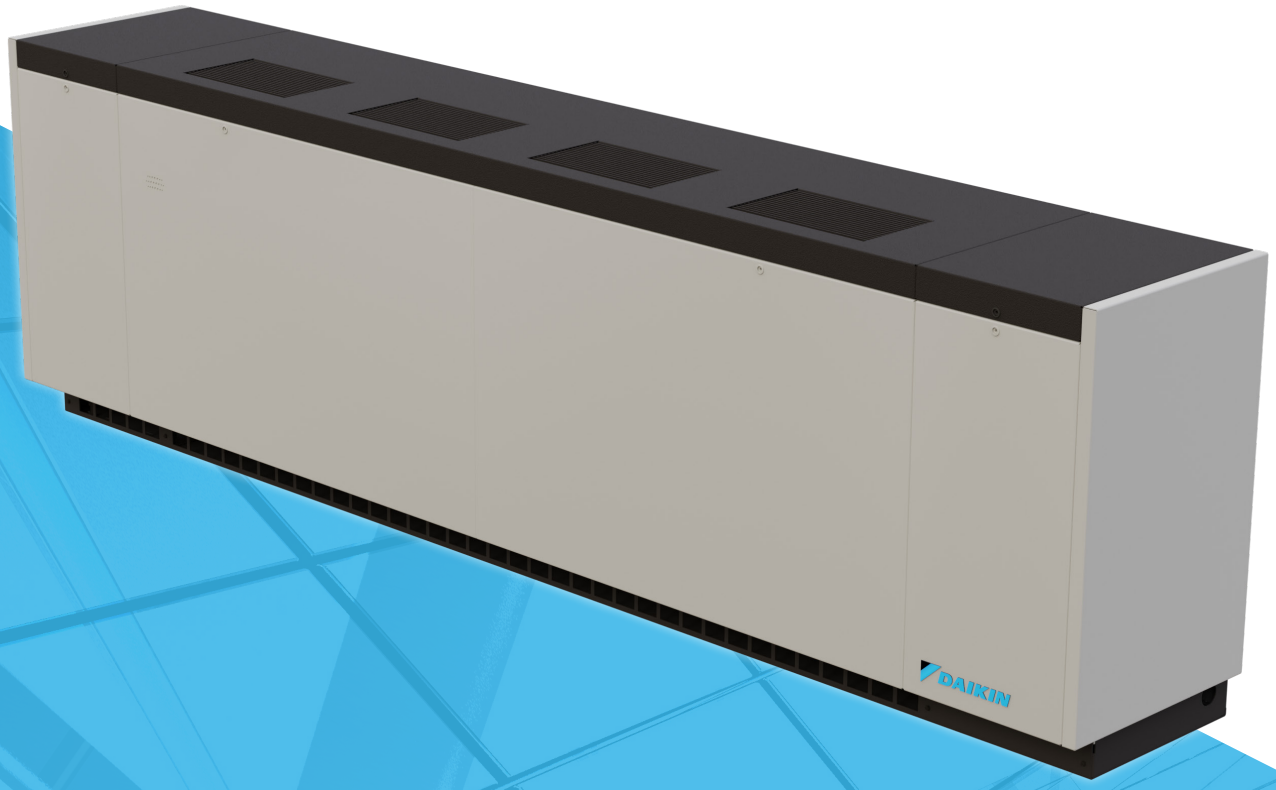
INSTALLATION & MAINTENANCE MANUAL

IM 1396-1

JULY 2025

CLASSROOM UNIT VENTILATOR



- MODELS AVS, AVV, AVB, AVR
- SIZES 07 - 15 (750 TO 1500 CFM)
- R-32 REFRIGERANT

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Safety Information

Hazard Identification

⚠ DANGER

Danger indicates a hazardous situation, which will result in death or serious injury if not avoided.

⚠ WARNING

Warning indicates a potentially hazardous situations, which can result in property damage, personal injury, or death if not avoided.

⚠ CAUTION

Caution indicates a potentially hazardous situations, which can result in minor injury or equipment damage if not avoided.

NOTICE

Notice indicates practices not related to physical injury.

NOTE: Indicates important details or clarifying statements for information presented in Figures or Tables.

Safety Considerations

This manual provides installation and maintenance information for Daikin Applied CLASSROOM UNIT VENTILATOR with a MicroTech® controller.

NOTICE

Installation and maintenance are to be performed only by licensed, if required by local codes and regulations, or qualified personnel who are familiar with local codes and regulations and are experienced with this type of equipment.

⚠ DANGER

LOCKOUT/TAGOUT all power sources prior to service, pressurizing, de-pressuring, or powering down the unit. Failure to follow this warning exactly can result in serious injury or death. Disconnect electrical power before servicing the equipment. More than one disconnect may be required to de-energize the unit. Be sure to read and understand the installation, operation, and service instructions within this manual.

This unit is equipped with a Refrigerant Detection System, and the system components, such as supply fans, may begin operation unexpectedly and without warning.

⚠ WARNING

Electric shock hazard. Improper handling of this equipment can cause personal injury or equipment damage. This equipment must be properly grounded. Connections to and service of the MicroTech control panel must be performed only by personnel that are knowledgeable in the operation of the equipment being controlled.

⚠ 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.

⚠ WARNING

This unit contains R-32, a class A2L refrigerant that is flammable. This unit should only be installed, serviced, repaired, and disposed of by qualified personnel licensed or certified in their jurisdiction to work with R-32 refrigerant. Installation and maintenance must be done in accordance with this manual. Improper handling of this equipment can cause equipment damage or personal injury.

For installation only in locations not accessible to the general public.

Be aware that R-32 refrigerant may not contain an odor. Place in a well ventilated area to prevent accumulation of refrigerant. When installing the unit in a small room, take measures to keep the refrigerant concentration from exceeding allowable safety limits. Excessive refrigerant leaks, in the event of an accident in a closed ambient space, can lead to oxygen deficiency.

Do not pierce or burn this unit.

Never use an open flame during service or repair. Never store in a room with continuously operating ignition sources (for example: open flames, an operating gas appliance, or and operating electric heater.), where there is ignitable dust suspension in the air, or where volatile flammables such as thinner or gasoline are handled.

Only use pipes, nuts, and tools intended for exclusive use with R-32 refrigerant in compliance with national codes (ASHRAE15 or IRC).

Do not mix air or gas other than R-32 in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, which may cause equipment damage or injury.

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

For more information, consult "Refrigerant Information" on page 89.

⚠ WARNING

The appliance is designed to activate leak mitigation airflow in the event a refrigerant leak is detected. This is required to ensure dilution and prevent stagnation of any leaked refrigerant. Always ensure the supply fans are able to operate freely. Always maintain proper airflow and do not allow filters, air inlets, or air outlets to become blocked.

⚠ WARNING

When moving flammable A2L refrigerant to/from the unit from an auxiliary tank, a grounding strap must be used. An electrical charge builds when halo-carbon refrigerant travels in a rubber hose. A grounding strap must be used between the auxiliary refrigerant tank and the unit's end sheet (earth ground), which will safely take the charge to the ground. A fire risk could occur if this procedure is not followed.

⚠ WARNING

Polyolester Oil, commonly known as POE oil is a synthetic oil used in many refrigeration systems, and may be present in this Daikin Applied product. POE oil, if ever in contact with PVC/CPVC, will coat the inside wall of PVC/CPVC pipe causing environmental stress fractures. Although there is no PVC/CPVC piping in this product, please keep this in mind when selecting piping materials for your application, as system failure and property damage could result. Refer to the pipe manufacturer's recommendations to determine suitable applications of the pipe.

⚠ 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.

⚠ CAUTION

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

⚠ 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 control panel before performing any service work. Never unplug any cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

NOTICE

This unit is not intended for use in laundry rooms.

UL Compliance Statements for Unit Work

- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e., non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available at hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space.
- Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards. Safety checks are necessary to ensure that the risk of ignition is minimized and “No Smoking” signs shall be displayed.
- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
- Equipment not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children shall not be allowed to play on or with equipment.
- If unit is permanently connected to water main; hose sets are not to be used.

Unit Labels

Pictogram warning and informational labels may be present on the unit. Consult the table below for reference.

Label	Description
	WARNING - flammable refrigerant present
	Read the technical manual for service instructions
	WARNING - A2L low-burning velocity refrigerant present
	Pressurized medium present
	Ultraviolet (UV) radiation present
	Read the technical manual for instructions
	WARNING - flammable refrigerant present

Introduction

Model Nomenclature

U	AVV	K	S10	A	S	68	A	B1	AL	22	G	I	B	3
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Category	Code Item	Code Option	Code Designation & Description			
Product Category	1	1	U	Unit Ventilators		
Model Type	2	2-4	AVS	Floor, Face & Bypass	AVV	Floor, Valve Control
			AVB	Floor, Face & Bypass, Reheat	AVR	Floor, Valve Control, Reheat
Design Series	3	5	9	Design J		
			K	Design K (for Units with R-32 Refrigerant Coil)		
Motor Type	4	6	S	PSC Motor, 3-Speed	V	EC Motor, Variable Airflow
			H	EC Motor, 3-Speed		
Nominal Capacity		7-8	07	750 cfm	13	1250 cfm
			10	1000 cfm	15	1500 cfm
Voltage	5	9	A	115/60/1	D	208/60/3 (Electric Heat Required)
			C	208/60/1	H	230/60/3 (Electric Heat Required)
			G	230/60/1	K	460/60/3 (Electric Heat Required)
			J	265/60/1		
Coil Options	6	10	U [1]	2 Row CW/HW 2 pipe	V [5]	2 Row CW
	Numerical codes [#] include optional stainless steel drain pan.		D [2]	3 Row CW/HW 2 pipe	S [6]	3 Row CW
			E [3]	4 Row CW/HW 2 pipe	W [7]	4 Row CW
			F [4]	5 Row CW/HW 2 pipe	Y [8]	5 Row CW
			G [9]	DX	Z	None
			M [0]	DX for HP Operation		
Heating Options	7	11-12	12	3 Element Low Cap. Electric Heat	68	Steam Low Cap.
			13	6 Element Low Cap. Electric Heat	69	Steam High Cap.
			65	1 Row HW	78	Opposite End Steam Low Cap.
			66	2 Row HW	79	Opposite End Steam High Cap.
			67	3 Row HW	00	None
Hand Orientation	8	13	A	Same Hand LH	E	LH Heating/RH Cooling
			B	Same Hand RH	F	RH Heating/LH Cooling
			D	RH Electric Heat Only	R	Single Coil Left Hand
			G	RH Electric Heat / LH Cool	S	Single Coil Right Hand
Controls	9	14-15	##	MicroTech Controls (See Control Code Table Below)		

Control Features		Feature Selections							
Open Protocol	BACnet / Stand-Alone	•		•		•	•		
	LonMark		•		•			•	•
DCV	CO_2 Sensor			•	•		•		•
Factory Installed Keypad	LUI					•	•	•	•
		Control Code							
Economizer Control	Basic	B1	B5	B9	BD	BH	BL	BP	BT
	Expanded	E1	E5	E9	ED	EH	EL	EP	ET
	Leading-Edge	L1	L5	L9	LD	LH	LL	LP	LT

23	Field Mounted Controls (by Others)
17	Digital Ready

U	AVV	K	S10	A	S	68	A	B1	AL	22	G	I	B	3
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Category	Code Item	Code Option	Code Designation & Description			
Discharge	10	16-17	AL	16-5/8" Top Bar Grille	AP	21-7/8" Top Bar Grille Full Adapter Back, Cold Pipe Tunnel, Top Duct In
			AK	21-7/8" Top Bar Grille Partial Adapter Back, Open Tunnel	AM	21-7/8" Top Bar Grille 2" Step, Full Adapter Back, Closed Tunnel
			AN	21-7/8" Top Bar Grille Full Adapter Back, Closed Tunnel	AB	21-7/8" Top Bar Grille Full Adapter Back, Closed Pipe Tunnel w/ Solid Back
Return Air/ Outside Air	11	18-19	22	Return Air Bottom Front / Outdoor Air Rear	30	Return Air Bottom with Draft Stop / OA Rear
			24	Recirculation Only / No OA or RA Dampers		
Power Connection	12	20	G	Box w/Switch		
			J	Box w/Switch, w/USB		
			K	Box w/Switch, w/SD		
			M	Box w/Switch, w/USB, w/SD		
Color	13	21	I	Antique Ivory	G	Soft Gray
			W	Off White	C	Cupola White
			B	Putty Beige		
SKU Type	14	22	B	Standard Delivery		
Product Style	15	23	1	1st Style Change (No DX Coil)		
			2	R-410 Coil (Service Replacement)		
			3	R-32 Refrigerant		

Installation

Receiving and Handling

Carefully check equipment against the bill of lading to ensure all items have been received. Before unloading any unit, check the nameplate to make sure the voltage complies with the power supply available.

Inspect all units for damage upon arrival. If a unit has become dirty during shipment, carefully clean it prior to completing the inspection. Daikin Applied is not responsible for physical damage after the unit leaves the factory unless the contract with Daikin Applied states otherwise.

NOTICE

All units should be carefully inspected for damage when received. Report all loss or shipping damage using a claim form supplied by Daikin Applied.

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 refusal to honor a damage claim.

CONCEALED LOSS OR DAMAGE: Concealed loss or damage means loss or damage which does not become apparent until the unit has been unpacked or unwrapped. The contents may be damaged in transit due to rough handling even though the exterior may not show damages. When the damage is discovered, make a written request for inspection by the carrier's agent within **five (5) days** of the delivery date and file a claim with the form provided by Daikin Applied. Refer to the Daikin Applied Freight Policy for further information.

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 1 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 1 & Figure 2).

Figure 1: Forklift Lifting Requirements

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, located on the lower right end of the unit ventilator, contains specific information of standard components as listed in the "Model Nomenclature" on page 5.

Install this product in accordance with good engineering practices and workmanship, following these general instructions, plus the job-specific Daikin Applied submittal drawings provided for specific dimensions, unit arrangements, controls and electrical details, pipe stub-up locations, etc. Applicable tools for lifting, hook-up of piping, electrical and insulation are required.

- 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.

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.

Figure 2: Stack Units Maximum Two High As Shown

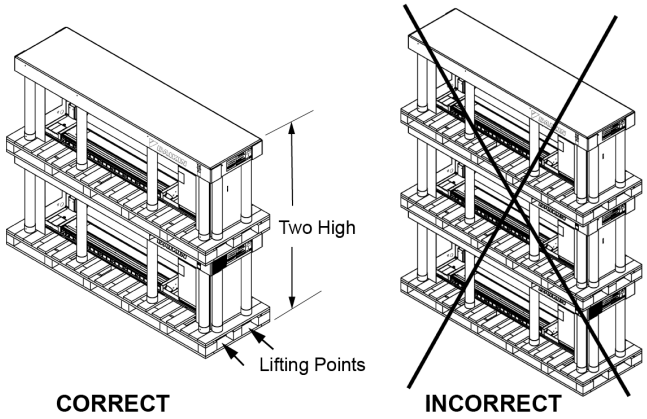


Table 1: Approximate Shipping Weights and Physical Data

Unit Size	Shipping Weight lbs (kg)	Approx. Shipping Weight lbs (kg)	Shipping Size (Carton & Pallet) in (mm)	Filter Size in (mm)	Unit Length[1] in (mm)	Number of Fans
	16⅝" Units	21⅞" Units				
07	350 (168)	370 (163)	67L x 23W x 36.39H (1702 x 584 x 924)	10 x 36.5 x 1 (254 x 927 x 25)	62 (1575)	2
10	425 (193)	445 (202)	79L x 23W x 36.39H (2007 x 584 x 924)	10 x 48.5 x 1 (254 x 1232 x 25)	74 (1880)	3
13	495 (225)	525 (238)	91L x 23W x 36.39H (2311 x 584 x 924)	10 x 60.5 x 1 (254 x 1551 x 25)	86 (2174)	4
15	570 (259)	600 (272)	103L x 23W x 36.39H (2616 x 584 x 924)	Two: 10 x 36.5 x 1 (254 x 927 x 25)	98 (2489)	4

[1] Measurement is without end panels.
[2] All unit ventilators are 30" (762 mm) high.

Unit Location

Figure 3: Typical Classroom Unit Ventilator Installation and Louver Details

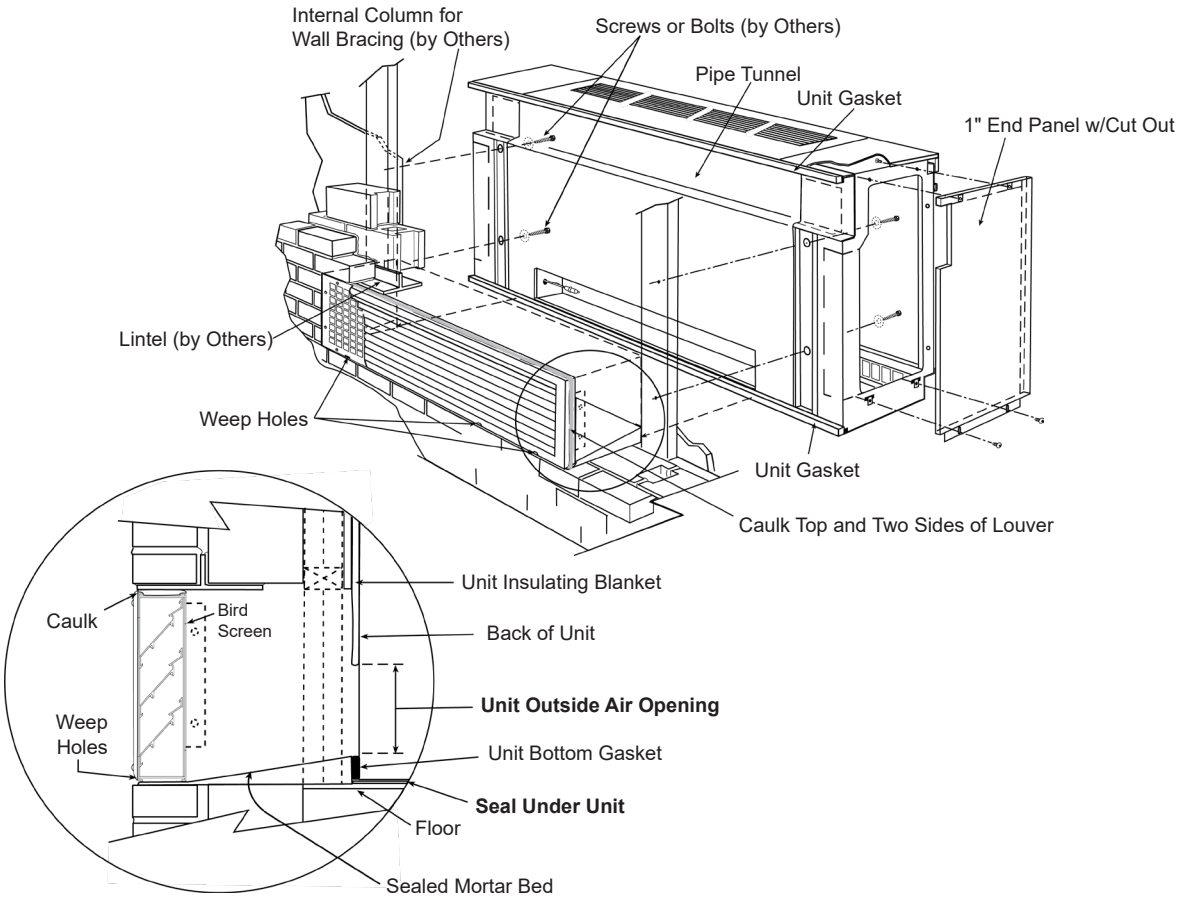
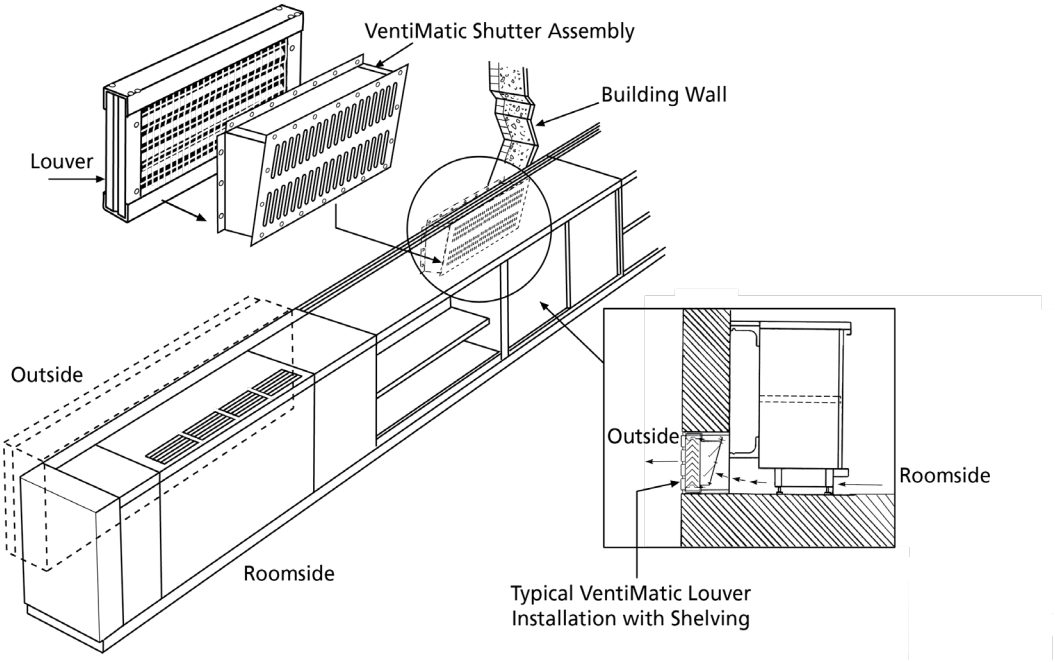


Figure 4: Typical VentiMatic Shutter Assembly Installation



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.

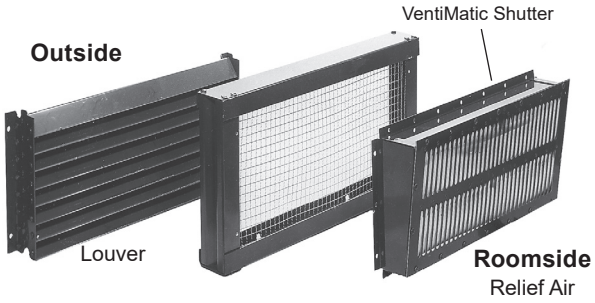
Vertical floor models are typically installed in front of a wall opening containing a properly sized louver that is designed to let in outside air while preventing water (such as rain) from getting past the louver and into the unit itself. A weather-tight seal keeps unwanted air and moisture from entering the occupied space. See Figure 6 on page 10 through Figure 21 on page 14, and Table 2 on page 13 for various louver details.

VentiMatic™ Shutter Assembly

In many installations, a Daikin Applied 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: *Bird screen and louver are shipped in one (1) piece.*

Installing Louvers

Louver Details

Figure 6: Horizontal and Vertical Blade Louvers, Without Flange (See Caution Below for Louver Blade Orientation and Drainage)

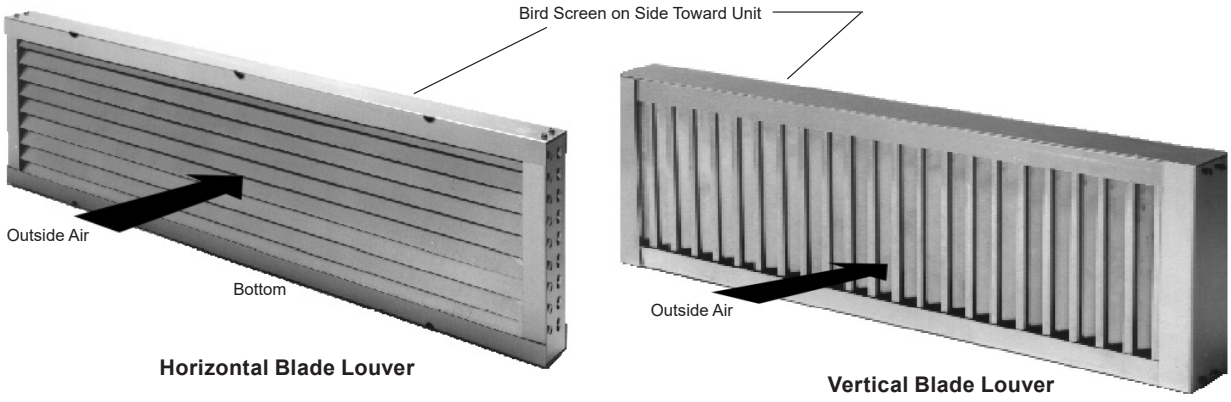
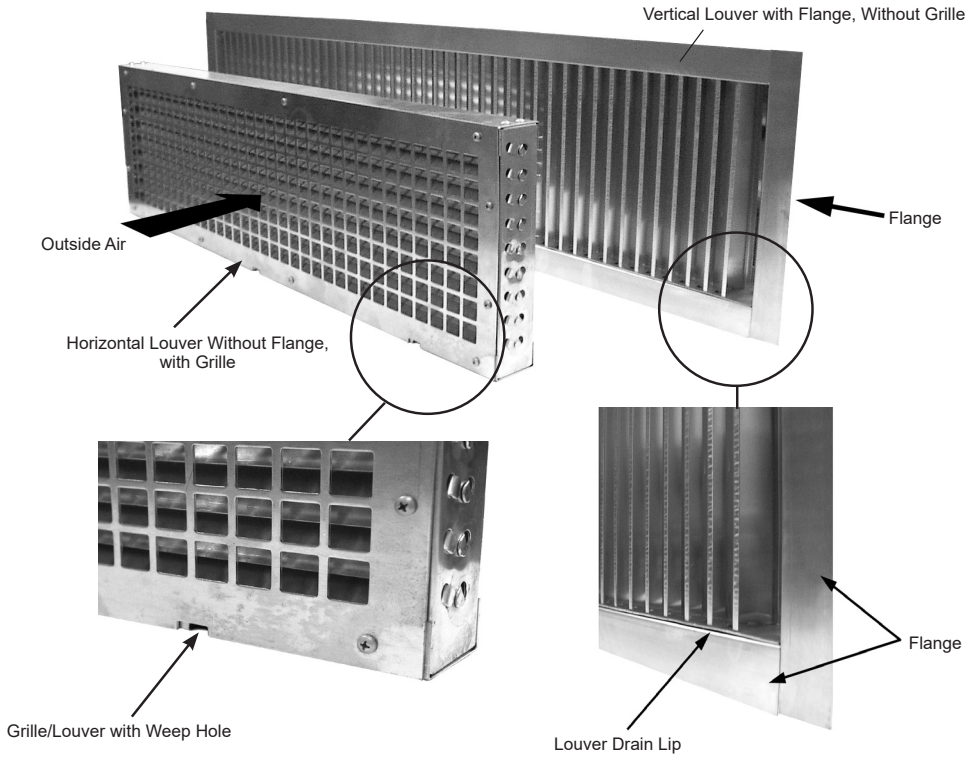


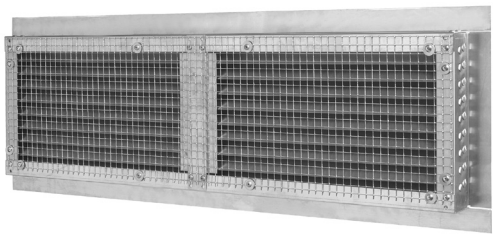
Figure 7: Horizontal and Vertical Blade Louvers, Without Flanges with Grille or with Flange Without Grille



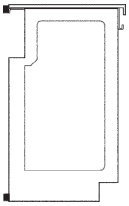
⚠ CAUTION

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.

Figure 8: Rear of Horizontal Blade Louver with Bird Screens and Flange



Louver Installation with Typical Unit Configurations



Unit Configuration Type AL

Figure 9: 16-5/8" (422 mm) Deep Unit with Open Pipe Tunnel and Standard Louver Location

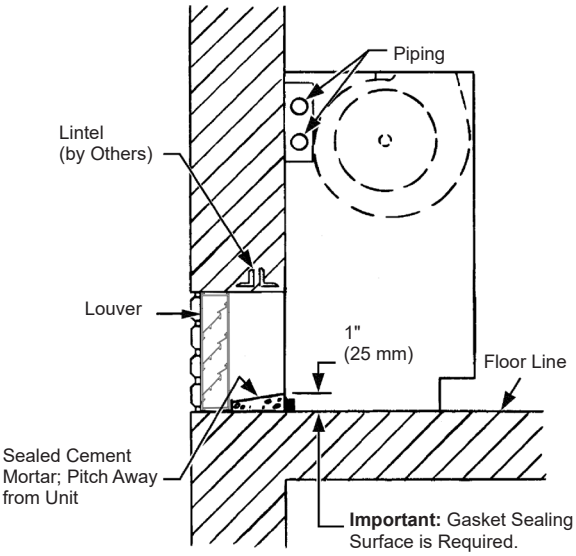
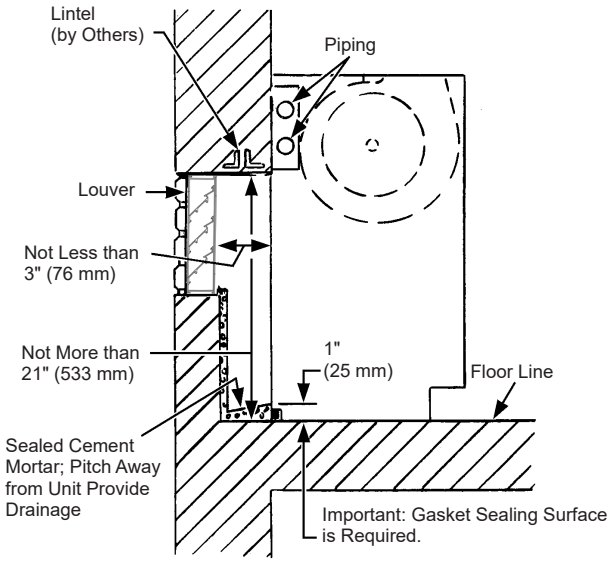


Figure 10: 16-5/8" (422 mm) Deep Unit with Open Pipe Tunnel & High Louver Application with Chased Wall



⚠ CAUTION

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

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

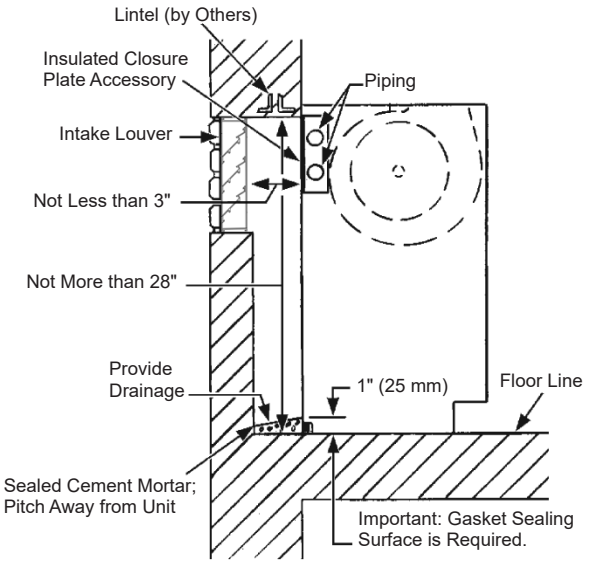
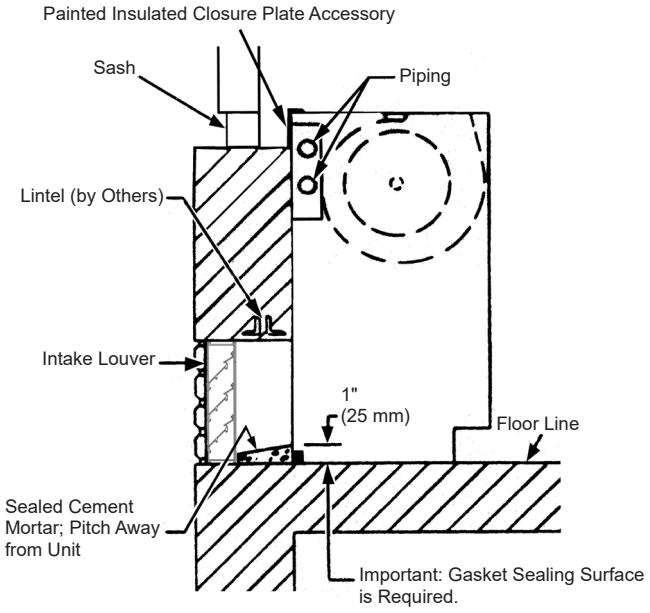
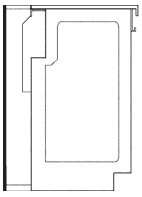


Figure 12: Floor Level Outdoor Air Intake with Window Below Unit Top Using Arrangement AL and 9" "Finished" (Painted) Accessory (Uninsulated) Closed Pipe Tunnel





Unit Configuration Type AN

NOTICE

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

Figure 13: 21-7/8" (556 mm) Deep Full Adapter Back Unit with Standard Louver Application

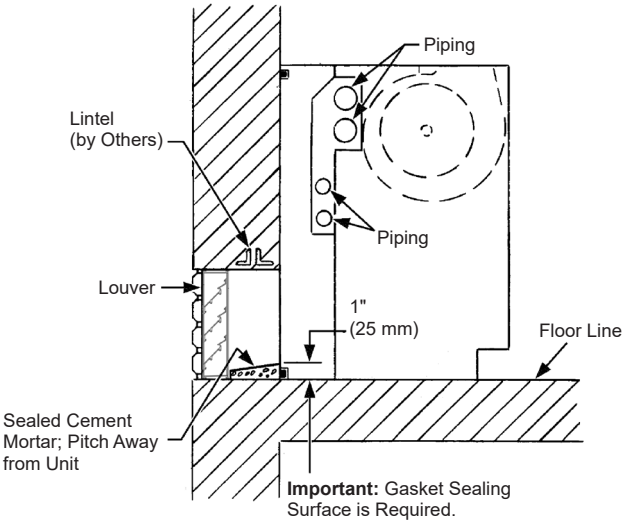
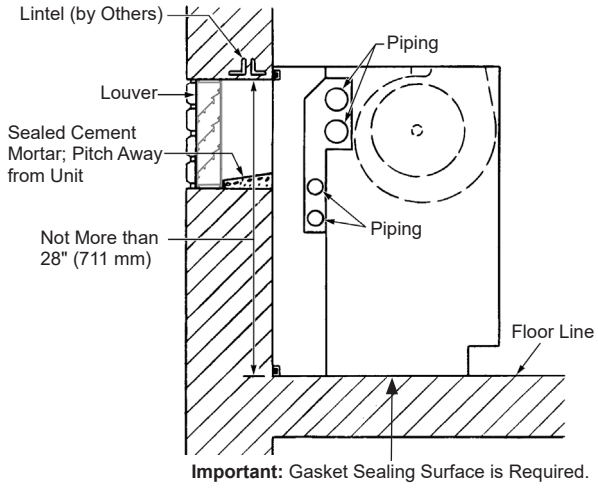
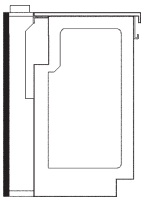


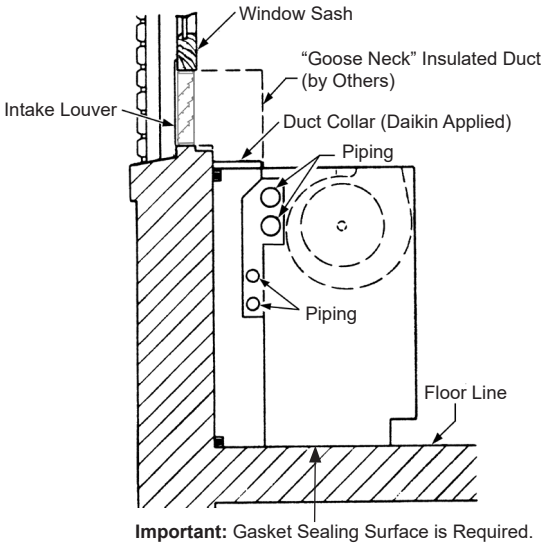
Figure 14: 21-7/8" (556 mm) Deep Full Adapter Back Unit with High Louver Application

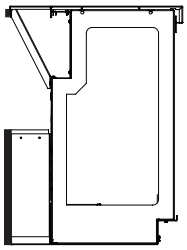




Unit Configuration Type AP

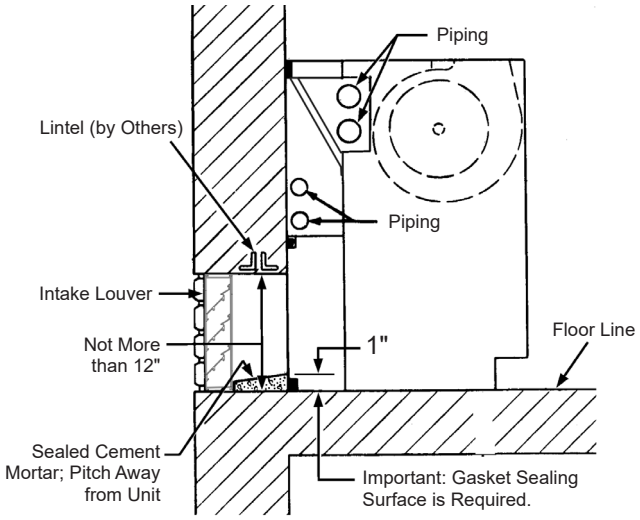
Figure 15: The 21-7/8" (556 mm) Deep Full Adapter Back Unit with Closed Pipe Tunnel, Ducted with Top Intake





Unit Configuration Type AK

Figure 16: 21-7/8" (556 mm) Deep Partial Adapter Back Unit with Open Pipe Tunnel



Typical Installation Methods

If the fresh air opening has not yet been made, see Figure 9 on page 11 through Figure 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 2. If the opening is already there, measure to be sure there is a minimum of 3/8" (9 mm) 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 2: 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 5/8" (613)	10 7/8" (267)	1	0	500	236
36" (914)	39" (991)	36 5/8" (918)	10 7/8" (267)	0	1	750	354
48" (1219)	51" (1295)	48 5/8" (1222)	10 7/8" (267)	2	0	1000	472
60" (1524)	63" (1600)	60 5/8" (1527)	10 7/8" (267)	1	1	1250	590
72" (1829)	75" (1905)	72 5/8" (1832)	19 7/8" (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" (25 mm) 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 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 17: Typical Louver Installation with Sloping Sealed Cement Mortar Base

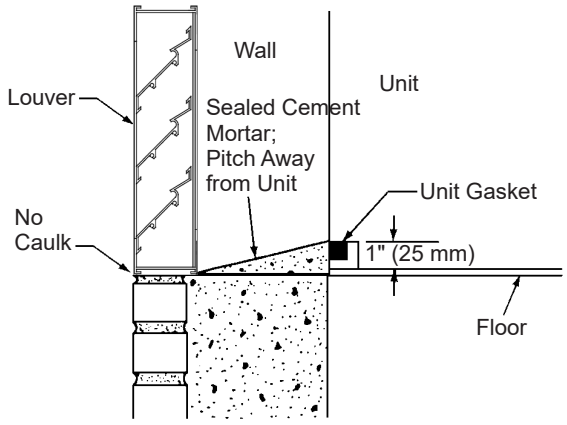
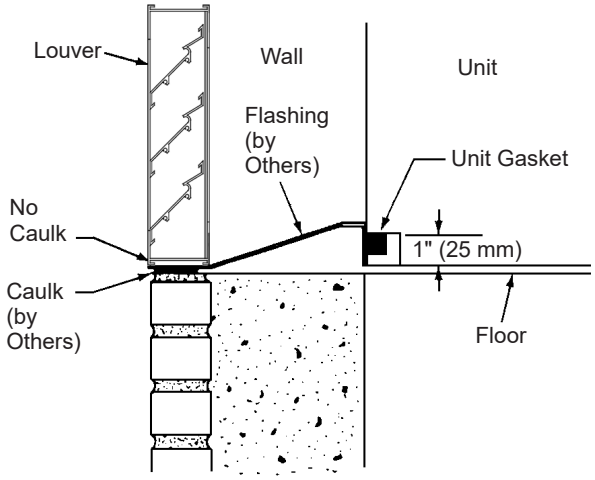


Figure 18: Typical Louver Installation with Flashing



⚠ CAUTION

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

See Figure 6 on page 10 through Figure 21 on page 14. Before setting the louver, be sure the drain lip (vertical louver) is at the bottom, horizontal louver blades face down and the bird screen is towards the unit. See Figure 20 and Figure 21 on page 14. 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, (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, (Figure 21) place the louver in the opening so that it is recessed a minimum 1/16" (2 mm) 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.

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. See Figure 18 on page 13. 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.

