is essential that the maintenance manager examine notations (from the previous 24 hours) on a daily basis.

As weather and safety dictate, a visual check of the AcuAir® unit should be made once each shift (daily at a minimum) to examine operating conditions. Unusual leaks, noise, vibration, part damage/failures, or vandalism should be logged and investigated immediately. Corrective action should be initiated immediately.

Components of the AcuAir unit should also be part of the daily operational checks for the AcuAir® system unit. In particular, filtration performance is important to satisfactory and problem-free AcuAir® system unit operation.

COIL MAINTENANCE

An AcuAir® air unit's operational readiness is dependent on the condition of the coil. Coils that are dirty, blocked from airflow, or physically damaged may affect overall heat transfer capability of the AcuAir® system to a significant degree.

Periodically conduct a visual inspection of the coil section and refrigerant line connections. Remove any airborne debris that may have collected on the face of the coils themselves.

Refrigerant could share the air stream with food products and personnel. As such, proper maintenance of coils, to prevent corrosion and leaks, is essential to prevent product loss and to ensure the safety of plant personnel.

A typical refrigerated food processing facility sparkles with stainless steel food contact surfaces and clean work spaces. However, evaporators that are suspended overhead, trapping airborne contaminants and corrosive elements in the coils, are usually not so sparkly. **Dirty coils are unsanitary. They must be cleaned regularly with simple, gentle, wash and rinse procedures.**

For all coils, chlorine-based cleansing solutions, acidic cleansing solutions and highly alkaline cleansing solutions are hazardous to the coil's integrity. Use a mildly alkaline cleanser. Consult with your chemical supplier and read the Material Safety Data Sheet for your cleansing solution.

NOTICE

Air units move air (and airborne contaminants) across the coil. Protect the coil from corrosion by washing and rinsing frequently.

The water used to wash the coils should be analyzed prior to use to determine its suitability. It should not contain dissolved chemicals or organisms. Contact a specialist to test the water,

then follow his recommendations. Establish and follow a regular testing and treatment schedule.

Further need for cleaning or repair of an AcuAir® system coil should be left to the judgement of a certified or factory-trained service person. Contact the local AcuAir® representative if a coil or its connections appears to have been significantly damaged.

Do not allow ice buildup. If a coil remains partially frosted after a defrost, it is unlikely to ever completely clean itself in a subsequent defrost. If a coil is allowed to build ice into a solid block, the ice can cause stresses to develop which are capable of breaking coil tubes and piping.

CAUTION

NEVER take shortcuts to clear ice from a coil by applying an open flame to melt ice or frost.

DAMPER MAINTENANCE

1. General Maintenance – Dampers require proper maintenance in order to function correctly. Blade shafts, linkages, stainless steel side seals (if applicable) and other moving parts should be periodically cleaned and lubricated. A light molybdenum oil in aerosol cans is preferable since the jet nozzle permits pinpointing the stream of lubricant where required. It usually contains an evaporating solvent and dries to a nonoily film, which will not attract dirt. For dampers located in difficult or impossible to reach locations, field access panels/doors are required as installed by others.

2. Periodic Inspections – All automatic dampers should be checked and serviced on a regular schedule. The recommended interval is monthly and should never exceed three months. Malfunctioning dampers can lead to improper control of space temperatures, excessive infiltration, and increased energy costs.

3. Inspection Checklist – At a minimum, include the following items in scheduled inspections:

- Observe damper motors and actuators through an operating cycle to check for defects and binding. Inspect mounting bolts for integrity.
- Adjust actuator linkages so those dampers open and close fully for given stroke.
- Verify tightness of closed blades – readjust linkage for any blades that may not close fully.
- Replace any damaged blades – clean operating parts.
- Inspect blade edge and side seal – replace as necessary.
- Inspect pins, straps, bushings, etc., for wear and replace as required.
- Lubricate all moving part contact points and side seals.
- Inspect caulked joints between the damper frames and the main structure – repair if the possibility of air or water leakage exists.

FILTER MAINTENANCE

Both pre-filters and final filters should be visually inspected at regular intervals and should be replaced when they appear dirty or damaged. As a rule of thumb, filters should be replaced when the air pressure drop across them becomes double the pressure drop when newly installed.

Finish and Sealing

AcuAir® units utilize a food grade caulk for air and water sealing on the interior and exterior. The sealing on the units should be inspected and repaired as necessary.

NOTICE

It is important that food grade sealant be used when repairing or replacing unit caulking.

ELECTRICAL CONDUIT SEALING REQUIREMENT

The AcuAir hygienic unit has the potential to operate with internal air humidity and external ambient temperatures conducive to forming condensation. These factors make it important that measures be taken to eliminate risk of water and ice collecting where it has the potential to cause damage or faulty operation. Before initial start-up of the AcuAir hygienic unit a thorough inspection of all conduit openings should be made and any compromised openings resealed. Follow up inspections should be performed as indicated on the recommended maintenance schedule.

Sources of Water or Ice

Water may enter the inside of the electrical conduit and door switches by either of two methods: through unsealed conduit ends and flexible conduit pigtails prior to the AcuAir unit factory wiring being reconnected on site or by humidity migrating into unsealed conduits that are open to the inside the AcuAir enclosure. Humidity that migrates into an electrical conduit that is then exposed to outdoor temperatures below the dew point of the air will condense into water and drain to the lowest location possible. If those outdoor temperatures are cold enough this water may then turn into ice.

Remedy

In order to eliminate the collection of condensed water inside electrical conduit, panels and instrumentation it is very important that electrical conduit openings are adequately sealed. Each sealed opening restricts the further migration of humidity and the potential for water collection and damage.

The example in Figure 50 highlights the important locations for sealing electrical conduit. This representation is not to be considered all inclusive but rather a representation of the typical locations requiring sealing putty.

UNIT CLEANING AND SANITATION

The unit should be thoroughly cleaned at regular intervals. Your chemical supplier should be consulted when picking the proper cleaning chemicals.

CAUTION

DISCONNECT ALL ELECTRICAL POWER BEFORE CLEANING THE UNIT.

