



# Installation, Operation, and Maintenance Performance Climate Changer™ Air Handlers for Data Center Applications



Model: PSCA

## ⚠ 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.

March 2024

CLCH-SVX015A-EN

TRANE  
TECHNOLOGIES



# Introduction

Read this manual thoroughly before operating or servicing this unit.

## Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:



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



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.



Indicates a situation that could result in equipment or property-damage only accidents.

## Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

## Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

### ⚠ WARNING

#### Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in **NEC** and your local/state/national electrical codes.

### ⚠ WARNING

#### Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

**⚠ WARNING****Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Trane personnel should always follow local regulations.

## Additional Environmental Information

Air handler foamed panels rely on a foam system that utilizes water and R-1233zd as blowing agents.

## Copyright

This document and the information in it are the property of Trane, and may not be used or reproduced in whole or in part without written permission. Trane reserves the right to revise this publication at any time, and to make changes to its content without obligation to notify any person of such revision or change.

## Trademarks

All trademarks referenced in this document are the trademarks of their respective owners.

## Factory Training

Factory training is available through Trane University™ to help you learn more about the operation and maintenance of your equipment. To learn about available training opportunities contact Trane University™.

Online: [www.trane.com/traneuniversity](http://www.trane.com/traneuniversity)

Phone: 855-803-3563

Email: [traneuniversity@trane.com](mailto:traneuniversity@trane.com)



# Table of Contents

General Information .....	6	General Recommendations .....	19
Overview of Manual .....	6	Drain Pan Trapping .....	19
Nameplate .....	6	Piping Package .....	20
Operating Environment .....	6	Water Coil Piping .....	21
Unit Description .....	6	Installation – Electrical .....	22
Components .....	6	Typical Wiring Schematics .....	24
Factory-Mounted Controls .....	6	Controls Interface .....	25
Pre-Packaged Configurations for		Connecting the Operator Display .....	25
Controls .....	7	Calibrating the Operator Display .....	25
Wiring .....	7	Adjusting Brightness and Contrast .....	25
Pre-Installation .....	8	External Communications Port .....	25
Receiving and Handling .....	8	Start-Up .....	26
Inspection .....	8	Pre-Startup Checklist .....	26
Packaging/Shipping .....	8	General Checks .....	26
Identification .....	8	Fan-Related Checks .....	26
Handling .....	8	Coil-Related Checks .....	26
Receiving Checklist .....	8	Motor-Related Checks .....	26
Jobsite Storage .....	8	Unit Operation .....	27
Outdoor Storage .....	8	Calculate Motor Voltage	
Long-Term Storage .....	9	Imbalance .....	27
Site Preparation .....	9	VFD Programming Parameters .....	27
Dimensions and Weights .....	10	Fan Inlet Airflow Measuring System .....	28
Service Clearance Recommendations .....	10	Wiring .....	29
Installation – Mechanical .....	11	Transmitter Sizing .....	29
Lifting and Rigging .....	11	Transmitter Calibration .....	29
General Lifting Considerations .....	11	Maintenance .....	29
Fork lifting Considerations .....	11	Constant K Factor .....	29
Unit Placement and Assembly .....	12	External Insulating Requirements .....	30
Removing the Shipping Skid .....	12	Routine Maintenance .....	31
Seismic Application Requirements .....	14	Maintenance Checklist .....	31
Single Level Design .....	14	Cleaning the Unit .....	31
Stacked Design .....	15	Cleaning Non-Porous Surfaces .....	31
Anchoring .....	15	Cleaning Porous Surfaces .....	32
Component Installation .....	17	Coils .....	32
Fans .....	17	Water Coils .....	32
Fan Isolation .....	17	Coil Winterization .....	33
Adjusting the Isolators .....	17	Moisture Purge Cycle .....	33
Filters .....	17	Drain Pans .....	33
Filter Installation .....	17	Fans .....	34
Piping and Connections .....	19		

Inspecting and Cleaning Fans .....	34	Throwaway Filters.....	35
Motor Bearing Lubrication .....	34	Troubleshooting .....	36
Fan Motor Inspection .....	34		
Filters .....	34		



# General Information

## Overview of Manual

Use this manual to install, startup, operate, and maintain the Performance Climate Changer™ air handler model PSCA. Carefully review the procedures discussed in this manual to minimize installation and startup difficulties.

## Nameplate

Each Performance air handler section includes one or more nameplate/label, which identifies the type of section

and functional components, customer tagging information, the unit serial number, the unit order number, the build-section position for installation, and the unit model number.

**Note:** The unit serial number and order number is required when ordering parts or requesting service for a Trane air handler.

**Figure 1. Performance PSCA air handler section nameplate**

**Performance Climate Changer™ Air Handler**

ORDER NO. / BL	Y0H225A / A
SERIAL NO.	K16M92993
UNIT MODEL NO.	PSCA072UAAA
TAG ID	PSCA-Unit 20
BUILD SECTION	1 OF 8

**RETURN FAN SECTION**

MOTOR VOLTAGE	460/603
MOTOR HORSEPOWER	10
MAXIMUM INVERTER FREQUENCY (HZ)	86.0

**Airflow**

THIS UNIT CONTAINS ECONOMIZER THAT MEETS OR EXCEEDS ALL MANDATORY REQUIREMENTS PRESCRIBED BY TITLE 24, INCLUDING BUT NOT LIMITED TO 5 YR PARTS ONLY WARRANTY, SUCCESSFULLY TESTED TO 60,000 ACTUATION LESS THAN 10 CFMSQ.FT. OF DAMPER LEAKAGE AT 1" WG PER AMCA 500L. NOTE: AN EXTERNAL OVERLOAD DEVICE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (OR CEC) IS REQUIRED WHEN NOT PROVIDED BY TRANE. SUPPLY AIR TEMPERATURE LIMITATIONS: 104 F MAX IN DRAW-THRU ARRANGEMENTS; 200 F MAX IN BLOW-THRU ARRANGEMENTS. FIELD CONDUCTORS SHALL HAVE INSULATION RATING NOT LESS THAN 600V

Manufactured under one or more of the following patent numbers:  
6237354, 6972795, 7017355, 7150314, 7178355, 7340806, 7389846, 7526903, 7685634, 8231334, 8911206

Trane [www.trane.com](http://www.trane.com) Made in USA

## Operating Environment

The Performance Climate Changer™ air handler is a central station air handler for indoor and outdoor applications. When considering the placement of the air handler, it is important to consider the operating environment. The acceptable ambient temperature range for unit operation is -40°F to 140°F (-40°C to 60°C).

For heating applications, a special motor may be required to withstand the higher temperatures. Motors with Class B insulation are acceptable for ambient temperatures up to 104°F, while motors with Class F insulation can withstand ambient temperatures to 140°F (60° C).

**Note:** Units with UL approval have a maximum ambient temperature requirement of 104°F. The customer should provide adequate freeze protection for the coils. See “Routine Maintenance,” p. 31 for more information.

## Unit Description

The Performance Climate Changer air handler is designed for a variety of controlled-air applications. The basic unit consists of a fan, heating and/or cooling coils, filters, and dampers.

## Components

Trane air handlers ship as complete assemblies or in subassemblies if shipping splits are required. Some assembly is required when the unit ships in sub-assemblies.

For more information, contact your local Trane sales office.

## Factory-Mounted Controls

Trane air handlers are available with a wide selection of factory-mounted controls, end devices, including Symbio™ controls, and variable frequency drives (VFD).

Most control components are mounted inside the unit. Depending on the system configuration, this may include dirty filter switches, averaging temperature sensors, and low limit switches. VFDs, new end devices, controllers, control transformers, static pressure transducers, DC power supplies, and customer interface relays will be in enclosures mounted on the inside of the unit.

Small items that cannot be factory-mounted, such as space temperature sensors, outside air temperature sensors, and humidity sensors, will ship inside the control enclosures, or packaged and shipped inside the fan or mixing box section. Larger items are shipped inside the fan section.

**Note:** All control valves ship directly to the ship-to address from the vendor unless another address is given on the Trane sales order.

## Pre-Packaged Configurations for Controls

If the air handler has been selected using one of Trane's pre-packaged solutions options for controls, there are a number of resources available to aid in commissioning and start-up of the unit. These resources include commissioning sheets, graphics, and technical application notes. The technical application notes include the control sequencing, Trane Graphic Programming (TGP), and Rover set-up files for the specific unit selected. These resources are available through your local Trane sales office.

For more information on controls, refer to the following manuals:

- Programmable Symbio™ 500 controllers
  - *Symbio™ 500 Programmable Controller Installation, Operation, and Maintenance* (BAS-SVX090\*-EN)
  - *Installing the Tracer TD7 Display* (X39641191-01A)
- TR150 Drives

- *TR150 and TR170 Design Guide* (BAS-SVX59\*-EN)
- *TR150 and TR170 Programming Guide* (BAS-SVP16\*-EN)

## Wiring

### **⚠ WARNING**

#### **Proper Field Wiring and Grounding Required!**

**Failure to follow code could result in death or serious injury.**

**All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.**

### **⚠ WARNING**

#### **Electrical Shock Hazard!**

**Failure to follow instructions below could result in death or serious injury.**

**Properly connect the system's oversized protective earthing (grounding) terminal(s).**

Before installation, consider overall unit serviceability and accessibility before mounting, running wires (power), making penetrations, or mounting any components to the cabinet.

Wiring to the air handler must be provided by the installer and must comply with all national and local codes. The fan motor nameplate includes a wiring diagram. If there are any questions concerning the wiring of the motor, write down the information on the motor nameplate and contact your local Trane sales office.



# Pre-Installation

## Receiving and Handling

### Inspection

Upon delivery, thoroughly inspect all components for any shipping damage that may have occurred, and confirm that the shipment is complete. See “Receiving Checklist,” p. 8 section for detailed instructions.

**Note:** *Delivery cannot be refused. All units are shipped F.O.B. factory. Trane is not responsible for shipping damage.*

### Packaging/Shipping

Performance air handlers ship as a complete unit or in individual sections to be field assembled. Indoor air handler sections are stretch-wrapped or shrink-wrapped before shipping. All factory shipping protection should be removed upon delivery. This wrapping is for transit protection only.

Indoor Performance air handlers ship in subassemblies if the total length of the units exceeds 98 inches or if the total weight exceeds factory limits.

Smaller components and hardware may be shipped separately, or shipped inside the unit. This hardware is typically packaged in a clear plastic envelope or cardboard box, and can be found inside the fan, mixing box, or access section.

### Identification

Each air handler section includes a nameplate identifying the section type and functional components, customer tagging information, unit serial number, unit order number, the build-section position for installation, and the unit model number. See “Nameplate,” p. 6.

### Handling

Air handlers have an integral base frame designed with the necessary number of lift points for safe installation. See “Lifting and Rigging,” p. 11.

### Receiving Checklist

Complete the following checklist immediately after receiving shipment to detect possible shipping damage.

- Verify the shipment is complete. Small components may ship inside the unit or ship separately. Check the parts list to confirm all materials are present. If any component is missing, contact your local Trane sales office.
- Check all units, components, connections, and piping. Check fan wheel for free rotation by spinning manually. Check all doors, latches and hinges. Inspect interior of each unit or section. Inspect coils for damage to fin surface and coil connections. Check for rattles, bent

corners, or other visible indications of shipping damage. Tighten loose connections.

