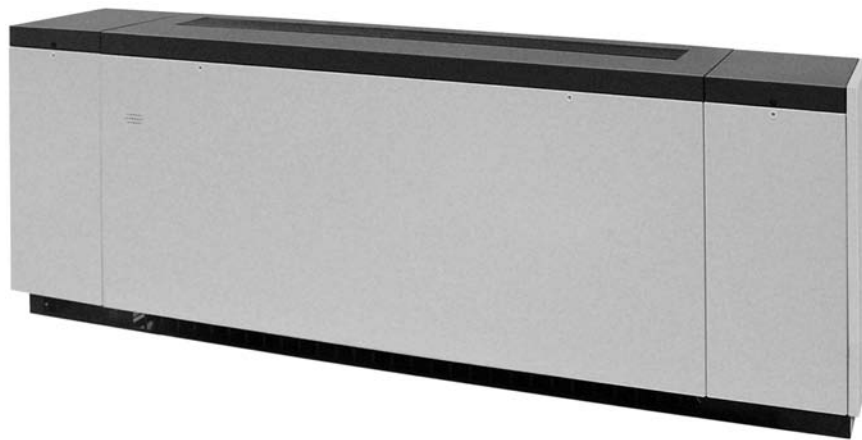


Daikin Classroom Unit Ventilators

Digital Ready, MicroTech II™ ("F" Vintage)
Field Controls by Others



Vertical Floor Models AVS, AVV, AVB and AVR



IMPORTANT!

Before beginning installation, please read this publication in its entirety.
Develop a thorough understanding before starting the installation procedure.
This manual is to be used as a guide. Each installation is unique, so only general topics are covered.
The order in which topics are covered may not be those required for the actual installation.

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Table 1 - Unit Ventilator (Floor Type) Data Plate - Specific Information

Field	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Model	U	AVS	6	S07	A	S	65	E	23	AL	22	G	B	C	1

1. Product Category

U = Unit Ventilator

2. Product Identifier*

AVS = Floor, Face and Bypass Damper, Heat/Cool, Heat Only, Cool Only
 AVV = Floor, Valve Control, Hydronic or Electric Heat/Cool, Heat Only, Cool Only
 AVR = Floor, Valve Control, Hydronic or Electric Reheat/Dehumid
 AVB = Floor, Face and Bypass Damper, Hydronic Reheat
 * End panels not included; Ordered as accessory, shipped separately boxed

3. Design Series

5 = E Design
 6 = F Design

4. Nominal Capacity, cubic feet per minute (cfm)

S07 = 750
 S10 = 1000
 S13 = 1250
 S15 = 1500

5. Voltage, volts, phase, Hertz (v-Hz-ph)

A = 115-60-1
 C = 208-60-1
 G = 230-60-1
 J = 265-60-1
 D = 208-60-3
 H = 230-60-3
 K = 460-60-3

6. Cooling Options

U = 2-row Chilled Water/Hot Water, 2-pipe
 D = 3-row Chilled Water/Hot Water, 2-pipe
 E = 4-row Chilled Water/Hot Water, 2-pipe
 F = 5-row Chilled Water/Hot Water 2-pipe
 G = Direct Expansion (DX)
 S = 3-row Chilled Water
 V = 2-row Chilled Water
 W = 4-row Chilled Water
 Y = 5-row Chilled Water

7. Heating Options

00 = None
 12 = Low Electric Heat, 3-element
 13 = High Electric Heat, 6-element
 65 = 1-row, Hot Water
 66 = 2-row, Hot Water
 67 = 3-row, Hot Water
 68 = Low Capacity Steam
 69 = High Capacity Steam
 78 = Low Capacity Steam, Opposite End Drain
 79 = High Capacity Steam, Opposite End Drain

8. Hand Orientation [Right (RH) Left (LH)]

A = LH Both Coils (only w Controls by Others)
 B = RH Both Coils (only w Controls by Others)
 D = RH Electric Heating, One Coil
 E = LH Heating, RH Cooling
 F = RH Heating, LH Cooling
 G = RH Electric Heating, LH Cooling
 R = LH Single Coil
 S = RH Single Coil

9. Controls (TC = Time Clock, CO₂ = CO₂ Sensor)

23 = Field Mounted Controls by Others
 17 = Digital Ready/with Damper Actuators, (3)@ 10k NTC Sensors, 3 Terminal Strips, 75 VA 24 Volt T'fmr, w/o UV Controller
 B1 = Basic Stand-Alone w/o TC
 B2 = Basic Stand-Alone Master w/o TC
 B3 = Basic Stand-Alone Servant w/o TC
 B4 = Basic BACnet MS/TP w/o TC
 B5 = Basic LonMark SCC w/o TC
 B6 = Basic Metasys N2 Open w/o TC
 B7 = Basic Stand-Alone w/ TC
 B8 = Basic Stand-Alone Master w/ TC
 B9 = Basic Stand-Alone w/o TC w/CO₂
 BA = Basic Stand-Alone Master w/o TC w/CO₂
 BB = Basic Stand-Alone Servant w/o TC w/CO₂
 BC = Basic BACnet MS/TP w/o TC w/CO₂
 BD = Basic LonMark SCC w/o TC w/CO₂

BE = Basic Metasys N2 Open w/o TC w/CO₂
 BF = Basic Stand-Alone w/ TC w/CO₂
 BG = Basic Stand-Alone Master w/ TC w/CO₂
 E1 = Expanded Stand-Alone w/o TC
 E2 = Expanded Stand-Alone Master w/o TC
 E3 = Expanded Stand-Alone Servant w/o TC
 E4 = Expanded BACnet MS/TP w/o TC
 E5 = Expanded LonMark SCC w/o TC
 E6 = Expanded Metasys N2 Open w/o TC
 E7 = Expanded Stand-Alone w/ TC
 E8 = Expanded Stand-Alone Master w/ TC
 E9 = Expanded Stand-Alone w/o TC w/CO₂
 EA = Expanded Stand-Alone Master w/o TC w/CO₂
 EB = Expanded Stand-Alone Servant w/o TC w/CO₂
 EC = Expanded BACnet MS/TP w/o TC w/CO₂
 ED = Expanded LonMark SCC w/o TC w/CO₂
 EE = Expanded Metasys N2 Open w/o TC w/CO₂
 EF = Expanded Stand-Alone w/ TC w/CO₂
 EG = Expanded Stand-Alone Master w/ TC w/CO₂
 L1 = Leading Stand-Alone w/o TC
 L2 = Leading Stand-Alone Master w/o TC
 L3 = Leading Stand-Alone Servant w/o TC
 L4 = Leading BACnet MS/TP w/o TC
 L5 = Leading LonMark SCC w/o TC
 L6 = Leading Metasys N2 Open w/o TC
 L7 = Leading Stand-Alone w/ TC
 L8 = Leading Stand-Alone Master w/ TC
 L9 = Leading Stand-Alone w/o TC w/CO₂
 LA = Leading Stand-Alone Master w/o TC w/CO₂
 LB = Leading Stand-Alone Servant w/o TC w/CO₂
 LC = Leading BACnet MS/TP w/o TC w/CO₂
 LD = Leading LonMark SCC w/o TC w/CO₂
 LE = Leading Metasys N2 Open w/o TC w/CO₂
 LF = Leading Stand-Alone w/ TC w/CO₂
 LG = Leading Stand-Alone Master w/ TC w/CO₂

10. Discharge

AB = 21-7/8" Unit, Top Bar Grille Discharge, Full Adapter Back w Closed Pipe Tunnel w Solid Back
 AK = 21-7/8" Unit, Top Bar Grille Discharge, Partial Adapter Back w Open Pipe Tunnel
 AL = 16-5/8" Unit, Top Bar Grille Discharge
 AM = 21-7/8" Unit, Top Bar Grille Discharge, 2" Stepped Full Adapter Back w Closed Pipe Tunnel
 AN = 21-7/8" Unit, Top Bar Grille Discharge, Full Adapter Back w Closed Pipe Tunnel
 AP = 21-7/8" Unit, Top Bar Grille Discharge, Partial Adapter Back w Closed Pipe Tunnel, Top Duct Intake

11. Return Air (RA) / Outside Air (OA)

22 = RA Bottom Front / OA Rear Duct Collar
 24 = 100% RA Bottom Front / No OA Opening / No OA/RA Dampers
 30 = RA Bottom Front w Draft Stop / OA Rear Duct Collar

12. Power Connection

G = Box w Switch

13. Color

B = Putty Beige
 G = Soft Gray
 I = Antique Ivory
 W = Off White

14. SKU

B = Standard Delivery
 C = Extended Delivery

15. Product Style

1

Field-Installed Accessories may accompany Unit Ventilator(s), or may be shipped separately. These may include: Adapter Backs; Aluminum Louvers; Aluminum Grilles; Auxiliary Drain Pans; Controls / Sensors; End Panels; Spare Filters; MicroTech II Controls, Remote Wall Sensors (temperature); End of Cycle DDC Valve; Modulating DDC Valves; Subbases. See instructions shipped with accessories and install according to these and the plans.

Model AV Floor Unit Ventilator Installation

Models AVV, AVR, AVS, AVB, and AVR

Figure 1 - Data Plate Location



Receiving & Handling

This product was carefully packed and thoroughly inspected before leaving the factory. Responsibility for its safe delivery was assumed by the carrier upon acceptance of the shipment. Claims for loss or damage sustained in transit must therefore be made upon the carrier, as follows:

Visible Loss or Damage

Any external evidence of loss or damage must be noted on the freight bill or carrier's receipt, and signed by the carrier's agent. Failure to adequately describe such external evidence of loss or damage may result in the carrier's refusing to honor a damage claim. The form required to file such a claim will be supplied by the carrier.

Concealed Loss or Damage

Concealed loss or damage means loss or damage which does not become apparent until the product has been unpacked. The contents may be damaged in transit due to rough handling even though the carton may not show external damages. When the damage is discovered upon unpacking, make a written request for inspection by the carrier's agent within fifteen (15) days of the delivery date. File a claim with the carrier since such damage is the carrier's responsibility.

Storage

If equipment is stored for any length of time before installation, it should remain in its shipping packaging in a clean, dry, climate controlled area.

Lifting Unit

A forklift or other lifting device is needed to install this product.

WARNING

Make sure lifting equipment can handle the weight of the unit safely. Personal injury may result if improper lifting and moving methods are used. (See table 2, page 3 for approximate shipping weights)

CAUTION

Use 72" length forklift tines, short tines will damage the unit bottom. Improper handling can damage internal components. Do not stand the unit on end or stack (see figure 2 & 3)

Figure 2 - Stack Units Maximum 2 High as Shown

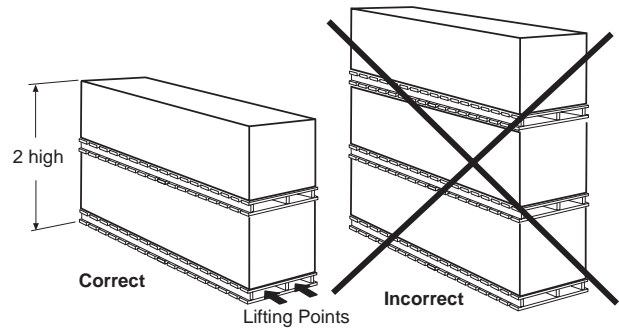


Figure 3 - Forklift Lifting Requirements



Pre-Installation Information

- Before beginning installation, please read this publication in its entirety.
- Directions given in this bulletin for right and left sides assume a position facing the indoor side of the unit ventilator.
- Before beginning installation, if provided, remove the protective plastic film covering the unit painted panels.


WARNING

Plastic packaging is a suffocation hazard, dispose of properly. Keep away from children.

Safety

Follow all safety codes. Wear safety glasses and work gloves. Use a quenching cloth for brazing operations. Have a fire extinguisher available. Follow all warnings and cautions in these instructions and attached to the unit. Consult applicable local building codes and National Electrical Codes (NEC) for special requirements. Recognize safety information. When you see a safety symbol on the unit or in these instructions, be alert to the potential for personal injury. Understand the meanings of the words DANGER, WARNING, and CAUTION. DANGER identifies the most serious hazards that will result in death or severe personal injury; WARNING means the hazards can result in death or severe personal injury; CAUTION identifies unsafe practices that can result in personal injury or product and property damage. Improper installation, adjustment, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may result in personal injury or property damage. This product must be installed only by personnel with the training, experience, skills, and applicable licensing that makes him/her "a qualified professional HVACR installer."

⚠ DANGER

 Disconnect all electrical power before servicing unit. Electrical shock will cause severe injury or death.

⚠ WARNING

Hazardous Voltage!
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.

⚠ CAUTION

Personal injury hazard. Wear protective gloves to avoid possible cuts and abrasions from exposed edges. Avoid contact with sharp edges.

⚠ WARNING

Cleaning agents may cause serious damage to internal components, such as aluminum coils and electronic controls, etc. Do not operate unit ventilator while building maintenance cleaning agents are in use.

Pre-Installation Considerations

Properly Identify Unit Ventilator(s)

To be sure the correct unit ventilator(s) is/are installed in the correct location(s), the installer must check the packing list and unit identification/tagging number(s) against the plans. Further, the unit data plate, (see figure 1) located on the lower right end of the unit ventilator, contains specific information of standard components as listed in Table 1.

Figure 4 - Shipping Envelope Contents - Located in right end compartment of unit.



Uncrate and Inspect the Unit Ventilator(s)

Carefully remove the packaging, remaining alert to any signs of shipping damage. Be careful not to discard components that may be included with the packaging. (You may want to retain some or all of the packaging to provide jobsite unit location information and temporary protection for the unit ventilator after installation.) Be sure to dispose of plastic packaging and protective cardboard properly, in accordance with local recycling rules and guidelines.

If unit is damaged, file a claim with the carrier. Notify the local Daikin Unit Ventilator representative immediately.

Wall Openings, Louvers, and VentiMatic™ Shutter

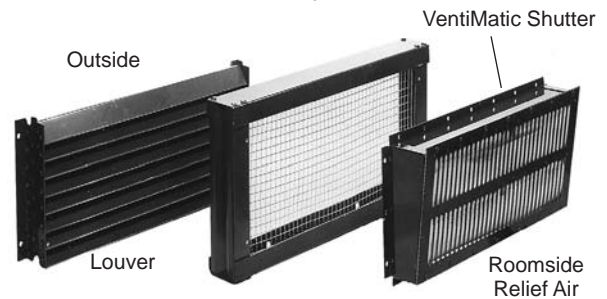
Prior to unit installation, be sure that the exterior wall openings and louvers, as applicable, are ready and in accordance with the job plans. Vertical Floor Models AVS, AVV, AVB, AVR are typically installed in front of a wall opening containing a properly sized louver that is designed to let in outside air while preventing water (such as rain) from getting past the louver and into the unit itself. A weather-tight seal keeps unwanted air and moisture from entering the occupied space. See Figures 6 through 21, and table 1 for various louver details.

VentiMatic™ Shutter Assembly

In many installations, a Daikin VentiMatic Shutter Assembly is specified. See figure 5. This one-way shutter is a continuously variable, gravity actuated, room exhaust vent that operates in direct response to positive static pressure. It opposes any airflow into the room and allows a slight positive pressure.

It is important that the VentiMatic shutter and unit ventilator louvers are mounted on the same wall. This neutralizes the effect of the wind. Forcing excess air into the room through the unit ventilator louver overcomes the same wind pressure that works to keep the VentiMatic shutter closed. This prevents room air exhausting from the room through the VentiMatic shutter.

Figure 5 – VentiMatic Shutter Assembly



Note: Birdscreen and louver are shipped in one (1) piece.

Table 2 - Approximate Shipping Weights, Physical Data

Models AVS, AVV, AVR, AVB	Shipping Weight lbs. (kg) 16 ⁵ / ₈ " Units	Approx. Shipping Weight lbs. (kg) 21 ⁷ / ₈ " Units	Filter Size in. (mm)	Unit Length* in. (mm)	Number of Fans
S07	350 (168)	370 (163)	10 x 36.5 x 1 (254 x 927 x 25)	62 (1575)	2
S10	425 (193)	445 (202)	10 x 48.5 x 1 (254 x 1232 x 25)	74 (1880)	3
S13	495 (225)	525 (238)	10 x 60.5 x 1 (254 x 1551 x 25)	86 (2174)	4
S15	570 (259)	600 (272)	Two: 10 x 36.5 x 1 (254 x 927 x 25)	98 (2489)	4

* Measurement is without end panels.

All unit ventilators are 30" (762 mm) high.

Installing Louvers

Louver Details

Figure 6 – Horizontal and Vertical Blade Louvers, Without Flange, (see Caution below for louver blade orientation and drainage)

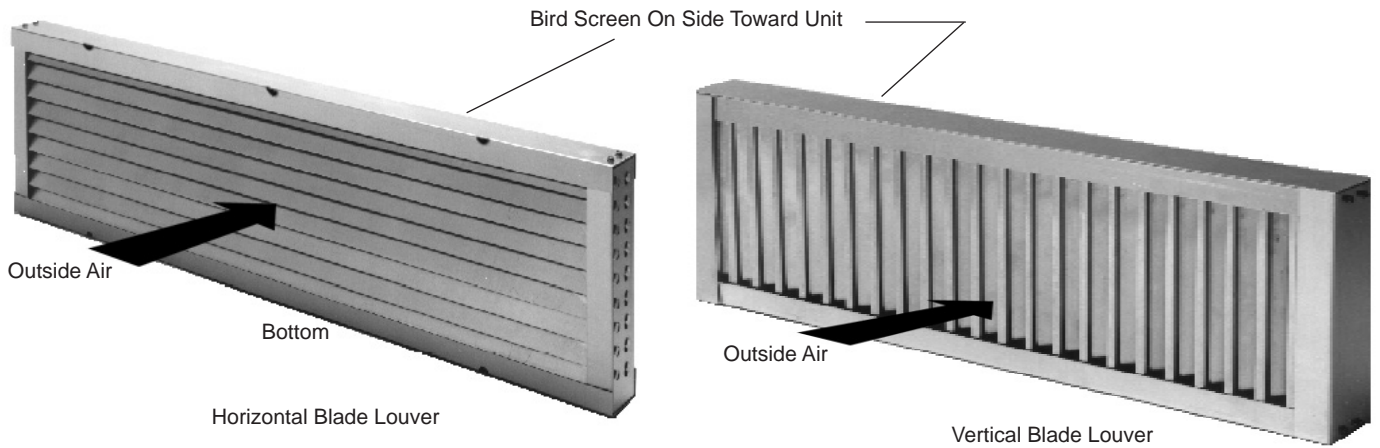


Figure 7 – Horizontal and Vertical Blade Louvers, Without Flanges With Grille or With Flange Without Grille

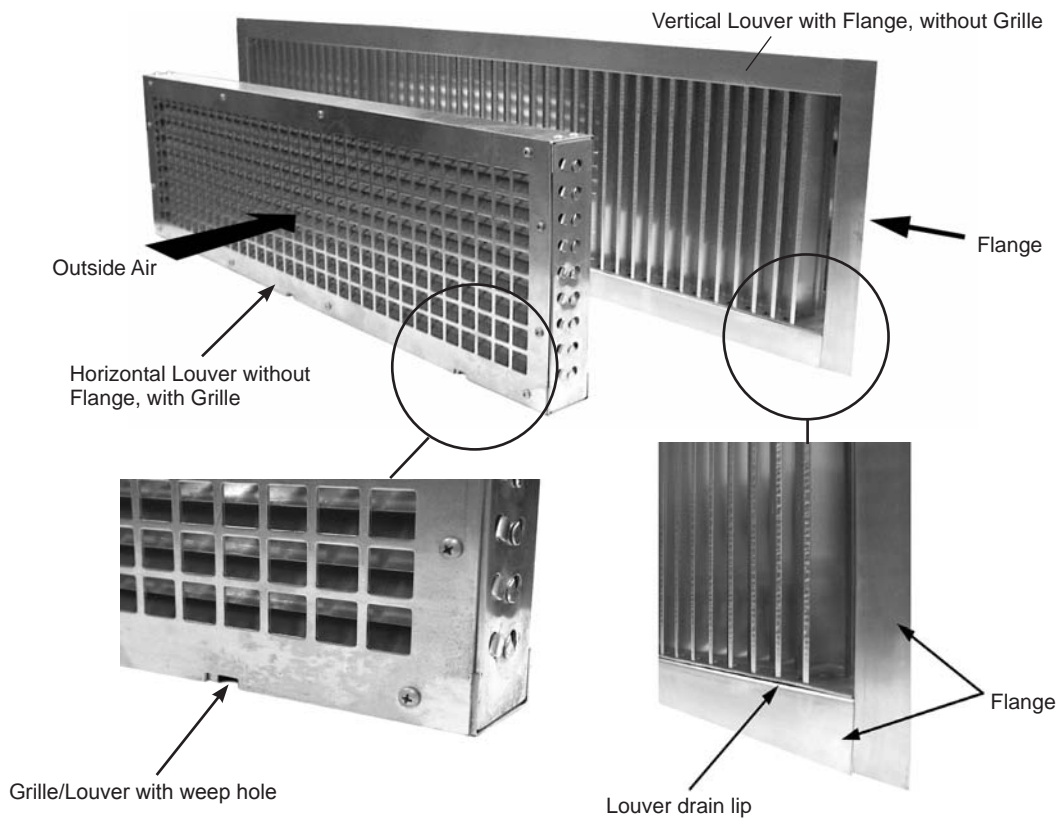
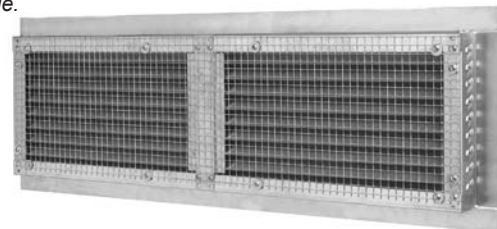


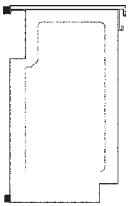
Figure 8 – Rear of Horizontal Blade Louver with Birdscreens and Flange.



CAUTION

Locate Drain Lip at bottom of vertical louver to allow proper drainage. For horizontal louvers, the louver blades should face down for proper drainage. Bird screen should always be on side toward unit.

Louver Installation With Typical Unit Configurations



Unit Configuration Type AL

Figure 9 - The 16⁵/₈" (422mm) Deep Unit with Open Pipe Tunnel and Standard Louver Location

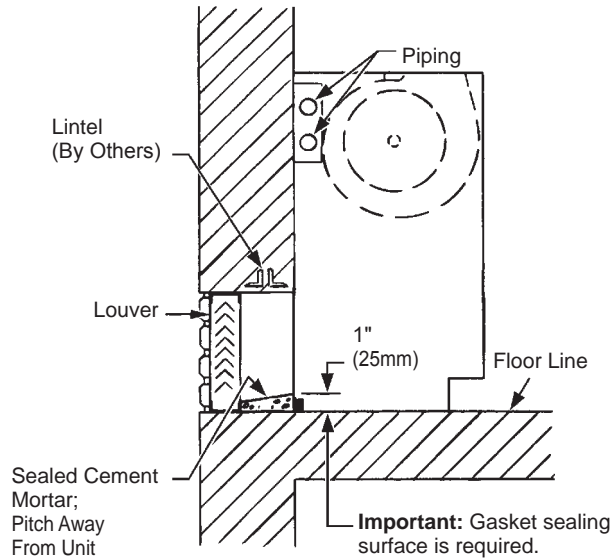
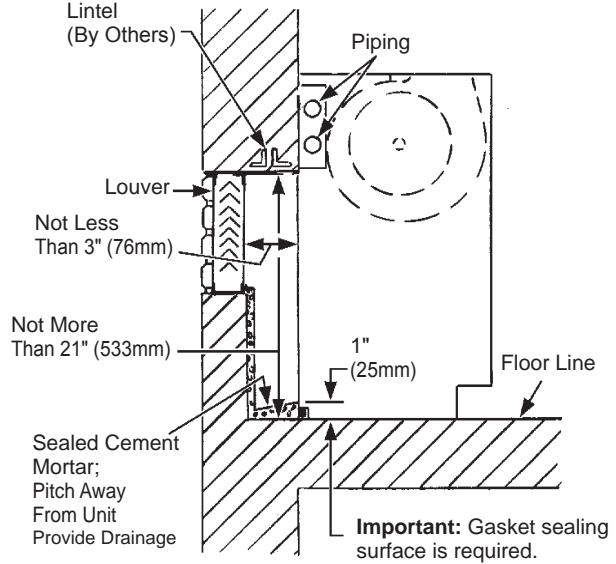
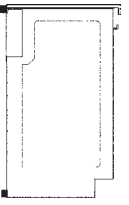


Figure 10 - 16⁵/₈" (422mm) Deep Unit with Open Pipe Tunnel & High Louver Application with Chased Wall



CAUTION
 Accumulated moisture can cause property damage if not properly drained. Installing contractor must provide such drainage.



Unit Configuration Type AL

Figure 11 - Above Floor Level Outdoor Air Intake Using Arrangement AV or AL With Accessory Closed Pipe Tunnel

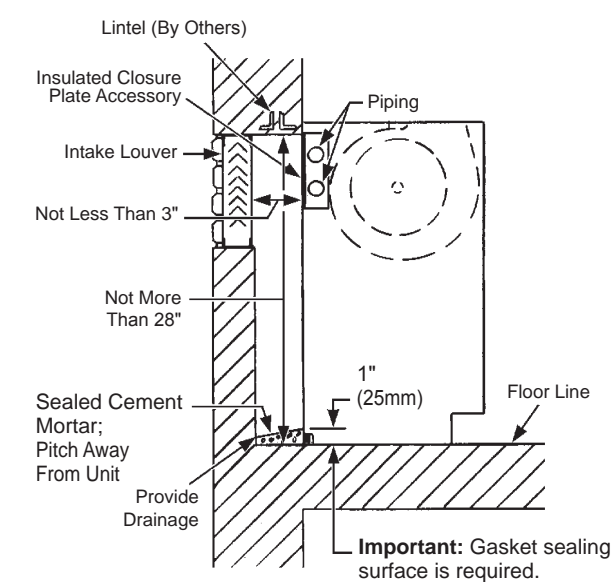
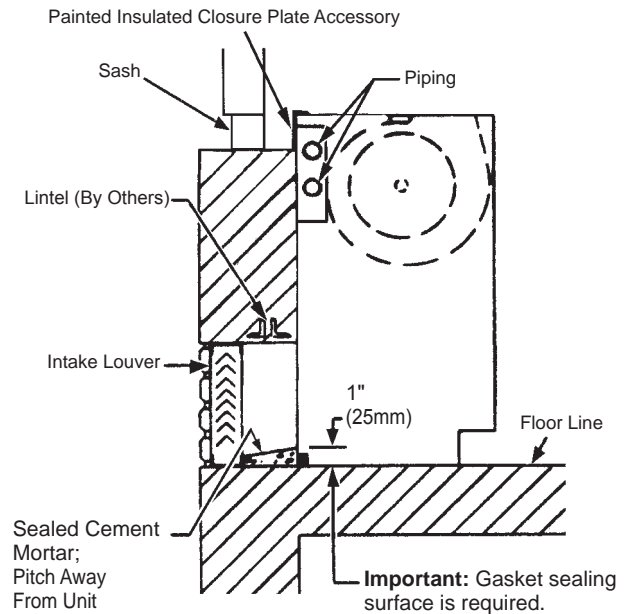
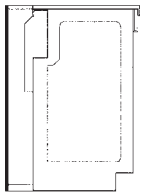


Figure 12 - Floor Level Outdoor Air Intake With Window Below Unit Top Using Arrangement AL And 9" "Finished" (Painted) Accessory (Uninsulated) Closed Pipe Tunnel



Louver Installation With Typical Unit Configurations



Unit Configuration Type AN

Note:

Arrangement AB with full metal back panel, similar to configuration type AN. (Outside air opening to be cut and sealed by others.)

Figure 13 - 2 1/8" (556mm) Deep Full Adapter Back Unit With Standard Louver Application

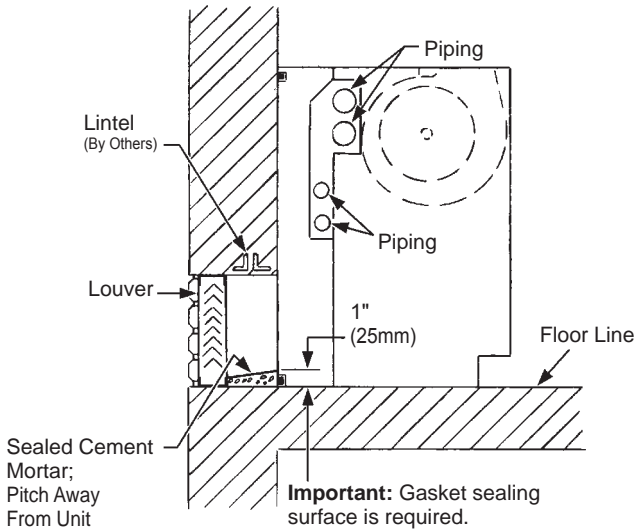
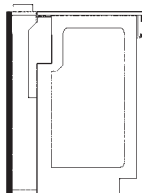
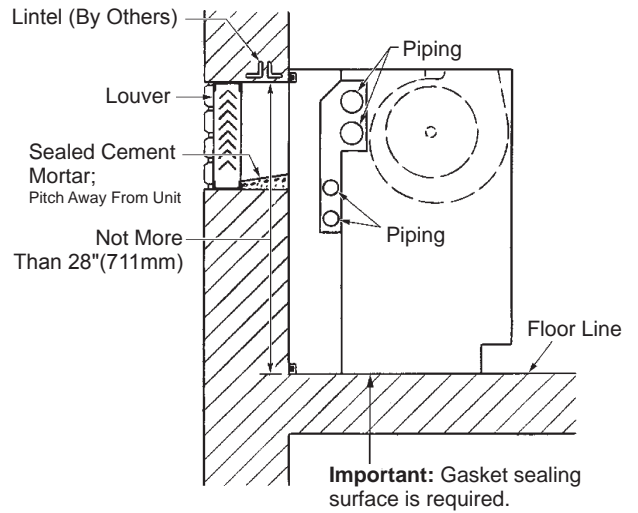
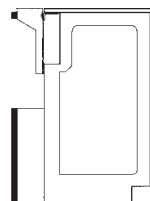
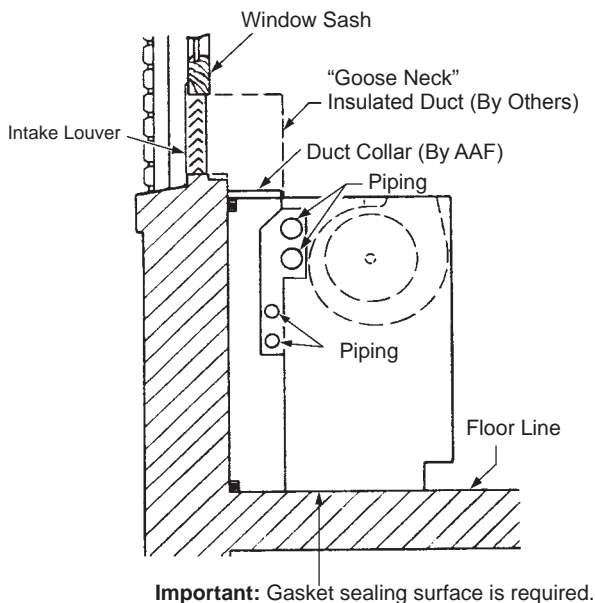


Figure 14 - 2 1/8" (556mm) Deep Full Adapter Back Unit with High Louver Application



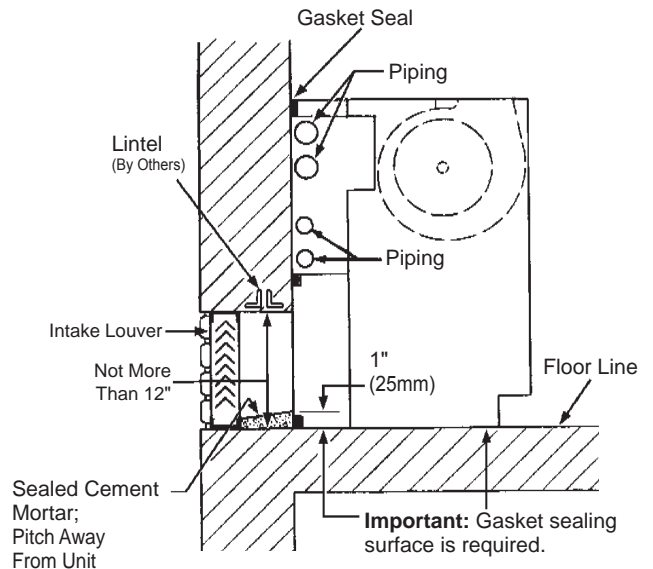
Unit Configuration Type AP

Figure 15 - The 2 1/8" (556mm) Deep Full Adapter Back Unit with Closed Pipe Tunnel, Ducted with Top Intake



Unit Configuration Type AK

Figure 16 - 2 1/8" (556mm) Deep Partial Adapter Back Unit with Open Pipe Tunnel



Installing Louvers

Typical Installation Methods

If the fresh air opening has not yet been made, see figures 9 through 16 for the recommended locations and the job-specific plans for the exact location. Follow local codes.

Cut the wall opening so that it is slightly larger than the louver being installed. For dimensions, see Table 3. If the opening is already there, measure to be sure there is a minimum of 3/8" (9mm) clearance around all sides. For masonry installations, a lintel must be installed above all louvers.

In thick wall applications, the portion of the wall between the louver and the unit is the outside air plenum. Line this plenum area with 3/8" (9 mm) mortar or other suitable material. In some applications, the job specifications require a metal sleeve connection between the louver and the unit. If using such a sleeve, properly caulk it to ensure a weather-tight seal. This is critical in preventing freeze-ups, cold drafts, and air infiltration. Be sure the wall is smooth, square, and provides a suitable mating surface.

