ENGINEERING SUBMITTAL DATA

ED 19139-3

MAY 2026

SMARTSOURCE®

LARGE CAPACITY HORIZONTAL AND VERTICAL WATER SOURCE HEAT PUMPS

Model WSLH - Horizontal - Unit Sizes 072 – 120 (6 to 10 Tons)
Model WSLV - Vertical - Unit Sizes 072 – 300 (6 to 25 Tons)
R-32 Refrigerant

* AHRI CERTIFIED® www.ahridirectory.org Water Source HP ANSI/AHRI/ASHRAE/ISO13256

ETL LISTED C US Intertek

*Models with capacities greater than 135,000 Btuh are not included in the ANSI/AHRI/ASHRAE/ISO13256-1 water-to-air and brine-to-air heat pump certification program.

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

Large Capacity Horizontal Water Source Heat Pump, Model WSLH, Sizes 072-120 (6 to 10 Tons)

Daikin Applied 6 to 10-ton horizontal units have a common cabinet size and common water, condensate, and duct connection locations for easier and more efficient installation.

The cabinet is constructed of unpainted, G-60 galvanized steel. Large panels provide access to the fan/motor compartment and the compressor/control compartment. The interiors of the top and side panels and the bottom of the unit are covered with 1/2″ thick, 1½ lb. dual-density fiberglass insulation. The filter is supported by a factory-mounted combination filter rack and return air duct collar, eliminating the need for field-mounted brackets.

The water and condensate connections protrude through the outside of the cabinet. The water connections are FPT type for easy connection to flexible stainless steel hoses. The large condensate connection provides effective condensate removal.

The electrical components are located in the compressor section of the unit. Holes are provided on the cabinet to facilitate main power and low voltage control wiring through separate holes. All wiring connections are made internal to the cabinet for maximum safety. Each unit is rated to accept time delay fuses for branch circuit and is protected by a resettable circuit breaker.

The standard control for all large capacity units is the MicroTech® unit controller. The unit controller receives its power from the 75VA control transformer.

A BACnet® communication module is available as an option.

Large Capacity Vertical Water Source Heat Pump, Model WSLV, Sizes 072 - 300 (6 to 25 Tons)

Large capacity vertical water source heat pump units are easily located in small equipment rooms or floor-by-floor installations. They can be applied to all building types where it is advantageous to extend the water source heat pump concept to larger or core areas.

Each heat pump is factory assembled and run tested for reliability. Service is accomplished through multiple front, back and side access panels. Access is available to all serviceable components.

Two unique frame sizes make up our 6 through 25-ton product line - each with a consistent shape for easy layout of the ductwork, water piping, condensate piping and electrical connections.

Units are constructed of G-60 galvanized steel. The interiors of all framework and panels are covered with 1/2″ thick, 1½ lb. dual-density fiberglass insulation. Multiple 1″ filters are supported by factory-mounted brackets for side removal in either direction.

Electrical components are located in the lower section, adjacent to the compressor(s). Knockouts are provided on both sides of the unit to facilitate main power and low voltage wiring through separate holes. Each unit is rated to accept time delay fuses for branch circuit over-current protection. Each unit is ETL listed.

The control box is accessible through the compressor section access panel. The control box houses the major operating electrical controls, including the control circuit board(s), transformer, compressor contactor(s), fan contactor(s) and terminal block. Each component is accessible for service or replacement.

The standard control for all large capacity units is the MicroTech unit controller. The unit controller receives its power from the 75VA control transformer. A BACnet communication module is available as a selectable option.

Model Nomenclature

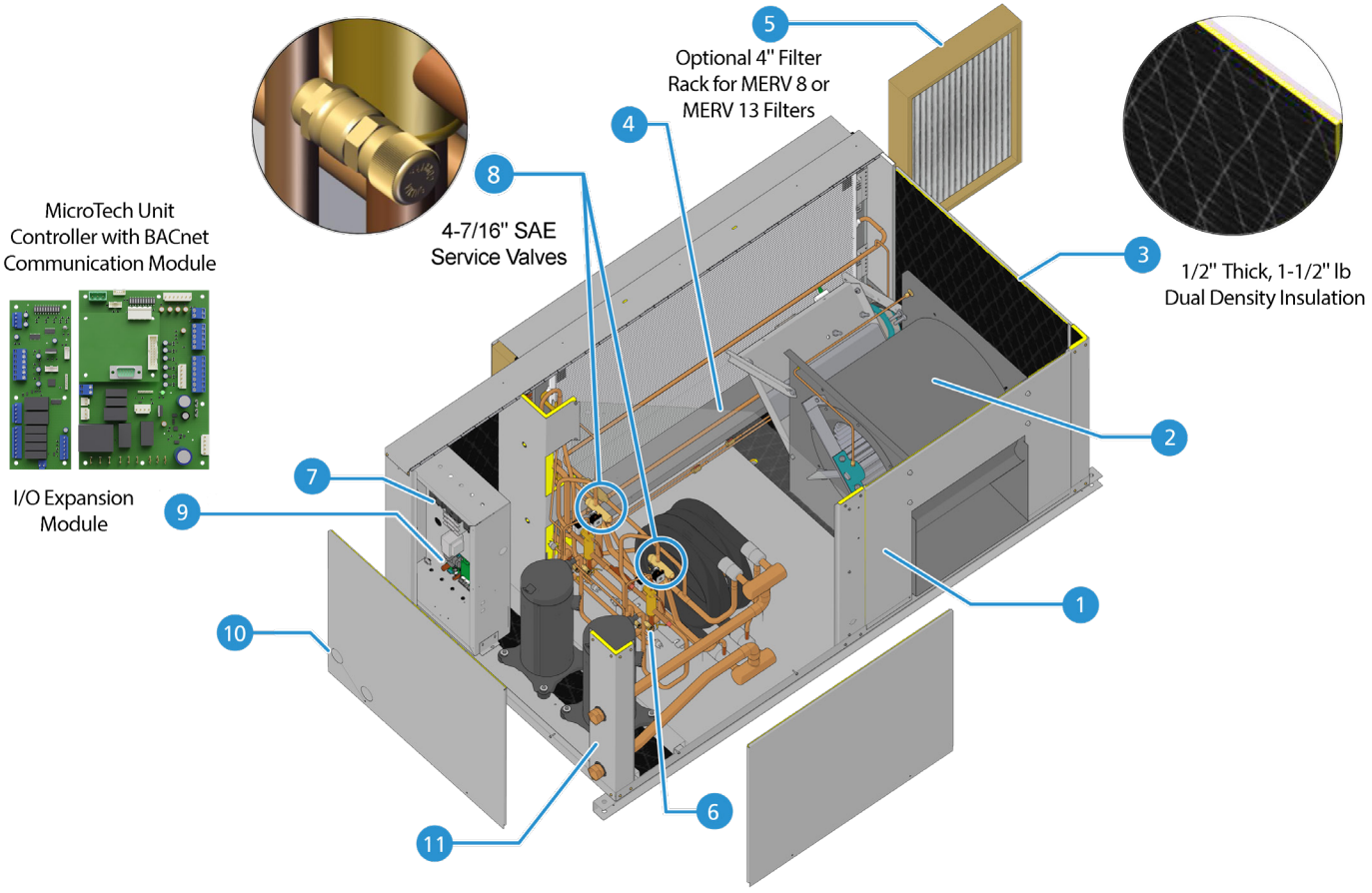
1	2-3	4	5-7	8	9	10	11-12	13	14	15	16	17	18	19	20	21-22	23	24	25	26	27	28	29	30	31	32	33	34
W	SL	V	200	F	1	R	FF	C	M	T	S	A	Y	Y	2	YY	A	Y	Y	Y	Y	Y	S	G	Y	Y	Y	L

Category	Code Position	Code	=	Description
Product Category	1	W	=	Water Source Heat Pump
Model Type	2-3	SL	=	SmartSource Large Capacity
Configuration	4	H	=	Horizontal
		V	=	Vertical
Nominal Capacity	5-7	072	=	72,000 Btu/h Nominal Cooling
		096	=	96,000 Btu/h Nominal Cooling
		120	=	120,000 Btu/h Nominal Cooling
		200	=	200,000 Btu/h Nominal Cooling (Vertical Only)
		240	=	240,000 Btu/h Nominal Cooling (Vertical Only)
		300	=	300,000 Btu/h Nominal Cooling (Vertical Only)
Voltage	8	F	=	208-230/60/3
		K	=	460/60/3
		L	=	575/60/3
Design Series (Vintage)	9	1	=	Design Series 1
Piping Hand	10	L	=	Left Hand (Vertical Only)
		R	=	Right Hand
Cabinet Configuration	11-12	LS	=	Left Hand Return / Straight Discharge (Horizontal Only)
		LE	=	Left Hand Return / End Discharge (Horizontal Only)
		FT	=	Front Return / Top Horizontal Discharge (Vertical Only)
		FF	=	Front Return / Upblast Front Discharge (Vertical Only)
Water Coil Type	13	C	=	Copper Inner Tube
		G	=	Copper Inner Tube (Geothermal)
		S	=	Cupronickel Inner Tube
		J	=	Cupronickel Inner Tube (Geothermal)
Unit Control	14	M	=	MicroTech Unit Controller
		B	=	MicroTech Unit Controller + BACnet
Controller Options	15	T	=	T-Stat Control
		S	=	Sensor Control
Fan Motor Options	16	S	=	Integral HP - STD Static
		H	=	Integral HP - High Static
		U	=	Integral HP - Ultra High Static (Vertical only - N/A size 300)
		M	=	Integral HP - STD Static with VFD (N/A 575V)
		N	=	Integral HP - High Static with VFD (N/A 575V)
		Q	=	Integral HP - Ultra High Static with VFD (Vertical only - N/A size 300 or 575V)
Insulation (Compressor Side / Air Side)	17	A	=	Fiberglass / Fiberglass
		D		Sound Blanket + Fiberglass / Fiberglass
Water Coil - Indoor Air	18	Y	=	None
		W	=	Waterside Economizer
Dehumidification	19	Y	=	None
		B	=	Hot Gas Bypass
		R	=	Hot Gas Reheat
Transformer	20	2	=	75VA
Options	21-22	YY	=	None
		0A	=	Freeze Fault
Filter Racks & Filters	23	A	=	1" Rail & 1" Disposable Filter (Vertical Only)
		C	=	2" Rack & 2" Disposable Filter (Horizontal Only)
		D	=	2" Rack & 2" MERV 8 Filter
		H	=	4" Rack & 4" MERV 13 Filter
Water Flow Options	24	Y	=	None
Piping Package	25	Y	=	None
Electric Heat Size	26	Y	=	None
Electric Heat Control (Board Configuration)	27	Y	=	None
Cabinet Color	28	Y	=	Galvanized
		W	=	Off White (Horizontal Only)

