Installation and Maintenance Manual IM 985-12

Group: **WSHP**
Part Number: **910366653**
Date: **September 2021**

Enfinity™ Console Water Source Heat Pumps 1/2 to 1-1/2 Ton

R-410A Models MHC Standard Range & MHW Geothermal Range

Flat Top & Slope Top – Unit Sizes 007 – 018

Slope Top Unit

Flat Top Unit

Hazard Identification Information

⚠ WARNING

This Installation and Maintenance bulletin is intended to provide the proper procedures for installing a Daikin Console Water Source Heat Pump. Failure to follow these procedures can cause property damage, severe personal injury or death. Additional, failure to follow these procedures can cause premature failure of this equipment or cause erratic unit operation, resulting in diminished unit performance. Disregarding these directions may further lead to suspension or revocation of the manufacturer's warranty.

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

Note: *Indicates important details or clarifying statements for information presented.*

1	2-4	5	6-8	9	10	11	12	13	14-15	16-17	20	23	24-26	30-32	34	35-37	38
W	MHC	1	007	B	E	H	B	T	01	S2	2	L	UNL	B04	E	75V	R

Category	Code Option	Code Designation		Description
Product Category	1	W	=	Water Source Heat Pump
Model Type	2-4	MHC	=	R410A, Wall Mounted, Standard Range
		MHW	=	R410A, Wall Mounted, Geothermal Range
Design Series	5	2	=	Design 2
Nominal Capacity	6-8	007	=	7,000 Btuh Nominal Cooling
		009	=	9,000 Btuh Nominal Cooling
		012	=	12,000 Btuh Nominal Cooling
		015	=	15,000 Btuh Nominal Cooling
		018	=	18,000 Btuh Nominal Cooling
Controls	9	S	=	MicroTech® III Unit Controller - SmartSource
		H	=	MicroTech III series 2 controller w/LonWorks Comm Module
		J	=	MicroTech III series 2 controller w/BACnet Comm Module
Voltage	10	A	=	115-60-1 (Sizes 007-012 only)
		E	=	208-230/60/1
		J	=	265/277-60-1
Cabinet Height	11	H	=	High Sill
		L	=	Low Sill
Return Air	12	B	=	Bottom Return (High Sill)
		F	=	Front Return (Low Sill)
Discharge Air	13	T	=	Top
Blower Motor	14-15	01	=	Standard
Cabinet Type / Discharge Grille	16-17			
Cabinet Type	16	A	=	Flat Top w/12" Extended End Pocket (Code Option 11 must be “H”)
		B	=	Slope Top w/12" Extended End Pocket (Code Option 11 must be “H”)
		F	=	Flat Top
		S	=	Slope Top
Discharge Grille	17	C	=	Chassis Only
		2	=	Standard Stamped Louver
		3	=	Multi-Directional Grille
Heating Options	20	2	=	2.5 kW Electric Heat (Sizes 007, 009, 012 Only) (208-230/60/1 or 265/277-60 1)
		3	=	3.5 kW Electric Heat (Sizes 015, 018 Only) (208-230/60/1 or 265/277-60-1)
Piping Hand	23	L	=	Left
		R	=	Right
Thermostat Control / Programmability & Options	24-26			
Controls	24	R	=	Remote Wireless
		S	=	Wall-Mounted Space Sensor w/NSB Override (Standalone Only) (265/277-60-1 w/No Electric Heat Option)
		U	=	Unit Mounted Thermostat with LCD Display (Standalone Only)
		W	=	Wall Mounted Thermostat with Fan Speed Switch (Standalone Only)
Programmability	25	N	=	Non-Programmable
		P	=	7-Day Programmable w/ LCD Display
		Y	=	None
Options	26	L	=	Low Limit Control (Must be code option 24-“R”, “U” or “W” or code option 25-“Y”)
		M	=	Low Limit Control and Unit-mounted NSB Override Switch (Must be code option 24-“W” or code option 25-“Y”)
		P	=	NSB Override Switch (Must be code option 24-“W” or code option 25-“Y”)
		R	=	Remote Sensor (Must be code option 24-“W”)
Options	30-32	B02	=	2" Rear Extension
		B04	=	4" Rear Extension
		B06	=	6" Rear Extension
Power Connection	34	C	=	Unit Mounted 20A Plug and Cord (Cannot be 265/277-60-1, w/code option “2” or “3”
		D	=	Unit Mounted 20A Plug and Cord with Fused Disconnect Switch
		E	=	Unit Mounted 20A Plug and Cord with Non-Fused Disconnect Switch
Cabinet Electrical	35-37	75V	=	75VA Control Transformer
Water Flow Control	38	P	=	2-Way Motorized 1/2" Isolation Valve, High Close-Off Pressure N.C. (Normally Closed) and Supply, Return, Bypass Hand Valves and Measureflow Device
		R	=	1/2" Supply, Return and Bypass Valves Only
		W	=	2-Way Motorized 1/2" Isolation Valve, High Close-Off Pressure N.C. (Normally Closed) and Supply, Return and Bypass Hand Valves

Receiving and Storage

Upon receipt of the equipment, check carton for visible damage. Make a notation on the shipper's delivery ticket before signing. If there is any evidence of rough handling, immediately open the cartons to check for concealed damage. If any damage is found, notify the carrier within 48 hours to establish your claim and request their inspection and a report. The Warranty Claims Department should then be contacted.

Do not stand or transport the machines on end. For storing, each carton is marked with "up" arrows.

In the event that elevator transfer makes up-ended positioning unavoidable, do not operate the machine until it has been in the normal upright position for at least 24 hours.

Temporary storage at the job site must be indoor, completely sheltered from rain, snow, etc. High or low temperatures naturally associated with weather patterns will not harm the units. Excessively high temperatures, 140°F (60°C) and higher, may deteriorate certain plastic materials and cause permanent damage.

IMPORTANT

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

VISIBLE LOSS OR DAMAGE

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

CONCEALED LOSS OR DAMAGE

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

⚠ CAUTION

The installer must determine and follow all applicable codes and regulations. This equipment presents hazards of electricity, rotating parts, sharp edges, heat and weight. Failure to read and follow these instructions can result in property damage, severe personal injury or death. This equipment must be installed by experienced, trained personnel only.

Pre-Installation

1. To prevent damage, do not operate this equipment for supplementary heating and cooling during the construction period. Doing so will void the warranty.
2. Inspect the carton for any specific tagging numbers indicated by the factory per a request from the installing contractor. At this time the voltage, phase and capacity should be checked against the plans.
3. Check the unit size against the plans to verify that the unit is being installed in the correct location.
4. Before installation, check the available dimensions where the unit be installed versus the dimensions of the unit.
5. Note the location and routing of water piping, condensate drain piping, and electrical wiring. The locations of these items are clearly marked on submittal drawings.
6. The installing contractor will find it beneficial to confer with piping, sheet metal, and electrical foremen before installing any unit.

Note: *Check the unit data plate for correct voltage with the plans before installing the equipment. Also, make sure all electrical ground connections are made in accordance with local code.*

7. The contractor shall cover the units to protect the machines during finishing of the building. This is critical while spraying fireproofing material on bar joists, sandblasting, spray painting and plastering. Damage to the unit due to a failure to protect it during finishing of the building is not covered by the warranty.

Table 1: Physical Data (in inches)

Unit Size		007		009	012	015	018
Unit Dimensions H x W (Extnd End) x D[1] (in.)		25 x 46 (58) x 10-3/4				25 x 54 (66) 10-3/4	
Fan Wheel - D x W (in.)		4-3/8 × 27-1/4				4-3/8 × 35-3/8	
Fan Motor (hp)		1/30			1/18		
Coil Face Area (ft.^{2})		1.67				2.22	
Coil Rows		2		2	3	2	3
Voltage		115-208/230	265		All Voltages		
Refrigerant Charge (oz.)		20	22	21	22	30	33
Filter (Qty.) Size (in.)	Low Sill	(1) 23-3/4w x 8-3/4d				(1) 31-3/4w x 8-3/4d	
	High Sill	(1) 29-1/4w x 9-3/4d				(1) 37-1/4w x 9-3/4d	
Water Connections, Sweat Connections (in.)		5/8 O.D.					
Condensate Connection, I.D. (In.)		3/4					
Weight, Operating (lbs.)		138		144	146	166	171
Weight, Shipping (lbs.)		158		164	166	196	201

[1] Add 2", 4" or 6" to unit depth for optional rear extension.

Unit Installation (Recommended)

⚠ WARNING

Installation and maintenance are to be performed by qualified personnel who are familiar with local codes and Regulations, and experienced with this type of equipment.

⚠ CAUTION

Sharp edges can cause personal injury. Avoid contact with them.

Installation and maintenance are to be performed by qualified personnel who are familiar with local codes and Regulations, and experienced with this type of equipment.

1. Consult job blueprints for unit location. Unit should be positioned to allow 15" from front panel to objects in room. Clean area where unit is to be installed, removing all construction dirt and debris.
2. Remove the unit from the shipping carton and save the carton to be used as a protective cover after the installation is complete.
3. Remove the screws (numbered 1) shown in Figure 1, securing the right and left side /corner panels to the subbase. Lift the panels up and out until the bottom tab clears the slot in the subbase.

Note: *Set the unit panels aside where they will not be damaged.*

4. Remove the two screws (numbered 2) in Figure 1 securing the front panel to the subbase and remove the panel by lifting up and tilting out until the panel tabs clear the slots in the subbase.

Note: *If using the Alternate Unit Installation procedure "(Using Provided Brackets)" on page 8 it is not necessary to remove the top section. Continue with step 5 if using the recommended method of installation.*

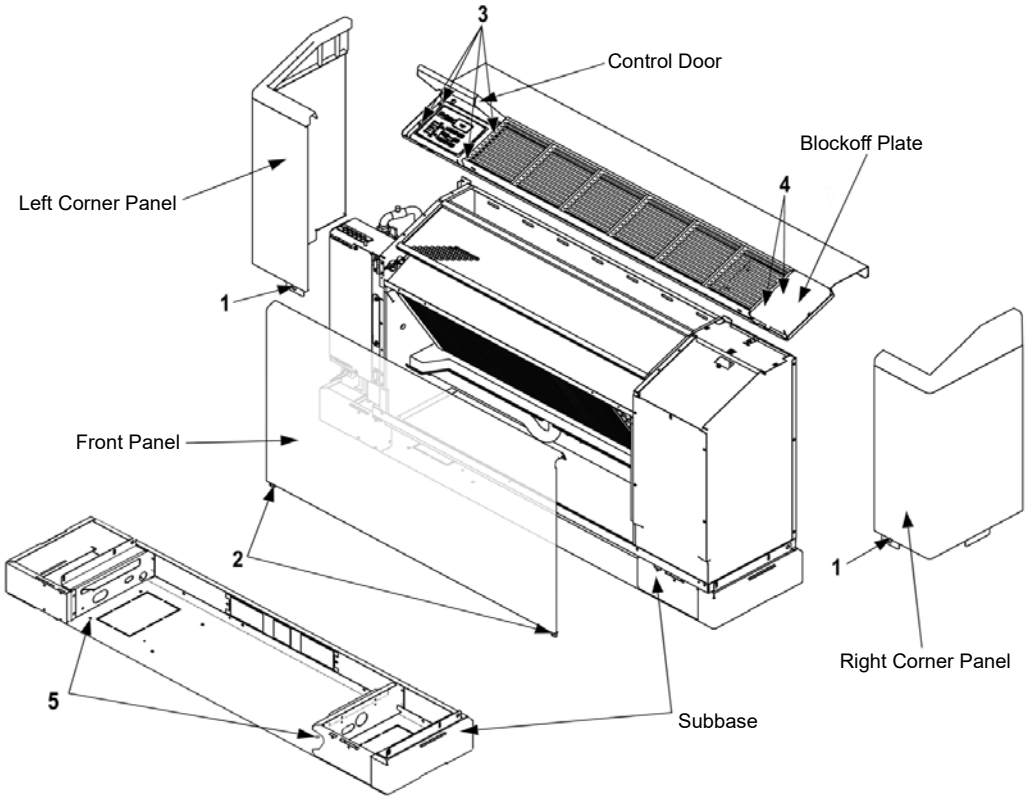
5. Open the control door and remove the four screws that hold the top panel and control pad in place (numbered 3) in Figure 1. On the opposite end of the cabinet top lift off the blank-off plate to the right and remove the last two mounting screws (numbered 4) in Figure 1. Lift the top panel off, turning the control pad so that it fits down through the opening in the top panel.

Note: *After removing the panels, set aside in a safe area where they will not be damaged.*

STOP! *If an outside air damper kit is to be installed, refer to IM 974 for the manual damper and the motorized damper kit and install it now.*

6. Position the chassis/subbase against the wall where the unit is to be installed. Remove any mouldings at the floor or wall (see letter A in (Figure 2 on page 7). Allow adequate room for piping and electrical connections in the subbase by checking the electrical connection end of the subbase and chassis.

Figure 1: Cabinet Panel Screw locations and Panel Removal



Note: *Make sure electrical and piping connections are in the proper location within the subbase end piping compartment.*

7. Remove the filter and locate the existing 1/4" mounting holes in the bottom of the subbase labeled (5) in Figure 2 subbase detail.

8. Be sure the subbase is tight to the wall. Transfer a mark with a marker or pencil to the floor at mounting hole locations labeled (5).

9. Move unit away to pre-drill 1/4" mounting holes in the floor at marked locations.

IMPORTANT

Clean unit mounting area of all construction debris. Check that the floor is level and at 90 degrees to the wall as shown in Figure 2. Daikin recommends the placement of a sound absorbing mat beneath the unit footprint before continuing to the next installation step.

Note: *Use the appropriate fasteners by others in accordance with local building codes.*

10. Insert fasteners through the mounting holes in the subbase and secure the subbase to the floor, tightening the fasteners. Do not over-tighten fasteners and distort or warp the subbase plate.

11. Use a carpenters square and level to check that the unit is level and 90 degrees to the wall and floor (see letters C & D in Figure 2).

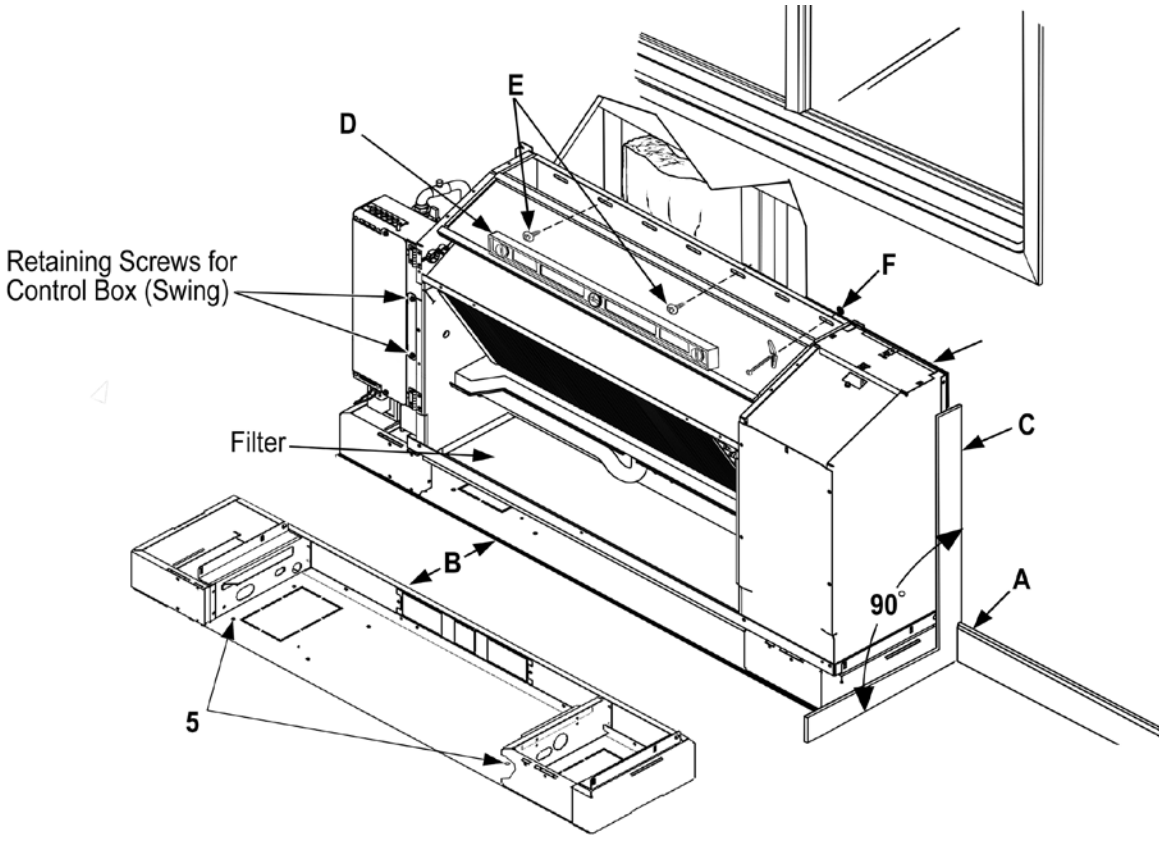
12. The chassis back panel has a series of slots on the back flange to mount the assembly to the wall. It is the installing contractor's responsibility to select the correct fasteners for each unit to meet local codes (see letter E in Figure 2).

Note: *Use a minimum of three fasteners to secure the unit (field supplied). Secure two fasteners into wall studs. At location(s) where no stud is present, secure with a Toggle bolt or equivalent (by others) (see letter F in Figure 2).*

13. Reinstall the panels in reverse order as performed in prior steps 3 through 5.

14. Cut out one side and the bottom of the shipping carton, leaving the top and three sides to place over the unit for protection during construction.

Figure 2: Unit Mounting Details



Alternate Unit Installation

(Using Provided Brackets)

Procedure

1. With the front, left and right cabinet panels removed, set the entire unit in its final mounting position.
2. With the chassis still mounted on the subbase, remove filter to allow access to the subbase bottom plate.
3. Locate the existing 1/4" mounting holes in the bottom of the subbase labeled (5) in Figure 3.

Note: *Make sure electrical and piping connections are in the proper location within the subbase end piping compartment.*

4. Transfer a mark with a marker or pencil to the floor at mounting hole locations (5).
5. Move unit away to pre-drill 1/4" mounting holes in the floor at marked locations.

IMPORTANT

Clean unit mounting area of all construction debris. Check that the floor is level and at 90 degrees to the wall as shown in Figure 2 on page 7. Daikin recommends the placement of a sound absorbing mat beneath the unit footprint before continuing to the next installation step.

Note: *Use the appropriate fasteners by others in accordance with local building codes.*

STOP! *If an outside air damper kit is to be installed, refer to IM 974 for the manual damper and the motorized damper kit and install it now.*

6. Insert fasteners through the mounting holes in the subbase and finish securing the unit to the floor, tightening the fasteners. Do not over-tighten fasteners and distort or warp the subbase plate.
7. Locate mounting brackets at locations at the wall as shown in Figure 3.

