ENGINEERING SUBMITTAL DATA

ED 19141-2

MAY 2026

SMARTSOURCE®

VERTICAL STACK WATER SOURCE HEAT PUMP

Models WSVF & WSVC
Unit Sizes 009–036
R-32 Refrigerant

Model WSVF

Model WSVC

Hazard Identification

⚠ DANGER
Danger indicates a hazardous situation, which will result in death or serious injury if not avoided.

⚠ WARNING
Warning indicates a potentially hazardous situations, which can result in property damage, personal injury, or death if not avoided.

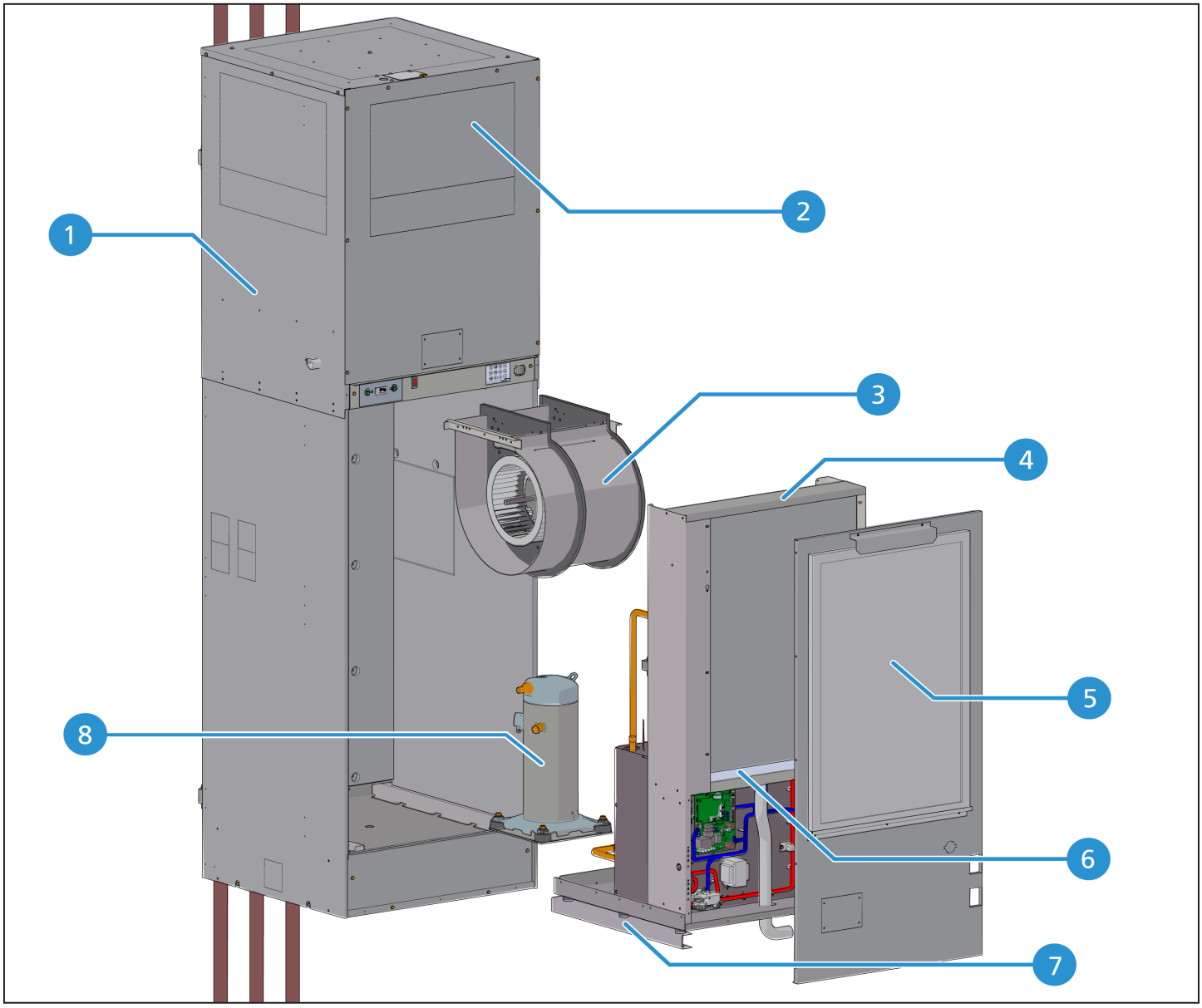
⚠ CAUTION
Caution indicates a potentially hazardous situations, which can result in minor injury or equipment damage if not avoided.

NOTICE
Notice indicates practices not related to physical injury.

NOTE: Indicates important details or clarifying statements for information presented.

Introduction

Figure 1: Component Locations



General Unit Information

Daikin Applied Vertical Stack (V-Stack) WSHP units are designed for use in multiple floor apartments, condominiums, hotels, nursing homes, and other similar applications. They require minimal floor space and are designed for multiple discharge arrangements.

- Available in multiple unit sizes—009 (3/4 tons, 2.6kW) through 036 (3 tons, 10.6kW)
- Units exceed ASHRAE 90.1 minimum efficiency levels
- R-32 refrigerant, environmentally friendly with low GWP

Table 1: Component locations

No.	Component
1	Cabinet
2	Supply air plenum
3	Motor/blower assembly
4	Chassis
5	Replaceable air filter
6	Primary condensate drain pan
7	Chassis vibration isolators
8	Compressor

Model Nomenclature

Table 2: Model Nomenclature

1	2-3	4	5-7	8	9	10-12	13	14	15-16	17	18	19-20	21	22	23-24	25	26
W	SV	C	024	E	1	TYY	C	M	13	A	Y	YY	S	Y	YY	Y	Y

27	28	29	30-32	33	34	35	36	37	38	39	40	41	42	43-44	45-47	48-50
Y	N	Y	088	Y	Y	Y	Y	Y	Y	Y	S	2	L	YY	YYY	YYY

Category	Code Position	Code	=	Description	
Product Category	1	W	=	Water Source Heat Pump	
Model Type	2-3	SV	=	SmartSource Vertical Stack	
Configuration	4	C	=	Chassis	
		F	=	Cabinet	
Nominal Capacity	5-7	009	=	9,000 Btu/h Nominal Cooling	
		012	=	12,000 Btu/h Nominal Cooling	
		015	=	15,000 Btu/h Nominal Cooling	
		018	=	18,000 Btu/h Nominal Cooling	
		024	=	24,000 Btu/h Nominal Cooling	
		030	=	30,000 Btu/h Nominal Cooling	
		036	=	36,000 Btu/h Nominal Cooling	
Voltage	8	A	=	115/60/1 (Sizes 009 and 012 Only)	
		E	=	208-230/60/1	
		J	=	265/60/1	
Design Series (Vintage)	9	1	=	Design Series 1	
Discharge Air	10	B**	=	Primary Supply - Back	88", 92", 96" Cabinets Only
		F**	=	Primary Supply - Front	
		L**	=	Primary Supply - Left	
		R**	=	Primary Supply - Right	
		T**	=	Primary Supply - Top	
		Y**	=	None (Chassis Only)	
	11	*B*	=	Secondary Supply - Back	88", 92", 96" Cabinets Only
		F	=	Secondary Supply - Front	
		L	=	Secondary Supply - Left	
		R	=	Secondary - Right	
		T	=	Secondary - Top	
		Y	=	None (Chassis Only)	
	12	**T	=	Tertiary - Top (88", 92", 96" Cabinets Only)	
		**Y	=	None (Chassis Only)	
Water Coil Type	13	C	=	Copper Inner Tube	
		G	=	Copper Inner Tube - Geothermal	
		S	=	Cupronickel Inner Tube	
		J	=	Cupronickel Inner Tube - Geothermal	
		Y	=	None (Cabinet Only)	
Unit Control	14	M	=	MicroTech Unit Controller	
		B	=	MicroTech Unit Controller + BACnet	
		T	=	MicroTech Unit Controller + Wireless	
Fan Motor Options	15	1*	=	PSC	
		3*	=	ECM - Constant CFM (015-036)	
		5*	=	ECM - Constant Torque (009-012)	
	16	*3	=	2-Speed Fan - Unit Toggle Switch (PSC Only)	
		*4	=	PWM Controlled (ECM Only)	
Insulation	17	A	=	1/2" Fiberglass - Skin Faced	
		E	=	3/8" Closed Cell Foam	
		F	=	1/2" Fiberglass - Foil Faced	

Category	Code Position	Code	=	Description	
Sound Package	18	S	=	Mass Plate	Chassis Only
		M	=	Mass Plate & Compressor Blanket (Sizes 024-036)	
		Y	=	None	
Supplemental Heating	19	H*	=	Hot Water Coil - 1-Row	Requires EC Motor Option
		J*	=	Hot Water Coil - 2-Row	
		Y*	=	None	
	20	*V	=	3-Way Motorized Valve for Hot Water Coil	
		*Y	=	None	
Filters	21	S	=	Standard, 1" Fiberglass	
		M	=	1" MERV 8	
		H	=	2" MERV 13 (Requires EC Motor Option)	
		Y	=	None (Chassis Only)	
Water Flow Options	22	C	=	2-Way Motorized Iso-Valve, General Close-Off Pressure N.C. (Normally Closed)	
		V	=	2-Way Motorized Iso-Valve, General Close-Off Pressure N.O. (Normally Open)	
		H	=	2-Way Motorized Iso-Valve, High Close-Off Pressure N.C. (Normally Closed)	
		E	=	3-Way Motorized Iso-Valve, General Close-Off Pressure N.C. (Normally Closed)	
		G	=	3-Way Motorized Iso-Valve, High Close-Off Pressure N.C. (Normally Closed)	
		Y	=	None	
Piping Package	23	B*	=	Auto Flow Regulator 1.5 GPM	
		C*	=	Auto Flow Regulator 2.0 GPM	
		D*	=	Auto Flow Regulator 2.5 GPM	
		E*	=	Auto Flow Regulator 3.0 GPM	
		F*	=	Auto Flow Regulator 3.5 GPM	
		G*	=	Auto Flow Regulator 4.0 GPM	
		H*	=	Auto Flow Regulator 4.5 GPM	
		I*	=	Auto Flow Regulator 5.0 GPM	
		J*	=	Auto Flow Regulator 5.5 GPM	
		K*	=	Auto Flow Regulator 6.0 GPM	
		L*	=	Auto Flow Regulator 7.0 GPM	
		M*	=	Auto Flow Regulator 8.0 GPM	
		N*	=	Auto Flow Regulator 9.0 GPM	
		O*	=	Auto Flow Regulator 10.5 GPM	
		Y*	=	None	
	24	*S	=	Strainer	
		*Y	=	None	
Future Use	25	Y	=	None	
Corrosion Protection	26	C	=	Anti-Coil Corrosion Protection Package	
		Y	=	None	
Future Use	27	Y	=	None	
Electrical Options	28	F	=	Fused Disconnect with Wire Harness	
		N	=	Non-Fused Disconnect with Wire Harness	
		H	=	HACR Breaker (115V/208-230V Only)	
Power & Control Access	29	S	=	Side	Cabinet Only
		T	=	Top (88”, 92”, 96” Cabinets Only)	
		Y	=	None (Chassis Only)	
Cabinet Height	30-32	080	=	80" Cabinet Height	Cabinet Only
		088	=	88" Cabinet Height	
		092	=	92" Cabinet Height	
		096	=	96" Cabinet Height	
		KDN	=	63.5" Cabinet Height	
		YYY	=	None (Chassis Only)	

Category	Code Position	Code	=	Description	
Factory-Installed Subbase	33	2	=	2" Subbase	Cabinet Only; 96″ Cabinets with a Sub-base must Ship Horizontally with Packaging Selection 1 or 2.
		3	=	3" Subbase	
		4	=	4" Subbase	
		5	=	5" Subbase	
		Y	=	None	
Secondary Drain Pan	34	G	=	Galvanized	
		S	=	Stainless Steel	
		Y	=	None (Chassis Only)	
Riser Location	35	L	=	Left Cabinet	
		R	=	Right Cabinet	
		B	=	Back Cabinet	
		A	=	Alternate Back Cabinet Piping	
		Y	=	None	
Riser Mounting	36	F	=	Factory Supplied - Shipped Attached (N/A with Packaging Selection 4,5,8, or 9)	
		J	=	Factory Supplied - Shipped Loose	
		Y	=	None	
Future	37	Y	=	None	
Future	38	Y	=	None	
Future	39	Y	=	None	
Standard or Special	40	S	=	Standard	
		X	=	Special	
Packaging	41	1	=	Standard Packaging	
		2	=	Multipack Cabinets - Multiple Cabinets on 1 Pallet Group	
		6	=	63.5" (KDN) Cabinet Multipack - 4 per Pallet	
		7	=	63.5" (KDN) Single Cabinet - 1 per Pallet	
		4	=	Single Packaging Cabinet Shipped Vertically	Requires Full Truckload Shipment
		5	=	Multipack Cabinet Shipped Vertically - Multiple Cabinets on One Pallet Group	
		8	=	Single Packaging Chassis + Cabinet	
		9	=	Multipack Chassis + Cabinet - Multiple Cabinets on One Pallet Group	
Extended Warranty	42	F	=	4 Year Extended Compressor Only Parts Warranty with 1st Year Labor Allowance	
		H	=	4 Year Extended Refrigerant Circuit Parts Warranty with 1st Year Labor Allowance	
		J	=	4 Year Extended Complete Unit Parts Warranty with 1st Year Labor Allowance	
		L	=	First Year Labor Allowance	
		M	=	1 Year Extended Compressor Only Parts Warranty with 1st Year Labor Allowance	
		N	=	1 Year Extended Refrigerant Circuit Parts Warranty with 1st Year Labor Allowance	
		S	=	1 Year Extended Complete Unit Parts Warranty with 1st Year Labor Allowance	
		T	=	4 Year Extended Complete Unit Parts Warranty with Labor Allowance	
Secondary Connection Stub Length	43-44	YY	=	None	
		06	=	6" Stub Out	
Riser Extension Above Cabinet	45-47	YYY	=	None	
		A**	=	0-20" Maximum	
Riser Extension Below Cabinet	48-50	YYY	=	None	
		B**	=	0-20" Maximum	

Components and Technology

Component and Option Details

Cabinet

Constructed of unpainted galvanized steel with a small footprint. 18" × 18" cabinet for unit sizes 009 through 012, 18" × 20" for unit sizes 015 and 018, and 24" × 24" for unit sizes 024 through 036.

The cabinet can be separated into two sections for ease of handling, making it easier to move the unit to the upper floors in a multi-story building.

Cabinet Insulation

The standard cabinet is lined with 1/2″-thick dual-density fiberglass insulation. Foil- or skin-faced, dual-density fiberglass insulation is available as an option.

With the optional Indoor Air Quality (IAQ) insulation package, the cabinet is available with 3/8″-thick closed-cell foam insulation.

Chassis Insulation

The standard chassis compressor compartment is lined with 1/2″-thick dual-density fiberglass insulation.

In combination with the fiberglass options, a compressor compartment Sound Reduction Package option adds a compressor mass plate and for 024–036 units, an optional compressor sound blanket.

With the optional IAQ insulation package, the chassis compressor compartment is available with 3/8″-thick closed-cell foam insulation.

In combination with the IAQ option, a compressor compartment Sound Reduction Package option adds a compressor mass plate and for 024–036 units, an optional compressor sound blanket.

Configurations

Figure 2: Single Discharge–Top Only

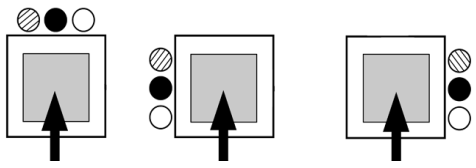


Figure 3: Closed Plenum–Field Modification Required

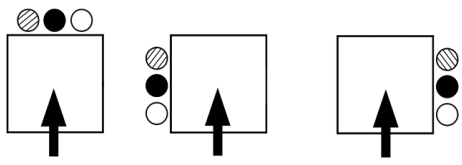


Figure 4: Single-Side Discharge

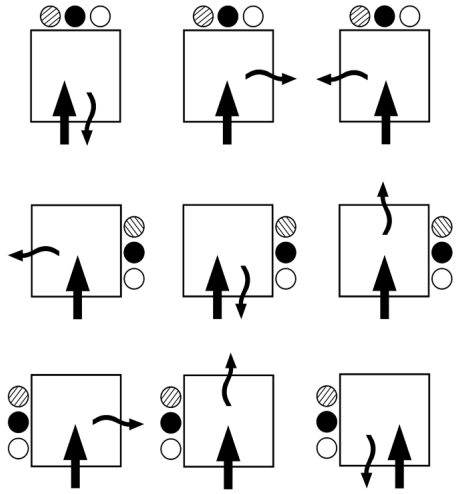


Figure 5: Double-Side Discharge

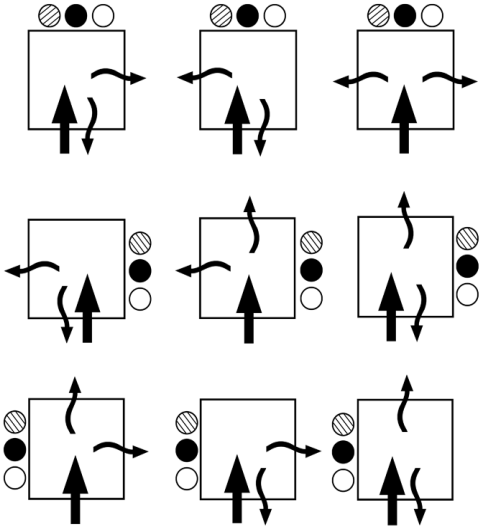


Figure 6: Side and Top Discharge

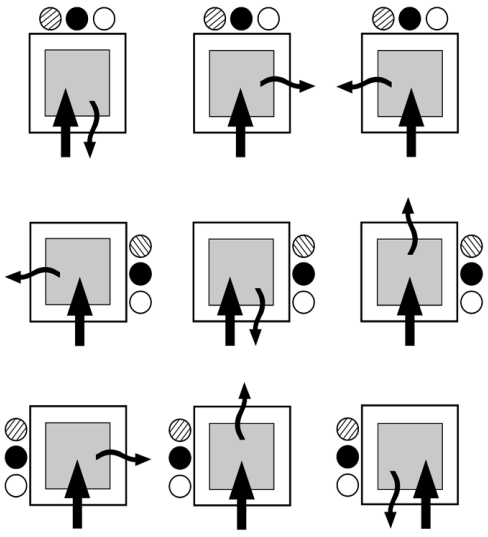
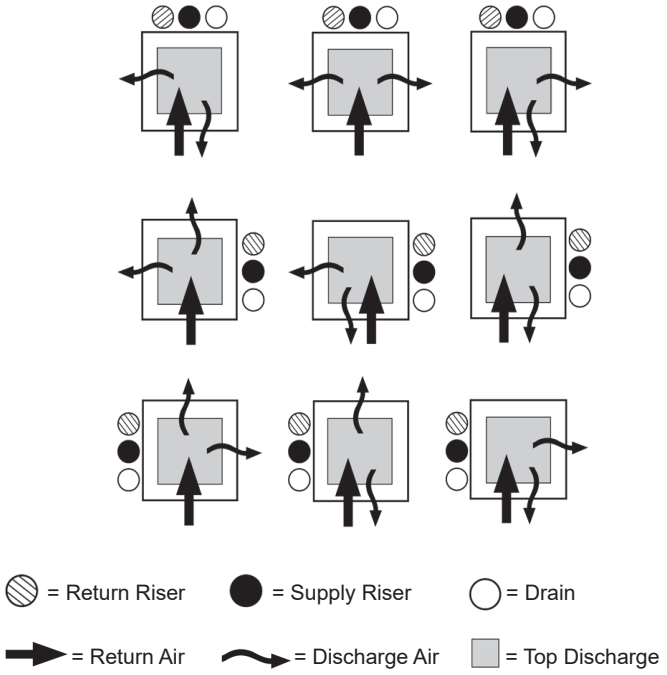


Figure 7: Double-Side and Top Discharge



NOTE: 80″-high cabinet not available with side discharge, top discharge only.

Chassis

Removable, allowing staged installation and ease of service and routine maintenance. The chassis can be shipped separately or inside the unit cabinet.

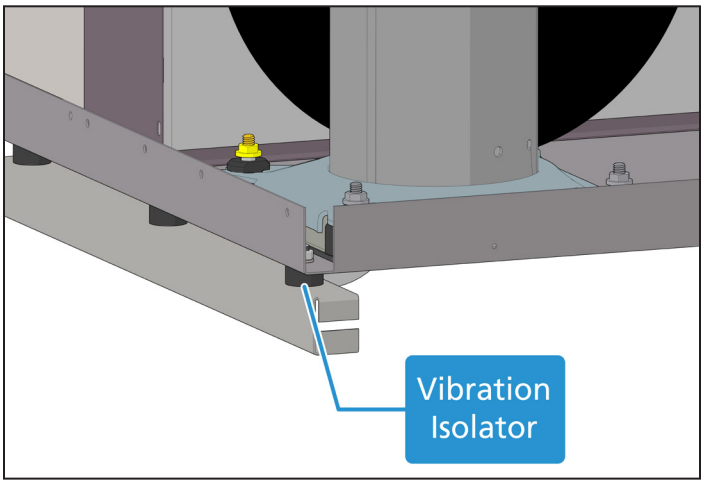
Shipping the chassis inside the unit cabinet vertically lowers overall project costs by reducing the amount of packaging that must be secured, shipped, unloaded, and disposed of after delivery (Figure 8).

Figure 8: Chassis Shipped Inside Cabinet

Chassis Vibration Isolators

Isolators are integral to the chassis support rails to help minimize noise and vibration transmission, resulting in a quiet occupied space (Figure 9).

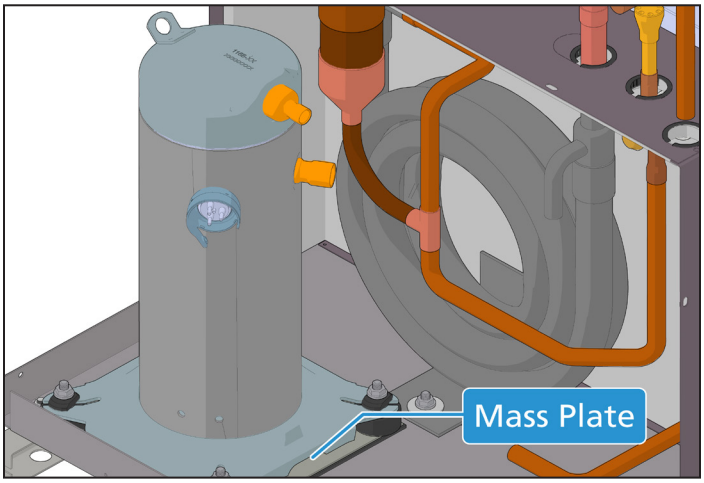
Figure 9: Vibration Isolators



Compressors

High efficiency rotary and scroll, available with optional mass plate (Figure 10) and/or compressor blanket for quiet operation (blanket only available for scroll compressors).

Figure 10: Optional Mass Plate



Supply Air Plenum

Allows for multiple discharge air configurations. Supply air diffuser 1/2″ foam seal is field-furnished and installed.

Filters

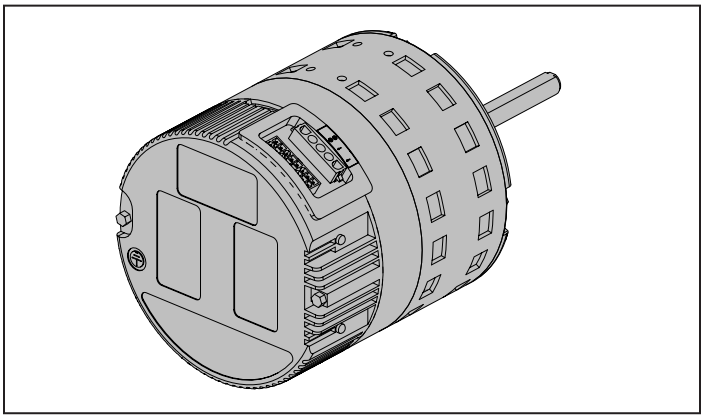
1″ standard (factory-provided) or an optional 1″ MERV 8 or 2″ MERV 13 for improved indoor air quality.

Motor/Blower Assembly

The standard blower motor is a multi-speed, permanent split capacitor (PSC) with thermal overload protection. The fan, motor and housing are easy to remove and slide out from the cabinet front. The fan and motor are attached to an orifice ring, and this assembly is mounted to the fan housing, easily removable should service be necessary.

All units are available with a variable eight-speed electronically commutated motor (ECM), featuring eight selectable CFM settings for quiet operation and reduced energy consumption. Because the ECM controls the amount of air delivery, it is the perfect choice for sound sensitive spaces. The motor can be controlled to 1% duty cycle via a BACnet MS/TP communications network. Unit sizes 009–012 utilize a constant torque ECM and unit sizes 015–036 utilize a constant CFM ECM (Figure 11).

Figure 11: EC Motor



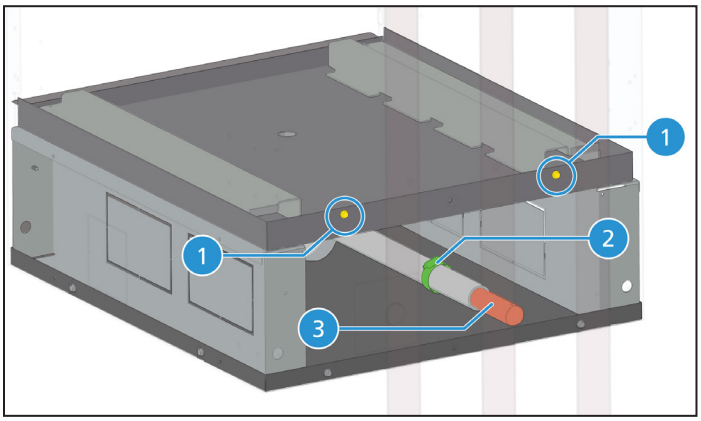
Primary Condensate Drain Pan

Sloped and constructed of a corrosion resistant ABS plastic. The primary drain pan sits below the air coil to capture all condensate in cooling mode. A factory-installed condensate overflow sensor disables unit operation when the condensate level reaches the sensor.

Secondary Condensate Drain Pan

A standard galvanized steel pan or optional corrosion resistant stainless steel pan sits below the chassis to collect condensate from the primary pan and prevents it from dripping into the cabinet, reaching the living space. This drain pan also includes a factory-installed condensate overflow sensor.

Figure 12: Secondary Condensate Drain Pan

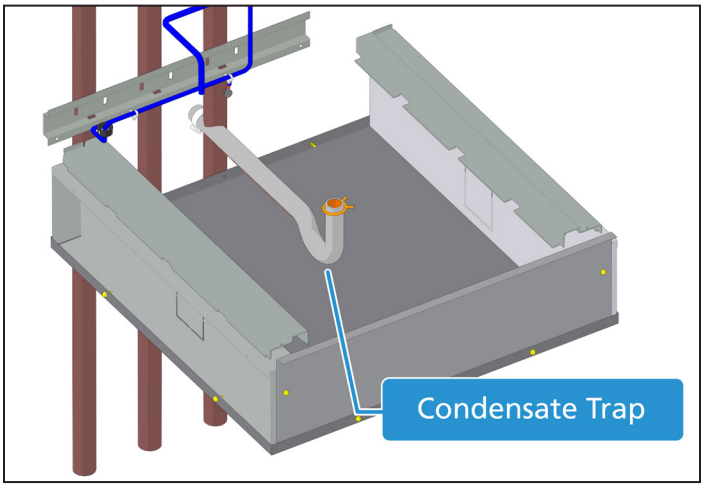


No.	Component
1	Drain Pan Screws
2	Clamp
3	Drain Stub-Out

Condensate Drain Hose

Equipped with a formed drain hose with a flexible condensate trap.

Figure 13: Condensate Drain Hose



LED Annunciators

LED status lights on the control boards display fault conditions to provide easy troubleshooting and diagnosis and are viewable via the LED status view port.

Front-Mounted Disconnect Switch

Easy access disconnect switch allows the user to turn off power to the unit for service/maintenance (Figure 14).