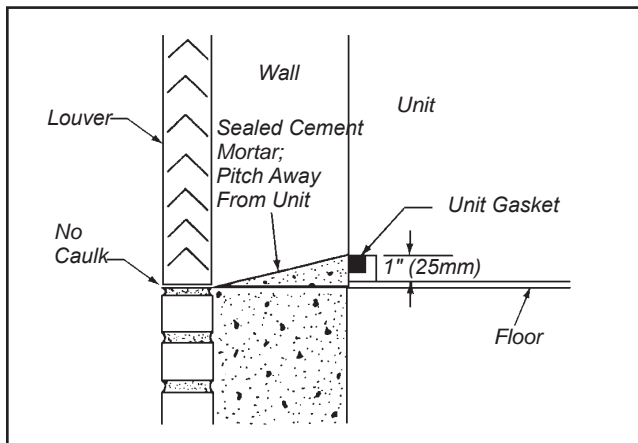
Table 3 - Recommended Wall Openings For Wall Louvers

B	C	Recommended Wall Openings For Wall Louvers		Maximum Number of VentiMatic Shutters Which Can Be Mounted On Standard Louver		VentiMatic Shutter(s) Air Capacity Maximum	
		Length	Height	24" Shutter	36" Shutter	cfm	L/s
24" (610)	27" (659)	24 3/8" (613)	10 1/8" (267)	1	0	500	236
36" (914)	39" (991)	36 3/8" (918)	10 1/8" (267)	0	1	750	354
48" (1219)	51" (1295)	48 3/8" (1222)	10 1/8" (267)	2	0	1000	472
60" (1524)	63" (1600)	60 3/8" (1527)	10 1/8" (267)	1	1	1250	590
72" (1829)	75" (1905)	72 3/8" (1832)	19 1/8" (495)	0	2	1500	708

Before setting the louver, construct a sloping, sealed cement mortar base to drain unwanted moisture to the outside, (see figure 17). Be sure the mortar base is 1" (25mm) thick at the unit and tapers toward the louver. The mortar at the unit also acts as a backing against which the open cell gasket of the unit itself can seal. This is critical in preventing water leaks and air leaks under the unit. Be sure the sealed cement mortar base is smooth and flush with the interior wall.

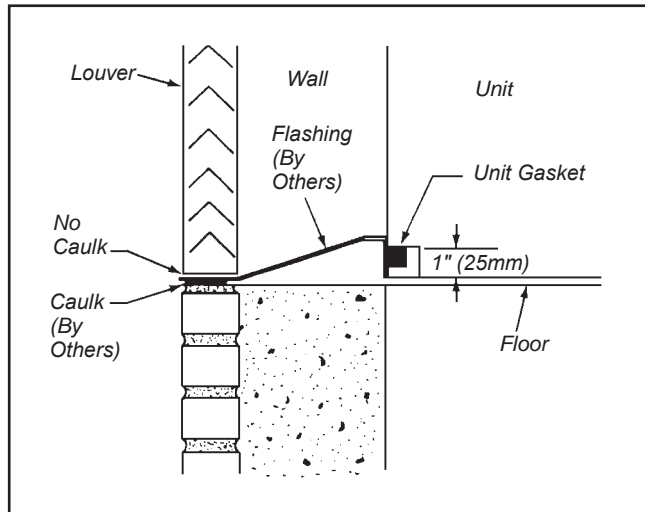
If it is not possible to construct a sloping mortar base, then field-supplied flashing is required. See figure 18. The flashing should terminate flush with the exterior of the building. Place a bead of caulk under the flashing

Figure 17 - Typical Louver Installation with Sloping Sealed Cement Mortar Base



to prevent moisture from wicking back to the unit. Do not caulk the joint between the louver and the flashing. This joint is designed to let unwanted moisture escape.

Figure 18 - Typical Louver Installation with Flashing



CAUTION

Personal injury hazard. Wear protective gloves to avoid possible cuts and abrasions from exposed edges. Avoid contact with sharp edges.

See figures 6 through 19. Before setting the louver, be sure the drain lip (vertical louver) are at the bottom, horizontal louver blades face down and the bird screen is towards the unit. See figures 20 and 21. Place a heavy bead of caulk along the top and the two vertical sides of the louver, leaving the bottom uncaulked so that if moisture gets into the area between the louver and the unit, it can drain to the outside, unrestricted.

If the louver is supplied with flanges, (see figure 20) place an additional bead of caulk on the inside of the top and side flanges that come in contact with the building facade. Do not caulk the bottom flange. Place the louver in the opening and push it tight against the supplied building, fastening it to the exterior of the building using fasteners (by others) appropriate to the installation. Seal the top and sides with a waterproof caulk to make it weather-tight. Do not caulk the bottom of the louver; doing so might trap unwanted moisture behind the flange. (See figure 20)

If the louver is supplied with no flanges, (see figure 21) place the louver in the opening so that it is recessed a minimum 1/16" (2mm) beyond the building facade or as directed in the architectural plans. If specified in the plans, secure the louver in the wall using mechanical fasteners (supplied by others) appropriate to the installation. (See figure 19 for suggested fastening). With the louver solidly in place, run a bead of caulk around the perimeter of the louver to seal it weather-tight. Do not plug the weep holes (horizontal louver) or the drip line (vertical louver). This might restrict the flow of unwanted moisture to the outside (see figure 21)

See figure 18. If flashing was used instead of the sloping mortar base, caulk the flashing where it meets the inside of the opening between the louver and the unit. This helps prevent moisture from getting under the flashing and into the room.

Figure 19 - Suggested method for fastening louver (without flange) inside wall opening .

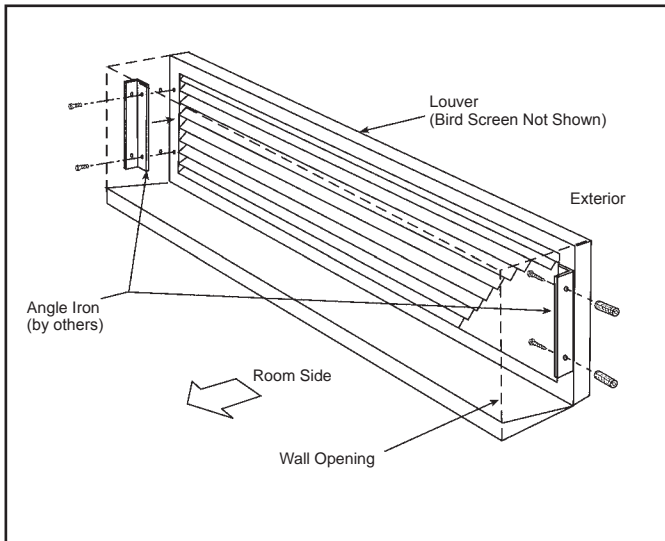


Figure 20 - Vertical or Horizontal Blade Wall Intake Louver (Flanged) (Vertical Blade Shown)

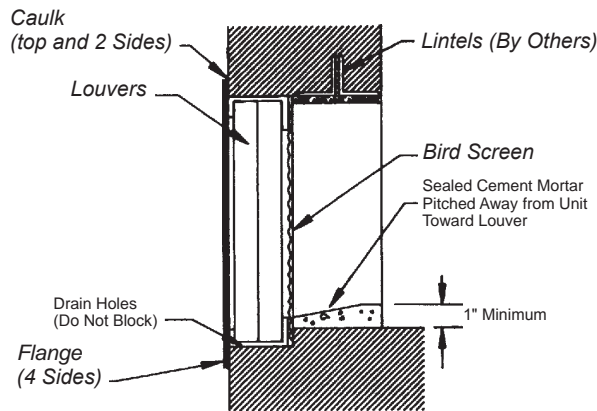
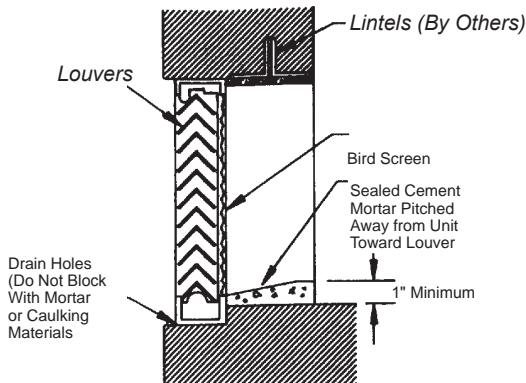


Figure 21 - Vertical or Horizontal Blade Wall Intake Louver (Recessed Without Flange) (Horizontal Blade Shown)



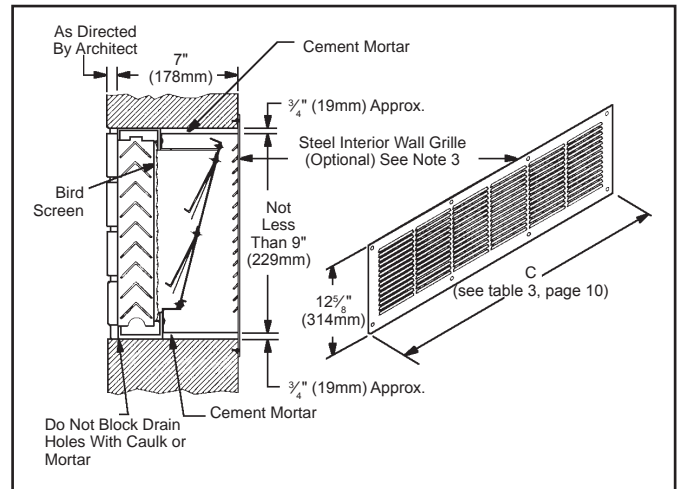
Installing the VentiMatic Shutter Assembly

The VentiMatic Shutter Assembly is mounted on an installed wall louver. For larger units with 100% ventilation air dampers, two VentiMatic Shutters may be mounted side by side on the same louver. See figure 24.

The size and appearance of the wall louvers with or without optional grilles used with the unit ventilator, and the VentiMatic Shutter, are identical.

When installing VentiMatic Shutter(s) on the wall louver, make sure all moving parts are free to operate unobstructed and placed level and plumb for proper operation. If optional steel interior wall grille is furnished, install as shown in Figure 22.

Figure 22 - Louver , VentiMatic Shutter, Interior Wall Grille Details, Dimensions



Notes:

1. Horizontal blade wall louver shown. Vertical blade wall louver also available with VentiMatic shutter.
2. Optional exterior grille matches unit ventilator wall louver in material and design. Mounted on wall louvers.
3. Optional steel interior wall grille should be used to conceal the interior wall opening whenever the VentiMatic shutter is not located behind shelf cabinets or DraftStop enclosure. Hardware to mount the interior wall grille is not included.

Figure 23 - Single VentiMatic Shutter & Wall Louver

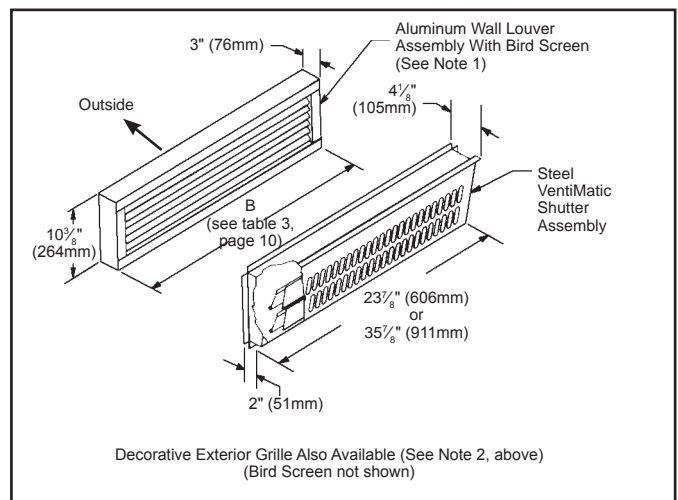
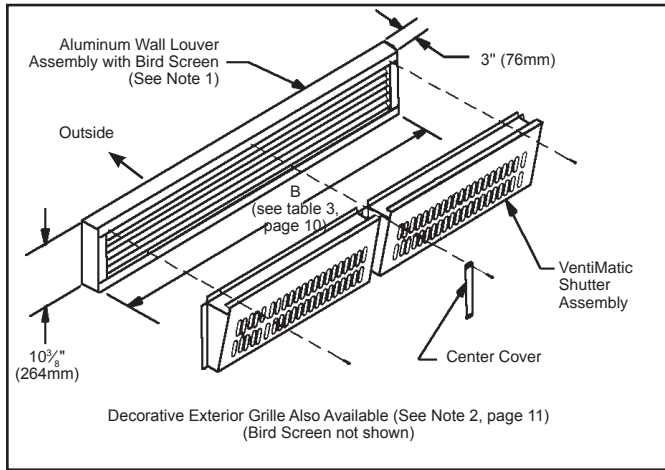


Figure 24 - Two VentiMatic Shutters & Wall Louver



Before Setting the Unit in Place

Move the unit ventilator to the correct location. See Table 2, page 6 for approximate shipping weights.

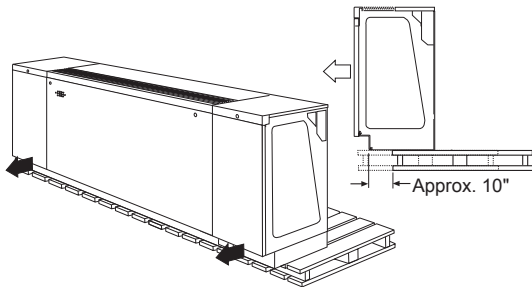
Carefully remove unit ventilator from wood skid. Be sure to properly dispose of the skid in accordance with local recycling rules and guidelines.

Removing Unit from the Skid

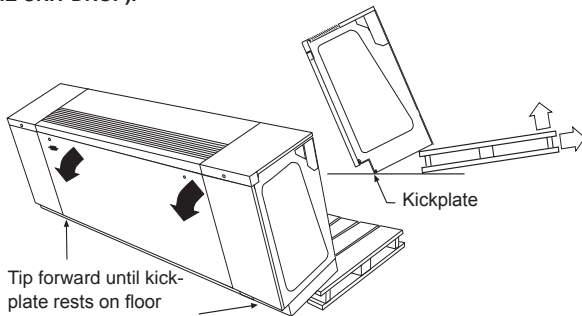
Remove fasteners at each end which hold the unit to the skid and carefully slide the front of the unit off the skid (1). Tip unit forward until the bottom of the slotted front kickplate is resting on the floor (2). Lift rear of unit off of the skid by tipping unit forward while supporting the unit from the front, until it is possible to slide skid out from under the unit. GENTLY LOWER the rear of the unit to the floor (3).

Figure 25 - Removing Unit from Skid

1. Carefully slide the front of the unit off the front of the skid.



2. While supporting unit from the front, slowly tip unit forward until bottom of kickplate is resting on floor. Lift skid slightly and GENTLY lower the rear of the unit to the floor while pulling skid back (DO NOT LET THE UNIT DROP).



CAUTION

Leakage of outdoor air wastes energy, causes drafts and erratic unit ventilator operation. Check the following details: At the correct unit ventilator location, examine the wall surface. Make sure that it is smooth, plumb, and perpendicular to the floor. The seals on the rear of the unit ventilator will take up the small irregularities found in normal masonry construction. If the wall is irregular or has mullions, install furring strips to provide a flush surface against which the unit ventilator can seal. If there are moldings on the floor/wall line, omit them behind the unit ventilator. Provide a sealing surface at the floor line. Install a seal pad under the unit to prevent air leakage. Install the unit ventilator against a wall made of non-combustible material, and on a floor made of non-combustible material. Floor must be level, unbroken and structurally strong to support the unit.

Mounting Holes, Piping and Electrical Knockout Locations & Dimensions

Figure 26 - Front View with End Panels - Mounting Holes Locations

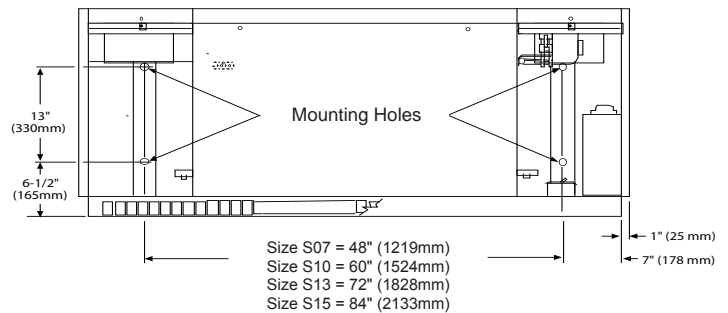
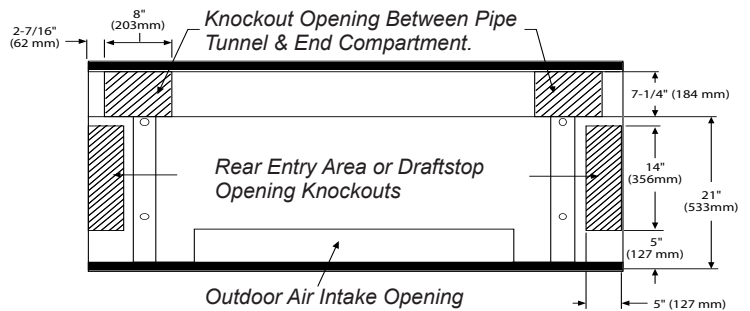


Figure 27 - Rear View without End Panels and Subbase - Piping and Electrical Knockout Locations and Dimensions



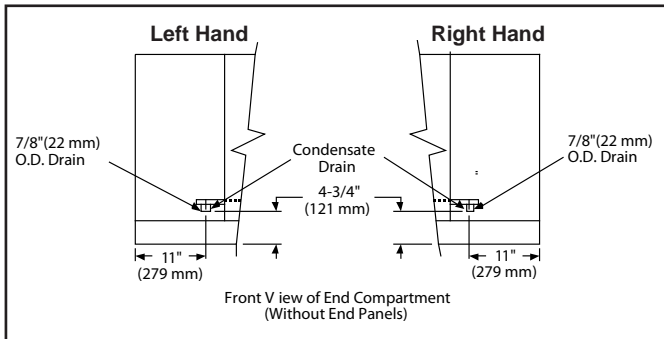
NOTICE

End compartment Draftstop knockouts must be removed for proper Draftstop operation. (21-7/8" units only)

Note:
See Draftstop IM bulletin (IM 473) for suggested installation procedure.

Reversing Drain Pan Slope

Figure 28 - Condensate Drain Pan Connection Location



⚠ DANGER
 Disconnect all electrical power before servicing unit to prevent injury or death due to electrical shock.

⚠ CAUTION
 Personal injury hazard. Wear protective gloves to avoid possible cuts and abrasions from exposed edges. Avoid contact with sharp edges.

Procedure

If the unit has a cooling coil, check the condensate drain pan to be sure it slopes down toward the drain stub-up end. To do so, compare the right and left hand drain pan ends to Figures 30 & 31. The end with the shallow lower bracket (Figure 30) is the low end of the drain pan. To reverse the slope of the drain pan do the following:

1. Remove the lower bracket and upper plate from each end of the unit, as shown in figures 30 and 31. This is done by removing the screws in each with a 1/4 inch nut driver.
2. Reinstall the brackets on the opposite end of the unit.

NOTICE
 The drain pan has two (2) connections on each end; a standard drain connection and an overflow connection.

3. Verify the standard drain connection is open on the low (drain) end only. If the drain connection stub-outs at the high end of the drain pan are open, seal them water tight with silicone sealer or similar.
4. Mount static equalizer cover to low end bracket of drain pan.

Figure 29 - Mount Static Equalizer Cover

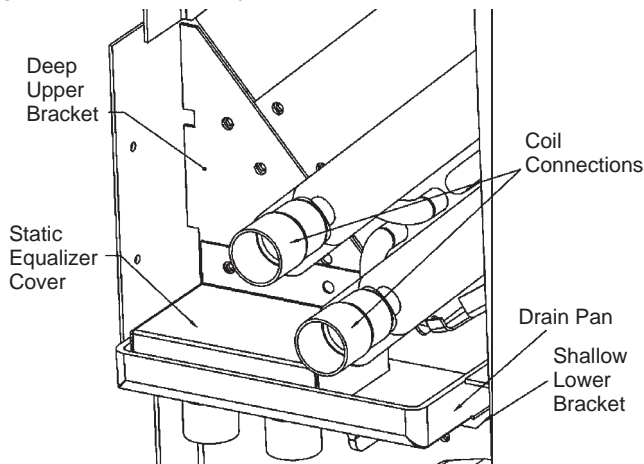


Figure 30 - Low End of Drain Pan (Drain End)

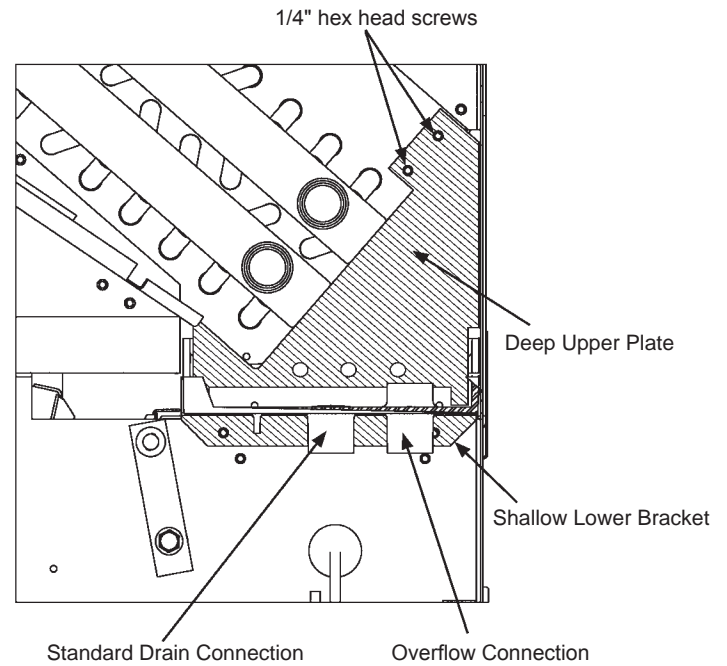
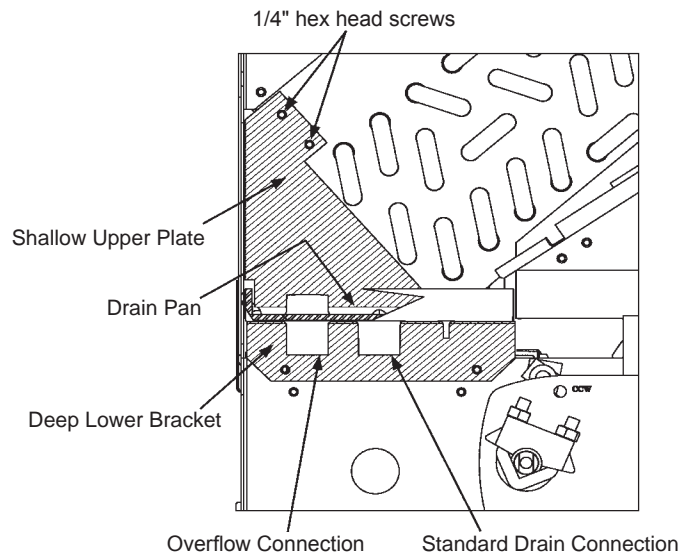


Figure 31 - High End of Drain Pan

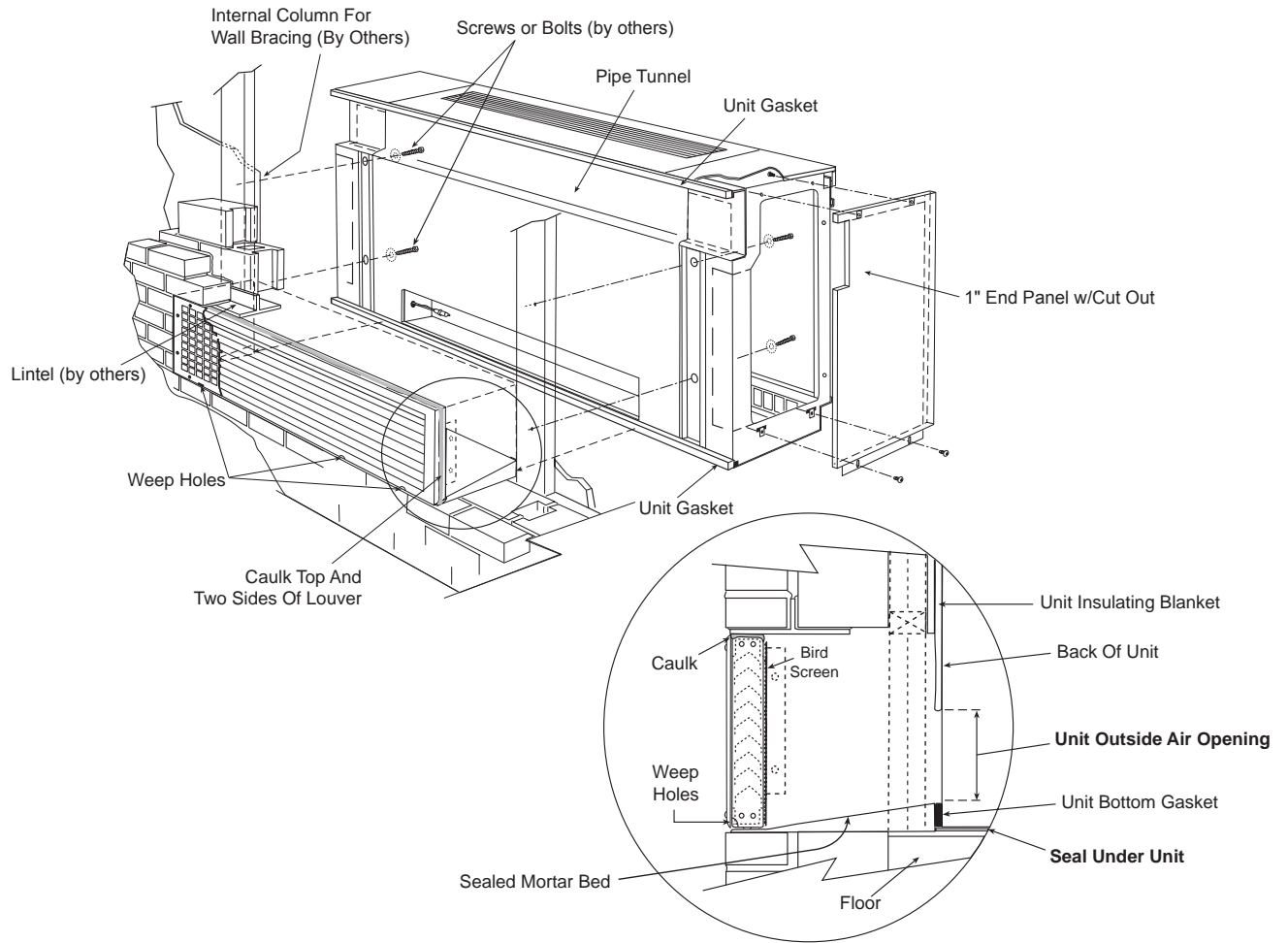


To Clean the Drain Pan

1. Remove the shallow and deep upper plates from the unit (see figures 29 and 30).
2. Spray water into the drain pan on the high end to wash debris to the low end (drain end).
3. Remove any debris, making sure that the drain holes are not obstructed.
4. Wipe the drain pan with a cloth.
5. Reinstall the upper plates.

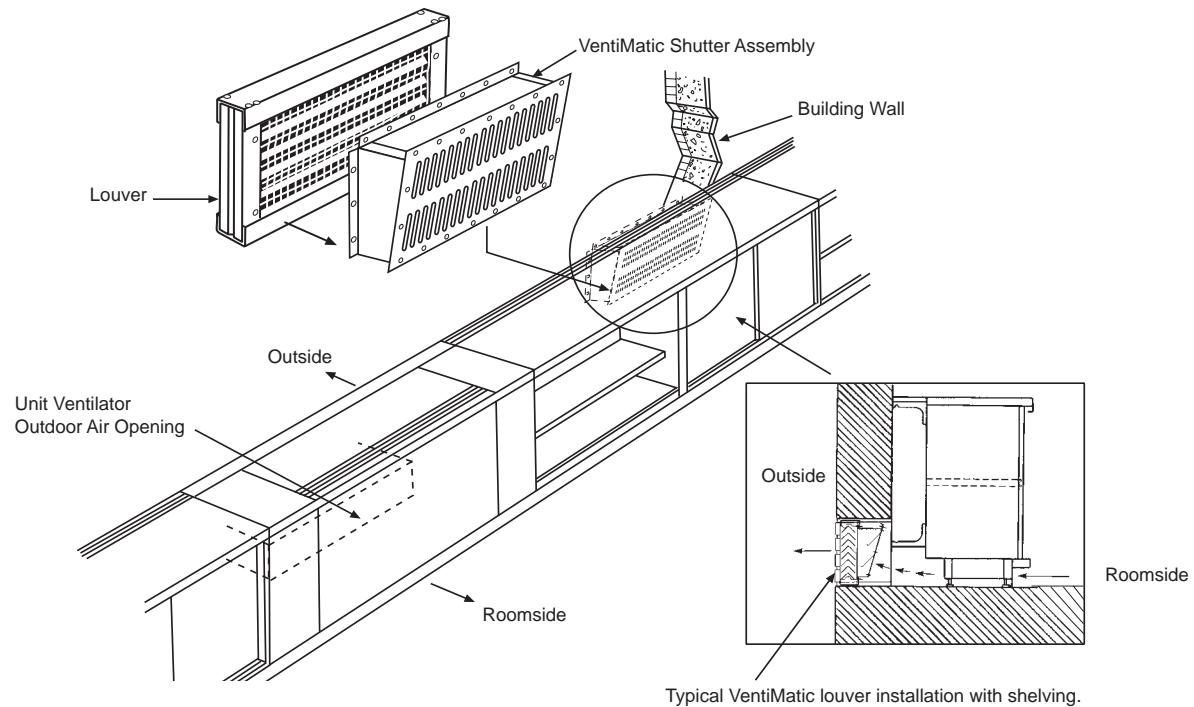
Typical Floor Unit Installation

Figure 32 – Typical Classroom Unit Ventilator Installation And Louver Details (see installation section for typical warnings and cautions)



Typical VentiMatic™ Shutter and Draftstop™ Installation

Figure 33 – Typical VentiMatic Shutter Assembly Installation (see installation section for typical warnings and cautions)



Meeting IBC Seismic Requirements

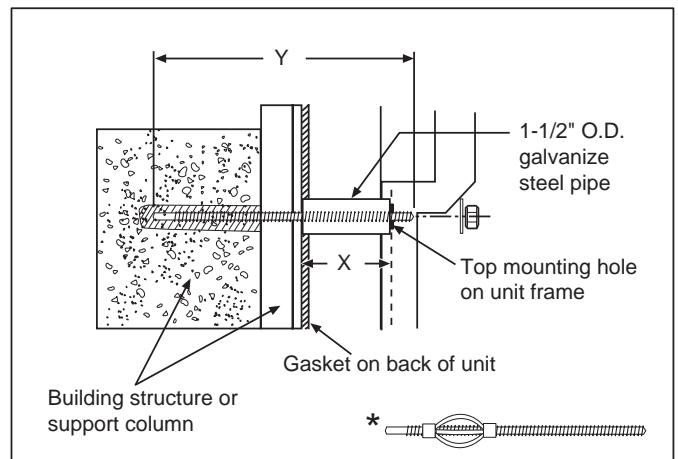
Daikin unit ventilators can be specified, as follows, to meet International Building Code seismic requirements:

- All components included in these unit ventilators are designed, manufactured and independently tested, rated and certified to meet the seismic compliance standards of the International Building Code.
- Components designated for use in systems that are life safety, toxic, high hazard, combustible or flammable meet the on line, anchorage and load path requirements for life safety as defined in IBC sections 1621.1.6, 1621.3.3, 1707.7.2. and IBC Commentary, Volume II, section 1621.1.6, IBC notes pertaining to the release of hazardous material.
- All components used as part of a system other than the above meet as a minimum, all load path and anchorage standards for components as outlined in IBC section 1621.3.3 & 1707.7.2.
- All completed component assemblies are clearly labeled for field inspection. Seismic Compliance Labels include the manufacturer's identification, designation of certified models, definitive information describing the product's compliance characteristics, and the Independent Certifying Agency's name and report identification.

In addition to all seismic requirements for IBC Certification listed elsewhere in the project specification, submittals for these units include:

1. A Certificate of Compliance from the Independent Certifying Agency clearly indicating that components supplied on this project are included in the component manufacturer's Certificate of Compliance.
2. Clear installation instructions including all accessory components that are part of the overall component installation.

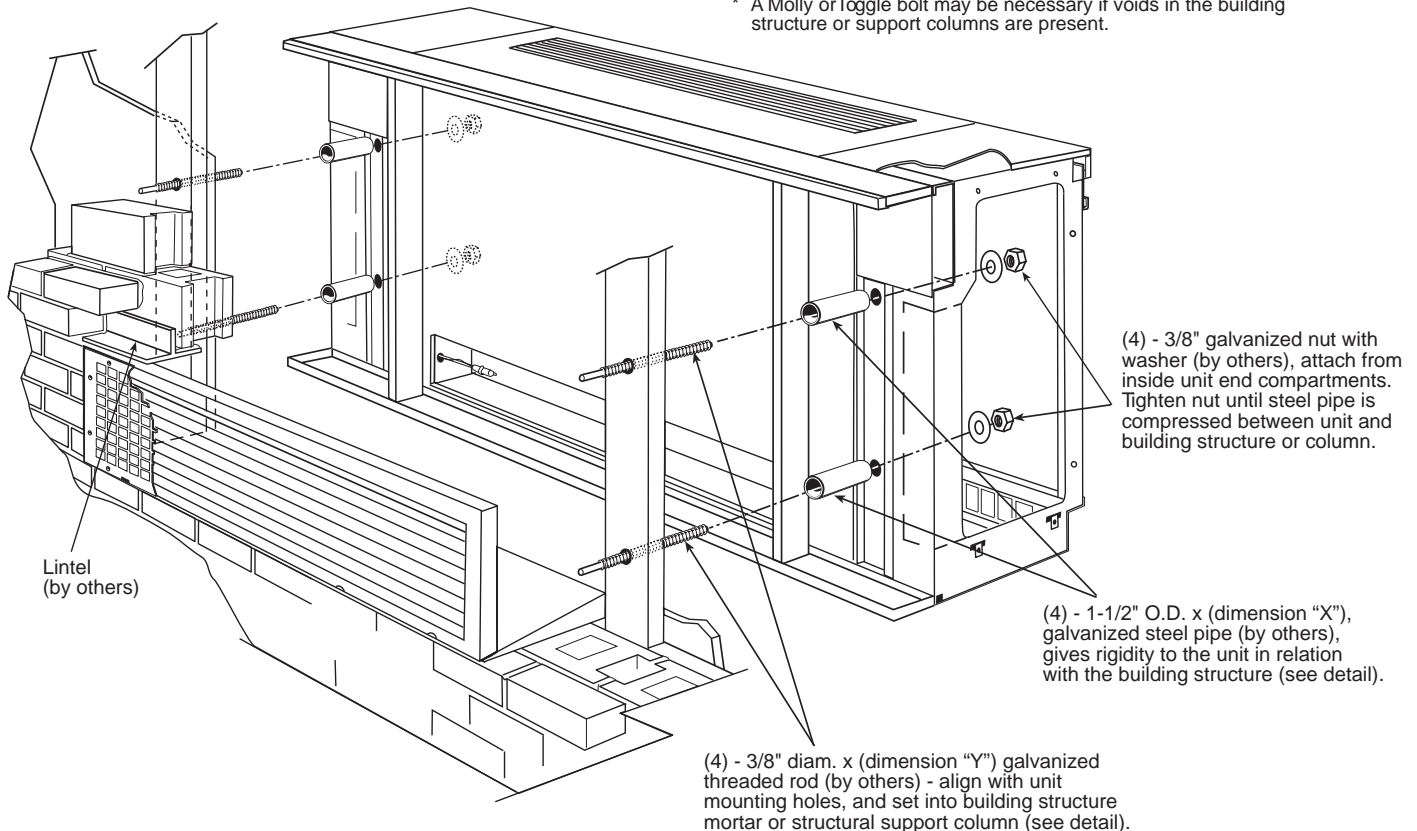
DETAIL



NOTE Dimensions "X" and "Y" to be determined by installing contractor based on fit up requirements of job.

