Installation and Maintenance Manual IM 988-1

Group: **Applied Air Systems**
Part Number: **IM 988**
Date: **April 2015**

Self-Contained Air Conditioning Systems

Model SWT “C” Vintage
Sizes 18 through 40
MicroTech® III Unit Controller
R-407C Refrigerant

Daikin Self-Contained Air Conditioning units, models SWT 018C through 040C are factory assembled, refrigerant charged and tested, water-cooled packaged air conditioning units designed for ducted applications.

Each unit is comprised of three distinct sections:

- Main cooling/heating
- Filter/waterside economizer
- Fan section

Each unit contains multiple scroll compressors, water cooled condensers, multi-circuit evaporator, thermal expansion valves, interconnecting refrigerant piping, forward curved centrifugal fan, belt drive, fan motor, 4" pleated filters and all necessary operating and safety controls.

The unit is designed to easily disassemble for access to mechanical rooms, freight elevators, etc. Disassembly of the sections does not require breaking refrigeration lines. When a unit is knocked down, the maximum section width, including fastener heads, is less than 34-1/2 inches. Once in the mechanical room, the unit is easily reassembled.

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 Applied Rooftop and Self-Contained unit controller is standard equipment. For a detailed description of the MicroTech components, input/output configurations, field wiring options and requirements, and service procedures, refer to IM 919. For operation and information on programming the MicroTech III unit controller, refer to OM 920.

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.

Hazard Identification Information

It is the owner's and installer's responsibility to read and comply with all safety information and instructions, as well as the accompanying hazard identification symbols.

Failing to follow safety information increases the risk of property damage and/or product damage, serious personal injury, or death. Improper installation, operation or maintenance can void the warranty.

Recognize Safety Symbols, Words, and Labels. The following symbols and labels are used throughout this manual to indicate immediate or potential hazards.

⚠ CAUTION

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

⚠ WARNING

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

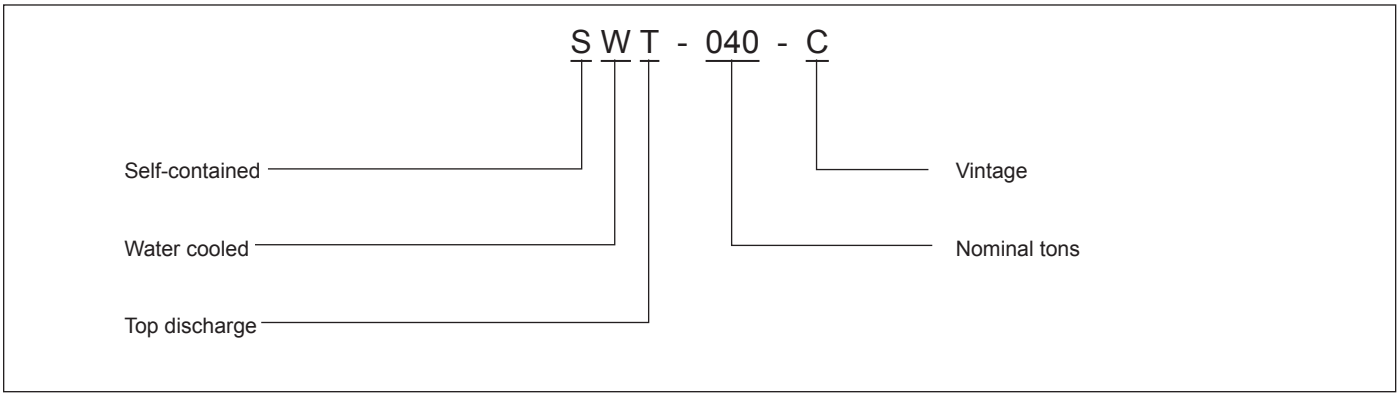
⚠ DANGER

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

NOTICE

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

Nomenclature



General Information

⚠ NOTICE

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

⚠ 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

Sharp edges and coil surfaces can cause personal injury. Wear protective gear and avoid contact

⚠ 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.

Handling

Units may be shipped in one or two sections. When the unit is shipped in two sections, the fan section is separate from the base sections. Units ship with a protective covering that should remain in place while the unit is being moved to its final location.

NOTE: Check for concealed damage as soon as possible.

When the fan section ships separately, lifting lugs are provided for rigging and handling. The lugs are mounted on the fan section. If the fan section ships attached to the base sections, lifting lugs are not provided.

The unit base section accepts lifting rods through channels on the base rail. If units are lifted by crane, provide protection against sling or cable chaffing damage. Use spreader bars across the top of the cabinet to prevent structural damage to the frame.Protect floor surfaces when equipment is moved across finished flooring. Use plywood sheeting to protect surfaces and distribute weight loading.

Vibration Isolators

All units are provided with 1" neoprene isolation pads, shipped separately. Install pads beneath the unit, locating at each corner and the center of each base channel. For units provided with more than six isolator pads, evenly space the additional pads under the front and rear base channels.

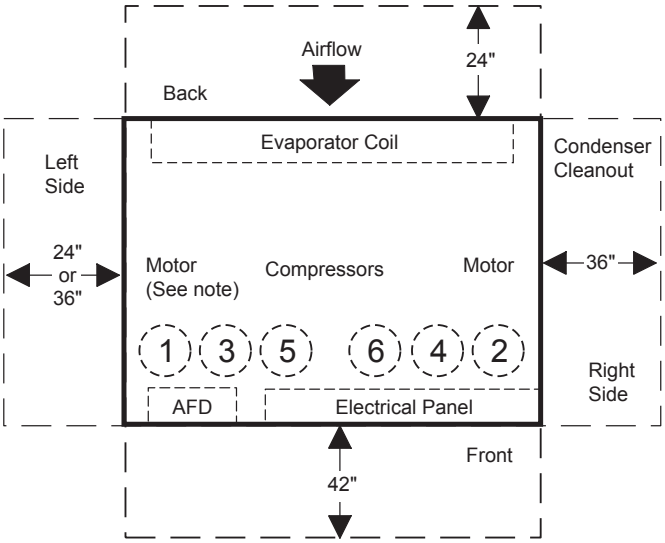
Location/Service Access

To facilitate installation and provide service, and maintenance access, follow the recommended clearances in Table 1. 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 side 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 1: Recommended Clearances

Location	Clearance length (inches)
Unit front	42
Unit rear	24
Motor location, right side	36
Piping location, left side or right side	36
Side without motor or piping	24

Figure 1: Recommended Service and Maintenance Clearance



NOTE: The motor is located on the left side for a front discharge an arrangement.

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.

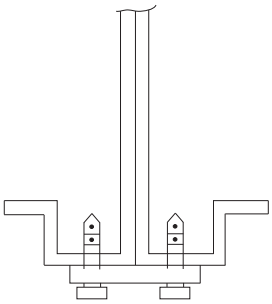
Disassembly of Sections

⚠ WARNING

Connection plates can be used as rigging plates for the fan section only. Do not use them for rigging the entire unit. Unit can tip or fall and cause equipment damage, severe personal injury, or death.

If units are ordered for modular construction, they can be disassembled easily into three sections. The figures below illustrate the main cooling/heating, filter/waterside economizer, and fan sections. The thick lines in the figures show where the sections are disassembled. The sections are secured by connection plates and screws. The following information describes the location of the connecting points.

Figure 2: Main and Filter/Waterside Economizer Module Connection



Section A-A
Main and filter/waterside economizer module connections

Fan section—disassembly from base sections

The fan section sits on the base sections and is secured with four steel plates. Each plate has two screws in the base sections and two screws in the fan section. Two of the plates are shown in Figure 2. The connection plates are also the rigging plates for the fan section only. Do NOT use them for rigging the entire unit.

Main cooling/heating—disassembly from filter/waterside economizer sections

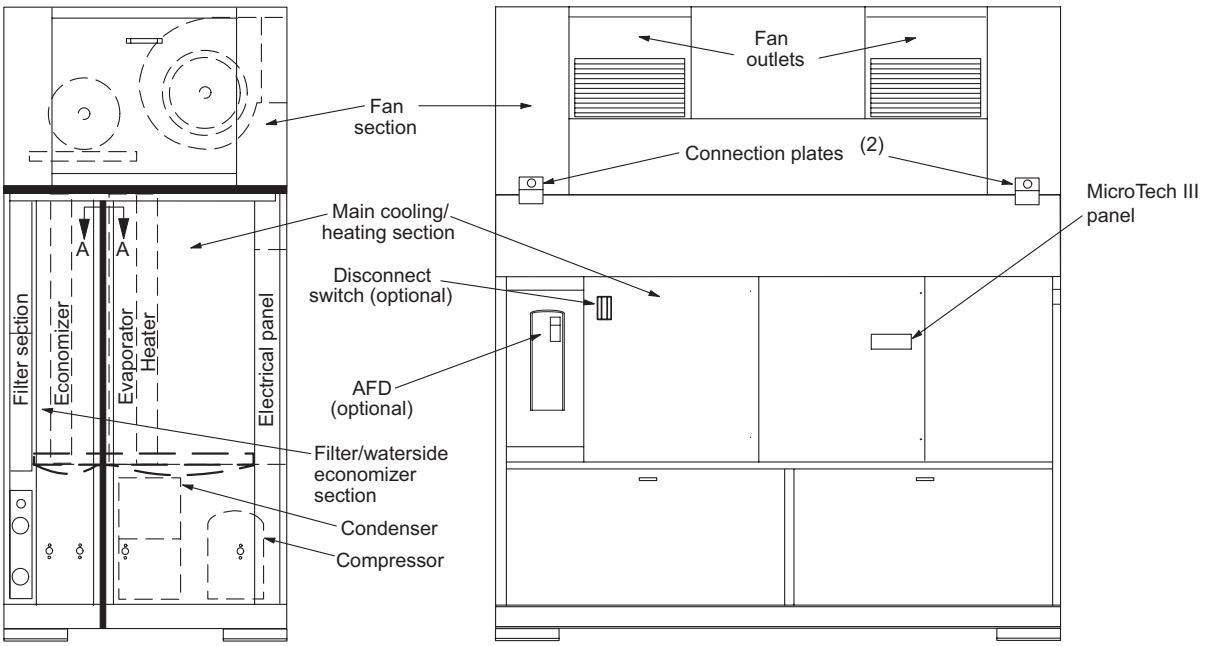
The following information is for units ordered for modular construction (code 32=1).

NOTE: Disassembly of units not ordered for modular construction (code 32=Y) requires field modification. Units not ordered for modular construction do not have victaulic couplings on the water pipes, and the various control sensors are mounted in the unit.

Two steel plates, which are the height of the sections, connect the main cooling/heating and the filter/waterside economizer sections. The plates are secured with multiple screws on the right and left side of the base sections. The connection plate and screws are illustrated in Figure 3.

- The filter/waterside economizer section overlaps the main cooling/heating sections along the bottom and top adjoining rails. Multiple screws connect the two sections along these bottom and top overlaps.
- Victaulic couplings connect the water pipes between the filter/waterside and main cooling/heating sections. Each victaulic coupling is secured with two bolts
- A flexible PVC tube with pipe clamps connects the condensate drain pipe between the two sections.

Figure 3: Discharge Duct Configuration



(1) Unit sizes 018, 023 and 028 have a single fan.
(2) Connection plates are also the rigging plates for the fan section only.

Field Mounting of Sensors

Units with Fan Section Shipped Separately (Code 21=*M)

The following items require field connection or mounting when the fan section is shipped separately:

Power harness

1. The power harness is located in the fan section with one end connected to the fan motor. Connect the other end of the power harness to the control panel.
2. Three penetration holes are provided to the control panel. The holes are pre-punched in the upper right hand side of the control panel (facing the control panel). Select one of the holes and cut out the insulation.
3. Mount the power harness conduit fitting in the hole.
4. Connect the three fan power wires to the leaving side of the electric component detailed on the power schematic.

Supply air sensor

The sensor, labeled DAT, ships loose in the main cooling/ heating section on the right side (facing the control panel). Move the DAT sensor into the fan section. The mounting location is on the right side of the fan section (facing the unit front). The mounting hole is labeled DAT on a plate at the bottom of the fan.

Duct high limit tube

The tube, labeled DHL, ships loose in the main cooling/ heating section on the left side (facing the unit front).

1. Mount the duct high limit tube on the left side of the fan section regardless of front or back discharge. The mounting location is labeled DHL TUBE on the flex duct metal.
2. Place the tube and holder through the flex duct assembly and screw the locking nut on the inside of the fan.

Units Ordered for Modular Construction (Code 32=1)

Right side of unit

The following items require field connection or mounting in the filter/waterside economizer section. Each item ships loose in the main cooling/ heating section. The three items are located on the right side of the section (facing the unit front). A hole is provided leaving the main cooling/heating section, entering the filter/waterside economizer section. Thread each item through this hole into the filter/waterside economizer section. The mounting location of the three items is the space after the filters, before the coils. The following provide mounting hole locations for each item:

- Mixed air sensor—Identify the sensor labeled MAT. Mount the sensor in the second hole from the top labeled MAT.
- Plastic tube for air flow and clogged filter switch—The tube for pressure sensing on the Proof of Air Flow Switch (PC7) and the Clogged Filter Switch (PC5) is labeled PC5/PC7.
- Freezstat—If the optional Freezstat is ordered, its control wiring must be connected. Plug the control wiring into the freezstat mounted on the top hole.

Left or right side of unit

The following are located on the same side of the unit as the water piping connections. The water piping connections can be ordered right hand or left hand. Each of these items requires field mounting or connections.

Mount the optional water flow switch in the leaving water line after all water tube brazing is complete. The flow switch is shipped wired but loose on the bottom of the unit near the water connections. A threaded plug is factory installed in the water line at the 9 o'clock or 3 o'clock position. Screw the flow switch into the plug using pipe dope or an equal thread sealer.

Mount the EWT temperature sensor in the filter/ waterside economizer section. The sensor is shipped wired but loose on the bottom of the main cooling/heating section, on the side of the water connections (Figure 4 and Figure 5).

Identify the sensor labeled EWT and mount to the holder on the entering water tube (Figure 4). The entering water tube is the bottom tube and is labeled at the point it penetrates the unit.

Connect the control wiring for the valve(s) actuator, which controls the water flow through the waterside economizer (optional) and condenser. The wire connectors from the control board are shipped loose in the base of the main cooling/heating section. The wire connectors from the valve actuator(s) are shipped loose in the base of filter/waterside economizer section.

The control wire coming from the actuator motor has a socket connector that matches the prong connector from the control panel. *If there is more than one actuator motor, match the wire number on the socket connector with the wire number on the prong connector. If the wire numbers are not matched, the valves will not be controlled properly.*

Figure 4: Water Connection Side of Unit

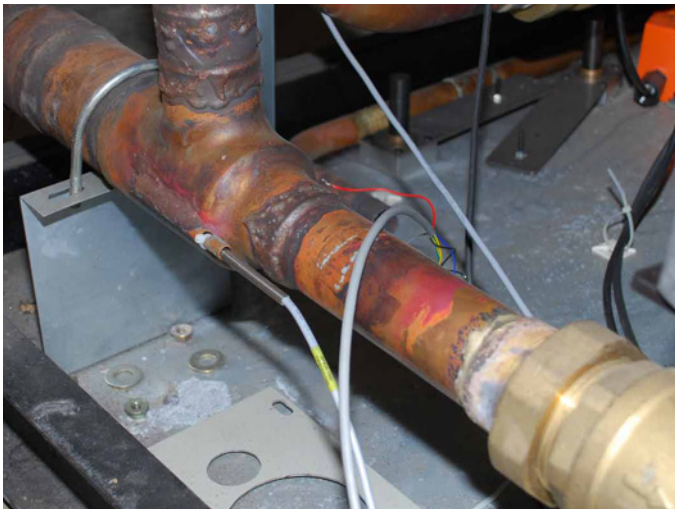
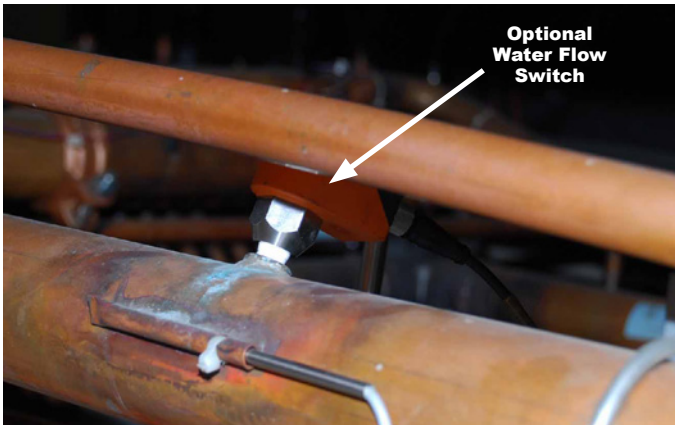


Figure 5: Back Side of Unit



Refrigerant Piping—Pressure Relief Valves

⚠ 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.

