



Catalog 1104-14

**Enfinity™ Console Water Source Heat Pumps
1/2 to 1½ Ton**

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

Unit Sizes 007-018



Model Nomenclature	3	Information for initial start-up	36
AHRI Performance Data	4	Airflow correction factors	37
Enfinity™ Console Water Source Heat Pumps	5	Antifreeze correction factors	37
Introduction	5	Dimensional Data	38
With Enfinity water source heat pumps, you benefit from:	5	Flat top – high sill, left-hand piping – unit size 007 - 012	38
Features & Options	6	Flat top – high sill, right-hand piping – unit size 007 - 012	38
Configuration	7	Flat top – low sill, left hand piping – unit size 007 - 012	39
Cabinet	7	Flat top – low sill, right-hand piping – unit size 007 - 012	39
Chassis	7	Flat top – high sill, left hand piping – unit size 015 - 018	40
Optional factory installed features	7	Flat top – high sill, right hand piping – unit size 015 - 018	40
Controls Options	8	Flat top – low sill, left hand piping – unit size 015 - 018	41
MicroTech® III unit controller	9	Flat top – low sill, right-hand piping – unit size 015 - 018	41
MicroTech® III unit controller with LONWORKS or BACnet communication module	11	Slope top – high sill, left-hand piping – unit size 007 - 012	42
MicroTech III unit controller with communication modules features	11	Slope top – low sill, left-hand piping – unit size 007 - 012	43
I/O expansion module	12	Slope top – high sill, left-hand piping – unit size 015 - 018	44
Control Accessories	14	Slope top – high sill, right hand piping – unit size 015 - 018	44
Thermostats and Remote Sensors used with MHC units – standalone operation	14	Slope top – low sill, left-hand piping – unit size 015 - 018	45
Control Accessories	15	Slope top – low sill, right hand piping – unit size 015 - 018	45
Remote control node (RCN)	15	Wireless temperature control (T9000)	46
Room temperature sensors for MicroTech III unit controller – building automated system (BAS) operation	16	Remote control node (RCN)	46
Thermostats used with MHC console units –standalone operation	17	Supply and return water hoses	46
Unit mounted thermostats used with MHC console units –standalone operation	18	Combination balancing and shutoff valves	47
Applications	19	2-way motorized valve	47
Water source heat pump systems	20	Piping package (options)	47
Boiler / tower applications: AHRI 320 / ISO 13256-1	20	Outdoor air dampers	50
Open loop well water applications: AHRI 325 / ISO 13256-1	20	Extended end pocket (option)	50
Closed loop geothermal applications: AHRI 330/ISO 13256-1	21	Multiple unit control panel (MUCP)	50
Application considerations	22	Typical Wiring Diagrams	51
Unit selection	23	Typical MicroTech III unit controller for sizes 007-015 – 208/230/60Hz/1-phase	51
Capacity Data	24	Typical MicroTech III unit controller with electric heat for size 018 208/230/60Hz/1-phase	52
Unit Size 007 (295 SCFM)	24	Typical MicroTech III unit controller with communication module and wall-mounted room temperature sensor – 265/277/60Hz/1-phase	53
Unit Size 009 (355 SCFM)	26	Engineering Guide Specifications	54
Unit Size 012 (370 SCFM)	28		
Unit Size 015 (535 SCFM)	30		
Unit Size 018 (485 SCFM)	32		
Engineering Data	34		
Physical data	34		
Electrical data	34		
Fan performance	35		
Operating limits	36		

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	S	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

Enfinity™ - high performance, high efficiencies, lower operating costs

Table 1: AHRI performance data (rated in accordance with AHRI/ASHRAE/ISO Standard 13256-1). English (I-P) units

Unit Size	Fluid Flow Rate		Water Loop				Ground Loop			
			Cooling 86°F EWT		Heating 68°F EWT		Cooling 77°F EWT		Heating 32°F EWT	
	(GPM)	(CFM)*	Capacity (Btuh)	EER (Btuh/W)	Capacity (Btuh)	COP	Capacity (Btuh)	EER (Btuh/W)	Capacity (Btuh)	COP
007	1.9	295	7700	14.5	9110	5.0	8300	16.9	5600	3.3
009	2.4	355	9200	14.0	11000	4.5	9700	16.1	7000	3.2
012	2.9	370	11000	13.1	13700	4.3	11700	15.3	8900	3.2
015	3.7	535	14500	15.1	18200	5.2	15400	17.3	10900	3.4
018	4.6	485	16400	13.4	20900	4.3	17300	15.3	13200	3.4

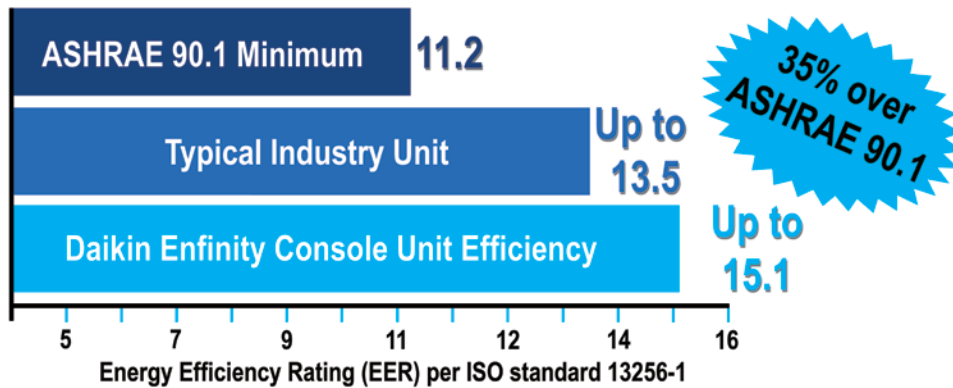
Legend: Btuh = British Thermal Units per Hour COP = Coefficient of Performance EER = Energy Efficiency Ratio

Water Loop: 1. Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) EAT and 86°F (30°F) EWT.
2. Heating capacity is based on 68°F db, 59.0°F wb (20/15°C) EAT and 68°F (20°C) EWT.

Ground Loop: 1. Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) EAT and 77°F (25°F) EWT.
2. Heating capacity is based on 68°F db, 59.0°F wb (20/15°C) EAT and 32°F (0°C) EWT.

Notes: Ratings are at 208 volt electrical.
* CFM based on dry coil

35% greater efficiency than the minimum required by ASHRAE 90.1, for units less than 17,000 Btuh per ISO Standard 13256-1 for Boiler/Tower applications.



Introduction

More than 30 years ago, McQuay (Now Daikin Applied) designed the first complete line of water source heat pumps for high efficiency, individually-zoned comfort control in offices, schools, assisted living facilities, manufacturing facilities and other commercial buildings. Our reputation for outstanding reliability and quiet operation has been reinforced in thousands of successful installations.

Enfinity water source heat pumps incorporate the best of our past and the best of what's new. Using feedback from building owners, consulting engineers, contractors and service engineers, we designed Enfinity products to give you maximum flexibility to design, install, operate and maintain the ideal water source heat pump system for your building project. And we incorporated non-ozone depleting R-410A refrigerant, which—along with high Energy Efficiency Ratios (EER's)—helps preserve our environment and precious energy resources.

With Enfinity water source heat pumps, you benefit from:

High efficiency that minimizes environmental impact and lowers operating costs

- Units exceed ASHRAE Standard 90.1 minimum requirements
- Standard range or geothermal application flexibility

Engineered for flexibility and performance

- Two cabinet sizes, each with Daikin's subtle aesthetic and small footprint design, make it easy to meet the space requirements of your new construction or replacement application.
- MicroTech® unit controller with Open Choices™ feature allows easy, low cost integration with the Building Automation System (BAS) of your choice.

Improved efficiency

- Factory-installed, unit-mounted thermostats save time and money versus installing wall-mounted thermostats.
- Wide range of factory-installed options, including electric heat, motorized valves and thermostat options help you meet more specific application requirements with minimum design or installation time and expense.

Easy, low-cost maintenance

- Easy access to the unit compressor (end panel), fan section and coil (front panel) and unit controls (left or right end panel).
- A easily removable blower motor allows the tangential fan wheel to remain in the housing during motor replacement.
- A hinged control box allows easy access to the piping compartment.

Quiet operation

- New Gentleflo™ fan wheel allows the fan motor to operate at lower speed for quieter operation.
- High efficiency rotary compressor mounted on a mass plate system reduces noise due to vibration.

Superior indoor air quality (IAQ)

- Removable, non-corrosive and double-sloped polymer drain pan promotes positive condensate drainage.
- Optional closed-cell insulation prevents insulation fibers from entering the air stream.

R-410A refrigerant with zero ozone depletion potential or phase-out date

- R-410A is classified as A1/A1 – lower toxicity, no flame propagation – per ASHRAE Standard 31.





1 Cabinets

- Design flexibility with slope top or flat top configurations and directional grille options
- Service accessible with removable top, front, and end panels

2 Compressor

- Increased energy savings using high efficiency rotary design
- Zero ozone depleting R-410A refrigerant with no phase-out date

3 Gentleflo™ fan

- High efficiency and quiet multi-speed tangential fan system

4 MicroTech® III unit controller

- Streamlined network controls using LONWORKS® or BACnet® communication modules
- I/O expansion module for electric heat and multiple fan speeds

5 LED status lights

- Easy diagnosis and troubleshooting of fault condition indicators

6 Filter

- Easily accessible and serviceable 1/2" standard disposable filter

7 Hinged control box

- Increases service access to plumbing end compartment for fast installation and maintenance

8 2-way motorized valve packages (optional)

- Factory-installed or field-installed choice for variable pumping applications.
- Reduced operating costs with two-way isolation valves

9 Double-sloped drain pan

- Easily removable and cleanable, non-corrosive polymer design promotes maintenance and superior Indoor Air Quality (IAQ)

10 T9000 wireless temperature controller (option)

- Precise temperature control without installation and wiring expenses
- Factory-installed or field-installed choice for 24V thermostat controlled units

Remote control node (RCN)

- Easy integration with unit and temperature controls

11 Multi-directional grilles (option)

- Discharge air directional control using rotatable grilles

12 High sill extended end pocket (option)

- Increases service access 11" for piping or field-installed pump

Outside air dampers (option - not shown)

- Increased ventilation air control - motorized or manual operation

7" high sub base (option - not shown)

- Increases piping arrangement flexibility

2", 4", 6" cabinet rear extension (option - not shown)

- Extends space behind unit for piping (high sill units only)

Expanded paint colors – for any decor.



Configuration

Console water source heat pumps are available in five cooling capacity sizes, from 1/2 through 1½ tons, (1757 to 5274 watts). Each is available in four different configurations.

Flat top units meet the traditional requirements for a rugged unit. Slope top units offer a more modern look. The high silhouette unit is 25" (635mm) high and the low silhouette unit is only 22½" (572mm) high. The overall unit dimensions are very compact; unit sizes 007 through 012 are 46" (1168mm) long and sizes 015 through 018 are 54" (1372mm) long. All units are a constant 10¾" (273mm) deep for minimum floor space and a consistent "look" for all unit sizes.

All units incorporate a slide-out chassis concept which allows it to be installed easily or removed and replaced quickly when service is required to minimize downtime for the space the unit serves. The cabinet is made up of individual panels, each of which can be easily removed to expose the chassis for field hook-up of water and electrical connections. The chassis easily slides off the subbase for service or changeout.

Cabinet

All cabinets are painted with optional Antique Ivory or Cupola White baked enamel finish for an aesthetically pleasing appearance. The discharge grilles and subbase can be Oxford Brown or match the cabinetry on flat top or slope top units.

The shallow 22 degree slope top cabinet is constructed of 18-gauge steel. The top and side corners and grille are constructed of tough, impact-resistant ABS polycarbonate. The grille extends to the front and sides for a smooth look as well as providing a curtain stop in back. The discharge grilles can be rotated to direct the air in an 11 degree angle from the vertical and can be reversed for a 33 degree discharge angle. The control door has a finger slot and simply lifts up for access to the thermostat. Overall, the slope top unit allows minimal airflow interference from curtains and objects resting on the cabinet, while at the same time providing a rugged, aesthetically pleasing look.

The flat top cabinet is constructed of 18-gauge steel with grille options that meet basic needs with its rugged construction and its 11 degree discharge angle.

Chassis

The chassis houses the fan section, refrigerant circuit and controls. The air enters through the bottom of the chassis, through the subbase or through the front panel in low sill units.

The refrigeration system includes a rotary compressor, reversing valve, coaxial heat exchanger, capillary tubes, air coil, high and low side access valves, and safety controls. Access to the compressor is through a removable end panel. The compressor is isolated from the unit with external vibration mounts, mass plate/viscoelastic dampening material and the compartment is totally insulated to make the quietest console unit on the market. Safety

controls include low temperature (freezestat) and refrigerant high pressure switches. The control box is hinged for easy access to all of the controls. The MicroTech III unit controller offers both standalone or communicating (LONWORKS or BACnet) control options.

Each uses a printed circuit board for clean wiring and a low voltage control circuit with a 50 VA transformer. See on [page 8](#) for more detailed information. Main power is made to a chassis-mounted 2" x 4" (51mm x 102mm) junction box.

The fan section employs Daikin's Gentleflo tangential system fan and efficient, two-speed PSC motor for selectable airflow and/or noise level. Access to the fan wheel is made through the top panel. The motor is secured to the chassis with three screws for easy service.

Water piping connections are 5/8" O.D. copper tubing (sweat connection stubs) and terminate away from the side of the chassis in the piping compartment for easy access. Unique left- and right-hand piping (includes condensate and electrical) locations are available. The 3/4" (19mm) I.D. flexible clear vinyl condensate drain tube is internally trapped and extends 14" (356mm) into the piping compartment for easy connection. Piping (electrical and condensate also) can enter through the back wall or through the floor within the subbase. The chassis allows for a piping compartment between the chassis and the cabinet.

Optional factory installed features

Boilerless system electric heat eliminates the need for a boiler in the heat pump water loop. An electric heater is added to the discharge side of the fan scroll. If the entering water temperature falls to 58°F (15°C) the thermostat locks out compressor operation. On a call for heat, the electric heater is energized. When the entering water temperature raises, the unit will resume compressor operation on a call for heat. An emergency electric heat override plug allows for electric heat, if the compressor (mechanical) heat should fail. Each unit has various heater sizes to select from. Not available on 115 volt units. Not CSA listed.

Extended end pocket (high sill units)

Optional extended cabinet end pocket for high sill units, provides 11" of additional area inside the left or right end pocket for piping or a field-installed pump.

Multi-directional grilles

Selectable plastic Multi-Directional Grilles can rotate 90, 180 or 270 degrees for added control of discharge air direction.

2", 4", 6" cabinet rear extension (high sill units)

The optional, factory-installed rear extension for (high sill units only) provides extended space between the wall and unit for piping.

Control choices and added functionality





The control box is accessible through the left or right end corner panel. It houses the major operating electrical controls including the MicroTech® III unit controller, transformer, compressor relay and fan relay. Each component is accessible for service or replacement.

Four unique control choices are offered with the MicroTech III unit controller:

- Standalone operation using a MicroTech III unit controller
- MicroTech III unit controller with I/O Expansion module
- MicroTech III unit controller with a LONWORKS® communication module
- MicroTech III unit controller with a BACnet® communication module

Each option features direct quick-connect wiring to all unit-controlled components for “clean” wiring inside the control box.

Table 2: Control options

Control	Description	Application	Protocol
<p>MicroTech III</p>  <p>(Standalone) Unit Controller.</p>	<p>The MicroTech III unit controller is a standalone microprocessor-based control board conveniently located in the unit control box for accessibility. The board is designed to provide standalone control of a Water Source Heat Pump using a wall thermostat or a wall mounted temperature sensor. Each unit controller is factory programmed, wired, and tested.</p>	<p>Each unit controller is factory programmed, wired, and tested for complete control of single zone, standalone operation of your Daikin Water Source Heat Pump.</p>	<p>Unit-mounted or wall-mounted thermostat</p>
<p>I/O Expansion Module</p> 	<p>The I/O Expansion Module is an extension of the Microtech III unit controller and provides additional functionality to the Microtech III control system. It is required on all units with an LED annunciator and provides operation of the boilerless electric heat feature.</p>	<p>Allows for:</p> <ul style="list-style-type: none"> • Monitoring of entering water temperature for boilerless electric heat control. • Outputs for optional electric heat 	<p>Unit-mounted or wall-mounted thermostat</p>
<p>LONWORKS</p>  <p>Communication Module</p>	<p>The MicroTech III unit controller can accept a plug-in LONWORKS communication module to provide network communications and added functionality to easily integrate with an existing BAS. The communication module can be factory- or field-installed and is tested with all logic required to monitor and control the unit.</p>	<p>LONTALK application protocol is designed for units that are integrated into a LONWORKS communication network for centralized scheduling and management of multiple heat pumps.</p>	<p>LONMARK 3.4 Certified</p>
<p>BACnet</p>  <p>Communication Module</p>	<p>The MicroTech III unit controller can accept a plug-in BACnet communication module to provide network communications and added functionality to easily integrate with an existing BAS. The communication module can be factory- or field-installed and is tested with all logic required to monitor and control the unit.</p>	<p>Designed to be linked with a centralized building automation system (BAS) through a BACnet communications network for centralized scheduling and management of multiple heat pumps.</p>	<p>BACnet MS/TP</p>

MicroTech® III unit controller

The MicroTech III Unit Controller is a microprocessor-based control board conveniently located in the unit control box for easy access through a removable access panel. The standalone unit controller is a hard wired interface and provides all the necessary field connections. The board can be wired for 24-volt AC output to the wall thermostat by using terminals R & C. An LED annunciator is located on the front corner of the unit chassis to quickly check the operating status of the unit.

MicroTech III operating features

Assumes cycle fan operation-not continuous fan operation:

- **Start-up** – The unit will not operate until all the inputs and safety controls are checked for normal conditions.
- **Cooling mode** – On a call for cooling, the compressor and fan will start after the various control timers have expired. If the reversing valve output is energized, the reversing valve output will be de-energized 5 seconds after the compressor has been energized. When the load is satisfied, the compressor and fan shut off.
- **Heating mode** – On a call for heating, the compressor and fan start after the various control timers have expired. If the reversing valve output is de-energized, the reversing valve output will be energized 5 seconds after the compressor has been energized. When the load is satisfied, the compressor and fan shut off. The reversing valve remains energized.
- **Short cycle protection & random start** – After power cycle or deactivation of certain alarms, or when leaving the unoccupied mode, a new random compressor start-delay time between 300 and 360 seconds is generated. The random start timer prevents compressors in different units from starting simultaneously. Compressor minimum OFF (360 sec) and compressor minimum ON (180 sec) timers prevent compressor short cycling.
- **Unoccupied mode** – A simple “grounded” signal between terminals U and C (no power source required), puts the unit into the unoccupied mode for night setback operation.
- **Override mode** – A switch on the deluxe automatic changeover thermostat can be activated during the unoccupied mode to put the unit back into the occupied mode for two hours for after-hours heating or cooling.
- **Motorized valve/pump restart** – The IV/PR (H8) terminals on the The MicroTech III unit controller are used to energize (open) a motorized valve or start a water pump to get water circulating prior to starting the compressor on call for heating or cooling. The IV/PR (H8) terminal may be “daisy chained” between 200 units.
- **Brownout protection** – The MicroTech III unit controller measures the input voltage and will suspend compressor and fan operation if the voltage falls below 80% of the unit nameplate rated value. A unique LED status is generated and an output is available to a “fault” LED at the thermostat.
- **Unit shutdown** – A simple grounded signal puts the unit into the shutdown mode. Compressor and fan operations are suspended. A unique LED status is generated and an output signal is made available for connection to a “fault” LED at the thermostat.
- **Condensate overflow protection** – The MicroTech III unit controller incorporates a liquid sensor at the top of the drain pan. Upon sensing water, cooling operation is suspended and an LED status is generated.
- **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.
- **Intelligent alarm reset** – The Intelligent Reset feature helps to minimize nuisance trips of automatic 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.
- **Equipment protection control** – The MicroTech III unit controller receives separate input signals from the refrigerant high-pressure switch and the low suction line temperature sensor. In a high-pressure situation, compressor operation is suspended. In a low temperature situation, the unit goes into a defrost cycle where the unit is put into cooling operation for 60 seconds until the coaxial heat exchanger is free of ice. Each switch generates its own unique LED status and output is available to a “fault” LED at the thermostat if either situation exists.

Note: Most unit fault conditions are the result of operating the equipment outside the unit specifications.

Table 3: 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 °F (-2.78 to +2.78 °C)
		JP5 = Shorted	Long Range: 55 to 95 °F (12.78 to 35 °C)
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 at fluid temperatures below 32°F 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, property damage and will void unit warranty.

Table 4: 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.

MicroTech® III unit controller with LONWORKS or BACnet communication module

Each Daikin Console Water Source Heat Pump can be equipped with a LONWORKS or BACnet communication module. The LONWORKS module is LONMARK 3.4 certified and designed to communicate over a LONWORKS communications network to a Building Automation System (BAS). The BACnet module is designed to communicate over a BACnet MS/TP communications network to a building automation system. Both controllers are microprocessor-based and can be factory or field-installed.

The control modules are programmed and tested with all the logic required to monitor and control the unit. Optional wall sensors may be used with the communication modules to provide limited local control of the Console Water Source Heat Pump. The MicroTech III 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.

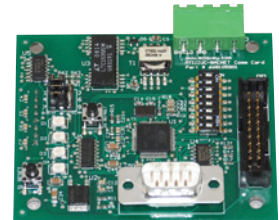
MicroTech III LONWORKS communication module

The LONWORKS communication module is designed for units that are integrated into a LONWORKS communication network for centralized scheduling and management of multiple heat pumps.



MicroTech III BACnet communication module

Designed to be linked with a centralized building automation system (BAS) through a BACnet communications network for centralized scheduling and management of multiple heat pumps.



MicroTech III unit controller with communication modules features

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

- Enable heating and cooling to maintain space temperature setpoint based on a room sensor setting
- 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

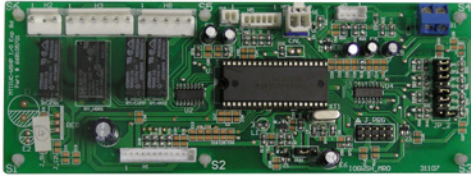
An on-board status LED indicates the status of the MicroTech III LONWORKS or BACnet module.

The MicroTech III unit controller includes:

- A unit-mounted return air sensor (Factory installed)
- A unit-mounted discharge air sensor (Factory installed)
- A leaving water temperature sensor (Factory installed)

I/O expansion module

Note: Only available on console units with electric heat selected.