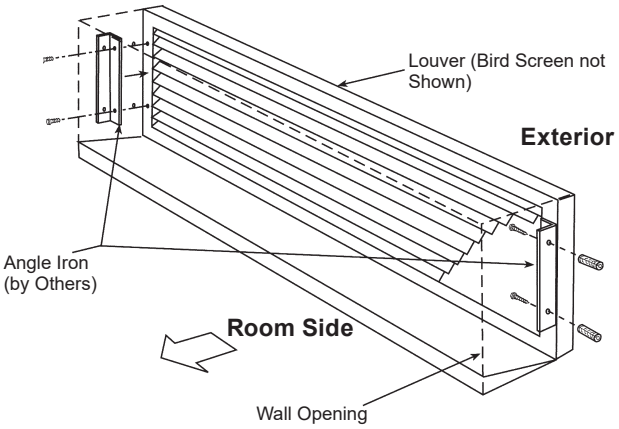


Figure 20: Vertical or Horizontal Blade Wall Intake Louver (Flanged) (Vertical Blade Shown)

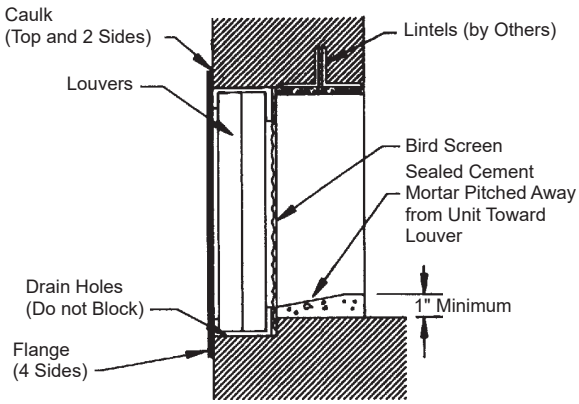
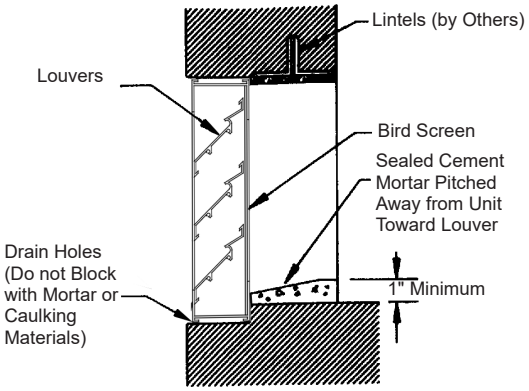


Figure 21: Vertical or Horizontal Blade Wall Intake Louver (Recessed Without Flange) (Horizontal Blade Shown)



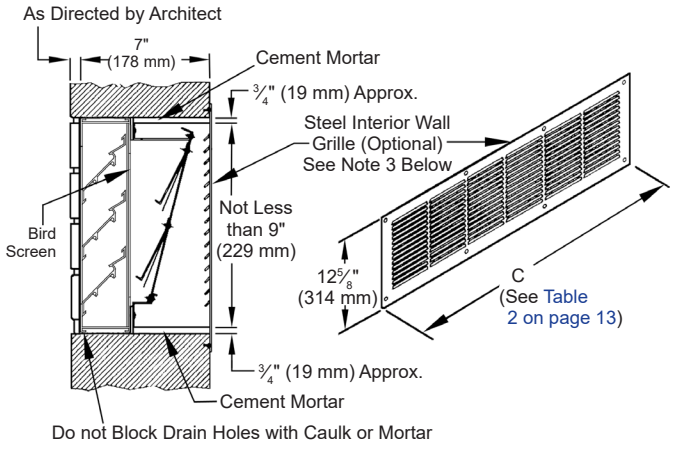
Installing the VentiMatic Shutter Assembly

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 on page 15.

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

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



NOTE 1: Horizontal blade wall louver shown. Vertical blade wall louver also available with VentiMatic shutter.

NOTE 2: Optional exterior grille matches unit ventilator wall louver in material and design. Mounted on wall louvers.

NOTE 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

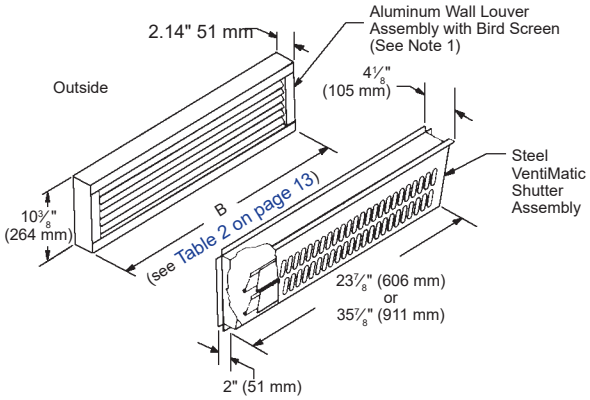
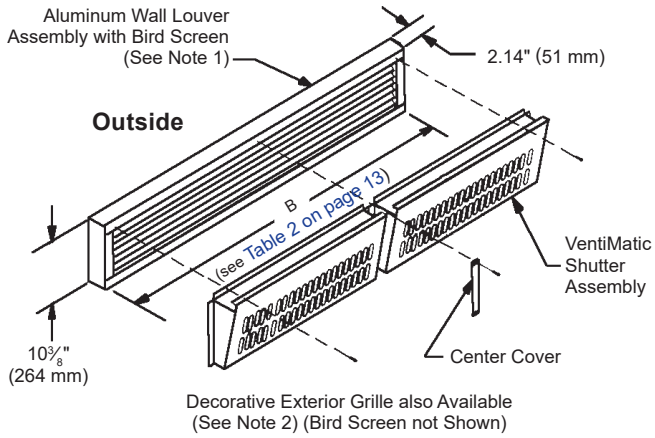


Figure 24: Two VentiMatic Shutters & Wall Louver



Preparing to Move the Unit

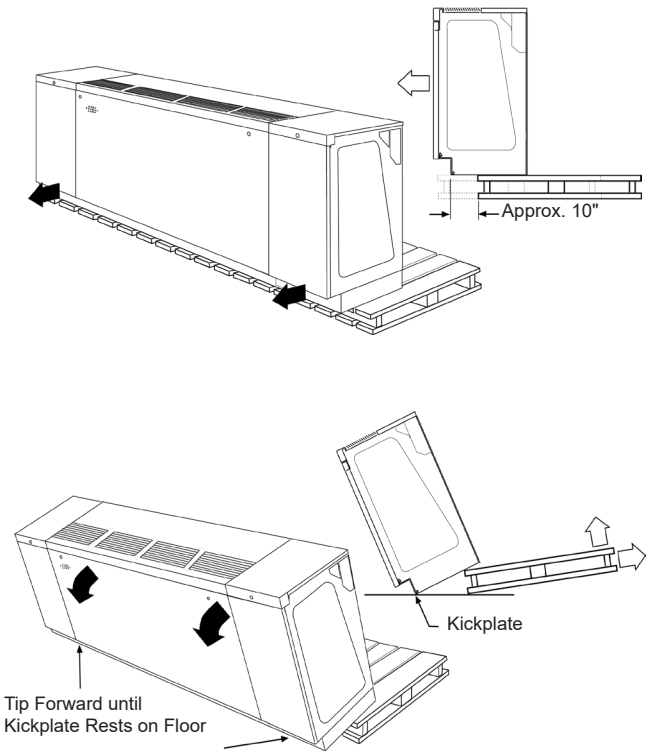
Move the unit ventilator to the correct location. See Table 1 on page 8 for approximate shipping weights.

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

1. Remove fasteners at each end which hold the unit to the skid, and 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 the bottom of the slotted front kickplate is resting on the floor.
3. Lift rear of unit off 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. DO NOT DROP. See Figure 25.

Figure 25: Removing Unit from Skid



⚠ 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

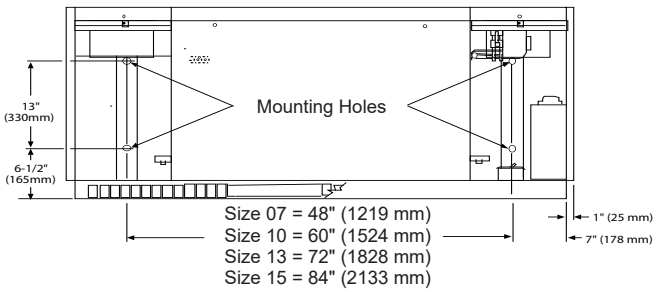
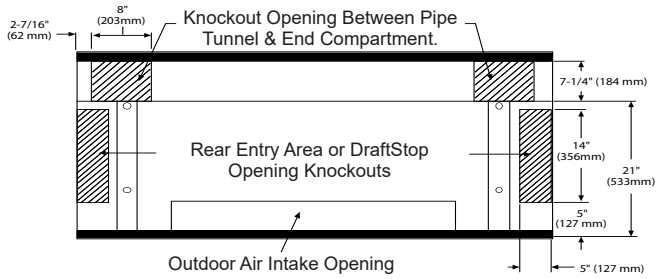


Figure 27: Rear View Without End Panels and Subbase - Piping and Electrical Knockout Locations and Dimensions



NOTICE

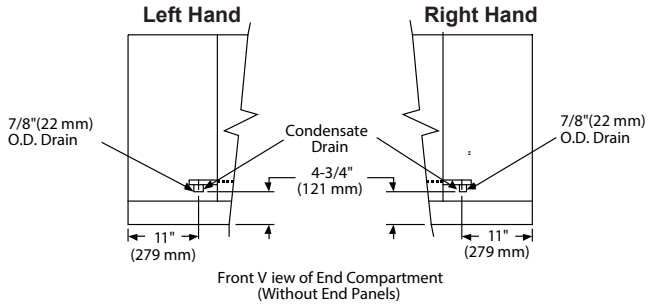
End compartment DraftStop knockouts must be removed for proper DraftStop operation (21-7/8" units only).

NOTICE

See DraftStop Engineering Data (ED 19038) 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 Figure 30 & Figure 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 Figure 30 and Figure 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

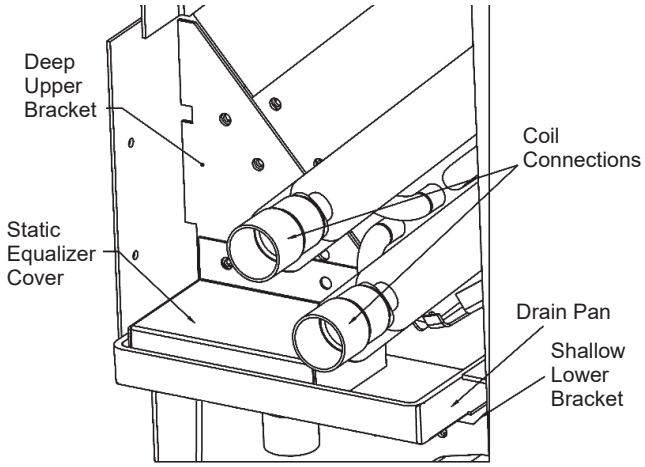


Figure 30: Low End of Drain Pan (Drain End)

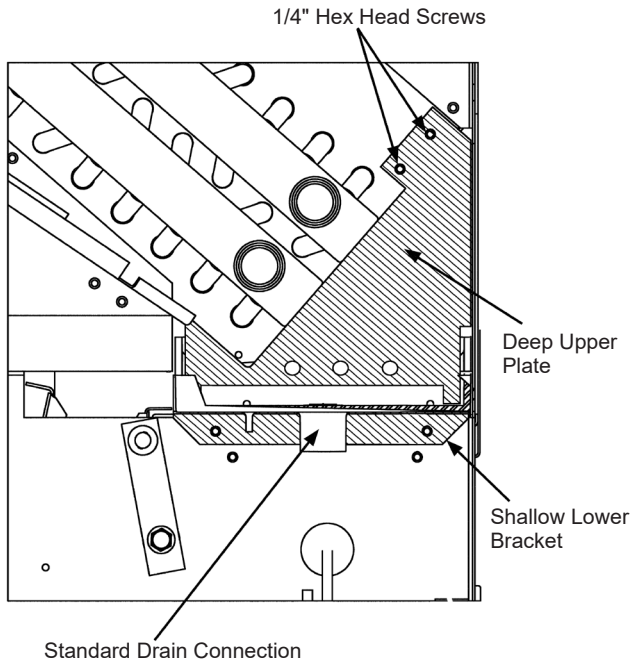
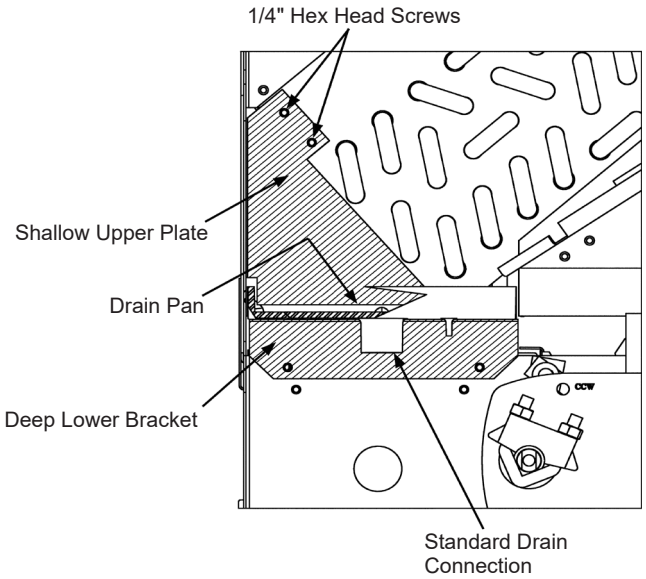


Figure 31: High End of Drain Pan



To Clean the Drain Pan

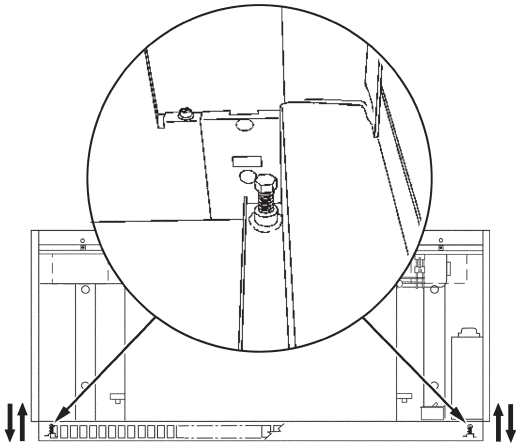
1. Remove the shallow and deep upper plates from the unit.
2. Spray water into the drain pan on the high end to wash debris to the low end (drain end).
3. Remove any debris, making sure that the drain holes are not obstructed.
4. Wipe the drain pan with a cloth.
5. Reinstall the upper plates.

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 (Figure 32).

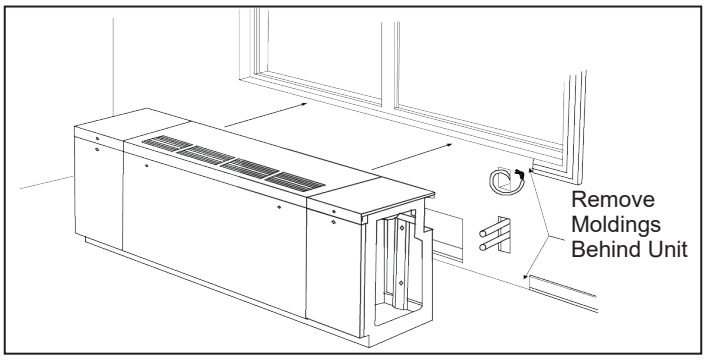
Figure 32: Leveling Legs Location



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.

Figure 33: Setting the Unit Ventilator in Place



Refer to Figure 3 on page 8 and Figure 26 and Figure 27 on page 16 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. The envelope also contains an Allen wrench to provide access to the 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.

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 – Valves, Brazing and Insulating

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 degrees 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, use quenching rags, shields, or other steps to protect unit ventilator components from overheating damage (melting insulation and damage to valves, wiring, electronics, sensors, etc.). See Figure 36.

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 loss 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 34 and Figure 35 for hot water and chilled water coil connections. Refer to drawings in "Coil Headers, Locations" on page 20 for specific coil arrangement.

⚠ 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 34: Hot Water Coil Connections (Right-Hand Shown)

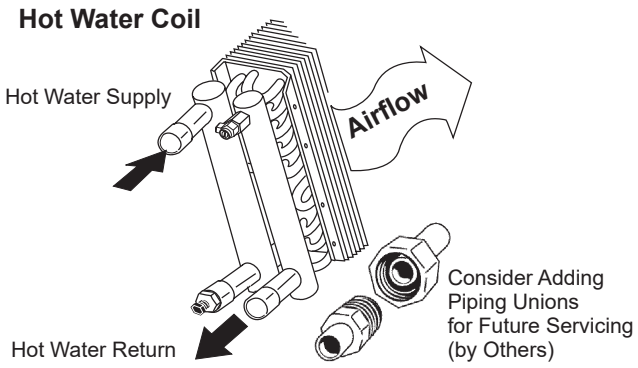


Figure 35: Chilled Water Coil Connections (Right-Hand Shown)

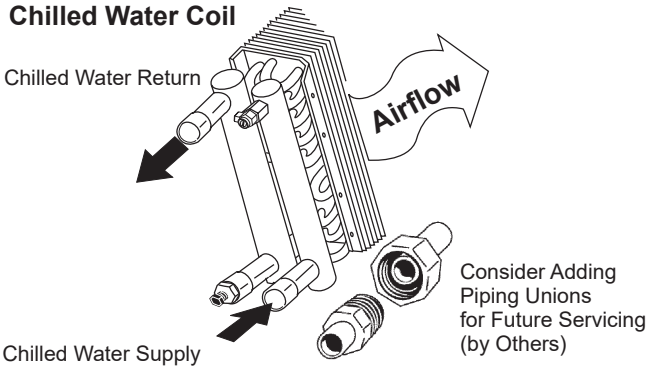
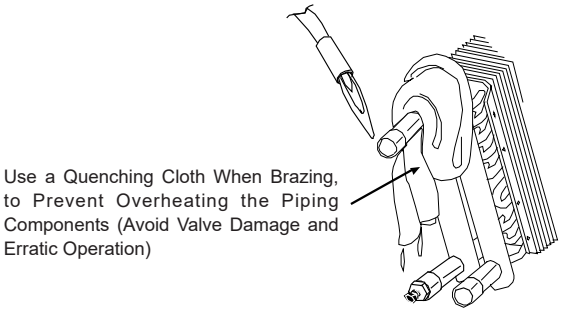


Figure 36: Protect Components from Overheating Before Brazing



2-pipe Chilled Water/Hot Water Systems Install Water-in Temperature Sensor (OCT)

After making the piping connections, securely attach and insulate the water-in temperature sensor (OCT) 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 airflow through the coil.

For Water Systems

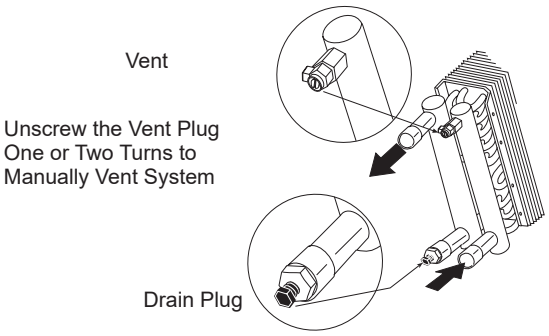
After flushing piping adequately, so all debris is removed, fill the system.

⚠ 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 37. After venting, tighten the vent plug firmly.

Figure 37: Vent and Drain Plug



Coil Headers, Locations

Table 3: Coil Connection Dimensions for Lettered Values

Unit Depth		Dimensions										
		A	B	C	D	E	F	G	H	I	J	K
in.	16-5/8	3-3/4	12-1/4	4-7/8	7-3/4	1-5/8	10-1/8	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.	21-7/8	9	17-1/2	10-1/8	13	6-7/8	15-3/8	8	8-1/8	10-7/8	8-1/4	10-1/4
mm	556	229	445	257	330	175	391	203	206	276	210	260

Table 4: Direct Expansion (DX) Coil G[9] and M[0] Connection Tubing

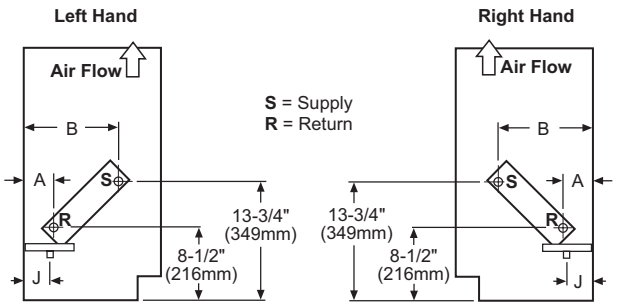
Unit Series	07		10		13		15	
	in	mm	in	mm	in	mm	in	mm
Suction Line OD	3/4	19	3/4	19	3/4	19	3/4	19
Liquid Line OD	1/2	12.7	1/2	12.7	1/2	12.7	1/2	12.7

NOTICE

1. All coils have same end supply and return connections.
2. Steam coils have a factory installed pressure equalizing valve and a 24″ (610 mm) long pressure equalizing line which terminates in a 1⁄2″ M.P.T. fitting.
3. 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 Daikin Applied controls.)
4. Cooling condensate drain pan is shipped sloped down towards the cooling coil connections but is field reversible.
5. Electric heating coil power connections are right end only. Junction box has 1″ (25 mm) and 2″ (51 mm) (trade size) knockouts, 10-1⁄2″ (267 mm) from right end of the unit.
6. Coil stubs are 7⁄8″ I.D. (female) and terminate 9″ (229 mm) from the end of the unit.
7. Steam coils are 1-1⁄8″ female (sweat) connections and terminate 9″ (229 mm) from the end of the unit.
8. DX coils (G[9] and M[0]) have O.D. sweat connections. Interconnecting tube by others. Table 4 for correct tubing size.

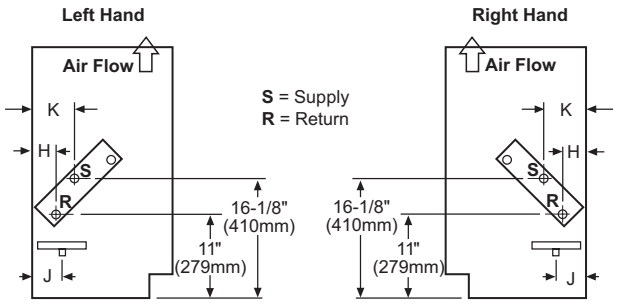
Heating Only Units

Figure 38: Hot Water Only Unit (Coils 65, 66, 67)



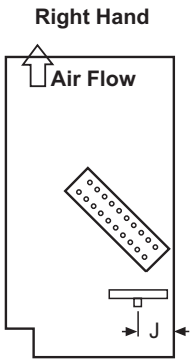
NOTE: This arrangement available on AVV and AVS units only.

Figure 39: Steam Heating Only Unit (Coils 68, 69, 78, 79)



NOTE: This arrangement available on AVV and AVS units only.

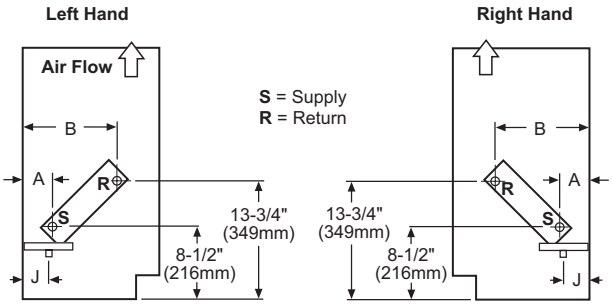
Figure 40: Electric Heating Only Unit (Coils 12, 13)



NOTE: This arrangement available on AVV units only.

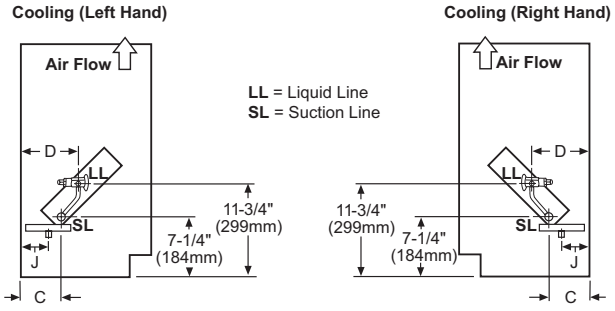
Cooling Only Units

Figure 41: Chilled Water Only Unit (Coils V[5], S[6], W[7], Y[8])



NOTE: This arrangement available on AVV and AVS units only.

Figure 42: Direct Expansion Cooling Only Unit (Coils G[9], M[0])



NOTE: This arrangement available on AVV units only.

Condensate Drain Locations

Figure 43: Condensate Drain

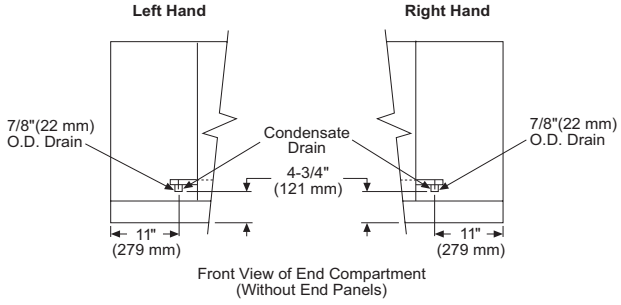
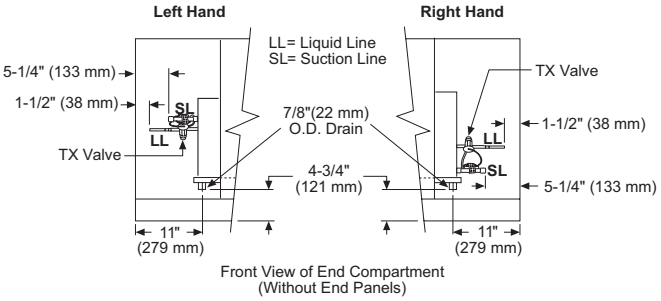


Figure 44: Condensate Drain and DX Coil Connections



Heat/Cool Units

NOTICE

Numerical codes [#] denote optional stainless steel drain pan (cooling coils).

Chilled Water and Hot Water Unit

Figure 45: Chilled Water Cooling Coils V[5], S[6], W[7], Y[8]

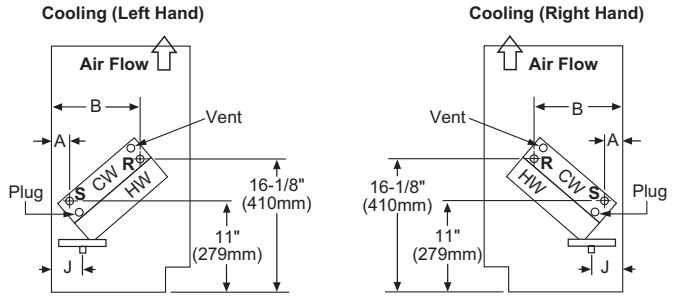
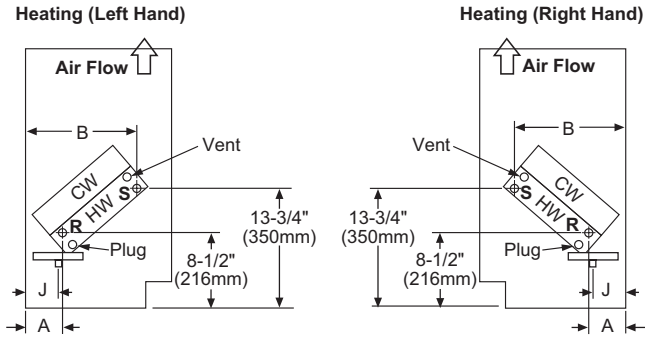


Table 5: Hot Water Heating Coils 65, 66, 67



Direct Expansion and Hot Water Unit

Figure 46: Direct Expansion Cooling Coils G[9], M[0]

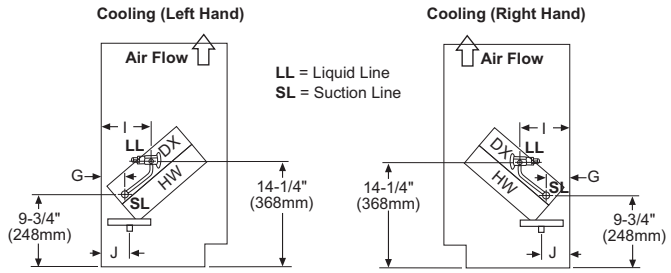
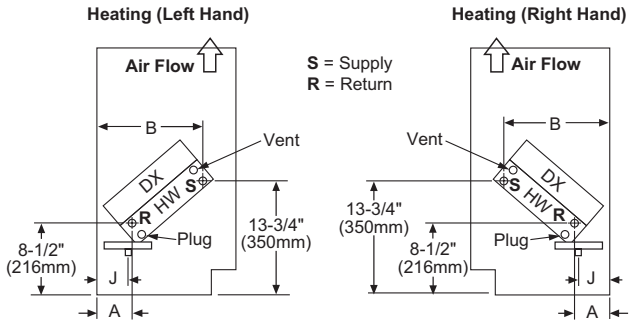


Figure 47: Hot Water Heating Coils 65, 66, 67



Direct Expansion and Steam Unit

NOTICE

For opposite end drain steam coils (code 78, 79) Return (R) is 7¼" (184 mm) from bottom of unit and (H) 2" (51 mm) from the back of unit. Unless otherwise noted, LH and RH connections are the same.

Figure 48: Direct Expansion Cooling Coils G[9], M[0]

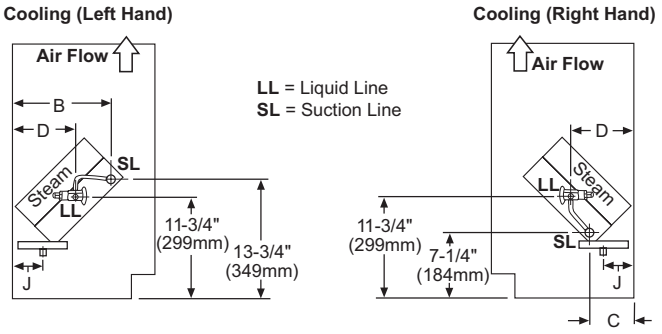
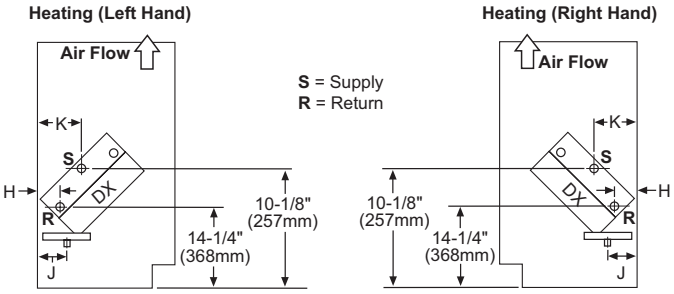


Figure 49: Steam Heating Coils 68, 69, 78, 79



Chilled Water and Steam Unit

Figure 50: Chilled Water Cooling Coils V[5], S[6]

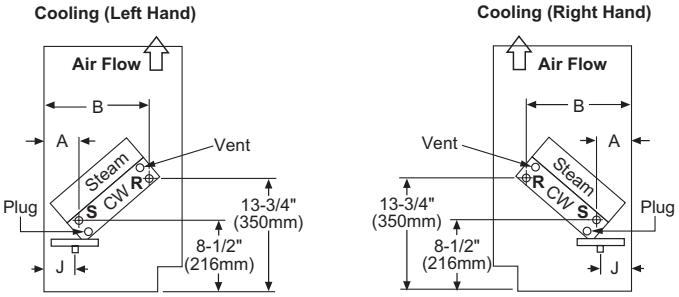
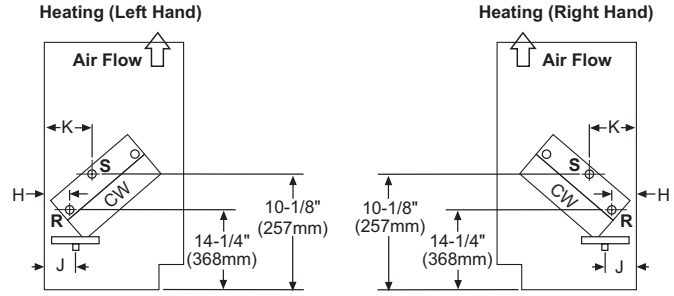
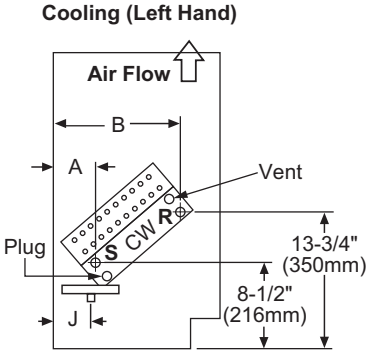


Figure 51: Steam Heating Coils 68, 69, 78, 79



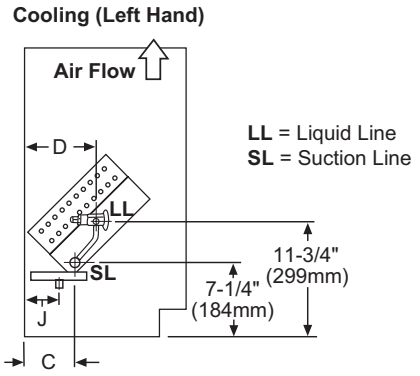
Chilled Water and Electric Heating Coils

Figure 52: Chilled Water (1st Position) and Electric Heating (Cooling Coils V[5], S[6], W[7]), (Heating Coils 12, 13)



Direct Expansion and Electric Heating Unit

Figure 53: Direct Expansion (1st Position) and Electric Heating (Cooling Coils G[9], M[0]), (Heating Coils 12, 13)



Reheat Units

Chilled Water and Hot Water Unit

NOTICE

Numerical codes [#] denote optional stainless steel drain pan (cooling coils).

Figure 54: Chilled Water Coils V[5], S[6], W[7], Y[8]

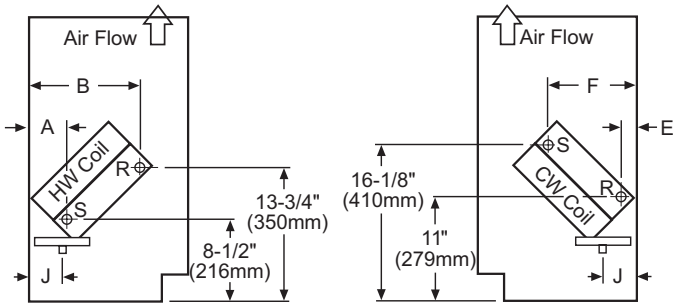
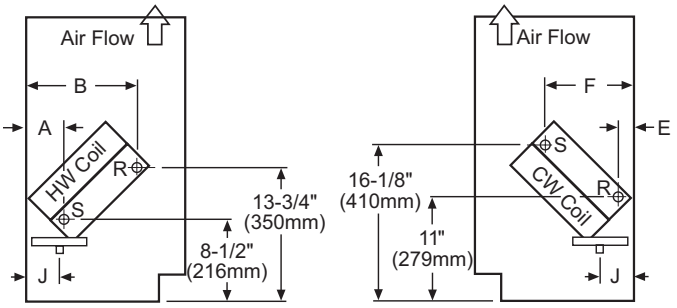


Figure 55: Hot Water Heating Coils 65, 66, 67



Direct Expansion and Hot Water Unit

Figure 56: Direct Expansion Cooling Coils G[9], M[0]

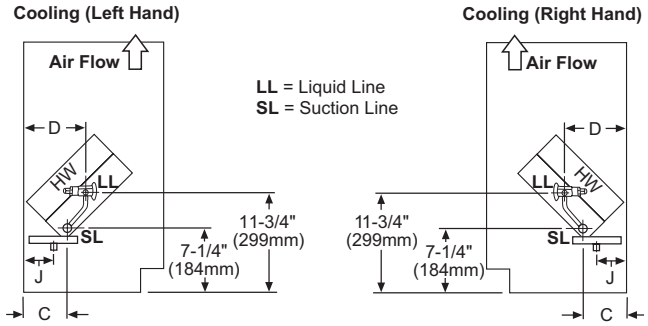
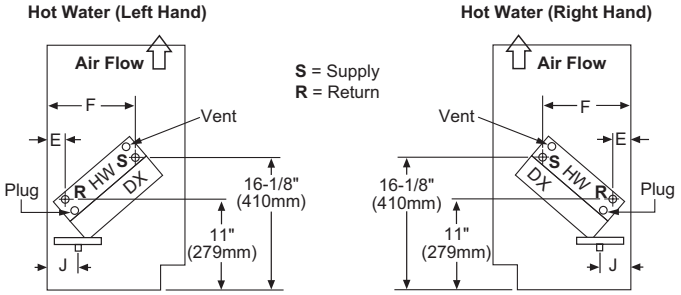


Figure 57: Hot Water Heating Coils 65, 66, 67



Direct Expansion and Steam Unit

NOTICE

For opposite end drain steam coils (code 78, 79) Return (R) is 7¼" (184 mm) from bottom of unit and (H) 2" (51 mm) from the back of unit. Unless otherwise noted, LH and RH connections are the same.

Figure 58: Direct Expansion Cooling Coils G[9], M[0]

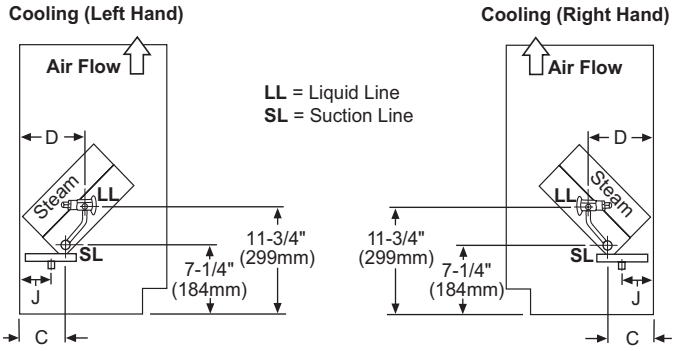
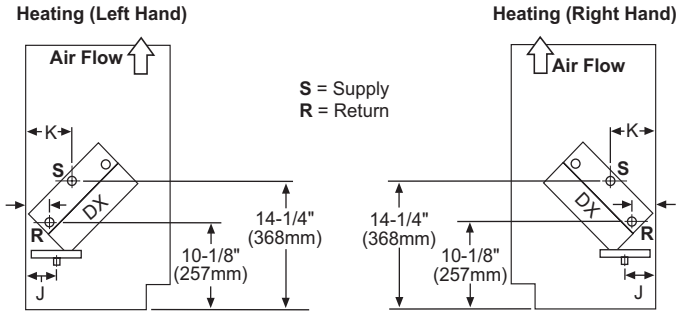


Figure 59: Steam Heating Coils 68, 69, 78, 79



Chilled Water and Steam Unit

Figure 60: Chilled Water Coils V[5], S[6]

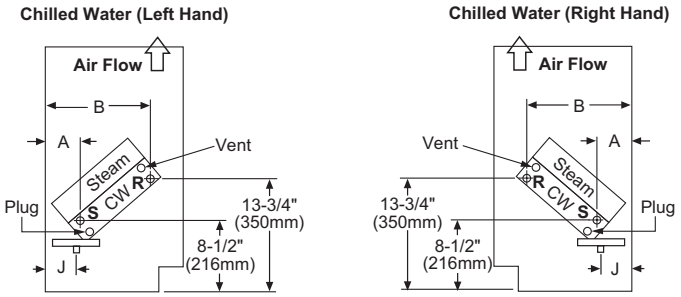
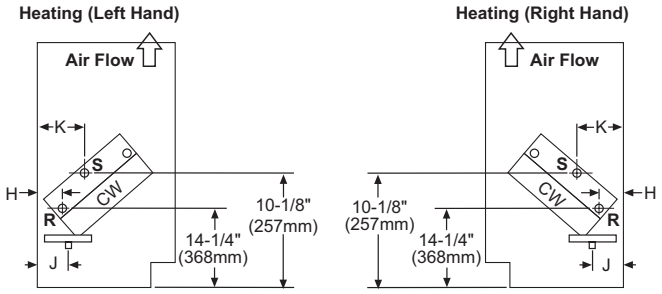
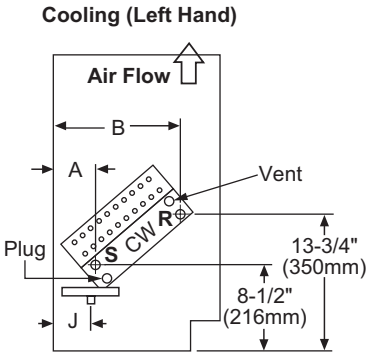


Figure 61: Steam Heating Coils 68, 69, 78, 79



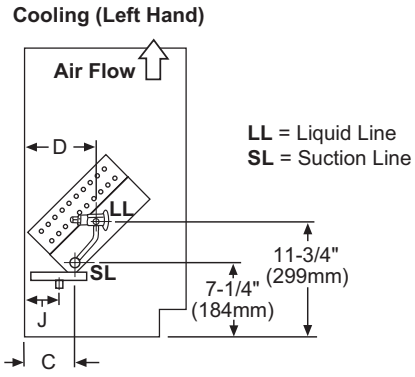
Chilled Water and Electric Heating Coils

Figure 62: Chilled Water (1st Position) and Electric Heating (Cooling Coils V[5], S[6], W[7]), (Heating Coils 12, 13)



Direct Expansion and Electric Heating Unit

Figure 63: Direct Expansion (1st Position) and Electric Heating (Cooling Coils G[9], M[0]), (Heating Coils 12, 13)



Typical Valve Packages

The optional factory-supplied Daikin Applied control valve(s) for water applications are either 2-way or 3-way type. The control valve(s) are shipped separately 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 Figure 64 through Figure 88 as applicable, as well as the job-specific piping drawings.

