Installation and Maintenance Manual IM 991-2

Group: **Applied Air Systems**

Part Number: **IM 991**

Date: **July 2019**

Maverick® II
Commercial Packaged Rooftop System

Models MPS062E–MPS075E
62 through 75 Tons
R-410A Refrigerant
MicroTech® III Unit Controller

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This manual provides general informationabout the Daikin Compressor Nameplate Maverick II rooftop unit, model MPS 062E - 075E. In addition to an overall description of the unit, it includes mechanical and electrical installation procedures, commissioning procedures, sequence of operation information, and maintenance instructions. For further information on the optional forced draft gas-fired furnace, refer to IM 684 or IM 685.

The MicroTech III applied rooftop unit controller is provided. For a detailed description of the MicroTech III components, input/output configurations, field wiring and information on using and programming the MicroTech III unit controller, refer to OM 920.

For a description of operation and information on using the keypad to view data and set parameters, refer to the appropriate program-specific operation manual (see Figure 1).

Table 1: Program Specific Rooftop Unit Literature

Rooftop unit control configuration		Operation manual number
VFDs	Daikin Applied 208 - 460 V	OM 844
	Daikin Applied 575 V	OM 895
	Daikin Applied 208 - 460 V	OM 991
	Daikin Applied 575 V	

Unit Nameplate

The unit nameplate is located on the outside lower right corner on the main control box door. It includes the unit model number, serial number, unit part number, electrical characteristics, and refrigerant charge.

Compressor Nameplate

Size 62 units utilize the tandem compressor design. Each compressor includes an individual nameplate along with a nameplate identifying the tandem compressors.

Size 70-75 units utilize the trio compressor design. Each compressor includes an individual nameplate. There is no nameplate identifying the trio compressors.

Gas Burner Nameplate

On units that include gas heat, the nameplate is located on the lower right corner on the main control box door. It includes the burner model number,minimum/maximum input, maximum temperature rise, and minimum CFM.

Hazard Identification Information

⚠ CAUTION

Cautions indicate potentially hazardous situations, which can result in personal injury or equipment damage if not avoided.

⚠ WARNING

Warnings indicate potentially hazardous situations, which can result in property damage, severe personal injury, or death if not avoided.

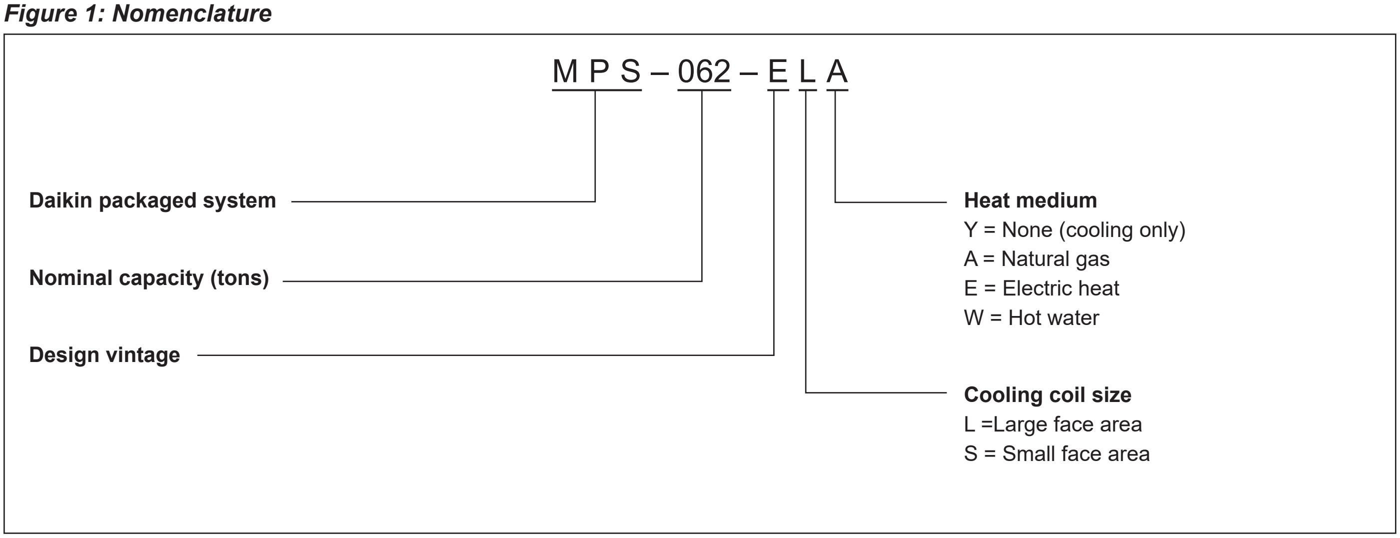
⚠ DANGER

Dangers indicate a hazardous situation which will result in death or serious injury if not avoided.

⚠ NOTICE

Notices give important information concerning a process, procedure, special handling or equipment attributes.

Figure 1: Nomenclature



Unit Description

Typical Component Locations

Figure 2 shows a typical gas heat or electric heat unit with the locations of the major components. Figure 3 on page 5 shows a typical cooling only unit with the locations of the major components. These figures are for general information only. See the project's certified submittals for actual specific dimensions and locations.

Figure 2: Typical Component Locations for Heating Unit

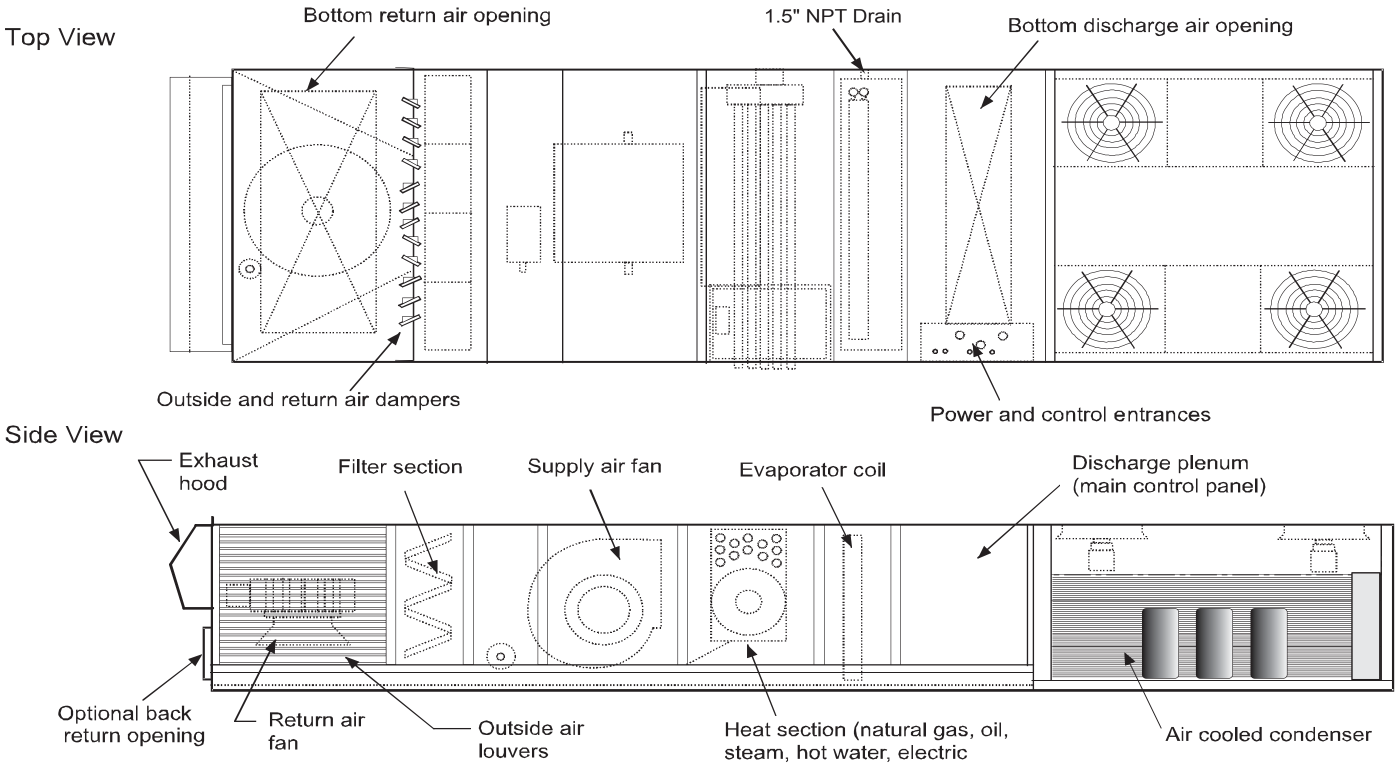
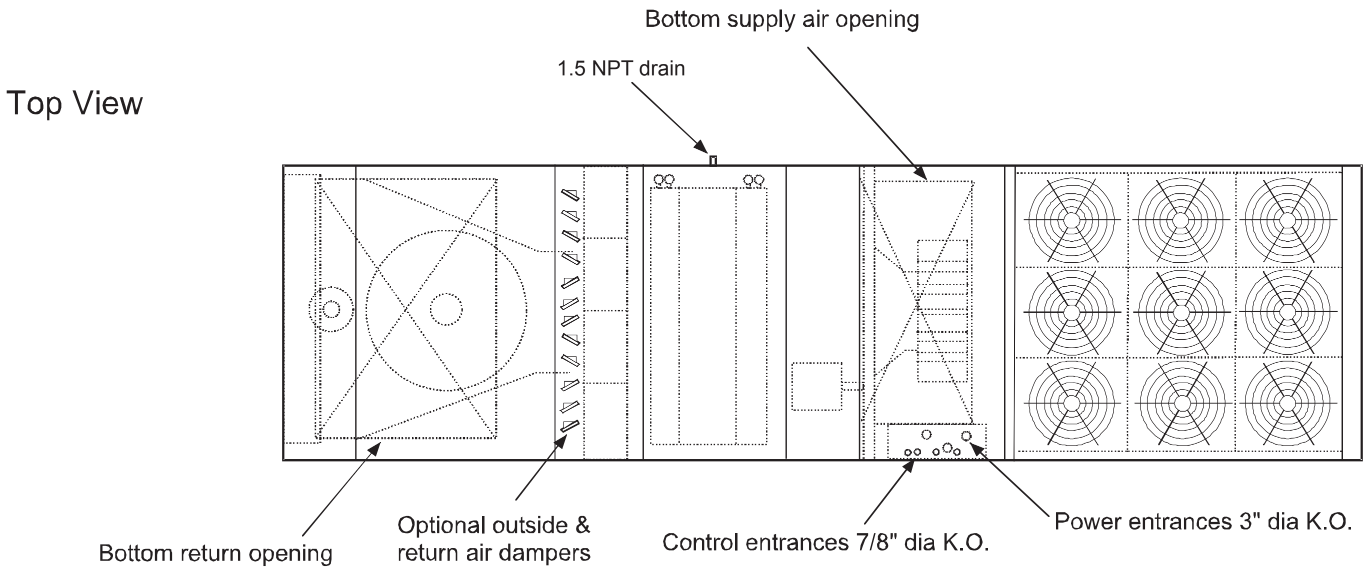
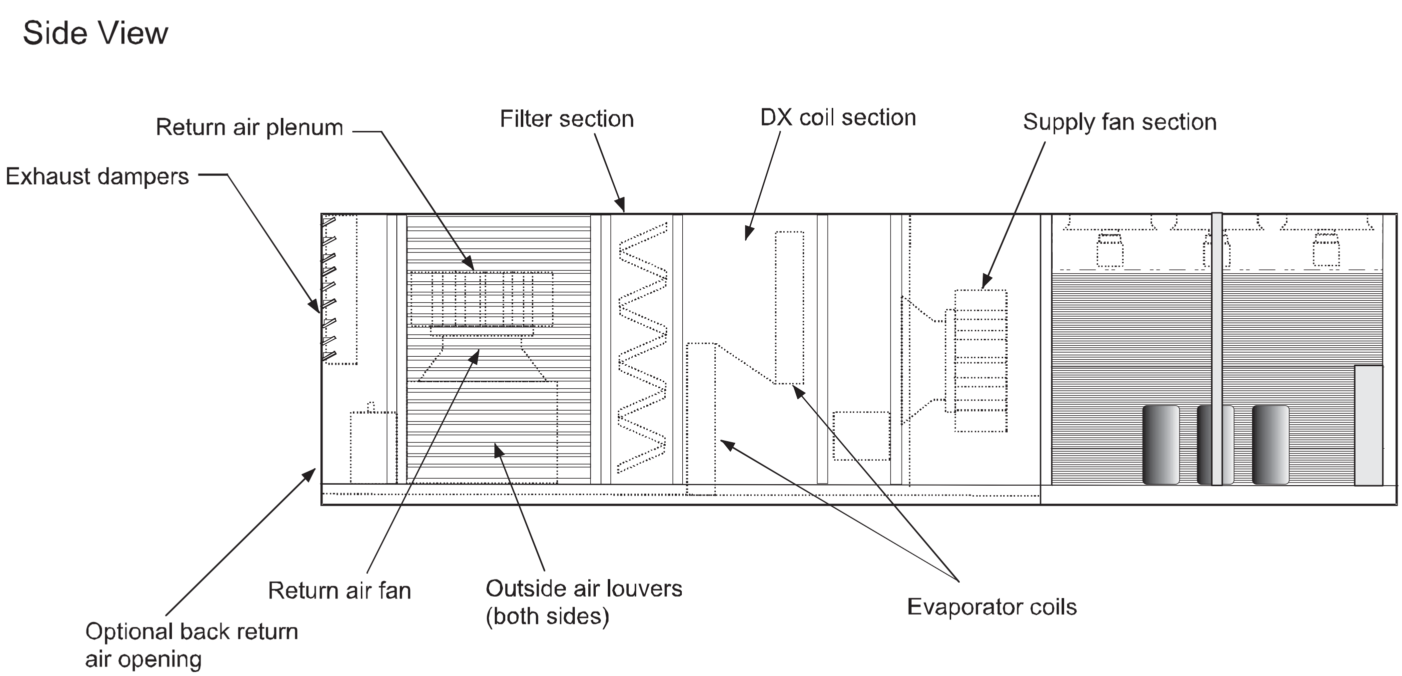


Figure 3: Typical Component Locations for Cooling Only Unit

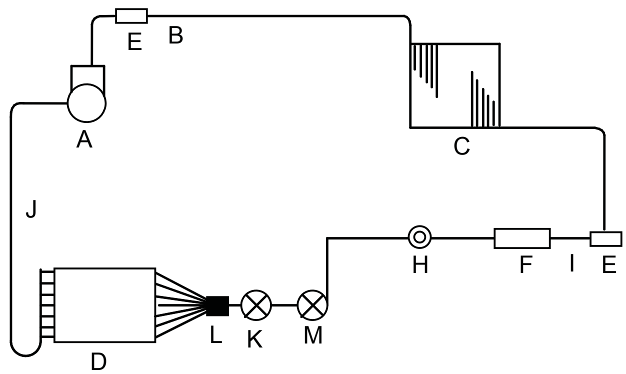




Refrigeration Piping

This section presents the unit refrigeration piping diagrams for the various available configurations.

Figure 4: Circuit Schematic



A Compressor (2 or 3 per circuit)
B Discharge line
C Condenser coil
D Evaporator coil
E Manual shutoff valve
F Filter-drier
H Sightglass
I Liquid line
J Suction line
K Thermal expansion valve
L Distributor
M Drop solenoid valve

Figure 5: Condenser Piping, Scroll Compressors, Two to Three Compressors per Circuit are Provided (6 Compressors Shown)

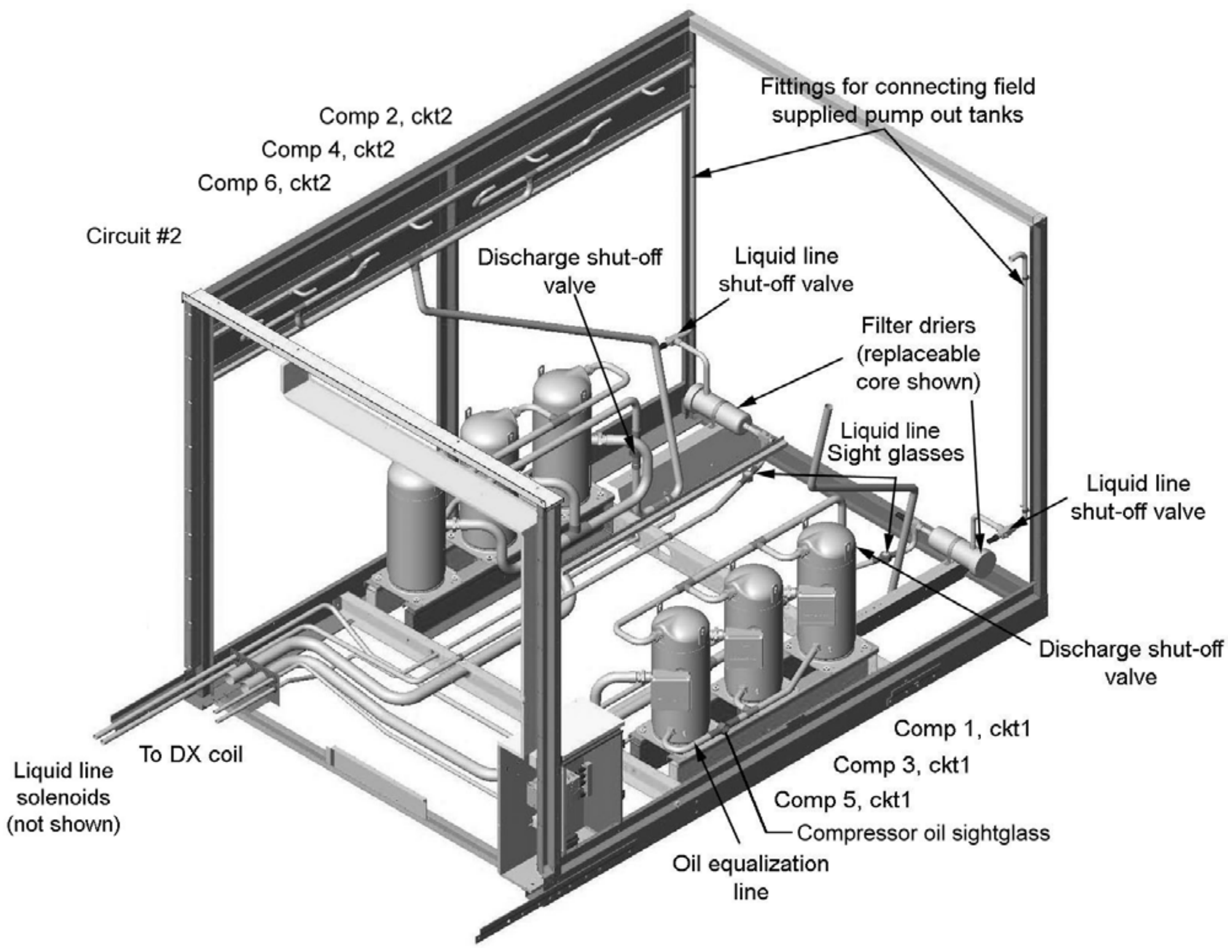


Figure 6: Air Handler Piping (Flat DX)

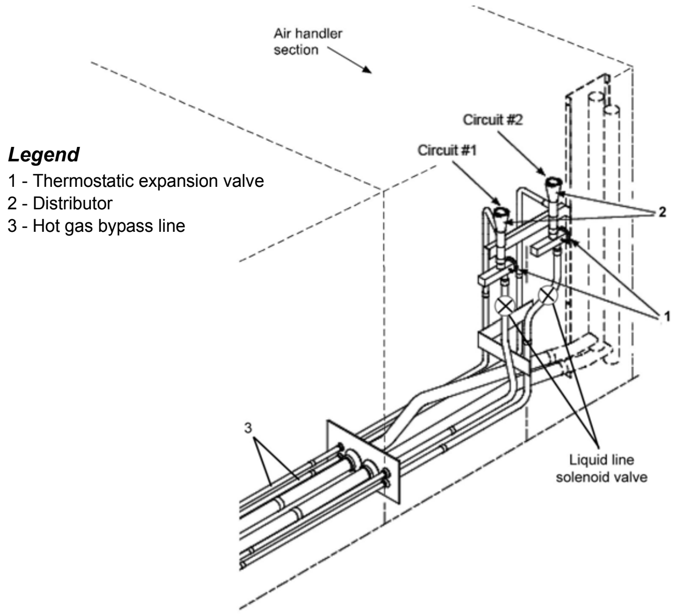
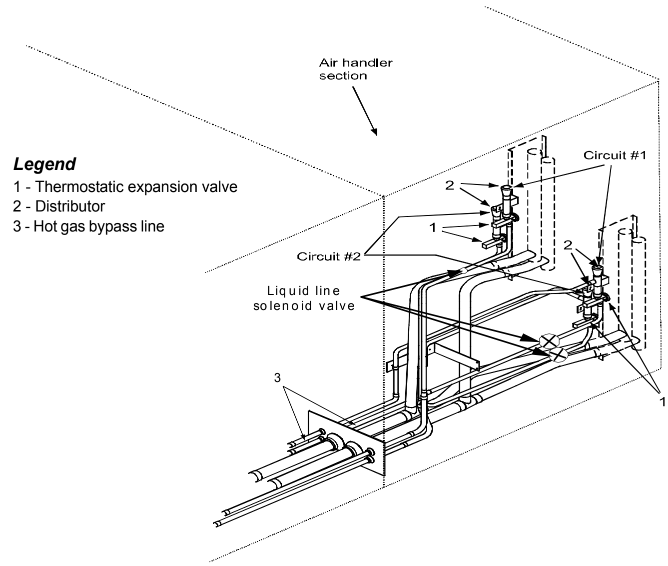


Figure 7: Air Handler Piping (Staggered DX)



Control Locations

Figure 8 (gas and electric units) and Figure 9 on page 9
components mounted in control panels. Additional information
(cooling only and hot water heat units) show the locations of
is included in Table 2 on page 14 and the wiring diagram
the various control components mounted throughout the units.
legend, which is included in "Wiring Diagrams" on page 40.
See "Control Panel" on page 10 for the locations of control.

Figure 8: Control Locations—Gas and Electric Heat Units

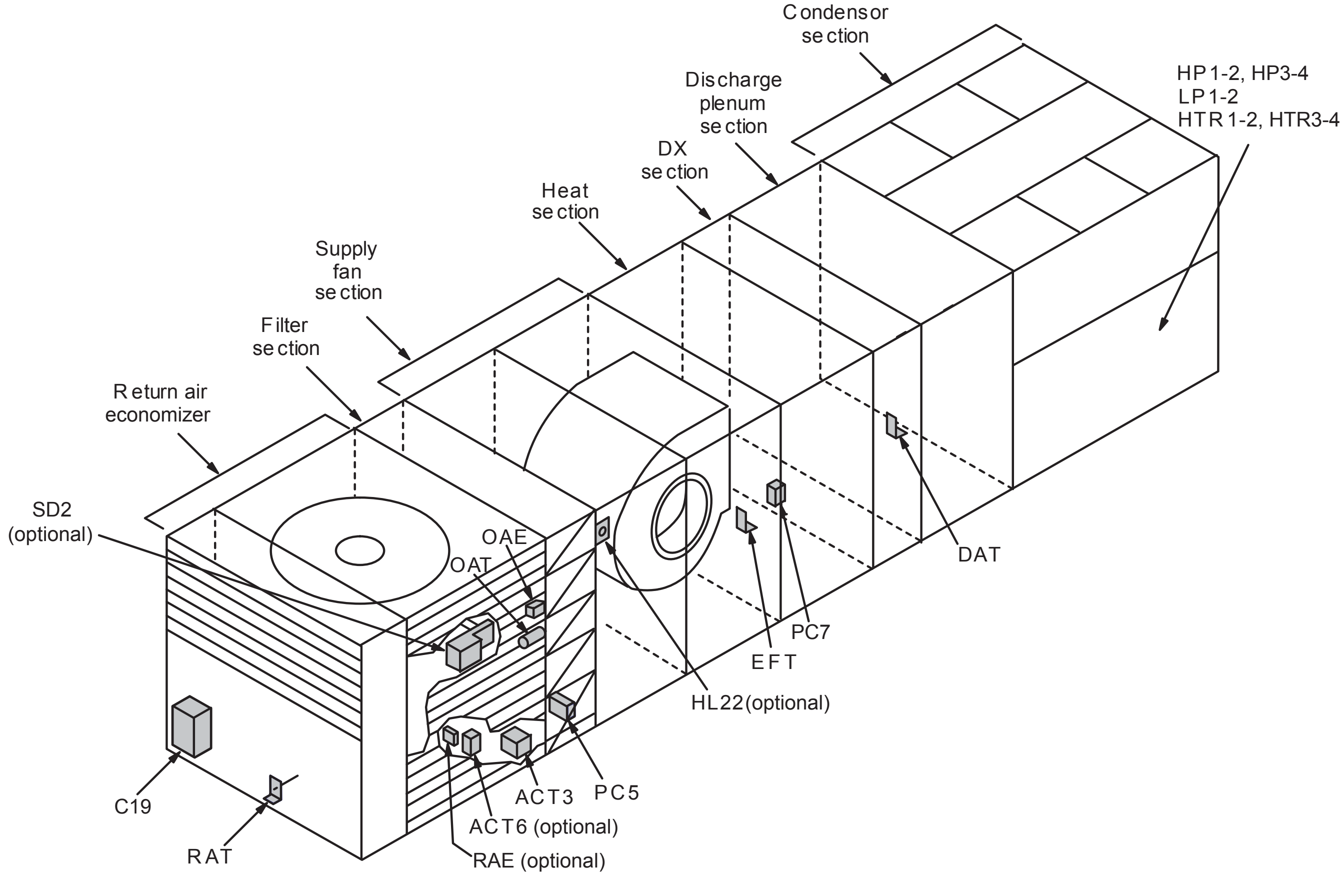
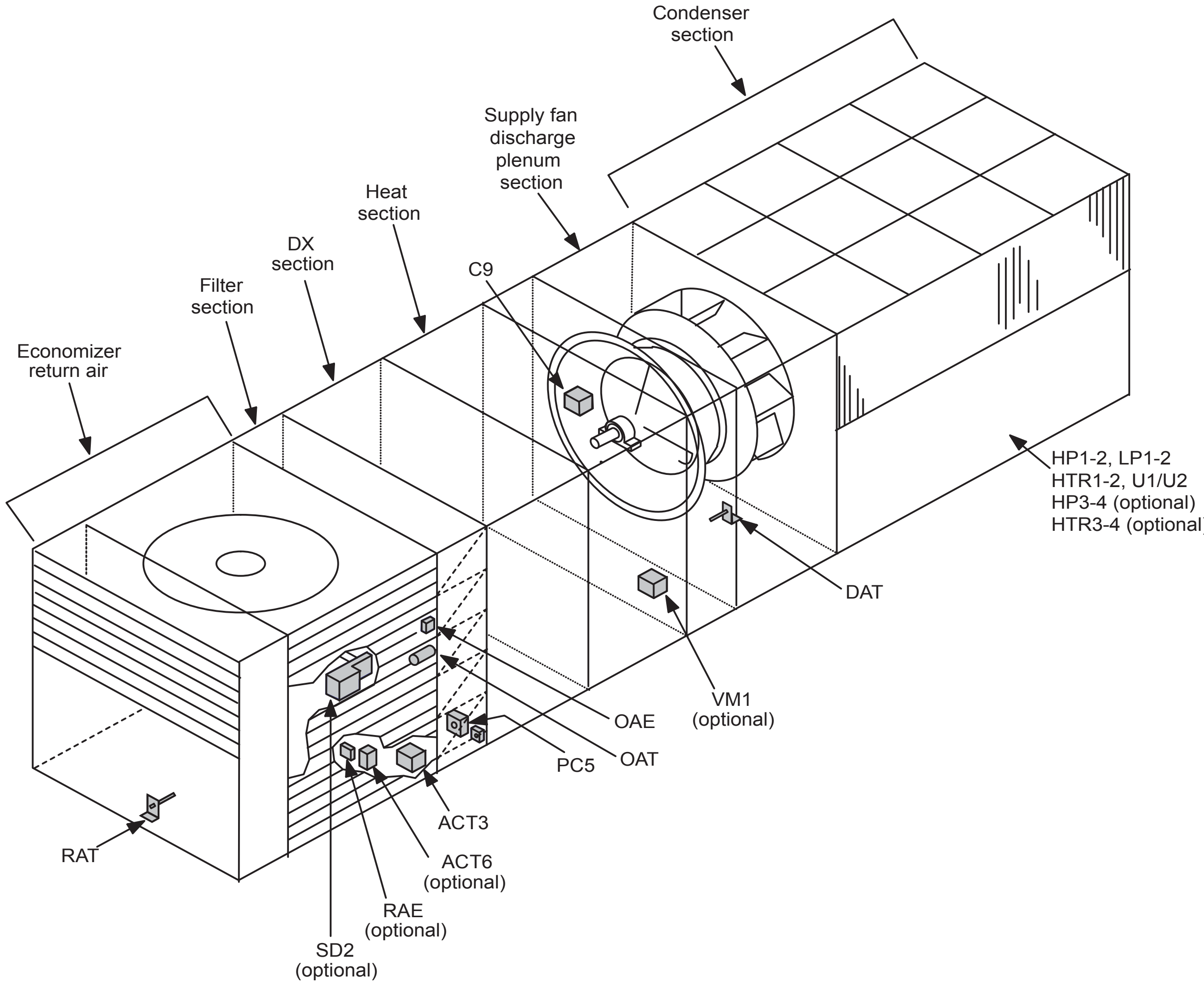


Figure 9: Control Locations—Cooling Only and Hot Water HeatUnits



Control Panel

The unit control panels and their locations are shown in the from these figures depending on the particular unit options. following figures. These figures show a typical unit. See “Wiring Diagrams” on page 40 for the legend and configuration. Specific unit configurations may differ slightly component description.

Figure 10: Typical Control Panel Locations

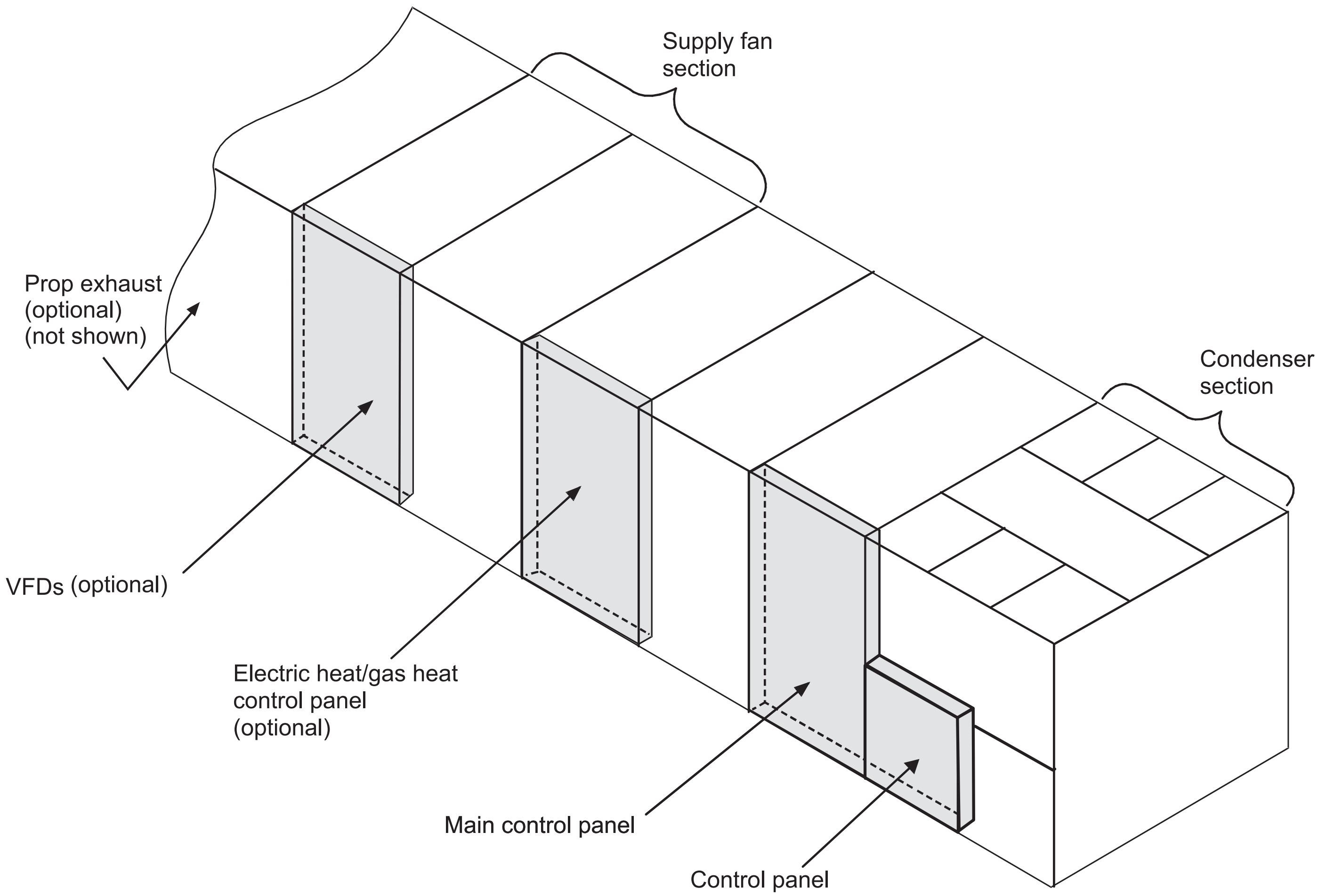


Figure 11: Typical Main Control Panel, 460 Volt

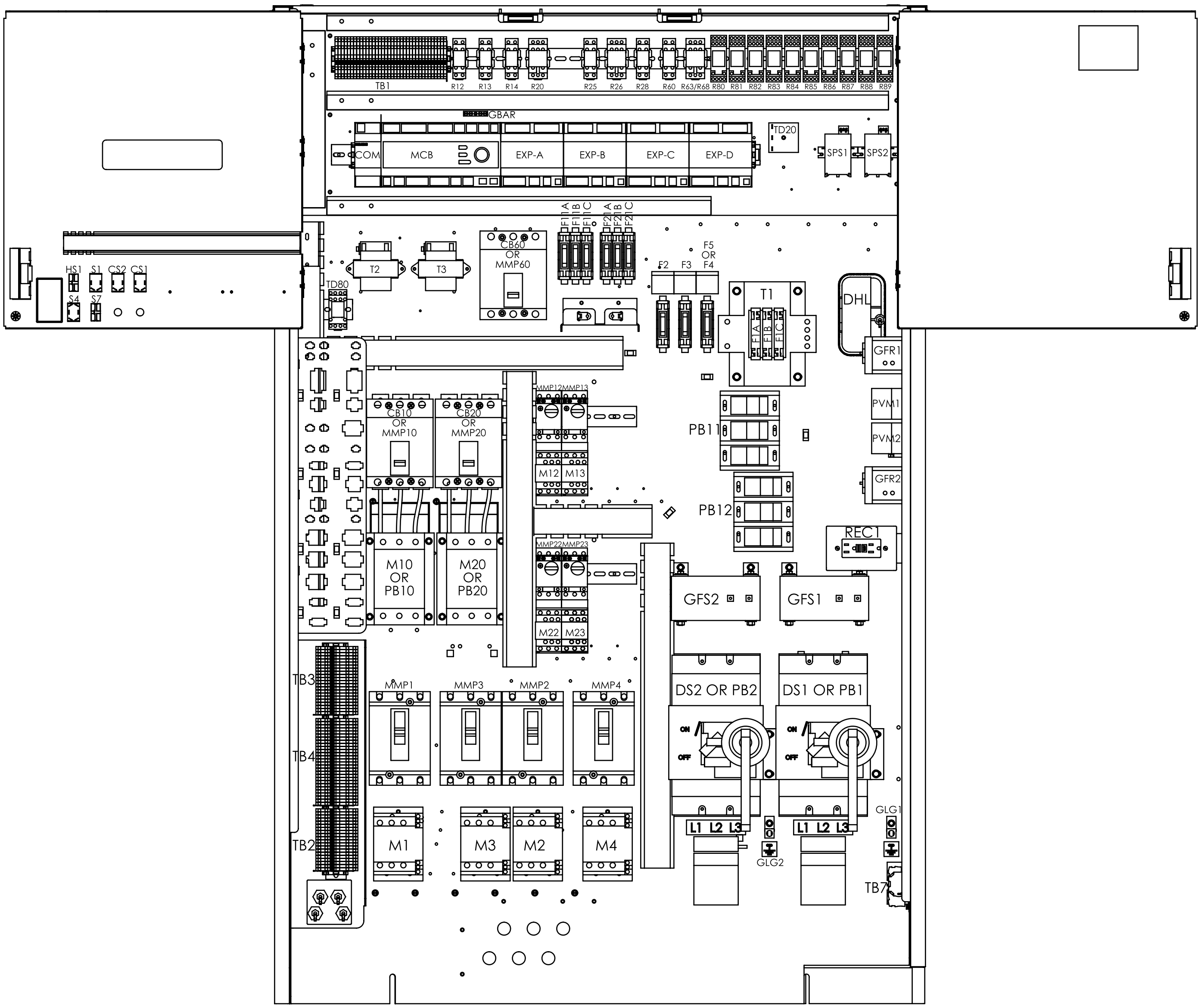


Figure 12: Typical Gas Heat Panel

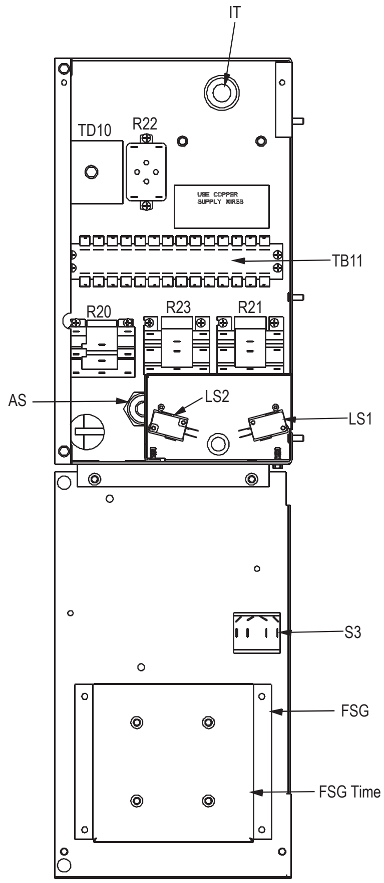


Figure 13: Typical Prop Exhaust Panel, 2 Fans, 460 Volt

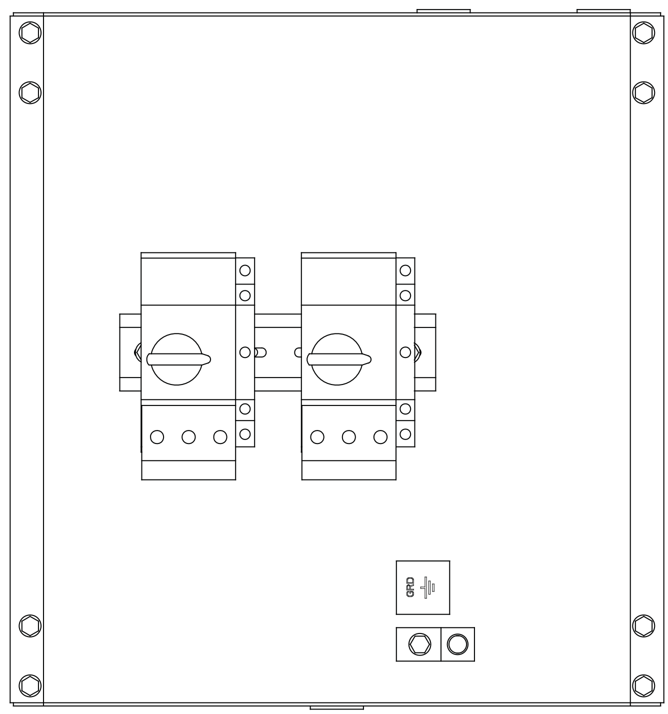


Figure 14: Condensing Unit Control Panel

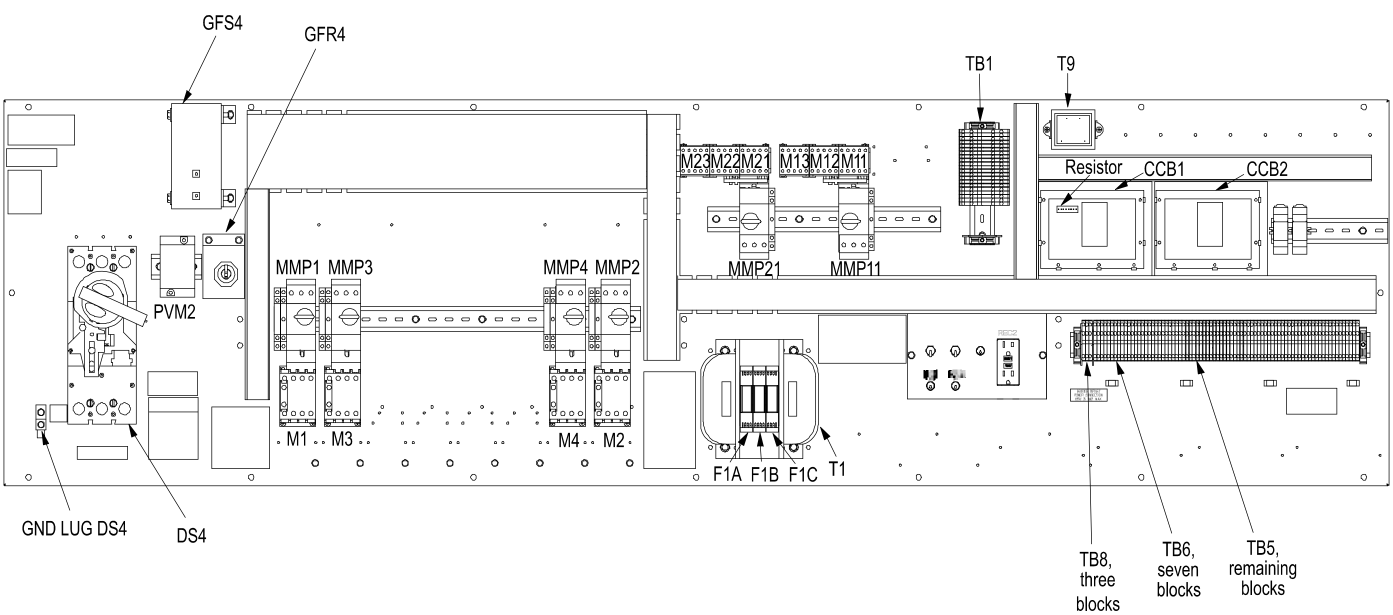


Figure 15: Electric Heat Panel

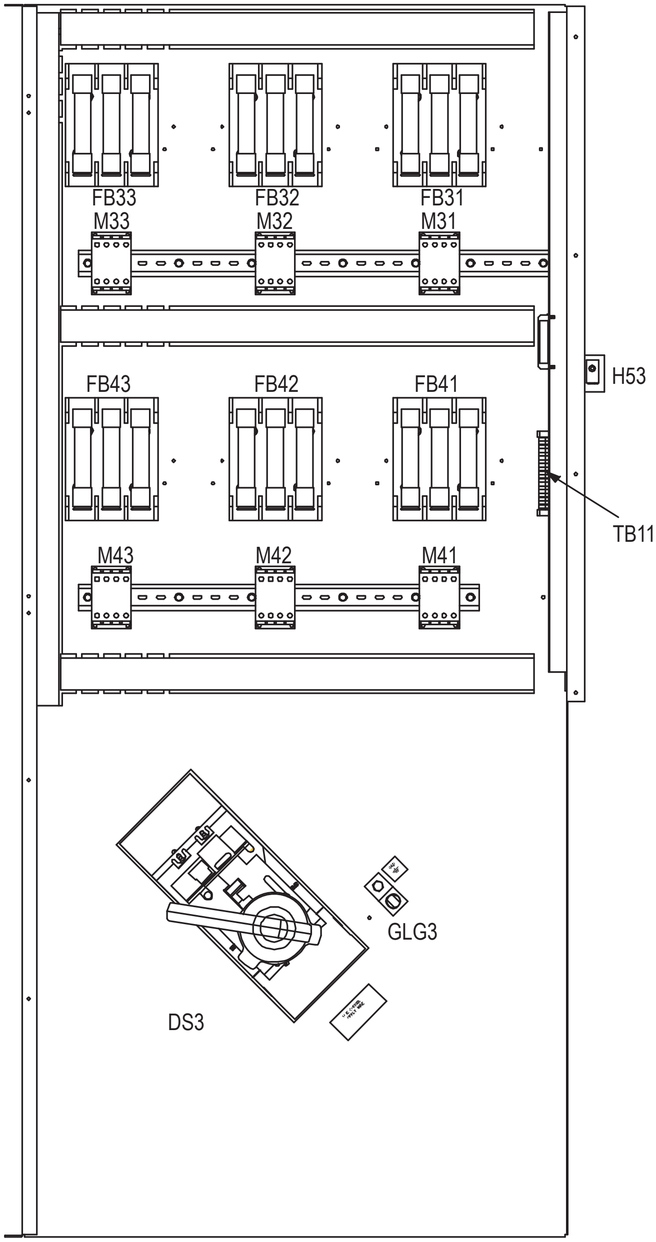
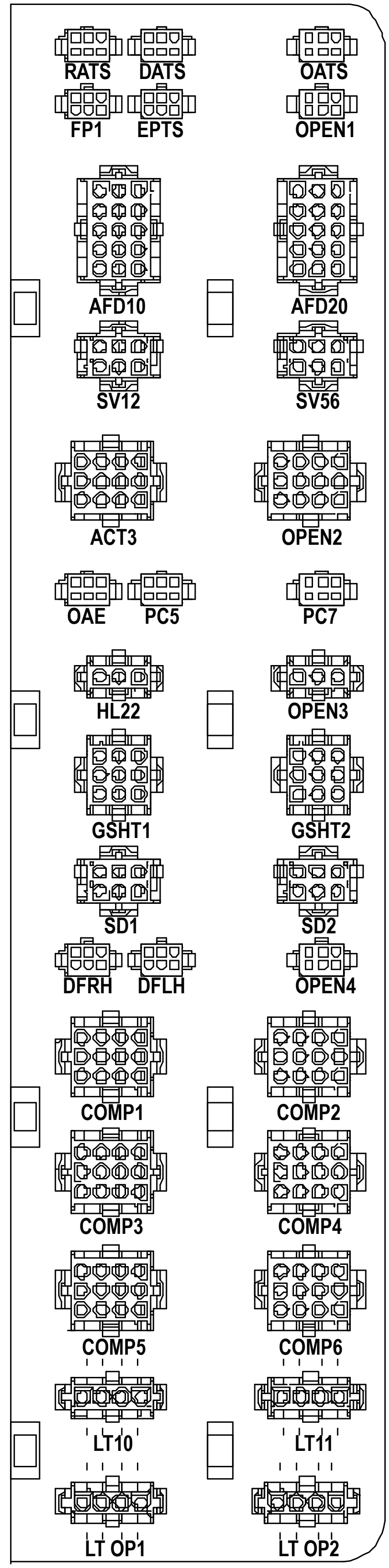


Figure 16: Harness Plug Connector Detail



Fantrol

The Fantrol, provided on all units, is a method of head pressure control that automatically cycles the condenser fans in response to ambient air temperature. This feature maintains head pressure and allows the unit to run at low ambient air temperatures.

Units have two independent refrigerant circuits with one to four condenser fans being controlled independently by the ambient air temperature of each circuit. See the following sections for sequence of operation for condenser fans with Fantrol.

Table 2: R-410A Fantrol Setpoints in °F with MicroTech III Controls

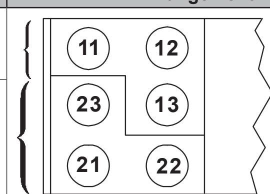
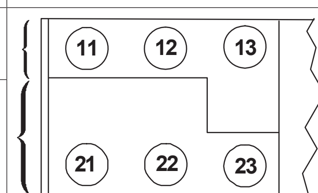
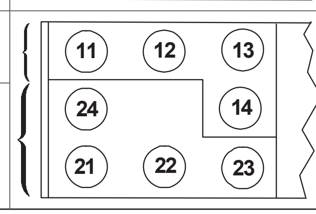
MPS Model	Degrees Farenheit									
	B05		B06		B07		B08		PC13/PC23*	
	Setpoint	Differential	Setpoint	Differential	Setpoint	Differential	Setpoint	Differential	Setpoint	Differential
062E	0	5	70	5	0	5	—	—	—	—
070E	0	5	75	5	—	—	—	—	90	35
075E	0	5	65	5	85	5	—	—	90	35

* PC13/23 Cutin = 450 psig (125 degree sat.)
Cut out= 275 psig (90 degree sat.)

Condenser Fan Arrangement

Table 3 shows the condenser fan numbering conventions and locations for each unit size.

Table 3: Condenser Fan Arrangement

Unit Size	Refrigerant Circuit	Arrangement
062E	1	
	2	
070E	1	
	2	
075E	1	
	2	

⚠ CAUTION

Sharp edges on sheet metal and fasteners can cause personal injury.

This equipment must be installed, operated, and serviced only by an experienced installation company and fully trained personnel.

The installation of this equipment shall be in accordance with the regulations of authorities having jurisdiction and all applicable codes. It is the responsibility of the installer to determine and follow the applicable codes.

NOTE: Low head pressure may lead to poor, erratic refrigerant feed control at the thermostatic expansion valve. The units have automatic control of the condenser fans which should provide adequate head pressure control down to 50°F (10°C) provided the unit is not exposed to windy conditions. The system designer is responsible for assuring the condensing section is not exposed to excessive wind or air recirculation.

Receiving Inspection

When the equipment is received, all items should be carefully checked against the bill of lading to be sure all crates and cartons have been received. **If the unit has become dirty during shipment (winter road chemicals are of particular concern), clean it when received.**

All units should be carefully inspected for damage when received. Report all shipping damage to the carrier and file a claim. In most cases, equipment is shipped F.O.B. factory and claims for freight damage should be filed by the consignee.

