39CCN, CCW Indoor and Outdoor Custom Air Handlers

INSTALLATION, START-UP AND SERVICE INSTRUCTIONS

Contents

INTRODUCTION

The 39CC custom air-handling units are designed for indoor (39CCN) or outdoor (39CCW) installations. Modular design allows for heating sections such as hot water coils, steam coil, or electric heat. Cooling options include chilled water, DX (direct expansion), or glycol. Filter options include bag, rigid, HEPA, mini-pleat, vee, and others.

For further information on unit and component identification, contact your Carrier representative for the approved submittal.

Due to the custom nature of the products, there may be areas beyond the scope of this manual.

Manufacturer reserves the right to discontinue or change specification or designs at any time without notice and without incurring obligations.

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SAFETY CONSIDERATIONS

Air-handling equipment is designed to provide safe and reliable service when operated within design specifications. To avoid injury to personnel and damage to equipment or property when operating this equipment, use good judgment and follow safe practices as outlined below

DANGER

- NEVER open an access door while Air handling unit is in operation.
- NEVER enter an enclosed fan cabinet or reach into a unit while the fan is running.
- LOCK OPEN AND TAG the fan motor power disconnect switch before working on a fan. Take fuses with you and note removal on tag. Electric shock can cause personal injury or death.
- LOCK OPEN AND TAG the electric heat coil power disconnect switch before working on or near heaters.
- Failure to follow these warnings could lead to personal injury or death.

CAUTION

- SECURE drive sheaves with a rope or strap before working on a fan to ensure that rotor cannot free-wheel.
- DO NOT restore power to unit until all temporary walkways inside components have been removed.
- NEVER pressurize equipment in excess of specified test pressures.
- PROTECT adjacent flammable material when welding or flame cutting. Use sheet metal or asbestos cloth to contain sparks. Have a fire extinguisher at hand and ready for immediate use.
- EQUIPMENT WIRED TO AUTOMATIC CONTROL DEVICES may start without warning, resulting in personal injury or property damage. In many instances a unit will have multiple electrical and compressed-air connection points. To prevent unforeseen startup, prior to beginning work on the equipment always lockout all power supplies.
- Failure to follow these warnings could result in personal injury or equipment damage.

WARNING

- ALWAYS DISCONNECT main power to the equipment before installing or servicing air conditioning equipment. Electrical shock can cause injury or death.
- CHECK the assembly and component weights to be sure that the rigging equipment can handle them safely. Note also, the centers of gravity and any specific rigging instructions.
- CHECK for adequate ventilation so that fumes will not migrate through ductwork to occupied spaces when welding or cutting inside air-handling unit cabinet or plenum.
- WHEN STEAM CLEANING COILS be sure that the area is clear of personnel.
- DO NOT attempt to handle access covers and removable panels on outdoor units when winds are strong or gusting until you have sufficient help to control them. Make sure panels are properly secured while repairs are being made to a unit.
- DO NOT remove access panel fasteners until fan is completely stopped. Pressure developed by a moving fan can cause excessive force against the panel which can injure personnel.
- DO NOT work on dampers until their operators are disconnected.
- BE SURE that fans are properly grounded before working on them.
- Failure to follow these warnings could result in personal injury or equipment damage.

STEP-1 PREINSTALLATION

Receiving and Inspection

IMPORTANT:
- Immediately report any damage detected after delivery to carrier and obtain a concealed damage inspection report upon their inspection of the shipment.
- Keep a written record of all communications.

1. Verify receipt of all parts by comparing items in the shipment with those listed on the bill of lading.
2. Inspect the unit(s) for any damage that may have occurred during shipping.
3. Indicate any problems such as shortage, damage, or breakage on the carrier's freight bill and obtain the **signature of the driver or carrier's representative as verification**.
4. To facilitate inspection, a list of items shipped with the units is included and attached to the inside access door of the supply fan section.
5. Among the items generally shipped loose are the following:
   - Fan section: Split unit reassembly hardware (nuts, bolts, caulking); replacement fan belts; lifting lugs.
   - Filter section: Filters; filter clips
6. If considerable damage has been incurred and the situation is urgent, **contact your sales representative** for assistance.

Storage

IMPORTANT:
- Improper storage will result in significantly reduced equipment reliability.
- It is likely that an electric motor or fan that does not experience regular use while being exposed to normally humid atmospheric conditions will encounter bearing degradation. In addition, the motor's electrical insulation may absorb an excessive amount of moisture leading to the motor winding failing to ground.

1. The following preparations should be followed:
   - Minimize condensation in and around the fan and motor by humidity controls.
   - Coat all external machined surfaces with a material to prevent corrosion.
   - Measure and record the motor electrical resistance of insulation with a Megger meter or a resistance meter. The insulation resistance = kV rating + 1 Megohom.
   - Whenever possible store equipment indoors in a dry area and protect the fan shaft bearings and fan wheel from dust and corrosion.
2. If outdoor storage is necessary:
   - Close all latches on access doors to prevent water/air leakage.
   - Unit should be placed on a level surface. Avoid setting the unit directly on water or wet ground.
   - Supports should be placed at 6-ft intervals.
   - Use a tarp or similar weatherproof cover to protect cabinet exterior against dust, dirt, moisture, and corrosion.
   - Cover the unit from the roof down to the base on each side. Inspect and ventilate each section every 2 weeks to prevent mold/ mildew growth, and to observe overall integrity of the unit.
3. To protect against excessive vibration and accidental impact, never store other equipment inside or on top of the unit.
4. If unit must be stored for an extended period:
   - Manually rotate fan wheels monthly
   - Lightly grease fan and motor bearings every month.
   - Protect against excessive vibration and accidental impact.

