Installation, Operation and Maintenance

Performance Climate Changer™ Air Handlers

Indoor and Outdoor Units
Sizes 3-120

⚠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.

October 2012

CLCH-SVX07C-EN

X-39641152010

Warnings, Cautions and Notices

Warnings, Cautions and Notices. Note that warnings, cautions and notices appear at appropriate intervals throughout this manual. Warnings are provide to alert installing contractors to potential hazards that could result in death or personal injury. Cautions are designed to alert personnel to hazardous situations that could result in personal injury, while notices indicate a situation that could result in equipment or property-damage-only accidents.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

Read this manual thoroughly before operating or servicing this unit.

ATTENTION: Warnings, Cautions and Notices appear at appropriate sections throughout this literature. Read these carefully:

⚠WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	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.
NOTICE:	Indicates a situation that could result in equipment or property-damage only

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-including industry replacements for CFCs such as HCFCs and HFCs.

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. 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!

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

⚠WARNING

Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards.

- **Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate MSDS sheets and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate MSDS sheets and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.**
- **If there is a risk of arc or flash, technicians MUST put on all Personal Protective Equipment (PPE) in accordance with NFPA 70E or other country-specific requirements for arc flash protection, PRIOR to servicing the unit.**

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

Ultraviolet (UV) Germicidal Irradiation Lights!

The United States Environmental Protection Agency (EPA) believes that molds and bacteria inside buildings have the potential to cause health problems in sensitive individuals. If specified, Trane provides ultraviolet lights (UV-C) as a factory-engineered and installed option in select commercial air handling products for the purpose of reducing microbiological growth (mold and bacteria) within the equipment. When factory provided, polymer materials that are susceptible to deterioration by the UV-C light will be substituted or shielded from direct exposure to the light. In addition, UV-C radiation can damage human tissue, namely eyes and skin. To reduce the potential for inadvertent exposure to the lights by operating and maintenance personnel, electrical interlocks that automatically disconnect power to the lights are provided at all unit entry points to equipment where lights are located.

⚠ WARNING

Equipment Damage From Ultraviolet (UV) Lights!

Trane does not recommend field installation of ultraviolet lights in its air handling equipment for the intended purpose of improving indoor air quality. High intensity C-band ultraviolet light is known to severely damage polymer (plastic) materials and poses a personal safety risk to anyone exposed to the light without proper personal protective equipment (could cause damage to eyes and skin). Polymer materials commonly found in HVAC equipment that may be susceptible include insulation on electrical wiring, fan belts, thermal insulation, various fasteners and bushings. Degradation of these materials can result in serious damage to the equipment.

Trane accepts no responsibility for the performance or operation of our air handling equipment in which ultraviolet devices were installed outside of the Trane factory.

Table of Contents

Table of Contents

Introduction

Overview of Manual

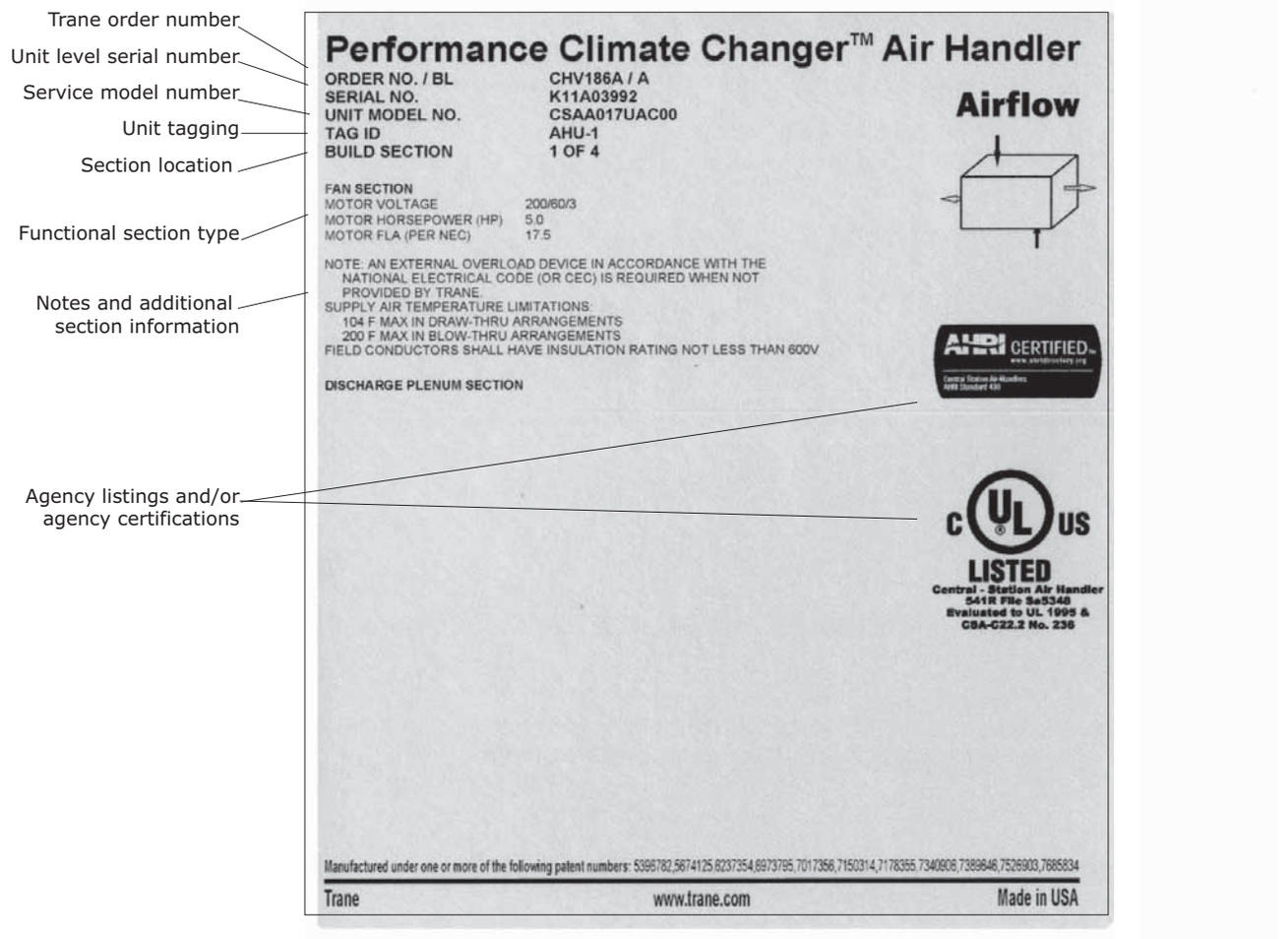
Use this manual to install, startup, operate, and maintain the Performance Climate Changer™ air handler. Carefully review the procedures discussed in this manual to minimize installation and startup difficulties.

Nameplate

Each Performance air handler section includes one or more nameplate/label (see Figure 1), 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 air handler section nameplate



General Information

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 -40ºF to 140ºF (-40ºC to 60ºC).

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 104º F, while motors with Class F insulation can withstand ambient temperatures to +140º F (60º C).

Note: Units with UL approval have a maximum ambient temperature requirement of 104ºF. The customer should provide adequate freeze protection for the coils. See "Routine Maintenance" on page 121 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.

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

A wide variety of components is available for Trane air handlers, including numerous fan, coil, and filter options, access sections, diffusers, discharge plenums, face-and-bypass sections, UL-approved electric heat sections, humidifiers, mixing boxes, moisture eliminator sections, exhaust dampers, controls, blenders and airflow monitoring stations.

For more information, refer to the following documents, available from your local Trane sales engineer:

- CLCH-PRC015-EN, Performance Climate Changer™ Air Handler catalog
- CLCH-PRC016-EN, Performance Climate Changer™ Air Handler quick select
- CLCH-SVN05A-EN, Roof Curbs for Performance Climate Changer™ Air Handlers installation instructions
- CLCH-PRG003-EN, Performance Climate Changer™ Air handler guide specifications
- CLCH-SLB017-EN, Performance Climate Changer™ Air Handler sales brochure
- CLCH-SVX08A-EN, Gas Heat in Performance Climate Changer™ Air Handlers installation, operation, and maintenance guide

Factory-Mounted Controls

Trane air handlers are available with a wide selection of factory-mounted controls, including controllers, motor starters, and variable frequency drives (VFD).

Most control components are mounted inside the unit. Depending on the system configuration, this may include damper actuators, dirty filter switches, averaging temperature sensors, and low limit switches. VFDs, starters, 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.

All factory-mounted control systems (controls that are factory-wired to a unit controller or termination strip) ordered without starters or variable-frequency drives (VFDs) are provided with 120 to 24 Vac control transformers mounted and wired in the auxiliary control panel. The customer must provide 120 Vac control power, 50/60 Hz, typically 3 amps for unit sizes 3 to 57 and 5 amps for unit sizes 66 to 100. A dedicated 15-amp circuit is recommended.

Factory-mounted control systems ordered with factory-mounted starters or VFDs are supplied with line to 24 Vac control transformers. No additional power wiring is required.

Pre-Packaged Solutions 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 a more in-depth understanding of controls, refer to the following manuals:

- For programmable MP580 controllers
  - CNT-SVP01A-EN
- For hardware installation
  - CNT-SVN01A-EN
- For Trane TR200 Drives
  - BAS-SVX19A-EN

Wiring

⚠WARNING

Proper Field Wiring and Grounding Required!

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

Entrances are generally provided for field-installation of high and low voltage wiring through a pipe/nipple connection in the unit depending on unit configuration with or without factory-mounted controls. 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 Requirements

Based on customer requirements, Trane air handlers can ship as complete units or as individual sections to be field assembled. Unit sizes 3-120 have an integral base frame designed with the necessary number of lift points for safe installation. Indoor air handlers sizes 3-30 are also shipped with a shipping skid designed for forklift transport.

Unless otherwise specified, Performance indoor air handlers ship in subassemblies if the total length of the units exceeds 98 inches or if the total weight exceeds the limits shown in Table 1. If either the maximum weight or maximum length is exceeded, the unit will ship in multiple pieces. See Table 2 for limits for outdoor air handlers.

Note: These limits are based on a four-point lift.

Table 1. Shipping length and weight limitations for indoor air handlers

Unit Size	Maximum Unit Weight (lb.)	Maximum Unit Length (in)
3–31	<2,500	98
35, 36	<3,900	98
40, 41	<4,300	98
50–58	<5,100	98
66-120	<8000	98

Table 2. Shipping length and weight limitations for outdoor air handlers

Unit Size	Minimum Length (in.)	Maximum Length (in.)	Maximum Weight (lb.)
3–31	24.50	360.00	8,000
35-58	24.50	96.00[1]	12,000
66-120	24.50	96.00[1]	12,000

Notes: [1]Some specialty sections can be attached to the adjacent section even if this causes length to be greater than 96 inches, up to 118.44 inches.

Receiving Checklist

Upon receipt of the air handler(s), a thorough inspection should be performed to note any shipping damage that may have occurred and that the shipment is complete. All factory shipping protection should be removed immediately to allow complete access for the inspection. The shipping protection provided by the factory is for transit protection only and should not be used as a jobsite storage cover.

Note: Delivery cannot be refused. Trane is not responsible for shipping damage.

- Check all access doors to confirm that the latches and hinges are not damaged.
- Inspect the interior of each section for any internal damage.

Note: Concealed damage must be reported within 15 days of receipt.

- Inspect the coils for damage to the fin surface and/or coil connections.
- If the unit was ordered with factory-mounted controls, locate all sensors.

Note: Items that cannot be factory-mounted should ship inside the control enclosures or should be packaged inside the fan or mixing box section.

- Check all control devices attached to the unit exterior and confirm that they are not damaged.
- Manually rotate the fan wheel to ensure free movement of the shaft, bearings, and drive.
- Inspect the fan housing for any foreign objects.
- If the unit is shipped in subassemblies, locate the assembly hardware, which should be packaged and shipped inside the fan or mixing box section.
- Inspect and test all piping for possible shipping damage. Nipples may be installed on coils at the factory but should always be tightened and tested before any connections are made. Rough handling during shipping, in addition to other factors can cause pipe connections to become loose.

Note: Trane will not be responsible for any leak at the field connections. Coils have been factory pressure tested before shipping.

Assembly Hardware

Trane air handlers ship with all necessary assembly hardware and gasket material. This hardware is packaged in either a clear plastic envelope or cardboard box and can be found inside the fan, mixing box, or access section. If there is not enough space inside the section, a crate or pallet will be loaded onto the bed of the truck. Check the Parts List on the Field Assembly drawing against the contents of the crate. Do not proceed with unit assembly until verification that all materials are present. Sometimes it is necessary to use more than one section to ship hardware. Please check all sections thoroughly before contacting your local Trane sales engineer to report missing hardware.

Resolving Shipping Damage

Trane air handlers ship freight-on-board (FOB), meaning that the unit belongs to the customer the moment the delivery truck leaves the factory. If damage has occurred to the unit during shipment, follow these instructions:

Note: Trane is not responsible for shipping damage.

1. Make specific notation, describing the damage, on the freight bill. Take photos of the damaged material if possible.
2. Report all claims of shipping damage to the delivering carrier immediately and coordinate carrier inspection if necessary.

Note: Do not attempt to repair the unit without consulting the delivering carrier.

3. Notify your Trane sales representative of the damage and arrange for repair.

Note: Do not attempt to repair the unit without consulting the Trane sales representative.

4. Keep the damaged material in the same location as it was received.

Note: It is the receiver's responsibility to provide reasonable evidence that concealed damage was not incurred after delivery.

Storage Recommendations

NOTICE:

Corrosion!

Use only canvas tarps to cover air handlers. Plastic tarps can cause condensation to form in and on the equipment, which could result in corrosion damage or wet storage stains.

Note: All factory shipping protection should be removed. This wrapping is for transit protection only and should not be used for jobsite storage.

Indoor air handlers and/or field-installed accessories that must be stored for a period of time before installation *must* be protected from the elements. A controlled indoor environment is recommended for proper storage.

Outdoor air handlers require no special protection for storage before installation. Keep the equipment in the original container for protection and ease of handling.

Note: The warranty does not cover damage to the unit or controls due to negligence during storage.

General Storage

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

Long-Term Storage

For longer periods of storage, allow proper clearance around the unit to perform periodic inspection and maintenance of 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 following the lubrications recommendations in "Fan Bearing Lubrication" on page 124.
- 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 if present, refer to the motor manufacturer's lubrication recommendation for proper lubrication.

Outdoor Storage Considerations

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.
- Loosen the belt tension on the drive belts.
- Cover the unit securely with a canvas tarp.
- Do not stack units.
- Do not pile other material on the unit.

Preparing the Unit Site

- Ensure the installation site can support the total weight of the unit (see "Unit Dimensions and Weights" on page 12 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 Clearances" on page 12). Refer to submittals for specific minimums.
- Allow room for supply and return piping, ductwork, electrical connections, and coil removal.
- Ensure there is adequate height for condensate drain requirements. See "Drain Pan Trapping" on page 86.

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!

The floor or foundation must be level and the condensate drain at the proper height for proper coil drainage and condensate flow. Standing water and wet surfaces inside the equipment can become an amplification site for microbial growth (mold), which could cause odors and damage to the equipment and building materials.

- Confirm the roof curb or 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, the customer may need to provide 120 Vac power to 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.
- If the unit integral base frame ceiling suspension provisions are not used, the installer/contractor must provide a ceiling-suspended mounting frame designed to support the length, width, and weight of the entire air-handling unit. See "Ceiling Suspension" on page 26 for more information.
- Rooftop curb-mounted units must be sealed tightly to the curb. Use proper sealants and roof-to-curb sealing techniques to prevent water and air leakage. Refer to CLCH-SVN05A-EN Roof Curbs for Performance Climate Changer™ Air Handlers Installation Instructions.

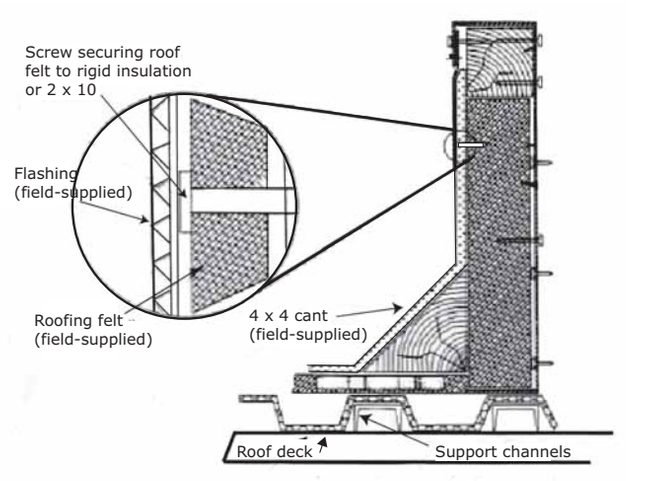
Note: Preparation of the roof curb or pier mount and roof openings should be completed prior to lifting the unit to the roof.

Roof Curb Installation Checklist

See CLCH-SVN05A-EN Roof Curbs for Performance Climate Changer™ Air Handlers Installation Instructions for information on installing roof curbs.

It is recommended that the curb be installed directly on the support members and fastened to the supports using tack welds or other equivalent methods. Properly supported decking should be installed inside the air handler section of the curb when this method is used. See Figure 2.

Figure 2. Cross section of typical curb installation on new construction



1. Verify that the roof structure can adequately support the combined weight of the unit and curb assembly.
2. Ensure that the selected installation location provides sufficient service and operational clearances.
3. Remove any twist within the curb due to roof supports and square the curb.
4. Level the curb.
5. Secure the curb to the roof support members.
6. Install 2-inch thick boards or rigid insulation around the curb.
7. Install cant strips around the curb.
8. Bring field supplied roofing felt up to the top of the curb nailing strips. Nail felt into place.
9. Install field supplied flashing under the lip of the curb flanges and over the felt.
10. Apply sealant to the four corners.
11. Caulk all joints between the curb and the roof.

Attach the gasket material to the curb's top flanges (entire perimeter) and to the supply and return air duct opening panel flanges.

Unit Dimensions and Weights

Note: 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.

Service Clearances

A minimum clearance of the section width plus 12 inches on the access door side of the gas heat section is recommended for routine maintenance. This clearance provides enough room to replace the heat exchanger in the event of failure. The section side panels must be removed to access the heat exchanger. Refer to Table 3 for service clearance recommendations for the air handler.

Figure 3. Service Clearance

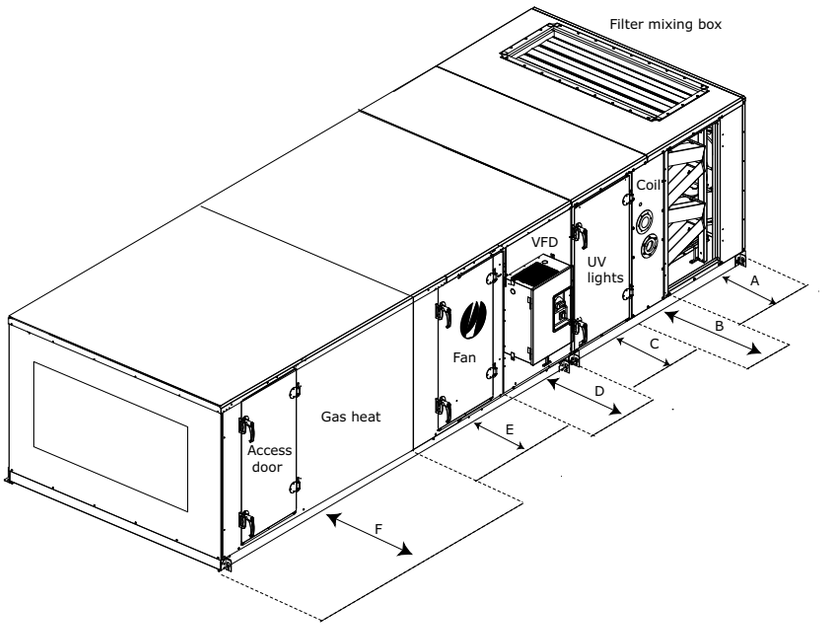


Table 3. Service clearance dimensions (inches)

Component	3	4	6	8	10	12	14	17	21	22	25	26	30	31	35	36	40	41	50	51	57	58	66	80	100	120
A (filter)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
B (coil)	48	59	59	66	77	82	87	87	95	77	95	77	109	87	115	96	128	96	141	110	141	110	156	156	170	197
C (UV Lights)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
C (Catalytic Air Cleaner)	43	59	59	63	75	81	83	83	58	75	58	75	83	83	75	59	83	83	83	83	83	83	83	83	75	83
D (external starter or VFD)	61	61	61	61	61	61	61	61	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
D (internal starter or VFD)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
E (fan)	48	48	48	48	51	54	58	61	60	51	66	51	66	58	66	60	70	60	77	66	77	66	93	93	101	101
F (gas heat - Ext Vestibule)	n/a	n/a	89	90	108	100	100	105	115	n/a	115	n/a	118	n/a	136	n/a	140	n/a	156	n/a	156	n/a	170	179	180	n/a
F (gas heat - Int Vestibule)	n/a	n/a	56	63	74	79	84	84	92	n/a	92	n/a	106	n/a	112	n/a	125	n/a	138	n/a	138	n/a	153	153	167	194

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, hoods, pipe cabinets, 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 starters, VFDs, or other high-voltage devices must be provided per NEC requirements.

Note: 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.

Table 4. Section dimensions (inches) and weights (pounds) - unit sizes 3-30

Nominal airflow	1500	2000	3000	4000	5000	6000	7000	8500	10,500	11,000	12,500	13,000	15,000
Airflow at 625 fpm	2169	3475	4338	4581	6075	8331	9025	11,806	13,456	13,194	16,944	18,231	19,025
Unit size	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**17**	**21**	**22**	**25**	**26**	**30**
Height - indoor unit	29.00	29.00	35.25	37.75	37.75	41.50	41.50	49.00	52.75	67.25	61.50	85.50	61.50
Width	31.50	44.00	44.00	50.50	61.50	66.50	72.00	72.00	80.00	61.50	80.00	61.50	93.50
Height for outdoor unit includes base drip lip	36.25	36.38	42.63	45.13	45.13	49.25	49.25	56.75	60.50	n/a	69.25	n/a	69.25
Weight add for outdoor unit (lbs/in. of unit length)	1.66	1.91	1.91	2.04	2.27	2.40	2.51	2.51	2.68	n/a	2.68	n/a	2.94
Access or blank													
-Small horizontal	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	48.05	57.43	60.55	66.67	74.92	80.55	84.67	88.41	96.28	89.63	100.65	98.73	110.78
-Medium horizontal	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	59.91	71.18	75.25	82.74	92.66	99.61	104.57	109.45	119.10	111.84	124.79	123.71	136.97
-Extended-medium horizontal	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	74.73	88.37	93.62	102.82	114.83	123.43	129.44	135.74	147.62	139.60	154.97	154.93	169.71
-Medium-large horizontal	24.50	24.50	24.50	26.50	26.50	26.50	26.50	24.50	24.50	26.50	24.50	26.50	24.50
	121.60	107.28	113.84	132.94	148.08	159.18	166.74	164.66	178.99	170.14	188.17	189.27	205.72
-Large horizontal or turning	34.00	34.00	34.00	36.00	36.00	36.00	36.00	36.00	34.00	36.00	46.00	46.00	46.00
	137.75	164.85	179.46	208.50	235.01	257.70	271.35	293.42	314.60	315.97	413.45	428.50	457.18
-Extra-large horizontal or turning	36.00	41.00	41.00	44.00	42.50	42.50	42.50	44.00	50.25	50.25	56.50	56.50	56.50
	143.68	188.92	205.18	240.63	263.83	288.68	303.68	335.49	407.29	395.09	476.83	494.06	525.93
-Ducted inlet or ducted outlet section	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	48.10	57.40	60.50	66.70	74.90	80.50	84.70	88.40	96.30	89.60	100.60	98.70	110.80
Blender	19.00	24.50	24.50	26.50	36.00	36.00	36.00	36.00	34.00	30.500	46.00	36.00	46.00
	94.86	132.71	146.30	173.34	238.64	264.12	276.73	303.71	323.59	300.15	427.13	385.06	470.25
Cool Dry Quiet (CDQ) Desiccant Dehumidification	52.00	52.00	52.00	52.00	55.00	58.00	58.00	58.00	56.00	n/a	56.00	n/a	58.00
	495.00	651.00	694.00	792.00	1011.00	1165.00	1326.00	1390.00	1793.00		1876.00		2029.00
Coils													
-Small horizontal (with 4-row UW)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	116.10	148.55	174.35	205.79	244.49	285.13	307.44	352.47	433.37	433.22	502.46	523.01	572.50
-Medium horizontal (with 8-row UW)	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	168.65	220.23	265.58	318.97	382.53	450.07	488.32	569.79	700.27	690.67	817.63	840.58	941.48
-Extended-medium horizontal (with 8-row UW)	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	185.58	239.53	286.06	341.16	406.80	476.00	516.35	599.24	737.96	721.58	858.03	878.74	985.30
-Medium-large horizontal (with 10-row W)	24.50	24.50	24.50	26.50	26.50	26.50	26.50	24.50	24.50	26.50	24.50	26.50	24.50
	270.61	359.79	433.08	554.88	656.63	777.26	884.93	1013.57	1262.10	1175.58	1478.66	1503.93	1503.93
-Large horizontal or vertical (with 10-row W)	34.00	34.00	34.00	36.00	36.00	36.00	36.00	36.00	34.00	36.00	46.00	46.00	46.00
	302.77	396.45	471.99	597.03	702.74	826.53	938.18	1081.30	1333.70	1234.32	1652.36	1652.73	1652.73
-Electric Heat Coil	36.00	41.00	41.00	44.00	42.50	42.50	42.50	44.00	50.25	n/a	46.00	n/a	56.50
	295.00	364.00	413.00	480.00	563.00	622.00	666.00	731.00	876.00		1012.00		1244.00
Integral-face-and-bypass coil													
-Less than 4 rows	n/a	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50
	n/a	355.20	367.21	470.21	541.93	585.86	619.66	733.14	792.88	858.31	805.52	1047.84	940.46
-4 rows	n/a	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00
	n/a	543.54	560.74	725.48	835.34	901.70	950.23	1131.90	1216.48	1313.83	1399.66	1613.03	1439.40
Controls section (includes largest available VFD)	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50
	184.00	208.00	253.00	272.00	295.00	315.00	327.00	350.00	428.00	419.00	453.00	464.00	487.00

Table 4. Section dimensions (inches) and weights (pounds) - unit sizes 3-30

Unit size	3	4	6	8	10	12	14	17	21	22	25	26	30
Diffuser	10.00	10.00	10.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	19.00	19.00	19.00
	45.70	55.08	58.20	80.39	90.31	97.26	102.22	107.10	116.75	109.49	152.62	152.58	167.36
Discharge plenum													
-Horizontal	34.00	34.00	34.00	36.00	36.00	36.00	36.00	36.00	34.00	36.00	46.00	46.00	46.00
	135.40	162.50	177.11	206.15	232.66	255.35	269.00	291.07	312.25	313.62	411.10	426.15	454.83
-Vertical	36.00	41.00	41.00	44.00	42.50	42.50	42.50	44.00	50.25	n/a	56.50	n/a	56.50
	159.90	211.48	233.54	275.69	306.29	339.58	358.68	401.43	486.37		570.00		634.27
Energy Wheel	n/a	52.00	52.00	52.00	55.00	58.00	58.00	58.00	56.00	n/a	56.00	n/a	58.00
		609.00	663.00	765.00	911.00	1085.00	1208.00	1269.00	1484.00		1595.00		1868.00
Face-and-Bypass Dampers													
-Face-and-bypass	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	105.60	129.06	141.70	157.63	178.68	199.15	209.53	224.50	248.05	137.25	265.62	152.58	291.36
-External face-and-bypass	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	22.00	19.00	27.75	19.00
	122.68	155.15	167.79	190.70	219.68	241.45	255.80	270.77	300.08	153.91	317.53	207.22	353.22
-Internal face-and-bypass or face damper only	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	107.95	140.46	149.91	174.82	203.43	227.60	241.91	255.18	291.55	137.25	306.62	152.58	341.36
Fan													
-Belt-drive plenum fan with motor	36.00	41.00	41.00	44.00	42.50	42.50	42.50	44.00	50.25	n/a	56.50	n/a	56.50
	397.87	538.34	631.36	682.55	875.00	951.91	1069.39	1239.89	1443.56		1494.52		1751.34
-Housed FC fan with motor	36.00	41.00	41.00	44.00	42.50	42.50	42.50	44.00	50.25	50.25	56.50	56.50	56.50
	368.77	449.75	544.28	589.00	721.69	882.15	904.21	1054.64	1329.38	1295.80	1487.55	1511.37	1710.85
-Housed AF/BC fan with motor	36.00	41.00	41.00	44.00	42.50	42.50	42.50	44.00	50.25	50.25	56.50	56.50	56.50
	378.87	467.35	574.68	649.40	849.71	920.08	942.14	1098.21	1432.10	1444.53	1572.28	1609.10	1797.21
-Direct-drive plenum fan with motor	36.00	41.00	41.00	44.00	42.50	42.50	42.50	44.00	50.25	50.25	56.50	56.50	56.50
	373.16	516.35	535.05	692.86	795.54	912.52	936.26	991.99	1380.92	1237.09	1541.05	1600.04	1652.91
Filters													
-Side load 2-in. angled	24.50	24.50	24.50	26.50	26.50	26.50	26.50	24.50	24.50	24.50	24.50	24.50	24.50
	134.55	163.83	175.66	202.44	225.96	251.82	265.94	314.12	347.50	348.70	403.70	418.53	454.19
-Side load 4-in. angled	24.50	24.50	24.50	26.50	26.50	26.50	26.50	24.50	24.50	24.50	24.50	24.50	24.50
	141.89	176.87	192.86	209.64	247.16	254.22	273.54	352.07	379.13	361.27	409.37	470.37	465.65
-Side load cartridge 12-in. or short bag 18-in.	24.50	24.50	24.50	26.50	26.50	26.50	26.50	24.50	24.50	24.50	24.50	24.50	24.50
	125.03	159.79	176.46	220.46	234.88	284.12	303.60	335.02	365.40	342.50	439.69	440.65	479.36
-Side load 2-in. flat	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	70.27	86.53	91.98	103.59	117.74	133.81	141.07	148.02	165.52	160.19	182.07	177.12	198.93
-Side load 4-in. flat	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	81.56	104.62	114.08	117.09	143.40	142.66	154.67	202.82	213.64	189.17	217.75	254.10	249.73
-Side load 2-in. and 4-in. combination flat	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	100.62	128.19	139.09	144.56	174.73	185.69	201.37	252.57	268.17	252.01	288.98	326.16	326.58
-Long bag 30-in.	36.00	41.00	41.00	44.00	42.50	42.50	42.50	44.00	50.25	50.25	46.00	40.00	46.00
	159.54	203.31	223.70	269.26	289.43	330.97	349.19	382.94	461.96	395.90	488.89	462.06	523.37
-Front-load HEPA	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
	240.36	262.50	346.16	368.01	407.75	439.62	452.92	569.28	692.30	595.47	750.47	837.36	822.10
-Front-load cartridge	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
	215.15	237.79	285.59	310.12	341.11	386.04	399.01	470.25	525.86	468.47	580.13	552.53	651.47
-Front-load short bag	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	222.35	246.75	279.75	306.39	335.16	369.65	383.67	432.15	473.60	487.79	518.05	573.98	566.55

Table 4. Section dimensions (inches) and weights (pounds) - unit sizes 3-30

Unit size	3	4	6	8	10	12	14	17	21	22	25	26	30
Gas heat													
- 200 MBH	n/a	n/a	57.00 752.92	57.00 797.85	59.00 852.48	57.00 912.57	57.00 937.05	60.00 1011.83	60.00 1074.91	n/a	n/a	n/a	n/a
- 300 MBH	n/a	n/a	73.00 901.27	73.00 953.49	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- 360 MBH	n/a	n/a	n/a	n/a	77.00 1093.23	73.00 1131.38	68.00 1127.89	71.00 1211.08	69.00 1264.50	n/a	69.00 1348.04	n/a	66.00 1298.88
- 560 MBH	n/a	n/a	n/a	n/a	n/a	n/a	n/a	71.00 1191.99	69.00 1246.59	n/a	65.00 1307.47	n/a	66.00 1441.79
- 700 MBH	n/a	n/a	n/a	n/a	n/a	n/a	n/a	83.00 1479.92	75.00 1503.43	n/a	75.00 1599.35	n/a	76.00 1745.65
- 860 MBH	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	81.00 1606.36	n/a	81.00 1711.24	n/a	76.00 1804.77
- 1000 MBH	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	87.00 1364.25	n/a	90.00 1497.35	n/a	85.00 1560.01
Humidifier													
-Building Steam	14.00 125.00	14.00 146.00	14.00 165.00	14.00 184.00	14.00 226.00	14.00 269.00	14.00 286.00	14.00 324.00	14.00 354.00	14.00 368.00	14.00 398.00	14.00 500.00	14.00 452.00
-Atmospheric Steam	14.00 127.00	14.00 168.00	14.00 178.00	14.00 203.00	14.00 252.00	14.00 276.00	14.00 312.00	14.00 339.00	14.00 396.00	14.00 344.00	14.00 432.00	14.00 396.00	19.00 528.00
Mixing box													
-with angled filters	34.00 137.75	34.00 164.85	34.00 179.46	36.00 208.50	36.00 235.01	36.00 257070	36.00 271.35	36.00 293.42	34.00 314.60	36.00 315.97	46.00 413.45	46.00 428.50	46.00 457.18
-with front/back Traq and top Traq dampers	36.00 191.06	41.00 247.07	41.00 272.06	44.00 321.58	42.50 356.08	42.50 396.49	42.50 418.78	44.00 463.57	50.25 555.65	51.00 549.18	56.50 646.61	n/a	56.50 715.15
-reduced length with side/top/back/bottom airfoil damper	23.40 131.80	23.40 158.30	23.40 177.90	23.40 202.80	23.40 231.60	23.40 257.60	28.40 298.40	28.40 328.40	28.40 370.10	n/a	28.40 408.10	n/a	32.50 485.80
Multizone													
- 3-deck vertical discharge	n/a	n/a	61.00 1125.00	61.00 1313.00	66.00 1671.00	71.00 1899.00	71.00 2063.00	71.00 2211.00	82.00 2757.00	n/a	82.00 2991.00	n/a	82.00 3425.00
- 2-deck vertical discharge	n/a	n/a	61.00 763.00	61.00 899.00	66.00 1099.00	71.00 1266.00	71.00 1380.00	71.00 1526.00	82.00 1882.00	n/a	82.00 2108.00	n/a	82.00 2413.00
-3-deck horizontal discharge	n/a	n/a	52.00 1031.00	52.00 1219.00	52.00 1511.00	57.00 1729.00	57.00 1892.00	57.00 2034.00	72.00 2603.00	n/a	72.00 2829.00	n/a	72.00 3267.00
-2-deck horizontal discharge	n/a	n/a	52.00 701.00	52.00 832.00	52.00 982.00	57.00 1145.00	57.00 1253.00	57.00 1396.00	72.00 1755.00	n/a	72.00 1975.00	n/a	72.00 2264.00
Silencer													
-3 ft	38.00 198.00	38.00 256.00	38.00 286.00	38.00 319.00	38.00 359.00	38.00 442.00	38.00 461.00	38.00 512.00	38.00 573.00	38.00 562.00	38.00 699.00	38.00 659.00	38.00 800.00
-5 ft	62.00 308.00	62.00 391.00	62.00 436.00	62.00 483.00	62.00 541.00	62.00 678.00	62.00 704.00	62.00 780.00	62.00 873.00	62.00 858.00	62.00 1073.00	62.00 1005.00	62.00 1215.00
Trane Catalytic Air Cleaning System (TCACS)	36.00 334.73	36.00 367.14	36.00 389.21	36.00 434.66	36.00 470.05	36.00 497.59	36.00 514.12	36.00 544.30	36.00 599.38	36.00 690.80	36.00 665.11	36.00 777.83	36.00 711.12
UV light	14.00 76.02	14.00 93.64	14.00 98.69	14.00 120.26	14.00 135.22	14.00 146.68	14.00 155.07	14.00 162.95	14.00 179.84	n/a	14.00 188.71	n/a	14.00 218.33

Table 4. Section dimensions (inches) and weights (pounds) - unit sizes 3-30

	Sections below are for outdoor units only												
Unit size	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**17**	**21**	**22**	**25**	**26**	**30**
Diagonal economizer													
-with airfoil dampers	46.00	49.00	50.00	48.00	53.00	53.00	57.00	52.00	63.00	n/a	57.00	n/a	63.00
	187.00	231.00	256.00	276.00	334.00	365.00	407.00	414.00	534.00		548.00		649.00
-with airfoil damper and one side Traq damper	46.00	49.00	50.00	48.00	53.00	53.00	57.00	52.00	63.00	n/a	57.00	n/a	63.00
	204.00	247.00	271.00	290.00	349.00	378.00	426.00	431.00	555.00		565.00		689.00
Exhaust damper section for outdoor unit	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	n/a	19.00	n/a	19.00
	93.30	113.30	124.30	140.20	159.60	176.70	186.80	204.00	229.10		250.50		280.40
Hoods													
-Back inlet hood with airfoil and Traq dampers	22.25	44.00	44.00	50.38	61.50	66.38	71.88	72.00	79.88	n/a	79.88	n/a	93.38
	22.00	45.00	47.00	47.00	52.00	69.00	74.00	74.00	74.00		128.00		166.00
-Side inlet hood with airfoil and Traq dampers	20.00	20.00	20.00	20.00	22.88	22.88	31.38	25.75	29.13	n/a	25.75	n/a	27.88
	17.00	17.00	22.00	22.00	31.00	42.00	50.00	50.00	50.00		84.00		96.00
-Exhaust hood with airfoil damper	20.00	20.00	20.00	20.00	22.88	22.88	31.38	25.75	29.13	n/a	25.75	n/a	27.88
	12.00	12.00	16.00	16.00	21.00	29.00	30.00	30.00	30.00		59.00		67.00
-Economizer inlet hood	45.50	49.00	49.50	48.00	53.00	53.00	56.50	52.00	62.50	n/a	57.00	n/a	62.50
	41.00	37.00	45.00	61.00	68.00	76.00	137.00	174.00	179.00		214.00		224.00
Pipe cabinet weight													
15 inches long, 36 inches deep	104.00	104.00	116.00	120.00	120.00	127.00	127.00	141.00	148.00	n/a	164.00	n/a	164.00
24 inches long, 36 inches deep	122.00	122.00	135.00	140.00	140.00	147.00	147.00	162.00	170.00	n/a	187.00	n/a	187.00
48 inches long, 36 inches deep	169.00	169.00	184.00	191.00	191.00	200.00	200.00	218.00	228.00	n/a	249.00	n/a	249.00
96 inches long, 36 inches deep	263.00	263.00	284.00	293.00	293.00	305.00	305.00	331.00	343.00	n/a	373.00	n/a	373.00

Note: [1]Nominal airflow is based on 500 fpm through a nominal coil (i.e. 500xunit size 8=4000 cfm). [2]Airflow@625 fpm through the flat filter (maximum filter velocity). [3]Height includes standard 2.5-inch base frame for sizes 3-57 and 6-inch base frame for sizes 66-120. [4]Height includes 6-inch base frame for sizes 3-120.[5]Variable lengths available from 14-96 inches. [6]Fan section weights include the heaviest fan with the largest ODP motor available. [7]Nominal length and height shown for discharge plenums. Variable plenum height and length is available from 0.5 to 1.5 of nominal. [8]Access section required with humidifiers for dispersion distance.

Table 5. Section dimensions (inches) and weights (pounds) - unit sizes 31-120

Nominal airflow	15,500	17,500	18,000	20,000	20,500	25,000	25,500	28,500	29,000	33,000	40,000	50,000	60,000
Airflow at 625 fpm	22,138	23,263	25,000	25,519	30,138	34,375	34,306	39,581	39,722	47,225	53,475	65,106	76,388
Unit size	**31**	**35**	**36**	**40**	**41**	**50**	**51**	**57**	**58**	**66**	**80**	**100**	**120**
Height - indoor unit	85.50	67.25	89.00	67.25	104.00	75.75	104.00	85.50	116.25	92.50	107.50	119.75	119.75
Width	72.00	100.00	80.00	112.50	80.00	125.50	93.50	125.50	93.50	140.50	140.50	154.50	182.00
Height for outdoor unit includes base drip lip	n/a	75.00	n/a	75.00	n/a	84.38	n/a	94.13	n/a	97.63	112.63	124.88	124.88
Weight add for outdoor unit (lbs/in. of unit length)	n/a	3.02	n/a	3.28	n/a	3.73	n/a	6.12	n/a	2.57	2.57	2.80	3.25
Access or blank													
-Small horizontal	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	n/a	n/a	n/a	n/a
	106.61	211.11	207.98	227.92	224.38	254.69	242.54	265.35	255.92				
-Medium horizontal	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	15.00	15.00	15.00	15.00
	133.18	241.53	238.68	260.24	257.35	290.28	277.55	302.41	292.80	430.36	449.60	493.59	549.13
-Extended-medium horizontal	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	166.39	279.57	277.04	300.64	298.56	334.76	321.32	348.74	338.89	476.36	497.88	545.85	605.56
-Medium-large horizontal	26.50	24.50	29.50	24.50	29.50	24.50	29.50	24.50	29.50	24.50	24.50	24.50	24.50
	202.93	321.40	319.24	345.09	343.89	410.37	369.46	427.50	389.59	574.11	600.46	656.89	725.47
-Large horizontal or turning	46.00	48.00	46.00	48.00	46.00	48.00	46.00	48.00	46.00	49.00	54.00	60.00	60.00
	467.28	514.42	509.00	557.22	561.11	639.24	615.72	682.26	661.42	907.93	1036.33	1242.40	1387.96
-Extra-large horizontal or turning	n/a	63.75	n/a	63.75	n/a	68.50	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		624.86		675.12		809.42							

Table 5. Section dimensions (inches) and weights (pounds) - unit sizes 31-120

Unit size	31	35	36	40	41	50	51	57	58	66	80	100	120
-Ducted inlet or ducted outlet section	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	106.60	211.10	208.00	227.90	224.40	254.70	242.50	265.30	255.90	372.90	389.30	428.30	478.60
Blender	40.00	48.00	48.00	48.00	48.00	48.00	54.00	48.00	48.00	49.00	54.00	60.00	60.00
	449.80	540.76	495.07	593.46	616.31	675.51	656.33	731.75	718.81	970.30	1112.23	1345.03	1567.62
Cool Dry Quiet (CDQ) Desiccant Dehumidification	n/a	56.00	n/a	56.00	n/a	59.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		2914.00		3122.00		4224.00							
Coils													
-Small horizontal (with 4-row UW)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	n/a	n/a	n/a	n/a
	594.43	690.59	675.23	754.61	792.51	934.27	922.65	1044.33	1014.74				
-Medium horizontal (with 8-row UW)	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	15.00	15.00	15.00	15.00
	968.56	1094.27	1095.29	1219.78	1290.73	1561.92	1523.08	1759.58	1686.19	2220.94	2558.94	3094.04	3638.44
-Extended-medium horizontal (with 8-row UW)	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	1009.31	1148.70	1138.74	1279.06	1337.01	1613.56	1572.75	1813.06	1738.19	2275.46	2615.73	3163.21	3712.02
-Medium-large horizontal (with 10-row W)	26.50	24.50	29.50	24.50	29.50	24.50	29.50	24.50	29.50	24.50	24.50	24.50	24.50
	1737.73	1955.08	2017.86	2216.68	2355.51	2754.49	2791.28	3215.01	3116.00	3876.05	4488.82	5499.42	6713.50
-Large horizontal or vertical (with 10-row W)	46.00	48.00	46.00	48.00	46.00	48.00	46.00	48.00	46.00	n/a	n/a	n/a	n/a
	1896.66	2131.70	2161.23	2401.84	2508.26	2985.19	2955.21	3454.40	3287.59				
-Electric Heat Coil	n/a	63.75	n/a	63.75	n/a	68.50	n/a	48.00	n/a	49.00	n/a	n/a	n/a
		1666.00		1825.00		2267.00		2297.00		2857.00			
Integral-face-and-bypass coil													
-Less than 4 rows	26.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50
	1190.19	1129.66	1407.86	1168.40	1449.00	1793.80	1640.15	1956.80	1817.25	2322.61	2378.60	2865.77	2936.42
-4 rows	43.00	43.00	43.00	43.00	43.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	1836.97	1677.52	2148.28	1720.20	2196.84								
Controls section (includes largest available VFD)	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50	28.50
	496.00	637.00	649.00	674.00	698.00	745.00	747.00	787.00	790.00	964.00	1031.00	1146.00	1266.00
Diffuser	19.00	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	27.50	37.25	37.25	37.25
	164.04	319.05	316.89	342.74	341.54	381.33	367.11	397.35	387.24	571.76	715.78	781.92	860.66
Discharge plenum													
-Horizontal	46.00	48.00	46.00	48.00	46.00	48.00	46.00	48.00	46.00	49.00	54.00	60.00	60.00
	464.93	627.24	621.68	677.47	682.71	772.27	745.34	821.10	798.32	1058.35	1198.64	1423.88	1585.80
-Vertical	n/a	63.75	n/a	63.75	n/a	68.50	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		876.48		949.58		1136.53							
Energy Wheel	n/a	61.00	n/a	65.00	n/a	65.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		2403.00		2742.00		3111.00							
Face-and-Bypass Dampers													
-Face-and-bypass	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	164.04	473.39	274.69	556.23	296.21	630.10	318.97	714.61	336.54	888.33	973.60	1093.88	1205.53
-External face-and-bypass	27.75	22.00	27.75	22.00	27.75	22.00	27.75	22.00	27.75	39.00	39.00	39.00	39.00
	222.16	566.46	341.83	660.36	368.32	740.29	395.56	831.66	417.20	1256.07	1348.84	1498.11	1643.69
-Internal face-and-bypass or face damper only	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	164.04	502.53	274.69	575.62	296.21	678.20	318.97	714.61	336.54	888.33	954.26	1082.84	1194.50
Fan													
-Belt-drive plenum fan with motor	n/a	53.50	n/a	53.50	n/a	57.50	n/a	59.50	n/a	61.00	63.00	73.75	82.25
		2368.54		2740.37		3263.68		3599.82		4062.62	4745.62	6223.51	7341.11
-Housed FC fan with motor	73.25	63.75	80.50	63.75	80.50	68.50	88.00	68.50	88.00	84.00	92.00	96.00	96.00
	1832.18	2400.18	2423.46	2603.08	2771.01	3151.89	3312.75	3235.63	3414.05	4201.67	4922.58	5297.62	5600.08
-Housed AF/BC fan with motor	73.25	63.75	80.50	63.75	80.50	68.50	88.00	68.50	88.00	84.00	92.00	96.00	96.00
	1979.55	2429.71	2568.99	2695.61	2863.54	3221.42	3382.28	3305.16	3483.58	4311.38	5101.29	6025.44	6891.90

Table 5. Section dimensions (inches) and weights (pounds) - unit sizes 31-120

Unit size	31	35	36	40	41	50	51	57	58	66	80	100	120
-Direct-drive plenum fan with motor	73.25	63.75	80.50	63.75	80.50	68.50	88.00	68.50	88.00	84.00	92.00	96.00	96.00
	1673.71	2057.87	2804.47	2406.73	3039.54	3469.95	4268.88	3545.86	4349.06	4903.24	5456.86	7176.65	7382.51
Filters													
-Side load 2-in. angled	24.50	24.50	24.50	24.50	24.50	27.50	24.50	27.50	24.50	27.50	27.50	27.50	27.50
	469.97	593.86	562.37	649.06	652.32	770.02	688.86	797.89	777.14	989.00	1088.02	1157.16	1282.20
-Side load 4-in. angled	24.50	24.50	24.50	24.50	24.50	27.50	24.50	27.50	24.50	27.50	27.50	27.50	27.50
	477.66	594.02	567.56	631.64	663.25	768.20	747.25	805.97	778.73	999.89	1105.14	1201.91	1338.65
-Side load cartridge 12-in. or short bag 18-in.	24.50	24.50	24.50	24.50	24.50	27.50	24.50	27.50	24.50	27.50	27.50	27.50	27.50
	487.55	681.24	637.25	668.25	762.69	878.57	874.81	934.14	980.36	1239.99	1364.91	1746.31	1903.54
-Side load 2-in. flat	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	15.00	15.00	15.00	15.00
	198.17	319.66	322.85	358.18	358.29	408.69	392.33	438.52	426.12	598.12	637.02	716.56	817.63
-Side load 4-in. flat	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	15.00	15.00	15.00	15.00
	241.97	359.20	350.39	375.13	404.69	451.33	461.82	498.71	476.21	657.87	729.15	803.46	913.90
-Side load 2-in. and 4-in. combination flat	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	322.00	476.00	484.13	504.37	570.61	600.40	646.20	671.64	667.97	853.08	981.02	1078.09	1165.92
-Long bag 30-in.	37.25	37.25	37.25	37.25	37.25	37.25	37.25	37.25	37.25	37.25	37.25	37.25	37.25
	505.93	657.41	700.77	716.04	802.78	826.72	883.10	906.56	944.63	1094.61	1270.51	1393.17	1549.80
-Front-load HEPA	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
	874.09	985.62	1176.01	1128.46	1267.90	1397.21	1449.89	1520.35	1561.45	1845.81	2141.38	2553.97	2924.72
-Front-load cartridge	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
	637.18	867.68	796.62	922.78	931.37	1093.06	1061.94	1173.89	1168.54	1449.48	1671.46	1923.09	2155.95
-Front-load short bag	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
	622.53	750.89	778.04	799.75	885.35	917.08	968.65	979.84	1048.59	1231.49	1365.35	1538.95	1696.33
Gas heat													
- 200 MBH	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- 300 MBH	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- 360 MBH	n/a	66.00 1402.11	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- 560 MBH	n/a	66.00 1594.61	n/a	64.00 1468.07	n/a	64.00 1853.53	n/a	64.00 1900.53	n/a	n/a n/a	n/a n/a	n/a n/a	n/a n/a
- 700 MBH	n/a	73.00 1895.19	n/a	75.00 1804.11	n/a	74.00 2190.52	n/a	74.00 2241.91	n/a	74.00 2490.63	n/a	n/a	n/a
- 860 MBH	n/a	80.00 2046.29	n/a	75.00 2098.72	n/a	74.00 2280.52	n/a	74.00 2331.91	n/a	74.00 2580.63	74.00 2198.81	n/a n/a	n/a n/a
- 1000 MBH	n/a	80.00 1723.73	n/a	81.00 1844.68	n/a	77.00 2325.57	n/a	77.00 2082.86	n/a	74.00 2300.63	74.00 1918.81	84.00 3156.04	92.00 3125.34
- 1250-1750 MBH	n/a	101.00 2540.84	n/a	105.00 2717.94	n/a	106.00 3264.84	n/a	106.00 2942.76	n/a	109.00 3309.39	109.00 2949.68	92.00 3878.54	102.00 3886.60
- 2000 MBH	n/a	n/a	n/a		n/a	114.00 3758.71	n/a	114.00 3430.29	n/a	112.00 3688.33	112.00 3320.33	109.00 4503.52	109.00 4391.21
-2400 MBH	n/a	n/a	n/a		n/a		n/a	n/a	n/a	118.00 3890.31	112.00 3455.33	121.00 4715.85	119.00 4668.51
Humidifier													
-Building Steam	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	15.00	15.00	15.00	15.00
	561.00	544.00	622.00	599.00	684.00	782.00	773.00	897.00	807.00	1123.00	1215.00	1363.00	1551.00
-Atmospheric Steam	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
	471.00	581.00	508.00	665.00	570.00	724.00	683.00	803.00	742.00	977.00	1078.00	1265.00	1492.00

Table 5. Section dimensions (inches) and weights (pounds) - unit sizes 31-120

Unit size	31	35	36	40	41	50	51	57	58	66	80	100	120
Mixing box													
-with angled filters	46.00	48.00	46.00	48.00	46.00	48.00	46.00	48.00	46.00	49.00	54.00	60.00	60.00
	467.28	519.12	513.70	561.92	565.81	653.36	629.45	653.36	675.14	946.02	1077.83	1287.99	1433.55
-with front/back Traq and top Traq dampers	n/a	63.75	n/a	63.75	n/a	68.50	n/a	68.50	n/a	84.00	92.00	96.00	96.00
		966.49		1073.80		1261.78		1365.59		1907.28	2151.42	2473.12	2790.48
-reduced length with side/top/back/bottom airfoil damper	n/a	35.50	n/a	38.50	n/a	41.50	n/a	41.50	n/a	41.50	41.50	47.00	53.00
		708.50		795.10		947.60		1022.70		1328.50	1453.60	1731.30	2025.40
Multizone													
- 3-deck vertical discharge	n/a	92.00	n/a	92.00	n/a	96.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		4263.00		4732.00		5739.00							
- 2-deck vertical discharge	n/a	92.00	n/a	92.00	n/a	96.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		2965.00		3267.00		3986.00							
-3-deck horizontal discharge	n/a	78.00	n/a	78.00	n/a	78.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		4020.00		4471.00		5276.00							
-2-deck horizontal discharge	n/a	78.00	n/a	78.00	n/a	78.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a
		2725.00		3006.00		3633.00							
Silencer													
-3 ft	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
	826.00	918.00	951.00	974.00	1013.00	1226.00	1142.00	1332.00	1312.00	1573.00	1741.00	2196.00	2555.00
-5 ft	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00
	1272.00	1335.00	1478.00	1439.00	1558.00	1795.00	1759.00	1945.00	2030.00	2313.00	2555.00	3230.00	3786.00
Trane Catalytic Air Cleaning System (TCACS)	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
	825.55	881.59	916.32	935.35	945.79	1044.28	1043.64	1148.17	1132.38	1362.38	1451.30	1707.27	1881.13
UV light	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	15.00	15.00	15.00	15.00
	n/a	325.48	n/a	352.71	n/a	394.34	n/a	419.43	n/a	574.52	604.11	667.60	758.72
Sections below are for outdoor units only													
Diagonal economizer													
-with airfoil dampers	n/a	75.00	n/a	83.00	n/a	72.00	n/a	76.00	n/a	83.00	86.00	93.00	93.00
		931.00		1062.00		1120.00		1223.00		1680.00	1851.00	2173.00	2396.00
-with airfoil damper and one side Traq damper	n/a	75.00	n/a	83.00	n/a	72.00	n/a	76.00	n/a	83.00	86.00	93.00	93.00
		973.00		1101.00		1169.00		1266.00		1722.00	1920.00	2290.00	2494.00
Unit size	**31**	**35**	**36**	**40**	**41**	**50**	**51**	**57**	**58**	**66**	**80**	**100**	**120**
Exhaust damper section for outdoor unit	n/a	24.50	n/a	24.50	n/a	24.50	n/a	22.40	n/a	22.40	22.40	22.40	22.40
		450.80		489.90		565.60		586.60		755.30	820.10	935.50	1058.30
Hoods													
-Back inlet hood with airfoil and Traq dampers	n/a	99.88		112.38	n/a	125.38	n/a	125.38	n/a	126.00	140.00	140.00	167.25
		176.00	n/a	195.00		230.00		270.00		317.00	344.00	491.00	566.00
-Side inlet hood with airfoil and Traq dampers	n/a	40.88		40.88	n/a	44.75	n/a	37.25	n/a	37.25	37.25	43.00	48.75
		122.00	n/a	128.00		161.00		174.00		189.00	258.00	412.00	415.00
-Exhaust hood with airfoil damper	n/a	40.88		40.88	n/a	39.63	n/a	37.25	n/a	37.25	37.25	43.00	48.75
		73.00	n/a	77.00		93.00		114.00		129.00	174.00	206.00	221.00
-Economizer inlet hood	n/a	75.00		83.00	n/a	72.00	n/a	75.50	n/a	83.00	86.00	93.00	93.00
		195.00	n/a	275.00		358.00		345.00		418.00	522.00	629.00	778.00
Pipe cabinet weight													
15 inches long, 36 inches deep	n/a	175.00	n/a	175.00	n/a	191.00	n/a	209.00	n/a	215.00	243.00	265.00	265.00
24 inches long, 36 inches deep	n/a	199.00	n/a	199.00	n/a	216.00	n/a	236.00	n/a	243.00	273.00	298.00	298.00
48 inches long, 36 inches deep	n/a	263.00	n/a	263.00	n/a	284.00	n/a	309.00	n/a	317.00	354.00	385.00	385.00
96 inches long, 36 inches deep	n/a	392.00	n/a	392.00	n/a	421.00	n/a	454.00	n/a	466.00	517.00	558.00	558.00

Fans/Motors

Starter/VFD Weights

Fan weights do not include starter/VFD weights. Table 6 gives approximate starter/VFD weights.

