



Catalog 1108-31

Enfinity™ Horizontal Ceiling-Mounted Water Source Heat Pumps

Model CCH Standard Range
Model CCW Geothermal Range

Unit Sizes 007 – 070 (1/2 to 6 Tons) • R-410A Refrigerant



Model Nomenclature	3	Dimensional Data	33
AHRI Performance Data	4	Size 007, 009, 012 – Left Hand Return, End and Straight Discharge	33
Introduction	5	Size 007, 009, 012 – Right Hand Return, End and Straight Discharge	34
Features & Options	6	Size 015, 019, 024 – Left Hand Return, End and Straight Discharge	35
Enfinity Horizontal Ceiling-Mounted Water Source Heat Pumps		Size 015, 019, 024 – Right Hand Return, End and Straight Discharge	36
Sizes 007-070 (1/2 to 6 Tons)	6	Size 030, 036 – Left Hand Return, End and Straight Discharge	37
Product Features	11	Size 030, 036 – Right Hand Return, End and Straight Discharge	38
Control Options	13	Size 042, 048, 060, 070 – Left Hand Return, End and Straight Discharge	39
Control Features	14	Size 042, 048, 060, 070 – Right Hand Return, End and Straight Discharge	40
Applications	18	Filter Rack/Return Air Duct Collar	41
Typical Horizontal Unit Installation	18	Optional Non-Fused Disconnect Switch	42
Typical Cooling and Heating Refrigeration Cycles	20		
Systems	21		
Selection Procedure	23		
Engineering Data	24	Typical Wiring Diagram	43
Physical Data	24	MicroTech III Controller with PSC Motor – 115-60-1 Unit Sizes 007-009	43
Shipping Dimensions for Standard Units	24	MicroTech III Controller with PSC Motor, Communication Module – 208/230-60-1 Unit Sizes 015-060	44
Fan Performance	25	MicroTech III Controller with PSC Motor – 208/230/460-60-3 Unit Sizes 024-070	45
Fan Performance (Continued)	26	MicroTech III Controller with EC Motor and Optional Comm – 208/230-60-3 Unit Sizes 007–012	46
Fan Performance (Continued)	27	MicroTech III Controller with EC Motor and Optional Comm – 208/230-60-1 Unit Sizes 019-070	47
Electrical Data	28	MicroTech III Controller with EC Motor and Optional Communication Module – 460-60-3 Unit Sizes 024-070	48
Operating Limits	30		
Correction Factors	31		
Accessories	32	Control Accessories	49
Combination Balancing and Shutoff (Ball) Valves	32	Thermostats and Remote Indoor Sensor	49
Motorized Valve	32	Room Temperature Sensors	50
Supply and Return Water Hoses	32		
Two or Four-Inch Filter Rack (Option)	32	Engineering Specifications	51

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Category	Code Item	Code Option	Code Designation & Description	
Product Category	01	1	W =	Water Source Heat Pump
Product Identifier	02	2-4	CCH =	R410A, Ceiling-Mounted, Standard Range
			CCW =	R410A, Ceiling-Mounted, Geothermal Range
Design Series (Vintage)	03	5	4 =	D Design
			5 =	E Design
Nominal Capacity	04	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
			019 =	19,000 Btuh Nominal Cooling
			024 =	24,000 Btuh Nominal Cooling
			030 =	30,000 Btuh Nominal Cooling
			036 =	36,000 Btuh Nominal Cooling
			042 =	42,000 Btuh Nominal Cooling
			048 =	48,000 Btuh Nominal Cooling
			060 =	60,000 Btuh Nominal Cooling
			070 =	70,000 Btuh Nominal Cooling
Controls	05	9	S =	Microtech III Unit Controller
			H =	Microtech III Controller with LonWORKS Comm Module
			J =	Microtech III Controller with BACnet Comm Module
Voltage	06	10	A =	115-60-1 (Sizes 007- 009 only)
			E =	208-230/60/1
			J =	265/277-60-1
			F =	208-230/60/3
			K =	460/60/3*
			L =	575/60/3
			M =	230/50/1
			N =	380/50/3
Return Air	08	12	L =	Left
			R =	Right
Discharge Air	09	13	E =	End Discharge
			S =	Straight Discharge
Blower Motor	10	14-15	01 =	PSC
			03 =	Low Static PSC (Size 024 only)
			14 =	ECM
Construction Type	12	18	A =	Standard
			B =	Standard with 2" Filter Rack
			C =	Standard with Compressor Sound Blanket
			D =	Standard with Compressor Sound Blanket and 2" Filter Rack
			E =	Indoor Air Quality (IAQ)
			F =	Indoor Air Quality (IAQ) with 2" Filter Rack
			G =	Indoor Air Quality (IAQ) with Compressor Sound Blanket
			H =	Indoor Air Quality (IAQ) with Compressor Sound Blanket and 2" Filter Rack
			J =	Sound Package
			K =	Sound Package with 2" Filter Rack
			L =	Standard with 4" Merv 13 Filter Rack
			M =	Standard with Compressor Sound Blanket and 4" Merv 13 Filter Rack
			N =	Indoor Air Quality (IAQ) with 4" Merv 13 Filter Rack
			Q =	Indoor Air Quality (IAQ) with Compressor Sound Blanket and 4" Merv 13 Filter Rack
			R =	Sound Package with 4" Merv 13 Filter Rack
Heat Exchanger	13	19	C =	Copper Inner Tube - Steel Outer Tube
			S =	Cupronickel Inner Tube - Steel Outer Tube
Drain Pan	19	30-32	YYY =	Standard (Corrosion Resistant Polypropylene) Drain Pan
			SYY =	Stainless Steel Drain Pan
Refrigerant	20	33	A =	R410A
Power Connection	21	34	F =	Unit Mounted Non-Fused Disconnect Switch
Cabinet Electrical	22	35-37	YYY =	Standard (50VA Transformer)
			75V =	75VA Control Transformer
Color	24	39	Y =	None (Galvanized)
Agency Listing	26	41	C =	ETL, CETL, ARI, MEA
Packaging	27	42	1 =	Standard
Product Style	29	44	1 =	Style

Notes: * A 460 volt, 3-phase unit that utilize an ECM fan motor will need a 4-wire WYE voltage supply with 3 hot leads and a neutral wire to power the EC motor with neutral and one hot for 277/60/1 voltage to the EC motor.

Table 1: ASHRAE/AHRI/ISO 13256-1 – English (I-P) units

Enfinity Horizontal			PSC Fan Motor								
			Water Loop Heat Pump ³					Ground Loop Heat Pump ⁴			
			Cooling EWT 86°F		Heating EWT 68°F			Cooling EWT 77°F		Heating EWT 32°F	
Unit Size	GPM	CFM	Capacity (Btuh)	EER	Capacity (Btuh)	COP	Capacity (Btuh)	EER	Capacity (Btuh)	COP	
007	2.0	315	7600	13.4	10000	4.6	8400	15.8	6400	3.2	
009	2.4	315	9600	13.3	12600	4.5	10200	15.3	7700	3.2	
012	3.0	400	13000	12.7	16000	4.3	14000	15.0	10500	3.1	
015	3.8	500	15500	16.0	18000	5.2	16700	18.7	11400	4.0	
019	5.3	630	19600	15.4	22900	4.9	20500	17.9	13900	3.5	
024	6.2	800	23700	14.9	27200	4.8	24400	17.0	17100	3.4	
030	7.6	1000	30400	15.3	36200	5.0	31500	17.7	23100	3.6	
036	9.0	1200	35800	15.2	42500	4.9	37800	17.7	28400	3.6	
042	10.7	1400	43000	15.0	50700	5.0	44500	17.1	33900	3.7	
048	12.3	1600	48400	14.1	57100	4.7	50200	16.1	38400	3.5	
060	15.2	2000	59500	14.6	69400	4.9	61500	16.8	47500	3.7	
070*	17.5	2330	67100	13.0	80400	4.4	69800	15.0	53000	3.3	
Enfinity Horizontal			EC Fan Motor								
			Water Loop Heat Pump ³					Ground Loop Heat Pump ⁴			
			Cooling EWT 86°F		Heating EWT 68°F			Cooling EWT 77°F		Heating EWT 32°F	
Unit Size	GPM	CFM	Capacity (Btuh)	EER	Capacity (Btuh)	COP	Capacity (Btuh)	EER	Capacity (Btuh)	COP	
007	2.0	315	7600	13.4	10000	4.6	8400	15.8	6400	3.2	
009	2.4	315	9600	13.3	12600	4.5	10200	15.3	7700	3.2	
012	3.0	400	13000	12.7	16000	4.3	14000	15.0	10500	3.1	
015	3.8	500	16000	17.6	18100	5.6	17200	20.8	11500	4.0	
019	5.3	630	19700	16.2	23000	5.2	20600	19.0	14000	3.7	
024	6.2	800	23800	15.2	27300	5.0	24500	17.4	17200	3.7	
030	7.6	1000	30500	15.9	36100	5.3	31600	18.4	23000	3.8	
036	9.0	1200	36000	16.0	42400	5.2	38000	18.8	28700	3.8	
042	10.7	1400	43000	15.5	51600	5.2	44100	17.9	34600	3.8	
048	12.3	1600	48700	15.6	57700	5.2	50600	18.2	39300	3.9	
060	15.2	2000	59700	15.5	69300	5.2	61700	17.9	48000	3.9	
070*	17.5	2330	68300	13.5	80400	4.6	71100	15.5	53000	3.4	

Notes: 1. Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) Entering Air Temperature.

2. Heating capacity is based on 68°F db (20°C) Entering Air Temperature.

³ Rated in accordance with ISO Standard 13256-1 Boiler/Tower.

⁴ Rated in accordance with ISO Standard 13256-1 Ground Loop.

5. All ratings based on 208V operation.

* 208-230/60/3 voltage

Enfinity Horizontal Ceiling-Mounted Water Source Heat Pumps Sizes 007-070 (1/2 to 6 tons)

- Model WCCH (Standard Range: 55°F to 110°F)
- Model WCCW (Geothermal Range: 30°F to 110°F)

Daikin Enfinity Horizontal Ceiling-Mounted units are designed for use in multiple floor apartments, office buildings, hotels, nursing homes and other similar applications.

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.

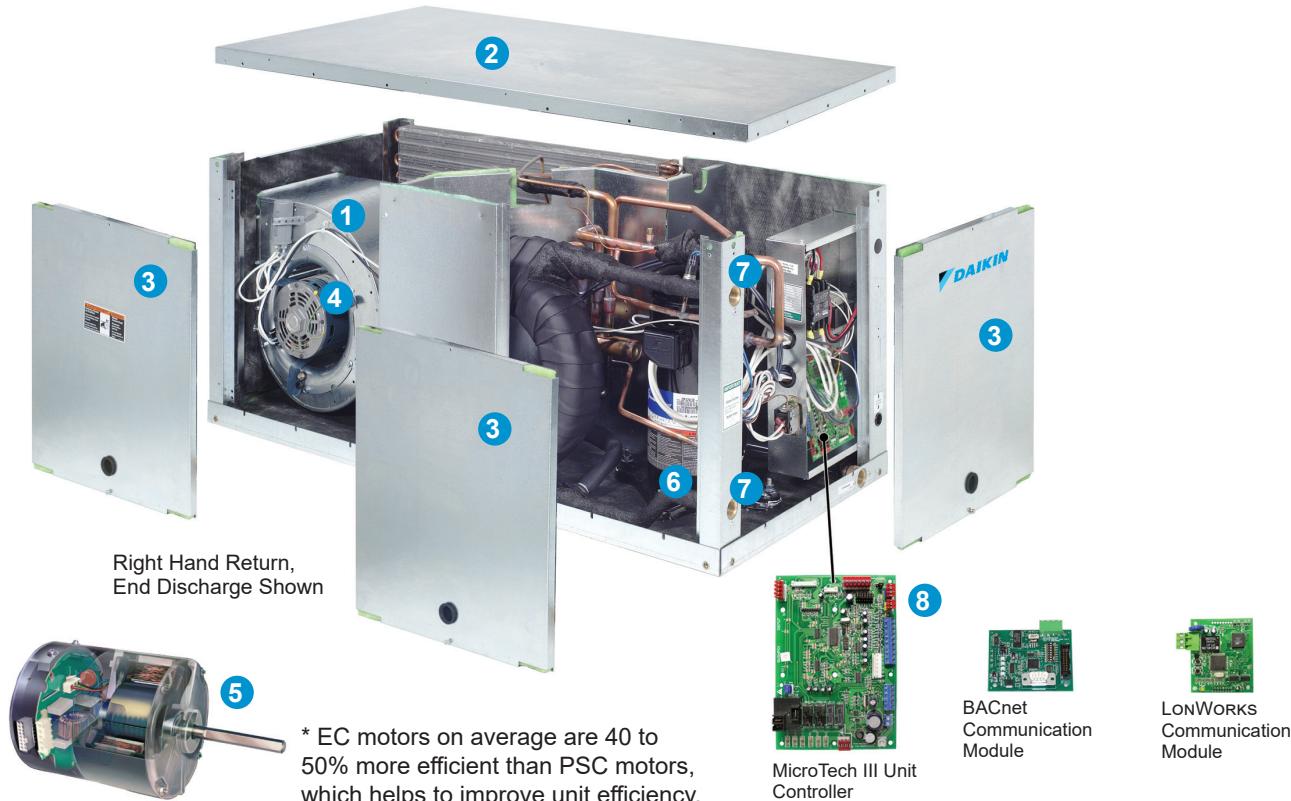
With Daikin Enfinity Water Source Heat Pumps, You Benefit from:

- High efficiency, low operating costs
- Easy, low cost design and installation
- Standard or geothermal range application flexibility
- Superior indoor air quality
- Quiet, reliable operation
- Easy, low-cost maintenance and service
- Available in multiple unit sizes – 007 (1/2 ton, 2.6kW) through 070 (6 ton, 10.6kW)
- Units exceed ASHRAE 90.1 efficiency levels
- R-410A Refrigerant, environmentally friendly with zero ozone depletion potential
- Optional Cupronickel Coaxial Coil
- Optional extended 4-year parts warranty

Enfinity Horizontal Ceiling-Mounted Water Source Heat Pumps

Sizes 007-070 (1/2 to 6 Tons)

- Model WCCH (Standard range: 55°F to 110°F)
- Model WCCW (Geothermal range: 30°F to 110°F)



1 Fan Section

- Fan section is separated from the compressor section with an insulated divider panel for maximum sound attenuation. A large removable panel provides easy service access to the blower and motor.

2 Cabinet

- Durable, heavy gauge galvanized steel cabinet construction.

3 Removable access panels

- Both end and side panels provide easy access to compressor compartment, blower and motor. End panel provides easy access to the unit controls.

4 Blower motor

- Multi-speed, PSC type with thermal overload protection. The motor is isolated from the fan housing for minimum vibration transmission. Removable orifice ring allows easy removal of blower and motor.

5 *Smart ECM fan control with 4-position switch (option)

- Available in unit sizes 007 to 070. Programmed to make soft starts and stops to reduce stress transmitted to the fan housing. They adjust their speed and torque to deliver constant airflow over a wide range of external static pressure

6 Compressor

- Mounted close to the access panel for maximum serviceability and isolated from the bottom panel with rubber isolators. Sizes 019-070 standard with massplate for quiet operation

7 Piping connections

- Water connections are FPT water fittings, flush with the outside of the cabinet, allowing easy one-wrench connection of units. The large condensate connection provides for proper condensate removal.

8 MicroTech® III unit controller

- Designed for flexibility, the main control board is used in standalone applications. A separate LonWorks® or BACnet® communication module can be easily snapped onto the board to accommodate the building automation system of your choice.

Control options

- MicroTech III - Standalone
- MicroTech III - BACnet communication module
- MicroTech III - LonWorks communication module

Enfinity horizontal units available in five cabinet sizes: (007 & 009), (012), (015, 019 & 024), (030 & 036), (042 thru 070)



Cabinet

Daikin Enfinity horizontal water source heat pumps are available in five cabinet sizes, each with the lowest possible profile to conserve space.

Consistencies in shape, connection locations, parts and assemblies throughout the five cabinets make layout, installation and service simple.

- All water and electrical connections are made from the front of the unit.
- A large, lift-up-and-out panel provides easy access to the control box, refrigeration circuit and compressor.
- A second large panel provides easy service access to the compressor.
- A third large panel allows complete service of the blower section while the unit is hanging and without disconnecting the unit from the ductwork.
- Cabinet surfaces are constructed of unpainted, G-60 galvanized steel.
- Panel interiors and the bottom of the unit are covered with 1/2" (12.7 mm) thick, 1½lb. (681g) density, coated, acoustic type glass fiber insulation. Non-fibrous (IAQ) insulation available as selectable option.

Flexible Cabinet Configurations

Daikin Enfinity horizontal heat pumps offer four configurations to meet your space requirements (see figures 1-4). Whether working around obstacles or laying out units down a corridor, the mirror image design of the units lets you configure the system using minimum ductwork and piping. This helps reduce design, material and installation costs.

For maximum flexibility, the fan discharge can exit from the end or side of the unit. This can be configured at the factory or field-converted using interchangeable side and end panels.

Left-hand cabinet configurations

Figure 1: Left hand return with end discharge

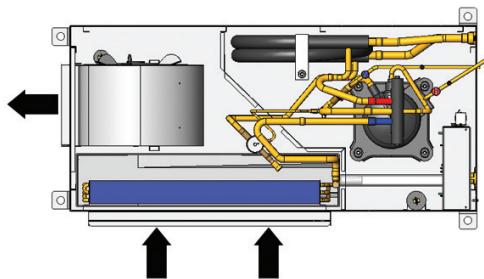
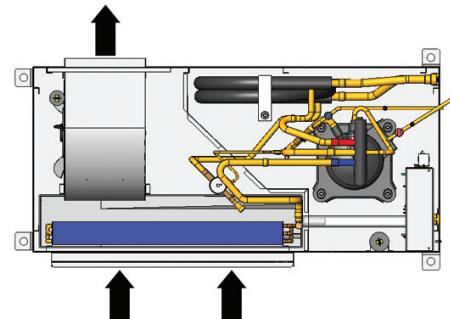


Figure 2: Left hand return with straight discharge



Right-hand cabinet configurations

Figure 3: Right hand return with end discharge

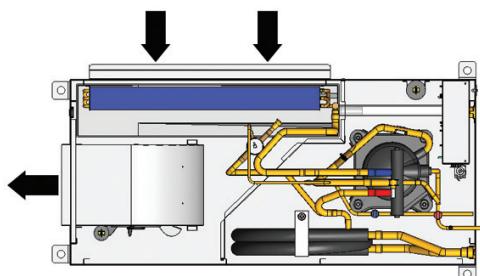
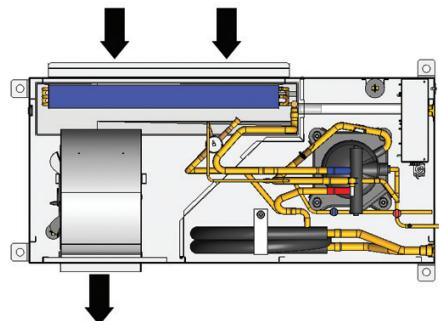


Figure 4: Right hand return with straight discharge



Low Design and Installation Costs

- Four configurations for each unit size (left or right return and straight or end discharge) allow you to specify units to fit space requirements and to design the system using minimum ductwork and piping.
- Five cabinet sizes, each with Daikin's low-profile design, make it easy to meet the space requirements of your new construction or replacement application.
- Flush FPT water fittings allow easy, one-wrench connection of units and help reduce delays caused by shipping damage.
- Flexible control options that include standalone or network operation with the building automation system of your choice using LonMark® or Alerton BACnet® communications.

High Energy Efficiency

- High unit EERs result in low operating costs.
- Each unit includes a thermal expansion valve for precise refrigerant flow metering to meet load requirements and increase efficiency at any fluid temperature, including low temperature geothermal range applications.
- The coaxial heat exchanger is designed for maximum heat transfer at normal and low water flow rates with minimum pressure drop.
- High efficiency fan motor and low-speed fan operation reduce energy consumption.