- If a unit is damaged, make specific notations concerning the damage on the freight bill. Do not refuse delivery.
- Notify the carrier’s terminal of the damage immediately by phone and mail. Request an immediate joint inspection of the damage by the carrier and consignee.
- Notify your Trane sales representative of the damage and arrange for repair. Do not attempt to repair the unit without consulting the Trane representative.
- Inspect the unit for concealed damage as soon as possible after delivery. Report concealed damage to the freight line. It is the receiver’s responsibility to provide reasonable evidence that concealed damage did not occur after delivery. Take photos of damaged material if possible.

**Note:** *Concealed damage must be reported to the Freight Carrier in writing within 5 business days of receipt.*

## Jobsite Storage

Indoor air handlers and field-installed accessories must be protected from the elements. A controlled indoor environment is recommended for proper storage.

**Note:** *All factory shipping protection should be removed. This wrapping is for transit protection only.*

The unit controller and all other electrical/electronic components should be stored in conditions of -20°F to 120°F and 5 to 95 percent relative humidity, non-condensing. Electrical components are not moisture-tolerant.

Outdoor units require no special protection for storage prior to installation.

## Outdoor Storage

### NOTICE

#### Unit Corrosion Damage!

**Plastic tarps can cause condensation to form in and on the equipment, which could result in corrosion damage or wet storage stains.**

**Use only canvas tarps to cover air handlers.**

Outdoor storage is not recommended for units that will be installed indoors. However, when outdoor storage is necessary, several things must be done to prevent damage:

**Note:** *Keep the equipment on the original wooden blocks/skid for protection and ease of handling.*



- Select a well-drained area, preferably a concrete pad or blacktop surface.
- Place the unit on a dry surface or raised off the ground to assure adequate air circulation beneath the unit and to assure no portion of the unit will contact standing water at any time.
- Cover the unit securely with a canvas tarp.
- Do not stack units.
- Do not pile other material on the unit.

## Long-Term Storage

For longer periods of storage, allow proper clearance around the unit to perform periodic inspections and maintenance on the equipment. While the unit is in storage:

- Every two weeks, rotate the fan and motor shaft 30 revolutions by hand. Check for free rotation.
- Every six months, check fan shaft bearings and grease lines. Add grease using a manual grease gun.
- Check the motor lubrication; remove and clean grease plugs and check for the presence of moisture in the grease. If moisture is present, remove the motor and send it to an authorized repair shop for bearing inspection/ replacement. If no moisture is present, refer to the motor manufacturers lubrication recommendation for proper lubrication.

## Site Preparation

- Confirm the installation site can support the total weight of the unit. (See “[Dimensions and Weights](#),” p. 10 for approximate section weights; refer to the unit submittals for actual weights.)
- Allow sufficient space for adequate free air and necessary service access. (See “[Service Clearance Recommendations](#),” p. 10.) Refer to submittals for specific minimums.

- Allow room for supply and return piping, ductwork, electrical connections, and coil removal.
- Verify height meets condensate drain requirements. See “[Drain Pan Trapping](#),” p. 19.

**Note:** *If unit is installed in a mechanical room on a pad, inadequate height may necessitate core-drilling the floor to attain proper trap height. Insufficient height could inhibit condensate drainage and result in flooding the unit and/or equipment room.*

## NOTICE

### Microbial Growth!

**Failure to follow instructions below could result in odors and damage to the equipment and building materials.**

**The floor or foundation must be level and the condensate drain at the proper height for proper drainage and condensate flow. Standing water and wet surfaces inside the equipment can become an amplification site for microbial growth (mold). If there is evidence of microbial growth on the interior insulation, it should be removed and replaced prior to operating the system.**

- Confirm the foundation of the mounting platform is level and large enough to accommodate the unit. Refer to the unit submittals for specific dimensions.
- Provide adequate lighting for maintenance personnel to perform maintenance duties.
- Provide permanent power outlets in close proximity to the unit for installation and maintenance.
- Depending upon job requirements, 120 Vac power may need to be provided for the unit controller. Refer to submittals for more information. A dedicated 15-amp circuit is recommended.
- Wiring for the air handler must be provided by the installer and must comply with all national and local electrical codes.

# Dimensions and Weights

## Service Clearance Recommendations

Figure 2. Service clearance for indoor units

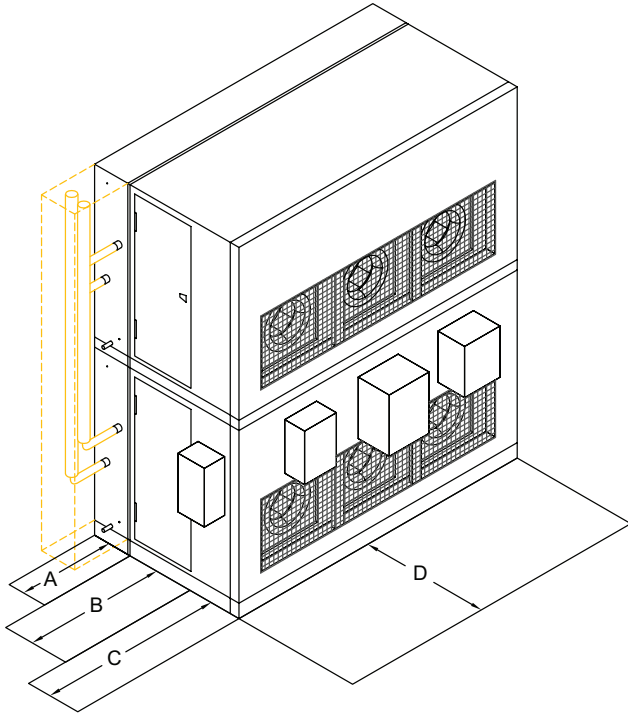


Table 1. Service clearance dimensions (inches)

Component	Width (in.)
A (Coil)	24
B (Filter and Fan)	30
C (Low Voltage Control Box)	45
D (High Voltage Boxes)	48

**Note:** At a minimum, the above clearance dimensions are recommended on one side of the unit for regular service and maintenance. Refer to as-built submittal for locations of items such as filter access doors, coil, piping connections, motor locations, etc. Sufficient clearance must be provided on all sides of unit for removal of access panels, plug panels, or section-to-section attachment brackets. Clearance for VFDs, or other high-voltage devices must be provided per NEC requirements. For specific dimensional and weight information, refer to the unit submittals. The dimensions and weights in this manual are approximate. Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.

# Installation – Mechanical

## Lifting and Rigging

### General Lifting Considerations

#### ⚠ WARNING

##### Heavy Objects!

Placing, assembling, and/or suspending more than one module/subassembly at a time could result in death, serious injury, or equipment damage. Always place, assemble, and suspend modules/subassemblies one at a time.

#### ⚠ WARNING

##### Improper Unit Lift!

Failure to properly lift unit in a LEVEL position could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury, and equipment or property-only damage.

Test lift unit approximately 24 inches (61 cm) to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level.

#### NOTICE

##### Equipment Damage!

Premature skid removal could result in equipment damage.

Keep skid in place until unit is ready to set. Do not move the unit or subassembly without the skid in place as shipped from the factory.

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 areas. Approximate unit weights are provided in “Dimensions and Weights,” p. 10. Refer to the unit submittals for actual section weights. Test the unit for proper balance before lifting.

#### ⚠ WARNING

##### Heavy Object!

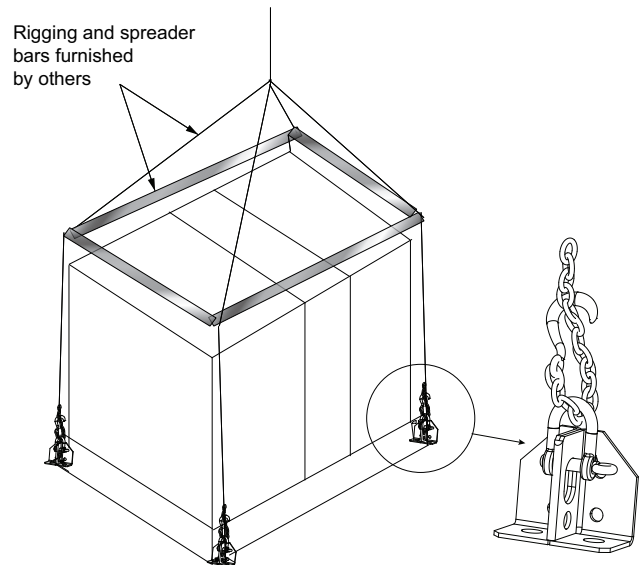
Failure to follow instructions below could result in unit dropping which could result in death or serious injury, and equipment or property-only damage.

Ensure that all the lifting equipment used is properly rated for the weight of the unit being lifted. Each of the cables (chains or slings), hooks, and shackles used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables (chains or slings) may not be of the same length. Adjust as necessary for even unit lift.

Always rig subassemblies or sections as they ship from the factory. Never bolt sections together before rigging. To assist in proper placement, organize all ship splits in order of configuration before hoisting units in place.

- Make the loop of the sling parallel to the direction of airflow, if possible.
- When hoisting the unit into position, use the proper rigging method, such as straps, slings, spreader bars, or lifting lugs for protection and safety.
- Use **all** lifting lugs provided. See submittal documentation for unit lifting lug size. Use field-provided spreader bars and slings to rig units and subassemblies as shown in [Figure 3, p. 11](#). The air handler is not designed to be lifted or rigged from the top of the unit.

Figure 3. Lifting detail



### Fork lifting Considerations

#### NOTICE

##### Equipment Damage!

Improper use of fork lift could result in equipment damage.

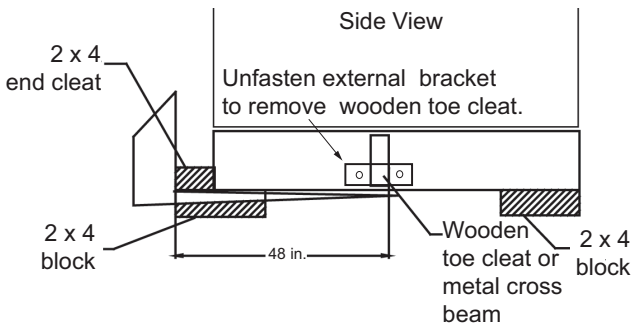
Do not use a fork lift on air handlers or subassemblies that do not have an end cleat. Trane is not responsible for equipment damage resulting from improper fork lift practices.

**Note:** Do not use a forklift on outdoor air handlers or indoor air handlers/subassemblies that do not have end cleat (see [Figure 4, p. 12](#)).

A forklift may be used to lift a single section or small subassembly, provided the forks extend under both ends of the base frame, or as indicated in [Figure 4, p. 12](#). The forks should not contact the bottom of the air handler. Units

should only be lifted from the proper end identified by the lifting label on the unit. A lifting crane or other means should be used for larger units where forks cannot extend under both base rails

**Figure 4. Fork lift points with base rail**



## Unit Placement and Assembly

If the air handler ships in subassemblies or in individual sections, some assembly is required, including:

- Ceiling-suspended indoor unit assembly
- Section-to-section assembly

### ⚠ WARNING

#### Heavy Objects!

Placing, assembling, and/or suspending more than one module/subassembly at a time could result in death, serious injury, or equipment damage.

Always place, assemble, and suspend modules/subassemblies one at a time.

### NOTICE

#### Equipment Damage!

Failure to follow instructions below could result in equipment damage.