Category	Code Position	Code	=	Description
Standard or Special	29	S	=	Standard
		X	=	Special
Drain Pan Material	30	S	=	Stainless Steel Drain Pan
		G	=	Galvanized Drain Pan
Electrical Options	31	Y	=	None
		P	=	Phase Monitor
Corrosion Protection	32	Y	=	None
		C	=	Corrosion Protection
IAQ	33	Y	=	None
Extended Warranty	34	Y	=	None
		V	=	1 Year Extended Compressor Only Parts Warranty
		W	=	1 Year Extended Refrigerant Circuit Parts Warranty
		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
		E	=	1 Year Extended Complete Unit Parts Warranty
		C	=	4 Year Extended Compressor Only Parts Warranty
		R	=	4 Year Extended Refrigerant Circuit Parts Warranty
		P	=	4 Year Extended Complete Unit Parts Warranty
		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
		T	=	4 Year Extended Complete Unit Parts Warranty with Labor Allowance

Components and Technology

Horizontal Units



No.	Component	Description
1	Cabinet	The unit cabinet is made of robust heavy gauge G-60 galvanized steel for long term equipment protection and superior sound attenuation.
2	Fan Section	Unit contains a forward curved, DWDI fan with solid steel shaft mounted in ball bearings. The motor is a three phase, Open-Drip Proof (ODP) type with variable pitch sheave and adjustable base.
3	Insulation	All interior framework and panels are lined with 1/2" thick, 1½ lb. dual-density fiberglass insulation.
4	Drain Pan	The drain pan is constructed of heavy-gauge, insulated, galvanized steel or optional stainless steel.
5	Filters	Units include standard 2" factory-installed filter rack with 2" disposable filters. The filter rack is outfitted with a duct collar. Other options include a MERV 8 filter in a 2" filter rack or MERV 13 filter in a 4" filter rack.
6	Refrigeration Circuit	All units have a dual refrigerant circuit with scroll compressors, thermal expansion valve, coaxial heat exchanger, finned tube airside coil, reversing valve and service valves.
7	Electrical	The control enclosure includes many components including fan relay, compressor contactors, 24 VAC control transformer and control circuit boards.
8	Service Valves Connections	Service valves are located inside the front access panel – one on the low side and one on the high side of each refrigeration circuit – for charging and servicing. All valves are 7/16" SAE fittings.
9	MicroTech Controller	Designed for flexibility, the control board is used in standalone applications in conjunction with the I/O expansion module for control of the second refrigerant circuit. A separate BACnet communication module can be easily snapped onto the MicroTech board to allow communication with a building automation system. The control system accommodates the use of a two-stage heat/two-stage cool 7-day programmable or non-programmable wall-mounted thermostat, offered as a field-installed option. Sensors are available for building automation system applications.
10	LED Status View Port	LED status lights display fault conditions to provide easy troubleshooting and diagnosis, visible without removing the access panel.
11	External Pipe Connections	Supply and return pipe connections located outside the cabinet make pipe connections easy without removing access panels.

Refrigeration System

Units have a dual circuit design and the two circuits operate independently to enable load shedding when conditions allow. Each circuit employs a random start feature to prevent both compressors from energizing simultaneously after an “unoccupied” cycle.

Units contain two of each refrigerant system component, including high efficiency compressors, coaxial heat exchanger with a copper inner tube and steel outer tube, reversing valves, expansion valves, high/low side refrigerant service valves, and required safety controls. Large access panels are provided for easy service access to any of these components.

The reversing valves are energized in the heating mode and will “fail-safe” to the cooling mode, which is the predominant mode of operation.

The air-to-refrigerant coil is a dual circuit coil on one slab. The fins are lanced and the tubes have finned edges on the inside to enhance heat transfer capabilities. Geothermal range units include coil and piping insulation to protect against condensation in low temperature geothermal applications.

Safety controls include a low suction temperature sensor and low and high pressure switches to lock out compressor operation at extreme conditions. The safety controls can be reset from the main disconnect switch to prevent unauthorized reset. The unit can also be reset from the thermostat by cycling the unit from OFF to AUTO or FAN and back to OFF (see Thermostat fault reset on page 19).

For additional safety, each unit has a low pressure switch to protect the compressor from low refrigerant charge. The low setting prevents nuisance trips while providing adequate protection.

Thermal Expansion Valve

Units include a Thermal Expansion Valve (TXV) for refrigerant metering. The TXV precisely meters the exact amount of refrigerant flow through the system to meet the load and deliver rated heating and cooling capacity while operating at optimum efficiency.

Fan Section

The fan section includes the fan housing, fan wheel, fan motor, adjustable sheave, high strength V-belt, and drain pan. The standard drain pan is made of G-60 galvanized steel and is insulated from the cabinet. A stainless steel drain pan is available as an option. The pan has ample height to allow self-priming of the condensate trap. The fan motor is belt driven with an adjustable sheave for field adjustment. The motor is isolated from the fan housing to minimize vibration transmission to the cabinet. The fan housing protrudes through the cabinet to provide adequate material to connect to a field-provided flexible duct collar. The fan discharge can exit from the end or the side of the unit and must be configured at the factory.

Factory Installed Options

Geothermal range units are available for applications requiring heating operation at reduced entering conditions. The geothermal range unit will operate at 25ºF (-4ºC) minimum entering water temperature, 40ºF (4ºC) minimum entering air temperature.

An optional Variable Frequency Drive (VFD) can be factory installed internally in the cabinet fan section. Factory installation allows for an optimal installation location for the VFD and a lower cost compared to field installation. The VFD is preprogrammed to operate at a constant speed of 60 Hz and includes a keypad for local or remote control. To adjust this speed, consult the literature of the VFD manufacturer.

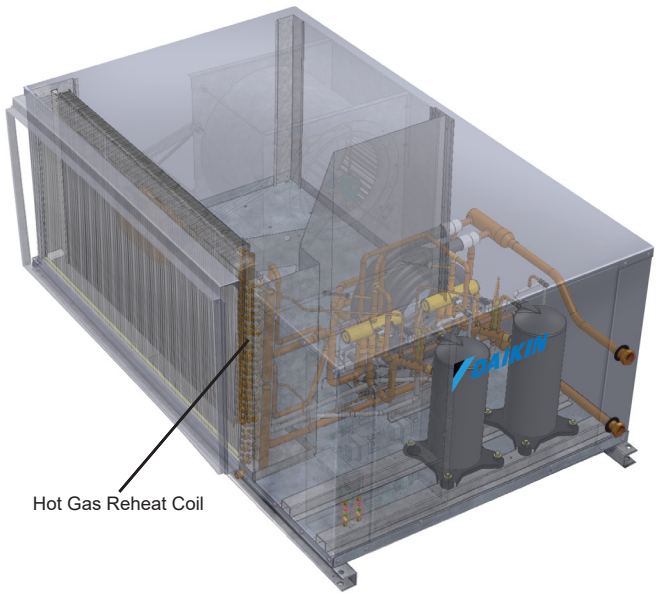
Filter Rack and Filters

Units come standard with a 2-inch, 4-sided, factory-installed filter rack and 2-inch disposable filters. Filters can be removed from either side of the filter rack. An optional 2" factory-installed filter rack with MERV 8 filter or 4" factory-installed filter rack with MERV 13 filter is available. Three filters are needed for each unit.

Hot Gas Reheat Coil

For improved indoor climate control, Daikin Applied offers accurate and cost effective dehumidification control using a hot gas reheat coil. The hot gas reheat coil option is an excellent solution for applications where maintaining low humidity in a space is crucial. Once the space temperature is satisfied, the humidistat signal diverts the high temperature refrigerant gas to the reheat coil located downstream of the cooling coil. The conditioned and reheated air prevents over cooling of the space and maximizes moisture removal for improved indoor comfort. Under humid conditions (60% RH) and typical loop water temperatures, the latent capacity is optimized for approximately 90% of the sensible capacity. With loop water conditions of 85°F (29°C), the leaving air temperature is approximately the same as the entering air temperature, resulting in effective dehumidification without over cooling the space.

