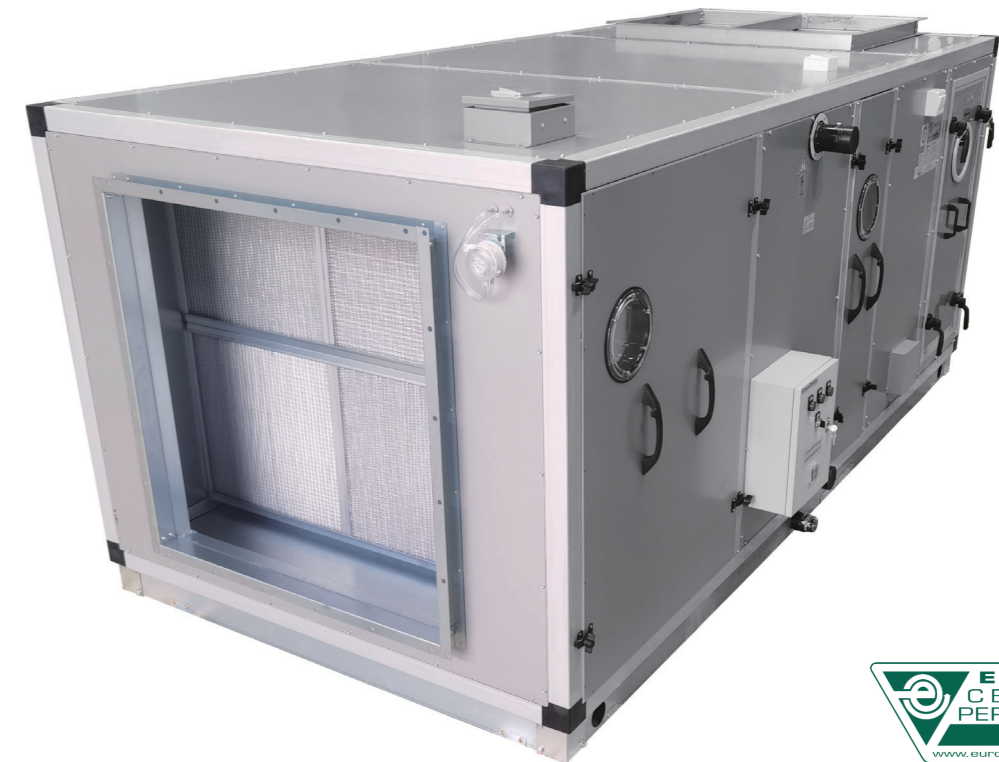




# Installation, Operation and Maintenance CLCA Air Handler



1010-2359A-02E

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CLCA-SVX01-EN April 2023

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## SAFETY WARNING

Only Qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

April 2023

CLCA-SVX01-EN

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TRANE  
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### Notice

World environmental scientists have concluded, based on the best currently available evidence, that ozone in our upper atmosphere is being reduced due to the release of CFC fully halogenated compounds.

The Trane Company urges that all HVAC servicers working on Trane equipment, or any manufacturer's products, make very effort to eliminate, if possible, or vigorously reduce the emission of CFC, HCFC and HFC refrigerants to the atmosphere resulting from installation, operation, routine maintenance, or major service on this equipment. Always act in a responsible manner to conserve refrigerants for continued use even when acceptable alternatives are available.

*Refrigerant used in any type of air-conditioning or refrigerating equipment should be recovered for reuse, recovered and / or recycled for reuse, reprocessed (reclaimed), or properly destroyed, whenever it is removed from equipment. Never release to the atmosphere!*

### Safety Considerations

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

### Warning and Cautions

Notice that WARNING and CAUTION appear at appropriate intervals throughout this manual.



WARNING indicates a potentially hazardous situation that could result in personal injury or death.



CAUTIONs are designed to alert you to conditions that could result in minor personal injury or equipment damage.



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## General Information

### ● Foreword

These installations, operation and maintenance instructions are given as a guide to good practice in the installation, commission into service, operation and periodic maintenance by the user, of TRANE Quantum™ Air Handler. They do not contain full service procedures necessary for the continued successful operation of this equipment; the services of a qualified technician should be employed through the medium of a maintenance contract with a reputable service company.

### ● Warranty

Trane's standard warranty covers the equipment. It does not cover damage due to misuse, lack of maintenance, or failure to comply with the manufacturer's instructions or recommendations.

### ● Unit Description

TRANE Quantum™ Air Handler are Central Station Air Handlers designed for a variety of controlled air application. The basic unit consists of a fan, heating and/or cooling coils, filters and air dampers. See product catalogue for list of available modules and options. The TRANE Quantum™ Air Handler are designed for cooling load conditions of 1000-65000 nominal CFM. Fans are double width, double inlet, centrifugal types with forward curved, backward curved, and airfoil blade designs. To insure fan motor assembly stability the unit ships with shipping brackets Located between the fan support frame. These spacers must be removed prior to fan operation, to assure proper vibration isolation. Units ship as complete units, sections or subassemblies. Each section is provided with a nameplate (label) which includes type of section, unit serial number, customer tag number and unit model number.

## CLCA Model Nomenclature

EG: C L C A 0 1 2

1	2	3	4	5	6	7
---	---	---	---	---	---	---

DIGIT	Description
1,2,3,4	CLCA = Product Category
5,6,7	Casing Sizes: 003, 004, 006, 008, 010, 012, 014, 016, 020, 025, 030, 035, 040, 045, 050, 060, 070, 080, 085, 090, 095

## Receiving

### ●Nameplate

All of TRANE Quantum™ Air Handler are identified by a multiple-character model number. Its use enables owner/operator, installing contractors, and service technicians to define the operation, components and options for a particular unit. Be sure to refer to the information printed on the unit nameplate (figure1) when ordering replacement or requesting service.

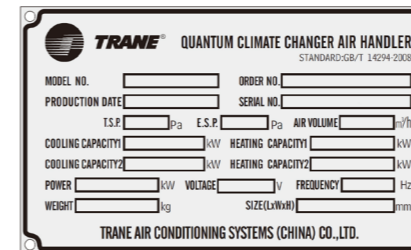


Figure 1

### ●Delivery Check

All unit sections are securely fasten to skids for shipping and handling purpose.

Upon receipt of the unit(s), inspect for damage that may have occurred during shipment and any items, which were ordered but did not arrive with the unit. Complete the following checks:

1. Visually inspect the exterior unit casing and all accessories for any dents, punctures or shipping and handling damage.
2. Cut all banding (if applicable) loose from skid, but do not remove the skids.
3. Check all access doors to confirm that they are secured with latches.
4. Manually rotate the fan wheel to ensure free movement of the shaft and bearings.  
Inspect the fan housing for any foreign objects.
5. Inspect the coil(s) for fin damage.

### ●Resolving Shipping damage

If damage is found or items are missing:

1. Report all claims of shipping damage to the delivering carrier (transporter) immediately, and schedule an inspection.
2. Make specific notations concerning the damage on the freight bill.
3. Keep damaged material in the same location as received. It is the receiver's responsibility to provide reasonable evidence that damage was not incurred after delivery.
4. Photograph damage if possible.
5. Do not move or discard damaged freight packaging materials.
6. Notify the Trane sales representative of the damage and arrange for repair. Do not attempt and arrange for repair. Do not attempt to repair the unit without consulting the sales representative. **TRANE IS NOT RESPONSIBLE FOR SHIPPING DAMAGE.**

### ●Storage Considerations

When storing a TRANE Quantum™ Air Handler, for a period of time before installation, it must be protected. **The warranty will not cover damages to the unit do to negligence during storage.** Indoor storage is ideal and requires only a few special precautions.

To protect the unit from damage due to the elements and prevent it from possibly becoming a contaminant source for indoor air quality (IAQ) problems, the unit should be stored indoors. When outdoor storage is necessary, several things must be done to prevent damage.

### ●Outdoor Storage

1. Select a well-drained area, preferably a concrete pad or blacktop surface.
2. Place the unit(s) on a dry surface or raised off the ground to assure adequate air circulation beneath unit and to assure that no portion of the unit contacts standing water at any time.
3. Allow proper clearance around the unit to perform periodic inspection and maintenance of the equipment while in storage.
4. Keep the equipment in the original shipping container for protection and ease of handling.
5. Cover the unit securely with a CANVAS tarp.
6. Ensure that the canvas tarp is secure.
7. Do not stack units.
8. Do not pile other material on the units.
9. Loosen belt tension on drive belts.

## Rigging and Handling

### Rigging and Handling

Confirm that factory installed (if any) attachment brackets are in place and screws tight, before rigging. The unit will ship either assembled or as sections. Before preparing the unit for lifting, estimate the approximate center of gravity for lifting safety. Because of placement of internal components, the unit weight may be unevenly distributed, with more weight in the coil and fan area. Approximate unit weights are given in Appendix A & B. Always apply good rigging procedures when lifting a unit. Before hoisting the unit into position, be sure that a proper method of rigging is used, with straps or slings and spreader bars for protection and safety during lifting. Always test-lift the unit to determine exact unit balance and stability before hoisting it to the installation location.

#### WARNING

NEVER ASSEMBLE OR BOLT SECTIONS OR SUBASSEMBLIES TOGETHER BEFORE RIGGING. ALWAYS RIG SECTIONS OR SUBASSEMBLIES AS RECEIVED FROM THE FACTORY.

#### WARNING

DO NOT LIFT THE UNIT WITHOUT TEST-LIFT FOR BALANCE AND RIGGING. DO NOT LIFT THE UNIT ABOVE PERSONNEL. FAILURE TO OBSERVE THESE WARNINGS MAY RESULT IN PERSONAL INJURY, DEATH OR EQUIPMENT DAMAGE. (See Appendix A & B for components weight).

### Off Loading

A specific lifting method for offloading the units is recommended as follows (See Figure 2):

1. 75mm-diameter lifting holes, or certified lifting lugs, are provided on the unit base frame.
2. ALL LIFTING POINTS in one axis of the unit must be used when offloading and moving the unit.
3. Slings and spreader bars are to be provided by the rigger and attached to ALL LIFTING POINTS.
4. The minimum rated lifting capacity (vertical) of each sling and spreader bar should be no less than the shipping weight.
5. The unit must be lifted with care, avoiding shock load by lifting the unit slowly and evenly.

#### WARNING

ENSURE SLINGS DO NOT FOUL ON UNIT PROTRUSIONS.

THE CENTRE OF GRAVITY WILL VARY PER UNIT... POSITION THE SLING AND SPREADER BARS CAREFULLY TO COMPENSATE FOR THIS.

### Moving To Position On Site

TRANE Quantum™ Air Handler are supplied in sections modules, flat packed, or as a complete unit, in accordance with the relevant assembly drawings. Any necessary use of force during unloading or movement of the units must only be applied via the unit base frame or shipping pallet.

**WARNING**

NEVER LIFT THE UNITS BY COIL CONNECTIONS OR BY ANY OTHER PROTRUSIONS.

THE ROOF IS NOT DESIGNED TO BE WALKED ON, BUT IF THIS IS UNAVOIDABLE, ENSURE A MORE EVEN WEIGHT DISTRIBUTION BY THE USE OF BOARDS.

FAILURE TO DO SO MAY RESULT IN SEVERE PERSONAL INJURY OR DEATH.

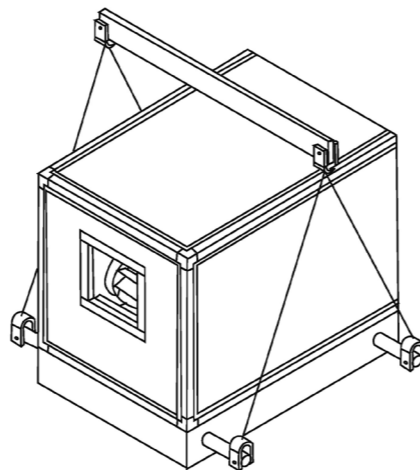


Figure 2

## Rigging and Handling

### Forklift Trucks

The forks must only be applied under the unit base frame and not against the unit base frame. The lift point should be as near as possible to the centre of gravity (see Figures 3 and 4). In the case of larger units the use of several forklift trucks may be required.

### Roller Movement

Units fitted with base frames may be moved on roller trolley or tubular rollers (see Figure 5).

