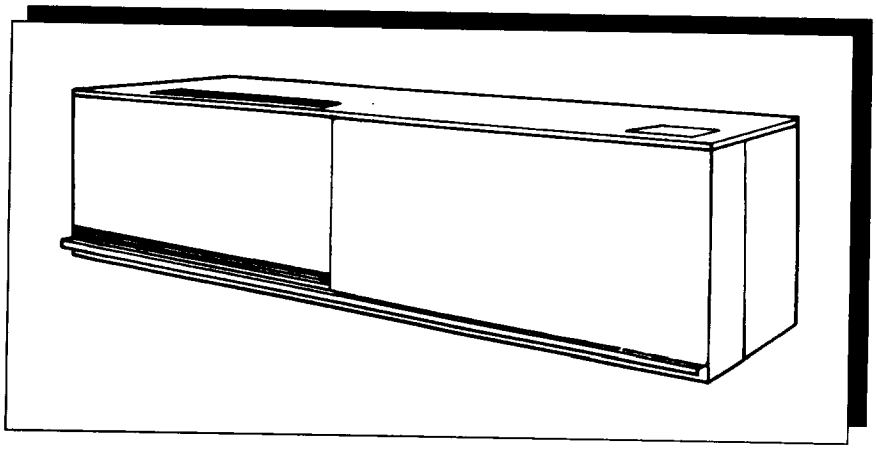
TRANE

Installation, Operation, and Maintenance Manual

Air Cooled Self-Contained Unit Ventilator Heat Pump and Air Conditioner Models THPB, TACB



TSCB-IOM-1 (June 1997)

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Literature History

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

Installation Operation and Maintenance	***TSCB-IOM-1***
Library	***Service Literature***
Product Section	***Air Terminal Devices & Heating Products***
Product	***Unit Ventilators***
Model	***THPB/TACB***
Literature Type	***Installation Operation Maintenance***
Sequence	***1***
Date	***May 1997***
File No.	***SV-TD-UV-TSCB-IOM-1996***
Supersedes	***NEW***

MODEL NUMBER DESCRIPTION

Typical Service Model Number (located on unit nameplate):

Number ⇨	THP	B	044	4	M	AO	A	1	1	1	4	0
Digit ⇨	1,2,3	5	5,6,7	8	9	10, 11	12	13	14	15	16	17

Table 1
Model Number for Self-Contained Unit Ventilator

Selection Category	Description of Selection	Model No.	Digit
Model	Terminal Heat Pump	THP	1-3
	Terminal Air Conditioner	TAC	
Development Sequence	Current	B	4
Size	24 MBH Nominal Capacity	024	5-7
	30 MBH Nominal Capacity	030	
	36 MBH Nominal Capacity	036	
	40 MBH Nominal Capacity	040	
	44 MBH Nominal Capacity	044	
	48 MBH Nominal Capacity	048	
	54 MBH Nominal Capacity	054	
Voltage	208/60/1	2	8
	208/60/3	3	
	230/60/1	4	
	230/60/3	5	
	460/60/3	8	
Heat Options	High capacity electric heat (THPB)	H	9
	Medium capacity electric heat (THPB)	M	
	Low capacity electric (THPB)	L	
	Hot water heat (TACB)	W	
	Hot water heat with crossover piping (TACB)	X	
	Special heat	S	
Design Sequence	1st	AO	10-11
Controls	TUC	A	12
	TUC with time clock	B	
	Special controls	S	

Table 1
Model Number for Self-Contained Unit Ventilator

Selection Category	Description of Selection	Model No.	Digit
Wall-mounted Sensor	No unit or wall mounted sensor	0	13
	Unit mounted sensor with external adjustment and fan speed switch	1	
	Wall mounted sensor with internal adjustment and unit mounted fan speed switch	2	
	Wall mounted sensor with external adjustment and unit mounted fan speed switch	3	
Agency Listing	No agency listing	0	14
	UL and CUL agency listing	1	
Wall Sleeve	For non-recessed application	0	15
	For recessed into wall application	1	
Unit Color	Standard Deluxe Beige	1	16
	Cameo White	2	
	Soft Dove	3	
	Stone Gray	4	
	Driftwood Gray	5	
	Rose Mauve	6	
	Bronze Tone	7	
	Special color	S	
Open	Open	0	17
	Special	S	

SAFETY

NOTE: The installation and servicing of the equipment referred to in this booklet should be done only by qualified, experienced technicians.

EMISSIONS NOTE: The Trane Company urges that all HVAC servicers working on Trane equipment, or any manufacturer's products, make every effort to vigorously reduce or eliminate, where possible, the emission of CFC, HCFC, and HFC refrigerants to the atmosphere resulting from installation, operation, routine maintenance, or major service on the equipment.

Always act in a responsible manner to conserve refrigerants for continued use even when acceptable alternatives are available.

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

Take extra care to properly maintain all service equipment directly supporting refrigerant service work such as gauges, hoses, vacuum pumps, and recycling equipment. Be aware of unit enhancements, conversion refrigerants, compatible parts, and manufacturer's recommendations that will reduce refrigerant emissions and increase equipment operating efficiencies. Follow specific manufacturer's guidelines for conversion of existing systems.

Observe the following warnings, cautions and all warning labels on the unit:

WARNING

HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER BEFORE SERVICING.
Failure to disconnect power (including remote disconnects) before servicing can cause severe personal injury or death.



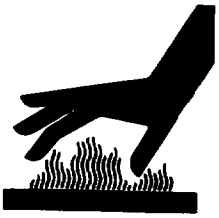
WARNING

ROTATING FAN BLADE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.
Failure to disconnect power before servicing can cause severe personal injury or death.



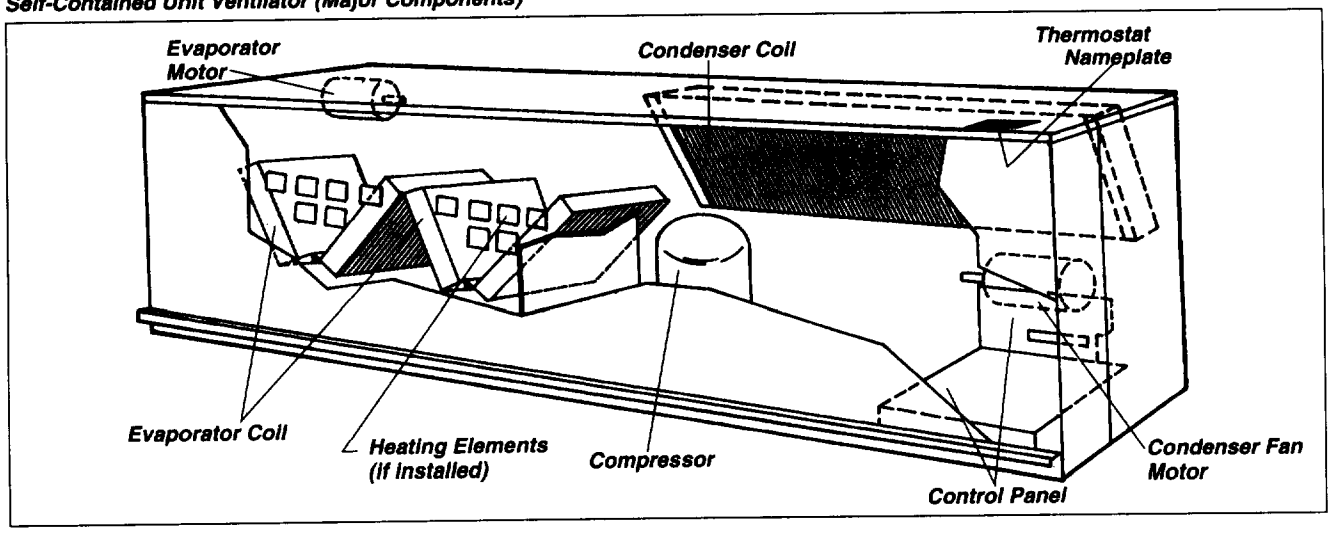
WARNING

HOT SURFACE! DO NOT TOUCH SURFACE.
Can cause minor to severe burns.



GENERAL DESCRIPTION

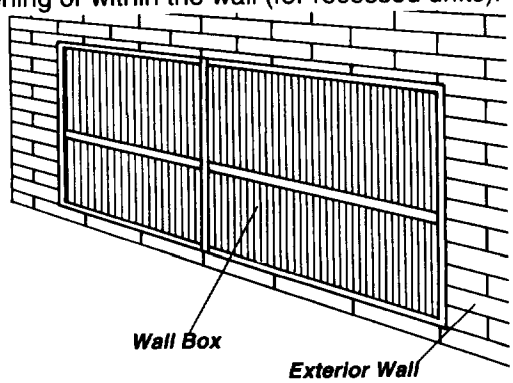
Figure 1
Self-Contained Unit Ventilator (Major Components)



The Trane Self-Contained Classroom Unit Ventilator is an indoor device capable of providing heating and cooling comfort for a typical classroom in ambient temperatures of -20°F to 105°F. The unit is designed to be located along an exterior wall.

The unit *(Figure 1)* consists of the condenser (outdoor) and evaporator (indoor) sections housed in a cabinet. The condenser section coils are exposed to the outside air. The compressor and control panel are mounted in front of the condenser coils and are accessible from the room interior by removing a front cabinet panel. The evaporator, or indoor, section of the unit, is adjoining and contains the evaporator coils and electric auxiliary heat elements or hot water heating coils. This section also contains a fresh air inlet for outdoor air for ventilation or, if conditions are right, free ventilation cooling.

A wall sleeve is provided for unit mounting at the wall opening or within the wall (for recessed units).



The wall box is a louvered intake to supply outdoor air directly into the unit through an exterior wall. It also provides condenser intake and exhaust air. The wall box is available from Trane.

Operation

A single two-speed, unit-controlled tangential fan draws return air and fresh air, as required, continuously through the coils.

Under preset conditions and only if the outside air is cooler than inside, economizer operation allows ventilation cooling as required. If space temperature rises above the preset cooling setpoint and the economizer operation is insufficient, the compressor and outdoor fan are energized for mechanical cooling.

Also in heating, if the space temperature falls below a preset heating setpoint, the hot water valve modulates open to maintain the setpoint (TACB units only). Auxiliary electric heat is energized if the heating setpoint cannot be maintained by refrigerant heating (THPB units only). (For complete unit sequence of operation see "SEQUENCE OF UNIT OPERATION" on page 27

The operator can control unit operation using a combination two-position system/fan switch with a programmable temperature setpoint. On a heat pump, an emergency heat switch is provided.

Controls

The standard control system is a microprocessor-based Terminal Unit Controller (TUC) mounted on the control panel that operates the indoor and outdoor fans, compressor, reversing valve (heat pump), hot water or electric heat (heat pump) and fresh air/return air dampers. The controller maintains the zone temperature at the zone thermostat setpoint and assures minimum ventilation air requirements. A standard thermostat is mounted on the unit.

A wall-mounted thermostat or sensor is optional. Provisions for wiring to a building automation system (Trane Tracer™ or other) are included.

Machine Protection

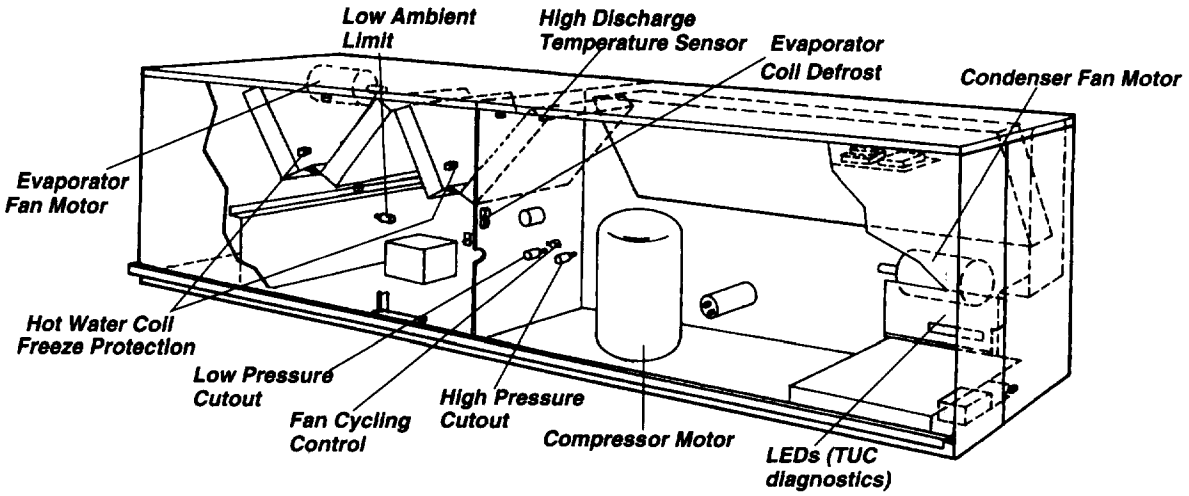


Figure 2
Unit Protection Devices (Figure 2)

- ❑ Fan motors: internal thermal overload protection
- ❑ Compressor motor: internal thermal overload protection
- ❑ High pressure: high pressure (430 psi) in refrigerant circuit will cause a lockout of the compressor and outdoor fan
- ❑ Low pressure: low pressure (7 psi) in refrigerant circuit will cause a lockout of the compressor and outdoor fan
- ❑ Evaporator defrost: if the indoor coil temperature drops below a preset level, the compressor and outdoor fan will shut down until the sensor resets
- ❑ Electric Heat High Limit: high discharge temperature limit will shut off electric heat when discharge exceeds 195°F
- ❑ Outdoor Coil Defrost: if the outdoor coil temperature drops below a preset point, the compressor and reversing valve will be energized, the outdoor fan will shut off, and electric heat will come on until the coil is defrosted
- ❑ Hot Water Coil Freeze Protection: if the freeze sensor opens, the hot water valve will be driven open until the sensor resets. If the sensor is below the preset limit longer than 5 minutes or below 0° in the unoccupied/off mode, the valve will be open 100%
- ❑ Fan Cycling Control: High refrigerant pressure will switch fans from NORM to MAX speed.

On units with TUC controls, controller diagnostics will indicate, via LEDs, the presence of faulty controls.

General Data

Table 2
Weight and Dimensions

Size Unit (MBH)	Length (inches)	Height (inches)	Depth (inches)	Unit Weight(lb)
24	86	30	32-3/32	730
30	86	30	32-3/32	730
36	98	30	32-3/32	809
40	98	30	32-3/32	809
44	110	30	32-3/32	894
48	110	30	32-3/32	894
54	110	30	32-3/32	894

Table 3
Compressor Voltage Data

Range	Voltage, Volts/Hz/Phase				
	208/60/1	230/60/1	208/60/3	230/60/3	460/60/3
Minimum	180	207	180	207	414
Maximum	220	253	220	253	506

NOTE: Operating voltages must be within min/max or warranty is voided

Table 4
Fan Characteristics

			Unit Size						
			24	30	36	40	44	48	54
Room Fan Data	Nominal CFM (at MAX speed)		850	850	1100	1100	1350	1350	1350
		No. of Fans	1	1	1	1	1	1	1
	Approx. RPM	Max Cool	1070	1070	950	950	1070	1070	1070
		Normal Cool	850	850	850	850	850	850	850
	Fan Dia (In)		5.5	5.5	5.5	5.5	5.5	5.5	5.5
	Fan Width (in)		27.25	27.25	38	38	38	38	38
Room Fan Motor HP			1/12	1/12	1/10	1/10	1/8	1/8	1/8
Outdoor Fan Motor HP			1/3	1/3	1/3	1/3	1/2	1/2	1/2
Filters, (Qty)/Size			(2)/15x25x1	(2)/15x25x1	(1)/20x25x1 (2)/12x25x1	(1)/20x25x1 (2)/12x25x1	(1)/20x25x1 (2)/12x25x1	(1)/20x25x1 (2)/12x25x1	(1)/20x25x1 (2)/12x25x1

INSTALLATION

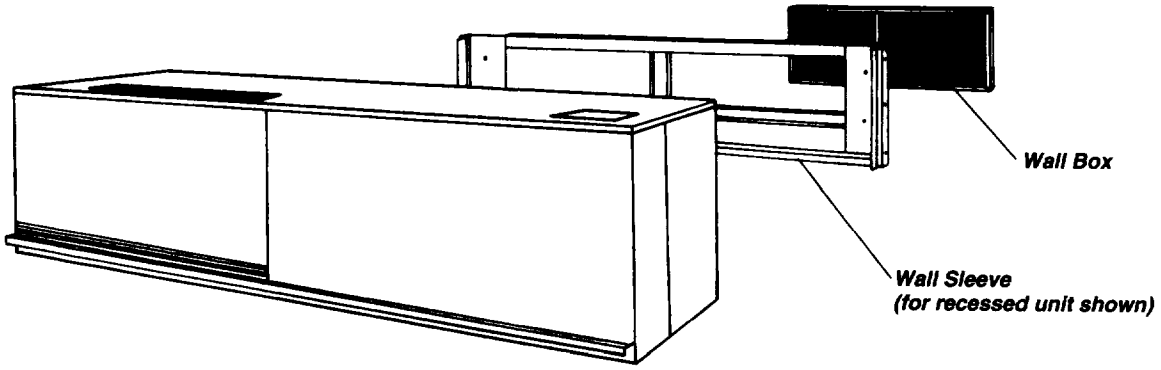
System Components

The unit consists of the cabinet and wall sleeve, as shown *(Figure 3). Note that different wall sleeves are required for recessed and non-recessed installations.* In addition, an outdoor wall box is installed and a splitter between the unit and wall box, fabricated by the installing contractor, must be used to separate condenser inlet and outlet and fresh air inlet air flow when the wall sleeve is not flush with the wall box.

Optional system components include:

- ❑ Wall-mounted sensor
- ❑ Auxiliary heat source is electric heat for heat pumps; hot water is primary heat source for cooling-only (air conditioner) units.

Figure 3
Unit, Sleeve, and Wall Box



Receiving Shipment

The Trane Self-Contained Unit Ventilator and wall sleeve are structurally protected, packaged in clear plastic wrapping, and screwed at three locations to a pallet as shown. The wall box is shipped separately.

Perform the following steps upon receipt of the unit or soon afterward.

CAUTION:Do NOT stand the unit on end or stack.
Improper handling can damage internal components.

1 Inspect the unit for any damage or evidence of mishandling. Report all apparent damage or shortages on the freight claim provided. Concealed damage not discovered until after unloading should be reported to the carrier immediately.

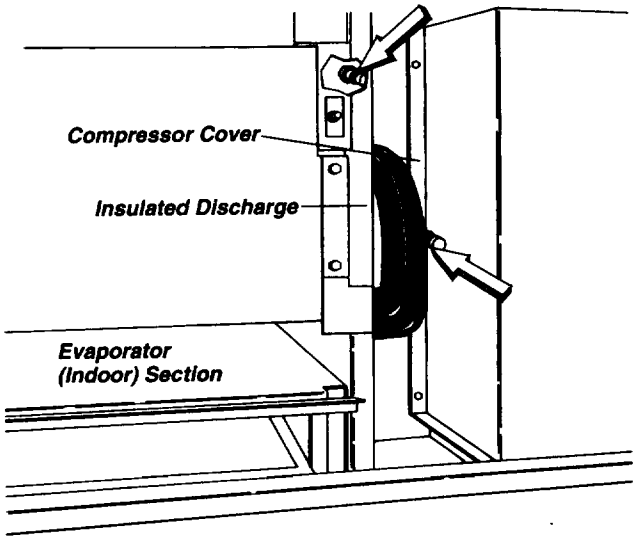
NOTE: True refrigerant pressure varies with the ambient temperature.

2 If the unit appears undamaged, remove enough of the wood crating and plastic wrap so the two unit front cabinet panels (22 to 32 lb each) can be removed. Check the refrigerant charge by attaching a pressure gauge at either schrader valve as shown *(Figure 4)*. Pressure should be according to the following table; if not, **call Trane service immediately.**

Ambient Temp. (°F)	Gage Pressure (psig)
60	100 =±20
70	122 =±20
80	144 =±20
90	168 =±20

NOTE: The unit finish will scratch, especially if front panels are placed on top. Avoid contact when handling.

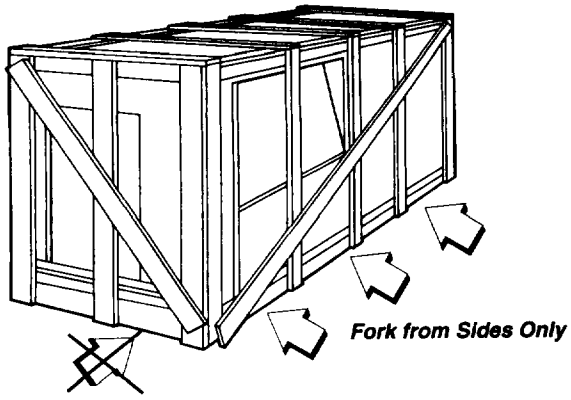
Figure 4
Schrader Valve Locations (Arrows) For Pressure Check



3 If the refrigerant pressure checks OK and there is no apparent unit damage, remove the rest of the crating and plastic wrap. If the pressure is not OK, call Trane Service immediately.

4 To move the unit on the pallet, use a fork lift with forks at least 36" long. Fork from either side, *but not from the ends (Figure 5).* Check dimensions and clearances before moving.

Figure 5
Self-Contained Unit Ventilator as Shipped



The unit is intended for indoor use only. The equipment should be stored indoors prior to installation to protect it from the elements. If indoor storage is not possible, provide the following provisions for outdoor storage:

- ❑ Place the units on a dry, paved surface or raise them off the ground to assure adequate air circulation beneath the unit and to assure that no portion of the unit contacts standing water at any time.

Note: Wet interior unit insulation can increase the chanced of microbial growth, which has been determined to cause odors and serious health-related IAQ problems.

- ❑ Completely cover the unit(s) with a water repellant tarp for protection from the elements.
- ❑ Make provisions for continuous venting (e.g., leaving the unit on the shipping skid) of the covered units to prevent moisture from condensing on the unit surfaces.

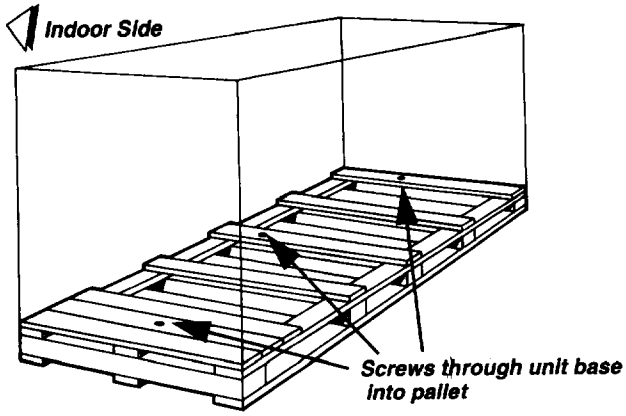
NOTE: If the unit is not to be recessed, only the bottom of the wall sleeve is shipped and rests under the rear of the unit with a gasket in place.

5 *For recessed units only,* the shipping bolts are welded to the wall sleeve. These four studs attach to the inside of the unit, accessible by reaching inside.

6 Remove the wall sleeve from the unit and pallet.

7 Remove the three 1/4" lag screws attaching the unit to the pallet as shown *(Figure 6).* (NOTE: Removing the lag screw at the outdoor end requires removing the control panel (high voltage) cover.) *The screws must be removed before the unit can be moved from the pallet and installed.*

Figure 6
Shipping Lag Screw Locations



8 Select a location to insure convenient removal of the unit and access for maintenance and service after installation. The following criteria should be met when choosing an installation location:

- ❑ The floor area should be able to support the total weight of the wall sleeve and unit. The floor should be level.
- ❑ Piping (for air conditioner units with hot water) should be routed up from the floor or through the wall in the area accessible to unit connections.
- ❑ Any wall structure above the air opening (grille) for the unit should be self-supporting. The unit assembly cannot bear excessive weight without bending. Load bearing walls must be carefully considered when installing units.
- ❑ Hung light fixtures can interfere with circulating air flow along the ceiling. If possible, align fixtures perpendicular to the unit to reduce the profile moving air will encounter. Recessed light fixtures are preferred for all classroom unit installations.
- ❑ Permanent floor space should be available for the unit to extend from the wall into the room. Some of the unit may be recessed into the wall, reducing part of the unit extending into the room.
- ❑ Clearance should be allowed for removing unit components from the front (interior) for servicing *(Figure 7)*.