Note: *Brackets should be located approximately 3" from the top of the chassis. A slot is provided in the sheet metal end partition for the bracket to fit into.*

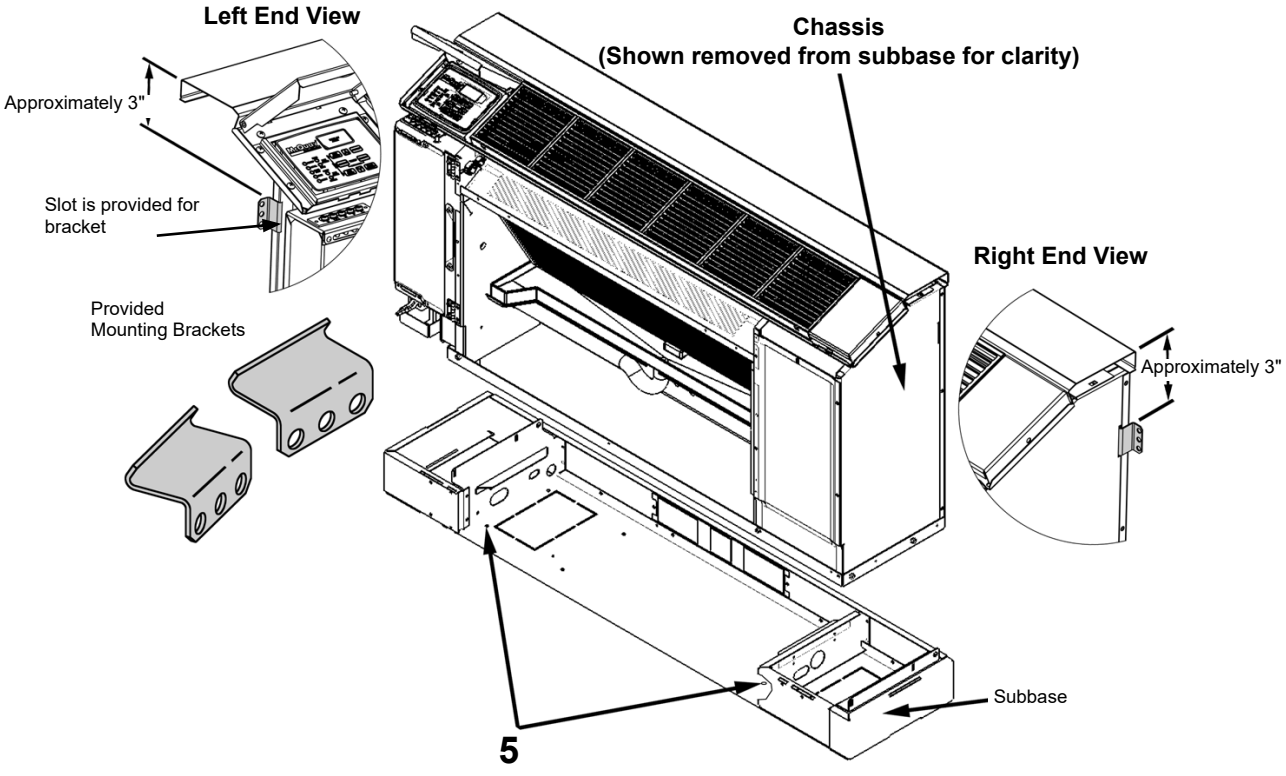
8. Mark the position of the bracket mounting holes onto the wall. Remove the brackets and using a preset depth drill, pre-drill holes to accept a wall anchor (by others).

⚠ WARNING

Failure to use a pre-set depth drill could result in serious injury or death.

Note: *It is preferred that the brackets are screwed directly into a stud where available. However, drywall anchors can be utilized when studs are absent at bracket locations. It is the responsibility of the installing contractor to provide the appropriate fasteners and anchors to ensure that the unit is secured properly.*

Figure 3: Mounting Bracket Installation



Installation With Optional Cabinet Rear Extension

(2", 4" or 6" Deep Extension)

Refer to Figure 4, and labels 1a through 6a.

1. Remove screw (1a) and remove left end panel (1b).

Note: *Retain all screws for re-assembly. Set components aside in a safe place where they will not be damaged.*

2. Remove screw (2a) and remove right end panel (2b).

3. Remove screw (3a) and (3b) and remove center-front panel (3c).

4. Remove blockoff panels (4a) and (4b) by carefully prying them up.

5. Remove two (2) screws (5a) which hold the touchpad control in place. Carefully pass the touchpad controller through it's mount opening on the grille tray as shown in detail (5b). Take care to secure the touch pad controller so the attached wiring is not damaged.

6. Refer to grille tray detail (6a) and slide the grille tray assembly to the side to clear the tabs from the slots holding the grille tray in place. Note the number of tabs based on the unit type. Remove the grille tray.

Note: *Make sure electrical and piping connections are in the proper location within the subbase end piping compartment.*

IMPORTANT

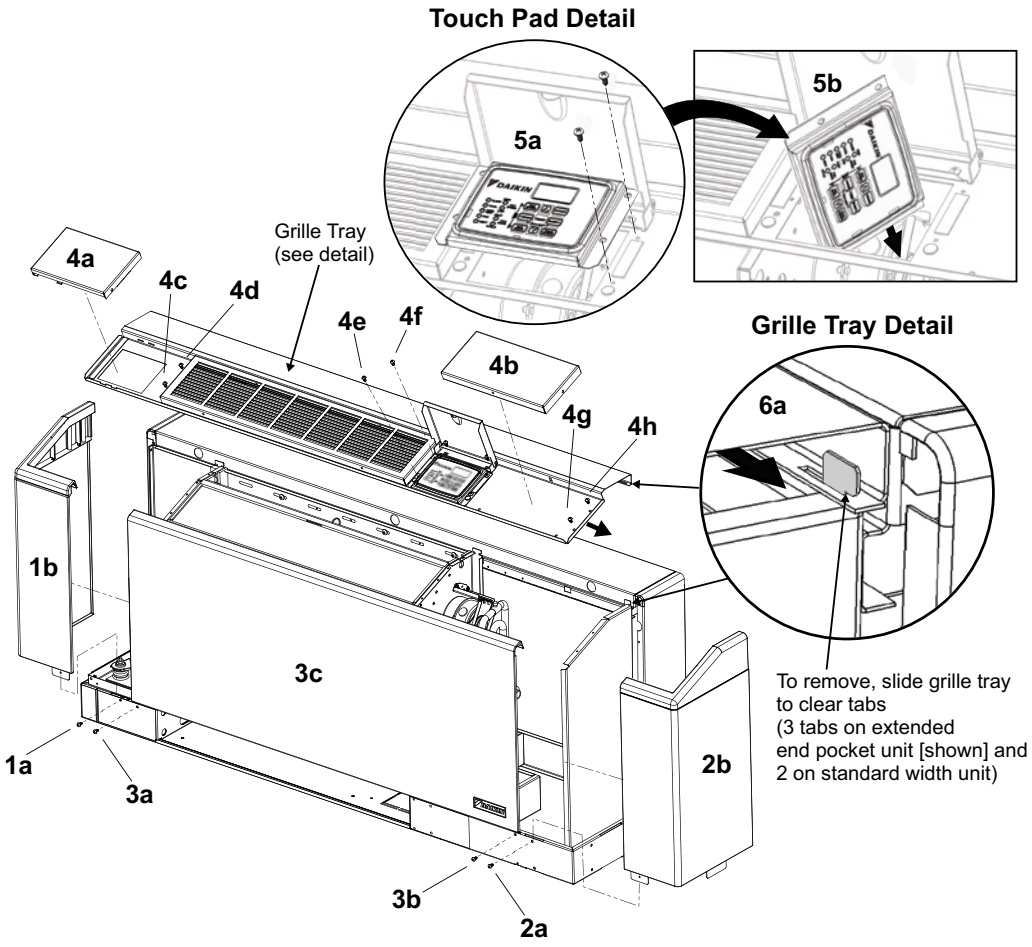
Clean unit mounting area of all construction debris. With a carpenters square check that the floor is level and 90 degrees to the wall. Refer to letters “C” & “D” in Figure 2 on page 7).

IMPORTANT

Daikin recommends the placement of a sound absorbing mat beneath the unit footprint before continuing to the next installation step.

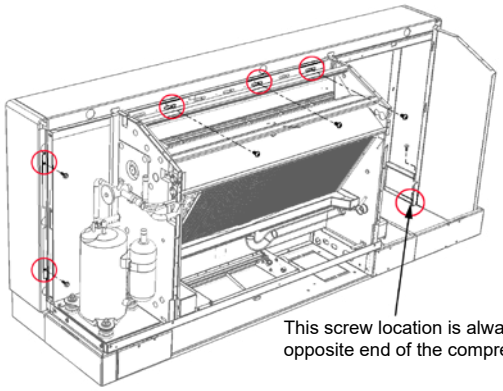
Note: *Right-hand (slope-top) unit shown, dimensions are mirrored for left-hand units and flat-top units.*

Figure 4: Prepare For Installation



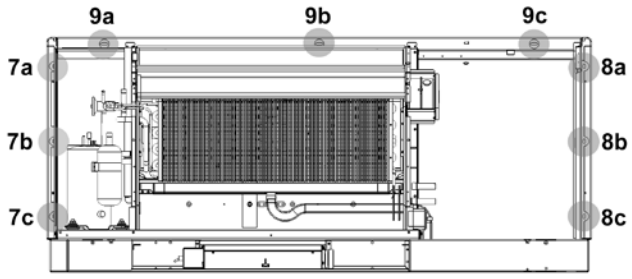
Note: *The rear extension may be detached from the chassis by removing screws shown in Figure 5.*

Figure 5: Detach Points On The Rear Extension

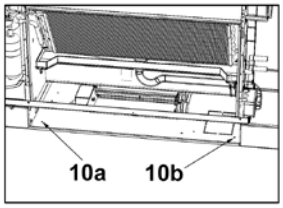


7. Position the unit in the desired location against the wall and transfer a mark to the wall at each of the mounting hole locations as shown in Figure 6.

Figure 6: Extension Mounting Hole Locations



Front View



Sub base Mounting Holes

- Three locations along the left-hand side of the rear extension (cut outs) labeled, (7a), (7b), and (7c).
- Three locations along the right-hand side of the rear extension (cut outs) labeled, (8a), (8b), and (8c).
- Three locations along the top-front edge of the rear extension (cut outs) labeled (9a), (9b), and (9c).
- Two locations in the bottom of the subbase labeled (10a) and (10b).

Note: *It is preferred that mounting screws are secured to wall studs. However, drywall anchors, toggle bolts or equivalents should be used when a wall stud is not present. It is the responsibility of the installing contractor to provide the appropriate fasteners and anchors to ensure that the unit is properly secured.*

⚠ WARNING

Failure to use a pre-set depth drill could result in serious injury or death.

8. Move unit away and pre-drill 1/4" holes in the floor at the marked locations (10a and 10b) for the subbase.

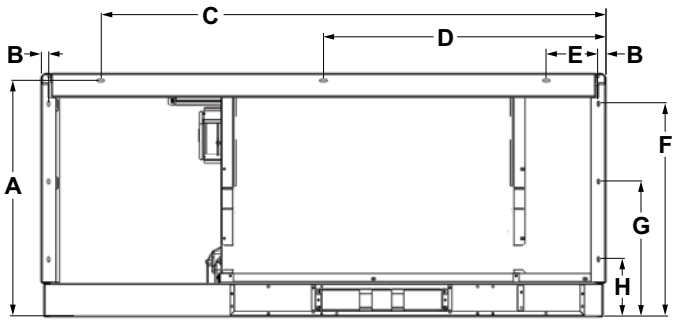
9. Drill holes at marked locations for the rear extension. Where there is no wall stud present, install a wall anchor, toggle bolt or equivalent.

Note: *Use the appropriate fasteners in accordance with local building codes.*

10. Reposition the unit and install fasteners (by others) at each mounting point in the rear extension.

11. Insert fasteners through the mounting holes in the subbase and finish securing the unit to the floor at labeled locations (10a) and (10b) as shown in Figure 5. Do not over-tighten fasteners and distort or warp the subbase plate.

Figure 7: Extension Mounting Hole Location Dimensions



Back View

Unit Size	Unit Type	A	B	C	D	E	F	G	H
007, 009, 012	Standard Unit	24.3	0.75	39.9	23	6.1	21.94	13.91	5.91
	With Extd. End Pocket			51.9	29				
015, 018	Standard Unit			47.9	27				
	With Extd. End Pocket			59.9	33				

Note: *Right-hand (slope-top) unit shown, dimensions are mirrored for left-hand units and flat-top units.*

Piping

1. Connect units to supply and return piping in a two-pipe reverse return configuration (Figure 8).
   A reverse return system is inherently self-balancing and requires only trim balancing where multiple quantities of units with different flow and pressure drop characteristics are connected to the same loop. A simple way to check for proper water balance is to take a differential temperature reading across the water connections when in the cooling mode. To achieve proper water flow, the differential should be 10°F to 14°F (-5°C to -8°C).
   A direct return system may also be acceptable, but proper water flow balancing is more difficult to achieve and maintain.
2. The piping must comply with local codes.

⚠ WARNING

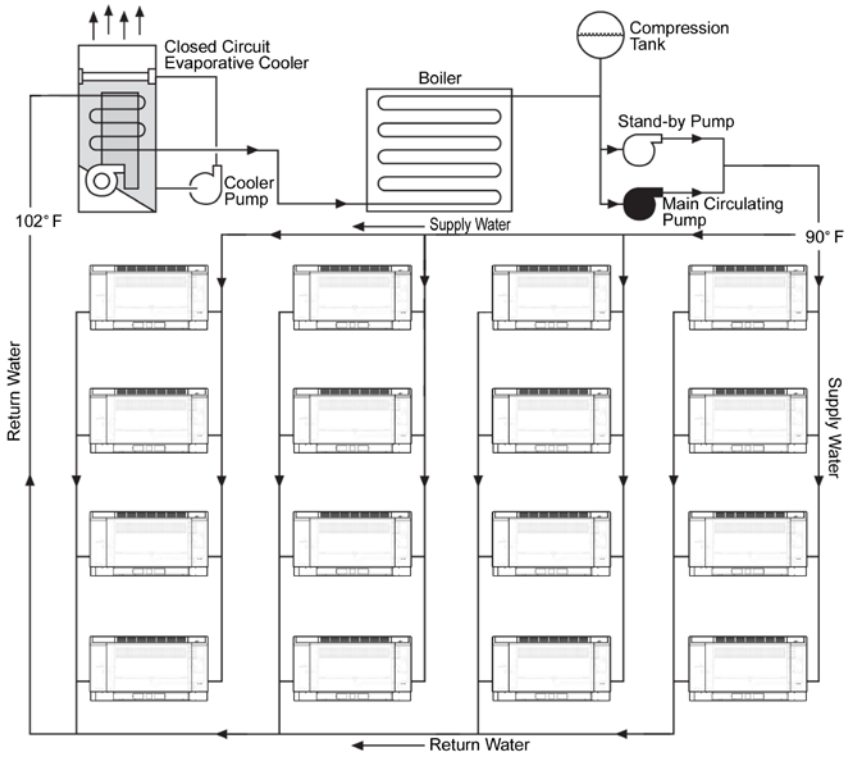
Polyolester Oil, commonly known as POE oil is a synthetic oil used in many refrigeration systems, and may be present in this Daikin product. POE oil, if ever in contact with PVC/CPVC will coat the inside wall of PVC/CPVC pipe causing environmental stress fractures. Although there is no PVC/CPVC piping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

3. Supply and return run outs are typically connected to the unit by short lengths of high pressure flexible hose which are sound attenuators for both unit operating noise and hydraulic pumping noise.

Note: *Be sure that one end of the hose has a swivel fitting to facilitate removal for service. Hard piping to the unit can result in added operating noise.*

4. If sealant compound is not provided for flexible hose fittings, apply Teflon tape to the connections to help prevent leaks.
5. Supply and return shutoff valves are required at each unit. The return valve is used for balancing and should have a “memory stop” so that it can always be closed off, but can only be re-opened to the proper position for the flow required, unless an auto-flow control device is used.
6. Do not connect a unit to the supply and return piping until the water system has been cleaned and flushed completely. After this is done, the initial connection should have all valves wide open in preparation for water system flushing.
7. Condensate piping should be installed per local codes. Each unit is supplied with an internal clear vinyl condensate hose.
8. Units are internally trapped. A means of disconnection must be furnished to facilitate chassis removal.
9. No point of the drain system may be above the drain pan of any unit.
10. Automatic flow control devices must not be installed prior to system cleaning and flushing.
11. A high point of the piping system must be vented.
12. Check local code for any requirement for electric fittings.

Figure 8: Typical 2-Pipe Reverse Return Configuration



Water Connections

All piping connections should be made using good plumbing practices and in accordance with any and all local codes that may apply.

Note: *On left-hand piping units the water supply connection is on the top. Right hand piping units the water supply is at the bottom location.*

Unit Piping Connection

Each heat pump is supplied with extended copper tubing on the water-to-refrigerant coil and 5/8" (16mm) O.D. tubing. The connections are for both the supply and return water connections. See Figure 9 for left and right hand connections locations.

Shutoff/Balancing Valve Piping

Each heat pump requires a shutoff valve on both the supply and return lines for easy serviceability and removal if it becomes necessary.

We suggest using our combination shutoff/balancing valves installed in the field between the contractor's piping and the heat pump unit. The valve installed on the return line acts as a balancing valve to adjust the proper water flow. An automatic flow limiting device is also available as a factory installed option.

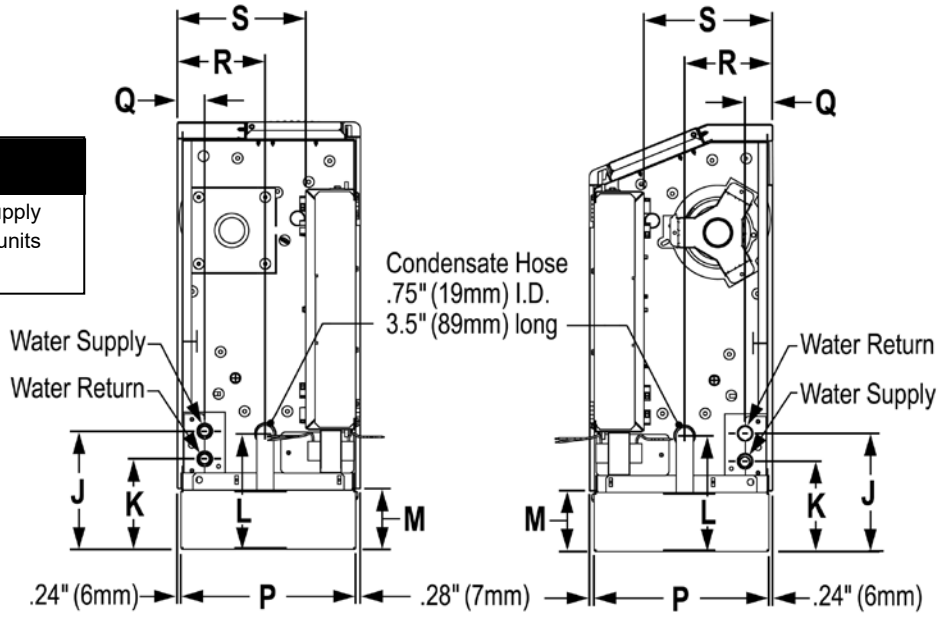
Add the female pipe adapter connection to unit supply and return coil connection by sweating them in place using silver solder.

