Installation Manual

IM 1032-2

Group: **Applied Air Systems**
Part Number: **IM 1032**
Date: **December 2013**

Self-Contained Air Conditioning Systems

Type SWP
Vintage H
Refrigerant R-410A
Capacity 20 through 130 tons

Original Instruction

General Description

Daikin Applied Self-Contained Air Conditioning units, model SWP are factory assembled, refrigerant charged and tested, water-cooled packaged air conditioning units designed for ducted applications.

Each unit contains multiple hermetic compressors, water cooled condensers, multi-circuit evaporator, thermal expansion valves, interconnecting refrigerant piping, supply fan, belt drive, fan motor, pleated filters and all necessary operating and safety controls. Units ship fully charged with R-410A refrigerant unless they are ordered with the modular construction option. Modular units ship with a nitrogen holding charge. Units with the modular construction Option can be easily disassembled for access to mechanical room entries, freight elevators and other constrictions.

Optional Variable Frequency Drivers (VFD) are offered. 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).

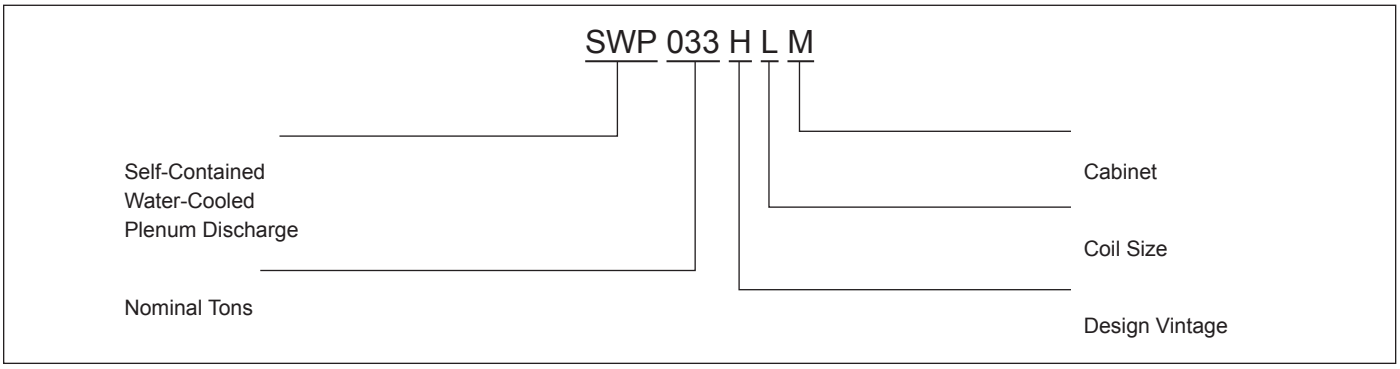
All rigging, installation, power and control wiring external to the unit, and condenser water and condensate piping are the responsibility of the installer.

The MicroTech® III self-contained unit controller is standard equipment. For a detailed description of the MicroTech III components, input/output configurations, field wiring options and requirements, and service procedures, refer to IM 919, “MicroTech III Unit Controller” For a description of operation and information on using and programming the MicroTech III unit controller, refer to OM 920, “Microtech III Unit Controls.

Table 1: VFD Installation, Operation and Maintenance Literature

	Rooftop Unit Control Configuration	Operation Manual Number
VFDs	Daikin Applied 208–460V	OM 844
	Daikin Applied 575V	OM 895
	Non-Daikin Applied	See vendor manuals

Figure 1: Nomenclature



Inspection

When the equipment is received, carefully check all items against the bill of lading to ensure a complete shipment. Do not sign the shipping receipt until all items are accounted for. Carefully inspect all units for damage upon arrival. Report all shipping damage to the carrier and file a claim. Before unloading the unit, check the unit serial plate to be sure it agrees with the power supply available.

NOTE: Check for concealed damage as soon as possible.

Handling

⚠ WARNING

Never allow any part of the unit to fall during unloading or moving as this can cause equipment damage, severe personal injury, or death.

⚠ CAUTION

Do not attempt to install dollies in the center of the unit. Units can become unstable and tip over, causing injury

⚠ CAUTION

Do not move units in an upended position. Internal components may tear away, causing injury.

Units ship with a protective covering that should remain in place while the unit is being moved to its final location.

Units are provided with lifting lugs for rigging with a crane. If units are lifted by crane, use slings or cable to protect against chaffing damage and use spreader bars across the top of the cabinet to prevent any structural damage to the frame.

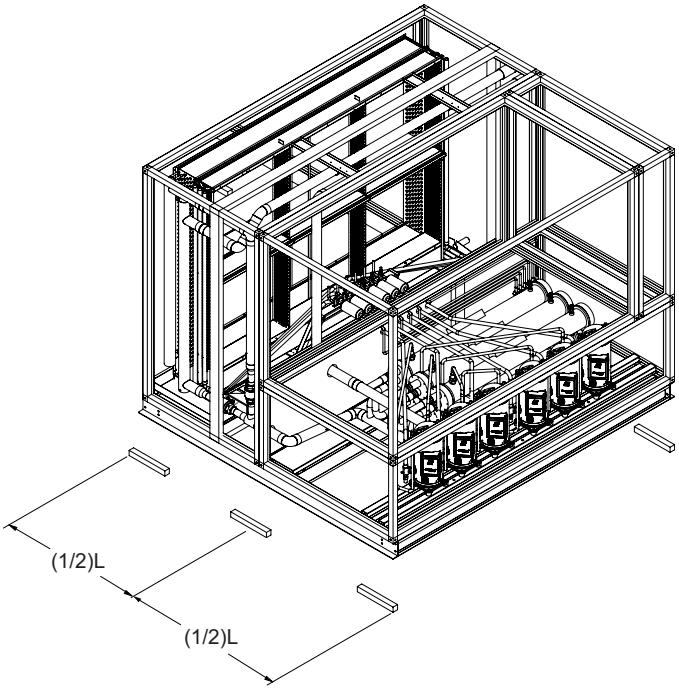
The unit base frame accepts dollies or Johnson bars for transporting the unit. Place furniture dollies at all lift point locations and use a Johnson bar at one end for maneuvering.

Vibration Isolators

All units are provided with 1" neoprene isolation pads, shipped separately. Using the instructions provided in the shipment, install pads beneath the unit, locating them at each corner and at 1/2 the length of each side base channel. Evenly space the additional pads under the remaining base channels.

NOTE: Only qualified personnel familiar with local codes and regulations and experienced with this type of equipment should perform installation and maintenance

Figure 2: Isolation Pad Placement



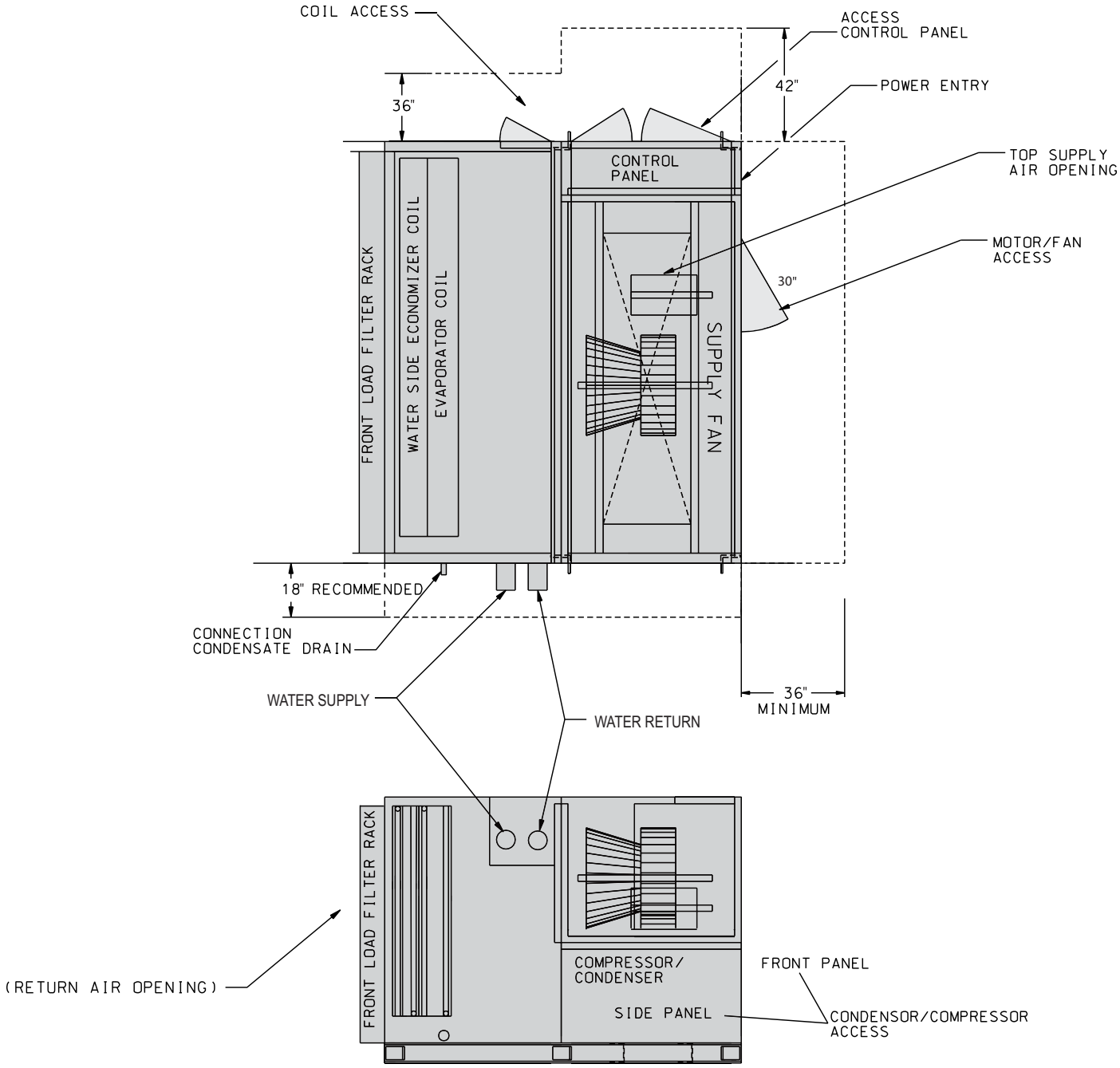
Location/Service Access

To facilitate installation and provide service, and maintenance access, follow the recommended clearances in Table 2. Minimum clearances required by local, state, or federal codes such as the NEC take precedence over those listed below. Clearance is required to allow room for filter access, mechanical cleaning of the condenser tubes and economizer coil, access to expansion valves and other control components, and to allow for possible fan shaft or compressor removal.

Table 2: Recommended Clearances

Location	Clearance Length, inches (mm)
Control panel	42 (1067)
Unit rear, filter section	24 (610)
Access side	36 (914)
Unit front	36 (914)
Opposite access side	18 (457)

Figure 3: Recommended Service and Maintenance Clearance



Removing Shipping Restraints

Mechanical restraints are used to secure the spring-mounted fan during shipment. Remove the restraints and the shipping blocks after unit is set in its final location.

Shipping

All units leave the factory assembled completely. Units intended to be disassembled contain a nitrogen holding charge. Non-modular units will hold the manufacturer recommended refrigerant charge (R410A).

Arrival at Installation Site

The unit must be unloaded in accordance with the rigging instructions displayed on the outside of the unit or in the installation manuals inside. The lifting lugs located inside the unit base rail are the only lifting lugs to use for lifting the complete unit. Never use any individual section lifting lugs to lift the whole unit.

Some items are shipped lose inside units such as filters and rubber isolator pads. All units should be inspected before unloading and all lose items secured.

Disassembling and Reassembling Modular Units

To avoid injuries or damage to the equipment, please read the installation manual (IM 919) before rigging or disassembling the unit. Follow all the warning and caution labels placed on the unit.

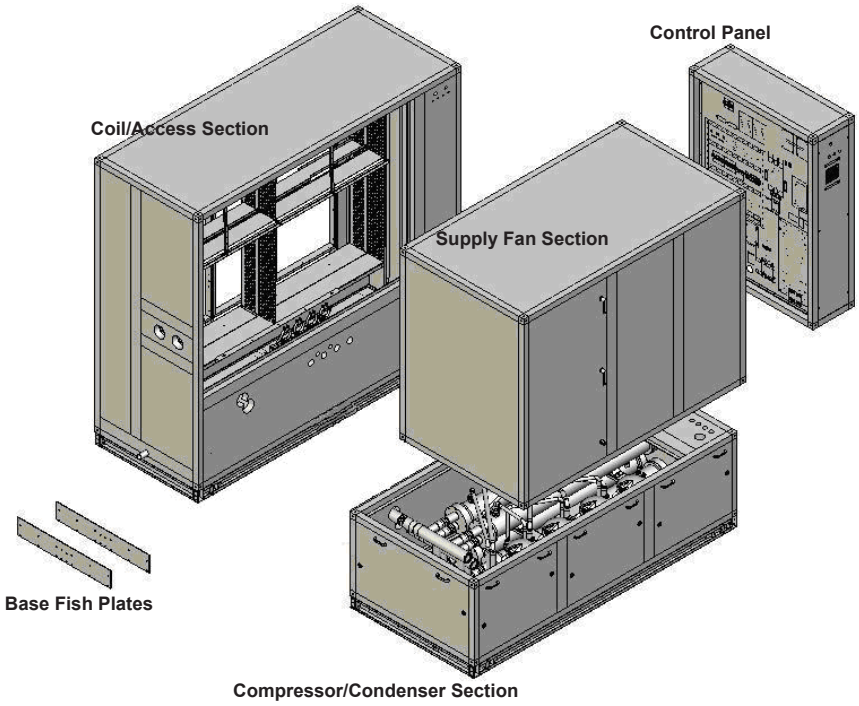
Disassembly of Sections

If the unit is ordered with the modular construction (Unit Configuration Code 43 = 1) option, the refrigerant circuits are shipped with a nitrogen holding charge (Unit Configuration Code 11 = NP) and can be disassembled into four pieces. A unit not originally intended to be disassembled will have R410A refrigerant factory charge that must be properly recovered before disassembly.

Figure 4 illustrates the four distinct sections;

1. Coil/access section,
2. Supply fan section,
3. Compressor/condenser section and
4. the Control panel.

Figure 4: Self-Contained Unit with Four Sections Separated



In addition to refrigerant and water piping, the unit has various standard and optional components that cross between sections which will require field disconnection and reconnecting or mounting:

Coil/Access Section
- Mixed air sensor (MAT)
- Plastic tube for clogged filter switch (PC5)
- Freezstat(s) (FS*)
- Actuator Harness(es) (ACT3 & ACT4)
- Ultra Violet Light harness (es)
- Waterflow Sensor (WFS)
- Entering Water Temperature (EWT)

Supply Fan Section
- Discharge Air Temperature (DAT)
- Plastic tube for air flow switch (PC7) and Duct

High Limit (DHL)
- Supply Fan motor power harness
- Supply Fan Door Switch (S21)
- Electric Heat high limit switch(es) (HL*)
- Electric Heat power harness

Compressor/Condenser Section
- Pressure Transducer Harnesses (PSR1 & 2)
- Compressor High Pressure Switches (HP*)
- Compressor Low Pressure Switches (LP*)
- Compressor Motor Protection (MP*)
- Compressor power harnesses

External
- Return Air Temperature (RAT)
- Plastic tube for the Static Pressure Sensor(s) (SPSI & 2)
- Outside Air Temperature (OAT)
- Zone or Space Temperature (ZNT1)

* Quantities vary with unit size

Disassembly

1. Open the fan section access door and remove any item placed in the section during shipping.
2. Open the Control Box doors and remove any item placed during shipping, such as filter clips and isolation pads.
3. Review the wiring schematics and wiring connections inside the control box. Disconnect control and power connections for the supply fan motor and all compressors. Control wires are plugged into the Patch Panel on the right side. Disconnect the tubing on PC5, PC7 and DHL pressure switches.
4. Disconnect sensor wires from the control box that go out to the other sections. Place the wire harnesses in the section where their respective sensor is located.
5. The top panel of the Control Panel Box should be removed to allow two eye bolts with nuts to be installed and used for rigging. Connect the lifting hooks to the eye bolts and lift to secure the clamps and provide support to the Control Box in transition. Remove the steel plates' screws (Figure 5); close the panel doors and lift carefully to remove the section completely (See Figure 7).

NOTE: To remove panels, flat or right angle painted plates; T-30 TORX drive is required.

Figure 5: Painted Steel Plates

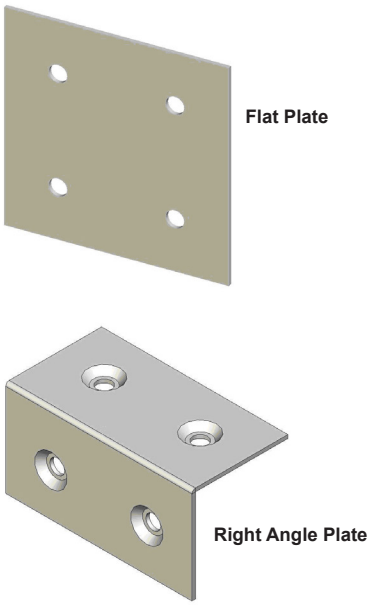
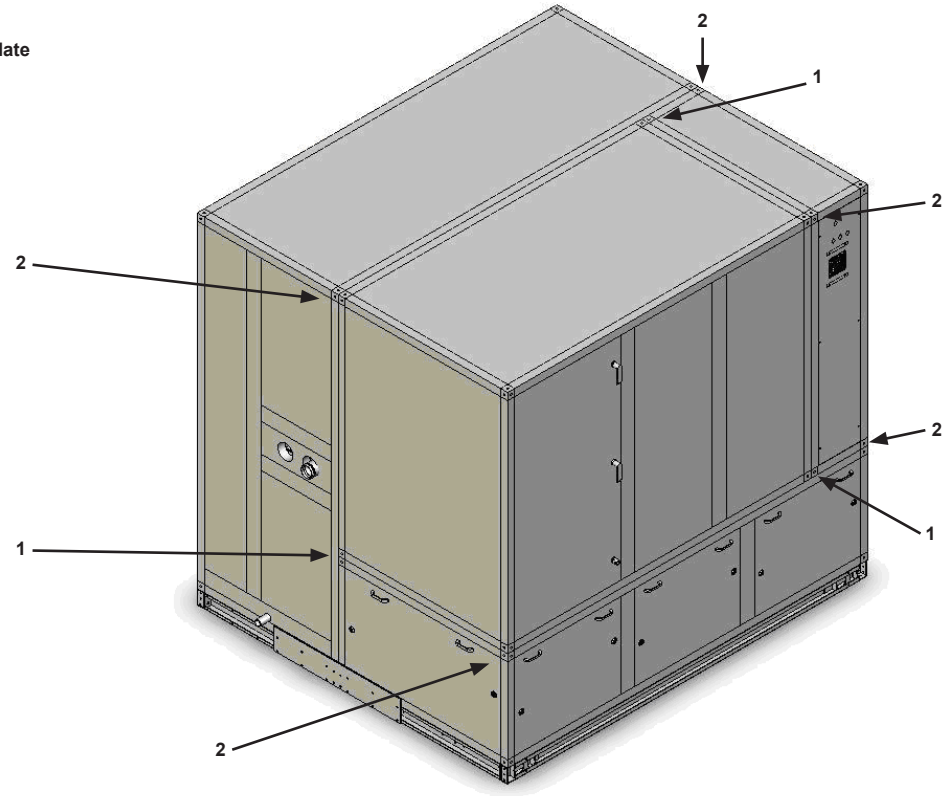


Figure 6: Assembled Self-Contained Unit Showing Steel Plate Locations and Type

See Figure 5
1) Flat Plate
2) Right Angle Plate



6. Remove all top paneling and the intermediates. Use the supply fan assembly base frame to lift the whole section. Hook points have been added to the design. Fan sizes 40" and larger will use AVKs and eyebolts. Use long enough chains to avoid exerting pressure on the fan or the motor from the side. Lift the fan section slowly until it is supported. Remove the painted steel plates (flat and right angle) connecting the section to compressor/condenser section and coil/access section. Balance the tension in the lifting chains to pull the section back five inches to disengage the splice collar frame from the coil section. Lift the fan section carefully and slowly away from the unit (See Figure 8).
7. Once the supply fan section is removed, the compressor/condenser section can be accessed from the top. Remove the side access panels on both sides of the section (Right or Left hand units). Locate and remove the Victaulic couplings of the water pipes (15/16" wrench or socket). Relieve the Nitrogen charge in each refrigerant circuit before cutting any refrigerant line. Cut Refrigerant lines (liquid and suction) at locations that will be accessible to brazing during unit reassembly. See (Figure 9) for suggested cut area. Cover the refrigerant pipes on both sides of the cut to avoid contamination.

