Installation and Maintenance Manual IM 672-13

Group: **Applied Air Systems**
Part Number: **IM 672**
Date: **August 2017**

Vision® Air Handler

Models CAC/CAH 003—090 C

General Information

⚠ CAUTION

Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

Vision® indoor air handlers are not designed to be weather resistant. Do not install them outdoors.

The system design and installation must follow accepted industry practice as described in the ASHRAE Handbook, the National Electric Code, and other applicable standards. This equipment must be installed in accordance with regulations of authorities having jurisdiction and all applicable codes.

Installation and maintenance must be performed by qualified personnel familiar with applicable codes and regulations and experienced with this type of equipment. Sheet metal parts, self-tapping screws, clips, and such items inherently have sharp edges; the installer should exercise caution.

Receiving and Handling

1. Carefully check items against the bills of lading to verify all crates and cartons have been received. Carefully inspect all units for shipping damage. Report damage immediately to the carrier and file a claim.
2. Vision air handler units are constructed of galvanized or painted steel and are inspected thoroughly before leaving the factory. Take care during installation to prevent damage to units.
3. Take special care when handling the blower section. All fans are dynamically balanced before leaving the factory. Rough handling can cause misalignment or a damaged bearings or shaft. Carefully inspect fans and shaft before unit installation to verify this has not happened.
4. Handle the zone damper of the multi-zone units with special care. Zone dampers are set and inspected before leaving the factory, but should be checked on arrival to the job to verify the bell arm and connecting rod set screws did not become loose in shipment.

Nomenclature

CAH 003 G D A C

Model
CAH = Custom modular air handler
CAC = Custom modular component

Nominal unit size
(cataloged size—nominal square foot of coil)
003, 004, 006, 008, 010, 012, 014, 017, 021, 025, 030, 035, 040, 050, 065, 080, 085, 090

Vintage

Unit cross section
C = Standard unit cross section
M = Custom size cross section

Motor location
A = Motor along side of fan housing
C = Motor downstream of ECM fan
D = Motor downstream of belt-drive plenum fan
F = Motor on inline fan
G = Motor downstream of direct-drive plenum fan
H = Motor downstream of direct-drive plenum fan in fan array
T = Motor behind twin fan housing

Unit type/coil position
B = Blow-through cooling coil location
D = Draw-through cooling coil location
H = Heating only
V = Vent only
M = Multizone

Unit Storage

- Store on a level surface in a clean, dry location where temperature can be controlled if possible.
- Pack fan and motor bearings (unless motor bearings are sealed) with compatible grease with the shaft stationary. After grease has been installed, rotate shaft about 10 rotations.
- Isolate unit from shock and vibration.
- Once a month, rotate shaft a minimum of 10 revolutions. Insure the stopped position is different than the original position.
- Coat shafts with lubricant as needed to prevent corrosion.
- A descant bag may be hung in the interior of the unit to minimize corrosion in humid storage environments. Do not clean galvanized steel surfaces with oil dissolving chemicals. This may remove the protective coating and accelerate corrosion.
- Do not allow coverings to trap moisture on galvanized surfaces.

Belt-Driven fans

- Reduce belt tension by at least 50% or remove the belts. Remove belts if they will be subjected to temperatures exceeding 85° F to avoid deterioration.
- Remove belt guard when adjusting belts
- Reduce belt tension prior to removing or installing belts.
- Removing or installing tensioned belts may cause personal injury and damage to the sheaves, belts, bearings or shafts.
- Adjustable sheaves should be opened as wide as possible and the adjustment threads lubricated so they do not corrode. Be careful not to put lubricant on the belt running surface

Prior to start up

- Set screws on bearings, fan wheels, and sheaves need to be checked for proper torque. Also check bolt torque for any taper lock hubs either on the wheel or sheaves.
- Check sheaves for corrosion. Significant corrosion can cause belt or sheave failure.
- Purge old grease from fan bearings while rotating the shaft to distribute the new grease evenly and prevent bearing seal failure.
- Correctly align and tension belts. See on page 45.

Service Clearances

In addition to providing adequate space around the unit for piping coils and drains, access to at least one side of the unit is always required to allow for regular service and routine maintenance, which includes filter replacement, drain pan inspection and cleaning, fan bearing lubrication, and belt adjustment. Provide sufficient space—at least equal to the length of the coil—on the side of the unit for shaft removal and coil removal. Space, at least equal to the length of the side coil, is required for coil removal. Space, at least equal to the fin height, is required for top coil removal. See Figure 1 for servicing space requirements.

For routine maintenance purposes, access normally is obtained through the access doors or by removing panels. Fan and filter sections are always provided with a service door on one side of the unit. If requested, doors can be provided on both sides of the unit. Optional service doors are available for most section types and are provided based on customer request.

If component replacement is required, the top panel also can be removed. If necessary, the unit can be disassembled. Maintain at least 54" of clearance in front of electrical power devices (starters, VFDs, disconnect switches and combination devices). Electrical power devices that are mounted on the side of the unit typically are up to 12" deep (Figure 2). Fan sections with multiple fans have motor control boxes up to 16" deep when supplied with VFDs.

Figure 1: Servicing Space Requirements

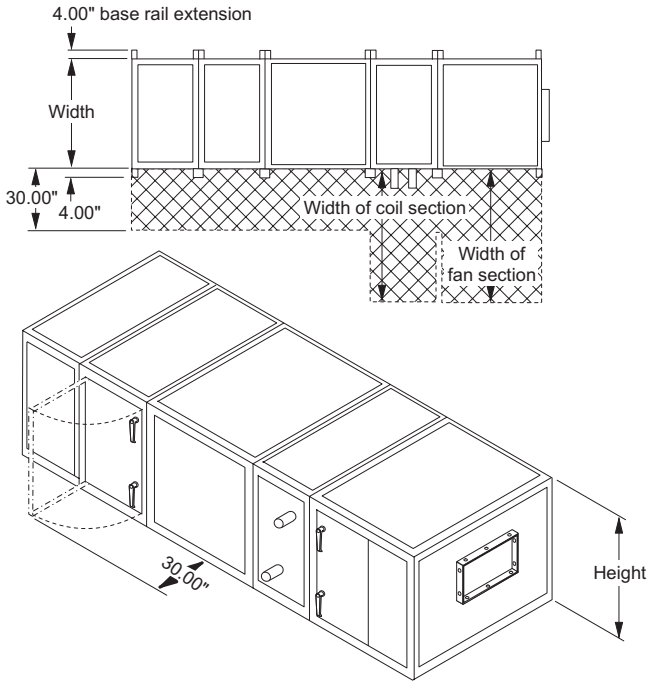
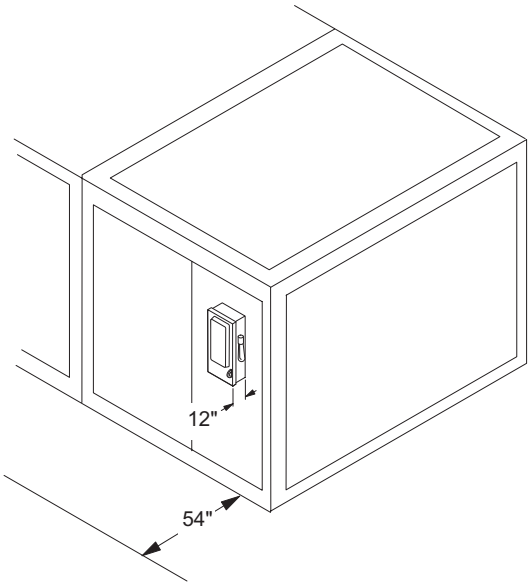


Figure 2: Service Clearance for Electrical Power Devices



Rigging

⚠ WARNING

Use all lifting points. Improper lifting can cause severe personal injury and property damage.

⚠ CAUTION

Lifting points may not be symmetrical to the center of gravity of the unit. Ballast or unequal cable lengths maybe required.

⚠ DANGER

DO NOT LIFT FROM 2" HOLES AT ENDS OF UNIT. Failure to comply may result in personal injury or death.

Vision air handlers ship as separate sections, completely assembled, or in modules of assembled sections. The unit must be rigged as it ships from the factory. Do not rig units after assembly. When a unit is provided with a factory-installed base rail, it can be lifted using the 2" diameter lifting holes located in the corners of each shipping section (Figure 3). If a unit does not have a base rail, rig it using straps or a sling. Fasten the strapping under the skid that ships with the section (Figure 4).

To prevent damage to the unit cabinetry, use spreader bars. Position spreader bars to prevent cables from rubbing the frame or panels. Before hoisting into position, test lift for stability and balance. Avoid twisting or uneven lifting of the unit.

A fan array or coil section might have a tall, thin aspect ratio. The center of balance on these sections can be high and make the section prone to tipping during the lift. Care should be taken when lifting units with a tall, thin aspect ratio.

Figure 3: Units on Base Rails

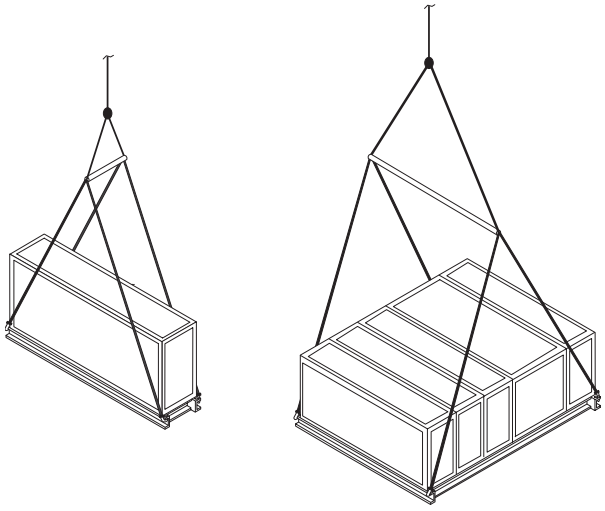
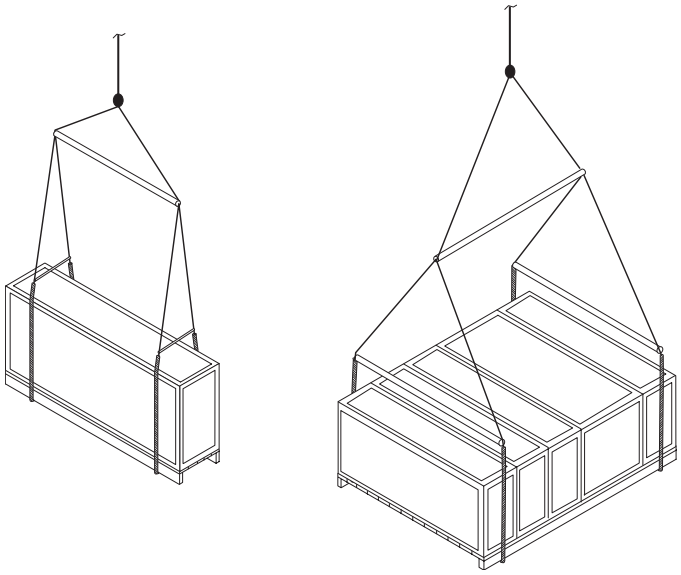
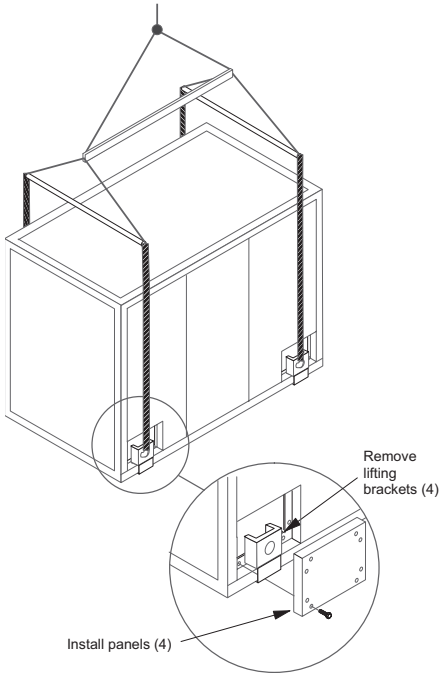


Figure 4: Units on Skids



Fan sections greater than 108" wide that are stacked on another section that are not Class II plenum fans are constructed with internal fan support frames that have integral lifting brackets (Figure 5). After the fan section is placed in position, remove and discard the lifting brackets. Install the small panels provided to complete the unit cabinet areas where the lifting brackets were located.

Figure 5: Large Fan Sections Stacked on Top of a Lower Section



Class II plenum fans that are stacked on another section may be lifted using the methods shown in the following figures. The shipping brackets must remain in place and be tight in order to lift using this method. Figure 6 shows a belt-drive fan with field supplied eye bolts that are screwed into factory installed hex AVK fasteners in the main channels supporting the fan. Figure 7 shows a direct-drive fan with field supplied eye bolts on the motor end and straps around the spring bracket on the inlet end. When factory installed hex AVK fasteners are installed, they should be used for lifting. When they are not installed, it is acceptable to lift from the shipping brackets on the fan. Figure 8 shows dual fans being lifted in a similar manner as the single direct-drive fan. An eight point lift must be used for dual fans to make sure both fans are supported properly and the cabinet structure does not become overloaded along the center.

If the fan section is connected to another section such as a plenum or access section, then DO NOT attempt to lift both sections using just the fan section. The other section(s) must be supported separately using straps.

Figure 6: Belt-Drive Class II Plenum Fan Stacked Unit

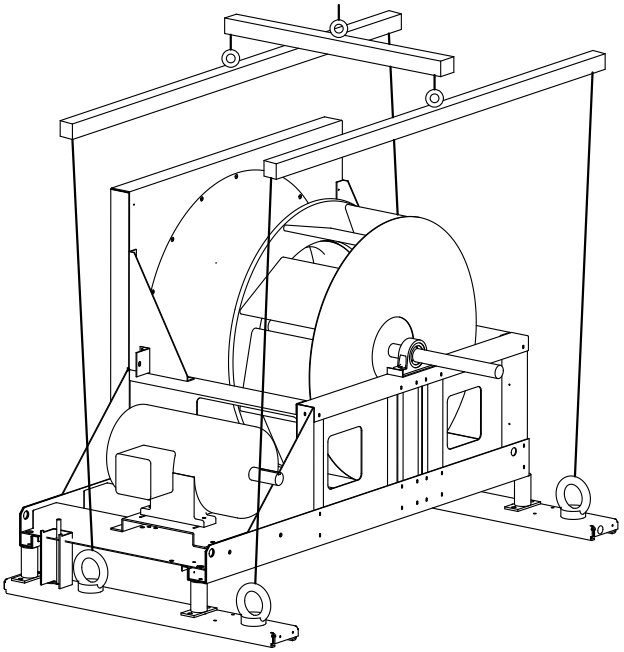


Figure 7: Direct-Drive Class II Plenum Fan Stacked Unit

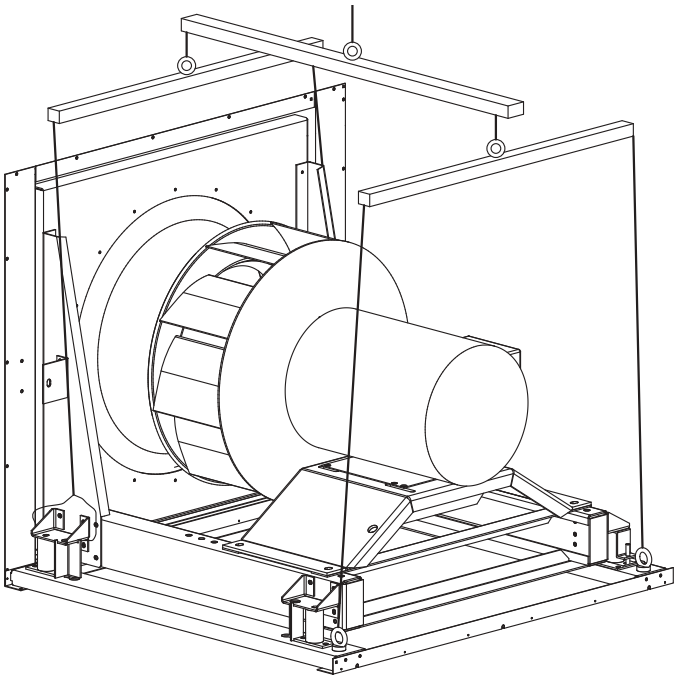
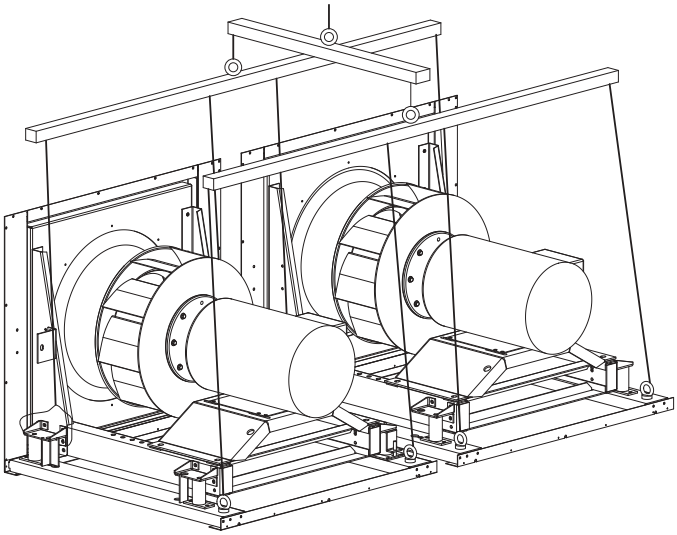


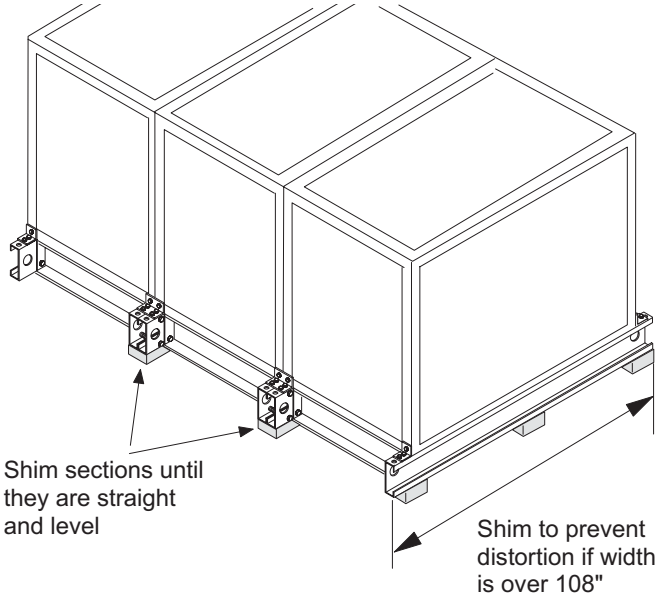
Figure 8: Direct-Drive Class II Dual Plenum Fan Stacked Unit



Unit Leveling

Place the equipment on a flat and level surface. Where the surface irregularities could cause the equipment to distort, use a shim so the base of the unit is a straight line. Uneven or distorted sections cause misfit or binding of the doors and panels and improper draining of drain pans. Units that are over 108" wide must rest on a flat surface for the entire width of the base rails or must be shimmed at one or more points along the length of the rails to prevent distortion or sagging of the support rails (Figure 9).

Figure 9: Leveling the Unit



Assembling Sections

External Section-to-Section Mounting

Vision air handling units can ship fully assembled or as separate shipping sections. Rig units that require field assembly of shipping sections into position first. Shipping sections are provided with a connection splice joint attached on the leaving air side of the shipping section. The splice joint is insulated and provides an air-tight seal between two sections once they are assembled together. If the splice joint was bent during shipping or rigging, restore it to its original position. (Figure 19 on page 12).

Horizontal Airflow Section Mounting

1. Rig the unit into position and lineup shipping sections in the direction of air flow. Pull sections together to fasten. Use a furniture clamp or straps and a ratchet to help pull the sections together securely (Figure 10).
2. If the unit has a factory-installed base rail, first fasten base rails together using the 3/8"-16 × 5" bolts located in the splice kit provided with the unit.
    a. To fasten two shipping sections together, four bolts are needed (two on each side of the unit). The bolts are run from one base rail into the other and fastened with a nut. Complete each section bottom and top before attaching additional sections.
3. If no base rail is provided, fasten the unit in the same manner on the bottom and top frame channels.
4. Once the sections are positioned together, remove the fastener in each of the channel corners (on the mating edges in the channel piece).
5. Place a flat section joining plate (found in the splice kit) over the two coned holes in the channels, so that the plate spans the two sections.
6. Replace the fasteners in their original position, through the joining plate.
7. For certain Custom Air Handler units, use the provided section joining plates to fasten sections together. Space them as shown in Figure 11. Using the provided ¼"-14 x 1" self tapping screws, drill screw the joining plates into the frame channel on each section, keeping unit sections tight together. Follow instruction drawing included in the assembly kit.

Figure 10: Horizontal Joining Sections

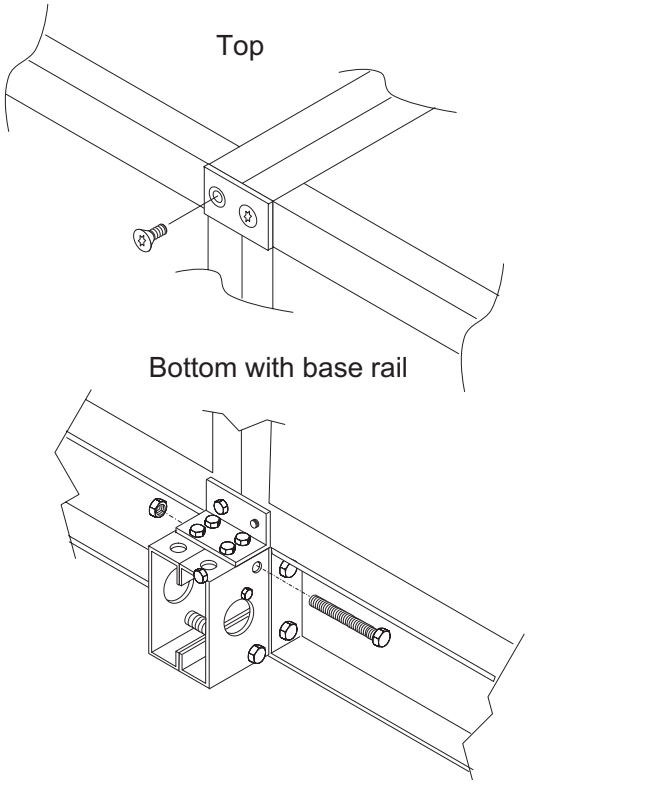
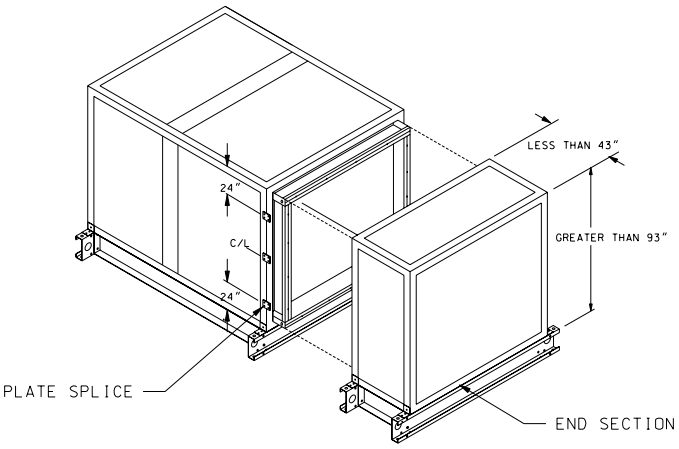


Figure 11: Frame Channel Stiffener Plates (Custom Air Handler Units Only)



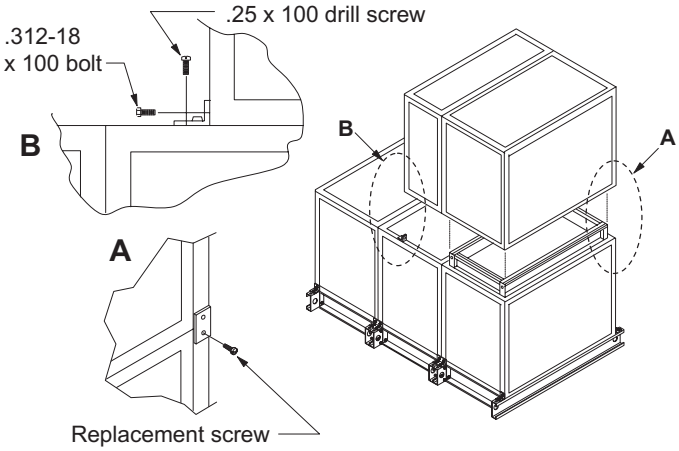
Vertical Inverted Airflow Section Mounting

For vertical or inverted arrangements, before lifting any top mounting sections into place, rig into place and fasten together the bottom tier of sections. Once bottom level sections are in place and secured, lift stacked components and fasten using the following procedure:

NOTE: See Face and Bypass Section Mounting on page 14 for the exception to this procedure.