Using the specified hoses, screw the fixed end into the shut-off/balancing valve. Insert the adapter into the female fitting. Using two crescent wrenches, one to hold the pipe connection and the second to tighten the adapter, insert the swivel end of the hose on the adapter and tighten. This completes the hose connection to standard heat pump equipment.

IMPORTANT

On left-hand piping units the water supply connection is on the top. Right-hand piping units the water supply is at the bottom location.

Figure 9: Supply and Return Connections Locations for Left- Hand and Right Hand Units (Flat Top and Slope Top)



Left-Hand Piping View **Right-Hand Piping View**

Table 1: Dimensions (High Sill Units)

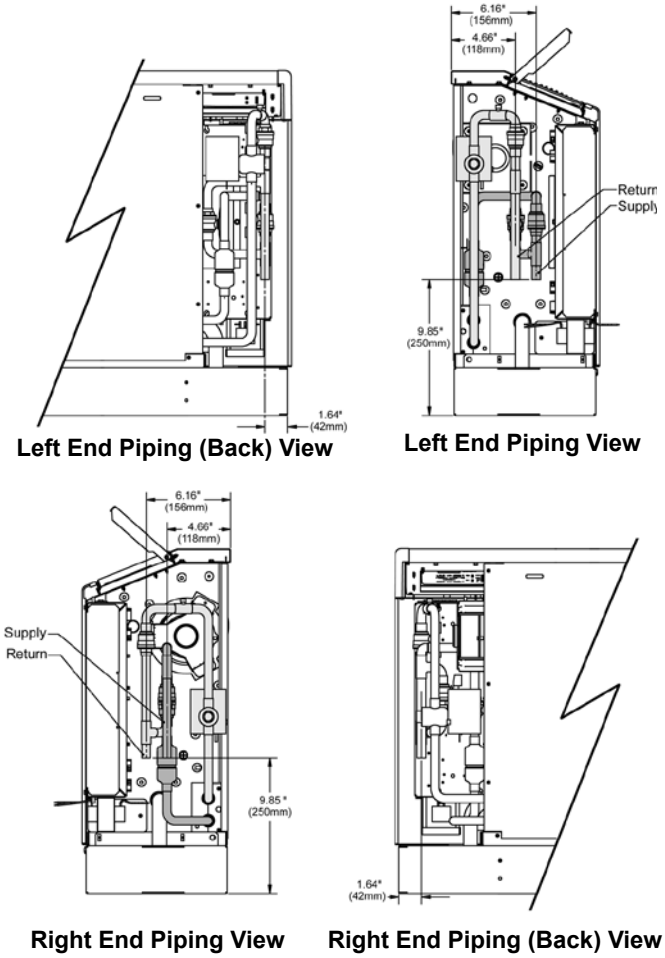
Unit Size	J	K	L	M	P	Q	R	S
007-018	6⅞" (175mm)	5 1/5" (132mm)	6¾" (172mm)	3½" (90mm)	10¼" (260mm)	1 3/5" (41mm)	5¼" (134mm)	7½" (192mm)

Optional Factory-Installed Motorized & Hand Valve Assemblies

Console water source heat pumps can be configured with factory-installed motorized valves. Valves should be mounted on the return water line. All valve assemblies terminate with 5/8" O.D copper tubing.

Note: *Make sure the pipes fit the confines of the piping compartment of the heat pump unit (Figure 10).*

Figure 10: Typical Motorized Valve Piping



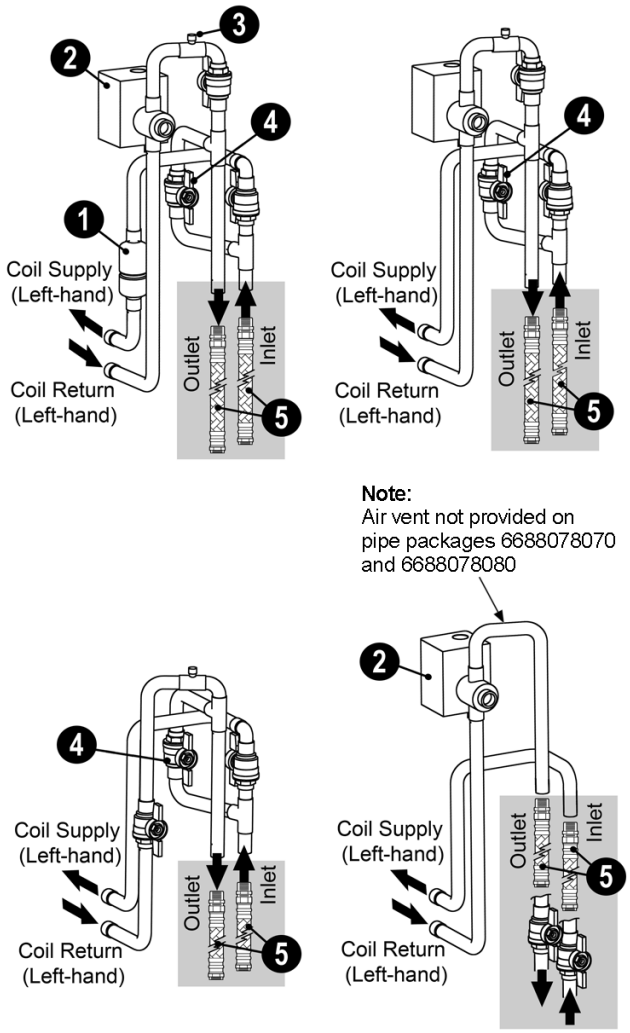
Left End Piping (Back) View | **Left End Piping View**

Right End Piping View | **Right End Piping (Back) View**

Note: *Daikin offers a wide variety of piping packages. Consult your local sales rep for more information.*

When installing the hoses on valve assemblies, use the method as outlined in "Shutoff/Balancing Valve Piping" on page 12.

Figure 11: Typical Piping Package Configurations (Left-Hand Unit Piping Connections Shown)



= Field-Installed (Not Included)

1. Measureflow device
2. 2-way motorized isolation valve
3. Air bleed vent (not provided on pipe packages 6688078070 and 6688078080)
4. Supply, return and bypass hand valve
5. Inlet-outlet flexible hoses (field-installed - Not included)

Notes: *Optional flexible hose kits are provided with a 5/8" JIC FPT sweat adapter for field-installation to supply and return pipe stubs.*

On left-hand piping units the water supply connection is on the top. Right hand piping units the water supply is at the bottom location.

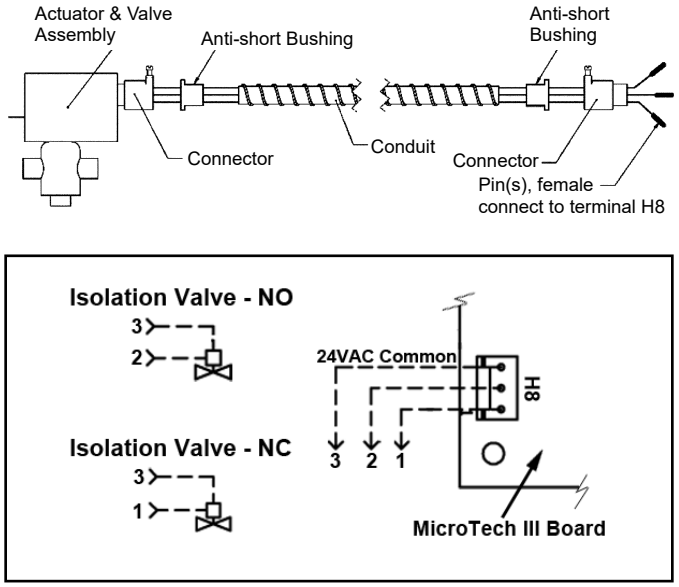
Motorized Isolation Valve

The 2-way motorized valve kit is available as a factory-installed and wired option or may be ordered as a field-installed accessory.

Wired as shown in Figure 12, the motorized valve will open on a call for compressor operation. Valves for unit sizes 007 to 018 are 1/2".

Figure 12 illustrates the wiring for a Normally Closed (NC), power open motorized valve.

Figure 12: Normally Closed, Power Open Motorized Valve Wiring



Notes: *1. Connectors on valve must be cut off and stripped back and the wires twisted to make connections to the H8 (IV/PR) terminals on the MicroTech III controller.*

2. All plumbing connections are made the same, whether or not the unit has valve packages. Plumbing connections must conform with local piping and building codes. The ability to remove the unit in order to perform repairs is imperative.

Condensate Hose Connection

Each unit is supplied with a 3/4" (19mm) I.D. clear vinyl condensate hose internally trapped within the chassis. The hose extends 3½" (89mm) out of the chassis within the piping compartment to reach the floor or the back wall.

Field condensate piping must enter within the confines of the cabinet (back wall or floor) similar to the supply and return piping. Slide the vinyl hose over the condensate pipe and clamp it.

Antifreeze Correction Factors

Table 2: Ethylene Glycol

	10%	20%	30%	40%	50%
Cooling Capacity	0.9950	0.9920	0.9870	0.9830	0.9790
Heating Capacity	0.9910	0.9820	0.9770	0.9690	0.9610
Pressure Drop	1.0700	1.1300	1.1800	1.2600	1.2800

Table 3: Propylene Glycol

	10%	20%	30%	40%	50%
Cooling Capacity	0.9900	0.9800	0.9700	0.9600	0.9500
Heating Capacity	0.9870	0.9750	0.9620	0.9420	0.9300
Pressure Drop	1.0700	1.1500	1.2500	1.3700	1.4200

Table 4: Methanol

	10%	20%	30%	40%	50%
Cooling Capacity	0.9980	0.9720	–	–	–
Heating Capacity	0.9950	0.9700	–	–	–
Pressure Drop	1.0230	1.0570	–	–	–

Table 5: Ethanol

	10%	20%	30%	40%	50%
Cooling Capacity	0.9910	0.9510	–	–	–
Heating Capacity	0.9950	0.9600	–	–	–
Pressure Drop	1.0350	0.9600	–	–	–

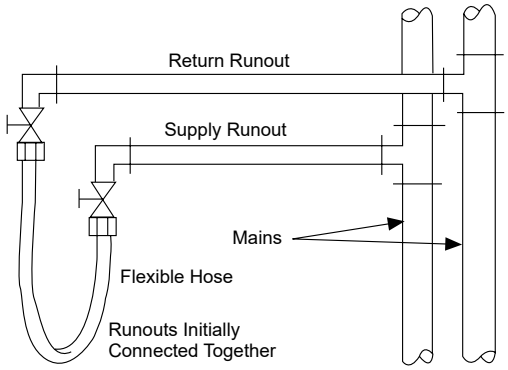
Cleaning & Flushing Water System

⚠ CAUTION

Prior to first operation of any unit, the water circulating system must be cleaned and flushed of all construction dirt and debris. If the unit is provided with water shutoff valves, either electric or pressure operated, the supply and return run outs must be connected together at each unit location. This will prevent the introduction of dirt into the water circulating system. Additionally, pressure operated valves only open when the compressor is operating.

1. Prior to first operation of any unit, the water circulating system must be cleaned and flushed of all construction dirt and debris.
   If the units are equipped with water shutoff valves, either electric or pressure operated, the supply and return run outs must be connected together at each unit location. This will prevent the introduction of dirt into the unit. See Figure 13.

Figure 13: Connections for flushing system piping



2. Fill the system at the city water makeup connection with all air vents open. After filling, close all air vents. The contractor should start main circulator with the pressure reducing valve open. Check vents in sequence to bleed off any trapped air, ensuring circulation through all components of the system. Power to the heat rejector unit should be off, and the supplementary heat control set at 80°F (27°C). While circulating water, the contractor should check and repair any leaks in the unit and surrounding piping. Drains at the lowest point(s) in the system should be opened for initial flush and blow-down, making sure city water fill valves are set to make up water at the same rate. Check the pressure gauge at pump suction and manually adjust the makeup to hold the same positive steady pressure both before and after opening the drain valves. Flush should continue for at least two hours or longer until the drain water is clean and clear.
3. Shut off supplemental heater and circulator pump and open all drains and vents to completely drain down the system. Short circuited supply and return run outs should now be connected to the unit supply and return connections. Do not use sealers at the swivel flare connections of hoses.
4. Flush system with water for 2 hours or longer until water is clean.
5. Refill the system with clean water. Test the water using litmus paper for acidity, and treat as required to leave the water slightly alkaline (pH 7.5 to 8.5). The specified percentage of antifreeze may also be added at this time. Use commercial grade antifreeze designed for HVAC systems only. Do not use automotive grade antifreeze (See "Antifreeze Correction Factors" on page 14).
   Once the system has been filled with clean water and antifreeze (if used), precautions should be taken to protect the system from dirty water conditions.

NOTICE

It is Daikin policy not to make recommendations on water treatment. It is the responsibility of the user to check that the water supply to the units is free of contaminants or corrosive agents, chemicals or minerals. The general contractor or owner should contact a local water treatment company regarding water treatment. A fouled closed loop water system will lead to premature component failure.

Note: *Contact a local water treatment company to confirm water clarity prior to unit operation.*

Dirty water will result in system wide degradation of performance and solids may clog system-wide valves, strainers, flow regulators, etc. Additionally, the heat exchanger may become clogged which reduces compressor service life or causes premature failure.

6. Set the loop water controller heat add setpoint to 70°F (21°C) and the heat rejection setpoint to 85°F (29°C). Supply power to all motors and start the circulating pumps. After full flow has been established through all components including the heat rejector (regardless of season) and the vented air and loop temperatures have been stabilized, each of the units will be ready for check, test and start-up, air balancing, and water balancing.

⚠ CAUTION

Units must be checked for water leaks upon initial water system start-up. Water leaks may be a result of mishandling or damage during shipping. Failure by the installing contractor to check for leaks upon start-up of the water system could result in property damage.

Electrical Connections

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

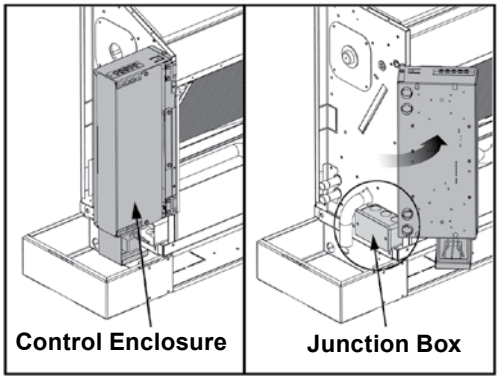
⚠ DANGER

Hazardous Voltage!
The installer must determine and follow all applicable codes and regulations. This equipment presents hazards of electricity, rotating parts, sharp edges, heat and weight. Failure to read and follow these instructions can result in property damage, severe personal injury or death.

Standard Electrical Connection

Each chassis comes with a junction box mounted on the side of the chassis and contains the field electrical connection (Figure 14).

Figure 14: Junction Box Location



Notes: *1. If electrical wiring or conduit comes through the floor, all wires or conduit should be sealed at this point. It will prevent any condensation or water leakage that may occur due to lack of preventive maintenance. Each unit has an internal condensate trap but will require cleaning.*

2. Wiring coming through the wall should be sealed to stop cold air infiltration through the wall cavity which could affect unit thermostat operation. Remove the junction box cover, selecting the proper knockout and remove it. Install a strain relief and pass the wires through the strain relief into the junction box making the connection and reinstall the junction box cover.

3. Check the local code concerning correct electrical connection.

Cord & Plug Electrical Connection (field installed)

Cord connected equipment comes with a box and appropriate voltage receptacle. However, a disconnect switch and fuses can also be provided in the box. As an option, the box comes factory mounted and is ready to be field wired to the incoming power. The box is mounted on the same side as the piping.

It is the responsibility of the installing contractor to make the proper electrical connection to the electrical box, using the same method as described in the standard electrical connection.

Mechanical (Compressor) Heating Override to Electric Heat Operation

Note: *Only with units equipped with the electric heat feature*

In the event of a compressor failure or, electric heat is desired over mechanical (compressor) heating, a factory certified service technician may reconfigure the male and female plugs to enable electric heat. This option allows emergency electric heat when mechanical heating is not available. Electric heat can be disabled and the unit can be returned to mechanical (compressor) heating operation when desired (Figure 15).

Note: *In electric heat mode, unit will not run compressor on a call for heating. The electric heater will be utilized instead.*

⚠WARNING

Before disconnecting or connecting plugs, be sure power to unit is off and power disconnect switch is in the off position.

Switching Mechanical (Compressor) Heating to Electric Heat Operation

1. Disconnect wires 70 and 71 plug located on outside of control box from socket that connects to the Entering Water Temperature (EWT) Sensor (Figure 15).
2. Reconnect wires 70 and 71 plug into the Electric Heat (EH) socket located on the back of the hinged control box (Figure 15).
3. Coil the disconnected Entering Water Temperature Sensor wire and store in safe location for later use.

Figure 15: Switching to Electric Heat Detail

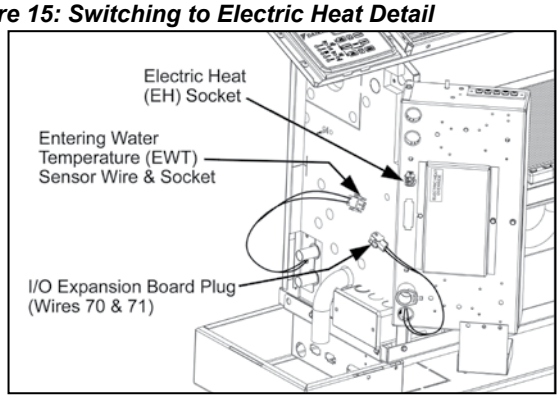


Table 6: Electric Heater Current and Power

Nominal Voltage	Sizes 007, 009, 012 2.5kW		Sizes 015, 018 3.5kW	
	Power (kW)	Current (Avg)	Power (kW)	Current (Avg)
208	2.01	9.67	2.71	13.02
230	2.46	10.70	3.31	14.40
240	2.68	11.16	3.61	15.03
265	3.27	12.33	4.40	16.59
277	3.57	12.88	4.80	17.35

Electrical Data

General

1. Be sure the available power is the same voltage and phase as that shown on the unit serial plate. Line and voltage wiring must be done in accordance with local codes or the National Electrical Code, whichever is applicable.
2. Apply correct line voltage to the unit. A disconnect switch near the unit is required by code. Power to the unit must be sized correctly and have dual element (Class RK5) fuses or HACR circuit breaker for branch circuit overcurrent protection. See the nameplate for correct ratings.
3. All 208-230V single phase units are factory wired for 208 volt operation unless specified for 230 volts.