NOTE: The model shown has four circuits. Number of circuits ranges from two on small units to eight on large ones. There may be more lines to cut on large units. Mark circuits if necessary, to avoid confusion.

8. Remove painted flat steel plates (from the side) connecting this section with the coil sections (same plates connecting fan, coil and condenser/compressor sections). Remove the double galvanized steel plates connecting the base sections together to split the coil/access section from the compressor/condenser section with a 9/16" wrench or socket. Splitting the two sections apart will expose the other four lifting brackets. Use the four base lifting brackets on each section for lifting. Use spreader bars to keep the lifting chains away from the section frame to prevent any damage to the unit structure. The center of gravity is higher than the base level. Handle the section carefully to avoid tilting.
9. The base lifting lugs must be used to lift the coil section (See Figure 10). Spreader bars are needed to prevent the chains from exerting lateral pressure on the coil frame.

⚠ CAUTION

Coil section is heavier than the fan section. Lifting chains used on this section must have the proper safety ratings. Table 3 lists the weights of maximum individual sections for each unit size group.

Figure 7: Control Box Lifting

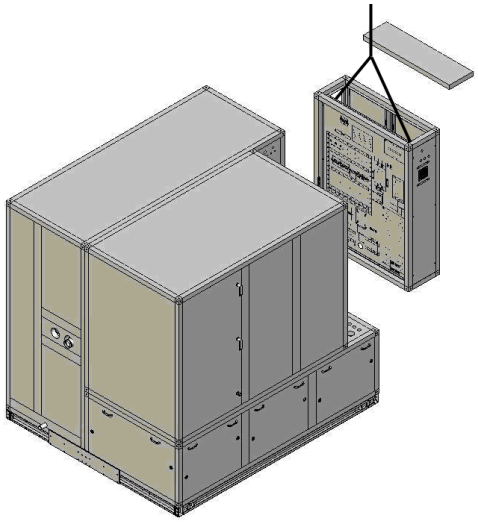
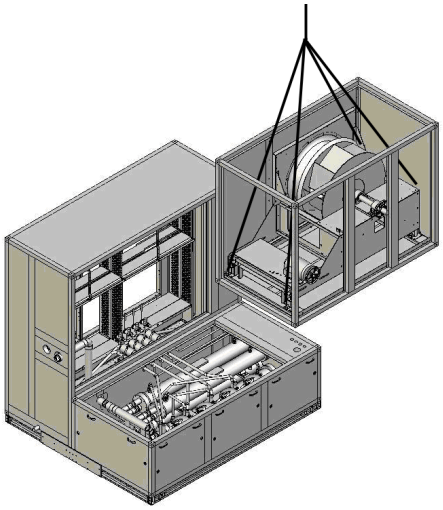


Figure 8: Supply Fan Section Lifting



⚠ CAUTION

Condenser/compressor section is heavier than the fan section. Lifting chains used on this section must have the proper safety ratings. Table 3 lists the weights of maximum individual sections for each unit size group.

⚠ WARNING

The center of gravity is higher than the base level.

⚠ CAUTION

Coil section is the tallest and has many delicate parts that can be damaged easily as a result of falling or bumping into walls or other equipment. Any damage to the section may require a coil replacement. Handle the coil section slowly and carefully (restrain as required) to avoid tilting.

Table 3: Maximum Weights of Individual Sections (lbs.)

Unit Size	Condenser/ Compressor	Coil	Fan	Control Panel
Small	1850	1750	1200	300
Small Tall	2250	1900	1450	300
Medium	2450	2550	1850	400
Large	2550	3000	2450	450
Large Tall	4300	3550	2900	500
8 Compressor	4500	3550	3250	650

Figure 9: Condenser/Compressor Section and Coil Section Ready for Separation

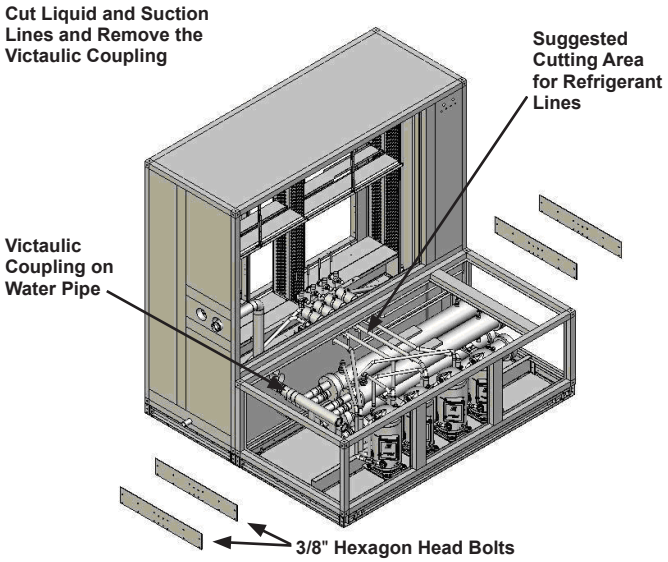
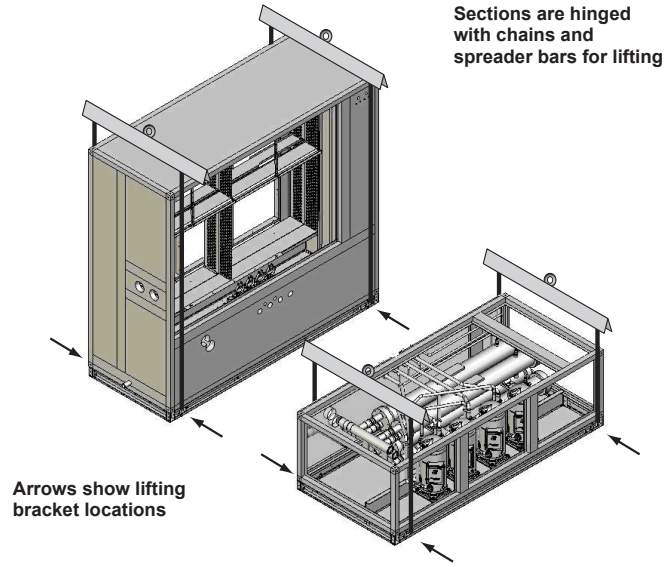


Figure 10: Coil Section and Compressor/Condenser Section



Reassembly

1. Starting with the coil/access section, attach the double galvanized steel plates to the base.
2. Line up the compressor/condenser section with the coil/access section. Slide the compressor/condenser section towards the coil section. Attach the two sections using the double galvanized steel plates. Install painted steel plates (flat) in their respective areas.
3. Braze the refrigerant (liquid and suction) lines between two sections (Note: R410A design working pressure is 450 PSI. or as indicated on the unit data label). Similar factory joints are brazed with Copper-Phosphoros-2% Silver brazing rods.
4. Connect water pipes using the Victaulic couplings. Test water pipes for leaks in areas with new connections. Test refrigerant pipes for leaks in new brazed areas.
5. Evacuate, test and charge the refrigerant circuits with R410A. See dataplate for refrigerant charge amount per circuit.
6. Lift the supply fan section taking care to align the splice joint to seat into the mating gasket of the coil/access section to provide an air tight seal. All corners of the unit sections must line up before some of the flat and right angle steel plates can be installed to stabilize the fan, coil and compressor/condenser sections together.
7. All units have shipping brackets holding the fan tight in place during shipping. Remove brackets before commissioning the fan section and adjust the spring isolators before installing the control panel box.
8. Organize all wire harnesses in each section and get them ready to reconnect to the Control Panel.
9. Lift the Control Panel into place. Attach the section using painted flat and right angle steel plates (Figure 5). After the control box is secure, re-connect power wires, control plugs and sensors.

⚠ CAUTION

Keep your hands at a safe distance from the unit while guiding the wires into the control panel during installation. Make sure no wire get caught under the Control panel box frame.

⚠ WARNING

Re-install interconnecting wires only, after the panel has been set and secured.

Refrigerant Piping—Pressure Relief Valves

(ETL Marked Units Only)

All units have individual refrigerant circuits and each circuit is provided with a spring loaded relief valve. The valve is set to open when refrigerant pressure reaches 600 psig. The relief valve accommodates a 3/8" flare connection for applications where it is necessary to connect vent piping and run it outside the building.

⚠ CAUTION

When refrigerant is vented to the outside of the building, install the vent piping as recommended in ASHRAE Standard 15-1994. Failure to vent properly can result in personal injury.

Water Connections

Due to the variety of piping practices, follow the recommendations of local authorities. They can supply the installer with the proper building and safety codes required for proper installation.

For best performance, install the piping with a minimum number of bends and elevation changes. Size piping to minimize system pressure drop.

Piping should contain the following:

1. Vibration eliminators to reduce vibration and noise transmission to the building.
2. Shutoff valves to isolate the unit from the piping system during unit servicing.
3. Manual or automatic air vent valves at the high points of the system.
4. Some means of maintaining adequate system water pressure (e.g., expansion tank or regulating valve).
5. Temperature and pressure indicators located at the unit to aid in servicing.
6. A strainer or some means of removing foreign matter, which can damage the pump and shorten unit life, from the water before it enters the pump. Such damage is not covered by warranty. Place it far enough upstream to prevent cavitation at the pump inlet (consult pump manufacturer for recommendations). Using a strainer prolongs pump life and helps maintain system performance.

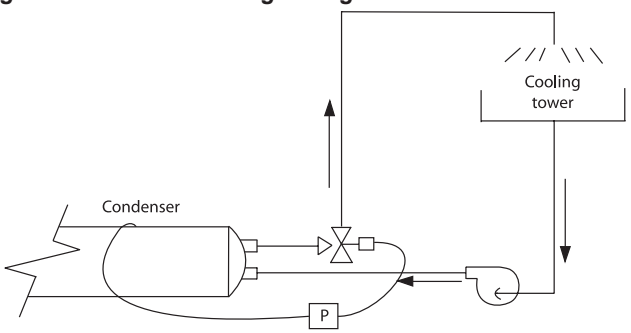
Condenser Piping

1. Units can be specified with water and condensate connections on either the left or right side of the unit.
2. All condensers are factory piped for a common condenser water supply and a common condenser water return connection.
3. Make field piping connections to factory-provided piping, locating them as indicated on the unit submittal drawings. Run the piping connections to the outside of the unit cabinet. Standard connections are ODS copper with victaulic connections.
4. Make supply and return water connections at the proper locations as indicated by the dimensional drawings.
5. Units with factory-mounted water side economizer should not require head pressure control. The economizer typically elevates the water temperature by 5°F to 10°F before entering the condenser, allowing suitable condenser water temperatures whenever the tower supply temperature is 50°F (10°C) or higher. Mechanical cooling is locked out below 55°F (12.8°C) EWT.
6. If entering condenser water temperatures will go below 55°F (12.8°C), provide head pressure control. Fan cycling and/or modulating discharge dampers on the cooling tower are often used, or a 3-way bypass around the tower is used to maintain condenser water temperature. If multiple units are in the loop, it is generally more cost effective to use cooling tower control to maintain the temperature at >55°F (12.8°C).

   The factory installed water regulating valve is placed in the water line entering the condenser; and shuts down to prevent water from siphoning out of the condensers. For systems where a constant pumping head is required, install the water regulating valve in a bypass line around the condensers. It then must open on falling discharge pressure.

   These typical systems, depending on the specific application, must maintain a constant condensing pressure regardless of temperature conditions and must provide adequate head pressure for proper thermostatic expansion valve operation. A minimum head pressure of 294 psi (21.3 bar.) (95°F [35°C] condensing temperature) is recommended.
7. Condenser tube velocities must not exceed 10' per second (3 m/s) (approximately 7.5 gpm/ton [0.47 lps/ton]).

Figure 11: Condenser Regulating Valve



Condensate Drain Connection

The condensate drain connection is 1.25" NPT and is generally located on the same end of the unit as the condenser water connections. Run drain lines and traps full size from drain pan connection. The trap depth and the distance must be twice the static pressure in the drain pan section under normal operation so the trap remains sealed. Pitch the condensate line away from the unit with a minimum slope of 1/8" per foot (3.2 mm/0.3 meters).

Keep drain pans and the drain trap clean by periodic cleaning.

Duct Connections

Refer to submittal drawings for duct connection dimensions.

Supply Air

To connect supply ductwork directly to the unit, first mount a duct collar at the fan outlet. Fan discharge opening sizes are indicated on the unit dimensional drawings. Daikin Applied recommends a canvas type connecting collar.

⚠ WARNING

Unit cannot be started until the ductwork is installed to avoid injury

Return Air

Return air to the unit can be ducted or free, as follows.

Ducted return

Attach return ductwork to the 2" flange around the perimeter of the unit's return air opening. Use a canvas-type duct connecting collar. All ductwork connected to the unit must be of adequate size and construction for the application. Also use a canvas-type connector where the duct penetrates the machine room wall(s). This helps prevent vibration generated by air movement in the duct from being transmitted out to the occupied spaces.

Free return

Use the mechanical equipment room as a return plenum with no hard connection at the unit.

NOTE: Some building codes do not allow using the mechanical room as a return plenum. Check applicable local codes for each installation.

Service Connections

Left-Hand—Right-Hand

Service connections are determined when facing the back of the unit. Right-hand connections are standard; left-hand connections are optional.

Long-term Storage

Project delays or site conditions can require the storage of Daikin Applied Self-Contained Air Conditioning Units for an extended period of time.

Location

The Daikin Applied Self-Contained Air Conditioning Unit is an indoor unit. Care must be taken to store the unit indoors away from weather conditions. While the area does not need to be air conditioned, Daikin Applied recommends that the electronic control equipment in the unit be stored in a 5% to 95% RH (non-condensing) environment.

Shrink Wrap

Do not allow the shrink wrap to trap moisture on the outside or inside surfaces of the unit. Shrink wrap must be removed immediately after installation. Once the shrink wrap is removed the unit(s) cannot be stored outdoors.

Preparation

Check that unit is set on a level surface and access panels are properly secured.

Supply Fans

1. Move the motor base to check and lubricate slides and lead screws.
2. Remove the drive belts and store them in the fan section.
3. Pack fan and motor bearings (unless motor bearings are sealed) with compatible grease with the shaft stationary. After grease has been installed, rotate shaft about 10 rotations.
4. Isolate unit from shock and vibration.
5. Once a month, rotate shaft a minimum of 10 revolutions. Insure the stopped position is different than the original position.
6. Coat shafts with lubricant as needed to prevent corrosion.
7. A descant bag may be hung in the interior of the unit to minimize corrosion in humid storage environments.
8. Do not clean galvanized steel surfaces with oil dissolving chemicals. This may remove the protective coating and accelerate corrosion.
9. Adjustable sheaves should be opened as wide as possible and the adjustment threads lubricated so they do not corrode. Be careful not to put lubricant on the belt running surface.

Cooling circuits

1. Close all the refrigerant service valves on each circuit.
2. Tag the valves as a warning for the technician who will be restarting the units.
3. If the unit has already been filled with cooling tower water, drain the unit completely. The condenser (and waterside economizer if it has one) is (are) mechanically cleanable, remove the condenser head tube plugs and thoroughly clean. See “Condenser Head Assembly and Gasket Replacement” on page 42.
4. Flush the internal condensate trap with antifreeze solution if the unit will be subjected to freezing temperatures.
5. Once a month, manually stroke the control valves to prevent seizing.

Restart

After extended storage, a very complete start up must be performed. Inevitable accumulations of dirt, insect nests, etc. can contribute to problems if not cleaned out thoroughly prior to start up. In addition, thermal cycling will have tended to loosen mechanical and electrical connections. The following start up procedure will help discover these and other issues that may have developed during the storage interval.

Prior to Start Up

1. Set screws on bearings, fan wheels, and sheaves need to be checked for proper torque. Also check bolt torque for any taper lock hubs either on the wheel or sheaves.
2. Check sheaves for corrosion. Significant corrosion can cause belt or sheave failure.
3. Purge old grease from fan bearings while rotating the shaft to distribute the new grease evenly and prevent bearing seal failure.
4. Correctly align and tension belts. See “Drive Sheave Alignment” on page 38 and “Drive Belt Adjustment” on page 39.

Unit Physical Data

Table 4: SWP 023 Through SWP 130

Data	SWP model size																
	023	028	033	039	040	044	050	056	062	065	073	080	088	099	105	120	130
Compressor																	
Quantity	2			3		3, 4		4			6				8		
Size	See unit data plate																
Evaporator coil																	
Face area (ft^2)	25.2[1]				29.8[1]		45.2[1]		52.5[1]		60.9[1]				71.3[1]		
Rows	5										6						
Waterside economizer coil																	
Face area (ft^2)	25.2[1]				29.8[1]		45.2[1]		52.5[1]		60.9[1]				71.3[1]		
Rows	4																
Electric heat																	
Nom. Output (kW)	34					34, 68											
Evaporator fan (SAF)																	
Quantity	1																
Size[2]	24.5			27.0		36.5				44.0							

Note:
1. Maximum size coil to fit in unit. Smaller size coils can be used for these units.
2. Maximum fan diameter. Units may have previous smaller size.

Table 5: Single Compressor Circuit Charge, R-410A

Compressor (HP)	Refrigerant charge per circuit (R-410A)[1]	Oil charge per circuit (oz)
6	30 lbs	60
8	30 lbs	85
9	30 lbs	110
10	35 lbs	110
13	35 lbs	110
15	35 lbs	110

Note:
Actual refrigerant charge is calculated for each unit and is listed on the unit data plate. When possible, always use the unit data plate for refrigerant charge quantity.

Field Wiring

General

Wiring must comply with all applicable codes and ordinances. Daikin Applied's product warranty does not cover equipment failures caused or contributed to by wiring not in accordance with specifications. A tripped manual motor protector (MMP) or open fuse indicates a short, ground or overload. Before replacing a fuse or restarting a compressor or fan motor, locate the trouble and correct. Use copper wire for all power lead terminations. Contact the factory for information concerning aluminum wire power lead terminations.