1. The vertical/inverted section has a splice joint extending out the top of the bottom joining section. Lower the section that is to be positioned over the opening over the splice joint to seal the connection between the two sections.
2. The two sections are fastened together at the four bottom corners of the mating edge. To fasten the corners located on the end of the unit (where bottom section and top section walls are flush with each other), remove the flat head fasteners in the corners of both sections.
3. Cover the coned holes with a flat joining plate and replace the flat head fasteners in the holes to secure the joining plate to both sections (Figure 12).
4. When one section is deeper than the other, secure the two sections using an L-shaped joining plate. To secure the L-shaped bracket, remove the flat head fastener from the corner, position the bracket over the hole, and replace the flathead fastener with a 5/16"-18 × 1" bolt. Once the bolt is in place, secure the bracket to the adjoining section with a 1/4" × 1" drill screw. Repeat the same procedure on both corners of the unit (Figure 12).

Figure 12: Vertical/Inverted Joining Sections

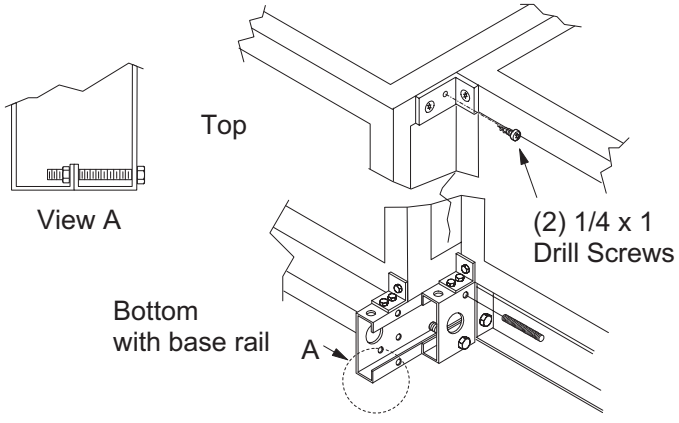


Extended Coil Section Mounting

The extended coil section is 6" wider than all other sections of the same unit size. The extension is always located on the coil connection side of the unit. Because the extended coil section is wider than other sections, it always ships as a separate shipping section, and must be joined to other sections in the field. To join an extended coil section to other components, first follow the Horizontal Airflow Section Mounting, page 7 steps to secure the opposite connection side. To fasten the connection side, use the following procedure:

1. If the unit has a factory-installed base rail, the extended coil section base rail is also 6" wider than the adjoining base rail. Extended coil section base rails on the connection side are fastened together using the 3/8"-16 by 3" bolts located in splice kit provided with the unit (Figure 13).
2. If no base rail is provided, the section is fastened in the same manner on the bottom and top. Once the sections are positioned together, remove the fastener in the corner of the channel piece of the section mating to the extended coil section (Figure 13).
3. Place an L-shaped section joining plate (located in the splice kit) over the coned hole in the channel.
4. Replace the flat head fastener originally used in the corner with a 5/16"-18 1" bolt and fasten it through the L-shaped joining plate.
5. Position the L-shaped joining plate so it butts up against the extended coil section frame channel. To secure the plate to the extended coil section, run two 1/4" × 1" drill screws through the joining plate and into the frame channel.

Figure 13: Extended Coil Section Joining

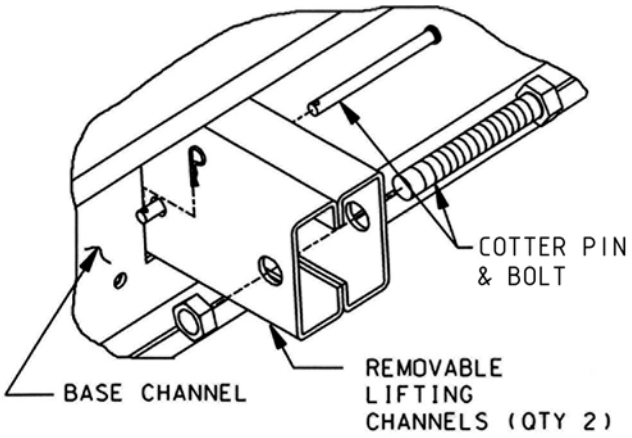


Side-by-Side Heatwheel Section Joining

The side-by-side heatwheel will have two individual sections parallel in the direction of airflow to be attached to either side. Each section will attach to the heatwheel section and then to the other parallel section.

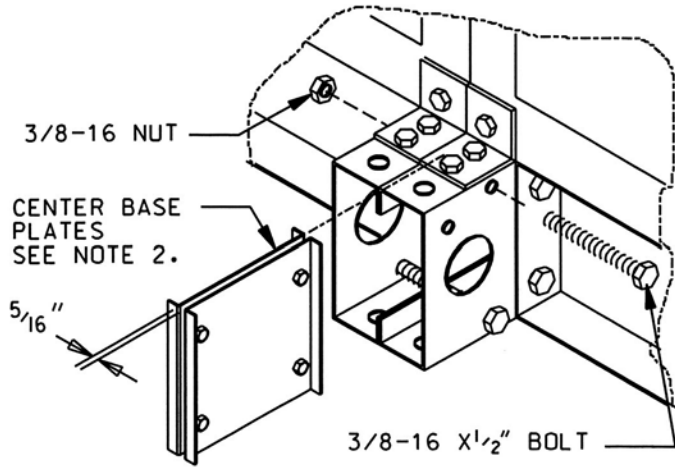
1. Rig the unit into position and line shipping sections up in direction of air flow. Sections must be pulled together to fasten using a furniture clamp or straps.
    a. If the heatwheel section width is greater than 143", then rig the section into position using the two removable lifting channels. After section is properly placed, remove cotter pin and bolts from lifting channel and discard as seen in Figure 14

Figure 14: Cotter Pin and Bolt Detail



2. If included, remove center base plates that are attached to the base channels and save for Step 4.
3. If the unit has a factory installed base rail, fasten the base rails together using the 3/8"-16 × 5" bolts located in the splice kit provided with the unit.
    a. To fasten two shipping sections together, two bolts are required on the one side. The bolts are run from one base rail into the other and fastened with a nut. Complete each section bottom and top before attaching additional sections.
4. Assemble the center base plates as show in Figure 15, leaving a 5/16" space between each plate to slide onto section base channels to center point of section width.
5. Once the sections are positioned together, remove the fastener in each of the channel corners (on the mating edges in the channel piece).
6. Place a flat section joining plate (found in the splice kit) over the two coned holes in the channels, so the plate spans the two sections.

Figure 15: Base Plate Detail



7. Replace the fasteners in their original position, through the joining plate.
8. Assemble the next section parallel to the assembled section by following Steps 1 – 7 above.
9. Using the 3/8"-16 × 1" bolts provided, fasten the two parallel sections' bases together as seen in Figure 16.
10. Using appropriate safety equipment if necessary, remove the fastener in each of the channel corners on the top between the two parallel sections and discard.
11. Use the 2 × 2 holed splice plate with 2 × 5/16"-18 × 1" screws and 2 × ¼" drill screws. The 2 × 5/16"-18 × 1" screws will go into the frame channel holes and the 2 × ¼" drill screws will go into the heatwheel frame channel as show in Figure 17.

Figure 16: Base Section Detail

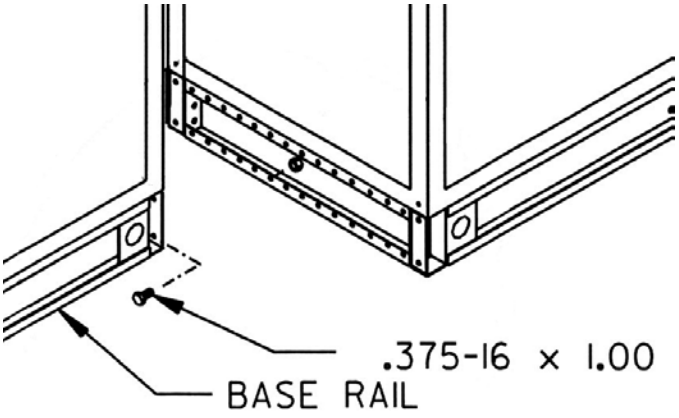
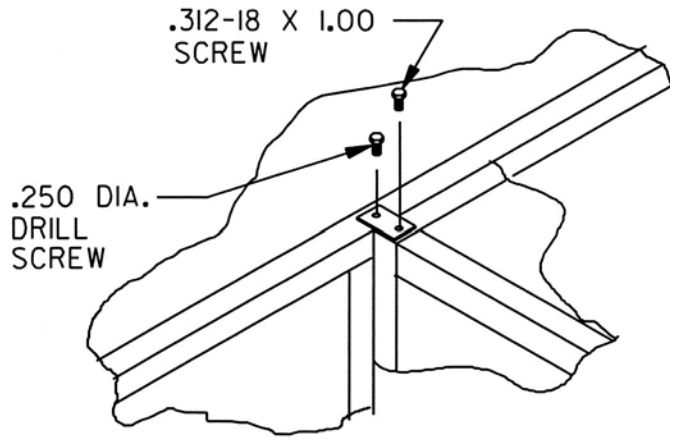


Figure 17: Frame Channel Detail



Internal Section-to-Section Mounting

If desired, shipping sections can be fastened together internally. To fasten internally, run field-provided #10 sheet metal screws or drill screws (4" long maximum) through the interior frame channel of one unit into the splice joint of the neighboring section.

The section-to-section splice joint is always provided on the leaving air side of a shipping section and seals against the frame channel on the entering-air side of the adjoining section. Align the splice joint to seat into the mating gasket to provide an air seal. If the splice joint was bent during shipping or rigging, restore it to its original position (Figure 19).

For Custom Air Handler units, ensure that the D-gasket is attached to the entering air side frame channel (Figure 18). If it has dislodged during shipping, restore to original location.

Figure 18: D-Gasket Placement Detail (Custom Air Handler Units only)

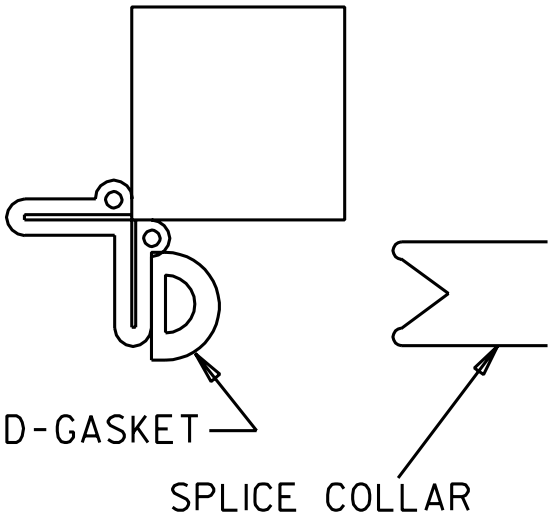
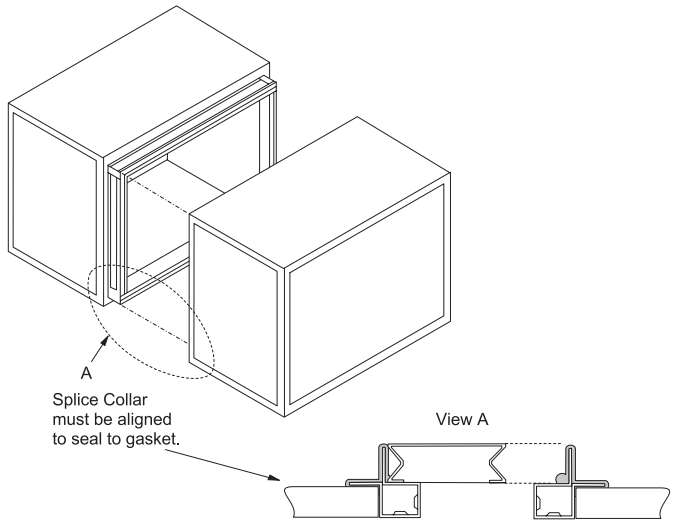


Figure 19: Internal Fastening



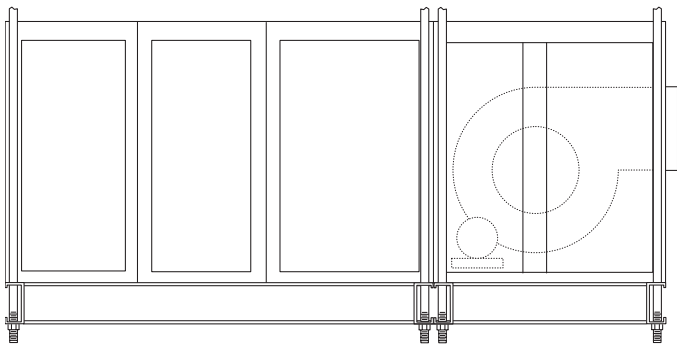
Ceiling Hung

When a unit is ceiling hung, support it with a base rail, angle iron, or channel. The Vision air handler is not designed to be suspended from the top of the unit. Before hanging, rig and completely assemble the unit. See Assembling Sections on page 8.

Ceiling Hung Using Base Rail

The optional base rail provided by the factory has 5/8" diameter holes in each corner to run hanger rods through. To properly support the unit and maintain unit integrity, support each shipping section with hanger rods in each corner (Figure 20).

Figure 20: Ceiling Suspended with Base Rail



Ceiling Hung Using Angle Iron Channel

Install field-provided angle iron or channels per SMACNA guidelines. When a unit is unitized (ships in one piece), channel support each component under the unit width (Figure 21).

NOTE: The supporting angle iron must fully support the 2" frame channel at each section joint.

When a unit is sectionalized (ships in multiple sections), channel support each component under the unit width and provide support under the full length of the unit base (Figure 22). Locate hanger rods so they do not interfere with access into the unit.

Ceiling suspension using the unit base rails is limited to unit cabinet widths less than 108". Support units with cabinets 108" wide and greater with structural members designed to support the unit at the ends and at intermediate points along the base rails.

Figure 21: Ceiling Suspended w/o Base Rail—Unitized Construction

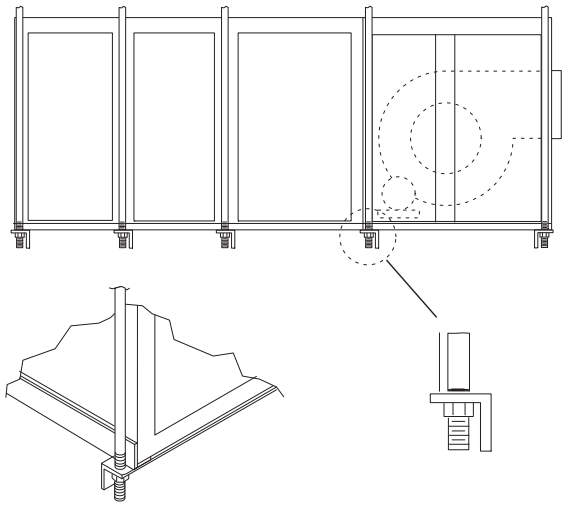
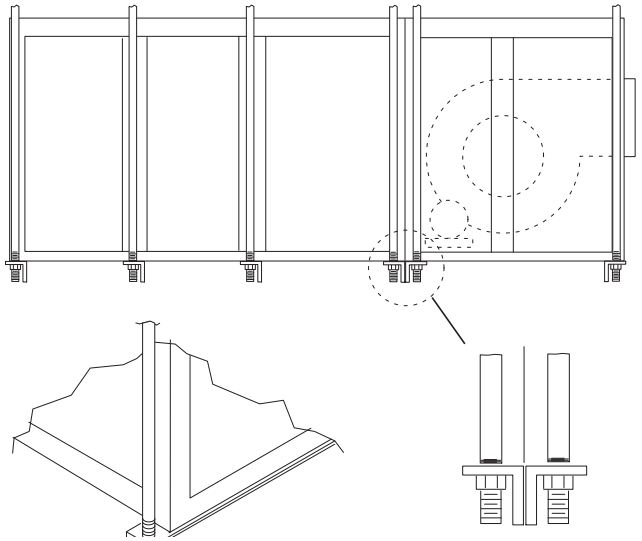


Figure 22: Ceiling Suspended w/o Base Rail—Modular Construction



Panels, Frame Channels, and Doors

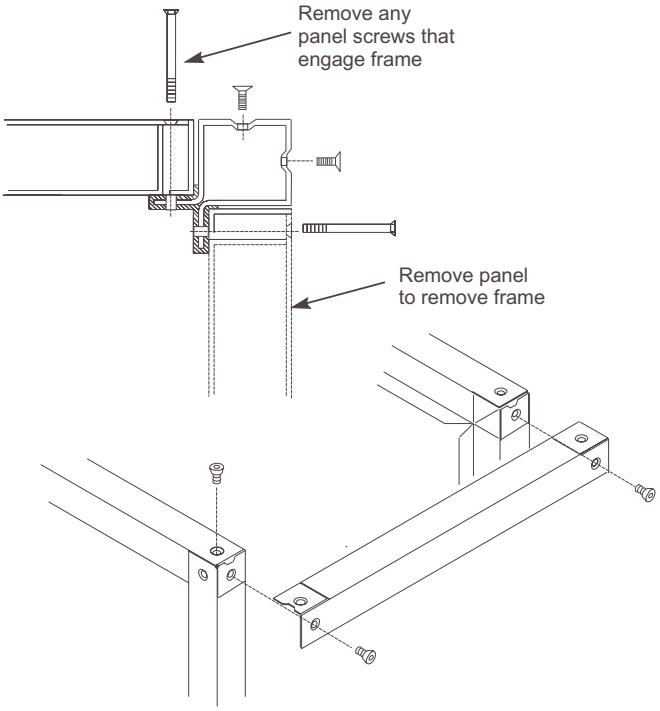
Panel Removal

To remove a side or top panel, remove the flat head Torx 30 fasteners along the sides of the panel. Lift off the panel after removing all fasteners.

Frame Channel Removal

Frame channels that run the length of the unit along the top can be removed to allow access to both the side and top of the unit. To remove the frame channel, first remove the side panel(s). Once the side panel is off, remove the flat head Torx 30 fasteners in the corner of the frame channels. Then pull the frame channel out the side. Remove any panel screws that are within one inch of the of the frame since they are engaged into the gasketed flange of the frame (Figure 23).

Figure 23: Removing Panel Screws



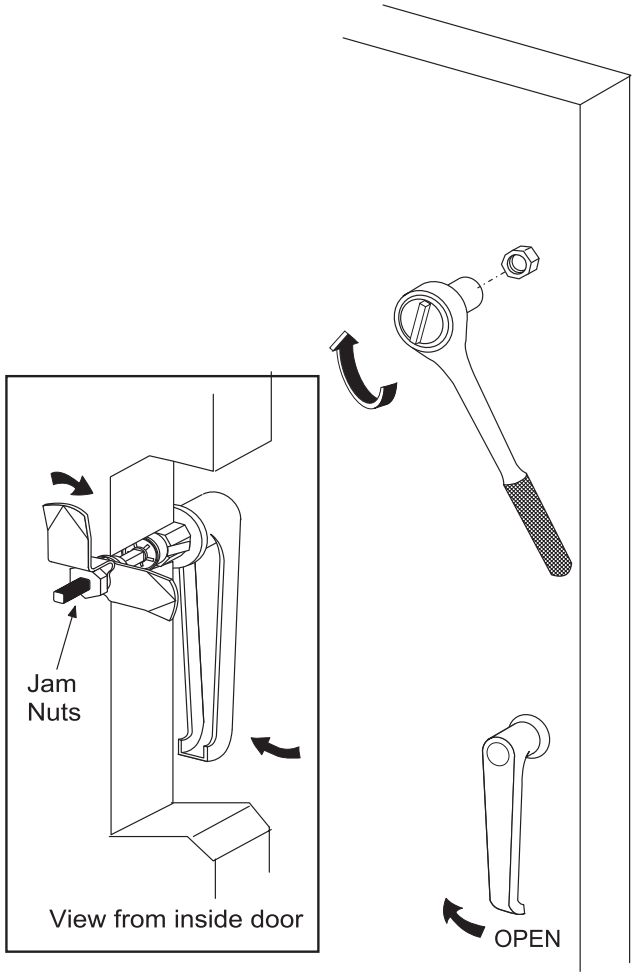
Fan Section Doors

⚠ CAUTION

Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

NOTE: Opening fan section doors requires using a 1/2" socket wrench (Figure 24), which satisfies ANSI standards and other codes that require the “use of tools” to access compartments containing moving parts or electrical wiring.

Figure 24: Opening Fan Section Door



Injected-Foam Insulated Panels

Vision air handlers are furnished with double-wall, injected-foam insulated panels. Foam panels are stronger, more rigid, and lighter than panels with fiberglass insulation. The insulation R-value is improved to 13. However, foam insulation can burn when exposed to flame or other ignition sources and release toxic fumes. Take care in cutting and sealing all field-cut openings in these panels.

Panel Cutting Procedure

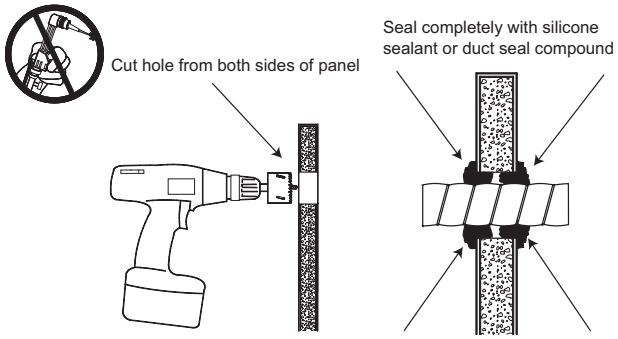
⚠ WARNING

Flame and smoke can cause equipment damage, severe personal injury, or death.