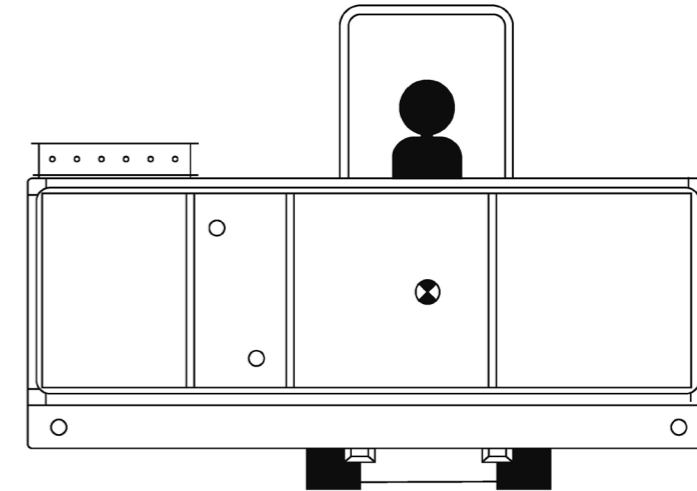


Figure 3

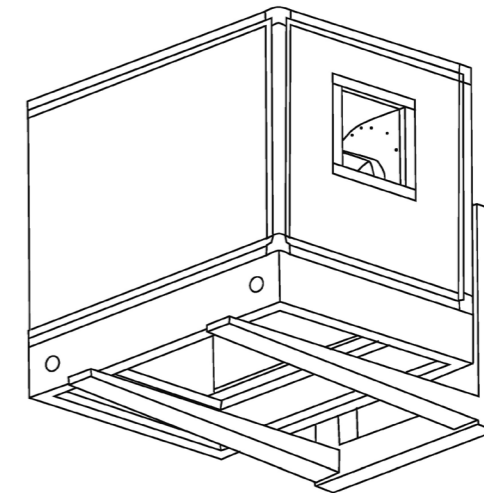


Figure 4

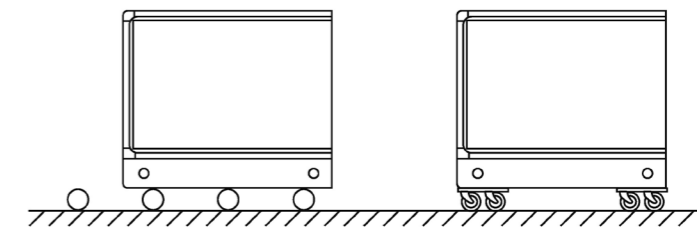


Figure 5

## Installation

### Foundation

When selecting and preparing the unit site, follow these guidelines:

1. Ensure that the site can support the total weight of the unit. Unit weight figures only provide total gross weights and do not include the Additional weight for water in any coils.
2. Confirm that the foundation of the mounting platform is large enough to Include the unit dimensions plus service plus service access.
3. The floor or foundation must be level for correct coil drainage and condensate flow.
4. Provide adequate lighting for maintenance personnel to perform maintenance duties.
5. When the unit is positioned on site, there must be sufficient space around the unit to ensure that correct operation and effective maintenance can be carried out. Figure 6 gives recommended space allowances.
  - On the designated access side of the unit, working areas must have minimum 1 mtr, space (P).
  - Allowance for coil connections, dimension "C" must be dimension 200mm + unit width.
  - A clear unobstructed area before and after an air intake or discharge is required to ensure correct air movement. The width of the area must be  $\geq$  the width of the unit, and the depth (dimension "L") must be  $\geq 0.5 \times$  the overall unit height.

Complete reinforced concrete foundations are suitable or strip foundations may also be used (see Figure 7). In the case of strip foundations, concrete or steel supports are premissible, but support is required under breakpoints and every 2 m along the unit base.

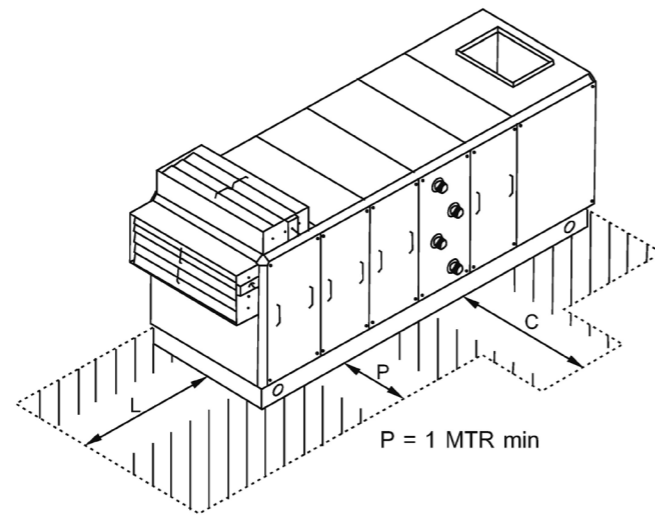


Figure 6

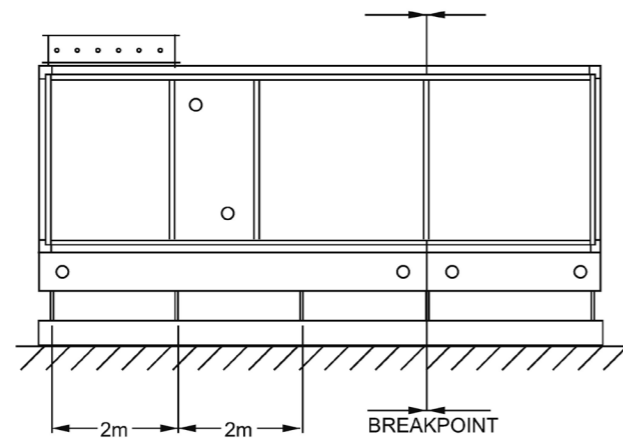


Figure 7 - Air Handling Unit Steels Foundation

## Installation

**⚠ IMPORTANT**

FAILURE TO PROVIDE A LEVEL PLINTH OR SUPPORT WILL RESULT IN DOORS JAMMING AND AIR LEAKS FROM THE CASING.

### Erection

To minimize noise transmission, insulation material such as cork slabbing (TICO pads) or rubber pad May be placed between the unit base and the foundation (see Figure 8).

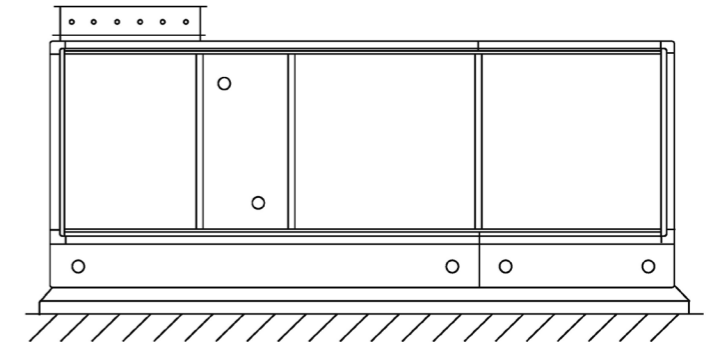


Figure 8 - Air Handling Unit Plinth Foundation



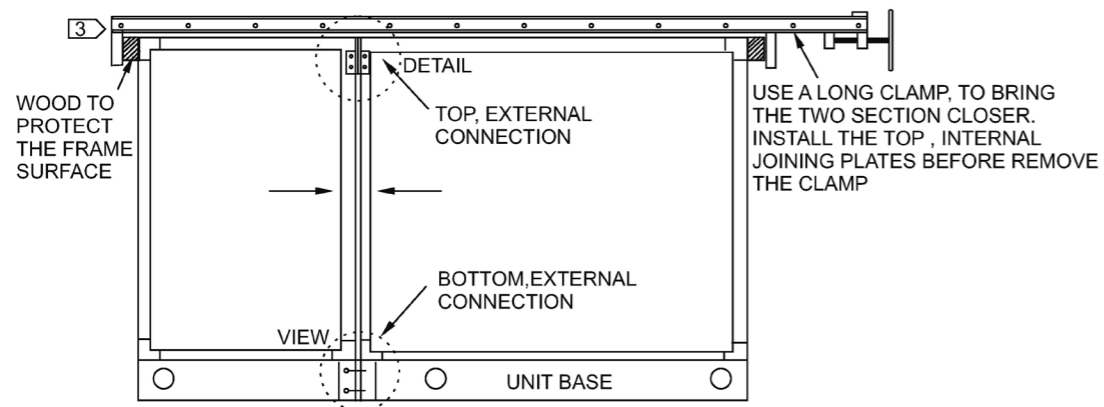
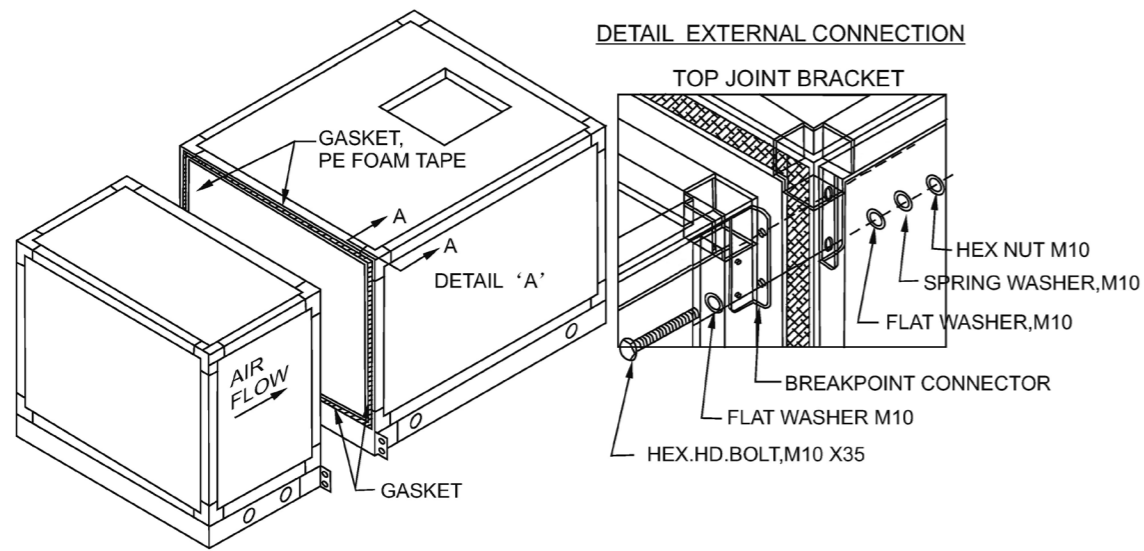
## Assembly & Installation CLCA (Connection)

### External Connection

**BREAK POINT JOINING METHOD**  
 MODULE TO MODULE BREAK  
 POINT EXTERNAL JOINING  
 (TO BE DONE AT JOB SITE)

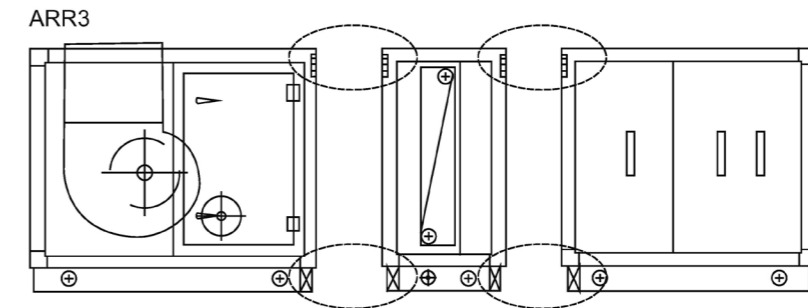
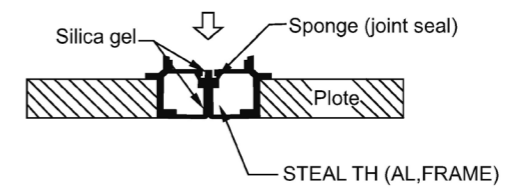
● ENSURE GASKET IS IN-PLACE  
 & GOOD CONDITION AT FRAME.

#### DETAIL EXTERNAL CONNECTION



## Assembly & Installation CLCA (Connection)

### INTERNAL JOINT (SIDE & TOP & BOTTOM)

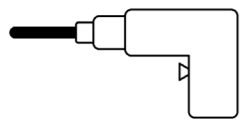


## Assembly & Installation (CLCA Paneling)

### PERSONAL PROTECTION EQUIPMENTS



### ACCESSORIES TO DISMANTLE & ASSEMBLE CLCA

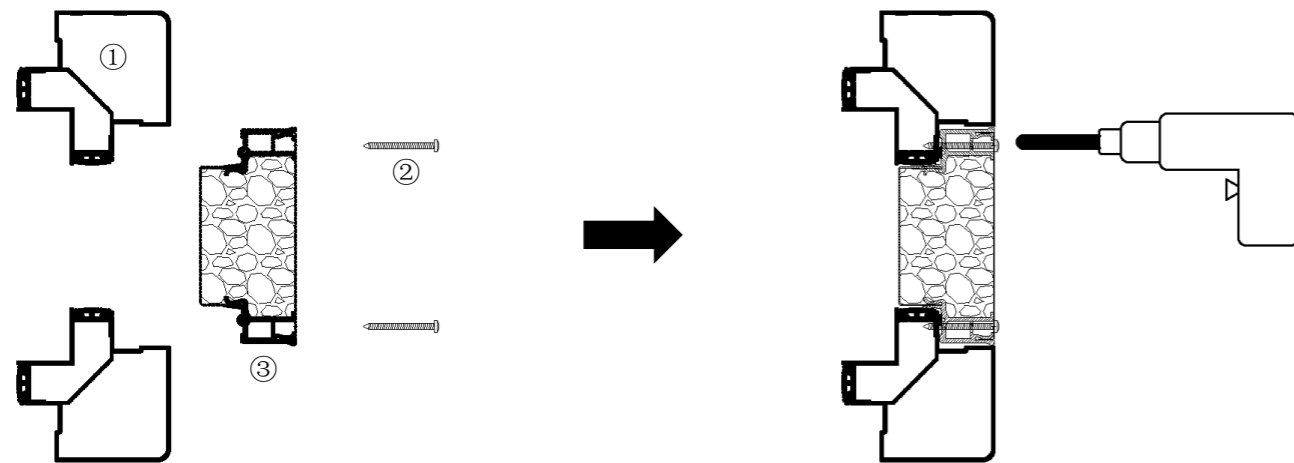


AIR / ELECTRIC DRILL



2MM GALVANIZED PLATE(SIZE:100\*100)