Do not exceed the following operating temperature limits in internal unit sections:

- Sections with electrical components: 104°F
- Sections without electrical components: 200°F

### NOTICE

#### Microbial Growth!

Failure to follow instructions below could result in odors and damage to the equipment and building materials.

The floor or foundation must be level and the condensate drain at the proper height for proper drainage and condensate flow. Standing water and wet surfaces inside the equipment can become an amplification site for microbial growth (mold). If there is evidence of microbial growth on the interior insulation, it should be removed and replaced prior to operating the system.

If a unit arrives in sections, then each section must be individually hoisted, set on the housekeeping pad, roof curb, or pier mount and then assembled.

Refer to the unit submittals and unit tagging for correct placement of all sections. If there are any discrepancies between the submittals and the unit tagging, contact your local Trane representative before proceeding.

Following the order of the sections on the unit submittals and tagging, individually place each unassembled section or subassembly in the appropriate installation location.

#### Notes:

- Prior to placing fan section in the appropriate installation location, verify shipping tie-downs have been removed.
- Piers beneath shipping splits must be structurally sound to support the weight of the unit.

For proper operation, the unit must be installed level (zero tolerance) in both horizontal axes. For vertical discharge units, allow space under the unit for supply air ductwork connections.

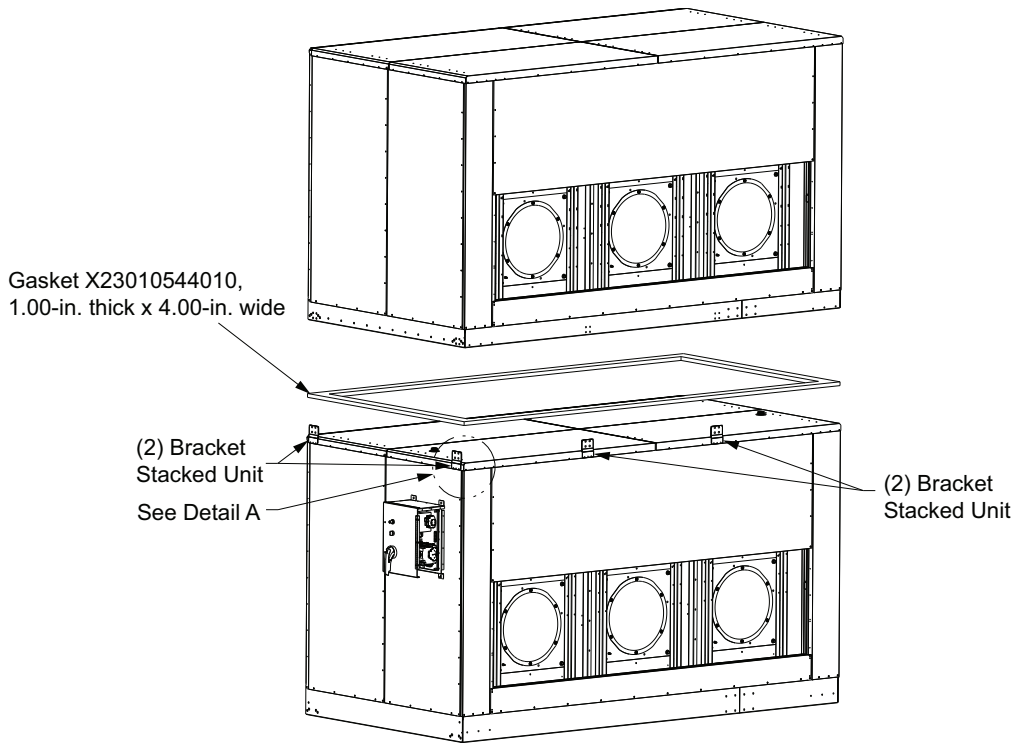
**Note:** Air handlers often include optional factory-provided casing penetration entry points for field-provided wiring. Consider overall unit serviceability and accessibility before mounting, running wires (power), making cabinet penetrations, or mounting any components to the cabinet.

See “Component Installation,” p. 17 for special assembly/installation considerations.

## Removing the Shipping Skid

Remove the wooden shipping blocks, wooden toe cleat if there is one, and end cleats prior to lowering unit into final position or installing the unit to the roof curb.

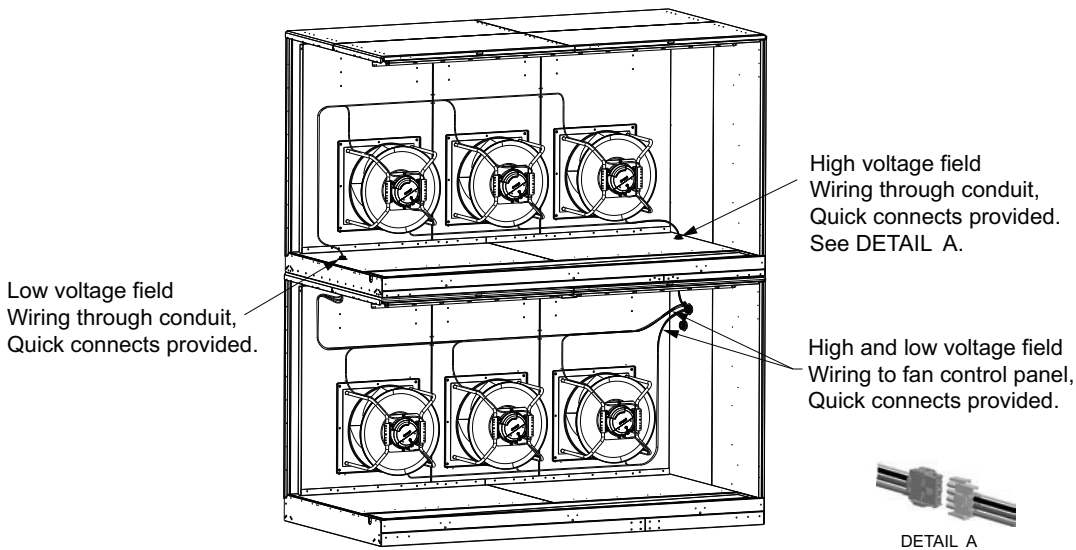
**Figure 5. Stacked unit assembly**



1. If the unit is equipped with factory-mounted controls, move adjacent subassembly within six inches and fasten quick connects where the sections bolt together. See [Figure 5, p. 13](#) for low voltage. See [Figure 6, p. 13](#) for high voltage.

**Note:** Reference the appropriate controller manual for more details on the installation of units with factory-mounted controls.

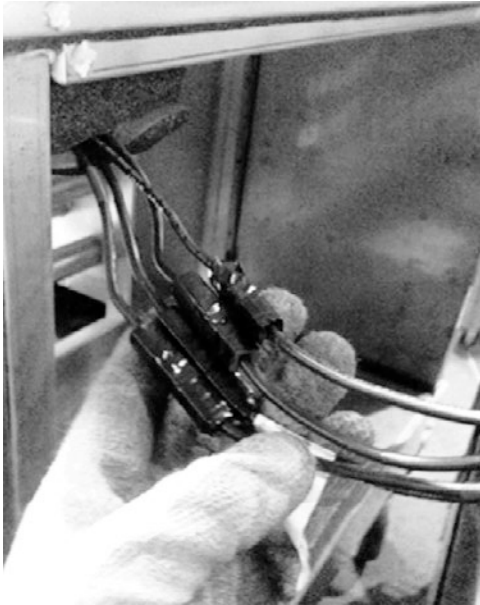
**Figure 6. Section-to-section low voltage quick connects**



**Note:** Unit shown with walls hidden for clarity.

2. Assemble and seat connections per color code.

**Figure 7. Section-to-section high voltage quick connects**



3. Wrap each connection individually with black electrical tape.
4. Fully wrap the connection with tape.

5. Use a bar clamp to pull adjacent shipping section lifting lugs together.

## Seismic Application Requirements

Air handling equipment manufactured by Trane is capable of structurally and operationally withstanding the seismic response criteria as required by the International Building Codes (IBC) 2000, 2003, 2006, 2009, 2012, 2015, 2018 and 2021, and CBC 2007, 2010, 2013, 2016 and 2019. Trane has third-party certification for IBC compliance for seismic applications for unit sizes 3 to 120 and stacked units.

**Note:** *If seismic isolation has been specified, the following requirements must be adhered to for installation. Failure to follow these instructions would void the warranty.*

### Single Level Design

#### Grade to Roof Mounted Non-Isolated

##### Steel Dunnage/Steel Curb:

3/8-inch diameter ASTM A325 or SAE grade 5 bolts attached to unit base located as noted above or 1-inch long 3/16-inch welds at unit base located as noted above.

**Table 2. Anchor requirements for non-stacked units**

SDS	lp	z/h	Attachment Method	Equipment Weight (lbs.)	Seismic Restraint Model	Attachment System	
						Qty per tag	Method
1.483	1.5	1.0	Floor mounted (concrete)	45 psf maximum	Bolt down	2 per mounting location	Anchor: Hilti HDA-P Dia.: M12 x 125/50 Embed.: 4.922 inches Edge: 14-in./8-in. thick Conc.: 3000 psi
0.967	1.5	1.0	Floor mounted (concrete)	45 psf maximum	Bolt down	2 per mounting location	Anchor: Hilti TZ-CS Dia.: 1/2 inch Embed.: 3.25 inches Edge: 14-in./6-in. thick Conc.: 3000 psi
1.850	1.5	1.0	Floor mounted (concrete)	45 psf maximum	Bolt down	2 per mounting location	Anchor: A325 Bolt Dia.: 1/2 inch Embed.: n/a Edge: n/a Conc.: n/a
1.850	1.5	1.0	Floor mounted (welded to steel)	45 psf maximum	Welded	1 per mounting location	6-inch weld length with 1/8-inch weld leg

**Notes:**

1. Install clips at shipping split corners.
2. Install clips at shipping splits containing fans or coils at 48 inches maximum on-center spacing.

## Stacked Design

### Grade to Roof Mounted ( $0 \leq Sds \leq 1.85$ ) Non-Isolated

#### 4000 psi Concrete:

- 1/2-inch diameter Hilti Kwik Bolt TZ carbon steel concrete anchors attached to unit base rails.
- Install clips at all ship split corners.
- Install clips at ship splits with a stacked section at 36 inches maximum on-center spacing.

- Install clips at single level ship splits containing fans or coils at 48 inches maximum on-center spacing.
- 3 1/4-inch minimum anchor embedment.
- 7 1/2-inch minimum distance to the nearest edge.
- 6-inch minimum concrete slab thickness.

#### Steel Dunnage/Steel Curb:

1/2-inch diameter ASTM A325 or SAE Grade 5 bolts attached to unit base located as noted above or 1-inch long 3/16-inch welds at unit bases located as noted above.

**Table 3. Anchor requirements for non-stacked units**

SDS	lp	z/h	Attachment Method	Equipment Weight (lbs.)	Seismic Restraint Model	Attachment System	
						Qty per tag	Method
0.421	1.5	1.0	Floor mounted (concrete)	150 psf maximum	Bolt down	See note below	1/2-in. dia. Hilti Kwik Bolts TZ-CS with min. embedment of 3-1/4-in.; Edge distance of 12-in. on 6-in. thick 3,000 psi concrete
0.637	1.5	1.0	Floor mounted (concrete)	150 psf maximum	Bolt down	See note below	Hilti HAD-P M12x125/50 bolts with min. embedment of 4.92-in.; Edge distance of 12-in. on a 8-in. thick 3,000 psi concrete
1.85	1.5	1.0	Floor mounted (steel)	150 psf maximum	Bolt down	See note below	1/2-in. dia. ASTM A325/Grade 5 bolts
1.85	1.5	1.0	Floor mounted (steel)	150 psf maximum	Welded to steel	See note below	1/8-in. thick, 6-in. long weld

**Notes:**

1. Install clips at shipping split corners.
2. Install anchors at shipping splits with a stacked module at 36-in. max spacing.