A single power terminal block is provided as standard, and wiring within the unit is done in accordance with the National Electric Code (NEC). Each branch circuit within the control panel is individually protected by fuse or MMP. A single field-supplied disconnect is required or a unit-mounted, non-fused disconnect can be ordered with the unit.

A knockout is located on the right or left front unit upright for locating unit power entry. 24 V field connections are suitable for Class II wiring.

Unit Disconnect

Disconnecting means are addressed by Article 440 of the NEC, which requires "disconnecting means capable of disconnecting air conditioning and refrigerant equipment including motor-compressors, and controllers, from the circuit feeder." Select and locate the disconnect switch within the NEC guidelines. Location requirements per NEC are that the disconnect is located in a readily accessible position within sight (50 feet) of the unit. A factory-mounted, non-fused disconnect is available.

Return Air and Outside Air Sensors

All units are provided with a return air sensor. It is connected to the patch panel and is coiled and placed in the control box of the unit for shipment. Field-installation is required to put it in the return air stream for proper unit operation. The return air sensor is connected to the unit's patch panel at location PL1 (see IM 919).

The outside air sensor is optional and can be ordered with the unit. The outside air sensor is field wired to terminal strip TB2. It is connected at terminals 122, 123, and 123G.

The mixed air temperature sensor is already installed at the air inlet.

Mount the sensors in areas that are exposed to representative temperature conditions. Mount them at a position that has good air mixing and does not have stratification. Sensors can be mounted in the ductwork using a grommet (see Figure 12).

Figure 12: Return/Outside Air Sensor Mounting

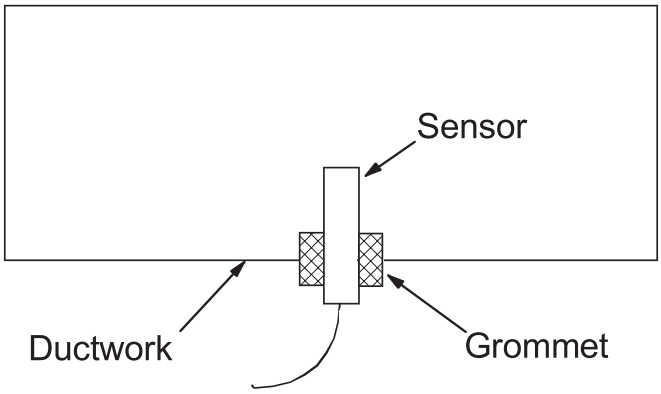


Table 6: Compressor Motors

Compressor (hp)	Refrigerant	208V/60Hz/3Ø		230V/60Hz/3Ø		460V/60Hz/3Ø		575V/60Hz/3Ø		415V/50Hz/3Ø	
		RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA
6	R-410A	21.0	182	19.0	164	8.4	75	6.8	54	7.9	75
7	R-410A	20.2	182	19.6	164	11.6	100	9.8	78	—	—
8	R-410A	23.2	216	22.5	195	11.3	95	9.0	80	—	—
9	R-410A	26.9	249	25.0	225	12.6	114	9.6	80	—	—
10	R-410A	30.3	264	28.2	239	14.2	125	10.6	80	13.6	145
11	R-410A	35.4	271	32.0	245	15.5	125	12.6	100	—	—
13	R-410A	40.8	332	38.5	300	18.3	150	17.4	109	17.2	139
15	R-410A	49.8	376	48.4	340	18.5	173	20.2	132	21.9	196

Table 7: SAF Motor Nameplate Amperage

Horsepower	Type	208/60/3	230/60/3	400/50/3[1]	460/60/3	575/60/3
		FLA	FLA	FLA	FLA	FLA
3	Premium efficiency	9.3	8.2	4.1	4.1	3.1
5	Premium efficiency	15.7	13.6	6.8	6.8	5.2
7.5	Premium efficiency	22.3	20.0	10.0	10.0	7.4
10	Premium efficiency	29.0	25.8	12.9	12.9	10.3
15	Premium efficiency	43.4	37.8	18.9	18.9	14.1
20	Premium efficiency	57.0	49.0	24.5	24.5	18.9
25	Premium efficiency	70.0	61.0	30.5	30.5	24.2
30	Premium efficiency	83.3	72.4	36.2	36.2	29.8
40	Premium efficiency	110.0	96.0	48.0	48.0	38.0
50	Premium efficiency	137.0	120.0	60.0	60.0	47.5
60	Premium efficiency	160.0	140.0	70.0	70.0	56.0

Note:
1. 460/60/3 motors are used. Derate nameplate horsepower to 0.83 to obtain actual horsepower.

Supply Power Wiring

1. Units require three-phase power supply.
2. Allowable voltage tolerances:
   a. **60 Hertz**
      Nameplate 208 V: Min. 187 V, Max. 229 V
      Nameplate 230 V: Min. 207 V, Max. 253 V
      Nameplate 460 V: Min. 414 V, Max. 506 V
      Nameplate 575 V: Min. 518 V, Max. 632 V
   b. **50 Hertz**
      Nameplate 400 V: Min. 342 V, Max. 418 V
3. Power lead wire sizing:
   a. For units with cooling capability (all concurrent loads) with or without hot water heating and circuits with motor loads only: MCA = 1.25 (largest motor RLA or FLA) + other loads
4. Size wires in accordance with Table 310-16 or Table 310-19 of the National Electrical Code.
5. Size wires for a maximum of 3% voltage drop.

Lug Size

Table 8: Lug sizes for single disconnect

Disconnect size	Lug size
100	#12-3/0
150	#12-3/0
250	#8-350 MCM
400	(2) #8-600 MCM
600	(2) #8-600 MCM

Table 9: Lug sizes for power block

Power block size	Lug size
310	#6-350 MCM
420	#2-600 MCM
570	(2) #4-300 MCM

Note:
Use copper wire only. 760 (2) #6-500 MCM

Control Center

All electrical controls are enclosed in a central control center located at the side of the unit. The control center is divided into two separate compartments, one for high voltage and one for low voltage. The lower compartment houses the high voltage components and can be accessed through the “Electrical Access” panels indicated on the dimensional drawing. High voltage components include:

- Fan motor contactor, M30/M30I/M30B/M10
- Fan motor protector, MMP9, MMP10, MMP30
- Fan motor circuit breaker, CB10
- Compressor contactors, M1–M8
- Compressor motor protector, MMP1–MMP8
- Transformer, T1, T2, T3
- Disconnect switch, DS1–DS2
- Power block, PB1–PB2

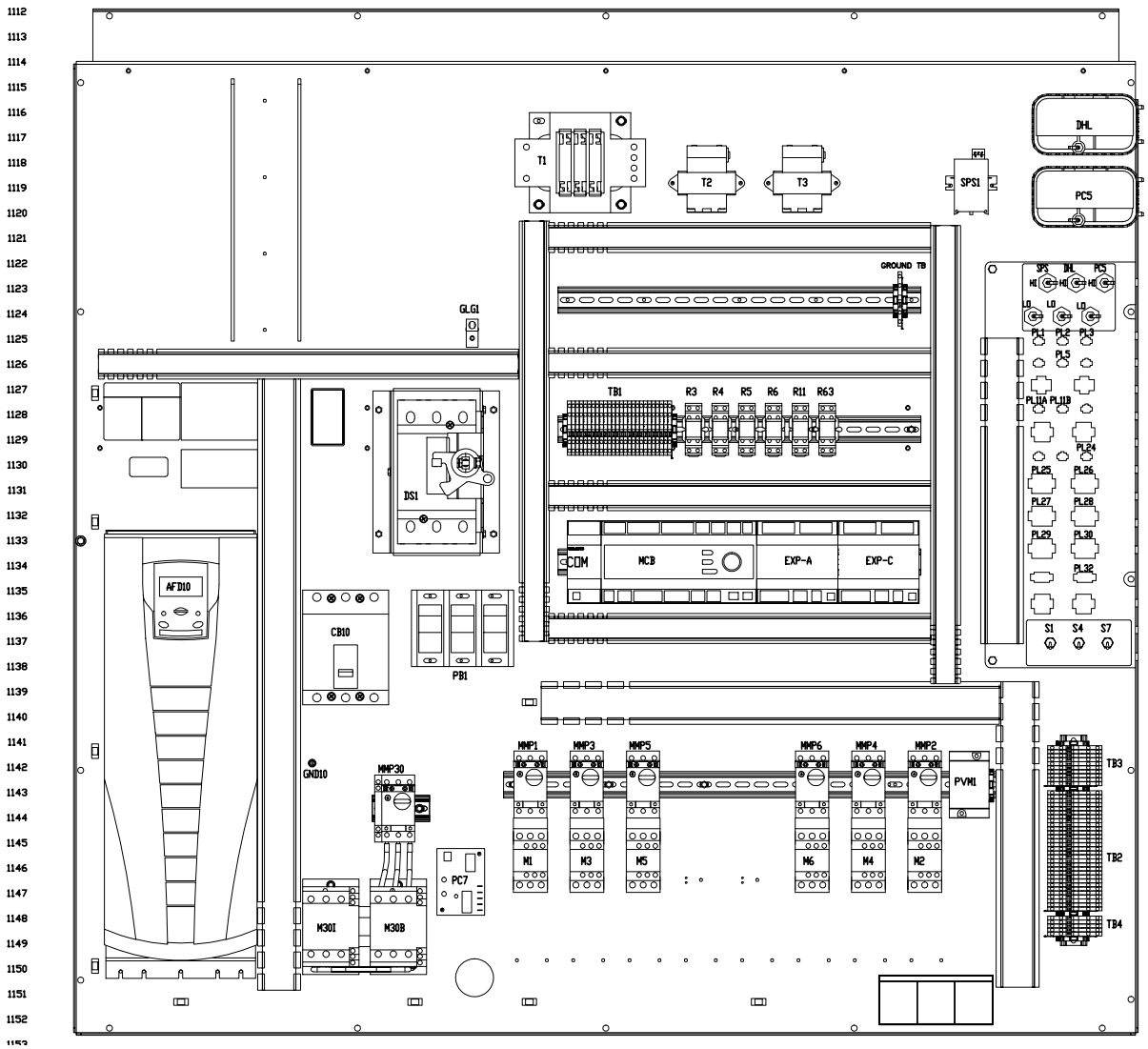
If the optional disconnect switch is provided, the switch handle is visible and accessible without removing any safety or access panels.

Low voltage components are located in the upper right compartment and include:

- MicroTech III main control board, MCB
- I/O Expansion Module A, B, and C optional
- Duct static pressure sensor, SPS1
- Optional 2nd duct static pressure sensor, SPS2
- Optional BACnet®/IP communication module
- Optional BACnet MS/TP communication module
- Optional LONWORKS® communication module

NOTE: IM 919 has additional layouts of the control center.

Figure 13: Typical 460 Volt, 6-Compressor Control Center Layout, High and Low Voltage Compartments (ETL Only)



Control Panel Components

Manual Motor Protector (MMP)

The manual motor protector (MMP) provides coordinated branch circuit, short circuit protection, a disconnecting means, a motor controller, and coordinated motor overload protection.

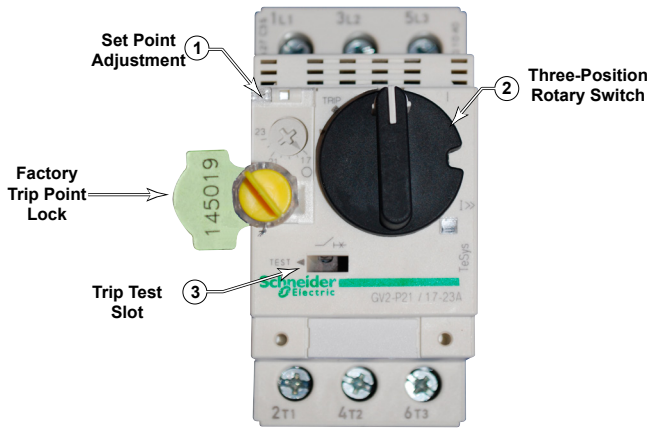
The MMP trip points are factory set and locked, see Figure 14. Do not change unless the motor ampacity changes or the MMP is replaced with a new device with incorrect set point adjustment. Any other non-authorized trip point or set point adjustment voids all or portions of the unit's warranty. Setpoint values are published on the schematic, near the MMP for each MMP. The MMP should be set to the value published on the schematic and locked by the factory.

To reset a tripped MMP, clear the trip by rotating the knob counterclockwise to the OFF position; then rotate the knob clockwise to the ON position. See "2" in Figure 14.

⚠ 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.

Figure 14: Manual Motor Protector



Circuit Breaker

Circuit breakers are installed upstream of all VFDs to provide short circuit protection (Figure 15).

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

Other MMP features:

- Three-position rotary operator: OFF-TRIP-ON. See "2" in Figure 15.
- Lockout—tagoutable rotary operator: turn the rotary operator to OFF, slide out the extension arm, and insert a lockout pin.
- Ambient compensated –20°F to +60°F
- Single-phase sensitivity: if one phase exceeds set point, all three phases open.
- Trip test: insert a 9/64" screw driver in the slot to simulate a trip. See "3" in Figure 15.

Figure 15: Circuit Breaker

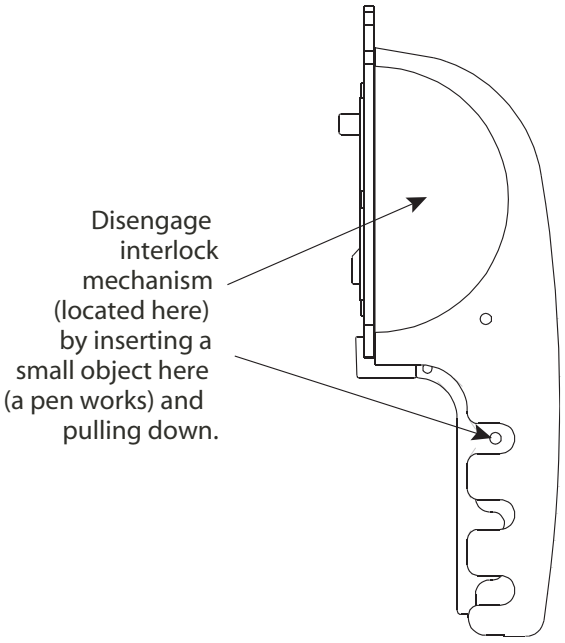
Disconnect

The optional disconnect is a molded case switch with many of the same features of the circuit breaker. The disconnect comes standard with a through-the-door handle and mechanism (Figure 16) to disconnect power to the unit prior to opening the door. The handle can be padlocked in the OFF position while performing maintenance to 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.

Figure 16: Through-the-Door Handle Disconnect



⚠ WARNING

Disengaging interlock exposes high voltage that can cause severe personal injury or death. Do not touch exposed components. Wear dry clothes and stand on a dry,nonconducting surface. Do not wear jewelry. Work with another trained, experienced technician nearby.

Terminals

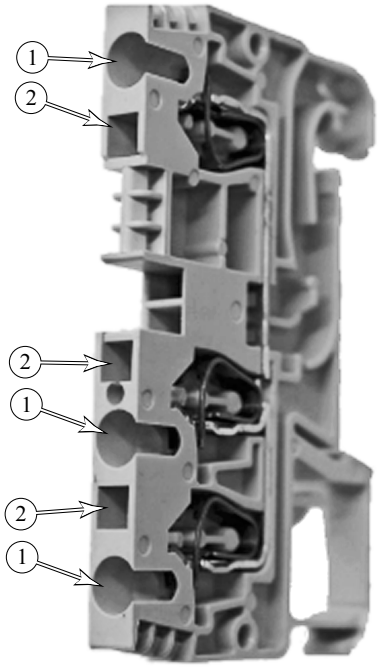
All field wiring terminals are spring clamp type, which offer several advantages over traditional screw-type terminals:

- Spring connections do not require torquing
- Spring connections resist failure due to vibration
- Easily identifiable terminal markers
- Combination spring release and square test ports

To insert a wire to the terminal connector:

1. Insert a small flat-blade screwdriver into the square hole (“1” in Figure 17) to open the spring clamp (“2” in Figure 17) adjacent to the desired wire location .
2. Strip approximately 1/2" of insulation from the wire.
3. Insert the stripped wire into the wire terminal (“1” in Figure 17).
4. Remove the screwdriver to close the spring clamp.

Figure 17: Terminal Connectors



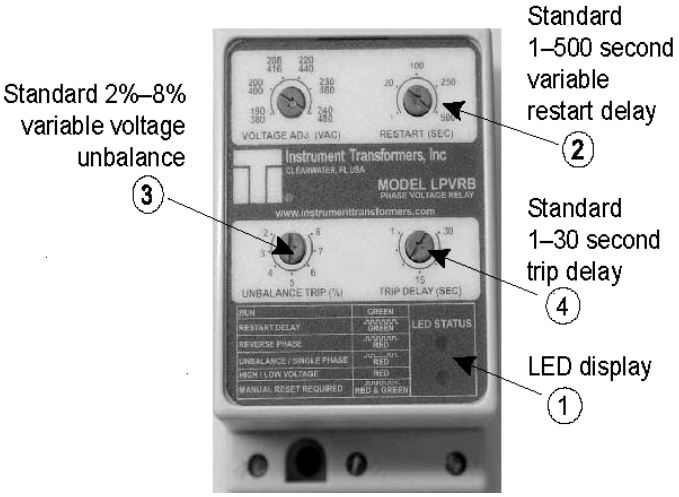
Phase Voltage Monitor (PVM)

The phase voltage monitor is designed to help protect three-phase loads from damaging power conditions. A microprocessor-based voltage and phase-sensing circuit constantly monitor the three-phase voltages to detect harmful power line conditions. When a harmful condition is detected, its output relay is deactivated after a specified amount of time (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.

Other features:

- LED display to indicate status (see “1” in Figure 18)
- Loss of phase
- High or low voltage
- Voltage imbalance
- Phase reversal
- Rapid cycling
- Standard 1 to 500 second variable restart delay (see “2” in Figure 18)
- Standard 2% to 8% variable voltage imbalance (see “3” in Figure 18)
- Standard 1 to 30 second trip delay (see “4” in Figure 18)

Figure 18: Phase Voltage Monitor



High Pressure Switches

(ETL Marked Units Only)

The high pressure switch (HP1-HP8) is a single pole pressure activated device that opens on a pressure rise. When the switch opens, it de-energizes the compressor circuit, shutting down the compressor. The MicroTech III controller displays an alarm condition. Once the cause of the fault is identified and corrected, manually reset the unit through the MicroTech III keypad/display interface. The control is attached to a Shrader fitting and is located at the compressor. To check the control, shut off water flow to the condensers and observe the cutout point on a high pressure gauge. The high pressure control should open at 500 psig and close at 380 psig. After testing the high pressure control, check the pressure relief device for leaks.

Low Pressure Switches

The low pressure switch (LP1-LP8) is a single pole, pressure activated device that closes on a pressure rise. It senses evaporator pressure and is factory set to close at 120 psig and open at 70 psig. Compressor operation is not allowed until the switch closes. The low pressure switch is an automatic reset control. If the condition occurs on any one compressor three times in a 24-hour period, the alarm has to be reset manually through the MicroTech III keypad/display interface to restart the compressor. The low pressure switch is attached to a Shrader® fitting and is located at the compressor.