Before operating unit, seal all piping and wiring holes on both inner and outer panels with an industrial grade silicone sealant or duct seal compound. **Do not use a cutting torch or expose panel to fire.** Panel damage can occur.

1. Determine the number and location of holes required for electrical conduit, piping, and control wiring as follows (also refer to Figure 25):
    a. Check that adequate space is available inside the unit for conduit or pipe routing.
    b. Do not locate holes in a panel that provides access to key maintenance components such as filters and fan assemblies.
    c. Do not locate where the conduit or piping blocks airflow or obstructs hinged access doors.
2. Once a proper location is determined, drill a small pilot hole completely through the panel. Then use a sharp hole saw or a saber saw and cut from each side of the panel.
3. Seal the double-wall panel on each side with an industrial/ commercial grade silicone sealant or duct seal compound. It is extremely important to seal each panel hole or penetration securely so that it is airtight, watertight, and that there is no exposed foam insulation.

Figure 25: Cutting/Sealing Injected-Foam Insulated panels



Prop 65—Substances in fuel or from fuel combustion can cause personal injury or death, and are known to the State of California to cause cancer, birth defects or other reproductive harm.

Field Mounting Junction Boxes and Other Components

For field mounting 4" × 4" or smaller junction boxes to the standard panel exterior, use a minimum quantity of four, 3/16" diameter pop rivets. DO NOT use self-tapping drill screws. They will not tighten nor secure properly and panel damage can occur.

If larger, heavier components require mounting on unit panels, use through-bolts with flat washers through both outer and inner panels. To maintain panel integrity, seal both ends with an industrial/commercial grade silicone sealant or duct seal compound.

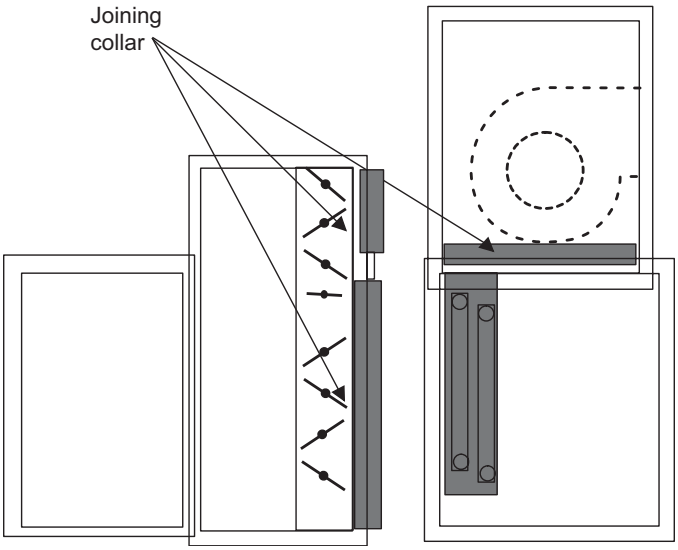
The unit frame channel is another excellent location for securing heavier components; self-tapping screws are not acceptable. Ensure that the location permits the full operation of all access doors and panels and does not interfere with other vital components.

Face and Bypass Section Mounting

Internal face and bypass, and external face and bypass for sizes 003 to 035 are mounted together using the instructions for horizontal components and do not require additional instruction.

For all size units that bypass directly into a vertical fan section and for sizes 040 to 090 with external face and bypass, use the following instructions.

Figure 26: Assembly of Fan Coil Sections



Bypass Into a Vertical Fan Section

Vertical coil sections and the top mounted fan section always ship separately and must be mounted together at the job site. The vertical coil section and the bypass duct each has a joining collar mounted on the leaving air side of the section and duct, respectively (Figure 26). The mounting collar fits into the side (bypass) and bottom (vertical coil section) openings in the fan section. To correctly position the collars in the fan openings, assemble the fan and coil section first. Use the steps below for assembly.

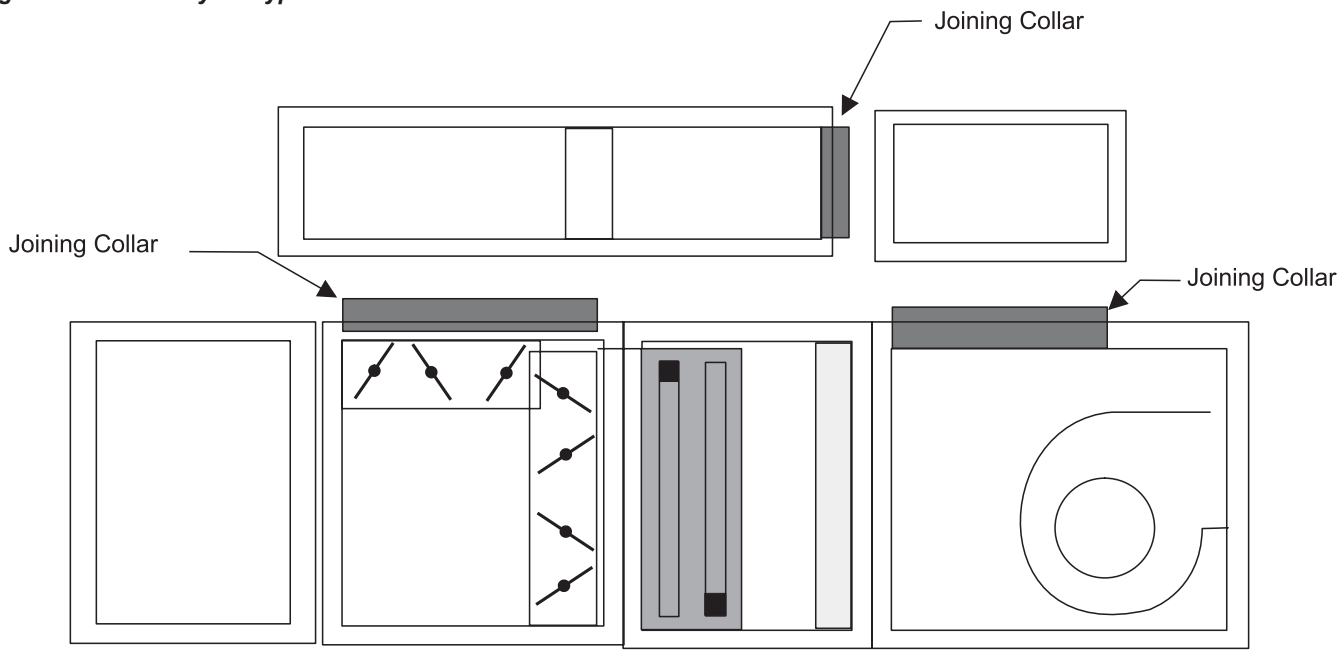
1. Place the vertical coil section in position. If an access section is positioned downstream from the coil section and not already assembled to the coil section, secure the two sections together.
2. Lift the fan section on top of the vertical coil section, taking care to line up the joining collar in the bottom of the fan section.
3. For sizes 003 to 035, the bypass duct is integral to the unit construction and does not require attachment to the bypass section. For sizes 040 to 090, position and assemble the bypass duct to the bypass section before joining to the fan.
4. Once the fan is positioned on top of the vertical coil section and the bypass duct and bypass section are assembled, position the two assemblies and line up the joining collars with the openings in the fan and vertical coil section.
5. Once the sections are lined up and in position, secure the unit together by fastening joining plates to the unit.

External Face and Bypass Duct Assembly (Sizes 040 to 090)

When unit sizes 040 to 090 are ordered with external face and bypass, the bypass duct ships separately and must be attached to the unit in the field. The joining of the bypass duct to the unit must be done after the unit is assembled. Also, if the bypass duct is over 90" long, the duct does not ship in one piece and must be field assembled. The field assembly of the bypass duct to the unit requires the following steps (also refer to Figure 27).

1. Position the unit shipping sections together and assemble in the equipment room.
2. After the unit is assembled, lift the duct into position over the unit. Joining collars are shipped factory assembled to the unit and duct. There is a joining collar located in the top of the bypass opening and in the leaving air side of the bypass duct. These joining collars are used to provide air seals. Line up the duct with the top openings in the unit.
3. If the bypass duct is longer than 90", the duct ships in more than one piece and must be field assembled. Place the piece of duct that has the joining collar on the bottom on top of the unit first. Once it is in place, position the other piece of duct. Take care to fit the splice collar into the first piece of duct and then lower the other end into the bypass opening.
4. Once the duct is positioned correctly, fasten the duct pieces together with the joining plate provided. To do this, remove the fasteners in the corners of the duct assemblies, place the plate over the holes in the corners, and then replace the fasteners (Figure 10 on page 9).

Figure 27: Assembly of Bypass Duct to Unit



Multizone Assembly

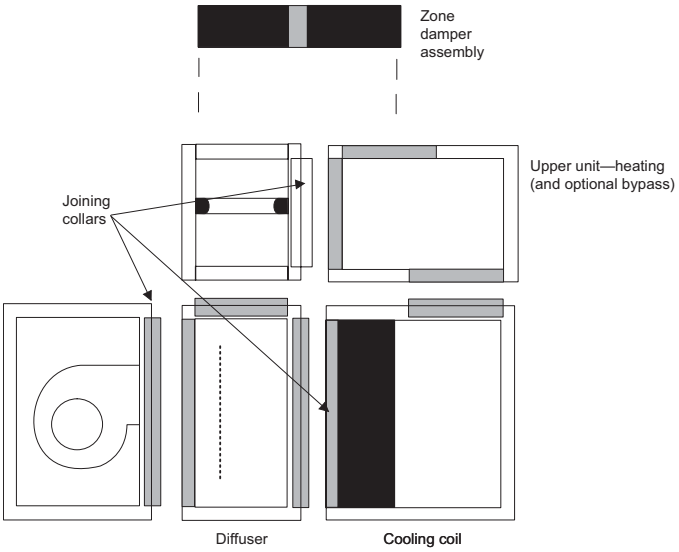
The multizone section may ship completely assembled or it may ship in numerous pieces. Whether the section ships in a single piece or multiple pieces depends on customer requirements and the unit size. When a multizone section is over 90" high or 90" wide, split it into sections for shipping.

The unit may ship in 1, 2, 3, 4, or 5 separate pieces, see Figure 29. Typically, the multizone damper assembly ships separately (see Multizone Damper Assembly and Figure 29) and must be attached at the job site. Attach the damper after the other components are assembled. Use the instructions below for assembling the multizone section (also refer to Figure 29).

1. If the diffuser and the cold deck section ship separately, join them together first. The joining collar mounted in the diffuser fits into the entering air side of the coil section. Line up the two sections and fasten together.
2. Once the diffuser and cold deck sections are joined, lift the hot deck and bypass sections in place on top of the diffuser/ cold deck section. If possible, assemble the hot deck and bypass section (if there is one) together before lifting on top. There always is a joining collar in the diffuser. The joining collar provides the seal between the sections joints. It is important to line up and fit the collar in the hot deck and bypass section. For vertical applications, the cold deck also has a joining collar in the discharge opening. This collar fits in the bottom of the vertical bypass section.
3. After the components in the multizone are fitted together, fasten the joining plates to the corners in the unit exterior.
4. If a damper was ordered, assemble it to the section (see Multizone Damper Assembly and Figure 29).

NOTE: Verify that the joining collars are aligned to seat into the gasket. Straighten any collars distorted from shipping or from rigging.

Figure 28: Multizone Sections Assembly



Multizone Damper Assembly

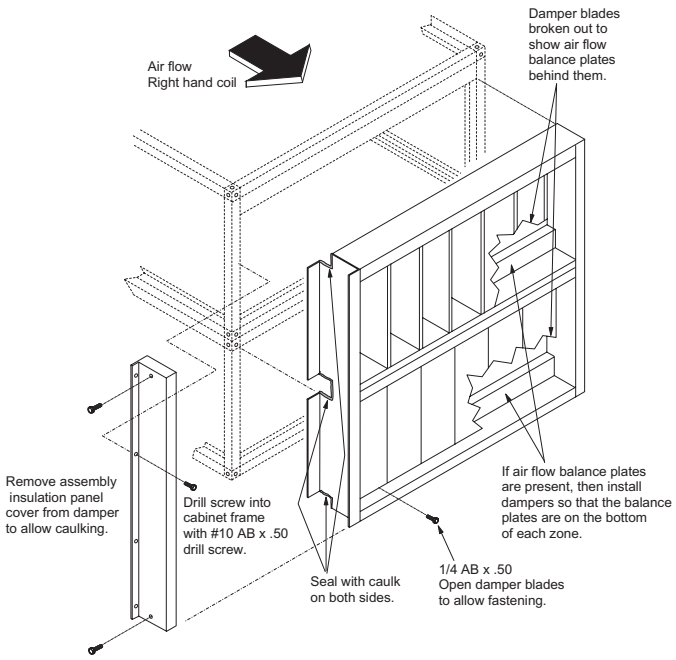
When a multizone unit is ordered with dampers, depending on the multizone configuration and size, the damper assembly may ship separately (all horizontal and units with a total height over 90").

When the dampers are not factory assembled to the unit, they ship to the job site on a skid. An assembly kit with screws and an instruction drawing are included with the damper for field assembly to the unit.

To assemble:

1. First remove the side plate that encloses insulation from both sides of the damper assembly.
2. Lift the damper assembly into position (Figure 29).
3. Fasten the assembly to the frame channels within the multizone openings.
4. Use caulking to seal up the areas around the unit frame channel to prevent any air leakage.
5. After caulking, put the side plates back in place and secure. Damper shaft extensions are provided on both ends of the damper assembly for actuation. The dampers are linked together by a linkage bar on both ends of the damper. The linkage bar is cut at the time of installation to divide the damper into the required number of zones (refer to Multizone Damper Adjustment on page 17).

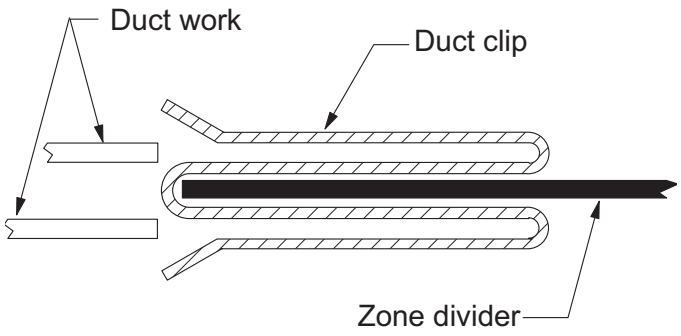
Figure 29: Multizone Damper Assembly



Duct Connections

Use flexible connectors on the outlet and inlet duct connections of all units. Each zone divider has a W-shaped duct clip. Insert ductwork into this clip (Figure 30).

Figure 30: Duct Connectors



NOTE: Before connecting to ductwork, refer to Multizone Damper Adjustment below.

Multizone Damper Adjustment

The installer must clear the damper assemblies of construction dirt and debris. These materials result in higher torque requirements and may bend or damage damper components.

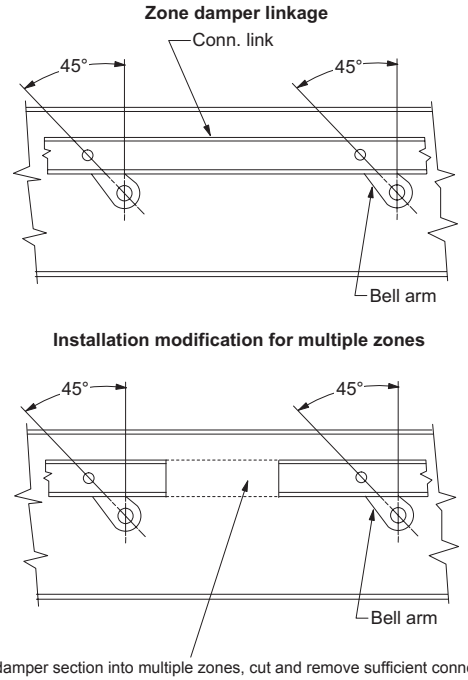
Before you begin:

1. Verify that dampers are square and operating smoothly before ducting.
2. Install duct access panels on the downstream damper for inspection and maintenance.

If multizone dampers do not close properly, adjust the blades as follows:

1. Loosen set screws in bell arms for all zones.
2. Close all cold deck dampers tightly.
3. Move bell arms so they are at a 45° angle to the vertical center when viewing the zone dampers from the cold deck end of the damper section (Figure 31).
    a. Two-deck zone dampers—The cold deck closes when the bell arms are 45° from the vertical center. The hot deck closes when the bell arms are 45° clockwise from the vertical center.
    b. Three-deck zone dampers—The cold deck closes when the bell arms are 45° clockwise from the vertical center. The hot deck closes when the bell arms are 45° counterclockwise from the vertical center.
4. Tighten set screws on bell arms while holding the dampers closed.
5. All zone damper blades should close properly. If one or a few zones do not close completely, repeat the procedure for these zones.

Figure 31: Bell Arms at 45° Angle to Vertical Center



To divide the damper section into multiple zones, cut and remove sufficient connecting link to allow adjacent zones to operate independently.

NOTE: The damper blades on two-deck dampers seal through several degreesof shaft rotation.The damper blades can rotate 360° and do not engage a stop.The hot deck blades are mounted at a 90° to the cold deck blades. Beforeinstalling the zone duct, set up linkages and dampers and adjust. If adjustmentis required and access to the blades is restricted, observe the cold deck bladeposition by removing the cabinet panel on the coil section.

Multizone, Mixing Box and Economizer Damper Torque Requirements

On multizone units, the actuator must drive the connection link for proper damper actuation. Do not activate multiple dampers must from the shaft extension opposite the connection link.

Mounting Actuators

⚠ CAUTION

Maximum damper rotation is 70°. Maximum shaft torque is 205 inches/pound. Greater rotation or torque can cause equipment damage.

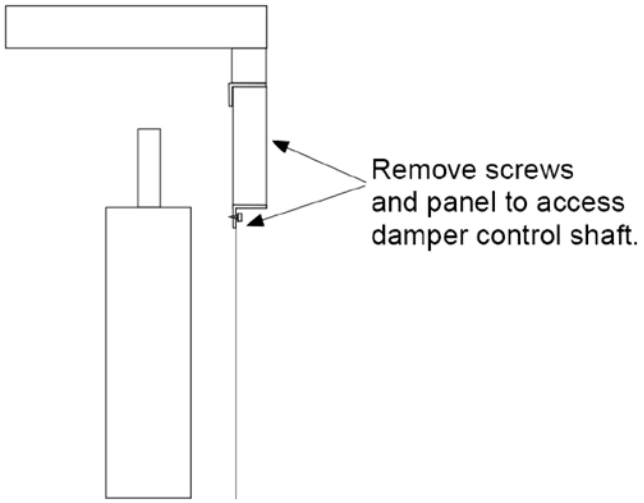
The installing contractor is responsible for the mounting of all field-installed actuators. No provisions are made for the location of these actuators due to the number of options and arrangements available and the variety of specific applications. Typically, actuators are mounted inside the cabinet. Provide proper support for the actuator to avoid excessive stress in the cabinet, linkage, or damper shafts.

Fresh air and return air dampers can be linked together and driven from the same actuator if the dampers are the same size. If the dampers are different sizes, they must be driven by separate actuators and controlled appropriately. Exhaust dampers are always driven by a separate actuator.

EXCEPTION: For the angled economizer, the fresh air and return air dampers must always be driven by separate actuators.

A typical rotary electric actuator can handle up to 40 sq. ft. of damper. For pneumatic actuators, allow 5 in-lb per square foot of damper area.

Figure 32: Filler Panel above Dampers on Angled Economizer Sections



Angled Economizer Actuator Access

For units less than 34" in height, including standard sizes 003-006, access to the damper drive shafts of the angled economizer is via the top panel of the section. There will be limited to no access to the actuators if the top panel cannot be removed.

Access to the fresh air and exhaust air damper drive shafts of the angled economizer is via a removable panel located above each damper and weather hood (Figure 32). There are two options for gaining access to the return air damper drive shaft:

1. If the unit has a housed return fan or plenum exhaust fan, an access section should be located immediately downstream of the economizer section for access to the return air damper drive shaft.
2. If the unit has a plenum return fan or housed exhaust fan, access to the return air damper drive shaft can be obtained via the fan section's access door and the removable filler panel located above the return air damper.

Face Bypass Damper Torque Requirements

Face and bypass dampers may or may not be linked together. When dampers are placed before a single bank of coils, they always are linked together and require a single actuator. When dampers bypass a stacked or staggered coil, the dampers are not linked and require multiple actuators. Unit sizes 040 to 090 provided with external face and bypass require three actuators. Other arrangements with stacked or staggered coils require two actuators. A damper shaft extension is provided. Normally, the shaft extension is located on the drive side of the unit, but it can be moved to the other side.

Face and bypass dampers have a torque requirement of 10 in-lbs per square foot of damper face area.

Isolation Dampers for Multiple Fans

Optional isolation dampers can be provided on multiple fans to prevent backflow through a fan that is turned off for service. These isolation dampers are not intended to be used to control flow through the fan. The isolation damper for a fan that is going to be started must be positioned in the full open position before the fan is started. Do not start a fan with the damper located at the inlet with the damper fully or partially closed. This can cause airflow, vibration, and sound problems that can lead to failure.

Isolation dampers can be provided with actuators that are mounted in the airstream. Actuator sizing for the isolation dampers should be based on 9 in-lb per square foot of damper.

Piping and Coils

When designing and installing piping:

- Follow applicable piping design, sizing, and installation information in ASHRAE handbooks.
- Observe all local codes and industry standards.
- Do not apply undue stress at the connection to coil headers; **always use a backup pipe wrench.**
- Support pipework independently of the coils.

Water Cooling Coils

- Water supply, water return, drain, and vent connections extend through the end panel of the coil section. All connections are labeled on the end panel.
- Water supply and water return connections are typically male NPT iron pipe.
- When installing couplings, do not apply undue stress to the connection extending through unit panel. **Use a backup pipe wrench to avoid breaking the weld between coil connection and header.**
- Follow recommendations of the control manufacturer regarding types, sizing, and installation of controls.

Direct Expansion Coils

- The coil distributor and suction connection extend through the end panel of the coil section.
- Check nozzle in distributor for proper tonnage.
- When a field supplied thermostatic expansion valve is used, it is located outside the unit and connected directly to the distributor. Do not apply heat to the body of the expansion valve.
- The thermostatic expansion valve must be of the external equalizer tube type. Connect the 1/4" diameter external equalizer tube provided on the coil to connection on expansion valve.
- Use care when piping the system to see that all joints are tight and all lines are dry and free of foreign material. For typical refrigerant piping, see condensing unit product manual.

Steam Coils

Piping (see Figure 33)

- All steam coils in units are pitched toward return connection.
- Steam supply and steam return connections typically are male NPT iron pipe and are labeled on the end panel of coil section. Connections extend through the coil section end panel.
- When installing couplings, do not apply undue stress to the connection extending through unit panel. **Use a backup pipe wrench to avoid breaking the weld between coil connection and header.**
- Support piping independently of coils and provide adequate piping flexibility. Stresses resulting from expansion of closely coupled piping can cause serious damage.
- Do not reduce pipe size at the coil return connection. Carry return connection size through the dirt pocket, making the reduction at the branch leading to the trap.