Rigging

⚠CAUTION:
- Never attempt to lift the unit using tie-downs. Tie-downs are for securing the unit to the truck only. See Fig.1
- Never lift units or subassemblies without a base by attaching bolts, clevises, pins, hooks, etc. to casing, casing hardware, flanges, angles, or tabs. Only rig as shown here.
- *Use extreme caution when moving an air-handling unit with a forklift.*

IMPORTANT:
- Prior to lifting, install removable lugs shipped loose in the fan section
- To avoid damaging the air-handling unit, always lift in an upright position, and never move or lift from a sideways or upside-down position.
- During a lift, all lugs must be used.
- It is mandatory to use spreader bars for larger units with lifting lugs or slings for smaller units to prevent damage to the casing of the units by rigging equipment.
- Only qualified rigging personnel should operate lift equipment.
- *Use extreme caution when moving an air-handling unit with a forklift.*

1. The air-handling unit may be shipped in one of three ways
   - Assembled
   - Subassemblies or groups of parts
   - Separate sections
2. To ensure safe lifting, estimate the unit's center of gravity, taking into account that the weight may be unevenly distributed due to the placement of internal components (for example, more weight in the coil and fan areas). In case where the unit's center of gravity is a concern, **please contact your Carrier Representative**.

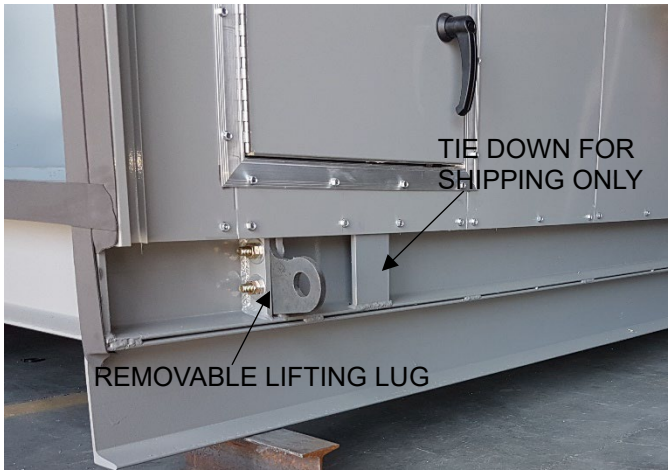

Figure 1 Lifting Lug

3. Spreader bars are required to prevent damage to the cabinet and protruding components. To distribute the load properly, the tension in each line must also be adjusted. See *Fig. 2*.

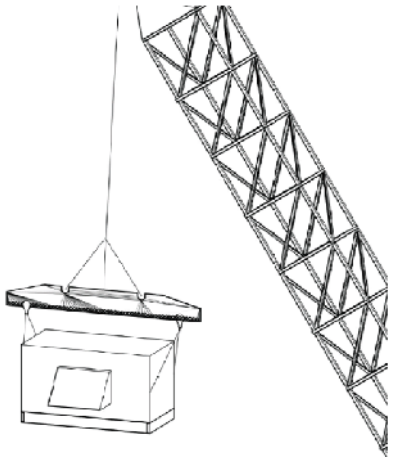

Figure 2 Lifting with Spreader Bars

4. For smaller units when no lifting lugs are provided, use a belt-type sling to raise the unit from the base, carefully avoiding door handles, electrical boxes, coil connections, and other protrusions.
5. Units can be lifted with forklifts as long as the forks are 40 inches and the end tips contact the bottom of the intermediate supports of the base rail. Additionally, a forklift may be used to lift small subassemblies or individual sections, but the forks must reach the other side of the base rail. See *Fig. 3*.

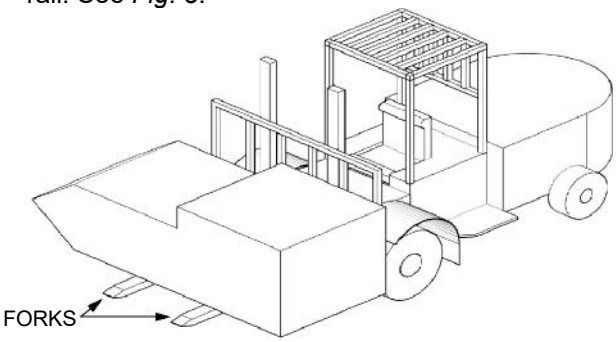

Figure 3 Forklift

6. SPLIT UNITS:
   - Split units less than 102 in. may be shipped loosely assembled.
   - Disassembly is required, with each section being lifted individually.
   - The “loosely assembled” split sections are affixed using a minimum number of bolts for transit and cannot be lifted while fastened together.
   - Use all lifting lugs to avoid unit damage and/or personal injury.

Clearance Requirements

IMPORTANT:
- As required by the state, city or the national electrical code (NEC or CEC), the service space between the face of any electrical enclosure and wall or obstruction must be **42 inches minimum**.
- Ensure sufficient clearance to open doors and install piping and ductwork.
- Do not obstruct airflow through louvers of hoods; the distance between the louver and any facing wall must be equal to the horizontal width of the louver.
- Provide enough space around the unit for easy removal of access panels and parts (such as fan wheels, motors, and belt guards)
- To facilitate removal of coils, fan shaft, and fan wheel, allow a minimum clearance equal to the width of the unit on one side.

STEP-2 INSTALLATION

IMPORTANT:
- The services of qualified field services personnel are required for safe and proper installation of this equipment.
- Do not operate this unit outside the listed nameplate ratings for flow or static pressure.
- This unit is designed for installation on a level surface or suspended on a level plane.
- Follow **SMACNA** (Sheet Metal and Air Conditioning Contractors’ National Association) guidelines for supply/return/exhaust duct connections and minimal duct obstruction clearances.

Air Handler Unit Pad

IMPORTANT:
Base rail paint damage must be repaired by cleaning down to bare metal and applying two heavy coats of matching paint to stop corrosion and rust.