Compressor Motor Protector

All compressors are thermally protected. The solid state protection device (MP1-MP8) is located in the compressor junction box. Whenever the protection system opens, the compressor shuts down for 30 minutes, and the MicroTech III controller displays an alarm indication.

The solid state protection device is used on the following:

- Independent circuits—13, 15 hp

The in-line protection control automatically resets when the alarm condition is removed and the time delay is satisfied.

The in-line protection device is used on the following:

- Independent circuits—6, 8, 10 hp

If the condition occurs on any one compressor three times in a 24-hour period, the alarm has to be manually reset through the MicroTech III keypad/display interface to restart the compressor.

Clogged Filter Switch

A clogged filter switch (PC5) is provided to indicate when the unit filters are to be changed. The switch is factory set to close at 1.0 inches of H_2O. The switch has a field-adjustable set point range of 0.05 to 5.0 inches of H_2O. Turn the adjustment screw clockwise to decrease differential pressure setting. Turn the adjustment screw counterclockwise to increase differential pressure setting. When the filter pressure differential exceeds the switch setpoint, MicroTech III controller displays a clogged filter indication. The unit is allowed to continue operation. PC5 is located in the main control panel.

Phase Fail/Under Voltage Protection

The phase voltage monitor (page 19) protects against high voltage, phase imbalance, and phase loss (single phasing) when any one of three line voltages drops to 74% or less of setting. This device also protects against phase reversal when improper phase sequence is applied to equipment and protects against low voltage (brownout) when all three line voltages drop to 90% or less of setting. An indicator run light is ON when all phase voltages are within specified limits. The phase voltage monitor is located on the load side of the power block with a set of contacts wired to the 115-volt control circuit to shut down the unit whenever phase voltages are outside the specified limits.

Duct High Limit

A duct high limit (DHL) pressure control is provided as standard with all units with variable air volume control. The duct high limit is intended to protect the ductwork, etc. from over pressurization caused by tripped fire dampers or a control failure. When the duct pressure exceeds the setting of the control, the unit de-energizes via the MicroTech III controller, which displays an alarm condition. After the reason for trip is identified and corrected, reset the control via the MicroTech III keypad/display interface.

The duct high limit control is factory installed, including sensing tubing, and preset for a 3.0" inches of H2O trip point. The control can be readjusted in the field to match the specific ductwork of a project. The switch has a field-adjustable set point range of 0.05 to 5.0 inches of H_2O. Turn the adjustment screw clockwise to decrease differential pressure setting. Turn the adjustment screw counterclockwise to increase differential pressure setting. The DHL is located in the main control panel.

Table 10: Electrical Legend

ID	Description	Standard location
ACT3	Actuator motor, economizer	Coil section
ACT4	Actuator motor, water regulating/bypass valve	Coil section
CB10	Circuit breaker, supply fan, electric heat, compressors 1-8	Main control box
DAT	Discharge air temperature sensor	Discharge section
DHL	Duct hi-limit	Main control box
DS1	Disconnect, total unit or electric heat/compressor	Main control box
DS2	Disconnect, SAF/controls	Main control box
EXP A, B, C	MTIII expansion modules	Main control box
EWT	Entering water temp. sensor	Coil section
F1A, B	Fuse, control circuit transformer (T1), primary	Main control box
F1C	Fuse, control circuit transformer (T1), secondary	Main control box
FB31-34	Fuseblock, electric heat	Main control box
FS1, FS2	Freezestat control	Coil section, heat/cool
FE	Functional earth ground	Main control box
GRD/PE	Ground	Main control box
HL31-34	Hi-limits, ctl. elect. heaters	Coil section
HP1-8	Hi-pressure controls, refrig.	On compressors
HTR1-8	Crankcase heaters	On compressors
HUM1	Humidistat sensor	Field installed
LP1–8	Low-pressure controls, refrigeration	On compressors
LR10	Line reactor, supply fan	Main control box
M1–8	Contactor, compressors 1-8	Main control box
M10	Contactor, supply fan	Main control box
M20	Contactor, supply fan, dual contactor start	Main control box
M21-28	Contactor, compressor, dual contactor start	Main control box
M30B (bypass)	Contactor, reversing bypass SA fan	Main control box
M30I (inverter)	Contactor, reversing inverter SA fan	Main control box
M31-34	Contactor, electric heat	Main control box
MAT	Mixed air temp. sensor	Filter section
MCB	Microtech III control board	Main control box
MJ	Mechanical jumper	Main control box
MMP1–8	Manual motor protector, compressors 1-8	Main control box
MMP10	Manual motor protector, supply fan	Main control box
MMP20	Motor protector, supply fan, dual contactor start	Main control box
MMP21-28	Motor protector, compressor, dual contactor start	Main control box
MMP30	Manual motor protector, inverter bypass, supply fan	Main control box
MP1–8	Motor protector, compressors 1–8	On compressors
OAE	Outside air enthalpy sensor	Field installed in outside duct
OAT	Outside air temperature sensor	Field installed in outside duct
PB1	Power block, total unit or comp/ electric heat	Main control box
PB2	Power block, SAF/controls	Main control box
PB10	Power block, field installed	VFD Main control box
PC5	Pressure control, clogged filter	Main control box
PC7	Pressure control or inductive relay, proof airflow	Main control box
PVM1, 2	Phase voltage monitor	Main control box
R3–8	Relay, hi-pressure	Main control box
R45	Relay, UV lights	Main control box
RAT	Return air temperature sensor	Field installed in return duct
S1	Controls power	Main control box
S4	Inverter/off/bypass	Main control box
S7	Controls/on/auto	Main control box
S21	Fan interlock door switch	Fan section
S40-45	Switches, door interlock, UV lights	Coil/access section
SD1	Smoke detector, supply	Supply fan section
SHS1	Space humidity sensor	Field installed
SPS1, 2	Static pressure sensors, duct/building	Main control box
SV1, 2	Solenoid valves, liquid	Comp/cond section
SV5, 6	Solenoid valves, HGBP	Coil/access section
T1	Transformer, main control and UV lights (line/115 VAC)	Main control box
T2	Transformer, control input (115/24 VAC)	Main control box
T3	Transformer, control output (115/24 VAC)	Main control box
TB1	Terminal block, internal	Main control box
TB2	Terminal block, field, class 2	Main control box
TB3	Terminal blocks, factory	Main control box
TB4	Terminal block, field, 115 VAC	Main control box
UV	Ultra-violet light(s)	Coil/access section
VFD10	Adjustable freq. drive, supply fan	Main control box
VM1	Valve motor #1, heating	Field provided and installed
VM5	Valve motor #5, cooling	Coil/access section
ZNT1	Zone temp. sensor, setback	Field installed in zone