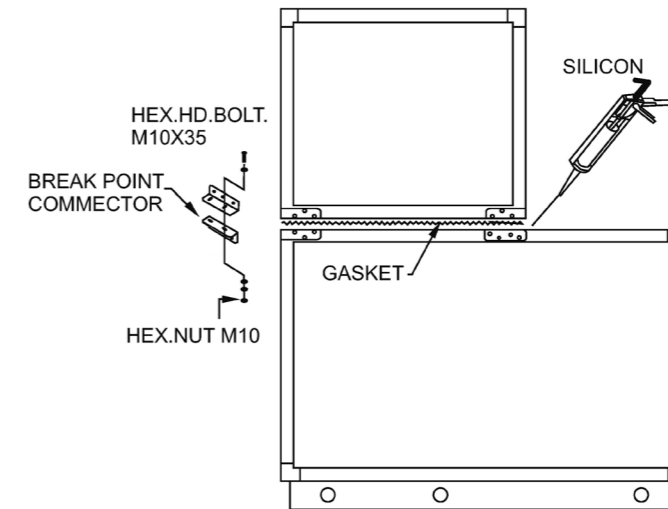
### CLCA PANELING



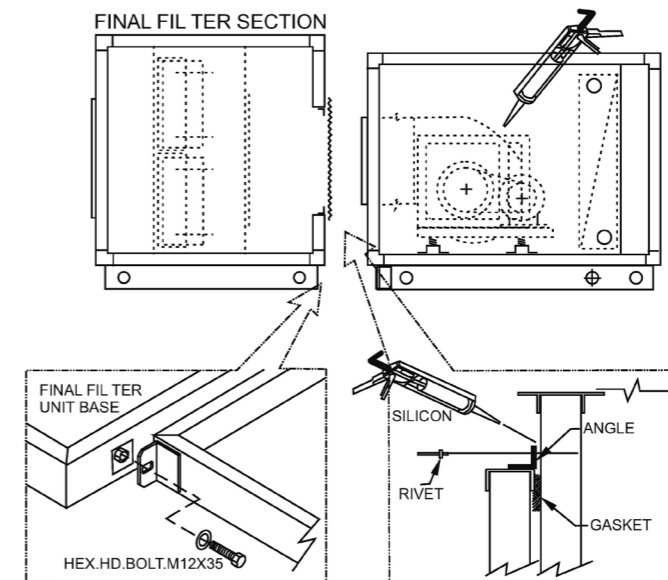
- 1 – CLCA Unit Frame
- 2 – CLCA Panel
- 3 – Panel Screws

## Assembly & Installation

### VERTICAL UNIT JOINING METHOD



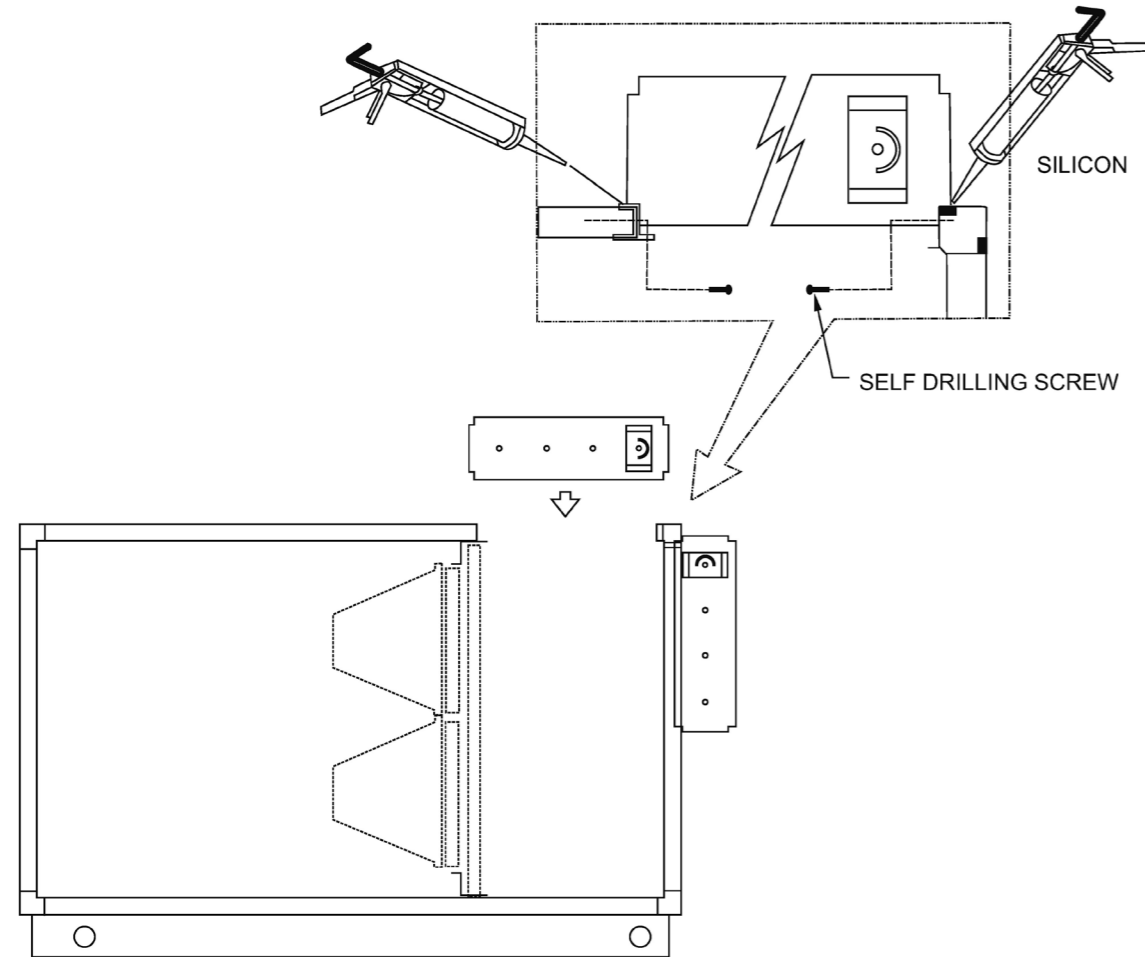
### FINAL FILTER JOINING METHOD





## Assembly & Installation

### DAMPER INSTALLATION



## Assembly & Installation

### Piping - Condensate Drain Pan Connections

On cooling section(s) the drain pan should always be connected directly to a trap to ensure proper drainage of condensate.

**CAUTION**  
Failure to provide adequate condensate piping may result in water damage to the equipment or building.

**IMPORTANT**  
The applicable "rule of thumb" for amount of condensate may as high as 6 lbs/hr/ton for units serving areas with high latent heat.

Male-threaded, 1-1/2" BSPT condensate drain connection is provided on one side of the coil section. The main drain lines and trap must be the same size as the drain connection. Pitch the connection line horizontal or downward toward an open drain and install a plugged tee to facilitate cleaning. Condensate lines should not be connected to a closed drain. This is to avoid the possibility of drawing sewer gasses into the unit. Drain traps must be primed. If they are not, the trap is essentially non-existent and the drain pan will likely overflow.

### Units With More Than One Drain Pan

With the Trane Quantum™ Air Handler, each module can be ordered with or without a drain pan. When more than one module has a drain pan, you must trap each module individually. Connecting all drains to a common line with only one trap will result in condensate retention, and possible water damage to the air handler or adjoining space.

If a module has a drain pan for cleaning purposes only, it does not need a trap; however a cap or shut off valve should be installed on the drain connection. Only modules handling condensate, such as a cooling coil module or eliminator module, require a trap. Figure 9 through Figure 10 are examples of typical installations.

Figure 9  
Drain Pan Trapping for module under Negative Pressure

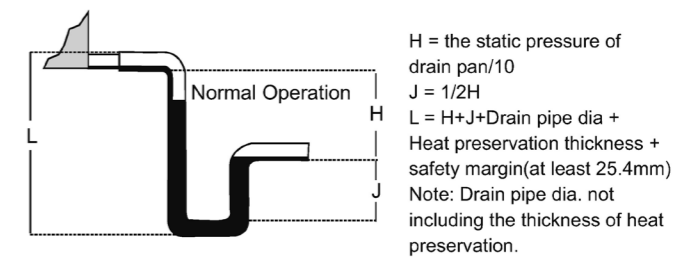
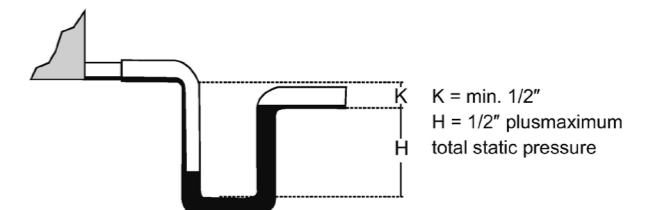


Figure 10  
Drain Pan Trapping for module under Positive Pressure



## Assembly & Installation

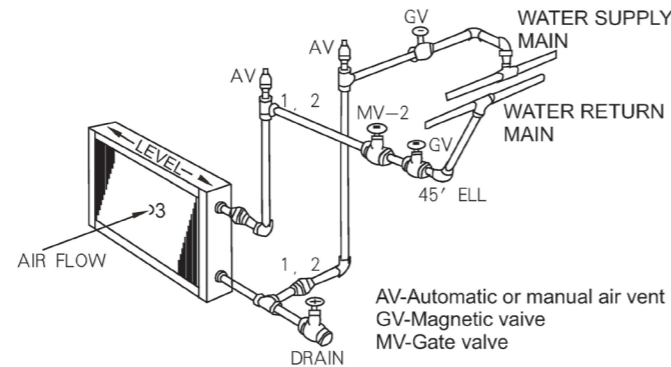
### Chilled Water Piping - Coil Connection

**General Coil Piping Recommendation**  
Refer to Figure 11 for typical cooling / heating and steam coil piping.

Proper installation, piping and trapping is necessary to assure satisfactory coil operation and to prevent operational damage. Water inlet and outlet connections protrude through the coil section side panel. Follow standard piping practices when piping to the coil. Note the following:

1. Support all piping independently of the coils.
2. Provide swing joints or flexible fittings in all connections that are adjacent heating coils in order to absorb thermal expansion and contraction strains.
3. When attaching piping to the coil header, make the connection only tight enough to prevent leaks, the maximum recommended torque is 200ft-lbs.
4. Teflon tape or teflon piping compound should not be used because of its high lubricity, teflon makes it easier to tighten the pipe to the header joint past the point where an effective seal is created, thus damage to the coil could result.
5. "White Zinc" compound / pipe sealer on all threaded connection is Recommended, instead.

Figure 11  
Typical Piping for Water Coil



NOTE: DRAIN AND VENT CONNECTIONS ARE PROVIDED AS STANDARD ON COIL HEADERS.

IF EXTENDED DRAINS AND VENTS ARE REQUIRED, THEY MUST BE FIELD PROVIDED.

**IMPORTANT**

To avoid damaging the coil connections it is essential to grip the pipe connection whilst applying counter pressure to tighten the joint (see Figure 12). Use "Back-up wrench" when attaching piping to coils, on threaded connections.

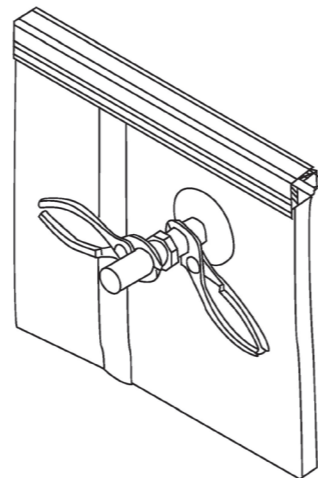


Figure 12  
Completely stress-free connections are essential. The pipework of the coils should be arranged to facilitate easy removal of the coil for any required maintenance purposes.

## Assembly & Installation

### Steam Coil Piping Type A, AA Steam Coils

These are for central system, industrial and process application with one row, opposite-end connections. Maximum standard operating limits:  
Copper tubes: 100 psig and 400oF  
Type AA coils feeds alternate tubes. Refer to Figure 13 for typical steam coil piping.

**CAUTION**

Condensate must flow freely from coil at all times to prevent physical coil damage from water hammer, unequal thermal stresses, freeze-up and/or corrosion. Complete the following recommendations to prevent coil damage.

1. Install a 1/2 inch, 15 degree swing check vacuum breaker in the unused condensate return tapping as close as possible to the coil.
  2. Vent the vacuum breaker line to the atmosphere or connect it to the return main at the discharge side of the steam trap.
- Note: Vacuum breaker relief is mandatory when the coil is controlled by a modulating steam supply or a two-Position (ON-OFF) automatic steam supply valve.
3. Run the return pipe at the full size of the steam trap connection except for the short nipple screwed directly into the coil condensate connection. Do not bush or reduce the coil return tapping size.
  4. Proper steam trap selection and installation is necessary for satisfactory coil performance and service life. For installation, use the Following steps:

- Select trap based on maximum possible condensate rate.
- Locate the steam trap discharge at least 12 inches below the condensate return tapping, this provides sufficient hydrostatic head pressure to overcome trap losses and assure complete condensate removal.
- Float and thermostatic traps are recommended because of gravity drain and continuous discharge operation.
- Use float and thermostatic traps are recommended because of gravity drain and continuous discharge operation.
- Use bucket traps ONLY when the supply steams in unmodulated and 25 psig or higher.
- Always install strainers as close as possible to the inlet side of the trap. Do not modulate Type A, AA coils. Use two position (ON-OFF) steam supply controls.