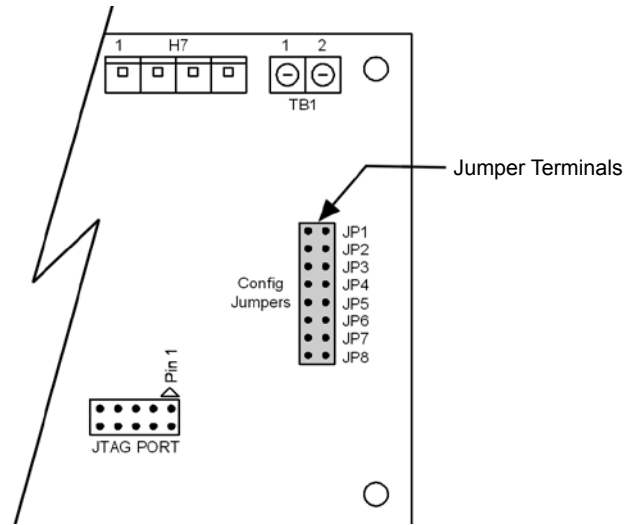


The I/O Expansion Module is a factory installed option. It is an extension of the MicroTech III unit controller and provides extra functionality.

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.

Figure 1: I/O Expansion module configuration jumper terminals



Features

Standard heat pumps / single circuit units

- Monitors entering water temperature for boilerless electric heat control

Table 5: I/O expansion module jumper settings (when used)

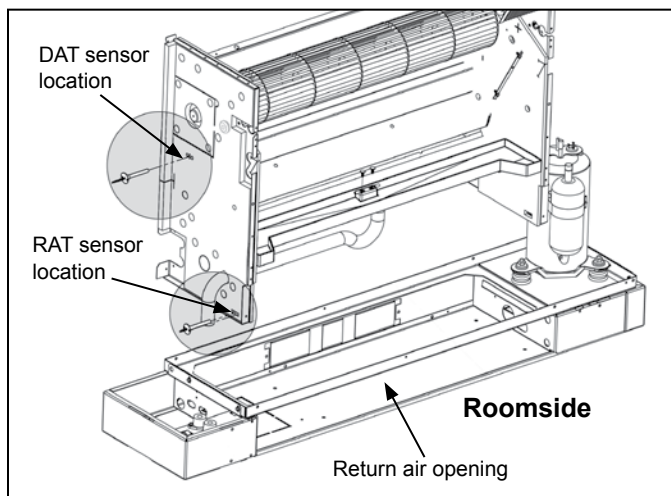
I/O Expansion Description	Jumper(s)	Setting	Description
Not Used	JP1 & JP2	JP1 = Open JP2 = Open	None
		JP1 = Shorted JP2 = Open	
		JP1 = Open JP2 = Shorted	
		JP1 = Shorted JP2 = Shorted	
Heating Options	JP3 & JP4	JP3 = Open JP4 = Open	None
		JP3 = Open JP4 = Shorted	Boilerless Electric Heat
Not Used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

Table 6: 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.

Figure 2: Discharge air temperature sensor (DAT) & return air temperature (RAT) sensor locations



Note: Refer to IM 956 for (DAT), (RAT) and (LWT) leaving water temperature sensor details.

The communication modules provide network 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 $\pm 5^{\circ}\text{F}$ setpoint adjustment
- Room temperature sensor with LED status, timed-override button, 55° to 95°F setpoint adjustment

Thermostats and Remote Sensors used with MHC units

Wi-Fi 7-day programmable electronic thermostat, 2 heat/2 cool

Note: Refer to IO&AP 910193130 Manual for details



Wi-Fi Programmable Electronic Thermostat

For 2-stage heating, 2-stage cooling, high-low fan speed and boilerless electric heat control, the Wi-Fi programmable thermostat provides simple control capabilities. With alarm fault clearing, a timed override button and unit status LED, this thermostat provides an easy interface to the MicroTech III SmartSource controller for both automatic and manual changeover capabilities. It can be connected to the accessory remote temperature sensor.

7-day programmable electronic thermostat, 2 heat/2 cool

Note: Refer to IO&AG 910193131 Manual for details



Programmable Electronic Thermostat

For 2-stage heating, 2-stage cooling and boilerless electric heat control, the programmable thermostat provides simple control capabilities. With alarm fault clearing, a timed override button and unit status LED, this thermostat provides an easy interface to the MicroTech III SmartSource controller for both automatic and manual changeover capabilities. It can be connected to the accessory remote temperature sensor.

Programmable and non-programmable thermostats, 1 stage heat/1 stage cool

Note: Refer to 668811301 and 668811201 Install Manuals for details



Programmable

Non-Programmable

For 1-stage heating, 1-stage cooling, both the Programmable and Non-Programmable thermostats provide simple control capabilities. With alarm fault clearing, a timed override button and unit status LED, these thermostats provide an easy interface to the MicroTech III unit controls with automatic changeover capabilities. Each can be connected to the accessory remote temperature sensor.

Programmable and non-programmable thermostats, 2 stage heat/2 stage cool

Note: Refer to 910121748 and 910121746 Install Manuals for details



Programmable

Non-Programmable

For 2-stage heating, 2-stage cooling, both the Programmable and Non-Programmable thermostats provide simple control capabilities. With alarm fault clearing, a timed override button and unit status LED, these thermostats provide an easy interface to the MicroTech III unit controls for both automatic and manual changeover capabilities. Each can be connected to the accessory remote temperature sensor.

Programmable and non-programmable thermostats, 1 stage heat/1 stage cool

For 1-stage heating, 1-stage cooling, the hard wired, auto changeover Programmable and Non-Programmable thermostats provide simple control capabilities. With backlit display, two-speed fan control, field calibration button, lockout function and remote temperature sensing capabilities. These thermostats provide an easy interface to the MicroTech III unit controls.



Programmable (P/N 668811101)



Non-programmable (P/N 668811001)

Remote room sensors used with the programmable and non-programmable thermostats



With logo (P/N 667720401)



No logo (P/N 107096001)

The remote indoor temperature sensors provide the ability to measure room temperature remotely, from the thermostat location.

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.

Room temperature sensors for MicroTech III unit controller – building automated system (BAS) operation

A MicroTech III Water Source Heat Pump Room Temperature Sensor is required when connecting a console unit to a Building Automation System (BAS) using either the LONWORKS or BACnet Communication Module. All MicroTech III water source heat pump room temperature sensors provide electronic sensing of the room temperature for single or multiple-stage cooling and heating control, unit status annunciation, timed tenant override, and fault clearing capabilities.

Digitally adjustable display sensor

Note: Refer to IM 1237 for details



The display sensor is used in conjunction with MicroTech III equipped units. The sensor has a digital display for temperature, occupancy, alarm, setpoint and status indication. Controls include four buttons for setpoint, occupied/unoccupied request, and override reset.

Adjustable cool/warm sensor with occupancy switch

The Adjustable Cool/Warm Sensor with Occupancy Switch can be used for 2-stage heating, 2-stage cooling. Unit status is provided through a flashing LED located on the sensor while timed tenant override and fault reset are provided through the override button. Changing the system mode, fan mode and occupancy is easily accomplished through the slider switches.



Adjustable 55° to 95°F or +/-5°F sensors



Adjustable 55° to 95°F Sensor

The adjustable 55° to 95°F or +/- 5°F sensors can be used for 2-stage heating, 2-stage cooling. Unit status is provided through a flashing LED located on the sensor while timed tenant override and fault reset are provided through the override button. Changing the system or fan mode is easily accomplished through the slider switches.



Alternate Celsius Slider Face

+/-5°F Sensor

Basic room sensor

Note: Refer to IM 1238 for details



The basic room sensor is used in conjunction with MicroTech III equipped units. The sensor has an output for temperature, and LED status indication and includes an override reset button.

Basic sensor



The basic sensor provides simple room temperature sensing for 2-stage heating, 2-stage cooling applications. Unit status is provided through a flashing LED located on the sensor while timed tenant override and fault reset are provided through the override button.

CAUTION

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

Table 7: Thermostats used with stand-alone operation console units









Thermostats used with MHC console units –standalone operation		Thermostats					
		Programmable / Non-Programmable		Programmable	Non-Programmable	Programmable	Non-Programmable
							
Standard		Part No. 910193126	Part No. 910193093	Part No. 668811301	Part No. 668811201	Part No. 910121748	Part No. 910121746
Wi-Fi		Part No. 910193131	Part No. 910193130				
Feature							
Display	Room Temperature & Setpoint	●	●	●	●	●	●
	Changeover						
	Manual	●			●		●
	Automatic	●	●	●	●	●	●
Stages	Heating	2	2	2	2	2	2
	Cooling	2	2	2	2	2	2
Fan Speed		Unit Mounted	Remote Thermostat	Remote Thermostat	Remote Thermostat	Unit Mounted	Unit Mounted
Operating Modes	System	Cool-Off-Heat-Auto	Cool-Off-Heat-Auto	Cool-Off-Heat-Auto	Cool-Off-Heat-Auto	Cool-Off-Heat-Auto	Cool-Off-Heat-Auto
	Fan	On-Auto-Hourly	On-Auto-Hourly	On-Auto-Hourly	On-Auto-Hourly	On-Auto	On-Auto
Annunciation	Status LED 5VDC			●	●	●	●
	Alarm Fault LED 24 VAC	●	●	●	●	●	●
Reset	Alarm	●	●	●	●	●	●
	Override	●	●	●	●	●	●
Remote Sensors	Indoor	●	●	●	●	●	●
	Outdoor						
Application							
Electric Heat	Boilerless	●	●	●	●	●	●
	Supplemental	●	●	●	●	●	●
	Primary	●	●	●	●	●	●
	Emergency	●	●	●	●	●	●
Remote Sensors							
<p>Used with Thermostats: 910193126, 910193093, 910193131, 910193130, 668811301, 668811201, 910121748, 910121746,</p>							
Indoor Room Temperature		Part No. 667720401		Part No. 107096001			

Table 8: Unit mounted thermostats used with stand-alone operation console units






Unit mounted thermostats used with MHC console units –standalone operation		Thermostats	
		Programmable	Non-Programmable
			
		Part No. 668811101	Part No. 668811001
Feature			
Display	Room Temperature & Setpoint	●	●
Changeover	Manual		
	Automatic	●	●
Stages	Heating	1	1
	Cooling	1	1
Operating Modes	System	Cool-Off-Heat-Auto	Cool-Off-Heat-Auto
	Fan	On-Auto	On-Auto
Annunciation	Status LED 5VDC	●	●
	Alarm Fault LED 24 VAC	●	●
Reset	Alarm	Cycle Mode to "OFF" or push ▲▼ for 10 seconds	Cycle Mode to "OFF" or push ▲▼ for 10 seconds
	Setback Override	Push ▲▼ for 3 seconds	Push ▲▼ for 3 seconds

Table 9: Room temperature sensors for BAS operation

Sensors used with MHC console units – building automated system (BAS) operation		Room Temperature Sensors		
		Digitally Adjustable Display Sensor	Basic Room Sensor With Cool to Warm Adjust	Basic Room Sensor
				
		With Temperature Display, Indicates, ALARM, Override and Occupancy.	Senses Temperature, With Temperature Adjust Cool to Warm, LED Status Indication, Override Reset Button	Senses Temperature, LED Status Indication, Override Reset Button
		Part No. 910152147	Part No. 910171464	Part No. 910152149
Feature				
Setpoint Adjustment		Digitally Adjustable	Cool to Warm	None
Display	Room Temperature & Setpoint	●		
	Room Humidity & Setpoint			
Stages	Heating	4	4	4
	Cooling	3	3	3
Operating Modes	System			
	Fan			
	Occupancy	LCD Display of Occupied-Unoccupied Icon		
Annunciation	Status LED	LCD Display of Unit Status	●	●
	LCD Alarm Display	●		
Reset	Alarm	●	●	●
	Setback Override	●	●	●

Typical cooling and heating refrigeration cycles (for standard heat pump operation only)

Figure 3: Cooling refrigeration cycle

When the wall thermostat calls for COOLING, the reversing valve directs the flow of the refrigerant, a hot gas, from the compressor to the water-to-refrigerant heat exchanger. There, the heat is removed by the water, and the hot gas condenses to become a liquid. The liquid then flows through a thermal expansion valve to the air-to-refrigerant heat exchanger coil. The liquid then evaporates and becomes 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.

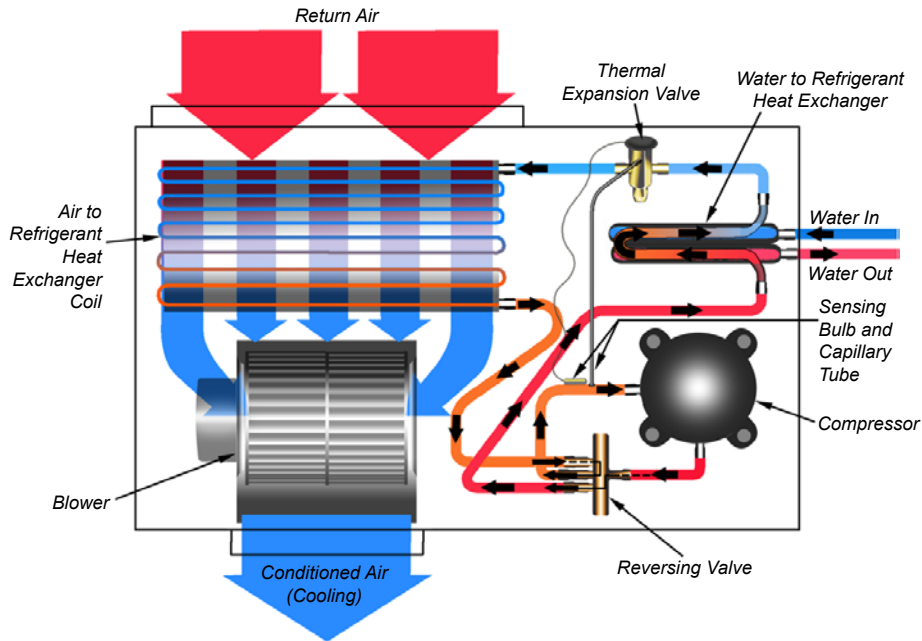
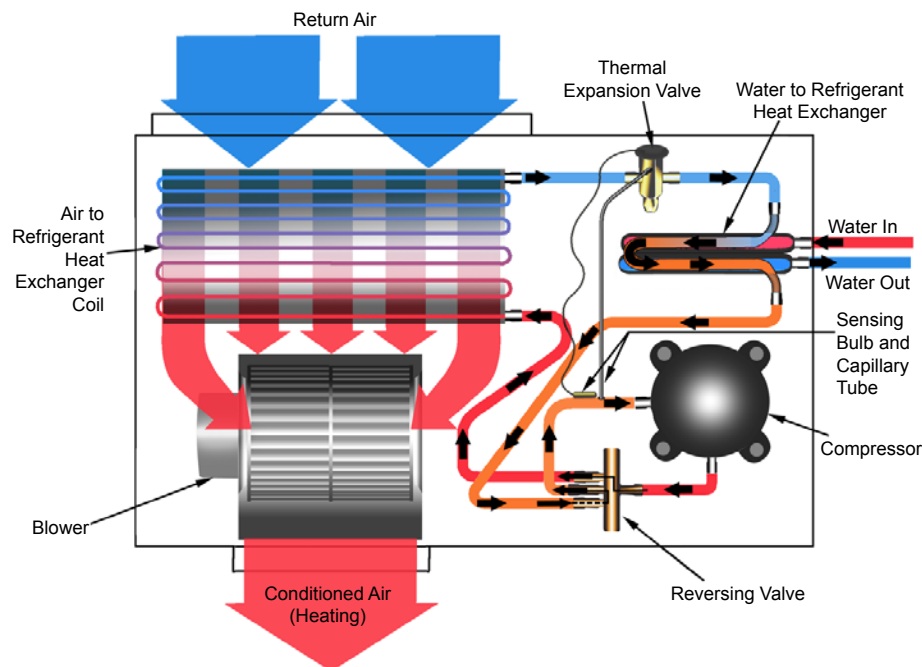


Figure 4: Heating refrigeration cycle

When the wall thermostat calls for HEATING, the reversing valve directs the flow of the refrigerant, a hot gas, from the compressor to the air-to-refrigerant heat exchanger coil. There, the heat is removed by the air passing over the surfaces of the coil and the hot gas condenses and becomes a liquid. The liquid then flows through a thermal expansion valve to the water-to-refrigerant heat exchanger. The liquid then evaporates and becomes 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.



Water source heat pump systems

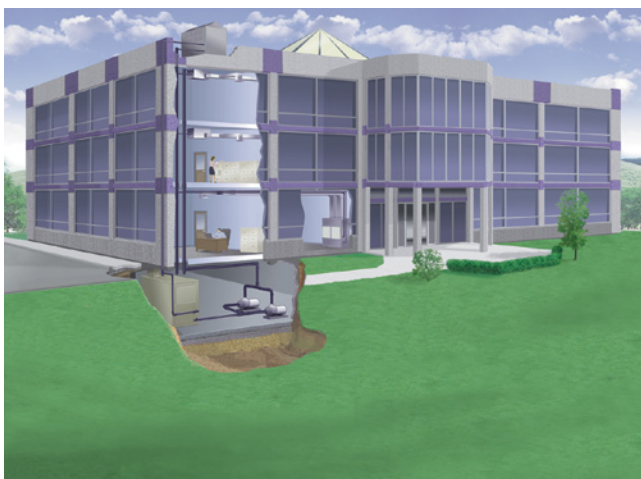
Water source heat pump systems are one of the most efficient, environmentally friendly systems available for heating and cooling buildings. High-efficiency, self contained units (sizes 7,000 btuh to 420,000 btuh) can be placed in virtually any location within a building. Each unit responds only to the heating or cooling load of the individual zone it serves. This permits an excellent comfort level for occupants, better control of energy use for building owners and lower seasonal operating costs. The Air-Conditioning Refrigeration Institute (ARI) and the International Standards Organization (ISO) publish standards so that water source heat pumps are rated for specific applications. The ARI/ISO loop options shown in this catalog are typical water source heat pump loop choices available in today's market. These systems offer benefits ranging from low cost installation to the highest energy efficiency available in the market today.

Boiler / tower applications: AHRI 320 / ISO 13256-1

A "Boiler/Tower" application uses a simple two-pipe water circulating system that adds heat, removes heat or transfers rejected heat to other units throughout the building. The water temperature for heating is generally maintained between 65°F – 70°F and is usually provided by a natural gas or electric boiler located in a mechanical room. The condensing water temperature, during cooling months, is maintained between 85°F and 95°F and requires the use of a cooling tower to dissipate waste heat. Cooling towers can be located on the roof, or inside or adjacent to the building. This application can be the lowest cost of the loop options available.

Note: ASHRAE 90.1 standards require that circulating pumps over 10 HP will require use of "variable frequency drive" equipment and pipe insulation to be used whenever water temperatures are below 60 degrees and above 105 degrees. See ASHRAE 90.1 Standards for details.

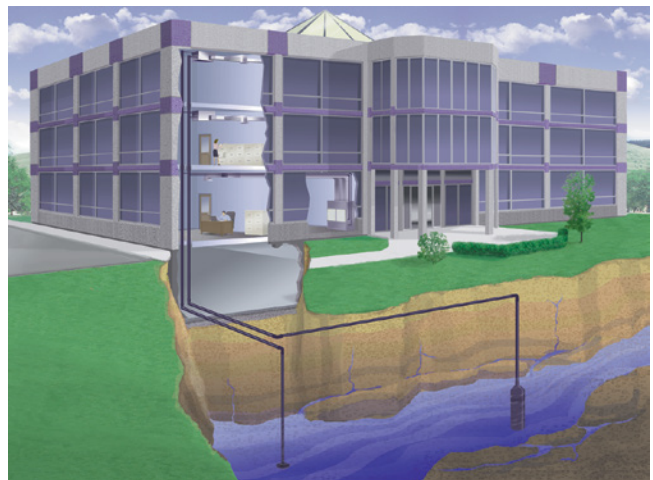
Figure 5: Boiler/tower application



Open loop well water applications: AHRI 325 / ISO 13256-1

"Open Loop" well water systems use ground water to remove or add heat to the interior water loop. The key benefit of an open loop system is the constant water temperature, usually 50°F to 60°F, which provides efficient operation at a low first cost. Most commercial designers incorporate a heat exchanger to isolate the building loop from the well water. Using heat exchangers can reduce maintenance issues while still allowing the transfer of heat from unit to unit as with the "Boiler/Tower System". A successful design provides an ample amount of groundwater (approximately 2 GPM per ton) and adequate provisions for discharging water back to the aquifer or surface. Open Loop applications are commonly used in coastal areas where soil characteristics allow reinjection wells to return the water back to the aquifer. Note that some states have requirements on the depths of return water reinjection wells, and such wells must be approved by the United States Environmental Protection Agency. Also, bad water quality can increase problems with heat exchanger scaling. Suspended solids can erode the heat exchanger. Strainers can be used to contain suspended solids.

Figure 6: Open loop well application

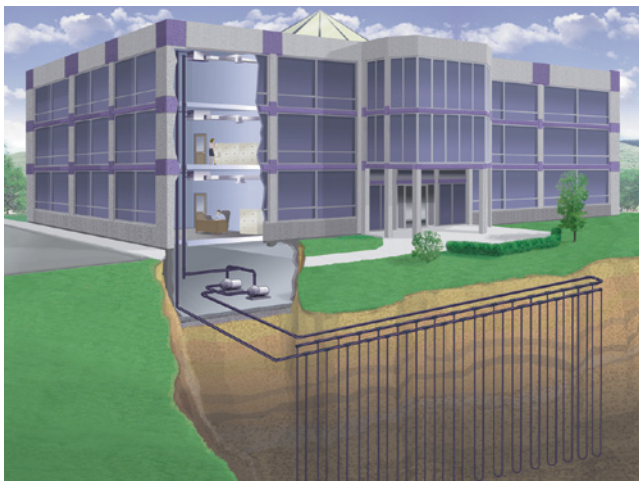


Closed loop geothermal applications: AHRI 330/ISO 13256-1

“Vertical Closed Loop” applications are installed by drilling vertical bore holes into the earth and inserting a plastic polyethylene supply/return pipe into the holes. The vertical wells are connected in parallel reverse return fashion to allow the water from the building to circulate evenly throughout the bore field. The circulating fluid dissipates heat to the ground in a similar manner as a “tower” and adds heat back to the loop like a boiler. If properly designed, the loop field can maintain the loop temperatures necessary to condition the building without the use of a boiler or a tower. Loop temperatures usually range from 37°F to 95°F in Northern climates.