Table 6. Approximate starter and VFD weights per horsepower (lbs.)

Horsepower	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125
Starter[1]	65	65	65	65	65	65	65	65	65	97	97	97	97	97	97	97	97
VFD[2]	123	123	132	124	125	136	151	162	177	197	241	325	332	243	258	294	314

Note: [1]These weights represent the largest available starter. [2]VFD weights include transformer, distribution block, and enclosure.

Motor Weights

Fan weights provided in this manual include the heaviest ODP (open drip-proof) motor. Approximate motor weights are shown in Table 7.

Table 7. Approximate motor weights (pounds)

Motor Type	Motor RPM	Horsepower 3/4	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	100	125
Energy efficient ODP (EEOP)	1800	24	29																
NEMA Premium ODP (HEOP)	1200		39	77	91	147	126	249	300	375	443	594	667						
NEMA Premium TEFC (HETC)	1200		56	96	109	148	185	310	341	423	481	614	655						
NEMA Premium ODP (HEOP)	1800		36	42	47	76	82	118	148	234	263	330	379	488	521	698	808	1114	1238
NEMA Premium TEFC (HETC)	1800		47	54	56	91	108	159	185	285	315	452	481	578	670	808	889	1239	1466
NEMA Premium ODP (HEOP)	3600		36	36	37	89	104	173	203	267	243	261	407						
NEMA Premium TEFC (HETC)	3600		36	53	62	85	103	154	176	287	322	448	496						

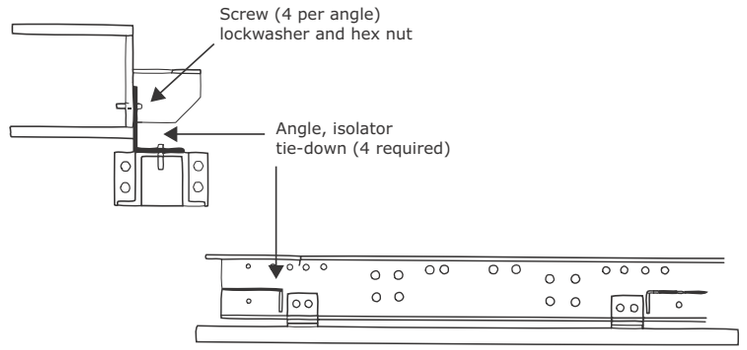
Installation - Mechanical

Lifting and Rigging

Remove Shipping Tie-Downs

Prior to unit placement, remove the shipping tie-downs. See Figure 4.

Figure 4. Isolator tie-down removal



- Shipping tie-downs are located at each corner of the isolation base. See Figure 5, Figure 6, Figure 7, and Figure 8.

Figure 5. Isolator tie-down for unit sizes 3-8

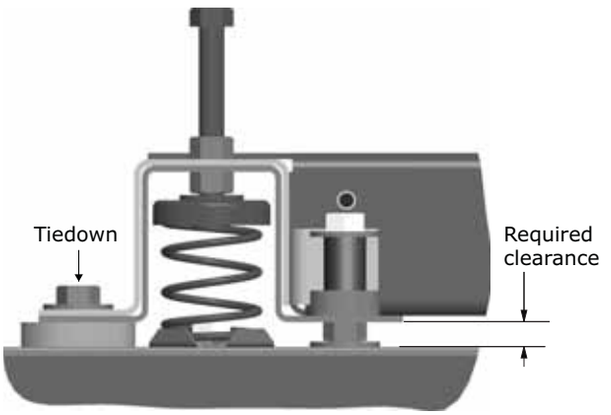


Figure 6. Isolator tie-down for unit sizes 10-30

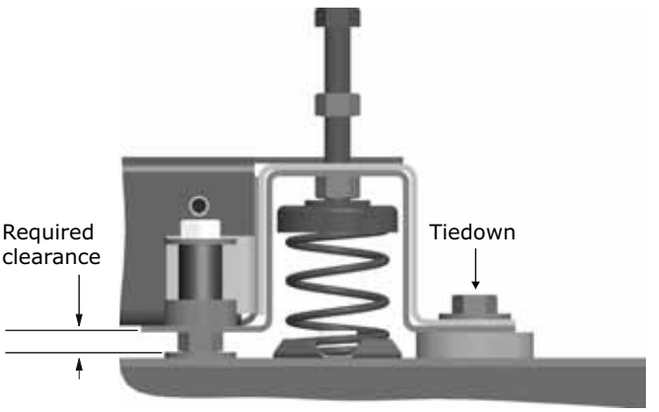


Figure 7. Isolator tie-down removal for unit sizes 66-120

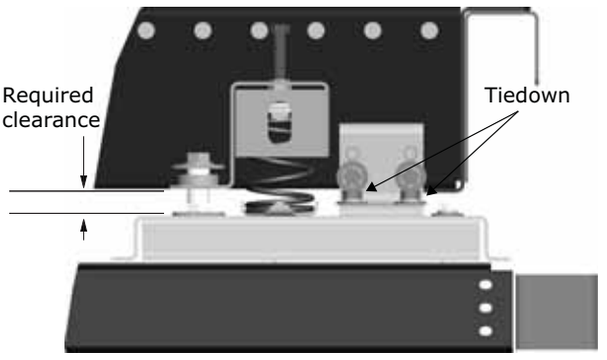
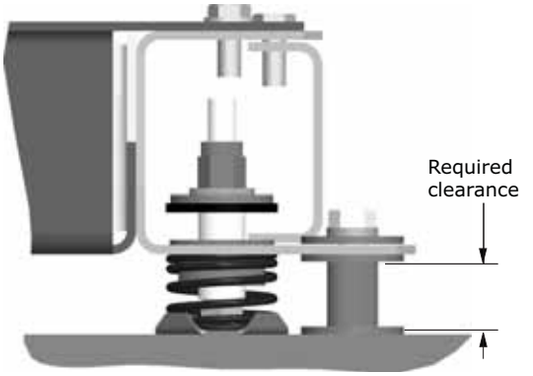
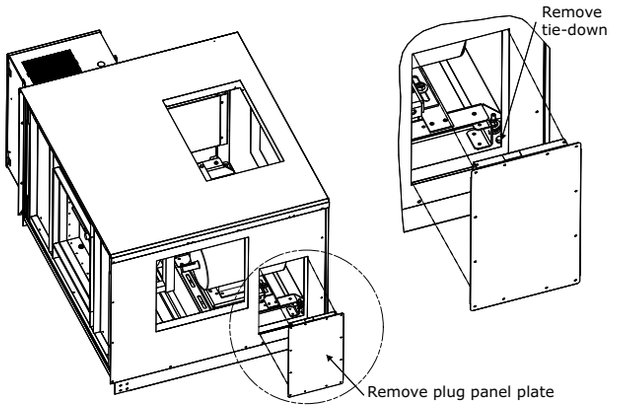


Figure 8. Belt-drive plenum fan tie down



- Access for removal of shipping tie-downs for unit sizes 3-30 is available through the fan section access door or opposite drive-side plug panel. See Figure 9.

Figure 9. Plug panel plate



- Access for removal of shipping tie-downs for unit sizes 3-30 is available through the fan section access door or opposite drive-side plug panel. See Figure 9.
- Remove the bolt. This will release the isolator and make it possible to remove the pipe or spacer.
- Replace plug panel if applicable.

Note: For outdoor air handlers, after isolator tie-down is removed, remove the paper backing from the butyl tape around plug panel perimeter prior to replacing plug panel.

General Lifting Considerations

⚠WARNING

Risk of Unit Dropping!

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

⚠WARNING

Improper Unit Lift!

Test lift unit approximately 24 inches to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level. Failure to properly lift unit could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury and possible equipment or property-only damage.

:

NOTICE:

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. Premature skid removal could result in equipment damage.

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 "Unit Dimensions and Weights" on page 12. Refer to the unit submittals for actual section weights. Test the unit for proper balance before lifting.

For outdoor air handlers, preparation of the roof curb or pier mount and roof openings must be completed before lifting to the roof. See CLCH-SVN04A-EN Roof Curbs for Performance Climate Changer Air Handlers installation instructions for details.

⚠WARNING

Heavy Objects!

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. Other lifting arrangements could cause equipment or property damage. Failure to follow instructions above or properly lift unit could result in unit dropping and possibly crushing operator/technician which could result in death or serious injury.

Always rig subassemblies or sections as they ship from the factory. Never bolt sections together before rigging.

- 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 Figure 10 and Table 8 for lug hole sizes and location.

Figure 10. Lug holes

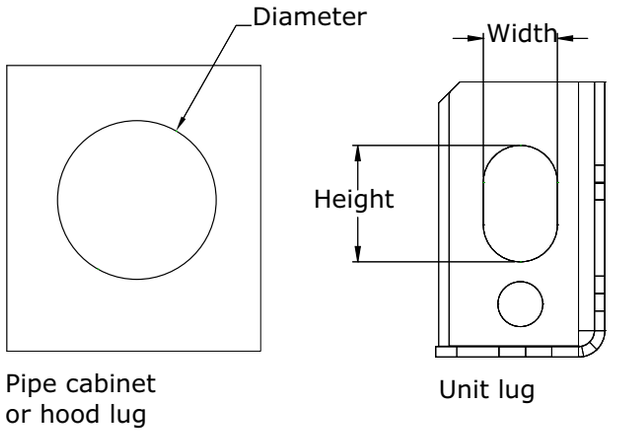
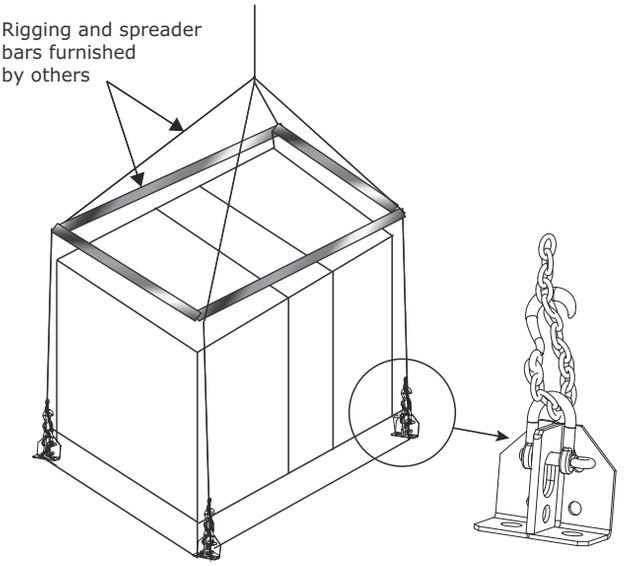


Table 8. Lug hole sizes

Section	Location	Unit Size	Width	Height
Unit Lug Hole Size	Indoor	3-21, 25, 30	0.88	1.38
	Indoor	22, 26, 31, 35-58	1.38	1.25
	Indoor	66-120	1.25	2.75
	Outdoor	3-30	1.25	2.75
Pipe Cabinet	Outdoor	3-120	2.5-in. diameter	
Hood	Outdoor	3-120	1-in. diameter	

- For unit sizes 3 to 120 with integral base frame, use field-provided spreader bars and slings to rig units and subassemblies as shown in Figure 11. The air handler is not designed to be lifted or rigged from the top of the unit.

Figure 11. Lifting detail for unit sizes 3 to 120



- For outdoor units, never stack the pipe cabinet or inlet hood on the unit as it is being lifted.
- Do not attach the intake/exhaust hood or pipe cabinet to the unit prior to lifting the unit. Doing so may damage the equipment. Attach the hoods to the unit only after all sections are in place.
- For outdoor air handlers, all shipping supports and crating on the face of the sections must be removed to permit proper fit-up and sealing of the surfaces. Dispose of properly.

Lifting Hoods and Pipe Cabinets

⚠ WARNING

Risk of Unit Dropping!

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

Figure 12. Lifting inlet and exhaust hoods

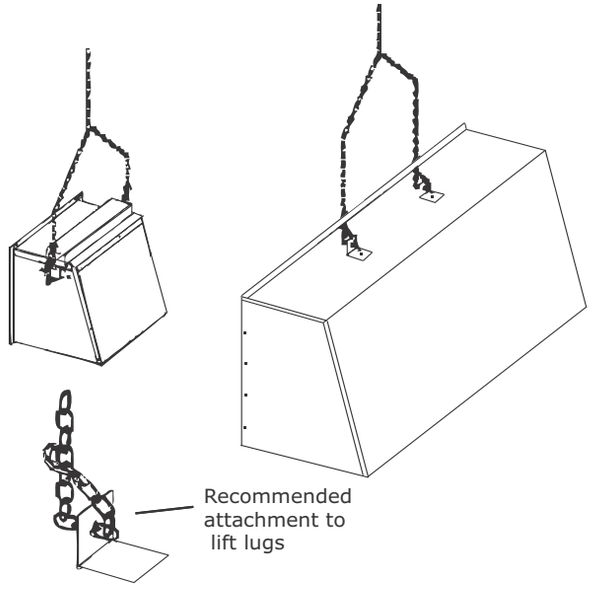
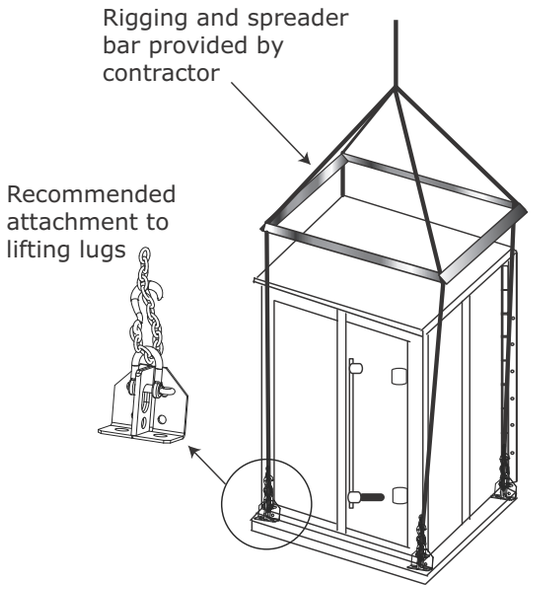


Figure 13. Lifting pipe cabinets



Forklifting Considerations

NOTICE:

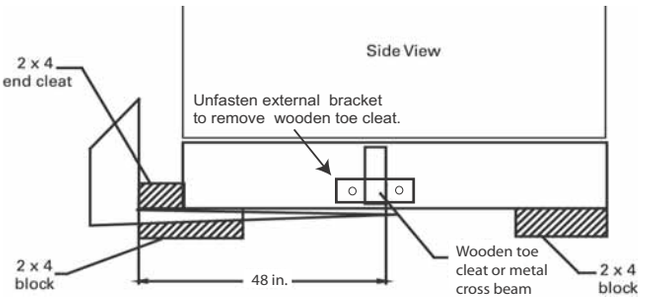
Equipment Damage!

Do not use a fork lift on air handlers or subassemblies larger than size 30. Improper use of fork lifts on units larger than size 30 could result in equipment damage. Trane is not responsible for equipment damage resulting from improper fork lifting practices.

Note: Do not use a forklift on outdoor air handlers or indoor air handlers/subassemblies larger than size 30.

For unit sizes 3-30, 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 14. 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 14. 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; see See “Ceiling Suspension” on page 26.
- Section-to-section assembly; see “Section-to-Section Assembly” on page 27.

⚠WARNING

Toxic Fumes!

Keep open flame away from unit exterior or interior. Do not weld or use cutting torch on the exterior or interior of the unit. The unit contains polyurethane insulation. Flame could produce toxic gas which could result in death or serious injury.

:

NOTICE:

Equipment Damage!

The internal sections of this unit containing electrical components must not exceed 104º F operating temperature. Internal sections of the unit which do not contain electrical components must not exceed 200º F temperature. Failure to comply with temperature requirements could result in equipment damage.

Unit Placement

⚠WARNING

Risk of Unit Dropping!

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

NOTICE:

Microbial Growth!

The floor or foundation must be level and the condensate drain at the proper height for proper coil drainage and condensate flow. Standing water and wet surfaces inside the equipment can become an amplification site for microbial growth (mold), which could cause odors and damage to the equipment and building materials.

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.

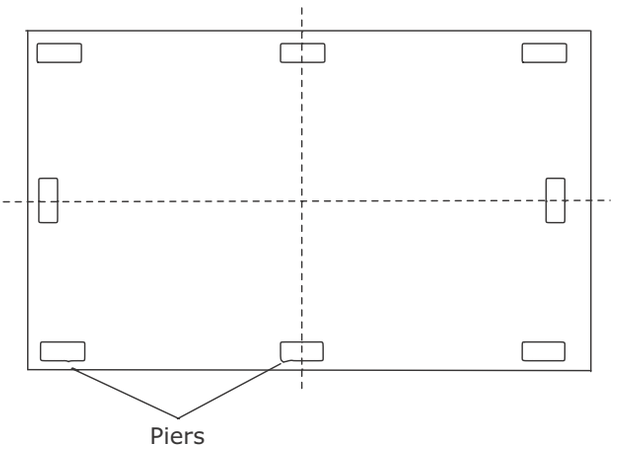
Note: Prior to placing fan section in the appropriate installation location, verify shipping tie-downs have been removed.

For outdoor units, the pipe cabinet must also be mounted as an individual section. Refer to “Pipe Cabinet Installation” on page 32 for specific instructions.

When mounting the unit on a roof curb, make sure the gasketing between the roof curb and unit base provides an airtight seal.

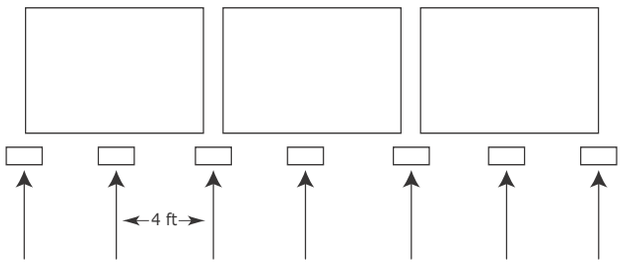
When mounting the unit on a pier mount, locate one pier at each corner as a minimum, directly underneath any shipping split (ensure full support under each side) and then every four feet at equally spaced intervals around the perimeter of the unit. Both the unit and the pipe cabinet should be supported by their base around the entire perimeter. See Figure 15 and Figure 16.

Figure 15. Piers located in each corner and spaced evenly every four feet



Note: Piers beneath shipping splits must be structurally sound to support the weight of the unit.

Figure 16. Side view with two shipping splits - locate one pier directly under each shipping split



Note: 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.

Unit Assembly

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 Requirements" on page 45 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.

Ceiling Suspension

⚠ WARNING

Risk of Unit Dropping!

Do not use mounting legs for ceiling suspension, external isolation, or unit support during module placement. Mounting legs are designed only to secure the unit to the floor, housekeeping pad, or platform. Improper use of the mounting legs as described above could result in unit dropping and crushing technicians which could result in death or serious injury, and equipment damage.

Note: Ceiling suspension is not recommended for units larger than size 57 unless using a field-provided mounting frame.

Using a Field-Provided Mounting Frame

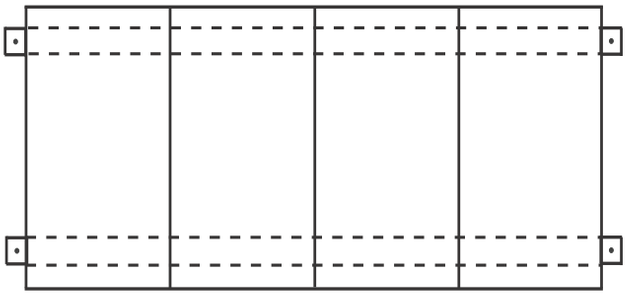
If a field-provided mounting frame is used for ceiling suspension, the installer/contractor must provide a ceiling-suspended mounting frame designed to support the length, width, and weight of the entire air-handling unit. See "Unit Dimensions and Weights" on page 12 for approximate weights.

Note: It is the building engineer's responsibility to size the structural channels and to provide the appropriate hangers.

Structural channels in a field-provided frame can be mounted parallel to airflow or perpendicular to airflow:

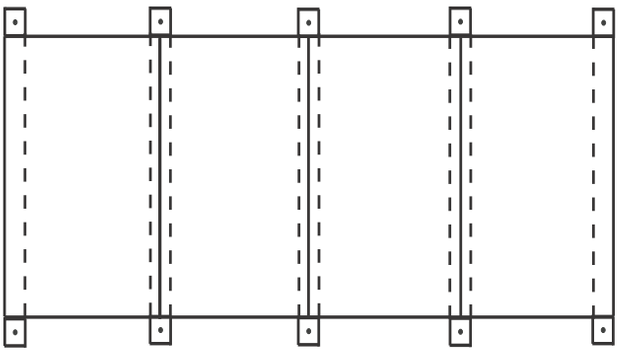
- For parallel-to-airflow channels, size channels based on a four-point load distribution (see Figure 17.

Figure 17. Typical suspension method-parallel channels



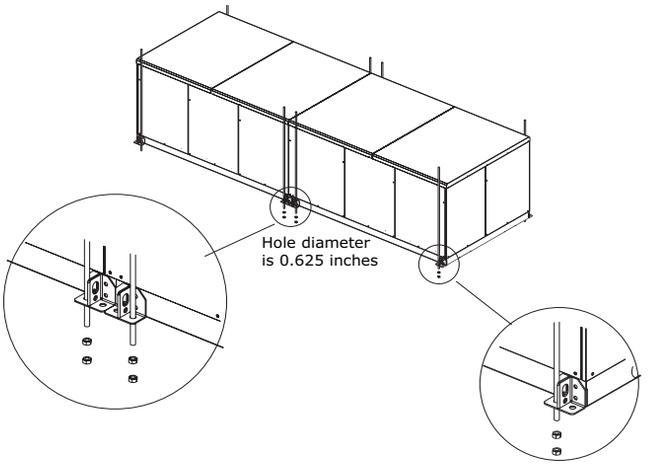
- For perpendicular-to-airflow channels, size channels based on the load distribution of the individual sections and install the channels so that *both ends of every section are supported* (see Figure 18).

Figure 18. Typical ceiling suspension-perpendicular channels



Using Integral Base Frame

Figure 19. Ceiling suspension for unit sizes 3-57



If using the factory-provided integral base frame for ceiling suspension, individual sections and/or subassemblies will have base frame shipping splits and base frame lifting lugs. When using the base frame for ceiling suspension:

- Suspend the unit (on both sides of the unit) at each shipping split lug as well as the four corners of the unit (see Figure 19). See Figure 10 and Table 8 on page 23 for lug hole sizes.
- Bolt shipping splits together.

The hanger rods must extend through the bottom of the base lug. It is the building engineer's responsibility to provide the appropriate hangers.

Shipping Gussets

Prior to pulling the shipping splits together, the shipping gussets (see Figure 20) should be removed to simplify panel removal (except for units required OSHPD certification). If there is enough access after joining the shipping splits, the gussets can be removed after they are joined. The exception to this rule is for size 35-50 stacked units. For these sizes, the gusset should be left in place for the lower level unit unless they are installed in a shipping split that contains a coil.

Do not mistake the coil structural gusset (see Figure 21) used on unit sizes 66-120 with the shipping gussets.

Figure 20. Shipping gusset

Figure 21. Coil structural gusset

Section-to-Section Assembly

Air handlers ship with all necessary assembly hardware and gasket material. The hardware should be packaged in either a clear plastic envelope or cardboard box inside the fan section, access section, or mixing box.

The number of sections to be assembled often makes it necessary to use more than one section to ship the assembly material; therefore, check all sections thoroughly before contacting your Trane sales representative to report missing items.

Sections are joined with gasketing applied to one of the mating surfaces and hardware to bolt the sections together. The gasketing for section-to-section joints is a closed cell foam with adhesive backing.

To assemble the unit:

1. Locate the mounting hardware and gasket material.
2. All shipping supports and crating on the face of the sections must be removed and discarded to permit proper fit-up and sealing of the surfaces. Remove any shipping bolts located on the mounting surfaces of the sections (see Figure 22).
3. Apply the gasketing to one of the mating surfaces; see Figure 22, Figure 23, and Figure 24.

Figure 22. Section-to-section installation

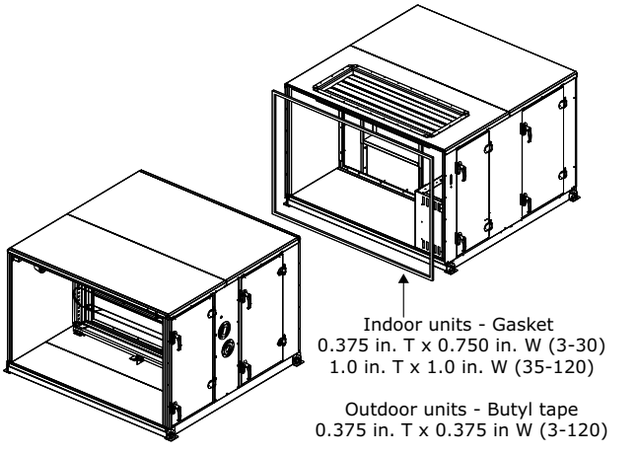
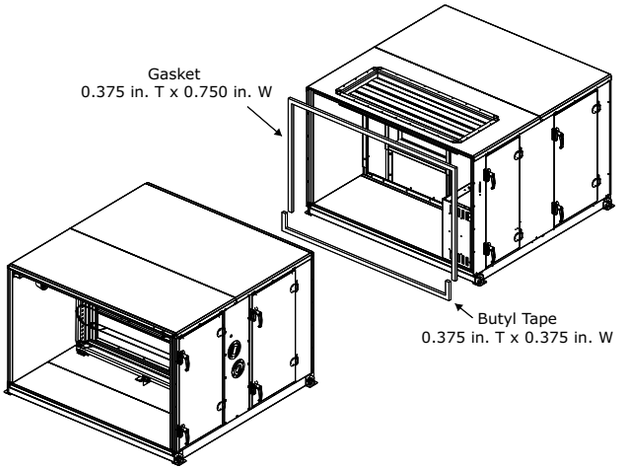
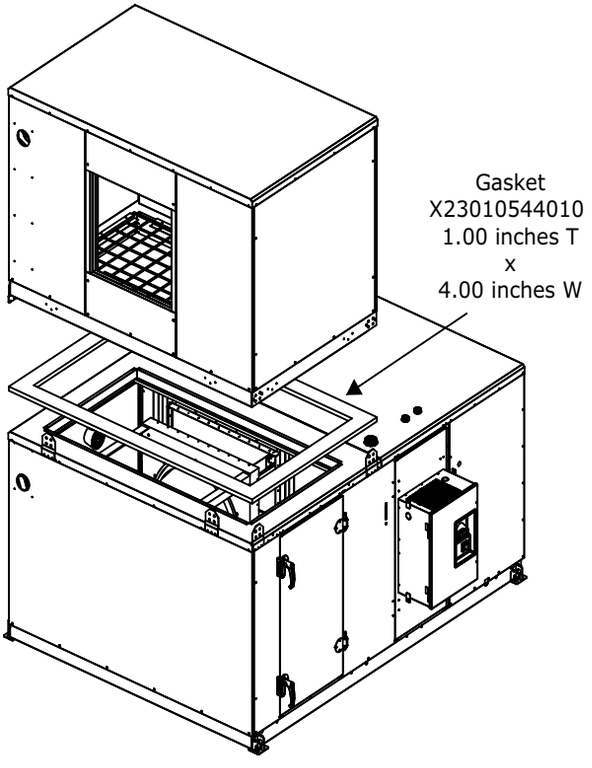


Figure 23. Coil-section-to-downstream-section bolt up with splash guard



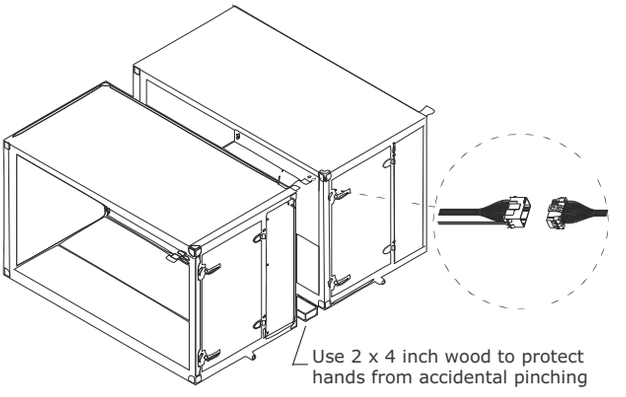
Note: Reference the appropriate controller manual for more details on the installation of units with factory-mounted controls.

Figure 24. Stacked unit assembly (shown for sizes 3-50)



4. 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 25).

Figure 25. Horizontal section-to-section quick connects



5. Use a bar clamp to pull adjacent shipping section lifting lugs together.
6. For indoor units sizes 66-120 and for outdoor units size 10-120, a wedge block is provided to aid in pulling and aligning the units together. Attach the wedge blocks to both sides of the units being pulled together, matching the correct wedge block with the correct hole pattern. See Figure 29, p. 30.
7. Verify that the subassembly with the overhang profile on the roof is higher than the mating subassembly. If it is not, raise one end of the subassembly and bring the unit together. See Figure 26.
8. Due to unlevel floor and platforms, the roof may be misaligned as shown in Figure 26. A common solution

is to raise one end of the shipping section to clear the hemming before pulling the units together.

Figure 26. Roof alignment (indoor unit only)

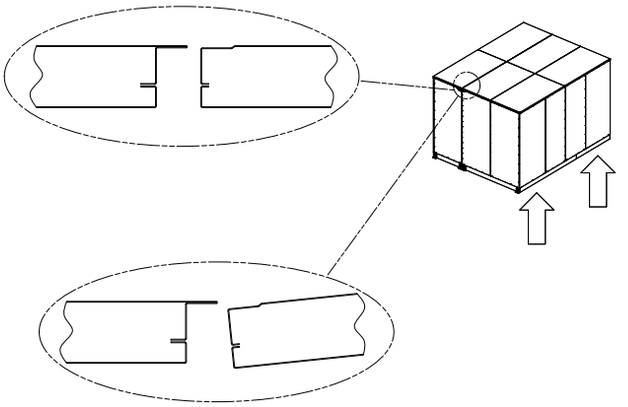


Figure 27. Adjust height of roof by adjusting vertical channels

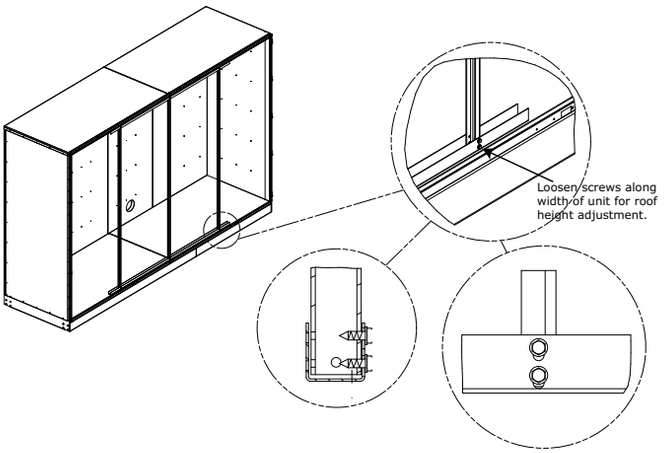
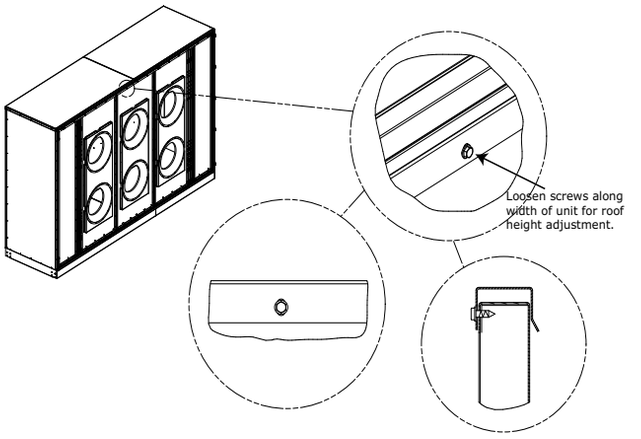


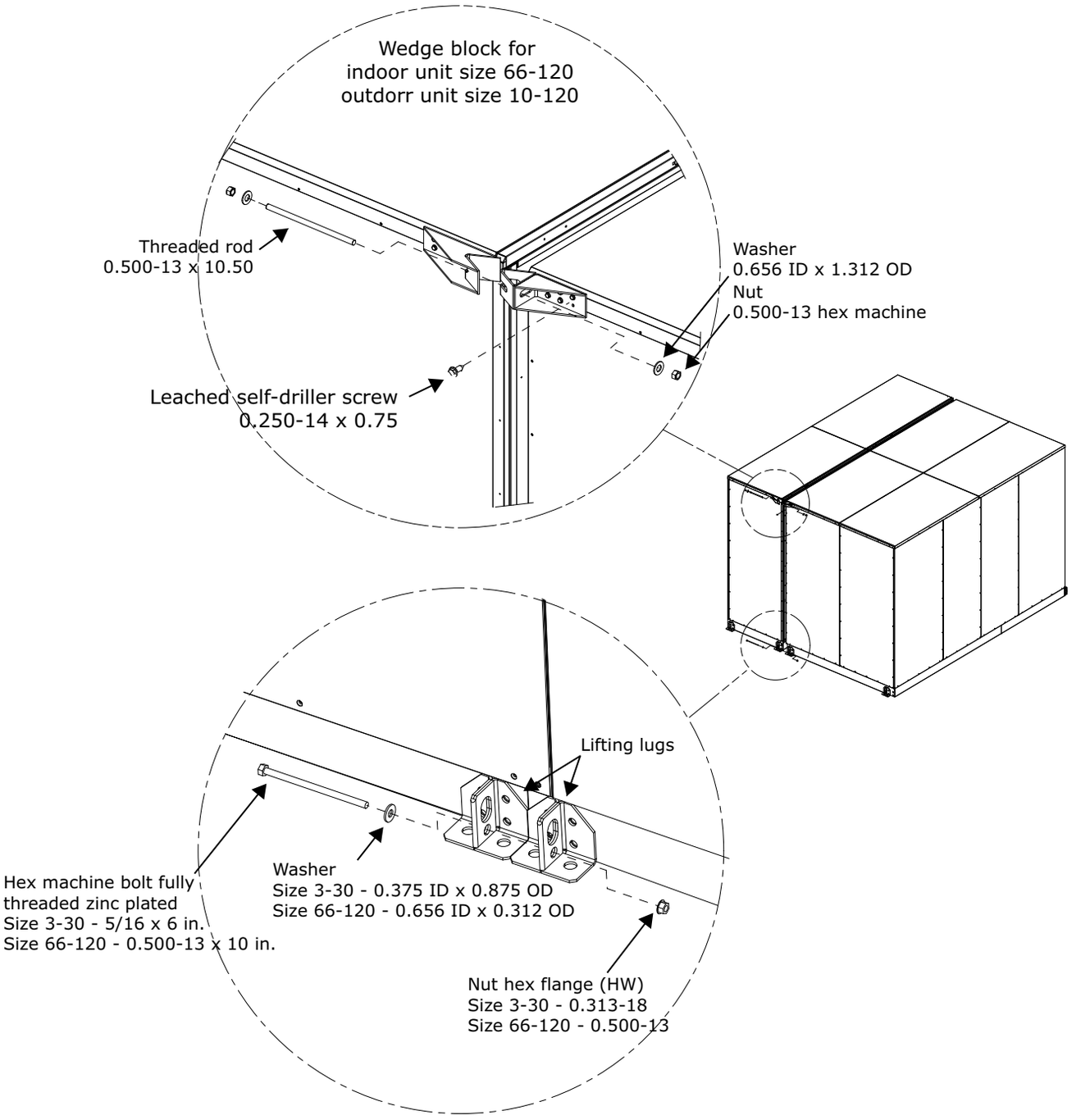
Figure 28. Adjust height of roof by loosening screws



9. In addition, an adjustment can also be made to the height of the roof of either subassembly. At the center (width-wise) of the unit, measure the height of each adjacent subassembly and verify that the subassembly with the overlap sheet metal is higher than the mating subassembly roof. If it is not, adjust the height of either subassembly by loosening the screws in the vertical channels or component structure and adjust the height of the roof. See Figure 27 and Figure 28).

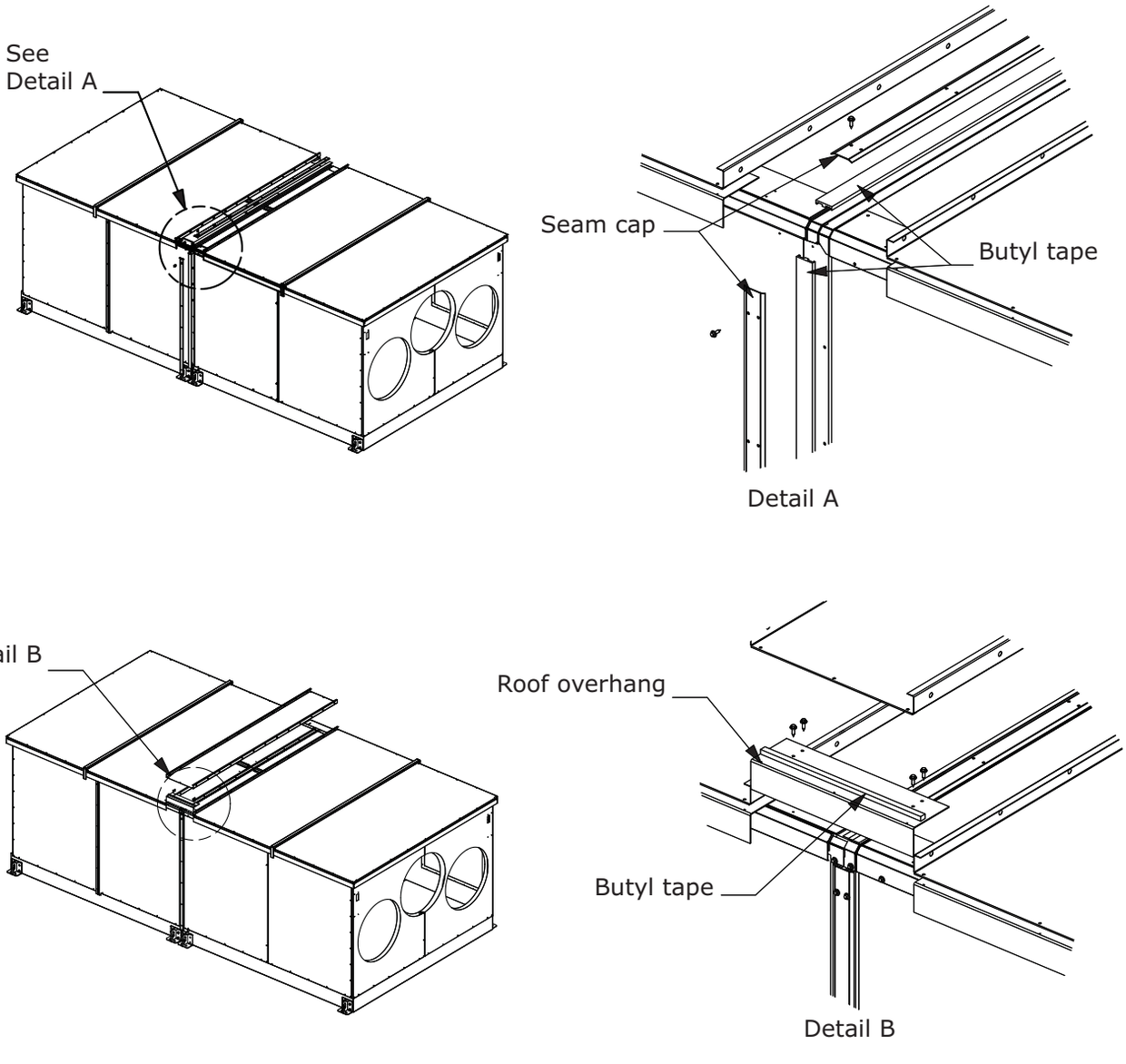
10. For unit sizes 3-30, bolt the unit base frames together using 5/16-inch bolts (see Figure 29).
11. For unit sizes 35-120, bolt the unit base frames together using ½-threaded rod (see Figure 29).
12. For sizes 66-120 only, bolt through the wedge blocks using a ½-threaded rod (see Figure 29). Alternate between tightening on the lifting lug bolts and wedge block bolts until the shipping section comes together.
13. Use straps and come-alongs to compress the gasketing and pull the sections together along the height of the unit.

Figure 29. Base frame split assembly



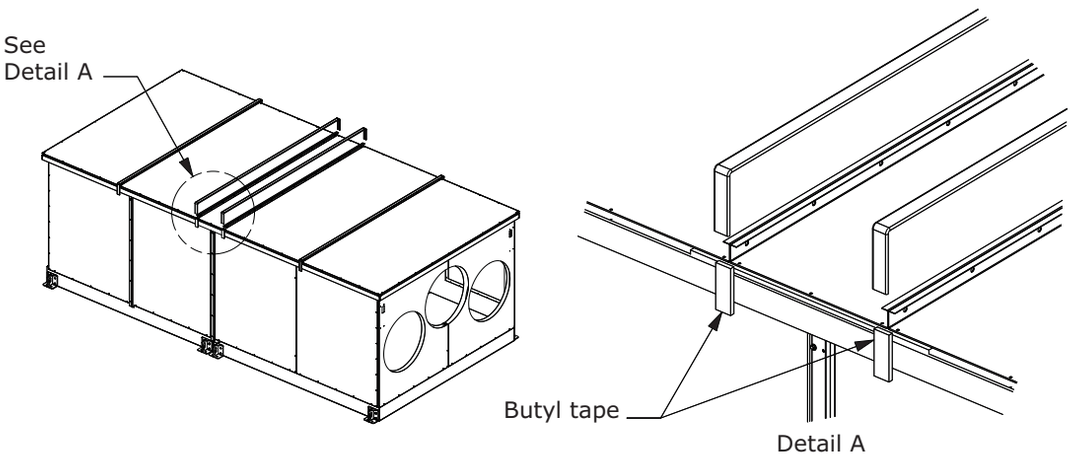
14. Install the section-to-section screws inserting the appropriate screws through the overlapping flanges using a powered impact gun and taking care not to strip the screws. Outdoor air handlers will ship with a seam cap that is to be installed over the section-to-section seams. Factory-supplied butyl tape must be applied over the seam prior to seam cap being applied. See Figure 30.

Figure 30. Section-to-section seam cap installation



15. For outdoor air handlers, attach roof overhang angle with number 10 screws. Join outdoor roof panels together at the seams in the direction perpendicular to airflow and secure them in place with 5/16-inch x 3/4-inch bolts and 5/16 lock nuts. Install the roof joint strip to cover the seam between two outdoor roof panels in the perpendicular to airflow direction of. Use 3/8-inch butyl tape to cover the seam between two outdoor roof panels overhang at the side the unit. Bend joint strip over roof panel and use two number 10 sheet metal screws (one in each roof panel) to secure joint strip. Trim the roof joint strip to insure that it does not protrude more than 1/16-inch beyond outdoor roof overhang (see Figure 31).

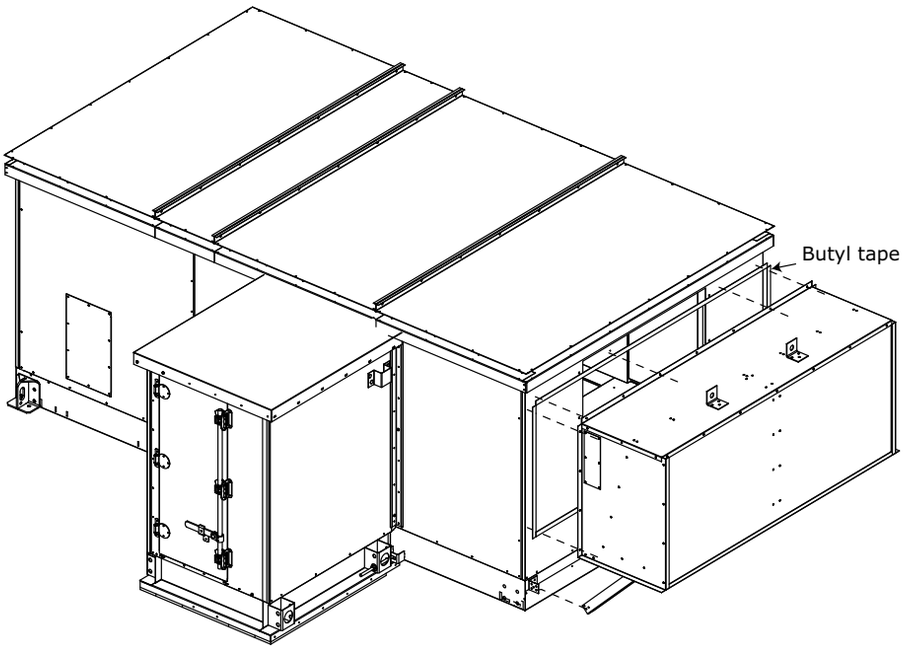
Figure 31. Join outdoor roof panels at the seams



Pipe Cabinet Installation

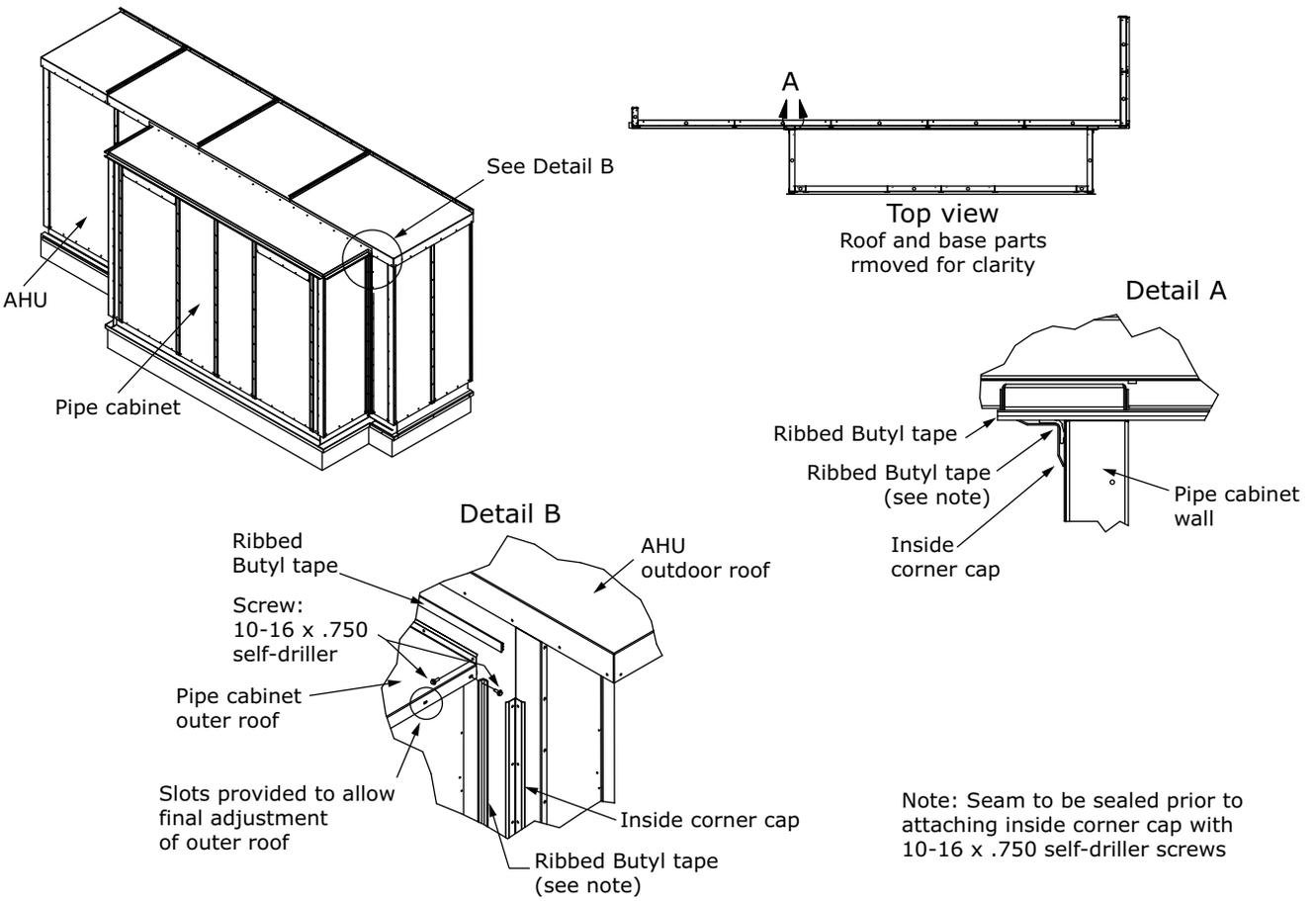
1. After air handler is completely installed and checked for accuracy of level and square, pipe cabinet install can begin.
2. Remove pipe cabinet base cross member by removing the four bolts and nuts.
3. Check to ensure that the structure the pipe cabinet is to be installed on is square and level.
4. Install 3/8-inch x 3/8-inch white butyl tape to flanged side of pipe cabinet wall and remove paper backing from tape. See Figure 32.
5. Lift cabinet into place on to pipe cabinet curb.
6. Slide pipe cabinet tight up against the sidewall of the air handler.
7. Check pipe cabinet side walls to ensure they are plumb.
8. Apply a bead of caulk along the corner between the pipe cabinet and air handler wall prior to installing connecting angle.