NOTICE

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" (229 mm) 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 controls, they must be at opposite ends.

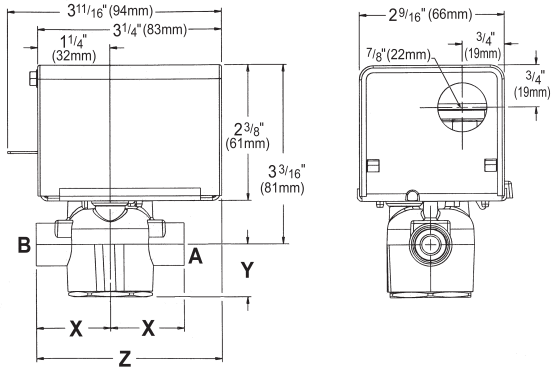
Face & Bypass EOC Valves

2-Way EOC Valve

When piping the 2-Way End of Cycle (EOC) valve, refer to label to determine the direction of flow. The valve should be installed so that there is a 2" (51 mm) 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.

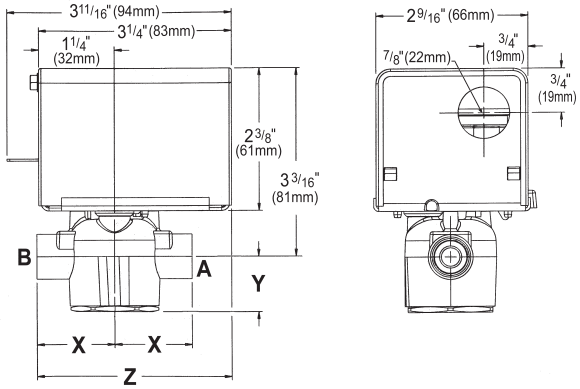
When using MicroTech controls, coil connections must be opposite end. The EOC valve accessory must be field installed on the unit for which it was selected.

Figure 64: 2-Way EOC Valve Dimensions



Connection	Cv	X	Y	Z
3/4" (19 mm) FNPT	7.5	1 11/16" (43 mm)	15/16" (24 mm)	3 5/8" (92 mm)

Figure 65: 2-Way EOC Steam Valve Dimensions



Connection	Cv	X	Y	Z
1" (25 mm) FNPT	8.0	1 7/8" (47 mm)	1" (25 mm)	3 11/16" (94 mm)

Table 6: F&BP EOC Valve Body Specifications - 2-Way Valve

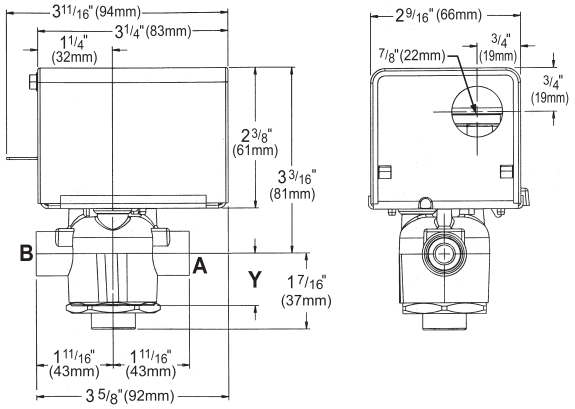
	2-Way Valve
Connections	3/4" FNPT, 1" FNPT
Static Pressure	300 psi (2100 kPa)
Close-Off Pressure	13 & 15 psi (90 & 103 kPa)
Temperature	32°F to 200°F (0°C to 93°C)

3-Way EOC Valve

When piping the 3-Way End of Cycle (EOC) valve, refer to label to determine the direction of flow. The valve should be installed so that there is a 2” (51 mm) 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 MicroTech controls, coil connections must be opposite end. The EOC valve accessory must be field installed on the unit for which it was selected.

Figure 66: 3-Way EOC Valve Dimensions



Connection	Cv	Y
3/4" (19 mm) FNPT	5.0	15/16" (24 mm)

Table 7: EOC Actuator Specifications

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 8: F&BP EOC Valve Body Specifications - 3-Way Valve

	3-Way Valve
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)

2-Way Modulating Valve (Chilled Water, Hot Water or Combination)

Two-way modulating control valves for MicroTech are designed to regulate the flow of chilled water, hot water or the combination. They consist of a nickel plated brass body and stainless steel ball valve and stem, with a spring return proportional actuator. The optional valve accessory is shipped separately from the unit ventilator for field installation to prevent shipping damage and to provide flexibility in making the field piping connection.

Figure 67: 2-Way Modulating Valve Dimensions

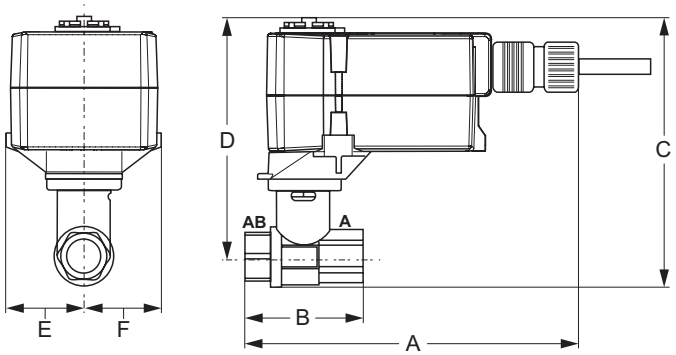


Table 9: 2-Way Actuator Specifications (CW, HW, CW/HW)

Power Supply	24 VAC, ±20%, 50/60 Hz, 24 VDC, ±10%
Electrical Connection	3ft [1m], 18 GA plenum cable with 1/2" conduit connector
Overload Protection	electronic throughout 0° to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)
Input Impedance	100 k Ω for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA
Feedback Output U	2 to 10 VDC, 0.5 mA max
Angle of Rotation	Max. 95°, 90°
Position Indication	visual indicator, 0° to 95° (0° is full spring return position)
Running Time (Motor)	95 sec
Running Time (Fail-Safe)	<25 sec
Ambient Humidity	max. 95% RH non-condensing
Ambient Temperature Range	-22°F to 122°F [-30°C to 50°C]
Storage Temperature Range	-40°F to 176°F [-40°C to 80°C]

Table 10: 2-Way Valve Body Specifications (CW, HW, CW/HW)

Service	chilled, hot water, up to 60% glycol
Flow Characteristic	equal percentage
Controllable Flow Range	75°
Body Pressure Rating [psi]	600
Media Temperature Range (Water)	0°F to 250°F [-18°C to 120°C]
Max Differential Pressure (Water)	50 psi (345 kPa)
Close-Off Pressure	200 psi

Table 11: 2-Way Modulating Valve 1/2" – Dimensions (CW, HW, CW/HW)

Valve Part No.	Cv	Connection Size	A	B	C	D	E	F
B209	0.8	1/2"	6.59" (167 mm)	2.38" (60 mm)	4.9" (124 mm)	4.32" (110 mm)	1.53" (38 mm)	
B210	1.2							
B211	1.9							
B212	3.0		6.59" (167 mm)	2.38" (60 mm)	5.48" (139 mm)	4.71" (120 mm)	1.53" (38 mm)	
B213	4.7							
B214	7.4							

Table 12: 2-Way Modulating Water Valve 1/2" – Pressure Drop (CW, HW, CW/HW)

			Pressure Drop Across the Valve									
2-Way CCV Part No.	Cv Maximum Rating	Connection Size	1 psi	2 psi	3 psi	4 psi	5 psi	6 psi	7 psi	8 psi	9 psi	10 psi
B209	0.8	1/2"	0.8	1.1	1.4	1.6	1.8	2.0	2.1	2.3	2.4	2.5
B210	1.2		1.2	1.7	2.1	2.4	2.8	2.9	3.2	3.4	3.6	3.8
B211	1.9		1.9	2.7	3.3	3.8	4.2	4.7	5.0	5.4	5.7	6.0
B212	3.0		3.0	4.2	5.2	6.0	6.8	7.3	7.9	8.5	9.0	9.5
B213	4.7		4.7	6.6	8.1	9.4	11	12	12	13	14	15
B214	7.4		7.4	10	13	15	17	18	20	21	22	23

2-Way Modulating Valve (Steam) - 1/2”

Two-way modulating control valves for MicroTech are designed to regulate the flow of steam. They consist of a nickel plated brass body and stainless steel ball valve and stem, with a spring return, proportional actuator. The optional valve accessory is shipped separately from the unit ventilator for field installation to prevent shipping damage and to provide flexibility in making the field piping connection.

Figure 68: 2-Way Modulating Valve (Steam) Dimensions

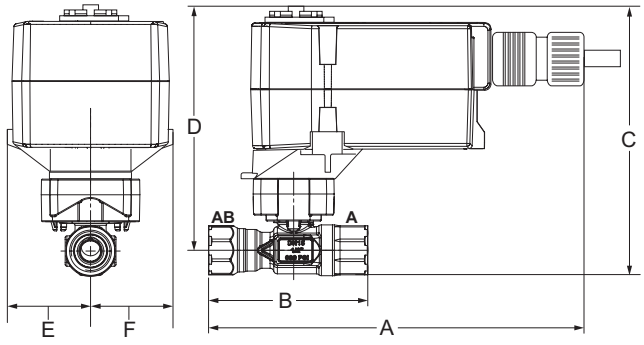


Table 13: 2-Way Actuator Specifications (Steam) – 1/2”

Power Supply	24 VAC ± 20%, 50/60 Hz, 24 VDC ± 10%
Electrical Connection	3ft [1m], 18 GA plenum cable with 1/2" conduit connector"
Overload Protection	electronic throughout 0° to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)
Input Impedance	100 k Ω for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA
Feedback Output U	2 to 10 VDC, 0.5 mA max
Angle of Rotation	Max. 95°, 90°
Position Indication	visual indicator, 0° to 95° (0° is full spring return position)
Running Time (Motor)	95 sec
Running Time (Fail-Safe)	<25 sec
Ambient Humidity	max. 95% RH non-condensing
Ambient Temperature Range	-22°F to 122°F [-30°C to 50°C]
Storage Temperature Range	-40°F to 176°F [-40°C to 80°C]

Table 14: Valve Body Specifications (Steam) – 1/2”

Service	high temperature hot water/low pressure steam, up to 60% glycol
Flow Characteristic	A-port equal percentage
Controllable Flow Range	75°
Body Pressure Rating [psi]	600
Max Inlet Pressure (Steam)	15 psi
Media Temperature Range (Water)	60°F to 266°F [16°C to 130°C]
Media Temperature Range (Steam)	250°F [120°C]
Maximum Differential Pressure (Steam)	15 psi
Max Differential Pressure (Water)	60 psi partially open ball, 116 psi full open
Close-Off Pressure	200 psi

Table 15: 2-Way Modulating Steam Valve 1/2" – Dimensions

Valve Part No.	Cv	Connection Size	A	B	C	D	E	F
B215HT073	0.73	1/2"	7.32" (186 mm)	3.33" (85 mm)	5.8" (147 mm)	5.3" (135 mm)	1.52" (39 mm)	1.52" (38.5 mm)
B215HT186	1.86							

Table 16: 2-Way Modulating Steam Valve 1/2” – Pressure Drop

			Pressure Drop Across the Valve					
2-Way CCV Part No.	**Cv Maximum Rating**	**Connection Size**	**2 psi**	**3 psi**	**4 psi**	**5 psi**	**10 psi**	**15 psi**
B215HT073	0.73	1/2"	10.99	13.71	16.11	18.33	28.03	36.74
B215HT186	1.86		22.34	34.93	41.06	46.70	71.42	93.60

3-Way Modulating Valve (Chilled Water, Hot Water or Combination)

Three-way modulating control valves for MicroTech are designed to regulate the flow of hot or chilled water or the combination. They consist of a nickel plated brass body and stem with chrome plated brass ball valve, with a spring return, proportional 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 69: 3-Way Modulating Valve (Chilled Water, Hot Water or Combination) Dimensions

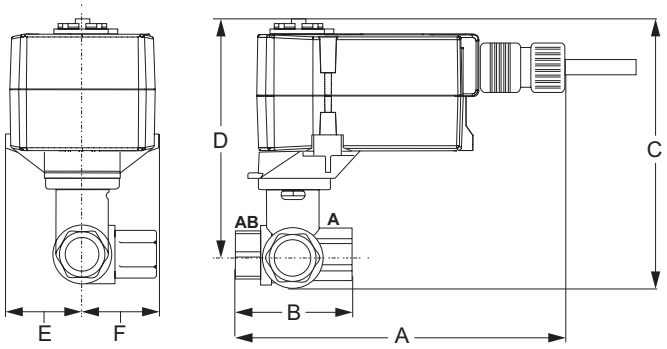


Table 17: 3-Way Actuator Specifications (CW, HW, CW/HW)

Power Supply	24 VAC, ±20%, 50/60 Hz, 24 VDC, ±10%
Electrical Connection	3ft [1m], 18 GA plenum cable with 1/2" conduit connector
Overload Protection	electronic throughout 0° to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)
Input Impedance	100 k Ω for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA
Feedback Output U	2 to 10 VDC, 0.5 mA max
Angle of Rotation	Max. 95°, 90°
Position Indication	visual indicator, 0° to 95° (0° is full spring return position)
Running Time (Motor)	95 sec
Running Time (Fail-Safe)	<25 sec
Ambient Humidity	max. 95% RH non-condensing
Ambient Temperature Range	-22°F to 122°F [-30°C to 50°C]
Storage Temperature Range	-40°F to 176°F [-40°C to 80°C]

Table 18: 3-Way Valve Body Specifications (CW, HW, CW/HW)

Service	chilled, hot water, up to 60% glycol
Flow Characteristic	A-port Equal percentage; B-port modified linear for constant flow
Controllable Flow Range	75°
Body Pressure Rating [psi]	600
Media Temperature Range (Water)	0°F to 250°F [-18°C to 120°C]
Max Differential Pressure (Water)	50 psi (345 kPa)
Close-Off Pressure	200 psi

Table 19: 3-Way Modulating Valve 1/2" – Dimensions

Valve Part No.	Cv	Connection Size	A	B	C	D	E	F
B309(B)	0.8	1/2"	6.59" (167 mm)	2.38" (60 mm)	4.9" (124 mm)	4.32" (110 mm)	1.53" (38 mm)	1.2" (31 mm)
B310(B)	1.2							
B311(B)	1.9							
B312(B)	3.0		6.59" (167 mm)	2.38" (60 mm)	4.9" (124 mm)	4.71" (120 mm)	1.53" (38 mm)	1.29" (33 mm)
B313(B)	4.7							

Table 20: Modulating 3-Way Hot Water, Chilled Water or 2-Pipe CW/HW Valve 1/2" – Pressure Drop

			Pressure Drop Across the Valve									
3-Way CCV Part No.	Cv Maximum Rating	Connection Size	1 psi	2 psi	3 psi	4 psi	5 psi	6 psi	7 psi	8 psi	9 psi	10 psi
B309(B)	0.8	1/2"	0.8	1.	1.4	1.6	1.8	2.0	2.	2.3	2.4	2.5
B310(B)	1.2		1.2	1.7	2.	2.4	2.8	2.9	3.2	3.4	3.6	3.8
B311(B)	1.9		1.9	2.7	3.3	3.8	4.2	4.7	5.0	5.4	5.7	6.0
B312(B)	3.0		3.0	4.2	5.2	6.0	6.8	7.3	7.9	8.5	9.0	9.5
B313(B)	4.7		4.7	6.6	8.1	9.4	11	12	12	13	14	15

Steam Modulating Valve Selection

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.

Table 21: Modulating 2-Way, Normally Open, Steam Valves – Pressure Drop

			Pressure Drop Across the Valve					
2-Way CCV Part No.	**Cv Maximum Rating**	**Connection Size**	**2 psi**	**3 psi**	**4 psi**	**5 psi**	**10 psi**	**15 psi**
B215HT073	0.73	1/2"	10.99	13.71	16.11	18.33	28.03	36.74
B215HT186	1.86		22.34	34.93	41.06	46.70	71.42	93.60

2-Way and 3-Way Hot Water and Chilled Water Modulating Valve Selection

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 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 21, 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.

Formula to Calculate Cv

Q = Capacity in gallons per minute

Cv = Valve sizing coefficient determined experimentally for each style and size of valve, using water at standard conditions as the test fluid

ΔP = Pressure differential in psi

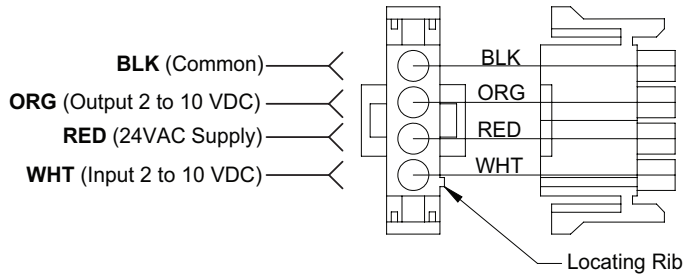
G = Specific gravity of fluid (water at 60°F = 1.0000)

$$Cv = Q\sqrt{\frac{G}{\Delta P}}$$

⚠ 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 70: Actuator Wiring



NOTE: The actuator spring returns the valve to the open position when the actuator is de-energized (off).

Typical Piping Arrangements

Mount heating valve actuators in an upright position above the centerline of the valve body and pipe actuators normally open to the coil. Modulating valve actuators for hot water applications may be positioned above the valve body a maximum of 75 degrees from the vertical. For steam applications only, mount the modulating valve actuator above the valve body at 45 degrees 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 degrees 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 Applied 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. Refer to label to determine the direction of flow. Control valves should be installed so that there is 2" (51 mm) 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. Hot water connections may be same end as cooling coil connections, but are recommended to be opposite end to facilitate piping.

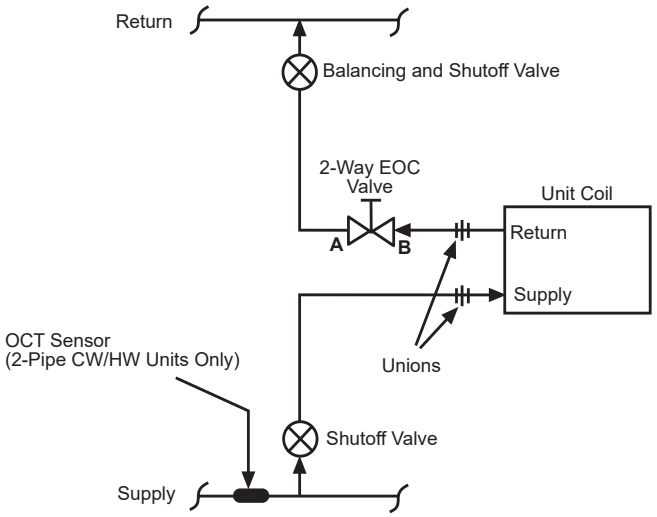
When using MicroTech controls, coil connections must be opposite end. The EOC valve must be field installed on the unit for which it was selected.

Heating – Hot Water EOC Valve Piping

2-Way EOC, Normally Open, Hot Water or 2-pipe CW/HW Valve Piping (Typical)

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 71: 2-Way Hot Water EOC Valve Piping

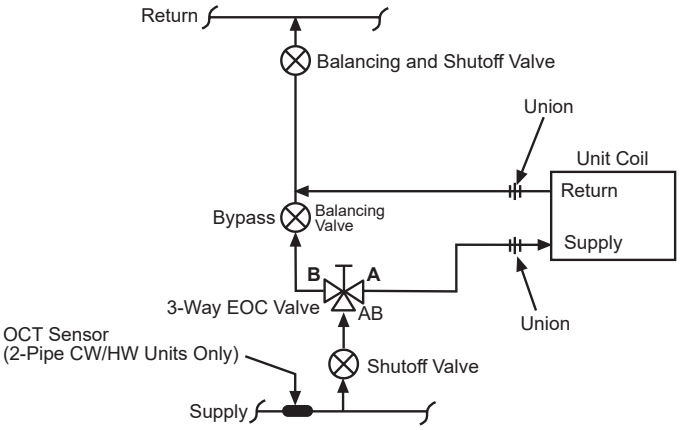


NOTE: For Erie EOC water valves, always have the direction of water flow piped to the B-port of the valve.

3-Way EOC, Normally Open, Hot Water or 2-pipe CW/HW Valve Piping (Typical)

The 3-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 allows the water to bypass the coil.

Figure 72: 3-Way Hot Water EOC Valve Piping

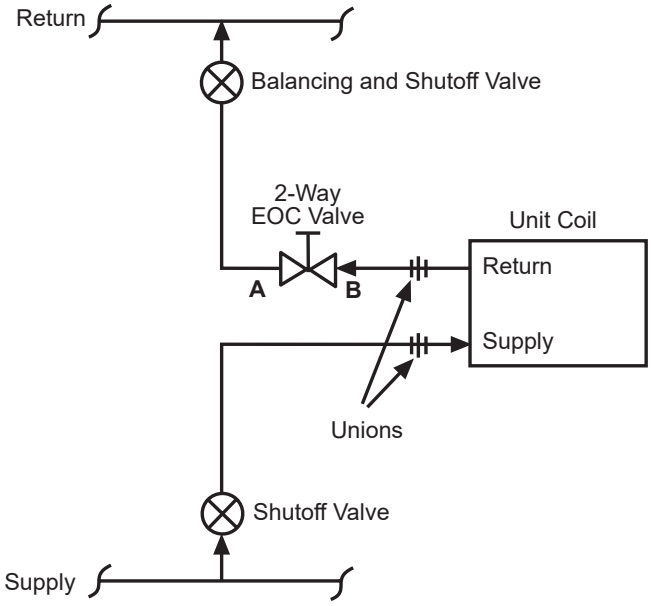


Chilled Water EOC Valve Piping

2-Way EOC, Normally Closed, Chilled Water Valve Piping (Typical)

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 73: 2-Way Chilled Water EOC Valve Piping

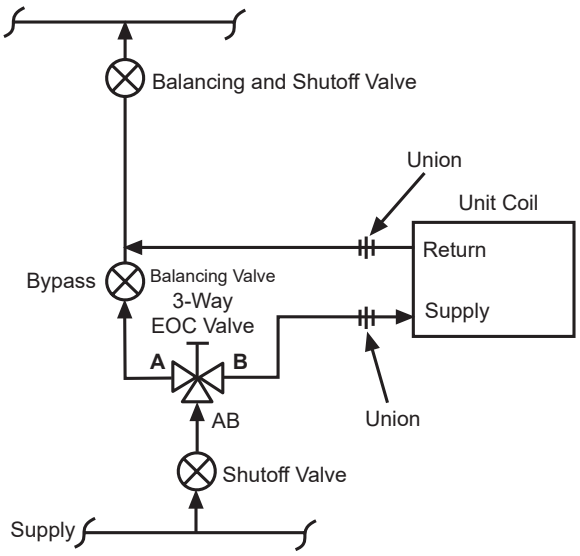


NOTE: For Erie EOC water valves, always have the direction of water flow piped to the B-port of the valve.

3-Way EOC, Normally Closed, Chilled Water Valve Piping (Typical)

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 74: 3-Way Chilled Water EOC Valve Piping



Typical Water Coil Piping - EOC Valve Piping

Figure 75: Face and Bypass with 3-Way EOC Valve (Piping Within Unit End Compartment)

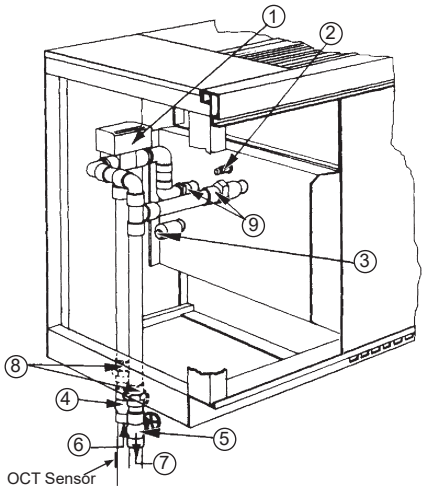
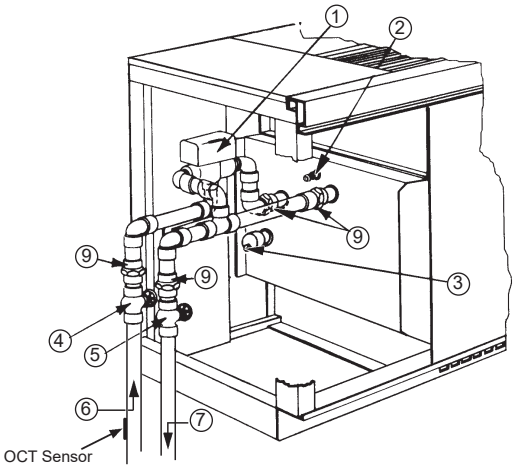


Figure 76: Face and Bypass with 3-Way EOC Valve (Piping Outside Unit End Compartment)



Legend for Figure 75 & Figure 76	
1	Three-way EOC control valve (Daikin Applied accessory or by others)
2	Coil air vent (Daikin Applied)
3	Coil drain (Daikin Applied)
4	Shutoff valve (by others)
5	Balancing shutoff valve(s) (by others)
6	Supply
7	Return
8	Unions (by others), must disconnect below floor line
9	Supply and return coil connection and stub-up unions (by others)

Steam – Typical Modulating Valve Piping

The optional factory supplied Daikin Applied controls with a 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” (51 mm) minimum clearance to remove the actuator form 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 Daikin Applied factory controls, coil connections must be opposite end. The modulating valve accessory must be field installed on the unit for which it was selected.

Figure 77: Typical 2-Way Steam Modulating Valve Piping

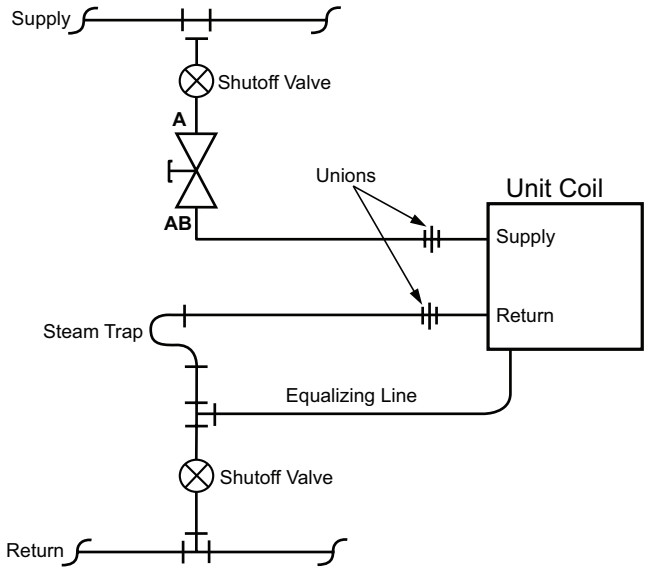


Figure 78: Same End Connections – Model AV 68/69 Coils

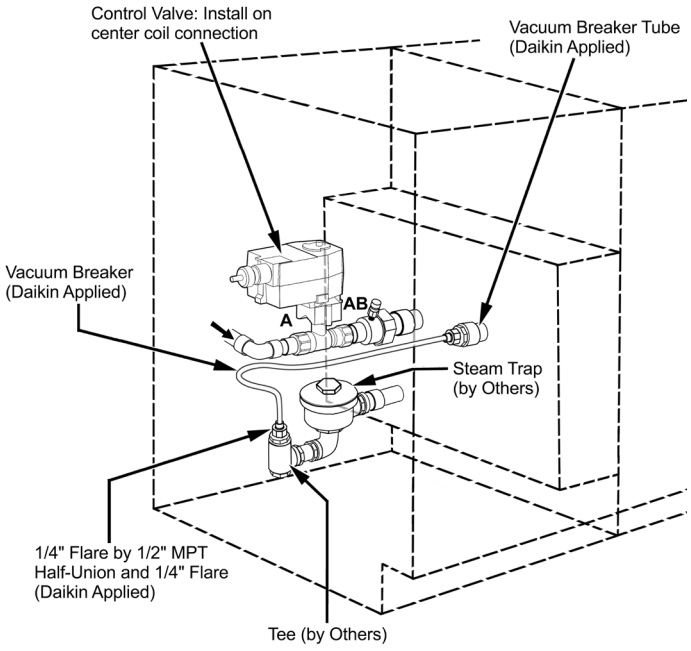
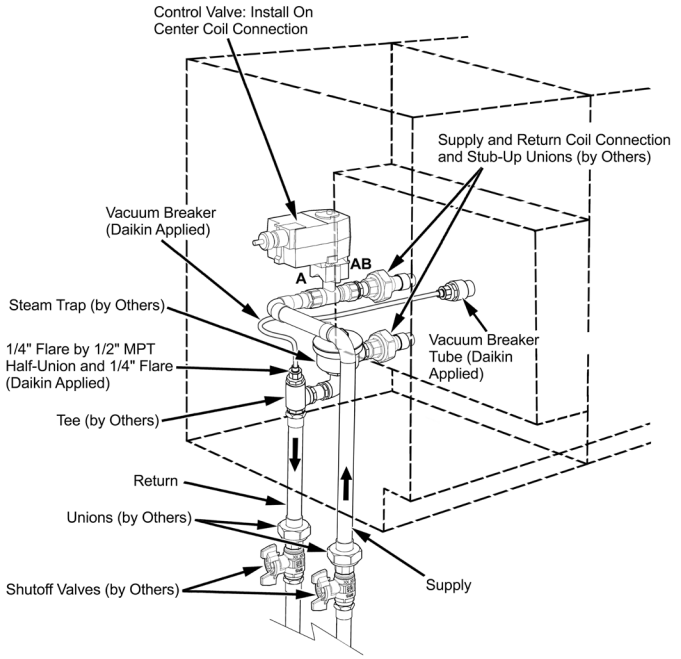


Figure 79: 2-Way Steam Modulating Valve Control - Same End Drain Connection (Piping Within Unit End Compartment)



In Steam Systems:

The optional factory-supplied Daikin Applied controls 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 Figure 77 through Figure 82, as well as the job-specific piping drawings.

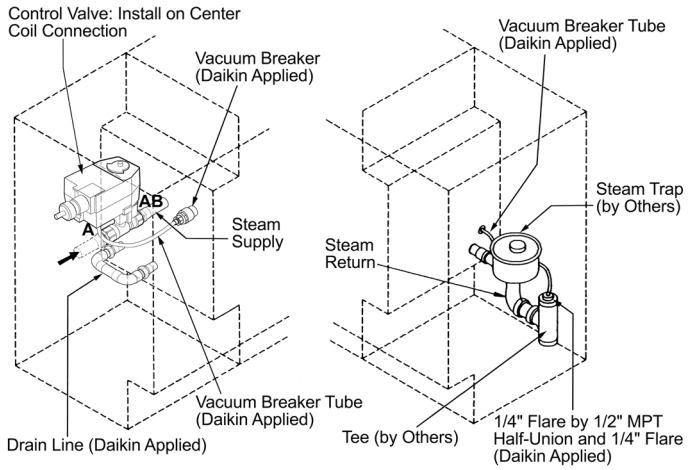
For steam applications, the 2-way, angle pattern valve furnished is normally piped open to the coil. All steam coils are 1-1/8” (34 mm) female sweat connections. Coil connections terminate 9” (229 mm) from the end of the unit.

Steam coils have a factory-installed pressure equalizing valve and a 24” (610 mm) 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 controls, coil connections must be opposite end.

See Figure 78 through Figure 82. Connect the 1/4” (6.35 mm) vacuum breaker tube to the downstream return line. Make this connection downstream of the trap outlet.

Figure 80: Opposite End Drain Connection – (78/79 Coils)



Left End View **Right End View**

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

Typical Steam Coil Piping

Figure 81: Face and Bypass with 2-Way EOC Valve - Same End Drain Connection (Piping Within Unit End Compartment)

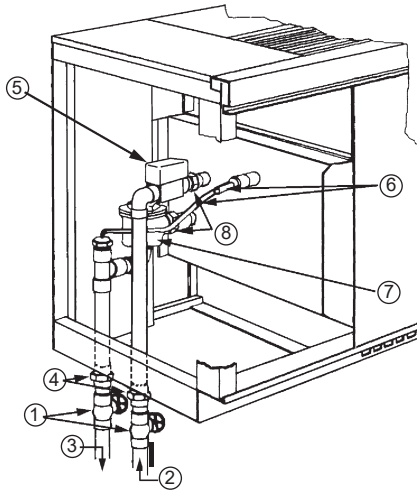
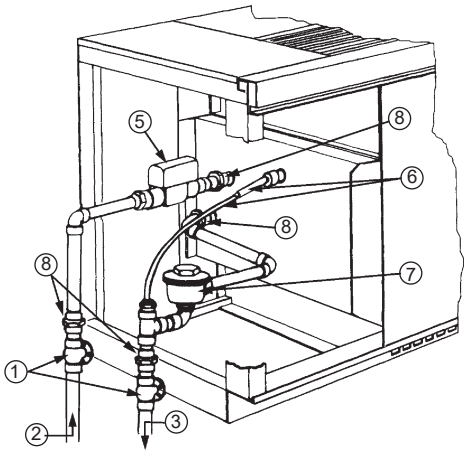
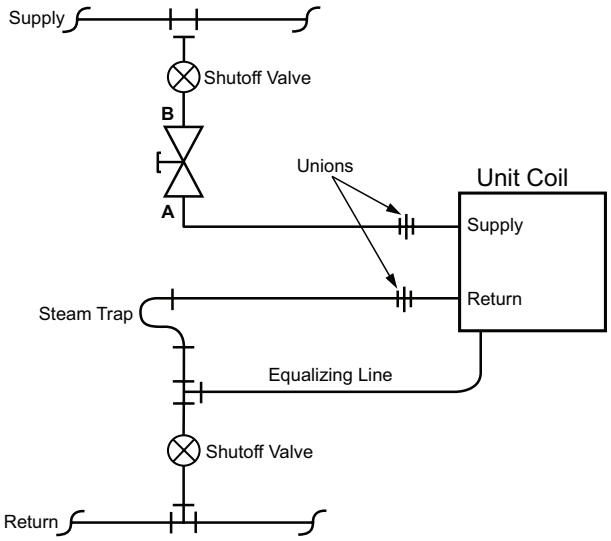


Figure 82: Face and Bypass with 2-Way EOC Valve - Same End Drain Connection (Piping Outside Unit End Compartment)



Legend for Figure 81 & Figure 82	
1	Shutoff valve (by others)
2	Supply
3	Return
4	Unions (by others), must disconnect below floor line
5	Two-way, EOC two-position valve (Daikin Applied accessory or by others)
6	Steam check valve and pressure equalizing line (Daikin Applied)
7	Float and thermostatic steam trap (by others)
8	Supply and return coil connection and stub-up unions (by others)

Figure 83: 2-Way Steam EOC Valve Piping



NOTE: For Erie EOC steam valves, always have the direction of steam flow piped to the B port of the valve. Actuator to be configured for B port to be normally open.

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" (51 mm) minimum clearance to remove the actuator form 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 Daikin Applied MicroTech controls, coil connections must be opposite end. The modulating valve accessory must be field installed on the unit for which it was selected.

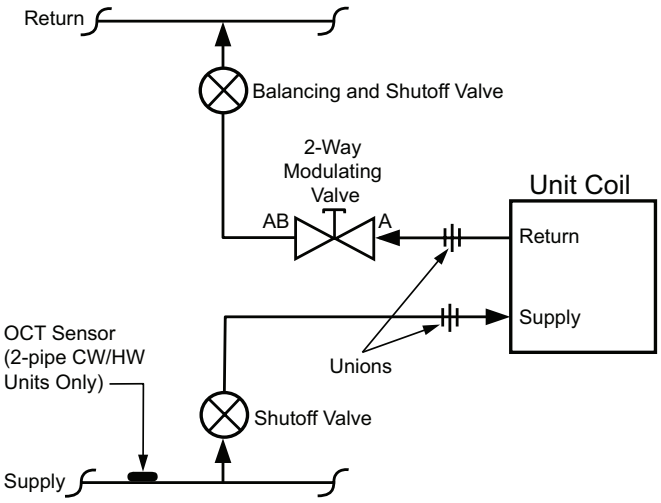
⚠ CAUTION

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.

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.

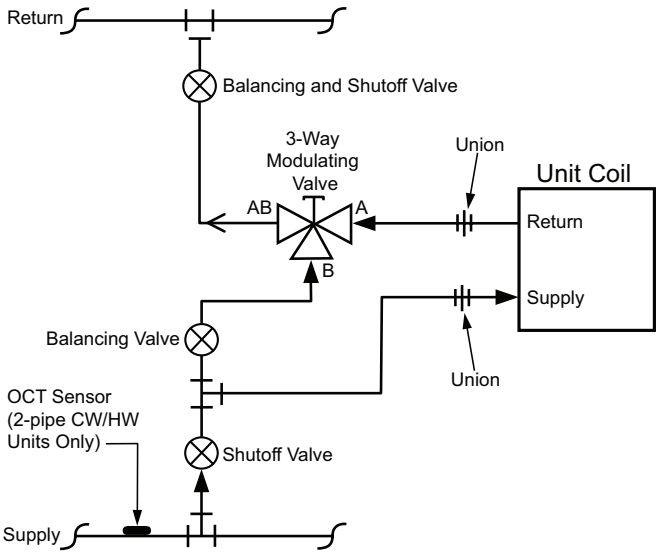
Figure 84: 2-Way Modulating Valve Control, Normally Open, Hot Water or 2-pipe CW/HW Piping



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 85: 3-Way Modulating Valve Control



NOTE: The A port is always piped to the coil. Actuator to be configured for A port to be Normally Open.

Cooling – Chilled Water Modulating Valve Piping

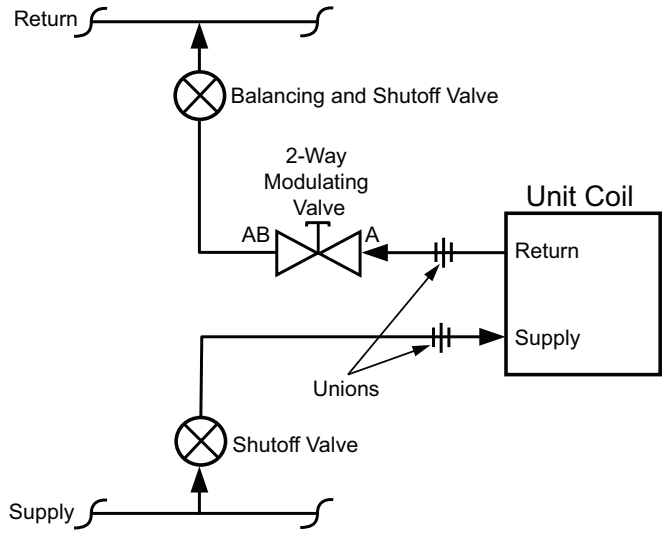
2-Way Modulating, Normally Closed, Chilled Water Valve Piping (Typical)

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

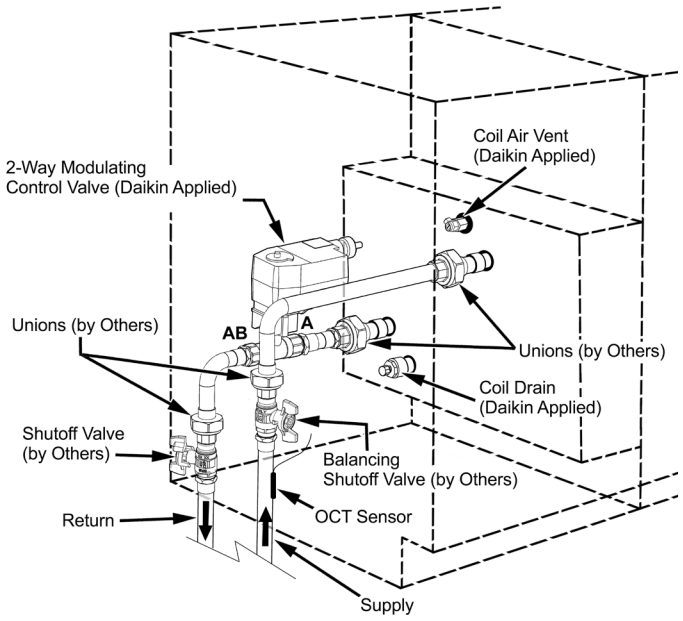
Refer to the arrow on the modulating valve body to determine the direction of flow. If the valve is mounted improperly, the unit will not operate properly and damage to the valve may result.

Figure 86: 2-Way Modulating Valve Control, Normally Closed, Chilled Water Piping



NOTE: Actuator to be configured for A port to be normally closed.