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 400 psig. The relief valve accommodates a 1/2" flare connection for applications where it is necessary to connect vent piping and run it outside the building.

Water Connections

General

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. With units with factory-provided water side economizer coil, run the piping connections to the outside of the unit cabinet. Connections are located behind a factory-mounted shipping cover. All connections are copper sweat connections as indicated on unit dimensional drawings.
4. Make supply and return water connections at the proper locations as indicated by the dimensional drawings. The supply (water in) connection is always the lower connection.
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 or higher. Without head pressure control, mechanical cooling is locked out below 55°F EWT.
6. If entering condenser water temperatures will go below 55°F, 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.

   If the water regulating valve is placed in service with the unit condenser, install it in the water line leaving the condenser; it should shut 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 180 psi (95°F condensing temperature) is recommended.
7. Condenser tube velocities must not exceed 10 feet per second. Flow and velocity will be satisfactory if water volumes do not exceed those shown in Table 2 on page 12.
8. Test water pipes for leaks in areas that include victaulic couplings before water is supplied to internal components.

Figure 6: Condenser Regulating Valve (Refrigerant Pressure Controlled)

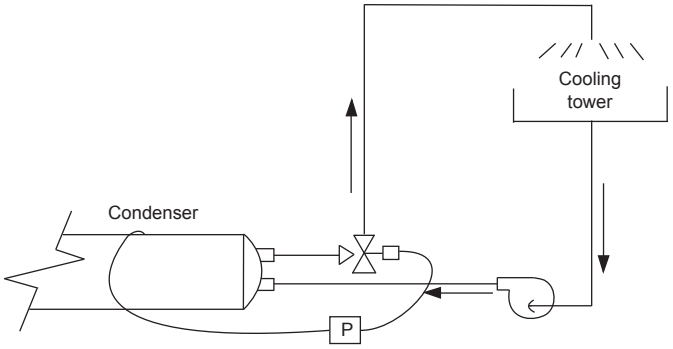
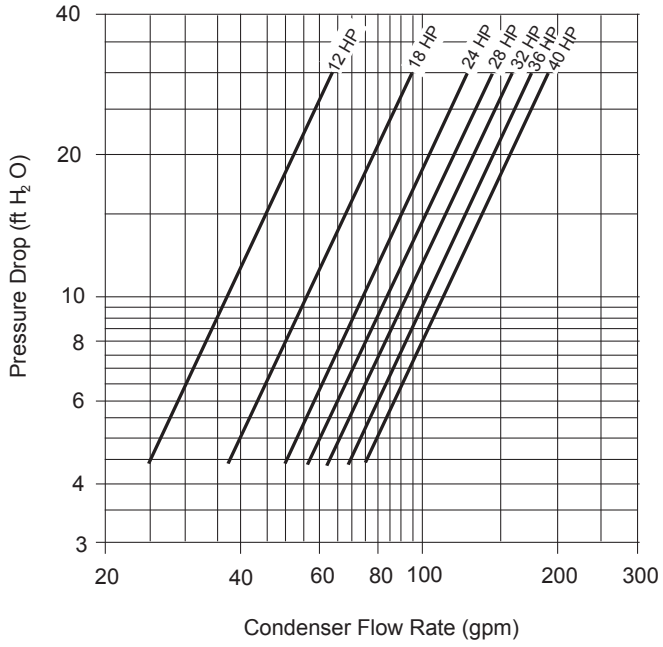
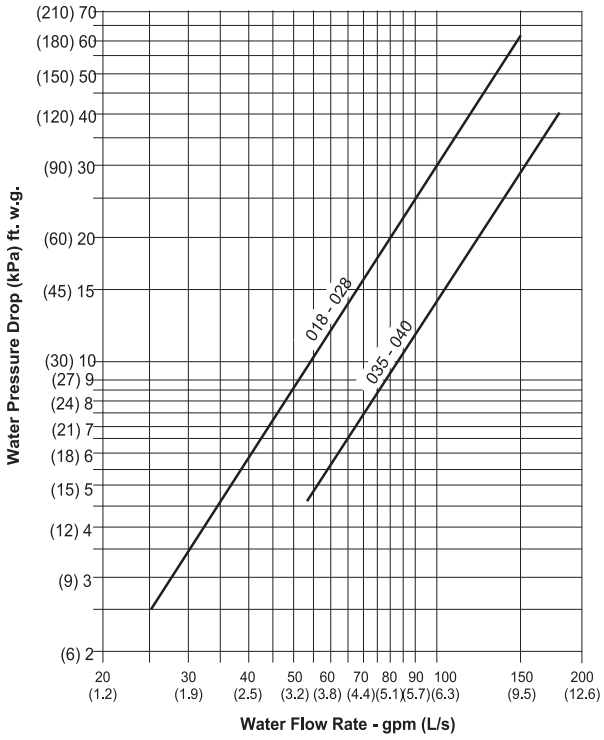


Figure 7: Condenser Water Pressure Drop, SWT 018 to 040, Independent Circuit



HP = total unit compressor horsepower

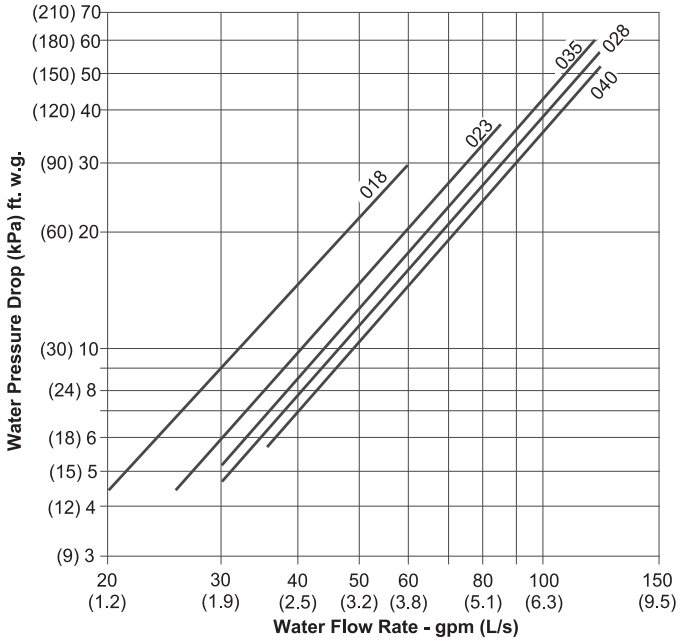
Figure 8: Economizer System Water Pressure Drop, SWT 018C through 040C



NOTE: Includes coil, Control valves, and interconnecting piping.

Add this ΔP to condenser ΔP to obtain unit ΔP for pump selection.

Figure 9: Hot Water Coil Water Pressure Drop (1-row), SWT018C through SWT040C

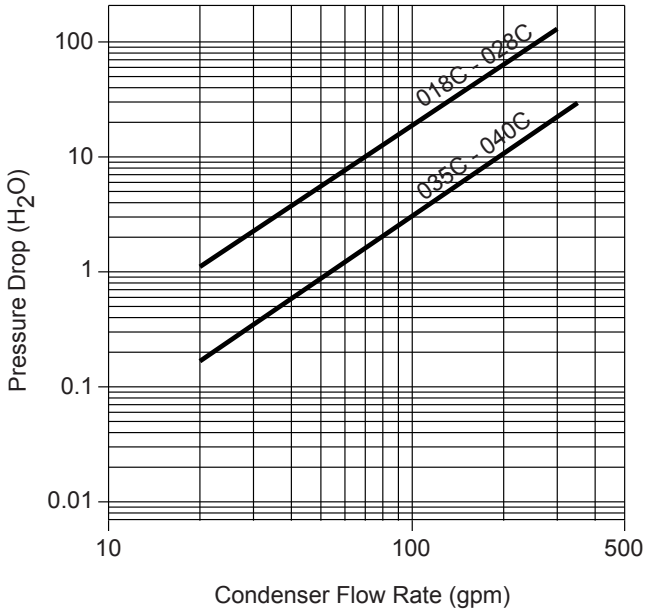


Note: Includes coil, control valve and interconnecting piping.

Condensate Drain Connection

The condensate drain connection is 1 1/8" O.D.S. copper and is located on the same end of the unit as the condenser water connections. The drain is internally trapped at the factory, requiring no external trap. Pitch the condensate line away from the unit with a minimum slope of 1/8" per foot. Keep drain pans and the drain trap clean by periodic cleaning. A cleanout is provided as standard in the trap.

Figure 10: Water Regulating Valve Pressure Drop Condensate Drain Connection



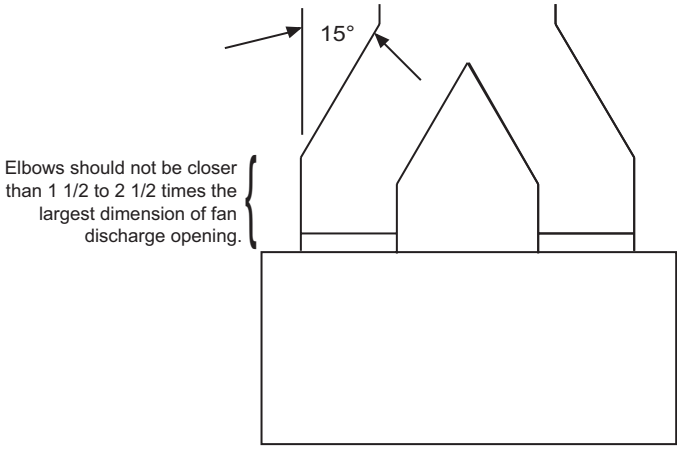
Duct Connections

Supply Air

To connect supply ductwork directly to the unit, first mount a duct collar at the fan outlet, avoiding the mounting screws located around the perimeter of the fan discharge opening. Fan discharge opening sizes are indicated on the unit dimensional drawings. Daikin recommends a canvas type connecting collar. To maintain specified fan performance, the two-fan units should incorporate a properly designed “pants” duct connection (Figure 11).

Units are available in two fan configurations as shown in Figure 11. Duct take-offs that are installed opposite to the direction of fan rotation result in an associated system effect loss and reduced fan performance.

Figure 11: Two-Fan Unit Top Detail



“Pants” duct connection

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. Refer to Figure 12. 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.

NOTE: Do not obstruct the unit access panel located below the return opening.

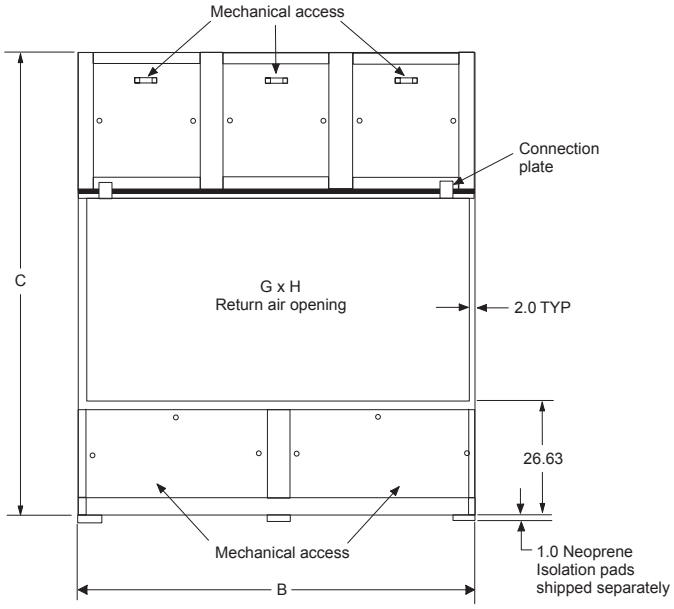
For units with ducted return, connect the open port on the clogged filter switch (PC5) to the return air duct.

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.

Figure 12: Return Duct Connections



Back Elevation

For dimensions, see Table 5 on page 14.

Unit Capacities and Physical Data

Table 2: SWT 018C to 040C English Units (SI Units)

Data	SWT model size				
	018C	023C	028C	035C	040C
Compressor					
Quantity	2,3, or 4 (4)	2, 3, or 4 (4)	4	4	4
Size	(see application chart, Table 4 on page 13.)				
Evaporator coil					
Face area; ft² (m²)	11.8 (1.10)	15.3 (1.42)	18.9 (1.76)	23.3 (2.16)	26.3 (2.44)
Rows	4, 6	4, 6	4, 6	4, 6	4, 6
FPI	12	12	12	12	12
Performance					
Nominal tons	13.6	19.7	25.8	31.1	35.6
Waterside economizer coil					
Face area; ft² (m²)	11.8 (1.10)	15.3 (1.42)	18.9 (1.76)	23.3 (2.16)	26.3 (2.44)
Rows	4	4	4	4	4
FPI	12	12	12	12	12
Max. working press.; psi. (Pa)	400 (2.8)	400 (2.8)	400 (2.8)	400 (2.8)	400 (2.8)
Hot water heating coil					
Face area; ft² (m²)	9.3 ()	12.8 ()	16.3 ()	20.2 ()	23.8 ()
Rows	1	1	1	1	1
FPI	12	12	12	12	12
Electric heat					
kW	34	34	34	34	34
Filters					
[Qty] size; in. (mm) 4" depth; {102 mm depth}	[3] 20×20 (405×405)	[3] 20×20 (405×405)	[3] 20×20 (405×405)	[5] 20×20 (508×50)	[5] 20×20 (508×50)
	[2] 25×20 (508×405)	[2] 25×20 (508×405)	[2] 25×20 (508×405)	[5] 25×20 (508×63)	[5] 25×20 (508×63)
	[4] 16×25 (50×508)	[4] 16×25 (50×508)	[4] 16×25 (50×508)	—	—
Evaporator fan					
Quantity	1	1	1	2	2
Size; in. (mm)	15	18	18	15–15	15–15
Minimum hp	5	7.5	10	10	15
Maximum hp	10	15	20	20	25
Min. design; cfm (L/s), CV	2950 (310)	3825 (852)	4725 (1053)	5825 (1298)	6575 (1465)
Min. design; cfm (L/s), VAV	4720 (2228)	6120 (2889)	7560 (3568)	9320 (4399)	10520 (4965)
Max. design; cfm (L/s)	7080 (3342)	9180 (4333)	11340 (5352)	13980 (6599)	15780 (7448)
Condenser					
W.S. working press.; psi (Pa)	400 (2.8)	400 (2.8)	400 (2.8)	400 (2.8)	400 (2.8)
Min entering temp.; °F (°C)	55 (13)	55 (13)	55 (13)	55 (13)	55 (13)

Table 3: Single Compressor Circuit Charge, R-407C

Compressor (hp)	Refrigerant charge per circuit (R-407C)*	Oil charge per circuit (oz)
6	9 lbs	60
10	13 lbs	110
13	17 lbs	140

NOTE: *Charge quantities listed are average. Actual charge quantity is dependent on individual unit evaporator coil circuiting. Actual charge quantities are stamped on each unit nameplate.

Table 4: Compressor Application Chart

SWT model size	Compressor horsepower				MIN. GPM (L/s)	MAX GPM CKT (L/s)
	#1 CKT	#2 CKT	#3 CKT	#4		
018C	—	—	—	—	24 (1.5)	42 (2.7)
	6	6	6	—	36 (2.3)	62 (4.0)
	6	6	6	6	48 (3.0)	84 (5.3)
023C	6	6	6	—	35 (2.2)	65 (4.1)
	6	6	6	6	48 (3.0)	84 (5.3)
	6	6	6	6	58 (3.7)	102 (6.4)
	6	6	6	10	58 (3.7)	102 (6.4)
	6	6	10	10	68 (4.3)	119 (7.5)
028C	6	6	6	6	48 (3.0)	84 (5.3)
	6	6	6	10	58 (3.7)	102 (6.4)
	6	6	10	10	68 (4.3)	119 (7.5)
	6	10	10	10	78 (4.9)	137 (8.7)
035C	6	6	6	10	58 (3.7)	102 (6.4)
	6	6	10	10	68 (4.3)	119 (7.5)
	6	10	10	10	78 (4.9)	137 (8.7)
	10	10	10	10	88 (5.6)	154 (9.7)
040C	6	6	6	10	58 (3.7)	102 (6.4)
	6	6	10	10	68 (4.3)	119 (7.5)
	6	10	10	10	78 (4.9)	137 (8.7)
	10	10	10	10	88 (5.6)	154 (9.7)
	10	10	13	13	104 (6.5)	183 (11.5)
	13	13	13	13	120 (7.6)	212 (13.4)

Dimensions

Table 5 contains dimensions that vary from unit to unit, marked with letters (A, B, C, etc.) in the figures. Depth, length, and height dimensions do not include the handle, latch, or fastener extensions. For shipping dimensions, the skid adds 4" (102 mm) to depth, 8" (204 mm) to the length, and 4" (102 mm) to the height.

There are two victaulic connections for condenser water at the module split (see Figure 13).