Figure 32. Pipe cabinet installation



9. Install inside corner cap. See Figure 33 Detail A and B.
10. Install 3/8-inch x 3/8-inch white butyl tape to unit wall where pipe cabinet roof connects.
11. Lift pipe cabinet roof into place and attach to unit wall with screws. See Figure 33.

Figure 33. Pipe cabinet installation details

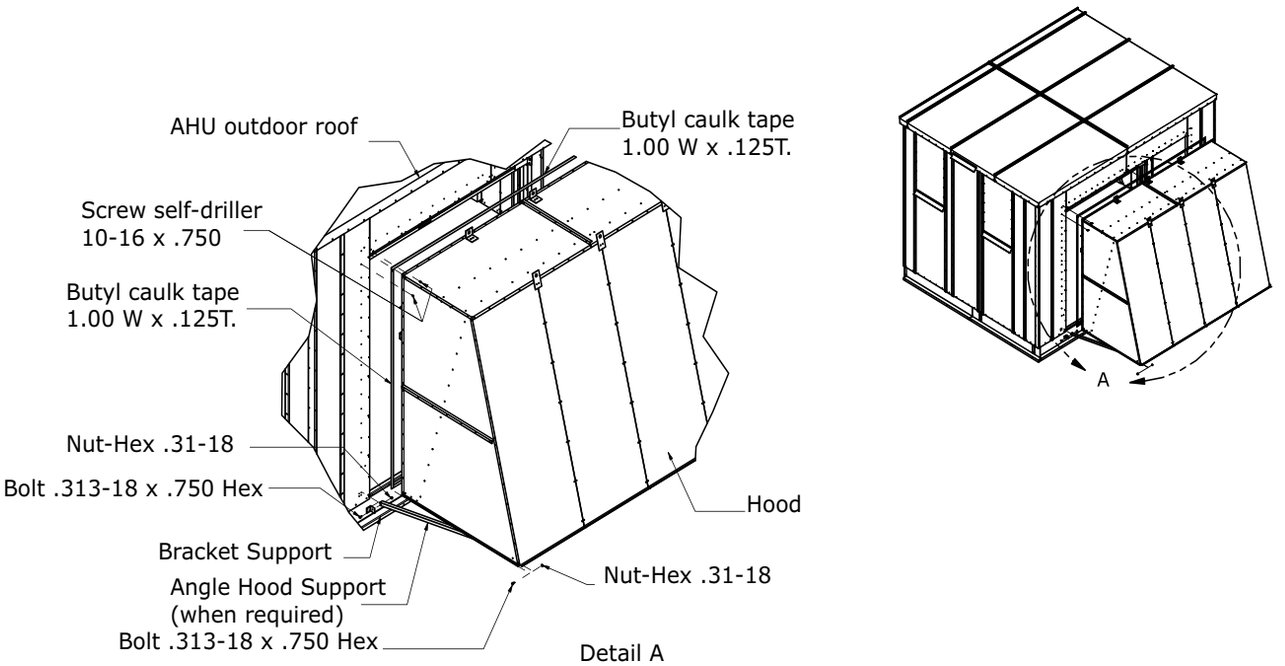


Outdoor Unit Weather Hoods

1. Per the unit drawing determine mounting location of the unit weather hoods.
2. Using the factory provided screws mount the weather hoods to the unit.
3. On larger units, weather hoods may be large enough to require angled down supports. In those cases, the angles are shipped attached to the hood but will need to be connected to the air handler by the installing contractor. See Figure 34.

Note: It is required that the hoods be sealed to the unit using factory-provided butyl/caulk tape.

Figure 34. Hood installation



Stacked Outdoor Units

Assembly hardware

Table 9. Parts list for outdoor stacked units

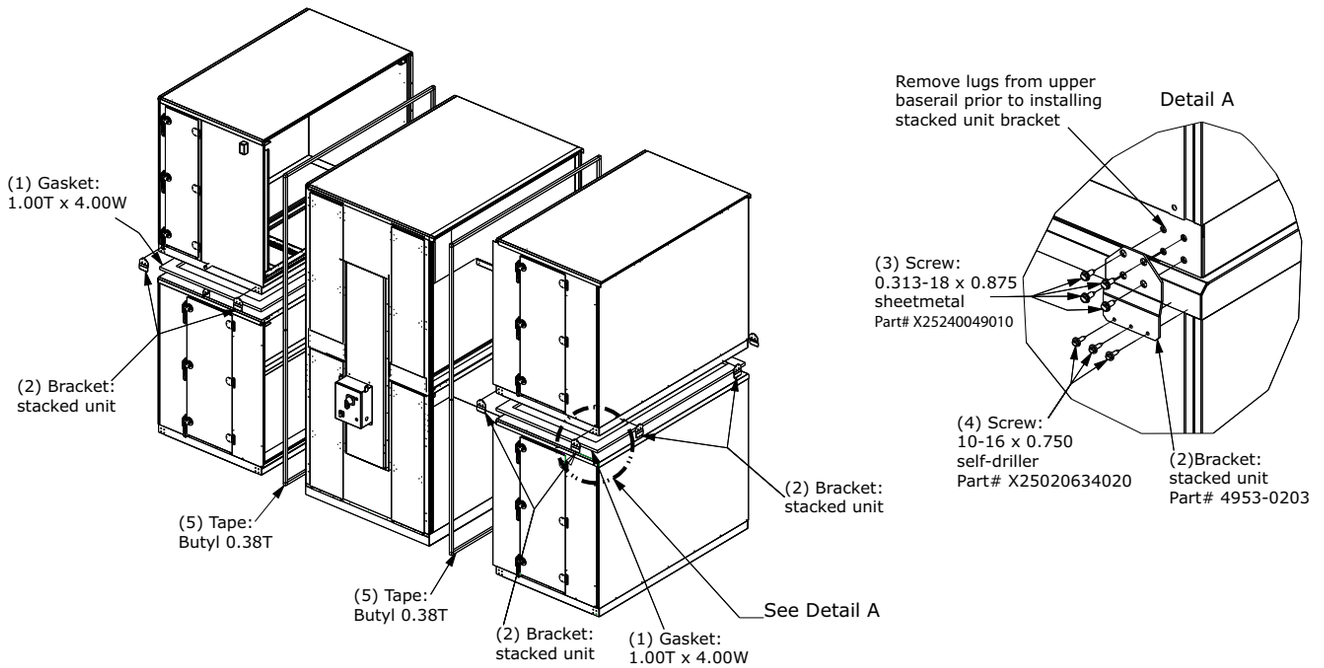
Item	Description
1	Gasket: 1.00T x 4.00W
2	Bracket: Stacked unit
3	Screw: 0.313-18 x 0.875 sheet metal
4	Screw: 10-16 x 0.750 self driller
5	Tape: Butyl 0.38T
6	Tape: Ribbed Butyl
7	Plate: Vertical seam cap
8	Tape: 0.12T x 1.00W, gray Butyl
9	Guard: perpendicular to airflow flashing

Item	Description
10	Guard: Energy recovery end cover
11	Guard: Energy recovery end cover
12	Guard: Direction of airflow flashing
13	Guard: Flashing seam cover
14	Adhesive/sealant: Flex polyurethane
15	Bracket: Hood support
16	Angle: Hood support
17	Screw: 0.250-14 x 0.750 self driller

Unit assembly

1. See Figure 35. Apply gasket (Item 1) on top of lower unit. Compress gasketing to ensure a good air seal between upper and lower sections.
2. Place upper unit on lower unit.
3. Remove lifting lugs from top unit and attach stacking brackets (Item 2) to top and bottom units using screws (Item 3 and Item 4). See Detail A in Figure 35. Stacking brackets (Item 2) are to be used on the right and left sides at each shipping split section end and also on front and back of the unit.
4. Apply Butyl tape (Item 5) to one side of the shipping split section.
5. Slide shipping split sections together, pulling tight using lifting lugs and threaded rod on bottom and straps or pipe clamps on top.

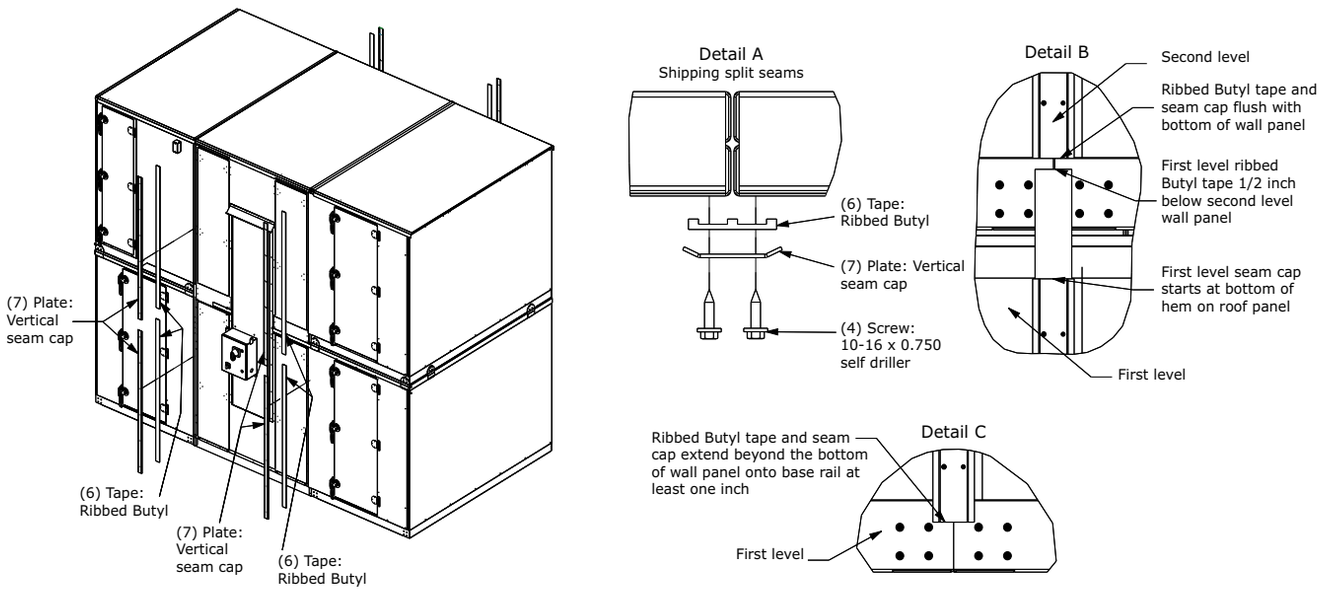
Figure 35. Stacked unit assembly



Vertical Seam Cap Installation

1. See Figure 36. Apply ribbed Butyl tape (Item 6) over all vertical shipping split seams (see Detail A). First level ribbed Butyl tape (Item 6) starts 1/2 inch below second level wall panel (see Detail B), and extends down beyond the bottom of the first level wall panel onto the base rail at least one inch (see Detail C). Second level ribbed Butyl tape (Item 6) starts at bottom of wall panel on second level (see Detail B) and runs up to the top of the second level wall panel.
2. Secure vertical seam cap (Item 7) over ribbed Butyl tape (Item 6) with screws (Item 4) (see Detail A). First level vertical seam cap (Item 7) starts at bottom of hem on roof panels (see Detail B) and extends down onto the base rail at least one inch (see Detail D in Figure 41). Vertical seam cap (Item 7) on second level starts at bottom of wall panel and extends up (see Detail B). Second level vertical seam cap (Item 7) may extend onto the roof panel.

Figure 36. Vertical seam cap installation



Flashing Installation

For additional information, see “Flashing Installation Notes” on page 40.

For hood installations, see “Install flashing and hood” on page 41.

1. See Figure 37. Apply Butyl tape (Item 8) to perpendicular-to-airflow flashing (Item 9) and secure to base rail with screws (Item 4) on front and back of unit (see Detail A in Figure 41).
2. For energy wheel/CDQ wheel, preassemble end covers (Item 10 and Item 11) to direction-of-airflow flashing (Item 12) with screws (Item 4). Apply caulk (Item 14) to create water tight seal (see Detail B in Figure 39).
3. Apply Butyl tape (Item 8) to direction-of-airflow flashing (Item 12) and secure to base rails with screws (Item 4). Start at corners to ensure tight corner seams. Apply caulk (Item 14) to create water-tight seal (see Detail A and Detail C in Figure 40).
4. Install seam covers (Item 13) to all flashing seams (see Detail D in Figure 41).

Figure 37. Flashing installation

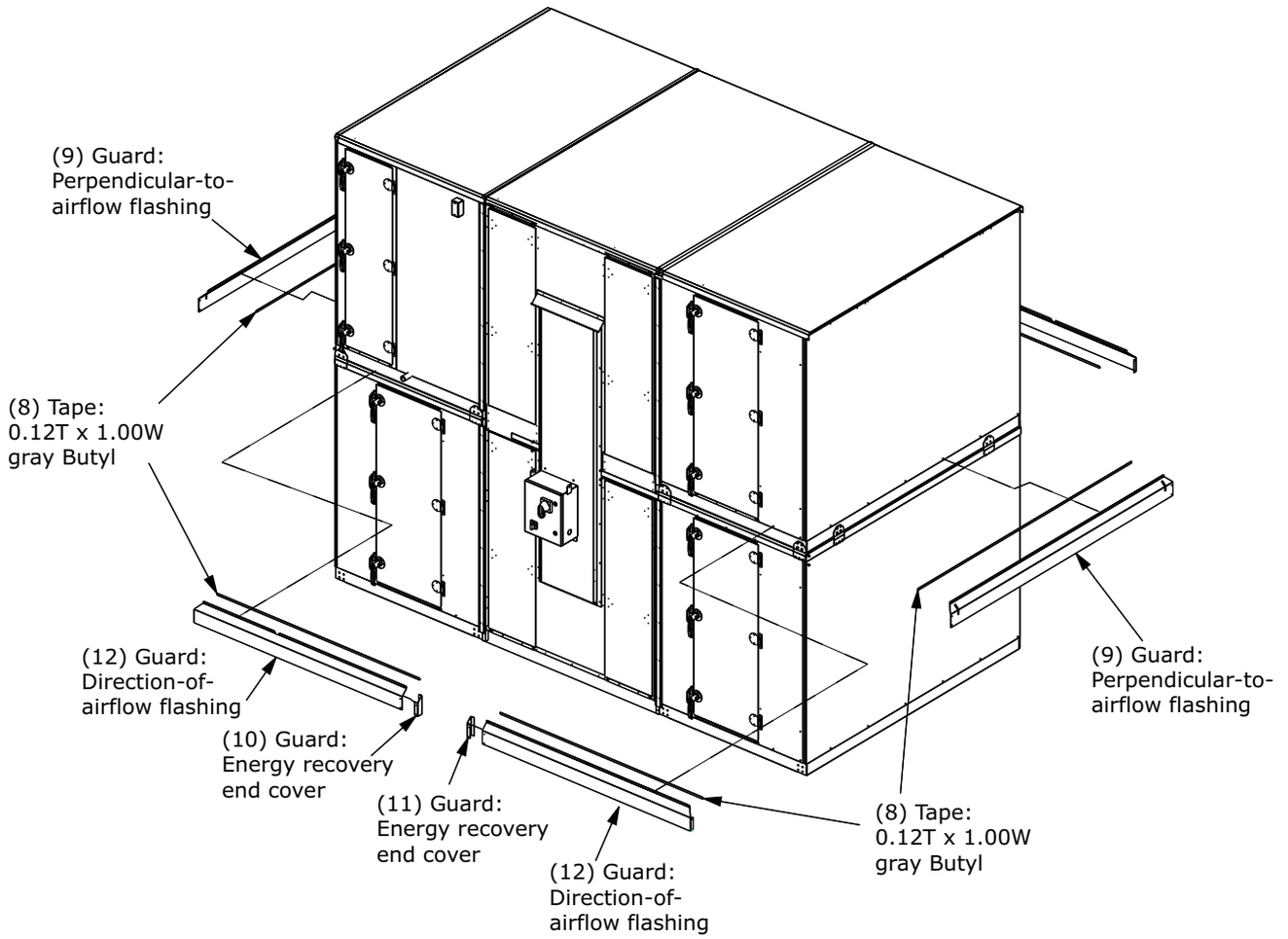


Figure 38. Flashing installation location

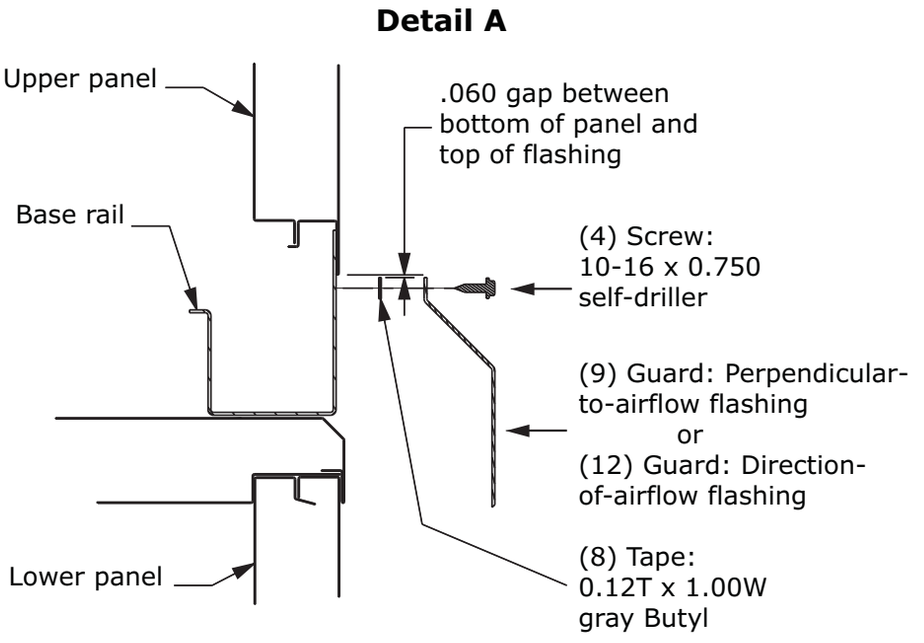


Figure 39. Flashing end cover installation applied to energy wheels and CDQ sections

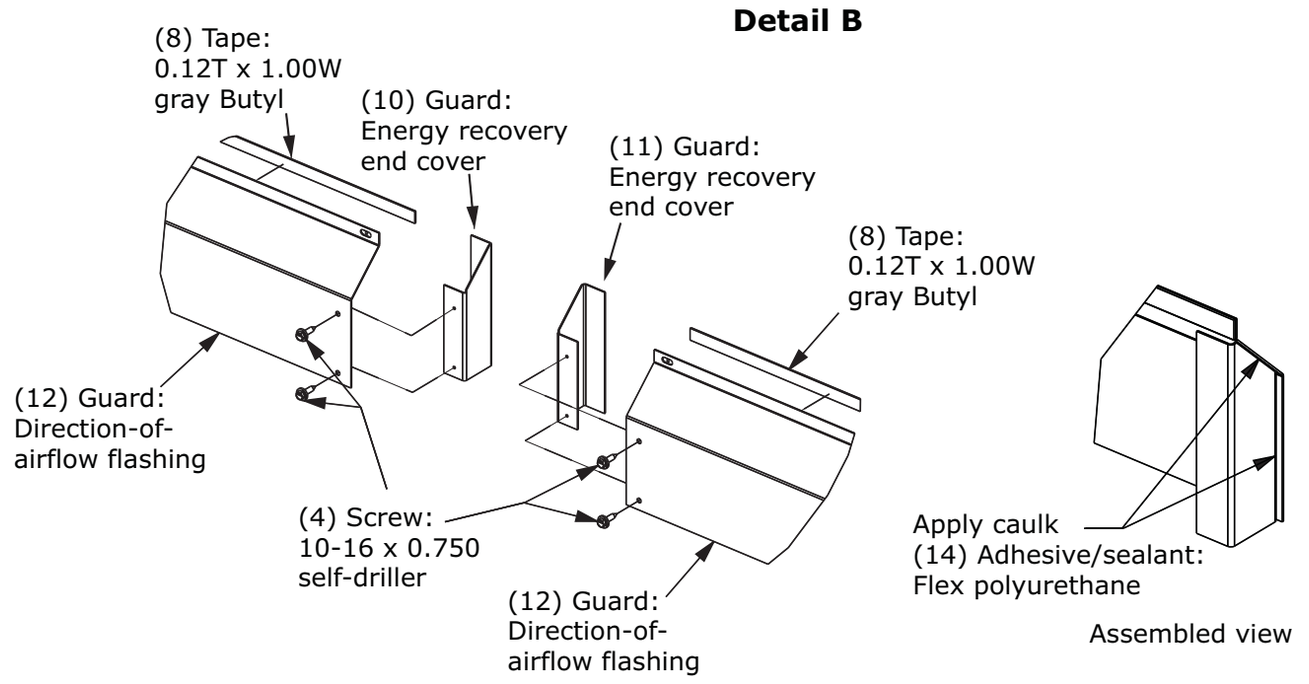


Figure 40. Flashing for corner seams

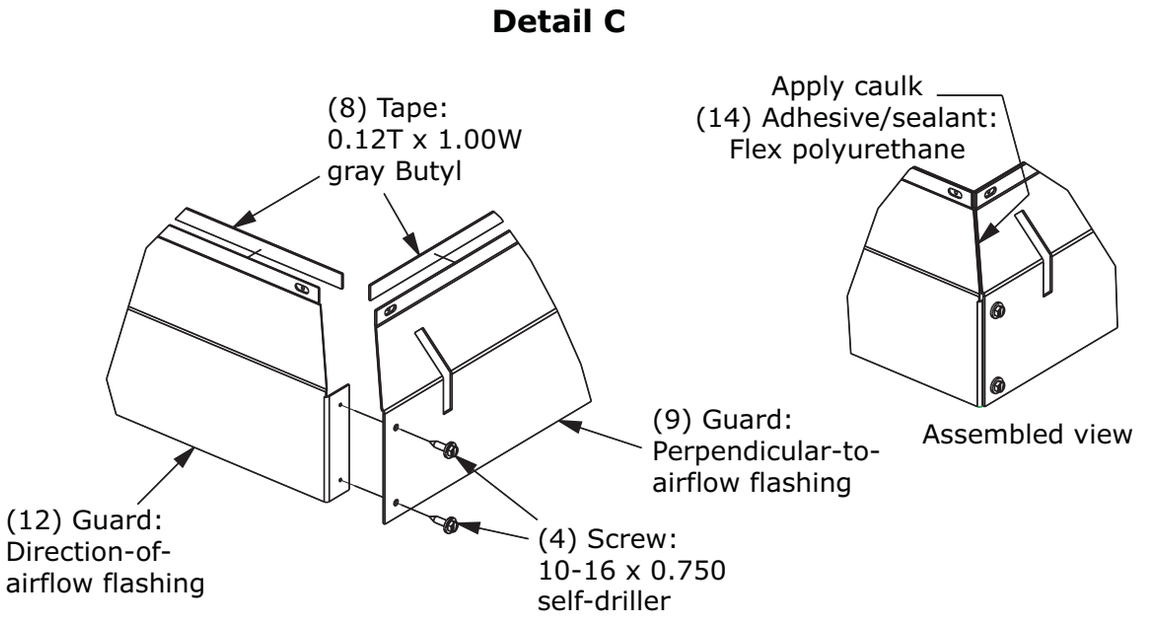
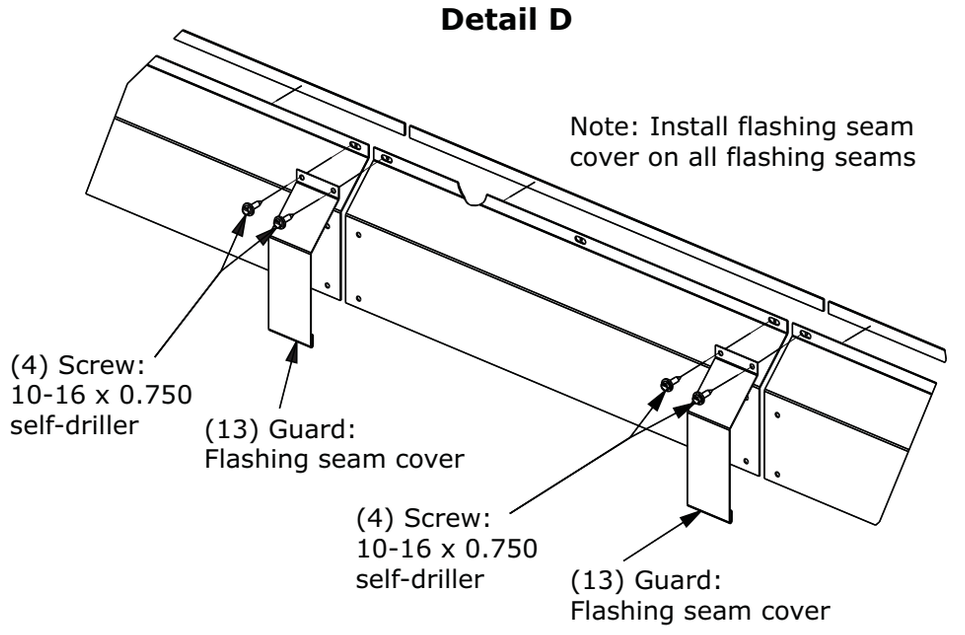


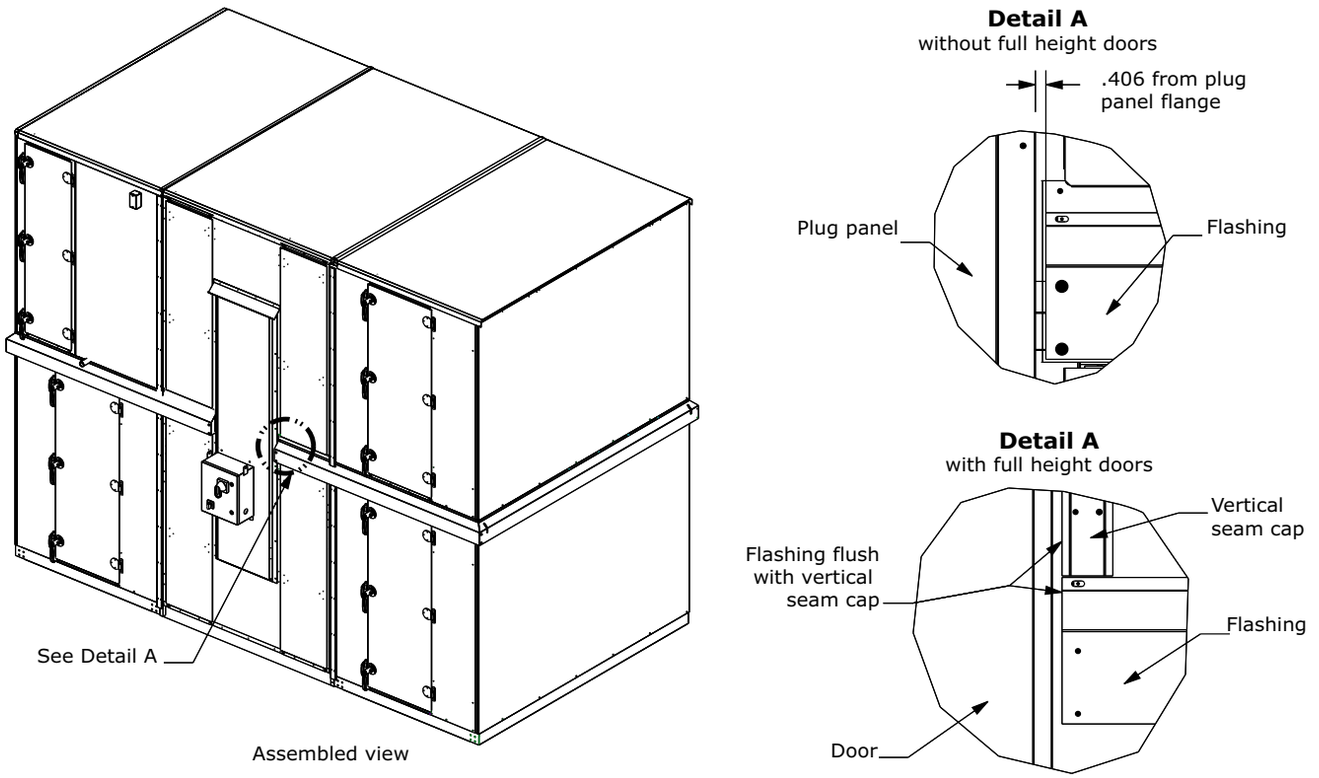
Figure 41. Flashing seam cover installation



Flashing Installation Notes

- Side flashing will have locating features:
  - Right side front and back pieces will have two diamonds and a tab. Intermediate right side pieces (if present) will have two diamonds and length of part will match the ship group length and mounting holes will match hole pattern on the unit.
  - Left side front and back pieces will have one diamond and a tab. Intermediate left side pieces (if present) will have one diamond and length of part will match the ship group length and mounting holes will match hole pattern on the unit.
- Flashing runs full length on right/left sides of unit except on access side when an energy recovery section is present. For energy recovery section without full height doors, flashing will extend to removable plug panel. For energy recovery section with full height doors, flashing will be flush with edge of vertical seam caps (see Detail A in Figure 42).
- Flashing runs full length on front/back of unit. Front/back flashing will not have any locating features and will always have mitre (one piece will have two mitres, two pieces will have one mitre).

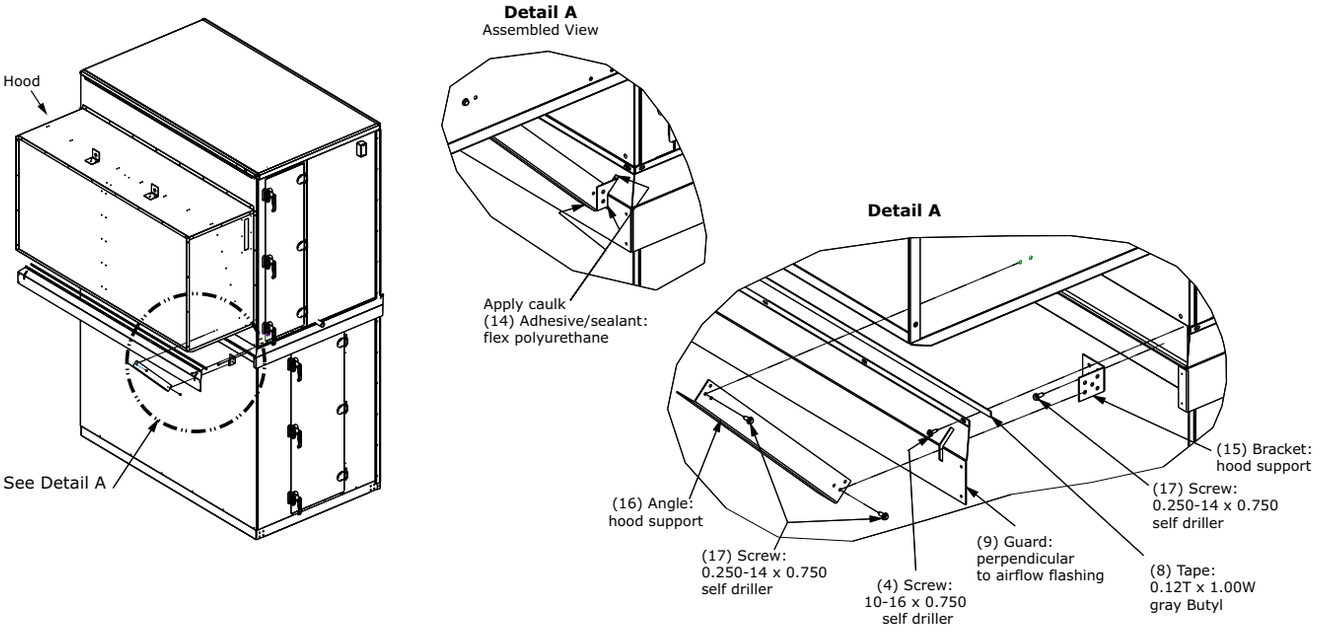
Figure 42. Side flashing installation



Install flashing and hood

1. See Figure 43. Secure two hood support brackets (Item 15) to base rail with screws (Item 17).
2. Apply Butyl tape (Item 8) to flashing (Item 9) and place over hood support brackets (Item 15) using cut in flashing and secure to base rails with screws (Item 4).
3. See “Outdoor Unit Weather Hoods” on page 34 for hood installation instructions.
4. Secure hood support angles (Item 16) to hood support brackets (Item 15) and to the hood side panels with screws (Item 17).
5. Apply caulk (Item 14) around hood support bracket (Item 15), hood support angle (Item 16), and cutout in perpendicular-to-airflow flashing (Item 9) to ensure water-tight seal.

Figure 43. Stacked unit assembly



Indoor Dual-Path SDU/Winterizer Assembly

⚠ WARNING

Heavy Objects!

Do not stack air handlers unless factory-designed and factory-approved. When stacking units, factory-designed unit support brackets must be used. Stacking units without factory-approval and without factory-provided support brackets could result in the base unit collapsing under the weight of the top unit which could result in death or serious injury and property damage.

A dual-path, Split Dehumidification Unit (SDU)/winterizer air handler consists of two units that are stacked together in a draw-thru arrangement that share one supply fan. The unit on the first level (primary unit) is designed to handle the return air and is larger than the unit on the second level (secondary unit), which is designed to handle outside air.

Factory-designed unit support brackets are provided with all factory-approved, dual-path SDUs or winterizer air handlers.

- A horizontal SDU/winterizer dual-path air handler incorporates a horizontal supply fan on the first level with a top opening in the primary unit that aligns with a bottom opening in the secondary unit.
- A vertical SDU/winterizer dual-path air handler incorporates a vertical supply fan on the second level with a back opening that aligns with a front opening in the secondary unit.

To assemble air handlers utilizing factory-approved and factory-provided dissimilar unit sizes for horizontal SDU or winterizer applications, join all similar size shipping sections per “Section-to-Section Assembly” on page 27.

Horizontal SDU/Winterizer Air Handler Assembly

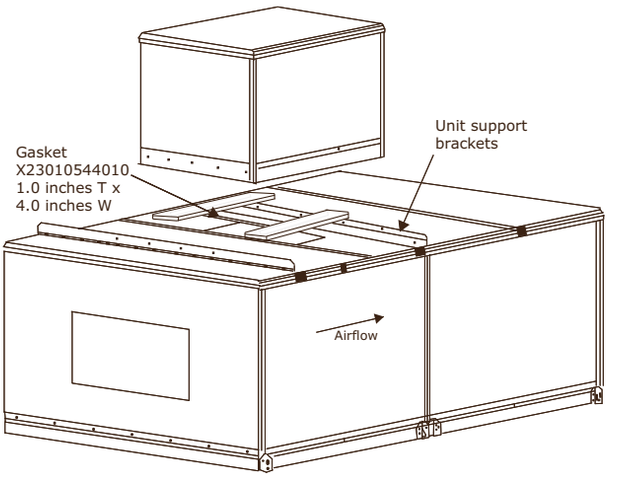
To assemble dissimilar unit sizes for an indoor horizontal SDU/winterizer configuration:

1. Locate the mounting hardware and gasket material.

Note: Black unit support brackets ship pre-installed on the primary (larger) unit section.

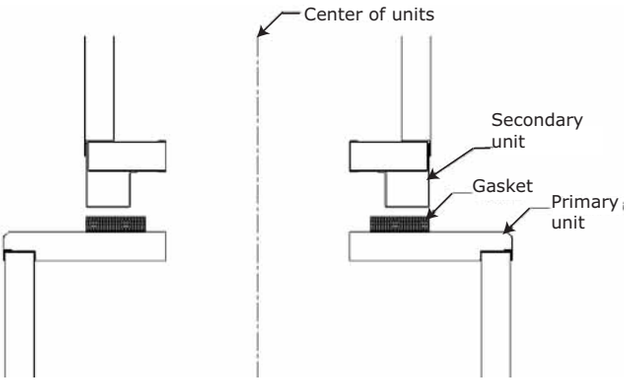
2. Apply gasket in direction of airflow between the black unit support brackets to the roof of the primary unit. See Figure 44. The gasket needs to be placed such that it will be directly under the integral base frame of the secondary (smaller) unit to be stacked on top. The secondary unit will be centered along the width on the primary unit.

Figure 44. Apply gasket in direction of airflow



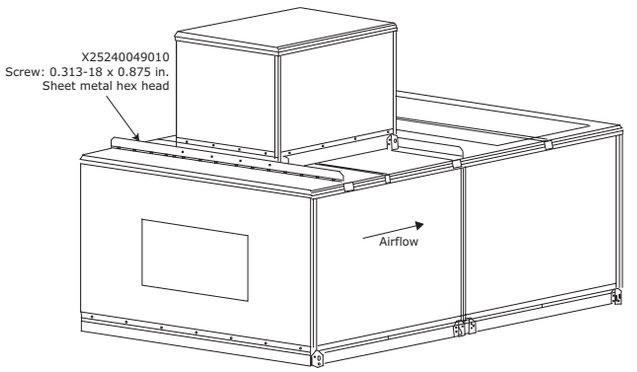
3. If there is an opening in the roof of the primary unit, apply gasket perpendicular to airflow on the roof next to the opening (air entering side only).
4. Lift the secondary unit, following instructions in “General Lifting Considerations” on page 22 (see Figure 11), and place on the black unit support brackets (see Figure 45). The secondary unit must be centered on the primary unit between the black unit support brackets.

Figure 45. Place secondary unit on black unit support brackets.



5. Install screws as shown in Figure 46 inserting the appropriate screws using a powered impact gun and taking care not to strip the screws.
6. Remove the secondary unit lifting lugs one at a time and reinstall screws after sections are set in final position.

Figure 46. Install screws using powered impact gun.

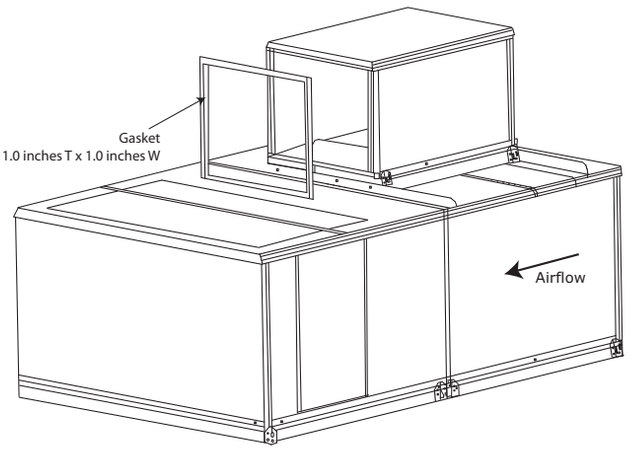


Vertical SDU/Winterizer Air Handler Assembly

To assemble dissimilar unit sizes for an indoor vertical SDU/winterizer configuration:

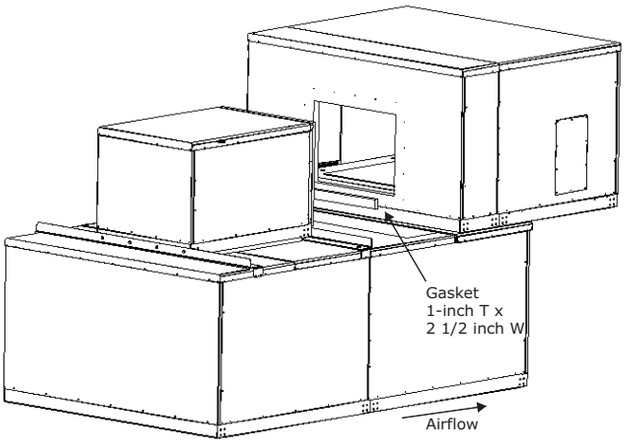
1. Apply gasketing to the mating surface of the secondary unit (see Figure 47).

Figure 47. Apply gasketing to mating surface of secondary unit



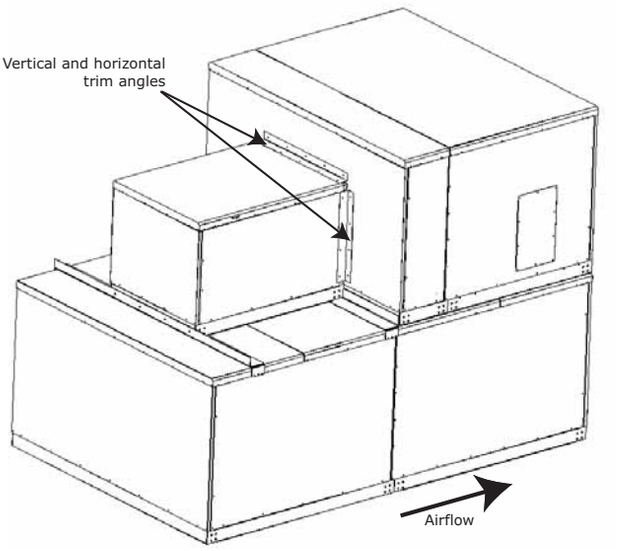
2. Apply gasketing to the mating surface of the primary unit at the bottom of the opening (see Figure 48.

Figure 48. Apply gasketing to the mating surface of the primary unit.



3. Lift the secondary unit, follow instructions in "General Lifting Considerations" on page 22 (see Figure 11), and place on the black unit support brackets (see Figure 45, p. 42. The secondary unit must be centered on the primary unit between the black unit support brackets.
4. Install trim angles as shown in Figure 49 inserting the 10-16 x 3/4-inch self-drilling screws using a powered impact gun and taking care not to strip the screws.

Figure 49. Install trim angles



External Raceway Assembly

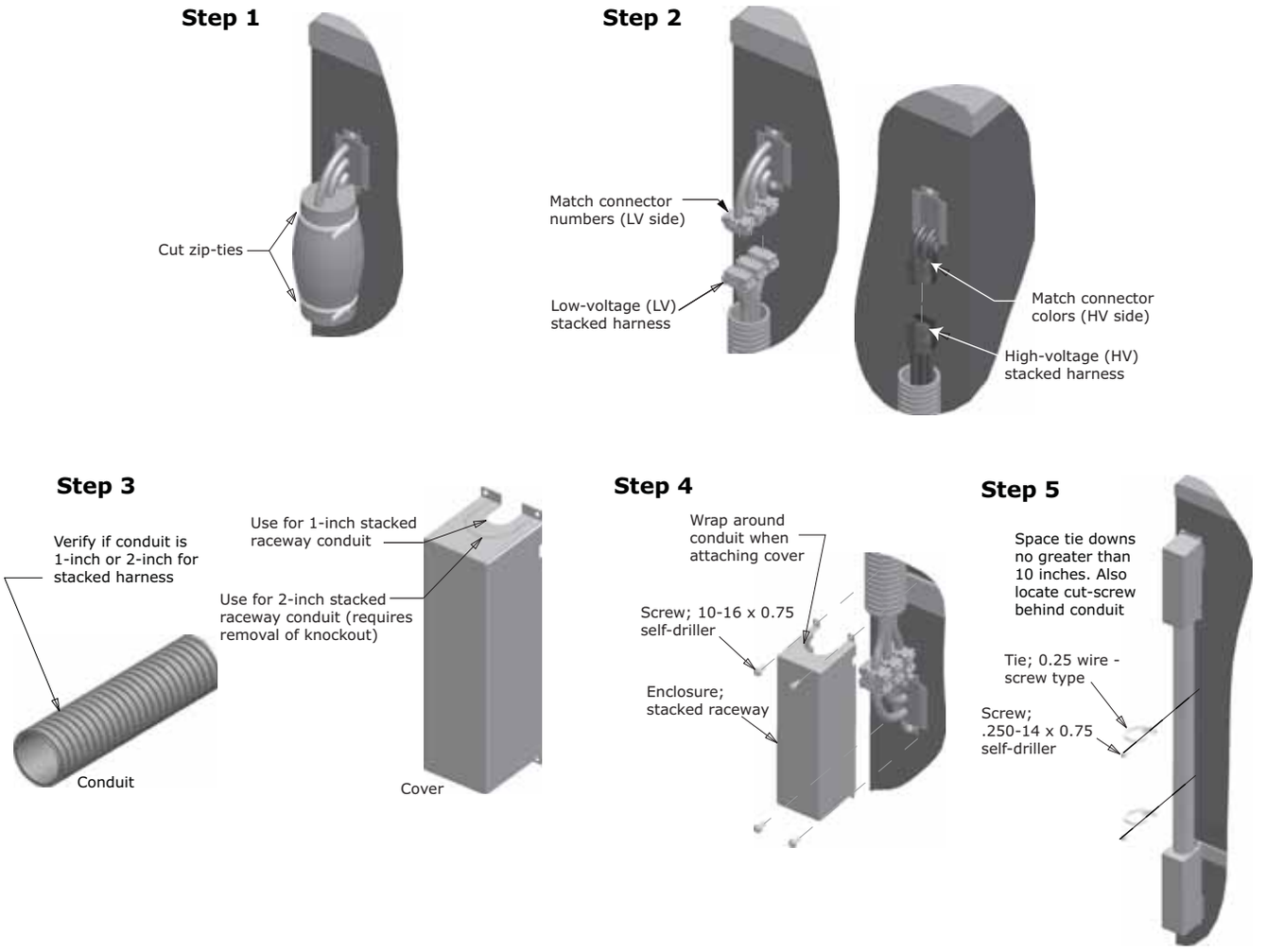
For air handling units with factory-installed power wiring extending from the first level to the second level, wiring must be connected and assembled in a raceway.

1. Remove protective foam cover from connectors.
2. Attach stacked raceway harness connectors, matching connector colors on the high voltage side and connector numbers on the low voltage side.
3. Verify conduit size.
4. Attach covers.
5. Secure conduit.

Part numbers:

- Indoor
  - External Raceway Kit: KIT09713
- Outdoor
  - External Raceway Kit - Top: KIT16191
  - External Raceway Kit - Bottom: KIT16192

Figure 50. External raceway



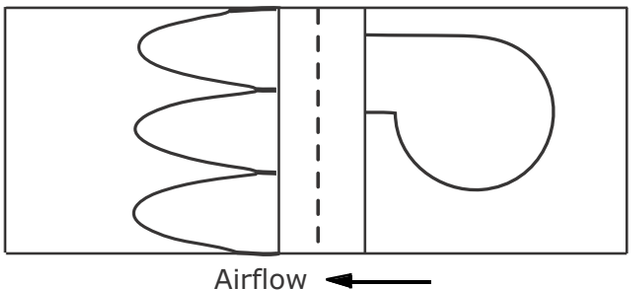
Component Installation Requirements

The components in the air handler may have installation requirements that could affect the unit's performance.

Diffuser Section

Diffuser sections are usually placed between a fan and a downstream coil or filter. Because placement is critical to unit performance, verify the correct placement of the diffuser section before assembling the unit (see Figure 51).

Figure 51. Diffuser placement sizes 3 to 120



Filter Section

Bag and cartridge filter sections can be used as a pre-filter section, a final filter section, or both. This use is determined by the filter's placement in relation to the fan.

- A final filter is placed after the fan.
- A pre-filter is placed before the fan.

Note: Cartridge and bag filters provided by Trane are fitted with a 7/8-inch header that fits in the filter track. If using filters supplied by another manufacturer, filters should be purchased with a 7/8-inch header. In some cases it may be necessary to gasket other manufacturers' filters to ensure a good air seal.

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

Final Filter Section

A final filter section should not be bolted directly to the face of a fan section. One or more intermediate sections must be placed between the fan discharge and the filter section.

Pre-Filter Section

A pre-filter section has no special installation requirements unless placed directly upstream of a plenum fan. In these configurations, ensure a blank section is placed between the fan inlet and the filter section.

Trane recommends the use of disposable pre-filters with high-efficiency filters. Disposable pre-filters slide into the mounting tracks just ahead of the bag/cartridge filters.

Filter Installation

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

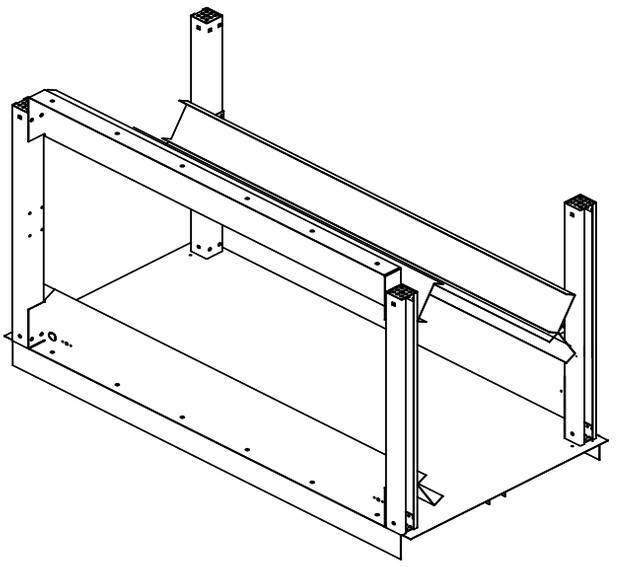
To install filters:

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.