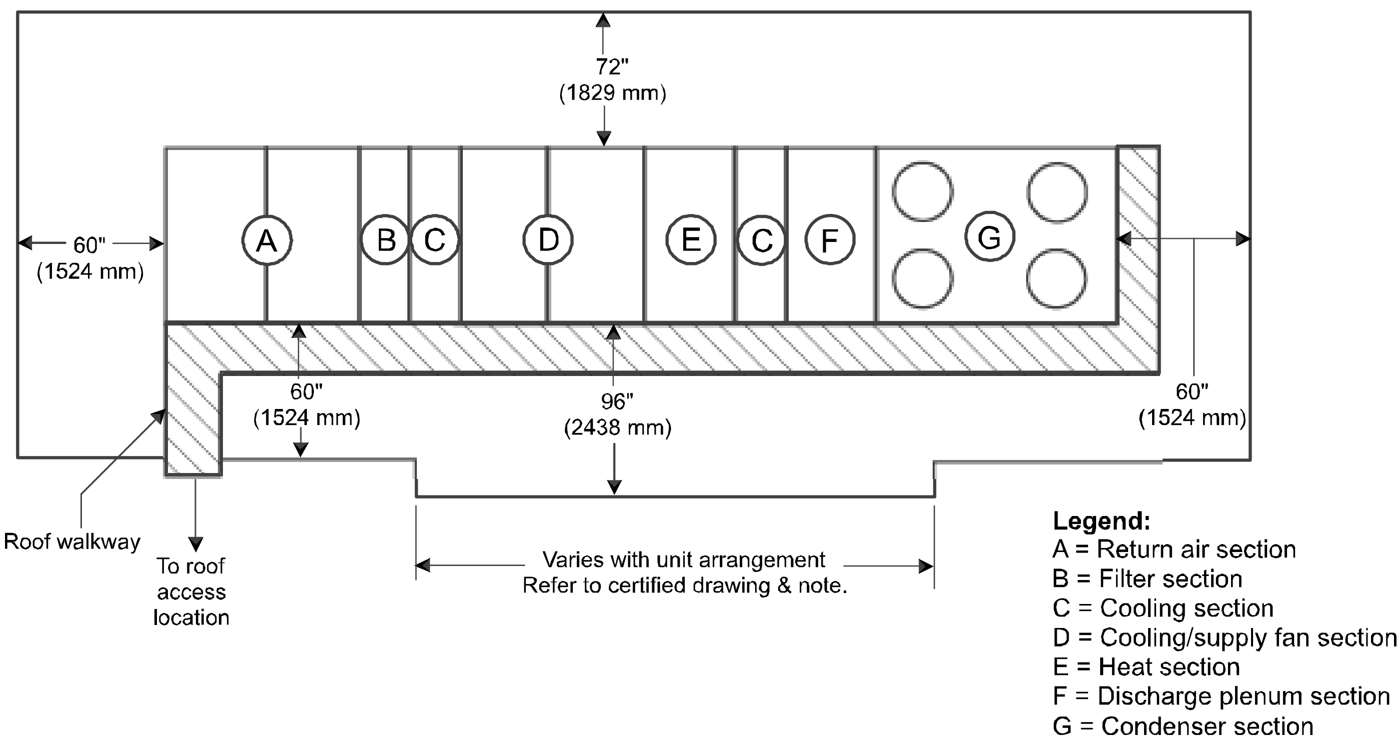
Before unloading the unit, check the unit nameplate to make sure the voltage complies with the power supply available.

Unit Clearances

Service Clearance

Allow service clearance approximately as indicated in Figure 17. Also, Daikin recommends providing a roof walkway to the rooftop unit as well as along at least the two sides of the unit that provide access to most controls and serviceable components.

Figure 17: Service Clearances



Ventilation Clearance

Below are minimum ventilation clearance recommendations. The system designer must consider each application and provide adequate ventilation. If this is not done, the unit will not perform properly.

Unit(s) surrounded by a screen or a fence:

1. The bottom of the screen or fence should be at least 1 ft. (305 mm) above the roof surface.
2. The distance between the unit and a screen or fence should be as described in "Service Clearance" and Figure 17 on page 15.
3. The distance between any two units within a screen or fence should be at least 120" (3048 mm).

Unit(s) surrounded by solid walls:

1. If there are walls on one or two adjacent sides of the unit, the walls may be any height. If there are walls on more than two adjacent sides of the unit, the walls should not be higher than the unit.
2. The distance between the unit and the wall should be at least 96" (2438mm) on all sides of the unit.
3. The distance between any two units within the walls should be at least 120" (3048mm).

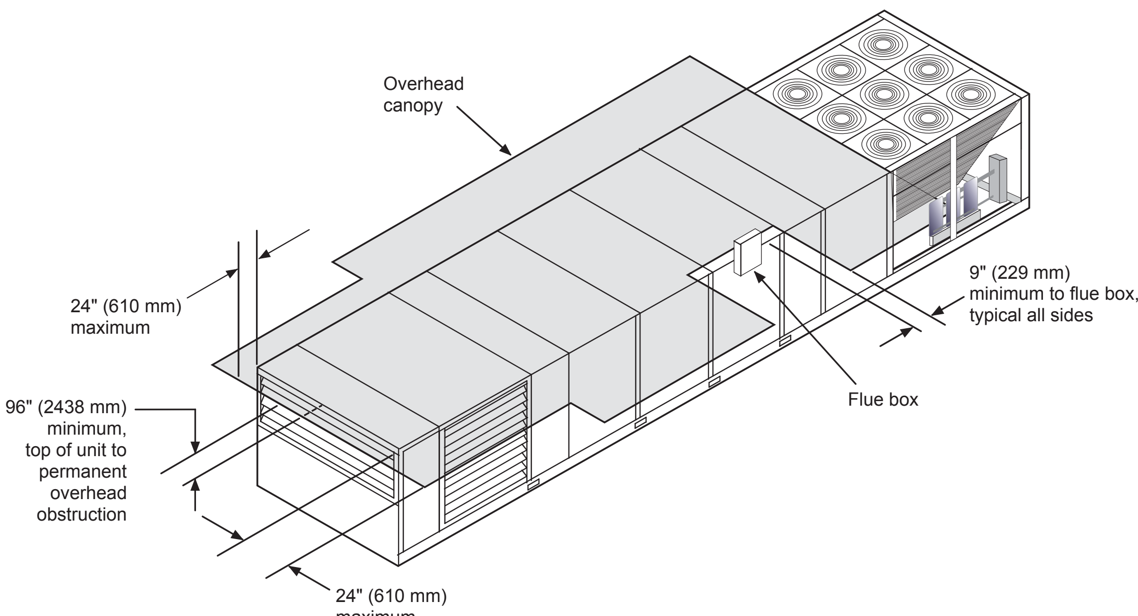
Do not locate outside air intakes near exhaust vents or other sources of contaminated air.

If the unit is installed where windy conditions are common, install wind screens around the unit, maintaining the clearances specified (see Figure 18). This is particularly important to prevent blowing snow from entering outside air intake and to maintain adequate head pressure control when mechanical cooling is required at low outdoor air temperatures.

Overhead Clearance

1. Unit(s) surrounded by screens or solid walls must have no overhead obstructions over any part of the unit.
2. The area above the condenser must be unobstructed in all installations to allow vertical air discharge.
3. The following restrictions must be observed for overhead obstructions above the air handler section (see Figure 18):
   a. There must be no overhead obstructions above the furnace flue, or within 9" (229 mm) of the flue box.
   b. Overhead obstructions must be no less than 96" (2438 mm) above the top of the unit.
   c. There must be no overhead obstructions in the areas above the outside air and exhaust dampers that are farther than 24" (610 mm) from the side of the unit.

Figure 18: Overhead Clearance



Roof Curb Assembly and Installation

⚠ WARNING

Mold can cause personal injury. Some materials such as gypsum wallboard can promote mold growth when damp. Such materials must be protected from moisture that can enter units during maintenance or normal operation.

Locate the roof curb and unit on a portion of the roof that can support the weight of the unit. The unit must be supported to prevent bending or twisting of the machine.

If building construction allows sound and vibration into the occupied space, locate the unit over a non-critical area. It is the responsibility of the system designer to make adequate provisions for noise and vibration in the occupied space.

Install the curb and unit level to allow the condensate drain to flow properly and allow service access doors to open and close without binding.

Integral supply and return air duct flanges are provided with the roof curb, allowing connection of duct work to the curb before the unit is set. The gasketed top surface of the duct flanges seals against the unit when it is set on the curb. These flanges must not support the total weight of the ductwork. See “Installing Ductwork” on page 26 for details on duct connections. It is critical that the condensate drain side of the unit be no higher than the opposite side.

Assembly of a typical roof curb is shown in Figure 19 on page 18. Parts **A** through **K** are common to all units having bottom supply and return openings. Depending on the unit length, Parts **L** and **M** may be included with the roof curb kit to create the correct overall curb length.

Assembly Instructions (Figure 19 on page 18)

1. Set curbing parts A through K per dimensions shown over roof opening or on a level surface. Note location of return and supply air openings.
2. If applicable, set other curbing parts (**D**, **L**, **M**, etc.) in place making sure that the orientation complies with the assembly instructions. Check alignment of all mating bolt holes. See Detail A.
3. Bolt curbing parts together using fasteners provided. Tighten all bolts finger tight.
4. Square entire curbing assembly and securely tighten all bolts.
5. Position curb assembly over roof openings. Curb must be level from side to side and over its length. Check that top surface of the curb is flat with no bowing or sagging.
6. Weld curbing in place. Caulk all seams watertight. Remove backing from 0.25" (6 mm) thick × 1.50" (38 mm) wide gasketing and apply to surfaces shown by cross-hatching.
7. Flash curbing into roof as shown in Detail B.
8. Parts **E** and **F** are not required on units with no return shaft within the curb perimeter.
9. Parts **G** and **H** are not required on units with no supply shaft within the curb perimeter.
10. Be sure that electrical connections are coordinated (see Figure 20 on page 19).

Figure 19: Roof Curb Assembly

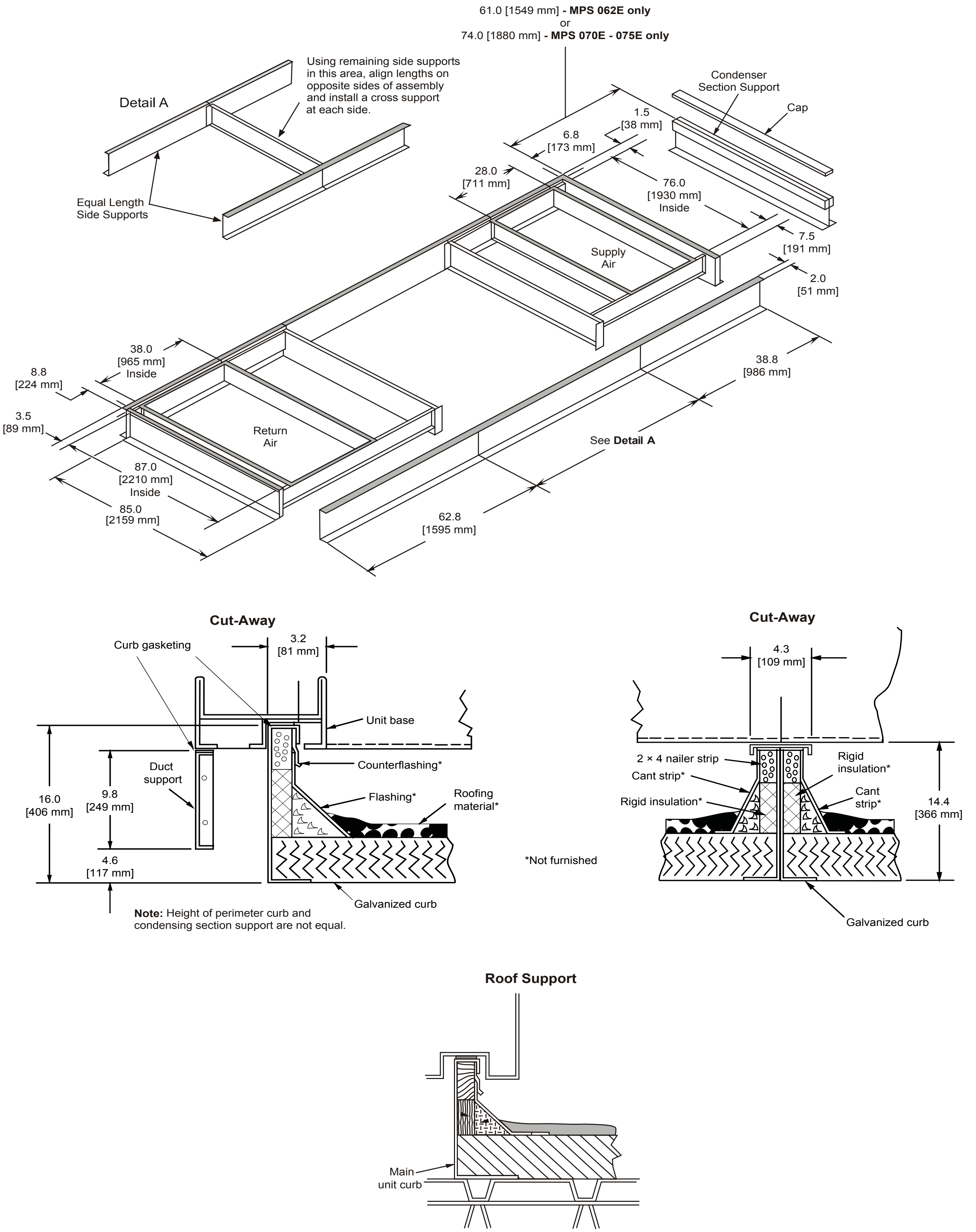
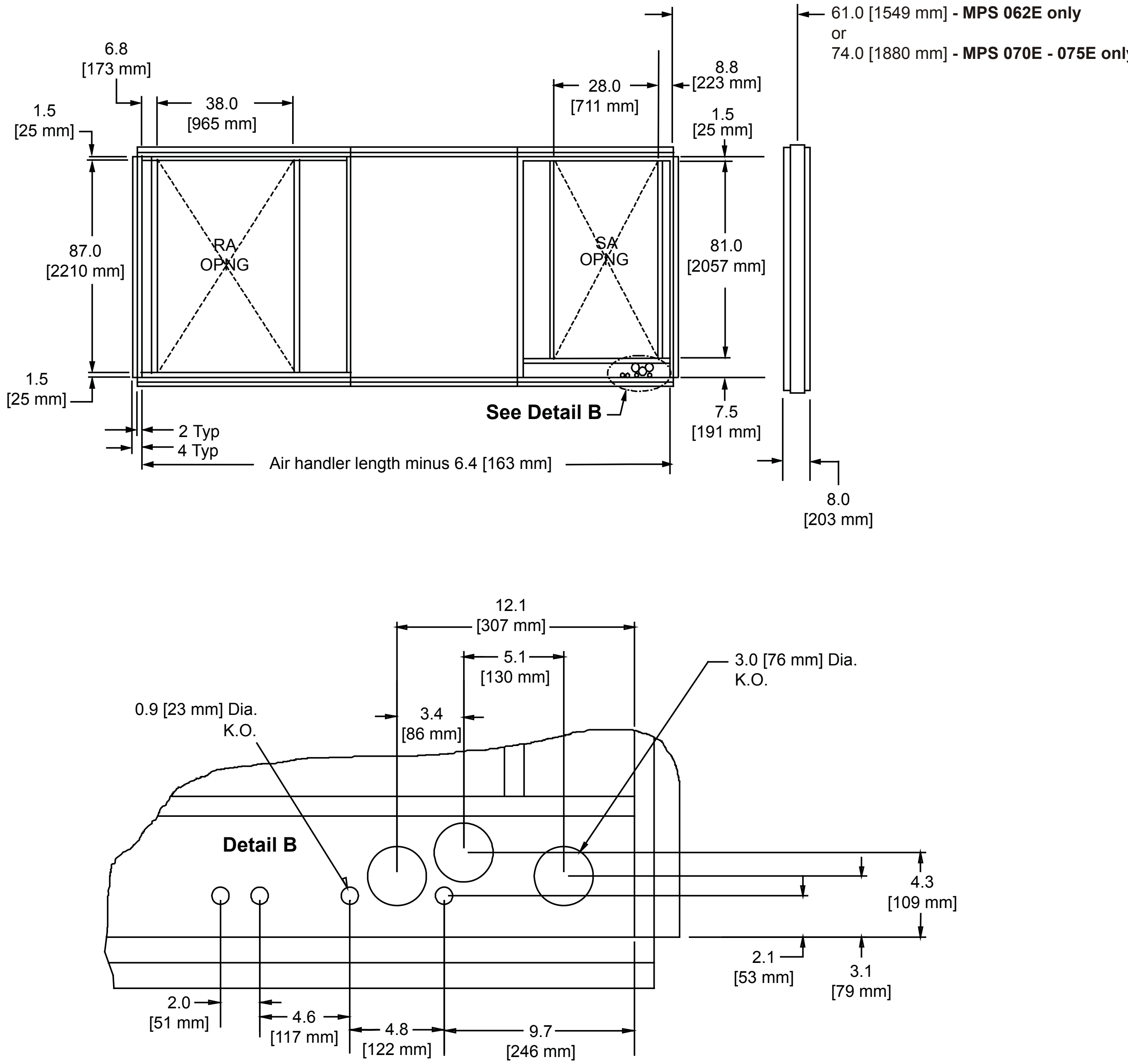


Figure 20: Typical Power Wire Entrance, Curb View (See Project Certified Drawings)



Post and Rail Mounting

⚠ CAUTION

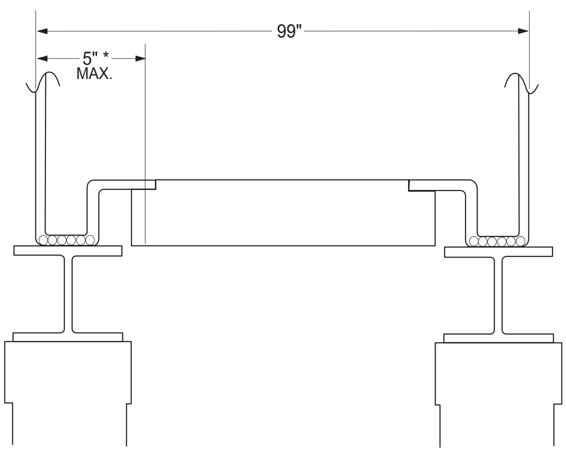
Equipment damage can result if the unit is not level.

The unit must be level side-to-side and over the entire length.

When mounting by post and rail, run the structural support the full length of the unit. Locate the structural member at the base of the unit as shown in Figure 21, assuring the I-beam is well supported by the structural member.

If resilient material is placed between the unit and the rail, insert a heavy steel plate between the unit and the resilient material to distribute the load. Seal cabinet penetrations (electrical, piping, etc.) properly to protect against moisture and weather.

Figure 21: Post and Rail Mounting



* Beam can extend beneath unit no more than 5" to allow adequate space for duct connections and electrical entry.

Rigging and Handling

⚠ WARNING

Use all lifting points. Improper lifting can cause severe personal injury and property damage.

Lifting brackets with 2" (51 mm) diameter holes are provided on the sides of the unit.

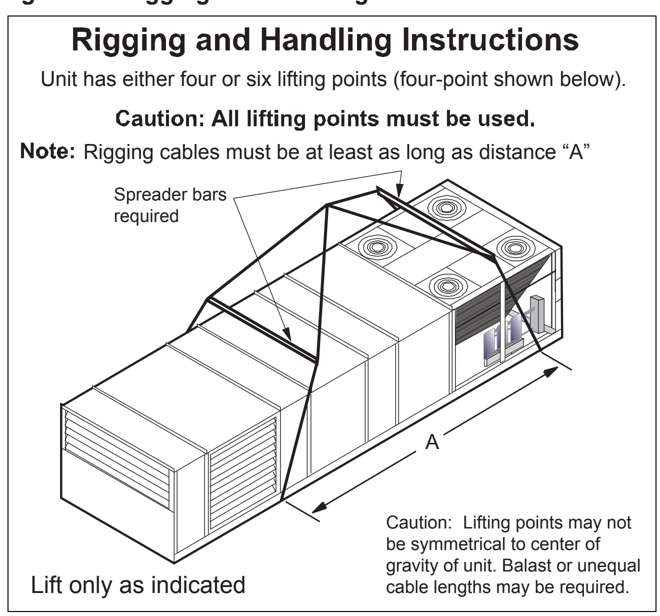
Use spreader bars, 96" to 100" (2438 to 2540 mm) wide to prevent damage to the unit cabinet. Avoid twisting or uneven lifting of the unit. The cable length from the bracket to the hook should always be longer than the distance between the outer lifting points.

If the unit is stored at the construction site for an intermediate period, take these additional precautions:

1. Support the unit well along the length of the base rail.
2. Level the unit (no twists or uneven ground surface).
3. Provide proper drainage around the unit to prevent flooding of the equipment.
4. Provide adequate protection from vandalism, mechanical contact, etc.
5. Securely close the doors.
6. If there are isolation dampers, make sure they are properly installed and fully closed to prevent the entry of animals and debris through the supply and return air openings.
7. Cover the supply and return air openings on units without isolation dampers.

Figure 22 shows an example of the rigging instruction label shipped with each unit.

Figure 22: Rigging and Handling Instruction Label



Lifting Points

⚠ CAUTION

Lifting points may not be symmetrical to the center of gravity of the unit. Ballast or unequal cable lengths may be required.

Refer to Figure 23 and the following calculations to determine whether a four or six point lift is required.

B = distance from first lifting lug to middle lifting lug on units with 6-point lift.
X = distance from the entering air end of the unit (or shipping section) to the first lifting lug in the direction of air flow.
X = 48", for all unit or shipping sections with outdoor air/return air options.
X = 0", for shipping sections without outdoor air/return air options.
Y = distance from condenser or leaving air end of unit to the last lifting lug.
Y = 36.5" (size 62) or **Y = 30.0"** (sizes 70-75), for all units or shipping sections with condensers.
Z = total base rail length of the units.

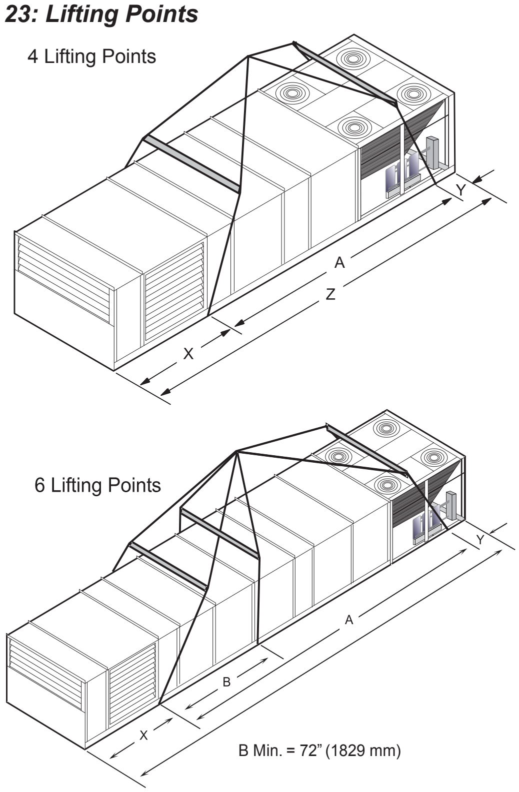
NOTE: **Z** excludes hoods and overhung parts extending past base rails of the unit.

Installation

A = Z - X - Y
If A < 288", 4-point lift is sufficient
If A > 288", 6-point lift is required
B = A / 2 +/- 48"

NOTE: Middle lifting lug may be installed on either side of the midpoint to avoid interference with condensate drains.

Figure 23: Lifting Points



Cabinet Weather Protection

⚠ CAUTION

Transportation, rigging, or maintenance can damage the unit's weather seal. Periodically inspect the unit for leakage. Standing moisture can promote microbial growth, disease, or damage to the equipment and building.

This unit ships from the factory with fully gasketed access doors and cabinet caulking to provide weather resistant operation. After the unit is set in place, inspect all door gaskets for shipping damage and replace if necessary.

Protect the unit from overhead run off from overhangs or other such structures.

Recaulk field-assembled options such as external piping or vestibules per the installation instructions provided with the option.

Unit Piping

Condensate Drain Connection

⚠ WARNING

Cleaning should be performed by qualified personnel.

Drain pans must be cleaned periodically. Material in uncleaned drain pans can cause disease.

The unit is provided with a 1.5" male NPT condensate drain connection. Refer to certified drawings for the exact location. For proper drainage, level the unit and drain pan side to side and install a P-trap.

RPS units may have positive or negative pressure sections. Use traps in both cases with extra care given to negative pressure sections. In Figure 24, dimension **A** should be a minimum of 8" (203 mm). As a conservative measure to prevent the cabinet static pressure from blowing or drawing the water out of the trap and causing air leakage, dimension **A** should be two times the maximum static pressure encountered in the coil section in inches w.c.

Draining condensate directly onto the roof may be acceptable; refer to local codes. Provide a small drip pad of stone,mortar, wood, or metal to protect the roof against possible damage.

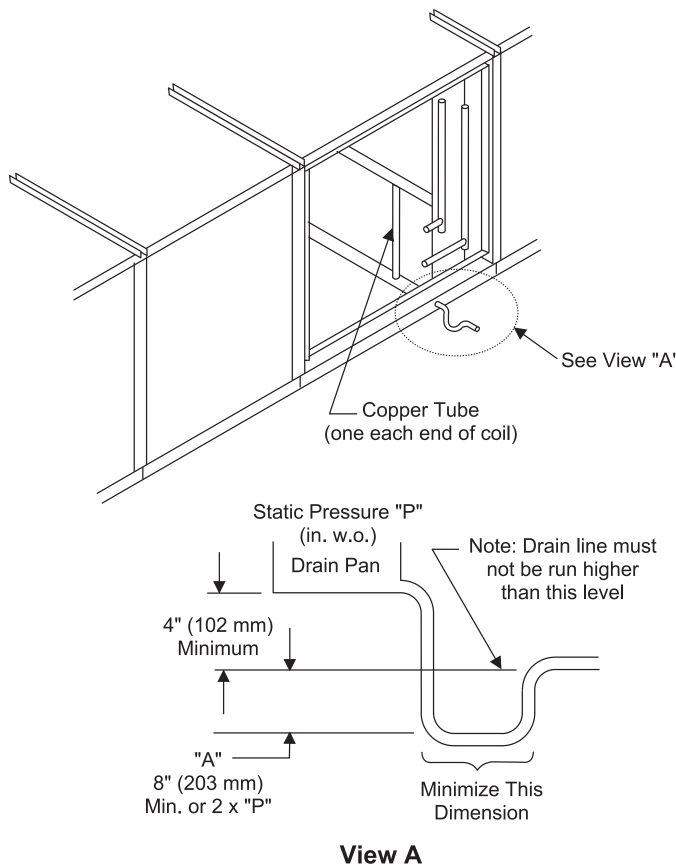
If condensate is piped into the building drainage system, pitch the drain line away from the unit a minimum of 1/8" per foot. The drain line must penetrate the roof external to the unit. Refer to local codes for additional requirements. Sealed drain lines require venting to provide proper condensate flow.

Where the cooling coils have intermediate condensate pans on the face of the evaporator coil, copper tubes near both ends of the coil provide drainage to the main drain pan. Check that the copper tubes are in place and open before the unit is put into operation.

On units with staggered cooling coils, the upper drain pan drains into the lower coil drain pan through a copper tube near the center of the drain pan. Check that this tube is open before putting the unit into operation and as a part of routine maintenance.

Drain pans in any air conditioning unit have some moisture in them, allowing micro-organisms to grow. Therefore, periodically clean the drain pan to prevent this buildup from plugging the drain and causing the drain pan to overflow. Clean drain pans to prevent the spread of disease. Cleaning should be performed by qualified personnel.

Figure 24: Condensate Drain Connection



Gas Piping

See the "Installation" section of the gas-fired furnace installation manual, IM 684 or IM 685.

Hot Water Coil Piping

⚠ CAUTION

Coil freeze possible. Can damage equipment. Follow instructions for mixing antifreeze solution used. Some products have higher freezing points in their natural state than when mixed with water. The freezing of coils is not the responsibility of Daikin Applied. Refer to "Winterizing Water Coils" on page 101.

Hot water coils are provided without valves for field piping or piped with three-way valves and actuator motors.

Hot water coils are not normally recommended for use with entering air temperatures below 40°F (4°C). No control system can guarantee a 100% safeguard against coil freeze-up. Glycol solutions or brines are the only freeze-safe media for operation of water coils at low entering air temperature conditions.

When no factory piping or valve is included, the coil connections are 1-5/8" ODM copper.

Refer to the certified drawings for the recommended piping entrance locations. Seal all piping penetrations to prevent air and water leakage.

NOTE: All coils have vents and drains factory installed.

With the factory piping and valve package, field piping connections are the same NPT size as the valve with female threading (see Figure 26).

Factory-installed water valves and piping are bronze, brass, and copper. Dissimilar metals within the plumbing system can cause galvanic corrosion. To avoid corrosion, provide proper di-electric fittings as well as appropriate water treatment.

Figure 25: Hot Water Heat Section (Shown with Factory Valve and Piping)

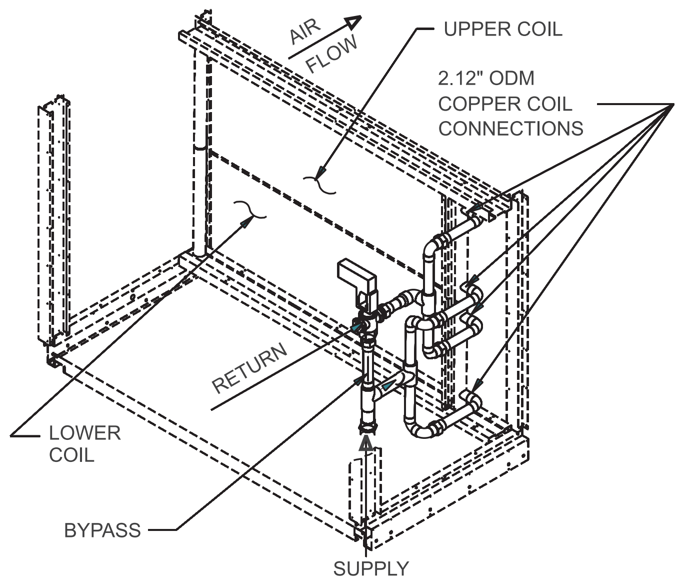
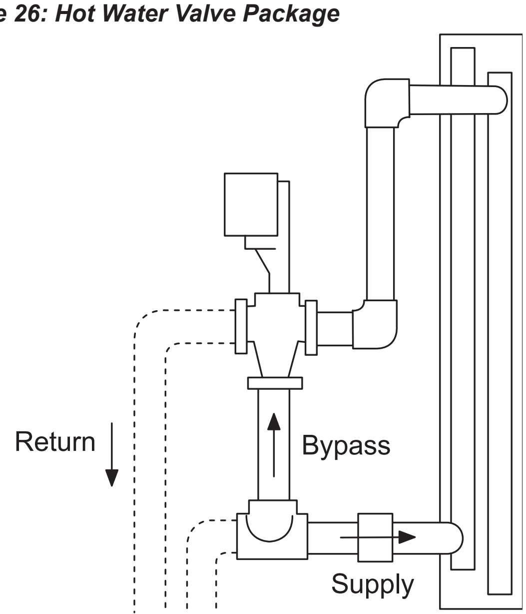


Figure 26: Hot Water Valve Package



Damper Assemblies

The optional damper assemblies described in this section normally are ordered with factory-installed actuators and linkages. The following sections describe operation and linkage adjustment of the factory-installed option.

Economizer Dampers

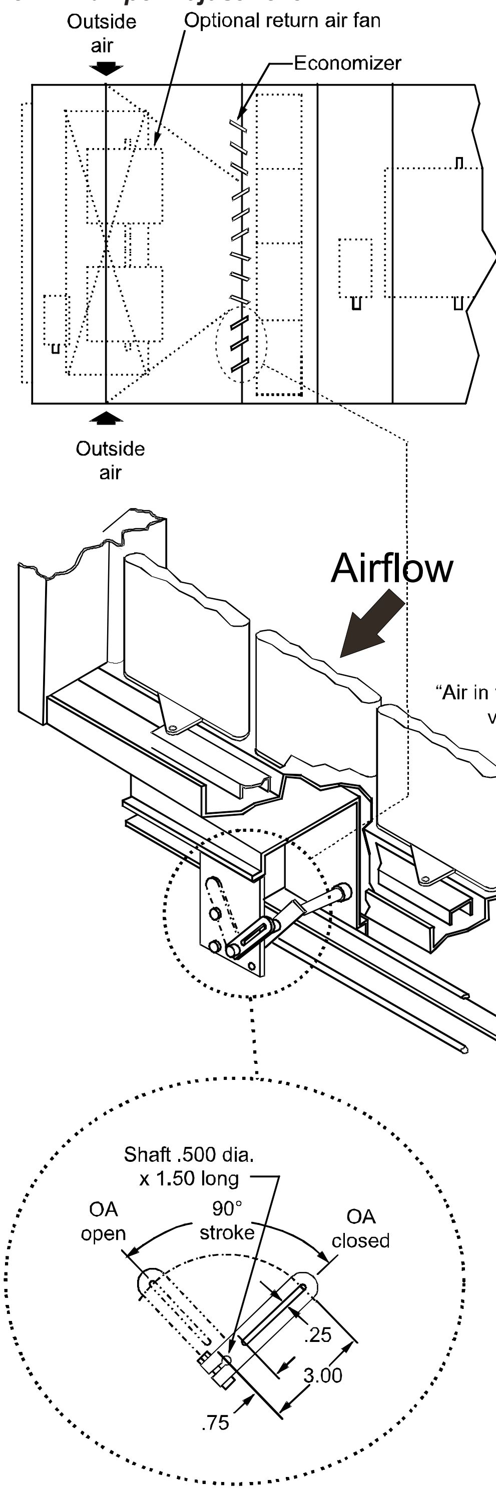
Outside air intake is provided on both sides of the unit, and the return air path is at the center of the damper set. As the single actuator modulates the outside air dampers open, the return air dampers close. Exhaust air exits the unit through the gravity relief dampers provided at the end of the economizer section.

The damper is set so that the crankarm moves through a 90 degree angle to bring the economizer dampers from full-open to full-close (see Figure 27). Access to the actuator and linkage is from the filler section. Mechanical stops are placed in the crankarm mounting bracket. Do not remove stops. Driving the crankarm past the stops results in damage to the linkage or damper. The unit ships with a shipping bolt securing the linkage crankarm. Remove shipping bolt before use.

NOTE: For good airflow control, adjust linkages so damper blades do not open beyond 70 degrees. Opening a damper blade beyond 70 degrees has little effect on its airflow.

Do not "overclose" low leak damper blades. The edge seal should just lightly contact the adjoining blade. The blades will lock up if they are closed so far the seal goes over center.

Figure 27: Damper Adjustment



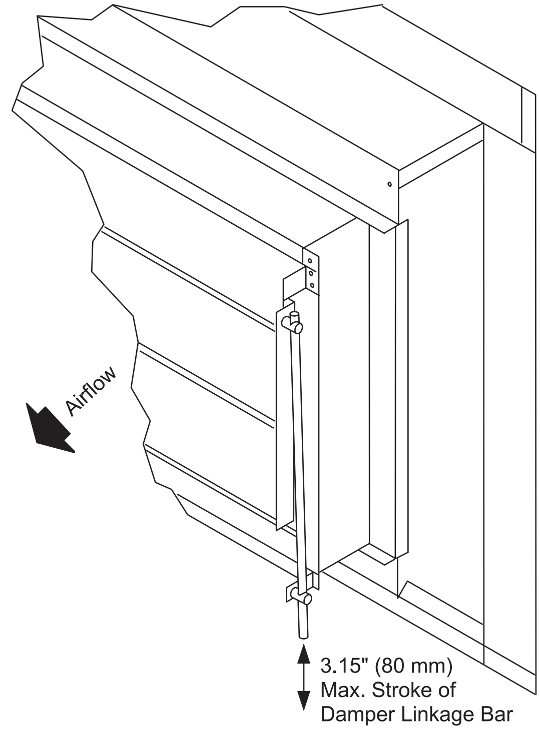
Intake Hood Damper (0% to 30% Outside Air)

These dampers are intended to remain at a fixed position during unit operation, providing fresh air quantities from 0% to 30% of the total system airflow, depending on the damper setting. This setting is made at the linkage rod on units with manually adjustable linkages.

On units provided with MicroTech III controls, the damper position may be set at the controller keypad. During unit operation, the two-position actuator drives the damper to the position set on the keypad. During the OFF cycle, the damper is automatically closed.

No unit-mounted exhaust dampers are provided with this option.

Figure 28: Damper Linkage Bar Typical for All Sizes



Installing Ductwork

⚠ WARNING

Mold can cause personal injury. Materials such as gypsum wall board can promote mold growth when damp. Such materials must be protected from moisture that can enter units during maintenance or normal operation.

NOTICE

Installer must provide access in the ductwork for plenum-mounted controls. Once duct work is installed in units with side discharge, access to plenum-mounted components is difficult.

On bottom-supply/bottom-return units, if a Daikin roof curb is not used, the installing contractor should make an airtight connection by attaching field fabricated duct collars to the bottom surface of either the roof curb's duct flange or the unit's duct opening. Do not support the total weight of the ductwork from the unit or these duct flanges. See Figure 29.

Units with optional back return or side discharge all have duct collars provided. To expose the discharge duct collars on a side discharge unit, remove the plenum section access door and the door gasketing.

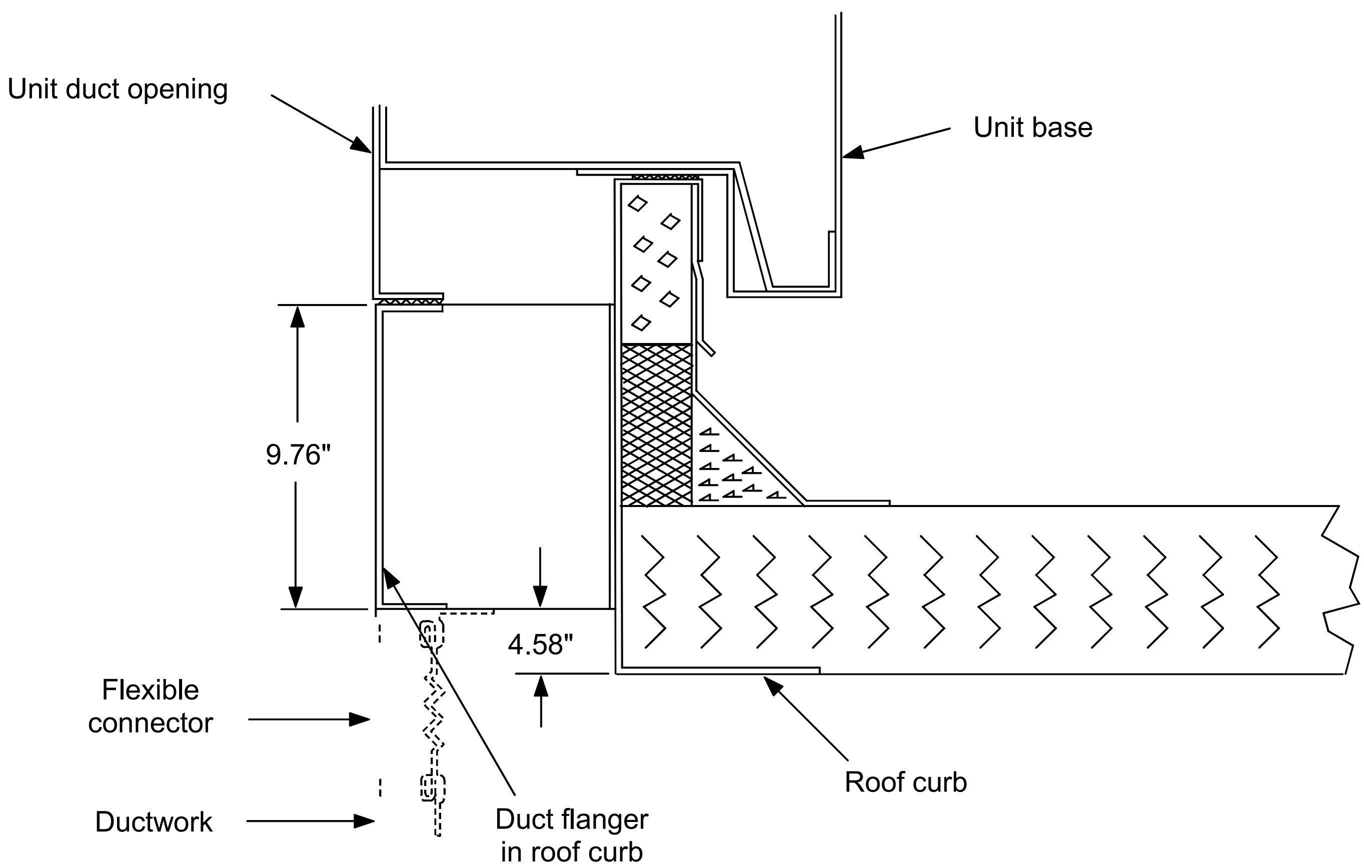
Use flexible connections between the unit and ductwork to avoid transmission of vibration from the unit to the structure.

To minimize losses and sound transmission, design duct work per ASHRAE and SMACNA recommendations.

Where return air ducts are not required, connect a sound absorbing T or L section to the unit return to reduce noise transmission to the occupied space.

Ductwork exposed to outdoor conditions must be built in accordance with ASHRAE and SMACNA recommendations and local building codes.

Figure 29: Installing Duct Work



Installing Duct Static Pressure Sensor Taps

For all VAV units, duct static pressure taps must be field installed and connected to the pressure sensors in the unit. Sensor SPS1 is standard; additional sensor SPS2 is optional. These sensors are located in the main control panel (see “Control Panel” on page 10).

Carefully locate and install the duct static pressure sensing tap. Improperly locating or installing the sensing tap causes unsatisfactory operation of the entire variable air volume system. Below are pressure tap location and installation recommendations.The installation must comply with local code requirements

1. Install a tee fitting with a leak-tight removable cap in each tube near the sensor fitting. This facilitates connecting a manometer or pressure gauge if testing is required.
2. Use different colored tubing for the duct pressure (HI) and reference pressure (LO) taps, or tag the tubes. Daikin recommends ¼" plastic tubing.
3. Locate the duct pressure (HI) tap near the end of a long duct to ensure that all terminal box take-offs along the run have adequate static pressure.
4. Locate the duct tap in a non-turbulent flow area of the duct. Keep it several duct diameters away from take-off points, bends, neckdowns, attenuators, vanes, or other irregularities.
5. Use a static pressure tip (Dwyer A302 or equivalent) or the bare end of the plastic tubing for the duct tap. (If the duct is lined inside, use a static pressure tip device.)
6. Install the duct tap so that it senses only static pressure (not velocity pressure). If a bare tube end is used, it must be smooth, square (not cut at an angle) and perpendicular to the airstream (see Figure 31).
7. Locate the reference pressure (LO) tap somewhere near the duct pressure tap within the building (see Figure 30). If the reference tap is not connected to the sensor, unsatisfactory operation will result.
8. Route the tubes between the curb and the supply duct, and feed them into the unit through the knockout in the bottom of the control panel (see Figure 30). Connect the tubes to appropriate barbed fittings in the control panel. (Fittings are sized to accept ¼" plastic tubing.)

Figure 30: Static Pressure Tubing Entrance Location

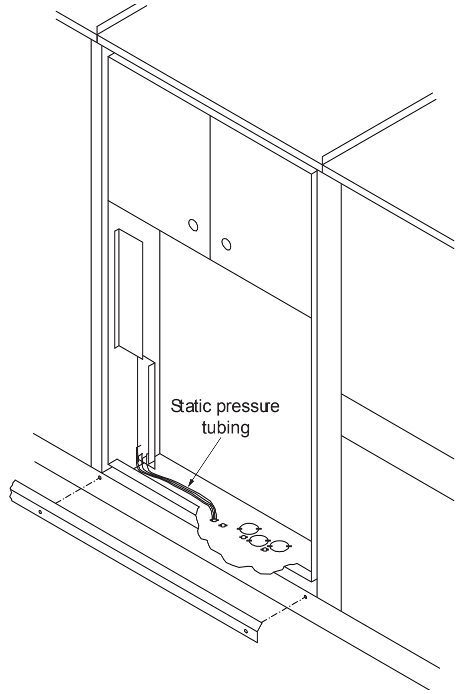
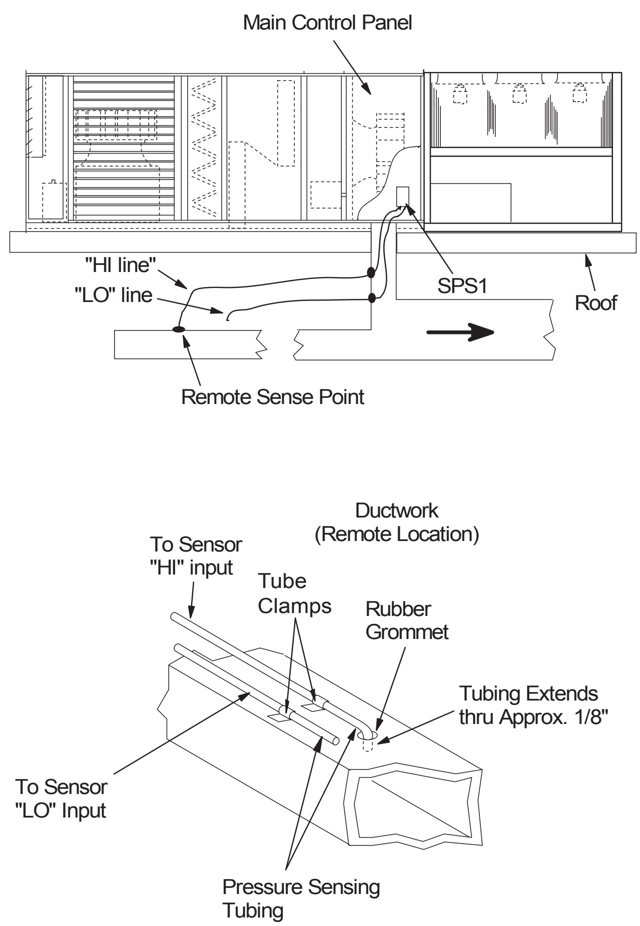


Figure 31: Pressure Sensing Tubing Installation



Installing Building Static Pressure Sensor Taps

⚠ CAUTION

Fragile sensor fittings.

If you must remove tubing from a pressure sensor fitting, use care. Do not use excessive force or wrench the tubing back and forth to remove or the fitting can break off and damage sensor.

If a unit has direct building static pressure control capability, you must field-install and connect static pressure taps to pressure sensor SPS2 in the unit. This sensor is located at the bottom of the main control panel next to terminal block TB2 (see “Control Panel” on page 10).

Carefully locate and install the two static pressure sensing taps. Improper location or installation of the sensor taps causes unsatisfactory operation. Below are pressure tap location and installation recommendations for both building envelope and lab, or “space within a space” pressure control applications. The installation must comply with local code requirements.

Building Pressurization Applications

1. Install a tee fitting with a leak-tight removable cap in each tube near the sensor fitting. This facilitates connecting a manometer or pressure gauge if testing is required.
2. Locate the building pressure (HI) tap in the area that requires the closest control. Typically, this is a ground level floor that has doors to the outside.
3. Locate the building tap so it is not influenced by any source of moving air (velocity pressure). These sources may include air diffusers or outside doors.
4. Route the building tap tube between the curb and the supply duct and feed it into the unit through the knockout in the bottom of the control panel (see Figure 30 on page 27). Connect the tube to the ¼-inch HI fitting for sensor SPS2.
5. Locate the reference pressure (LO) tap on the roof. Keep it away from the condenser fans, walls, or anything else that may cause air turbulence. Mount it high enough above the roof so it is not affected by snow. Not connecting the reference tap to the sensor results in unsatisfactory operation.
6. Use an outdoor static pressure tip (Dwyer A306 or equivalent) to minimize the adverse effects of wind. Place some type of screen over the sensor to keep out insects. Loosely packed cotton works well.
7. Route the outdoor tap tube out of the main control panel through a small field-cut opening in the edge of the control wiring raceway cover (see Figure 30). Cut this “mouse hole” in the vertical portion of the edge. Seal the penetration to prevent water from entering. Connect tube tothe ¼-inch LO fitting for sensor SPS2.

Lab Pressurization Applications

1. Install a “T” fitting with a leak-tight removable cap in each tube near the sensor fitting. This facilitates connecting a manometer or pressure gauge if testing is required.
2. Use different colored tubing for the controlled space pressure (HI) and reference pressure (LO) taps, or tag the tubes.
3. Regardless whether the controlled space is positive or negative with respect to its reference, locate the HI pressure tap in the controlled space. (The setpoint can be set between -0.2" and 0.2" w.c.)
4. Locate the reference pressure (LO) tap in the area surrounding the controlled space. Not locating the reference tap to the sensor results in unsatisfactory operation.
5. Locate both taps so they are not influenced by any source of moving air (velocity pressure). These sources may include air diffusers or doors between the high and low pressure areas.
6. Route the building tap tube between the curb and the supply duct and feed it into the unit through the knockout in the bottom of the control panel (see Figure 30).
7. Connect the tube to the ¼-inch HI fitting for sensor SPS2.

Field Power Wiring

⚠ DANGER

Hazardous voltage. Can cause severe injury or death.

Disconnect electric power before servicing equipment.

⚠ CAUTION

Wires are located in the base rail. Move wires before drilling hole(s) through the base rail.

Wiring must comply with all applicable codes and ordinances. The warranty is voided if wiring is not in accordance with these specifications. An open fuse, tripped circuit breaker, or Manual Motor Protector (MMP) indicates a short, ground, or overload. Before replacing a fuse, circuit breaker, MMP, or restarting a compressor or fan motor, identify the trouble and correct.

According to the National Electrical Code, a disconnecting means shall be located within sight of and readily accessible from the air conditioning equipment. The unit can be ordered with an optional factory-mounted disconnect switch. This switch is not fused. Power leads must be over-current protected at the point of distribution. The maximum allowable overcurrent protection (MROPD) appears on the unit nameplate.

All units are provided with internal power wiring for single or dual point power connection. The power block or an optional disconnect switch is located within the main control panel. Field power leads are brought into the unit through 3" knockouts in the bottom of the main control panel. Refer to the unit nameplate to determine the number of power connections. See Figure 32 and Table 4 on page 31.

If the unit has a factory mounted disconnect switch, generally the switch must be turned OFF to open the main control panel door. However, the door can be opened without disconnecting power by following the procedure covered on page 107. If this is done, use caution since power is not removed from the unit or the controller.

The preferred entrance for power cables is through the bottom knockouts provided on the unit. If side entrance is the only option, a drilling location is provided.

The drilling dimensions must be followed exactly to prevent damage to the control panel. The dimensions provided are the only possible point of side entrance for the power cables.

NOTE: To wire entry points, refer to certified drawings for dimensions.