Service connections are determined facing the front of the unit. Left-hand standard are standard; right-hand connections are optional. Please indicate on the unit submittal. Unit sizes 018C, 023C, and 028C have a single fan. Unit sizes 018C, 023C, and 028C have a single mechanical access panel in the bottom front and the bottom back (see Figure 14).

Filters are removable from the rear of the unit or through a side filter access door, located on the piping connection side. When the water economizer option is ordered, unit length increases by approximately 3.5" (89 mm) for piping connections. The mechanical access panel(s) in the back of the unit start 2" (51mm) below the return duct opening. Do not obstruct the access panel(s). On units 018C, 023C and 028C, there are two access doors. All dimensions ± 0.25" (6.4 mm). See Figure 15.

Table 5: SWT Dimensions

Basic unit	018C	023C	028C	035C	040C
A. Depth in. (mm)	52.00 (1321)	52.00 (1321)	52.00 (1321)	52.00 (1321)	52.00 (1321)
B. Length in. (mm)	84.00 (2134)	84.00 (2134)	84.00 (2134)	100.00 (2540)	100.00 (2540)
C. Height in. (mm)	112.75 (2864)	112.75 (2864)	112.75 (2864)	112.75 (2864)	112.75 (2864)
D. Fan discharge in. (mm)	18.62 (473)	21.88 (556)	21.88 (556)	18.62 (473)	18.62 (473)
E. Fan discharge in. (mm)	15.88 (403)	18.88 (480)	18.88 (480)	15.88 (403)	15.88 (403)
F. Unit side to fan in. (mm)	32.69 (830)	31.06 (789)	31.06 (789)	23.88 (606)	23.88 (606)
G. Return duct height in. (mm)	45.94 (1167)	45.94 (1167)	45.94 (1167)	45.94 (1167)	45.94 (1167)
H. Return duct length in. (mm)	80.00 (2032)	80.00 (2032)	80.00 (2032)	96.00 (2438)	96.00 (2438)
J. Water out/in (ODS)	2-1/8	2-1/8	2-1/8	2-5/8	2-5/8
K. Hot water out/in (ODS)	1-5/8	1-5/8	1-5/8	1-5/8	1-5/8
L. To fan discharge in. (mm)	2.0 (51)	2.00 (51)	2.00 (51)	6.46 (164)	6.46 (164)

Figure 13: Unit Discharges

For dimensions B, C, G, H, J, K, see Table 5 on page 14.

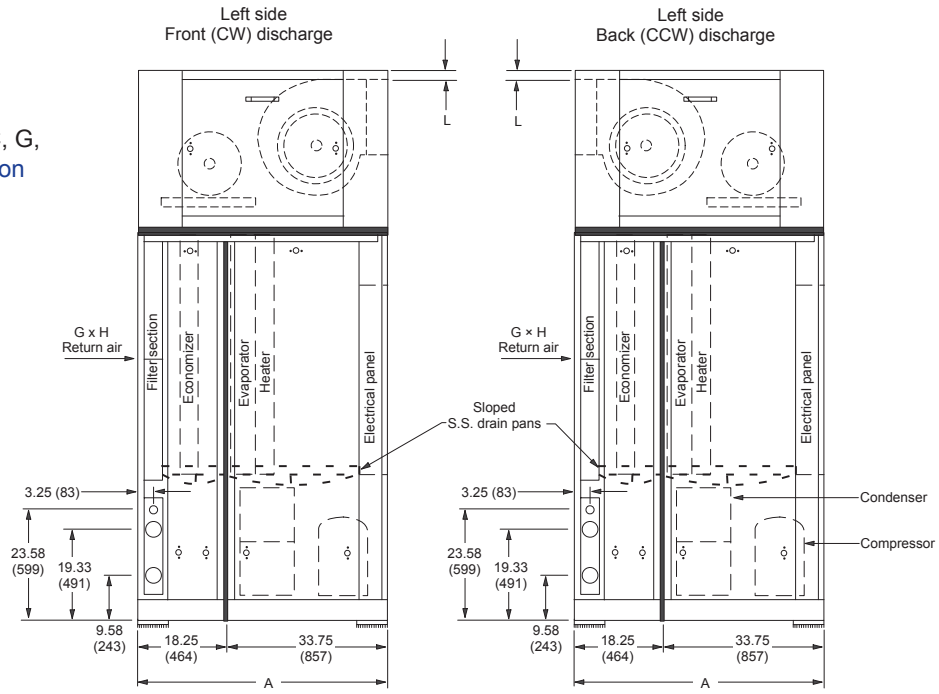


Figure 14: Unit Front Plan and Front Elevation

For dimensions B, C, G, H, J, K, see Table 5 on page 14.

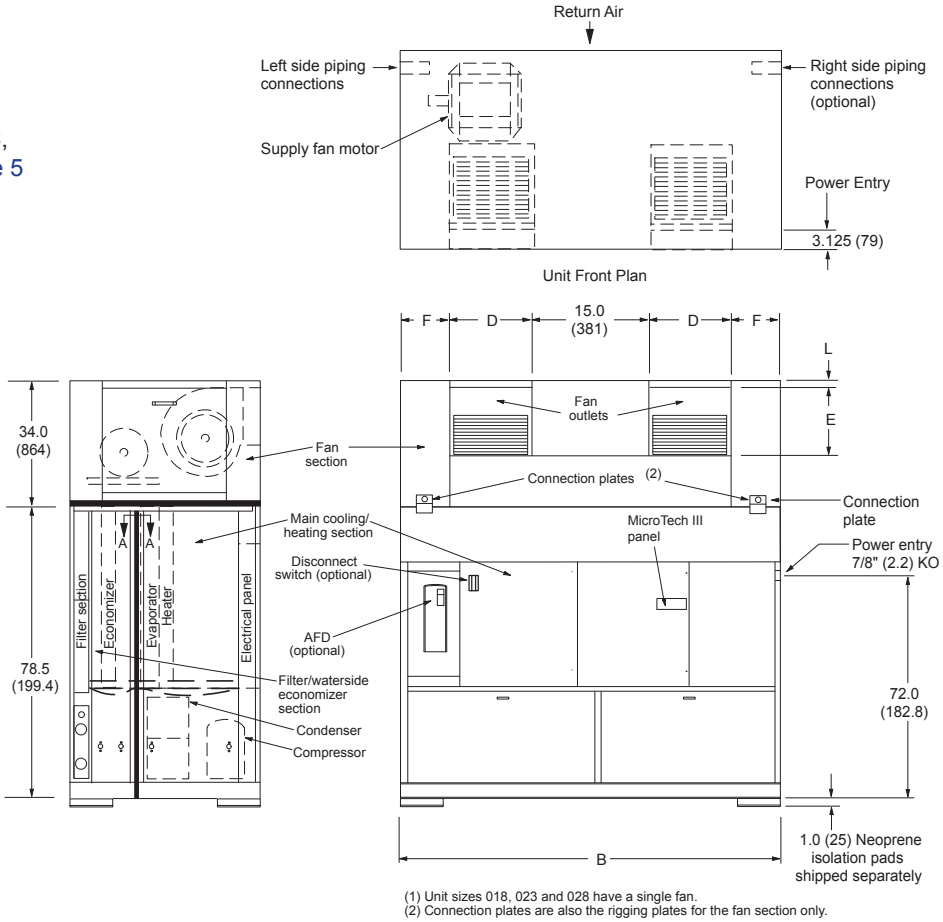
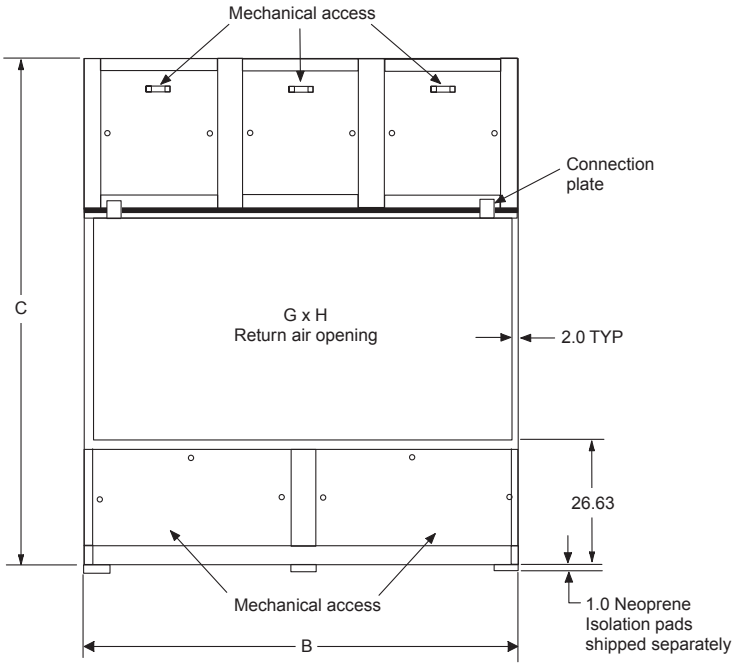
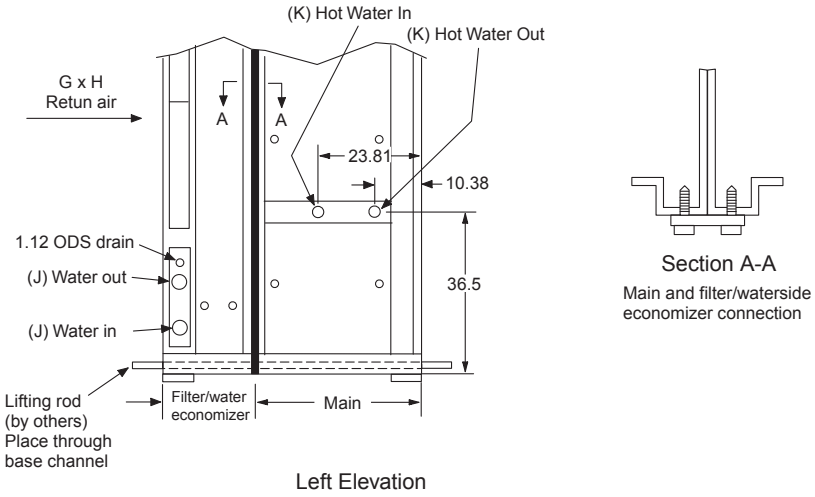


Figure 15: Back Elevation and Left Side



Back Elevation



Left Elevation

For dimensions B, C, G, H, J, K, see Table 5 on page 14.

Table 6: Unit and Component Weight—English Units in lbs; Metric Units in (kg)

Component		Unit size				
		018 C	023 C	028 C	035 C	040 C
Main cooling/heating section						
Main base		946 (429)	946 (429)	946 (429)	1045 () 474	1045 (474)
4 row DX coil		206 (94)	238 (108)	278 (126)	333 (151)	354 (161)
6 row DX coil		250 (113)	294 (133)	347 (157)	417 (189)	450 (204)
Comp./cond. water						
(4) 6 hp	43 (20)	856 (388)	856 (388)	856 (388)	856 (388)	—
(3) 6, (1) 10 hp	57 (26)	—	987 (448)	987 (448)	987 (448)	987 (448)
(2) 6, (2) 10 hp	66 (30)	—	1105 (501)	1105 (501)	1105 (501)	1105 (501)
(1) 6, (3) l0 hp	74 (34)	—	—	1233 (559)	1233 (559)	1233 (559)
(4) 10 hp	95 (43)	—	—	—	1368 (621)	1368 (621)
(2) 10, (2) 13 hp	—	—	—	—	—	1511 (680)
(4) 13 hp	—	—	—	—	—	1654 (744)
Hot water coil, 1 row, 12 fpi[1]		71 (32)	97 (44)	119 (54)	130 (59)	152 (69)
HW coil water		16 (7)	20 (9)	23 (10)	28 (13)	32 (15)
Electric heat—34 kW		20 (9)	20 (9)	20 (9)	20 (9)	20 (9)
Skid for main		99 (45)	99 (45)	99 (45)	115 (52)	115 (52)
Filter/waterside economizer section						
Base		368 (167)	368 (167)	368 (167)	428 (194)	428 (194)
Water economizer coil, 4 row[2]		266 (121)	298 (135)	340 (154)	393 (178)	410 (186)
Economizer water		51 (23)	65 (29)	75 (34)	94 (43)	111 (50)
Fan section						
Fan and frame		900 (408)	930 (422)	930 (422)	1120 (508)	1120 (508)
Skid for fan section		98 (44)	98 (44)	98 (44)	115 (52)	115 (52)
Supply fan motors						
3 hp open drip proof		71 (32)	—	—	—	—
5 hp open drip proof		82 (37)	—	—	—	—
7 1/2 hp open drip proof		124 (56)	124 (56)	—	—	—
l0 hp open drip proof		144 (65)	144 (65)	144 (65)	144 (65)	—
l5 hp open drip proof		—	185 (84)	185 (84)	185 (84)	185 (84)
20 hp open drip proof		—	—	214 (97)	214 (97)	214 (97)
25 hp open drip proof		—	—	—	—	266 (121)
3 hp totally enclosed		72 (32)	—	—	—	—
5 hp totally enclosed		85 (39)	—	—	—	—
71/2 hp totally enclosed		140 (64)	140 (64)	—	—	—
10 hp totally enclosed		170 (77)	170 (77)	170 (77)	170 (77)	—
15 hp totally enclosed		—	235 (107)	235 (107)	235 (107)	235 (107)
20 hp totally enclosed		—	—	300 (136)	300 (136)	300 (136)
25 hp totally enclosed		—	—	—	—	330 (150)

1. Hot water coil weight includes valve piping.
2. Water economizer weight includes valves and piping.

Field Wiring

Wiring must comply with all applicable codes and ordinances. Daikin's product warranty does not cover equipment failures caused or contributed to by wiring not in accordance with specifications. An 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. Each branch circuit within the control panel is fused individually. A single field-supplied disconnect is required or a unit-mounted, nonfused disconnect can be ordered with the unit.

Power entry can be made on the right hand unit upright. A 7/8" pilot knockout is provided on the upright 72" up from the bottom and 3-1/8" in from the front of the unit. See Figure 14 on page 15. 24 V field connections are suitable for Class II wiring.

Unit Disconnect

Disconnecting means are addressed by Article 440 of the National Electric Code (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, nonfused disconnect is available.

Return Air and Outside Air Sensors

All units are provided with a return air sensor. It is connected to the input control board and is coiled and placed in the control box of the unit for shipment. Field install it in the return air stream for proper unit operation. The return air sensor is connected to the unit's input board at location AI4 (see IM 710).

The outside air sensor is optional and can be ordered with the unit. It ships loose in a package and is located on the floor of the fan section. The outside air sensor is field wired to terminal strip TB2. It is connected at terminals 124 and 125.

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

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 (Figure 16).

Figure 16: Return/Outside Air Sensor Mounting

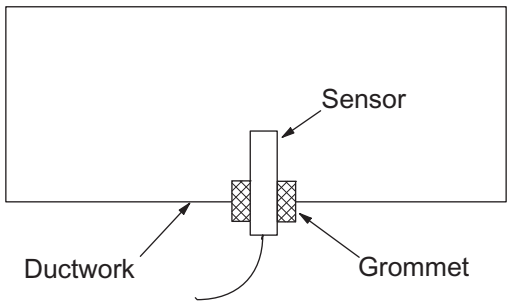


Table 7: Compressor Motors

Compressor hp	Refrigerant	208/60/3		230/60/3		460/60/3		575/60/3	
		RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA
6	R-407	14.7	156	14.7	156	7.3	75.0	5.8	54.0
10	R-407	27.5	278.0	27.5	278.0	13.8	127.0	11.0	100.0
13	R-407	32.5	350.0	32.5	350.0	16.2	158.0	13.0	125.0

Table 8: Electric Heaters

SWP unit size	208 V, 60 Hz, 3 phase			230 V, 60 Hz, 3 phase			400 V, 50 Hz, 3 phase			460 V, 60 Hz, 3 ph			575 V, 60 Hz, 3 phase		
	kW	MBh	FLA	kW	MBh	FLA	kW	MBh	FLA	kW	MBh	FLA	kW	MBh	FLA
018 to 040	27.8	94	77.2	34	116	85.6	25.7	88	37.2	34	116	42.8	34	116	34.2

Table 9: 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	High efficiency	9.9	9.0	4.5	4.5	3.4
	Premium efficiency	9.3	8.2	4.1	4.1	3.1
5	High efficiency	16.1	14.0	7.0	7.0	5.3
	Premium efficiency	15.7	13.6	6.8	6.8	5.2
7.5	High efficiency	25.0	21.6	10.8	10.8	8.2
	Premium efficiency	22.3	20.0	10.0	10.0	7.4
10	High efficiency	33.0	28.0	14.0	14.0	11.0
	Premium efficiency	29.0	25.8	12.9	12.9	10.3
15	High efficiency	44.8	40.6	20.3	20.3	16.2
	Premium efficiency	43.4	37.8	18.9	18.9	14.1
20	High efficiency	61.0	50.0	25.0	25.0	20.0
	Premium efficiency	57.0	49.0	24.5	24.5	18.9
25	High efficiency	74.0	62.0	31.0	31.0	24.3
	Premium efficiency	70.0	61.0	30.5	30.5	24.2

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. 87 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 + 2 amps

   b. For units with cooling capability and nonconcurrent electric heat capability:

      In the cooling mode, the loads are composed of supply fan motor and compressors. In heating mode, the loads are composed of supply fan motor and electric heater. The MCA is calculated for unit running in either mode; the highest value obtained is used for the MCA.