Superior Indoor Air Quality

- A standard, corrosion-free plastic drain pan is double-sloped to eliminate standing water and inhibit microbial growth.
- Optional non-fibrous insulation is available for sensitive air quality applications.

Quiet Operation

- Large fan wheel allows the fan motor to operate at lower speed for quieter operation.
- Heavy gauge cabinet construction and vibration isolated hanger brackets minimize noise and vibration.
- Two quiet compressor selections (depending on voltage and size variations) including rotary (sizes 007 to 015) and scroll compressors (sizes 019 to 070).
- Standard heavy-gauge steel mass-plate with visco elastic dampening material below the compressor helps reduce noise emission in horizontal ceiling unit sizes 019-070.

Easy, Low-Cost Maintenance

- Easy access to the unit compressor (2-sides), fan and motor (1-side) and controls (end access).
- A removable orifice ring allows the blower and motor to be removed without removing the blower housing or disconnecting the unit from the ductwork.

Figure 5: Removable orifice ring for easy blower and motor removal



R-410A Refrigerant

- R-410A refrigerant has zero ozone depletion potential, no scheduled phase-out and is classified in ASHRAE standard 31 as lower toxicity, no flame propagation.

Figure 6: Removable panels provide easy access

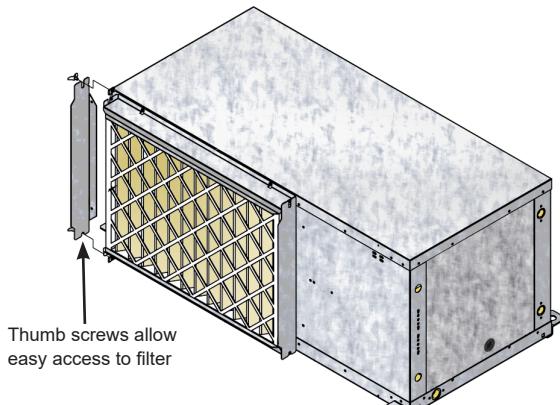


Filter Rack

The filter is supported by factory mounted brackets that allow for face removal. Units come standard with a 1" (25.4 mm) thick throwaway filter mounted in a combination filter rack and return air duct collar, thus eliminating field mounted brackets. The filter can be removed from any of the four sides or from the front.

- As a factory-installed selectable option units will have a 2" throwaway filter in a 4-sided filter rack with duct collar. Where high indoor air quality is required units will have a 4" thick, high efficiency Merv 13 filter in a 4-sided filter rack with duct collar. The filter rack can be mounted for left hand or right hand filter removal by rotating it 180 degrees. Two thumb screws allow easy removal of the access door for quick filter changes without using a tool.

Figure 7: 2" or 4" filter rack for easy filter removal



Hanger Bracket

Each unit is furnished with a mounting kit that includes four heavy metal hanger brackets for hanging the unit from field-supplied hanger rods. Rubber isolators are included for sound and vibration attenuation, as are mounting washers, bolts and lock washers. The hangers are attached to fasteners at each corner of the unit, which are an integral part of the cabinet.

Figure 8: Unit hangers



Blower Housing

The blower housing protrudes from the side of the cabinet, allowing adequate material for connection to a flexible duct. For maximum flexibility, the fan discharge can exit from the end or the side of the unit. This can be configured at the factory or can be field-converted before installation, using interchangeable side and end panels.

Figure 9: Fan housing protrudes through the cabinet for connection of flexible duct



Water Connections

The water and condensate connections are FPT fittings, securely mounted flush to the corner post to allow for connection to a flexible hose without the use of a back-up wrench. This helps reduce the time required to connect the unit and helps prevent delays due to shipping damage.

Figure 10: Flush FPT water fittings

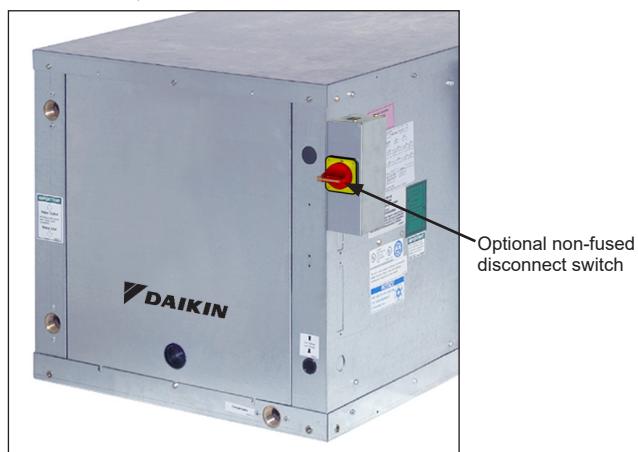


Electrical

The electrical components are located in the compressor section of the unit. Separate holes are provided on the cabinet to facilitate main power and low voltage control wiring. All wiring connections are made internal to the cabinet to reduce the risk of accidental contact. Each unit is rated to accept time-delay fuses for branch circuit overcurrent protection. Single phase units are also rated for use with HACR circuit breakers.

Optional non-fused disconnect switch

This factory-installed option includes the addition of a 2 or 3-pole switch mounted on the unit. The switch has a lockout/tag out feature. The switch is rated to handle the unit only (not to include additional amperage from field installed accessories).



Drain Pan

Daikin horizontal heat pumps come standard with a Polypropylene (PP), corrosion-resistant plastic drain pan to promote good indoor air quality. The pan is double sloped for positive draining to reduce the occurrence of standing water and microbial growth.

Figure 11: Corrosion-resistant, double-sloped plastic drain pan



Compressor

Daikin Enfinity water source heat pumps are designed around the most advanced compressors in the industry. A wide variety of compressor types are used to offer the best system design for the dedicated refrigerants and tonnage. This allows Daikin Enfinity water source heat pumps to deliver rated capacity with low noise levels.

Rotary compressor are used in unit sizes 007 to 015. Unit sizes 019 to 070 use a scroll compressor.



Reversing Valve

A 4-way reversing valve is included with all Daikin Enfinity water source heat pumps. The valve is energized in the heating mode and will “fail-safe” to the cooling mode which is the predominant mode of operation for commercial applications.

Figure 12: 4-way reversing valve



Thermal Expansion Valve

All Daikin Enfinity water source heat pump units include a thermal expansion valve for refrigerant metering. The Thermal Expansion Valve (TXV) allows the unit to operate at optimum efficiency with fluid temperatures ranging from 30°F to 110°F, and entering air temperatures ranging from 40°F to 90°F. The TXV precisely meters the exact amount of refrigerant flow through the system to meet the load and deliver rated heating and cooling capacity.

Figure 13: Thermal expansion valve (TXV)



Fluid-to-Refrigerant Coil

The copper or cupronickel (optional) tube-in-tube coaxial heat exchanger used in Daikin Enfinity water source heat pumps are designed for maximum heat transfer at normal and low water flow rates with minimum pressure drop. The inside tube is deeply fluted to enhance heat transfer and minimize fouling. All coaxial coils are tested to 500 psig on the water side and 600 psig on the refrigerant side. Extended (geothermal) range (CCW) units include coil and piping insulation to protect against condensation in low-temperature extended (geothermal) range applications.

Figure 14: Coaxial heat exchanger



CorMax® Connections

Two CorMax valves are located inside the end access panel – one on the low side and one on the high side of the refrigeration circuit – for charging and servicing. All valves are 7/16" SAE fittings.

Figure 15: CorMax valves



Air-to-Refrigerant Coil

The air-to-refrigerant heat exchanger is a large face area coil with copper tubes and aluminum fins. The fins are lanced and mechanically bonded to the tubes using finned edges on the inside which expand during assembly to enhance heat transfer capabilities. The maximum working pressure of the heat exchanger is 600 psig (4136 kPa). The coil is designed for optimal performance in both heating and cooling while maintaining the benefit of a compact size.

Refrigeration System

Units have a coaxial heat exchanger with a copper inner tube and a steel outer tube. The air coil is a large face area coil with copper tubes and aluminum fins. Safety controls include high-pressure and low-temperature switch to lock out compressor operation at extreme conditions. For additional protection, units 015 and larger have a 7 psi (48 kPa) low-pressure switch to protect the compressor from low refrigerant charge. The low setting prevents nuisance trips while providing additional protection.

Blower Section

The blower section includes the blower housing, wheel, motor and drain pan. It is separated from the compressor section by an insulated divider panel for maximum sound attenuation. The large size of the blower wheel allows it to rotate more slowly, reducing motor work to improve efficiency and provide for quiet operation. A large panel provides service access to the blower and motor. All blower/motor assemblies have a removable orifice ring on the housing to accommodate motor and blower removal without disconnecting the unit from the ductwork.

For maximum flexibility, the fan discharge on the horizontal unit can exit from the end or side of the unit. This can be configured at the factory or field-converted using interchangeable side and end panels. Refer to IM 1049.

Blower Motors

The standard blower motor is a multi-speed, Permanent Split Capacitor (PSC) type with thermal overload protection. It is permanently lubricated. The motor is factory wired to maximize performance and efficiency. Unit sizes 019 and larger have a terminal strip on the motor for simple motor speed change without going back to the control box. The motor is isolated from the fan housing using rubber isolators to minimize vibration transmission. All blower/motor assemblies have a removable orifice ring on the housing to accommodate motor and blower removal without disconnecting the unit from the ductwork.

Figure 16: High efficiency blower motor



EC Constant Torque Fan Motor (Option)

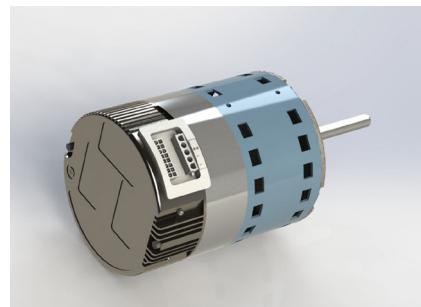
The optional constant torque EC blower motor offers increased efficiencies. This motor is similar in function to a PSC, but will deliver airflow at higher external static pressures. These motors are available for sizes 007 to 012 and include a field adjustable 4-position fan speed selector switch.



**Constant Torque EC
Motor Sizes 007-012**

EC Constant CFM Fan Motor (Option)

For unit sizes 015 – 070, the high efficiency EC constant airflow motor option provides constant airflow and economical performance over a wide static pressure range. This motor is an ideal option for high filtration applications that utilize the optional MERV-13 air filter. One of the many benefits of the EC motor is a soft start/stop feature for quiet operation. The 4-speed fan selector switch allows for quick fan speed adjustment to optimize unit performance. **NOTE:** These motors require a neutral wire for units with 460/3 electrical.



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.

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

- Standalone operation using a MicroTech III unit controller
- MicroTech III unit controller with a BACnet® communication module
- MicroTech III unit controller with a LonWorks® communication module

Each option features direct quick-connect wiring to all unit-controlled components for “clean” wiring inside the control box. Each control circuit board receives power from a 50 VA transformer (optional 75VA transformer).

Table 1: Control options

Control	Description	Application	Protocol
MicroTech III  (Standalone) Unit Controller.	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.	Each unit controller is factory programmed, wired, and tested for complete control of single zone, standalone operation of your Daikin Water Source Heat Pump.	Unit-mounted or wall-mounted thermostat
I/O Expansion Module 	The I/O Expansion Module is an extension of the Microtech III unit controller and provides additional functionality to the Microtech III control system. The interconnect cable from the I/O expansion module to the MicroTech III unit controller provides two-stage operation of the water source heat pump.	Allows for: <ul style="list-style-type: none"> • Monitoring of entering water temperature for boilerless electric heat control • Outputs for optional electric heat • Output for multi-speed fans on a standard water source heat pump • Independent LED annunciator to easily identify operation fault conditions for two-stage units 	Unit-mounted or wall-mounted thermostat
LonWorks  Communication Module	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.	LonTALK application protocol is designed for units that are integrated into a LonWorks communication network for centralized scheduling and management of multiple heat pumps.	LonMARK 3.4 Certified
BACnet  Communication Module	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.	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.	BACnet MS/TP

MicroTech® III Controller

General Use and Information

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.

Standard Sequence of Operation

Assumes cycle fan operation-not continuous fan operation:

- **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.

Available Operating Modes

- **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.
- **Tenant 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.

MicroTech III Unit Protections & LED Fault Status Annunciation

- **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.
- **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. An LED status is generated and an output is available to a “fault” LED at the thermostat.
- **Emergency unit shutdown** – A simple grounded signal puts the unit into the shutdown mode. Remote shutdown is provided so that when properly connected to a water loop controller or remote switch, the emergency shutdown input can be used to shut down the water source heat pump. Compressor and fan operations are suspended, and an a unique two external LED status is generated.
- **Condensate overflow protection** – The MicroTech III unit controller incorporates a liquid sensor at the top of the drain pan. Upon sensing water, cooling and dehumidification operations are 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 helps to minimize nuisance trips of automatic lockouts caused by low-temperature faults in heating mode. 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 during heating operation, 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. Refer to ["Table 2: MicroTech III controller configuration jumper settings"](#) on page 15.

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

Table 2: 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 3: I/O expansion module jumper settings

I/O Expansion Description	Jumper(s)	Setting	Model
Fan Row Select for Operating Modes: Fan Only (with Optional ECM)	JP1 & JP2	JP1 = Open JP2 = Open	Fan Row "A" Selected
		JP1 = Shorted JP2 = Open	Fan Row "B" Selected
		JP1 = Open JP2 = Shorted	Fan Row "C" Selected
		JP1 = Shorted JP2 = Shorted	Fan Row "D" Selected
Secondary Heating Options	JP3 & JP4	JP3 = Open JP4 = Open	None
		JP3 = Shorted JP4 = Open	Supplemental Electric Heat
		JP3 = Open JP4 = Shorted	Boilerless Electric Heat
		JP3 = Shorted JP4 = Shorted	Not Used
Not Used	JP5 & JP6	JP5 = Open JP6 = Open	None
		JP5 = Shorted JP6 = Open	Not Used
		JP5 = Open JP6 = Shorted	Not Used
Not Used	JP7	JP7 = Open	—
Compressor Capacity Option	JP8	JP8 = Open JP8 = Shorted	Not Used

Table 4: MicroTech III controller fault & status LED's

Description	Type	Yellow	Green	Red
I/O 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	Fault	OFF	OFF	Flash
Compressor Low Pressure	Fault	OFF	OFF	ON
Compressor Suction Temp Sensor Fail	Fault	Flash	Flash	ON
Compressor Low Suction Temp	Fault	Flash	OFF	OFF
Freeze Fault Detect	Fault	Flash	OFF	Flash
Room Temp Sensor Fail (Room Sensor Control Only)	Fault	Flash	Flash	ON
Leaving Water Temp Sensor Fail	Fault	Flash	Flash	ON
Condensate Overflow	Fault	ON	OFF	OFF
Serial EEPROM Corrupted	Fault	ON	ON	ON
Service Test Mode Enabled	Mode	Flash	Flash	Flash
Unoccupied Mode	Mode	ON	ON	OFF
Occupied, Bypass, Standby, or Tenant Override Modes	Mode	OFF	ON	OFF

Table 5: I/O expansion module fault & status LED's

Description	Type	Yellow	Green	Red
Baseboard Communication Fail	Fault	Flash	OFF	Flash
Entering Water Temp Sensor Fail (Boilerless Electric Heat)	Fault	ON	OFF	Flash
Low Entering Water Temperature (No Display On Boilerless Electric Heat)	Fault	OFF	ON	Flash
Fan is OFF	Mode	OFF	ON	OFF
Fan Running at Low Speed (0 to 33%) Duty Cycle	Mode	OFF	Flash	OFF
Fan Running at Medium Speed (34 to 66%) Duty Cycle	Mode	ON	Flash	OFF
Fan Running at High Speed (67 to 100%) Duty Cycle	Mode	Flash	Flash	OFF

Notes: 1. Mode / faults are listed in order of priority.

2. I/O expansion module supplied with boilerless and supplemental electric heat options.

MicroTech® III Unit Controller with LONWORKS® or BACnet® Communication Module

Each Enfinity Horizontal 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 Horizontal 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.

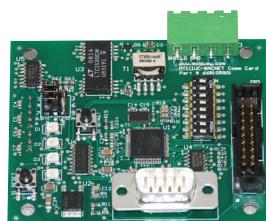
MicroTech III LONWORKS Communication Module

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 with communication module includes:

- Return Air Temperature sensor (RAT) (field-installed)
- Discharge Air Temperature sensor (DAT) (field-installed)
- Leaving Water Temperature sensor (LWT)

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.

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
- Temperature sensor with LED status, timed-override button, and $\pm 3^{\circ}\text{F}$ setpoint adjustment
- Room sensor with LED status, timed-override button, 55° to 95°F setpoint adjustment

Typical Horizontal Unit Installation

Unit Location

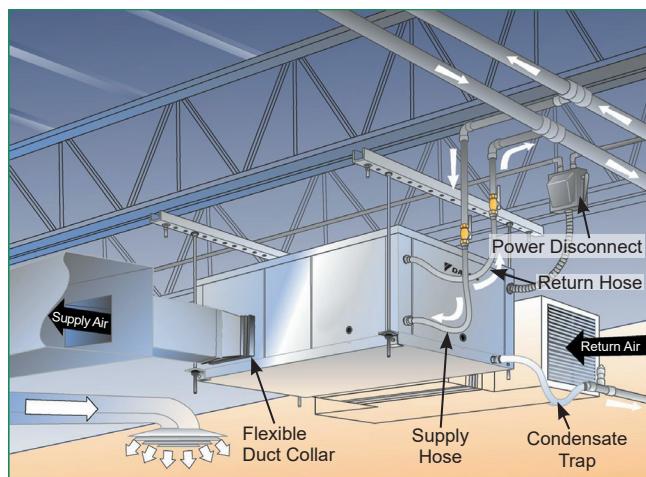
It is important to leave enough space for service personnel to perform maintenance or repair. Locate the horizontal unit to allow for easy removal of the filter and access panels. Allow a minimum of 18" (46 cm) clearance on each side of the unit for service and maintenance access and do not install the unit above any piping. Always be sure to leave at least one side of the filter rack unobstructed so that the service personnel will be able to slide the filter out. Each unit is suspended from the ceiling by four 3/8" threaded rods fastened to the unit by a hanger bracket and rubber isolator. The design should place the unit directly below the structural members so that it is securely anchored.

Avoid installing units directly above spaces where building occupants will reside (e.g. above office desks or classrooms) to reduce the requirement for noise attenuation. Do not place units above high traffic areas because service access may be limited during occupied hours. For example, units are typically installed above the hallway drop ceiling in Schools and the supply and return air is routed directly into classrooms. Local code may require fire dampers to be used with this application.

Piping

The WSHP 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

Figure 17: Typical ceiling installation



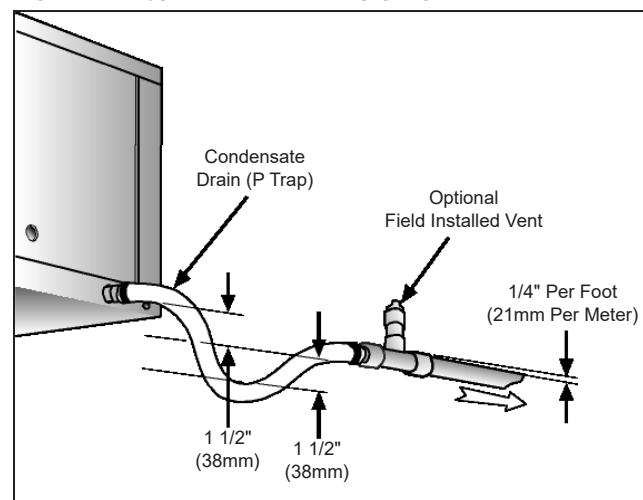
sound attenuator for both the unit operating noise and hydraulic pumping noise. One end of the hose has a swivel fitting to facilitate removal of the unit for replacement or service. Include supply and return shutoff valves in the design to allow removal of a unit without the need to shut down the entire 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 Piping

CCH-CCW horizontal units have a 3/4-inch FPT condensate drain connection, flush to the unit. The field installed condensate piping must include a trap after the connection and 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.