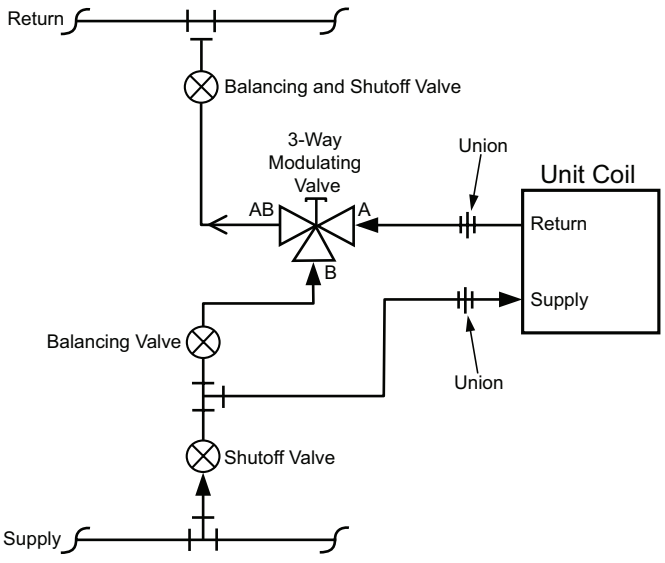
Figure 87: 2-Way Modulating, Normally Closed Chilled Water Valve Piping



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

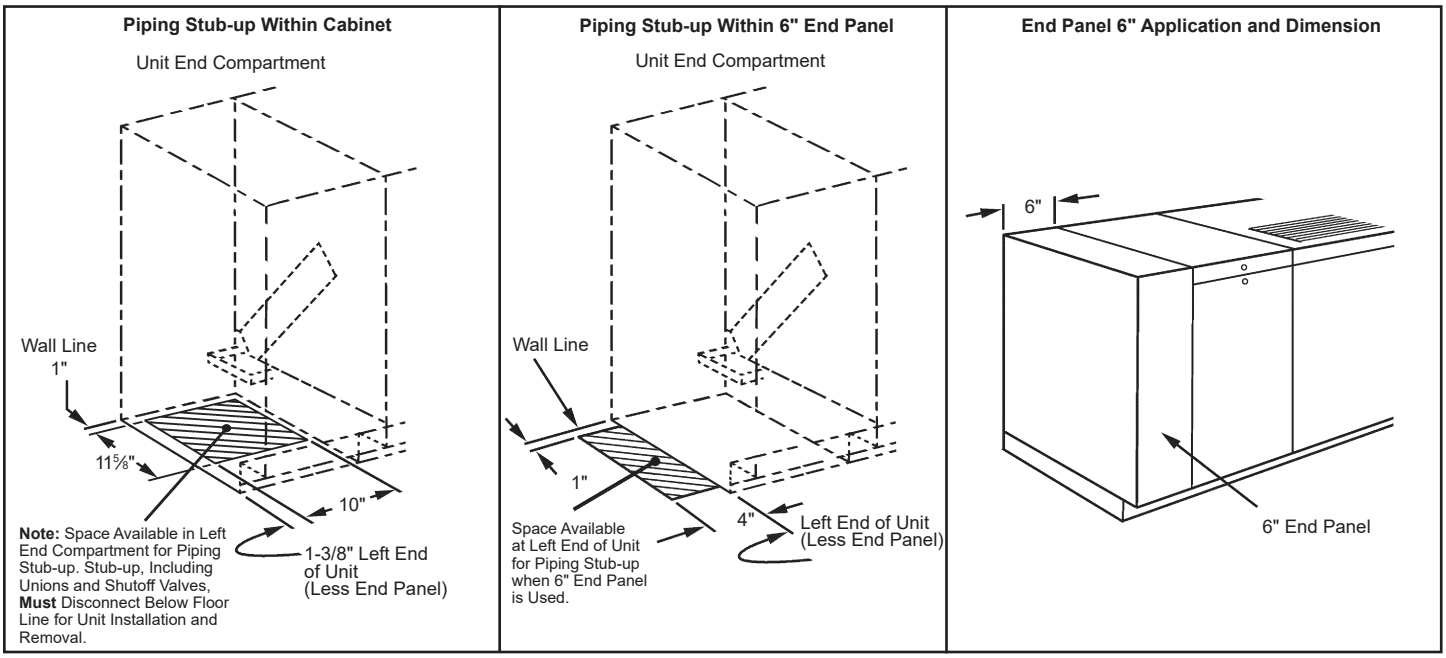
The 3-way Modulating chilled water valve is furnished normally closed to the coil. When the valve is de-energized (off) the flow bypasses the coil. Energizing the valve allows flow through the coil in a modulating fashion.

Figure 88: 3-Way Modulating Valve Control, Normally Closed, Chilled Water Piping



NOTE: The A port is always piped to the coil. Actuator to be configured for A port to be Normally Closed.

Figure 89: Piping Stub-Up Details, 6" End Panel



Condensate Piping

Daikin Applied 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-32 Piping

DX coils have O.D. sweat connections. Interconnecting tubing is field-supplied. See Table 22 on page 40 and job-specific drawings for correct tubing sizes.

In Units with Optional TXV Bypass:

The DX coil will have a TXV bypass installed to allow for split-system pairing with a heat pump condensing unit, to allow for field-supplied refrigerant heating.

⚠ 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.).

⚠ CAUTION

STOP Before Brazing! Use a quenching cloth when brazing to prevent overheating the TXV valve body which could result in valve damage and erratic operation.

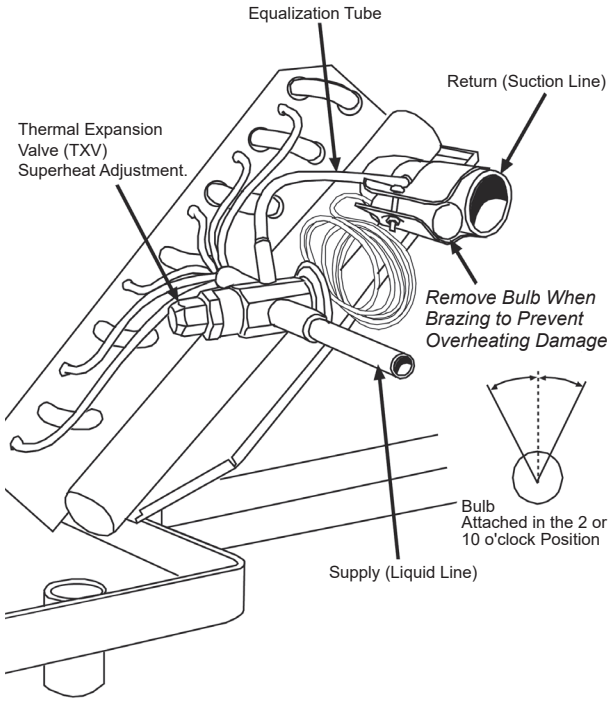
During brazing, bleed nitrogen through the piping. Using field-supplied material suitable for insulating refrigerant lines, wrap the thermal expansion valve (TXV) bulb and the piping between the TXV and the point where it enters the coil with at least one thickness of the material. Likewise, insulate the suction line. (See Figure 92 through Figure 95 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

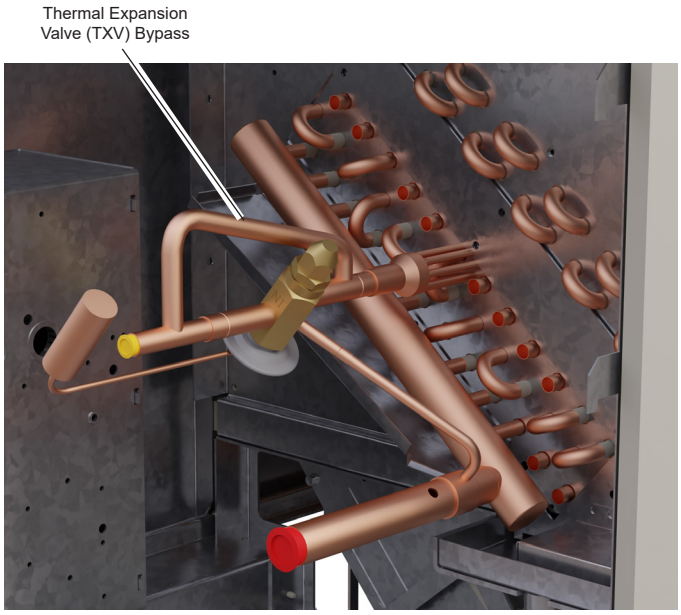
Ensure refrigerant pressure taps are installed in piping end compartment for proper charging and setting of the TXV valve.

Figure 90: TXV Valve Piping Detail (Left Hand Shown)



NOTE: Install pressure taps on supply (liquid line) and return (suction line) piping (by others).

Figure 91: Optional TXV Bypass Valve Piping Detail



Unit Ventilator Split Systems Guidelines

⚠ CAUTION

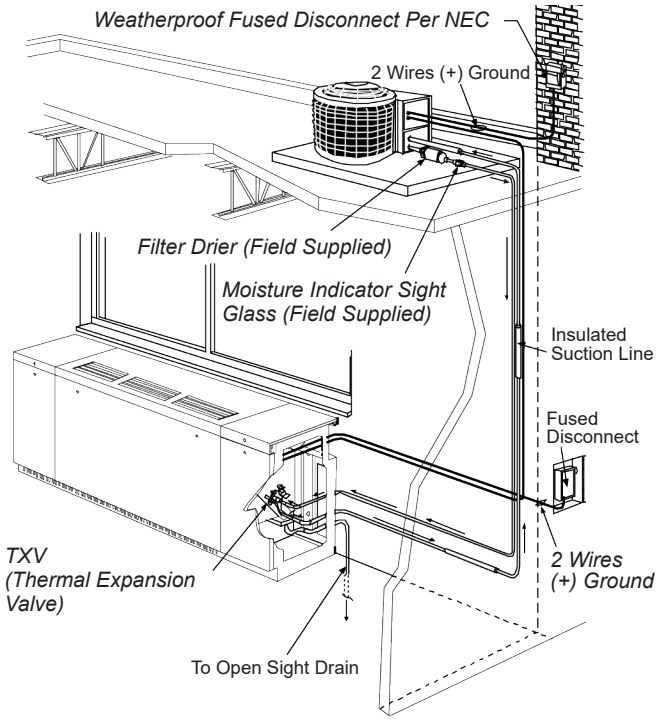
Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected. Failure to do so may result in equipment failure.

The following provides basic guidelines that will provide proper system cooling and operation of an R-32 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:

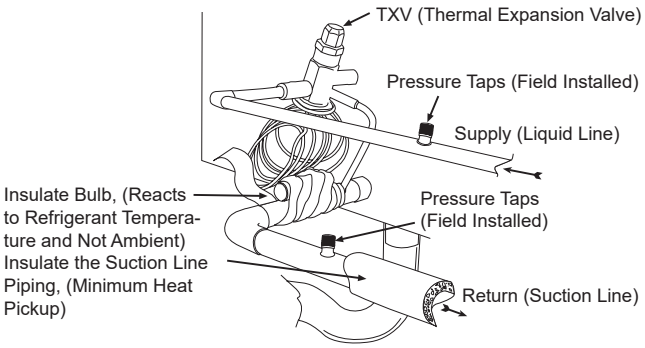
- Size piping per ASHRAE Refrigeration Handbook (correct refrigerant and compressor oil flow), see Table 22 on page 40.
- Use clean sealed refrigerant grade piping (prevent system contamination).
- Install liquid line filter dryer (clean/dry system to prevent damage of operating components), see Figure 94 on page 40.
- 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 94 on page 40.
- Install pressure taps on the unit ventilator's liquid line and suction lines for subcooling and superheat measurements at the unit ventilator, see Figure 94 on page 40.
- 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 95 on page 40.
- 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 95 on page 40.
- Install low ambient temperature switch at condensing unit wired in the condenser control system (locks out mechanical cooling below 60ºF - proper system operation and free economizer usage), see Figure 95 on page 40.
- Incorporate compressor time delay (5 minute) in condensing unit control system (reduces excessive compressor cycling), see Figure 95 on page 40.
- Single phase compressors - consider hard start kits to overcome non-equalized pressure in refrigerant lines.

Figure 92: 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 95 on page 40.
- UV fans must continue to run upon low refrigerant temperature trip of T4 (controls by others) or ICT (MicroTech) (evaporator airflow dissipates residual low coil surface temperatures - suction pressures raised, coil frosting reduced), see Figure 95 on page 40.
- 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 95 on page 40.
- Lock the face and bypass damper 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 90 on page 38.
- 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 90 on page 38.
- Insulate the TXV bulb (reacts to refrigerant temperatures and not ambient), see Figure 93.
- Insulate the suction line piping (minimum heat pickup), see Figure 93.
- Evacuate and properly charge the refrigerant system, see Figure 94 on page 40.
- 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 95ºF 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 96 on page 41.
- 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 24 on page 41.
- 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 180 psig and 280 psig (for proper TXV refrigerant flow at lower ambient), see Figure 95 on page 40.

Figure 93: 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 - 95ºF ambient, 45ºF saturated suction temperature, 105ºF saturated liquid temperature, 6-7ºF superheat, 15ºF 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 23 on page 41).
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.

Table 22: Dimensions, DX Tubing in (mm)

Nominal Capacity	Suction Line O.D.	Liquid Line O.D.
750 cfm	3/4" (19 mm)	1/2" (12.7 mm)
1000 cfm	3/4" (19 mm)	1/2" (12.7 mm)
1250 cfm	3/4" (19 mm)	1/2" (12.7 mm)
1500 cfm	3/4" (19 mm)	1/2" (12.7 mm)

NOTE: The piping dimensions in Table 22 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 94: Typical Split System Evacuation/Charging Setup

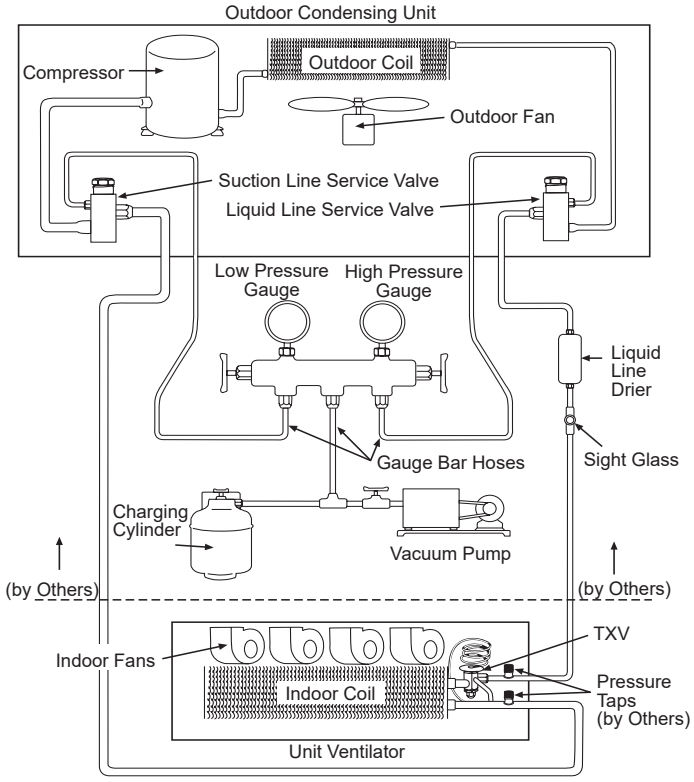
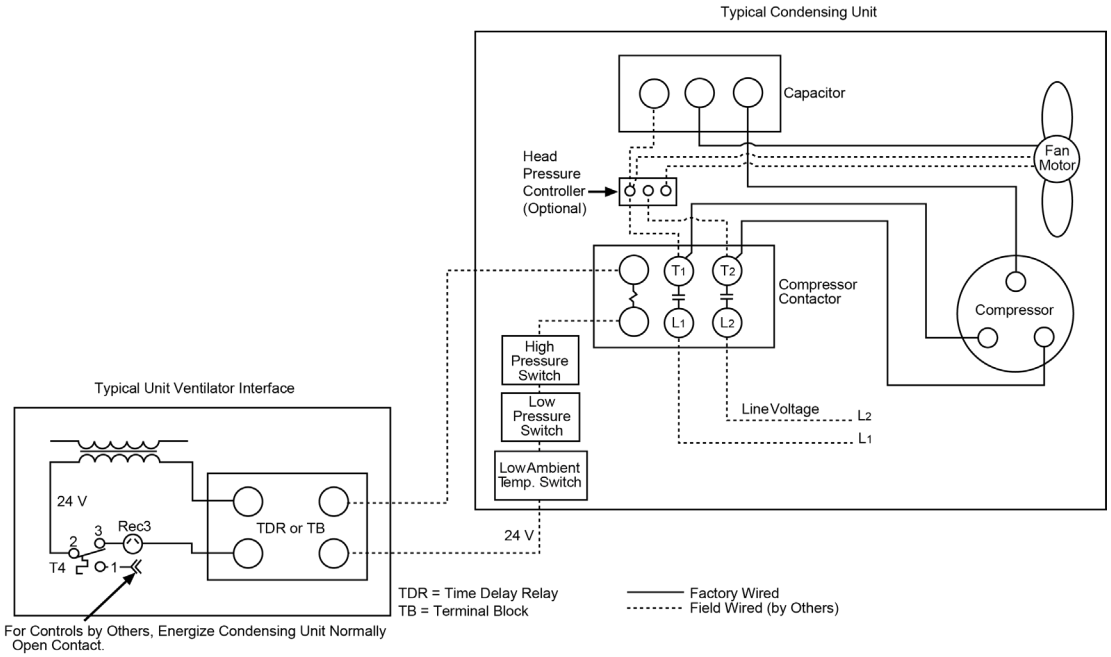


Figure 95: Typical Unit Ventilator/Condensing Unit Wiring Diagram



⚠ 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 24.
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 23.
4. Subtract saturated suction temperature from measured temperature to obtain superheat.
5. Refer to Table 24 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 23: Saturated Temperature - Pressure Chart

(ºF)	R-32 psig	(ºF)	R-32 psig	(ºF)	R-32 psig
32	103.23	44	130.53	80	241.48
33	105.34	45	133.00	85	260.86
34	107.48	46	135.50	90	281.32
35	109.65	47	138.04	95	302.91
36	111.85	48	140.61	100	325.67
37	114.08	49	143.21	105	349.64
38	116.34	50	145.84	110	374.88
39	118.63	55	159.51	115	401.43
40	120.95	60	174.04	120	429.34
41	123.30	65	189.47	125	458.67
42	125.67	70	205.82	130	489.47
43	128.08	75	223.15	140	555.77

NOTE: The pressure values are calculated at sea level.

Table 24: 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 - 95ºF ambient, 45ºF saturated suction temperature, 105ºF saturated liquid temperature, 6-7ºF superheat, 15ºF subcooling.

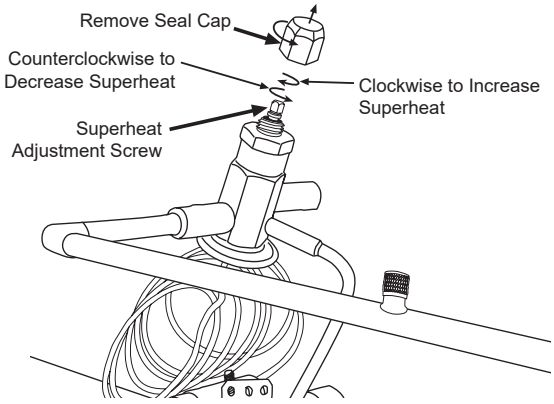
Superheat Adjustment

1. Remove the seal cap from thermal expansion valve (see Figure 96).
2. Turn the adjustment screw clockwise to increase superheat and counterclockwise to decrease superheat (Figure 96). 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

Do not force adjustment stem of TXV. When adjusting superheat setting, there are a maximum of 10 turns on the stem. Turning adjustment stem after reaching stop will damage valve.

Figure 96: Superheat Adjustment of TXV



Electrical and Controls

Electrical Heating Data

⚠ 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.

Table 25: Electrical Data – PSC Motor

	Unit Type	AVS AVB AVV AVR	AVS AVV AVR	AVV AVR	AVS AVB AVV AVR	AVS AVV AVR	AVV AVR	AVS AVB AVV AVR	AVS AVV AVR	AVV AVR	AVS AVB AVV AVR	AVS AVV AVR	AVV AVR
	CFM	750			1000			1250			1500		
	Indoor Fan Motor HP	0.25			0.25			0.25			0.25		
	# of Electric Heater Elements	–	3	6	–	3	6	–	3	6	–	3	6
115-60-1	Indoor Fan Motor Nameplate Amps	3.2	—	—	3.2	—	—	3.2	—	—	3.2	—	—
	Electric Heater Amps	—	—	—	—	—	—	—	—	—	—	—	—
	Unit MCA	4.00	—	—	4.00	—	—	4.00	—	—	4.00	—	—
	Max Fuse Size or Circuit Breaker	15	—	—	15	—	—	15	—	—	15	—	—
208-60-1	Indoor Fan Motor Nameplate Amps	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Electric Heat KW	—	6.0	12.0	—	8.0	16.0	—	10.0	20.0	—	12.0	24.0
	Electric Heater Amps	—	28.8	57.7	—	38.5	76.9	—	48.1	96.2	—	57.7	115.4
	Unit MCA	3.75	39.75	75.88	3.75	51.88	99.88	3.75	63.88	124.00	3.75	75.88	148.00
	Max Fuse Size or Circuit Breaker	15	45	80	15	60	110	15	70	125	15	80	150
230-60-1	Indoor Fan Motor Nameplate Amps	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Electric Heat KW	—	5.5	11.0	—	7.4	14.7	—	9.2	18.4	—	11.0	22.1
	Electric Heater Amps	—	25.0	50.0	—	33.3	66.7	—	41.7	83.3	—	50.0	100.0
	Unit MCA	3.50	34.75	66.00	3.50	45.13	86.88	3.50	55.59	107.63	8.50	66.00	128.50
	Max Fuse Size or Circuit Breaker	15	40	70	15	50	90	15	60	110	15	70	150
265-60-1	Indoor Fan Motor Nameplate Amps	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	Electric Heat KW	—	5.5	11.0	—	7.4	14.7	—	9.2	18.4	—	11.0	22.1
	Electric Heater Amps	—	21.7	43.3	—	28.9	57.8	—	36.1	72.2	—	43.3	86.6
	Unit MCA	3.25	30.38	57.38	3.25	39.38	75.50	3.25	48.38	93.50	6.88	57.38	111.50
	Max Fuse Size or Circuit Breaker	15	35	60	15	40	80	15	50	100	15	60	125
208-60-3	Indoor Fan Motor Nameplate Amps	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.2	3.2	7.3	7.3	7.3
	Electric Heat KW	—	6.0	12.0	—	8.0	16.0	—	10.0	20.0	—	12.0	24.0
	Electric Heater Amps	—	16.7	33.3	—	22.2	44.4	—	27.8	55.5	—	33.3	66.7
	Unit MCA	3.75	24.63	45.38	3.75	31.50	59.25	3.75	38.50	73.13	9.13	45.38	87.13
	Max Fuse Size or Circuit Breaker	15	25	50	15	35	60	15	40	80	15	50	90
230-60-3	Indoor Fan Motor Nameplate Amps	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	6.8	6.8	6.8
	Electric Heat KW	—	5.5	11.0	—	7.4	14.7	—	9.2	18.4	—	11.0	22.1
	Electric Heater Amps	—	14.5	28.9	—	19.3	38.5	—	24.1	48.2	—	28.9	57.8
	Unit MCA	3.50	22.06	40.12	3.50	28.07	52.16	3.50	34.10	64.20	8.50	40.12	76.25
	Max Fuse Size or Circuit Breaker	15	25	40	15	30	60	15	35	70	15	40	80
460-60-3	Indoor Fan Motor Nameplate Amps	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	9.6	9.6	9.6
	Electric Heat KW	—	5.5	11.0	—	7.4	14.7	—	9.2	18.4	—	11.0	22.1
	Electric Heater Amps	—	7.2	14.5	—	9.6	19.3	—	12.0	24.1	—	14.5	28.9
	Unit MCA	6.25	13.04	22.06	6.25	16.04	28.08	6.25	19.05	34.10	12.00	22.06	40.13
	Max Fuse Size or Circuit Breaker	15	15	20	15	15	30	15	20	35	15	20	40

Table 26: Electrical Data – EC Motor

	Unit Type	AVS AVB AVV AVR	AVS AVV AVR	AVV AVR	AVS AVB AVV AVR	AVS AVV AVR	AVV AVR	AVS AVB AVV AVR	AVS AVV AVR	AVV AVR	AVS AVB AVV AVR	AVS AVV AVR	AVV AVR
	CFM	750			1000			1250			1500		
	Indoor Fan Motor HP	0.33			0.33			0.33			0.75		
	# of Electric Heater Elements	–	3	6	–	3	6	–	3	6	–	3	6
115-60-1	**Indoor Fan Motor Nameplate Amps**	5.0	—	—	5.0	—	—	5.0	—	—	9.6	—	—
	Electric Heater Amps	—	—	—	—	—	—	—	—	—	—	—	—
	Unit MCA	6.25	—	—	6.25	—	—	6.25	—	—	12	—	—
	Max Fuse Size or Circuit Breaker	15	—	—	15	—	—	15	—	—	15	—	—
208-60-1	**Indoor Fan Motor Nameplate Amps**	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.3	7.3	7.3
	Electric Heat KW	—	6.0	12.0	—	8.0	16.0	—	10.0	20.0	—	12.0	24.0
	Electric Heater Amps	—	28.8	57.7	—	38.5	76.9	—	48.1	96.2	—	57.69	115.38
	Unit MCA	3.75	39.75	75.88	3.75	51.88	99.88	3.75	63.88	124.00	9.13	81.25	153.38
	Max Fuse Size or Circuit Breaker	15	40	80	15	60	100	15	70	125	15	90	175
230-60-1	**Indoor Fan Motor Nameplate Amps**	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	6.8	6.8	6.8
	Electric Heat KW	—	5.5	11.0	—	7.4	14.7	—	9.2	18.4	—	11	22.1
	Electric Heater Amps	—	25.0	50.0	—	33.3	66.7	—	41.7	83.3	—	50	100
	Unit MCA	3.5	34.75	66.00	3.50	45.13	86.88	3.50	55.59	107.63	8.5	71	133.5
	Max Fuse Size or Circuit Breaker	15	35	70	15	50	90	15	60	110	15	80	150
265-60-1	**Indoor Fan Motor Nameplate Amps**	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	5.5	5.5	5.5
	Electric Heat KW	—	5.5	11.0	—	7.4	14.7	—	9.2	18.4	—	11	22.1
	Electric Heater Amps	—	21.7	43.3	—	28.9	57.8	—	36.1	72.2	—	43.32	86.64
	Unit MCA	3.25	30.38	57.38	3.25	39.38	75.50	3.25	48.38	93.50	6.88	61	115.13
	Max Fuse Size or Circuit Breaker	15	35	60	15	40	80	15	50	100	15	70	125
208-60-3	**Indoor Fan Motor Nameplate Amps**	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.3	7.3	7.3
	Electric Heat KW	—	6.0	12.0	—	8.0	16.0	—	10.0	20.0	—	12	24
	Electric Heater Amps	—	16.7	33.3	—	22.2	44.4	—	27.8	55.5	—	33.34	66.69
	Unit MCA	3.75	24.63	45.38	3.75	31.50	59.25	3.75	38.50	73.13	9.13	50.75	92.5
	Max Fuse Size or Circuit Breaker	15	25	50	15	35	60	15	40	80	15	60	100
230-60-3	**Indoor Fan Motor Nameplate Amps**	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	6.8	6.8	6.8
	Electric Heat KW	—	5.5	11.0	—	7.4	14.7	—	9.2	18.4	—	11	22.1
	Electric Heater Amps	—	14.5	28.9	—	19.3	38.5	—	24.1	48.2	—	28.9	57.8
	Unit MCA	3.5	21.63	39.63	3.5	27.63	51.63	3.5	33.63	63.75	8.5	44.63	80.75
	Max Fuse Size or Circuit Breaker	15	25	40	15	30	60	15	35	70	15	45	90
460-60-3	**Indoor Fan Motor Amps***	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	9.6	9.6	9.6
	Electric Heat KW	—	5.5	11.0	—	7.4	14.7	—	9.2	18.4	—	11	22.1
	Electric Heater Amps	—	7.2	14.5	—	9.6	19.3	—	12.0	24.1	—	14.45	28.9
	Unit MCA	6.25	10.60	19.63	6.25	13.60	25.69	6.25	16.61	31.69	12	21.06	39.13
	Max Fuse Size or Circuit Breaker	15	15	20	15	15	30	15	20	35	15	25	40

NOTE: Fan Motor is 115/60/1

Unit Electrical and Control Connections

MicroTech Unit Mounted DDC Control Components

1. **MicroTech 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, Client/Server 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 16 analog inputs, 8 binary inputs, 4 analog outputs, 2 PWM outputs, and 14 binary outputs. Client/Server 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 8-pin header and 4 locking standoffs. Available communication modules:

- **Building Automation and Control Network (BACnet®) Client Server/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 135-2008 standard for BACnet systems
- **LonWorks® Compliant Space Comfort Controller (SCC) –** Supports the LonWorks SCC profile number 8500_10

3. **Local User Interface (LUI) (optional):** (see Figure 98 on page 45). 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 4 x 20 OLED digit display, 6 keys, and 2 individual LED indicators. In addition to the operating mode states and fan functions, the touch pad will digitally display:

- The room set point temperature
- The current room temperature
- Any fault code for quick diagnostics at the unit

4. **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) –** Fault indication signal, exhaust fan on/off or auxiliary heat signal

5. **Electric Connection Box:** Contains the motor speed transformer. Refer to the unit wiring diagram for specifics.
6. **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.
7. **Fuse(s):** Fan motor and controls have the hot line(s) protected by factory installed cartridge type fuse(s).
8. **Control Transformer:** 75 VA 24-volt NEC Class 2 transformer for 24 volt power supply. (Located behind the motor transformer.)
9. **Outdoor Air/Return Air Damper Actuator (A1):** Proportional, direct-coupled actuator that spring returns the outdoor air damper to the closed position upon a loss of power.
10. **Face and Bypass Damper Actuator (A2):** Proportional, direct-coupled control actuator that is non-spring returned (Model AVS only).
11. **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 (+/- 2°F) and automatically resets at 45°F (+/- 2°F).
12. **Low Refrigerant Temperature Sensor (ICT):** The ICT 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."

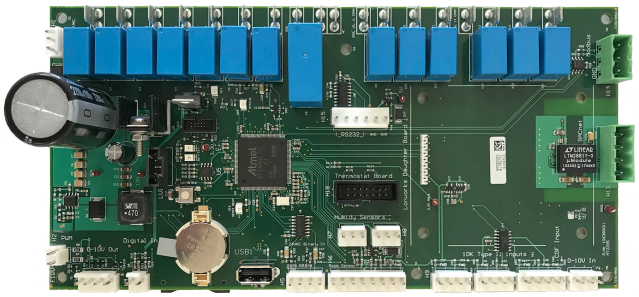
NOTICE

Not all external signal options can be used simultaneously and may not be available on all software models.

13. **Room Temperature Sensor (RAT):** 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).
14. **Discharge Air Temperature Sensor (DAT):** The sensor is located on the second fan from the right to sense discharge air temperatures.
15. **Outdoor Air Temperature Sensor (OAT):** 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.
16. **Outdoor Air Humidity Sensor (OH) (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.

17. **Room Humidity Sensor (IH) (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.
18. **CO_2 Sensor (CO_2) (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 CO_2 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.
19. **A2L Sensor (A2L1-2):** Up to two unit mounted R32 refrigerant sensors are installed in the base of each end pocket. They are used to detect a refrigerant leak for initiating leak mitigation control.
20. **MT6210 A2L Mitigation Controller:** Factory mounted controller monitors the A2L sensors and indicates a refrigerant leak or refrigerant sensor failure should one occur.
21. **Control Valve(s) (not shown):** Optional accessory valve(s) may be either 2 position End of Cycle (AVS and AVB 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 (OCT) (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.)

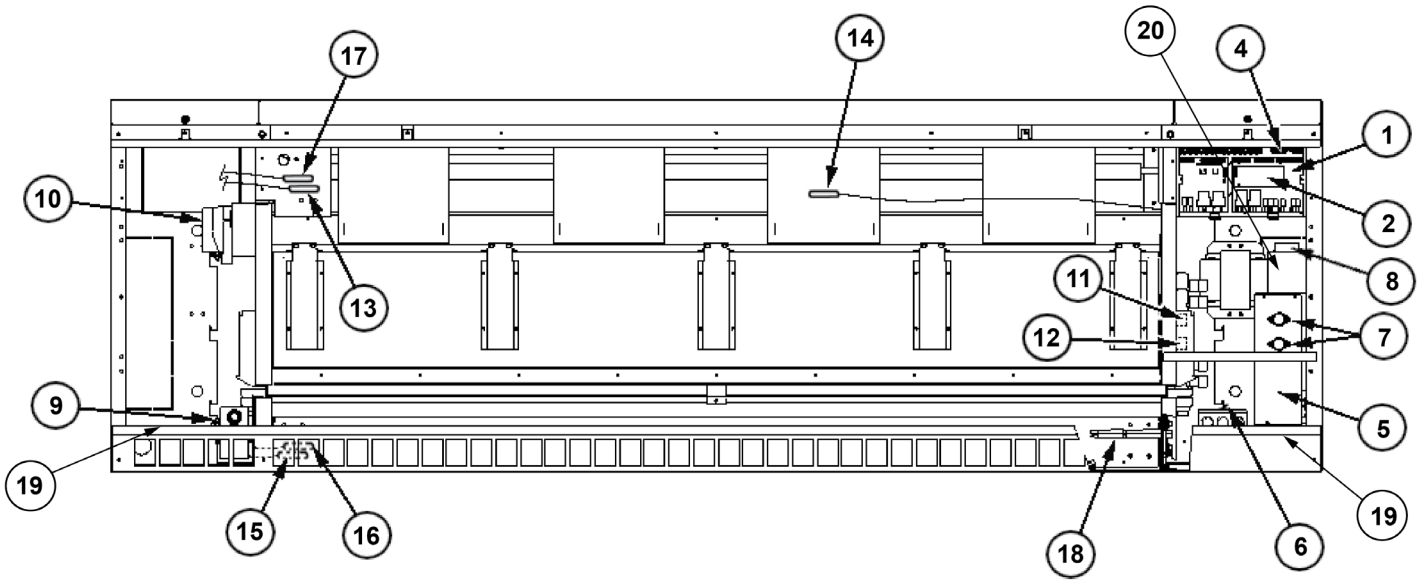
Figure 97: MicroTech Control Board



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

Figure 98: Top View

Figure 99: MicroTech Sensor and Component Locations



Economizer Control Capabilities

Basic – Compares the inside and outside air temperatures using item 13 (Room Temperature Sensor) and item 15 (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 13 (Room Temperature Sensor) and item 15 (Outdoor Air Temperature Sensor) and calculates the enthalpy of the outside air relative humidity using item 16 (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 13 (Room Temperature Sensor) and item 15 (Outdoor Air Temperature Sensor) and compares the enthalpy of the inside and outside air relative humidity using item 16 (Outdoor Air Humidity Sensor) and item 17 (Room Humidity Sensor) to determine if outdoor air can be used for "free", economizer cooling operation.

Economizer for Reheat

Basic – Uses items 13 (Room Temperature Sensor, item 15 (Outdoor Air Temperature Sensor) and item 17 (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 13 (Room Temperature Sensor), item 15 (Outdoor Air Temperature Sensor), item 16 (Outdoor Air Humidity Sensor) and item 17 (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)

Figure 100: Local user interface (LUI)

The optional built-in LUI touch pad with digital OLED display is located in the right hand compartment below the top right access door. The 4 x 20 OLED display will provide a variety of information including:

Operating Mode States

- Fan functions
- Room set point temperature
- Current room temperature
- Fault codes for quick diagnostics at the unit

The LUI has a built in menu structure (Password protected) with 4 keys and 2 individual LED indicators to adjust the unit ventilator operating parameters shown in the following.

Operating Mode States

- **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

- **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

- **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.