      – For unit in cooling mode:
        MCA = 1.25 (largest RLA or FLA) + other loads + 2 amps
      – For unit in heating mode, below 60 kW:
        MCA = 1.25 (electric heat FLA + fan FLA) + 2 amps
      – For unit in heating mode, above 50 kW:
        MCA = 1.25 (SAF amps) + (electric heat) + 2 amps
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 Sizes

For Single Disconnect or Power Block

Table 10: Single Disconnect

Unit	Voltage	Size (amps)
018 to 028	208/230	225
018 to 028	400/460	100
018 to 028	575	100
035 to 040	208/230	225
035 to 040	400/460	150
035	575	100
040	575	150

Table 11: Lug sizes for single disconnect

Disconnect size	Lug size
100	#6-2/0
150	#2-3/0
225	#3-300 MCM
250	#4-350 MCM
400	250 MCM-500 MCM
600	250 MCM-350 MCM

Table 12: Lug sizes for power block

Power block size	Lug size
310	#6-35 MCM
420	#2-600 MCM
570	(2) #4-300 MCM
760	(2) #6-500 MCM

NOTE: Use copper wire only.

Control Center

All electrical controls are enclosed in a central control center (see Figure 17) located at the front 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
- Compressor contactors, M1–M6
- Compressor fuses, FB1–FB6
- Electric heat contactors, M11–M16
- Transformer, T1, T2, T3
- Disconnect switch, DS1–DS2
- Power block, PB1–PB2
- Manual motor protector, MMP30
- Circuit breaker, CB10

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

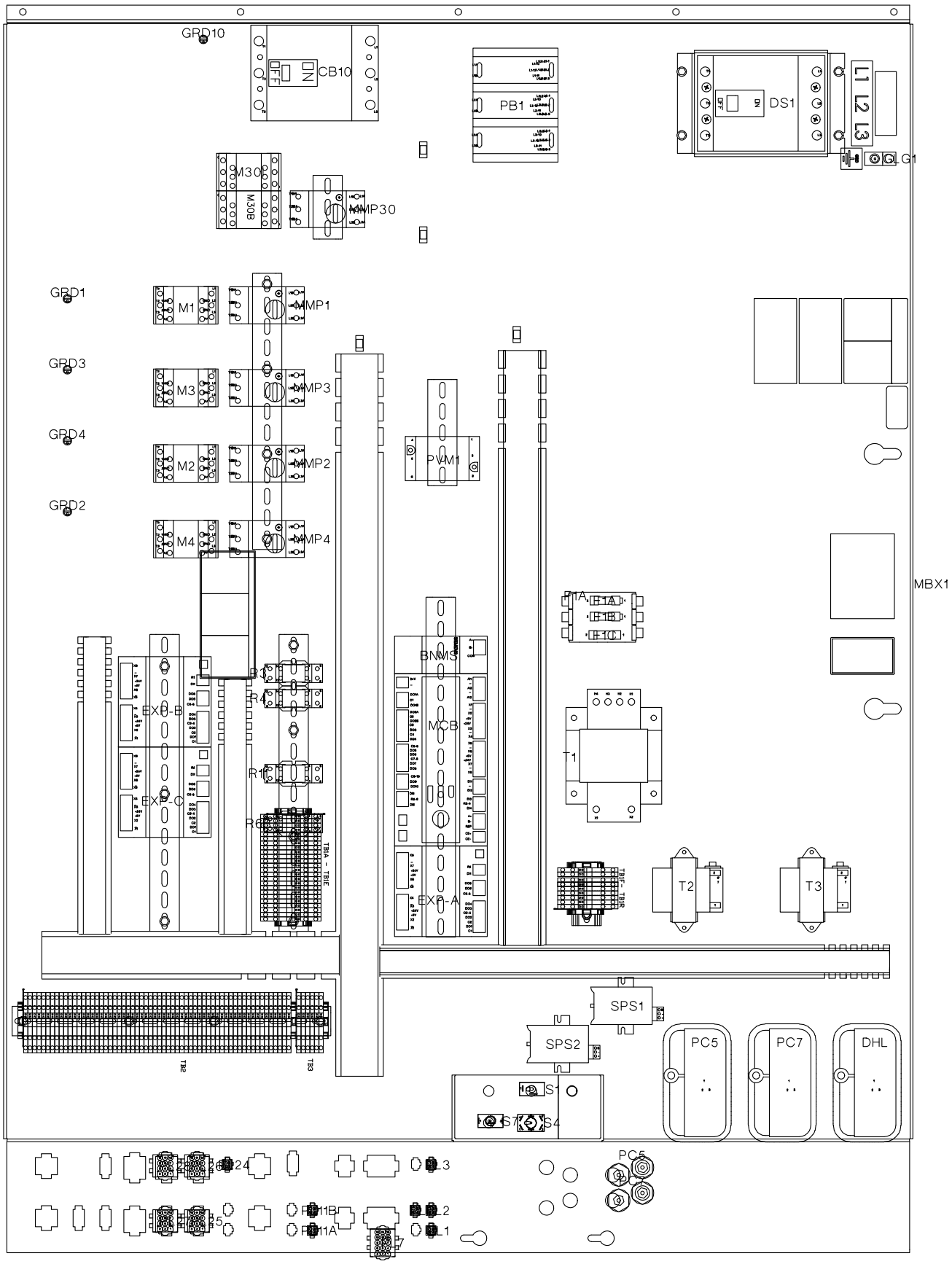
Low voltage components are located in the upper left compartment and include:

- MicroTech III main control board, MCB
- MicroTech III expansion modules
- 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*

Located ion the control panel is the interactive MicroTech III keypad/display and unit switch.

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

Figure 17: Typical 460 Volt, 6 Compressor Control Center Layout, High and Low Voltage Compartments



Electrical Legend

General Notes

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

ID	Description	Standard Location
ACT3, 4	Actuator motor, economizer	Comp/cond section
AFD10	Adjustable frequency drive, supply fan	Front assembly
CB10	Circuit breaker, supply fan	Main control box
CCB1, 2	Compressor control boards, refrig. circuits	Main control box
DAT	Discharge air temperature sensor	Discharge section
DHL	Duct hi-limit	Main control box
DS1	Disconnect, total unit or cond/heat	Main control box
DS2	Disconnect, SAF/RAF/ controls	Main control box
F1A, B	Fuse, control circuit transformer (t1), primary	Main control box
F1C	Fuse, control circuit transformer (t1), secondary	Main control box
FB11, 12	Fuseblock, electric heat (top bank)	Main control box
FB13, 14	Fuseblock, electric heat (bot. bank)	Main control box
HL11A, HL11B	Hi-limits, pwr, elec heaters (top bank)	Heat section, electric
HL12A, HL12B	Hi-limits, pwr, elec heaters (bot. bank)	Heat section, electric
HP1–6	Hi-pressure controls, refrig	On compressors
LP1–6	Low-pressure controls, refrigeration	On compressors
M1–6, M21–26	Contactor, compressor	Main control box
M9 M10	Contactor, supply fan	Main control box

ID	Description	Standard Location
M30	Contactor, reversing, invertor bypass, supply fan	Inverter bypass box
MCB	Microprocessor circuit board	Main control box
MJ	Mechanical jumper	All control boxes
MMP1–6, MMP21–26	Manual motor protector, compressors	Main control box
MMP9–10	Manual motor protector, supply fan	Main control box
MP1–6	Motor protector, compr.#1–6	On compressors
OAT	Outside air temperature sensor	Economizer section
PB1, 2	Power block, power distribution	Main control box
PB10	Power block, supply fan	Main control box
PC5	Pressure control, clogged filter	Main control box
PC7	Pressure control, proof airflow	Main control box
PB10	Power block, supply fan	Main control box
PVM1, 2	Phase voltage monitor	Main control box
R1–6	Relay, compressor high pressure	Main control box
R62, 63, 65	Relay, use on specials	Main control box
R70–79	Relay, use on specials	Main control box
RAT	Return air temperature sensor	Main control box
S1	Switch, system ON/OFF	Main control box
S4	Switch, inverter bypass, ON/ OFF	Main control box
S7	Switch, local ON/AUTO/ OFF to controller	Main control box
SPS1, 2	Static pressure sensors, duct/building	Main control box
PSR1, 2	Pressure transducer, head pressure control	Condenser section
T1	Transformer, main control (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
T4	Transformer, exh. damper actuator (115/12 VDC)	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/discharge section
VM1	Valve motor #1, heating	Heat section
ZNT1	Zone temp. sensor, setback	Field installed