Figure 32: Power Wiring Connections

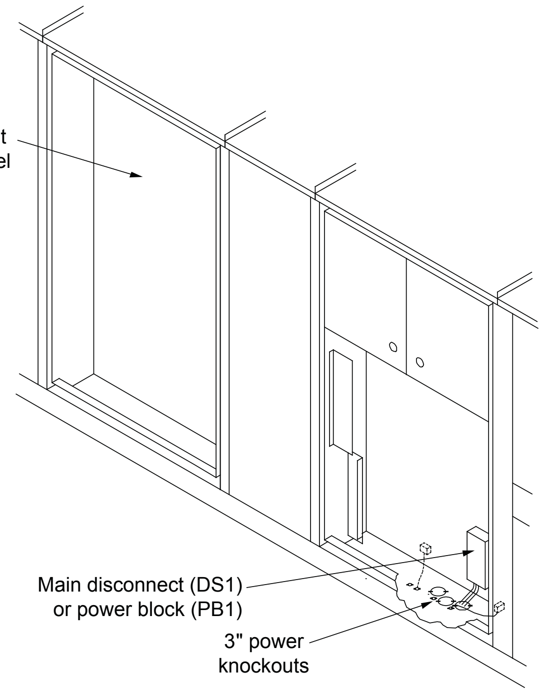


Figure 33: Optional Side Power Wiring Entrance

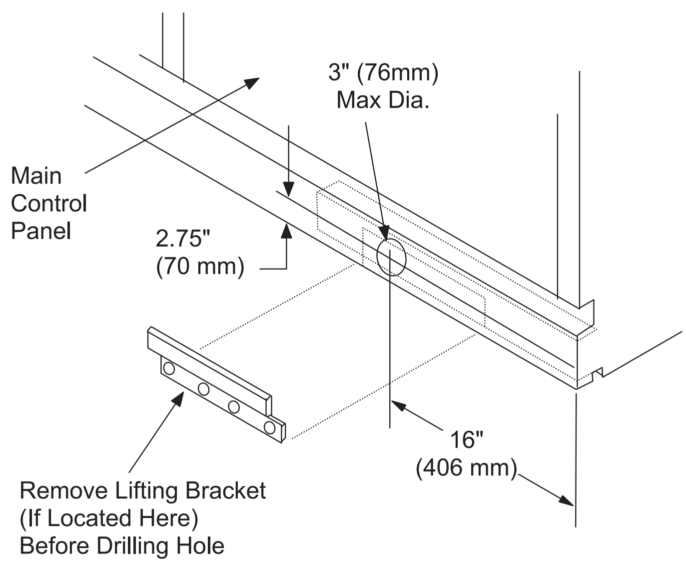
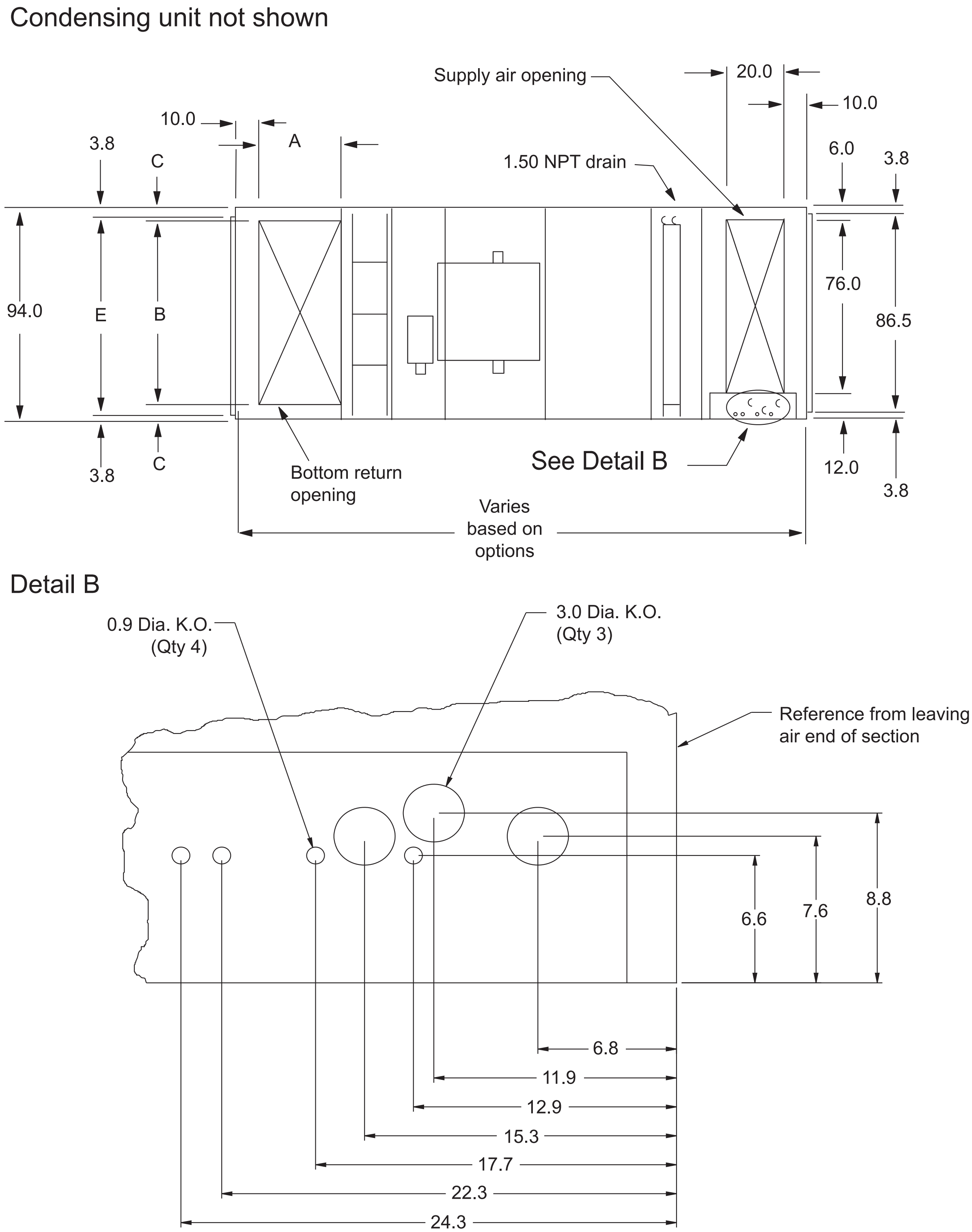


Figure 34: Typical Power Wire Entrance, Unit View (Actual Opening Shown on Submittal Documents)



All Units

⚠ CAUTION

Provide proper line voltage and phase balance. Improper line voltage or excessive phase imbalance constitutes product abuse. It can cause severe damage to the unit's electrical components.

The minimum circuit ampacity (wire sizing amps) is shown on the unit nameplate. Refer to Table 4 for the recommended number of power wires.

Copper wire is required for all conductors. Size wires in accordance with the ampacity tables in Article 310 of the National Electrical Code. If long wires are required, it may be necessary to increase the wire size to prevent excessive voltage drop. Wires should be sized for a maximum of 3% voltage drop. Supply voltage must not vary by more than 10% of nameplate. Phase voltage imbalance must not exceed 2%. (Calculate the average voltage of the three legs. The leg with voltage deviating the farthest from the average value must not be more than 2% away.) Contact the local power company for correction of improper voltage or phase imbalance.

A ground lug is provided in the control panel for each disconnect or power block. Size grounding conductor in accordance with Table 250-95 of the National Electrical Code.

In compliance with the National Electrical Code, an electrically isolated 115V circuit is provided in the unit to supply the factory-mounted service receptacle outlet and optional unit lights. This circuit is powered by a field connected 15A, 115V power supply. Leads are brought into the units through a 7/8" knockout in the bottom of the main control panel, near the power wire entry point.

Table 4: Recommended 3-Phase Power Wiring

To Ensure Disconnects and Power Blocks Mate with Power Wiring					
Wire Gauge	Qty./Pole	Insulation Rating (°C)	No. of Conduits	Conduit (Trade Size, in.)	For MCA up to (amps)
3	1	75	1	1-1/4	100
2	1	75	1	1-1/4	115
1	1	75	1	1-1/4	130
1/0	1	75	1	1-1/2	150
2/0	1	75	1	2	175
3/0	1	75	1	2	200
4/0	1	75	1	2	230
250	1	75	1	2-1/2	255
300	1	75	1	2-1/2	285
350	1	75	1	3	310
400	1	75	1	3	335
500	1	75	1	3	380
3/0	2	75	2	2	400
4/0	2	75	2	2	460
250	2	75	2	2-1/2	510
300	2	75	2	2-1/2	570
350	2	75	2	3	620
400	2	75	2	3	670
500	2	75	2	3	760
250	3	75	3	2-1/2	765

1. All wire sizes assume separate conduit for each set of parallel conductors.
2. All wire sizes based on NEC Table 310-16 for 75° CTHW wire (copper). Canadian electrical code wire ampacities may vary.
3. All wire sizes assume no voltage drop for short power leads.

Field Control Wiring

⚠ DANGER

Electrical shock hazard. Can cause severe injury or death.

Connect only low voltage NEC Class II circuits to terminal blocks TB2 and TB5. Reinstall and secure all protective dead front panels when the wiring installation is complete.

Units are available with several control arrangements which may require low voltage field wiring. Detailed descriptions of various field control wiring options and requirements are included in the "Field Wiring" section of IM 919, MicroTech III Unit Controller. Refer to the unit wiring diagrams for additional installation information.

Wiring must comply with applicable codes and ordinances. The warranty is voided if wiring is not in accordance with these specifications.

All field control wiring connections are made at the Class II terminal block TB2, which is located in the main control panel. Field wiring connections to the 115 volt receptacle are made at terminal block TB7, which is also located in the main control panel. Refer to Figure 35, Figure 36, and "Control Panel" on page 10. Two 7/8" knockouts are provided for wire entry.

Figure 35: Field Control Wiring Connections

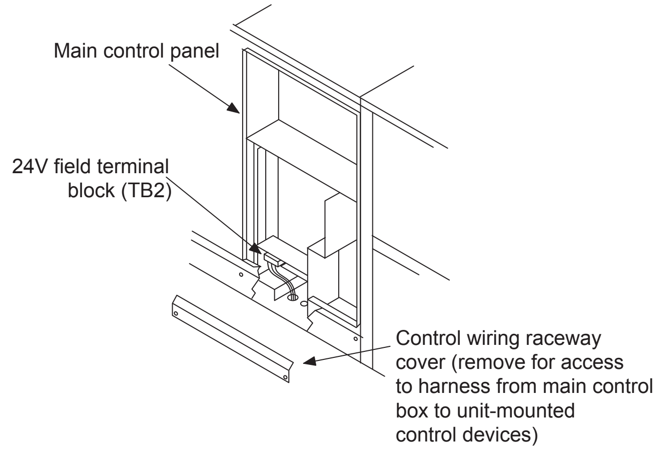


Figure 36: Control Wiring Raceway

Spring Isolated Fans

Releasing Spring Mounts

⚠ WARNING

Moving machinery hazard. Can cause severe injury or death.

Moving machinery hazard. Can cause severe injury or death. Before servicing equipment, disconnect power and lock off. More than one disconnect may be required to de-energize unit.

The optional spring-mounted supply and return fans are locked down for shipment. Hold-down fasteners are located at each spring mount. Remove these fasteners before operating the fans. Figure 38 shows a typical spring mount. Note that the 3/8" hold-down bolt securing the fan base to the unit cross channel must be removed.

After removing the hold-down fasteners, rock the fan assembly by hand to check for freedom of movement.

Figure 37: RDT Spring Mount Hold Down Fasteners

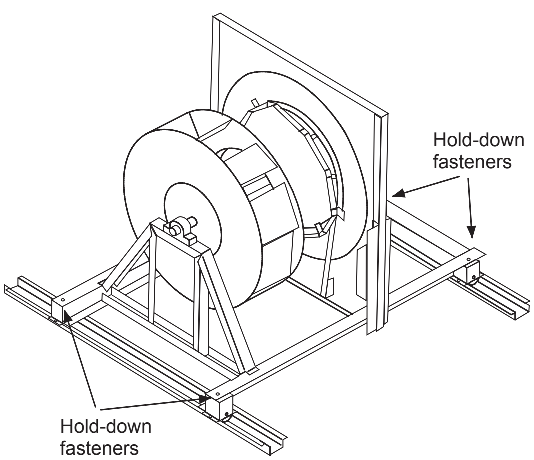
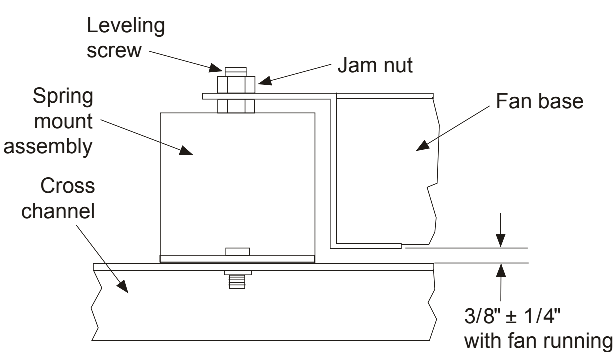


Figure 38: Fan Spring Mount Adjustment



* Grossly out-of-adjustment thrust restraints can affect this dimension. Recheck after thrust restraints are adjusted.

Adjusting Spring Mounts

⚠ WARNING

Moving machinery hazard. Can cause severe injury or death.

Start the fans for the first time according to the "Check, Test, and Start Procedures" on page 68. If this is not done, equipment damage, severe personal injury, or death can occur.

⚠ CAUTION

Do no use impact tools for field spring mount adjustments as damage to bits or to the bolt slot may occur.

To adjust spring mount compression, perform the following:

1. Loosen the 0.625-18 UNF hex nut.
2. Place additional weight on the fan sled frame and use a lever to slightly compress the spring or raise the sled. This will allow the bolt to turn freely.
3. Place one or two drops of oil on the threads if needed.

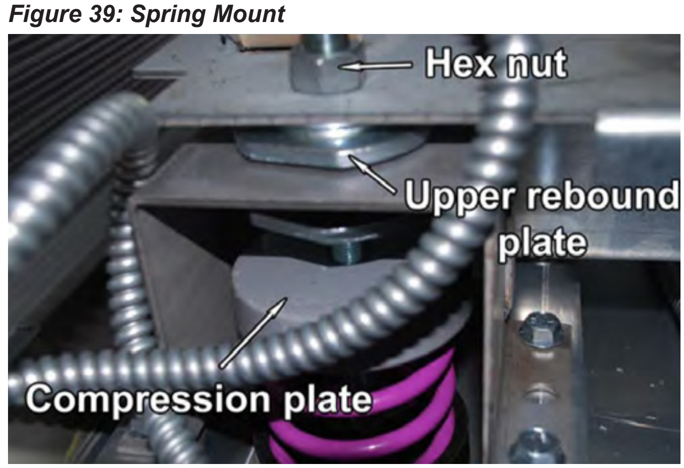
NOTE: The greatest friction that makes adjustment difficult, comes from the surfaces of the top of the upper-rebound plate, both sides of the 0.625" washer, and the underside of the sled. If friction is occurring at these point, relieve the weight and oil the friction surfaces.

4. Use a flat blade socket drive bit (1/2" drive handle recommended) and make sure that when adjusting the slotted bolt, that the upper-rebound plate also turns. This action allows the bolt to push the compression plate up or down with the lease friction occurring between the 0.625" washer and the underside of the channel.

NOTE: If the spring compresses to far, lift the sled before turning. If the spring does not compress enough, place weight on the sled corner, forcing it down before turning.

5. Re-adjust the position of the lower-rebound plate so that the sled has at least 3/4" travel and not more than 1.25" of travel.

Figure 39: Spring Mount



Relief Damper Tie-Down

Economizer sections with a 30" or 40" return fan have a relief damper that is tied down for shipping. Remove the two brackets and two screws before operation to allow movement of dampers. Access is from inside the economizer section.

Adjustment of Seismic Restraints

Spring mounted supply air and return air fans may be ordered with factory installed seismic restraints. Refer to Figure 40. The system consists of four snubbers, one located next to each spring isolator. These snubbers will allow free movement of the fan assemblies during normal operation because normal operation will not cause fan movements that exceed 0.25" (6 mm). However, they will restrain the fan assembly and limit movement to 0.25" (6mm) in any direction if an abnormal condition were to occur.

The position the fan will assume during normal operation will be determined by actual job site airflow and static pressure. Therefore, for proper operation, the seismic restraints must be field adjusted as part of the normal "Check, Test and Start" procedure. When the fan is operating in a normal manner there should be no contact between the snubber restrainer angle and the snubber neoprene bumper. However, in a "seismic event," the snubber will limit movement of the spring mounted fan assembly to 0.25" (6 mm) in any direction, thereby helping to prevent the fan from being tossed about and damaged, or causing damage.

When a seismic restraint is properly adjusted and the fan is operating normally, the neoprene center bumper will be centered within the 2" (51 mm) diameter hole in the restrainer angle, and the restrainer angle will be centered vertically between the flanges of the neoprene center bumper. This results in 0.25" (6 mm) clearance in all directions. When the fan is turned OFF the restrainer angle may come to rest on the neoprene center bumper.

The seismic restraint is adjustable in all directions. Vertical slots in the restrainer angle and horizontal slots in the blower base allow the restrainer angle to be adjusted up and down and back and forth. The neoprene center bumper is mounted on a slotted hole allowing its adjustment in and out.

Removing the neoprene center bumper bolt allows removal, disassembly, and replacement of the neoprene components.

Adjusting Supply Fan Thrust Restraints

Thrust restraints are provided when housed double-width fans are mounted on springs. After the spring mounts are adjusted for level operation when the fan is running, check the thrust restraints. With the fan OFF, set the adjustment nuts so the spring is slightly compressed against the angle bolted to the fan housing frame. Refer to Figure 41. When the fan is turned ON, the fan moves back to a level position and the thrust restraint springs compresses.

Figure 40: Cross Section of Seismic Restraint

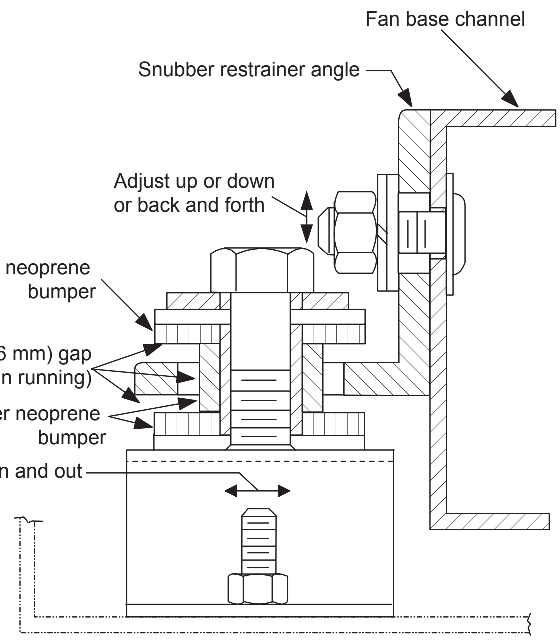
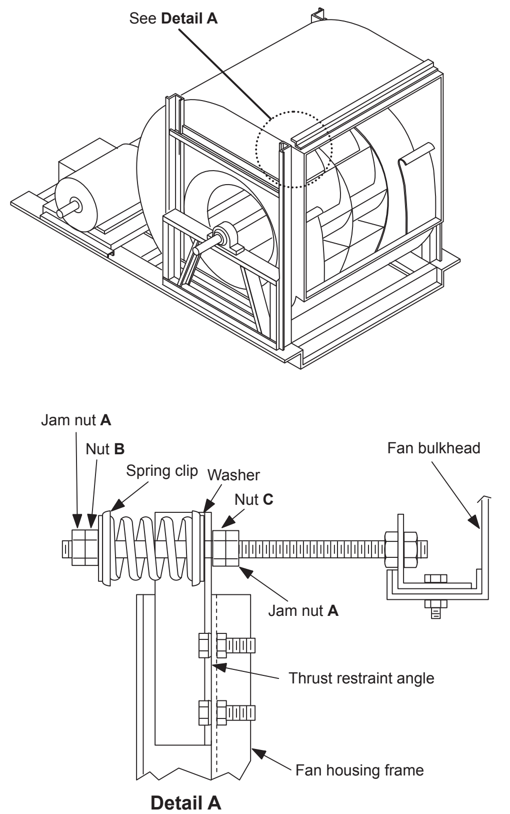


Figure 41: Thrust Restraint Adjustment



Thrust restraint adjustment (with fan OFF)
1. Loosen jam nuts "A".
2. Turn nut "C" until spring cup and washer contact thrust restraint angle.
3. Turn nut "B" until spring is compressed by two turns of nut "B".
4. Tighten jam nuts "A".

The following sequences of operation are for a unit equipped with MicroTech III, an economizer, 4-compressor/4-stage cooling, 3 to 1 turn down burner, variable frequency drives (VFD), and an external time clock. These sequences describe the ladder wiring diagram logic in detail; refer to "Wiring Diagrams" on page 40 as you read them. Note that your unit's sequences of operation may vary from those described here. Refer to the wiring diagrams supplied with the unit for exact information.

For detailed description of operation information relating to the MicroTech III controller's software, refer to the appropriate operation manual (see Table 1 on page 3). These manuals describe the various setpoints, parameters, operating states, and control algorithms that affect rooftop unit operation.

Power-up

When primary power is connected to the unit, 115 V (ac) power is fed through control circuit transformer T1 and control circuit fuse F1C (line 166, page 43) to compressor crankcase heaters HTR-1, HTR-2, HTR-3 and HTR-4 (lines 836-848, page 57).

When system switch S1 (line 203, page 47) is closed, low voltage transformers T2 (line 203, page 47), T3 (line 251, page 50) and T9 (line 802, not shown) energize, and 115 V (ac) power is supplied to the following:

- The supply fan VFD (line 135-137, page 43)
- Heating control panel (line 603, page 49)
- Economizer actuator (lines 256-257)

Transformer T2 supplies 24 V (ac) power to terminals 24V and COM on the main control board MCB (lines 207 and 208). Transformer T2 supplies 24 V (ac) power to the following (see Figure 43 on page 42 and page 43):

- Switch S7 ON-AUTO-OFF (line 217)
- Enthalpy sensor OAE (line 247)
- External time clock contacts (line 215)
- Airflow interlock switch PC7 (line 228)
- Dirty filter switches PC5 and PC6 (lines 242 and 247, not shown)
- Gas furnace alarm relay R24 (line 225, not shown)
- Smoke detector SD2 (line 237)

The time clock, S7 switch and emergency shutdown terminals (lines 217-222) control fan operation.

NOTE: Unit ships with factory installed jumpers between TB2 101 and 105 and between 101 and 106.

Fan Operation

A supply fan is provided on every unit. That may be the only fan, but either a return fan or an exhaust fan, or fans, can be provided also.The start/stop signal and the speed signal for fans that are controlled by variable frequency drives are provided via an internal ModBus network.Constant volume supply and return fans are started and stopped through digital outputs.

Supply Fan

The supply fan is turned ON when the unit enters the Recirculation state.The supply fan is turned OFF when the unit transitions to the OFF state, but it stays on for a OffHtClDelayTime (Default- 120 seconds) if the unit is turned OFF while DX cooling or staged heating is active.The OffHtClDelayTime function is overridden when and Emergency OFF or Duct High Limit fault is active.

Return Fan

A return fan driven by a variable frequency drive is started four seconds after the supply fan is started to reduce the amp draw peak on startup.A constant volume return fan is turned ON through the same output as the supply fan. An external Fan Delay Relay is used to provide a delay between startups if required.

Supply Fan Capacity Control (VAV)

The speed of a modulating supply fan is controlled by a 0-100% signal provided to the VFD via an internal Modbus network. Supply Fan Capacity Control for a modulating fan is controlled to either maintain the duct static pressure at a desired value or maintain a fixed speed based on a signal provided via a network.

The choice of control method, SF Cap Ctrl, may be set to Duct Pressure or Speed via the keypad. After the supply fan is started, a speed signal of 33% is sent to the variable frequency drive for the DSPCtrlDelay (Default=30 seconds). Control reverts to either duct pressure or speed after the fan has been on for the duration of the DSPCtrlDelay time.The VFD speed is not controlled below the minimum SAF speed setting (default 33%) while the fan is operating.

Units supplied with Daikin MD2, MD3, and MD6 drives will have a user editable maximum supply fan hertz setpoint (default 60 Hz) located in the SAF Set Up menu. This parameter can be changed when job site conditions require the speed of the drive to be above 60 Hz.

Duct Static Pressure Control

The supply air fan speed is controlled by a VFD. The control parameter for the fan speed is the duct static pressure setpoint. If the duct static pressure is below the duct static pressure setpoint by more than ½ the deadband, the fan speed will increase. Likewise if the duct static pressure is above the duct static pressure setpoint by more than ½ the deadband the fan speed will decrease. Example - if the duct static pressure setpoint is 1.2" and the deadband is 0.1",the duct static pressure must reach 1.14 before the fan will increase in speed. The Duct Static Pressure setpoint may be set through the keypad or via a network signal. The active setpoint is changed whenever either of these values changes so it equals whichever value was changed most recently.

Speed/Network

When speed control is selected, the fan operates at the larger of its minimum speed or a value provided via a connected network or the keypad/display.

Single Zone VAV Control (1ZnVAV)

When space temperature control is selected, the supply fan VFD is controlled with a PI_Loop to maintain the Control Temperature input at the Occupied or Unoccupied Cooling Setpoint or Occupied or Unoccupied Heating Setpoint. This control choice is designed for DAC control type and will be used in applications where the unit will act as a single VAV box to control space temperature. Cooling and heating discharge air temperature control and outside air damper control will function in the normal manner as with VAV units.

Cooling: Multistage

Entering the Cooling Operating State

The unit enters the Cooling operating state from the Fan Only operating state when the control temperature rises above the Occupied or Unoccupied Cooling Set Point by more than half the Cooling Dead Band and the discharge air temperature is above the discharge cooling setpoint by more than half the cooling Dead Band. The unit transitions from Cooling to Fan only when the control temperature falls below the Occupied or Unoccupied Cooling Set Point by more than half the Occupied or Unoccupied Cooling Dead Band. The unit will also transition from the Cooling to Fan only operating state if Cooling operation is disabled due to OA ambient lockout.

Staging – DAT Control

In the Cooling state, compressor stages are turned on and off to maintain an average Discharge Air Temperature near the Discharge Cooling Setpoint. When the load is such that cooling capacity is being staged up and down between two stages, this control sequence causes the unit to operate longer at the stage that produces the discharge air temperature that is closer to the setpoint over time which results in an average discharge air temperature that is very close to the Discharge Cooling Setpoint.

This setpoint may be fixed or reset as described in the Cooling DAT Reset section. External devices such as VAV boxes maintain the desired space conditions. The unit may be a Constant Volume unit, but it is normally a Variable Air Volume unit. If the Discharge Air Temperature is approaching the setpoint, the number of stages continues to increase or decrease until the actual temperature gets within half the deadband. Control of cooling stages is based on two values, the Degree Time Above and the Degree Time Below the Discharge Cooling Setpoint. The difference between the actual discharge air temperature and the Discharge Cooling Setpoint is added to one of the Degree Time values every ten seconds.

If the Discharge Air Temperature exceeds Discharge Cooling Setpoint, the difference is added to the Degree Time Above value. If the Discharge Air Temperature is below the Discharge Cooling Setpoint, the difference is added to the Degree Time Below value. These values are limited to a maximum value of 250 to prevent remaining too long in one stage because one value or the other became very large.

When the unit enters the Cooling state the first compressor is turned on immediately. When the unit is equipped with evaporative condensing, the sump pump must be turned on before any compressor is turned on. If there is a sump pump fail condition, cooling will stay in stage 0.

With DAT staging control, there are four possible staging transitions; Stage up after stage up, stage up after stage down, stage down after stage down, and stage down after stage up. These are described in the following paragraphs:

Stage Up After Stage Up:

If the time since the last stage change exceeds the cooling stage timer, the discharge air temperature is greater than the Discharge Cooling Setpoint by more than half the deadband, the last stage change was a stage up, and dehumidification is not active; cooling capacity is increased by one stage

Stage Up After Stage Down:

If the time since the last stage change exceeds the cooling stage timer, the discharge air temperature is greater than the Discharge Cooling Setpoint by more than half the deadband, the last stage change was a stage down, the Degree Time Above value is greater than or equal to the Degree Time Below value, and the dehumidification is not active; cooling capacity is increased one stage.

Stage Down After Stage Down:

If the time since the last stage change exceeds the cooling stage timer, the discharge air temperature is less than the Discharge Cooling Setpoint by more than half the deadband, the last stage change was a stage down, and dehumidification is not active; cooling capacity is decreased one stage.

Stage Down After Stage Up:

If the time since the last stage change exceeds the cooling stage timer, discharge air temperature is less than the Discharge Cooling Setpoint by more than half the deadband, the last stage change was a stage up, the Degree Time Below value is greater than or equal to the Degree Time Above value, and dehumidification is not active; cooling capacity is decreased one stage.

The Degree Time Below and Degree Time Above values change whenever a stage change occurs. If the previous stage change was a stage up and the number of stages increases again, both Degree Time Above and Degree Time Below are set to zero.

If the last stage change was a stage up and the stage decreases due to the Degree Time Below exceeding the Degree Time Above, the Degree Time Below is reduced by an amount equal to Degree Time Above and then the Degree Time Above is set to zero.

If the last stage change was a stage down and the stage increases due to the Degree Time Above exceeding the Degree Time Below, the Degree Time Above is reduced by an amount equal to Degree Time Below and then the Degree Time Below is set to zero.

Degree Time logic is not used when dehumidification is active. When dehumidification is active, cooling capacity is increased if the time since the last stage change exceeds the cooling stage timer and the Leaving Coil Temperature (LCT) is greater than the Maximum Leaving Coil Setpoint. When dehumidification is active, cooling capacity is decreased if the time since the last stage change exceeds the cooling stage timer amd the leaving coil temperature is less than the minimum leaving coil setpoint.

Average Discharge Control Method Illustration

Figure 42 on page 38 is an illustration of the "Degree Time" compressor staging control method and is meant to show a variety of staging possibilities not normal unit operation. Figure 42 shows nine points on a graph of the discharge air temperature changing with time. The Cooling Interstage Timer setting is 5 minutes.

Point 1 Assume that the controller has just staged up and that DTA and DTB are zero. As a result, the discharge air temperature drops and the Cooling Interstage Timer is reset.

Point 2 DTA (Area A) equals DTB (Area B). The discharge air temperature is below the Effective Discharge Cooling Set Point by more than half the Discharge Cooling Dead Band. However, since the Cooling Interstage Timer has not yet expired, no staging action occurs.

Point 3 The Cooling Interstage Timer has expired. DTB (Area B + Area C) is greater than DTA (Area A) and the discharge air temperature is below the Effective Discharge Cooling Set Point by more than half the Discharge Cooling Dead Band. Therefore, cooling is staged down. As a result, the discharge air temperature rises, the Cooling Interstage Timer is reset, and DTA is subtracted from both DTA and DTB. This zeros DTA and leaves DTB equal to Area C.

Point 4 The Cooling Interstage Timer has expired. The discharge air temperature is above the Effective Discharge Cooling Set Point by more than half the Discharge Cooling Dead Band. However, since DTA (Area E) is not yet equal to DTB (Area C + Area D), no staging action occurs and the discharge air temperature continues to rise.

Point 5 The Cooling Interstage Timer has expired. The discharge air temperature is above the Effective Discharge Cooling Set Point by more than half the Discharge Cooling Dead Band and DTA (Area E + Area F) is equal to DTB (Area C + Area D). Therefore, cooling is staged up. As a result, the discharge air temperature drops, the Cooling Interstage Timer is reset, and DTB is subtracted from both DTB and DTA. This zeros both DTA and DTB since they are equal. Note that the elapsed time since the last stage change in Figure 42 is 6.3 minutes.

Point 6 The Cooling Interstage Timer has expired. Because the cooling load is now increasing, the discharge air temperature does not fall below the Effective Discharge

Cooling Set Point by more than half the Discharge Cooling Dead Band. No staging action occurs for two reasons: (1) the discharge air temperature is within the Discharge Cooling

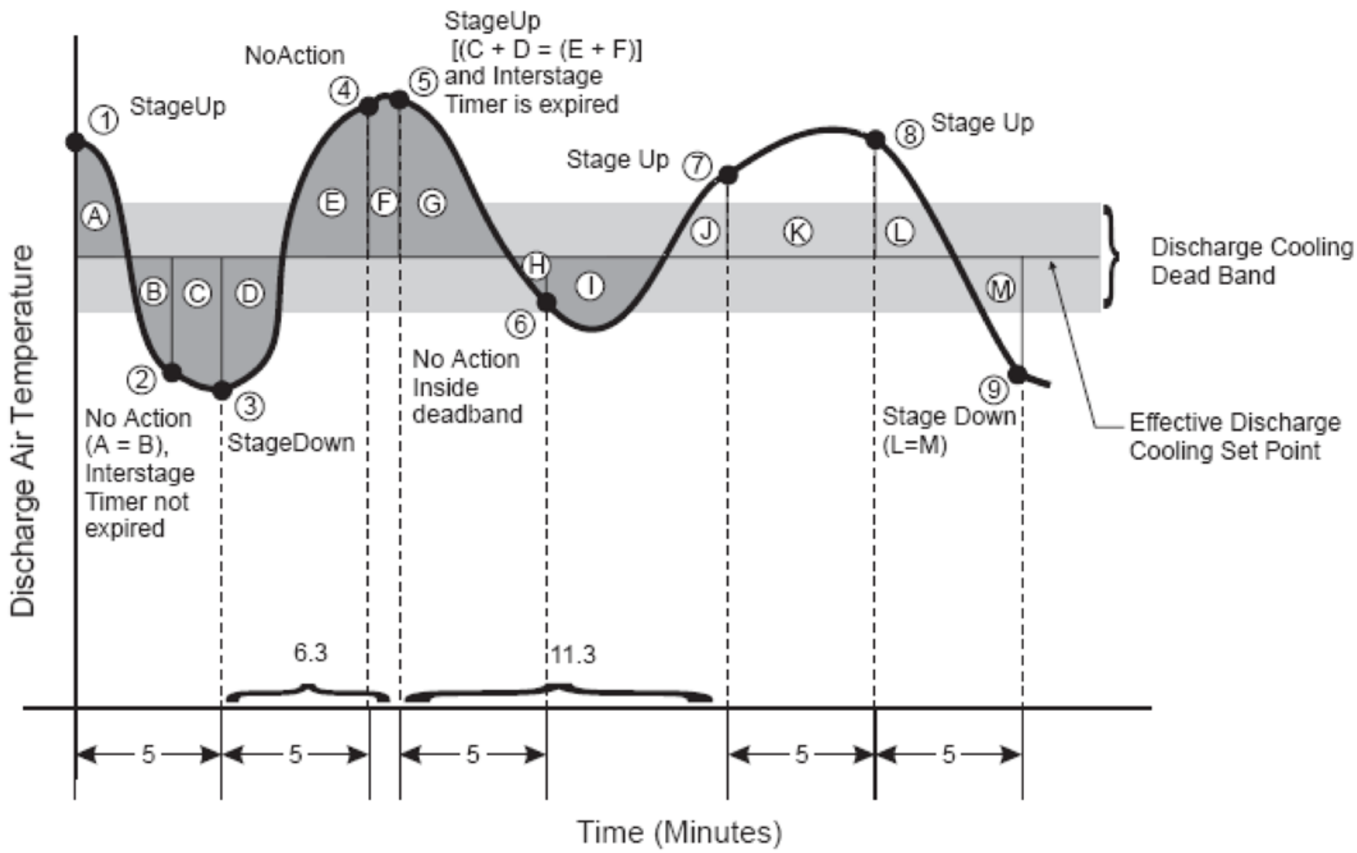
Dead Band and (2) DTB (Area H) is not yet equal to DTA (Area G). Even if the discharge air temperature falls below the Effective Discharge Cooling Set Point by more than half the Discharge Cooling Dead Band (as shown just after Point 6), a stage down does not occur because DTB remains less than DTA. The discharge air temperature starts rising again because the load is increasing.

Point 7 The discharge air temperature is again above the Effective Discharge Cooling Set Point by more than half the Discharge Cooling Dead Band. Since the Cooling Interstage Timer expired at Point 6, cooling is staged up. As a result, both DTA and DTB are zeroed and the Cooling Interstage Timer is reset. Note that DTA and DTB are both zeroed since two consecutive stage increase actions occurred. The discharge air temperature continues to rise, however, because the cooling load is still increasing. **Note:** that the elapsed time since the last stage change in this illustration is 11.0 minutes.

Point 8 The Cooling Interstage Timer has expired. Since the discharge air temperature is still above the Effective Discharge Cooling Set Point by more than half the Discharge Cooling Dead Band, another stage-up occurs. As a result, DTA (Area K) is again zeroed out (DTB remains zeroed) and the Cooling Interstage Timer is reset. The cooling load has leveled out, and the discharge air temperature drops.

Point 9 The Cooling Interstage Timer has expired at the same time that DTB (Area M) becomes equal to DTA (Area L). Therefore, cooling is staged down, the Cooling Interstage Timer is reset and DTA is subtracted from both DTA and DTB. This zeros both DTA and DTB since they are equal.

Figure 42: Average Discharge Control Method



Staging - Zone Control

In the Cooling state, compressor stages are turned ON and OFF to maintain the control temperature close to the Occupied or Unoccupied Cooling Setpoint. Use of the Projected Control Temperature reduces overshoot during cool down. See the Project Ahead section for a description of how the Project Ahead Temperature is calculated.

When the unit enters the Cooling state or dehumidification operation begins the unit goes directly to Cooling Stage # 1 so that the first compressor is turned on immediately.

During normal cooling operation the number of compressor stages increases when the time since the last stage change exceeds the Cooling stage timer, Projected Control Temperature is greater than the Occupied or Unoccupied Cooling Setpoint by more than half the deadband, the Control Temperature is greater than the Occupied or Unoccupied Cooling Setpoint by more than half the deadband, and the Discharge Air Temperature is greater than the minimum DAT cooling setpoint.

During normal cooling operation the number of compressor stages decreases when the time since the last stage change exceeds the cooling stage timer, the Projected Control Temperature is less than the Occupied or Unoccupied Cooling Setpoint by more than half the deadband, the Control Temperature is less than the Occupied or Unoccupied Cooling setpoint by more than half the deadband.

During normal cooling operation the compressor stages also decrease when the time since the last stage change exceeds the cooling stage timer, and the discharge air temperature is less than the minimum DAT Cooling setpoint.

When Dehumidification is active, compressor stages are controlled to maintain the leaving coil temperature between the minimum leaving coil setpoint and the maximum leaving coil DAT setpoint.

During dehumidification on operation, the number of compressor stages increases if the time since the last stage change exceeds the cooling stage timer and the leaving coil temperature is greater than the Maximum Leaving Coil Setpoint. During dehumidification operation, the number of compressor stages decreases if the time since the last stage change ecxeeds the cooling stage timer and the leaving coil temperature is less than the Minimum Leaving Coil Setpoint.

Project Ahead

This section describes the Projected Control Temperature used to turn on and off stages of heating and cooling for Zone Control units. It is not used in DAT Control units.

In Zone Control cooling and heating operation, the Projected Control Temperature, reduces overshoot as the zone temperature approaches a setpoint after startup. It does this by causing stages to stop increasing before the actual control temperature reaches the setpoint. The rate of change of the control temperature is calculated once per minute by the controller and equals the change during the last sixty seconds. This rate of change is multiplied by the Effective Project Ahead Time and is added to the current control temperature. The rate of change may be negative or positive so the Projected Control Temperature may be higher or lower than the actual control temperature. This value, the Projected Control Temperature, is the temperature that would exist after the Project Ahead Time passes if the control temperature were to continue to change at the same rate for the Effective Project Ahead Time. The Effective Project Ahead Time is set equal to the Cooling Project Ahead Time when the unit is in the Cooling state. The Effective Project Ahead Time is set equal to the Heating Project Ahead Time when the unit is in the Heating state. It is set equal to zero under all other conditions causing the Projected Control Temperature to equal the actual control temperature

Economizer Operation

When the outdoor air is suitable for free cooling, the switch in enthalpy sensor OAE is in position “3” (line 256, page 48) energizing Analog Output A0X7. When Analog Output A0X7 energizes, the economizer is enabled. (**NOTE:** If selected from the keypad, the enthalpy decision can be made based on outdoor temperature. In that condition, if the outdoor air temperature is less than or equal to the changeover set point, the economizer is enabled.) If cooling is required, the economizer dampers (ACT3) are modulated to maintain the discharge air temperature setpoint. Analog Output A0X7 drives the outdoor air dampers toward the open and closed (line 256) position. If the outdoor air dampers are wide open and more cooling is required, the dampers hold their positions and mechanical cooling is activated.

When the outdoor air is not suitable for free cooling, the switch in enthalpy sensor OAE is in position “1,” de-energizing Analog Output A0X7. (Alternatively, the outdoor air temperature is above the changeover setpoint plus the economizer changeover differential). When the economizer is disabled, the dampers are held at their minimum position.

Legend

ID	Description	Standard Location
ACT3, 4	Actuator motor, economizer	Economizer section
ACT10, 11	Actuator motor, exhaust dampers	Return section
ACT12	Actuator motor, enthalpy wheel bypass damper	Energy recovery section
AFD10	Adjustable frequency drive, supply fan	AFD/supply fan section
AFD20	Adjustable frequency drive, return/exhaust fan	AFD/ret. ex. fan section
AS	Airflow switch, burner blower	Gas heat box
BM	Burner blower motor	Heat section, gas
CB10	Circuit breaker, supply fan	Main control box
CB20	Circuit breaker, return/exhaust fan	Main control box
CCB1, 2	Compressor control boards, refrig. circuits	Main control box
CPC	Circuit board, main, micro controller	Main control box
CPR	Circuit board, expansion, micro controller	Main control box
CS1, 2	Control switches, refrig. circuits	Main/cond. control box
DAT	Discharge air temperature sensor	Discharge section
DHL	Duct hi-limit	Main control box
DS1	Disconnect, total unit or cond/heat	Main control box
EFT	Entering fan air temperature sensor	Supply fan section
EHB1	Staged electric heat board	Main control box
F1A, B	Fuse, control circuit transformer (T1), primary	Main control box
F1C	Fuse, control circuit transformer (T1), secondary	Main control box
F2	Fuse, control circuit transformer (T2), primary	Main control box
F3	Fuse, burner blower motor	Main control box
FB31–40	Fuseblock, electric heat (top bank)	Electric heat box
FB41–50	Fuseblock, electric heat (bot. bank)	Electric heat box
FD	Flame detector	Heat section, gas
FLC	Fan limit control	Heat section, gas
FSG	Flame safeguard	Gas heat box
GCB1	Generic condenser board, refrig. circ.	Main control box
GRD	Ground	All control boxes
GV1	Gas valve, pilot	Heat section, gas
GV2	Gas valve, main/safety	Heat section, gas
GV3	Gas valve, redundant/safety	Heat section, gas
HL1–10	Hi-limits, pwr, elec heaters (top bank)	Heat section, electric
HL11–20	Hi-limits, pwr, elec heaters (bot. bank)	Heat section, electric
HL22	Hi-limits, gas heat (pre-filters)	Supply fansection
HL23	Hi-limits, gas heat (final filters)	Final filter section
HL31–40	Hi-limits, ctl. elec heaters (top bank)	Heat section, electric
HL41–50	Hi-limits, ctl. elec heaters (bot. bank)	Heat section, electric
HP1–4	Hi-pressure controls, refrig	On compressors
HP5	Hi-pressure controls, gas	Heat section, gas
HS1	Heat switch, electric heat shutdown	Main control box
HS3	Heat switch, electric heat deadfront interlock	Electric heat box

ID	Description	Standard Location
HTR1–6	Crankcase heaters	On compressors
IT	Ignition transformer	Gas heat box
LAT	Leaving air temperature sensor	Energy recovery section
LP1, 2	Low-pressure controls, refrigeration	On compressors
LP5	Low-pressure control, gas	Heat section, gas
LS1, 2	Limit switch, low fire, high fire	Gas heat box
M1–8	Contactor, compressor	Main/cond. control box
M10	Contactor, supply fan	Main control box
M11–18	Contactor, condenser fans, circuit #1	Main/cond. control box
M21–28	Contactor, condenser fans, circuit #2	Main/cond. control box
M29	Contactor, burner motor	Gas heat box
M31–39	Contactor, electric heat (top bank)	Electric heat box
M41–50	Contactor, electric heat (bot. bank)	Electric heat box
MCB	Microprocessor circuit board	Main control box
MJ	Mechanical Jumper	All control boxes
MMP1–8	Manual motor protector, compressors	Main/cond. control box
MMP10	Manual motor protector, supply fan	Main control box
MMP11–18	Manual motor protector, cond. fans, ckt#1	Main/cond. control box
MMP21–28	Manual motor protector, cond. fans, ckt#2	Main/cond. control box
MMP51, 52, 53	Manual motor protector, exhaust fan(s)	Prop exhaust box
MP1–6	Motor protector, compr. #1–6	On compressors
OAE	Outside air enthalpy sensor	Economizer section
OAT	Outside air temperature sensor	Economizer section
PB1, 2	Power block, power distribution	Main control box
PB11, 12	Power block, power distribution	Main control box
PB19, 20	Power block, exhaust fan	Junction box, split unit
PC5	Pressure control, clogged filter	Pre-filter section
PC7	Pressure control, proof airflow	Supply fan section
PC8	Pressure control, minimum airflow	Coil section, cool
PC12, 22	Pressure control, Fantrol	Condenser section
PM1	Phone modem	Main control box
PS1, 2	Pumpdown switches, refrig circuits	Main/cond. control box
R1, 2	Relay, hi pressure reset	Main/cond. control box
R3, 4	Relay, hi pressure delay	Main/cond. control box
R5–8	Relay, safety, cool fail	Main/cond. control box
R9, 10	Relay, compressor lockout	Main/cond. control box
R20	Relay, heat, gas/ steam/ hotwater	Gas heat/main cont. box
R23	Relay, heat, gas & electric	Gas/electric heat box
R24	Relay, heat alarm, gas	Main control box
R25	Relay, heat, gas, start supply fan inverter	Main control box
R26	Relay, isol/exh. dampers, open/close	Main control box
R28	Relay, isolation damper, safety	Main control box
R29	Relay, remote fire alarm	Main control box
R66	Relay, smoke detector, return air	Main control box
R67	Relay, supply fan, enable	Main control box
R69	Relay, Inv. bypass VAV box interlock	Main control box

ID	Description	Standard Location
RAE	Return air enthalpy sensor	Return section
RAT	Return air temperature sensor	Return section
REC1	Receptacle, main box	Main control box
REC2	Receptacle, condenser box	Condenser control box
REC3	Receptacle, field power, 115V	Discharge bulkhead
S1	Switch, system ON/OFF	Main control box
S2	Switch, system ON/OFF, condenser unit	Condenser control box
S3	Switch, furnace ON/OFF	Gas heat box
S	Switch, local ON/AUTO/OFF to controller	Main control box
SD2	Smoke detector, return	Return section
SPS1, 2	Static pressure sensors, duct/building	Main control box
SR1-3	Sequencing relays, electric heat	Electric heat box
SV1, 2	Solenoid valves, liquid	Condenser section
T1	Transformer, main control (line/115 V (ac)	Main control box
T2	Transformer, control input (115/24 V (ac)	Main control box
T3	Transformer, control output (115/24 V (ac)	Main control box
T4	Transformer, exh. damper actuator (115/12 V (dc)	Main control box
T5	Transformer, electric heat	Electric heat box
T9	Transformer, refrig. circuit 24V	Main control box
TB1	Terminal block, internal	Main control box
TB2	Terminal block, field	Main control box
TB3	Terminal blocks, factory	Main control box
TB7	Terminal block, 115V convenience outlet, field	Main control box
TB11	Terminal block, heat	Heat control box
TD3, 4	Time delay, hi-pressure	Main/cond. control box
TR1, 2	Transducer, pressure	Main control box
VM1	Valve motor #1, heating	Gas heat box/heat section
VV1	Vent valve, gas heat	Heat Section, Gas
ZNT1	Zone temp. sensor, setback	Field installed

General Notes

1. Field wiring
2. Factory wiring
3. Shielded wire/cable
4. Main control box terminals
5. Auxilliary box terminals
6. Field terminals
7. Plug connector
8. 200/H200 Wire/harness number
9. WN7 Wire nut/ID