Typical MicroTech Wiring Diagrams

Figure 101: Electromechanical Controls – A2L Leak Mitigation

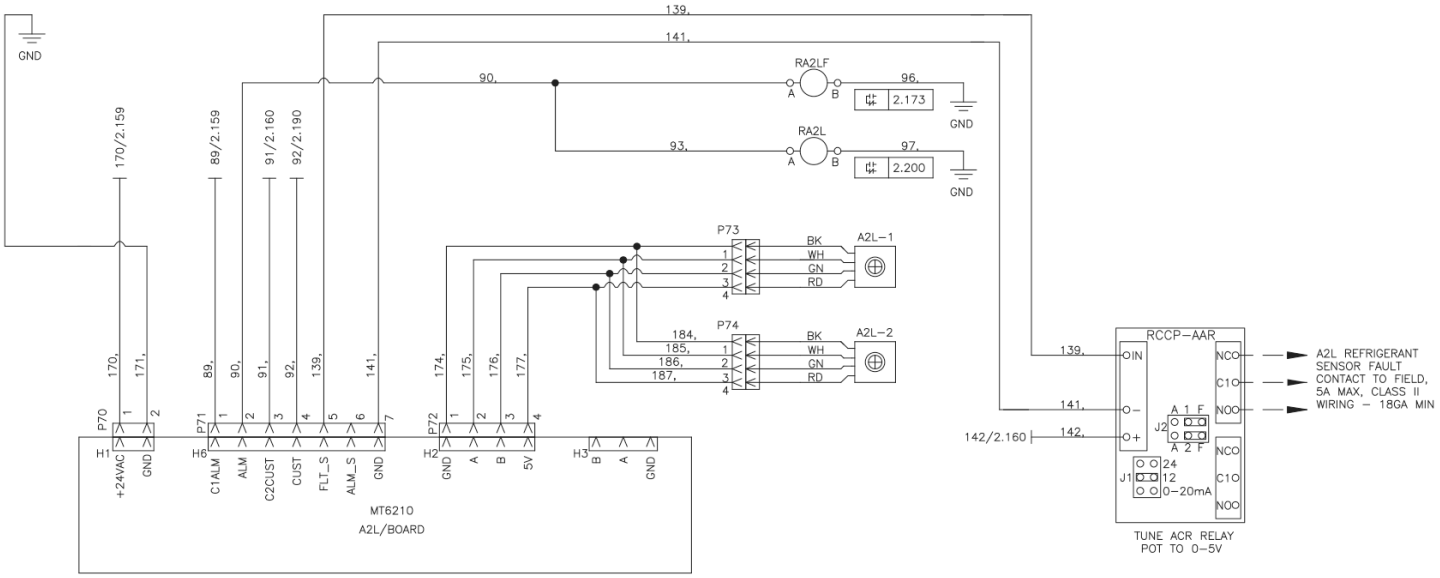


Figure 102: Typical MicroTech Wiring – 115 Volt/60 Hz /1 Ph

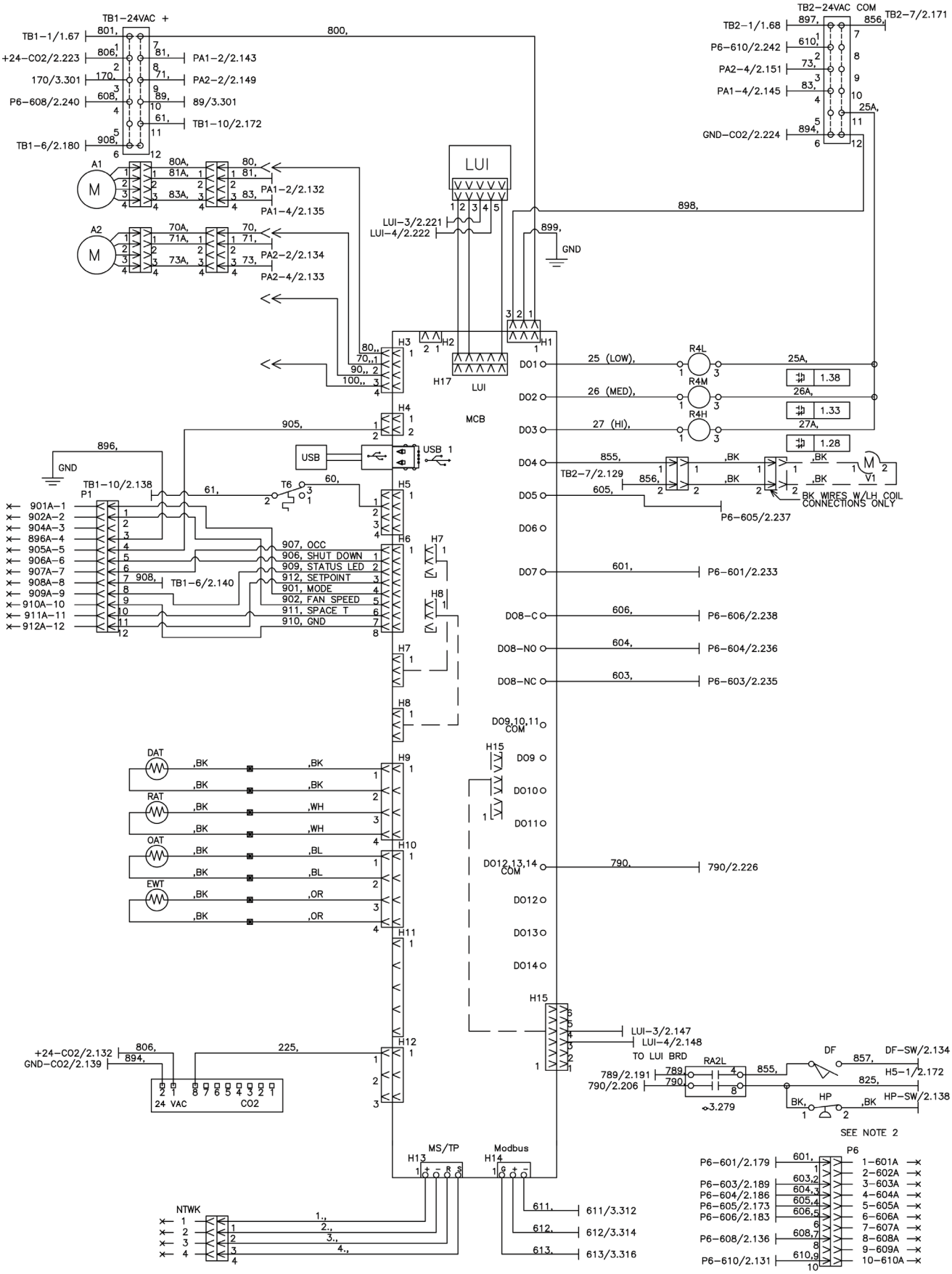
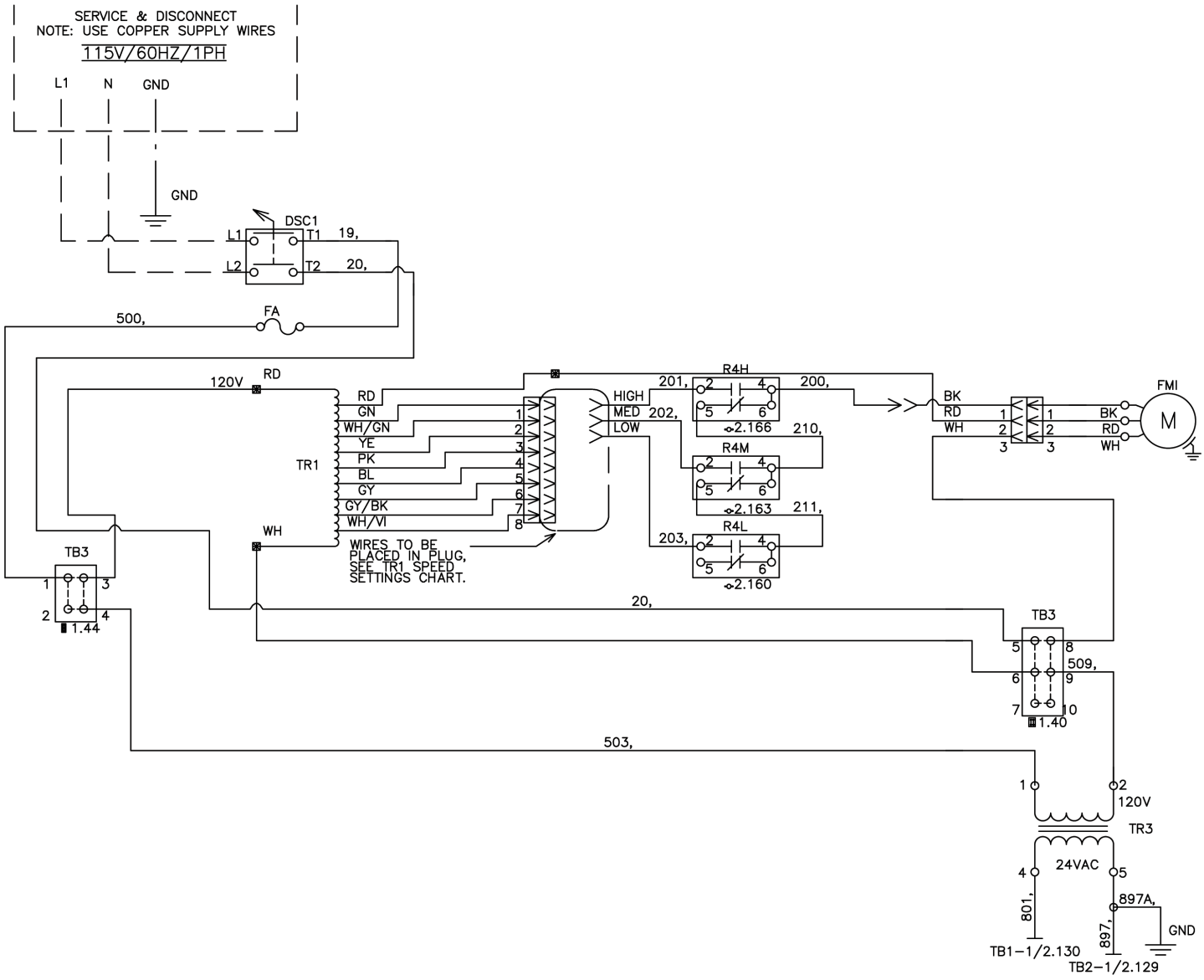


Figure 103: Typical MicroTech Wiring Diagram – Service and Disconnect, 115 Volt/60 Hz/1 Ph



Wiring Schematics Legend for "Typical MicroTech Wiring Diagrams"

Legend			
A1	Actuator- Outdoor Air	**OH1**	Thermostat - Overheat
A2	Actuator- Face & Bypass	**OH2**	Thermostat - Overheat
A2L1-2	A2L Refrigerant Sensor	**OHM**	E.H. Man Reset - Overheat Stat
CP1	Motor Compressor 2-Stage	**PL1**	LED Occupancy / Fault Status
C1	Compressor Contactor	**R1-R3**	Relay Electric Heat (Backup)
CAP1	Capacitor Run	**R10-R12**	Relay – Electric Heat
CEH1-3	Electric Heat Contactor	**R4H**	Relay – Fan High Speed
CO2	Sensor - Indoor Air CO2	**R4M**	Relay– Fan Medium Speed
DAT	Sensor - Discharge Air Temperature	**R4L**	Relay– Fan Low Speed
DCS	Switch - Unit Power	**R32**	Relay - Drain Pan Heater
DF	Dead Front Switch	**R28**	Relay - Outdoor Motor Air
EH1-6	Heater - Electric	**RA2L**	Relay A2L
EH10	Heater - Outdoor Drain Pan	**RAT**	Sensor - Room Air Temperature
F1A/F1B	Fuse - Compressor	**RV**	Reversing Valve
F2A/F3C	Fuse - Electric Heat	**T6**	Thermostat - Freeze Stat
FA/FB	Fuse– Control, Load	**TB1**	Terminal Block - 24VAC+
FC/FD	Fuse– Control, Transformer	**TB2**	Terminal Block – 24VAC Gnd
FMI	Motor - Room Fan	**TB3**	(A, B) Terminal Block – Main Power
FMO	Motor Outdoor Air	**TBE**	Terminal Block - Electric Heat
HP	High Pressure Switch	**TR1**	Transformer - Motor Speed
ICT	Sensor - Indoor DX Coil Temperature	**TR3**	Transformer - 208 / 230V-24V, 75VA
IH	Sensor - Indoor Humidity	**TR4**	Transformer - 460V–230V
MCB	Main Control Board	**TR5**	Transformer - 208 / 230V-24V
MT6210	A2L Control Board	**V1**	Valve - Heat EOC (Accessory)
NTWK	Network Connection	**V2**	Valve - Cool EOC (Accessory)
OAT	Sensor - Outdoor Air Temperature	**VH**	Valve - Heat (Accessory)
OCT	Sensor - Outdoor DX Coil Temperature	**VC**	Valve - Cool (Accessory)
OH	Sensor - Outdoor Humidity		

Legend - Symbols	
– – –	Accessory or field mounted component
⏚	Ground
⊠	Wire nut / splice
●	Overlap point - common potential wires
L1/1.20	Wire link (wire link ID / page # . line #)

TR1 Speed Settings				
	750	**1000**	**1250**	**1500**
High	PK	YE	WH/GN	GN
Med	GY	GY	PK	YE
Low	GY/BK	GY/BK	GY	PK

NOTE 1: All electrical installation must be in accordance with national and local electrical codes and job wiring schematic.

NOTE 2: External wiring options - see IM for the different configured options, wiring to be minimum 18 gauge, 90°C.

NOTE 3: EC motors are factory programmed for specified airflow. Contact Daikin Applied for replacement.

NOTE 4: Cap extra wire. Switch wire 42A to red wire for 208V operation.

NOTE 5: Devices in legend may or may not be on unit.

MicroTech Unit Electrical Connections

⚠ DANGER

Do not force adjustment stem of TXV. When adjusting superheat 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 27, Figure 104, Figure 105 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 Daikin Applied). The junction box has 1” (25 mm) and 2” (51 mm) knockouts, located 10-1/2” (267 mm) 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 104. (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.

Figure 104: Electric Heat Unit Power Switch Locations

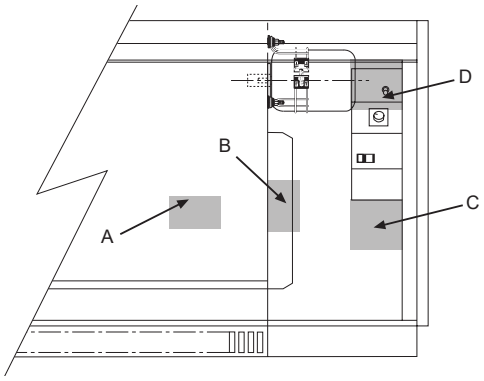


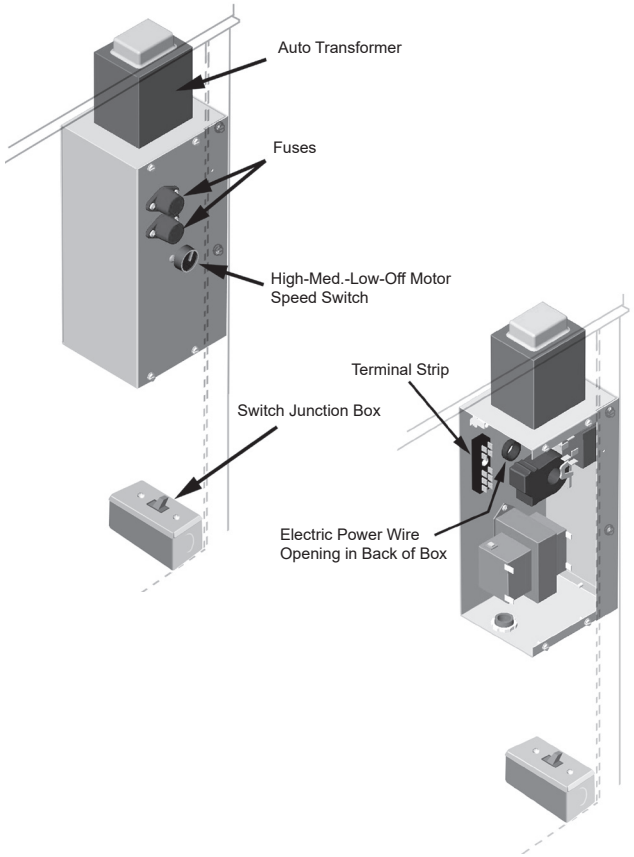
Table 27: Electrical Data/Motor Data and Unit Amp without Electric Heat

Unit Series	CFM (Nom.)	L/s	Motor HP	Watts	Unit Current #			
					115 V	208 V	230 V	265 V
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

NOTE 1: # Amps at unit voltage, 60 Hz, single phase.

NOTE 2: Table 25 on page 42, Table 32 on page 63, and Table 33 on page 79.

Figure 105: Electric Connection Box and Junction Box Located in Right End Compartment



A2L Leak Mitigation Connections

Terminal A2LCUST is intended to be used to provide notification of a refrigerant leak. This normally de-energized output will energize providing 24 VAC when the MT6210 Mitigation Controller detects a refrigerant leak as indicated by one of the A2L sensors. In the event of an A2L leak, the compressor and any electric heat outputs will be de-energized and the fan will be forced to run at high speed for at least 5 minutes after refrigerant centrifugation is no longer detected. See Figure 101.

Upon indication of a refrigerant leak by the MT6210 Mitigation Controller, the field installed controller should disable compressor and electric heat signals immediately and also command the fan speed so that sufficient airflow is delivered within 10 seconds of leak indication. The MT6210 Mitigation Controller will continue to deliver the airflow until the leak indication signal is re-energized.

The Adjustable Analog Relay (AAR) board is intended to provide notification of a refrigerant sensor failure. Relay 1 on the AAR will be energized under normal operating conditions (closed circuit between C1 and N.O., open circuit between C1 and N.C.) and energized when the MT6210 Mitigation Controller detects that any of the sensors are reporting a failure, or if they are not communicating with the MT6210 Mitigation Controller or when a refrigerant leak is detected.

Upon indication of a sensor failure by the MT6210 Mitigation Controller, the field installed controller should command the fan speed so that sufficient airflow is delivered within 10 seconds of sensor failure indication. The MT6210 Mitigation Controller will continue to deliver the airflow until the sensor failure indication signal is re-energized.

⚠ CAUTION

The Adjustable Analog Relay (AAR) is factory calibrated to provide an indication of a R-32 sensor failure or communication problem. Consult the factory before making any adjustments to the settings on the AAR.

MicroTech Wall Mounted Sensor

⚠ WARNING

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

⚠ WARNING

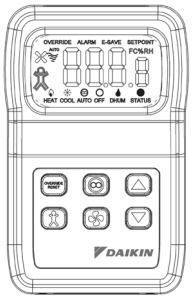
To avoid electrical shock, personal injury, or death:

1. Installer must be a 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 12 VAC/VDC to any lead or damage will result.
5. Avoid locations where excessive moisture, corrosive fumes, or vibrations are present.

NOTICE

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.

Figure 106: Wall Mounted Temperature Sensor



When Using a Remote Temperature Sensor

If a decision is made to use a 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 Figure 107 and Figure 108). The UVC is capable of using one of four remote wall mounted temperature sensors. It is recommended that additional wires be pulled to compensate for potential wire breakage or future options.

- 6-Button Digital Adjustable Sensor (PN 910247458) 8 total wires (power and ground wires should be bundled separately)
- 4-Button Digital Adjustable Sensor (PN 910247448) 6-wires (power and ground wires should be bundled separately)
- The Basic Sensor with setpoint adjustment (PN 910247453) 4-wires
- The Basic Sensor (PN 910247450) 3-wires

NOTICE

For sensor terminal wiring details see the installation manual specific to the sensor being used.

Table 28: 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.

Figure 107: Correct Wall Sensor Locations

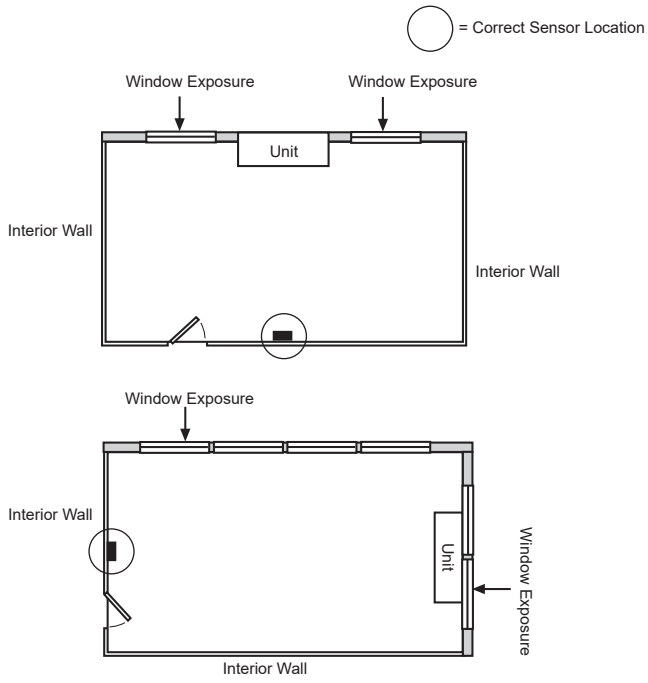
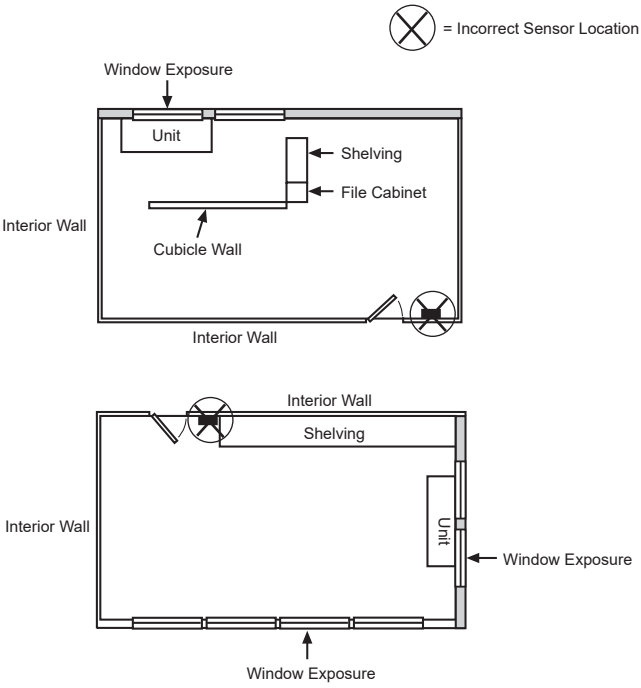


Figure 108: Incorrect Unit and Wall Sensor Locations



Typical Connections For Temperature Sensor Applications

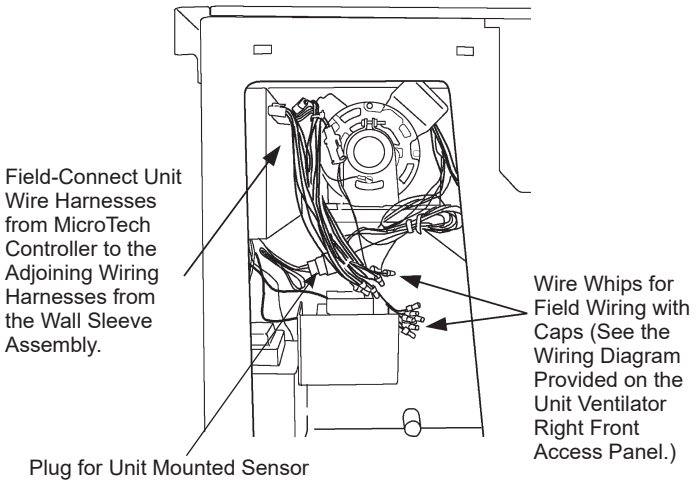
The low voltage field wiring connections have all been centrally located within the unit ventilator and are easily accessible.

To simplify field connections, multi-pin plugs are factory provided and pre-wired with short wire whips (Figure 109). Each of the wires in these wire whips is capped and should remain capped if not used. See Table 29 on page 54 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.

For sensor terminal wiring details see the installation manual specific to the sensor being used.

Figure 109: Field Wiring Whips with Caps Viewed from Right End Compartment



Sensor Functions

- Display sensor to show room temperature, fan speed (AUTO/HIGH/MEDIUM/LOW), system mode (HEAT/COOL AUTO/OFF), ALARM, override and occupancy.

Table 29: Unit Ventilator MicroTech Board to Room Temperature Sensor Wiring

MicroTech Base Board									
Terminal Block Label	**TB1**	**H6-1**	**H6-2**	**H6-3**	**H6-4**	**H6-5**	**H6-6**	**H6-7**	**H6-8**
Sensor 910247458	●	●	○	●	●	●	●	●	●
Sensor 910247448	●	●	○	●	●	○	○	●	●
Sensor 910247453	○	○	○	●	●	○	○	●	●
Sensor 910247450	○	○	○	●	○	○	○	●	●
Description	24VAC	Occupancy	Shutdown (Not Used)	Status LED	Setpoint	Unit Mode	Fan Speed	10K RTD	Ground
Wire	**908**	**907**	**906**	**909**	**912**	**901**	**902**	**911**	**910**
Typical Wiring									
Terminal Label	**R**	**U**	**1 (ST)**	**3 (SP)**	**2 (FM)**	**6 (FC)**	**4 (UTS)**	**5 (GND)**	
Description	24VAC	Unoccupied	Unit Status Output	Setpoint Adjust	Unit Mode	Fan Speed	Room Temp Sensor & Tenant Override	Ground	
Room Temperature Sensor									

Terminal Designations

● = Active Terminal ○ = Not Used

Mounting

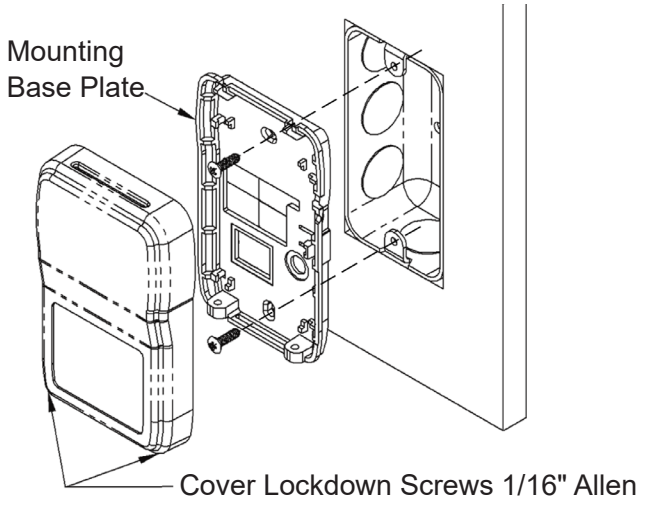
Location

Avoid mounting on outside walls or in direct sunlight.

Junction Box, (J-Box)

1. Pull the wire through the wall and out of the junction box, leaving about six inches free.
2. Pull the wire through the hole in the base plate.
3. Secure the back plate to the box using the #6-32 × 1/2 inch mounting screws provided.
4. Screw the plate firmly to the wall so the foam plate backing is compressed about 50%.
5. Terminate the unit according to the guidelines in the Termination section.
6. Attach cover by latching it to the top of the base, rotating it down and snapping into place.
7. Secure the cover by backing out the lock-down screws using a 1/16” Allen wrench until it is flush with the bottom of the cover.

Figure 110: Junction Box Mounting



NOTE: Hardware is provided for both junction box and drywall installation.

Drywall Mounting

1. Place the base plate against the wall where you want to mount the sensor.
2. Mark out the two mounting holes where the unit will be attached to the wall. Drill a 3/16” hole in the center of each mounting hole and insert a drywall anchor into the holes.
3. Drill one 1/2” hole in the middle of the marked wiring through hole area.
4. Pull the wire through the wall and out the 1/2” hole, leaving about six inches free.
5. Pull the wire through the hole in the base plate.
6. Secure the base to the drywall anchors using the #6 × 1” mounting screws provided.
7. Screw the plate firmly to the wall so the foam plate backing is compressed about 50%.
8. Terminate the unit according to the guidelines in the Termination section.
9. Attach cover by latching it to the top of the base, rotating it down and snapping it into place.
10. Secure the cover by backing out the lock-down screws using a 1/16” Allen wrench until it is flush with the sides of the cover.

NOTICE

In any wall-mount application, the wall temperature and the temperature of the air within the wall cavity can cause erroneous readings.

The mixing of room air and air from within the wall cavity can lead to condensation, erroneous readings and sensor failure. To prevent these conditions, Daikin Applied recommends sealing the conduit leading to the junction box with fiberglass.

Maintenance

Wipe the display as needed with a damp water only cotton cloth. Do not use any type of cleaner as it may damage the buttons or scratch the display. Do not paint.

Terminations

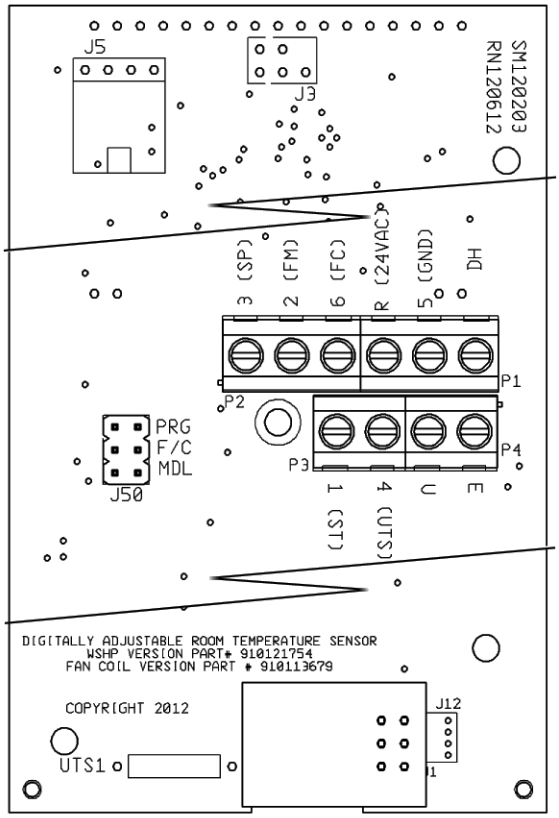
⚠ CAUTION

The AC power wiring at terminals [R] & [5] should be run in a separate twisted shielded pair to avoid fluctuating and inaccurate signal levels induced into the other sensor signal wires. This sensor AC power can be run in the same conduit with the sensor signal wire as long as it’s run in twisted, shielded pair and terminated properly.

Daikin Applied recommends using shielded 22AWG for all connections and a separate twisted pair for the power wire connections. The shield should be earth grounded only at the power source. Larger gauge wire may be required for runs greater than 250’.

All wiring must comply with the National Electric Code (NEC) and local codes. Do NOT run any of this device’s wiring in the same conduit as other AC power wiring. Tests show that fluctuating and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines. If you are experiencing any of these difficulties, please contact your Daikin Applied representative.

Figure 111: Sensor Circuit Board



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.

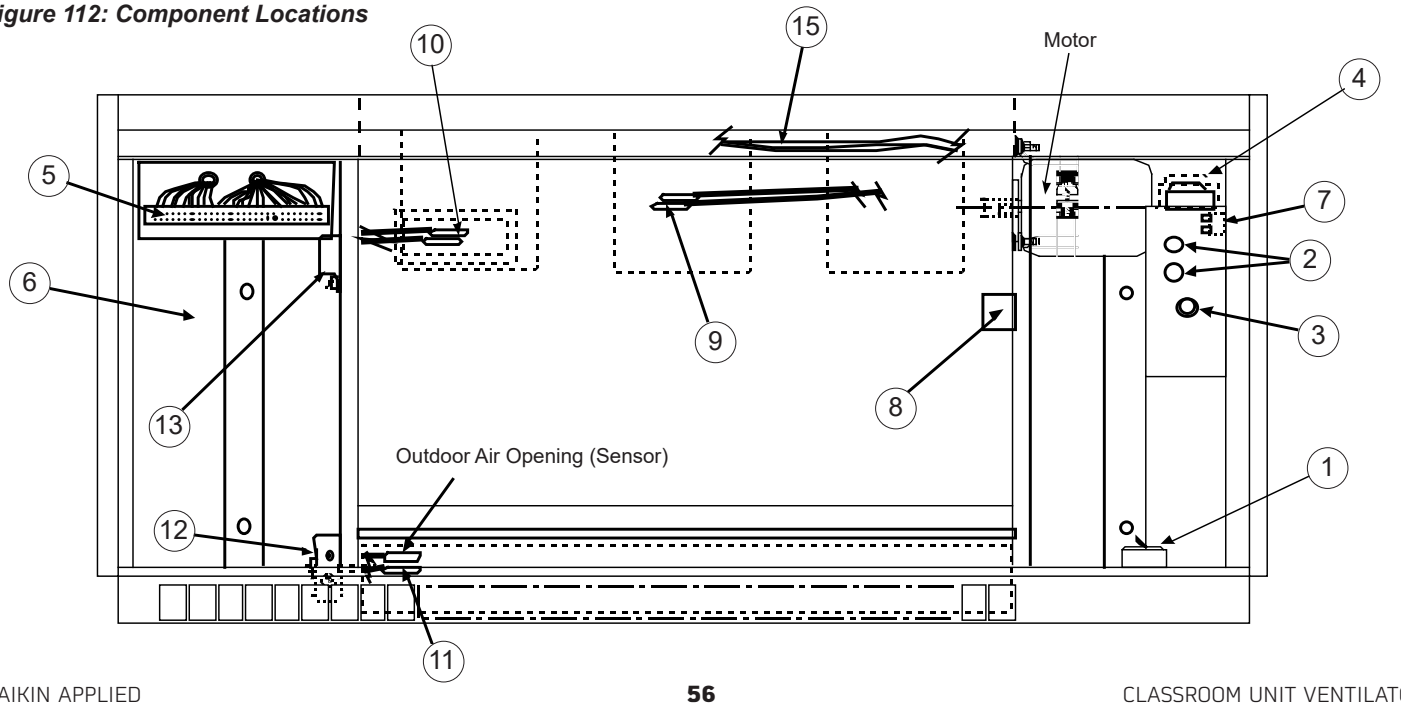
Digital Ready consists of the following components which are factory wired and powered:

1. **Unit Main Power "On-Off" switch:** disconnects main power to 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 V 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" (203 mm x 533 mm) 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. **Low Air Temperature Limit (T6 - Freezestat):** factory installed, 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):** 10 K 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. **Outdoor Air/Return Air Damper Actuator (A1):** spring returned, direct coupled, proportional control (2 to 10 VDC).
13. **Face and Bypass Damper Actuator (A3):** non-spring returned, proportional control (2 to 10 VDC).
14. **End of Cycle DDC Valves (not shown):** one or two spring return actuators (by others), interface from the terminal board providing 24-volt power. Open/shut signal from UVC (by others).
15. **24 V 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, protects against abnormally low evaporator coil temperatures. Direct Expansion (DX) units only (not shown).

Figure 112: Component Locations



Digital Ready Face and Bypass Control Wiring Diagrams

Figure 113: Digital Ready Face and Bypass Control - 208-230 V/60 Hz/1 Ph

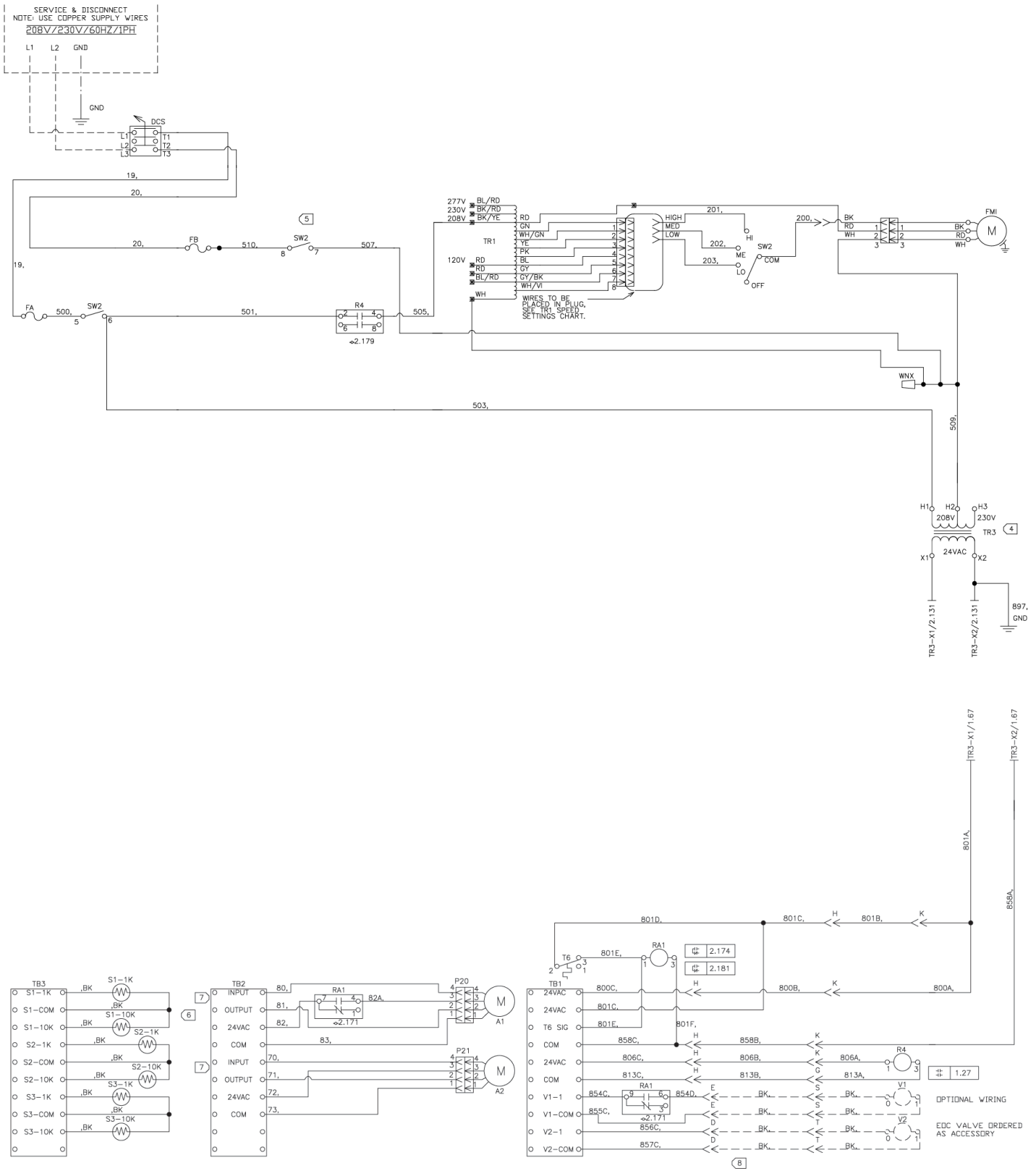


Figure 114: Digital Ready Face and Bypass Control - 120 V/60 Hz/1 Ph

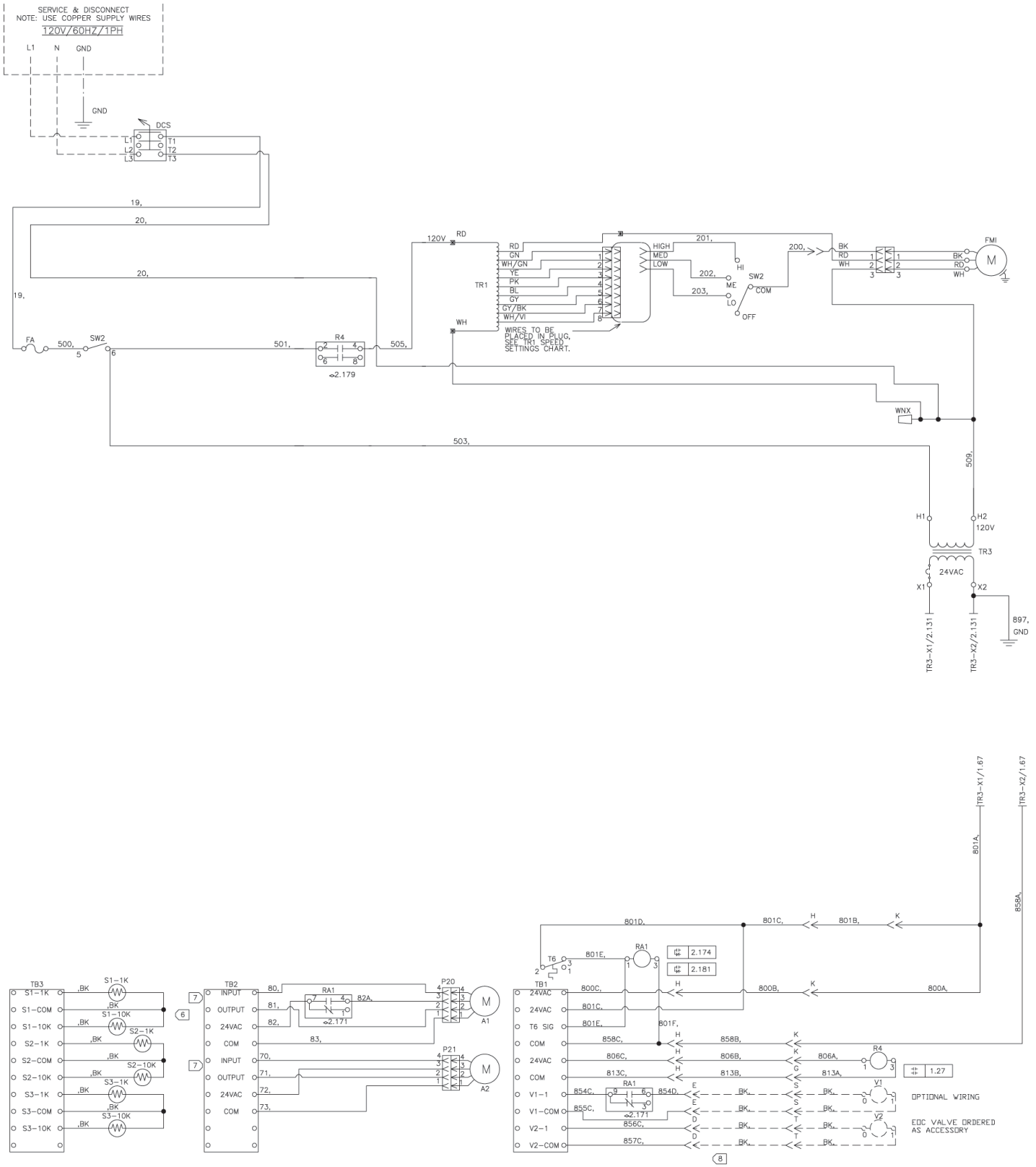
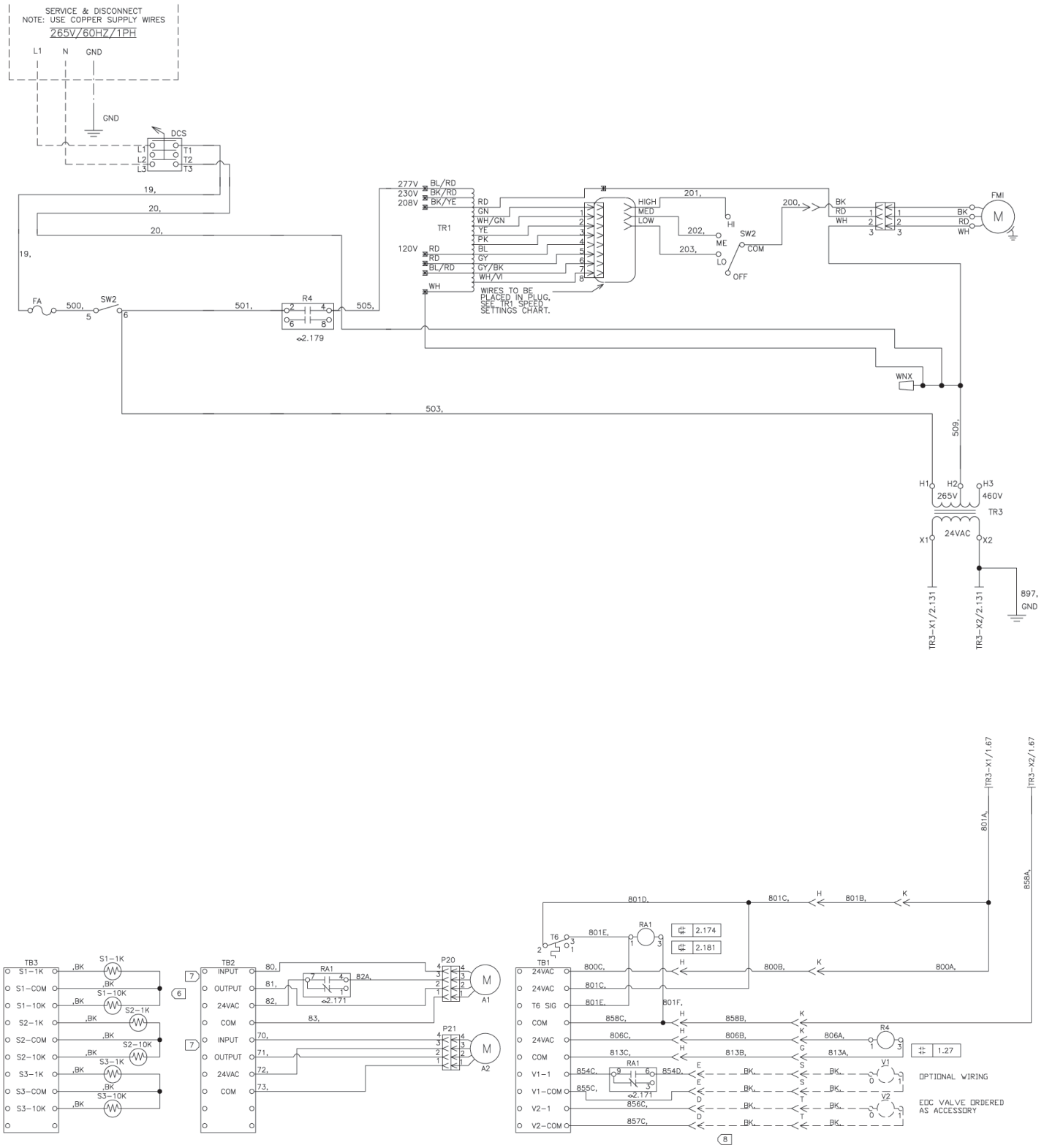


Figure 115: Digital Ready Face and Bypass Control - 265 V/60 Hz/1 Ph



Wiring Schematics Legend for "Digital Ready Face and Bypass Control Wiring Diagrams"

Legend			
A1	Actuator- Outdoor Air	**SW1**	Switch Disconnect
A2	Actuator- Face & Bypass	**SW2**	Switch - On, Off, and Fan Speed
DCS	Switch - Unit Power	**T6**	Thermostat - Freeze Stat
FA/FB	Fuse– Control, Load	**TB1**	Terminal Board Control
FMI	Motor - Room Fan	**TB2**	Terminal Board Control
R2A	Relay – Actuator/Valve	**TB3**	Terminal Board Control
R4	Relay – Fan Coil (24VAC)	**TR1**	Transformer - Motor Speed
S1	Sensor - Room Air	**TR3**	Transformer - 24V, 75VA
S2	Sensor - Discharge Air	**V1**	Valve - Heating N.O. Spring Return
S3	Sensor - Outdoor Air	**V2**	Valve - Cooling N.O. Spring Return

Legend - Symbols	
– – –	Accessory or field mounted component
⏚	Ground
⊠	Wire nut / splice
●	Overlap point - common potential wires
L1/1.20	Wire link (wire link ID / page # . line #)

Motor Size	SW2 Term	TR1 Speed Settings			
		750	1000	1250	1500
1/4 HP 0.00-0.20 ESP	High	PK	YE	WH/GN	GN
	Med	GY	GY	PK	YE
	Low	GY/BK	GY/BK	GY	PK

NOTE 1: All electrical installation must be in accordance with national and local electrical codes and job wiring schematic.