* A Molly or Toggle bolt may be necessary if voids in the building structure or support columns are present.

Figure 34 - Typical IBC Seismic Installation

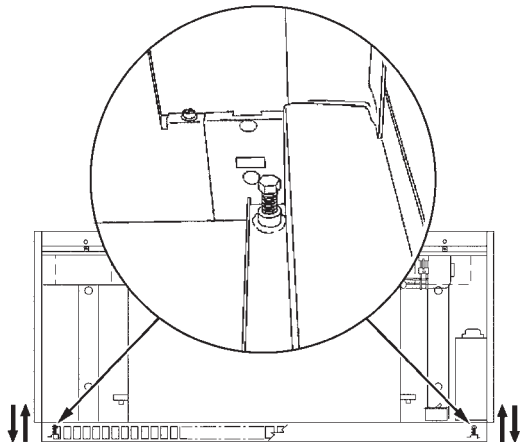


Unit Ventilator Installation

Before setting the unit ventilator in position, be sure that field-supplied electrical connections are in place, de-energized and in accordance with the plans.

Move the unit ventilator into position against the wall surface. Check to see that the unit ventilator is level from end to end and back to front. Using a 4' level is recommended. Leveling bolts are located at each end of the front kickplate (see figure 35).

Figure 35 - Leveling Legs Location



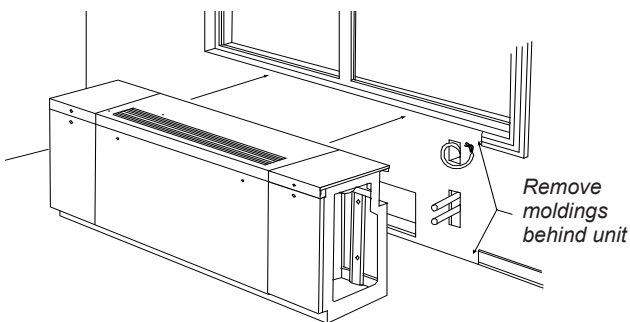
NOTICE

Face and Bypass damper set-up is required at start-up. Failure to properly set-up Face and Bypass damper can result in control problems and unit damage not covered by warranty. Refer to Service Bulletin, UV-SB-106507312.

CAUTION

Unit must be anchored to an internal wall column or other suitable support (see figure 32, page 14)

Figure 36 - Setting The Unit Ventilator In Place



Refer to figure 32 and figures 26 and 27 and attach the unit ventilator to the wall through the four (4) mounting holes provided, using field-supplied fasteners appropriate to the wall construction and the washers provided in the brown envelope with these instructions (figure 37). Envelope also contains allen wrench to provide access to unit. Push the unit ventilator tight to the wall structure so that the outdoor air seals are compressed. Secure the wall fasteners to prevent the unit ventilator from moving and tipping over.

Figure 37 - Shipping Envelope Contents.



Make Piping Connections

CAUTION

Be sure the hot and chilled water supply and return system are thoroughly flushed and cleaned before connecting piping to the unit ventilator. Debris in the lines can damage the unit.

For All Systems

Be sure to install the control valve(s) on the correct unit ventilator. Indiscriminate mixing of valves in the field can result in valves improperly sized for the desired flow rate, which can result in poor operation and coil freezeups. Install control valve so there is at least 2" (51 mm) minimum clearance to remove the actuator from the valve body. Be certain that the control valve is installed correctly, with its orientation vertical. Valves should be installed at least 5° off center.

CAUTION

Be certain that the control valves are installed with the proper port orientation to provide proper flow and fail safe operation. Incorrect installation can result in improper unit operation, and/or the possibility of coil freeze-up.

With future servicing considerations in mind, use standard, field-supplied shutoff valves and union connections; this permits easy removal of the coil or control valve if servicing is required.

WARNING

While brazing, have an extinguisher readily available. Wear appropriate eye and hand protection. Ensure all areas with shared ventilation have ample fresh air ventilation.

Proper ventilation is required for brazing. When brazing, be sure to protect unit ventilator components from overheating damage (melting insulation, also damage to valves, wiring, electronics, sensors, etc.). Before filling, be sure to flush all piping adequately so that all debris is removed. Debris can prevent proper valve operation, resulting in overheating, overcooling, etc.

Ensure proper insulation of supply and return piping. Proper insulation prevents loss of unit ventilator capacity, overheating of end compartment, and / or moisture dripping.

The piping to and from the unit must be protected from outside air and freeze conditions. The piping must be suitably insulated for condensation or heat lose or gain. Penetrations entering the unit end compartments must be fitted/sealed for unit integrity.

Water Coil Connections

Hook up water piping in accordance with Figure 38 and 39 for hot water and chilled water coil connections.

CAUTION

Failure to install water piping to coils properly can result in improper unit operation and coil freeze-ups.

NOTICE

Use piping shut off valves and connection unions for future servicing to the coil supply and return stubs, instead of hard piping. This permits easy removal of the coil or control valve if servicing is required.

Figure 38 - Hot Water Coil Connections

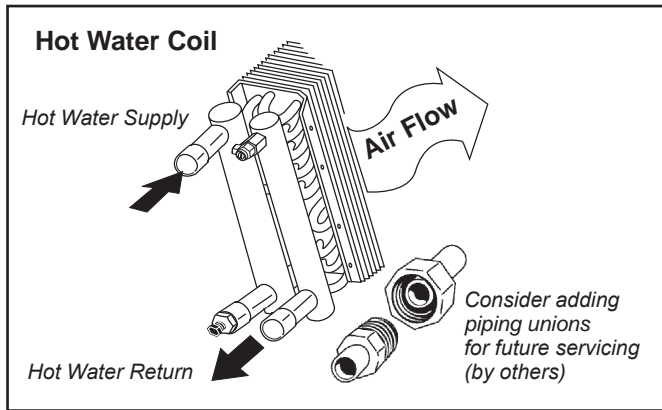


Figure 39- Chilled Water Coil Connections

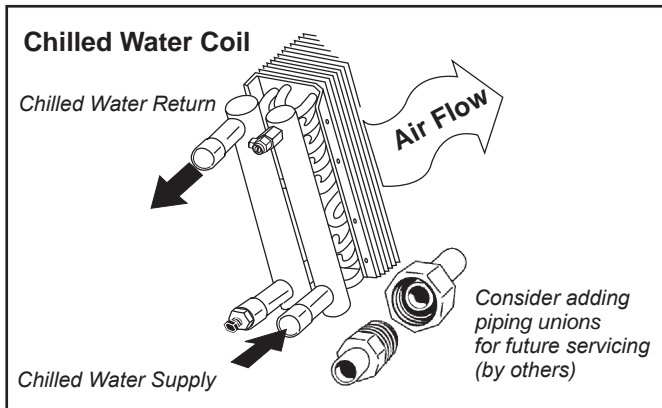
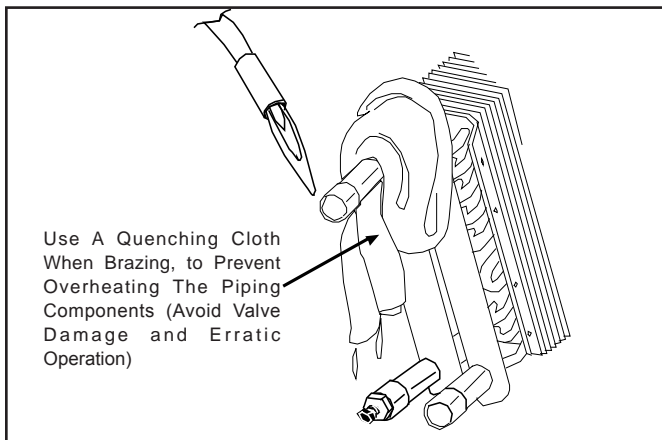


Figure 40 - Protect Components From Overheating Before Brazing



2-pipe Chilled Water/Hot Water Systems

After making the piping connections, securely attach and insulate the water-in temperature sensor (S5) to the water coil supply line. The sensor should be located on the water supply line in an area where there is continuous water flow. The sensor hangs loose in the same end compartment as the coil connections. This sensor must be attached correctly for proper unit operation.

After Brazing

Install provided donut shaped insulation seals around pipe fittings, by removing white backing. Press seals up to coil partition to seal gaps in partition insulation.

CAUTION

Donut insulation seals must be installed for proper air flow through the coil.

For Water Systems

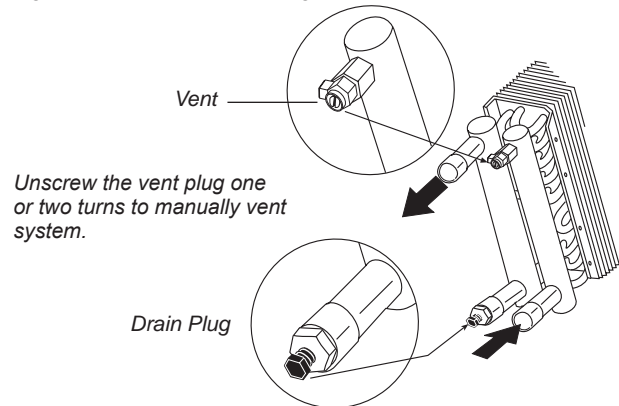
After flushing piping adequately, so all debris is removed, fill the system.

WARNING

Water system under pressure. Keep face and body parts well away from vent.
Unscrew the vent plug only one or two complete turns, and vent slowly. Water pressure can result in severe personal injury.

At initial operation, vent manually by unscrewing the vent plug one or two turns, figure 41. After venting, tighten the vent plug firmly.

Figure 41 - Vent and Drain Plug



Coil Headers, Locations Heating Only

Figure 42 - Hot Water Heating Only Unit (Coils 65, 66, 67)

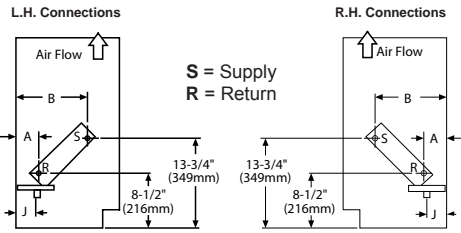
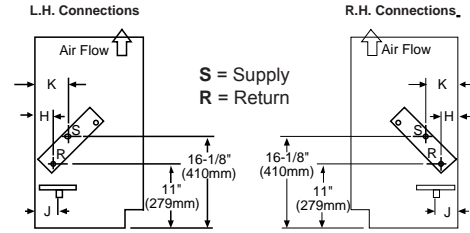


Figure 43 - Steam Heating Only Unit (Coils 68, 69, 78, 79)



Note: For opposite end drain steam coils (code 78,79) Return (R) is 7/4\"(184mm) from bottom of unit and H - 2\"(51mm) from back of unit.

Figure 44- Electric Heating Only Unit (Coils 12, 13)

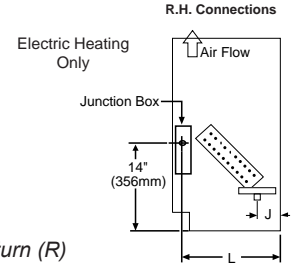


Table 4 - Heating Only – Coil Position/Combinations In Air Stream (one coil per position) Note: X indicates Available.

First Position in Air Stream		Second Position in Air Stream		Face and Bypass		Valve					
65	66	67	68	69	78	79	12	13	AVS	AVV	AVV Elect..
									X	X	
											X

Heating Coils

- 65 = 1-Row Hot Water Coil
- 66 = 2-Row Hot Water Coil
- 67 = 3-Row Hot Water Coil
- 68 = Low Capacity Steam Coil
- 69 = High Capacity Steam Coil
- 78 = Opposite End Drain Low Capacity Steam Coil
- 79 = Opposite End Drain High Capacity Steam Coil
- 12 = Low Electric Heat Coil
- 13 = High Electric Heat Coil

Cooling Coils

Z = None

Cooling Only

Figure 45 - Chilled Water Only Unit (Coils S, W, V)

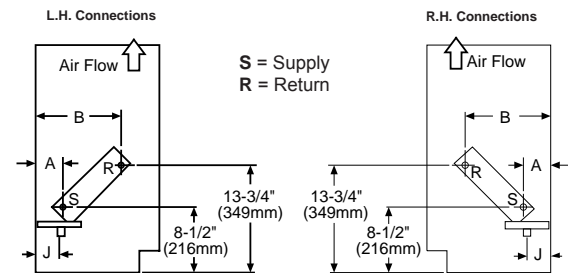


Figure 46 - Direct Expansion Cooling Only Unit (Coil G)

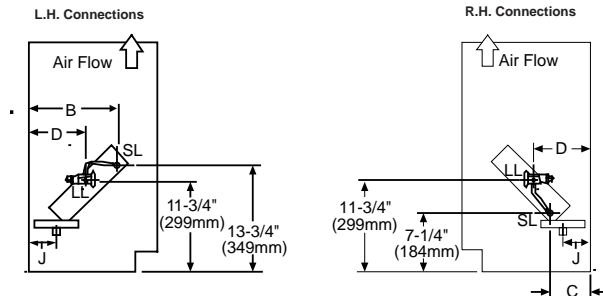


Table 5 - Cooling Only – Coil Position/Combinations In Air Stream (one coil per position) Note: X indicates Available.

First Position in Air Stream		Second Position in Air Stream		Face and Bypass		Valve			
Y	V	S	W	G	00	00	00	AVS	AVV
								X	X
									X

Cooling Coils

- V = 2-Row CW Coil
- S = 3-Row CW Coil
- W = 4-Row CW Coil
- G = Direct Expansion Coil
- Y = 5-Row CW Coil

Heating Coils

00 = None

Table 6 - Dimensions

Unit Depth	Dimensions											
	A	B	C	D	E	F	G	H	I	J	K	
in	16%	3%	12 1/4	4 7/8	7 3/4	1 5/8	10 5/8	2 3/4	2 7/8	5 5/8	3	5
mm	422	95	311	124	198	41	257	70	73	143	76	127
in	21 1/2	9	17 1/2	10 1/2	13	6 3/4	15 3/4	8	8 3/4	10 3/4	8 3/4	10 3/4
mm	556	229	445	257	330	175	391	203	206	276	210	260

Table 7 - DX Coil (G) Connection Tubing

Unit Series	S07	S10	S13	S15
Suction Line O.D. (in/mm)	3/4 19	3/4 19	7/8 22	7/8 22
Liquid Line O.D. (in/mm)	1/4 6.35	1/4 6	3/8 10	3/8 10

Notes:

- All coils have same end supply and return connections.
- Steam coils have a factory installed pressure equalizing valve and a 24" (610mm) long pressure equalizing line which terminates in a 1/2" M.P.T. fitting.
- Steam/hot water connections may be same end as cooling coil connections, but they are recommended to be opposite end to facilitate piping. (Must be opposite end when using AAF controls.)
- Cooling condensate drain pan is shipped sloped down towards the cooling coil connections but is field reversible.
- Electric heating coil power connections are right end only. Junction box has 1" (25mm) and 2" (51mm) (trade size) knockouts, 10 1/2" (267mm) from right end of the unit.
- For limitations with coil combinations see tables 4, 5, 8 and 9.
- Coil stubs are 7/8" I.D. (female) and terminate 9" (229mm) from the end of the unit.
- Steam coils are 1 1/8" female (sweat) connections and terminate 9" (229mm) from the end of the unit.
- DX coils (G) have O.D. sweat connections. Interconnecting tube by others. See table 7 for correct tubing size.

Coil Headers, Locations Chilled Water and Heating Coils

Figure 47 - Chilled/Hot Water (2-pipe) Unit
(Coils D, E, U)

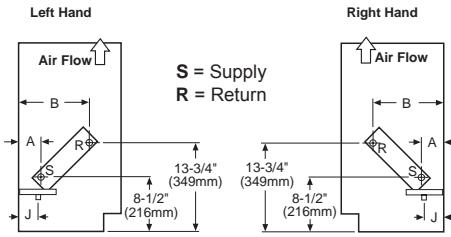


Figure 48 - Chilled Water and Hot Water Unit
(Cooling Coils S, W, V) (Heating Coils 65, 66, 67)

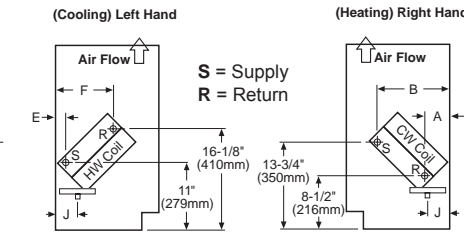
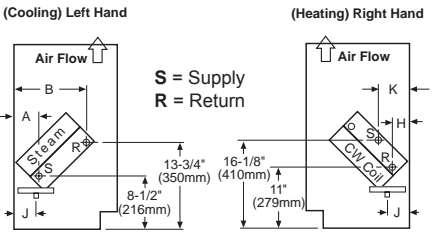


Figure 49 - Chilled Water and Steam Unit
(Cooling Coils S, V)
(Heating Coils 68, 69, 78, 79)



Note: For opposite end drain steam coils (code 78,79) Return (R) is 7 1/4" (184mm) from bottom of unit and H - 2" (51mm) from back of unit. (see table 6 for dimensions)

Direct Expansion Coils and Heating Coils (See Table 7 for Direct Expansion (DX) Coil)

Figure 50 - Direct Expansion (G) and Hot Water Unit
(Cooling Coil G) (Heating Coils 65, 66, 67) (Not Reheat)

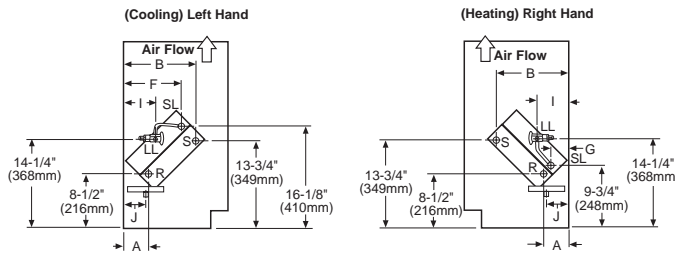


Figure 51 - Direct Expansion (G) and Steam Unit
(Cooling Coil G) (Heating Coils 68, 69, 78, 79)

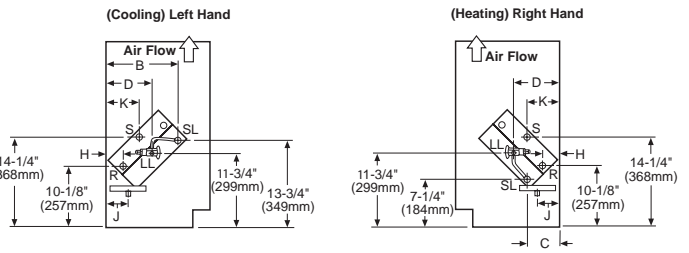


Figure 52 - Direct Expansion and Electric Heating
(Cooling Coils G) (Heating Coils 12, 13)

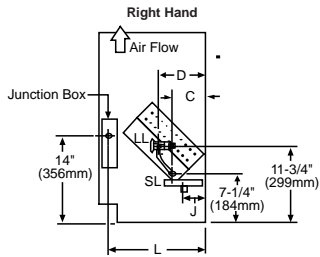


Figure 53 - Chilled Water (1st Position) and Electric Heating
(Cooling Coils V, S, W) (Heating Coils 12,13)

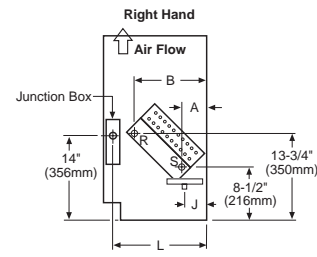


Table 8 - Heat/Cool Position/Combinations In Air Stream (one coil per position) Note: X indicates Available.

First Position in Air Stream	Second Position in Air Stream	Face and Bypass		Valve	
		AVS	AVS Elect..	AVV	AVV Elect.
F U D E	00	X		X	
65 66 67	V S	X		X	
65 66	W	X		X	
65 66 67	G	X		X	
G	12 13				X
V S W	12 13				X
V S W	12		X		
G V S	68 69 78 79	X		X	
65	Y	X		X	

Heating Coils

- 65 = 1-Row Hot Water Coil
- 66 = 2-Row Hot Water Coil
- 67 = 3-Row Hot Water Coil
- 68 = Low Capacity Steam Coil
- 69 = High Capacity Steam Coil
- 78 = Opposite End Drain Low Capacity Steam Coil
- 79 = Opposite End Drain High Capacity Steam Coil
- 12 = Low Electric Heat Coil
- 13 = High Electric Heat Coil
- 00 = None

Cooling Coils

- U = 2-Row CW/HW 2-Pipe Coil
- D = 3-Row CW/HW 2-Pipe Coil
- E = 4-Row CW/HW 2-Pipe Coil
- F = 5-Row CW/HW 2-Pipe Coil
- V = 2-Row CW Coil
- S = 3-Row CW Coil
- W = 4-Row CW Coil
- Y = 5-Row CW Coil
- G = Direct Expansion Coil
- Y = 5-Row CW Coil

See Notes and Tables 6 and 7 on page 18

Coil Headers, Locations

Reheat

Figure 54 - Chilled Water and Hot Water Unit
(Cooling Coils S, W, V)
(Heating Coils 65, 66, 67)

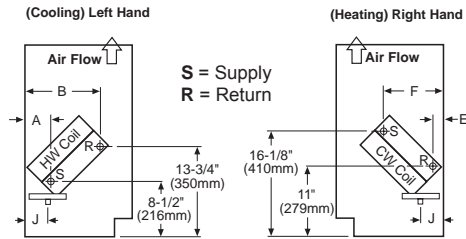


Figure 55 - Chilled Water and Steam Unit
(Cooling Coils S, V)
(Heating Coils 68, 69, 78, 79)

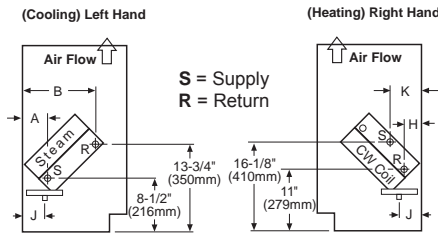
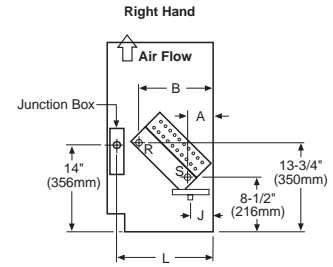


Figure 56- Chilled Water and Electric Heating
(Cooling Coils V, S, W)
(Heating Coils 12, 13)



Note: For opposite end drain steam coils (code 78,79) Return (R) is 7 1/4" (184mm) from bottom of unit and H - 2" (73mm) from back of unit.

Figure 57 - Direct Expansion (G) and Hot Water Unit
(Cooling Coil G)
(Heating Coils 65, 66, 67)

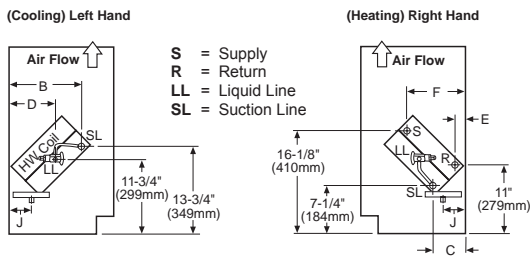


Figure 58 - Direct Expansion (G) and Steam Unit
(Cooling Coil G)
(Heating Coils 68, 69, 78, 79)

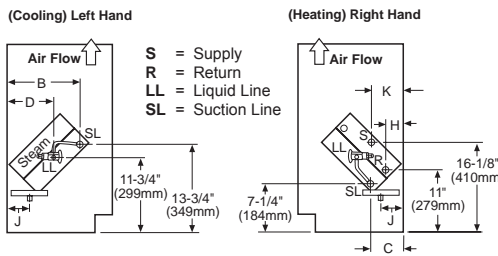


Figure 59 - Direct Expansion and Electric Heating
(Cooling Coils G)
(Heating Coils 12, 13)

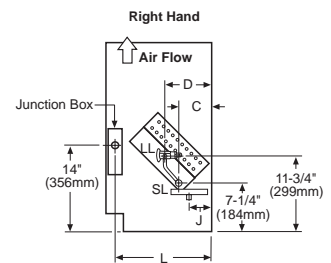


Table 9 - Reheat Coil Position/Combinations In Air Stream (one coil per position) Note: X indicates Available.

First Position in Air Stream	Second Position in Air Stream	Face and Bypass		Valve	
		AVB	AVR	AVR Elect.	
V S	65 66 67 68 69 78 79	X	X		
W	65 66	X	X		
G	65 66 67 68 69 78 79		X		
G	12 13			X	
V S W	12 13				X
Y	65	X	X		

Heating Coils

- 65 = 1-Row Hot Water Coil
- 66 = 2-Row Hot Water Coil
- 67 = 3-Row Hot Water Coil
- 68 = Low Capacity Steam Coil
- 69 = High Capacity Steam Coil
- 78 = Opposite End Drain Low Capacity Steam Coil
- 79 = Opposite End Drain High Capacity Steam Coil
- 12 = Low Electric Heat Coil
- 13 = High Electric Heat Coil

Cooling Coils

- V = 2-Row CW Coil
- S = 3-Row CW Coil
- W = 4-Row CW Coil
- Y = 5-Row Coil
- G = Direct Expansion Coil

Typical Valve Packages

The optional factory-supplied Daikin Control Valve(s) for water applications can be either 2-way or 3-way type, and is / are shipped separate from the unit ventilator itself to help avoid shipping damage to the piping of the connection stub from the weight of the valve, and to provide the installer with maximum flexibility in making the field piping connection. Before proceeding, see figures 60 through 84 as applicable, as well as the job-specific piping drawings.

Notes:

1. See label furnished on 2-way valve to determine direction of flow through the valve.
2. Adhere to the port orientation shown for the 3-way valve.
3. For hot water applications and chilled water/hot water (2-pipe) applications, the 2-way valve furnished is normally piped open to the coil; the 3-way valve is piped normally open to the coil.
4. For chilled water applications, the 2-way valve furnished is normally piped closed to the coil; the 3-way valve is piped normally closed to the coil.
5. The 3-way valve is generally selected for diverting water back to the return main, where a constant pump head pressure is required.
6. All water coil stubs are 7/8" I.D. female sweat. Coil connections terminate 9" (229mm) from the end of the unit. Hot water connections may be same end as cooling coil connections, but are recommended to be at opposite ends from each other. When using MicroTech II controls, they must be at opposite ends.

Face and Bypass – MicroTech II™ 2-Way and 3-Way End-of-Cycle Valves

Figure 60 - 2-way End of Cycle Valve

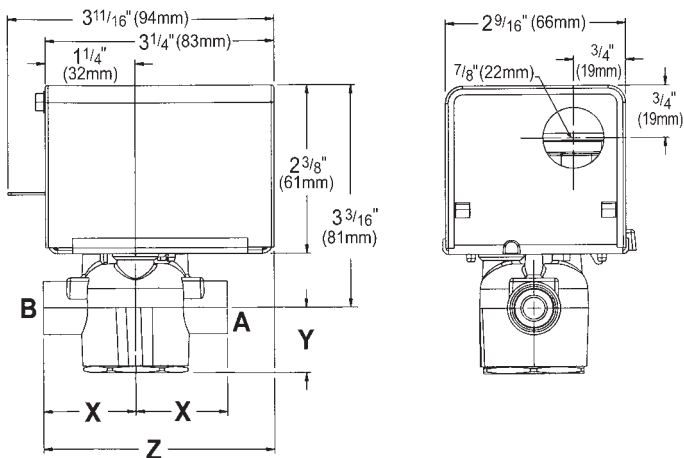


Table 10 - 2-way Actuator

Control	2 Position
Electrical	24 VAC, 50/60 Hz
Stroke	Power Stroke 9 to 11 seconds Spring return 4 to 5 seconds
Ambient	32°F to 125°F (0°C to 52°C)

Table 11 - 2-way Valve Body

Connections	3/4" FNPT, 1" FNPT
Static Pressure	300 psi (2100 kPa)
Close-Off Pressure	13 psi and 15 psi (90 kPa and 103 kPa)
Temperature	32°F to 200°F (0°C to 93°C)

Figure 61 - 3-way End of Cycle Valve

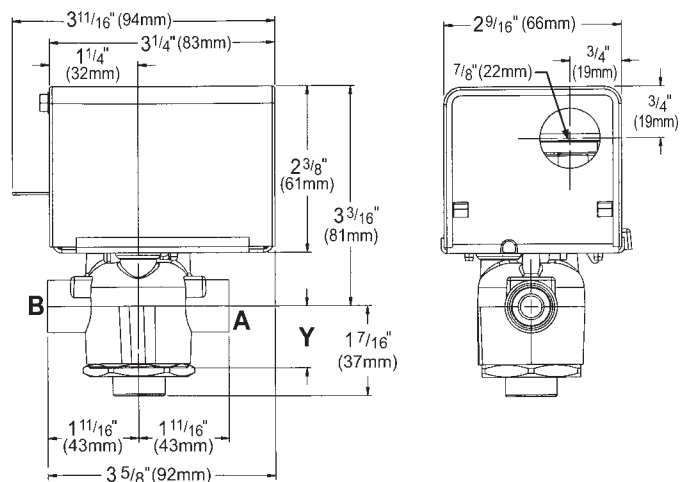


Table 12 - 3-way Actuator

Control	2 Position
Electrical	24 VAC, 50/60 Hz
Stroke	Power Stroke 9 to 11 seconds Spring return 4 to 5 seconds
Ambient	32°F to 125°F (0°C to 52°C)

Table 13 - 3-way Valve Body

Connections	3/4" FNPT
Static Pressure	300 psi (2100 kPa)
Close-Off Pressure	13 psi (90 kPa)
Temperature	32°F to 200°F (0°C to 93°C)

Table 14 - EOC Connection

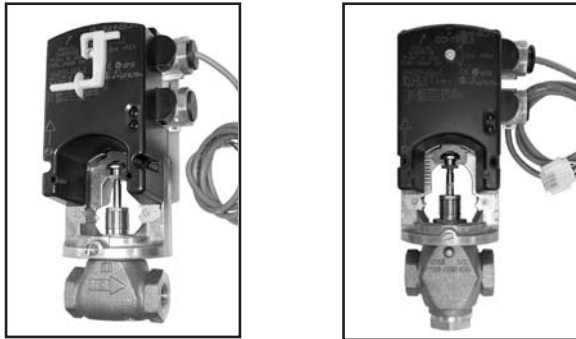
Connection	C _v	X	Y	Z
3/4" (19mm) FNPT	7.0	1 1/16" (43mm)	1 1/16" (23mm)	3 5/8" (92mm)
*1" (25mm) FNPT	7.0	1 7/8" (47mm)	1" (25mm)	3 11/16" (94mm)

* 1" valve for steam only

2-Way and 3-Way Modulating Valves – MicroTech II™

The modulating control valves for MicroTech II are designed to regulate the flow of hot water, chilled water and steam. They consist of a bronze body valve with a spring return, floating point actuator. The optional valve accessory is shipped separate from the unit ventilator for field installation to prevent shipping damage and to provide flexibility in making the field piping connection.

Figure 62 - 2-Way and 3-Way Modulating Valve Actuators



2-Way Modulating Valve

3-Way Modulating Valve

Table 15. Actuator Specifications

Control	Floating Point Modulating
Electrical	20 to 30 VAC at 50/60 Hz or 24 VDC ± 10%
Transformer	12 VA (class 2 power source)
Stroke	29/32 in. (23mm) max. 76 seconds
Spring Return	4 to 9 seconds at room temperature (stem up)
Operating Temperature	35 to 250°F (2 to 121°C); 15 psig (103 kPa) saturated steam

Table 16. Valve Body Specifications

Static Pressure	Water	400 psig (2.756 ,PA) up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	38 psig (262 kPa) Saturated steam at 284°F
Fluid Temperature		35 to 250°F (2 to 121°C); 15 psig (103kPa) saturated steam

Table 17. 2-Way and 3-Way Modulating Valve Dimensions

Valve Size, in. (DN)	A	B			C
	N.O./N.C./Three Way	2-Way N.O.	2-Way N.C.	Three-Way	
1/2 (DN15)	3 (76)	13/16 (21)	1-9/16 (39)	1-3/16 (46)	8 (203)
3/4 (DN20)	3-7/32 (81)	15/16 (24)	1-5/8 (41)	2-1/8 (54)	8 (203)
1 (DN25)	4-1/8 (119)	1-5/32 (29)	1-3/4 (44)	2-9/16 (65)	9-7/32 (234)
1-1/4 (DN32)	4-23/32 (119)	1-11/32 (34)	2 (51)	2-25/32 (70)	9-7/32 (234)

Modulating Valve Specifications – MicroTech II™

Figure 63

2-Way Modulating Valve

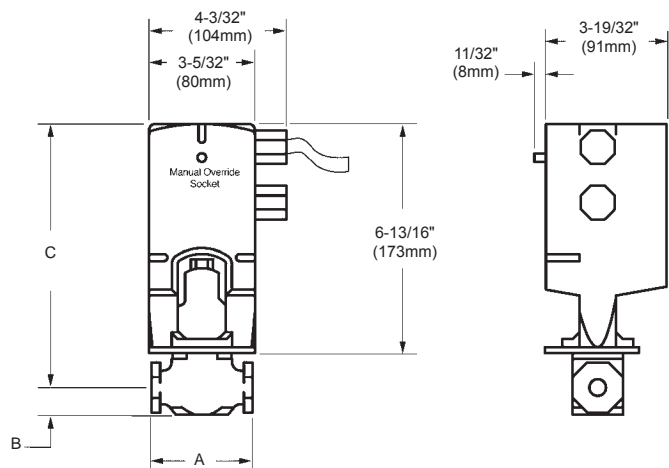
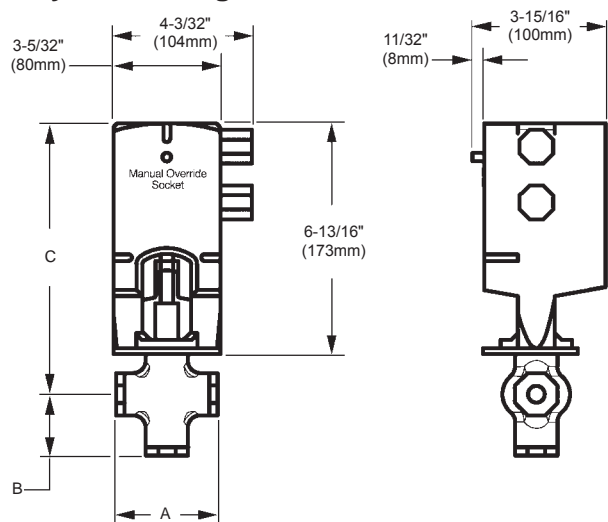


Figure 64

3-Way Modulating Valve



Steam Modulating Valve Selection (MicroTech II™)

The steam modulating control valve is expected to vary the quantity of steam through the coil. Any movement of the valve stem should produce some change in the steam flow rate. To select a modulating steam valve:

1. Obtain the supply steam inlet pressure.
2. Determine the actual heat requirement of the space to be heated.
3. Select a valve (Cv) from Table 18, which gives the capacity range

based on a 60% pressure drop at the low end of the range and 100% pressure drop at the high end of the range. For example: With 2 psig (13.8 kPa) inlet steam pressure, the valve with a Cv of 4.6, in the full open position, would have a 1.2 psig (8.3 kPa) pressure drop at 68 MBh (20.1 kW) and a 2psig pressure drop at 86 MBh (25.2 kW). The valve should have a capacity less than or equal to the space to be heated.