Figure 52. Filter block-off placement



Filter Placement

Figure 53. 2-inch and 4-inch flat filter placement for unit sizes 3-50 - side loading

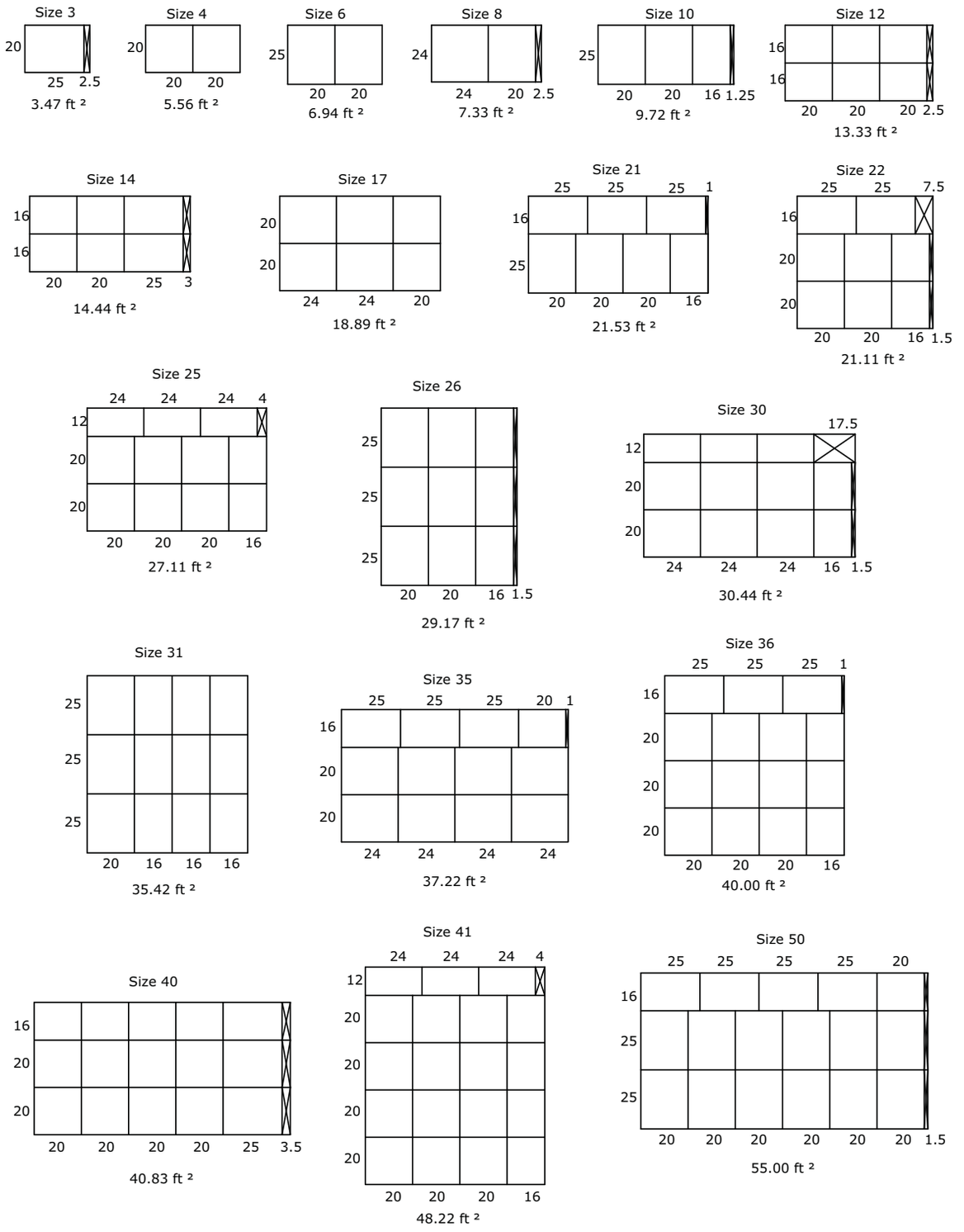


Figure 54. 2-inch and 4-inch flat filter placement for unit sizes 51-120 - side loading

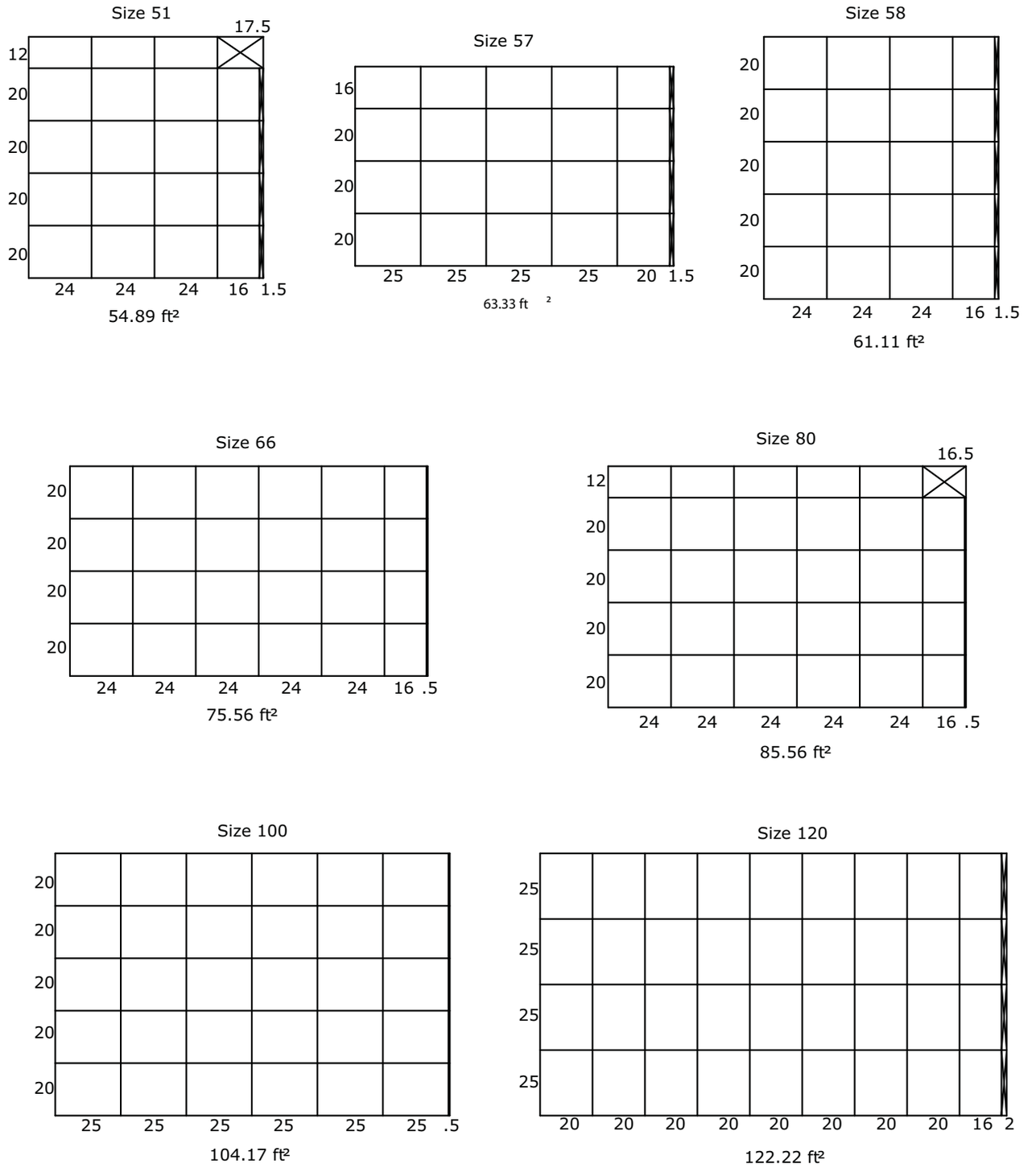


Figure 55. 2-inch/4-inch combination flat filter placement for unit sizes 3-50 - side loading

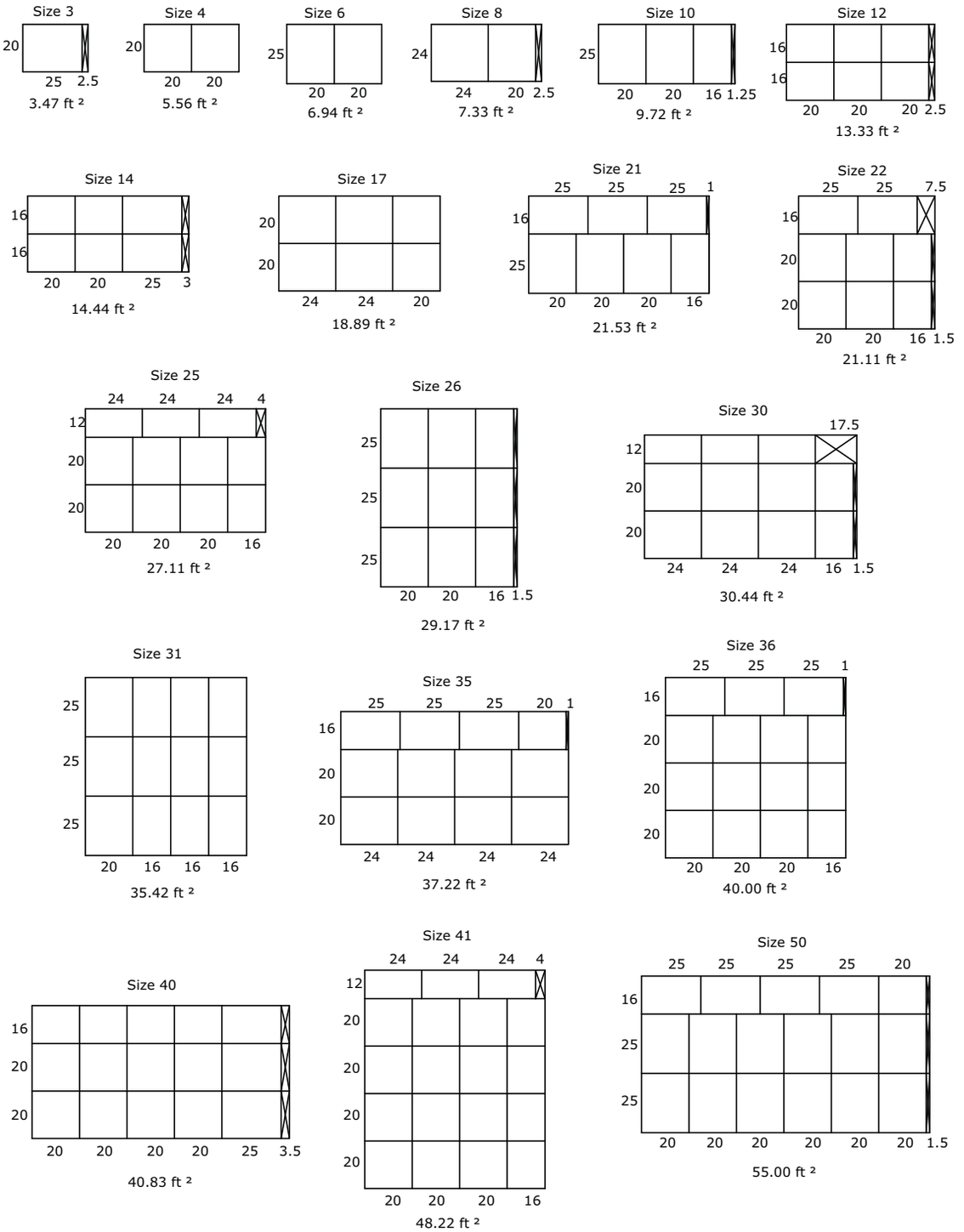


Figure 56. 2-inch/4-inch combination flat filter placement for unit sizes 51-120 - side loading

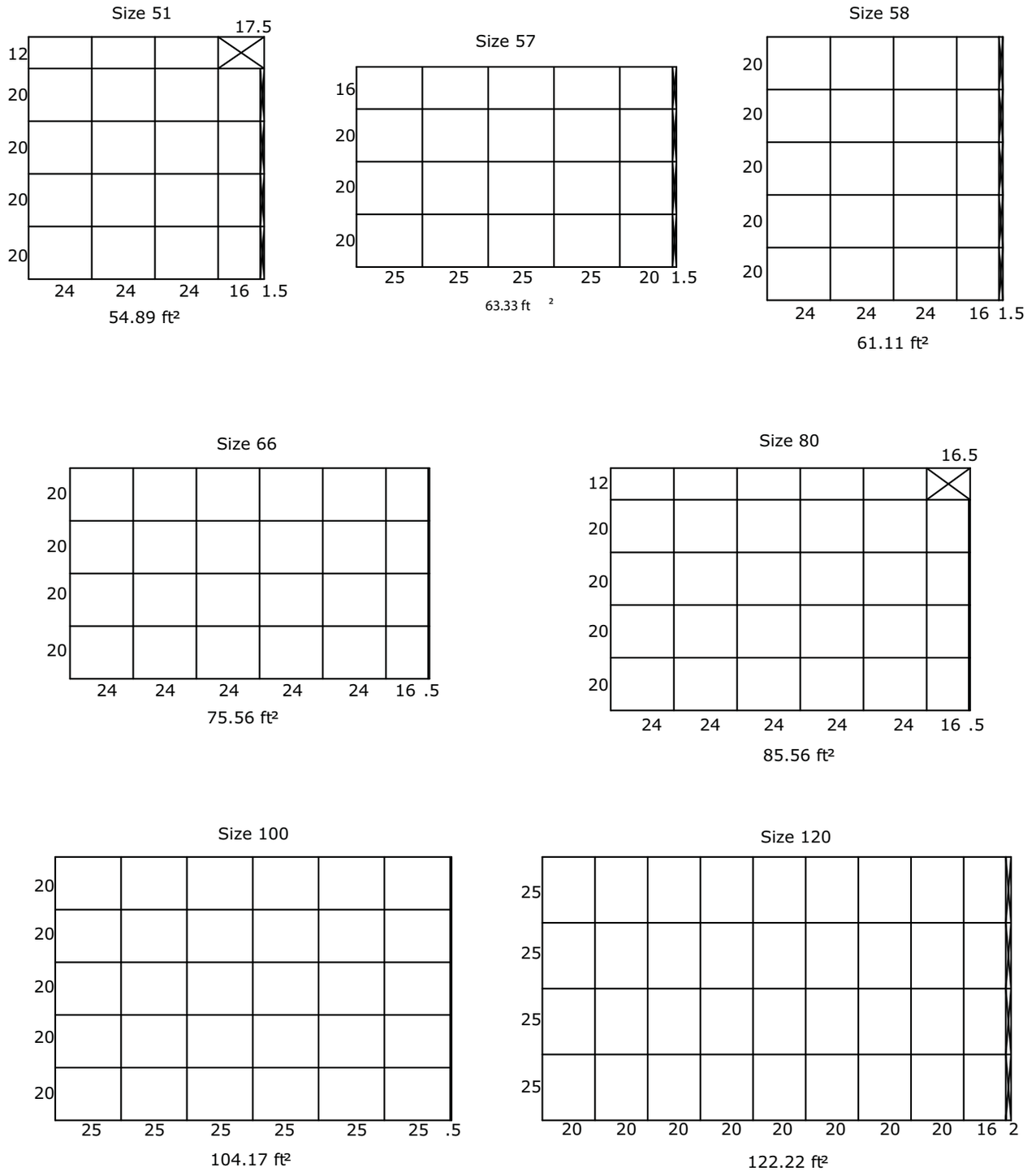


Figure 57. 2-inch and 4-inch angled filter placement for unit sizes 3-50 - side loading

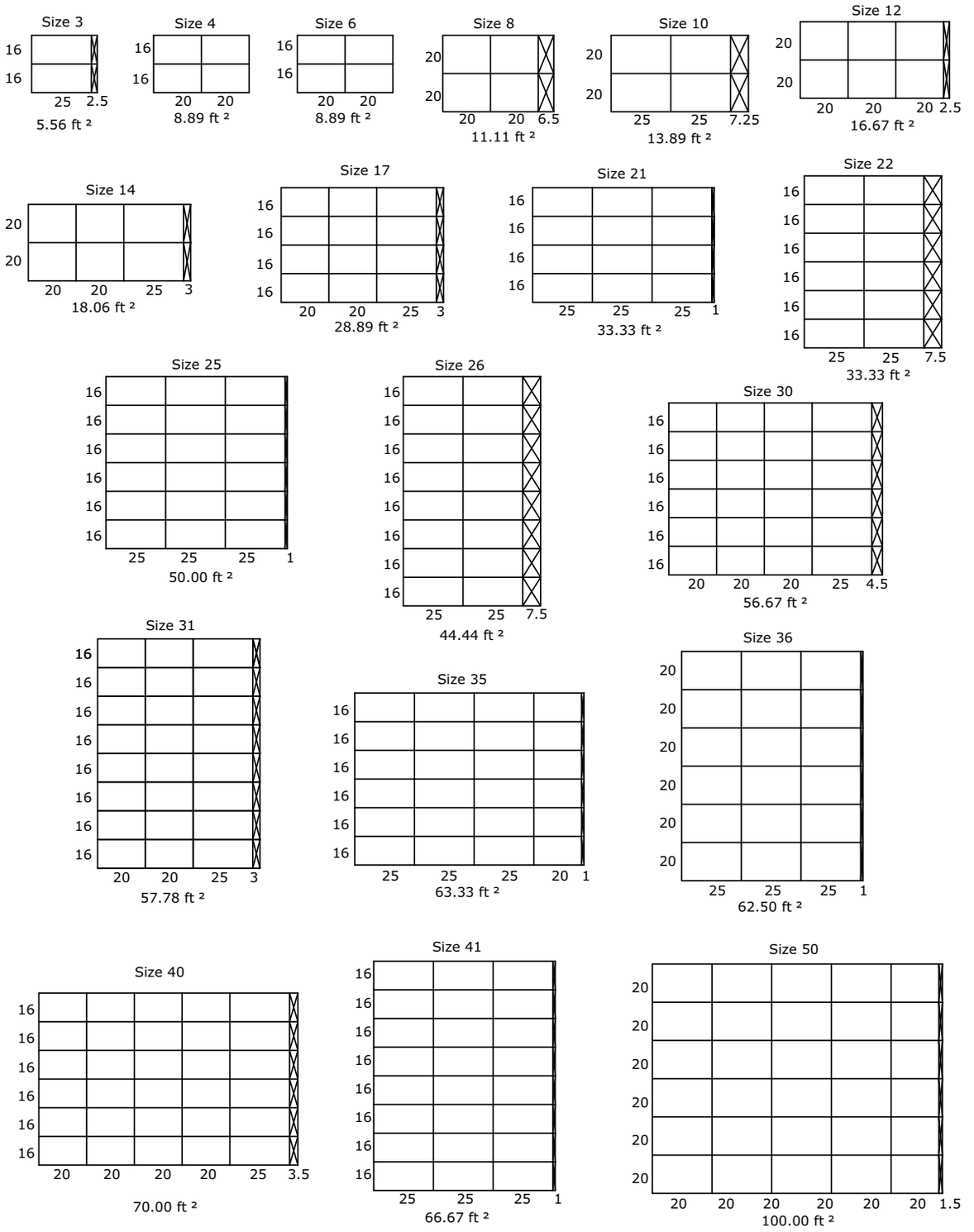


Figure 58. 2-inch and 4-inch angled filter placement for unit sizes 51-120 - side loading