Operating Voltages

115/60/1	104 volts min.; 127 volts max.
208-230/60/1	197 volts min.; 253 volts max.
265/60/1	238 volts min.; 292 volts max.
230/50/1	197 volts min.; 253 volts max.

Note: *Voltages listed are to show voltage range. However, units operating with over voltage and under voltage for extended periods of time will experience premature component failure.*

Operating Limits

Environment

This equipment is designed for indoor installation only. Sheltered locations such as attics, garages, etc., generally will not provide sufficient protection against extremes in temperature and/or humidity, and equipment performance, reliability, and service life may be adversely affected.

Table 7: Air limits in °F (°C)

Air Limits	Standard Range Units		Geothermal Range Units	
	Cooling	Heating	Cooling	Heating
Minimum Ambient Air[1]	50°F (10°C)	50°F (10°C)	40°F (4°C)	40°F (4°C)
Maximum Ambient Air[2]	100°F/77°F (38°C/25°C)	85°F (29°C)	100°F/77°F (38°C/25°C)	85°F (29°C)
Minimum Entering Air[1]	65°F/55°F (18°C/13°C)	50°F (10°C)	65°F/55°F (18°C/13°C)	50°F (10°C)
Common Design Entering Air	75°F/63°F (24°C/17°C)	70°F (21°C)	75°F/63°F (24°C/17°C)	70°F (21°C)
Maximum Entering Air[2]	85°F/71°C (29°C/22°C)	80°F (27°C)	85°F/71°C (29°C/22°C)	80°F (27°C)

Table 8: Fluid limits

Fluid Limits	Standard Range Units		Geothermal Range Units	
	Cooling	Heating	Cooling	Heating
Minimum Entering Fluid	55°F (13°C)	55°F (13°C)	30°F (-1°C)	20°F (-6°C)
Common Design Entering Fluid	85-90°F (29-32°C)	70°F (21°C)	90°F (32°C)	35-60°F (1.5-16°C)
Maximum Entering Fluid	110°F (43°C)	90°F (32°C)	110°F (43°C)	90°F (32°C)
Minimum GPM/Ton	1.5			
Nominal GPM/Ton	3.0			
Maximum GPM/Ton	4.0			

Notes: 1. Maximum and minimum values may not be combined. If one value is at maximum or minimum, the other two conditions may not exceed the normal condition for standard units. Geothermal range units may combine any two maximum conditions, but not more than two, with all other conditions being normal conditions.

2. This is not a normal or continuous operating condition. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.

Additional Information

Units are designed to start and operate with entering air at 40°F (4°C), with entering water at 70°F (21°C), with both air and water at the flow rates used in the ARI-Standard 320-86 rating test, for initial start-up in winter.

Note: *This is not a normal or continuous condition. It is assumed that such a start-up is for the purpose of bringing the building space to occupancy temperature.*

MicroTech® III Unit Controller

The MicroTech III Unit Controller includes built-in features such as random start, compressor time delay, shutdown, condensate overflow protection, defrost cycle, brownout, and LED/fault outputs. Refer to "Table 11: MicroTech III Controller Status LED's" on page 20.

The unit has been designed for operation with a microelectronic wall thermostat selected by the manufacturer. Do not operate the unit with any other type of wall thermostat.

Each unit has a printed circuit board control system. The low voltage output from the low voltage terminal strip is AC voltage to the wall thermostat. R is A/C voltage output to the wall stat.

The 24 volt low voltage terminal strip is set up so R-G energizes the fan, R-Y1 energizes the compressor for cooling operation, R-W1 energizes the compressor and reversing valve for heating operation. The reversing valve is energized in the heating mode. The circuit board has a fan interlock circuit to energize the fan whenever the compressor is on if the thermostat logic fails to do so.

The output to the wall stat is AC current. Terminal (R) on the wall stat can be connected to terminal (R) on the PC board for AC voltage.

R = AC current **R to G** = fan only

R to Y1 = cooling **R to W1** = heat

The MicroTech III unit controller has a lockout circuit to stop compressor operation if any one of its safety switches opens (high pressure switch and low pressure switch on unit sizes 024 through 060). If compressor low suction temperature is detected, the unit will go into the cooling mode for 60 seconds to defrost any slush in the water-to-refrigerant heat exchanger. If the condensate sensor detects a filled drain pan, the compressor operation will be suspended only in the cooling mode. The unit is reset by opening and closing the disconnect switch on the main power supply to the unit in the event the unit compressor operation has been suspended due to low temperature (freezestat) switch, high pressure switch, or low pressure switch on unit sizes 048 thru 060. The unit does not have to be reset on a condensate overflow detection.

The MicroTech III unit controller fault output sends a signal to an LED on a wall thermostat. "Table 11: MicroTech III Controller Status LED's" on page 20 lists the faults that cause the Alarm “A” terminal output to indicate an alarm condition exists.

Remote Reset of Automatic Lockouts

The Remote Reset feature provides the means to remotely reset some lockouts generated by high-pressure and/or low-temperature faults. When the MicroTech III unit controller is locked out due to one of these faults, and the cause of the fault condition has been cleared, energizing the O-terminal for 11 seconds or more forces the MicroTech III unit controller to clear the lockout. Cycling unit power also clears a lockout if the conditions causing the fault have been alleviated.

The Intelligent Alarm Reset feature helps to minimize nuisance trips of automatic reset lockouts caused by low temperature faults. This feature clears faults the first two times they occur within a 24-hour period and triggers an automatic lockout on the 3rd fault. The retry count is reset to zero every 24 hours.

The MicroTech III unit controller has built-in night setback operation. A “grounded’ signal to the “U” terminal on TB3 of the unit control puts the unit into the unoccupied mode for night setback operation. Fan operation terminates and unit control will only respond to signal at the W2 terminal. Daytime heating and cooling operation is locked out. +24VAC to W2 energizes the compressor and reversing valve for heating operation. Night setback operation can be overridden for two hours by energizing the O on the TB2 terminal of the unit control for 4 to 10 seconds. Day thermostat setpoints then control the heating and cooling operation. The MicroTech III unit controller also accommodates shutdown operation on receipt of a “grounded” signal to the “E” input, respectively, on TB3 input terminal of the unit control.

Table 9: MicroTech III Unit Controller Terminals Locations and Descriptions

H1 – 1	24	24 VAC Power Input
H1 – 2	C	24 VAC common
H2 – 1	SL1	Fan Low Speed Output – Switched L1
H2 – 2		Blank Terminal
H2 – 3	N	Fan Low Speed Output – Neutral
H3 – 1	HP1-1	Comp High Pressure Switch (HP1) Input Terminal 1
H3 – 2	HP1-2	Comp High Pressure Switch (HP1) Input Terminal 2
H4 – 1	1	Discharge Air Temp Sensor – Common
H4 – 2		Discharge Air Temp Sensor – Signal
H4 – 3		Leaving Water Temp Sensor – Common
H4 – 4		Leaving Water Temp Sensor – Signal
H5 – 1	1	I/O Expansion Module Common (Gnd)
H5 – 2		I/O Expansion Module Common (Gnd)
H5 – 3		I/O Expansion Module +5 VDC
H5 – 4		I/O Expansion Module SPI CE1
H5 – 5		I/O Expansion Module SPI CLK
H5 – 6		I/O Expansion Module SPI OUT
H5 – 7		I/O Expansion Module SPI IN
H5 – 8		I/O Expansion Module +12 VDC
H5 – 9		I/O Expansion Module 24 VAC
H5 – 10		I/O Expansion Module 24 VAC
H5 – 11		No Connection
H5 – 12		No Connection
H6 – 1	1	Condensate Overflow Signal Input
H6 – 2		Compressor Suction Temp Sensor (LT1) – Common
H6 – 3		Compressor Suction Temp Sensor (LT1) – Signal
H6 – 4		Compressor Low Pressure Switch (LP1) – Source Voltage
H6 – 5		Compressor Low Pressure Switch (LP1) – Signal
H6 – 6		Reversing Valve – Common
H6 – 7		Reversing Valve – Output
H7 – 1	1	No Connection
H7 – 2		No Connection
H7 – 3		Red LED Output
H7 – 4		Green LED Output
H7 – 5		Yellow LED Output
H7 – 6		Red-Green-Yellow LED Common
H8 – 1	1	Isolation Valve/Pump Request Relay N/O
H8 – 2		Isolation Valve/Pump Request Relay N/C
H8 – 3		24 VAC Common
H9 – 1	1	Room Temp Sensor & Tenant Override – Signal
H9 – 2		Room Temp Sensor & Tenant Override – Common
TB1 – 1	1	Room Sensor – Status LED Output
TB1 – 2	2	Room Sensor – Fan Mode & Unit Mode Switches
TB1 – 3	3	Room Sensor – Setpoint Adjust Potentiometer
TB1 – 4	4	Room Sensor – Room Temp Sensor & Tenant Override
TB1 – 5	5	Room Sensor – DC Signal Common
TB2 – 1	R	24 VAC
TB2 – 2	A	Alarm Output
TB2 – 3	W2	Thermostat – Heat Stage #2 Input
TB2 – 4	W1	Thermostat – Heat Stage #1 Input
TB2 – 5	Y2	Thermostat – Cool Stage #2 Input
TB2 – 6	Y1	Thermostat – Cool Stage #1 Input
TB2 – 7	G	Thermostat – Fan Input
TB2 – 8	O	Thermostat – Tenant Override Input
TB2 – 9	C	24 VAC Common
TB3 – 1	E	Emergency Shutdown Input
TB3 – 2	U	Unoccupied/Occupied Input
L1 – 1	L1 - 1	Line Voltage Terminal 1
L1 – 2	L1 - 2	Line Voltage Terminal 2
L1 – 3	L1 - 3	Line Voltage Terminal 3
N1	N1	Neutral Terminal 1
N2	N2	Neutral Terminal 2
N3	N3	Neutral Terminal 3
COMP Relay	SWL1	Switch – L1 Voltage
	L1	No Connection

Table 10: MicroTech III Controller Configuration Jumper Settings

Baseboard Description	Jumper(s)	Setting	Model
Normal / Test Mode	JP1	JP1 = Open	Normal Operation
		JP1 = Shorted	Service / Test Mode
Fan Operation	JP2	JP2 = Open	Continuous Fan Operation (On)
		JP2 = Shorted	Cycling Fan Operation (Auto)
Loop Fluid	JP3	JP3 = Open	Water Loop Fluid
		JP3 = Shorted	Glycol Loop Fluid
Freeze Fault Protection	JP4	JP4 = Open JP4 = Shorted	Not Used
Room Sensor Setpoint Potentiometer Range	JP5	JP5 = Open	Short Range: -5 to +5 ºF (-2.78 to +2.78 ºC)
		JP5 = Shorted	Long Range: 55 to 95 ºF (12.78 to 35 ºC)
Thermostat / Room Sensor	JP6	JP6 = Open	Thermostat Control
		JP6 = Shorted	Room Sensor Control
Compressor Heating Source	JP7	JP7 = Open	Allow Compressor Heating Mode Operation
		JP7 = Shorted	Disable Compressor Heating Mode Operation
I/O Expansion Module	JP8	JP8 = Open	I/O Expansion Board Not Present
		JP8 = Shorted	I/O Expansion Board Is Required

⚠ WARNING

Proper antifreeze/water solution is required to minimize the potential of fluid freeze-up. Jumper JP3 is factory set for water freeze protection with the jumper open. Operation with anti-freeze protection requires JP3 to be field configured for the jumper closed. If unit is employing a fresh water system (no anti-freeze protection), it is extremely important that JP3 jumper setting remains in the open position (factory default setting) in order to shut down the unit at the appropriate water temperature to protect your heat pump from freezing. Failure to do so can result in unit damage and fluid leaks.

Table 11: MicroTech III Controller Status LED's

Description	Type*	Yellow	Green	Red
IO Expansion Communication Fail	Fault	ON	Flash	Flash
Invalid Configuration	Fault	Flash	Flash	OFF
Low Voltage Brownout	Fault	OFF	Flash	OFF
Emergency Shutdown	Mode	OFF	Flash	OFF
Compressor High Pressure (HP1)	Fault	OFF	OFF	Flash
Compressor Low Pressure (LP1)	Fault	OFF	OFF	ON
Compressor Low Suction Temp Sensor Fail (LT1)	Fault	Flash	Flash	ON
Freeze Fault Detect (Freeze Fault Protection Only)	Fault	Flash	OFF	Flash
Compressor Low Suction Temp (LT1)	Fault	Flash	OFF	OFF
Room Temp Sensor Fail (With Room Sensor Control Only)	Fault	Flash	Flash	ON
"Condensate Overflow (Cooling)	Fault	ON	OFF	OFF
Low Entering Water Temp (Heating Compressor Inhibit; No Display with Boilerless EH)	Fault	Flash	OFF	Flash
Serial EEPROM Corrupted	Fault	ON	ON	ON
Service Test Mode Enabled	Mode	Flash	Flash	Flash
Unoccupied Mode	Mode	ON	ON	OFF
Occupied, Bypass, Standby Modes	Mode	OFF	ON	OFF

Note: Mode / Faults are listed in order of priority.*

Note: *A random start delay time between 300 and 360 seconds is generated at power up.*

Figure 16: MicroTech III Unit Controller Terminal Locations

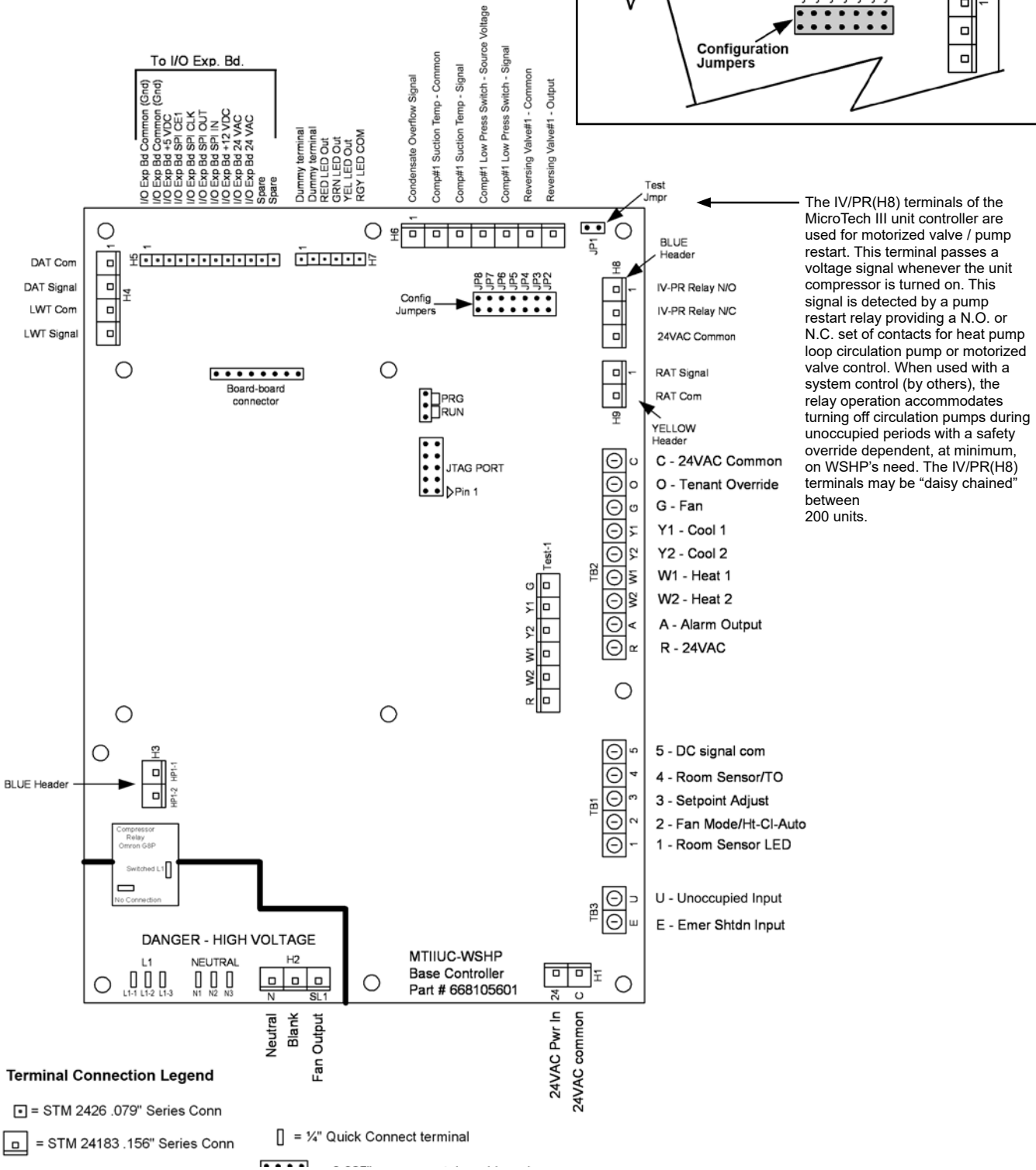
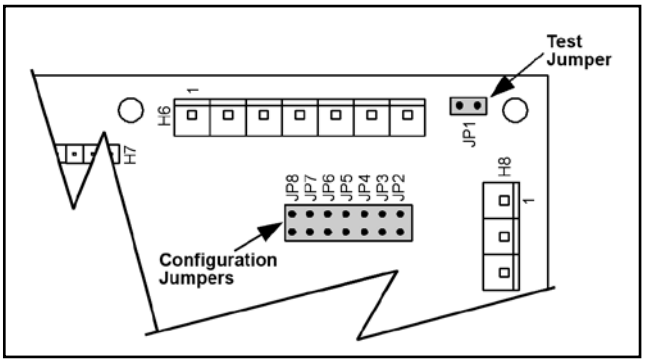
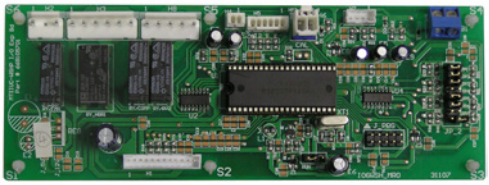


Figure 17: Location of Configuration Jumpers on the MicroTech III Unit Controller



The IV/PR(H8) terminals of the MicroTech III unit controller are used for motorized valve / pump restart. This terminal passes a voltage signal whenever the unit compressor is turned on. This signal is detected by a pump restart relay providing a N.O. or N.C. set of contacts for heat pump loop circulation pump or motorized valve control. When used with a system control (by others), the relay operation accommodates turning off circulation pumps during unoccupied periods with a safety override dependent, at minimum, on WSHP's need. The IV/PR(H8) terminals may be "daisy chained" between 200 units.