Table 18. Modulating 2-Way, Normally Open, Steam Valve – Pressure Drop

Cv	Connection	Valve Inlet Pressure							
		2 psig		5 psig		13.8 kPa		34.5 kPa	
		Capacity Range (MBh)				Capacity Range (kW)			
0.73	1/2" (13mm) FNPT	11	14	18	22	3.2	4.0	5.2	6.3
1.8	1/2" (13mm) FNPT	27	34	44	53	7.8	9.9	12.9	15.6
4.6	1/2" (13mm) FNPT	68	86	112	136	20.1	25.2	32.9	39.9
7.3	3/4" (19mm) FNPT	109	137	178	216	31.8	40.0	52.2	63.3
11	1" (25mm) FNPT	164	206	269	325	48.0	60.3	78.7	95.4
18.5	1 1/4" (32mm) FNPT	275	346	452	547	80.7	101.4	132.4	160.4

Note: The actuator plug-in wiring for the Steam Valve is the same as the Hot Water and Chilled Water Modulating Valve. (see figure 65)

Hot Water and Chilled Water Modulating Valve Selection (MicroTech II)

The unit ventilator control valve is expected to be able to vary the quantity of water that flows through the coil in a modulating fashion. Any movement of the valve stem should produce some change in the amount of water that flows through the coil. Oversized control valves cannot do this. For example, assume that when the control valve is fully open, the pressure drop through the coil is twice as great as the drop through the valve. In this case, the control valve must travel to approximately 50% closed before it can begin to have any influence on the water flow through the coil. The control system, no matter how sophisticated, cannot overcome this. Oversized control valves can also result in "hunting" which will shorten the life of the valve and actuator and possibly damage the coil.

To correctly select the proper Hot Water or Chilled Water Modulating Valve:

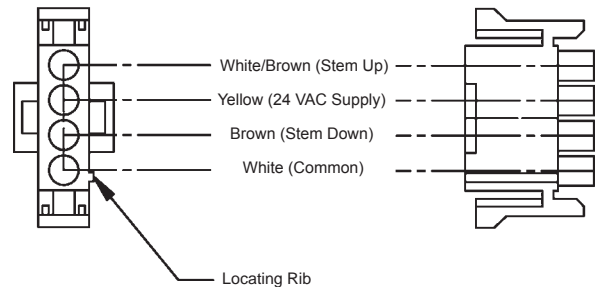
1. Determine the flow of water and the corresponding pressure drop through the coil.
2. Obtain the pressure difference between the supply and return mains.
3. Select a valve size (Cv) from Table 19 on the basis of taking 50% of the available pressure difference (at design flow) between the supply and return mains at the valve location. The valve should have a pressure drop greater than that of the coil.
4. Select a normally open valve for hot water, or 2-pipe CW/HW coils. For chilled water coils select a normally closed valve.

5. Select either a 2-way or 3-way modulating valve. The 3-way valve is generally selected for diverting water back to the return main where a constant pump head pressure is required.

⚠ CAUTION

Care must be taken with modulating valves to provide proper water flow. In freezing conditions, water flow must be maintained through the heating coil or a suitable freeze-prevention solution employed to prevent freeze-up. Similarly, the cooling coil must be drained or a suitable freeze-prevention solution employed.

Figure 65 - Actuator Wiring



Normally Open (Stem Up) – Push Stem Down to Close
Normally Closed (Stem Up) – Push Stem Down to Open

Note: The actuator spring returns the valve to the stem up position when the actuator is de-energized (off)

Table 19. 2-Way and 3-Way Modulating Valve Pressure Drop (Hot Water and Chilled Water)

Cv	Connection	Recommended Flow Rates	Valve Pressure Drop	Water Flow Rates GPM (L/s)																		
				2 (.13)	3 (.19)	4 (.25)	5 (.32)	6 (.38)	7 (.44)	8 (.51)	9 (.57)	10 (.63)	11 (.64)	12 (.76)	13 (.82)	14 (.88)	15 (.95)	16 (1.01)	17 (1.07)	18 (1.13)	19 (1.20)	20 (1.26)
0.73	1/2" (13mm)	2 GPM to 3 GPM (.13 L/s) to (.19 L/s)	WPD Ft of H ₂ O (kPa)	17.3 (51.6)	38.8 (116)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.8	1/2" (13mm)	2 GPM to 7 GPM (.13 L/s) to (.44 L/s)	WPD Ft of H ₂ O (kPa)	2.8 (8.5)	6.4 (19.1)	11.4 (34.0)	17.7 (53.1)	25.6 (76.4)	34.8 (104)	-	-	-	-	-	-	-	-	-	-	-	-	-
4.6	1/2" (13mm)	5 GPM to 16 GPM (.32 L/s) to (1.0 L/s)	WPD Ft of H ₂ O (kPa)	-	-	-	2.7 (8.1)	3.9 (11.7)	5.3 (15.9)	7.0 (20.8)	8.8 (26.3)	10.9 (32.5)	13.2 (39.3)	15.7 (46.8)	18.4 (54.9)	21.3 (63.7)	24.5 (73.1)	27.8 (83.2)	-	-	-	-
7.3	3/4" (19mm)	9 GPM to 20 GPM (.57 L/s) to (1.3 L/s)	WPD Ft of H ₂ O (kPa)	-	-	-	-	-	-	-	3.5 (10.5)	4.3 (12.9)	5.2 (15.6)	6.2 (18.6)	7.3 (21.8)	8.5 (25.3)	9.7 (29.0)	11.0 (33.0)	12.5 (37.3)	14.0 (41.8)	15.6 (46.6)	17.3 (51.6)

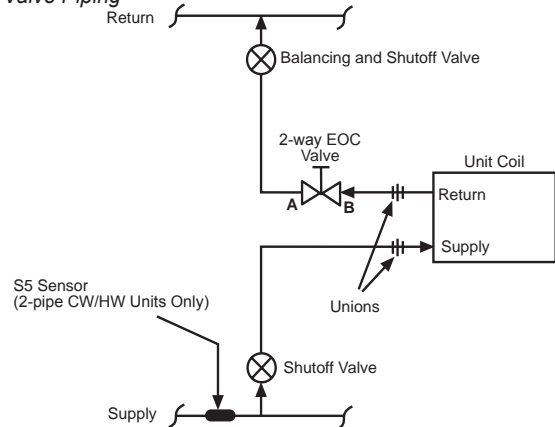
Typical Piping Arrangements

Heating valve actuators should be mounted in an upright position above the centerline of the valve body and should be piped normally open to the coil. Modulating valve actuators for hot water applications may be positioned above the valve body a maximum of 75° from the vertical. For steam applications only, mount the modulating valve actuator above the valve body at 45° from the vertical. Two-position, end-of-cycle (EOC) valves used with face and bypass damper controlled units may be positioned above the valve body a maximum of 85° from the vertical. All control valves are shipped loose to help avoid shipping damage to the piping or the coil connection stub from the weight of the valve, and to provide the installing contractor with maximum flexibility in making the field piping connections. Refer to Daikin factory instruction sheet shipped with the unit for port orientation and a piping schematic. Control valves must be installed on the units in which they are shipped. Indiscriminate mixing of valves among units can result in valves not properly sized for the desired flow rate. Control valves should be installed so that there is 2" minimum clearance to remove the actuator from the valve body. As a future service consideration, provide unions for removal of the unit coil and/or the control valve.

Heating – Hot Water End of Cycle Valve Piping

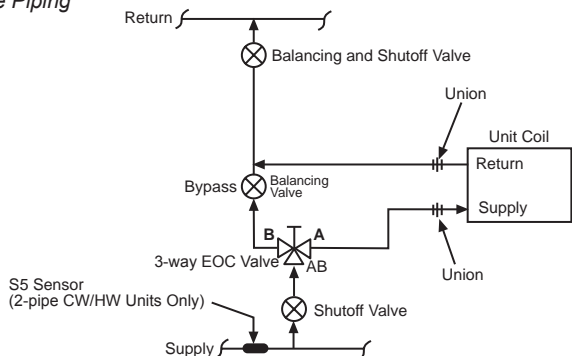
The 2-way EOC hot water or 2-pipe CW/HW valve is furnished normally open to the coil. When the valve is de-energized (off) there is full flow through the coil. Energizing the valve shuts off the water flow.

Figure 66 - 2-way EOC, Normally Open, Hot Water or 2-pipe CW/HW Valve Piping



The 3-way hot water or 2-pipe CW/HW valve is furnished normally open to the coil. When the valve is de-energized (off) there is full flow through the coil. Energizing the valve allows the water to bypass the coil.

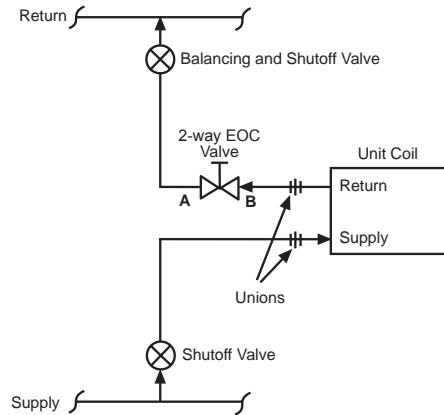
Figure 67 - 3-way EOC, Normally Open, Hot Water or 2-pipe CW/HW Valve Piping



Cooling – Chilled Water EOC Valve Piping

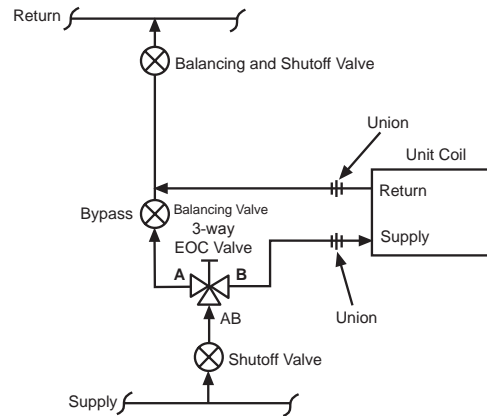
The 2-way EOC CW valve is furnished normally closed to the coil. When the valve is de-energized (off) there is no flow through the coil. Energizing the valve allows flow through the coil.

Figure 68 - 2-way EOC, Normally Closed, Chilled Water Valve Piping



The 3-way EOC CW valve is furnished normally closed to the coil. When the valve is de-energized (off) the flow bypasses the coil. Energizing the valve allows flow through the coil.

Figure 69 - 3-way EOC, Normally Closed, Chilled Water Valve Piping



For 2-pipe systems use 3-way End of Cycle Valve (EOC) so supply water is running through the circuit. The S5 sensor should be mounted on the supply water pipe.

Typical Piping Arrangements

Table 20 - Descriptions

- ① Three-way End of Cycle control valve (Daikin)
- ② Coil air vent (Daikin)
- ③ Coil drain (Daikin)
- ④ Shutoff valve (Others)
- ⑤ Balancing shutoff valve(s) (Others)
- ⑥ Supply
- ⑦ Return
- ⑧ Unions (Others)—Must disconnect below floor line
- ⑨ Two-way, End of Cycle two-position valve (Daikin)
- ⑩ Union: Half attached to coil, half attached to valve
- ⑪ Modulating control valve (Daikin)
- ⑫ All piping, fittings and unions by others (not Daikin) except as noted
- ⑬ Steam check valve and pressure equalizing line (Daikin)
- ⑭ Float and thermostatic steam trap (Others)
- ⑮ Supply and return coil connection and stub-up unions by others

Typical Water Coil Piping - EOC Valve Piping

Figure 70 - Face and Bypass With 3-way End-of-Cycle Valve (Piping Within Unit End Compartment)

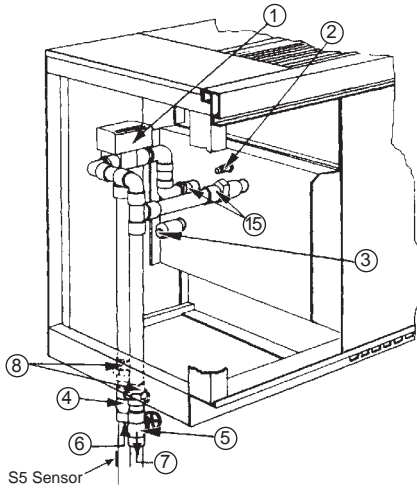
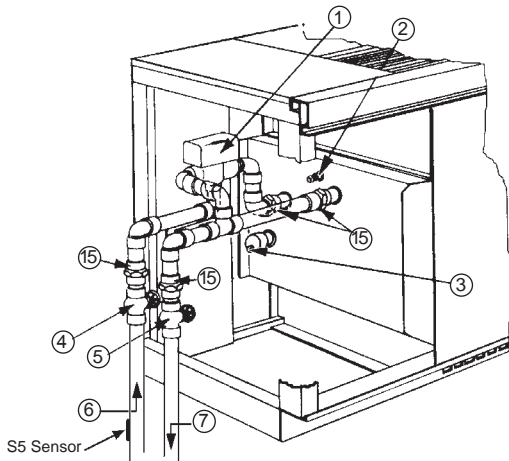


Figure 71 - Face and Bypass With 3-way End-of-Cycle Valve (Piping Outside Unit End Compartment)



Steam – Typical Modulating Valve Piping

The optional factory supplied Daikin MicroTech II™ 2-way Modulating steam valve is furnished normally open to the coil. When the valve is de-energized (off) there is full flow through the coil. Energizing the valve reduces the steam flow in a modulating fashion.

CAUTION

Refer to the arrow on the modulating valve body to determine the direction of flow. If the valve is mounted improperly, the unit will not operate properly and damage to the valve may result.

The valve should be installed so that there is a 2" (51mm) minimum clearance to remove the actuator from the valve body. Provide unions for removal of unit coil and/or control valve as a future service consideration.

Steam connections may be same end as cooling coil connections, but are recommended to be opposite end to facilitate piping. When using MicroTech II controls, they must be opposite end. The modulating valve accessory must be field installed on the unit for which it was selected.

Figure 72 - Typical 2-Way Steam Modulating Valve Piping

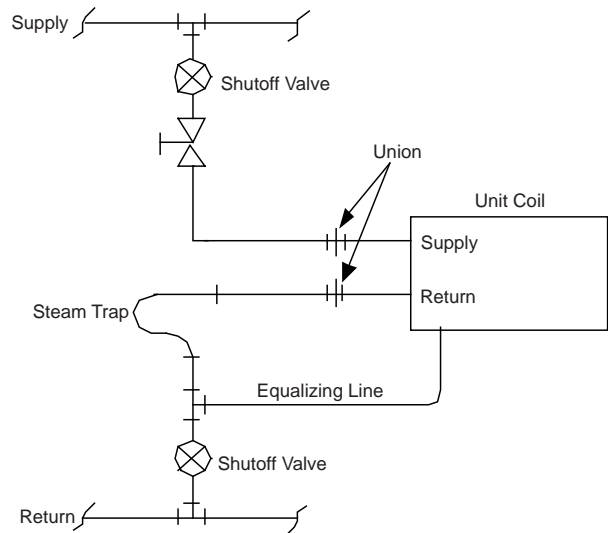


Figure 73 - Same End Connections – Model AV 68/69 Coils

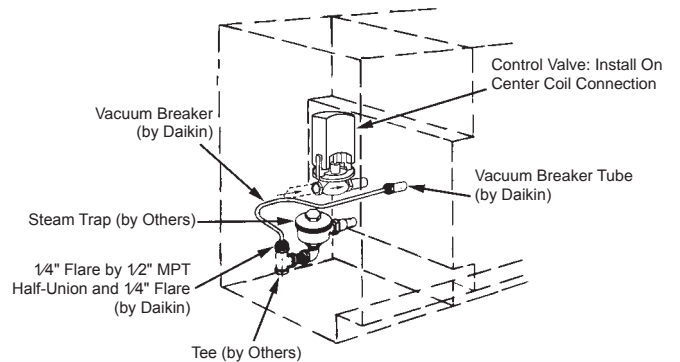
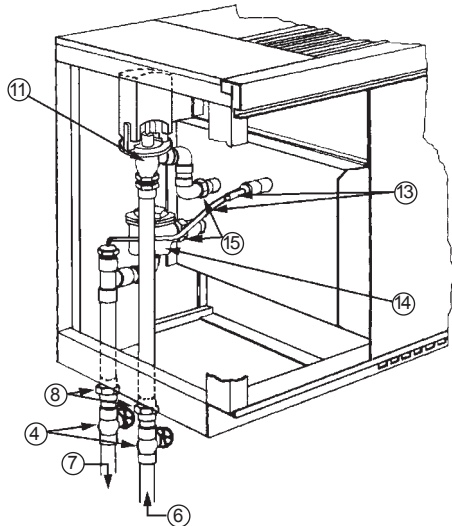


Figure 74 - 2-Way Steam Modulating Valve Control - Same End Drain Connection (Piping Within Unit End Compartment)



See page 25 for number designation descriptions.

In Steam Systems:

The optional factory-supplied Daikin MicroTech II™ Modulating Control Valve for steam applications is the 2-way type. It is shipped separately from the unit ventilator to help avoid shipping damage, yet provide the installer with maximum flexibility in making the field piping connection. Before proceeding, see Figures 72 through 77, as well as the job-specific piping drawings.

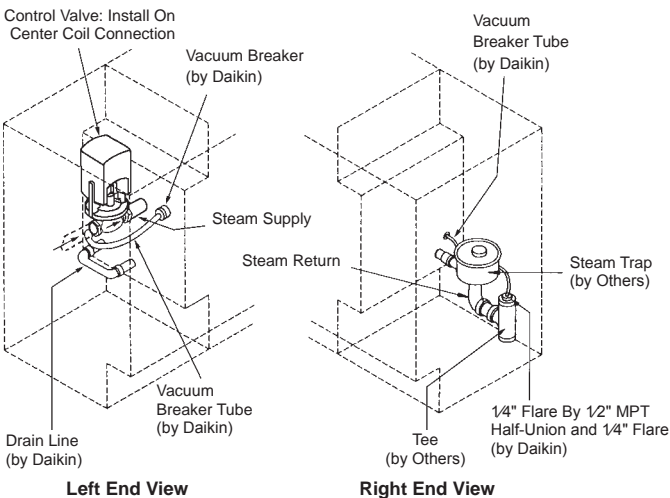
For steam applications, the 2-way, angle pattern valve furnished is normally piped open to the coil. All steam coils are 1-1/8" (34mm) female sweat connections. Coil connections terminate 9" (229mm) from the end of the unit.

Steam coils have a factory-installed pressure equalizing valve and a 24" (610mm) long pressure equalizing line that terminates in a 1/2" M.P.T. fitting.

Steam connections may be same end as cooling coil connections, but are recommended to be opposite end to facilitate piping. When using MicroTech II controls, they must be opposite end.

See Figures 73 through 77. Connect the 1/4" (6.35mm) vacuum breaker tube to the downstream return line. Make this connection downstream of the trap outlet.

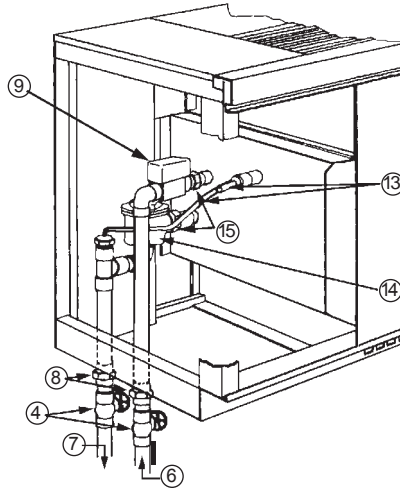
Figure 75 - Opposite End Drain Connection – (78/79 Coils)



Left Hand Steam Supply and Right Hand Steam Return (Shown)

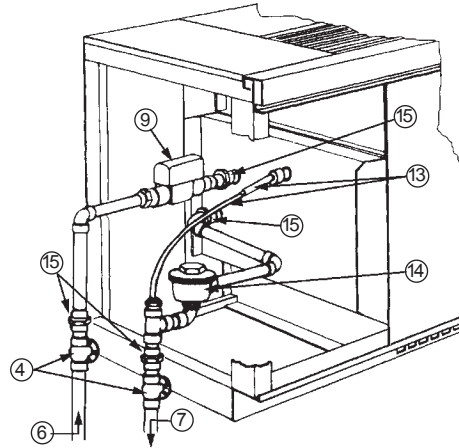
Typical Steam Coil Piping

Figure 76 - Face and Bypass With 2-way End-of-Cycle Valve - Same End Drain Connection (Piping Within Unit End Compartment)



See page 25 for number designation descriptions.

Figure 77 - Face and Bypass With 2-way End-of-Cycle Valve - Same End Drain Connection (Piping Outside Unit End Compartment)



See page 25 for number designation descriptions.

Heating – Modulating Valve Piping

Hot Water (or 2-pipe CW/HW) Modulating Valve Piping

When piping the modulating valve, refer to the arrows on the modulating valve body to determine the direction of flow. The valve should be installed so that there is a 2" (51mm) minimum clearance to remove the actuator from the valve body. Provide unions for removal of unit coil and/or control valve as a future service consideration. Hot water connections may be same end as cooling coil connections, but are recommended to be opposite end to facilitate piping. When using AAF MicroTech II controls, they must be opposite end. The modulating valve accessory must be field installed on the unit for which it was selected.

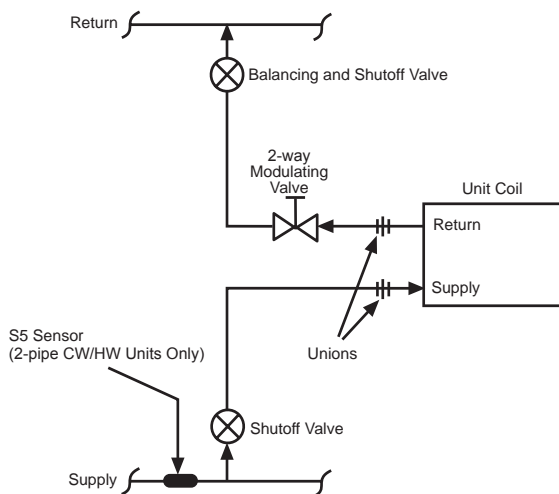
CAUTION

Refer to the arrows on the modulating valve body to determine the direction of flow. If the valve is mounted improperly, the unit will not operate properly and damage to the valve may result.

2-way Modulating, Normally Open, Hot Water or 2-pipe CW/HW Valve Piping (typical)

The 2-way Modulating hot water (or 2-pipe CW/HW) valve is furnished normally open to the coil. When the valve is de-energized (off) there is full flow through the coil. Energizing the valve reduces the volume of water flow in a modulating fashion.

Figure 78 - 2-way Modulating Valve Control, Normally Open, Hot Water or 2-pipe CW/HW Piping



3-way Modulating, Normally Open, Hot Water or 2-pipe CW/HW Valve Piping (typical)

The 3-way Modulating hot water (or 2-pipe CW/HW) valve is furnished normally open to the coil. When the valve is de-energized (off) there is full flow through the coil. Energizing the valve allows a varying amount of water to bypass the coil.

Figure 79 - 3-way Modulating Valve Control

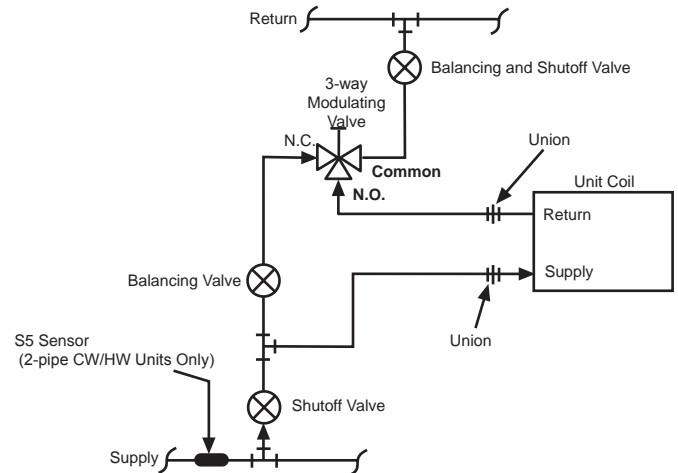
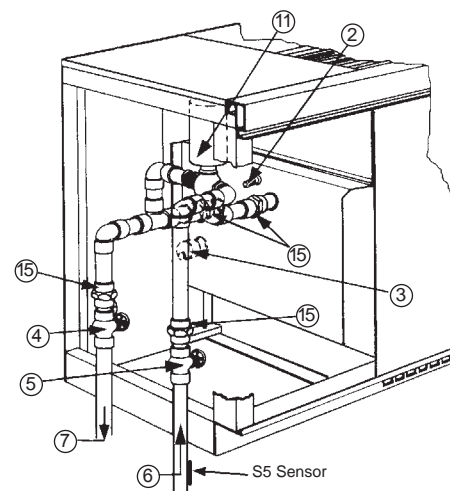


Figure 80 - 3-way Modulating Valve Control (Piping Outside Unit End Compartment)



See page 25 for number designation descriptions.

Cooling – Chilled Water Modulating Valve Piping

2-way Modulating, Normally Closed, Chilled Water Valve Piping (typical)

The 2-way Modulating chilled water valve is furnished normally closed to the coil. When the valve is de-energized (off) there is no flow through the coil. Energizing the valve allows flow through the coil in a modulating fashion.

CAUTION

Refer to the arrows on the modulating valve body to determine the direction of flow. If the valve is mounted improperly, the unit will not operate properly and damage to the valve may result.

Figure 81 - 2-way Modulating Valve Control, Normally Closed, Chilled Water Piping

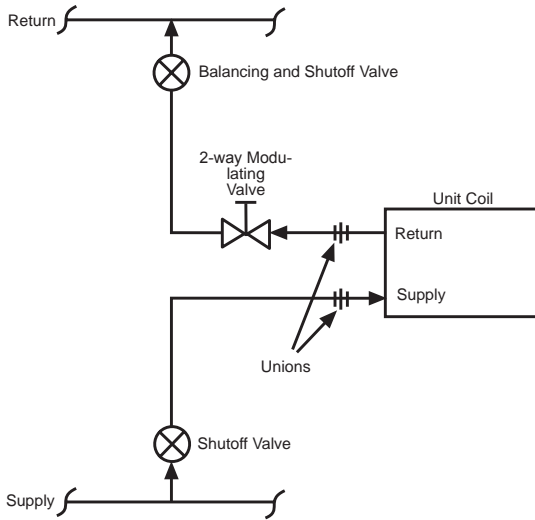
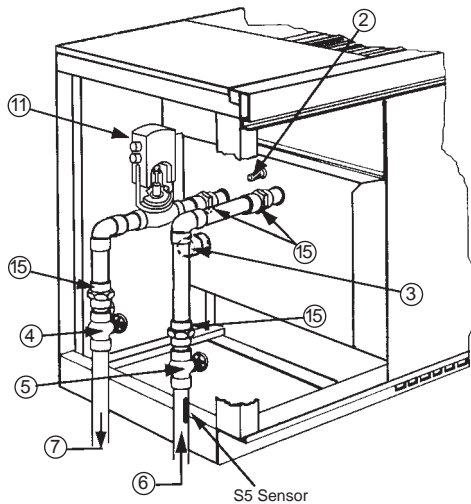


Figure 82 - 2-way Modulating, Normally Closed Chilled Water Valve Piping (Piping Outside Unit End Compartment)



See page 25 for number designation descriptions.

3-Way Modulating, Normally Closed, Chilled Water Valve Piping (typical)

The 3-way Modulating chilled water valve is furnished normally closed to the coil. When the valve is de-energized (off) the flow bypasses the coil. Energizing the valve allows flow through the coil in a modulating fashion.

Figure 83 - 3-way Modulating Valve Control, Normally Closed, Chilled Water Piping

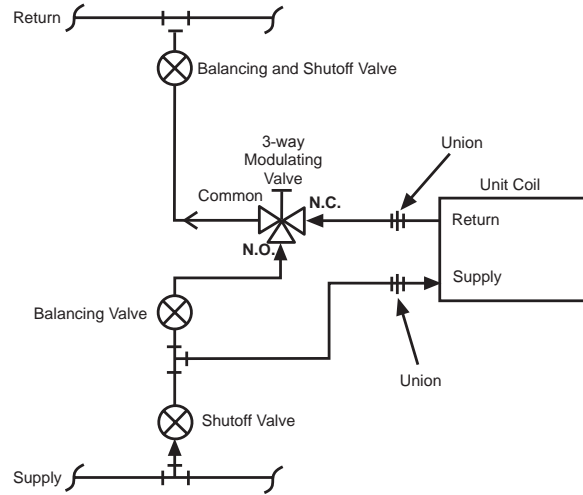
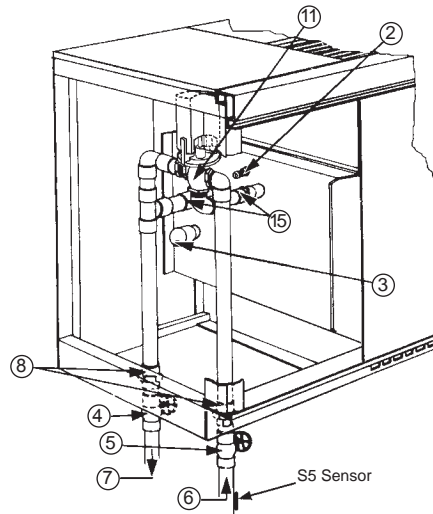
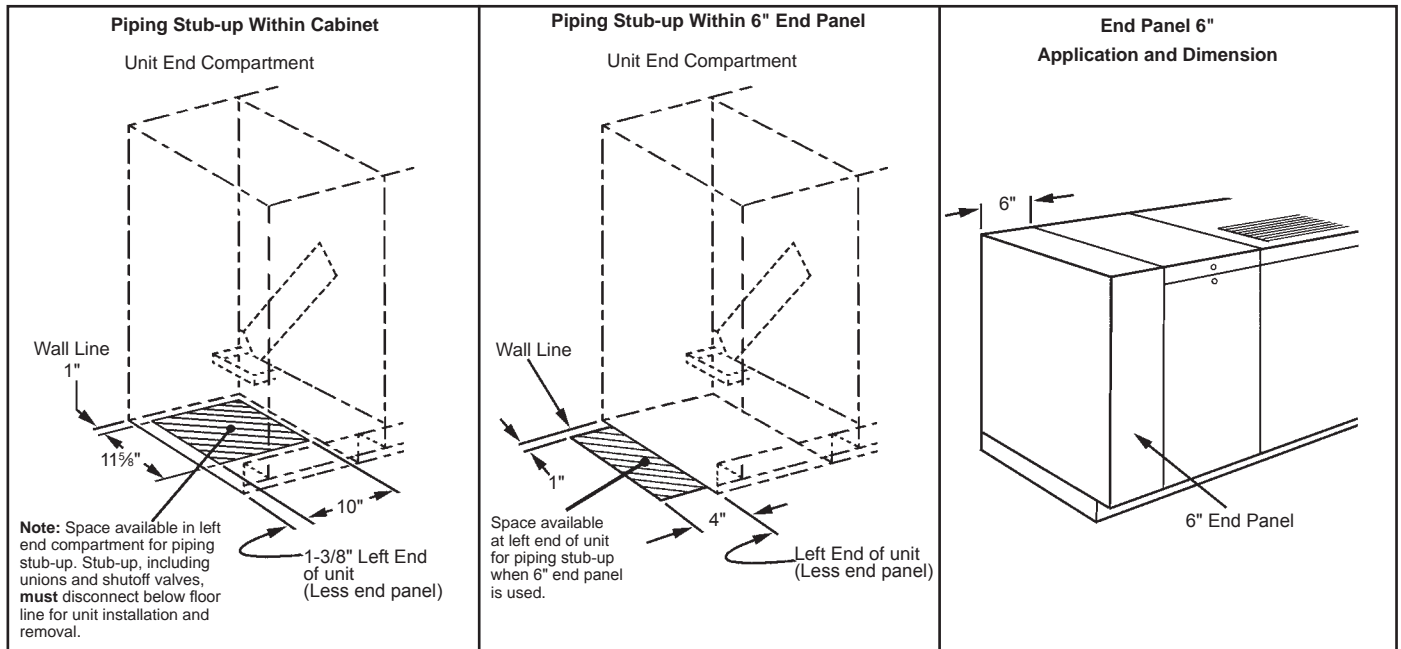


Figure 84 - 3-way Modulating Valve Control (Piping Within Unit End Compartment)



See page 25 for number designation descriptions.

Figure 85 - Piping Stub-Up Details, 6" End Panel



Condensate piping:

Daikin cooling unit ventilators are designed for condensate removal into a condensate disposal system. Do not connect the unit drain connection so that condensate exits to the outside and/or is exposed to freezing temperatures. **Installer is responsible for any damage that might be caused from freezing condensate.** In applications with an end compartment auxiliary drain pan, see the installation instructions shipped with the auxiliary drain pan itself.

Direct-Expansion (DX) R-22 Piping

DX coils have O.D. sweat connections. Interconnecting tubing is field-supplied. See Table 21, page 31 and job-specific drawings for correct tubing sizes.

CAUTION

Wrap TXV valve with a quenching cloth and remove bulb from suction line to avoid valve damage while brazing.

Proper ventilation is required for brazing. When brazing, be sure to protect unit ventilator components from overheating damage (melting insulation, also damage to valves, wiring, electronics, sensors, etc.). During brazing, bleed nitrogen through the piping. Using field-supplied material suitable for insulating refrigerant lines, wrap the thermal expansion valve (TXV) bulb and the piping between the TXV and the point where it enters the coil with at least one thickness of the material. Likewise, insulate the suction line. (See figures 87-90 for typical piping and wiring) Ensure proper insulation of supply and return piping. Proper insulation prevents loss of unit ventilator capacity, overheating of end compartment, and / or moisture dripping.