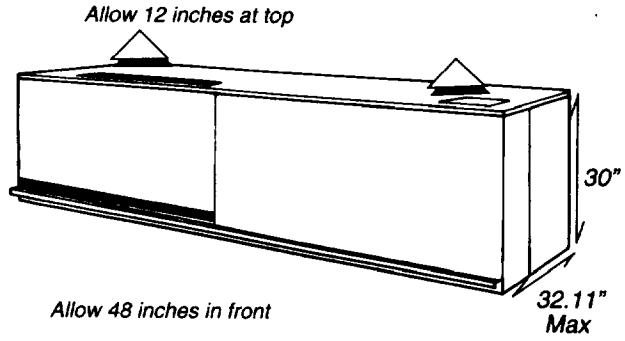
NOTE: Do not obstruct the unit air flow (intake and supply vents.

WARNING

The unit weighs from 730 to 900 lb, depending on size. Use proper lifting and moving techniques or personal injury may result.

9 When in position next to the wall for installation, carefully slide the unit off the pallet onto the unit's four or five runners. Lift from the ends (1/2-inch clearance at bottom for gripping) or the front toepiece, **not** at the top cover.

Figure 7
Suggested Clearances In Room



Recessed Unit Installation

Refer to the following steps to install only RECESSED units

NOTE: The suggested sequence of installation of wall box, sleeve, and unit may vary with contractor choice and type of installation, conditions, and availability of equipment.

Prepare the Wall Opening

NOTE: Read this entire section before altering the wall structure for installation of the Self-Contained Unit Ventilator.

The entire installation is in numbered sequence.

The wall sleeve and wall box will require penetrating the wall for installation. The size of the openings, inside and outside, are dependent on the unit size.

CAUTION:The wall should NOT be load-bearing. The wall sleeve will deflect with excessive weight.

Figure 8
Wall Opening dimensions - Recessed Installation)

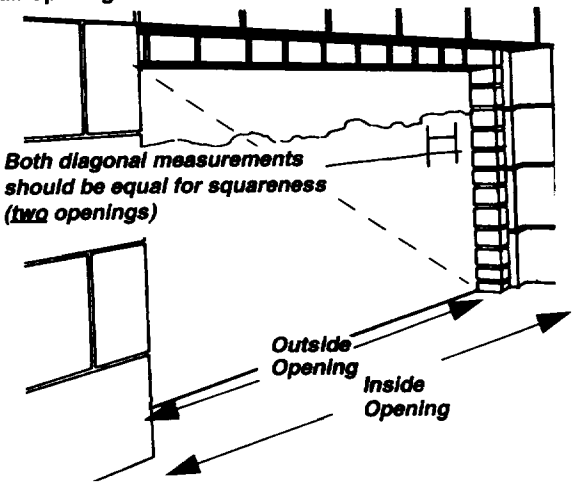


Table 5
Wall Opening Cut Dimensions - Recessed Installation

Unit Size	[Inside Opening] Cut SLIGHTLY LARGER than Wall Sleeve dimensions (in) of	[Outside Opening] Cut SLIGHTLY LARGER than Wall Box dimensions (in) of
24, 30	30-1/4 x 88-1/2	28-7/8 x 68-1/2
36, 40	30-1/4 x 100-1/2	28-7/8 x 82-1/2
44, 48,54	30-1/4 x 112-1/2	28-7/8 x 94-1/2

Squareness of the wall penetration is critical. Verify that both the inside and outside wall penetrations are square to wall box and unit installation. Measure and compare the diagonal dimensions for squareness.

Size the Opening

NOTE: The bottoms of both wall openings must be the same height as the floor line.

1 Size the outside wall opening *(Figure 8)* ***slightly larger*** than the dimensions of the external wall box given in the wall box submittal. Allow for a weathertight fit. Use lintels or other supports as needed. A lintel *(Figure 9)* is typically used with masonry walls, installed above the unit and wall box to support the block and brick wall.

2 Since the unit will be built into the wall, size the inside wall opening *(Figure 8)* ***slightly larger*** than the sleeve *(Table 5)*.

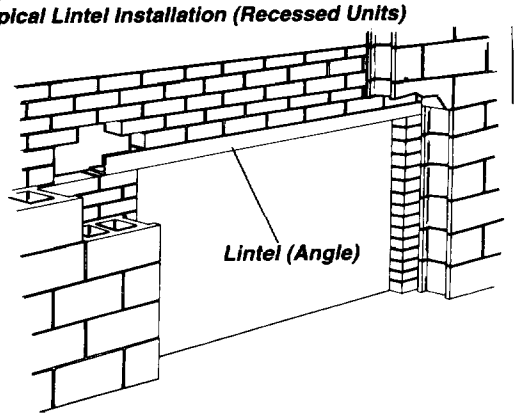
Finish the Opening

3 Using a suitable blade, cut the outside wall to the dimensions required for the wall box installation. This opening will be slightly larger than the dimensions of the wall box, yet allow a weathertight fit. Check squareness.

4 Cut the inside wall opening to match the dimensions of the unit. Take care to maintain the smaller outside wall opening. Check squareness. Knock out the materials in the inside and outside walls to clear the opening completely.

5 Install a lintel in the opening, if required *(Figure 9)*.

Figure 9
Typical Lintel Installation (Recessed Units)

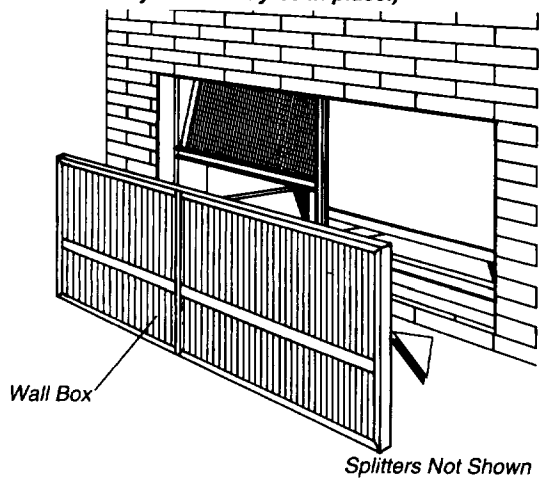


NOTE: The wall opening must be finished off smooth for a weathertight fit between the wall surface and the wall sleeve flanges. Sheet metal is commonly

fabricated by installers to cover the sides of the wall opening.

Install the Wall Box *(Figure 10)*

Figure 10
Wall box (Depending on the order of installation, the unit and sleeve shown may not already be in place.)



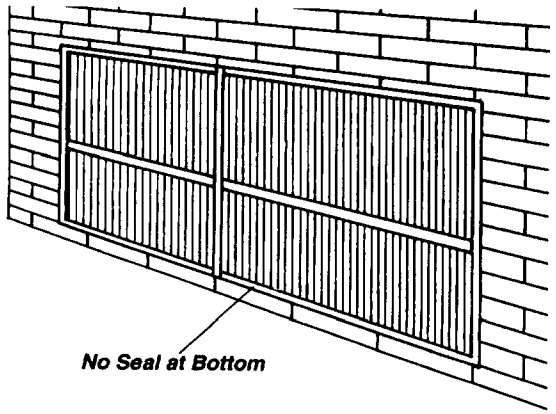
NOTE: The wall box has several weep holes on the lower front face for water drainage. Correct installation places the weep holes at the ***bottom*** *of the wall box facing outside.*

Use of a non-Trane-provided wall box may alter the air flow and result in reduced (derated) performance.

6 If the wall box is installed before the wall sleeve and unit, attach it to the wall surface as needed.

7 Seal the wall box to the wall opening with appropriate caulking material to provide a weathertight fit. Be sure to allow a 3/16-inch gap below the wall box to allow rainwater to drain out. (Note: the wall box manufacturer should provide a standoff at the bottom to maintain the gap.) Do NOT seal the bottom.

Figure 11
Wall Box Installed



Install the Wall Sleeve

CAUTION:Avoid placing excessive weight on the wall sleeve because deflection could affect unit installation and future service removal. (Recessed ONLY)

8 If the wall box has been installed *(Figure 11)*, confirm that a weathertight seal exists on three sides (not bottom).

9 Verify that the inside wall penetration is square. The diagonal distance between corners should be equal.

10 In partially recessed unit installations, seal the open area along the wall opening (between the wall box and wall sleeve) to prevent leaks into the building.

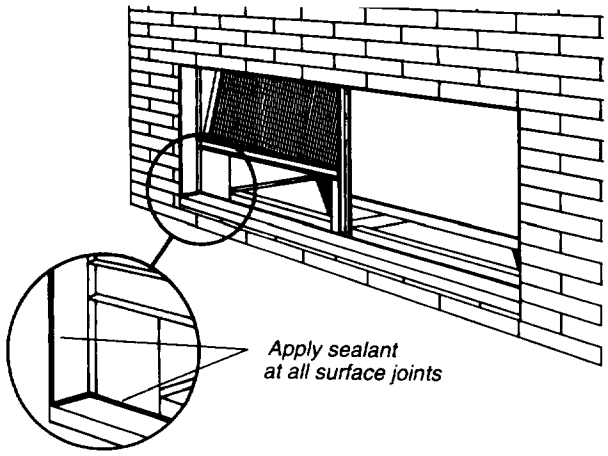
11 Place the wall sleeve into the inside wall opening and determine the amount of recess.

12 Level the wall sleeve horizontally and plumb the wall sleeve vertically.

13 Fasten the wall sleeve securely in place using concrete lag bolts or other suitable fasteners. Lag bolts should secure the sleeve base to the floor. Secure the wall sleeve at the sides and top as needed.

14 Caulk or seal any space between the wall sleeve and the wall and floor (all sides) on both the indoor and outdoor side of the wall sleeve *(Figure 12)*. Insulating foam is recommended.

Figure 12
Wall Sleeve Installation



Install the Horizontal and Vertical Air Splitters (Contractor Fabricate)

The air splitters are only required for non-recessed and partially recessed unit installations.

The horizontal air splitter creates two direct air flows for the condenser. The lower portion provides discharge air; the upper portion of the wall box allows air to enter the condenser. The vertical air splitter separates the flows from the indoor and outdoor sections.

The air splitters are not furnished by Trane. *Each splitter should be individually fabricated for the wall sleeve installation. 22- or 24-gage aluminum sheet is easy to form and works quite satisfactorily. The following figures (Figure 13) (Figure 14) show the preferred structure and arrangement of the splitters.*

Figure 13
Vertical Air Splitter Installation (typical)

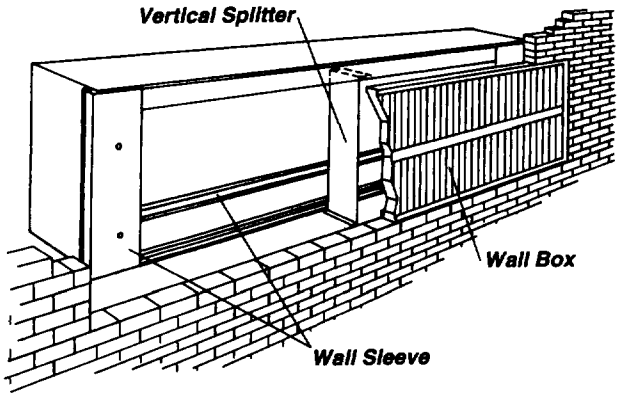
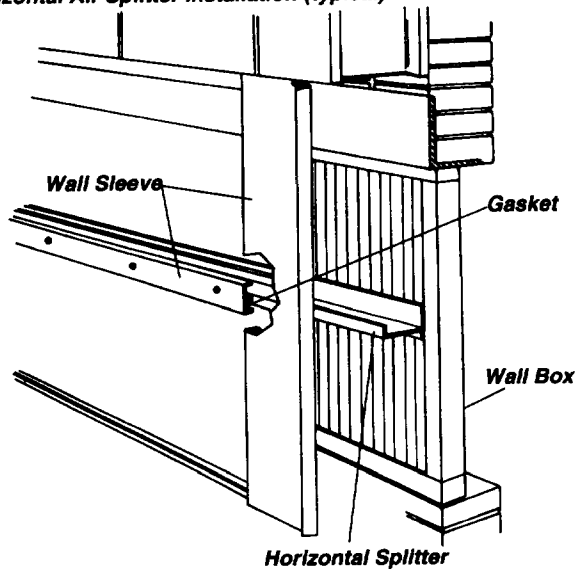


Figure 14
Horizontal Air Splitter Installation (typical)



15 To fabricate the air splitters, measure the depth of the opening between the back edge of the wall sleeve and the wall box. Add 3 inches of additional material for mounting flanges on each side.

16 Cut the horizontal air splitter to the length of the wall sleeve opening *in the condenser section* and the total depth (with flanges) calculated in the preceding step. The vertical splitter is cut to the vertical height plus mounting flange length.

17 Brake the material along the small depth dimension to create two 1-1/2 inch flanges. One flange should be upward and the other downward.

NOTE: The horizontal air splitter should slope slightly downward away from the unit to allow any water to drain down and out of the wall box. Cutting a few small drain holes for water will prevent any water buildup.

18 Fasten the fabricated horizontal air splitter horizontally to the wall sleeve along the line that separates the upper and lower sections (and air flows) as shown. Securing the splitters to the sleeve with sheet metal screws is recommended.

19 Change the angle of the air splitter so that the open flange will seal against the wall box. There is no need to fasten the splitter to the wall box.

Install the External Condensate Drain

NOTE: Condensate develops during the air conditioning cycle of Model TACB and the air conditioning, heating, and defrost cycles of Model THPB. During the air conditioning cycle, condensate that forms on the evaporator coil from conditioning humid air falls into a drain pan for disposal. During heating and defrost, condensate from the outdoor coil drains to its drain pan for disposal. The condensate runs through clear flexible and copper tubing along the front of the unit behind the toepiece to a stub on the bottom of the left end pocket.

Condensate drainage to the outside will be visible on the exterior of the building and may violate local codes, especially if the unit is installed on the second floor or higher. If not allowed, a building condensate system (internal) is strongly recommended.

20 Make piping connection at the drain stub provided. To install an external drain, clamp a 7/8" ID hose to the 7/8" OD copper fitting on the drain pan. Route the hose to the building condensate system, if available.

For building without an internal condensate system, use an external drain at the unit. Either route the condensate pipe to a pipe installed through the wall or route this hose to drain onto a water dam (see Step 22). This latter method directs condensate to flow under the wall box to the outside of the building.

NOTE: The hole and the pipe must be lower than the drain pans.

21 Drill a hole at the back of the unit for the external drain, if needed. The hole must be 2-1/2 to 3 inches above the floor.

22 Run the hose slightly downward and out.

NOTE: This method requires adequate freeze protection which must be furnished by others.

Fabricate a Water Dam

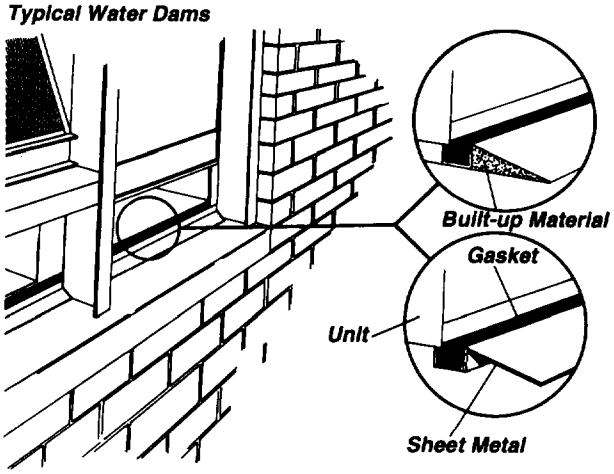
A field-fabricated water dam is recommended for all units. This water dam allows any water that is blown in during rain to drain away from the unit.

23 To fabricate the water dam, build up a nonporous material sloping away from the sleeve *(Figure 15)*. A second option for water drainage is to cut a piece of corrosion-resistant material (e.g. 22-gage aluminum) to the length of the unit and wide enough to ensure an incline when placed flush against the sleeve:

Unit Size	Length	Width
024 & 030	88"	Distance between wall box and sleeve plus 1"
036 & 040	100"	
044, 048 & 054	112"	

24 If sheet metal is used, it may be necessary to brake the material along the small width dimension to create a single flange. The flange should mate with the bottom edge of the base as shown *(Figure 15)* and end just before the wall box.

Figure 15
Typical Water Dams



Install the Unit

NOTE: The Trane Self-Contained Unit Ventilator is the last major component to be installed in the system. Allow clearance in front of the unit for service access.

25 Confirm that the wall box and wall sleeve components have been properly installed with the field-fabricated air splitters and water dam. Check that provisions for condensate drainage are made.

26 Confirm that gasketing is in place on the back of the unit in line with the sleeve. Apply 3/4 X 3/4-inch gasketing as needed, if missing.

27 Remove the front cabinet panels from the unit, if not already removed. Lay the panels to the side.

28 Line up the unit with the wall sleeve and confirm that the unit will slide into the wall sleeve. Check the air splitter and water drain for alignment with the unit.

NOTE: The following step can be done after the unit is positioned on the sleeve, if convenient.

29 Complete internal electrical wiring to the disconnect switch. See the section "Make Electrical Connections." Reference the wiring diagram supplied with the unit.

NOTE: The rear of the unit MUST rest on the bottom of the sleeve, compressing the gasket material in the channel, thereby creating a seal.

CAUTION:Do not thread the nut on the stud as a means to snug the unit closer to the sleeve. This could damage the cabinet frame.

30 (*This will require more than one person.*) Push the unit up on the sleeve so the four studs provided on the left and right gussets of the wall sleeve protrude through the slotted openings in the rear of the unit.

To verify that the unit is pushed far enough forward and over the sealing bottom sleeve gasket *(Figure 16)*, you should measure 32-3/8 (+1/4" tolerance) inches from the back of the wall sleeve to the front lip of the toepiece on the unit at both sides *(Figure 17)*.

Figure 16
Detail of Gasket Material In Channel Of Wall Sleeve (Bottom part of Sleeve for Non-recessed Installation Shown)

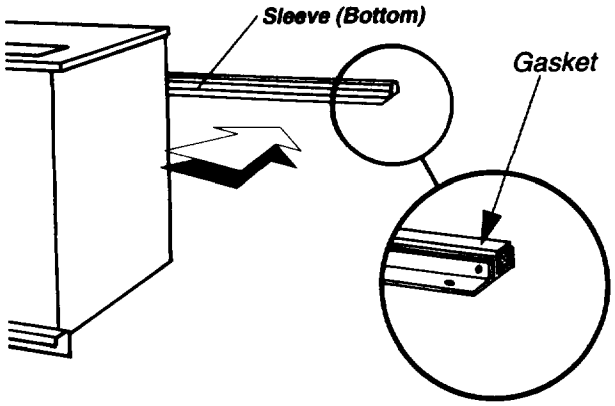
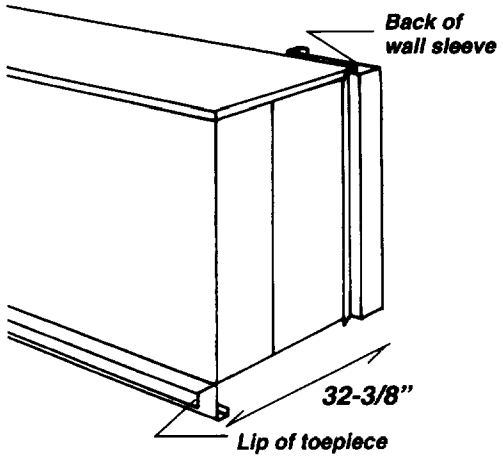


Figure 17
Measuring Unit Placement

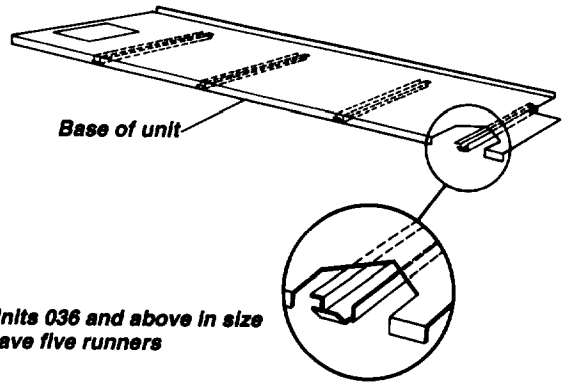


NOTE: The unit finish will scratch, especially if front panels are placed on top. Avoid contact when handling.

31 Check that the unit is level on the floor surface. For proper operation, the unit must be installed level (zero tolerance) in both horizontal axis. Failure to level the unit properly can result in condensate management problems such as standing water inside the unit. Standing water inside the equipment can result in microbial growth (i.e., mold) in the drain pan, which has been found to cause unpleasant odors and serious health-related indoor air quality (IAQ) problems.

If shimming on the front is needed, place the shims under the outermost runners (plus a middle runner on larger units). The locations of all runners are shown *(Figure 18)* and given in the following table:

Figure 18
Runners



Unit Size	Runner Locations: Distance from the Left Edge of Unit (inches)
024, 030	10, 41, 63, 78-3/4
036, 040	8-1/8, 31-3/8, 53, 75, 90-3/4
044, 048, 054	8-1/8, 31-3/8, 53, 75, 102-3/4

NOTE: The runners are channels attached to the bottom of the unit from back to front. They only extend 2 inches in from the front of the unit. Shims, therefore, must be placed at least 2 inches in from the front for elevation.

32 Secure the unit in place by threading nuts and washers on each 5/16" stud. Finger-tighten.

33 Replace the unit front cabinet panels. Adjust as needed to ensure the front panels are flush with end panels.

34 Stuff insulation into any gaps between the unit and the sides and top of wall opening to prevent air leakage and heat transfer.

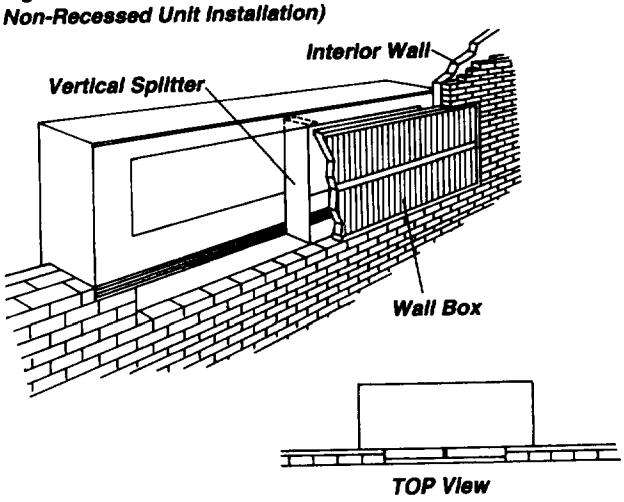
35 Trim the unit at the wall contact points to ensure an airtight seal and uniform appearance.

36 Continue with the procedure *"Make Piping Connections"* on page 23.

Non-recessed Installation

Refer to the following steps to install units NON-RECESSED or mounted flush to the interior wall.

Figure 19
Non-Recessed Unit Installation)



NOTE: The suggested sequence of installation of wall box, sleeve, and unit may vary with contractor choice and type of installation, conditions, and availability of equipment.

Prepare the Wall Opening

NOTE: Read this entire section before altering the wall structure for installation of the Self-Contained Unit Ventilator.

The entire installation is written in numbered sequence.

The wall box will require penetrating the wall for installation. The size of the single opening is dependent on the unit size.

Squareness of the wall penetration is critical. Verify that the wall penetration is square to wall box and unit installation. Measure and compare the diagonal dimensions for squareness.

Size the Opening

1 Size the outside wall opening slightly larger than the dimensions of the external wall box, given in the wall box submittal. Allow for weathertight fit. Use lintels or other supports as needed. A lintel *(Figure 18)* is typically used with masonry walls, installed above the unit and wall box to support the block and brick wall.