Figure 1: WSLH Unit with Hot Gas Reheat (HGRH)

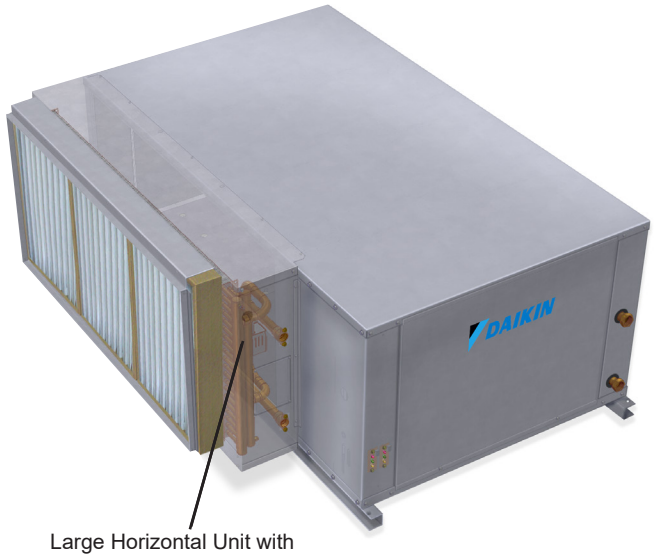


Waterside Economizer

The waterside economizer option helps to reduce energy consumption by using cool loop water temperatures to condition a space without energizing mechanical cooling. Even in the coldest weather a space can experience a build-up of ambient heat from people, equipment, lighting and the sun. Buildings with temperature controlled computer rooms, media/resource rooms or medical equipment rooms, benefit from the waterside economizer when the geothermal loop field or cooling tower temperatures are cool enough to provide air conditioning.

The waterside economizer includes a hydronic cooling coil located upstream of the unit's evaporator coil and after the filter. When entering water temperatures are between 40° to 60°F (4.4°C to 15.6°C), a multi-stage thermostat or room temperature sensor in conjunction with a factory-installed entering water temperature sensor and a 2-position 3-way diverting valve, determines when loop water can be diverted to the hydronic coil for economizer cooling. The MicroTech unit controller determines if the economizer or mechanical cooling will be utilized. The controller also provides low temperature protection to avoid economizer operation when entering water temperatures are below 35°F (2°C).

Figure 2: WSLH with Waterside Economizer Option

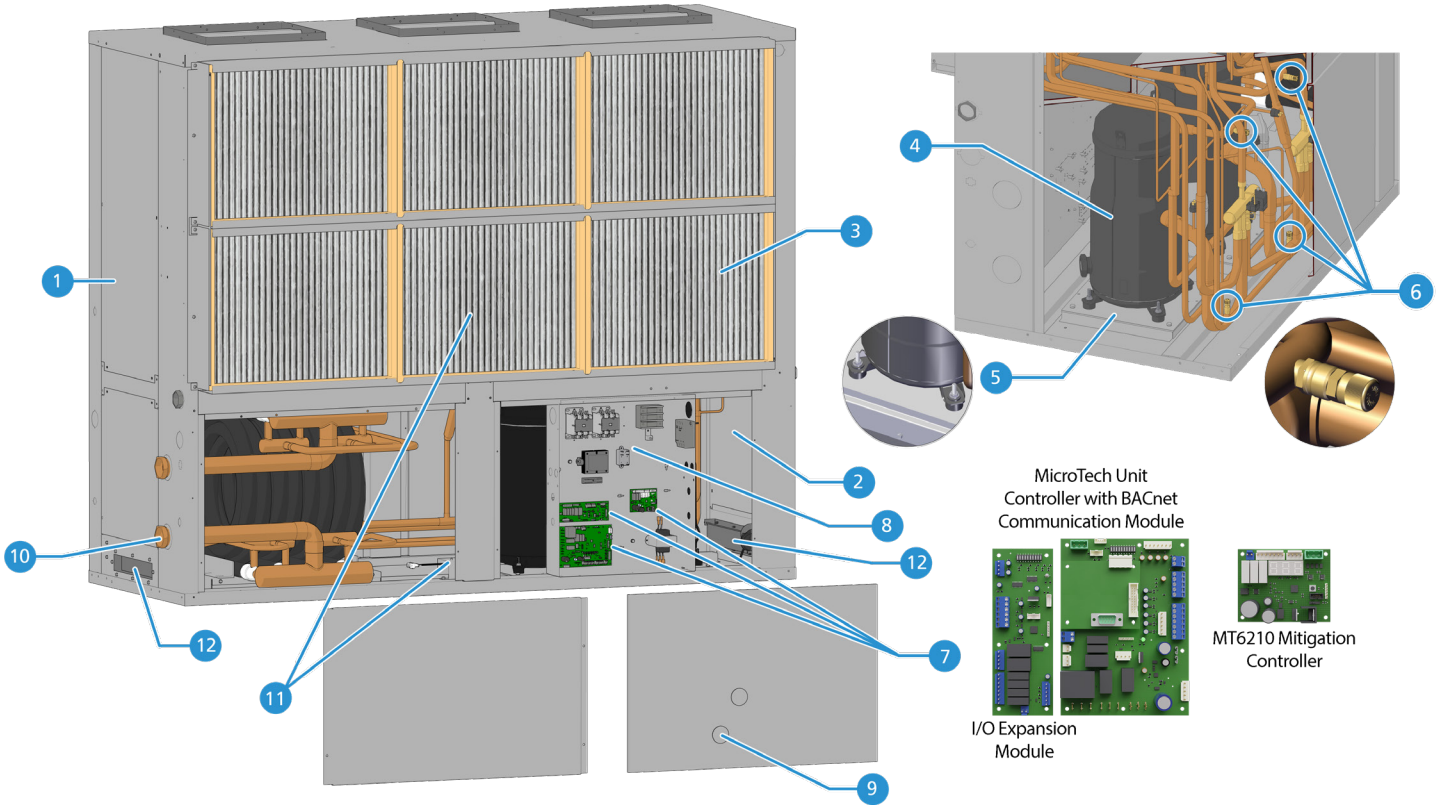


Large Horizontal Unit with
Waterside Economizer Option

Hot Gas Bypass

During cooling operation an external equalizer senses the suction pressure at the evaporator outlet. If the suction pressure drops below 115 psig the Hot Gas Bypass (HGBP) valve will begin to open and bypass hot discharge gas to the evaporator inlet, helping to prevent evaporator coil icing due to low suction pressure. The valve will continue to open as required to full capacity. As suction pressure rises to normal levels the HGBP valve will begin to close until normal cooling operation resumes.

Vertical Units



No.	Component	Description
1	Cabinet	The unit cabinet is made of robust heavy gauge G-60 galvanized steel for long term equipment protection and superior sound attenuation.
2	Insulation	All interior framework and panels are lined with 1/2" thick, 1½ lb. dual-density fiberglass insulation.
3	Filters	Unit includes standard 1" factory-installed filter rack with 1" disposable filter. Other options include a MERV 8 in a 2" filter rack, MERV 13 in a 4" filter rack, or a field installed 2" filter rack with duct collar.
4	Refrigerant Circuit	All units have a dual refrigerant circuit with scroll compressors, thermal expansion valve, coaxial heat exchanger, finned tube air side coil, and reversing valve.
5	Compressor Vibration Isolators	Compressor vibration isolators come standard on all units to reduce vibration sound levels during compressor operation.
6	Service Valves	Service valves, one on the low side and one on the high side of each refrigeration circuit, are for charging and servicing. All valves are 7/16" SAE fittings.
7	MicroTech Controls	Designed for flexibility, the control board is used in standalone applications in conjunction with the I/O expansion module for control of the second refrigerant circuit. A separate BACnet communication module can be easily snapped onto the board to allow communication with a building automation system. The control system accommodates use of two-stage heat/ two-stage cool 7-day programmable or nonprogrammable wall-mounted thermostats, offered as a field-installed option. Sensors are available for building automation system applications.
8	Electrical	The control enclosure includes fan relay, compressor relays, 24-volt control transformer, lockout circuits, and control circuit board.
9	LED Status View Port	LED status lights display fault conditions to provide easy troubleshooting and diagnosis, visible without removing the access panel.
10	External Pipe Connections	Supply and return pipe connections located outside the cabinet make pipe connections easy without removing access panels.
11	A2L Mitigation Board Sensors (For WSLV 200-300)	If a refrigerant leak is detected, compressor and electric heat operation is disabled and the supply fan blower fan is activated, providing airflow at or above the minimum required airflow to evacuate excess concentration. Once the time is over, the unit will resume its normal operation. If the sensors detect another refrigerant concentration excess, the unit will go back into mitigation mode and will repeat the same process.
12	A2L Mitigation Damper (For WSLV 200-300)	If a refrigerant leak is detected by the A2L mitigation board, dampers will be powered open.

Refrigeration System

All Large Vertical unit sizes have dual independent circuits. Each circuit includes a scroll compressor, reversing valve, water to-refrigerant coaxial heat exchanger, expansion valve, air-side coil, and safety controls.

The compressor is located adjacent to the compressor access panel and isolated from a bottom panel with rubber isolators. The reversing valve is energized in the heating mode and will “fail-safe” to the cooling mode, which is the predominant mode of operation.