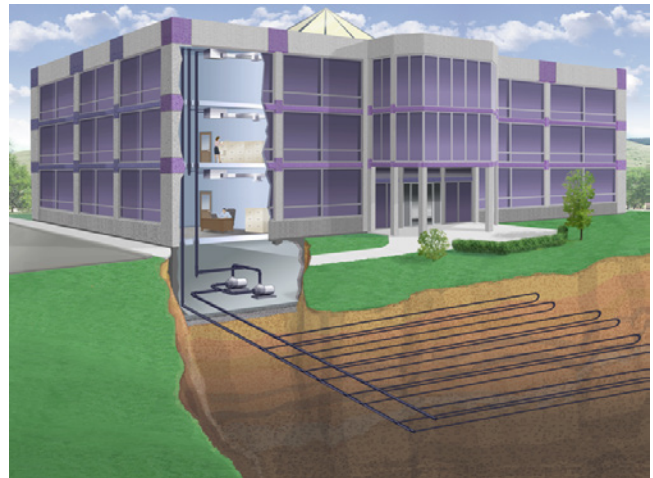
Southern applications can see temperatures ranging from 40°F to 100°F. The number of bore holes and their depth should be determined by using commercial software that is specifically designed for vertical geothermal applications. Typical bore depths of a vertical loop range from 150 to 400 feet and generally require about 250 feet of surface area per ton of cooling.

Figure 7: Vertical loop application



A closed loop “Horizontal” geothermal application is similar to a vertical loop application with the exception that the loops are installed in trenches approximately 5 feet below the ground surface. The piping may be installed using a “four-pipe” or “six-pipe” design and could require 1,500 to 2,000 square feet of surface area per ton of cooling. Loop temperatures for a commercial application can range from 35°F to 95°F in Northern climates. Southern climates can see temperatures ranging from 40°F to 100°F. Horizontal loops are generally not applied in urban areas because land use and costs can be prohibitive. New advances in installation procedures have improved the assembly time of horizontal loops while keeping the first cost lower than a vertical loop.

Figure 8: Horizontal loop application



A “Surface Water” or “Lake” closed loop system is a geothermal loop that is directly installed in a lake or body of water that is near the building. In many cases, the body of water is constructed on the building site to meet drainage or aesthetic requirements. Surface loops use bundled polyethylene coils that are connected in the same manner as a vertical or horizontal loop using a parallel reverse return design. The size and the depth of the lake is critical. Commercial design services should be used to certify that a given body of water is sufficient to withstand the building loads. Loop temperatures usually range from 35°F to 90°F and prove to be the best cooling performer and lowest cost loop option of the three geothermal loops. Some applications may not be good candidates due to public access or debris problems from flooding.

Figure 9: Surface water loop application



Application considerations

Typical console installation



Unit location

The Console Water Source Heat Pump is typically installed on an exterior wall.

Locate a Console unit to allow for easy removal of the filter and access panels. Allow a minimum of 18" (46 cm) clearance on each side of the unit for service and maintenance access.

To reduce noise emissions, install a field-provided 1/4-inch thick, rubber isolator pad below the entire base of the unit. The pad should be equal to the overall foot-print size of the unit to provide sound dampening of the unit while in operation. The unit must sit flat on the floor to prevent unwanted noise and vibration.

Piping

The console water source heat pump unit is typically connected to the supply / return piping using a “reverse return” piping system which includes a flow control device so that flow requirements are met for each zone. A short, high pressure “flexible hose” is used to connect the unit to the building’s hard piping and acts as a sound attenuator for both the unit operating noise and hydronic pumping noise. One end of the hose has a swivel fitting to facilitate removal of the unit for replacement or service. Include supply and return shutoff valves in the design to allow removal of a unit without the need to shut down the entire heat pump system. The return valve may be used for balancing and will typically have a “memory stop” so that it can be reopened to the proper position for the flow required. Fixed flow devices are commercially available and can be installed to eliminate the need for memory stop shut off valves. Include Pressure / Temperature ports to allow the service technician to measure water flow and unit operation.

Condensate drain

The factory provided condensate drain trap on the console unit is located inside the end cabinet. Condensate removal piping must be pitched away from the unit not less than 1/4" per foot. A vent is required after the trap so that the condensate will drain away from the unit. The vent can also act as a clean out if the trap becomes clogged. To avoid having waste gases entering the building, the condensate drain should not be directly piped to a drain/waste/vent stack. See local codes for the correct application of condensate piping to drains.

Daikin has available optional fire-rated flexible hoses to better facilitate supply and return piping connections. These flexible hoses reduce vibration between the unit and the rigid piping system. See Catalog 1196 for more detailed hose kit features.

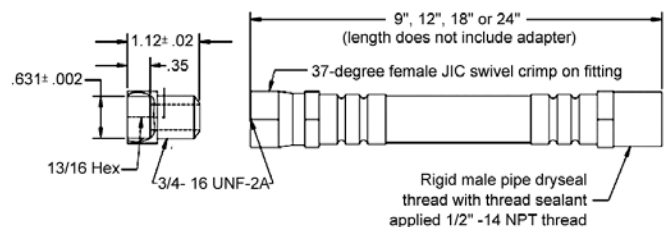
Fire rated supply or return hoses



Table 10: Hose specifications

Hose Type	Nominal Length	Max. Recommended Working Pressure	Minimum Burst Pressure @ 70° to 90°	Minimum Bend Radius
1/2" MNPT Supply & Return	9"	400 psig	1600 psig	2½"
	12"	400 psig	1600 psig	2½"
	18"	400 psig	1600 psig	2½"
	24"	400 psig	1600 psig	2½"

Figure 10: Hose detail



Unit selection

Achieving optimal performance with water source heat pump systems requires both accurate system design and proper equipment selection. Use a building load program to determine the heating and cooling loads of each zone prior to making equipment selections. With this information, the Daikin SelectTools™ software selection program for Water Source Heat Pumps can be used to provide fast, accurate and complete selections of all Daikin water source heat pump products. SelectTools software is available by contacting your local Daikin Representative.

While we recommend that you use Daikin SelectTools software for all unit selections, manual selections can be accomplished using the same zone load information and the capacity tables available in this catalog.

Boiler / tower application manual selections:

The following example illustrates a typical selection for a zone in a boiler/tower system for a commercial building. A building load program determines that this zone needs 10,430 Btuh of total cooling, 6,950 Btuh of sensible cooling and 9,150 Btuh of total heating. The water temperatures for the boiler/tower system are 90°F for cooling and 70°F for heating. The return air temperature is 80°F dry bulb with 67°F wet bulb for cooling and 70°F for heating.

Zone requirements:

Total Cooling Load	=	10,430 Btuh
Sensible Cooling Load	=	6,950 Btuh
Total Heating Load	=	9,150 Btuh
Air Flow Required	=	275 CFM
Return Air Cooling	=	80°F DB / 67°F WB
Return Air - Heating	=	70°F DB

Since a Daikin Model MHC 009 produces approximately 10,000 Btuh of cooling, it is not sufficient for this zone and a model MHC 012 should be considered. Model MHC is chosen because it is specifically designed for a boiler/tower application. Typical water flow rates for boiler/tower applications are 2.0 to 2.5 GPM per ton and in this example no antifreeze is used.

Selection:

Model MHC 012 (boiler/tower)		
Total Cooling Capacity @ 90 EWT	=	11,511 Btuh
Sensible cooling capacity @ 90 EWT	=	7,660 Btuh
Total Heating Capacity @ 70 EWT	=	14,160 Btuh
CFM =		275
Water Flow required to meet capacity	=	8 GPM
Water Pressure drop	=	2.5 (FT. H2O)

Final selection: MHC 012

Extended range/geothermal applications:

The following example illustrates the same zone in a geothermal application.

The load requirements for the zone are the same as the above example – 10,430 Btuh of total cooling and 6,950 Btuh of sensible cooling and 9,150 Btuh of heating. Geothermal loop software programs are available to help determine the size of the loop field based on:

- Desired entering water temperatures for the system.
- Specific acreage available for the loop which produces specific min./max loop temps for the unit selection.
- Entering water temperatures for geothermal systems can be as high as 90° to 100°F and as low as 30°F based on the geographical location of the building. Water flow rates are typically 2.5 to 3 GPM per ton and the use of antifreeze is required in most northern applications.

Zone requirements:

Total Cooling Load	=	10,430 Btuh
Sensible Cooling Load	=	6,950 Btuh
Total Heating Load	=	9,150 Btuh
Air Flow Required	=	275 CFM
Return Air Cooling	=	80°F DB / 67°F WB
Return Air - Heating	=	70°F DB

A Daikin Model MHW is chosen for this geothermal application. Model MHW offers insulated water piping for condensation considerations and a different freezestat setting to allow entering water temperatures lower than 40°F (with antifreeze). Output capacities should be recalculated using the antifreeze reduction tables that are shown on "Antifreeze correction factors" on page 37. The Model MHW 012 is first considered but may not meet the heating load because of the reduced entering water temperatures (35°F) and an antifreeze solution of 21% propylene (see page 37).

Selection:

Model MHW 012 (extended range model)

Total cooling capacity @ 100 EWT	=	10,555 Btuh
× .980	=	10,344
Sensible cooling capacity @ 100 EWT	=	7,257 Btuh
× .980	=	7,112
Total heating capacity @ 35 EWT	=	9,430 Btuh
× .975	=	9,240 (CFM = 284)
Water Flow required to meet capacity	=	2.4 GPM
Water Pressure drop = 2.5 × 1.5	=	3.75 (FT. H2O)

Final selection: MHW 012

Note: In applications where the zone may be a corner office or have excessive glass area, the heating load could be greater than the heating output capacity of the MHC 012 model (say 7,800 Btuh). The choices are to upsize the unit to the next model available (015).

Unit Size 007 (295 SCFM)

EWT (°F)	GPM	WPD		EAT (°F)	Cooling					Heating					
		PSI	Ft of W.C.		Total (Btu/hr)	Sensible (Btu/hr)	Power Input (kW)	THR (Btu/hr)	EER	Total (Btu/hr)	Power Input (kW)	THA (Btu/hr)	LAT (°F)	COP	
20	1.2	0.3	0.8	65/55	<i>Tint = Operation Not Recommended</i>						4600	0.406	3200	79	3.32
		0.3	0.8	70/59							4400	0.431	2900	84	2.99
		0.3	0.8	75/63							4200	0.457	2600	88	2.69
		0.3	0.8	80/67							4000	0.482	2400	92	2.43
		0.3	0.8	85/71											
	1.8	0.8	1.8	65/55							4800	0.408	3400	80	3.44
		0.8	1.8	70/59							4600	0.433	3100	84	3.11
		0.8	1.8	75/63							4400	0.459	2800	89	2.81
		0.8	1.8	80/67							4200	0.484	2500	93	2.54
		0.8	1.8	85/71											
	2.3	1.3	3.0	65/55							4900	0.410	3500	80	3.50
		1.3	3.0	70/59							4700	0.435	3200	85	3.16
		1.3	3.0	75/63							4500	0.460	2900	89	2.86
		1.3	3.0	80/67							4300	0.486	2600	93	2.59
		1.3	3.0	85/71											
30	1.2	0.3	0.8	65/55	7900	6400	0.274	8800	28.8	5600	0.417	4200	82	3.93	
		0.3	0.8	70/59	8600	6700	0.270	9500	31.9	5400	0.442	3900	87	3.58	
		0.3	0.8	75/63	9300	7100	0.266	10200	35.0	5200	0.468	3600	91	3.25	
		0.3	0.8	80/67	9900	7400	0.261	10800	37.9	5000	0.493	3300	96	2.97	
		0.3	0.8	85/71	10600	7800	0.257	11500	41.2						
	1.8	0.8	1.7	65/55	8000	6500	0.261	8900	30.7	5700	0.419	4300	83	3.98	
		0.8	1.7	70/59	8700	6800	0.257	9600	33.9	5500	0.444	4000	87	3.63	
		0.8	1.7	75/63	9300	7200	0.253	10200	36.8	5300	0.470	3700	92	3.30	
		0.8	1.7	80/67	10000	7500	0.248	10800	40.3	5100	0.495	3400	96	3.02	
		0.8	1.7	85/71	10700	7900	0.244	11500	43.9						
	2.3	1.3	2.9	65/55	8100	6500	0.250	9000	32.4	5900	0.421	4500	83	4.10	
		1.3	2.9	70/59	8700	6900	0.246	9500	35.4	5700	0.446	4200	88	3.74	
		1.3	2.9	75/63	9400	7200	0.242	10200	38.8	5500	0.472	3900	92	3.41	
		1.3	2.9	80/67	10100	7600	0.238	10900	42.4	5200	0.497	3500	96	3.06	
		1.3	2.9	85/71	10700	7900	0.233	11500	45.9						
40	1.2	0.3	0.7	65/55	8100	6700	0.316	9200	25.6	6500	0.428	5000	85	4.45	
		0.3	0.7	70/59	8700	7000	0.312	9800	27.9	6300	0.453	4800	90	4.07	
		0.3	0.7	75/63	9400	7400	0.308	10500	30.5	6100	0.479	4500	94	3.73	
		0.3	0.7	80/67	10100	7700	0.303	11100	33.3	5900	0.504	4200	98	3.43	
		0.3	0.7	85/71	10800	8100	0.299	11800	36.1						
	1.8	0.7	1.7	65/55	8200	6700	0.303	9200	27.1	6700	0.430	5200	86	4.56	
		0.7	1.7	70/59	8800	7100	0.299	9800	29.4	6500	0.455	4900	90	4.18	
		0.7	1.7	75/63	9500	7400	0.295	10500	32.2	6300	0.481	4700	95	3.84	
		0.7	1.7	80/67	10200	7800	0.290	11200	35.2	6000	0.506	4300	99	3.47	
		0.7	1.7	85/71	10800	8100	0.286	11800	37.8						
	2.3	1.2	2.8	65/55	8200	6800	0.292	9200	28.1	6800	0.432	5300	86	4.61	
		1.2	2.8	70/59	8900	7100	0.288	9900	30.9	6600	0.457	5000	91	4.23	
		1.2	2.8	75/63	9600	7500	0.284	10600	33.8	6400	0.483	4800	95	3.88	
		1.2	2.8	80/67	10200	7800	0.280	11200	36.4	6200	0.508	4500	99	3.57	
		1.2	2.8	85/71	10900	8200	0.275	11800	39.6						
50	1.2	0.3	0.7	65/55	8000	6800	0.362	9200	22.1	7400	0.439	5900	88	4.94	
		0.3	0.7	70/59	8600	7100	0.358	9800	24.0	7200	0.464	5600	92	4.54	
		0.3	0.7	75/63	9300	7500	0.353	10500	26.3	7000	0.490	5300	97	4.18	
		0.3	0.7	80/67	10000	7800	0.349	11200	28.7	6800	0.515	5000	101	3.87	
		0.3	0.7	85/71	10600	8200	0.345	11800	30.7						
	1.8	0.7	1.7	65/55	8000	6800	0.349	9200	22.9	7600	0.441	6100	89	5.05	
		0.7	1.7	70/59	8700	7200	0.345	9900	25.2	7400	0.466	5800	93	4.65	
		0.7	1.7	75/63	9400	7500	0.340	10600	27.6	7200	0.492	5500	97	4.29	
		0.7	1.7	80/67	10100	7900	0.336	11200	30.1	7000	0.517	5200	102	3.96	
		0.7	1.7	85/71	10700	8200	0.332	11800	32.2						
	2.3	1.2	2.7	65/55	8100	6900	0.338	9300	24.0	7700	0.443	6200	89	5.09	
		1.2	2.7	70/59	8800	7200	0.334	9900	26.3	7500	0.468	5900	93	4.69	
		1.2	2.7	75/63	9400	7600	0.329	10500	28.6	7300	0.494	5600	98	4.33	
		1.2	2.7	80/67	10100	7900	0.325	11200	31.1	7100	0.519	5300	102	4.01	
		1.2	2.7	85/71	10800	8300	0.321	11900	33.6						
60	1.2	0.3	0.7	65/55	7600	6700	0.411	9000	18.5	8400	0.450	6900	91	5.47	
		0.3	0.7	70/59	8300	7100	0.406	9700	20.4	8200	0.475	6600	96	5.05	
		0.3	0.7	75/63	9000	7400	0.402	10400	22.4	8000	0.501	6300	100	4.68	
		0.3	0.7	80/67	9700	7800	0.398	11100	24.4	7800	0.526	6000	104	4.34	
		0.3	0.7	85/71	10300	8100	0.394	11600	26.1						
	1.8	0.7	1.6	65/55	7700	6800	0.398	9100	19.3	8500	0.452	7000	92	5.51	
		0.7	1.6	70/59	8400	7100	0.393	9700	21.4	8300	0.477	6700	96	5.10	
		0.7	1.6	75/63	9100	7500	0.389	10400	23.4	8100	0.503	6400	100	4.72	
		0.7	1.6	80/67	9700	7800	0.385	11000	25.2	7900	0.528	6100	105	4.38	
		0.7	1.6	85/71	10400	8200	0.381	11700	27.3						
	2.3	1.2	2.7	65/55	7800	6800	0.387	9100	20.2	8600	0.454	7100	92	5.55	
		1.2	2.7	70/59	8500	7200	0.383	9800	22.2	8400	0.479	6800	96	5.13	
		1.2	2.7	75/63	9100	7500	0.378	10400	24.1	8200	0.505	6500	101	4.75	
		1.2	2.7	80/67	9800	7900	0.374	11100	26.2	8000	0.530	6200	105	4.42	
		1.2	2.7	85/71	10500	8200	0.370	11800	28.4						

Unit Size 007 (295 SCFM) Continued

EWT (°F)	GPM	WPD		EAT (°F)	Cooling					Heating				
		PSI	Ft of W.C.		Total (Btu/hr)	Sensible (Btu/hr)	Power Input (kW)	THR (Btu/hr)	EER	Total (Btu/hr)	Power Input (kW)	THA (Btu/hr)	LAT (°F)	COP
70	1.2	0.3	0.7	65/55	7100	6500	0.463	8700	15.3	9300	0.461	7700	94	5.91
		0.3	0.7	70/59	7800	6900	0.458	9400	17.0	9100	0.487	7400	98	5.47
		0.3	0.7	75/63	8500	7200	0.454	10000	18.7	8900	0.512	7200	103	5.09
		0.3	0.7	80/67	9200	7600	0.450	10700	20.4	8700	0.537	6900	107	4.74
		0.3	0.7	85/71	9800	7900	0.446	11300	22.0					
	1.8	0.7	1.6	65/55	7200	6600	0.450	8700	16.0	9500	0.463	7900	95	6.01
		0.7	1.6	70/59	7900	6900	0.446	9400	17.7	9300	0.489	7600	99	5.57
		0.7	1.6	75/63	8600	7300	0.441	10100	19.5	9000	0.514	7200	103	5.13
		0.7	1.6	80/67	9200	7600	0.437	10700	21.1	8800	0.539	7000	107	4.78
		0.7	1.6	85/71	9900	8000	0.433	11400	22.9					
	2.3	1.1	2.6	65/55	7300	6600	0.439	8800	16.6	9600	0.465	8000	95	6.05
		1.1	2.6	70/59	8000	7000	0.435	9500	18.4	9400	0.490	7700	99	5.62
		1.1	2.6	75/63	8600	7300	0.430	10100	20.0	9200	0.516	7400	104	5.22
		1.1	2.6	80/67	9300	7700	0.426	10800	21.8	9000	0.541	7200	108	4.87
		1.1	2.6	85/71	10000	8000	0.422	11400	23.7					
80	1.2	0.3	0.7	65/55	6500	6300	0.518	8300	12.5	10200	0.472	8600	97	6.33
		0.3	0.7	70/59	7200	6600	0.514	9000	14.0	10000	0.498	8300	101	5.88
		0.3	0.7	75/63	7900	7000	0.509	9600	15.5	9800	0.523	8000	106	5.49
		0.3	0.7	80/67	8500	7300	0.505	10200	16.8	9600	0.548	7700	110	5.13
		0.3	0.7	85/71	9200	7600	0.501	10900	18.4					
	1.8	0.7	1.5	65/55	6600	6300	0.505	8300	13.1	10400	0.474	8800	97	6.42
		0.7	1.5	70/59	7300	6700	0.501	9000	14.6	10200	0.500	8500	102	5.97
		0.7	1.5	75/63	7900	7000	0.496	9600	15.9	10000	0.525	8200	106	5.58
		0.7	1.5	80/67	8600	7400	0.492	10300	17.5	9800	0.550	7900	111	5.22
		0.7	1.5	85/71	9300	7700	0.488	11000	19.1					
	2.3	1.1	2.6	65/55	6700	6400	0.494	8400	13.6	10500	0.476	8900	98	6.46
		1.1	2.6	70/59	7300	6700	0.490	9000	14.9	10300	0.501	8600	102	6.02
		1.1	2.6	75/63	8000	7100	0.485	9700	16.5	10100	0.527	8300	107	5.61
		1.1	2.6	80/67	8700	7400	0.481	10300	18.1	9900	0.552	8000	111	5.25
		1.1	2.6	85/71	9300	7800	0.477	10900	19.5					
90	1.2	0.3	0.7	65/55	5800	5900	0.576	7800	10.1	11200	0.483	9600	100	6.79
		0.3	0.7	70/59	6500	6300	0.571	8400	11.4	11000	0.509	9300	104	6.33
		0.3	0.7	75/63	7200	6600	0.567	9100	12.7	10800	0.534	9000	109	5.92
		0.3	0.7	80/67	7800	7000	0.563	9700	13.9	10600	0.560	8700	113	5.54
		0.3	0.7	85/71	8500	7300	0.559	10400	15.2					
	1.5	0.7	1.5	65/55	5900	6000	0.563	7800	10.5	11300	0.485	9600	100	6.82
		0.7	1.5	70/59	6600	6300	0.558	8500	11.8	11100	0.511	9400	105	6.36
		0.7	1.5	75/63	7200	6700	0.554	9100	13.0	10900	0.536	9100	109	5.95
		0.7	1.5	80/67	7900	7000	0.550	9800	14.4	10700	0.562	8800	113	5.57
		0.7	1.5	85/71	8600	7400	0.546	10500	15.8					
	2.0	1.1	2.5	65/55	6000	6000	0.552	7900	10.9	11500	0.487	9800	101	6.91
		1.1	2.5	70/59	6600	6400	0.548	8500	12.0	11300	0.512	9600	105	6.46
		1.1	2.5	75/63	7300	6700	0.543	9200	13.4	11100	0.538	9300	110	6.04
		1.1	2.5	80/67	8000	7100	0.539	9800	14.8	10900	0.563	9000	114	5.67
		1.1	2.5	85/71	8600	7400	0.535	10400	16.1					
100	1.2	0.3	0.7	65/55	5100	5500	0.636	7300	8.0	<p align="center">Tint = Operation Not Recommended</p> <p>Notes:</p> <ol style="list-style-type: none"> Operation below 40°F EWT is based upon a 15% methanol antifreeze solution. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated. See performance correction tables for operating conditions other than those listed. Interpolation is permissible; extrapolation is not. For performance data outside the EAT listed, refer to the Daikin SelectTools selection program Table does not reflect fan or pump power corrections for AHRI/ISO conditions. Data is based on unit at full load operation. Performance data based on 208/1ph power supply. <p>Capacity Table Legend: EWT = Entering Water Temperature (°F) GPM = Gallons Per Minute WPD = Water Pressure Drop (PSIG) PSI = Pounds Per Square Inch EAT = Entering Air Temperature (°F) LWT = Leaving Water Temperature (°F) THA = Total Heat of Absorption (Btu) THR = Total Heat of Rejection (Btu) EER = Energy Efficiency Ratio COP = Coefficient of Performance kW = Kilowatts</p>				
		0.3	0.7	70/59	5700	5900	0.632	7900	9.0					
		0.3	0.7	75/63	6400	6200	0.628	8500	10.2					
		0.3	0.7	80/67	7100	6600	0.623	9200	11.4					
		0.3	0.7	85/71	7800	6900	0.619	9900	12.6					
	1.5	0.7	1.5	65/55	5200	5600	0.623	7300	8.3					
		0.7	1.5	70/59	5800	5900	0.619	7900	9.4					
		0.7	1.5	75/63	6500	6300	0.615	8600	10.6					
		0.7	1.5	80/67	7200	6600	0.610	9300	11.8					
		0.7	1.5	85/71	7800	7000	0.606	9900	12.9					
	2.0	1.1	2.5	65/55	5200	5600	0.612	7300	8.5					
		1.1	2.5	70/59	5900	6000	0.608	8000	9.7					
		1.1	2.5	75/63	6600	6300	0.604	8700	10.9					
		1.1	2.5	80/67	7200	6700	0.600	9200	12.0					
		1.1	2.5	85/71	7900	7000	0.595	9900	13.3					
110	1.2	0.3	0.6	65/55	4300	5100	0.699	6700	6.2					
		0.3	0.6	70/59	5000	5500	0.695	7400	7.2					
		0.3	0.6	75/63	5700	5800	0.691	8100	8.2					
		0.3	0.6	80/67	6400	6200	0.686	8700	9.3					
		0.3	0.6	85/71	7000	6500	0.682	9300	10.3					
	1.5	0.7	1.5	65/55	4400	5200	0.686	6700	6.4					
		0.7	1.5	70/59	5100	5600	0.682	7400	7.5					
		0.7	1.5	75/63	5800	5900	0.678	8100	8.6					
		0.7	1.5	80/67	6400	6200	0.673	8700	9.5					
		0.7	1.5	85/71	7100	6600	0.669	9400	10.6					
	2.0	1.1	2.5	65/55	4500	5300	0.675	6800	6.7					
		1.1	2.5	70/59	5200	5600	0.671	7500	7.7					
		1.1	2.5	75/63	5800	6000	0.667	8100	8.7					
		1.1	2.5	80/67	6500	6300	0.662	8800	9.8					
		1.1	2.5	85/71	7200	6600	0.658	9400	10.9					