I/O Expansion Module



This manual covers the installation of a Daikin Console Unit - Model MHC, MHW Water Source Heat Pump. For installation and operation information on MicroTech III unit controller and other ancillary components, see:

- IM 927 - MicroTech III Unit Controller for Water Source Heat Pumps (LONWORKS).
- IM 928 - MicroTech III BACnet Communication Module
- OM 931 - MicroTech III Unit Controller for Water Source Heat Pumps Operation and Maintenance Manual

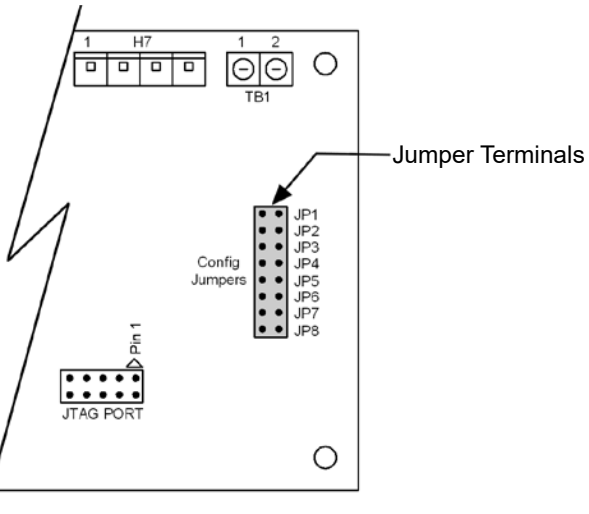
The I/O Expansion Module is a field-installed option. It is an extension of the MicroTech III unit controller and provides extra functionality.

The I/O Expansion Module has 2 main purposes:

- The I/O Expansion Module has outputs to control electric heat on a standard Water Source Heat Pump.
- The I/O Expansion Module has an independent LED annunciator to identify operational fault conditions for the electric heater.

Adding an I/O Expansion Module (with an interconnect cable) to the unit controller allows the operation of secondary electric heat with the Console Water Source Heat Pump.

Figure 18: I/O Expansion Module Configuration Jumper Terminals



Features

Standard Heat Pumps / Single Circuit Units

- Monitors entering water temperature for secondary electric heat control

Table 12: I/O Expansion Module Jumper Settings (when used)

I/O Expansion Description	Jumper(s)	Setting	Description
Not Used	JP1 & JP2	JP1 = Open JP2 = Open	None
		JP1 = Shorted JP2 = Open	
		JP1 = Open JP2 = Shorted	
		JP1 = Shorted JP2 = Shorted	
Heating Options	JP3 & JP4	JP3 = Open JP4 = Open	None
		JP3 = Open JP4 = Shorted	Boilerless Electric Heat
Not Used	JP5 & JP6	JP5 = Open JP6 = Open	None
Not Used	JP7 & JP8	JP7 = Open JP8 = Open	None

* Available with secondary heating options in addition to EC motor.

Table 13: I/O Expansion Module LED & Fault Outputs (when used)

Description	Type	Yellow	Green	Red
Baseboard Communication Fail	Fault	Flash	OFF	Flash
Low Entering Water Temperature (No Display On Boilerless Electric Heat)	Fault	OFF	ON	Flash
Fan is OFF	Mode	OFF	ON	OFF
Fan is ON	Mode	OFF	Flash	OFF
	Mode	ON	Flash	OFF
	Mode	Flash	Flash	OFF

Notes: 1. Mode / faults are listed in order of priority.
2. I/O expansion module supplied with boilerless and supplemental electric heat options.

MicroTech III Unit Controller with LONWORKS® Communication Module

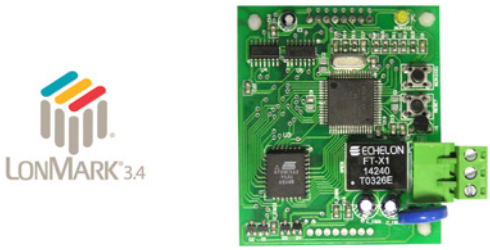
This manual covers the installation of a Daikin Console Water Source Heat Pump. For installation and operation information on LONWORKS Communication Module and other ancillary control components, see:

- IM 927 - MicroTech III Unit Controller for Water Source Heat Pumps (LONWORKS).
- IM 933 - LonMaker Integration Plug-in Tool: For use with the MicroTech III Unit Controller.
- IM 955 - MicroTech III Wall Sensor For use with Microtech III Unit Controller
- OM 1149 - MicroTech III Unit Controller for Water Source Heat Pumps Operation and Maintenance Manual

Each Daikin water source heat pump can be equipped with a LONWORKS communication module that is LONMARK 3.4 certified. The controller is microprocessor-based and is designed to communicate over a LONWORKS communications network. It can be factory or field-installed.

The unit controller is programmed and tested with all the logic required to monitor and control the unit. An optional wall sensor may be used with the communication module to provide limited local control of the Water Source Heat Pump. The unit controller monitors water and air temperatures and passes information to the communication module. The module communicates with the BAS, to provide network control of the Water Source Heat Pump.

Figure 19: LONWORKS Communication Module



MicroTech III Unit Controller with LONWORKS Communication Module orchestrates the following unit operations:

- Enable heating and cooling to maintain setpoint based on a room sensor
- Enable fan and compressor operation
- Monitors all equipment protection controls
- Monitors room and discharge air temperatures
- Monitors leaving water temperature
- Relays status of all vital unit functions

An on-board status LED indicates the status of the MicroTech III LONWORKS module.

The MicroTech III unit controller with communication module includes:

- A unit-mounted Return Air Sensor (RAT) (factory installed)
- A unit-mounted Discharge Air Sensor (DAT) (factory installed)
- A Leaving Water Temperature Sensor (LWT) (factory installed)

The communication module provides access to setpoints for operational control

Available wall sensors include:

- Room sensor
- Room sensor with LED status and tenant override button
- Temperature sensor with LED status, timed-override button, and ±5°F setpoint adjustment
- Room sensor with LED status, timed-override button, 55° to 95°F setpoint adjustment

MicroTech III Controller with BACnet MS/TP Communication Module

For installation and operation information on MicroTech III unit controller and other ancillary components, see:

- IM 928 - MicroTech III BACnet Communication Module
- OM 1149 - MicroTech III Unit Controller for Water Source Heat Pumps Operation and Maintenance Manual
- IM 955 - MicroTech III Wall Sensor For use with Microtech III Unit Controller

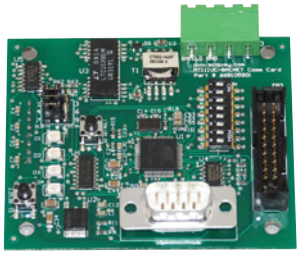
Daikin water source heat pumps are available with a Daikin BACnet communication module The module is programmed and tested with all the logic required to control the unit, and is designed to communicate over a BACnet MS/TP communications network to a building automation system (BAS). It can be factory or field-installed.

The unit controller is programmed and tested with all the logic required to monitor and control the unit. An optional wall sensor may be used with the communication module to provide limited local control of the Water Source Heat Pump. The unit controller monitors water and air temperatures and passes information to the communication module. The module communicates with the BAS, to provide network control of the Water Source Heat Pump.

The module makes operational data and commands available on a communications network using BACnet objects and properties:

- The network cable is a shielded twisted-pair cable
- Network communications are configurable to operate at 9600, 19200, 38400 or 76800 (default 38400) 76.8 Kbps
- DIP switches on the controller enable the MS/TP MAC address to be set in the range 0-127
- A status LED on the communication module indicates communication activity on the MS/TP communication network

Figure 20: MicroTech III BACnet Water Source Heat Pump Snap-in Communication Module



MicroTech III Unit Controller with BACnet Communication Module orchestrates the following unit operations:

- Enable heating and cooling to maintain setpoint based on a room sensor
- Enable fan and compressor operation
- Monitors all equipment protection controls
- Monitors room and discharge air temperatures
- Monitors leaving water temperature
- Relays status of all vital unit functions

An on-board status LED indicates the status of the MicroTech III BACnet module.

The MicroTech III unit controller with communication module includes:

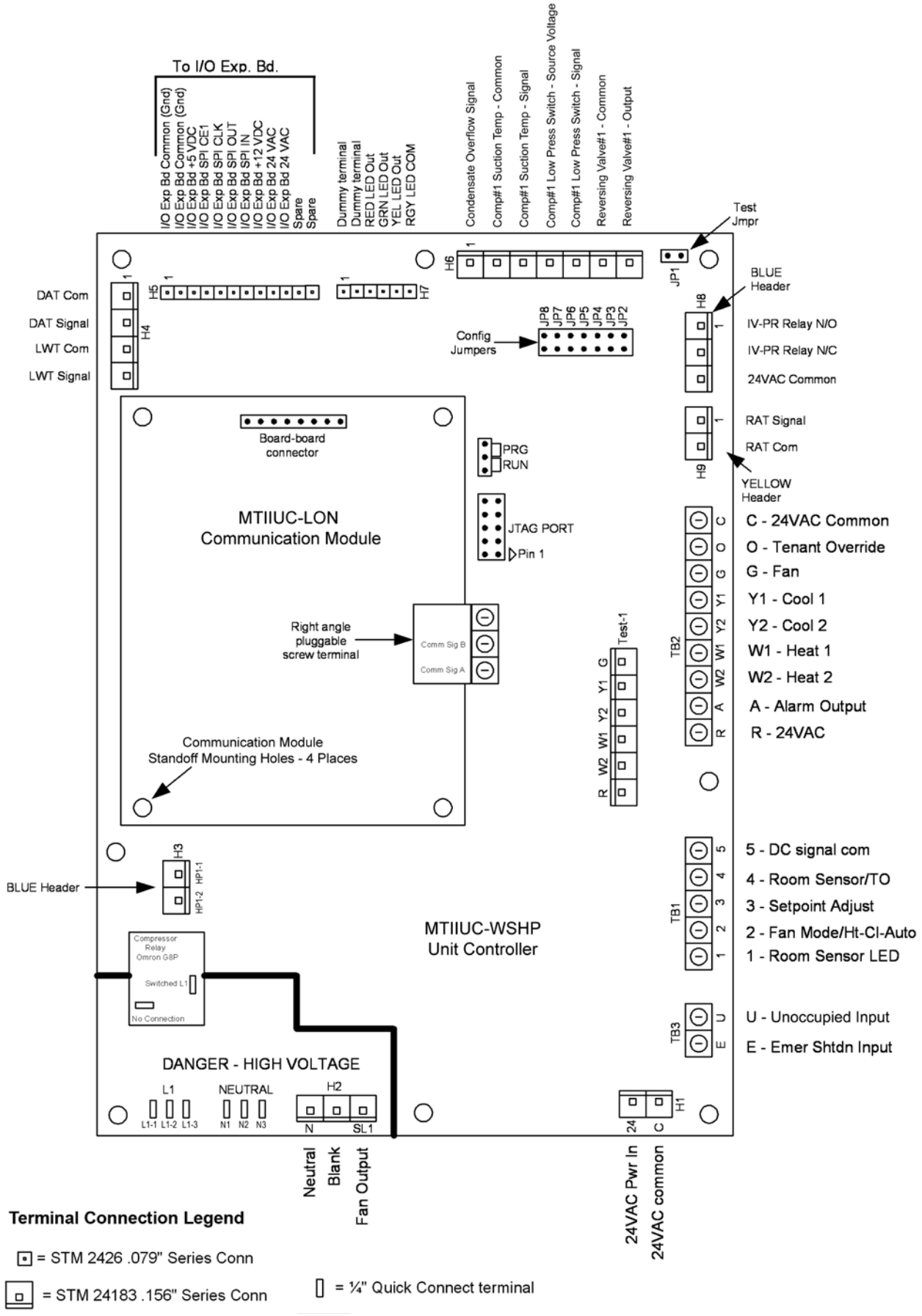
- A unit-mounted Return Air Sensor (RAT) (factory installed)
- A unit-mounted Discharge Air Sensor (DAT) (factory installed)
- A Leaving Water Temperature Sensor (LWT) (factory installed)

The communication module provides access to setpoints for operational control

Available wall sensors include:

- Room sensor
- Room sensor with LED status and tenant override button
- Room temperature sensor with LED status, timed-override button, and ±5°F setpoint adjustment
- Room temperature sensor with LED status, timed-override button, 55° to 95°F setpoint adjustment

Figure 21: LONWORKS Communication Module Placement on MicroTech III Unit Controller



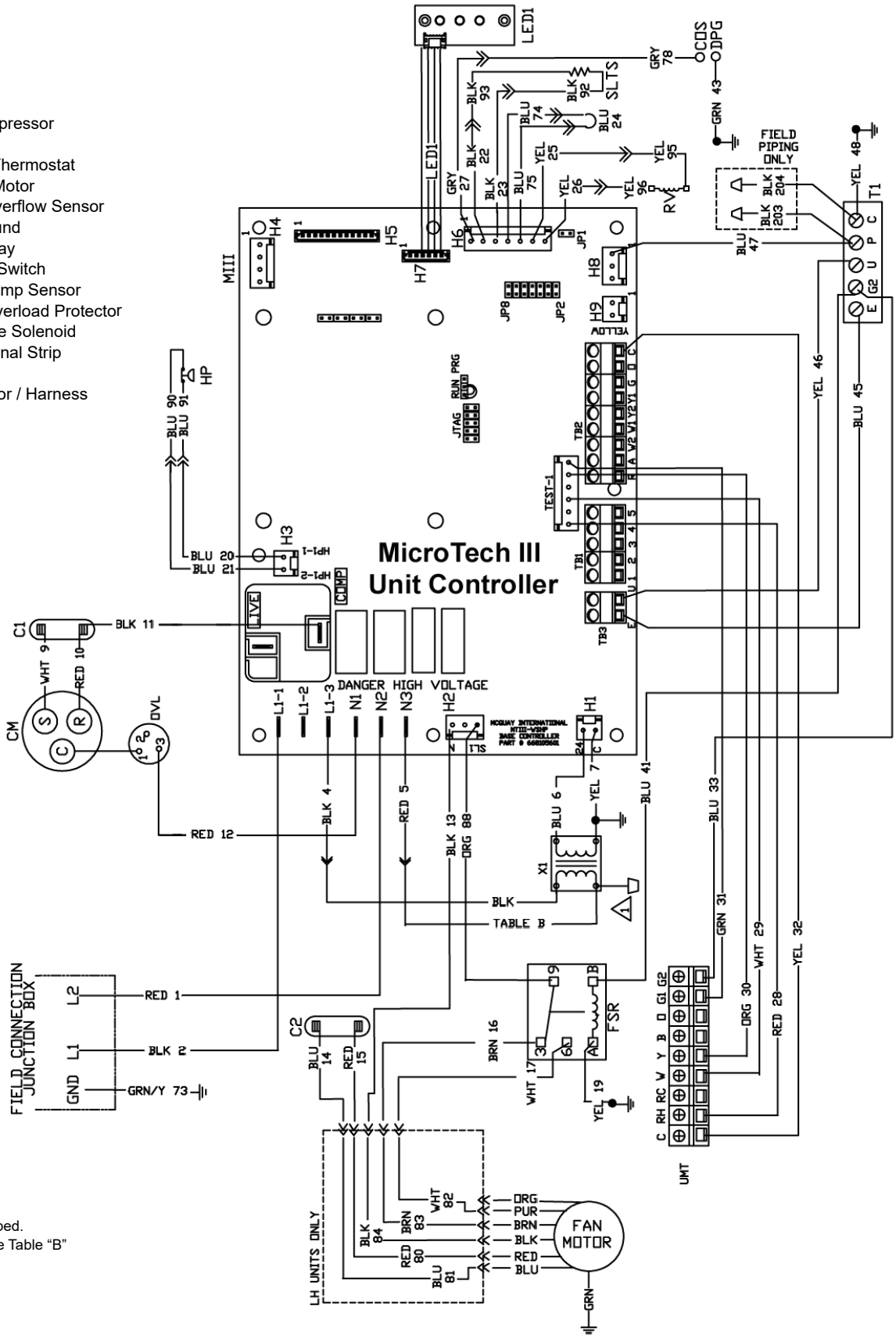
MicroTech III Unit Controller for Sizes 007-015 – 208/230/60Hz/1-Phase

Drawing No. 669539003A

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
UMT	Unit-Mounted Thermostat
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DPG	Drain Pan Ground
FSR	Fan Speed Relay
HP	High Pressure Switch
SLTS	Suction Line Temp Sensor
OVL	Compressor Overload Protector
RV	Reversing Valve Solenoid
T1	EG2UPC Terminal Strip
X1	Transformer
LED1	LED Annunciator / Harness

Table B	
208V	RED
230V	ORG



Notes:

1. Transformer:
   Unused wire to be capped.
2. Unit wired for 208V, see Table "B"

Note: *Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.*

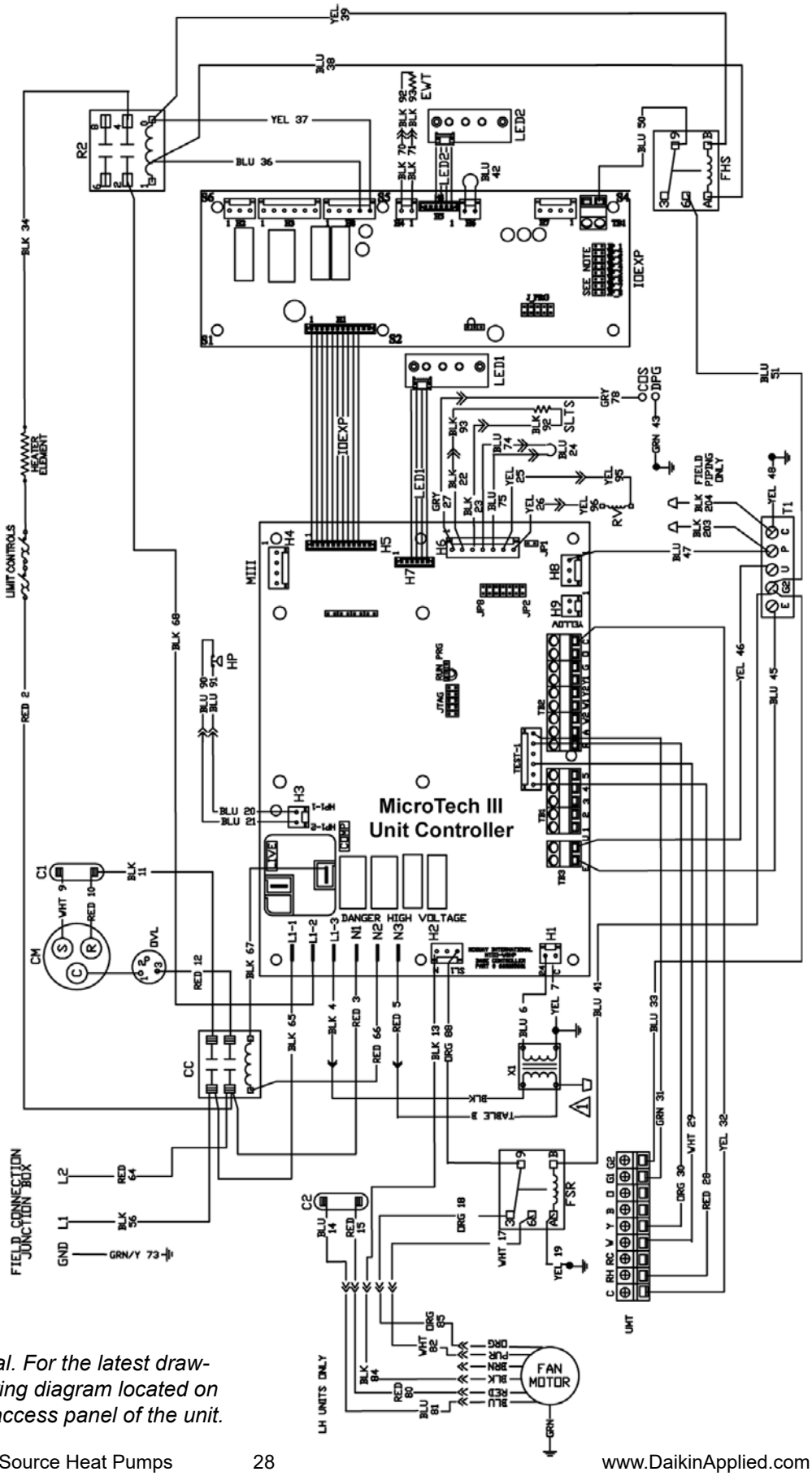
MicroTech III Unit Controller With Electric Heat for Size 018 – 208/230/60Hz/1-Phase

Drawing No. 669539006A

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Compressor Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DPG	Drain Pan Ground
FSR	Fan Speed Relay
HP	High Pressure Switch
R2	Relay - Electric Heat
IOEXP	I/O Expansion Board / Harness
LED2	LED Annunciator / Harness
SLTS	Suction Line Temp Sensor
OVL	Compressor Overload Protector
RV	Reversing Valve Solenoid
T1	EG2UCP Terminal Strip
X1	Transformer
LED1	LED Annunciator / Harness
FHS	Fan High Speed Relay
UMT	Unit-Mounted Thermostat
EWT	Entering Water Temp Sensor

Table B	
208V	RED
230V	ORG



Notes:

1. Transformer:
   Unused wire to be capped.
2. Unit wired for 208V, see Table "B"

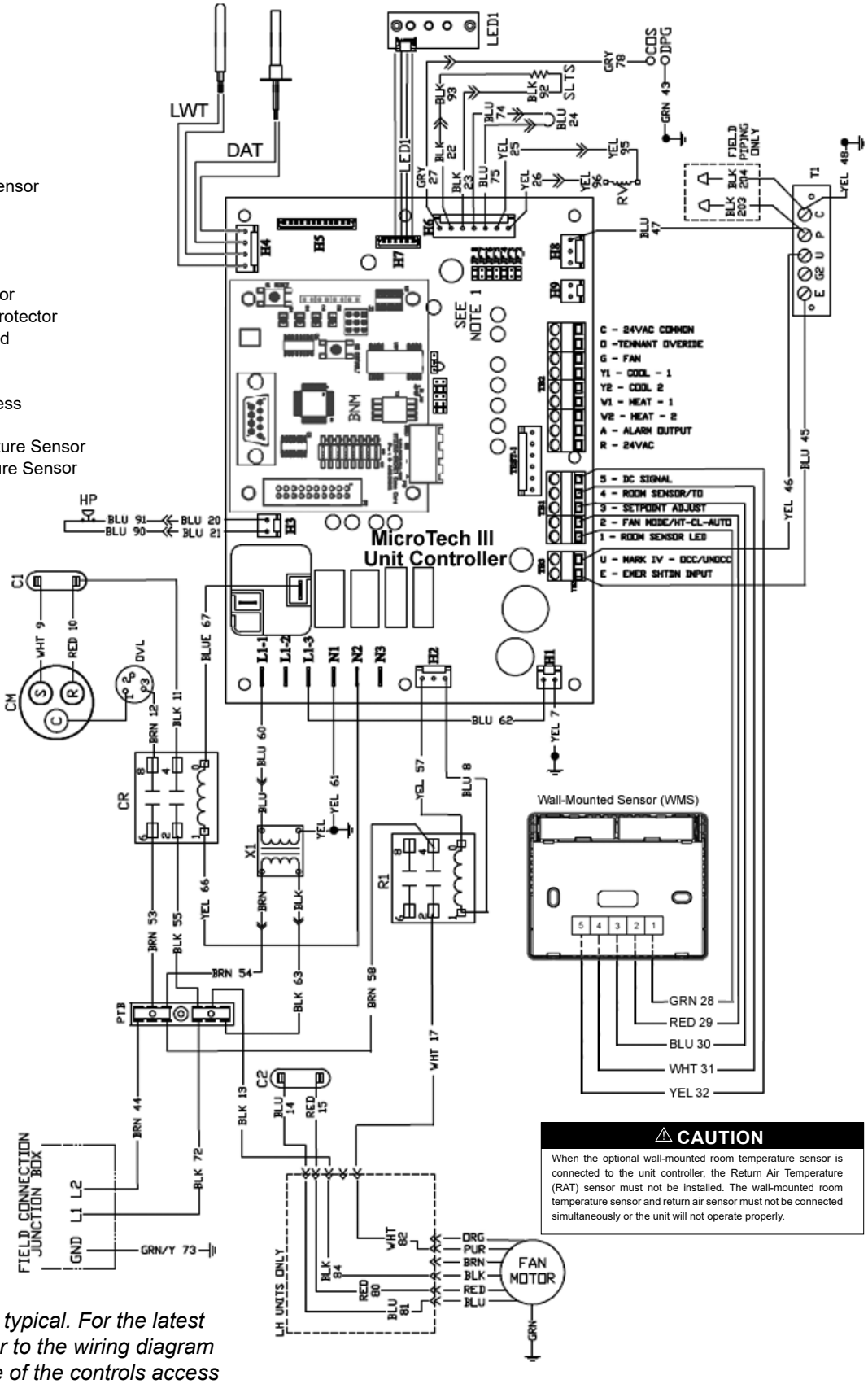
Note: *Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.*

MicroTech III Unit Controller with Communication Module and Wall-Mounted Room Temperature Sensor – 265/277/60Hz/1-Phase

Drawing No. 669542001

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
R1	Relay - Fan Motor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DPG	Drain Pan Ground
FSR	Fan Speed Relay
PTB	Power Terminal Block
HP	High Pressure Switch
SLTS	Suction Line Temp Sensor
OVL	Compressor Overload Protector
RV	Reversing Valve Solenoid
T1	EG2UCP Terminal Strip
X1	Transformer
LED1	LED Annunciator / Harness
CR	Compressor Relay
LWT	Leaving Water Temperature Sensor
DAT	Discharge Air Temperature Sensor



⚠ CAUTION

When the optional wall-mounted room temperature sensor is connected to the unit controller, the Return Air Temperature (RAT) sensor must not be installed. The wall-mounted room temperature sensor and return air sensor must not be connected simultaneously or the unit will not operate properly.

Note: *Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.*

⚠ CAUTION

Units must be checked for water leaks upon initial water system start-up. Water leaks may be a result of mishandling or damage during shipping. Failure by the installing contractor to check for leaks upon start-up of the water system could result in property damage.

Cooling or Heating – Manual Operation

The Microtech III unit controller has built-in features such as random start, compressor time delay, night setback, load shed, shutdown, condensate overflow protection, defrost cycle, brownout, and LED/fault outputs. Refer to "Table 11: MicroTech III Controller Status LED's" on page 20 for LED and fault output sequences. The 24 volt low voltage terminal strip is set so R-G energizes the fan. R-W1 energizes the fan and compressor and reversing valve for heating operation.

The reversing valve is set up to be energized in the heating mode. The circuit board has a fan interlock circuit to energize the fan whenever the compressor is on.

The Microtech III unit controller has a lockout circuit to stop compressor operation if any one of its safeties opens (high pressure or suction line sensor). If the suction line low temperature sensor opens, the unit will go into the cooling mode for 60 seconds to defrost any slush in the water-to-refrigerant heat exchanger.

After 60 seconds, the compressor is locked out. If the condensate sensor detects a filled drain pan, the compressor operation will be suspended only in the cooling mode. The unit is reset by opening and closing the disconnect switch on the main power supply to the unit in the event the unit compressor operation has been suspended due to low suction line sensor reaching its set point, or a high pressure switch.

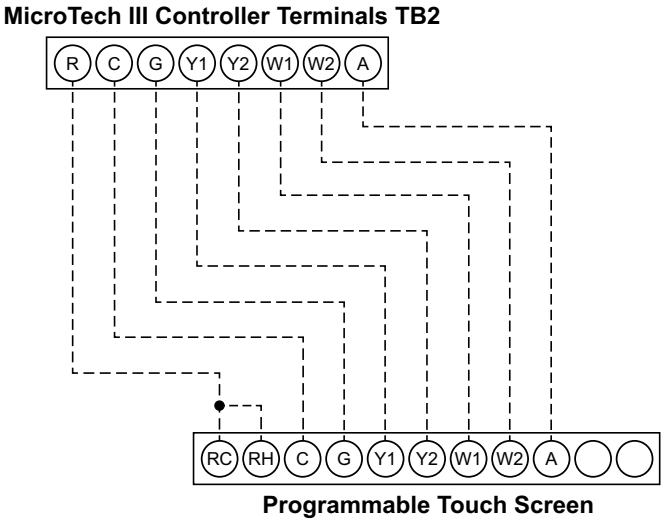
The MicroTech III unit controller fault output sends a signal to an LED on a wall thermostat. "Table 11: MicroTech III Controller Status LED's" on page 20 lists the faults that cause the Alarm “A” terminal output to indicate an alarm condition exists.

IMPORTANT

Each water source heat pump unit has a compressor and blower motor. Each component part has and internal temperature and amperage sensitive overload. If the overload opens it will suspend unit operation. Check component parts by measuring the winding resistance and looking for an open circuit.

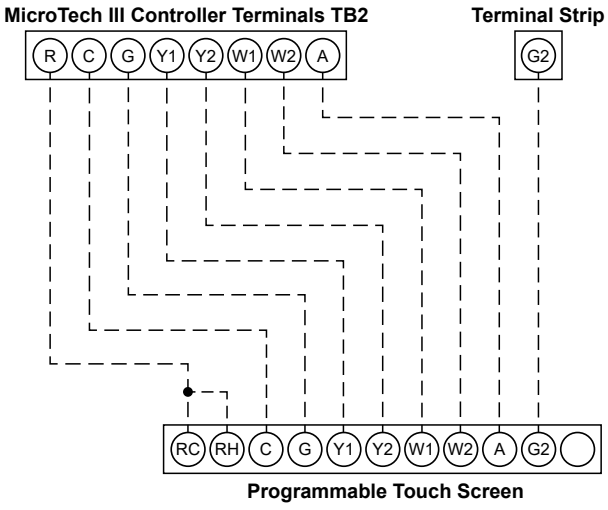
Typical Connections For Thermostats & Temperature Sensors Applications

Programmable Electronic Thermostat 2 Heat/2 Cool, 7-Day Programmable, Auto Changeover, Hardwired – P/N 910193126 & Wi-Fi P/N 910193131



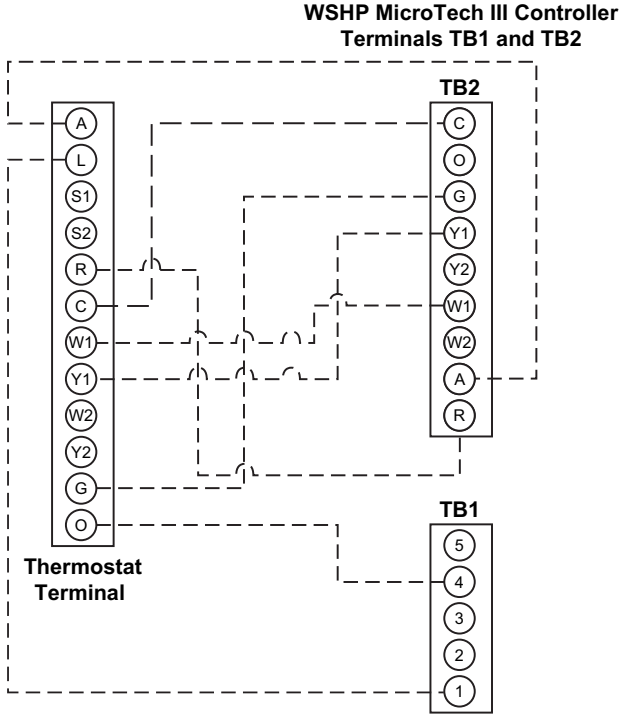
Notes: *Includes thermostat and wall plate Refer to IO manual 910193126.*

Programmable Electronic Thermostat 2 Heat/2 Cool, 7-Day Programmable, Auto Changeover, Hardwired – P/N 910193093 & Wi-Fi P/N 910193130



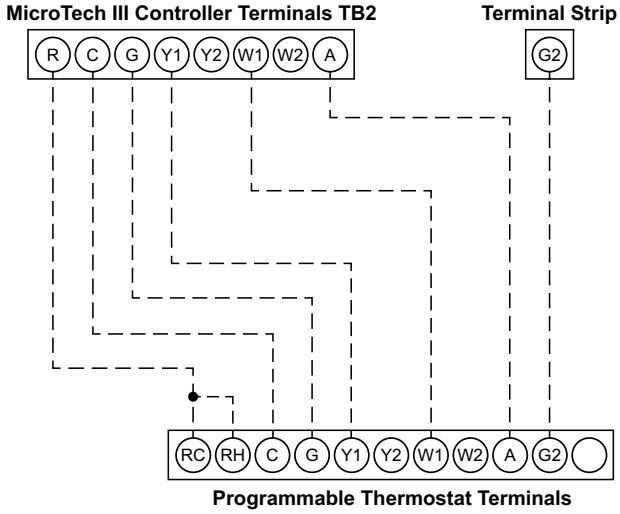
Notes: *Includes thermostat and wall plate Refer to IO manual 910193093.*

Non-Programmable Electronic Thermostat Hardwired – 1 Heat/1 Cool, Auto Changeover Fan Speed Control – P/N 668811201



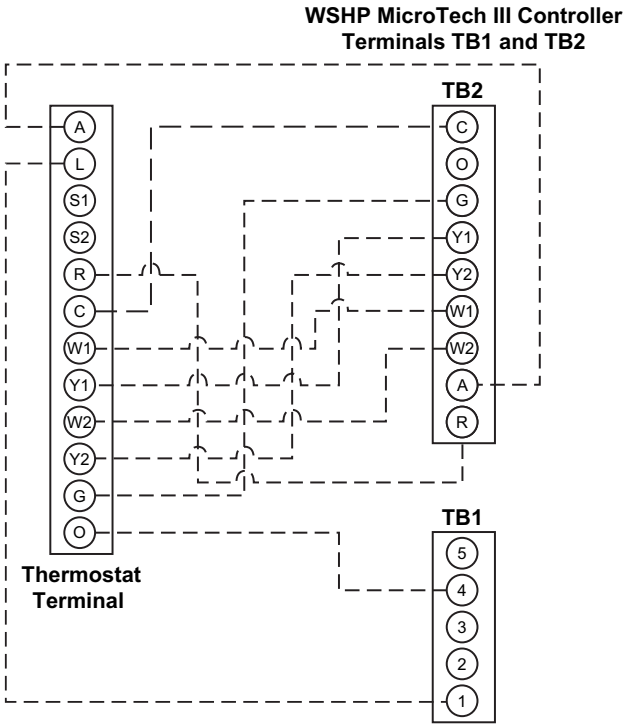
Notes: *Includes thermostat and wall plate. Refer to IO manual 668811201.*
**When remote reset of a lockout condition is required at the wall thermostat, it will be necessary to utilize a conductor between terminal "O" on the wall thermostat to "TB1 terminal 4" on the MicroTech III unit controller (non-programmable stat only).*

Programmable Electronic Thermostat Hardwired – 1 Heat/1 Cool, Auto Changeover Fan Speed Control – P/N 668811301



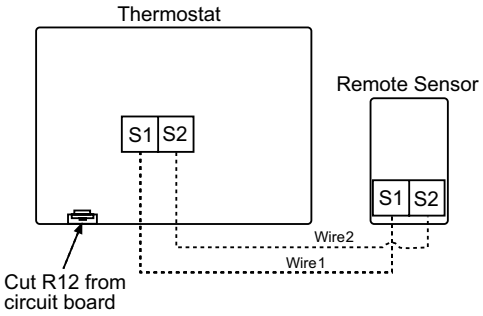
Notes: *Includes thermostat and wall plate. Refer to IO manual 668811301.*

Non-Programmable Electronic Thermostat 2 Heat/2 Cool, Auto Changeover, Hardwired – P/N 910121746 & P/N 910121748



Notes: Includes thermostat and wall plate. Refer to IO manuals 910121746 or 910121748.
**When remote reset of a lockout condition is required at the wall thermostat, it will be necessary to utilize a conductor between terminal "O" on the wall thermostat to "TB1 terminal 4" on the MicroTech III unit controller (non-programmable stat only).*

Accessory Remote Room Sensor P/N 667720401 and 107096001



⚠ CAUTION

When the optional wall-mounted room temperature sensor is connected to the unit controller, the Return Air Temperature (RAT) sensor must not be installed. The wall-mounted room temperature sensor and return air sensor must not be connected simultaneously or the unit will not operate properly.