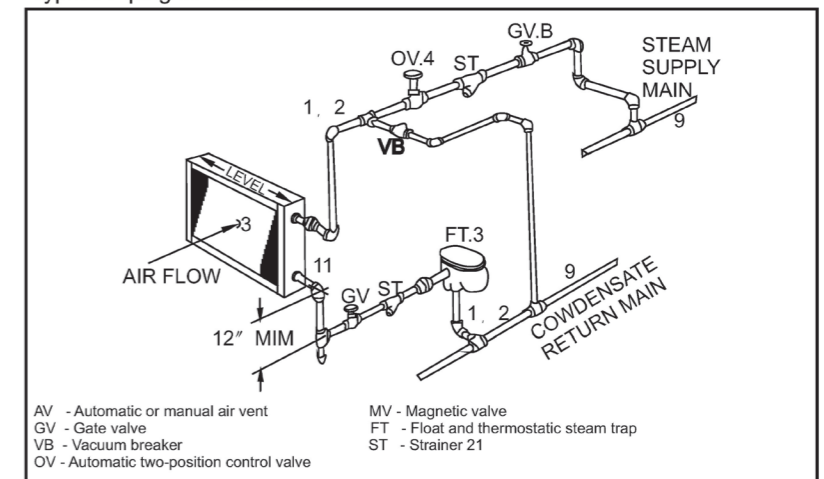
5. Use a V-port modulating valve to obtain gradual modulating action.

**CAUTION**

Caution: Always open the steam supply control valve slowly to prevent possible coil damage.

6. Do not modulate systems with overhead or pressurized returns unless the condensate is drained by gravity to a receiver (vented to the atmosphere) and returned to the main by a condensate pump.
7. At start-up on units with fresh air dampers, slowly turn the steam on full at least 10 minutes before opening the fresh air.
8. Pitch all supply and return steam piping down minimum of 1-inch per 10 feet in the direction of flow.
9. Do not drain the steam mains or take-off through the coils. Drain the mains ahead of the coils through a steam trap to the return line.
10. Overhead return require 1 psig of pressure at the steam trap discharge for each 2 - feet elevation to assure continuous condensate removal.

Figure 13  
Typical Piping for Steam Coil



AV - Automatic or manual air vent  
GV - Gate valve  
VB - Vacuum breaker  
OV - Automatic two-position control valve  
MV - Magnetic valve  
FT - Float and thermostatic steam trap  
ST - Strainer 21

## Assembly & Installation

### Refrigerant Coil Piping

*TYPE FD COILS HAVE BEEN DEHYDRATED AND CHARGED WITH A HOLDING CHARGE OF DRY NITROGEN. 10-20 PSIG TO PREVENT LEAKS AND SYSTEM CONTAMINATION, DO NOT BREAK THE SEALS UNTIL THE COIL IS INSTALLED.*

1. Follow accepted refrigeration piping practices and safety precautions for typical refrigerant coil piping and components. Specific recommendations are provided with the condensing units, including instructions for pressure-testing, evacuation, and system charging. General recommendations for component selection and line sizing follow.
2. Leak-test the entire refrigeration system after all piping is complete.
3. Charge the unit according to approximate weight requirements, operating pressures and superheat / subcooling measurements.
4. Adjust the thermal expansion valve setting if necessary.

### General Refrigerant Piping Recommendations

**IMPORTANT: REFER TO THE NOTE ON THE INSIDE FRONT COVER OF THIS MANUAL REGARDING HANDLING OF REFRIGERANTS.**

### Liquid Line Components

Trane recommends the use of a properly sized liquid line filter-drier installed upstream from the expansion valve and as close to the evaporator coil as possible. Base filter-drier selection on a minimum pressure drop of 2 psi at the design condition.

1. Install moisture indicator/sight glass between the expansion valve and filter-drier. The moisture indicator/ sight glass must be sized to match the size of the liquid line at the thermal expansion valve.
2. Size liquid line shutoff valve with an access port using the selected liquid line OD, and install it close to the condenser.
3. Minimize use of other valves, tube bends and reducers since these items tend to increase pressure drop and to reduce subcooling at the expansion valve.
4. The Thermal Expansion Valve (TEV) must be selected for proper size and capacity. The size of the TEV should cover the full range of loadings. Check that the valve will successfully operate at the lightest load condition. Select expansion valves with external equalizer connections, and those designed to operate against a back pressure of 20 pounds per square inch higher than actual evaporator pressure.
5. Install the TEV directly in the coil liquid connection (distributor) provided. The liquid distributor must be in a true vertical position.

### Suction Line Components

Install suction line pressure tap on the leaving side of the evaporator coil near the TEV sensing bulb location. Accurate superheat measurement and thermal expansion valve adjustment demands that suction pressure be measured near the evaporator coil.

### Liquid Line Sizing

All compressors have a Refrigerant Charge Limit (RCL) that must not be exceeded. Since the RCL and pressure drop are in direct conflict with each other, Trane recommends that the liquid line be sized as small as possible, while maintaining a low enough pressure drop to ensure 5°F (3°C) of subcooling at the expansion valve.

### Suction Line Sizing

Suction line tubes must be sized to maintain refrigerant vapor velocities that are high enough to ensure oil entrainment under all operating conditions.

It is not necessary to pitch horizontal suction lines toward the compressor when refrigerant coils is used with Trane condensing units that are designed with a gas trap in the suction line just prior to the compressor.

## Assembly & Installation

**CAUTION**

To avoid equipment malfunction, use care when brazing or soldering so that distributor tubing is not restricted or blocked. To braze Thermostatic Expansion Valves (TXV) avoid direct flame (figure 15) to the valve body and avoid excessive heat on diaphragm. As an extra precaution, a wet cloth may be around the body and element during brazing operation.

Figure 14  
Typical Piping for Refrigerant Coil

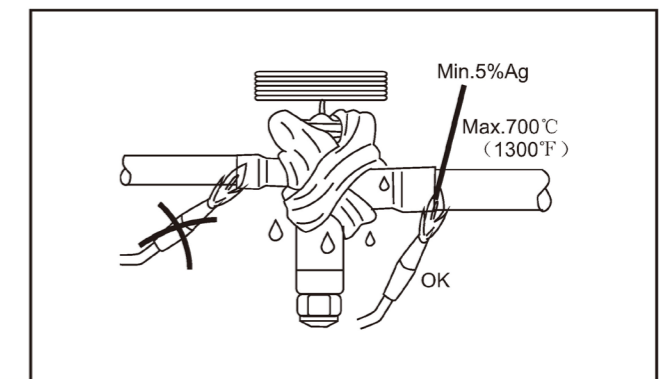
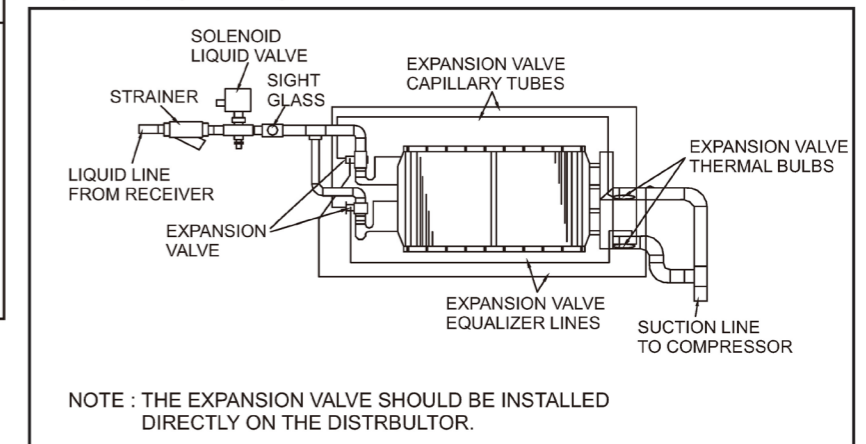
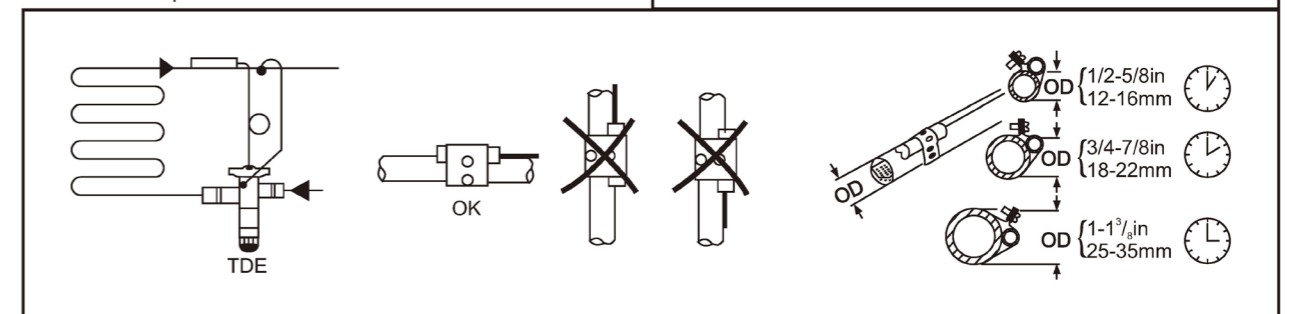


Figure 15  
Solder Technique



Note: Flame should heat away from TXV element



## Start - Up

Perform the following steps prior to starting the unit.

1. Inspect electrical connections. They should be clean and secure. Compare actual wiring with specific diagrams provided on the unit.
2. Check piping and valves for leaks. Open or close the valves to check for proper operation. Drain lines should be open.



### CAUTION

The use of untreated or improperly treated water in unit coils may cause scaling, erosion, corrosion, algae, slime or other equipment damage. Consult a qualified water treatment specialist to determine if water treatment is required. The Trane Company assumes no responsibility for equipment damage caused by untreated or improperly treated water.

3. If equipped with a refrigerant coil, charge and leak-test the unit and get it ready for operation according to instructions provided with the condenser equipment.
4. Check that all air filters are in place and positioned properly. Under Periodic Maintenance, see section titled "Air Filters."
5. Close and secure all unit access doors. Check that the latch set screws are tight.
6. Remove all foreign material from the drain pan and check drain opening and condensate line for obstructions.
7. Prime the DRAIN TRAP.

### Start-up Procedures

After completing all start-up checks and procedures, the unit may be started. The following checks and adjustments should be made during initial start-up:



### WARNING

Disconnect electrical power prior to access into a fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to "wind-milling." The impeller should be secured to physically restrict rotational movement. Failure to secure impeller can cause severe personal injury or death. Disconnect electrical power source when connecting or disconnecting electrical wires for test procedures. Do not open service access doors while the unit is operating. Failure to exercise caution or while inspecting, unit operation may result in injury or death from electrical shock, air movement or rotating parts.

If the unit was stored for an extended period of time, the following items should be checked before starting the unit.

1. Inspect motor bearings for moisture and rust. Replace bearings if necessary and repack with new grease.
2. Check motor winding. An acceptable winding resistance reading is from 6 meg-ohms to infinity. If reading is less than 5 Meg-ohms, winding should be dried out in an oven or by blower.
3. Inspect the entire motor for rust and corrosion.
4. Lubricate the motor as instructed in the section titled "Periodic Maintenance," or as indicated by the maintenance tag on the motor.
5. Bump-start unit and observe the fan wheel for proper rotation, as indicated by rotation arrow located on fan housing.
6. Measure the motor voltage and ampage on all phases to ensure proper operation. The readings should fall within the range given on the motor nameplate.

Maximum allowable voltage imbalance is two percent. Voltage imbalance is defined as 100 times the sum of the deviation of the three voltage from the average, divided by twice the average voltage. For example, if the three measured voltages are 221, 230 and 227, the average would be 226 volts.



## Start - Up

The percent of voltage imbalance is then calculated:

$$\frac{100 \times \{[226-221] + [230-226] + [227-226]\}}{2 \times 226} = 2.2\% \text{ (Unacceptable)}$$

In this example, 2.2 percent imbalance is not acceptable and the power company should be notified to correct it.

7. Check unit vibration if the fan speed is changed more than 5% from the original designed rpm, or if parts such as shafts, fan wheels, bearings, or other drive components are replaced. Do not exceed max. fan rpm.
8. Pay particular attention to any vibration, noise or overheating of the motor and fan bearings. (Bearings may run warm during break in.)

### Excessive Vibration

EXCESSIVE VIBRATION MUST BE CORRECTED TO PREVENT BEARING AND SHAFT DAMAGE. SEE THE SECTION TITLED "TROUBLE-SHOOTING" FOR DETAILS ON THE COMMON CAUSES FOR VIBRATION.

### Determine Fan RPM

Fan rpm can be determined by using a strobe-type tachometer, or revolution counter.

### Sheave Alignment

Align the fan and motor sheaves by using a straightedge. The straightedge must be long enough to span the distance between the outside edges of the sheaves. For more details refer to maintenance section.



## Maintenance

### Periodic Maintenance Checklist

The following checklist describes the suggested maintenance schedule to maintain proper operation of the unit. Detailed procedures for owner-operator maintenance checks are given after this checklist.

**⚠ WARNING**

Disconnect electrical power and allow rotating parts to stop before servicing the unit. Exercise caution if unit must be on for test or maintenance procedures. Failure to do so may result in injury or death from electrical shock or moving parts.