## Anchoring

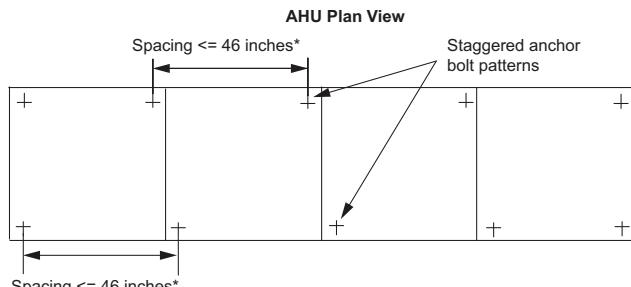
Lifting lugs should be used to anchor the unit at the ends of each shipping split. Per the anchor requirements, additional anchoring may be needed. If so, anchors will be provided and installed on the unit. An example of a seismic anchor is shown in [Figure 8, p. 15](#).

Anchor selection meets or exceeds IBC 2000, 2003, 2006, 2009, 2012, and CBC 2007, 2010 compliance requirements.

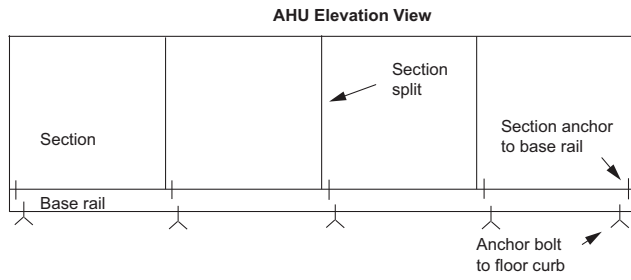
Special Inspection per IBC Section 1704 is required on all installations. All anchors listed above must be installed to meet compliance.

**Figure 8. Seismic anchor**



**Figure 9. Seismic anchor pattern**

\*Only if not anchoring each functional section







# Component Installation

The components in the air handler may have installation requirements that could affect the units performance.

## Fans

The fan section can be configured as either draw-thru or blow-thru. Review the submittals and unit tagging information prior to assembly to determine placement.

### ⚠ WARNING

#### Hazardous Service Procedures!

Failure to follow all precautions in this manual and on the tags, stickers, and labels could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the following instructions: **Unless specified otherwise, disconnect all electrical power including remote disconnect and discharge all energy storing devices such as capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. When necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been trained in handling live electrical components perform these tasks.**

## Fan Isolation

The fan-and-motor assembly can be internally isolated. The fan and motor bases are bolted to a minimum of four spring isolators. The isolators are secured to the fan section support base.

Shipping tie-down bolts are bolted adjacent to the isolators between the fan isolation base and the isolator support frame. The shipping tie-downs secure the isolation base to the support assembly to prevent any damage to the fan section during shipment.

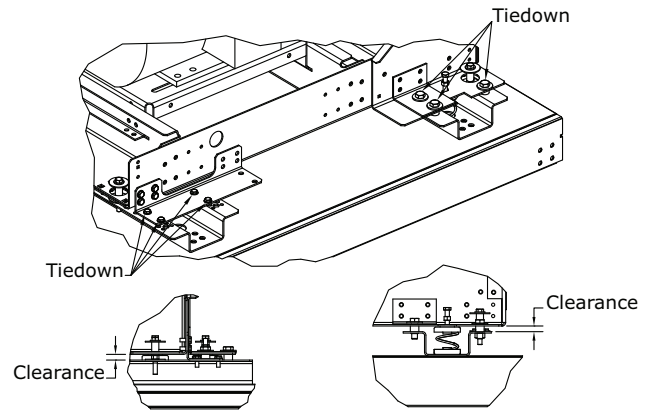
**Note:** Remove the tie-downs **only** if the factory-provided isolation is to be used.

## Adjusting the Isolators

Once the shipping tie-downs are removed and the internal isolation is released, it may be necessary to adjust the isolators to achieve the proper operation height of the fan and motor isolation base.

Minimum required clearance is 0.5 inches. To determine the isolator clearances on all unit sizes, measure between the top of the cabinet channel and the bottom of the isolation base channel.

Figure 10. Tie-down removal



## Filters

Filters should be installed when the unit is set. This will protect internal components, such as the heating and cooling coils.

## Filter Installation

### ⚠ WARNING

#### Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.

**Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.**

To install filters:

1. Disconnect the power to the unit.
2. Open the filter section access door.
3. Slide the filters into the tracks.

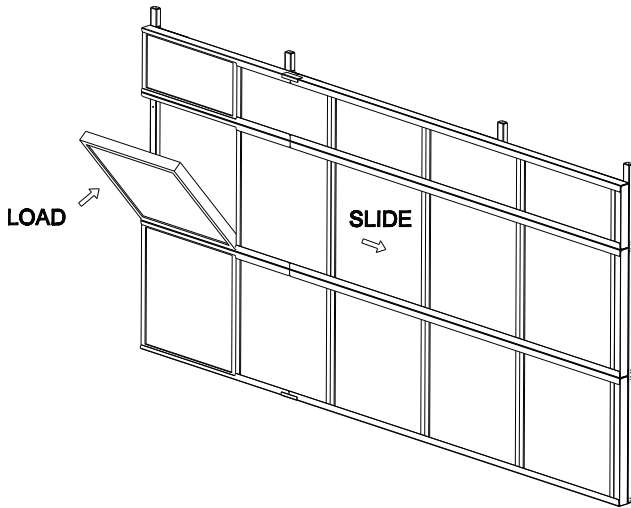
**Note:** Bag filters must be installed with the pleats in the vertical plane.

4. The block-off is permanently installed and will create a seal when the access door is closed.
5. Close the access door slowly to allow any gasketing to compress.



## Component Installation

Figure 11. Filter rack



**Note:** Load media from front of rack. Slide media across filter track, then load additional media until row is filled. Repeat for each row.



# Piping and Connections

## NOTICE

### Connection Leaks!

Failure to follow instructions below could result in damage to the coil header and cause connection leaks.

Use a backup wrench when attaching piping to coils with copper headers. Do not use brass connectors because they distort easily.

## NOTICE

### Over Tightening!

Failure to follow instructions below could result in damage to the coil header.

Do not use teflon-based products for any field connections because their high lubricity could allow connections to be over tightened.

## NOTICE

### Leakage!

Failure to follow instructions below could result in equipment damage.

Properly seal all penetrations in unit casing from inner to outer panel in order to prevent unconditioned air from entering the module, as well as prevent water from infiltrating the insulation.

## General Recommendations

Proper installation, piping, and trapping is necessary to confirm satisfactory coil operation and to prevent operational damage:

- Support all piping independently of the coils.
- Provide swing joints or flexible fittings on all connections that are adjacent to heating coils to absorb thermal expansion and contraction strains.
- If the coil was ordered with factory-mounted controls, install the control valves. The valves ship separately.

**Note:** The contractor is responsible for supplying the installation hardware.

- For best results, use a short pipe nipple on the coil headers prior to making any welded flange or welded elbow type connections.
- Extended drain and vent connections are provided as standard on D1 and D2 coils only. If extended drains and vents are required on other water coils, they must

be field-installed or ordered as specials from the factory.

- Pipe coils counterflow to airflow.
- When attaching the piping to the coil header, make the connection only tight enough to prevent leaks.

**Note:** Do not exceed 200 foot-pounds of torque on supply and return connections. Do not exceed 25 foot-pounds of torque on drain and vent connections.

- Use pipe sealer on all thread connections.
- After completing the piping connections, seal around pipe from inner panel to outer panel.

## Drain Pan Trapping

### ⚠ WARNING

#### No Step Surface!

Failure to follow instruction below could result in death or serious injury.

Do not walk on the sheet metal drain pan. Walking on the drain pan could cause the supporting metal to collapse and result in the operator/technician falling.

## NOTICE

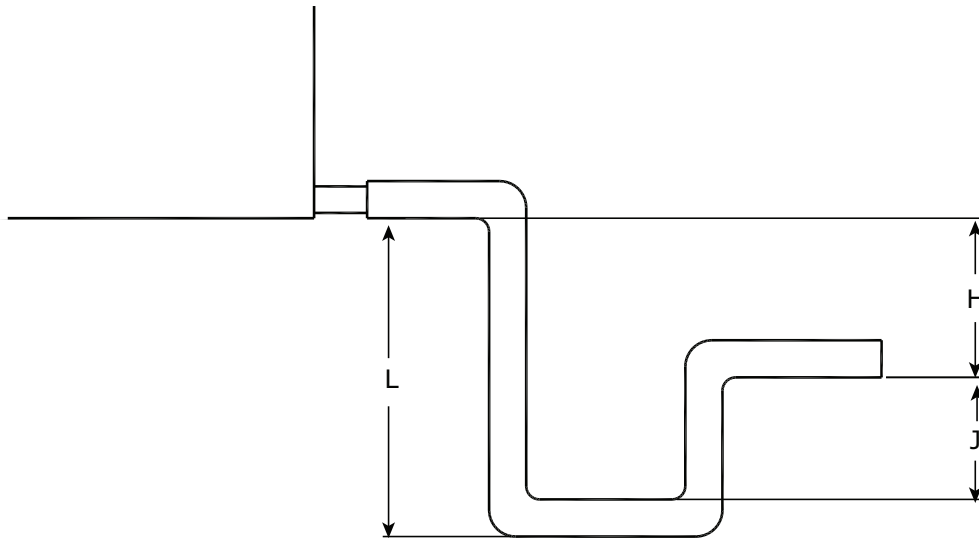
### Water Damage!

Failure to follow instructions below could result in water damage.

When more than one section has a drain pan, trap each section individually. Connecting multiple drains to a common line with only one trap could result in condensate retention and water damage to the air handler or adjoining space.

Threaded condensate drain connections are provided on only one side of the coil section. Pitch the connection lines horizontal or downward toward an open drain. Trane recommends installing a plug to facilitate cleaning of the trap. The drain connection sizes are:

Figure 12, p. 20 illustrates the proper trapping, piping, and operation of the trap. Use the formula under the figure to determine the correct minimum depth for the condensate trap. If a section has a drain pan for cleaning purposes only, it does not need a trap; however, a cap or shutoff valve should be installed on the drain connection. Only sections handling condensate, such as a cooling coil section or moisture eliminator section, require a trap.