Unit Size 009 (355 SCFM) Continued

EWT (°F)	GPM	WPD			Cooling					Heating				
		PSI	Ft of W.C.	EAT (°F)	Total (Btu/hr)	Sensible (Btu/hr)	Power Input (kW)	THR (Btu/hr)	EER	Total (Btu/hr)	Power Input (kW)	THA (Btu/hr)	LAT (°F)	COP
70	1.5	0.6	1.3	65/55	8500	6000	0.596	10500	14.3	10900	0.602	8800	93	5.30
		0.6	1.3	70/59	9200	6300	0.591	11200	15.6	10700	0.628	8600	98	4.99
		0.6	1.3	75/63	9900	6700	0.587	11900	16.9	10500	0.653	8300	102	4.71
		0.6	1.3	80/67	10500	7000	0.583	12500	18.0	10300	0.679	8000	107	4.44
		0.6	1.3	85/71	11200	7400	0.579	13200	19.3					
	2.3	1.3	3.0	65/55	8600	6100	0.578	10600	14.9	11100	0.605	9000	94	5.37
		1.3	3.0	70/59	9300	6400	0.574	11300	16.2	10900	0.631	8700	98	5.06
		1.3	3.0	75/63	10000	6800	0.570	11900	17.5	10700	0.656	8500	103	4.78
		1.3	3.0	80/67	10600	7100	0.565	12500	18.8	10500	0.682	8200	107	4.51
		1.3	3.0	85/71	11300	7500	0.561	13200	20.1					
	3.0	2.2	4.9	65/55	8700	6100	0.563	10600	15.5	11300	0.607	9200	94	5.45
		2.2	4.9	70/59	9400	6500	0.559	11300	16.8	11100	0.633	8900	99	5.13
		2.2	4.9	75/63	10100	6800	0.555	12000	18.2	10900	0.658	8700	103	4.85
		2.2	4.9	80/67	10700	7200	0.550	12600	19.5	10700	0.684	8400	108	4.58
		2.2	4.9	85/71	11400	7500	0.546	13300	20.9					
80	1.5	0.6	1.3	65/55	8000	5700	0.662	10300	12.1	12000	0.621	9900	96	5.66
		0.6	1.3	70/59	8600	6100	0.658	10800	13.1	11800	0.646	9600	101	5.35
		0.6	1.3	75/63	9300	6400	0.653	11500	14.2	11600	0.672	9300	105	5.05
		0.6	1.3	80/67	10000	6800	0.649	12200	15.4	11400	0.697	9000	110	4.79
		0.6	1.3	85/71	10600	7100	0.645	12800	16.4					
	2.3	1.3	2.9	65/55	8100	5800	0.645	10300	12.6	12200	0.624	10100	97	5.72
		1.3	2.9	70/59	8700	6100	0.640	10900	13.6	12000	0.649	9800	101	5.41
		1.3	2.9	75/63	9400	6500	0.636	11600	14.8	11800	0.674	9500	106	5.13
		1.3	2.9	80/67	10100	6800	0.632	12300	16.0	11600	0.700	9200	110	4.85
		1.3	2.9	85/71	10700	7200	0.628	12800	17.0					
	3.0	2.1	4.8	65/55	8200	5900	0.630	10400	13.0	12400	0.626	10300	97	5.80
		2.1	4.8	70/59	8800	6200	0.625	10900	14.1	12200	0.651	10000	102	5.49
		2.1	4.8	75/63	9500	6600	0.621	11600	15.3	12000	0.677	9700	106	5.19
		2.1	4.8	80/67	10200	6900	0.617	12300	16.5	11800	0.702	9400	111	4.92
		2.1	4.8	85/71	10800	7300	0.613	12900	17.6					
90	1.5	0.6	1.3	65/55	7300	5400	0.731	9800	10.0	13100	0.639	10900	99	6.00
		0.6	1.3	70/59	8000	5700	0.727	10500	11.0	12900	0.665	10600	103	5.68
		0.6	1.3	75/63	8600	6100	0.723	11100	11.9	12700	0.690	10300	108	5.39
		0.6	1.3	80/67	9300	6400	0.718	11800	13.0	12500	0.716	10100	112	5.11
		0.6	1.3	85/71	10000	6800	0.714	12400	14.0					
	2.3	1.3	2.9	65/55	7400	5500	0.714	9800	10.4	13300	0.642	11100	99	6.07
		1.3	2.9	70/59	8100	5800	0.710	10500	11.4	13100	0.667	10800	104	5.75
		1.3	2.9	75/63	8700	6200	0.705	11100	12.3	12900	0.693	10500	108	5.45
		1.3	2.9	80/67	9400	6500	0.701	11800	13.4	12700	0.718	10200	113	5.18
		1.3	2.9	85/71	10100	6900	0.697	12500	14.5					
	3.0	2.1	4.7	65/55	7500	5500	0.699	9900	10.7	13500	0.644	11300	100	6.14
		2.1	4.7	70/59	8200	5900	0.695	10600	11.8	13300	0.670	11000	104	5.81
		2.1	4.7	75/63	8800	6200	0.690	11200	12.8	13100	0.695	10700	109	5.52
		2.1	4.7	80/67	9500	6600	0.686	11800	13.8	12900	0.721	10400	113	5.24
		2.1	4.7	85/71	10200	6900	0.682	12500	15.0					
100	1.5	0.5	1.2	65/55	6600	5000	0.803	9300	8.2	<p align="center">Tint = Operation Not Recommended</p> <p>Notes:</p> <ol style="list-style-type: none"> Operation below 40°F EWT is based upon a 15% methanol antifreeze solution. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated. See performance correction tables for operating conditions other than those listed. Interpolation is permissible; extrapolation is not. For performance data outside the EAT listed, refer to the Daikin SelectTools selection program Table does not reflect fan or pump power corrections for AHRI/ISO conditions. Data is based on unit at full load operation. Performance data based on 208/1ph power supply. <p>Capacity Table Legend:</p> <p>EWT = Entering Water Temperature (°F) GPM = Gallons Per Minute WPD = Water Pressure Drop (PSIG) PSI = Pounds Per Square Inch EAT = Entering Air Temperature (°F) LWT = Leaving Water Temperature (°F) THA = Total Heat of Absorption (Btu) THR = Total Heat of Rejection (Btu) EER = Energy Efficiency Ratio COP = Coefficient of Performance kW = Kilowatts</p>				
		0.5	1.2	70/59	7300	5400	0.799	10000	9.1					
		0.5	1.2	75/63	7900	5700	0.795	10600	9.9					
		0.5	1.2	80/67	8600	6100	0.790	11300	10.9					
		0.5	1.2	85/71	9300	6400	0.786	12000	11.8					
	2.3	1.2	2.8	65/55	6700	5100	0.786	9400	8.5					
		1.2	2.8	70/59	7400	5400	0.782	10100	9.5					
		1.2	2.8	75/63	8000	5800	0.777	10700	10.3					
		1.2	2.8	80/67	8700	6100	0.773	11300	11.3					
		1.2	2.8	85/71	9400	6500	0.769	12000	12.2					
	3.0	2.1	4.7	65/55	6800	5200	0.771	9400	8.8					
		2.1	4.7	70/59	7500	5500	0.766	10100	9.8					
		2.1	4.7	75/63	8100	5900	0.762	10700	10.6					
		2.1	4.7	80/67	8800	6200	0.758	11400	11.6					
		2.1	4.7	85/71	9500	6600	0.754	12100	12.6					
110	1.5	0.5	1.2	65/55	5900	4600	0.878	8900	6.7					
		0.5	1.2	70/59	6600	5000	0.873	9600	7.6					
		0.5	1.2	75/63	7300	5300	0.869	10300	8.4					
		0.5	1.2	80/67	7900	5700	0.865	10900	9.1					
		0.5	1.2	85/71	8600	6000	0.860	11500	10.0					
	2.3	1.2	2.8	65/55	6000	4700	0.860	8900	7.0					
		1.2	2.8	70/59	6700	5100	0.856	9600	7.8					
		1.2	2.8	75/63	7400	5400	0.852	10300	8.7					
		1.2	2.8	80/67	8000	5800	0.847	10900	9.4					
		1.2	2.8	85/71	8700	6100	0.843	11600	10.3					
	3.0	2.0	4.6	65/55	6100	4800	0.845	9000	7.2					
		2.0	4.6	70/59	6800	5100	0.841	9700	8.1					
		2.0	4.6	75/63	7500	5500	0.837	10400	9.0					
		2.0	4.6	80/67	8100	5800	0.832	10900	9.7					
		2.0	4.6	85/71	8800	6200	0.828	11600	10.6					

Physical data

Table 11: Physical data

Unit Size	007	009	012	015	018	
Unit Dimensions H x W (Extnd End) x D1 (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 x 27-1/4			4-3/8 x 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.

Electrical data

Table 12: Standard static motor

Unit Size	Voltage/Hz/Phase	Compressor		Fan Motor FLA	Total Unit FLA	Minimum Voltage	Minimum Circuit Amps	Maximum Fuse or HACR Breaker Size
		RLA	LRA					
007	115-60-1	5.9	31	0.50	6.4	104	7.9	15.0
	208/230-60-1	2.9	15	0.41	3.3	187	4.0	15.0
	265/277-60-1	2.5	12	0.23	2.7	239	3.4	15.0
009	115-60-1	7.0	42	0.50	7.5	104	9.3	15.0
	208/230-60-1	3.6	21	0.41	4.0	187	4.9	15.0
	265/277-60-1	3.1	17	0.23	3.3	239	4.1	15.0
012	115-60-1	9.1	51	0.70	9.8	104	12.1	20.0
	208/230-60-1	4.4	30	0.33	4.7	187	5.8	15.0
	265/277-60-1	3.9	24	0.38	4.3	239	5.3	15.0
015	208/230-60-1	5.0	30	0.47	5.5	187	6.7	15.0
	265/277-60-1	4.3	24	0.38	4.7	239	5.8	15.0
018	208/230-60-1	6.2	32	0.47	6.7	187	8.2	15.0
	265/277-60-1	5.3	28	0.38	5.7	239	7.0	15.0

Table 13: Standard static motor and optional electric heater (heat pump not running)

Unit Size	Voltage/Hz/Phase	Electric Heater				Fan Motor FLA	Total Unit FLA	Minimum Voltage	*Minimum Circuit Amps		*Maximum Fuse Size		
		*kW		*FLA									
007	115-60-1	-		-		-	-	-	-		-		
	208/230-60-1	2.0	2.7	9.7	11.1	0.41	10.1	11.5	187	12.9	14.4	15	15
	265/277-60-1	3.6		12.9		0.23	13.1		239	16.4		20	
009	115-60-1	-		-		-	-	-	-	-		-	
	208/230-60-1	2.0	2.7	9.7	11.1	0.41	10.1	11.5	187	12.9	14.4	15	15
	265/277-60-1	3.6		12.9		0.23	13.1		239	16.4		20	
012	115-60-1	-		-		-	-	-	-	-		-	
	208/230-60-1	2.0	2.7	9.7	11.1	0.47	10.1	11.6	187	12.7	14.5	15	15
	265/277-60-1	3.6		12.9		0.38	13.3		239	16.6		20	
015	208/230-60-1	2.7	3.7	13.2	15.2	0.47	13.6	15.7	187	17.1	19.6	20	20
	265/277-60-1	4.9		17.5		0.38	17.9		239	22.4		25	
018	208/230-60-1	2.7	3.7	13.2	15.2	0.47	13.6	15.7	187	17.1	19.6	20	20
	265/277-60-1	4.9		17.5		0.38	17.9		239	22.4		25	

Note: *kW, FLA, MCA and max fuse calculated at 208, 240 and 277 volt as required by UL 1995.

Fan performance

Table 14: Airflow vs. CFM - standard static motor

Unit Size	Fan Speed	Cooling		Heating	
		SCFM	L/s	SCFM	L/s
007	Low	220	104	225	106
	High	275	130	295	139
009	Low	260	123	265	125
	High	345	163	355	168
012	Low	250	118	260	123
	High	360	170	370	175
015	Low	340	160	350	165
	High	525	248	535	252
018	Low	380	179	390	184
	High	475	224	485	229

Operating limits

Air limits

Table 15: 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)

Fluid limits

Table 16: 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.

Information for initial start-up

Standard range units:

Units are designed to start in an ambient of 50°F (10°C), with entering air at 50°F (10°C), with entering water at 70°F (21°C), with both air and water at the flow rates used in the ISO 13256-1 rating test, for initial start-up in winter.

Note: 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.

Geothermal range units:

Geothermal range heat pump conditioners are designed to start in an ambient of 40°F (5°C), with entering air at 40°F (5°C), with entering water at 40°F (5°C), with both air and water at the flow rates used in the ISO 13256-1 rating test, for initial start-up in winter.

Note: 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.

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.

Power supply

A voltage variation of +/-10% of nameplate voltage is acceptable.

Airflow correction factors

Table 17: Airflow correction factors

	Percent of Nominal Airflow						
	85	90	95	100	105	110	115
Total Cooling Capacity	0.972	0.982	0.993	1.00	1.007	1.010	1.013
Sensible Cooling Capacity	0.926	0.948	0.974	1.00	1.027	1.055	1.066
kW - Cooling	0.977	0.984	0.993	1.00	1.011	1.018	1.028
Total Heat of Rejection	0.975	0.983	0.991	1.00	1.008	1.015	1.018
Total Heating Capacity	0.967	0.978	0.990	1.00	1.009	1.017	1.024
kW - Heating	1.009	1.006	1.003	1.00	0.997	0.995	0.993
Total Heat of Absorption	0.967	0.976	0.989	1.00	1.010	1.019	1.025

Antifreeze correction factors

Table 18: 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 19: 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 20: Methanol

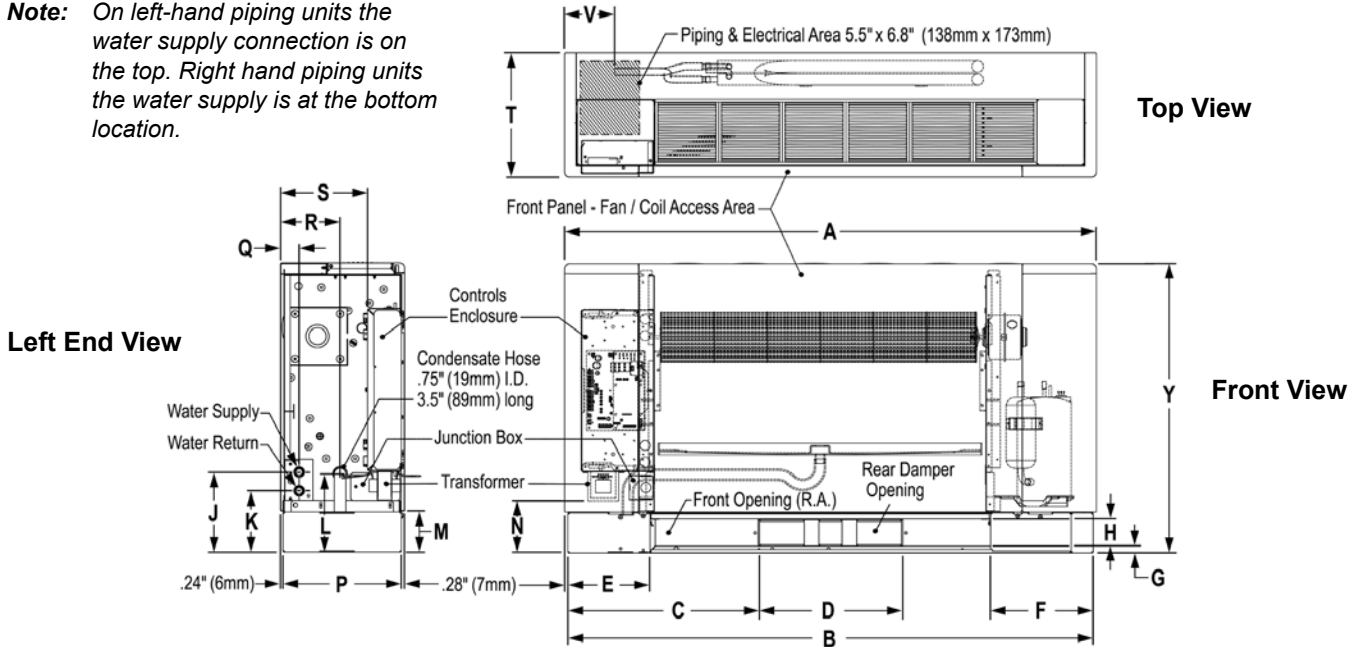
	10%	20%	30%	40%	50%
Cooling Capacity	0.9980	0.9720	–	–	–
Heating Capacity	0.9950	0.9700	–	–	–
Pressure Drop	1.0230	1.0570	–	–	–

Table 21: Ethanol

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

Flat top – high sill, left-hand piping – unit size 007 - 012

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.



Flat top – high sill, right-hand piping – unit size 007 - 012

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.

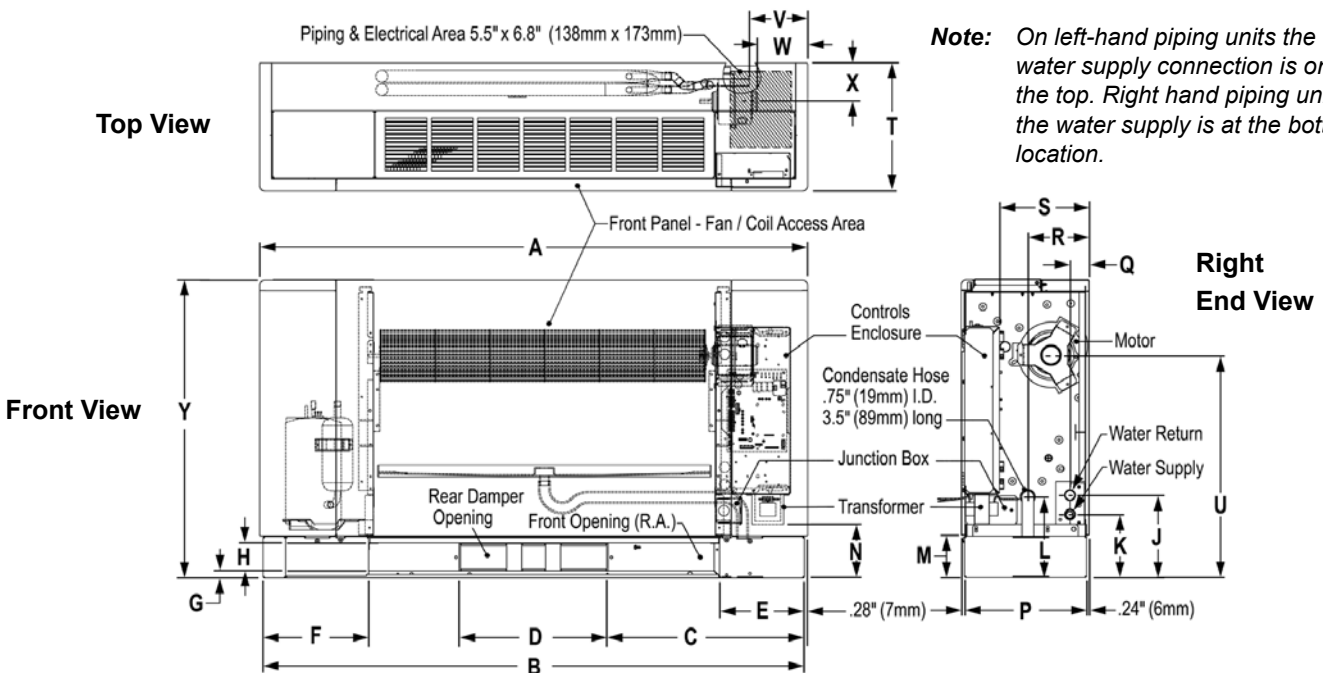


Table 22: Dimensions

Unit Size	A ¹	B	C	D	E	F	G	H	J	K	L	M
007-012	46" (1168mm)	45½" (1153mm)	16½" (418mm)	12½" (318mm)	7" (181mm)	8⅞" (225mm)	0.6" (14mm)	2¼" (57mm)	6⅞" (175mm)	5⅛" (132mm)	6¾" (172mm)	3½" (90mm)
	N	P	Q	R	S	T ²	U	V	W	X	Y	
	4¼" (108mm)	10¼" (260mm)	1⅜" (41mm)	5¼" (134mm)	7½" (192mm)	10¾" (273mm)	18¾" (476mm)	4⅝" (118mm)	4¼" (108mm)	3¼" (83mm)	25" (635mm)	

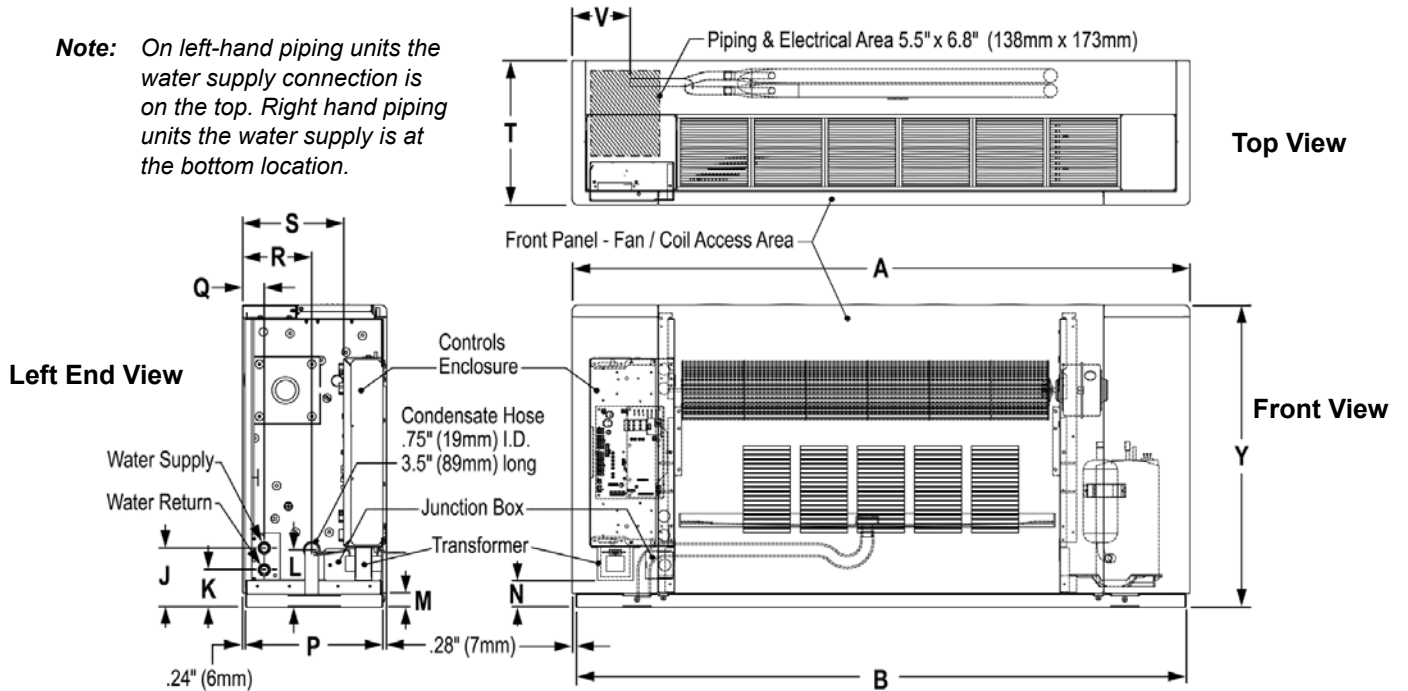
Notes: Dimensions are approximate

¹ Add 12" to dimension "A" unit width for optional extended end pocket.