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

Figure 19: Main Power Schematic, Variable Volume

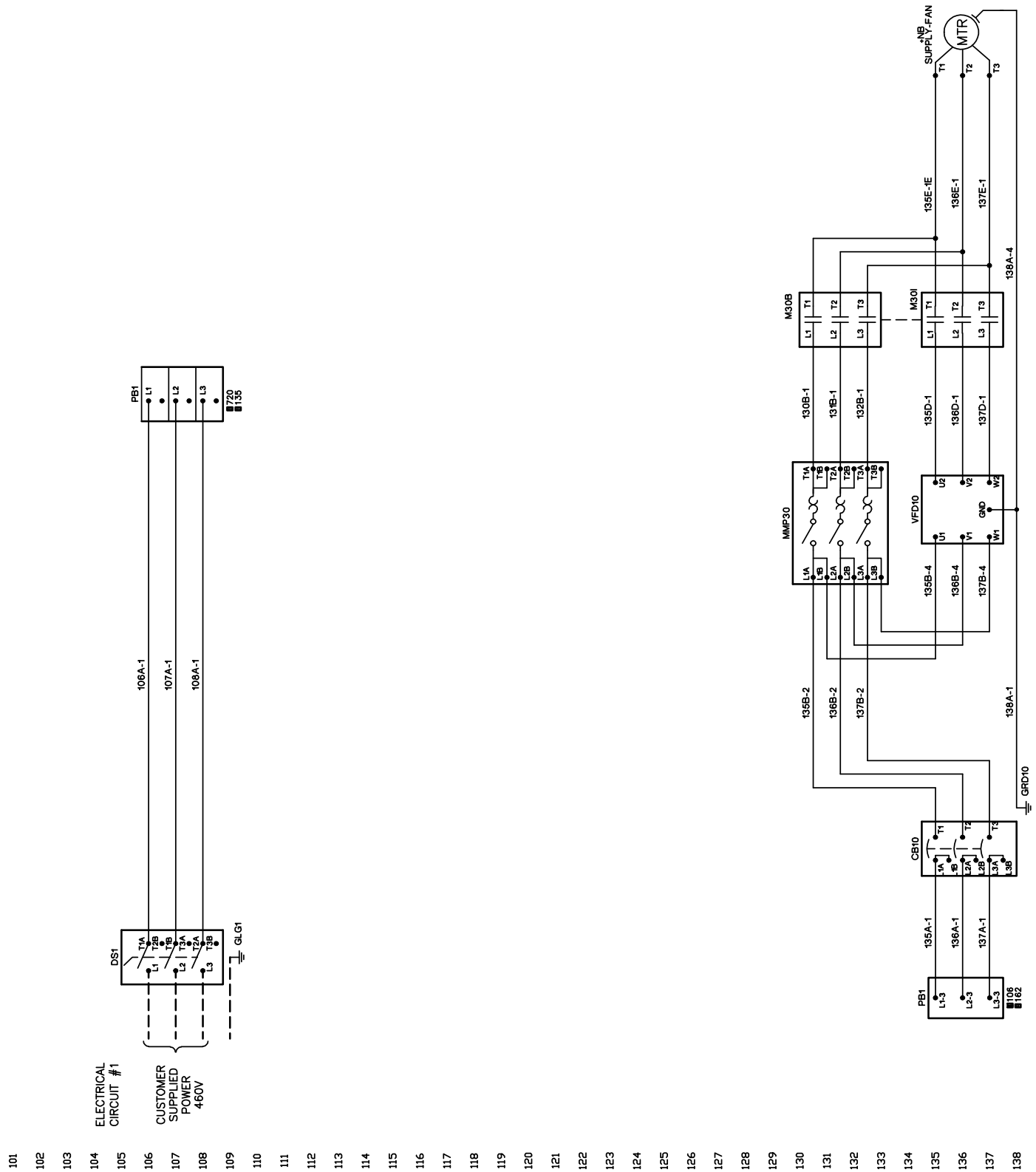


Figure 19 continued: Main Power Schematic, Variable Volume

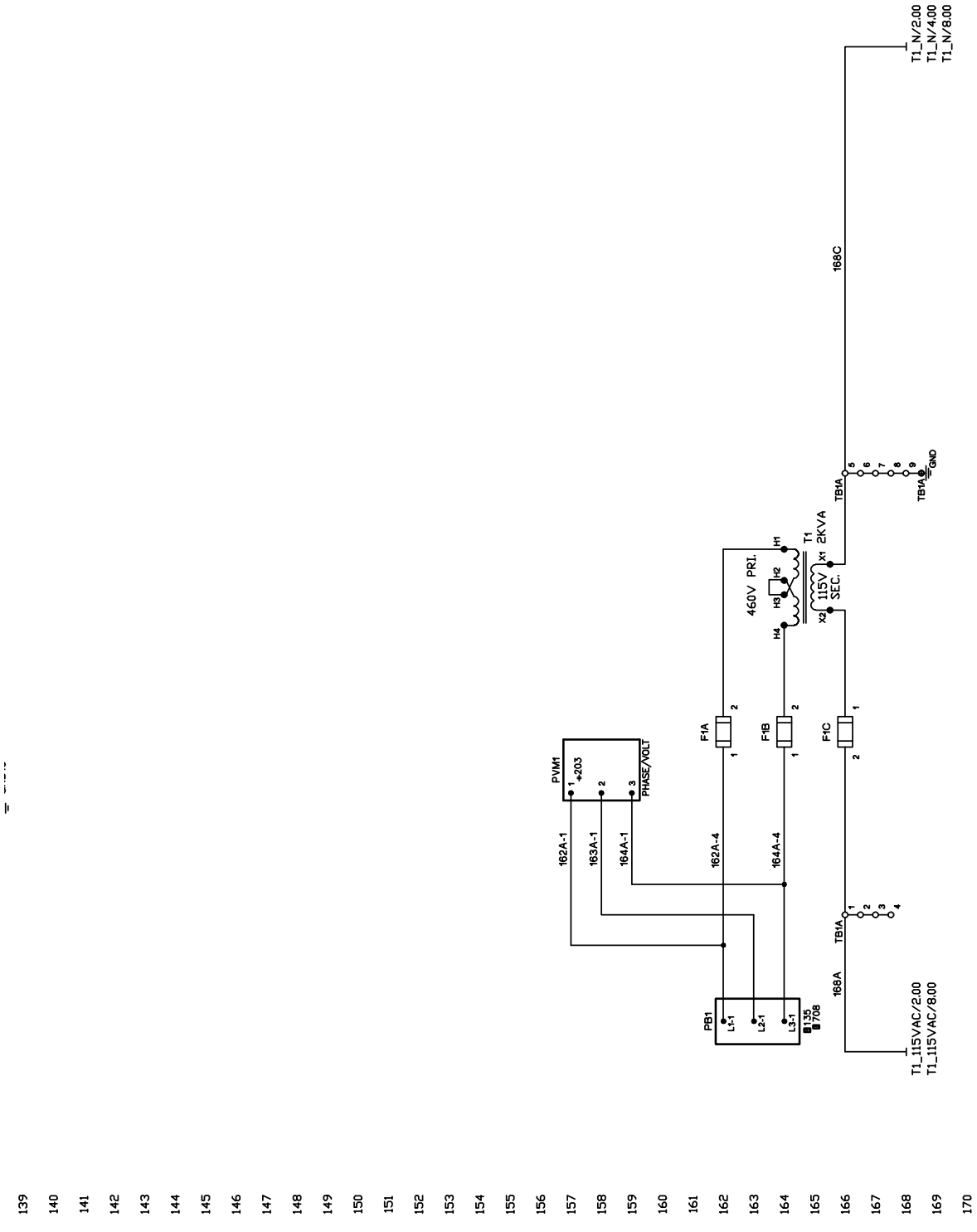


Figure 20: Control Input Schematic, Variable Volume

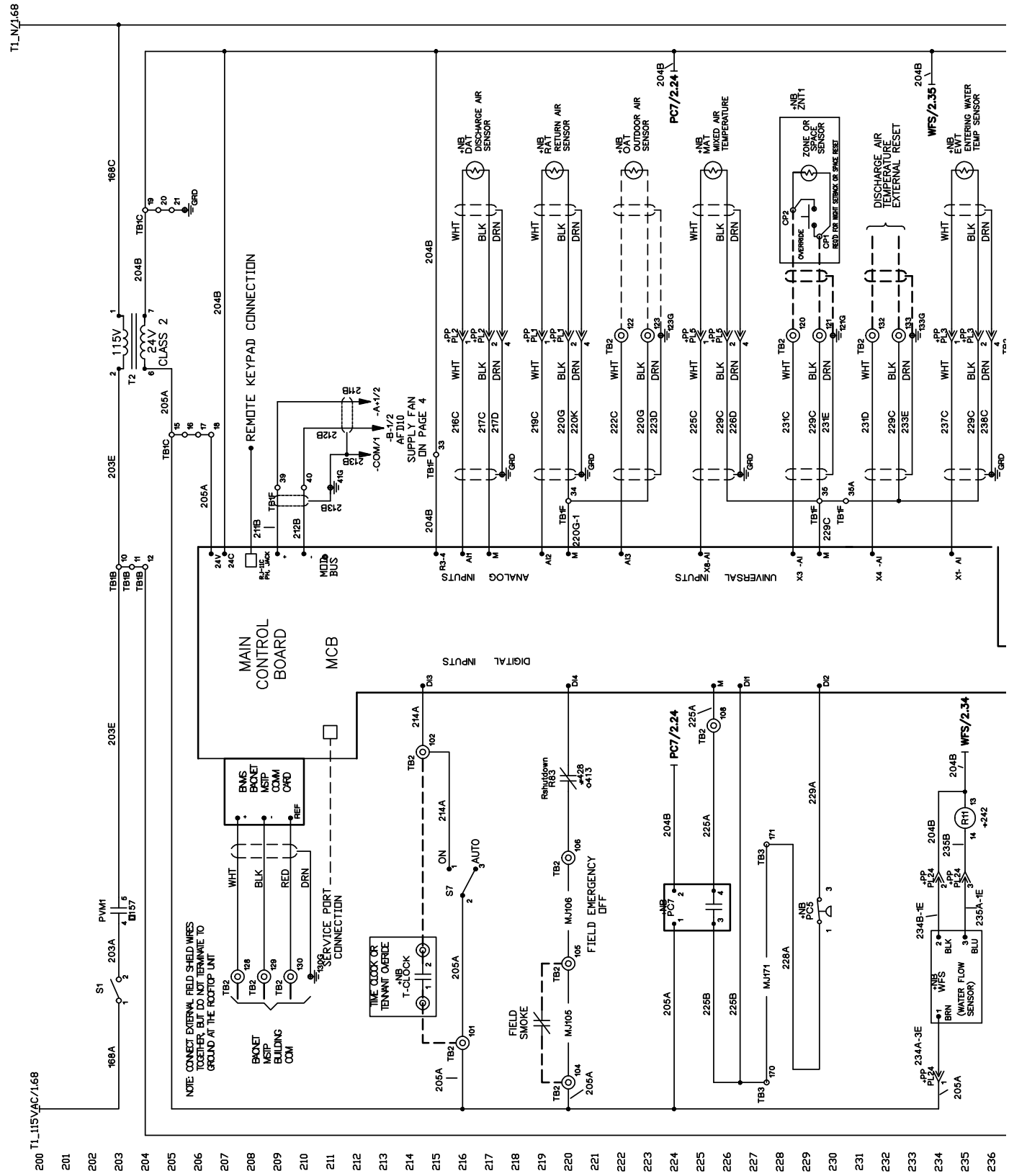


Figure 20 continued: Control Input Schematic, Variable Volume

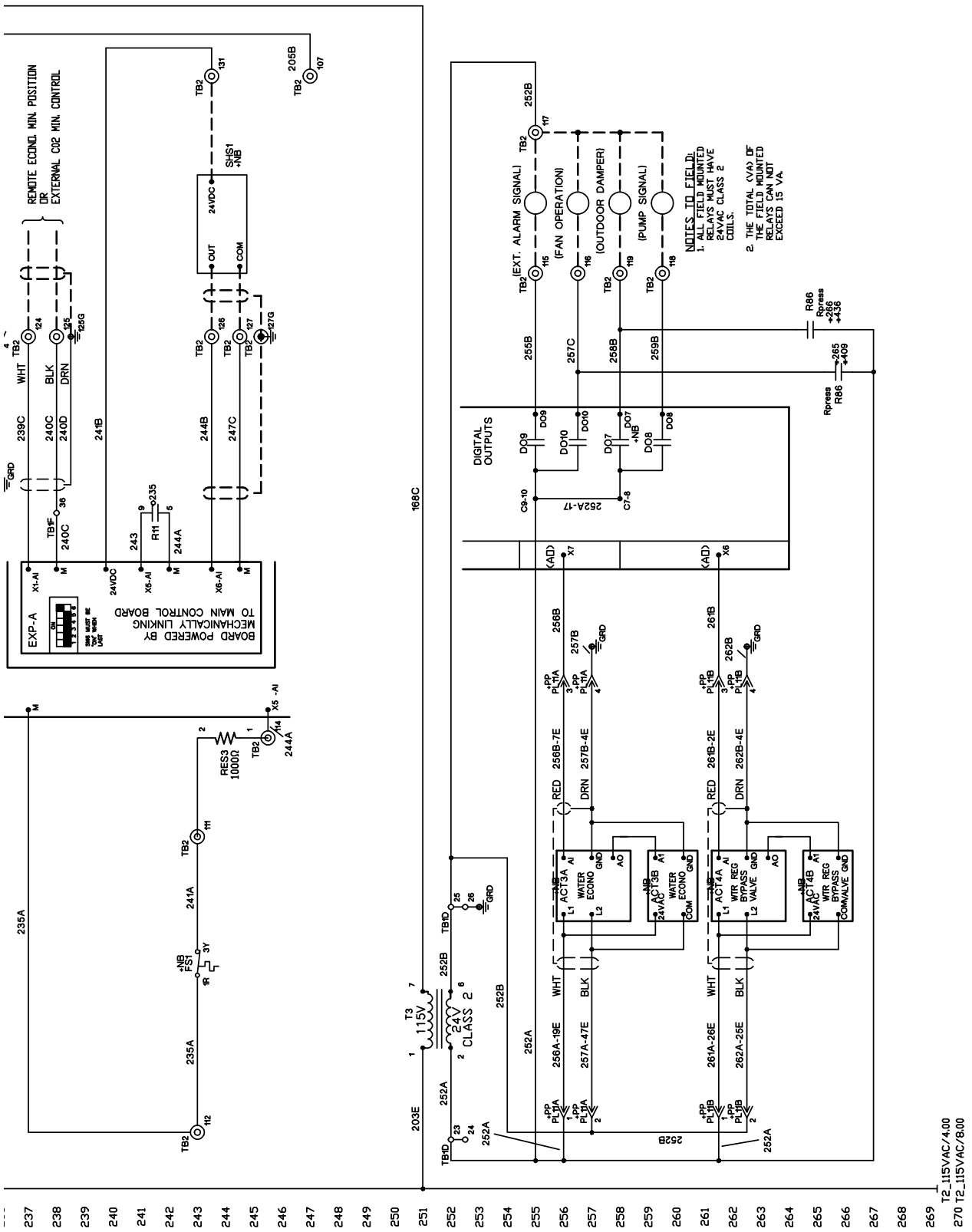


Figure 21: Inverter Output Schematic

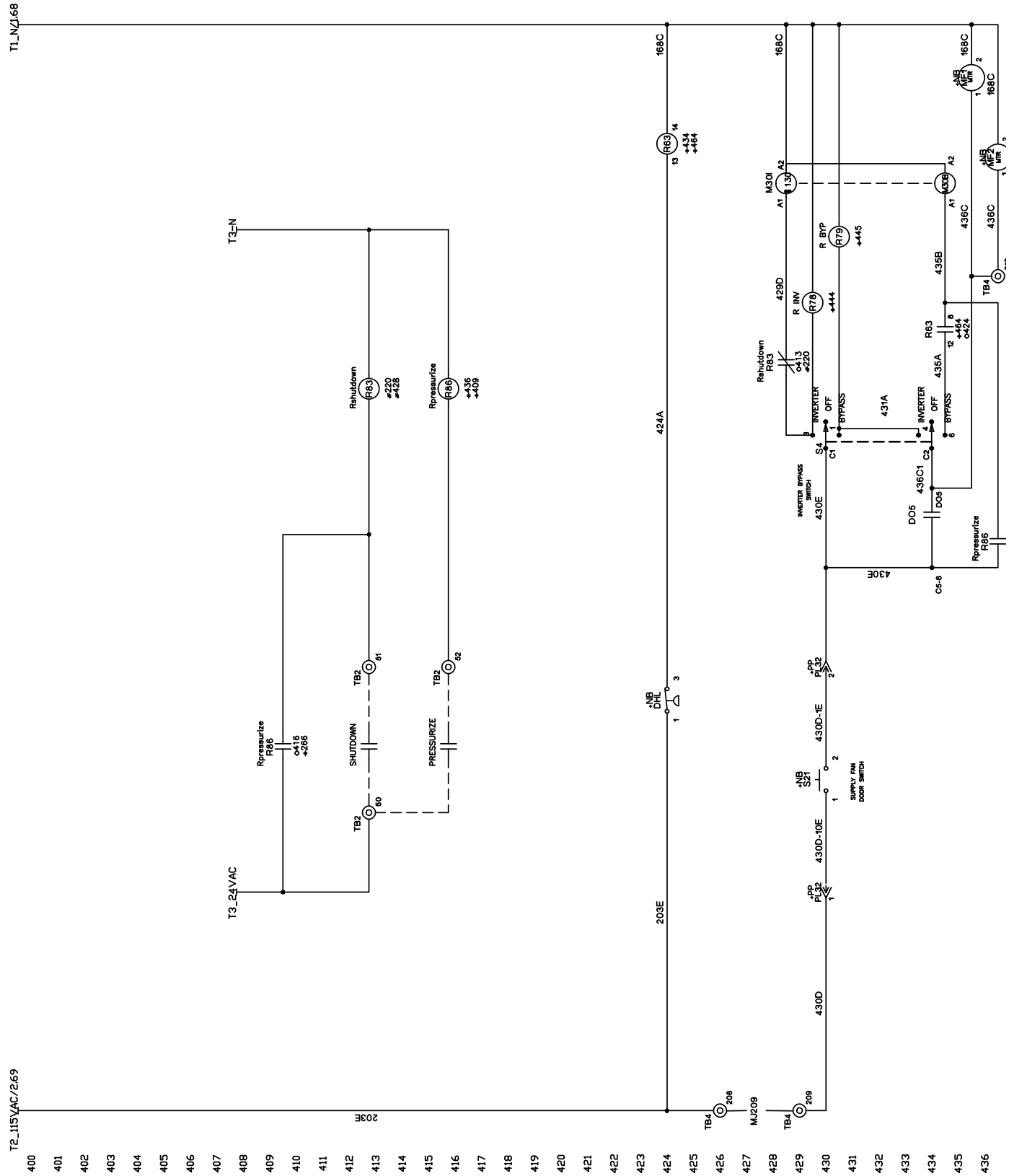


Figure 21 continued: Inverter Output Schematic

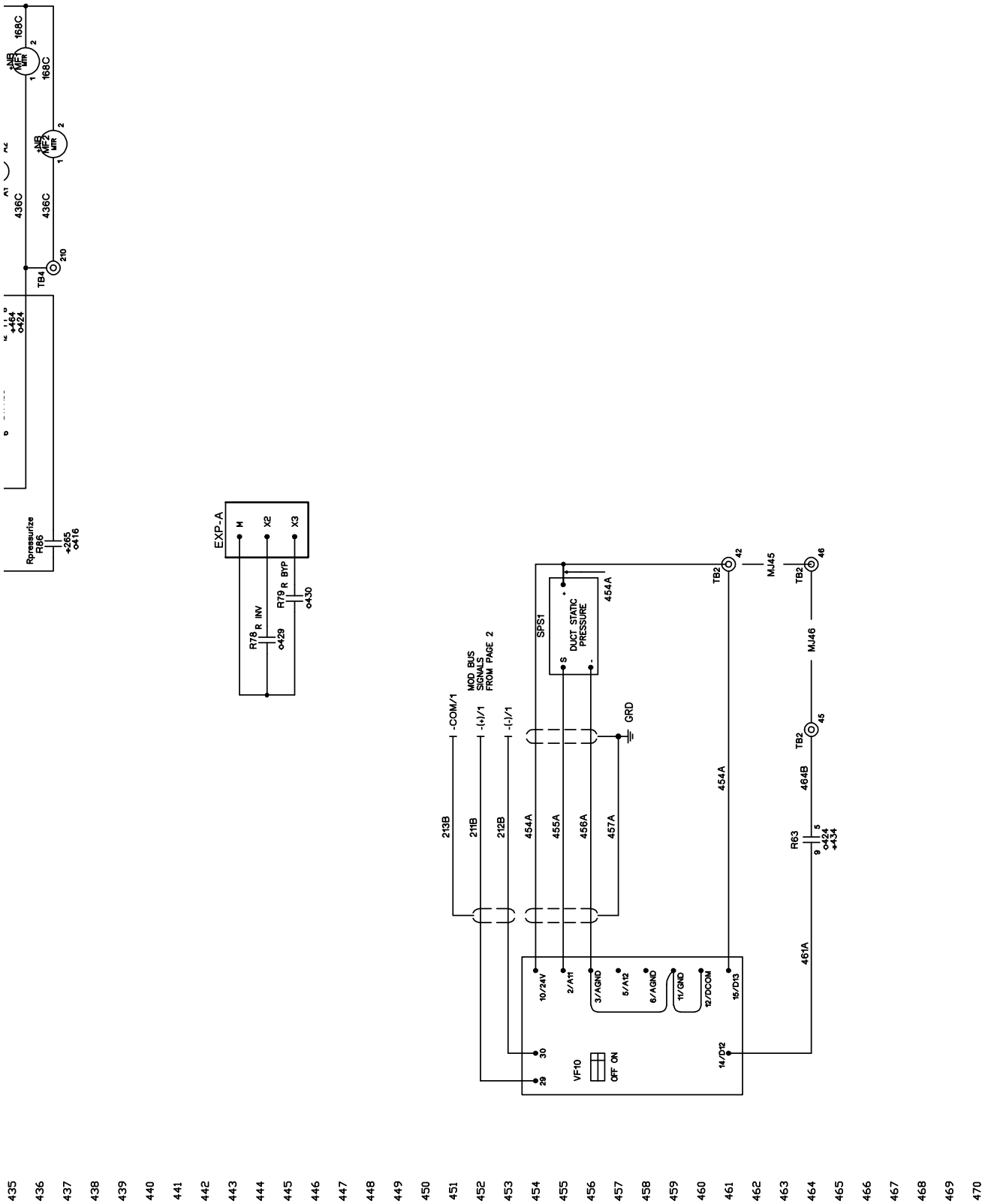


Figure 22: Condenser Output, Independent Refrigeration Circuit

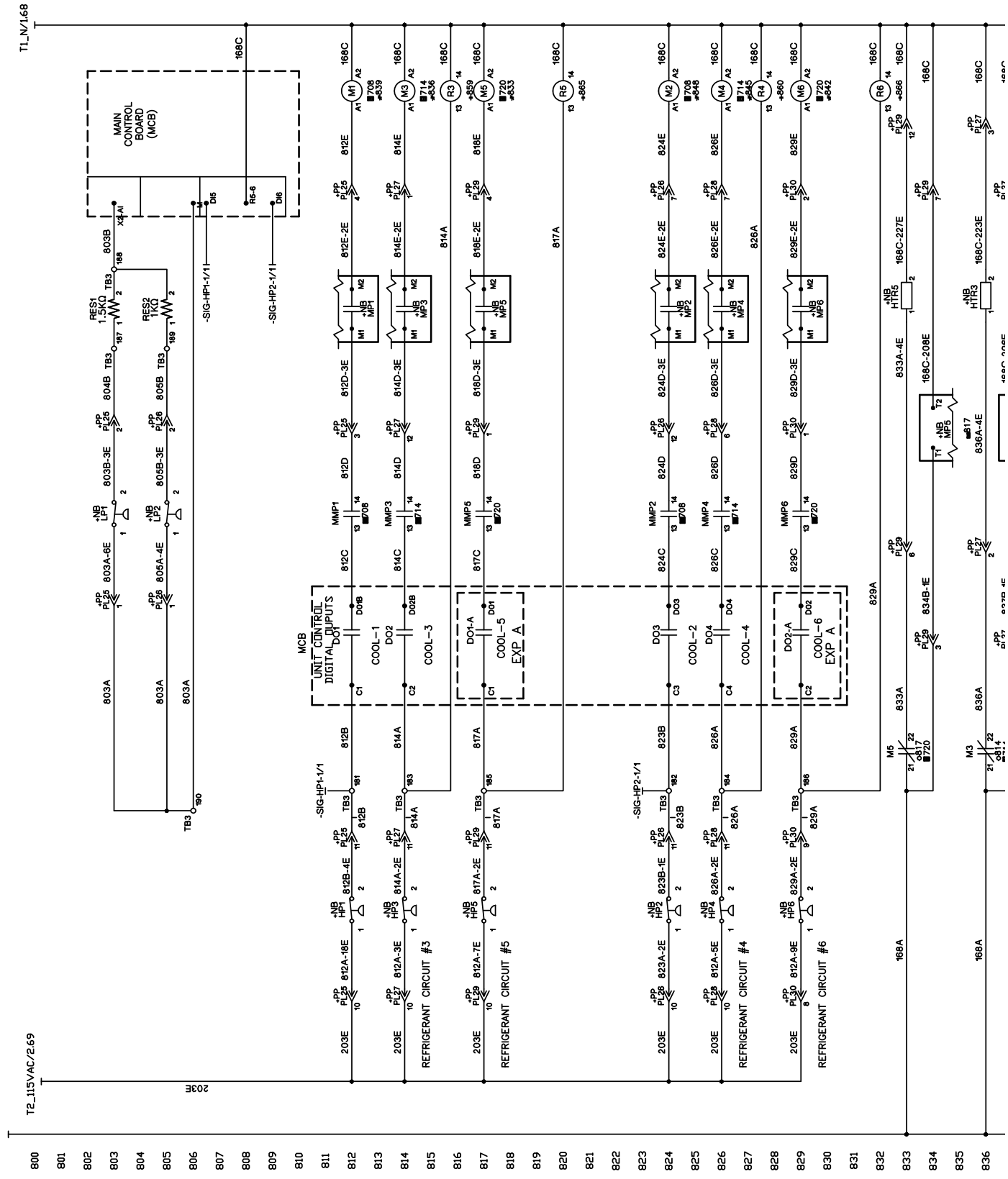


Figure 22 continued: Condenser Output, Independent Refrigeration Circuit

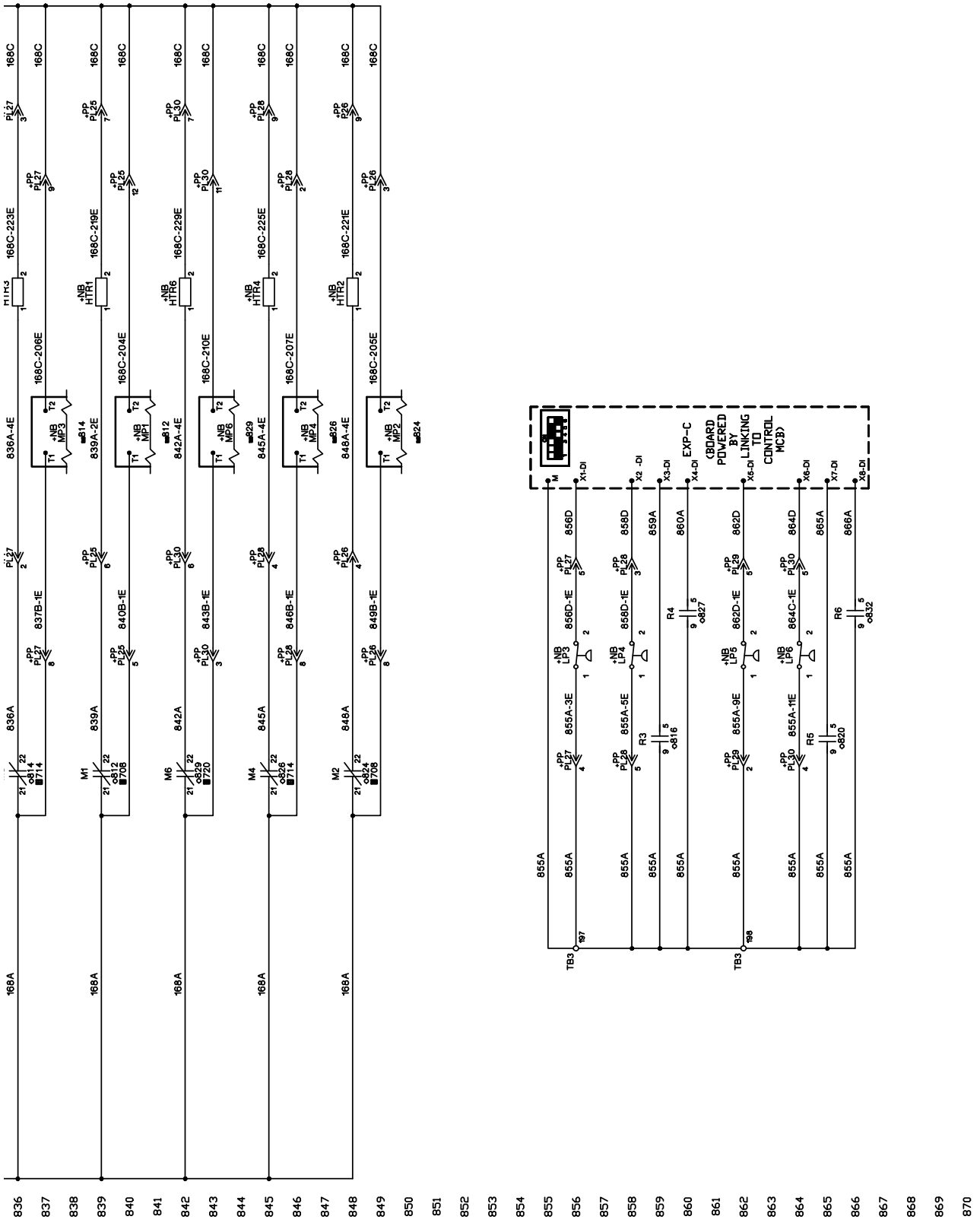


Figure 22 continued: Condenser Output, Independent Refrigeration Circuit (continued)