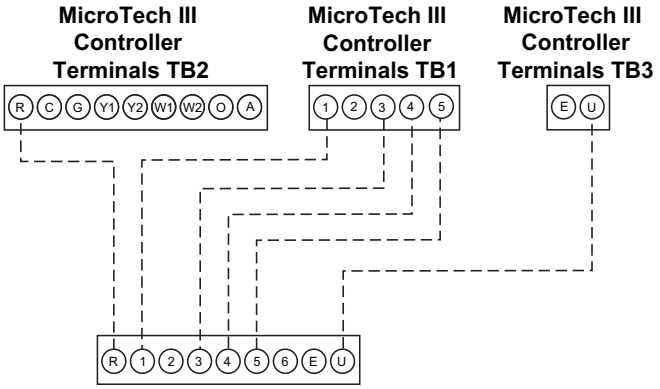
7-Day Programmable, Auto Changeover, Fan Speed Control, Hardwired P/N 668811101

For detailed installation, operation and application refer to 668811101 Install Manual.

Non-Programmable, Auto Changeover, Fan Speed Control, Hardwired P/N 668811001

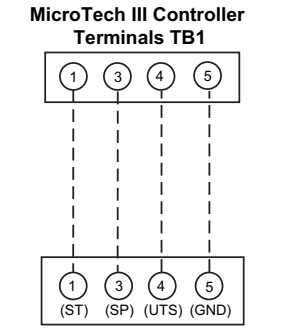
For detailed installation, operation and application refer to 66881101 Install Manual.

4-Button Digitally Adjustable Display Sensor – P/N 910152147



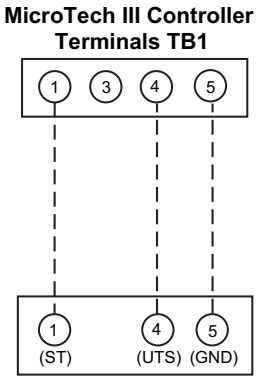
Digitally Adjustable Room Temperature Sensor

Cool/Warm Adjustable Sensor Wiring – P/N 910171464



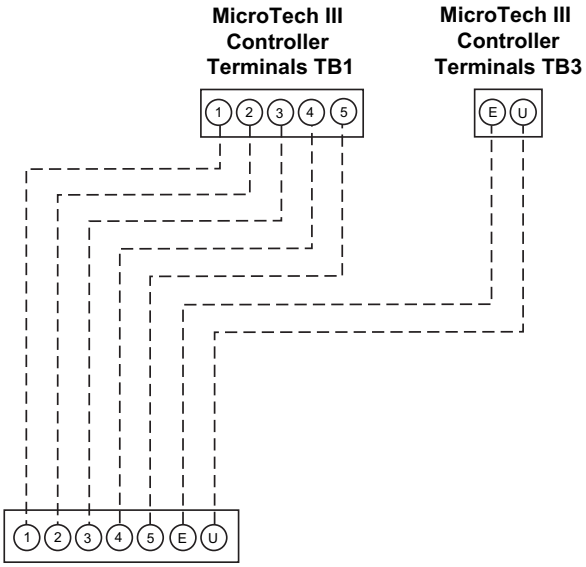
Cool/Warm Adjustable Sensor (Part No. 910171464)

Basic Sensor Wiring – P/N 910152149



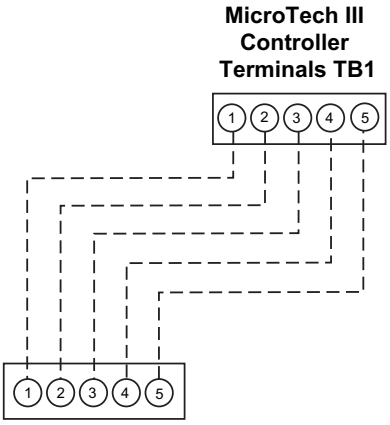
Basic Sensor (Part No. 910152149)

Room Temperature Sensor – Adjustable Cool/ Warm With Occupancy Switch – P/N 910121753



Adjustable Cool/Warm With Occupancy Switch Room Temperature Sensor

Room Temperature Sensors Adjustable 55° to 95°F or +/- 3°F – P/N 669529101 Sensor +/- 3°F – P/N 669529201



Adjustable 55º to 95º or +/- 3ºF Room Temperature Sensor

Wireless Temperature Control (T9000)

The T9000 Wireless Temperature Control is designed to provide precision temperature control without the installation labor and expense of wiring.

- Powered by AA batteries
- Mounts in any suitable location that will provide good temperature control.
- Large LCD display provides the user with current room temperature, set point temperature, time, program interval, and other system status information.

For detailed installation, operation refer to Operation & Maintenance Bulletin OM 897.

Programmable

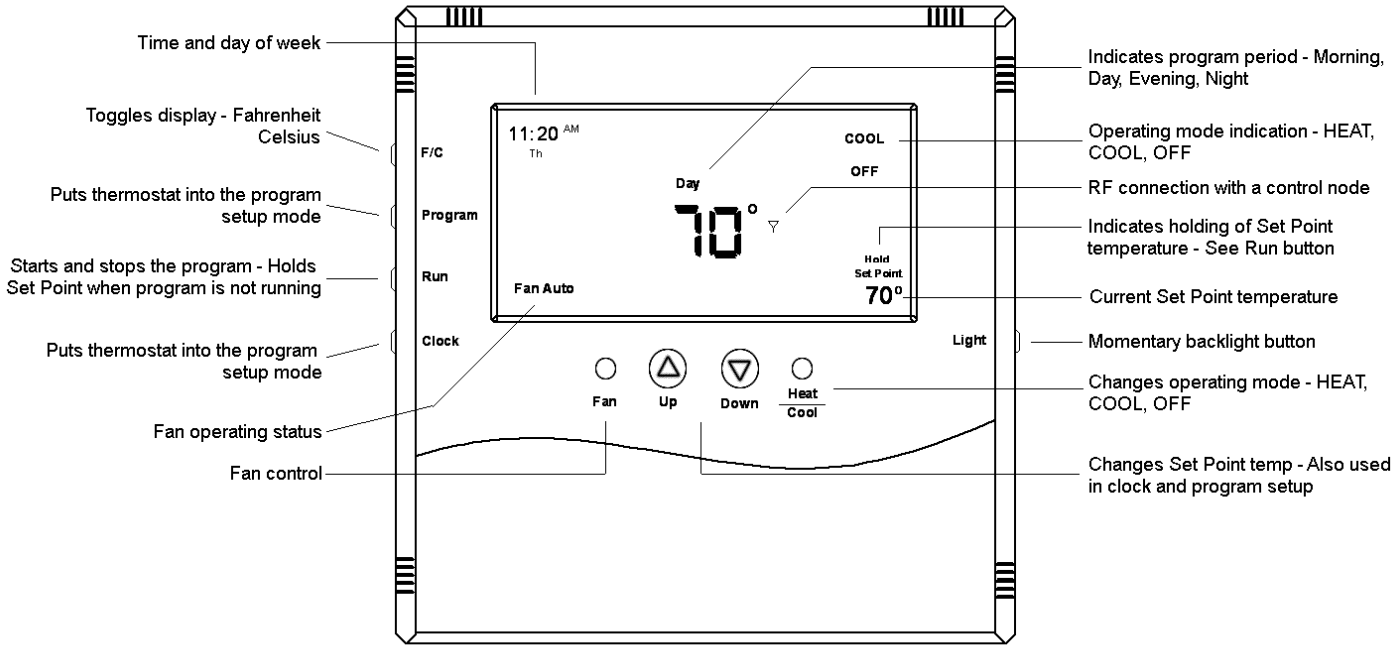
Non-programmable

The second part of the T9000 system is called a Remote Control Node or “RCN”. An RCN interfaces with specific desired HVAC equipment, and communicates with its thermostat using unlicensed 900 MHz, radio frequency energy. At the time of installation, the T9000 thermostat is linked to one or more RCN controls. The thermostat and RCN that have been linked will not interfere with, or be affected by, any other thermostat or RCN in adjacent rooms, apartments, or neighboring homes.

Remote Control Node (RCN)

Used with the Wireless Temperature Control, the RCN interfaces with specific HVAC equipment, and communicates with its thermostat using unlicensed 900 MHz, radio frequency energy. Contact your local Daikin Representative for details.

Figure 22: T9000 Overview



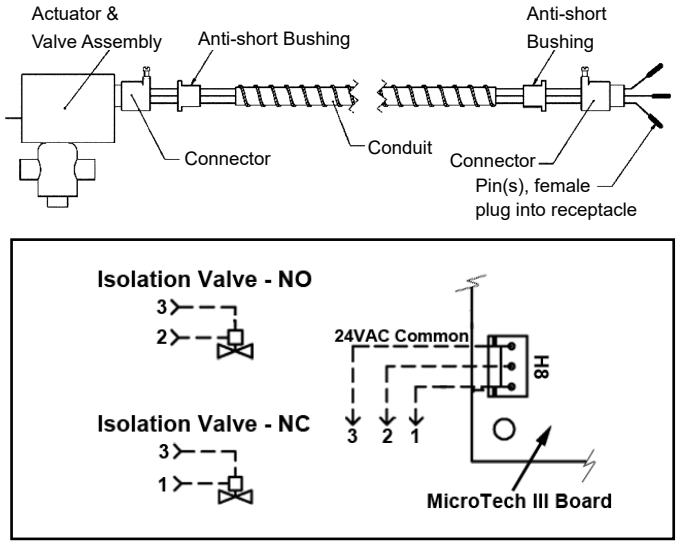
Motorized Isolation Valve & Relay

The motorized valve kit may be ordered as a field-installed accessory.

Wired as shown in Figure 23, the motorized valve will open on a call for compressor operation. Valves for unit sizes 007 to 018 are 1/2".

Using a Normally Closed (N/C), power open valve, wire as illustrated in Figure 23.

Figure 23: Normally Closed, Power Open Motorized Valve Wiring



Pump Restart Relay

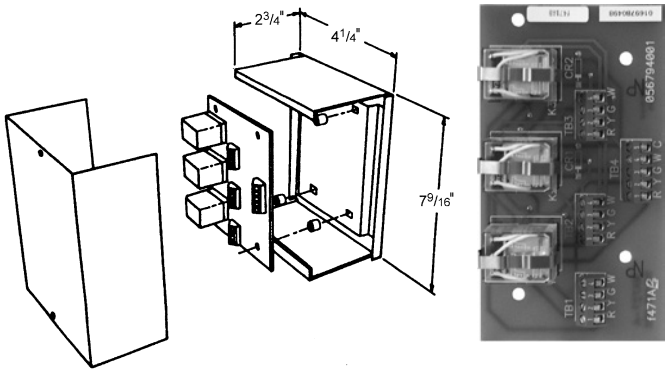
The MicroTech III unit controller has an internal Pump Restart Relay connected to H8, Pin 2 for the Normally Open (N/O) terminal of the internal relay.

Connect to H8, Pin 1 for the Normally Closed (N/C) terminal of the internal relay.

The output of the internal pump restart relay is 24-volts AC and the output is not available when the H8 connection is used to control a motorized valve.

Multiple Unit Control Panel (MUCP) for Use With MicroTech® III Unit Controller

For detailed installation instructions refer to IM 952



The Multiple Unit Control Panel (MUCP) is an accessory used when up to 3-units are controlled from a single thermostat. Console units must have the MUCP field-installed in a remote location, typically close to the units and convenient for service access.

A maximum of 2 boards may be used together if up to 6-units must be connected and controlled from a single thermostat.

Notes: *The MUCP control board does not fit inside the console unit control box.*
Multi-speed operation is only available with the optional unit-mounted fan speed switch.

The multiple unit control board provides the components necessary to protect the MicroTech III unit controller from electrical damage that may occur when using standard off-the-shelf relays.

This version of the board uses VAC relays and should not be used in combination with any other accessories or equipment that require VDC connections to the “G”, “W1”, or “Y1” terminals (i.e. Boilerless System Kit).

Outside Air Damper

Field-installed Option

⚠CAUTION

To prevent infiltration of ambient conditions, it is the responsibility of the contractor to assure that factory installed gasketing matches up with the wall opening, or that additional material is used to assure a positive seal.

Cold Weather Operation

Console water source heat pumps may experience erratic operation during cold ambient conditions with the outside air damper in the open position. See "Operating Limits" on page 17, for guidelines.

Figure 24: Manual Outside Air Damper Assembly (See IM 974 for detailed installation instructions)

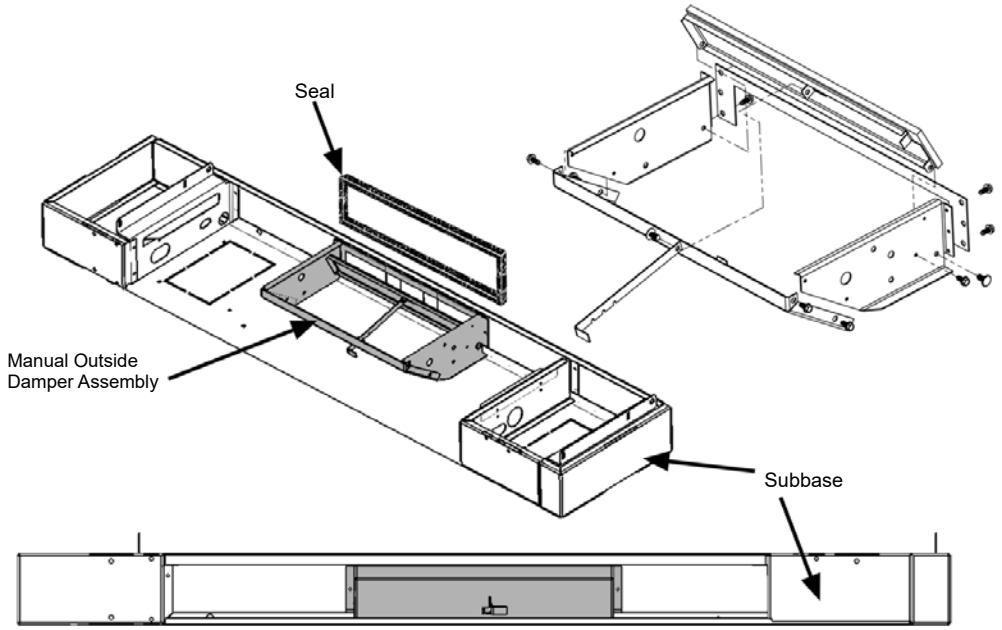
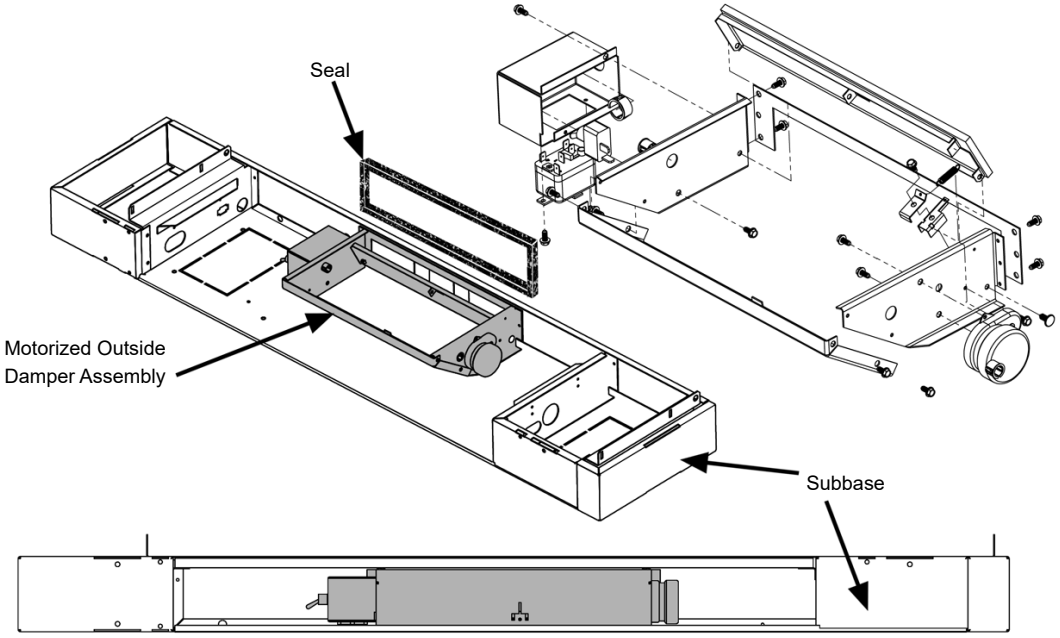


Figure 25: Motorized Outside Air Damper Assembly (See IM 974 for detailed installation instructions)



The in and outs of R-410A

R-410A is a non-ozone depleting blend of two refrigerants - HFC-125 and HFC-32 in a fifty percent mixture. R-410A exhibits higher operating pressure and refrigeration capacity than R-22. R-410A is intended for use in new air conditioning applications that have traditionally used HCFC-22 (R-22). Due to higher capacity and pressure of R-410A, it must not be used in existing R-22 systems.

Although R-410A is non-flammable at ambient temperature and atmospheric pressure, it can become combustible under pressure when mixed with air.

Note: *R-410A should not be mixed with air under pressure for leak testing. Pressure mixtures of dry nitrogen and R-410A can be used for leak testing.*

Lubrication

R-410A should be used only with polyester (POE) oil. The HFC refrigerant components in R-410A will not be compatible with mineral oil or alkylbenzene lubricants. R-410A systems will be charged with the OEM recommended lubricant, ready for use with R-410A.

Charging

Due to the zeotropic nature of R-410A, it should be charged as a liquid. In situations where vapor is normally charged into a system, a valve should be installed in the charging line to flash the liquid to vapor while charging.

Make certain that the recycle or recovery equipment used is designed for R-410A. The pressure of R-410A refrigerant is approximately 60 percent greater than that of R-22. Pressure gauges require a range up to 800 PSIG high side and 250 PSIG low side. Recovery cylinders require a 400 PSIG rating – do not put R-410A in a 300 PSIG rated cylinder.

⚠ WARNING

Recycle/recovery equipment must be designated for R-410A. R-410A pressure is greater than R-22. Improper equipment can cause severe injury or death.