Figure 43: VAV Fan Power, Unit Powered Receptacle

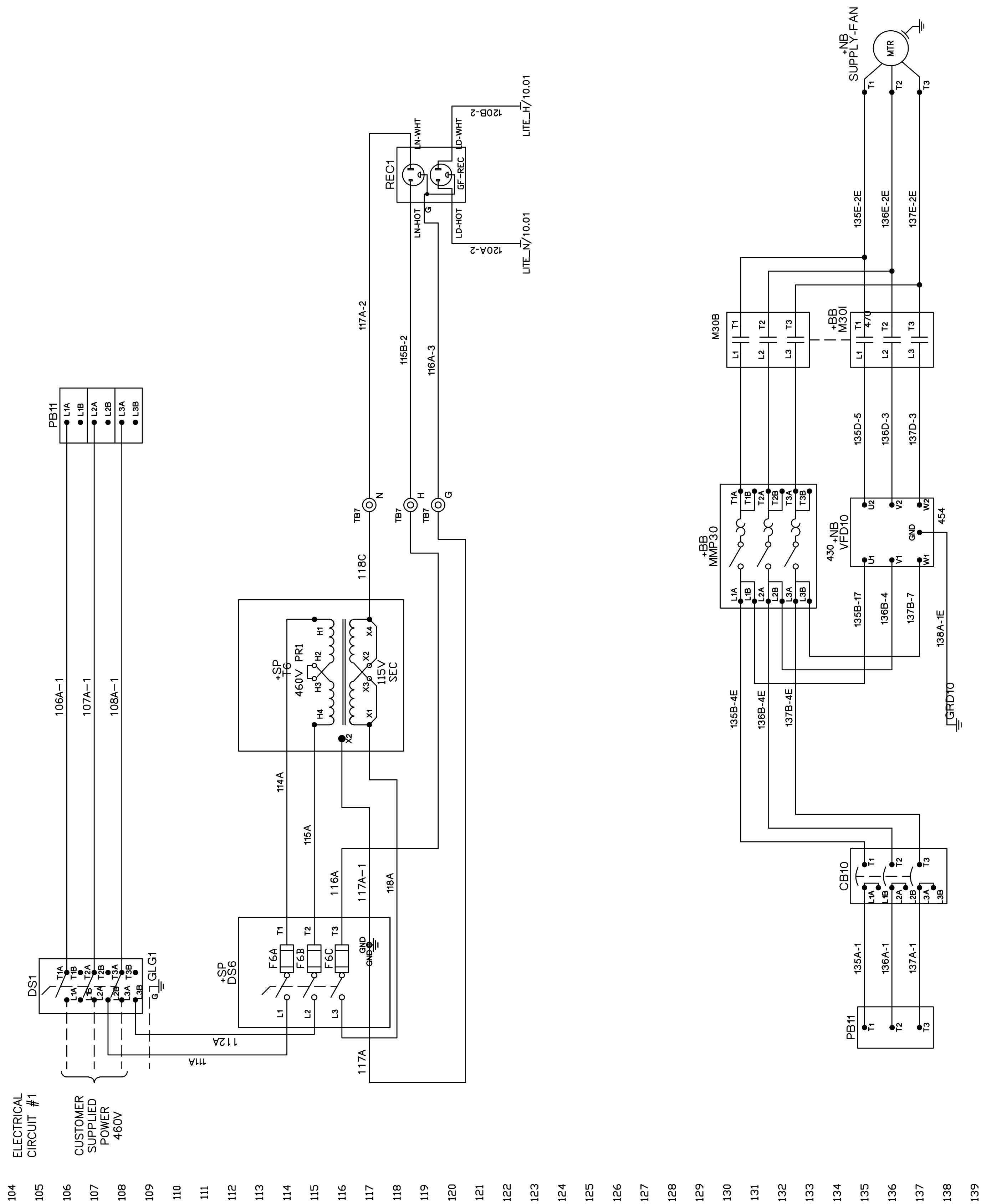


Figure 43 continued: VAV Fan Power, Unit Powered Receptacle

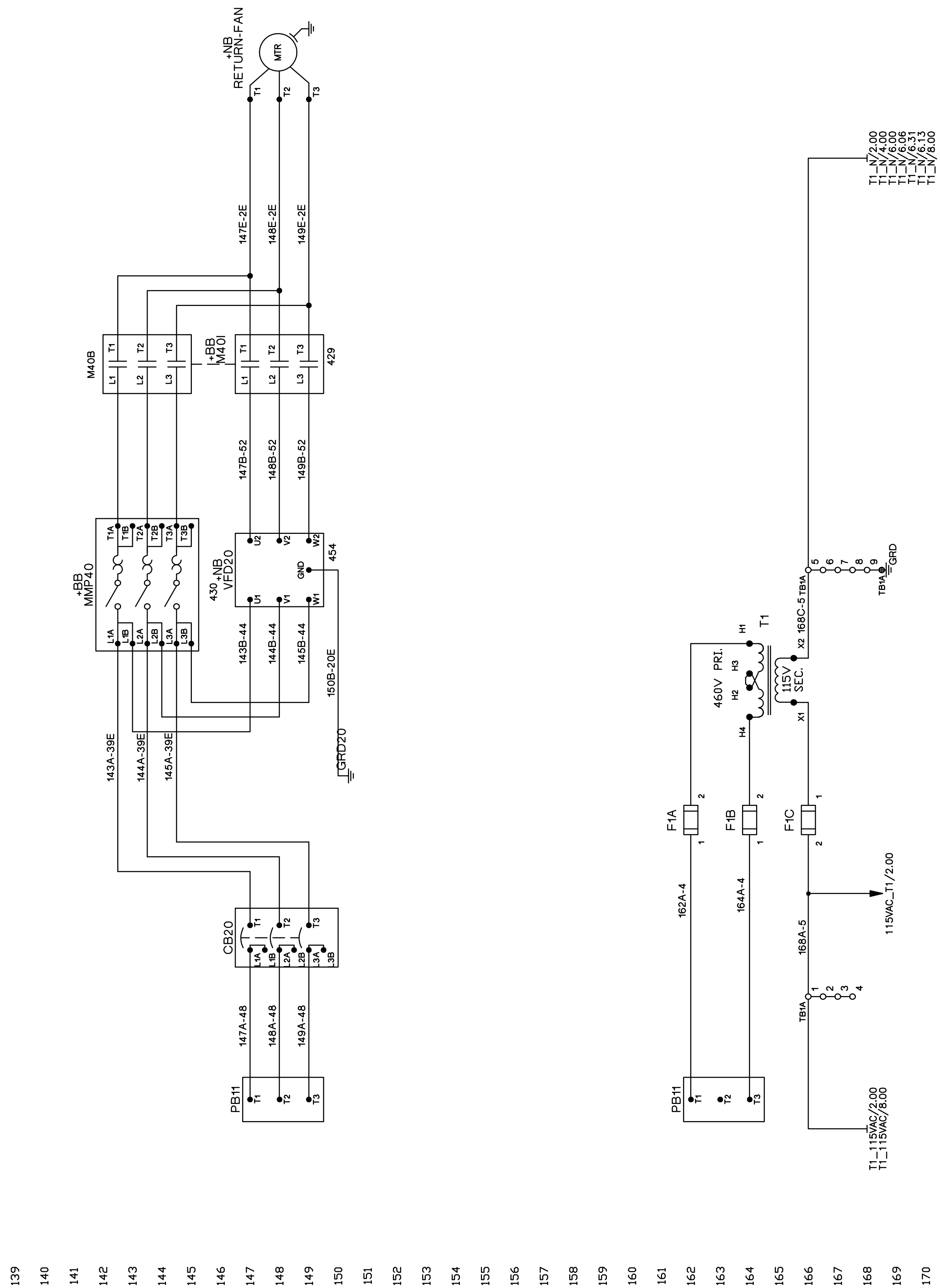


Figure 44: Constant Volume (SAF) Fan Power

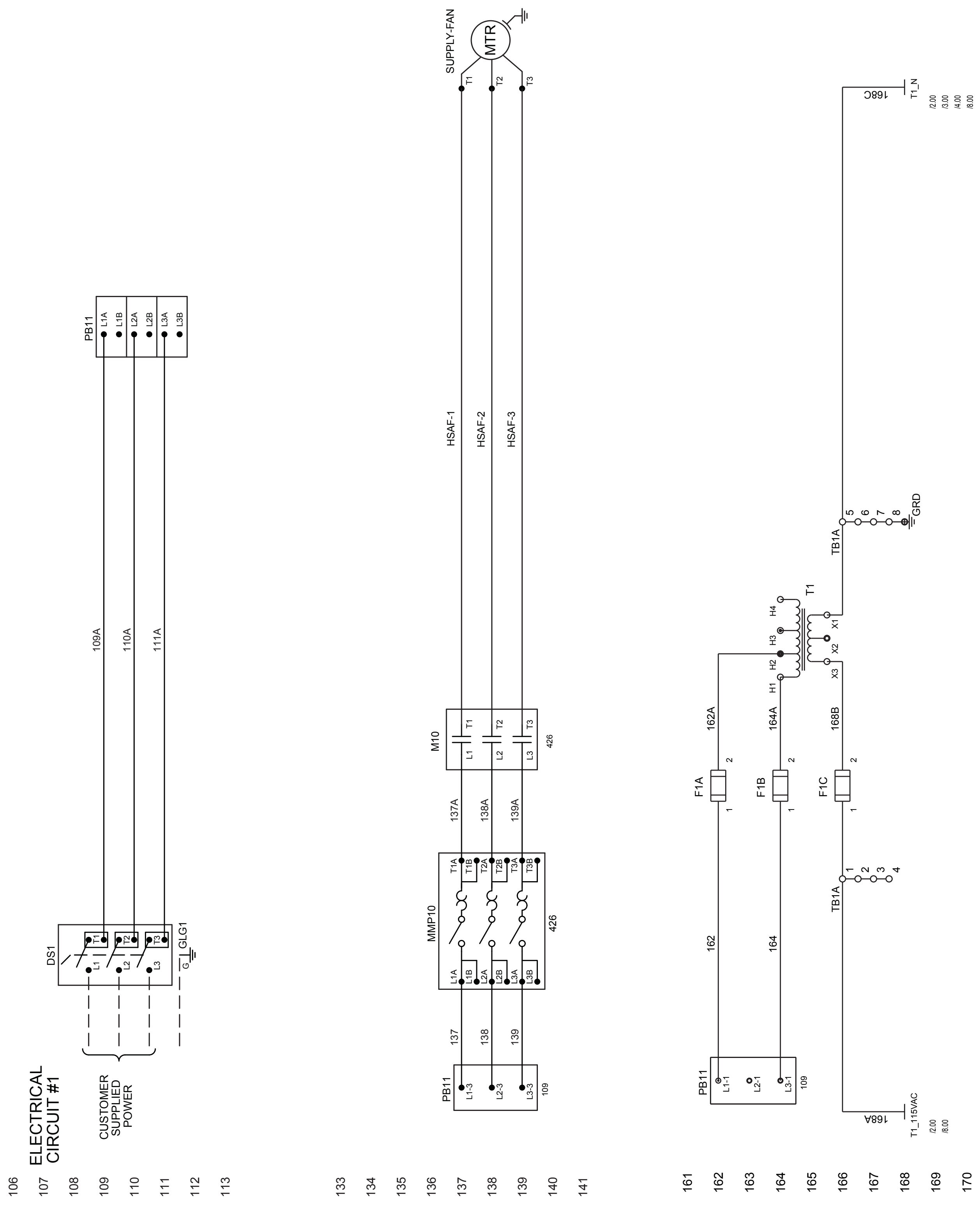


Figure 45: MPS 070 Condensing Unit Power

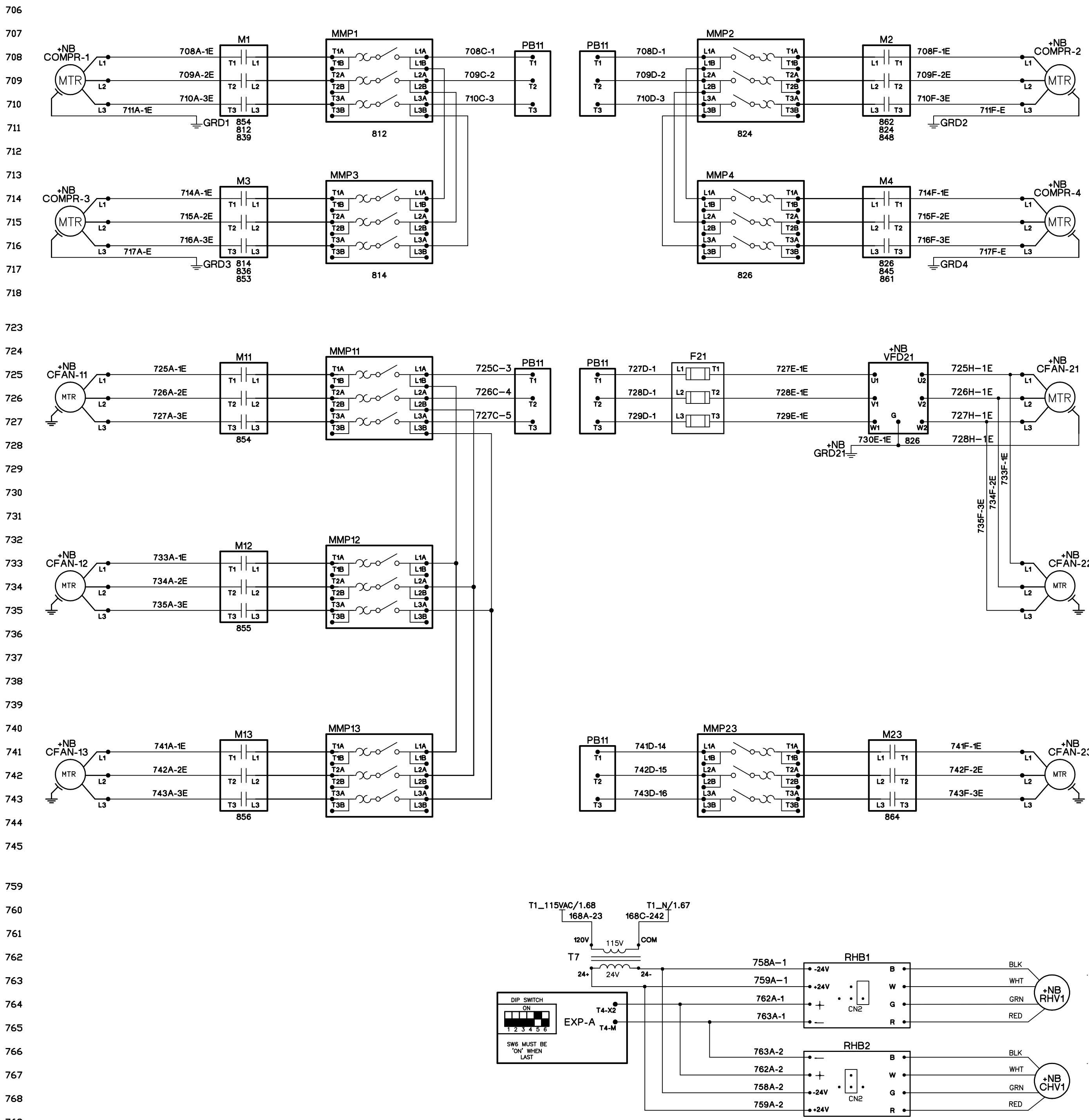


Figure 46: VFD Control

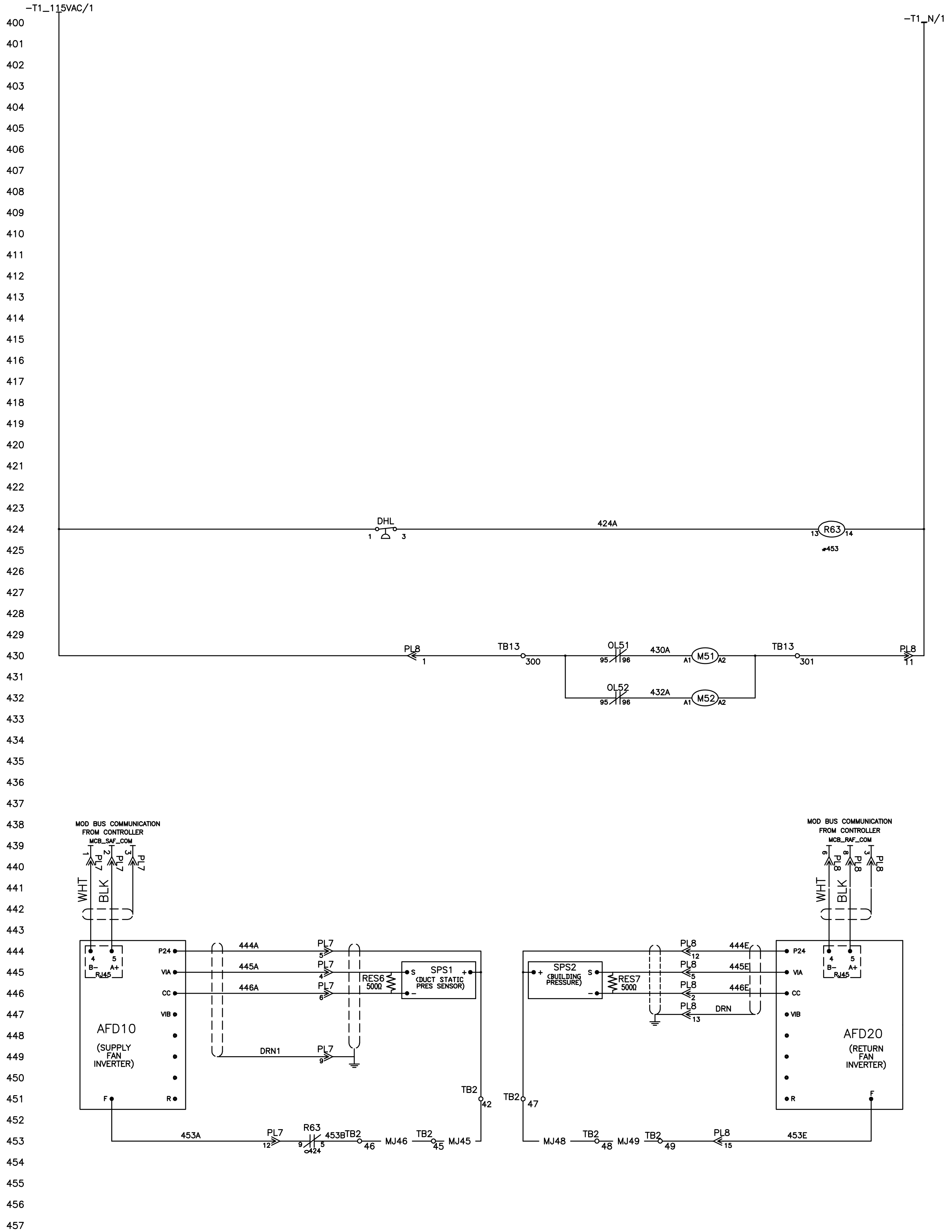


Figure 47: VAV Control Inputs

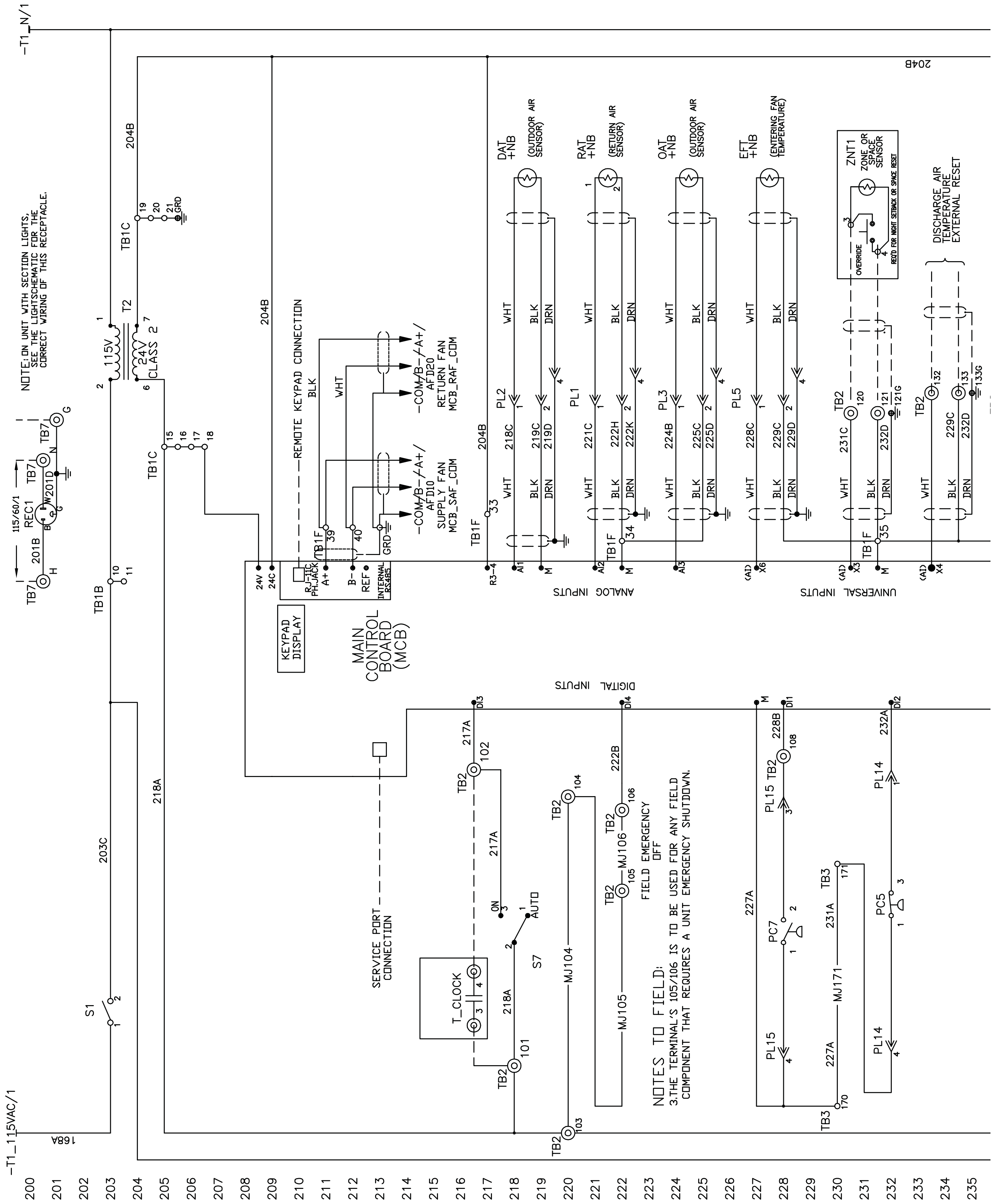


Figure 47 continued: VAV Control Inputs

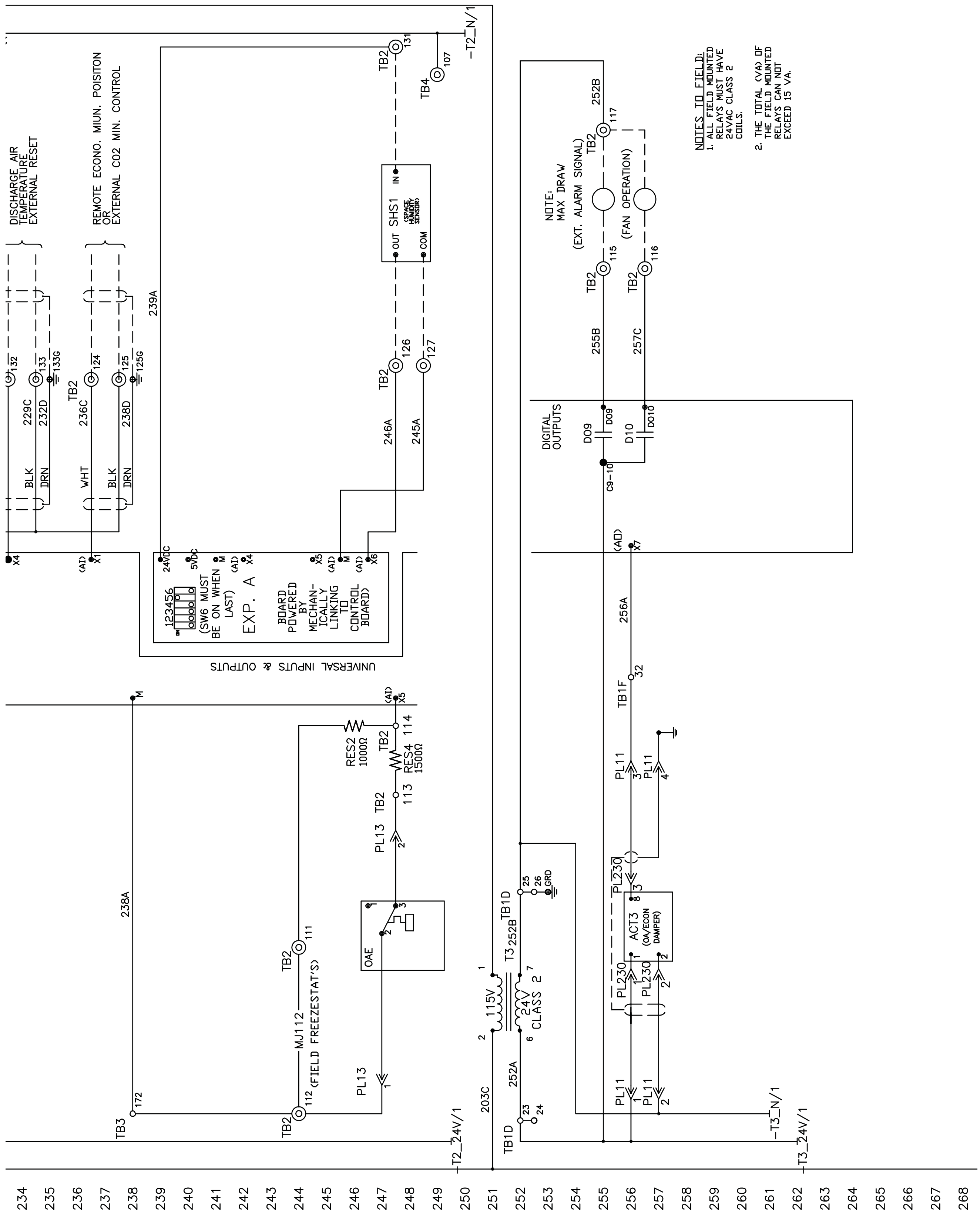


Figure 48: Gas Burner Control

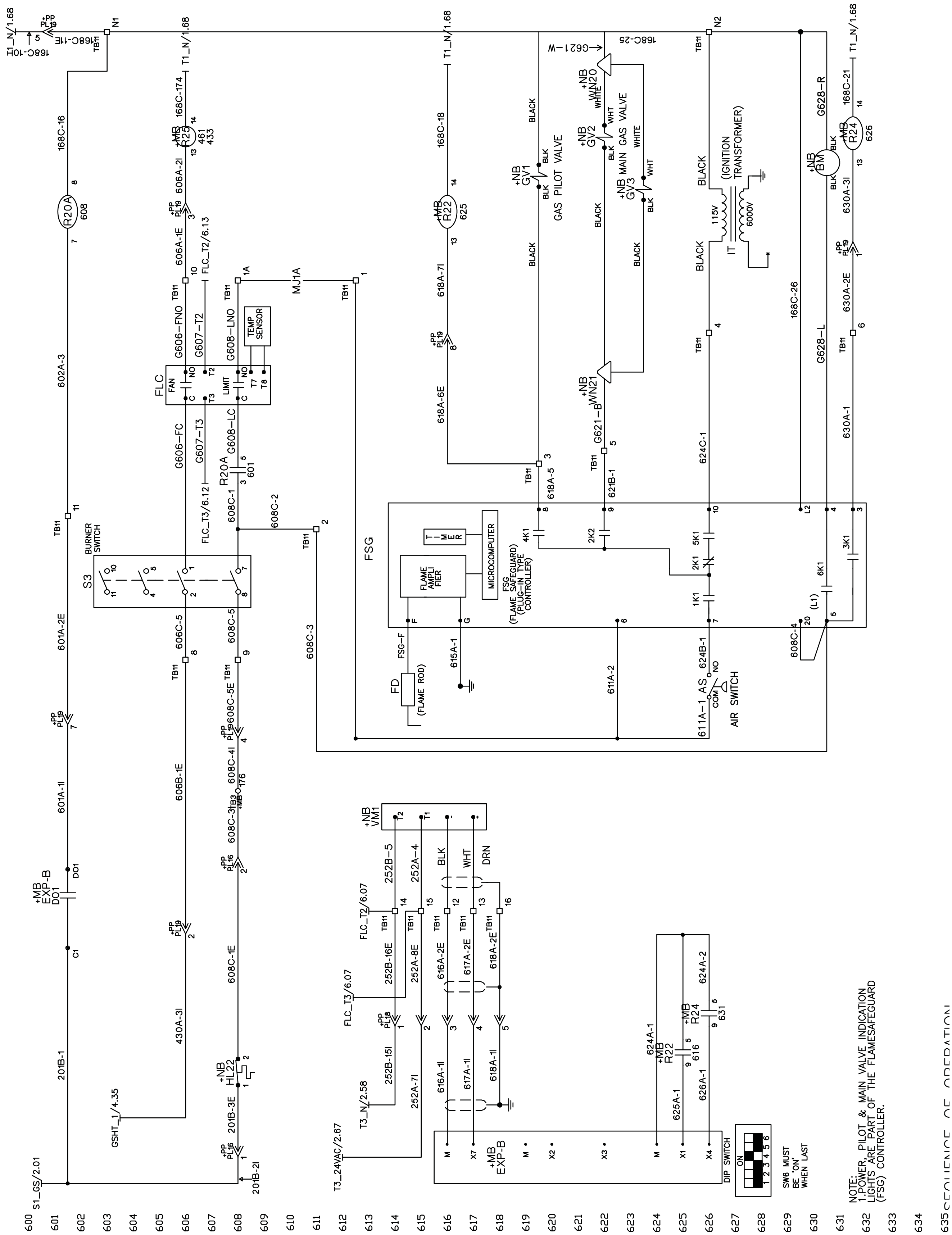


Figure 48 continued: Gas Burner Control

SEQUENCE OF OPERATION

When 120V power is furnished through the system on/off switch (S1), through the burner on/off switch (S3), through the high limit control (FLC), terminal #6 on the flame safeguard (FSG) is powered on a call for heat.

Whenever power is restored to the flame safeguard, the flame safeguard will go through a 10 second initiation period before the prepurge period will begin. The burner air control valve will be at minimum position during off cycles. Upon a call for heat or any other time that a prepurge cycle occurs, the air control valve will be repositioned to the maximum position for prepurge and then returned to the minimum position for low fire start.

Upon a call for heat, the controller will close digital output (EXPB-DO1) and energize the R20A relay. Once the normally open contacts of the R20A relay close 120V power is supplied to terminal #6 on the FSG. The FSG then energizes its terminal #4, which powers the burner combustion air blower moter (BM) and starts the FSG prepurge cycle.

After completion of the FSG prepurge period there will be a 10 second trial for ignition during which terminal #8 (combination gas valve – GV1) and terminal #10 (ignition transformer – IT) will be energized. If flame is being detected through the flame rod (FD) at the completion of the 10 second trial for ignition period, terminal #10 (ignition transformer – IT) will be de-energized and terminal #9 (main gas valves – GV2 and GV3) will be energized and the control system will be allowed to control the firing rate once the heating stage timer (default 5 minutes) has passed. After the flame has lit and been proven and the heating stage time has passed, the controller will modulate (VM1) to the required firing rate via analog output EXPB-AO_X7. In the event the flame fails to ignite or the flame safeguard fails to detect its flame within 10 seconds, terminal #4, 8, 9, and 10 will be de-energized, thus de-energizing the burner. The FSG will then lockout and would require manual resetting. If the FSG lockout occurs, FSG terminal #3 will energize the R24 alarm input status relay which will 'make' a digital input to the controller (EXPB-DI_X4). When this digital input is 'made' the controller will drive VM1 to the clased position. At the same time EXPB-DO2 will open, the prepurge sequence will be disabled and reset. If the FSG terminal #8 de-energizes relay R22 (EXPB-DI_X1) after having it turned on and the FSG is not off on safety lockout, the controller will drive the VM1 to the closed position.

If an attempt is made to reset the FSG or if an automatic restart is initiated after flame failure, the earlier described FSG prepurge cycle will be repeated. If the unit overheats, the high limit control (FLC) will cycle the burner, limiting furnace temperature to the limit control set point. The flame safeguard contains 'LEDS' (lower left corner) that will glow to indicate operation.

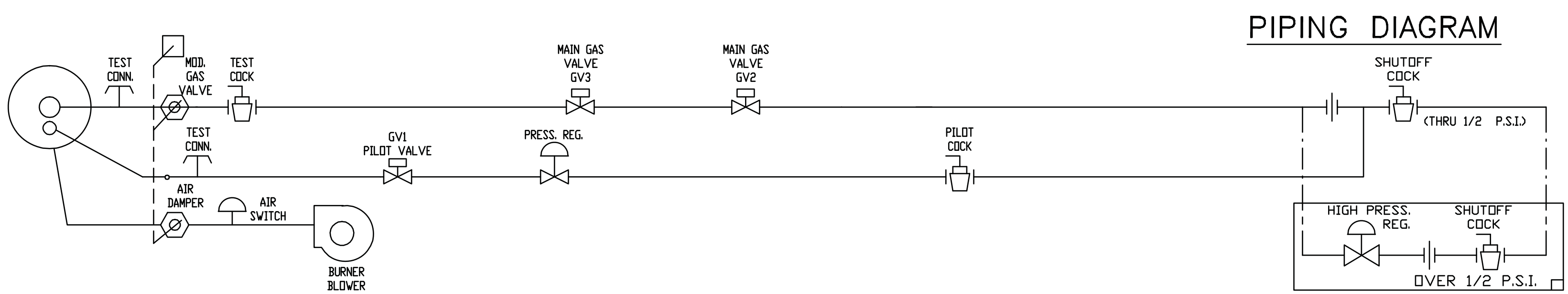


Figure 49: Electric Heat Control

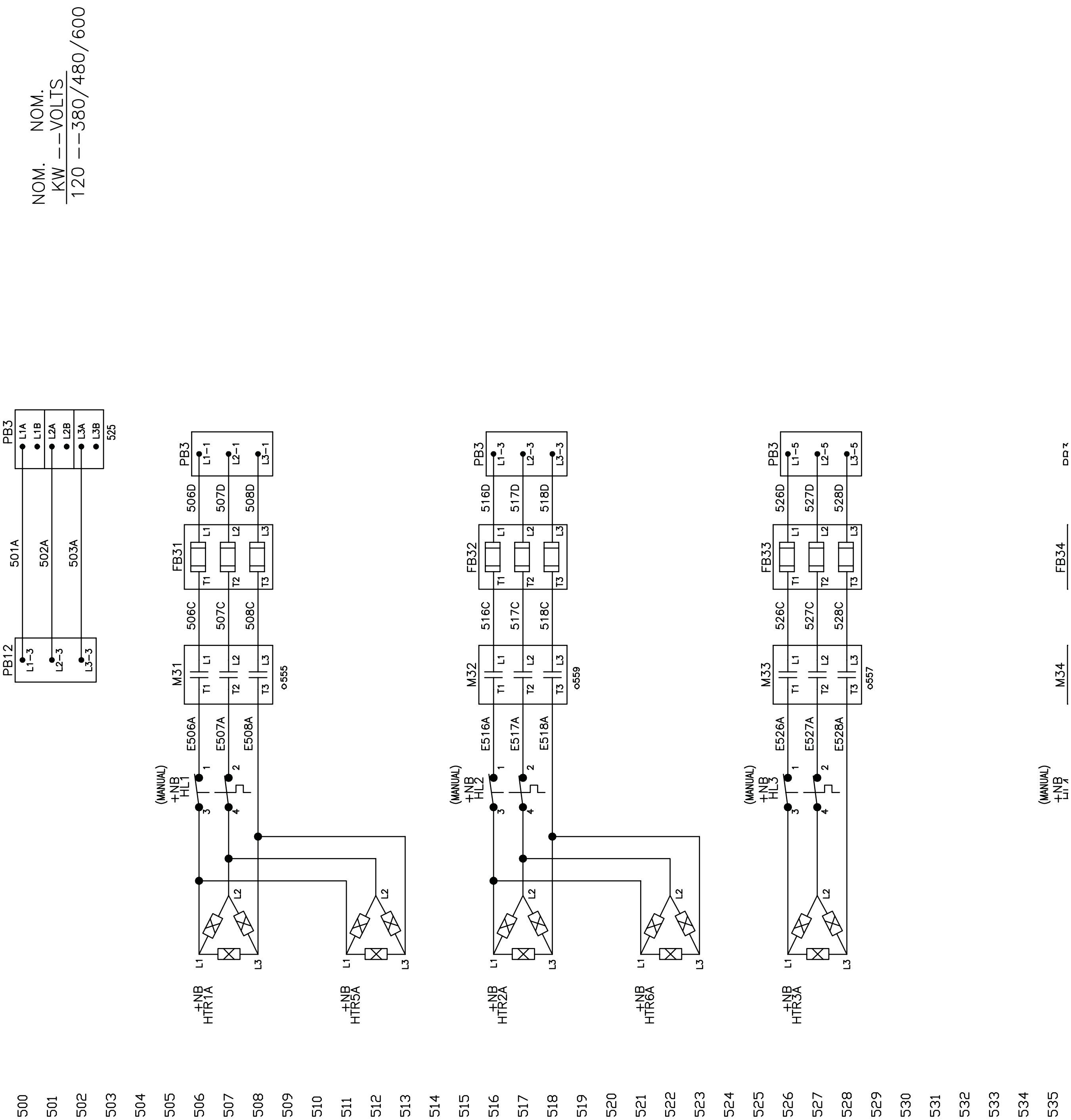


Figure 49 continued: Electric Heat Control

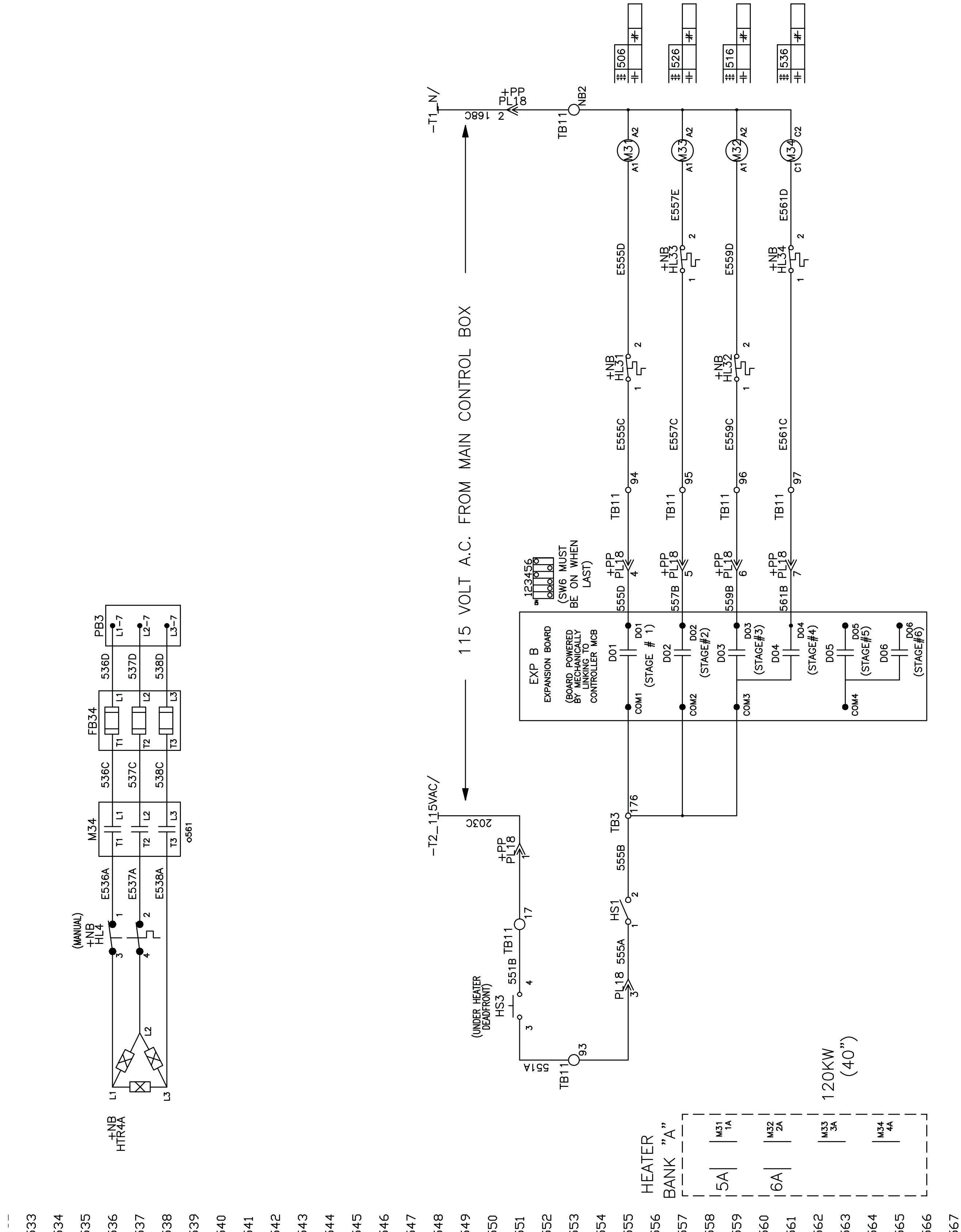


Figure 50: Condensing Unit Control with Scroll Compressors

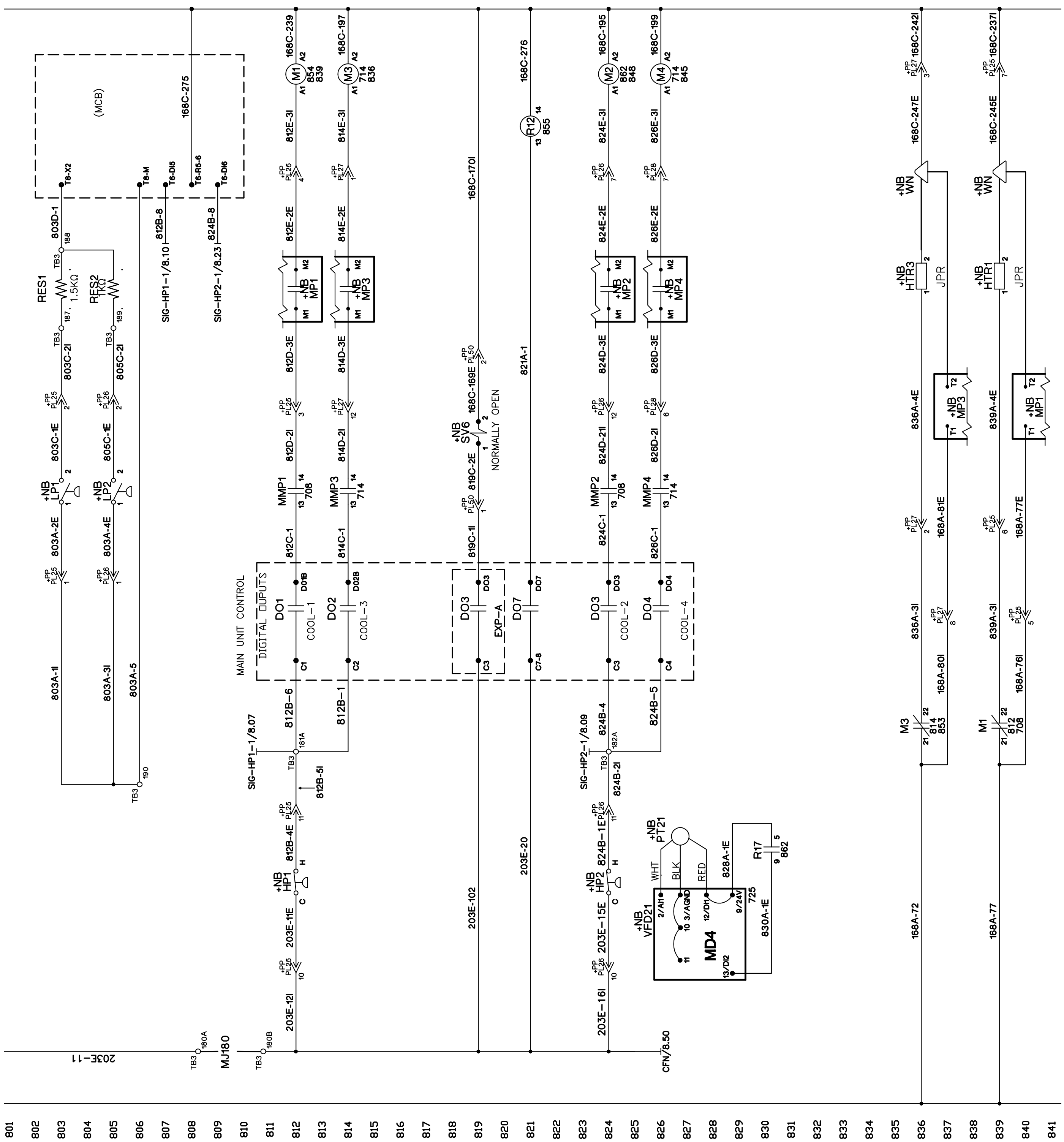


Figure 50 continued: Condensing Unit Control with Scroll Compressors

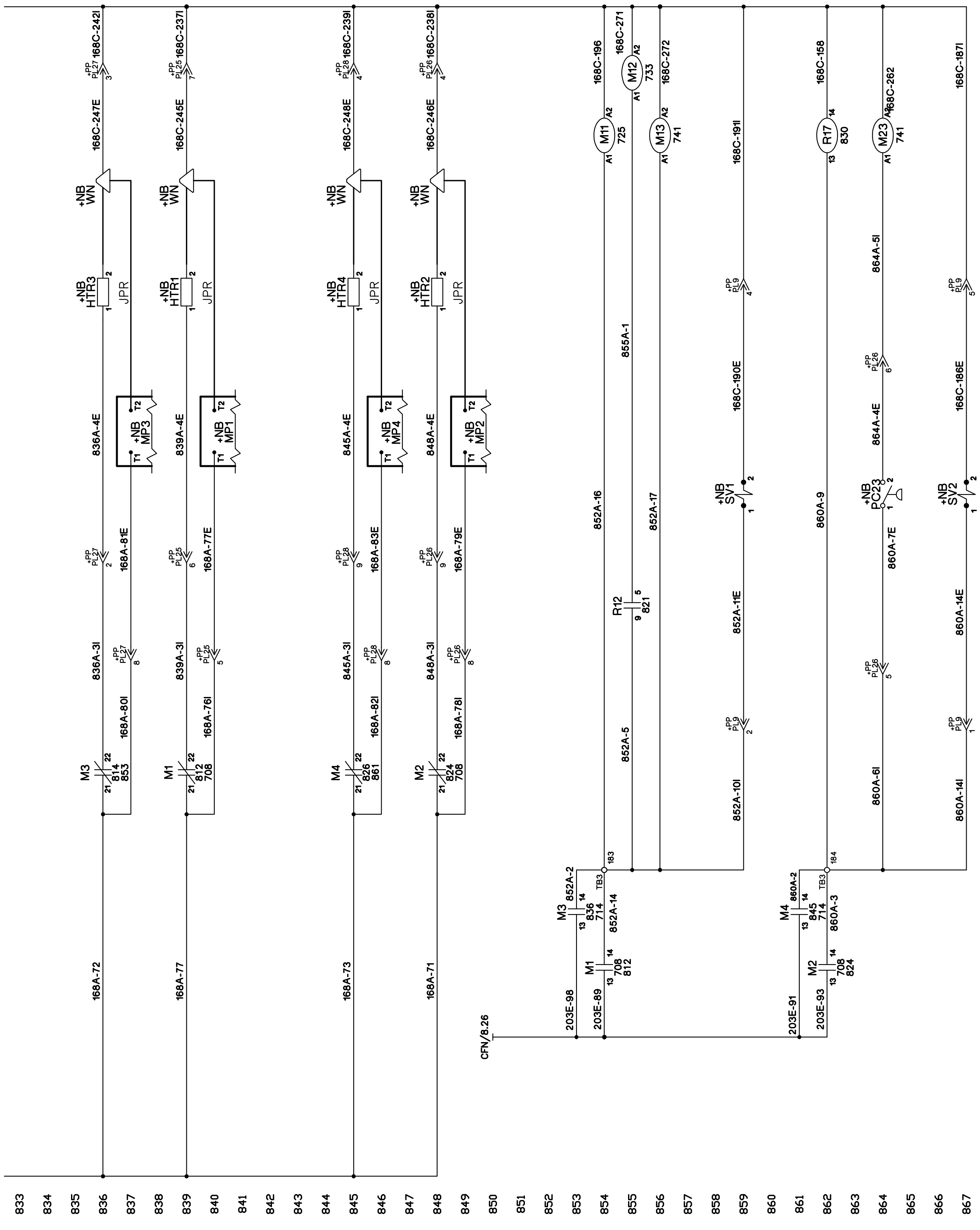


Figure 51: CV Fan Control

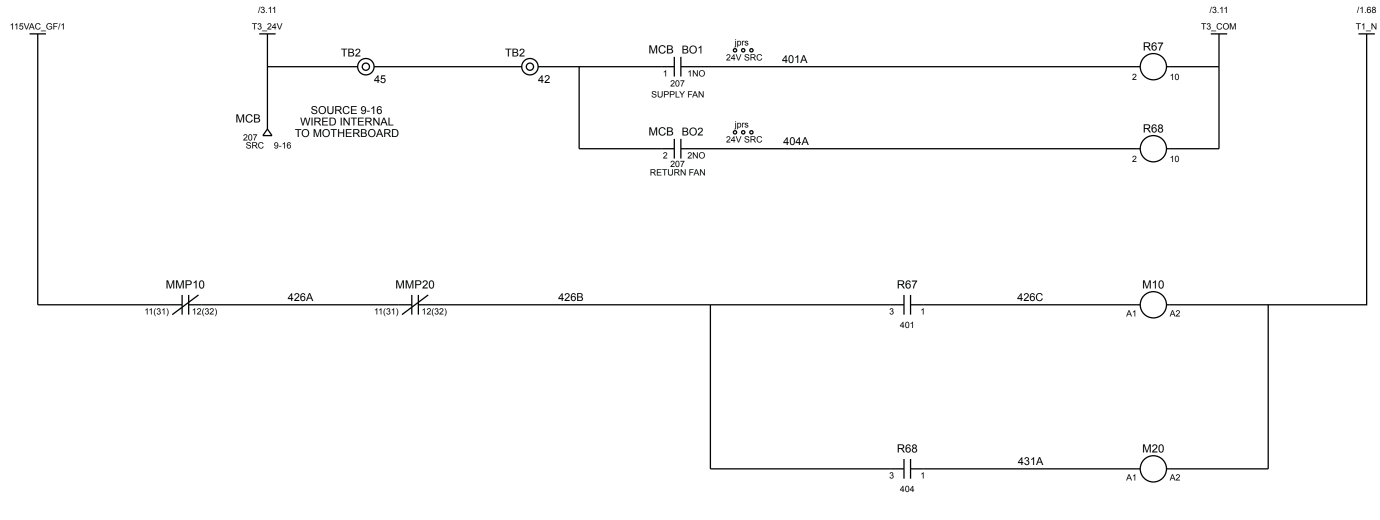
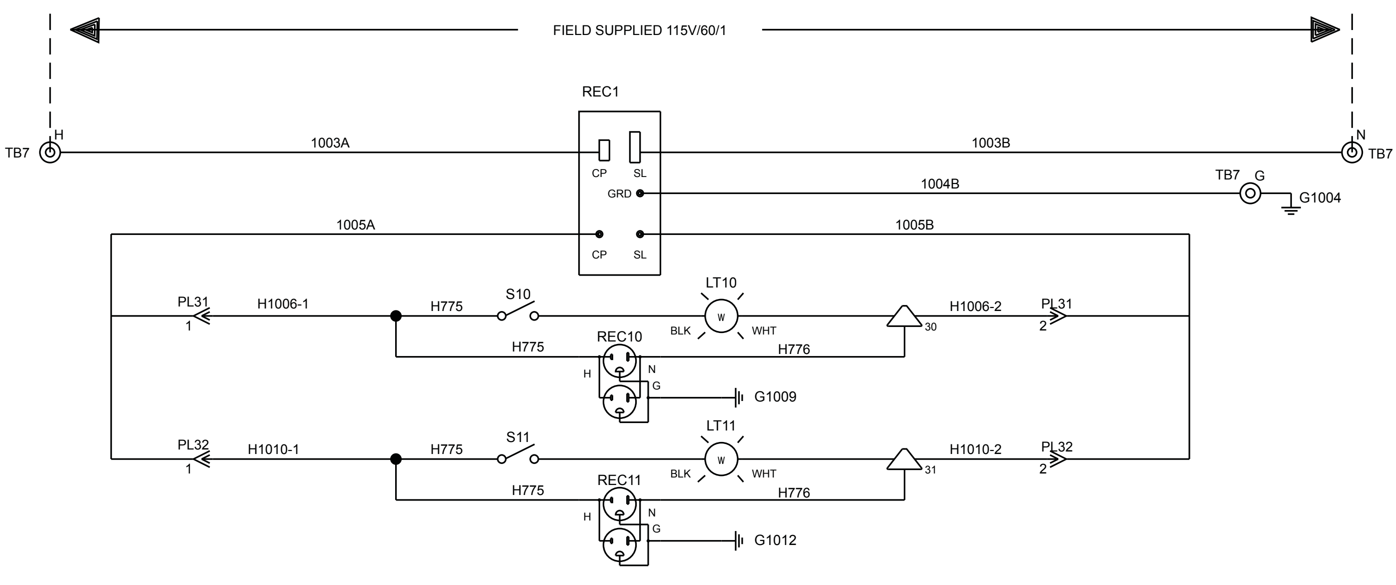


Figure 52: Light and Receptacle Power (Field Power)



Control Actuators

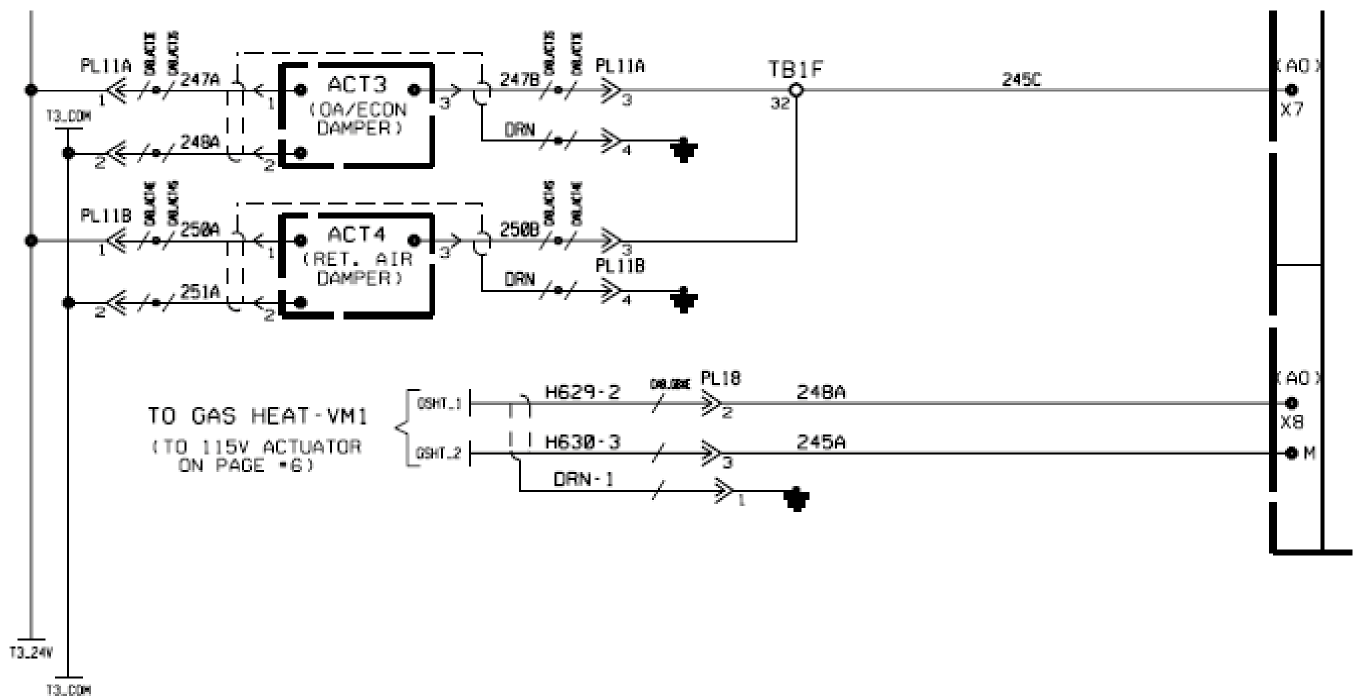
The actuators are controlled by an analog signal from the unit controller. Damper actuators utilize a 0-10 V (dc) analog signal while modulating heating/cooling valve actuators utilize a 2-10 V (dc) signal. Spring-return actuators are used for the 0-30% outdoor air and economizer dampers. The mixing dampers are normally closed to the outside air.