Figure 18: Typical condensate piping



Ductwork & Sound Attenuation

Ductwork is normally applied to ceiling-mounted heat pumps on the discharge side of the unit. A discharge collar is provided on all horizontal unit models for fastening the ductwork. Use a flexible connector between the discharge collar and the duct transformation to help reduce vibration transmission from the cabinet and to simplify disconnection of the unit from the ceiling ductwork. If return ductwork is to be used, attach a flexible connector to the filter rack collar to help reduce vibration transmission and removal of the unit. Return plenum ducting should be at least 12 inches away from the coil so that the coil is evenly loaded with return air.

As a general recommendation, duct interiors should have an acoustic / thermal lining at least 1/2 inch thick over the entire duct run. For better sound attenuation, line the last five diameters of duct before each register with a one-inch thick sound blanket. Elbows, tees and dampers can create

turbulence or distortion in the airflow. Place a straight length of duct, 5 to 10 times the duct width, before the next fitting to smooth out airflow. Diffusers that are located in the bottom of a trunk duct can also produce noise. For this same reason, volume control dampers should be located several duct widths upstream from an air outlet.

For Hotel, Motel, Dormitory or Nursing Home applications that use a single duct discharge, a velocity of 500 to 600 fpm is suggested. These applications typically have static pressures as low as 0.05 inches of water and duct lengths approximately six feet in length. The discharge duct must be fully lined and have a square elbow without turning vanes. Return air for these applications should enter through a "low" sidewall filter grille and route up the stud space to a ceiling plenum. For horizontal heat pumps mounted from the ceiling, an insulated return plenum is sometimes placed at the return air opening to further attenuate line-of-sight sound transmission through return openings.

Figure 19: Suggested supply ducting per ASHRAE and SMACNA publications

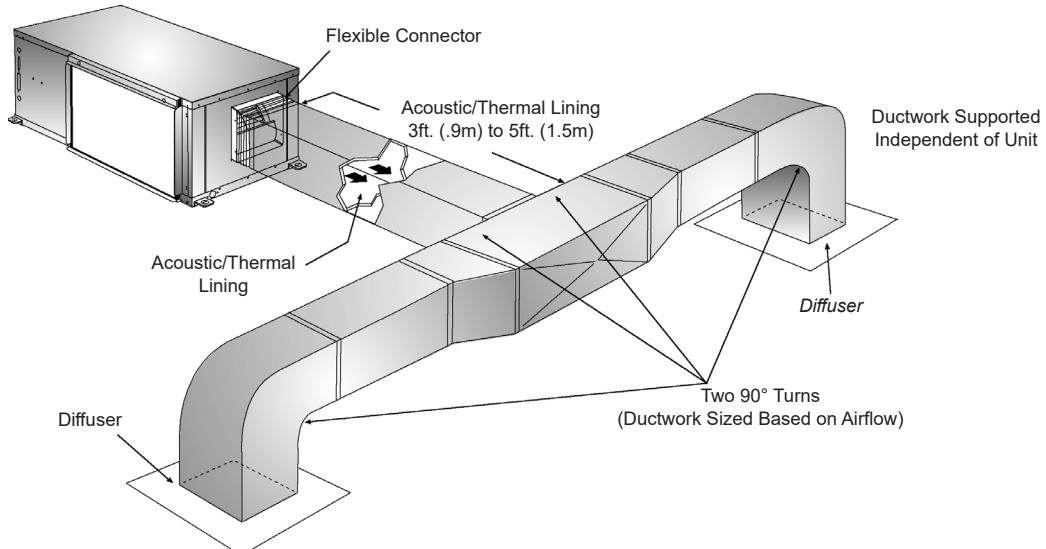
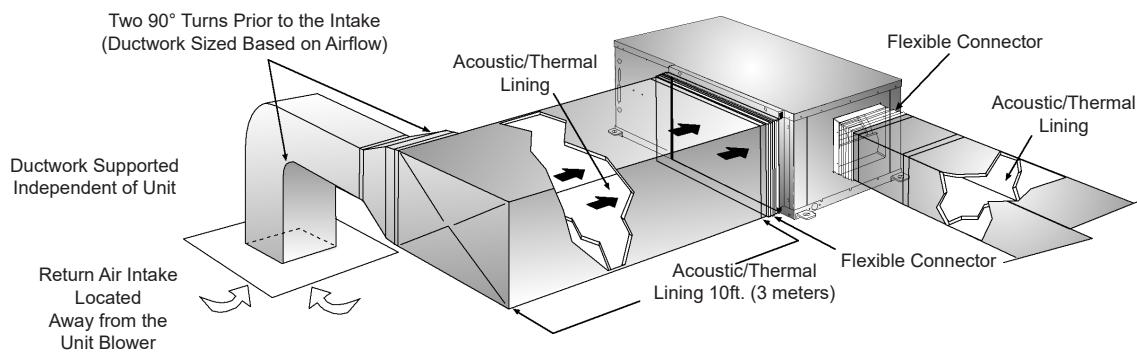


Figure 20: Suggested return ducting per ASHRAE and SMACNA publications

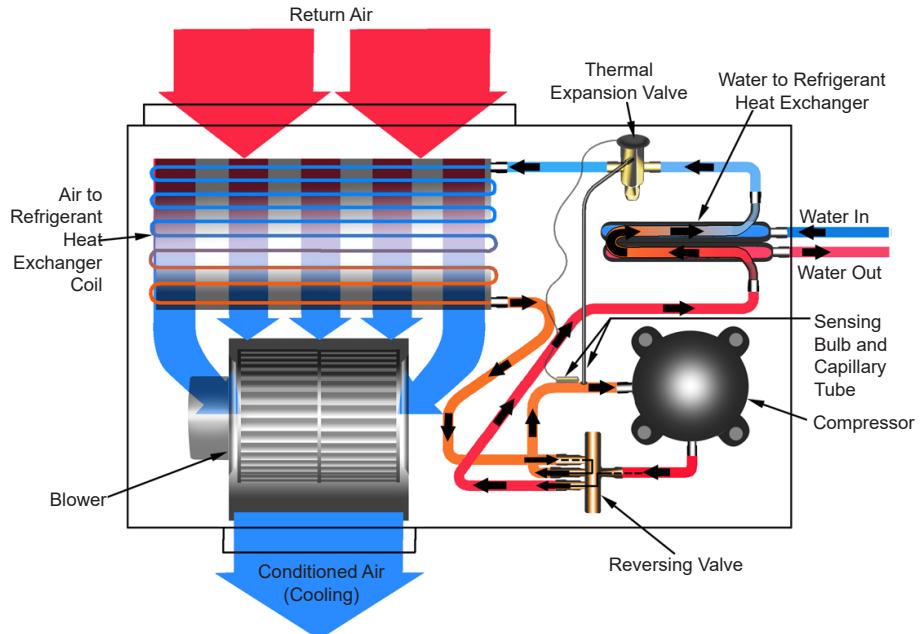


Typical Cooling and Heating Refrigeration Cycles

Note: For standard heat pump operation only

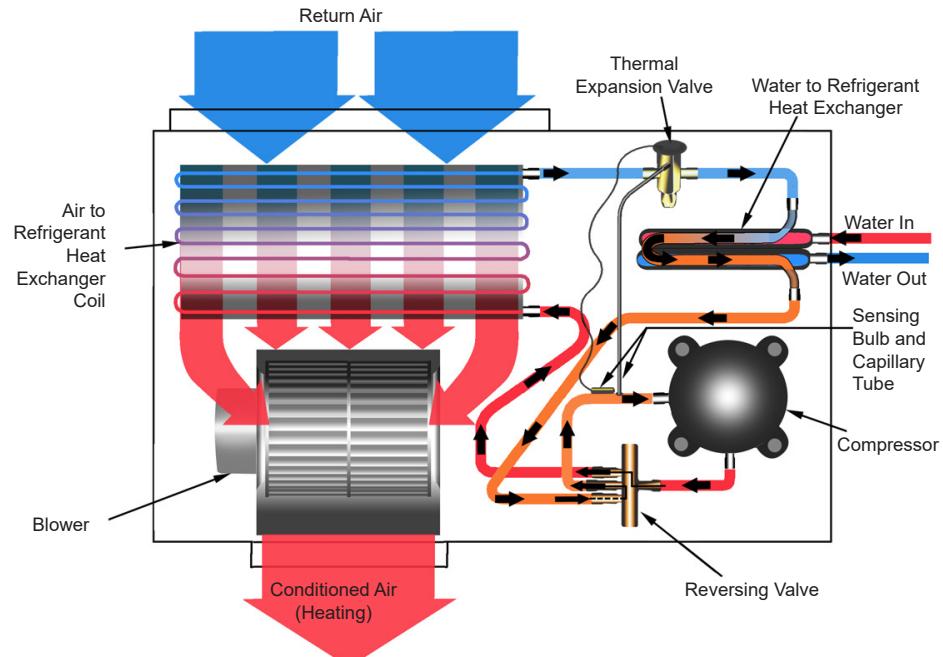
Cooling Refrigeration Cycle

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.



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.



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 290,000 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.

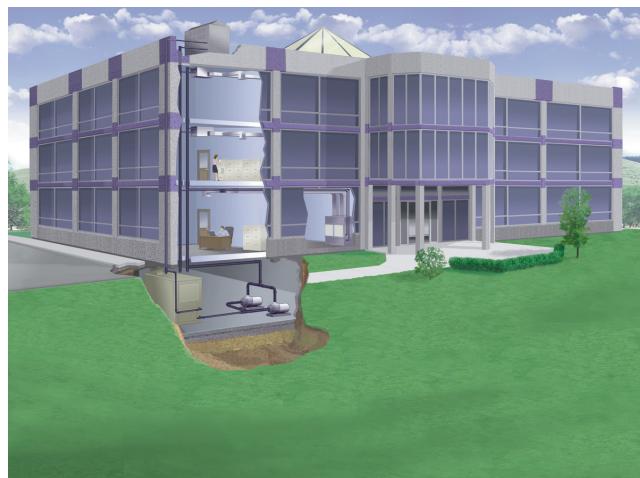
Boiler / Tower Applications

AHRI 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 21: Boiler/tower application



Open Loop Well Water Applications

AHRI 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 22: Open loop well application



Closed Loop Geothermal Range Applications

AHRI ISO 13256-1

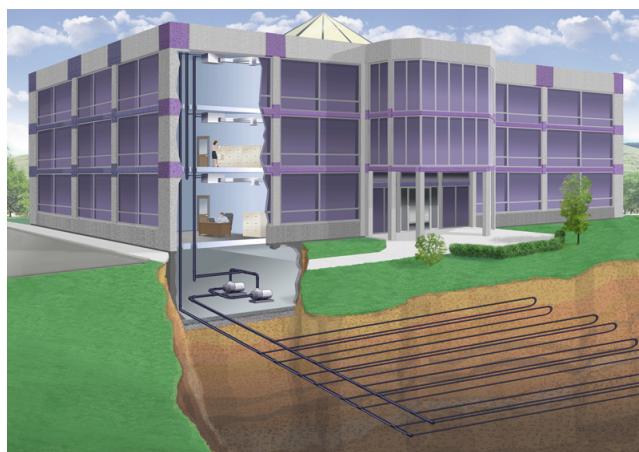
"Vertical Closed Loop" applications are installed by drilling vertical bore holes into the earth and inserting a plastic polyethylene supply/return pipe into the holes. The vertical wells are connected in parallel reverse return fashion to allow the water from the building to circulate evenly throughout the borefield. 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 range 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 23: Vertical loop application



A closed loop "Horizontal" geothermal range 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 24: Horizontal loop application



A "Surface Water" or "Lake" closed loop system is an geothermal range 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 25: Surface water loop application



Selection Procedure

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 38,255 Btuh of total cooling, 31,832 Btuh of sensible cooling and 36,988 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	=	38,255 Btuh
Sensible Cooling Load	=	31,832 Btuh
Total Heating Load	=	36,988 Btuh
Air Flow Required	=	1510 CFM
Return Air Cooling	=	80°EDB/ 67°EBW
Return Air - Heating	=	70°EDB

Since a Daikin Model CCH 036 produces approximately 36,000 Btuh of cooling, it is not sufficient for this zone and a model CCH 042 should be considered. Model CCH 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.....	CCH 042	(Boiler / Tower model)
Total Cooling Capacity @ 90° EWT	=	41,713 Btuh
Sensible cooling capacity @ 90° EWT	=	31,167 Btuh
Total Heating Capacity @ 70° EWT	=	51,654 Btuh
CFM = 1510 @ 0.63 ESP (Wet Coil)		
Water Flow required to meet capacity	=	8 GPM
Water Pressure drop	=	3.08 (FT. H2O)
Final Selection		CCH 042

Geothermal Range Applications

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

The load requirements for the zone are the same as the previous example – 38,255 Btuh of total cooling and 31,832 Btuh of sensible cooling and 36,988 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 range 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.

Physical Data

Table 6: Size 007 - 024

Unit Size	007	009	012	015	019	024
Fan Wheel - D x W	6.3" x 6.0"	6.3" x 6.0"	6.2" x 7.4"	9.5" x 7.1"	9.5" x 7.1"	9.5" x 7.1"
Fan Motor Horsepower	1/8	1/8	1/8	1/6	1/3	1/3
EC Motor Horsepower	1/10	1/10	1/10	1/3	1/3	1/3
Coil Face Area (Sq. Ft.)	1.11	1.11	1.53	2.75	2.75	2.75
Coil Rows	3	3	4	3	3	3
Refrigerant Charge (Oz.)	20	24	34	43	49	39.5
Filters	1" Filter, (Qty.) Size	(1) 10"H x 20"W	(1) 10"H x 20"W	(1) 10"H x 26"W	(1) 18"H x 24"W	(1) 18"H x 24"W
	2" Filter, (Qty.) Size	(1) 9.5"H x 21.5"W	(1) 9.5"H x 21.5"W	(1) 9.5"H x 27.5"W	(1) 18"H x 25"W	(1) 18"H x 25"W
	4" Filter, (Qty.) Size	(1) 9.5"H x 21.5"W	(1) 9.5"H x 21.5"W	(1) 9.5"H x 27.5"W	(1) 18"H x 25"W	(1) 18"H x 25"W
Water Connections, Female NPT	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
Condensate Connections, Female NPT	3/4" I.D.	3/4" I.D.	3/4" I.D.	3/4" I.D.	3/4" I.D.	3/4" I.D.
Weight, Operating (Lbs.)	99	99	115	195	195	195
Weight, Shipping (Lbs.)	130	130	145	214	214	214
Water Volume (U.S. Gallons)	0.24	0.24	0.24	0.49	0.49	0.49

Table 7: Size 030 - 070

Unit Size	030	036	042	048	060	070
Fan Wheel - D x W	9.5" x 7.1"	9.5" x 7.1"	12.9" x 11.1"	12.9" x 11.1"	12.9" x 11.1"	12.9" x 11.1"
Fan Motor Horsepower	1/3	1/2	1/2	3/4	3/4	3/4
EC Motor Horsepower	1/2	1/2	3/4	3/4	1	1
Coil Face Area (Sq. Ft.)	3.43	3.43	3.43	3.43	6.11	6.11
Coil Rows	3	3	3	3	3	3
Refrigerant Charge (Oz.)	48	49	59	58	71	84
Filters	1" Filter, (Qty.) Size	(1) 19"H x 27"W	(1) 19"H x 27"W	(2) 16"W x 22.5"H	(2) 16"W x 22.5"H	(2) 22"H x 22"W
	2" Filter (Qty.) Size	(1) 18.5"H x 30.5"W	(1) 18.5"H x 30.5"W	(1) 21.5"H x 34.5"W	(1) 21.5"H x 34.5"W	(1) 21.5"H x 46.5"W
	4" Filter (Qty.) Size	(1) 18.5"H x 30.5"W	(1) 18.5"H x 30.5"W	(1) 21.5"H x 34.5"W	(1) 21.5"H x 34.5"W	(1) 21.5"H x 46.5"W
Water Connections, Female NPT	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
Condensate Connections, Female NPT	3/4" I.D.	3/4" I.D.	3/4" I.D.	3/4" I.D.	3/4" I.D.	3/4" I.D.
Weight, Operating (Lbs.)	225	223	293	298	332	332
Weight, Shipping (Lbs.)	244	242	314	319	351	351
Water Volume (U.S. Gallons)	0.73	0.73	0.95	0.95	1.15	1.15

Shipping Dimensions for Standard Units

Table 8: Shipping dimensions for standard units

Unit Size	007	009	012	015	019	024
Dimensions (In.)	39L x 25W x 17H		48L x 26W x 25H		48L x 26W x 26H	
Unit Size	030	036	042	048	060	070
Dimensions (In.)	52L x 27W x 25H		57L x 33W x 28H		57L x 33W x 29H	

Fan Performance

Table 9: Standard PSC motor

Unit Size	Speed	Factory Wired	Nominal cfm	External Static Pressure (in. w.c.)													
				0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75
007	High	Yes	300	410	400	390	380	360	350	330	320	310	290	270	250		
009	High	Yes	300	410	400	390	380	360	350	330	320	310	290	270	250		
012	Low	No	400	350	340	330	320	300									
	High	Yes		430	420	400	390	370	360	340	320	300					
015	Low	Yes	500	690	670	650	620	590	560	520	480	440	390				
	High	No		950	930	910	880	850	810	770	720	660	610	540	480	400	
019	Low	No	630	670	650	640	610	590	570	540	510						
	High	Yes		890	870	840	820	790	760	730	700	660	620				
024	Low	Yes	800	1000	990	980	970	950	940	910	890	880	830	800	760	720	660
	High	No		1190	1170	1150	1130	1110	1090	1060	1030	990	950	920	880	820	770
030	Low	No	1000	1050	1040	1030	1020	1010	990	970	950	920	890	850	820	770	
	High	Yes		1270	1260	1240	1210	1190	1170	1140	1110	1070	1030	980	940	890	840
036	Low	No	1200			1170	1170	1160	1140	1120	1090	1060	1020	980	940	900	
	High	Yes		1510	1500	1480	1460	1430	1390	1350	1310	1260	1200	1150	1090	1040	980
042	Low	No	1400				1450	1440	1420	1370	1280	1200	1120				
	High	Yes		2130	2110	2090	2050	2020	1970	1930	1870	1790	1690	1580	1460	1250	
048	Low	Yes	1600	2100	2070	2030	1990	1950	1900	1850	1790	1720	1600	1400			
	High	No		2440	2380	2330	2260	2200	2130	2070	2000	1910	1780	1590	1410		
060	Low	No	2000			2080	2070	2050	2020	1980	1940	1900	1850	1770	1680		
	High	Yes		2600	2570	2530	2490	2440	2390	2320	2260	2180	2100	2010	1920	1620	
070	Low	No	2300			2080	2070	2050	2020	1980	1940	1900	1850	1770	1680		
	High	Yes		2600	2570	2530	2490	2440	2390	2320	2260	2180	2100	2010	1920	1620	

Note: PSC blower motors are designed to deliver nominal 400 cfm/ton.

Table 10: Low static PSC motor

Unit Size	Speed	Factory Wired	Nominal cfm	External Static Pressure (in. w.c.)													
				0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75
024	Low	No	800	670	650	640	610										
	High	Yes		890	870	840	820	790	760	730	700	660	620				

Note: For wet coil, calculate face velocity (cfm/ coil face area, sq. ft.). Add the following static to the external static pressure for the corresponding face velocity: 300 fpm = 0.05", 400 fpm = 0.10", 500 fpm = 0.14". Re-enter table at the increased external static pressure to determine final cfm.