Coils

- Install vacuum breakers on all application to prevent retaining condensate in the coil. Generally, the vacuum breaker is connected between the coil inlet and the return main. The vacuum breaker should be open to the atmosphere, and the trap design should allow venting of large quantities of air.
- Do not drip supply mains through the coil.
- Do not attempt to lift condensate when using modulating or on/off control.

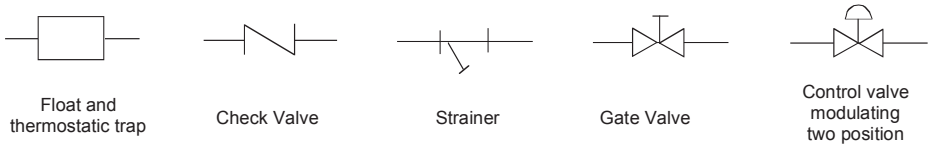
Traps

- Size traps in accordance with the manufacturers' recommendations. Make sure that the required pressure differential is always available. Do not undersize.
- Use float and thermostatic or bucket traps for low pressure steam. On high pressure steam, use bucket traps. Use thermostatic traps only for air venting.
- Use bucket traps for on/off control only.
- Locate traps at least 12 inches below the coil return connection.
- Multiple coil installation
- Individually trap each coil or group of coils that is controlled individually trapped.
- Coils in series—use separate traps for each coil, or bank of coils.
- Coils in parallel—a single trap can be used, but an individual trap for each coil is preferred.
- Do not attempt to lift condensate when using modulating or on/off control.
- With coils arranged for series airflow, use a separate control on each bank or coil in the direction of airflow.

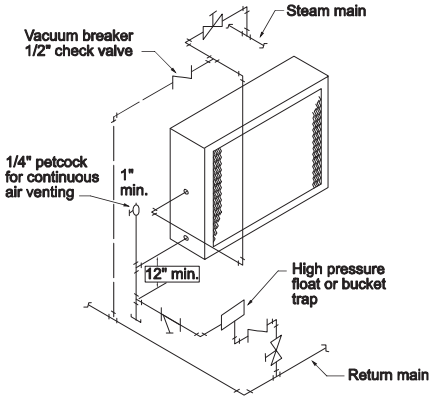
Valves

- Do not use modulating steam valves on high pressure systems.
- Properly size modulating valves. **Do not undersize.**
- Freezing conditions (entering air temperatures below 35°F).
- Daikin strongly recommends 5JA, 8JA, 5RA and 8RA coils.
- Supply 5 psi steam to coils at all times.
- Do not use modulating valves. Provide control by face and bypass dampers.
- Consider using two or three coils in series with two position steam control valves on the coil or coils that handle 35°F or colder air. Use a modulating valve on the downstream coil to provide the desired degree of control.
- Thoroughly mix fresh air and return air before it enters the coil. Also, to obtain true air mixture temperatures, properly locate temperature control elements.
- As additional protection against freeze-up, install the trap sufficiently below the coil to provide an adequate hydrostatic head to remove condensate during an interruption in the steam pressure. Estimate three feet for each 1 psi of trap differential required.
- On startup, admit steam to coil ten minutes before admitting outdoor air.
- Close fresh air dampers if steam supply pressure falls below the minimum specified.

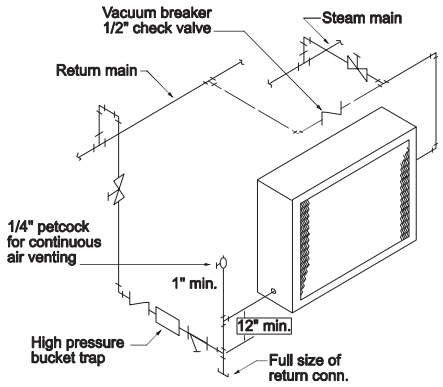
Figure 33: Piping Arrangements



High Pressure (over 25 psi)

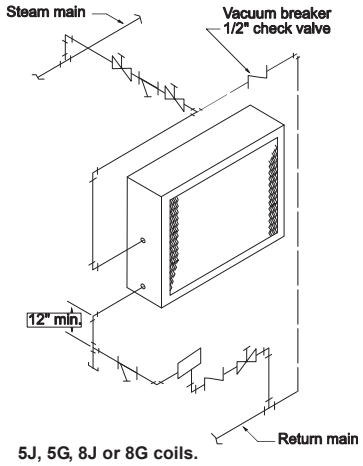


5GA or 8GA coils. Note that the addition of a vacuum breaker to permit the coil to drain during shutdown.

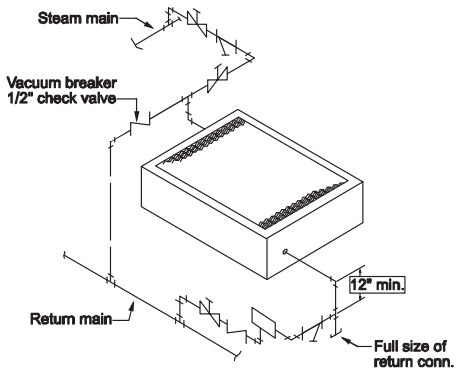


5TA, 8TA, or 5HA coils. Condensate is lifted to overhead return main

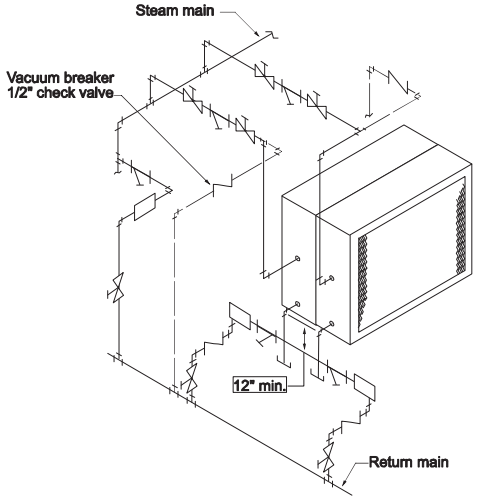
Low Pressure (to 25 psi)



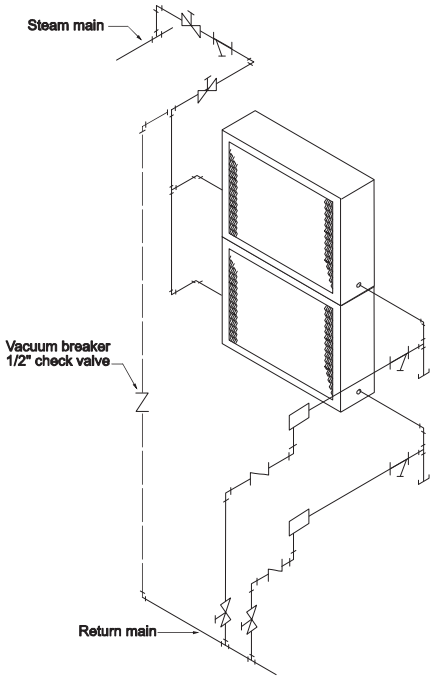
5J, 5G, 8J or 8G coils.



5RA, 8RA, or 5SA coils. Installed



5JA or 8JA coil. Installed in series. Note that each coil must have a separate control valve and trap.



5RA, 8RA, or 5SA coils. Banked two high, individual trapping of each coil as shown is preferred.

Water Heating Coils

⚠ CAUTION

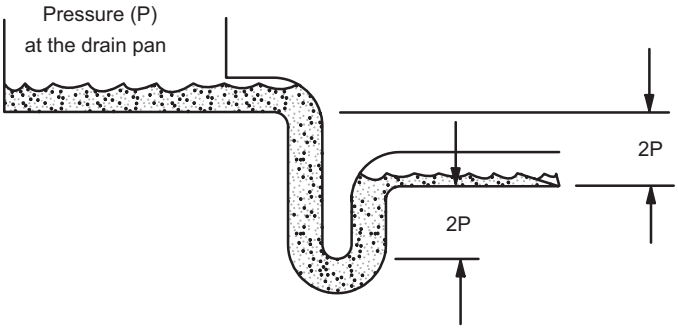
Improper installation, use, or maintenance of water heating coils can cause equipment damage. Read and follow instructions carefully.

- Water supply and water return connections extend through the end panel of the coil section. All connections are labeled on the end panel.
- Water supply and water return connections are male NPT iron pipe.
- When installing couplings, do not apply undue stress to the connection extending through unit panel. Use a backup pipe wrench to avoid breaking the weld between the coil connection and header.
- Follow recommendations of the control manufacturer regarding types, sizes, and installation of controls.
- Do not use hot water coils with entering air below 40°F.
- If fresh air and return air are to be heated by a hot water coil, carefully design the system to provide thorough mixing before air enters the coil.
- To prepare coils for winter operation, see Winterizing Water Coils on page 47.

Drain Pan Traps

Run drain lines and traps full size from the drain pan connection. Install drain pan trap to allow condensate to drain freely. On both blow-through and draw-through units, the trap depth and the distance between the trap outlet and the drain pan outlet must be twice the static pressure in the drain pan section under normal operation so the trap remains sealed (Figure 34).

Figure 34: Allow Adequate Distance Between Trap Outlet and Drain Pan Outlet



Internal Isolation Assembly Adjustment

On units with internally isolated fan and motor assemblies, the assemblies are secured for shipment.

Before Operating the Unit

Remove the shipping brackets and tie-down bolts (refer to Figure 36, Figure 37 and) and discard. The shipping brackets located on the opposite drive side of the unit are difficult to access from the drive side of the unit. Either remove them before the unit is assembled, or remove the panel on the opposite drive side to gain access.

The spring isolators under the four corners of the fan and motor assembly are factory adjusted while the fan was not running. With the unit operating at normal cfm and static pressure, all the isolators should be at the same height opening (Table 1 through Table 5). If adjustments are required, loosen the 1/2" cap screw on top of the isolator and turn the adjusting bolt to lower or raise the fan and motor base. Retighten the cap screw when adjustments are completed.

Table 1: Motor Beside Fan Spring Mount Adjustments

Spring Mount Adjustment at Rest			
Isolator Position	**Top or Bottom Horizontal H**	**Downblast H**	**Upblast H**
Unit Sizes 003 – 035			
1	3.75	3.75	4.25
2	4.25	3.75	4.25
3	4.25	3.75	4.25
4	3.75	3.75	4.25
Unit Sizes 040 – 090			
1	6.00	6.00	6.50
2	6.50	6.00	6.50
3	6.50	6.00	6.50
4	6.00	6.00	6.50

Table 2: Motor Behind Fan Spring Mount Adjustments

Spring Mount Adjustment at Rest			
Isolator Position	**Top or Bottom Horizontal H**	**Downblast H**	**Upblast H**
Unit Sizes 003 – 035			
1	6.75	6.75	6.75
2	6.75	6.75	6.75
3	6.75	6.75	6.75
4	6.75	6.75	6.75
Unit Sizes 040 – 090			
1	6.75	6.75	6.75
2	6.75	6.75	6.75
3	6.75	6.75	6.75
4	6.75	6.75	6.75

For models 040 through 090 with housed fans, the isolators should be at equal height (6") during fan operation. Center the fan outlet in the outlet panel opening. If adjustment is required, loosen the bolt on top of the isolator assembly (. Turn the adjustment nut below the fan frame to lower or raise the fan motor and frame assembly. Retighten the bolt on top of the isolator assembly.

Table 3: Class II Belt-Drive Plenum Fan Spring Height

Fan Size	Isolator Type	Operating Height (in.)
13–16	Standard 2" Deflection	4.5
18–36	Standard 2" Deflection	4.0
13–36	Seismic	4.0
40–60	All	6.75

Table 4: Class III Plenum Fan Spring Height

Cabinet Width (in.)	Isolator Type	Operating Height (in.)
Width < 108	All	4.0
Width ≥ 108	All	6.75

Table 5: Class II Direct-Drive Plenum Fan Spring Height

Fan Size	Isolator Type	Operating Height (in.)
11–36	All	4.0
40–44	All	6.75

Figure 35: Adjusting Large Spring Mount Assembly

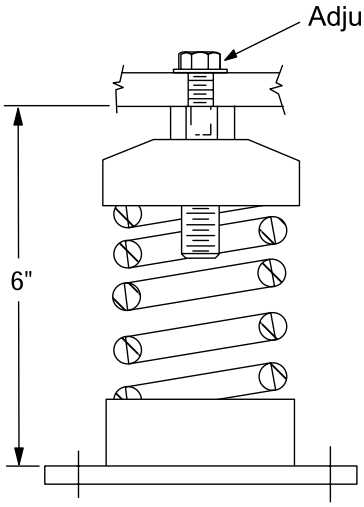


Figure 36: Removing "Motor Behind" Shipping Brackets

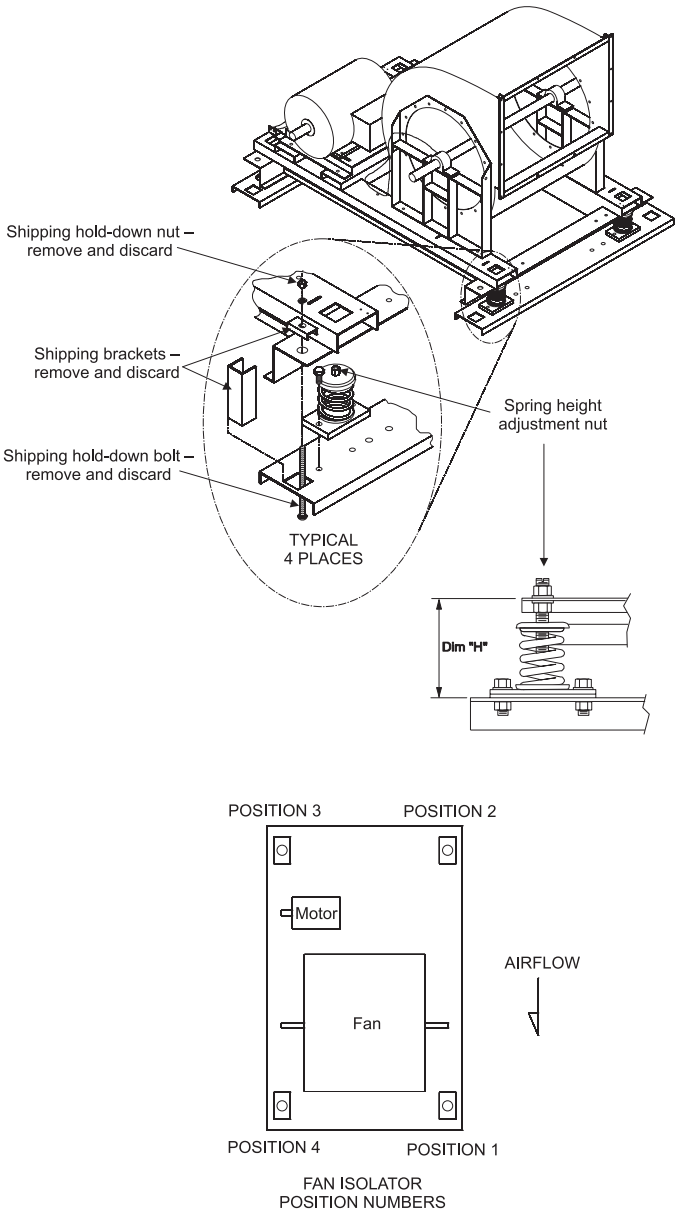


Figure 37: Removing "Motor Beside" Shipping Brackets

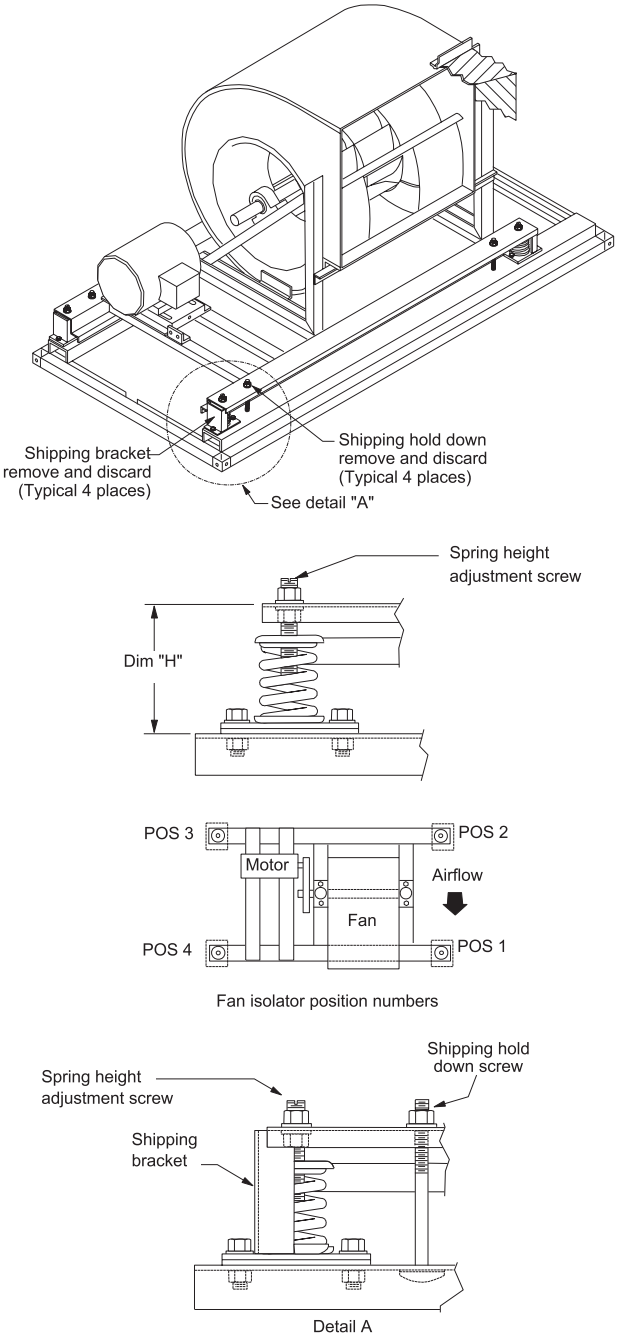
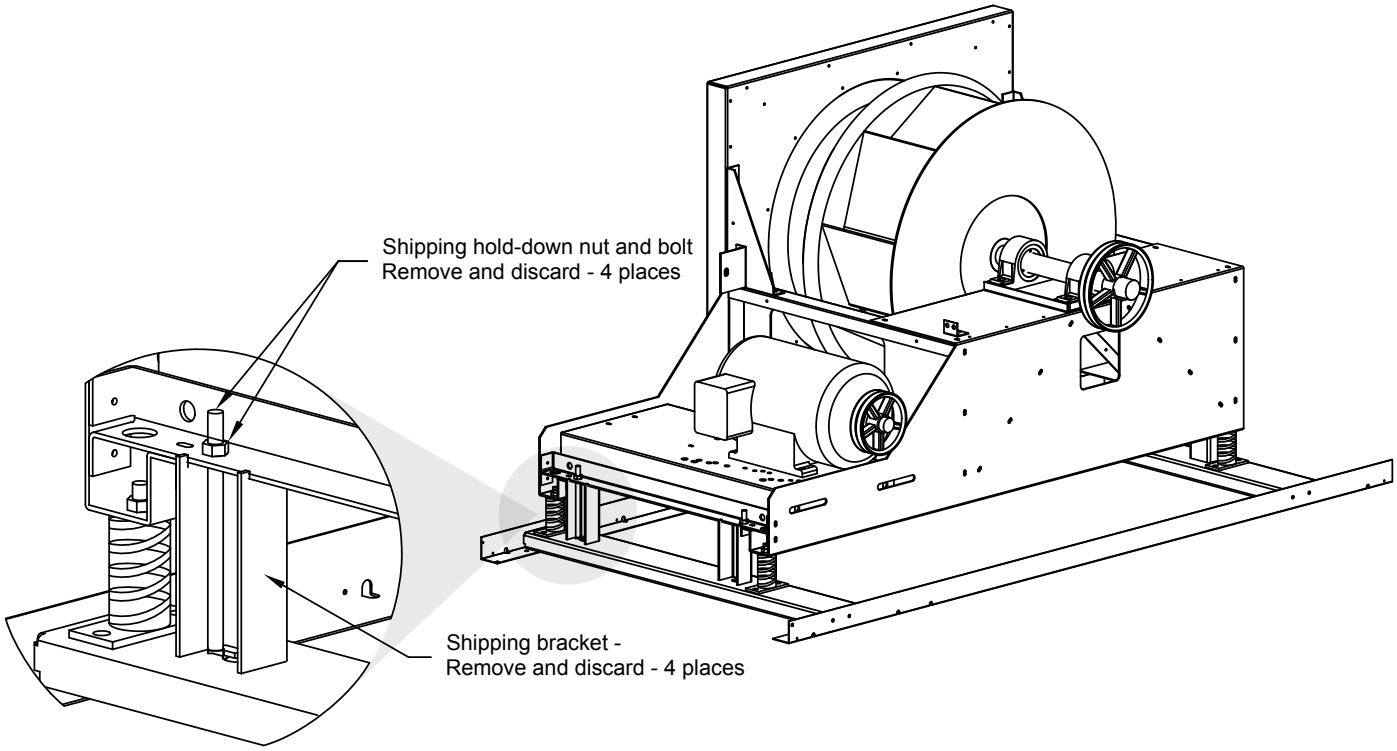


Figure 38: Plenum Fan Typical Shipping Brackets



OSHPD Seismic Anchoring/Mounting

For seismic stability of the unit, additional anchoring and mounting procedures are required. The anchoring options and corresponding spectral response acceleration are given in Table 6. Holes in the Vision/Skyline base frame are to be field drilled. Any mounting hardware is to be field supplied.