Typical Wiring Schematics

Figure 18: Compressor Power Schematic

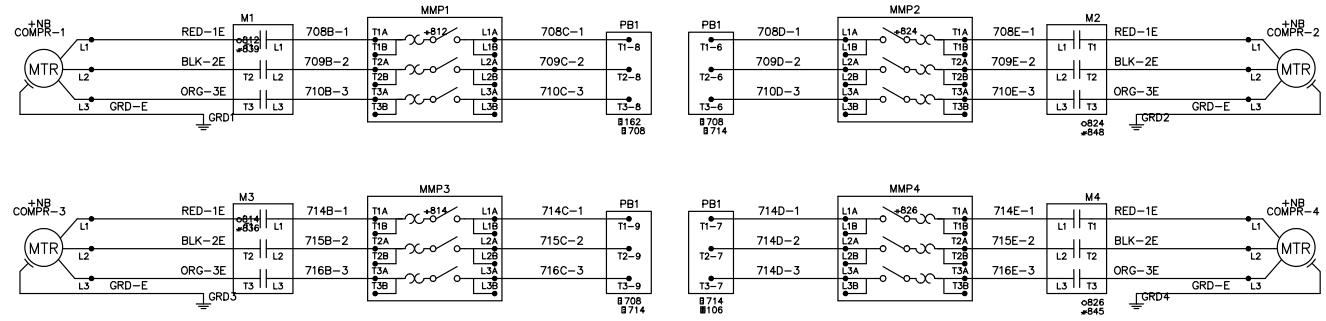


Figure 19: Main Power Schematic

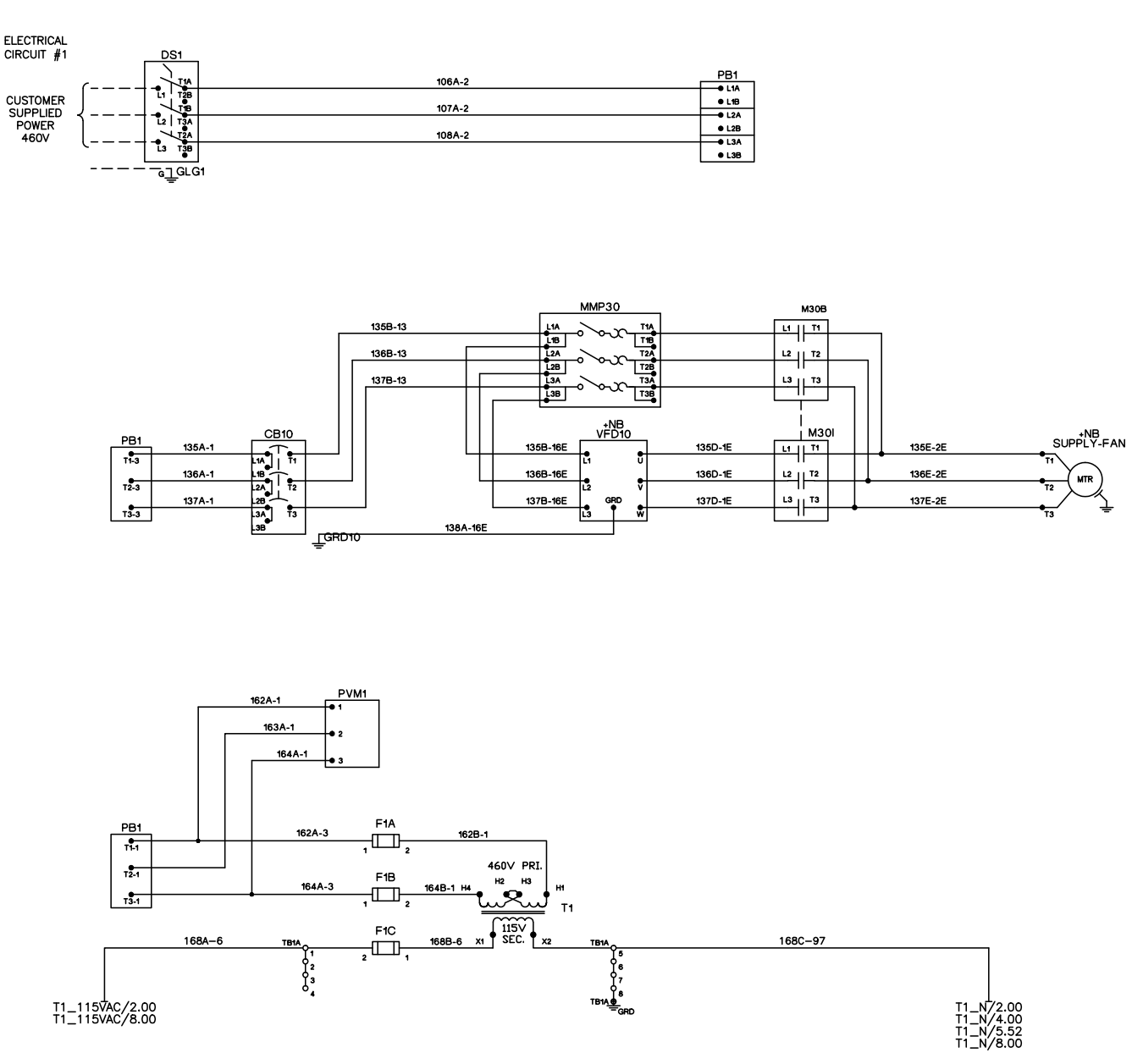


Figure 20: Control Input Schematic, Variable Air Volume

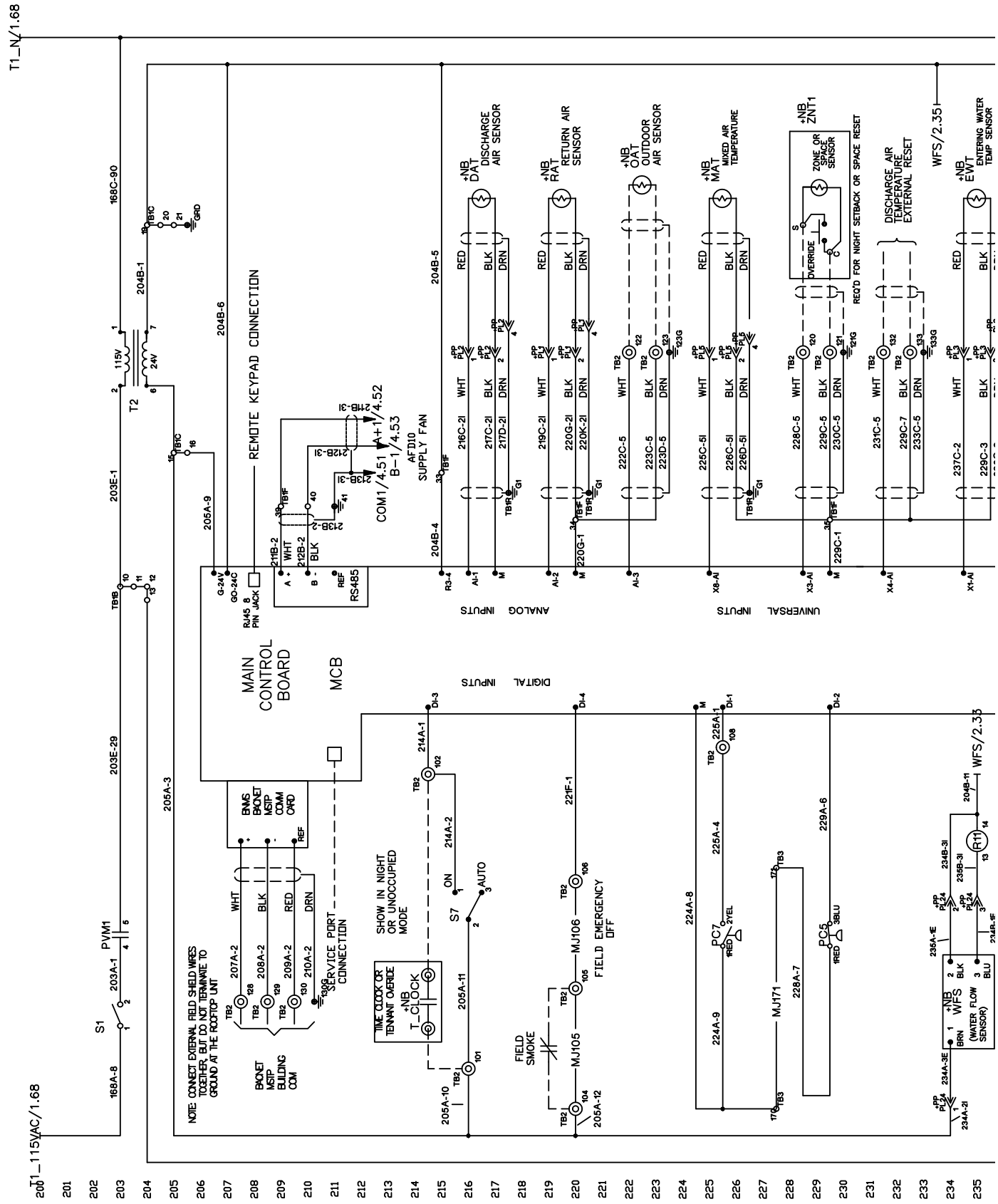


Figure 20 continued: Control Input Schematic, Variable Air Volume

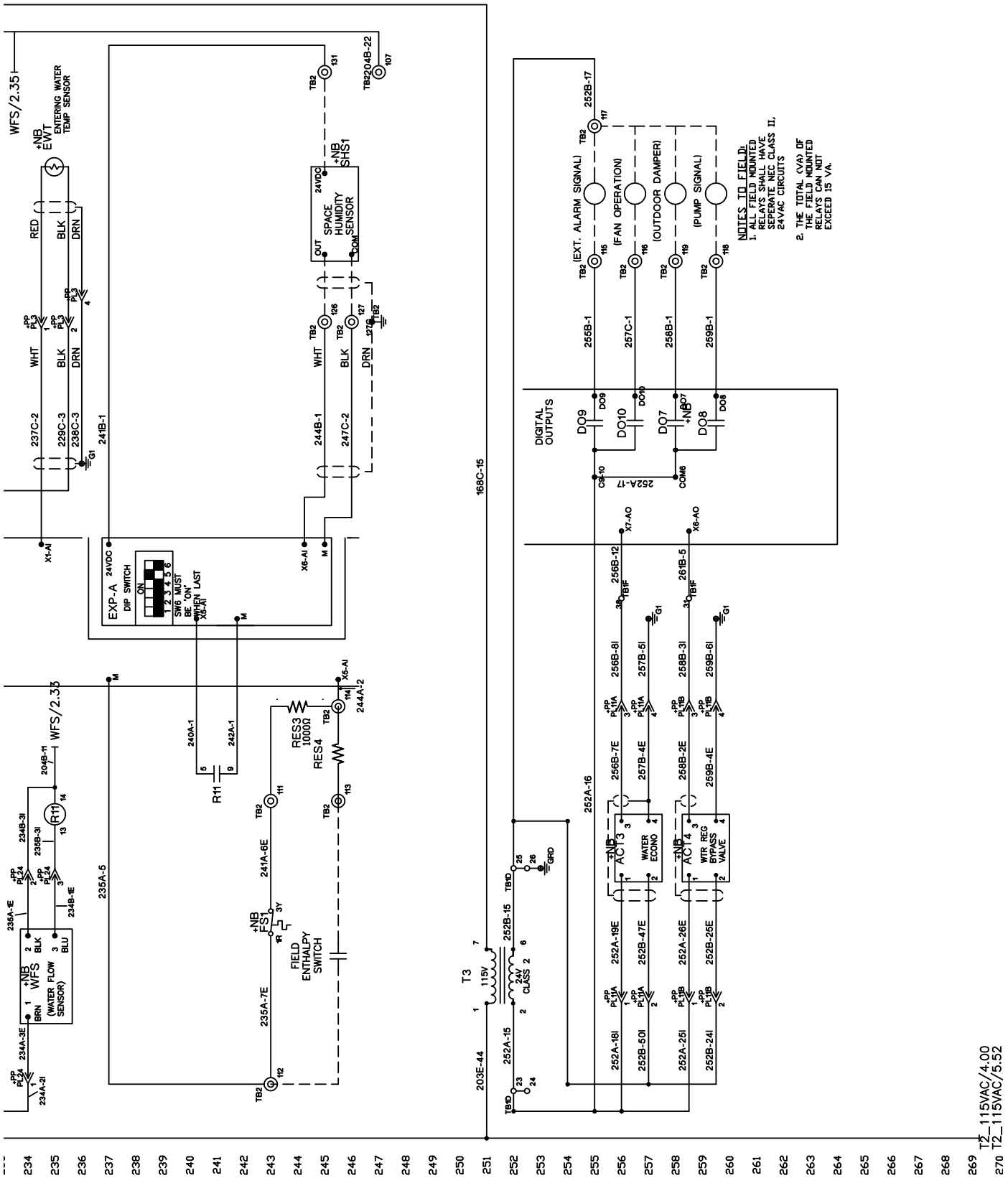


Figure 21: Condenser Output Schematic, Independent Refrigerant Circuit

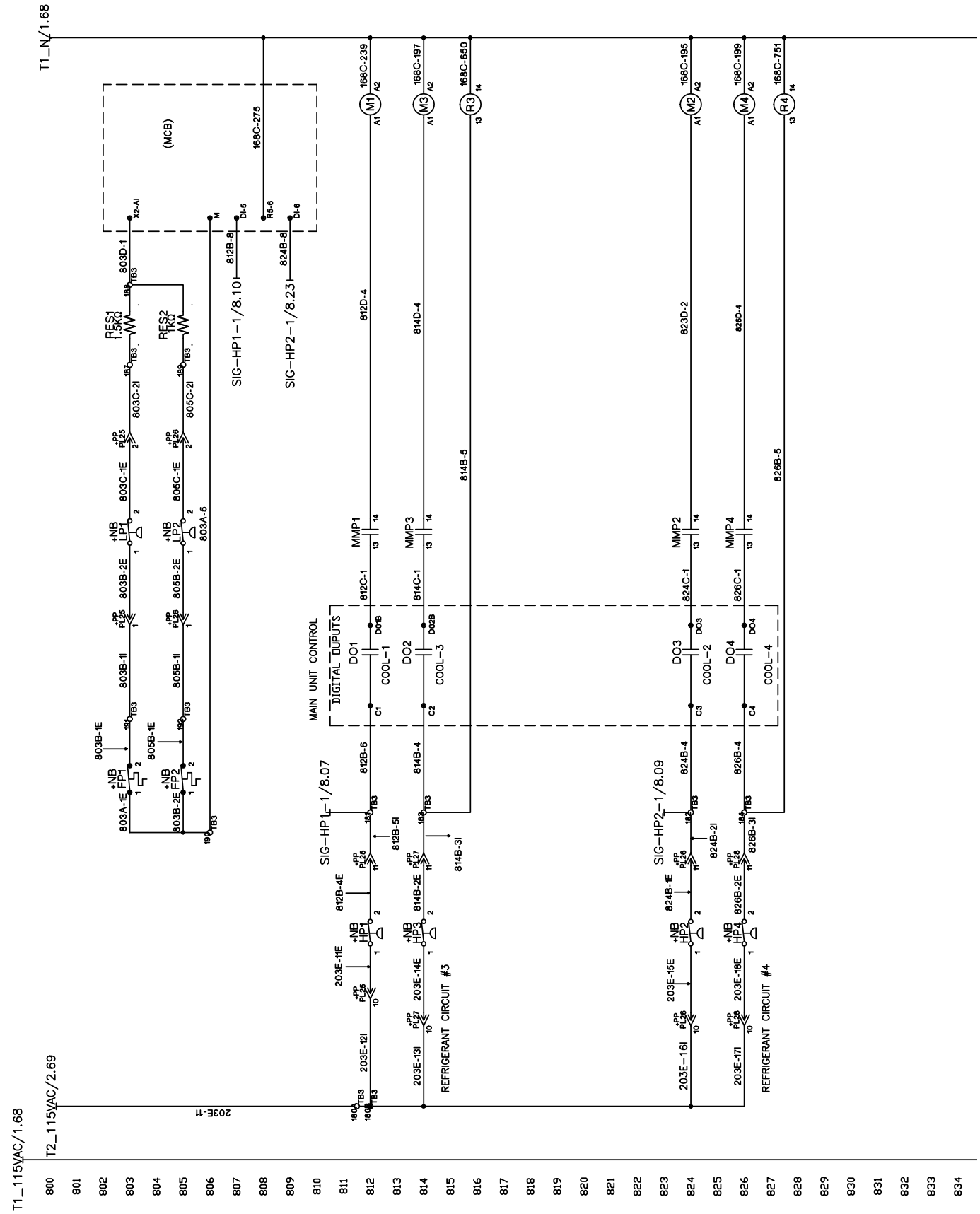


Figure 21 continued: Condenser Output Schematic, Independent Refrigerant Circuit

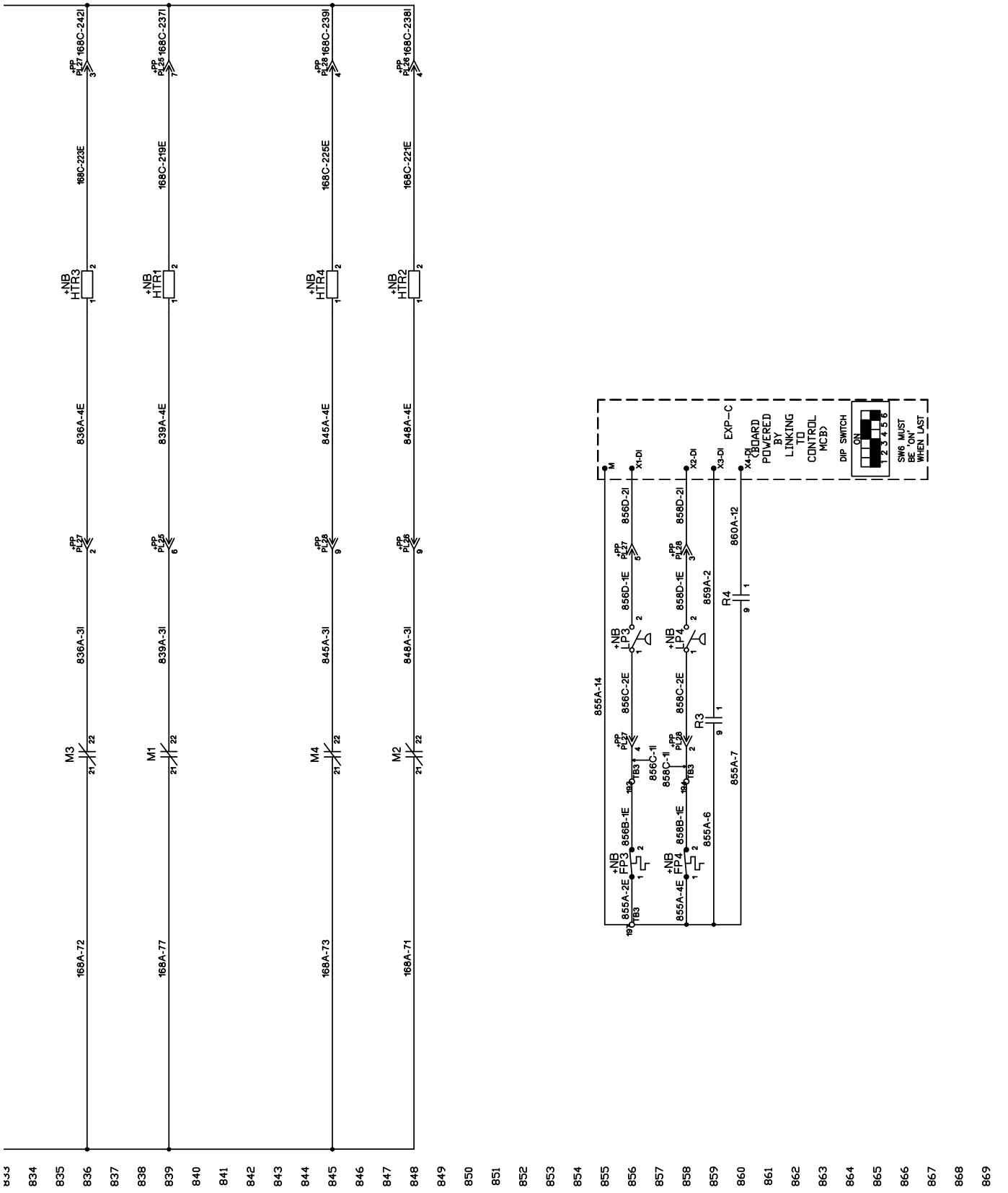


Figure 22: Inverter Output Schematic

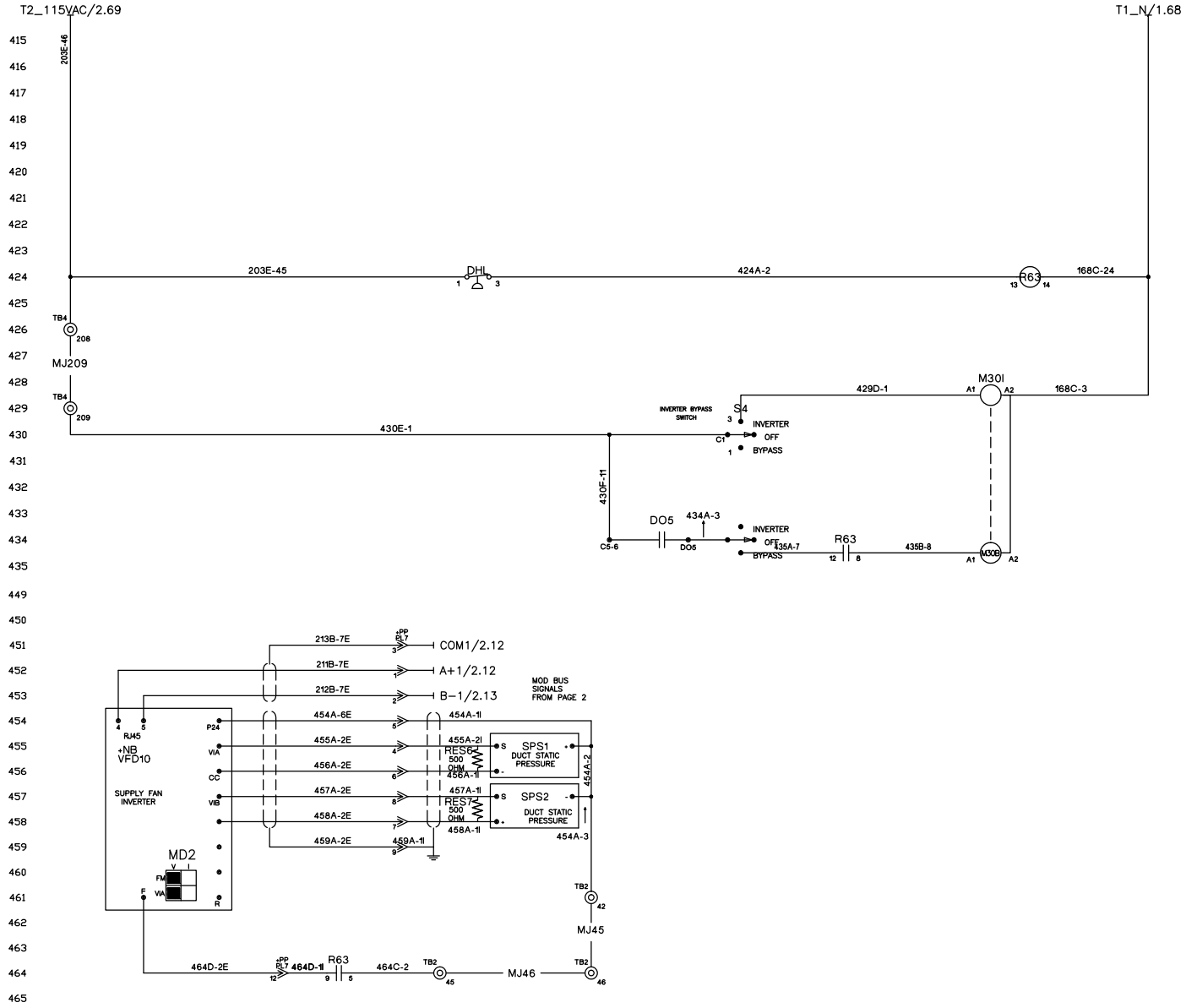
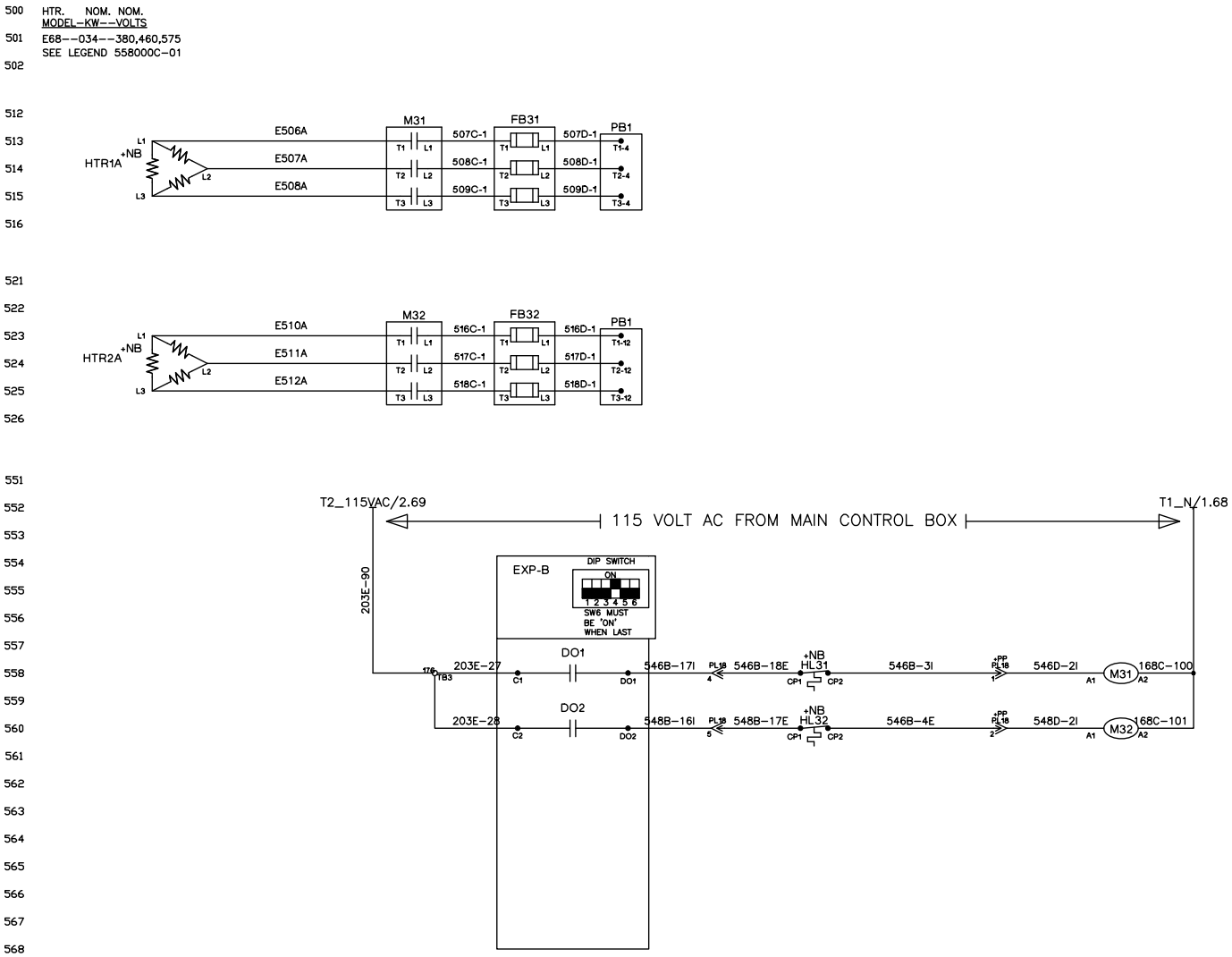