² Add 2", 4" or 6" to dimension "T" unit depth for optional rear extension (high sill units only).

Flat top – low sill, left hand piping – unit size 007 - 012

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.



Flat top – low sill, right-hand piping – unit size 007 - 012

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.

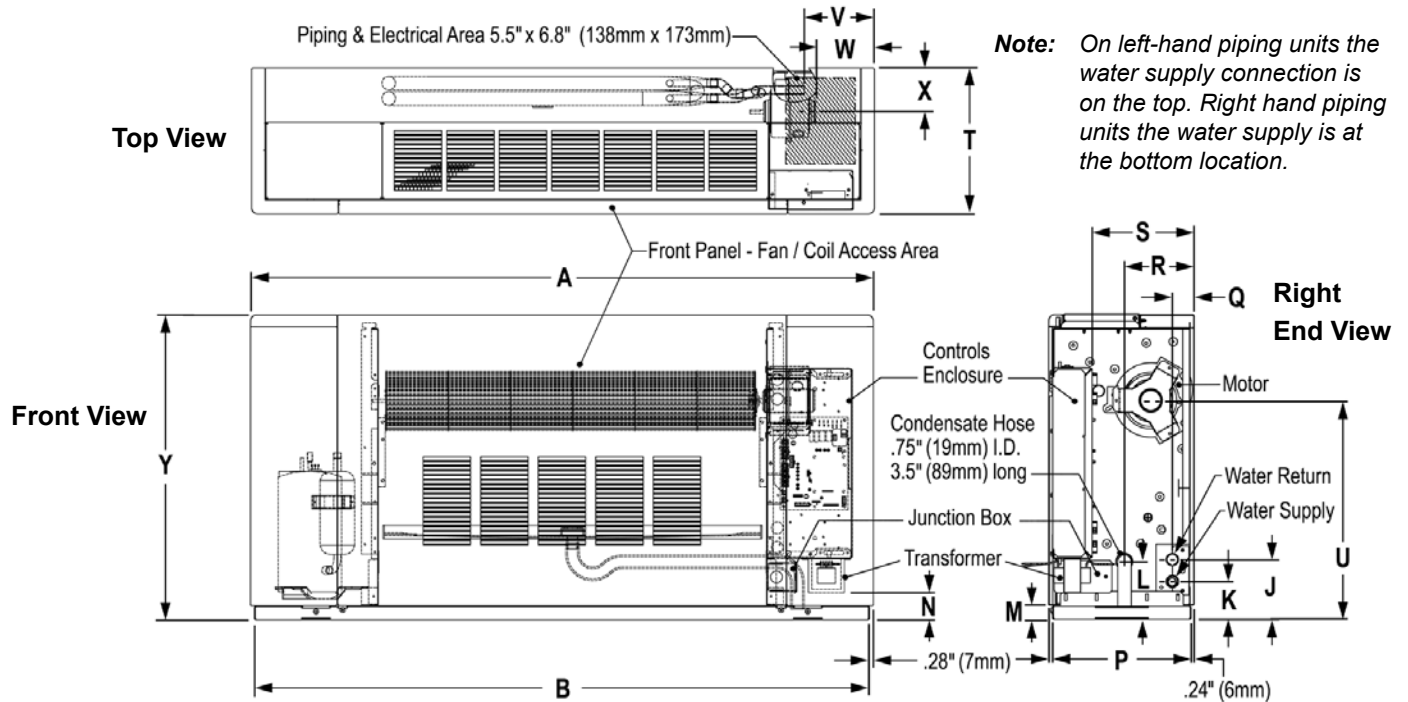


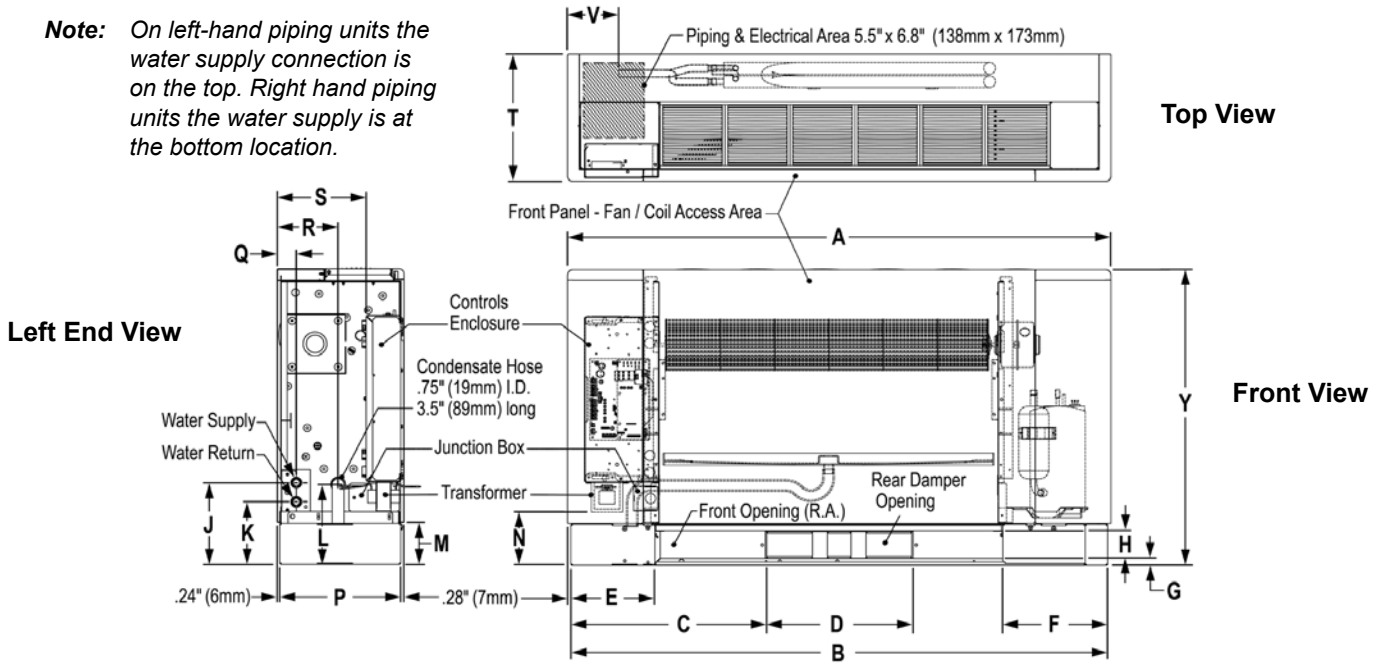
Table 23: Dimensions

Unit Size	A	B	J	K	L	M	N	P	Q	R	S	T
007-012	46" (1168mm)	45 5/8" (1153mm)	4 5/8" (111mm)	2 3/4" (70mm)	4 1/4" (108mm)	1" (26mm)	1 3/4" (45mm)	10 1/4" (260mm)	1 3/5" (41mm)	5 1/5" (131mm)	7 1/2" (192mm)	10 3/4" (273mm)
	U	V	W	X	Y							
	16 1/4" (413mm)	4 5/8" (118mm)	4 1/4" (108mm)	3 1/4" (83mm)	22 1/2" (572mm)							

Note: Dimensions are approximate

Flat top – high sill, left hand piping – unit size 015 - 018

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.



Flat top – high sill, right hand piping – unit size 015 - 018

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.

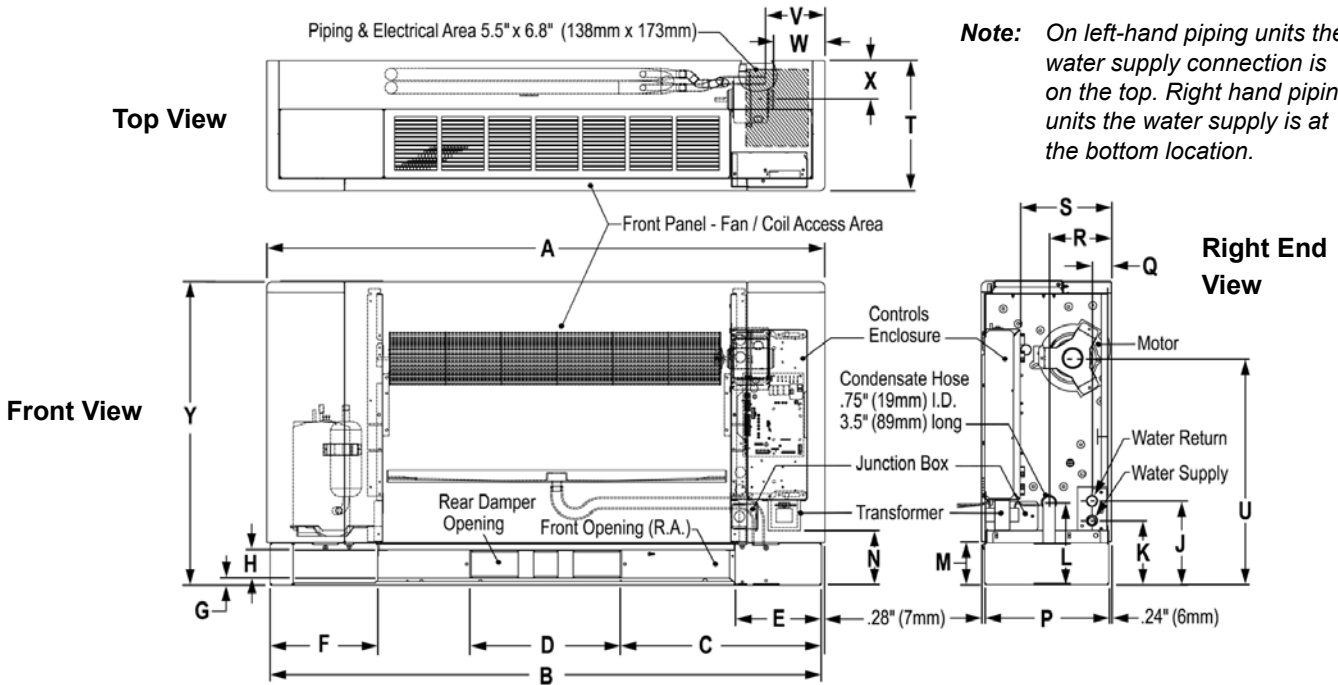


Table 24: Dimensions

Unit Size	A ¹	B	C	D	E	F	G	H	J	K	L	M
015-018	54" (1372mm)	53 3/4" (1356mm)	20 1/2" (519mm)	12 1/2" (318mm)	7" (181mm)	8 5/8" (225mm)	0.6" (14mm)	2 1/4" (57mm)	6 7/8" (175mm)	5 1/5" (132mm)	6 3/4" (172mm)	3 1/2" (90mm)
	N	P	Q	R	S	T ²	U	V	W	X	Y	
	4 1/4" (108mm)	10 1/4" (260mm)	1 1/5" (41mm)	5 1/4" (134mm)	7 1/2" (192mm)	10 3/4" (273mm)	18 3/4" (476mm)	4 5/8" (118mm)	4 1/4" (108mm)	3 1/4" (83mm)	25" (635mm)	

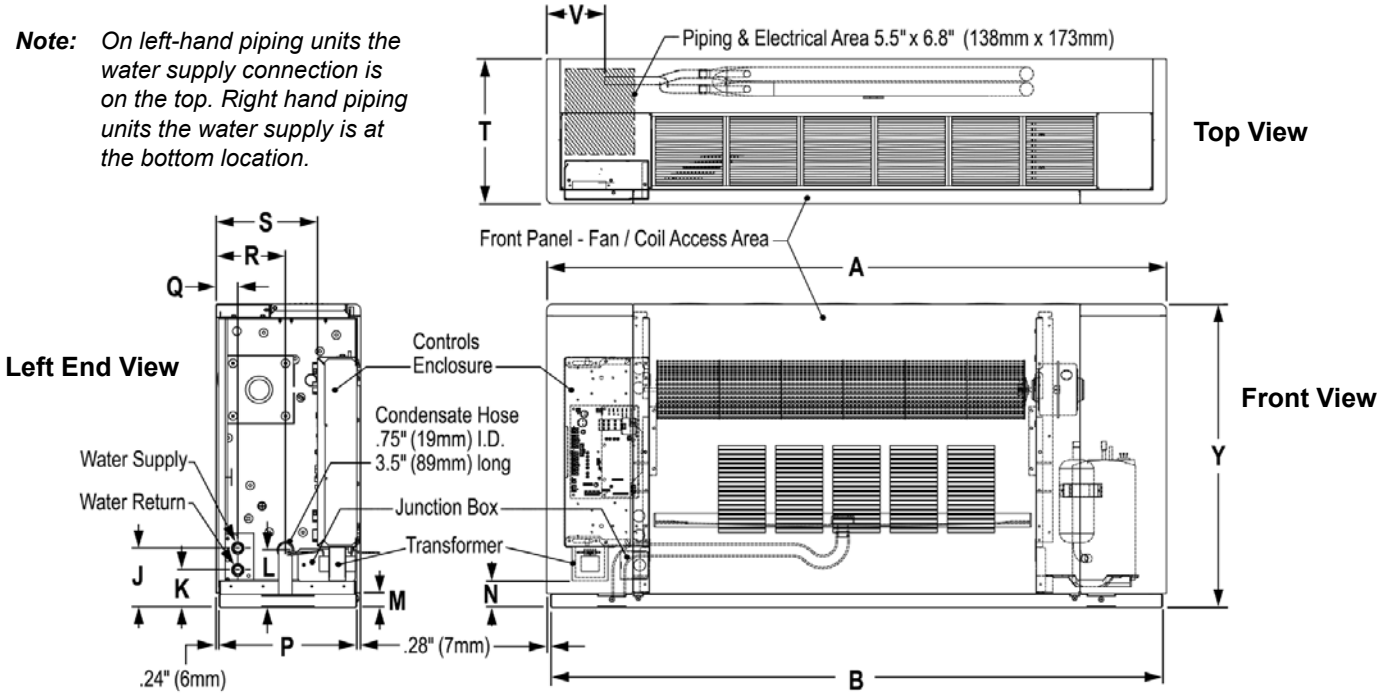
Notes: Dimensions are approximate

¹ Add 12" to dimension "A" unit width for optional extended end pocket.

² Add 2", 4" or 6" to dimension "T" unit depth for optional rear extension (high sill units only).

Flat top – low sill, left hand piping – unit size 015 - 018

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.



Flat top – low sill, right-hand piping – unit size 015 - 018

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.

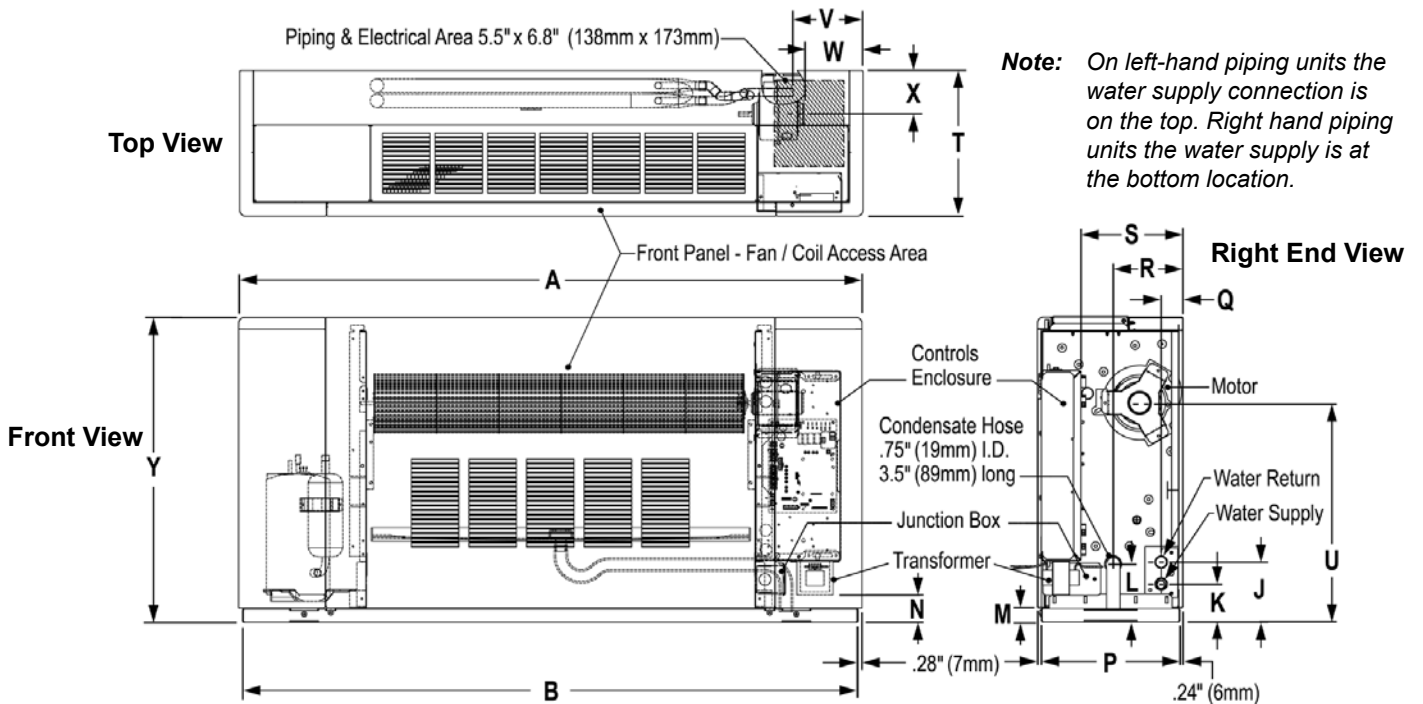


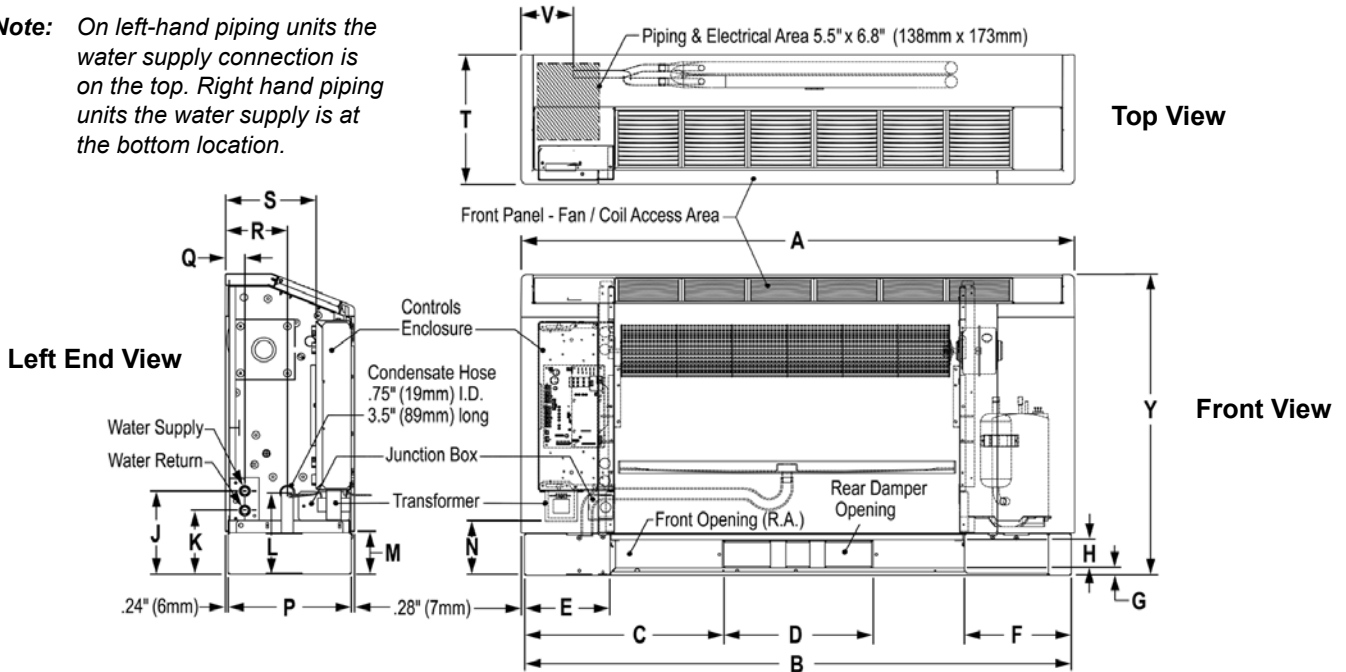
Table 25: Dimensions

Unit Size	A	B	J	K	L	M	N	P	Q	R	S	T
015-018	54" (1372mm)	53 3/4" (1356mm)	4 1/4" (111mm)	2 1/4" (70mm)	4 1/4" (108mm)	1" (26mm)	1 1/4" (45mm)	10 1/4" (260mm)	1 3/8" (41mm)	5 1/4" (134mm)	7 1/2" (192mm)	10 3/4" (273mm)
	U	V	W	X	Y							
	16 1/4" (413mm)	4 3/8" (118mm)	4 1/4" (108mm)	3 1/4" (83mm)	22 1/2" (572mm)							

Note: Dimensions are approximate

Slope top – high sill, left-hand piping – unit size 007 - 012

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.