Convenience Receptacle

A Ground Fault Circuit Interrupter (GFCI) convenience receptacle is provided in the main control box on all units. One of the following is required:

1. Connect a separate field-supplied 115 V power wiring circuit to the 115 V field terminal block TB7, located in the main control box.
2. Select the factory powered outlet option at time of purchase.

Figure 53: Control Actuators Wiring Diagram



Enthalpy Control

Outside Air Enthalpy Control (OAE)

Units with MicroTech III control and an economizer come standard with an electro-mechanical enthalpy control device (OAE) that senses both the humidity and temperature of the outside air entering the unit. This device has an enthalpy scale marked **A** through **D**. Table 5 shows the control points at 50% RH for settings **A** through **D**. Figure 54 shows this scale on a psychrometric chart. When the outside air conditions exceed the setting of the device, the outside air dampers are positioned to the minimum outside air intake position by the MicroTech III controller.

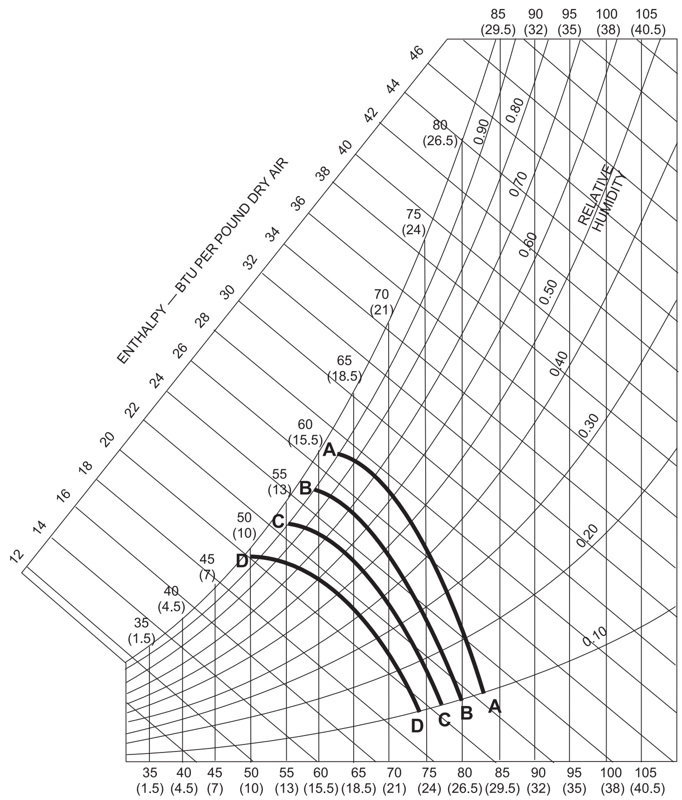
Differential Enthalpy Control (OAE/RAE)

An optional electric differential enthalpy control arrangement (OAE/RAE) is available on units with MicroTech III control. In this configuration a solid-state humidity and temperature sensing device is located in both the return (RAE) and outside intake (OAE) airstreams. This OAE device has the same **A** through **D** scale as the device described above. However, with the OAE/RAE arrangement the switch ON, OAE must be set all the way past the **D** setting. With this done, the MicroTech III controller adjusts the return and outside air dampers to use the airstream with the lowest enthalpy.

Table 5: Enthalpy Control Settings

Control curve	Control point temperature at 50% RH
A	73°F (23°C)
B	70°F (21°C)
C	67°F (19*C)
D	63°F (17°C)

Figure 54: Enthalpy Control Settings



Smoke and Fire Protection

⚠ WARNING

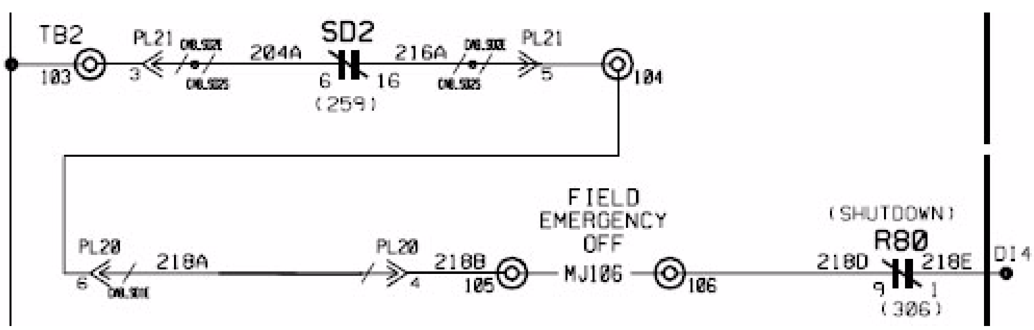
Improper smoke, fire, or fume air handling can result in severe personal injury or death.

Daikin optionally offers factory installed outdoor air, return air, and exhaust air dampers as well as smoke detectors in thereturn air openings, complete with wiring and control. These components often are used in the building's smoke, fume, and fire protection systems. However, due to the wide variation in building design and ambient operating conditions into which our units are applied, we do not represent or warrant that our products will be fit and sufficient for smoke, fume, and fire control purposes. The owner and a fully qualified building designer are responsible for meeting all local and NFPA building code requirements with respect to smoke, fume, and fire control.

Factory installed smoke detectors have similar wiring and the control sequence is as follows:

- When smoke is detected, normally closed sensor contacts open. This removes power from binary input B18 on the main control board.
- The MicroTech III controller responds by shutting down the unit. The controller is placed in the Alarm OFF state and cannot be restarted until the alarm is manually cleared. Refer to the operation manual supplied with the unit for information on clearing alarms.
- The smoke detectors must be reset manually once they have been tripped. Power must be cycled to the smoke detector to reset.

Figure 55: Smoke Detector Schematic



Emergency Shutdown

The terminals 105 & 106 on TB2 can be used for any field supplied component that requires a unit emergency shutdown. When these terminals are used, the factory-installed jumper must be removed.

External Time Clock

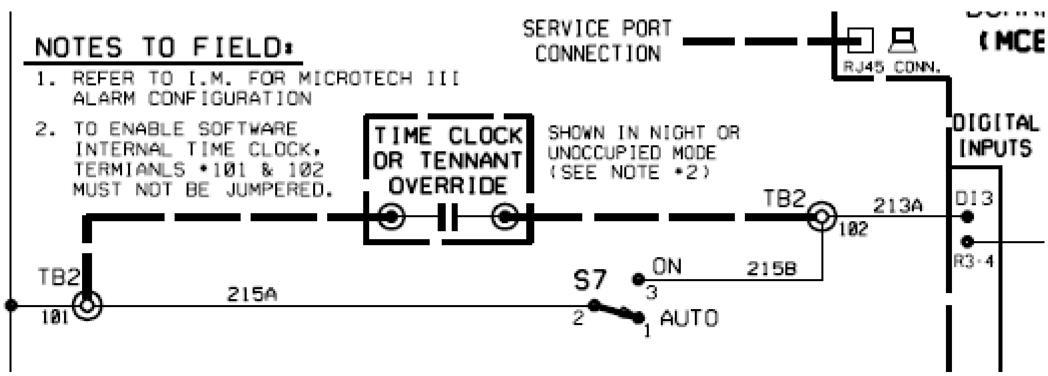
You can use an external time clock as an alternative to (or in addition to) the MicroTech III controller's internal scheduling function. The external timing mechanism is set up to open and close the circuit between field terminals 101 and 102. When the circuit is open, power is not supplied to binary input MCB-BI1. This is the normal condition where the controller follows the programmable internal schedule. When the circuit is closed, power is fed to BI1. The MicroTech III controller responds by placing the unit in the occupied mode, overriding any set internal schedule. For more information, see the "Digital Inputs" section of IM 919, "MicroTech III Applied Rooftop Unit Controller."

External Time Clock or Tenant Override

There are several methods of switching the rooftop unit between occupied and unoccupied operation. It can be done by the controller internal schedule, a network schedule, an external time clock, or a tenant override switch. If the internal schedule or a network schedule is used, field wiring is not required.

An external time clock or a tenant override switch can be used by installing a set of dry contacts across terminals 101 and 102 on the field terminal block (TB2).When these contacts close, 24 V (ac) is applied to binary input MCB-DI3, overriding any internal or network schedule and placing the unit into occupied operation (provided the unit is not manually disabled). When the contacts open (24 V (ac) is removed from MCB-DI3) the unit acts according to the controller internal time schedule or a network schedule. Refer to the unit wiring diagrams for specific wiring termination details.

Figure 56: External Time Clock or Tenant Schematic



Field Output Signals

The following outputs may be available for field connections to a suitable device.

VAV Box Signal/Fan Operation Signal

Digital Output #10 (MCB-DO10) may be selected as either the Fan Operation output or the VAV output via the keypad. The VAV/Fan Op selection can be selected by accessing the Unit Setup menu in the Extended Menu section.

Fan Operation

The Fan Operation Output (MCB-DO10) supplies 24V(ac) to terminal 116 on the field terminal block(TB2) when the output is ON. To use this signal, wire the coil of a field supplied and installed 24V(ac) pilot relay across terminals 116 and 117 on TB2. When this output is on, 24V (ac) is supplied from the T3 control transformer through the output relay to energize the field relay. Refer to the as-built wiring diagrams.

The Fan Operation output is ON when the unit is not OFF and when both the unit is OFF and airflow is detected. It is OFF when the unit is OFF and airflow is not detected.

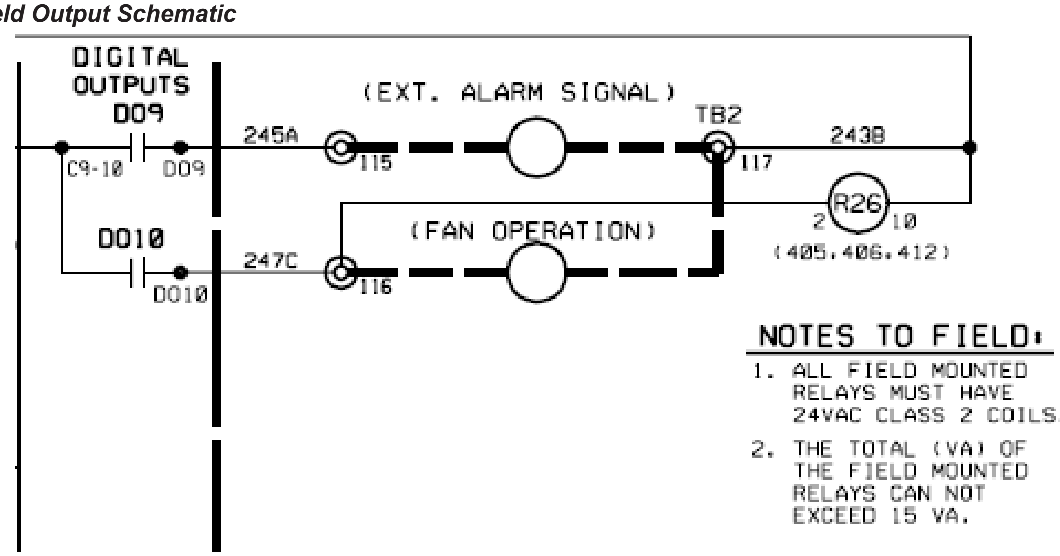
VAV BoxOutput

The VAV Box Output (MCB-DO10) supplies 24 V (ac) to terminal 116 on the field terminal block (TB2) when the output is ON. To use this signal, wire the coil of a field supplied and installed 24V (ac) pilot relay across terminals 116 and 117 on TB2. When this output is ON, 24 V(ac) is supplied from the T3 control transformer through the output relay to energize the field relay. Refer to the as-built wiring diagrams.

In the Heating state, the VAV Output is turned OFF to indicate that hot air instead of the normal cool air is being supplied to the VAV boxes. The VAV boxes are driven to their Heating Position when hot air is provided based on either the normally open or normally closed contacts of the VAV output. The VFD will continue to be controlled to maintain the desired duct static pressure. This output is also OFF when the unit is in the Startup or Recirculation states. If this output is in the Heat (OFF) position when the unit enters the Fan Only state or Minimum DAT Control state, the output remains OFF for an adjustable Post Heat Time (while the unit VFDs are driven to minimum speed) or until the VFD gets to its minimum speed if the Post Heat Time is set greater than 0. The Post Heat Timer can be adjusted via the keypad/display Timer Setting menu in the Extended Menus.

During unoccupied operation, the VAV Box Output is in the Cool (ON) position unless airflow is detected. When airflow is detected, it switches to the Heat (OFF) position.

Figure 57: Field Output Schematic



Entering Fan Temperature Sensor

The entering fan temperature (EFT) sensor and an associated "Lo Airflow Problem" alarm are provided on VAV units with MicroTech III control and gas or electric heat. The EFT sensor is located in the supply fan section of the unit at the supply air funnel.

Heat is disabled whenever the airflow is detected to be too low for safe heating operation. This condition is indicated when the supply air temperature exceeds the mixed air temperature by more than 60°F (16°C).

NOTE: This value is not always 60°F. It depends on whether the unit is gas or electric heat and on the burner/baffling arrangement on gas heat units.

In this case, a "Lo Airflow Problem" alarm is generated and heat is not enabled until the alarm is manually cleared. Refer to the operation manual supplied with the unit for information clearing alarms (OM 920).

Duct High Pressure Limit

The duct high pressure limit control (DHL) is provided on all VAV units.The DHL protects the duct work, the terminal boxes, and the unit from over pressurization, which could be caused by, for example, tripped fire dampers or control failure.

The DHL control is factory set to open when the discharge plenum pressure rises to 3.5" wc (872 Pa). This setting should be correct for most applications; however, it is adjustable. Removing the front cover of the device reveals a scale showing the current setting. Turning the adjustment screw (located on the bottom of the device) adjusts the setting up or down.

If the DHL switch opens, digital input MCB BI 14 on the Main Control Board de-energizes. The MicroTech III controller then shuts down the unit and enters the OFF-Alarm state. The alarm must be manually cleared before the unit can start again. Refer to the operation manual supplied with your unit for more information on clearing alarms (OM 920).

Variable Frequency Drive Operation

Refer to the vendor instructions supplied with the unit.

Optional Low Ambient Compressor Operation

Daikin's head pressure control operates in conjunction with Speedtrol by modulating the motor speed of the last condenser fan of each refrigeration circuit in response to condenser pressure. By varying the speed of the last condenser fan of each refrigeration circuit, the VFD option allows mechanical cooling operation in ambient temperatures down to 0°F (-18°C). The VFD option senses refrigerant head pressure and varies the fan speed accordingly. When the pressure rises, the Speedtrol increases the fan speed; when the pressure falls, Speedtrol decreases the fan speed.

The VFD throttling range is 250 to 400 psig, fixed. The VFD fan motor is a three-phase motor, identical to the unit voltage (208 V to 575 V) and is controlled by a variable frequency drive (Figure 58). The variable frequency drive receives a signal from a pressure transducer and varies the condenser fan speed accordingly.

The pressure transducer is calibrated to provide a 1.0 to 5.0V(dc) signal with a 8 to 30 V (dc) input, starting at 1.0 V (dc) @ 250 psig and up to 5.0 V (dc) @ 400 psig. In order to maintainan acceptable condensing pressure, the VFD will modulate the motor down to a minimum of 23Hz, and will not allow operation below this frequency level. At, or above 400 psig, the VFD will operate the motor at 60 Hz. The control band between the two frequencies (23 Hz and 60 Hz) is a linear relationship with the condensing pressure as shown in (Figure 59).

The VFDs and pressure transducers are located in the control box mounted in the condensing section. Each refrigerant circuit is independent and has its own respective VFD and pressure transducer. The Speedtrol option operates independently of the main unit controller.

Figure 58: R-410A Speedtrol

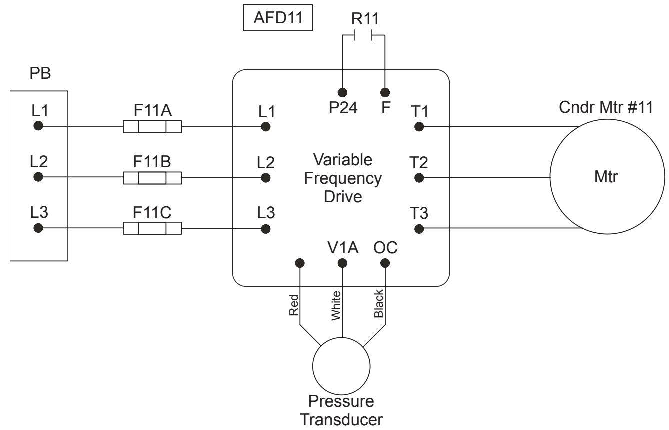
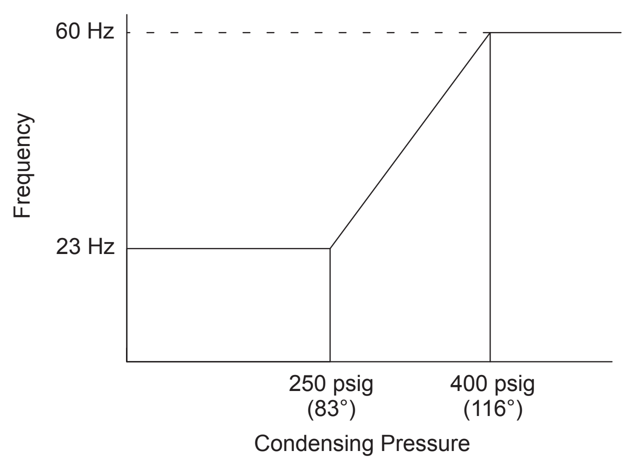


Figure 59: Speedtrol Operating Characteristics



Propeller Exhaust Fan Option

Economizer units may include propeller exhaust or centrifugal return fan options. This section covers maintenance and operating instructions for the propeller exhaust option. Centrifugal return fan construction, maintenance and operation is similar to that for supply fans and covered in other sections of this manual.

Prestarting Checks

Check all fasteners and set screws for tightness. This is especially important for bearing set screws.

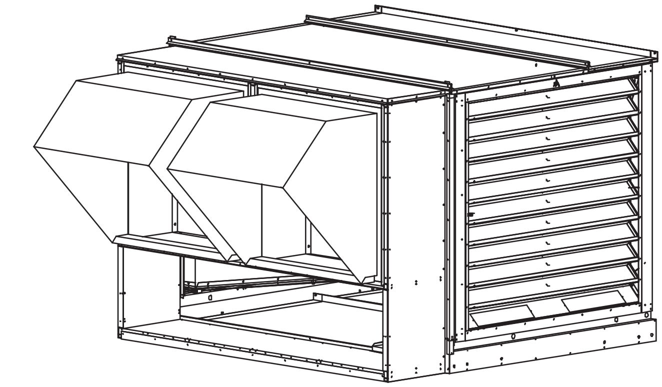
The propeller should rotate freely and not rub on the fan panel venturi. Rotation direction of the propeller should be checked by momentarily turning the unit ON. Rotation should be in the same direction as the rotation decal affixed to the unit or as shown in Figure 61. For three-phase installations, fan rotation can be reversed by simply interchanging any two of the three electrical leads.

The adjustable motor pulley is preset at the factory for the specified fan RPM. Fan speed can be increased by closing or decreased by opening the adjustable pulley. Two or three groove variable pitch pulleys must be adjusted an equal number of turns open. Any increase in fan speed represents a substantial increase in horsepower required from the motor. Always check motor load amperage and compare to name plate rating when changing fan speed.

Once the fan is put into operation, set up a periodic maintenance program to preserve the reliability and performance of the fan. Items to include in this program are:

- Belts
- Bearings
- Fasteners
- Setscrews
- Lubrication
- Removal of Dust/Dirt

Figure 60: Two Fans with Back Return Shown



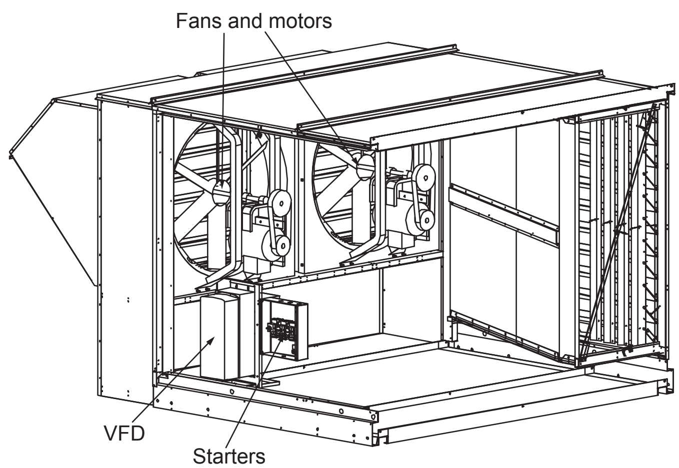
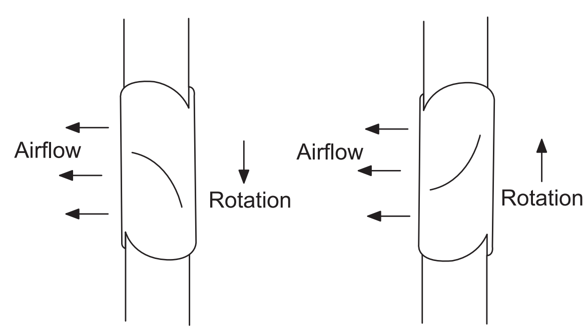


Figure 61: Fan Rotation



Damper Counterbalance Adjustment

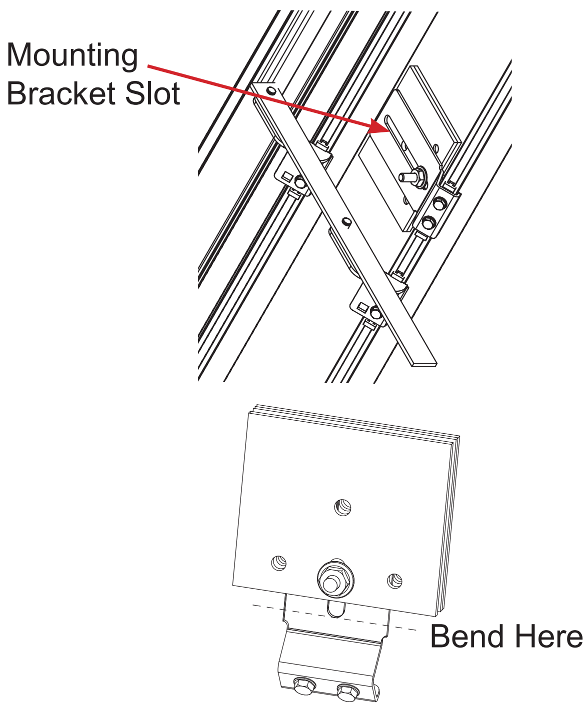
The following instructions should be followed when attempting to maximize the counterbalance effect on the EM or GM model dampers. Be aware that when the balance setting is highly sensitive, friction wear and contamination will have an adverse effect to the operation of the damper. The sensitivity of the counterbalance should only be set to meet the application requirements. The damper must be mounted square and plumb and operate freely before any weight adjustments are performed.

Adjustment #1 will effect the balance of the blades in the open position. Adjustment #2 will effect the balance of the blades in the closed position along with a small change to the open position balance.

If the damper blades do not achieve full open position under airflow and you want them to open further or all the way, then adjustment #1 will need to be performed. If the damper blades do not open completely and adjustment #1 has been addressed, then more weight is required.

If the airflow through the damper is light and the blades only slightly move from the closed position, then adjustment #2 and #1 are required.

Figure 62: Counterbalance Adjustment



Adjustment #1:

Moving the weight stack along the length of the mounting bracket slot (Figure 62) will effect the full open balance of the blade assembly. Moving the weights further away from the blade pivot point will cause the blades to become more balanced so that at some point, and with enough weight, the blades would remain open. Care must be taken to ensure that when the weights are moved outward from the blade pivot point they will not interfere with the adjacent blade when the blades close. Moving the weights back towards the blade pivot point will allow the blades to close.

Adjustment #2:

The damper is assembled with the counterbalance weights and bracket installed such that, when the blades are closed, the counterbalance weights and bracket are positioned directly in line with the blade pivot points. This position of the weights will provide a slight load that will hold the blades in the closed position. To reduce this load, the counterweight-mounting brackets can be bent (Figure 62) away from the adjacent blade surface. Bending the counterweight mounting brackets will move the counterweight stack behind the blade pivot point and therefore allow the blades to start opening at lower airflow rates. This adjustment should be performed in small increments since the blades will not fully close if the brackets are bent to far.

NOTE: Performing adjustment #2 will have a small effect on adjustment #1. Therefore, if adjustment #1 is critical, then adjustment #1 may need to be repeated.

Belts

⚠ WARNING

Rotating parts can cause severe personal injury or death. Replace all belt/fan guards that are removed temporarily for service.

It is very important that the drive pulleys remain in proper alignment after adjustments are made. Misalignment of pulleys results in premature belt wear, noise, vibration, and power loss. See Figure 63. Premature belt failures are frequently caused by improper belt tension (either too tight or too loose) or misaligned pulleys. The proper tension for operating a V-belt is the lowest tension at which the belts will not slip at peak load conditions. For initial tensioning, the proper belt deflection half way between pulley centers is 1/64" for each inch of belt span. For example, if the belt span is 64 inches, the belt deflection should be one inch using moderate thumb pressure at midpoint of the drive, See Figure 64.

Check belt tension two times during the first 24 hours of operation and periodically thereafter. To adjust belt tension, simply loosen four fasteners (two on each side of the motor plate) and slide the motor plate away from the fan shaft until proper belt tension is attained. On some fans, fasteners attaching the motor to the motor plate must be loosened in order to adjust the belt.

Figure 63: Drive Pulley Alignment

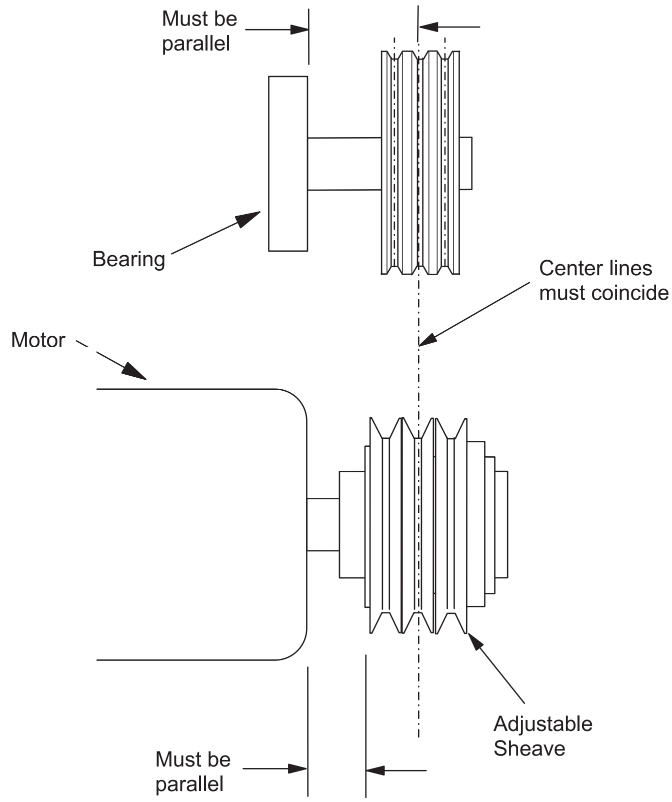


Figure 64: Belt Adjustment

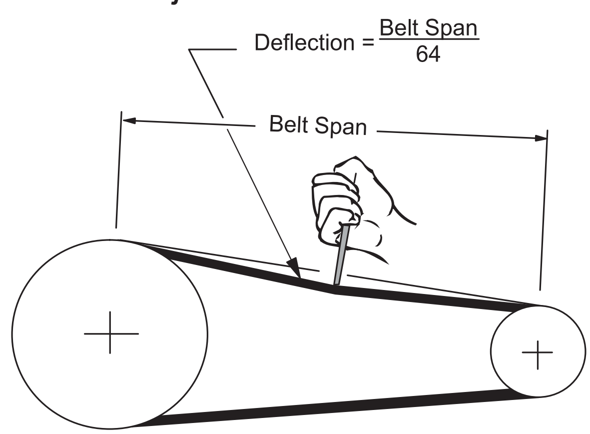


Figure 65: PropellerExhaust Fan Replacement Parts List

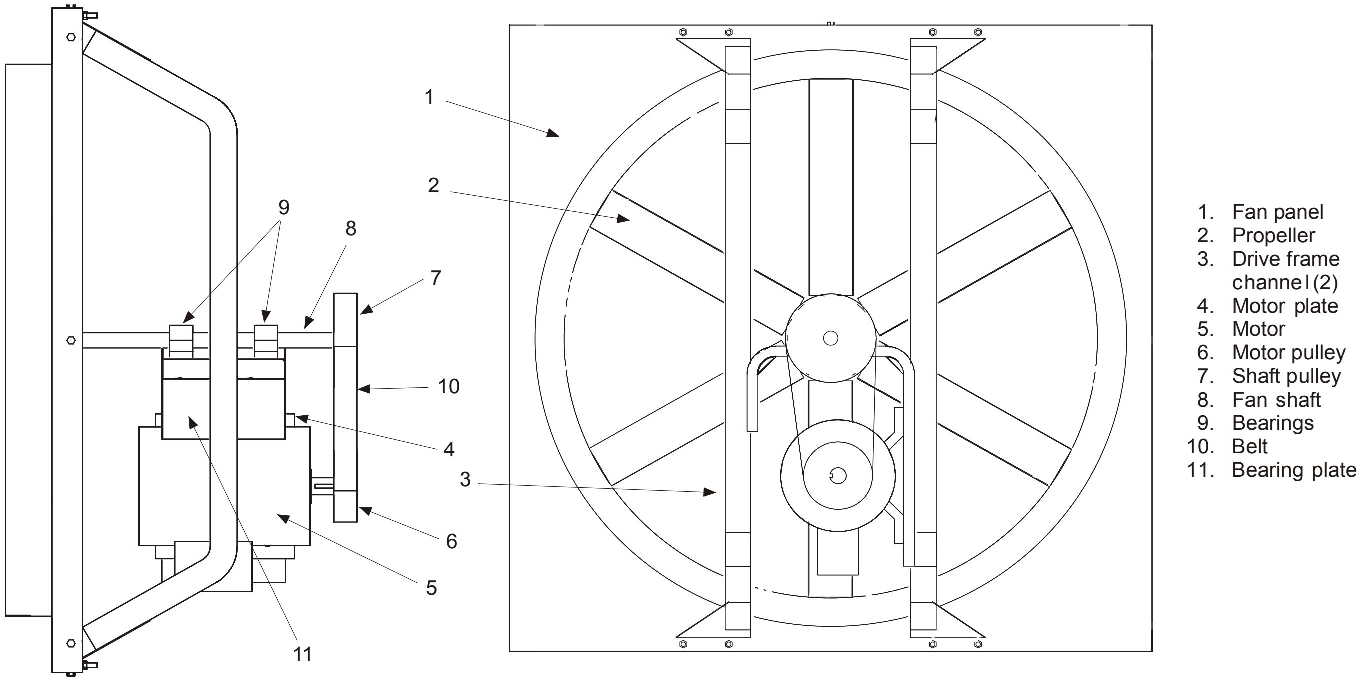


Table 6: Propeller Exhaust Fan Troubleshooting

Problem	Cause	Corrective Action
Reduced Airflow	System resistance is too high.	Check backdraft dampers for proper operation. Remove obstructions in ductwork. Clean dirty filters. Check for adequate supply for air exhaust fans or exhaust air for supply fans.
	Unit running backwards.	See "Before Start-up" on page 68.
	Fan speed too low.	Increase fan speed.
	Excessive dirt on propeller.	Clean propeller.
ExcessiveNoise	Bearings	Tighten bearing collars and setscrews. Lubricate bearings. Replace defective bearings.
	V-Belt drive	Tighten pulleys on motor shaft and fan shaft. Adjust belt tension. Align pulleys. Replace worn belts or pulleys.
	Excessive vibration	Clean dirt build-up from propeller. Check all setscrews and fasteners for tightness. Check for worn bearing. Correct propeller imbalance. Check for loose dampers, guards or ductwork.
	Defective motor	Replace motor.

Bearings

Bearings are the most critical moving part of the fan; inspect them at periodic intervals. Check locking collars, set screws, and fasteners that attach bearings to the bearing plate for tightness. In a clean environment and temperatures above 32°F/below 200°F, lubricate fan shaft bearings with grease fittings semi-annually using a high quality lithium-based grease. If unusual environmental conditions exist temperatures below 32°F/above 200°F, moisture or contaminants, more frequent lubrication is required. With the unit running, add grease very slowly with a manual grease gun until a slightbead of grease forms at the seal. Be careful not to unseat the seal by over lubricating or using excessive pressure. Bearings without grease fittings are lubricated for life.

Fasteners and Setscrews

Any fan vibration has a tendency to loosen mechanical fasteners. Periodic inspection should include checking all fasteners and setscrews for tightness. Pay particular attention to setscrews attaching the propeller to the shaft and the shaft to the bearings. Loose bearing setscrews lead to premature failure of the fan shaft.

Lubrication

Refer to "Bearings" for bearing lubrication. Many fractional horsepower motors installed on the smaller fans are lubricated for life and require no further attention. Oil motors equipped with oil holes in accordance with the manufacturer's instructions printed on the motor. Use a high grade SAE 20 machine oil and use caution not to over lubricate. Grease motors supplied with grease fittings according to directions printed on the motor.

Removing Dust/Dirt

Thoroughly clean the exterior surface of the motor, fan panel, and entire propeller periodically. Dirt can clog cooling openings on motor housings, contaminate bearing lubricant, and collect on propeller blades causing severe imbalance if left unchecked. Use caution and do not allow water or solvents to enter the motor or bearings. Under no circumstances should motors or bearings be sprayed with steam or water.

Exhaust Fan ON/OFF Control

The exhaust fans are turned ON and OFF based on building static pressure, outdoor air damper position, and discharge fan capacity. Exhaust fans do not have to always run while the supply fan is ON, as does a return fan. They are turned ON and OFF through output MCB-B02 on the Main Control Board. For detailed information on Propeller Exhaust Fan Control, see the operation manual supplied with the unit (OM 920).

Exhaust Fan Troubleshooting

Table 6 provides guidelines for troubleshooting problems with the propeller exhaust fan options.

WARNING

Electric shock and moving machinery hazard. Can cause severe equipment damage, personal injury, or death.

Disconnect and tag out all electrical power before servicing this equipment.

All start-up and service work must be performed only by trained, experienced technicians familiar with the hazards of working on this type of equipment.

Read and follow this manual: "MicroTech III Applied Rooftop Unit Controller" manual (OM 920) before operating or servicing.

Bond the equipment frame to the building electrical ground through grounding terminal or other approved means.

All units are completely run tested at the factory to promote proper operation in the field. Nevertheless, the following check, test, and start procedures must be performed to properly start the unit. To obtain full warranty coverage, complete and sign the check, test, and start form supplied with the unit, or complete the "Rooftop Equipment Warranty Registration" on page 112 and return it to Daikin.

A representative of the owner or the operator of the equipment should be present during start-up to receive instructions in the operation, care, and maintenance of the unit. If the unit has a factory-mounted disconnect switch, use the switch's bypass mechanism to open the main control panel door without de-energizing the control panel. See page 107 for instructions.

Servicing Control Panel Components

DANGER

Hazardous voltage. May cause severe injury or death.

Disconnect electric power before servicing equipment. More than one disconnect may be required to de-energize the unit.

Disconnect all electric power to the unit when servicing control panel components. Unless power is disconnected to the unit, the components are energized. Always inspect units for multiple disconnects to ensure all power is removed from the control panel and its components before servicing.

Before Start-up

1. Verify that the unit is completely and properly installed with ductwork connected.
2. Verify that all construction debris is removed, and that the filters are clean.
3. Verify that all electrical work is complete and properly terminated.
4. Verify that all electrical connections in the unit control panel and compressor terminal box are tight, and that the proper voltage is connected.
5. Verify all nameplate electrical data is compatible with the power supply.
6. Verify the phase voltage imbalance is no greater than 3%.
7. Verify that gas piping is complete and leak tight.
8. Verify that the shutoff cock is installed ahead of the furnace, and that all air has been bled from the gas lines.
9. Manually rotate all fans and verify that they rotate freely.
10. Verify that the belts are tight and the sheaves are aligned.
11. Verify that all setscrews and fasteners on the fan assemblies are still tight. Do this by reading and following the instructions in "Setscrews" on page 98, which is in the "Maintenance" section of this manual.
12. Verify that the evaporator condensate drain is trapped and that the drain pan is level.
13. If unit is curb mounted, verify that the curb is properly flashed to prevent water leakage.
14. Before attempting to operate the unit, review the control layout description to become familiar with the control locations.
15. Review the equipment and service literature, the sequences of operation, and the wiring diagrams to become familiar with the functions and purposes of the controls and devices.
16. Determine which optional controls are included with the unit.
17. Before closing (connecting) the power disconnect switch, open (disconnect) the following unit control circuit switches:
    a. Main Control Panel
        – Turn system switch S1 to OFF.
        – Electric heat units: turn switch HS1 to OFF.
    b. Furnace Control Compartment
        – Turn furnace switch S3 to OFF.
        – Main Control Panel Switch S7 to OFF.
18. If the DAC or SCC unit does not have an optional zone temperature sensor (ZNT1) connected to it, you may need to change the keypad entry under *Main Menu\Commission Unit\Unit Setup\Space Sensor = from none, Analog/Net, Digital/Net.*

NOTE: If desired, you can significantly reduce all MicroTech III internal control timers by the changing the entry under keypad menu *Main Menu\Commission Unit\Timer Settings\Service Time* = (from *0 min to X min* where X is the number of minutes you want the unit to operate with fast timers).

Power Up

1. Close the unit disconnect switch. With the control system switch S1 in the OFF position, power should be available only to the control circuit transformer (T1) and the compressor crankcase heaters.
2. Turn the Switch S1 to ON. Power should now be supplied to the control panel, and the LEDs on MCB1 should follow the normal startup sequence (refer to "Power-up" on page 35).

Fan Start-up

1. Verify all duct isolation dampers are open. Unit mounted isolation dampers may be in the supply or return sections.
2. Place the unit into the Fan Only mode through the keypad menu *Main Menu\Quick Menu\Ctrl Mode = Fan*.
3. Turn Switch S7 to ON. The controller should enter the Startup Initial operating state. If the fan does not run:
   a. Check fuses F1 and F3.
   b. Check the manual motor protectors or that the circuit breakers have not tripped.
   c. Check the optional phase monitor.
4. If the fans are equipped with optional spring isolators, check the fan spring mount adjustment. When the fans are running they should be level. Refer to "Spring Isolated Fans" on page 33.
5. Verify the fan rotation is correct.
6. Verify the DHL safety is opening at a pressure compatible with duct working pressure limits.

NOTE: The supply and return fan drives usually are selected for operation in the drive's mid-speed range. The return fan drives are usually shipped with fixed pitch sheaves that will provide the selected fan speed; however, the supply fan drives are usually shipped with variable pitch sheaves that are adjusted to provide the minimum fan speed. Both drives should be adjusted for proper airflow during air balancing. See "Air Balancing" on page 72.

Economizer Start-up

⚠ CAUTION

Adjust dampers properly. Improper adjustment can damage the dampers. When an economizer is ordered without an actuator, the linkage requires a 3.14" linear stroke to open it fully. Do not allow dampers to be driven beyond their normal full closed or full open position.

1. Check whether the outdoor air is suitable for free cooling by displaying the keypad menu *Main Menu View\Set Unit\Econo Status. See* OM 920 *"Determining Economizer Status" section*. *Low* indicates low outdoor air enthalpy; *High* indicates high outdoor air enthalpy. See "Enthalpy Control" on page 57 to verify that the enthalpy changeover control is working properly. You may want to take temperature and humidity measurements.
2. At the keypad, set the cooling setpoint low enough so the controller calls for cooling. Adjust the value in *View\Set Unit\Cooling\Occ Clg Spt* below the temperature shown in *View\Set Unit\Temperatures\Control Temp*. In addition, on DAC units, adjust the value in *View\Set Unit\Cooling\DAT Clg Spt* below the temperature shown in *View\Set Unit\Temperatures\Discharge Temp.*
3. Place the unit into cooling mode through the keypad menu *Quick Menu\Ctrl Mode = Cool Only*.
4. Observe the outdoor air dampers:
   a. If the outdoor enthalpy is low, the control algorithm should start to modulate the dampers open to maintain the discharge air setpoint.
   b. If the outdoor enthalpy is high, the dampers should maintain their minimum position. Look at menu *View\Set Unit\Min OA Damper\Min OA Pos*. Change this entry to another value. Verify that the dampers move to the new minimum position setpoint.
5. If the unit is equipped with the electromechanical enthalpy changeover control (Honeywell H205) and the outdoor air condition is borderline, attempt to change its input to the MicroTech III controller by turning the switch adjustment to A or D. Check enthalpy status in keypad menu *Main Menu View\Set Unit\Econo Status. See* OM 920 *"Determining Economizer Status" section.* If this reading is *Low*, go to Step 5a. If it is *High*, go to Step 5b.

NOTE: It may not be possible to check the economizer operation in both low and high enthalpy states on the same day. If this is the case, repeat this procedure on another day when the opposite outdoor air enthalpy conditions exist.

Compressor Startup

⚠ CAUTION

Low ambient temperature hazard. Can cause compressor damage. Do not attempt to start up and check out the refrigeration system when the outdoor air temperature is below 50°F unless the unit is specially equipped for low ambient operation.

⚠ NOTICE

Venting refrigerant to atmosphere is not allowed per most local laws and/or codes.

With the supply and return fans operational, prepare for compressor operation.

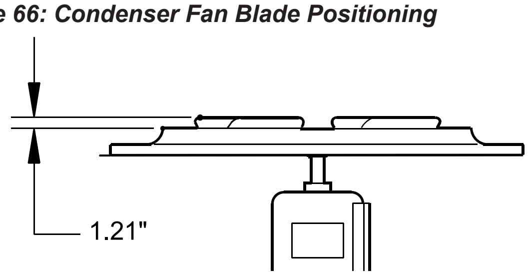
If the unit contains optional refrigeration service valves, they will be shipped closed. Open the discharge and suction valves. The valve are a quarter-turn ball valve type. Verify that the unit has not lost its refrigerant charge. Check the compressor oil level before startup. The oil level should be at or slightly above the center of the sight glass.

Verify that the crankcase heaters are operating. These should operate for at least 24 hours before starting the compressors.

NOTE: On VFD compressors VZH088 and VZH117, verify that the VFD is powered and providing a DC holding current to the compressor when the compressor is OFF. The holding current heats the compressor motor and is used in place of an external banded crankcase heater. The local control panel on the VFD will display that a holding current is present.

Verify that the condenser fan blades are positioned properly and that the screws are tight (see Figure 66). The fan blade must be correctly positioned within its orifice for proper airflow across the condenser coils.

Figure 66: Condenser Fan Blade Positioning



Scroll Compressor Rotational Direction

Scroll compressors only compress in one rotational direction. Three-phase compressors can rotate in either direction depending upon phasing of the power to L1, L2, and L3. Since there is a 50/50 chance of connecting power to cause rotation in the reverse direction, verify that the compressor rotates in the proper direction after the system is installed. If the compressor is rotating properly, suction pressure drops and discharge pressure rises when the compressor is energized. If the compressor is rotating in reverse, the sound level is louder and current draw is reduced substantially. After several minutes of operation, the compressor's motor protector trips.

All three-phase compressors are wired the same internally. Therefore, once the correct phasing is determined for a specific system or installation, connecting properly phased power leads to the same terminals should maintain proper rotational direction.

On VFD compressors, if reverse rotation is noted at startup, the power leads (U and W) at the compressor should be reversed. Reversing the VFD's incoming power leads will not change the compressor's rotational direction.

Perform the following procedure on all units:

1. At the keypad, set the cooling setpoint low enough so that the controller will call for cooling. The value in *View\Set Unit\Cooling\Occ Clg Spt* will need to be adjusted below the temperature shown in *View\Set Unit\Temperatures\Control Temp*. In addition, on DAC units, the value in *View\Set Unit\Cooling\DAT Clg Spt* will need to be adjusted below the temperature shown in *View\Set Unit\Temperatures\Discharge Temp*.
2. Place the unit into cooling mode through the keypad menu *Quick Menu\Ctrl Mode = Cool Only*.
3. Verify that the low ambient compressor lockout temperature setpoint, *Main Menu\Commission Unit\Cooling Setup\Clg Lo OAT Lk* is set below the current outside air temperature (shown in *View\Set Unit\Temperatures\OA Temp*).

NOTE: Do not attempt to operate the compressors if the outdoor air is too cool. See the caution statement under "Compressor Startup".

4. Close the S1 switch. Now refrigeration circuit #1 is enabled and circuit #2 is disabled. After CS1 is closed, the MT III board starts its 5-minute timing cycle. Note that if the unit has an economizer and the outdoor air enthalpy is low, the economizer must fully open before the controller will energize mechanical cooling.
5. When the outdoor air damper has fully opened and the time delay has expired, the liquid line solenoid SV1 and the compressor should start.
   a. Verify that there is a call for cooling by checking the keypad menu *Quick Menu\Unit State* =. This should be in *Cooling*.
   b. Check the keypad menu *Main Menu\View\Set Unit\Unit Status\Settings\Clg Status* =. The compressors will only run if this reads (Enabled).
   c. Trace the control circuits.
6. Verify that compressor #1 starts. If the compressor motor hums but does not run, verify that it is getting three-phase power.

7. The compressor should operate continuously while there is a call for cooling. If the compressor cycles on its low pressure switch, do the following:
    a. Verify that the circuit is not short of refrigerant.
    b. Check for low airflow.
    c. Check for clogged filters.
    d. Check for restricted ductwork.
    e. Check for very low temperature return air entering the unit.
    f. Verify that the liquid line components, expansion valve, and distributor tubes are feeding the evaporator coil.
    g. Verify that all air handling section panels are closed.
    h. Verify that the liquid line service valves are completely open.
8. Verify that the compressors stage properly. As the circuit loads up the second compressor (if available) will be energized. For more information on staging sequences, refer to IM 919 and OM 920.
9. Verify that the condenser fans are cycling and rotating properly (blowing air upward). When the compressor starts, at least one condenser fan should also start. The CCB1 should control the remaining condenser fans based on ambient air conditions. Look at keypad menu *Main Menu\Commission Unit\Cooling Setup\ Cfan Out1 Spt =, Cfan Out2 Spt =, Cfan Out3 Spt*. Table 2 on page 14 shows recommended setpoints based on the unit size. Cond Fan1 controls BO5, Cond Fan2 controls BO6, Cond Fan3 controls BO7, Cond Fan4 controls BO8. Refer to the unit wiring diagrams and Table 3 on page 14.
10. After 15 minutes of run time, check the oil level in the compressor sightglass. If low oil or heavy foaming is observed, it is possible that liquid refrigerant is returning to the compressor. Check the suction superheat (see Expansion Valve Superheat Adjustment). It should be between 10°F (5.5°C) and 13°F (7.2°C).
11. Open S1. the compressor should stop. Place the unit into the "Fan Only" mode through the keypad menu *Main Menu\Quick Menu\Ctrl Mode = fan only*.
12. Check refrigerant circuit #2 by repeating steps 2 through 9, substituting circuit #2 nomenclature for circuit #1 nomenclature (CS2, TD2, CCB2, and compressor #2 (and #4).
13. Check the compressor oil level again, add oil if low.
14. Verify that the condenser refrigerant subcooling at full capacity is between 13 and 20°F.