- The foundation and floor should be level (shim when necessary), rigid, and strong enough to support the weight of the entire unit.
- It is the installer’s responsibility to secure the unit to the unit pad in accordance with all applicable building and earthquake codes.
- After the unit has been installed, the base rail should be inspected for paint damage from chains in the tie down brackets, use of the lifting lugs and fastening the unit down.

Ceiling Suspended Units

⚠CAUTION: The casing is not a support component

IMPORTANT: • The installer is responsible for installing in accordance with applicable building and earthquake codes. See fig.4

- Ceiling suspended units must be supported from the base.
- To fully support the unit, four or more suspension points are required.
- The exact number of support points is function of the unit length and weight. Please refer to submittal drawings for lift locations.

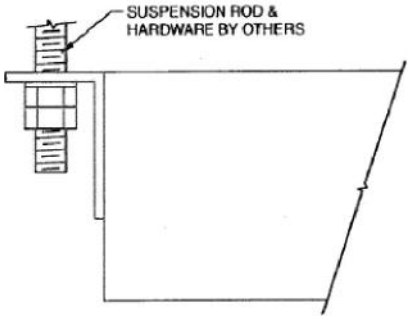

Figure 4 Suspension Mounting

Roof Curb

IMPORTANT:
- The installer is responsible for installing roof curb in accordance with the local building and earthquake code.
- Follow **SMACNA** and industry guidelines for duct gages, sizing, materials, insulation and supports.

Roof curbs are shipped either fully welded or in split sections. Bolt together if roof curb is bolted construction

Follow the procedure to assemble roof curb, if required:

STEP 1: Arrange the 4 perimeter sidewalls so that pre-drilled holes are aligned. Drive bolts each corner securely (bolts provided).

STEP 2: Drive bolt the remaining support members using the predrilled holes and provided drive bolts. Turn out the flanges before fastening. See Fig. 5.

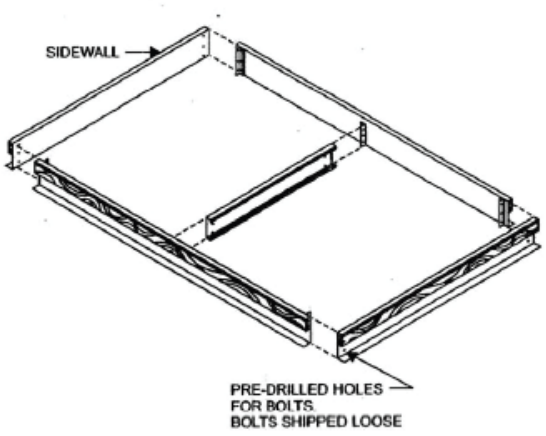

Figure 5 Roof Curb Assembly

STEP 3: Line up the assembled curb with the roof openings. Square up the curb by measuring the diagonal distance between opposite corners and adjust until the distances are equal. Level the curb.

STEP 4: Install the foam rubber seal strip atop the installed curb. This provides an airtight seal and isolates the roof from vibration.

STEP 5: Roof the curb prior to setting the unit. Use standard 2 in. x 4 in. wood nailers (provided), insulate and flash (by others) as required.

STEP 6: Check to ensure that curb is level and securely attached to structure.

STEP 7: Check for sufficient height between the unit base and the roof to allow for drain trapping.

STEP 8: Use polyurethane caulking on top of the curb to seal between the unit base and the roof curb.

STEP 9: Safely lift the unit in place.

Duct/Weather Hood Installation

- Transition to and from units as required for proper airflow.
- When installing ductwork or weather hoods to unit exterior, use gaskets or caulking around entire perimeter of flange.
- Align the duct or hood over the opening. Check for adequate clearance to doors and other openings.
- Install the duct of hood using sheet metal screws through the unit casing.
- Carefully remove excess caulking, if required, from around the flange.

Electrical Connections

IMPORTANT:
Follow the latest **NEC (National Electrical Code)** and/or other applicable codes for all electrical wiring and connections, including grounding.

- Nameplate data contains line voltage and minimum ampacity for this unit.
- Separate line voltage power supply should be run directly from the building distribution panel to the electrical connection on the unit.
- Consult wiring diagrams provided with the unit. Follow NEC and applicable codes for conduit and wire ratings.

Coils

IMPORTANT:
- Do not block the air vent; this may result in poor coil performance connections.
- Inlet line strainers are recommended to prevent debris from blocking coil tubes or valves.

HEATING COILS (HOT WATER, STEAM) — Heating coils are constructed of copper tube with corrugated fins. Maximum operating pressure is 150 psig. Coils are provided with drain and vent connections.

- Common causes of heating coil damage are:
  1. *Improper piping installation*
  2. *Water hammer*
  3. *Freezing*
  4. *Control valve chattering*
  5. *Internal corrosion from chemicals in fluid*
  6. *External corrosion from chemicals in the airstream*

COOLING COILS (CHILLED WATER, DIRECT EXPANSION, GLYCOL) — Cooling coils are constructed of

copper tube with corrugated fins. Maximum operating pressure is 150 psig.

- An IAQ 304SS (indoor air quality 304 stainless steel) condensate drain pan is located under the coil with drain and vent connections.
- Common causes of water-cooling coil damage are:
  1. *Improper piping installation*
  2. *Water hammer*
  3. *Freezing*
  4. *Control valve chattering*
  5. *Internal corrosion from chemicals in fluid*
  6. *External corrosion from chemicals in the air stream*
- DIRECT EXPANSION (DX) COOLING COILS are thermal counter-flow construction with same end liquid and suction connections.
- Refrigerant distributors are brass, pressure type with copper distributor tubes factory installed.
- Common causes of DX cooling coil damage are:
  1. *Improper piping installation*
  2. *Freezing (due to excessively low pressure)*
  3. *Internal corrosion*
  4. *External corrosion from chemicals in the air stream*

Reassembly of Split Units

⚠CAUTION:

- To prevent air and water leaks, all units must be carefully assembled and installed on a proper foundation.
- Never skip caulking or securing bolts—improper assembly and caulking can lead to leaks and equipment damage.
- Use proper lifting tools and techniques when aligning sections; avoid personal injury.