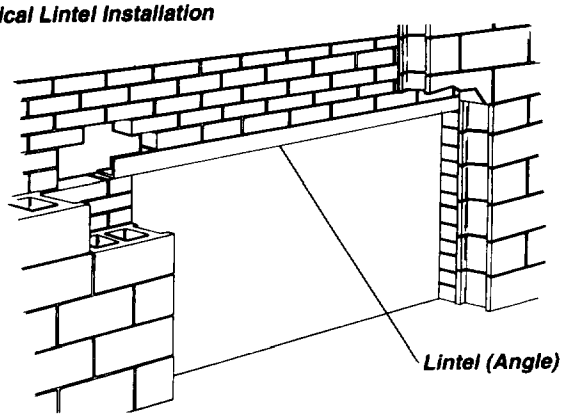
2 Since the unit is flush with the inside of the wall, size the inside wall opening to match the outside wall opening (slightly larger than the dimensions of the wall box). This will allow for outdoor air to pass through the wall box for the condenser and also provide fresh air for ventilation.

Finish the Opening

3 Using a suitable blade, cut the outside wall to the dimensions required for the wall box installation. Check squareness.

4 Install a lintel in the opening, if required *(Figure 20)*.

Figure 20
Typical Lintel Installation



NOTE: The wall opening must be finished off smooth for a weathertight fit between the wall surface and the wall sleeve flanges. Sheet metal sleeve is commonly fabricated to cover the sides of the wall opening.

Install the Wall Box *(Figure 21)*

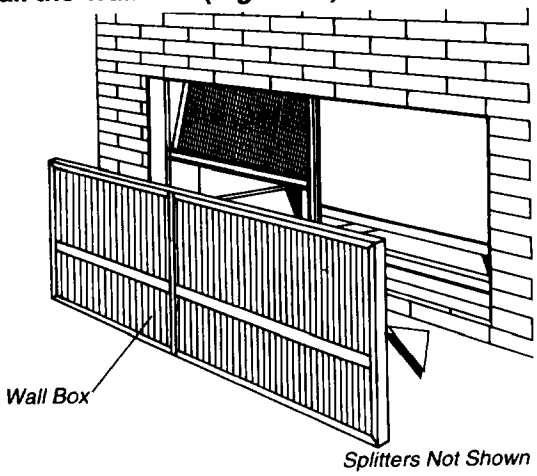


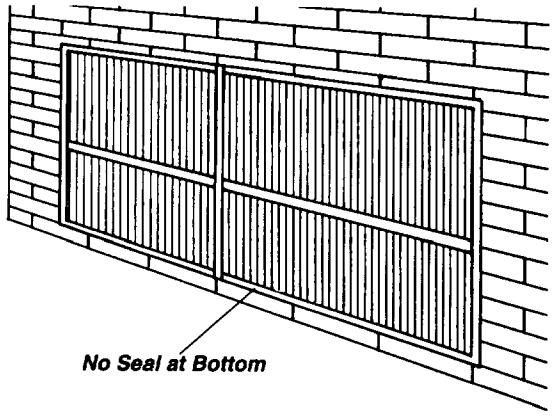
Figure 21
Wall box (Depending on the order of installation, the unit and sleeve shown may not already be in place.)

NOTE: The wall box has several weep holes on the lower front face. Correct installation places the weep holes at the ***bottom*** *of the wall box facing outside.*

5 If the wall box is to be installed before the unit, secure it to the sides and top of the recessed wall opening. For some wall boxes, flanges are provided through which screws can be drilled into the wall surface as needed.

6 Seal the wall box to the wall opening with appropriate caulking material to provide a weathertight fit *(Figure 22)*. Be sure to allow a 3/16-inch gap below the wall box to allow rainwater to drain out. (Note: the wall box manufacturer should provide a standoff at the bottom to maintain the gap.) *Do NOT seal the bottom.*

Figure 22
Wall Box Installed



Install the Wall Sleeve

For non-recessed installations, only the ***bottom*** *of the wall sleeve is used.*

7 Seal the open area along the wall penetration and floor (all sides) to prevent leaks into the building. Add insulation, as required, to openings in brick or block, mortar or other wall surfaces to minimize heat loss (or entry in warm weather).

Install the Horizontal and Vertical Air Splitters (Contractor Fabricate)

The horizontal air splitter creates two direct air flows for the condenser. The lower portion provides discharge air; the upper portion of the wall box allows air to enter the condenser. The vertical air splitter separates the flows from the indoor and outdoor sections.

The air splitters are not furnished by Trane. Each splitter should be individually fabricated for the unit installation. 22- or 24-gage aluminum sheet is easy to form and works quite satisfactorily. The following figures (Figure 23) (Figure 24) shows the preferred structure and arrangement of the splitters.

Figure 23
Vertical Air Splitter Installation (typical)

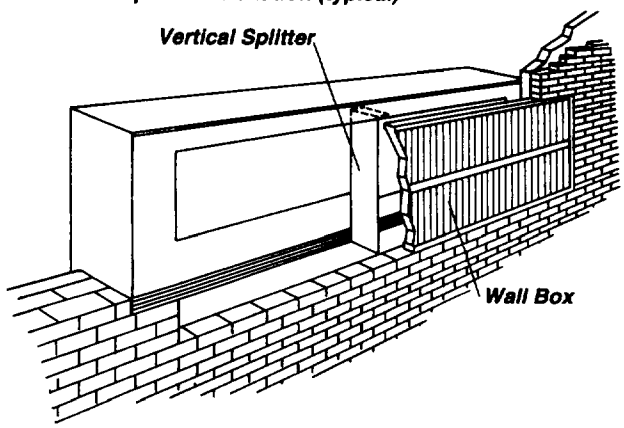
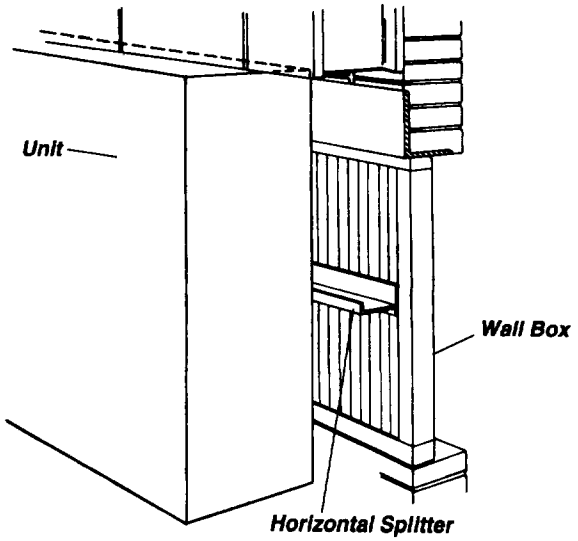


Figure 24
Horizontal Air Splitter Installation (typical)



8 To fabricate the air splitters, measure the depth of the opening between the back edge of the unit and the wall box. Add 3 inches of additional material for mounting flanges on each side.

9 Cut the horizontal air splitter to the length of the unit opening *in the condenser section* and the total depth (with flanges) calculated in the preceding step. The vertical splitter is cut to the vertical height plus mounting flange length.

10 Brake the material along the small depth dimension to create two 1-1/2 inch flanges. One flange should be upward and the other downward.

NOTE: The horizontal air splitter should slope slightly downward away from the unit to allow any water to drain down and out of the wall box. Cutting a few small drain holes for water will prevent any water buildup.

11 Fasten the fabricated horizontal air splitter horizontally to the unit along the line that separates the upper and lower sections (and air flows) as shown. Securing the splitters to the unit with sheet metal or concrete screws is recommended.

12 Change the angle of the air splitter so that the open flange will seal against the wall box. There is no need to fasten the splitter to the wall box.

Install the External Condensate Drain

NOTE: Condensate develops during the air conditioning cycle of Model TACB and the air conditioning, heating, and defrost cycles of Model THPB. During the air conditioning cycle, condensate that forms on the evaporator coil from conditioning humid air falls into a drain pan for disposal. During heating and defrost, condensate from the outdoor coil drains to its drain pan for disposal. The condensate runs through clear flexible and copper tubing along the front of the unit behind the toepiece to a stub on the bottom of the left end pocket.

Condensate drainage to the outside will be visible on the exterior of the building and may violate local codes, especially if the unit is installed on the second floor or higher. If not allowed, a building condensate system (internal) is strongly recommended.

13 Make piping connection at the drain stub provided. To install an external drain, clamp a 7/8" ID hose to the 7/8" OD copper fitting on the drain pan. Route the hose to the building condensate system, if available.

For building without an internal condensate system, use an external drain at the unit. Either route the condensate pipe to a pipe installed through the wall or route this hose to drain onto a water dam (see Step 15). This latter method directs condensate to flow under the wall box to the outside of the building.

NOTE: The hole and the pipe must be lower than the drain pans.

14 Drill a hole at the back of the unit for an external drain, if needed. The hole must be 2-1/2 to 3 inches above the floor and run slightly downward and out.

NOTE: This method requires adequate freeze protection which must be furnished by others.

Fabricate a Water Dam

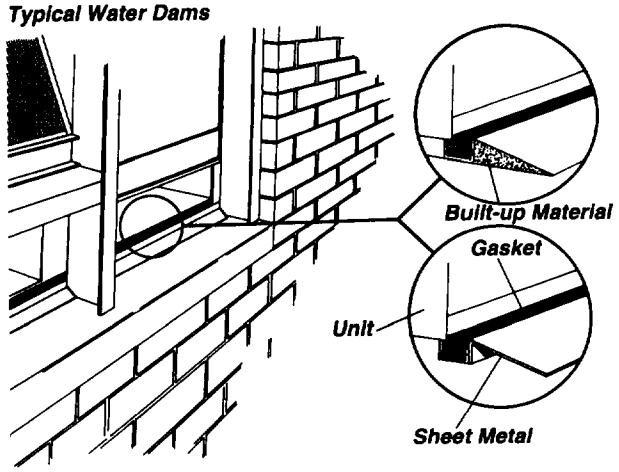
A field-fabricated water dam is recommended for all units. This water dam allows any water that is blown in during rain to drain away from the unit.

15 To fabricate the water dam *(Figure 25)*, build up a nonporous material sloping away from the unit. A second option for water drainage is to cut a piece of corrosion-resistant material (e.g. 22-gage aluminum) to the length of the unit and wide enough to ensure an incline when placed flush against the unit:

Unit Size	*Length*	*Width*
024 & 030	*88"*	*Distance between wall box and unit plus 1"*
036 & 040	*100"*	
44 thru 54	*112"*	

16 If sheet metal is used, it may be necessary to brake the material along the small width dimension to create a single flange. The flange should mate with the bottom edge of the base as shown and end just before the wall box.

Figure 25
Typical Water Dams



Install the Unit

NOTE: The Trane Self-Contained Unit Ventilator is the last major component to be installed in the system. Allow clearance in front of the unit for service access.

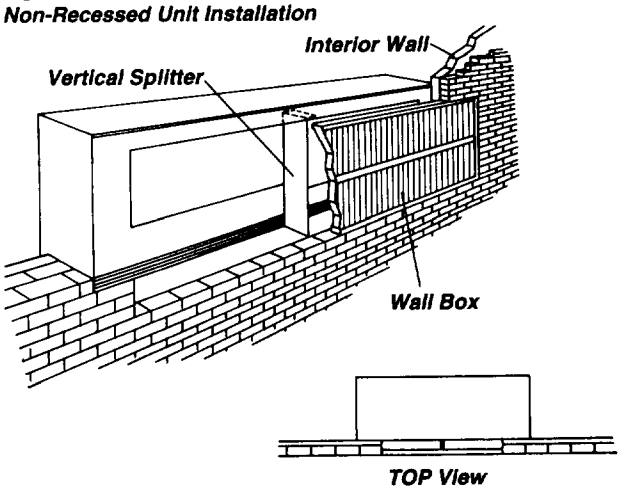
17 Confirm that the wall box and wall sleeve base component has been properly installed with the field-fabricated air splitters *(Figure 26)* and water dam. Check that provisions for condensate drainage are made.

18 Confirm that gasketing is in place on the back of the unit. Apply 3/4 X 3/4-inch gasketing as needed, only if missing.

19 Remove the front cabinet panels from the unit, if not already removed. Lay the panels to the side.

20 Line up the unit with the wall sleeve base and confirm that the unit will slide against the wall opening and onto the base *(Figure 27)*. Check the air splitter and water drain for alignment with the unit.

Figure 26
Non-Recessed Unit Installation



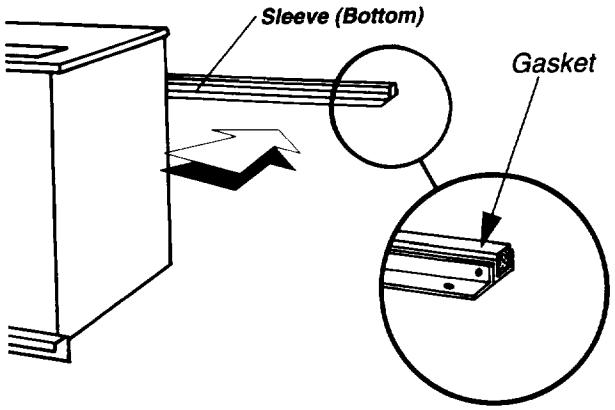
NOTE: The following step can be done after the unit is positioned on the sleeve, if convenient.

21 Complete internal electrical wiring to the disconnect switch. See the section "Make Electrical Connections." Reference the wiring diagram supplied with the unit.

NOTE: The rear of the unit MUST rest on the bottom of the sleeve, compressing the gasket material in the channel, thereby creating a seal.

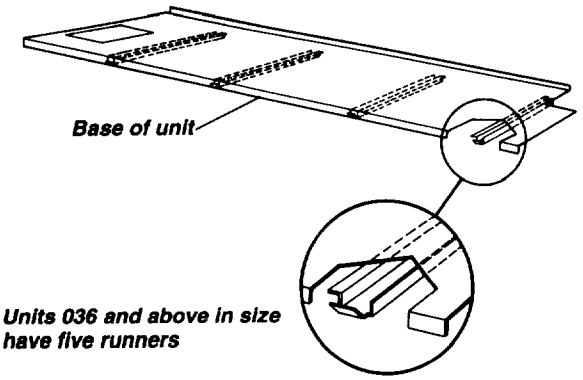
CAUTION:Do not thread the nut on the stud as a means to snug the unit closer to the sleeve. This could damage the cabinet frame.
Use proper lifting techniques to prevent injury when moving the unit.

Figure 27
Detail of Gasket Material In Channel Of Wall Sleeve (Bottom part of Sleeve for Non-recessed Installation Shown)



22 Check that the unit is level on the floor surface. If shimming on the front is needed, place the shims under the outermost runners (plus a middle runner on larger units). The locations of all runners *(Figure 28)* are given in the following table:

Figure 28
Runners



Unit Size	Runner Locations: Distance from the Left Edge of Unit (inches)
024, 030	10, 41, 63, 78-3/4
036, 040	8-1/8, 31-3/8, 53, 75, 90-3/4
044, 048, 054	8-1/8, 31-3/8, 53, 75, 102-3/4

NOTE: The runners are channels attached to the bottom of the unit from back to front. They only extend 2 inches in from the front of the unit. Shims, therefore, must be placed at least 2 inches in from the front for elevation.

23 Secure the unit to the interior wall and trim as needed for an airtight seal and uniform appearance.

24 Secure the unit in place by threading nuts and washers on each 5/16" stud. Finger-tighten.

25 Replace the unit front cabinet panels. Adjust as needed to ensure the front panels are flush with end panels.

26 Continue with the procedure *"Make Piping Connections"* that follows.

Make Piping Connections *(Both Recessed and Non-recessed Unit Installations)*

Water connections are required only when Model TACB is supplied with a hot water heating coil. Hose and/or pipes are available from the factory for making hot water connections.

27 Make the entry connections inside the left end pocket of the unit unless the crossover piping arrangement *(Figure 30)*is used.

28 See *Figure 29* for locations of water connections and the factory-installed ball valves

Figure 29
Hot Water Connection Points

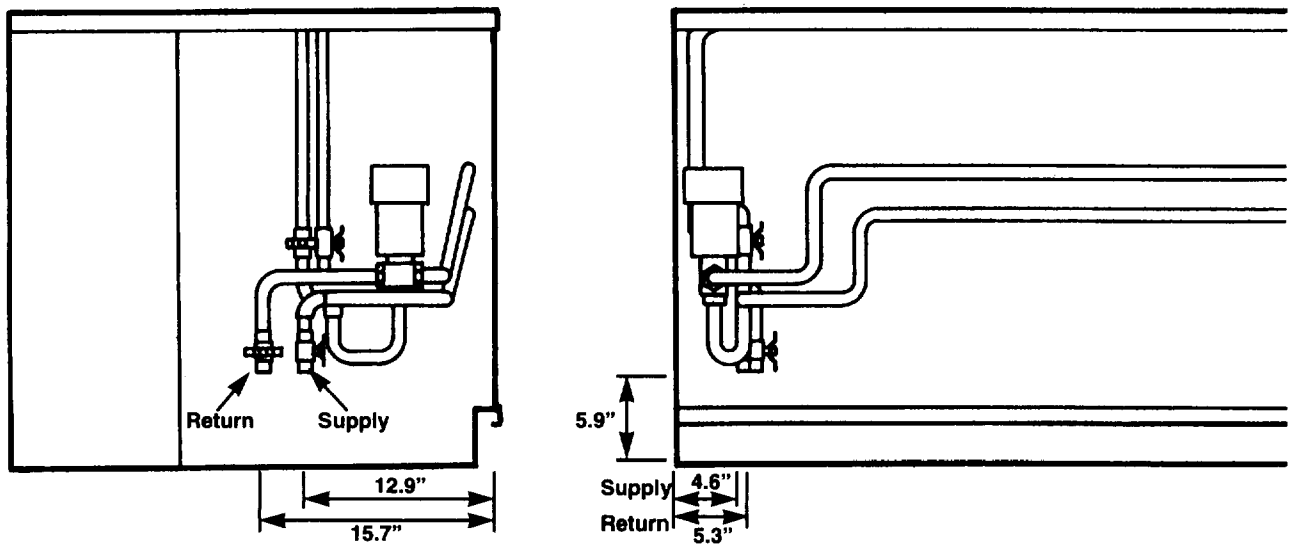
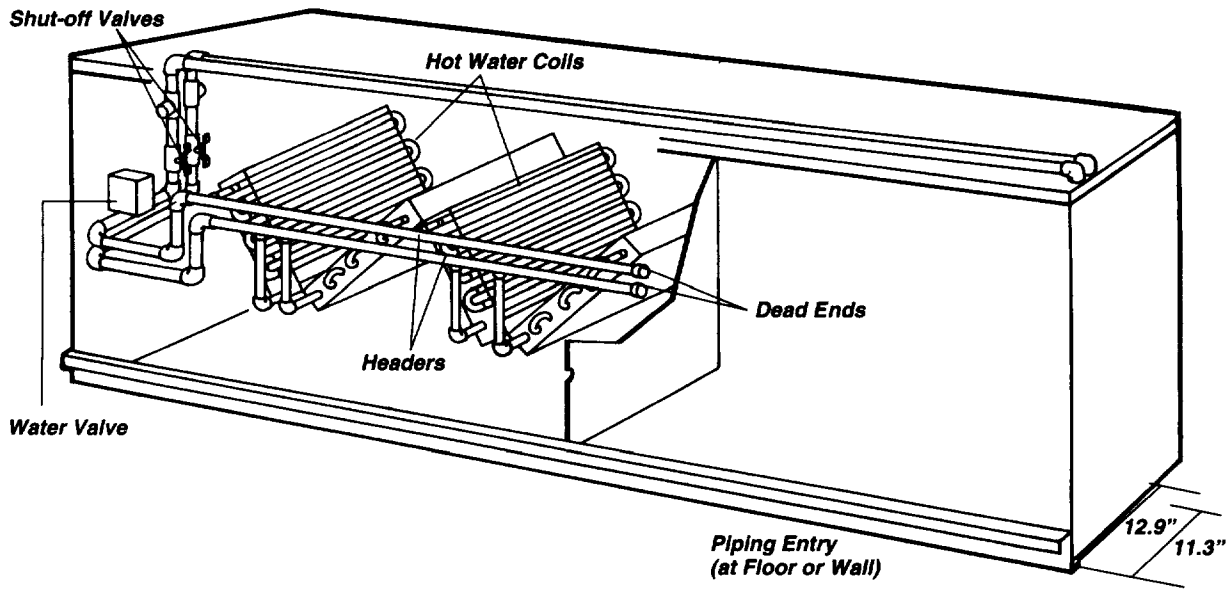


Figure 30
Typical Piping Installation (with optional Crossover Piping)



Make Electrical Connections

A 5-1/2" x 11-1/4" clearance area at the right end pocket of the unit is provided for electrical connections for incoming power at the floor or through the wall.

NOTE: All field wiring should be in accordance with the National Electric Code and applicable local codes.

29 Check the unit nameplate to verify that the rated unit voltage and building power supply match. Refer to the wiring diagram furnished with the unit for details. The diagrams provided in this manual are *typical.*

30 Remove the unit front panel, if not already off, and loosen the four screws on the control panel cover. The panel cover can now be removed, allowing access to the unit's main disconnect switch *(Figure 31).*

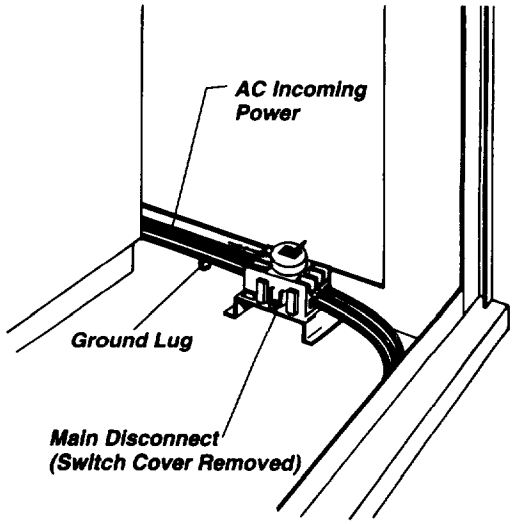
31 Remove the disconnect switch cover by pulling the side tabs out and lifting.

NOTE: Power wires must be run through a conduit plate and have a cord grip attached (by installing contractor).

32 Connect power (two or three wires) to the disconnect switch lugs, in the required locations for proper phasing, and the single ground wire to the ground lug per the wiring diagram supplied with the unit.

33 Check for proper phasing of incoming power. *Unit should not be operated while incorrectly phased.*

Figure 31
AC Power Connection at the Main Disconnect



34 Replace the main disconnect switch cover in the proper position as before (ON position on the far side). If it doesn't fit, the cover may be backward.

CAUTION:Shield the sensor wire from the higher voltage power lines.

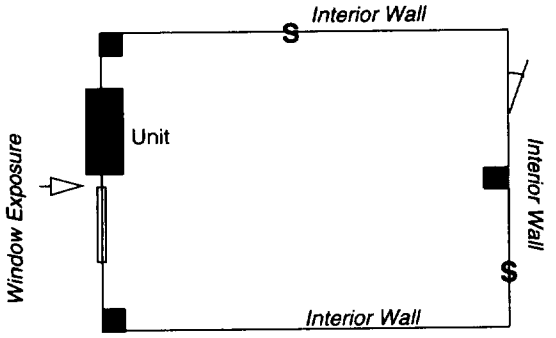
35 If a remote thermostat is required, run this wiring to the terminal block according to the wiring diagram.

36 *For non-recessed Installations*: cover the cutout provided in the unit on the right side for conduit connections to prevent unintentional access.

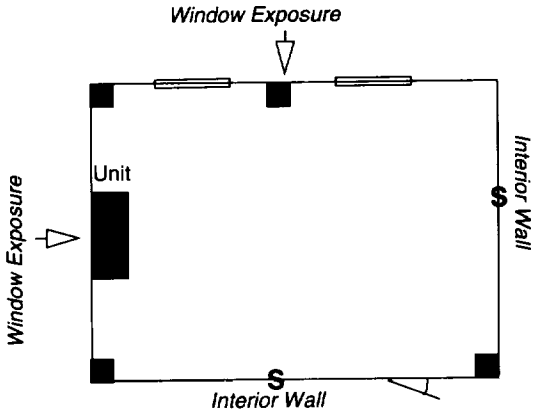
Install the Wall-Mounted Zone Sensor (Optional)

37 Locate the zone sensor in the most critical comfort areas, but not in direct sunlight or in the zone air supply stream *(Figure 32)*. Avoid mounting the sensor near drafts or "dead spots" behind doors or corners, near concealed pipes or chimneys, or on outside walls.