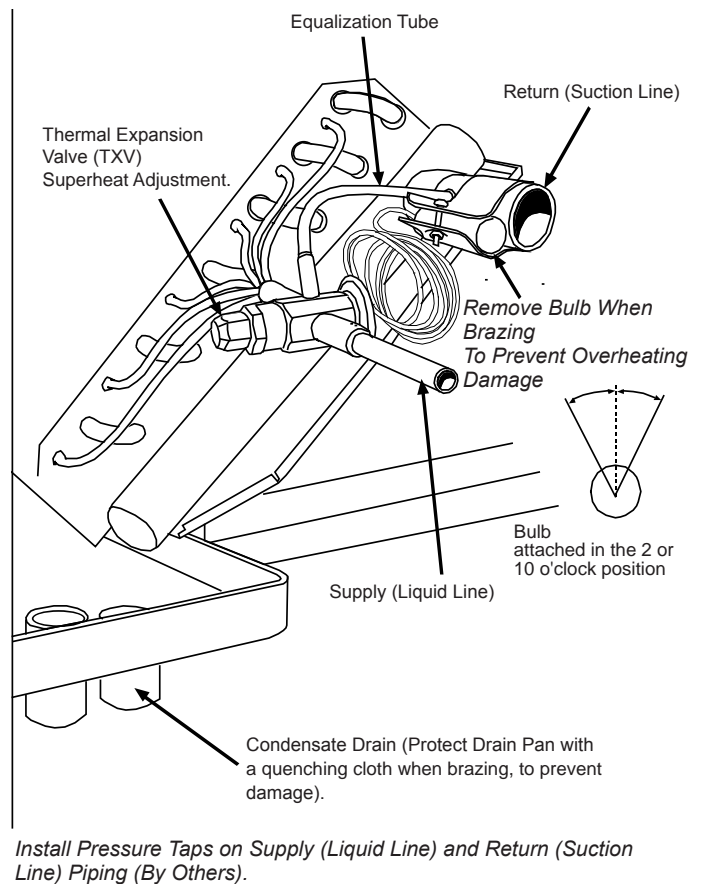
NOTICE

Ensure refrigerant pressure taps are installed in piping end compartment for proper charging and setting of the TXV valve.

Figure 86 - TXV Valve Piping Detail (Left Hand Shown)

STOP! Before Brazing

Use A Quenching Cloth When Brazing, to Prevent Overheating The TXV Valve Body (Avoid Valve Damage and Erratic Operation)



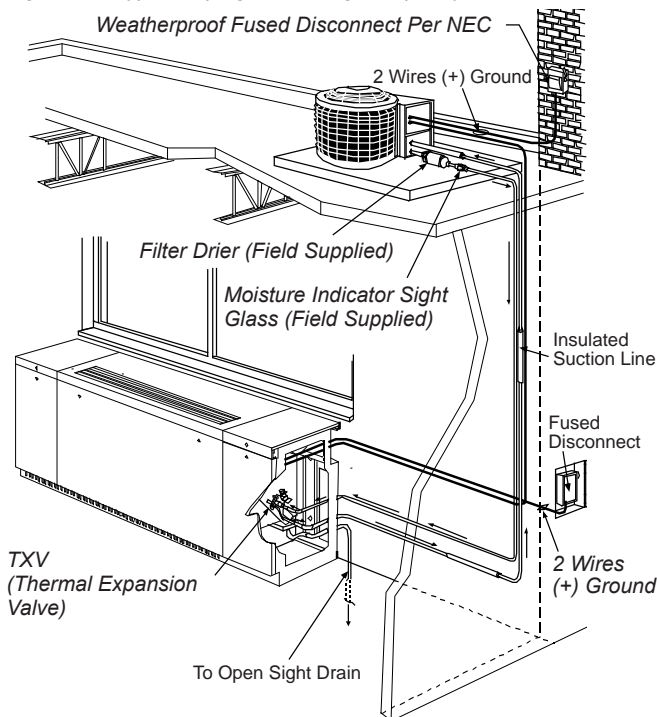
Unit Ventilator Split Systems Guidelines

The following provides basic guidelines that will provide proper system cooling and operation of an R-22 commercial DX/hot water system for school applications. DX system components must be matched and sized correctly (not oversized) for the load.

The DX system **must** incorporate the following, provided by others, for proper operation:

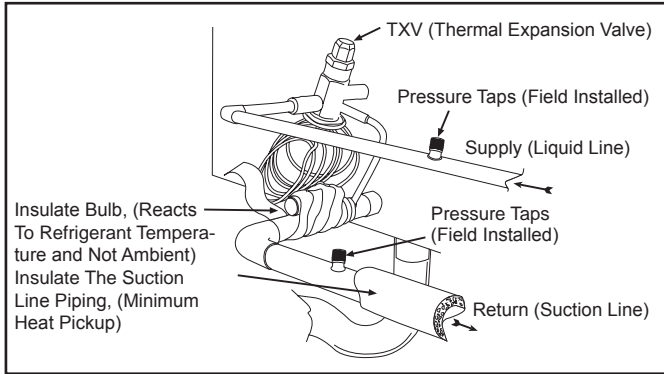
- Size piping per ASHRAE Refrigeration Handbook (correct refrigerant and compressor oil flow), see figure 88 and table 21.
- Use clean sealed refrigerant grade piping (prevent system contamination)
- Install Liquid Line Filter Drier (clean/dry system to prevent damage of operating components), see figure 89.
- Install Liquid Line Sight Glass (indicates refrigerant dryness and if liquid in liquid line - *do not use the sight glass to determine when refrigerant system is charged correctly*), see figure 88.
- Install pressure taps on the unit ventilator's liquid line and suction lines for subcooling and superheat measurements at the unit ventilator, see figures 88 and 89.
- Install High Pressure Switch at condensing unit wired in condenser control system (protects compressor and refrigerant system from excessive pressures - condenser fan failure or overcharging), see figure 90.
- Install Low Pressure Switch at condensing unit wired in the condenser control system (low refrigerant pressure switch protects the system under low refrigerant suction conditions), see figure 90.
- Install Low Ambient Temperature Switch at condensing unit wired in the condenser control system (locks out mechanical cooling below 60°F - proper system operation and free economizer usage), see figure 90.
- Incorporate Compressor Time Delay (5 minute) in condensing unit control system (reduces excessive compressor cycling), see figure 90.
- Single phase compressors - consider hard start kits to overcome non-equalized pressure in refrigerant lines.

Figure 87 - Typical Piping and Wiring for Split System



- Incorporate Low Refrigerant Temperature Sensor (T4) in condensing unit control system (T4 protects the system under low refrigerant suction conditions) see figure 90.
- UV fans must continue to run upon Low Refrigerant Temperature trip of T4 (controls by others) or S4 (MicroTech II) (evaporator air flow dissipates residual low coil surface temperatures - suction pressures raised, coil frosting reduced), see figure 90.
- UV fans must continue to run for set time period during unoccupied mode after satisfaction of the space sensor (dissipates residual low evaporator coil surface temperatures - reducing coil frosting), see figure 90.
- Lock the Face and Bypass Damper (actuator spring return to full face when de-energized) in the full face position during mechanical cooling (full air through evaporator coil reduces low refrigerant suction conditions, potential coil frosting)
- When Brazing bleed Nitrogen through piping (reduced oxides and blockage in piping/TXV)
- Use Heat Sink when brazing to prevent overheating the TXV valve body and bulb (avoid valve damage and erratic operation), see figure 86.
- Verify the TXV bulb securely attached at 2 or 10 o'clock for 7/8" and smaller diameter suction line piping (proper suction gas sensing and reduced hunting) See figure 86.
- Insulate the TXV bulb (reacts to refrigerant temperatures and not ambient), see figure 88.
- Insulate the suction line piping (minimum heat pickup), see figure 88.
- Evacuate and properly charge the refrigerant system, see figure 89.
- Charge to subcooling at the condensing unit per the condensing unit manufacturer's instructions, typically 15°F to 16°F at the unit ventilator, subcooling at 95°F outdoor ambient (results in correct refrigerant distribution at the coil to prevent low suction temperatures)
- Adjust TXV for correct superheat to eliminate/minimize hunting, see figure 91.
- Set superheat to 5°F to 7°F at the UV coil suction line when 95°F outdoor ambient (proper system superheat for optimum performance). Allow system to settle for 20 to 30 minutes to reach stable steady state conditions and then recheck/adjust superheat if necessary, see table 23.
- Compensate both subcooling and superheat for actual outdoor ambient and indoor air temperatures
- In windy areas, add wind baffles to condensing unit or build a parapet (eliminate wind effect on condensing unit coil for proper TXV refrigerant flow at lower ambient)
- For lower ambient conditions install variable speed condenser fan head pressure control to maintain head pressures between 180psig and 280psig (for proper TXV refrigerant flow at lower ambient), see figure 90.

Figure 88 - Insulate Bulb and Suction Line Piping



Checking System Charge

The system charge should be checked under design conditions [95°F outside air, 80°F/67°F (DB/WB) indoor air]. Refer to condensing unit manufacturer's guidelines.

Before adjusting refrigerant charge, verify that the unit ventilator is operating at normal design cfm. Nominal cfm is determined with a dry coil, and cfm will be reduced during air conditioning operation with a wet coil. Filters and coil must be clean and fan speed set at high temperature to obtain subcooling.

NOTICE

Typical conditions - 95°F ambient, 75 psig suction, 285 psig head pressure, 6-7°F superheat, 15°F subcooling.

Determining Subcooling

To determine correct subcooling:

1. Measure outdoor ambient. It must be between 65°F and 105°F.
2. Measure liquid line temperature 6 inches from the TXV inlet.
3. Measure liquid line pressure near the TXV.
4. Determine saturated liquid temperature from saturated temperature pressure chart (table 22).
5. Subtract measured liquid line temperature from saturated liquid temperature to obtain subcooling.
6. Adjust charge per condensing unit manufacturer recommendation to obtain 15 - 16°F subcooling.

Figure 89 - Typical Split System Evacuation/Charging Setup

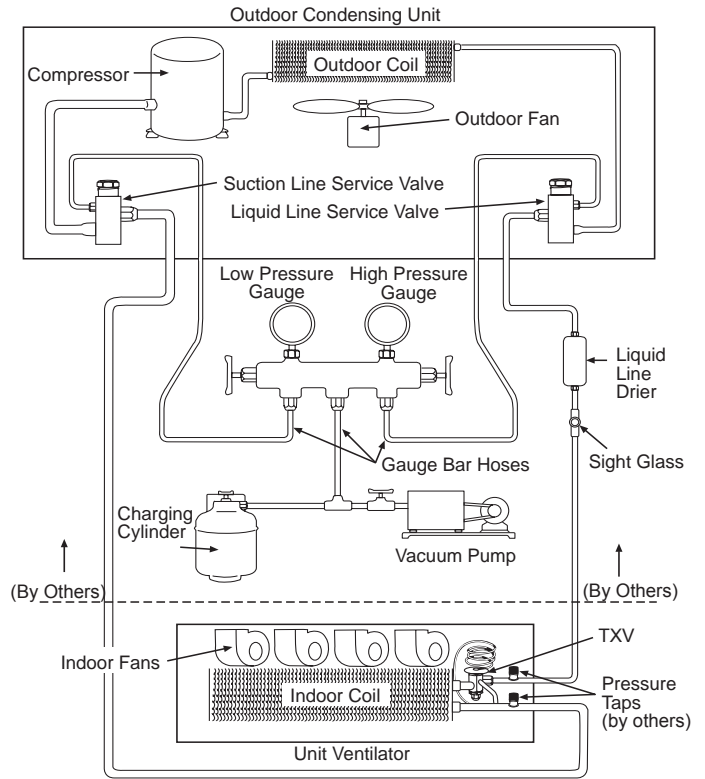


Table 21 - Dimensions, DX Tubing inches (mm)

Models AVS, AVV, AVB, AVR	Suction Line O.D.	Liquid Line O.D.
S07	3/4" (19mm)	1/4" (6mm)
S10	3/4" (19mm)	1/4" (6mm)
S13	7/8" (22mm)	3/8" (10mm)
S15	7/8" (22mm)	3/8" (10mm)
S20	7/8" (22mm)	3/8" (10mm)

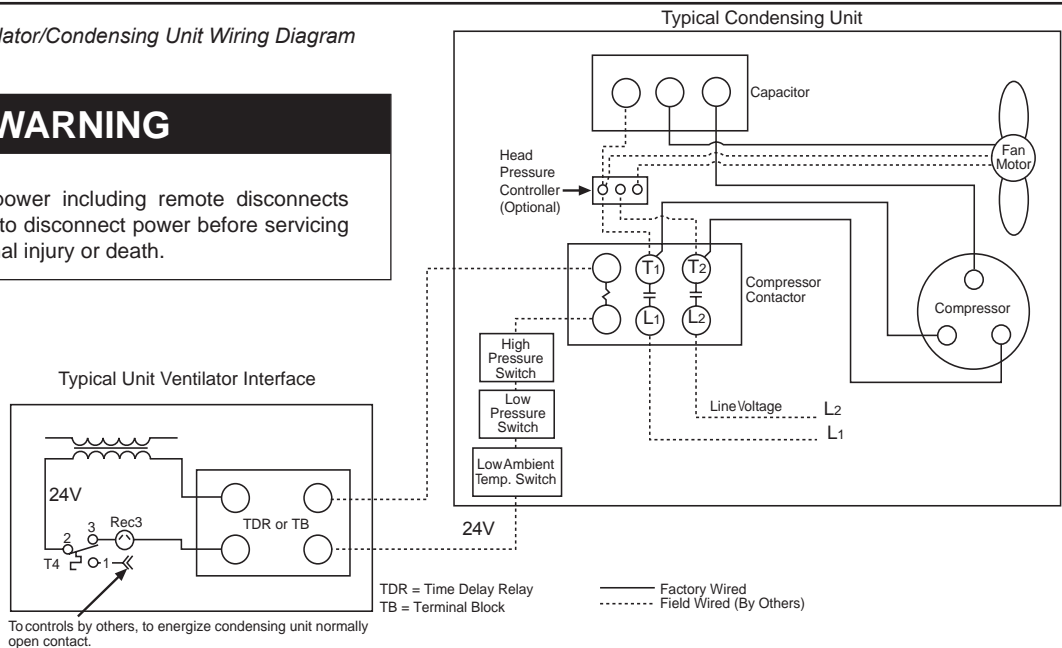
Note:

Table 21 piping dimensions are for systems with up to 30 ft. (9.14 m) vertical separation and up to 100 ft (30.47 m) horizontal separation from the outdoor condensing unit.

Figure 90 - Typical Unit Ventilator/Condensing Unit Wiring Diagram

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.



Determining System Superheat

After the subcooling has been determined, check system superheat.

1. Determine required superheat from superheat range, table 23.
2. Measure suction line temperature 6 inches from service valve.
3. Measure suction line pressure at service valve and determine saturated suction temperature from table 22.
4. Subtract saturated suction temperature from measured temperature to obtain superheat.
5. Refer to table 23 and adjust charge as required for correct superheat at ambient conditions.

NOTICE

Each time that charge is added or removed from the system, allow the system to run approximately 20 - 30 minutes before pressure and temperature readings are taken and superheat calculations made.

NOTICE

If system hunting occurs or subcooling is reduced, it may be necessary to adjust TXV to obtain correct superheat.

Table 22 — Saturated Temperature - Pressure Chart

(°F)	R410A-PSIG	(°F)	R410A-PSIG	(°F)	R410A-PSIG
32	101.1	44	127.7	80	235.8
33	103.2	45	130.2	85	254.7
34	105.2	46	132.6	90	274.5
35	107.4	47	135.1	95	295.5
36	109.5	48	137.5	100	317.6
37	111.7	49	140.1	105	340.9
38	113.9	50	142.6	110	365.4
39	116.2	55	147.0	115	391.2
40	118.4	60	170.1	120	418.3
41	120.7	65	185.2	125	446.9
42	123.0	70	201.1	130	476.8
43	125.4	75	218.0	140	541.4

Table 23 — Superheat Range

Outdoor Ambient	Indoor Coil Air Inlet Temp. DB/WB (50% RH)		
	75/63	80/67	85/71
105	*	*	8-10
100	*	3-5	9-11
95	*	5-7	11-13
90	*	9-11	13-15
85	5-7	10-12	15-17
80	8-10	12-14	18-20
75	10-12	15-17	21-23
70	13-15	19-21	24-26
65	15-17	21-23	26-28

NOTICE

Typical conditions - 95°F ambient, 75 psig suction, 285 psig head pressure, 6 - 7° superheat, 15°F subcooling

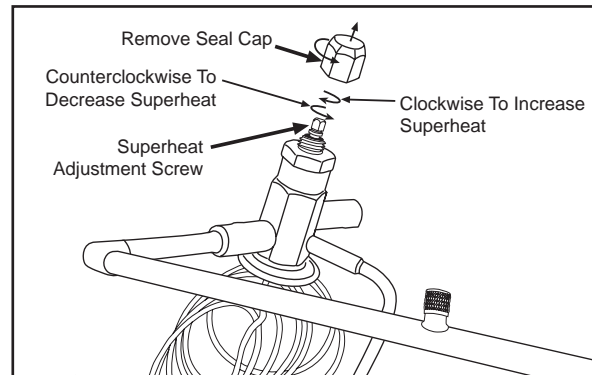
Superheat Adjustment

1. Remove the seal cap from thermal expansion valve (see figure 91).
2. Turn the adjustment screw clockwise to increase superheat and counterclockwise to decrease superheat (see figure 91). One complete 360° turn changes the superheat approximately 3-4°F, regardless of the refrigerant type. As much as 30 minutes may be required for the system to stabilize after the adjustment is made.
3. Replace and hand-tighten seal cap.

CAUTION

setting, there are a maximum of 10 turns on the stem. Turning adjustment stem after reaching stop will damage valve.

Figure 91 - Superheat Adjustment of TXV



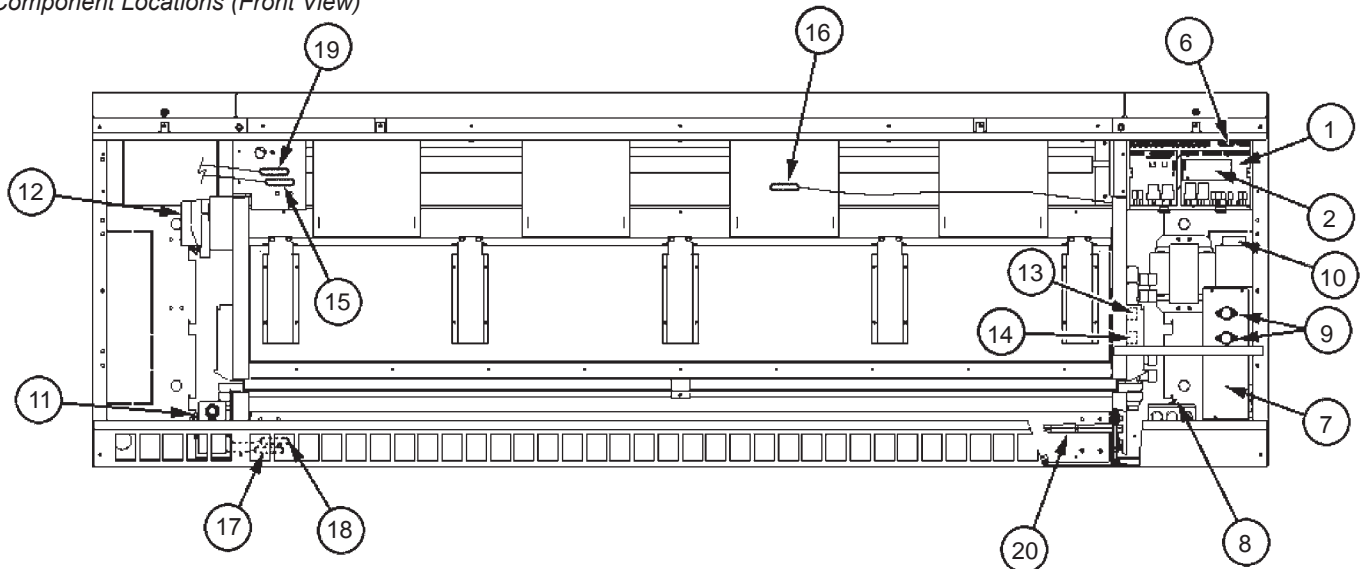
Making Control Connections

MicroTech II™ Unit Mounted DDC Control Components – Models AVS, AVV, and AVR

- 1 **MicroTech II Unit Ventilator Controller (UVC):** (Located Beneath the Local User Interface Panel). Factory mounted and run tested, microprocessor-based DDC control device capable of complete Standalone unit control, Master/Servant control or incorporated into a building-wide network using an optional plug-in communication module. The UVC contains a microprocessor that is preprogrammed with the application code required to operate the unit. The UVC supports up to 6 analog inputs, 12 binary inputs, and 9 binary outputs. The UVC EXP I/O board supports up to 4 additional analog inputs and 8 additional binary outputs. Master/Servant units have the controller factory configured and installed for a local peer-to-peer network between these units (network wiring between these units needs to be field installed). Optional network communication is provided via plug-in communication modules that connect directly to the UVC.
- 2 **Communication Module (optional):** Plug-in network communication module that is attached to the UVC via a 12-pin header and 4 locking standoff. Available communication modules:
 - **Building Automation and Control Network (BACnet®) Master Servant/Token Passing (MS/TP)** - Allows the UVC to inter-operate with systems that use the BACnet (MS/TP) protocol with a conformance level of 3. Meets the requirements of ANSI/ASHRAE 135-1995 standard for BACnet systems.
 - **LonWorks® compliant Space Comfort Controller (SCC)** – Supports the LonWorks SCC profile number 8500_10.
 - **Metasys N2® Open** – Provides N2 Open network communication capability to the UVC.
- 3 **Local User Interface (LUI):** (see fig. 93) The LUI provides a unit mounted interface which indicates the current unit operating state and can be used to adjust the unit ventilator operating parameters (operating mode, temperature set points, fan speed and occupancy mode). The LUI features a 2-digit display, 7 keys (1 key is hidden), and 9 individual LED indicators. See “Local User Interface” for further details.
- 4 **Tenant Override Switch** (see fig. 94) – Provides a momentary contact closure that causes the unit to enter the “tenant override” operating mode for a set time period (default = 120 minutes).

- 5 **Time Clock (TC) (optional on standalone units only)** (see fig. 94) – Factory mounted 7 day/24 hour, digital time clock with up to twenty (20) programs to sequence the unit ventilator through occupied and unoccupied modes in accordance with a user programmed time schedule.
- 6 **External Signal Connection Plugs:** Three (3) multi-pin plugs are factory provided and pre-wired with short wire whips that are capped (they must remain capped if not used). Provided for field wiring of:
 - Remote Wall Mounted Temperature Sensor (optional accessory).
 - External Input Signals (by others): unoccupied, remote shutdown, ventilation lockout, dew point/humidity (night time operation), or exhaust interlock signals
 - External Output Options (by others): lights on/off, fault indication signal, exhaust fan on/off or auxiliary heat signal.
- 7 **Electric Connection Box:** Contains the motor speed transformer. Refer to the unit wiring diagram for specifics.
- 8 **Unit Main Power “On-Off” Switch: (SW1)** Disconnects the main power to the unit for servicing or when the unit is to be shut down for an extended period of time.
- 9 **Fuse(s)** - Fan motor and controls have the hot line(s) protected by factory installed cartridge type fuse(s).
- 10 **Control Transformer** - 75 VA 24-volt NEC Class 2 transformer for 24 volt power supply. (Located behind the motor transformer).
- 11 **Outdoor Air/Return Air Damper Actuator - (A1)** Direct coupled, floating point (tristate) actuator that spring returns the outdoor air damper to the closed position upon a loss of power.
- 12 **Face and Bypass Damper Actuator - (A2)** Direct coupled, floating point (tristate) actuator that is non-spring returned (Model AVS only).
- 13 **Hydronic Coil Low Air Temperature Limit (T6 freezestat)** – Factory installed on all units with hydronic (water) coils. The T6 freezestat cuts out at 38°F (+/- 3°F) and automatically resets at 45°F (+/- 3°F).
- 14 **Low Refrigerant Temperature Sensor (S4)** - The S4 sensor is provided on all units with a direct expansion (DX) cooling coil. It is located on the right hand side of the coil “u-bend”.

Figure 92 - MicroTech II Sensor and Component Locations (Front View)



NOTICE

Not all external signal options can be used simultaneously and may not be available on all software models. Refer to the “UVC Input and Output Tables” in IM 739 for available options.

- 15 **Room Temperature Sensor - (S1)** The unit mounted sensor is located in the sampling chamber (front, center section) where room air is continuously drawn through for prompt response to temperature changes in the room. A Remote Wall Mounted Temperature Sensor is also available for remote room temperature sensing. (optional accessory).
- 16 **Discharge Air Temperature Sensor - (S2)** The sensor is located on the second fan from the right to sense discharge air temperatures.
- 17 **Outdoor Air Temperature Sensor - (S3)** The sensor is located in the outdoor air section of the unit before the outdoor air damper. With network applications, the unit mounted sensor can be overridden by a remote sensor through the network.
- 18 **Outdoor Air Humidity Sensor (S8) (optional)** - Unit mounted humidity sensor for units using Expanded outdoor enthalpy economizer or Leading Edge indoor/outdoor, true enthalpy comparison economizer. The sensor is located in the outdoor air section of the unit before the outdoor air damper. With network applications, the unit mounted sensor can be overridden by a remote sensor through the network.
- 19 **Room Humidity Sensor (S6) (optional)** - Unit mounted humidity sensor for units capable of passive or active dehumidification or with units using Leading Edge indoor/outdoor, true enthalpy comparison economizer. The sensor is located in the sampling chamber (front, center panel) where room air is continuously drawn through for fast response to humidity changes in the room. With network applications, the unit mounted sensor can be overridden by a remote sensor through the network.
- 20 **CO₂ Sensor (S7) (optional)** – Unit mounted, single beam absorption infrared gas sensor with a sensing range of 0 – 2000 ppm and voltage output of 0 to 10 VDC (100 ohm output impedance). The Pitot Tube sensing device is located in the unit ventilator’s return air stream. The optional CO₂ sensor is used with the UVC’s Demand Control Ventilation feature to vary the amount of outside air based on actual room occupancy. With network applications, the unit mounted sensor can be overridden by a remote sensor through the network.
- 21 **Control Valve(s) (not shown)** – Optional accessory valve(s) may be either 2 position “End of Cycle” (AVS models) or modulating (AVV and AVR models), to control the quantity of water through the coil. Available in 2-way or 3-way configurations. Spring return actuators are required for all hot water and steam heating valves. All heating valves are Normally Open (NO) and all cooling valves Normally Closed (NC). (See piping/valve section)
- 22 **Water In Temperature Sensor (S5)(not shown)** – The water in temperature sensor is factory wired on 2-pipe CW/HW units only. The sensor must be field installed and insulated (by others) on the supply connection of the hydronic coil. The sensor must be located on the supply connection where there is continuous water flow. It is located on the same side as the coil connections. The sensor measures the entering water temperature to determine if the temperature is acceptable for either heating or cooling based on the unit’s operating state. (see piping section)

Figure 93 - MicroTech II Control Boards (with LonWorks Module Installed)

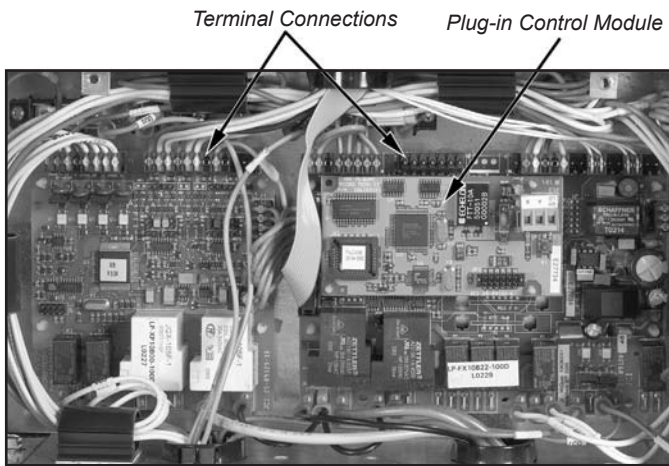
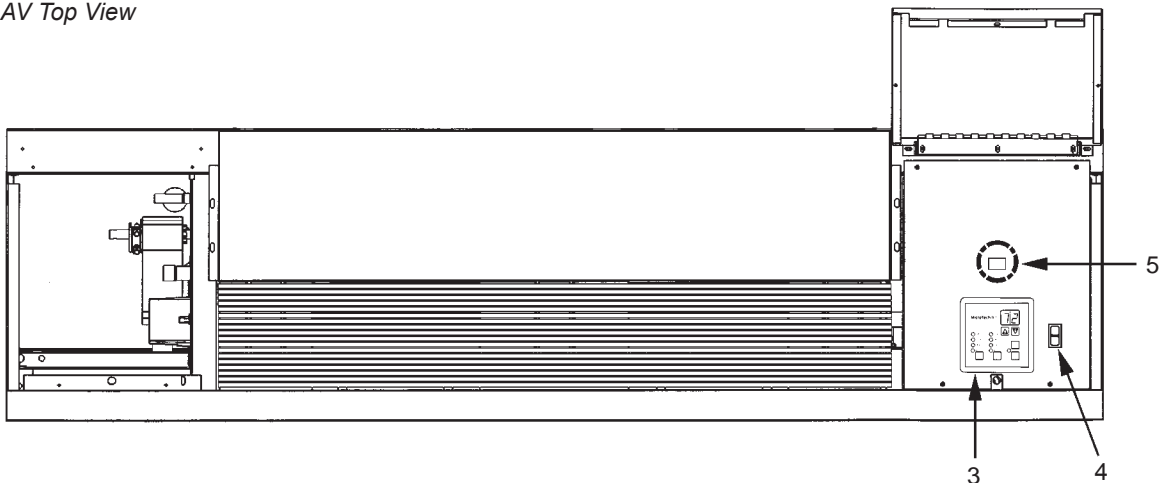


Figure 94 - AV Top View



Note:
If Installing Communication Module, refer to the installation instructions specific to that Communication Module.

IM 731 - MicroTech II BACnet® Communications Module for BACnet Master-Servant/Token Passing Networks.

IM 729 - MicroTech II LonWorks Communications Module compliant with LonMark Space Comfort Controller (SCC) Functional Profile.

IM 730 - MicroTech II Metasys N2® Communications Module for N2 Open Networks

Economizer Control Capabilities

Basic – Compares the inside and outside air temperatures using item 16 (Room Temperature Sensor) and item 18 (Outdoor Air Temperature Sensor) to determine if outdoor air can be used for “free”, economizer cooling operation.

Expanded - Compares the inside and outside air temperatures using item 16 (Room Temperature Sensor) and item 18 (Outdoor Air Temperature Sensor) and calculates the enthalpy of the outside air relative humidity using item 19 (Outdoor Air Humidity Sensor) to determine if outdoor air can be used for “free”, economizer cooling operation.

Leading Edge – True enthalpy comparison economizer that compares the inside and outside air temperatures using item 16 (Room Temperature Sensor) and item 18 (Outdoor Air Temperature Sensor) and compares the enthalpy of the inside and outside air relative humidity using item 19 (Outdoor Air Humidity Sensor) and item 20 (Room Humidity Sensor) to determine if outdoor air can be used for “free”, economizer cooling operation.

Economizer for Reheat

Basic – Uses items 16 (Room Temperature sensor, item 18 (Outdoor Air Temperature Sensor) and item 20 (Room Humidity Sensor) for active dehumidification (reheat) or to determine if outdoor air can be used for “free”, economizer cooling operation.

Leading Edge - Uses items 16 (Room Temperature Sensor), item 18 (Outdoor Air Temperature Sensor), item 19 (Outdoor Air Humidity Sensor) and item 20 (Room Humidity Sensor) for active dehumidification (reheat) or to determine if outdoor air can be used for “free”, economizer cooling operation.

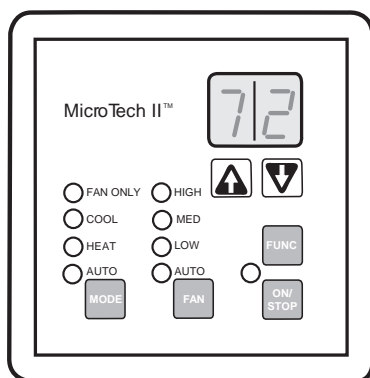
Local User Interface (LUI)

The built-in LUI touch pad (See Figure 94, item 3) has a 2-digit LED display that indicates the current unit operating state. See OM for unit type, for details of operation. The touch pad will “digitally display”:

- The room set point temperature
- Current Room Temperature (With certain buttons held in place)
- Any fault code for diagnostics at the unit (With certain buttons held in place)

The LUI has a built in menu structure (Hidden Key and Password protected) with 7 keys (1 key is hidden) and 9 individual LED indicators to adjust the unit ventilator operating parameters shown below.

Figure 95 - Local User Interface (LUI)



Operating Mode States (4)

- **Heat** - Heating and economizer operation only
- **Cool** – Cooling and economizer operation only
- **Fan Only** – Fan operation only
- **Auto** – Unit automatically switches between heating, cooling and economizer operation to satisfy the room load conditions. The current unit state is also displayed.

Fan States (4)

- **High** (constant speed)
- **Medium** (constant speed)
- **Low** (constant speed)
- **Auto** (part load, variable air) – Varies the fan speed automatically to meet the room load conditions whether the unit is in heating, cooling or economizer mode. The current fan speed is also displayed. During low load or normal operation (about 60% of the time) the fans will operate at low speed. When the load increases to an intermediate demand the fans automatically shift to medium speed. At near design or design load conditions, the fans will operate on high speed. A 10-minute delay between speed changes is incorporated to minimize the awareness of these changes. The outdoor air damper will index based on the fan speed to maintain the required minimum cfm (cubic feet per minute) of ventilation air.