Before cleaning, any capped drain pipes should be uncapped, and motors should be draped with plastic. During cleaning, the following components should **NOT** be directly sprayed with water: Motors, Damper Motors, Bearings, Pitot Tubes, Filters, and Electronic Sensors.

NOTICE

High pressure water has the potential to dislodge caulk and sealing putty. It is important to thoroughly inspect all seam caulking and electrical conduit sealing putty following a sanitary wash down.

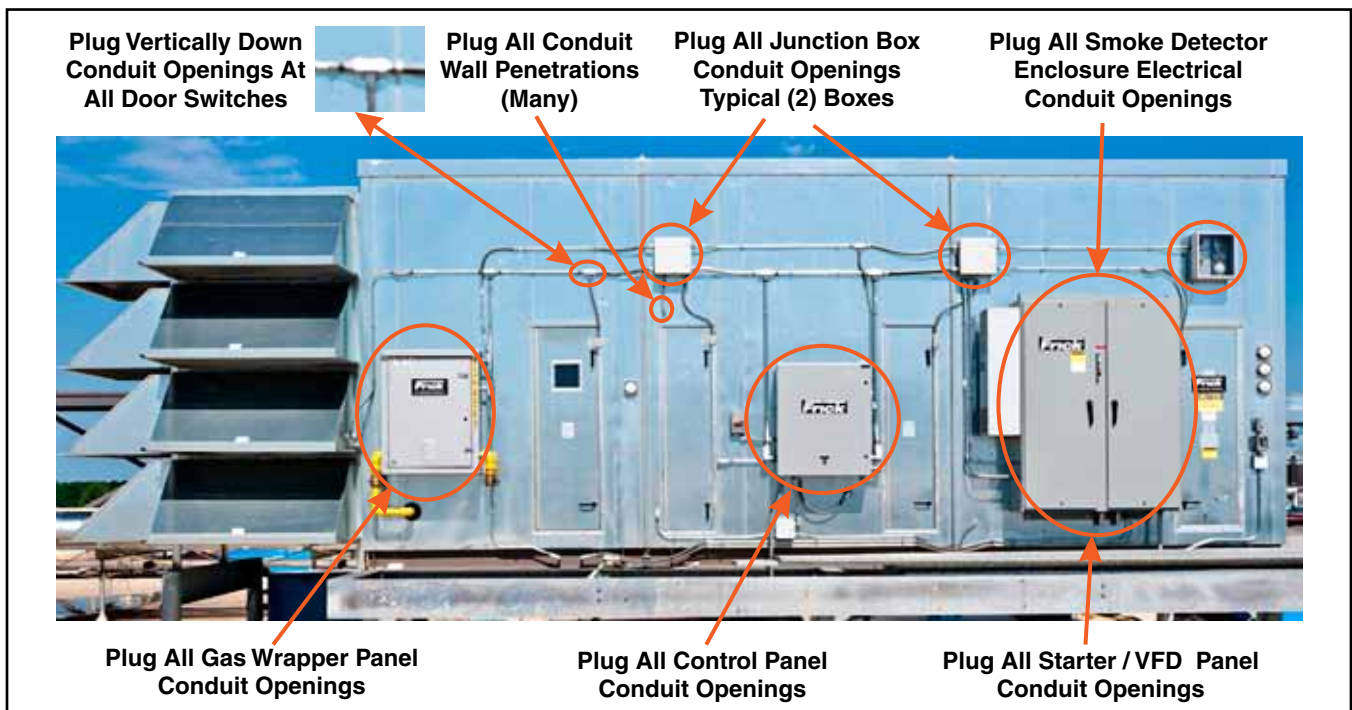


Figure 50 – Required Putty Locations

FAN BEARING LUBRICATION

Standard fan configurations ship with fan bearings factory lubricated (ready for start-up). The fan should be turned off and locked out to prevent accidental start-up of the fan during lubrication procedures. Also, secure sheaves before servicing the unit to ensure that the fan cannot freewheel. Failure to do so may result in severe personal injury.

Proper lubrication of bearings helps to assure maximum bearing life. Generally, lubricate bearings every 1,000 hours of operation or more frequently when exposed to wet location, wide temperature variety or severe atmospheric conditions.

Add grease with manual grease gun until a light bead of grease appears at the bearing grease seal or refer to lubrication frequency in the Tables 1, 2 & 3. Observation of the condition of the grease expelled from the bearings at the time of re-lubrication is the best guide as to whether lubrication intervals and the amount of grease added should be altered. Always lubricate bearings prior to extended shutdown or storage and rotate shaft monthly.

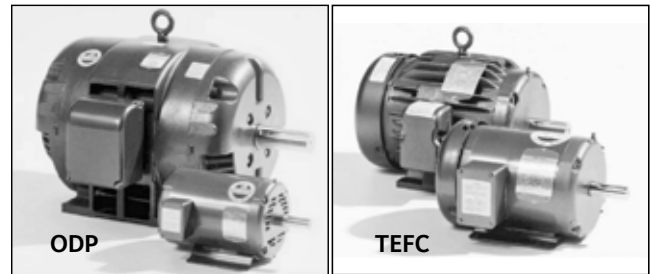
Recommended Lubricant for Fan Bearings

A Lithium / Petroleum base grease conforming to an NLGI Grade II consistency is normally used. Lubricant must be free of any chemical impurities such as free acid or free alkali, dust, rust, metal particles or abrasives. This light viscosity, low torque grease is rust inhibited and water resistant, has a temperature range of -30°F to +200°F with intermittent highs of +250°F. Lubricate bearings as required by the severity of required duty.

Proper Interval and Quantity - See Tables 1, 2 & 3

FAN SEGMENT-FAN MOTOR

Keep the motor clean, dry and properly lubricated at all times. Blow dust and dirt out of windings periodically using low-pressure (50 psig) air. (Figure 51)



**Figure 51 – ODP (Open Drip Proof)
TEFC (Totally Enclosed Fan Cooled)**

Mounting Hardware and Adjustable Motor Base

- Inspect for loose parts.
- Inspect for damage.

Motor Condition (Visual)

- Inspect for leaky bearing seals.
- Inspect for damage.
- Inspect for dirt, dust & debris in air vents on motor housing.