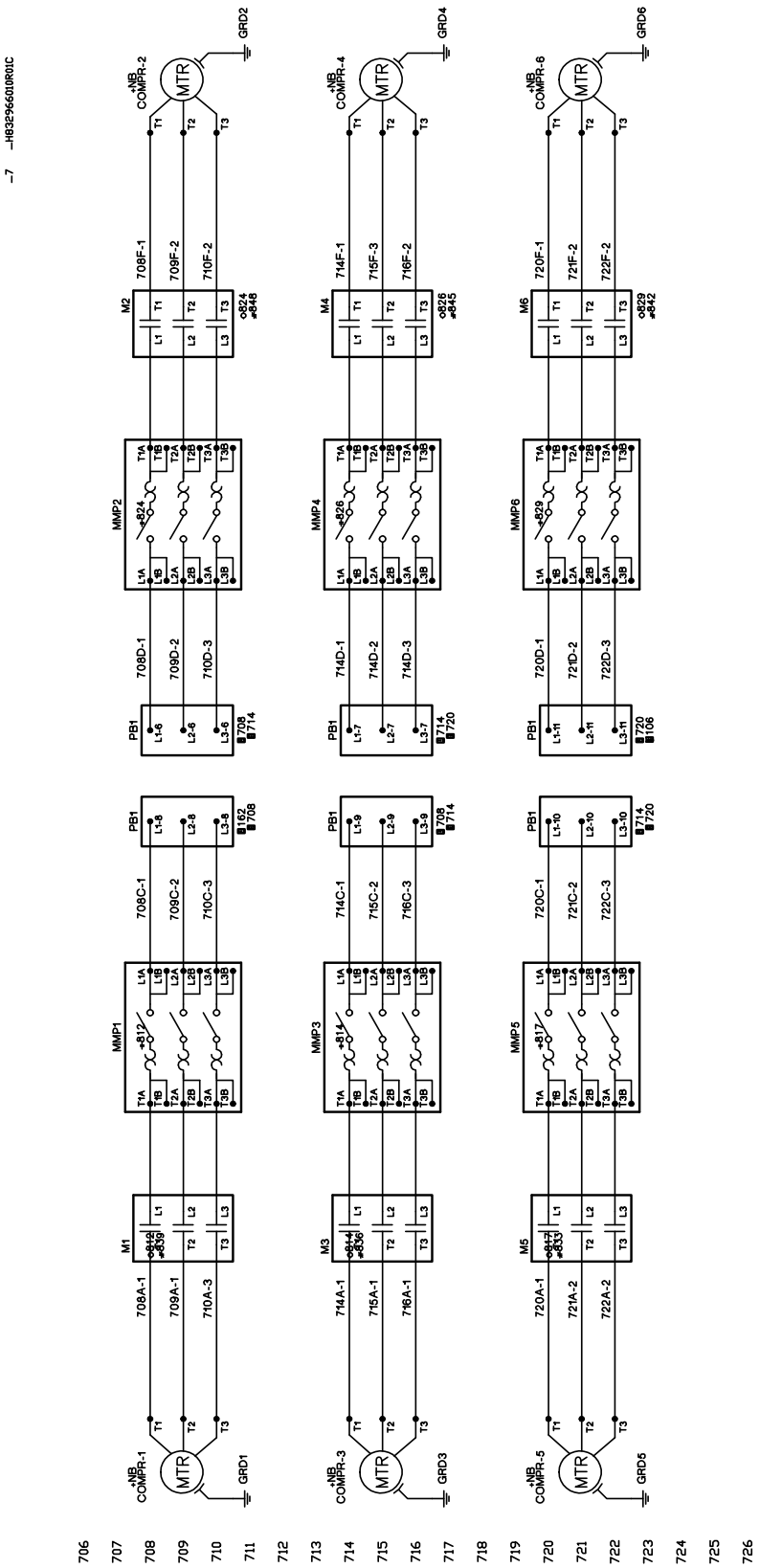
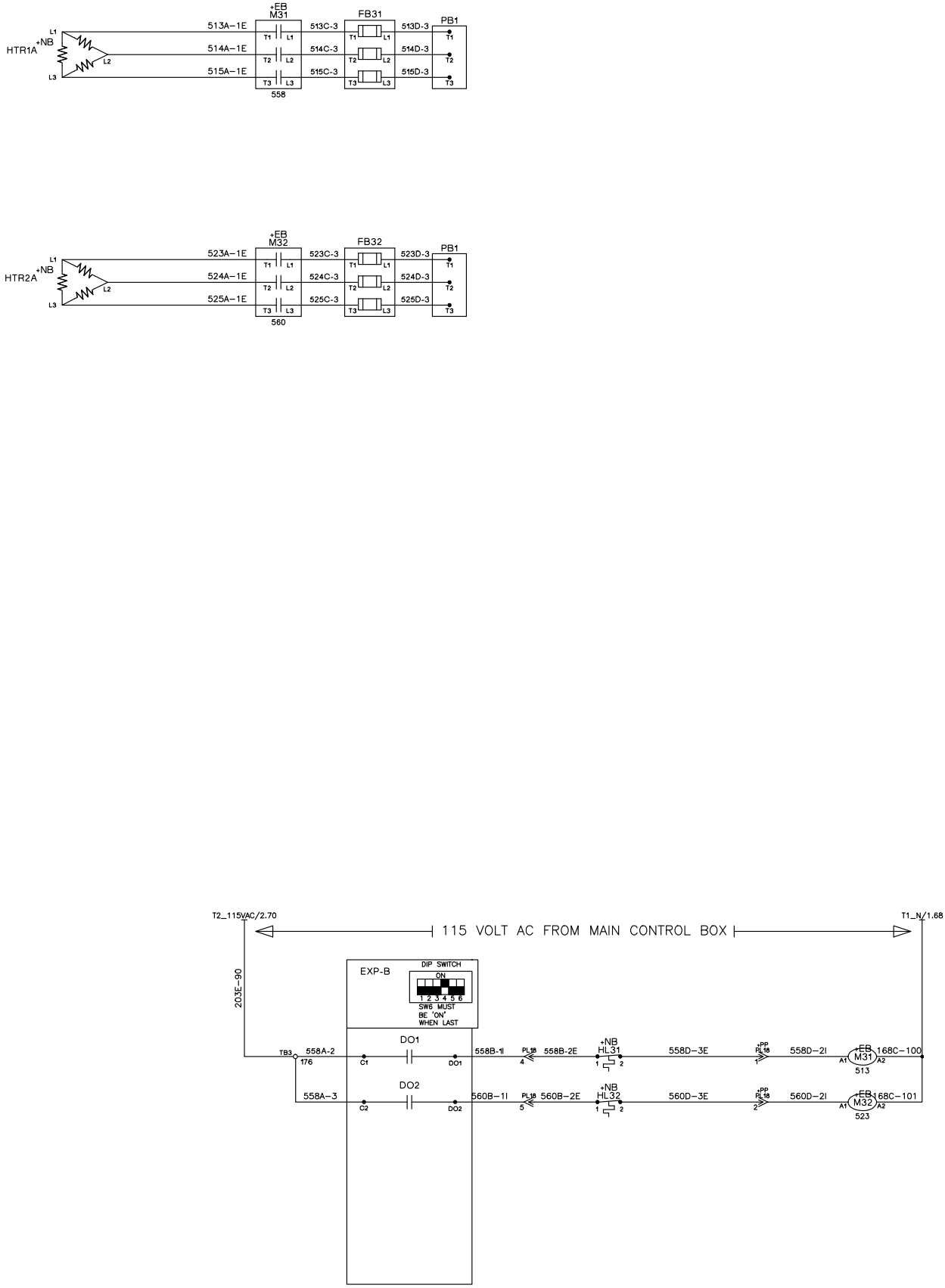


Figure 23: Electric Heat Schematic



Duct Static Pressure Sensor

All units provided with variable air volume control include a factory-mounted static pressure sensor (SPS1). The unit also can have an optional second static pressure sensor, SPS2. The sensor is factory wired and requires field installation of 1/8" I.D. sensor tubing to the selected duct location.

NOTE: Be sure that tubing complies with local code requirements. Flame retardant plastic or metal tubing may be required. Carefully select the ductwork sensing point for the pressure sensor. Improper location of the sensing point results in unsatisfactory operation of the entire variable air volume system.

Adhere to the following guidelines:

1. Position sensors near the end of long duct runs so all terminal box take-offs along the run have adequate static pressure to operate.
2. Position the end of the sensing tube perpendicular to the airflow to sense only static pressure.
3. Locate the sensing tube in a non-turbulent flow area of the duct. Keep several duct widths away from take-off points, bends, or neck downs.

Mounting Instructions

1. Drill a hole in the duct at the remote sensing point and install a rubber grommet (Figure 24).
2. Insert the sensing tube 1/8" into the duct and securely clamp tubing to the duct, being sure not to stress or kink the tubing.

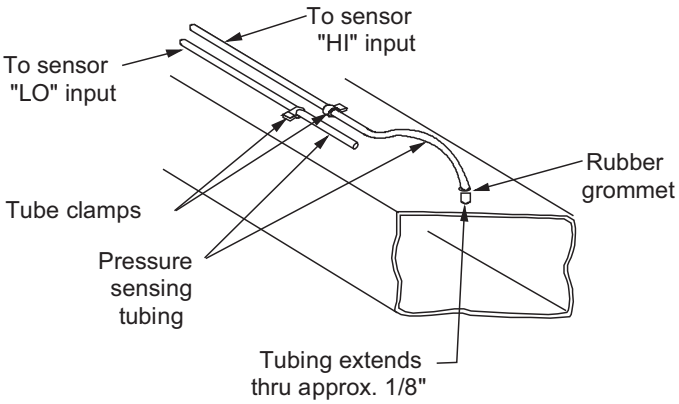
NOTE: The end of the sensing tube must be smooth and cut straight across. An angle cut affects operation.

3. Clamp a second tube to the outside of the duct at the location of the sensing point.
4. Run both tubes along the ductwork and back to the unit.
5. Route the tubing to the pressure sensor (SPS1) by drilling two holes through the unit upright post.
6. Use a grommet at each hole to protect the tubing and seal the cabinet.

NOTE: To avoid confusion between “high” and “low” tubing, use two different tubing colors and record this information along with the sensing point location on the master building blueprints.

7. Connect tubing to the high and low ports at the patch panel in the main control section.

Figure 24: Sensor Mounting



Freezestat

(ETL Marked Units Only)

A non-averaging type freezestat (FS1/FS2) is provided to protect hydronic coils from subfreezing temperatures. If the unit has an economizer coil, the control is mounted on the entering face of the economizer coil. If the unit does not have an economizer coil, the control is mounted on the leaving face of the hot water coil. Upon sensing a temperature above specification, the unit shuts down, opens the hydronic control valves, and sends an alarm indication via the MicroTech III controller. The freezestat has a field-adjustable set point range of 35°F to 45°F. To change the set point, turn the adjustment screw until the pointer lines up with the desired cutout point. The adjustment screw is accessible at the bottom of the control or at the top when the cover is removed.

Condenser Water Flow Switch

The Water Flow sensor (WF1) is available to verify flow to the unit condenser before compressor operation is allowed. The flow sensor is factory installed in the unit on the entering water condenser pipe. If the unit senses a loss of condenser water, cooling is locked out via the MicroTech III controller. When flow is restored, the unit automatically resets. The Water Flow sensor operates on the calorimetric principle using the cooling effect of the flowing condenser water around its stainless steel tip to provide flow detection.

Water Side Economizer

A completely factory-installed, factory-piped, and factory-controlled water side economizer system is available on any constant or variable air volume system. Whenever the entering water temperature is more than 5°F to 7°F below the mixed air temperature to the unit, the control valves modulate to provide cooling directly from the tower water (adjustable at the MicroTech III keypad/display). The economizer system can be used to provide 100% of the cooling demand or supplement mechanical cooling by precooling the return air. The economizer system consists of a water coil and two, two-way, control valves. The unit's MicroTech III controller modulates the control valves to satisfy the cooling demand whenever the entering water is suitable. When the control valves are in the 90% open position, the unit's compressors are allowed to stage on to satisfy the cooling load. When the entering water temperature is no longer suitable, the economizer control valve closes and the unit is on 100% mechanical cooling.

Two valve control arrangements are available from the factory. The first maintains full flow through the unit condensers at all times. This control arrangement is used for systems with constant pumping systems. For installations with a variable pumping system, the control valves are sequenced so flow is removed from the unit whenever cooling is not required.

The economizer system is factory piped and the coil takes advantage of the same drain pan and condensate connection. To vent air from the economizer coil, use the uppermost clean out plug or vent plug on top of the header. The torque requirement for the clean out plugs is 10 inch-lb (1,13 N-M).

Condenser Water Head Pressure Control

An optional condenser head pressure control valve is available on units without water side economizer. This option permits operation with entering water temperatures as low as 40°F. The valve is a two-way regulating valve controlled via MicroTech III to maintain refrigerant head pressure.

Variable Frequency Drive

As an option, a variable frequency drive (VFD) is available for airflow modulation. A manually activated bypass contactor is provided to allow system operation in the event of drive service.

Static pressure is controlled by the unit-mounted MicroTech III controller. Indication of current airflow is available at the MicroTech III controller. Static pressure is sensed by one or two factory-mounted duct sensors. The installer provides and installs the sensor tubing from unit mounted sensor(s) to duct location(s). The static pressure set point is keypad adjustable through the MicroTech III DDC controller.

All variable air volume units include a field-adjustable, duct high limit safety control to protect ductwork from excessive duct pressure.

Disconnect Switch

A factory-mounted, non-fused main circuit interrupter is available for disconnecting the main electrical power. The switch is located at the front of the control panel and is accessible without unit penetration. The lug size information is provided in Table 8 and Table 9 on page 15.

Dual Power Supply

A dual power block is an option for the power supply, which allows the fan motor and control circuit to be isolated from the compressor circuit. If the unit has the optional electric heat, it is circuited with the compressors.

Heating Coil Control

A factory-mounted, heating water coil is available, without a factory-mounted control valve. The field-provided and installed heating control valve is controlled by the unit's MicroTech III controller. Refer to "as built" schematics for field terminals.

Spring Return Actuators

24 VAC powered actuators are used to automatically control the water valves. The MicroTech III controller unit monitors conditions and controls the actuators accordingly, using a 0 to 10 VDC analog signal to close and open the valves respectively.

General

⚠ WARNING

ELECTRIC SHOCK HAZARD

The equipment frame must be bonded to the building electrical ground with the grounding terminal provided or other acceptable means. Failure to properly ground can result in electric shock, equipment damage, severe personal injury, or death. Lock out and tag out all power sources to equipment before servicing.

⚠ WARNING

Always open the power disconnect switch before opening service panels. Failure to do so can result in electric shock, equipment damage, severe personal injury, or death.

Start Up and service of this equipment must be performed only by trained, experienced personnel. A representative of the owner or the operator should be present during Start Up to receive instruction in unit operation, care, and adjustment.

Complete a check, test, and start up procedure. The completed check test and start form (supplied with each unit) must be signed and returned to Daikin Applied.

NOTE: Before opening service panels, always lock out and tag out the power disconnect switch.

Pre-Start Up

⚠ WARNING

Unit cannot be started until the ductwork is installed to avoid injury

1. Check that the unit is completely and properly installed with ductwork connected.
2. Check that all construction debris is removed and filters are clean.
3. With all electrical disconnects open, check all electrical connections to be sure they are tight. Although all factory connections are tight before shipment, shipping vibration can cause loosening.
4. Check all compressor valve connections for tightness to avoid refrigerant loss at Start Up. Although all factory connections are tight before shipment, shipping vibration can cause loosening. See Table 11 for proper valve torque values.
5. Check the tightness of setscrews in bearings, drives, and fan wheels. If retightening is needed, make certain the fan wheel is centered and setscrews are torqued per Table 12.
6. Check that the fan rotates freely. Check belt tension and alignment.

7a. Check all factory- and field-installed Victaulic coupling connections for tightness to avoid water leaks. Although all factory connections are tight before shipment, shipping vibration can loosening.

7b. Check that the unit condenser drains were made.

8. Before attempting to operate the unit, review the control layout description to become familiar with the control locations.
9. Review all equipment service literature and the unit wiring diagrams supplied with each unit.
10. Review optional controls to determine which are included in the unit.
11. Check that the return air temperature sensor and optional space temperature sensor, if used, are installed in the return air duct and that the wiring terminations were made at the unit input board.
12. Check that the entering water temperature sensor is mounted.
13. Check that the optional duct static pressure sensor is connected to the duct with appropriate tubing. The unit may have one optional static pressure sensor, SPS1, or two, SPS1 and SPS2.
14. Check the voltage of the unit power supply and see that it is within the allowed ±10% tolerance. Phase voltage unbalance must be within ±2%.
15. Check the unit power supply wiring for adequate ampacity and a minimum insulation rating of 75°C.
16. Verify that all mechanical and electrical inspections were completed per local codes.

⚠ CAUTION

Compressor and refrigerant valves are closed for shipment

17. Open the compressor suction and discharge shutoff valves and liquid line shutoff valves until back-seated. Always replace valve seal caps.
18. Make sure the unit switch S7 is in the OFF position. Then throw the main power disconnect to ON. This energizes the crankcase heaters. Wait a minimum of 24 hours before starting the unit.

Table 11: Valve Torques

Coupling nut size (in)	Gage port cap torque (lbs-ft)	Stem cap torque (lbs-ft)	Coupling nut torque (lbs-ft)
1.00	7±1	32±2	55+5
1.25	7±1	32±2	90+10
1.75	7±1	45±3	205+15

Table 12: Setscrew Torque

Setscrew diameter	Torque min. (ft.-lbs.)
#10	4.3
1/4"	10.0
5/16"	20.0
3/8"	25.0

Start Up

General

All units are factory tested for proper field operation.

1. Verify that the close disconnect switch with switch S7 is in the Auto position and that the crankcase heaters have operated for 24 hours.
2. Supply power to the MicroTech III controller; the LEDs on MCB1 should follow the normal startup sequence.
3. Set the internal MicroTech III time clock or the external time clock, if used.
4. Set the cooling set point to a value that provides a full call for cooling.
5. Start the auxiliary equipment for the installation such as water pumps, cooling towers, etc.

Fan Start Up

1. Place the unit into the FAN ONLY mode, using the following keypad sequence.

   System
   – Control Mod:
   – Off
   – Auto
   – Heat/Cool
   – Heat only
   – Cool only
   – Fan only
2. Turn switch S7 to ON. The supply air fan should start and run.
3. Observe the fan rotation. If the fan rotates backward, reverse the two legs of the main unit supply power. Unit compressors are factory “phased” to match the supply fan. Do not reverse internal fan motor power leads since this results in the compressor being out of phase.
4. If the fan does not run:
   a. Check the control circuit fuses F1A, F1B, F1C.
   b. Verify that the fan overload is not tripped.
   c. Check the fan motor power fuses or manual motor protector (MMP).
   d. Trace the circuits.

Compressor Start Up

With the supply air fan operational, prepare for compressor operation.

⚠ CAUTION

The unit ships with the refrigeration service valves closed. Remove the service caps and backseat (open) the suction, discharge, and liquid line valves. Then replace the service caps.

Connect service gauges and crack valves off the backseat position (one turn forward). Verify that the unit has not lost its refrigerant charge due to shipping damage or leaks. Verify that the compressor crankcase heaters are operating. These should operate at least 24 hours before starting compressors.

1. Set Cooling Control Setpoint, MicroTech III, to a value that provides a call for full cooling.
2. Place the unit into the COOL ONLY mode through the keypad/display.
3. If desired, the MicroTech internal control timers can be reduced to 20 seconds. Enter the amount of time it operates in this “Fast” mode through the keypad as follows:

   Extended Menus
   • Timer Settings
   – Service Time

NOTE: Use “Fast” timers only to verify the sequencing of compressors during Start Up. For proper unit operation, return the timer to “Normal.”

Do not allow compressors to come on repeatedly in the “Fast” timer mode since this can damage compressors and/or indicates “Motor Protector Failure” under compressor alarms.

4. If the compressor motor hums but does not run, verify that the unit is getting three-phase power.

The compressors should run continuously. If a compressor cycles on the low pressure switch:

1. Verify that the circuit is not low on charge.
2. Check for low airflow.
3. Check for clogged filters.
4. Check for restricted ductwork.
5. Check for very low mixed air temperatures to the unit.
6. Verify that all the distributor tubes, the expansion valve and the liquid line components are feeding the evaporator coil.
7. Verify that all fan section access panels are in place.
8. Verify that the suction service valves and the liquid line service valves are completely open.
9. Verify that all sensor inputs are connected.