**Figure 12. Drain pan trapping for negative and positive pressure applications**

**Section under negative pressure**

$L = H + J + \text{pipe diameter}$  where:  
 $H = 1 \text{ inch}$  for each inch of negative  
 pressure plus 1 inch with loaded filters  
 $J = 1/2 H$

**Section under positive pressure**

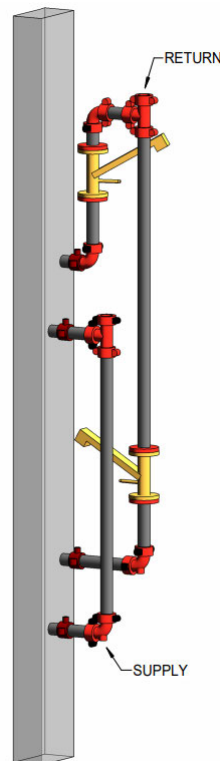
$L = H + J + \text{pipe diameter}$  where:  
 $H = 1/2 \text{ inch}$  (minimum)  
 $J = 1/2 \text{ inch}$  plus the unit positive static  
 pressure at coil discharge (loaded filters)

## Piping Package

Factory-engineered piping package provides single points of connection for the cooling coil supply and returns. Piping package includes control valves on the return side of each coil.

Piping package ships direct to jobsite. Piping assembly and installation field-installed. Refer to the submittal for equipment-specific valve selection, pipe size, and configuration details.

Piping support structure must be provided by the installer and comply with all national and local plumbing codes. Piping weight must be supported independently of the air handling unit.

**Figure 13. AHU coil connections**


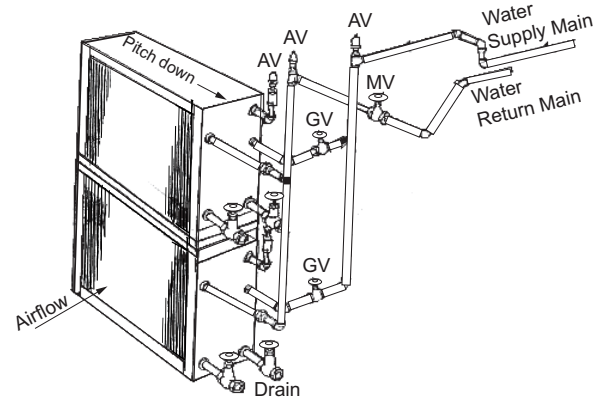
## Water Coil Piping

Water coils are self-venting only if the water velocity exceeds 1.5 feet per second (fps) in the coil tubes. See the unit submittals for coil water velocity. If the water velocity is below these minimums, vent the coil by one of the following methods:

1. Install an air vent in the top pipe plug tapping of the return header.
2. When the return line rises above the top of the coil, vent from the top of the return header horizontally to the return piping.

**Note:** *TT coils are designed with larger than normal end tube sheet holes to allow for maximum expansion. Air leakage around tubes should be expected and handled by capping over coil ends or by sealing around tubes with a pliable sealant such as silicone.*

**Figure 14. Typical piping for stacked water coils**



**Note:** *Coils shown with factory and field-provided piping.*

# Installation – Electrical

## ⚠ WARNING

### Hazardous Voltage w/Capacitors!

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

## ⚠ WARNING

### Electrical Shock Hazard!

Failure to follow instructions below could result in death or serious injury. Properly connect the system's oversized protective earthing (grounding) terminal(s).

## NOTICE

### Use Copper Conductors Only!

Failure to use copper conductors could result in equipment damage as the equipment was not designed or qualified to accept other types of conductors.

*Note: Air handlers often include optional factory-provided casing penetration entry points for field-provided wiring. Consider overall unit serviceability and accessibility before mounting, running wires (power), making cabinet penetrations, or mounting any components to the cabinet.*

Units intended for indoor use are available with variable frequency drives (VFDs) that are externally mounted in an enclosure.

A typical externally mounted VFD is shown in [Figure 15, p. 22](#).

Figure 15. Externally mounted VFD



A typical wiring schematic for a VFD is shown in [Figure 18, p. 24](#). Unit specific wiring schematics are shipped with each unit.

All units with VFDs that have direct-digital controllers (DDCs) are provided with line voltage to 24 Vac power transformers.

When provided, the line voltage to 24 Vac transformers are factory wired to the supply fan power feed. All units with factory-mounted controllers, and no VFDs, are provided with 120 Vac to 24 Vac control transformers, as shown in [Figure 16, p. 22](#), and require a separate 120 V field connection.

Figure 16. Controller - externally mounted



As with VFDs, units intended for indoor use are available with DDCs mounted internally or externally (see [Figure 16, p. 22](#)), while units intended for outdoor use are only available with internally mounted DDCs.

In units with 24 Vac LED marine lights, the lights are wired together to a single switch located in the controls interface module. When DDCs are provided, the lighting circuit is powered from the DDC power feed and does not require a

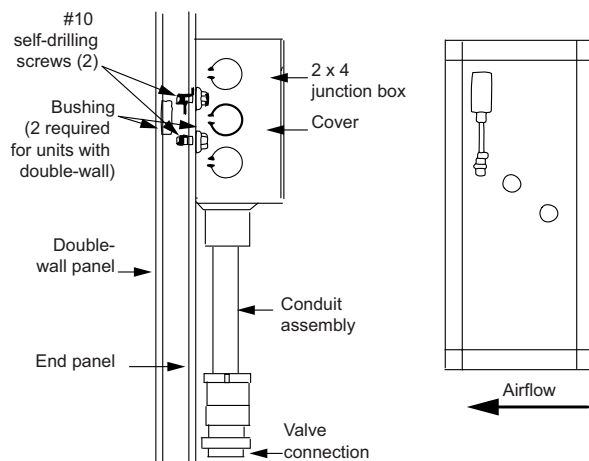
separate power source. When marine lights are provided without DDCs, the lighting circuit requires a separate 120V field connection that powers the lights through a 120V to 24 Vac power transformer.

A mounted GFCI receptacle is provided for all units that have DDCs or marine lights. The receptacle is mounted in the controls interface module with the unit light switch. The receptacle requires a separate 120V power feed.

Field installed DDC control devices:

- Install outside-air sensor and space sensor, if ordered.
- Connect control valves, if ordered, to the valve jack provided as part of the unit wiring harness. The valve jack is typically located at the air-leaving side of the coil connection inside the casing panel. For valve junction box mounting and wiring detail, see [Figure 17, p. 23](#).

**Figure 17. Junction box for valve wiring**



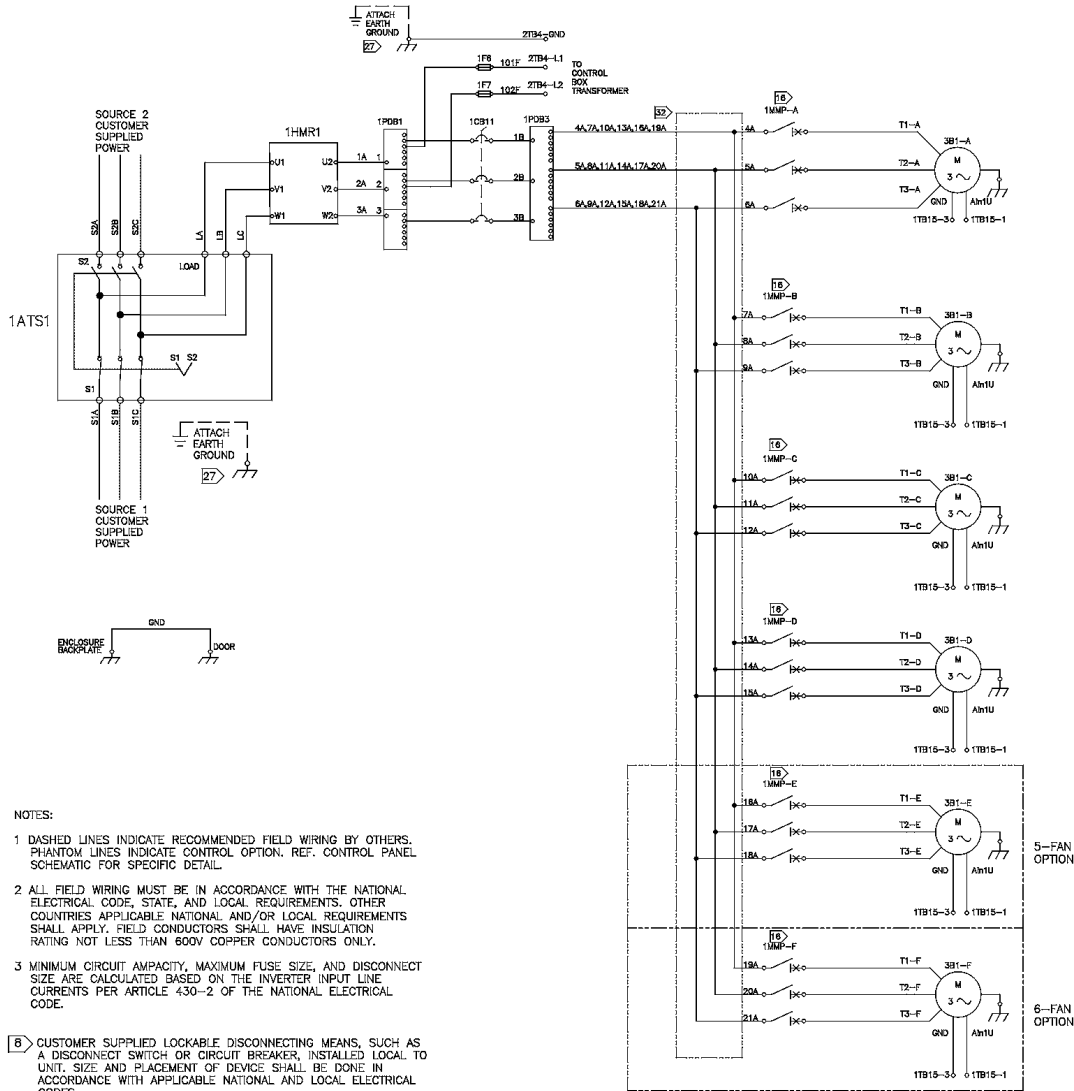
**Note:** Properly seal all penetrations in unit casing. Failure to seal penetrations from inner panel to outer panel could result in unconditioned air entering the unit.



# Installation – Electrical

## Typical Wiring Schematics

Figure 18. Typical data center fan schematic internal/external mi fan panel fan array option, spp w/ controller



**NOTES:**

- 1 DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE CONTROL OPTION. REF. CONTROL PANEL SCHEMATIC FOR SPECIFIC DETAIL.
- 2 ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, STATE, AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. FIELD CONDUCTORS SHALL HAVE INSULATION RATING NOT LESS THAN 600V COPPER CONDUCTORS ONLY.
- 3 MINIMUM CIRCUIT AMPACITY, MAXIMUM FUSE SIZE, AND DISCONNECT SIZE ARE CALCULATED BASED ON THE INVERTER INPUT LINE CURRENTS PER ARTICLE 430-2 OF THE NATIONAL ELECTRICAL CODE.
- 6 CUSTOMER SUPPLIED LOCKABLE DISCONNECTING MEANS, SUCH AS A DISCONNECT SWITCH OR CIRCUIT BREAKER, INSTALLED LOCAL TO UNIT. SIZE AND PLACEMENT OF DEVICE SHALL BE DONE IN ACCORDANCE WITH APPLICABLE NATIONAL AND LOCAL ELECTRICAL CODES.
- 9 REMOVE JUMPER AND INSTALL FIELD SAFETY INTERLOCK.
- 10 FIELD SUPPLIED CONTACTS.
- 12 IF UNIT HAS SHIPPING SPLITS, WIRING WILL TERMINATE TO MODULE AT EACH SHIPPING SPLIT.
- 27 ATTACH GROUND OR EQUIPMENT GROUND.

LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	CIRCUIT BREAKER
1F6, 1F7	CONTROL TRANSFORMER FUSING
1PDB1, 1PDB3	POWER DISTRIBUTION BLOCK
1TB13	TERMINAL STRIP CONTROL CIRCUIT
3B1-A THRU F	MI FAN 1 THRU 6
1ATS1	AUTOMATIC TRANSFER SWITCH
1HMR1	HARMONIC REACTOR

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

USE COPPER CONDUCTORS ONLY!  
 UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.  
 FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!  
 LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.  
 L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.

UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!  
 LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.  
 SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

**HAZARDOUS VOLTAGE!**  
 DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE. FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

**TENSION DANGEREUSE!**  
 COUPER TOUTES LES TENSIONS ET OUVRIRE LES SECTIONNEURS A DISTANCE, PUIS SUIVRE LES PROCEDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUTS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAINEMENTS A VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS. NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAINER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

**VOLTAJE PELIGROSO!**  
 DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUIDO LAS DISCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETAS ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCION DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR. EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.





# Controls Interface

The portable operator display is used for temporary connection to and operation of Trane Symbio™ controller. With the portable operator display, you can monitor data, change setpoints, monitor alarms, and override points. The portable operator display includes a 10 ft (3 m) cable with connector that is stored in the storage compartment of the carrying bag. The cable cannot be disconnected from the operator display. Keep this document with the portable operator display for access to calibration and cleaning instructions.

**Note:** *The portable operator display is not used for timeclock scheduling. To provide scheduling you must use a Tracer Summit system.*

## Connecting the Operator Display

To connect the portable operator display:

1. Locate the factory-provided service module.
2. Attach the operator-display cable to the operator-display connector on the service module. The operator display receives power from the controller and turns on automatically when it is connected.

<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Display Damage!</b> Failure to follow instructions below could result in damage to the display. Use a cloth dampened with commercial liquid glass cleaner to clean the operator display. Do not spray water or cleaner directly on screen.</p>
---

## Calibrating the Operator Display

This section shows how to calibrate the operator display touch screen and how to adjust the brightness and contrast. To set up the operator display screens and security, see the *Tracer® TD7 Display Installation Instructions* (BAS-SVN112\*-EN).

To calibrate the operator display:

1. On the home screen, press **Setup**. The **Setup** menu appears.
2. Page down to view the next screen.
3. Press **Calibrate Touch Screen**. A calibration screen appears.

<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Equipment Damage!</b> Failure to follow instructions below could result in equipment damage. Protect operator display from contact with sharp objects.</p>
---

4. Touch the target using a small, pliable, blunt object, such as a pencil eraser or your finger. Hold until the beeping stops. A second calibration screen appears.
5. Again, touch the target with the object. Hold until the beeping stops. The **Advanced Selection** screen appears.
6. Press **Home**. The home screen appears.

## Adjusting Brightness and Contrast

To adjust the brightness and contrast of the operator display:

1. On the home screen, press **Setup**. The **Setup** menu appears.
2. Page down to view the next screen.
3. Press the **Adjust Brightness** and **Contrast** buttons. The **Brightness and Contrast** screen appears.
4. To increase the brightness, press the buttons along the top row, in sequence, from left to right. To decrease the brightness, press the buttons from right to left.

**Note:** *Contrast adjustment is not available on all computer display models.*

5. To increase the contrast, press the buttons along the bottom row, in sequence, from left to right. To decrease the contrast, press the buttons from right to left.
6. Press **Home**. The home screen appears.

## External Communications Port

Units with a factory-provided DDC controller can include a service module with an external communications port when purchased. Both the operator display and Tracer® TU service tool can be connected without shutting off the unit through the external communications port. Open the cover plate on the service module and plug into the RJ-45 port for the operator display or the USB port for the Tracer TU service tool. This enables continuous operation of the air handler without disruption to the operating conditions of the unit. When servicing of the unit is complete, close the cover plate on the service module to eliminate any air leakage path.



# Start-Up

## Pre-Startup Checklist

Once the air handler has been assembled and installed, attention must be directed to individual components for proper operation. Before operating the unit, complete the pre-startup checklist.

### **⚠ WARNING**

#### **Hazardous Voltage w/Capacitors!**

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

## General Checks

- Verify unit installation is level.
- Verify supply-air and return-air ducts have been connected.
- Check that air filters are in place and positioned properly.
- Remove any debris from the unit interior.
- Remove all foreign material from the drain pan and check drain pan opening and condensate line for obstructions.
- Close and secure all unit access doors.
- If differential pressure switch is provided on filter rack, adjust per system requirements.
- Inspect electrical connections to the unit and unit controllers.
  - Connections should be clean and secure.
  - Compare the actual wiring with the unit diagrams.
  - Reference the appropriate controller manual for more details about starting units with factory-mounted controls.
- Check piping and valves for leaks. Open or close the valves to check for proper operation. Drain lines should be open.
- Leave this manual with the unit.

## Fan-Related Checks

- If the unit is not externally isolated, verify the optional fan isolator tie-down bolts have been removed. See [“Fan Isolation,” p. 17](#) for more information.
- Rotate all fan wheels manually to confirm they turn freely in the proper direction.

- Inspect fan motor and bearings for proper lubrication.

## Coil-Related Checks

### **NOTICE**

#### **Proper Water Treatment Required!**

The use of untreated or improperly treated water could result in scaling, erosion, corrosion, algae or slime.

Use the services of a qualified water treatment specialist to determine what water treatment, if any, is required. Trane assumes no responsibility for equipment failures which result from untreated or improperly treated water, or saline or brackish water.

- Verify coil and condensate drain piping connections are complete.
- Check the piping and valves for leaks.
  - Open or close the valves to check operation.
  - The drain lines should be open.
- If unit has a refrigerant coil, verify it has been charged and leak-tested according to the instructions provided with the condenser equipment. Adjust the superheat setting.
- Remove all foreign material from the drain pan and check the pan opening and condensate line for obstructions.

## Motor-Related Checks

- Locate installation manual from the motor manufacturer for the specific motor installed. This can be found by contacting the motor manufacturer’s representative. The motor manufacturer’s recommendations take precedence for all matters related to the start-up and routine maintenance of the motor.
- Check the motor lubrication for moisture and rust.
  - Remove and clean grease plugs to inspect.
  - If moisture is present, consult an authorized repair shop for bearing inspection/replacement. This may require removal and transport of motor.
  - If no moisture is present, refer to the motor manufacturers lubrication recommendations for proper lubrication.
  - The motor manufacturer may recommend lubricating the motor as part of their routine start-up instructions.
- Check motor winding. An acceptable winding resistance reading is from 6 meg-ohms to infinity. If reading is less than 5 mega-ohms, the winding should be dried out in an oven or by a blower.
- Inspect the entire motor for rust and corrosion.

- Bump-start the unit and confirm the fan wheel rotates properly, as indicated by the rotation arrow located on the fan housing.

**Note:** For motor warranty needs, contact your local Trane sales office.

## Unit Operation

### **⚠ WARNING**

#### **Rotating Components!**

Failure to disconnect power before servicing could result in rotating components cutting and slashing technician which could result in death or serious injury.

During installation, testing, servicing and troubleshooting of this product it may be necessary to work with live and exposed rotating components. Have a qualified or licensed service individual who has been properly trained in handling exposed rotating components, perform these tasks.

### **⚠ WARNING**

#### **Live Electrical Components!**

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

Before complete start-up, bump-start the unit and confirm the fan wheel rotates properly, as indicated by the rotation arrow located on the fan housing.

After initial start-up:

Calculate the motor voltage imbalance, notifying the power company to correct unacceptable imbalances.

### Calculate Motor Voltage Imbalance

After start-up, measure the motor voltage and amperage on all phases to confirm proper operation. The readings should fall within the range given on the motor nameplate. The maximum allowable voltage imbalance is 2 percent. Voltage imbalance is defined as 100 times the sum of the

deviation of the three voltages from the average, divided by twice the average voltage. For example, if the three measured voltages are 221, 230 and 227, the average voltage would be 226 volts. The percent of voltage imbalance is then calculated.

$$\text{Voltage Imbalance} = \frac{100A}{2 \times \text{Avg Voltage}}$$

where :

$$A = (226-221) + (230-226) + (227-226)$$

$$\text{Voltage imbalance} = 2.2\% \text{ (not acceptable)}$$

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

## VFD Programming Parameters

Units shipped with an optional variable frequency drive (VFD) are preset and run-tested at the Trane factory. If a problem with a VFD occurs, verify the programmed parameters listed in [Table 5, p. 27](#) have been set.

**Table 4. Trane TR150 switching frequency**

Horsepower	Voltage	Max KHz	Trane Setting
0.5–15	208/230	16	16
20–60	208/230	12	12
0.5–30	460	16	16
40–125	460	12	12
0.5–10	575	12	12
15–125	575	8	8

### **⚠ WARNING**

#### **Hazardous Voltage w/Capacitors!**

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

**Table 5. Trane TR150 VFD programming parameters**

Parameter # TR150	Description	Factory Default	Trane Setting
0-03	Region	International	North American
1-03	Torque Characteristics	Auto Energy Optim. VT	Variable Torque [1]for Direct-Drive Fans
1-20	Motor Power	Depends on unit	Set Based on Motor Nameplate
1-22	Motor Voltage	Depends on unit	Set Based on Motor Nameplate

**Table 5. Trane TR150 VFD programming parameters (continued)**

Parameter # TR150	Description	Factory Default	Trane Setting
1-24	Motor Current	Depends on unit	Set Based on Motor Nameplate
1-25	Rated Motor Speed	Depends on unit	Set Based on Motor Nameplate
1-71	Start Delay	0.0 Sec	2 Sec
1-73	Flying Start	Disabled	Enable
1-90	Motor Thermal Protection	ETR Trip 1 [4]	ETR Trip 1 [4]
3-02	Minimum Reference	Application dependant	0 Hz
3-03	Maximum Reference	60Hz	60 or the Value of Maximum Inverter Frequency (Hz) on nameplate if fan is direct drive.
3-15	Terminal 53 Analog Input	Analog Input 53	Analog Input 53
3-41	Ramp-up Time	Application dependant	30 Sec
3-42	Ramp-down Time	Application dependant	30 Sec
4-12	Output Freq Low Limit	Application dependant	20 Hz
4-14	Output Freq High Limit	60 or the Value of Maximum Inverter Frequency (Hz) on nameplateif fan is direct drive.	60 or the Value of Maximum Inverter Frequency (Hz) on nameplateif fan is direct drive.
4-18	Current Limit	Application dependant	110%
4-19	Max Output Frequency	Application dependant	65 Hz or 120 Hz for Direct Drive Fan
5-12	Terminal 27 Digital Input	No Operation	Coast Inverse
5-40	Function Relay	No Operation	Relay 1 Active No Alarm [160] Relay 2 Active Motor Running [5]
6-14	Terminal 53 Low Ref Feedback	0.0 Hz	20 Hz
6-15	Terminal 53 High Ref Feedback	Application dependant	60 or the Value of Maximum Inverter Frequency (Hz) on Nameplate if fan is direct drive.
14-01	Switching Frequency	5.0 kHz	Set to Max for HP (see Table 4, p. 27)
14-20	Reset Mode	Manual Reset	Automatic Reset x 5

## Fan Inlet Airflow Measuring System

A fan inlet airflow measuring system (piezometer) is available on many centrifugal and plenum fans. Tranes system determines airflow using a static pressure differential.