Table 6: OSHPD Mounting

Attachment Method	SDS	Attachment System (by Others)	
		Spacing	System
Bolted attachment to steel (Figure 39)	1.93	48	5/8" DIA SAE Grade 5
Welded attachment to steel (Figure 40)	1.84	48	3/16" Weld Leg and 4" welded length
Bolted attachment to Concrete (Figure 41)	1.68	24	Hilti HAD-P M16 × 190/40 with 4-3/4" embedment

Figure 39: Unit with Base Frame Mounted on Steel

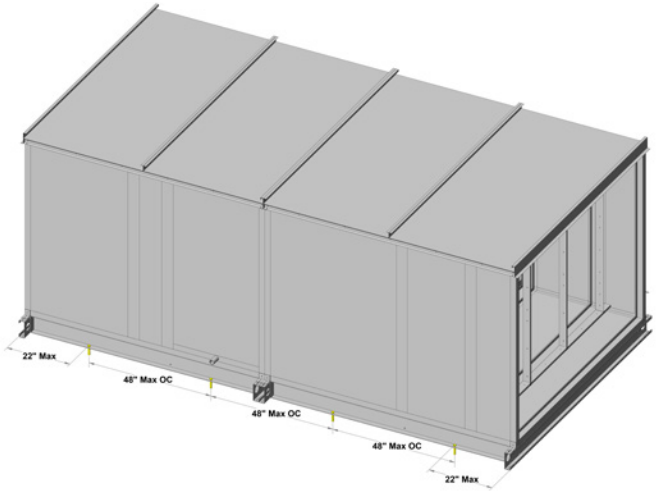


Figure 40: Unit with Base Frame Welded

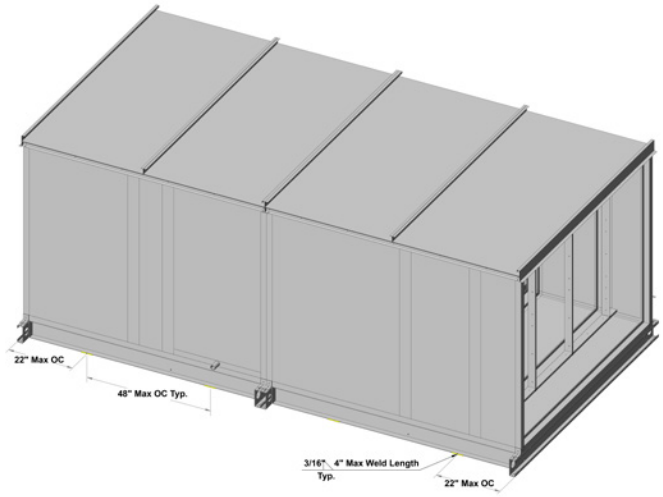
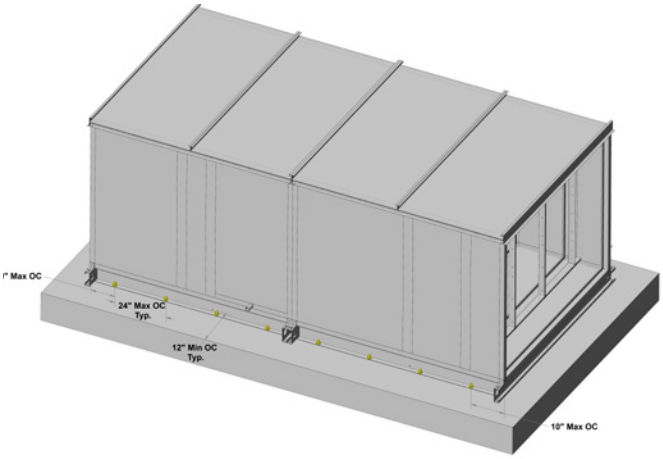


Figure 41: Unit with Base Frame Mounted on Concrete



Wiring

⚠ DANGER

Capacitor Hazardous Voltage! Failure to disconnect power and discharge capacitors before servicing will result in serious injury or death.

Disconnect all electric power (including remote disconnects)before servicing. Perform lockout/tagout procedures to ensure that power can not be energized. For variable frequency drives,or other energy storing components that have been furnished and mounted by either Daikin, or by others, refer to the specific manufacturer's literature for allowable waiting periods For discharge of capacitors. Verify capacitors have been discharged using an appropriate voltmeter.

⚠ CAUTION

Use copper conductors only! Failure to use copper conductors can result equipment damage.

- Electrical service to each fan must correspond to the rated voltage on the motor or electrical panel nameplate and conform to the National Electric Code and local restrictions.
- Connect each fan section metal frame to the building electrical ground.
- A door electrical interlock is not provided as standard.
- Thermal motor protection is external to the unit. Unless the unit is provided with a variable frequency drive (VFD) or a unit mounted starter, thermal protection and a disconnect switch provision per electric codes are provided by others.
- When the unit is factory provided with a disconnect switch, starter or a variable frequency drive (VFD), the components are mounted on the outside of the unit cabinet. Factory wiring is provided from the device to the unit internal motor.
- All electrical components must be grounded to the building central ground. Suitable ground wires and/or (bonding) lugs are provided for all motors, disconnect switches, starters, and variable frequency drives. Provide dedicated ground (bonding) copper conductors in accordance with local and national codes.
- For units provided with a motor only or with an external junction box, wire connections are made with suitable wire nuts or connectors for the gauge wires provided.
- For units provided with a disconnect switch or starter, field wiring will be terminated to lugs. Wire size and lug torque requirements are shown on the unit electrical schematic provided in the component print pocket. All power supply wire connections must be torqued as shown.
- When the unit is provided with a VFD only, refer to the VFD manual for wire size and torque requirements. For instances where multiple motors are being driven by a single VFD, be sure to set up the VFD and size the wiring according to the power requirements of all motors that are being driven by that VFD.
- When not being serviced, close and secure electrical panel doors to prevent ingress of moisture and airborne contaminants.

Control Wiring

- Access to the VFD is through the fan cabinet access door for single fans. Provide shielded cable only as described in the provided VFD manual. Route wire through the panel so that it does not interfere with an other components or access doors. Do not drill through drip pans or drain pans. Refer to the provided VFD installation manual for detailed control wiring instructions.
- For multiple fans in parallel, the VFD(s) are mounted inside of the electrical enclosure, which is mounted on the exterior of the fan section. When multiple fan sections are provided with multiple VFDs, they must be set up so that the fans always start simultaneously and are set to ramp up and down together. Do not attempt to run fans in parallel at different speeds as this can result in uneven airflow that can cause performance, sound, and vibration problems that can lead to failure. Provided that the fan is capable of running fast enough and the motor is sized appropriately, VFDs may be operated up to a maximum recommended frequency of 90 Hertz for 1800 RPM and slower motors. Motors that are 3600 RPM may be operated up to a maximum speed of 4000 RPM or 66.7 Hertz provided the fan is rated that high. Operation above 4000 RPM can damage motor bearings and is not recommended.

Startup Checks

⚠ WARNING

ROTATING FAN

Can cause severe injury or death. Before servicing fans,lockout and tag out power.

⚠ WARNING

FIRE/ELECTRIC SHOCK HAZARD

Can cause property damage, personal injury or death. Wire fan power supply and ground motor frame in accordance with local electric codes.

⚠ WARNING

Fan motor requires overload protection.

Failure to provide motor overload protection can result in fire,property damage, electric shock, personal injury, or death. Connect motor to an overload protective device rated incompliance with local electric codes.

⚠ CAUTION

DO NOT OVERHEAT FAN MOTOR

High air temperatures in the fan section can cause the fan motor to burnout. On draw-through air handlers or air handlers with the fan section down the air stream from the heating section, the discharge air temperature of the heating section must not exceed 104°F (40°C).

When performing startup and service, always take thorough safety precautions. Only trained, experienced personnel should perform these functions.

Before Starting the Unit

⚠ CAUTION

Equipment damage due to loose fasteners represents improper start-up and equipment abuse. It is not covered by the warranty.

Before entering fan section, make sure that fan electrical power source is disconnected and locked in the OFF position.

1. Check that the unit is completely and properly installed with ductwork connected.
2. Check that all constru tion debris is removed and filters are clean.
3. Check that all electrical work is complete and properly terminated.
4. Check that all electrical connections are tight and that the proper voltage is connected. Phase imbalance must not exceed 2%.
5. Do not grease ball bearings on the fan shaft and motor before startup. They are prelubricated.
6. Check tightness of crews in bearings and fan wheel(s). If retightening is needed, position the fan wheel(s) per Table 7, page 29 through Table 9, page 30 and Table 10 through Table 12, page 31. Torque set screws per Table 13 and , page 31.
7. Check alignment of fan and motor sheaves and belt tension. Adjust if necessary. Check tightness of sheave setscrews and/or capscrews (refer to , page 31).
8. Leak test the thermal system to verify that connections are tight.
9. Check that the condensate drain is trapped.
10. Rotate the shaft by hand to be sure it is free.
11. If multiple fans are supplied with a block off plate and it is installed on one of the fans, make sure to only start the fans without the block off plate. Do not start any fan that has the block off plate installed on it.
12. If multiple fans are supplied with isolation dampers, make sure the isolation dampers are fully open before starting the fans.

VFD Setup

Fans ordered with VFDs that were factory installed are setup and tested prior to shipment. Prior to starting the fan(s), double check the VFD settings according to the recommendations in the VFD manual.

Once the correct VFD settings are verified, the fans should be run through a sweep of the full range of operating speeds that are expected to check for any vibration issues. If any areas of concern are located, it is recommended to lock out those frequencies using the VFD (see lock out frequencies or skip frequencies in the VFD manual). This will ensure that the fans will never operate continuously at those points, but will rather pass through them to get to the desired points of operation.

Fan Startup

⚠ WARNING

ROTATING FAN

Can cause severe injury or death. Before servicing fans,lockout and tag out power.

Start and run fan. See on page 30 for proper fan rotation. Observe the rotation. If the fan operates backward, reverse two legs of the three-phase supply power.

NOTE: Variable pitch fan drives usually are provided for operation in the mid-speed adjustment range. However, the drives usually ship with the adjustment opened up for minimum fan speed. Adjust the drives for the proper airflow. See Fan Drive Adjustments on page 41.

After 48 Hours of Operation

1. Disconnect and lock electrical power source.
2. Check tightness of all bearing, wheel, and sheave setscrews (or capscrews). Refer to Table 13.
3. Recheck belt tension and adjust if necessary. Belts tensioned sufficiently to slip one to two seconds at startup will perform satisfactorily, extending life and reducing

Fan Wheel Alignment

Figure 42: Wheel-to-Inlet Funnel Relationship—Fan Wheels (Housed)

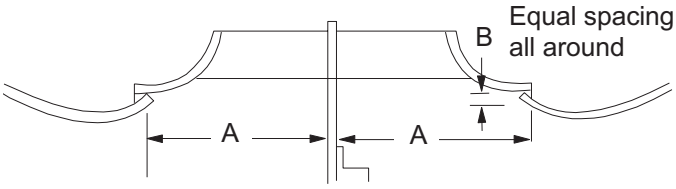


Table 7: Wheel-to-Inlet Funnel Relationship—Fan Wheels(Housed)

Airfoil[1] (in.)					
Unit sizes 003 to 035			Unit sizes 040 to 090		
Diameter	A[2] (mm)	B[3] (mm)	Diameter	A[2] (mm)	B[3] (mm)
13.22	4.56 (116)	0.21 (5.33)	20.00	7.19 (183)	0.31 (7.87)
14.56	5.06 (129)	0.21 (5.33)	22.25	7.69 (195)	0.33 (8.38)
16.18	5.62 (143)	0.21 (5.33)	24.50	8.56 (217)	0.31 (7.87)
17.69	6.90 (175)	0.22 (5.59)	27.00	9.47 (241)	0.63 (16.00)
21.56	7.59 (193)	0.24 (6.10)	30.00	10.47 (266)	0.39 (9.91)
24.00	8.45 (215)	0.23 (5.84)	33.00	11.75 (298)	0.38 (9.65)
—	—	—	36.50	325 (12.78)	0.38 (9.65)
—	—	—	40.25	363 (14.31)	0.50 (12.70)

Note:

[1]To obtain rated air performance, dimensional relationship must be held.

[2]To obtain dimension A, loosen setscrews in wheel hub(s), shiftingwheel(s) axial as needed, retightening setscrews.

[3]To obtain dimension B, loosen screw and washer fasteners around periphery of funnel(s), shifting funnel radially as required, re-torquing fasteners.

Figure 43: Wheel-to-Inlet Funnel Relationship—Forward Curved Fan Wheels

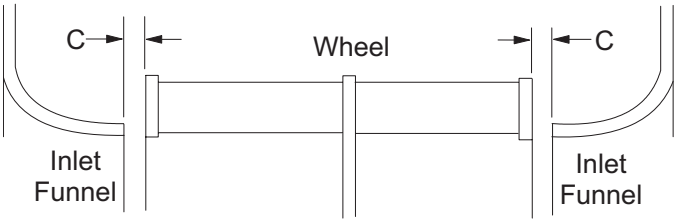


Figure 44: Wheel-to-Inlet Funnel Relationship—Forward Curved Fan Wheels

Forward Curved[1] (in.)			
Unit sizes 003 to 035		Unit sizes 040 to 090	
Diameter	C[2] (mm)	Diameter C[2] (mm)	
9×4	0.25 (6.35)	20 (Class 1 & 2)	0.24 (6.10)
9×7	0.13 (3.30)	22.38 (Class 1 & 2)	0.41 (10.41)
9×9	0.25 (6.35)	25 (Class 1 & 2)	0.47 (11.94)
10	0.22 (5.59)	27.62 (Class 1 & 2)	0.47 (11.94)
12	0.35 (8.89)	30 (Class 1 & 2)	0.47 (11.94)
15	0.44 (11.18)	33 (Class 1 & 2)	0.50 (12.70)
18	0.25 (6.35)	36 (Class 1 & 2)	0.75 (19.05)
20 (Class 1 & 2)	0.73 (8.54)	—	—
22½ (Class 1 & 2)	0.59 (14.99)	—	—
24½ (Class 1 & 2)	0.56 (14.22)	—	—

Note:

[1]To obtain rated air performance, dimensional relationship must be vibration. If retensioning is necessary, be certain to retain held.

[2]Adjust dimension C by loosening wheel hub setscrews, shifting sheave alignment wheel(s) axial as needed, and retightening setscrews.

Figure 45: Wheel-to-Inlet Funnel Relationship— 13 to 36 Belt-Drive Plenum Fans

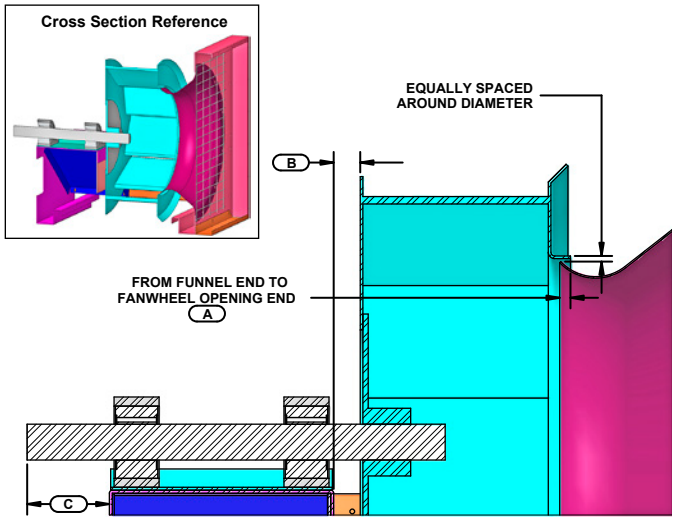


Table 8: Wheel-to-Inlet Funnel Relationship— 13 to 36 Belt-Drive Plenum Fan

Wheel-Funnel Parameters			
Size	A	B	C
13	0.25	0.91	3.50
15	0.25	0.91	3.50
16	0.25	0.91	3.50
18	0.38	0.86	3.88
20	0.42	1.11	3.88
22	0.45	1.11	3.88
24	0.51	1.11	3.88
27	0.55	1.36	4.50
30	0.62	1.36	4.50
33	0.55	1.50	5.00
36	0.63	1.50	5.00

Figure 46: Wheel-to-Inlet Funnel Relationship— 40 to 60 Belt-Drive Plenum Fans

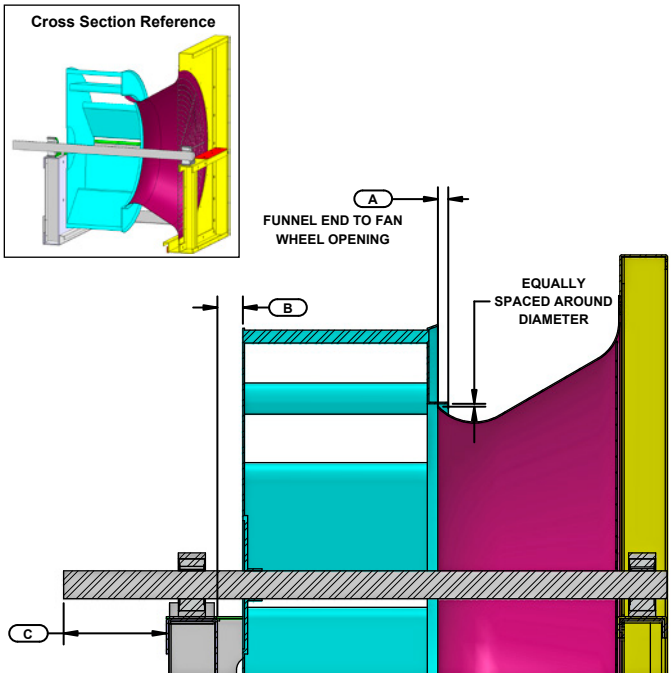


Table 9: Wheel-to-Inlet Funnel Relationship— 40 to 60 Belt-Drive Plenum Fan

Wheel-Funnel Parameters			
Size	A	B	C
40	0.82	2.00	4.88
44	0.91	2.25	5.50
49	1.00	2.50	5.50
54	1.10	2.50	5.50
60	1.23	3.00	5.50

Setscrews on MPQ fan wheels must be installed using a calibrated torque wrench to the value listed below, ±5%.The fasteners must be periodically checked to satisfy agency requirements for components on rotating machinery.

Figure 47: Fan Wheel Rotation

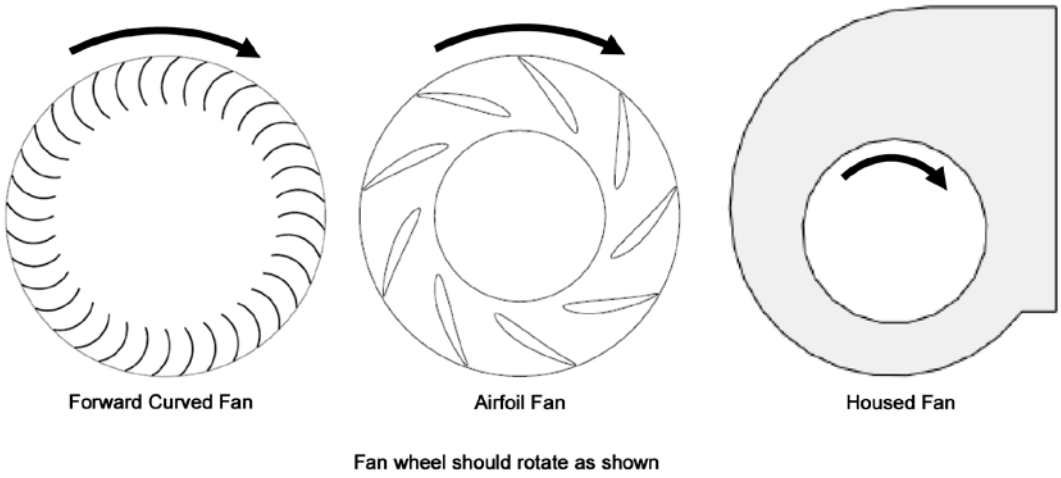


Figure 48: Wheel-to-Inlet Funnel Relationship—Inline Fans Overlap

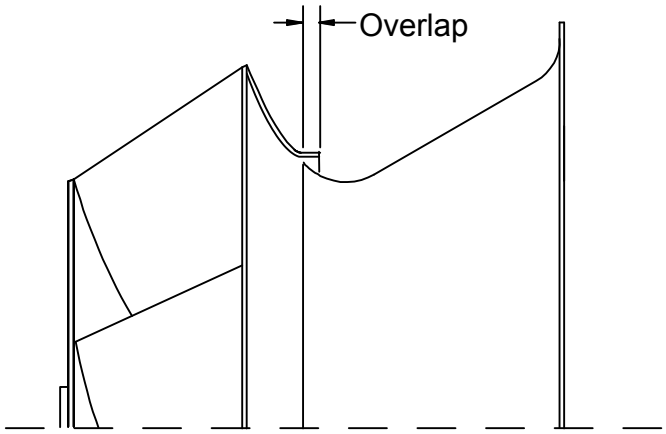


Table 10: Wheel-to-Inlet Funnel Relationship—Inline Fans

Wheel—Funnel Overlap	
Size	**Overlap**
150	.375
165	.438
182	.562
200	.625
222	.688
245	.750
270	.812
300	.875
330	1.000
365	1.125
402	1.250
445	1.375

Table 11: Wheel-to-Inlet Funnel Relationship—Direct-Drive Fans Only Class II fans

Fan Size	Overlap (in.)
11	0.25
12	0.25
15	0.25
16	0.38
18	0.38
20	0.41
22	0.45
24	0.50
27	0.55
30	0.61
33	0.67
36	0.75
40	0.82
44	0.91

Table 12: Wheel-to-Inlet Funnel Relationship—Direct-Drive Class III fans

Fan Size	Overlap (in.)
13	0.12
15	0.19
16	0.25
18	0.31
20	0.38
22	0.44
24	0.50
27	0.56
30	0.62
33	0.75
36	0.81
40	0.88
44	0.94
49	1.0
54	1.06
60	1.12

Table 13: Setscrew Torque Specifications—Class II Plenum

Fan Size	Setscrew Size	Torque (ft.-lb)	
		Aluminum	Steel
11/12/13	3/8	19.2	N/A
15	3/8	19.2	N/A
16	3/8	19.2	N/A
18	3/8	19.2	N/A
20	3/8	19.2	N/A
22	3/8	19.2	N/A
24	3/8	19.2	N/A
27	3/8	19.2	22
30	1/2	41.7	55
33	1/2	41.7	55
36	1/2	41.7	55
40	1/2	41.7	55
44	1/2	41.7	55
49	1/2	41.7	55
54	1/2	41.7	55
60	3/4	115	150

Table 14: Bearing Collar and Wheel Hub Set Screw Torque (All Fans Except Class II Plenum Fans)

Set Screw Diameter (in)	Minimum torque ft/lbs (kg/m)
1/4	5.5 (0.76)
1/16	10.5 (1.45)
3/8	19.0 (2.63)
7/16	29.0 (4.01)
1/2	42.0 (5.81)
5/8	92.0 (12.72)

Daikin Fan Array

⚠ WARNING

Closing the damper on an operational fan could send the fan into surge that could produce fans stall, excessive vibration, unit damage, or personnel injury.

The Daikin Fan Array is available with optional, factory mounted VFDs. See OM manuals OM 1190 and 1191 for details on the Daikin supplied VFD.

Care should be taken when programing and synchronizing the drives in the Daikin Fan Array such that all fans turn at the same speed. Fans running at unequal speeds can produce vibration and could stall a fan. Definition of fan numbering is given in Figure 49.

The Daikin Fan Array is standard with a manual block off plate. The unit will ship with one block off plate that will come installed on fan 1A. This block off plate is to be removed before unit operation and stored outside of the air tunnel. In the event of a lost fan motor, the block off plate is installed on the non-functional fan to prevent air re-circulation. This is designed to be a temporary measure unit this fan and/or motor is replaced. After fan and/or motor replacement the block off plate is to be removed and stored outside of the air tunnel.

The Daikin Fan Array has an optional gravity actuated block off damper. These dampers are equipped with counter weights.

The Daikin Fan Array has an optional actuated block off damper. These dampers are designed to prevent air recirculation in the event of a lost fan. Care should be taken that the damper actuator only be given a close signal if the fan is not operational (motor burnout for example).

The Daikin Fan Array can be equipped with a fan blank off plate. See Figure 50 with a block off plate mounted to fan 3C. If the unit is ordered with the manual block off plate, it will be installed to fan 1A. This plate has to be removed before start up.