= Out of Range

Fan Performance (Continued)

Table 11: Constant torque motor CFM values - Sizes 007–012

Unit Size	Setting	Function	External Static Pressure (inches of water column)												
			.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70
007	Setting 4 (High)	Stage 1	386	379	370	357	348	337	330	327	316	308	290	277	270
	Setting 3 (Standard)		357	349	335	322	312	308	301	290	280	265	253	245	239
	Setting 2 (Medium)		324	311	299	288	285	275	266	247	237	227	222	215	208
	Setting 1 (Low)		324	311	299	288	285	275	266	247	237	227	222	215	208
	Setting 4 (High)	Stage 2	410	407	398	388	375	368	357	355	349	339	330	323	313
	Setting 3 (Standard)		386	379	370	357	348	337	330	327	316	308	290	277	270
	Setting 2 (Medium)		357	349	335	322	312	308	301	290	280	265	253	245	239
	Setting 1 (Low)		324	311	299	288	285	275	266	247	237	227	222	215	208
	A	Fan Only	386	379	370	357	348	337	330	327	316	308	290	277	270
	B		357	349	335	322	312	308	301	290	280	265	253	245	239
	C		324	311	299	288	285	275	266	247	237	227	222	215	208
	D		270	256	250	243	223	207	197	193	180	171	159	147	130
009	Setting 4 (High)	Stage 1	386	379	370	357	348	337	330	327	316	308	290	277	270
	Setting 3 (Standard)		357	349	335	322	312	308	301	290	280	265	253	245	239
	Setting 2 (Medium)		324	311	299	288	285	275	266	247	237	227	222	215	208
	Setting 1 (Low)		324	311	299	288	285	275	266	247	237	227	222	215	208
	Setting 4 (High)	Stage 2	410	407	398	388	375	368	357	355	349	339	330	323	313
	Setting 3 (Standard)		386	379	370	357	348	337	330	327	316	308	290	277	270
	Setting 2 (Medium)		357	349	335	322	312	308	301	290	280	265	253	245	239
	Setting 1 (Low)		324	311	299	288	285	275	266	247	237	227	222	215	208
	A	Fan Only	386	379	370	357	348	337	330	327	316	308	290	277	270
	B		357	349	335	322	312	308	301	290	280	265	253	245	239
	C		324	311	299	288	285	275	266	247	237	227	222	215	208
	D		270	256	250	243	223	207	197	193	180	171	159	147	130
012	Setting 4 (High)	Stage 1	412	403	391	378	367	355	345	335	323	293	275	259	250
	Setting 3 (Standard)		385	372	357	342	332	319	309	300	286	251	242	223	212
	Setting 2 (Medium)		353	339	327	313	298	288	274	265	228	211	203	183	177
	Setting 1 (Low)		353	339	327	313	298	288	274	265	228	211	203	183	177
	Setting 4 (High)	Stage 2	451	438	423	409	400	387	375	365	352	342	334	313	294
	Setting 3 (Standard)		412	403	391	378	367	355	345	335	323	293	275	259	250
	Setting 2 (Medium)		385	372	357	342	332	319	309	300	286	251	242	223	212
	Setting 1 (Low)		353	339	327	313	298	288	274	265	228	211	203	183	177
	A	Fan Only	412	403	391	378	367	355	345	335	323	293	275	259	250
	B		385	372	357	342	332	319	309	300	286	251	242	223	212
	C		353	339	327	313	298	288	274	265	228	211	203	183	177
	D		314	298	282	264	248	234	203	191	176	164	154	133	125

Notes: 1. For wet coil, calculate face velocity (cfm/coil face area, sq. ft.). Add the following static to the external static pressure for the corresponding face velocity: 300 fmp = 0.05", 400 fpm = 0.10", 500 fpm = 0.14". Re-enter table at the increased external static pressure to determine final cfm.
 2. Actual unit performance may differ from those listed in the catalog and selection software due to variations in field conditions, unit installations, and test and balancing devices

Fan Performance (Continued)

Table 12: Single stage units with constant CFM type EC motor - Sizes 015–070

Unit Size	MicroTech III Unit Controller							I/O Expansion Module	
	Setting	Maximum ESP (in. wg.) ²	'Low CFM Heat	'High CFM Heat	'Low CFM Cool	'High CFM Cool	Electric Heat	Setting	Fan Only
015	4 (High)	0.7	520	580	520	580	580	A	450
	3 (Standard)		450	520	450	520	580	B	410
	2 (Medium)		390	450	390	450	580	C	370
	1 (Low)		390	390	390	390	580	D	300
019	4 (High)	0.7	630	700	630	700	700	A	570
	3 (Standard)		560	630	560	630	700	B	520
	2 (Medium)		480	560	480	560	700	C	460
	1 (Low)		480	480	480	480	700	D	390
024	4 (High)	0.7	800	900	800	900	900	A	750
	3 (Standard)		700	800	700	800	900	B	710
	2 (Medium)		610	700	610	700	900	C	670
	1 (Low)		610	610	610	610	900	D	600
030	4 (High)	0.7	1020	1140	1020	1140	1140	A	900
	3 (Standard)		900	1020	900	1020	1140	B	790
	2 (Medium)		780	900	780	900	1140	C	690
	1 (Low)		780	780	780	780	1140	D	530
036	4 (High)	0.7	1160	1300	1160	1300	1300	A	1180
	3 (Standard)		1020	1160	1020	1160	1300	B	1060
	2 (Medium)		880	1020	880	1020	1300	C	940
	1 (Low)		880	880	880	880	1300	D	760
042	4 (High)	0.7	1400	1580	1400	1580	1580	A	1220
	3 (Standard)		1230	1400	1230	1400	1580	B	1040
	2 (Medium)		1050	1230	1050	1230	1580	C	860
	1 (Low)		1050	1050	1050	1050	1580	D	590
048	4 (High)	0.7	1600	1800	1600	1800	1800	A	1490
	3 (Standard)		1400	1600	1400	1600	1800	B	1320
	2 (Medium)		1200	1400	1200	1400	1800	C	1160
	1 (Low)		1200	1200	1200	1200	1800	D	900
060	4 (High)	0.7	2000	2260	2000	2260	2260	A	1860
	3 (Standard)		1760	2000	1760	2000	2260	B	1730
	2 (Medium)		1500	1760	1500	1760	2260	C	1590
	1 (Low)		1500	1500	1500	1500	2260	D	1390
070	4 (High)	0.7	2160	2400	2160	2400	2400	A	2010
	3 (Standard)		1920	2160	1920	2160	2400	B	1860
	2 (Medium)		1680	1920	1680	1920	2400	C	1720
	1 (Low)		1680	1680	1680	1680	2400	D	1500

Notes:¹ The unit is capable of high-low fan performance through the use of a 2-stage thermostat wired to specific terminals for High-Low CFM fan performance. Standard operation with a 1-stage thermostat is indicated as High CFM fan performance.

Electrical Data

Table 13: Standard PSC motor

Unit Size	Voltage/Hz/Ph	Compressor		Fan Motor FLA	Total Unit RLA	Minimum Voltage	Minimum Circuit Amps	Maximum Fuse Size
		RLA	LRA					
007	115/60-1	7.0	45.5	2.1	9.1	104	10.9	15
	208/230-60-1	3.4	22.0	1.0	4.4	197	5.3	15
	265/277-60-1	2.9	17.5	0.7	3.6	240	4.3	15
009	115/60-1	8.3	45.5	2.1	10.4	104	12.5	20
	208/230-60-1	4.0	22.0	1.0	5.0	197	6.0	15
	265/277-60-1	3.3	18.8	0.7	4.0	240	4.8	15
012	208/230-60-1	5.6	29.0	1.0	6.6	197	8.0	15
	265/277-60-1	4.7	20.0	0.7	5.4	240	6.6	15
015	208/230-60-1	5.6	29.0	1.0	6.6	197	8.0	15
	265/277-60-1	5.0	28.0	1.0	6.0	240	7.2	15
019	208/230-60-1	9.0	48.0	1.0	10.0	197	12.3	20
	265/277-60-1	7.1	43.0	1.0	8.1	240	9.8	15
024	208/230-60-1	13.5	58.3	1.7	15.2	197	18.6	30
	265/277-60-1	9.0	54.0	1.6	10.6	240	12.8	20
	208/230-60-3	7.1	55.4	1.7	8.8	197	10.6	15
	460-60-3	3.5	28.0	1.2	4.7	416	5.6	15
030	208/230-60-1	14.1	73.0	1.7	15.8	197	19.3	30
	265/277-60-1	11.2	60.0	1.6	12.8	240	15.6	25
	208/230-60-3	8.9	58.0	1.7	10.6	197	12.8	20
	460-60-3	4.2	28.0	1.2	5.4	416	6.5	15
036	208/230-60-1	16.7	79.0	3.0	19.7	197	23.9	40
	265/277-60-1	13.5	72.0	3.0	16.5	240	19.9	30
	208/230-60-3	10.4	73.0	3.0	13.4	197	16.0	25
	460-60-3	5.8	38.0	1.7	7.5	416	9.0	15
042	208/230-60-1	19.9	109.0	3.4	23.3	197	28.3	45
	208/230-60-3	13.6	83.1	3.4	17.0	197	20.4	30
	460-60-3	6.1	41.0	1.5	7.6	416	9.1	15
	575-60-3	4.2	33.0	1.6	5.8	520	6.9	15
048	208/230-60-1	21.4	135.0	4.5	25.9	197	31.3	50
	208/230-60-3	14.5	98.0	4.5	19.0	197	22.6	35
	460-60-3	6.3	55.0	2.0	8.3	416	9.9	15
	575-60-3	6.0	41.0	1.8	7.8	520	9.3	15
060	208/230-60-1	26.3	134.0	4.5	30.8	197	37.4	60
	208/230-60-3	15.6	110.0	4.5	20.1	197	24.0	35
	460-60-3	7.8	52.0	2.0	9.8	416	11.8	15
	575-60-3	5.8	38.9	1.8	7.6	520	9.1	15
070	208/230-60-3	19.6	136.0	4.5	24.1	197	29.0	45
	460-60-3	8.2	66.1	2.0	10.2	416	12.3	20
	575-60-3	6.6	55.3	1.8	8.4	520	10.1	15

Electrical Data (continued)

Table 14: Low static motor electrical data

Unit Size	Voltage/Hz/Ph	Compressor		Fan Motor FLA	Total Unit FLA	Minimum Voltage	Minimum Circuit Amps	Maximum Fuse Size
		RLA	LRA					
024	208/230-60-1	13.5	58.3	1.00	14.5	197	17.9	30
	265/277-60-1	9.0	54.0	1.00	10.0	240	12.2	20
	208/230-60-3	7.1	55.4	1.00	8.1	197	9.9	15
	460-60-3	3.5	28.0	1.00	4.5	416	5.3	15

Table 15: EC motor

Unit Size	Voltage/Hz/Ph	Compressor		Fan Motor FLA	Total Unit FLA	Minimum Voltage	Minimum Circuit Amps	Maximum Fuse Size
		RLA	LRA					
007	115/60-1	7.0	45.5	1.75	8.8	104	10.50	15
	208/230-60-1	3.4	22.0	0.94	4.3	197	5.19	15
009	115/60-1	8.3	45.5	1.75	10.1	104	12.13	20
	208/230-60-1	4.0	22.0	0.94	4.9	197	5.94	15
012	208/230-60-1	4.0	22.0	0.94	4.9	197	5.94	15
015	208/230-60-1	5.6	29.0	3.0	8.2	197	10.00	15
	265/277-60-1	4.7	20.0	2.6	7.4	240	8.85	15
019	208/230-60-1	9.0	48.0	3.0	11.6	197	14.25	20
	265/277-60-1	7.1	43.0	2.6	9.5	240	11.48	15
024	208/230-60-1	13.5	58.3	3.0	16.1	197	19.88	30
	265/277-60-1	9.0	54.0	2.6	11.4	240	13.85	20
	208/230-60-3	7.1	55.4	3.0	9.7	197	11.88	15
	460-60-3*	3.5	28.0	2.6	5.9	416	6.98	15
030	208/230-60-1	14.1	73.0	5.0	19.1	197	22.6	35
	265/277-60-1	11.2	60.0	4.1	15.3	240	18.1	25
	208/230-60-3	8.9	58.0	5.0	13.9	197	16.1	25
	460-60-3*	4.2	28.0	4.1	8.3	416	9.4	15
036	208/230-60-1	16.7	79.0	5.0	21.7	197	25.9	40
	265/277-60-1	13.5	72.0	4.1	17.6	240	21.0	30
	208/230-60-3	10.4	73.0	5.0	15.4	197	18.0	25
	460-60-3*	5.8	38.0	4.1	9.9	416	11.4	15
042	208/230-60-1	19.9	109.0	5.9	25.8	197	32.18	50
	208/230-60-3	13.6	83.1	5.9	19.5	197	24.30	35
	460-60-3*	6.1	41.0	5.5	11.6	416	13.13	15
048	208/230-60-1	21.4	135.0	5.9	27.3	197	34.05	50
	208/230-60-3	14.5	98.0	5.9	20.4	197	25.43	35
	460-60-3*	6.3	55.0	5.5	11.8	416	13.38	15
060	208/230-60-1	26.3	134.0	5.9	32.2	197	42.28	60
	208/230-60-3	15.6	110.0	5.9	21.5	197	28.90	40
	460-60-3*	7.8	52.0	6.9	14.7	416	16.65	20
070	208/230-60-3	19.6	136.0	7.4	27.0	197	33.90	50
	460-60-3*	8.2	66.1	6.9	15.1	416	17.5	25

Note: *All 460-60-3 units require 4-wire power, which includes a neutral wire. EC motors 460-60-3 volt units require a 265 volt power supply. Both a hot AND a neutral wire are required to obtain proper fan motor voltage. Therefore, 4-wires with a wye type wiring arrangement is required.

Operating Limits

Information for Initial Start-Up Only

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.*

Extended (Geothermal) Range Units:

Extended (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.*

Table 16: Water source heat pump operating temperature limits (for continuous duty)

Operating Mode	Entering Air °F				Entering Water °F			
	Minimum		Maximum		Standard Range		Geothermal Range	
	DB	WB	DB	WB	Minimum	Maximum	Minimum	Maximum
Cooling	65	55	85	71	55	110	50	110
Ambient	50	—	100	—	—	—	—	—
Heating	50	—	80	—	55	90	20	90
Ambient	50	—	85	—	—	—	—	—

Notes: 1. In the heating mode, the sum of the entering air + entering water must be $\geq 100^{\circ}\text{F}$.

2. MINIMUM WATER FLOW = 1.5 GPM/Ton.

3. 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.

Table 17: Water source heat pump operating temperature limits at start-up (not for continuous duty)

Operating Mode	Entering Air °F				Entering Water °F			
	Minimum		Maximum		Standard Range		Geothermal Range	
	DB	WB	DB	WB	Minimum	Maximum	Minimum	Maximum
Cooling	50	40	105	87	45	120	30	120
Ambient	45	—	110	—	—	—	—	—
Heating	40	—	85	—	40	95	20	100
Ambient	40	—	85	—	—	—	—	—

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. Three-phase system imbalance shall not exceed 2%.

Correction Factors

Table 18: Airflow correction factors

	Percent of Nominal Airflow								
	85	90	95	100	105	110	115	120	125
Total Cooling Capacity	0.976	0.983	0.990	1.000	1.004	1.011	1.017	1.024	1.031
Sensible Cooling Capacity	0.926	0.950	0.975	1.000	1.024	1.048	1.073	1.098	1.122
kW - Cooling	0.976	0.984	0.993	1.000	1.010	1.019	1.027	1.036	1.044
Total Heat of Rejection	0.976	0.984	0.991	1.000	1.006	1.014	1.021	1.029	1.036
Total Heating Capacity	0.969	0.979	0.988	1.000	1.007	1.017	1.027	1.036	1.046
kW - Heating	1.009	1.006	1.003	1.000	0.998	0.995	0.992	0.990	0.987
Total Heat of Absorption	0.968	0.978	0.988	1.000	1.008	1.018	1.028	1.038	1.048

Table 19: 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 20: 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 21: 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 22: Ethanol

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

Combination Balancing and Shutoff (Ball) 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.

Figure 26: Shut off ball valve



Motorized Valve

Used for variable pumping applications, the valve is wired directly to the H8 terminal on the MicroTech III controller and typically piped in the return water line from the unit. The valve will allow water flow only when there is a call for heating or cooling. The valve is rated for 300 psig (2070 kPa).

Figure 27: 2-way motorized valve



Supply and Return Water Hoses

Figure 28: Flow control, 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 Thermoplastic Rubber (EPTF) with 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. Fittings are either plated steel or brass. The maximum working pressure for both the shut-off ball valve and shut-off ball valve with strainer is 400 psig. The maximum operating temperature is -4°F (-20°C) to 250°F (121°C).

A summary of various hose kits are listed below. See Catalog 1196 for more detailed hose kit features.

Hose kit # 1: Condensate hose kits – one flexible fire rated condensate hose with fixed male NPT x female JIC swivel with male NPT adapter.

Figure 29: Condensate hose kit



Hose kit # 2: Supply and return hose kits – Two flexible supply and return hoses with fixed male NPT x female JIC swivel with male NPT adapter.

Hose kit # 4: Supply and return hose kit with shut-off ball valves - valves have pressure and temperature (P/T) ports to allow pressure and temperature readings during commissioning.

Hose kit # 5: Supply and return hose kit with shut-off ball valves, y-strainer and blowdown valve – The supply hose assembly includes a shut-off ball valve with one pressure/temperature test port, y-strainer with blowdown valve. The return assembly includes a shut-off ball valve with pressure/temperature test port and drain valve for servicing.

Hose kit # 6: Supply and return hose kit with ball valve and auto flow control valve – The supply hose assembly includes a shut-off ball valve with one pressure/temperature test port. The return assembly includes a shut-off ball valve with two pressure/temperature test ports and auto flow control valve.

Hose kit # 7: Supply and return hose kit with ball valve and auto flow control valve, y-strainer and blowdown valve – The supply hose assembly includes a shut-off ball valve with one pressure/temperature test port y-strainer with blowdown valve. The return assembly includes a shut-off ball valve with two pressure/temperature test ports and auto flow control valve.

Two or Four-Inch Filter Rack (Option)

Selectable as factory-mounted or as an optional field-installed kit, replacing the standard 1" filter rack. It provides a 1" (25 mm) extended collar for connection of return air ductwork and accepts a 2" (51 mm) or 4" thick, high performance filter. The filter rack can be mounted for left hand or right hand filter removal by rotating it 180 degrees. Two thumb screws allow easy removal of the access door for quick filter changes without using a tool.

See page 41 for details.

Size 007, 009, 012 – Left Hand Return, End and Straight Discharge

Physical data (in inches)

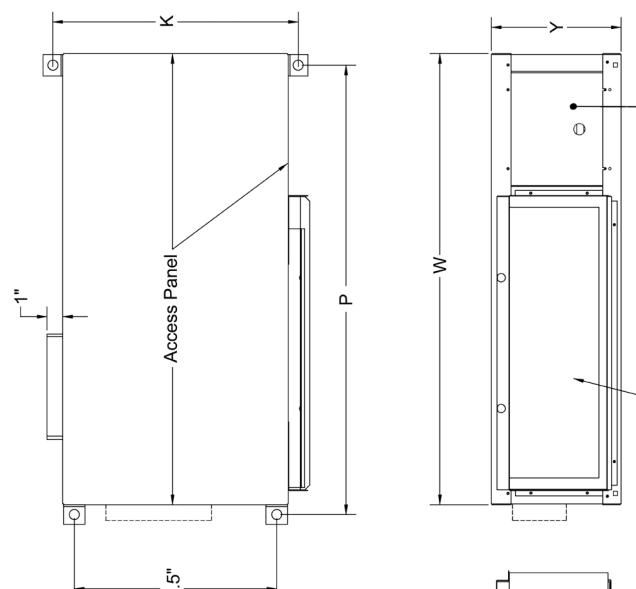
Unit Size	007	009	012
Fan Wheel - D x W	6.3 x 6.0	6.3 x 6.0	6.2 x 7.4
Standard PSC Motor-Horsepower	1/8	1/8	1/8
Coil Face Area (Sq. Ft.)	1.11	1.11	1.53
Coil Rows	3	3	4
Refrigerant Charge (oz.)	22 oz.	22 oz.	31.5 oz.
Standard 1" Filter, (Qty.) Size (In.)	(1)10x20	(1)10x20	(1)10x26
Water Connections, FPT	1/2	1/2	1/2
Condensate Connections, FPT	3/4	3/4	3/4
Weight, Operate (Lbs.)	99	99	115
Weight, Shipping (Lbs.)	130	130	145

Overall unit dimensions

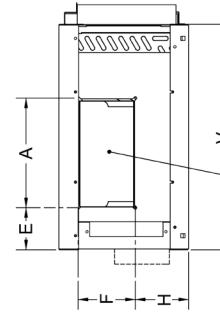
Size 007, 009 = 20"W x 34"L x 11.50"H
 Size 012 = 20"W x 40)L x 11.50"H

Dimensions are approximate

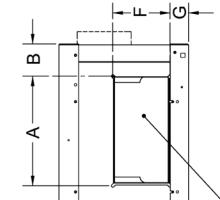
Right and left hand return determined by
 facing the water connection side of the unit.