Figure 23: Electric Heat Schematic



Control Panel Components

Manual Motor Protector (MMP)

⚠ WARNING

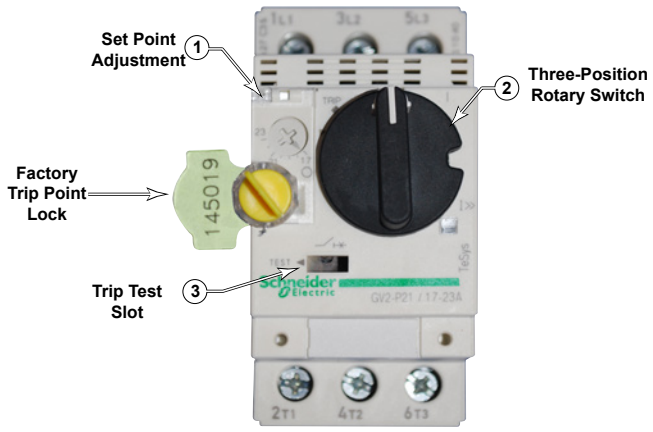
If an overload or a fault current interruption occurs, check circuits to determine the cause of the interruption. If a fault condition exits, examine the controller. If damaged, replace it to reduce the risk of fire or electrical shock.

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

The MMP trip points are factory set and locked, see Figure 24. 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 24.

Figure 24: Manual Motor Protector



Circuit Breaker

⚠ CAUTION

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

Circuit breakers are installed upstream of all VFDs to provide short circuit protection (Figure 25).

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 25.
- 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 25.

Figure 25: Circuit Breaker

Field Wiring Terminals

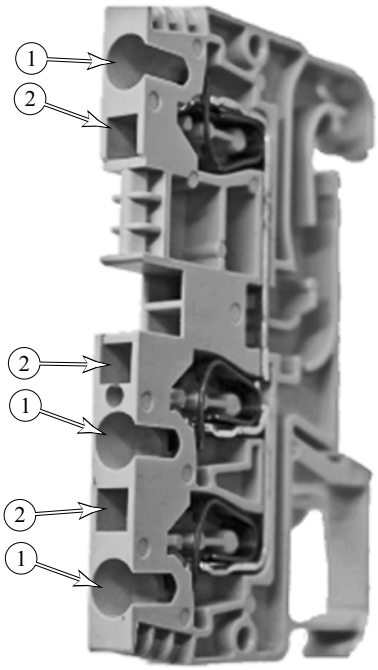
All field wiring terminals are spring clamp type, which offer several advantages over traditional screw-type terminals:

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

To insert a wire to the terminal connector:

1. Insert a small flat-blade screwdriver into the square hole (“1” in Figure 26) to open the spring clamp (“2” in Figure 26) 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 26).
4. Remove the screwdriver to close the spring clamp.

Figure 26: Terminal Connectors



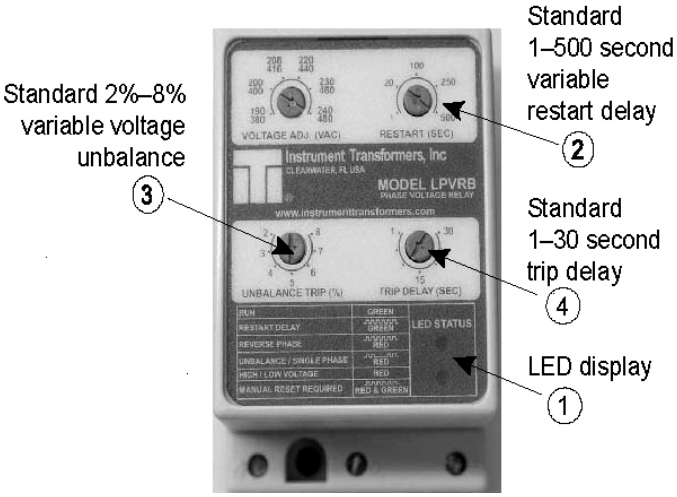
Phase Voltage Monitor (PVM)

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 27)
- 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 27)
- Standard 2% to 8% variable voltage imbalance (see “3” in Figure 27)
- Standard 1 to 30 second trip delay (see “4” in Figure 27)

Figure 27: Phase Voltage Monitor



High Pressure Switches

The high pressure switch (HP1-HP4) 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 high pressure switch is located at the top of the compressor on the discharge connection. 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 360 psig and close at 300 psig. After testing the high pressure control, check the pressure relief device for leaks.

Low Pressure Switches

The low pressure switch (LP1-LP4) is a single pole, pressure activated device that closes on a pressure rise. It senses evaporator pressure and is factory set to close at 60 psig and open at 35 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 located at the bottom of the compressor on the suction connection.

Compressor Motor Protector

All compressors are thermally protected.

All compressors have in-line protection. The control automatically resets when the alarm condition is removed and the time delay is satisfied. The reset time is approximately 5-10 minutes but can be longer if the compressor is hot.

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.

Proof of Airflow Switch

A positive proof of airflow switch (PC7) is provided with all units. The switch is factory set to close at 0.2 inches H_20. The switch has a field-adjustable set point range of 0.05 to 5.0 inches H_20. Turn the adjustment screw clockwise to decrease differential pressure setting. Turn the adjustment screw counterclockwise to increase differential pressure setting.

In a constant volume system, if the fan system is energized and the minimum pressure setting of the switch has not been reached, the unit shuts down and a loss of airflow alarm is indicated at the MicroTech III controller. For variable air volume units, the unit shuts down due to loss of airflow only if the airflow switch is open AND the duct static pressure is less than half the duct static pressure set point. Once the reason for the fault is corrected, manually reset the unit through the MicroTech III keypad/display interface. PC7 is located in the fan section on the motor side.

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 fan section on the motor side

Optional Equipment

Duct High Limit

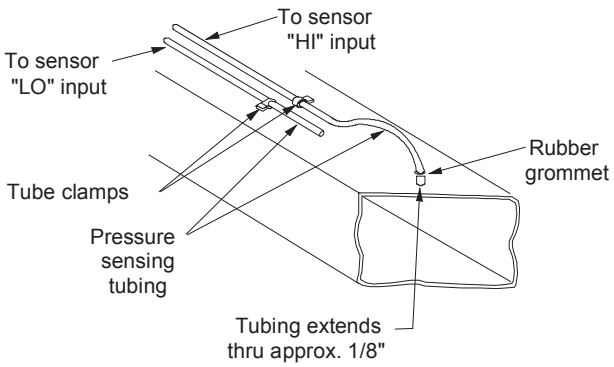
A duct high limit (DHL) pressure control is provided as standard with all units with variable air volume control. The duct high limit is intended to protect the ductwork, etc. from over pressurization caused by tripped fire dampers or a control failure. When the duct pressure exceeds the setting of the 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 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 fieldadjustable 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 coil section on the back side of the control panel.

Phase Fail/Under Voltage Protection

The phase voltage monitor 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.

Figure 28: Mounting Sensor



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 nonturbulent flow area of the duct. Keep several duct widths away from take-off points, bends, or neck downs.

Mounting Instructions (see Figure 28)

1. Drill a hole in the duct at the remote sensing point and install a rubber grommet.
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 on the sensor.

Freezestat

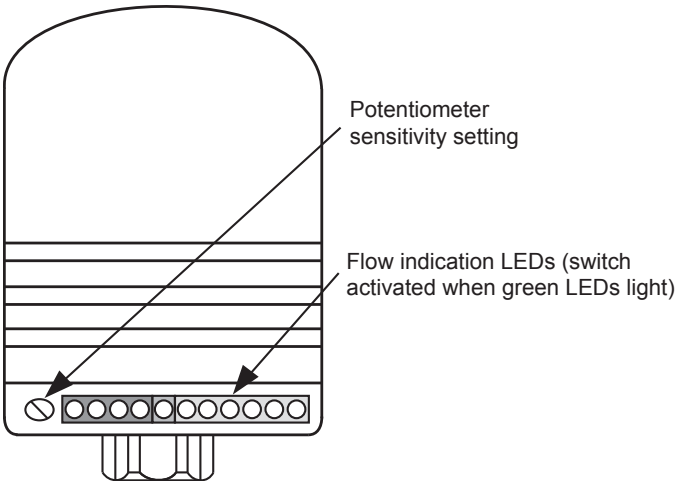
A non-averaging type freezestat (FS1) is provided to protect hydronic coils from subfreezing temperatures. If the unit has an economizer coil, the control is mounted on the entering face of the economizer coil. If the unit does not have an economizer coil, the control is mounted on the leaving face of 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 is opposite 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 leaving 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.

The water flow switch is factory set at 39 ft./min. To make adjustments, turn the potentiometer sensitivity shown in Figure 29. The sensitivity adjustment screw is sealed under a thin coating of glue. Use a small screwdriver to gently scrape off the glue. Turn the screw counterclockwise to activate the switch at a higher velocity. Turn the screw clockwise to activate the switch at a lower velocity.

Figure 29: Adjusting condenser water flow switch



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 3°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 95% 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 mechanical cooling is not required. A mechanical clutch is provided on each valve to manually close or open the valves.

The economizer system is factory piped and the coil uses the same drain pan and condensate connection. To vent air from the economizer coil, use the uppermost cleanout plug. The torque requirement for the cleanout plugs is 10 inch-lb.

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.

Adjustable Frequency Drive

An optional adjustable frequency drive (AFD) is available for airflow modulation. A manually activated bypass contactor allows 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, nonfused main circuit interrupter is available for disconnecting the main electrical power. The switch is located at the front of the unit on the control panel and is accessible without unit penetration. The lug size information is provided in Table 11 and Table 12 on page 20.

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.

Electric Heat

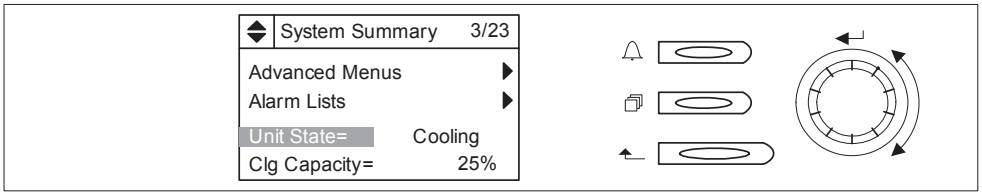
Optional electric heat is available. Heat is controlled by the unit's MicroTech III unit controller to maintain the set point. The heaters are factory installed and factory wired, including branch fusing and all safety controls.

Hot Water Control

A factory-mounted, 1-row or 2-row, hot water coil is available, with or without factory-mounted control valve. The hot water control valve is controlled by the unit's MicroTech III controller to provide morning warm-up heat or heat for constant volume application.

Using the Keypad/Display

Figure 30: Keypad Controls



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

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

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

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

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

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

Passwords

When the keypad/display is first accessed, the Home Key is pressed, the Back Key is pressed multiple times, or if the keypad/display has been idle for the Password Timeout timer (default 10 minutes), the display will show a “main” page where the user can enter a password or continue without entering a password. The three password levels available are Level 2, Level 4, and Level 6, with Level 2 having the highest level of access. Entering the Level 6 password allows access to the Alarm Lists Menu, System Summary Menu, and the Standard Menus group. Entering the Level 4 password allows similar access to Level 6 with the addition of the Extended Menus group. Entering the Level 2 password allows similar access to Level 4 with the addition of the Advanced Menus group. The Level 2 password is 6363, the Level 4 is 2526, and the Level 6 password is 5321. Continuing without entering one of these three levels allows access only to the Alarm Lists Menu and the System Summary Menu.

NOTE: Alarms can be acknowledged without entering a password.

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

Figure 31: Password Main Page

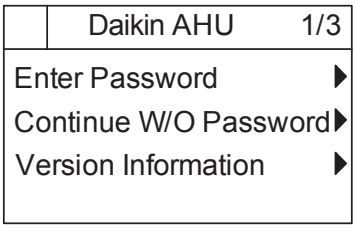
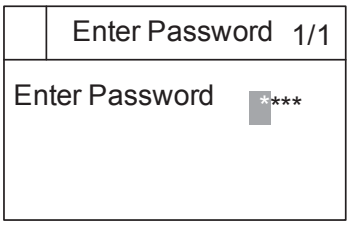


Figure 32: Password Entry Page



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

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

Navigation Mode

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

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

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

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

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

Edit Mode

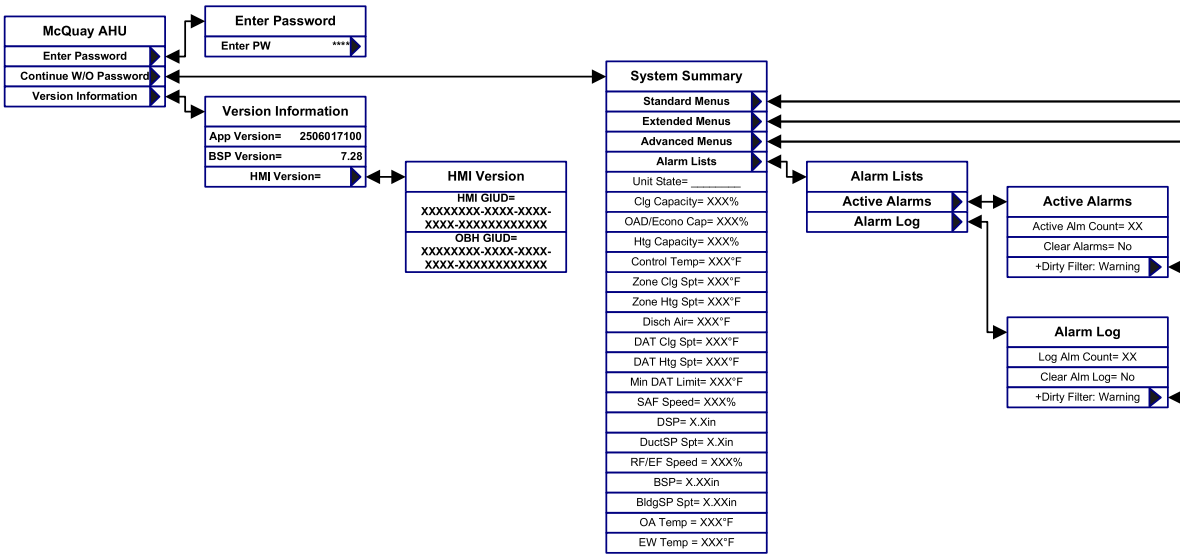
The Editing Mode is entered by pressing the navigation wheel while the cursor is pointing to a line containing an editable field. Once in the edit mode pressing the wheel again causes the editable field to be highlighted. Turning the wheel clockwise while the editable field is highlighted causes the value to be increased. Turning the wheel counter-clockwise while the editable field is highlighted causes the value to be decreased. The faster the wheel is turned the faster the value is increased or decreased. Pressing the wheel again cause the new value to be saved and the keypad/display to leave the edit mode and return to the navigation mode.