Figure 49: Daikin Fan Array Configuration

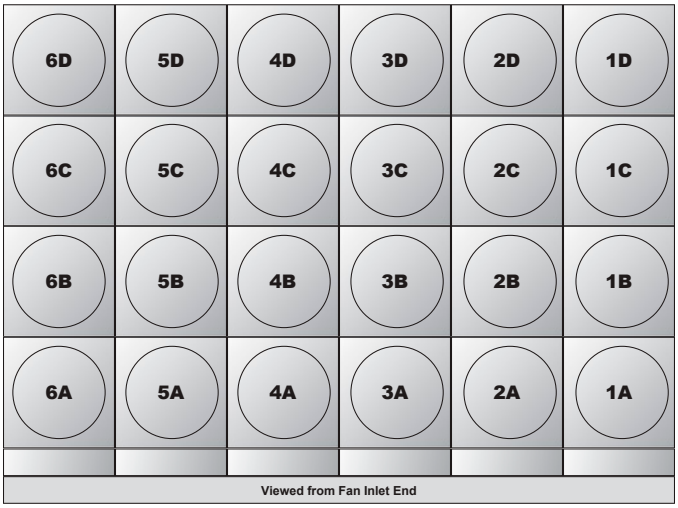
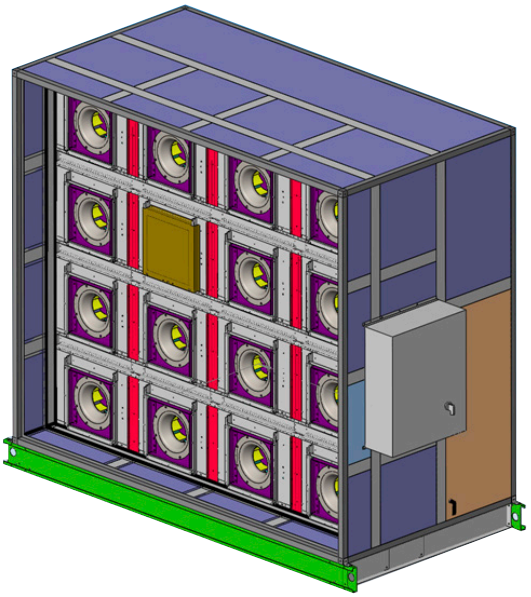


Figure 50: Fan Array with Block Off Plate



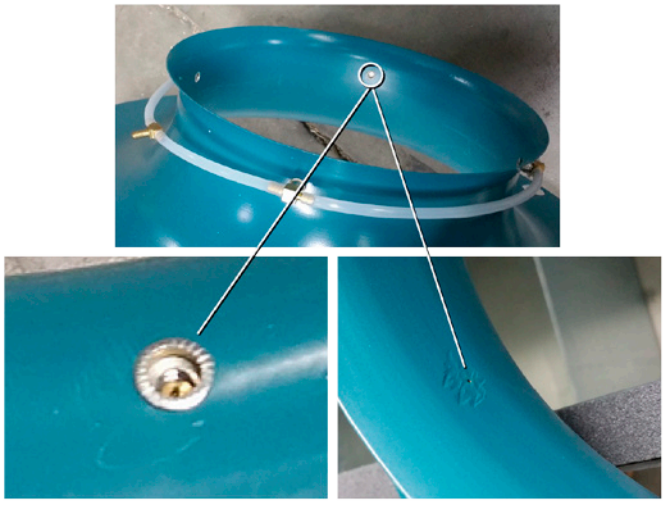
Optional Piezometer Ring Airflow Measurement Device

Piezometer rings are available as an option on direct drive plenum fans to measure airflow though the fan. The device consists of a piezometer ring mounted in the throat of the funnel and a static pressure tap mounted near the inlet of the funnel. The pressure drop is measured from the tap located near the inlet of the funnel to the piezometer ring in the throat. The inlet tap is connected to the high-pressure side of the transducer and the piezometer ring is connected to the low-pressure side.

See the equations and factors required to calculate flow using the piezometer ring.

NOTE: There are two manufacturer options for the piezometer ring. Care should be taken to ensure that the appropriate coefficients are used, otherwise airflow measurement may be incorrect. Reference Figure 51 to determine which piezometer ring you have.

Figure 51: Determining the Manufacturer



Daikin Applied Piezo Ring | TCF Piezo Ring

Non-Standard Density Method

The following equation is used to measure the flow for non-standard density:

$ACFM = C1 \times A \times \sqrt{(\Delta P/\rho)}$

where: A = Inlet funnel throat area (square feet) - from Table 16 and Table 18

ΔP = The differential in static pressure from the piezometer ring and the inlet pressure tap (inches w.g.)

ρ = Air density (pounds mass/cubic foot)

C1 = Value from Table 15 and Table 17

Standard Density Method

The equation can be simplified by assuming standard density and assuming funnel dimensions match the drawing dimensions. Table 16 and Table 18 show the factor (F) for each fan size and type. The equation then becomes the following:

For standard air (ρ = 0.075 lb/ft3):

$ACFM = F \times \sqrt{(\Delta P)}$

where: F = factor from Table 16 and Table 18

ΔP = The differential in static pressure from the piezometer ring and the front pressure tap (inches w.g.)

Table 15: DDPL Factors For Free and Ducted Inlet — Non Standard Density Method, TCF Piezo Ring

Product	C1 Free Inlet	C1 Ducted Inlet
DDPL Size 11-16	753.06	794.06
DDPL Size 18-44	692.03	740.14

Table 16: DDPL Factors For Free and Ducted Inlet — Standard Density Method, TCF Piezo Ring

DDPL Size	Free Inlet F	Ducted Inlet F	Area A
11 and 12	944.92	996.36	0.344
15	1206.40	1272.08	0.439
16	1518.58	1601.26	0.552
18	1821.92	1948.58	0.721
20	2185.80	2337.76	0.865
22	2713.93	2902.60	1.074
24	3285.02	3513.39	1.300
27	3997.61	4275.53	1.582
30	4945.21	5289.01	1.957
33	5968.62	6383.56	2.362
36	7290.21	7797.03	2.885
40	8869.55	9486.16	3.510
44	10827.92	11580.68	4.285

Table 17: DDPL Factors for Free and Ducted Inlet – Non-Standard Density Method, Daikin Piezo Ring

DDPL Size	C1 Free Inlet	C1 Ducted Inlet
12	783.66	792.43
15	767.48	763.62
16	732.77	757.40
18	612.29	619.65
20	653.83	652.65
22	674.42	673.16
24	679.53	681.34
27	656.57	660.15
30	691.07	692.12
33	675.26	677.89
36	675.83	676.67
40	699.51	694.22
44	681.07	681.01

Table 18: DDPL Factors for Free and Ducted Inlet – Standard Density Method, Daikin Piezo Ring

DDPL Size	Free Inlet F	Ducted Inlet F	Area A
12	1004.66	1016.46	0.344
15	1261.99	1260.20	0.439
16	1526.96	1572.35	0.552
18	1675.69	1672.77	0.721
20	2117.33	2110.61	0.865
22	2710.75	2693.35	1.074
24	3312.67	3319.41	1.300
27	3901.60	3929.94	1.582
30	5017.64	5033.71	1.957
33	5942.72	5979.46	2.362
36	7274.52	7316.07	2.885
40	9179.91	9089.14	3.513
44	10891.71	10880.24	4.285

Optional Transducer for Piezometer Rings

A transducer is available for Piezometer rings. Factory mounting locations for the fan transducer is shown in Figure 52 for direct-drive plenum fans. Figure 53 shows the installation for fan array. Wiring for the transducer is field-supplied and installed.

Figure 52: Direct-drive Plenum Fan Installation

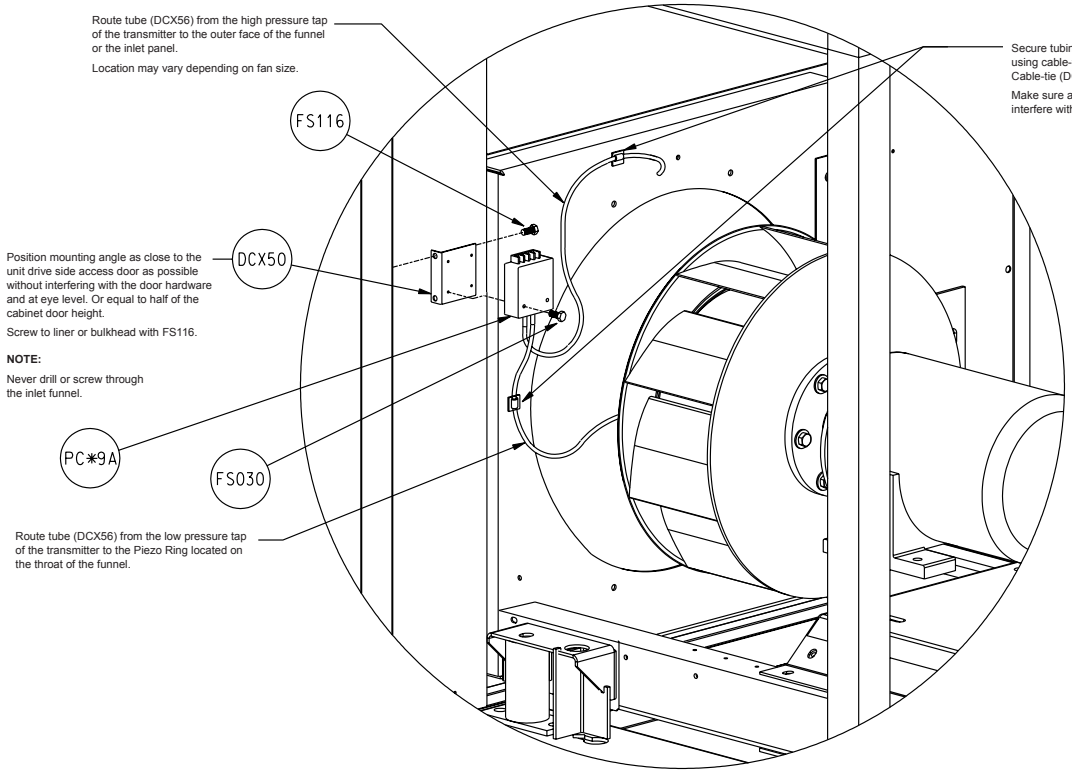
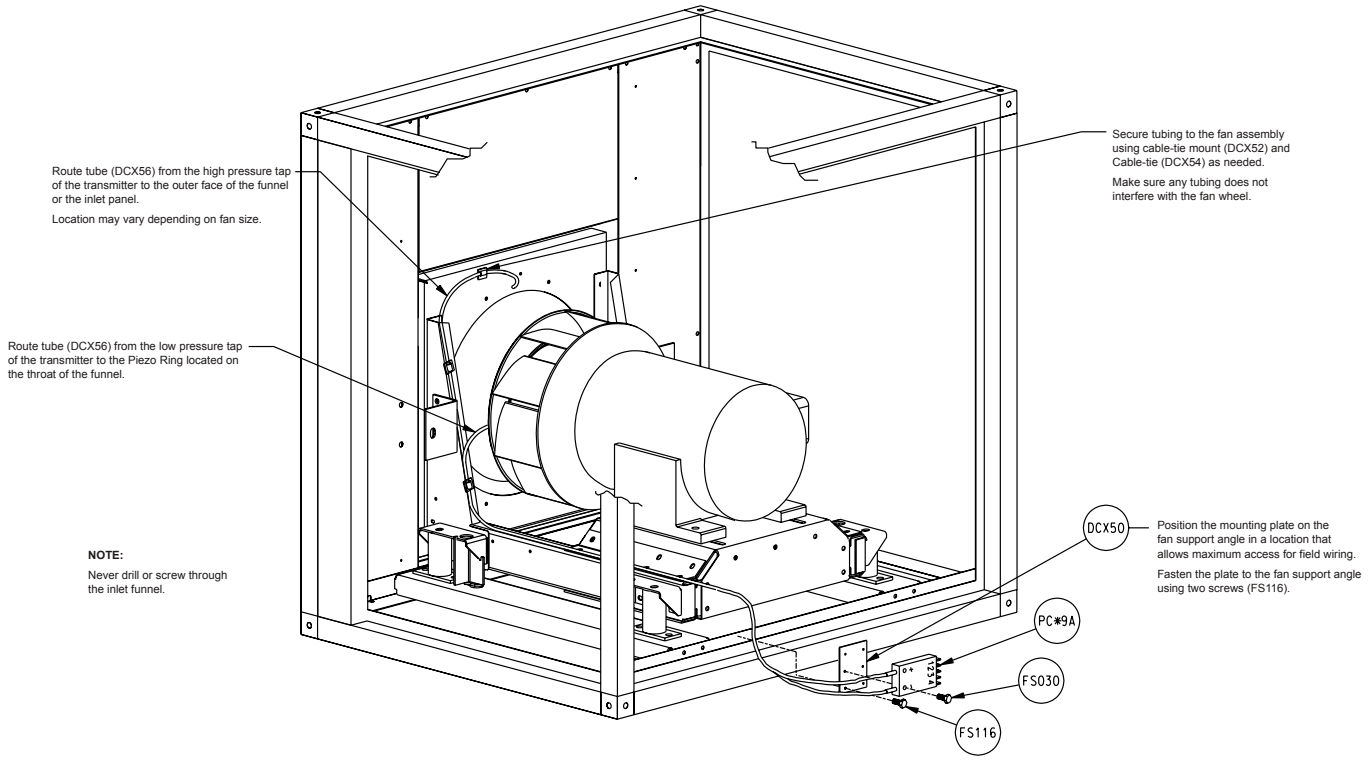


Figure 53: Fan Array Installation



Daikin EC Fan Array

The Daikin EC Fan Array is made of an impeller, EC motor, and inverter. It is installed as an assembly, and in the event of failure, the entire assembly must be replaced. Bearings are permanently sealed and lubricated, so no periodic greasing is necessary.

A minimum 24" access section is recommended downstream of the ECM fan array section to gain access to the fans. If an access section is not selected downstream of the fan array, there will be very limited access to the fans for service/replacement.

The entire array is controlled via a 0-10V signal. Control signal is wired to points 3 and 4 on the Daikin low voltage terminal strip seen in Figure 55. There are two other points for the EC Fan Array: fan array enable and disable are points 1 and 2, and fan array fault are points 5 and 6. If any fan in the fan array faults, there is a contact closure between 5 and 6.

NOTE: To DISABLE the array, connect points 1 and 2 together. The array defaults to ENABLE with nothing connected to points 1 and 2.

The control panel can be ordered for remote mounting. For remote mounted panels the individual fans will be wired to each other, but the factory will not wire to the outside of the cabinet.

The EC Fan Array has an option for a block off plate that can be ordered as a parts kit from the Daikin Parts group. A minimum 24" access section is recommended upstream of the ECM fan array section to install block-off plate.

Figure 54: EC Fan Array

Figure 55: Control Signal

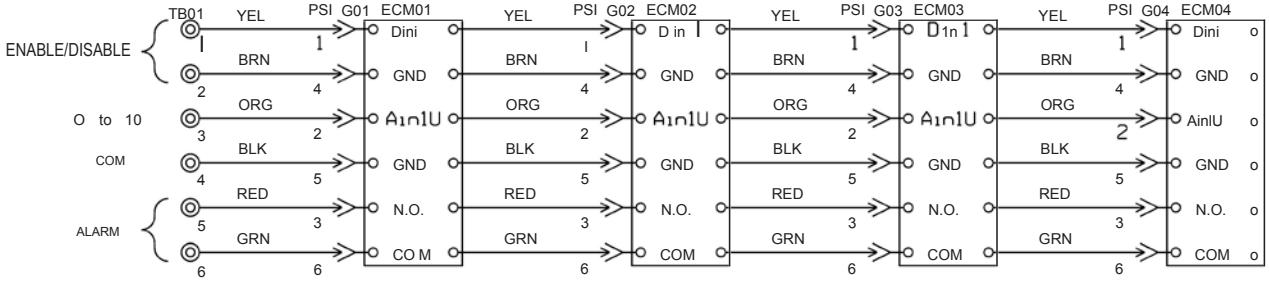


Figure 56: High Voltage Wiring

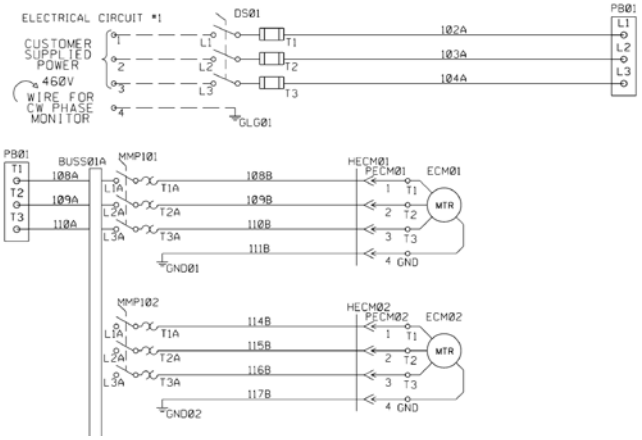
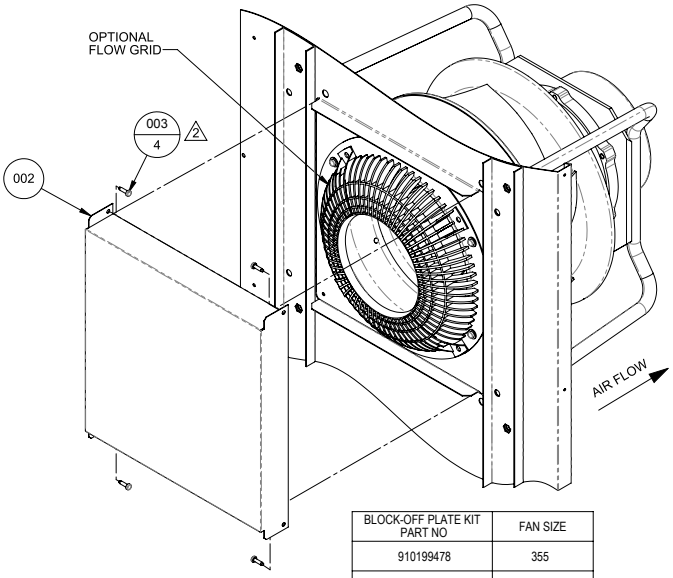


Figure 57: Block-Off Plate Installation



BLOCK-OFF PLATE KIT PART NO	FAN SIZE
910199478	355
910199479	450

NOTES:
1) INSTALL BACK-DRAFT PANEL AS SHOWN OVER NON-FUNCTIONING FAN
2 SECURE USING (4) SELF DRILL/TAPPING SCREWS

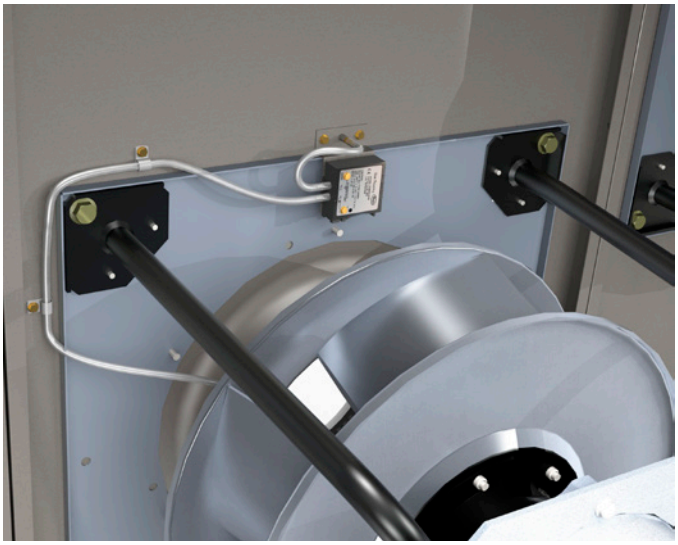
Optional Piezometer Point Airflow Measurement Device

A Piezometer point is an option with EC fans to measure airflow through the fan. The device consists of a piezometer point mounted in the throat of the funnel and a static pressure tap mounted near the inlet of the funnel. The pressure drop is measured from the tap located near the inlet of the funnel to the piezometer point in the throat. The inlet tap is connected to the high-pressure side of the transducer and the piezometer point is connected to the low-pressure side.

A transducer is always factory supplied when the Piezometer Option is selected with an EC Fan. Figure 58 shows the installation for EC fans.

See the equations and factors required to calculate flow using the piezometer point:

Figure 58: Piezometer Transducer



Non-Standard Density Method

The following equation is used to measure the flow for non-standard density:

$ACFM = C1 \times A \times \sqrt{(\Delta P/\rho)}$

where: A = Inlet funnel throat area (square feet) - from Table 20

ΔP = The differential in static pressure from the piezometer ring and the inlet pressure tap (inches w.g.)

ρ = Air density (pounds mass/cubic foot)

C1 = Value from Table 19

Standard Density Method

The equation can be simplified by assuming standard density and assuming funnel dimensions match the drawing dimensions. Table 19 shows the factor (F) for each fan size and type. The equation then becomes the following:

For standard air (ρ = 0.075 lb/ft3):

$ACFM = F \times \sqrt{(\Delta P)}$

where: F = factor from Table 20

ΔP = The differential in static pressure from the piezometer ring and the front pressure tap (inches w.g.)

Table 19: ECM Factors for Free and Ducted Inlet — Non-Standard Density Method

ECM Size	C1 Free Inlet	C1 Ducted Inlet
355	774.47	774.47
450	783.31	783.31

Table 20: ECM Factors for Free and Ducted Inlet — Standard Density Method

ECM Size	Free Inlet F	Ducted Inlet F	Area A
355	1372.74	1372.74	0.485
450	2226.07	2226.07	0.778

Operating Limits

Do not exceed the operating limits in Table 21 through Table 25. A fan wheel operated beyond the rpm and temperature limits shown can suffer permanent distortion or fracture. The resulting unbalance can cause severe unit vibration.

Table 21: Fan Operating Limits—Unit Sizes 003 to 035

Forward Curved—Housed										
Diameter	9×4	9×7	9×9	10.62	12.62	15	18	20	22.25	24.50
Max. RPM Class I	N/A	2189	2223	1934	1614	1328	1155	1050	944	858
Max. RPM Class II	2244	2854	2896	2518	2091	1725	1450	1200	1030	910

Airfoil—Housed					
13.22	14.56	16.19	19.69	21.56	24.00
3000	3000	2300	2000	1700	1500
4335	3918	3457	2858	2427	2255

Table 22: Fan Operating Limits—Unit Sizes 040–090

Forward Curved—Housed							
Diameter	20	22.38	25	27.62	30.25	33	36
Max. RPM Class I	1010	930	790	690	650	600	560
Max. RPM Class II	1281	1178	1011	910	835	763	715

Airfoil—Housed						
20	22.25	24.5	27	30	33	36.5
2077	1875	1691	1479	1328	1209	1073
2703	2413	2199	1928	1730	1579	1401

Table 23: Fan Operating Limits—Belt-Drive Plenum Fans

Belt-Drive Plenum fans																
Size	13	15	16	18	20	22	24	27	30	33	36	40	44	49	54	60
Max. RPM Class II	3909	3468	2820	2930	2674	2403	2183	1860	1783	1620	1465	1329	1202	1091	986	891
Max. RPM Class III	4000	4000	3887	3735	3409	3065	2780	2423	2182	1984	1759	1598	1447	1314	1178	1071

Table 24: Fan Operating Limits—Direct-Drive Plenum Fans

Direct-Drive Plenum Fans																		
Size	11	12	13	15	16	18	20	22	24	27	30	33	36	40	44	49	54	60
Max. RPM Class II	4000	4000	—	3909	3650	3650	2674	2403	2183	1981	1783	1620	1465	1329	1202	—	—	—
Max. RPM Class III	—	—	4000	4000	3887	3735	3409	3065	2780	2423	2182	1984	1759	1598	1447	1314	1178	1071

Table 25: Fan Operating Limits—Inline Fans, Twin Fans

Inline Fans/Twin Fans												
Diameter	18.25	20	22.25	24.5	27	30	33	36.5	40.25	44.50	49	54.25
Max. RPM Class I	2727	2488	2236	2041	1835	1665	1476	1330	1208	1072	973	880
Max. RPM Class II	3409	3111	2796	2551	2294	2082	1846	1662	1510	1340	1216	1100

Twin Fans						
Diameter	9×9	10.62	12.62	15	18.12	20
Max. RPM	2575	2400	2000	1700	1400	1200
Max. HP	10	15	15	30	40	40

Fan Vibration Levels

Each unit as shipped is trim balanced to operate smoothly. To provide satisfactory operation after shipping and installation, use the accepted industry guidelines for field balancing fans. See Table 26.