Occupancy Modes (4)

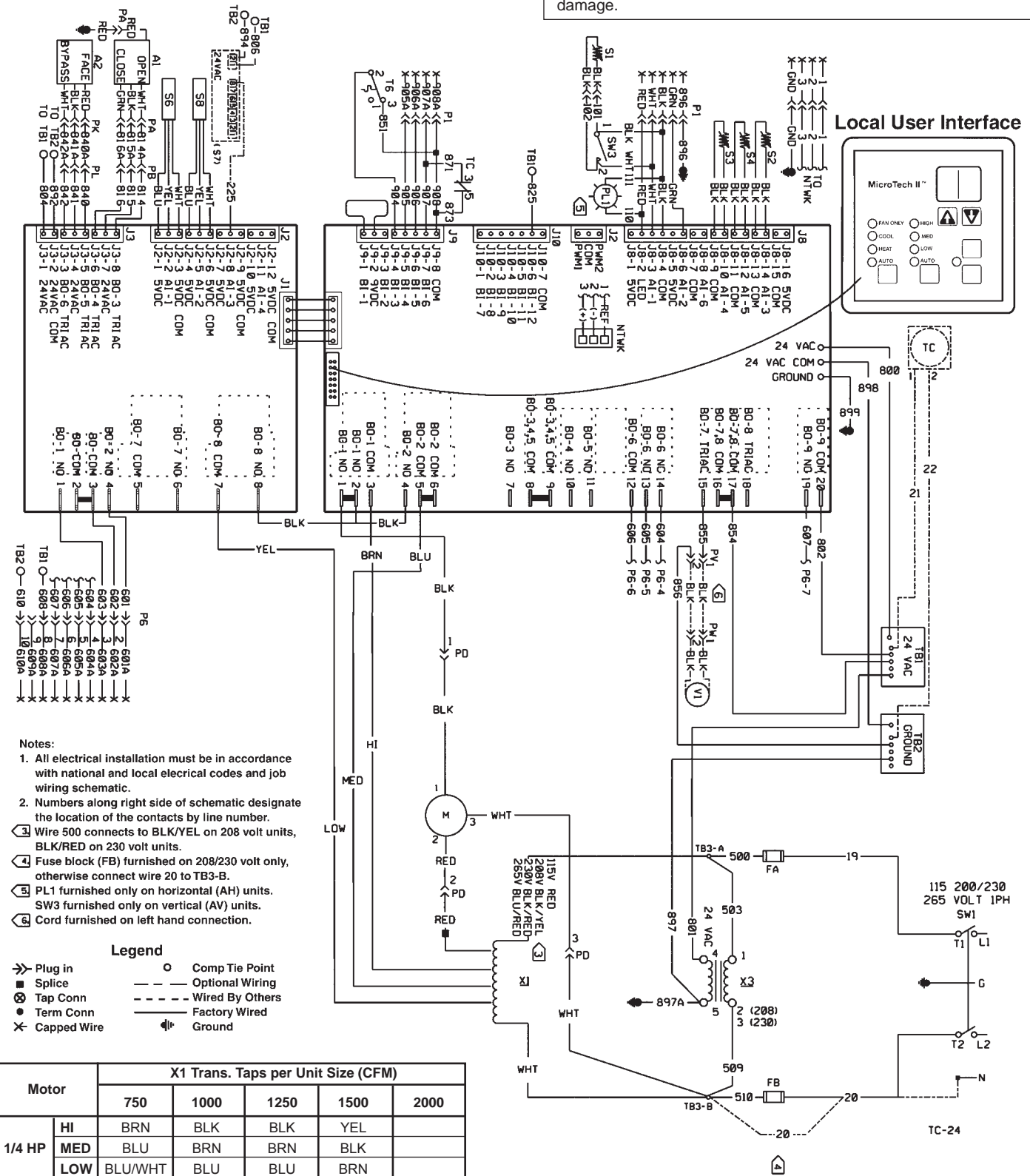
- **Occupied** – Normal, daytime operation where the unit maintains the room set point.
- **Unoccupied** – Night set back operating mode in which the unit responds to a new room set point and cycles to maintain the condition. The fan comes on when heating or cooling is needed and runs until the load is satisfied. The outside air damper is closed during this mode. With direct expansion (DX) cooling units, when a cooling load is satisfied by the refrigerant system, the compressor is de-energized and the Unit Ventilator indoor fan continues to run for a fixed period of time to remove possible frost buildup on the evaporator coil.
- **Stand By Mode** – The unit ventilator maintains the stand by mode set point temperature with the outside air damper closed. The fan runs continuously unless it is configured to cycle in response to the room load.
- **Bypass Mode** – By depressing the Tenant Override Switch (Item 4) the unit is placed back into the Occupied Mode for a predetermined time (default of 120 minutes). This time can be set in 1-minute increments from 1 minute to 240 minutes through the Unit Ventilator Service Tool or a network.

MicroTech II Wiring Diagram – Typical

Figure 96 - DE Cooling W/Hot Water Heat Damper Control 115, 208/230, 265 Volt/1 Phase

CAUTION

Refer to unit wiring diagram located on inside of right front panel, for actual wiring. Improper wiring can cause equipment and property damage.



- Notes:**
- All electrical installation must be in accordance with national and local electrical codes and job wiring schematic.
 - Numbers along right side of schematic designate the location of the contacts by line number.
 - Wire 500 connects to BLK/YEL on 208 volt units, BLK/RED on 230 volt units.
 - Fuse block (FB) furnished on 208/230 volt only, otherwise connect wire 20 to TB3-B.
 - PL1 furnished only on horizontal (AH) units. SW3 furnished only on vertical (AV) units.
 - Cord furnished on left hand connection.

Legend

	Plug in		Comp Tie Point
	Splice		Optional Wiring
	Tap Conn		Wired By Others
	Term Conn		Factory Wired
	Capped Wire		Ground

Motor	X1 Trans. Taps per Unit Size (CFM)				
	750	1000	1250	1500	2000
1/4 HP	HI	BRN	BLK	BLK	YEL
	MED	BLU	BRN	BRN	BLK
	LOW	BLU/WHT	BLU	BLU	BRN
1/3 HP	HI				BLU
	MED				BLU/WHT
	LOW				YEL
1/2 HP	HI	RED	RED	RED	RED
	MED	BRN	BRN	BRN	BLK
	LOW	YEL	YEL	YEL	BLK

DANGER

DISCONNECT ALL ELECTRICAL POWER BEFORE SERVICING UNIT TO PREVENT INJURY OR DEATH DUE TO ELECTRICAL SHOCK.

CAUTION

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

MicroTech II™ Unit Electrical Connections

⚠ DANGER

To avoid electrical shock, personal injury or death, be sure that field wiring complies with local and national fire, safety, and electrical codes, and voltage to the system is within the limits shown in the job-specific drawings and unit electrical data plate(s).

⚠ WARNING

Power supply to unit must be disconnected before making field connections. To avoid electrical shock, personal injury or death, be sure to rigorously adhere to field wiring procedures regarding proper lockout and tagout of components.

See Table 24, and Figures 96, 97 & 98 and the job-specific electrical drawings before proceeding with field power and control wiring. See also the wiring diagram provided on the unit ventilator right front access panel.

Unit ventilators equipped with an optional electric heating coil have electric heating coil power connections at right end only.

Procedure

1. Provide power supply to right end compartment to match unit nameplate.

⚠ CAUTION

Use copper conductors only. Use of aluminum conductors may result in equipment failure and overheating hazards. All wiring in right hand compartment must be class 1.

2. Wire leads provided from unit ventilator electric connection box to load side of unit power switch (switch provided by AAF). The junction box has 1" (25mm) and 2" (51mm) knockouts, located 10-1/2" (267mm) from right end of unit.
3. Provide ground wire from grounding screw in switch junction box to switch ground terminal.
4. Wire field power supply to line side of unit power switch. Wire ground conductor to switch ground terminal.
5. Mount unit power switch in switch junction box and install switch cover plate (provided).
6. On units with electric heat, the 2 pole unit power switch is replaced by a 3 pole switch, and is mounted as shown on figure 97. (A) shows switch location for valve control units and (B), (C) and (D) show location for Face & Bypass control units. (B) is for 208, 230 and 265 volt units. (C) shows location for 460 volt units.
7. Use IM 747 for MicroTech II wiring information/installation procedures.

Figure 97 - Electric Heat Unit Power Switch Locations

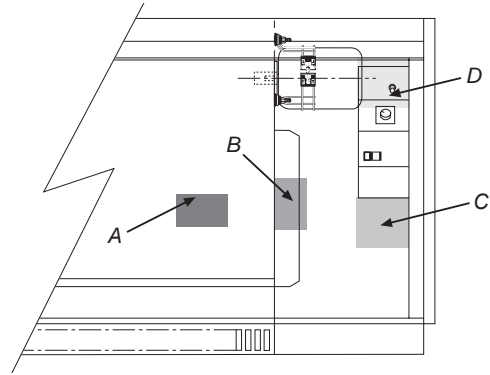


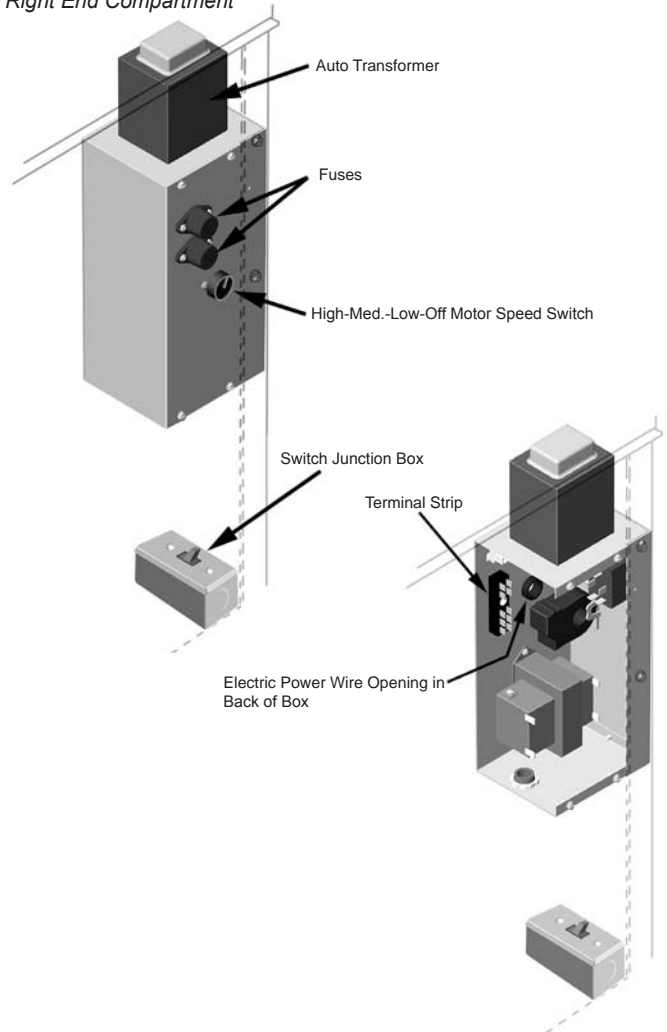
Table 24 - Floor AV Electrical Data/Motor Data and Unit Amp without electric heat

Unit Series	CFM (Nom.)	L/s	Motor HP	Watts	Unit Current #			
					115V	208V	230V	265V
S07	750	354	1/4	164	1.8	1.0	0.9	0.8
S10	1000	472	1/4	244	3.1	1.7	1.5	1.3
S13	1250	590	1/4	306	3.5	1.9	1.8	1.5
S15	1500	708	1/4	334	3.7	2.0	1.8	1.6

Amps at unit voltage, 60 Hz, single phase

See tables 30 & 31, pages 50 & 51 for electric heat wiring data

Figure 98 - Electric Connection Box and Junction Box Located in Right End Compartment



MicroTech II™ Remote Wall Mounted Sensor

WARNING

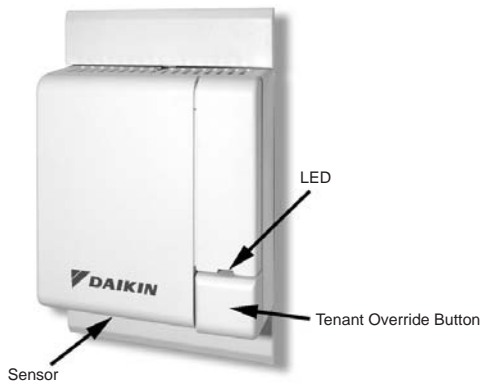
Rigorously adhere to field wiring procedures regarding proper lockout and tagout of components.

WARNING

To avoid electrical shock, personal injury or death:

1. Installer must be qualified, experienced technician.
2. Disconnect power supply before installation to prevent electrical shock and damage to equipment.
3. Make all connections in accordance with electrical wiring diagrams, and in compliance with national and local codes. Use copper conductors only.
4. Do not exceed ratings of the device. This is a low voltage device: Never apply more than 12VAC/VDC to any lead or damage will result.
5. Avoid locations where excessive moisture, corrosive fumes, or vibrations are present.

Figure 99 - Basic Remote Wall Sensor




When Using A Remote Wall Mounted Temperature Sensor

If a decision is made to use a Remote Wall Mounted Temperature Sensor instead of the unit mounted room air sensor then placement of the Remote Wall Mounted Temperature Sensor is critical for proper room temperature sensing (see figures 100 and 101). The UVC is capable of using one of three remote wall mounted temperature sensors. Figure 104 shows a 4-wire connection (plus shield drain wire) (see table 25). It is recommended that additional wires be pulled to compensate for potential wire breakage or future options. The Basic Wall Mounted Temperature Sensor requires only 3-wires (plus shield drain wire) since the Basic Wall Mounted Temperature Sensor has no setpoint adjustment (see figure 103).

NOTICE

All MicroTech II equipped unit ventilators are provided as standard with a unit mounted space temperature sensor. The unit mounted temperature sensor is provided with a quick disconnect plug (white) located outside of box with numbered wires 101 and 102. When using a remote wall mounted temperature sensor the unit mounted temperature sensor quick disconnect plug must be separated so that the unit mounted sensor is disconnected from the UVC.

Figure 100 - Correct Wall Sensor Locations  = Correct Sensor Location

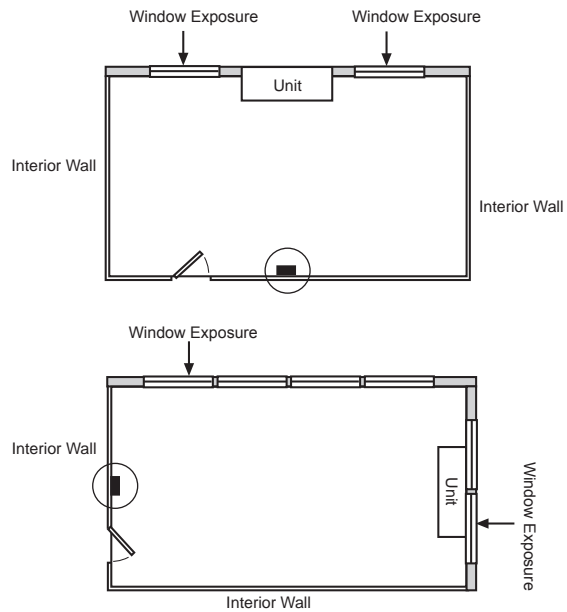

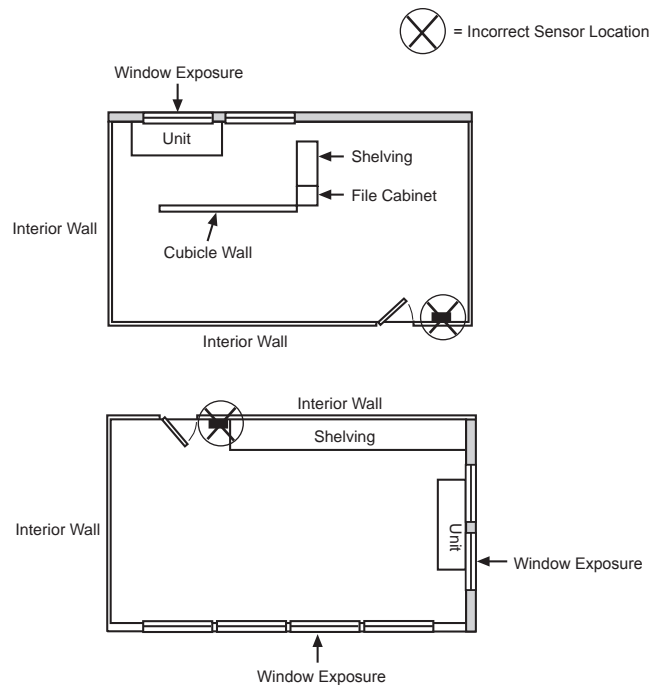


Figure 101 - Incorrect Unit and Wall Sensor Locations  = Incorrect Sensor Location



Note:

Avoid placing wall sensor near drafty areas such as doors or windows. Avoid external walls, or dead spots near exposed columns. Avoid direct sunlight on wall sensor.

Table 25. Max Sensor Wire Length and Gauge

Maximum sensor wire length for less than 1°F error	
Gauge	Length
14 AWG	800 ft. (244 m)
16 AWG	500 ft. (152 m)
18 AWG	310 ft. (94 m)
20 AWG	200 ft. (61 m)
22 AWG	125 ft. (38 m)

⚠ CAUTION

Static sensitive components. A static discharge while handling electronic circuit boards can cause damage to the components. Discharge any static electrical charge by touching the bare metal inside the main control panel before performing any service work. Never unplug any cables, circuit board terminal blocks, relay modules, or power plugs while power is applied to the panel.

Field Wiring Remote Mounted Temperature Sensor

The low voltage field wiring connections have all been centrally located within the unit ventilator and are easily accessible.

To simplify field connections, multi-pin plugs are factory provided and pre-wired with short wire whips (see figure 102). Each of the wires in these wire whips is capped and should remain capped if not used. The unit mounted temperature sensor is provided with a quick disconnect plug (white) with wires numbered 102 and 103, and must be separated so that the unit mounted sensor is disconnected from the UVC. This disables the unit mounted sensor (see figure 102). See Figures 103 and 104 for wiring the remote mounted temperature sensor to the unit control wiring.

All low voltage field wiring connections must be run in shielded cable with the shield drain wires connected as shown in the field wiring diagrams.

Figure 102 - Model AV - Field Wiring Whips with Caps Viewed from Right End Compartment

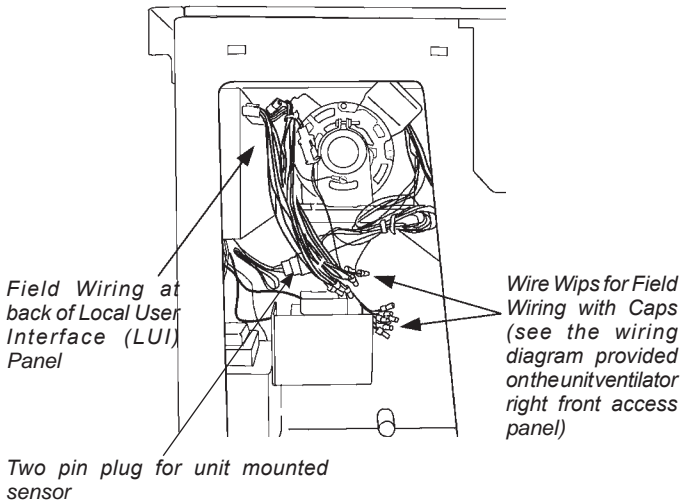


Figure 103 - Wall Mounted Temperature Sensor Wiring for Basic Wall Sensor

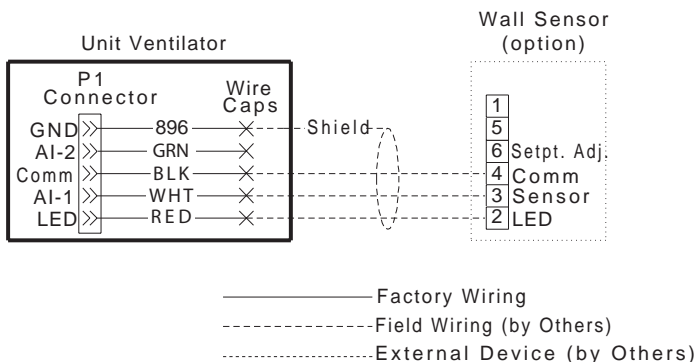
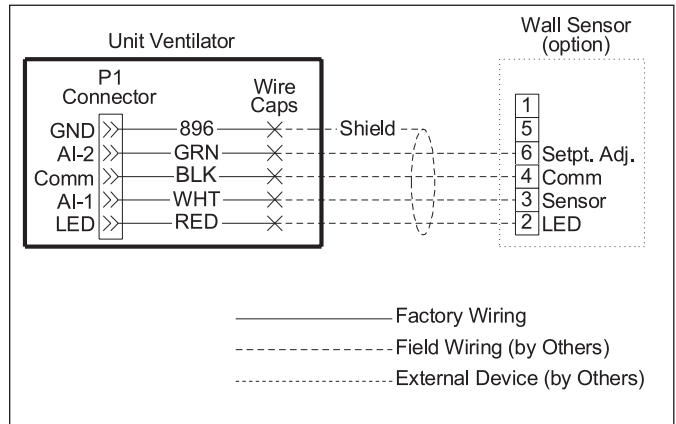


Figure 104 - Wall Mounted Temperature Sensor Wiring for Expanded and Deluxe Wall Sensor



Installing the Remote Mounted Temperature Sensor

NOTICE

The unit comes with a unit mounted sensor and does not require a remote wall mounted sensor.

This describes the installation of the following three wall mounted sensor models:

- P/N 111048101 – Basic
- P/N 111048103 – Expanded $\pm 3^\circ\text{F}$ setting
- P/N 111048102 – Deluxe 54°F to 85°F setting

Use the installation instructions included with the Remote wall sensor.

Parts Included - All Models

- pre-assembled sensor that includes:
 - large (50.8 x 101.6 mm [2 x 4 in.]) mounting base (1)
 - terminal block (1)
 - 1.5 mm (1/16 in.) cover screw (1)
 - endcaps (2)
- alternate small (80 x 80 mm [3.15 x 3.15 in.]) mounting base (1) with attached terminal block (1)
- cover slider insert with printed logos for McQuay® (1) and AAF® (1)
- No. 6-32 x 1 in. flat-head screw (2)
- No. 8 x 1.25 in. panhead tapping screw (2)
- hollow plastic wall anchor (2)

Parts Included - 111048102 and 111048103 Only

- alternate serrated setpoint dial (attached)
- smooth setpoint dial (separate)

Special Tools Needed

- .5 mm (1/16 in.) Allen wrench
- 7 mm (1/4 in.) flat-blade screwdriver
- hole saw with 35 mm (1-3/8 in.) blade (for surface mounting only)
- drill with 8 mm (5/16 in.) drill bit (for surface mounting only)

Mounting

The MicroTech II™ Wall Mount Sensor allows for two mounting methods: wallbox mounting and surface mounting.

Note: Wallbox mounting requires the large mounting base. Use either the large or small mounting base for surface mounting.

Performing Wallbox Mounting

To perform wallbox mounting (Figure 105):

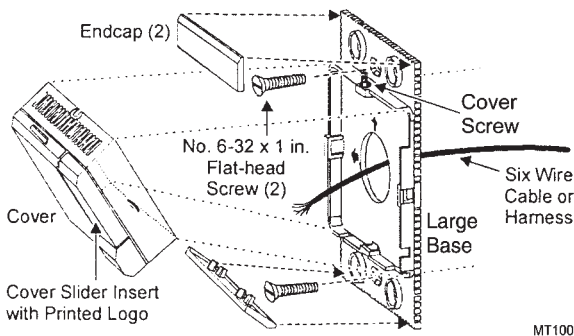
1. Slide the desired cover slider insert onto the cover until it snaps into place.
2. Remove the two endcaps from the mounting base.
3. Loosen the cover screw using a 1.5 mm (1/16 in.) Allen wrench and remove the sensor.
4. Pull the cable or wiring through the wallbox and mounting base.
5. Rotate the mounting base until one of the arrows on the base points up and the screw openings in the base align with the threaded holes in the wallbox. If necessary, reposition the cover screw above the arrow.
6. Fasten the base to the wallbox with the No. 6-32 x 1 in. screws provided.
7. Remove terminal block and wire to the appropriate terminals as shown in "Wiring".

IMPORTANT

8. Install terminal block onto sensor with terminal 6 next to the edge of sensor.

9. Replace the sensor and tighten the cover screw.
10. Replace the two endcaps on the mounting base.

Figure 105 - Wallbox Mounting

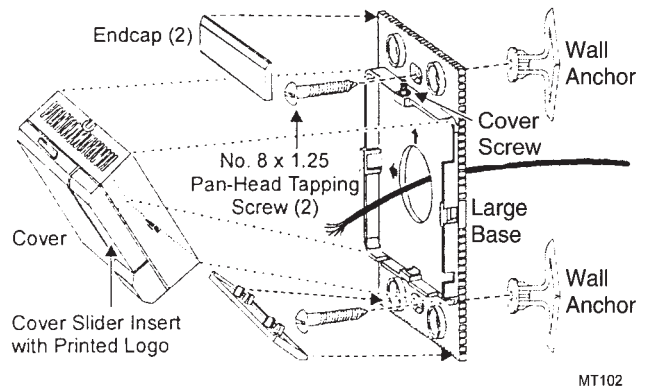


Performing Surface Mounting Using Large Base

To perform surface mounting using the large base. (Figure 106):

1. Slide the desired cover slider insert onto the sensor until it snaps into place.
2. Remove the two endcaps from the mounting base.
3. Loosen the cover screw using a 1.5 mm (1/16 in.) Allen wrench and remove the sensor.
4. Drill a 35 mm (1-3/8 in.) hole in the surface where the sensor will be mounted.
5. Pull the cable or wiring through the hole.

Figure 106 - Surface Mounting Using Large Base



MT102

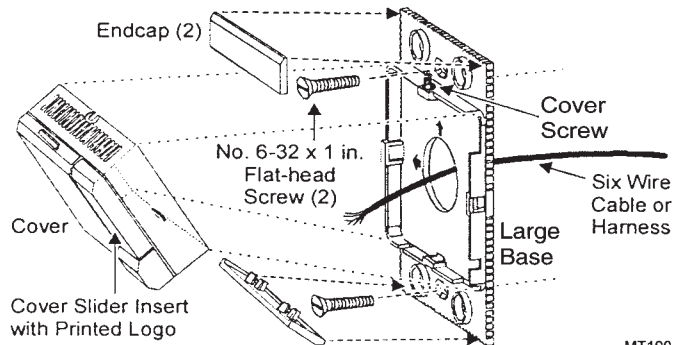
6. Rotate the mounting base until one of the arrows on the base points up. If necessary, reposition the cover screw above the arrow. Place the base against the wall, and mark the screw holes using the base as a template.
7. Drill two 8 mm (5/16 in.) holes at the markings.
8. Insert the hollow plastic wall anchors (Figure 106), position the base, and then drive the two pan-head tapping screws.
9. Pull the wiring through the mounting base.
10. Remove terminal block and wire to the appropriate terminals as shown in "Wiring".

IMPORTANT

11. Install terminal block onto sensor with terminal 6 next to the edge of sensor.

12. Replace the sensor and tighten the cover screw.
13. Replace the two endcaps on the mounting base.

Figure 107 - Insert Wall Anchors



MT100

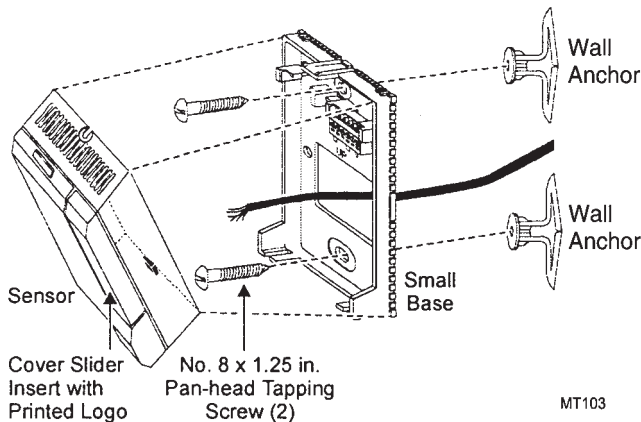
Performing Surface Mounting Using Small Base

To perform surface mounting using the small base (Figure 108):

1. Slide the desired cover slider insert onto the sensor until it snaps into place.
2. Remove the two endcaps from the mounting base.
3. Remove the cover screw using a 1.5 mm (1/16 in.) Allen wrench and discard it. Remove the sensor.
4. Remove and discard the terminal block from inside the sensor.
5. Drill a 35 mm (1-3/8 in.) hole in the surface where the sensor will be mounted.

6. Pull the cable or wiring through the hole.
7. Place the small base against the wall, (with the arrow on the base pointing up) and mark the screw holes using the base as a template.
8. Drill two 8 mm (5/16 in.) holes at the markings.
9. Insert the hollow plastic wall anchors (Figure 108), position the base, and then drive the two pan-head tapping screws.
10. Pull the wiring through the mounting base.
11. Wire to the appropriate terminals to the small mounting base as shown in "Wiring".
12. Snap the sensor into the small mounting base (cover screw is not required).

Figure 108 - Surface Mounting Using Small Base



Wiring

NOTICE

Shielded cable should always be used. However, shielded cable generally is not required, except in electrically noisy environments, such as near gas ignition systems, radar or magnetic resonance imaging equipment, etc. It is the responsibility of others to determine what constitutes an "electrically noisy" environment for each installation. Refer to table 25, page 38 for maximum wire length.

Figure 109 - 111048101 Sensor Wiring

Terminal Block on 111048101 Sensor

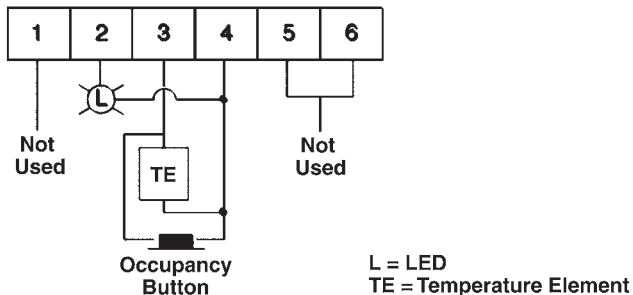
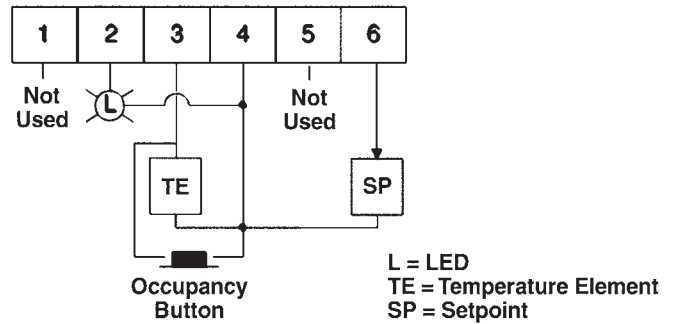


Figure 110 - 111048102 and 111048103 Sensor Wiring

Terminal Block on 111-48102 Sensor or 111048103 Sensor



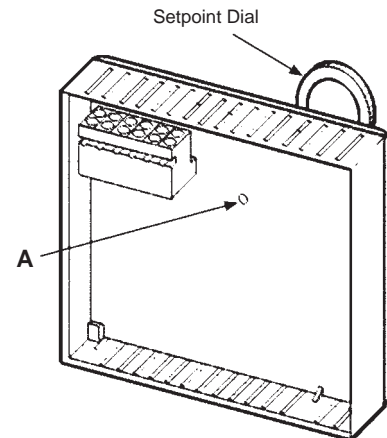
Setup and Adjustments

Switching Setpoint Dials

To switch setpoint dials:

1. Remove the sensor from the mounting base.
2. Rotate the smooth setpoint dial so that it points straight up.
3. As shown in Figure 111, insert the Allen wrench through the hole in the back of the printed wiring board (A) and push gently until the smooth setpoint dial is free.
4. Press the serrated setpoint dial into place on the sensor, making sure that the dial points straight up.
5. Replace the sensor on the mounting base.

Figure 111 - Removing the Standard Setpoint Dial



Repairs and Replacement

No repair options available. Call your local Daikin representative for sensor replacement.

Making Control Connections

Digital Ready™ – Face & Bypass Control Components Model AVS

Digital Ready is a factory installed pre-wired package of selected Direct Digital Control (DDC) components. It facilitates the field hook up of a DDC Unit Ventilator Controller (UVC) that is compatible with these factory installed, pre-wired components, and capable of providing the standard ASHRAE II cycle.

CAUTION

It is the responsibility of the Automatic Temperature Control supplier to ensure the controls operate correctly and protect the unit.