Both heat exchanger components incorporate advanced heat transfer technologies. The coaxial heat exchanger has a copper inner tube and steel outer tube. The large face area coil has copper tubes and aluminum fins. Geothermal units include coil and piping insulation to protect against condensation in low temperature applications.

Safety controls on each refrigerant circuit include a suction line temperature sensor, low refrigerant pressure and high pressure switches to lock out compressor operation at extreme conditions. The safety controls can be reset from the main disconnect switch to prevent unauthorized reset. The unit can also be reset from the thermostat by cycling the unit from OFF to AUTO or FAN and back to OFF (see Thermostat fault reset on page 19.) Each circuit has high and low side refrigerant service valves for refrigerant circuit diagnostics and charging.

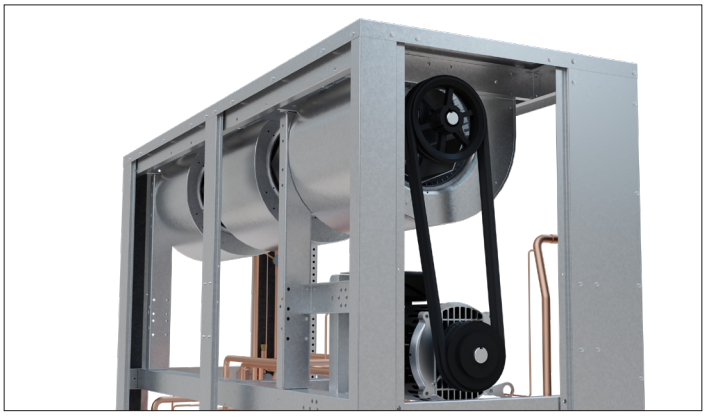
Thermal Expansion Valve

Units include a Thermal Expansion Valve (TXV) for refrigerant metering. The TXV precisely meters the exact amount of refrigerant flow through the system to meet the load and deliver rated heating and cooling capacity while operating at optimum efficiency.

Fan Section

The fan section includes a belt-driven fan assembly, multiple DWDI forward curved fan wheels, solid fan shaft, steel ball bearings, three phase fan motor, adjustable motor sheave, adjustable motor base, fan pulley and insulated divider panel between the compressor section. Unit sizes 072 through 120 have two fan assemblies and unit sizes up to 300 have three fan assemblies. The fan motor is always located at the piping end.

Figure 3: Belt-Driven Fan Assembly Compartment



Factory Installed Options

Optional high static or ultra static fan motors are available to handle increased CFM and static pressure applications. (The ultra static fan motor option is not available on unit size 300.)

A Variable Frequency Drive (VFD) to control the fan motor is available as a factory installed option. It is installed internally inside the cabinet fan section and includes a keypad for local or remote control. The VFD comes factory programmed for a constant 60 Hz fan speed operation. Consult the VFD manufacturer's literature prior to making any fan speed adjustments.

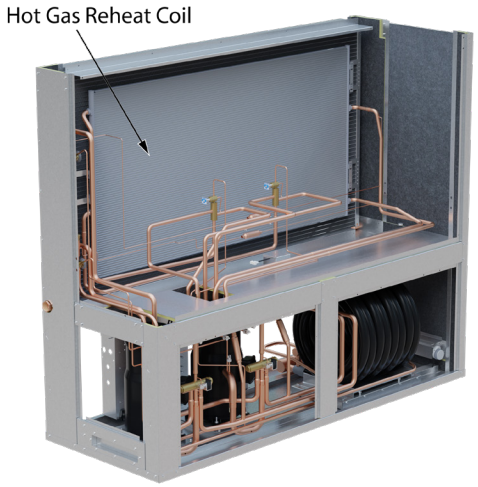
Filter Rack and Filters

Units come standard with a 1-inch, 4-sided, factory-installed filter rack and 1-inch disposable filters. Filters can be removed from either side of the filter rack. An optional 2" factory-installed filter rack with MERV 8 filter or 4" factory-installed filter rack with MERV 13 filter is available. Four filters are needed for unit sizes 072-120 and 6 filters for unit sizes 200-300.

Hot Gas Reheat

For improved indoor climate control, Daikin Applied offers accurate and cost effective dehumidification control using a hot gas reheat coil. The hot gas reheat coil option is an excellent solution for applications where maintaining low humidity in a space is crucial. Once the space temperature is satisfied, the humidistat signal diverts the high temperature refrigerant gas to the reheat coil located downstream of the cooling coil. The conditioned and reheated air prevents over cooling of the space and maximizes moisture removal for improved indoor comfort. Under humid conditions (60% RH) and typical loop water temperatures, the latent capacity is optimized for approximately 90% of the sensible capacity. With loop water conditions of 85°F (29°C), the leaving air temperature is approximately the same as the entering air temperature, resulting in effective dehumidification without over cooling the space.

Figure 4: WSLV with Hot Gas Reheat (HGRH)



Waterside Economizer

The waterside economizer option helps to reduce energy consumption by using cool loop water temperatures to condition a space without energizing mechanical cooling. Even in the coldest weather a space can experience a build-up of ambient heat from people, equipment, lighting and the sun. Buildings with temperature controlled computer rooms, media/resource rooms or medical equipment rooms, benefit from the waterside economizer when the geothermal loop field or cooling tower temperatures are cool enough to provide air conditioning.

The waterside economizer includes a hydronic cooling coil located upstream of the unit's evaporator coil and after the filter. When entering water temperatures are between 40° to 60°F (4.4°C to 15.6°C), a multi-stage thermostat or room temperature sensor in conjunction with a factory-installed entering water temperature sensor and a 2-position 3-way diverting valve, determines when loop water can be diverted to the hydronic coil for economizer cooling. The MicroTech unit controller determines if the economizer or mechanical cooling will be utilized. The controller also provides low temperature protection to avoid economizer operation when entering water temperatures are below 35°F (2°C).

Figure 5: WSLV with Waterside Economizer Option

Hot Gas Bypass

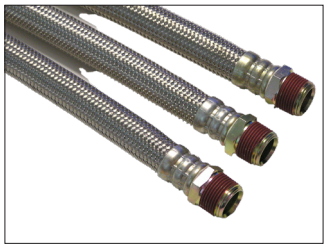
During cooling operation an external equalizer senses the suction pressure at the evaporator outlet. If the suction pressure drops below 115 psig the Hot Gas Bypass valve will begin to open and bypass hot discharge gas to the evaporator inlet, helping to prevent evaporator coil icing due to low suction pressure. The valve will continue to open as required to full capacity. As suction pressure rises to normal levels the HGBP valve will begin to close until normal cooling operation resumes.

Accessories

Supply and Return Water Hoses

Available as fire rated construction in 2 or 3 foot (610 mm or 914 mm) lengths. Fire rated hoses have a synthetic polymer core with an outer rated covering of stainless steel. Fittings are steel. Assembly is “fire rated” and tested according to UL 94 with a V-0 rating and ASTM 84. Each hose has MPT connections. Hoses have a swivel connection at one end and are available in 1-1/4" (32 mm) to match the FPT fittings on unit sizes 072 through 120. Unit sizes 200 through 300 have 2" (51 mm) FPT fittings.

Figure 6: Flexible, Steel Braided Supply and Return Hoses



Hose Specifications

Inner Tube:

1-1/4" (32 mm) hose inner tube made of fire retardant TRP (thermosplastic rubber) tested to UL-94 with V-0 rating

2" (51 mm) hose inner tube made of stainless steel tube material

Outer Braid:

1-1/4" (32 mm) and 2" (51 mm) hose outer braid made of stainless steel wire (ANSI 302/304)

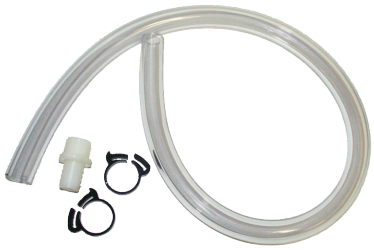
Temperature Range:

-40°F to 212°F (-40°C to 100°C)

Condensate Hose Kit

Available as a long clear plastic hose with the necessary clamps and a MPT hose fitting for connection to the FPT field piping.

Figure 7: Condensate Hose Kit



Combination Balancing and Shutoff (Ball) Valves

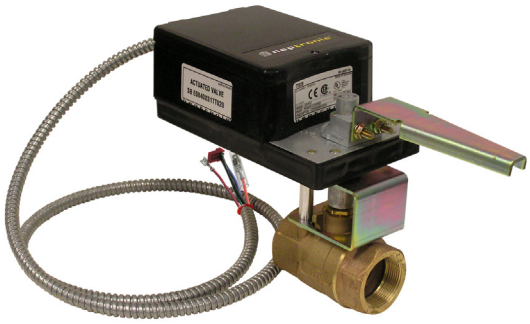
Shutoff valves are constructed of brass and rated at 400 psig (2758 kPa) maximum working pressure. Valves have a built-in adjustable memory stop to eliminate rebalancing. Valves have FPT connections on both ends for connection to the water hose and to the field piping.