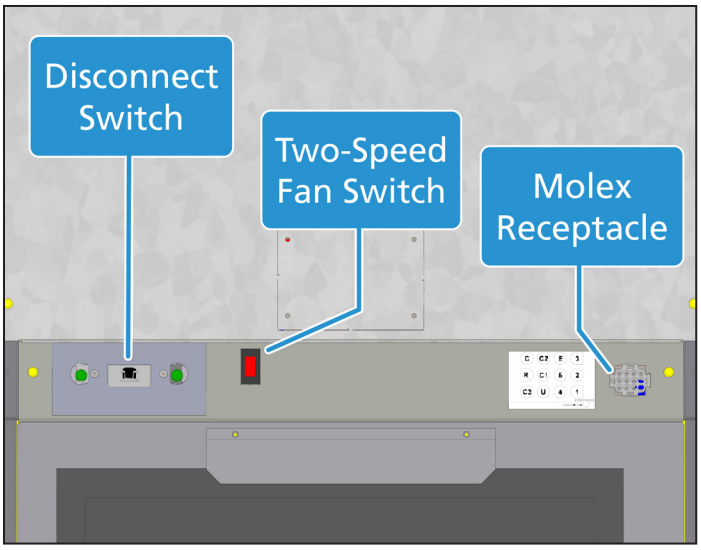
Two-Speed Fan Switch (Option)

Convenient location of the fan speed switch allows for easy fan speed change (units with PSC motor, Figure 14).

Molex Receptacle for Thermostat or Room Sensor

Provides easy plug-in connection of wall-mounted thermostat or room temperature sensor (Figure 14).

Figure 14: Disconnect And Fan Switches And Molex Receptacle



Hinged Perimeter Return Air Panel Door

Constructed of heavy gauge steel, lined with insulation to help attenuate sound from the compressor and fan assembly. Magnetic latching clips ensure the panel door stays closed during operation. An optional dual locking feature is available. Available with electrostatic powder coat finish in colors of cupola white or antique ivory.

Figure 15: Hinged Perimeter Return Air Panel Door

Louvered Return Air Panel Door with Optional Motorized Damper

The louvered return air panel door has two 1–5/8" × 7" cutouts available to connect ductwork for delivering outdoor air into the space using the optional motorized outdoor air damper. The optional motorized outdoor air damper mounts only on the hinge side of the door, which is selectable as right or left hand. Available with electrostatic powder coat finish in colors of cupola white or antique ivory.

Figure 16: Louvered Return Air Panel Door With Optional Motorized Damper

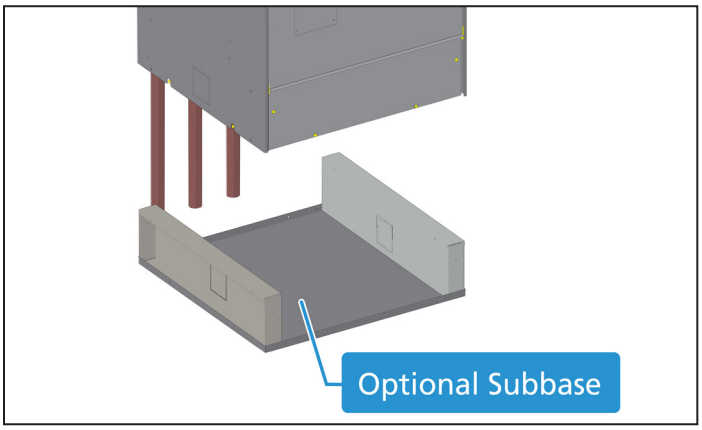
Supply Air Diffusers

Diffusers are constructed of aluminum with a mill finish or an optional painted finish, available in three variations: double deflection, double deflection with optional extension, and double deflection with adjustable damper. Damper blades are positioned vertically and adjust easily for directing the unit discharge air.

Subbase Kit

An optional subbase is available in heights of 2", 3", 4" and 5" to accommodate interiors with higher baseboard mouldings.

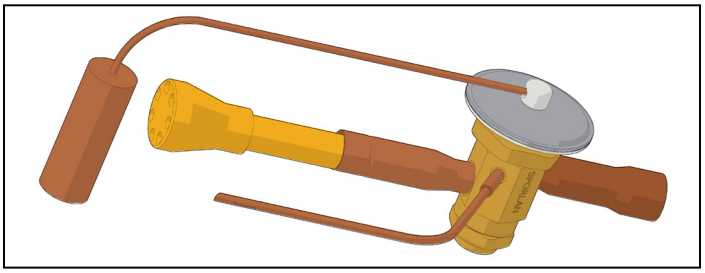
Figure 17: Optional Subbase



TXV Refrigerant Metering Device

Vertical stack water source heat pump units include a thermal expansion valve (TXV) for refrigerant metering. The TXV allows the unit to operate at optimum efficiency with normal fluid and entering air temperatures. The TXV precisely meters the exact amount of refrigerant flow through the system to deliver rated heating and cooling capacity to the space to satisfy the load.

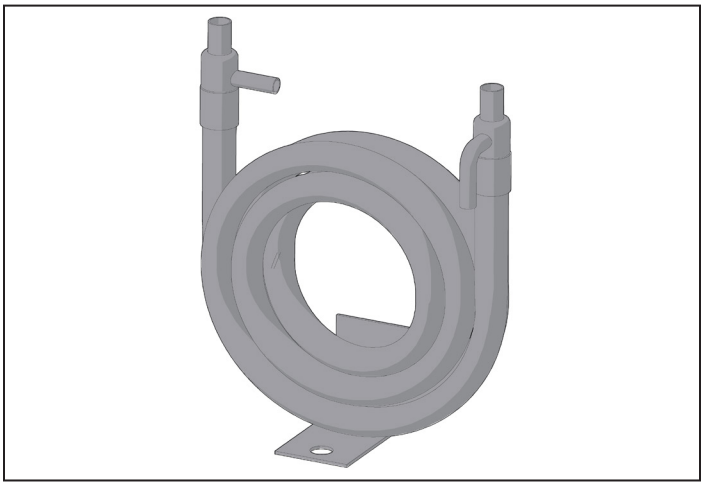
Figure 18: TXV Refrigerant Metering Device



Water-to-Refrigerant Coil

The copper or cupronickel (optional) tube-in-tube coaxial heat exchanger used in vertical stack water source heat pumps is designed for maximum heat transfer at nominal water flow rates resulting in 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. The geothermal range chassis includes an insulated coax coil, and insulated refrigerant and water piping insulation to protect against condensation in low-temperature geothermal applications.

Figure 19: Coaxial Heat Exchanger



Two-Way and Three-Way Motorized Valves

Two-way valves are used for variable pumping applications when more than one unit is installed on a common loop. These valves are also used to conserve water when used for ground water applications.

Three-way valves are used for constant flow applications or installed at the end of a variable flow branch piping run to maintain minimum flow conditions.

On a call for cooling or heating, the valve opens, providing full water flow prior to compressor operation. The valve is controlled via a factory provided 24 volt control harness plugged into the H6 output terminals of the MicroTech 2300 unit controller and wired to the control valve actuator.

Hydronic Heat

The hydronic heat option helps to reduce energy consumption by using hot loop water temperatures to condition a space without energizing mechanical heating. Hydronic heat can help maximize heat transfer from rooms that require cooling to ones that require heating without the added cost of operating the compressor.

The unit includes a hydronic heating coil located downstream of the unit's evaporator coil and after the filter. When entering water temperatures are between 90° and 120°F, a two-stage thermostat or room temperature sensor in conjunction with a factory-installed entering water temperature sensor and a two-position, three-way diverting valve determine when loop water can be diverted to the hydronic coil and the unit coax coil for hydronic heating. Smart fan controls further reduce energy consumption and sound levels by delivering optimum air flow during hydronic heat operation.

Corrosion Protection (Option)

Coils can be coated with an optional inorganic, silicon-based nano-ceramic coating. This coating has a 3,000-hour salt spray rating per ASTM B-117.

Stainless Steel Braided Hoses

Daikin Applied sells a variety of flexible supply, return and condensate hoses and hose assemblies to connect the chassis water lines to the risers to complete a building's hard piping system.

Contact your Daikin Applied representative for more detailed hose kit features.

Field-Adjustable EC Fan Motor

EC motors are available as a selectable option. EC motors provide the ultimate in efficiency and performance flexibility with eight field-selectable CFM settings and is customizable over BACnet, providing quieter operation and lower energy consumption. The factory-installed dipswitches on the expansion board allow for easy commissioning through a simple click of the switch to set the CFM delivered to the space. This allows for field adjustment of air delivery to the space for sound-sensitive applications or for increased air distribution.

Controls

MicroTech 2300 Unit Controller

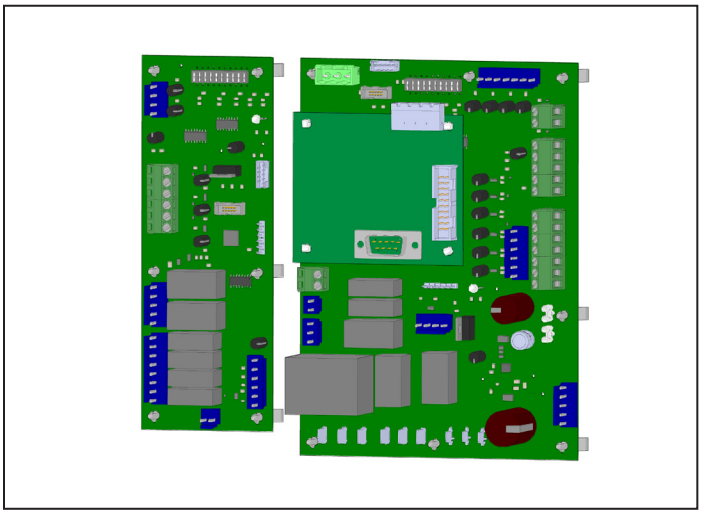
The MicroTech 2300 unit controller is a microprocessor-based controller and is provided on every Vertical Stack WSVF/WSVC unit. The controller monitors the safety devices to protect the unit from unsafe operating conditions, and controls the reversing valve, compressor and fan operation for efficient unit operation.

Safety controls included as standard:

- High-pressure switch located in the refrigerant discharge line.
- Low-pressure switch located in the refrigerant suction line for loss of refrigerant charge protection.
- Low-suction temperature sensor located in the compressor suction line to protect against coil freeze-up.
- Condensate overflow protection sensor is factory-mounted in the drain pan of the unit.

The controller is accessible within the electrical control box through the bottom front access panel.

Figure 20: MicroTech 2300 and 2310 Unit Controllers and BACnet Card



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 or optional 75 VA transformer. The main board can be wired for 24-volt AC output to the wall thermostat by using terminals R and C.

Controls Integration

For protocol information including, integration points list for BACnet networks, refer to ED 19129.

Two control choices are offered with the MicroTech Unit SmartSource unit control system:

- MicroTech unit controller (stand-alone)
- MicroTech unit controller with BACnet communication module
- MicroTech unit controller with wireless thermostat

MicroTech Unit SmartSource Controller with BACnet Communication Module

Daikin Applied water source heat pumps are available with a BACnet MS/TP communication module that is designed to communicate over a BACnet MS/TP communications network to a building automation system (BAS). It can be factory- or field-installed.

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

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

- The network cable is a shielded twisted-pair cable
- Network communications run up to 76.8 kbps
- DIP switches on the controller enable the MS/TP MAC address to be set in the range 0–127
- Four green status LEDs on the communication module indicate communication activity on the MS/TP communication network and with the unit controller

The MicroTech SmartSource unit controller with communication module includes a factory-installed leaving water temperature sensor, field-installed discharge air and return air temperature sensor. A Daikin Applied wall-mounted temperature sensor may be used in place of the factory-provided return air temperature sensor.

Accessories

Table 3: Wired Thermostat Selections

Wall Mounted Thermostats & Remote Sensor for Use with All SmartSource WSHP Units		Thermostats				Remote Sensor
		Non-Programmable	Programmable (7 Day or 5+1+1)		7 Day Programmable	Remote Indoor Thermostat Sensor
		2H/2C	2H/2C	2H/3C Humidity Control	2H/3C Humidity Control WIFI	
						
Daikin Applied 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 Applied 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		•	•	•	•	

Table 4: Room Temperature Sensors

Room Sensors for Use with All SmartSource WSHP Units with a BACnet Communication Module		Room Temperature Sensors			
		Basic Room Sensor	Cool to Warm Adjust	Digitally Adjustable Display Sensor	
					
		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 Applied 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		•	•	•	•

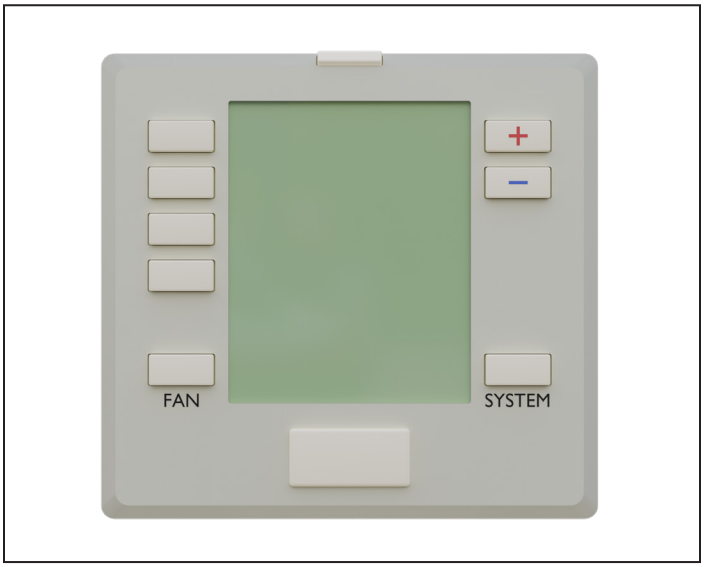
Wireless Temperature Control

The wireless thermostat option is designed to provide precision temperature control without the installation labor and expense of wiring.

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

For detailed installation and operation information, refer to the manual provided with the thermostat.

Figure 21: Wireless Thermostat



The second part of the wireless system is called a Remote Control Node or “RCN.” An RCN interfaces with specific desired HVAC equipment, and communicates with its thermostat wirelessly. At the time of installation, the wireless thermostat is linked to the RCN. The thermostat and RCN that have been linked will not interfere with, or be affected by, any other thermostat or RCN in adjacent rooms, apartments, or neighboring homes.

Figure 22: Remote Control Node (RCN)

AHRI Performance Data

PSC Motor

Table 5: WSHP AHRI Performance Data with PSC Motor

Unit Size	Unit Voltage	Rated CFM	Rated GPM	Water Loop				Ground Loop (Geothermal)			
				Cooling–EWT 86°F		Heating–EWT 68°F		Cooling–EWT 77°F		Heating–EWT 32°F	
				Btu/h	EER	Btu/h	COP	Btu/h	EER	Btu/h	COP
009	115/60/1	300	2.25	8700	15.5	10,500	5.1	9200	18.5	6200	3.3
	208-230/60/1			8900	14.8	10,900	5.0	9500	17.8	6400	3.2
	265/60/1			9000	14.1		4.8	9600	16.5	6500	
012	115/60/1	400	3.0	11,400	14.2	13,500	4.7	12,000	16.6	8200	3.2
	208-230/60/1			11,500	14.3	13,600		12,100	16.8	8300	3.3
	265/60/1			11,200	13.7	13,200	4.6	11,700	16.1	8100	3.2
015	208-230/60/1	500	3.75	14,700	14.1	16,600	4.6	15,500	16.6	10,500	3.2
	265/60/1			15,500	14.3	17,500		16,300	16.9	11,000	3.3
018	208-230/60/1	600	4.5	18,700	13.7	23,400	4.3	19,800	16.1	14,600	3.2
	265/60/1			18,500	13.6	23,200		19,600	15.9	14,500	
024	208-230/60/1	800	6.0	23,800	14.7	27,800	4.9	24,800	17.1	17,500	3.3
	265/60/1			23,300	14.4	27,200	4.8	24,300	16.8	17,200	
030	208-230/60/1	1000	7.5	28,100	14.5	33,100	4.6	29,400	16.8	20,800	3.2
	265/60/1			28,100	14.2		4.5		16.5		
036	208-230/60/1	1200	9.0	35,000	14.5	39,300	4.4	36,300	16.4	27,200	3.3
	265/60/1			33,600	13.5	37,700	4.1	34,800	15.3	26,100	3.2

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) EAT and 86°F (30°C) EWT.

NOTE 2: Heating capacity is based on 68°F db, 59.0°F wb (20/15°C) EAT and 68°F (20°C) EWT.

EC Motor

Table 6: WSHP AHRI Performance Data with EC Motor

Unit Size	Unit Voltage	Rated CFM	Rated GPM	Water Loop				Ground Loop (Geothermal)			
				Cooling–EWT 86°F		Heating–EWT 68°F		Cooling–EWT 77°F		Heating–EWT 32°F	
				Btu/h	EER	Btu/h	COP	Btu/h	EER	Btu/h	COP
009	115/60/1	300	2.25	8700	16.0	10500	5.2	9400	19.0	6300	3.4
	208-230/60/1			8900	15.3	10,900	5.1	9500	18.4	6400	3.3
	265/60/1			9000	14.8		5.0		17.8		
012	115/60/1	400	3.0	11,500	14.8	13,300	4.7	12,100	17.5	8000	3.2
	208-230/60/1			11,600	15.0	13,400	4.8	12,200	17.6	8100	3.3
	265/60/1			11,300	14.4	13,000	4.6	11,800	16.9	7900	3.2
015	208-230/60/1	500	3.75	14,800	14.8	17,200	4.7	15,700	17.4	10,800	3.3
	265/60/1			15,600	14.9	18,100	4.8	16,500	17.6	11,400	3.4
018	208-230/60/1	600	4.5	18,900	14.7	22,700	4.4	20,000	17.3	14,200	3.2
	265/60/1			18,700	14.5	22,500	4.3	18,300	17.0	14,100	
024	208-230/60/1	800	6.0	23,800	15.3	27,000	4.9	24,800	17.9	16,900	3.3
	265/60/1			23,300	15.0	26,500	4.8	24,300	17.6	16,600	
030	208-230/60/1	1000	7.5	28,900	16.6	33,600	4.9	30,200	19.3	21,200	3.4
	265/60/1			28,900	16.0		4.7		18.5		3.3
036	208-230/60/1	1200	9.0	35,000	14.8	38,900	4.5	36,300	16.9	26,900	3.3
	265/60/1			33,600	13.9	37,300	4.2	34,800	15.9	25,800	3.2

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) EAT and 77°F (25°C) EWT.

NOTE 2: Heating capacity is based on 68°F db, 59.0°F wb (20/15°C) EAT and 32°F (0°C) EWT.