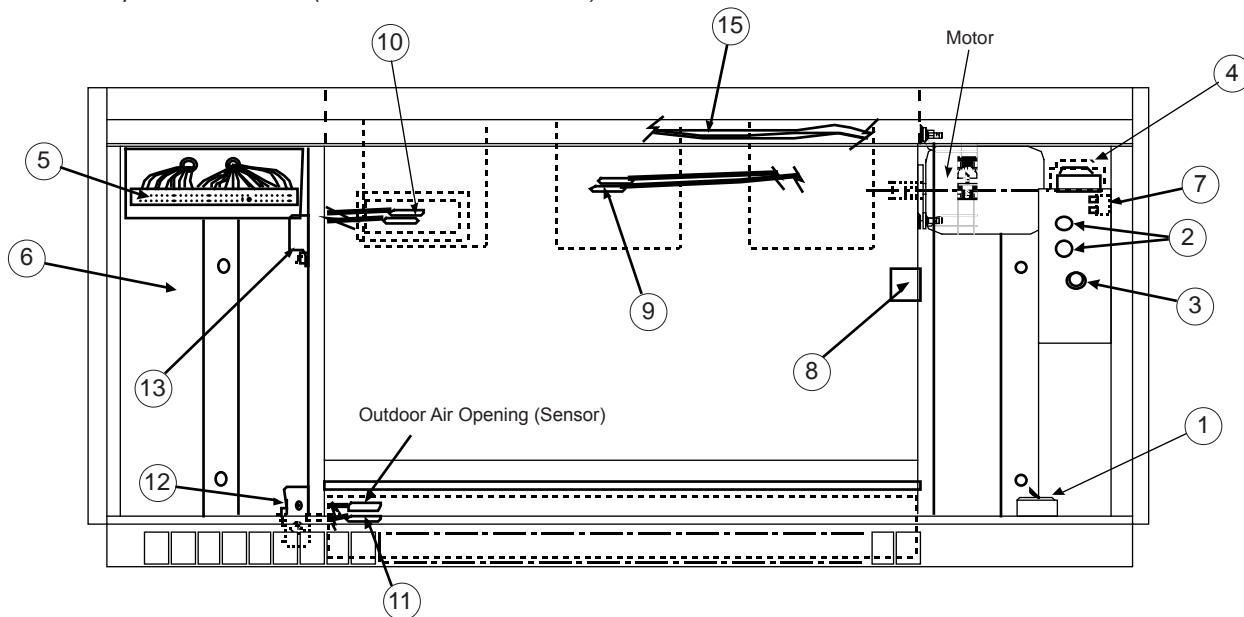
Digital Ready consists of the following components which are factory wired and powered:

- 1 Unit Main Power “On-Off” switch – disconnects main power to the unit for service. Non-fused power interrupt switch
- 2 Fuse(s) – fan motor, auto transformer and control transformer have the hot line(s) protected by factory installed cartridge type fuse(s).
- 3 Three (3) speed HIGH-MEDIUM-LOW-OFF motor fan speed switch (SW2).
- 4 75 VA 24-volt NEC Class 2 transformer for 24-volt power supply
- 5 Three 10-pole Europa type 16 awg terminal strips rated for 10 amps at 300 volts with nickel plated connectors and zinc plated clamping screws (TB1, TB2, TB3).
- 6 Space available in left end compartment, approximately 8" x 21" (203mm x 533mm) for UVC mounting (by others)

Wired to the Terminal Strips:

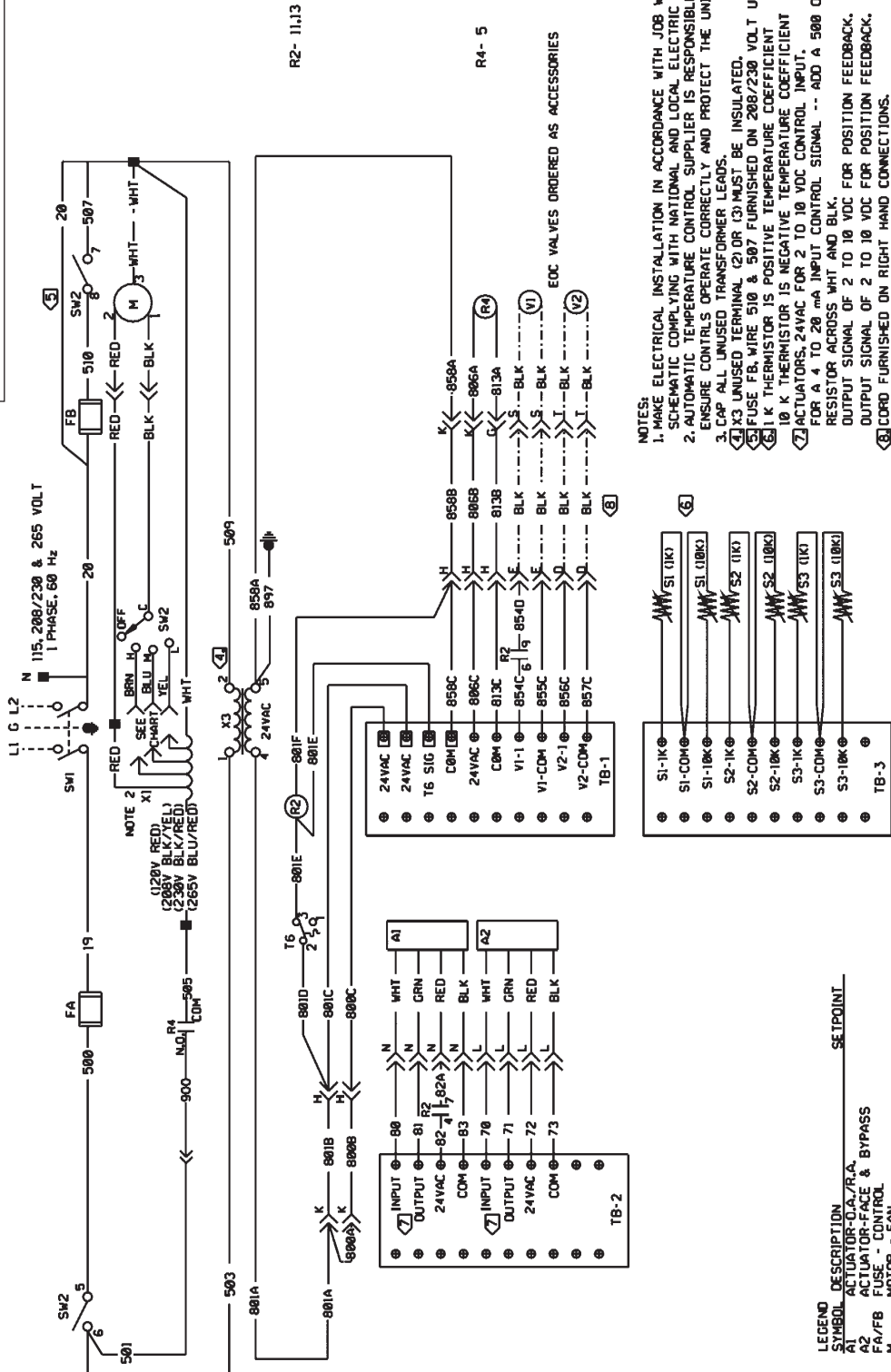
- 7 Interface with the fan motor start/stop relay, (R4) in electric connection box.
- 8 Interface with a factory installed Low Air Temperature Limit (T6 - Freezestat). Cuts out below 38°F±2 °F and automatically resets above 45°F±2 °F. Responds when any 15% of the capillary length senses these temperatures. Wired so that upon T6 cut out, the outside air damper (A1) closes, the hot water valve opens and the 24 volt power supply to the terminal strip (T6 Sig) is interrupted.
- 9 Discharge Air Temperature Sensors – (S2) 10K ohm NTC (Negative Temperature Coefficient) and 1 K ohm PTC (Positive Temperature Coefficient). Located on the second fan housing from the right to sense discharge air temperatures.
- 10 Room Temperature Sensors - (S1) 10K ohm (NTC) and 1 K ohm (PTC). The unit mounted sensors are located in the unit sampling chamber (front center section), where room air is constantly drawn through for prompt response to temperature changes in the room.
- 11 Outdoor Air Temperature Sensors - (S3) 10K ohm (NTC) and 1 K ohm (PTC). The sensors are located in the outdoor air section of the unit before the outdoor air damper.
- 12 Direct coupled, proportional control (2 to 10 VDC or 4 to 20 mA) Outdoor Air/Return Air Damper Actuator (A1) (spring return).
- 13 Direct coupled, proportional control (2 to 10 VDC or 4 to 20 mA) Face and Bypass Damper Actuator (A3) (non-spring returned).
- 14 Interface from the terminal board with one or two End of Cycle DDC valves with spring return actuators (by others) (Not Shown) providing 24-volt power. Open/shut signal from UVC (by others).
- 15 24-volt power wiring harness from the right to left-hand end compartment through the built-in metal wire raceway terminating at three terminal blocks.
- 16 Low Refrigerant Temperature Sensor (T4-capillary sensor), helps protect against abnormally low evaporator coil temperatures. Direct Expansion (DX) units only (Not shown).

Figure 112 - Component Locations (Vertical Floor Unit Shown)



Digital Ready™ Wiring Diagram – Typical
 Figure 113 - Face and Bypass Control

CAUTION
 Refer to unit wiring diagram located on the right front panel, for actual wiring.



MOTOR SIZE	SW2 TERM. NUMBER	X1 LEAD COLOR PER UNIT SIZE (CFM)
1/4 HP -7.5 TO .45"	HI MED LOW	1000 1250 1500
1/3 HP -7.5 TO .45"	HI MED LOW	1500 1750 2000
1/2 HP -7.5 TO .45"	HI MED LOW	2000 2250 2500

- NOTES:**
1. MAKE ELECTRICAL INSTALLATION IN ACCORDANCE WITH JOB WIRING SCHEMATIC COMPLYING WITH NATIONAL AND LOCAL ELECTRIC CODES. AUTOMATIC TEMPERATURE CONTROL SUPPLIER IS RESPONSIBLE TO ENSURE CONTROLS OPERATE CORRECTLY AND PROTECT THE UNIT.
 2. CAP ALL UNUSED TERMINAL (2) OR (3) MUST BE INSULATED.
 3. FUSE FB, WIRE 510 & 507 FURNISHED ON 208/230 VOLT UNITS ONLY.
 4. 10 K THERMISTOR IS POSITIVE TEMPERATURE COEFFICIENT
 5. 10 K THERMISTOR IS NEGATIVE TEMPERATURE COEFFICIENT
 6. ACTUATORS, 24VAC FOR 2 TO 10 VDC CONTROL INPUT. FOR A 4 TO 20 mA INPUT CONTROL SIGNAL -- ADD A 500 OHM RESISTOR ACROSS WHT AND BLK.
 7. OUTPUT SIGNAL OF 2 TO 10 VDC FOR POSITION FEEDBACK.
 8. CORD FURNISHED ON RIGHT HAND CONNECTIONS.

LEGEND

- PLUG IN
- ⊗ TAP CONN.
- ⊙ TERM CONN
- × CAPPED WIRE
- ⊕ GROUND
- COMP TIE POINT
- OPTIONAL WIRING
- WIRED BY OTHERS
- WIRED BY AAF

SYMBOL	DESCRIPTION	SETPOINT
A1	ACTUATOR-FACE & BYPASS	
A2	ACTUATOR-FACE & BYPASS	
FA/FB	FUSE - CONTROL	
M	MOTOR	
R2	RELAY - ACTUATOR/VALVE	
R4	RELAY - FAN	
S1	SENSOR-ROOM AIR	
S2	SENSOR-DISCHARGE AIR	
S3	SENSOR-OUTDOOR AIR	
SW1	SWITCH - DISCONNECT	
SW2	SWITCH - ON/OFF AND FAN SPEED	
TB-1	TERMINAL BOARD	
TB-2	TERMINAL BOARD	
TB-3	TERMINAL BOARD	
T6	THERMOSTAT-LOW LIMIT	38°F
V1	VALVE-HEATING N.O. SPRING RETURN	
V2	VALVE-COOLING N.C. SPRING RETURN	
X1	TRANSFORMER - MOTOR SPEED	
X3	TRANSFORMER 75VA CLASS 2	

Digital Ready Unit Mounted Temperature Sensor Specifications

A 10 K ohm Negative Temperature Coefficient (NTC) sensor and a 1 K ohm Positive Temperature Coefficient sensor is provided for the discharge air, outdoor air and room air temperature measurement. They are located next to each other in the air stream as shown in Figure 114. Each is wired to the terminal strip separately so that the Automatic Temperature Control contractor may select the appropriate sensor for the application.

10 K ohm NTC Sensor

The 10 K ohm NTC sensor is constructed from stainless steel with an epoxy seal and twisted wire leads.

Type: 10K ohm @ 25°C
Accuracy: ±0.2°F, 40°F - 80°F
 ±0.36°F, 32°F - 158°F

1 K ohm PTC Sensor

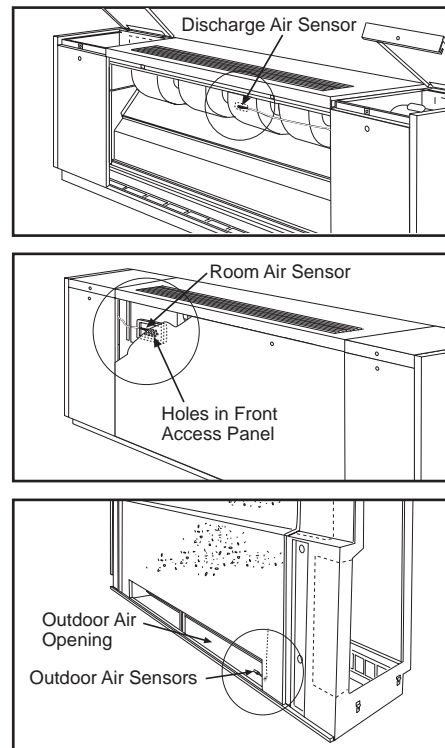
The 1 K ohm sensor is a shrink-wrap encapsulated, PTC silicon sensing element with stranded, tinned copper wire leads (#22 AWG).

Type: 1035 ohm @ 25°C
Accuracy: ±0.9°F, 5°F - 167°F

Table 26 - Temperature Sensors Resistance Values

10 K ohm (NTC)	Temperature (°C)	-40	-20	0	20	25	30	40	50	60
	Resistance (ohms)	337200	97130	32660	12490	10000	8056	5326	3602	2489
1 K ohm (PTC)	Temperature (°C)	-40	-20	0	20	25	30	40	50	60
	Resistance (ohms)	613	727	855	997	1035	1074	1153	1237	1323

Figure 114 - Sensor Locations



Digital Ready – Damper Actuator Specifications

Outdoor Air/Return Air Damper Actuator

The outdoor air/return air damper actuator is a unit mounted, direct coupled, proportional control actuator that **spring returns** the outdoor air damper shut upon a loss of power. The actuator provides proportional damper control based on a 2 to 10 VDC input from the DDC Unit Ventilator Controller (UVC). A 4 to 20 mA input signal can be used with the field addition of a Belimo ZG-R01 (or equivalent) 500 ohm resistor (by others). Refer to the wiring diagram for proper installation of the resistor. A 2 to 10 VDC output signal is provided for damper position feedback. Rotation is clockwise to open OA, close RA.

Face and Bypass Damper Actuator

The Face & Bypass damper actuator is a unit mounted, direct coupled, non-spring returned actuator used for the modulation of the face and bypass damper. The actuator provides proportional damper control

based on a 2 to 10 VDC input from the DDC Unit Ventilator Controller (UVC). A 4 to 20 mA input signal can be used with the field addition of a Belimo ZG-R01 (or equivalent) 500 ohm resistor (by others). Refer to the wiring diagram for proper installation of the resistor. A 2 to 10 VDC output signal is provided for damper position feedback. The gears can be manually disengaged with a button on the actuator cover. Rotation is counterclockwise to bypass air around coil.

Figure 115 - Outdoor Air/Return Air Damper Actuator & Face and Bypass Damper Actuator

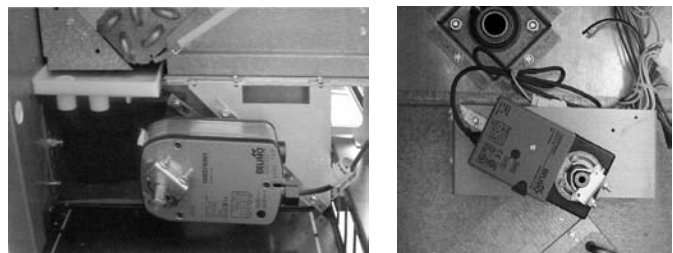


Table 27. - Actuators Technical Data

Actuator Type	Power Supply	Power Consumption	Transformer Sizing	Torque	Running Time	Direction of Rotation
Outdoor Air/Return Air Damper Actuator	24 VAC ±20% 50/60 HZ 24 VDC ±10%	2 Watts	4 VA (class 2 power source)	45 in-lb	80 to 110 sec for 0 to 35 in-lb	Reversible with built in switch L/R L = CW with an increase in voltage. R = CCW with an increase in voltage.
Face & Bypass Damper Actuator	24 VAC ±20% 50/60 HZ 24 VDC ±10%	Running: 2.5 Watt; Holding: 1 Watt	5 VA (class 2 power source)	45 in-lb	90 sec constant (independent of load)	Spring: reversible with CW/CCW mounting. Motor: reversible with built in switch. CW = CW with a decrease in signal. CCW = CCW with a decrease in signal.

Digital Ready Unit Electrical Connections

⚠ WARNING

Rigorously adhere to field wiring procedures regarding proper lockout and tagout of components.

⚠ WARNING

To avoid electrical shock, personal injury or death:

1. Installer must be qualified, experienced technician.
2. Disconnect power supply before installation to prevent electrical shock and damage to equipment.
3. Make all connections in accordance with electrical wiring diagrams, and in compliance with national and local codes. Use copper conductors only.
4. Do not exceed ratings of the device. This is a low voltage device: Never apply more than 12VAC/VDC to any lead or damage will result.
5. Avoid locations where excessive moisture, corrosive fumes, or vibrations are present.

See Table 28, and Figure 113 and the job-specific electrical drawings before proceeding with field power and control wiring. See also the wiring diagram provided on the unit ventilator right front access panel. In addition, those unit ventilators equipped with optional electric heating coil have electric heating coil power connections at right end only.

Procedure

1. Provide power supply to right end compartment to match unit nameplate.

⚠ CAUTION

Use copper conductors only. Use of aluminum conductors may result in equipment failure and overheating hazards. All wiring in right hand compartment must be class 1.

2. Wire leads provided from unit ventilator electric connection box to load side of unit power switch (switch provided by AAF). The junction box has 1" (25mm) and 2" (51mm) knockouts, located 10-1/2" (267mm) from right end of unit.
3. Provide ground wire from grounding screw in switch junction box to switch ground terminal.

Figure 116 - Terminal Strip



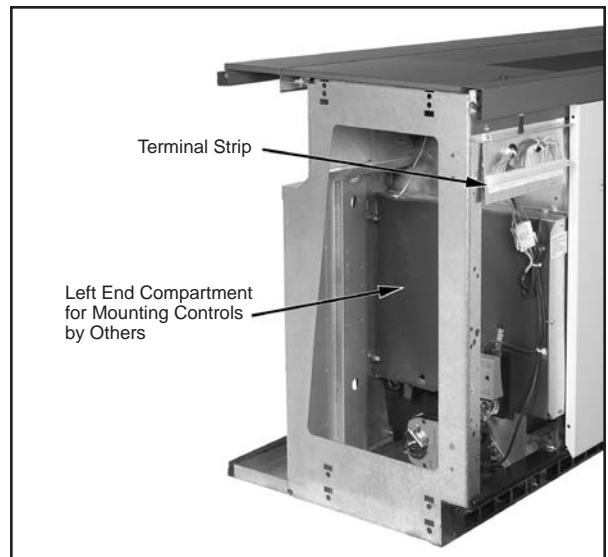
4. Wire field power supply to line side of unit power switch. Wire ground conductor to switch ground terminal.
5. Mount unit power switch in switch junction box and install switch cover plate (provided).
6. Figure 121 (A) shows switch location for valve control units and (B), (C) and (D) show location for Face & Bypass control units. (B) is for 208, 230 and 265 volt units.
7. See figure 116 & 120 for terminal strip designations.

Table 28 - Floor AV Electrical Data/Motor Data and Unit Amp without electric heat

Unit Series	CFM (Nom.)	L/s	Motor HP	Watts	Unit Current #			
					115V	208V	230V	265V
S07	750	354	1/4	164	1.8	1.0	0.9	0.8
S10	1000	472	1/4	244	3.1	1.7	1.5	1.3
S13	1250	590	1/4	306	3.5	1.9	1.8	1.5
S15	1500	708	1/4	334	3.7	2.0	1.8	1.6

Amps at unit voltage, 60 Hz, single phase

Figure 117 - Unit Left End Compartment and Terminal Strip



Making Control Connections Controls by Others Components

Daikin unit ventilators come with factory installed components and wiring. It facilitates the field hookup of controls by others, capable of providing the standard ASHRAE II cycle that are compatible with these factory installed and pre-wired components.

CAUTION

It is the responsibility of the Automatic Temperature Control supplier to ensure the controls operates correctly and protect the unit.

Controls by others option consists of the following components which are factory provided and wired where indicated:

- 1 Unit Main Power “On-Off” switch – disconnects main power to the unit. Non-fused power interrupt switch (S1)
- 2 Fan motor, auto transformer and control transformer have the hot line(s) protected by factory installed fuse(s).
- 3 Three (3) speed HIGH-MEDIUM-LOW-OFF motor fan speed switch (SW2), wired to auto transformer (X1), to provide fan speed/air delivery.
- 4 Factory installed Low Air Temperature (limit T6 - freezestat) across leaving air side of hydronic heating coil. Cuts out below $38^{\circ}\text{F} \pm 2^{\circ}\text{F}$ and automatically resets above $45^{\circ}\text{F} \pm 2^{\circ}\text{F}$. Responds when any 15% of the capillary length senses these temperatures.

CAUTION

It is the responsibility of the Automatic Temperature Control supplier to ensure the T6 freezestat is incorporated properly to protect the unit.

- 5 For direct expansion (DE) coils the unit is supplied with a Low Refrigerant Temperature Sensor (T4 - capillary sensor), that is located on the leaving air side of the direct expansion coil. T4 cuts out below $34^{\circ}\text{F} \pm 2^{\circ}\text{F}$ and automatically resets above $38^{\circ}\text{F} \pm 2^{\circ}\text{F}$. Responds when any 15% of the capillary length senses these temperatures.
- 6 For Direct Expansion (DE) coils the unit is supplied with a 40 VA, 24 volt, NEC class 2 transformer, for 24 volt power (X2), with a factory installed 5 minute timer delay relay (TDR) (located inside Unit Power Box).

CAUTION

It is the responsibility of the Automatic Temperature Control supplier to ensure that T4 and R4 are incorporated properly to protect the unit.

Figure 119 - Controls by Others Unit Power and Junction Box Connection Location

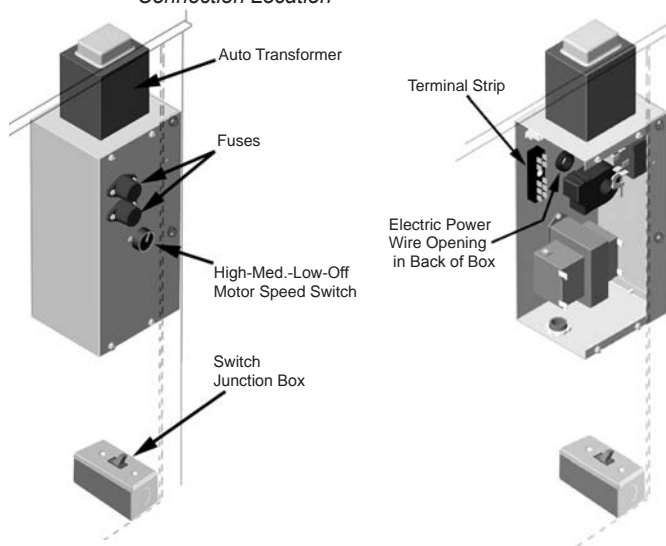
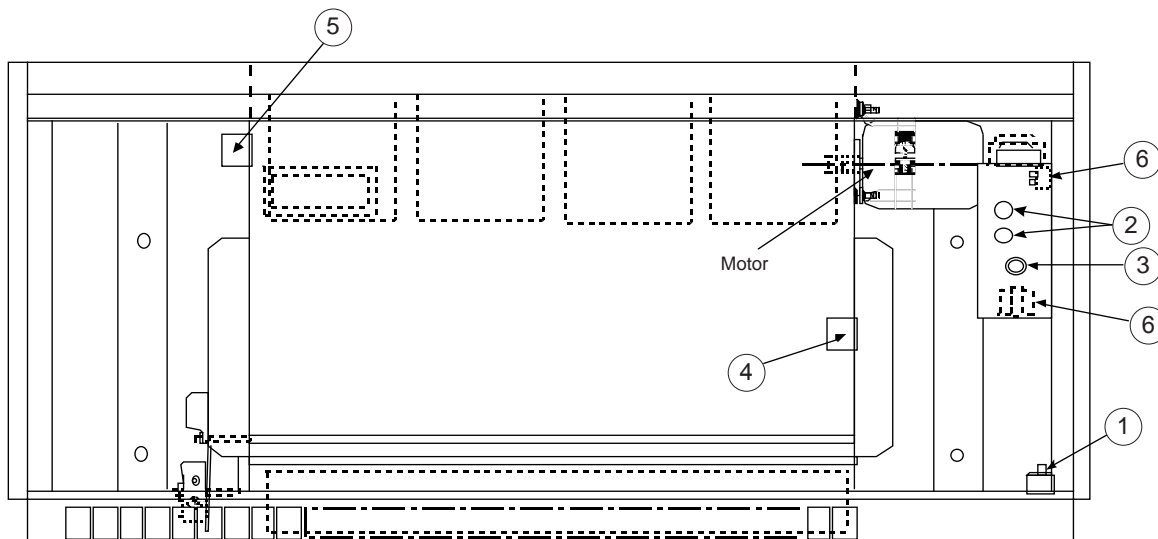
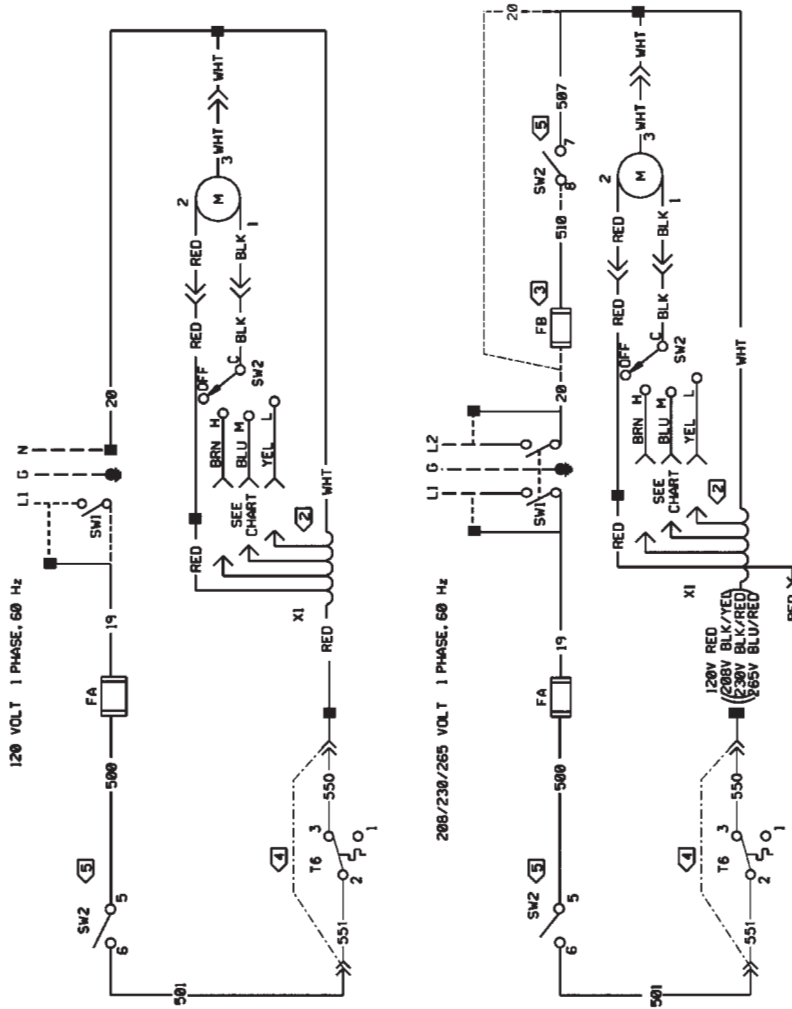


Figure 118 - Controls by Others Unit Component Locations



Controls by Others Wiring Diagram – Typical
 Figure 120 - Field Installed



LEGEND	
SYMBOL	DESCRIPTION
C	CONTACTOR, COMPRESSOR (BY OTHERS)
FA/FB	FUSE - CONTROL
M	MOTOR - FAN
SW1	SWITCH - DISCONNECT
SW2	SWITCH - ON-OFF & FAN SPEED
T4	THERMOSTAT COIL LOW TEMP
T6	THERMOSTAT COIL LOW LIMIT 30°
T8-DE	TEMPERATURE BOARD FOR DE CONTACTOR
TUR	TEMPERATURE BOARD FOR TUR CONTACTOR
X1	WIRING POINT FOR DE CONTACTOR
X2	TRANSFORMER 40 VA CLASS 2

LEGEND	
→	PLUG IN
○	COMP TIE POINT
—	SPLICE
⊗	TAP CONN.
⊙	WIRED BY OTHERS
•	WIRED BY AAF
X	CAPPED WIRE
⊥	GROUND

⚠ DANGER

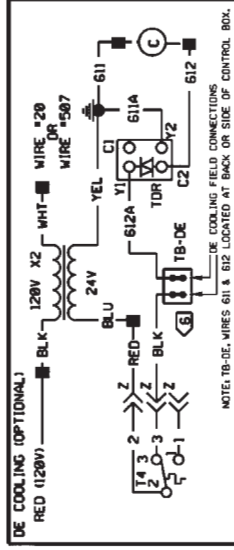


Disconnect all electrical power before servicing unit.
 Electrical shock will cause severe injury or death.

⚠ CAUTION

Refer to unit wiring diagram located on inside of right front panel, for actual wiring. Improper wiring can cause equipment and property damage.

MOTOR SIZE	SW2 TERM. NUMBER	X1 LEAD COLOR PER UNIT SIZE (CFM)
1/4 HP (AV UNITS)	HI	750
	MED	1000
	LOW	1500
1/6 HP (AH UNITS)	HI	BLU
	MED	GRY/BLK
	LOW	WHT/GRN
1/4 HP (AV UNITS)	HI	YEL
	MED	WHT/GRN
	LOW	GRN
1/6 HP (AH UNITS)	HI	GRY
	MED	PNK
	LOW	WHT/GRN
1/4 HP (AV UNITS)	HI	GRY/BLK
	MED	GRY/BLK
	LOW	WHT/GRN
1/6 HP (AH UNITS)	HI	GRY/BLK
	MED	GRY/BLK
	LOW	WHT/GRN



- NOTES:
1. MAKE ELECTRICAL INSTALLATION IN ACCORDANCE WITH JOB WIRING SCHEMATIC COMPLYING WITH NATIONAL AND LOCAL ELECTRIC CODES.
 2. CAP ALL UNUSED TRANSFORMER LEADS.
 3. FUSE FB, SW2, WIRE 510 & 507 FURNISHED ON 208/230 VOLT UNITS ONLY.
 4. T6, WIRES 550 & 551 FURNISHED ONLY ON UNITS WITH HOT WATER OR CHILLED WATER. ALL OTHERS CONNECT TRANSFORMER WIRE TO WIRE # 508.
 5. SW2 CONTACTS 5, 6 AND 7, 8 OPEN ONLY WHEN SW2 IS IN OFF POSITION!
 6. AUTOMATIC TEMPERATURE CONTROL CAN BE WIRED TO T6-DE FOR DE COOLING OPERATION.
- TYPICAL OPERATION IS TO WIRE FROM THE T6-DE TO A NORMALLY OPEN RELAY WITH THE RELAY CLOSING ON CONTROL CALL FOR COOLING.
- FOR ADDITIONAL INFORMATION, CONTACT MCOUAY APPLICATIONS.

⚠ WARNING

Hazardous Voltage!
 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.

Making Control Connections

Controls by Others – Electrical Connections

⚠ WARNING

Rigorously adhere to field wiring procedures regarding proper lockout and tagout of components.

⚠ WARNING

To avoid electrical shock, personal injury or death:

1. Installer must be qualified, experienced technician.
2. Disconnect power supply before installation to prevent electrical shock and damage to equipment.
3. Make all connections in accordance with electrical wiring diagrams, and in compliance with national and local codes. Use copper conductors only.
4. Do not exceed ratings of the device. This is a low voltage device: Never apply more than 12VAC/VDC to any lead or damage will result.
5. Avoid locations where excessive moisture, corrosive fumes, or vibrations are present.

See Table 29, and Figures 120 - 122 and the job-specific electrical drawings before proceeding with field power and control wiring. See also the wiring diagram provided on the unit ventilator right front access panel.

Unit ventilators equipped with an optional electric heating coil have electric heating coil power connections at right end only, (see tables 30 & 31, pages 50-51).

Procedure

1. Provide power supply to right end compartment to match unit nameplate.

⚠ CAUTION

Use copper conductors only. Use of aluminum conductors may result in equipment failure and overheating hazards. All wiring in right hand compartment must be class 1.

2. Wire leads provided from unit ventilator electric connection box to load side of unit power switch (switch provided by AAF). The junction box has 1" (25mm) and 2" (51mm) knockouts, located 10-1/2" (267mm) from right end of unit.
3. Provide ground wire from grounding screw in switch junction box to switch ground terminal.
4. Wire field power supply to line side of unit power switch. Wire ground conductor to switch ground terminal.
5. Mount unit power switch in switch junction box and install switch cover plate (provided).
6. On units with electric heat, the 2 pole unit power switch is replaced by a 3 pole switch and is mounted as shown on figure 121. (A) shows switch location for valve control units and (B), (C) and (D) show location for Face & Bypass control units. (B) is for 208, 230 and 265 volt units. (C) shows location for 460 volt units. Also, on electric heat units with controls by others, wiring to the field mounted controller is done in the left end compartment. See specific wiring diagram for details. The unit comes with wiring that requires relay controls by others.

⚠ CAUTION

It is the responsibility of the Automatic Temperature Control supplier to ensure that the proper electric heat control components are installed, and operate correctly to protect the unit.