Electrical Checks

- Inspect all electrical terminations.
- Inspect conduit fittings and clamps for damage or looseness.
- Inspect operating amperage and compare to nameplate.

TABLE 1 – FAN BEARING – LUBRICATION INTERVALS - BALL BEARING PILLOW BLOCKS									
Relubrication schedule (months)									
SPEED (RPM)	500	1000	1500	2000	2500	3000	3500	4000	4500
SHAFT DIA.									
1/2" thru 1 1/16"	6	6	5	3	3	2	2	2	1
1 1/16" thru 2 7/16"	6	5	4	2	2	1	1	1	1
2 1/16" thru 2 15/16"	5	4	3	2	1	1	1		
3 7/16" thru 3 15/16"	4	3	2	1	1	1			

TABLE 2 – FAN BEARING – LUBRICATION INTERVALS - SPHERICAL ROLLER BEARING SOLID PILLOW BLOCKS									
Relubrication schedule (months)									
SPEED (RPM)	500	1000	1500	2000	2500	3000	3500	4000	4500
SHAFT DIA									
1 3/16" thru 1 7/16"	6	4	4	2	1	1	1	1	1/2
1 11/16" thru 2 3/16"	4	2	1 1/2	1	1/2	1/2	1/2	1/2	1/2
2 7/16" thru 3 7/16"	3	1 1/2	1	1/2	1/2	1/2	1/2		
3 15/16" thru 4 15/16"	2 1/2	1	1/2	1/4					

TABLE 3 – FAN BEARING – LUBRICATION INTERVALS - SPHERICAL ROLLER BEARING-SPLIT PILLOW BLOCKS										Grease to be added at each interval
Relubrication schedule (months)										
SPEED (RPM)	500	750	1000	1500	2000	2500	3000	3500	4000	
SHAFT DIA										
1 7/16" thru 1 15/16"	6	4 1/2	4	4	3 1/2	2 1/2	2 1/2	1	1	0.50 oz
2 3/16" thru 2 11/16"	5	4 1/2	4	2 1/2	2 1/2	1 1/2	1/2	1/4	1/4	0.75 oz
2 15/16" thru 3 15/16"	4 1/2	4	3 1/2	2 1/2	1 1/2	1	1/2			2.00 oz
4 7/16" thru 4 15/16"	4	4	2 1/2	1	1/2					4.00 oz
5 7/16" thru 5 15/16"	4	2 1/2	1 1/2	1						7.00 oz

Lubrication

Motor Bearing Lubricant - Bearing grease will lose its lubricating ability over time. The lubricating ability of grease depends primarily on the type of grease, the size of the bearing, the speed at which the bearing operates and the severity of the operating conditions. Good results can be obtained if the following recommendations are used in your maintenance program:

- A high-grade ball or roller bearing grease should be used. Recommended grease for standard service conditions is Polyrex EM (Exxon Mobil).
 - Maximum operating temperature for standard motors = 110°C.
 - Shutdown temperature in case of a malfunction = 115°C.
- Proper Lubrication Intervals - Recommended lubrication intervals are shown in Table 4. It is important to realize that the recommended intervals of Table 4 are based on average use. Refer to additional information contained in Tables 5 and 6.
- Motor Lubrication Procedure (Figure 52)

⚠ CAUTION

To avoid damage to motor bearings, grease must be kept free of dirt. For an extremely dirty environment, contact your distributor or an authorized Service Center for additional information.

- With Grease Relief Plug
 1. Clean all grease fittings.
 2. Remove grease relief plug.
 3. Add only the recommended amount of grease.
 4. Reinstall grease relief plug

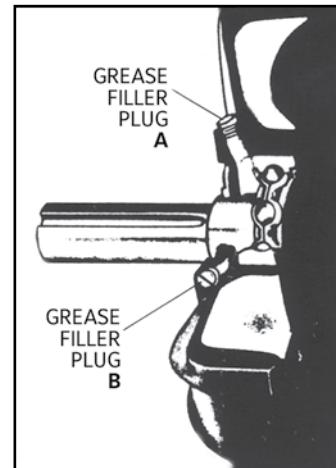


Figure 52 - Grease Fittings

⚠ CAUTION

Be sure that the grease you are adding to the motor is compatible with the grease already in the motor. Consult your distributor or an authorized service center if grease other than the recommended type is to be used.

TABLE 4 - MOTOR BEARING - LUBRICATION INTERVALS						
NEMA / (IEC) FRAME SIZE	Rated speed - rpm					
	10,000	6,000	3,600	1,800	1,200	900
UP TO 210 INCL (132)	**	2,700 hr	5,500 hr	12,000 hr	18,000 hr	22,000 hr
OVER 210 TO 280 INCL. (180)			3,600 hr	9,500 hr	15,000 hr	18,000 hr
OVER 280 TO 360 INCL. (180)			*2,200 hr	7,400 hr	12,000 hr	15,000 hr
OVER 360 TO 5,800 INCL. (180)			*2,200 hr	3,500 hr	7,400 hr	10,500 hr

* Lubrication intervals are for ball bearings For roller bearings, divide the listed lubrication interval by 2
 ** For 6205 and 6806 bearings For 6807 bearings, consult oil mist lubrication (MN410)
 Relubrication interval for 6205 bearing is 1,550 hr (Using grease lubrication)
 Relubrication interval for 6806 bearing is 720 hr (Using grease lubrication)

TABLE 5 - MOTOR BEARING - SERVICE CONDITIONS			
SEVERITY OF SERVICE	AMBIENT TEMP MAX	ATMOSPHERIC CONTAMINATION	TYPE OF BEARING
STANDARD	40°C	CLEAN, LITTLE CORROSION	DEEP GROOVE BALL BEARING
SEVERE	50°C	MODERATE DIRT, CORROSION	BALL THRUST, ROLLER
EXTREME	>50°C* OR CLASS H INSULATION	SEVERE DIRT, ABRASIVE DUST	ALL BEARINGS
LOW TEMPERATURE	<-30°C**	CORROSION	

* Special high temperature grease is recommended. NOTE that high temperature grease may not mix with other grease types. Thoroughly clean bearing and cavity before adding grease.
 ** Special low temperature grease is recommended.