Capacity Data

PSC Motor

Table 7: Size 009 (300 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	1.5	2.3	5.3	Operation not recommended					5300	0.566	3400	86	2.7
	2.25	4.7	10.7						5600	0.570	3700	87	2.9
	3	7.6	17.6						5900	0.574	3900	88	3.0
30	1.5	2.3	5.3	11200	7200	0.309	12300	36.2	5800	0.576	3800	88	3.0
	2.25	4.6	10.6	11400	7300	0.289	12400	39.5	6100	0.580	4100	89	3.1
	3	7.5	17.4	11700	7300	0.269	12600	43.6	6400	0.584	4400	90	3.2
40	1.5	2.2	5.1	11000	7100	0.336	12100	32.7	7000	0.597	5000	91	3.4
	2.25	4.4	10.3	11200	7200	0.316	12300	35.5	7300	0.601	5200	92	3.6
	3	7.3	16.9	11400	7300	0.295	12400	38.6	7600	0.606	5500	93	3.7
50	1.5	2.2	5.0	10700	7000	0.378	12000	28.3	8300	0.618	6200	95	3.9
	2.25	4.3	10.0	10900	7100	0.358	12100	30.5	8600	0.622	6500	96	4.1
	3	7.1	16.4	11100	7100	0.337	12300	32.9	9000	0.626	6900	98	4.2
60	1.5	2.1	4.9	10300	6800	0.433	11800	23.8	9600	0.636	7400	99	4.4
	2.25	4.2	9.8	10500	6900	0.413	11900	25.4	9900	0.640	7700	100	4.5
	3	6.9	16.0	10700	6900	0.392	12000	27.3	10200	0.644	8000	101	4.6
70	1.5	2.1	4.8	9700	6600	0.498	11400	19.5	10800	0.651	8600	103	4.9
	2.25	4.1	9.6	10000	6600	0.478	11600	20.9	11100	0.655	8900	104	5.0
	3	6.8	15.7	10200	6700	0.457	11800	22.3	11400	0.659	9100	105	5.1
80	1.5	2.0	4.7	9200	6300	0.570	11100	16.1	11800	0.665	9500	106	5.2
	2.25	4.1	9.4	9400	6300	0.550	11300	17.1	12100	0.669	9800	107	5.3
	3	6.7	15.4	9600	6400	0.530	11400	18.1	12400	0.673	10100	108	5.4
90	1.5	2.0	4.6	8500	5900	0.648	10700	13.1	12900	0.677	10600	110	5.6
	2.25	4.0	9.2	8700	6000	0.627	10800	13.9	13200	0.681	10900	111	5.7
	3	6.6	15.1	8900	6100	0.607	11000	14.7	13500	0.685	11200	111	5.8
100	1.5	2.0	4.5	7800	5600	0.727	10300	10.7	Operation not recommended				
	2.25	3.9	9.1	8000	5700	0.707	10400	11.3					
	3	6.5	14.9	8200	5700	0.686	10500	11.9					
110	1.5	1.9	4.5	7000	5300	0.806	9800	8.7					
	2.25	3.9	9.0	7200	5300	0.785	9900	9.2					
	3	6.4	14.8	7500	5400	0.765	10100	9.8					
120	1.5	1.9	4.4	6200	4900	0.881	9200	7.0					
	2.25	3.9	8.9	6500	5000	0.861	9400	7.6					
	3	6.3	14.6	6700	5100	0.840	9600	8.0					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 8: Size 012 (400 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	2	3.4	7.9	Operation not recommended					6900	0.688	4500	86	2.9
	3	7.1	16.5						7300	0.698	4900	87	3.1
	4	12.0	27.7						7700	0.708	5300	88	3.2
30	2	3.4	7.8	14200	9200	0.424	15600	33.5	7600	0.700	5200	88	3.2
	3	7.0	16.3	14300	9300	0.395	15600	36.2	8000	0.711	5600	89	3.3
	4	11.8	27.3	14400	9300	0.365	15600	39.5	8400	0.721	5900	90	3.4
40	2	3.3	7.6	13700	8900	0.493	15400	27.8	9100	0.739	6600	92	3.6
	3	6.8	15.8	13800	9000	0.463	15400	29.8	9500	0.749	6900	93	3.7
	4	11.5	26.5	13900	9000	0.434	15400	32.1	9900	0.759	7300	94	3.8
50	2	3.2	7.4	13300	8800	0.552	15200	24.1	10600	0.776	8000	95	4.0
	3	6.7	15.4	13400	8800	0.522	15200	25.7	11000	0.786	8300	96	4.1
	4	11.2	25.8	13500	8900	0.492	15200	27.4	11400	0.796	8700	97	4.2
60	2	3.1	7.2	13000	8700	0.608	15100	21.4	12100	0.803	9400	99	4.4
	3	6.5	15.0	13100	8800	0.579	15100	22.6	12500	0.814	9700	100	4.5
	4	10.9	25.2	13200	8800	0.549	15100	24.0	12900	0.824	10100	101	4.6
70	2	3.1	7.1	12500	8600	0.671	14800	18.6	13500	0.826	10700	102	4.8
	3	6.4	14.7	12600	8600	0.642	14800	19.6	13900	0.836	11000	103	4.9
	4	10.7	24.7	12800	8700	0.612	14900	20.9	14300	0.846	11400	104	5.0
80	2	3.0	6.9	11900	8300	0.748	14500	15.9	14800	0.852	11900	105	5.1
	3	6.2	14.4	12100	8400	0.719	14600	16.8	15200	0.862	12300	106	5.2
	4	10.5	24.2	12200	8500	0.689	14600	17.7	15600	0.872	12600	107	5.2
90	2	3.0	6.8	11200	8000	0.847	14100	13.2	16000	0.883	13000	108	5.3
	3	6.1	14.2	11300	8000	0.817	14100	13.8	16400	0.894	13300	109	5.4
	4	10.3	23.8	11400	8100	0.788	14100	14.5	16800	0.904	13700	110	5.4
100	2	2.9	6.7	10300	7500	0.975	13600	10.6	Operation not recommended				
	3	6.1	14.0	10500	7600	0.946	13700	11.1					
	4	10.2	23.5	10600	7700	0.916	13700	11.6					
110	2	2.9	6.6	9500	7100	1.142	13400	8.3					
	3	6.0	13.8	9600	7100	1.112	13400	8.6					
	4	10.1	23.2	9700	7200	1.082	13400	9.0					
120	2	2.9	6.6	8800	6700	1.353	13400	6.5					
	3	5.9	13.7	8900	6800	1.323	13400	6.7					
	4	10.0	23.0	9000	6900	1.294	13400	7.0					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 9: Size 015 (500 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	2.5	2.5	5.8	Operation not recommended					9100	0.942	5900	87	2.8
	3.75	5.1	11.9						9700	0.952	6400	88	3.0
	5	8.5	19.7						10300	0.963	7000	89	3.1
30	2.5	2.5	5.7	17900	11900	0.610	20000	29.3	10000	0.959	6700	88	3.1
	3.75	5.1	11.7	18100	11900	0.554	20000	32.7	10500	0.969	7200	89	3.2
	5	8.4	19.4	18200	11900	0.498	19900	36.6	11100	0.979	7800	90	3.3
32	2.5	2.4	5.5	18000	11900	0.681	20300	26.4	11700	0.996	8300	92	3.4
	3.75	4.9	11.4	18200	11900	0.625	20300	29.1	12300	1.007	8900	93	3.6
	5	8.2	18.9	18300	11900	0.568	20200	32.2	12900	1.017	9400	94	3.7
50	2.5	2.3	5.4	18000	11800	0.743	20500	24.2	13600	1.035	10100	95	3.9
	3.75	4.8	11.1	18200	11800	0.687	20500	26.5	14200	1.045	10600	96	4.0
	5	8.0	18.4	18300	11800	0.630	20500	29.0	14800	1.055	11200	97	4.1
60	2.5	2.3	5.3	17700	11600	0.819	20500	21.6	15400	1.069	11700	98	4.2
	3.75	4.7	10.8	17800	11600	0.763	20400	23.3	16000	1.079	12300	99	4.3
	5	7.8	17.9	18000	11600	0.707	20400	25.5	16600	1.089	12900	101	4.5
70	2.5	2.2	5.2	17000	11300	0.917	20100	18.5	17200	1.098	13400	102	4.6
	3.75	4.6	10.6	17200	11300	0.861	20100	20.0	17800	1.108	14000	103	4.7
	5	7.6	17.5	17300	11300	0.805	20000	21.5	18400	1.118	14600	104	4.8
80	2.5	2.2	5.1	16100	10800	1.035	19600	15.6	18700	1.121	14900	104	4.9
	3.75	4.5	10.4	16300	10900	0.978	19600	16.7	19300	1.132	15400	106	5.0
	5	7.5	17.2	16400	10900	0.922	19500	17.8	19900	1.142	16000	107	5.1
90	2.5	2.2	5.0	15200	10400	1.163	19200	13.1	20000	1.140	16100	107	5.1
	3.75	4.4	10.2	15300	10400	1.107	19100	13.8	20600	1.150	16700	108	5.3
	5	7.3	16.9	15500	10400	1.050	19100	14.8	21200	1.160	17200	109	5.4
100	2.5	2.1	4.9	14300	10000	1.293	18700	11.1	Operation not recommended				
	3.75	4.4	10.1	14500	10000	1.237	18700	11.7					
	5	7.2	16.7	14600	10000	1.181	18600	12.4					
110	2.5	2.1	4.9	13500	9700	1.421	18400	9.5					
	3.75	4.3	9.9	13600	9700	1.365	18300	10.0					
	5	7.1	16.5	13800	9700	1.308	18300	10.5					
120	2.5	2.1	4.8	12500	9300	1.549	17800	8.1					
	3.75	4.3	9.8	12600	9300	1.493	17700	8.4					
	5	7.1	16.4	12800	9300	1.437	17700	8.9					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 10: Size 018 (600 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	3	3.6	8.3	Operation not recommended					12300	1.267	8000	89	2.8
	4.5	7.6	17.6						13300	1.296	8900	90	3.0
	6	13.0	30.1						14300	1.326	9800	92	3.2
30	3	3.5	8.2	22500	13800	0.817	25300	27.5	13300	1.302	8900	90	3.0
	4.5	7.5	17.4	22800	14000	0.744	25300	30.7	14300	1.331	9800	92	3.1
	6	12.8	29.7	23100	14100	0.670	25400	34.5	15400	1.361	10800	94	3.3
40	3	3.4	7.9	22300	13700	0.846	25200	26.4	15700	1.371	11000	94	3.4
	4.5	7.3	16.9	22600	13900	0.773	25200	29.3	16800	1.400	12000	96	3.5
	6	12.5	28.8	22900	14000	0.699	25300	32.8	17800	1.430	12900	97	3.6
50	3	3.3	7.7	22200	13700	0.920	25300	24.1	18300	1.439	13400	98	3.7
	4.5	7.1	16.4	22500	13900	0.846	25400	26.6	19300	1.468	14300	100	3.9
	6	12.1	28.0	22800	14000	0.773	25400	29.5	20300	1.498	15200	101	4.0
60	3	3.3	7.5	21700	13500	1.027	25200	21.1	20800	1.506	15700	102	4.0
	4.5	6.9	16.0	22100	13700	0.954	25400	23.2	21800	1.535	16600	103	4.2
	6	11.8	27.4	22400	13800	0.880	25400	25.5	22900	1.565	17600	105	4.3
70	3	3.2	7.4	20900	13100	1.158	24900	18.0	23300	1.573	17900	106	4.3
	4.5	6.8	15.7	21200	13300	1.085	24900	19.5	24300	1.603	18800	107	4.4
	6	11.6	26.8	21600	13400	1.011	25100	21.4	25300	1.632	19700	109	4.5
80	3	3.1	7.2	19800	12600	1.305	24300	15.2	25700	1.641	20100	109	4.6
	4.5	6.7	15.4	20100	12700	1.231	24300	16.3	26700	1.670	21000	111	4.7
	6	11.4	26.3	20400	12800	1.158	24400	17.6	27800	1.700	22000	113	4.8
90	3	3.1	7.1	18600	12000	1.461	23600	12.7	28000	1.707	22200	113	4.8
	4.5	6.6	15.1	18900	12200	1.387	23600	13.6	29000	1.736	23100	114	4.9
	6	11.2	25.9	19300	12300	1.314	23800	14.7	30100	1.766	24100	116	5.0
100	3	3.0	7.0	17600	11500	1.625	23200	10.8	Operation not recommended				
	4.5	6.5	14.9	17900	11700	1.552	23200	11.5					
	6	11.0	25.5	18200	11800	1.478	23200	12.3					
110	3	3.0	6.9	16600	11100	1.803	22800	9.2					
	4.5	6.4	14.8	16900	11200	1.730	22800	9.8					
	6	10.9	25.2	17200	11400	1.656	22900	10.4					
120	3	3.0	6.9	15200	10400	2.007	22100	7.6					
	4.5	6.3	14.6	15500	10600	1.933	22100	8.0					
	6	10.8	25.0	15800	10700	1.860	22200	8.5					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 11: Size 024 (800 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	4	4.2	9.6	Operation not recommended					15000	1.468	10000	86	3.0
	6	8.2	19.0						15600	1.482	10500	87	3.1
	8	13.4	30.9						16200	1.495	11100	88	3.2
30	4	4.1	9.5	28300	18900	0.955	31600	29.6	16200	1.480	11100	88	3.2
	6	8.1	18.7	28100	18800	0.918	31200	30.6	16800	1.494	11700	88	3.3
	8	13.2	30.4	27900	18700	0.880	30900	31.7	17400	1.507	12300	89	3.4
40	4	4.0	9.2	28400	19000	0.991	31800	28.7	19200	1.517	14000	91	3.7
	6	7.9	18.2	28200	18900	0.953	31500	29.6	19800	1.531	14600	91	3.8
	8	12.8	29.5	28000	18800	0.916	31100	30.6	20300	1.544	15000	92	3.9
50	4	3.9	8.9	27900	18700	1.079	31600	25.9	22300	1.563	17000	94	4.2
	6	7.7	17.7	27700	18600	1.041	31300	26.6	22900	1.577	17500	95	4.3
	8	12.4	28.7	27500	18500	1.003	30900	27.4	23500	1.590	18100	95	4.3
60	4	3.8	8.7	27100	18200	1.200	31200	22.6	25200	1.611	19700	97	4.6
	6	7.5	17.3	26900	18100	1.162	30900	23.1	25800	1.625	20300	98	4.7
	8	12.1	28.0	26700	18000	1.124	30500	23.7	26400	1.639	20800	99	4.7
70	4	3.7	8.5	26000	17600	1.345	30600	19.3	27600	1.658	21900	100	4.9
	6	7.3	16.9	25900	17500	1.307	30400	19.8	28200	1.672	22500	100	4.9
	8	11.9	27.4	25700	17500	1.269	30000	20.2	28700	1.685	22900	101	5.0
80	4	3.6	8.4	24900	17200	1.513	30100	16.5	29400	1.702	23600	102	5.1
	6	7.2	16.6	24700	17100	1.475	29700	16.7	29900	1.716	24000	102	5.1
	8	11.7	26.9	24600	17000	1.437	29500	17.1	30500	1.729	24600	103	5.2
90	4	3.6	8.3	23800	16700	1.714	29700	13.9	30600	1.746	24600	103	5.1
	6	7.1	16.3	23600	16600	1.676	29300	14.1	31200	1.760	25200	104	5.2
	8	11.5	26.5	23400	16600	1.638	29000	14.3	31800	1.774	25700	104	5.3
100	4	3.5	8.1	22500	16300	1.965	29200	11.4	Operation not recommended				
	6	7.0	16.1	22300	16200	1.928	28900	11.6					
	8	11.3	26.1	22100	16100	1.890	28600	11.7					
110	4	3.5	8.0	20900	15600	2.295	28700	9.1					
	6	6.9	15.9	20700	15500	2.258	28400	9.2					
	8	11.2	25.8	20500	15400	2.220	28100	9.2					
120	4	3.5	8.0	18800	14500	2.740	28200	6.9					
	6	6.8	15.8	18600	14400	2.703	27800	6.9					
	8	11.1	25.6	18500	14300	2.665	27600	6.9					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 12: Size 030 (1000 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	5	3.6	8.2	Operation not recommended					17800	1.808	11600	86	2.9
	7.5	7.0	16.2						18800	1.830	12500	87	3.0
	10	11.4	26.2						19900	1.853	13600	88	3.1
30	5	3.5	8.1	33200	22700	1.265	37500	26.2	19400	1.826	13200	88	3.1
	7.5	6.9	16.0	33600	22700	1.171	37600	28.7	20400	1.848	14100	89	3.2
	10	11.2	25.8	34000	22800	1.077	37700	31.6	21500	1.871	15100	90	3.4
40	5	3.4	7.9	33300	22800	1.326	37800	25.1	22800	1.874	16400	91	3.6
	7.5	6.7	15.5	33700	22900	1.232	37900	27.3	23800	1.897	17300	92	3.7
	10	10.9	25.1	34100	22900	1.138	38000	30.0	24900	1.919	18300	93	3.8
50	5	3.3	7.7	32800	22700	1.407	37600	23.3	26300	1.932	19700	94	4.0
	7.5	6.5	15.1	33200	22800	1.313	37700	25.3	27400	1.955	20700	95	4.1
	10	10.6	24.4	33600	22800	1.219	37800	27.6	28400	1.977	21600	96	4.2
60	5	3.2	7.5	32000	22400	1.514	37200	21.1	29900	1.994	23100	98	4.4
	7.5	6.4	14.7	32400	22500	1.420	37200	22.8	30900	2.017	24000	99	4.5
	10	10.3	23.8	32800	22500	1.326	37300	24.7	32000	2.040	25000	100	4.6
70	5	3.2	7.3	30900	21900	1.654	36500	18.7	33300	2.060	26300	101	4.7
	7.5	6.2	14.4	31300	21900	1.560	36600	20.1	34300	2.083	27200	102	4.8
	10	10.1	23.3	31700	22000	1.467	36700	21.6	35400	2.105	28200	103	4.9
80	5	3.1	7.2	29600	21200	1.835	35900	16.1	36600	2.131	29300	104	5.0
	7.5	6.1	14.2	30000	21300	1.741	35900	17.2	37700	2.154	30300	105	5.1
	10	9.9	22.9	30400	21300	1.647	36000	18.5	38700	2.176	31300	106	5.2
90	5	3.1	7.1	28100	20400	2.062	35100	13.6	39800	2.209	32300	107	5.3
	7.5	6.0	13.9	28500	20500	1.968	35200	14.5	40900	2.231	33300	108	5.4
	10	9.7	22.5	28900	20500	1.875	35300	15.4	41900	2.254	34200	109	5.4
100	5	3.0	7.0	26500	19600	2.344	34500	11.3	Operation not recommended				
	7.5	5.9	13.7	26900	19600	2.250	34600	12.0					
	10	9.6	22.2	27300	19700	2.156	34700	12.7					
110	5	3.0	6.9	24900	18800	2.686	34100	9.3					
	7.5	5.9	13.6	25300	18800	2.592	34200	9.8					
	10	9.5	22.0	25700	18800	2.498	34200	10.3					
120	5	3.0	6.8	23100	18100	3.096	33700	7.5					
	7.5	5.8	13.5	23500	18100	3.002	33800	7.8					
	10	9.4	21.8	23900	18100	2.908	33800	8.2					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 13: Size 036 (1200 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	6	4.8	11.2	Operation not recommended					23700	2.262	16000	88	3.1
	9	9.8	22.7						24600	2.280	16800	89	3.2
	12	16.2	37.4						25500	2.299	17600	90	3.3
30	6	4.8	11.0	39300	25900	1.538	44600	25.5	25800	2.295	18000	90	3.3
	9	9.7	22.3	39700	26000	1.416	44500	28.0	26700	2.314	18800	90	3.4
	12	15.9	36.8	40100	26100	1.293	44500	31.0	27600	2.332	19600	91	3.5
40	6	4.6	10.7	41100	27300	1.612	46600	25.5	29800	2.360	21700	93	3.7
	9	9.4	21.7	41500	27400	1.490	46600	27.9	30700	2.379	22600	94	3.8
	12	15.5	35.7	41900	27500	1.367	46600	30.7	31600	2.397	23400	94	3.9
50	6	4.5	10.4	40800	27500	1.730	46700	23.6	33400	2.421	25100	96	4.0
	9	9.1	21.1	41200	27600	1.607	46700	25.6	34300	2.440	26000	96	4.1
	12	15.1	34.8	41600	27700	1.485	46700	28.0	35200	2.458	26800	97	4.2
60	6	4.4	10.2	39600	27100	1.884	46000	21.0	36700	2.479	28200	98	4.3
	9	8.9	20.6	39900	27200	1.761	45900	22.7	37600	2.498	29100	99	4.4
	12	14.7	33.9	40300	27300	1.639	45900	24.6	38400	2.516	29800	99	4.5
70	6	4.3	9.9	38100	26400	2.070	45200	18.4	39500	2.533	30800	100	4.6
	9	8.7	20.1	38500	26500	1.947	45100	19.8	40400	2.551	31700	101	4.6
	12	14.4	33.2	38900	26600	1.824	45100	21.3	41300	2.570	32500	102	4.7
80	6	4.2	9.8	36700	25600	2.288	44500	16.0	42100	2.583	33300	102	4.8
	9	8.6	19.8	37100	25700	2.165	44500	17.1	43000	2.601	34100	103	4.8
	12	14.1	32.6	37500	25800	2.043	44500	18.4	43900	2.620	35000	104	4.9
90	6	4.2	9.6	35200	24900	2.543	43900	13.8	44200	2.628	35200	104	4.9
	9	8.4	19.4	35600	25000	2.420	43900	14.7	45100	2.646	36100	105	5.0
	12	13.9	32.1	36000	25100	2.298	43800	15.7	46000	2.665	36900	105	5.1
100	6	4.1	9.5	33500	24200	2.843	43200	11.8	Operation not recommended				
	9	8.3	19.2	33900	24300	2.720	43200	12.5					
	12	13.7	31.6	34300	24400	2.598	43200	13.2					
110	6	4.1	9.4	31500	23400	3.201	42400	9.8					
	9	8.2	19.0	31900	23500	3.078	42400	10.4					
	12	13.5	31.3	32300	23500	2.955	42400	10.9					
120	6	4.0	9.3	29200	22200	3.632	41600	8.0					
	9	8.1	18.8	29600	22300	3.510	41600	8.4					
	12	13.4	31.0	30000	22400	3.387	41600	8.9					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

EC Motor

Table 14: Size 009 (300 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	1.5	2.3	5.3	Operation not recommended					5200	0.541	3400	86	2.8
	2.25	4.7	10.7						5500	0.545	3600	87	3.0
	3	7.6	17.6						5900	0.549	4000	88	3.1
30	1.5	2.3	5.3	11300	7200	0.281	12300	40.2	5700	0.551	3800	87	3.0
	2.25	4.6	10.6	11500	7300	0.261	12400	44.1	6000	0.555	4100	88	3.2
	3	7.5	17.4	11700	7400	0.241	12500	48.6	6300	0.559	4400	89	3.3
40	1.5	2.2	5.1	11100	7200	0.308	12200	36.1	7000	0.572	5000	91	3.6
	2.25	4.4	10.3	11300	7200	0.287	12300	39.3	7300	0.576	5300	92	3.7
	3	7.3	16.9	11500	7300	0.267	12400	43.0	7600	0.581	5600	93	3.8
50	1.5	2.2	5.0	10700	7000	0.349	11900	30.6	8300	0.593	6300	95	4.1
	2.25	4.3	10.0	10900	7100	0.329	12000	33.1	8600	0.597	6600	96	4.2
	3	7.1	16.4	11200	7200	0.309	12300	36.2	8900	0.601	6800	97	4.3
60	1.5	2.1	4.9	10300	6800	0.404	11700	25.5	9600	0.611	7500	99	4.6
	2.25	4.2	9.8	10500	6900	0.384	11800	27.4	9900	0.615	7800	100	4.7
	3	6.9	16.0	10700	7000	0.363	11900	29.4	10200	0.619	8100	101	4.8
70	1.5	2.1	4.8	9800	6600	0.468	11400	20.9	10700	0.626	8600	103	5.0
	2.25	4.1	9.6	10000	6700	0.448	11500	22.3	11000	0.630	8800	104	5.1
	3	6.8	15.7	10200	6700	0.428	11700	23.8	11300	0.634	9100	105	5.2
80	1.5	2.0	4.7	9200	6300	0.540	11000	17.0	11800	0.640	9600	106	5.4
	2.25	4.1	9.4	9400	6400	0.520	11200	18.1	12100	0.644	9900	107	5.5
	3	6.7	15.4	9600	6400	0.500	11300	19.2	12400	0.648	10200	108	5.6
90	1.5	2.0	4.6	8500	6000	0.616	10600	13.8	12800	0.652	10600	109	5.8
	2.25	4.0	9.2	8800	6000	0.596	10800	14.8	13100	0.656	10900	110	5.9
	3	6.6	15.1	9000	6100	0.576	11000	15.6	13400	0.660	11100	111	6.0
100	1.5	2.0	4.5	7800	5600	0.695	10200	11.2	Operation not recommended				
	2.25	3.9	9.1	8000	5700	0.675	10300	11.9					
	3	6.5	14.9	8300	5800	0.654	10500	12.7					
110	1.5	1.9	4.5	7000	5300	0.773	9600	9.1					
	2.25	3.9	9.0	7300	5300	0.753	9900	9.7					
	3	6.4	14.8	7500	5400	0.732	10000	10.2					
120	1.5	1.9	4.4	6200	4900	0.847	9100	7.3					
	2.25	3.9	8.9	6500	5000	0.827	9300	7.9					
	3	6.3	14.6	6700	5100	0.807	9500	8.3					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 15: Size 012 (400 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	2	3.4	7.9	Operation not recommended					6700	0.668	4400	86	2.9
	3	7.1	16.5						7100	0.678	4800	87	3.1
	4	12.0	27.7						7500	0.688	5100	88	3.2
30	2	3.4	7.8	14300	9300	0.394	15600	36.3	7400	0.680	5100	88	3.2
	3	7.0	16.3	14400	9300	0.365	15600	39.5	7800	0.691	5400	89	3.3
	4	11.8	27.3	14500	9400	0.335	15600	43.3	8200	0.701	5800	89	3.4
40	2	3.3	7.6	13800	9000	0.463	15400	29.8	8900	0.719	6400	91	3.6
	3	6.8	15.8	13900	9000	0.433	15400	32.1	9300	0.729	6800	92	3.7
	4	11.5	26.5	14000	9100	0.404	15400	34.7	9700	0.739	7200	93	3.8
50	2	3.2	7.4	13400	8800	0.522	15200	25.7	10400	0.756	7800	95	4.0
	3	6.7	15.4	13500	8900	0.492	15200	27.4	10800	0.766	8200	96	4.1
	4	11.2	25.8	13600	9000	0.462	15200	29.4	11200	0.776	8500	97	4.2
60	2	3.1	7.2	13100	8800	0.578	15100	22.6	11900	0.783	9200	98	4.5
	3	6.5	15.0	13200	8800	0.549	15100	24.0	12300	0.794	9600	99	4.5
	4	10.9	25.2	13300	8900	0.519	15100	25.6	12700	0.804	10000	100	4.6
70	2	3.1	7.1	12600	8600	0.641	14800	19.6	13300	0.806	10500	102	4.8
	3	6.4	14.7	12700	8700	0.612	14800	20.8	13700	0.816	10900	103	4.9
	4	10.7	24.7	12900	8800	0.582	14900	22.2	14100	0.826	11300	103	5.0
80	2	3.0	6.9	12000	8400	0.718	14500	16.7	14600	0.832	11800	105	5.1
	3	6.2	14.4	12200	8500	0.689	14600	17.7	15000	0.842	12100	106	5.2
	4	10.5	24.2	12300	8500	0.659	14600	18.7	15400	0.852	12500	107	5.3
90	2	3.0	6.8	11300	8100	0.817	14100	13.8	15800	0.863	12900	108	5.4
	3	6.1	14.2	11400	8100	0.787	14100	14.5	16200	0.874	13200	108	5.4
	4	10.3	23.8	11500	8200	0.758	14100	15.2	16600	0.884	13600	109	5.5
100	2	2.9	6.7	10400	7600	0.945	13600	11.0	Operation not recommended				
	3	6.1	14.0	10600	7700	0.916	13700	11.6					
	4	10.2	23.5	10700	7700	0.886	13700	12.1					
110	2	2.9	6.6	9600	7200	1.112	13400	8.6					
	3	6.0	13.8	9700	7200	1.082	13400	9.0					
	4	10.1	23.2	9800	7300	1.052	13400	9.3					
120	2	2.9	6.6	8900	6800	1.323	13400	6.7					
	3	5.9	13.7	9000	6900	1.293	13400	7.0					
	4	10.0	23.0	9100	7000	1.264	13400	7.2					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 16: Size 015 (500 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	2.5	2.5	5.8	Operation not recommended					9400	0.942	6200	87	2.9
	3.75	5.1	11.9						10000	0.952	6700	88	3.1
	5	8.5	19.7						10600	0.963	7300	90	3.2
30	2.5	2.5	5.7	18100	12000	0.592	20100	30.5	10300	0.959	7000	89	3.1
	3.75	5.1	11.7	18300	12000	0.538	20100	34.0	10900	0.969	7600	90	3.3
	5	8.4	19.4	18400	12000	0.483	20000	38.1	11500	0.979	8200	91	3.4
40	2.5	2.4	5.5	18200	12000	0.661	20500	27.5	12100	0.996	8700	92	3.6
	3.75	4.9	11.4	18400	12000	0.606	20500	30.3	12700	1.007	9300	93	3.7
	5	8.2	18.9	18500	12000	0.552	20400	33.5	13300	1.017	9800	94	3.8
50	2.5	2.3	5.4	18200	11900	0.721	20700	25.2	14000	1.035	10500	96	4.0
	3.75	4.8	11.1	18300	11900	0.667	20600	27.4	14600	1.045	11000	97	4.1
	5	8.0	18.4	18500	12000	0.612	20600	30.2	15300	1.055	11700	98	4.3
60	2.5	2.3	5.3	17900	11700	0.795	20600	22.5	15900	1.069	12200	99	4.4
	3.75	4.7	10.8	18000	11700	0.741	20500	24.3	16500	1.079	12800	100	4.5
	5	7.8	17.9	18200	11800	0.686	20500	26.5	17100	1.089	13400	101	4.6
70	2.5	2.2	5.2	17200	11400	0.891	20200	19.3	17700	1.098	13900	103	4.7
	3.75	4.6	10.6	17300	11400	0.836	20200	20.7	18300	1.108	14500	104	4.8
	5	7.6	17.5	17500	11400	0.781	20200	22.4	18900	1.118	15100	105	5.0
80	2.5	2.2	5.1	16300	11000	1.004	19700	16.2	19300	1.121	15500	106	5.0
	3.75	4.5	10.4	16400	11000	0.950	19600	17.3	19900	1.132	16000	107	5.2
	5	7.5	17.2	16600	11000	0.895	19700	18.5	20500	1.142	16600	108	5.3
90	2.5	2.2	5.0	15300	10500	1.129	19200	13.6	20600	1.140	16700	108	5.3
	3.75	4.4	10.2	15500	10500	1.074	19200	14.4	21200	1.150	17300	109	5.4
	5	7.3	16.9	15600	10500	1.020	19100	15.3	21900	1.160	17900	110	5.5
100	2.5	2.1	4.9	14500	10100	1.256	18800	11.5	Operation not recommended				
	3.75	4.4	10.1	14600	10100	1.201	18700	12.2					
	5	7.2	16.7	14800	10100	1.146	18700	12.9					
110	2.5	2.1	4.9	13600	9800	1.380	18300	9.9					
	3.75	4.3	9.9	13800	9800	1.325	18300	10.4					
	5	7.1	16.5	13900	9800	1.270	18200	10.9					
120	2.5	2.1	4.8	12600	9400	1.504	17700	8.4					
	3.75	4.3	9.8	12700	9400	1.449	17700	8.8					
	5	7.1	16.4	12900	9400	1.395	17700	9.2					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 17: Size 018 (600 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	3	3.6	8.3	Operation not recommended					11900	1.176	7900	88	3.0
	4.5	7.6	17.6						12900	1.207	8800	90	3.1
	6	13.0	30.1						13900	1.237	9700	91	3.3
30	3	3.5	8.2	22700	14000	0.737	25200	30.8	12900	1.212	8800	90	3.1
	4.5	7.5	17.4	23000	14100	0.664	25300	34.7	13900	1.243	9700	91	3.3
	6	12.8	29.7	23400	14200	0.590	25400	39.7	14900	1.273	10600	93	3.4
40	3	3.4	7.9	22500	13900	0.766	25100	29.4	15300	1.284	10900	93	3.5
	4.5	7.3	16.9	22800	14000	0.693	25200	32.9	16200	1.314	11700	95	3.6
	6	12.5	28.8	23200	14100	0.619	25300	37.5	17200	1.345	12600	96	3.7
50	3	3.3	7.7	22400	13900	0.840	25300	26.7	17700	1.354	13100	97	3.8
	4.5	7.1	16.4	22700	14000	0.766	25300	29.6	18700	1.384	14000	99	4.0
	6	12.1	28.0	23100	14100	0.693	25500	33.4	19700	1.415	14900	100	4.1
60	3	3.3	7.5	22000	13700	0.947	25200	23.2	20200	1.423	15300	101	4.2
	4.5	6.9	16.0	22300	13800	0.874	25300	25.5	21200	1.454	16200	103	4.3
	6	11.8	27.4	22600	13900	0.800	25300	28.2	22200	1.484	17100	104	4.4
70	3	3.2	7.4	21100	13300	1.078	24800	19.6	22600	1.492	17500	105	4.4
	4.5	6.8	15.7	21400	13400	1.005	24800	21.3	23600	1.523	18400	106	4.5
	6	11.6	26.8	21800	13500	0.931	25000	23.4	24600	1.553	19300	108	4.6
80	3	3.1	7.2	20000	12700	1.225	24200	16.3	24900	1.562	19600	108	4.7
	4.5	6.7	15.4	20300	12800	1.151	24200	17.6	25900	1.593	20500	110	4.8
	6	11.4	26.3	20600	13000	1.078	24300	19.1	26900	1.623	21400	111	4.9
90	3	3.1	7.1	18800	12100	1.381	23500	13.6	27200	1.630	21600	112	4.9
	4.5	6.6	15.1	19100	12300	1.307	23600	14.6	28200	1.661	22500	113	5.0
	6	11.2	25.9	19500	12400	1.234	23700	15.8	29100	1.691	23300	115	5.0
100	3	3.0	7.0	17700	11700	1.545	23000	11.5	Operation not recommended				
	4.5	6.5	14.9	18100	11800	1.472	23100	12.3					
	6	11.0	25.5	18400	11900	1.398	23200	13.2					
110	3	3.0	6.9	16700	11200	1.723	22600	9.7					
	4.5	6.4	14.8	17100	11300	1.650	22700	10.4					
	6	10.9	25.2	17400	11500	1.576	22800	11.0					
120	3	3.0	6.9	15300	10500	1.927	21900	7.9					
	4.5	6.3	14.6	15700	10700	1.853	22000	8.5					
	6	10.8	25.0	16000	10800	1.780	22100	9.0					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 18: Size 024 (800 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	4	4.2	9.6	Operation not recommended					14600	1.418	9800	86	3.0
	6	8.2	19.0						15200	1.432	10300	86	3.1
	8	13.4	30.9						15800	1.445	10900	87	3.2
30	4	4.1	9.5	28300	18900	0.885	31300	32.0	15800	1.430	10900	87	3.2
	6	8.1	18.7	28100	18800	0.848	31000	33.1	16400	1.444	11500	88	3.3
	8	13.2	30.4	27900	18700	0.810	30700	34.4	16900	1.457	11900	88	3.4
40	4	4.0	9.2	28400	19000	0.921	31500	30.8	18600	1.467	13600	90	3.7
	6	7.9	18.2	28200	18900	0.883	31200	31.9	19200	1.481	14100	91	3.8
	8	12.8	29.5	28000	18800	0.846	30900	33.1	19800	1.494	14700	91	3.9
50	4	3.9	8.9	27900	18700	1.009	31300	27.7	21700	1.513	16500	93	4.2
	6	7.7	17.7	27700	18600	0.971	31000	28.5	22300	1.527	17100	94	4.3
	8	12.4	28.7	27500	18500	0.933	30700	29.5	22800	1.540	17500	95	4.3
60	4	3.8	8.7	27100	18200	1.130	31000	24.0	24500	1.561	19200	96	4.6
	6	7.5	17.3	26900	18100	1.092	30600	24.6	25100	1.575	19700	97	4.7
	8	12.1	28.0	26700	18000	1.054	30300	25.3	25600	1.589	20200	98	4.7
70	4	3.7	8.5	26000	17600	1.275	30400	20.4	26800	1.608	21300	99	4.9
	6	7.3	16.9	25900	17500	1.237	30100	20.9	27400	1.622	21900	100	5.0
	8	11.9	27.4	25700	17500	1.199	29800	21.4	27900	1.635	22300	100	5.0
80	4	3.6	8.4	24900	17200	1.443	29800	17.3	28500	1.652	22900	101	5.1
	6	7.2	16.6	24700	17100	1.405	29500	17.6	29100	1.666	23400	101	5.1
	8	11.7	26.9	24600	17000	1.367	29300	18.0	29600	1.679	23900	102	5.2
90	4	3.6	8.3	23800	16700	1.644	29400	14.5	29700	1.696	23900	102	5.1
	6	7.1	16.3	23600	16600	1.606	29100	14.7	30300	1.710	24500	103	5.2
	8	11.5	26.5	23400	16600	1.568	28800	14.9	30900	1.724	25000	103	5.3
100	4	3.5	8.1	22500	16300	1.895	29000	11.9	Operation not recommended				
	6	7.0	16.1	22300	16200	1.858	28600	12.0					
	8	11.3	26.1	22100	16100	1.820	28300	12.1					
110	4	3.5	8.0	20900	15600	2.225	28500	9.4					
	6	6.9	15.9	20700	15500	2.188	28200	9.5					
	8	11.2	25.8	20500	15400	2.150	27800	9.5					
120	4	3.5	8.0	18800	14500	2.670	27900	7.0					
	6	6.8	15.8	18600	14400	2.633	27600	7.1					
	8	11.1	25.6	18500	14300	2.595	27400	7.1					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 19: Size 030 (1000 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	5	3.6	8.2	Operation not recommended					18100	1.715	12200	87	3.1
	7.5	7.0	16.2						19200	1.737	13300	88	3.2
	10	11.4	26.2						20300	1.759	14300	89	3.4
30	5	3.5	8.1	34100	23300	1.101	37900	31.0	19800	1.732	13900	88	3.3
	7.5	6.9	16.0	34500	23300	1.012	38000	34.1	20800	1.754	14800	89	3.5
	10	11.2	25.8	34900	23400	0.923	38100	37.8	21900	1.777	15800	90	3.6
40	5	3.4	7.9	34100	23400	1.159	38100	29.4	23200	1.780	17100	91	3.8
	7.5	6.7	15.5	34600	23500	1.070	38300	32.3	24300	1.802	18100	92	4.0
	10	10.9	25.1	35000	23500	0.981	38400	35.7	25400	1.824	19200	93	4.1
50	5	3.3	7.7	33700	23400	1.235	37900	27.3	26800	1.837	20500	95	4.3
	7.5	6.5	15.1	34100	23400	1.146	38000	29.8	27900	1.859	21600	96	4.4
	10	10.6	24.4	34500	23400	1.058	38100	32.6	28900	1.881	22500	97	4.5
60	5	3.2	7.5	32900	23000	1.336	37500	24.6	30400	1.898	23900	98	4.7
	7.5	6.4	14.7	33300	23100	1.247	37600	26.7	31400	1.920	24800	99	4.8
	10	10.3	23.8	33700	23100	1.159	37700	29.1	32500	1.942	25900	100	4.9
70	5	3.2	7.3	31700	22500	1.469	36700	21.6	33800	1.963	27100	101	5.0
	7.5	6.2	14.4	32100	22500	1.380	36800	23.3	34900	1.985	28100	102	5.2
	10	10.1	23.3	32600	22600	1.291	37000	25.2	36000	2.007	29100	103	5.3
80	5	3.1	7.2	30400	21800	1.639	36000	18.5	37200	2.032	30300	104	5.4
	7.5	6.1	14.2	30800	21800	1.551	36100	19.9	38200	2.054	31200	105	5.4
	10	9.9	22.9	31200	21900	1.462	36200	21.3	39300	2.076	32200	106	5.5
90	5	3.1	7.1	28900	21000	1.854	35200	15.6	40400	2.108	33200	107	5.6
	7.5	6.0	13.9	29300	21000	1.766	35300	16.6	41500	2.130	34200	108	5.7
	10	9.7	22.5	29700	21100	1.677	35400	17.7	42500	2.152	35100	109	5.8
100	5	3.0	7.0	27300	20100	2.120	34500	12.9	Operation not recommended				
	7.5	5.9	13.7	27700	20200	2.032	34600	13.6					
	10	9.6	22.2	28100	20200	1.943	34700	14.5					
110	5	3.0	6.9	25600	19300	2.444	33900	10.5					
	7.5	5.9	13.6	26000	19300	2.355	34000	11.0					
	10	9.5	22.0	26400	19400	2.266	34100	11.6					
120	5	3.0	6.8	23800	18600	2.831	33500	8.4					
	7.5	5.8	13.5	24200	18600	2.743	33600	8.8					
	10	9.4	21.8	24600	18700	2.654	33700	9.3					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Table 20: Size 036 (1200 CFM)