Figure 8: Shutoff Ball Valve

Motorized Valve

Used in variable pumping type applications, the valve actuator is wired and typically piped in the return water line. The 2-way motorized water valve kit includes the valve body, actuator and wire harness. The 24 VAC valve actuator must be wired directly to terminal block H6 on the MicroTech controller. The valve will only energize on a call for heating or cooling. The 1-1/4" valve is rated for 300 psig (2068 kPa) and the 2" valve is rated for 150 psig (1034 kPa).

Figure 9: 2-Way Motorized Valve



2" Deep Filter Rack Kit with Return Air Duct Flange (WSLV)

A (field-installed) accessory 2" filter rack with duct flange allows for connection of return air ducting to the unit. Four filters are needed for unit sizes 072-120 and 6 filters for unit sizes 200-300.

Thermostats and Remote Indoor Sensors

Table 1: 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 2: 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		•	•	•	•

Controls

MicroTech Unit Controller with an Optional BACnet Communication Module

For installation and operation information on MT2300 unit controller and other ancillary components, see:

- OM 1364 - MT2300 Unit Controller with MT 2310 I/O Expansion Board MicroTech Controller
- IM 956 - Temperature Sensors for Units with MicroTech III or MT2300 Unit Controller and LonWorks® or BACnet Communication Module
- IM 1363 - MicroTech MT2300 Water Source Heat Pump Unit Controller BACnet MS/TP Communication Module
- ED 19129 - MicroTech MT2300 Water Source Heat Pump Unit Controller BACnet Protocol Information

Daikin Applied water source heat pumps are available with an optional 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

MicroTech Unit Controller with BACnet MS/TP communication module orchestrates the following unit operations:

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

The MT2300 Unit Controller with an optional communication module Includes:

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

NOTICE

Refer to IM 956 for details to install RAT & DAT sensors.

The communication modules provide network access to setpoints for operational control.

Available wall sensors include:

- Room sensor
- Room sensor with LED status and tenant override button
- Temperature sensor with LED status, timed-override button; ±5°F setpoint adjustment
- Room sensor with LED status, timed-override button, 55°F to 95°F setpoint adjustment
- Room sensor with digital display, timed override button, occupancy button; ±5°F setpoint adjustment or 55°F to 95°F temperature setpoint and dehumidification control

Control Features & Options

The control enclosure houses the major operating electrical controls including the MicroTech unit controller and I/O expansion module, control transformer, compressor relays and fan relay. Each component is easily accessed for service or replacement.

Two unique control choices are offered with the MicroTech unit control system:

- Standalone operation using a MicroTech unit controller and I/O expansion module
- MicroTech unit controller with I/O expansion module and BACnet communication module

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

MicroTech Unit Controller

⚠ WARNING

To avoid electrical shock, personal injury, or death, be sure that field wiring complies with local and national fire, safety, and electrical codes, and voltage to the system is within the limits shown in the job-specific drawings and unit electrical data plate(s). Power supply to unit must be disconnected when making field connections. To avoid electrical shock, personal injury, or death, be sure to rigorously adhere to field wiring procedures regarding proper lockout and tagout of components.

General Use and Information

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

The MicroTech unit control system includes two microprocessor-based control boards conveniently located in the unit control box for easy access through a removable access panel. The standalone controls are a hard wired interface and provides all the necessary field connections. The board can be wired for 24-volt AC output to the wall thermostat by using terminals R & C. Two sets of LED annunciators are located on the front of the unit chassis to allow quick check of the unit operating status.

MT2300 Board LED Indicator

When the unit controller is communicating a certain fault or mode, the LED indicator will flash a designated pattern or sequence. See Figure 10 for the location of the MT2300 board LED indicator. Table 3 gives a description of the LED activity. Refer to OM 1364 for additional information.

Table 3: MT2300 Board LED Indicator Sequence

LED Activity	Type	Color	Description
1 Flash	Mode	Green	No Call for Heating/Cooling/ Dehumidification
2 Flash	Mode	Green	Call for Cooling
3 Flash	Mode	Green	Call for Heating
4 Flash	Mode	Green	Call for Fan Only

Figure 10: LED Indicator on MT2300 Board

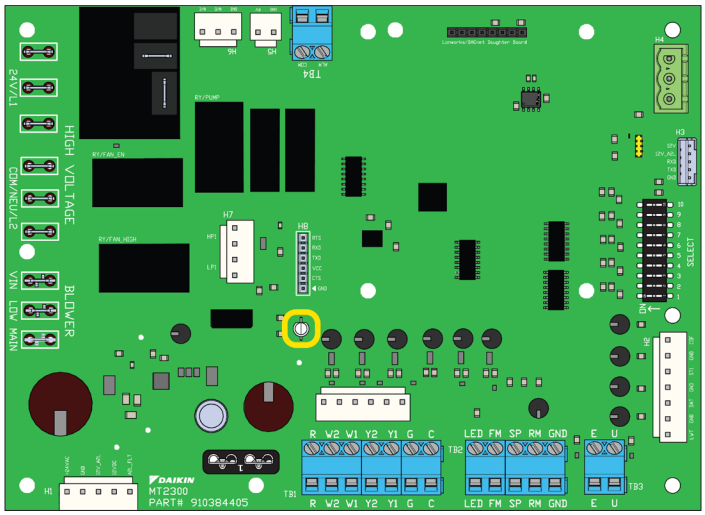


Table 4: MicroTech 2300 Unit Controller Connector and Terminal Descriptions

Connector	I/O	Type	Signal	Description
H1-1	+24VAC	Power	VAC	Control Power Voltage
H1-2	GND	Power	Ground	Control Power Common
H1-3	12V_A2L	Input	VDC	A2L Sense Voltage
H1-4	12 VDC	Output	VDC	A2L Mitigation Voltage
H1-5	A2L_ ALM	Input	Digital	A2L Fault Alarm
H2-1	LWT	Input	Analog	Leaving Water Temperature
H2-2	GND	REF	Common	
H2-3	DAT	Input	Analog	Discharge Air Temperature
H2-4	GND	REF	Common	
H2-5	ST1	Input	Analog	Comp1 Suction Temperature
H2-6	GND	REF	Common	
H2-7	COF	Input	Analog	Condensate Overflow
H3-1	12V	Output	VDC	Base/Expansion Board Interface
H3-2	12V_A2L	Output	VDC	
H3-3	RXD	COM	UART	
H3-4	TXD	COM	UART	
H3-5	GND	COM	UART	
H4-1	B(+)	COM	N/A	Future Use
H4-2	A(-)	COM	N/A	
H4-3	GND	COM	N/A	
H5-1	GND	REF	Common	Comp1 Reversing Valve
H5-2	RV	Output	24 VAC	
H6-1	GND	REF	Common	Pump Request- Common (Ground) Terminal
H6-2	NO	Output	24 VAC	Pump Request - Normally Open Terminal for Normally Closed Valves

Connector	I/O	Type	Signal	Description
H6-3	NC	Output	24 VAC	Pump Request - Normally Closed Terminal for Normally Open Valves
H7-1,2	LP1	Input	Digital	Comp1 Low Pressure
H7-3,4	HP1	Input	Digital	Comp1 High Pressure
TB1-1	R	Output	24 VAC	Thermostat 24 VAC Power
TB1-2	W2	Input	24 VAC	Thermostat Heat Stage 2
TB1-3	W1	Input	24 VAC	Thermostat Heat Stage 1
TB1-4	Y2	Input	24 VAC	Thermostat Cool Stage 2
TB1-5	Y1	Input	24 VAC	Thermostat Cool Stage 1
TB1-6	G	Input	24 VAC	Thermostat Fan
TB1-7	C	REF	Common	Thermostat Common
TB2-1	LED	Output	5 VDC	Room Sensor LED
TB2-2	FM	Input	Analog	Room Sensor Fan/Mode
TB2-3	SP	Input	Analog	Room Sensor Setpoint Adjust
TB2-4	RM	Input	Analog	Room Sensor Air Temp / Tenant Override
TB2-5	GND	REF	Common	Room Sensor Common
TB3-1	E	Input	Digital	Emergency Shutdown
TB3-2	U	Input	Digital	Unoccupied Sensor
TB4-1,2	ALM	Output	Digital	Alarm Output - Contact Closure
BLOWER	VIN	Input	VAC	Blower Motor Voltage
BLOWER	LOW	Output	VIN	Blower Motor Low Speed
BLOWER	MAIN	Output	VIN	Blower Motor High Speed or ECM
LIVE (Relay)	Comp1	Output	L1/24V	Compressor Stage 1
LIVE x 3	24V/L1	Input	VAC	Comp1 Line1 Control Voltage
LIVE x 3	COM/ NEU/L2	Input	VAC	Comp1 Line2 Control Voltage
Daughter Board	BACnet	COM	SPI	BACnet MS/TP Only