Figure 121 - Electric Heat Unit Power Switch Locations

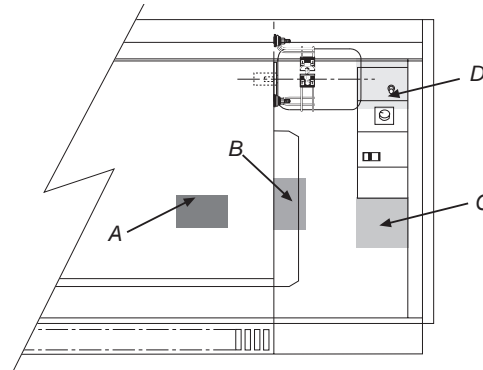


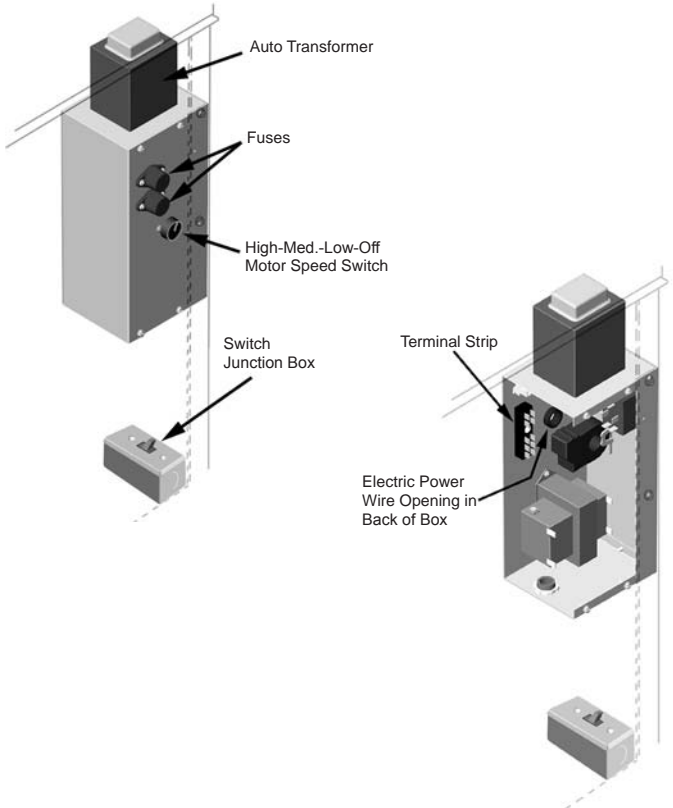
Table 29 - Floor AV Electrical Data/Motor Data and Unit Amp without electric heat

Unit Series	CFM (Nom.)	L/S	Motor HP	Watts	Unit Current #			
					120V	208V	230V	265V
S07	750	354	1/4	216	2.2	1.2	1.1	1.0
S10	1000	472	1/4	277	2.8	1.6	1.4	1.3
S13	1250	590	1/4	335	3.3	1.9	1.7	1.5
S15	1500	708	1/4	445	4.4	2.6	2.3	2.0

of Amps at unit voltage, 60 Hz, single phase

See tables 30 & 31, pages 50 & 51 for electric heat wiring data

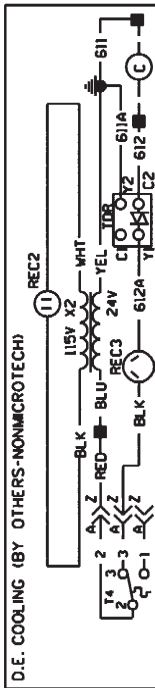
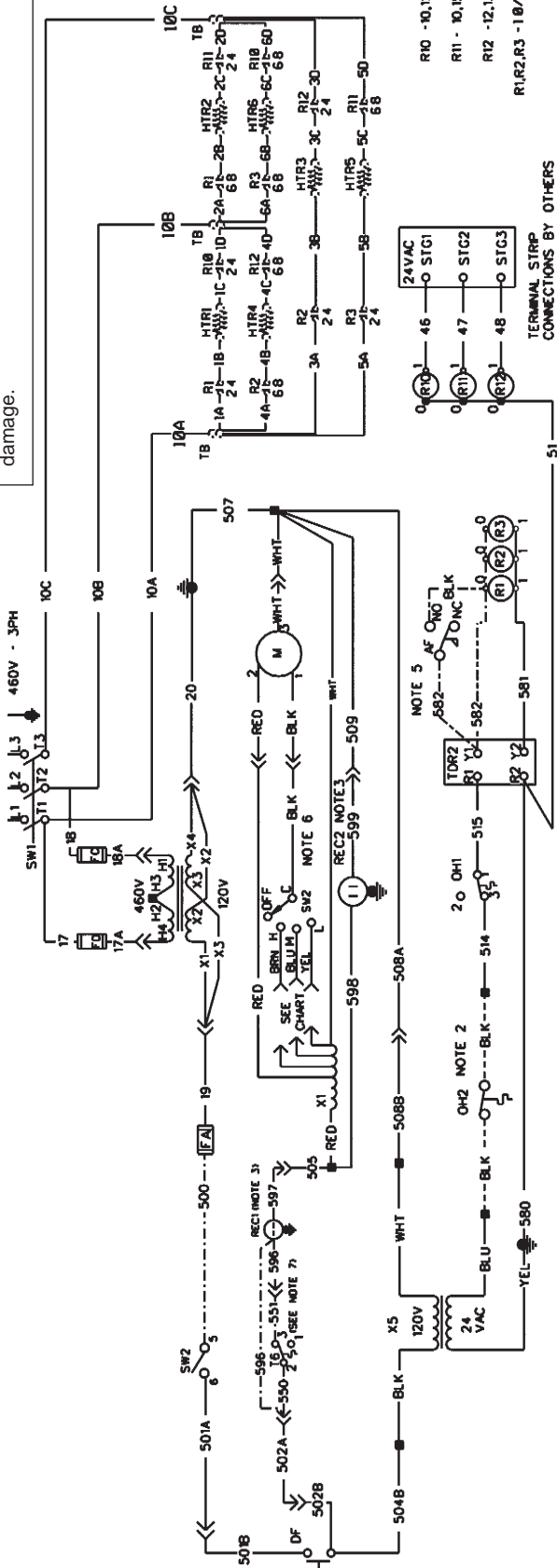
Figure 122 - Controls by Others Unit Power and Junction Box Connection Location



Electric Heat Wiring Diagram – Typical
 Figure 123 - 460 Volt, 60 Hz, 3 Phase

CAUTION

Refer to unit wiring diagram located on inside of right front panel, for actual wiring. Improper wiring can cause equipment and property damage.



- Legend**
- Plug in
 - Splice
 - ⊕ Tap Conn
 - ⊙ Term Conn
 - ⊖ Capped Wire
 - Comp Tie Point
 - Optional Wiring
 - Wired By Others
 - ⊕ Factory Ground

ELECTRIC HEAT SEQUENCE
 1) BACKUP RELAYS R1/R2 & R3 ARE ENERGIZED WHEN POWER IS APPLIED.
 2) MAIN RELAYS R1/R2 & R3 ARE ENERGIZED WHEN A 24VAC SOURCE IS APPLIED TO THE 24VAC TERMINAL STRIP.
 3) CONTACTS CAN BE SEQUENCED BY APPLYING THE 24VAC TO THE STAGES (1,2 & 3) AT DIFFERENT TIME INTERVALS.

LEGEND

SYMBOL	DESCRIPTION
AF	SWITCH - AIR FLOW (SEE NOTE 5) (OPT)
DF	SWITCH - DEAD FRONT
F	FUSE - CONTROL
F2A/F4C	FUSE - HEATER OR TERMINAL BLOCK (NOTE 4) SETPOINT
OR/TB	HEATERS (SEE NOTE 4)
HTR1/6	MOTOR - ROOM AIR FAN
M	THERMOSTAT - LIMIT (SEE NOTE 2)
R1/R2/R3	RELAYS - BACKUP (SEE NOTE 4)
R1/R2/R3	RELAYS - MAIN
REC1	RECEPTACLE - DAY-NIGHT (OPT)
REC2	RECEPTACLE - POWER (OPT)
REC3	RECEPTACLE - D.E. COOLING (OPT)
SW1	SWITCH - UNIT POWER
SW2	SWITCH - ON-OFF AND FAN SPEED
T4	THERMOSTAT - D.E. COOL LOW LIMIT (OPT)
T6	THERMOSTAT - D.E. COOL LOW LIMIT (OPT)
TDR	RELAY-TIME DELAY
TDR2	PROTECTOR-LOW VOLTAGE (OPT)
X1	TRANSFORMER - MOTOR SPEED
X2	TRANSFORMER - CLASS 2
X3	TRANSFORMER - CLASS 2 (NOT FURNISHED C.B.O.)
X4	TRANSFORMER-POWER

Motor	X1 Lead Color per Unit Size (CFM)					
	750	1000	1250	1500	2000	
1/4 HP	HI	BRN	BLK	BLK	YEL	2000
	MED	BLU	BRN	BRN	BLK	
	LOW	BLU/WHT	BLU	BRN	BLK	
1/3 HP	HI				BLU	
	MED				BLU/WHT	
	LOW				YEL	
1/2 HP	HI	RED	RED	RED	RED	
	MED	BRN	BRN	BLK	BLU	
	LOW	YEL	YEL	YEL	BLK	

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CAUTION

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

DANGER

DISCONNECT ALL ELECTRICAL POWER BEFORE SERVICING UNIT TO PREVENT INJURY OR DEATH DUE TO ELECTRICAL SHOCK.



WARNING

To avoid electrical shock, personal injury or death, be sure that field wiring complies with local and national fire, safety, and electrical codes, and voltage to the system is within the limits shown in the job-specific drawings and unit electrical data plate(s). Power supply to unit must be disconnected when making field connections. Rigorously adhere to field wiring procedures regarding proper lockout and tagout of components.

Electric Heating

Table 30 - Standard Motor Electric Heat Capacities, Amps, Wire Sizing, and Over Current Protection

	Unit Type	AVS	AVV	AVS	AVV	AVS	AVV	AVS	AVV
		AVR	AVR	AVR	AVR	AVR	AVR	AVR	AVR
	CFM								
	Number of Electric Elements	3	6	3	6	3	6	3	6
	KW	6	12	8	16	10	20	12	24
	MBH	20.48	40.96	27.3	54.61	34.13	68.26	40.96	81.91
	Final Air Temp F (70 F entering air temp)	95.2	120.3	95.2	120.3	95.2	120.3	95.2	120.3
	Air Temperature Rise	25.2	50.3	25.2	50.3	25.2	50.3	25.2	50.3
208-60-1	Electric Heating Amperes	28.8	57.7	38.5	76.9	48.1	96.2	57.7	115.4
	Unit Minimum Circuit Ampacity	39.1	75.23	51.23	99.23	63.23	123.4	75.23	147.4
	Maximum Fuse Size or Circuit Breaker Amps	40	80	55	100	70	130	80	150
230-60-1	Electric Heating Amperes	25.04	50.09	33.18	66.37	41.63	83.27	50.09	100.2
	Unit Minimum Circuit Ampacity	34.4	65.71	44.58	86.06	55.14	107.2	65.71	128.3
	Maximum Fuse Size or Circuit Breaker Amps	35	70	45	90	60	110	70	130
265-60-1	Electric Heating Amperes	21.74	43.59	28.85	57.7	36.17	72.33	43.59	87.07
	Unit Minimum Circuit Ampacity	30.28	57.59	39.16	75.22	48.31	93.52	57.59	111.9
	Maximum Fuse Size or Circuit Breaker Amps	35	60	40	80	50	100	60	120
208-60-3	Electric Heating Amperes	16.7	33.3	22.2	44.4	27.8	55.5	33.3	66.6
	Unit Minimum Circuit Ampacity	23.98	44.73	30.85	58.6	37.85	72.48	44.73	86.35
	Maximum Fuse Size or Circuit Breaker Amps	25	45	35	60	40	80	45	90
230-60-3	Electric Heating Amperes	14.5	28.9	19.2	38.3	24.0	48.1	28.9	57.8
	Unit Minimum Circuit Ampacity	21.2	39.23	27.1	51.0	33.1	63.2	39.2	75.4
	Maximum Fuse Size or Circuit Breaker Amps	25	40	30	55	35	70	40	80
460-60-3	Electric Heating Amperes	7.2	14.5	9.6	19.2	12.0	24.0	14.5	28.9
	Unit Minimum Circuit Ampacity	12.1	21.23	15.1	27.1	18.1	33.1	21.2	39.2
	Maximum Fuse Size or Circuit Breaker Amps	15	25	20	30	20	35	25	40

Amps at unit voltage, 60Hz, single phase

Note: Unit wire sizing should be determined in accordance with NEC and local codes.

* External static pressure ranges must be strictly adhered to.

Electric Heating

Table 31 - High Static Applications Electric Heat Capacities, Amps, Wire Sizing, and Over Current Protection

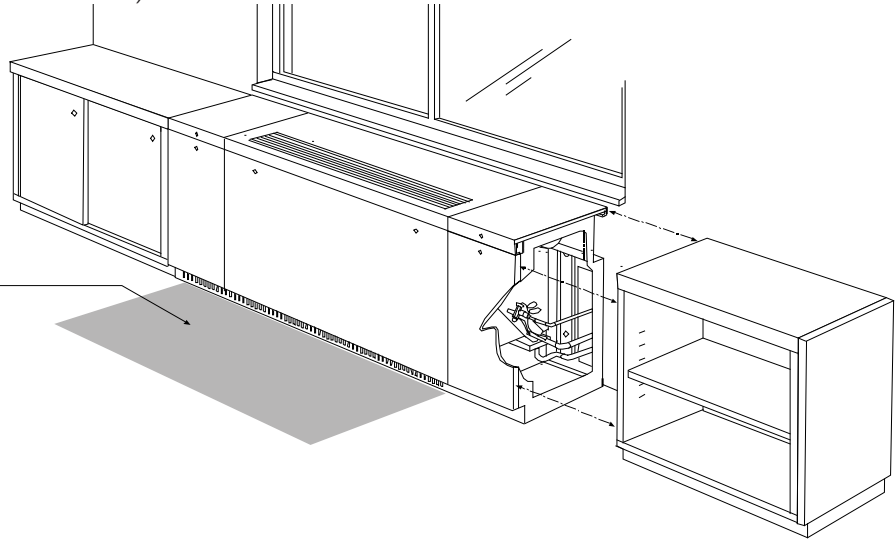
	Unit Type	AVS	AVV	AVS	AVV	AVS	AVV	AVS	AVV
		AVR	AVR	AVR	AVR	AVR	AVR	AVR	AVR
	CFM								
	Number of Electric Elements	3	6	3	6	3	6	3	6
	KW	6	12	8	16	10	20	12	24
	MBH	20.48	40.96	27.3	54.61	34.13	68.26	40.96	81.91
	Final Air Temp F (70 F entering air temp)	95.2	120.3	95.2	120.3	95.2	120.3	95.2	120.3
	Air Temperature Rise	25.2	50.3	25.2	50.3	25.2	50.3	25.2	50.3
208-60-1	Electric Heating Amperes	28.8	57.7	38.5	76.9	48.1	96.2	57.7	115.4
	Unit Minimum Circuit Ampacity	42.2	78.33	54.33	102.3	66.33	126.5	78.33	150.5
	Maximum Fuse Size or Circuit Breaker Amps	45	80	55	110	70	130	80	175
230-60-1	Electric Heating Amperes	25.04	50.09	33.18	66.37	41.63	83.27	50.09	100.2
	Unit Minimum Circuit Ampacity	37.5	68.81	47.68	89.16	58.24	110.3	68.81	131.4
	Maximum Fuse Size or Circuit Breaker Amps	40	70	50	90	60	120	70	140
265-60-1	Electric Heating Amperes	21.74	43.59	28.85	57.7	36.17	72.33	43.59	87.07
	Unit Minimum Circuit Ampacity	33.38	60.69	42.26	78.32	51.41	96.62	60.69	115
	Maximum Fuse Size or Circuit Breaker Amps	35	70	45	80	55	100	70	120
208-60-3	Electric Heating Amperes	16.7	33.3	22.2	44.4	27.8	55.5	33.3	66.6
	Unit Minimum Circuit Ampacity	27.08	47.83	33.95	61.7	40.95	75.58	47.83	89.45
	Maximum Fuse Size or Circuit Breaker Amps	30	50	35	70	45	80	50	90
230-60-3	Electric Heating Amperes	14.5	28.9	19.2	38.3	24	48.1	28.9	57.81
	Unit Minimum Circuit Ampacity	24.33	42.33	30.2	54.07	36.2	66.33	42.33	78.46
	Maximum Fuse Size or Circuit Breaker Amps	25	45	35	55	40	70	45	80
460-60-3	Electric Heating Amperes	7.2	14.5	9.6	19.2	12	24	14.5	28.9
	Unit Minimum Circuit Ampacity	15.2	24.33	18.2	30.2	21.2	36.2	24.33	42.33
	Maximum Fuse Size or Circuit Breaker Amps	20	25	20	35	25	40	25	45

Note: Electric heat disconnect provided.

Cabinets

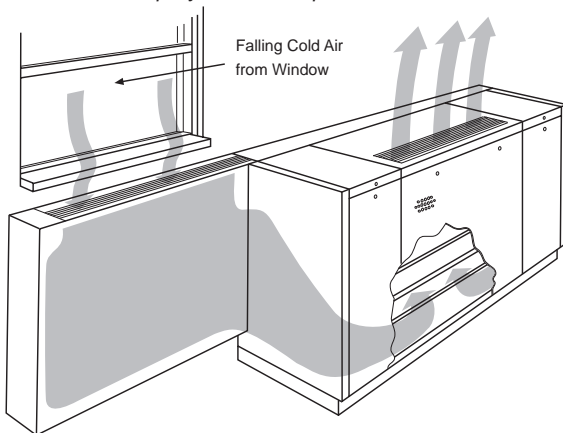
Figure 124 - Cabinet(s) Meeting Unit Ventilator (refer to the instructions specific to the installation, included with the cabinets).

NOTICE
Remove debris, dust, dirt, and any obstruction from the area in front of the return air intake grille at the floor (approximately 3' - see shaded area) as this will affect unit performance. If a draftstop system has been installed be sure that all draftstop intake grilles are unobstructed.



Draftstop™ System/Window Down-draft Installation

Figure 125 - DraftStop System Concept



Window down-draft protection is recommended for classrooms where the following conditions exist:

1. Window area exceeds 40% of the total outside wall area.
2. Single-pane glass is used.
3. Outside temperatures are below 35°F for a significant portion of the occupied period.

The need for window down-draft protection will not always be so clear cut. Where uncertainty exists, a further check can be made by calculating the window heat loss at an outdoor temperature of 35°F. If estimated window heat loss exceeds 250 BTUH/FT, window down-draft protection is recommended. If estimated window heat loss is less than 250 Btuh/Ft., the need for down-draft protection is marginal but should not be arbitrarily dismissed.

The “DraftStop” system can be employed even in those marginal applications to provide the occupants comfort without the material installation and operating cost penalty associated with “auxiliary radiation.” The unit ventilator is ordered with the return air intake having a draftstop blockoff to restrict return air flow through the front bottom unit opening, option “30” in field “11” of the model number. This allows drawing of return air through the draftstop enclosure located under the windows. A manually adjustable damper is located beneath each section of DraftStop grille, see figure 128 on page 53. This damper is provided so that a uniform air velocity can be achieved throughout the entire length of the DraftStop grille. This simple adjustment is made once by the installer during the final stage of installation.

Table 30. DraftStop Grille Length

Unit Nom. CFM	20" High DraftStop Wall Enclosure		24" High DraftStop Wall Enclosure or Storage Cabinets	
	Minimum Length (Ft.) Each Side	Maximum Length (Ft.) Each Side	Minimum Length (Ft.) Each Side	Maximum Length (Ft.) Each Side
750	3	13	3	22
1000	4	18	4	30
1250	5	22	5	36
1500	6	25	6	42

Figure 126 - Unit Back Showing knockouts for DraftStop Applications

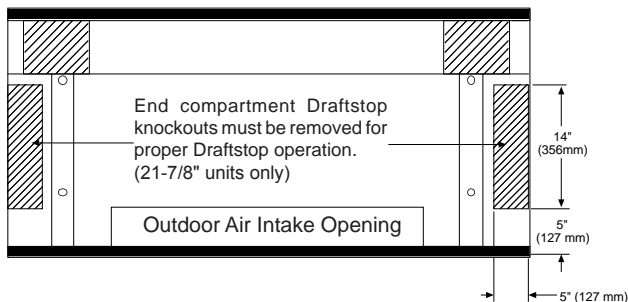


Figure 127 - Typical Finned Radiation Enclosure (left) And Typical DraftStop Enclosure (right)



NOTICE

The following information is a general outline for installing the Draftstop system. Refer to the specific installation instructions provided with the Draftstop system equipment.

Draftstop is made up of three separate sections as listed below:

1. Upper channel or backplate
2. Mounting components
3. Enclosures and trims

Items 1, and 2 are materials which will be required to start the installation. Item 3 is the completion material and should be stored in a safe area until needed.

The following step-by-step procedures should be adhered to:

1. Check the area in which the equipment is to be installed and clear away the debris.
2. Review the engineered floor plans or the approved equipment room schedule.
3. Place the proper amount of equipment in each area in accordance with plans or schedule.
4. Proceed to install the equipment as outlined on the following pages. Refer to the installation instructions included with the Draftstop system for more detailed information.

Upper Channel or Backplate Assembly

1. Establish a level chalk line on the wall at a height specified for the top of the enclosure. Select mounting hardware which is suitable for the type of wall construction used and mount the upper channel or backplate flush with the chalk line. When mounting, use the pre-punched holes and push the hardware through the sponge gasket.

Note:

- a. The upper channel is provided with continuous 5/16" diameter holes on 2" centers for mounting.
- b. Where used, the backplate assembly consists of a full backplate welded to the back of the upper channel. Fasten the backplate at the bottom as well as at the top.
2. Wall-to-Wall Application: Starting at the left side, run the upper channel or backplate along the wall. Note that the upper channel or backplate is installed behind the wall trim as well as the enclosure, because both the enclosure and wall trim rest in the top groove of the upper channel.
3. Wall-to-End Application: Run the upper channel or backplate from the wall to a point where the enclosure will end. See Draftstop installation instructions for details of end cap installation.
4. End-to-End Application: Run the upper channel or backplate the same length as the enclosure. See Draftstop installation instructions for details or end cap installation.
5. For inside corners, run the upper channel or backplate into the corner, butting the pieces together. If desired, pieces may be stopped short of the corner a maximum of one inch. Refer to the Draftstop installation instructions for details of the corner trim installation.

The Draftstop enclosure and unit ventilator end panel should be matched, to ensure proper airflow. Tables 31-34 show the various end panels available, follow installation instructions included with the end panels.

Figure 128 - Typical DraftStop Enclosure

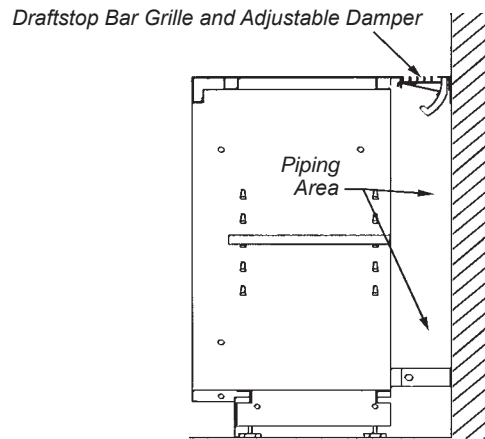


Table 31 - 1" (25mm) End Panel Dimensions – Floor Unit Ventilators

All Dimensions in Inches	16 5/8" (422mm) Deep End Panels	21 7/8" (556mm) Deep End Panels
Top View		
End View With No Cut-out		
End View With 2 1/2" x 7" (64mm x 178mm) Cut-out		
End View With 4" x 18" (102mm x 457mm) Cut-out		
End View With 4" x 22" (102mm x 559mm) Cut-out		
End View With 2" x 5 1/4" (51mm x 133mm) Step Down		

Figure 129 - Typical DraftStop Enclosure

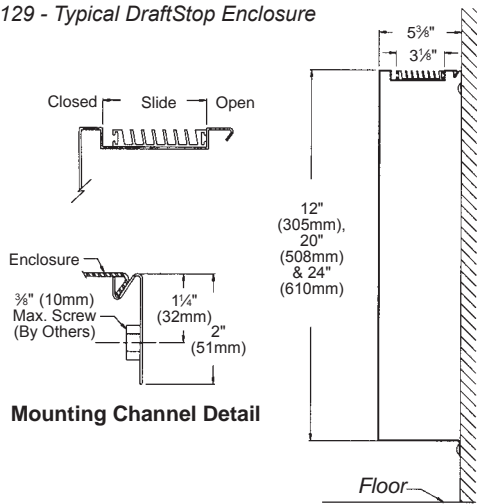


Table 32. 1" (25mm) End Panel Dimensions – Non-Standard 28" Deep Floor Unit Ventilators

All Dimensions in Inches	28" (711mm) Deep End Panels
Top View	
End View With No Cut-out	
End View With 2 1/2" x 7" (64mm x 178mm) Cut-out	
End View With 4" x 18" (102mm x 457mm) Cut-out	
End View With 4" x 22" (102mm x 559mm) Cut-out	
End View With 2" x 5 1/4" (51mm x 133mm) Step Down	

Table 33 - 6" (152mm) End Panel Dimensions – Floor Unit Ventilators

Top View		
End View With No Cut-out		

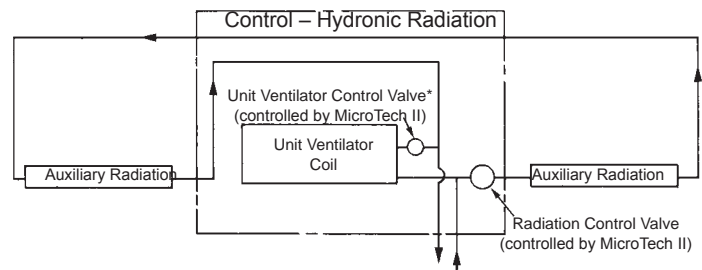
Table 34 - 6" (152mm) End Panel Dimensions – 28" Non-Standard Floor Unit Ventilators

Top View	
End View With No Cut-out	

Finned Radiation System

Finned radiation down-draft control is available for those who prefer it. Made of furniture-quality steel and designed to complement the unit ventilator styling, it is particularly appropriate for a building with very large expanses of window where the DraftStop system is not used, and for use in other parts of the building.

Figure 130 - Typical Finned Radiation Piping



*Not required with Face & Bypass control

Installing Unit Ventilator End Panels:

See Figure 131. Accessory end panels are shipped separately with hardware and kickplate, or simulated kickplate adhesive tape used on 16⁵/₈" units (only). Align each end panel with the top and front edges of the unit ventilator. Attach each end panel to the unit ventilator using the hardware provided.

Figure 131 - Install End Panels

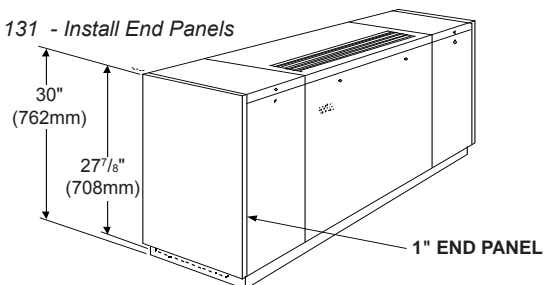


Figure 132 - Install End Panels With Provided Hardware (1" End Panel Shown)

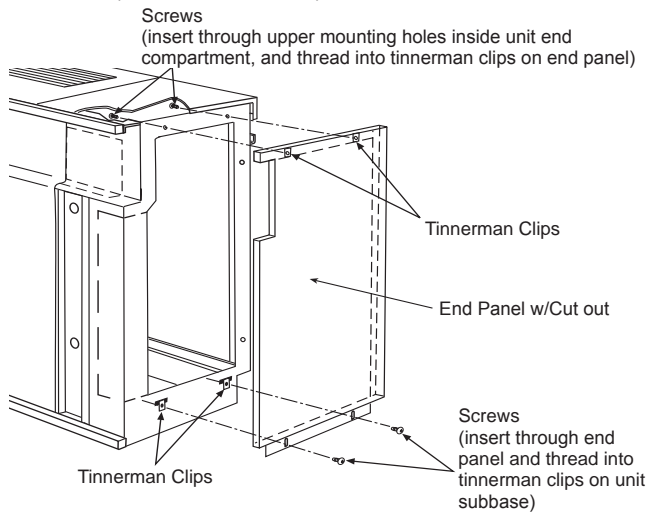
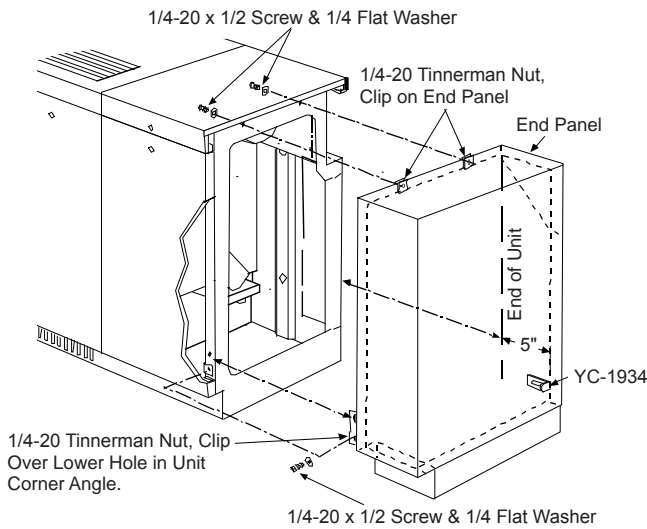


Figure 133 - Install End Panels With Provided Hardware (6" End Panel Shown)



1. Position (YC-1934) bracket on wall so angle is 5" from end of unit and near bottom (see figure 133).
2. Mark and drill required hole for fastening device (not included).
3. Attach bracket to wall.
4. Attach end panel. Bracket should prevent movement of end panel toward end of unit when pressure is applied to end panel, readjust bracket if necessary.

Prepare Unit Ventilator(s) for Start-up

Oiling the Fan Shaft End Bearing:

CAUTION

Do not attempt to operate the unit fans until the fan bearings have been oiled. Oiled bearings provide smooth, and quiet operation of the fan system.

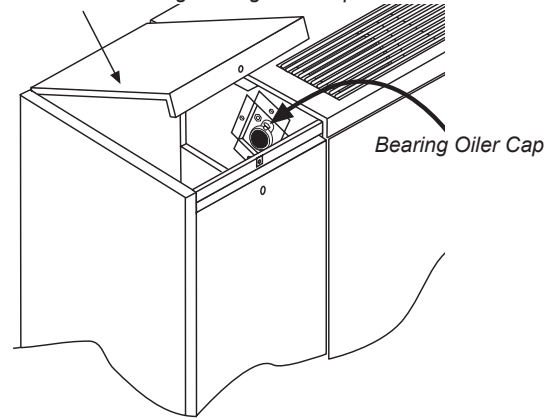
See Figure 134 for oiling point. Access to fan shaft bearing is through left top access door (750, 1000, 1250 cfm units only). Lift the oiler cap. Oil, using a few drops of high grade SAE 20 or 30 nondetergent oil. Do not over-oil.

NOTICE

G.E. motor manufacturer recommends not oiling the fan motor.

Figure 134 - Oiling Point

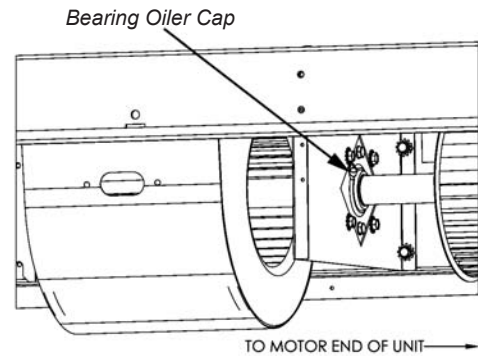
Access To Fan Shaft Bearing Through Left Top Access Door



NOTICE

For 1500 cfm units, access to the fan shaft bearing is through the center front panel. It is located between the third and fourth fan housing from the right (Figure 135).

Figure 135 - Oiling Point for 1500 cfm units



Unit Ventilator Start-up

NOTICE

Remove debris, dust, dirt, and any obstruction from the area in front of the return air intake grille at the floor as this will affect unit performance. If a draftstop system has been installed be sure that all draftstop intake grilles are unobstructed.

1. Before proceeding inspect the fan system, ensure all parts are aligned properly and move freely. Inspect fans and fan discharge area for obstructions. Rotate fan manually. Check that a clean filter is installed and area in front of unit ventilator is free of debris (see figure 124). All panels should be in place and properly fastened. Check for outdoor air leaks and condensation. Ensure the coil section is properly sealed using the insulating foam donuts supplied.
2. After the unit ventilator has been properly installed, activate unit electrical power and applicable chilled water/hot water/steam/refrigerant systems.
3. Using the applicable control, activate the unit ventilator. Depending on the operating mode selected, the dampers, fans, and other components should operate as needed.
4. Run the unit ventilator for ten minutes, listening and observing. Fans should be operating correctly, and rotating in the proper direction, without unusual noise. Likewise, the unit should be free of sheet metal rattles and / or unusual noises. All panels should be in place and properly fastened, and checked for air leaks and condensation.

Filter(s)

⚠ CAUTION

Turn off unit before servicing to avoid danger of injury from rotating fans.

Turn off the unit, (fan speed switch or unit on/off switch is located behind the right front end compartment panel). Remove the center front panel, pull out the filter and replace with a clean filter. Replace the center panel and restart the unit.

Filters should be replaced during the first week of placing into service to prevent dirt carry-over into the internals of the unit and back into the classroom, (see figure 136). A periodic filter changeout program should be established. Filters should be checked monthly or more often if conditions indicate. Filters are included in all units. Daikin single-use filters are standard on all but electric heat units, which come with permanent wire mesh filters. Permanent wire mesh and renewable media filters are available for non-electric heat units, in lieu of single-use filters.

- **Single-use filters** feature Amerglas media. They are designed to be used once and discarded.
- **Permanent filters** are metal filters that may be removed for cleaning and reused numerous times.
- **Renewable media filters** (figure 134) consist of a heavy painted metal structural frame and renewable Amerglas media.

⚠ CAUTION

Electric heat units should **ONLY** use permanent wire mesh filters. Filters other than wire mesh are not intended for electric heat units, and can cause unit damage, property damage or personal injury.

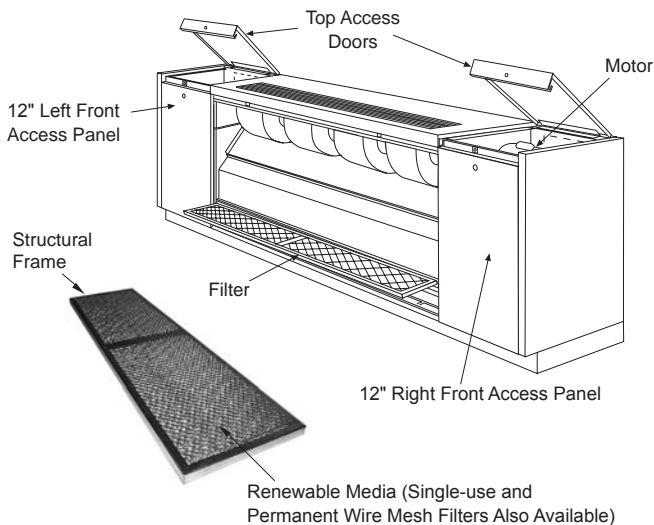
⚠ CAUTION

Units must have a filter installed when operating. Operation without a filter can compromise unit performance due to build up of dust and dirt on components.

⚠ CAUTION

Dirty or clogged filters can impact unit performance, resulting in damage to the unit.

Figure 136 - Filter installation



Complete Check, Test and Start Procedure

(Included in the shipping envelope in the end compartment of the unit). Provide completed Check, Test and Start procedure to local Daikin representative and to specifying engineer to verify proper start-up was completed.

Installer/Owner's Responsibility Protect your investment - read carefully

Your Daikin express written limited warranty does not cover equipment failures that are caused by misuse, abuse, mis-installation, failure to maintain the unit, etc. So, for example, the following damage is not covered by warranty:

1. Progressive damage to machine from failure to check and test at start-up.
2. Damage resulting from handling during installation or damage resulting from transportation.
3. Incorrect or fluctuating power supply.
4. Damage resulting from failure to keep evaporator coil and intake clean.
5. Damage resulting from freezing water or condensate, inadequate or interrupted water supply, use of corrosive water, rearrangement of unit piping system, fouling or restriction of the water circuit by foreign material.
6. Inaccessibility of unit for service or parts installation that prevents proper equipment operation.
7. Damage resulting from the use of the unit in a corrosive atmosphere, ie., cleaning materials, fumes, etc
8. Damage caused by not cleaning or replacing filters.
9. Damage caused by accident, alteration of unit design, or tampering.

Please complete and return the Check, Test and Start document immediately to protect your warranty.

Daikin Training and Development

Now that you have made an investment in modern, efficient Daikin equipment, its care should be a high priority. For training information on all Daikin HVAC products, please visit us at www.DaikinAP.com and click on training, or call 540-248-9646 and ask for the Training Department.

Warranty

All Daikin equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Representative for warranty details. Refer to Form 933-430285Y. To find your local Daikin Representative, go to www.DaikinAP.com.

Aftermarket Services

To find your local parts office, visit www.DaikinAP.com or call 800-37PARTS (800-377-2787). To find your local service office, visit www.DaikinAP.com or call 800-432-1342.

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to www.DaikinAP.com.

Products manufactured in an ISO Certified Facility.