The following is a description of the MicroTech III menu structure. These menus and items can all be displayed with the keypad/display. Menu items displayed will change based on the selected unit configuration. Keypad/display menus are divided into

1. **System Summary menu** - password required.
2. **Standard menu** - password not required.
3. **Extended Menu** - higher level password required.
4. **Advanced Menu** - requires the highest level password.

Figure 33: Keypad/Display Menu Structure

AHU MicroTech

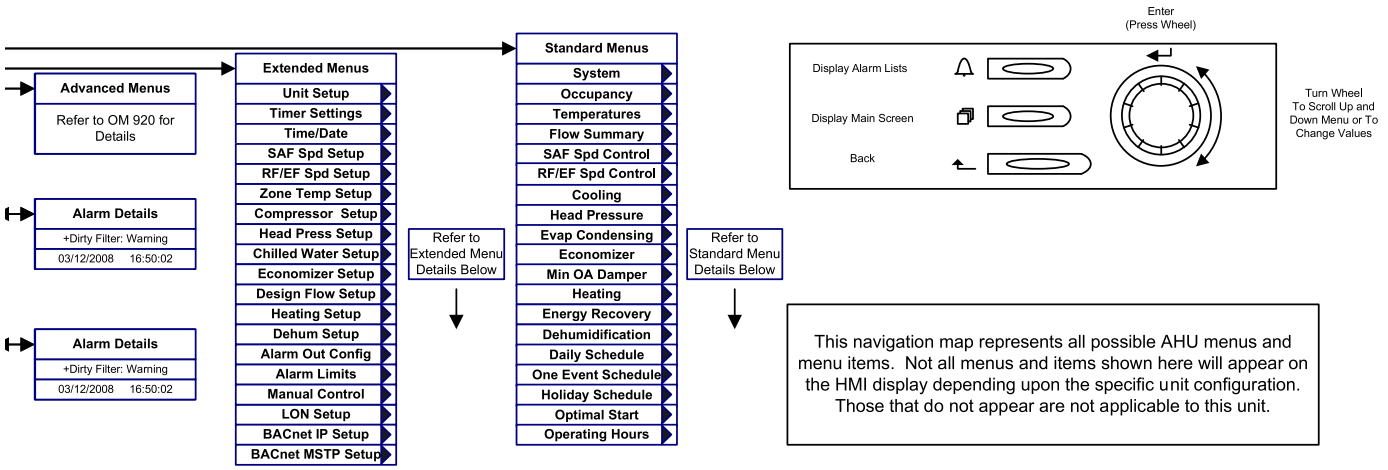


System	Occupancy	Temperatures	Flow Summary	SAF Spd Control	RF/EF Spd Control	Cooling	Head Pressure	Evap Condensing
Unit State= _____	Occupancy= _____	Control Temp= XXX°F	Airflow= _____	SAF Speed= XXX%	RF/EF Speed= XXX%	Zone Clg Spt= XXX°F	WRV Pos= XXX%	Cond Fan Spd= XXX%
Unit Status = _____	Occ Mode= Auto	Disch Air= XXX°F	Waterflow= _____	Speed Cmd= XXX%	Speed Cmd= XXX%	Unocc Clg Spt= 85.0°F	Head P Circ 1= XXXPSI	CFan Spd Cmd= XXX%
Ctrl Mode= Off	OccSrc= _____	Return Air= XXX°F	Water Pump= _____	Duct Press= X.Xin	Min Speed= 5%	DAT Clg Spt= 55.0°F	Head P Circ 2= XXXPSI	Min Fan Speed= 25%
Clg Status= _____	UnoccSrc= _____	Space Temp= XXX°F	Supply Fan= _____	DuctSP Spt= 1.0 in	Bldg Press= X.XXin	Clg Reset= None	Setpoint= 260PSI	Stage Time= 10min
Htg Status= _____	Tnt Ovrde Time= 0 Min	OA Temp= XXX°F	Ret/Exh Fan= _____	SAF Ctrl= DSP	BldgSP Spt= 0.050in	Min Clg Spt= 55.0°F		Sump Temp= XXX°F
Econo Status= _____		EFT/LC Temp= XXX°F	VAV/FanOp= _____	Rem SAF Cap= 25%	RF/EF Ctrl= Tracking	Min Clg Spt @ 0		Min Sump T= 75.0°F
Clg Capacity= XXX%		EW Temp= XXX°F			Rem RAF Cap= 5%	Max Clg Spt= 65.0°F		Max Sump T= 85.0°F
Htg Capacity= XXX%		Mixed Air= XXX°F			Rem ExhF Cap= 5%	Max Clg Spt @ 100		Sump Dump Spt= 35.0°F
SAF Capacity= XXX%								Pump Status= _____
RF/EF Capacity= XXX%								Smp Pmp Delay= 30sec
OAD/Econo Cap= XXX%								Conductivity= XXXS/CM
Emerg Mode= Normal								Dophin System= No
Net App Mode= Auto								

Extended Menus

Unit Setup	Timer Settings	Time/Date	SAF Spd Setup	RF/EF Spd Setup	Zone Temp Setup	Compressor Setup	Head Press Setup	Chilled Water Setup
RAT Sensor= Yes	Service Tim= 0min	Time= hh:mm:ss	DSP Ctrl Dly= 30s	BSP Ctrl Dly= 30s	Ctrl Temp Src= RAT	Clg DB= 2.0d°F	Head Press DB= 10PSI	Clg DB= 2.0d°F
100% OA= No	Start Up= 180s	Date= hh:mm:ss	Min Speed= 25%	BSP DB= 0.010in	Use Tstat Spt= No	Lead Circuit= #1	WRV Period= 10s	Clg Period= 20s
Ctrl Mode= Off	Recirculate= 180s		DSP DB= 0.1in	BSP Period= 5s	Zone Clg DB= 2.0d°F	Staging Type= Standard	WRV Gain= 3.6	Clg Gain= 1
OAT Sensor= Yes	Zero OA Time= 0min		VFD Ramp Time= 60s	BSP Gain= 0.2s	Clg Period= 60s	Stage Time= 5 min	WRV PAT= 10s	Clg PAT= 40s
MAT Sensor= Yes	Tnt Override= 120min		Min Period= 5s	Max Spd Chg= 4%	Clg Gain= 0.1	CFanOut1 Spt= 55°F	WRV Max Chg= 7%	CW Max Chg= 15%
Space Sensor= Yes	Post Heat= 0s		Max Spd Chg= 15%	Sup Fan Max= 100%	Clg PAT= 600s	CFanOut2 Spt= 65°F	Init Op Time= 60s	Stage Time= 5min
Eng Units= English	Password= 10min			RF @ SF Max= 95%	Max Clg Chg= 5.0d°F	CFanOut3 Spt= 75°F	Min WRV Pos= 10%	OAT Clg Lock= 55°F
VAV/FanOut= FanOut	Low DAT= 6min			Sup Fan Min= 30%	Zone Htg DB= 2.0d°F	Cond Fan Diff= 5d°F	Min WRV Tmp= 58°F	OATDiff= 2d°F
	ClgStateDelay= 300s			RF @ SF Min= 25%	Htg Period= 60s	OAT Clg Lock= 55°F	Max WRV Tmp= 105°F	
	Bypass Valve= 300s			Min Speed= 5%	Htg Gain= 0.1	OATDiff= 2d°F	WRV Act Time= 60s	
				MinExStrtTime= 120s	Htg PAT= 600s	Min EWT= 55°F	Min WRV Time= 60s	
				MinExStopTime= 120s	Max Htg Chg= 5.0d°F			
				MinExhOAPos= 5%				
				MinExhSAFCap= 10%				

ı III Keypad Navigation



Standard Menus

Economizer	Min OA Damper	Heating	Energy Recovery	Dehumidification	Daily Schedule	One Event Schedule	Holiday Schedule	Optimal Start	Operating Hours
Economizer Pos= XXX%	Min OA Pos= XXX%	Zone Htg Spt= 68.0°F	Energy Rcvy= Yes	Dehum Status= _____	Mon= 00:00-00:00	Beg= mm/dd@hh:mm	Hol 1= m/d/y-m/d/y	Enable= No	Supply Fan= XXXXXh
DAT Clg Spt= 55.0°F	Vent Limit= 20%	Unocc Htg Spt= 55.0°F	Wheel Speed= XXX%	Rel Humidity= XXX%	Tue= 00:00-00:00	End= mm/dd@hh:mm	Hol 2= m/d/y-m/d/y	Htg Rate= 0.4°F/min	Ret/Exh Fan= XXXXXh
Min OA Pos= XXX%	DCV Limit= 10%	MWUSpt= 70.0°F	Whl Spd Cmd= XXX%	Dewpoint= XXX°F	Wed= 00:00-00:00		Hol 3= m/d/y-m/d/y	Htg OAT= 35°F	Mech Cool= XXXXXh
Chgover Temp= 55.0°F	Min OA Reset= None	DAT Htg Spt= 100.0°F	ER DAT= XXX°F	Dehum Method= None	Thu= 00:00-00:00		Hol 4= m/d/y-m/d/y	Des Htg OAT= 0°F	Comp # 1= XXXXXh
EWT Diff= 3.0d°F	DesignFlow= Yes	Htg Reset= None	ER ExhT= XXX°F	RH Setpoint= 50%	Fri= 00:00-00:00		Hol 5= m/d/y-m/d/y	Clg Rate= 0.4°F/min	Comp # 2= XXXXXh
	OA @ MinV/mA= 0%	Min Htg Spt= 55.0°F	Min ExhT Diff= 2.0°F	Dewpoint Spt= 50°F	Sat= 00:00-00:00		Hol 6= m/d/y-m/d/y	Clg OAT= 85°F	Comp # 3= XXXXXh
	OA @ MaxV/mA= 100%	Min Htg Spt @ 0	Max ExhT Diff= 6.0°F	Reheat Spt= XXX°F	Sun= 00:00-00:00		Hol 7= m/d/y-m/d/y	Des Clg OAT= 95°F	Comp # 4= XXXXXh
	Min V/mA= 0.0V	Max Htg Spt= 120.0°F	Stage Time= 5min	Reheat Cap= XXX%	Hol= 00:00-00:00		Hol 8= m/d/y-m/d/y		Comp # 5= XXXXXh
	Max V/mA=10.0V	Max Htg Spt @ 100	Min Off Time= 20min				Hol 9= m/d/y-m/d/y		Comp # 6= XXXXXh
	PPM@DCVLmt= 800PPM	Min DAT Ctrl= Yes	Rel Humidity= XXX%				Hol 10= m/d/y-m/d/y		Comp # 7= XXXXXh
	PPM@VntLmt= 1000PPM	Min DAT Limit= 55.0°F							Comp # 8= XXXXXh
	IAQ PPM= _____	Occ Heating= Yes							Heating= XXXXXh
	Min PPM= 0 PPM								Economizer= XXXXXh
	Max PPM= 2000 PPM								Tnt Override= XXXXXh
	V/A @Min PPM= 0.0/V								Dehum= XXXXXh
	V/A @Max PPM= 10.0V								ER Wheel= XXXXXh
	Min Fan Diff= 20%								
	Max Fan Diff= 50%								
	OA Flow= _____								
	MinOAFlw Spt= 2000CFM								
	Min Clg Spd= 40%								
	LoFlo V Lmt= 30%								

Economizer Setup	Design Flow Setup	Heating Setup	Dehum Setup	Alarm Out Config	Alarm Limits	Manual Control
Econo DB= 2.0d°F	Des Flo DB= 3%	Htg DB= 2.0d°F	RH DB = 2%	Faults= Fast	Hi Disch Temp= 170°F	Manual Ctrl= Normal
Econo Period= 30/40s (air/water)	DF Period= 30s	Htg Period= 60s	Dewpoint DB= 2d°F	Problems= Slow	Lo Disch Temp= 40°F	Supply Fan= Off
	Des Flo Gain= 0.1	Htg Gain= 0.8	RH Period= 10s	Warnings= Off	Hi Return Temp= 120°F	RF/EF VFD= Off
Econo Gain= 10/1 (air/water)	DF Max Chg= 5%	Htg PAT= 120s	RH Gain= 1			SAF Spd Cmd= 0%
	DesignFlow= Yes	Htg Max Chg= 10%	RH PAT= 10s			RF/EF Spd Cmd= 0%
Econo PAT= 60/40s (air/water)	RH Lvl Pos= XXX.XX%	Stage Time= 5min	RH Max Chg= 16%			OAD/Econo= 0%
	LH Lvl Pos= XXX.XX%	OAT Htg Lock= 55.0°F	Dehum Method= None			OAD OpCl= Close
Econo Max Chg= 10/15% (air/water)		OAT Diff= 2d°F	Dehum Ctrl= Occupied			Comp 1= Off
		F&BP Method= OpenVlv	Sensor Loc= Return			Comp 2= Off
Flush Econo= Yes		F&BP ChgOvrT= 37°F	Mn Lvg Coil T= 48.0°F			Comp 3= Off
Econo Diff= 2d°F		Warmup Period= 240s	Mx Lvg Coil T= 55.0°F			Comp 4= Off
		Hold Period= 240s	Min Rheat Spt= 55.0°F			Comp 5= Off
			Max Rheat Spt= 65.0°F			Comp 6= Off
			RH Sens Type= VDC			Comp 7= Off
			RH Min Signal= 0.0V			Comp 8= Off
			RH Max Signal= 10.0V			CFan Outpt 1= Off
						CFan Outpt 2= Off
						CFan Outpt 3= Off
						BP/WR Valve= 0%
						CW Valve= 0%
						ECond VFD= Off

ECFan Spd Cmd= 0%
EC Drn Valve= Close
Sump Pump= Off
Main Gas Vlv= Close
Htg Valve= 0%
F&BP Damper= 0%
Htg Stg 1= Off
Htg Stg 2= Off
Htg Stg 3= Off
Htg Stg 4= Off
Htg Stg 5= Off
Htg Stg 6= Off
Reheat Valve= Off
ERecWheel= Off
ER Whl Cmd= Off
ERBP Dmpr Cl= Off
ERBP Dmpr Op= Off
Cond Wtr Pump= Off
Alm Output= Off
VAV/FanOp= Off

General

⚠ DANGER

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

1. Check that the unit is completely and properly installed with ductwork connected. Check to ensure there are no water leaks.
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 13 for proper valve torque values.
5. Check the tightness of setscrews in bearings, drives, and fan wheels. If retightening is needed, make certain fan wheels are centered between the inlet openings and setscrews are torqued per Table 14.
6. Check that the fan rotates freely. Check belt tension and alignment.
7. Check that the unit condenser water connections and condensate drain connections 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 room sensor) is installed in the return air duct and that the wiring terminations were made at the unit input board.
12. Check that entering condenser water temperature sensor is mounted.
13. Check that the optional duct static pressure sensor SPS1, if used, is connected to the duct with appropriate tubing. The unit may have one optional static pressure sensor, SPS1. The other option would be 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.
17. Open all liquid line service valves and tighten all packing nuts
18. Open the compressor suction and discharge shutoff valves until backseated. Always replace valve seal caps. For units with compressor crankcase heaters: Make sure the unit switch S1 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 13: 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 14: 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 disconnect switch is closed, the S1 switch is OFF, and that the crankcase heaters have been ON for 24 hours.
2. Turn the S1 switch on to supply power to the MicroTech III controller.
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 Mode =
   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 fuse F1.
   b. Verify that the fan motor protector is not tripped.
   c. Check the fan motor circuit breaker is not tripped.
   d. Trace the circuits.
   e. Verify that the optional phase voltage monitor has not tripped.