Economizer Start Up

The economizer modulates to maintain the cooling discharge set point whenever the entering water temperature is below the mixed air temperature to the unit by an adjustable differential (0–10°F) and the unit is calling for cooling.

To verify operation of the economizer when entering water is unsuitable, place the entering water temperature (EWT) sensor in a cold water bath. Once the sensor is in the bath, observe that the economizer control valve is open. Readjust the control setting or remove the sensor from the bath and observe that the economizer control valve drives close.

Electric Heat Start Up

The electric heater is staged to maintain the discharge heating set point. To verify the electric heat operation, adjust the heating set point through the keypad:

Temperatures
• Zone heating
– Electric

Expansion Valve Superheat Adjustment

It is very important that superheat is set properly. Under full load conditions it should be between 10°F and 12°F. Lower entering air conditions, lower airflow rates, and higher condensing temperatures reduce the load on the expansion valve. Under reduced load conditions, the superheat could be as low as 6°F to 8°F. Insufficient superheat causes liquid floodback to the compressor and possible liquid slugging. Excessive superheat reduces system performance and shortens compressor life. Verify that the sensing bulb is properly located and securely strapped to the refrigerant line. See Figure 25. Turn the adjusting stem clockwise to increase superheat. Adjust the stem (one turn at a time, maximum) and observe the superheat. Allow up to 30 minutes for the system to rebalance at the final setting.

⚠ WARNING

The supply fan inlet is located near the expansion valves.

Refrigerant Charge

Each unit is designed for use with R-410A.

⚠ CAUTION

Field mixing or changing of refrigerants can compromise performance and damage equipment. Improper refrigerant addition can cause equipment damage and severe personal injury.

Non-modular units ship with a full operating charge of refrigerant and oil. However, in the event of a leak in the system, some added charge may be required. In an undercharged situation, any of the following may occur:

- If a circuit is slightly undercharged, bubbles appear in the sightglass.
- If the circuit is severely undercharged, it may trip on its low pressure safety.

If any of these conditions occur, first identify and correct the source of the leak and then follow the charging procedure described below.

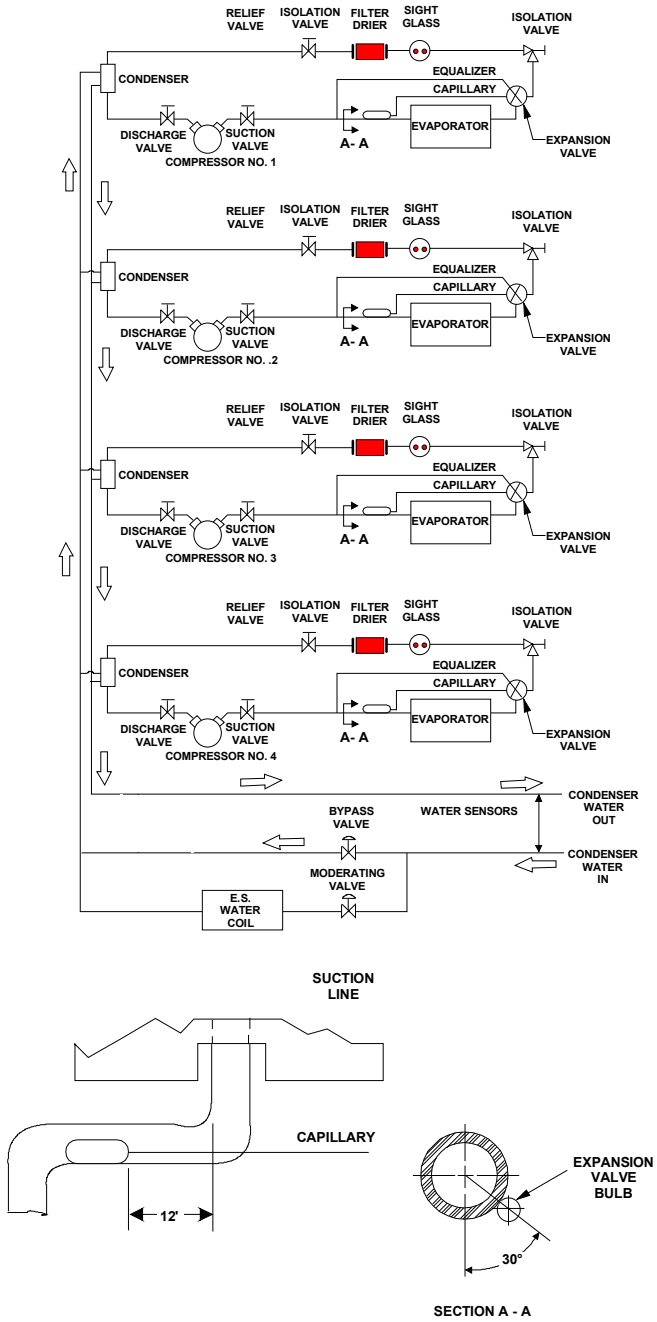
Using the liquid line sight-glass as the sole means of metering additional refrigerant charge into a self-contained unit, or any AC unit, does not always provide the desired result. Depending on the load conditions experienced by the equipment during the charging process, adding refrigerant until the sight-glass is clear of all bubbles may overcharge the system and cause future operating issues. The better way to charge a circuit is to use liquid subcooling and suction line superheat as indicators, using the following procedure, which should prevent overcharging of the circuit:

1. Verify that superheat is set per the Expansion Valve Superheat Adjustment section.
2. Measure the discharge pressure reading and convert it to a discharge temperature.
3. Measure and record the circuit's liquid line temperature.
4. Measure and record the entering condenser water temperature using the MicroTech III display.
5. Calculate liquid subcooling: subcooling = discharge temperature – liquid line temperature
6. If the calculated subcooling value is less than 8ºF, add refrigerant.
7. Monitoring discharge pressure and liquid line temperature, add refrigerant until the discharge temperature minus the liquid line temperature is equal to 8ºF ± 2ºF. If the system is running at light load conditions, subcooling should be at the low end of the range. If the system is running near design conditions, subcooling should be near the upper end of the range.
8. Verify that superheat is still in the prescribed range.

Table 13: Acceptable Refrigerant Oils

R-410A (polyolester [POE] oils) Note: Do not use mineral oils with R-410A.
Copeland ULtra 22 CC
Mobil EAL™ Arctic 22 CC
ICI EMKARATE RL™ 32CL

Figure 25: Water and Refrigerant Piping Schematic



Variable Air Volume (VAV) Start Up

Enter the duct static pressure set point value and parameters through the keypad:

Supply Fan Speed Menu
- SAF Spd Control
  - DuctSPs Spt

Variable air volume, ranging from minimum to maximum, is obtained by using a variable frequency drive (VFD). The VFD can increase the fan speed from 0 rpm to the fan's maximum r.p.m. to provide 100% air volume. The VFD will use a frequency (0–60 Hz) to control the fan r.p.m.

The VFD is controlled by the MCB and may have a manual bypass.

Fan Wheel Alignment

Figure 26: Wheel-to-Inlet Funnel Relationship—13 to 36 Plenum Fans

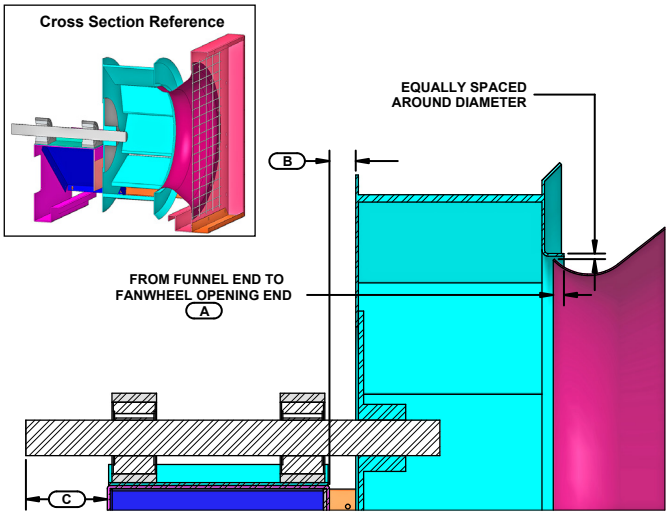


Table 14: Wheel-to-Inlet Funnel Relationship—13 to 36 Plenum Fan

Wheel-Funnel Parameters			
Size	A	B	C
13	0.25	0.91	3.50
15	0.25	0.91	3.50
16	0.25	0.91	3.50
18	0.38	0.86	3.88
20	0.42	1.11	3.88
22	0.45	1.11	3.88
24	0.51	1.11	3.88
27	0.55	1.36	4.50
30	0.62	1.36	4.50
33	0.55	1.50	5.00
36	0.63	1.50	5.00

Figure 27: Wheel-to-Inlet Funnel Relationship—40 to 60 Plenum Fans

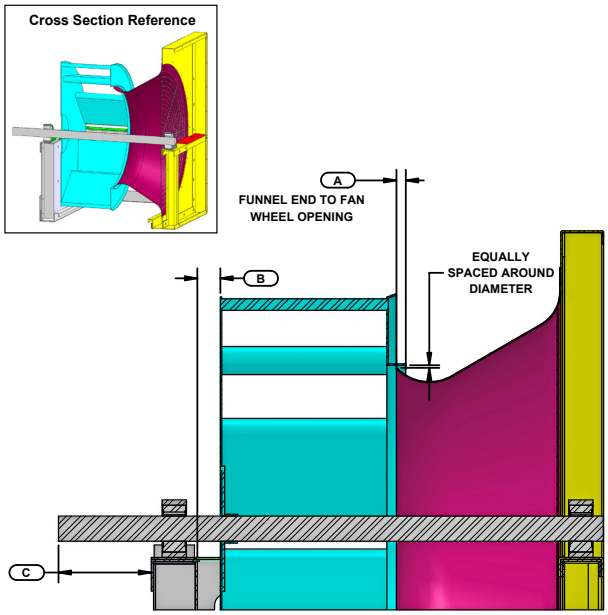


Figure 28: Wheel-to-Inlet Funnel Relationship—40 to 60 Plenum Fan

Wheel-Funnel Parameters			
Size	A	B	C
40	0.82	2.00	4.88
44	0.91	2.25	5.50
49	1.00	2.50	5.50
54	1.10	2.50	5.50
60	1.23	3.00	5.50

Setscrews on MPQ fan wheels must be installed using a calibrated torque wrench to the value listed below, ±5%.The fasteners must be periodically checked to satisfy agency requirements for components on rotating machinery.

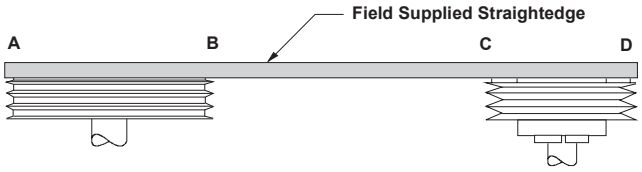
Table 15: Setscrew Torque Specifications—Belt Drive Plenum Fans Only

Fan Size	Setscrew Size	Torque (ft.-lb)	
		Aluminum	Steel
13	3/8	19.2	N/A
15	3/8	19.2	N/A
16	3/8	19.2	N/A
18	3/8	19.2	N/A
20	3/8	19.2	N/A
22	3/8	19.2	N/A
24	3/8	19.2	N/A
27	3/8	19.2	22
30	1/2	41.7	55
33	1/2	41.7	55
36	1/2	41.7	55
40	1/2	41.7	55
44	1/2	41.7	55
49	1/2	41.7	55
54	1/2	41.7	55
60	3/4	115	150

Drive Sheave Alignment

Check the drive sheave alignment using the four-point method shown in Figure 29. When measuring from the straight edge to the belt, the distance at points A, B, C, and D must be equal for correct alignment.

Figure 29: Sheave Alignment



RPM Changes

All units are provided with fixed pitch sheaves selected for the specified operating conditions. If a new fan rpm selection is required, field install a new sheave selection. Adjust the belt tension as described below.

Drive Belt Adjustment

General Rules of Tensioning

- The ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
- Check tension frequently during the first 24–48 hours of operation.
- Overtensioning shortens belt and bearing life.
- Keep belts free from foreign material that can cause slippage.
- Make V-drive inspections on a periodic basis. Adjust the tension if the belt is slipping. Do not apply belt dressing. This can damage the belt and cause early failure.

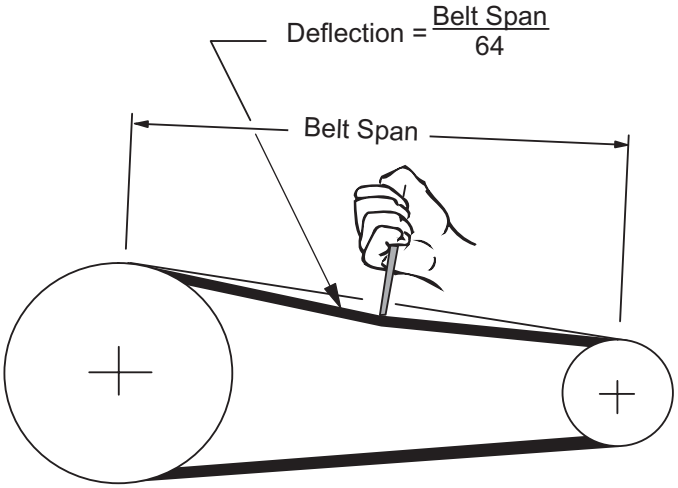
Tension Measurement Procedure

1. Measure the belt span. See Figure 30.
2. Place the 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 located on the fan housing.

When new belts are installed, the initial tension drops. After 48 hours of operation, check the tightness of all setscrews on the fan hub and bearing sleeves and retighten belts.

NOTE: If after all tension adjustments the belts slip or squeal when starting, increase tension slightly. Replace the belts if they are worn or glazed.

Figure 30: Drive Belt Adjustment



Final Control Settings

When all of the Start Up procedures are completed, set the individual control parameters for operation, as follows:

- Unit switch S7 to AUTO
- Heating/Cooling control parameters, as required
- Alarm limits, as required
- Night setback parameters, as required
- Duct static pressure and building static pressure, as required
- Economizer control parameters, as required
- Control timers. as required
- Date and time, as required
- Operating schedule, as required
- Holiday schedule, as required

Maintaining Control Parameter Records

After the unit is checked, tested, and started and the final control parameters are set, record the final settings and keep them on file. Update this file whenever changes are made to the control parameters. This facilitates any required analysis and troubleshooting of the system operation.

Planned Maintenance

⚠ WARNING

Improper maintenance can cause equipment damage, severe personal injury, or death. Installation and maintenance must be performed only by trained, experienced personnel who are familiar with local code and regulations and are experienced with this type of equipment.

⚠ WARNING

Moving machinery and electrical power hazards. Can cause severe personal injury death. Disconnect and lock off power before servicing equipment.

⚠ CAUTION

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

Planned maintenance is the best way to help avoid unnecessary expense and inconvenience. At regular intervals have a qualified service technician inspect this system. The required frequency of inspections depends on installation and operating duty. Routine maintenance should cover the following items:

1. Tighten all belts, setscrews, and wire connections. (See Table 12 on page 34). Retighten all power connections every six months.
2. Clean the evaporator or economizer 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.
3. Clean the condenser and economizer tubes periodically. Clean condenser and economizer coils chemically or mechanically. Keep tubing clean to maintain system performance. (Condenser head removal instructions follow)
4. Lubricate motor and fan shaft bearings.
5. Align or replace belts as needed.
6. Replace filters as needed.
7. Check refrigerant sightglass. If sightglass is not solid with steady-state full load operation of unit, check for refrigerant leaks.

NOTE: A partially full sightglass is not uncommon at part load conditions. Check for proper superheat.

8. Check for condensate drain blockage. Clean condensate pan as needed.
9. Check power and control voltages.
10. Check running amperage.
11. Check operating temperatures and pressures.
12. Check and adjust temperature and pressure controls.
13. Check and adjust linkages.
14. Check operation of all safety controls.
15. Lubricate door latch mechanisms.

Periodic Obligatory Checks and Start Ups for Appliances under Pressure

The units are included in a Category II classification established by the European Directive PED 97/23/EC. For equipment belonging to this category, some local regulations require a periodic inspection by an authorized agency. Check with your local requirements.

Table 16: Routine Maintenance Program

List of Activities	Weekly	Monthly[1]	Yearly[2]
General			
Reading of operating data[3]	X		
Visual inspection of machine for any damage and/or loosening		X	
Verification of thermal insulation integrity			X
Clean and paint where necessary			X
Analysis of water[5]			X
Check of flow switch operation		X	
Electrical			
Verification of control sequence			X
Verify contactor wear – Replace if necessary			X
Verify that all electrical terminals are tight – Tighten if necessary			X
Clean inside the electrical control board			X
Visual inspection of components for any signs of overheating		X	
Verify operation of compressor and electrical resistance		X	
Measure compressor motor insulation using a Megger Insulation Resistance Tester			X
Refrigeration circuit			
Check for any refrigerant leakage		X	
Verify refrigerant flow using the liquid sight glass – Sight glass full	X		
Verify filter dryer pressure drop		X	
Analyze compressor vibrations			X
Analyze compressor oil acidity[6]			X
Condenser section			
Clean condenser banks[4]			X
Verify that fans are well tightened			X
Verify condenser bank fins – Comb if necessary			X

Notes:
1. Monthly activities include all the weekly ones.
2. The annual (or early season) activities include all weekly and monthly activities.
3. Unit operating values should be read on a daily basis thus keeping high observation standards.
4. In environments with a high concentration of air-borne particles, it may be necessary to clean the condenser bank more often.
5. Check for any dissolved metals.
6. TAN (Total Acid Number): ≤ 0, 10 — No action
   Between 0.10 and 0.19 — Replace anti-acid filters and recheck after 1,000 running hours. Continue to replace filters until the TAN is lower than 0.1.
   > 0, 19 — Replace oil, oil filter and filter dryer. Verify at regular intervals.

Important Information Regarding the Refrigerant Used

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.

Refrigerant type = R134A
GWP(1) value = 1300
(1) GWP = Global Warming Potential

The refrigerant quantity necessary for standard operation is indicated on the unit name plate.

Real refrigerant quantity charged in the unit is listed on a silver sticker inside the electrical panel.

Periodical inspections for refrigerant leaks may be required depending on European or local legislation.

Please contact your local dealer for more information.

Disposal

The unit is made of metal, plastic and electronic parts. All these parts must be disposed of in accordance with the local regulations in terms of disposal.

Lead batteries must be collected and sent to specific refuse collection centers.

Oil must be collected and sent to specific refuse collection centers.