TABLE 6 - MOTOR BEARING LUBE INTERVAL MULTIPLIER	
SEVERITY OF SERVICE	MULTIPLIER
STANDARD	1.0
SEVERE	0.5
EXTREME	0.1
LOW TEMPERATURE	1.0

INSPECTING V-BELTS AND SHEAVES

Before a new set of V-belts are installed, inspect the condition of the sheaves. Dirty or rusty sheaves impair the drive's efficiency and abrade the belts, which result in premature failure. (See Figure 53)

Inspect and clean sheaves; replace worn or damaged sheaves- Worn sheave grooves are one of the principal causes of premature belt failure.

- Clean dirty, dusty, or rusty sheaves. Feel sheave grooves (wear gloves or use a rag) for nicks or burrs, and file them smooth.
- Belts should ride in sheave grooves so that the top of the belt is just above the highest point of the sheave. If the grooves are worn to the point where the belt bottoms out (a clue: check for shiny groove bottoms), the belts will slip and burn.
- If the groove walls are "dished out," the bottom corners of the belt will quickly wear off and cause rapid failure. Check groove wear by sight, touch, or with a groove gauge. If grooves are "dished out" 1/32" or more - replace the sheaves.

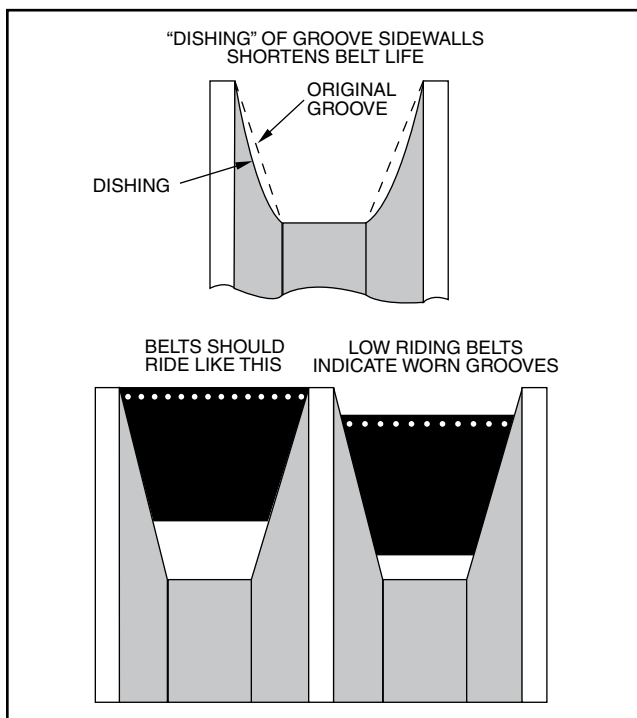


Figure 53 - Sheave Inspection

Inspect Sheave Alignment

NOTICE

An incorrectly aligned sheave can substantially shorten belt life or overload blower and motor bearings, shortening their life expectancy. A belt tensioned too tightly can overload the motor electrically, causing nuisance tripping of the motor overloads and/or motor failure and/or shaft failure.

Sheave adjustment should be verified by placing a straight edge across the sheave faces so that it touches all four points

of contact. Ordinarily, a misalignment of more than one-half of one degree (one-eighth inch in one foot) will adversely affect belt life. Improper sheave alignment produces uneven wear on one side of the belt, causes the belt to roll over in the sheave or throws all the load on one side of the belt, stretching or breaking the cords on that side.

After the proper operating tension has been applied to the belts, verify the following:

- Parallel position of the sheave shafts.
- Correct alignment of sheave grooves.

Sheave alignment and parallelism of shafts is very important. Proper alignment helps equalize the load across the entire belt width, thereby reducing wear and extending belt life. Figure 54 shows how to align a synchronous drive properly using a straightedge (A) or a piece of string (B).

After aligning the sheaves, verify the rigidity of the supporting framework. Shafts should be well supported to prevent distortion and a resulting change in the center distance under load. Do not use spring-loaded or weighted idlers.

Alignment Using A Straightedge (Preferred)

Place a straightedge against the outer edge of the sheaves. Figure 54 (A) shows the four points where the straight edge should touch the sheaves. The straight edge should cross the sheaves at the widest possible part of the sheave.

Alignment Using A String

Tie a string around either shaft and pull it around and across the outer edge of both sheaves. Figure 54 (B) shows how the string should touch four points when the drive is properly aligned.

Belt Replacement

Always replace belts as a matched set. Used belts will always be longer because of stretching and new belts should never be installed singly on a matched drive.

Follow the steps below to replace belts:

1. Release the tension on the belts by loosening the adjusting nuts on the fan motor.
2. Remove old belts and verify the sheave alignment with a straight edge.
3. Install the new belts on the sheave.

CAUTION

Never place the belts on the sheaves by using a screwdriver to pry the belt over the rim of the sheave.

TENSIONING V-BELTS & SHEAVES

General Rules Of Tensioning:

1. Correct belt tensioning data is located on "V-belt Drive Kit Label", which is mounted on inside of fan access door.
2. Adjust the belt tension using the adjusting nuts on the motor mount.
3. The ideal tension is the lowest tension at which the belt will not slip during start-up.