Note: *Because a water source heat pump operates under a wide range of water and air temperatures, the values printed below are to be taken as suggested pressure and temperatures. All Daikin water source heat pumps are designed for commercial use. The units are designed for the cooling mode of operation and fail safe to cooling. The reversing valve is energized for the heating mode of operation.*

Superheat	*Head Pressure*	*Water Delta T*
8 to 14 degrees	335-355 PSIG	10° to 14°

Note: *All information above is based on ISO standard 13256-1 and tested at these conditions.*

General Maintenance

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

MicroTech III Unit Controller LED Faults

Table 14: Low Voltage Brownout or Emergency Shutdown

Description*	Type	Yellow	Green	Red
Low Voltage Brownout	Fault	OFF	Flash	OFF
Emergency Shutdown	Mode	OFF	Flash	OFF

** Same LED display for both conditions.*

- *Verify the E terminal is not connected to common. Remove wire, if connected, and LED should change to solid green only.*
- *Confirm the low voltage supply is between 19-32VAC at the H1 terminal of the main board. If the low voltage supply is out of range, verify the unit supply voltage matches the nameplate voltage and the correct transformer primary wire has been selected.*

Table 15: Compressor High Pressure

Description*	Type	Yellow	Green	Red
Compressor High Pressure	Fault	OFF	OFF	Flash

- *Verify high pressure switch is connected to terminal H3 on the main board.*
- *Check for continuity of the high pressure switch.*

If the high pressure fault resets when power is cycled:

- *Check water flow (cooling operation)*
- *Check airflow (heating operation)*
- *Entering water and air temperatures should be within the operating limits.*

Table 16: Compressor Low Pressure

Description*	Type	Yellow	Green	Red
Compressor Low Pressure	Fault	OFF	OFF	ON

- *Loose wire connection on low pressure circuit*
- *Failed low pressure switch*
- *Unit is low on charge*

Table 17: Compressor Low Suction Temp

Description*	Type	Yellow	Green	Red
Compressor Low Suction Temp	Fault	Flash	OFF	OFF

- *Check water flow (heating operation)*
- *Check airflow (cooling operation)*
- *Entering water and air temperatures should be within the operating limits.*

Table 18: Temperature Sensor Failure

Description*	Type	Yellow	Green	Red
Temperature Sensor Failure	Fault	Flash	Flash	ON

- *Check wire connections*
- *Check sensor resistance 10K@77°F*

Table 19: Condensate Overflow

Description*	Type	Yellow	Green	Red
Condensate Overflow	Fault	ON	OFF	OFF

- *Poor condensate drain*
- *Check the resistance to ground on condensate wire. This should be open if there is no water in the pan.*

Table 20: Serial EEPROM Corrupted

Description*	Type	Yellow	Green	Red
Serial EEPROM Corrupted	Fault	ON	ON	ON

- *Cycle power to see if problem is corrected.*
- *Replace main board, only if problem persists after power cycle.*

Table 21: Service Test Mode Enabled

Description*	Type	Yellow	Green	Red
Service Test Mode Enabled	Mode	Flash	Flash	Flash

- *Jumper JP1 is shorted for service test mode operation. Note: Used only for testing purposes, control timing may damage actual hardware.*

Table 22: Unoccupied Mode

Description*	Type	Yellow	Green	Red
Unoccupied Mode	Mode	ON	ON	OFF

• Terminal U on main control board is connected to common from external source, or the network is overriding occupancy mode.

Table 23: Occupied, Bypass Mode, Standby or Tenant Override Modes

Description*	Type	Yellow	Green	Red
Occupied, Bypass Mode, Standby or Tenant Override Modes	Mode	OFF	ON	OFF

• Unit is operating normal. It may currently have a control signal or ready to operate when a control signal is active.

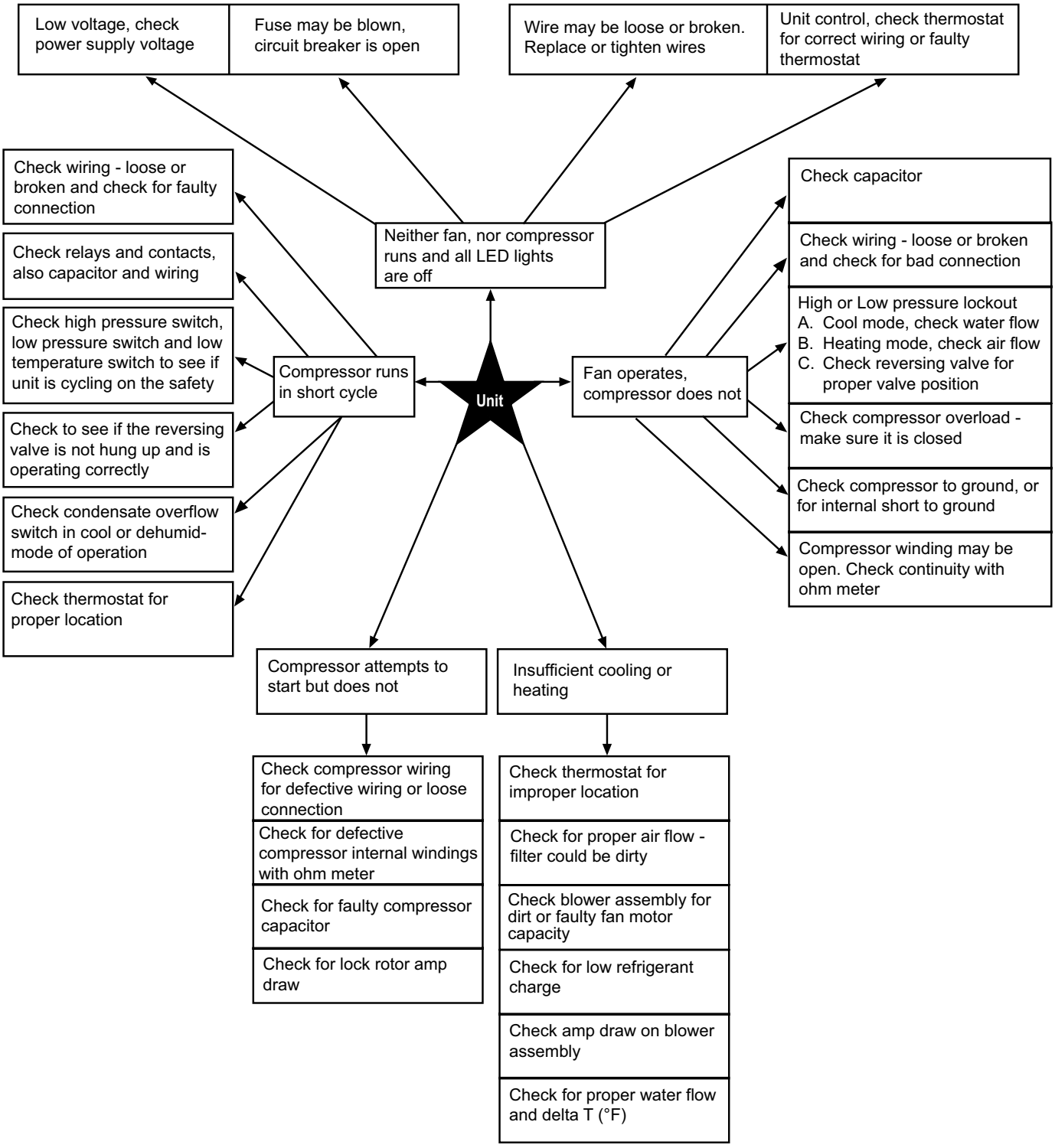
Troubleshooting Refrigeration Circuit

Figure 26: Troubleshooting Refrigeration Circuit

Symptom	Head Pressure	Suction Pressure	Compressor Amp Draw	Super Heat	Subcooling	Air Temp Differential	Water (loops) Temp Differential	Safety Lock Out
Charge Undercharge System (Possible Leak)	Low	Low	Low	High	Low	Low	Low	Low Pressure
Overcharge System	High	High	High	Normal	High	Normal Low	Normal	High Pressure
Low Air Flow Heating	High	High	High	High Normal	Low	High	Low	High Pressure
Low Air Flow Cooling	Low	Low	Low	Low Normal	High	High	Low	Low Temp
Low Water Flow Heating	Low Normal	Low Normal	Low	Low	High	Low	High	Low Temp
Low Water Flow Cooling	High	High	High	High	Low	Low	High	High Pressure
High Air Flow Heating	Low	Low	Low	Low	High	Low	Low	Low Temp
High Air Flow Cooling	Low	High	Normal	High	Low	Low	Normal	High Pressure
High Water Flow Heating	Normal	Low	Normal	High	Normal	Normal	Low	High Pressure
High Water Flow Cooling	Low	Low	Low	Low	High	Normal	Low	Low Temp
TXV Restricted	High	Low	Normal Low	High	High	Low	Low	Low Temp

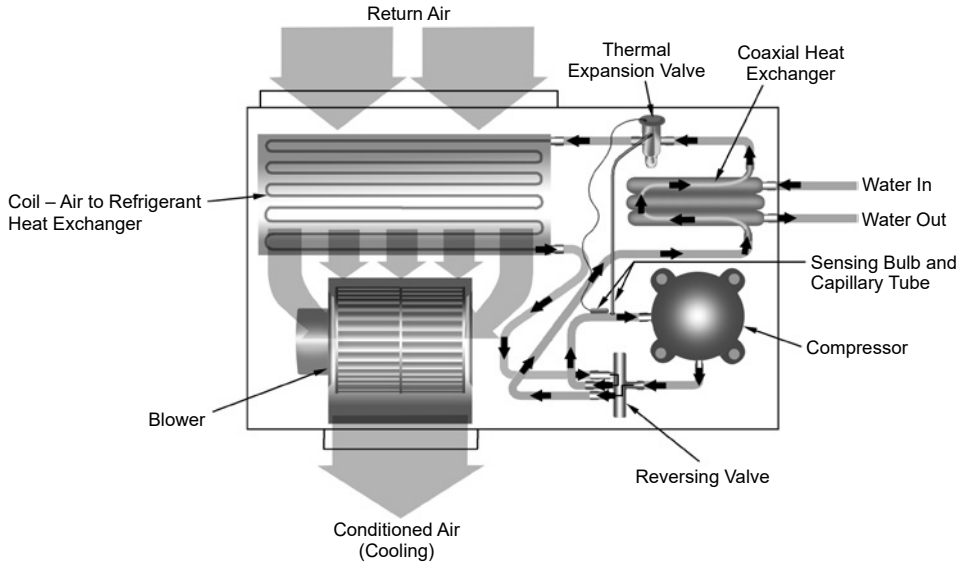
Troubleshooting Guide - Unit Operation

Figure 27: Troubleshooting Guide - Unit Operation



Typical Cooling and Heating Refrigeration Cycles

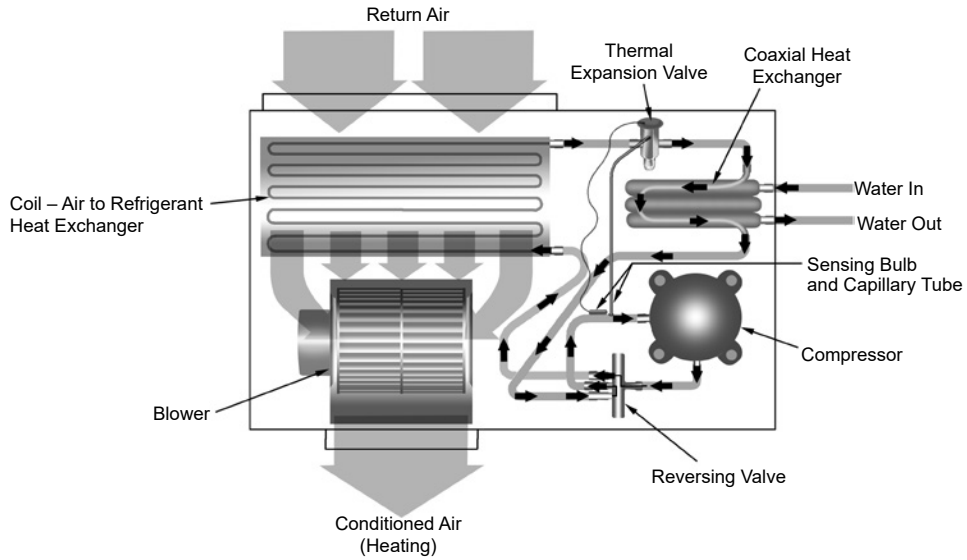
Figure 28: Cooling Mode



Cooling Refrigeration Cycle

When the wall thermostat is calling for COOLING, the reversing valve directs the flow of the refrigerant, a hot gas, leaving the compressor, to the water-to-refrigerant heat exchanger. Here the heat is removed by the water and the hot gas condenses to become a liquid. The liquid then flows through a thermal expansion metering system to the air-to-refrigerant heat exchanger coil. The liquid then evaporates becoming a gas, at the same time absorbing heat and cooling the air passing over the surfaces of the coil. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.

Figure 29: Heating Mode



Heating Refrigeration Cycle

When the wall thermostat is calling for HEATING, the reversing valve directs the flow of the refrigerant, a hot gas, leaving the compressor, to the air-to-refrigerant heat exchanger coil. Here the heat is removed by the air passing over the surfaces of the coil and the hot gas condenses to become a liquid. The liquid then flows through a capillary thermal expansion metering system to the water-to-refrigerant heat exchanger. The liquid then evaporates becoming a gas, at the same time absorbing heat and cooling the water. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.

⚠ DANGER

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

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

General Use and Information

The Microtech III unit controller is provided with two drive terminals, R(24VAC) and C(0 VAC) that can be used by the end user to drive the thermostat inputs (G, Y1, Y2, W1, and W2) and control inputs (U, E, and O). Any combination of a single board drive terminal (R or C) may be used to operate the MicroTech III unit controller's control or thermostat inputs. However, only one drive terminal (R or C) can be connected to any individual input terminal or damage may result. Some control inputs are not accessible to the end user (for example, HP, LP, SLTS, and COF).

Typically the Microtech III unit controller's R (24VAC) terminal is used to drive the board's thermostat inputs and control inputs by connecting it to the R terminal of an industry standard thermostat. The control outputs of the standard thermostat are then connected to the Microtech III unit controller thermostat inputs and control inputs as needed. Any remaining board input(s) may be operated by additional thermostat outputs or remote relays (dry contacts only).

All Microtech III unit controller inputs must be operated by dry contacts powered by the control board's power terminals. No solid state devices (Triacs) may be used to operate the Microtech III unit controller inputs. No outside power source may be used to operate the Microtech III unit controller inputs.

This page left blank intentionally

Water Source Heat Pump Equipment Check, Test and Start Form

This form must be completed and submitted within ten (10) days of start-up to comply with the terms of the Daikin warranty. Forms should be returned to Daikin Warranty Department.

Installation Data

Job Name _____ Check, Test & Start Date _____

City or Town _____ State _____ Zip _____

Who is Performing CTS _____

General Contractor _____

Equipment Type (Check all that apply)

☐ Closed Loop ☐ Open Loop

☐ Geothermal ☐ Other (specify)_____

Essential Items Check of System – *Note:* *"No" answers below require notice to installer by memorandum (attached copy.)*

Essential Items Check

A. Voltage Check_____ Volts Loop Temp._____ °F Heating Set For _____ °F Cooling System Water P.H. Levels _____

B. Yes	No	Condition	Comments
☐	☐	Loop Water Flushed Clean	
☐	☐	Closed Type Cooling Tower	
☐	☐	Water Flow Rate to Heat Pump Balanced	
☐	☐	Standby Pump Installed	
☐	☐	System Controls Functioning	
☐	☐	Outdoor Portion of Water System Freeze Protected	
☐	☐	Loop System Free of Air	
☐	☐	Filters Clean	
☐	☐	Condensate Traps Installed	

Note: "No" answers below require notice to installer by memorandum (attached copy.)

☐	☐	Outdoor Air to Heat Pumps:	
☐	☐	Other Conditions Found:	

Please include any suggestions or comments for Daikin Applied: _____

_____

_____

_____

Above System is in Proper Working Order

Note: *This form must be filled out and sent to the warranty administrator before any service money can be released.*

_____
Date

_____
Signature for Sales Representative

_____
Signature for Customer

For Internal Use

Release:

SM _____

CTS _____

T _____

_____
Service Manager Approval

_____
Date

Form WS-CTS-00.01 (Rev. 4/14)

Unit Check / Equipment Data

Installation Data

Job Name _____ Check Test Date: _____

City _____ State _____ Zip _____

Daikin Model # _____

Daikin Serial # _____ Job site Unit ID # (HP #)_____

General Contractor:_____ Mechanical Contractor:_____

Technician Performing Start-Up: Name_____ Employer:_____

Complete equipment data from measurements taken at the locatons indicated on the drawing below.

Equipment Data

Flow Rate **EWP - LWP = ΔP**

(1) EWP - PSI In _____minus (2) LWP - PSI Out _____ equals ΔP _____

The first step in finding GPM is to subtract leaving water pressure from entering water pressure. The difference between the two is referred to as ΔP. ΔP can be converted to GPM by looking in the equipment specification catalog. **Caution ΔP ≠ GPM**

Note: A conversion table must be used to find GPM from (Delta) ΔP measurements.

Loop Fluid Temperature Rise / Drop through Coaxial Heat Exchanger **EWT - LWT = ΔT**

(3) EWT - °F Out_____ minus (4) LWT - °F Out_____ equals Fluid ΔT _____

ΔT is the rise or drop in the fluid temperature as it passes through the Coaxial.

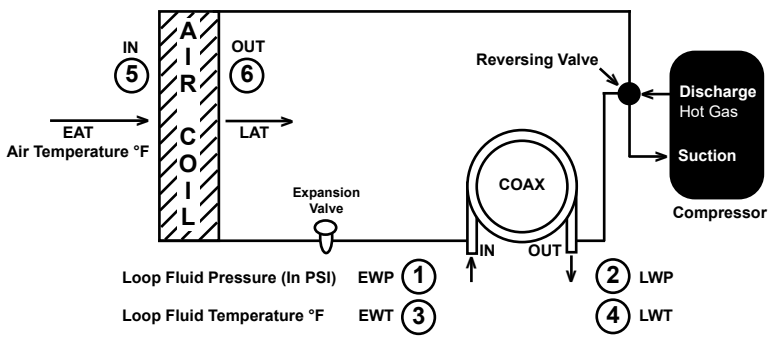
Air Temperature Rise / Drop through the air coil **ΔT x CFM x 1.08 = BTUH Sensible**

(5) EAT - °F In_____ minus (6) LAT - °F Out _____ equals Air ΔT_____

Note: Perform Check, Test and Start-Up in the Cooling Mode Only.

EWT - Entering Water Temperature
LWT - Leaving Water Temperature
EWP - Entering Water Pressure
LWP - Leaving Water Pressure
EAT - Entering Air Temperature
LAT - Leaving Air Temperature
Δ- Delta (Differential)
CFM - Cubic Feet/Minute
BTUH - British Thermal Units/Hour

Check, Test & Start



Form No._____

Commercial Check, Test and Start Worksheet

(Complete all equipment measurements indicated for each unit per installation on previous page)

	Model	Serial #	H.P. #	EWT ③	LWT ④	EWP ①	LWP ②	EAT ⑤	LAT ⑥	Volts	Amps Cool-ing	Check Air Filter and Coil	Comments (more comments on next sheet)
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
15.													
16.													
17.													
18.													
19.													
20.													
21.													
22.													
23.													
24.													
25.													
26.													
27.													
28.													
29.													
30.													
31.													
32.													
33.													
34.													
35.													
36.													
37.													
38.													
39.													
40.													
41.													
42.													

Part No._____

Notes / Comments

Daikin Applied Training and Development

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

Warranty

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

Aftermarket Services

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

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

Products manufactured in an ISO Certified Facility.