**⚠ WARNING**

Disconnect electrical power prior to access into fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to "windmilling". The impeller should be secured to physically restrict rotational movement can cause severe personal injury or death.

#### After 48 Hours Operation

■ Belts have acquired their permanent stretch. Readjust but do not overtighten.

#### Weekly

■ Observe unit weekly for any change in running condition and any unusual noise.

#### Every Month or weekly

■ Check air filters. Clean or replace if clogged or dirty. Change bag filters when pressure drop is 1-inch W.G.

#### Every Three to Six Months

■ Check greasing on fan and motor.

■ Align fan and motor sheaves (pulley). Tighten sheaves setscrews to the proper torque.

■ Check and adjust fan belt tension.

■ Tighten electrical connection.

■ Inspect coils for dirt build-up or coil freeze up

#### Every Year

■ Inspect the unit casing for corrosion. If damage is found, clean and repaint the surface with a rust-resistant primer and vinyl chlorinated lacquer.

■ Clean the fan wheels and fan shaft. Remove rust with emery cloth and apply a coat of LPS#3 or an equivalent.

■ Inspect the condensate drain pan and drain line, remove sludge or foreign materials that might obstruct proper drainage. Remove obstacles.

■ Check damper linkages, set-screws and blade adjustment for proper damper operation.

■ Inspect the control and power box wiring for secure connections and insulation.

■ Rotate the fan wheel and check for obstruction in the fan housing. The wheel should not rub on the fan housing. Adjust the center if necessary and tighten wheel setscrews to the proper torque.

■ Check condition of gasketing and insulation around unit, door and damper.

■ Examine flex connections for cracks or leaks. Repair or replace damage material.

### ⚠ IMPORTANT

Small & Medium size fans are furnished shielded bearings. The bearings are lubricated for life and maintenance free. If re-lubrication is necessary, on larger fans it is recommended to use a lithium base grease suitable for all temperatures within the operational limits.



## Maintenance

### Maintenance Plan

The following table (see Table 1) gives recommended maintenance intervals for the CLCP unit. Intervals are based upon normal running conditions, in a moderate climate, and assuming 24 hour running.

Units operating outside these guideline may require shorter or longer maintenance intervals.

Table 1 - Recommended Maintenance Intervals

Component	Check the following	Weekly	Monthly	3 - 6 Monthly	Annual
Fan / Motor	Fan In General	Yes	Yes		
	For Corrosion		Yes		
	Flexible Connection		Yes	Yes	
	Anti-Vibration Mounts			Yes	
	Drainage		Yes		
	Fan Bearing		Yes	Yes	
	Motors In General		Yes	Yes	
	Motor Bearing		Yes	Yes	
	Belt Drive In General		Yes		
	Panel Or Bag Filters	Yes			
Filter	Roll Filters			Yes	
	Fin Block / Fin Bundle			Yes	
Coils	Frost Protection			Yes	
	Drainage	Yes		Yes	
	Drop Eliminator			Yes	
	Steam Coils		Yes		
Humidifiers	Scaling		Yes		
	Condensate Drain		Yes		
Dampers	Dampers		Yes	Yes	
	Scilencers		Yes		
Inlet / Outlet	Hoods And Louvers		Yes		
	Plate Heat Exchangers			Yes	
Energy Recovery Components	Thermal Wheel				Yes
	Control Box And Wiring			Yes	Yes

## Maintenance

The maintenance interval periods are stated, guidelines only. Any large deviations in the pattern of usage may necessitate further maintenance attention.

### IMPORTANT

During maintenance operation the unit must be completely isolated and precautions taken to prevent any premature restart.

#### 1. Fan

If the fan / motor assembly is going to be stored for two weeks before use, the fan should be rotated by hand at weekly intervals to avoid bearing damage.

If storage will be over one month it is recommended that the belts be slackened as well.

Check for soiling, damage, corrosion, and any tendency to bind. Clean as necessary.

Check that the flexible connection are securely fixed.

Check the function of all antivibration mounts.

Check for any obstructions or blockages of the air intakes and discharges.

Check the traps for leaks or blockages and prime as necessary.

#### 2. Bearing Test

Check that the fan bearing is tightened and is not unduly noisy, by sounding it using a metal bar as a conductor.

Where a belt guard has been supplied, check that it is fitted correctly.

If there is any irregular noise or knocking, renew both bearings. Fan bearing are greased for life, but larger units with standard bearings require annual lubrication. These have grease nipple. In the case of extreme running conditions, lubricate in accordance with the following recommendations:

Recommended lubricants;  
ALVANIA  
GREASE 3 (SHELL)  
MOBILUX 3 (MOBIL)  
BEACON 3 (ESSO)  
SKF 28 (BALL BEARINGGREASE)

### IMPORTANT

Do not overlubricate bearings. Excessive pressure caused by overlubrication can displace bearing grease seals or cause grease to overheat the bearing, resulting in premature bearing failure.

#### 3. Fan Motors

Inspect periodically for excessive vibration or temperature. Operating conditions will vary the frequency of inspection and lubrication. Contact the motor manufacturer or Trane for lubrication instruction. Most smaller frame motors comes without grease nipple where the bearings are permanently sealed.

The motors with double shielded bearings are lubricated for life and cannot be relubricated.

W.E motors up to 132 frame and TECO and Brook Hansen motors up to 180 frame comes with sealed for life bearings, while motors above this range, have open bearings with "flush through" re-greasing facilities.

### WARNING

DISCONNECT POWER SOURCE FOR MOTOR LUBRICATION. FAILURE TO DO SO MAY RESULT IN INJURY OR DEATH FROM ELECTRICAL SHOCK OR MOVING PARTS.

To re-lubricate the motor, complete the following:

1. Turn the motor off. Make sure it cannot accidentally restart.
2. Remove the relief plug and clean out any hardened grease.
3. Add fresh grease through the fitting with low pressure grease gun.
4. Run the motor for few minutes to expel any excess grease through the relief vent.
5. Stop the motor and replace the relief plug.

Table2  
Motor Greasing Intervals

Rated output kW	Poles	Relubrication Period	
		Standard condition	Severe condition
0-30	4upwards	7years	3years
37-75	4upwards	210days	70days
90-110	4upwards	90days	30days

Standard condition: 8 hour operation per day with rated or light loading in a clean and low vibration environment. Severe condition: 24 hour operation per day with rated/light loading or in a dirty/ dusty environment or where the motor is subject to vibration/light shock loading.

Grease Type:  
TECO/Brook Hansen motor - Use Esso Unirex Lithium N3 grease. W.E motor - Use Shell Alvania R3.

## Maintenance

#### 4. Air Filters

Suggest the panel filter allowable maximum resistance is about 130 Pa, the bag filter allowable maximum resistance is about 260 Pa, the highly efficient filter allowable maximum resistance is about 500 Pa. When the resistance is close to the allowable maximum, the filter need to be clean or replaced, and according to the actual usage of the unit, when the filter need cleaning for many times, please choose aluminum mesh filter, in addition, the chemical fiber filter after when cleaning must be soaked in water for gentle scrub and fully dry, when the filter efficiency is lower than the original efficiency 85%, the filter must be replaced in accordance with size, type and filtration efficiency.

#### 5. Drain Pans

##### Inspecting Cleaning

The condensate drain pan and drain line must be checked to assure that the condensate drains as designed. This inspection should occur a minimum of every six months or more often as dictated by operating experience.

For units with sloped drain pans: If evidence of standing water or condensate overflow exists, steps should be taken to identify and remedy the cause immediately. Refer to the troubleshooting section of this manual for possible causes and solutions. If microbial growth in the drain pan is observed, it should be cleaned and removed immediately. Drain pans should be cleaned using the following procedure:

1. Disconnect all electrical power to the unit.
2. Don the appropriate personal protective equipment (PPE).
3. Remove all standing water.
4. Use a scraper or other tools to remove any solid matter. Remove solid matter with a vacuum device that utilizes high efficiency particulate arrestance (HEPA) filters with a minimum efficiency of 99.97% at 0.3 micron particle size.
5. Thoroughly clean the contaminated area(s) with a mild bleach and water solution or an EPA-approved sanitizer specifically designed for HVAC use. Carefully follow the sanitizer manufacturer's instructions regarding the use of the product.
6. Immediately rinse the drain pan thoroughly with fresh water to prevent potential corrosion from the cleaning solution of the drain pan and drain line components.
7. Allow the unit to dry thoroughly before putting the system back into service.
8. Determine and correct the cause of the microbial contamination.
9. Be careful that the contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution.

#### 6. Coil Cleaning

Steam, hot water and chilled water coils should be kept clean to maintain maximum performance. If fins become dirty, clean with steam and detergent, hot water spray and detergent, or one of the commercially available chemical coil cleaners. Rinse coils thoroughly after cleaning.

### WARNING

Follow all directions provided with chemical cleaners to avoid personal injury and/or coil damage. Commercially available chemical cleaners may contain caustic or hazardous agents.

In the event of coils being out of commission for some time, it is advisable to completely drain down the coil. On each occasion when refilling is undertaken, check that the coil is effectively vented.

Periodic cleaning of the coils is required.

Dirty coils have increased airside pressure drops and reduced heat transfer, thus unbalancing the cooling or heating system.

##### Cleaning

In the event that fin edges have been bent, they can be straightened with the aid of a coil comb.

The cleaning is carried out with the unit intact using a powerful vacuum cleaner on the dust-contaminated side. If the unit is very dirty it will need to be removed and wet cleaned.

If required, soft cleaning brushes may be used ensuring that the heat exchanger fin are not damaged.

##### Frost protection

Check that frost protection is working before the commencement of each winter period. Ensure that the frost sensor is correctly installed and fitted and is working within the correct temperature range.

##### Drop eliminator

Check the cleanliness of the droplet separator section and the blades annually. If the blades are dirty, remove and clean them. Contamination can result in damage through water droplets in the system's performance. Ensure that the blades are correctly repositioned and that they are not distorted.

## Maintenance

### Direct expansion coils

Never use hot water or steam to clean these coils. During normal operation, the fin block must not ice up. If this occurs, check the refrigeration system.

Refrigerant coils should be kept clean to maintain maximum performance. If fins become dirty, clean with cold water and detergent or one of the commercially available chemicals coil cleaners. Rinse coils thoroughly after cleaning.



#### WARNING

Never use steam or hot water to clean a refrigerant coil. Dangerous pressures may be built up by improper application of heat resulting in equipment damage or personal injury.

### 7. Coil Winterization

Provisions must be made to drain those coils that are not in use when subjected to freezing temperature.



#### CAUTION

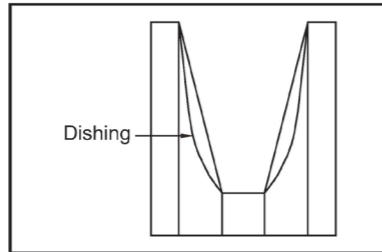
Failure to properly drain and vent coils when not in use during freezing temperatures may result in coil freeze-up damage. Drain and vent hardware provided by installing contractor.

To drain these coils, blow out the coils with compressed air, fill and drain the tubes with full-strength ethylene glycol several times, and then drain the coil as completely as possible.

### 8. Pulley and Belt

Proper installation techniques will assure that you get full service life and minimum down time from your belt drives.

1. Turn machine OFF and lock out power source.
2. Remove belt guard, loosen motor mounts and shorten center distance between pulleys. Remove old belts.
3. Inspect. Repair or replace drives components.
  - Clean oil, grease and debris from pulleys, remove rust with wire brush.
  - Inspect and replace damaged pulleys. Get your money's worth from a new set of belts by checking and replacing worn or damaged Pulleys. In the long run,



replacement pulley cost will more than be recovered in increased belt life, reduced downtime, and lower maintenance expenses. Check following:

- a) Worn groove sidewalls, "Dishing" should not exceed 1/32"(0.8mm) for individual belts. With a banded belt, dishing should not exceed 1/64"(0.4mm). When a banded belt rides too low in worn pulley grooves the tie band can be cut by the flanges between the grooves.
- b) Shiny pulley groove bottoms. This is a sure sign that the belt has bottomed out. The resulting slippage shortens belt life.

- c) Wobbling and/or damaged pulleys. Generally caused by improper pulley or bushing installation, wobbling and/or damaged pulleys can unbalance a drive, wear out belt rapidly, and damage bearings and bend shafts.

Check and repair worn bearings and bent shafts.

4. Select replacement belts. Replace all belts on a drive with a new matched set.

- a) Do not mix old and new belts on a drive. A new belt will ride higher in the pulley groove and operate at a higher tension than an old belt. Running them together will damage the new belt as it cannot carry its share of the load.
- b) Do not mix belt from different make, because dimensions and constructions will vary running such "Mis-Matched" belts will not give full service life.
- c) Replace with correct type and cross section belt. Matched SPA section belt with SPA section pulleys. Do not put a SPA belt section on a SPB section pulley. Also dimensionally similar belts can have very different horsepower rating.

#### 5. Install new belts

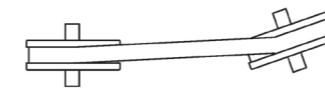
- Loosen the drive take up and place the new belts on the pulley. Press the belts with your hand to position the slack of each belt on the same side of the drive. If the slack is on different sides, start up loads can break belt tensile cords.
- Do not pry or force belts onto the pulleys. This can break the load carrying tensile cords of the belt and the belts will break or turn over shortly after installation.
- Take Up slack until belts fit snugly.