EWT (°F)	GPM	WPD		Cooling—EAT 80/67° F					Heating—EAT 70° F				
		PSI	Ft of WC	Total (Btu/h)	Sensible (Btu/h)	Power Input (kW)	THR (Btu/h)	EER	Total (Btu/h)	Power Input (kW)	THA (Btu/h)	LAT (°F)	COP
25	6	4.8	11.2	Operation not recommended					23400	2.182	15900	88	3.1
	9	9.8	22.7						24300	2.200	16800	89	3.2
	12	16.2	37.4						25200	2.219	17600	89	3.3
30	6	4.8	11.0	39300	25900	1.478	44300	26.6	25500	2.215	17900	90	3.4
	9	9.7	22.3	39700	26000	1.356	44300	29.3	26400	2.234	18800	90	3.5
	12	15.9	36.8	40100	26100	1.233	44300	32.5	27300	2.252	19600	91	3.6
40	6	4.6	10.7	41100	27300	1.552	46400	26.5	29500	2.280	21700	93	3.8
	9	9.4	21.7	41500	27400	1.430	46400	29.0	30400	2.299	22500	93	3.9
	12	15.5	35.7	41900	27500	1.307	46400	32.1	31200	2.317	23300	94	3.9
50	6	4.5	10.4	40800	27500	1.670	46500	24.4	33100	2.341	25100	95	4.1
	9	9.1	21.1	41200	27600	1.547	46500	26.6	33900	2.360	25800	96	4.2
	12	15.1	34.8	41600	27700	1.425	46500	29.2	34800	2.378	26700	97	4.3
60	6	4.4	10.2	39600	27100	1.824	45800	21.7	36300	2.399	28100	98	4.4
	9	8.9	20.6	39900	27200	1.701	45700	23.5	37200	2.418	28900	99	4.5
	12	14.7	33.9	40300	27300	1.579	45700	25.5	38000	2.436	29700	99	4.6
70	6	4.3	9.9	38100	26400	2.010	45000	19.0	39100	2.453	30700	100	4.7
	9	8.7	20.1	38500	26500	1.887	44900	20.4	40000	2.471	31600	101	4.7
	12	14.4	33.2	38900	26600	1.764	44900	22.0	40900	2.490	32400	101	4.8
80	6	4.2	9.8	36700	25600	2.228	44300	16.5	41600	2.503	33100	102	4.9
	9	8.6	19.8	37100	25700	2.105	44300	17.6	42500	2.521	33900	103	4.9
	12	14.1	32.6	37500	25800	1.983	44300	18.9	43400	2.540	34700	103	5.0
90	6	4.2	9.6	35200	24900	2.483	43700	14.2	43800	2.548	35100	104	5.0
	9	8.4	19.4	35600	25000	2.360	43700	15.1	44700	2.566	35900	104	5.1
	12	13.9	32.1	36000	25100	2.238	43600	16.1	45500	2.585	36700	105	5.2
100	6	4.1	9.5	33500	24200	2.783	43000	12.0	Operation not recommended				
	9	8.3	19.2	33900	24300	2.660	43000	12.7					
	12	13.7	31.6	34300	24400	2.538	43000	13.5					
110	6	4.1	9.4	31500	23400	3.141	42200	10.0					
	9	8.2	19.0	31900	23500	3.018	42200	10.6					
	12	13.5	31.3	32300	23500	2.895	42200	11.2					
120	6	4.0	9.3	29200	22200	3.572	41400	8.2					
	9	8.1	18.8	29600	22300	3.450	41400	8.6					
	12	13.4	31.0	30000	22400	3.327	41400	9.0					

Table Legend

Btu/h	British Thermal Units per Hour	GPM	Gallons per Minute
CFM	Airflow rate, Cubic Feet per Minute	kW	Kilowatts
COP	Coefficient of Performance	LAT	Leaving Air Temperature
EAT	Entering Air Temperature	PSI	Pounds per square Inch
EER	Energy Efficiency Ratio	THA	Total Heat of Absorption
EWT	Entering Water Temperature	THR	Total Heat of Rejection
Ft of WC	Feet of Water Column	WPD	Waterside Pressure Drop

NOTE 1: Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 86°F (30°C) entering water temperature.

NOTE 2: Heating capacity is based on 68°F (20°C) entering air temperature and 68°F (20°C) entering water temperature.

Hydronic Heat Performance

Table 21: One-Row Hydronic Heat Performance (Sizes 009–036)

Unit Size	GPM	WPD		CFM	90° F EWT			100° F EWT			110° F EWT			120° F EWT		
		PSI	FT		Capacity Btu/h	LWT °F	LDB °F	Capacity Btu/h	LWT °F	LDB °F	Capacity Btu/h	LWT °F	LDB °F	Capacity Btu/h	LWT °F	LDB °F
009	1.1	1.2	2.8	280	2,529	85.5	78.2	3,833	93.2	82.4	5,155	100.9	86.7	6,491	108.5	91.0
	1.5	2.1	4.9		2,734	86.4	78.8	4,132	94.5	83.4	5,546	102.6	87.9	6,972	110.7	92.5
	2.3	4.6	10.6		2,969	87.4	79.6	4,478	96.0	84.5	6,000	104.7	89.4	7,533	113.3	94.3
012	1.5	2.1	4.9	350	3,037	86.0	77.8	4,595	93.9	81.8	6,172	101.8	85.9	7,765	109.6	90.0
	2.0	3.7	8.5		3,253	86.7	78.4	4,913	95.1	82.7	6,590	103.4	87.0	8,281	111.7	91.3
	3.0	8.0	18.5		3,500	87.7	79.0	5,278	96.5	83.6	7,070	105.3	88.2	8,873	114.1	92.9
015	1.9	1.8	4.1	440	3,545	86.2	77.5	5,396	94.3	81.3	7,284	102.3	85.3	9,203	110.2	89.3
	2.5	3.1	7.2		3,862	86.9	78.1	5,857	95.3	82.3	7,883	103.7	86.6	9,932	112.1	90.9
	3.8	6.9	15.9		4,223	87.7	78.9	6,382	96.6	83.4	8,565	105.4	88.0	10,769	114.3	92.6
018	2.3	2.5	5.8	530	4,055	86.4	77.1	6,163	94.5	80.7	8,310	102.6	84.5	10,488	110.7	88.3
	3.0	4.4	10.2		4,391	87.1	77.6	6,653	95.6	81.6	8,946	104.0	85.6	11,266	112.5	89.6
	4.5	9.9	22.8		4,772	87.9	78.3	7,211	96.8	82.6	9,675	105.7	86.9	12,162	114.6	91.2
024	3.0	3.0	6.8	700	5,682	86.2	77.4	8,606	94.3	81.2	11,569	102.3	85.1	14,562	110.3	89.0
	4.0	5.2	12.0		6,087	87.0	78.0	9,200	95.4	82.0	12,348	103.8	86.1	15,524	112.2	90.3
	6.0	11.5	26.6		6,551	87.8	78.6	9,884	96.7	82.9	13,244	105.6	87.3	16,629	114.5	91.7
030	3.8	3.5	8.2	880	6,714	86.4	77.0	10,226	94.5	80.7	13,808	102.6	84.4	17,446	110.7	88.2
	5.0	6.2	14.4		7,308	87.1	77.6	11,082	95.6	81.6	14,910	104.0	85.6	18,782	112.5	89.6
	7.5	14.0	32.3		7,963	87.9	78.3	12,034	96.8	82.6	16,151	105.7	86.9	20,305	114.6	91.2
036	4.5	5.1	11.7	1060	7,661	86.6	76.6	11,644	94.8	80.0	15,697	103.0	83.5	19,805	111.2	87.1
	6.0	9.0	20.7		8,271	87.2	77.1	12,525	95.8	80.8	16,839	104.4	84.5	21,204	112.9	88.3
	9.0	20.1	46.4		8,957	88.0	77.7	13,533	97.0	81.7	18,158	106.0	85.7	22,825	114.9	89.7

Table Legend	
BTU/h	British Thermal Units per Hour
CFM	Airflow Rate, Cubic Feet per Minute
EDB	Entering Dry Bulb
LDB	Leaving Dry Bulb
EWT	Entering Water Temperature
LWT	Leaving Water Temperature
GPM	Gallons per Minute
WPD	Waterside Pressure Drop

NOTE 1: Data based on 70°F EDB.

NOTE 2: All unit sizes include ECM.

Table 22: Two-Row Hydronic Heat Performance (Sizes 009–036)

Unit Size	GPM	WPD		CFM	90° F EWT			100° F EWT			110° F EWT			120° F EWT		
		PSI	FT		Capacity Btu/h	LWT °F	LDB °F	Capacity Btu/h	LWT °F	LDB °F	Capacity Btu/h	LWT °F	LDB °F	Capacity Btu/h	LWT °F	LDB °F
009	1.13	1.6	3.7	280	3,592	83.6	81.6	5,415	90.4	87.5	7,251	97.2	93.4	9,097	103.9	99.4
	1.50	2.6	6.0		3,867	84.8	82.5	5,822	92.2	88.8	7,787	99.6	95.2	9,760	107.0	101.5
	2.25	5.2	12.0		4,177	86.3	83.5	6,282	94.4	90.3	8,395	102.5	97.1	10,514	110.7	104.0
012	1.50	2.6	6.0	350	4,323	84.2	81.1	6,515	91.3	86.8	8,721	98.4	92.5	10,937	105.4	98.2
	2.00	4.2	9.8		4,630	85.4	81.9	6,970	93.0	88.0	9,322	100.7	94.0	11,684	108.3	100.1
	3.00	8.5	19.7		4,974	86.7	82.8	7,481	95.0	89.3	9,998	103.3	95.8	12,522	111.7	102.3
015	1.88	2.1	5.0	440	6,195	83.4	83.0	9,345	90.1	89.6	12,518	96.7	96.3	15,709	103.3	103.0
	2.50	3.6	8.3		6,645	84.7	84.0	10,010	92.0	91.0	13,393	99.3	98.2	16,792	106.6	105.3
	3.75	7.5	17.2		7,151	86.2	85.0	10,759	94.3	92.6	14,382	102.3	100.2	18,018	110.4	107.9
018	2.25	3.0	6.8	530	7,183	83.6	82.5	10,833	90.4	88.9	14,509	97.1	95.3	18,206	103.8	101.7
	3.00	5.0	11.5		7,695	84.9	83.4	11,591	92.3	90.2	15,511	99.7	97.0	19,449	107.0	103.9
	4.50	10.4	24.0		8,271	86.3	84.4	12,446	94.5	91.7	16,640	102.6	99.0	20,849	110.7	106.3
024	3.00	3.4	7.8	700	9,315	83.8	82.2	14,058	90.6	88.4	18,839	97.4	94.6	23,649	104.0	100.9
	4.00	5.7	13.2		9,988	85.0	83.0	15,051	92.5	89.7	20,149	99.9	96.3	25,275	107.2	103.0
	6.00	12.0	27.7		10,745	86.4	84.0	16,175	94.6	91.1	21,633	102.7	98.3	27,113	110.8	105.4
030	3.75	3.9	9.0	880	9,962	84.7	80.4	15,086	92.0	85.8	20,274	99.2	91.2	25,509	106.4	96.7
	5.00	6.7	15.6		10,794	85.7	81.3	16,300	93.5	87.0	21,854	101.3	92.8	27,445	109.0	98.7
	7.50	14.5	33.6		11,704	86.9	82.2	17,636	95.3	88.4	23,606	103.7	94.7	29,608	112.1	100.9
036	4.50	5.5	12.7	1060	11,336	85.0	79.8	17,152	92.4	84.8	23,035	99.8	89.9	28,967	107.1	95.0
	6.00	9.5	22.0		12,232	85.9	80.6	18,463	93.8	85.9	24,747	101.8	91.3	31,076	109.6	96.8
	9.00	20.6	47.5		13,231	87.1	81.4	19,938	95.6	87.2	26,691	104.1	93.0	33,480	112.6	98.9

Table Legend	
Btu/h	British Thermal Units per Hour
CFM	Airflow Rate, Cubic Feet per Minute
EDB	Entering Dry Bulb
LDB	Leaving Dry Bulb
EWT	Entering Water Temperature
LWT	Leaving Water Temperature
GPM	Gallons per Minute
WPD	Waterside Pressure Drop

NOTE 1: Data based on 70°F EDB.

NOTE 2: All unit sizes include ECM.

Fan Performance

Table 23: Fan Performance for PSC Motor

Unit Size	Rated Airflow	Speed	External Static Pressure (in-H_2O) (Dry Coil and STD Filter) (inches of water column)										
			0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
009	300	Low	400	380	350	310	270	220					
		High	430	410	370	330	290	250	210				
012	400	Low	400	380	350	310							
		High	430	410	370	330	290						
015	500	Low	440	420	390	360							
		High	520	500	470	420	380						
018	600	Low	580	560	550	530	520	500	490	470	450		
		High	680	670	660	640	620	600	580	550	520	500	470
024	800	Low	760	760	720	680	650	620	590	560			
		High	920	880	840	800	760	720	670	620	560		
030	1000	Low	950	940	930	910	900	880	860	840	820	810	790
		High	1170	1150	1120	1100	1070	1040	1020	990	960	930	900
036	1200	Low	1080	1070	1050	1040	1020	1000	980	950	910	850	
		High	1300	1290	1260	1230	1190	1160	1140	1120	1100	1050	980

NOTE: Add 0.01" ESP for the optional discharge diffuser, and 0.02" ESP for the optional return air grille.

Table 24: Constant Torque EC Motor CFM Values

Airflow in SCFM												
Unit Size	Setting	Function	External Static Pressure (in-H2O) (Dry Coil and STD Filter) (inches of water column)										
			0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.5
009	1	Stage 2	340	320	295	275	250	230	210				
	2		330	305	280	260	235	210					
	3		310	285	260	235	215						
	4		295	270	245	220							
	5		320	295	270	250	225						
	6		305	280	255	230							
	7		285	260	235	210							
	8		275	245	220								
	A	Fan Only	220										
012	1	Stage 2	450	435	415	400	380	365	345	330	310	295	
	2		425	410	390	370	355	335	315	300	280		
	3		405	385	365	345	325	310	290				
	4		380	360	340	320	300	280					
	5		415	395	380	360	340	320	305	285			
	6		390	370	350	335	315	295					
	7		365	345	325	305	285						
	8		340	320	295								
	A	Fan Only	240										

Table 25: Constant CFM EC Motor Values

Unit Size	MicroTech Unit Controller							
	Setting[2]	Maximum ESP (in. WC.)	Fan Only[3]	Low CFM Cool[1]	High CFM Cool[1]	Low CFM Heat[1]	High CFM Heat[1]	Hydronic Heat
015	Fan Speed 1	0.5	310	500	560	500	560	500
	Fan Speed 2		310	465	530	465	530	465
	Fan Speed 3		310	435	500	435	500	435
	Fan Speed 4		310	405	465	405	465	405
	Fan Speed 5		310	450	515	450	515	450
	Fan Speed 6		310	420	480	420	480	420
	Fan Speed 7		310	405	450	405	450	405
	Fan Speed 8		310	405	420	405	420	405
018	Fan Speed 1	0.5	375	600	675	600	675	600
	Fan Speed 2		375	565	640	565	640	565
	Fan Speed 3		375	525	600	525	600	525
	Fan Speed 4		375	490	565	490	565	490
	Fan Speed 5		375	545	620	545	620	545
	Fan Speed 6		375	505	580	505	580	505
	Fan Speed 7		375	490	545	490	545	490
	Fan Speed 8		375	490	505	490	505	490
024	Fan Speed 1	0.5	500	800	900	800	900	800
	Fan Speed 2		500	750	850	750	850	750
	Fan Speed 3		500	700	800	700	800	700
	Fan Speed 4		500	650	750	650	750	650
	Fan Speed 5		500	725	825	725	825	725
	Fan Speed 6		500	675	775	675	775	675
	Fan Speed 7		500	650	725	650	725	650
	Fan Speed 8		500	650	675	650	675	650
030	Fan Speed 1	0.5	625	1000	1125	1000	1125	1000
	Fan Speed 2		625	940	1065	940	1065	940
	Fan Speed 3		625	875	1000	875	1000	875
	Fan Speed 4		625	815	940	815	940	815
	Fan Speed 5		625	905	1030	905	1030	905
	Fan Speed 6		625	845	970	845	970	845
	Fan Speed 7		625	815	905	815	905	815
	Fan Speed 8		625	815	845	815	845	815
036	Fan Speed 1	0.5	770	1205	1350	1205	1350	1205
	Fan Speed 2		770	1135	1280	1135	1280	1135
	Fan Speed 3		770	1060	1205	1060	1205	1060
	Fan Speed 4		770	990	1135	990	1135	990
	Fan Speed 5		770	1095	1240	1095	1240	1095
	Fan Speed 6		770	1025	1170	1025	1170	1025
	Fan Speed 7		770	990	1095	990	1095	990
	Fan Speed 8		770	990	1025	990	1025	990

NOTE 1: The unit is capable of high-low fan performance through the use of a two-stage thermostat wired to specific terminals for High-Low CFM.

NOTE 2: Units are shipped at setting 3 (standard).

NOTE 3: Fan Only speed in the above table is when SW4 is Off. When SW4 is On, the Fan Only speed will match Cool Low CFM (Stage 1) speed.

Correction Factors

Table 26: Airflow Correction Factors

Airflow		Cooling				Heating		
CFM/ton	% of Nominal	Total Capacity	Sensible Capacity	Power	Heat of Rejection	Heating Capacity	Power	Heat of Absorption
445	112%	1.030	1.074	1.012	1.027	1.025	0.971	1.039
425	106%	1.016	1.038	1.006	1.014	1.013	0.985	1.020
410	103%	1.008	1.019	1.003	1.007	1.006	0.992	1.010
400	100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
390	97%	0.992	0.980	0.996	0.993	0.993	1.007	0.990
375	94%	0.985	0.962	0.994	0.986	0.987	1.015	0.980
355	88%	0.970	0.926	0.987	0.973	0.975	1.029	0.961
330	82%	0.958	0.889	0.981	0.959	0.962	1.043	0.942

NOTE: The correction factor table is for reference only. For precise performance numbers, use Daikin Select Tools.

Table 27: Cooling Correction Factors

Entering Air WB °F	Total Cooling Capacity	Sensible Cooling Capacity Multipliers–Entering DB °F						Power	Heat of Rejection
		65	70	75	80	80.6	85		
55	0.797	0.874						0.991	0.831
60	0.882	0.672	0.875	1.079				0.995	0.902
65	0.966		0.673	0.877	1.081			0.998	0.972
66.2	0.986		0.625	0.829	1.032	1.057		0.999	0.989
67	1.000		0.592	0.796	1.000	1.024	1.204	1.000	1.000
70	1.051			0.675	0.879	0.903	1.083	1.002	1.042
71	1.135				0.677	0.701	0.880	1.006	1.113

NOTE: The correction factor table is for reference only. For precise performance numbers, use Daikin Select Tools.

Table 28: Heating Correction Factors

Entering Air DB °F	Heating Capacity	Power	Heat of Absorption
50	1.050	0.754	1.128
55	1.038	0.816	1.096
60	1.025	0.877	1.064
65	1.013	0.939	1.032
68	1.005	0.975	1.013
70	1.000	1.000	1.000
75	0.987	1.061	0.968
80	0.975	1.123	0.936
85	0.962	1.184	0.904

NOTE: The correction factor table is for reference only. For precise performance numbers, use Daikin Select Tools.

Electrical Data

PSC Motor

Table 29: Standard PSC Motor

Unit Size	Voltage/Hz/ Phase	Compressor		Fan Motor RLA	Total Unit RLA	Minimum Voltage	Minimum Circuit Amps	Maximum Fuse or HACR Breaker Size
		RLA	LRA					
009	115/60/1	6.1	31.5	0.8	6.9	104	8.4	15
	208-230/60/1	3.4	16.5	0.4	3.8	197	4.7	15
	265/60/1	3	16.3	0.5	3.5	231	4.2	15
012	115/60/1	8.6	38.0	0.8	9.4	104	11.6	20
	208-230/60/1	4.3	20.6	0.4	4.7	197	5.8	15
	265/60/1	3.7	16.4	0.5	4.2	231	5.1	15
015	208-230/60/1	5.5	26.4	0.6	6.1	197	7.4	15
	265/60/1	4.8	21.5	0.6	5.4	231	6.6	15
018	208-230/60/1	7.2	41.8	0.9	8.1	197	9.9	15
	265/60/1	6.2	31.0	0.8	7.0	231	8.6	15
024	208-230/60/1	11.4	59.3	0.9	11.2	197	13.8	20
	265/60/1	14.4	60.5	0.8	11.1	231	13.6	20
030	208-230/60/1	12.9	66.3	1.6	13.1	197	16.0	25
	265/60/1	12.9	71.7	1.2	12.1	231	14.8	25
036	208-230/60/1	18.4	88.0	3.1	19.6	197	23.7	40
	265/60/1	14.6	90.8	1.9	15.0	231	18.3	30

Table Legend	
RLA	Rated Load Amps
LRA	Locked Rotor Amps

EC Motor

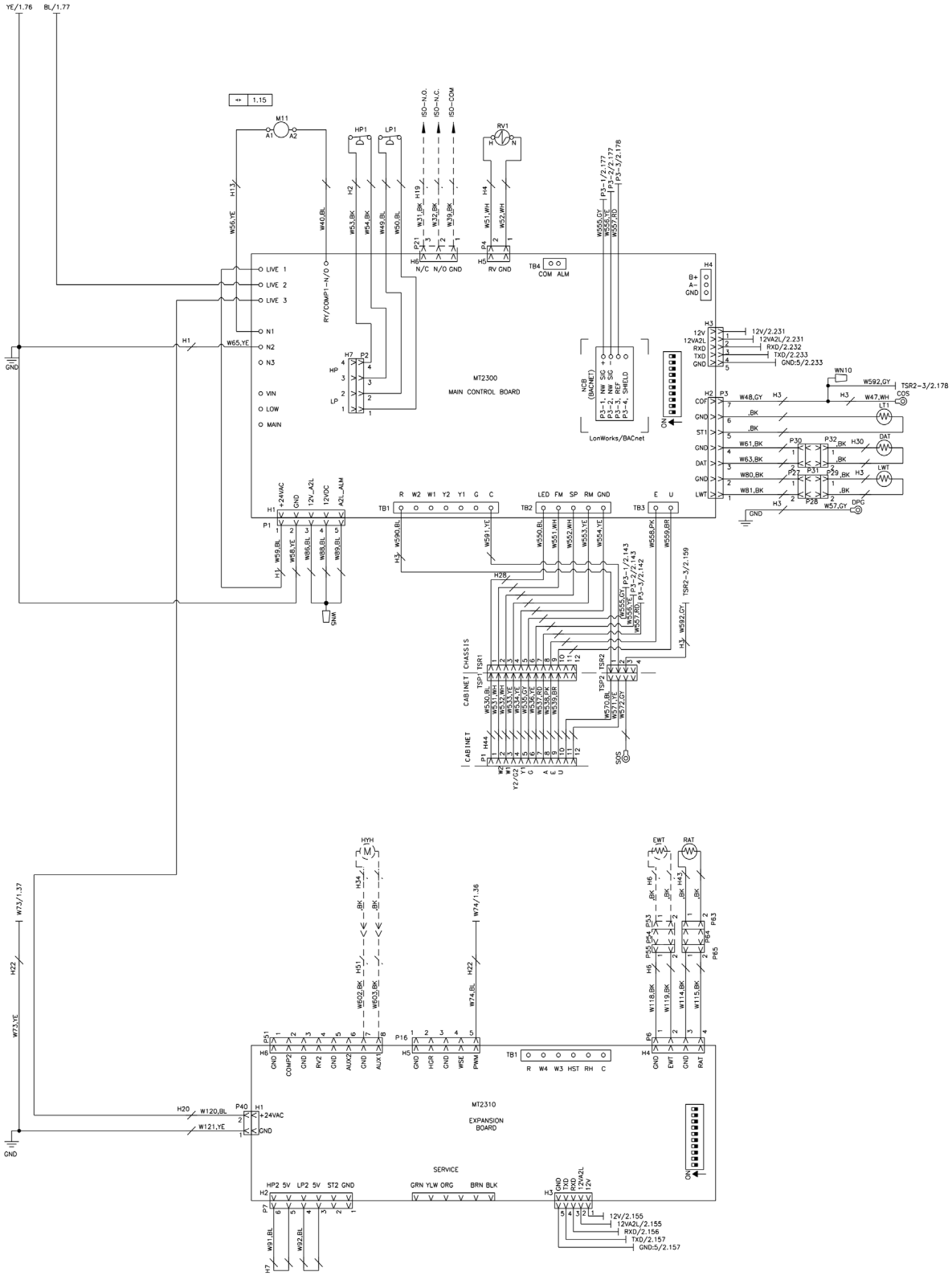
Table 30: Optional EC Motor

Unit Size	Voltage/Hz/ Phase	Compressor		Fan Motor RLA	Total Unit RLA	Minimum Voltage	Minimum Circuit Amps	Maximum Fuse or HACR Breaker Size
		RLA	LRA					
009	115/60/1	6.1	31.5	1.8	7.9	104	9.4	15
	208-230/60/1	3.4	16.5	0.9	4.3	197	5.2	15
	265/60/1	3.0	16.3	1.8	4.8	231	5.6	15
012	115/60/1	8.6	38.0	1.8	10.4	104	12.6	20
	208-230/60/1	4.3	20.6	0.9	5.2	197	6.3	15
	265/60/1	3.7	16.4	1.8	5.5	231	6.4	15
015	208-230/60/1	5.5	26.4	3.0	8.5	197	9.9	15
	265/60/1	4.8	21.5	2.6	7.4	231	8.6	15
018	208-230/60/1	7.2	41.8	3.0	10.2	197	12.0	15
	265/60/1	6.2	31.0	2.6	8.8	231	10.4	15
024	208-230/60/1	11.4	59.3	3.0	13.3	197	15.9	25
	265/60/1	14.4	60.5	2.6	12.9	231	15.5	25
030	208-230/60/1	12.9	66.3	3.0	14.5	197	17.4	25
	265/60/1	12.9	71.7	2.6	13.5	231	16.2	25
036	208-230/60/1	18.4	88.0	5.0	21.5	197	25.6	40
	265/60/1	14.6	90.8	4.1	17.2	231	20.5	30