NOTE 2: Automatic temperature control supplier is responsible to ensure controls operate correctly and protect the unit.

NOTE 3: Cap all unused transformer leads.

NOTE 4: For 230 V operation, switch wire 509 to 240 V terminal in the transformer.

NOTE 5: Fuse FB, wire 510, and wire 507 furnished on 208/230 volt units only.

NOTE 6: 1K thermistor is positive temperature coefficient. 10K thermistor is negative temperature coefficient.

NOTE 7: Actuators, 24 VAC for 2 to 10 VCD control input. For A 4 to 10 mA input control signal, add a 500 Ohm resistor across WHT and BLK. Output signal of 2 to 10 VDC for position feedback.

NOTE 8: Cord furnished on right hand connections.

NOTE 9: Devices in legend may or may not be on unit.

Digital Ready Unit Mounted Temperature Sensor Specifications

A 10 kΩ Negative Temperature Coefficient (NTC) sensor and a 1 kΩ 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 116. Each is wired to the terminal strip separately so that the Automatic Temperature Control contractor may select the appropriate sensor for the application.

10 kΩ NTC Sensor

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

Type: 10 kΩ @ 25°C

Accuracy: ±0.2°F, 40°F - 80°F

±0.36°F, 32°F - 158°F

1 kΩ PTC Sensor

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

Type: 1035 Ω @ 25°C

Accuracy: ±0.9°F, 5°F - 167°F

Figure 116: Sensor Locations

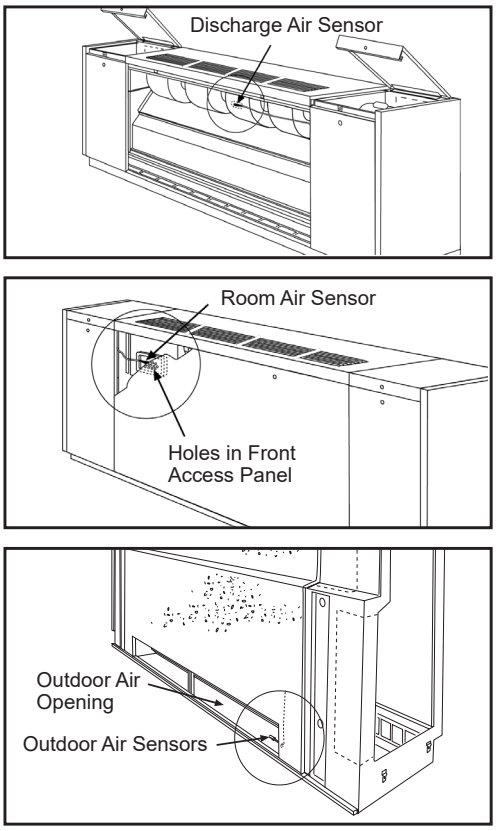


Table 30: Temperature Sensors Resistance Values

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

Digital Ready – Damper Actuator Specifications

Outdoor Air/Return Air Damper (OAD) 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 (scaled to 2-6 VDC for vertical configurations and 2-8 VDC for horizontal configurations) from the DDC Unit Ventilator Controller (UVC). Rotation is clockwise to open OA, close RA.

Figure 117: Outdoor Air Damper Actuator

Face & 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). Refer to the wiring diagram for proper installation of the resistor. The gears can be manually disengaged with a button on the actuator cover. Rotation is counterclockwise to bypass air around coil.

Figure 118: Face & Bypass Actuator

Table 31: Actuators Technical Data

Actuator Type	Power Supply	Power Consumption	Transformer Sizing	Torque	Running Time	Direction of Rotation
Face & Bypass Damper Actuator	24 VAC ±20% 50/60 HZ	1.2 Watts 2.1 VA	3 VA (class 2 power source)	44 in-lb	90 sec	Reversible with built in switch.
Outdoor Air / Return Air Damper Actuator	24 VAC ±20% 50/60 HZ	Running: 4 Watt 6 VA Holding: 2 Watt 3.6 VA	8 VA (class 2 power source)	35 in-lb	90° with motor 30s 90° with spring return 15s	Spring: Reversible with CW/CCW mounting. Motor: Reversible with built in switch.

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 a 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 12 VAC/VDC to any lead or damage will result.
5. Avoid locations where excessive moisture, corrosive fumes, or vibrations are present.

See Table 32, and refer to Digital Ready component details on page 56 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 Daikin Applied). The junction box has 1” (25 mm) and 2” (51 mm) knockouts, located 10-1/2” (267 mm) 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. Refer to Figure 134 on page 79. (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 120 for terminal strip designations.

Table 32: Electrical Data/Motor Data and Unit Amp Without Electric Heat

Unit Series	CFM (Nom.)	L/s	Motor HP	Watts	Unit Current #			
					115 V	208 V	230 V	265 V
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

NOTE: # Amps at unit voltage, 60 Hz, single phase.

Figure 119: Unit Left End Compartment and Terminal Strip

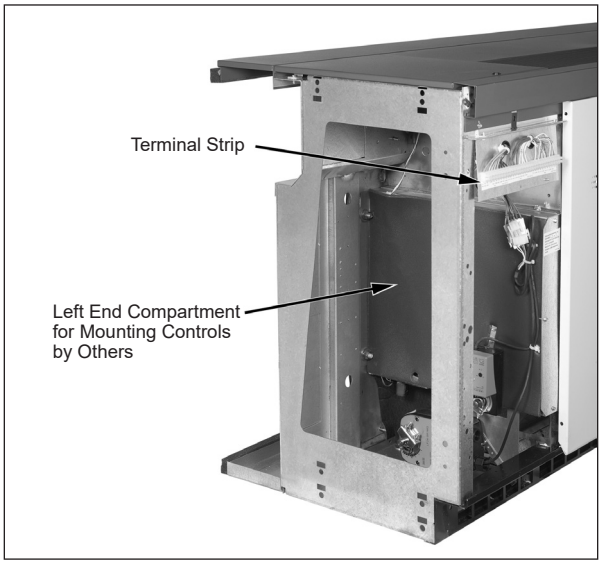
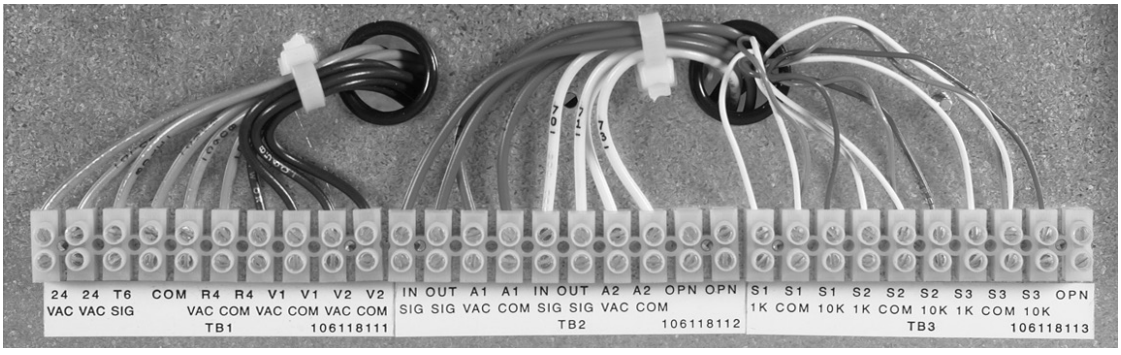


Figure 120: Terminal Strip



Controls by Others Components

Daikin Applied 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. **Fuse(s):** 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°F ± 2°F and automatically resets above 45°F ± 2°F. Responds when any 15% of the capillary length senses these temperatures.

⚠ CAUTION

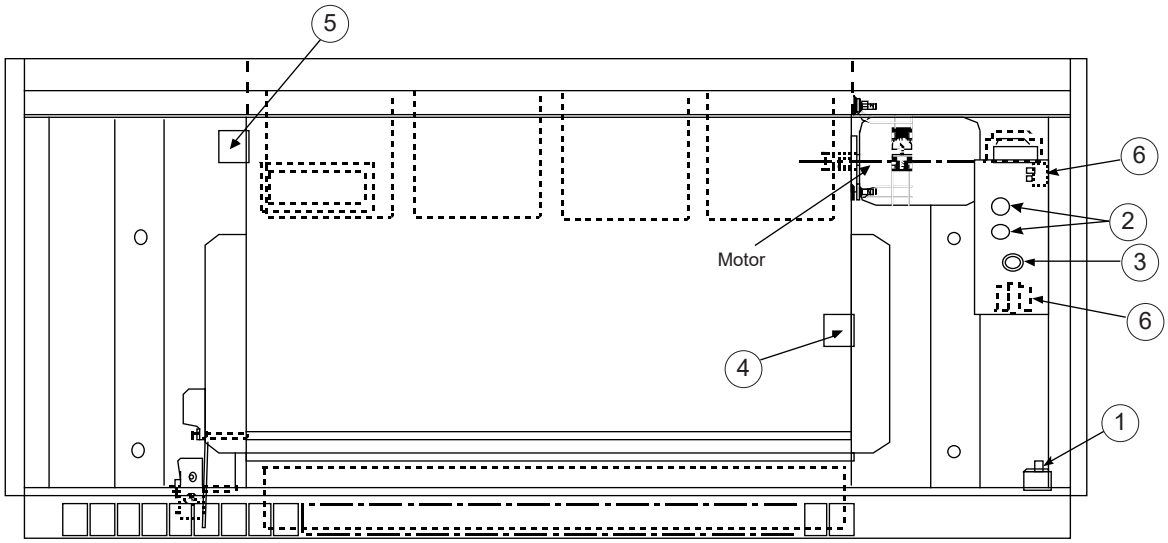
It is the responsibility of the Automatic Temperature Control supplier to ensure the T6 freezestat is incorporated properly to protect the unit.

5. **Low Refrigerant Temperature Sensor (T4 - Capillary Sensor):** for Direct Expansion (DE) coils the unit is supplied with a (T4) sensor, located on the entering air side of the direct expansion coil. T4 cuts out below 34°F ± 2°F and automatically resets above 38°F ± 2°F. Responds when any 15% of the capillary length senses these temperatures.
6. **24 V, NEC Class 2 Transformer:** Units with a Direct Expansion (DE) coil are supplied with a 50VA 24 volt power (X2), with a factory installed 5 minute timer delay relay (TDR) (located inside Unit Power Box). Units with a EC motor are supplied with a 75VA 24 volt power transformer.

⚠ 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 121: Controls by Others Unit Power and Junction Box Connection Location



Controls by Others - Variable Airflow

An optional ECM with “variable fan speed control” allows a field provided DDC controller to modulate the unit airflow between 50% and 100% of nominal unit airflow in a single zone variable air volume sequence. In continuous fan mode, the benefits of Single Zone VAV include sound reduction, energy savings, and consistent and precise temperature control for improved comfort with better air mixing and less stratification. In humid climates, the ability to deliver a wide range of fan speeds is particularly effective for de-humidification.

NOTICE
This option is not available with MicroTech controls.

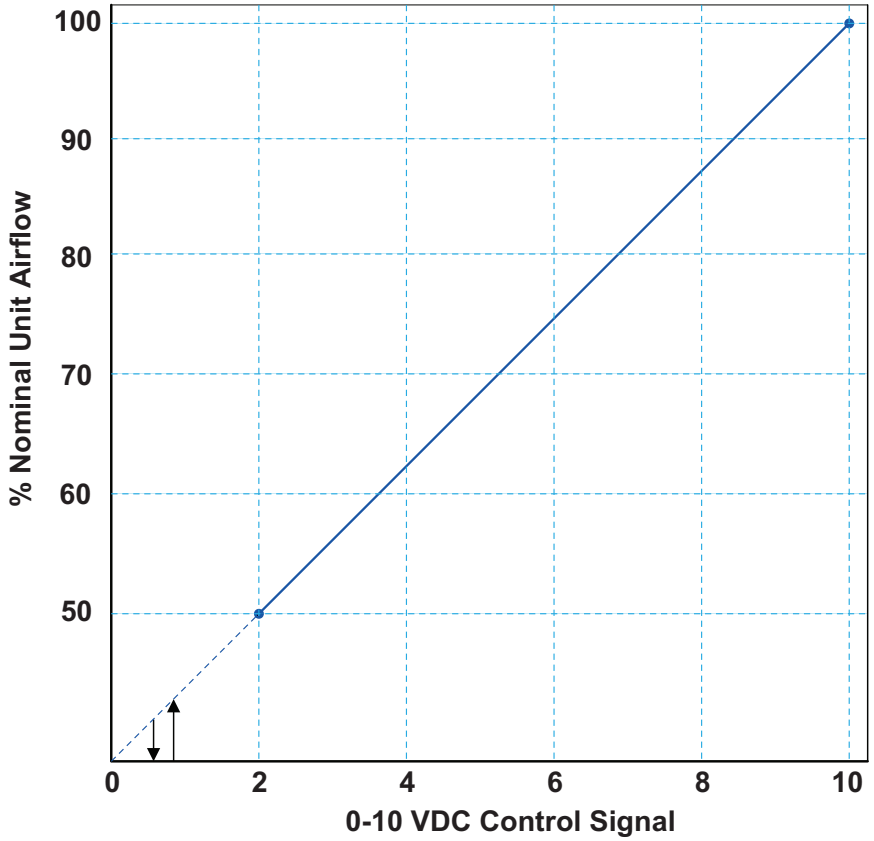
Making Control Connections

For field provided control wiring connections refer to the appropriate control wiring schematic.

Connect the field supplied controller to the harness provided. A 0-10 VDC fan control signal must be provided between ground and wire 33. For RPM/data out signal, connect controller to wire 34.

The variable fan speed scale is linear between a minimum 50% airflow at 2 VDC and a maximum 100% airflow at 10 VDC as shown in Figure 122. Reducing the input signal to 0 VDC will cause the motor to turn off. Care should be taken when using variable airflow on units with DX cooling as lower airflow may increase the risk of coil freeze-up. Variable airflow control should not be used on units with electric heat.

Figure 122: 0-10 VDC Variable Fan Speed Control



Typical Controls by Others Wiring Diagram – Units with Optional EC Motor with Variable Airflow

Figure 123: Variable Airflow 208-230V /60 Hz/1 Ph – Motor Switchbox, Non-Electric Heat Units

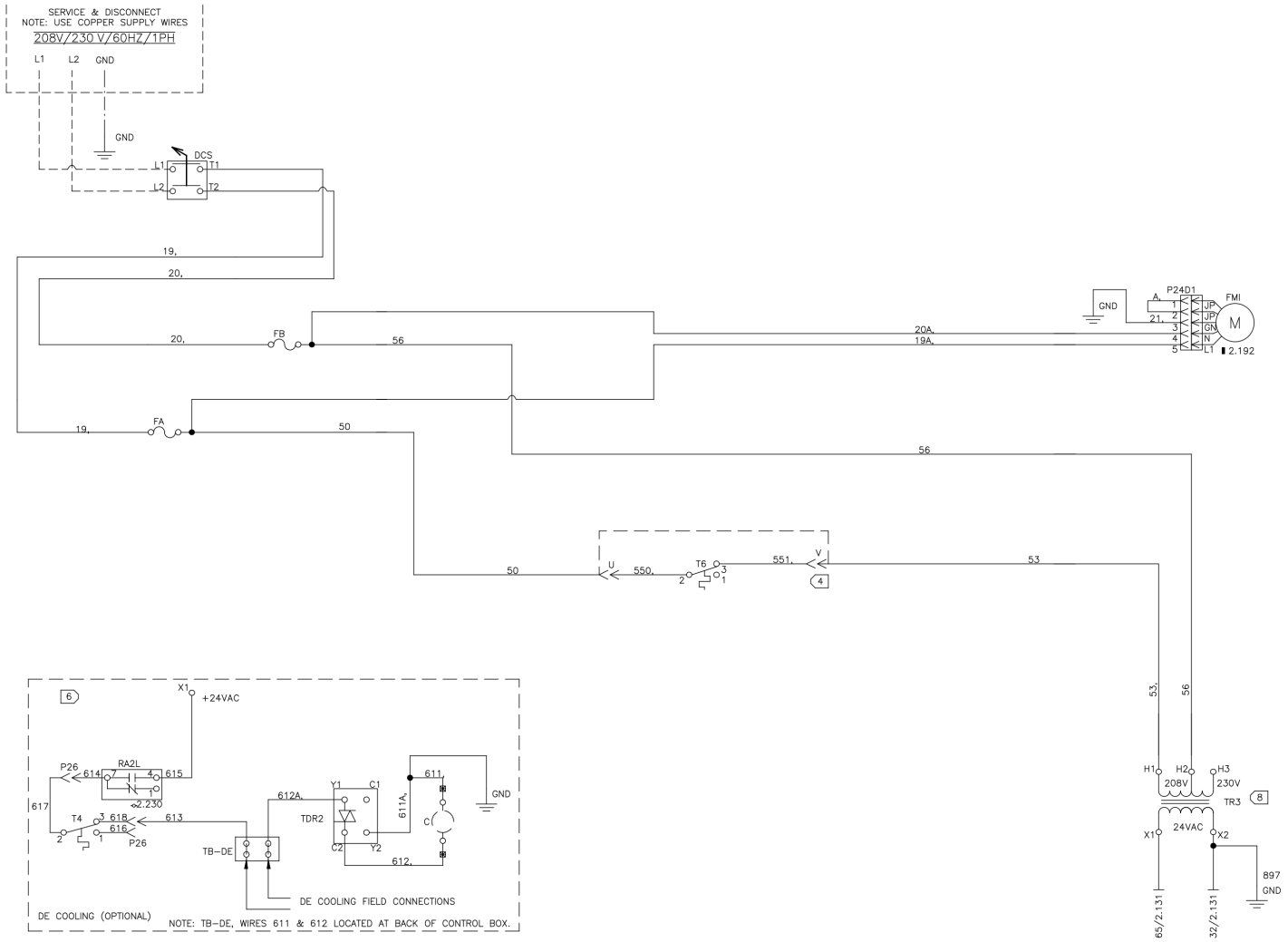


Figure 124: Variable Airflow 208-230V /60 Hz/1 Ph – Motor Switchbox, Non-Electric Heat Units

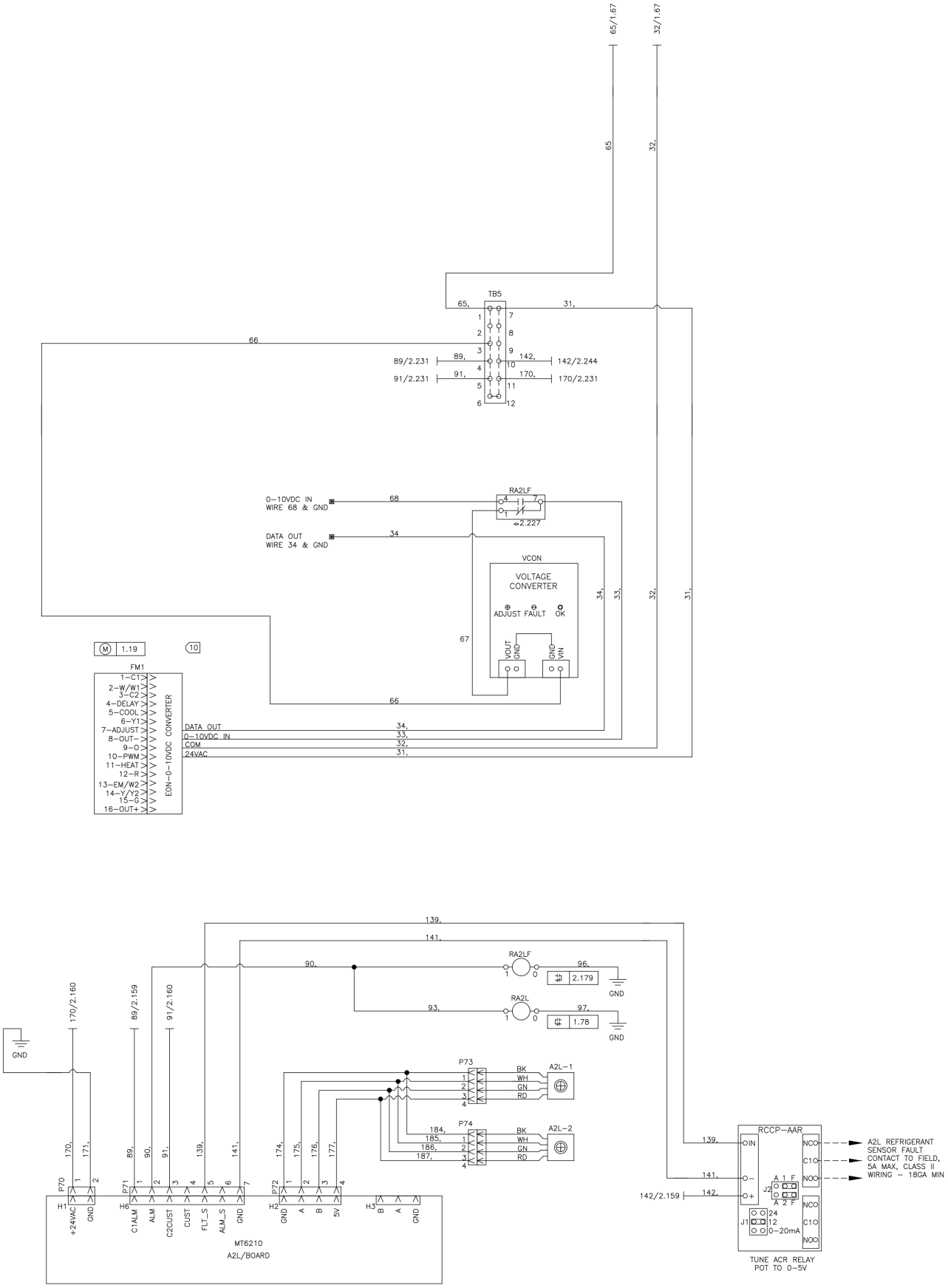


Figure 125: Variable Airflow 115 V/60 Hz/1 Ph – Motor Switchbox, Non-Electric Heat Units

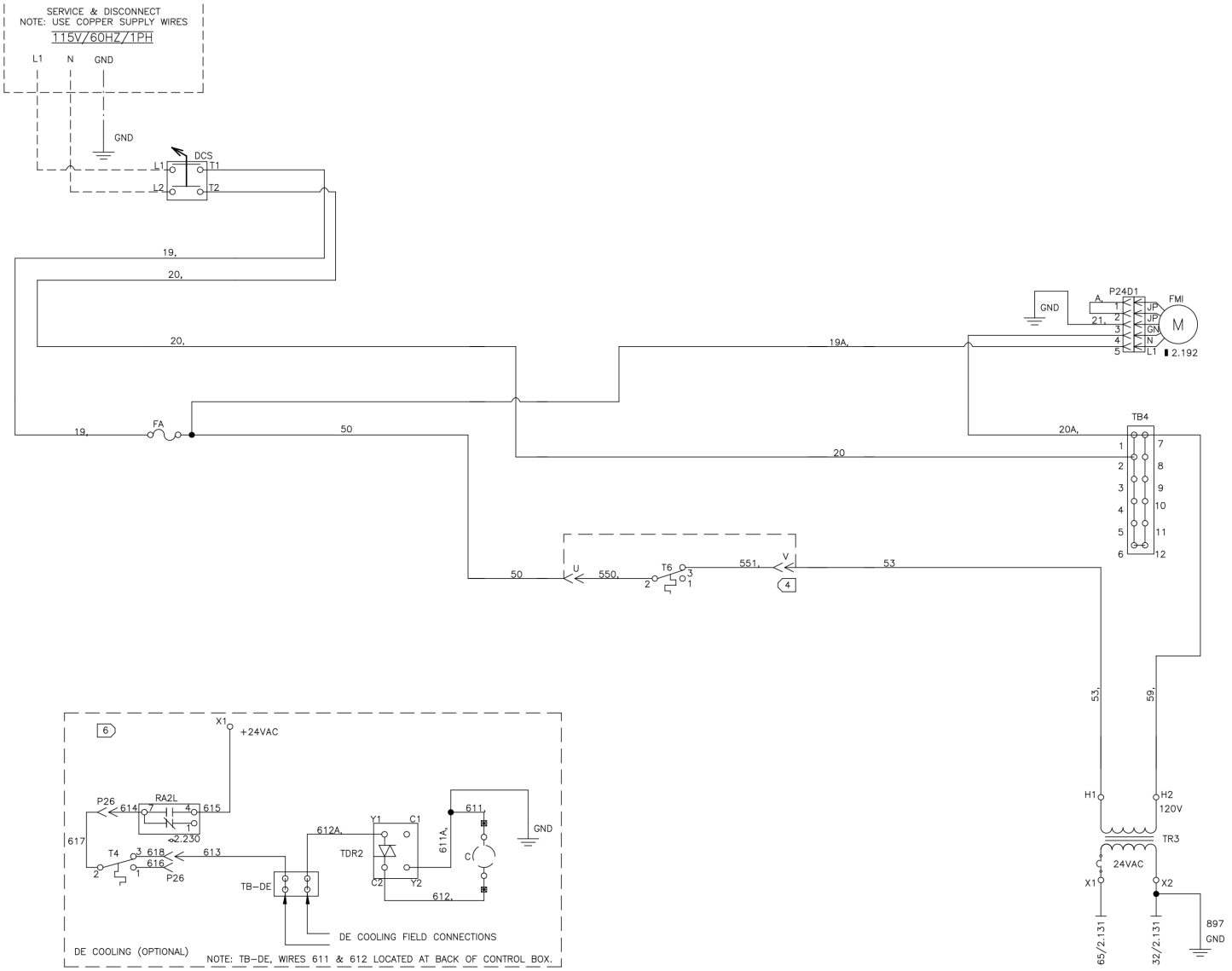


Figure 126: Variable Airflow 115 V/60 Hz/1 Ph – Motor Switchbox, Non-Electric Heat Units

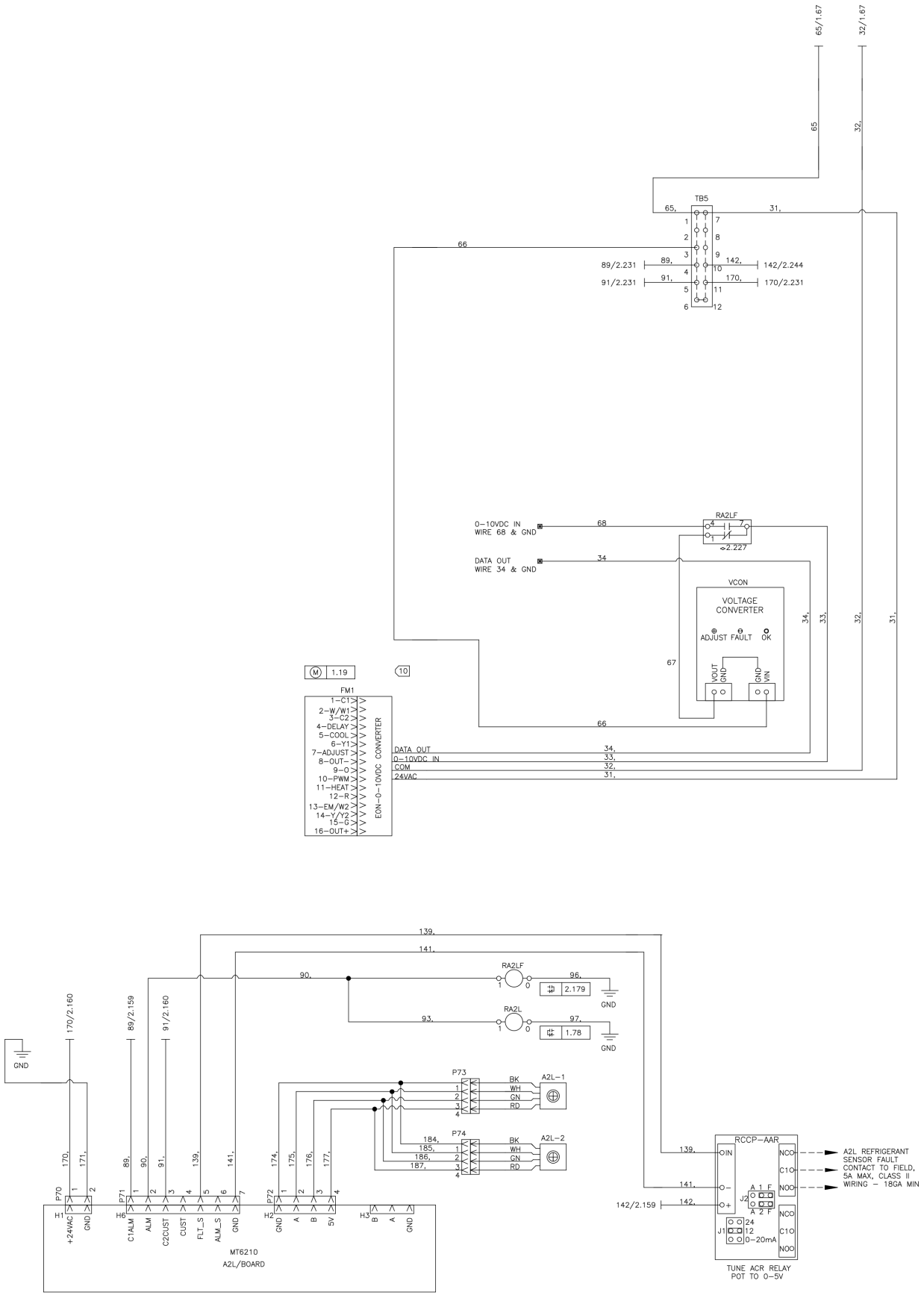


Figure 127: Variable Airflow 265 V/60 Hz/1 Ph – Motor Switchbox, Non-Electric Heat Units

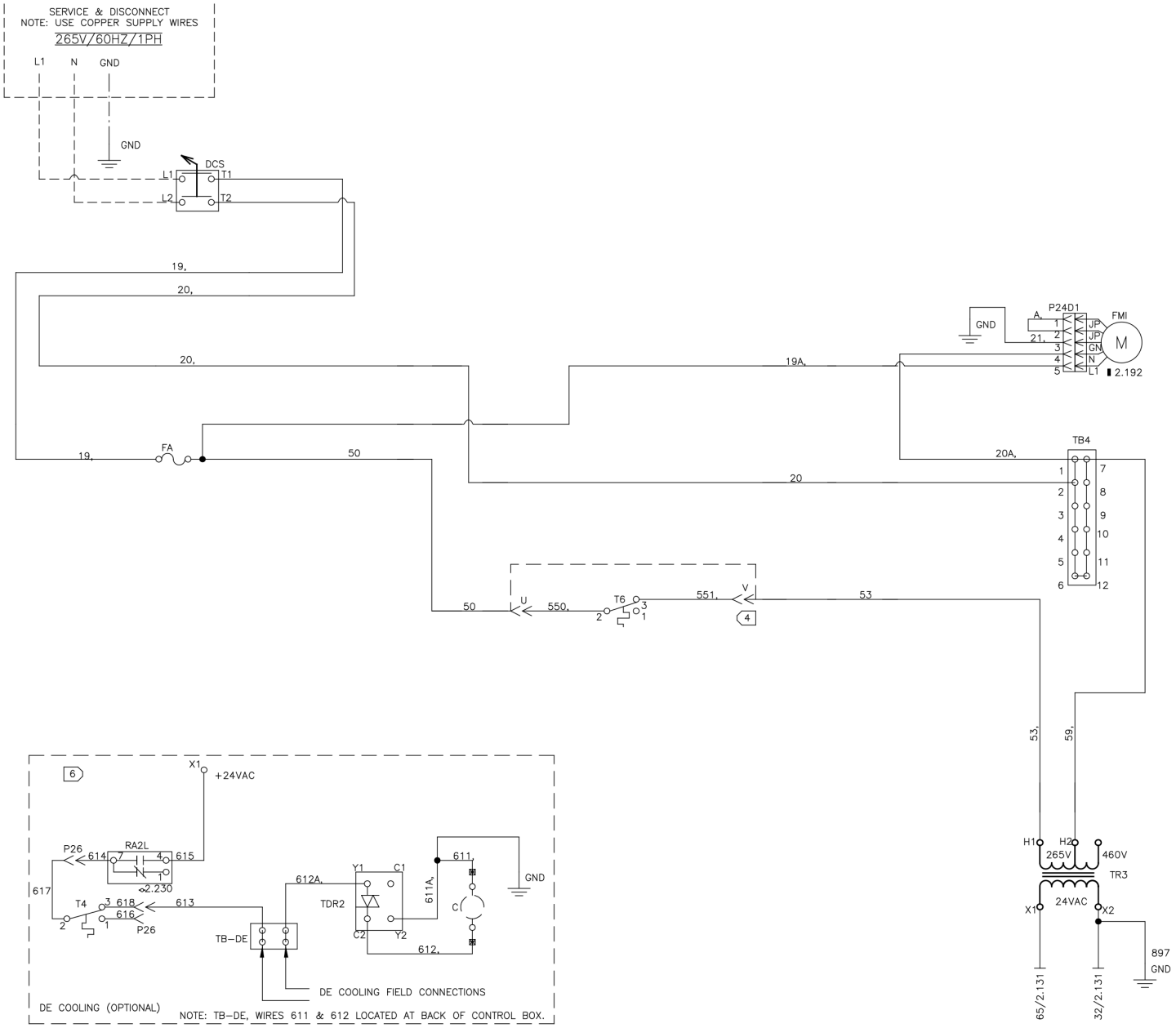
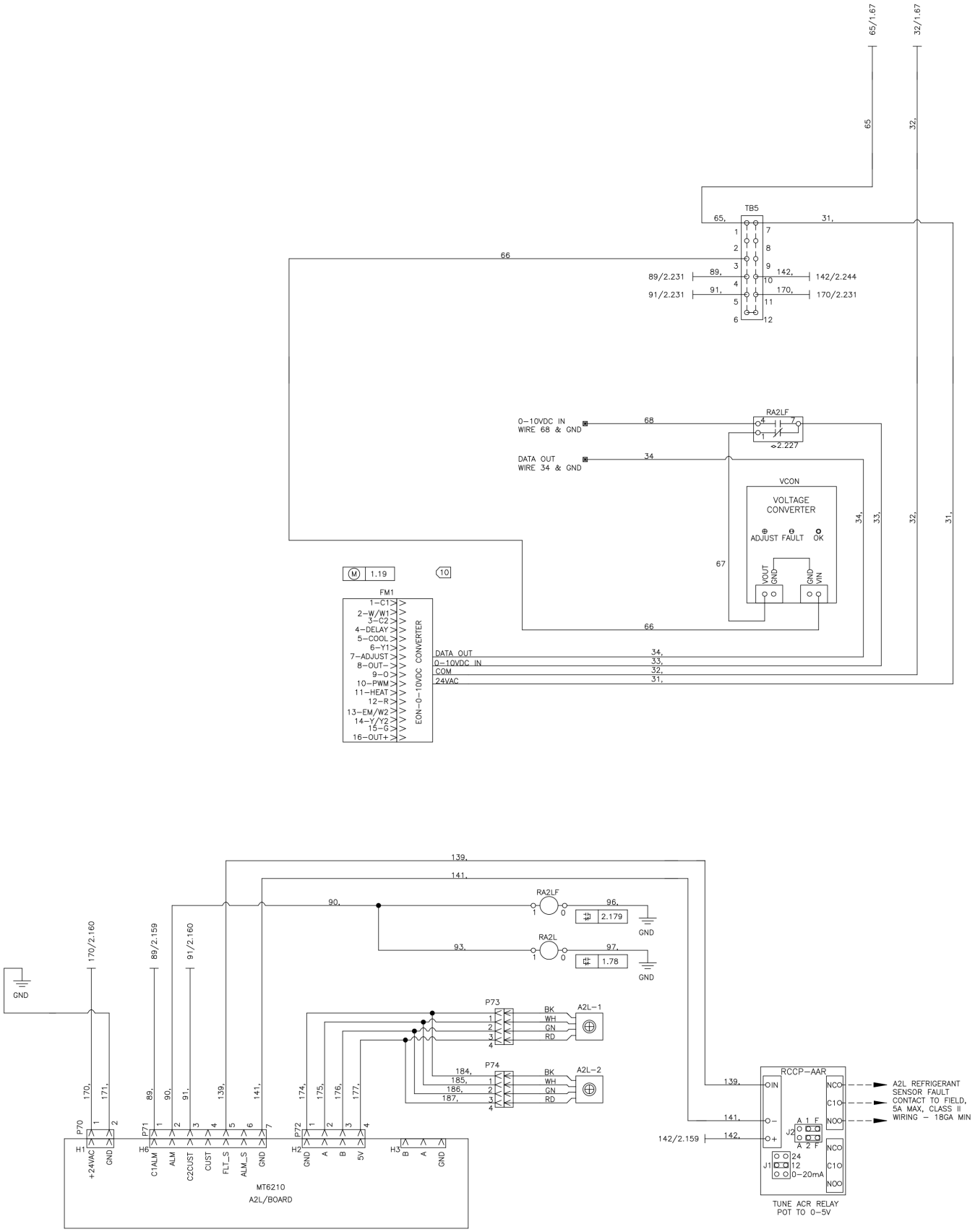


Figure 128: Variable Airflow 265 V/60 Hz/1 Ph – Motor Switchbox, Non-Electric Heat Units



Wiring Schematics Legend for "Typical Controls by Others Wiring Diagram – Units with Optional EC Motor with Variable Airflow"

Legend					
A1	Actuator (Optional)	**R3B**	Relay – Defrost/EH Coil (24 VAC)	**T5**	Thermostat Defrost
A2LB	A2L Mitigation Board	**R4**	Relay – Fan Coil (24 VAC)	**T6**	Thermostat - Freeze Stat
A2L-1	A2L Sensor	**R7**	Relay – Compressor Lockout	**T7**	Thermostat- Changeover 60°
C1	Compressor Contactor	**R8-9**	Relay – Emergency Heat	**T8**	Thermostat - Cooling Lockout 59C F
CAP1	Capacitor Run	**R10-12**	Relay – Electric Heat	**TB1**	Terminal Board Control
CEH1-3	Electric Heat Contactor	**R11A**	Relay - Defrost	**TB2**	Terminal Board Control
CO2	Sensor – Indoor Air CO_2	**RA1**	Relay - Actuator/Valve	**TB3**	Terminal Board Control
CP1	Motor Compressor 2-Stage	**RA2L**	A2L Actuator	**TB4**	Terminal Board
CS	Current Sensor (Hawkeye 800)	**RA2LF**	A2L Actuator	**TB5**	Terminal Board
DCS	Switch – Unit Power	**RAT**	Sensor - Room Air Temperature	**TB-DE**	Terminal Board for DE Contactor
DF	Dead Front Switch	**RCCP**	Transducer AAR	**TBE**	Terminal Block - Electric Heat
EH1-6	Heater – Electric	**REH**	Relay – H1 Fan 3rd STG EH	**TDR1**	Time Delay Low Voltage 5 Min
EH10	Heater – Outdoor Drain Pan	**RT6**	Relay – Freeze Stat	**TDR2**	Protector Low Voltage 5 Min
F1A/F1B	Fuse – Compressor	**RV**	Reversing Valve	**TR1**	Transformer - Motor Speed
F2A/F3B	Fuse – Electric Heat	**S2**	Sensor - DA (TAC 01-2085-001)	**TR3**	Transformer - 24 V, 75 VA
FA/FB	Fuse – Control, Load	**SW1**	Switch – Disconnect	**TR4**	Transformer - 460 V–230 V
FC/FD	Fuse – Control, Transformer	**SW2**	Switch – On - Off and Fan Speed	**TR5**	Transformer - 24 V
FMI	Motor – Room Fan	**SW5**	Switch – Emergency Heat	**TS**	Terminal Strip for EH
FMO	Motor Outdoor Air	**SW6**	Switch Rocker SPDT	**V1**	Valve - Heat EOC (Accessory)
R1-R3	Relay Electric Heat (Back Up)	**T2**	Thermostat EH Relay - 0A Temp>20°	**V2**	Valve - Cool EOC (Accessory)
R2S	Relay – High (2nd) Stage Compr	**T4**	Thermostat Low Temp 28°	**VCON**	Converter Cable 0-10 VDC

Legend - Symbols	
– – –	Accessory or field mounted component
⏚	Ground
⊠	Wire nut / splice
●	Overlap point - common potential wires
L1/1.20	Wire link (wire link ID / page # . line #)

Motor Size	SW2 Term	TR1 Speed Settings			
		750	1000	1250	1500
1/4 HP 0.00-0.20 ESP	High	PK	YE	WH/GN	GN
	Med	GY	GY	PK	YE
	Low	GY/BK	GY/BK	GY	PK

NOTE 1: Make electrical installation in accordance with job wiring schematic complying with national and local electrical codes.