## Maintenance

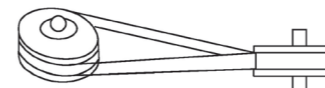
6. Check pulley alignment.
  - Place a straight edge across pulleys faces to correct alignment.
  - Check parallel position of shafts. And correct alignment or grooves.
  - Note: Mount pulleys as close to Bearing as possible.

**Note:** Store belts in a cool, dry place out of direct sunlight.

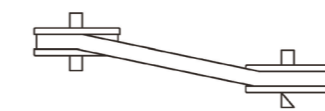
Types of sheave and shaft misalignment



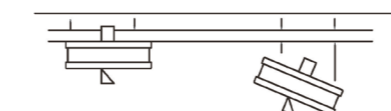
Horizontal Angular



Vertical Angular

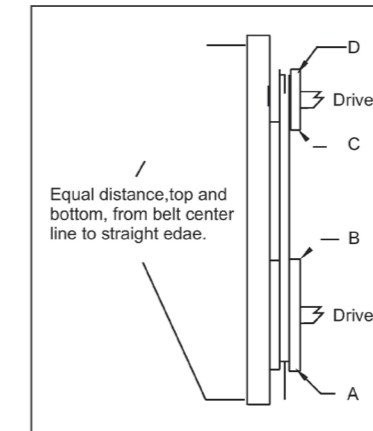


Parallel



Align with straightedge along sheave faces

Figure 16  
Sheave Alignment



### Fan Belt Tension

**Note:** Fan belt tension should be checked at least twice during the first day of operation, since there is a rapid decrease in tension until belts are run in.

Proper belt tensioning is required to ensure maximum bearing and drive component life and is based on fan brake horsepower requirement.

#### Belt Tension Measurement

Check the belt tension as follows: Measure the span length mm of the drive. With a belt tensioner at the center of the span, apply a force K (perpendicular to the span) large enough to deflect the belt 15mm per 1 meter of span. Refer to figure 17.

$$\text{DEFLECTION} = \text{SPAN mm} \times 15/1000\text{mm}$$

The deflection force for the belt should be within the minimum and maximum force shown in the Table 3. When the tension drops to the minimum value, readjust to the maximum value. To measure belt tension, use a belt tensioner as shown in Figure 18. Determine actual deflection by depressing one belt with the belt tensioner and measuring the deflection relative to the other belts or to belt line. Adjust the belt tension to the correct force (Newton) and tighten all setscrews to the proper torques.

Figure 17  
Belt Tension Measurement

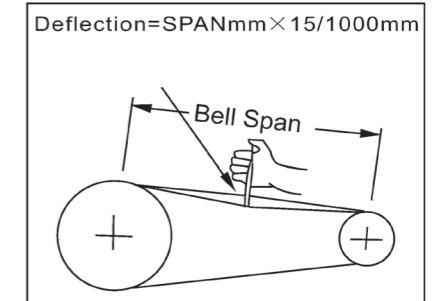


Figure 18  
Belt Tension Measurement

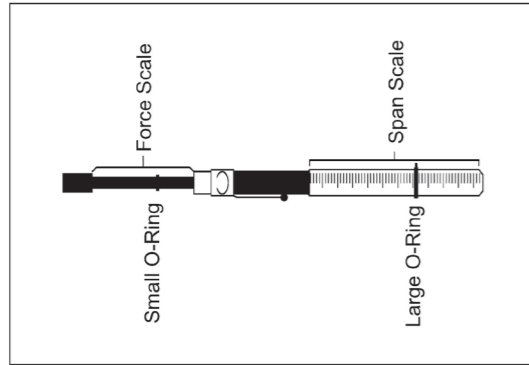
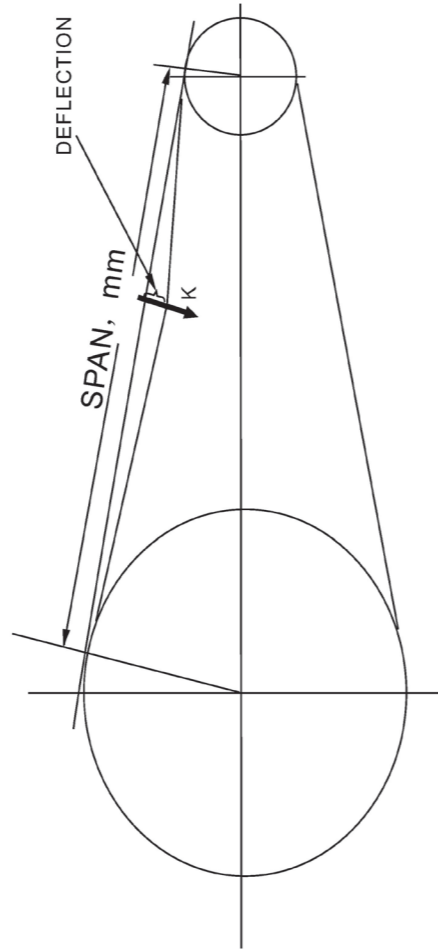


Table 3. Deflection Force, K

Cross Section	Force	DEFLECTION FORCE, K					
		SPZ	SPA	SPB	SPC		
		min.	Max.	min.	Max.		
63-80,mm	kgF	1.2	1.9	1.5	2.3	-	-
	N	12	19	14	23	-	-
81-112,mm	kgF	1.6	2.4	1.9	3.0	2.5	3.7
	N	16	24	19	29	24	36
113-160,mm	kgF	1.9	2.9	2.7	4.1	3.4	5.1
	N	19	28	26	40	33	50
161-224,mm	kgF	1.9	3.0	3.1	4.7	4.4	6.5
	N	19	29	30	46	43	64
225-355,mm	kgF	-	-	3.3	4.9	5.2	7.9
	N	-	-	32	48	51	77
356-630,mm	kgF	-	-	-	-	5.6	8.4
	N	-	-	-	-	55	82

N=Newton  
kgF=kilogram Force=9.80665 N



### General

Use the tables in this section to assist in identifying the cause or causes of a malfunction in Air Handler operation. The column header RECOMMENDED ACTION will suggest repair procedures.

Note: These tables are intended as a diagnostic aid only. For detailed repair procedures, contact your local Trane Service Company.

Symptom	Probable Cause	Recommended Action
Bearing noise	Poor alignment	Loosen bearing setscrews and realign
	Inadequate lubrication	Grease bearing(s) (Plummer block)
Bearing is excessively hot	Overtensioned belts No lubricant (plummer block type) Overlubrication Misaligned bearing	Retension belts Apply grease Clean surface of grease and purge Correct alignment and check that shaft is level
Motor stalls	Low line voltage Short circuit, phase to earth (open Phase) Overloaded motor	Check across AC line. Correct voltage if possible Check line phases and terminal block connection. Reduce system load, fan driven speed or increase motor capacity
Motor overheats	Motor fan is clogged with dirt preventing proper ventilation Overloaded motor Motor fan damaged	Remove fan cover, clean fan and replace cover Reduce load or replace with larger motor Replace motor fan / clean
Excessive vibration	Poor pulley alignment Transport brackets not removed Overtensioned belts Fan / unit vibration isolator collapsed	Check pulley alignment Remove items used for transport only Retension belts Replace vibration isolator
Excessive vibrator	Misalign drive	Align drive
Excessive motor noise	Motor mounting bolts loose Worn motor bearings Fan rubbing on fan cover	Tighten motor mounting bolts Replace bearings and seals Remove interference in motor fan housing
Excessive fan noise	Fan rubbing on inlet cone or guard Worm fan bearings Loose impeller	Remove item and repair Replace bearings and seals Retighten hub
Premature belt wear	Incorrect tension or alignment Dirt or grease on belts Belts rubbing Odd belts being fitted	Re-tension and align Clean belts and pulleys; check for grease leaks Remove obstruction Replace with full set
Filter collapsing	Blocked with dirt Air velocity too high Filter wrong size	Change at advised dirty condition Check unit running conditions Replace with filter sizes as supplied from Trane





## Trouble Analysis

Symptom	Probable Cause	Recommended Action
Damper seizing	Blade bent Spindle or mechanism loose Actuator loose	Repair or replace blade Tightening lever fixings Refit actuator correctly
Low coil capacity (Chilled Water)	Air is by passing coil Coil tubes are blocked Incorrect airflow (CFM) Incorrect water flow rate (GPM) Incorrect water temperature	Prevent bypass with block-off Clean and unblock tubes Check water pumps, valves and lines for obstructions Provide proper water temperature
Low coil capacity (Refrigerant)	Air is by passing coil Coil tubes are blocked Incorrect airflow Expansion valve not operating Poor refrigerant distribution	Prevent bypassing with block-off Clean and unblock tubes Check fan-operating conditions Check sensing bulb location and TXV operation Check for blockage in distributor and tube
Leaking Coil	Header / exposed pipe damage Cracks in joints due to strain of pipework on headers Swelling of joints due to frost (Water-hammer Steam Coils)	Repair damaged part Check support and alignment of pipework and rectify Check frost protection method and correct, improve Trapping of steam supply
Drain pan overflow	Incorrect hydraulic trapping Blockage in trap Plugged Drain Line Unit not level	Resize / fit trap and check air break arrangement Clean trap and refit Clean drain line Level unit
Standing water in drain pan	Improper trap design	Design trap per unit installation instructions
Wet interior insulation	Coil face velocity too high Improper trap design Drain pan leaks / overflows Condensation on surfaces	Reduce fan speed Design trap per unit installation instructions Repair leaks Insulate surfaces
Excess dirt in unit	Missing filters Filter bypass	Replace filters Reduce filters bypass
Microbial growth (mold) inside air handler	Standing water in drain pan Moisture problems	See "Standing water" symptom See "Wet interior insulation" section
Loose fan belt	Motor is poorly positioned Worn or damaged belt Worn Sheaves	Adjust tension Replace belt or belt set. Check sheave alignment Replace sheaves
Short belt life	Worn Sheaves Misalign belt Grease or oil on belts Belt slipping Belts rubbing	Replace sheaves Realign drive with MVP sheave set at mean pitch diameter Check for leaky bearings. Clean belts and sheaves Adjust tension Remove obstruction or realign drive for clearance
Rapid motor bearing wear	Excessive overhung load due to overtensioned drive	Check belt tension and overhung load
	Excessive overhung load due to a small	Replace sheave with larger one



## Trouble Analysis

### Pulley and Belt

Coucs SYMPTOMS	Belt pries on or misplaced slack	Belts rubbing guard	Pulleys misalign	Worn or damaged pulleys	Pulleys too far from pulleys	Poor bearing or shaft conditions	Insufficient tension	Excessive tension	Improper pulley installation	Belt worn(Normal service life)	Wrong belt cross section or type	Mismatched or mixed belts	Machine induced impulse or type	Improper or prolonged storage	Excessive heat	Excessive oil or grease	Use of belt dressing	Abrasive environment	Foreign objects in grooves	Excessive moisture	Overloaded drive-undebeiting	Drive seriously overbelited	Pulley too small	Insufficient wrap on small pulley	Backside Idler
Rapid side wall wear		@	@	✓		✓	@		@					@	@	@	@	@		@					
Worn cove on back		✓																				@		@	
Belt turns over or jump off pulley	@						@	@				✓							@						
Belt soft, swollen															✓	@									
Belt slips, squeals (Spin Burn)				✓	✓	✓		✓								@				@	@		@		
Belt cover split	@																		@						
Underside cracked			@	@								@	@	✓								✓		@	
Tie-band damakaged		@	@	✓	✓			@											✓						
Repeated breakage	@						@						@						@		✓				
Belts ride too high															@	@									
Belts bottoming				✓	✓			@														✓			
Repeated take up necessary			@	@	@	@																@			
Belt vebrate excessively or appear mismatched			@	@	@			@	@	@	✓											@	@		
Bearing are hot			@	@	@	@	@		✓													@	@		
Shafts whip orbend			@	@	@	@	@		✓																
Cracked bushings			@	@							✓														
Pulley wobble			@	@			@				✓														

✓ Indicates Most Common Causes  
@ Indicates Other Possible Causes



## Appendix A HDT – Unit Weight

**HDT Unit Weight (kg) - Fan and Coil Sections (without motor weight)  
50mm Casing**

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)						
	Fan Arrangement		Coil Row						
	Front-Top. Front-Bottom.	Top-Front & Top-Back	1	2	4	6	8	10	12
003	68	68	52	55	69	83	101	112	123
004	82	82	67	71	91	112	136	153	171
006	111	111	82	87	116	140	171	193	217
008	128	128	97	103	134	170	208	236	263
010	140	140	109	117	152	192	235	269	304
012	178	190	131	141	183	234	288	332	377
014	196	209	150	162	212	273	337	390	444
016	238	251	165	178	234	300	371	429	488
020	282	297	187	203	268	348	431	502	573
025	364	379	217	237	315	410	510	596	684
030	406	407	268	292	384	500	622	729	840
035	466	483	302	330	436	571	712	838	965
040	567	585	335	368	487	644	803	949	1093
045	592	611	376	413	549	726	907	1074	1238
050	740	782	409	451	601	798	999	1181	1369
060	765	809	465	515	694	926	1163	1379	1603
065	930	923	539	594	790	1051	1317	1560	1808
070	930	954	577	637	852	1134	1424	1689	1958
080	1067	1092	620	685	912	1219	1530	1817	2107
085	1099	1125	676	747	994	1328	1668	1984	2300
090	1137	1164	716	791	1056	1414	1775	2111	2447
095	1168	1196	754	835	1116	1497	1882	2239	2595