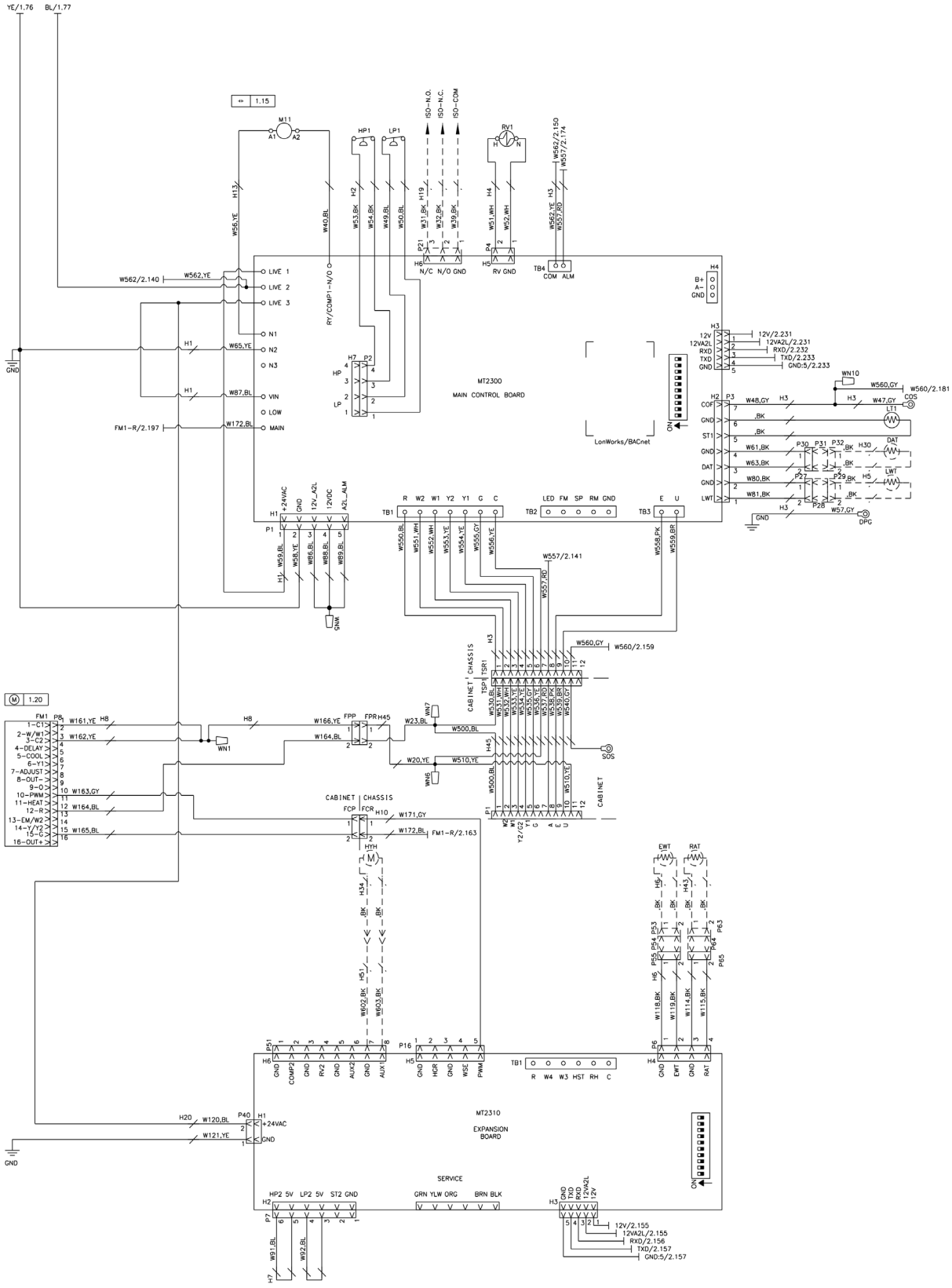
Table Legend	
RLA	Rated Load Amps
LRA	Locked Rotor Amps

Typical Wiring Diagrams

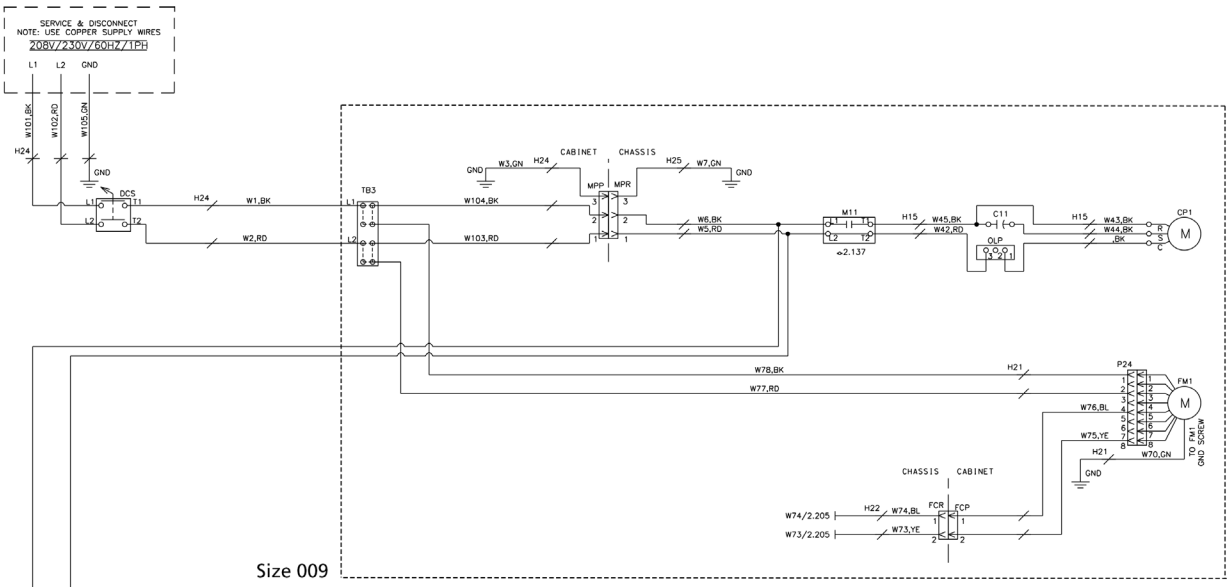
MicroTech Unit Controller, EC Constant Torque Motor BACnet, 208–230/60/1-Control Voltage, Unit Sizes 009–012



MicroTech Unit Controller, EC Constant CFM Motor Wireless, 208–230/60/1-Control Voltage, Unit Sizes 015–036



MicroTech Unit Controller, EC Motor 208–230/60/1



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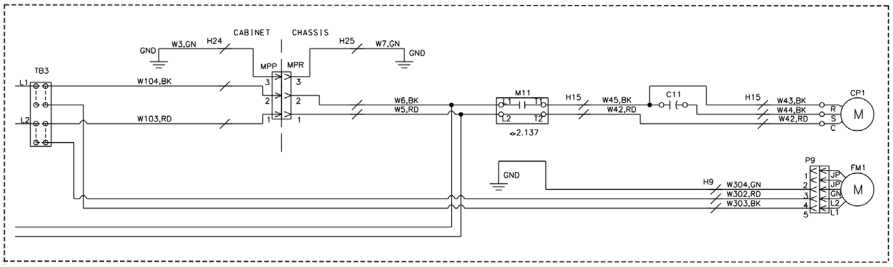
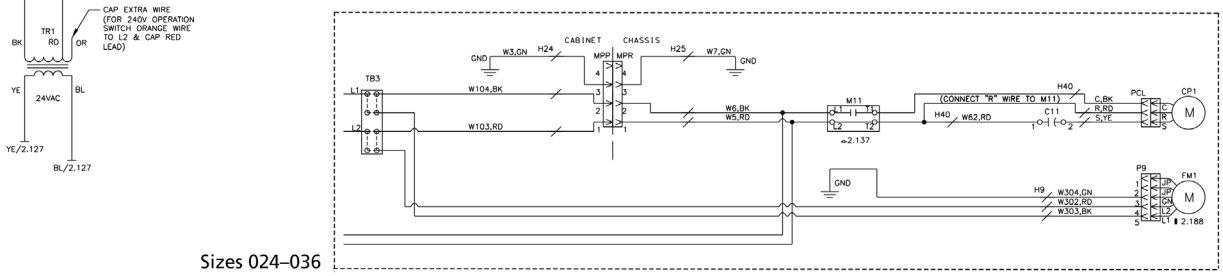


Sizes 015–018



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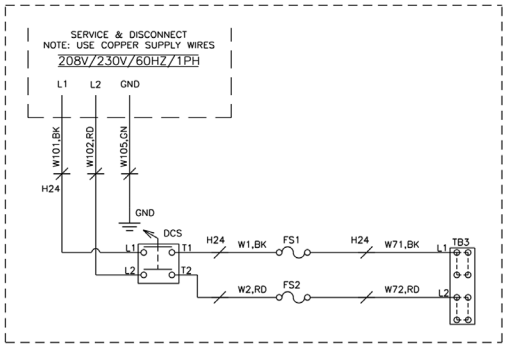

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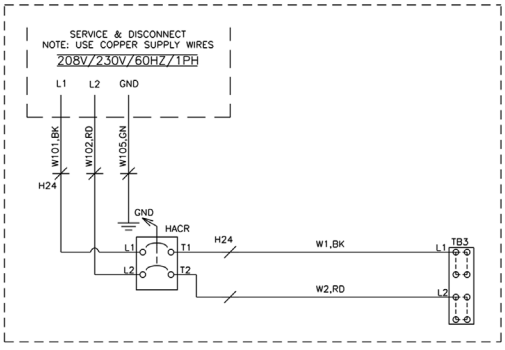
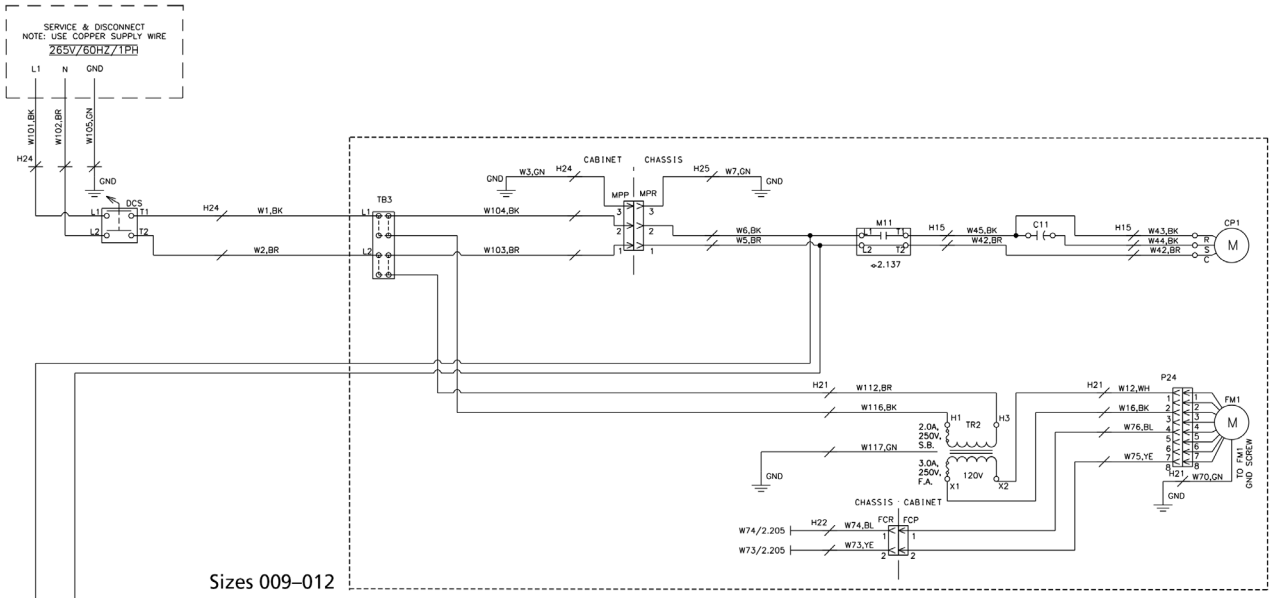


OPTION: HACR

MicroTech Unit Controller, EC Motor 265/60/1



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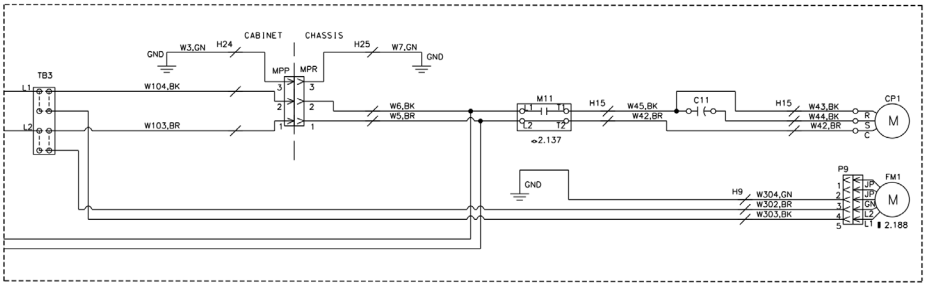

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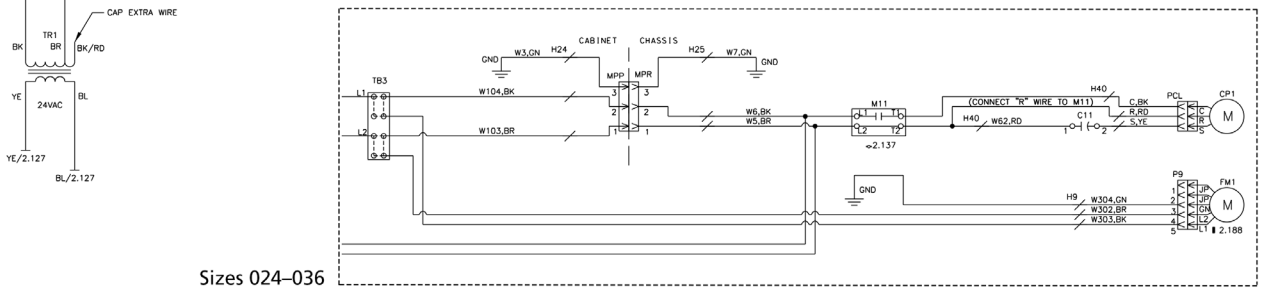
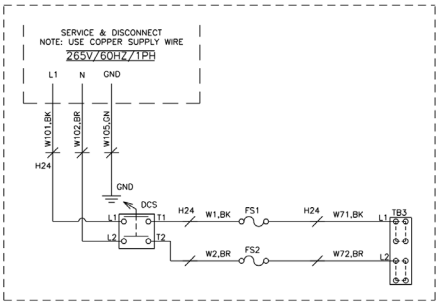


Sizes 024–036



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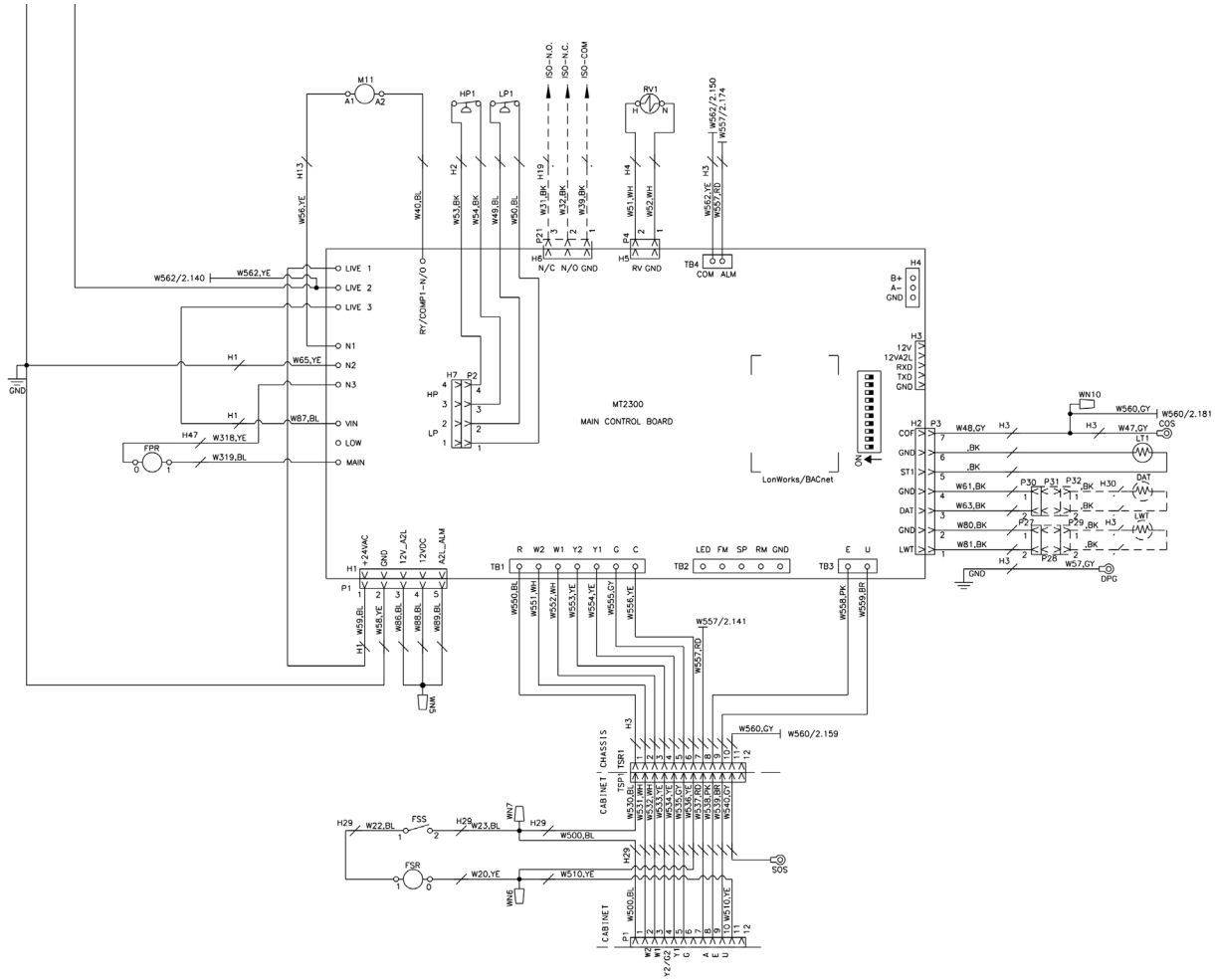
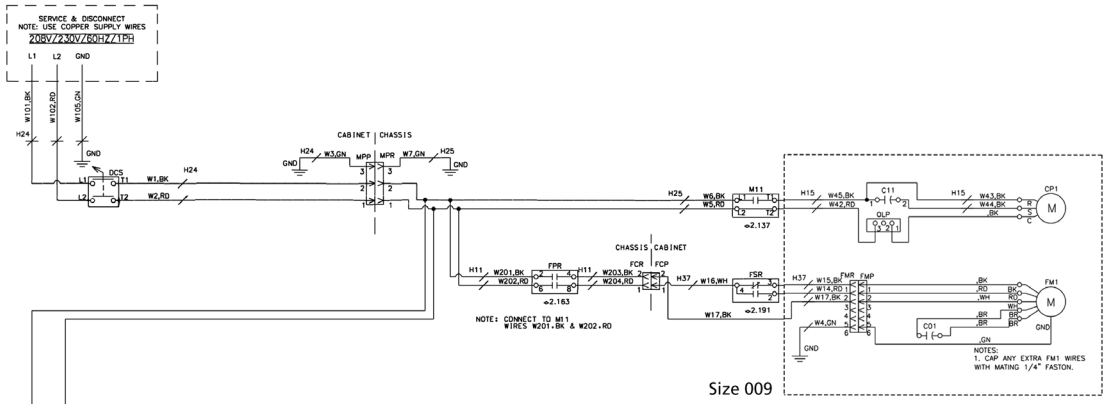
MicroTech Unit Controller, PSC Motor
Thermostat Control, 208–230/60/1-Control Voltage



MicroTech Unit Controller, PSC Motor 208–230/60/1



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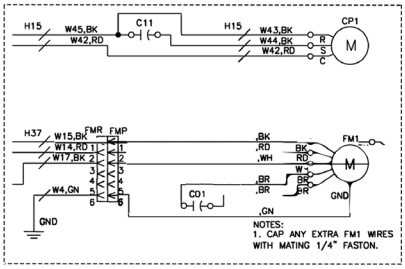

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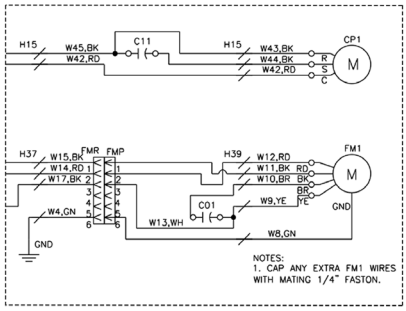
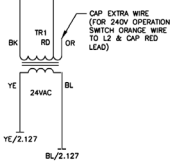
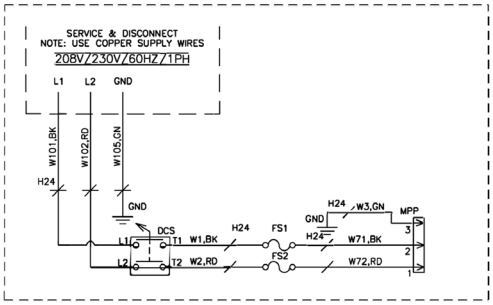


Sizes 015–018





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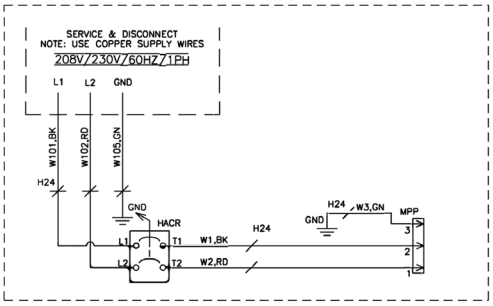
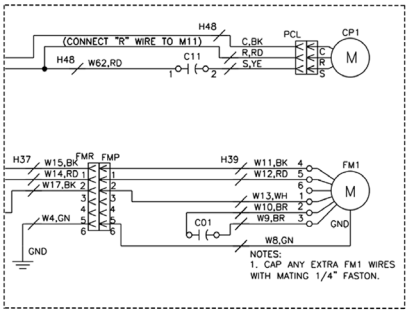


OPTION: HACR BREAKER



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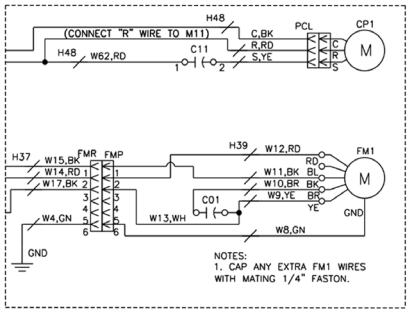
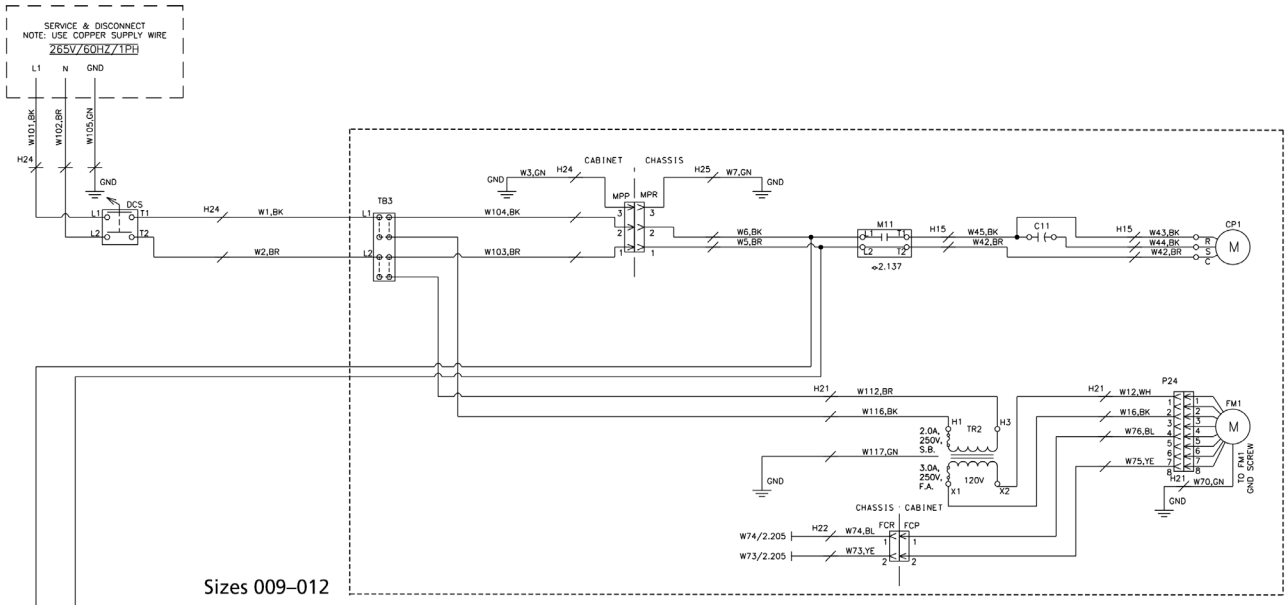
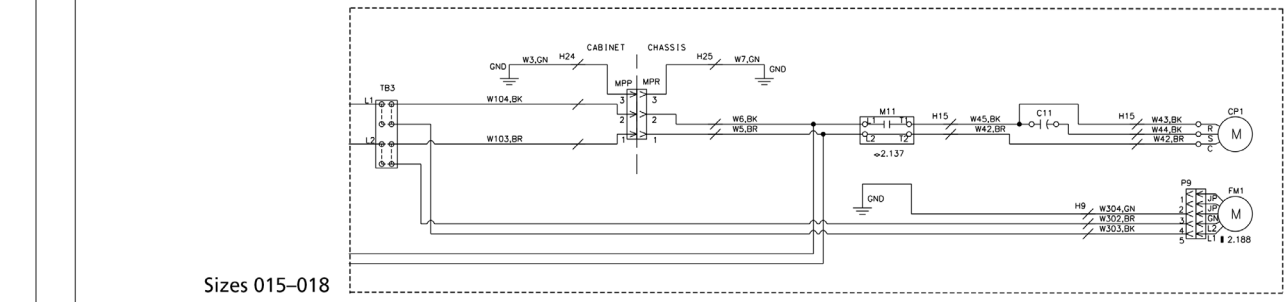


Sizes 030–036

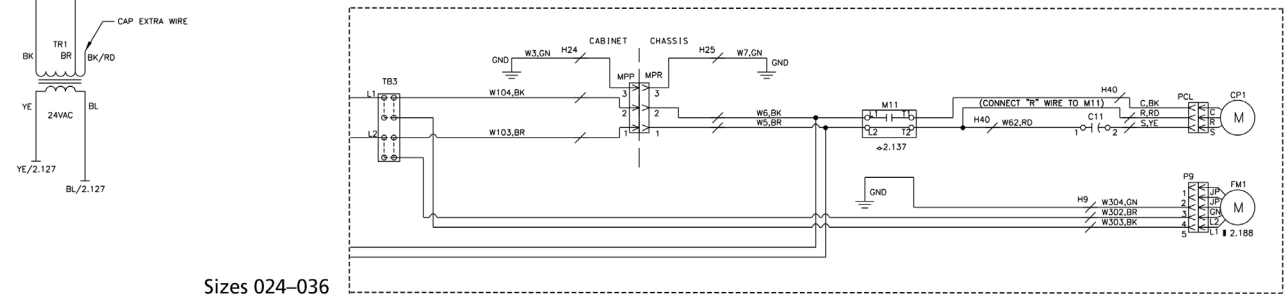
MicroTech Unit Controller, PSC Motor 265/60/1



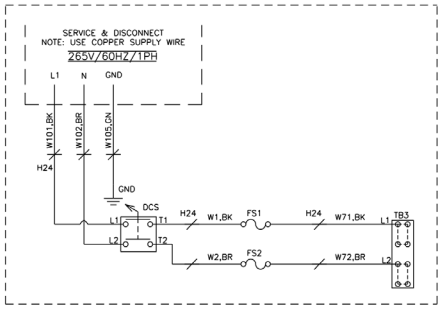
Sizes 009–012



Sizes 015–018

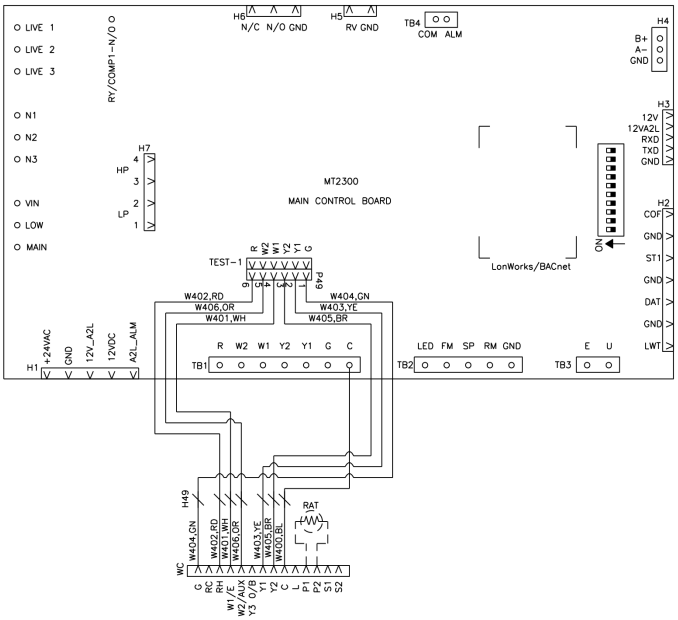


Sizes 024–036



OPTION: FUSED DISCONNECT

Wireless Thermostat Wiring



NOTE: Remaining connections are shown in previous diagrams.