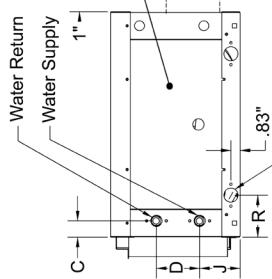
End Discharge View



Straight Discharge View



Access Panel



Dimensional data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	P1	R	T	V	W	Y
007-009	7.55	3.25				4.12	4.95	1.80	5.00	3.60	22	8.93	3.23	3.00	34	31	3.73	1.25	20	34
012	9.60	2.80	1.45		3.83	3.75	4.80	5.00	1.80	40	37	3.73	40	37	34	40	40	40	11.50	

Size 007, 009, 012 – Right Hand Return, End and Straight Discharge

Physical data (in inches)

Unit Size	007	009	012
Fan Wheel - D x W	6.3 x 6.0	6.3 x 6.0	6.2 x 7.4
Standard PSC Motor Horsepower	1/8	1/8	1/8
Coil Face Area (Sq. Ft.)	1.11	1.11	1.53
Coil Rows	3	3	4
Refrigerant Charge (oz.)	22 oz.	22 oz.	31.5 oz.
Standard 1" Filter, (Qty.) Size (In.)	(1)10 x 20	(1)10 x 20	(1)10 x 26
Water Connections, FPT	1/2	1/2	1/2
Condensate Connections, FPT	3/4	3/4	3/4
Weight, Operate (Lbs.)	99	99	115
Weight, Shipping (Lbs.)	130	130	145

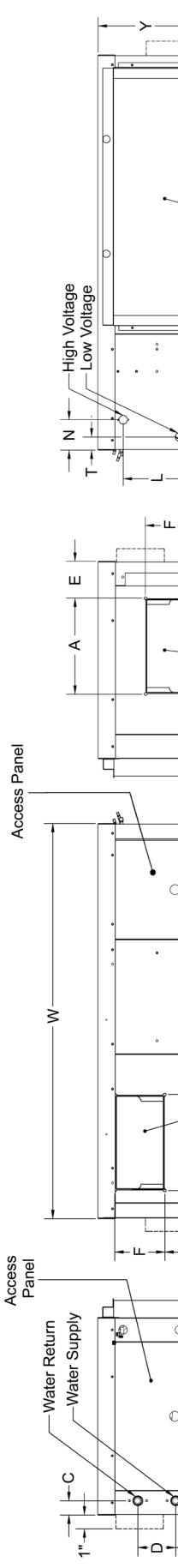
Overall unit dimensions
 Size 007, 009 = 20"W x 34"L x 11.50"H
 Size 012 = 20"W x 40)L x 11.50"H

Dimensions are approximate

Right and left hand return determined by
 facing the water connection side of the unit.

Straight Discharge View

End Discharge View



Dimensional data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	V	W	Y
007-009	7.55	3.25	4.12	4.95	1.80	5.00	3.60	22	8.93	3.23	3.00	34	31	3.73	1.25	20	34	11.50	
012	9.60	2.80	1.45	3.83	3.75	4.80	5.00	1.80			40	37					40		

Size 015, 019, 024 – Left Hand Return, End and Straight Discharge

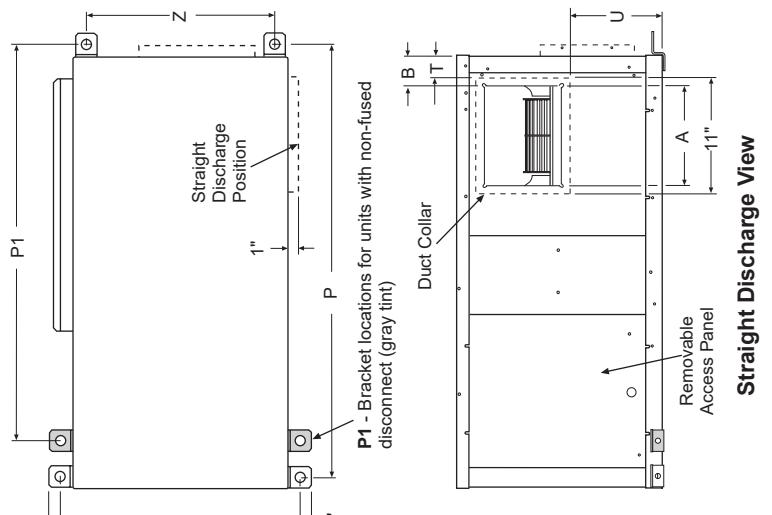
Physical Data (in inches)

Unit Size	015	019	024
Fan Wheel - D x W	9.5 x 7.1	9.5 x 7.1	9.5 x 7.1
Standard PSC Motor Horsepower	1/6	1/3	1/3
Coil Face Area (Sq. Ft.)	2.75	2.75	2.75
Coil Rows	3	3	3
Refrigerant Charge (oz.)	43 oz.	39.5 oz.	49 oz.
Standard 1" Filter, (Qty.) Size (In.)	(1)18 x 24	(1)18 x 24	(1)18 x 24
Water Connections, FPT	1/2	1/2	1/2
Condensate Connections, FPT	3/4	3/4	3/4
Weight, Operate (Lbs.)	195	195	195
Weight, Shipping (Lbs.)	214	214	214

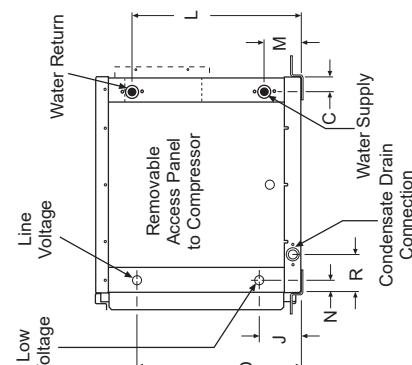
Overall unit dimensions =
20"W x 42"L x 19"H

Dimensions are approximate.

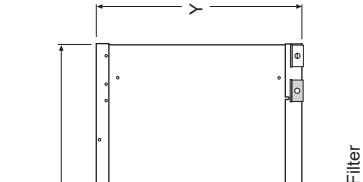
Right and left hand return
determined by facing the water
connection side of the unit.



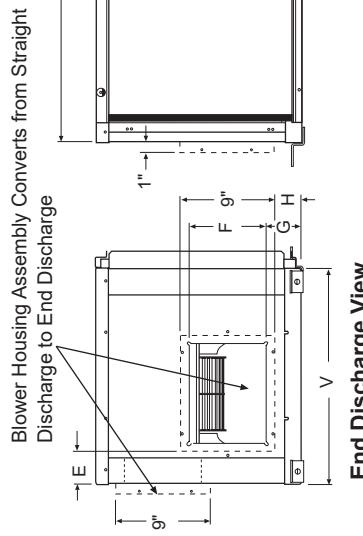
Straight Discharge View



Straight Discharge View



End Discharge View



Dimensional data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	Y	Z	
015, 019, 024	9.22	3.00	1.45	14.93	2.91	7.12	3.15	2.15	4.10	22	15.43	3.60	1.25	42	38.90	3.73	2.03	8.30	20	42	19	17.50

Size 019, 024 – Right Hand Return, End and Straight Discharge

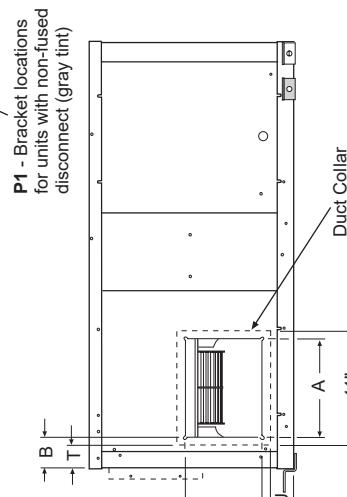
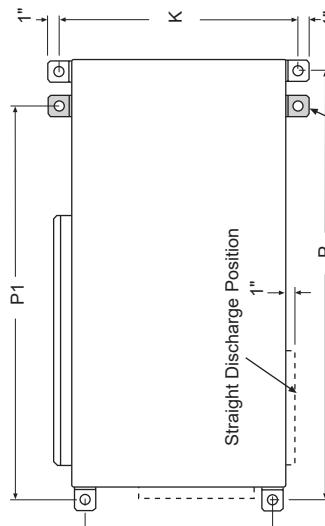
Physical data (in inches)

Unit Size	015	019	024
Fan Wheel - D x W	9.5 x 7.1	9.5 x 7.1	9.5 x 7.1
Standard PSC Motor Horsepower	1/6	1/3	1/3
Coil Face Area (Sq. Ft.)	2.75	2.75	2.75
Coil Rows	3	3	3
Refrigerant Charge (oz.)	43 oz.	39.5 oz.	49 oz.
Standard 1" Filter, (Qty.) Size (In.)	(1)18x 24	(1)18x 24	(1)18x 24
Water Connections, FPT	1/2	1/2	1/2
Condensate Connections, FPT	3/4	3/4	3/4
Weight, Operate (Lbs.)	195	195	195
Weight, Shipping (Lbs.)	214	214	214

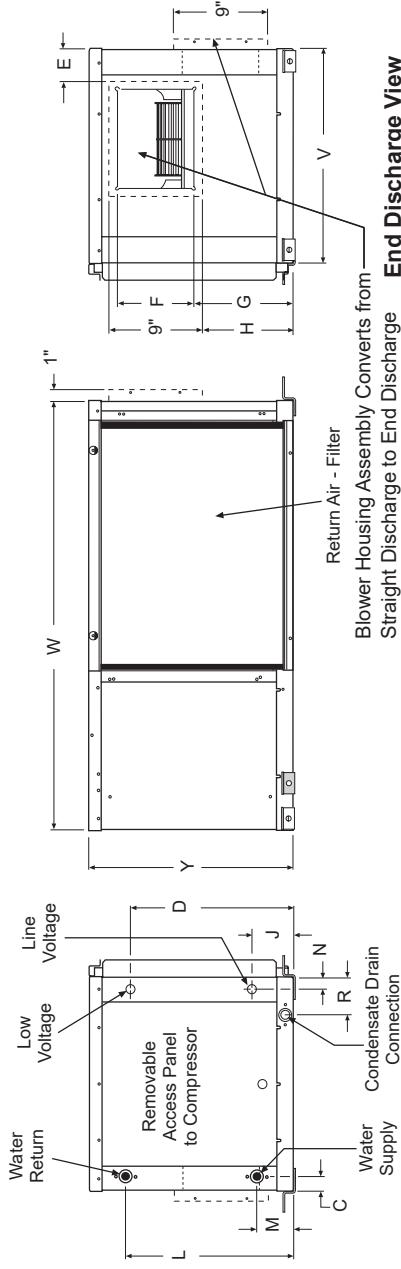
Overall unit dimensions =
20"W x 42"L x 19"H

Dimensions are approximate.

Right and left hand return
determined by facing the water
connection side of the unit.



Straight Discharge View



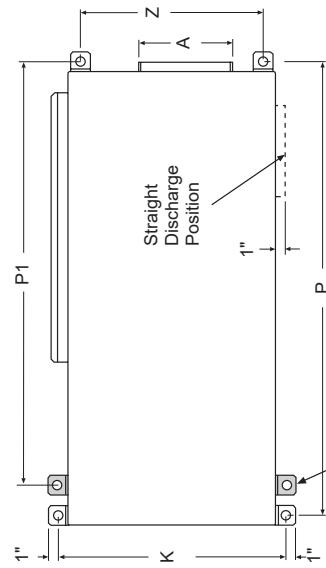
Dimensional data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	P1	R	T	U	V	W	Y	Z
015, 024	9.22	2.98	1.45	14.93	2.91	7.12	9.28	8.30	4.10	22	15.43	3.60	1.25	42	38.90	3.73	2.00	2.15	20	42	19	17.50

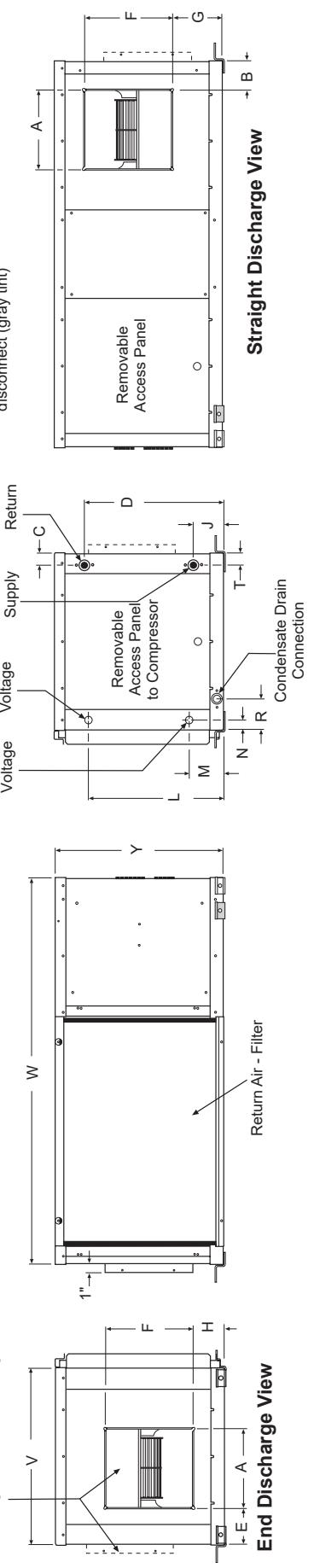
Size 030, 036 – Left Hand Return, End and Straight Discharge

Physical data (in inches)

Unit Size	030	036
Fan Wheel - D x W	9.5 x 7.1	9.5 x 7.1
Standard PSC Motor Horsepower	1/3	1/2
Coil Face Area (Sq. Ft.)	3.43	3.43
Coil Rows	3	3
Refrigerant Charge (oz.)	48 oz.	49 oz.
Standard 1" Filter, (Qty.) Size (In.)	(1)19 x 27	(1)19 x 27
Water Connections, FPT	3/4	3/4
Condensate Connections, FPT	3/4	3/4
Weight, Operate (Lbs.)	225	223
Weight, Shipping (Lbs.)	244	242



Blower Housing Assembly Converts from Straight Discharge to End Discharge



Dimensional data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	V	W	Y	Z
030 - 036	9.29	3.53	1.45	16.43	4.41	10.26	6.17	4.06	3.60	23	15.93	4.10	1.25	46	42.90	3.74	1.45	21	46	20
																			18.50	

Size 030, 036 – Right Hand Return, End and Straight Discharge

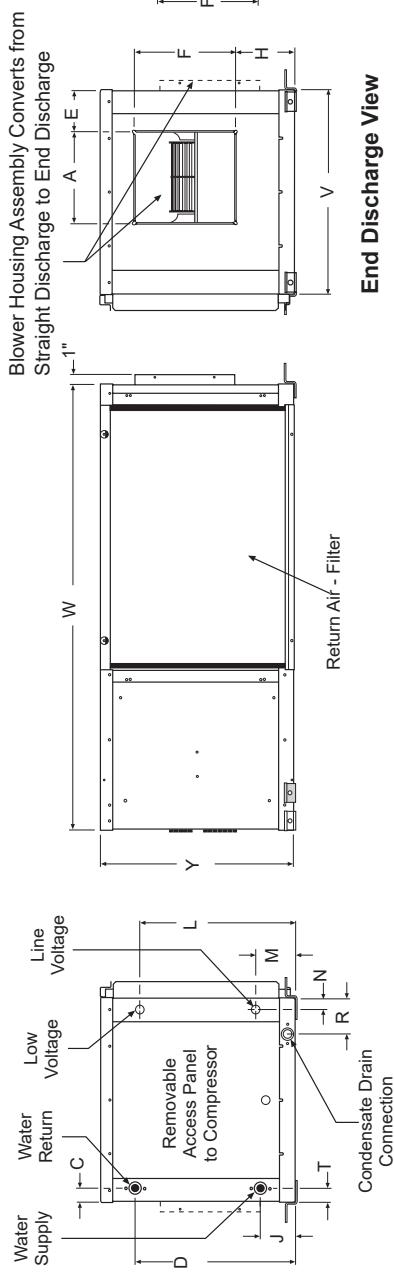
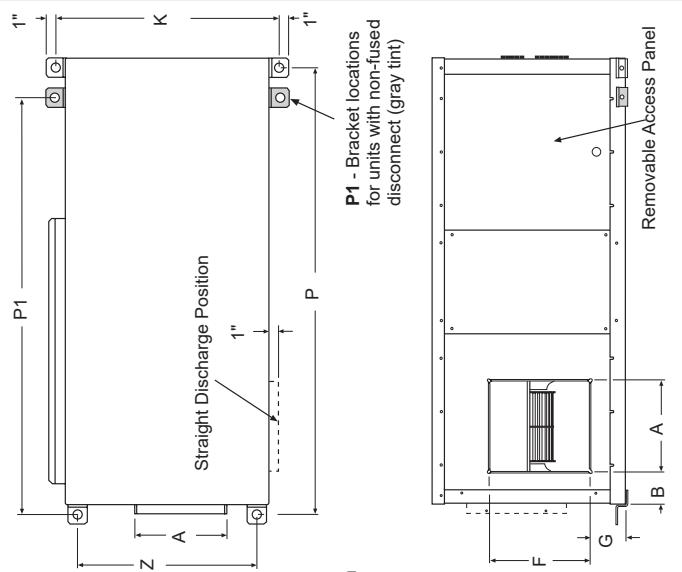
Physical data (in inches)

Unit Size	030	036
Fan Wheel - D x W	9.5 x 7.1	9.5 x 7.1
Standard PSC Motor Horsepower	1/3	1/2
Coil Face Area (Sq. Ft.)	3.43	3.43
Coil Rows	3	3
Refrigerant Charge (oz.)	48 oz.	49 oz.
Standard 1" Filter, (Qty) Size (In.)	(1)19x 27	(1)19x 27
Water Connections, FPT	3/4	3/4
Condensate Connections, FPT	3/4	3/4
Weight, Operate (Lbs.)	225	223
Weight, Shipping (Lbs.)	244	242

Overall unit dimensions = 21"W x 46"L x 20"H

Dimensions are approximate.

Right and left hand return determined by facing the water connection side of the unit.



Dimensional data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	V	W	Y	Z
030 - 036	9.29	3.53	1.45	16.43	4.41	10.26	4.06	6.17	3.60	23	15.93	4.10	1.25	46	42.90	3.74	1.45	21	46	20
																				18.50

Size 042, 048, 060, 070 – Left Hand Return, End and Straight Discharge

Physical data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	P1	R	T	V	W	Y	Z
Fan Wheel - D x W	042	12.9 x 11.1	048	12.9 x 11.1	060	12.9 x 11.1	070	12.9 x 11.1													
Standard PSC Motor Horsepower	1/2		3/4		3/4		3/4														3/4
Coil Face Area (Sq. Ft.)	4.43		4.43		6.11		6.11														6.11
Coil Rows	3		3		3		3														3
Refrigerant Charge (oz.)	60.0 oz.		55.0 oz.		74.0 oz.		85.0 oz.														28" W x 52" L x 23" H
Standard 1" Filter, (Qty.) Size (In.)	(2) 16 x 22.5		(2) 16 x 22.5		(2) 22 x 22		(2) 22 x 22														
Water Connections, FPT	3/4		3/4		3/4		3/4														
Condensate Connections, FPT	3/4		3/4		3/4		3/4														
Weight, Operate (Lbs.)	293		298		332		332														
Weight, Shipping (Lbs.)	314		319		351		351														

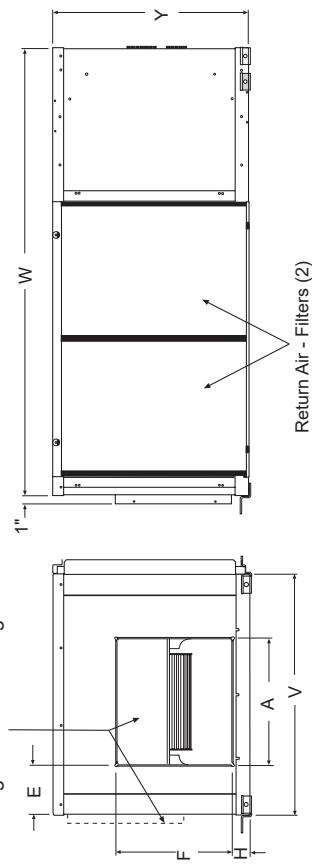
Overall unit dimensions =

28" W x 52" L x 23" H

Dimensions are approximate.