Table 5: MT2310 I/O Board Connectors and Terminals

Connector	I/O	Type	Signal	Description
H1-1	GND	Power	Ground	Control Power Common
H1-2	+24VAC	Power	VAC	Control Power Voltage
H2-1	GND	REF	Common	Comp2 Suction Temperature
H2-2	ST2	Input	Analog	
H2-3,4	LP2	Input	Digital	Comp2 Low Pressure
H2-5,6	HP2	Input	Digital	Comp2 High Pressure
H3-1	12V	Input	VDC	Base/Expansion Interface
H3-2	12V_A2L	Input	VDC	
H3-3	TXD	COM	UART	
H3-4	RXD	COM	UART	
H3-5	GND	REF	Common	
H4-1	RAT	Input	Analog	Return Air Temperature
H4-2	GND	REF	Common	
H4-3	EWT	Input	Analog	Entering Water Temperature
H4-4	GND	REF	Common	
H5-1	GND	REF	Common	Hot Gas Reheat Valve
H5-2	HGR	Output	24 VAC	
H5-3	GND	REF	Common	Waterside Economizer Valve
H5-4	WSE	Output	24 VAC	
H5-5	PWM	Output	PWM	Variable Speed Blower Motor
H6-1	GND	REF	Common	Compressor Stage 2
H6-2	COMP2	Output	24 VAC	
H6-3	GND	REF	Common	Comp2 Reversing Valve
H6-4	RV2	Output	24 VAC	
H6-5	GND	REF	Common	Auxiliary Heat 2
H6-6	AUX2	Output	24 VAC	
H6-7	GND	REF	Common	Auxiliary Heat 1 / Hydronic Heat
H6-8	AUX1	Output	24 VAC	
TB1-1	C	REF	Common	Input Common
TB1-2	RH	Input	Analog	Space Relative Humidity
TB1-3	HST	Input	24VAC	Humidistat
TB1-4	W3	Input	24VAC	Thermostat - Stage 3 Heat
TB1-5	W4	Input	24VAC	Thermostat - Stage 4 Heat or Stage 3 Cool
TB1-6	R	Output	24 VAC	Thermostat - 24 VAC Power

Standard Sequence of Operation

Assumes cycle fan operation-not continuous fan operation:

- **Start-up** – The unit will not operate until all the inputs and safety controls are checked for normal conditions.
- **Cooling mode** – On an initial call for stage 1 cooling, the fan will energize, the pump request will energize, and the 60 second flow timer will start. When the compressor minimum off (360 seconds) and random startup (0 to 60 seconds) timers are expired, the lead compressor will start the stage 1 cooling settings. Minimum off time is 6-minutes (360 seconds) while minimum run time is 3-minutes (180 seconds). If room setpoint conditions are not satisfied, the lag compressor will start, which is stage 2 cooling settings. When the room setpoint conditions are satisfied and the minimum run time (180 seconds) has expired, the lag compressor will shut off first followed by the lead compressor when all cooling requests are satisfied. If fan cycling is enabled, the fan will turn off once room setpoint conditions are satisfied.
- **Heating mode** – On an initial call for heating, the fan will energize, the pump request will energize, the 60 second flow timer will start. After the flow, compressor minimum off (360 seconds), and random startup (0 to 60 seconds) timers are expired, the lead compressor will start at stage 1 heating settings; the reversing valve shall energize 5 seconds after the lead compressor turns on. Minimum off time is 6-minutes (360 seconds) while minimum run time is 3-minutes (180 seconds). If room setpoint conditions are not satisfied, the lag compressor will operate at stage 2 heating settings. When the room setpoint conditions are satisfied and the minimum run time (180 seconds) has expired, the compressor will shut off. If fan cycling is enabled, the fan will turn off, once room setpoint conditions are satisfied.
- **Dehumidification mode** – Uses hot gas reheat with a 2-stage thermostat and humidistat for precise humidity control.
- **Hot gas reheat with temperature control** – If the space temperature setpoint is satisfied, but the space humidity is above the humidity setpoint, the dehumidification mode is activated. The fan will energize, the pump request will energize, the 45 second flow timer will start, the compressor minimum off, and random startup timers expire, the hot gas reheat valve opens sending hot gas to the reheat coil, the lead compressor energizes, and after 180 seconds the lag compressor energizes. Return air is cooled and reheated to

near space temperature. A call for cooling will close the hot gas reheat valve and the unit will resume normal cooling operation.
If the space cooling and heating temperature setpoints are satisfied, but the humidity falls below the space humidity setpoint, the dehumidification mode is suspended.

- **Waterside economizer** – This mode requires the optional factory-installed waterside economizer. A hydronic economizer coil, 3-way water valve and temperature sensor are added to the unit. The purpose of this mode is to satisfy some or all of the cooling demand by using the loop water, which is often reduced to 50°F or less via the cooling tower to achieve sufficient cooling performance. When a call for 1st stage cooling is engaged, with the entering loop water below the economizer changeover temperature, the H6 output on the MicroTech board is activated to open the motorized valve allowing water flow to the equipment. The compressor is locked out, the 3-way water valve opens to allow cool loop water to flow through the economizer coil. The fan starts after 30 seconds (unless it is already on thru activation of the G terminal by the thermostat fan switch “on”). On a further demand for cooling, stage 2; the 1st compressor will start in the cooling mode and the waterside economizer will be disabled. On a further demand for cooling the second compressor will energize. The waterside economizer mode will not be activated if the entering water temperature is below 45°F and an alarm (fault) signal will be generated.
When the room setpoint conditions are satisfied, the compressor will shut off, the 3-way valve will close and the fan will either shut off (fan switch ”auto”) or continue to run (fan switch “on”). The minimum off timer of 360 seconds starts. If the loop temperature increases above the changeover temperature, waterside economizer mode will be suspended and the unit will resume normal mechanical cooling mode with stage 1 of the thermostat now starting the compressor.

Available Operating Modes

- **Unoccupied mode** – A simple “grounded” signal between terminals U and C (no power source required), puts the unit into the unoccupied mode for night setback operation.
- **Override mode** – A switch on the deluxe automatic changeover thermostat can be activated during the unoccupied mode to put the unit back into the occupied mode for two hours for after-hours heating or cooling.

Boilerless Heat Control (Field Installed)

- **Boilerless electric heat mode** – (Requires Boilerless System Kit Accessory) When the entering water temperature is below setpoint, the compressors will not be allowed to operate. On an initial call for heating, the fan and electric heat will start. When the room setpoint conditions are satisfied, electric heat will be de-energized and the fan will continue to operate at its “fan only” setting when enabled or continuous fan operation. If fan cycling is enabled, the fan will turn off after 30 seconds once room setpoint conditions are satisfied.

MicroTech Unit Protections & LED Fault Status Annunciation

- **Short cycle protection & random start** – After power cycle or deactivation of certain alarms, or when leaving the unoccupied mode, a new random compressor start delay time between 300 and 360 seconds is generated. The random start timer prevents compressors in different units from starting simultaneously. Compressor minimum OFF 360 sec) and compressor minimum ON (180 sec) timers prevent compressor short cycling.
- **Interstaging timer** – A default value of 5 minutes between staging of compressors, this feature minimizes short cycling of compressors and improves comfort.
- **Motorized valve/pump restart** – The IV/PR (H6) terminals on the The MicroTech unit controller are used to energize (open) a motorized valve or start a water pump to get water circulating prior to starting the compressor on call for heating or cooling. Lead compressor operation shall be delayed a minimum of 45 seconds, after the motorized valve/isolation valve output energizes to allow for supply water flow.
- **Brownout protection** – The MicroTech unit controller measures the input voltage and will suspend compressor and fan operation if the voltage falls below 80% of the unit nameplate rated value. A unique LED status is generated and an output is available to a "fault" LED at the thermostat.
- **Emergency unit shutdown** – A simple grounded signal puts the unit into the shutdown mode. Remote shutdown is provided so that when properly connected to a water loop controller or remote switch, the emergency shutdown input can be used to shut down the water source heat pump. Compressor and fan operations are suspended, and a unique LED status is generated.
- **Condensate overflow protection (cooling & dehumidification modes only)** – The MicroTech unit controller incorporates a liquid sensor at the top of the drain pan. When the unit senses a high condensate water level for 60 consecutive seconds while in the cooling or dehumidification modes the unit enters the "Off Alarm" machine state. The dehumidification or cooling mode operation will immediately be deenergized as well as the pump output.
- **Thermostat fault reset (preferred method)** – A feature to reset some lockouts like high pressure and/or low temperature remote from the unit is available. When the cause of the fault condition has been fixed, repaired or resolved, the unit can be reset from the thermostat. To reset the fault, move the system switch on the thermostat from its current position (Heat/Auto/Cool) to the Off position and back to its original position two times within 30 seconds. The unit will now be reset. The intelligent reset counter and the 24 hour timer are cleared.

NOTICE
Some thermostats have internal timers greater than 30 seconds that delay their switching capabilities. Defeating their internal timers may be required to reset the fault using the thermostat.