Wiring Schematics Legend

NOTICE

Devices in legend may or may not be on unit.

Abbr.	Description
CO1–4	Fan Motor 1–4 Capacitor
C11	Compressor 1
CP1	Compressor 1
COE	Condensate Overflow Protection Sensor–WSE
COS	Condensate Overflow Protection Sensor
CUR	Current Sensor
DAT	Discharge Air Temperature Sensor
DCS	Disconnect Switch
DPG	Drain Pan Ground
EB1	Expansion Control Board 1
EH1	Electric Heat
EWT	Entering Water Temperature Sensor
FCP	Fan Connector Plug
FRC	Fan Connector Receptacle
FM1–4	Fan Motor 1–4
FPR	Fan Power Relay
FSR	Fan Speed Relay
FSS	Fan Speed Switch
FS1–4	Fuse 1–4
GND	Ground
HACR	HACR Breaker
HP1	High Pressure Switch 1
HYH	Hot Water Heat Valve Actuator
LAT	Leaving Air Temperature Sensor
LP1	Low Pressure Switch 1
LT1	Compressor Suction Line Temperature Sensor 1
LWT	Leaving Water Temperature Sensor
M01–04	Fan Motor 1–4 Contactor

Abbr.	Description
M11–1	Compressor 1, Contactor
MCB	Main Control Board
MPP	Main Power Connector Plug
MPR	Main Power Connector Receptacle
NCB	Network Control Board
OLP	Overload Protector–Compressor Motor
PDPG	Primary Drain Pan Ground
R15	Relay, Field Contacts, Alarm Output
R25	Relay, Hot Gas Reheat
RAT	Return Air Temperature Sensor
RV1	Reversing Valve 1
SOS	Secondary Overflow Sensor
TB1	Terminal Block, Line Voltage
TB2	Terminal Block, 24V
TB3	Terminal Block, EH1 Line Voltage
TR1	Transformer–Control
TR2	Transformer–Fan Motor
TSL	Thermostat, Wireless
TS1	Terminal Strip
TSP	Terminal Strip Connector Plug
TSR	Terminal Strip Connector Receptacle
TSW	Thermostat, Wired (Unit-Mounted)
W001–^	Wire
WC	Wireless Controller
H001–^	Wire Harness
WN1–^	Wire Nut
P001–^	Wire Plug
PCP1	Wire Plug Assy–Compressor Power
PT01	Wire Plug Assy–2-Stage Comp Ctrl
WSE	Waterside Economizer Actuator

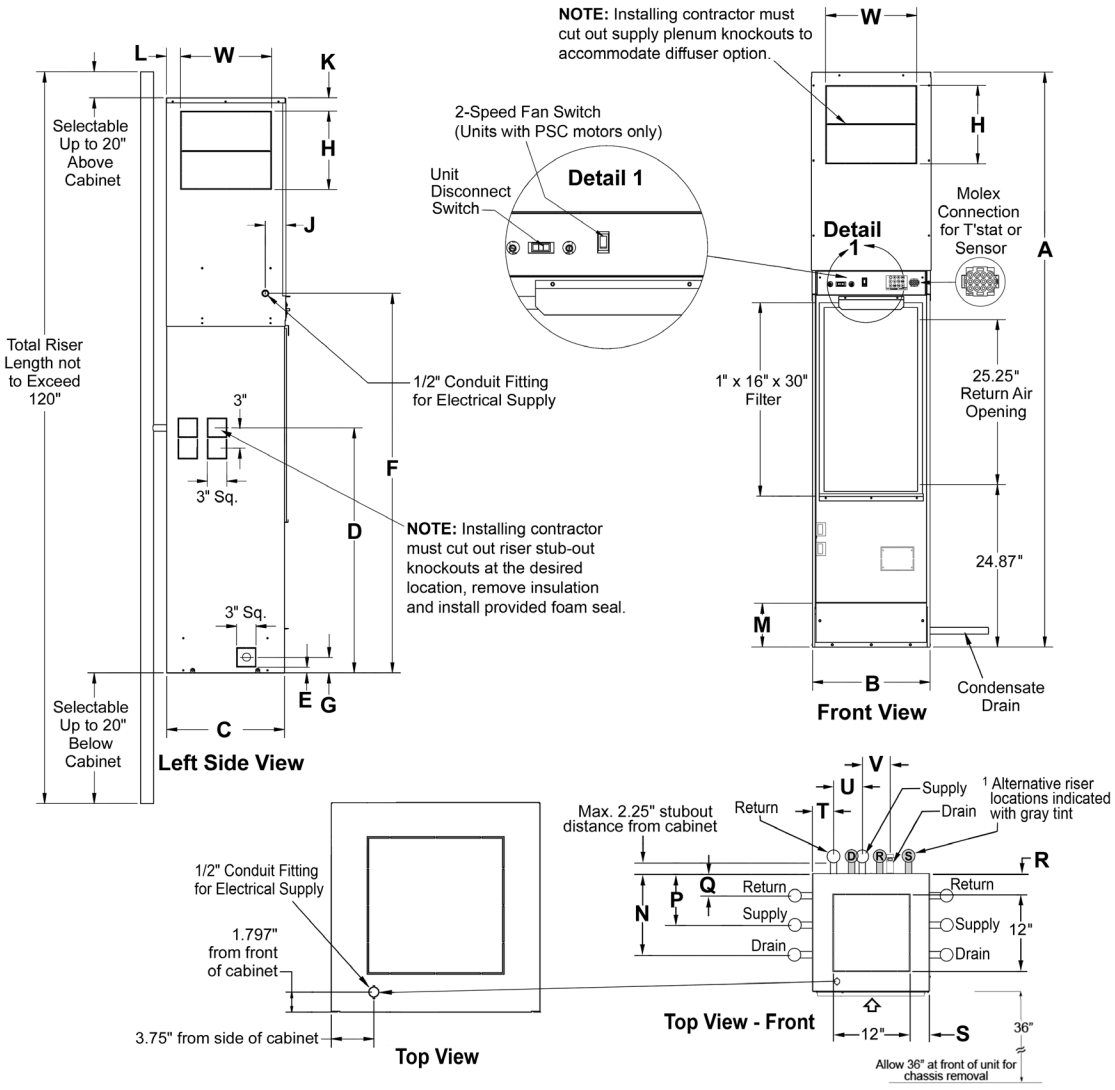
Physical Data

Table 31: Vertical Stack Physical Data

Unit Size		009	012	015	018	024	030	036
Compressor Type		Rotary				Scroll		
Fan Wheel - D x W (in)		6.2 x 8		9.5 x 6		9.9 x 7.12	9.8 x 9.5	
PSC Fan Motor (HP)								
115/60/1		1/20						
208-230/60/1		1/20		1/3		1/8	1/3	
265/60/1		1/20		1/3		1/8	1/3	
EC Fan Motor (HP)								
115/60/1		1/10						
208-230/60/1		1/10		1/3		1/3	1/2	
265/60/1		1/10		1/3		1/3	1/2	
Air Coil								
Dimensions (H x L) - (in)		13 x 20.78		13 x 25.98		19 x 20.78	19 x 27.71	
Face Area (ft^2)		1.88		2.35		2.74	3.66	
Rows		3	3	3	3	3	3	3
Water Connections - Male JIC (in)		1/2				3/4		
Condensate Connection - Plastic Hose (in)		7/8 I.D.						
Coax Coil Volume (gal @ 70°F)		0.06		0.16		0.19	0.31	
Refrigerant Charge (oz)		21	22	25	33	28	43	31
Filter Size - H x W		30" x 16"				30" x 20"		
Operating Weight (lbs)								
Chassis		96		105		150	165	
Chassis w/1-row Hydronic Coil		103		117		161	180	
Chassis w/2-row Hydronic Coil		107		122		166	188	
Cabinet	63.5"	116		118		150	158	
	80"	124		126		159	166	
	88"	131		132		168	174	
	92"	134		136		172	179	
	96"	137		139		176	183	
Shipping Weight, with Carton (lbs)		**Single Pack/4-Pack**						
Chassis		113/421		123/461		171/641	187/701	
Chassis w/1-row Hydronic Coil		119/445		131/493		178/669	196/737	
Chassis w/2-row Hydronic Coil		122/457		135/509		182/685	202/761	
Shipping Weight, with Carton (lbs)		**4-Pack**						
Cabinet	63.5"	562		570		717	749	
	80"	594		600		754	781	
	88"	622		627		788	814	
	92"	642		649		814	841	
	96"	654		662		831	858	
Shipping Weight, with Carton (lbs)		**Single Pack/4-Pack**						
Chassis + Cabinet (Vertical Upright Position)	63.5"	247/858		257/898		383/1340	388/1404	
	80"	258/896		268/937		395/1379	410/1439	
	88"	267/934		277/974		407/1429	422/1489	
	92"	270/948		280/989		413/1452	428/1512	
	96"	275/966		285/1007		418/1474	433/1534	

Dimensional Drawings

18" × 18" Cabinet, Sizes 009–012



Dimensions

Unit Size 009–012 (18 in × 18 in) Cabinet (Dimensions in Inches)																		
Unit Height "A"	B	C	D	E	F	G	J	K	L	M	N	P	Q	R	S	T	U	V
80, 88, 92, 96	18.07	18.11	37.50	0.88	58.09	2.38	3.125	2.0	2.0	6.72	12.4	7.9	3.3	3.0	3.0	3.3	4.5	4.5

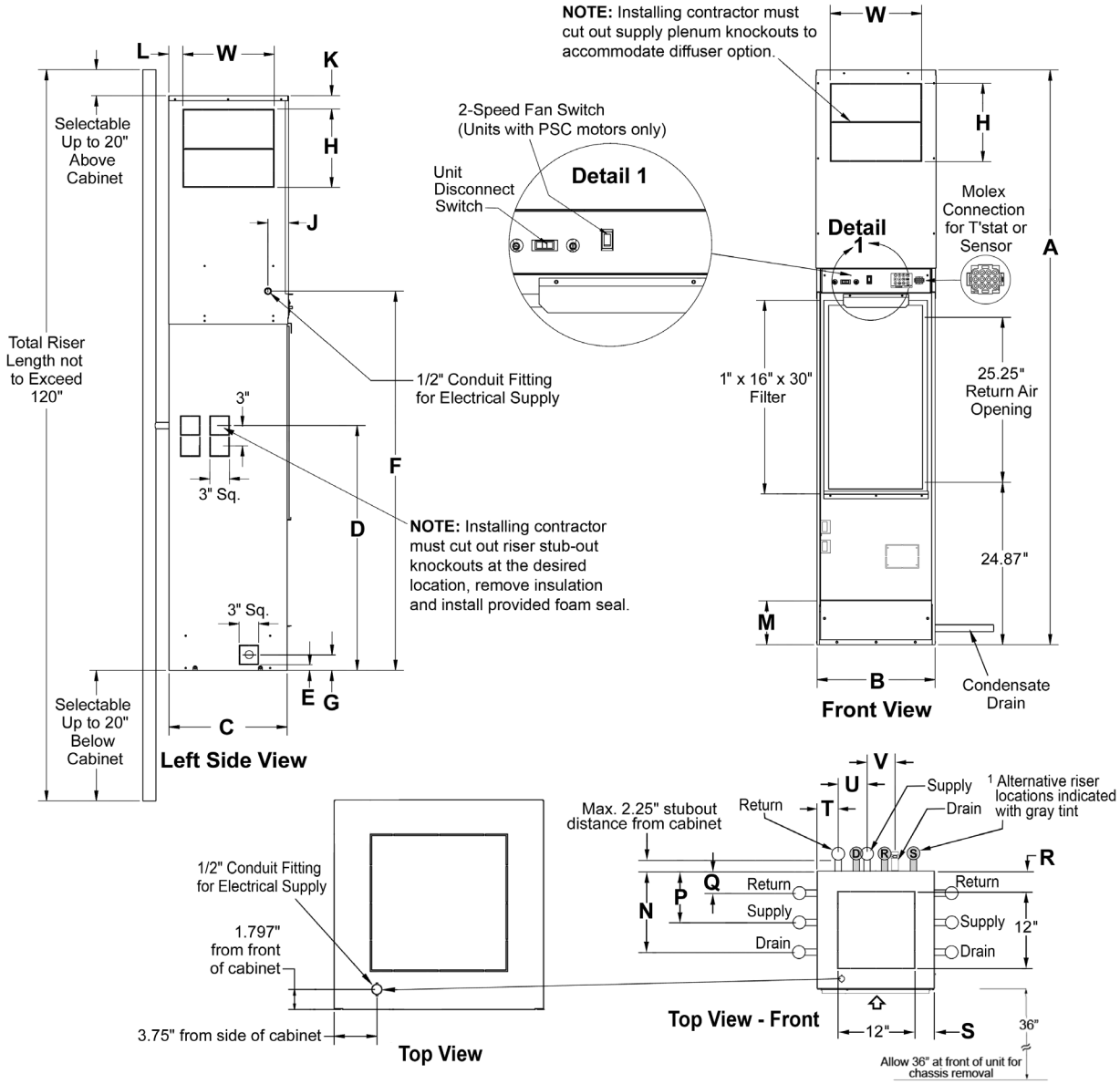
Discharge Openings (Dimensions in Inches)								
Unit Size	Single		Double		Triple		Single-Top Opening	
009–012	W	H	W	H	W	H	W	H
	14	16	14	8	NR	NR	12	12

NOTE 1: Alternative riser locations dimensions mirror those shown as "T," "U," and "V"

NOTE 2: NR = Not Recommended

NOTE 3: 80"-high cabinet not available with side discharge, top discharge only.

18" × 20" Cabinet, Sizes 015–018



Dimensions

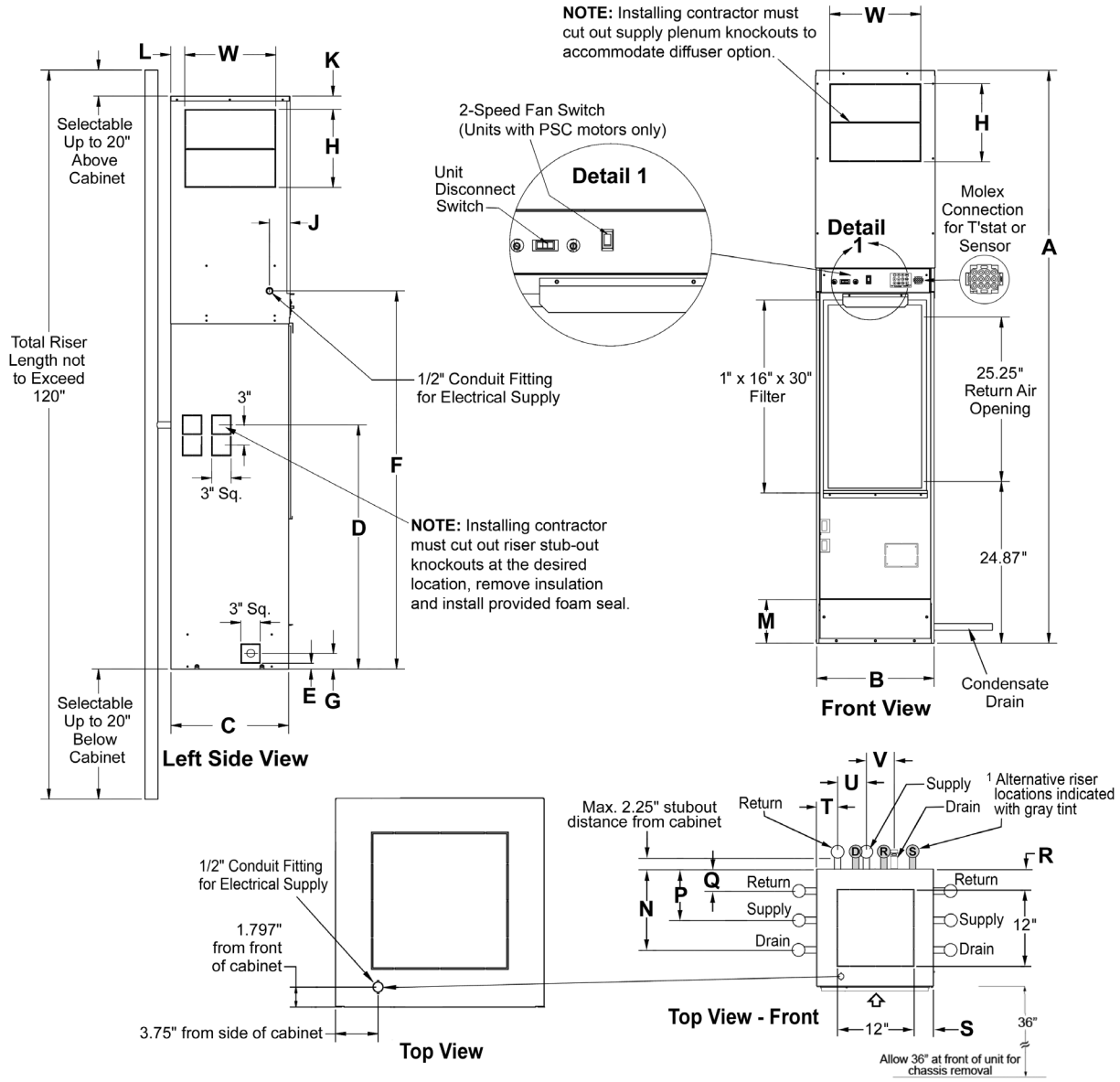
Unit Size 015–018 (18 in × 20 in) Cabinet (Dimensions in Inches)																		
Unit Height "A"	B	C	D	E	F	G	J	K	L	M	N	P	Q	R	S	T	U	V
80, 88, 92, 96	18.07	20.00	37.50	0.88	58.09	2.38	3.125	2.0	3.0	6.72	12.4	7.9	3.3	4.0	3.0	3.12	4.5	4.5

Discharge Openings (Dimensions in Inches)								
Unit Size	Single		Double		Triple		Single-Top Opening	
015–018	W	H	W	H	W	H	W	H
	14	16	14	8	14	8	12	12

NOTE 1: Alternative riser locations dimensions mirror those shown as "T," "U," and "V"

NOTE 2: 80"-high cabinet not available with side discharge, top discharge only.

24" × 24" Cabinet, Sizes 024–036



Dimensions

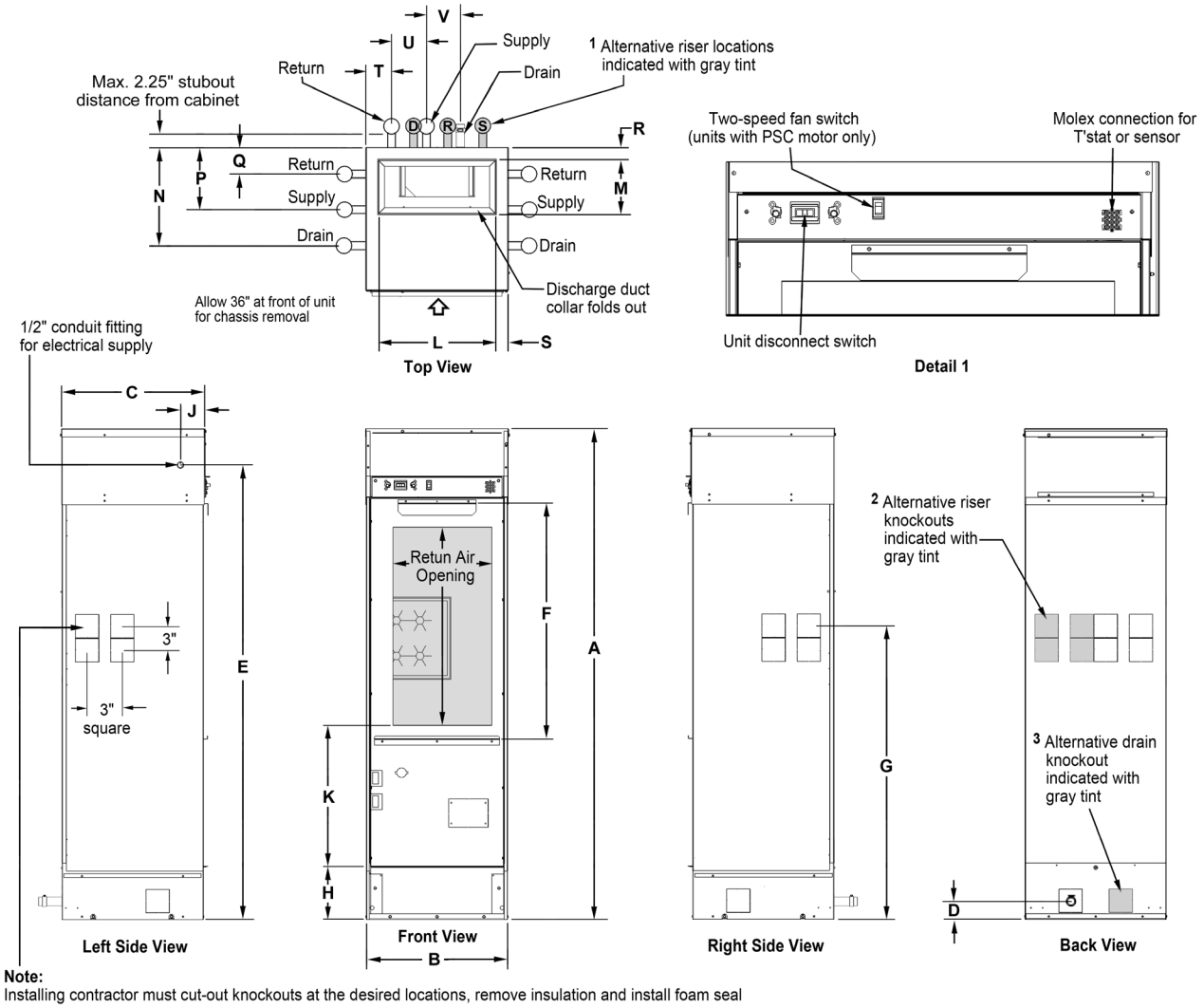
Unit Size 024–036 (24 in × 24 in) Cabinet (Dimensions in Inches)																		
Unit Height "A"	B	C	D	E	F	G	J	K	L	M	N	P	Q	R	S	T	U	V
80, 88, 92, 96	24.00	24.04	37.50	0.88	58.08	2.38	4.54	2.0	3.0	6.72	12.4	7.9	3.3	3.09	3.10	3.12	4.5	4.5

Discharge Openings (Dimensions in Inches)								
Unit Size	Single		Double		Triple		Single-Top Opening	
024	W	H	W	H	W	H	W	H
	NR	NR	18	10	18	10	18	18
030–036	NR	NR	18	14	18	10	18	18

NOTE 1: NR = Not Recommended

NOTE 2: 80"-high cabinet not available with side discharge, top discharge only.