Compressor Start-Up

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

NOTE: The unit ships with the refrigeration service valves open. Check the service caps for tightness.

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 crankcase heaters are operating. These should operate at least 24 hours before starting compressors.

1. Set Cooling Control Setpoint, to a value that provides a call for full cooling.
2. Place the unit into the COOL ONLY mode through the keypad/display.
3. A user may override timers for a period of up to 240 minutes by setting the service timer to a non-zero number. When the service timer is not zero, the times listed below are set to the Service Time (Default = 20 seconds) instead of the normal values. This allows the unit to be run through its operating states without having to wait for the normal time delays to expire. These times revert to the standard values when the Service Time countdown is set to zero or is set to zero by the user. The affected times are:
   • Cooling Stage Time
   • Heating Stage Time
   • Start Initial Time
   • Recirculation
   • ZeroOATime
4. The compressors start one at a time, beginning with compressor number 1. Facing the unit, from left to right, compressors are numbered as follows: Independent circuit: 1, 3, 5, 6, 4, 2 or 1, 3, 4, 2 Dual circuit: 1, 3, 2, 4
5. 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.

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 34). 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.

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 degrees) and the unit is calling for cooling.

To verify operation of the economizer when entering water is unsuitable, place the water 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.

Hot Water Start-Up

The hot water valve is modulated to maintain the discharge heating set point. To verify the hot water valve operation, adjust the heating set point through the keypad:

Heating:
Zone Heating Spt=

Set the heating set point to a temperature greater than the control temperature plus the dead band. Note the cooling set point must be higher than the heating set point. With the heating set point set properly, the hot water valve should modulate open. To close the hot water valve, adjust the heating set point below the control temperature minus the dead band. After testing the hot water valve, return the heating set point to its proper setting.

Refrigerant Charge

⚠ CAUTION

Field mixing or changing of refrigerants can compromise performance and damage equipment. Improper refrigerant addition can cause equipment damage and severe personal injury. Units purchased for R-407C operation must be charged only with R-407C.

Table 15: Acceptable Refrigerant Oils

R-407C (polyolester [POE] oils)
Copeland Ultra 22 CC
Mobil EAL™ Arctic 22 CC
ICI EMKARATE RL™ 32CL

NOTE:
Do not use mineral oils with R-407C.

Each unit is designed for use with R-407C. Units purchased with these specific refrigerants must use these refrigerants only.

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 a circuit is moderately undercharged, it may trip on its frost protection sensor.
- 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.

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 “System Check, Test, and Start” 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 near design conditions, subcooling should be near the upper end of the range.
8. Verify that superheat is still in the prescribed range.

R-407C Leaks

⚠ CAUTION

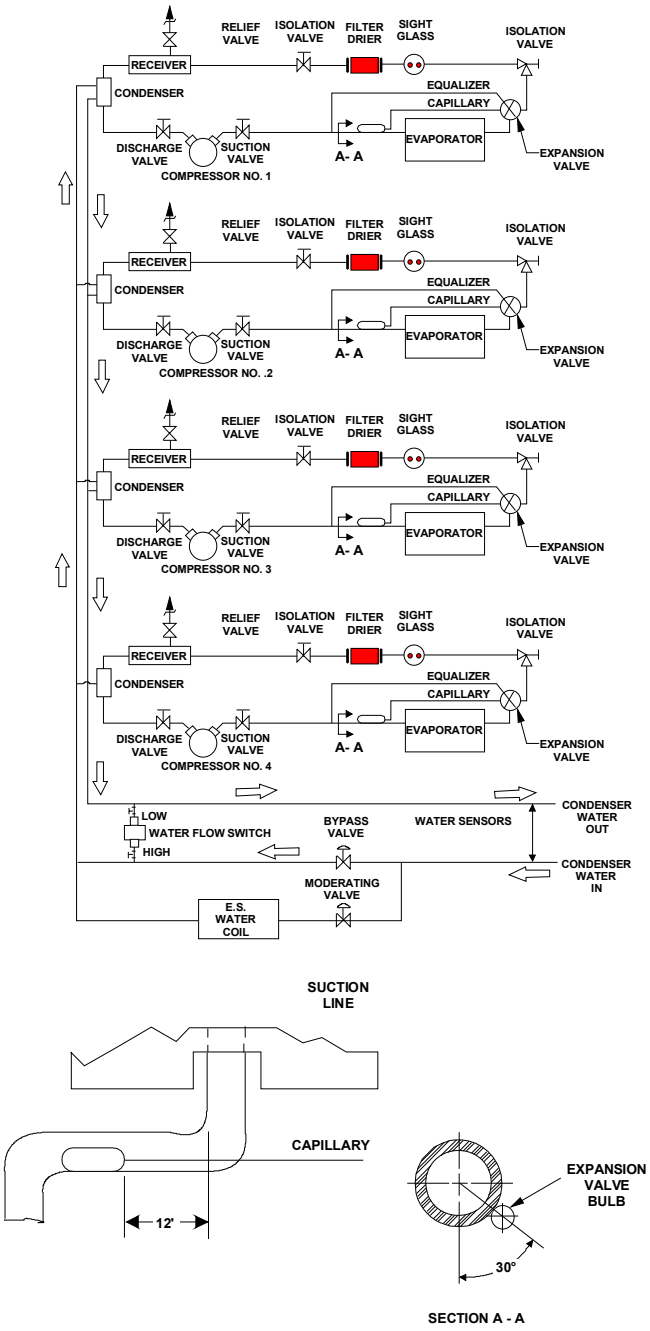
Adding refrigerant to the suction must always be done by trained service personnel that are experienced with the risks associated with liquid-related damage to the compressor

R-407C is a zeotropic blend of three HFC refrigerants (R-32, R-125, and R-134a). Zeotropic blends do not behave as one substance. Therefore, a change of phase does not occur at a fixed temperature. R-407C has a “glide” of 8°F because it boils and evaporates over a 8°F change in temperature.

If an R-407C unit leaks refrigerant, there is no way to determine how much of each of the three component refrigerants has leaked. However, experience in the field shows that R-407C can be “topped” off after a leak and operate normally. There is no need, except in the case of critically charged systems, to replace the entire charge after a leak.

When recharging or topping off a system using R-407C, it is important to remove the refrigerant from the charging cylinder in the liquid phase. Many of the cylinders for the newer refrigerants use a dip tube so that in the upright position, liquid is drawn from the cylinder. DO NOT vapor charge out of a cylinder unless the entire cylinder is to be charged into the system. Refer to charging instructions provided by the refrigerant manufacturer.

Figure 34: Water and Refrigerant Piping Schematic



Variable Air Volume (VAV) Start-Up

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

SAF Spd Control:
Duct SP Spt=

When the appropriate number of VAV terminal boxes are opened by setting down their respective thermostats, the vanes should go to the maximum airflow. Upon closing enough VAV boxes by setting their respective thermostats up, the inlet vanes should go to the minimum airflow position.

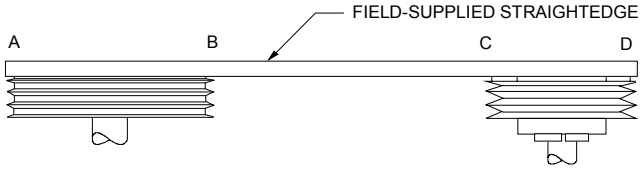
RPM Selection

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 Sheave Alignment

Check the drive sheave alignment using the four-point method shown in Figure 35. 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 35: Drive Alignment



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
- Over-tensioning 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

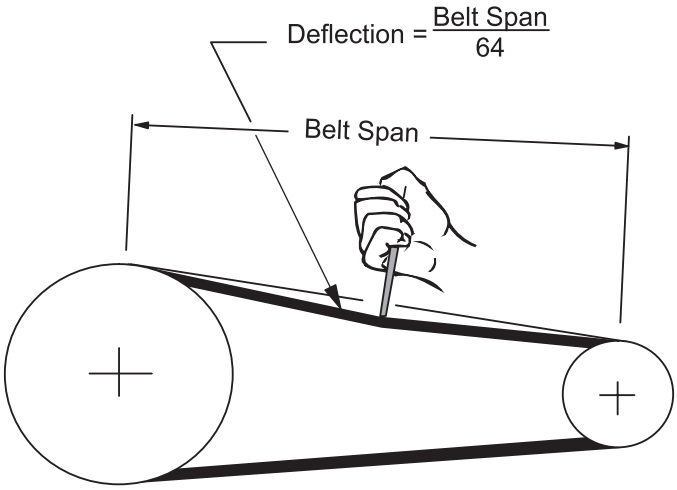
Tension measurement procedure

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.

1. Measure the belt span (see Figure 36).
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.

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 36: 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

NOTE: For the keypad menu structure, see OM 920.

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 codes and regulations and are experienced with this type of equipment

⚠ WARNING

Moving machinery and electrical power hazards. Can cause severe personal injury or 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 13 and Table 14 on page 40).
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.
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.
8. A partially full sightglass is not uncommon at part load conditions. Check for proper superheat.
9. Check for condensate drain blockage. Clean condensate pan as needed.
10. Check power and control voltages.
11. Check running amperage.
12. Check operating temperatures and pressures.
13. Check and adjust temperature and pressure controls.
14. Check and adjust linkages.
15. Check operation of all safety controls.

Unit Storage

Location

The Daikin Self-Contained unit is an indoor unit and must be protected from precipitation. If the unit is stored on the ground, additional precautions should be taken as follows:

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

Preparation

Supply Fans

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

Cabinet

Once a month, remove access panels and verify that no moisture or debris is accumulating in the unit.

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 freezeup. 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

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

Cooling Circuits

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

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

Control Compartment

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

Condenser

1. Water cooled self-contained units require water flow through the condenser during space air cooling operations. If the unit is not connected to a water source and the customer is confident that it is dry, and will remain dry, then no action needs to be taken to store the condensers. Make sure to keep the pipe inlet and outlet connections covered to prevent vermin or debris from entering inside.
2. If the unit is connected to a water supply with glycol in it and the customer is confident that it will not freeze, then no action needs to be taken to store the condensers.
3. If the unit is connected to a water supply and there is a chance that it could freeze, the unit should be isolated from the water supply and then drained. To keep any residual water in the unit from freezing, an antifreeze such as RV antifreeze should be added to the condenser and water economizer to prevent freezing.
4. Depending on water conditions, occasional treatment or flushing may be required.

Restart

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

Bearing Lubrication

⚠ CAUTION

Bearing overheating potential. Can damage the equipment. Do not overlubricate bearings. Use only high grade mineral grease with a 200°F safe operating temperature. See Table 16 for recommended lubricants.

Motor Bearings

Supply and Return Fans

Supply and return fan motors should have grease added after every 2000 hours of operation. Using the following procedure, relubricate the bearings while the motor is warm, but not running. Use one of the greases shown in Table 16.

1. Remove and clean upper and lower grease plugs.
2. Insert a grease fitting into the upper hole and add clean grease (Table 16) with a low pressure gun.
3. Run motor for five minutes before replacing the plugs.

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

Table 16: Recommended Lubricants and Amounts for Fan Motor Bearings

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

Fan Shaft Bearings

⚠ CAUTION

For safety, stop rotating equipment. Add one half of the recommended amount shown in Table 19. Start bearing, and run for a few minutes. Stop bearing and add the second half of the recommended amount. A temperature rise, sometimes 30°F (1°C), after relubrication is normal. Bearing should operate at temperature less than 200°F (94°C) and should not exceed 225°F (107°C) for intermittent operation. For a relubrication schedule, see Table 17. For applications that are not in the ranges of the table, contact Daikin

⚠ CAUTION

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

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

Table 17: SAF and RAF Relubrication Intervals

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

Use NLGI #2 Lithium or Lithium Complex Grease

Table 18: Recommended Lubricants for Fan Shaft Ball Bearings

Name	Temperature	Base	Thickener	NLGI grade
Texaco, Premium RB	30° to 350°F (34° to 177°C)	Parafinic mineral oil	Lithium	2
Mobile, AW2	40° to 437°F (40° to 175°C)	Mineral oil	Lithium	2
Mobile, SHC 100	68° to 356°F (50° to 180°C	Synthetic	Lithium	2
Chevron, Altiplex Synthetic	60° to 450°F (51° to 232°C)	Synthetic	Lithium	2
Exxon, ronex MP	40° to 300°F (40° to 149°C)	Mineral oil	Lithium	2

NOTE: Temperature ranges over 140°F are shown for lubricants only. Maximum unit temperature is 140°F.

Table 19: Recommended SAF and RAF Relubrication Grease Charge

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

Bearing Replacement

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

Bearings in bolt-on housings (units)

1. Check area - Clean and organize bearing installation area and keep well lit. Be sure mounting surfaces are clean and flat.
2. Check shaft - Shaft should be within tolerance range shown in Table 20, clean, and free of nicks and burrs. Mount bearing on unused section of shafting or repair/ replace shafting as required.
3. Install unit - Slide unit onto shaft. If it is difficult to mount bearing on shaft, use a piece of emery cloth to reduce any high spots on shaft. Do not hammer on any component of the bearing.
4. Fasten unit in place - Install housing mounting bolts, check and align bearing and tighten mounting bolts to recommended fastener torques. Exercising extreme caution and safety, rotate shaft slowly to center bearing.

Table 20: Shaft Size Tolerances

Shaft Size (in.)	Tolerance
1-11/16 to 2-7/16	+0.0 to -0.0015
2-7/16 and up	+0.0 to -0.002

Table 21: Recommended Torque Values for Concentric Locking Bearing/Shaft Size

Fan Size (in.)	Bore Size (in.)	Torx Screw	Size in lbs.
27 (AF) / 40 & 49 (SWSI)	2-3/16	T-30	180
30 & 33 (AF) / 44 (SWSI)	2-7/16	T-45	400
36 (AF)	2-11/16	T-45	400
40 (AF)	2-15/16	T-45	400

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

BOA concentric inserts

1. Be sure that BOA Concentric collar is fitted square and snug against the shoulder on the inner ring.
2. Torque BOA Concentric collar cap screw to torque recommended in Table 21.

Monitor installed bearing

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

When writing to Daikin for service or replacement parts, provide the model number, serial number, and unit part number of the unit as stamped on the serial plate attached to the unit. For questions regarding wiring diagrams, 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 22: MicroTech III Unit Controller Parts

Description	Daikin 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

Table 23: Fan Filter Parts

Unit size	Filter size	Quantity	Part number			
			2"—35%	4"—35%	4"—65%	4"—85%
018 to 028	16 × 20	4	072407701	072402301	072405701	072407601
	20 × 20	3	072407703	072402303	072405703	072407603
	25 × 25	2	072407704	072402304	072405704	072407604
035 to 040	20 × 20	5	072407703	072402303	072405703	072407603
	20 × 25	5	072407704	072402304	072405704	072405704

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.

Self-Contained Equipment Warranty Registration Form

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

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

GENERAL INFORMATION

Job Name: _____ **GOI No.:** _____

Installation address: _____

City: _____ **State:** _____

Purchasing contractor: _____

City: _____ **State:** _____

Name of person doing start-up: _____

Company name: _____

Address: _____

City/State/Zip: _____

UNIT INFORMATION

Unit model number: _____ **Unit serial number:** _____

Compressor 1 model number: _____ **Serial number:** _____

Compressor 2 model number: _____ **Serial number:** _____

Compressor 3 model number: _____ **Serial number:** _____

Compressor 4 model number: _____ **Serial number:** _____

Compressor 5 model number: _____ **Serial number:** _____

Compressor 6 model number: _____ **Serial number:** _____

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Self-Contained Equipment Warranty Registration Form (continued)

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

I. Initial Check

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

DAIKIN **Self-Contained Equipment Warranty Registration Form (continued)**

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

Reading	Comp. #1	Comp. #2	Comp. #3	Comp. #4	Comp. #5	Comp. #6
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
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

V. Hot Water Coil

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

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

Signature _____ **Startup date:** _____

Return completed form by mail to:

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

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

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

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DAIKIN

Quality Assurance Survey Report

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

Job Name: _____ **Daikin Applied G.O. No.** _____

Installation address:_____

City: _____ State: _____

Purchasing contractor:_____

City: _____ State: _____

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

Company name:_____

Address:_____

City/State/Zip: _____

Unit model number: _____ **Unit serial number:** _____

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

   Location on unit _____

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

   Excellent Good Fair Poor

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

   Location on unit _____

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

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

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

   Location on unit _____

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

   Comments _____

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

   Excellent Good Fair Poor

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

    Excellent Good Fair Poor

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

    Excellent Good Fair Poor

    Comments _____

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

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People and ideas you can trust.™

Daikin Applied Training and Development

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

Warranty

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

Aftermarket Services

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

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

Products manufactured in an ISO Certified Facility.