Carrier Custom air units are assembled in one piece in the factory to make sure that all piece's match and the bolt holes line up and are then split prior to shipping.

- Preparation
  1. Ensure the housekeeping pad or roof curb is level before starting reassembly.
  2. All nuts, bolts, washers, and caulking required for assembly of the unit are shipped in the supply fan section.
- Assembly Steps:

  STEP 1: Place all sections on a level surface.

  STEP 2: Apply caulk where indicated on both sides of split panel and roof flanges. Bolt the base together securely.

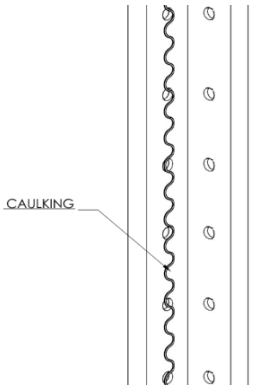

Figure 7 Caulking Split Panel Flanges

If needed, use a come-along or hand-operated winch to tighten the space between unit sections.

If bolt holes do not align due to racking during transit:

- Lift one side with a jack to align holes on the opposite wall.
- After bolting this wall, remove the jack.
- Proceed with bolting the other side, base, floor, and roof.
- Any racking that is out of square should realign as the unit settles.

STEP 3: Check that all bolts are properly secured.

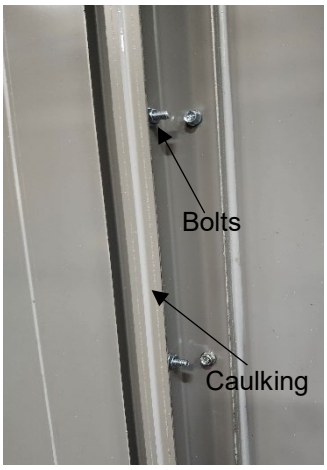

Figure 6 Bolt and Caulk Standing Seam

STEP 4: Caulk exterior roof seams. See fig.8

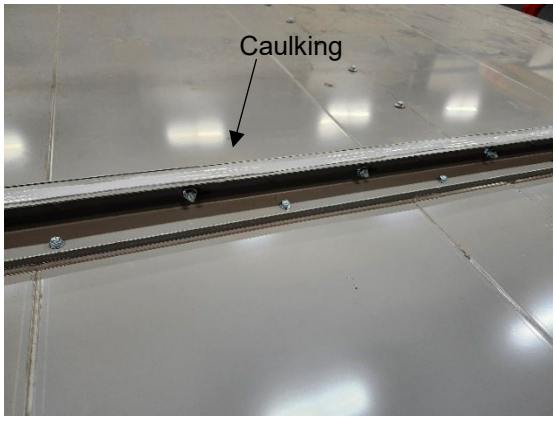

Figure 8 Exterior Roof Seam

STEP 5: Caulk and bolt standing seam and install the roof cleat. See fig. 9.

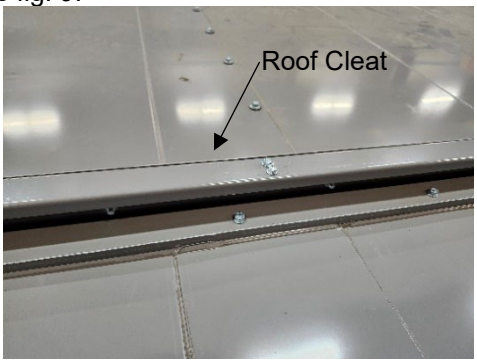

Figure 9 Roof Cleat

STEP 6: Check all splits to ensure proper bolting and caulking. See fig.10

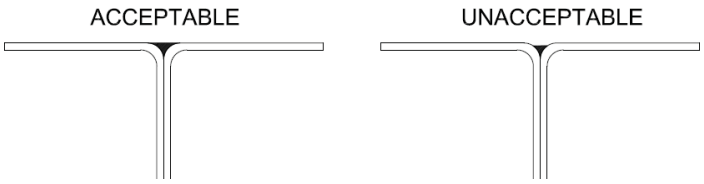

Figure 10 Properly Caulk Seams

STEP 7: Verify all electrical and piping connections are correct and complete.

Reassembly of Stacked Unit Horizontal Splits

IMPORTANT:
If the equipment is not properly installed and caulked, the unit may leak under pressure or water may leak into the unit from the split joint.

For a unit split both vertically and horizontally:

1. Complete the assembly of the lower section.
2. Join the upper sections to the lower sections.
3. Caulk underneath clips, behind lifting lugs, and behind upper base channel. Wherever possible, secure base anchor clips in bolt holes.
4. Check all splits to ensure proper bolting and caulking.
5. Check all splits to ensure that all electrical and piping connections are correct and complete.
6. For units wider than any split section's airway length:
   - Removable lifting lugs are provided along the width of the unit.
   - After closely positioning the split, remove the inner lifting lugs.
   - During final bolting, use come-along or hand-operated winch to tighten the space between unit sections.

Trapping Drains

IMPORTANT:
- Improper drain trapping can cause the drain pan to flood and potentially damage the air-handling unit and surrounding facilities.

- All condensate drain connections and floor drains must be trapped on the job site **by others**.
- Check and confirm that all drain traps are installed correctly.
- Refer to *Fig. 11* for condensate drain trap sizing.
- Inspect drain pans for proper drainage after installation.