NOTE 2: Cap all unused transformer leads.

NOTE 3: Fuse FB, SW2, and wire 56 furnished on 208/230 volt units only. Fuse FB, SW2, wire 510 and 507 furnished on 208/230 volt units only.

NOTE 4: T6 and wires 550 and wire 551 furnished only on units with hot water or chilled water. All others connect transformer wire to wire 50.

NOTE 5: SW2 contacts 5, 6 and 7, 8 open only when SW2 is in OFF position.

NOTE 6: Automatic temperature control can be wired to TB-DE for de-cooling operation. Typical operation is to wire from the TB-DE to a Normally Open relay, with the relay closing on control call for cooling. For additional information, contact Daikin Applied.

NOTE 7: Motors are factory programmed for specified airflow. Contact Daikin Applied for replacement.

NOTE 8: For 230V operation, switch wire 56 to 240V terminal in the transformer.

NOTE 9: Devices in legend may or may not be on unit.

Typical Controls by Others Wiring Diagram – Field Installed

Figure 129: Controls by Others – Field Installed - 208-230 V/60 Hz/1 Ph

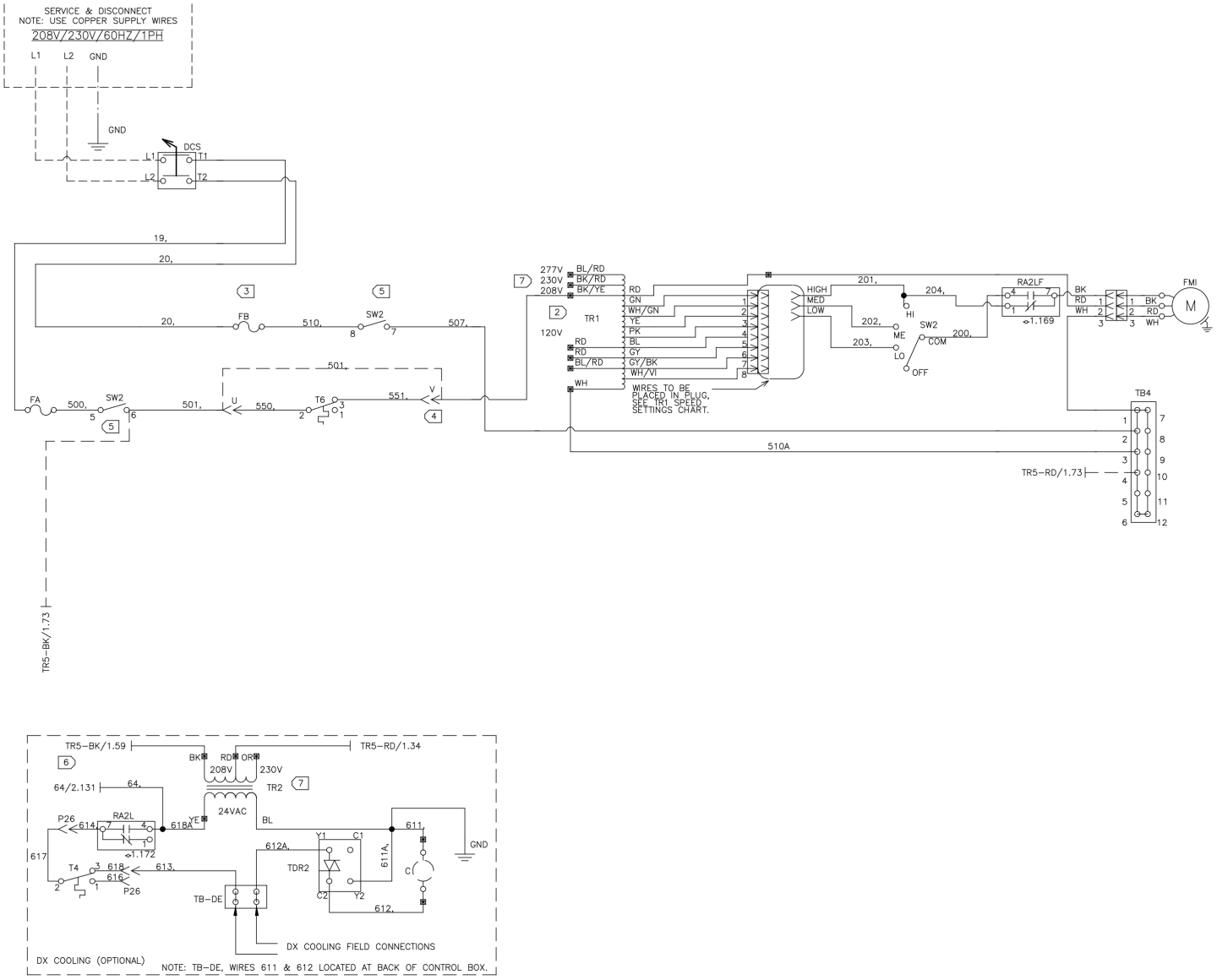


Figure 130: Controls by Others – Field Installed - 115 V/60 Hz/1 Ph

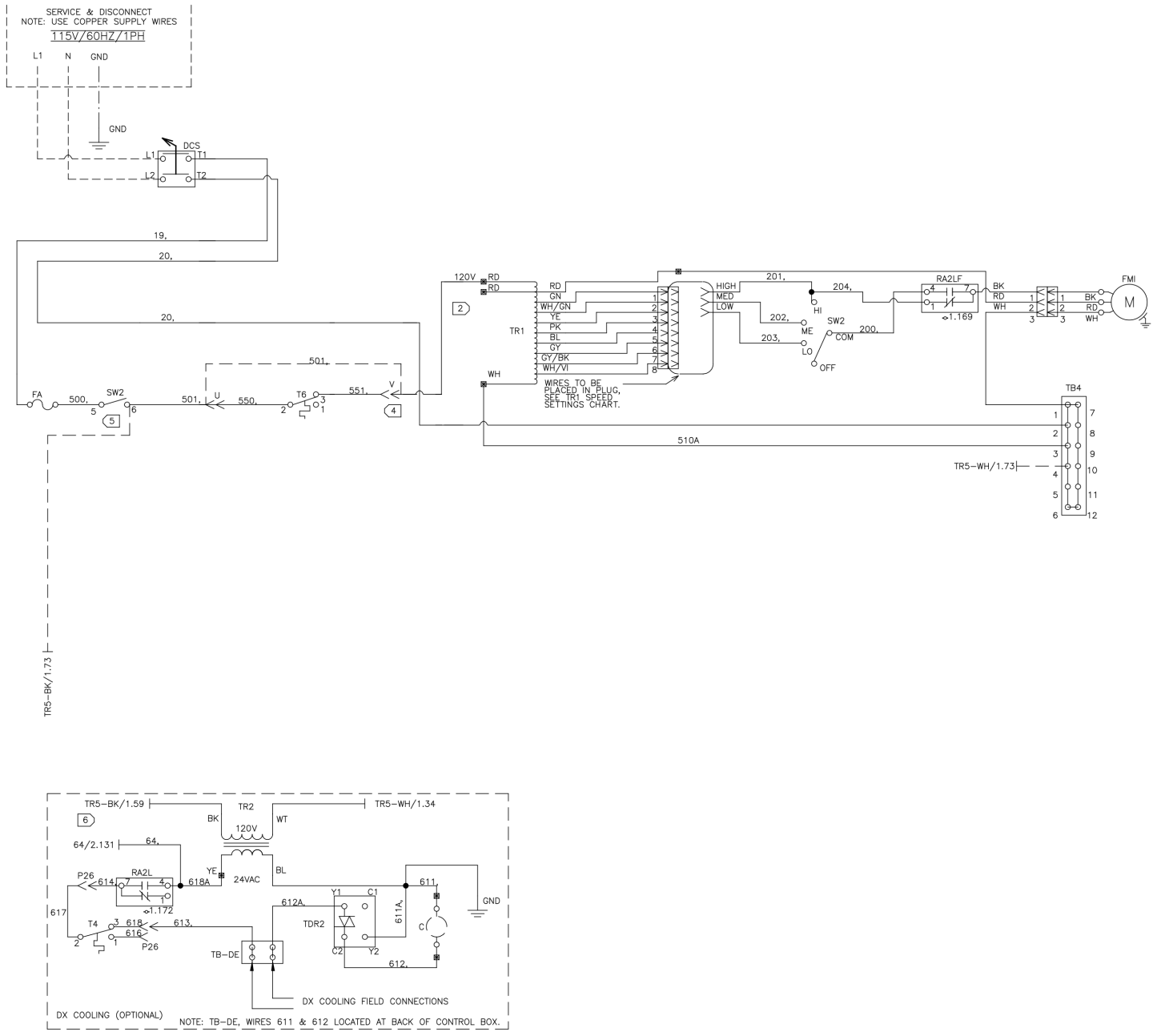


Figure 131: Controls by Others – Field Installed - 115 V/60 Hz/1 Ph

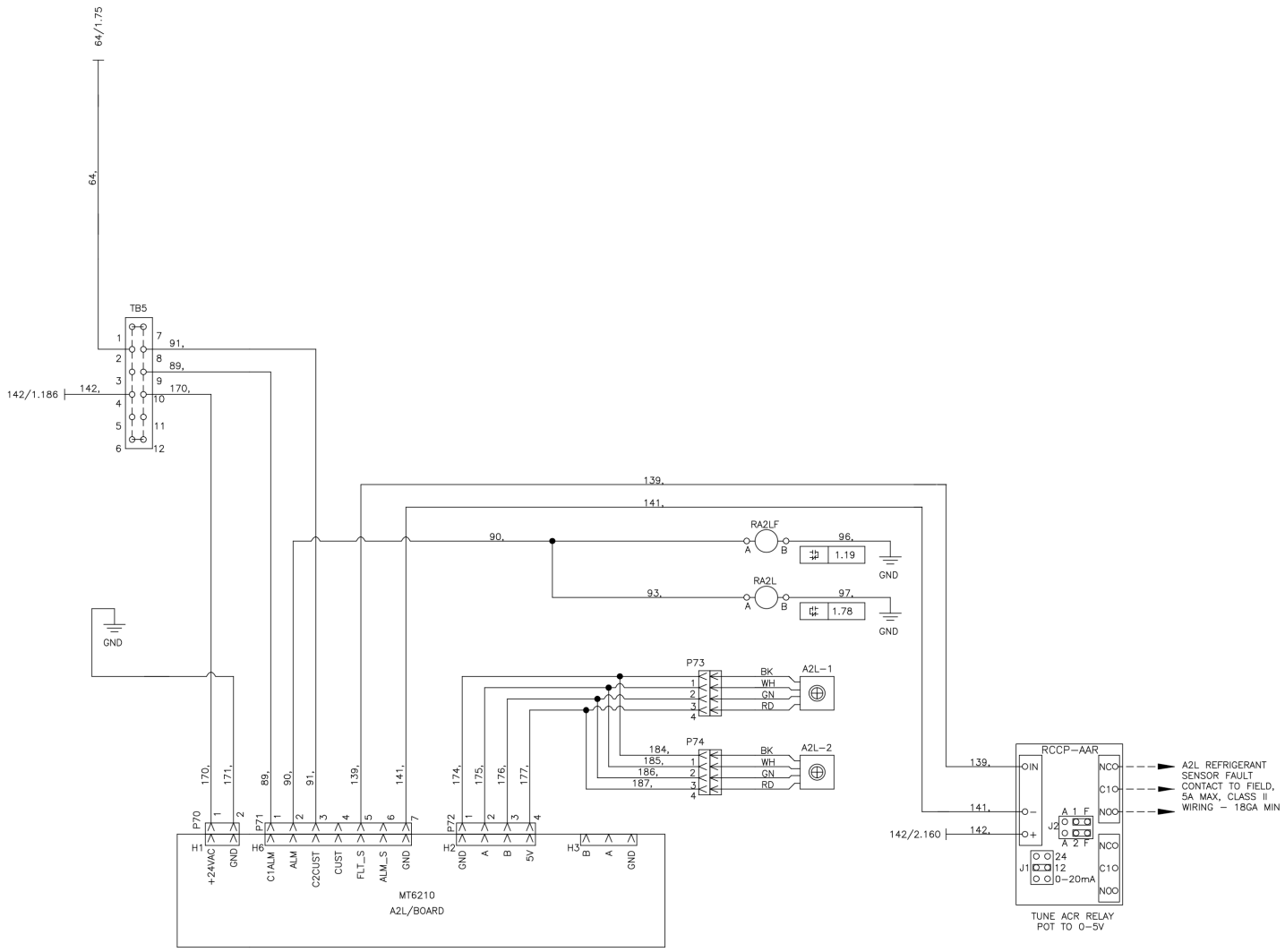


Figure 132: Controls by Others – Field Installed - 265 V/60 Hz/1 Ph

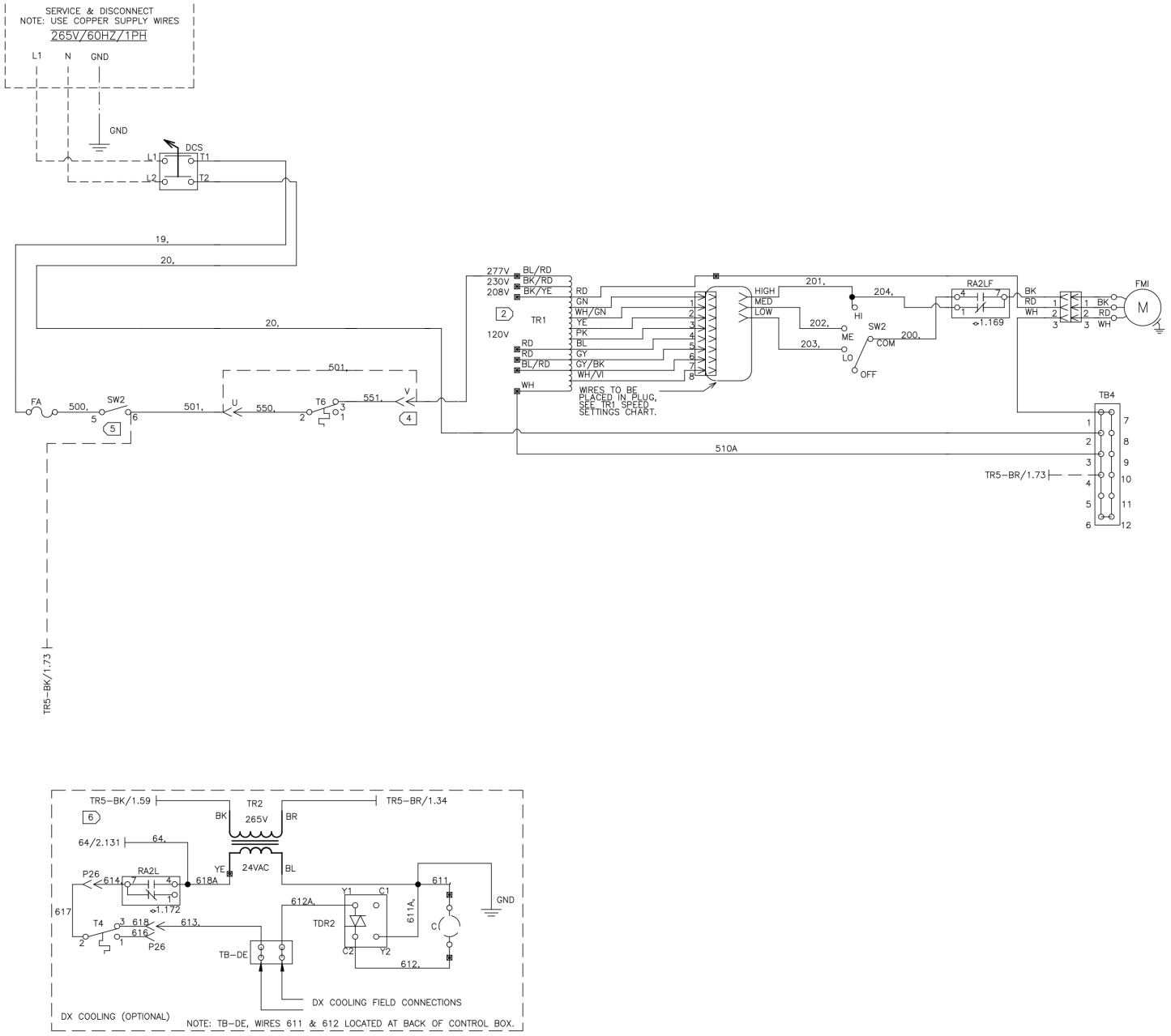
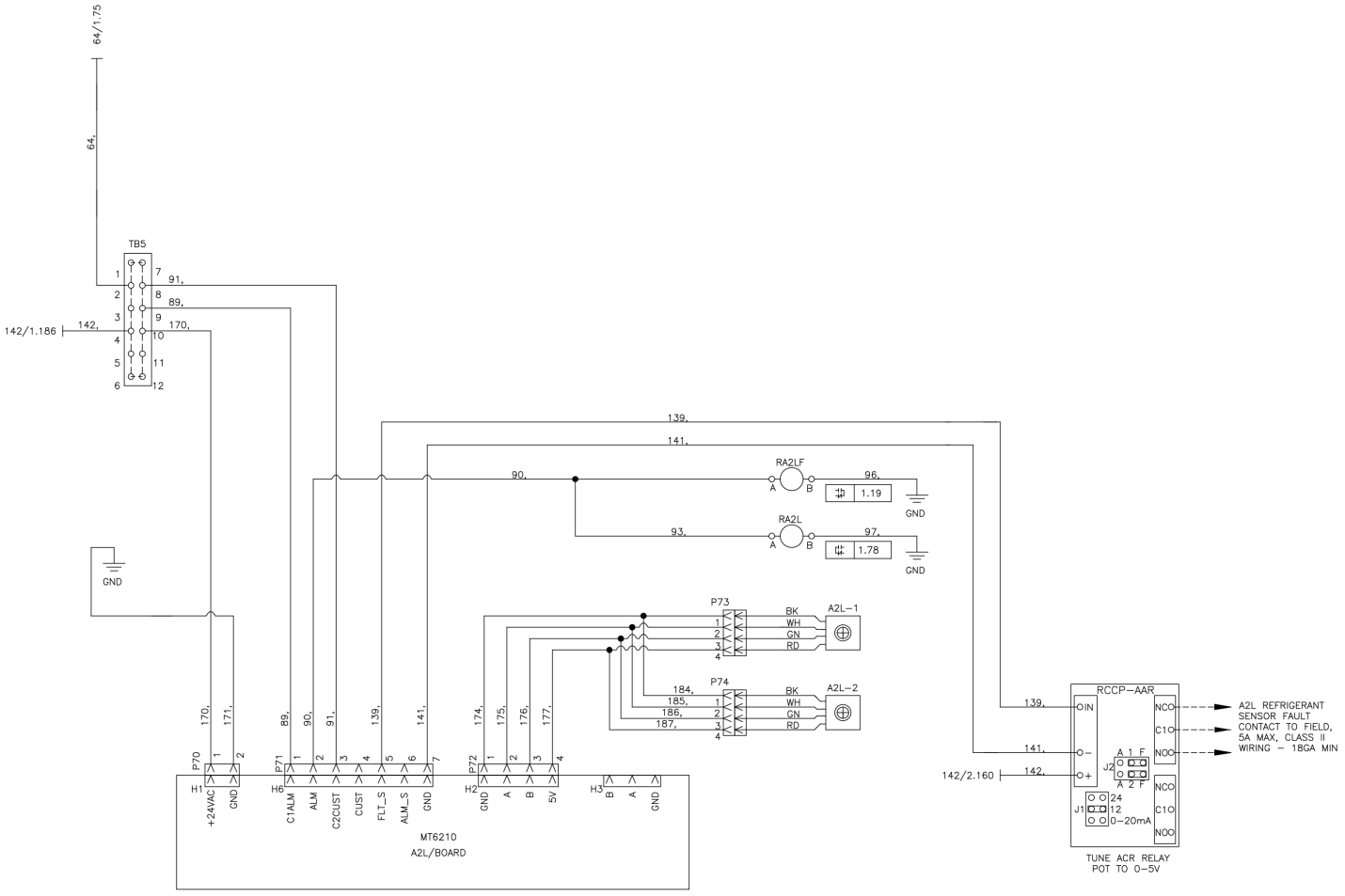


Figure 133: Controls by Others – Field Installed - 265 V/60 Hz/1 Ph



Wiring Schematics Legend for "Typical Controls by Others Wiring Diagram – Field Installed"

Legend					
A1	Actuator (Optional)	**R1-R3**	Relay Electric Heat (Back Up)	**T2**	Thermostat EH Relay - 0A Temp>20°
A2LB	A2L Mitigation Board	**R2S**	Relay – High (2nd) Stage Compr	**T4**	Thermostat Low Temp 28°
A2L-1	A2L Sensor	**R3B**	Relay – Defrost/EH Coil (24 VAC)	**T5**	Thermostat Defrost
C1	Compressor Contactor	**R4**	Relay – Fan Coil (24 VAC)	**T6**	Thermostat - Freeze Stat
CAP1	Capacitor Run	**R7**	Relay – Compressor Lockout	**T7**	Thermostat- Changeover 60°
CEH1-3	Electric Heat Contactor	**R8-9**	Relay – Emergency Heat	**T8**	Thermostat - Cooling Lockout 59C F
CO2	Sensor – Indoor Air CO_2	**R10-12**	Relay – Electric Heat	**TB1**	Terminal Board Control
CP1	Motor Compressor 2-Stage	**R11A**	Relay - Defrost	**TB2**	Terminal Board Control
CS	Current Sensor (Hawkeye 800)	**RA1**	Relay - Actuator/Valve	**TB3**	Terminal Board Control
DCS	Switch – Unit Power	**RA2L**	A2L Actuator	**TB4**	Terminal Board
DF	Dead Front Switch	**RA2LF**	A2L Actuator	**TB5**	Terminal Board
EH1-6	Heater – Electric	**RAT**	Sensor - Room Air Temperature	**TB-DE**	Terminal Board for DE Contactor
EH10	Heater – Outdoor Drain Pan	**RCCP**	Transducer AAR	**TBE**	Terminal Block - Electric Heat
F1A/F1B	Fuse – Compressor	**REH**	Relay – H1 Fan 3rd STG EH	**TDR1**	Time Delay Low Voltage 5 Min
F2A/F3B	Fuse – Electric Heat	**RT4**	Relay - 24 VAC	**TDR2**	Protector Low Voltage 5 Min
FA/FB	Fuse – Control, Load	**RT6**	Relay – Freeze Stat	**TR1**	Transformer - Motor Speed
FC/FD	Fuse – Control, Transformer	**RV**	Reversing Valve	**TR3**	Transformer - 24 V, 75 VA
FMI	Motor – Room Fan	**S2**	Sensor - DA (TAC 01-2085-001)	**TR4**	Transformer - 460 V–230 V
FMO	Motor Outdoor Air	**SW1**	Switch – Disconnect	**TR5**	Transformer - 24 V
OH1	Thermostat - Overheat	**SW2**	Switch – On - Off and Fan Speed	**TS**	Terminal Strip for EH
OH2	Thermostat - Overheat	**SW5**	Switch – Emergency Heat	**V1**	Valve - Heat EOC (Accessory)
OHM	EH Man Reset Overheat Stat	**SW6**	Switch Rocker SPDT	**V2**	Valve - Cool EOC (Accessory)

Legend - Symbols	
– – –	Accessory or field mounted component
⏚	Ground
⊠	Wire nut / splice
●	Overlap point - common potential wires
L1/1.20	Wire link (wire link ID / page # . line #)

Motor Size	SW2 Term	TR1 Speed Settings			
		750	1000	1250	1500
1/4 HP 0.00-0.20 ESP	High	PK	YE	WH/GN	GN
	Med	GY	GY	PK	YE
	Low	GY/BK	GY/BK	GY	PK

NOTE 1: Make electrical installation in accordance with job wiring schematic complying with national and local electrical codes.

NOTE 2: Cap all unused transformer leads.

NOTE 3: Fuse FB, SW2, wire 510, and wire 507 furnished on 208/230 volt units only.

NOTE 4: T6 and wires 550 & 551 furnished only on units with hot water or chilled water. All others connect transformer wire to wire 501.

NOTE 5: SW2 Contacts 5, 6 and 7, 8 open only when SW2 is in OFF position.

NOTE 6: Automatic temperature control can be wired to TB-DE for de-cooling operation. Typical operation is to wire from the TB-DB to a Normally Open relay, with the relay closing on control call for cooling. For additional information, contact Daikin Applied.

NOTE 7: For 230V operation, switch wire 501 to "240V" terminal in the transformer.

NOTE 8: Devices in legend may or may not be on unit.

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 a 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 12 VAC/VDC to any lead or damage will result.
5. Avoid locations where excessive moisture, corrosive fumes, or vibrations are present.

See Table 33, Figure 134 through Figure 136 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 Daikin Applied). The junction box has 1” (25 mm) and 2” (51 mm) knockouts, located 10-1/2” (267 mm) 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 in the location as shown in Figure 134. (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 134: Electric Heat Unit Power Switch Locations

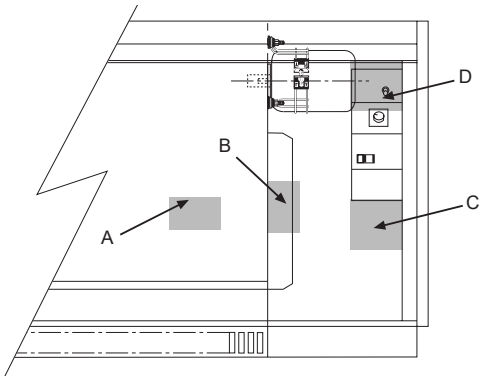


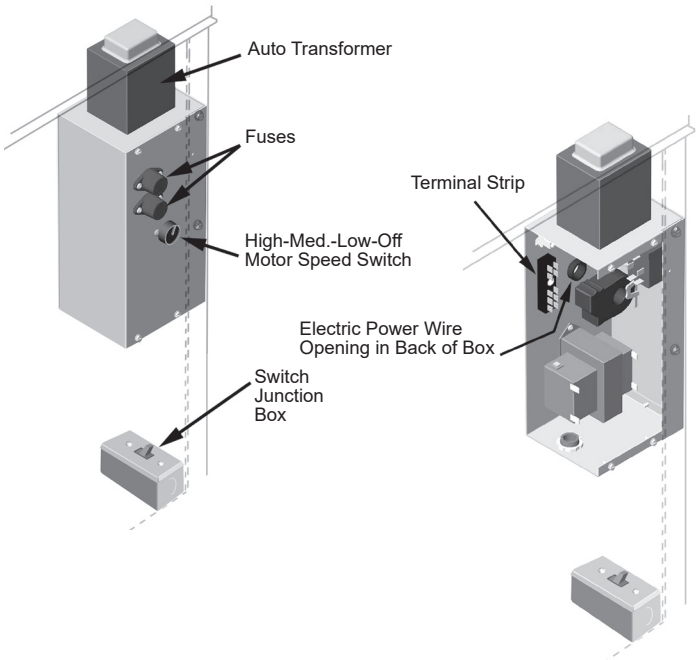
Table 33: Electrical Data/Motor Data and Unit Amp Without Electric Heat

Unit Series	CFM (Nom.)	L/s	Motor HP	Watts	Unit Current #			
					115 V	208 V	230 V	265 V
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

NOTE 1: # Amps at unit voltage, 60 Hz, single phase.

NOTE 2: "Electrical Data – PSC Motor" on page 42, Table 27 on page 51 and Table 32 on page 63.

Figure 135: Controls by Others Unit Power and Junction Box Connection Location



Typical Electric Heat Wiring Diagram

Figure 136: Electric Heat Wiring Diagram – Typical 460 V/60 Hz/3 Ph

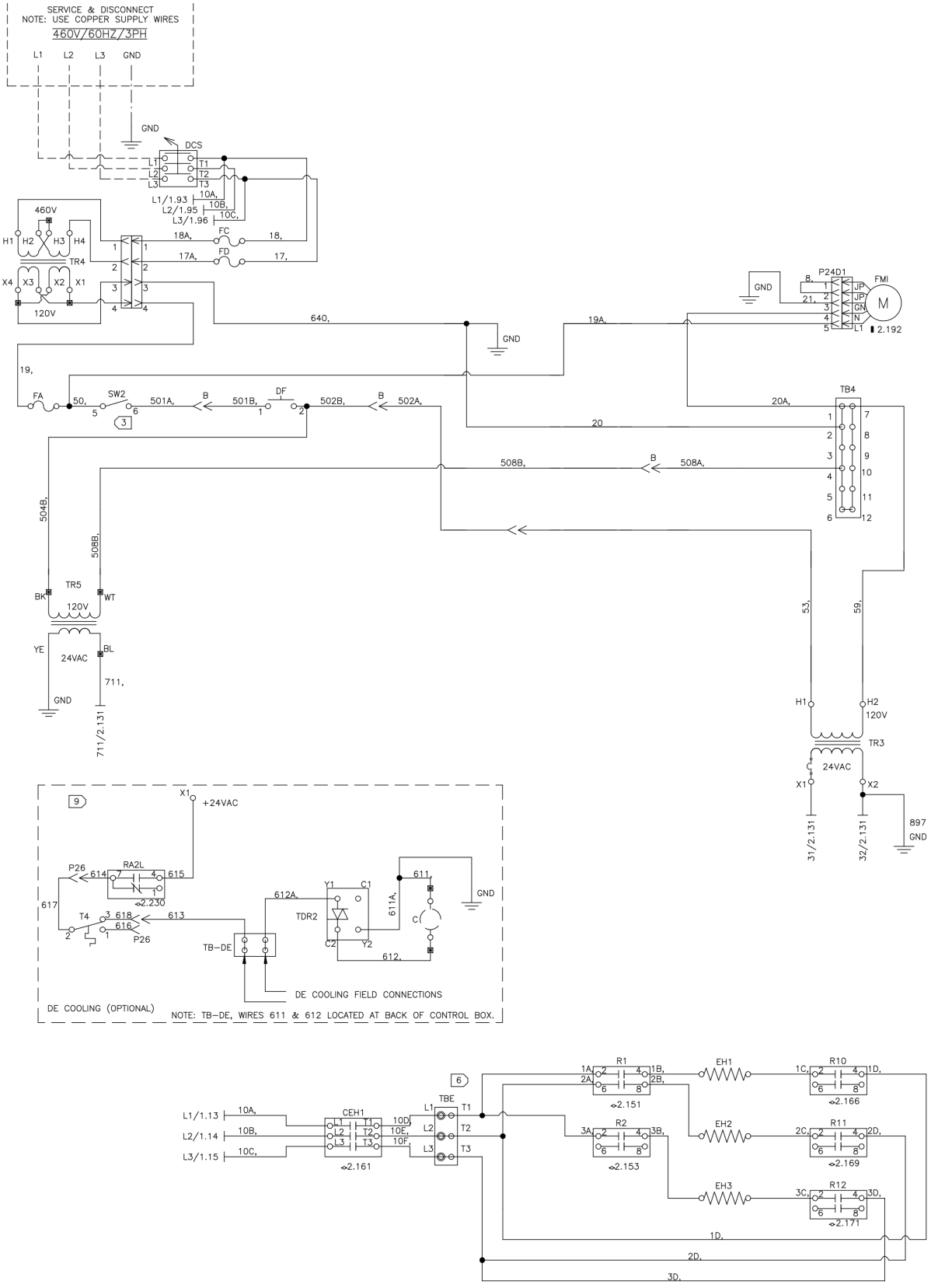
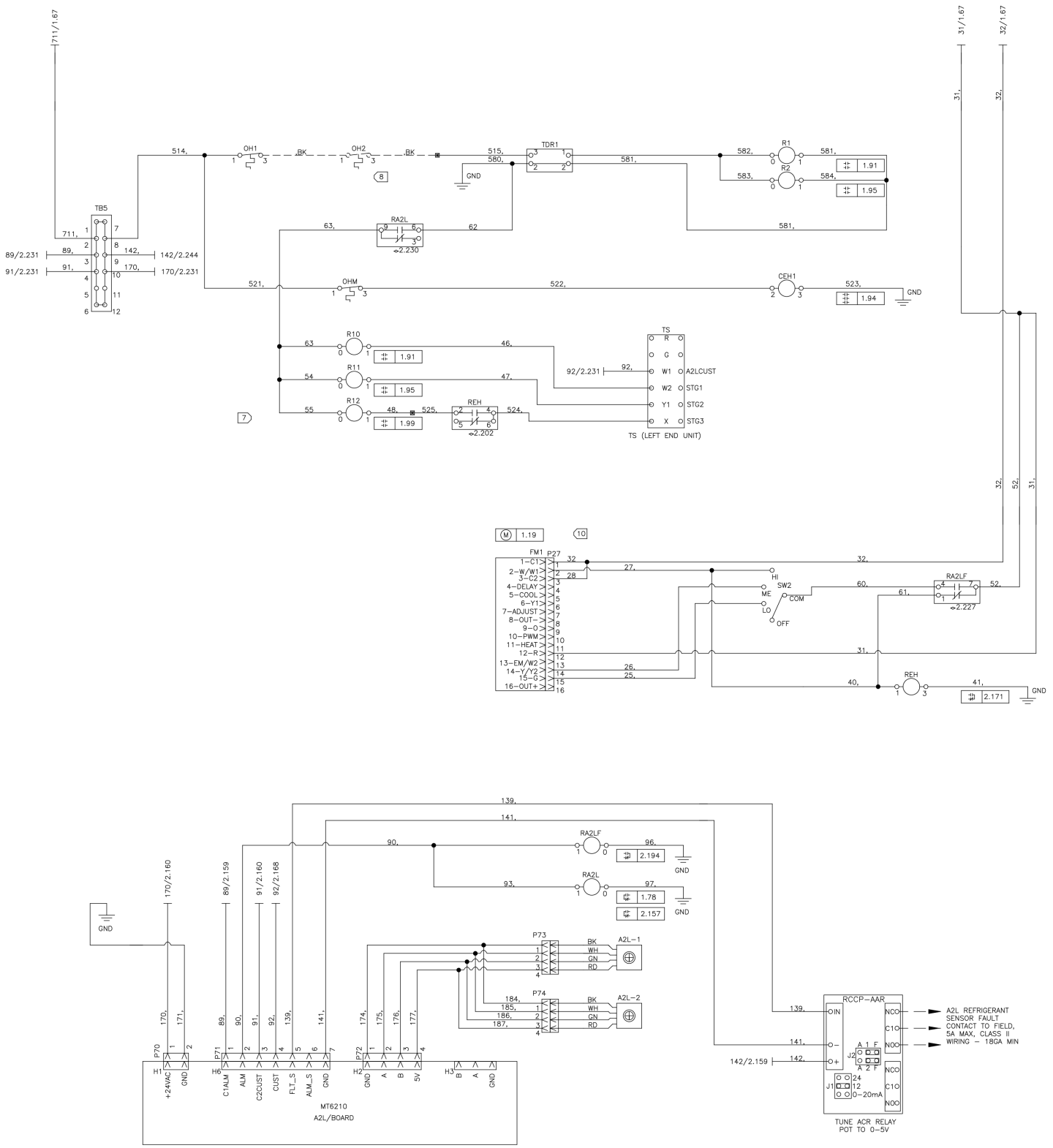


Figure 137: Electric Heat Wiring Diagram – Typical 460 V/60 Hz/3 Ph



Wiring Schematics Legend for "Typical Electric Heat Wiring Diagram"

Legend					
A1	Actuator (Optional)	**R1-R3**	Relay Electric Heat (Back Up)	**SW2**	Switch – On - Off and Fan Speed
A2LB	A2L Mitigation Board	**R2S**	Relay – High (2nd) Stage Compr	**SW5**	Switch – Emergency Heat
A2L-1	A2L Sensor	**R3B**	Relay – Defrost/EH Coil (24 VAC)	**SW6**	Switch Rocker SPDT
C1	Compressor Contactor	**R4**	Relay – Fan Coil (24 VAC)	**T2**	Thermostat EH Relay - 0A Temp>20°
CAP1	Capacitor Run	**R4H**	Relay – Hi Fan Speed Coil (24 VAC)	**T4**	Thermostat Low Temp 28°
CEH1-3	Electric Heat Contactor	**R4L**	Relay – Low Fan Speed Coil (24 VAC)	**T5**	Thermostat Defrost
CO2	Sensor – Indoor Air CO_2	**R4M**	Relay – Med Fan Speed Coil (24 VAC)	**T6**	Thermostat - Freeze Stat
CP1	Motor Compressor 2-Stage	**R7**	Relay – Compressor Lockout	**T7**	Thermostat- Changeover 60°
CS	Current Sensor (Hawkeye 800)	**R8-9**	Relay – Emergency Heat	**T8**	Thermostat - Cooling Lockout 59C F
DCS	Switch – Unit Power	**R10-12**	Relay – Electric Heat	**TB1**	Terminal Board Control
DF	Dead Front Switch	**R11A**	Relay - Defrost	**TB4**	Terminal Board
EH1-6	Heater – Electric	**RA1**	Relay - Actuator/Valve	**TB-DE**	Terminal Board for DE Contactor
EH10	Heater – Outdoor Drain Pan	**RA2L**	A2L Actuator	**TBE**	Terminal Block - Electric Heat
F1A/F1B	Fuse – Compressor	**RA2LF**	A2L Actuator	**TDR1**	Time Delay Low Voltage 5 Min
F2A/F3B	Fuse – Electric Heat	**RAT**	Sensor - Room Air Temperature	**TDR2**	Protector Low Voltage 5 Min
FA/FB	Fuse – Control, Load	**RCCP**	Transducer AAR	**TR1**	Transformer - Motor Speed
FC/FD	Fuse – Control, Transformer	**REH**	Relay – H1 Fan 3rd STG EH	**TR3**	Transformer - 24 V, 75 VA
FMI	Motor – Room Fan	**RT4**	Relay - 24 VAC	**TR4**	Transformer - 460 V–230 V
FMO	Motor Outdoor Air	**RT6**	Relay – Freeze Stat	**TR5**	Transformer - 24 V
OH1	Thermostat - Overheat	**RV**	Reversing Valve	**TS**	Terminal Strip for EH
OH2	Thermostat - Overheat	**S2**	Sensor - DA (TAC 01-2085-001)	**V1**	Valve - Heat EOC (Accessory)
OHM	EH Man Reset Overheat Stat	**SW1**	Switch – Disconnect	**V2**	Valve - Cool EOC (Accessory)

Legend - Symbols	
– – –	Accessory or field mounted component
⏚	Ground
⊠	Wire nut / splice
●	Overlap point - common potential wires
L1/1.20	Wire link (wire link ID / page # . line #)

Motor Size	SW2 Term	TR1 Speed Settings			
		750	1000	1250	1500
1/4 HP 0.00-0.20 ESP	High	PK	YE	WH/GN	GN
	Med	GY	GY	PK	YE
	Low	GY/BK	GY/BK	GY	PK

Electric Heat Sequence:

1. Backup relays R1, R2, and R3 are energized when power is applied.
2. Main relays R10, R11, and R12 are energized when a 24 VAC source is connected to STG1, STG2, and STG3 on terminal strip.
3. Electric heat can be staged by applying the 24 VAC to the stages (1, 2, and 3) at different time intervals.

Control Wiring Notes:

NOTE 1: Make electrical installation in accordance with job wiring schematic complying with national and local electrical codes.

NOTE 2: Automatic temperature control supplier is responsible to ensure controls operate correctly and protect the unit.

NOTE 3: SW2 contacts 5, 6 and 7,8 open only when SW2 is in OFF position.

NOTE 4: T6 only on units with chilled water.

NOTE 5: Devices in legend may or may not be on unit.