Right and left hand return determined by facing the water connection side of the unit.

Blower Housing Assembly Converts from Straight Discharge to End Discharge



End Discharge View

Dimensional data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	P1	R	T	V	W	Y	Z
042 - 070	14.68	4.89	1.45	19.43	5.76	13.43	8.06	1.95	3.60	23	17.43	5.60	1.25	52	48.80	3.74	1.45	28	52	23	25.50

Size 042, 048, 060, 070 – Right Hand Return, End and Straight Discharge

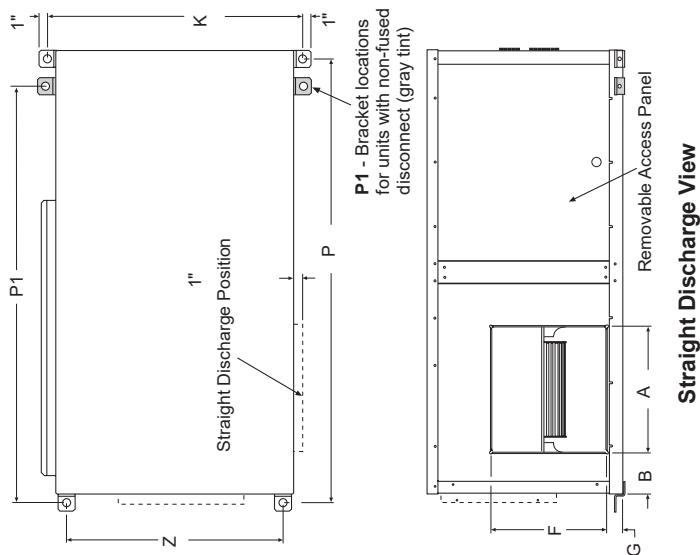
Physical data (in inches)

Unit Size	042	048	060	070
Fan Wheel - D x W	12.9 x 11.1	12.9 x 11.1	12.9 x 11.1	12.9 x 11.1
Standard PSC Motor Horsepower	1/2	3/4	3/4	3/4
Coil Face Area (Sq. Ft.)	3.43	3.43	6.11	6.11
Coil Rows	3	3	3	3
Refrigerant Charge (oz.)	60.0 oz.	55.0 oz.	74.0 oz.	85.0 oz.
Standard 1" Filter, (Qty.) Size (In.)	(2)16 x 22.5	(2)16 x 22.5	(2)22 x 22	(2)22 x 22
Water Connections, FPT	3/4	3/4	3/4	3/4
Condensate Connections, FPT	3/4	3/4	3/4	3/4
Weight, Operate (Lbs.)	293	298	332	351
Weight, Shipping (Lbs.)	314	319	351	351

Overall unit dimensions =
28" W x 52" L x 23" H

Dimensions are approximate.

Right and left hand return
determined by facing the water
connection side of the unit.



Straight Discharge Position

End Discharge View

Removable Access Panel

Dimensional data (in inches)

Unit Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	P1	R	T	V	W	Y	Z
042 - 070	14.68	4.89	1.45	19.43	5.76	13.43	1.95	8.06	3.60	30	17.43	5.60	1.25	52	48.80	3.74	1.45	28	52	23	25.50

Filter Rack/Return Air Duct Collar

Unit Sizes 007 Thru 070

Figure 30: Standard 1" filter rack – left hand return, end discharge

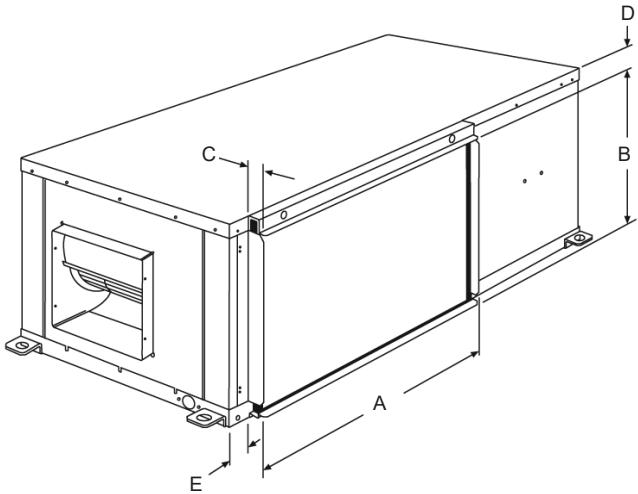
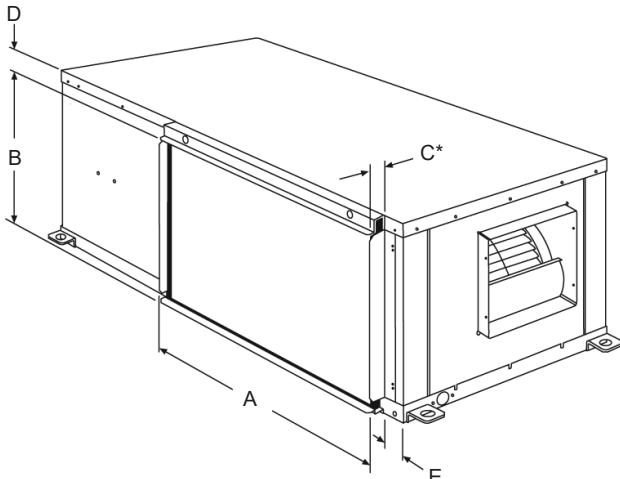


Figure 31: Standard 1" filter rack – right hand return, end discharge



Unit Size	Dimensions (inches)				
	A	B	C	D	E
007, 009	20.17	8.88	1.90	1.56	1.25
012	26.17	8.88	1.90	1.56	1.25
015, 019, 024	24.00	17.02	1.76	1.06	1.39
030, 036	27.32	18.01	1.63	1.06	1.63
042, 048	32.07	21.54	1.63	1.06	2.16
060, 070	44.20	20.97	1.63	1.06	2.16

Optional 2" or 4" Filter Rack Assembly

Figure 32: Optional 2" filter rack dimensions

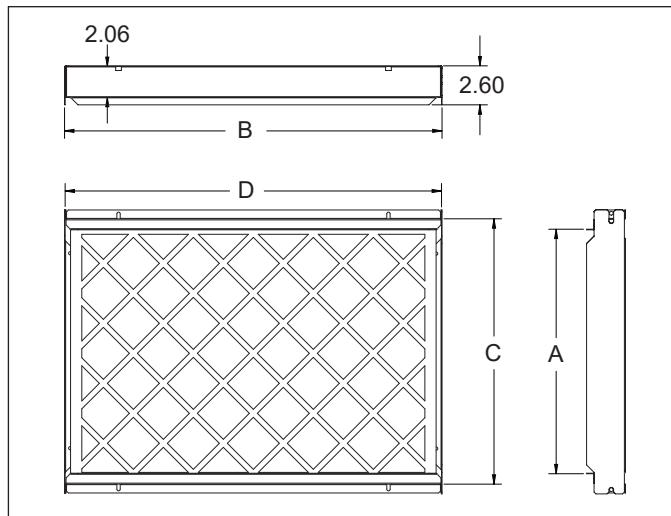
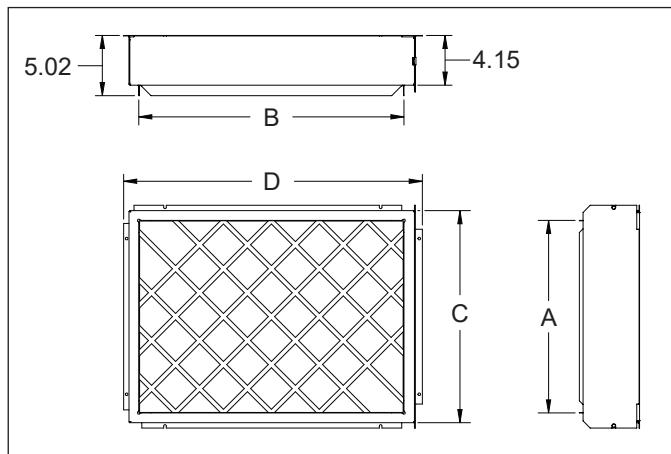


Figure 33: Optional 4" filter rack dimensions



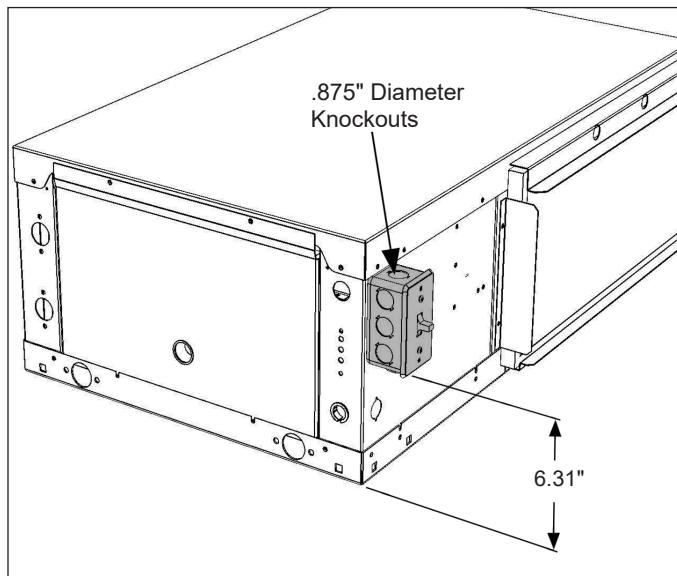
Unit Size	Filter Rack Type	Dimensions (inches)			
		A	B	C	D
007, 009	2-inch	8.22	21.43	9.55	21.43
	4-inch	8.08	18.14	9.70	21.08
012	2-inch	8.22	27.42	9.55	27.42
	4-inch	8.08	24.14	9.70	27.08
015, 019, 024	2-inch	16.29	25.15	17.62	25.15
	4-inch	16.08	22.14	17.70	24.94
030, 036	2-inch	17.23	30.75	18.56	30.75
	4-inch	17.08	26.14	18.70	29.90
042, 048	2-inch	20.28	34.75	21.61	34.75
	4-inch	19.33	30.34	20.95	35.10
060, 070	2-inch	20.22	46.9	21.54	46.9
	4-inch	19.33	42.46	20.95	47.22

Optional Non-Fused Disconnect Switch

- Notes:**
1. Disconnect switch on unit sizes 007 through 012 is always located on the right side, opposite the water connections.
 2. The disconnect switch on unit sizes 015 through 070 is located opposite the water connections based on a left-hand or right-hand unit.

Unit Sizes 007 Thru 012

Figure 34: 2½" x 4" Junction box with disconnect switch – sizes 007 through 012



Unit sizes 015 Thru 070

Figure 35: Disconnect switch – sizes 015 through 070 (left-hand unit shown)

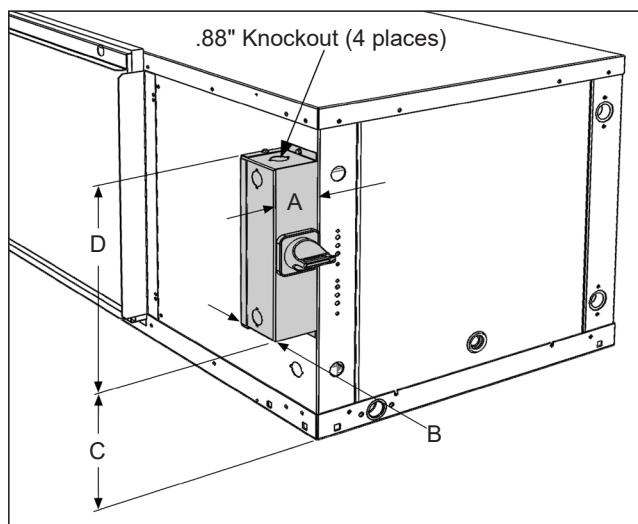
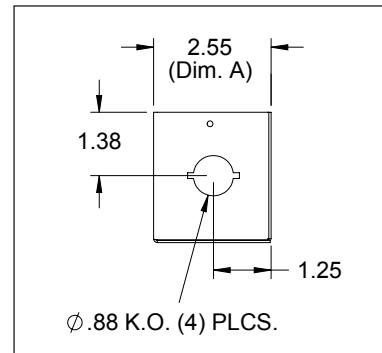


Figure 36: Knockout locations – sizes 015 through 070

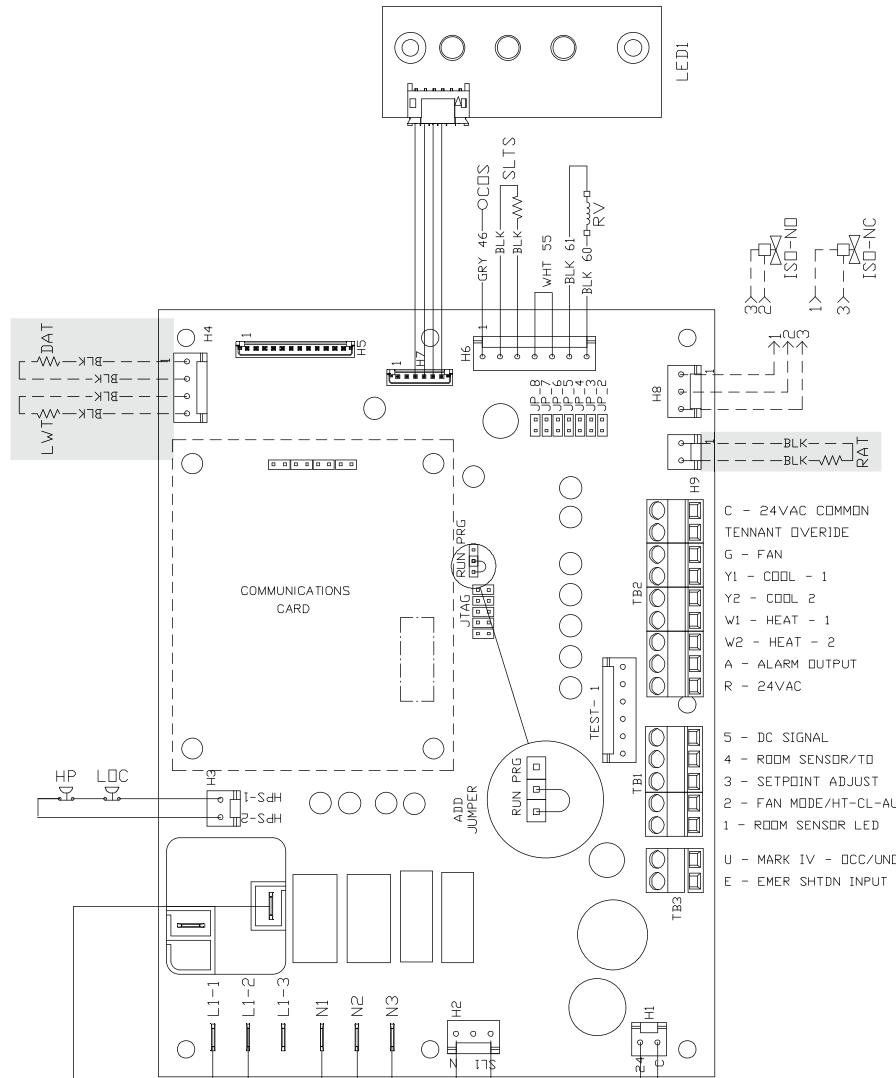


Unit Size	Dimensions (inches)			
	A	B	C	D
015, 019, 024	2.55	2.55	6.10	10.50
030, 036			6.55	
042, 048			8.11	
060, 070			7.90	

MicroTech III Controller with PSC Motor – 115-60-1 Unit Sizes 007-009

Drawing No. 910161297

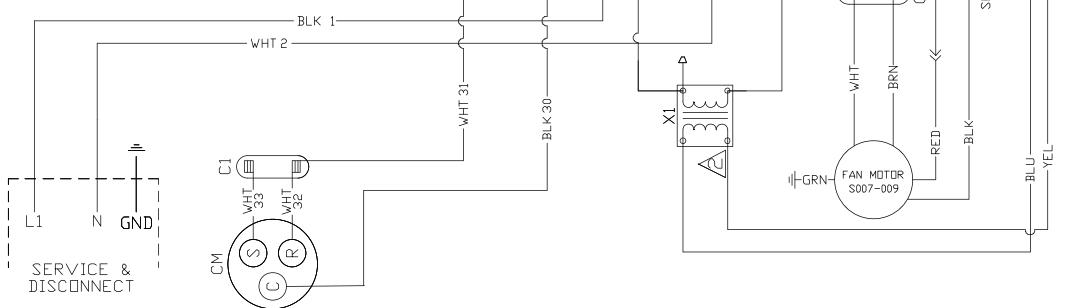
Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.



Notes:

- Main board jumpers:
No jumpers shorted, all open

- Transformer:
Unused wire to be capped.



Note: Gray tint areas in wiring diagram: Units configured with a communication module include a Leaving Water (LWT), Discharge Air (DAT) and a Return Air (RAT) Temperature sensor. The DAT and RAT sensors are shipped loose inside the control box for field installation.

MicroTech III Controller with PSC Motor, Communication Module – 208/230-60-1

Unit Sizes 015-060

Drawing No. 910167676

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.

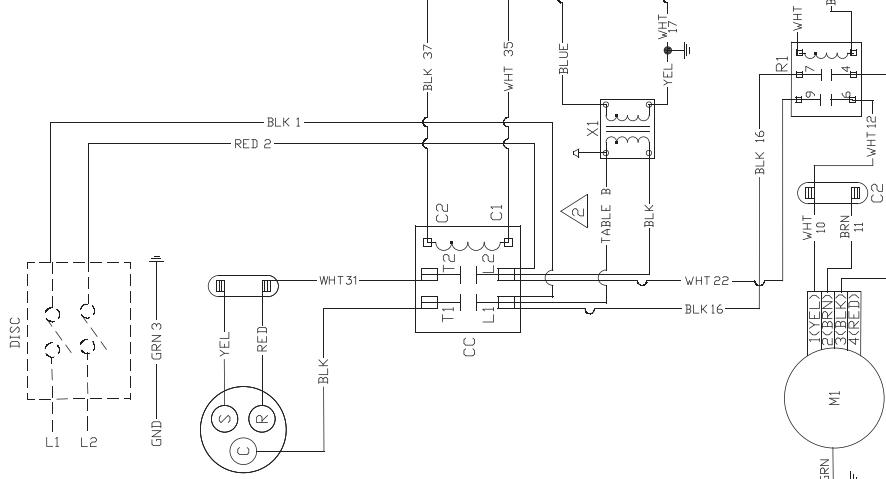
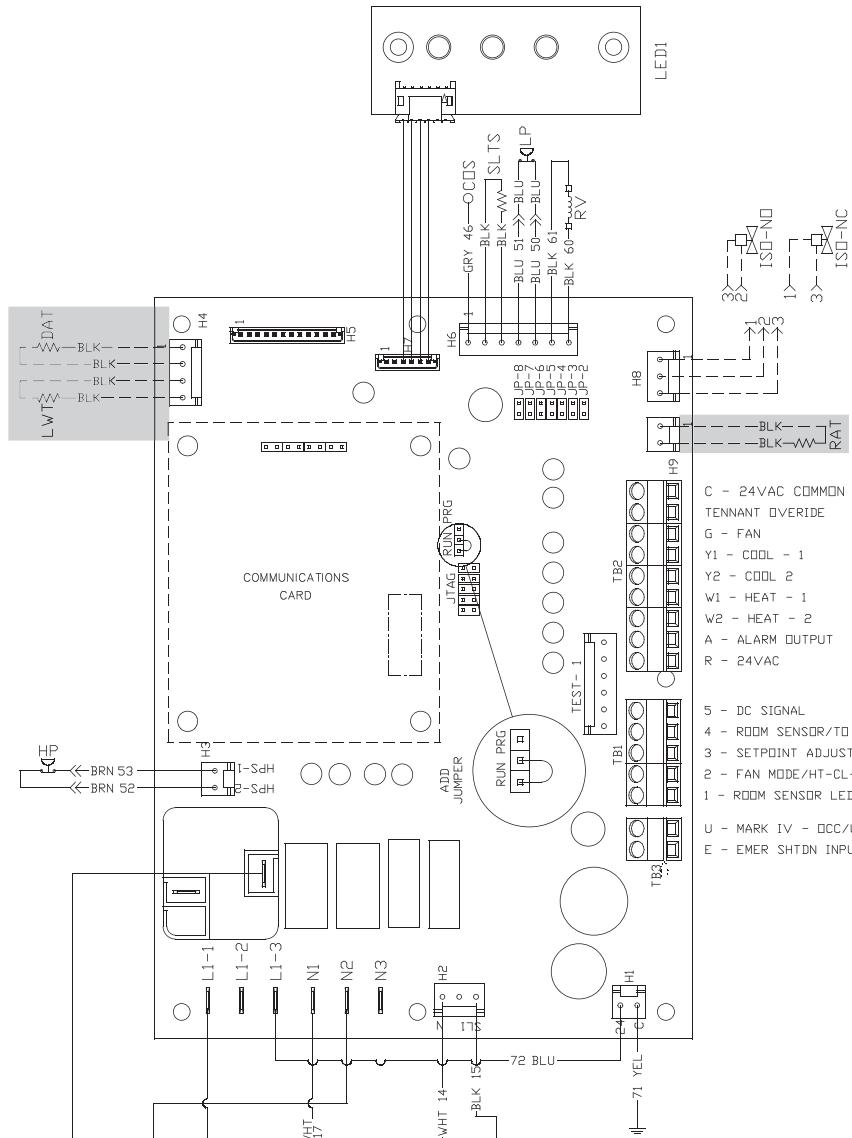
Table B	
208V	RED
230V	ORG

Legend

Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Compressor Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DISC	Non-Fused Disconnect Switch (Option)
HP	High Pressure Switch
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
LED1	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
P1	24VAC Supply IO Expansion Board
R1	Relay - Fan Motor
RAT	Return Air Temp Sensor
RV	Reversing Valve SolenoidX1
M1	Fan Motor
X1	Primary 24VAC Transformer
—	Standard Unit Wiring
---	Factory Installed Options

Notes:

- Main board jumpers:
JP3 Geothermal
- Transformer:
Unused wire to be capped.