Figure 32
Zone Sensor Locations (Typical)



Avoid drafty areas near doors

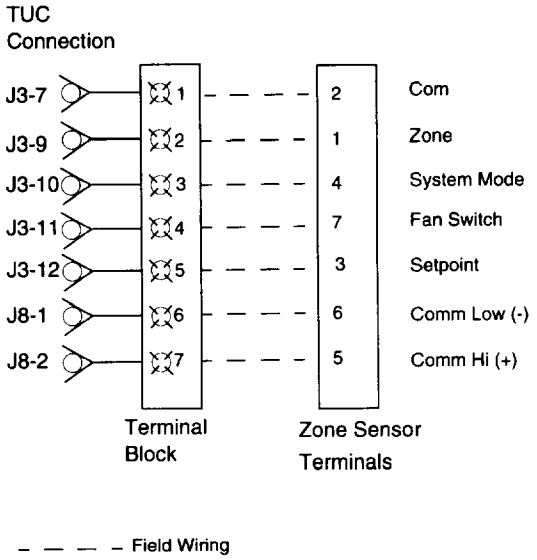


Avoid external walls; avoid dead spots near exposed columns

S = *Suggested sensor location* **Not to Scale**

CAUTION:Do not install zone sensor wires in conduit that contains 24 VAC or other high power wires. Use copper conductors only.

38 Wire the sensor to the terminal board (see wiring diagram) at the unit according to local codes. Use 16-22 AWG, copper twisted shielded pair, no more than 1000 feet long. Connect the shield to the TUC and tape at the other end.



39 Disconnect the return air sensor and setpoint wire at the unit terminal board as shown in the wiring diagram so the external zone sensor can be used.

Install Tracer Building Automation System Link (when used)

NOTE: The TUC can communicate with a Tracer building automation system via a Comm4 communications link. Refer to the ***Tracer Installation Guide*** *for additional information.*

All Tracer communication link wiring is low-voltage Class 2.

1 Check NEC and local codes for compliance requirements.

2 Use Trane wire[1] or equivalent for binary inputs, analog inputs, ICS link, and the unit-to-unit communication link.

NOTE: The maximum wire length from the Tracer to the last TUC in a chain must not exceed 5000 feet.

1. Plenum-rated, 150C, 18 GA, shielded twisted pair. Each conductor is stranded, tinned copper. Capacitance is 23+ picofarads per foot.

3 Daisy-chain shields and ground only at the Tracer to prevent communications failures. Tape the shield at the last TUC in the chain to prevent any connection between the shield and another ground.

4 Refer to the **Tracer Installation Guide** for information on building-to-building communications.

NOTE: Observe polarity on all connections.

5 Connect wires to Terminals1TB4-6 (-) and 1TB4-7 (+) on the terminal block.

6 Connect the shield to the terminal (1TB4-8) of the Tracer or sheet metal ground.

You can view the TUC firmware version from both Tracer™ and EveryWare™ or check the last two digits of the part number on the TUC microprocessor. ***Example:*** *6200-0028-14*

Verify that the TUC address is correctly set using the DIP switches on the TUC service panel. The test input must be momentarily shorted to set the address. Use the table in Appendix B for settings.

Cycling power to the TUC forces the TUC to read the DIP switch settings (Rev 12 TUC or higher).

Perform Operational Checkout

NOTE: This checkout and the checklist following should always be completed by the installing contractor to validate the installation. If the unit is not run in normal operation immediately, the building operator/user should follow the separate Pre-start Checklist provided in the Operation section of this manual.

7 Check the communications wire connections and polarity. Polarity must be observed throughout the TUC link.

8 Verify that the zone sensor (optional) connection is correct.

9 Power up the system. Check the supply voltage from TUC terminal J4-3 to common. Voltage should measure 20 to 28 VAC. For TUC standalone controls, check operation using the TUC LEDs (See Unit Operation section). If the system is configured with the Tracer, go to the Tracer display to check status and perform the TUC setup (Refer to Tracer manual). Troubleshoot the TUC, if necessary. See "TUC Troubleshooting" on page 45.

10 Run the unit through the cooling and heating sequences. See the sequence of operation section in this manual.

11 **If the unit fails to heat or cool, suggesting a compressor problem, check that the compressor is properly wired and running in phase.**

Final Installation Checklist

- ❑ Run the unit for ten minutes. Does the unit run and operate as described in the section covering the operating sequence in response to the room?
- ❑ Are the condenser fan and indoor blower operating correctly, with proper rotation and without unusual noise? The condenser fan operation can be verified by observing the outdoor section from the outside of the building.
- ❑ Is the compressor operating correctly and has the system been checked for proper charge?
- ❑ Have the voltage and running current been checked to determine if they are within the unit specifications?
- ❑ Have the panels been checked for air leaks and condensation?
- ❑ Have the heating air temperature rise and cooling air temperature drop been checked?
- ❑ Has the unit been checked for sheet metal rattles and are there any unusual noises?
- ❑ Are all covers and panels in place and properly fastened?
- ❑ Has the owner or maintenance personnel been given a copy of this manual, warranty, and instructed on proper operating and maintenance?

SEQUENCE OF UNIT OPERATION

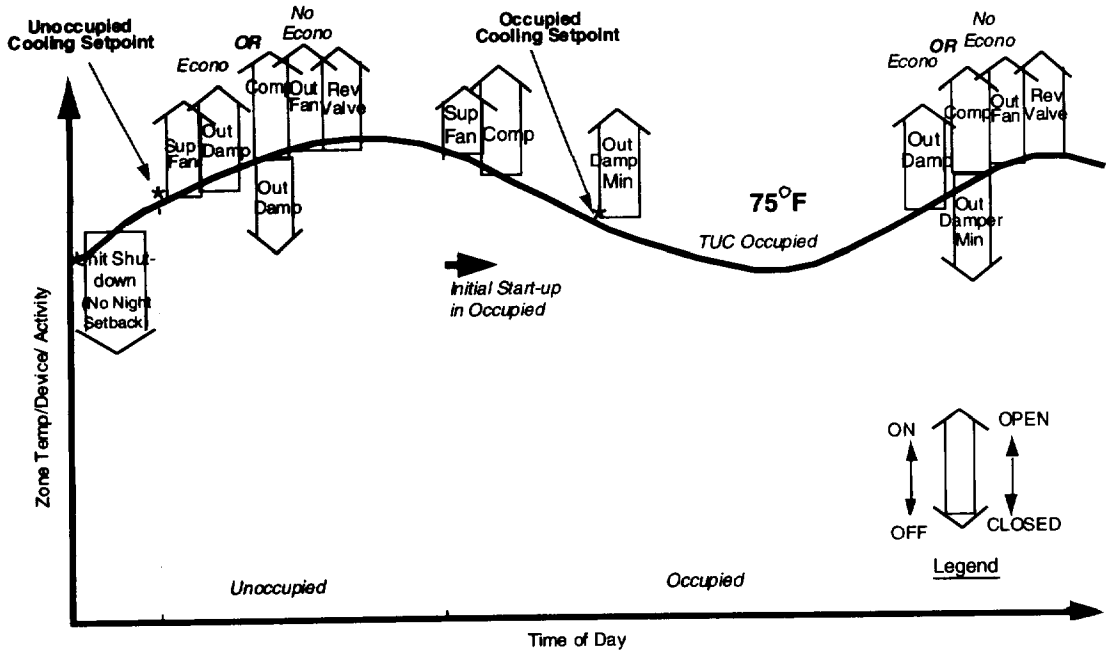
SYSTEM AND UNIT OPERATION

Unit Control

Unit control is provided through a microprocessor-based Terminal Unit Controller (TUC). The TUC provides control of the indoor and outdoor fans, compressor, reversing valve, electric heat, hot water heat, and fresh air/return air dampers to maintain the zone temperature at the zone thermostat temperature setpoints and to maintain the minimum ventilation air requirements.

The TUC operates without fault (cycling output relays) through short momentary power losses of 0.1 second or less. For longer power losses, the TUC resets, the fresh air damper closes using a spring return actuator, and the power-up sequence is initiated. The unit has a variety of devices that control the cooling operation. These devices (fans, dampers, compressor, reversing valve) are activated (or opened) at programmed temperatures or in a particular mode (occupied or unoccupied). The TUC automatically initiates all device activity.

Cooling Operation - Self-contained Unit Vent



The cooling sequence curve or gradient typically illustrates the points along the room temperature curve at which specific devices operate. The curve covers a typical 24-hour period.

The far left of the curve shows the building unoccupied and the unit shut down. In unoccupied mode, as the temperature rises in time to the unoccupied cooling setpoint, certain devices are activated to cool the room to the setpoint. The devices may repeatedly cycle off and on during the unoccupied period.

When the initial start-up in occupied mode begins, the unit is usually called upon to further lower the room to a comfort level accommodating more people, perhaps 75 °F as shown. In this period, cooling is sustained until the occupied cooling setpoint is reached.

In the occupied range on the curve, devices cycle on and off as shown, perhaps many times to maintain the comfort level.

Should the outside air be cool enough to provide "free" ventilation cooling, the economizer mode devices will function as shown. If outside cooling is not sufficient, other devices initiate machine cooling.

Note that the temperature curve is gradual and sometimes the room temperature will exceed or fall below setpoints for a time. This is normal in any environment as conditions require time to stabilize.

Cooling Operation

In the unoccupied mode, when cooling functions are reduced during low-demand periods, the supply fan is indexed off; the outside air damper is modulated closed; the return air damper is open.

While in the unoccupied mode, if the space temperature rises above the programmable unoccupied cooling setpoint, cooling operation is enabled and the supply fan is cycled on.

NOTE: The cooling control is based on zone air temperature. The cooling setpoint is determined by either the operator adjusting the local setpoint (thermostat adjustment knob), by the TUC default, or the TUC reading the Tracer command. See the controls section for details.

Economizer operation, whereby outside air is drawn indoors for free ventilation cooling, is enabled when outdoor air temperature is 10°F (programmable) below the zone temperature. When the outside air temperature is warmer than the space temperature, the outside air damper is closed and the compressor and outdoor fan are energized. Note: compressor cooling is disabled at 50°F.

Transition from Unoccupied to Occupied

When the unit transitions from the unoccupied mode to occupied mode, cooling is initiated. The TUC changes modes based on the Tracer signal, operator changing settings, or according to the hard-wired input to the microprocessor.

During initial cooling, the TUC energizes mechanical cooling and the compressor, outdoor fan, and reversing valve are energized.

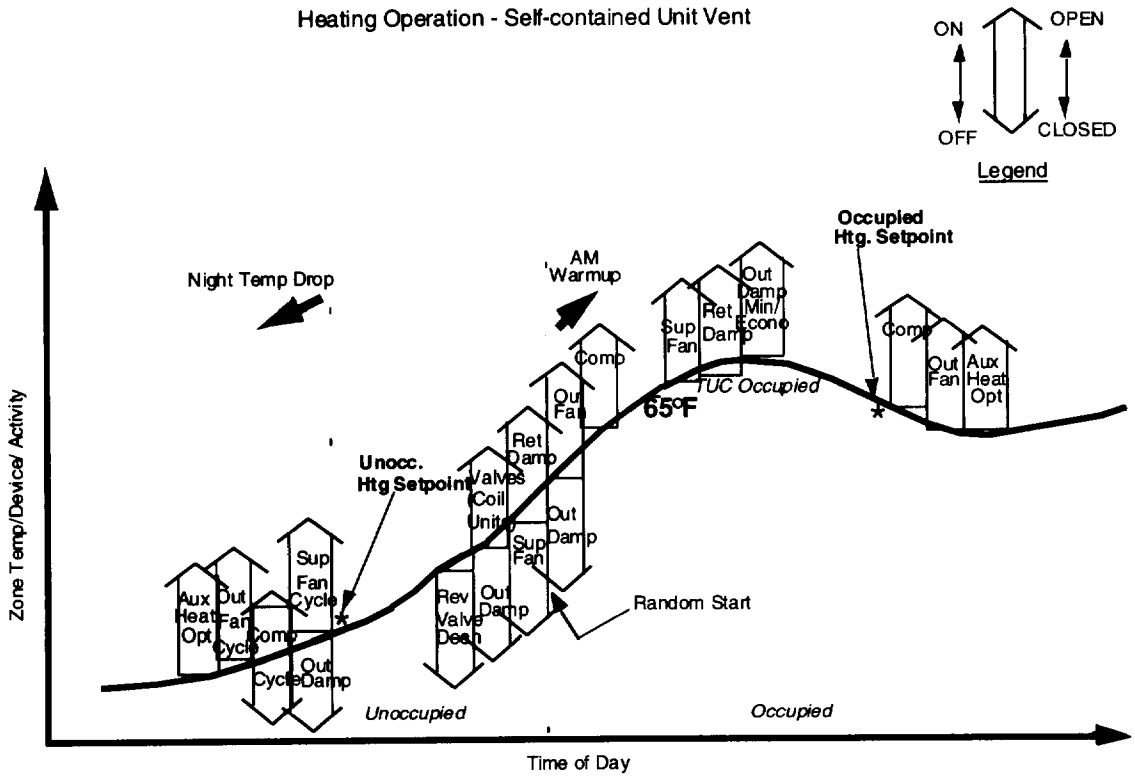
NOTE: The TUC activates the Random Start routine on power-up or when an occupied command from Tracer is received. This function prevents an electrical spike that would occur when energizing several building units at the same time. A random number generator in the TUC software is used to generate a delay from 3 to 32 seconds at each unit.

When the zone temperature is within 2°F of the cooling setpoint, the outside air damper opens to the minimum ventilation position and the TUC begins to operate in the occupied mode to maintain the cooling setpoint.

While in the occupied mode, the supply fan runs continuously. The outside air damper position is at minimum or in the economizer position. The position of the return air damper is opposite that of the outside air damper.

If the space temperature rises above the programmable occupied cooling setpoint, cooling operation is enabled. When the outside air temperature is cooler than the space temperature, the outside air damper is opened. Economizer operation is enabled when outdoor air temperature is 10°F (programmable) below the zone temperature. When the outside air temperature is warmer than the space temperature, the outside air damper again goes to minimum, the optional hot water valve is closed, and the compressor and outdoor fan are energized.

NOTE: The reversing valve only switches when the compressor starts and unit operation is switched from heating to cooling or vice versa.



The heating sequence curve illustrates the points (room temperature or mode) when unit devices operate to maintain heated comfort. The curve covers a typical 24-hour period.

The left of the curve shows the unoccupied mode when the devices noted cycle on or off as the night temperature drops below the unoccupied heating setpoint. Other device activity occurs when the temperature gets too warm for the setting.

The morning warm-up period signals the programmed onset of unit heating to meet occupied zone needs at a comfort level of 65° F shown here.

Looking at the occupied mode zone to the right of the curve shows that devices cycle on and off to maintain the 65° F comfort level. This may happen many times depending on conditions.

Heating Operation

In the unoccupied mode the supply fan is indexed off, the outside air damper is modulated closed and the return air damper is open.

Should the space temperature fall below the unoccupied heating setpoint, the supply fan is cycled on in max. speed, the outside air damper remains closed and the compressor and outdoor fan are energized. For heat pump units, the TUC will cycle the compressor to maintain the unoccupied zone temperature.

NOTE: The heating control is based on zone air temperature and discharge air temperature. The heating setpoint is established as an offset below the cooling setpoint. If not set by the operator locally, the TUC controls the setpoint using Tracer commands, if present or communicating. See the controls section for details.

Transition from Unoccupied to Occupied

When the unit transitions from the unoccupied mode to occupied mode, the unit initiates heating (to the new setpoint level) and random start routines are activated. The TUC changes modes based on the Tracer signal, operator changing settings, or according to the hard-wired input to the microprocessor.

When zone temperature is more than 3°F below the setpoint, a warm-up sequence is initiated. The fan is on continuously, the outside air damper is closed and the compressor and outdoor fan are energized to heating. Hot water is the primary source for the

TACB. When the zone temperature reaches within 2°F of the setpoint (compressor minimum on/off times apply), the outside air damper goes to minimum and the TUC operates in the occupied mode.

Occupied Operation

While in the occupied mode, the supply fan runs continuously. The outside air damper position is at minimum or in the economizer position. The return air damper is at a position opposite to the outside air damper position.

Should the space temperature fall below the programmable occupied heating setpoint, the compressor and outdoor fan are energized. On units equipped with hot water coils, the heating valve would modulate open.

Optional Functions Available Through Tracer

Night Set Back - Allows you to change operating setpoints during unoccupied periods when larger extremes of space temperature can be tolerated to save operating expense. If the zone temperature exceeds either the unoccupied heating or cooling setpoint by the allowable deadband for that setpoint, the unit will attempt to satisfy the unoccupied conditions as quickly as possible.

Night Shut Down - In the shutdown mode, the unit is turned off and all heating and cooling functions are disabled. The outside air damper is closed.

TUC Interface to Non-Trane Building Automation System

A pair of field-accessible terminals is provided to interface the TUC to a non-communicating building automation system. When a connection across these terminals is made the desired condition occurs until the connection is broken.

Occupied/Unoccupied - Night setback for unoccupied operation occurs when the connection between the terminals is closed. When the connection is open, unit occupied operation is restored. Any malfunction that requires manual reset is not affected by this input. Manual reset of the malfunction is still required.

Component Operation

Table 6
Component Operation - Heat Pump Unit

Component	Cooling		Heating		
	Unoccupied	Occupied	Unoccupied	Occupied	Notes
Supply Air Fan	Cycles	Operates continuously at selected speed (MAX or NORM)	Fan shutdown is delayed if leaving air temp. is above 85° for a max. of 90 sec.	Operates continuously at selected speed (MAX or NORM).	Starts in max speed for approx. 3 seconds
Compressor	TUC control logic cycles the compressor in cooling as called for by the zone sensor.		TUC control logic cycles the compressor in heating as called for by the zone sensor.		One-minute minimum on and off time delay periods apply to the compressor during normal operation, except at power up. Safety devices override the time delay. When the supply fan is shut down due to a thermal overload condition, the compressor is permitted to run. Other safety devices are designed to take the compressor off line.
Reversing Valve	Energized	Remains energized after a cooling cycle until either a heating cycle is initiated or the system switch is moved to OFF	De-energized	Stays de-energized until a cooling cycle is initiated	Valve is de-energized in the OFF mode

Table 7
Component Operation - Air Conditioning Unit

Component	Cooling		Heating		
	Unoccupied	Occupied	Unoccupied	Occupied	Notes
Supply Air Fan	Cycles	Operates continuously at selected speed (max or normal)	Cycles	Operates continuously at selected speed (max or normal)	Starts in max speed for approx. 3 seconds
Compressor	TUC control logic cycles the compressor in cooling as called for by the zone sensor.		TUC control logic modulates the hot water valve.		One-minute minimum on and off time delay periods apply to the compressor during normal operation, except at power up. Safety devices override the time delay. When the supply fan is shut down due to a thermal overload condition, the compressor is permitted to run. Other safety devices are designed to take the compressor off line.

Other Operation Features

NOTE: The transition from heat to cool is based on the measure of demand for heating and cooling in the zone and is also based on the time between setpoint change.

Air Side Economizer Mode - available for free ventilation cooling with outside air. On power-up, the damper calibrates itself, driving open for 15 seconds and driving closed for 90 seconds. The economizer is enabled when the unit is in the occupied mode and the outside air temperature is 10°F (programmable) below the zone temperature. During economizer operation, the outside air damper modulates between its minimum position and fully open position, based on return air temperature, to maintain space temperature to 0.5°F cooler than the space setpoint. If the TUC is disabled for economizer operation, outdoor air temperature is less than 10°F below the zone temperature, or the unit is in the heating mode, the outside air damper adjusts to its minimum position (0-50% of actuator stroke).

NOTE: If the space sensor fails, the TUC is in the unoccupied mode, the supply fan is off due to a safety trip-out, or unit power is lost, the outside air damper closes fully using spring return.

Modulating Hot Water/Staged Electric Heat - On a call for heat by the zone sensor, the TUC energizes the heating contact to power the electric heat elements. On a call for cooling, the TUC de-energizes the contactor to remove power from the electric heat elements. Low capacity electric heat, on 24 and 30 MBH units, has one stage of capacity. Medium and High heat provide two stages of electric heat according to the following table.

Hot water heat is modulating and powered by the TUC..

	Total Electric Heat Provided	
Fan Speed	*Electric Only*	*Electric with Compressor*
NORM	*1/2*	*1/4*
MAX	*full*	*1/2*

Evaporator Defrost -prevents frosting of the indoor coil during the cooling mode. The system will enter an evaporator defrost cycle if the coil temperature drops below 24°F. The defrost cycle consists of shutting off the compressor and outdoor fan until the coil temperature rises above 45°F.

Water Coil Low Temperature Protection - A coil freeze sensor capillary tube is routed across the indoor hot water coil. If this sensor detects a temperature less than 36°F on the leaving air side of the coil, it will start opening the water valve until the switch resets. When the switch resets, the valve will be closed again. If the freeze switch is open for more than five minutes, unit operation will be locked out, requiring manual reset.

Outdoor Coil Defrost - prevents frosting of the outdoor coil during the heating mode. The first defrost is not allowed until the TUC automatically initiates an outdoor coil defrost cycle, if needed (and only after the compressor has accumulated 30 minutes of run time after power up). During the defrost cycle the reversing valve is energized; the compressor remains on; the outdoor fan motor is turned off; and the auxiliary electric heat elements are energized. Based on the temperature difference between outdoor ambient temperature and outdoor coil temperature, the TUC initiates further defrost cycles. This occurs only when the outdoor air temperature is below 52°F and the coil temperature is below 33°F.

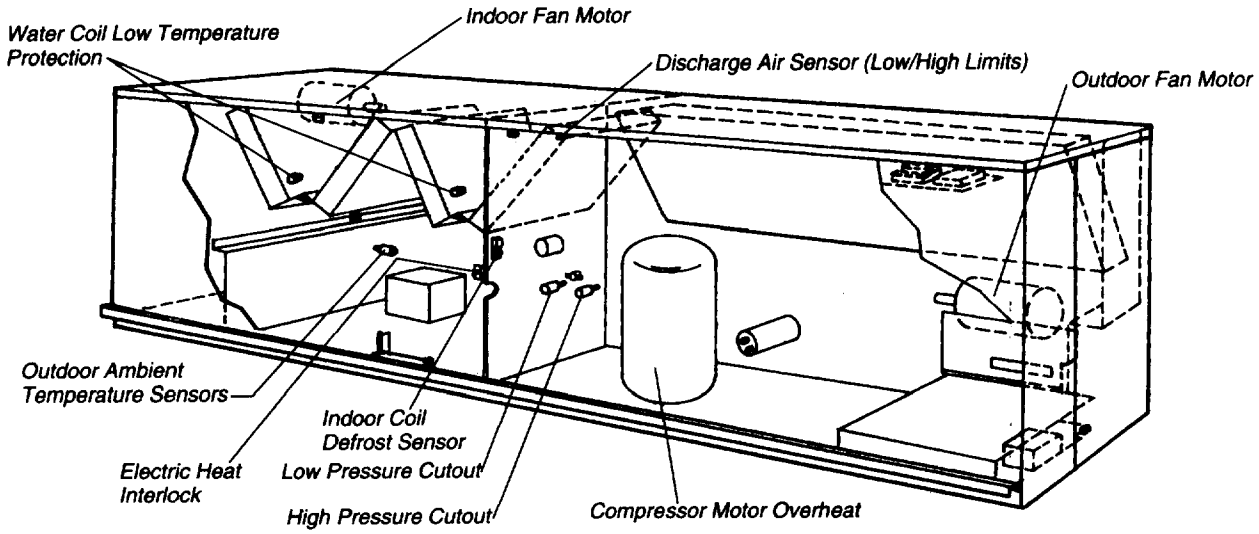
The defrost cycle ends when a preset temperature range for the outdoor coil is reached.

ASHRAE Economizer Cycle II Operation - The basic requirement to be met is the use of outdoor air for cooling, the use of a minimum outdoor air flow for ventilation during heating, and reduced outdoor air flow to assist heating recovery to the setpoint. The ability to close the outdoor air damper when the zone temperature is well below the setpoint is configurable. In the heating mode, when the zone temperature drops 3°F below the zone heating setpoint, the outside air damper will go to the closed position. When the zone temperature is between 2°F below zone setpoint and zone setpoint the outside air damper will go to minimum position. When the zone temperature goes above the setpoint, the outside air damper will modulate open.