63.5″ High Cabinet - Sizes 009-018



Note:
Installing contractor must cut-out knockouts at the desired locations, remove insulation and install foam seal

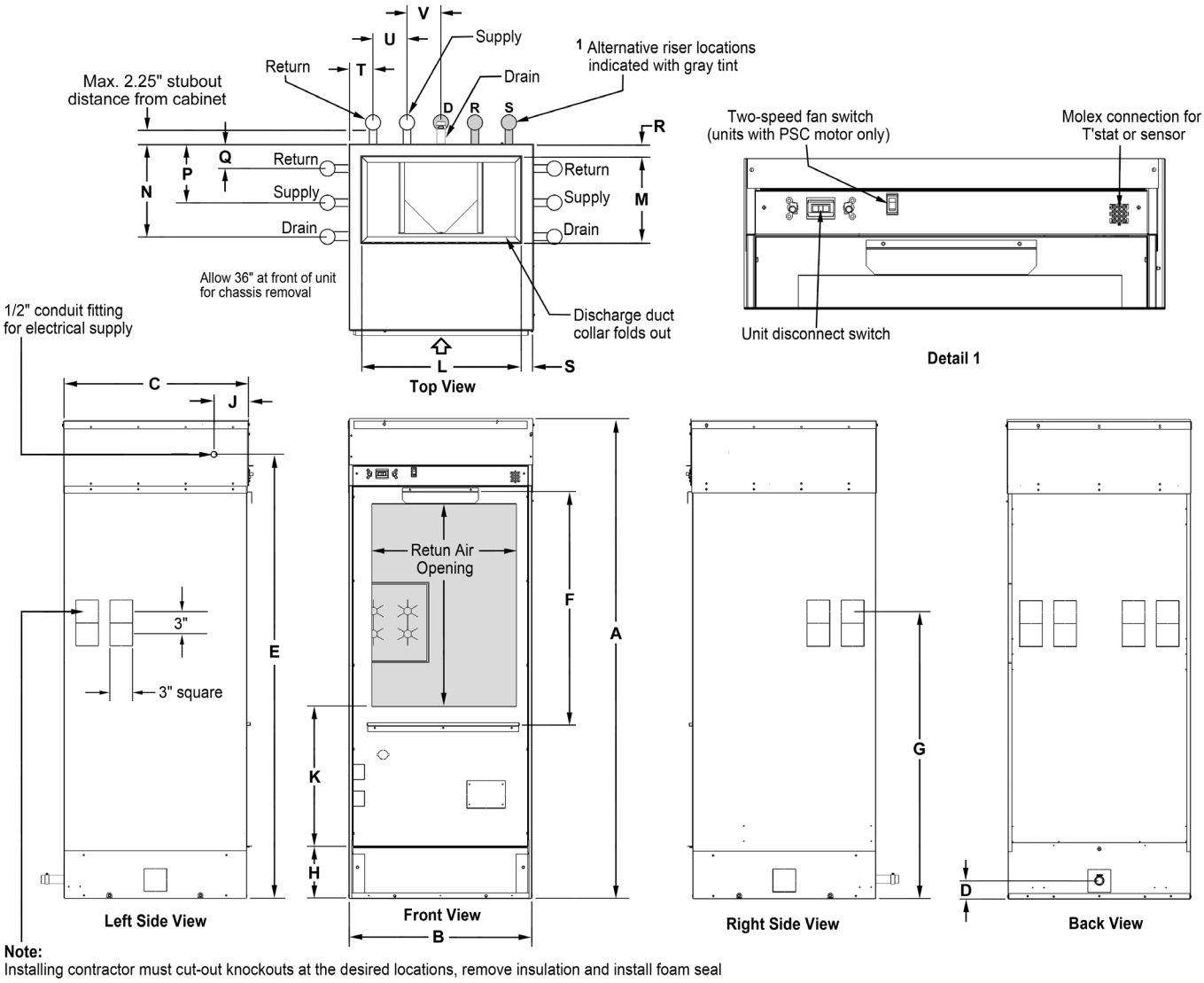
Dimensions

Cabinet											
Cabinet	A[4]	B	C	D	E	Filter Size F (W x H x D)	Return Air Opening (W x H)	G	H	J	K
18 x 18 (Size 009-012)	62.75	18.00	18.00	2.38	58.08	16″ x 30″ x 1″	12.62 x 25.25	37.50	6.72	3.125	24.87
18 x 20 (Size 015-018)			20.00								

Top View										
Cabinet	Discharge Air Opening[5]		N	P	Q	R	S	T	U	V
	L	M								
18 x 18 (Size 009-012)	15.00	6.80	12.4	7.9	3.3	1.64	1.64	3.12	4.50	4.50
18 x 20 (Size 015-018)		8.80								

NOTE: [1] Alternative riser locations dimensions mirror those shown as “T”, “U”, and “V”
[2] Alternative riser locations for unit sizes 009-018 are field-specified (code 22 = A)
[3] Alternative drain location for unit sizes 009-018 is field-specified (code 22 = A)
[4] Dimension “A” overall cabinet height is 63.5″ with discharge duct collar folded out
[5] Dimensions “L” and “M” are the discharge air opening with the duct collar folded out

63.5″ High Cabinet - Sizes 024-036



Note:
Installing contractor must cut-out knockouts at the desired locations, remove insulation and install foam seal

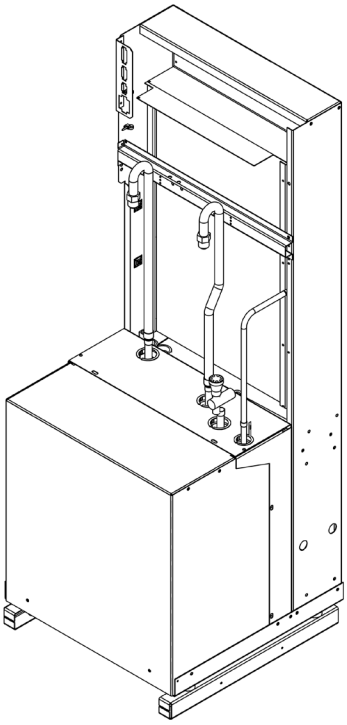
Dimensions

Cabinet											
Cabinet	A[4]	B	C	D	E	Filter Size F (W x H x D)	Return Air Opening (W x H)	G	H	J	K
24 x 24 (Size 024-036)	62.75	24.00	24.00	2.38	58.08	20″ x 30″ x 1″	19.00 x 26.50	37.50	6.72	4.54	25.04

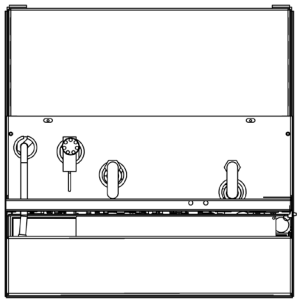
Top View										
Cabinet	Discharge Air Opening[5]		N	P	Q	R	S	T	U	V
	L	M								
24 x 24 (Size 024-036)	21.00	11.25	12.4	7.9	3.3	1.64	1.64	3.12	4.50	4.50

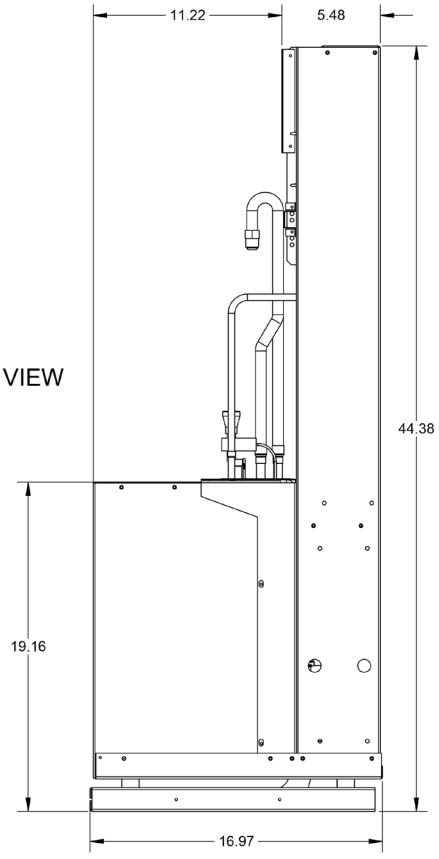
NOTE: [1] Alternative riser locations dimensions mirror those shown as “T”, “U”, and “V”. Knockouts are factory provided on unit sizes 024-036.
[2] Alternative riser locations for unit sizes 009-018 are field-specified (code 22 = A)
[3] Alternative drain location for unit sizes 009-018 is field-specified (code 22 = A)
[4] Dimension “A” overall cabinet height is 63.5” with discharge duct collar folded out
[5] Dimensions “L” and “M” are the discharge air opening with the duct collar folded out

Chassis - Sizes 009-012

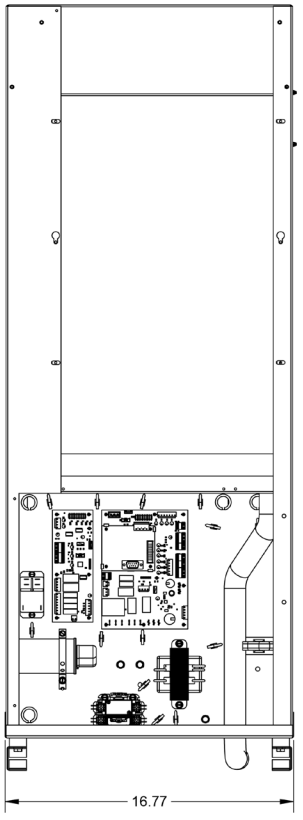


TOP VIEW



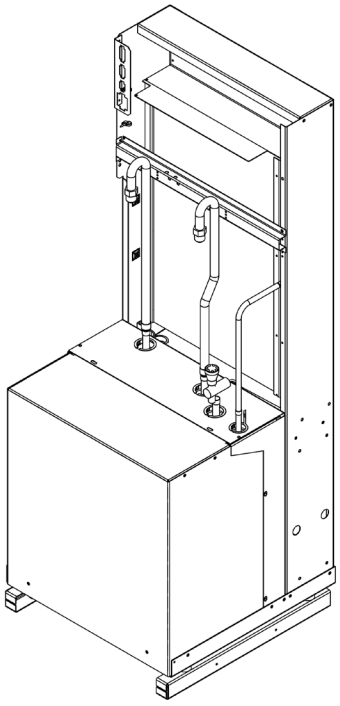


Ⓐ
LEFT SIDE VIEW

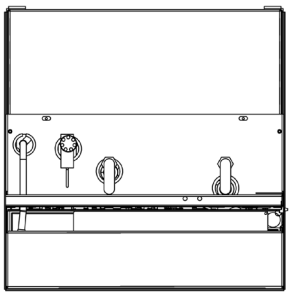


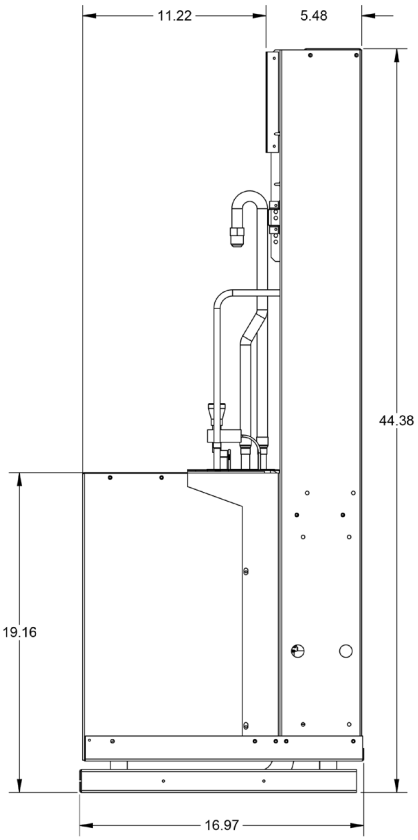
FRONT VIEW

Chassis - Sizes 015-018



TOP VIEW





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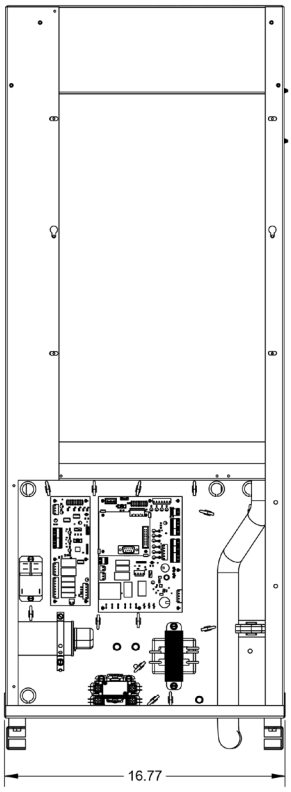
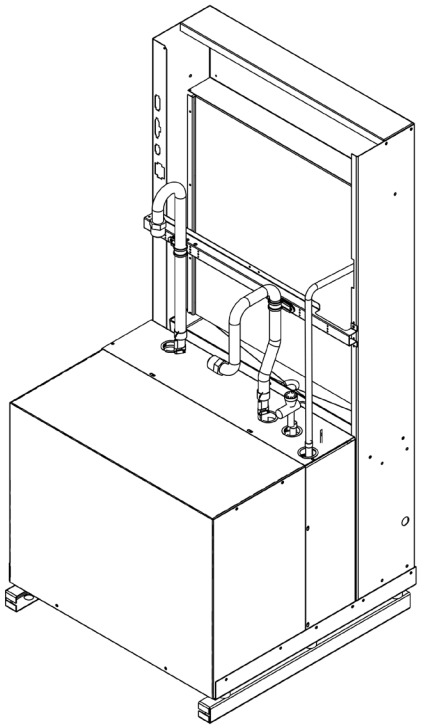
LEFT SIDE VIEW

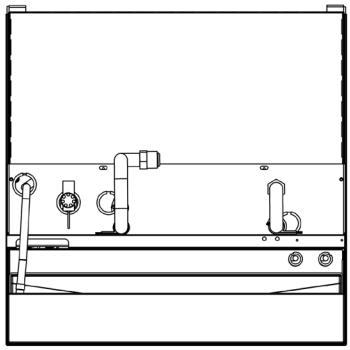


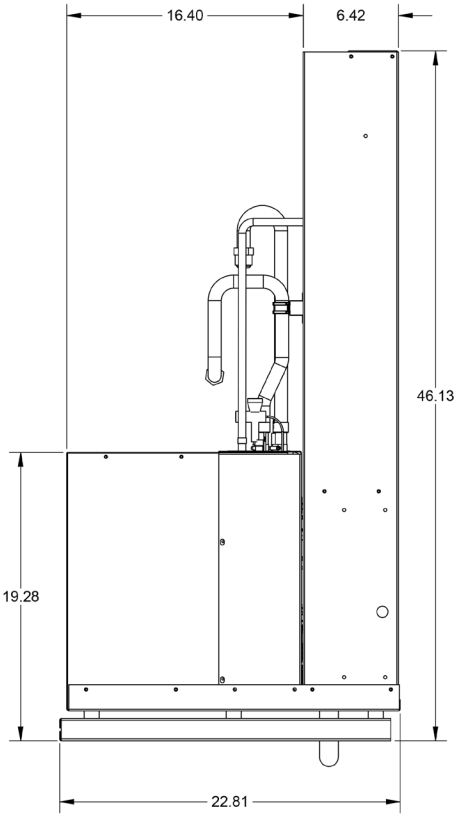
FRONT VIEW

Chassis - Sizes 024-030



TOP VIEW





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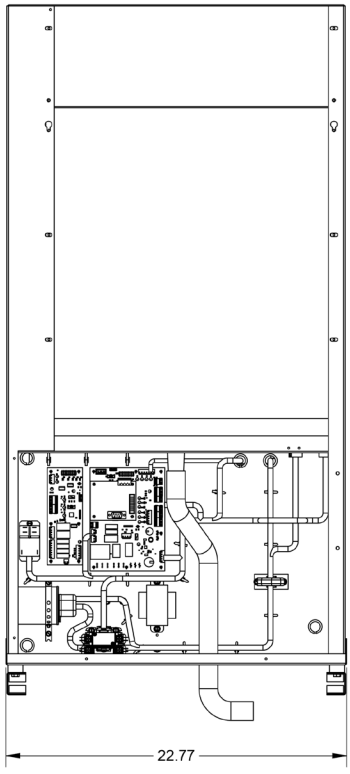
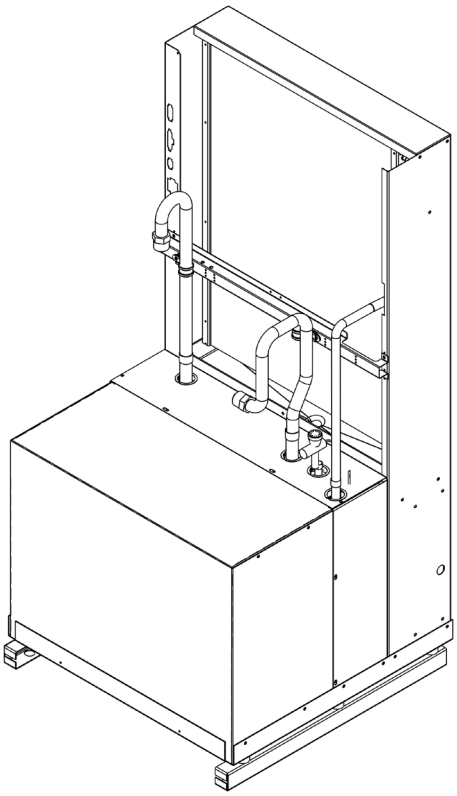
LEFT SIDE VIEW

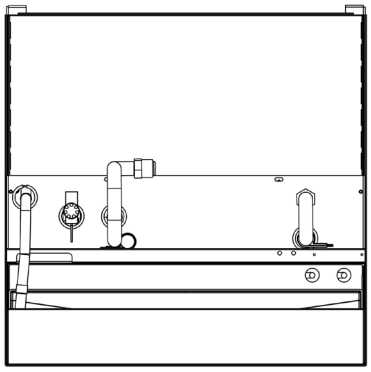


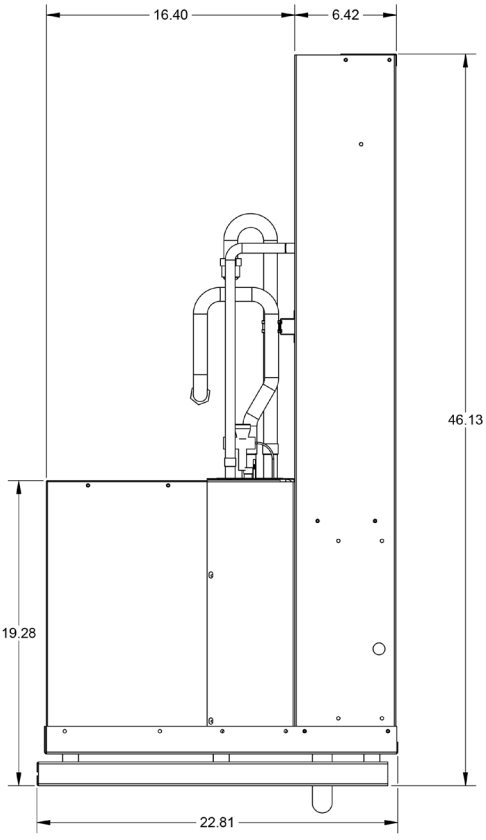
FRONT VIEW

Chassis - Size 036

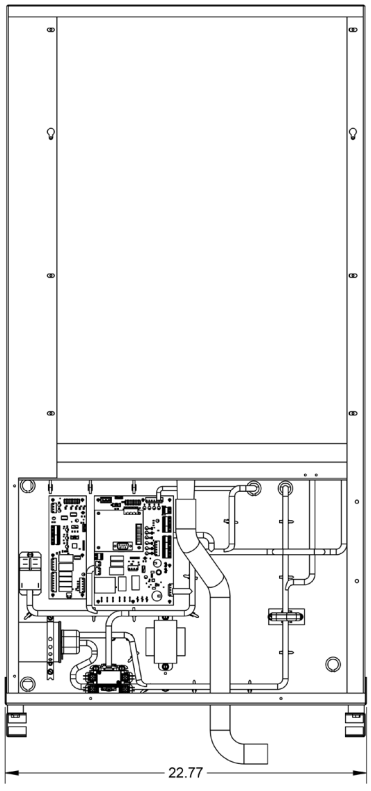


TOP VIEW





LEFT SIDE VIEW



FRONT VIEW

Supply, Return and Condensate Risers

Supply and return risers are available as Type L copper, insulated (up to 3″) or non-insulated. Condensate risers are available as Type M or Type L copper. All condensate risers are available with factory installed insulation or with no insulation. Maximum riser length available (extension above + cabinet height + extension below) is 120″.

Each supply and return riser includes a factory brazed shutoff valve, constructed of brass and rated at 400 psig (2758 kPa) maximum working pressure. They have male JIC connections for field connecting flexible supply and return hoses. Shutoff valves may be ordered when piping up secondary units.

Table 32: Risers and Pipe Reducers Specifications

Diameter	Supply/Return Riser Material		Condensate Riser Material			
	Type L Copper	Insulated Type L Copper 1/2″ or 3/4″ Closed Cell Foam	Type M Copper	Insulated Type M Copper 1/2″ or 3/4″ Closed Cell Foam	Type L Copper	Insulated Type L Copper 1/2″ or 3/4″ Closed Cell Foam
3/4"	•	•	•	•	•	•
1"	•	•	•	•	•	•
1-1/4"	•	•	•	•	•	•
1-1/2"	•	•	•	•	•	•
2"	•	•	•	•	•	•
2-1/2"	•	•	•	•	•	•
3"	•	•	•	•	•	•
4"	•	-	-	-	-	-

Diameter	Copper Riser Options							
	Riser Extensions[1] (Accessory)				Swaged End[2]	Riser Cap	Coupling Down One Riser Size	Coupling Up One Riser Size
	22″	24″	36″	54″				
3/4"	•		•	•	•	•	-	•
1"	•	•	•	•	•	•	•	•
1-1/4"	•	•	•	•	•	•	•	•
1-1/2"	•	•	•	•	•	•	•	•
2"	•	•	•	-	•	•	•	•
2-1/2"	•	-	•	-	•	•	•	•
3"	•	-	•	-	•	•	•	•
4"	-	-	-	-	•	•	•	-

[1] Connecting risers are Type “L” copper and will be the same diameter and are swaged on one end to allow for a minimum of 2 inches insertion depth.

[2] Swaged connections allow for up to 3 inches insertion depth.

Riser Sizing

NOTICE

The design, selection of components, and specifications for a building's riser system are typically the responsibility of the mechanical engineering company retained on a given project. The information within this document is to be used solely as a guide.

The proper selection of risers for length, diameter and other features are critical components to designing a cost-effective job since copper is a significant portion of a V-Stack WSHP material costs. If the riser diameter is too small, the flow of water to the heat pump may be restricted and the water velocity through the riser may cause an excessive water pressure drop due to friction loss and/or erosion of the pipe. If the riser diameter is too large it can be difficult to maintain pressure in the system. Therefore, proper riser sizing and understanding of the system can minimize initial costs and avoid the undesirable effects of high-water velocities, noise, erosion, and installation and maintenance costs down the road.

Sizing the risers can be determined by totaling the sum of the flow required for all the units on the riser column. By calculating the flow required in the columns as they ascend the building, the riser sizes should increase or decrease to accommodate the flow. The risers closest to the supply and return mains will be carrying the greatest amount of water and will be the largest, the risers furthest from the mains will carry the least amount of water and will be the smallest. Risers are available from ¾″ up to 4" in diameter.

The proper size of the riser is determined by calculating the velocity of the water in the riser. The maximum water velocity that a riser should experience is 6-7 ft/second. The maximum riser flow rate table (Table 33) can be used as a quick reference chart for determining the maximum GPM allowed for a given riser size. Riser flow diagrams can be found in the ASHRAE Fundamentals Handbook and may be used to calculate the precise water velocity for a given riser diameter and flow.

Condensate Riser Sizing

Condensate risers are available in Type-M or L copper, varying diameters from 3/4 inch to 3-inch, and with 1/2 or 3/4 inch thick closed cell foam insulation.

To calculate minimum condensate riser diameter, add up total connected load in tons and and use Table 34.

Table 33: Allowable Flow Rates for Closed System Piping Type L Copper

TYPE L													
Riser Dimensions - in				Max. Flow GPM	Velocity (ft/second)	Head Loss		Max. Total Connected Load[1] In Tons (GPM/Ton)					
Size	OD	ID	Wall Thickness			(ft/100 ft)	(PSI/100 ft)	1.5	2.0	2.5	3.0	3.5	4.0
3/4"	0.875	0.785	0.045	6.0	4.0	8.81	3.82	4.0	3.0	2.4	2.0	1.7	1.5
1"	1.125	1.025	0.05	10.0	3.9	6.20	2.68	6.7	5.0	4.0	3.3	2.9	2.5
1-1/4"	1.375	1.265	0.055	16.0	4.1	5.32	2.30	10.7	8.0	6.4	5.3	4.6	4.0
1-1/2"	1.625	1.505	0.06	25.0	4.5	5.22	2.26	16.7	12.5	10.0	8.3	7.1	6.3
2"	2.125	1.985	0.07	50.0	5.2	4.90	2.12	33.3	25.0	20.0	16.7	14.3	12.5
2-1/2"	2.625	2.465	0.08	80.0	5.4	4.08	1.77	53.3	40.0	32.0	26.7	22.9	20.0
3"	3.125	2.945	0.09	120.0	5.7	3.64	1.57	80.0	60.0	48.0	40.0	34.3	30.0
4"	4.125	3.905	0.11	200.0	5.4	2.37	1.03	133.3	100.0	80.0	66.7	57.1	50.0

[1] Unit cooling capacity at ISO Standard 13256-1 rating conditions, divided by 12,000.

Table 34: Minimum Condensate Riser Diamater

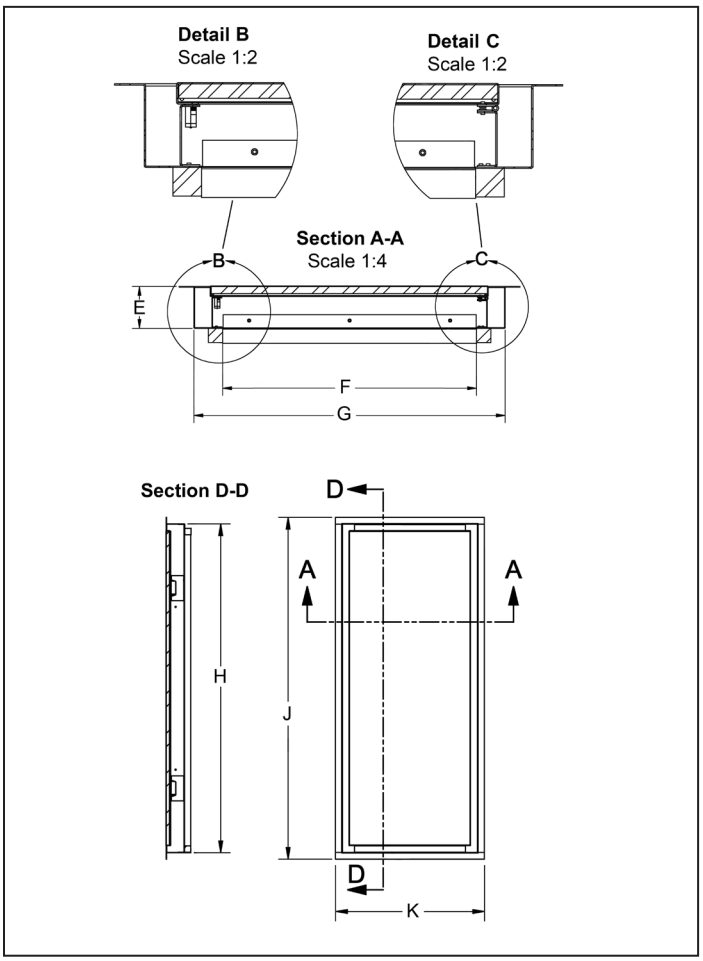
Minimum Condensate Riser Diameter	
Total Connected Load in Tons	Condensate Riser Dimension
Up to 20	3/4″
21 to 40	1″
41 to 90	1-1/4″
91 to 125	1-1/2″
126 to 250	2″

Return Air Panel Doors

Hinged Perimeter Return Air Panel Door

Constructed of heavy-gauge steel, lined with insulation to help attenuate sound from the compressor and fan assembly. Magnetic latching clips ensure the panel door stays closed during operation. An optional dual locking feature is available. Available with electrostatic powder coat finish in colors of cupola white or antique ivory.

Figure 23: Hinged Perimeter Return Air Door



Louvered Return Air Panel Door with Optional Motorized Damper

The louvered return air panel door has two 1–5/8" × 7" cut-outs available to connect ductwork for delivering outdoor air into the space using the optional motorized outdoor air damper. The optional motorized outdoor air damper mounts only on the hinge side of the door which is selectable as right or left hand. Available with electrostatic powder coat finish in colors of cupola white or antique ivory.

Figure 24: Louvered Return Air Panel Door with Optional Motorized Damper

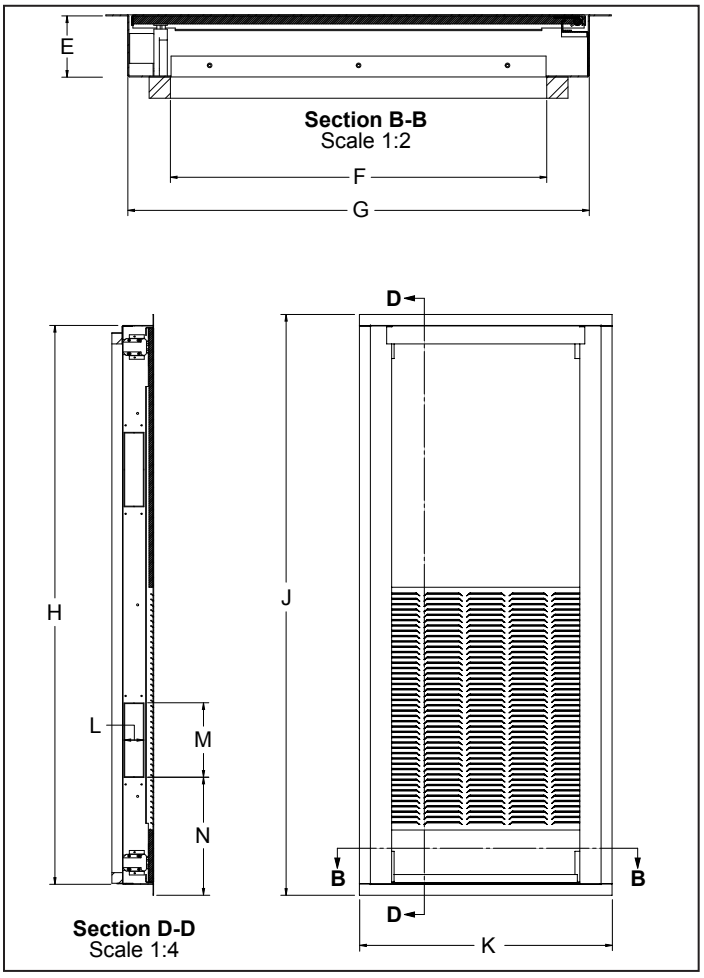


Table 35: Return Air Panel Dimensions

Unit Size	E		F	G	H	J	K	Outdoor Air Opening		
	1" Filter Compatible Door	2" Filter Compatible Door						L	M	N
009-018	2.92"	3.92"	17.69"	21.69"	52.53"	54.60"	23.75"	1.88"	7.00"	11.08"
024-036			23.69"	27.69"			29.75"			

System Considerations

Operating Limits

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

⚠ CAUTION

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

NOTICE

Altitude Limits: Maximum applied altitude not to exceed 9,843 ft (3,000 m).