Note: Gray tint areas in wiring diagram: Units configured with a communication module include a Leaving Water (LWT), Discharge Air (DAT) and a Return Air (RAT) Temperature sensor. The DAT and RAT sensors are shipped loose inside the control box for field installation.

MicroTech III Controller with PSC Motor – 208/230/460-60-3 Unit Sizes 024-070

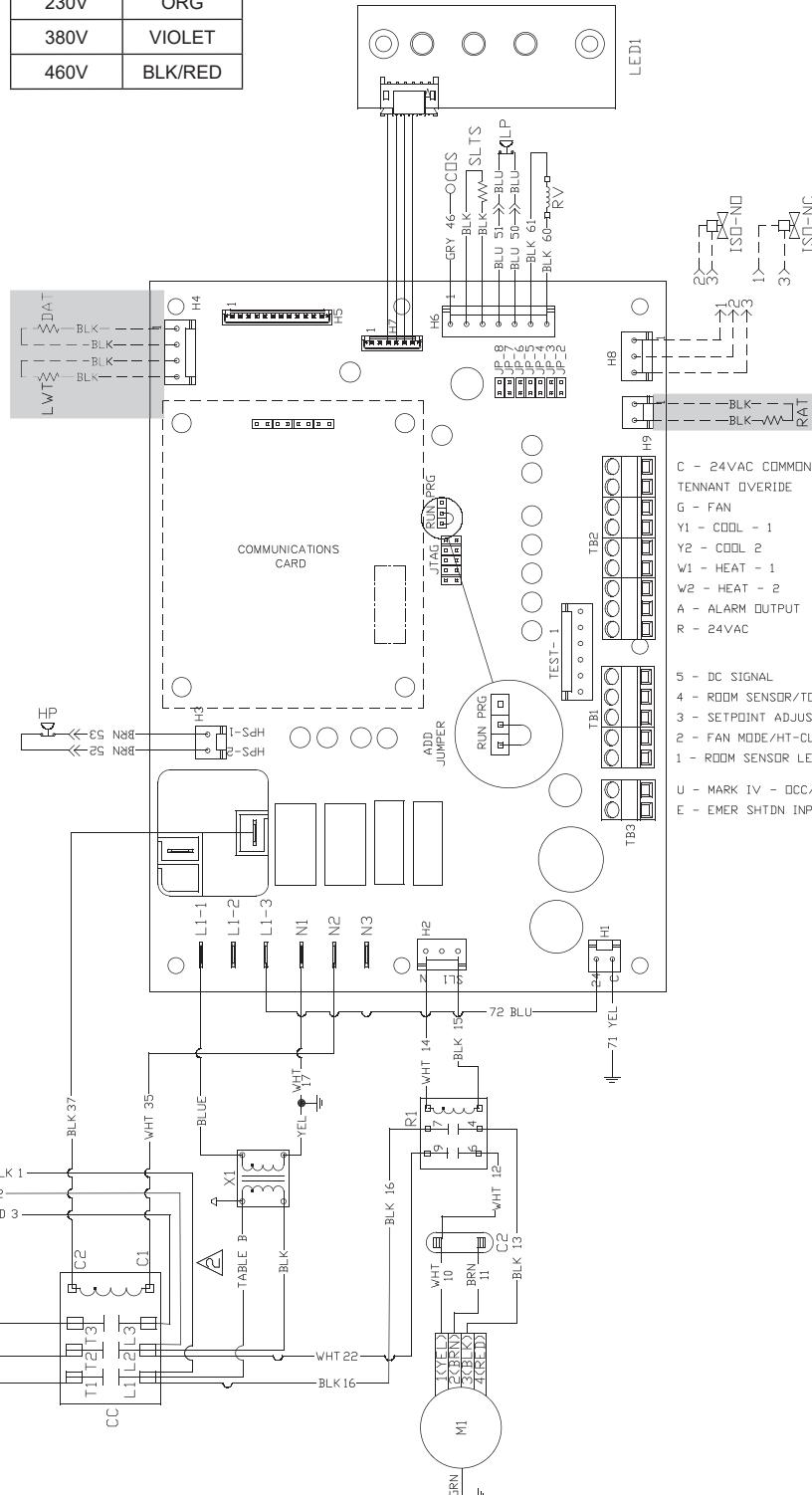
Drawing No. 910201061

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.

Legend

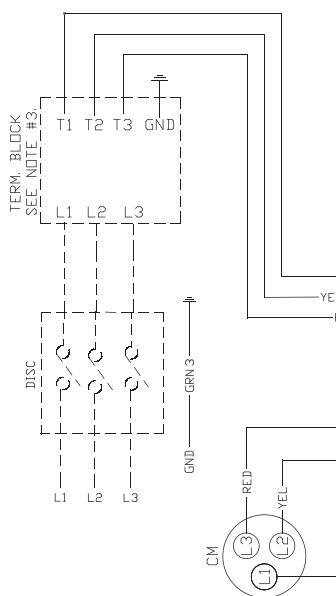
Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Compressor Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DISC	Non-Fused Disconnect Switch
EWT	Entering Water Temp Sensor
HP	High Pressure Switch
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
LED1	LED Announcer / Harness
LWT	Leaving Water Temp Sensor
LP	Low Pressure Switch
MIII	MicroTech III Main Board
R1	Relay - Fan Motor
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
SLTS	Suction Line Temp Sensor
TB1	Power Terminal Block
X1	Primary 24VAC Transformer
—	Standard Unit Wiring
---	Factory Installed Options

Table B	
208V	RED
230V	ORG
380V	VIOLET
460V	BLK/RED



Notes:

- Main board jumpers:
JP3 Geothermal
- Transformer:
Unused wire to be capped.
- Terminal block used on 380V, 50Hz
3-phase units
- Numbers (colors) shown on motor
diagram are terminal locations and do
not refer to wire numbers/colors



Note: Gray tint areas in wiring diagram: Units configured with a communication module include a Leaving Water (LWT), Discharge Air (DAT) and a Return Air (RAT) Temperature sensor. The DAT and RAT sensors are shipped loose inside the control box for field installation.

MicroTech III Controller with EC Motor and Optional Comm – 208/230-60-3 Unit Sizes 007–012

Drawing No. 910167992

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.

Table B	
208V	RED
230V	BRN

Legend

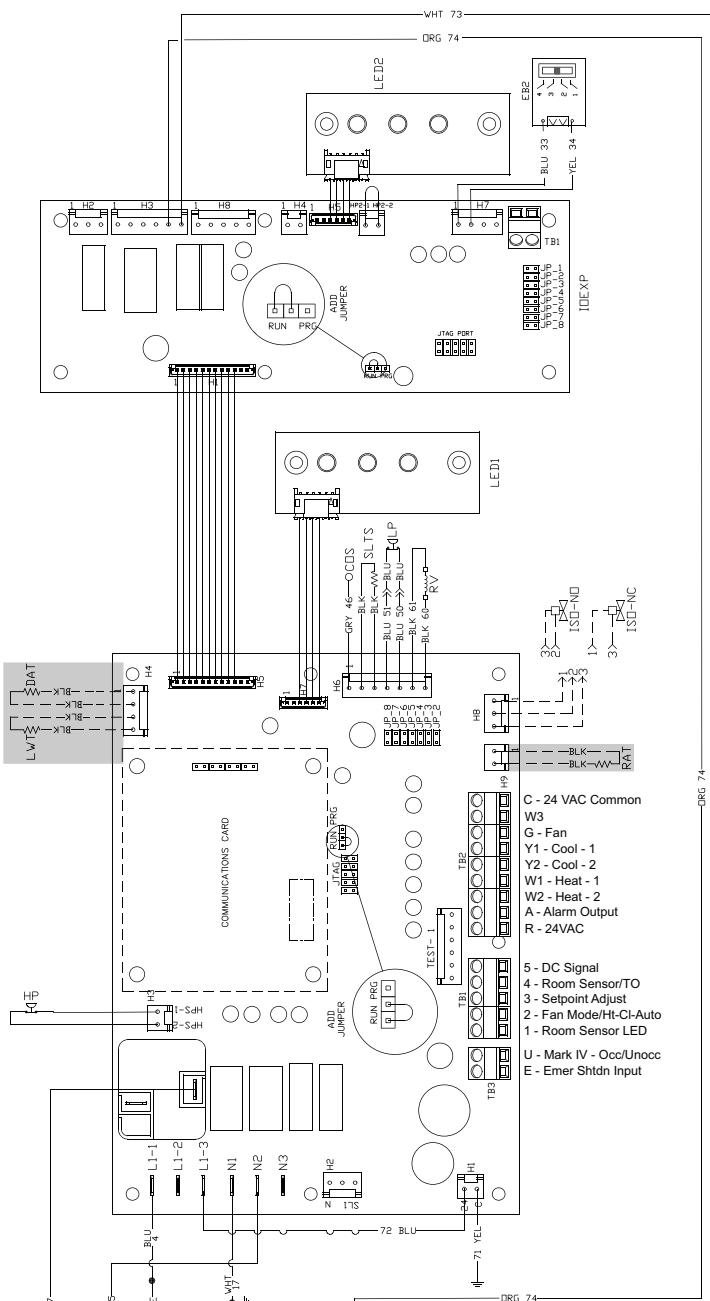
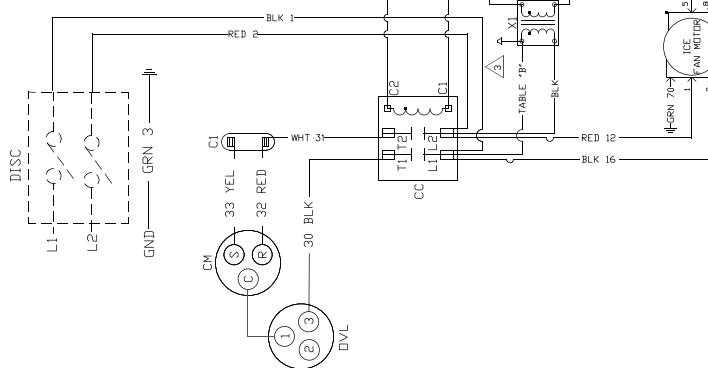
Item	Description
C1	Capacitor-Compressor
CC	Compressor - Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DISC	Non-Fused Disconnect Switch (Opt)
EB2	Exp Brd 2 - Fan Speed Cntl
HP	High Pressure Switch
IOEXP	I/O Expansion Board / Harness
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
LED1	LED Annunciator / Harness
LED2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
SLTS	Suction Line Temp Sensor
X1	Primary 24VAC Transformer
—	Standard Unit Wiring
---	Factory Installed Options
OVL	Compressor Overload

Notes:

1. Main Board Jumpers
 - JP2 Shorted for cycling fan
 - JP3 Geothermal
 - JP8 Shorted for IO Board Comm
2. IO Expansion Board Jumpers
 - All open for single stage compressor

Transformer:

Unused wire to be capped.



Note: Gray tint areas in wiring diagram: Units configured with a communication module include a Leaving Water (LWT), Discharge Air (DAT) and a Return Air (RAT) Temperature sensor. The DAT and RAT sensors are shipped loose inside the control box for field installation.

MicroTech III Controller with EC Motor and Optional Comm – 208/230-60-1 Unit Sizes 019-070

Drawing No. With Nidec EC Motor (910269510) and Genteq EC Motor Detail (910154305)

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.

Table B	
208V	RED
230V	ORG

Legend

Item	Description
C1	Capacitor-Compressor
CC	Compressor - Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DISC	Non-Fused Disconnect Switch (Opt)
EB2	Exp Brd 2 - Fan Speed Cntl
HP	High Pressure Switch
IOEXP	I/O Expansion Board / Harness
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
LED1	LED Annunciator / Harness
LED2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
SLTS	Suction Line Temp Sensor
IB	ECM Interface Board
IB-1	ECM Interface Board Connection 1
IB-2	ECM Interface Board Connection 2
X1	Primary 24VAC Transformer
—	Standard Unit Wiring
---	Factory Installed Options

Notes:

1. Main Board Jumpers

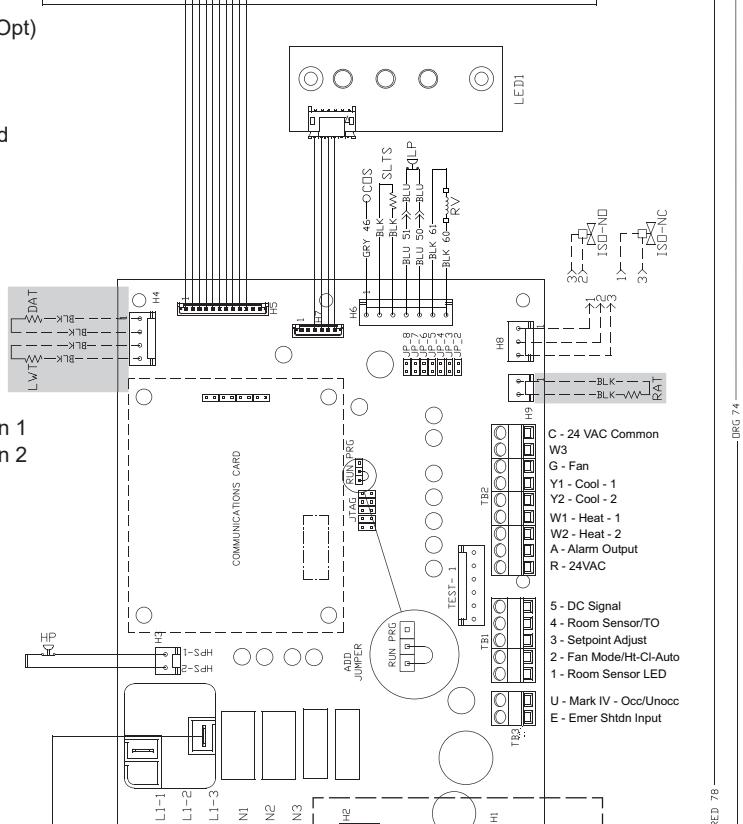
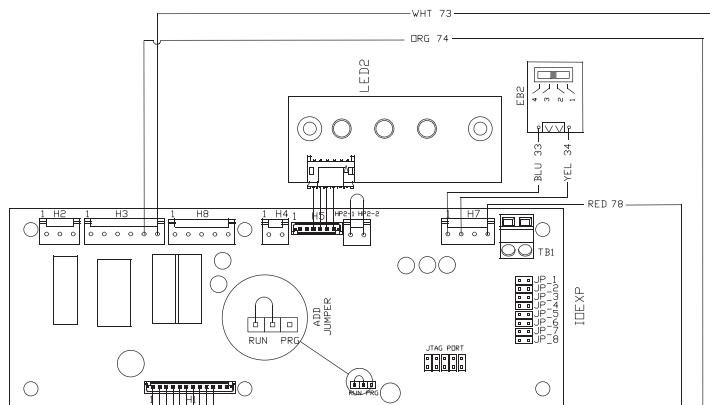
- JP2 Shorted for cycling fan
- JP3 Geothermal
- JP8 Shorted for IO Board Comm

2. IO Expansion Board Jumpers

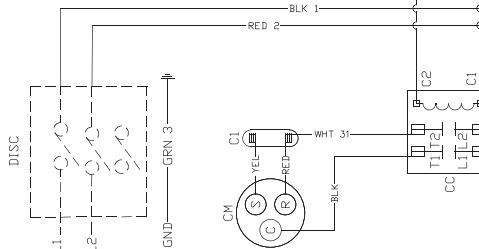
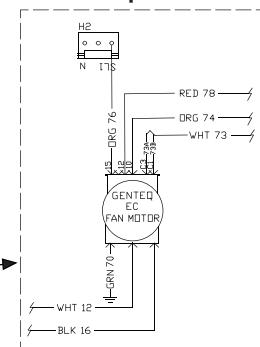
All open for single stage compressor

Transformer:

Unused wire to be capped.



Genteq EC Motor



Note: Gray tint areas in wiring diagram: Units configured with a communication module include a Leaving Water (LWT), Discharge Air (DAT) and a Return Air (RAT) Temperature sensor. The DAT and RAT sensors are shipped loose inside the control box for field installation.

MicroTech III Controller with EC Motor and Optional Communication Module – 460-60-3 Unit Sizes 024-070

Drawing No. With Nidec EC Motor (910269505) and Genteq EC Motor Detail (910168407)

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.