NOTE 6: Typ 6 Elm on 750 and 1000 cfm units only. Terminal block furnished when total heating load is less than 48 amps.

NOTE 7: N/A

NOTE 8: OH2 supplied on ceiling units, connect wire 515 to OH1 on AV (floor) units.

NOTE 9: Automatic temperature control can be wired to TB-DE for DE cooling operation. Typical operation is to wire from the TB-DE to a normally open relay with the relay closing on control call for cooling. For additional information, contact Daikin Applied.

NOTE 10: Motors are factory programmed for specified air flow. Contact Daikin Applied representative for replacement.

Field Installed Accessories

DraftStop™ System/Window Downdraft Installation

Figure 138: DraftStop System Concept

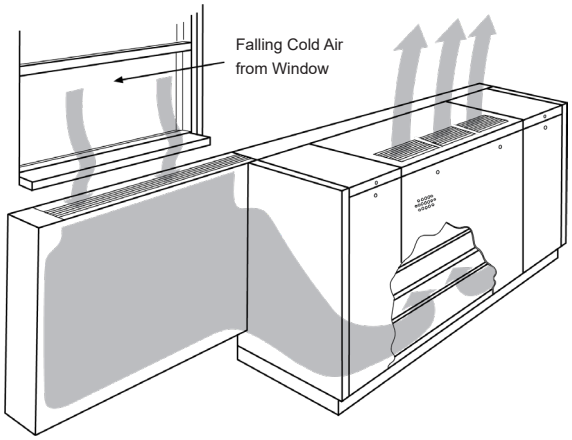
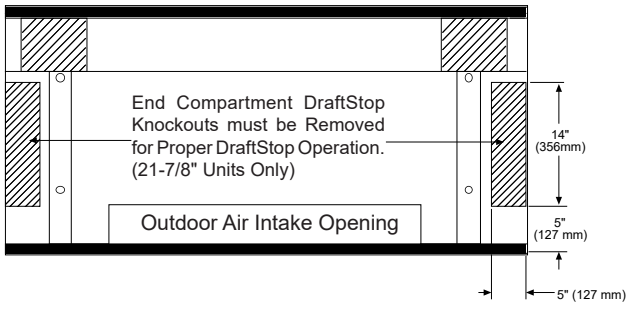


Table 34: DraftStop Grille Length

Unit Nominal 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 139: Unit Back Showing knockouts for DraftStop Applications



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 airflow 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 141. 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.

Figure 140: 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 prepunched holes and push the hardware through the sponge gasket.
   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. Table 35 through Table 38 show the various end panels available, follow installation instructions included with the end panels.

Figure 141: Typical DraftStop Enclosure

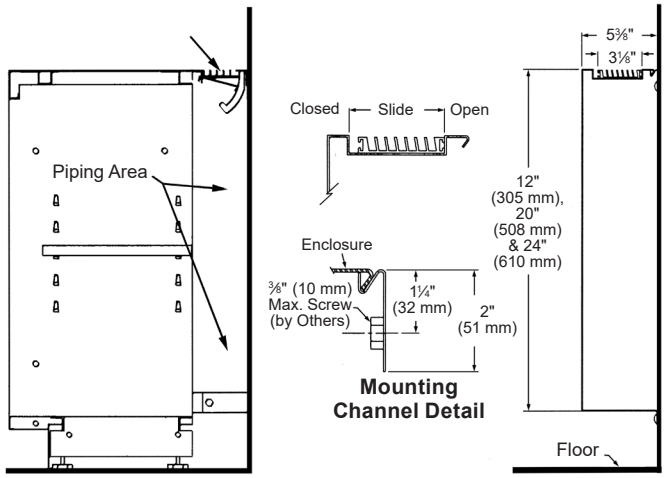


Table 35: 1" (25 mm) End Panel Dimensions – Floor Unit Ventilators

All Dimensions in Inches	16 5/8" (422 mm) Deep End Panels	21 7/8" (556 mm) Deep End Panels
Top View	16 5/8" (422mm), 1" (25mm)	21 7/8" (556mm), 1" (25mm)
End View with No Cut-out	27 7/8" (708mm)	27 7/8" (708mm)
End View with 2 1/2" x 7" (64 mm x 178 mm) Cut-out	7" (178mm), 1" (25mm), 2 1/2" (64mm), 27 7/8" (708mm)	7" (178mm), 1" (25mm), 2 1/2" (64mm), 27 7/8" (708mm)
End View with 4" x 18" (102 mm x 457 mm) Cut-out	18" (457mm), 1" (25mm), 4" (102mm), 27 7/8" (708mm)	18" (457mm), 1" (25mm), 4" (102mm), 27 7/8" (708mm)
End View with 4" x 22" (102 mm x 559 mm) Cut-out	22" (559mm), 1" (25mm), 4" (102mm), 27 7/8" (708mm)	22" (559mm), 1" (25mm), 4" (102mm), 27 7/8" (708mm)
End View with 2" x 5 1/4" (51 mm x 133 mm) Step Down		5 1/4" (133mm), 2" (51mm), 27 7/8" (708mm)

Table 36: 1" (25 mm) End Panel Dimensions – Non-Standard 28" Deep Floor Unit Ventilators

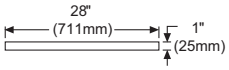
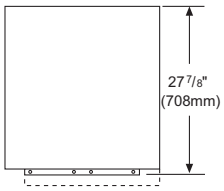
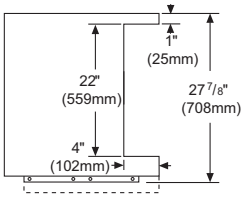
All Dimensions in Inches	28" (711 mm) Deep End Panels
Top View	
End View with No Cut-out	
End View with 21/2" x 7" (64 mm x 178 mm) Cut-out	
End View with 4" x 18" (102 mm x 457 mm) Cut-out	
End View with 4" x 22" (102 mm x 559 mm) Cut-out	
End View with 2" x 51/4" (51 mm x 133 mm) Step Down	

Table 37: 1" (25 mm) End Panel Dimensions – Non-Standard 28" Deep Floor Unit Ventilators 6" (152 mm) End Panel Dimensions – Floor Unit Ventilators

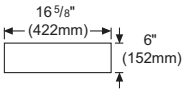
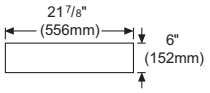
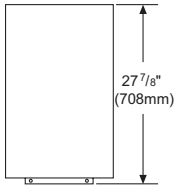
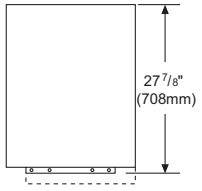
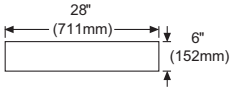
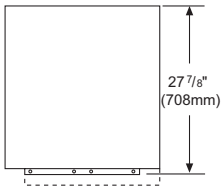
All Dimensions in Inches	16 5/8" (422 mm) Deep End Panels	217/8" (556 mm) Deep End Panels
Top View		
End View with No Cut-out		

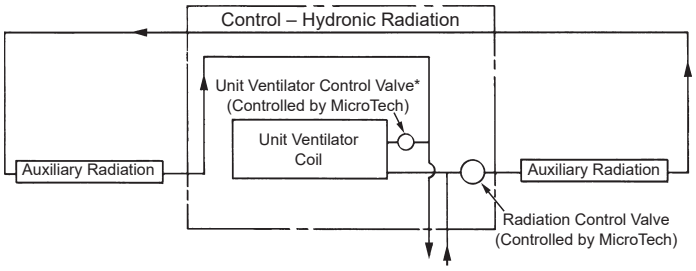
Table 38: 6" (152 mm) End Panel Dimensions – 28" Non-Standard Floor Unit Ventilators

All Dimensions in Inches	217/8" (556 mm) Deep End Panels
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 142: Typical Finned Radiation Piping



*Not Required with Face & Bypass Control

Installing Unit Ventilator End Panels

See Figure 143. Accessory end panels are shipped separately with hardware and kickplate, or simulated kickplate adhesive tape used on 16⅝" 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.

1. Position (YC-1934) bracket on wall so angle is 5" from end of unit and near bottom (Figure 145).
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.

Figure 143: Install End Panels

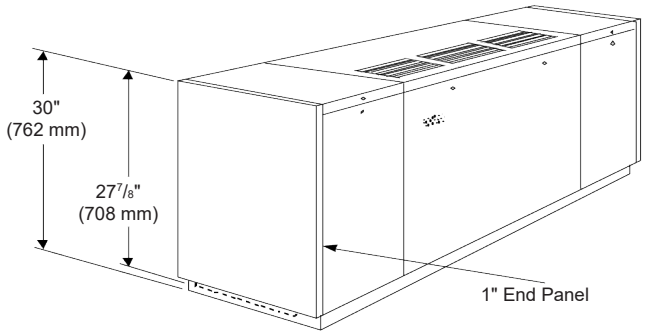


Figure 144: Install End Panels with Provided Hardware (1" End Panel Shown)

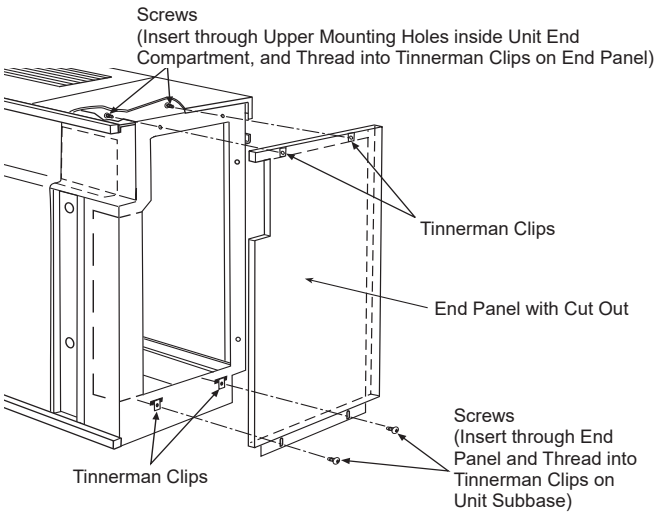


Figure 145: Install End Panels with Provided Hardware (6" End Panel Shown)

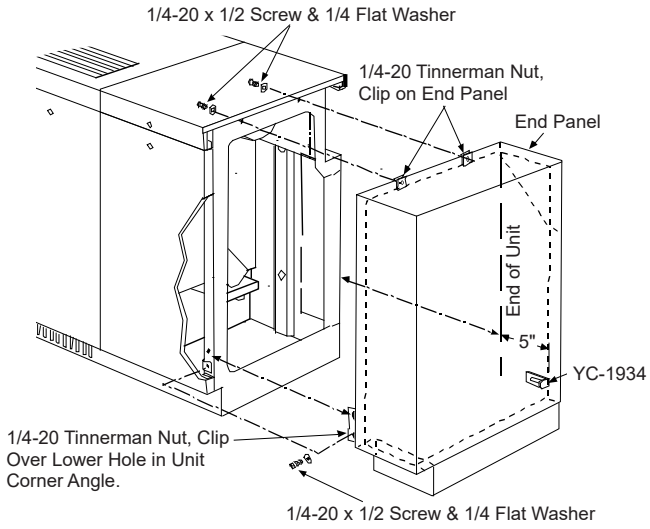
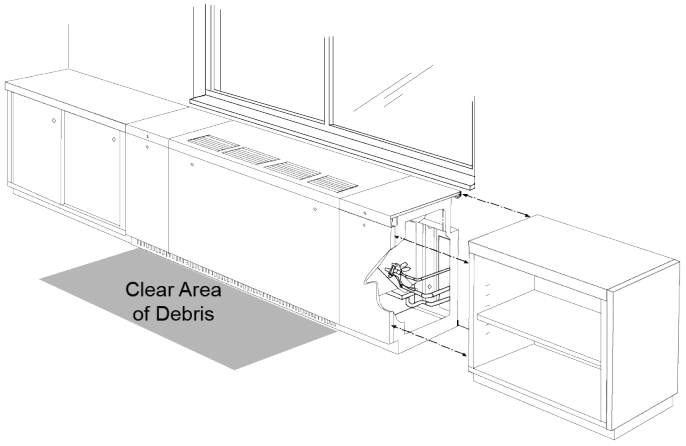


Figure 146: Cabinet(s) Meeting Unit Ventilator

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.



NOTE: Refer to the instructions included with the cabinets specific to the installation.

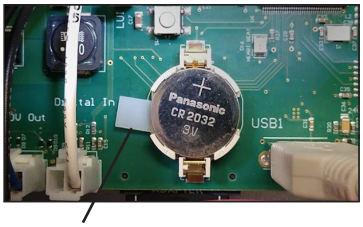
Operation

Start-Up

Remove Battery Shipping Tab

The controller battery protects the time clock schedule in the event of a power loss. Remove the board backup battery shipping tab by grasping the tab and pulling gently. The battery should be replaced every 3 years with a new CR2032 or equivalent.

Figure 147: Battery Shipping Tab



Remove Battery Shipping Tab

Complete Check, Test and Start Procedure

Provide completed Check, Test and Start form to your local Daikin Applied representative and specifying engineer for verification that proper start-up was completed. See page 95.

⚠ CAUTION

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, to verify that all parts are aligned properly and move freely. Inspect fans and fan discharge area for obstructions. Verify that power has been disconnected. Rotate the fan assembly manually. Check that a clean filter is installed and the area in front of unit ventilator is free of debris (see Figure 146). All panels should be in place and properly fastened. Check for outdoor air leaks and condensation. Verify that 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. Check for air leaks and condensation.
5. Test Refrigerant Detection System (RDS). See "A2L Leak Detection Sensor and Board Troubleshooting and Diagnostics" on page 91. For full details on the mitigation modes and sequence of operation please refer to the literature for the unit controller and A2L mitigation control board.

Post Installation Checklist

- ☐ Unit is securely fastened to wall.
- ☐ Electrical hook-up is complete; power, control, wall thermostat (if applicable) in accordance with unit wiring diagram(s).
- ☐ Air filter is clean and in place.
- ☐ All access and end panels are in place and protective covering has been removed.
- ☐ No debris, dust, dirt, or obstructions exist in front of the return air intake grille at the floor.
- ☐ All installation work has been completed in accordance with applicable local, state and national codes.
- ☐ Unit is square and level and is running smoothly and quietly.
- ☐ Refrigerant Detection System for refrigerant leak mitigation has been tested.
- ☐ No air infiltration has been detected.
- ☐ Paint nicks and scratches have been touched up (as required).
- ☐ Access space is provided for maintenance, service and unit removal.
- ☐ Shipping carton replaced over unit for protection (as required).
- ☐ Owner or maintenance personnel provided with a copy of this manual and other manuals/documents shipped with the unit.
- ☐ Owner or maintenance personnel instructed on proper unit operation and maintenance.

Maintenance

General Maintenance

1. Normal maintenance on all units is generally limited to filter changes. Units are provided with a permanently lubricated motor and require no oiling even though oil caps may be provided.
2. Filter changes are required at regular intervals. The time period between changes will depend upon the project requirements. Check filters at 60-day intervals for the first year until experience is acquired. If light cannot be seen through the filter when held up to sunlight or a bright light, it should be changed. A more critical standard may be desirable.
3. The condensate drain pan should be checked annually and cleaned and flushed as required.
4. Record performance measurements of volts, amps, and water temperature differences (both heating and cooling). A comparison of logged data with start-up and other annual data is useful as an indicator of general equipment condition.
5. Periodic lockouts almost always are caused by air or water problems. The lockout (shutdown) of the unit is a normal protective result. Check for dirt in the water system, water flow rates, water temperatures, airflow rates (may be a dirty filter), and air temperatures. If the lockout occurs in the morning following a return from night setback, entering air below machine limits may be the cause.

Oiling (Not Required)

No oiling required. The indoor motor and fan shaft bearings are permanently lubricated.

NOTICE

Motor manufacturer recommends not oiling the room fan motor.

Filter(s)

⚠ CAUTION

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

⚠ 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

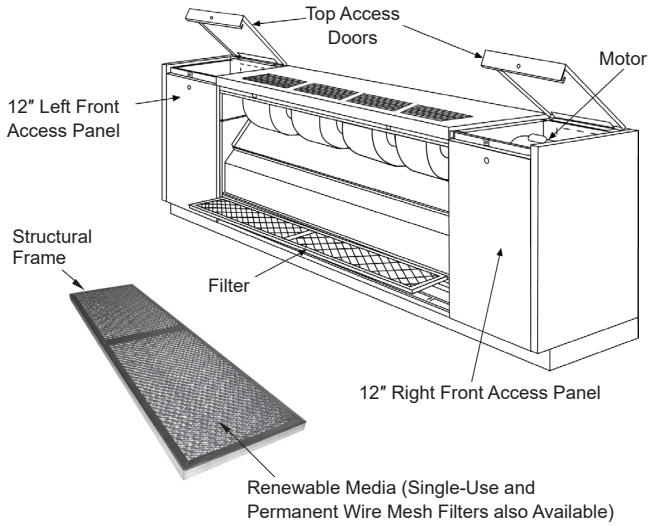
Dirty or clogged filters can impact unit performance, resulting in damage to the unit.

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 148). 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 Applied 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 148) consist of a heavy painted metal structural frame and renewable Amerglas media.

Figure 148: Filter Installation



Refrigerant Information

Refrigerant Guidelines

⚠ WARNING

This unit contains R-32, a class A2L refrigerant that is flammable. This unit should only be installed, serviced, repaired, and disposed of by qualified personnel licensed or certified in their jurisdiction to work with R-32 refrigerant. Installation and maintenance must be done in accordance with this manual. Improper handling of this equipment can cause equipment damage or personal injury.

For installation only in locations not accessible to the general public.

Be aware that R-32 refrigerant may not contain an odor. Place in a well ventilated area to prevent accumulation of refrigerant. When installing the unit in a small room, take measures to keep the refrigerant concentration from exceeding allowable safety limits. Excessive refrigerant leaks, in the event of an accident in a closed ambient space, can lead to oxygen deficiency.

Do not pierce or burn this unit.

Never use an open flame during service or repair. Never store in a room with continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater.), where there is ignitable dust suspension in the air, or where volatile flammables such as thinner or gasoline are handled.

Only use pipes, nuts, and tools intended for exclusive use with R-32 refrigerant in compliance with national codes (ASHRAE15 or IRC).

Do not mix air or gas other than R-32 in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, which may cause equipment damage or injury.

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

⚠ WARNING

The appliance is designed to activate leak mitigation airflow in the event a refrigerant leak is detected. This is required to ensure dilution and prevent stagnation of any leaked refrigerant. Always ensure the supply fans are able to operate freely. Always maintain proper airflow and do not allow filters, air inlets, or air outlets to become blocked. Refer to Table 40.

⚠ WARNING

The appliance shall be installed, operated, and stored in a room with a floor area not less than the minimum room area.

≥ 803.14 ft² (74.61 m²)
Minimum Room Area*

*See the required minimum room area for your specific unit size in Table 40.

NOTICE

Refer to Table 39 for the altitude adjusted room area calculation referenced later in this manual.

The indoor equipment mitigation requirements are calculated at sea level. For higher altitudes, adjust the minimum room area specified on or near the serial plate by the corresponding altitude adjustment factor shown in Table 39. This table is provided as a reference. Adjusted room area (Amin adj) is the product of the minimum room area specified in the serial plate and the minimum room area multiplier, as shown in formula below.

Amin adj = Amin (serial plate) * (minimum room area multiplier)

The minimum room area can also be found in Table 40.

Table 39: Minimum Room Area Multipliers by Altitude

Altitude (Meters)	Minimum Room Area Multiplier
0	1.000
305	1.047
500	1.078
750	1.117
1000	1.156
1250	1.195
1500	1.234
1750	1.273
2000	1.312
2250	1.351
2500	1.390
2750	1.429
3000	1.468
3250	1.507
3500	1.546

Table 40: Minimum Airflow and Room Area Requirements

Unit Size	Tonnage	Voltage	Estimated Recommended Charge for Condensing Unit oz (kg)	Maximum R-32 Refrigerant Charge with Field Piping oz (kg)	Minimum Airflow Qmin ft³/min (m³/min)	Minimum Room Area Amin ft² (m²)
07	1-1/2	208/230-1	53 (1.50)	194.75 (5.52)	318 (9.00)	645.26 (59.95)
10	2-1/2	208/230-1	63 (1.79)	204.75 (5.80)	334 (9.46)	678.40 (63.02)
13	3	208/230-1	69 (1.96)	216.3 (6.13)	353 (1.00)	716.66 (66.58)
	3	208/230-3	60 (1.70)	201.75 (5.72)	329 (9.32)	668.46 (62.10)
	3	460-3	60 (1.70)	207.3 (5.88)	338 (9.57)	686.85 (63.81)
15	3-1/2	208/230-1	83 (2.35)	230.3 (6.53)	376 (10.65)	763.05 (70.89)
	3	208/230-3	60 (1.70)	201.75 (5.72)	329 (9.32)	668.46 (62.10)
	3	460-3	60 (1.70)	207.3 (5.88)	338 (9.57)	686.85 (63.81)
	4	208/230-3	84 (2.38)	225.75 (6.40)	368 (10.42)	747.98 (69.49)
	4	460-3	84 (2.38)	242.4 (6.87)	395 (11.19)	803.14 (74.61)

Refrigerant Detection System (RDS) Operation

The Refrigerant Detection System (RDS) is controlled by refrigerant sensors, which are secured to designated locations for active monitoring. If the sensors detect the presence of R-32 refrigerant above 15% LFL mitigation actions are initiated. Compressor and electric heat operation is disabled and the supply fan is activated, providing airflow at or above the minimum required airflow to evacuate excess concentration. Once refrigerant concentration reaches below a safe threshold, the unit will resume normal operation. If the sensors detect another refrigerant concentration excess, the unit will go back into mitigation mode and will repeat the same process.

High speed airflow must be maintained above minimum airflow levels for proper operation of the RDS. See Table 40 for specific airflow requirements.

Refrigerant Detection System and Sensors

For additional instructions on how to operate the RDS including how to activate a manual test of the RDS, refer to the unit controller manual.

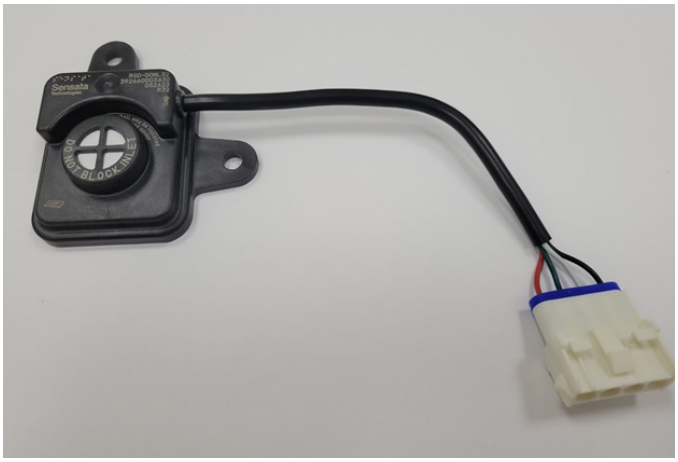
⚠ WARNING

This unit is equipped with a Refrigerant Detection System (RDS). Only components and refrigerant detection sensors specified by Daikin Applied may be used for replacement and maintenance.

⚠ WARNING

Always ensure the refrigerant detection sensors installed in the equipment are free of debris and the inlet is not blocked. If replacing a refrigerant detection sensor, always install in the identical orientation as the original sensor.

Figure 149: Sample Refrigerant Detection Sensor



NOTE: Identify the sensor inlet marked “Do Not Block Inlet,” and ensure it is free of debris.

⚠ WARNING

Auxiliary devices which may be a Potential Ignition Source shall not be installed in the duct work. Examples of such Potential Ignition Sources are hot surfaces with a temperature exceeding 700°C (1292°F) and electric switching devices.

⚠ WARNING

The unit must be stored and/or located to prevent mechanical damage of the refrigeration system. Do not store the unit near sources of open flame, electrical switching devices, or hot surfaces above 700°C (1292°F). If the unit is stored indoors, the storage area should be larger than the Minimum Room Area specified in this manual. The storage space should be well ventilated and not allow for the stagnation of leaked refrigerant. Failure to do so may result in a fire or explosion hazard.

⚠ WARNING

Only auxiliary devices approved by Daikin Applied or declared suitable for installation with R-32 shall be installed in the connecting ductwork.

Lubrication

R-32 should be used only with polyolester (POE) oil. The HFC refrigerant components in R-32 will not be compatible with mineral oil or alkylbenzene lubricants. R-32 systems will be charged with the OEM recommended lubricant, ready for use with R-32.

Competence of Personnel

Information of procedures additional to usual information for refrigerating equipment installation, repair, maintenance and decommission procedures is required when equipment with flammable refrigerants is affected.

The training of these procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. The achieved competence should be documented by a certificate.

⚠ WARNING

Service on this equipment is to be performed by qualified refrigeration personnel familiar with equipment operation, maintenance, correct servicing procedures, and the safety hazards inherent in this work. Causes for repeated tripping of equipment protection controls must be investigated and corrected. Disconnect all power before doing any service inside the unit. If refrigerant leaks from the unit, there is a potential danger of suffocation since refrigerant will displace the air in the immediate area. Servicing this equipment must comply with the requirements of all applicable industry related published standards and local, state and federal, statutes, regulations and codes in regards to refrigerant reclamation and venting. Avoid exposing refrigerant to an open flame or other ignition source.

Maintaining and servicing R-32 refrigerant should only be performed as recommended by this manual and by personnel licensed or certified in their jurisdiction to handle A2L refrigerants. Dismantling the unit and treatment of the refrigerant, oil, and additional parts must be done in accordance with the relevant local, state, and national regulations.

Only use tools meant for use on R-32 refrigerant, such as a gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, or refrigerant recovery equipment.

The following guidelines align with UL Standard 60335-2-40.

Maintenance and Repair

- Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with FLAMMABLE REFRIGERANTS.
- Ensure sufficient ventilation at the repair place.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark. The standard procedure to short circuit the capacitor terminals usually creates sparks.
- When brazing is required, the following procedures shall be carried out in the right order:
  - Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
  - Evacuate the refrigerant circuit.
  - Remove parts to be replaced by cutting, not by flame.
  - Purge the braze point with nitrogen during the brazing procedure.
  - Carry out a leak test before charging with refrigerant.
- Reassemble sealed enclosures accurately. If seals are worn, replace them.
- Check safety equipment before putting into service.

Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible. Markings that are illegible shall be corrected; and
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

A2L Leak Detection Sensor and Board Troubleshooting and Diagnostics

At power up, the Refrigerant Detection System RDS control board display shows what sensors are detected and what sensors are not detected.

- Where X is the sensor number (1 to 8):
  - SX = 1 , sensor X is active and communicating
  - SX = 0, sensor X is not communicating or inactive

By pressing and holding the push button for:

- Less than 2 seconds:

  The RDS control board display shows the last 10 sensor faults (can be loss of communication or faulted state reported by a specific sensor). General configuration fault (Flt CFG) is also shown when the expected number of sensors does not match the number of sensors detected online.

- More than 2 seconds and less than 5 seconds:

  The display shows sensor(s) status info:

  — The current LFL level.

  — Loss of communication or faulted state reported by a specific sensor.
- More than 5 seconds and less than 10 seconds:

  The RDS control board starts a mitigation test. The board will go into alarm mode and the MT6210 controller will begin the mitigation sequence. The mitigation test will last approximately 5 minutes.

  As part of the test, the following will occur:

  — Compressor outputs will be de-energized.

  — Electric heat outputs will be de-energized.

  — Supply fan circulation will be energized to provide airflow above minimum required levels.
- More than 10 seconds:

  The display shows all the GID values supported by the sensor board.

Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system; and
- that there is continuity of earth bonding.

Sealed electrical and intrinsically safe components

- All sealed electrical components shall be replaced.
- All intrinsically safe components must be replaced.

Cabling

- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Leak Detection

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. NEVER use the following when attempting to detect flammable refrigerant leaks:

- A halide torch (or any other detector using a naked flame)
- Substances containing chlorine

Detection of flammable refrigerants

The following leak detection methods are deemed acceptable for all refrigerant systems:

- Electronic leak detectors may be used to detect refrigerant leaks. For FLAMMABLE REFRIGERANTS, the sensitivity of electronic leak detectors may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.
- Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. Examples of leak detection fluids are:

  — bubble method; or

  — fluorescent method agents.
- If a leak is suspected, all open flames shall be removed/ extinguished.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to instructions in "Pressure Testing and Refrigerant Evacuation".

Pressure Testing and Refrigerant Evacuation

- Make sure that air or any matter other than R-32 refrigerant does not get into the refrigeration cycle.
- If refrigerant gas leaks occur, ventilate the room/area as soon as possible.
- R-32 should always be recovered and never released directly into the environment.
- Only use tools meant for use on R-32 refrigerant (such as a gauge manifold, charging hose, or vacuum pump adapter).

Removal and evacuation

When breaking into the refrigerant circuit to make repairs, or for any other purpose, conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration.

- The following procedure shall be adhered to:

  i. safely remove refrigerant following local and national regulations - see "Recovery" section;

  ii. purge the circuit with inert gas;

  iii. evacuate;

  iv. purge with inert gas;

  v. open the circuit by cutting (if flammable refrigerant) or brazing.

- The refrigerant charge shall be recovered into the correct recovery cylinders according to local and national codes. For equipment containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the equipment safe for flammable refrigerants. This process might need to be repeated several times.
- Compressed air or oxygen shall not be used for purging refrigerant systems.
- For equipment containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
- When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
- Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

Handling and Storage

Conditions for safe storage

- Requirements to be met by storerooms and receptacles:
  - Store only in unopened original receptacles
  - Store in a cool and dry location
- Further information about storage conditions:
  - Keep container tightly sealed
  - Store in cool, dry conditions in well sealed receptacle
  - Protect from heat and direct sunlight
- Maximum storage temperature: 40°C (104°F)

Fire and explosion protection information

Open and handle refrigerant receptacle with care. Keep ignition sources away. Do not smoke. Protect against electrostatic charges. Waste air is to be released into the atmosphere only via suitable separators.

Commissioning

- Ensure that the floor area is sufficient for the refrigerant charge or that the ventilation duct is assembled in a correct manner.
- Connect the pipes and carry out a leak test before charging with refrigerant.
- Check safety equipment before putting into service.

Charging procedures

In addition to conventional charging procedures and specific unit charging guidelines, the following requirements shall be followed:

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.
- Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning

- If the safety is affected when the equipment is put out of service, the refrigerant charge shall be removed before decommissioning.
- Ensure sufficient ventilation at the equipment location.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark.
- Remove the refrigerant according to details in "Recovery" section. If recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
- Ensure all isolation valves on the equipment are closed off.

Labeling

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For equipment containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free

disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Recovery procedure

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant.

It is essential that electrical power is available before the task is commenced.

1. Become familiar with the equipment and its operation.
2. Isolate system electrically.
3. Before attempting the procedure, ensure that
   - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
   - all personal protective equipment is available and being used correctly;
   - the recovery process is supervised at all times by a competent person;
   - recovery equipment and cylinders conform to the appropriate standards.
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that cylinder is situated on the scale before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80% volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

Disposal

- Waste treatment method recommendation:
  - Must be specially treated adhering to official regulations
  - Incineration in an adequate incinerator is recommended
  - Uncleaned packaging disposal must be made according to official regulations
- Ensure sufficient ventilation at the working place
- The following procedure shall be adhered to:
  i. safely remove refrigerant following local and national regulations - see "Recovery" section;
  ii. evacuate the refrigerant circuit;
  iii. purge the refrigerant circuit with nitrogen gas for 5 minutes;
  iv. evacuate again; and
  v. If compressors are to be removed, cut out the compressor and drain the oil.

Appendix

Warranty Registration Form

Warranty - Check, Test and Start	Form: 5F-4240
	Group: **ATS**
	Date: **June 2024**
	Supercedes: **573882Y**

Unit Ventilator Warranty Registration Form

Check, test & start procedure for Daikin Applied Unit Ventilators

This form must be completely filled out and the record retained by the sales representative or the owner in order to comply with the terms of the Daikin Applied warranty.

Sales Office: _____ S.O.#: _____ Date Started: _____

Job Name: _____ G.O. # _____

Job Location: _____

Unit Location: _____ Unit Tagging: _____

Model No: _____ Serial No.: _____

Supply Voltage: L1/L2 _____ L2/L3 _____ L3/L1 _____ Rated: _____

Room Fan Motor Amps: T1: _____ RPM _____ Nameplate Rating: _____

I. Initial check

A. Does electrical service correspond to unit nameplate? ..... Yes ☐ No ☐
B. Are all electrical power connections tight? ..... Yes ☐ No ☐
C. Does all field wiring conform to unit electrical schematic? ..... Yes ☐ No ☐
D. Is unit installed per IM bulletin? ..... Yes ☐ No ☐
E. Cabinet paint O.K.? ..... Yes ☐ No ☐
F. Cabinet bent? ..... Yes ☐ No ☐
G. Do outdoor (AEQ, AZU, AZQ & AZR) and indoor fans turn freely? ..... Yes ☐ No ☐
H. Are all setscrews on outdoor and indoor fan couplings tight? ..... Yes ☐ No ☐
I. Is the fan coupler aligned between the shaft and motor? ..... Yes ☐ No ☐
J. Are end bearing bolts on outdoor and indoor fan shaft tight? ..... Yes ☐ No ☐
K. Have the fan shaft end bearing and room fan motor been oiled (if applicable)? ..... Yes ☐ No ☐
L. Are outdoor air and return air dampers operating properly? ..... Yes ☐ No ☐
M. Is the filter clean? ..... Yes ☐ No ☐
N. Is there excessive noise or vibration? ..... Yes ☐ No ☐

If Yes, corrective action (if any) _____

II. Controls check

A. Does the unit have Daikin Applied controls (MicroTech)? ..... Yes ☐ No ☐

If No, control company _____
If controls are not by Daikin Applied, skip to Section III.

B. Condensate disposal system operating O.K.? ..... Yes ☐ No ☐
C. Does unit start and perform per sequence of operation as stated in OM? ..... Yes ☐ No ☐
D. If the unit has a unit mounted sensor, has the insulation been removed from the sampling chamber inlet? ..... Yes ☐ No ☐
E. Are all sensors installed and insulated properly? ..... Yes ☐ No ☐
F. If the unit has MicroTech controls, room setpoint: _____°F Deadband 6° or _____°F

III. Refrigeration system

A. Has all field piping been leak tested to 100 psig (AVS, AVV, AVR, AHF, AHV, & AHR)? ..... Yes ☐ No ☐
B. Is expansion valve bulb properly installed and insulated? ..... Yes ☐ No ☐
C. High pressure control cutout (if applicable) _____ psig
D. Crankcase heater operating O.K.? ..... Yes ☐ No ☐
E. Reversing valve operating O.K.? ..... Yes ☐ No ☐
F. Emergency heat operating O.K.? ..... Yes ☐ No ☐
G. Piping correct (AVS, AVV, AVR, AHF, AHV, & AHR to remote condensing unit)? ..... Yes ☐ No ☐
H. Checked for refrigerant leaks? ..... Yes ☐ No ☐

IV. Hydronic piping check

A. Is unit piping correct (the remainder of this section applies only to units with Daikin Applied controls)? ..... Yes ☐ No ☐
B. Is the modulating control valve(s) piped correctly (valve controlled units)? ..... Yes ☐ No ☐
C. Is the modulating control valve(s) placed in the upright position (valve controlled units)? ..... Yes ☐ No ☐
D. Is 2 - position control valve(s) piped correctly (face and bypass)? ..... Yes ☐ No ☐

Warranty Registration Form

V. Start-up (Readings must be taken at full load conditions)

A. Outdoor Fan Motor Amps: T1 _____ Nameplate Rating: _____

B. Compressor Amps (Cig): T1 _____ T2 _____ T3 _____ Nameplate Rating: _____

C. Compressor Amps (Htg): T1_____ T2 _____ T3 _____ Nameplate Rating: _____

D. Refrigerant Pressures Htg./Clg.: Suction:_____ /_____ Discharge:_____ / _____

E. Refrigerant Temperature Htg./Clg.: Suction_____°F/_____°F Discharge:_____°F/_____°F

F. O.A.Temp.: _____°F Super Heat: _____°F Subcooling:_____°F

G. R.A. Temp. Htg./Clg.: _____°F/_____°F Discharge Air Temp.:_____°F/_____°F

H. Electric Htg. Amp: L1 _____ L2 _____ L3 _____ Total Amp: _____

I. Water Temperature Htg./Clg.: In _____°F/_____°F Out _____°F/_____°F

VI. Performed by:

Company: _____

Name: _____

Title: _____

Signature: _____ Date: _____

Comments: _____

_____

_____

_____

_____

_____

Service Technician: _____

Contractor Representative: _____

Limited Product Warranty

DAIKIN APPLIED AMERICAS INC.
LIMITED PRODUCT WARRANTY
(**United States and Canada**)

WARRANTY

Daikin Applied Americas Inc. dba Daikin Applied ("Company") warrants to contractor, purchaser and any owner of the product (collectively "Owner") that, subject to the exclusions set forth below Company, at its option, will repair or replace defective parts in the event any product manufactured by Company, including products sold under the brand name Daikin and used in the United States or Canada, proves defective in material or workmanship within twelve (12) months from initial startup or eighteen (18) months from the date shipped by Company, whichever occurs first. Authorized replacement parts are warranted for the remainder of the original warranty. All shipments of such parts will be made FOB factory, freight prepaid and allowed. Company reserves the right to select carrier and method of shipment. In addition, Company provides labor to repair or replace warranty parts during Company normal working hours on products with rotary screw compressors or centrifugal compressors. Warranty labor is not provided for any other products.

Company must receive the Registration and Startup Forms for products containing motor compressors and/or furnaces within ten (10) days of original product startup, or the ship date and the startup date will be deemed the same for determining the commencement of the warranty period and this warranty shall expire twelve (12) months from that date. For additional consideration, Company will provide an extended warranty(ies) on certain products or components thereof. The terms of the extended warranty(ies) are shown on a separate extended warranty statement.

No person (including any agent, sales representative, dealer or distributor) has the authority to expand the Company's obligation beyond the terms of this express warranty or to state that the performance of the product is other than that published by Company.

EXCLUSIONS

1. If free warranty labor is available as set forth above, such free labor does not include diagnostic visits, inspections, travel time and related expenses, or unusual access time or costs required by product location.
2. Refrigerants, fluids, oils and expendable items such as filters are not covered by this warranty.
3. This warranty shall not apply to products or parts : (a) that have been opened, disassembled, repaired, or altered, in each case by anyone other than Company or its authorized service representative; (b) that have been subjected to misuse, abuse, negligence, accidents, damage, or abnormal use or service; (c) that have not been properly maintained; (d) that have been operated or installed, or have had startup performed, in each case in a manner contrary to Company's printed instructions; (e) that have been exposed, directly or indirectly, to a corrosive atmosphere or material such as, but not limited to, chlorine, fluorine, fertilizers, waste water, urine, rust, salt, sulfur, ozone, or other chemicals, contaminants, minerals, or corrosive agents; (f) that were manufactured or furnished by others and/or are not an integral part of a product manufactured by Company; or (g) for which Company has not been paid in full.
4. This warranty shall not apply to products with rotary screw compressors or centrifugal compressors if such products have not been started, or if such startup has not been performed, by a Daikin Applied or Company authorized service representative.

SOLE REMEDY AND LIMITATION OF LIABILITY

THIS WARRANTY CONSTITUTES THE SOLE WARRANTY MADE BY COMPANY. COMPANY'S LIABILITY TO OWNER AND OWNER'S SOLE REMEDY UNDER THIS WARRANTY SHALL NOT EXCEED THE LESSER OF: (i) THE COST OF REPAIRING OR REPLACING DEFECTIVE PRODUCTS; AND (ii) THE ORIGINAL PURCHASE PRICE ACTUALLY PAID FOR THE PRODUCTS. COMPANY MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, REGARDING PREVENTION OF MOLD/MOULD, FUNGUS, BACTERIA, MICROBIAL GROWTH, OR ANY OTHER CONTAMINATES. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT AND UNDER NO CIRCUMSTANCE SHALL COMPANY BE LIABLE TO OWNER OR ANY THIRD PARTY FOR INCIDENTAL, INDIRECT, SPECIAL, CONTINGENT, CONSEQUENTIAL, DELAY OR LIQUIDATED DAMAGES FOR ANY REASON, ARISING FROM ANY CAUSE WHATSOEVER, WHETHER THE THEORY FOR RECOVERY IS BASED IN LAW OR IN EQUITY, OR IS UNDER A THEORY OF BREACH CONTRACT OR WARRANTY, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE. THE TERM "CONSEQUENTIAL DAMAGE" INCLUDES, WITHOUT LIMITATION, THOSE DAMAGES ARISING FROM BUSINESS INTERRUPTION OR ECONOMIC LOSS, SUCH AS LOSS OF ANTICIPATED PROFITS, REVENUE, PRODUCTION, USE, REPUTATION, DATA OR CROPS.

ASSISTANCE

To obtain assistance or information regarding this warranty, please contact your local sales representative or a Daikin Applied office.

Form No. 933-430285Y-01-A (11/2023)
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