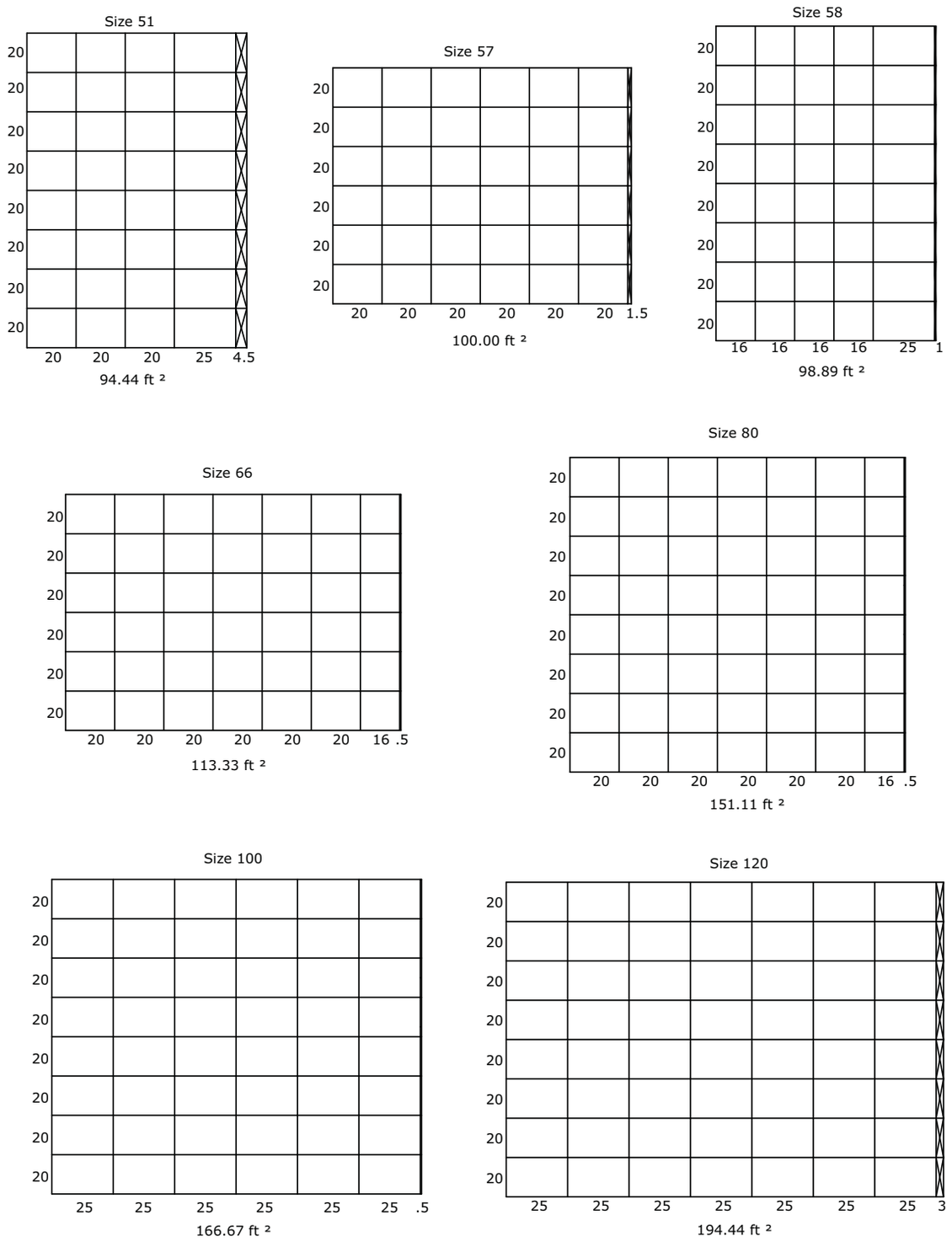


Figure 59. Long bag filter placement for unit sizes 3-50 - side loading

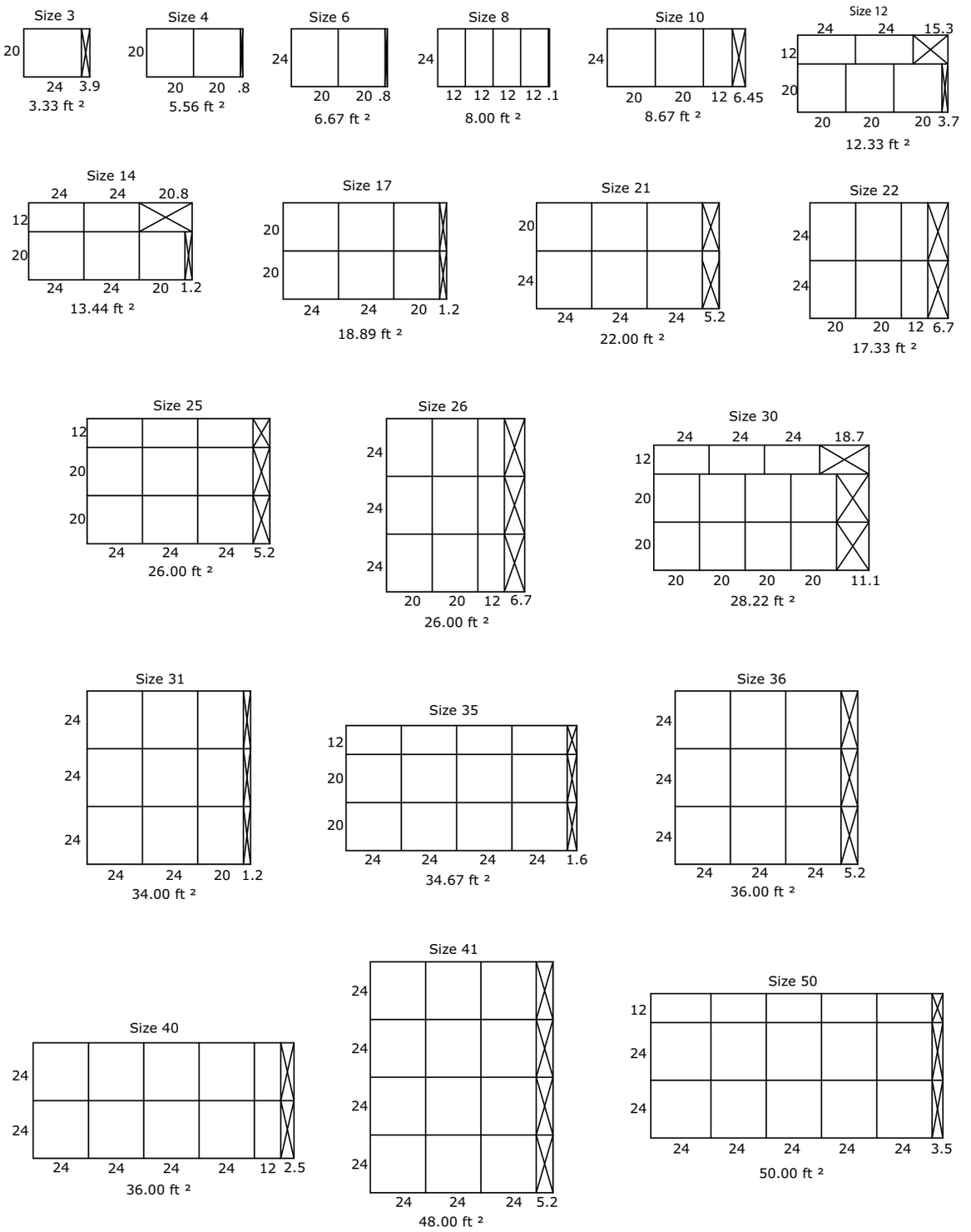


Figure 60. Long bag filter placement for unit sizes 57-120 - side loading

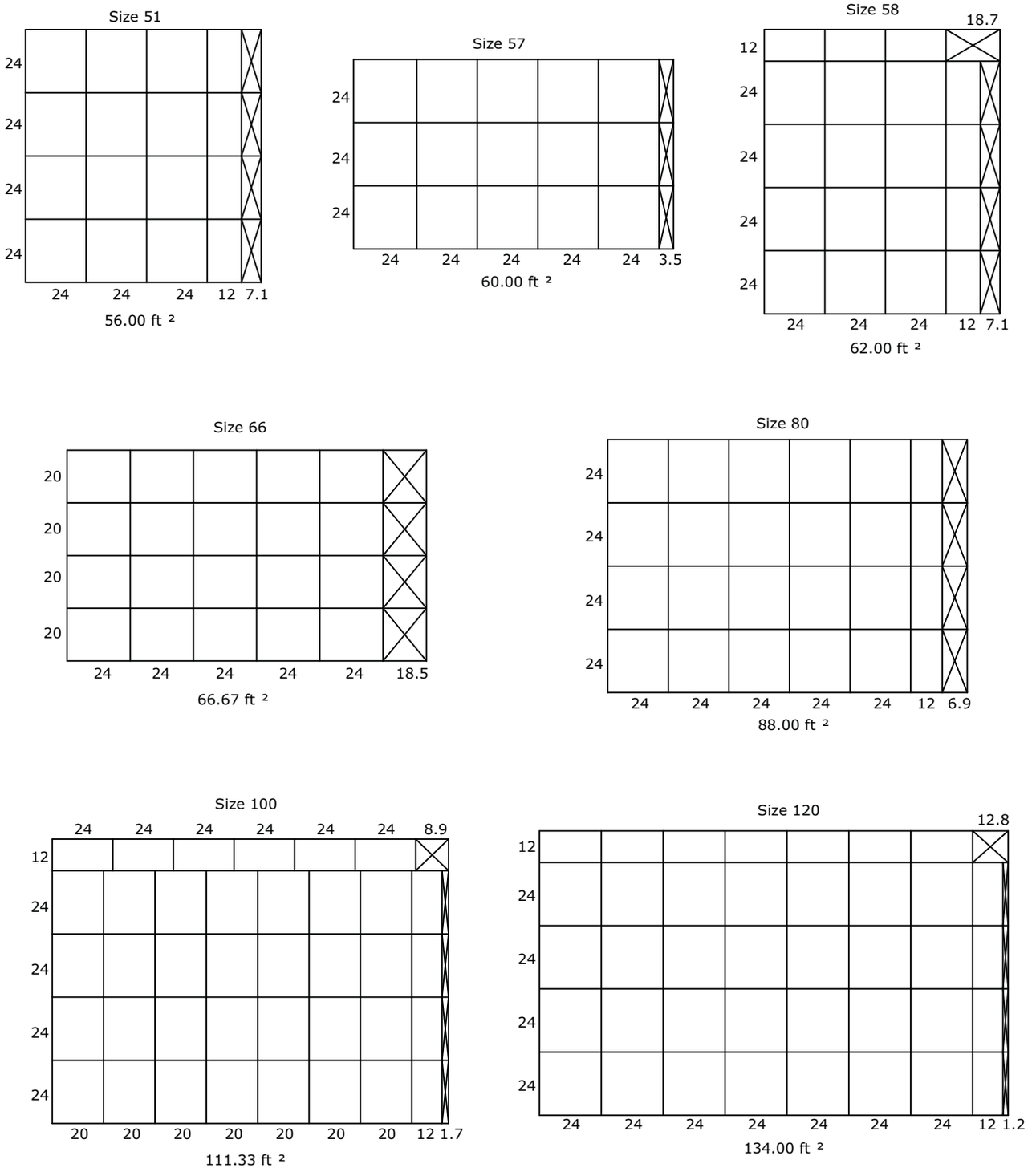


Figure 61. Short bag filter placement for unit sizes 3-50 - side loading

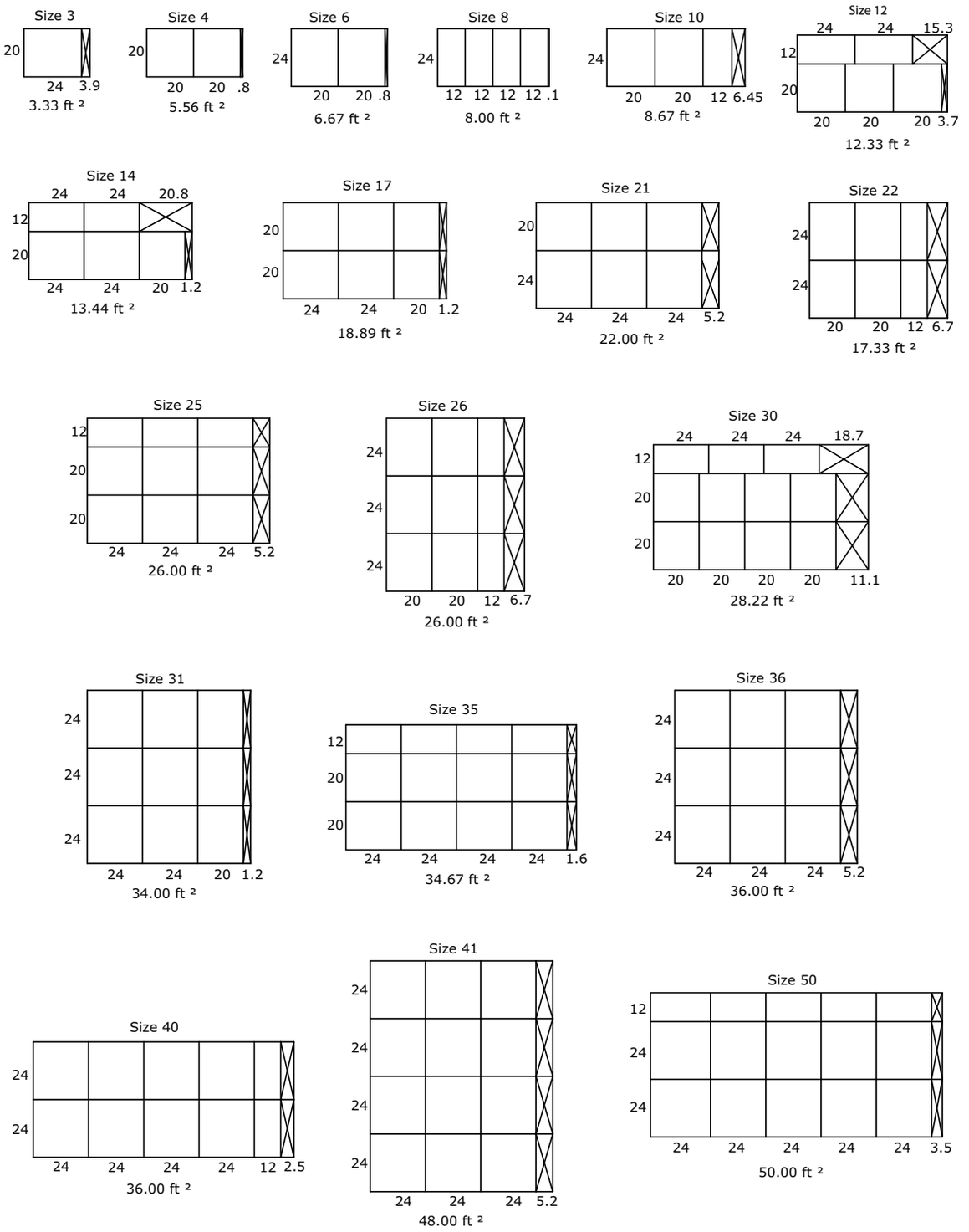


Figure 62. Short bag filter placement for unit sizes 57-120 - side loading

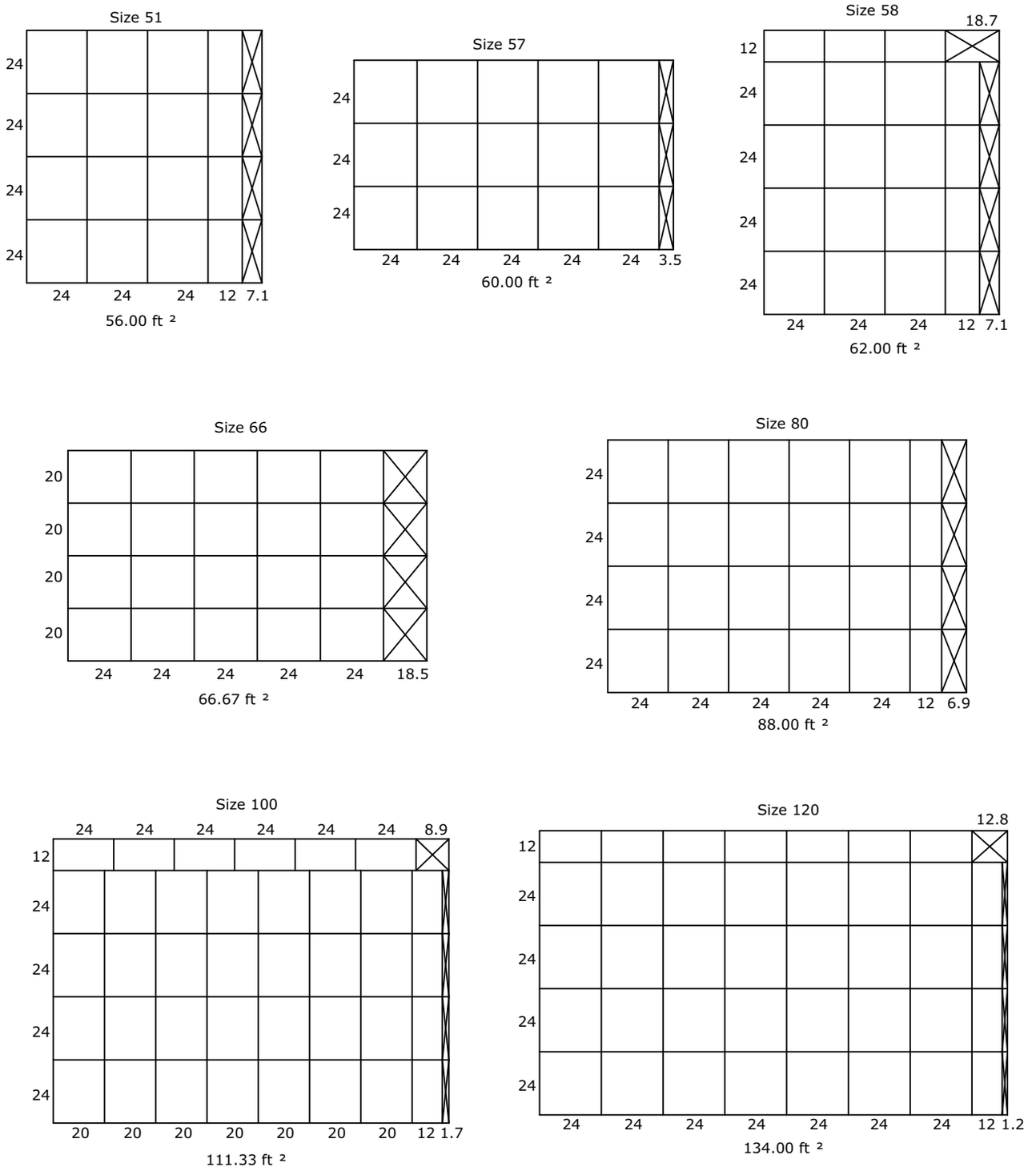


Figure 63. Cartridge filter placement for unit sizes 3-50 - side loading

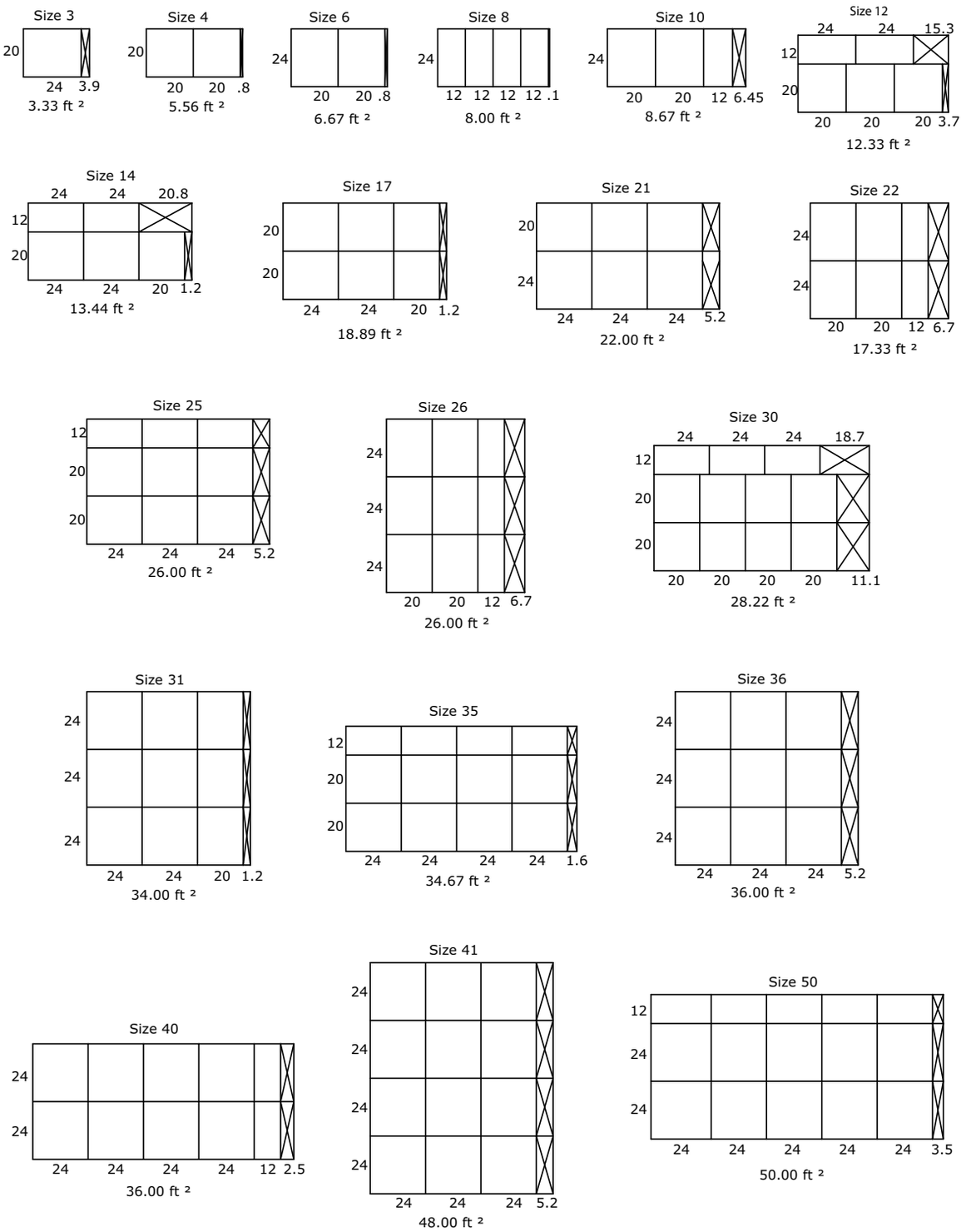


Figure 64. Cartridge filter placement for unit sizes 57-120 - side loading

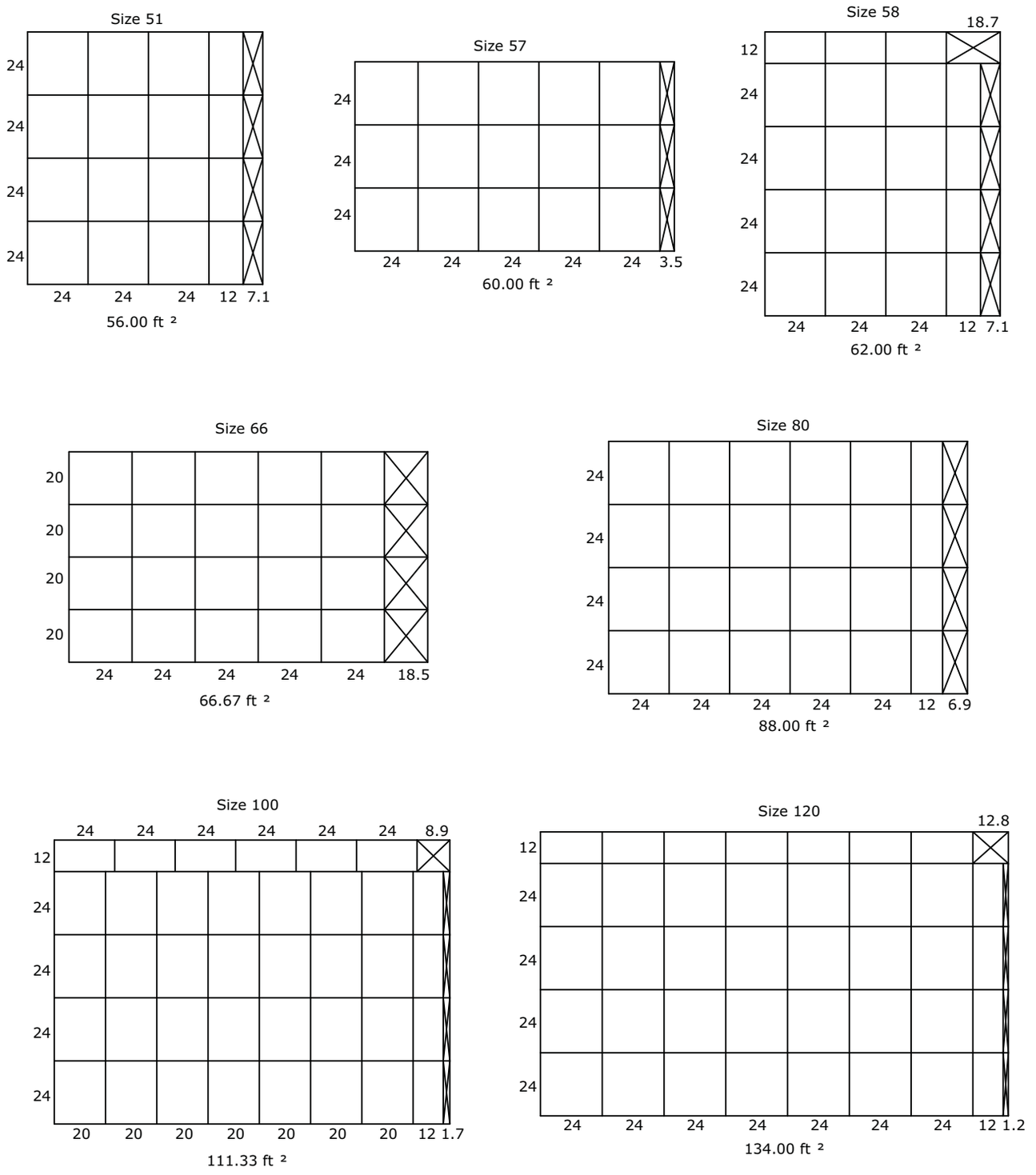


Figure 65. Front-load bag and cartridge filter placement for unit size 3-50

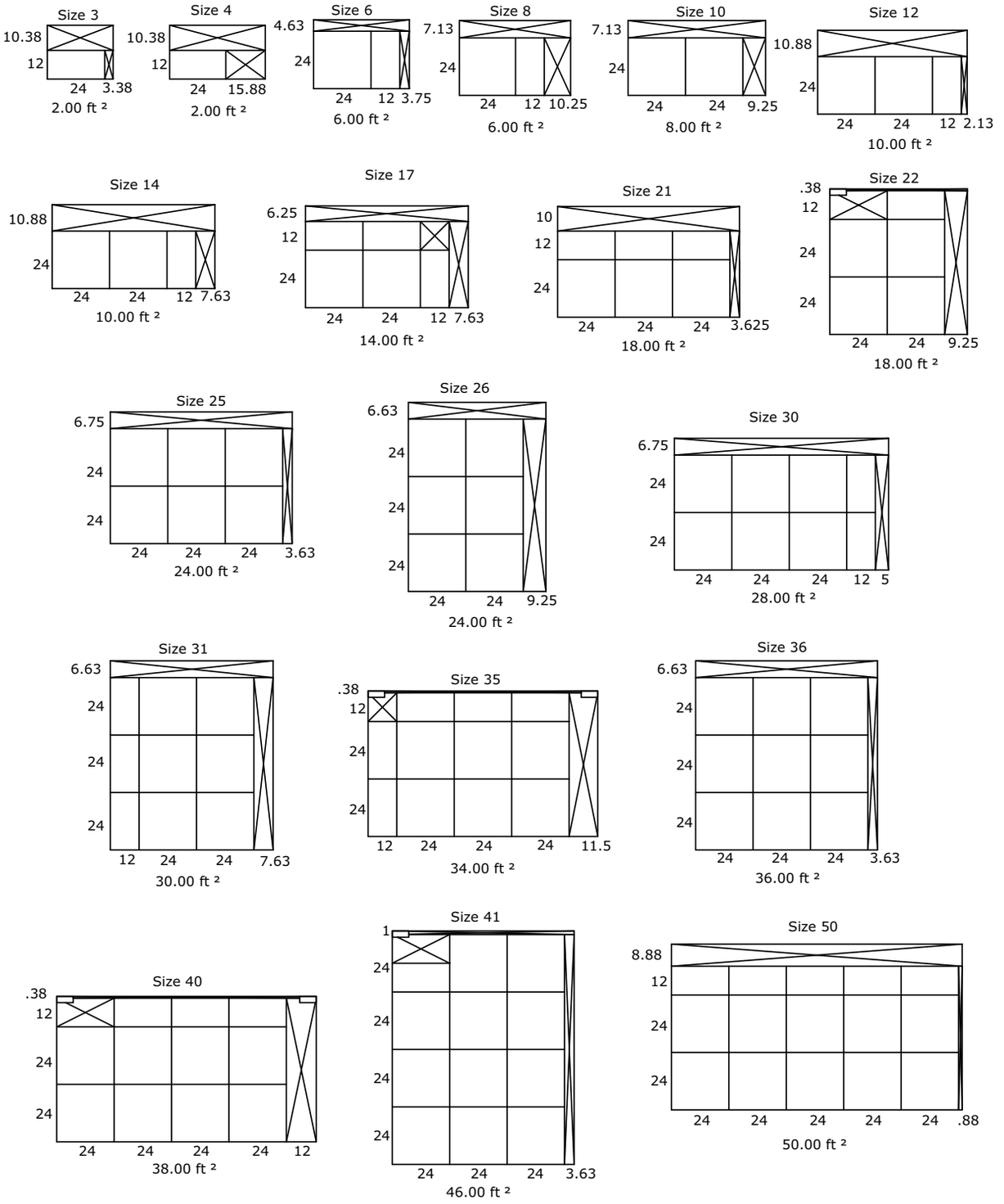


Figure 66. Front-loading bag and cartridge filter placement for unit size 57-120

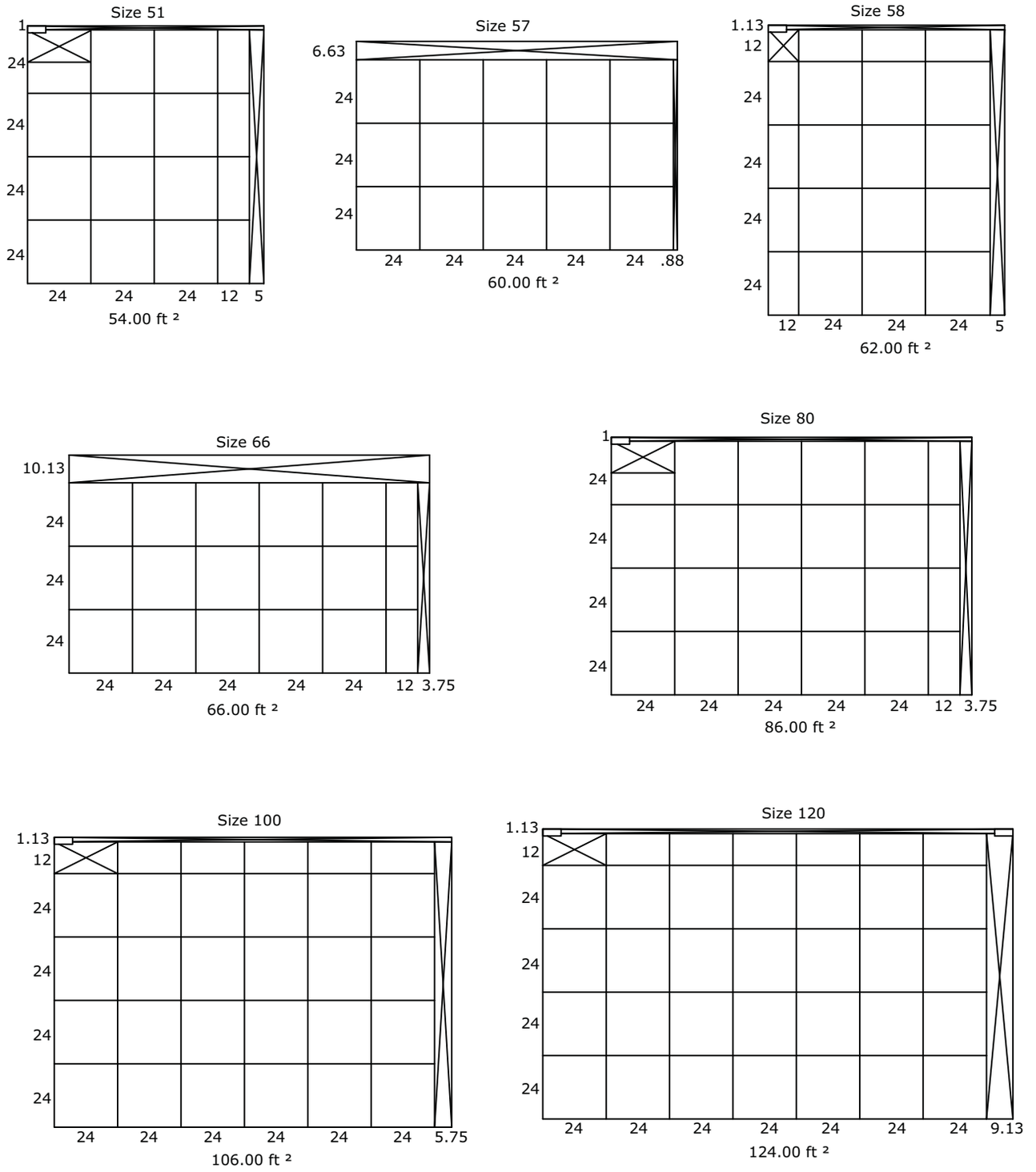


Figure 67. HEPA filter placement for unit size 3-50 - front loading

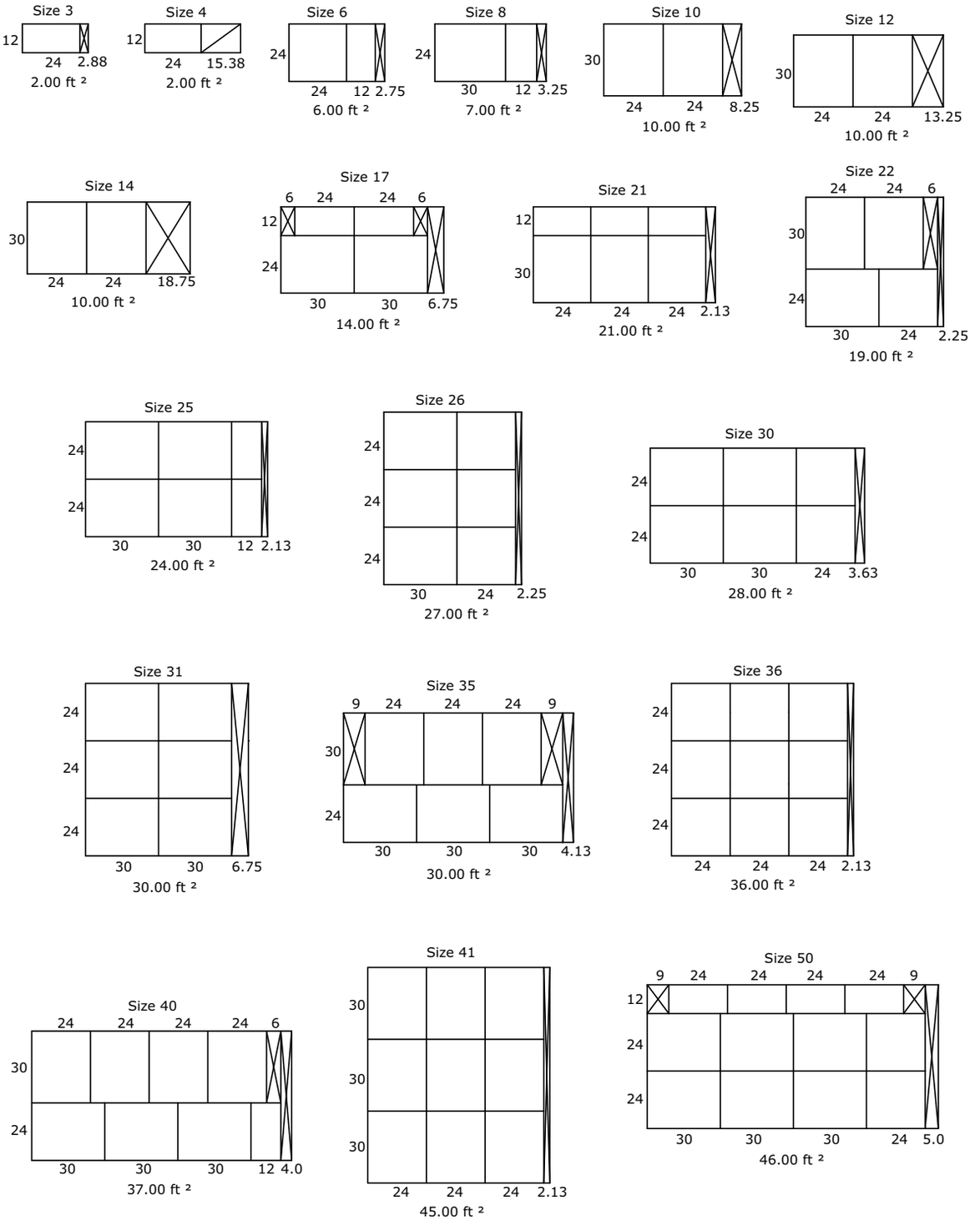
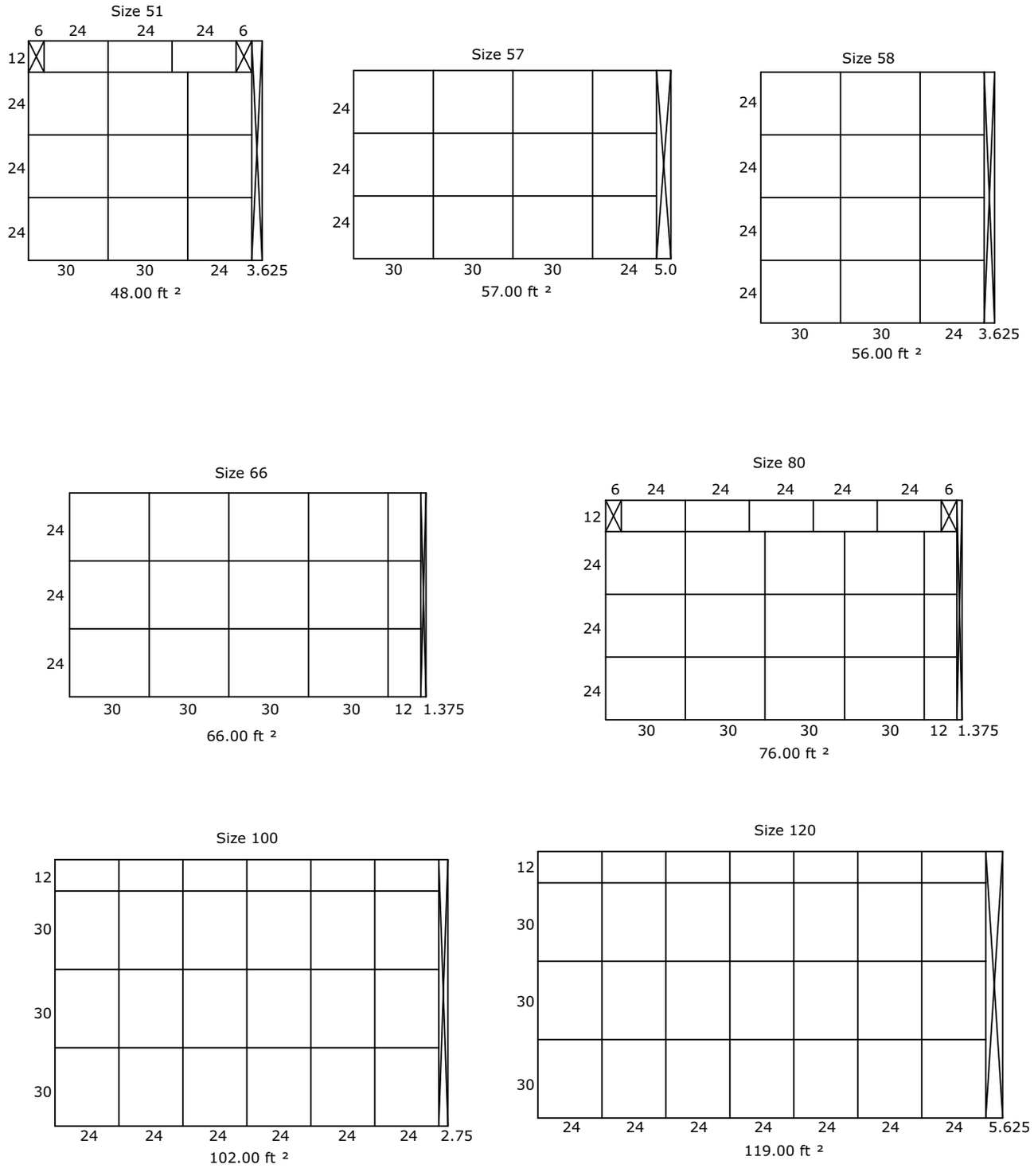


Figure 68. HEPA filter placement for unit size 57-120 - front loading



Fan Section

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!

The maintenance and troubleshooting procedures recommended in this manual could result in exposure to electrical, mechanical or other potential safety hazards. Always refer to the safety warnings provided throughout this manual concerning these procedures. 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. Failure to follow all of the recommended safety warnings provided, could result in death or serious injury.

Fan Isolation

The fan-and-motor assembly is 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 clearances are listed in Table 10. 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. See Figure 69, Figure 70, Figure 71, and Figure 72.

Table 10. Minimum isolator clearances (inches)

Unit Size	Fan Type	Required Clearance
3–8	FC, BC, Plenum	1.0
10–31	FC, AF, Plenum	0.5
35-58	FC, AF, Plenum	0.5
66-120	FC, AF, Plenum	1.0

Figure 69. Isolator adjustment for unit sizes 10-30

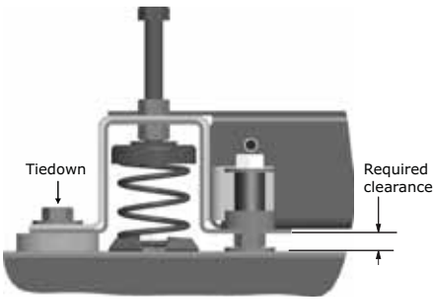


Figure 70. Isolator adjustment for unit sizes 10-30

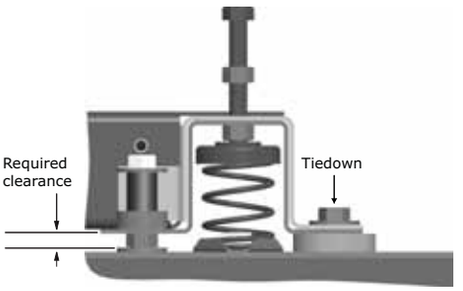


Figure 71. Isolator adjustment for unit sizes 66-120

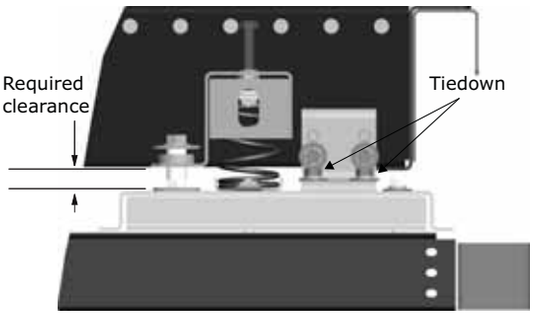
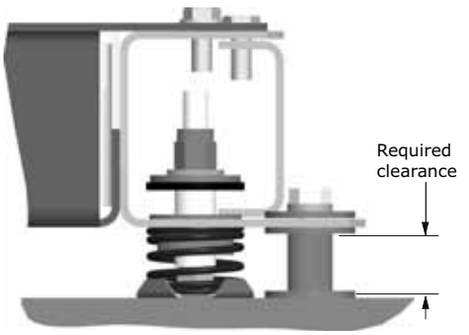


Figure 72. Belt-drive plenum fan isolator adjustment size 3-8



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. Trane has third-party certification for IBC compliance for seismic applications for unit sizes 3-30. Certification for larger sizes is in process.

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

Anchor Requirements

Single Level Design Break - Size 3-120 Grade to Roof Mounted (0<=Sds<=1.85) Non-Isolated

4000 psi concrete

- 3/8-inch diameter Hilti Kwik Bolt TZ carbon steel concrete anchors attached to unit base rails.
- Install clips at shipping split corners
- Install clips at shipping splits containing fans or coils at 48 inches maximum on-center spacing.
- 2-inch minimum anchor embedment
- 4-3/8-inch minimum distance to the nearest edge
- 4-inch minimum concrete slab thickness

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.

Stacked Design Break - Size 3-50 Grade to Roof Mounted (0<=Sds<=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.

Anchor Pattern

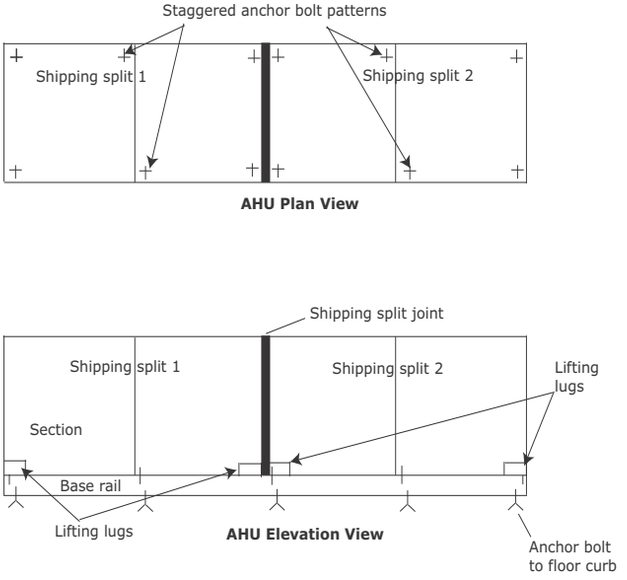
Lifting lugs should be used to anchor the unit at the ends of each shipping split. Per the anchor requirements, additional anchoring may be needed. If so, anchors will be provided and installed on the unit. An example of a seismic anchor is shown in Figure 73.

Anchor selection meets or exceeds IBC 2000, 2003, 2006 and 2009 compliance requirements.

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

Figure 73. Seismic anchor

Figure 74. Seismic anchor pattern



Hurricane Application Requirements

Miami/Dade County Hurricane-Certified Air Handlers

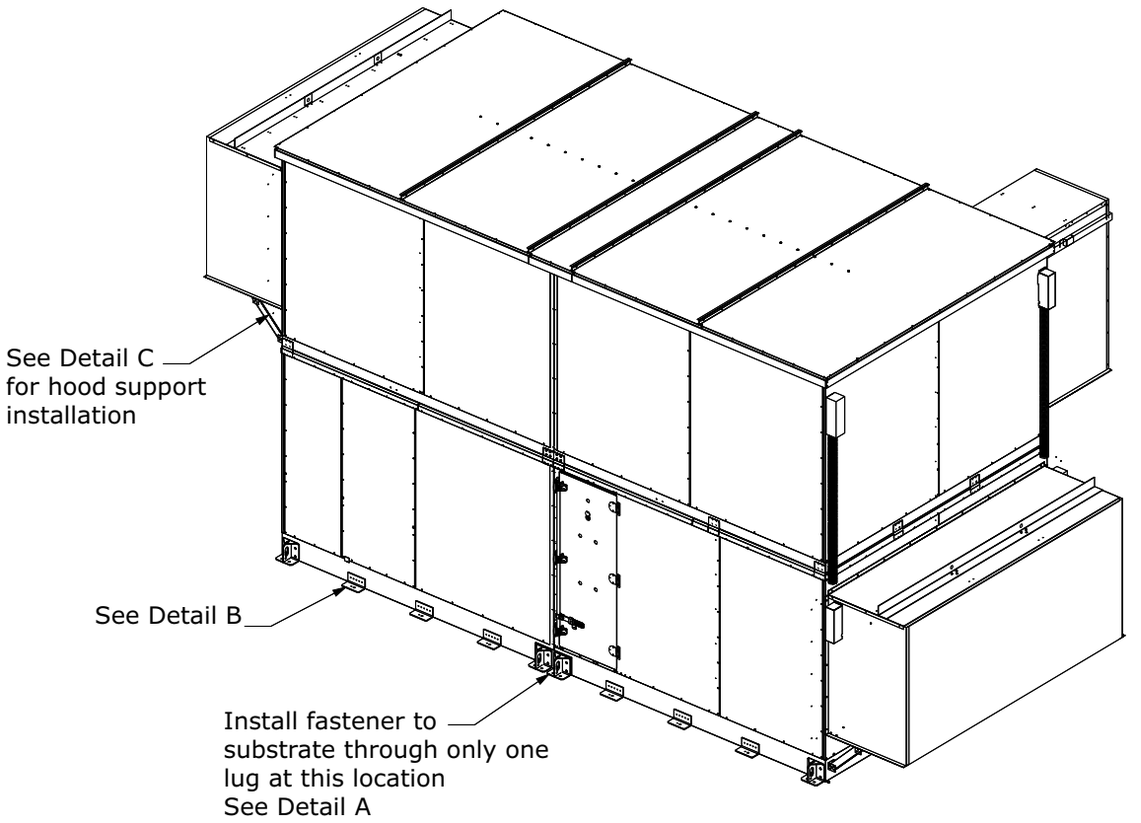
Performance Climate Changer air handlers size 3-30 are approved and have has been designed to comply with the High Velocity Hurricane Zone of the Florida Building Code. Notice of compliance and additional product construction details can be found at the Miami-Dade County, Building Code Compliance Office Web site.

The Florida licensed engineer or architect-of-record for the project shall be responsible for the design, sizing, and structural adequacy of the product framework as well as curbing and attachment to the roof, or as accepted by the corresponding building departments.

Approved Method for Anchoring Unit

The method shown in Figure 75 through Figure 85 is what is approved and recommended for anchoring the unit to substrate and roof curb. Any deviation to this may require the approval of the local building code enforcement agency.

Figure 75. Method for anchoring unit to substrate and roof curb



Hurricane Unit Anchorage

Figure 76. Typical direct anchorage to substrate at lifting lugs (also see Table 11)

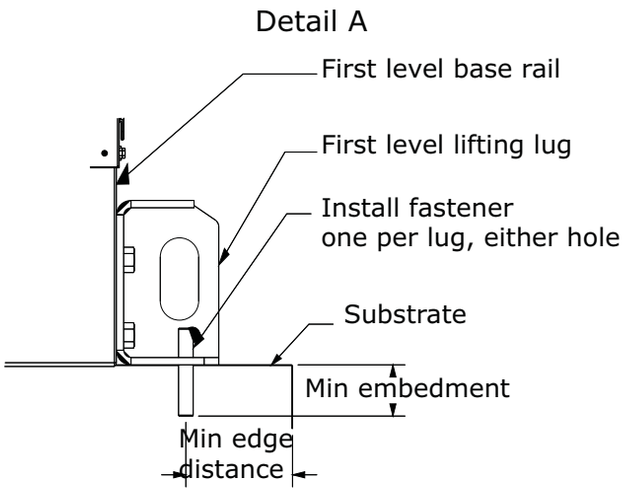
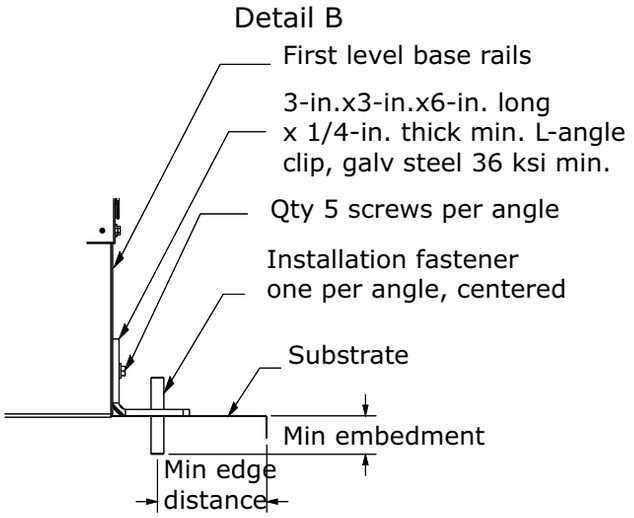


Figure 77. Typical direct anchorage to substrate using L-clip in addition to lifting lugs (also see Table 11)



Note: Anchor spacing to be 24 inches maximum typical long side of unit.

Table 11. Installation anchor information

Anchor / substrate	Minimum embedment	Minimum edge distance
1/2-inch powers chem-standard threaded rod installed with chem-standard adhesive capsule in 3.2 ksi minimum concrete substrate	1 1/2 inches	6 inches
1/4-inch Elco dril-flex hex head schre installed in 36 ksi minimum steel 1/8-inch think minimum Ufull thread engagement)	1/8 inch	1/2 inch

Figure 78. Typical installation of unit baserail to curb

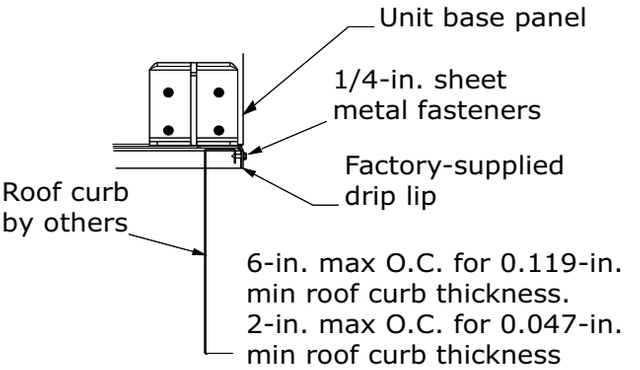
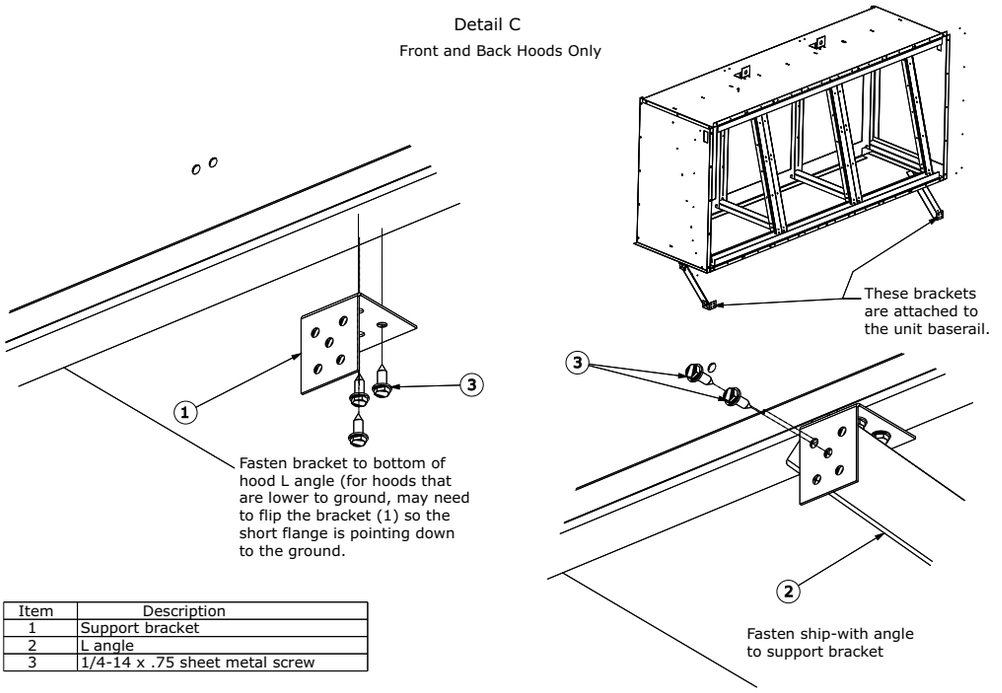


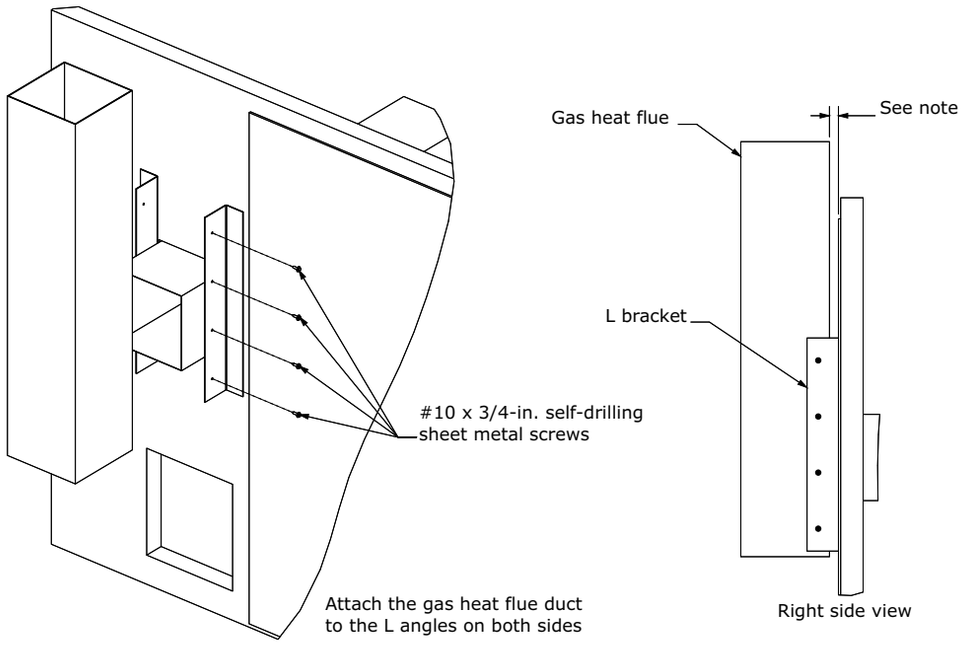
Figure 79. Installation of front and back hoods



Item	Description
1	Support bracket
2	L angle
3	1/4-14 x .75 sheet metal screw

Gas Heat Installation

Figure 80. Attach the gas heat flue duct to the L angles on both sides



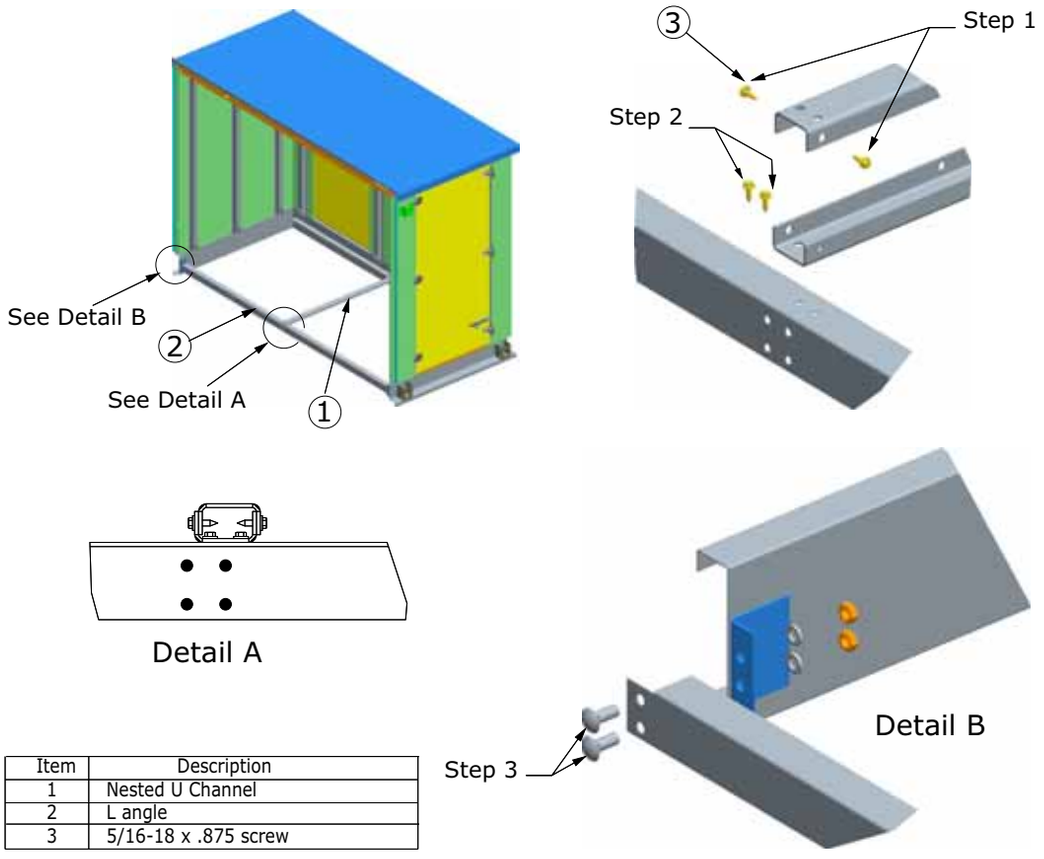
Note: When installing flue, leave enough clearance to avoid roof's edge and anything above the roof.

Pipe Cabinet Installation

Nested U Channels and L angle have to be removed to install the pipe cabinet to the unit and reinstall per hurricane certification guidelines. See Figure 81.

1. Remove the fasteners from the top of the nested U channel.
2. Remove the U channel from the unit base L angle and the pipe cabinet base L angle.
3. Remove the corner fasteners from the pipe cabinet base and the unit base L angle. These fasteners are not required to be put back.

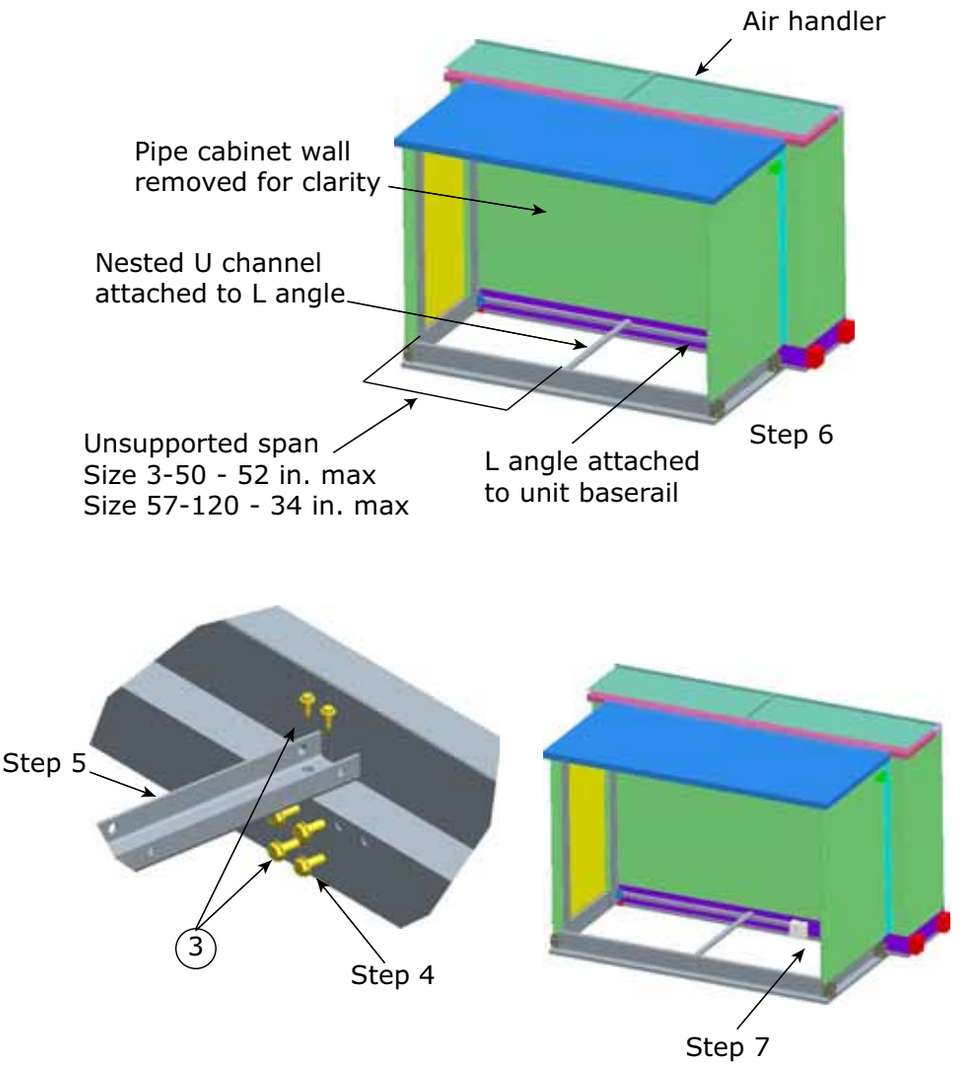
Figure 81. Instructions for pipe cabinet with nested U channels



Item	Description
1	Nested U Channel
2	L angle
3	5/16-18 x .875 screw

4. Attach the unit base L angle from the pipe cabinet to the unit base rail. See Step 4 in Figure 82
5. Attach a U channel to the unit base L angle. Make sure to clear any coil piping. Make sure to attach enough nested U channels to comply to the unsupported span. See Step 5 in Figure 82.
6. Locate the pipe cabinet in place, and reinstall the U channel to the pipe base L angle and reinstall the top U channel to the nest (see Step 1, Figure 81).
7. When the L angle interferes with the unit base rail lifting lugs or splice plate, mark and cut L angle section to clear the component. If excess L angle is not needed for nested U channel, leave it off. See Figure 82.

Figure 82. Attaching L angles in pipe cabinet



Pipe Cabinet Hurricane Anchorage

Figure 83. Typical installation of pipe cabinet baserail to curb

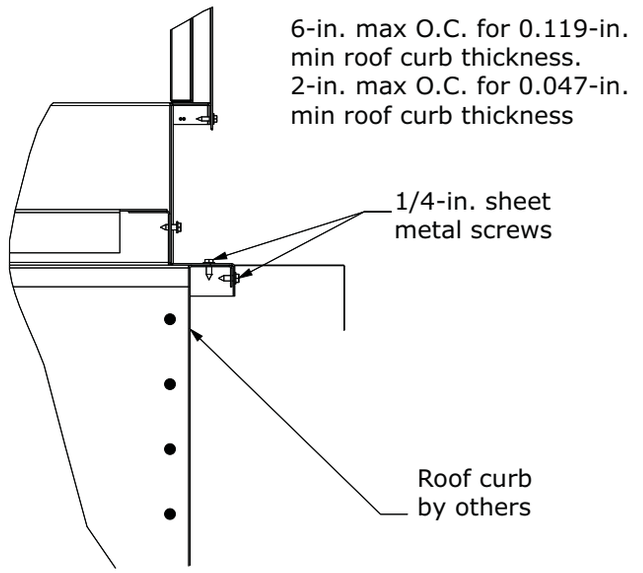


Figure 84. Typical direct anchorage pipe cabinet baserail to substrate with L clip

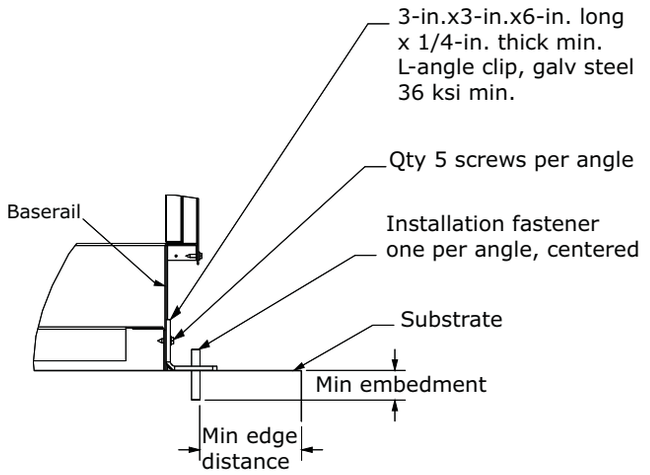
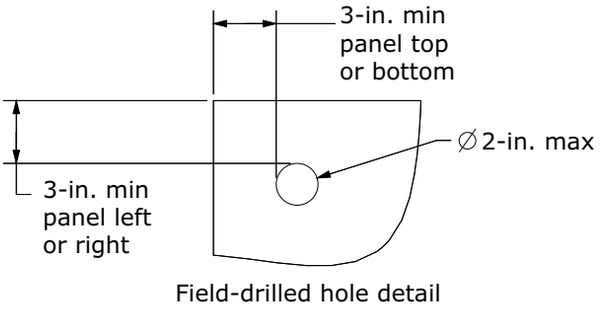


Figure 85. Pipe-cabinet approved field penetrations



Damper Section

Dampers are factory-installed and adjusted and can be found in mixing box/economizer sections. There are two damper blade configurations available: parallel-blade and opposed-blade.

Traq™ dampers are another type of damper available in mixing box sections. Traq dampers have only one blade configuration - opposed. They have two control applications available - standard Traq dampers and low-flow Traq dampers. Low-flow Traq dampers are always not linked and consist of two damper sets - one set for minimum outside air measurement and one set for economizing. Each will have its own VCM.

The air handler is available with factory-mounted controls or end devices. If the unit is not ordered with controls or end devices, it is the installer's responsibility to provide and install the damper actuators. Size the actuators according to Table 12.

Mixing section and economizer dampers are designed for the damper actuators to be direct coupled and installed in the air stream. If other provisions are required, modifications to the section will be the responsibility of the installing contractor.

Damper Torque Requirements

Table 12. Mixing box damper torque requirements (inch pound) at 1-inch w.g. air pressure drop

Unit Size	Parallel airfoil damper only	Opposed airfoil damper only	Standard Traq damper only	Low-flow minimum OA Traq damper only	Low-flow econ Traq damper only	Parallel airfoil damper linked to parallel airfoil damper	Opposed airfoil damper linked to opposed airfoil damper	Standard Traq linked to airfoil damper	Standard Traq linked to standard Traq damper
3	9.00	6.40	18.00	n/a	n/a	10.30	7.70	19.30	36.00
4	13.10	9.30	36.00	18.00	18.00	14.90	11.20	37.90	72.00
6	17.10	12.20	36.00	18.00	18.00	19.60	14.70	38.40	72.00
8	23.30	16.60	54.00	18.00	36.00	26.60	19.90	57.30	108.00
10	29.00	20.70	54.00	18.00	36.00	33.20	24.90	58.10	108.00
12	35.70	25.50	67.50	22.50	45.00	40.70	30.60	72.60	135.00
14	39.50	28.20	67.50	22.50	45.00	45.20	33.90	73.10	135.00
17	48.90	34.90	67.50	22.50	45.00	55.90	41.90	74.50	135.00
21	60.40	43.10	99.00	33.00	66.00	69.00	51.80	107.60	198.00
25	72.40	51.70	99.00	33.00	66.00	82.80	62.10	109.30	198.00
30	84.20	60.10	108.00	36.00	72.00	96.20	72.20	120.00	216.00
35	100.20	71.50	108.00	36.00	72.00	114.50	85.90	122.30	198.00
40	110.20	78.70	108.00	36.00	72.00	125.90	94.50	119.60	198.00
50	126.30	90.20	112.50	37.50	75.00	144.30	108.20	135.70	216.00
57	154.80	110.60	112.50	37.50	75.00	176.90	132.70	164.20	198.00
66	177.60	126.80	150.00	37.50	75.00	202.90	152.20	187.00	264.00
80	210.30	150.20	187.50	37.50	112.50	240.30	180.20	223.10	360.00
100	272.00	194.30	225.00	37.50	150.00	310.90	233.20	284.90	396.00
120	322.40	230.30	225.00	37.50	150.00	368.50	276.30	335.20	432.00

Table 13. Air-to-Air Plate Heat Exchanger Bypass Damper

Unit size	Damper dia (in) A	Damper dia (in) B	Damper qty	Damper torque (in-lb)	Actuator torque (max) (in-lb)	Actuator qty	Linkage
3	25.00	24.03	1	20.90	42.00	1	No
4	37.50	24.03	1	31.30	42.00	1	No
6	37.50	29.78	1	38.80	160.00	1	No
8	44.00	29.78	1	45.50	160.00	1	No
10	55.00	35.53	1	67.90	160.00	1	No
12	60.00	35.53	1	74.00	160.00	1	No
14	65.50	35.53	1	80.80	160.00	1	No
17	65.50	24.03	2	109.30	160.00	1	Yes
21	73.50	24.03	2	122.70	160.00	1	Yes
25	73.50	29.78	2	152.00	160.00	1	Yes
30	87.00	29.78	2	179.90	160.00	2	Yes
35	93.50	29.78	2	193.40	160.00	2	Yes
40	106.00	29.78	2	219.20	160.00	2	Yes

Table 14. Air-to-Air Plate Heat Exchanger Frost Damper

Unit size	A	B	Damper qty	Damper torque (in-lb)	Actuator torque (max) (in-lb)	Actuator qty	Linkage
3	25.00	13.97	1	12.10	42.00	1	No
4	37.50	13.97	1	18.20	42.00	1	No
6	37.50	13.97	1	18.20	42.00	1	No
8	44.00	13.97	1	21.30	42.00	1	No
10	55.00	13.97	1	26.70	42.00	1	No
12	60.00	13.97	1	29.10	42.00	1	No
14	65.50	13.97	1	31.80	160.00	1	No
17	65.50	13.97	2	63.50	160.00	1	Yes
21	73.50	13.97	2	71.30	160.00	1	Yes
25	73.50	13.97	2	71.30	160.00	1	Yes
30	87.00	13.97	2	84.40	160.00	1	Yes
35	93.50	13.97	2	90.70	160.00	1	Yes
40	106.00	13.97	2	102.80	160.00	1	Yes
50	119.00	13.97	2	115.40	160.00	1	Yes

Table 15. Side Traq damper - standard flow mixing box

Unit size	Damper dia (in)	Damper qty	Damper torque (in-lb)	Total torque (in-lb)	Actuator torque (max) (in-lb)	Actuator qty	Face-to-face linkage	Linkage on face
3, 4, 6, 8	13.00	1	18.00	18.00	42.00	1	No	No
10, 12	16.00	1	22.50	22.50	42.00	1	No	No
14, 17	13.00	2	18.00	36.00	42.00	1	No	Yes
21, 22, 25, 26	16.00	2	22.50	45.00	160.00	1	No	Yes
30, 31, 35, 40	20.00	2	33.00	66.00	160.00	1	No	Yes
36, 41, 50, 57, 66	24.00	2	36.00	72.00	160.00	1	No	Yes
51, 58, 80	28.00	2	37.50	75.00	160.00	1	No	Yes
100	28.00	3	37.50	112.50	160.00	1	No	Yes
120	24.00	4	36.00	144.00	160.00	1	No	Yes

Table 16. Side Traq damper - standard flow diagonal economizer

Unit sizes	Damper dia (in)	Damper qty	Damper torque (in-lb.)	Total torque (in-lb.)	Actuator torque (max) (in-lb.)	Actuator qty	Face-to-face linkage	Linkage on face
3	13.00	1	18.00	18.0	42.00	1	No	No
4	13.00	2	18.00	36.0	42.00	2	No	No
6, 8	13.00	2	18.00	36.0	42.00	1	No	Yes
10, 12, 14	16.00	2	22.50	45.0	160.00	1	No	Yes
17	13.00	4	18.00	72.0	160.00	1	No	Yes
21	20.00	2	33.00	66.0	160.00	1	No	Yes
25	16.00	4	22.50	90.0	160.00	1	No	Yes
30	20.00	3	33.00	99.0	160.00	1	No	Yes
35	28.00	2	37.50	75.0	160.00	2	No	No
40	28.00	2	37.50	75.0	160.00	1	No	Yes
50	24.00	3	36.00	108.0	160.00	1	No	Yes
57	24.00	4	36.00	144.0	160.00	1	No	Yes
66	28.00	3	37.50	112.5	160.00	1	No	Yes
80	28.00	4	37.50	150.0	160.00	1	No	Yes
100, 120	28.00	5	37.50	187.5	160.00	2	No	Yes

Table 17. Single -Side Traq low flow mixing box

Unit size	Damper Dia (in)	Damper Qty	Damper Torque (in-lb.)	Low flow Traq Torque (in-lb.)	Remained Traq Torque (in-lb.)	Actuator qty for low flow Traq	Actuator qty for remained damper	Actuator total Qty	Face-to-face Linkage	Linkage on Face
14, 17	13.00	2	18.00	18.00	18.00	1	1	2	No	No
21, 22, 25, 26	16.00	2	22.50	22.50	22.50	1	1	2	No	No
30, 31, 35, 40	20.00	2	33.00	33.00	33.00	1	1	2	No	No
36, 41, 50, 57, 66	24.00	2	36.00	36.00	36.00	1	1	2	No	No
51, 58, 80	28.00	2	37.50	37.50	37.50	1	1	2	No	No
100	28.00	3	37.50	37.50	75.00	1	1	2	No	Yes
120	24.00	4	36.00	36.00	108.00	1	1	2	No	Yes

Table 18. Dual-side Traq low flow mixing box

Unit size	Damper dia (in)	Damper qty	Damper torque (in-lb)	Low-flow Traq torque (in-lb)	Remained Traq torque (in-lb)	Actuator qty for std Traq damper	Actuator qty for low-flow Traq damper	Actuator qty for single low-flow Traq	Actuator total qty	Face-to-face linkage	Linkage on face
3, 4, 6, 8	13.00	2	18.00	18.00	18.00	1	-	1	2	No	No
10, 12	16.00	2	22.50	22.50	22.50	1	-	1	2	No	No
14, 17	13.00	4	18.00	18.00	54.00	1	1	1	3	No	No
21, 22, 25, 26	16.00	4	22.50	22.50	67.50	1	1	1	3	No	No
30, 31, 35, 40	20.00	4	33.00	33.00	99.00	1	1	1	3	No	No
36, 41, 50, 57, 66	24.00	4	36.00	36.00	108.00	1	1	1	3	No	No
51, 58, 80	28.00	4	37.50	37.50	112.50	1	1	1	3	No	No
100	28.00	6	37.50	37.50	187.50	1	1	1	3	No	Yes
120	24.00	8	36.00	36.00	252.00	1	1	1	3	No	Yes

Table 19. Side Traq low-flow diagonal economizer

Unit size	Damper dia (in)	Damper qty	Damper torque (in-lb.)	Low flow Traq torque (in-lb.)	Remainder Traq torque (in-lb.)	Actuator qty for low flow Traq	Actuator qty for remainder damper	Actuator total qty	Face-to-face linkage	Linkage on face
4	13.00	2	18.00	18.00	18.00	1	1	2	No	No
6	13.00	2	18.00	18.00	18.00	1	1	2	No	No
8	13.00	2	18.00	18.00	18.00	1	1	2	No	No
10	16.00	2	22.50	22.50	22.50	1	1	2	No	No
12	16.00	2	22.50	22.50	22.50	1	1	2	No	No
14	16.00	2	22.50	22.50	22.50	1	1	2	No	No
17	13.00	4	18.00	18.00	54.00	1	1	2	No	Yes
21	20.00	2	33.00	33.00	33.00	1	1	2	No	No
25	16.00	4	22.50	22.50	67.50	1	1	2	No	Yes
30	20.00	3	33.00	33.00	66.00	1	1	2	No	Yes
35	28.00	2	37.50	37.50	37.50	1	1	2	No	No
40	28.00	2	37.50	37.50	37.50	1	1	2	No	No
50	24.00	3	36.00	36.00	72.00	1	1	2	No	Yes
57	24.00	4	36.00	36.00	108.00	1	1	2	No	Yes
66	28.00	3	37.50	37.50	75.00	1	1	2	No	Yes
80	28.00	4	37.50	37.50	112.50	1	1	2	No	Yes
100	28.00	5	37.50	37.50	150.00	1	1	2	No	Yes
120	28.00	5	37.50	37.50	150.00	1	1	2	No	Yes

Table 20. Side rectangle angle damper - 2000 fpm

Unit size	A (in)	B (in)	Damper qty	Torque (in-lb.)	Actuator torque (max) (in-lb.)	Actuator qty	Linkage
3	11.25	13.97	1	13.10	42.00	1	No
4	11.25	13.97	1	13.10	42.00	1	No
6	15.75	13.97	1	18.30	42.00	1	No
8	20.25	13.97	1	23.60	42.00	1	No
10	20.25	16.30	1	27.50	42.00	1	No
12	27.00	16.30	1	36.70	42.00	1	No
14	23.25	19.72	1	38.20	42.00	1	No
17	30.50	19.72	1	50.10	160.00	1	No
21	36.75	19.72	1	60.40	160.00	1	No
25	45.75	19.72	1	75.20	160.00	1	No
30	48.50	20.22	1	81.70	160.00	1	No
35	45.50	25.47	1	96.60	160.00	1	No
40	48.00	28.35	1	113.40	160.00	1	No
50	56.75	31.22	1	147.60	160.00	1	No
57	65.75	31.22	1	171.10	160.00	2	No
66	70.50	31.22	1	183.40	160.00	2	No
80	85.00	31.22	1	221.10	160.00	2	No
100	95.00	36.97	1	292.70	160.00	2	No
120	96.00	42.72	1	341.80	160.00	3	No

Table 21. Side rectangle damper per 1200 fpm - diagonal economizer with OA rectangular dampers

Unit size	A (in)	B (in)	Damper qty	Torque (in-lb.)	Actuator torque (max) (in-lb.)	Actuator qty	Linkage
3	12.50	13.97	1	14.60	42.00	1	No
4	13.75	19.72	1	22.60	42.00	1	No
6	18.75	19.72	1	30.80	42.00	1	No
8	24.25	19.72	1	39.90	42.00	1	No
10	23.50	25.47	1	49.90	160.00	1	No
12	29.00	25.47	1	61.60	160.00	1	No
14	26.00	31.22	1	67.60	160.00	1	No
17	32.00	31.22	1	83.30	160.00	1	No
21	40.00	31.22	1	104.10	160.00	1	No
25	48.00	31.22	1	124.90	160.00	1	No
30	47.00	36.97	1	144.80	160.00	1	No
35	48.00	42.72	1	170.90	160.00	2	No
40	48.00	48.47	1	193.90	160.00	2	No
50	57.75	48.47	1	233.30	160.00	2	No
57	67.50	48.47	1	272.60	160.00	2	No
66	69.50	28.35	2	277.10	160.00	2	Yes
80	83.00	28.35	2	330.90	160.00	3	Yes
100	95.25	31.22	2	418.20	160.00	3	Yes
120	95.00	36.97	2	493.90	160.00	4	Yes

Table 22. Short mixing box rectangle damper - top, back or bottom only

Unit size	A (in)	B (in)	Damper Qty	Torque (in-lb.)	Actuator Torque (max) (in-lb.)	Actuator qty	Linkage
3	13.00	8.22	1	5.20	42.00	1	No
4	19.75	8.22	1	7.90	42.00	1	No
6	27.00	8.22	1	10.80	42.00	1	No
8	35.00	8.22	1	14.00	42.00	1	No
10	43.75	8.22	1	17.50	160.00	1	No
12	32.00	13.97	1	21.70	160.00	1	No
14	60.00	8.22	1	24.00	160.00	1	No
17	43.50	13.97	1	29.50	160.00	1	No
21	53.75	13.97	1	36.50	160.00	1	No
25	64.50	13.97	1	43.80	160.00	1	No
30	55.00	19.72	1	52.70	160.00	1	No
35	64.00	19.72	1	61.40	160.00	1	No
40	56.50	25.47	1	70.00	160.00	1	No
50	68.00	25.47	1	84.20	160.00	1	No
57	66.00	31.22	1	100.20	160.00	1	No
66	58.50	19.72	2	112.20	160.00	1	No
80	54.25	25.47	2	134.30	160.00	1	No
100	65.25	25.47	2	161.60	160.00	2	No
120	66.00	31.22	2	200.30	160.00	2	No

Table 23. Damper torque per blade (inch-pounds)

Unit size	2 Deck Horizontal	2 Deck Vertical	3 Deck dual-actuator Horizontal	3 Deck dual-actuator Vertical	3 Deck single-actuator Horizontal	3 Deck single-actuator Vertical
6	7.10	5.50	7.50	5.80	32.50	25.00
8	7.10	5.50	7.50	5.80	32.50	25.00
10	8.00	6.20	8.60	6.60	32.50	25.00
12	8.00	6.20	8.60	6.60	32.50	25.00
14	8.00	6.20	8.60	6.60	32.50	25.00
17	8.00	6.20	8.60	6.60	32.50	25.00
21	9.90	7.50	11.50	8.70	32.50	25.00
25	9.90	7.50	11.50	8.70	32.50	25.00
30	9.90	7.50	11.50	8.70	32.50	25.00
35	19.80	15.20	31.50	24.40	32.50	25.00
40	19.80	15.20	31.50	24.40	32.50	25.00
50	19.80	15.20	31.50	24.40	32.50	25.00