Connecting Ducts

IMPORTANT:
To prevent air leakage and eliminate system performance problems, always caulk around all duct connections to ensure tight seals.

- When connecting **flanged ducts directly to the casing**, use self-tapping sheet metal screws.
- For duct connections to **collar-type openings**, use s-cleats or overlapping joints.
- Caulk around all duct connections to form tight seals.

Connecting Rain Hoods

IMPORTANT:
Adequate clearance and proper caulking are essential to ensure access and prevent water or air leaks.

- Allow **adequate clearance** to doors and other openings on the unit.
- Use **sheet metal screws** to fasten the hood(s) to the casing of the air handling unit.
- **Caulk around the hood flange** to ensure a tight seal.
- Carefully **remove any excess caulking** after installation.

Electrical Installation

CAUTION:
- Improper wiring or grounding can result in equipment malfunction, electrical hazards, or loss of waterproof integrity. Always follow code requirements and manufacturer instructions.
- Never cut holes in the bottom of outdoor units.
- Always check for proper grounding before energizing the unit.
- Ensure all conduit penetrations are sealed to prevent water and air leaks.
- Only use wiring that matches the original specifications.

PRECAUTION:
- Ensure correct motor and blower rotation when connecting three-phase power.
- Wire interior lighting and convenience outlets to a separate power supply.
- Refer to wiring diagrams for shielded or twisted wire requirements.
- Lock all latches on electrical and control panels.

1. Install all wiring according to local code and authority requirements.
2. Use the wiring diagrams provided in the control cabinet.
3. Size field wiring for a maximum 10% voltage drop.
4. Mount disconnects properly and ensure adequate grounding.
5. Use rigid or flexible conduit for all field wiring outside the electrical enclosure.
6. Reconnect any wiring disconnected on the unit that were split in 2 or more sections for shipment.

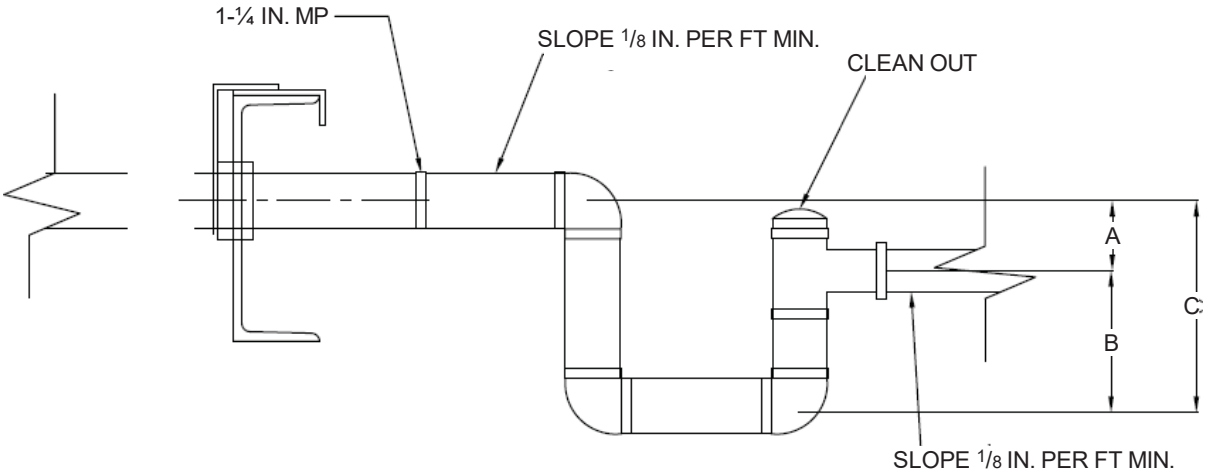

Figure 11 Condensate Drain Trap Sizing

(+) STATIC PRESSURE (BLOW THROUGH COIL
A - 1 inch
B -TSP +1 inch
C - TSP + 2 inch

(-) STATIC PRESSURE (DRAW THROUGH COIL
A - TSP + 1 inch
B - 1/2TSP + 1 inch
C - 1-1/2 + 2 inch

LEGEND

MP: Male Pipe
TSP: Total Static Pressure (inside drain plenum, inches of water)

STEP-3 START-UP

Preliminary Inspection

1. **Disconnect power to unit**. Use safety lockouts and label all disconnects to prevent unintentional powering.
2. Verify all field connections and wiring meet applicable codes. Verify that power supply connection voltage matches nameplate rating. Verify all wiring terminals are tight.
3. Inspect all piping for leak and verify conformance to piping codes.
4. Remove all fan shipping tie-downs and bracing. See the section Fan Start-Up below.
5. Verify required filters are securely in place before starting unit.
6. Verify supply duct(s) are free from obstructions.
7. Verify all supply dampers/diffusers are open.

Fan Start-Up

1. Inspect fan and drive assembly (see *Fig. 12*). Adjust belt (if applicable) to appropriate tension and alignment.
2. Check fan rotation. Correct by changing wiring if required.
3. Power the fan, measure airflow per AMCA (Air Movement and Control Association) suggested methods, and compare to nameplate data.
4. Adjust either the VFD (variable frequency drive) or belt-drive sheave to alter the fan speed to achieve required flow.
5. After proper flow is achieved, verify that the motor amp draw agrees with the motor nameplate full load amp rating.

STEP-4 SERVICE

Monthly

1. Check supply air filters and clean or replace as required.
2. Check the cooling coil condensate drain pan for proper draining and clean if necessary.
3. Fan bearings with grease fittings need to be lubricated. Bearings that do not have grease fittings are permanently sealed and do not require lubrication. Check submittal data for types of bearings used.
4. Fans ship from the factory with fan bearings factory lubricated. The fan should be turned off and locked out to prevent accidental start- up during lubrication.
5. Verify that the sheaves are secured before servicing the fan.
6. Generally, lubricate fan bearings every 1000 hours.
7. Add grease with manual grease gun until a light bead of grease appears at the bearing grease seal. Alternatively, the grease capacity recommendations in Tables 1 and 2 can help for proper grease charge.
8. Always lubricate bearings prior to extended shut-down or storage and rotate shaft monthly.