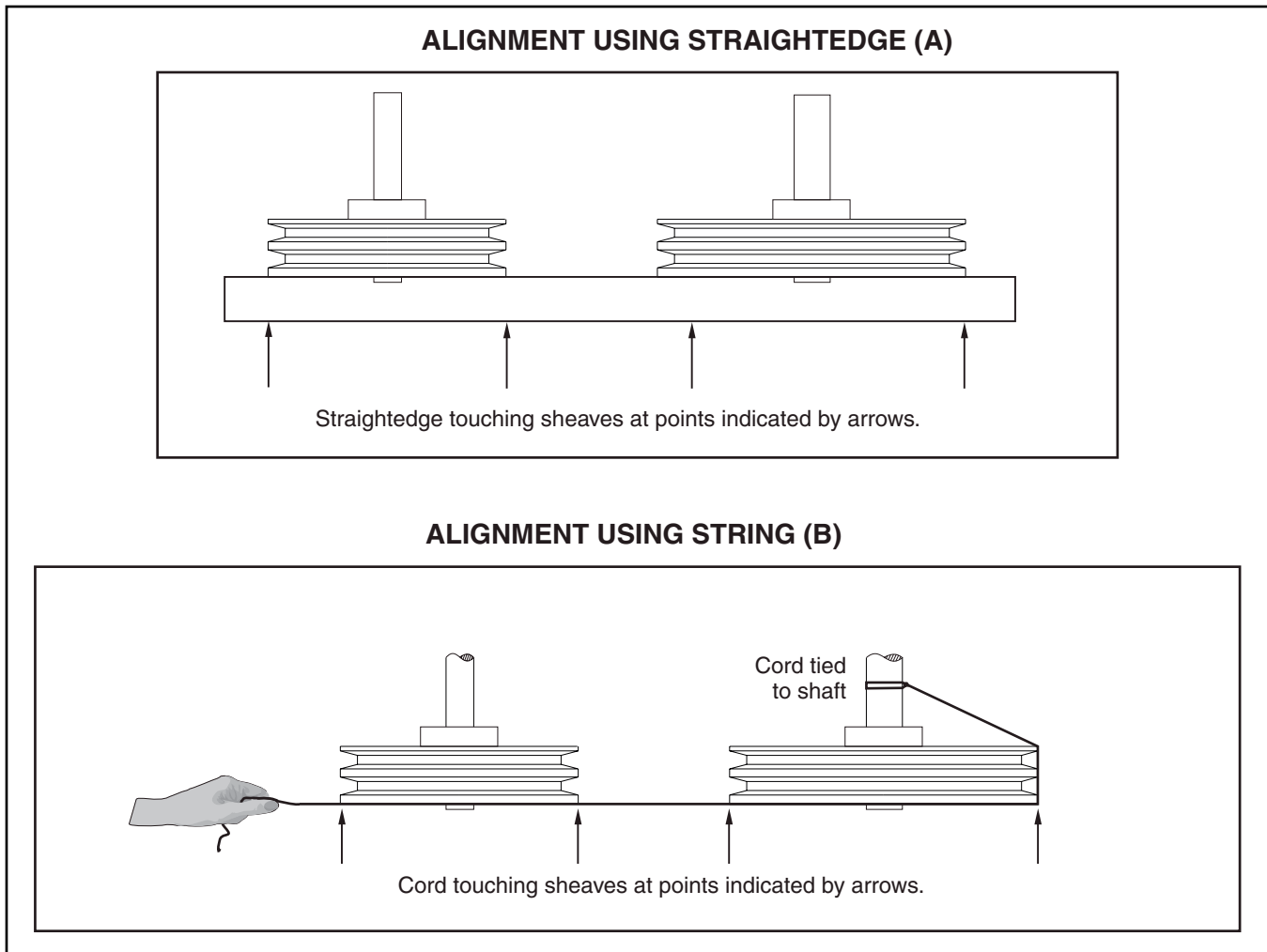


Figure 54 – Sheave Alignment

4. Inspect tension after:
- The first 24 hours of operation.
 - One week of operation.

New belt tension will drop rapidly during the first few hours of operation.

5. Overtensioning shortens belt and bearing life.
6. Keep belts free from foreign material, which may cause slip.
7. Make V-drive inspection on a periodic basis. Tension belt when slipping is observed. Never apply belt dressing, as this will damage the belt and cause early failure.

Simple Tensioning Procedure

1. Measure the span length, K .
2. At the center of the span (K), apply a force (perpendicular to the span) large enough to deflect the belt $1/64$ " for every inch of span length. For example, the deflection of a 100-inch span would be $100/64$ or $1\frac{9}{16}$ inches. See Figure 55.

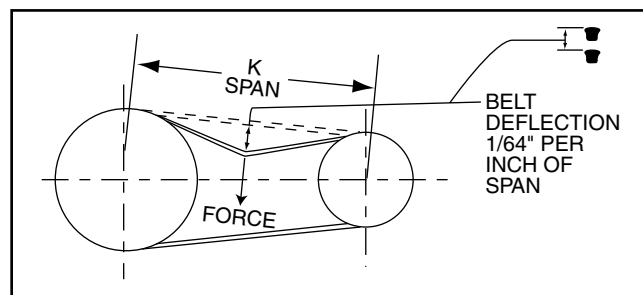


Figure 55 - Simple Tensioning Procedure

**OPERATING AND MAINTENANCE
INSTRUCTIONS FOR PIEZOMETER**

⚠ CAUTION
**DO NOT PERFORM MAINTENANCE ON THE Piezometer
WHEN FAN IS ROTATING.**

Operation of the Piezometer

The Piezometer has no moving parts; it cannot be turned on or off or adjusted. Each of the two rings on the exterior side of the inlet cone are fitted with a 0.25 union brass tee. The two tees are the connection points for running pneumatic tubing from the Piezometer to an air pressure gauge. This Piezometer will automatically produce a pressure differential signal whenever the fan is moving air. (Figure 56)

Maintenance of the Piezometer

Basic Piezometer maintenance requires keeping the eight tiny pressure pickup holes, in the flange and throat of the inlet cone, free from blockage or debris buildup and periodically checking the tubing and fittings attached outside the Piezometer for wear or damage.

In addition, periodically back-flushing each line gently with compressed air may help to blowout debris in the line and pressure pickup holes. It is important and necessary to keep the inside surface of the cone clean; especially in a one-inch radius immediately around the pressure pickup holes.

In the unlikely event that the pneumatic tubing on the Piezometer is damaged, simply remove the damaged section and replace with a comparable type of tubing.

NOTICE
**PRESSURE DIFFERENTIAL ON TUBING IS LESS THAN
1 PSIG.**

In the unlikely event that one of the brass fittings which is sweated to the Piezometer breaks loose from the Piezometer, simply remove that fitting and replace it with a straight coupling fitting of similar construction. Do not attempt to resolder the fitting to the Piezometer.

There are four pickup holes on each piezometer ring. Elimination of one of them will not adversely affect the performance of most Piezometer.