Table 24. Energy recovery bypass opposed-blade damper

Unit size	A (in)	B (in)	Damper qty	Torque (in-lb.)	Actuator Torque (max) (in-lb.)	Actuator qty	Linkage
3 - 8	18.00	8.22	1	5.10	42.00	1	No
8 - 14	32.00	8.22	1	9.10	42.00	1	No
10 - 17	41.75	8.22	1	11.90	42.00	1	No
12 - 21	53.50	8.22	1	15.30	42.00	1	No
21 - 50	52.50	13.97	1	25.50	160.00	1	No
17, 21	61.50	8.22	1	17.60	42.00	1	No
21 - 30	66.00	8.22	1	18.80	42.00	1	No
25 - 50	65.00	13.97	1	31.50	160.00	1	No
21	70.00	8.22	1	20.00	42.00	1	No
35 - 50	84.50	13.97	1	41.00	160.00	1	No
35 - 50	75.00	13.97	1	36.40	160.00	1	No
40 - 50	102.00	13.97	1	49.50	160.00	1	No
50	113.00	13.97	1	54.80	160.00	1	No

Table 25. Exhaust fan damper torque

Unit size	A (in)	B (in)	Damper Qty	Torque (in-lb.)	Actuator Torque (max) (in-lb.)	Actuator qty	Linkage
3	19.83	13.97	1	13.50	42	1	No
4	32.33	13.97	1	22.00	42	1	No
6	32.33	13.97	1	22.00	42	1	No
8	38.83	13.97	1	26.40	160	1	No
10	49.83	13.97	1	33.80	160	1	No
12	54.83	13.97	1	37.20	160	1	No
14	60.33	13.97	1	41.00	160	1	No
17	60.33	13.97	1	41.00	160	1	No
21	68.33	13.97	1	46.40	160	1	No
25	68.33	13.97	1	46.40	160	1	No
30	81.83	13.97	1	55.60	160	1	No
35	40.88	19.72	2	78.40	160	2	No
40	30.42	19.72	3	87.50	160	3	No
50	34.75	19.72	3	99.90	160	3	No
57	34.75	19.72	3	99.90	160	3	No
66	39.75	31.22	3	181.00	160	3	No
80	38.42	31.22	3	174.90	160	3	No
100	43.09	31.22	3	196.20	160	3	No
120	52.25	31.22	3	237.90	160	3	No

Table 26. Energy recovery recirculation parallel-blade damper

Unit size	A (in)	B (in)	Damper qty	Torque (in-lb.)	Actuator torque (max) (in-lb.)	Actuator qty	Linkage
3	16.00	13.97	1	10.90	42.00	1	No
4	28.50	13.97	1	19.40	42.00	1	No
6	28.50	13.97	1	19.40	42.00	1	No
8	35.00	13.97	1	23.80	42.00	1	No
10	46.00	13.97	1	31.20	42.00	1	No
12	51.00	13.97	1	34.60	42.00	1	No
14	56.50	13.97	1	38.40	160.00	1	No
17	56.50	13.97	1	38.40	160.00	1	No
21	64.50	13.97	1	43.80	160.00	1	No
25	64.50	13.97	1	43.80	160.00	1	No
30	78.00	13.97	1	53.00	160.00	1	No
35	84.50	13.97	1	57.40	160.00	1	No
40	97.00	13.97	1	65.90	160.00	1	No
50	110.00	13.97	1	74.70	160.00	1	No

Table 27. Face damper torque requirements

Unit size	A (in)	B (in)	Damper Qty	Torque (in-lb)	Actuator torque (max) (in-lb.)	Actuator Qty
3	23.20	19.72	1	13.80	42.00	1
4	35.70	19.72	1	21.30	42.00	1
6	35.70	25.47	1	27.50	42.00	1
8	42.20	25.47	1	32.50	42.00	1
10	53.20	25.47	1	40.90	42.00	1
12	58.20	31.22	1	54.90	160.00	1
14	63.70	31.22	1	60.10	160.00	1
17	63.70	36.97	1	71.10	160.00	1
21	71.70	42.72	1	92.50	160.00	1
22	50.94	54.82	1	84.36	160.00	1
25	71.70	48.47	1	105.00	160.00	1
26	50.94	68.19	1	104.93	160.00	1
30	85.20	48.47	1	124.70	160.00	1
31	29.19	68.19	2	120.25	160.00	1
35	43.44	50.94	2	133.70	160.00	1
36	33.19	73.94	2	148.26	160.00	1
40	32.19	50.94	3	148.60	160.00	1
41	33.19	91.19	2	182.85	160.00	2
50	36.52	62.44	3	206.70	160.00	2
51	39.94	91.19	2	220.03	160.00	2
57	36.52	68.19	3	225.70	160.00	2
58	39.94	102.69	2	247.78	160.00	2
66	41.52	73.94	3	278.20	160.00	2
80	41.52	85.44	3	321.50	160.00	3
100	46.19	99.41	3	416.10	160.00	3
120	55.35	99.41	3	498.70	160.00	4

Table 28. Internal face-and-bypass damper torque requirements

Unit size	A (in)	B (in)	Damper Qty	Torque (in-lb)	Actuator torque (max) (in-lb.)	Actuator Qty
3	23.20	18.31	1	12.80	42.00	1
4	35.70	18.31	1	19.70	42.00	1
6	35.70	19.37	1	20.90	42.00	1
8	42.20	24.39	1	31.10	42.00	1
10	53.20	24.39	1	39.20	42.00	1
12	58.20	31.14	1	54.80	160.00	1
14	63.70	31.14	1	59.90	160.00	1
17	63.70	36.61	1	70.50	160.00	1
21	71.70	42.17	1	91.30	160.00	1
22	50.94	50.94	1	78.38	160.00	1
25	71.70	47.80	1	103.50	160.00	1
26	50.94	68.19	1	104.93	160.00	1
30	85.20	47.80	1	123.00	160.00	1
31	29.19	68.19	2	120.25	160.00	1
35	43.44	50.94	2	133.70	160.00	1
36	33.19	73.94	2	148.26	160.00	1
40	32.19	50.94	3	148.60	160.00	1
41	33.19	85.44	2	171.32	160.00	2
50	36.52	62.44	3	206.70	160.00	2
51	39.94	85.44	2	206.16	160.00	2
57	36.52	68.19	3	225.70	160.00	2
58	39.94	101.62	2	245.19	160.00	2
66	41.52	73.94	3	278.20	160.00	2
80	41.52	85.44	3	321.50	160.00	3
100	46.19	99.41	3	416.10	160.00	3
120	55.35	99.41	3	498.70	160.00	4

External face-and-bypass damper torque requirements

Unit size	A (in)	B (in)	Damper Qty	Bypass Torque (in-lb)	Face Torque (in-lb.)	Torque (in-lb)	Actuatortorque (max) (in-lb.)	Actuator Qty
3	19.83	13.97	1	8.40	13.80	22.20	42.00	1
4	32.33	13.97	1	13.60	21.30	34.90	42.00	1
6	32.33	13.97	1	13.60	27.50	41.10	42.00	1
8	38.83	13.97	1	16.40	32.50	48.90	160.00	1
10	49.83	13.97	1	21.00	40.90	62.00	160.00	1
12	54.83	13.97	1	23.10	54.90	78.00	160.00	1
14	60.33	13.97	1	25.50	60.10	85.50	160.00	1
17	60.33	13.97	1	25.50	71.10	96.60	160.00	1
21	68.33	13.97	1	28.80	92.50	121.40	160.00	1
22	49.83	13.97	1	21.03	84.36	105.39	160.00	1
25	68.33	13.97	1	28.80	105.00	133.80	160.00	1
26	49.83	19.72	1	29.69	104.93	134.61	160.00	1
30	81.83	13.97	1	34.50	124.70	159.30	160.00	1
31	60.33	19.72	1	35.94	120.25	156.19	160.00	1
35	41.17	13.97	2	34.70	133.70	168.40	160.00	2
36	68.33	19.72	1	40.71	148.26	188.96	160.00	2
40	27.61	13.97	3	35.00	148.6	183.50	160.00	2

External face-and-bypass damper torque requirements

Unit size	A (in)	B (in)	Damper Qty	Bypass Torque (in-lb)	Face Torque (in-lb.)	Torque (in-lb)	Actuatortorque (max) (in-lb.)	Actuator Qty
41	68.33	19.72	1	40.71	182.85	223.55	160.00	2
50	31.94	13.97	3	40.40	206.70	247.10	160.00	2
51	81.83	19.72	1	48.75	220.03	268.78	160.00	2
57	31.94	13.97	3	40.40	225.70	266.10	160.00	2
58	81.83	19.72	1	48.75	247.78	296.53	160.00	2
66	36.94	25.47	3	85.30	278.20	363.50	160.00	3
80	36.94	25.47	3	85.30	321.50	406.80	160.00	3
100	41.61	25.47	3	96.00	416.10	512.20	160.00	4
120	50.78	25.47	3	117.20	498.70	615.90	160.00	4

Opposed-Blade and Parallel-Blade Damper

Opposed-blade and parallel-blade airfoil dampers in unit sizes 3-120, as well as internal and external face-and-bypass sections, have centered dampers with an internal jack-shaft (see Figure 86, Figure 87 and Figure 88). A 95-degree actuator rotation gives a 90-degree blade travel.

Note: Damper blades should be checked for proper operation from full open to full closed position before unit start up. Damper blade positioning may have changed due to shipping and handling vibrations.

Figure 86. Typical mixing box configurations for unit sizes 3 to 120

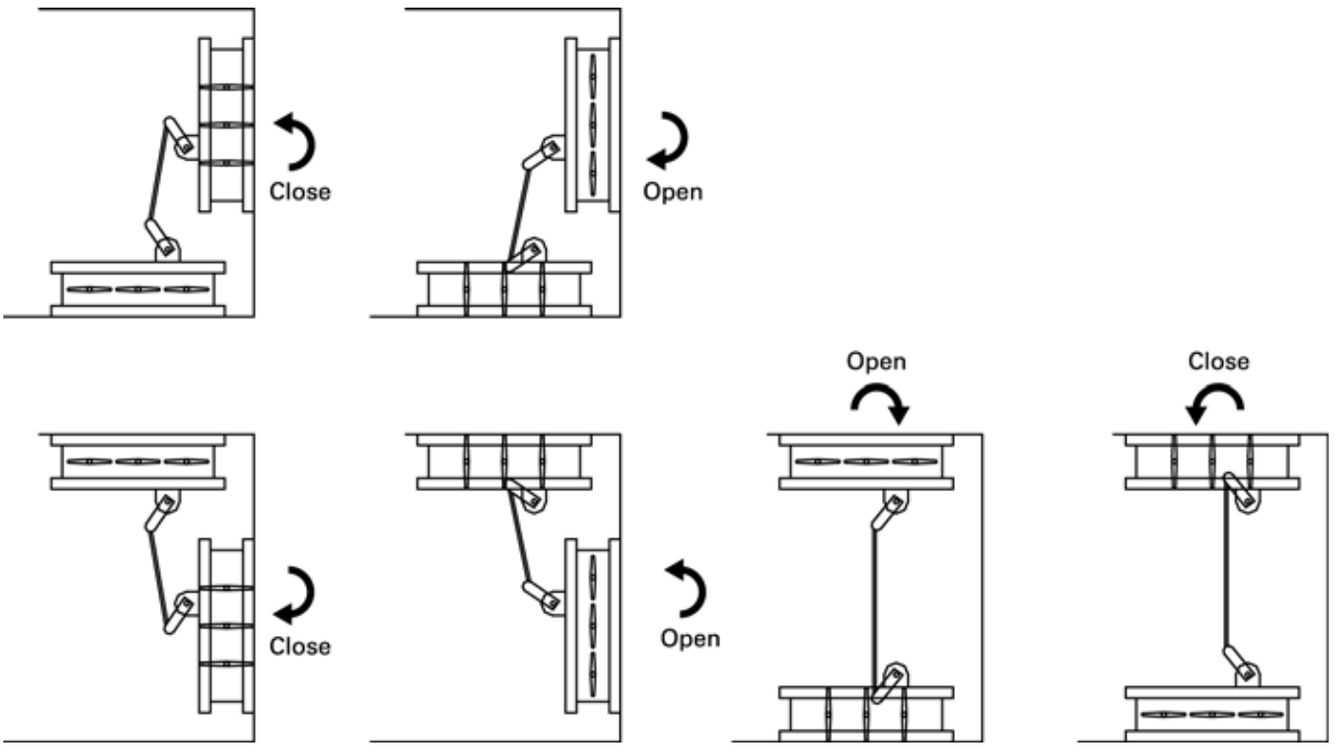


Figure 87. Typical internal face-and-bypass configuration

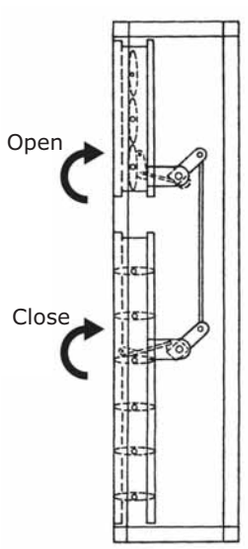
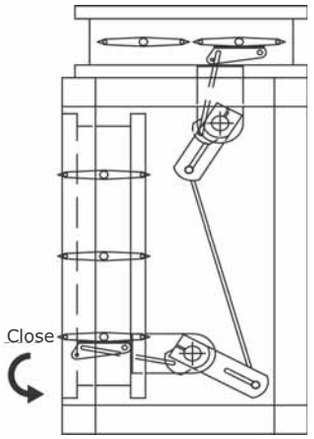


Figure 88. Typical external face-and-bypass configuration



Multizone Modules

Under certain operating conditions, condensation may form on the cold deck portion of the multizone damper section. To prevent this, insulate around the damper rods. Be sure the insulation does not affect damper operation.

Zone Damper Operators

Zone damper operators are available factory-mounted with factory-mounted controls or as a stand-alone end device. If not factory-provided, the contractor is responsible for providing these operators. In all cases, the damper operator should be connected to the drive rod.

Adjusting Zone Dampers

Zone dampers should be installed and adjusted prior to making duct connections, assuring proper setup of the damper zones:

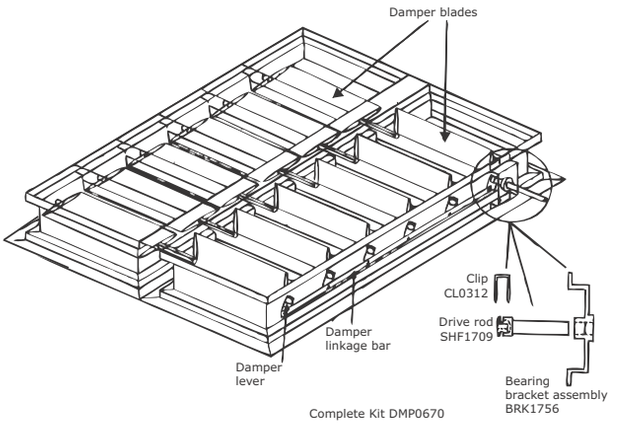
1. Check the damper blades to confirm they are not binding. The blade should rotate 90 degrees.
2. Determine the number of zones required. The zone damper is fitted with a linkage bar that connects all damper zones.
3. Select the number of damper segments required for the first zone.
4. Cut a section out of the damper linkage bar just after the last lever in that zone.

Note: It may be necessary to remove the damper linkage bar to cut it. To remove the linkage bar pry the "e" rings from the blade axles and remove the bar.

5. Repeat steps 3 and 4 for the remaining zones.
6. Attach the damper operator drive rod to one blade axle in each zone with the two-deck damper.
7. Use the self-drilling screws provided to mount the bearing bracket assembly (see Figure 89).

Note: The drive rod kits ship in a separate box, found in the fan module or the cold deck of the multizone module.

Figure 89. Setting the zone damper rods and damper linkage



Duct Connections

All duct connections to the air handlers should be installed in accordance with the standards of the National Fire Protection Association (NFPA):

- NFPA 90A for installing air conditioning and ventilating systems other than residence type.
- NFPA 90B for residence-type warm air heating and air-conditioning systems.

See unit submittal documentation for additional duct mounting information.

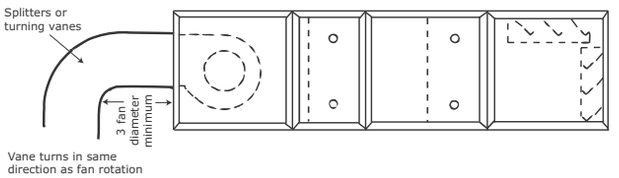
Fan Discharge Connections

To ensure the highest fan efficiency, duct turns and transitions must be made carefully, minimizing air friction losses and turbulence. Proper ductwork installation, as outlined by such organizations as Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), should be followed closely.

Fan sections with rectangular and round openings have a one-inch flange on the discharge that can be used to attach the duct. When using lined ducts, the insulation should not obstruct the discharge opening. For plenum fan sections with bell mouth fittings, see "Bell Mouth Discharge Connections" on page 82.

Connections made directly to the discharge opening of a housed fan should have a minimum of three fan diameters of straight duct before any turns or transitions. The ductwork should be the same size as the fan discharge opening. The first turn of the connection should be in the same direction as the fan rotation as shown in Figure 90. The air that the fan discharges into the duct is extremely turbulent and requires some length of duct to stabilize. Abrupt changes in ductwork directly off the fan discharge may adversely affect fan performance and acoustics.

Figure 90. Typical discharge ductwork recommendations



Damper Connections

Standard damper sections include mixing sections, filter mixing sections, face dampers sections, internal face-and-bypass sections, and economizer sections. There are two damper blade configurations available - parallel-blade and opposed-blade. Traq™ dampers are another type of damper available in mixing box sections.

Ductwork attached to the standard damper sections should be sized to fit the opening of the damper. Duct opening dimensions are provided in the submittals. When using lined duct, ensure that the insulation does not obstruct the damper opening (see Figure 91 and Figure 92).

Note: Damper blades should be checked for proper operation from full-open to full-closed position before unit start up. Damper blade positioning may have changed due to shipping and handling vibrations.

Figure 91. Typical section with duct flat/flange connection- uninsulated or externally insulated

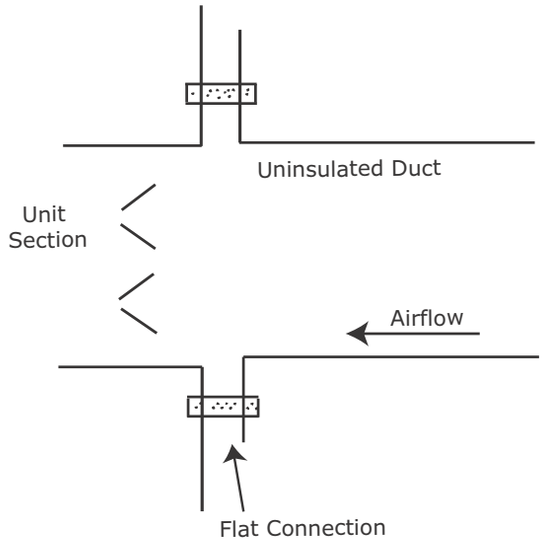
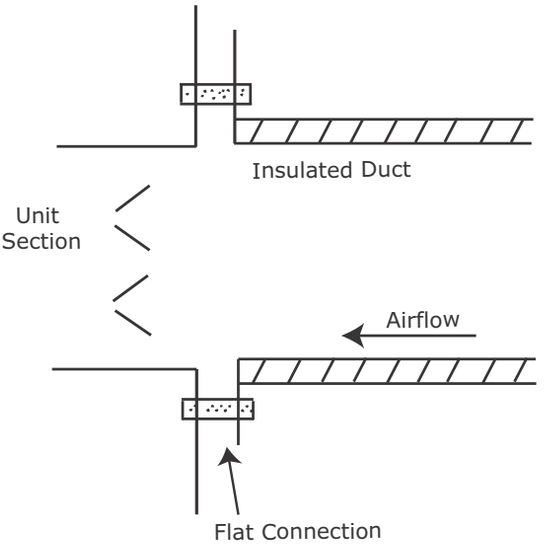


Figure 92. Typical section with duct flat/flange connection- internally insulated



Bottom Opening Duct Installation

1. Install gasket to duct flange to ensure air tight seal.
2. Install duct into place underneath framed opening in unit base per Figure 93. Refer to factory curb layout provided with unit submittals for duct size and location.
3. Bottom of unit base elevation is flush with duct opening in bottom of unit (see Figure 94 and Figure 95).

Figure 93. Field-supplied duct connection to AHU bottom supply/return air opening

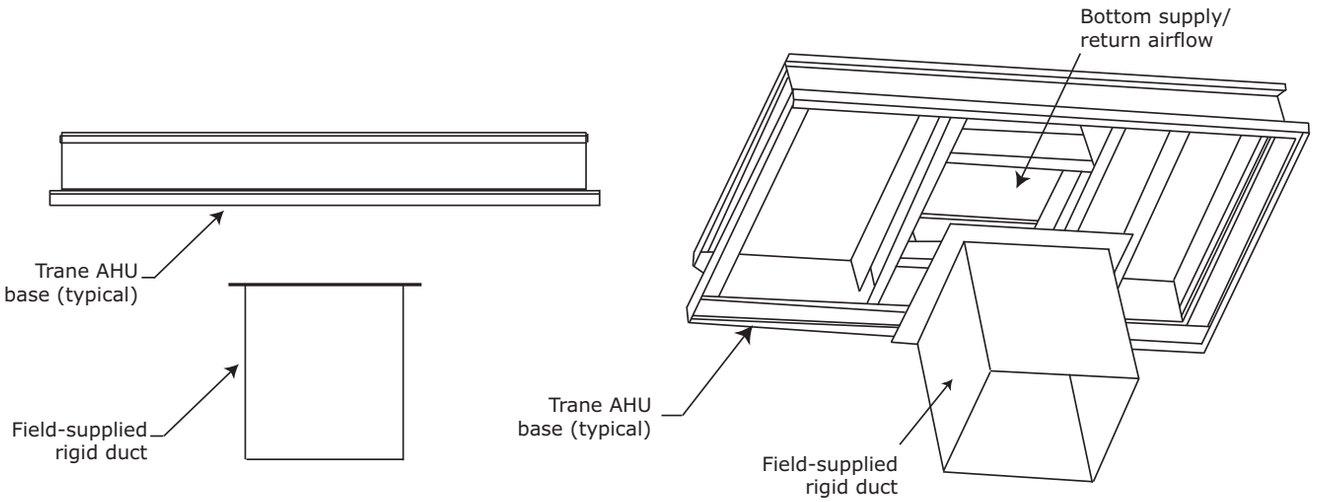


Figure 94. Field-supplied duct connection details - curb mount

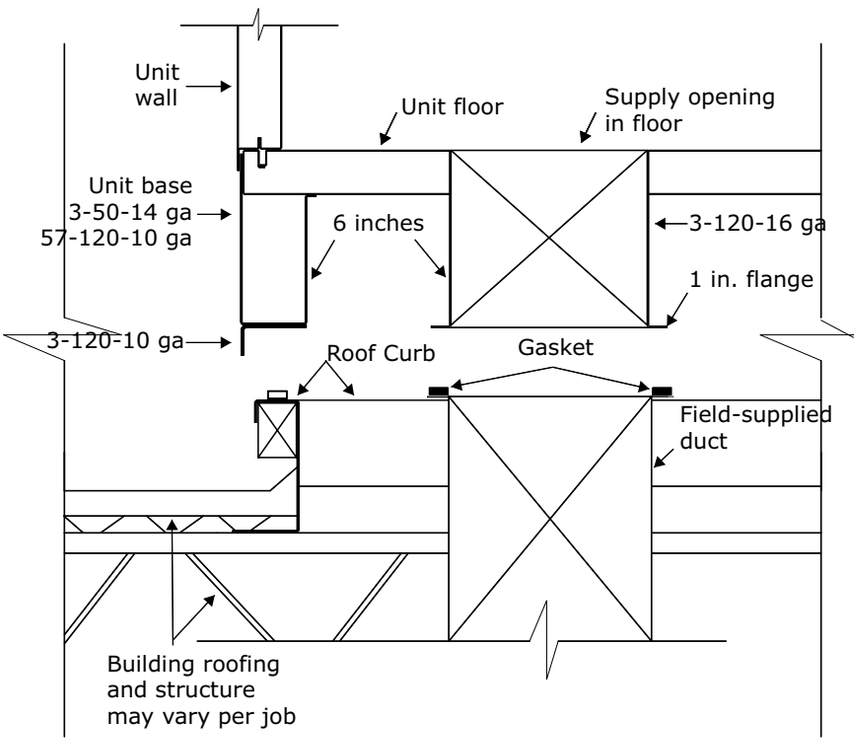
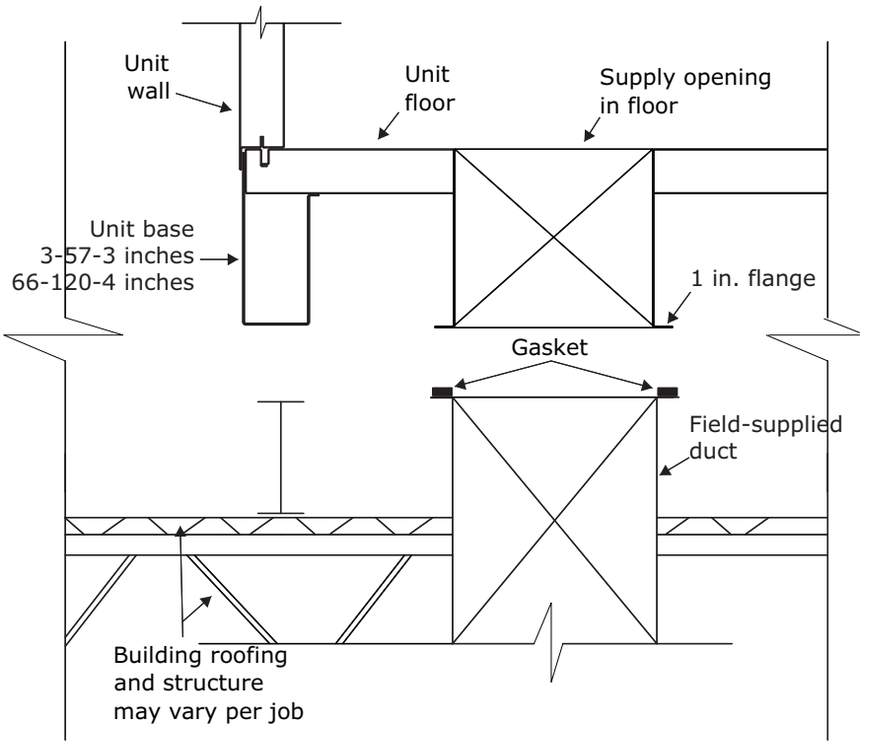


Figure 95. Field-supplied duct connection details - pier mount



Discharge Plenum Connections

Discharge plenum sections are available with or without openings. Sections with rectangular and round openings have a framed opening that can be used to secure the duct to the frames. If the duct is lined, it is important the insulation does not obstruct the opening of the section.

For a discharge plenum with field-cut openings, attach the duct to the side panel.

Bell Mouth Discharge Connections

Round duct connections to be fastened to plenum fan and discharge plenum sections with bell mouth discharge openings should be sized to attach to the casing or directly to the bell mouth fitting. Attachment to the casing requires the round duct diameter to be sized two inches larger than the nominal bell mouth outlet. An angle ring with a flat flange should be affixed to the round duct to secure the duct to the casing (see Figure 96). Attachment to the bell mouth fitting requires the duct and fitting to be insulated by the installing contractor up to the bell mouth radius to prevent condensation (see Figure 97). The bell mouth fitting extends through the casing by one inch.

Figure 96. Securing round duct to casing over bell mouth outlet

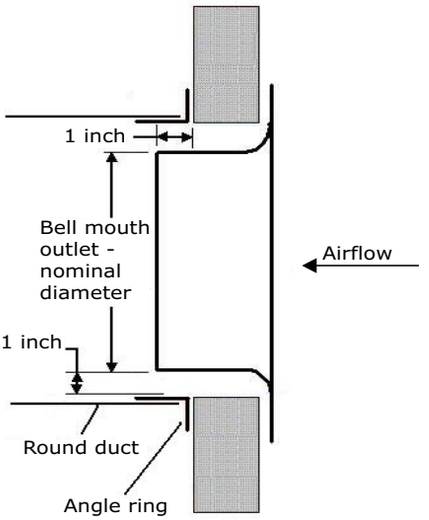
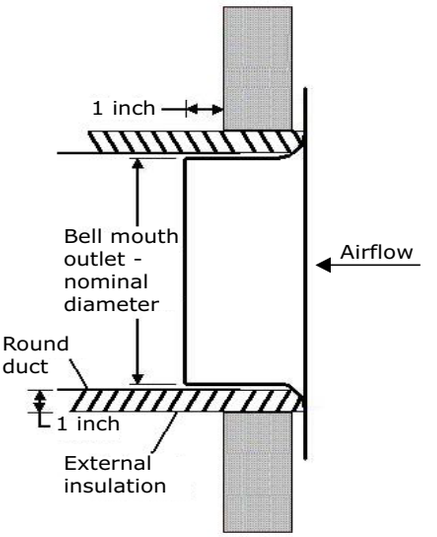


Figure 97. Securing round duct to bell mouth outlet

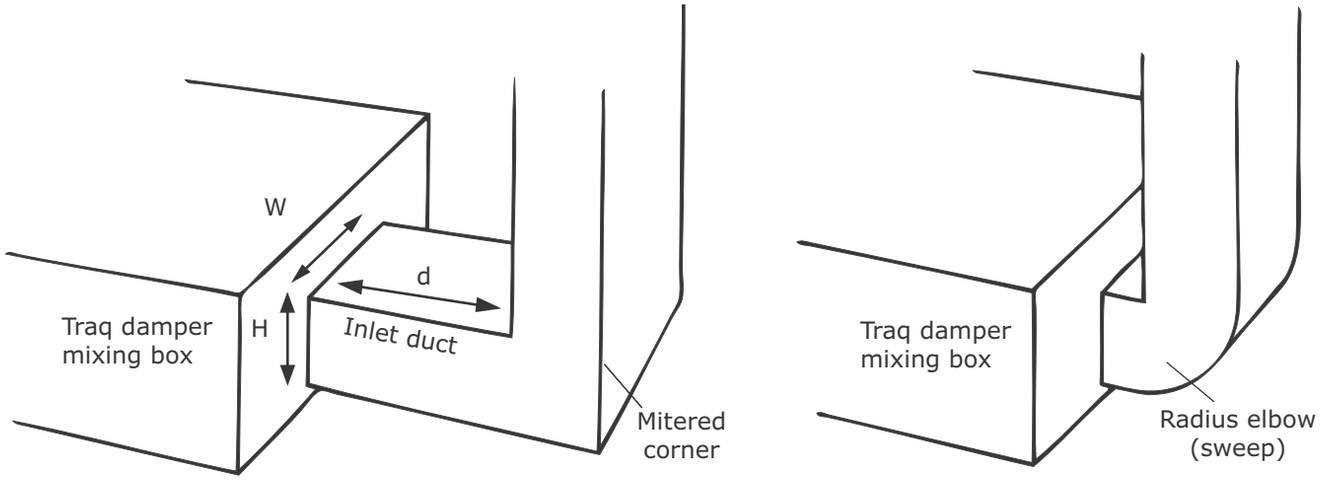


Traq Damper Connections

Size the duct connections to attach to the specified portion on the face of the mixing box that the duct connection completely covers all of the Traq damper.

For a mitered corner, provide one hydraulic duct diameter between the entering face of the Traq dampers and the duct turn. For a radius elbow, or sweep, place the elbow directly against the face of the Traq dampers (see Figure 98).

Figure 98. Traq damper duct connections



External Face-and-Bypass Connections

The external face-and-bypass damper sections will require a field-fabricated duct to direct the bypass air into the appropriate section. Duct sizing recommendations are listed in Table 29.

Table 29. Recommended bypass duct sizes (inches)

Unit size	H	W	L
3	16.00	20.00	14.00
4	18.00	33.00	16.00
6	18.00	33.00	16.00
8	18.00	39.00	16.00
10	18.00	50.00	16.00
12	22.00	55.00	20.00
14	22.00	61.00	20.00
17	22.00	61.00	20.00
21	28.00	69.00	26.00
22	45.00	50.50	31.13
25	28.00	69.00	26.00
26	47.00	50.50	33.13
30	28.00	82.00	26.00
31	47.00	61.00	33.13
35	45.00	80.00	36.00
36	47.50	69.00	40.13
40	45.00	93.00	36.00
41	55.50	69.00	40.13
50	45.00	106.00	36.00
51	55.50	82.00	40.13
57	47.00	106.00	40.00
58	55.50	82.00	52.13
66	48.00	121.00	40.00
80	56.00	121.00	48.00
100	56.00	135.00	48.00
120	56.00	162.00	48.00

When attaching a bypass duct to a downstream fan section or access section, the section will have a factory-provided opening. (see Figure 99, Figure 100, and Figure 101.)

When bypassing into an access section, remove a panel. It is not necessary to cut an opening.

Figure 99. External face-and-bypass with duct configuration designed to bypass air into a vertical fan section

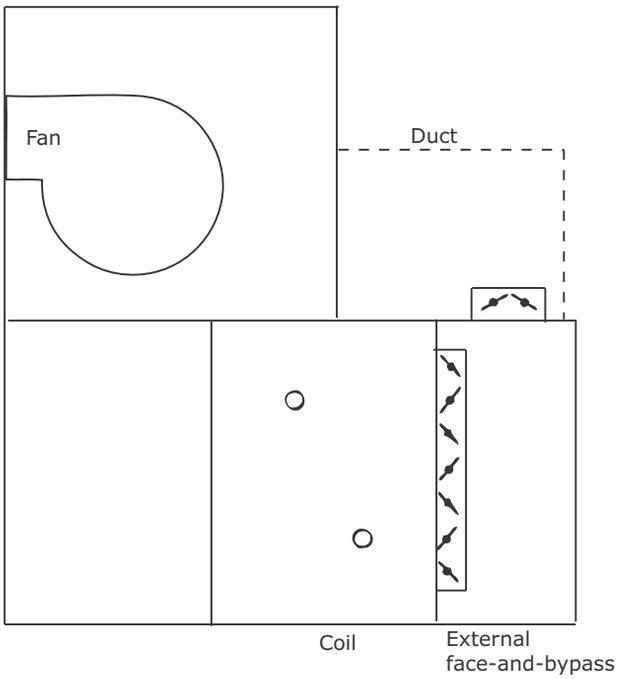


Figure 100. External face-and-bypass with duct configuration designed to bypass air around one coil

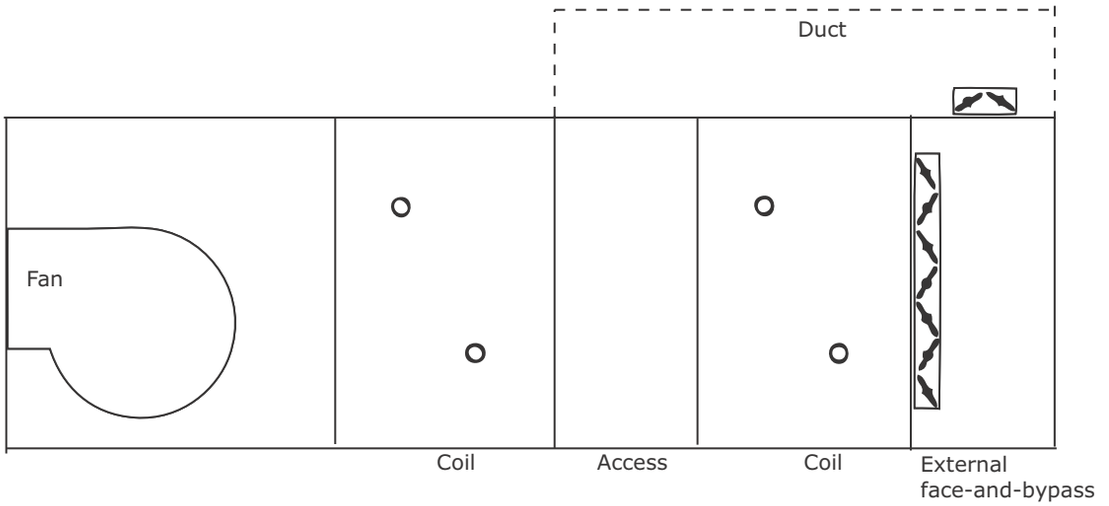
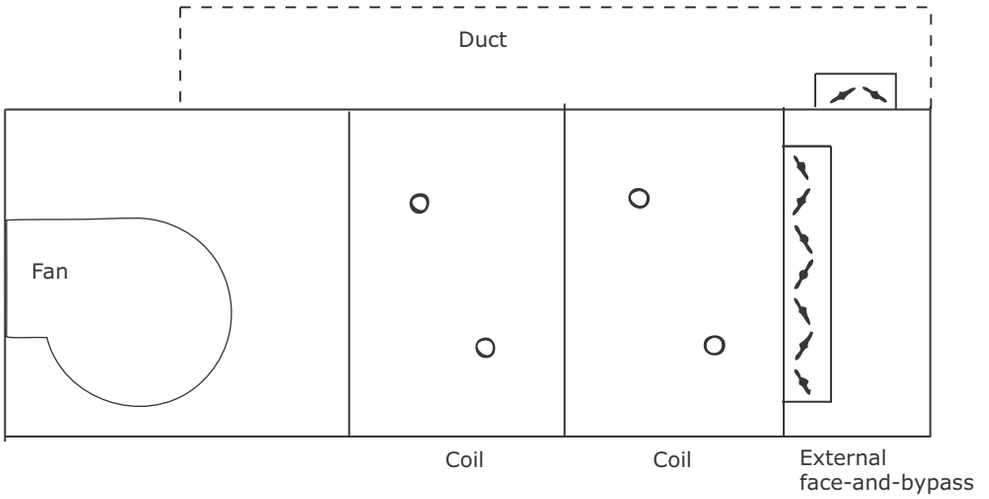


Figure 101. External face-and-bypass with duct configuration designed to bypass air into a horizontal fan section



Other Connections

Access, filter, and other sections may have open inlets with a 2-inch (sizes 3-120) panel frame for connecting the ductwork. If the duct is lined, it is important the insulation does not obstruct the opening of the section.

Figure 102. Typical duct flat/flange end of unit connection - uninsulated

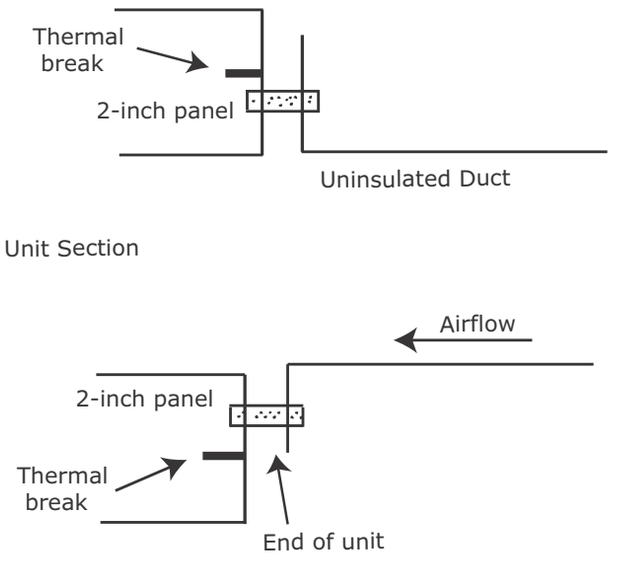
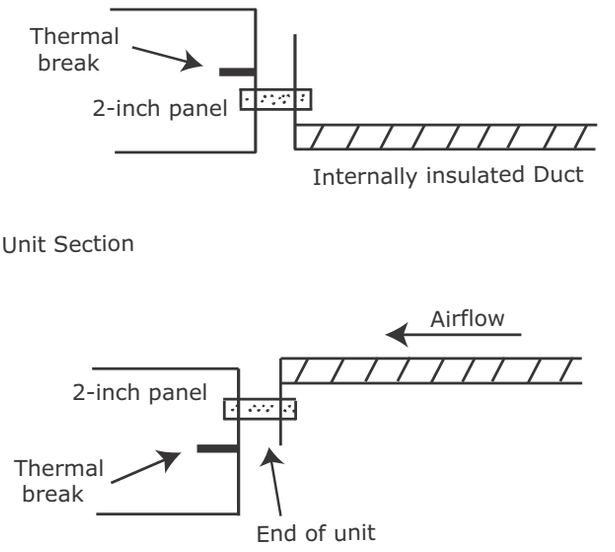


Figure 103. Typical duct flat/flange end of unit connection - insulated



Coil Piping and Connections

NOTICE:

Connection Leaks!

Use a backup wrench when attaching piping to coils with copper headers to prevent damage to the coil header. Do not use brass connectors because they distort easily and could cause connection leaks.

NOTICE:

Over Tightening!

Do not use Teflon-based products for any field connections because their high lubricity could allow connections to be over-tightened, resulting in damage to the coil header.

NOTICE:

Leakage!

Properly seal all penetrations in unit casing. Failure to seal penetrations from inner panel to outer panel could result in unconditioned air entering the module, and water infiltrating the insulation, resulting in equipment damage.

General Recommendations

Proper installation, piping, and trapping is necessary to ensure 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. Maximum recommended torque is 200 foot-pounds.
- 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!

Do not walk on the sheet metal drain pan. Walking on the drain pan could cause the supporting metal to collapse, resulting in the operator/technician to fall. Failure to follow this recommendation could result in death or serious injury.

NOTICE:

Water Damage!

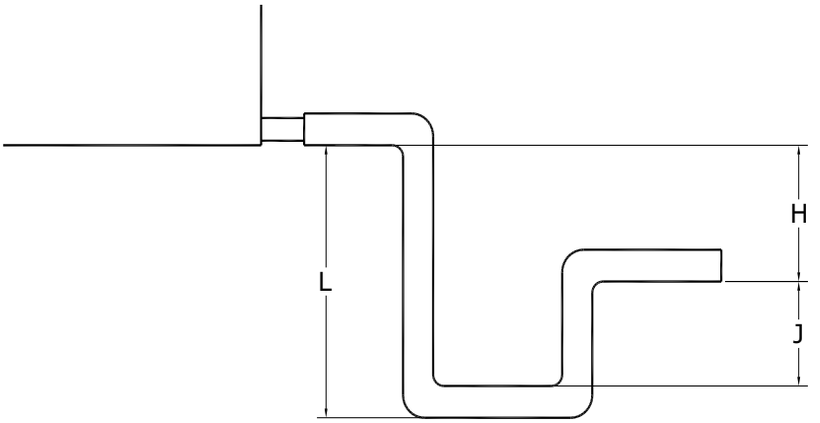
When more than one module has a drain pain, trap each module individually. Connecting all drains to a common line with only one trap can result in condensate retention and possible water damage to the air handler or adjoining space.

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:

Unit size	NPT (national pipe thread) external connection
3-31	1-inch
35-58	1 1/4 inch
66-120	1 1/2 inch

Figure 30 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.

Table 30. Drain pan trapping for negative and positive pressure applications



Drain pan trapping for section under negative pressure	Drain pan trapping for section under positive pressure
L = H + J + pipe diameter where: H = 1 inch for each inch of negative pressure plus 1 inch J = 1/2 H	L = H + J + pipe diameter where: H = 1/2 inch (minimum) J = 1/2 inch plus the unit positive static pressure at coil discharge (loaded filters)

Steam Coil Piping

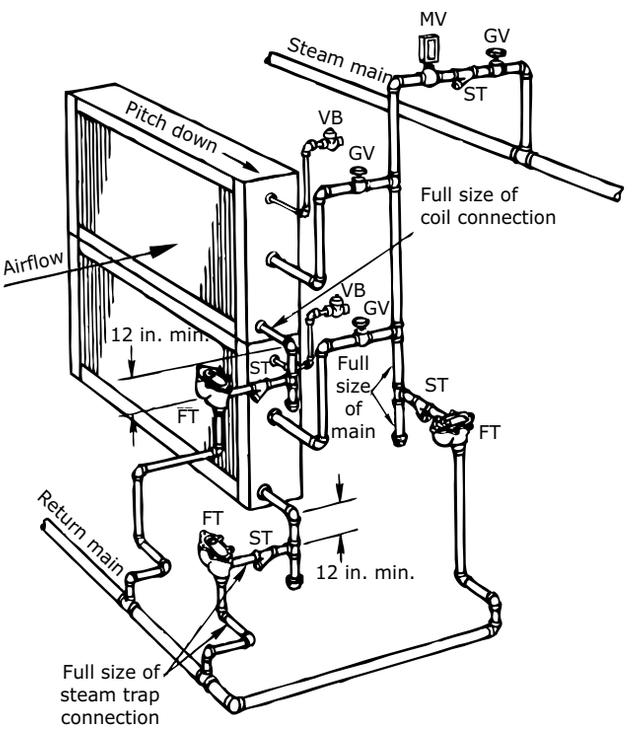
Air handlers fitted with steam coils have labeled holes for piping penetrations. Figure 104 illustrates a typical steam coil piping configuration. See Table 31 for the codes of system components in these figures.

The coil condensate return line must be piped full size of the condensate trap connection, except for a short nipple screwed directly into the coil header's condensate return tapping. Do not bush or reduce the coil return trapping size.

Table 31. Code of system components for piping figures

Code	System component
FT	Float and thermostatic steam trap
GV	Gate valve
OV	Automatic two-position (ON-OFF) control valve
VB	Vacuum breaker
ST	Strainer
AV	Automatic or manual air vent
MV	Modulating control valve

Figure 104. Typical piping for Type NS steam coils and horizontal tubes for horizontal airflow



NOTICE:

Breaker Cracking Pressure!

The 1/2-inch NPT, 15 degree swing check valve vacuum breaker is recommended because other vacuum breakers, such as spring-loaded ball-check breakers, have cracking pressures as high as 1.25 inches Hg (17 inches of water). Vacuum breakers with fitting sizes smaller than 1/2 inch NPT are too small to relieve vacuum quick enough to ensure complete condensate drainage. Other types of swing check valve vacuum breakers are acceptable if the fittings size is not smaller than 1/2-inch NPT and the cracking pressure is not larger than 0.25 inches HG (3.5 inches of water). Failure to follow these instructions could result in equipment damage.

To prevent coil damage, complete the following recommendations:

- Install a 1/2-inch NPT, 15 degree swing check valve vacuum breaker with cracking pressure of 0.25 inches Hg (3.4 inches water) or lower at the top of the coil. This vacuum breaker should be installed as close to the coil as possible.
- For coil type NS, install the vacuum breaker in the unused condensate return tapping at the top of the coil.
- Vent the vacuum breaker line to atmosphere or connect it into the return main at the discharge side of the steam trap

Note: Vacuum breaker relief is mandatory when the coil is controlled by a modulating steam supply or automatic two position (ON-OFF) steam supply valve. Vacuum breaker relief is also recommended when face-and-bypass control is used.

NOTICE:

Coil Condensate!

Condensate must flow freely from the coil at all times to prevent coil damage from water hammer, unequal thermal stresses, freeze-up and/or corrosion. In all steam coil installations, the condensate return connections must be at the low point of the coil. Failure to follow these instructions could result in equipment damage.

Proper steam trap installation is necessary for satisfactory coil performance and service life. For steam trap installation:

1. Install the steam trap discharge 12 inches below the condensate return connection. Twelve inches provides sufficient hydrostatic head pressure to overcome trap losses and ensures complete condensate removal.
   a. Use float and thermostatic traps with atmospheric pressure gravity condensate return, with automatic controls, or where the possibility of low-pressure supply steam exists. (Float and thermostatic traps are recommended because of gravity drain and continuous discharge operation.)
   b. Use bucket traps only when the supply steam is not modulated and is 25 psig or higher.

Note: Trane steam coils require a minimum of 2 psi of pressure to assure even heat distribution.

2. Trap each coil separately to prevent holding up condensate in one or more of the coils.
3. Install strainers as close as possible to the inlet side of the trap.
4. If installing coils in series airflow, control each coil bank independently with an automatic steam-control valve. Size the traps for each coil using the capacity of the first coil in direction of airflow.
5. Use a modulating valve that has linear flow characteristics to obtain gradual modulation of the coil steam supply.

Note: Do not modulate systems with overhead or pressurized returns unless the condensate is drained by gravity into a receiver, vented to atmosphere, and returned to the condensate pump.

6. Pitch all supply and return steam piping down 1 inch for every 10 feet in the direction of the steam or condensate flow.

Note: Do not drain the steam mains or take-offs through the coils. Drain the mains ahead of the coils through a steam trap to the return line.

7. Ensure overhead returns have 1 psig of pressure at the steam trap discharge for every 2 feet of elevation for continuous condensate removal.

Water Coil Piping

Figure 105, and Figure 106 illustrate typical water coil piping configurations.