IMPORTANT:
Use only lithium-based grease. See the section Recommended Grease on *page 9*.

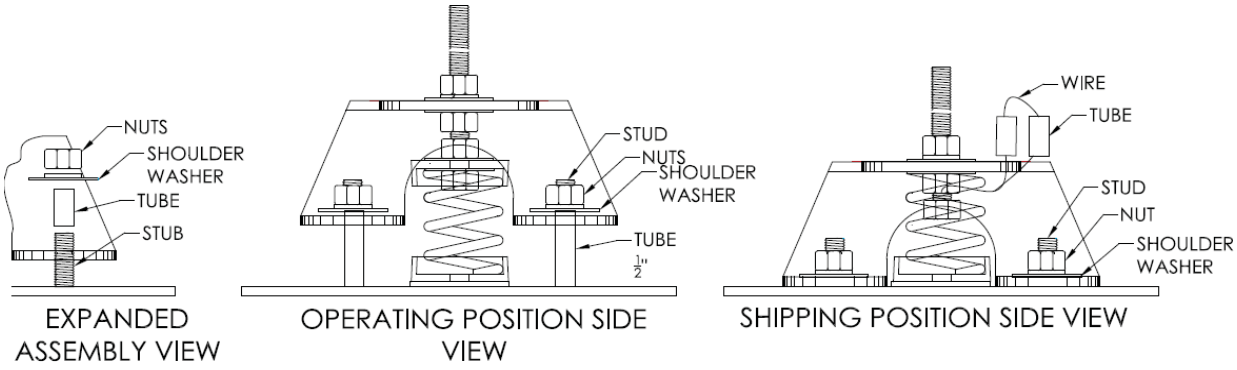

Figure 12 Fan Assembly

Table 1 Ball Bearing Lubrication Schedule

SHAFT DIAMETER (INCHES)	APPROX. GREASE CAPACITY (OUNCES)	FAN SPEED (RPM)						
		500	1000	1500	2000	2500	3000	3500
0.50 to 1.69	1/2	6 mos.	6 mos.	5 mos.	3 mos.	3 mos.	2 mos.	2 mos.
1.94 to 2.44	3/4	6 mos.	5 mos.	4 mos.	2 mos.	2 mos.	1 mo.	1 mo.
2.56 to 2.94	1 1/2	5 mos.	4 mos.	3 mos.	2 mos.	1 mo.	1 mo.	1 mo.
3.44 to 3.94	3	4 mos.	3 mos.	2 mos.	1 mo.	1 mo.	1 mo.	—

Table 2 Spherical Roller Bearing Lubrication Schedule

SHAFT DIAMETER (INCHES)	APPROX. GREASE CAPACITY (OUNCES)	FAN SPEED (RPM)					
		500	750	1000	1500	2000	2500
1.44 to 1.94	1/2	6 mos.	4.5 mos.	4 mos.	4 mos.	3.5 mos.	2.5 mos.
2.19 to 2.69	3/4	5 mos.	4.5 mos.	4 mos.	2.5 mos.	2.5 mos.	1.5 mos.
2.94 to 3.94	2	4.5 mos.	4 mos.	3.5 mos.	2.5 mos.	1.5 mos.	—
4.44 to 4.94	4	4 mos.	4 mos.	2.5 mos.	1 mo.	—	—
5.44 to 5.94	7	4 mos.	2.5 mos.	1.5 mos.	—	—	—

RECOMMENDED GREASE

- *NGLI (National Lubricating Grease Institute) no.2, lithium based.*
- *Water Resistant -20F to 200F.*

Every Six Months

IMPORTANT:
- Do not use caustic or abrasive cleaners on fan shaft.
- Do not allow belt to bottom out in sheave.

1. Check fans for condition and tension of belts. Replace cracked, frayed or glazed belt. Re-verify tension after 48 hours and re-tension if required. See the section Belt Tensioning Method below. Do not over-tighten belts or bearing damage can occur. Belt should depress its width when pressed firmly inward at midpoint between pulleys and should tighten enough to prevent slipping. If motor pulley shoulder is worn, replace that as well.
2. Check fan and motor bearings for binding, noise, or excessive heat.
3. Check fan wheels for dirt, debris, or grease accumulation. Clean if required. Do not use caustic or abrasive cleaners on fan shaft.
4. On current production, the correct tension information is listed on the fan drive label.
5. For older equipment or units with field-modified drives, use the deflection formula in the following example and the tension data from *Table 3*

BELT TENSIONING METHOD:

i. When installing or re-placing belts, always use a complete set of new belts. Mixing old and new belts will result in the premature wear or breakage of the newer belts.
ii. Refer to label on inside of fan access door for information on factory-supplied drive.
iii. Always adjust the motor position so that V-belts can be installed without stretching over grooves. Forcing belts can result in uneven stretching and a mismatched set of belts.
iv. Tighten belts by turning motor-adjusting jackscrews. Turn each jackscrew an equal number of turns.
v. Equalize belt slack so that it is on the same side of belt for all belts. Failure to do so may result in uneven belt stretching.
vi. Tension new drives at the maximum deflection force recommended (*Table 3*)

Example:
Belt Span = 16 in.
Belt Cross-Section A, Super Belt, RPM Range (1000-2500)
Small Sheave PD = 5 in.
Deflection = (Belt Span)/64
Solution:
a)From *Table 3* find that deflection force for a new type A, super belt with 5-in. small sheave PD, RPM Range (1000-2500) is 8 lb.
b) Deflection = 16/64 = ¼ inch.