If ASHRAE Cycle II is enabled (occupied preheat damper position closed), the outdoor air damper remains closed during the transition from unoccupied to occupied until the zone temperature is within 2°F of the heating setpoint. If the zone temperature falls 3°F or more below the heating setpoint during the occupied mode, the TUC reinitiates ASHRAE Cycle II until the zone temperature is within 2°F of the heating setpoint

Control Features

Figure 33
Unit Control Features



The following are both standard and optional unit control features:

Table 8
Unit Control Features

Condition(Rephrase)	Action	Notes
Discharge Air Low Limit	Sensor prevents discharge air temperature from falling below a 35°F limit.	*Cooling operation*
Discharge Air High Limit	High temperature thermostat prevents discharge air temp from rising above a 195°F limit. Shuts down electric heat operation.	*Heating operation*
Zone Sensor Failure	Zone sensor failure is an alarm condition. When a discharge air sensor is installed, Tracer changes to discharge air temperature control. Otherwise a unit shutdown occurs	*Only with Tracer*
Compressor Cycle Limit (Standard)	Minimum 1 minute on/off cycles maintain oil return for compressor reliability.	
Low Pressure Cutout (Standard)	Low refrigerant pressure is detected by a normally closed pressure switch wired in series with the compressor contactor coil. The switch opens at 7 psig (±5 psig) and signals to the TUC to lock out the compressor. The low pressure switch resets at 32 psig (±5 psig)	This pressure cutout provides loss-of-charge machine protection.
High Pressure Cutout	High refrigerant pressure is detected by a normally closed pressure switch in the compressor discharge that is wired in series with the compressor contactor coil. The switch opens at 430 psig (±7 psig) and loss of current is detected by the TUC. The TUC locks out compressor and outdoor fan operation, requiring manual reset. The high pressure switch will reset at 260 psig (±20 psig). The TUC must be manually reset by cycling 24V power or putting the thermostat switch in the FAN ONLY position.	*To cycle 24V power, turn the unit off and on*
Fan Motor (indoor and outdoor)	Internal thermal overload protection cuts out motor	*Automatic reset*
Compressor Motor Overheating	Internal thermal overload protection cuts out motor	*Automatic reset*
Compressor Crankcase Heater	On when compressor is not running	*Only on 044-054 3-phase units*
DX Cooling Outdoor Air Low Limit.	Air conditioner and heat pump compressor cooling is disabled when outdoor temperature drops below 50°F. Compressor cooling is enabled when temperature rises at least 4 degrees above.	*Automatic reset*

Table 8
Unit Control Features

Condition(Rephrase)	Action	Notes
High Discharge Pressure	Fan speed is switched from normal to maximum when the discharge pressure exceeds 390 psig	*Automatic reset*
Water Coil Low Temperature Protection	For units with hot water coils, if the freeze switch is open for more than 5 minutes, unit operation will be locked out requiring manual reset	*Sensor has capillary tube routed on the surface of the discharge side of the hot water coils.*
Low Ambient Limit	Low outdoor temperature (below 50°F for cooling and below 15°F for heating) will shut down the compressor in the cooling and/or heating modes	*Heat pump only*
Electric Heat Interlock	Locks out electric heat operation when left front cabinet panel is removed.	*Heat pump only*

Zone Temperature - Unit Mounted Operator Interface

All units have a factory-installed unit-mounted thermostat wired to a return air temperature sensor. Operator interface includes a system switch, fan switch, and temperature setpoint adjustment dial. The system and fan switches and temperature adjustment are located beneath a hinged cover on the top right hand side of the unit.

Unit Control System Interface

Occupied/Unoccupied - A pair of field-accessible terminals is provided that will cause unit standby (unoccupied) when the connection between them is closed. When the connection is opened, unit occupied operation will be restored.

Manual reset is not affected by this input.

Table 9
Relationship between Outdoor Air Temperature Sensors and Damper Position

	Modulating Outdoor Air Damper	
Condition	Occupied	Unoccupied
No outdoor air temperature sensed (sensor failure)	*Open to minimum position*	*Closed*
Outdoor air temperature sensed and economizing feasible	*Economizing*	*Open and economizing during unit operation – otherwise closed*
Outdoor air temperature sensed and economizing not feasible	*Open to minimum position*	*Closed*

Zone Temperature Setpoint

The cooling and heating control is based on zone air temperature. The unit mounted operator interface has one cooling temperature setpoint adjustment. The heating setpoint is established as an offset (2°F) from the cooling setpoint. The thermostat setpoints can be adjusted from 50 to 90°F for both heating and cooling while the unit is running.

The unit external-mounted adjustment determines the setpoint if the TUC is configured in the "Local Mode" in Tracer. If the TUC is configured in the "Remote Mode" or if the local setpoint adjustment fails, the TUC will use the Tracer downloaded setpoint as the space setpoint. If the Tracer is not communicating, the TUC defaults to memory or local setpoints.

Timed Override

NOTE: The Timed Override Cancel/On buttons are present on all units. They will only work if the time clock or Tracer are used to control unoccupied operation.

The zone sensor has the Timed Override (TOV) ON/CANCEL push-button feature. The ON push-button indexes the unit into an occupied mode when the unit is in the unoccupied mode. When the "ON" button is momentarily depressed, its activates the TOV signal for two minutes (for communication to Tracer), then sets occupied operation for the timed override period (usually two hours). Minimum compressor run times are observed. Depressing the button does not affect the zone temperature reported by the TUC.

When the CANCEL button is pressed, the override is cancelled and the unit will operate in unoccupied mode.

UNIT OPERATION

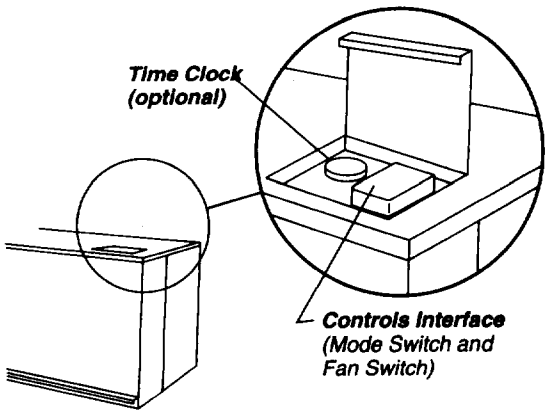
Pre-Start Check List

NOTE: These checks are made by the building operator or user before running the unit after a considerable time has passed since the unit was installed and checked by the installing contractor.

- ❑ Is the unit properly located and level with proper clearance for controls and service access?
- ❑ Are filters of the correct size and number, clean and in place?
- ❑ With the front access panels removed, do components, piping, and wiring appear to be in place and not leaking or damaged?
- ❑ Is the thermostat (wall sensor) in a good location?
- ❑ Has all installation work been done in accordance with applicable local and national codes?
- ❑ Replace all covers and access panels to prevent air loss and safety hazards?

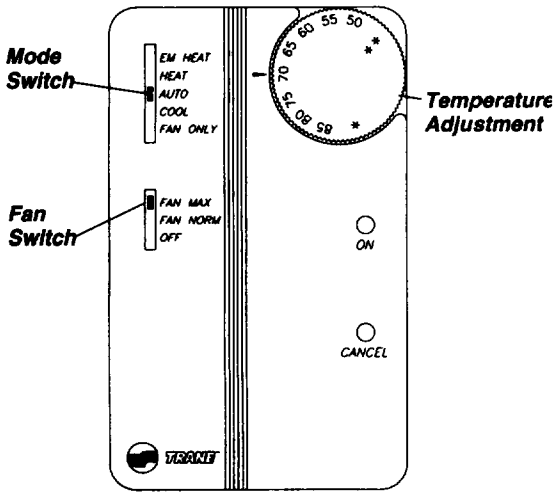
Unit Controls

Figure 34
Unit Controls (Control Interface and Time Clock)



The unit controls interface, if provided by Trane, are located behind the access door on the top right of the unit. They include a five-position mode switch (four for AC units) and a three-position fan switch along with an external temperature adjustment dial. A wall-mounted sensor may be provided and may have an internal or external temperature adjustment *(Figure 35)*.The unit and wall-mounted controls may be equipped with two slide switches described in Table 10. The time clock is an optional feature.

Figure 35
Interface Controls



Set the mode switch—to control the mode and the fan speed—for either heating or cooling. The outdoor fan runs only depending on the requirements for heating or cooling; the indoor fan runs continuously.

NOTE: If a wall-mounted sensor is provided, it must be correctly field-wired and the unit sensor disconnected to use the external adjustment. See the Installation section of this manual and the wiring diagram with the unit.

When the zone sensor is provided, it also will have two push-buttons to override the unoccupied setpoints.

Table 10
Unit Controls

	System Switch
EM HEAT *(For heat pump units only)*	*Directs the compressor off during a request for heating and enables electric heat control only.*
HEAT	*The compressor and outdoor fan are energized based on the need for heating. Units equipped with hot water coils will modulate the hot water valve based on the need for heating.*
AUTO	*The indoor fan runs continuously, at the speed established by the fan switch. Normal cooling, heating and economizer functions are enabled. The compressor and outdoor fan are turned on based on the need for cooling (and the reversing valve energized) or the need for heating (and the reversing valve de-energized). The outdoor air dampers are at minimum position or, depending upon outdoor conditions, may be opened further to provide free ventilation cooling. All TUC lockouts are manually reset whenever the System switch is set to the FAN ONLY position or when power is restored to the unit.*
COOL	*The compressor and outdoor fan are energized based on the need for cooling.*
FAN ONLY	*When the switch is in the FAN ONLY position, all normal economizer, cooling and heating functions are disabled. All outputs are set to their de-energized state. Outdoor air damper is closed. The supply fan runs.*
	Fan Switch
MAX *(Maximum)*	*Directs that the fan run at the high speed setting when the fan is called to operate. This setting is usually used at start-up, for a short time, for rapid cooling and ventilation. The switch can then be turned back to NORM.*
NORM *(Normal)*	*Directs that the fan run at the normal speed setting when the fan is called to operate. The fan will start at maximum speed, regardless of fan switch setting when the cooling or heat is initiated and then run at normal speed if the switch is turned to NORM.*
OFF	*Turns the fan off and disables the unit*
	Pushbutton Switches (On Zone Sensor)
ON *(Night Setback Override ON)*	*When pressed, the TUC activates the timed override ((TOV) signal for two minutes, clears the CANCEL signal (if set), and starts a two-hour override timer. This is used after the programmed cooling/heating settings have been overridden.*
CANCEL	*When pressed for at least one second, clears the override (ON) signal and sets the timed override timer to zero. This is used to manually cancel the programmed cooling/heating time clock settings.*
	Temperature (Setpoint) Adjustment
Dial Indicator (50 to 90°F)	*Allows manual setting of the cooling and heating setpoints (The heating setpoint is automatically set to be two degrees below the dial setting. The setpoint can be adjusted from (50 to 90°F) while the unit is running.*

Setting the Time Clock

The time clock **must be programmed** for the unit to operate in occupied mode (under load). *If not programmed, the unit will run in the unoccupied mode.* Power must be supplied to the unit for the time clock to be set.

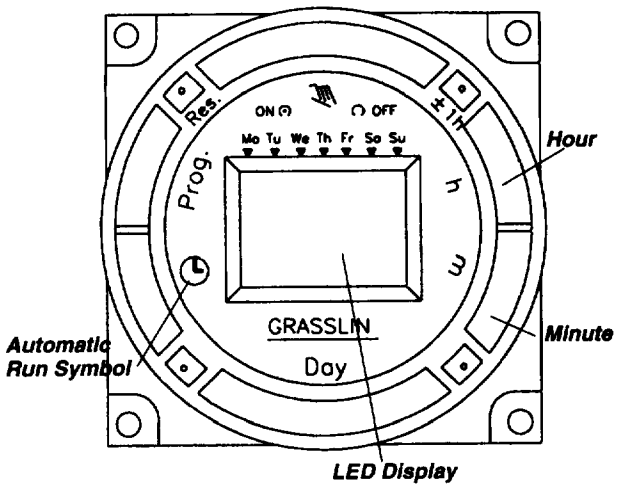
The following procedure covers:

- ❑ setting the current time and day
- ❑ setting the program (events)
- ❑ reviewing and changing the programs, and
- ❑ overriding programs (manually).

Set the Time and Day

The time clock *(Figure 36)* is located behind the access door on the top right of the unit.

Figure 36
Time Clock



1 Press **Res.** (Reset) to clear the display and any program data. The "day" numbers (1-7) will blink.

2 Hold **h** (Hour) in and toggle **±1h** to select military or a.m./p.m. mode. If a.m/p.m. is elected, **AM** appears in the display. Release **h**.

3 Press and hold ◷ (Run). If daylight savings time is in effect, **±1h** should appear in the display. If not, press **±1h** to clear.

4 Still holding ◷ down, set the current hour and minutes by pressing **h** and **m** respectively. Then set the day with the **Day** key using the number corresponding to the day of the week (1 is Monday, 7 is Sunday).

5 Release ◷ and the colon ":" in the display will begin flashing.

Set the Program

Determine in advance how you want the unit to operate.

For normal occupied operation, the unit "load" is set ON, whether in heating or cooling. This means the unit will respond differently to changing conditions and maintain a higher comfort level.

For unoccupied operation or "no load" conditions, a lower comfort level is provided. The load can be switched off by using the program for periods when the room will be unoccupied.

Note: If the room will be unoccupied, the time clock should be programmed accordingly to conserve energy. The position of the outside damper can allow too much outside air in an unoccupied space if the unit's time clock is set for "load" or occupied mode and can result in unnecessary unit cycling and undesirable heat transfer.

Remember that the program is easily changed and can also be overridden after it is initially set.

1 Press the **Prog.** key. Spaces or fields for entering time (hours and minutes) appear as dashes separated by a colon.

2 Press **Prog.** again. The number of free (available) programs is given in this case to be "**Fr20**" or 20.

3 Press **Prog.** again to return to the event time mode.

4 Enter the time for the first program event.
*For example, should you want the unit to operate under load for an occupied period at 8:00 a.m., enter "**08:00**" **AM** on the display using the **h** and **m** keys. Better yet, enter the time a half hour or so before the arrival of people, so the unit will bring the room up (or down" to the preset occupied temperature setpoints).*

5 Toggle the "Load" key on (◉ 1or off (O) to link the time with the action.
In the example from the preceding step, you would set the load ON.

6 If the program event you just entered will be the same every day (as indicated by *all* seven day numbers at the top of the display) you can press **Prog.** to lock in that event and go to the next event. If not and the program will vary during the week (e.g. different program for the weekend), don't press **Prog.** go to the following step.

Note: If you press Prog. by mistake, simply continue to press Prog. until the event comes up in review and make the change.

7 With the time and hour for the event set, select the day or days for which the event applies by pressing the **Day** key. Toggling the **Day** key gives you ten options for individual days or combinations that can be applied. Select one and lock it in by pressing **Prog.**

In the example, if you only want the unit to operate under load for the time set for weekdays, you would select "1 2 3 4 5" by pressing **Day**, then select another program event for the weekend.

8 Repeat the preceding steps to set the next program event. A "load: event is followed by an "unload" event. *For example if the unit is programmed for a load condition in the morning,*

you could program the unit to unload later in the day or at night when the room will become unoccupied for a period. If the occupied and unoccupied periods vary widely but predictably, you can program a cycle of events during any day or combination of days (up to 20 events)

Note: If only one event is programmed, the unit will remain in that load or unload condition all the time.

9 When all the events are programmed, press the ◷ (run) key for normal operation. The current time as set will be displayed, along with the run symbol (◷).

Review and Change Programs

To review a program and events at any time, press **Prog**. at any time. Programs events will be displayed in the sequence they were entered with repeated presses of **Prog**.

To change a program, select the event as in the previous paragraph and alter the new data (day, hour minute) as desired to overwrite the old program. Press **Prog** to store the data.

To delete a program event, select the event again and press **h** and **m** until dashes appear in the time display. Press either **Prog**. or ◷ until the dashes flash in the display.

To reset all program data, press **Res**.

Override Program (Manual Operation)

While in the Run mode (◷ symbol in display), press the hand key to reverse the load status (e.g. if the load was ON, it is now OFF). A hand symbol appears to indicate the override is active.

At the next scheduled event, automatic (program) control will resume eliminating the override.

To switch the load *permanently ON*, press the key a second time. **[◉]** appears in the display.

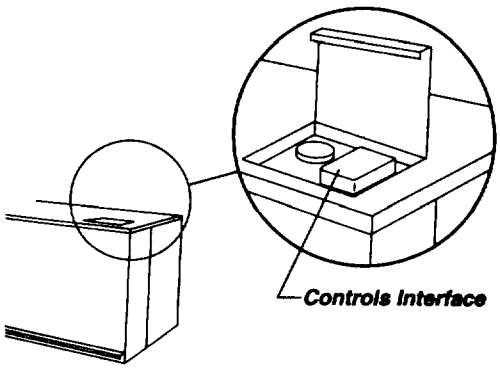
To switch the load *permanently OFF*, press the key a third time. **[O]** appears in the display.

To return to automatic (programmed) operation, press the key a fourth time. Run ◷ appears in the display.

NOTE: The Main Power Disconnect switch is located on the lower right side of the unit behind the right front cabinet panel. It is only used to remove power to the unit for servicing.

Operation

Figure 37
Operation Controls



Starting the Unit in the Heating Mode

Note: See section on "Operating Sequence" for a description of heating operating sequence.

1 Check to make sure all grilles are clear and all cabinet panels are in place before start-up.

NOTE: Do not set the dial to "" or "**." This will cause a setpoint failure and default to TUC values.*

2 Set unit or wall thermostat *(Figure 37)* to a relatively high temperatures setting; place the system switch in "Auto" or "Heat" position.

3 Adjust the thermostat setting to a comfort level after the room warms.

Starting the Unit in the Cooling Mode

Note: *See section on "Sequence of Operation" for a description of cooling operating sequence.*

NOTE: Do not set the dial to "" or "**." This will cause a setpoint failure and default to TUC values.*

1 Set the system switch to "Auto" or "Cool" position and move the thermostat to a setting below current room temperature. The condenser fan motor, compressor and evaporator fan motor will operate automatically.

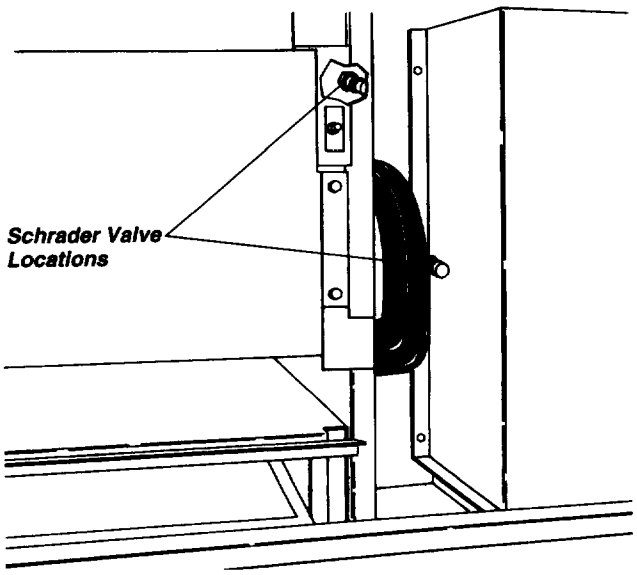
2 Adjust the thermostat setting to a comfort level after the room cools.

Checking Operating Pressures (ONLY if unit fails to heat or cool)

NOTE: Operating pressure is not routinely checked since some loss of refrigerant always results

Install pressure gauges on the gauge ports of the discharge and suction line valves *(Figure 38)* to check the suction and discharge pressures.

Figure 38
Pressure Check Points



Checking Voltage

With the compressor running, check the line voltage at the unit. The voltage should be within the range shown on the unit nameplate. If low voltage is encountered, check the size and length of the supply line from the main disconnect to the unit. The line may be undersized for the length of the run.

Cooling Shut Down

1 Place system selector in FAN ONLY position or reset the thermostat at a point above room temperature.

NOTE: Do not turn power OFF at the main power disconnect switch except when servicing the unit is required.

Economizer Operation

Note: *See the sequence of operation section for a description of the economizer operation.*

Economizer operation is controlled by the TUC and requires no operator action.

Checking Operation Using TUC LEDs

The seven LEDs (Figure 39)indicate the mode of operation and/or status (Table 11) and the eight DIP switches are used to set the TUC address. The test input and DIP switches are used to run diagnostics.

WARNING

Make sure the high voltage control panel cover is in place. Contact with high voltage can cause personal injury or death.

1 Remove the right front panel to the unit for access to the service interface panel on the TUC board.

Figure 39
Service LEDs

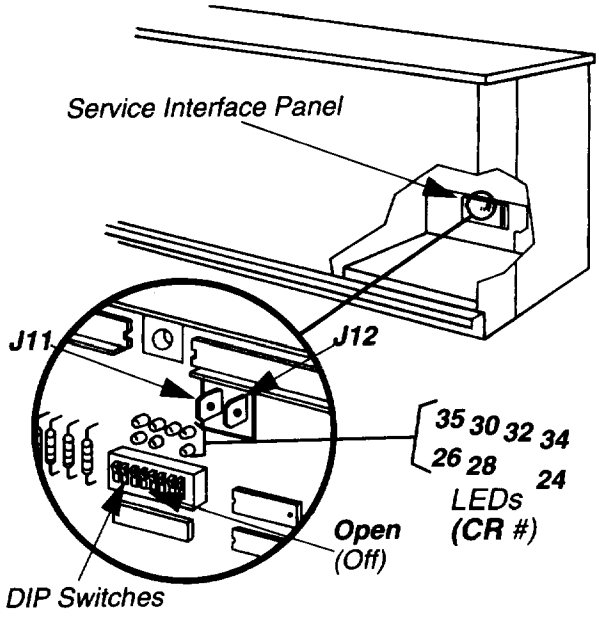


Table 11
Service Interface Panel LEDs

LED	Condition	Status
CR35 (SYS)	Always ON	
CR30 (HEAT)	Steady On	Heat Mode
	Blinking	Diagnostic present. This shows that the unit was in heating mode during the diagnostic
CR32 (COOL)	Steady ON	Cool mode
	Blinking	Diagnostic present. This shows that the unit was in cooling mode during the diagnostic
CR24 (COMM)	Steady OFF	No ICS connection or no communication link activity.
	Steady ON	Incorrect wiring to the ICS link. This may be due to incorrect polarity from EveryWare or on link.
	Slow blink	The TUC recognizes ICS communications link. Slow blink is 0.5 seconds on and 1.5 seconds off.
	Rapid blink	Active communication with Tracer or Everyware. Rapid blink is 0.2 second on and 0.2 second off.
CR26	Steady ON	On when a high pressure cutout, low pressure cutout, or freezestat diagnostic is present.
	Blinking	Diagnostic has been reset from Tracer, EveryWare, or manually from the mounted thermostat. This is also known as the last diagnostic when the LED is blinking.

2 Check out the zone sensor to determine if an erroneous temperature is being reported to the TUC. Use the following table *(Table 12)* to verify the integrity of the sensor thumbwheel. Use an ohmmeter to measure thumbwheel resistance at terminals 2 and 3 on the zone sensor. Also measure sensor resistance at terminals 1 and 2 on the zone sensor. "Values" listed in the table may vary ±1%.