Slope top – high sill, right-hand piping – unit size 007 - 012

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.

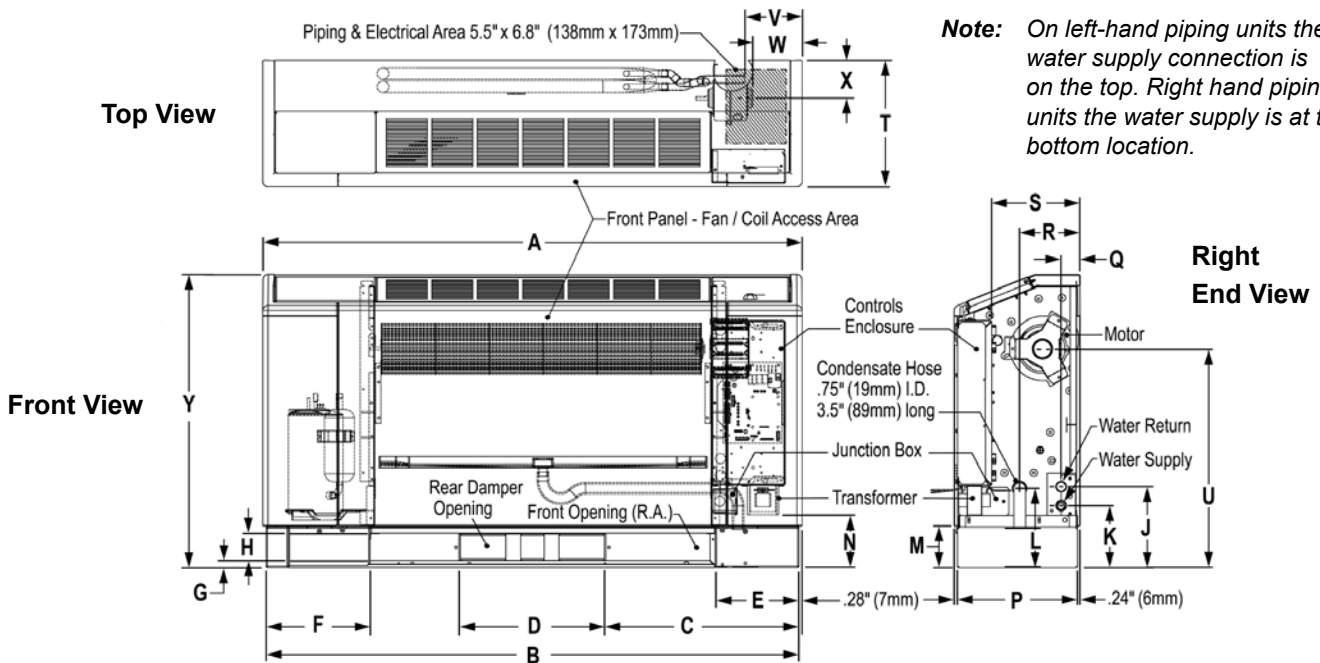


Table 26: Dimensions

Unit Size	A ¹	B	C	D	E	F	G	H	J	K	L	M
007-012	46" (1168mm)	45 5/8" (1153mm)	16 1/2" (418mm)	12 1/2" (318mm)	7" (181mm)	8 7/8" (225mm)	0.6" (14mm)	2 1/4" (57mm)	6 7/8" (175mm)	5 1/5" (132mm)	6 3/4" (172mm)	3 1/2" (90mm)
	N	P	Q	R	S	T ²	U	V	W	X	Y	Z
	4 1/4" (108mm)	10 1/4" (260mm)	1 1/5" (41mm)	5 1/4" (134mm)	7 1/2" (192mm)	10 3/4" (273mm)	18 3/4" (476mm)	4 5/8" (118mm)	4 1/4" (108mm)	3 1/4" (83mm)	25" (635mm)	

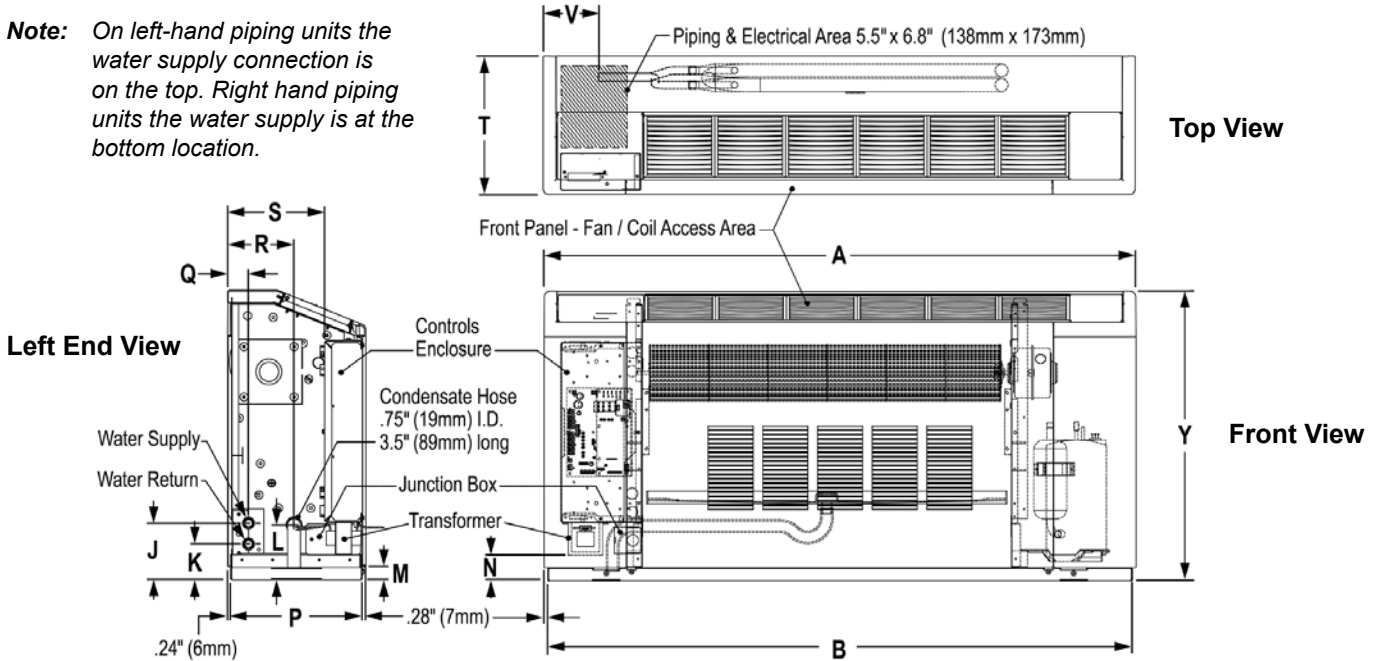
Notes: Dimensions are approximate

¹ Add 12" to dimension "A" unit width for optional extended end pocket.

² Add 2", 4" or 6" to dimension "T" unit depth for optional rear extension (high sill units only).

Slope top – low sill, left-hand piping – unit size 007 - 012

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.



Slope top – low sill, right-hand piping – unit size 007 - 012

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.

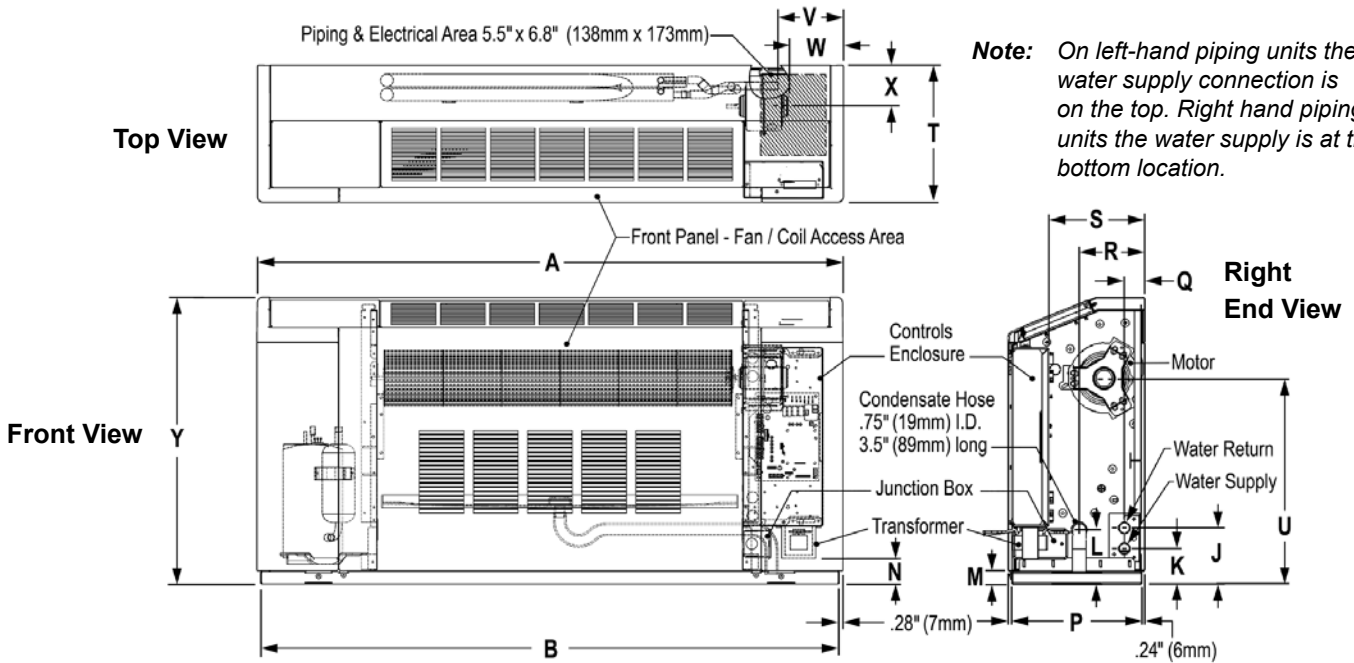


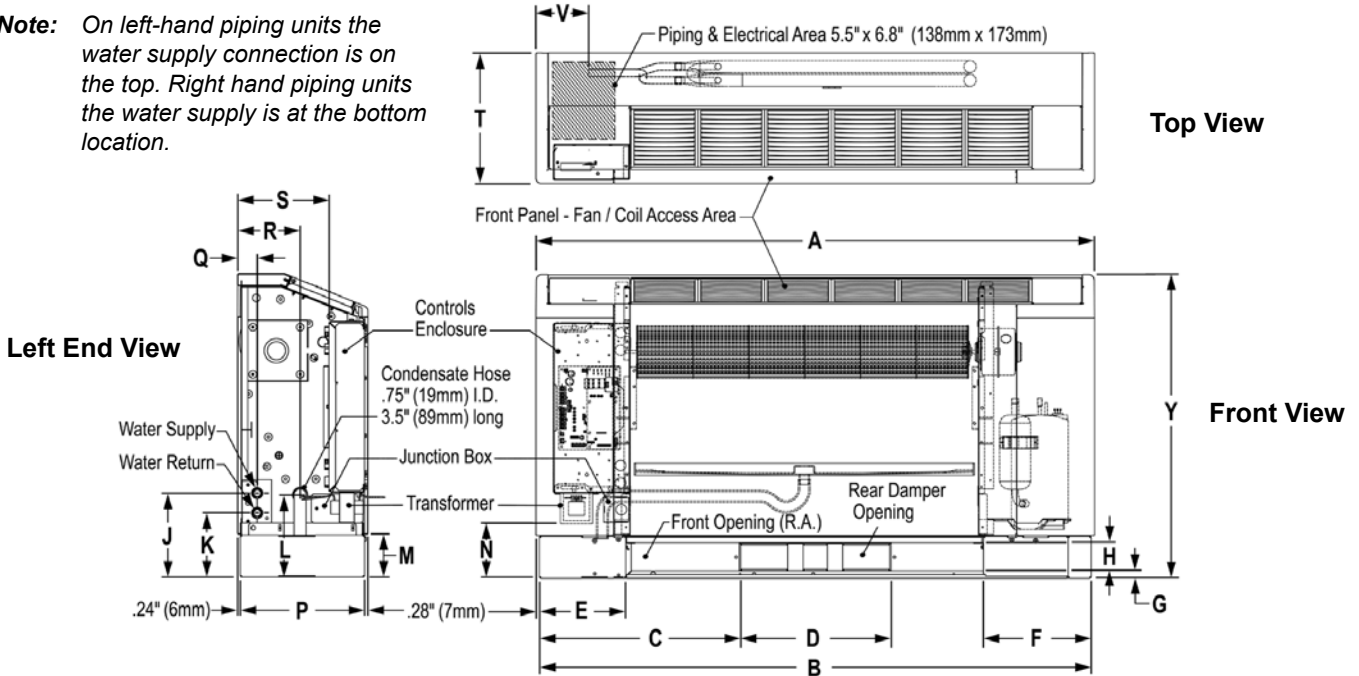
Table 27: Dimensions

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M
007-012	46" (1168mm)	45 5/8" (1153mm)	16 1/2" (418mm)	12 1/2" (318mm)	7" (181mm)	8 7/8" (225mm)	0.6" (14mm)	2 1/4" (57mm)	6 7/8" (175mm)	5 1/8" (132mm)	6 3/4" (172mm)	3 1/2" (90mm)
	N	P	Q	R	S	T	U	V	W	X	Y	
	4 1/4" (108mm)	10 1/4" (260mm)	1 5/8" (41mm)	5 1/4" (134mm)	7 1/2" (192mm)	10 3/4" (273mm)	18 3/4" (476mm)	4 5/8" (118mm)	4 1/4" (108mm)	3 1/4" (83mm)	25" (635mm)	

Note: Dimensions are approximate

Slope top – high sill, left-hand piping – unit size 015 - 018

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.



Slope top – high sill, right hand piping – unit size 015 - 018

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.

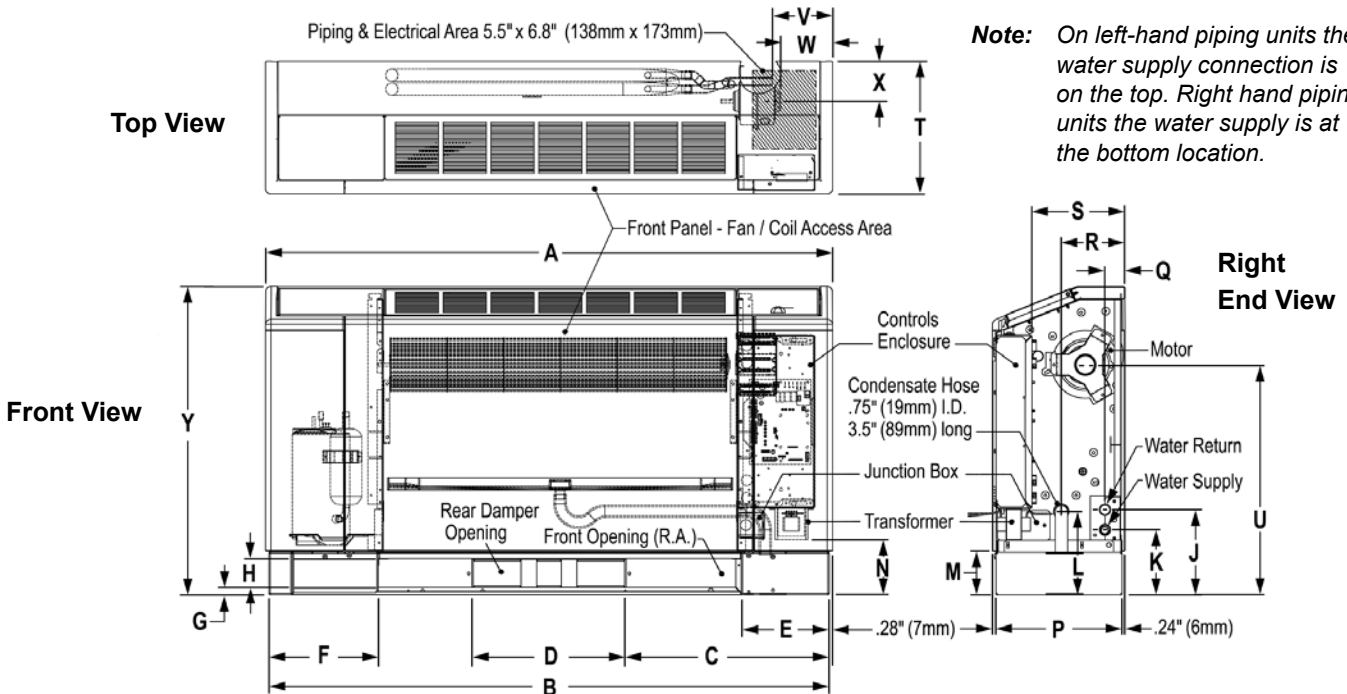


Table 28: Dimensions

Unit Size	A ¹	B	C	D	E	F	G	H	J	K	L	M
015-018	54" (1372mm)	53 3/8" (1356mm)	20 1/2" (519mm)	12 1/2" (318mm)	7" (181mm)	8 7/8" (225mm)	0.6" (14mm)	2 1/4" (57mm)	6 7/8" (175mm)	5 1/5" (132mm)	6 3/4" (172mm)	3 1/2" (90mm)
	N	P	Q	R	S	T ²	U	V	W	X	Y	
	4 1/4" (108mm)	10 1/4" (260mm)	1 3/5" (41mm)	5 1/4" (134mm)	7 1/2" (192mm)	10 3/4" (273mm)	18 3/4" (476mm)	4 5/8" (118mm)	4 1/4" (108mm)	3 1/4" (83mm)	25" (635mm)	

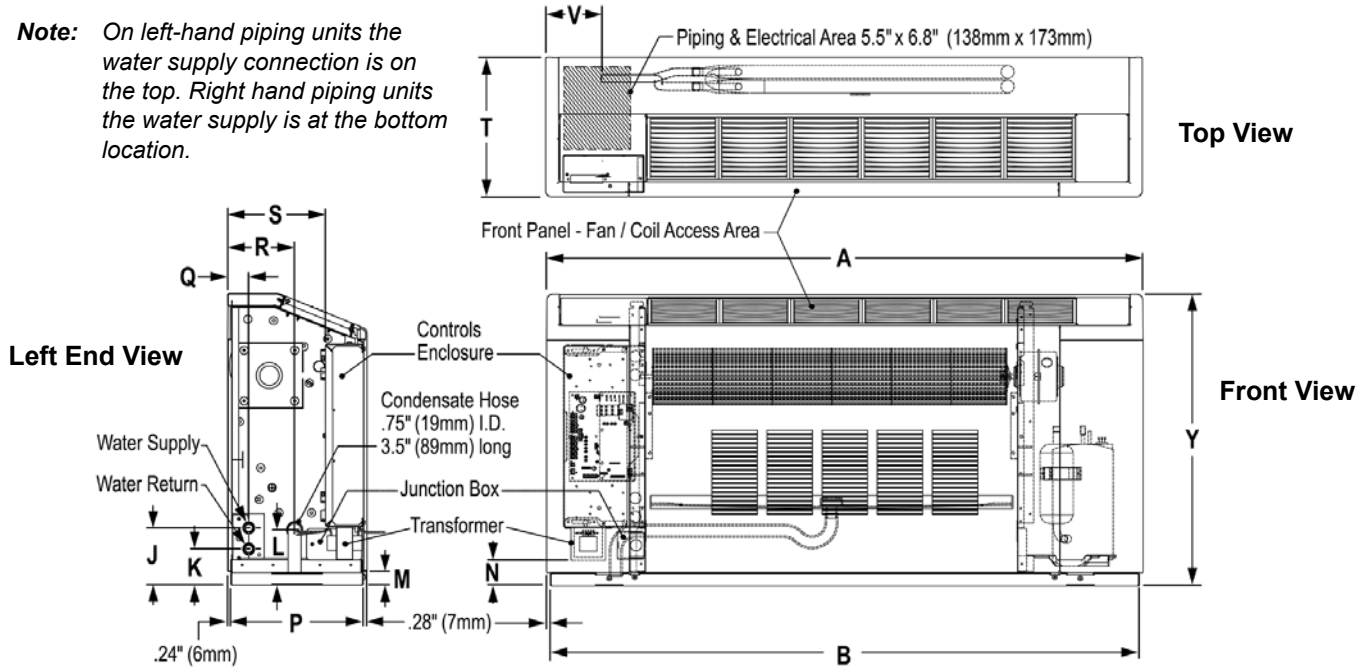
Notes: Dimensions are approximate

¹ Add 12" to dimension "A" unit width for optional extended end pocket.

² Add 2", 4" or 6" to dimension "T" unit depth for optional rear extension (high sill units only).

Slope top – low sill, left-hand piping – unit size 015 - 018

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.



Slope top – low sill, right hand piping – unit size 015 - 018

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.