Table B	
460V	BLK/RED

Legend

Item	Description
C1	Capacitor-Compressor
CC	Compressor - Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DISC	Non-Fused Disconnect Switch (Opt)
EB2	Exp Brd 2 - Fan Speed Cntl
HP	High Pressure Switch
IOEXP	I/O Expansion Board / Harness
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
IB	ECM Interface Board
IB-1	ECM Interface Board Connection 1
IB-2	ECM Interface Board Connection 2
LED1	LED Annunciator / Harness
LED2	LED Annunciator / Harness
LP	Low Pressure Switch
SLTS	Suction Line Temp Sensor
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
X1	Primary 24VAC Transformer
—	Standard Unit Wiring
---	Factory Installed Options

Notes:

1. Main Board Jumpers

JP2 Shorted for cycling fan

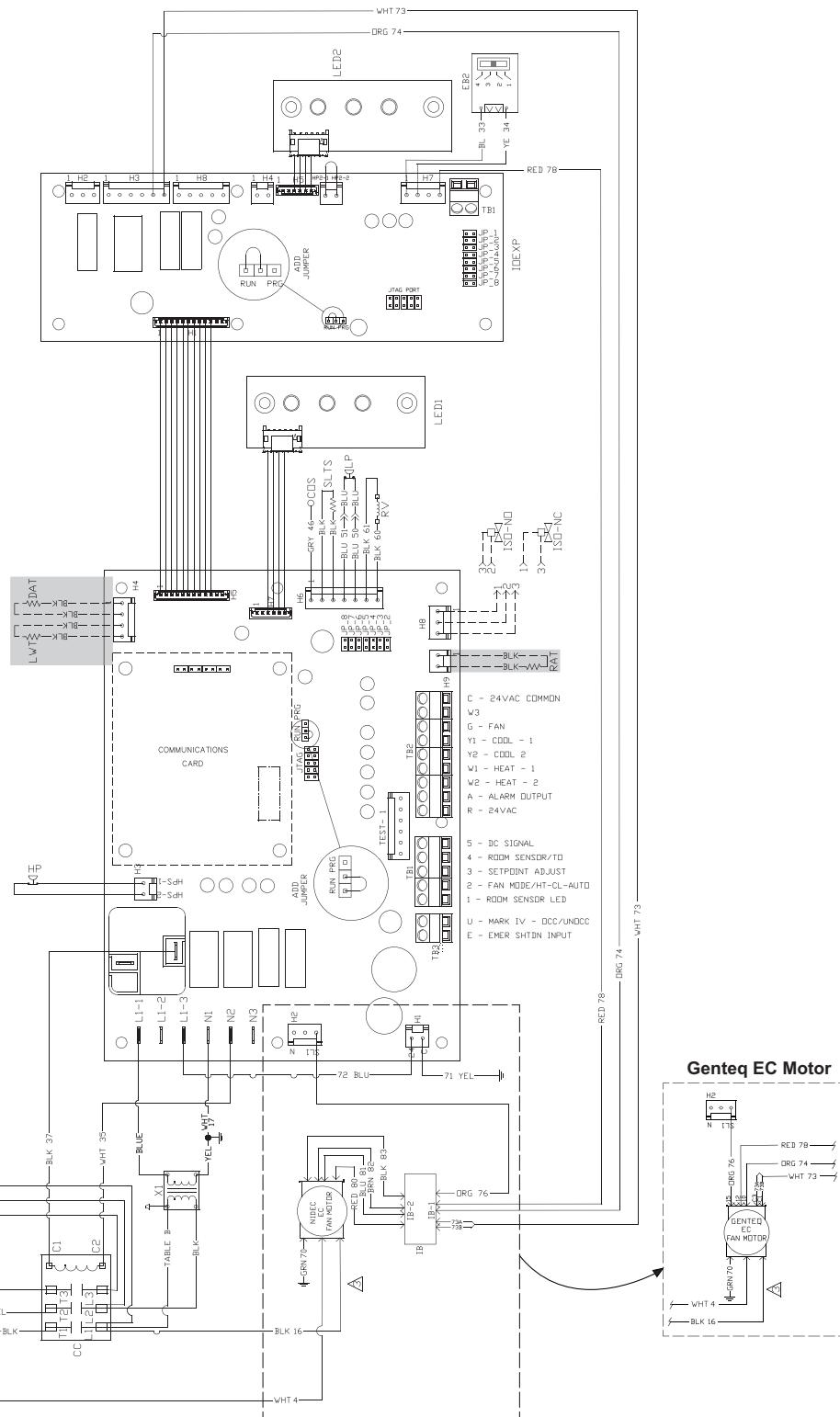
JP3 Geothermal

JP8 Shorted for IO Board Comm

2. IO Expansion Board Jumpers

All open for single stage compressor

 460V units with EC Fan Motor require a neutral wire.



Note: Gray tint areas in wiring diagram: Units configured with a communication module include a Leaving Water (LWT), Discharge Air (DAT) and a Return Air (RAT) Temperature sensor. The DAT and RAT sensors are shipped loose inside the control box for field installation.

Thermostats and Remote Indoor Sensor

Table 23: Thermostat Selections

Wall Mounted Thermostats & Remote Sensor for use with all WSHP units: Console, V-Stack, Enfinity & SmartSource models		Thermostats				Remote Sensor	
		Non-Programmable	Programmable (7 Day or 5+1+1) Non-Programmable	7 Day Programmable Non-Programmable			
		2H/2C	2H/2C	2H/3C Humidity Control	2H/3C Humidity Control WIFI		
Daikin Part Number		910411879	910411880	910417943	910417944	910420874	
Feature							
LCD Display	Room Temperature & Setpoint	•	•	•	•	Allows Remote Temperature Sensing	
	Room Humidity %			•	•		
Glow in the dark Display light		•	•	•	•		
Operating Modes	System	Heat-Off-Cool-Auto	Heat-Off-Cool-Auto	Heat-Off-Cool-Auto	Heat-Off-Cool-Auto		
	Fan	On-Auto	On-Auto	On-Auto-IAQ	On-Auto-IAQ		
Changeover	Manual	•	•	•	•	Use up to 16 sensors for temperature averaging	
	Auto	•	•	•	•		
Temperature Control Range		44° F to 90° F (7° C to 32° C)	44° F to 90° F (7° C to 32° C)	44° F to 90° F (7° C to 32° C)	44° F to 90° F (7° C to 32° C)		
Adjustable Setpoint Limits		•	•	•	•		
Keypad Lockout				•	•		
Filter Change Reminder			•	•	•		
Programmable Fan		•	•	•	•		
Power Type	Battery	2 AA Alkaline Batteries					
	Hardwire (Common Wire)	18 to 30 VAC	18 to 30 VAC	18 to 30 VAC	18 to 30 VAC		
Permanent Memory Retention		•	•	•	•		
Remote Indoor Sensor Capable (Requires Daikin P/N: 910420874)			•	•	•		
Terminals		Rh, RC, G, Y, Y2, C, O, B, W/E, W2	Rh, RC, C, Y, Y2, W/E, W2, G, B, O, S1, S2	Rh, RC, C, Y, Y2, W/E, W2, G, B, O, S1, S2, H, D	Rh, RC, C, Y, Y2, W/E, W2, G, B, O, S1, S2, H, D		
Application							
Dehumidification	Smart Dehumidification			•	•		
	Simplified	•	•	•	•		
	Humidistat Controlled			•	•		
Electric Heat	Boilerless	•	•	•	•		
	Supplemental	•	•	•	•		
	Primary	•	•	•	•		
Waterside Economizer		•	•	•	•		
Hydronic Heat		•	•	•	•		

Room Temperature Sensors

Table 24: Room Temperature Sensors for BAS Operation

		Room Temperature Sensors			
		Basic Room Sensor	Cool to Warm Adjust	Digitally Adjustable Display Sensor	
Room Sensors for use with all WSHP units with a BACnet or LonWorks Communication Module: Console, V-Stack, Enfinity & Smart-Source models					
		Temperature Sensing, LED Status Indication, Override/Reset Button	Cool/Warm Temperature Sensing Adjustment, LED Status Indication, Override/Reset Button	Temperature, Occupancy, Alarm, Setpoint and Status display, Override/Reset and Occupied/Unoccupied Buttons	Temperature, Humidity, Occupancy, Alarm, Setpoint and Status display, Override/Reset and Occupied/ Unoccupied Buttons
Daikin Part Number		910152149	910171464	910152147	910121754
Feature					
Setpoint Adjustment		None	Cool to Warm	Digitally Adjustable	Digitally Adjustable
Display	Room Temperature & Setpoint			•	•
	Room Humidity & Setpoint				•
Stages	Heating	4	4	4	4
	Cooling	3	3	3	3
Operating Modes	System				Heat-Off-Cool-Auto Dehumidify
	Fan				On-Auto
	Occupancy			LCD Display of Occupied-Unoccupied Icon	LCD Display of Occupied-Unoccupied Icon
Annunciation	Status LED	•	•	LCD Display of Unit Status	LCD Display of Unit Status
	LCD Alarm Display			•	•
Reset	Alarm	•	•	•	•
	Setback Override	•	•	•	•
Application					
Dehumidification	Smart Dehumidification				•
Electric Heat	Boilerless	•	•	•	•
	Supplemental	•	•	•	•
	Primary	•	•	•	•
Waterside Economizer		•	•	•	•
Hydronic Heat		•	•	•	•

General

Units shall be supplied completely factory assembled, piped, internally wired, fully charged with R-410A and capable of operating over an entering water temperature range of 45°F to 120°F on standard range models, and 30° to 120°F for geothermal range models. All equipment must be rated and certified in accordance with AHRI/ISO 13256-1 and must be tested, investigated, and determined to comply with the requirements of the standards for Heating and Cooling Equipment UL-1995 for the US and CAN/CSA-C22.2 NO. 236 for Canada. Each unit shall be ETL, ETLC and CE Listed. Each unit shall be run-tested at the factory. The installing contractor shall be responsible for furnishing and installing water source heat pumps as indicated on the plans and per the installation instructions.

Option

All geothermal range units shall have an insulated water-to-refrigerant heat exchanger. An additional refrigerant temperature sensor shall disable compressor operation at 6.5°F, or at a temperature common to low-temperature operation and not one common to boiler/tower operation (28°F). Geothermal range units shall have an insulated refrigerant-to-water heat exchanger and insulated water and refrigerant tubing; all designed to help prevent sweating.

Casing and Cabinet

The cabinet shall be fabricated from heavy gauge G-60 galvanized sheet metal with interior surfaces lined with 1/2-inch thick, 1-1/2 lb. [1/2" thick coated glass fiber insulation] [3/8" thick closed-cell non-fibrous Rubatex IAQ insulation]. The insulation shall have a flame spread of less than 25 and a smoke developed classification of less than 50 per ASTM E-84 and UL 723. All fiberglass shall be coated and have exposed edges tucked under flanges to prevent the introduction of glass fibers into the air stream. All insulation must meet NFPA 90A requirements.

Units shall be configured in one of the following airflow arrangements:

- Left Return/End Discharge
- Left Return/Straight Discharge
- Right Return/End Discharge
- Right Return/Straight Discharge

Units shall have a factory-installed 1" duct flange on the discharge of the blower and must have a minimum of two access panels, one for the compressor compartment and one for the blower compartment. Unit shall have a corrosion resistant polypropylene (PP) plastic "dual-sloped" drain pan with a drain connection being flush mounted to the unit casing. It is the installing contractor's responsibility to provide sufficient clearance so that units can be easily removed for servicing.

Option

The cabinet shall be fabricated from heavy gauge G-60 galvanized sheet metal with interior surfaces lined with 3/8-inch, 1.8 lb. closed-cell foam material designed to absorb medium frequency sound and shall meet NFPA 90A requirements.

Filter Rack and Filters

Unit shall have a 2-sided, 1" throwaway filter and a 1" factory-installed combination filter rack/return air duct collar. The filter shall be removable from either side of the unit.

Option

Units shall have a 2" throwaway filter in a 4-sided filter rack with duct collar, or a 4" thick, high efficiency Merv 13 filter in a 4-sided filter rack with duct collar. Filter rack shall have a removable access door on the side to accommodate filter removal.

Refrigerant Circuit

Units shall have a sealed refrigerant circuit, which includes a non-CFC depleting R-410A refrigerant [rotary (sizes 007-015), and scroll compressor (sizes 019 to 070)]. In addition, each unit will have a thermostatic expansion valve, an aluminum fin and rifled copper tube refrigerant-to-air heat exchanger, a reversing valve and a water-to-refrigerant coaxial heat exchanger. The coaxial coils shall be made of [copper] [or optional cupronickel] and shall be deeply fluted to enhance heat transfer and minimize fouling and scaling. The coaxial coil shall have a working pressure of 500 psig on the waterside of the unit and 600 psig on the refrigerant side for all R-410A units. The compressor shall have thermal overload protection. Safety controls shall include a minimum of 3 safety devices; high refrigerant pressure switch, low refrigerant pressure switch and a low refrigerant suction temperature sensor. The low refrigerant suction temperature sensor shall provide freeze protection for the water coil and the air coil. Refrigerant gauge access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent the compressor from operating via a microprocessor lockout circuit. The lockout circuit shall be reset at the thermostat or at the unit disconnect switch.

Option

The coaxial coil shall be made of cupronickel inner tube and a painted steel outer tube and shall be deeply fluted to enhance heat transfer and minimize fouling for applications involving city or well water.

Sound Package

Option

The hermetic compressor shall be mounted on compressor manufacturer furnished rubber grommets. On unit sizes larger than 1 ton, the hermetic compressor shall have a double isolation system. The compressor shall be mounted on compressor manufacturer furnished rubber grommets on a mass plate under the compressor. The mass plate shall have a dual material assembly. The top is heavy gauge galvanized steel. The bottom is a viscoelastic isolation material. The isolation material is 1/8" thick, 1 lb./sq. ft. with a barrier layer to improve the sound transmission loss. The assembly reduces compressor vibration that can be transmitted to the cabinet.

Option

For additional sound attenuation on sizes 1½ tons and larger, a compressor blanket constructed from high performance Duracoustic sound material with superior sound absorption and deadening properties shall be provided. The sound rated material has a density of 1.5 lb/ft³ and is made from a loaded vinyl reinforced barrier and is embedded with 0.5" urethane foam.

Option

007-019 have a dual layer of fiberglass insulation that is strategically placed in the compressor compartment.

Drain Pan

The condensate pan shall be constructed of a corrosion resistant polypropylene (PP) to prevent corrosion and sweating. The bottom of the drain pan shall be sloped on two planes to provide complete drainage of water from the pan to meet IAQ requirements. The water source heat pump unit as standard shall be supplied with electronic condensate overflow protection. A mechanical float switch will not be accepted.

Option

Unit to have corrosion-resistant 304 insulated stainless steel drain pan. Fan and motor assembly

Fan and Motor Assembly

Unit shall have a direct drive centrifugal fan. The fan housing shall have a removable orifice ring to facilitate fan motor and fan wheel removal. The fan housing shall protrude through the cabinet to facilitate field supply duct connection. The fan motor shall be multi-speed, permanently lubricated, PSC type isolated from the fan housing with vibration grommets and internal thermal overload protection. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule.

Units above one ton shall have a terminal strip mounted on the fan motor to facilitate motor speed change.

EC Motor Option

An EC motor shall be optional for unit sizes 007 thru 070. The EC motor shall deliver precise speed and economical performance regardless of system static pressure.

Option (007-012)

The fan motor shall be permanently lubricated, constant torque electronically commutated for improved operation. Field adjustable CFM settings shall be accomplished from a 4-position switch in the control box.

Option (015-070)

The fan motor shall be permanently lubricated, variable speed, constant CFM, electronically commutated for improved operation. Field adjustable CFM settings shall be accomplished from a 4-position switch in the control box. The constant CFM EC motor shall have the ability to reduce the CFM as the space temperature approaches the thermostat setpoint for improved dehumidification. Units with 460/60/3 power require the 4th wire neutral.

Electrical

A control box shall be located within the unit and shall contain controls for compressor, reversing valve and fan motor operation and shall have either, a 50VA or (optional) 75VA transformer and a terminal block for low voltage field wiring connections. Unit shall be name-plated to accept time delay fuses or HACR circuit breaker for branch over-current protection of the power source. Unit control system shall provide heating or cooling as required by the set points of the wall thermostat. The unit control scheme shall provide for fan operation simultaneous with compressor operation (fan interlock) regardless of the thermostat type. The unit shall be capable of providing an output signal to an LED on the thermostat or to a central monitoring panel to indicate a "fault" condition from the activation of any one of the safety switches.

Option

Disconnect Switch - This factory-installed option shall include the addition of a 2 or 3-pole switch mounted on the unit. The switch shall have a lockout/tag out feature. The switch shall be rated to handle the unit only (not to include additional amperage from field installed accessories).

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. Delayed de-energizing of the reversing valve for quiet reversing valve operation.
5. Compressor short cycle protection of a minimum between 300 to 360 seconds before restart is possible.
6. Random unit start-up after coming off on unoccupied mode or after initial power up.
7. Single grounded wire connection for activation of the unoccupied or unit shutdown modes.
8. Night setback temperature setpoint input signal from the wall thermostat.
9. Override signal from wall thermostat to override unoccupied mode for 2 hours.
10. Brownout protection to suspend unit operation if the supply voltage drops below 80% of normal.
11. Condensate overflow protection to suspend cooling or dehumid operations in an event of a full drain pan.
12. Suspended compressor operation upon activation of the refrigerant pressure switch(es).
13. Cooling operation activated for 60 seconds upon activation of the low suction temperature - defrost cycle.

- 14.** Method of defeating compressor, reversing valve and fan time delays for fast service diagnostics.
- 15.** Remote reset - provides means to remotely reset automatic lock-outs generated by high/low pressure faults and/or low temperature faults.
- 16.** Fault Retry clears faults the 1st two times they occur within a 24-hour period and triggers automatic lock-out on 3rd fault.

Option

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 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
- Support optional control outputs

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°F);
- Room sensor with timed-override button and set point adjustment (-3 to +3°F);
- Room sensor (no options, sensor only).

Option

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.

Units with LONWORKS Communication Module are 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.

Warranty

Manufacturer shall warranty equipment for a period of 12 months from start-up or 18 months from shipping (whichever occurs first).

Option

Manufacturer shall warranty equipment for a period of 12 months from start-up or 18 months from shipping (whichever occurs first). Manufacturer shall warranty the compressor an additional 1 year from the expiration date of the standard warranty.

Manufacturer shall warranty equipment for a period of 12 months from start-up or 18 months from shipping (whichever occurs first). Manufacturer shall warranty the refrigerant circuit an additional 1 year from the expiration date of the standard warranty.

Manufacturer shall warranty equipment for a period of 12 months from start-up or 18 months from shipping (whichever occurs first). Manufacturer shall warranty the complete parts an additional 1 year from the expiration date of the standard warranty.

Manufacturer shall warranty equipment for a period of 12 months from start-up or 18 months from shipping (whichever occurs first). Manufacturer shall warranty the compressor an additional 4 years from the expiration date of the standard warranty.

Manufacturer shall warranty equipment for a period of 12 months from start-up or 18 months from shipping (whichever occurs first). Manufacturer shall warranty the refrigerant circuit an additional 4 year from the expiration date of the standard warranty.

Manufacturer shall warranty equipment for a period of 12 months from start-up or 18 months from shipping (whichever occurs first). Manufacturer shall warranty the complete parts an additional 4 years from the expiration date of the standard warranty.

Field Installed Accessories

Wall Thermostat Options

- Programmable Electronic Thermostat Two-stage heat/Two-stage cool, 7-day programmable. Subbase shall have system "Mode/Prog" and fan "Auto/On" switches. Thermostat shall have the option of an Optional Remote Sensor.
- Non-programmable, auto or manual changeover Two-stage heat/Two-stage cool, night setback override. Subbase shall have system "Cool/Off/Heat/Auto" and fan "Auto/On" switches. Thermostat shall have the option of an Optional Remote Sensor.

Wall Temperature Sensor Options:

- Wall Sensor with timed-override button.
- Wall Sensor with timed-override button and set point adjustment (55 to 95 deg F), fan mode switch (auto/on), operational mode button (Heat/Cool/Auto) and status LED to display fault condition.
- Wall Sensor with timed-override button and set point adjustment (-3 to +3 deg F), fan mode switch (auto/on), operational mode button (Heat/Cool/Auto) and status LED to display fault condition.

Hose Kits:

Two fire-rated flexible hoses with ASTM ratings of Flame Spread 25, Fuel Contribution 25 and Smoke Density 50 for connection to unit and field piping. Hose shall be covered with stainless steel braiding to prevent damage.

Valve Options:

- Combination balancing and shutoff valve with adjustable memory stop.
- Optional 2-way, Normally Open (N.O.) or Normally Closed (N.C.) motorized valves.

Automatic Flow Hose Kit:

The automatic flow hose kit shall include an automatic flow control valve, two ball valves, two flexible hoses, a high flow Y-strainer, and may include a strainer blow-down and various other accessories. The automatic flow control valve shall be factory set to a rated flow, and shall automatically control the flow to within 10% of the rated value over a 40 to 1 differential pressure, operating range (2 to 80 PSID). Operational temperature shall be rated from fluid freezing, to 225°F. The valve body shall be constructed from hot forged brass UNS C37700 per ASTM B-283 latest revision.

Boilerless System Kit

The Boilerless System Kit provides the necessary hardware to provide control of either a field-supplied or factory installed electric duct heater for emergency (boilerless) electric heat. The kit will not allow simultaneous operation of both the compressor and electric heater.



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.