Type 5A, 5W, D1, W, UW, TT, P,2, P4, and P8 water coils are self-venting only if the water velocity exceeds 1.5 feet per second (fps) in the coil tubes. Type D2, UA, UU, and WD water coils are self-venting only if the water velocity exceeds 2.5 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 105. Typical piping for type 5W one-row water coil

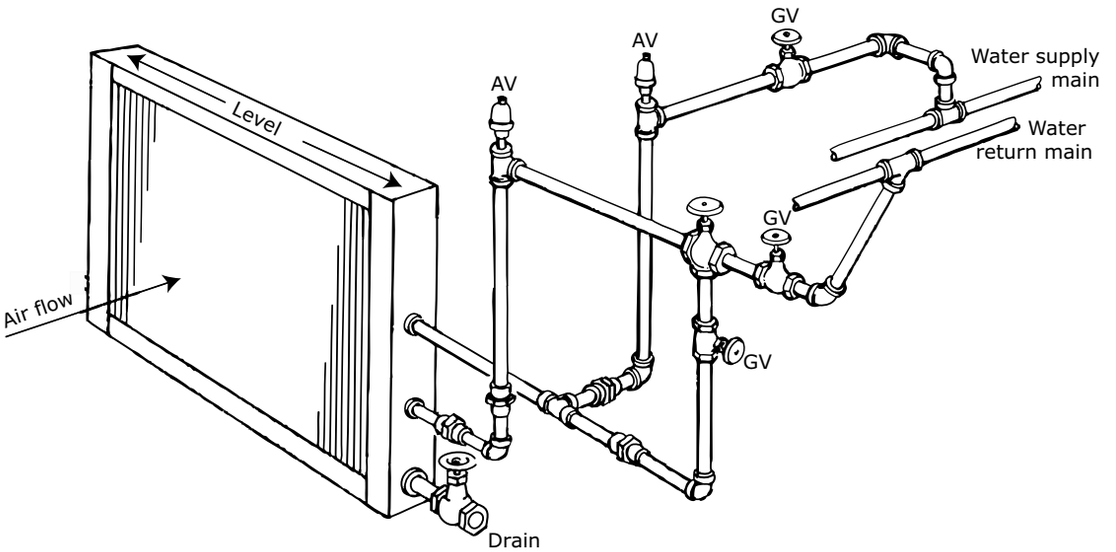


Figure 106. Typical piping for type 5A, 5W two-row, W 3- to 12-row, WD, D1, and D2 water coils

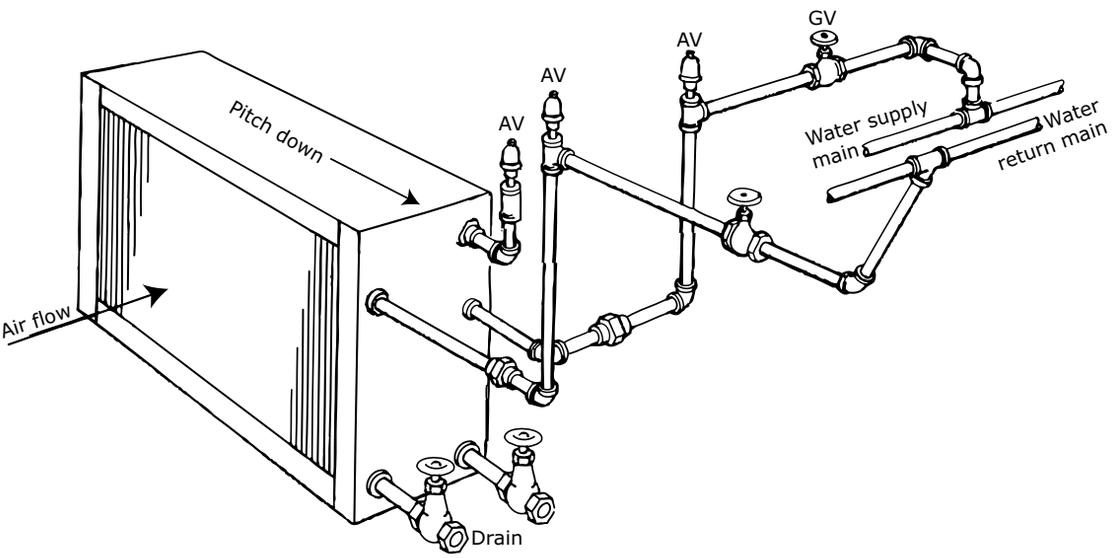
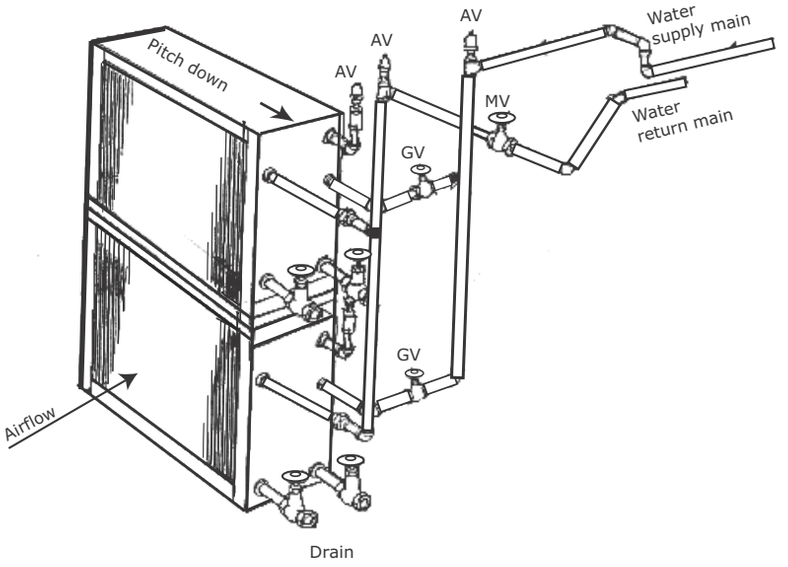


Figure 107. Typical piping for stacked water coils

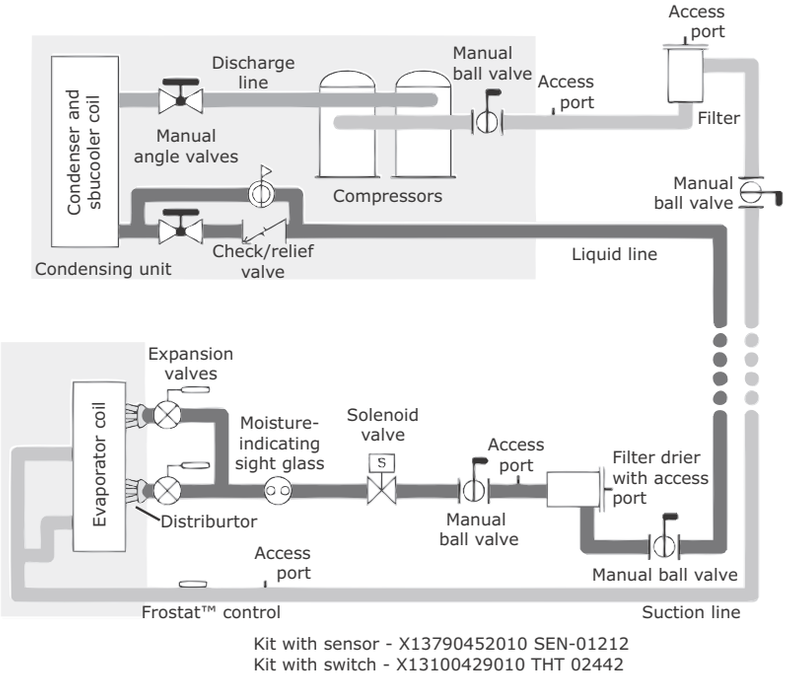


Refrigerant Coil Piping

Note: Refer to for information on handling refrigerants.

Use Figure 108 to determine the proper, relative sequence of the components in the refrigerant lines that connect the condensing unit to an evaporator coil. Refer to "," p. 93 for more detailed schematics of evaporator piping.

Figure 108. Example of placement for split-system components



Liquid Lines

Line Sizing

Properly sizing the liquid line is critical to a successful split-system application. The selected tube diameter must provide at least 5°F [2.7°C] of subcooling at the expansion valve throughout the operating envelope. Increasing the size of the liquid line will not increase the available subcooling.

Routing. Install the liquid line with a slight slope in the direction of flow so that it can be routed with the suction line. Minimize tube bends and reducers because these items tend to increase pressure drop and to reduce subcooling at the expansion valve. Liquid line receivers, other than those that are factory-installed, are not recommended.

Insulation

The liquid line is generally warmer than the surrounding air, so it does not require insulation. In fact, heat loss from the liquid line improves system capacity because it provides additional subcooling.

Components

Liquid-line refrigerant components necessary for a successful job include a filter drier, access port, solenoid valve, moisture-indicating sight glass, expansion valve(s), and ball shutoff valves. Figure 108 illustrates the proper sequence for positioning them in the liquid line. Position the components as close to the evaporator as possible.

- *Filter drier.* There is no substitute for cleanliness during system installation. The filter drier prevents residual contaminants, introduced during installation, from entering the expansion valve and solenoid valve.
- *Access port.* The access port allows the unit to be charged with liquid refrigerant and is used to determine subcooling. This port is usually a Schraeder® valve with a core.
- *Solenoid valve.* In split systems, solenoid valves isolate the refrigerant from the evaporator during off cycles; under certain conditions, they may also trim the amount of active evaporator as compressors unload. Generally, the "trim" solenoid valve is unnecessary for variable-air-volume comfort-cooling applications, and is only required for constant-volume applications when dehumidification is a concern.
- *Moisture-indicating sight glass.* Be sure to install one moisture-indicating sight glass in the main liquid line. The only value of the sight glass is its moisture indication ability. Use actual measurements of temperature and pressure—not the sight glass—to determine subcooling and whether the system is properly charged. The moisture indicator/sight glass must be sized to match the size of the liquid line at the thermal expansion valve.
- *Thermal expansion valve.* The expansion valve is the throttling device that meters the refrigerant into the evaporator coil. Metering too much refrigerant floods the compressor; metering too little elevates the compressor temperature. Choosing the correct size and type of expansion valve is critical to assure it will correctly meter refrigerant into the evaporator coil throughout the entire operating envelope of the system. *Correct refrigerant distribution into the coil requires an expansion valve for each distributor.*

NOTICE:

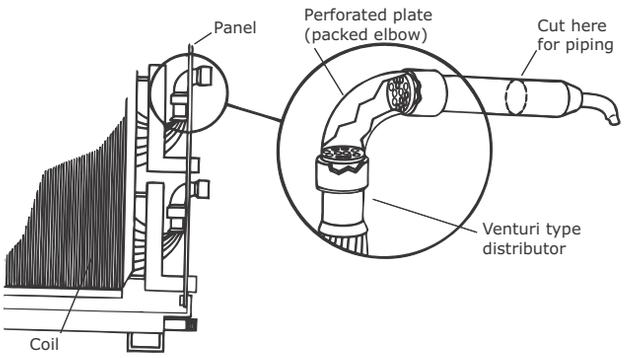
Valve Damage!

Disassemble the thermal expansion valve before completing the brazing connections. If necessary, wrap the valve in a cool, wet cloth while brazing. Failure to protect the valve from high temperatures could result in damage to internal components.

The thermal expansion valve must be selected for proper size and capacity. The size of the expansion valve should cover the full range of loadings. Check that the valve will successfully operate at the lightest load condition. For improved modulation, choose expansion valves with balanced port construction and external equalization.

Cut the process tube and cap assembly from the liquid connection as shown in Figure 109 and install the expansion valve directly to the liquid connections.

Figure 109. Type F refrigerant coil with packed elbow



Suction Lines

Line sizing

Proper suction-line sizing is required to guarantee the oil returns to the compressor throughout the system's operating envelope. At the same time, the line must be sized so that the pressure drop does not excessively affect capacity or efficiency. To accomplish both objectives, it may be necessary to use two different line diameters: one for the horizontal run and for vertical drops, and another for the vertical lifts.

Routing

To prevent residual or condensed refrigerant from "free-flowing" toward the compressor, install the suction line so it slopes slightly—that is, by ¼ inch to 1 inch per 10 feet of run—toward the evaporator. When the application includes a suction riser, oil must be forced to travel the height of the riser. Riser traps and double risers are unnecessary in the suction line when the refrigerant coil is used with Trane condensing units.

Avoid putting refrigerant lines underground. Refrigerant condensation or installation debris inside the line, service access, and abrasion/corrosion can quickly impair reliability.

Insulation

Any heat that transfers from the surrounding air to the cooler suction lines increases the load on the condenser (reducing the system's air-conditioning capacity) and promotes condensate formation (adversely affecting indoor air quality). After operating the system and testing all fittings and joints to verify the system is leak-free, insulate the suction lines all the way to inner side panel to prevent heat gain and unwanted condensation.

Components

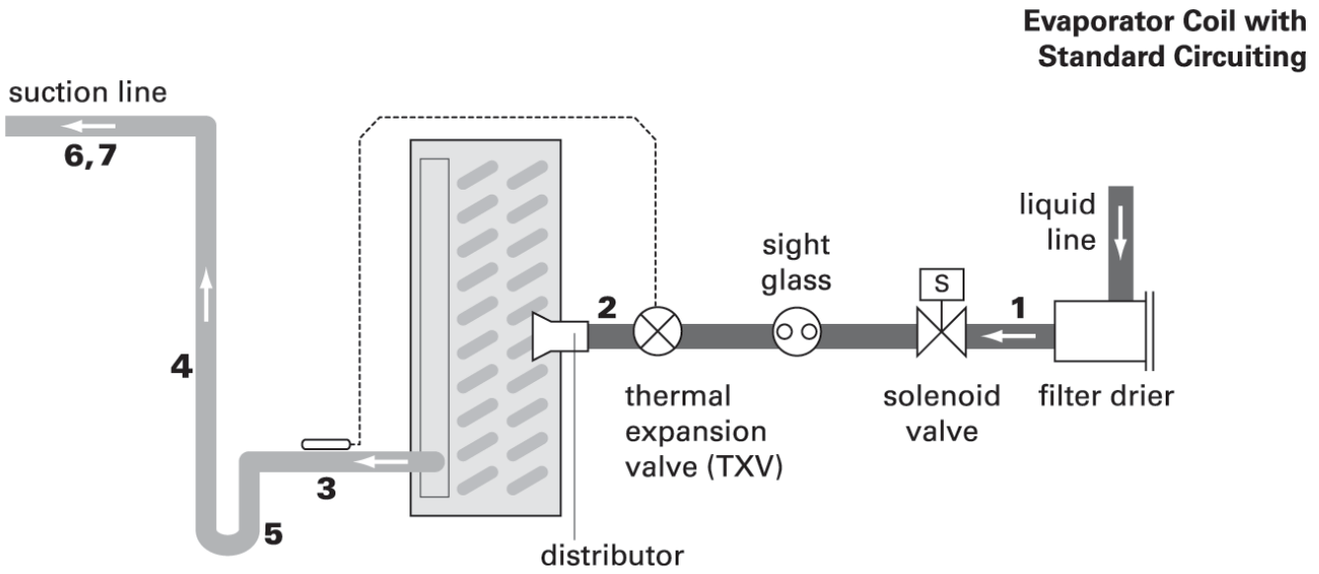
Installing the suction line requires field installation of these components: a filter, access port, and a Frostat™ control when the refrigerant coil is used with Trane condensing units. Position them as close to the compressor as possible.

Note: Placement of the Frostat control is illustrated in *Figure 108 on page 90**.*

- *Filter.* The suction filter prevents contaminants, introduced during installation, from entering the compressor. For this reason, the suction filter should be the replaceable-core type, *and* a clean core should be installed after the system is cleaned up.
- *Access port.* The access port is used to determine suction pressure. This port is usually a Schraeder valve with a core.
- *Frostat™ coil frost protection.* The Frostat control is the preferred method for protecting evaporator coils from freezing when the refrigerant coil is used with Trane condensing units. It senses the suction-line temperature and temporarily disables mechanical cooling if it detects frost conditions. The control is mechanically attached to the outside of the refrigerant line, near the evaporator, and wired to the unit control panel.
- *Ball shutoff valve.* Adding manual, ball-type shutoff valves upstream and downstream of the filter simplifies replacement of the filter core.

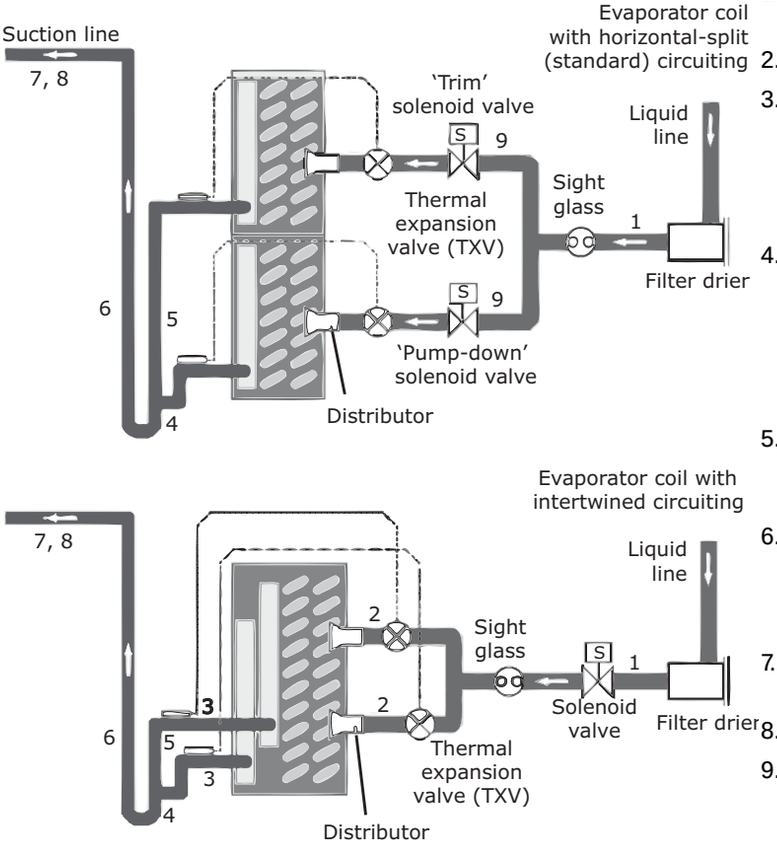
Field-Installed Evaporator Piping Examples

Figure 110. Single-circuit condensing unit: evaporator coil with one distributor



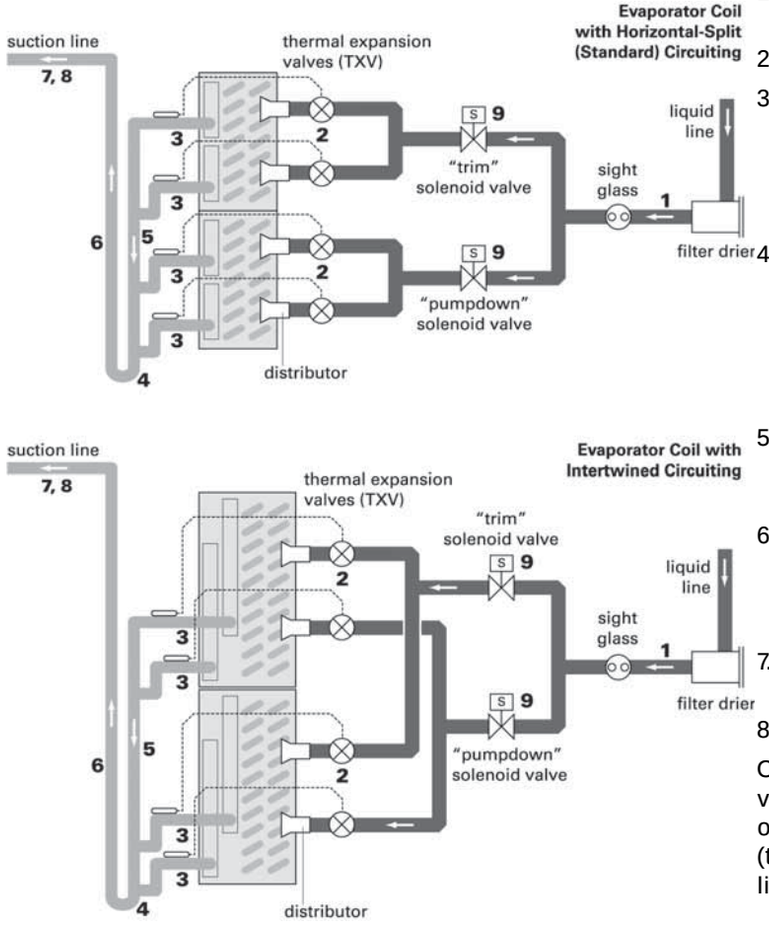
1. Pitch the liquid line slightly—1 inch/10 feet —so that the refrigerant drains toward the evaporator.
2. Provide one expansion valve per distributor.
3. Slightly pitch the outlet line from the suction header toward the suction riser—that is, 1 inch/10 feet in the direction of flow. Use the tube diameter that matches the suction-header connection.
4. For the vertical riser, use the tube diameter recommended by the condensing unit manufacturer. Assure the top of the riser is higher than the evaporator coil.
5. Arrange the suction line so the refrigerant gas leaving the coil flows downward, past the lowest suction-header outlet, before turning upward.
6. Pitch the suction line slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
7. Insulate the suction line.

Figure 111. Single-circuit condensing unit: evaporator coil with two distributors



1. Pitch the liquid line slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
2. Provide one expansion valve per distributor.
3. Slightly pitch the outlet line from the suction header toward the suction riser—that is, 1 inch/10 feet in the direction of flow. Use the tube diameter that matches the suction-header connection.
4. Arrange the suction line so the refrigerant gas leaving the coil flows downward, past the lowest suction-header outlet, before turning upward. Use a double-elbow configuration to isolate the thermal expansion valve bulb from other suction headers.
5. For horizontal tubing, use the tube diameter recommended by the condensing unit manufacturer.
6. For the vertical riser, use the tube diameter recommended by the condensing unit manufacturer. Assure the top of the riser is higher than the evaporator coil.
7. Pitch the suction line slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
8. Insulate the suction line.
9. Only use a "trim" solenoid valve for constant-volume, humidity-sensitive applications. For all other applications, install a single solenoid valve (the "pumpdown" solenoid valve) between the liquid-line filter drier and the sight glass.

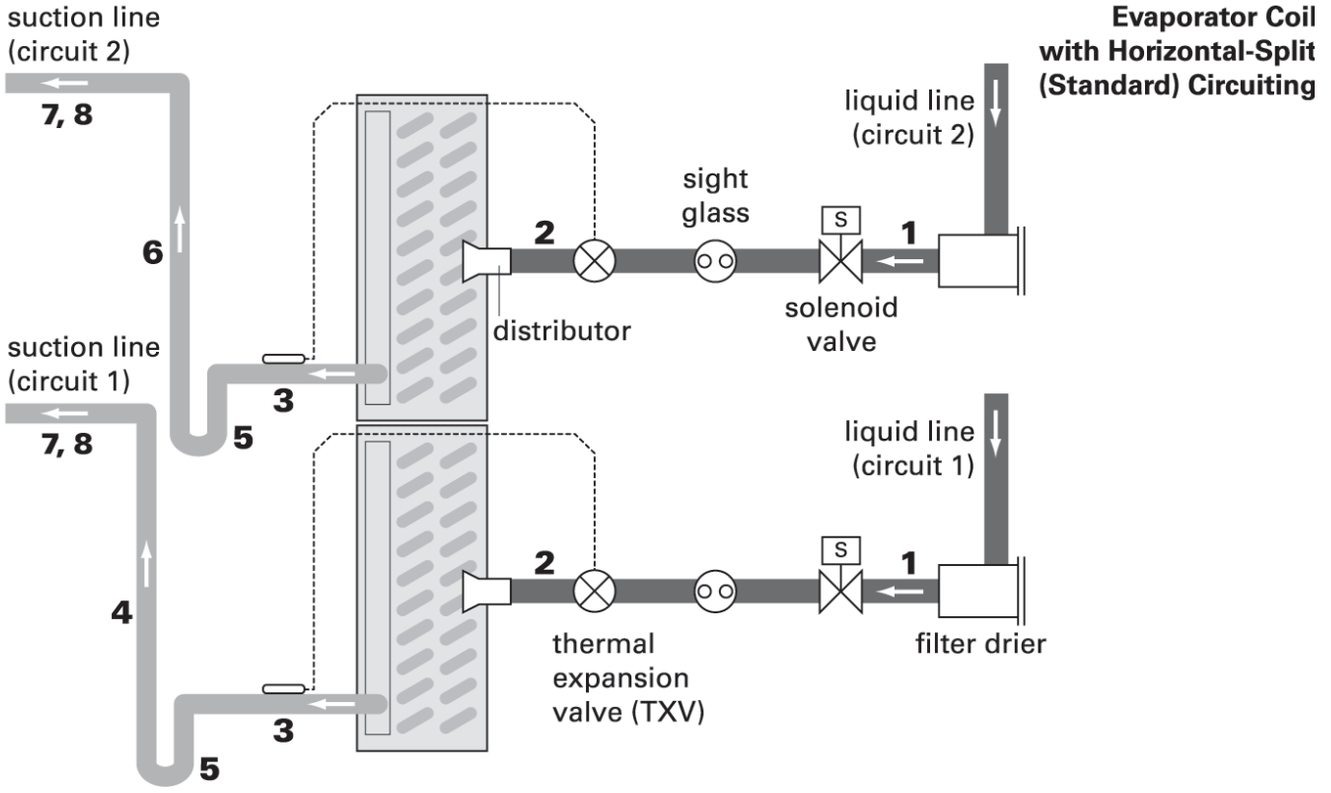
Figure 112. Single-Circuit Condensing Unit: Evaporator Coil with Four Distributors



1. Pitch the liquid line slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
2. Provide one expansion valve per distributor.
3. Slightly pitch the outlet line from the suction header toward the suction riser—that is, 1 inch/10 feet in the direction of flow. Use the tube diameter that matches the suction-header connection.
4. Arrange the suction line so the refrigerant gas leaving the coil flows downward, past the lowest suction-header outlet, before turning upward. Use a double-elbow configuration to isolate the thermal expansion valve bulb from other suction headers.
5. For horizontal tubing, use the tube diameter recommended by the condensing unit manufacturer.
6. For the vertical riser, use the tube diameter recommended by the condensing unit manufacturer. Assure the top of the riser is higher than the evaporator coil.
7. Pitch the suction line slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
8. Insulate the suction line.

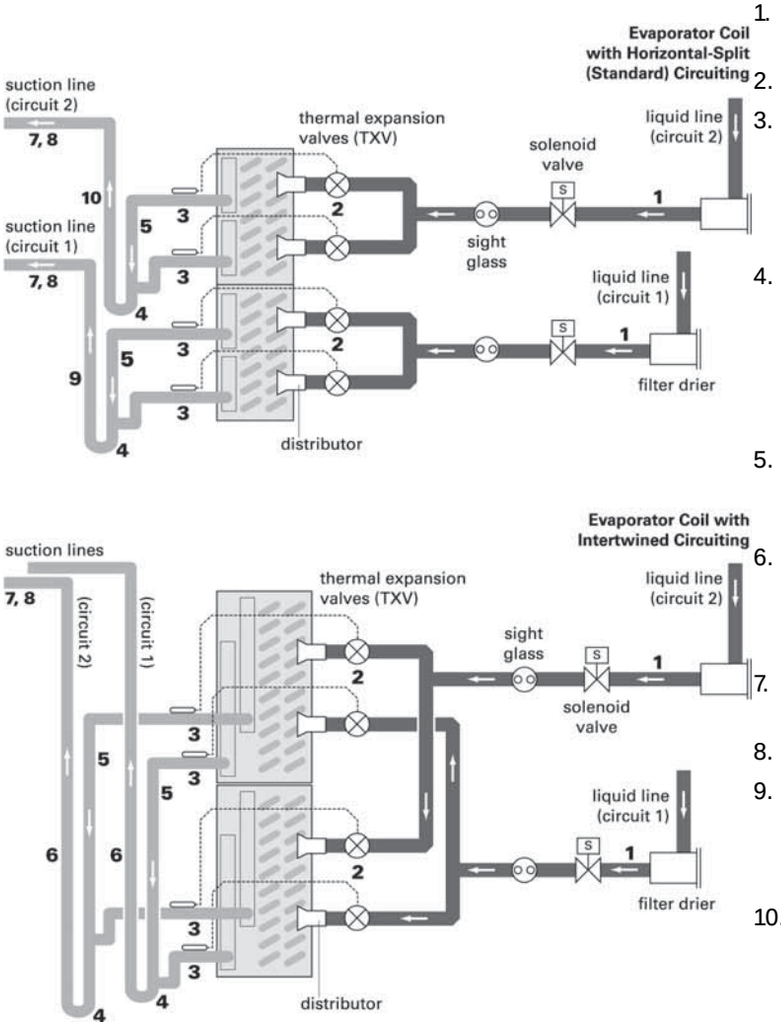
Only use a "trim" solenoid valve for constant-volume, humidity-sensitive applications. For all other applications, install a single solenoid valve (the "pumpdown" solenoid valve) between the liquid-line filter drier and the sight glass.

Figure 113. Dual-circuit condensing unit: evaporator coil with two distributors



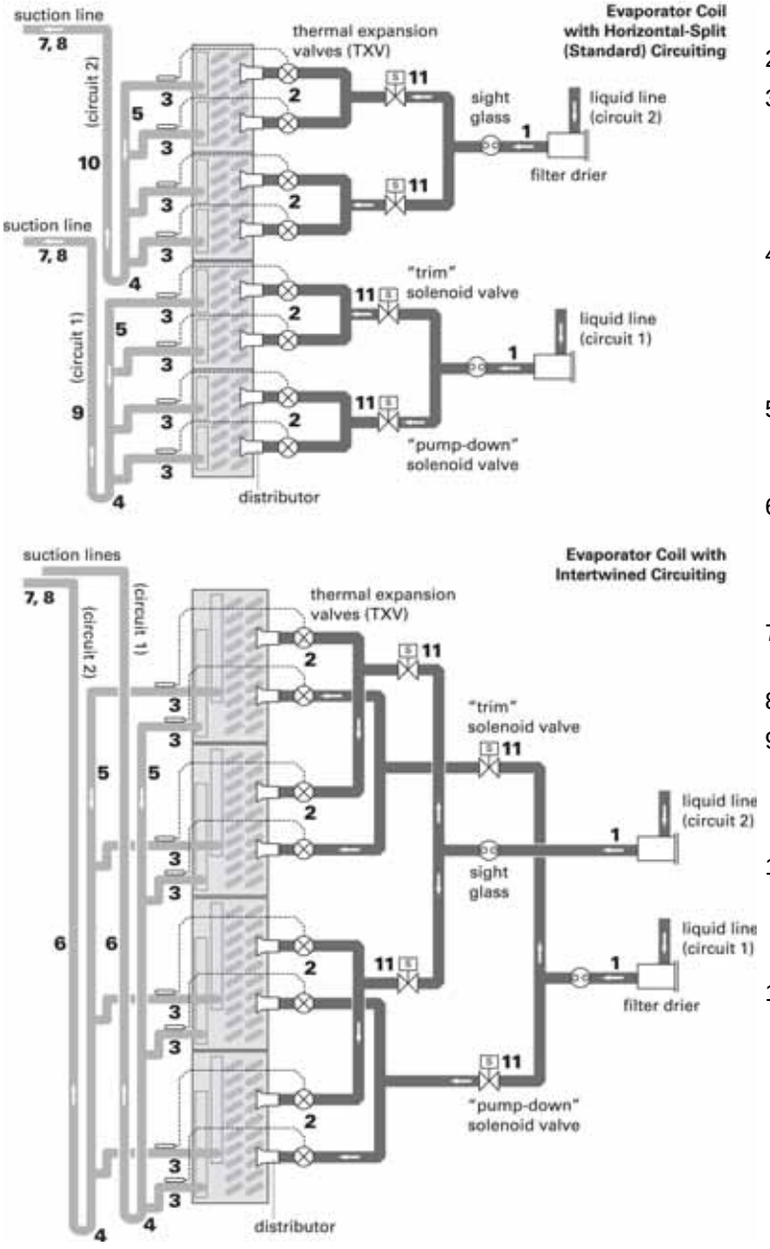
1. Pitch the liquid lines slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
2. Provide one expansion valve per distributor.
3. Slightly pitch the outlet line from the suction header toward the suction riser—that is, 1 inch/10 feet in the direction of flow. Use the tube diameter that matches the suction-header connection.
4. The top of the Circuit 1 suction riser must be higher than the bottom evaporator coil. Use the tube diameter recommended by the condensing unit manufacturer for the riser.
5. Arrange the suction line so the refrigerant gas leaving the coil flows downward, past the lowest suction-header outlet, before turning upward.
6. The top of the Circuit 2 suction riser must be higher than the top evaporator coil. Use the tube diameter recommended by the condensing unit manufacturer for the riser.
7. Pitch the suction lines slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
8. Insulate the suction lines.

Figure 114. Dual-circuit condensing unit: evaporator coil with four distributors



1. Pitch the liquid line slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
2. Provide one expansion valve per distributor.
3. Slightly pitch the outlet line from the suction header toward the suction riser—that is, 1 inch/10 feet in the direction of flow. Use the tube diameter that matches the suction-header connection.
4. Arrange the suction line so the refrigerant gas leaving the coil flows downward, past the lowest suction-header outlet, before turning upward. Use a double-elbow configuration to isolate the thermal expansion valve bulb from other suction headers.
5. For horizontal tubing, use the tube diameter recommended by the condensing unit manufacturer.
6. For the vertical riser, use the tube diameter recommended by the condensing unit manufacturer. Assure the top of the riser is higher than the evaporator coil.
7. Pitch the suction line slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
8. Insulate the suction line.
9. The top of the Circuit 1 suction riser must be higher than the bottom evaporator coil. Use the tube diameter recommended by the condensing unit manufacturer for the riser.
10. The top of the Circuit 2 suction riser must be higher than the top evaporator coil. Use the tube diameter recommended by the condensing unit manufacturer for the riser.

Figure 115.Dual-circuit condensing unit: evaporator coil with eight distributors



1. Pitch the liquid line slightly—1 inch/10 feet —so the refrigerant drains toward the evaporator.
2. Provide one expansion valve per distributor.
3. Slightly pitch the outlet line from the suction header toward the suction riser—that is, 1 inch/ 10 feet in the direction of flow. Use the tube diameter that matches the suction-header connection.
4. Arrange the suction line so the refrigerant gas leaving the coil flows downward, past the lowest suction-header outlet, before turning upward. Use a double-elbow configuration to isolate the TXV bulb from other suction headers.
5. For horizontal tubing, use the tube diameter recommended by the condensing unit manufacturer.
6. For the vertical riser, use the tube diameter recommended by the condensing unit manufacturer. Assure the top of the riser is higher than the evaporator coil.
7. Pitch the suction line slightly—1 inch/10 feet — so the refrigerant drains toward the evaporator.
8. Insulate the suction line.
9. The top of the Circuit 1 suction riser must be higher than the bottom evaporator coil. Use the tube diameter recommended by the condensing unit manufacturer for the riser.
10. The top of the Circuit 2 suction riser must be higher than the top evaporator coil. Use the tube diameter recommended by the condensing unit manufacturer for the riser.
11. Only use a “trim” solenoid valve for constant-volume, humidity-sensitive applications. For all other applications, install a single solenoid valve (the “pumpdown” solenoid valve) between the liquid-line filter drier and the sight glass.

Installation - Electrical

⚠WARNING

Hazardous Voltage w/Capacitors!

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. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

For additional information regarding the safe discharge of capacitors, see PROD-SVB06A-EN

.

NOTICE:

Use Copper Conductors Only!

Unit terminals are not designed to accept other types of conductors. Failure to use copper conductors could result in equipment damage.

Units intended for indoor use are available with starters or variable-frequency drives (VFDs) that are externally mounted in an enclosure or internally mounted in a recessed cabinet. Units intended for outdoor use are only available with internally mounted starters or VFDs. A typical internally mounted VFD is shown in Figure 116. A typical externally mounted VFD is shown in Figure 117.

Figure 116. Internally mounted VFD

Figure 117. Externally mounted VFD

Typical wiring schematics for VFDs and starters are shown in Figure 123 and Figure 124, respectively. Unit specific wiring schematics are shipped with each unit.

All units with starters or VFDs that have direct-digital controllers (DDCs) are provided with line voltage to 24 Vac power transformers as shown in Figure 118. 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 starters or VFDs, are provided with 120 Vac to 24 Vac control transformers, as shown in Figure 120, and require a separate 120V field connection. As with starters or VFDs, units intended for indoor use are available with DDCs mounted internally (see Figure 118) or externally (see Figure 119 and Figure 120), while units intended for outdoor use are only available with internally mounted DDCs.

In units with 24Vac LED marine lights, the lights are wired together to a single switch located in the controls interface module. Figure 119 shows a typical mounting of the controls interface module with an externally mounted controller. 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 24Vac 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 (see Figure 119) with the unit light switch. The receptacle requires a separate 120V power feed.

Figure 118. Internal controller

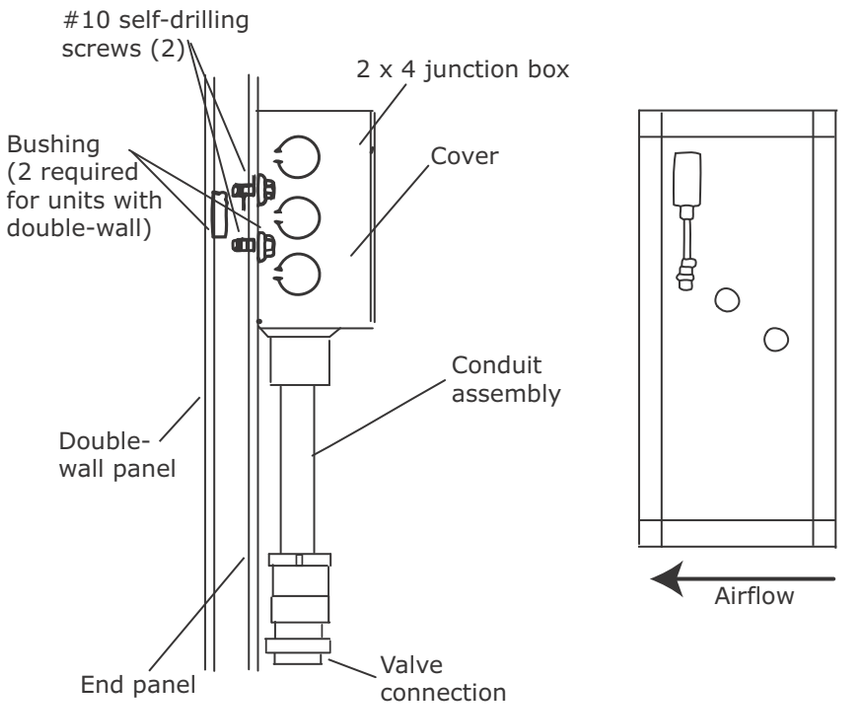
Figure 119. External mounted controller

Figure 120. External controller

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 121.

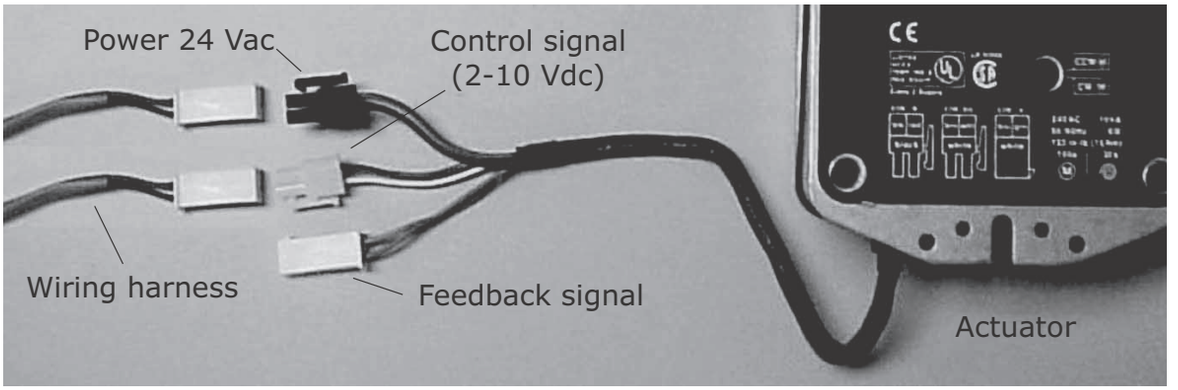
Figure 121. Junction box for valve wiring



Quick Connects

The actuators, factory-mounted or field-supplied, are separately wired and controlled by a direct-digital controller or other building logic. Figure 122 illustrates the typical quick connect scheme.

Figure 122. Typical quick connects with wiring identification



If the unit does not include a factory-mounted starter, wiring to the unit fan motor must be provided by the installer and must comply with all national and local electrical codes. The installer must also furnish a service disconnect switch in compliance with national and local electrical codes.

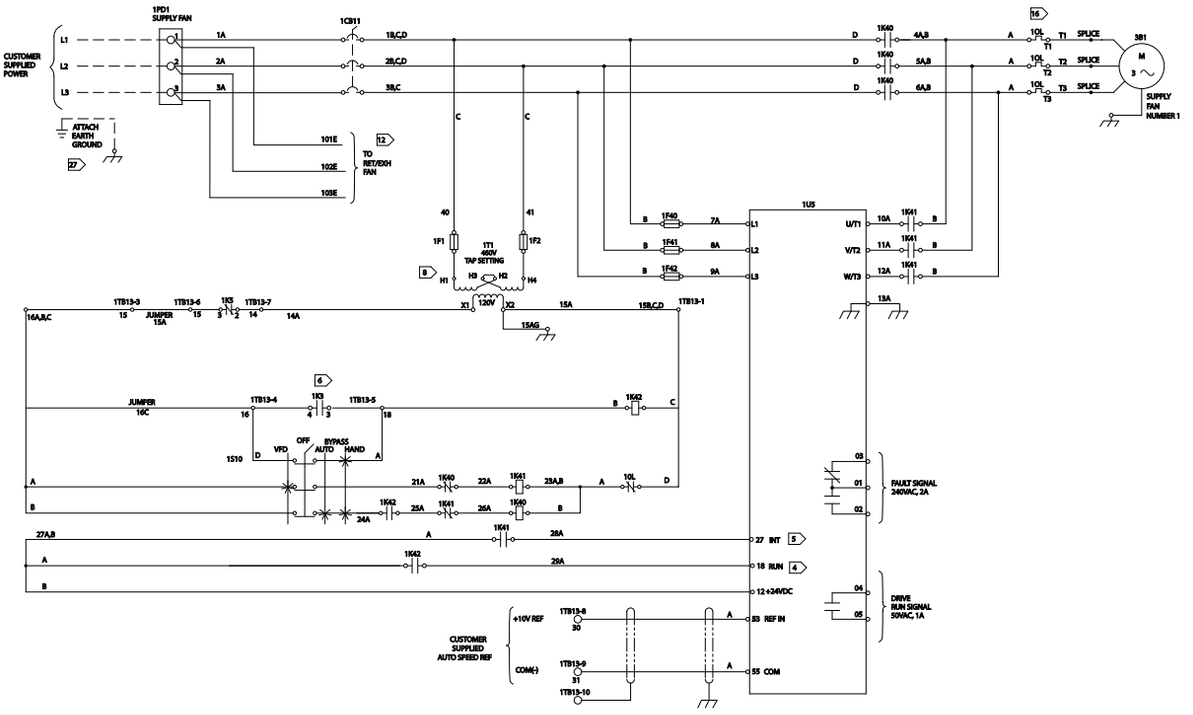
Fan motors require motor overload protective devices that are rated or selected in compliance with the National Electric Code (NEC) or Canadian Electric Code. Specific unit and motor connection diagrams are provided on the starter/VFD if Trane-provided, or refer to the motor nameplate.

If wiring directly to the motor, a flexible connection at the motor to permit fan belt adjustment should be provided. Fractional horsepower motors may be factory connected to a terminal box on the unit. If this construction is provided, the installer should complete field wiring to this connection box. For a typical high voltage wiring schematic, see Figure 123.

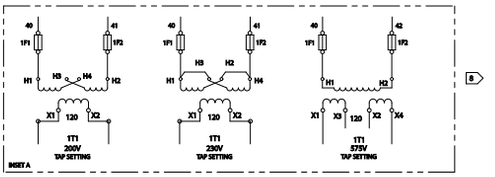
Note: Properly seal all penetrations in unit casing. Failure to seal penetrations from inner panel to outer panel could result in unconditioned air entering the unit.

Figure 123. Typical VFD wiring schematic

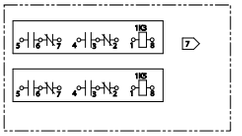
REV	INV/ECN	INT	DATE
A	13887	JDM	3-30-09



LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	VFD CIRCUIT BREAKER
1F1, 1F2	CONTROL CIRCUIT PRIMARY FUSE(S)
1F40,1F41,1F42	AFC FUSE(S)
1K3	SUPPLY FAN START/STOP RELAY
1K5	SUPPLY FAN LOW LIMIT RELAY
1K40	BYPASS CONTACTOR
1K41	ISOLATION CONTACTOR
1K42	RUN PERMISSIVE RELAY
1OL	OVERLOAD RELAY
1S10	VFD/OFF/BYPASS AUTO/BYPASS HAND SWITCH
1T1	PRIMARY TRANSFORMER
1PD1	SUPPLY FAN POWER DISTRIBUTION BLOCK
1TB13	TERMINAL STRIP CONTROL CIRCUIT
1U5	DRIVE CONTROLLER (AFC)
3B1	SUPPLY FAN MOTOR



BUSSMAN CLASS T DRIVE FUSE PART NO			
AFC FUSE	VOLTAGE	HP	PART NO
1F40 1F41 1F42	200/230	1,1.5	JJN-10
		2	JJN-15
		3	JJN-20
		5	JJN-25
		7.5	JJN-30
		10	JJN-50
		15	JJN-60
		20	JJN-80
		25,30	JJN-125
		40	FWH-150B
		50	FWH-200B
	460	1,1.5	JJS-6
		2,3	JJS-10
		5	JJS-20
		7.5	JJS-25
		10	JJS-30
		15,20	JJS-40
		25	JJS-50
		30	JJS-60
		40	JJS-80
		50	JJS-100
		60	JJS-125
		75	FWH-150B
		100	FWH-200B
		125	FWH-250B
	575	1,1.5	JJS-3
		2,3	JJS-6
		5,7.5	JJS-10
		10	JJS-15
		15	JJS-20
		20	JJS-30
		25	JJS-35
		30	JJS-45
		40	JJS-60
		50	JJS-80
		60	JJS-90
		75	JJS-100
		100	FWP-125A
		125	FWP-175B



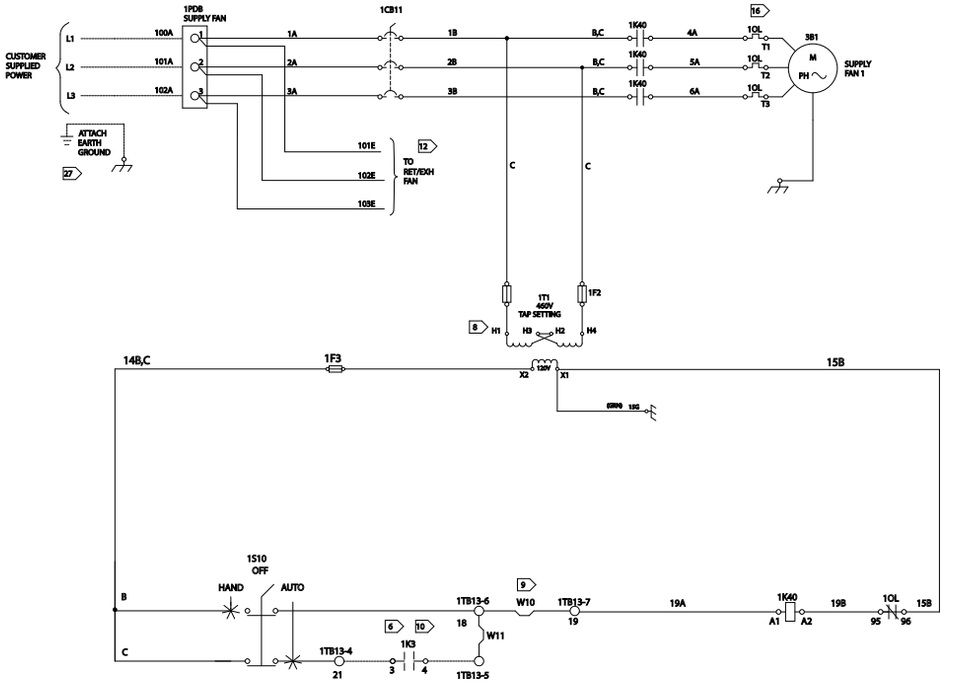
FUSE RATING (AMPS) - 600V CLASS LP-CC TIME DELAY PRIMARY TRANSFORMER FUSES				
LINE VOLTAGE	ITEM	MFR.	MFR. PART NO.	DANFOSS NO.
200	1F1,1F2	BUSSMAN	FNQ-R-1.25	34046200
230	1F1,1F2	BUSSMAN	FNQ-R-1.25	34046200
460	1F1,1F2	BUSSMAN	FNQ-R-0.60	34046000
575	1F1,1F2	BUSSMAN	FNQ-R-0.50	34053600

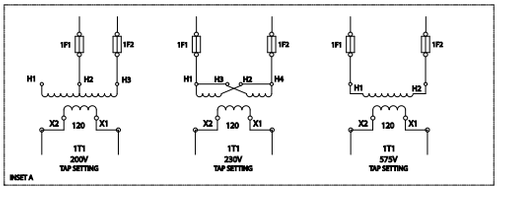
DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

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 (NEC), 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. THE MINIMUM CIRCUIT AMPACITY, THE MAXIMUM FUSE SIZE, AND DISCONNECT SIZE ARE CALCULATED BASED ON THE INVERTER INPUT LINE CURRENTS PER ARTICLE 430-2 OF THE NATIONAL ELECTRICAL CODE.
4. PROGRAM TERMINAL 18 AS RUN.
5. PROGRAM TERMINAL 27 INV. COASTING STOP.
6. CLOSES TO RUN AUTO MODE OR BYPASS AUTO FOR OPTION VFD OR STARTER.
7. RELAY(S)--CONTACTS: SILVER-CADMIUM OXIDE: 1/6 HP 5AMP @ 120V AC, 1/3 HP 5AMP @240V AC. SEE 24V SCHEMATIC DIAGRAM FOR COIL CONNECTIONS AND ACTUAL QUANTITY OF TRANSFORMER RELAYS.
8. CONTROL TRANSFORMER SHOWN FOR 460V PRIMARY. FOR 200 OR 230V OR 575V REFER TO INSET A.
12. IF UNIT HAS SHIPPING SPLITS WIRING WILL TERMINATE TO MODULE AT EACH SHIPPING SPLIT.
16. THE OVERLOAD RELAY TRIP SETTING MUST BE ADJUSTED TO CORRESPOND WITH THE MOTOR FULL LOAD CURRENT AS SHOWN ON THE MOTOR NAMEPLATE.
27. ATTACH GROUND OR EQUIPMENT GROUND.

Figure 124. Typical starter wiring schematic





LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	STARTER CIRCUIT BREAKER
1F1,1F2	CONTROL CIRCUIT PRIMARY FUSE(S)
1F3	CONTROL CIRCUIT SECONDARY FUSE
1K3	SUPPLY FAN START/STOP RELAY (FIELD SUPPLY)
1K40	SUPPLY FAN STARTER
1OL	OVERLOAD RELAY
1S10	HAND/OFF/AUTO SWITCH
1T1	PRIMARY TRANSFORMER
1PDB	SUPPLY FAN POWER DISTRIBUTION BLOCK
1TB13	TERMINAL STRIP CONTROL CIRCUIT
3B1	SUPPLY FAN MOTOR 1

FUSE RATING (AMPS) - 600V CLASS LP-CC TIME DELAY			
PRIMARY TRANSFORMER FUSES			
LINE VOLTAGE	ITEM	MANUFACTURER	MFR. PART NO.
200	1F1,1F2	FERRAZ-SHAWMUT	ATQR-1
230	1F1,1F2	FERRAZ-SHAWMUT	ATQR-8/10
460	1F1,1F2	FERRAZ-SHAWMUT	ATQR-4/10
575	1F1,1F2	FERRAZ-SHAWMUT	ATQR-3/10
SECONDARY CIRCUIT FUSES			
LINE VOLTAGE	ITEM	MANUFACTURER	MFR. PART NO.
120	1F3	FERRAZ-SHAWMUT	ATQ-8/10

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

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 (NEC), STATE AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. FIELD CONDUCTORS SHALL HAVE INSULATION RATINGNOT LESS THAN 600V COPPER CONDUCTORS ONLY.
3. THE MINIMUM CIRCUIT AMPACITY, THE 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. CLOSES TO RUN AUTO MODE OR BYPASS AUTO FOR OPTION VFD OR STARTER.
8. CONTROL TRANSFORMER SHOWN FOR 460V PRIMARY. FOR 200 OR 230V OR 575V REFER TO INSET A.
9. REMOVE JUMPER AND INSTALL FIELD SAFETY CONTACT.
10. FIELD SUPPLIED CONTACTS.
12. IF UNIT HAS SHIPPING SPLITS WIRING WILL TERMINATE TO MODULE AT EACH SHIPPING SPLIT.
16. THE OVERLOAD RELAY TRIP SETTING MUST BE ADJUSTED TO CORRESPOND WITH THE MOTOR FULL LOAD CURRENT AS SHOWN ON THE MOTOR NAMEPLATE.
27. ATTACH GROUND OR EQUIPMENT GROUND.

Controls Interface

The portable operator display is used for temporary connection to and operation of Tracer MP580/581 controllers. 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.

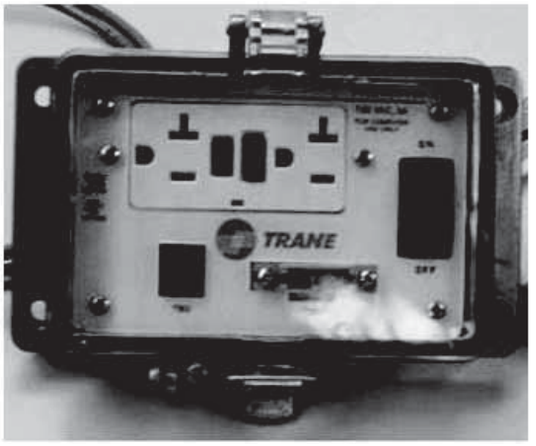
Note: The portable operator display is not used for timeclock scheduling. To provide scheduling you must use a Tracer Summit system.

Connecting the operator display

To connect the portable operator display:

1. Locate the factory-provided service module (see Figure 125).
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.

Figure 125. Service module



Setting up the operator display

NOTICE:

Water Damage!