Condenser Head Assembly and Gasket Replacement

Follow these instructions to remove the condenser head

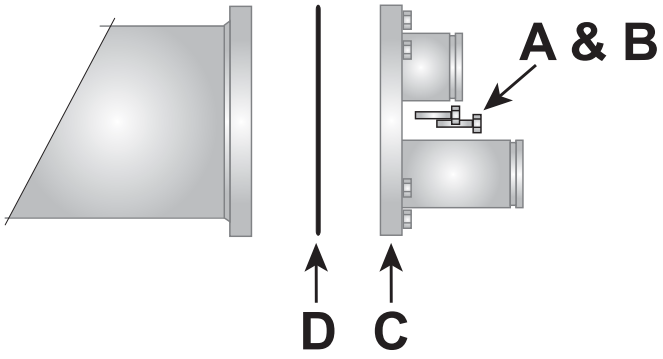
1. Completely drain the water before removing the header (if applicable).
2. Be sure to have a new rubber gasket on hand as a precaution, P/N 910115763.
3. Remove any parts connected to the head that was not part of the assembly, (i.e. manifolds, Victaulic couplings, etc).
4. Replace bolts “A” and “B”, Figure 31 with two centering pins.
5. Remove all other bolts in reverse order. Positions shown in Figure 31.
6. Remove head “C”, Figure 32 carefully. Avoid collisions with other components. Do not damage the head. Each condenser has multiple 3/4" O.D. copper tubes with a nominal wall thickness of 0.0028 inches.
7. Do not remove gasket “D”, Figure 32.
8. Carefully clean the gasket seating with a solvent to remove adhesive residue. Remove P/N 910116708, debris and excess solvent.
9. Apply a thin and even “new” coat of adhesive on the seating for the gasket. Position the gasket P/N 910115713 carefully.
10. Replace the head “C” using the center pins as guides.
11. Replace all other bolts.
12. Replace the centering pins in the “A” & “B” positions with bolts.
13. Tighten all bolts in order, see Figure 31 using the torque values in Table 17.

Table 17: Bolt Torque Value

Torque Value
M10 30 ft/lb [40 Nm]

Figure 31: Centering pin location and bolt order

Figure 32: Head Assembly



Motor Bearings Maintenance

Routine maintenance for motor bearings should include the following:

- Add grease to fan motors after every 2,000 hours of operation.
- Relubricate while the motor is warm and at a standstill.
- Remove and clean upper and lower grease plugs and insert grease fitting into upper hole, adding a small amount of clean grease with a low pressure gun. Run the motor for five minutes before replacing plugs.

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

⚠ CAUTION

BEARING OVERHEATING POTENTIAL

Bearing overheating can cause damage to equipment. Do not over lubricate. Use only a high grade mineral grease with a 200°F safe operating temperature. Refer to the unit lubrication instruction label for specific lubricants

Table 18: Recommend Lubricants for Fan Shaft Ball Bearings

Manufacturer	Product name	Temp. range °F (°C)
Texaco Lubricants Company	Premium RB	-30 to 300 (-34 to 149)
Keystone Ind. Lubricants	81EP–2	0 to 250 (-18 to 121)
Mobil Oil Corporation	Mobilith SCH100	-40 to 350 (-40 to 177)
Chevron U.S.A. Inc.	SRI–2	-20 to 325 (-29 to 163)
Exxon Company, U.S.A.	Ronex MP	-40 to 300 (-40 to 149)
Shell Oil Company	Alvania No. 2	-20 to 240 (-29 to 116)

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

Fan Bearing Maintenance

⚠ CAUTION

Failure to observe safety precautions can cause personal injury or equipment damage.

⚠ CAUTION

Failure to carefully follow installation instructions can result in improper installation, which can cause bearing performance problems as well as serious personal injury. Before attempting to install or remove bearings, read installation/removal instructions in their entirety.

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 19, clean, and free of nicks and burrs.
   - Mount bearing on unused section of shafting or repair/replace shafting as required.
3. Install unit
   - Slide bearing onto shaft. If it is difficult to mount bearing on shaft, use a piece of emery cloth to reduce any high spots on the shaft. Do not hammer any component of the bearing.
4. Fasten bearing into 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.
5. Monitor installed bearing
   - After bearing has run for several minutes, and again after several hours, check bearing for excessive noise or vibration.
   - Shut down unit and check housing temperature. Typical applications operate at 100°F to 150°F (38°C to 66°C) (similar to household hot tap water temperature).
   - Tighten all locking devices after 500 hours or three months, whichever comes first.
6. Bearing setscrew torques are shown on Table 15 on page 38

Table 19: Shaft tolerance range

Shaft diameter in (mm)	Shaft tolerance in (mm)
1/2 to 1-15/16 (12 to 49)	+0.0 to 0.0005 (+0.0 to -0.0125)
2 to 3-3/16 (50 to 80)	+0.0 to 0.0010 (+0.0 to -0.025)
3-1/4 to 4-5/16 (82 to 125)	+0.0 to 0.0015 (+0.0 to -0.040)

Winterizing Water Coils

Coil freeze-up can be caused by such things as air stratification and failure of outdoor dampers and/or preheat coils. Do not depend on routine draining of water cooling coils for winter shutdown or to protect against freeze-up. Severe coil damage can result. Drain all coils as thoroughly as possible and then treat each of them in the following manner:

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

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

Panels, Frame Channels, and Doors

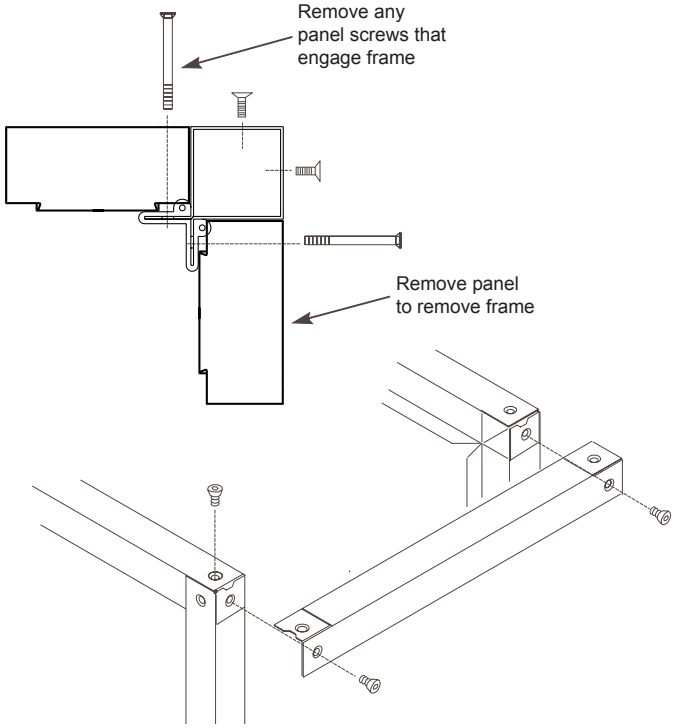
Panel Removal

To remove a side or top panel, remove the flat head Torx 30 fasteners along the sides of the panel. Lift off the panel after removing all fasteners.

Frame Channel Removal

Top frame channels that run the length of the unit can be removed to allow access to both the side and top of the unit. To remove the frame channel, first remove the side panel(s). Once the side panel is off, remove the flat head Torx 30 fasteners in the corner of the frame channels and pull the frame channel out the side. Remove any panel screws that are within 1" of the of the frame, since they are engaged into the gasketed flange of the frame. See Figure 33.

Figure 33: Removing Panel Screws



Fan Section Doors

1. Use a 1/2" socket and rotate 1/4 turn clockwise as shown in Figure 34. If the socket and handle are on the left side of the door, rotate 1/4 turn counterclockwise.
2. Rotate the door handle 1/4 turn clockwise and then 1/4 turn counterclockwise to release any internal pressure or vacuum and open the door. If the socket and handle are on the left side of the door, rotate the door handle 1/4 turn counterclockwise and then 1/4 turn clockwise.
3. To prevent air leakage, tighten the door panels by adjusting the jam nuts.

NOTE: Opening the fan section doors requires using a 1/2" socket wrench, which satisfies ANSI standards and other codes that require the “use of tools” to access compartments containing moving parts or electrical wiring. See Figure 34.

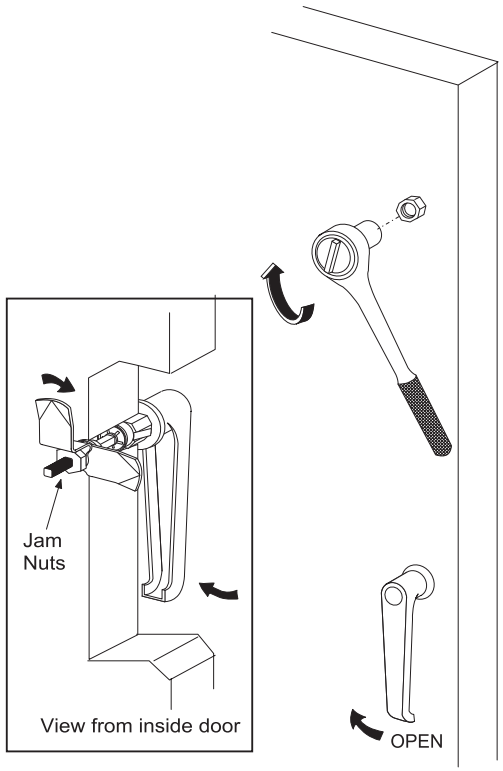
⚠ CAUTION

Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

⚠ CAUTION

DO NOT attempt to rotate the cup. Damage to the unit will occur.

Figure 34: Opening Fan Section Door



When writing to Daikin Applied 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.

Table 20: Replacement Parts List

Description	Daikin Applied part number
MT3006 Lg Controller w/ HMI 27 IOs	193407301
MT3025 Extension IO Module 15 IOs	193407501
MT3O51M Human Int Panel/Wall Mount 8×40	193408001
MT3041 Com Module BACnet IP	193408101
MT3043 Com Module LON — SCC	193408202
MT3042 Com Module BACnet MS/TP- 202 DAC	193408301
MT3044 Com Module Modbus RS485×2	193408401
MT3045 Remote Support Module	193408501
MT3 Service Cable 80 cm	193408601
MT3 Service Cable 150 cm	193408701
MT3 Real Time Clock Battery 200 Days	193409001
MT3 Conn Set Ext 2 Spring Top Entry	193409301
MT3 Conn Ext I/O Direct Connect 10 Pk	193409601
MT3 Conn Ext I/O Direct Connect 1 Pk	193409701
MT3 Conn Ext I/O Remote Connect 10 Pk	193409701
MT3 Conn Ext I/O Remote Connect 1 Pk	193409901
MT3 Conn 2 Pin Spring Top Entry	193410302
MT3 Conn 3 Pin Spring Top Entry	193410303
MT3 Conn 4 Pin Spring Top Entry	193410304
MT3 Conn 5 Pin Spring Top Entry	193410305
MT3 Conn 6 Pin Spring Top Entry	193410306
MT3 Conn 7 Pin Spring Top Entry	193410307
MT3 Conn 8 Pin Spring Top Entry	193410308
Zone Temperature Sensor with Tenant Override	113117701
Zone Temperature Sensor with Tenant Override & Remote Set Point Adjustment	113117801
Discharge Air Temperature Sensor	193314600
Entering Air Temperature Sensor	193414600
Outside Air Temperature Sensor	193414600
Return Air Temperature Sensor	193414600
Mixed Air Temperature Sensor	193414600
Entering Water Temperature Sensor	193414600
Entering Air Temperature Sensor	193414600
Duct Static Pressure Sensor	049545013
Refrigerant Pressure Transducer Circuit 1	065816802
Refrigerant Pressure Transducer Circuit 2	065816802
Transformer Line/115 VAC	N/A
Transformer 115/24 VAC	349937303
Space Humidity Sensor, Wall Mount	067294901
Space Humidity Sensor, Duct Mount	067295001
Water Flow Switch	098867101
Airflow Proving Switch	060015801
Duct High Limit	065493801
Enthalpy Control, Electro-Mechanical	030706702
Enthalpy Control, Comparative	049262201
Return Air Enthalpy Sensor	049262201
Smoke Detector: Supply Air	098873101
Smoke Detector: Return Air	098873101

Compressors

All Daikin Applied Self-Contained products include a first-year parts only warranty. The warranty period extends 12 months from start up 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. See Daikin Applied's published Limited Product Warranty for exclusive details.

Scroll Compressors

Scroll service replacement compressors for Daikin Applied Self-Contained units can be obtained from the following sources:

- Daikin Applied Service Parts maintains a stock of replacement compressors.
- Copeland Refrigeration has stocking wholesalers throughout the U.S. who maintain a limited stock of replacement scroll compressors. The stock of single compressors is much better than the stock of tandems "tandem ready," single compressors.

All Compressors

The decision to replace the failed portion of the tandem (or one of the two compressors on a circuit), 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.
2. **Out of warranty:** The customer decides whether to replace the entire tandem.

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 start up 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 Applied Parts Department (Minneapolis, MN).

To order:

1. Contact the Daikin Applied Parts Department for compressor availability.
2. Send a completed parts order form to the Daikin Applied Parts Department.
3. The Parts Department processes the order and the compressors ship 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 Applied warranty.
4. After the failed compressor is replaced, return it to Daikin Applied with a Return Goods Tag attached. You will receive the tag 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 Applied equipment that includes the extended 2nd–5th year compressor warranty option, the replacement compressor must be ordered through the Daikin Applied Parts Department (Minneapolis, MN).

To order:

1. Contact the Daikin Applied Parts Department for compressor availability.
2. Send the Daikin Applied Parts Department a completed parts order form.
3. The Parts Department processes the order and the compressors ship 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 Applied warranty.
4. After the failed compressor is replaced, return it to Daikin Applied with a Return Goods Tag attached. You will receive the tag in the mail. 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 at Minneapolis, Minnesota.

A “return goods” tag will be sent to be included with the returned material. Enter the information required on the tag to expedite handling at our factories and to expedite 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 Applied 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.

Consult your local Daikin Applied Representative for warranty details. Refer to Form 933-430285Y. To find your local Daikin Applied Representative, go to www.DaikinApplied.com.

Warranty Return Material Procedure

Defective material may not be returned without permission of authorized factory service personnel of Daikin Applied (Minneapolis, Minnesota, 763-553-5330). A “Return Goods” tag must be included with the returned material. Enter the required information to expedite handling and prompt issuance of credits. All parts must be returned to the appropriate Daikin Applied facility, designated on the “Return Goods” tag. Transportation charges must be prepaid.

The return of the part does not constitute an order for replacement. Therefore, a purchase order must be entered through the nearest Daikin Applied representative. The order should include part number, model number, and serial number of the unit involved.

Credit will be issued on customer’s purchase order following an inspection of the return part and upon determination that the failure is due to faulty material or workmanship during the warranty period.

DAIKIN Equipment Warranty Registration Form

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

Check, Test, and Start Procedure for SWP/SWT (Self-Contained Air Conditioning Systems)

Job name:_____ **Daikin Applied G.O. #:** _____

Installation address: _____

City:_____ **State:**_____

Purchasing contractor:_____

City:_____ **State:**_____

Unit model number:_____ **Serial number:** _____

Compressor #1 serial number: _____ **Compressor #2 serial number:** _____

Compressor #3 serial number: _____ **Compressor #4 serial number:** _____

Compressor #5 serial number: _____ **Compressor #6 serial number:** _____

Compressor #7 serial number: _____ **Compressor #8 serial number:** _____

Mark NA on all items that do not apply to the type of the unit. See the IM bulletin for more information. Make any additional comments on a separate sheet of paper and attach to this form.

I. Initial Check

A. Is any shipping damage visible?	Yes	No	N/A
B. Is the unit installed level	Yes	No	N/A
C. Is the unit positioned to provide adequate free area for service and operation?	Yes	No	N/A
D. Are the fan drives properly aligned and belts adjusted	Yes	No	N/A
E. Does the fan turn freely?	Yes	No	N/A
F. Are all setscrews on pulleys, bearings, and fans tightened?	Yes	No	N/A
G. Is the entering condenser water temperature sensor located correctly?	Yes	No	N/A
H. Has the installing contractor installed the return air temperature sensor in the return air stream?	Yes	No	N/A
I. Has the installing contractor installed the high and low static pressure sensor tubing in the ductwork?	Yes	No	N/A
J. Does electrical service correspond to the unit nameplate?	Yes	No	N/A
K. Are adequate disconnect and circuit protectors installed?	Yes	No	N/A
L. Is the unit adequately grounded?	Yes	No	N/A
M. Are all electrical power connections tight?	Yes	No	N/A
N. Have the compressor heaters operated continuously for 24 hours prior to startup?	Yes	No	N/A
O. Does all electrical wiring conform to unit electrical diagram?	Yes	No	N/A
P. Does all field wiring conform to electrical diagrams?	Yes	No	N/A
Q. Are all service valves open?	Yes	No	N/A
R. Have all shipping hold-down plates securing the fan frame been removed?	Yes	No	N/A
S. On unit with ducted return, has the low side tubing for PC5 (dirty filter switch) been installed?	Yes	No	N/A
T. Are all the cleanout plugs installed (condenser, condensate trap, and optional waterside economizer)?	Yes	No	N/A
U. Is the water flow sensor (WFS) installed?	Yes	No	N/A

II. Start-Up

A. Does the unit start and perform per sequence of operation as stated in the IM bulletin?	Yes	No	N/A
B. Does the fan rotate in the right direction?	Yes	No	N/A
C. Condenser inlet water temperature	_____ °F		
D. Condenser outlet water temperature	_____ °F		
E. Number of compressors operating	_____ °F		
F. Return air temperature	_____ °F		
G. Mixed air temperature	_____ °F		
H. Supply air temperature	_____ °F		
I. Compressor readings:	_____ °F		

Self-Contained Equipment Warranty Registration Form (continued)

Reading	Comp. #1	Comp. #2	Comp. #3	Comp. #4	Comp. #5	Comp. #6	Comp. #7	Comp. #8
Suction pressure, psig								
Discharge pressure, psig								
Superheat setting @ TXV bulb, °F								
Compressor RLA (nameplate)								
Current, line L1, amps								
Current, line L2, amps								
Current, line L3, amps								

J. Fan motor current per phase _____ amps _____amps_____ amps
FLA:_____ amps
Variable frequency drive: _____ % speed/ _____ Hertz

K. Fan speed _____ rpm at above frequency

L. Unit voltage across each phase _____ volts _____ volts _____ volts

M. Unit current per phase _____ amps _____ amps_____ amps

III. Control Check

Compressor low and high pressure cutouts	Comp. #1	Comp. #2	Comp. #3	Comp. #4	Comp. #5	Comp. #6	Comp. #7	Comp. #8
Low pressure cut-out, psig								
Low pressure cut-in, psig								
High pressure cut-out, psig								

IV. General

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

B. Are all gauge ports shut off, valve caps and packings tight after start-up? . . . . . Yes No N/A

C. Are VAV boxes set to keep a minimum air flow of 40% of design? . . . . . Yes No N/A

D. Do the economizer, water regulating, and heating valves rotate freely? . . . . . Yes No N/A

Comments:

Performed by: _____ **Title:** _____

Signature: _____ **Date of start-up:** _____

Return completed form by mail to:

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

or by email to:

AAH.Wty_WAR_forms@DaikinApplied.com

Please list any additional comments that could affect the operation of this unit; e.g., shipping damage, failed components, adverse installation applications, etc., on a separate sheet and attach to this form or within the email message.

2

Refrigerant Handling and Use

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol of 1997. Do not vent unit gases into the atmosphere.

The refrigerant quantity is indicated on the unit name plate. Periodic inspections for refrigerant leakage may be required depending on the European Directive PED 97/23/EC or local legislation. Contact you local Daikin Applied sales representative for more information.

Refrigerant Type	GWP[1] Value
R410A	1975

1. Global warming potential

Disposal of Material

This unit is made of metal and plastic parts. For its protection during transportation to the installation site, it also contains various packing and wrapping materials, not used in normal operations. All parts and material must be disposed of in accordance with local regulations of waste or recycled material. Lead batteries must be collected disposed of at specific refuse collection centers.

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. Refer to Form 933-430285Y. 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.