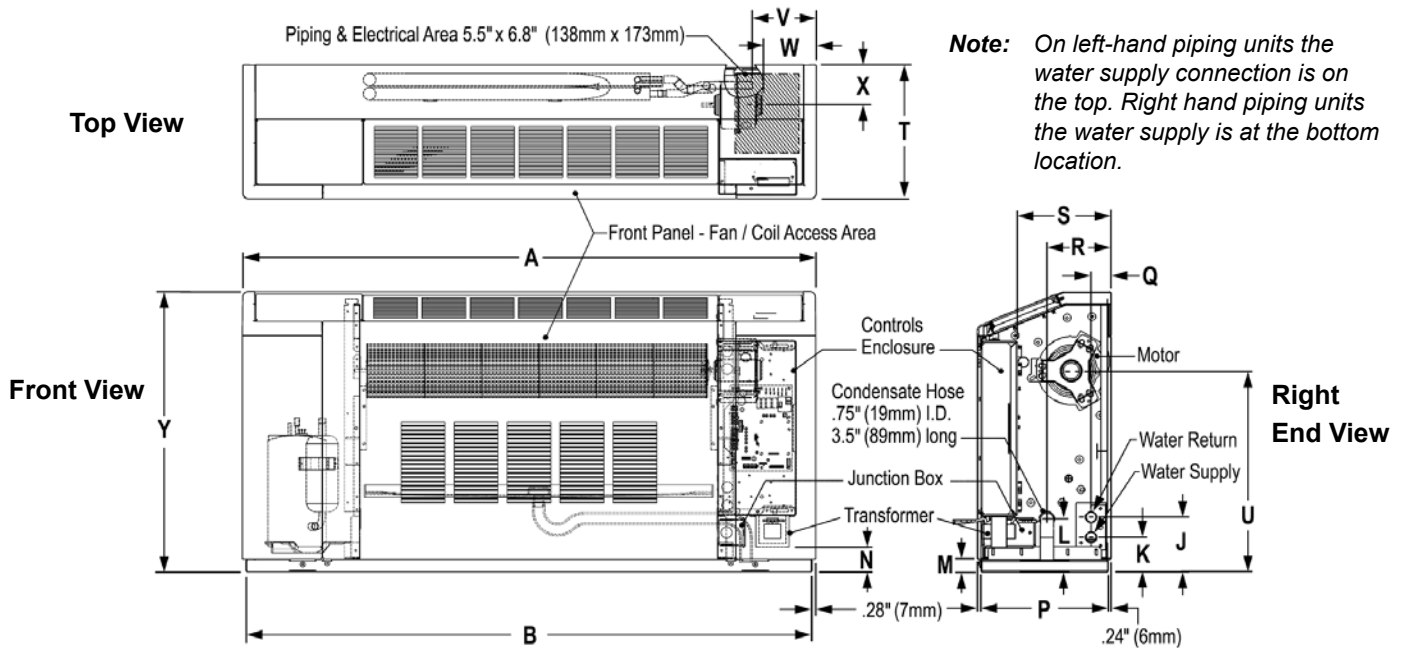
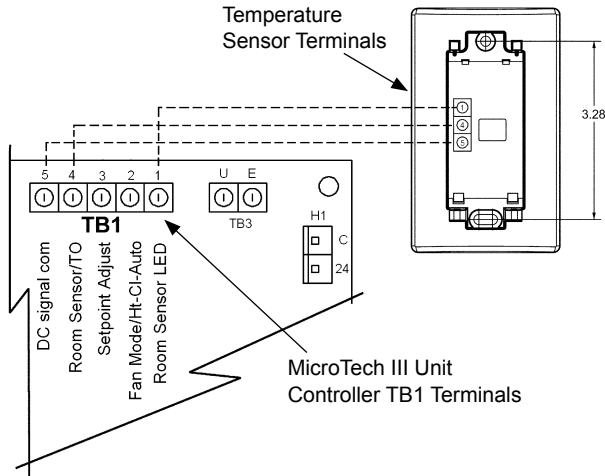


Table 29: Dimensions

Unit Size	A	B	J	K	L	M	N	P	Q	R	S	T
015-018	54" (1372mm)	53 3/8" (1356mm)	4 3/8" (111mm)	2 3/4" (70mm)	4 1/4" (108mm)	1" (26mm)	1 1/4" (45mm)	10 1/4" (260mm)	1 3/5" (41mm)	5 1/4" (134mm)	7 1/2" (192mm)	10 3/4" (273mm)
	U	V	W	X	Y							
	16 1/4" (413mm)	4 3/8" (118mm)	4 1/4" (108mm)	3 1/4" (83mm)	22 1/2" (572mm)							

Note: Dimensions are approximate

Figure 11: Optional water source heat pump room temperature sensor 669529001 wiring



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.



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.

Supply and return water hoses

Hose kits with standard flexible supply and return hoses are recommended between the water source heat pump unit and building's hard piping system. This is to control possible noise and transmission of vibration from the unit in the space.

Standard supply and return fire-rated hoses have an inner tube of (EPTF) white santoprene with a braided covering of stainless steel. The supply and return hoses have a swivel fitting at one end to facilitate removal of the unit for replacement or service. Hose fittings are of plated steel with the fixed end MNPT and the swivel end fitting of 5/8" sweat brass. The maximum operating temperature is -4°F to 212°F.

A description of the hose kit for the console unit is listed below. See Catalog 1196 for more detailed hose kit features.

Hose kit # 3: The supply and return hose kit for console units have one fixed MNPT end and a female JIC swivel with 5/8" ID female sweat adapter. The kit includes a set of two hoses with a 1/2" connection size, in lengths of 9", 12", 18" and 24".



Combination balancing and shutoff valves

Constructed of brass and rated at 400 psig (2758 kPa) maximum working pressure. Valves have a built-in adjustable memory stop to eliminate rebalancing. Valves have FPT connections on both ends for connection to the water hose and to the field piping.



2-way motorized valve

Used for variable pumping applications, the valve is wired in the compressor circuit and piped in the return water line from the unit.



A motorized valve relay and control valve assembly includes a relay, valve and wire harness. The valve opens when the compressor is turned on and closes when the compressor is off. The valve is rated for 300 psig (2068 kPa).

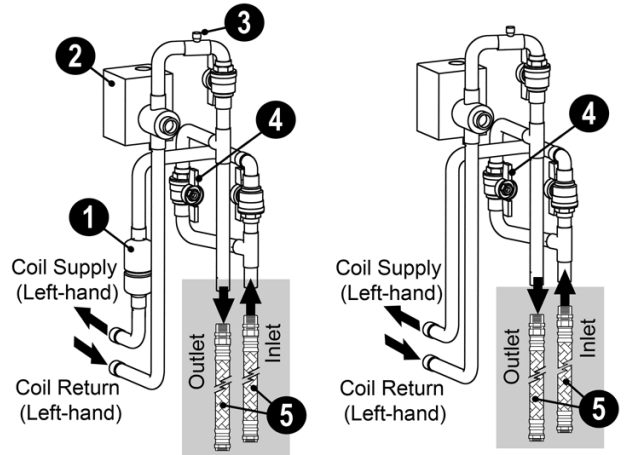
A multiple unit control panel allows a single wall-mounted thermostat to control up to three units in a common space.

An auxiliary relay controls optional devices when the fan is operating. The relay has SPDT contacts.

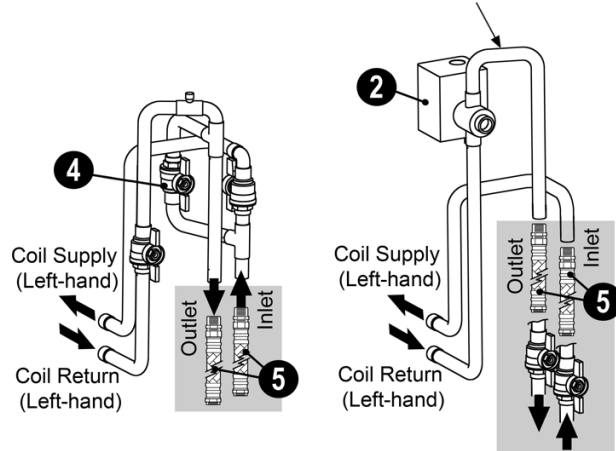
Piping package (options)

Piping packages can be ordered as a factory-installed option. Supply and return 5/8" O.D. copper tubing, (sweat connection stubs) are standard on unit piping and optional piping packages. Motorized valves can be ordered as a field-installed accessory.

Figure 12: Typical left hand piping package configurations



Note:
Air vent not provided on pipe packages 6688078070 and 6688078080



■ = 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.

Piping packages dimensions – left hand

Figure 13: Left-hand, motorized valve with flow control

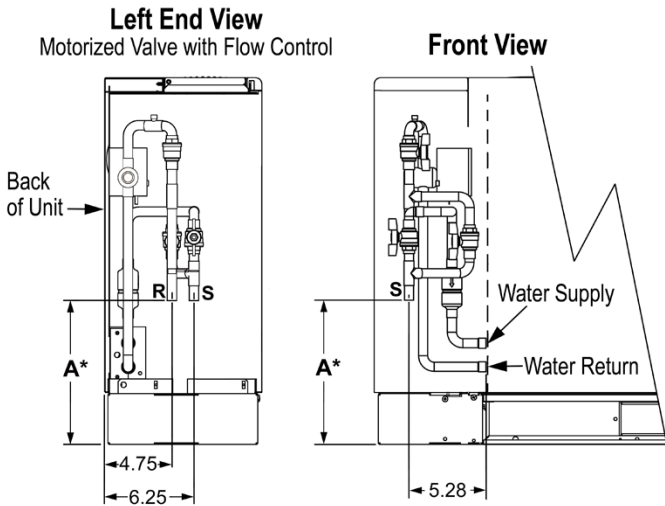


Figure 14: Left-hand, motorized valve with flow control

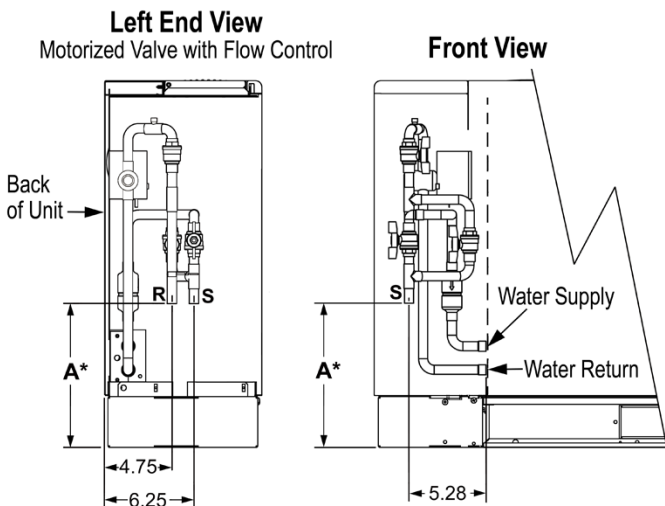


Figure 15: Left-hand, manual valve

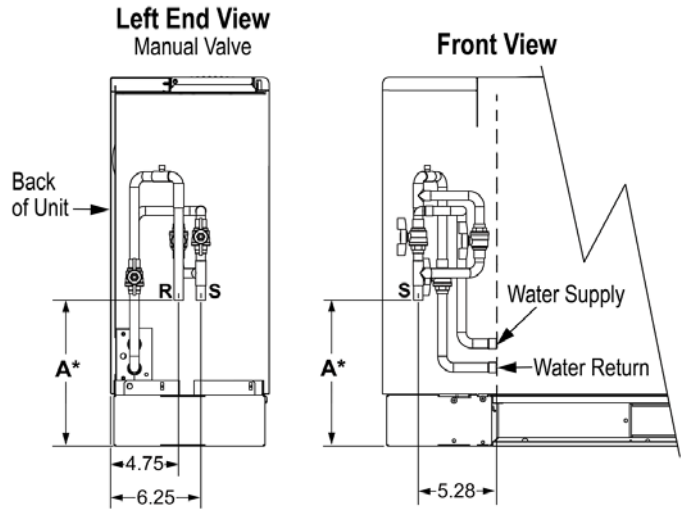
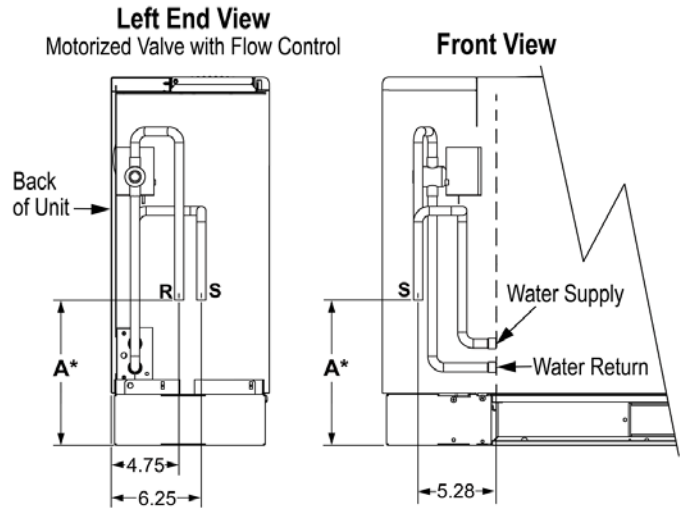


Figure 16: Left-hand, motorized valve with flow control



Dimension "A"	
High Sill	Low Sill
9.81"	7.31"

- Notes:**
1. Air bleed vent (not provided on pipe packages 6688078070 and 6688078080).
 2. Supply and return 5/8" O.D. copper tubing, (sweat connection stubs) are standard on unit piping and optional piping packages.
 3. *Optional flexible hose kits are provided with a 5/8" JIC FPT sweat adapter for field-installation to supply and return pipe stubs.*

Piping packages dimensions – right hand

Figure 17: Right-hand, motorized valve with flow control

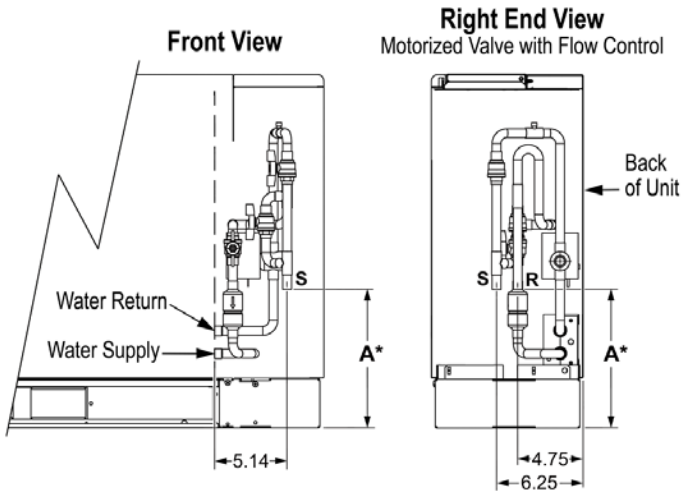


Figure 18: Right-hand, motorized valve with flow control

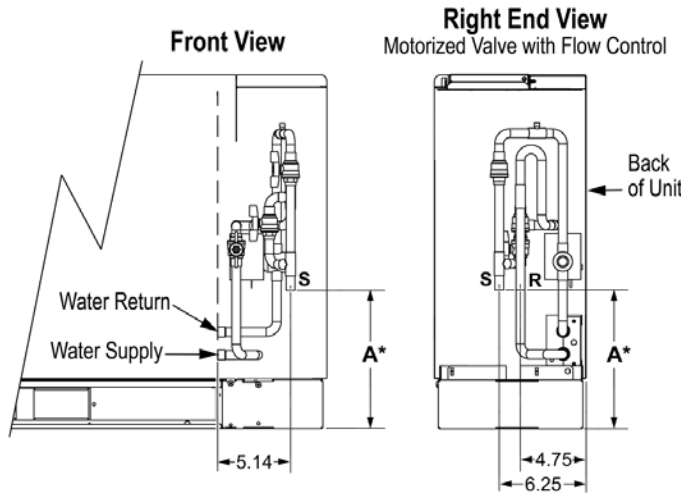


Figure 19: Right-hand, manual valve

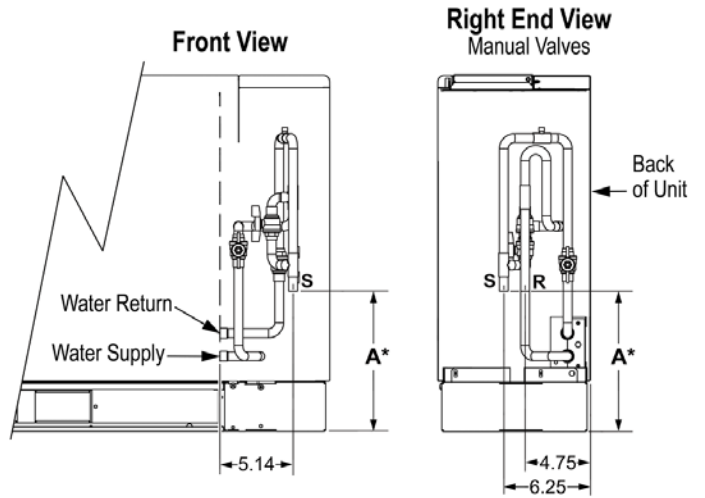
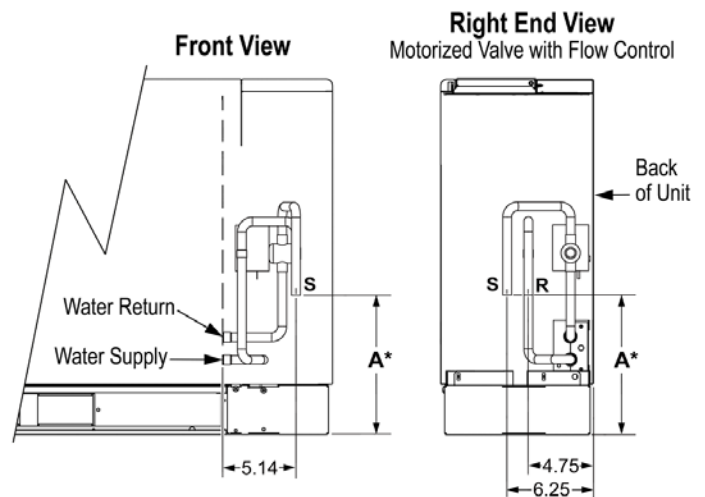


Figure 20: Right-hand, motorized valve with flow control



Dimension "A"	
High Sill	Low Sill
9.81"	7.31"

- Notes:**
1. Air bleed vent (not provided on pipe packages 6688078070 and 6688078080).
 2. Supply and return 5/8" O.D. copper tubing, (sweat connection stubs) are standard on unit piping and optional piping packages.
 3. *Optional flexible hose kits are provided with a 5/8" JIC FPT sweat adapter for field-installation to supply and return pipe stubs.*

Outdoor air dampers

Manually operated or Motorized outside air damper assemblies are available to order as field-installed accessories and provide ventilation air.

Figure 21: Manual outdoor air damper

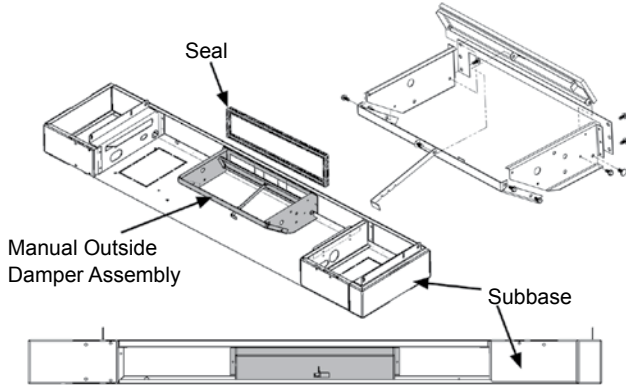
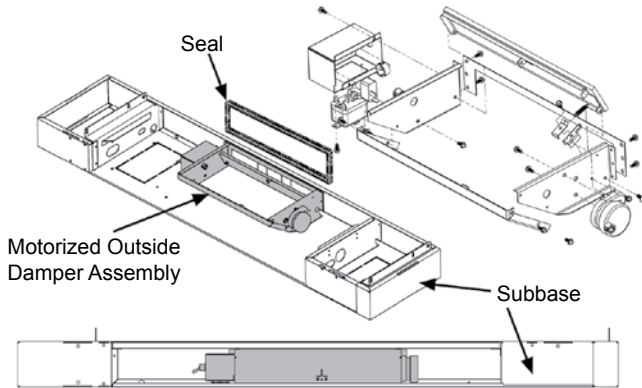
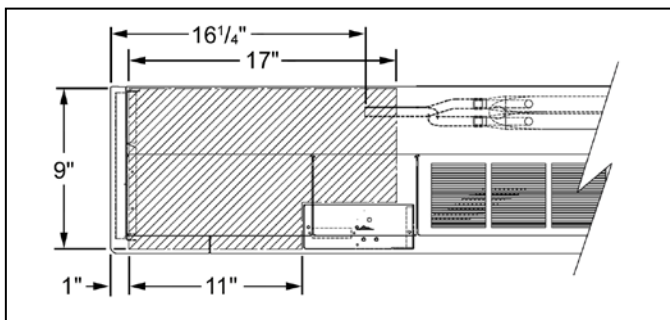


Figure 22: Motorized outdoor air damper



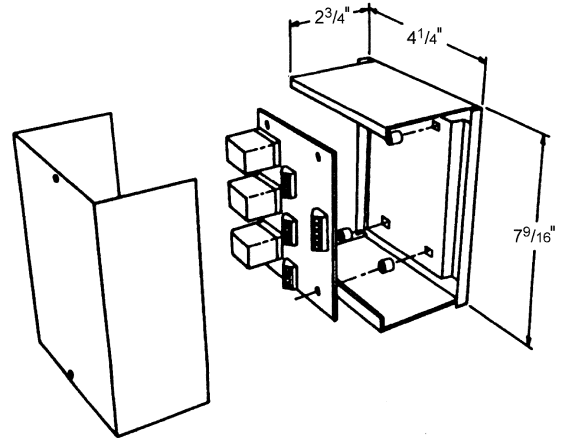
Extended end pocket (option)

Optional extended cabinet end pocket for high sill units, provides 11" of additional area inside the left or right end pocket for piping or a field-installed pump.



Multiple unit control panel (MUCP)

Figure 23: Multiple unit control panel and board



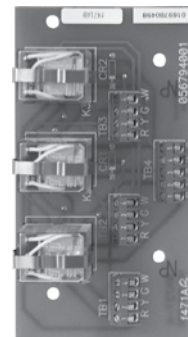
The Multiple Unit Control Panel (MUCP) is an accessory used when up to 3-units are controlled from a single thermostat. Console units must have the MUCP field-installed in a remote location, typically close to the units and convenient for service access.

Note: The MUCP control board does not fit inside the console unit control box.

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

Note: Multi-speed operation is only available with the optional unit-mounted fan speed switch.

Figure 24: Multiple unit control panel circuit board



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.