Table 12
Acceptable Zone Sensor Resistance Values

Space (Room) Temperature (°F)	Temperature (°C)	Thumbwheel Resistance (ohms)	Sensor Resistance (Ohms)
55	12.8	792	17.0
56	13.3	772	16.5
57	13.9	753	16.1
58	14.4	733	15.7
59	15.0	714	15.4
60	15.6	694	15.0
61	16.1	675	14.6
62	16.7	656	14.3
63	17.2	636	14.0
64	17.8	617	13.6
65	18.3	597	13.3
66	18.9	578	13.0
67	19.4	558	12.6
68	20.0	539	12.3
69	20.6	519	12.1
70	21.1	500	11.8
71	21.7	481	11.5

Table 12
Acceptable Zone Sensor Resistance Values

Space (Room) Temperature (°F)	Temperature (°C)	Thumbwheel Resistance (ohms)	Sensor Resistance (Ohms)
72	22.2	461	11.2
73	22.8	442	11.0
74	23.3	422	10.7
75	23.9	403	10.4
76	24.4	383	10.2
77	25.0	364	10.0
78	25.6	344	9.7
79	26.1	325	9.5
80	26.7	306	9.3
81	27.2	286	9.0
82	27.8	267	8.8
83	28.3	247	8.6
84	28.9	228	8.4
85	29.4	208	8.2

3 Verify that the LED (CR 35) on the TUC is on continuously.

4 Set DIP switch 7 (Switch SW1 *(Figure 41)*) to the ON position to put the TUC in the autocycle test mode.

5 Initiate the test mode by shorting across J11 and J12 on the TUC. Follow steps as outlined in the test mode table (*Table 13* or *Table 14*).

Note: The unit test sequence mode may be stopped in any step indefinitely to allow for troubleshooting by removing the short across J11 and J12 on the TUC.

Table 13
Test Modes (Autocycle) for TACB Air Conditioner Only

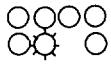
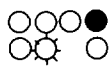
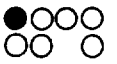
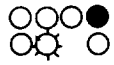
Step	Mode	LED	Description
None	Normal Operations		Unit responds to setting of thermostat.
0	Initiate Test Mode		Unit enters test mode. CR28 blinks and remains until end of the test cycle.
1	Indoor Fan ON-NORM speed		Indoor fan motor is on. Max speed for about 3 seconds, then switches to low speed.

Table 13
Test Modes (Autocycle) for TACB Air Conditioner Only

*2**	*Indoor Fan ON-Medium speed*		*Indoor motor still on low speed because medium speed option not present.*
3	*Indoor Fan ON-MAX speed*		*Indoor motor switches to high speed.*
4	*Open Economizer*		*Damper goes full open. Approximately 90 seconds.*
5	*Cool 1*		*Compressor is on. Damper goes closed. Outdoor fan is on. Heating Valve should be pushing down to close. Cool air leaving front of unit and warm air leaving rear of unit.*
6	*Heat*		*Compressor is off. Outdoor fan is off. Heating valve should be pushing up to open. Room air leaving front of unit.*
7	*Heat (1st Stage Heat)*		*Fan still on high. Valve closes. First stage of electric heat not present.*
*8**	*Heat 2 (2nd Stage Heat)*		*Indoor fan on high speed. Second stage of heat not present.*
*9**	*N/A*		*Indoor fan on high speed. Second stage of heat not present.*
*10**	*Reheat*		*Indoor fan on high speed. Second stage of heat not present.*
*11**	*ERSA*		*Indoor fan on high speed. Not used.*
12	*Normal*		*Unit responds to setting of thermostat*

*NOTE: Steps marked with * are still present but do not apply since they are not a feature or accessory on this unit.*

Table 14.
Test Modes (Autocycle) for THPB Heat Pump Only

Step	Mode	LED	Description
None	Normal Operations		Unit responds to setting of thermostat.
0	Initiate Test Mode		Unit enters test mode. CR28 blinks and remains until end of test cycle.
1	Indoor Fan ON-NORM speed		Indoor fan motor is on. Max speed for about 3 seconds, then switches to low speed.
2*	Indoor Fan ON-Medium speed		Indoor motor still on low speed because medium speed option not present.
3	Indoor Fan ON-MAX speed		Indoor motor switches to high speed.
4	Open Economizer		Damper goes full open. Approximately 90 seconds.
5	Reversing Valve		Reversing valve energizes. Fan on high. Damper closes.
6	Compressor 1		Compressor 1 on cooling. Indoor fan on high. Outdoor fan on high.
7*	Compressor 2		Compressor 1 on cooling. Indoor fan on high. No compressor 2 Outdoor fan on high.
8*	Compressor 3		Compressor 1 on cooling. Indoor fan on high. No compressor 3 Outdoor fan on high.
9	Heat		Reversing valve de-energizes. Indoor fan on high. Compressor off. Outdoor fan off.
10	Compressor 1		Compressor 1 on heating. Indoor fan on high. Outdoor fan on high.
11*	Compressor 2		Compressor 1 on heating. Indoor fan on high. No compressor 2. Outdoor fan on high.
12*	Compressor 3		Compressor 1 on heating. Indoor fan on high. No compressor 3. Outdoor fan on high.

13	Heat 1	●●○● ○☼ ○	Electric heat stage 1 on. Indoor fan on high. Outdoor air damper opens.
14	Heat 2	●●●○ ○☼ ○	Electric heat stage 2 on. Stage 1 off. Indoor fan on high.
15*	Reheat	●●●● ○☼ ○	Damper closes. Indoor fan on high. Not used
16	Normal Operation	●○○○ ○○ ○	Unit responds to setting on thermostat.

*NOTE: Steps marked with * are present but do not apply since they are not a feature or accessory on this unit.*

6 After completing the test mode, remove the jumper and verify thermostat operation by cycling the unit through cooling and heating.

During cooling, the compressor and outdoor fan should energize, the indoor fan should respond to the settings of the thermostat, the damper should go to minimum 10% in high speed, 20% in low speed, and the heating valve, if present, should be pushed down closed.

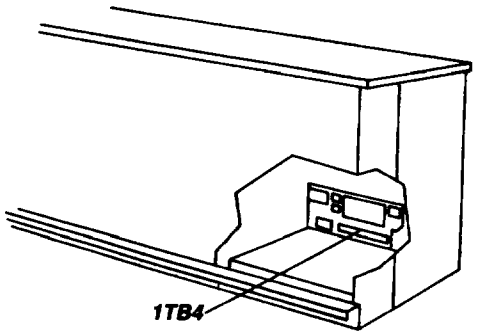
During heating, the compressor and outdoor fan should be energized, the indoor fan should respond to the settings of the thermostat, the damper should go to minimum 10% in high speed and 20% in low speed.

7 If the unit does not perform as indicated, call Trane service.

TUC Connections to EveryWare

Use terminals 7 and 6 of 1TB4 on the control panel as shown *(Figure 40).*

Figure 40
TUC Connections to EveryWare



EveryWare connections can be made at the RJ11 jack underneath the zone sensor cover or at 1TB4-6 and 1TB4-7, located at the ten-pole terminal block in the right hand end pocket, behind the unit front panel.

Troubleshooting

Use the following tables to diagnose apparent problems or failures.

The first table *(Table 15)* is used for suspected TUC or communications problems.

The second table *(Table 16)* can diagnose device or system problems using LED sequences.

Table 15
TUC Troubleshooting

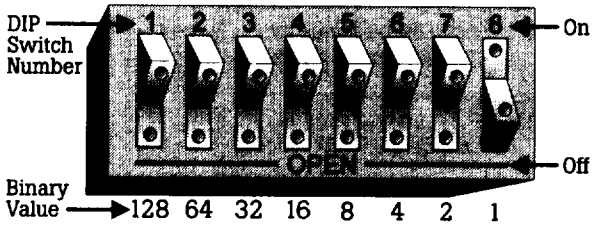
Symptom	Cause	Remedy
TUC doesn't communicate	*TUC is not addressed correctly*	*Verify and reset the DIP switch settings*
	Signal interference on the link	*Verify that the link wires are not routed near or with voltage source wires*
	Incorrect wiring	*Verify that link wiring is twisted pair*
	Incorrect supply voltage	*Verify the input power is 20-28 VAC*
	Defective TUC board	*Disconnect the communications link from the TUC board. Replace board if needed*
TUC does not display data	*TUC is not addressed correctly*	*Verify/reset the DIP switch settings*
	Wiring problem	*Disconnect the link and verify polarity*
	TUC has no power	*Check the system LED and verify the input power is 20-28 VAC*
	Defective TUC	*Replace TUC.*
TUC reports incorrect zone temperature or setpoint	*Incorrect wiring*	*Verify wiring connections,*
	Defective zone sensor	*Disconnect the zone sensor plug. Using an ohmmeter, check the resistance according to the zone sensor checkout procedure (Table X) Check the installation and location of the zone sensor.*
	Incorrect calibration	*Change the calibration factor on the TUC setup screens.*
	Setpoint wheel disabled	*Enable the zone sensor using the TUC setup screens.*
Fan control outputs (High or Low Speed) not energizing	*TUC downloaded incorrectly*	*Check unit type and control parameters.*
	Outputs on TUC have failed	*Check using the auto cycle test*
	Fan/control relay failed	**CAUTION:To avoid damage, do not jumper 24 VAC to J1.** *Remove the fan wires from the TUC and apply 24 VAC directly to the relay (1K3 (low speed) or 1K2 (high)).*
	Tracer/fan control outputs disabled	*Using the Tracer, check group, global, and Tracer overrides (see Tracer manual).*
	Tracer fan/control outputs disabled	*Using the Tracer, check group, global, and Tracer overrides (see Tracer manual).*
	TUC outputs configured as normally closed	*Verify the output configurations using the TUC setup screens.*
	Zone temperature is at or above high setpoint	*Increase the high limit using the TUC setup screens.*

Reading LED Diagnostics

Use the service interface panel LEDs to read the current unit diagnostic. If no current diagnostics are present, the last diagnostic appears. Follow the steps below:

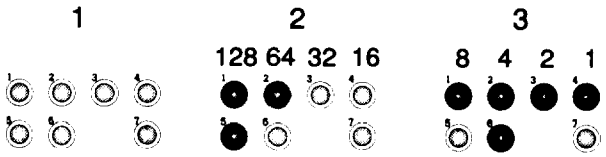
1 Set the DIP switches to address 8 (DIP switch 5 on). *Figure 41* shows an example of how the DIP switches look when set for address 8.

Figure 41
TUC DIP Switches set for Address 8



2 Short and hold the test input. Use a coin or other object to short the test input.

3 The LEDs blink to define a diagnostic code. See *Table 16* for a translation of the diagnostic codes. The information appears in three sequences. See the example below:



Sequence 1 shows all LEDs off. When you short and hold the test input, all LEDs go off for one second.

In **Sequence 2**, the illuminated LEDs represent the first part of the diagnostic code. In the example above, LEDs 1 and 2 are on.

In **Sequence 3**, the illuminated LEDs represent the second part of the diagnostic code. In the example, LEDs 1, 2, 3, and 4 are on.

Together, sequence 2 and 3 make up the eight bits which define the diagnostic code. To read the diagnostic code, combine sequence 2 and 3:

On On Off Off On On On On

When you compare the LEDs in the preceding example to the LEDs in *Table 16*, the diagnostic code is low coil entering air temperature (freeze).

4 When the diagnostic read is completed, return the dipswitches to the previous address.

Table 16
Diagnostic LED Sequences and Codes

Sequence 1	Sequence 2	Sequence 3	Code	Diagnostic
(Visible Only in Trane EveryWare™ Software)			*None*	*Power Failure*
			00	*None*
			01	*External Interlock*
			77	*DX Defrost*
			7F	*Compressor disable by Tracer™*
			A0	*Zone and supply temperature sensor failure*

Table 16
Diagnostic LED Sequences and Codes

Sequence 1	Sequence 2	Sequence 3	Code	Diagnostic
(Visible Only in Trane EveryWare™ Software)			None	Power Failure
○○○○ ○○ ○	●○●● ●○ ○	●○○○ ○● ○	B8	Compressor Status High or Low Pressure
○○○○ ○○ ○	●●○○ ●○ ○	●●●● ○● ○	CF	Low coil entering air temperature (freeze)
○○○○ ○○ ○	●●○● ●○ ○	○○●● ○● ○	D3	Low discharge air temperature (freeze)
○○○○ ○○ ○	●●○● ●○ ○	●●○● ○● ○	DD	Low outdoor air temperature (DX) cooling
○○○○ ○○ ○	●●○● ●○ ○	●●●○ ○● ○	DE	Low outdoor air temperature (DX) heating
○○○○ ○○ ○	●●●○ ●○ ○	●●●● ○● ○	EF	NOVRAM error
○○○○ ○○ ○	●●●● ●○ ○	●○○○ ○● ○	F8	Bad/no configuration
○○○○ ○○ ○	●●●● ●○ ○	●●●○ ○● ○	FE	Return air high limit

[1] *Diagnostic is not applicable to the Self-Contained Unit Ventilator, but is shown for reference only.*

Economizer Troubleshooting

If dampers do not appear to be functioning properly in economizer mode, check the damper according to the following table *(Table 17)*.

It will be necessary to observe the damper operation from either the outdoor side of the unit, if possible, or from the indoor side of the unit through the return air grille.

Table 17
Economizer Troubleshooting

Symptom	Probable Cause			
	No 24V Power	Actuator Motor Defective	Return Air Sensor Defective (or reading incorrect value)	Outdoor Air Sensor Defective (or reading incorrect value)
Damper will not operate	X	X		
Dampers only open to minimum ventilation position			X	X
Dampers open fully, but will not modulate			X	

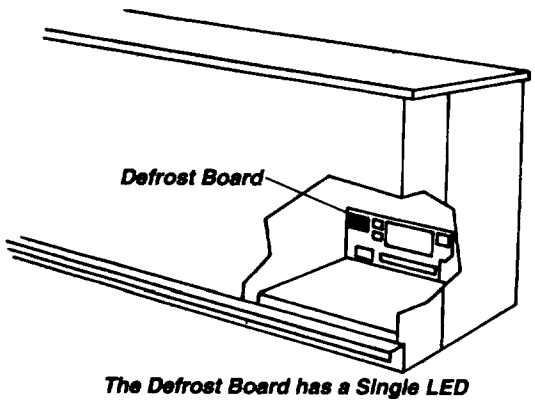
Defrost Control Troubleshooting

Should the condenser coil defrost function appear to have problems, check the operation and the defrost board *(Figure 42)* according to the following table *(Table 18)*.

WARNING

HAZARDOUS VOLTAGE! TESTING REQUIRES THAT THE UNIT BE RUNNING. TAKE PROPER PRECAUTIONS
Failure to observe caution and protect against contacting high voltage can cause severe personal injury or death.

Figure 42
Defrost Board



The Defrost Board has a Single LED

Table 18
Defrost Control Troubleshooting

Symptom	Cause	Remedy
LED (on defrost board) is OFF	*Wiring damaged*	*With unit running, check for 24 volts between across R-B and Y-B on board. If not, repair low voltage wiring.*
	LED or defrost control is bad	*Move test wire to "forced defrost" and "forced fault." If control responds accordingly, replace LED. If not, replace defrost control*
LED is flashing very rapidly (>4 times/sec) or appears to be on continuously	*Test wire is on "Test" position*	*Move test wire to "Normal"*
	Defrost control is bad	*If test wire is on "Normal," replace defrost control*
Control does not initiate a normal defrost. LED may be flashing (Outdoor temp below 49°F, outdoor coil temp below 35°F and ΔT increasing)	*Wiring, LED, or defrost control is bad*	*See previous symptom*
	Wiring damaged	*With unit running, check for 24 volts across Y-B on board. If not, repair wiring.*
	Sensors bad or mounted improperly	*Check resistance and mounting. If incorrect or bad, remount or replace sensor*
Control does not initiate a forced defrost	*Wiring is damaged*	*With unit running, check for 24 volts between across R-B and Y-B on board. If not, repair low voltage wiring*
	Defrost control is bad	*If voltage in previous check is ok, replace defrost control*
Defrost initiates manually but terminates in less than 10 sec	*Defrost control is bad*	*Replace defrost control*
Defrost initiates manually but terminates on time	*Coil sensor is bad*	*If coil sensor circuit has an open or reads at a very high resistance, replace coil sensor*

Table 18
Defrost Control Troubleshooting

Symptom	Cause	Remedy
	Defrost control is bad	*If outdoor fan does not cycle off in defrost, replace defrost control*
	Weather is active	*If windy weather is preventing normal termination, the condition should correct itself in time*
Defrost initiates on approx 15/25 min intervals	*Coil is dirty*	*Clean coil*
	Coil sensor is bad	*If coil sensor is open or reading a very high resistance, replace coil sensor*
	Ambient sensor is bad	*If ambient sensor reading is less than normal, replace sensor*
	Defrost control is bad	*If outdoor fan in not off in defrost, replace defrost control*
Defrost initiates on approx 30/45 min intervals	*Test wire not on "Normal" pin*	*Move test wire to "Normal" pin*
	Defective sensor	*Replace defective sensor (clear coil and reset Emerg. heat light)*
	System charge incorrect	*Verify correct charge*
		Verify a "forced defrost" terminates less than 15 min
	Defrost control bad	*If outdoor motor is off in defrost*
	Reversing valve solenoid is bad	*If SOV operation is improper, replace*
Outdoor fan runs during defrost	*Defrost control is bad*	*Replace defrost control*
No reversing valve solenoid delay on def term,	*Defrost control is bad*	*Replace defrost control*
Emergency heat light is on constantly	*Heat switch is not in "Normal" position*	*Move switch to "Normal" position*
	Wiring or defrost control is bad	*When RD/WH wire is LV box of the outdoor unit is disconnected, if emerg. heat light goes off, replace defrost control. If not, repair field wiring.*

Sensor Test

1 Measure the temperature to which the sensor is exposed.

2 If the sensor is mounted on a tube, place the lead on a temperature tester (Annie A-8 or equivalent) on the same tube near the sensor and insulate the bulb.

3 Unplug the sensor and measure the resistance with an ohmmeter (Simpson or equivalent), reading the value as quickly as possible to prevent the meter current from changing the resistance reading.

4 Locate the actual sensor temperature using the following table *(Table 19)*and allowing for variations of ± 4%.

Table 19
Sensor Resistance Values

Temperature (°F)	Resistance (Kohm)	Temperature (°F)	Resistance (Kohm)
86	7.85	41	24.76
81	8.85	36	28.45
75	10.24	32	31.84
70	11.59	25	37.50
65	13.14	19	46.44
59	15.32	14	53.94
55	16.93	10	57.64
50	19.41	5	67.06
45	22.20	0	78.05

GENERAL MAINTENANCE

WARNING

Hazardous Voltage! Disconnect All Electric Power Including Remote Disconnects Before Servicing. Failure to disconnect power before servicing can cause severe personal injury or death.



WARNING

Allow Rotating Fan To Stop Before Servicing Equipment. Failure to allow rotating fans to stop can cause severe personal injury or death.



WARNING

Do Not Touch Hot Surface. Use Care When Working With Hot Water Units. Failure to use care when working with hot water units may cause minor to severe burns.



SUGGESTED MAINTENANCE PRACTICES

Due to the long interval between maintenance periods, a maintenance log sheet should be attached to the unit for record keeping purpose.

SCHEDULED PREVENTIVE MAINTENANCE SERVICES

Refrigerant charge is not routinely checked unless a leak or loss of charge is certain since any check will result in some loss of charge.

The recommended schedule may vary with climate and equipment use conditions. Filters, for example, may need to be changed more often in a dusty environment. Make schedule adjustments accordingly.

NOTE: Motor and fan bearings on both indoor and outdoor fans are permanently lubricated and do not require oil.

Table 20
Scheduled Maintenance - Self-Contained Unit Ventilator

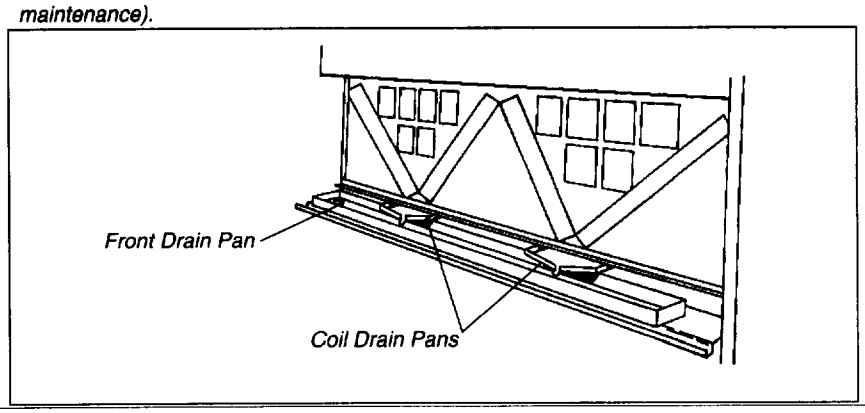
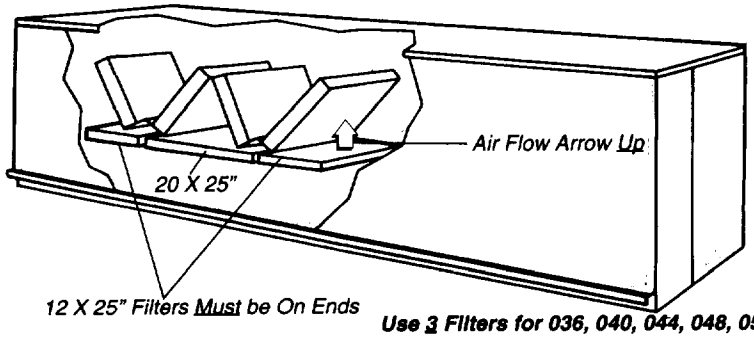
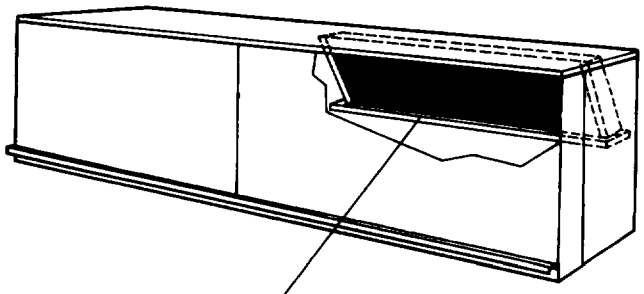
Interval	Task	Procedure	Notes
Monthly	*Inspect evaporator coils*	*Remove left front cabinet panel. Look for accumulated dirt in fins and coils, both sides. If dirty, use a vacuum cleaner or brush to clean coils, especially inlet side.*	
	Inspect evaporator drain pan	*Check front drain pan for accumulated dirt and debris. Drain path should be clear. Look for blockages in coil drain pans. The front pan lifts up and out, but the coil pans are secured with screws. Clean if needed (see six-month maintenance).* 	
	Clean damper area	*Remove front cabinet panel and filter. Clean out all debris in the area of the dampers.*	*Coil freeze up can be prevented by maintaining free damper operation.*
Every Six Months	*Inspect/replace filters*	*Lift out drain pan to access filter(s). If needed, replace with new furnace-type air filters* ***making sure the air flow direction arrows are pointing UP.*** *The 024 and 030 units use two standard 15x25"x1" furnace-type filters. The larger units use 1 20x25"x1" filter and 2 12x25"x1" filters installed as shown.*  ***Use 3 Filters for 036, 040, 044, 048, 054 Units*** *NOTE: Improperly installed filters can restrict air flow and affect unit performance.*	*Throwaway filters contain adhesive coated glass fibers that are enclosed in a fiberboard frame. Remove from the unit and dispose of entire filter. Overloaded filters will reduce unit air handling capacity and may result in insufficient heating during morning warm-up and loss of natural cooling capacity during mild weather.*
	Clean evaporator drain pan, lines	*Remove drain pans, clean, and reinstall. The front pan lifts up and out. The pan(s) under the coils require hardware removal. (See Inspecting and Cleaning Drain Pans for Details.)* *To clean drain lines, remove the return grille and clamps at the front base of the unit, clear any accumulated debris, and reclamp.*	*Coil drain pans need only be removed if especially dirty or drainage is blocked.*
	Check coils, fan sections, and insulation	*Inspect the coils, fan sections, an insulation to ensure that the components are free of dirt and microbial growth (mold). (See Inspecting and Cleaning Coils and Inspecting and Cleaning the Internal Insulation for cleaning details)*	

Table 20
Scheduled Maintenance - Self-Contained Unit Ventilator

Yearly	*Clean evaporator coils*	*Use a vacuum cleaner or brush to clean coils, especially inlet side.*	
	General unit inspection and cleaning	*Look for accumulated dirt, damage to coils, fans, motors, piping, and wiring and other obvious problems.*	
	Clean condenser drain pan	*Remove drain pan, clean, and reinstall.* *(See* Inspecting and Cleaning Drain Pans *for details.)*	*On the heat pump unit, the condenser drain pan has a heating strip running underneath. Disconnect the wires before removing the drain pan.*
Every two years		 *Condenser Drain Pan*	

Inspecting and Cleaning Drain Pans

NOTE: The condensate drain pan and drain line must be checked every six months to assure that the condensate flows freely.