Expansion Valve Superheat Adjustment

It is very important that the expansion valve superheat setting be adjusted to be between 8°F (-13°C) and 14°F (-10°C). Insufficient superheat will cause liquid floodback to the compressor which may result in slugging. Excessive superheat will reduce system capacity and shorten compressor life.

Turn the adjustment stem clockwise to increase superheat. Not exceeding one turn, adjust the stem and then observe the superheat. Allow up to 30 minutes for the system to rebalance at the final superheat setting.

On refrigeration circuits with multiple expansion valves, the superheat adjustment should be approximately the same for all valves in the circuit.

Checking Superheat

Following are recommendations for checking superheat:

1. Close the unit section doors. Running the unit with its doors open will affect expansion valve and system operation considerably.
2. For units with one expansion valve per circuit, check the pressure and temperature at the compressor suction valve.
3. For units with multiple expansion valves per circuit, check the pressure at the compressor, and check the temperature at the suction header that is fed by the valve.

NOTE: If low oil level is accompanied by heavy foaming visible in the oil sightglass, it is possible that excess liquid refrigerant is returning to the compressor depending on the rotation of the crank shaft. Check the suction superheat and adjust the expansion valve for 8°F (-13°C) and 14°F (-10°C) of superheat. If proper superheat is obtained, sightglass foaming is not a concern.

For RCS/RFS applications in which the condensing section is remote from the air handling section, consideration should have been given to proper piping between the sections, as this can affect the compressor oil level. Refer to the "ASHRAE Handbooks" for more information on proper refrigeration piping design and installation.

Heating System Startup

General

1. At the keypad, set the heating setpoints high enough so that the controller calls for heating.Adjust the value in *Main Menu View\Set Unit\Heating\Occ Htg Spt* = (above the temperature shown in) *Main Menu View\Set Unit\Temperatures\Control Temp*. In addition, on DAC units, adjust the value in *Main Menu View\Set Unit\Heating\DAT Htg Spt* above the temperature shown in *Main Menu View\Set Unit\Temperatures\Disch Temp*.
2. Place the unit into heating mode through the keypad menu *Main Menu\quick Menu\Ctrl Mode = Heat Only*.
3. Verify that the high ambient heat lockout temperature setpoint, *Main Menu\Commission Unit\Heating Setup\Htg Hi OAT Lk* is set above the current outside air temperature (shown in *Main Menu\View\Set Unit\Temperatures\OA Temp*).

Gas Furnace

Refer to the "Start-up and Operating Procedures" section of the Forced Draft Gas Fired Furnace Installation Manual, IM 684 or IM 685. Perform the start-up procedures given in it.

Electric Heat

Turn the electric heat switch HS1 to ON. The electric heaters should energize. If the unit has multistage electric heat, the MicroTech III Auxiliary Control board EHB1 should energize the heaters in successive stages. The rate of staging is set in keypad menu *Main Menu\Commission Unit\Heating Setup\Htg Stage Time*. The default value of *"5 min"* can be adjusted from 2 to 60 minutes.

Steam Heat

The steam valve actuator should open the valve. The steam valve is open when the valve stem is up. If the unit loses power, the spring in the actuator should drive the valve wide open. Check this by opening system switch S1.

Hot Water Heat

The hot water valve actuator should open the valve to the coil. The three-way hot water valve is open to the coil when the valve stem is down. If the unit loses power, the spring in the the actuator should drive the valve wide open to the coil. Check this by opening system switch S1.

Air Balancing

⚠ WARNING

Moving machinery hazard. Can cause severe personalinjury or death.

Do not use a mechanically driven tachometer to measure the speed of return fans on this fan arrangement. Use a strobe tachometer.

⚠ WARNING

Rotating parts can cause severe personal injury or death Replace all belt/fan guards that are temporarily removed for service.

Air balancing should be performed by a qualified air balancing technician. Note that the supply fan motors are usually shipped with variable pitch sheaves which are typically set at the low end of the drive's fan rpm range. See "Mounting and Adjusting Motor Sheaves" on page 74. The return fan motors are usually shipped with fixed pitch sheaves.

The following should be performed as part of the air balancing procedure:

1. Check the operating balance with the economizer dampers positioned for both full outdoor air and minimum outdoor air.
2. Verify that the total airflow will never be less than that required for operation of the electric heaters or gas furnace.
3. For VAV units that have fan tracking control, adjust the supply/return fan balance by using the MicroTech III controller's built-in, automatic capability. For complete information on using this feature, see OM 920, MicroTech III Applied Rooftop Unit Controller.
4. When the final drive adjustments or changes are complete, check the current draw of the supply and return fan motors. The amperage must not exceed the service factor stamped on the motor nameplate.
5. Upon completion of the air balance, replace variable pitch motor sheaves (if any) with comparably sized fixed pitch sheaves. A fixed pitch sheave will reduce vibration and provide longer belt and bearing life.

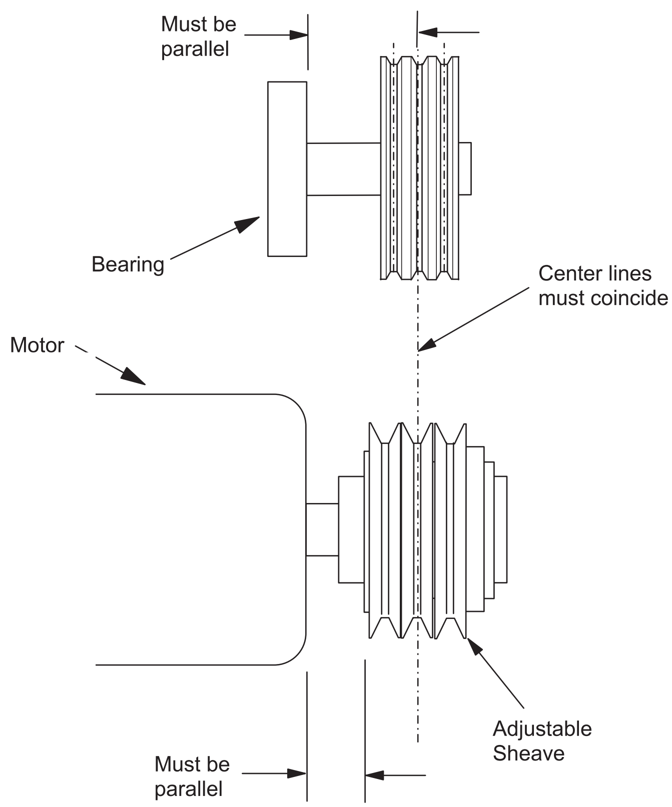
Drive Belt Alignments

Sheave Alignment

Mounting:

1. Verify both driving and driven sheaves are in alignment and the shafts are parallel. The center line of the driving sheave must be in line with the center line of the driven sheave. See Figure 67.
2. Verify that all setscrews are torqued to the values shown in Table 15 on page 98 before starting drive. Check setscrew torque and belt tension after 24 hours of service.

Figure 67: Sheave Alignment (Adjustable Shown)



Drive Belt Adjustment

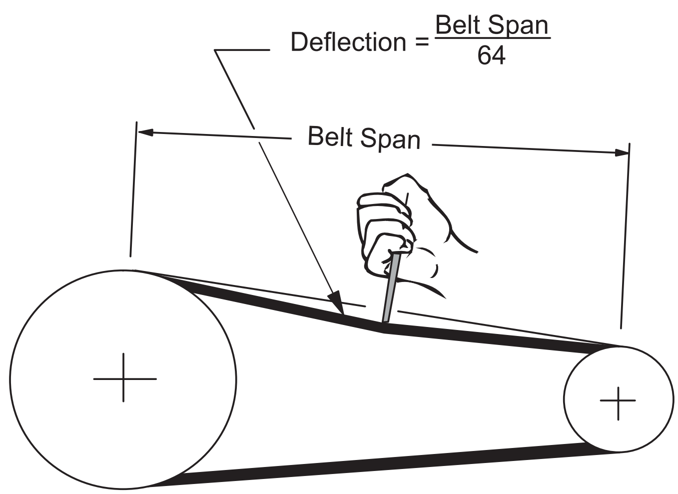
General Rules of Tensioning

1. The ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
2. Check tension frequently during the first 24 – 48 hours of operation.
3. Over tensioning shortens belt and bearing life.
4. Keep belts free from foreign material which may cause slippage.
5. Inspect V-belts on a periodic basis. Adjust tension if the belt is slipping. Do not apply belt dressing. This may damage the belt and cause early failure.

Tension Measurement Procedure

1. Measure the belt span. See Figure 68.
2. Place belt tension checker squarely on one belt at the center of the belt span. Apply force to the checker, perpendicular to the belt span, until the belt deflection equals belt span distance divided by 64. Determine force applied while in this position.
3. Compare this force to the values on the drive kit label found on the fan housing.

Figure 68: Drive Belt Adjustment



Mounting and Adjusting Motor Sheaves

VM and VP Variable Pitch Sheaves

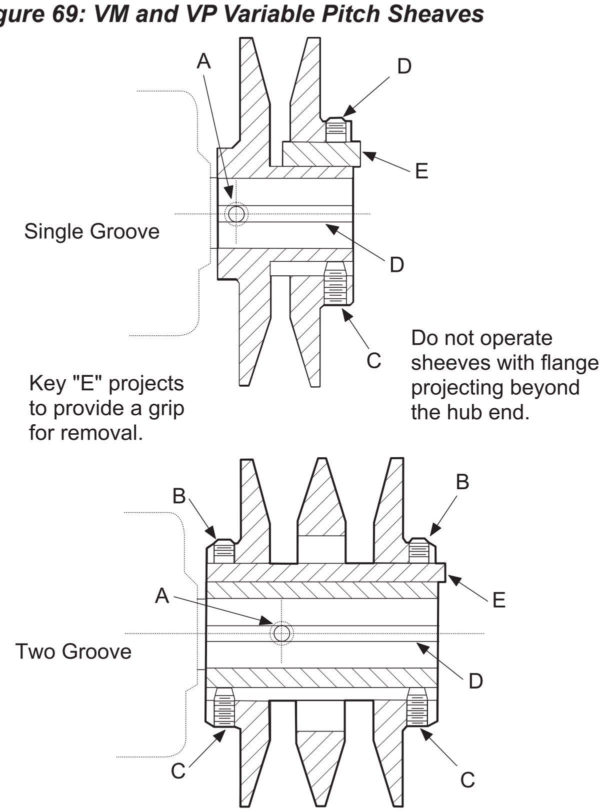
Mounting:

1. Mount all sheaves on the motor shaft with setscrew **A** toward the motor (see Figure 69).
2. Be sure both the driving and driven sheaves are in alignment and that the shafts are parallel.
3. Fit internal key **D** between sheave and shaft and lock setscrew **A** securely in place.

Adjusting:

1. Slack off all belt tension by moving the motor toward the driven shaft until the belts are free from the grooves. For easiest adjustment, remove the belts.
2. Loosen setscrews **B** and **C** in the moving parts of the sheave and pull out external key **E** (see Figure 69). This key projects a small amount to provide a grip for removing.
3. Adjust the sheave pitch diameter for the desired fan speed by opening the moving parts by half or full turns from closed position. Do not open more than five full turns for A-type belts or six full turns for B-type belts. Adjust both halves of two-groove sheaves by the same number of turns from closed to ensure both grooves have the same pitch diameter.
4. Replace external key **E** and securely tighten setscrews **B** over the key. Tighten setscrews **C** into the keyway in the fixed half of the sheave.
5. Put on belts and adjust the belt tension. Do not force belts over grooves. Loosen the belts by adjusting the motor base closer to the fan shaft.
6. Be sure that all keys are in place and that all setscrews are tight before starting the drive. Check the setscrews and belt tension after 24 hours of service.

Figure 69: VM and VP Variable Pitch Sheaves



LVP Variable Pitch Sheaves

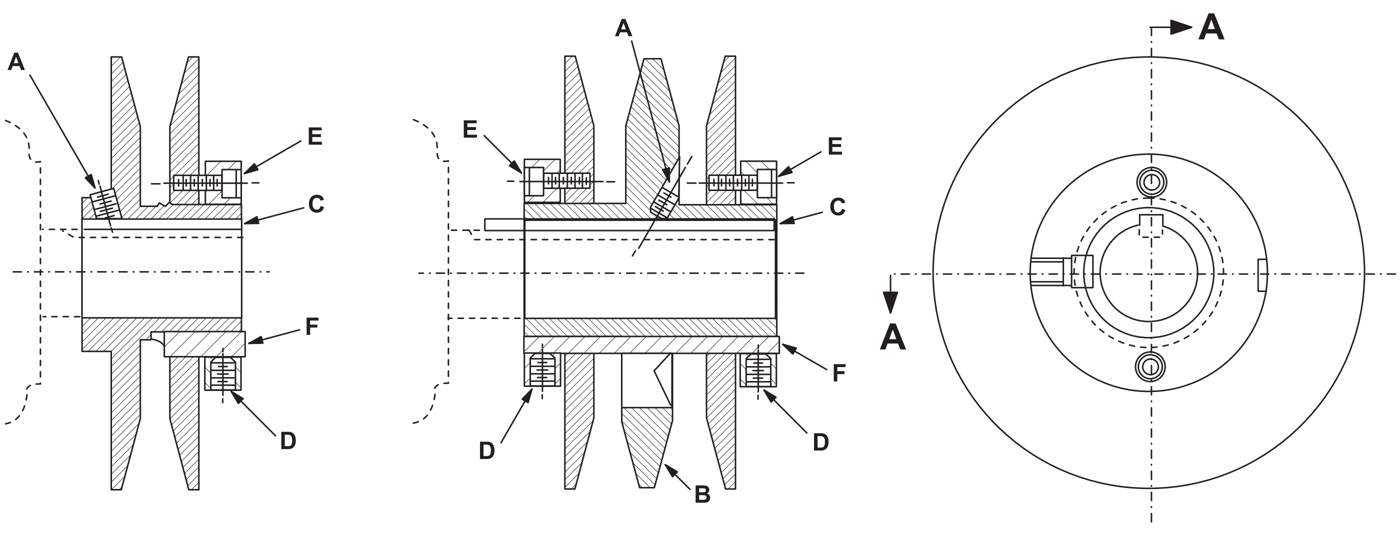
Mounting:

1. For single-groove sheaves, slide the sheave onto the motor shaft so that the side of the sheave with setscrew **A** is next to the motor (see Figure 70). For two-groove sheaves, slide the sheave onto the motor shaft so that the side of the sheave with setscrew **A** is away from the motor.
2. To remove the flange and locking rings:
    a. Loosen setscrews **D**.
    b. Loosen but do not remove capscrews **E**.
    c. Remove key **F**. This key projects a small amount to provide a grip for removing.
    d. Rotate the flange counterclockwise until it disengages the threads on the shaft barrel.
3. Be sure that the driving and driven sheaves are in alignment and the shafts are parallel. When aligning two-groove sheaves, allow room between the sheave and motor to get to capscrews **E**.
4. Insert key **C** between the sheave and the shaft and tighten setscrew **A** securely.

Adjusting:

1. Slack off all belt tension by moving the motor toward the driven shaft until the belts are free from the grooves. For easiest adjustment, remove the belts.
2. Loosen setscrews **D**.
3. Loosen but do not remove capscrews **E**.
4. Remove key **F**. This key projects a small amount to provide a grip for removing.
5. Adjust the pitch diameter by opening or closing the movable flange by half or full turns. Note that two-groove sheaves are supplied with both grooves set at the same pitch diameter. To ensure the same pitch diameter for satisfactory operation, move both movable flanges the same number of turns. Do not open sheaves more than five turns for A-type belts or six turns for B-type belts.
6. Replace key **F**.
7. Tighten setscrews **D** and capscrews **E**.
8. Put on the belts and adjust the belt tension. Do not force belts over grooves. Loosen the belts by adjusting the motor base closer to the fan shaft
9. Before starting the drive, make sure that all keys are in place and all setscrews and all capscrews are tight. Check and retighten all screws and retention the belts after approximately 24 hours of operation.

Figure 70: LVP Variable Pitch Sleeves



Section A-A

Section A-A

MVP Variable Pitch Sheaves

⚠ CAUTION

Do not loosen any screws other than the two locking screws (**A**) in the outer locking ring. Before operating the drive, securely tighten these screws.

Adjusting:

1. Slack off belt tension by moving the motor toward the driven shaft until the belts are free from the grooves. For easiest adjustment, remove the belts.
2. Loosen both locking screws **A** in outer locking ring, but do not remove them from the sheave. There is a gap of approximately 1/2" (1 mm) between the inner and outer locking rings. This gap must be maintained for satisfactory locking of the sheave.

   If locking screws **A** are removed by accident and the gap is lost, screw the outer locking ring down until it touches the inner locking ring. Then back off the outer ring 1/2 to 3/4 turn until the inner and outer ring screw holes line up. Reinsert locking screws **A**, but do not tighten them until after adjustment is made.
3. Adjust the sheave to the desired pitch diameter by turning the outer locking ring with a spanner wrench. Any pitch diameter can be obtained within the sheave range. One complete turn of the outer locking ring will result in a 0.233" (6 mm) change in pitch diameter.] Do not open **A–B** sheaves more than four 3/4 turns for A-type belts or 6 turns for B-type belts. Do not open **C** sheaves more than nine 1/2 turns.
4. Tighten both locking screws **A** in the outer locking ring.
5. Put on the belts and adjust the belt tension. Do not force belts over grooves. Loosen the belts by adjusting the motor base closer to the fan shaft.

Figure 71: MVP Variable Pitch Sheaves (Type A-B)

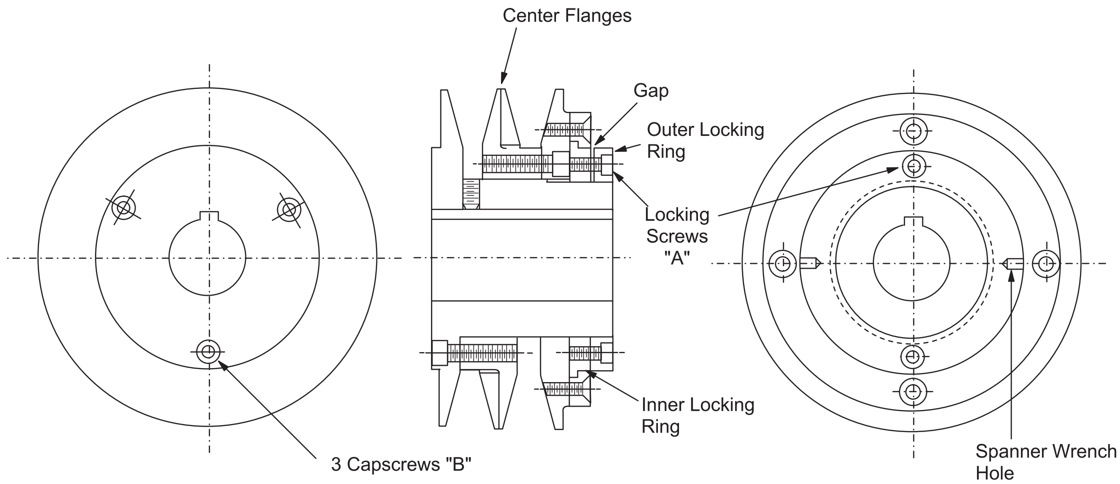
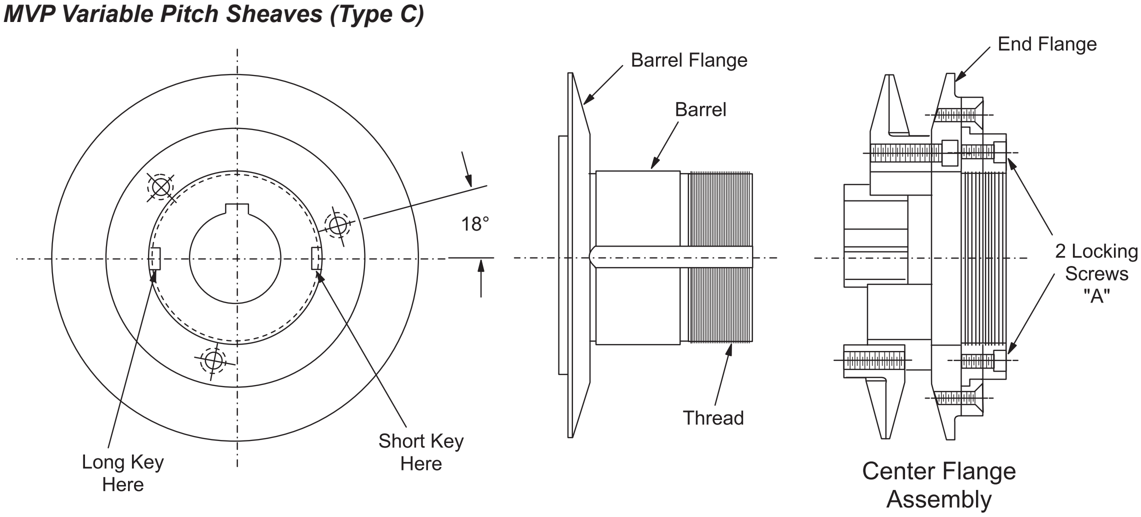


Figure 72: MVP Variable Pitch Sheaves (Type C)



⚠ CAUTION

If the unit has hot gas bypass on circuit #1 only, lead circuit must always be #1.

When all start-up procedures are completed, set the controls and program the MicroTech III controller for normal operation. Use the following list as a guide; some items may not apply to your unit. For more detail, see IM 919 and OM 920.

1. Turn system switch S1 to ON and S7 to AUTO.
2. Turn gas furnace switch S3 to AUTO or turn electric heat switch HS1 to ON.
3. Set the electromechanical (Honeywell H205) enthalpy control (OAE) as required (A, B, C, or D). Set the solid-state (Honeywell H705/C7400) enthalpy control (OAE/RAE) past D.
4. Set the heating and cooling parameters as required for normal unit operation.
    a. *Main Menu\View\Set Unit\Cooling\Occ Clg Spt & DAT Clg Spt.*
    b. *Main Menu\View\Set Unit\Heating\Occ Htg Spt & DAT Htg Spt.*
5. Set the low ambient compressor lockout setpoint as required in menu, *Main Menu\Commission Unit\Cooling Setup\Clg Lo Oat Lk* =. Do not set it below 50°F (10°C) unless the unit is equipped for low ambient operation.
6. Set the high ambient heat lockout temperature setpoint, *Main Menu\Commission Unit\Heating Setup\Htg Hi OAT Lk* as required.
7. Set the alarm limits as required in *Main Menu\Commission Unit\Alarm Configurations\Alarm Limits.*
8. Set the compressor lead/lag function as desired using keypad menu *Main Menu\Commission Unit\Cooling Setup\Lead Circuit* and *Main Menu\Commission Unit\Cooling Setup\Staging Type.* Refer to “Compressor Staging” in IM 919 and OM 920.
9. Set the duct static pressure control parameters as required in keypad menu *Airflow\Duct Pressure\.*
10. Set the building static pressure control parameters as required in keypad menu
    a. *Main Menu\View\Set Unit\RF/EF Control\Bldg SP Spt*.
    b. If RF/EF Control = Tracking, then set the fan tracking parameters as required in keypad menu. *Main Menu\ Commission Unit\RF\EF Setup\ Sup Fan Max, RF @ SF Max, Sup Fan Min, RF @ SF Min.*
11. Set the economizer control parameters as required in keypad menu *Main Menu\View\Set Unit\Economizer\OAD/Econo Pos.*
12. Set the control timers as required in keypad menu *Main Menu\Commission Unit\Timer Settings*.
    a. Set the date and time in keypad menu *Setup/Service\Time/Date\.*
    b. Set the operating schedule as required using keypad menus. *Main Menu\View\Set Unit\Date\Time\Schedules.*

NOTE: Note: When used with a Building Automation System, these settings may need to be kept at the default of no schedule:

Maintaining Control Parameter Records

Daikin recommends that the MicroTech III controller’s setpoints and parameters be recorded and saved for future reference. If the Microprocessor Control Board requires replacement, this record facilitates entering the unit’s proper data. The following tables display all the setpoints, monitoring points, and program variables offered by MicroTech III plus the keypad road map used to find each parameter.

A number of menus and menu items that appear on the unit keypad/display are conditional and may not apply to a specific unit, depending on the unit software configuration. The unit software configuration is defined by a “Software Configuration Code” shown on a label located near the keypad/display. The Software Configuration Code also can be displayed via the six menu items in the Config Code menu on the unit keypad/display. Refer to OM 920.

The shaded menus and menu items in Figure 76 starting on page 80 are conditional. A conditional menu or menu item includes a reference in Figure 76 to the position in the Software Configuration Code upon which its applicability depends. For example, the Duct Pressure menu in Figure 76 includes a notation [14=1 or 2]. This notation means that the Duct Pressure menu (and all its menu items) applies to the specific unit only if position 14 in its Software Configuration Code is a 1 or a 2. Otherwise, the menu or menu item is not applicable to the unit and does not affect its operation.

The items in Figure 76 include the factory-set value for all adjustable items.

NOTE: Keep a record of any changes made to any of these items.

Using the Keypad/Display

The keypad/display consists of a 5-line by 22 character display, three keys and a "push and roll" navigation wheel. There is an Alarm Button, Menu (Home) Button, and a Back Button. The wheel is used to navigate between lines on a screen (page) and to increase and decrease changeable values when editing. Pushing the wheel acts as an Enter Button.

The first line on each page includes the page title and the line number to which the cursor is currently "pointing". The line numbers are X/Y to indicate line number X of a total of Y lines for that page. The left most position of the title line includes an "up" arrow to indicate there are pages "above" the currently displayed items, a "down" arrow to indicate there are pages "below" the currently displayed items or an "up/down" arrow to indicate there are pages "above and below" the currently displayed page.

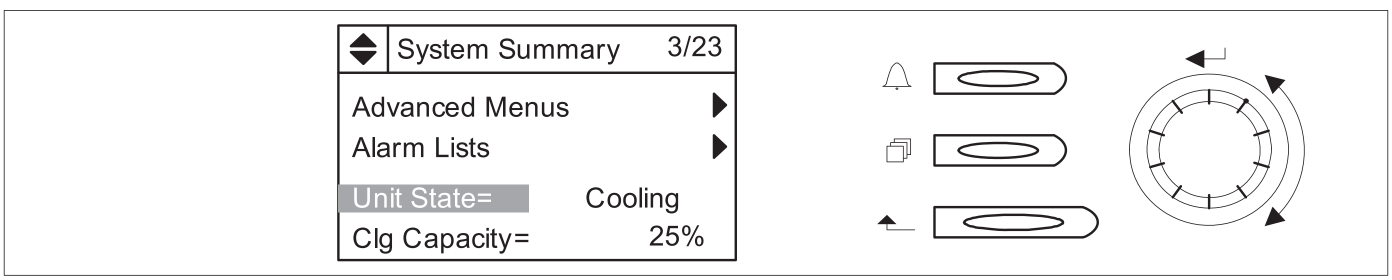
Each line on a page can contain status only information or include changeable data fields. When a line contains status only information and the cursor is on that line all but the value field of that line is highlighted meaning the text is white with a black box around it. When the line contains a changeable value and the cursor is at that line, the entire line is highlighted. Each line on a page may also be defined as a "jump" line, meaning pushing the navigation wheel will cause a "jump" to a new page. An arrow is displayed to the far right of the line to indicate it is a "jump" line and the entire line is highlighted when the cursor is on that line.

The keypad/display Information is organized into five main menus or menus groups; Alarm Lists Menu, System Summary Menu, Standard Menus, Extended Menus and Advance Menus.

NOTE: Only menus and items that are applicable to the specific unit configuration are displayed.

The Alarm Lists Menu includes active alarm and alarm log information. The System Summary Menu includes status information indicating the current operating condition of the unit. Standard Menus include basic menus and items required to setup the unit for general operation. These include such things are control mode, occupancy mode and heating and cooling setpoints. Extended Menus include more advanced items for "tuning" unit operation such as PI loop parameters and time delays. Advanced Menus include the most advanced items such as "unit configuration" parameters and service related parameters. These generally do not needing changing or accessing unless there is a fundamental change to or a problem with the unit operation.

Figure 73: Keypad Controls



Passwords

When the keypad/display is first accessed, the Home Key is pressed, the Back Key is pressed multiple times, or if the keypad/display has been idle for the Password Timeout timer (default 10 minutes), the display will show a “main” page where the user can enter a password or continue without entering a password.

The three password levels available are Level 2, Level 4, and Level 6, with Level 2 having the highest level of access. Entering the Level 6 password allows access to the Alarm Lists Menu, System Summary Menu, and the Standard Menus group. Entering the Level 4 password allows similar access to Level 6 with the addition of the Extended Menus group. Entering the Level 2 password allows similar access to Level 4 with the addition of the Advanced Menus group. The Level 2 password is 6363, the Level 4 is 2526, and the Level 6 password is 5321.

Continuing without entering one of these three levels allows access only to the Alarm Lists Menu and the System Summary Menu.

NOTE: Alarms can be acknowledged without entering a password.

The password field initially has a value **** where each * represents an adjustable field. These values can be changed by entering the Edit Mode.

Entering an invalid password has the same effect as continuing without entering a password.

Once a valid password has been entered, the controller allows further changes and access without requiring the user to enter a password until either the password timer expires or a different password is entered. The default value for this password timer is 10 minutes. It is changeable from 3 to 30 minutes via the Timer Settings menu in the Extended Menus.

Figure 74: Password Main Page

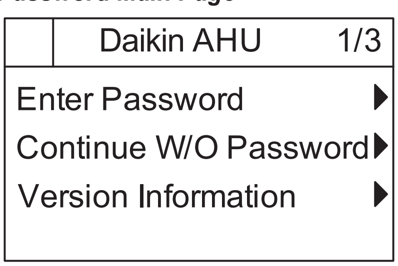
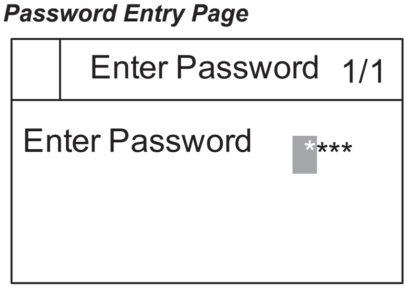


Figure 75: Password Entry Page



Navigation Mode

In the Navigation Mode, when a line on a page contains no editable fields all but the value field of that line is highlighted meaning the text is white with a black box around it. When the line contains an editable value field the entire line is inverted when the cursor is pointing to that line.

When the navigation wheel is turned clockwise, the cursor moves to the next line (down) on the page. When the wheel is turned counter-clockwise the cursor moves to the previous line (up) on the page. The faster the wheel is turned the faster the cursor moves.

When the Back Button is pressed the display reverts back to the previously displayed page. If the Back button is repeated pressed the display continues to revert one page back along the current navigation path until the “main menu” is reached.

When the Menu (Home) Button is pressed the display reverts to the “main page.”

When the Alarm Button is depressed, the Alarm Lists menu is displayed.

Edit Mode

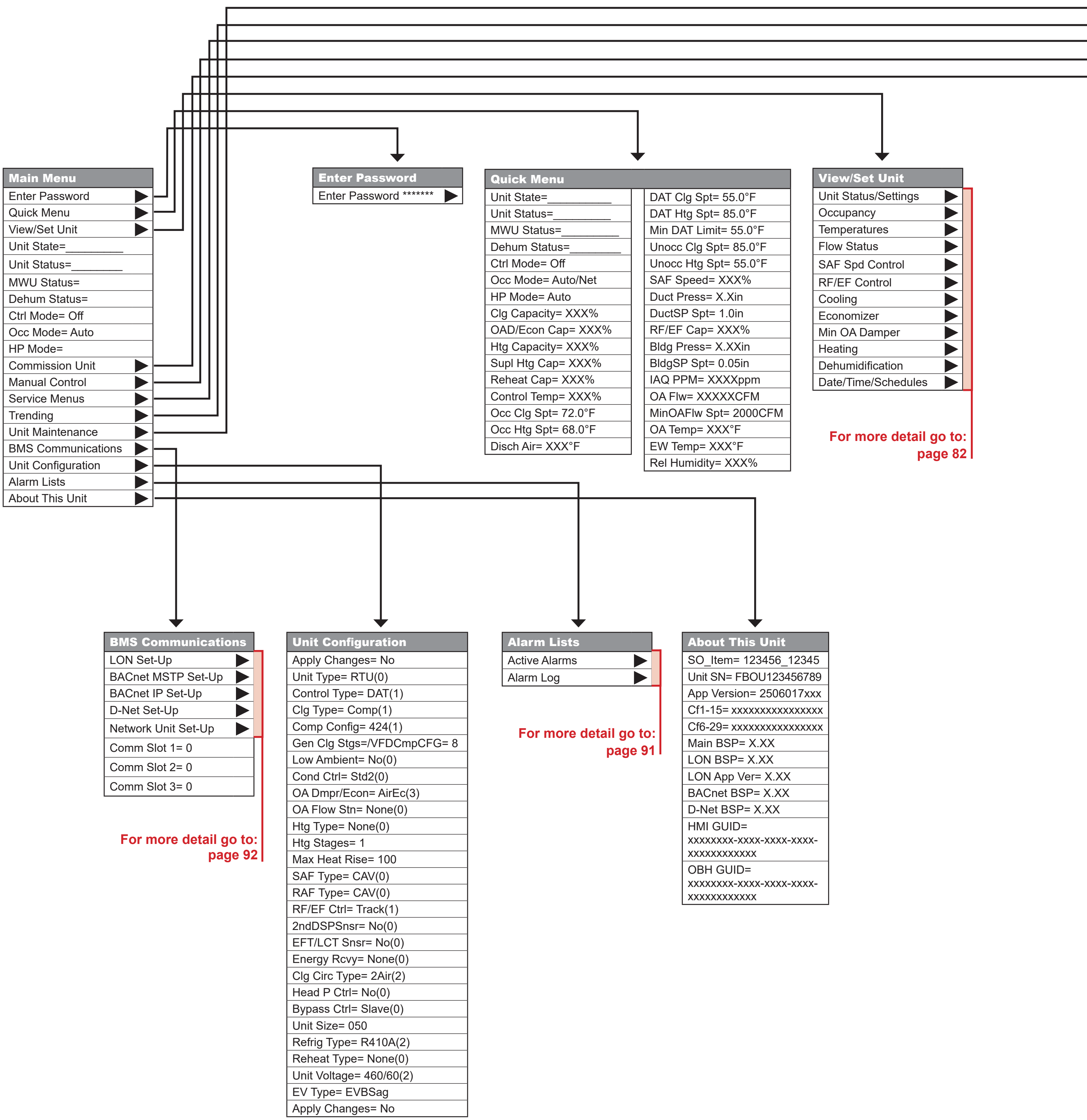
The Editing Mode is entered by pressing the navigation wheel while the cursor is pointing to a line containing an editable field. Once in the edit mode pressing the wheel again causes the editable field to be highlighted. Turning the wheel clockwise while the editable field is highlighted causes the value to be increased. Turning the wheel counter-clockwise while the editable field is highlighted causes the value to be decreased.

The faster the wheel is turned the faster the value is increased or decreased. Pressing the wheel again cause the new value to be saved and the keypad/display to leave the edit mode and return to the navigation mode.

Keypad/Display Menu Structure

The following is a description of the MicroTech III menu structure. These menus and items can all be displayed with the keypad/ display. Menu items displayed will change based on the selected unit configuration. Refer to OM 920 for more details.

***Figure 76: Main Menu** – Keypad/Display Menu Structure*



Commission Unit
Unit Set-Up ▶
Timer Settings ▶
SAF Set-Up ▶
RF/EF Set-Up ▶
Htg/Clg ChgOvr Set-Up ▶
Cooling Set-Up ▶
INV Cmp Set-Up ▶
Var Cmp Set-Up ▶
Econo Set-Up ▶
Min OA Set-Up ▶
Heating Set-Up ▶
OA Fan Set-Up ▶
Exp Valve Set-Up ▶
Defrost Set-Up ▶
Dehum Set-Up ▶
Energy Rec Set-Up ▶
Head Pressure Set-Up ▶
Evap Cond Set-Up ▶
D3 Set-Up ▶
Alarm Configuration ▶

For more detail go to:
page 84— 87

Manual Control	
Manual Control= Normal	CFan Outpt 1= Off
Supply Fan= Off	CFan Outpt 2= Off
SAF Spd Cmd= 0%	CFan Outpt 3= Off
Manual Ctrl= Normal	BP/WR Valve= 0%
Supply Fan= Off	CW Valve= 0%
SAF Spd Cmd= 0%	ExhFan Out 1= Off
INV/OF Ena= Off	ExhFan Out 2= Off
INV Cmp= Off	ECond VFD= Off
INV Cmp Cmd= 0%	ECFan Spd Cmd= 0%
Comp 3= Off	EC Dm Valve= Close
OA Fan= Off	Sump Pump= Off
OA Fan Cmd= 0%	Sep Flsh Vlv= Off
4 Way Valve= Off	SV1= Off
RcvSol Valve=Off	SV2= Off
BP Sol Valve= Off	Gas Htg On/Off= Off
EVI Cmd= 0%	Htg Valve= 0%
EVO Cmd= 0%	SCR Out= 0%
RF/EF Fan= Off	F&BP Damper= 0%
RF/EF Spd Cmd= 0%	Htg Stg 1= Off
OAD/Econo= 0%	SCR Ena 1= Off
OAD OpCl= Close	Htg Stg 2= Off
Var Cmp= Off	SCR Ena 2= Off
Var Cmp Cmd= 0%	Htg Stg 3= Off
VCmp Emg Stop= Nrml	Htg Stg 4= Off
Comp 1= Off	Htg Stg 5= Off
Comp 2= Off	Htg Stg 6= Off
Comp 3= Off	Reheat Valve= 0%
Comp 4= Off	RH Output= Off
Comp 5= Off	LSCRH Valve= Off
Comp 6= Off	HGBP Valve= Off
Comp 7= Off	ERec Wheel= Off
Comp 8= Off	ER Whl Cmd= 0%
U1 Comp 1= Off	ERBP Dmpr Cl= Off
U1 Comp 2= Off	ERBP Dmpr Op= Off
U2 Comp 1= Off	Cond Wtr Pump= Off
U2 Comp 2= Off	Alm Output= Off
Cond Sol 1= Off	Fan Op Out= Off
Cond Sol 2= Off	

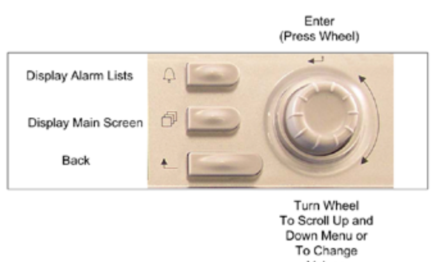
Service Menus
Timer Settings ▶
Operating Hours ▶
Save/Restore Settings ▶
Active Alarms ▶
Alarm Log ▶
Alarm Configuration ▶
Analog Input Status ▶
Universal I/O Status ▶
Digital Input Status ▶
Digital Output Status ▶
Network Input Status ▶
Modbus Status ▶
D3 Status ▶
Sensor Offsets ▶
Reset Counter= XXXX

For more detail go to:
page 88— 91

Trending
Trending Ena= No
Apply Chgs= No
Sample Time= 300s
TrendOnOff= Off
Export Data= No
Clear Trend= Done
Points 1–8 (Fixed) ▶
Points 9–24 (from List) ▶
Points 25–27 (with IDs) ▶
Points 28–30 (with IDs) ▶

For more detail go to:
page 92

Unit Maintenance
Operating Hours



This navigation map represents all possible AHU menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

Figure 76 continued: ***View/Set Unit*** *– Keypad/Display Menu Structure*

View/Set Unit
Unit Status/Settings ▶
Occupancy ▶
Temperatures ▶
Flow Status ▶
SAF Spd Control ▶
RF/EF Control ▶
Cooling ▶
Economizer ▶
Min OA Damper ▶
Heating ▶
Dehumidification ▶
Date/Time/Schedules ▶

Unit Status/Settings
Unit State= ___________
Unit Status= __________
MWU Status= _________
Dehum Status= ________
Ctrl Mode= Off
Clg Status= ___________
Htg Status= ___________
SuplHtgStatus= ________
Econo Status= _________
Clg Capacity= XXX%
Htg Capacity= XXX%
Supl Htg Cap= XXX%
Reheat Cap= XXX%
SAF Speed= XXX%
RF/EF Cap= XXX%
OAD/Econo Cap=XXX%
Rel Humidiy= XXX%
Net Emrg Ovrd= Normal
Net App Mode= Auto

Occupancy
Occupancy= __________
Occ Mode= Auto/Net
OccSrc= _____________
UnoccSrc= ___________
Tnt Ovrde Tm= 0 min

Temperatures
Control Temp= XXX°F
Disch Temp= XXX°F
Return Air= XXX°F
Space Temp= XXX°F
OA Temp= XXX°F
EF/LC Temp= XXX°F
EW Temp= XXX°F
Mixed Air= XXX°F
ER LAT= XXX°F
ER EAT= XXX°F
Sump Temp= XXX°F
PA Temp= XXX°F
DRT1= XXX°F
DRT2= XXX°F
DRT3= XXX°F
SRT= XXX°F
DFT= XXX°F
IRT= XXX°F
ORT= XXX°F
INVCompTemp= XXX°F

Flow Status
Airflow= ______________
Waterflow= ___________
Water Pump= _________
Supply Fan= __________
Ret/Exh Fan= _________

SAF Speed Control
SAF Speed= XXX%
Speed Cmd= XXX%
Duct Press= X.Xin
DuctSP Spt= 1.0in
IAQ PPM= XXXXPPM
OA Flw= XXXXXCFM
MinOAFlw Spt= 2000CFM
Bldg Press= X.XXin
BldgSP Spt= 0.05in

RF/EF Control
RF/EF Cap= XXX%
Speed Cmd= XXX%
Bldg Press- X.XXin
BldgSP Spt= 0.050in

Cooling
Occ Clg Spt= 72.0°F
Unocc Clg Spt= 85.0°F
DAT Clg Spt= 55.0°F

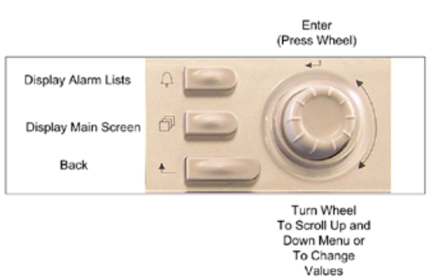
Economizer
OAD/Econo Pos= XXX%
DAT Clg Spt= 55.0°F
Min OA Pos= XXX%
FreeClgStatus = _______
Occ Clg Spt= 72.0°F
Unocc Clg Spt= 85.0°F

Min OA Damper
Min OA Pos= XXX%
Vent Limit= 20%
LoFlo V Lmt= 30%
DCV Limit= 10%
Min OA Src= __________

Heating
Occ Htg Spt= 68.0°F
Unocc Htg Spt= 55.0°F
MWU Spt= 70.0°F
DAT Htg Spt= 85.0°F

Dehumidification
Dehum Status= ________
Rel Humidity= XXX%
Dewpoint= XXX°F
Dehum Method= None
RH Setpoint= 50%
Dewpoint Spt= 50°F
Reheat Spt= XXX°F
Reheat Cap= XXX%

Date/Time/Schedules
Time= hh:mm:ss
Date= MM/DD/YY
UTC Diff= -60min
DAILY SCHEDULE
Mon= HH:MM-HH:MM
Tue= HH:MM-HH:MM
Wed= HH:MM-HH:MM
Thu= HH:MM-HH:MM
Fri= HH:MM-HH:MM
Sat= HH:MM-HH:MM
Sun= HH:MM-HH:MM
Hol= HH:MM-HH:MM
HOLIDAY DATES
Hol 1=MMMDD/YY-MMMDD/YY
Hol 2=MMMDD/YY-MMMDD/YY
Hol 3=MMMDD/YY-MMMDD/YY
Hol 4=MMMDD/YY-MMMDD/YY
Hol 5=MMMDD/YY-MMMDD/YY
Hol 6=MMMDD/YY-MMMDD/YY
Hol 7=MMMDD/YY-MMMDD/YY
Hol 8=MMMDD/YY-MMMDD/YY
Hol 9=MMMDD/YY-MMMDD/YY
Hol 10=MMMDD/YY-MMMDD/YY
ONE EVENT SCHEDULE
Beg= MMMDD/YY@HH:MM
End= MMMDD/YY@HH:MM
OPTIMAL START
Enable= No
Htg Range= 0.4 ºF/min
Htg OAT= 35 ºF
Des Htg OAT= 0 ºF
Clg Rate= 0.4 ºF/min
Clg OAT= 85 ºF
Des Clg OAT= 95 ºF
DAYLIGHT SAVINGS
DLS Strt Mon= Mar
DLS Strt Wk= 2nd Week
DLS End Mon= Nov
DLS End Wk= 1st Week
DLS Enable= Auto
PURGE
Max Purge= 0min



This navigation map represents all possible AHU menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

Figure 76 continued: ***Commission Unit** – Keypad/Display Menu Structure*

Commission Unit
Unit Set-Up ▶
Timer Settings ▶
SAF Set-Up ▶
RF/EF Set-Up ▶
Htg/Clg ChgOvr Set-Up ▶
Cooling Set-Up ▶
INV Cmp Set-Up ▶
Var Cmp Set-Up ▶
Econo Set-Up ▶
Min OA Set-Up ▶
Heating Set-Up ▶
OA Fan Set-Up ▶
Exp Valve Set-Up ▶
Defrost Set-Up ▶
Dehum Set-Up ▶
Energy Rec Set-Up ▶
Head Pressure Set-Up ▶
Evap Cond Set-Up ▶
D3 Set-Up ▶
Alarm Configuration ▶

List continues on, page 86

Unit Set-Up
Apply Changes= No
RAT Sensor= Yes
OAT Sensor= Yes
Space Sensor= Digtl/Net
Eng Units= English
Unit Name= xxxxxxxxxxxx
Rapid Start= No
Rapid Start Tm= 10min
DO10 Clg= FanOp

Timer Settings
Service Time= 0min
Start Up= 180s
Recirculate= 180s
Zero OA Time= 0min
Tnt Override= 120min
Post Heat= 0s
Pwd Timeout= 10min
Low DAT= 6min
ClgStateDelay= 300s
Bypass Valve= 300s
Clg Stg Time= 5min
Htg Stg Time= 5min
Air Flw Ign= 120s
MinExStrtTm= 120s
MinExStopTm= 120s
ER Whl Stg Tm= 5min
ER Whl Off Tm= 20min
EvCnd Stg Tm= 10min
WRV Init Tm= 60s
Min WRV Time= 60s
Htg Wrmup Tm= 240s
Htg Hld Period= 240s
RH Srg Time= 10min
Srvc Time Inc= 20s
OffHtClDelay= 120s

SAF Set-Up		
SAF Ctrl= DSP	CO_2 CONTROL	BSP CONTROL
AplyInputChgs= No	Min PPM= 0PPM	BSP DB= 0.01in
CO2 Input= None	Max PPM= 2000PPM	BSP Period= 5s
CFM Input= None	V/A @ Min PPM= 0V	BSP Gain= 0.2
BSP Input= No	V/A @ Max PPM= 10V	Max Spd Chg= 4%
SPEED CONTROL	Min SAF PPM= 800PPM	SAF SETUP
Rem SAF Cap= 33%	Max SAF PPM= 1100PPM	SAF Ctrl Dly= 30s
DSP CONTROL	Min PPM Spd= 50%	Min Speed= 33%
DSP DB= 0.1in	Max PPM Spd= 100%	VAVBox Out= ________
VFD Ramp Time= 60s	CFM CONTROL	Max SAF Hz=
Min Period= 5s	Min CFM= 0CFM	Max Vent Speed= 100%
Max Spd Chg= 15%	Max CFM= 10000CFM	Max SAF RPM= 2600
Duct Press 1= X.Xin	V/A @ Min CFM= 0V	ECM Status= _________
Duct Press 2= X.Xin	V/A @ Max CFM= 10 V	
1 ZONE VAV CONTROL	SAF CFM DB= 3%	
Min Clg Spd= 40%	SAF CFM Period= 30s	
Max Clg Spd= 100%	SAF CFM Gain= 0.1	
Min Htg Spd= 40%	SAF CFM MxChg= 5%	
Max Htg Spd= 100%		
Space Period= 60s		
Space Gain= 0.8		
Space PAT= 400s		
Space Max Chg= 10%		

INV Cmp Set-Up	
COMPRESSOR STATUS	COMPRESSOR SETUP
Clg State= ___________	Clg Lo OAT Lk= 55°F (RTU/SCU) 0°F (MPS) 25°F (DPS)
Htg State= ___________	Htg Lo OAT Lk= 0.0ºF 45°F (100% OA w/o ER)
INV Cmp Spd= XXX.X%	Htg Hi OAT Lk= 55.0ºF
INV Spd Cmd= XXX.X%	EffHtgOATLk= _______ºF
Comp 3=_____________	OAT Diff= 2ºF
Prev Standby=_______ ▶	INV Period= 20s
Compressor Limiting ▶	INV Gain= 2.5
Fault Code Details ▶ 1	INV PAT= 10s
INV Port Temp= XXX.XºF	INV Max Chg= 15%
INV Fin Temp= XXX.XºF	IFB COMM STATUS ▶ 2
INV Cmp Amps= XX.XA	
REFRIG CIRCUIT STATUS	
PTD= XXX.Xpsi	
PTS= XXX.Xpsi	
4 Way Valve=__________	
RcvrSol Valve=_________	
BP Sol Valve=_________	

Date/Time
MM/DD/YYYY HH:MM:SS

Compressor Limiting
Clg Press Lmtg=_______
Htg Press Lmtg=_______
C Ratio Lmtg=_________
Ref DLT Lmtg=_________
INV Brd Lmtg=_________
INV Man Dsbl= Enable
Comp3 ManDsbl= Enable

Var Comp Set-Up
COMPRESSOR STATUS
Var Cmp Status= _______
Var Spd Cmd= ________
Comp 1= _____________
Comp 3= _____________
Comp 5= _____________
REFRIG CIRCUIT STATUS
PTD1= _____________
PTD2= _____________
VCmpDischSH= _______
C1DschSatTmp= _______
C2DschSatTmp= _______
DRT1= ______________
DRT2= ______________
Cond Sol 1= Off
Cond Sol 2= Off
COMPRESSOR SET-UP
Var Cmp Period= 20s
Var Cmp Gain= 1
Var Cmp PAT= 40s
VarCmp MaxChg= 10%
OilBoost= Off
LowOilTime= 10min
OilBoostTime= 15min
LowTcOAT= 80°F