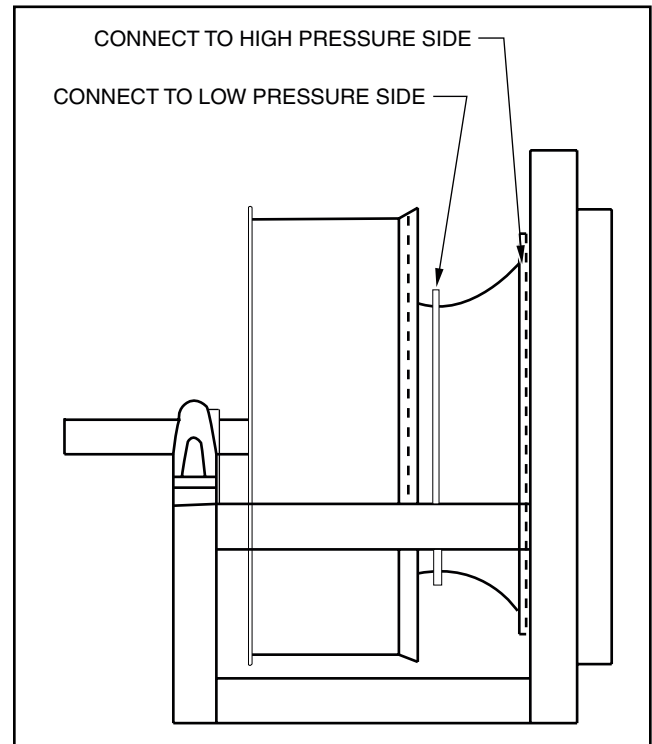


Figure 56 – Plenum Fan Tap Location And Connection Illustration

NOTICE
**For help with setup and calibration of Piezometers and
Transducers, contact Johnson Controls-Frick AcuAir
service @ 717-762-2121.**

RECOMMENDED MONTHLY SERVICE

Johnson Controls-Frick recommends that the unit undergo a thorough monthly inspection. The inspection should include, but not limited to, the following areas:

1. Blowers, Motors, and Drives

- a. Shut down the unit , and disconnect all electrical power. Touch all of the blower bearings. The bearings should be slightly warmer than the air passing over them, and they should all be approximately the same temperature. If any of the bearings are noticeably warmer than the other bearings, or if any of the bearings are too hot to touch, grease should be applied via the grease fitting. The bearings should be greased in accordance with the included Blower Bearing Lubrication Guidelines.
- b. Verify the tightness of the blower bearing bolts, the blower, motor, and pulleys, and the motor mounting bolts.
- c. Inspect the blower belt tension. The belts should be tensioned in accordance with the included Blower Belt Tension Guidelines. Visually inspect the belts for indications of wear. Replace the belts if there is evidence of cracking, fraying, or uneven wear.

2. Filters

- a. Visually inspect the prefilters, intermediate filters (if applicable) and final filters (if applicable). If the prefilter media appears damaged in any way, or if the media becomes wet, the prefilters should be changed immediately. If the intermediate filter media, or final filter media appears damaged, the filters should be changed immediately. Filters should normally be replaced when the static pressure drop through the media is double that of new media or when the pressure drop reaches the level recommended by the filter manufacturer. Original filter information is provided in the AcuAir project manual.

3. Unit Exterior

- a. Visually inspect the unit exterior. The seams between panels are factory sealed with silicon, and should be re-sealed if there appears to be any degradation of the original seal. Any scratches to the exterior of the unit should be repainted with the factory supplied touch-up paint.
- b. Verify the tightness of the door seals. If there is any indication of air infiltrating or escaping the unit via the doors, the door handles should be adjusted to provide a tighter seal.

MAINTENANCE INTERVALS

Maintenance of the AcuAir® system is relatively easy if sufficient consideration is given to the minimum maintenance requirements for keeping air-handling units performing to specification. These can be easily scheduled using the following "easy reference" preventative maintenance guide provided in the following **Recommended Maintenance Intervals** table.

Before performing any maintenance or inspection, make certain that all power has been disconnected, locked out, and tagged properly.

RECOMMENDED MAINTENANCE INTERVALS

TYPE OF SERVICE	START-UP	WEEKLY	MONTHLY	EVERY 3 MONTHS	EVERY 12 MONTHS
Inspect General Condition of Unit	X	X			
Clean debris from unit	X	X	X		
Check condition of prefilters	X	X	X		
Check pressure drop of final filters	X	X	X		
Check drains	X	X			
Inspect heat transfer section	X	X			
Lubricate damper bearings	X		X		
Check and adjust fan belt tension	X	X			
Check burner operation/safties	X			X	
Check unit for unusual noise or vibration	X	X			
Check fan bearing locking collars	X		X		
Check motor voltage current	X				X
Lubricate fan shaft bearings	X				X
Lubricate motor base adjusting screws	X			X	
Lubricate the fan motors	X				X
Check fan for rotation without obstruction	X		X		
Check fan for proper rotation	X		X		
Inspect protective finish	X		X		X
Inspect/adjust damper linkage	X		X		
Check and clean the smoke detector air filter and detector board	X			X	
Check the Ammonia Detector sensor cell	X			X	
Check the sealing putty of all electrical conduit openings both inside the air handler as well as inside all electrical enclosures.	X			X	

SPARE PARTS RECOMMENDATIONS

Johnson Controls-Frick® recommends that customers maintain an inventory of spare parts for the AcuAir air unit. By maintaining this inventory of spare parts, change-out requirements can be immediately satisfied during preventative maintenance inspections.

It is also advisable to reorder parts prior to taking existing spares from inventory. This policy helps prevents downtime due to "forgotten" spare parts order placement.

The type and recommended stock level for recommended part is listed in the order specific documentation provided after the AcuAir air unit is shipped from the factory.