TENSION MEASUREMENT PROCEDURE:

IMPORTANT:
- Ratio of deflection to belt span is 1:64 in either of the unit of measurement.
- Always use the correct tension values from *Table 3* for accurate results.
- Do not allow belt to bottom out in sheave.
- If measuring in Centimeters: Use kilogram force values for comparison.

STEP – 1 Measure the belt span (see *Fig. 13* for reference).
STEP – 2 Position the bottom of the large O-ring on the span scale at the measured belt span.
STEP – 3 Set the small O-ring on the deflection force scale to zero.
STEP – 4 Place the tension checker squarely on one belt at the center of the belt span.
STEP – 5 Apply force on the plunger perpendicular to the belt span until the bottom of the large O-ring is even with the top of the adjacent belt or with the bottom of a straight edge laid across the outside diameters of the v-belt sheaves.
STEP – 6 Remove the tension checker and read the force applied from the bottom of the small O-ring on the deflection force scale.
STEP – 7 Compare the measured force with the values given in *Table 3*. The force should be between the "Used Belt" and "New Belt" values. Use the "New Belt" value for initial installation and after job start or 1–3 minutes of operation. Use the "Used Belt" value for 8-hour and subsequent checks. If the belt span was measured in centimeters, use the kilograms of force values for comparison.

NOTE: The ratio of deflection to belt span is 1:64 in either unit of measurement.
Whenever possible, jog start for a few revolutions or preferably run drive for approximately 1 to 3 minutes and then retention in accordance with Steps 1-7. Running the drive for a few revolutions or minutes will help seat the belt(s) in the groove(s). This relatively early re-tensioning may reduce or minimize the amount of re-tensioning required in the first 24 hours of drive service. Record information on the label (Fig. 14) found on the door of the fan section.

Yearly

1. Lightly lubricate dampers and linkages.
2. Inspect both sides of coils for cleanliness. After cleaning, check again by flashlight from one side to the other by observing amount of light emission through the coil. Dirt and debris can collect deep within a multi-row coil. Use low pressure compressed air to blow through fins or detergent water from clean side to dirty side to clear.
3. Lubricate control valve linkages.

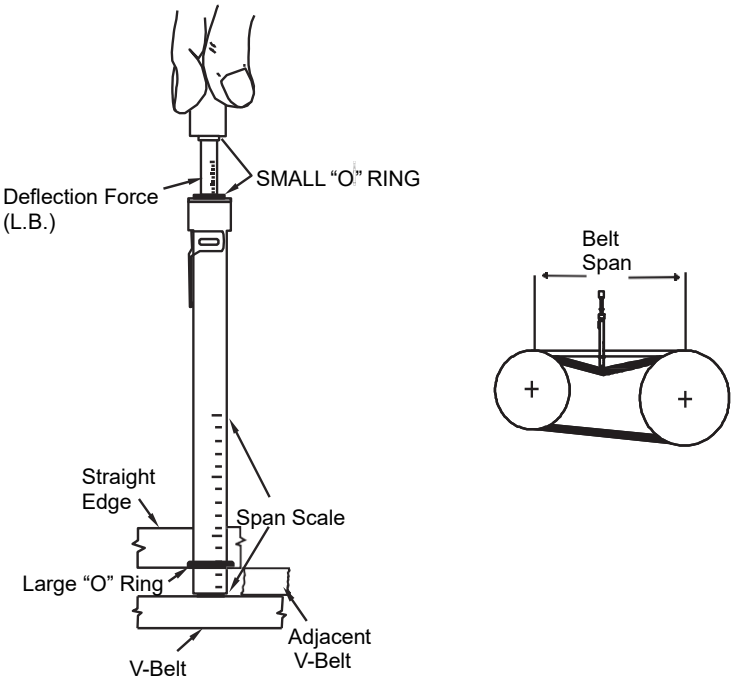

Figure 13 Belt Tensioning

Table 3 Fan Belt Tension Data

BELT STYLE	SMALLEST SHEAVE DIAMETER RANGE (in.)	RPM RANGE	BELT DEFLECTION FORCE (lb)			
			SUPER GRIPBELTS AND UNNOTCHED GRIPBANDS		GRIPNOTCH BELTS AND NOTCHED GRIPBANDS	
			USED BELT	NEW BELT	USED BELT	NEW BELT
A, AX	3.0 - 3.6	1000-2500 2501-4000	3.7 2.8	5.5 4.2	4.1 3.4	6.1 5.0
	3.8 - 4.8	1000-2500 2501-4000	4.5 3.8	6.8 5.7	5.0 4.3	7.4 6.4
	5.0 - 7.0	1000-2500 2501-4000	5.4 4.7	8.0 7.0	5.7 5.1	8.4 7.6
B, BX	3.4 - 4.2	860-2500 2501-4000	— —	— —	4.9 4.2	7.2 6.2
	4.4 - 5.6	860-2500 2501-4000	5.3 4.5	7.9 6.7	7.1 6.1	10.5 9.1
	5.8 - 8.6	860-2500 2501-4000	6.3 6.0	9.4 8.9	8.5 7.3	12.6 10.9
C, CX	7.0 - 9.0	500-1740 1741-3000	11.5 9.4	17.0 13.8	14.7 11.9	21.8 17.5
	9.5 - 16.0	500-1740 1741-3000	14.1 12.5	21.0 18.5	15.9 14.6	23.5 21.6
D	12.0 - 16.0	200-850 851-1500	24.9 21.2	37.0 31.3	— —	— —
	18.0 - 20.0	200-850 851-1500	30.4 25.6	45.2 38.0	— —	— —
3V, 3VX	2.2 - 2.4	1000-2500 2501-4000	— —	— —	3.3 2.9	4.9 4.3
	2.65 - 3.65	1000-2500 2501-4000	3.6 3.0	5.1 4.4	4.2 3.8	6.2 5.6
	4.12 - 6.90	1000-2500 2501-4000	4.9 4.4	7.3 6.6	5.3 4.9	7.9 7.3
5V, 5VX	4.4 - 6.7	500-1749 1750-3000 3001-4000	— — —	— — —	10.2 8.8 5.6	15.2 13.2 8.5
	7.1 - 10.9	500-1749 1750-3000 3001-4000	12.7 11.2	18.9 16.7	14.8 13.7	22.1 20.1
	11.8 - 16.0	500-1749 1750-3000 3001-4000	15.5 14.6	23.4 21.8	17.1 16.8	25.5 25.0
8V	12.5 - 17.0	200-850 851-1500	33.0 26.8	49.3 39.9	— —	— —
	18.0 - 22.4	200-850 851-1500	39.6 35.3	59.2 52.7	— —	— —