**Note:** This type of system is different than a total pressure or thermal dispersion system. As such, the calculations will be different.

Each system comes with a differential pressure transmitter. The minimum diameter is connected to the LO port of the transmitter and the reference pressure point is connected to (or actually is) the HI port of the transmitter.

**Figure 19. Fan inlet airflow measuring system**


## Wiring

The transmitter requires 24 Vdc/24 Vac power on terminals 1 (+) and 2 (ground) of the transmitter. When the airflow measurement system is ordered with a factory-mounted Symbio™ controller, the 24 Vdc power will be supplied.

In the absence of a factory-mounted Symbio controller, the installing contractor must confirm the transmitter has 24 Vdc/24 Vac power.

## Transmitter Sizing

The Trane specification requires that the flow meter option have a total accuracy of 5 percent. The total accuracy is a combination of:

- How accurately the flow meter itself is in sensing airflow.
- How accurately the transmitter senses the differential pressure.
- How accurately the controller translates the signal from the transmitter to a differential pressure.

Selecting the proper transmitter is critical in order to get accurate airflow measurements. How accurately the transmitter senses the differential pressure is dependent on:

- The pressure range selected
- The accuracy of the selected transmitter

Trane air handlers use a 0 to 5 inch, 0 to 10 inch, or 0 to 25 inch w.g. range transmitter as standard. To sufficiently cover VAV turndown on the smallest fans with the above range, a transmitter with an accuracy of 0.25 percent (full scale) is used as standard. If a field-provided transmitter with a lower accuracy is selected, the range should be chosen closer to the actual, maximum pressure differential expected for the application.

The transmitter outputs a signal that represents the differential pressure which is used to calculate airflow. To adequately calculate and display the airflow for the smaller fans, verify the analog input is programmed with enough decimal places to sufficiently represent the pressure differential being measured.

**Note:** *The transmitter is factory-calibrated to the range selected and cannot be significantly adjusted to tighten the range closer to the pressure being read for the given application.*

## Transmitter Calibration

The transmitter is factory-calibrated to a specific pressure range with a 0 to inch, 0 to 10 inch, or 0 to 25 inch w.g.

**Table 6. Constant K factors**

Fan Size (inches)/Type	Fan Class	Fan Name	K-Factor
27 AF Direct-drive Plenum	Any	27 TF, 27 TR	3998
30 AF Direct-drive Plenum	Any	30 TF, 30 TR	4945

range being used in most cases. To check calibration and to adjust if necessary, consult the transmitter manufacturer or the factory for specific procedures.

The transmitter outputs a linear, 2 to 10 Vdc signal representing a differential pressure measurement. With this measurement, the airflow through the fan can be calculated using the following equation:

$$CFM = K * \text{SQRT}(DP)$$

Where:

CFM = Airflow (ft<sup>3</sup>/min.) assuming a standard air density of 0.075 lbm/ft<sup>3</sup>.

K = A constant factor that is unique for each fan. See "Constant K Factor," p. 29 for more information.

DP = Differential pressure (inches w.g.) being measured by the transmitter.

Significant differences in elevation and/or temperature will affect the density of air. For air at a constant, non-standard density, a field-obtained K factor can be used. Alternatively, the following equation can be used to continuously correct the equation above:

$$ACFM = CFM * \text{SQRT}(0.075/\rho)$$

Where:

ACFM = Actual airflow (ft<sup>3</sup>/min.) corrected for non-standard air density.

$\rho$  = Density (lbm/ft<sup>3</sup>) of the air at the inlet to the fan.

**Note:** *Alternative units, including SI, can be used in place of the IP units above although the K-factor must be converted appropriately.*

## Maintenance

For a typical HVAC environment - especially with upstream filtration - there should be little to no required maintenance. In extreme cases or for mishaps (bearing grease in the taps for example), the flow meter is easily cleanable. The fan inlet airflow measuring system is extremely simple: a few pressure taps, a few fittings, and some tubing. Although unlikely, if any tap were to get clogged, simply disconnect each side of the transmitter and blast air in a reverse direction through the system.

## Constant K Factor

The constant K factor is unique for each fan and is primarily a function of the area and other geometric properties of the fan inlet. Pre-engineered factors are available from the factory for fan types where the airflow measurement system is available.



## Start-Up

**Table 6. Constant K factors (continued)**

Fan Size (inches)/Type	Fan Class	Fan Name	K-Factor
15.70 Motorized Impeller	Any	15VP	1747
17.70 Motorized Impeller	Any	17VP	2231
19.70 Motorized Impeller	Any	19VP	2612
22.00 Motorized Impeller	Any	22VP	3233
24.80 Motorized Impeller	Any	24VP	4071

**Note:** This table to be used for the updated tap design - mid-2014 and beyond. Refer to prior editions of this publication for the previous design.

When a single transmitter is supplied in a multiple fan system, one or more fans will be brought back to the transmitter as a manifold and the airflow will represent the total airflow for the system. As a result, the factor should be adjusted as follows:

$K = N * K\text{-Factor from Table 6, p. 29.}$

Where:

K = The final factor to be used for controller programming.

N = The number of active\* fans in the system.

\*If a fan fails in a multiple fan system where only one transmitter is being supplied, and if the remaining fans will continue to be used, the factor should be reduced accordingly. Additionally, if the inactive fan was included in the manifold back to the transmitter, the tubes from the inactive fan should be temporarily removed and replaced with tubes from an active fan (or simply plugged).

When a transmitter is supplied for each fan, the factor does not need to be adjusted. The resulting airflow will represent single-fan airflow. At the controller level, the individual airflows should be summed to get the total airflow. If a field-provided K-factor is to be used (see below), the measured airflow for the system should be divided by the number of active fans to get a single-fan K-factor.

Field-obtained factors can provide maximum accuracy. To obtain the factor in the field, measure the differential

pressure output from the transmitter while measuring the airflow through the system. Once these two values have been measured, simply solve for K using the following equation:

$$K = \text{ACFM} / \text{SQRT} (\text{DP})$$

Where:

K = Field-provided constant factor.

ACFM = Actual airflow (ft<sup>3</sup>/min.) being measured at the air density being measured.

DP = Differential pressure (inches w.g.) being measured by the transmitter.

## External Insulating Requirements

The following areas should be specifically addressed, as applicable:

- Supply and return water piping connections
- Supply and return refrigerant piping connections
- Condensate drain lines and connections
- Outdoor-air-intake duct connections
- Discharge duct connections
- Special requirements for low-temperature-air systems



# Routine Maintenance

## ⚠ WARNING

### Hazardous Service Procedures!

Failure to follow all precautions in this manual and on the tags, stickers, and labels could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the following instructions: Unless specified otherwise, disconnect all electrical power including remote disconnect and discharge all energy storing devices such as capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. When necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been trained in handling live electrical components perform these tasks.

## ⚠ WARNING

### Rotating Components!

Failure to disconnect power before servicing could result in rotating components cutting and slashing technician which could result in death or serious injury.

During installation, testing, servicing and troubleshooting of this product it may be necessary to work with live and exposed rotating components. Have a qualified or licensed service individual who has been properly trained in handling exposed rotating components, perform these tasks.

## Maintenance Checklist

Table 7. Maintenance checklist

Frequency	Maintenance
Every Week	Observe unit weekly for any change in running condition and unusual noise.
Every Month	Clean or replace air filters if clogged or dirty; coat permanent filters with oil after cleaning; change bag filters when pressure drop is 1 in. w.g. See "Filters," p. 34 for more information.
Every Three to Six Months	<ul style="list-style-type: none"> <li>Inspect and clean drain pans. See "Drain Pans," p. 33 for more information.</li> <li>Tighten electrical connections.</li> <li>Inspect coils for dirt build-up. See "Coils," p. 32 for more information.</li> </ul>
Every Year	<ul style="list-style-type: none"> <li>Inspect the unit casing for corrosion. If damage is found, clean and repaint.</li> <li>Clean the fan wheels and shaft. See "Fans," p. 34 for more information.</li> <li>Inspect and clean drain pans.</li> <li>Inspect electrical components and insulation.</li> <li>Inspect wiring for damage.</li> <li>Rotate the fan wheel and check for obstructions. The wheel should not rub. Adjust the center if necessary.</li> <li>Lubricate motor bearings in accordance with motor manufacturer's recommendations (see "Motor Bearing Lubrication," p. 34 for more information).</li> <li>Check condition of gasketing and insulation around unit, door and dampers.</li> </ul>

## Cleaning the Unit

### Cleaning Non-Porous Surfaces

## ⚠ WARNING

### Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

If microbial growth on a non-porous insulating surface (closed cell insulation or sheet metal surface) is observed:

1. Disconnect all electrical power to the unit.
2. Wearing the appropriate personal protective equipment, use a brush for sheet metal surfaces or a soft sponge on a foil face or closed cell foam surface to mechanically remove the microbial growth.

**Note:** Be careful not to damage the non-porous surface of the insulation.

3. Install a block-off to prevent spray from going into a dry section of the unit and/or system ductwork.
4. Thoroughly clean the contaminated area(s) with an



## Routine Maintenance

EPA-approved sanitizer specifically designed for HVAC use.

5. Rinse the affected surfaces thoroughly with fresh water and a fresh sponge to prevent potential corrosion of the drain pan and drain line.
6. Repeat [Step 4](#) and [Step 5](#) as necessary.
7. Confirm the drain line is open following the cleaning process.
8. Allow the unit to dry thoroughly before putting it back into service.
9. Replace all panels and parts and restore electrical power to the unit.
10. Be careful any contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution.

### Cleaning Porous Surfaces

#### **⚠ WARNING**

##### **Hazardous Voltage!**

Failure to disconnect power before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

To clean a porous insulating surface (fiberglass insulation):

1. Disconnect all electrical power to the unit.
2. Wearing the appropriate personal protective equipment, use a vacuum device with a HEPA filter (99.97 percent efficient at 0.3 micron particles) to remove the accumulated dirt and organic matter.  
**Note:** Be careful not to tear the insulation surface or edges.
3. Confirm the drain line is open following the cleaning process.
4. Allow the unit to dry thoroughly before putting it back into service.
5. Replace all panels and parts and restore electrical power to the unit.
6. Be careful any contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution.

### Coils

All coils should be kept clean to maintain maximum performance.

### Water Coils

#### **⚠ WARNING**

##### **Hazardous Voltage!**

Failure to disconnect power before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

#### **⚠ WARNING**

##### **Hazardous Chemicals!**

Failure to follow this safety precaution could result in death or serious injury. Coil cleaning agents can be either acidic or highly alkaline and can burn severely if contact with skin or eyes occurs.

Handle chemical carefully and avoid contact with skin. ALWAYS wear Personal Protective Equipment (PPE) including goggles or face shield, chemical resistant gloves, boots, apron or suit as required. For personal safety refer to the cleaning agent manufacturer's Materials Safety Data Sheet and follow all recommended safe handling practices.