If evidence of standing water or condensate overflow exists, steps should be taken to identify and remedy the cause of the problem (Refer to *Appendix D: Troubleshooting for IAQ* for further details). Standing water in drain pans can promote microbial growth (mold), which has been found to cause unpleasant odors and serious health-related IAQ quality problems. If microbial growth is present in the drain pan, it should be removed and the pan sanitized per the following instructions:

NOTE: Be careful that the contaminated material does not contact other areas of the unit or building. Properly dispose of all the contaminated materials and cleaning solution.

1 Don the appropriate personal protective equipment (PPE).

2 Remove all standing water.

3 Use a scraper or other tools to remove any solid matter.

4 Remove all the remaining loose material with a vacuum device that utilizes high efficiency particulate arrestance (HEPA) filters with a minimum efficiency of 99.97% at 0.3 micron particle size.

NOTE: Carefully follow the sanitizing solution manufacturer's instructions regarding the use of the product.

5 Thoroughly clean the contaminated area(s) with a mild bleach and water solution or an EPA-registered sanitizing solution specifically designed for HVAC use.

6 Thoroughly rinse the drain pan with fresh water to prevent potential drain pan and line component corrosion from the cleaning solution.

7 Allow the unit and components to dry thoroughly before putting the system back into service

8 Determine and correct the cause of the microbial contamination (See *Appendix D: Troubleshooting for IAQ* for further details).



WARNING

Disconnect power at the main breaker. Turn unit main disconnect switch OFF (located on the lower right side of the unit on the floor) before performing any maintenance.
Failure to do so can cause severe personal injury or death.

Inspecting and Cleaning Coils

NOTE: Coils should be inspected at least every six months or more frequently as dictated by operating experience. The frequency of required cleaning is dependent on the operating hours of the system, filter maintenance, efficiency, and dirt load.

Use caution to assure that any contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution.

Coils become externally fouled as a result of normal operation. Dirt on the surface of the coil reduces it's ability to transfer heat that can result in comfort problems, increased resistance to airflow, and increased operating energy costs. If the dirt on the surface of the coil becomes wet, which commonly occurs with cooling coils, microbial growth can result, which has been found to cause unpleasant odors and serious health-related IAQ quality problems.

The following steps describe the suggested method to clean the unit's coils:

Water Coils

1 Disconnect all power to the unit and controls.

2 Don the appropriate personal protective equipment (PPE).

3 Gain access to the coil section of the unit (both sides).

4 Use a soft brush to remove loose debris from both sides of the coil.

5 Use a steam cleaning machine, starting from the top of the coil and working downward. Clean the leaving air side of the coil first, then the entering air side. Use a block-off to prevent steam from blowing through the coil and into a dry section of the unit.

6 Repeat step 5 as necessary.

7 Allow the unit and components to dry Thoroughly before putting the system back into service.

8 Straighten any coil fins that may have been damaged during the cleaning process with a fin rake.

9 Replace all panels and components and restore electrical power to the unit.

Refrigerant Coils

NOTE: Use caution to assure that any contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution.

1 Disconnect all power to the unit and controls.

2 Don the appropriate personal protective equipment (PPE).

3 Gain access to the coil section of the unit (both sides).

4 Use a soft brush to remove loose debris from both sides of the coil.

NOTE: Carefully follow the cleaning solution manufacturers instructions regarding the use of the product.

5 Mix a high quality coil cleaning detergent with water according to the manufacturers instructions. If the detergent is strongly alkaline after mixing (pH 8.5 or higher), it must contain an inhibitor.

6 Place the mixed solution in a garden-style pump-up sprayer or high pressure sprayer.

NOTE: If a high pressure sprayer is used, note the following:

- ❑ Do not exceed 600 psi;
- ❑ Keep the nozzle at least 6 inches from the coil;
- ❑ Maintain a minimum nozzle spray angle of 15 degrees;
- ❑ Spray perpendicular to the coil face; and
- ❑ Protect other areas of the air handler and internal controls from contact with moisture or the cleaning solution.

7 Spray the leaving air side of the coil first, then the entering air side. use a block-off to prevent spray from going through the coin and into a dry section of the unit and/or system ductwork.

8 Thoroughly rinse both sides of the coil and the drain pan with cool, clean water.

9 Repeat steps 7 and 8 as necessary.

10 Straighten any coil fins that may have been damaged during the cleaning process with a fin rake.

11 Ensure that the drain line remains open following the cleaning process.

12 Replace all panels and components to dry Thoroughly before putting the system back into service.

Inspecting and Cleaning the Internal Insulation in Air Handlers

NOTE: Accumulated dirt and other organic matter exposed to water or relative humidity over 60% for extended periods of time can support microbial growth that must be removed to prevent the unit from becoming an IAQ contamination source. Insulation should be inspected every six months or as needed to ensure the unit is free of dirt and microbial growth.

The process of cooling and dehumidification produces condensate (water) that must be continuously removed from the equipment. The equipment is divided into two different sections in reference to condensate: *wet* and *dry*.

The *wet* section is considered to be from the entering air side of the cooling coil to the leaving edge of the drain pan. The *dry* section of the unit, therefore, is all other unit components.

In the wet section of the unit, it is common to see condensate build-up, including the internal insulation. Condensate build-up in the dry section, however, indicates an operational problem. (See *Appendix D: Troubleshooting for IAQ*)

If evidence of microbial growth contamination exists in either the *wet* or *dry* sections, immediate action should be taken to determine the cause, eliminate the cause, remove the contamination, and sanitize the affected area(s). Cleaning the surface requires the following steps:

NOTE: Use caution to assure that any contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution. Carefully follow the sanitizing solution manufacturer's instructions regarding use, personal protection, and ventilation procedures.

1 Don the appropriate personal protective equipment (PPE).

2 Thoroughly clean the contaminate area(s) with an EPA-registered sanitizing solution, specifically designed for HVAC use. Use a brush for sheet metal surfaces or a soft sponge on the foil-faced surface to mechanically remove the microbial growth.

3 Rinse the affected surfaces Thoroughly with fresh water and a fresh sponge to prevent corrosion of the drain pan and drain line.

4 Ensure that the drain line remains open after the cleaning process.

5 Replace all panels and components, and restore electrical power to the unit.

6 Allow the unit to dry completely before putting it back into service.

Inspecting and Cleaning Fans

NOTE: Fan sections of air handlers should be inspected every six months or as dictated by actual operating experience.

Accumulated dirt and organic matter on the interior surfaces of fan(s) can seriously impact fan performance and should be removed immediately. The suggested procedure for cleaning these surfaces is:

1 Don the appropriate personal protective equipment (PPE).

2 Use a portable vacuum with HEPA filtration (99.97% efficient at 0.3 micron particle size) to remove the loose dirt and organic matter.

NOTE: Carefully follow the sanitizing solution manufacturer's instructions regarding the use of the product.

3a If no microbial growth is present, remove the contamination (Step 2) and Thoroughly clean the affected area(s) with an EPA-registered sanitizing solution specifically designed for HVAC use.

3b If microbial growth is ***not*** present, Thoroughly clean the dan and associated components with an industrial cleaning solution.

4 Rinse the affected area(s) Thoroughly with fresh water and a fresh sponge to prevent corrosion of the metal surfaces.

5 Allow the unit and components to dry Thoroughly before putting it back into service.

If microbial growth is found, the cause of the contamination should be determined, removed, the affected area(s) sanitized, and corrective action implemented to ensure contamination does not reoccur.

WARNING

Disconnect power at the main breaker. Turn unit main disconnect switch OFF (located on the lower right side of the unit on the floor) before performing any maintenance.
Failure to do so can cause severe personal injury or death.

Unscheduled Maintenance

The following maintenance tasks are generally performed as required in the event of an equipment failure. See Troubleshooting section.

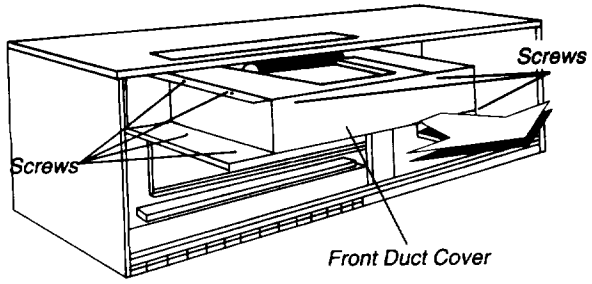
MOTOR - INDOOR FAN - Replacement

The Self -Contained Unit Ventilator fan motor is a permanent split capacitor type. If a replacement motor is required, it should be ordered from The Trane Company to maintain quality standards.

1 Remove the front cabinet panel for access to the indoor evaporator section.

2 Remove the shipping bracket (gusset) at the upper left corner of the unit and discard.

3 Remove 2 top screws (1 screw on the 024-030 units) holding the front duct cover to the unit. Don't remove the cover.



4 Remove 2 screws from the left side holding the fan assembly to the evaporator coil assembly below. Remove the 2 screws at the top holding the fan assembly to the fixed upper fan assembly.

5 Remove the single screw on the right side holding the evaporator assembly to the coil assembly.

6 Disconnect the plug to the fan motor.

7 Disconnect the room sensor wire located on the center front of the front duct cover.

8 Disconnect the plug to the electric heat high limit switches, if installed.

WARNING

Be careful lifting the evaporator fan assembly. Use proper lifting techniques or two people. Failure to do so could result in personal injury. The assembly weighs 35 or 50 lb depending on the unit size.

NOTE: Be careful lifting the fan assembly since most of the weight is distributed unequally in the rear at the motor. Lift from the sides when pulling the assembly out.

9 Supporting both sides, pull the fan assembly completely out of the cabinet for access to the motor and fan. Avoid tearing the foil-faced insulation covering the air discharge plenum and don't hit the fan blades.

10 Using a 3/32 allen wrench (T-handle extension), loosen the set screw on the shaft to free the fan hub and motor.

11 Remove the 4 screws holding the motor to the support. Replace the motor with a Trane-provided motor.

12 Reverse the procedure to install the motor. *Be sure the motor shaft is fully in the coupling and seat the setscrew on the flat side of the unit. Torque setscrew to 36 lb-in.*

13 Make sure the fan is centered and end-to-end.

INDOOR FAN - Replacement

NOTE: The fan motor may be removed first.

1 Loosen the 2 set screws on the bearing (opposite the motor end). Loosen the 2 bearing mounting bolts.

2 Slide the fan out and free. Replace with a Trane-provided part.

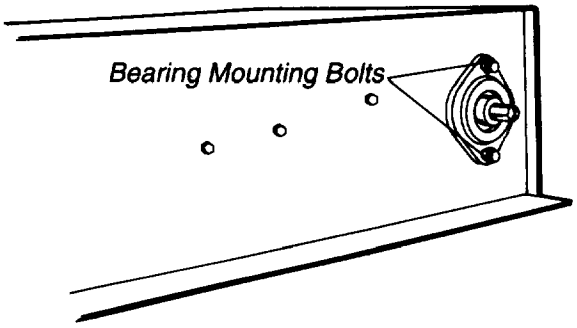
NOTE: Maintain 3/8" gap between the fan blade and the cutoff at all points for proper clearance. If not installed correctly, fan noise can result.

3 Reverse the procedure to install the fan.

4 Torque bearing setscrews to 36lb-in and mounting bolts to 11 lb-ft.

INDOOR FAN SHAFT BEARINGS- Replacement

NOTE: The indoor fan assembly is first removed for access to the bearing assembly (See preceding procedure). The fan and motor also must be removed (see preceding procedures) for tool access to remove and replace the bearing mounting bolts



1 Remove the 2 bearing mounting bolts to free the coupling halves and bearing.

2 Press the bearing out and replace.

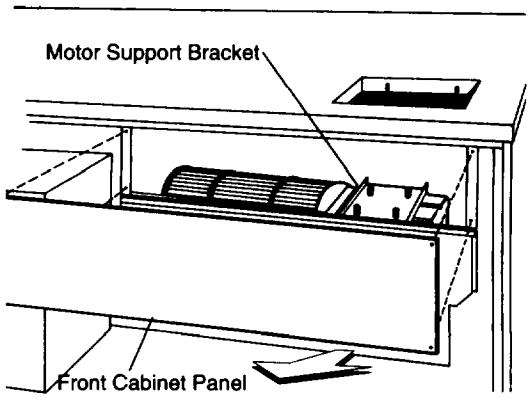
3 To reinstall, assemble the coupling halves in position and secure with the two mounting bolts. Torque bolts to 8 lb-ft.

4 Replace fan and motor. Make sure the fan shaft is fully in so the setscrew will seat.

MOTORS - OUTDOOR FAN - Replacement

The Self-Contained Unit Ventilator fan motor is a permanent split capacitor type. If a replacement motor is required, it should be ordered from The Trane Company to maintain quality standards.

1 Remove the service access cover for access to the condenser (outdoor) section.



2 Remove the screws holding the interior access panel to the support.

3 Remove the control panel cover to disconnect the 3 leads to the fan motor at the contactors.

4 Using a 3/16 allen wrench, loosen the setscrews on the fan shaft to free the fan motor hub.

5 Remove the screws holding the motor plate to the support bracket. Three screws are in the front and 3 are on the back side of the unit.

NOTE: The fan motor weighs approximately 32 lb.

6 Remove the 4 screws holding the motor to the support bracket. Replace with a Trane-supplied unit.

7 Reverse the procedure to replace the motor. Torque setscrews to 12 lb-ft.

OUTDOOR FAN - Replacement

CAUTION:Be careful working around the coil fins. They are razor-sharp and can easily cut your skin.

NOTE: The fan motor is removed first.

1 Using a 3/16 allen wrench, loosen the set screws on the fan shaft to free the motor hub.

2 Remove the 4 screws holding the motor plate to the support bracket. Two screws are in the front and 2 are hidden in the back. The screws in the slots are only loosened for fan removal.

NOTE: The fan motor weighs approximately 32 lb.

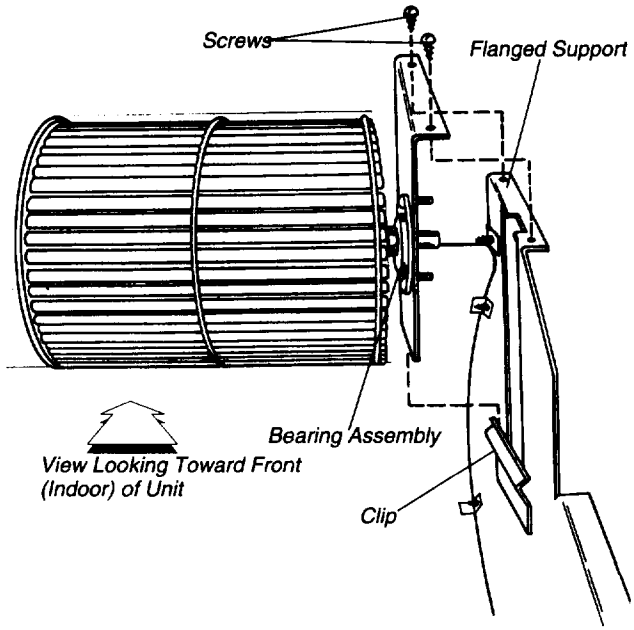
3 The bearing support opposite the motor end is slotted for ease of removal. Remove the two screws on the top flange of the bearing brackets. Lift the fan up and inward to remove. Remove the bearing assembly from the fan. Replace with a Trane-provided part.

NOTE: The back screws on the motor mount bracket must be replaced on installation for proper alignment.

4 Reverse the procedure to install the fan and motor.

OUTDOOR FAN SHAFT BEARINGS- Replacement

NOTE: Remove the fan motor and fan first.



NOTE: The fan bearing assembly is held by a clip at the bottom

1 Remove the 2 screws on the flanged support holding the bearing assembly. Lift the assembly up and out of the condenser section.

2 Remove the bearing by loosening the 2 setscrews that secure it to the shaft. Use a 3/32 allen wrench.

3 Reinstall the new bearing.

4 Reverse the procedure to reassemble the bearing assembly.

REFRIGERANT COILS - Repair

WARNING

The refrigerant must be properly evacuated from the coils before the system is broken for repair. Failure to do so will result in a dangerous or explosive situation.

Repair is limited to replacing coil (tubing) sections only and minor repair (raking of fins). If coil fins are severely damaged, the coil assembly must be replaced as a unit.

NOTE: When removing the hot water coils for service, there is no need to evacuate or cut the refrigerant piping. The coil assembly that provides hot water is a separate system.

1 Remove the fan assembly.

2 Shut off the water supply and drain the water from the coil. Locate the feeder lines from the hot water coils to the headers for the coil slab to be removed. Cut ***only*** these feeder lines.

3 Remove the triangle block-off sheet metal piece.

4 Remove the front and back screws holding the water coil end plates to the refrigeration coil end plates.

CAUTION:Use Gloves when handling the coil assembly to protect against the sharp fins.

5 Lift the water coil slab up over the coil assembly angle and out through the fan opening.

HOT WATER COILS - Repair

Repair is limited to replacing coil sections, brazing and rebrazing. Follow general accepted practice to include cleaning surfaces, aligning sections, using brazing filler and fluxes, and applying flame properly.

INDOOR COILS (Assembly)- Replacement

NOTE: The fan assembly must first be removed. (See preceding procedure.).

1 Remove the front cabinet panel for access to the indoor (evaporator) section.

2 Remove and tag all wiring and harnesses to the heater elements so the evaporator coil section will clear them when pulled out. It is not necessary to first remove the heater elements for heat pump units or hot water coils for air conditioning units.

WARNING

The refrigerant must be properly evacuated from the coils before the system is broken for repair. Failure to do so will result in a dangerous or explosive situation.

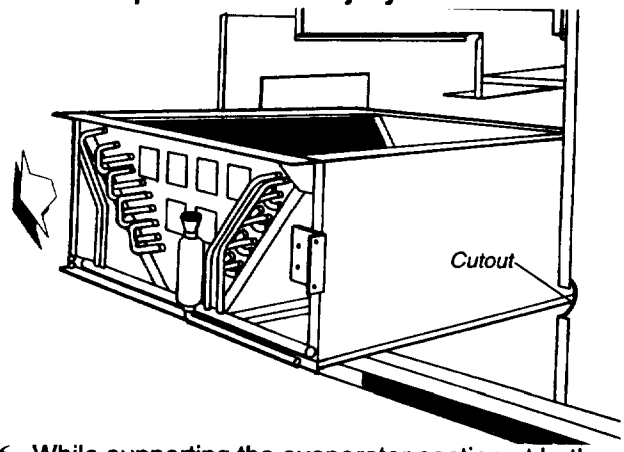
3 Unbraze the large suction line and liquid line at the cutout as shown. Cover the pipe openings for protection against dirt and debris.

4 Remove the 2 screws holding the coil section to the bracket at the right side.

5 Remove the 3 screws holding the evaporator section to the flanged support on the left side.

WARNING

The evaporator section weighs up to 84 lb (with heating elements for the larger size) and should always be lifted by two people. Use proper lifting techniques to avoid injury.

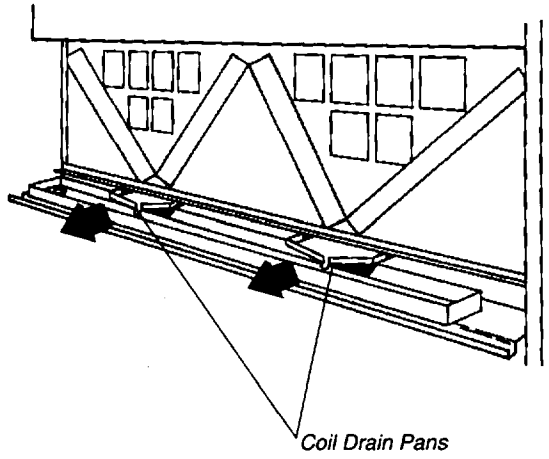


6 While supporting the evaporator section at both ends (two people), slide the evaporator section out and free.

NOTE: The outdoor coil drain pan is removable for cleaning, and should be cleaned whenever the coil is replaced.

EVAPORATOR (INDOOR) DRAIN PAN - Replacement

1 Remove the front cabinet panel.



2 Lift the front plastic drain pan up and out.

3 Slide the drain pan(s) out.

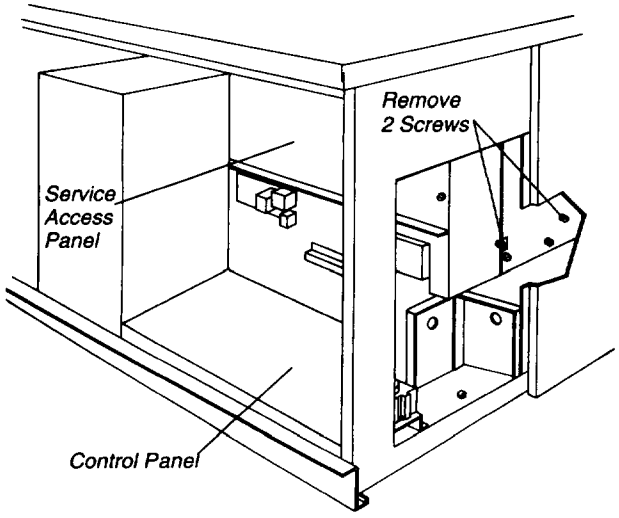
4 Replace pans and reverse procedure to install.

CONDENSER (OUTDOOR) DRAIN PAN - Replacement

1 Remove the right front cabinet panel.

2 Remove the service access panel.

3 Remove 2 screws holding the auxiliary drain pan in place.



4 Remove the drain pan blockoff (4 screws) to allow the pan to clear for removal.

5 Reaching in below the drain pan, remove the 2 screws holding the drain pan to the support member. Pull the freed pan up and toward you to remove.

6 Remove the control panel cover (4 screws).

7 Remove the 3 leads from the drain pan heater strip to the contactors in the control panel.

8 Replace the heater strip or pan as needed.

CAUTION:Replace the blockoff on installation. Failure to do so will create air and water carryover, affecting unit performance.

9 Reverse the procedure to reinstall the drain pan/ heater.

DAMPER ACTUATOR (Motor) - Replacement

NOTE: The damper motor can be reached and removed without removing the evaporator coil assembly.

1 Remove the evaporator section cabinet panel.

2 Remove the blockoff panel (4 screws).

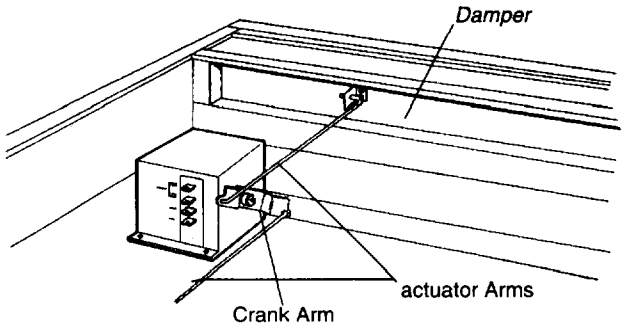
3 Remove the drain pan and filters.

4 Disconnect and tag the 4 electrical connectors from the motor.

5 Remove the 2 hex bolts from the crank arm to remove it and the actuator arm assembly from the actuator.

NOTE: The clips hold the actuator arm to the crank arm and damper bracket. They are not removed.

6 To remove the actuator, remove the 3 screws holding the actuator to the base. There are 2 in front and one in back.



Note: The crank arm must be replaced in the position it was removed for the proper damper linkage positions to be maintained.

7 Reverse the procedure to replace the actuator(s) and crank arms.

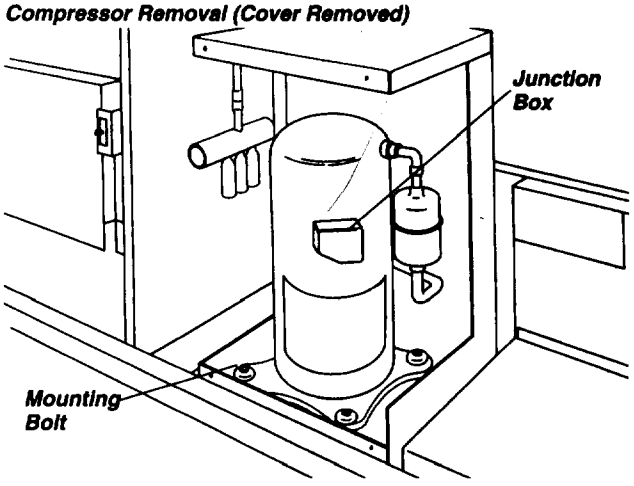
COMPRESSOR - Removal

WARNING

The refrigerant must be properly evacuated from the coils before the system is broken for repair. Failure to do so will result in a dangerous or explosive situation.