Econo Set-Up
EconChgovr= Enth&DB
Econo FDD= On
Clg Stage Time= 5min
Chgover Temp= 55.0°F
Clg DB= 2.0°F
Econo Period= 30/40s (air/water)
Econo Gain= 1-Oct (air/water)
Econo PAT= 60/40s (air/water)
Econo Max Chg= 10/15% (air/water)
Flush Econo= Yes
Econo Diff= 2.0°F
EWT Diff= 3.0°F
Clg Reset= None
Min Clg Spt= 55.0°F
Min Clg Spt @= 0/NA
Max Clg Spt= 65.0°F
Max Clg Spt@= 100/NA
Max OAT Lmt= 75°F
Min OAT Lmt= 70°F
Calibrate OAD= No
PosSwOpen= 97%
Max Sw Diff= 3%
PosSwClose= 3%
Min SW Diff= 5%
OAD Sw Status= _______

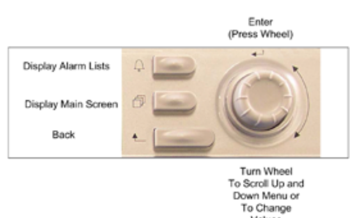
1, 2 **See the expansion information on page 91**

RF/EF Set-Up	
RF/EF Ctrl= Tracking	MinExStrtTm= 120s
Rem RAF Cap= 5%	MinExStopTm= 120s
Rem ExhF Cap= 5%	MinExOAPos= 5%
BSP DB= 0.01in	MinExSAFCap= 10%
BSP Period= 5s	ExhOnOAPos= 40%
BSP Gain= 0.2s	ExhMxOAPos= 100%
Max Spd Chg= 4%	Exh Stg 1 On= 40%
Sup Fan Max= 100%	Exh Stg 1 Off= 30%
RF @ SF Max= 95%	Exh Stg 2 On= 55%
Sup Fan Min= 30%	Exh Stg 2 Off= 40%
RF @ SF Min= 25%	Exh Stg 3 On= 70%
Lo Fan Diff= 75%	Exh Stg 3 Off= 50%
Hi Fan Diff- 75%	Max RF/EF Hz= 60Hz
RFEF Ctrl Dly= 30s	Max Vent Spd= 100%
Min Speed= 5% (with Exhaust Fan) 33% (with Return Fan)	Max RFEF RPM= 2600
	ECM Status= _________

Htg/Clg ChgOvr Set-Up
Ctlr Temp Src= RAT
AplyTstatchg= No
Use Tstat Spt= No
Occ Clg DB= 2.0°F
Clg Period= 60s
Clg Gain= 0.1
Clg PAT= 600s
Max Clg Chg= 5.0°F
Occ Htg DB= 2.0°F
Htg Period= 60s
Htg Gain= 0.1
Htg PAT= 600s
Max Htg Chg= 5.0°F
CalDRemSpt@10°C= No
CalDRemSpt@50°F= No
CalDRemSpt@30°C= No
CalDRemSpt@86°F= No
DemandShed= Ena
ClgDmdShdInc= 4°F
HtgDmdShdInc= 4°F
ClgShedRate= 2.0°F/hr
HtgShedRate= 2.0°F/hr

Cooling Set-Up
Clg Stage Time= 5min
Clg DB= 2.0°F
Clg Period= 20s
Clg Gain= 1
Clg PAT= 40s
CW Max Chg= 15%
Clg Lo OAT Lk= 55ºF (RTU/SCU) 0°F (MPS) 25°F (DPS or RTU w/ VFD Cmps)
OAT Diff= 2.0°F
Min EWT= 55°F
Clg Reset= None
Min Clg Spt= 55.0°F
Min Clg Spt @= 0/NA
Max Clg Spt= 65.0°F
Max Clg Spt@= 100/NA
Lead Circuit= #1
Staging Type= Std
CFanOut1 Spt= 55°F
CFanOut2 Spt= 65°F
CFanOut3 Spt= 75°F
Cond Fan Diff= 5°F
Unocc Diff= 3°F
DT Above Spt= ________
DT Below Spt= ________

Min OA Set-Up		
AplyMinOAChg= No (Uses MinOAT Type Instance Name)	CFM RESET	FAN SPEED RESET
	OA Flow= XXXXXCFM	Min Fan Diff= 20%
Min OA Reset= None	MinOAFlwSpt= 2000CFM	Max Fan Diff= 50%
BSPOAOvrd= No	Field Stn Rst= No	Min Clg Spd= 40%
RstLmtSnsr= None	Field Stn Cfg= VDC	Des Clg Spd= 100%
EXTERNAL RESET	Min CFM= 0 CFM	BSP RESET
OA @ MinV/mA= 0%	Max CFM= 10000 CFM	MinRFEFTm= 120s
OA @ MaxV/mA= 100%	V/A @Min CFM= 0.0/V	BSP OvdST= 5s
Min V/mA= 0.0/V	V/A @Max CFM= 10.0/V	BSP OvdGain= 0.2
Max V/mA= 10.0/V	OA CFM DB= 3%	BSP OvdMaxChg= 4%
CO_2 RESET	OA CFM Period= 30s	DAMPER LIMITING
IAQ Reset= Yes	OA CFM Gain= 0.1	RstTLmt= 32.0ºF
PPM@DCVLmt= 800PPM	OA CFM Max Chg= 5%	RstTSmplTm= 5s
PPM@VntLmt= 1000PPM	Design Flow= Yes	RstTGain= 0.2
IAQ PPM= XXXXPPM	Des Flo DB= 3%	RstPAT= 60s
Min PPM= 0 PPM	DF Period= 30s	RstTMaxChg= 4%
Max PPM= 2000 PPM	Des Flo Gain= 0.1	0–30% OA Max= 30%
V/A @Min PPM= 0.0/V	DF Max Chg= 5%	Min Inc Rate= 0.03
V/A @Max PPM= 10.0/V	RH Lvl Pos= ____________	Max Inc Rate= 1.0
	LH Lvl Pos= ____________	



This navigation map represents all possible AHU menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

Figure 76 continued: ***Commission Unit*** *– Keypad/Display Menu Structure*

Commission Unit
Unit Set-Up ▶
Timer Settings ▶
SAF Set-Up ▶
RF/EF Set-Up ▶
Htg/Clg ChgOvr Set-Up ▶
Cooling Set-Up ▶
Cooling Set-Up (2) ▶
INV Cmp Set-Up ▶
Var Cmp Set-Up ▶
Econo Set-Up ▶
Min OA Set-Up ▶
Heating Set-Up ▶
OA Fan Set-Up ▶
Exp Valve Set-Up ▶
Defrost Set-Up ▶
Dehum Set-Up ▶
Energy Rec Set-Up ▶
Head Pressure Set-Up ▶
Evap Cond Set-Up ▶
D3 Set-Up ▶
Alarm Configuration ▶

Heating Set-Up
Htg Stage Time= 5min
Htg DB= 2.0°F
Htg Period= 60s
Htg Gain= 0.8
Htg PAT= 120s
Htg Max Chg= 10%
Htg Lo OAT Lk= 0.0°F – 45.0°F (100% OA w/o ER)
Htg Hi OAT Lk= 55.0°F
EffHtgOATLk= 55.0°F
SplHtgOATLk= 55.0°F
OAT Diff= 2.0°F
Htg Reset= None
Min Htg Spt= 55.0°F
Min Htg Spt @= 0
Max Htg Spt= 120.0°F
Max Htg Spt@= 100
Min DAT Ctrl= Yes
Min DAT Limit= 55.0°F
F&BP Method= OpenVlv
F&BP ChgOvrT= 37°F
Occ Heating= Yes
Unocc Diff= 55.0°F
Htg Wmup Tm= 60s
Htg Hld Period= 240s
Max Purge Hld= 20s
Gas Derate V= 10.0v
MWUSensor= RAT

OA Fan Set-Up
OA FAN STATUS
OA Fan1 Spd= XXX%
OA Fan1 Cmd= XXX%
OA Fan1Amps= XX.XA
Fault Code Details ▶ 1
OA Fan2 Spd= XXX%
OA Fan2 Cmd= XXX%
OA Fan2Amps= XX.XA
Fault Code Details ▶ 1
REFRIG CIRCUIT STATUS
PTS= XXX.Xpsi
PTD= XXX.Xpsi
Disch Sat Tmp= XXX.X°F
EffDshSatTSpt= XXX.X°F
OA Temp= XXX°F
INV Fin Temp= XXX°F
OA FAN SET UP
DischSatTDiff= 15°F
DischSatTDB= 2.0°F
OA Fan Period= 25s
OA Fan Gain= 2.5
OA Fan PAT= 75s
OA Fan Max= 90%
IFB COMM STATUS ▶ 2

1, 2 **See the expansion information on page 91**

Exp Valve Set-Up	
EXP VALVE STATUS	EXP VALVE SETUP
EVI Pos= XXX%	SSH DB= 2.0ºF
EVO Pos= XXX%	SH Lo Base= 6.0ºF/5.0ºF/2.0ºF (15THP/3–12THP/ClgOnly)
EVStatus=____________	SH Hi Base= 9.0ºF
REFRIG CIRCUIT STATUS	Htg EVI Meth= SbC
PTS= XXX.Xpsi	IC SC Spt= 9.0ºF
PTD= XXX.Xpsi	IC SC DB= 2.0ºF
Suction SH= XX.X°F	HtgSC EVI Min= 12% (Unit Size≤6) 50% (Unit Size>6)
Discharge SH= XX.XºF	Clg EVO Meth= SbC
Subcooling= XX.X°F	OC SC Spt= 9.0ºF
Eff SSH Spt= XX.X°F	OC SC DB= 2.0ºF
EffSH Base= XX.X°F	ClgSC EVO Min= 12%
Eff SC Spt= XX.X°F	ManCtrl EV Op= Auto
Eff SC Lo Lmt= XXX%	
SRT= XXX°F	
Disch Sat Tmp= XXX.X°F	
Sucn Sat Tmp= XXX.X°F	
IRT= XXX°F	
ORT= XXX°F	

Evap Cond Set-Up
Cond Fan Spd= XXX%
CFan Spd Cmd= XXX%
Min Fan Speed= 33%
EvCond Stg Tm= 10min
Sump Temp= XXX°F
Min Sump T= 75.0°F
Max Sump T= 85.0°F
Sump Dump Spt= 35.0°F
Cndtvy= XXXS/CM
Hi Cndtvy Spt= XXXS/CM
SmpWtrLvDly= 5min
PostClgTime= 10min
SepFlshtime= 1min
Dolphin Sys= No

D3 Set-Up
Itouch Vers= ___________
Unit D3 Addr= Jan–00
Set D3 Addr= No
OA Unit Num= 0
OA Unit Amps= 0
OA Unit Addr= 0
Set OA Unit= No
Rst All OA= No
Min Load= 20%
Max Load= 50%
HiCapReset= No
DATLoDiff= 10.0ºF
Eco Method= None
DATHiDiff= 5.0ºF
OA Enth Max= 24.5 BTU/lb
OA Hum Max= 0.0107lb/lb (Units not displayed on HMI)
OAT Max= 84ºF
Temp Display= DAT
Low Speed= 33%
Med Speed= 60%
Hi Speed= 100%

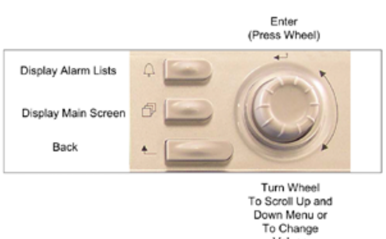
Alarm Configuration
ALARM LIMITS
Hi Disch Temp= 170°F
Lo Disch Temp= 40°F
Hi Return Temp= 120°F
ALARM OUT CONFIG
Faults= Fast
Problems= Slow
Warnings= Off
ALARM DELAYS
Frz Delay Time= 30s
LP Delay= 2s
LP Comp Delay= 5s (410A) 65s (R22)
Air Flw Ing=120s
Sens Alm Dly= 30s
Temp AlmDly= 30s
ALARM CONFIG
Emerg Stop= ManClr

Defrost Set-Up
Defrost State= _________
Manual DF= No
MinCmpOpTm= 10min
MinAccCmpTm= 40min
MaxFrostTm= 120min
Defrost Temp= XXºF
Tdef Adj= 0.0ºF
CmpOpTm= XXXmin
AccCmpOpTm= XXXmin
LoFrstAccTm= XXXmin
HiFrstAccTm= XXXmin

Dehum Set-Up
Dehum Method= None
RH DB= 2%
Dewpoint DB= 2°F
RH Period= 30s
RH Gain= 1
RH PAT= 30s
RH Max Chg= 10%
RH Stg Time= 10min
Stg Rht DB= 5.0°F
Dehum Ctrl= Occupied
Sensor Loc= Return
Mn Lvg Coil T= 45.0°F
Mx Lvg Coil T= 52.0°F
Rht Cmp Lmtg= Yes
Min Rheat Spt= 55.0°F
Max Rheat Spt= 65.0°F
RH Sens Type= VDC
RH Min Sig= 0.0V
RH Max Sig= 10.0V
Min Dehum Spd= 33%
Max Dehum Spd= 100%
Rht Min Pos= 10% (RPS) 15% (MPS) 5% (DPS, DPH)
RH Dec Rate= 1
RHOutMaxV= 10

Energy Rec Set-Up
Energy Rcvy= Yes
ER Wheel= ___________
Wheel Speed= XXX%
Whl Spd Cmd= XXX%
ER LAT= XXX°F
ER EAT= XXX°F
Min ExhT Diff= 2.0°F
Max ExhT Diff= 6.0°F
ER Whl Stg Tm= 5min
ER Whl Off Tm= 20min
Rel Humidity= XXX%
Min Whl Spd= 5%
Intersect Pt= XXX.XºF
Fst Mgnt Meth= Timed
OA Frst Temp= -20.56°F
Defrost Time= 5min
Defrost Period= 60min
Defrst On Tm= 1s
Defrst Off Tm= 24s
ER Whl Period= 30s
ER Whl Gain= 1.0
ER Whl PAT= 30s
ER Max Chg= 10%
LoERLATCmpLk= 45.0°F

Head Pressure Set-Up
Wtr Reg Vlv= XXX%
Head P Circ 1= XXXPSI
Head P Circ 2= XXXPSI
Setpoint= 260PSI
Head Press DB= 10PSI
WRV Period= 10s
WRV Gain= 3.6
WRV PAT= 10s
WRV Max Chg=7%
WRV Init Tm= 60s
Min WRV Pos=10%
Min WRV Tmp= 58°F
Max WRV Tmp= 150°F
WRV Act Time= 60s
Min WRV Time= 60s



This navigation map represents all possible AHU menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

*Figure 76 continued: **Service Menu** – Keypad/Display Menu Structure*

Service Menus
Timer Settings ▶
Operating Hours ▶
Save/Restore Settings ▶
Active Alarms ▶
Alarm Log ▶
Alarm Configuration ▶
Analog Input Status ▶
Universal I/O Status ▶
Digital Input Status ▶
Digital Output Status ▶
Network Input Status ▶
Modbus Status ▶
D3 Input Status ▶
Sensor Offsets ▶
Reset Counte= XXXX

List continues on, page 90

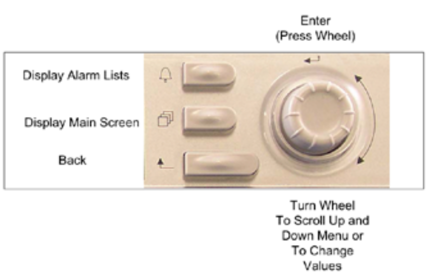
Timer Settings
Service Time= 0min
Start Up= 180s
Recirculate= 180s
Zero OA Time= 0min
Tnt Override= 120min
Post Heat= 0s
Pwd Timeout= 10min
Low DAT= 6min
ClgStateDelay= 300s
Clg Stg Time= 5min
Htg Stg Time= 5min
Air Flw Ign= 120s
MinExStrtTm= 120s
MinExStopTm= 120s
ER Whl Stg Tm= 5min
ER Whl Off Tm= 20min
Srvc Time Inc= 20s
OffHtClDelay= 120s

Operating Hours
Supply Fan= XXXXXh
Ret/Exh Fan= XXXXXh
Exh Out1= XXXXXh
Exh Out2= XXXXXh
Mech Cool= ___________
Var Comp= ___________
Comp # 1= XXXXXh
Comp # 2= XXXXXh
Comp # 3= XXXXXh
Comp # 4= XXXXXh
Comp # 5= XXXXXh
Comp # 6= XXXXXh
Comp # 7= XXXXXh
Comp # 8= XXXXXh
Cmp Cooling= _________
INV Comp= ___________
Comp 3= _____________
Heating= XXXXXh
Cmp Heating= _________
Economizer= XXXXXh
Tnt Override= XXXXXh
Dehumid= XXXXXh
Reheat= _____________
ER Wheel= XXXXXh

Save/Restore Settings
Save Params= No
Rstr Params= No
Rstr Factory= No
SaveToCard= No
LoadFromCard= No
CreateTrace= No
Trace To SD= No

Active Alarms
Alm Count: xx Clr Alms= No
+Alarm 1: Alarm Type ▶
+Alarm 2: Alarm Type ▶
•
•
•
+Alarm 10: Alarm Type ▶

3



This navigation map represents all possible AHU menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

Alarm Log
Log Count: xx Clr Log= No ▶
+/-Alarm 1: Alarm Type ▶
+/-Alarm 2: Alarm Type ▶
•
•
•
+/-Alarm 10: Alarm Type ▶
•
•
•
+/-Alarm 50: Alarm Type ▶

4

Alarm Configuration
ALARM LIMITS
Hi Disch Temp= 170°F
Lo Disch Temp= 40°F
Hi Return Temp= 120°F
ALARM OUT CONFIG
Faults= Fast
Problems= Slow
Warnings= Off
ALARM DELAYS
Frz Delay Time= 30s
LP Delay= 2s
LP Comp Delay= 5s
Air Flw Ing=120s
Sens Alm Dly= 30s
Temp AlmDly= 30s
ALARM CONFIG
Emerg Stop= ManClr

3, 4 **See connection on page 91**

Analog Input Status
MCB AI1= XXXXXXXX
MCB AI2= XXXXXXXX
MCB AI3= XXXXXXXX

Universal I/O Status	
MCB X1= XXXXXXXX	EMC X1= XXXXXXXX
MCB X2= XXXXXXXX	EMC X2= XXXXXXXX
MCB X3= XXXXXXXX	EMC X3= XXXXXXXX
MCB X4= XXXXXXXX	EMC X4= XXXXXXXX
MCB X5= XXXXXXXX	EMC X5= XXXXXXXX
MCB X6= XXXXXXXX	EMC X6= XXXXXXXX
MCB X7= XXXXXXXX	EMC X7= XXXXXXXX
MCB X8= XXXXXXXX	EMC X8= XXXXXXXX
EMA X1= XXXXXXXX	EMD X1= XXXXXXXX
EMA X2= XXXXXXXX	EMD X2= XXXXXXXX
EMA X3= XXXXXXXX	EMD X3= XXXXXXXX
EMA X4= XXXXXXXX	EMD X4= XXXXXXXX
EMA X5= XXXXXXXX	EMD X5= XXXXXXXX
EMA X6= XXXXXXXX	EMD X6= XXXXXXXX
EMA X7= XXXXXXXX	EMD X7= XXXXXXXX
EMA X8= XXXXXXXX	EMD X8= XXXXXXXX
EMB X1= XXXXXXXX	EME X1= XXXXXXXX
EMB X2= XXXXXXXX	EME X2= XXXXXXXX
EMB X3= XXXXXXXX	EME X3= XXXXXXXX
EMB X4= XXXXXXXX	EME X4= XXXXXXXX
EMB X5= XXXXXXXX	EME X5= XXXXXXXX
EMB X6= XXXXXXXX	EME X6= XXXXXXXX
EMB X7= XXXXXXXX	EME X7= XXXXXXXX
EMB X8= XXXXXXXX	EME X8= XXXXXXXX

Digital Input Status
MCB DI1= ____________
MCB DI2= ____________
MCB DI3= ____________
MCB DI4= ____________
MCB DI5= ____________
MCB DI6= ____________
EMD DLA1= __________

Digital Output Status	
MCB DO1= __________	EMC DO1= __________
MCB DO2= __________	EMC DO2= __________
MCB DO3= __________	EMC DO3= __________
MCB DO4= __________	EMC DO4= __________
MCB DO5= __________	EMC DO5= __________
MCB DO6= __________	EMC DO6= __________
MCB DO7= __________	EMD DO1= __________
MCB DO8= __________	EMD DO2= __________
MCB DO9= __________	EMD DO3= __________
MCB DO10= __________	EMD DO4= __________
EMA DO1= __________	EMD DO5= __________
EMA DO2= __________	EMD DO6= __________
EMA DO3= __________	EME DO1= __________
EMA DO4= __________	EME DO2= __________
EMA DO5= __________	EME DO3= __________
EMA DO6= __________	EME DO4= __________
EMB DO1= __________	EME DO5= __________
EMB DO2= __________	EME DO6= __________
EMB DO3= __________	
EMB DO4= __________	
EMB DO5= __________	
EMB DO6= __________	

Figure 76 continued: ***Service Menu*** *– Keypad/Display Menu Structure*

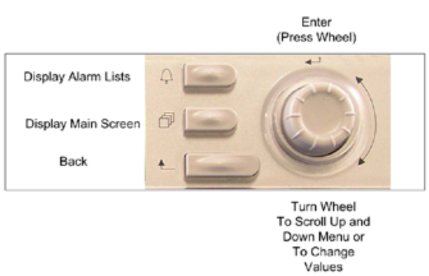
Service Menus
Timer Settings ▶
Operating Hours ▶
Save/Restore Settings ▶
Active Alarms ▶
Alarm Log ▶
Alarm Configuration ▶
Analog Input Status ▶
Universal I/O Status ▶
Digital Input Status ▶
Digital Output Status ▶
Network Input Status ▶
Modbus Status ▶
D3 Input Status ▶
Sensor Offsets ▶
Reset Counte= XXXX

Network Input Status
Net OAT In= XXX.XºF
Net Space In= XXX.XºF
NetCurrState= _________
NetNextState= _________
NetTmToNxtSt= XXXXXmin
Net App Mode= ________
Net Cl Ena Sw= X.X
Net Cl Ena Vl= XXX%
Net Ht Ena Sw= X.X
Net Ht Ena Vl= XXX%
Net Ec Ena Sw= X.X
Net Ec Ena Vl= XXX%
Net SAF Cap= XXX%
Net RAF Cap= XXX%
Net ExhF Cap= XXX%
Net CFlw Sw= XXX%
Net Flw Val= XXX%
Net Space IAQ= XXXXPPM
Net Rel Humid= XXX%
Net DATClgSpt= XXX.XºF
Net DATHtgSpt= XXX.XºF
nviSetpoint= XXX.XºF
OccManCmd= _________
Net Min OA= XXX%
nvoEffSpt= XXX.XºF
nciOccClgSpt= XXX.XºF
nciOccHtgSpt= XXX.XºF
nciHVACType= _________

Modbus Status
SF MB Status=_________
RF/EF MB Status=______
ER MB Status=________
OF MB Status= ________
IFB MB Status= ________
D3 MB Status=_________
SAFVFD Ex Flt= _______
RxFVFD Ex Flt= _______
ER VFD Ex Flt= ________
OF VFD Ex Flt= ________
MB Resistance= Yes
ECM Config= Done

D3 Status
D3 Comm Sts= ________
D3 Addr Err= __________
D3 On/Off= ___________
D3 Mode= ____________
D3 Clg Spt= XXX.XºF
D3 Htg Spt= XXX.XºF
D3 Fan Spd= __________
D3 Min Load= XXX%
D3 Max Load= XXX%
D3 Eco Ena= __________
OA Enthalpy= XXXBTU/lb
OA Hum Ratio= g/kg
D3 SWVers= XXXXXXXXXX
OAAdd1–16= __________
OAAdd17–32= _________
OAAdd33–49= _________
OAAdd50–64= _________
SetOAAddr= XX
CurrOAAddr= XX
CurrOAAmps= XXXA
CurrOARLA= XXXA

Sensor Offsets
Disch Air= 0.0ºF
Return Air= 0.0ºF
Space Temp= 0.0ºF
OA Temp= 0.0ºF
EF/LC Temp= 0.0ºF
EW Temp= 0.0ºF
Mixed Air= 0.0ºF
MAT LON SCC= 0.0ºF
ER LAT= 0.0ºF
ER EAT= 0.0ºF
Sump Temp= 0.0ºF
DRT1= 0.0ºF
DRT3= 0.0ºF
SRT= 0.0ºF
DFT= 0.0ºF
IRT= 0.0ºF
ORT= 0.0ºF



This navigation map represents all possible AHU menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

3 → Active Alarms; 4 → Alarm Log

Alarm Lists
Active Alarms ▶
Alarm Log ▶
Event Log ▶
LogCt:** Clr Log= -:No
+Event 1 ▶
+Event 2 ▶
•
•
•
+Event 49 ▶
+Event 50 ▶
Event Details ▶
+Alarm: Alarm Type ▶
Alarm Date
Alarm Time

Active Alarms
Alm Count: xx Clr Alms= No
+Alarm 1: Alarm Type ▶
+Alarm 2: Alarm Type ▶
•
•
•
+Alarm 10: Alarm Type ▶

Alarm Log
Log Count: xx Clr Log= No ▶
+/-Alarm 1: Alarm Type ▶
+/-Alarm 2: Alarm Type ▶
•
•
•
+/-Alarm 10: Alarm Type ▶
•
•
•
+/-Alarm 50: Alarm Type ▶

Alarm Details
+/-Alarm 1: Alarm Type
MM/DD/YYYY HH:MM:SS

Expansion Information

1

Fault Code Details
ACTIVE FAULT CODES
INVAlarmCode=______
Code Text
OF1AlarmCode=_______
Code Text
OF2AlarmCode=_______
Code Text
PREVIOUS FAULT CODES
PrvINVAlmCode=_______
Code Text
MM/DD/YYYY HH:MM:SS
PrvOF1AlmCode=______
Code Text
MM/DD/YYYY HH:MM:SS
PrvOF2AlmCode=______
Code Text
MM/DD/YYYY HH:MM:SS

2

IFB Comm Status
IFB SW Vers= VP0329008
IFBCommStatus=____
PrvCommStatus=_______
MM/DD/YYYY HH:MM:SS
ACS1 DataRcvd=_______
ACS3 DataRcvd=_______

Figure 76 continued: BMS Communications – Keypad/Display Menu Structure

BMS Communications
LON Set-Up ▶
BACnet MSTP Set-Up ▶
BACnet IP Set-Up ▶
D-Net Set-Up ▶
Network Unit Set-Up ▶

IM 918

LON Set-Up
Neuron ID= xxxxxxxxxxxx
SndHrtBT= 60s
RcvHrtBT= 30s
MinSndTm= 0s
Comm Status=_________
LON BSP= X.XXX
LON App Ver= XXXX

IM 917

BACnet MSTP Set-Up
ApplyMSTPChgs= No
Name= xxxxxxxxxxxxxxxx
Dev Instance= xxxxxxxxxx
MSTP Address= XXX
Baud Rate= 76800
Max Master= 127
Max Info Frm= 10
Unit Support= English
Term Resistor= No
NC Dev 1= 0
NC Dev 2= 0
AHU Loc/Net= Network
Comm Status= ________
RstOutofSrvc= Done
BACnet BSP= X.X.XX

IM 916

BACnet IP Set-Up
ApplyIPChgs= No
Name= xxxxxxxxxxxxxxxx
Dev Instance= xxxxxxxxxx
UDP Port= 47808
DHCP= On
Act IP= 0.0.0.0
ActMsk- 0.0.0.0
ActGwy= xxx.xxx.xxx.xxx
Gvn IP= 127.0.0.1
GvnMsk= 255.255.255.0
GvnGwy= 127.0.0.1
Unit Support= English
NC Dev 1= 0
NC Dev 2= 0
Comm Status= ________
AHU Loc/Net= Network
Comm Status= ________
RstOutofSrvc= Done
BACnet BSP= X.X.XX

D-Net Set-Up
ApplyD-NetChgs= No
DHCP= On
Act IP= 0.0.0.0
ActMsk- 0.0.0.0
ActGwy= xxx.xxx.xxx.xxx
Gvn IP= 127.0.0.1
GvnMsk= 255.255.255.0
GvnGwy= 127.0.0.1
Remote Srv En= Disable
Comm Status= ________
D-net BSP= X.X.XX

Network Unit Set-Up
Space Sensor= Local/Net
UNIT MODE SETTINGS
Ctrl Mode= Off
Occ Mode= Auto/net
RESET OPTIONS
Clg Reset= None
Htg Reset= None
AplyMinOAChg= No (Uses MinOA Type Instance Name)
Min OA Reset= None
Apply Changes= No
HEAT/COOL CHANGEOVER
Ctrl Temp SRC= RAT
AplyTstatChg= No
Use Tstat Spt= No
Occ Clg Spt= 72°F
Occ Htg Spt= 68°F
FAN CONTROL OPTIONS
SAF Ctlr= DSP
RF/EF Ctlr= Tracking

Figure 76 continued: Trending – Keypad/Display Menu Structure

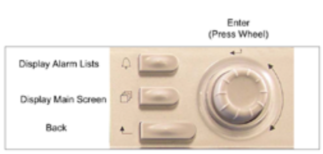
Trending
Trending Ena= No
Apply Chgs= No
Sample Time= 300s
TrendOnOff= Off
Export Data= No
Clear Trend= Done
Points 1–8 (Fixed) ▶
Points 9–24 (from List) ▶
Points 25–27 (with IDs) ▶
Points 28–30 (with IDs) ▶

Points 1–8 (Fixed)
Point 1= UnitSt
Point 2= Clg%
Point 3= Htg%
Point 4= SAF%
Point 5= OAD/Eco%
Point 6= CtrlTmp
Point 7= DAT
Point 8= OAT

Points 9–24 (from List)
Point 9= None
Point 10= None
Point 11= None
Point 12= None
Point 13= None
Point 14= None
Point 15= None
Point 16= None
Point 17= None
Point 18= None
Point 19= None
Point 20= None
Point 21= None
Point 22= None
Point 23= None
Point 24= None

Points 25–27 (with IDs)
Point 25
ID= F0AF0000
Type= 0000
Mem Num= 0100
Point 26
ID= F0AF0000
Type= 0000
Mem Num= 0100
Point 27
ID= F0AF0000
Type= 0000
Mem Num= 0100

Points 28–30 (with IDs)
Point 28
ID= F0AF0000
Type= 0000
Mem Num= 0100
Point 29
ID= F0AF0000
Type= 0000
Mem Num= 0100
Point 30
ID= F0AF0000
Type= 0000
Mem Num= 0100



This navigation map represents all possible AHU menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not

⚠ DANGER

Hazardous voltage. May cause severe injury or death.

Disconnect electric power before servicing equipment. More than one disconnect may be required to de-energize the unit.

⚠ WARNING

Moving machinery and electrical power hazards. May cause severe personal injury or death.

Disconnect and lock off all power before servicing equipment.

⚠ CAUTION

Sharp edges are inherent to sheet metal parts, screws, clips, and similar items. May cause personal injury. Exercise caution when servicing equipment.

⚠ NOTICE

Installation and maintenance must be performed only by qualified personnel who are experienced with this type of equipment and familiar with local codes and regulations.

Servicing Control Panel Components

Disconnect all electric power to the unit when servicing control panel components. Before servicing, always inspect units for multiple disconnects to ensure all power is removed from the control panel and its components.

Planned Maintenance

Preventive maintenance is the best way to avoid unnecessary expense and inconvenience. Have this system inspected at regular intervals by a qualified service technician. The required frequency of inspections depends upon the total operating time and the indoor and outdoor environmental conditions. Routine maintenance should cover the following items:

- Tighten all belts, wire connections, and setscrews.
- Clean the evaporator and condenser coils mechanically or with cold water, if necessary. Usually any fouling is only matted on the entering air face of the coil and can be removed by brushing.
- Lubricate the motor and fan shaft bearings.
- Align or replace the belts as needed.
- Clean or replace the filters as needed.
- Check each circuit's refrigerant sightglass when the circuit is operating under steady-state, full load conditions at or above 70° ambient. The sightglass should then be full and clear. If it is not, check for refrigerant leaks.

NOTE: A partially full sight glass is not uncommon at part load conditions. Do not use each circuit's refrigerant sightglass to indicate proper charge. Sightglasses are to be used for moisture indication only.

- Check for proper superheat.
- Check for proper subcooling.
- Check for blockage of the condensate drain. Clean the condensate pan as needed.
- Check the power and control voltages.
- Check the running amperage of all motors.
- Check all operating temperatures and pressures.
- Check and adjust all temperature and pressure controls as needed.
- Check and adjust all damper linkages as needed.
- Check the operation of all safety controls.
- Examine the gas furnace (see IM 684 or IM 685).
- Check the condenser fans and tighten their setscrews.
- Lubricate the door latch mechanisms.

Unit Storage

Location

The Daikin Rooftop Packaged System is an outdoor unit. However, the schedule may dictate storage either on the ground or in its final position at the site. If the unit is stored on the ground, additional precautions should be taken as follows:

- Make sure that the unit is well supported along the length of the base rail.
- Make sure that the unit is level (no twists or uneven ground surface).
- Provide proper drainage around the unit to prevent flooding of the equipment
- Provide adequate protection from vandalism, mechanical contact, etc. The condenser fins are particularly vulnerable to damage by even light contact with ground based objects.
- Make sure all doors are securely closed.
- Units should be fitted with covers over the supply and return air openings.

Supply Fans

1. Move the motor base to check and lubricate slides and lead screws.
2. Remove the drive belts, tag them with the fan name and unit serial number, and store them in a conditioned space out of direct sunlight.
3. Turn the supply fan manual motor protectors (MMP) to the OFF position.
4. Once every two weeks, rotate the fan and motor shafts. Mark the shaft positions first, to make sure they stop in a different position.
5. Depending on local climatic conditions, condensate may collect on components inside the units. To prevent surface rust and discoloration, spray all bare metal parts with a rust preventive compound. Pay close attention to fan shafts, sheaves, bearings, and bearing supports.

Cabinet Sections

Once a month, open a door on each section and verify that no moisture or debris is accumulating in the unit.

Cooling Circuits

The steps below are necessary only if the unit has been started.

1. Turn the compressor manual motor protectors (MMP) to the OFF position.
2. Close the discharge and liquid line refrigerant service valves on each circuit.
3. Tag the valves as a warning for the technician who restarts the units.

Gas Furnace

If the unit is equipped with a gas furnace, close the gas shutoff valve and open furnace control switch S3. For information on maintenance of the gas furnace, refer to IM 684.

Control Compartment

1. Daikin Applied recommends that the electronic control equipment in the unit be stored in a 5% to 95% RH (non-condensing) environment.
2. It may be necessary to put a heat source (light bulb) in the main control panel to prevent the accumulation of atmospheric condensate within the panel.
3. The location and wattage of the heat source is dependent on local environmental conditions.
4. Check the control compartment every two weeks to check that the heat source is functional and is adequate for current conditions.

Restart

⚠ CAUTION

Before replacing refrigerant sensors or protective devices, see "Refrigerant Charge" on page 96 for an important warning to prevent an abrupt loss of the entire charge.

⚠ CAUTION

To service liquid line components,the manual shutoff valve is closed and refrigerant is pumped into the condenser. The pounds of refrigerant in the system may exceed the capacity of the condenser, depending on the amount of refrigerant. Suitable means of containing the refrigerant is required.

After extended storage, perform a complete start up. Inevitable accumulations of dirt, insect nests, etc. can contribute to problems if not cleaned out thoroughly prior to startup. In addition, thermal cycling tends to loosen mechanical and electrical connections. Following the startup procedure helps discover these and other issues that may have developed during the storage interval.

Evacuation

Use a vacuum pump with a pumping capacity of approximately 3 cu.ft./min. and the ability to reduce the vacuum in the unit to at least 1 mm (1000 microns).

1. Connect a mercury manometer or an electronic or other type of micron gauge to the unit at a point remote from the vacuum pump. For readings below 1 millimeter, use an electronic or other micron gauge.
2. Use the triple evacuation method, which is particularly helpful if the vacuum pump is unable to obtain the desired 1 mm of vacuum. The system is first evacuated to approximately 29" (740mm) of mercury. Then add enough refrigerant vapor to the system to bring the pressure up to 0 pounds (0 microns).
3. Evacuate the system again to 29" (740 mm) of vacuum. Repeat this procedure three times. This method is most effective by holding system pressure at 0 pounds (0 microns) for a minimum of 1 hour between evacuations. The first pulldown removes about 90% of the noncondensables; the second removes about 90% of that remaining from the first pulldown. After the third pulldown, only 1/10 of 1% of noncondensables remains.

Table 8 shows the relationship between pressure, microns, atmospheres and the boiling point of water.

Table 7: Approximate R-410A Refrigerant Charge per Circuit

Unit size	Base charge lbs per circuit (less DX coil)				DX coil charge lbs per circuit per coil row	
	Blow through RPS		RDT or draw through RPS		DX=S*	DX=L*
	Circuit #1	Circuit #2	Circuit #1	Circuit #2		
062E	15	14	19	18	4.1	4.5
070E, 075E	18	17	22	21	4.1	4.5

* DX coil configuration (S = Standard, L = Large) is identified by the 8th digit of the RPS/RDT or RFS model number, found on the unit nameplate. For example, DX= L for unit model number RFSO6ODLY.

Table 8: Pressure-Vacuum Equivalents

Absolute pressure above zero		Vacuum below 1 atmosphere		Approximate fraction of 1 atmosphere	Boiling point of H_2O at each pressure (°F)
Microns	PSIA	Mercury (in.)	Mercury (mm)		
0	0	29.921	760.00	—	—
50	0.001	29,920	759.95	1/15,200	–50
100	0.002	29.920	759.90	1/7,600	–40
150	0.003	29.920	759.85	1/5,100	–33
200	0.004	29.910	759.80	1/3,800	–28
300	0.006	29.910	759.70	1/2,500	–21
500	0.009	29.900	759.50	1/1,520	–12
1,000	0.019	29.880	759.00	1/760	1
2000	0.039	29.840	758.00	1/380	15
4,000	0.078	29.760	756.00	1/189	29
6000	0.117	29.690	754.00	1/127	39
8,000	0.156	29.600	752.00	1/95	46
10,000	0.193	29.530	750.00	1/76	52
15,000	0.290	29.330	745.00	1/50	63
20,000	0.387	29.130	740.00	1/38	72
30,000	0.580	28.740	730.00	1/25	84
50,000	0.967	27.950	710.00	1/15	101
100,000	1.930	25.980	660.00	2/15	125
200,000	3.870	22.050	560.00	1/4	152
500,000	9.670	10.240	260.00	2/3	192
760,000	14.697	0	0	1 Atmosphere	212

Charging the System

⚠ CAUTION

Adding refrigerant to the suction must always be done by trained service personnel that are experienced with the risks associated with liquid-related damage to the compressor.

⚠ CAUTION

Units purchased for R-410A operation must be charged only with R-410A. Field mixing or changing of refrigerants can compromise performance and damage equipment.

⚠ NOTICE

Venting refrigerant to atmosphere is not allowed per most local laws and/or codes.

1. After all refrigerant piping is complete and the system is evacuated, it can be charged as described in the paragraphs following. Connect the refrigerant drum to the gauge port on the liquid shutoff valve and purge the charging line between the refrigerant cylinder and the valve. Then open the valve to the midposition.
2. If the system is under a vacuum, stand the refrigerant drum with the connection up, open the drum, and break the vacuum with refrigerant gas.
3. With a system gas pressure higher than the equivalent of a freezing temperature, invert the charging cylinder and elevate the drum above the condenser. With the drum in this position and the valves open, liquid refrigerant flows into the condenser. Approximately 75% of the total requirement estimated for the unit can be charged in this manner.
4. After 75% of the required charge enters the condenser, reconnect the refrigerant drum and charging line to the suction side of the system. Again, purge the connecting line, stand the drum with the connection side up, and place the service valve in the open position.

NOTE: Stamp the total operating charge per circuit on the unit nameplate for future reference.

Carefully add refrigerant slowly enough to the suction to prevent damage when first adding charge to the suction. Adjust the charging tank hand valve extremely slow such that only liquid leaves the tank but vapor enters the compressor.

Table 9: Acceptable Refrigerant Oils

R-410A (polyester [POE] oils)
CopelandULtra 22 CC
Mobil EAL™ Arctic 22 CC
ICI EMKARATE RL™ 32CL

NOTE: Do not use mineral oils with R-410A.

Refrigerant Charge

Each unit is designed for use with R-410A.The total charge per circuit is the sum of the following four values:

- Condenser section charge, see Table 7 on page 95.
- Evaporator coil charge, see Table 7.
- Charge for length of unit piping to the evaporator coil, see Table 7.
- The exact charge is listed on the unit nameplate.

Subcooling

When field charging the unit, use the following to properly charge the unit:

- All compressors on each circuit operating at full capacity.
- Allowable subcooling ranges are between 13°F to 20°F.
- Be sure to measure pressure and temperature at the same location when finding/calculating subcooling. Compare the actual temperature and pressures to the saturated liquid temperature.
- Ambient temperature must be between 60°F and 105°F.
- Condenser fan motors operating at 100% (only with option) If any one of the above items is not followed, subcooling readings will not be accurate and the potential exists for over or undercharging of the refrigerant circuit.

Refrigeration Service Valves

The unit is shipped with all refrigeration service valves closed. RDT, RPS and RCS units have the following:

- One discharge valve is provided per refrigerant circuit, located between the compressors and condenser.
- One liquid valve is provided per refrigeration circuit, located at end of condensing section opposite condenser control box.

Bearings

⚠ CAUTION

Bearing overheating can damage the equipment. Do not over lubricate bearings.

Use only a high grade mineral grease with a 200°F safe operating temperature. See below for specific recommended lubricants.

⚠ CAUTION

For safety, stop rotating equipment. Add one half of the recommended amount shown in Table 13. Start bearing and run for a few minutes. Stop bearing and add the second half of the recommended amount. A temperature rise, sometimes 30°F (1°C), after relubrication is normal. Bearing should operate at temperature less than 200°F (94°C) and should not exceed 225°F (107°C) for intermittent operation. For lubrication schedule, see Table 11. For any applications that are not in the ranges of the table, contact Daikin

⚠ NOTICE

The following tables state general lubrication recommendations based on our experience and are intended as suggested or starting points only. For best results, specific applications should be monitored regularly and lubrication intervals and amounts adjusted accordingly.

Motor Bearing Lubrication

Supply Fans — Supply fan motors should have grease added after every 2000 hours of operation. Using the following procedure, relubricate the bearings while the motor is warm, but not running. Use one of the greases shown in Table 12.

1. Remove and clean upper and lower grease plugs.
2. Insert a grease fitting into the upper hole and add clean grease (Table 12) with a low pressure gun.
3. Run the motor for five minutes before replacing the plugs.

NOTE: Specific greasing instructions are located on a tag attached to the motor. If special lubrication instructions are on the motor, they supersede all other instructions.

Condenser Fan — Condenser fan motors are permanently lubricated and require no periodic lubrication.

Propeller Exhaust Fans

"Propeller Exhaust Fan Option" on page 63.

Fan Shaft Bearing Lubrication

Any good quality lithium or lithium complex base grease, using mineral oil, conforming to NLGI grade 2 consistency, and an oil viscosity of 455-1135 SUS at 100°F (100–200 cSt at 40°C) may be used for relubrication.

Compatibility of grease is critical. Relubricatable Browning bearings are supplied with grease fittings or zerks for ease of lubrication with hand or automatic grease guns. Always wipe the fitting and grease nozzle clean.

Table 10: Recommended Lubricants and Amounts for Fan Motor Bearings

Mfr. Grease	Texaco, Polystar or Polyrex EM (Exxon Mobile) or Rykon Premium #2 or Penzoil Pen 2 Lube									
NEMA Size	56 to 140	140	180	210	250	280	320	360	400	440
Amount to Add (oz.)	0.08	0.15	0.19	0.30	0.47	0.61	0.76	0.81	1.25	2.12

Table 11: Relubrication Intervals

Speed	Temperature	Cleanliness	Relub. intervals
100 rpm	Up to 120°F (50°C)	Clean	6 to 12 months
500 rpm	Up to 150°F (65°C)	Clean	2 to 6 months
1000 rpm	Up to 210°F (100°C)	Clean	2 weeks to 2 months
1500 rpm	Over 210°F (100°C) to 250°F (120°C)	Clean	Weekly
Above 1500 rpm	Up to 150°F (65°C)	Dirty/wet	1 week to 1 month
Max catalog rating	Over 150°F (65°C) to 250°F (120°C)	Dirty/wet	Daily to 2 weeks
	Above 250°F (120°C)		Contact Browning

Use NLGI #2 Lithium or Lithium Complex Grease

Table 12: Recommended Lubricants for Fan Shaft Ball Bearings

Name	Temperature	Base	Thickener	NLGI grade
Texaco, Premium RB	30° to 350°F (34° to 177°C)	Parafinic mineral oil	Lithium	2
Mobile, AW2	40° to 437°F (40° to 175°C)	Mineral oil	Lithium	2
Mobile, SHC100	68° to 356°F (50° to 180°C)	Synthetic	Lithium	2
Chevron, Altiplex Synthetic	60° to 450°F (51° to 232°C)	Synthetic	Lithium	2
Exxon, RONEX MP	40° to 300°F (40° to 149°C)	Mineral oil	Lithium	2

NOTE: Temperature ranges over 225°F are shown for lubricants only. High temperature applications are not suitable for standard air handler components.

Table 13: Recommended Fan Relubrication Grease Charge

Shaft Size, in. (mm)	Oz. (grams)
1/2 to 3/4 (20)	0.03 (0.85)
7/8 to 1-3/16 (25-30)	0.10 (2.84)
1-1/4 to 1-1/2 (35-40)	0.15 (4.25)
1-11/16 to 1-15/16 (45-50)	0.20 (5.67)
2 to 2-7/16 (55-60)	0.30 (8.51)
2-1/2 to 2-15/16 (65-70)	0.50 (15.59)
3 to 3-7/16 (75-80)	0.85 (24.10)
3-1/2 to 4 (85-105)	1.50 (42.53)

Bearing Replacement

The following instructions must be read in entirety before attempting installation or removal. The procedures indicated should be carefully followed. Failure to do so can result in improper installation which could cause bearing performance problems as well as serious personal injury.

Bearings in Bolt-On Housings (Units)

1. **Check Area** — Clean and organize bearing installation area and keep well lit. Be sure mounting surfaces are clean and flat.
2. **Check Shaft** — Shaft should be within tolerance range shown in Table 14, clean, and free of nicks and burrs. Mount bearing on unused section of shafting or repair/ replace shafting as required.
3. **Install Unit** — Slide unit onto shaft. If it is difficult to mount bearing on shaft, use a piece of emery cloth to reduce any high spots on shaft. Do not hammer on any component of the bearing.
4. **Fasten Unit** in place — Install housing mounting bolts, check and align bearing and tighten mounting bolts to recommended fastener torques. Exercising extreme caution and safety, rotate shaft slowly to center bearing.

Table 14: Shaft Size Tolerances

Shaft Size (in)	Tolerance
1-11/16 to 2-7/16	+0 to -0.0015
2-7/16 and up	+0 to -0.002

BOA Concentric Inserts

1. Be sure that BOA Concentric collar is fitted square and snug against the shoulder on the inner ring.
2. Torque BOA Concentric collar cap screw to torque recommended in Table 15.

Table 15: Recommended Torque Values for Concentric Locking Bearing/Shaft Size

Fan Size (in)	Bore Size (in)	Torx Screw Size	In lbs.
40 (SWSI)	2-3/16	T-30	180
30 & 33 (AF)/ 44 (SWSI)	2-7/16	T-45	400

NOTE: AF = DWDI AF, SWSI = AF Plenum Fan

Monitor Installed Bearing

After bearing has been run for several minutes, and again after several hours, check bearing for excessive noise or vibration. Shutdown machine and check housing temperature: typical applications operate at 100°F–105°F (38°C–66°C). Tighten all locking devices after 500 hours or 3months, whichever comes first.

Vibration Levels

Each unit as shipped is trim balanced to operate smoothly.To provide satisfactory operation after shipping and installation, use accepted industry guidelines for field balancing fans. See Table 16.

NOTE: Excessive vibration from any cause contributes to premature fan and motor bearing failure. Monitor overall vibration levels every six months of operation. An increase in levels is an indication of potential trouble.

Table 16: Vibration Levels

Fan speed (RPM)	Vibration
800 or less	5 mils maximum displacement
801 or greater	0.20 in/sec maximum velocity

Vibration Causes

1. Wheel imbalance.
   a. Dirt or debris on wheel blades.
   b. Loose setscrews in wheel hub.
   c. Wheel distorted from overspeed.
2. Bent shaft.
3. Faulty drive.
   a. Variable pitch sheaves — Axial and radial runout of flanges; uneven groove spacing; out of balance. Also similar faults in driven sheave.
   b. Bad V-belts; lumpy, or mismatched; belt tension too tight or too loose.
4. Bad bearings, loose bearing hold-down bolts.
5. Motor imbalance.
6. Fan section not supported evenly on foundation.

Periodic Service and Maintenance

1. Check all moving parts for wear every six months.
2. Check bearing collar, sheave, and wheel hub setscrews, sheave capscrews, and bearing hold-down bolts for tightness every six months.

Setscrews

Setscrews are used to lock sheaves, locking collars, and fan wheels to their shafts. They must be checked periodically to see that they have not loosened. If this is not done, severe equipment damage could occur. Using Table 17, check the tightness of all setscrews with a torque wrench. Note that if the return fan bearings setscrews must be retightened, a special procedure is required to equally load both bearings (see "Supply Fan Wheel-to-Funnel Alignment" on page 99).

Table 17: Setscrew Minimum Torque Specifications

Setscrew diameter (in.)	Minimum torque (ft.lb)
1/4	5.5
5/16	10.5
3/8	19.0
7/16	29.0
1/2	42.0
5/8	92.0

Supply Fan Wheel-to-Funnel Alignment

If the unit is equipped with an airfoil or backward curved supply fan, the fan wheel-to-funnel alignment must be as shown in Figure 77, Figure 78 and Figure 79 to obtain proper air delivery and operating clearance. If necessary, adjustments are made as follows:

1. Verify that the fan shaft has not moved in its bearings.
2. Loosen the fan hub setscrews and move the wheel(s) along the shaft as necessary to obtain the correct dimension shown in Table 18.
3. Retighten the setscrews to the torque specification given in Table 17 on page 98. Tighten the setscrews over the keyway first; tighten those at 90 degrees to the keyway last.
4. Verify that the radial clearance around the fan is uniform. Radial clearance can be adjusted by slightly loosening the funnel hold-down fasteners, shifting the funnel as required, and retightening the fasteners.