**25mm Casing**

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)						
	Fan Arrangement		Coil Row						
	Front-Top. Front-Bottom.	Top-Front & Top-Back	1	2	4	6	8	10	12
003	51	51	50	52	66	80	97	108	119
004	62	62	62	65	83	104	126	142	160
006	81	81	75	80	102	130	159	181	204
008	96	96	90	96	124	159	194	222	249
010	105	105	102	110	141	181	221	255	290
012	135	144	123	133	171	222	272	316	361
014	149	159	141	153	199	260	319	372	426
016	179	188	156	169	221	287	353	412	471
020	212	222	177	193	254	333	411	482	554
025	277	288	206	227	299	394	489	575	663
030	319	319	256	281	367	483	599	707	817
035	354	360	289	318	418	553	688	814	940
040	439	452	321	355	468	624	777	922	1067
045	458	472	361	399	528	705	880	1046	1210
050	582	613	394	436	579	776	970	1151	1339

Note:  
1. Coil weight is the operating weight



## Appendix A HDT – Unit Weight

**Fan + Coil + Filter Sections (without motor weight)  
50mm Casing**

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)							Filter Section Weight(kg)			
	Fan Arrangement		Coil Row							2"Flat Filter	2"Hi- Capacity Filter	2"Flat Filter+ 15"Bag Filter	2"Flat Filter + 4"Cartridge Filter
	Front-Top & Front- Bottom	Top-Front & Top- Back	1	2	4	6	8	10	12				
003	68	68	52	55	69	83	101	112	123	21	47	36	41
004	82	82	67	71	91	112	136	153	171	25	57	38	48
006	111	111	82	87	116	140	171	193	217	32	67	44	58
008	128	128	97	103	134	170	208	236	263	38	81	50	67
010	140	140	109	117	152	192	235	269	304	35	84	54	71
012	178	190	131	141	183	234	288	332	377	41	102	62	81
014	196	209	150	162	212	273	337	390	444	48	111	70	94
016	238	251	165	178	234	300	371	429	488	44	117	67	100
020	282	297	187	203	268	348	431	502	573	50	128	74	112
025	364	379	217	237	315	410	510	596	684	54	149	83	129
030	406	407	268	292	384	500	622	729	840	56	165	96	142
035	466	483	302	330	436	571	712	838	965	68	193	106	161
040	567	585	335	368	487	644	803	949	1093	75	205	116	175
045	592	611	376	413	549	726	907	1074	1238	82	232	125	194
050	740	782	409	451	601	798	999	1181	1369	75	230	142	219
060	765	809	465	515	694	926	1163	1379	1603	82	251	157	249
065	930	923	539	594	790	1051	1317	1560	1808	88	279	169	269
070	930	954	577	637	852	1134	1424	1689	1958	95	290	180	288
080	1067	1092	620	685	912	1219	1530	1817	2107	101	319	187	315
085	1099	1125	676	747	994	1328	1668	1984	2300	108	330	198	328
090	1137	1164	716	791	1056	1414	1775	2111	2447	114	359	209	349
095	1168	1196	754	835	1116	1497	1882	2239	2595	119	365	220	362

**25mm Casing**

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)							Filter Section Weight(kg)			
	Fan Arrangement		Coil Row							2"Flat Filter	2"Hi- Capacity Filter	2"Flat Filter+ 15"Bag Filter	2"Flat Filter + 4"Cartridge Filter
	Front-Top & Front- Bottom	Top-Front & Top- Back	1	2	4	6	8	10	12				
003	51	51	50	52	66	80	97	108	119	19	42	31	36
004	62	62	62	65	83	104	126	142	160	23	48	29	39
006	81	81	75	80	102	130	159	181	204	31	58	34	48
008	96	96	90	96	124	159	194	222	249	37	70	39	56
010	105	105	102	110	141	181	221	255	290	33	72	43	59
012	135	144	123	133	171	222	272	316	361	39	88	49	68
014	149	159	141	153	199	260	319	372	426	46	97	55	80
016	179	188	156	169	221	287	353	412	471	42	103	52	85
020	212	222	177	193	254	333	411	482	554	48	112	58	96
025	277	288	206	227	299	394	489	575	663	51	131	66	112
030	319	319	256	281	367	483	599	707	817	53	146	77	123
035	354	360	289	318	418	553	688	814	940	65	172	85	140
040	439	452	321	355	468	624	777	922	1067	72	183	94	153
045	458	472	361	399	528	705	880	1046	1210	80	209	102	171
050	582	613	394	436	579	776	970	1151	1339	73	206	118	195

Note:  
1. Coil weight is the operating weight.  
2. Filter weight include filter media.



## Appendix A HDT – Unit Weight

Fan+Coil+Filter and Mixing Sections(without motor weight)  
50mm Casing

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)							Filter Section Weight(kg)				Mixing Box/ Rear or Top Inlet Section Weight
	Fan Arrngement		Coil Row							2"Flat Filter	2"Hi-Capacity Filter	2"Flat Filter+ 15"Bag Filter	2"Flat Filter + 4"Cartnidger Filter	
	Front-Top & Front-Bottom	Top-Front & Top-Back	1	2	4	6	8	10	12					
003	51	51	50	52	66	80	97	108	119	0	47	36	29	38
004	62	62	62	65	83	104	126	143	160	0	57	38	34	45
006	81	81	75	80	102	130	159	181	205	0	68	44	43	54
008	96	96	90	96	124	159	194	222	249	0	81	50	50	64
010	105	105	102	110	141	181	221	255	290	0	84	55	54	66
012	135	144	123	133	171	222	273	316	361	0	101	62	63	76
014	149	159	141	153	199	260	320	372	426	0	111	70	74	81
016	179	188	156	169	221	287	353	412	471	0	117	71	80	104
020	212	222	177	193	254	333	411	482	554	0	128	74	90	111
025	277	288	206	227	299	394	483	575	663	0	149	83	105	115
030	319	319	256	281	367	483	600	707	817	0	165	96	116	134
035	354	360	289	318	418	553	688	814	940	0	193	106	134	148
040	439	452	321	355	468	624	777	922	1067	0	205	115	146	161
045	458	472	361	399	528	705	880	1046	1210	0	232	142	163	211
050	582	613	394	436	579	776	970	1151	1339	0	230	157	187	215
060	765	809	465	515	694	926	1163	1379	1603	0	251	157	214	241
065	900	923	539	594	790	1051	1317	1560	1808	0	279	169	233	279
070	930	954	577	637	852	1134	1424	1689	1958	0	290	180	251	324
080	1068	1092	619	685	912	1219	1530	1817	2107	0	319	187	276	332
085	1099	1120	676	747	994	1328	1668	1984	2300	0	330	198	287	379
090	1137	1164	715	791	1056	1414	1775	2111	2447	0	359	209	307	388
095	1168	1196	754	834	1116	1497	1882	2239	2595	0	365	220	317	397

25mm Casing

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)							Filter Section Weight(kg)				Mixing Box/ Rear or Top Inlet Section Weight
	Fan Arrngement		Coil Row							2"Flat Filter	2"Hi-Capacity Filter	2"Flat Filter+ 15"Bag Filter	2"Flat Filter + 4"Cartnidger Filter	
	Front-Top & Front-Bottom	Top-Front & Top-Back	1	2	4	6	8	10	12					
003	51	51	50	52	66	80	97	108	119	0	42	31	26	35
004	62	62	62	65	83	104	126	143	160	0	48	31	31	42
006	81	81	75	80	102	130	159	181	205	0	58	34	39	51
008	96	96	90	96	124	159	194	222	249	0	70	39	46	60
010	105	105	102	110	141	181	221	255	290	0	72	43	49	58
012	135	144	123	133	171	222	273	316	361	0	88	49	57	68
014	149	159	141	153	199	260	320	372	426	0	97	55	68	71
016	179	188	156	169	221	287	353	412	471	0	103	55	74	89
020	212	222	177	193	254	333	411	482	554	0	112	58	83	95
025	277	288	206	227	299	394	483	575	663	0	131	66	98	98
030	319	319	256	281	367	483	600	707	817	0	146	77	108	114
035	354	360	289	318	418	553	688	814	940	0	172	85	125	127
040	439	452	321	355	468	624	777	922	1067	0	183	94	137	140
045	458	472	361	399	528	705	880	1046	1210	0	209	102	154	181
050	582	613	394	436	579	776	970	1151	1339	0	209	118	177	181

Note:

1. Coil weight is the operating weight
2. Filter weight includes filter media



## Appendix A VDT – Unit Weight

Fan and Coil Sections(without motor weight)  
50mm Casing

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)						
	Fan Arrngement		Coil Row						
	Front-Top, Front-Bottom, Back-Top & Back-Bottom	Top-Front & Top-Back	1	2	4	6	8	10	12
003	107	107	76	78	87	100	113	123	134
004	121	121	94	98	111	132	150	167	184
006	175	175	112	117	135	162	186	209	232
008	205	205	139	146	168	204	233	262	288
010	228	228	151	159	186	226	261	295	330
012	254	267	187	197	230	281	326	370	414
014	272	286	211	223	263	324	378	431	484
016	355	370	246	260	306	372	432	490	550
020	471	486	264	281	335	414	486	557	629
025	582	599	336	357	423	518	606	692	780
030	609	627	396	420	500	616	725	833	942
035	773	792	438	468	560	695	822	948	1074

25mm Casing

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)						
	Fan Arrngement		Coil Row						
	Front-Top, Front-Bottom, Back-Top & Back-Bottom	Top-Front & Top-Back	1	2	4	6	8	10	12
003	88	88	70	72	81	95	107	118	129
004	99	99	79	82	96	116	134	151	168
006	146	146	94	99	116	144	168	190	213
008	169	167	115	121	144	179	209	237	264
010	189	189	127	135	162	201	237	270	305
012	211	220	156	166	199	249	295	338	383
014	224	235	177	189	228	290	344	396	450
016	296	307	203	217	262	328	389	447	507
020	400	412	221	238	292	371	443	514	586
025	491	504	274	295	361	456	544	630	717
030	520	534	328	353	432	548	657	765	875
035	657	671	366	395	487	622	749	875	1001

Note:

1. Coil weight is the operating weight.



## Appendix A VDT – Unit Weight

Fan+Coil+Filter and Mixing Sections(without motor weight)  
50mm Casing

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)						Filter Section Weight(kg)				
	Fan Arrangement		Coil Row						2"Flat Filter	2"Hi-Capacity Filter	2"Flat Filter+ 15"Bag Filter	2"Flat Filter + 4"Cartnidge Filter	
	Front-Top, Front-Bottom, Back Top & Back-Bottom	Top-Front & Top-Back	1	2	4	6	8	10					12
003	107	107	76	78	87	100	113	123	134	0	47	36	29
004	121	121	94	98	111	132	150	167	184	0	57	38	34
006	175	175	112	117	135	162	186	209	232	0	68	44	43
008	205	205	139	146	168	204	233	262	288	0	81	50	50
101	228	228	151	159	186	226	261	295	330	0	84	55	54
012	254	267	187	197	230	281	326	370	414	0	101	62	63
014	272	286	211	223	263	324	378	431	484	0	111	70	74
016	355	370	246	260	306	372	432	490	550	0	117	71	80
020	471	486	264	281	335	414	486	557	629	0	128	74	90
025	582	599	336	357	423	518	606	692	780	0	149	83	105
030	609	627	396	420	500	616	725	833	942	0	165	96	116
035	773	792	438	468	560	695	822	948	1074	0	193	106	134

25mm Casing

Model Size	Fan Section Weight(kg)		Coil Section Weight(kg)						Filter Section Weight(kg)				
	Fan Arrangement		Coil Row						2"Flat Filter	2"Hi-Capacity Filter	2"Flat Filter+ 15"Bag Filter	2"Flat Filter + 4"Cartnidge Filter	
	Front-Top, Front-Bottom, Back Top & Back-Bottom	Top-Front & Top-Back	1	2	4	6	8	10					12
003	88	88	70	72	81	95	107	118	129	0	42	31	26
004	99	99	79	82	96	116	134	151	168	0	48	31	31
006	146	146	94	99	116	144	168	190	213	0	58	34	39
008	169	167	115	121	144	179	209	237	264	0	70	39	46
101	189	189	127	135	162	201	237	270	305	0	72	43	49
012	211	220	158	166	199	249	295	338	383	0	88	49	57
014	224	235	177	189	228	290	344	396	450	0	97	55	68
016	296	307	203	217	262	328	389	447	507	0	103	55	74
020	400	412	221	238	292	371	443	514	586	0	112	58	83
025	491	504	274	295	361	456	544	630	717	0	131	66	98
030	520	534	328	353	432	548	657	765	875	0	146	77	108
035	657	671	366	395	487	622	749	875	1001	0	172	85	125

- Note:  
1. Coil weight is the operatight  
2. Filter weight includes filter media