1 Remove the 9 screws holding the compressor cover. Remove the cover.

Figure 43
Compressor Removal (Cover Removed)



2 For compressors with single phase motor: Remove the capacitor on the right side of the compressor box (two screws and a clamp).

3 Remove the 3 wires at the compressor junction box. Tag for reinstallation.

4 Unbraze the suction and discharge lines at appropriate joints and following appropriate unbrazing procedures.

WARNING

Be careful lifting the compressor. Use proper lifting techniques or two people. Failure to do so could result in personal injury. The compressor weighs 45 lb.

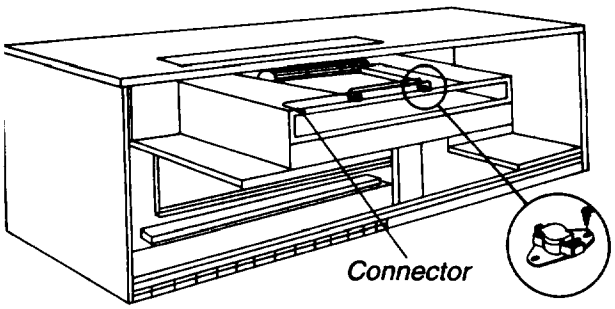
5 Remove the 4 mounting bolts holding the compressor to the unit. Remove the compressor.

6 Reverse the procedure to reinstall the compressor taking care to properly reposition the mortite seals added to the compressor cover for sound attenuation. *Make sure the isolators are in place.*

ELECTRIC HEATING ELEMENTS - Repair

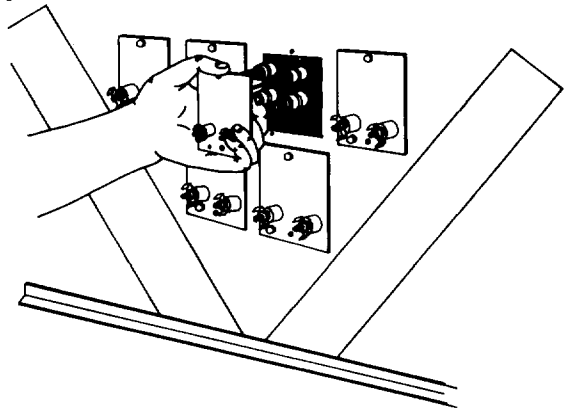
Repair consists of testing and, if needed, replacing the two (*one* for 020, 030 units) high limit switches for the electric heat. The high limit switches are located at the bottom of the fan discharge deck as shown.

Figure 44
High Limit Switches



1 To test the switches, remove the control panel cover and check continuity at the contactor as shown on the wiring diagram. An open indicates a failed switch (electric heat will not come on) requiring further isolating the fault (continuity testing across the switch, wires, connector) and possibly replacement of a wire or a switch.

ELECTRIC HEATING ELEMENTS - Replacement



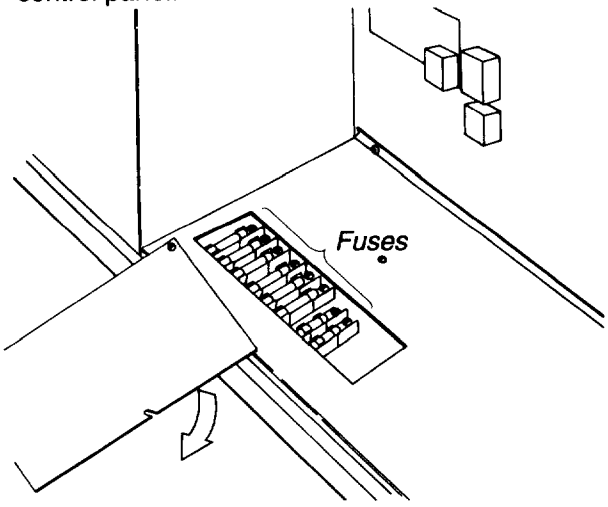
1 Disconnect the two wires to the terminals on the element being replaced.

2 Remove the two hex head screws holding the element to the block-off.

3 Reverse the procedure to replace the element making certain that the element rod end passes through the hole in the back panel.

FUSE Replacement

1 Remove the front cabinet panel for access to the control panel.



2 Loosen 3 screws on the top of the control panel. Rotate the fuse cover panel for access to the fuses.

NOTE: The unit has 15, 30, and 60 amp fuses, the size varying. Check fuse locations on the diagram provided.

3 Remove the suspect fuse. Check for an open between the contacts and then replace fuse with one the same size and rating.

4 Rotate the fuse cover panel back into position and tighten the screws.

PARTS, SERVICE OR REPLACEMENT:

If information or parts are required, please include complete identifying unit model number and serial number (found on the component nameplate), with your request to the local Trane Commercial Sales or Parts Agency.

Appendix A - Default Settings

Table 21
Default Settings

Factory Setpoint	Setting	Notes
Discharge Air Control Max.	*150°*	
Occupied Cooling Setpoint High Limit	*110°*	
Heating Setpoint High Limit	*110°*	
Unoccupied Cooling Setpoint	*85°*	
Default Occupied Cooling Setpoint	*74°*	
Default Occupied Heating Setpoint	*71°*	
Unoccupied Heating Setpoint	*60°*	
Discharge Air Control Minimum	*35°*	
DX Cooling SCUV Heat Pump Cooling Disable	*50°*	
Occupied Cooling Setpoint Low Limit	*40°*	
Occupied Heating Setpoint Low Limit	*40°*	
Outdoor Air Temp Freeze Avoidance Setpoint	*32°*	
Discharge Air Low Limit	*30°*	
Heat Pump Heating Disable	*15°*	
Economizer Minimum Position	*10%*	
Occupied Standby Alternative Vent Min Position	*20%*	
Unoccupied Zone Setpoint Offset	*0*	
Heat Offset	*2*	
Discharge Air Temp Control Dead Band	*2*	
Occupied Override Time	*120 min*	
Compressor Minimum On Time	*1 min*	
Compressor minimum Off Time	*1 min*	
	Devices	
High Pressure Cutout	*430 psig*	*7 psig tolerance*
High Pressure Reset	*260 psig*	*20 psig tolerance*
Low Pressure Reset	*32 psig*	*5 psig tolerance*
Low Pressure Cutout	*7 psig*	*4 psig tolerance*
Indoor Coil Defrost Reset	*45°*	*3° tolerance*
Freezestat Reset	*44°*	*3° tolerance*
Freezestat Trip	*36°*	*2° tolerance*
Indoor Coil Defrost Trip	*24°*	*2° tolerance*
Fan Speed Pressure Switch	*390 psig*	*7 psig tolerance*
Fan Speed Pressure Switch Reset	*260 psig*	*20 psig tolerance*

Appendix B - ICS Address

Setting the ICS Address

TUCs connected to a Comm4 communication link must be assigned a unique address number. Use the TUC's eight DIP switches to set the ICS address. The ICS address must be in the valid range of 33 to 96. See the figure *(Figure 45)* for an example of the DIP switches. Valid address settings appear in the following table *(Table 22)*.

The factory default address is set at 100.

Figure 45
TUC DIP Switches set for Address 33.

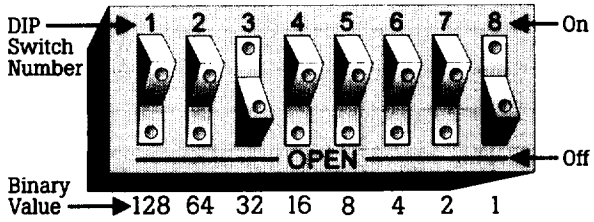


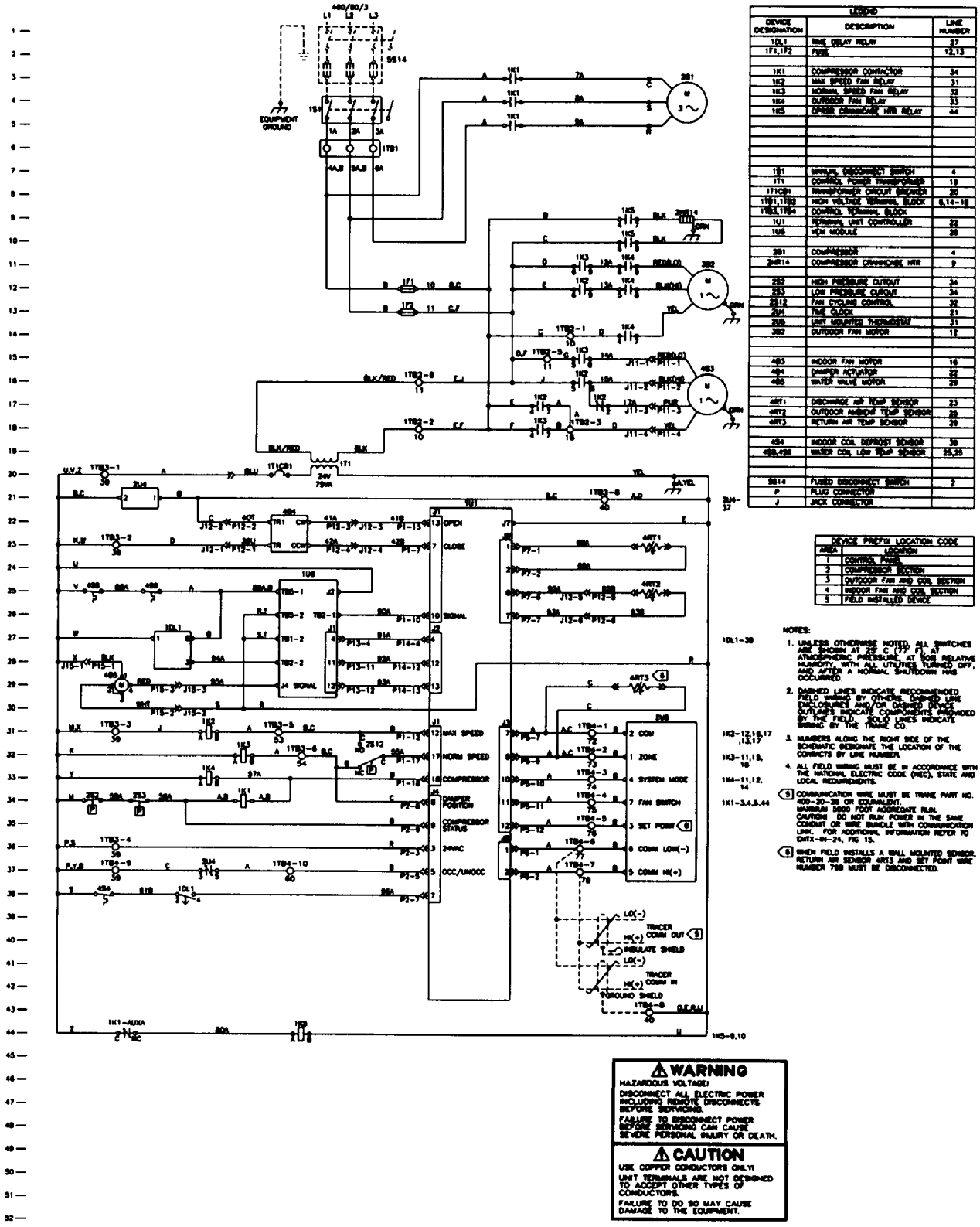
Table 22
Valid ICS Addresses

Position/ Address	1	2	3	4	5	6	7	8
33	Off	Off	On	Off	Off	Off	Off	On
34	Off	Off	On	Off	Off	Off	On	Off
35	Off	Off	On	Off	Off	Off	On	On
36	Off	Off	On	Off	Off	On	Off	Off
37	Off	Off	On	Off	Off	On	Off	On
38	Off	Off	On	Off	Off	On	On	Off
39	Off	Off	On	Off	Off	On	On	On
40	Off	Off	On	Off	On	Off	Off	Off
41	Off	Off	On	Off	On	Off	Off	On
42	Off	Off	On	Off	On	Off	On	Off
43	Off	Off	On	Off	On	Off	On	On
44	Off	Off	On	Off	On	On	Off	Off
45	Off	Off	On	Off	On	On	Off	On
46	Off	Off	On	Off	On	On	On	Off
47	Off	Off	On	Off	On	On	On	On
48	Off	Off	On	On	Off	Off	Off	Off
49	Off	Off	On	On	Off	Off	Off	On
50	Off	Off	On	On	Of	Of	On	Off
51	Off	Off	On	On	Off	Off	On	On
52	Off	Off	On	On	Off	On	Off	Off

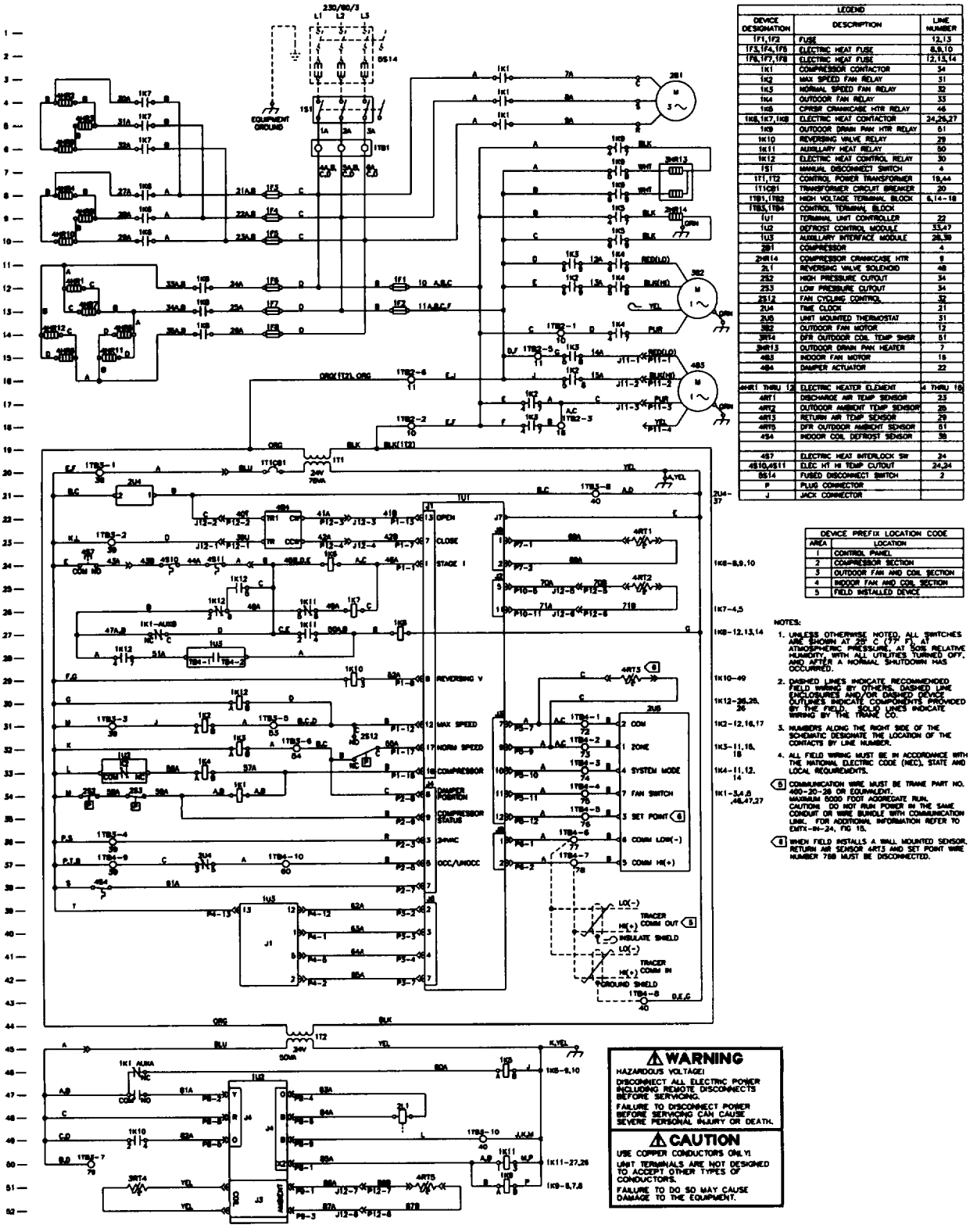
Table 22
Valid ICS Addresses

Position/ Address	1	2	3	4	5	6	7	8
53	Off	Off	On	On	Off	On	Off	On
54	Off	Off	On	On	Off	On	On	Off
55	Off	Off	On	On	Off	On	On	On
56	Off	Off	On	On	On	Off	Off	Off
57	Off	Off	On	On	On	Off	Off	On
58	Off	Off	On	On	On	Off	On	Off
59	Off	Off	On	On	On	Off	On	On
60	Off	Off	On	On	On	On	Off	Off
61	Off	Off	On	On	On	On	Off	On
62	Off	Off	On	On	On	On	On	Off
63	Off	Off	On	On	On	On	On	On
64	Off	On	Off	Off	Off	Off	Off	Off
65	Off	On	Off	Off	Off	Off	Off	On
66	Off	On	Off	Off	Off	Off	On	Off
67	Off	On	Off	Off	Off	Off	On	On
68	Off	On	Off	Off	Off	On	Off	Off
69	Off	On	Off	Off	Off	On	Off	On
70	Off	On	Off	Off	Off	On	On	Off
71	Off	On	Off	Off	Off	On	On	On
72	Off	On	Off	Off	On	Off	Off	Off
73	Off	On	Off	Off	On	Off	Off	On
74	Off	On	Off	Off	On	Off	On	Off
75	Off	On	Off	Off	On	Off	On	On
76	Off	On	Off	Off	On	On	Off	Off
77	Off	On	Off	Off	On	On	Off	On
78	Off	On	Off	Off	On	On	On	Off
79	Off	On	Off	Off	On	On	On	On
80	Off	On	Off	On	Off	Off	Off	Off
81	Off	On	Off	On	Off	Off	Off	On
82	Off	On	Off	On	Off	Off	On	Off
83	Off	On	Off	On	Off	Off	On	On
84	Off	On	Off	On	Off	On	Off	Off
85	Off	On	Off	On	Off	On	Off	On
86	Off	On	Off	On	Off	On	On	Off
87	Off	On	Off	On	Off	On	On	On
88	Off	On	Off	On	On	Off	Off	Off
89	Off	On	Off	On	On	Off	Off	On
90	Off	On	Off	On	On	Off	On	Off
91	Off	On	Off	On	On	Off	On	On
92	Off	On	Off	On	On	On	Off	Off
93	Off	On	Off	On	On	On	Off	On
94	Off	On	Off	On	On	On	On	Off
95	Off	On	Off	On	On	On	On	On
96	Off	On	On	Off	Off	Off	Off	Off

Appendix C - Typical Wiring Diagram for model TACB



Appendix C- Typical Wiring Diagram for model THPB



LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
1F1,1F2	FUSE	12,13
1F3,1F4,1F5	ELECTRIC HEAT FUSE	8,9,10
1F6,1F7,1F8	ELECTRIC HEAT FUSE	12,13,14
1K1	COMPRESSOR CONTACTOR	34
1K2	MAX SPEED FAN RELAY	51
1K3	NORMAL SPEED FAN RELAY	52
1K4	OUTDOOR FAN RELAY	53
1K6	CMPSR CRANKCASE HTR RELAY	46
1K6,1K7,1K8	ELECTRIC HEAT CONTACTOR	24,25,27
1K9	OUTDOOR DRAIN PAN HTR RELAY	51
1K10	REVERSING VALVE RELAY	29
1K11	AUXILLARY HEAT RELAY	50
1K12	ELECTRIC HEAT CONTROL RELAY	30
1S1	MANUAL DISCONNECT SWITCH	4
1T1,1T2	CONTROL POWER TRANSFORMER	19,44
1T1CB1	TRANSFORMER CIRCUIT BREAKER	20
1TB1,1TB2	HIGH VOLTAGE TERMINAL BLOCK	6,14-18
1TB3,1TB4	CONTROL TERMINAL BLOCK	
1U1	TERMINAL UNIT CONTROLLER	22
1U2	DEFROST CONTROL MODULE	53,47
1U3	AUXILLARY INTERFACE MODULE	28,39
2B1	COMPRESSOR	4
2HR14	COMPRESSOR CRANKCASE HTR	9
2L1	REVERSING VALVE SOLENOID	48
2S2	HIGH PRESSURE CUTOUT	34
2S3	LOW PRESSURE CUTOUT	34
2S12	FAN CYCLING CONTROL	32
2U4	TIME CLOCK	31
2U5	UNIT MOUNTED THERMOSTAT	31
3B2	OUTDOOR FAN MOTOR	12
3RT4	DFR OUTDOOR COIL TEMP SNSR	51
3HR13	OUTDOOR DRAIN PAN HEATER	7
4B3	INDOOR FAN MOTOR	18
4B4	DAMPER ACTUATOR	22
4HR1 THRU 12	ELECTRIC HEATER ELEMENT	4 THRU 16
4RT1	DISCHARGE AIR TEMP SENSOR	23
4RT2	OUTDOOR AMBIENT TEMP SENSOR	28
4RT3	RETURN AIR TEMP SENSOR	29
4RT5	DFR OUTDOOR AMBIENT SENSOR	51
4S4	INDOOR COIL DEFROST SENSOR	38
4S7	ELECTRIC HEAT INTERLOCK SW	24
4S10,4S11	ELEC HT HI TEMP CUTOUT	24,24
8S14	FUSED DISCONNECT SWITCH	2
P	PLUG CONNECTOR	
J	JACK CONNECTOR	

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	CONTROL PANEL
2	COMPRESSOR SECTION
3	OUTDOOR FAN AND COIL SECTION
4	INDOOR FAN AND COIL SECTION
5	FIELD INSTALLED DEVICE

NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25° C (77° F), AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF, AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
2. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. DASHED LINE ENCLOSURES AND/OR DASHED DEVICE OUTLINES INDICATE COMPONENTS PROVIDED BY THE FIELD. SOLID LINES INDICATE WIRING BY THE TRANE CO.
3. NUMBERS ALONG THE RIGHT SIDE OF THE SCHEMATIC DESIGNATE THE LOCATION OF THE CONTACTS BY LINE NUMBER.
4. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS.
5. COMMUNICATION WIRE MUST BE TRANE PART NO. 400-20-20 OR EQUIVALENT. MAXIMUM 5000 FOOT AGGREGATE RUN. CAUTION: DO NOT RUN POWER IN THE SAME CONDUIT OR WIRE BUNDLE WITH COMMUNICATION LINK. FOR ADDITIONAL INFORMATION REFER TO ENTK-IN-24, FIG 15.
6. WHEN FIELD INSTALLS A WALL MOUNTED SENSOR, RETURN AIR SENSOR 4RT3 AND SET POINT WIRE NUMBER 78B MUST BE DISCONNECTED.

⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.

FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

⚠ CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

Appendix D: Troubleshooting for IAQ

Table 23Trouble Shooting for IAQ

Problem	***Possible Cause***	***Remedy***
Drain pan is overflowing	*Plugged drain line* *Unit is not level*	*Clean drain line* *Level Unit*
Standing water in the drain pan	*Plugged drain line* *Unit not level*	*Clean drain line* *level unit*
Wet interior insulation	*Coil face velocity too high* *Drain pan leaks\overflowing* *Condensation on surfaces*	*Reduce fan speed* *Repair leak or replace\ clean drain line* *Insulate surfaces*
Excess dirt in unit	*Missing filters* *Excessive filter bypass*	*Replace filters* *Reduce filter bypass*
Microbial growth inside air handler	*Standing water in drain pan* *Moisture problems*	*See* Sanding water in the drain pan *above* *See* Wet interior insulation *above*

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An American Standard Company

Since The Trane Company has a policy of continuous product improvement, it reserves the right to change design and specifications without notice.

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