Table 26: Vibration Levels

Fan Speed (RPM)	Vibration
800 or less	5 mils maximum displacement
801 or greater	0.20 in/sec. maximum velocity

Note:
Excessive vibration from any cause contributes to premature fan and motor bearing failure. Monitor overall vibration levels every six months of operation. An increase in levels is an indication of potential trouble.

Vibration Causes

1. Wheel imbalance.
   a. Dirt or debris on wheel blades.
   b. Loose set screws in wheel hub or bearing-to-shaft.
   c. Wheel distorted from overspeed.
2. Bent shaft.
3. Drive faulty.
   a. Variable pitch sheaves—axial and radial runout of flanges; uneven groove spacing; out of balance. Also similar faults in driven sheave.
   b. Bad V-belts; lumpy, or mismatched; belt tension too tight or too loose.
4. Bad bearings, loose bearing hold-down bolts.
5. Motor imbalance.
6. Fan section not supported evenly on foundation.

Periodic Maintenance

1. Check all moving parts for wear every six months.
2. Check bearing collar, sheave, and wheel hub setscrews, sheave capscrews, and bearing hold-down bolts for tightness every six months.
3. Annually check and snug all electrical connections. Inspect for signs of water damage such as corrosion and repair if necessary. Check ground conductor and connection integrity and correct if needed.

Ball Bearing Lubrication

⚠ CAUTION

Bearing overheating potential. Can damage the equipment. Do not over lubricate bearings. Use only a high grade mineral grease with a 200°F safe operating temperature. See below for specific recommended lubricants.

Motor Bearings

Supply and return fans—Supply and return fan motors should have grease added after every 2000 hours of operation. Using the following procedure, re-lubricate the bearings while the motor is warm, but not running. Use one of the greases shown in Table 27.

1. Remove and clean upper and lower grease plugs.
2. Insert a grease fitting into the upper hole and add clean grease (Table 27) with a low pressure gun.
3. Run the motor for five minutes before replacing the plugs.

NOTE: Direct-Drive Class II fans that are supplied with TECO motors have double shielded bearings on frame sizes 140T-280T. These bearings are pre-packed with a long life grease and are not regreaseable. Larger frame size TECO motors are regreaseable and follow the same lubrication recommendations as all other motors.

Table 27: Recommended Lubricants and Amounts for Fan Motor Bearings

Manufacturers' Grease	NEMA Size	Amount to Add (oz.)
Texaco, Polystar or Polyrex EM (Exxon Mobile) or Rykon Premium #2 or Penzoil Pen 2 Lube	56 to 140	0.08
	140	0.15
	180	0.19
	210	0.30
	250	0.47
	280	0.61
	320	0.76
	360	0.81
	400	1.25
	440	2.12

NOTE: Specific greasing instructions are located on a tag attached to the motor. If special lubrication instructions are on the motor, they supersede all other instructions.

Fan Shaft Bearings

⚠ CAUTION

For safety, stop rotating quipment. Add one half of the recommended amount shown in Figure 24. Start bearing, and run for a few minu Stop bearing and add the second half of the recommended amount. A temperature rise, sometimes 30°F (1°C after lubrication is normal. Bearing should operate at tempe ature less than 200°F (94°C) and should not exceed 225 (107°C) for intermittent operation. For a lubrication schedule, see Table 22. For applications that are not in the range of the table, contact Daikin.

⚠ CAUTION

Table 28, Table 29 and Table 30 state general lubrication recommendations based on our experience and are intended as suggested or starting points only. For best results, specific applications should be monitored regularly and lubrication intervals and amounts adjusted accordingly.

Any good quality lithium or lithium complex base grease, using mineral oil, conforming to NLGI grade 2 consistency, and an oil viscosity of 455-1135 SUS at 100°F (100-200 cSt at 40°C) may be used for re-lubrication.

Compatibility of grease is critical. Lubricatable bearings are supplied with grease fittings or zerks for ease of lubrication with hand or automatic grease guns. Always wipe the fitting and grease nozzle clean.

Table 28: Lubrication Intervals

Speed	Bearing Temperature	Cleanliness	Lubrication Intervals
(Use NLGI #2 Lithium or Lithium Complex Grease)			
100 RPM	Up to 120°F (50°C)	Clean	6 to 12 months
500 RPM	Up to 150°F (65°C)	Clean	2 to 6 months
1000 RPM	Up to 210°F (100°C)	Clean	2 weeks to 2 months
1500 RPM	Over 210°F (100°C) to 250°F (120°C)	Clean	Weekly
Above 1500 RPM	Up to 150°F (65°C)	Dirty/Wet	1 week to 1 month
Max Catalog Rating	Over 150°F (65°C) to 250°F (120°C)	Dirty/Wet	Daily to 2 weeks
	Above 250°F (120°C)		Contact Browning

Table 29: Recommended Lubricants for Fan Shaft Ball Bearings

Name	Temperature	Base	Thickener	NLGI Grade
Texaco, Premium RB	30° to 350°F (34° to 177°C)	Parafinic Mineral Oil	Lithium	2
Mobil, AW2	40° to 437°F (40° to 175°C)	Mineral Oil	Lithium	2
Mobil, SHC 100	68° to 356°F (50° to 180°C)	Synthetic	Lithium	2
Chevron, Altiplex Synthetic	60° to 450°F (51° to 232°C)	Synthetic	Lithium	2
Exxon, Ronex MP	40° to 300°F (40° to 149°C)	Mineral Oil	Lithium	2

Note:
Temperature ranges over 225°F are shown for lubricants only. High temperature applications are not suitable for standard air handler components.

Table 30: Recommended Fan Lubrication Grease Charge

Shaft Size in Inches (mm)	Weight in Ounces (grams)
1/2 to 3/4 (20)	0.03 (0.85)
7/8 to 1-3/16 (25-30)	0.10 (2.84)
1-1/4 to 1-1/2 (35-40)	0.15 (4.25)
1-11/16 to 1-15/16 (45-50)	0.20 (5.67)
2 to 2-7/16 (55-60)	0.30 (8.51)
2-1/2 to 2-15/16 (65-70)	0.50 (15.59)
3 to 3-7/16 (75-80)	0.85 (24.10)
3-1/2 to 4 (85-105)	1.50 (42.53)

Fan Drive Adjustments

⚠ WARNING

Before servicing fans, lock out and tag out all power to the unit. Fans or belts can cause severe personal injury or death.

⚠ WARNING

Do not open the hinged access door and screw-fastenerd access panels while the unit is operating. Moving parts and strong suction forces can cause severe personal injury or death.

Upon completion of the air balance, replace the variable pitched motor sheave with a properly sized, fixed sheave. A matching fixed sheave provides longer belt and bearing life and minimizes vibration. Initially, it is best to have a variable pitched motor sheave for the purpose of air balancing. Once the balance is achieved, fixed sheaves maintain balancing and alignment more effectively. Replace the adjustable sheaves with fixed sheaves.

With the electrical power disconnected, locked and tagged out, measure the diameter of the V-belt outer surface where it passes around the sheave (pitch diameter). Calculate fan speed from the motor nameplate rpm.

$$\text{Fan RPM} = \text{motor RPM} \times \frac{\text{Measured diameter at motor sheave}}{\text{Measured diameter at fan sheave}}$$

VM/VP Variable Pitch Key Type Sheaves

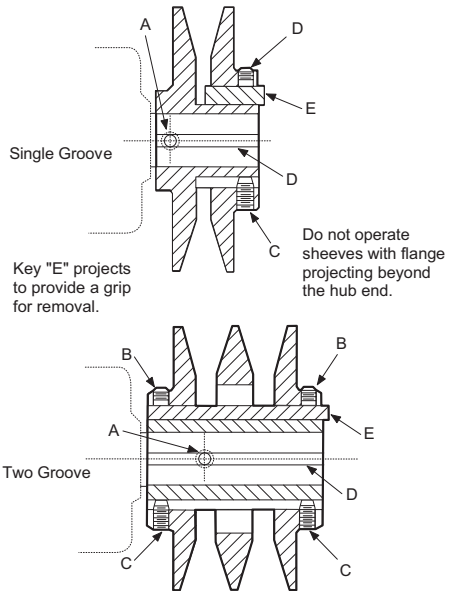
Mounting:

1. Mount all sheaves on the motor or driving shaft with the setscrews **A** toward the motor.
2. Verify that both driving and driven sheaves are in alignment and that shafts are parallel.
3. Fit internal key **D** between sheave and shaft and lock setscrew **A** securely in place.

Adjusting:

1. Loosen setscrews **B** and **C** in moving parts of sheave and pull out external key **E**. (This key projects a small amount to provide a grip for removing.)
2. To adjust sheave pitch diameter for desired speed, open moving parts by half or full turns from closed position. **Do not open more than five full turns for A belts or six full turns for B belts.**
3. Replace external key **E** and securely tighten setscrews **B** over key and setscrews **C** into keyway in fixed half of the sheave.
4. Put on belts and adjust tension. **Do not force belts over grooves.** See Fan Drive Belt on page 45.
5. Make future adjustments by loosening the belt tension and increasing or decreasing the pitch diameter of the sheave by half or full turns as required. Readjust belt tension before starting drive.
6. To provide the same pitch diameter, adjust both halves of the two-groove sheaves by the same number of turns from closed position.
7. Verify that all keys are in place and that all se screws are tight before starting drive. Check setscrews and belt tension after 24 hours service.

Figure 59: VP Type Sheave Adjustment



LVP Variable Speed Sheaves

Mounting:

1. Slide sheave on motor shaft so that the side of the sheave with setscrew **A** is next to the motor when setscrew **A** is in the hub or barrel of the sheave.
2. When setscrew **A** is at an angle in the center flange **B**, mount it away from the motor so that the outer locking ring and flange can be removed to get to the setscrew.
3. To remove the flange and locking ring:
   a. Loosen setscrews **D**.
   b. Loosen but do not remove capscrews **E**.
   c. Remove key **F**.

NOTE: This key projects a small amount to provide a grip for removing.

   d. Rotate the flange counterclockwise until it disengages the threads on the sheave barrel.
4. Verify that the driving and driven sheaves are in alignment and the shafts are parallel. When aligning two-groove sheaves, allow room between the sheave and motor to access capscrews **E**.
5. Insert key **C** between the sheave and the shaft and tighten setscrew **A** securely.
6. If flange and locking ring have been removed, when replacing them make sure that the inner and outer flanges are open from the closed position by the same amount as the other flange. Determine this by accurately measuring the top width of the grooves.
7. Insert key **F**.
8. Tighten setscrews **D** and capscrews **E**.
9. Put on belts and adjust belt tension. Do not force belts over grooves. See Fan Drive Belt.
10. Before starting the drive, ensure that all keys are in place and all setscrews and all capscrews are tight. Check and retighten all screws and retension belts after approximately 24 hours of service.

Adjusting:

1. Slack off belt tension if belts have been installed.
2. Loosen setscrews **D**.
3. Loosen but do not remove capscrews **E**.
4. Remove key **F**.

NOTE: This key projects a small amount providing a grip for removing.

5. Adjust pitch diameter by opening or closing the movable flanges by half or full turns.

NOTE: Two-groove sheaves are supplied with both grooves set at the same pitch diameter. To provide the same pitch diameter for satisfactory operation, move both movable flanges the same number of turns. Do not open sheaves more than five turns for A belts or six turns for B belts.

6. Replace key **F**.
7. Tighten setscrews **D** and capscrews **E**
8. If belts have been installed, readjust belt tension. If belts have not been installed, install them and adjust belt tension. **Do not force belts over grooves.** See Fan Drive Belt on page 45.
9. Before starting the drive, ensure that all keys are in place and all setscrews and all capscrews are tight. Check and retighten all screws and retension belts after approximately 24 hours of operation.
10. Replace variable speed sheaves for 15 hp motors and greater with a fixed pitch sheave after air balancing to maintain fan balance integrity. Fixed sheaves furnished by others.

MVP Variable Speed Sheaves

Mounting:

1. Verify both driving and driven sheaves are in alignment and the shafts are parallel. The centerline of the driving sheave must be in line with the centerline of the driven sheave (Figure 61).
2. Verify that all setscrews are torqued to the values shown in Table 31 before starting drive. Check setscrew torque and belt tension after 24 hours of service.

Adjusting:

1. Adjust motor base forward to release belt tension. Remove the belts for easier adjustment.
2. Loosen, but do not remove both of the locking setscrews **A** in the outer locking ring by using a hex key or torque wrench with a hex bit.
3. Adjust sheave to desired pitch diameter by turning the outer locking ring, using a spanner wrench or drift inserted into the three holes that are located 120° apart on the ring.
4. Any pitch diameter can be obtained within the sheave range. One complete turn of the outer locking ring changes the pitch diameter 0.233".
5. Do not open sheaves more than the following
   a. Do not open **B** sheaves more than 4-3/4 turns for the **A** belts or 6 turns for the **B** belts.
   b. Do not open **C** sheaves more than 9-1/2 turns.
   c. Do not open **5V** sheaves more than 6 turns.
   d. Do not open **8V** sheaves more than 8 turns.
6. Tighten BOTH locking screws **A** in the outer locking ring before operating the drive. Use a torque wrench and tighten to the value shown in Table 31.
7. Replace belts and adjust the motor base to tension the belts properly. See Fan Drive Belt on page 45.
8. Do not loosen any screws other than the two locking screws **A** in the outer locking ring when adjusting the sheave pitch. Do not operate the drive until the locking screws have been set to the torque specifications.

Figure 60: LVP Type Sheave Adjustment

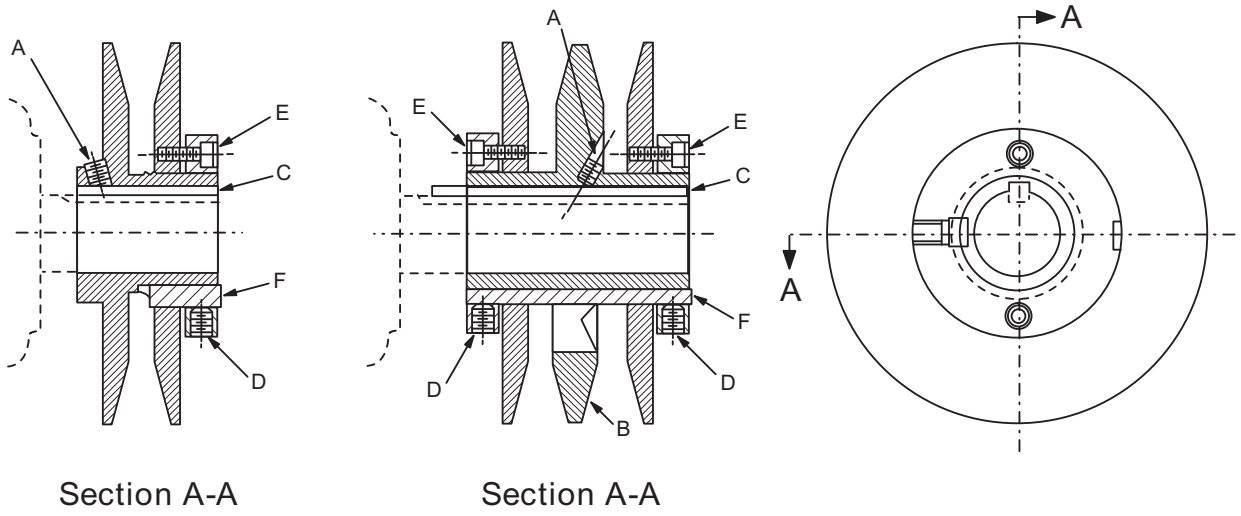
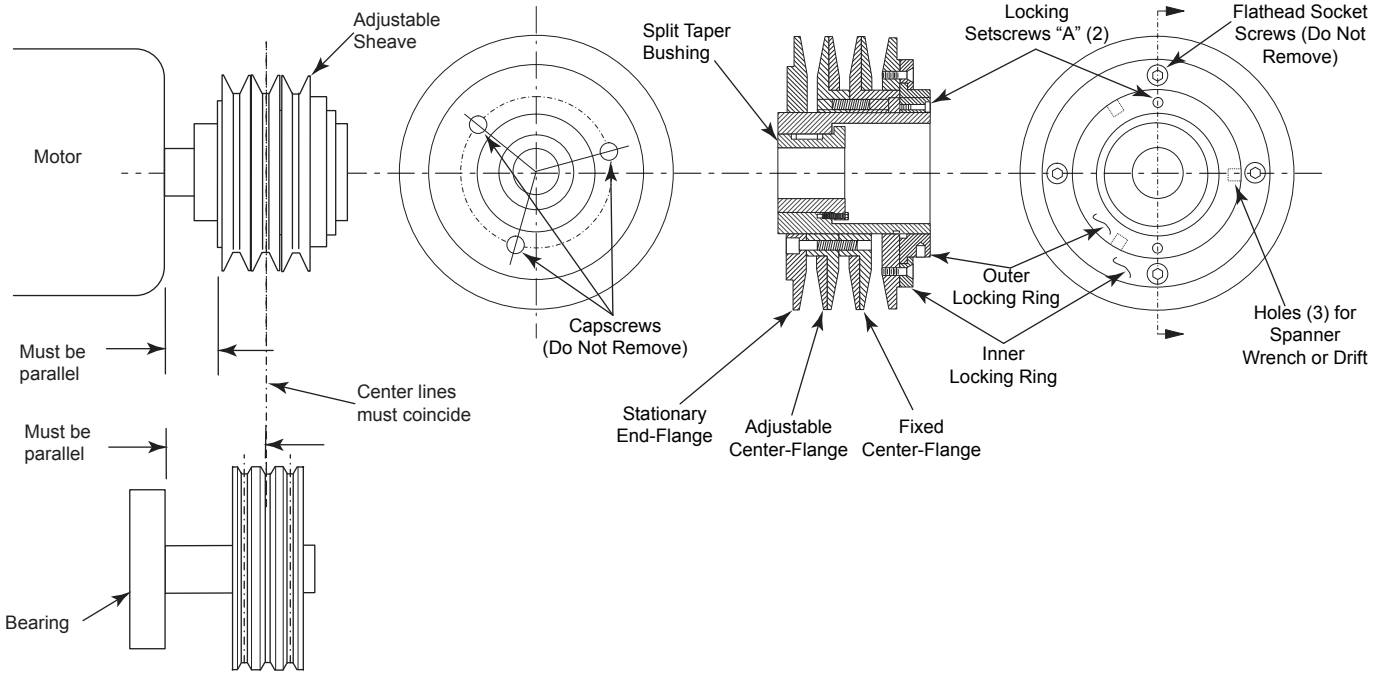


Table 31: Screw Torque Values

Nominal Screw Size (dia–thds/in)	Socket Head Cap Screws		Flat Head Socket Screws	Hollow Head Set Screws Only			
	Seating Torque		Seating Torque	Lengths Equal or Greater Than Dia.		For Lengths (L) Less Than Dia.	
				Seating Torque	Seating Torque	Length (L)	Seating Torque
	(in–lbs)	(in–lbs)	(in–lbs)	(in–lbs)	(in–lbs)	(in)	(in–lbs)
1/4–20NC	150	12.5	100	87	7.3	3/16	50
5/16–11NC	305	25.4	200	165	13.8	1/4	90
3/8–16NC	545	45.4	350	290	24.2	1/4, 5/16	150, 250
1/2–13NC	1300	108.3	N/A	620	51.7	N/A	N/A
5/8–11NC	N/A	N/A	N/A	1225	102.1	N/A	N/A

Figure 61: MVP Sheave Adjustment



Fan Drive Belt

⚠ WARNING

Moving belt and fan can cause severe personal injury or death.

During installation and filter maintenance:

- Verify that the belt and fan guards on plenum fan units are always in place.
- Lock and tag out fans to prevent accidental start up.
- Do not enter the filter compartment until the fan is completely stopped.
- Use approved equipment for reaching filters located above normal reach. Do not step on filter frames or unit components.
- Floor surfaces must be dry and free of oil or grease.

General Rules of Tensioning

1. The ideal tension is the lowest tension at which the belt does not slip under peak load conditions.
2. Check tension frequently during the first 24 to 48 hours of operation.
3. Over tensioning shortens belt and bearing life.
4. Keep belts free from foreign material that can cause slippage.
5. Inspect V-drive on a periodic basis. Adjust tension if the belt is slipping. Do not apply belt dressing. This can damage the belt and cause early failure.

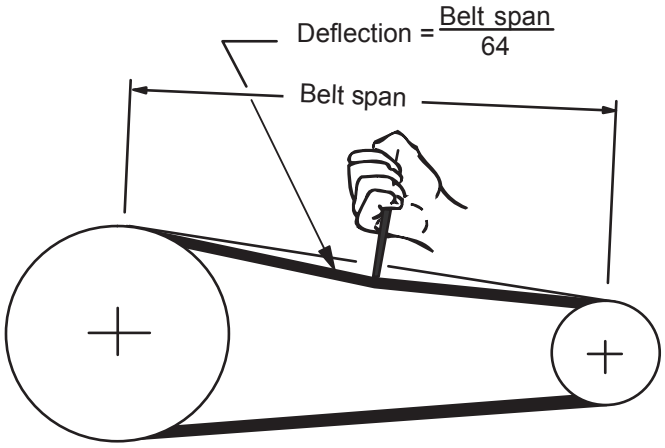
Tension Measurement Procedure

1. Measure the belt span (Figure 62).
2. Place belt tension checker squarely on one belt at the center of the belt span. Apply force to the checker, perpendicular to the belt span, until the belt deflection equals belt span distance divided by 64. Determine the force applied while in this position.
3. Compare this force to the values in .

Table 32: Belt Deflection Force (per Browning Specifications)

Cross Section	Small Sheave Diameter (in)	Number of Belts (Deflection Force lbs)					
		1		2		3 +	
		Min	Max	Min	Max	Min	Max
A, AX	0.0 to 3.5	3.0	5.0	2.5	4.0	2.0	3.5
	3.6 to 4.4	3.5	5.0	3.0	4.5	2.0	4.0
	4.5 +	4.0	5.5	3.0	5.0	2.5	4.5
B, BX	0.0 to 5.4	5.5	8.0	4.5	7.0	3.5	5.5
	5.5 to 7.6	5.5	8.5	4.5	7.5	3.5	5.5
	7.7 +	6.5	9.0	5.0	8.0	4.0	6.5
5V, 5VX	0.0 to 8.5	7.0	11.0	5.5	9.0	4.0	7.0
	8.6 to 12.0	8.5	13.0	6.5	10.5	5.0	8.0
	12.1 +	10.0	15.0	7.5	11.5	5.5	9.0

Figure 62: Drive Belt Adjustment



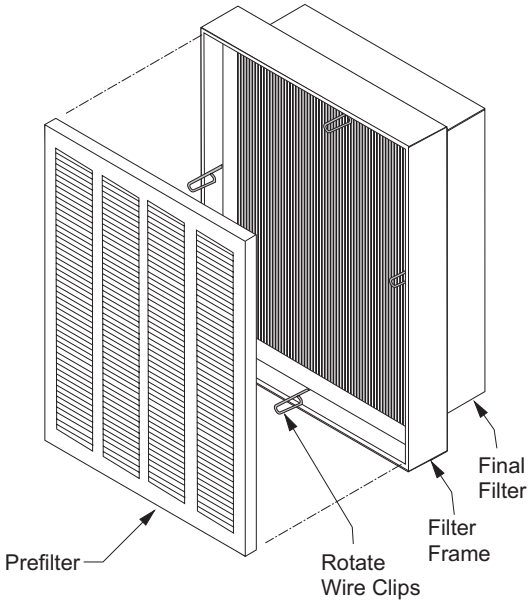
Filters

Front Load Filter Option

Front loaded filter options require that the filters be removed and replaced from inside the unit.