- **Reset of automatic lockouts (alternate method)** – A feature to reset some lockouts like high pressure and/ or low temperature at the unit is available. When the cause of the fault condition has been fixed, repaired or resolved, the unit can be reset at the unit. Apply a grounded signal to the tenant override input (screw terminal connection at TB2, pin 4) for a minimum of 10 seconds. The unit will now be reset. Alternatively, dropping power to the unit from the disconnect switch and re-applying power will reset the unit.
- **Intelligent alarm reset** – The Intelligent Reset feature helps to minimize nuisance trips of automatic lockouts caused by low-temperature faults. This feature clears faults the first two times they occur within a 24-hour period and triggers an automatic lockout on the 3rd fault. The fault remains active until the alarm is manually cleared. At the end of the 24 hour period, all counts for that specific intelligent reset alarm are cleared to zero only if the occurrence counter is presently less than the value of three. The 24-hour period and alarm counts are stored in memory that is cleared when power is cycled.
- **Selectable lead compressor** – The lead compressor selection provides a method to utilize circuit 2 if repairs are required on circuit 1. This is not intended for normal equipment operation. The dipswitch SW10 in the I/O expansion board is used to configure the “Lead Compressor” settings.
- **Lag compressor backup** – The lag compressor will operate if there is a fault in the lead compressor circuit. Lead compressor will immediately be de-energized by ignoring the compressor minimum ON timer. The lag compressor will energize in place of the lead compressor, when the lag compressor minimum OFF timer has expired. The reversing valve for the lag compressor will be positioned, if necessary, 5 seconds after the lag compressor starts up.
- **Equipment protection control** – The MicroTech controller receives separate input signals from the refrigerant high-pressure switch and the low suction line temperature sensor. In a high-pressure situation, compressor operation is suspended. In a low temperature situation, the unit goes into a defrost cycle where the unit is put into cooling operation for 60 seconds until the coaxial heat exchanger is free of ice. Each switch generates its own unique LED status.
- **Compressor protection (Size 300, Vertical Only)** – A communications module installed in the compressor electrical box provides advanced diagnostics, protection and communications, that enhance compressor performance and reliability.
- **Freeze fault protection option** – This factory-mounted option adds a leaving water temp, LWT, sensor to shut down compressor operation if the LWT gets too cold. It's a dual setting sensor, set for 35°F on boiler/tower and ground water applications (those with no antifreeze) in the cooling & heating modes and geothermal applications in the cooling mode, or 13.5°F LWT on geothermal applications in the heating mode (those with anti-freeze).

⚠ CAUTION

If you move the jumper to the lower (geothermal) setting, there is a risk of freeze-up if there is no anti-freeze in the loop.

- **Phase monitor option** – The factory-installed phase monitor helps to protect against phase loss, phase reversal and phase unbalance, and ideally suited for protection against reverse rotation of scroll and screw compressors.

Configuration DIP Switches

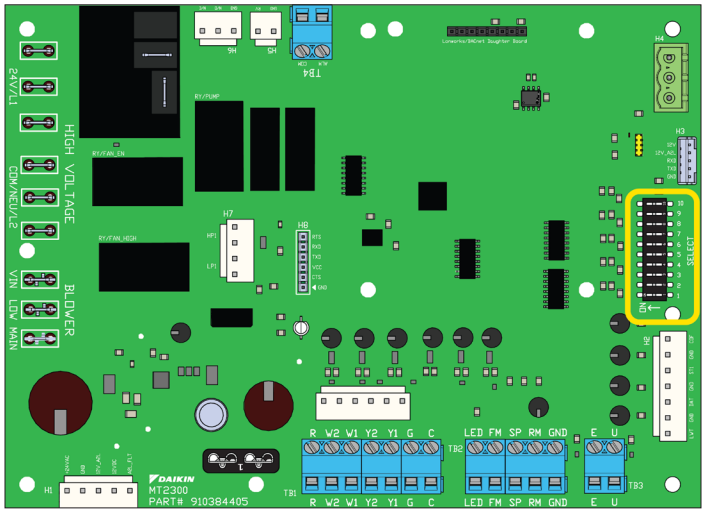
⚠ WARNING

Proper antifreeze/water solution is required to minimize the potential of fluid freeze-up. Switch SW3 is factory set for water freeze protection with the switch closed. Operation at fluid temperatures below 32°F (0°C) with anti-freeze protection requires SW3 to be field configured for the switch on. If unit is employing a fresh water system (no anti-freeze protection), it is extremely important that SW3 switch setting remains in the off position (factory default setting) in order to shut down the unit at the appropriate water temperature to protect your heat pump from freezing. Failure to do so can result in unit damage or property damage and will void unit warranty.

NOTICE

The settings of the hardware configuration DIP switches are read when the controller is powered. Any changes to the DIP switch settings require cycling power to the controller or sending a controller a reboot command through the network communications.

Figure 11: Location of Configuration DIP Switches on the MT2300 Unit Controller



⚠ CAUTION

The MT2300 unit controller incorporates static sensitive devices. A static charge from touching the device can damage the electronic components. To help prevent damage during service, use static discharge wrist straps. Static discharge wrist straps are grounded to the heat pump chassis through a 1M ohm resistor.

Table 6: MT2300 Main Board DIP Switch Settings

Switch	Description	Position	Model/Options
SW1	Normal/Test Mode	SW1 = OFF (0)	Normal Operation
		SW1 = ON (1)	Service/Test Mode
SW2	Fan Operation	SW2 = OFF (0)	Continuous Fan Operation (On)
		SW2 = ON (1)	Cycling Fan Operation (Auto)
SW3[1]	Loop Fluid	SW3 = OFF (0)	Water Loop Fluid
		SW3 = ON (1)	Glycol Loop Fluid
SW4	Freeze Fault Detect (FFD)	SW4 = OFF (0)	Disabled FFD
		SW4 = ON (1)	Enabled FFD with LWT sensor installed
SW5	Room Sensor Setpoint Adjust Range	SW5 = OFF (0)	Short Range -5 to +5 F (-2.78 to +2.78 C)
		SW5 = ON (1)	Long Range 55 to 95 F (12.78 to 35 C)
SW6	Thermostat/ Room Sensor Control	SW6 = OFF (0)	Thermostat Control
		SW6 = ON (1)	Room Sensor Control
SW7/ SW8[2]	Single Compressor Heating Source	SW7 = OFF (0)	Allow Compressor in Heating Mode
		SW7 = ON (1)	Disable Compressor in Heating Mode
	Single Compressor I/O Expansion Module	SW8 = OFF (0)	I/O Expansion Module Not Required
		SW8 = ON (1)	I/O Expansion Module is Required
	Two Compressor Availability	SW7 = OFF (0) SW8 = OFF (0)	Both Compressors Available (Automatic Compressor Fail Replace)
		SW7 = ON (1) SW8 = OFF (0)	Lead Compressor Available (Lag Compressor is Off-Line)
		SW7 = OFF (0) SW8 = ON (1)	No Compressors Available
SW9	WSHP Base Board Application Select	SW9 = OFF (0)	Single Compressor WSHP Application
		SW9 = ON (1)	Two Compressor Application
SW10	Discrete/Variable Speed Fan Select	SW10 = OFF (0)	Fan Single (Fan Main Output) or Variable (PWM) Speed
		SW10 = ON (1)	Dual Speed Fan (Low & High Discrete Outputs)

[1] See Warning under "Configuration DIP Switches" for DIP switch 3 (SW3) setting information.

[2] The functionality of SW7 and SW8 depends on the setting of SW9. If SW9 is OFF, SW7 and SW8 will be for Heating Source and I/O Expansion Module functionality. If SW9 is ON, SW7 and SW8 will be for Compressor Availability functionality.

NOTICE

Always disconnect power to the unit prior to making changes to the DIP switch settings on the interface board. The new settings will take effect once power is restored to the unit.

Figure 12: Location of Configuration DIP Switches on the MT2310 I/O Expansion Modules

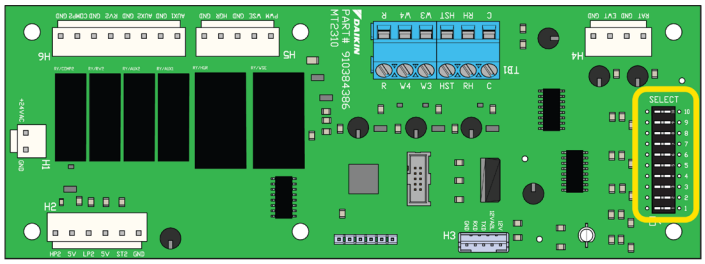


Table 7: MT2310 I/O Expansion Module DIP Switch Settings

Switch	Description	Position	Model/Options
SW1-4	Variable Fan Speed Row Selection	0000 to 1111 Binary	Variable Speed Fan Row Selection (1 to 16), used when "nciVsNetCnfgEn" is set to "Disable" the network override.
SW5/ SW6	Secondary Heating Options	SW5 = OFF (0) SW6 = OFF (0)	None
		SW5 = ON (1) SW6 = OFF (0)	Supplemental Electric Heat
		SW5 = OFF (0) SW6 = ON (1)	Boilerless Electric Heat
		SW5 = ON (1) SW6 = ON (1)	Hydronic Heating
SW7	Hot Gas Reheat (HGRH)	SW7 = OFF (0)	HGRH Disabled
		SW7 = ON (1)	HGRH Enabled
SW8	Waterside Economizer (WSE)	SW8 = OFF (0)	Waterside Economizer Disabled
		SW8 = ON (1)	Waterside Economizer Enabled
SW9	WSHP I/O Expansion Application Select	SW9 = OFF (0)	Single Compressor Application
		SW9 = ON (1)	Two Compressor Application
SW10	Dual Compressor Speed Option	SW10 = OFF (0)	Single Speed Compressor
		SW10 = ON (1)	Dual Speed Compressor
	Dual Compressor: Lead Compressor Select	SW10 = OFF (0)	Compressor #1 is Lead
		SW10 = ON (1)	Compressor #2 is Lead

NOTE: The functionality of SW10 depends on the setting of SW9. If SW9 is OFF, SW10 will be for Single Compressor Speed. If SW9 is ON, SW10 will be for Lead Compressor Select.