Troubleshooting

Symptom	Probable causes and Corrections
Motor doesn't start	<ul style="list-style-type: none"> Check MOA module to see if in AUTO (green light if on/red light if fuse is blown) Check blower door switch Check smoke/ammonia detectors (if applicable) Check end switch on OA dampers (if applicable) Check fuses Check overloads Check power to coil on starter Check power from starter to motor
Motor starts but quits shortly after.	<ul style="list-style-type: none"> Check fan belts Check tubes to airflow switch to be clean Check power through air flow switch Check rotation of fan
Cooling doesn't come on	<ul style="list-style-type: none"> Check MOA module to see if in AUTO (green light if on/red light if fuse is blown) Check setpoint for cooling Check OA lockout setpoint (lockout should be below OA Temp) Check power to valve
Steam valve doesn't modulate	<ul style="list-style-type: none"> Check setpoint for heat Check OA lockout setpoint (lockout should be above OA Temp) Check output for steam valve
Direct-fired burner doesn't light	<ul style="list-style-type: none"> Check setpoint for heat Check OA lockout setpoint (lockout should be above OA Temp) Check MOA module to see if in AUTO (green light if on/red light if fuse is blown) Check burner safety circuit. Eg. High gas pressure switch, Low gas pressure switch, high temp limit, burner door switch Check to make sure OUTSIDE air dampers are open and RETURN dampers are shut Check burner airflow switch Check and clean UV scanner
Check and gap pilot assembly (3/16" gap)	<ul style="list-style-type: none"> Check gas supply
Indirect-fired burner doesn't light	<ul style="list-style-type: none"> Check setpoint for heat Check OA lockout setpoint (lockout should be about OA Temp) Check MOA module to see if in AUTO (green light if on / red light if fuse is blown) Check blower on burner Check lockout alarm on Honeywell control Check burner airflow switch Check low fire end switch on burner damper motor Check spark rod and flame rod Check pilot assembly
Exhaust fan doesn't start	<ul style="list-style-type: none"> Check MOA module to see if in AUTO (green light if on / red light if fuse is blown) Check disconnect switch on fan Check overload Check power to and from starter Check damper end switch (if applicable)

ACUAIR FACTORY START-UP ASSISTANCE

Responsibilities of Parties in Coordinating Factory Start-up

Attention: Factory Sales Reps, Project Engineers, Installing Contractors, Project Owners

Factory start-up assistance is often included in the purchase price of AcuAir equipment. When factory start-up assistance is sold with the equipment, it is crucial for all parties involved in the completion of any project to understand and carry out their respective responsibilities prior to scheduling factory start-up personnel.

The purpose of factory start-up assistance is to provide final testing and calibration, to ensure that the equipment is functioning in compliance with the design specifications of the factory order. It does not include installation or assembly of any components shipped separately from the factory.

The factory start-up assistance includes one trip of a factory technician who will provide this service. It is our policy to bill additional time and travel expenses of any additional labor or expenses incurred in the event that the unit is not completely ready when the factory technician arrives.

The included factory start-up assistance is available Monday through Friday, except holidays, during normal and reasonable working hours. Customers with narrow time constraints, resulting in excessive overtime for factory start-up technicians, will be invoiced for the additional overtime hours incurred. Customers requiring Saturday or Sunday start-up of equipment will be billed at a weekend rate. Weekend and holiday start-up of equipment is NOT included in the sell price of the equipment! If you require a weekend start-up, consult your factory sales representative for scheduling availability and cost.

Factory start-up assistance should be requested at least two weeks prior to the start-up date. A request for start-up assistance is initiated by completing the AcuAir Prestart-up Checklist. E-mail, fax or mail the checklist to the factory per the instructions noted at the bottom of the checklist. Once the checklist is received, a factory representative will work with you to determine the best available date that a factory technician can be at the job site.

Factory Start-up Assistance will include:

- Testing and calibration of all AcuAir control components provided by Johnson Controls.
- Tuning of control system parameters and verification that control points are held within acceptable tolerance.
- Adjustment and testing of gas burners.
- Test and verification of all AcuAir safety and limit controls provided by Johnson Controls.
- The factory start-up technician will provide a basic control system review, basic troubleshooting training, and instruction regarding any AcuAir operator interface controls provided by Johnson Controls. This is a limited training which is adequate for most job sites. Additional training for maintenance crews or site owners is available at extra cost. Contact your sales representative for pricing.

Factory Start-up Assistance will not include:

- Piping of the gas supply lines to the unit or setting of gas regulators external to the unit.
- Wiring any connection of electrical power required to operate the equipment.
- Wiring or installation of external control devices. This includes items shipped separately such as sensors, valves, gages, etc.
- Wiring remote panels to the unit.
- Drainpipe plumbing and heat tape installation on drainpipe.
- Piping pneumatic tubing runs required by room pressure sensing controls.
- Wire connections at unit shipping splits.
- Air balancing of the room supply, return, and exhaust air. NOTE: Your factory technician will attempt to set control systems to deliver balanced room conditions, but absolute verification of air volumes and final adjustment is up to others.
- Filter installation.
- Piping of refrigerant lines or valves, settings of refrigerant line regulators.
- Assembly and installation of ship-separate mechanical, such as hoods.
- Assembly or installation of ductwork or diffuser systems.

Our factory service technicians are committed to providing customer satisfaction. Due to travel restrictions, they are limited as to the amount of tools that can be carried on a given trip. Please take the time to review this document to be sure that all facets of project construction and completion are assigned and understood by all participants.

When the project is complete, please fill out and send the following AcuAir Prestart-up Check List.



ACUAIR AIR HANDLER PRESTART-UP CHECKLIST

Name of Installing Contractor _____	Unit Tag # _____
Qualified Technician's Name: _____	Unit Model # _____
Frick Sales Order # _____	Unit Serial # _____
Job Name _____	
Job Site Location _____	
Job Site Contact and Phone # _____	

PRESTART-UP (For Site Records)

GENERAL UNIT INSPECTION

Identify and perform appropriate "lockout/tag out" and safety rules. For details on points below, see appropriate section of Installation, Operation, Maintenance manual provided with each air handler. For VFD equipped air handlers, refer to the VFD forms for additional start-up requirements.