To remove filters, rotate the wire clips. This releases both the prefilter and the final filter. When installing clean filters, check to verify the filters are fully seated in the frame (Figure 63).

Figure 63: Frame and Filters with Holding Clips



Filter Gauges

Filter gauges indicate pressure drop for installed filters. If prefilters are present, the gauge will indicate the pressure drop for both pre- and final filters.

Table 33 shows the typical filter pressure drop for clean filters at rated air flow. The tables also show a final pressure drop for front loaded filters.

Where a single filter gauge is used, the prefilters can be removed to check the pressure drop of the final filters.

Figure 64: Filter Gauge

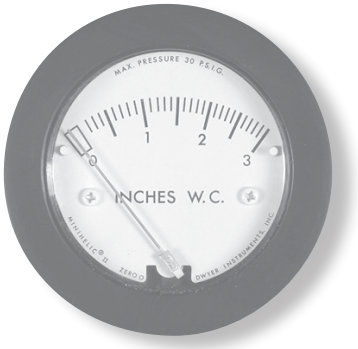


Table 33: Filter Pressure Drops

Bag filters—DriPak 2000				
Efficiency	45%	65%	85%	95%
Rated velocity (FPM)	625	500	500	500
Initial pressure drop	0.20–0.26	0.21–0.30	0.34–0.48	0.50–0.70
Initial pressure drop	1.0	1.0	1.0	1.0
Cartridge filters—Varicel II MH, 4.25" deep				
Efficiency	65%	85%	95%	
Rated velocity (FPM)	500	500	500	
Initial pressure drop	0.43	0.61	0.70	
Final pressure drop	1.5	1.5	1.5	
Cartridge filters—Varicel SH, 12" deep				
Efficiency	70%			
Rated velocity (FPM)	500			
Initial pressure drop	0.39			
Final pressure drop	1.2			
Pleated panel filters				
Type	Perfect pleat	AMAir 1300 4"		
Efficiency	30%	30%		
Rated Velocity (FPM)	500	625		
Initial Pressure Drop	0.36	0.36		
Final Pressure Drop	1.0	1.0		
5700 filters				
Efficiency	N/A			
Rated velocity (FPM)	500			
Initial pressure drop	0.25			
Final pressure drop	1.0			
Pleated 62 Plus filters				
Size	2"	4"		
Efficiency	70%	70%		
Initial pressure drop	0.42	0.37		
Final pressure drop	1.0	1.0		

Coils

⚠ CAUTION

Sharp fin edges are a potential injury hazard. Avoid contact with them.

1. To obtain maximum performance, the coil must be clean. Check once a year under normal operating conditions and, if dirty, brush or vacuum clean. Use a chemical coil cleaner on multiple row coils. Read and follow the chemical cleaner's instructions as some cleaners may contain harsh chemicals. Take care not to damage fins while cleaning. **CAUTION—Fin edges are sharp.**
2. Drain pans in any air conditioning unit may have some moisture. Algae, etc., can grow due to airborne spores and bacteria. Periodic cleaning is necessary to prevent this buildup from plugging the drain and causing the drain pan to overflow. Also, keep the drain pans clean to prevent the spread of disease. Cleaning should be performed by qualified personnel.
3. Dirt and lint can clog the condensate drain, especially with dirty filters. Inspect twice a year to help avoid overflow.

Winterizing Water Coils

⚠ WARNING

Mold can cause personal injury. Clean drain pan regularly so mold does not develop.

Coils can freeze due to air stratification or failure of outdoor air dampers and/or preheat controls. Drain all coils as thoroughly as possible and then treat in the following manner.

- Fill each coil independently with an antifreeze solution using a small circulating pump and again thoroughly drain.
- Check freezing point of antifreeze before proceeding to next coil. Due to a small amount of water always remaining in each coil, there is a diluting effect. The small amount of antifreeze solution remaining in the coil must always be sufficient enough to prevent freeze-up.

NOTE: Carefully read instructions for mixing antifreeze solution used. Some products have a higher freezing point in their natural state when mixed with water. Daikin is not responsible for the freezing of coils.

Removing and Replacing Components

⚠ WARNING

Before removing any component, lock out and tag out all power to the unit. Fans and belts can cause severe personal injury or death.

Removing a Side or Top Panel

1. Remove the flat head fasteners located along the sides of the panel.
2. Once all fasteners are removed, lift off the panel.

Removing a Frame Channel

Frame channels that run the length of the unit along the top can be removed to allow access to both the side and top of the unit.

1. First remove any adjoining side and top panel(s).
2. Once the side panel is off, remove the flat head fasteners in the corner of the frame channels.
3. Pull the frame channel out the side.
4. If any top panel fastens into the frame channel (when the frame channel is 24" or wider in direction of air flow), remove the fasteners in the top panel before pulling out the channel.

Removing the Fan Section

The fan shaft, motor, and any drive components can be removed and replaced through the access door opening. If required, the side panel can be removed for additional access.

If fan replacement is required, the entire fan assembly can be pulled out the side of the cabinet for housed fan assemblies. The fan assembly includes the fan housing, the bearing support, and the fan base.

1. Remove the side panels and any intermediate supports (follow instructions for side panel removal).
2. Once the panels and any intermediate supports are removed, disconnect the neoprene bulk head seal that is attached to the fan discharge.
3. Remove the four discharge angles that hold the neoprene canvas in place around the discharge opening.
4. Disconnect the fan sled from each of the corner mounts and pull the entire assembly out the side of the unit.
5. After the fan sled is out, loosen the fan bearings and pull out the shaft.
6. Disconnect the fan housing from the fan sled, and bearing support by removing the attaching bolts.
7. Replace the new fan, reconnect the shaft and bearings and put the fan assembly in the cabinet.
8. Replace panels and fasteners.

For plenum fan assemblies, the entire fan cabinet may need to be removed to replace the entire fan assembly depending on the length of the fan section. In some cases, the fan section is not long enough for the assembly to fit out the side of the cabinet. For those cases where it will fit, follow the above steps except the neoprene seal is a D-gasket on the inlet side that needs to be removed for plenum fans. Otherwise, the entire fan cabinet must be removed from the other sections and then the fan assembly can be removed out the discharge side of the cabinet.

Removing and Replacing the Coil

The coil can be removed by the side, top, or a combination of both. The size and configuration of the coil affects how the coil can be removed. Single banks of coil are fastened only on the connection side of the unit. Stacked and staggered coils are fastened on both ends of the coil. See the instructions below for details to remove each coil type.

Before removing the coil, disconnect all piping. The instructions below assume the coil is mounted in a sectionalized coil section where the frame channel can be removed without affecting other components. If the coil section is unitized with other components, removing the top frame channel requires removing additional panels.

Removing Single Coils

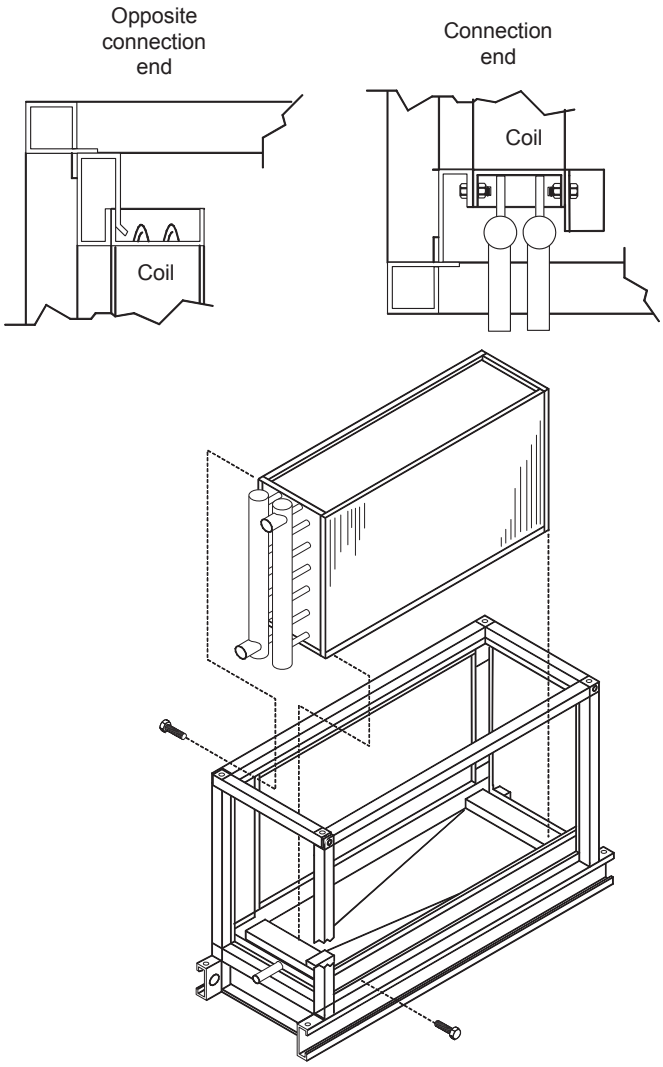
NOTE: Single coils are bolted to the unit on the connection end.The connection end is held in place with a clamp.

1. Disconnect all piping and remove the brass plugs for the vents and drains located in the connections.
2. Remove all screws and remove the access panel.
3. Remove the screws holding the coil in place.
4. Lift and pull the coil out the side.

Installing Single Coils

1. Slide the coil through the opening in the coil section onto the bottom coil rests.
2. To prevent any air bypass around the coil, place coils up against the coil bulkheads (refer to Figure 65).
3. Once the coil is in place, fasten the coil to the section.
4. Caulk the seams between the coil casings and bulkheads (refer to Figure 65).
5. If this is an additional coil being installed and not a replacement, locate the coil supply and return connections dimensionally. Carefully drill holes in the end panels of the unit.
6. Remove the brass plugs for the vents and drains on the connections.
7. Slip the panel over the connections.
8. Replace the brass plugs and panel fasteners.

Figure 65: Single Coil Removal



Removing Stacked Coils

NOTE: Top and bottom stacked coils are held together with steel plate and screws on one side and drain trough and screws on the other side. Remove the plate and trough before removing the coils. The coils cannot be removed attached together.

1. Disconnect all piping and remove the brass plugs for the vents and drains located in the connections.
2. Remove all screws and remove the access panel.
3. Remove the bolts holding the coil in place and then lift and pull out the coil from the side.
4. Remove the steel plate and the drain trough that hold the coils together.
5. Remove the bolts on both ends of the top coil holding it in place and then lift and slide the coil out.
6. Remove the bolts on both ends of the bottom coil holding it in place and then lift and slide the coil out.

Installing Stacked Coils

1. Slide the bottom coil through the opening in the coil section onto the bottom coil rests.
2. Place the coil up against the coil bulkheads to prevent any air bypass around the coil.
3. Once the coil is in place, bolt the coil to the section.
4. Caulk the mounting surface of the steel plate and install the plate on the coils.
5. Caulk the mounting surface of the drain trough and install the drain trough on the coils.
6. Caulk the seams between the coil casings and blockoffs.
7. Connect all piping and install the brass plugs for the vents and drains located in the connections.
8. Install the access panel.

Removing and Installing Staggered Coils

Staggered coils have two banks of coils positioned a few inches apart in the direction of airflow. Both coils are secured to the unit on the connection and opposite connection end of the unit.

1. Disconnect all piping and remove the brass plugs for the vents and drains located in the connections.
2. To access bolts holding the coils in place, remove the panels on both the connection and opposite connection end of the coil section.
3. Each coil is held in place with bolts located in the corners of the coil side plates. Remove the bolts and then lift and pull the coil out the side.
4. The bottom coil is fastened to the air block off plate. Remove the screws attaching this plate to the coil.
5. Once the fasteners holding the coil in place are removed, pull out the coil from either side of the unit.
6. Install the coils in reverse order of removal.

Replacement Parts

When writing to Daikin for service or replacement parts, refer to the model number and serial number of the unit stamped on the serial plate attached to the unit. If replacement parts are required, mention the date of installation of the unit and date of failure, along with an explanation of the malfunctions and a description of the replacement parts required.

Warranty

Consult your local Daikin Representative for warranty details. To find your local Daikin Representative, go to www.DaikinApplied.com.

Warranty Return Material Procedure

Defective material may not be returned without permission of authorized factory service personnel of Daikin in Minneapolis, Minnesota, (763) 553-5330. A “Return Goods” tag must be included with the returned material. Enter the required information to expedite handling and prompt issuance of credits. All parts must be returned to the appropriate Daikin facility, designated on the “Return Goods” tag. Transportation charges must be prepaid.

The return of the part does not constitute an order for replacement. Therefore, a purchase order must be entered through the nearest Daikin representative. The order should include part number, model number, and serial number of the unit involved.

Credit will be issued on customer’s purchase order following an inspection of the return part and upon determination that the failure is due to faulty material or workmanship during the warranty period.

Air Handling
Equipment Warranty Registration Form

To comply with the terms of Daikin Applied Warranty, complete and return this form within 10 days to the Warranty Department of Daikin Applied.

Check, test, and start procedure for air handling units with or without heat recovery and roof mounted air handlers.

GENERAL INFORMATION

Job Name: _____ **GOI No.:** _____

Installation address: _____

City: _____ **State:** _____

Purchasing contractor: _____

City: _____ **State:** _____

Name of person doing start-up: _____

Company name: _____

Address: _____

City/State/Zip: _____

UNIT INFORMATION

Unit model number: _____ **Unit serial number:** _____

SF VFD model number: _____ **Serial number:** _____

RF VFD model number: _____ **Serial number:** _____

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AHU Equipment Warranty Registration Form (continued)

Select Yes or No. If not applicable to the type of unit, select N/A.

I. INITIAL CHECK

A. Is any shipping damage visible? . . . . . Yes No N/A

B. Are fan drives properly aligned and belts properly adjusted? . . . . . Yes No N/A

C. Tightened all setscrews on pulleys, bearings and fans? . . . . . Yes No N/A

D. Have the hold-down bolts been backed off on spring mounted fan isolators? . . . . . Yes No N/A

E. With the power off, do fans turn freely by hand? . . . . . Yes No N/A

F. Electrical service corresponds to unit nameplate? . . . . . Yes No N/A

Volts _____ Hertz _____ Phase _____

G. Is the main disconnect adequately fused and are fuses installed? . . . . . Yes No N/A

H. Are all electrical power connections tight? (Check compressor, electrical box.) . . . . . Yes No N/A

I. Is the condensate drain trapped? . . . . . Yes No N/A

J. Fill the drain pan. Does water drain freely? . . . . . Yes No N/A

K. Is the unit mounted level? . . . . . Yes No N/A

II. FAN DATA

A. Check rotation of supply fan? . . . . . Yes No N/A

B. Voltage at supply fan motor: . . . . . 1–2_____ V 2–3 _____ V 1–3 _____ V

C. Supply fan motor amp draw per phase: . . . . . L1 _____ L2 _____ L3 _____

D. Overload amp setting: . . . . . _____

E. What is the supply fan rpm? . . . . . _____

F. Check rotation of return fan? . . . . . Yes No N/A

G. Voltage at return fan motor: . . . . . 1–2_____ V 2–3 _____ V 1–3 _____ V

H. Return fan motor amp draw per phase: . . . . . L1 _____ L2 _____ L3 _____

I. Overload amp setting: . . . . . _____

J. What is the return fan rpm? . . . . . _____

K. Record supply static pressure at unit in inches of H_20: . . . . . _____

L. Record return static pressure at unit (with outside air dampers closed) in inches of H_20: . . . . . _____

III. DAMPERS

A. Are blades and seals present? . . . . . Yes No N/A

B. Do damper open smoothly and shut tight? . . . . . Yes No N/A

DAIKIN

AHU Equipment Warranty Registration Form (continued)

Select Yes or No. If not applicable to the type of unit, select N/A.

IV. ELECTRIC HEAT

A. Electrical heat service corresponds to unit nameplate? . . . . . Yes No N/A

Volts _____ Hertz _____ Phase _____

B. Are there any signs of physical damage to the electric heat coils? . . . . . Yes No N/A

C. Have all electrical terminals been tightened? . . . . . Yes No N/A

D. Does sequence controller stage contactors properly? . . . . . Yes No N/A

E. Electric heater voltage across each phase: . . . . . _____ L1 _____ L2 _____ L3

F. Amp draw across each phase at each heating stage:

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Phase L1:	_____	_____	_____	_____	_____	_____
Phase L2:	_____	_____	_____	_____	_____	_____
Phase L3	_____	_____	_____	_____	_____	_____

G. FLA: L1 _____ L2_____ L3 _____

H. Operate electric heat with fans off. Electric heat must cycle on high limit control . . . . . Yes No N/A

V. CHILLED WATER COIL

A. Pressure test OK? . . . . . Yes No N/A

B. Drain pan draining OK? . . . . . Yes No N/A

VI. HOT WATER COIL

A. Pressure test OK? . . . . . Yes No N/A

VII. HEAT RECOVERY

A. Heat wheel rotates freely? . . . . . Yes No N/A

B. Heat wheel VFD operates properly? . . . . . Yes No N/A

C. Heat wheel VFD: . . . . . .Model # _____ Serial # _____

D. Check for air bypass around heat wheel. . . . . Yes No N/A

DAIKIN **AHU Equipment Warranty Registration Form (continued)**

Select Yes or No. If not applicable to the type of unit, select N/A.

VIII. Design Flow calibration

A. Verify power is supplied to the MicroTech III unit controller . . . . . Yes No N/A

B. Verify that the shipping screws have been removed from the measuring station vane . . . . . Yes No N/A

C. Examine station for damage . . . . . Yes No N/A

D. Record Level Position after calibration

- LH Level Position . . . . . _____
- RH Level Position . . . . . _____

NOTE: This is viewed in the MicroTech III controller, in the Min OA setup menu.

IX. GAS BURNER CHECK, TEST, & START

Specifications:
For gas, see Forced Draft Gas Burner Installation and Maintenance Bulletin. (IM 684 and IM 685)

A. Gas Furnace:. . . . . Model no. _____

B. Gas Burner: . . . . . .Model no._____ Serial no. _____

C. Gas Type firing: . . . . . .Single Stage _____ Modulation _____

D. Gas Rated firing rate (MBH input): . . . . . ._____

E. Gas Altitude (ft. above sea level): . . . . . ._____

F. Is there a circulating tank? . . . . . Yes No N/A

G. Input (CFH): . . . . . _____

H. Gas pressure at burner (inches w.c.): . . . . . _____

I. CO_2 (%) . . . . . _____

J. CO_2 (%): . . . . . _____

K. Pilot flame only in microamps (steady at low fire): . . . . . _____

L. Pilot Tap-gas pressure (inches w.c.): . . . . . _____

M. Motor only/burner FLA running amps: . . . . . _____

N. High limit control OK? . . . . . Yes No N/A

O. Flame safeguard (microamps): . . . . . _____

P. Flame failure shutoff (seconds): . . . . . _____

DAIKIN

AHU Equipment Warranty Registration Form (continued)

Select Yes or No. If not applicable to the type of unit, select N/A.

Q. Airswitch OK?	Yes	No	N/A
R. High Gas Pressure Switch OK?	Yes	No	N/A
S. Low Gas Pressure Switch OK?	Yes	No	N/A
T. Main Gas Valve Close-off OK?.	Yes	No	N/A

Thank you for completing this form. Please sign and date below.

Signature _____ **Startup date:** _____

Return completed form by mail to:

Daikin Warranty Department, 13600 Industrial Park Boulevard, Minneapolis, MN 55441

or by email to: AAH.Wty_WAR_forms@daikinapplied.com

Please fill out the Daikin Applied "Quality Assurance Survey Report" and list any additional comments that could affect the operation of this unit; e.g., shipping damage, failed components, adverse installation applications, etc. If additional comment space is needed, write the comment(s) on a separate sheet, attach it to the Survey Report and return it to the Warranty Department of Daikin Applied with the completed Equipment Warranty Registration form.

DAIKIN

Quality Assurance Survey Report

To whom it may concern:
Please review the items below upon receiving and installing our product. Select N/A on any item that does not apply to the product.

Job Name: _____ **Daikin Applied G.O. No.** _____

Installation address: _____

City: _____ State: _____

Purchasing contractor: _____

City: _____ State: _____

Name of person doing start-up (print): _____

Company name: _____

Address: _____

City/State/Zip: _____

Unit model number: _____ **Unit serial number:** _____

1. Is there any shipping damage visible? . . . . . Yes No N/A

   Location on unit _____

2. How would you rate the overall appearance of the product; i.e., paint, fin damage, etc.?

   Excellent Good Fair Poor

3. Did all sections of the unit fit together properly? . . . . . Yes No N/A
4. Did the cabinet have any air leakage? . . . . . Yes No N/A

   Location on unit _____

5. Were there any refrigerant leaks? . . . . . Yes No N/A

   From where did it occur? . . . . . Shipping Workmanship Design

6. Does the refrigerant piping have excessive vibration? . . . . . Yes No N/A

   Location on unit _____

7. Did all of the electrical controls function at start-up? . . . . . Yes No N/A

   Comments _____

8. Did the labeling and schematics provide adequate information? . . . . . Yes No N/A
9. How would you rate the serviceability of the product?

   Excellent Good Fair Poor

10. How would you rate the overall quality of the product?

    Excellent Good Fair Poor

11. How does the quality of Daikin Applied products rank in relation to competitive products?

    Excellent Good Fair Poor

    Comments _____

Please list any additional comments which could affect the operation of this unit; i.e., shipping damage, failed components, adverse installation applications, etc. If additional comment space is needed, write the comment(s) on a separate sheet, attach the sheet to this completed Quality Assurance Survey Report, and return it to the Warranty Department with the completed preceding "Equipment Warranty Registration Form".

13-4160 (05/14)

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Daikin Applied Training and Development

Now that you have made an investment in modern, efficient Daikin equipment, its care should be a high priority. For training information on all Daikin HVAC products, please visit us at www.DaikinApplied.com and click on Training, or call 540-248-9646 and ask for the Training Department.

Warranty

All Daikin equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Applied representative for warranty details. To find your local Daikin Applied representative, go to www.DaikinApplied.com.

Aftermarket Services

To find your local parts office, visit www.DaikinApplied.com or call 800-37PARTS (800-377-2787). To find your local service office, visit www.DaikinApplied.com or call 800-432-1342.

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to www.DaikinApplied.com.

Products manufactured in an ISO Certified Facility.

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