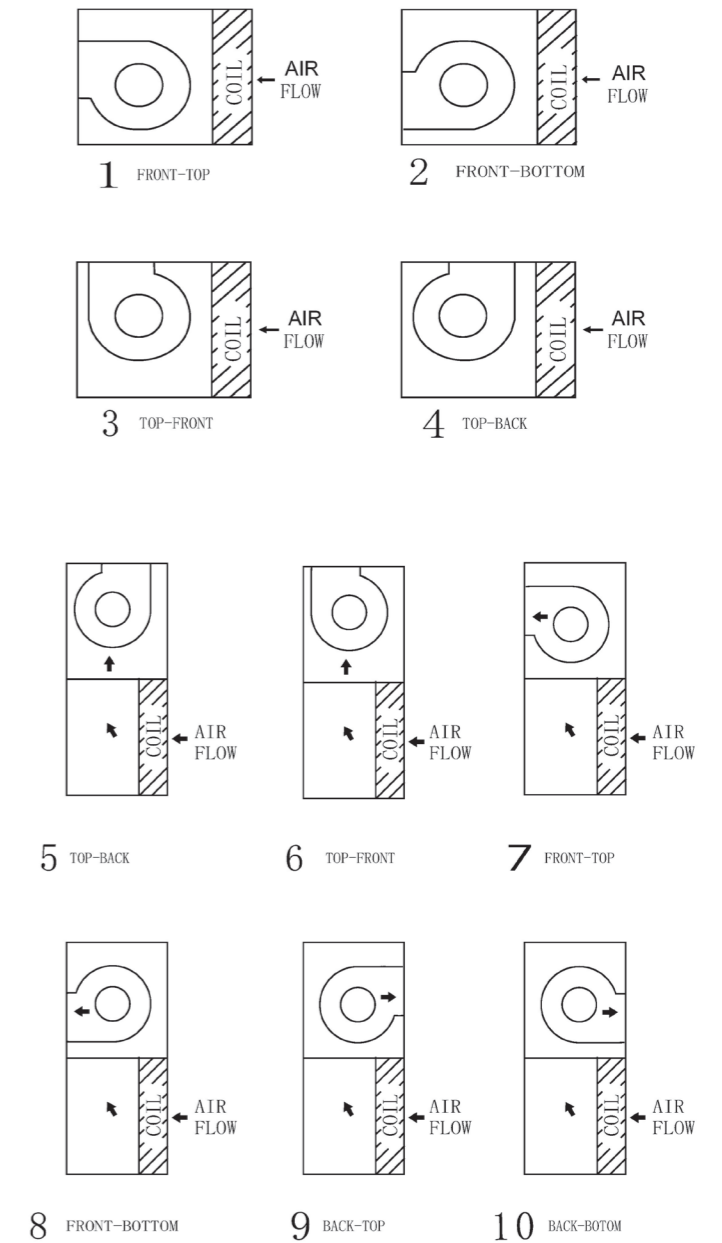


## Appendix B Fans and Arrangement

Fan Size and Diameter

Model Size	Fan size	Fan size Diameter (mm)
003	KAT9/7	229
	BC 180	180
004	KAT10/8	250
	KAT9/7	225
006	FC 250	250
	BC 250	
008	FC 280	280
	BC 280	
010	FC 315	315
	BC 315	
012	FC 400	400
	BC 400	
014	FC 400	400
	BC 400	
016	FC 450	450
	BC 450	
020	FC 500	500
	BC 500	
025	FC 560	560
	BC 560	
030	FC 560	560
	BC 560	
035	FC 630	630
	BC 630	
040	FC 710	710
	BC 710	
045	FC 710	710
	BC 710	
050	FC 800	800
	BC 800	
060	FC 800	800
	BC 800	
065	FC 900	900
	BC 900	
070	FC 900	900
	BC 900	
080	FC 1000	1000
	BC 1000	
085	FC 1000	1000
	BC 1000	
090	FC 1000	1000
	BC 1000	
095	FC 1000	1000
	BC 1000	

Fan Discharge Arrangements





## Appendix C - Filter and Quantity



## Appendix C – Filter and Quantity

Filter Dimension (Nominal) and Arrangement  
Flat Filter, Bag Filter & Cartridge Filter

MODEL	ARRANGEMENT	(Nominal Sizes in inches)
003		20
004		24
006		20
008		24
010		12
012		20
014		12
016		24
020		12
025		24
030		12
035		24
040		12
045		24
050		12
060		24

MODEL	ARRANGEMENT	(Nominal Sizes in inches)
065		12
070		24
080		12
085		24
090		12
095		24

Filter Dimension and Arrangement  
High Capacity Filter - CLCP

FILTER PLAN		
Model	Dimension	Filter Arrangement
003	2ROWS-24" x 20"	
004	2ROWS-24" x 20"	
006	2ROWS-48" x 20"	
008	2ROWS-48" x 20"	
010	4ROWS-48" x 20"	
012	4ROWS-48" x 20"	
014	4ROWS-72" x 20"	
016	5ROWS-48" x 20"	
020	5ROWS-72" x 20"	
025	7ROWS-72" x 20"	
030	8ROWS-72" x 20"	

FILTER PLAN		
Model	Dimension	Filter Arrangement
035	8ROWS-72" x 20"	
040	8ROWS-96" x 20"	
045	8ROWS-96" x 20"	
050	8ROWS-120" x 20"	
060	9ROWS-120" x 20"	
065	9ROWS-120" x 20"	
070	9ROWS-144" x 20"	
080	9ROWS-144" x 20"	
085	9ROWS-168" x 20"	
090	9ROWS-168" x 20"	
095	9ROWS-168" x 20"	



## Appendix C - Filter and Quantity

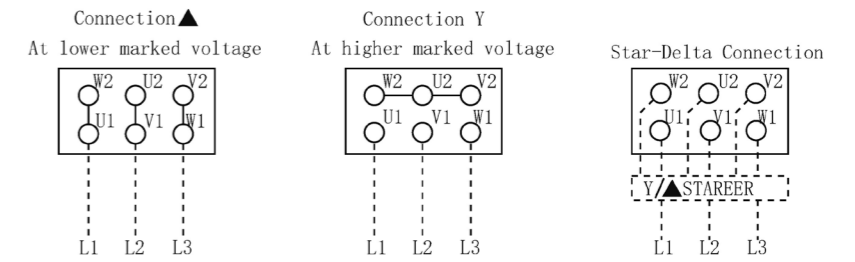
Filter Dimension and Arrangement  
Final Filter (HEPA)

FILTER PLAN					
MODEL	ARRANGEMENT	(NOMINAL SIZES IN INCHES)	MODEL	ARRANGEMENT	(NOMINAL SIZES IN INCHES)
003&004		24"	050		24" 24" 24" 24"
006&008		24" 24"			
010&012		12" 24" 24"			
014		12" 24" 24"			
016		12" 24" 24"	060&065		24" 24" 24" 24"
020		24" 24"			
025		12" 24" 24"			
030		24" 24" 24"	070&080		24" 24" 24" 24"
035		12" 24" 24"			
040		24" 24" 24"	085&090		24" 24" 24" 24"
045		12" 24" 24"			
			095		12" 24" 24" 24"

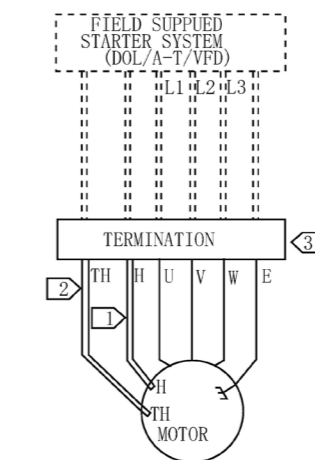


## Typical – Unit Wiring Diagram

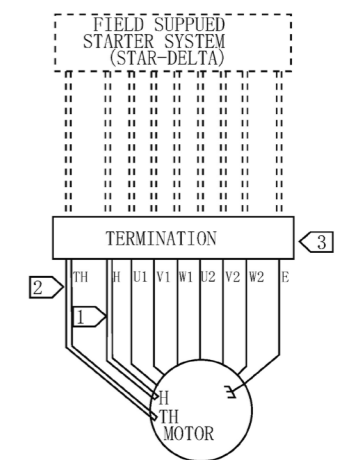
CONNECTION DRAWING FOR BARE MOTOR



CONNECTION DRAWING FOR TERMINATION - 3 POLE



CONNECTION DRAWING FOR TERMINATION - 6 POLE



LEGENDS	
DS	DISCONNECT SWITCH / ISOLATOR SWITCH
H	ANTI - CONDENSATION HEATERS
MCB	CIRCUIT BREAKER
TH	THERMISTOR PROTECTION
TBP	TERMINAL BLOCK POWER
TB	TERMINAL BLOCK

- NOTES:
- ① ONLY AVAILABLE WHEN HEATER OPTION AT MOTOR IS SELETED
  - ② ONLY AVAILABLE WHEN THERMISTOR OPTION AT MOTOR IS SELETED
  - ③ REFER TO TERMINATION TYPE



### Safety Recommendations

To avoid accidents and damage, the following recommendations should be observed during maintenance and service visits:

1. Disconnect the main supply before any servicing on the unit.
2. Service work on the refrigeration system and the electrical system should be carried out only by qualified and experienced personnel.

### Maintenance Contract

It is strongly recommended that you sign a maintenance contract with your local Service Agency. This contract provides regular maintenance of your installation by a specialist in our equipment. Regular maintenance ensures that any malfunction is detected and corrected in good time and minimizes the possibility that serious damage will occur. Finally, regular maintenance ensures the maximum operating life of your equipment. We would remind you that failure to respect these installation and maintenance instructions may result in immediate cancellation of the warranty.

The manufacturer has a policy of continuous product improvement, and reserves the right to alter any details of the products at any time without notice.

This publication is a general guide to install, use and properly maintain our products. The information given may be different from the specification for a particular country or for a specific order. In this event, please refer to your nearest office.

In no event shall Trane be liable for any incidental or consequential damages resulting from the use, misuse or inability to use the product.

### Training

The equipment described in this manual is the result of many years of research and continuous development. To assist you in obtaining the best use of it and maintaining it in perfect operating condition over a long period of time, the manufacturer has at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and technicians a better knowledge of the equipment they are using, or that is under their charge. Emphasis is particularly given to the importance of periodic checks on the unit operating parameters as well as on preventive maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

For additional information, contact your distributor / Installer stamp

## Pre – Start Up Checklist

TRANE AHU Pre-start up Checklist

### General Information

Date \_\_\_\_\_  
 Project Name: \_\_\_\_\_  
 Trane Sales Order # \_\_\_\_\_  
 Trane AHU Model \_\_\_\_\_  
 Unit Serial No.: \_\_\_\_\_  
 Unit TAG # \_\_\_\_\_  
 Design Capacity (CFM) @ Design ESP \_\_\_\_\_  
 AHU Location \_\_\_\_\_  
 Area Served \_\_\_\_\_  
 Start-Up Contractor \_\_\_\_\_  
 T & C Technician / Engineer \_\_\_\_\_

### Casing Installation Check

Exterior casing in good condition  \_\_\_\_\_  
 Interior casing in good condition  \_\_\_\_\_  
 Is the unit installation level?  \_\_\_\_\_  
 Are the unit clearances adequate for service and operation?  \_\_\_\_\_  
 Do all access doors open freely and are the handles operational?  \_\_\_\_\_

### Fan-Motor Installation Checks

Have all shipping braces / brackets been removed?  \_\_\_\_\_  
 Fan and Motor Alignment correct  \_\_\_\_\_  
 Belt tension & condition good  \_\_\_\_\_  
 Belt guard in place and secure.  \_\_\_\_\_  
 Do the fan rotate freely?  \_\_\_\_\_

### Electrical Installation Checks

Electrical Cable entry at unit wall & motor terminal box is sealed.  \_\_\_\_\_  
 Have all electrical connections been tested for tightness?  \_\_\_\_\_  
 Insulation test done on motor winding.  \_\_\_\_\_ ohm  
 Has overcurrent protection been installed to match unit nameplate requirement?  \_\_\_\_\_  
 Does the electrical supply correspond to the unit nameplate?  \_\_\_\_\_  
 External Power Disconnects in place and labeled.  \_\_\_\_\_  
 Proper grounding installed for motor and unit.  \_\_\_\_\_

Motor Nameplate FLA \_\_\_\_\_ Amp  
 Installed Motor kW \_\_\_\_\_ kW  
 Electrical Power Supply \_\_\_\_\_ Vac/Ph/Hz  
 Voltage Imbalance \_\_\_\_\_ %

### Supply Fan

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### Return / Exhaust Fan

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
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\_\_\_\_\_  
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 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_ Amp  
 \_\_\_\_\_ kW  
 \_\_\_\_\_ Vac/Ph/Hz  
 \_\_\_\_\_ %



## Pre – Start Up Checklist

### Coil & Piping Installation Checks

- Coils water In/OUT piping connected correctly.
- Condensate drain and P-trap been installed correctly / primed
- External pipe fittings complete and pipes properly supported
- Coil Headers of specified material
- Valves installed in correct direction

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

### Filter Instalation Checks

- Are the air filters installed with proper orientation?
- Filter Diffrential Pressure Switch operation?

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

### Mixing Box / Economizer Dampers

- Outdoor Air Damper Operation check
- Return Air Damper Operation check
- Exhaust Air Damper Operation check
- Have the air dampers been inspected?

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

### Supply Duct Installation Checks

- 3D requirement
- Duct visibly sound, clean, sealed & in good condition
- Ducts have no apprarent flow restriction.
- Ducts have turning vanes in square elbows

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

### Notes:

- Put a check or an "X" in the box if the indicated item is "OK"
- Put "NA" in the box if the item does not apply.
- Put "BO" in the box if the work is was performed by Others  
(include appropriate explanation)