To clean the operator display, use a cloth dampened with commercial liquid glass cleaner. Spraying water or cleaner directly on the screen could result in equipment damage.

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 MP580/ 581 Programmable Controller Programming* guide (CNT-SVP01B-EN).

Calibrating the operator display

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.

NOTICE:

Equipment Damage!

Do not allow the operator display to come in contact with sharp objects. This could result in equipment damage.

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 (see Figure 125) with an external communications port when purchased. Both the operator display and Rover 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-11 port for the operator display or the RS 485 port for the Rover 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!

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. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

For additional information regarding the safe discharge of capacitors, see PROD-SVB06A-EN

General Checks

- Ensure the unit has been installed level.
- Ensure supply-air and return-air ducts have been connected.
- Ensure damper operator motors and connecting linkage have been installed.
- Verify damper operation and linkage alignment.
- 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, ensure that the fan isolator tie-down bolts have been removed. See "Fan Isolation" section on page 62 for more information.
- Rotate all fan wheels manually to confirm they turn freely in the proper direction.
- Check fan shaft bearings, fan wheel, and drive sheave set screws for proper torque settings (see Table 35 on page 111.
  - Fan sheaves should be tight and aligned.
  - Bearing set screws should be torqued. See Table 48 on page 124 for torque values.
- Check fan drive belt tension. See "Tension the Fan Belt" section on page 109.
- Inspect fan motor and bearings for proper lubrication, if necessary. See "Fan Bearing Lubrication," on page 124.

Coil-Related Checks

:

NOTICE:

Proper Water Treatment!

The use of untreated or improperly treated water in coils could result in scaling, erosion, corrosion, algae or slime. It is recommended that the services of a qualified water treatment specialist be engaged 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.

- Ensure 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, ensure that 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.
- For steam coils, slowly turn the steam on full for at least 10 minutes before opening the fresh air intake on units with fresh air dampers.

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 manufacturer's 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!

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. Failure to follow all safety precautions could result in rotating components cutting and slashing technician which could result in death or serious injury.

⚠ WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be 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. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

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 startup:

- Calculate the motor voltage imbalance, notifying the power company to correct unacceptable imbalances.
- Periodically check the fan belt tension.

Calculate Motor Voltage Imbalance

After startup, measure the motor voltage and amperage on all phases to ensure 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.

$$\textbf{Voltage imbalance} = \frac{100A}{2 \times AvgVoltage}$$

where:

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

Voltage imbalance = 2.2% (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, ensure that the programmed parameters listed in Table 33 have been set. If trouble still persist after verifying factory parameters are correct, call Trane Drive Technical Support at 1-877-872-6363. Have the unit serial number from the drive available for the technical support representative. The technician will determine if drive can be repaired or needs to be replaced.

.

Table 32. Trane TR200 Switching Frequency

Horsepower	Voltage	Max KHz	Trane Setting
0.5 - 15	208/230	16	16
20 - 25	208/230	14	14
30 - 40	208/230	12	12
50	230	12	12
0.5 - 25	460	16	16
30 - 50	460	14	14
60 - 125	460	12	12
0.5 - 10	575	16	16
15 - 50	575	10	10
60 - 125	575	8	8

⚠WARNING

Hazardous Voltage w/Capacitors!

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. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

For additional information regarding the safe discharge of capacitors, see PROD-SVB06A-EN

Table 33. Trane TR200 VFD Programming Parameters

Parameter # TR200	Description	Factory Default	Trane Setting
3	Region	International	North American
103	Torque Characteristics (Fan Array only)	Auto Energy Optim. VT	Variable Torque (Fan Array only)
512	Terminal 27 Digital Input	Safety Interlock	Coast Inverse
121	Motor Power	Depends on unit	Set Based on Motor Nameplate
122	Motor Voltage	Depends on unit	Set Based on Motor Nameplate
124	Motor Current	Depends on unit	Set Based on Motor Nameplate
125	Rated Motor Speed	Depends on Parameter 102	Set Based on Motor Nameplate
173	Flying Start	Depends on application	Enable
302	Minimum Reference	6 Hz	0 Hz
303	Maximum Reference	60 Hz	60 or the Value of Maximum Inverter Frequency (Hz) on Nameplate **if fan is direct drive.**
315	Terminal 53 Analog Input	No Operation	Analog Input 53
341	Ramp-up Time	60 sec	30 sec
342	Ramp-down Time	60 sec	30 sec
412	Output Freq Low Limit	6 Hz	20 Hz
414	Output Freq High Limit	60 Hz	60 or the Value of Maximum Inverter Frequency (Hz) on Nameplate **if fan is direct drive.**
418	Current Limit	Depends on unit	110 percent
614	Terminal 53 Low Ref Feedback	0 Hz	20 Hz
615	Terminal 53 High Ref Feedback	Expression Limit	60 or the Value of Maximum Inverter Frequency (Hz) on Nameplate **if fan is direct drive.**
1401	Switching Frequency	Depends on application	See Table 32.

Tension the Fan Belt

NOTICE:

Belt Tension! (2 of 2)

Do not over-tension belts. Excessive belt tension will reduce fan and motor bearing life, accelerate belt wear and possibly cause shaft failure. Under tensioning belts is the primary cause of premature belt failure. Belts should not squeal at startup. Recheck belt tension after 8 hours, 24 hours, and 100 hours of operation and monthly thereafter.

Proper belt tension is required to ensure maximum bearing and drive component life and is based on motor horsepower requirement. A label located on the bearing support on the drive side of the unit lists all drive parts, the proper belt tension, and deflection for that tension for the specific drive (Figure 126).

If the drive is changed from the original, proper belt tension can be estimated using Table 34.

The correct operation tension for a V-belt drive is the lowest tension at which the belts will not slip under the peak load conditions. It may be necessary, however, to increase the tension of some drives to reduce excessive belt flopping or to reduce excessive startup squealing.

Figure 126. Tension drive belt label

Browning V-BELT DRIVE KIT 1627373
MODULE 0400

PURCHASE ORD. NUMBER B24597-061 H5D073B A
CUSTOMER'S KIT # H5D073B A-012-0400
MTR HP.= 10.0
FAN RPM = 1458 CD = 9.4 AT 3.00 TRN OPN
TENSION INFO - 3.86 LB., 0.14 IN.
DRIVE'S BELTS - B40
MOTOR SHEAVE - 2VP75X 1 3/8
MOTOR BUSHING - NONE REQUIRED
FAN SHEAVE - 2B5V80
FAN BUSHING - B 1 7/16

Check the fan belt tension at least three times during the first days of operation because there is a rapid decrease in tension until the belt settles in. To measure belt tension, use a belt tensiometer (see Figure 127). Determine actual deflection by depressing one belt with the belt tensiometer and measuring the deflection relative to the other belts or to belt line (see Figure 128). Adjust the belt tension to the correct pounds force and tighten all set screws to the proper torque.

Figure 127. Belt tensioner

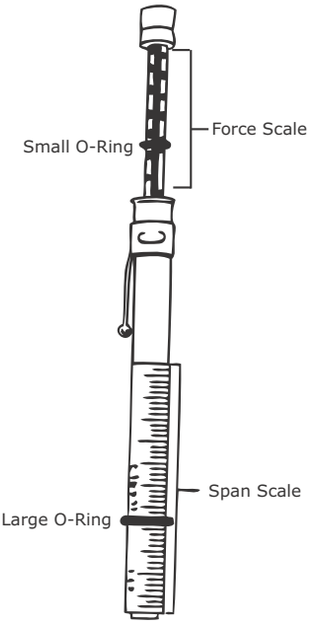


Figure 128. Belt tension measurement

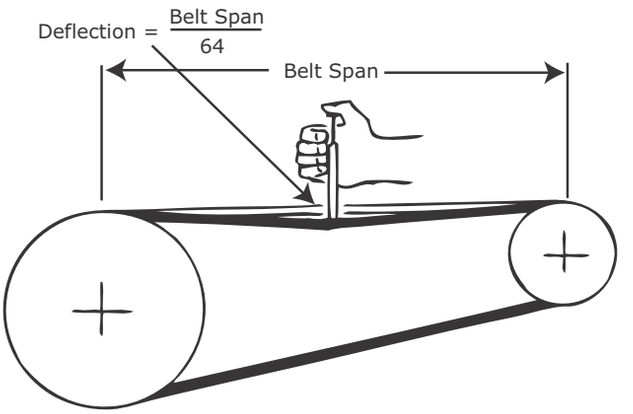


Table 34. Typical sheave diameter and deflection force

Cross section	Smallest sheave diameter range (in.)	Speed (rpm) range	Belt Deflection Force (lbs)			
			Super gripbelts and unnotched gripbands		Gripnotch belts and notched gripbands	
			Used belt	New belt	Used belt	New belt
A, AX	3.0–3.6	1,000–2,500	3.7	5.5	4.1	6.4
		2,501–4,000	2.8	4.2	3.4	5.0
	3.8–4.8	1,000–2,500	4.5	6.8	5.0	7.4
		2,501–4,000	3.8	5.7	4.3	6.4
	5.0–7.0	1,000–2,500	5.4	8.0	5.7	9.4
		2,501–4,000	4.7	7.0	5.1	7.6
B, BX	3.4–4.2	860–2,500	n/a	n/a	4.9	7.2
		2,501–4,000	n/a	n/a	4.2	6.2
	4.4–5.6	860–2,500	5.3	7.9	7.1	10.5
		2,501–4,000	4.5	6.7	7.1	9.1
	5.8–8.6	860–2,500	6.3	9.4	8.5	12.6
		2,501–4,000	6.0	8.9	7.3	10.9
C, CX	7.0–9.0	500–1,740	11.5	17.0	14.7	21.8
		1,741–3,000	9.4	13.8	11.9	17.5
	9.5–16.0	500–1,740	14.1	21.0	15.9	23.5
		1,741–3,000	12.5	18.5	14.6	21.6
D	12.0–16.0	200–850	24.9	37.0	n/a	n/a
		851–1,500	21.2	31.3	n/a	n/a
	18.0–20.0	200–850	30.4	45.2	n/a	n/a
		851–1,500	25.6	38.0	n/a	n/a
3V, 3VX	2.2–2.4	1,000–2,500	n/a	n/a	3.3	4.9
		2,501–4,000	n/a	n/a	2.9	4.3
	2.65–3.65	1,000–2,500	3.6	5.1	4.2	6.2
		2,501–4,000	3.0	4.4	3.8	5.6
	4.12–6.90	1,000–2,500	4.9	7.3	5.3	7.9
		2,501–4,000	4.4	6.6	4.9	7.3
5V, 5VX	4.4–6.7	500–1,749	n/a	n/a	10.2	15.2
		1,750–3,000	n/a	n/a	8.8	13.2
		3,001–4,000	n/a	n/a	5.6	8.5
	7.1–10.9	500–1,749	12.7	18.9	14.8	22.1
		1,750–3,000	11.2	16.7	13.7	20.1
	11.8–16.0	500–1,749	15.5	23.4	17.1	25.5
		1,750–3,000	14.6	21.8	16.8	25.0
8V	12.5–17.0	200–850	33.0	49.3	n/a	n/a
		851–1,500	26.8	39.9	n/a	n/a
	18.0–22.4	200–850	39.6	59.2	n/a	n/a
		851–1,500	35.3	52.7	n/a	n/a

Determine Fan Speed

⚠ WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to measure the speed of rotating components. Have a qualified licensed service individual who has been properly trained in handling exposed rotating components perform these tasks. Failure to follow all safety precautions when exposed to rotating components could result in death or serious injury.

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

Check unit vibration if the fan speed is changed more than five percent from the original designed speed, or if parts such as shafts, fan wheels, bearings, or other drive components are replaced. Do not exceed the maximum fan speed.

Pay particular attention to any vibration, noise, or overheating of the motor and fan bearings; however, note that bearings may run warm during break in.

Align Fan and Motor Sheaves

Align the fan and motor sheaves using a straightedge. The straightedge must be long enough to span the distance between the outside edges of the sheaves. When the sheaves are aligned, the straightedge will touch both sheaves at points A through D (see Figure 129) to confirm the shaft is parallel. For uneven width sheaves, place a string in the center groove of both sheaves and pull tight. Adjust the sheaves and tighten the sheave set screws to the proper torque given in Table 35.

Check Multiple Belts

Tighten the belts slightly and rotate the drive several times.

On multiple belt drives, ensure the force of deflection is approximately the same on each belt by pushing each belt in an equal distance at a point halfway from each sheave (see Figure 129). If this force is not the same for each belt, the motor and fan shaft are not parallel. Realign as required. After realignment, tighten the belts again to the standard belt tensioning specifications. If the force is still not the same for all belts, the belts or sheaves are worn and must be replaced.

Figure 129. Proper drive alignment

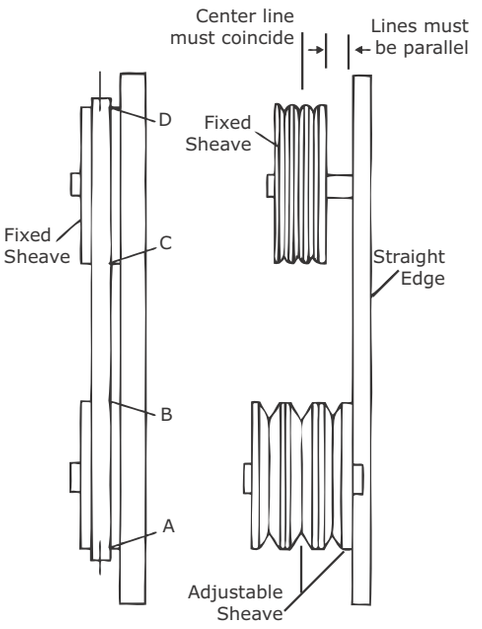


Table 35. Fan and drive compound torque settings (inches)

Screw Size	Hex Key	Square Head	Hex Head	Torque (in.-lb.)	Torque (ft.-lb.)
1/4	1/8	3/8	7/16	66-90	5.5-7.5
5/16	5/32	1/2	1/2	126-164	10.5-13.7
3/8	3/16	9/16	9/16	228-300	19.0-25.0
7/15	7/32	5/8	5/8	348-450	29.0-37.5
1/2	1/4	3/4	3/4	504-650	42.0-54.2
5/8	5/16	15/16	15/16	1290-1390	107.0-116.0
#10	3/32	-	-	28-40	2.3-3.3

Airflow Measuring Systems

Traq™ Dampers

Traq dampers are low-leak dampers that modulate and measure airflow. Each Traq damper section is supplied with a factory-mounted ventilation control module (VCM) on the interior of the mixing box section. The VCM has an input terminal for power and an output terminal for air velocity (see Figure 130). A direct-digital controller controls the factory-mounted and wired actuators.

Figure 130. Traq damper terminal connections

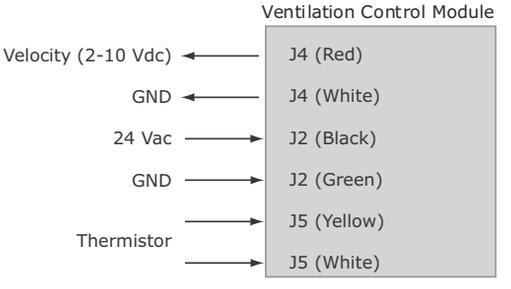
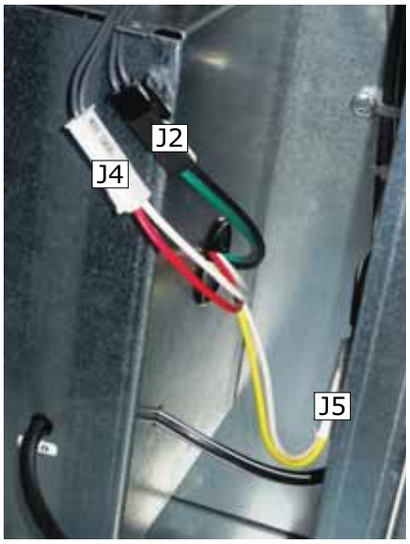


Figure 131. Traq damper terminal connections



VCM (Transducer) Calibration. The VCM has an auto-zero function that recalibrates the transducer once every minute. When troubleshooting, allow for the recalibration time before making any measurements.

Input Power. The only input the VCM needs is the 24 Vac power connected to terminals 1TB1–5 and 1TB1–6.

Output Velocity Signal. The 2 to 10 Vdc linear output signal from the VCM represents air velocity. This voltage can be converted to represent airflow (cfm or L/s) using the formula below and Table 36.

$$\text{Airflow} = k\ (\text{cfm @ 10V}) \left[\frac{(\text{volts} - 2)}{8}\right]$$

or

$$\text{Airflow} = k\ (\text{L/s @ 10V}) \left[\frac{(\text{volts} - 2)}{8}\right]$$

For example, if the VCM on a size 30 air handler at sea level (k=1) has a 10-volt signal, it would represent 24,492 cfm (11,559 L/s) through the Traq damper. If the voltage were 6 volts, airflow through the Traq damper would be 12,246 cfm (5779 L/s).

Table 36. Altitude adjustment factors

Sea level = 1.0	
Elevation (feet)	k
1000	0.982
2000	0.964
3000	0.949
4000	0.930
5000	0.914
6000	0.897
7000	0.876
8000	0.860
9000	0.846
10,000	0.825

Table 37. In Table 38 through Figure 45, the cfm at 10Vdc is a calculated value based on area and peak velocity. In certain situations, it can be advantageous to raise the velocity of air through the remaining Traq dampers by closing off one or more dampers in the unit. The cfm at 10Vdc can be recalculated based on the proportion of remaining Traq dampers or by multiplying the remaining area of dampers by peak velocity. Calculations are based on VCM voltage versus airflow at sea level.

Table 38. Back or top inlet standard Traq damper-air mixing and indoor economizer section

Unit Size	Part Number	Traq Damper Size (inches)	Quantity	Peak Velocity (fpm)	Total Area (ft^2)	CFM @ 10VDC Peak Velocity	L/s @ 10VDC Peak Velocity
3	495100860001	13	1	2475	0.92	2279	1076
4, 6	495100860001	13	2	2475	1.84	4559	2151
8, 10	495100860001	13	3	2475	2.76	6838	3227
12, 14, 17	495100870001	16	3	2475	4.19	10,365	4891
21, 25	495100890001	20	3	2600	6.54	17,012	8028
22, 26	495100870001	16	4	2475	5.58	13,820	6525
30, 35, 40	495100880001	24	3	2600	9.42	24,492	11,558
31	495100890001	20	4	2600	8.72	22,682	10,708
36, 41	495100880001	24	3	2600	9.42	24,492	11,563
50, 57	495100900001	28	3	2600	12.83	33,358	15,742
51, 58	495100900001	28	3	2600	12.82	33,337	15,738
66	495100900001	28	4	2600	17.10	44,460	20,981
80	495100900001	28	5	2600	21.38	55,588	26,232
100, 120	495100900001	28	6	2600	25.66	66,716	31,483

Table 39. Back or top inlet low-flow Traq damper-air mixing and indoor economizer sections

Unit Size	Part Number	Traq Damper Size (in)	Damper Type	Qty	Peak Velocity (fpm)	Total Area (ft^2)	CFM @ 10VDC Peak Velocity	L/s @ 10VDC Peak Velocity
4	495100860001	13	Min. Outside Air	1	2475	0.92	2279	1076
			Economizing	1				
6	495100860001	13	Min. Outside Air	1	2475	0.92	2279	1076
			Economizing	1				
8, 10	495100860001	13	Min. Outside Air	1	2475	0.92	2279	1076
			Economizing	2		1.84	4554	2149
12, 14, 17	495100870001	16	Min. Outside Air	1	2475	1.40	3455	1630
			Economizing	2		2.79	6910	3261
21, 25	495100890001	20	Min. Outside Air	1	2600	2.18	5671	2676
			Economizing	2		4.36	11341	5352
22, 26	495100870001	16	Min. Outside Air	1	2475	1.40	3455	1631
			Economizing	3		4.19	10365	4893
30, 35, 40	495100880001	24	Min. Outside Air	1	2600	3.14	8164	3853
			Economizing	2		6.28	16,328	7705
31	495100890001	20	Min. Outside Air	1	2600	2.18	5671	2677
			Economizing	3		6.54	17,012	8031
36, 41	495100880001	24	Min. Outside Air	1	2600	3.14	8164	3854
			Economizing	2		6.28	16,328	7708
50, 57	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5244
			Economizing	2		8.55	22,224	10,488
51, 58	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5246
			Economizing	2		8.55	22,225	10,492
66	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5244
			Economizing	3		12.82	33,336	15,731
80	495100900001	28	Min. Outside Air	2	2600	4.27	11,112	5244
			Economizing	3		17.10	44,448	20,975
100	495100900001	28	Min. Outside Air	2	2600	4.27	11,112	5244
			Economizing	4		8.55	22,224	10,488
120	495100900001	28	Min. Outside Air	2	2600	4.27	11,112	5244
			Economizing	4		21.37	55,561	26,219

Table 40. Mixing box Traq damper inlet - single-side standard flow

Unit size	Part number	Traq damper size (in)	Qty	Peak velocity (fpm)	Total area (ft^2)	CFM@10VDC peak velocity	L/s@ 10VDC peak velocity
3, 4, 6, 8	495100860001	13	1	2475	0.92	2279	1076
10, 12	495100870001	16	1	2475	1.40	3455	1631
14, 17	495100860001	13	2	2475	1.84	4559	2152
21, 22, 25, 26	495100870001	16	2	2475	2.79	6910	3262
30, 31, 35, 40	495100890001	20	2	2600	4.36	11,341	5354
36, 41, 50, 57, 66	495100880001	24	2	2600	6.28	16,328	7708
51, 58, 80	495100900001	28	2	2600	8.59	22,225	10,492
100	495100900001	28	3	2600	12.82	33,337	15,738
120	495100880001	24	4	2600	12.56	32,656	15,417

Table 41. Mixing box Traq damper inlet - single-side low flow

Unit size	Part number	Traq damper size (in)	Damper type	Qty	Peak velocity (fpm)	Total area (ft^2)	CFM@10VDC peak velocity	L/s@ 10VDC peak velocity
14, 17	495100860001	13	Min. Outside Air	1	2475	0.92	2279	1076
			Economizing	1				
21, 22, 25, 26	495100870001	16	Min. Outside Air	1	2475	1.40	3455	1631
			Economizing	1				
30, 31, 35, 40	495100890001	20	Min. Outside Air	1	2600	2.18	5671	2677
			Economizing	1				
36, 41, 50, 57, 66	495100880001	24	Min. Outside Air	1	2600	3.14	8164	3854
			Economizing	1				
51, 58, 80	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5246
			Economizing	1				
100	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5246
			Economizing	2		8.55	22,225	10,492
120	495100880001	24	Min. Outside Air	1	2600	3.14	8164	3854
			Economizing	3		9.42	24,492	11,563

Table 42. Mixing box Traq damper inlet - dual-side standard flow

Unit size	Part number	Traq damper size (in)	Qty	Peak velocity (fpm)	Total area (ft^2)	CFM@10VDC peak velocity	L/s@ 10VDC peak velocity
3, 4, 6, 8	495100860001	13	2	2475	1.84	4559	2152
10, 12	495100870001	16	2	2475	2.79	6910	3262
14, 17	495100860001	13	4	2475	3.68	9118	4305
21, 22, 25, 26	495100870001	16	4	2475	5.58	13,820	6525
30, 31, 35, 40	495100890001	20	4	2600	8.72	22,682	10,708
36, 41, 50, 57, 66	495100880001	24	4	2600	12.56	32,656	15,417
51, 58, 80	495100900001	28	4	2600	17.10	44,450	20,985
100	495100900001	28	6	2600	25.64	66,674	31,477
120	495100880001	24	8	2600	25.12	65,312	30,834

Table 43. Mixing box Traq damper inlet - dual-side low-flow

Unit size	Part number	Traq damper size (in)	Damper type	Qty	Peak velocity (fpm)	Total area (ft^2)	CFM@10VDC peak velocity	L/s@ 10VDC peak velocity
3, 4, 6, 8	495100860001	13	Min. Outside Air	1	2475	0.92	2279	1076
			Economizing	1				
10, 12	495100870001	16	Min. Outside Air	1	2475	1.40	3455	1631
			Economizing	1				
14, 17	495100860001	13	Min. Outside Air	1	2475	0.92	2279	1076
			Economizing	3		2.76	6838	3228
21, 22, 25, 26	495100870001	16	Min. Outside Air	1	2475	1.40	3455	1631
			Economizing	3		4.19	10365	4893
30, 31, 35, 40	495100890001	20	Min. Outside Air	1	2600	2.18	5671	2677
			Economizing	3		6.54	17,012	8031
36, 41, 50, 57, 66	495100880001	24	Min. Outside Air	1	2600	3.14	8164	3854
			Economizing	3		9.42	24,492	11,563
51, 58, 80	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5246
			Economizing	3		12.82	33,337	15,738
100	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5246
			Economizing	5		21.37	55,562	26,231
120	495100880001	24	Min. Outside Air	1	2600	3.14	8164	3854
			Economizing	7		21.98	57,148	26,980

Table 44. Side inlet standard Traq dampers - diagonal economizer section

Unit size	Part number	Traq damper size (in)	Quantity	Peak velocity (fpm)	Total area (ft2)	CFM@10VDC peak velocity	L/s@10VDC peak velocity
3	495100860001	13	1	2475	0.92	2279	1076
4, 6, 8	495100860001	13	2	2475	1.84	4559	2151
10, 12, 14	495100870001	16	2	2475	2.79	6905	3259
17	495100860001	13	4	2475	3.68	9118	4303
21	495100890001	20	2	2600	4.36	11,341	5352
25	495100870001	16	4	2475	5.58	13,820	6522
30	495100890001	20	3	2600	6.54	17,012	8028
35, 40	495100900001	28	2	2600	8.55	22,224	10,488
50	495100880001	24	3	2600	9.42	24,492	11,558
57	495100880001	24	4	2600	12.56	32,656	15,410
66	495100900001	28	3	2600	12.82	33,336	15,731
80	495100900001	28	4	2600	17.10	44,448	20,975
100, 120	495100900001	28	5	2600	21.37	55,561	26,219

Table 45. Side inlet low-flow Traq dampers - diagonal economizer section

Unit size	Part number	Traq damper size (in)	Damper type	Qty	Peak velocity (fpm)	Total area (ft^2)	CFM@10VDC peak velocity	L/s@ 10VDC peak velocity
4	495100860001	13	Min. Outside Air Economizing	1	2475	0.92	2279	1076
6	495100860001	13	Min. Outside Air Economizing	1	2475	0.92	2279	1076
8	495100860001	13	Min. Outside Air Economizing	1	2475	0.92	2279	1076
10	495100870001	16	Min. Outside Air Economizing	1	2475	1.40	3455	1630
12	495100870001	16	Min. Outside Air Economizing	1	2475	1.40	3455	1630
14	495100870001	16	Min. Outside Air Economizing	1	2475	1.40	3455	1630
17	495100860001	13	Min. Outside Air	1	2475	0.92	2279	1076
			Economizing	3		2.76	6838	3227
21	495100890001	20	Min. Outside Air Economizing	1	2600	2.18	5671	2676
25	495100870001	16	Min. Outside Air	1	2600	1.40	3630	1713
			Economizing	3		4.19	10,889	5138
30	495100890001	20	Min. Outside Air	1	2600	2.18	5671	2676
			Economizing	2		4.36	11,341	5352
35, 40	495100900001	28	Min. Outside Air Economizing	1	2600	4.27	11,112	5244
50	495100880001	24	Min. Outside Air	1	2600	3.14	8164	3853
			Economizing	2		6.28	16,328	7705
57	495100880001	24	Min. Outside Air	1	2600	3.14	8164	3853
			Economizing	3		9.42	24,492	11,558
66	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5244
			Economizing	2		8.55	22,224	10,488
80	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5244
			Economizing	3		12.82	33,336	15,731
100, 120	495100900001	28	Min. Outside Air	1	2600	4.27	11,112	5244
			Economizing	4		17.10	44,448	20,975

Trane utilizes AMCA certification for airflow measuring stations. Trane certifies that the Traq damper herein is licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 611 and comply with the requirements of the AMCA Certified Ratings Program.

The certification program provides the engineer and owner assurance that manufacturer-published performance ratings for airflow measurement stations are accurate and repeatable. Trane Traq dampers are certified with the integral ventilation control module which converts differential pressure to an electronic signal for control.

Refer to Performance Climate Changer Air Handler catalog CLCH-PRC015-EN for Traq damper testing and rating information.

Fan Inlet Airflow Measuring System

A fan inlet airflow measuring system is available on many centrifugal and plenum fans. 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 132. Fan inlet airflow measuring system

Wiring

The transmitter requires 24VDC power on terminals 1 (+) and 2 (ground) of the transmitter. When the airflow measurement system is ordered with a factory-mounted MP580 controller, the 24 VDC power will be supplied.

In the absence of a factory-provided MP580 controller, the installing contractor must ensure the transmitter has 24VDC power.

Note: Ensure that the transmitter has a separate power source.

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
- accuracy of the selected transmitter

Trane air handlers use either a 0-20 inch or a 0-40 inch 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, ensure that the analog input is programmed with enough decimal places to sufficiently represent the pressure differential being measured. For instance, Rover should be used to increase the number of decimal places being used (to a maximum of 4) on an MP-580/581 controller in lieu of the default zero.

Note that the adjustment of the “Zero” and “Span” controls on the transmitter itself are not required at time of installation. 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. The adjustments are primarily provided to account for any drift that may occur over time.

Transmitter Calibration

The transmitter is factory-calibrated to a specific pressure range with either a 0-20 inch or 0-40 inch w.g. 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, 2-10 VDC signal representing a differential pressure measurement. With this measurement, the airflow through the fan can be calculated using the following equation:

$CFM = K * SQRT(DP)$

Where:

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

K = A constant factor that is unique for each fan. See “Constant Factor K” section on page 118 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:

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

Where:

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

ρ = Density (lbm/ft^3) 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.

Constant Factor K

The constant factor K 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. See Table 46 for single-fan K factors. For a multiple-fan system, the constant factor K may need to be adjusted depending on how many transmitters are supplied.

Table 46. Constant K Factors

Fan Size (inches) / Type	Fan Class	Fan Name	K-Factor
9 BC	Class I	9 BA	935.00
9 BC	Class II	9 BB	868.20
10 BC	Class I	10 BA	1072.50
10 BC	Class II	10 BB	1072.50
12 AF	Class I	12 AA	2337.50
12 AF	Class II	12 AB	2237.30
15 AF	Class I	15 AA	3873.60
15 AF	Class II	15 AB	3873.60
18 AF	Class I	18 AA	4675.00
18 AF	Class II	18 AB	4675.00
20 AF	Class I	20 AA	5843.70
20 AF	Class II	20 AB	5119.90
22 AF	Class I	22 AA	7513.40
22 AF	Class II	22 AB	6624.10
25 AF	Class I	25 AA	9683.90
25 AF	Class II	25 AB	8891.10
28 AF	Class I	28 AA	12,856.20
28 AF	Class II	28 AB	11,795.00
32 AF	Class I	32 AA	16,295.60
32 AF	Class II	32 AB	16,295.60
36 AF	Class I	36 AA	19,701.70
36 AF	Class II	36 AB	19,367.80
40 AF[1]	Class I	40 AA	23,374.90
40 AF[2]	Class II	40 AA	25,378.40
40 AF[1]	Class I	40 AB	22,974.20
40 AF[2]	Class II	40 AB	25,044.50
44 AF	Class I	44 AA	30,113.00
44 AF	Class II	44 AA	30,113.00
49 AF	Class I	49 AB	37,470.00
49 AF	Class II	49 AB	37,470.00
20 FC	Class I	20 FA	7300.00
20 FC	Class II	20 FB	7203.90
22 FC	Class I	22 FA	9081.90
22 FC	Class II	22 FB	8793.10
25 FC	Class I	25 FA	12,030.00
25 FC	Class II	25 FB	11,700.00
28 FC	Class I	28 FA	14,450.00
28 FC	Class II	28 FB	14,036.00

Note: [1]To be used for fan rpm < 700 or cfm < 25,500. [2]To be used for fan rpm > 700 or cfm > 25,500.

Table 46. Constant K Factors

Fan Size (inches) / Type	Fan Class	Fan Name	K-Factor
32 FC	Class I	32 FA	20,400.00
32 FC	Class II	32 FB	20,150.00
36 FC	Class I	36 FA	28,049.90
36 FC	Class II	36 FB	27,549.00
40 FC	Class I	40 FA	39,236.40
40 FC	Class II	40 FB	38,067.70
10 BC belt-drive plenum	Class I or II	10 PA or 10 PB	563.00
11 BC belt-drive plenum	Class I or II	11PA or 11 PB	703.00
12 AF belt-drive plenum	Class I or II	12PA or 12 PB	1168.70
14 AF belt-drive plenum	Class I or II	14PA or 14 PB	1536.10
16 AF belt-drive plenum	Class I or II	16PA or 16 PB	1870.00
18 AF belt-drive plenum	Class I or II	18PA or 18 PB	2270.70
20 AF belt-drive plenum	Class I or II	20PA or 20 PB	2905.20
22 AF belt-drive plenum	Class I or II	22PA or 22 PB	3673.20
25 AF belt-drive plenum	Class I or II	25PA or 25 PB	4608.20
28 AF belt-drive plenum	Class I or II	28 PA or 28 PB	6277.80
32 AF belt-drive plenum	Class I or II	32 PA or 32 PB	7847.30
36 AF belt-drive plenum	Class I or II	36 PA or 36 PB	10017.80
40 AF belt-drive plenum	Class I or II	40 PA or 40 PB	13,023.10
44 AF belt-drive plenum	Class I or II	44 PA or 44 PB	14,692.80
49 AF belt-drive plenum	Class I or II	49 PA or 49 PB	18,299.20
55 AF belt-drive plenum	Class I or II	55 PA or 55 PB	23,901.00
63 AF belt-drive plenum	Class I or II	63 PA or 63 PB	31,135.00
10.50 AF direct-drive plenum	Class II	10 NF or 10 NW	630.00
13.50 AF direct-drive plenum	Class II	13 NR or 13 NF	952.00
15 AF direct-drive plenum	Class II	15 NR or 15 NF	1139.00
18 AF direct-drive plenum	Class II	18 NR or 18 NF	1673.00
20 AF direct-drive plenum	Class II	20 NR or 20 NF	1942.00
22 AF direct-drive plenum	Class II	22 NR, 22 NF, or 22 NW	2454.00
24 AF direct-drive plenum	Class II	24 NR, 24 NF, or 24 NW	3010.00
27 AF direct-drive plenum	Class II	27 NR or 27 NF	3701.00
30 AF direct-drive plenum	Class II	30 NR or 30 NF	4620.00
22 AF stacked direct-drive plenum	Class II	22 SF or 22 SW	2849.00
24.50 AF stacked direct-drive plenum	Class II	24 SF or 24 SW	4765.00

Note: (1) to be used for fan rpm < 700 or cfm < 25,500. (2) to be used for fan rpm > 700 or cfm > 25,500

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-Factor from Table 46

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 = ACFM/SQRT(DP)
Where:
K = Field-provided constant factor.
ACFM = Actual airflow (ft^3/min.) being measured at the air density being measured.
DP = Differential pressure (inches w.g.) being measured by the transmitter.

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.

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!

The maintenance and troubleshooting procedures recommended in this manual could result in exposure to electrical, mechanical or other potential safety hazards. Always refer to the safety warnings provided throughout this manual concerning these procedures. 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. Failure to follow all of the recommended safety warnings provided, could result in death or serious injury.

⚠WARNING

Rotating Components!

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 can not be inadvertently energized. Secure rotor to ensure rotor cannot freewheel. 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.

Maintenance Checklist

Table 47. Maintenance Checklist

Frequency	Maintenance
After 48 hours of operation	For belt-drive fans, the belts have acquired their permanent set. Readjust but do not overtighten. See “Tension the Fan Belt” on page 109 for more information.
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. wg. See “Air Filters” on page 122 for more information. • Belt-drive fans - relubricate fan bearings if necessary. See “Fan Bearing Lubrication” on page 124 for more information. Belt-drive fans - check and adjust fan belt tension.See “Tension the Fan Belt” on page 109 for more information.
Every three to six months	• Belt-drive fans - check fan bearing grease line connections. Lines should be tight to the bearings. • Check motor bracket torque. See Table 48 on page 124 for torque requirements. • Belt-drive fans - check bearing bolt torque and bearing setscrew torque. See Table 48 on page 124 for torque requirements. • Belt-drive fans - align fan and motor sheaves. Tighten sheave set screws to the proper torque. See “Align Fan and Motor Sheaves” on page 111 for more information. • Inspect and clean drain pans. See “Drain Pans” on page 122 for more information. • Tighten electrical connections. • Inspect coils for dirt build-up. See “Coils” on page 125 for more information.
Every year	• Inspect the unit casing for corrosion. If damage is found, clean and repaint. • Clean the fan wheels and shaft. See “Fans” on page 123 for more information. • Inspect and clean drain pans. • Check damper linkages, set screws, and blade adjustment. Clean, but do not lubricate, the nylon damper rod bushings. • Clean damper operators. • Inspect electrical components and insulation. • Inspect wiring for damage. • Rotate the fan wheel and check for obstructions. The wheel should not rub. Adjust the center if necessary. • Lubricate motor bearings in accordance with motor manufacturer’s recommendations (see “Motor Bearing Lubrication” on page 124 for more information). • Check condition of gasketing and insulation around unit, door and dampers. • Examine flex connections for cracks or leaks. Repair or replace damaged material.

Air Filters

⚠WARNING

Rotating Components!

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 can not be inadvertently energized. Secure rotor to ensure rotor cannot freewheel. 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.

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.

Permanent Filters

To clean permanent filters:

1. Disconnect all electrical power to the unit.
2. Wash the filter under a stream of water to remove dirt and lint.
3. Remove oil from the filter with a wash of mild alkali solution.
4. Rinse the filter in clean, hot water and allow to dry.
5. Coat both sides of the filter by immersing or spraying it with Air Maze Filter Kote W or an equivalent.
6. Allow to drain and dry for about 12 hours.
7. Reinstall the filter.

Note: It may be preferable to keep extra, clean filters to replace the dirty filters to minimize unit downtime for filter maintenance.

Cartridge or Bag Filters

To replace cartridge or bag filters:

1. Disconnect all electrical power to the unit.
2. Remove the dirty filters from their installed position.
3. Keeping the new bag filters folded, slide each filter into the filter rack, pushing them tightly against the unit.

Note: The pleats should be in the vertical position.

4. If using the optional pre-filters, replace them on the appropriate filter rack.
5. Close and secure the access door.

Drain Pans

⚠WARNING

Hazardous Chemicals!

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

⚠WARNING

No Step Surface!

Do not walk on the sheet metal drain pan. Walking on the drain pan could cause the supporting metal to collapse, resulting in the operator/technician to fall. Failure to follow this recommendation could result in death or serious injury.

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 exists, identify and remedy the cause immediately. Refer to "Troubleshooting" on page 129 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.

Fans

⚠ WARNING

Rotating Components!

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 can not be inadvertently energized. Secure rotor to ensure rotor cannot freewheel. 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.

Inspecting and Cleaning Fans

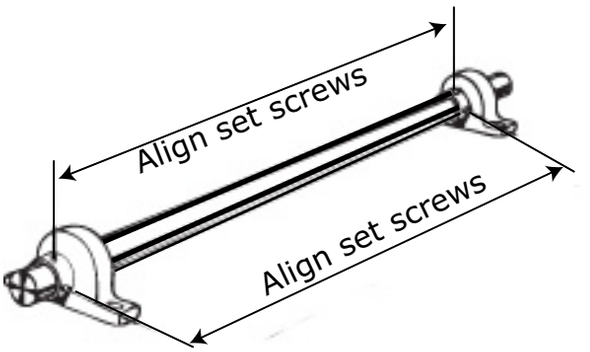
Fan sections of air handlers should be inspected every six months at a minimum or more frequently if operating experience dictates. If evidence of microbial growth (mold) is found, identify and remedy the cause immediately. Refer to "Troubleshooting" on page 129 for possible causes and solutions. To 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 high-efficiency particulate arrestance (HEPA) filters with a minimum efficiency of 99.97 percent at 0.3 micron particle size.
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.

Bearing Set Screw Alignment

Align bearing set screws for belt-drive fans as illustrated in Figure 133. Table 48 provides bearing set screw torque measurements.

Figure 133. Alignment



Torque Requirements

Refer to Table 48 for minimum torque of motor mounting and bearings bolts. Refer to Table 35 on page 111 for minimum setscrew torque.

Table 48. Minimum hex head bolt torque in lb.-ft. (Grade 5 bolts)

Size (inches)	Thread Designation	Minimum Torque
1/4-20	UNC	6
1/4-28	UNF	7
65/16-18	UNC	14
5/16-24	UNF	16
3/8-16	UNC	24
3/8-24	UNF	28
7/16-14	UNC	42
7/16-20	UNF	45
1/2-13	UNC	69
1/2-20	UNF	83
9/16-12	UNC	99
9/16-18	UNF	118
5/8-11	UNC	150
5/8-18	UNF	176
3/4-10	UNC	254
3/4-16	UNF	301
7/8-9	UNC	358
7/8-14	UNF	422
1-8	UNC	500
1-14	UNF	602

Note: Soft metric conversions are not acceptable for screw and hex sizes.

Fan Bearing Lubrication

NOTICE:

Bearing Failure!

Do not mix greases with different bases within the bearing. Mixing grease within the bearing could result in premature bearing failure.

For belt-drive fans, the grease used in electric motor bearings is usually not compatible with the grease used in fan bearings. Never mix the two grease types! See Table 49 for compatible greases and Table 50 for maximum grease capacity.

Note: Lubricate the motor bearing according to the motor manufacturer's recommendations and use the manufacturer-recommended grease. See "Motor Bearing Lubrication" on page 124.

Table 49. Compatible Greases

Type
Texaco Multi Fak 2
Shell Alvania 2
Mobil 532
Chevron Dura-Lith 2
Exxon Beacon
Keystone 84H

Table 50. Fan bearing maximum grease capacity

Shaft size (inches)	Capacity (fluid ounce)
1/2 - 3/4	1/7
7/8 - 1 3/16	3/8
1 1/4 - 1 1/2	5/8
1 11/16 - 1 15/16	7/8
2 - 2 7/16	1 1/4
2 1/2 - 2 15/16	2

- Fan bearings without lubrication lines are sealed bearings. Re-lubrication is not required.
- Fan bearings equipped with lubrication lines should be lubricated with a lithium-based grease that conforms to NLGI No. 2 for consistency.

Motor Bearing Lubrication

Obtain an operation and maintenance manual from the motor manufacturer for the specific motor installed. The motor manufacturer's 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.

Coils

All coils should be kept clean to maintain maximum performance.

Steam and Water Coils

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

⚠WARNING

Hazardous Chemicals!

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

To clean steam and 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 manufacturer's instructions.

Note: If the detergent is strongly alkaline after mixing (PH 8.5 or higher), it must contain an inhibitor. Follow the cleaning solution manufacturer's 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 degrees.
   - 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 steps 6 and 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.

Refrigerant Coils

⚠WARNING

Hazardous Pressures!

Coils contain refrigerant under pressure. When cleaning coils, maintain coil cleaning solution temperature under 150°F to avoid excessive pressure in the coil. Failure to follow these safety precautions could result in coil bursting, which could result in death or serious injury.

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

⚠WARNING

Hazardous Chemicals!

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

To clean refrigerant 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 manufacturer's instructions.

Note: If the detergent is strongly alkaline after mixing (PH 8.5 or higher), it must contain an inhibitor. Follow the cleaning solution manufacturer's 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 degrees.
   - 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 steps 6 and 7 as necessary.
9. Straighten any coil fins 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 and cleaning solution.

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 degrees.

NOTICE:

Coil Freeze-up!

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. Failure to do so could result in equipment damage.

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 type D1, D2, WL, LL, UA, UW, UU, W, P2, P4, P8, WD, 5D, and 5W 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 ensure no water remains in the coil, do not replace the vent and drain plugs until the coils are put back into service.

Note: Use care in removing header plugs from Type P2, P4, and P8 coils. Over-torquing may result in twisted tubes.

Moisture Purge Cycle

By it's 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 doesn't 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.

Cleaning Non-Porous Surfaces

⚠ WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

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 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 steps 4 and 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!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

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.

Ultraviolet (UV) Light Maintenance

The intensity of the ultraviolet energy emitted from the ultraviolet bulbs is dependent on the cleanliness and age of the bulb. The surface of the bulb should be kept as clean as possible for optimum intensity. Depending on the filtration level of the HVAC system and the general hygiene of the building, periodic cleaning may be necessary. Before attempting any maintenance procedures, always follow all warnings and cautions as detailed in this maintenance section.

⚠WARNING

Hazardous Voltage and Exposure to Ultraviolet Radiation!

This product contains components that emit high-intensity ultraviolet (UV-C) radiation which can be harmful to unprotected eyes and skin. To avoid injury, disconnect all electrical power, including remote disconnects, and make sure the UV lights are off before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in burns or electrocution which could result in death or serious injury.

⚠WARNING

Hazardous Mercury Vapors!

If large numbers of UV bulbs are broken, an appropriate respirator, as described in OSHA 1910.134, MUST be worn to prevent inhalation of mercury vapors. Mercury vapors are toxic and inhaling them could result in poisoning and suffocation. Failure to follow this recommendation could result in death or serious injury.

⚠CAUTION

Broken Glass!

Bulbs are fragile and can be easily broken. To avoid getting cut, always use cloth gloves and eye protection when handling, cleaning or replacing these bulbs. Bulbs may break if dropped or handled improperly. Refer to the MSDS sheet from the bulb manufacturer for additional safety information. Failure to handle bulbs properly could result in minor to moderate injury.

Cleaning the Bulbs

Note: If bulbs are found to be broken, see the proper warning and cautions below regarding broken bulbs and hazardous vapors.

1. Disconnect all electrical power to the unit and the ultraviolet bulbs.
2. Wearing soft cloth gloves and safety glasses, use two hands and firmly grasp the bulb at each end.
3. Rotate the bulb 90 degrees in either direction and move bulb away from the fixture and out of unit.
4. Wipe down each bulb with a clean cloth and alcohol. Avoid touching the bulb with bare hands as skin oils can accelerate future glass soiling and degrade the bulb performance.
5. Carefully return the bulb to the fixture and rotate it 90 degrees in either direction until it is firmly secured.
6. Close and latch all unit panels and reenergize power to the lights.

Replacing the Bulbs

Ultraviolet bulbs should be replaced annually if operated continuously or after 9,000 hours of use if operated intermittently. Replacement bulbs must be the specific size and wattage as originally supplied from the factory.

Note: Although the lights may continue to generate a characteristic blue glow beyond 9,000 operating hours, the ultraviolet radiation emitted by the bulbs degrades over time and will no longer provide the intended benefit.

1. Disconnect power to the HVAC unit and the ultraviolet bulbs. SEE WARNING ABOVE.
2. Wearing soft cloth gloves and safety glasses, use two hands and firmly grasp the bulb at each end.
3. Rotate the bulb 90 degrees in either direction and move bulb away from the fixture and out of unit.
4. Carefully install a new replacement bulb in the fixture and rotate it 90 degrees in either direction until it is firmly secured.
5. If broken bulbs are found or if you are required to dispose of used bulbs, the proper warning and cautions must be followed.
6. Always use cloth gloves and suitable eye protection when cleaning or replacing these bulbs. Bulbs may break if dropped or handled improperly.

Disposal of Bulbs

UV bulbs, like fluorescent bulbs, contain mercury, which is a regulated hazardous waste. The disposal requirements for hazardous wastes are determined by local, state and federal guidelines. Check all regulations before disposing of bulbs to assure you have met all requirements.

Refer to the MSDS sheet from the bulb manufacturer for additional disposal, handling and safety information.

After replacing bulbs, close and latch all unit panels and reenergize power to the lights.

Troubleshooting

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

⚠ WARNING

Hazardous Service Procedures!

The maintenance and troubleshooting procedures recommended in this manual could result in exposure to electrical, mechanical or other potential safety hazards. Always refer to the safety warnings provided throughout this manual concerning these procedures. 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. Failure to follow all of the recommended safety warnings provided, could result in death or serious injury.

Table 51. Air handler troubleshooting recommendations

Symptom	Probable Cause	Recommended Action
Bearing is excessively hot	First start after relubrication (Grease distribution)	Allow machine to cool down and restart.
	Over-lubrication	Clean surface of grease and purge.
	Over tensioned belts	Adjust belt tension.
	No lubricant	Apply lubricant. Check bearings for damage.
	Misaligned bearing	Correct alignment. Check shaft level.
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	Poor alignment	Align bearing set screws (see Table 35 on page 111). Loosen and retighten bearing set screws.
	Shipping spacers not removed	Remove shipping spacers and/or bolts (see "Fan Isolation" on page 62).
	Over tensioned belts	Adjust belt tension.
	Misaligned drive	Align drive.
Motor runs and then dies down	Partial loss of line voltage	Check for loose connections. Determine adequacy of main power supply.
	Starter shorts when motor warms up	Replace starter.
Motor does not come up to 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.
Rapid motor bearing wear	Excessive overhung load due to overtensioned drive	Check belt tension and overhung load.
	Excessive overhung load due to a small diameter motor sheave	Replace sheave with larger one.
Loose fan belt	Motor is poorly positioned	Adjust belt tension.
	Worn or damaged belt	Replace belt or belt set. Check sheave alignment.
	Worn sheaves	Replace sheaves.

Table 51. Air handler troubleshooting recommendations

Symptom	Probable Cause	Recommended Action
Short belt life	Worn sheaves	Replace sheaves.
	Misaligned belt	Realign drive with MVP sheave set at mean pitch diameter.
	Grease or oil on belts	Check for leaky bearings. Clean belts and sheaves.
	Belt slipping	Improper belt tension. Adjust tension.
	Belts rubbing	Remove obstruction or realign drive for clearance.
Bearing noise	Poor alignment	Loosen bearing set screws and realign (see "Align Fan and Motor Sheaves" on page 111)
	Failed bearing	Replace bearing.
	Inadequate lubrication	Replace bearing.
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 "Coil Piping and Connections" on page 86).
	Dirty fin surface	Clean the fin surface (see the "Coils" section on page 125).
	Incorrect glycol mixture	Verify glycol mixture and adjust if necessary.
Low refrigerant coil capacity	Incorrect airflow	Check fan operating condition.
	Expansion valve is not operating properly or is sized incorrectly	Check sensing bulb temperature. Verify valve operation. Verify proper valve size.
	Incorrect refrigerant charge	Verify refrigerant charge and adjust if necessary.
	Condensing unit failure	Verify condensing unit operation.
	Coil is piped incorrectly	Verify coil piping (see "Coil Piping and Connections" on page 86.)
	Clogged refrigerant line filter	Change filter core.
	Failure of suction/liquid line components	Verify component operation
	Dirty fin surface	Clean the fin surface (see the "Coils" section on page 125). Do not use steam to clean refrigerant coils.
	Fin frosting	Verify defrost cycle operation. Verify frostat operation. Verify refrigerant charge.
Low steam coil capacity	Incorrect airflow	Check fan operating condition.
	Coil is piped incorrectly	Verify coil piping (see "Coil Piping and Connections" on page 86).
	Incorrect steam pressure	Verify steam pressure and adjust if necessary.
	Excessive steam superheat	Check steam superheat. Steam superheat should not exceed 50ºF.
	Failure of steam line/condensate return components	Verify component operation
	Boiler failure	Verify boiler operation
	Dirty fin surface	Clean the fin surface (see the "Coils" section on page 125).
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

Trane optimizes the performance of homes and buildings around the world. A business of Ingersoll Rand, the leader in creating and sustaining safe, comfortable and energy efficient environments, Trane offers a broad portfolio of advanced controls and HVAC systems, comprehensive building services, and parts.
For more information, visit www.Trane.com.

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.

CLCH-SVX07C-EN 15 Oct 2012
Supersedes CLCH-SVX07C-EN (29 Feb 2012)

We are committed to using environmentally conscious print practices that reduce waste.