Table 18: Wheel-to-Funnel Relationship

Fan Type	Wheel diameter (inches)	A
DWDI Airfoil	30	10.6 (+0.3–0.0)
	33	11.7 (+0.3–0.0)
SWSI Airfoil	40	0.62
	44	16.21

Figure 77: DWDI Airfoil Wheel-to-Funnel Alignment

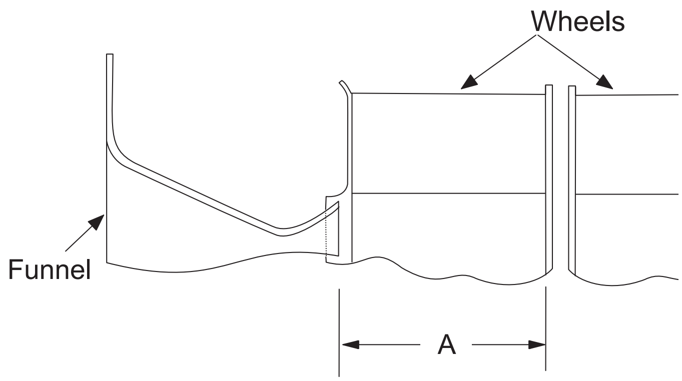


Figure 78: 40" SWSI Airfoil Wheel-to-Funnel Alignment

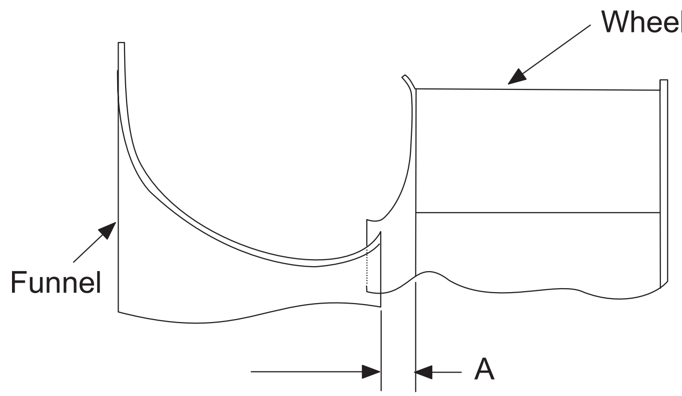
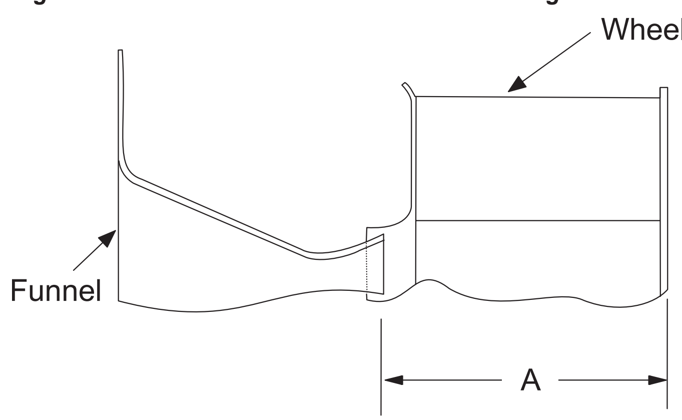


Figure 79: 44" SWSI Airfoil Wheel-to-Funnel Alignment



Scroll Compressor Piping

When replacing an individual scroll compressor on tandem or trio assemblies (see "Scroll Compressor" and "Replacing a Portion of a Tandem or Trio" on page 109), three refrigerant lines must be disconnected and re-assembled:

1. TPTL Oil Equalization Line
    a. The TPTL line (Figure 80) contains the oil sight glass.
    b. The TPTL line connects to each compressor with "rotalock" fittings (Figure 81).
    c. The TPTL line should be disconnected and re-used.
2. Suction Line
    a. This is the largest diameter piping.
    b. This line is brazed to each compressor.
3. Discharge Line
    a. This is the tubing that connects near the top of the compressor (Figure 83).
    b. This line is brazed to each compressor.

Preferred Replacement

1. Drain the oil.
2. Disconnect the TPTL line.
3. Cut out the failed compressor at the suction and discharge tubes. Make the cuts in the straight portions of the replacement tubes and as near the compressor as possible.
4. Braze couplings on the cut end of the original tubes so that they fit snugly into place.
5. Replace the TPTL oil equalization line.
6. Cut the new suction and discharge tubes to fit between the compressor and the couplings.
7. Assemble the new tubes but do not braze until everything fits snugly.
8. Braze tubes into place.

Alternative Replacement

1. Drain the oil.
2. Disconnect the TPTL line.
3. Cutout the failed compressor at the suction and discharge tubes.
4. Remove the compressor.
5. Un-sweat the cut suction and discharge stubs from their fittings and completely clean the old braze joint.
6. Place the new compressor into position.
7. Replace the TPTL oil equalization line.
8. Place the entire replacement discharge and suction tubes into position so that the tubes fit snugly into place.
9. Braze the tubes into place.

Figure 80: Oil Equalization Line

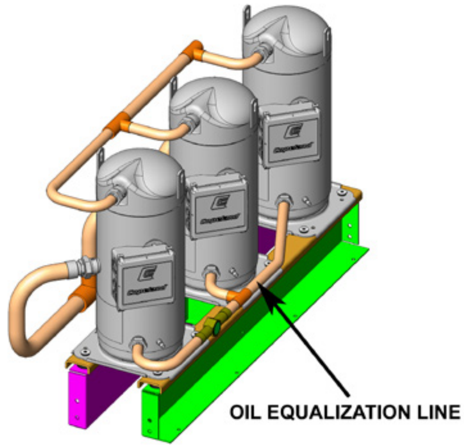


Figure 81: Oil Equalization Line with Rota-Lock Fittings

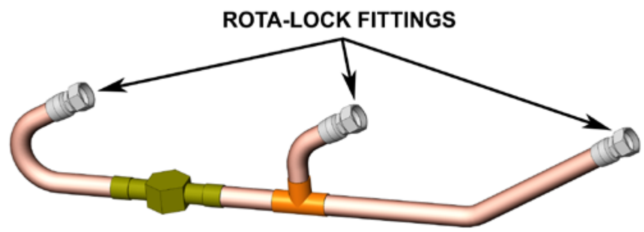


Figure 82: Suction Tubes

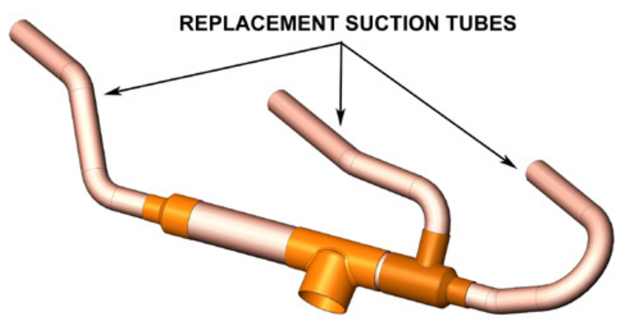
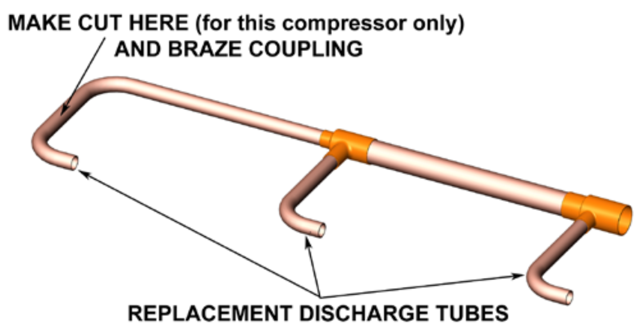


Figure 83: Discharge Tubes



All-Aluminum Condenser Coils

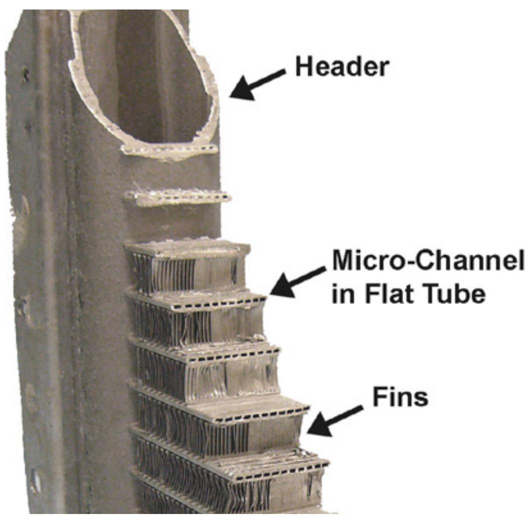
⚠ CAUTION

Potential equipment damage. If a standard copper brazing process is performed at this joint, the process will damage the aluminum connection. If a condenser coil ever needs to be replaced, the copper aluminum joint repair should be done with a ProBraze™ repair kit manufactured by Omni Technologies Corporation. A non-corrosive flux must also be used. The brazing temperature should be between 850°F–900°F.

The condenser coils are an all-aluminum design including the connections, micro-channels, fins (an oven brazing process brazes the fins to the micro-channel flat tube), and headers (Figure 84), which eliminates the possibility of corrosion normally found between dissimilar metals of standard coils.

During the condensing process, refrigerant in the coil passes through the micro-channel flat tubes, resulting in higher efficiency heat transfer from the refrigerant to the airstream.

Figure 84: Micro-Channel Coil Cross-Section

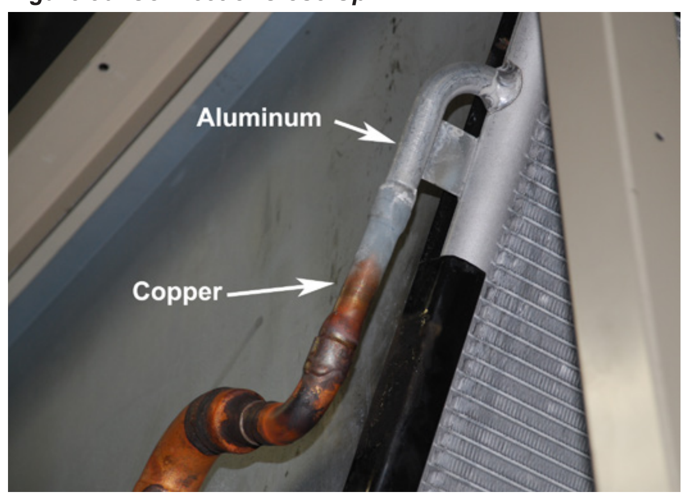


Connecting the Condenser Coil to Copper Tubing

Figure 85 and Figure 86 show the aluminum condenser coil connection(s) to the copper tubing in the unit. Because of the low melting point of aluminum (1220°F compared to1984°F for copper), this brazed joint is performed with a low temperature brazing process.

Figure 85: Aluminum/Copper Connections

Figure 86: ConnectionClose-Up



Winterizing Water Coils

Coil freeze-up can be caused by such things as air stratification and failure of the outdoor dampers and/or preheat coils. Severe coil damage may result. It is recommended that all coils be drained as thoroughly as possible and then treated in the following manner.

- Fill each coil independently with an antifreeze solution using a small circulating pump and again thoroughly drain.
- Check freezing point of antifreeze before proceeding to next coil. Due to a small amount of water always remaining in each coil, there will be a diluting effect. The small amount of antifreeze solution remaining in the coil must always be concentrated enough to prevent freeze-up.

NOTE: Carefully read instructions for mixing antifreeze solution used. Some products have a higher freezing point in their natural state than when mixed with water.

Refrigerant Charge

⚠ WARNING

Potential severe loss of charge may occur if the high refrigerant pressure switch is replaced before reclaiming the refrigerant. Replace switch after reclaiming refrigerant.

The unit nameplate references proper charge for each refrigerant circuit in case a full charge must be added to the unit. Verify these values using pages Table 7 on page 95.

The micro-channel condenser requires much lesscharge than traditional fin tube condensers. This means there is 35% less charge to recover when servicing the refrigeration circuit, but the condenser will not hold a high percentage of the charge.

The impact on service is as follows:

- **Positive impact** – the replacement refrigerant portion of service cost will be less
- **Positive impact** – it takes less time to reclaim the entire charge or the high side portion of the system.
- **Negative impact** – it takes more time to reclaim the low side portion of the system because you cannot first pumpdown most to the high side.

The micro-channel condenser coil design does not contain the internal volume to support the pumpdown of the entire unit charge into the condenser coil. To aid in the removal of refrigerant from the system, a Shrader valve port with a core has been provided on the liquid line, ahead of the liquid line shut-off valve. The port is intended for connecting to a suitable (and approved) storage container while using the unit compressor(s) to pump liquid refrigerant into a storage container.

Servicing Refrigerant Sensors or Switches

The Daikin Rooftop unit includes the following refrigerant sensors or switches.

1. Low refrigerant pressure sensing, operating switch, automatic reset
    a. Disables their associated compressors on a drop in suction pressure. Units with Fantrol, setpoint = 70 psig. Units with Speedtrol, setpoint = 25 psig (low ambient).
    b. Enables their associated compressors on a rise in suction pressure. Units with Fantrol, setpoint = 120 psig. Units with Speedtrol, setpoint = 60 psig.
2. High refrigerant pressure, protective switch, manual reset, reset by breaking control power to the S1 control switch.
    a. All R-410A high pressure switches disable their associated compressors on a rise in discharge pressure to 650 psig.
    b. The switches have a differential of 150 psig.

The low pressure and Speedtrol sensors/switches sense refrigerant pressure through Shrader fittings that contain cores. The cores are stop valves that do not allow refrigerant to flow through the Shrader unless the device is in place. Therefore the low pressure and Speedtrol sensors/switches can be replaced without reclaiming the refrigerant.

The Shrader that serves the high pressure switch does not contain a core in order to maximize the functionality of the safety. Therefore it cannot be replaced unless the refrigerant has already been reclaimed.

Control Panel Components

The following motor control protection is provided.

Table 19: RoofPak Individual Motor Control and Protection

Motor Type	Short Circuit	Overload	On-Off
Compressor < 100 Amps	MMP	Internal	Contactor
Compressor > 100 Amps	CB	Internal	Contactor
Condenser Fans	MMP	VFD	Contactor
EAF, One Fan	CB*	OL	Contactor
EAF, 2-3 Fans	CB*		Contactor
SAF & RAF with VFD No Bypass In Bypass	CB* CB	VFD OL	Contactor Contactor

MMP = manual motor protecto
Internal = vendor motor protect
CB = circuit breaker [* FB with MD4
OL = over load relay

Manual Motor Protector (MMP)

WARNING

If an overload or a fault current interruption occurs, check circuits to determine the cause of the interruption. If a fault condition exits, examine the controller. If damaged, replace it to reduce the risk of fire or electrical shock.

The manual motor protector (MMP) provides coordinated branch circuit, short circuit protection, a disconnecting means,a motor controller, and coordinated motor overload protection. A short circuit indicator with manual reset is mounted alongside of each MMP as a means to differentiate between a short circuit and overload trip conditions.

The MMP trip points are factory set. Do not change unless the motor ampacity changes or the MMP is replaced with a new device with incorrect setpoint adjustment. Any other non-authorized trip point or setpoint adjustment voids all or portions of the unit's warranty. Authorized setpoint adjustments accomplished as follows

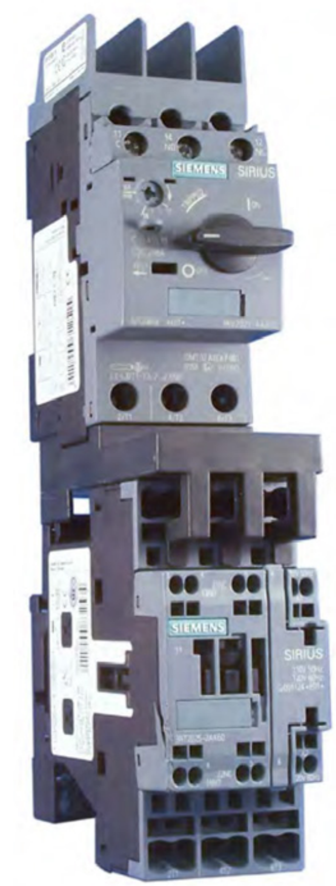
1. For motors with a 1.15 service factor, rotate the arrow onthe dial to correspond to the motor FLA.
2. For motors with a 1.0 service factor, multiply the motor FLA by 0.9; then rotate the arrow on the dial to correspond to that value.

To reset a tripped MMP, clear the trip by rotating the knob counterclockwise to the OFF (O) position; then rotate knob clockwise to the ON (I) position. See Figure 87.

Other MMP Features:

- Three-position rotary operator: OFF (O)-TRIP-ON (I) (Figure 87).
- Lockout—tagoutable rotary operator: turn the rotary operator to OFF (O), slide out the extension arm, and insert a lockout pin.
- Ambient compensated –20°C to +40°C.
- Single-phase sensitivity: if one phase exceeds setpoint, all three phases open.
- Trip test: insert a 9/64" screw driver in the test slot (Figure 87) to simulate a trip.

Figure 87: Manual Motor Protector



Thermal Overload Relay

Designed to provide current-dependent protection for loads with normal starting against impermissibility high temperature rises due to overload, phase asymmetry or phase failure. Increase in motor current beyond set point as a result to overload or phase failure will trip the overload and disconnect the motor.

The Relay trip points are factory set. Do not change unless the motor ampacity changes or the Relay is replaced with a new device with incorrect set point adjustment. Any other non-authorized trip points or set points adjustment voids all or portions of the unit's warranty. Authorized set point adjustment is accomplishment as follows:

1. For motors with 1.15 service factor, rotate the arrow on the dial to correspond to the motor FLA (See Figure 88).
2. For motors with a 1.0 service factor, multiply the motor FLA with 0.9; then rotate the arrow on the dial to correspond to that value.

To reset a tripped Relay, push the blue RESET button. To disconnect, push the Red stop Button (See Figure 88).

Other Relay features:

- Three connection systems options, Screw type, spring loaded and ring cable lug connection.
- Switch position indicator to indicate a trip and TEST function for wiring.
- Large rotary button to adjust current to Motor RLA.
- Selector switch for manual/and automatic RESET.

Figure 88: Overload Relay

Circuit Breaker

Circuit breakers are installed upstream of all VFDs to provide short circuit protection. These breakers are not adjustable.

To reset a tripped circuit breaker: Clear the trip by rotating the lever down to the OFF position (see Figure 89). Then rotate lever up to the ON position (Figure 89).

Breakers, like MMPs, have three distinct modes of operation which are clearly indicated by the handle position. The positions are ON (usually up, OFF (usually down), and TRIPPED (midway). Some circuit breakers may have a push-to-test button.

1. Press the handle or rotate the lever to the OFF position.
2. Press the handle or rotate the lever the opposite direction to the ON position.

Reset After Tripping Information

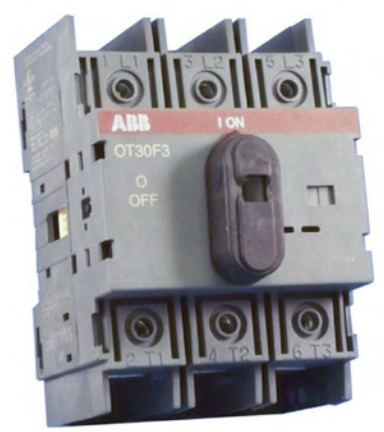
⚠ CAUTION

If a breaker is tripped, the handle/lever will be halfway between the OFF and ON positions. To reset a tripped circuit breaker:

⚠ WARNING

If a circuit breaker has tripped due to an overload or a fault current (short circuit), prior to resetting, the connected wiring circuits must be checked to determine the cause of the interruption.

Figure 89: Circuit Breaker

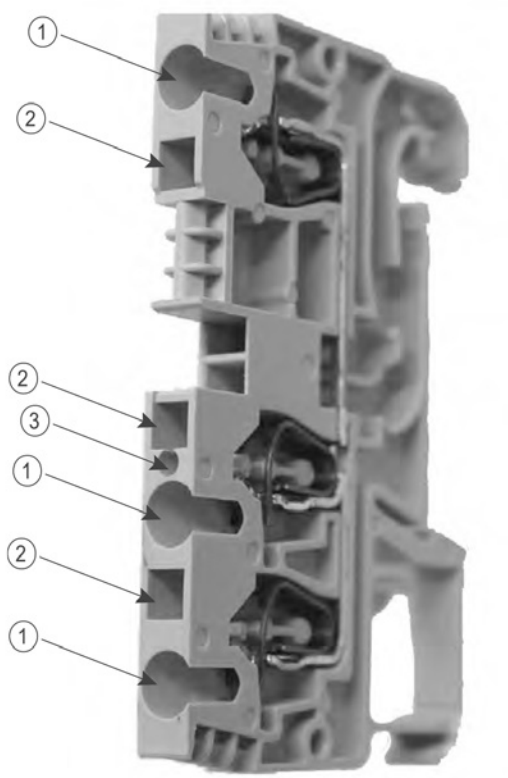


Field Wiring Terminals

All field wiring terminals are spring clamp type, which offer several advantages over traditional screw-type terminals:

- Spring connections do not require torquing
- Spring connections resist failure due to vibration
- Easily identifiable terminal markers
- Combination spring release and square test ports Wire connections require inserting (“1” in Figure 90 a stripped wire a round port and clamping the stripped wire by inserting a flat-bladed screw driver in the adjacent square port (“2” in Figure 90).

Figure 90: Terminal Connectors



Phase Voltage Monitor (PVM)

The phase voltage monitor (Figure 91)is designed to protect three-phase loads from damaging power conditions. A microprocessor-based voltage and phase sensing circuit constantly monitors the three-phase voltages to detect harmful power line conditions. When a harmful condition is detected, its output relay is deactivated after a specified trip delay (Trip Delay). The output relay reactivates after power line conditions return to an acceptable level for a specified amount of time (Restart Delay). The trip and restart delays prevent nuisance tripping due to rapidly fluctuating power line conditions.

There are two LEDs on the face of the PVM (“1” in Figure 91) to indicate the following:

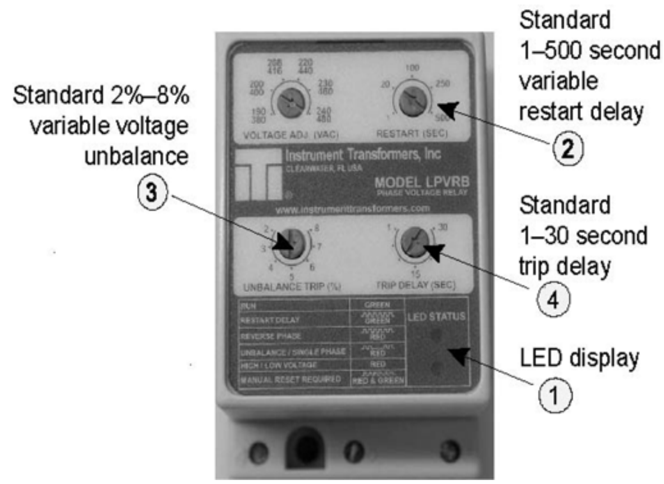
Table 20: LED Indication

Status	LED Indicator
Normal operation, no faults, relay energized	Green LED: steady ON
Loss of input phase (relay de-energized)	Red LED: flash twice, OFF, flash twice, OFF, etc.
Voltage unbalance (relay de-energized)	Red LED: flash twice, OFF, flash twice, OFF, etc.
High or low voltage (relay de-energized)	Red LED: steady ON
Phase reversal (relay de-energized)	Red LED: pulse ON, OFF, ON, OFF, etc.
Restart delay (fault cleared, PVM pending restart, relay de-energized)	Green LED: pulse ON, OFF, ON, OFF, etc.

Other features:

- Standard 2% to 8% variable voltage unbalance (“3” in Figure 91).
- Standard 1 to 500 second variable restart delay (“2” in Figure 91).
- Standard 1 to 30 second trip delay (“4” in Figure 91) (except loss of phase, which trips at 1 second nonadjustable).

Figure 91: Phase Voltage Monitor



Through-the-door Disconnect

⚠ DANGER

Hazardous voltage. May cause severe injury or death. Disconnect electric power before servicing equipment. More than one disconnect may be required to de-energize the unit.

⚠ CAUTION

Molded case switches do not provide over-current protection. This device may automatically open the circuit at levels above the ampere rating of the switch.

The optional “through-the-door” disconnect is a molded case switch with similar features of the circuit breaker. The “through-the-door” feature provides a safety interlock that disables power when the control panel door is opened. Opening the through-the-door disconnect without performing a proper machine shut-down is not recommended except in emergencies.

The through-the-door disconnect also provides for locking out power to the unit. To lock out power to the unit, rotate the handle to the “Reset/Lock” position and insert a padlock or locking device through the base of the handle. Do not lockout the handle with the Interlock in bypass mode.

Figure 92: Through-the-door Handle Disconnect

Figure 93: Interlock Bypass

Controlled Shut-down/Interlock Bypass

To access the control panel while power is active, for troubleshooting or performing a controlled shut-down, the through-the-door disconnect's interlock feature can be bypassed. The control panel door can be opened without disabling power to the control panel.

1. Insert a flat blade screwdriver into the slotted "release" located on the end of the disconnect faceplate (Figure 93).
2. Turn the release counter-clockwise and pull the door open.
3. To shut down an operating unit (no emergency condition present):
    a. Use the pump down switch to turn off the unit.
    b. The controls will then shut the liquid line solenoids, pump the refrigerant into the condenser, and turn off the compressors.

Pressure Sensors

The MicroTech III controller uses 0 to 5" W.C. static pressure transducers for measuring duct static pressure. As the duct static pressure varies from 0-5" W.C., the transducer output will vary from 4-20mA. The transducer output signal is 420mA however the signal entering the VFD is converted to a DC signal via a 500 Ohm resistor across the output signal at the transducer.

If building static pressure control is provided, a -0.25" W.C. to 0.25" W.C. static pressure transducer is used. As the building static pressure varies from -0.25" W.C. to 0.25" W.C., the transducer output will vary from 4-20mA. The transducer output signal is 4-20mA however the signal entering the VFD is converted to a DC signal via a 500 Ohm resistor across the output signal at the transducer.

Troubleshooting Pressure Transducers

Use the following procedure to troubleshoot a suspect sensor: If the duct static pressure always reads 0" WC on the unit keypad/display and the VFD speed is continuously ramping to 100%, check the following:

If the unit has two duct static pressure sensors (SPS1 and SPS2), verify that they both function properly per the following procedure. Also check for faulty wiring connections at the VFD analog inputs.

The controller displays and controls to the lower of the two readings. If a sensor is defective and inputs 0 volts to the VFD, the static pressure reading on the keypad/display reads 0 and the controller attempts to increase the 0 value to set point by ramping the VFD up.

If a second sensor (SPS2) is not installed or the pressure tubing to it is not connected, make sure the 2nd DSP Sensor= parameter in the Unit Configuration menu of the keypad/display is set to "No" so that the controller ignores the second static pressure analog input.

If a second sensor (SPS2) is installed, make sure the 2nd DSP Sensor= parameter in the Unit Configuration menu of the keypad/display is set to "Yes."

Check the 24 V (dc) power supply to the sensor, verify that there is 24 V (dc) between the suspect transducer "+" and "-" terminals.

Using an accurate manometer or gauge, measure the same pressure that the suspect transducer is sensing. To do this, tap into the transducer high and low pressure tubing or locate the measurement device taps next to the transducer taps.

If the suspect sensor is measuring duct static pressure, verify that the high and low pressure taps are properly installed. An improper pressure tap installation can cause severe fluctuations in the sensed pressure. Refer to the model-specific installation manual for pressure tap installation guidelines.

Measure the DC voltage output from the transducer across the sensor "S" and "-" terminals.

If the measured voltage and pressure do not match, there may be a wiring problem, the factory 500 ohm resistor across "S" and "-" or the transducer may be defective. Check the transducer input circuit wiring and connections for defects. If the measured voltage and pressure match, the VFD parameters and/or ModBus communication between the controller and the VFD will need to be verified.

Remove powers from the controller by opening system switch S1. If available, swap a similar good transducer with the suspect transducer or try installing a new transducer. Restore power by closing S1 and verify whether the suspect transducer is defective.

Table 21: MicroTech III Unit Controller Parts List

Daikin Part #	Aftermarket Part Description
193407301	MT3006 Lg Controller w/HMI 27 IOS
193407401	MT3026 Extension IO Module 26 IOS
193407501	MT3025 Extension IO Module 15 IOS
193407601	MT3024 Extension IO Module 8 IOS
193407701	MT3023 Extension IO Module 6 IOS
193408001	MT3051M Human Int Panel/Wall Mount 8 × 40
TBD	MT3051D Human Int Panel/Wall Mount 8 × 40
193408101	MT3041 Com Module BACnet® IP
193408201	MT3043 Com Module LON®
193408301	MT3042 Com Module BACnet® MS/TP
193408401	MT3044 Com Module MODBUS® RS485 × 2
193408501	MT3045 Remote Support Module
193408601	MT3 Service Cable 80 CM
193408701	MT3 Service Cable 150 CM
193408801	MT3 Local HMI Cable 80 CM
193408901	MT3 Local HMI Cable 150 CM
193409001	MT3 Real Time Clock Battery 200 Days
193409101	MT3 Conn Set CTRL Spring Top Entry
193409201	MT3 Conn Set EXT 1 Spring Top Entry
193409301	MT3 Conn Set EXT 2 Spring Top Entry
193409401	MT3 Conn Set EXT 3 Spring Top Entry
193409501	MT3 Conn Set EXT 4 Spring Top Entry
193409601	MT3 Conn EXT I/O Direct Connect 10 PK
193409701	MT3 Conn EXT I/O Direct Connect 1 PK
193409801	MT3 Conn EXT I/O Remote Connect 10 PK
193409901	MT3 Conn EXT I/O Remote Connect 1 PK
193410001	MT3 Sapro Eng Prog Tool
193410101	MT3 Test and Demo Suitcase 1
193410201	MT3 Test and Demo Suitcase 2
193410302	MT3 Conn 2 Pin Spring Top Entry
193410303	MT3 Conn 3 Pin Spring Top Entry
193410304	MT3 Conn 4 Pin Spring Top Entry
193410305	MT3 Conn 5 Pin Spring Top Entry
193410306	MT3 Conn 6 Pin Spring Top Entry
193410307	MT3 Conn 7 Pin Spring Top Entry
193410308	MT3 Conn 8 Pin Spring Top Entry

Replacement Parts

When writing to Daikin for service or replacement parts, provide the model number, serial number, and unit part number of the unit as stamped on the serial plate attached to the unit. For questions regarding wiring diagrams, it will be necessary to provide the number on the specific diagram. If replacement parts are required, include the date of unit installation, the date of failure, an explanation of the malfunction, and a description of the replacement parts required.

Scroll Compressor

Daikin Rooftops use the following Copeland Scroll Compressors.

1. **Tandem compressors** – basically two compressors specifically manufactured by Copeland into a single assembly.
2. **Trio compressors** – basically three single compressors factory piped in parallel with equalization lines.

All Daikin Rooftop products include a first-year parts only warranty. The warranty period extends 12 months from startup or 18 months from date of shipment, whichever comes first. Labor to install these parts is not included with this warranty. Compressors are considered a part and are included in this standard warranty.

Scroll service replacement compressors for Daikin Rooftop units can be obtained from the following two sources:

1. Daikin Service Parts maintains a stock of replacement compressors.
2. Copeland Refrigeration has stocking wholesalers throughout the U.S. who maintain a limited stock of replacement scroll compressors. Copeland does offer quick ship options though their wholesalers. However, if a portion of a tandem or trio is being replaced, Copeland cannot provide the piping kit, so labor will be more difficult (See “Scroll Compressor Piping” on page 100.)

Both sources can be used, at the customer’s discretion, within the first year warranty and with the following limitations.

1. **MPS 062E** – Only the failed portion of the tandem may need replacement.
2. **MPS 070E to 075E** – Only the failed portion of the trio may need replacement.

Replacing a Portion of a Tandem or Trio

The decision to replace the failed portion of the tandem or trio, as opposed to replacing the entire tandem or trio, must be decided based on the following.

1. **In warranty** – Warranty only covers replacement of the failed portion of the tandem or trio. Either source may be used.
2. **Out of warranty** – The customer decides whether to replace the entire tandem/trio or just a portion and either source may be used.

When replacing an “in warranty” compressor through a Copeland Wholesaler, take the failed compressor to the wholesaler for an over-the-counter or an advanced replacement exchange. Credit is issued by Copeland on the returned motor compressor upon receipt and factory inspection of the inoperative motor compressor. In this transaction, be certain that the motor compressor is definitely defective. If a motor compressor is received from the field that tests satisfactorily, a service charge plus a transportation charge will be charged against its original credit value.

If there was a delay in the startup of the equipment and the first-year warranty (Copeland) has expired on the compressor, within the 18-month-from-shipment warranty, order the replacement compressor through the Daikin Parts Department (Minneapolis).

1. Contact the Daikin Parts Department for compressor availability.
2. Send a completed parts order form to the Daikin Parts Department.
3. The Daikin Parts Department processes the order and the compressor is shipped from our Dayton, OH warehouse via ground transportation. If next-day air is required, indicate this on the parts order form and a freight charge will be billed to your account. Air freight costs are not covered under the Daikin warranty.
4. After the failed compressor is replaced, return it to Daikin Applied with a Return Goods tag attached, which you will receive in the mail. It must be attached to the compressor. The Return Goods tag has instructions on where to send the compressor. If the compressor is not returned, you will be billed for the replacement compressor.
5. Consideration may be given at this time to a compressor teardown analysis, depending on the history of failures.

On Daikin equipment that includes the extended 2nd–5th year compressor warranty option, the replacement compressor must be ordered through the Daikin Parts Department (Minneapolis).

1. Contact the Daikin Parts Department for compressor availability.
2. Send the Daikin Parts Department a completed parts order form.
3. The Daikin Parts Department will process the order and the compressors will be shipped from our Dayton, OH warehouse via ground transportation. If next-day air is required, you will need to indicate this on the parts order form and a freight charge will be billed to your account. Air freight costs are not covered under the Daikin warranty.
4. After the failed compressor has been replaced, it must be returned to Daikin Applied with a Return Goods tag attached. You will receive the tag in the mail and it must be attached to the compressor. The Return Goods tag will have instructions on where to send the compressor. If the compressor is not returned, you will be billed for the replacement compressor.
5. Consideration may be given at this time to a compressor teardown analysis, depending on the history of failures.

In-Warranty Return Material Procedure

Material other than compressors may not be returned except by permission of authorized factory service personnel of Daikin Applied, Minneapolis, Minnesota.

A Return Goods tag will be sent to be included with the returned material. Enter the information as called for on the tag in order to expedite handling at our factories and issuance of credits. All parts shall be returned to the factory designated on the Return Goods tag, transportation charges prepaid.

The return of the part does not constitute an order for replacement. A purchase order for the replacement part must be entered through your nearest Daikin representative. The order should include the component's part number and description and the model and serial numbers of the unit involved.

If it is determined that the failure of the returned part is due to faulty material or workmanship within the standard warranty period, credit will be issued on the customer's purchase order.

Limited Product Warranty (North America)

Daikin Applied ("Company") warrants to contractor, purchaser and any owner of the product (collectively "Owner") that Company, at its option, will repair or replace defective parts in the event any product manufactured by Company, including products sold under the brand names McQuay Air Conditioning, AAF Air Conditioning, AAF HermanNelson and Daikin Service, 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 replaced parts are warranted for the duration 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, labor to repair or replace warranty parts is provided during Company normal working hours on products with rotary screw compressors, centrifugal compressors and on absorption chillers. Warranty labor is not provided for any other products.

Company's liability to Owner under this warranty shall not exceed the lesser of the cost of correcting defects in the products sold or the original purchase price of the products.

PRODUCT STARTUP ON ABSORPTION, CENTRIFUGAL AND SCREW COMPRESSOR PRODUCTS IS MANDATORY and must be performed by Daikin Service or a Company authorized service representative.

It is Owner's responsibility to complete and return the Registration and Startup Forms accompanying the product to Company within ten (10) days of original startup. If this is not done, the ship date and the startup date will be deemed the same for warranty period determination, and this warranty shall expire twelve (12) months from that date.

Exceptions

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 which (a) have been opened, disassembled, repaired, or altered by anyone other than Company or its authorized service representative; or (b) have been subjected to misuse, negligence, accidents, damage, or abnormal use or service; or (c) have been operated, installed, or startup has been provided in a manner contrary to Company's printed instructions, or (d) were manufactured or furnished by others and which are not an integral part of a product manufactured by Company; or (e) have not been fully paid for by Owner.

Assistance

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

Sole Remedy

THIS WARRANTY CONSTITUTES THE OWNER'S SOLE REMEDY. IT IS GIVEN IN LIEU OF ALL OTHER WARRANTIES. THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT AND UNDER NO CIRCUMSTANCE SHALL COMPANY BE LIABLE FOR INCIDENTAL, INDIRECT, SPECIAL, CONTINGENT OR CONSEQUENTIAL DAMAGES, WHETHER THE THEORY BE BREACH OF THIS OR ANY OTHER WARRANTY, NEGLIGENCE OR STRICT LIABILITY IN TORT.

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.

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.

DAIKIN

Rooftop
Equipment Warranty Registration Form

To comply with the terms of Daikin Applied Warranty, complete and return this form within 10 days to the Warranty Department of Daikin Applied.

Check, test, and start procedure for Rooftop roof mounted air conditioners with or without heat recovery and roof mounted air handlers.

GENERAL INFORMATION

Job Name: ______________________________ **Unit No.:** ______________________

SOI No.: ______________________

Installation address: ____

City: ______________________________ **State:** ______________________

Purchasing contractor: ____

City: ______________________________ **State:** ______________________

Name of person doing start-up: ____

Company name: ____

Address: ____

City/State/Zip: ____

UNIT INFORMATION

Unit model number: ______________________________ **Unit serial number:** ______________________

Compressor 1 model number: ______________________________ **Serial number:** ______________________

Compressor 2 model number: ______________________________ **Serial number:** ______________________

Compressor 3 model number: ______________________________ **Serial number:** ______________________

Compressor 4 model number: ______________________________ **Serial number:** ______________________

Compressor 5 model number: ______________________________ **Serial number:** ______________________

Compressor 6 model number: ______________________________ **Serial number:** ______________________

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DAIKIN

Rooftop Equipment Warranty Registration Form (continued)

Select Yes or No. If not applicable to the type of unit, select N/A.

I. INITIAL CHECK

A. Is any shipping damage visible? . . . . ☐Yes ☐No ☐N/A

B. Are fan drives properly aligned and belts properly adjusted? . . . . ☐Yes ☐No ☐N/A

C. Tightened all setscrews on pulleys, bearings and fans? . . . . ☐Yes ☐No ☐N/A

D. Have the hold-down bolts been backed off on spring mounted fan isolators? . . . . ☐Yes ☐No ☐N/A

E. Do fans turn freely? . . . . ☐Yes ☐No ☐N/A

F. Has the discharge static pressure reference line been properly located within the building? . . . . ☐Yes ☐No ☐N/A

G. Electrical service corresponds to unit nameplate? . . . . ☐Yes ☐No ☐N/A

G1. Voltage at Terminal Block | Disconnect 1–2_____________ V 2–3 _____________ V 1–3 _____________ V

H. Is the main disconnect adequately fused and are fuses installed? . . . . ☐Yes ☐No ☐N/A

I. Are crankcase heaters operating, and have they been operating 24 hours prior to start-up? . . . . ☐Yes ☐No ☐N/A

J. Are all electrical power connections tight? (Check compressorelectrical box.) . . . . ☐Yes ☐No ☐N/A

K. Is the condensate drain trapped? . . . . ☐Yes ☐No ☐N/A

II. FAN DATA

A. Check rotation of supply fan? . . . . ☐Yes ☐No ☐N/A

B. Voltage at supply fan motor: . . . . 1–2_____________ V 2–3 _____________ V 1–3 _____________ V

C. Supply fan motor amp draw per phase: . . . . L1 _____________ L2 _____________ L3 _____________

D. Fuse sizes: . . . . ____

E. What is the supply fan rpm? . . . . _____________

F. Check rotation of return fan? . . . . ☐Yes ☐No ☐N/A

G. Voltage at return fan motor: . . . . 1–2_____________ V 2–3 _____________ V 1–3 _____________ V

H. Return fan motor amp draw per phase: . . . . L1 _____________ L2 _____________ L3 _____________

I. Fuse sizes: . . . . ____

J. What is the return fan rpm? . . . . _____________

K. Record supply static pressure at unit in inches of H_20: . . . . _____________

L. Record return static pressure at unit (with outside air dampers closed) in inches of H_20: . . . . _____________

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DAIKIN

Rooftop Equipment Warranty Registration Form (continued)

Select Yes or No. If not applicable to the type of unit, select N/A.

III. START-UP COMPRESSOR OPERATION

A. Do compressors have holding charges?

Circuit #1 . . . . ☐ Yes ☐ No ☐ N/A

Circuit #2 . . . . ☐ Yes ☐ No ☐ N/A

B. Are compressors rotating in the right direction? . . . . ☐ Yes ☐ No ☐ N/A

C. Do condenser fans rotate in the right direction? . . . . ☐ Yes ☐ No ☐ N/A

D. Ambient temperature (°F): . . . . ____________

E. Does unit start up and perform per sequence of operation? . . . . ☐ Yes ☐ No ☐ N/A

IV. PERFORMANCE DATA

A. Compressor voltage across each phase: . . . . 1–2____________ V 2–3 ____________ V 1–3 ____________ V

B. Compressor amperage of fully loaded compressor: Compressor #1 — Phase 1________ Phase 2 ________ Phase 3 _______

Compressor #2 — Phase 1________ Phase 2 ________ Phase 3 _______

Compressor #3 — Phase 1________ Phase 2 ________ Phase 3 _______

Compressor #4 — Phase 1________ Phase 2 ________ Phase 3 _______

Compressor #5 — Phase 1________ Phase 2 ________ Phase 3 _______

Compressor #6 — Phase 1________ Phase 2 ________ Phase 3 _______

C. Low pressure cut-out: . . . . Circuit 1 _________ psig Circuit 2 _________ psig

D. Low pressure cut-in: . . . . Circuit 1 _________ psig Circuit 2 _________ psig

E. High pressure cut-out: . . . . Circuit 1 _________ psig Circuit 2 _________ psig

F. Discharge pressure, one compressor: . . . . Circuit 1 _________ psig Circuit 2 _________ psig

G. Discharge pressure, fully loaded, 2–3 compressors: . . . . Circuit 1 _________ psig Circuit 2 _________ psig

H. Suction pressure, one compressor: . . . . Circuit 1 _________ psig Circuit 2 _________ psig

I. Suction pressure, fully loaded, 2–3 compressors: . . . . Circuit 1 _________ psig Circuit 2 _________ psig

J. Liquid press, fully loaded, 2–3 compressors (at liquid line shutoff valve): . . . Circuit 1 _________ psig Circuit 2 _________ psig

K. Liquid temperature, fully loaded, 2–3 compressors: . . . . Circuit 1 _________ psig Circuit 2 _________ psig

L. Suction line temperature: . . . . ___________ °F ___________°F

M. Superheat: . . . . ___________ °F ___________°F

N. Subcooling:. . . . . ___________ °F ___________°F

O. Is the liquid in the line sightglass clear and dry? . . . . ☐ Yes ☐ No ☐ N/A

P. Does the hot gas bypass valve function properly?. . . . . ☐ Yes ☐ No ☐ N/A

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Rooftop Equipment Warranty Registration Form (continued)

Select Yes or No. If not applicable to the type of unit, select N/A.

Q. At what suction pressure does the hot gas bypass valve open? . . . . Circuit 1 __________ psig Circuit 2 __________ psig

R. Record discharge air temperature at discharge of unit: ___________ °F

S. Are all control lines secure to prevent excessive vibration and wear? . . . . ☐ Yes ☐ No ☐ N/A

T. Are all gauges shut off and valve caps and packings tight after start-up? . . . . ☐ Yes ☐ No ☐ N/A

V. ELECTRIC HEAT CHECK, TEST & START

A. Electrical heat service corresponds to unit nameplate? . . . . ☐ Yes ☐ No ☐ N/A

Volts _____________ Hertz _____________ Phase _____________

B. Are there any signs of physical damage to the electric heat coils? . . . . ☐ Yes ☐ No ☐ N/A

C. Have all electrical terminals been tightened? . . . . ☐ Yes ☐ No ☐ N/A

D. Does sequence controller stage contactors properly? . . . . ☐ Yes ☐ No ☐ N/A

E. Electric heater voltage across each phase: . . . . ___________ L1 ___________ L2 ___________ L3

F. Amp draw across each phase at each heating stage:

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Phase L1:	___________	___________	___________	___________	___________	___________
Phase L2:	___________	___________	___________	___________	___________	___________
Phase L3	___________	___________	___________	___________	___________	___________

G. FLA: . . . . L1 ___________ L2___________ L3 ___________

H. Operate electric heat with fans off. Electric heat must cycle on high limit control . . . . ☐ Yes ☐ No ☐ N/A

VI. GAS BURNER CHECK, TEST, & START

Specifications:
For gas, see Forced Draft Gas Burner Installation and Maintenance Bulletin. (IM 684 and IM 685)

A. Gas Furnace:. . . . . Model no. _________________

B. Gas Burner: . . . . .Model no.__________________ Serial no. __________________

C. Gas Rated firing rate (MBH input): . . . . ._________________

D. Gas Altitude (ft. above sea level): . . . . ._________________

E. Input (CFH): . . . . _________________

F. Gas pressure at burner (inches w.c.): . . . . _________________

G. CO_2 (%) . . . . _________________

H. CO_2 (%): . . . . _________________

I. Pilot flame only in microamps (steady at low fire): . . . . _________________

J. Pilot Tap-gas pressure (inches w.c.): . . . . _________________

K. Motor only/burner FLA running amps: . . . . _________________

L. High limit control OK? . . . . ☐ Yes ☐ No ☐ N/A

M. Flame safeguard (microamps): . . . . _________________

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Rooftop Equipment Warranty Registration Form (continued)

Select Yes or No. If not applicable to the type of unit, select N/A.

N. Flame failure shutoff (seconds): . . . . _______________

O. Airswitch OK? . . . . ☐ Yes ☐ No ☐ N/A

P. High Gas Pressure Switch OK? . . . . ☐ Yes ☐ No ☐ N/A

Q. Low Gas Pressure Switch OK? . . . . ☐ Yes ☐ No ☐ N/A

R. Main Gas Valve Close-off OK?. . . . . ☐ Yes ☐ No ☐ N/A

S. Modulation Gas Heat Performance

Gas Pressure

Mod. Valve		**Reg. Valve**	
25% ______	in Wc.	25% ______	in Wc.
50% ______	in Wc.	50% ______	in Wc.
75% ______	in Wc.	75% ______	in Wc.
100% ______	in Wc.	100% ______	in Wc.

VII. Hot Water Coil

A. Pressure test OK? . . . . ☐ Yes ☐ No ☐ N/A

VIII. Heat Recovery

A. Heat wheel rotates freely? . . . . ☐ Yes ☐ No ☐ N/A

B. Heat wheel VFD operates properly? . . . . ☐ Yes ☐ No ☐ N/A

C. Heat wheel VFD . . . . Model No. ________________________ Serial No. __________________________

D. Check for air bypass around heat wheel . . . . ☐ Yes ☐ No ☐ N/A

IX. Design Flow Calibration

A. Verify power is supplied to the MicroTech III unit controller . . . . ☐ Yes ☐ No ☐ N/A

B. Verify that the shipping screws have been removed from the measuring station vane . . . . ☐ Yes ☐ No ☐ N/A

C. Examine station for damage . . . . ☐ Yes ☐ No ☐ N/A

D. Record Level Position after calibration

- LH Level Position . . . . ___________
- RH Level Position . . . . ___________

NOTE: This is viewed in the MicroTech III controller, in the Min OA setup menu.

DAIKIN

Rooftop Equipment Warranty Registration Form (continued)

Select Yes or No. If not applicable to the type of unit, select N/A.

X. Have all electronic or electrical controls been checked, adjusted, and tested for proper operation per the installation and maintenance bulletins?

. . . . ☐ Yes ☐ No ☐ N/A

XI. MAINTAINING MICROTECH CONTROL PARAMETER RECORDS

After the unit is checked, tested, and started and the final control parameters are set, record the final settings. Keep these records on file and update whenever changes to the control parameters are made. Keeping a record facilitates any required analysis and troubleshooting of the system operation and facilitates restoration after a controller replacement.

Thank you for completing this form. Please sign and date below.

Signature ____ **Startup date:** ____________________

Return completed form by mail to:

Daikin Warranty Department, 13600 Industrial Park Boulevard, Minneapolis, MN 55441

or by email to: AAH.Wty_WAR_forms@daikinapplied.com

Please fill out the Daikin Applied "Quality Assurance Survey Report" and list any additional comments that could affect the operation of this unit; e.g., shipping damage, failed components, adverse installation applications, etc. If additional comment space is needed, write the comment(s) on a separate sheet, attach it to the Survey Report and return it to the Warranty Department of Daikin Applied with the completed Equipment Warranty Registration form.

Submit Form

Clear Form

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DAIKIN

Quality Assurance Survey Report

To whom it may concern:
Please review the items below upon receiving and installing our product. Select N/A on any item that does not apply to the product.

Job Name: ____________________ **Daikin Applied S.O. No.**____________

Installation address:____________________

City: ____________________ State: ____________

Purchasing contractor:____________________

City: ____________________ State: ____________

Name of person doing start-up (print): ____________________

Company name:____________________

Address:____________________

City/State/Zip: ____________________

Unit model number: ____________________ **Unit serial number:** ____________

1. Is there any shipping damage visible? . . . . . Yes ☐ No ☐ N/A ☐

   Location on unit ____________________

2. How would you rate the overall appearance of the product; i.e., paint, fin damage, etc.?

   Excellent ☐ Good ☐ Fair ☐ Poor ☐

3. Did all sections of the unit fit together properly? . . . . . Yes ☐ No ☐ N/A ☐
4. Did the cabinet have any air leakage? . . . . . Yes ☐ No ☐ N/A ☐

   Location on unit ____________________

5. Were there any refrigerant leaks? . . . . . Yes ☐ No ☐ N/A ☐

   From where did it occur? . . . . . Shipping ☐ Workmanship ☐ Design ☐

6. Does the refrigerant piping have excessive vibration? . . . . . Yes ☐ No ☐ N/A ☐

   Location on unit ____________________

7. Did all of the electrical controls function at start-up? . . . . . Yes ☐ No ☐ N/A ☐

   Comments ____________________

8. Did the labeling and schematics provide adequate information? . . . . . Yes ☐ No ☐ N/A ☐
9. How would you rate the serviceability of the product?

   Excellent ☐ Good ☐ Fair ☐ Poor ☐

10. How would you rate the overall quality of the product?

    Excellent ☐ Good ☐ Fair ☐ Poor ☐

11. How does the quality of Daikin Applied products rank in relation to competitive products?

    Excellent ☐ Good ☐ Fair ☐ Poor ☐

    Comments ____________________

Please list any additional comments which could affect the operation of this unit; i.e., shipping damage, failed components, adverse installation applications, etc. If additional comment space is needed, write the comment(s) on a separate sheet, attach the sheet to this completed Quality Assurance Survey Report, and return it to the Warranty Department with the completed preceding “Equipment Warranty Registration Form”.

13F-4160 (02/16)

Daikin Applied Training and Development

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

Warranty

All Daikin equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Applied Representative for warranty details. To find your local Daikin Applied Representative, go to www.DaikinApplied.com.

Aftermarket Services

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

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

Products manufactured in an ISO Certified Facility.