To clean water coils:

1. Disconnect all electrical power to the unit.
2. Wearing the appropriate personal protective equipment, use a soft brush to remove loose debris from both sides of the coil.
3. Install a block-off to prevent spray from going through the coil and into a dry section of the unit and/or system ductwork.
4. Mix a high-quality coil cleaning detergent with water according to the manufacturers instructions.  
**Note:** If the detergent is strongly alkaline after mixing (pH 8.5 or higher), it must contain an inhibitor. Follow the cleaning solution manufacturers instructions regarding the use of the product.
5. Place the mixed solution in a garden pump-up sprayer or high-pressure sprayer. If a high pressure sprayer is to be used:
  - Maintain minimum nozzle spray angle of 15°.
  - Spray perpendicular to the coil face.
  - Keep the nozzle at least 6 inches from the coil.
  - Do not exceed 600 psi.
6. Spray the leaving air side of the coil first, then the entering air side.
7. Thoroughly rinse both sides of the coil and the drain pan with cool, clean water.
8. Repeat [Step 6](#). and [Step 7](#). as necessary.
9. Straighten any coil fins that may have been damaged



during the cleaning process.

10. Confirm the drain line is open following the cleaning process.
11. Allow the unit to dry thoroughly before putting it back into service.
12. Replace all panels and parts and restore electrical power to the unit.
13. Be careful any contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials.

## Coil Winterization

Water coil winterization procedures consist primarily of draining water from the coil before the heating season. Trane recommends flushing the coil with glycol if coils will be exposed to temperatures below 35°F.

### **NOTICE**

#### **Coil Freeze-Up!**

**Failure to follow instruction below could result in equipment damage.**

**Drain and vent coils when not in use. Trane recommends glycol protection in all possible freezing applications. Use a glycol approved for use with commercial cooling and heating systems and copper tube coils.**

Install field-fitted drains and vents to permit winterization of coils not in use and to assist in evacuating air from the water system during startup. If draining is questionable because of dirt or scale deposits inside the coil, fill the coil with glycol before the heating season begins.

Individual coil types determine how to properly winterize the coil. To determine the coil type find the Service Model No of Coil on the coil section nameplate. The coil type is designated by the second and third digits on that model number. For example, if the model number begins with DUWB, the coil type is UW; if the model number begins with DW0B, the coil type is W.

**Note:** *On many unit sizes, there are multiple coils in the coil section. Be sure to winterize all coils in a given coil section.*

To winterize water coils:

1. Remove the vent and drain plugs.
2. Blow the coil out as completely as possible with compressed air.
3. Fill and drain the coil several times with full strength glycol so that it mixes thoroughly with the water retained in the coil.
4. Drain the coil out as completely as possible.
5. To confirm no water remains in the coil, do not replace the vent and drain plugs until the coils are put back into service.

## Moisture Purge Cycle

By its very nature, any HVAC unit with a cooling coil serves as a dehumidifier, reducing the surrounding air's ability to hold water vapor as its temperature falls. This normally does not present a problem when the unit is running. However, when the fan stops, water vapor condenses on the cold metal surfaces inside the air handler and remains there until the air warms sufficiently to re-evaporate it. This damp, dark environment—though temporary—can encourage the growth of mold, mildew, and other microbial contaminants.

Providing a moisture purge cycle 15 to 30 minutes after shutdown disperses the cold, humid air inside the air-handling system more evenly throughout the building. This four-step cycle:

- Closes the outdoor air dampers.
- Turns off the cooling coil.
- Opens any variable-air-volume terminals connected to the air handler.
- Operates the supply fan for 10 to 15 minutes.

Air movement discourages water condensation and hastens re-evaporation of any condensate that does happen to form. This simple preventative measure effectively combats microbial growth and curbs moisture-related deterioration of air-handling components.

## Drain Pans

### **⚠ WARNING**

#### **Hazardous Chemicals!**

**Failure to follow this safety precaution could result in death or serious injury. Coil cleaning agents can be either acidic or highly alkaline and can burn severely if contact with skin or eyes occurs.**

**Handle chemical carefully and avoid contact with skin. ALWAYS wear Personal Protective Equipment (PPE) including goggles or face shield, chemical resistant gloves, boots, apron or suit as required. For personal safety refer to the cleaning agent manufacturer's Materials Safety Data Sheet and follow all recommended safe handling practices.**

### **⚠ WARNING**

#### **No Step Surface!**

**Failure to follow instruction below could result in death or serious injury.**

**Do not walk on the sheet metal drain pan. Walking on the drain pan could cause the supporting metal to collapse and result in the operator/technician falling.**

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

If evidence of standing water or condensate overflow



## Routine Maintenance

exists, identify and remedy the cause immediately. Refer to “[Troubleshooting](#),” p. 36 for possible causes and solutions.

To clean drain pans:

1. Disconnect all electrical power to the unit.
2. Wearing the appropriate personal protective equipment, remove any standing water.
3. Scrape solid matter off of the drain pan.
4. Vacuum the drain pan with a vacuum device that uses high-efficiency particulate arrestance (HEPA) filters with a minimum efficiency of 99.97 percent at 0.3 micron particle size.
5. Thoroughly clean any contaminated area(s) with a mild bleach and water solution or an EPA-approved sanitizer specifically designed for HVAC use.
6. Immediately rinse the affected surfaces thoroughly with fresh water and a fresh sponge to prevent potential corrosion of metal surfaces.
7. Allow the unit to dry completely before putting it back into service.
8. Be careful any contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution.

4. Thoroughly clean any contaminated area(s) with a mild bleach and water solution or an EPA-approved sanitizer specifically designed for HVAC use.
5. Immediately rinse the affected surfaces thoroughly with fresh water and a fresh sponge to prevent potential corrosion of metal surfaces.
6. Allow the unit to dry completely before putting it back into service.
7. Be careful any contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution.

## Fans

### **⚠ WARNING**

#### **Rotating Components!**

**Failure to secure rotor or disconnect power before servicing could result in rotating components cutting and slashing technician which could result in death or serious injury.**

**The following procedure involves working with rotating components.**

- **Disconnect all electric power, including remote disconnects before servicing.**
- **Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.**
- **Secure rotor to ensure rotor cannot freewheel.**

## Inspecting and Cleaning Fans

Fan sections of air handlers should be inspected every six months at a minimum or more frequently if operating experience dictates. If evidence of microbial growth (mold) is found, identify and remedy the cause immediately. Refer to “[Troubleshooting](#),” p. 36 for possible causes and solutions. To clean the fan section:

1. Disconnect all electrical power to the unit.
2. Wearing the appropriate personal protective equipment, remove any contamination.
3. Vacuum the section with a vacuum device that uses

## Motor Bearing Lubrication

Obtain an operation and maintenance manual from the motor manufacturer for the specific motor installed. The motor manufacturers recommendations take precedence for all matters related to the start-up and routine maintenance of the motor.

Motor grease fittings have been removed from factory-installed motors in compliance with UL regulations. Motor bearings require periodic maintenance throughout their life. Many different styles of motors come as standard selections, so please obtain the motor IOM and use the manufacturer-recommended grease.

## Fan Motor Inspection

Inspect fan motors periodically for excessive vibration or temperature. Operating conditions will vary the frequency of inspection and lubrication. Motor lubrication instructions are on the motor tag or nameplate. If for some reason these instructions are not available, contact the motor manufacturer. Some motor manufacturers may not provide oil tubes on motors with permanently sealed bearings.

## Filters

### **⚠ WARNING**

#### **Rotating Components!**

**Failure to secure rotor or disconnect power before servicing could result in rotating components cutting and slashing technician which could result in death or serious injury.**

**The following procedure involves working with rotating components.**

- **Disconnect all electric power, including remote disconnects before servicing.**
- **Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.**
- **Secure rotor to ensure rotor cannot freewheel.**

## Throwaway Filters

To replace throwaway filters, install new filters with the directional arrows pointing in the direction of airflow.

**Note:** Bag and cartridge filters must have an airtight seal to prevent air bypass. If using filters not supplied by Trane, apply foam gasketing to the vertical edges of the filter.



# Troubleshooting

This section is intended to be used as a diagnostic aid only. For detailed repair procedures, contact your local Trane service representative.

<b>⚠ WARNING</b>
<p><b>Hazardous Service Procedures!</b></p> <p>Failure to follow all precautions in this manual and on the tags, stickers, and labels could result in death or serious injury.</p> <p>Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, <b>MUST</b> follow precautions in this manual and on the tags, stickers, and labels, as well as the following instructions: Unless specified otherwise, disconnect all electrical power including remote disconnect and discharge all energy storing devices such as capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. When necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been trained in handling live electrical components perform these tasks.</p>

**Table 8. Air handler troubleshooting recommendations**

Symptom	Probable Cause	Recommended Action
Motor Fails to Start	Blown fuse or open circuit breaker	Replace fuse or reset circuit breaker.
	Overload trip	Check and reset overload.
	Improper wiring or connections	Check wiring with diagram supplied on unit.
	Improper current supply	Compare actual supply power with motor nameplate recommendations. Contact power company for adjustments.
	Mechanical failure	Check that motor and drive rotate freely. Check bearing lubricant.
Motor Stalls	Open phase	Check line for an open phase.
	Overloaded motor	Reduce load or replace with larger motor.
	Low line voltage	Check across AC line. Correct voltage if possible.
Excessive Vibration	Shipping spacers not removed	Remove shipping spacers and/or bolts (see "Fan Isolation," p. 17).
Motor Runs and Then Dies Down	Partial loss of line voltage	Check for loose connections. Determine adequacy of main power supply.
Motor Does not Come Upto Speed	Low voltage at motor terminals	Check across AC line and correct voltage loss if possible.
	Line wiring to motor too small	Replace with larger sized wiring.
Motor Overheats	Overloaded motor	Reduce load or replace with a larger motor.
	Motor fan is clogged with dirt preventing proper ventilation	Remove fan cover, clean fan and replace cover.
Excessive Motor Noise	Motor mounting bolts loose	Tighten motor mounting bolts.
	Rigid coupling connections	Replace with flexible connections.
	Worn motor bearings	Replace bearings and seals.
	Fan rubbing on fan cover	Remove interference in motor fan housing.

**Table 8. Air handler troubleshooting recommendations (continued)**

Symptom	Probable Cause	Recommended Action
Low Water Coil Capacity	Incorrect airflow	Check fan operating condition.
	Incorrect water flow	Inspect the water pumps and valves for proper operation and check the lines for obstructions.
	Incorrect water temperature	Adjust the chiller or boiler to provide the proper water temperature.
	Coil is piped incorrectly	Verify coil piping (see "Piping and Connections," p. 19).
	Dirty fin surface	Clean the fin surface (see "Coils," p. 32).
	Incorrect glycol mixture	Verify glycol mixture and adjust if necessary.
Drain Pan is Overflowing	Plugged Drain Line	Clean drain line.
	Unit not level	Level unit.
	Improper trap design	Design trap per unit installation instructions.
Standing Water in Drain Pan	Improper trap design	Design trap per unit installation instructions.
	Unit not level	Level unit.
	Plugged drain line	Clean drain line.
Wet Interior	Coil face velocity too high	Reduce fan speed.
	Improper trap design	Design trap per unit installation instructions.
	Drain pan leaks/overflows	Repair leaks.
	Condensation on surfaces	Insulate surfaces.
Excess Dirt in Unit	Missing filters	Replace filters.
	Filter bypass	Reduce filter bypass by ensuring all blockoffs are in place.
Microbial Growth (Mold) Inside Air Handler	Standing water in drain pan	See Standing water in drain pan above.



Notes

---



Trane - by Trane Technologies (NYSE: TT), a global innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit [trane.com](https://trane.com) or [tranetechnologies.com](https://tranetechnologies.com).

Trane has a policy of continuous product and product data improvements and reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.