NOTICE

TENSION BELTS TO SPECIFICATION SHOWN ON DRIVE LABEL. OVER TENSIONING BELTS WILL SEVERELY REDUCE BELT AND BEARING LIFE.

REPLACEMENT PARTS

BEARINGS

DRIVE _____

FREE _____

SHAFT _____

WHEEL _____

INLET CONE _____

TO ORDER REPLACEMENT PARTS,
CONTACT: RCD
(REPLACEMENT COMPONENTS DIVISION)
1-800-443-4410

Figure 14 Fan Section Label

INSTALLATION AND STORAGE CHECKLIST

SAFETY

☐Lockout power supplies before opening access doors. Prevent wheel rotation during fan servicing.

☐Replace belt guards or fan safety screen after installation/maintenance is completed.

☐Replace bolt or lock on “moving” access door.

RECEIVING AND INSPECTION

☐Inspect for shipping damage.

☐Compare items on bill of lading with items received.

STORAGE

☐Store Indoors

☐Tarp if stored outdoors

☐Close all doors if stored outdoors

☐Grease fan and rotate shaft monthly while in storage.

CLEARANCE REQUIREMENTS

☐Follow NEC requirements for clearance and electrical controls.

☐Allow clearance for fan, coil, filter, etc. removal and replacement.

LIFTING AND HANDLING

☐Lifting facilities are adequate for size and weight of equipment.

☐Split sections should be individually handled.

☐Air handler should only be lifted from removable lifting lugs on the base channel. (Removable lifting lugs are stored in the fan section for shipment.)

LOCATION CONSIDERATIONS

☐Support structure is adequately sized for air handler.

☐Gasketing is placed on roof curbs prior to air handler installation.

☐Air handler is secured in accordance with local building and earthquake codes.

SPLIT UNIT ASSEMBLY

☐All bolts are in place and tightened.

☐All exterior seams are caulked.

CONNECTION HOOK-UPS, INCLUDING:

☐Duct connections

☐Power

☐Water supply

☐Coil connection

☐Coil leak tests

☐Weather hood connection

☐Humidifiers

☐Wiring

☐Actuators

☐Sensors

☐Drain pans

☐Sumps

☐Other

UNIT FAN

☐Visually inspect wheel and fan rotation.

☐Inertia base is fitted.

☐Shipping tie downs are removed.

☐Seismic restraints are set up.

☐There are no impairments to “free” isolation.

☐The flex power line to fan motor does not interfere with isolation.

☐Check belt tension.

☐Check flex connection on fan.

☐Check VAV (variable air volume) devices and VAV actuators.

☐Bearings on fan are free of noise and operate freely; locking collars are set.

☐Verify that lubrication lines are attached and that bearings have been factory lubricated.

☐Check motor for nameplate vs. actual amps/voltage

FILTERS

☐Verify that filters are installed properly.

☐Verify that all seals are in place.

☐Verify that doors close properly.

☐Check air filter gages for operation.

☐Verify that all pressure tips are in place and not blocked.

COILS

☐ Check coils for visible damage and repair.

☐Verify that coil blank-offs are in place and sealed.

☐Verify that piping penetrations through cabinet wall are sealed properly.

☐Verify that piping to coils is completed.

☐Confirm that piping has been tested.

☐Clean drain pans.

☐Check that drains connection is clear.

☐Verify that drain traps are installed.

☐Prime traps.

EVAPORATIVE COOLING PACKAGES

☐Connections to unit are completed.

☐Float system is checked for operation.

☐Sump pump is hooked to power.

☐EVAP media is checked for damage.

☐ All blank-offs are in place.

☐Water treatment devices are installed (if applicable).

☐The system has been filled with water and test-run for leakage and high/low water shutoff.

☐The system has been run for 24 hours and the water changed.

☐All controls as specified in submittals are in place and tested.

ELIMINATORS AND DAMPERS

☐Equipment has been visually inspected for damage; damaged blades/linkage repaired.

☐Check that low-leak damper edge and blade seals are in place and not loose.

☐Manually operate each damper through cycle to verify operation and complete closure.

☐Actuators are installed.

☐Actuators have been hand-operated through cycle to ensure there is no over-torquing.

☐Actuators have been power-operated through cycle to verify operation.

GENERAL

☐Entire cabinet has been visually checked and repairs made if necessary.

☐Access doors have been checked for free movement and complete closure.

☐All seams are sealed.

☐Verify that there are no air leaks with running fan.

☐Check interior of unit for loose or damaged insulation and make repairs if necessary.

AFTER FAN START-UP: After 8 hours and 48 hours of fan operation, shut down fan, lockout power, and check the following:

☐Thrust restraints

☐Set screws and hold downs

☐Drive coupling alignments

☐Belt drive

☐Bearing housing temperature

Signature:_____ **Date:**_____

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