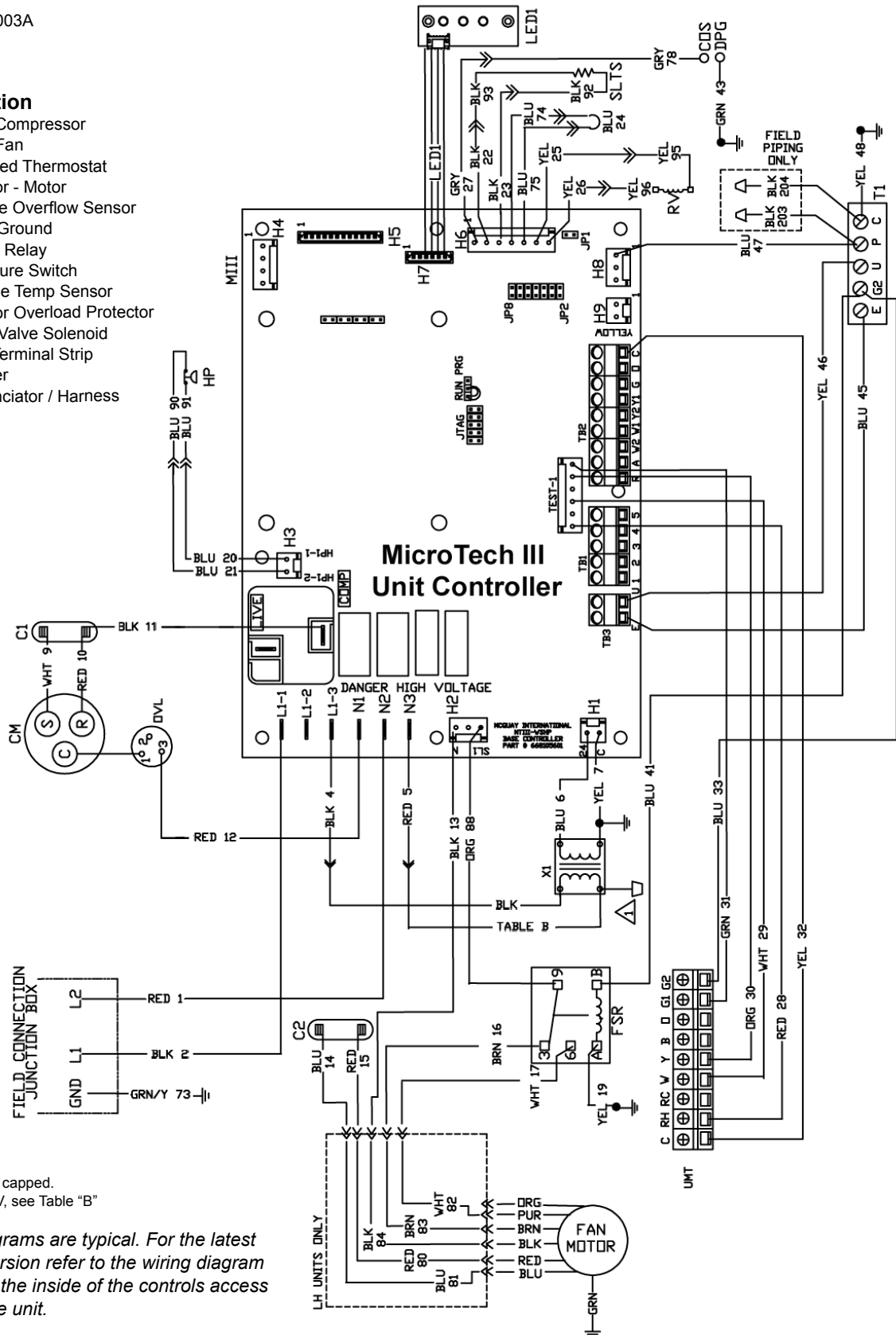
Typical MicroTech III unit controller for sizes 007-015 – 208/230/60Hz/1-phase

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

208V	RED
230V	ORG



Notes:

- Transformer: Unused wire to be capped.
- 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.

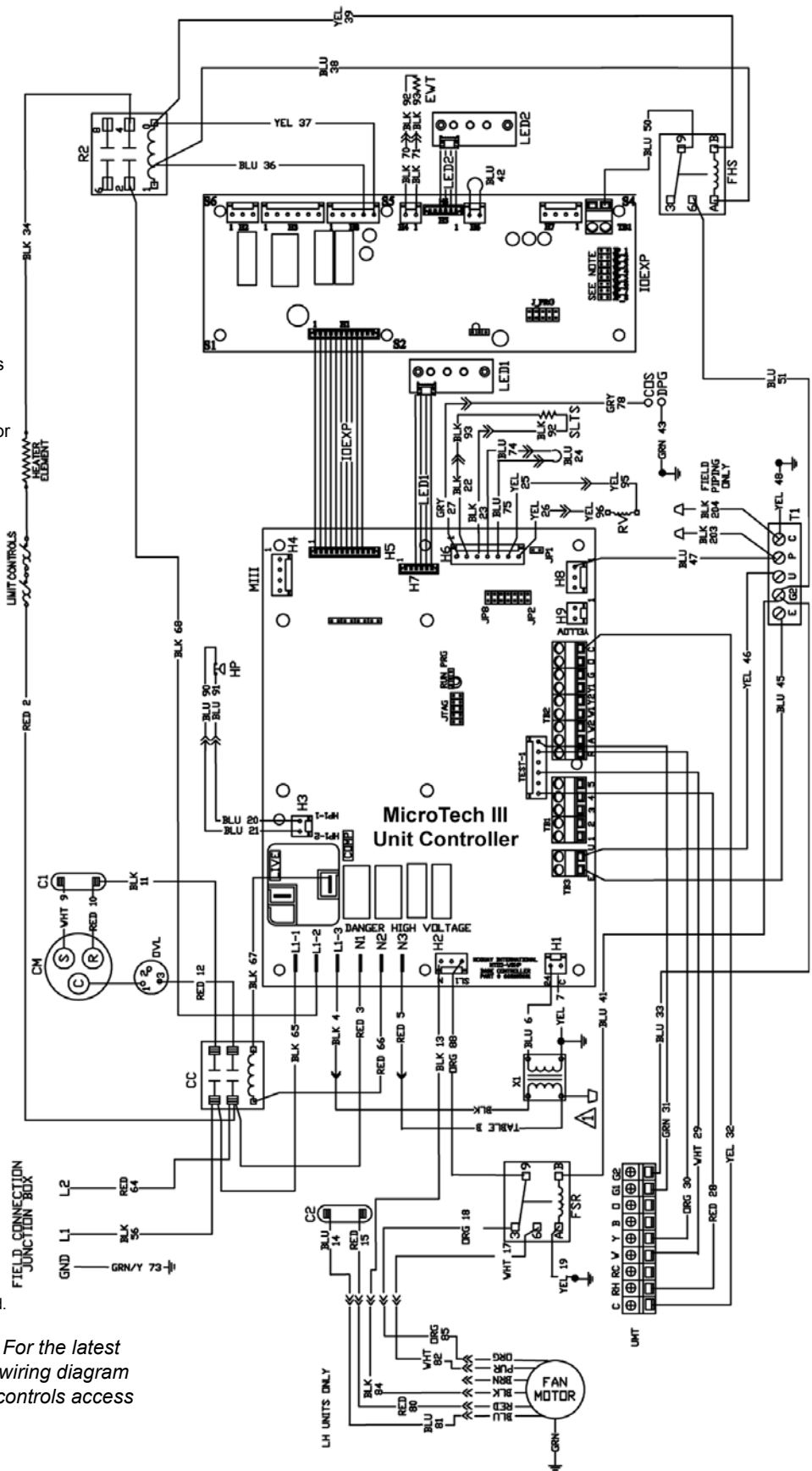
Typical MicroTech III unit controller with electric heat for size 018 208/230/60Hz/1-phase

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

208V	RED
230V	ORG



Notes:

- Transformer:
- Unused wire to be capped.
- Unit wired for 208V, see Table "B"
- I/O Expansion board jumper JP4 shorted.

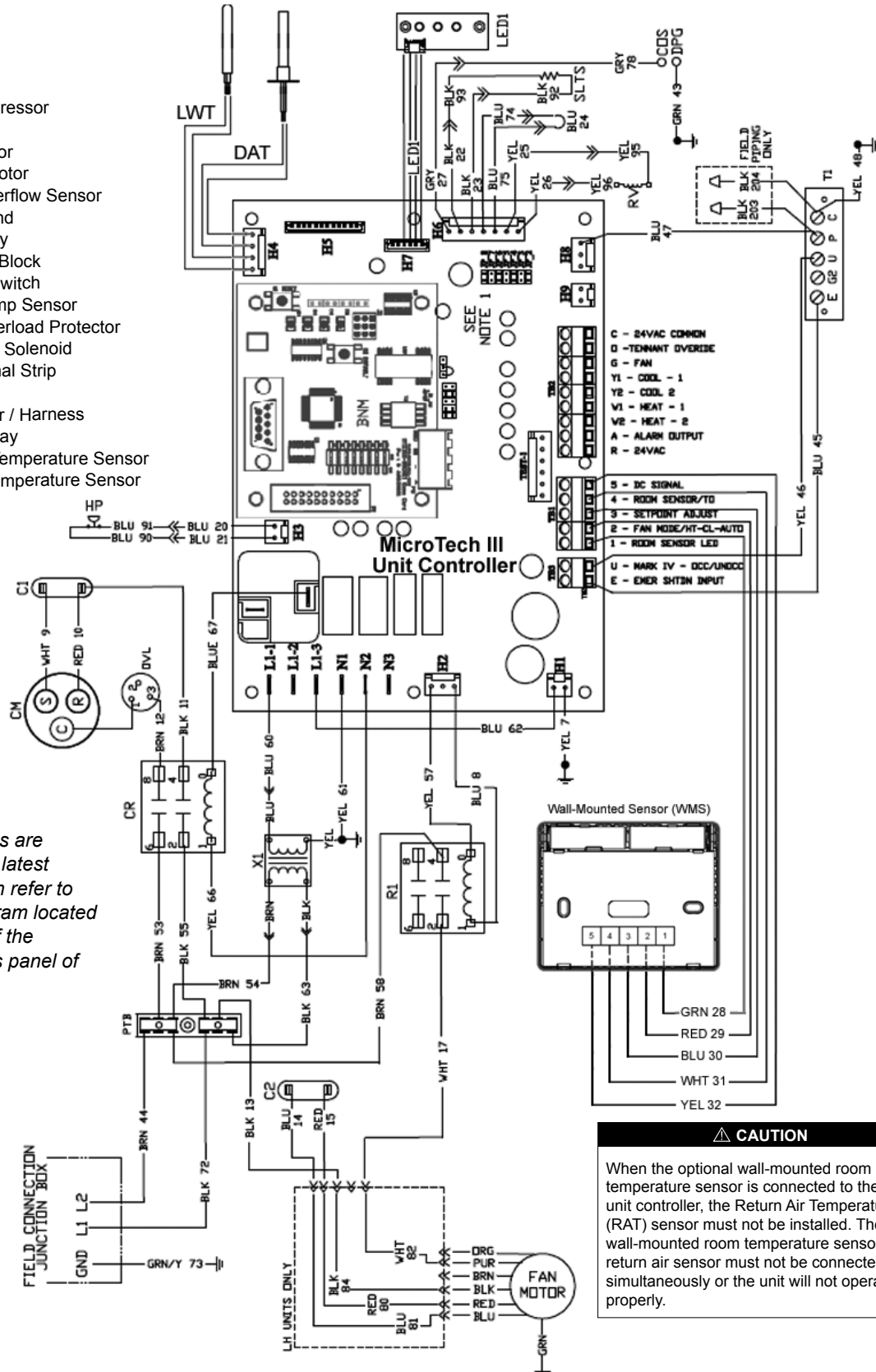
Note: Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.

Typical 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



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

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.

General

Contractor shall furnish and install Water Source Heat Pump units as indicated on plans. Each unit shall be listed in the ARI directory of certified products, ISO rated and CETL or CE listed. Each unit shall be fully run tested at the factory. Each unit shall ship in its own corrugated box. The unit shall consist of a subbase for floor mounting, a cabinet front, a left and right end corner panel and a slide-out chassis for attachment to the back wall and floor mounting on the subbase. The chassis shall include the refrigeration system, fan assembly and all controls.

The unit shall be capable of being shipped as a, **(choose one):**

- Complete unit including subbase, cabinet front, left and right end corner panels and chassis.
- Chassis only for spare unit or future installation.

Cabinet and chassis

The cabinet shall be fabricated from 18 or 20-gauge steel and include multiple holes/slots for attachment to the wall and floor. The cabinet sections shall be finished in Antique Ivory, Cupola White, Off White, Putty Beige, or Soft Grey baked enamel. The subbase shall be finished in Oxford Brown or to match the cabinet color. The cabinet shall be insulated. The chassis shall house the refrigeration system, water piping, fan assembly and all controls. Panels shall provide access to the fan compartment and the compressor/control box compartment. The filter shall be a 1/2" (25mm) throwaway type with front removal from the subbase.

The chassis shall be fully insulated and incorporate a non-corrosive condensate pan. The drain hose shall have a formed condensate trap.

The cabinet shall be 10¾" (273mm) maximum depth and shall **(choose one):**

- Have a 22° slope top angle and an opening in the subbase for return air with a maximum height of 25" (635mm).
- Have a flat top and an opening in the subbase for return air with a maximum height of 25" (635mm).
- Have an optional 2", 4", or 6" rear cabinet extension (high sill units only) fabricated from 18 or 20-gauge steel, and shall be insulated along the outdoor air channel. The rear cabinet extension shall be finished to match the cabinet color.

(Choose one):

- The slope top cabinet shall incorporate an optional, adjustable discharge grille and thermostat cover with flush mounting to the front and sides of the cabinet. The discharge grille shall direct the air at an 11° angle from the vertical and be field reversible for a 33° discharge angle. The grille shall be constructed of painted steel or optional, fire retardant ABS polycarbonate or anodized aluminum bar grille. The left and right cabinet corners shall be Antique Ivory or Cupola White and be constructed of polycarbonate to match the discharge grilles and control door.

The flat top unit shall **(choose one):**

- Incorporate a one-piece stamped, painted steel grille. The grille shall be painted Oxford Brown or match the cabinet color.
- Incorporate no cabinet and a duct collar on the chassis for installation into a field supplied custom cabinet enclosure.

Refrigerant circuit

Each unit shall have a sealed refrigerant circuit including a compressor, capillary expansion tube(s), finned tube heat exchanger, reversing valve, water-to-refrigerant coaxial heat exchanger, high and low side access valves, and safety controls.

Compressor shall be rotary type with external vibration mounts and thermal overload protection. The finned tube coil shall be constructed of aluminum fins bonded to copper tubes. The coaxial heat exchanger shall be constructed of a copper inner tube and a steel outer tube and be U.L. listed. The heat exchanger shall be rated for 400 psig (2759 kPa) on the water side and 450 psig (3104 kPa) on the refrigerant side.

Safety controls shall include a low suction temperature (freezestat) switch and a high refrigerant pressure switch to lock out compressor operation. Unit shall be capable of being reset only by interrupting the power supply to the unit. Manual reset of the safety switch at the unit shall not be allowed. Unit shall be capable of starting at entering air of 40°F (5°C) and entering water at 70°F (21°C) with both air and water flow rates at the ARI rating conditions.

Electrical

A control box with removable top cover shall be located on the right or left side of the chassis and shall contain controls for compressor, reversing valve and fan motor operation and a 50 VA transformer. The chassis shall have a 2" x 4" (51mm x mm) junction box mounted on the side to facilitate main power wiring and be capable of being located on the left or right side of the chassis. Unit shall be nameplated to accept time delay fuses or HACR circuit breaker for branch overcurrent protection of the power source.

Fan and motor assembly

Unit shall have a direct-drive tangential fan wheel. The fan housing shall be insulated with closed-cell insulation to help attenuate noise. The motor shall be thermally protected, two-speed, PSC type and be connected to the chassis. The motor shall have a plug connection and be connected to the chassis with three screws for easy removal and service.

Piping

The supply and return lines shall be 5/8" O.D. copper tubing and terminate away from the side of the chassis. The internally trapped condensate shall be a 3/4" (19mm) I.D. clear flexible vinyl tube protruding 14" (356mm) out of the chassis for connection at the floor or at the back wall. The supply, return and condensate tubing shall be capable of terminating at the left or right side of the chassis.

Thermostat / space sensor options

The thermostat shall be (**choose one**):

- Unit-mounted non-programmable w/LCD display
- Unit-mounted 7-day programmable w/LCD display
- Wall-mounted sensor
- Wall-mounted sensor w/setpoint adjustment
- Wall-mounted non-programmable
- Wall-mounted 7-day programmable
- Wireless non-programmable
- Wireless 7-day programmable

Solid-state control system

MicroTech III Control System - Unit shall have a microprocessor-based control system. The unit control logic shall provide heating and cooling operation as required by the wall thermostat set point. The control system shall provide the following for stand-alone operation:

1. The use of standard non-programmable or programmable wall thermostats.
2. Fan operation simultaneous with the compressor (fan interlock) regardless of thermostat logic.
3. Time delay compressor operation.
4. Compressor short cycle protection of a minimum between 300 to 360 seconds before restart is possible.
5. Random unit start-up after coming off on unoccupied mode or after initial start up.
6. Single grounded wire connection for activation of the unoccupied or unit shutdown modes.
7. Night setback temperature setpoint input signal from the wall thermostat.
8. Override signal from wall thermostat to override unoccupied mode for 2 hours.
9. Brownout protection to suspend unit operation if the supply voltage drops below 80% of normal.
10. Condensate overflow protection to suspend cooling or dehumid operation in an event of a full drain pan.
11. Suspended compressor operation upon activation of the refrigerant pressure switch(es).

12. Cooling operation activated for 60 seconds upon activation of the low suction temperature - defrost cycle.
13. Method of defeating compressor, reversing valve and fan time delays for fast service diagnostics.
14. Remote reset - Provides means to remotely reset automatic lock-outs generated by high/low pressure faults and/or low temperature faults.
15. Fault Retry clears faults the 1st two times they occur within a 24-hour period and triggers automatic lock-out on 3rd fault.

MicroTech™ III control with LonWORKS communication module – Unit shall have a microprocessor-based control system. The unit control logic shall communicate over a LONMARK communications network. The unit controller is factory programmed [LONMARK® 3.4 certified Application Code the current standard for new applications] and tested with all the logic required to monitor and control heating and cooling operation. The controller sets the unit mode of operation, monitors water and air temperatures, and can communicate fault conditions via a LONMARK communications network. Units with the MicroTech III and LonWORKS communication module include return air, discharge air and leaving water temperature sensors. Space temperature sensor options include a set-point adjustment, tenant override button, and the capability of substituting the return air sensor with a wall-mounted room sensor.

Microtech III control w/ BACnet communication module – Unit shall have a microprocessor-based control system. The unit control logic shall communicate over a BACnet communications network. The BACnet communication module shall incorporate an Atmel ARM7 Thumb series MCU and be capable of supporting a full MSTP BACnet implementation. The microprocessor shall also support SPI compatible communications with the MCU of the Microtech III controller. The physical interface to a BACnet BAS network shall be through an industry standard RS-485 transceiver capable of existing on an RS-485 network of up to 64 nodes. The unit controller is factory programmed and tested with all the logic required to monitor and control heating and cooling operation. The controller sets the unit mode of operation, monitors water and air temperatures, and can communicate fault conditions via a BACnet communications network. Units outfitted with Microtech III and BACnet Communication modules include return air, discharge air and leaving water temperature sensors. Space temperature sensor options include a set-point adjustment, tenant override button, and the capability of substituting the return air sensor with a wall-mounted room temperature sensor.

Each communicating unit controller performs the following unit operations:

- Enable heating and cooling to maintain space temperature set point at the room sensor
- Enable fan and compressor operation
- Monitor all safety controls
- Monitor discharge and return air temperature
- Monitor leaving water temperature
- Relay status of all vital unit functions

Unit mounted LED annunciators aid in diagnosing unit operation by indicating the water source heat pump operating mode and alarm conditions. If there are no current alarm conditions, the annunciator board will indicate normal unit operating mode. If an alarm condition exists, the Microtech III unit controller will send the fault condition to the LED annunciator, which will assist in troubleshooting the unit. Heat pumps with the Micro-Tech III Unit Controller with a LONWORKS Communication Module is designed to be linked with a centralized Building Automation System (BAS) through a LONMARK communications network for centralized scheduling and management of multiple heat pumps.

Wall-mounted room sensors are available to control the heating and cooling operation of each MicroTech III Water Source Heat Pump.

Available room sensors include:

- Room Sensor with timed override button and LED;
- Room temperature sensor with timed-override button and set point adjustment (55 to 95 deg F);
- Room sensor with timed-override button and set point adjustment (-5 to +5 deg F);
- Room sensor (no options, sensor only).

The control system type shall have an option of, **(choose one)**:

- Unit-mounted non-programmable w/LCD display, Hi-Lo-auto fan speed control
- Unit-mounted 7-day programmable w/LCD display, Hi-Lo-auto fan speed control
- Wall-mounted non-programmable w/LCD display, Hi-Lo-auto fan speed control
- Wall-mounted 7-day programmable w/LCD display, Hi-Lo-auto fan speed control
- Wall-mounted space temperature sensor/setpoint adjustment (55° F to 95°F), auto- On fan speed control

- Wall-mounted space temperature sensor/setpoint adjustment (-5° F to +5°F), auto- On fan speed control
- Wall-mounted sensor, no setpoint adjustment
- Wall-mounted sensor, night setback override button and LED status light
- Wireless thermostat and receiver, non-programmable, Hi-Lo-auto fan speed control
- Wireless thermostat and receiver, 7-day programmable, Hi-Lo-auto fan speed control

Optional boilerless system electric heat

Unit shall have a factory mounted electric heater and control system. A unit-mounted entering water temperature thermostat shall lock out compressor heating operation at 58°F (15°C). On a call for heating, the electric heater shall be activated. When the entering water temperature rises, the unit shall resume normal compressor heating operation. An emergency heat switch shall provide heating only from the electric heater in the event of a compressor failure.

Optional outside air damper kit

The damper is located in the back of the subbase for outside air intake and shall be operated manually from the subbase. Damper can be configured for manual adjustment or motorized control.

Optional plug cord kit

The chassis shall incorporate a plug cord for connection to a unit-mounted receptacle/fused disconnect switch box in the subbase under the chassis. The plug cord shall electrically mate to the receptacle.

Optional receptacle/fused disconnect kit

The permanent portion of the cabinet shall have a receptacle and fused disconnect switch to facilitate main power electrical connection permitting chassis removal without disconnecting main power wiring.

Optional motorized valve package

The return water line shall have a motorized water valve. The valve shall operate in conjunction with compressor operation; valve opens before compressor is turned on. The valve shall have a maximum rating of 300 psig (2068 kPa).

Field-installed accessories

Optional flexible hoses

Each unit can be supplied with two steel fire-rated hoses for connection to unit and field piping. Hose assembly shall be rated at 500 psig (3494 kPa).

Optional ball valves

Each unit can be supplied with two combination balancing and shutoff valves with adjustable memory stop.

Optional filter kits

12-pk. filter kits available from selection software.

Warranty

An optional 4-year extended compressor warranty covers the compressor for 5 years from the date at which the unit ships from the factory.

An optional 4-year extended refrigeration circuit warranty covers the entire refrigeration circuit and related components for 5 years.



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.