<input type="checkbox"/> Unit inspected for damage interior and exterior.	<input type="checkbox"/> Condensate drain properly trapped.
<input type="checkbox"/> Unit installed on flat and level surface. Outdoor unit mounted within roof slope limitations where applicable.	<input type="checkbox"/> Air hoods installed properly.
<input type="checkbox"/> Package Installed According to 090.400-SB (Proper Installation of Electronic Equipment)	<input type="checkbox"/> Terminal screws and wiring connections secure in control, electric and Air Modulator panels.
<input type="checkbox"/> All shipping splits sealed and secured properly.	<input type="checkbox"/> Verify that all ductwork is complete and available for full airflow.
<input type="checkbox"/> Unit installed with proper clearances.	<input type="checkbox"/> Clean air filters installed properly and secured.
<input type="checkbox"/> Visually inspect roof curb for tight seal around unit.	<input type="checkbox"/> Damper linkage is tight and in correct "power off" position.
<input type="checkbox"/> All shipping bolts and other material have been removed. (Fan, VIFB, Energy Recovery Wheel, Damper)	<input type="checkbox"/> Pipe chase floor sealed at penetrations.
<input type="checkbox"/> All shipped loose parts installed.	<input type="checkbox"/> Pneumatic tubing for room pressure sensors is in place.
<input type="checkbox"/> Controls installation complete.	<input type="checkbox"/> Filter gauge is installed in supply ductwork and set to zero
<input type="checkbox"/> Remote Panel is mounted and wired.	<input type="checkbox"/> Verify all plastic spacers have been removed between door and door frame.
<input type="checkbox"/> Unit control panel is accessible. (Catwalk, ladder, etc.)	<input type="checkbox"/> Verify Energy Recovery Wheel turns freely and wheel segments are fully engaged.
<input type="checkbox"/> All field wiring complete and inspected.	<input type="checkbox"/> Installer has cleaned out interior.
<input type="checkbox"/> All wiring and tubing connections made at shipping splits.	<input type="checkbox"/> Correct line voltage is supplied at disconnect.
<input type="checkbox"/> All field piping connections complete.	

Fan Inspection	
<input type="checkbox"/> Verify that bearings and locking collars have properly tightened setscrews, bolts and nuts.	<input type="checkbox"/> Fan wheel properly aligned, tight on shaft and freely moving.
<input type="checkbox"/> Sheaves properly aligned and tight on shaft.	<input type="checkbox"/> Verified fan base isolators and thrust restraints for proper adjustment. NOTE: Do not remove functional bolts from seismic isolators.
<input type="checkbox"/> Belt tension adjusted properly per drive package label on fan.	
<input type="checkbox"/> Verified fan alignment with unit discharge. Adjust with isolation.	<input type="checkbox"/> Fan bearings properly lubricated.

Burners	
<input type="checkbox"/> Gas Supply is provided up to unit.	<input type="checkbox"/> Flue is installed, if needed.
<input type="checkbox"/> Gas supply pressure is correct.	<input type="checkbox"/> Gas line is purged.
<input type="checkbox"/> PRV installed, if required?	

I have reviewed, understand, and acknowledge the terms and conditions of Johnson Controls start-up policies detailed in this document. The information that is provided in the prestart-up checklist is accurate.

_____	_____	_____
Authorized Signature	Authorized Firm	Phone #

START-UP

PERFORM THE FOLLOWING STEPS IN ORDER:

Refer to safety standards. Ensure all door latches are secured before starting.

- | | |
|--|--|
| <input type="checkbox"/> 1. Energize power to the unit disconnect switch.
<input type="checkbox"/> 2. Verify correct voltage, phase and cycles.
<input type="checkbox"/> 3. Energize fan motor(s) briefly (bump) and check for correct fan rotation.
<input type="checkbox"/> 4. Check operation of dampers.
<input type="checkbox"/> 5. Energize fan motor(s). Observe fan(s) for smooth operation. | <input type="checkbox"/> 6. Note/record motor nameplate Full Load Amp rating.
<input type="checkbox"/> 7. Immediately verify current draw of each leg of each motor.
<input type="checkbox"/> 8. VFD, refer to manufactures start up guide.
<input type="checkbox"/> 9. Inspect doors and latches for air leaks.
<input type="checkbox"/> 10. Inspect for obvious audible leaks.
<input type="checkbox"/> 11. Apply steam to cold coils slowly to prevent damage. |
|--|--|

RECORD DATA

POWER SUPPLY: Unit Nameplate V__ PH__ CYC, __ Verify V _____ / _____ / _____

DATA	SUPPLY FAN MOTOR	RETURN FAN MOTOR
-------------	------------------	------------------

Nameplate	Volts _____ Amps _____	Volts _____ Amps _____
-----------	------------------------	------------------------

Run Amps	_____ / _____ / _____	_____ / _____ / _____
----------	-----------------------	-----------------------

Catalog Number	_____	_____
----------------	-------	-------

Spec Number	_____	_____
-------------	-------	-------

Horse Power	_____	_____
-------------	-------	-------

RPM	Nameplate _____ Actual _____	Nameplate _____ Actual _____
-----	------------------------------	------------------------------

Frame size	_____	_____
------------	-------	-------

Service Factor	_____	_____
----------------	-------	-------

Jump (Skip) Frequencies	_____ / _____ / _____	_____ / _____ / _____
-------------------------	-----------------------	-----------------------

SUPPLY FAN

RETURN FAN

Manufacture Name	_____	_____
------------------	-------	-------

Type or Model Number	_____	_____
----------------------	-------	-------

Code or Shop Order Number	_____	_____
---------------------------	-------	-------

Serial Number	_____	_____
---------------	-------	-------

SUPPLY FAN DRIVE KIT

RETURN FAN DRIVE KIT

Belts (Quantity & ID Number)	_____	_____
------------------------------	-------	-------

Belt Tension	Tag _____ Actual _____	Tag _____ Actual _____
--------------	------------------------	------------------------

Fan RPM (DN)	Tag _____ Actual _____	Tag _____ Actual _____
--------------	------------------------	------------------------

other utilities

Refrigerant Number: _____

Refrigerant Liquid Supply: _____ psig _____ °F

Refrigerant Gas Suction: _____ psig _____ °F

Gas Supply Pressure _____ psig Natural Gas or Propane (Circle one)

_____ "Hg

Steam Pressure _____ psig

MAINTENANCE

Upon completion of start-up the customer assumes responsibility for periodic maintenance of this equipment in order to continue warranty. Refer to the Installation Operation and Maintenance Manual provided with this equipment.

Customer's agent signature: _____, Date: _____

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