Initial Unit Start-Up Temperature Range

NOTICE

This is not for continuous operation. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.

Standard range units

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

Extended range units

Extended range heat pump conditioners are designed to start in an ambient of 40ºF (4ºC), with entering air at 40ºF (4ºC), with entering water at 40ºF (4ºC), with both air and water at the flow rates used in the ISO 13256-1 rating test, for initial start-up in winter.

Table 36: Air Limits in °F (°C)

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

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

NOTE 2: This is not for continuous operation. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.

Table 37: Fluid Limits

Fluid Limits	Standard Range Units		Extended Range (Geothermal) Units	
	Cooling	Heating	Cooling	Heating
Minimum Entering Fluid	55°F (13°C)	55°F (13°C)	30°F (-1°C)	25°F (-4°C)
Common Design Entering Fluid	85-90°F (29-32°C)	70°F (21°C)	90°F (32°C)	35-60°F (1.5-16°C)
Maximum Entering Fluid	120°F (49°C)	90°F (32°C)	120°F (49°C)	90°F (32°C)
Minimum GPM/Ton	1.5			
Nominal GPM/Ton	3.0			
Maximum GPM/Ton	4.0			

Antifreeze

⚠ CAUTION

Do not use an automotive-grade antifreeze. Industrial grade glycols must be used. Automotive antifreeze contains inhibitors which will cause plating on the copper components used with the unit. The type and handling of glycol used must be consistent with local codes.

Glycols and other alcohols are commonly used as antifreeze; however, higher percentage mixtures of alcohols such as ethanol and methanol are not recommended due to increased flammability. Your local sales office should be consulted to determine the antifreeze best suited to your area. The use of antifreeze may impact system performance depending on its concentration and should be considered during initial system design. When antifreeze is added to the water system for freeze protection, recognize that the refrigerant suction pressure drop will be higher. The reduction in performance depends upon the antifreeze concentration and temperature.

In areas where minimum entering loop temperatures drop below 50°F (10°C) or where piping will be routed through areas subject to freezing, antifreeze is required. If 3 GPM per ton is maintained, this limit can be lowered to 42°F (6°C). Care must be given to maintain proper water flow.

Freeze protection should be maintained to 15°F (9°C) below the lowest expected entering loop temperature. For example, if 30°F (-1°C) is the minimum expected entering loop temperature, the leaving loop temperature would be 22 to 25°F (-6 to -4°C) and freeze protection should be at least 15°F (-10°C). Calculation is as follows: 30°F - 15°F = 15°F (-1°C - 9°C = -10°C).

All alcohols should be premixed and pumped from a reservoir outside of the building when possible or introduced under the water level to prevent fumes. Calculate the total volume of fluid in the piping system. Then use the percentage by volume shown in Table 38 for the amount of antifreeze needed. Antifreeze concentration should be checked from a well mixed sample using a hydrometer to measure specific gravity.

Table 38: Antifreeze Percentage by Volume

Type	Minimum Temperature for Low Temperature Protection			
	10°F (-12.2°C)	15°F (-9.4°C)	20°F (-6.7°C)	25°F (-3.9°C)
100% USP Food-Grade Propylene Glycol	38%	25%	22%	15%
Ethanol[1]	29%	25%	20%	14%
Methanol	25%	21%	16%	10%

NOTE 1: Must not be denatured with any petroleum product.

Table 39: Antifreeze Correction Factors

Ethylene Glycol					
	10%	20%	30%	40%	50%
Cooling Capacity	0.995	0.992	0.987	0.983	0.979
Heating Capacity	0.991	0.982	0.977	0.969	0.961
Pressure Drop	1.07	1.13	1.18	1.26	1.28
Propylene Glycol					
	10%	20%	30%	40%	50%
Cooling Capacity	0.99	0.98	0.97	0.96	0.95
Heating Capacity	0.987	0.975	0.962	0.942	0.93
Pressure Drop	1.07	1.15	1.25	1.37	1.42
Ethanol					
	10%	20%	30%	40%	50%
Cooling Capacity	0.991	0.951			
Heating Capacity	0.995	0.96			
Pressure Drop	1.035	0.96			
Methanol					
	10%	20%	30%	40%	50%
Cooling Capacity	0.998	0.972			
Heating Capacity	0.995	0.97			
Pressure Drop	1.023	1.057			

NOTE: Higher percentage mixtures of ethanol and methanol are not recommended due to increased flammability.

Water System Quality

The cleaning, flushing and chemical treatment of a water source heat pump system is fundamental to efficient operation and the life expectancy of the system.

Potential system problems produced by the use of water fall into three general categories:

- Scale formation: Mineral deposits which result from the crystallization and precipitation of dissolved salts in the water. The deposits form an insulating barrier, reducing the heat transfer rate and impeding the circulation of fluids due to increased pressure drop.
- Corrosion: Decomposition of the metal caused by absorption of gases from the air. Corrosion may occur in any metal component of the system.
- Organic growths: Slime and algae which form under certain environmental conditions, and can reduce the heat transfer rate by forming an insulating coating or can promote corrosion by pitting.

The system water should be evaluated for degrees of impurity, with testing available from independent testing labs, health departments or state agencies. See Table 40 on page 63.

Supply & Return Piping

All units should be connected to supply and return piping in a two-pipe reverse return configuration. A reverse return system is inherently self-balancing and requires only trim balancing where multiple quantities of units with different flow and pressure drop characteristics exist in the same loop.

To insure proper water flow, measure the temperature differential between the supply and return connections. The temperature differential should be 10°F to 14°F (5°C to 8°C) for units in cooling mode.

A direct return system may also work acceptably, but proper water flow balancing is more difficult to achieve and maintain.

⚠ WARNING

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

The supply and return stub outs and the factory-provided shutoff valves have male JIC connections and usually join the unit via short lengths of high pressure flexible hose which are sound attenuators for both unit operating noise and hydraulic pumping noise.

Some flexible hose threaded fittings are supplied with sealant compound. If not, apply Teflon tape to assure a tight seal.

Table 40: Water Quality Conditions and Applications for Units with a Coaxial Heat Exchanger

Potential Problem	Chemical(s) or Condition	Range for Copper Heat Exchangers	Range for Cupronickel Heat Exchanger
Scaling	Calcium & Magnesium Carbonate	Less than 350 ppm	Less than 350 ppm
Corrosion	pH Range	7 – 9	5 – 9
	Total Dissolved Solids	Less than 1000 ppm	Less than 1500 ppm
	Ammonia, Ammonium Hydroxide	Less than 0.5 ppm	Less than 0.5 ppm
	Ammonium Chloride, Ammonium Nitrate	Less than 0.5 ppm	Less than 0.5 ppm
	Calcium Chloride/ Sodium Chloride	Less than 125 ppm	Less than 125 ppm[4]
	Chlorine	Less than 0.5 ppm	Less than 0.5 ppm
	Hydrogen Sulfide	None Allowed	None Allowed
	Iron Oxide	Less than 1 ppm	Less than 1 ppm
Biological Growth	Iron Bacteria	None Allowed	None Allowed
Erosion	Suspended Solids	Less than 10 ppm	Less than 10 ppm
	Water Velocity	Less than 8 ft/s	Less than 12 ft/s

NOTE 1: Water hardness in ppm is equivalent to hardness in mg/L.

NOTE 2: Grains/gallon = ppm divided by 17.1.

NOTE 3: Copper and cupronickel heat exchangers are not recommended for pool applications for water outside the range of the table. Secondary heat exchangers are required for applications not meeting the requirements shown above.

NOTE 4: Salt water applications (approx. 25,000 ppm) require secondary heat exchangers due to copper piping between the heat exchanger and the unit fittings.

Unit Selection

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

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 23,500 Btu/h of total cooling, 16,000 Btu/h of sensible cooling and 27,000 Btu/h of total heating. The water temperatures for the boiler/tower system are 90°F for cooling and 70ºF 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

Design Criteria	Target Values
Total Cooling Load	23,500 Btu/h
Sensible Cooling Load	16,000 Btu/h
Total Heating Load	27,000 Btu/h
Air Flow Required	800 CFM
Return Air Cooling	80°F DB/ 67°F WB
Return Air Heating	70°F DB

Selection

Table 41: Model WSVC (Boiler/Tower Model)

Design Criteria	Actual Value
Total Cooling Capacity at 90° EWT	23,515 Btu/h
Sensible Cooling Capacity at 90° EWT	16,139 Btu/h
Total Heating Capacity at 70° EWT	27,180 Btu/h
CFM	803 at 0.15 ESP (Wet Coil)
Water Flow Required To Meet Capacity	4 GPM
Water Pressure Drop	8.6 (ft H_2O)
Final Selection	WSVC 024

Engineering Specifications

SMARTSOURCE VERTICAL STACK WATER SOURCE HEAT PUMP, MODELS WSVF & WSVC

PART 1—GENERAL

1.01 WORK INCLUDED

A. The contractor shall furnish and install where shown on the plans, packaged water source heat pumps. Sizes, types and performance shall be as indicated in the unit schedule. Each unit shall be complete with factory furnished components and accessories as shown in the plans and as herein specified.

B. Provide labor, materials, equipment and services to perform operations required for the complete installation and related work as required in contract documents.

C. Electrical work required as an integral part of the temperature control work is indicated on the mechanical drawings, and is the responsibility of this contractor to provide the complete system to perform the full sequence of operation shown, or as described in this specification.

1.02 REFERENCES

A. This is a performance specification, which uses the first named manufacturer's equipment as basis of design. Other manufacturers are named as acceptable, providing the other named manufacturers comply fully with all construction details, scheduled performance requirements and the full scope of these specifications. This does not necessarily mean that the other named manufacturers equipment will fit the available space or design requirements. It shall be the responsibility of this contractor to be sure that the system provided fully meets or exceeds the specified requirements and should any changes or additional apparatus be required for other named manufacturers, this contractor shall be fully responsible for the material and installation cost (including claims by all other trades, which may be effected by the substitution), to complete the installation and comply fully with the systems as outlined in these plans and specifications. A request for a substitution shall constitute a representation that the contractor will:

1. Investigate the proposed product and determine that it is equal to or superior in all respects to that specified.
2. Provide the same warranties or bonds for the substitution as for the product specified.
3. Coordinate the installation of an accepted substitution in the work, and make such other changes in the work as may be required for installation to make the work complete and equal to the basis of design in all respects.

B. Any manufacturer not named in these specifications shall be submitted to the engineer for technical review not less than fourteen days prior to the published bid date. The solicitation for consideration of alternate manufacturers shall include, but not limited to, full submittal data on unit construction, performance, and shall include:

1. Drawings and samples to demonstrate the products compliance.
2. Outline any changes required in other elements of the work because of the substitution.
3. Availability of local service and source of replacement material and parts.
4. A comparison of the proposed manufacturer's equipment with that specified. A complete copy of these specifications, with a notation written in the right margin of the specification; "C" for full compliance, or "D" for deviation, for each specification line item. For every instance of deviation, a full explanation shall be attached, identified by specification number.
5. A list of local installations where equipment of like and kind have been installed, with names and telephone numbers of personnel for each installation, that may be contacted as references.

C. The engineer shall determine compliance with the specification and whether the proposed manufacturer's equipment is acceptable for bid submission. Any deviation from this procedure is not acceptable and shall disqualify the proposed manufacturer. Acceptance and approval of any proposed equipment by the engineer for bid submission shall not be interpreted to imply that the proposed equipment will fit the available space or the dimensional or design requirements. The engineer will review requests for substitutions with reasonable promptness, and the decision to accept or reject the requested substitution will be responded to only by addendum. The engineer may request additional information, which must be provided and reviewed before determining compliance. If the engineer finds the product to be of general acceptance, an addendum will be issued adding that manufacturer's name. If not added by addendum, that manufacturer's equipment will not be allowed or considered for the project if submitted.

D. The judgment of the engineer shall be final.

1.03 SUBMITTALS

A. Shop drawings including weights, dimensions, and required clearances for service.

B. Electrical data, including minimum circuit ampacity and maximum overcurrent protection required, time delay fuse type or HACR circuit breaker required.

C. Computer-generated performance data at project application conditions.

D. Installation details

1.04 QUALITY ASSURANCE

A. Heat pump performance shall be certified in accordance with AHRI/ISO Standard 13256-1 and shall have the correct AHRI/ISO and CUL labels affixed to the cabinet. Heat pump performance at scheduled project operating conditions shall be substantiated by computer generated output data.

B. Heat pumps shall be listed by a nationally recognized safety-testing laboratory or agency, such as Underwriters Laboratory (UL), or Electrical Testing Laboratory (ETL), or Canadian Standards Association (CSA).

PART 2—PRODUCTS

2.01 GENERAL

A. Units shall be supplied completely factory-assembled, piped, internally wired, fully charged with pure single-component R-32 refrigerant and capable of operation with an entering water temperature range from 55°F to 120°F on water loop (standard range) models and 25°F to 120°F on ground loop (geothermal) 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-60335-2-40 Version 2 for the US and CAN/CSA-C22.2 NO. 60335-2-40 Version 2 for Canada. Each unit shall be ETL- and ETLC-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 installation instructions. Units with zeotropic blend refrigerants are not acceptable.

B. Electrical: All water source heat pump units shall be suitable for continuous operation with a supply voltage variation, measured at the factory power connection point, of 10% of the nameplate voltage. A control box shall be located within the unit and shall contain controls for standard components such as compressor, reversing valve, electric heat coil, and fan motor operation and shall have a standard 50VA, 24V control circuit transformer. Unit shall be name-plated to accept time delay fuses or HACR circuit breaker for branch over-current protection of the power source. All units shall have a short-circuit current rating of 5 kA rms symmetrical, 600 V maximum.

1. All heat pump nameplate electrical utilization voltages shall be in conformance with ANSI Standard C84.1 as follows:

Nameplate Voltage	Phase	Distribution Voltage	Service, No. of Conductors
115	1	120	3
208/230	1	240	3
265/277	1	277	3

2. All units shall be suitable for continuous operation with a supply voltage variation measured at the factory power connection point of ± 10% of the nameplate voltage.

C. Chassis: The chassis section shall be constructed of heavy gauge G60 galvanized steel. The chassis section shall consist of the air coil, coaxial heat exchanger, primary condensate drain pan and complete refrigeration circuit. The primary condensate drain pan shall be constructed of non-corrosive ABS plastic and be sloped to prevent standing water. The chassis section shall be easily removed from the cabinet without removing the wall mounted hinged return air grille. The slide-in chassis shall have an insulated compressor compartment and must be lined with 1/2"-thick, 1–1/2 lb dual density fiberglass insulation. The compressor compartment shall be separated from the fan compartment with an insulated steel cover. Compressors in the airstream are unacceptable. The chassis base shall incorporate formed galvanized slide rails with vibration isolators to prevent vibration transmission to the cabinet. Supply and return water connections shall be copper JIC fittings and be supported to the chassis frame.

D. Refrigerant circuit: Units shall have an R-32 sealed refrigerant circuit, which includes a rotary or scroll compressor, thermostatic expansion valve, an aluminum lanced-fin and rifled copper tube refrigerant-to-air heat exchanger, reversing valve and a coaxial, tube-in-tube, refrigerant-to-water heat exchanger. The coaxial coil shall be made of a copper inner tube and a painted steel outer tube 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 and 600 psig on the refrigerant side. The airside coils shall be rated at a minimum of 600 psig working pressure.

E. Safety controls: High- and low-pressure switches and low temperature safety sensor shall be wired through a latching lockout circuit to disable the unit until it is reset electrically by interrupting the power supply to the unit. Automatic reset by wall sensor switching shall not be allowed. All safety switches shall be normally closed, opening upon fault detection. Control logic dependent upon the closing of a normally open switch shall not be allowed to preclude the possibility of simple, easily corrected faults being escalated into compressor or heat exchanger failure due to loss of integrity in control wiring.

F. Cold start-up (WSVC): Manufacturer shall guarantee heat pump units to start and operate in an ambient temperature of 40°F with entering air at 40°F, with entering water at 70°F, with both air and water at the flow rates used in the ARI/ISO standard rating test, for initial system start-up in winter. (This is not a normal or continuous operating condition, and it is assumed that such a start-up is only for the purpose of bringing the building or space up to initial occupancy temperature).

G. Air section: The air section of the unit shall be isolated from the compressor and control section with insulated walls to minimize the transmission of compressor noise and to permit operational service testing with the compressor compartment cover removed.

H. Fan and motor assembly: Unit shall have a direct drive centrifugal fan motor assembly. The fan housing shall

have a removable orifice ring to facilitate fan motor and fan wheel removal without removing the fan housing. 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.

[OPTIONAL] The fan motor shall be constant torque electronically commutated for enhanced unit operation. Field adjustable CFM settings shall be accomplished from the position of 8-dip switch settings on the I/O expansion board located in the control box. OR

[OPTIONAL] The fan motor shall be constant torque electronically commutated for enhanced unit operation. These motors shall feature 5 pre-programmed torque settings that can be changed in the field to match design airflow requirements. OR

[OPTIONAL] The fan motor shall be variable speed, constant CFM, electronically commutated for improved operation and isolated from the fan housing with vibration grommets and internal thermal overload protection. Field adjustable CFM settings shall be accomplished from the position of 8-dip switch settings on the I/O expansion board located in the control box. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule.

I. Filters: All units shall be provided with one-inch thick, throwaway type fiberglass filters installed in a factory mounted one-inch filter rack.

[OPTIONAL] All units shall be provided with one-inch thick, MERV 8 filter installed in a factory mounted one-inch filter rack. OR

[OPTIONAL] All units shall be provided with two-inch thick, MERV 13 filter installed in a factory mounted two-inch filter rack.

J. Supply and return, condenser water connection: Supply and return water, and condensate connections shall be copper FPT fittings and be secured to the chassis frame. Risers with ball valves shall utilize JIC fittings. Supply, return, and condensate drain shall be connected to the loop and drain piping as detail on mechanical drawings.

K. Condensate pan: Units shall be G60 galvanized standard. Optional stainless steel is acceptable.

L. Control system

1. The unit control board shall be the main component of the system and shall contain the required inputs/outputs to operate a water source heat pump with a single speed fan.
2. Binary outputs: Seven total (main fan, compressor, reversing valve, isolation valve/pump request, one board status LEDs, room sensor status LED, alarm output).

   a. Main fan switched output (line or low voltage) to control single-speed fan operation.

   b. Compressor controls compressor operation (line or low voltage).

   c. Reversing valve controls reversing valve operations via low voltage. When the reversing valve output is de-energized, the reversing valve is in the “cool” position.

   d. Isolation valve/pump request switched output to send a signal that the water source heat pump requires loop fluid flow.

   e. 1-Tricolor onboard status LED provides mode/alarm indication (5VDC).

   f. Room sensor status LED provides unit status information (5VDC).

   g. Alarm output will generate a 24VAC or ground signal (depending on field wiring) signal that turns on when the unit fan is in fault mode “A” Output 24VAC signal that turns on when the unit fan is in fault mode.

M. Unit controller inputs/outputs: The Microtech Unit Controller will be microprocessor-based and have capabilities, performance, and memory sufficient to execute the various functions detailed in this specification. This document will not specify a type, a manufacturer, or a family of microcontrollers to be considered for use. However, at a minimum, the following features are deemed essential:

1. Analog input: condensate overflow, brownout detection, suction-line temp sensor, timed override switch, setpoint adjust, fan mode (heat/cool/auto)

   a. Condensate overflow: The presence of excessive condensate in the condensate drain pan is detected by a condensate sensor, which consists of a metal terminal ring mounted just below the top of the condensate pan. The analog input dedicated to condensate sensing must be capable of detecting the conductivity of water between the ring terminal and chassis ground. The conductivity trip point is 2.5 micro-ohms.

   b. Brownout detection: This analog input will measure the 24VAC input voltage applied to the controller as a means of indirectly monitoring line voltage applied to the unit. The 24VAC input, once rectified, filtered, and fed to an appropriate voltage divider, will be applied to the analog input as a DC voltage level proportional to the input voltage. At a minimum, the measurable range will be between 70 and 120% of the corresponding unit nameplate voltage. Due to the tolerances involved with the various components associated with this approach, calibration will occur during factory test when exactly 100% nameplate voltage is applied to the unit while in cooling mode. The digitized value of the resultant DC voltage applied to the analog input during the calibration period will be saved within the controller (in non-volatile memory) and used as a reference value for subsequent operation in the field. The brownout trip and recovery levels are a function of the application software and are listed elsewhere in this specification.

c. Suction-line temp sensor: Sensing element shall be equivalent to NTC Thermistor–10K ohms at 25°C, 0.2°C interchangeability. Advanced Thermal Products–Curve Z.

NOTE: The timed (tenant) override switch will short out the Room sensor thermistor. Sensing range shall be 0 to 158°F with a resolution of 1°F and an accuracy of ±1.5°F Maximum Total Error

d. Setpoint Adjust: The setpoint adjust circuit of a remote room sensor shall consist of a 1.5K-ohm 2-wire potentiometer. The wiper of the potentiometer will be connected to the analog input. The other lead of the potentiometer is tied to analog common. The 0–1.5K-ohm range will be interpreted by the base controller as an offset to the current temperature Set point -5 to +5°F or a range of 55 to 95°F (jumper selectable and scaled accordingly in software).

e. Fan on/auto, heat/cool/auto: The room sensor shall incorporate switches and fixed resistors that present different resistance values to a single analog input which correspond to the fan and operating mode functions detailed below. The room sensor is designed with specific resistance values to coincide with the software in unit control module.

2. Temperature input: Sensing element in the Microtech room temperature sensor is equivalent to NTC Thermistor–10K ohms at 25°C, 0.2°C interchangeability. Advanced Thermal Products–Curve Z.

NOTE: The timed (tenant) override switch will short out the room sensor thermistor. Sensing range shall be 0 to 158°F with a resolution of 1°F and an accuracy of ±1.5°F Maximum Total Error.

3. Binary input: 19 total (low pressure, high pressure, emergency shutdown, 10-board level dipswitches, 5-thermostat, occupied/unoccupied) that employ the occupied/unoccupied control.

a. Low pressure switch: The low-pressure switch shall be sourced with 24VAC or DC, ±20%. The binary input detection circuit shall be designed such that a minimum of 7mA current flows through the external contacts.

b. High pressure switch: The high-pressure switch shall be part of an interlock circuit that interrupts power to the on-board compressor relay coil. Since this is a low voltage safety circuit as defined by UL, the designer must apply appropriate spacing as dictated by the relevant UL standards. As part of HP switch state detection, this circuit must sense the current flowing through the on-board compressor relay coil and communicate this information to the HP binary input. The current sensing circuit (example device: NEC/CEL PS2501-1-A opto-isolator) must be upstream of the high pressure switch, i.e., between the control output and the HP switch. In the unlikely event that the compressor binary output or HP current sensing circuit fails closed, the HP switch can still perform its intended safety function by opening the compressor relay coil circuit.

c. Emergency shutdown: This binary input will detect the presence of an earth grounded signal, which is supplied by an external, remote set of contacts – such as those provided by a condenser loop water controller.

d. Board level configuration switches

- Switch 1: Normal/test mode
- Switch 2: Continuous/cycling fan
- Switch 3: Water/glycol (loop fluid)
- Switch 4: Freeze fault detection
- Switch 5: Room temperature setpoint adjustment range
- Switch 6: Local control type (thermostat or room sensor)
- Switch 7: Primary heating source (compressor or other)
- Switch 8: I/O expansion module (present or not required)
- Switch 9: Application select (single compressor or two compressors)
- Switch 10: Fan select (future)

e. Thermostat inputs G, Y1, Y2, W1, W2, shall detect the presence of 24VAC sourced from the “R” terminal. The binary input conditioning circuitry for these inputs is designed to be compatible with conventional wall thermostats.

f. Unoccupied mode: This binary input will detect the presence of an earth grounded signal, which is supplied by an external, remote set of contacts, such as those provided by a condenser loop water controller.

N. The I/O expansion board shall provide a means of adding I/O capability to the base controller in the form of extra analog inputs, analog output, binary inputs, and binary outputs. The primary use of the I/O expansion board is variable speed fan control, two-stage compressor operation, dehumidification, waterside economizer, and one- or two-stage electric heat. Some configurations may also require options such as fan speed control, hot gas reheat coil control, and electric heater coil control.

1. Analog input: Three total (entering water temperature, return air temperature, space relative humidity)

a. Entering water temperature (EWT) monitors entering water temperature by means of a 10k Ohm thermistor.

b. Return air temperature (RAT) monitors return air temperature by means of a 10k Ohm thermistor,

c. Space relative humidity (RAH) monitors space relative humidity by means of a 0-10VDC signal.

2. Analog output: one total (PWM signal)

a. PWM signal provides constant CFM or torque for fan operation within maximum and minimum settings as defined in the fan motor control.

3. Binary inputs: three total (Heat Stage 3, Heat Stage 4, Humidistat)

   a. Heat Stages 3 and 4 tell the Microtech Unit Controller that first- and second-stage electric heat are required.

   b. Humidistat tells the Microtech Unit Controller that dehumidification is required.

4. Binary output: Six total (compressor high capacity, Auxiliary Heat Stage 1, Auxiliary Heat Stage 2, hot gas reheat dehumidification, waterside economizer, tricolor status LED)

   a. Compressor high capacity (24VAC signal that enables the compressor at full load capacity.

   b. Auxiliary Heat Stage 1 24VAC signal that enables Stage 1 electric heat.

   c. Auxiliary Heat Stage 2 24VAC that enables Stage 2 electric heat.

   d. Waterside economizer enables the three-way diverting valve upon a call for waterside economizer depending on unit configuration.

   e. Tricolor status LED that indicates operating conditions of the I/O expansion module as well as fan speed for variable-speed fans.

   f. Board level configuration switches

   - Switches 1–4: Fan speed adjustment signals
   - Switches 5–6: Secondary heating options
   - Switch 7: Hot gas reheat dehumidification
   - Switch 8: Waterside economizer
   - Switch 9: Single or two-compressor unit
   - Switch 10: Single or two-stage compressor

O. Emergency shutdown: The controller will be in remote shutdown when the emergency shutdown contact closes to ground. 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. When in remote shutdown no other thermostat or control inputs will have effect on unit operation. No faults or modes have higher priority than remote shutdown. Remote shutdown or brownout modes have the same level of priority. When the unit is in remote shutdown mode, the following occurs:

1. The compressor is immediately de-energized (minimum on timer is ignored).
2. The reversing valve is immediately de-energized.
3. The fan is immediately de-energized.
4. The alarm output is de-energized.
5. When the emergency shutdown input is opened, the unit will automatically return to normal operation.

P. Intelligent reset (low pressure and low temperature in heating only): The “fault retry” feature helps to minimize nuisance trips of automatic lockouts caused by low-pressure or low temperature faults. This feature automatically clears these faults the first two times they occur within a 24-hour period and triggers an automatic lockout on the third fault. The retry count is reset to zero every 24 hours. The fault retry feature does not apply to a high-pressure fault—which causes an immediate lockout and requires a manual reset, or condensate overflow or brownout faults, which are self-clearing.

Q. Microtech Unit Controller and I/O Expansion Board Fault and Status LEDs: Separate board-mounted tricolor LEDs

1. Room sensor status LED: A 5VDC signal shall operate as follows:

Status LED	Mode
On continually	Occupied, Unoccupied Load Shed
On 0.5 sec, off 5.5 sec	Unoccupied
On 5.5 sec, off 0.5 sec	Tenant Override, Override Load Shed
On 0.1 sec, off 0.1 sec	Alarm Condition (Condensate Overflow, Brownout, Compressor Fault)

2.02 BASIS OF DESIGN

A. Model types R-32 WSVF or WSVC by Daikin Applied.

B. Standard Warranty: Daikin Applied shall warranty defective parts for a period of twelve (12) months from initial startup or eighteen (18) months from the date shipped by Daikin Applied, whichever occurs first. This warranty is subject to the terms and conditions of the Daikin Applied Americas Inc. Limited Product Warranty.

C. [OPTIONAL] Extended Warranty (All extended warranties are subject to the terms and conditions of the extended warranty statement):

1. An optional 1- or 4-Year Extended Compressor-Only Parts Warranty OR
2. An optional 1- or 4-Year Extended Refrigeration Circuit Parts Warranty OR
3. An optional 1- or 4-Year Extended Complete Unit Parts Warranty

2.03 ACCEPTABLE ALTERNATIVES

A. With prior approval only, submit a detailed summary listing of all variations in form, fit, or function, in addition to specified submittal data.

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