MicroTech SmartSource Unit Controller

The MicroTech SmartSource unit controller allows thermostat, Daikin Applied sensor and DDC standalone operation. The R (24VAC) terminal is used to operate thermostat inputs G, Y1, Y2, W1, W2, W3, W4, and TB2. The C (common) terminal is used to control inputs U and E. No external power sources may be used to operate the MicroTech controller. All units must be properly grounded per local code requirements.

Remote Reset of Automatic Lockouts

The Remote Reset feature provides the means to remotely reset automatic lockouts. There are three (3) ways to accomplish a unit reset once the fault condition has been remedied:

- Using the thermostat, cycle from cool or heat to off and back to heat or cool two times within 30 seconds.
- Press the Room Sensor or Thermostat Timed Override/ Reset Button for more than 10 seconds.
- Turn the unit power off and wait 10 seconds to turn back on.

When the cause of the fault condition has been remedied, and the unit is cycled from not requiring heating or cooling to needing heating or cooling twice within 30 seconds (accomplished by user manipulation of the Heat/Cool/ Auto/Off switch on the thermostat), an alarm reset equivalent to a tenant override button reset is generated. The intelligent reset counter and the 24 hour timer are cleared when this type of alarm reset is generated.

NOTICE

This feature only applies to thermostat controlled systems.

For room sensor controlled units, pressing the “Override” or “Reset” button for more than 10 seconds will apply a ground signal to the Room Temperature Sensor connection at TB2 pin 4, RS clearing the lockout alarm once the cause of the fault condition has been remedied.

A unit power cycle can also be used to clear an automatic lockout if the conditions causing the fault have been remedied.

Table 8: MT2300 Unit Controller Status LEDs

LED Activity	Type	Color	Description
Steady ON	Fault	Yellow	MCU Not Programmed
Steady ON	Fault	Red	MCU Hardware Failure
1 Flash	Fault	R–Y–G	Invalid Configuration
2 Flash	Fault	R–Y–G	Incompatible Software
1 Flash	Fault	R–Y	I/O Exp Board Communications Fail
1 Flash	Mode	G–Y	Service / Test Mode Active
Rapid Flash	Fault	Red	A2L Mitigation – Refrigerant Leak
1 Flash	Fault	Red	Compressor #1 High Pressure
2 Flash	Fault	Red	Compressor #1 Low Pressure
3 Flash	Fault	Red	Compressor #1 Suction Temp Sensor Fail
4 Flash	Fault	Red	Compressor #1 Low Suction Temp
5 Flash	Fault	Red	Compressor #2 High Pressure
6 Flash	Fault	Red	Compressor #2 Low Pressure
7 Flash	Fault	Red	Compressor #2 Suction Temp Sensor Fail
8 Flash	Fault	Red	Compressor #2 Low Suction Temp
9 Flash	Fault	Red	A2L Mitigation – Control Board Without Power
Rapid Flash	Mode	Yellow	A2L Mitigation – Refrigerant Sensor Out of Range
1 Flash	Fault	Yellow	Compressor Low Voltage Brownout
2 Flash	Fault	Yellow	Freeze Fault Detect (FFD)
3 Flash	Fault	Yellow	Control Temp Sensor Out of Range
4 Flash	Fault	Yellow	Entering Water Temp Sensor Out of Range
5 Flash	Fault	Yellow	Leaving Water Temp Sensor Out of Range
6 Flash	Fault	Yellow	Relative Humidity Sensor Out of Range
7 Flash	Fault	Yellow	Condensate Overflow
8 Flash	Fault	Yellow	Space Temp Sensor Out of Range
9 Flash	Fault	Yellow	Return Air Temp Sensor Out of Range
Rapid Flash	Mode	Green	Emergency Shutdown
1 Flash	Mode	Green	No Call for Heating / Cooling / Dehumidification
2 Flash	Mode	Green	Call for Cooling
3 Flash	Mode	Green	Call for Heating
4 Flash	Mode	Green	Call for Fan Only
5 Flash	Mode	Green	Unoccupied Mode Active
6 Flash	Mode	Green	Call for Dehumidification
7 Flash	Mode	Green	Low Entering Water Temp
8 Flash	Mode	Green	HGRH Low Return Air Temp Cutout
9 Flash	Mode	Green	WSE Low Temp Cutout

Table 9: MT2310 I/O Expansion Board Status LEDs

LED Activity	Type	Color	Description
1 Flash	Mode[1]	Green	Variable Speed Fan OFF
2 Flash	Mode[1]	Green	Variable Speed Fan ON: 0 to 20%
3 Flash	Mode[1]	Green	Variable Speed Fan ON: 21 to 30%
4 Flash	Mode[1]	Green	Variable Speed Fan ON: 31 to 40%
5 Flash	Mode[1]	Green	Variable Speed Fan ON: 41 to 50%
6 Flash	Mode[1]	Green	Variable Speed Fan ON: 51 to 60%
7 Flash	Mode[1]	Green	Variable Speed Fan ON: 61 to 70%
8 Flash	Mode[1]	Green	Variable Speed Fan ON: 71 to 80%
9 Flash	Mode[1]	Green	Variable Speed Fan ON: 81 to 90%
10 Flash	Mode[1]	Green	Variable Speed Fan ON: 91 to 100%
Steady ON	Fault	Yellow	MCU Not Programmed
Steady ON	Fault	Red	MCU Hardware Failure
1 Flash	Fault	R–Y–G	Invalid Configuration
2 Flash	Fault	R–Y–G	Incompatible Software
1 Flash	Fault	R–Y	Base Board Communications Failure
Rapid Flash	Fault	Red	A2L Mitigation - Alarm Condition

[1] When the BACnet network is overriding the fan speed DIP switch selection, the LED interval color will be yellow instead of green.

Table 10: Priority Level of Faults and Modes with Resets

Alarm Enumeration (BACnet)	Fault	Indication	Reset[1]
1	No Alarm	Normal operation	NA
2	MT2310 Communication Failure	Single compressor unit with SW #8 set to ON position	A
3	Incompatible Software	Incorrect Software Part or Version Numbers	P
4	Invalid Configuration	Base & IO Exp Application Mismatch or MT2310 detected but not required (SW #8)	P
5	A2L Alarm	A2L refrigerant leak detected	A
6	A2L Error - Power	A2L mitigation control is not powered	A
7	Compressor Low Voltage	"Brownout" condition exists	A
8	Comp #1 High Pressure	Compressor #1 high pressure switch opened	T,N

Alarm Enumeration (BACnet)	Fault	Indication	Reset[1]
9	Comp #2 High Pressure	Compressor #2 high pressure switch opened	T,N
10	Comp #1 Low Pressure	Compressor #1 low pressure switch opened	T,N
11	Comp #2 Low Pressure	Compressor #2 low pressure switch opened	T,N
12	Comp #1 Suction Temp Sensor	Compressor #1 suction temp sensor reading "out of range"	N
13	Comp #2 Suction Temp Sensor	Compressor #2 suction temp sensor reading "out of range"	N
14	Leaving Water Temp (LWT) Sensor	LWT sensor not present (SW #4 = ON)	N
15	Freeze Fault Detect (FFD)	LWT sensor temp below freeze setpoint (SW #4 = ON)	T,N
16	Comp #1 Low Suction Temp (ST1)	ST1 sensor temp below minimum setpoint	A,T,N[2]
17	Comp #2 Low Suction Temp (ST2)	ST2 sensor temp below minimum setpoint	A,T,N[2]
18	A2L Error - Sensor	A2L sensor lost communication or reported failure	A
19	Control Temp Sensor Failure	Room Temp and Return Air Temp sensor reading "out of range"	N
20	Entering Water Temp (EWT) Sensor Failure	EWT sensor reading "out of range"	N
21	Room Temp Sensor Failure	Room temp sensor reading "out of range"	N
22	Return Air Temp Sensor Failure	RAT sensor reading "out of range"	N
23	Space RH Sensor Failure	Space RH sensor reading "out of range"	N
24	Low Entering Water Temp (EWT)	EWT sensor reading below minimum setpoint	A
25	Condensate Overflow	Condensate overflow sensor indicates water present	A,N
26	Waterside Economizer (WSE) Low Temp	WSE temp sensor reading below minimum setpoint	A

[1] "A" = Auto Reset, "T" = Tenant Override Button Reset, "N" = Network Reset, "P" = power cycle only

[2] Low suction temperature faults have "Intelligent Reset" logic - 3 faults in a 24 hour period disables the auto reset function.

Table 11: I/O Expansion Module Configuration Switch

Fan Speed Row	Switch 1	Switch 2	Switch 3	Fan Only[1]	Cool Stage 1	Cool Stage 2	Heat Stage 1	Heat Stage 2
1	OFF	OFF	OFF	20%	80%	100%	80%	100%
2	ON	OFF	OFF	20%	70%	90%	70%	90%
3	OFF	ON	OFF	20%	60%	80%	60%	80%
4	ON	ON	OFF	20%	50%	70%	50%	70%
5	OFF	OFF	ON	20%	65%	85%	65%	85%
6	ON	OFF	ON	20%	55%	75%	55%	75%
7	OFF	ON	ON	20%	50%	65%	50%	65%
8	ON	ON	ON	20%	50%	55%	50%	55%

[1] When in Fan Only (SW4) mode, OFF = 20% and ON = Cool Stage 1 speed (heat or cool mode fan speeds not affected).

Table 12: Fault Recovery and Reset[1]

Fault Description	Auto Recover	Tenant Override Button Reset	Network Reset
I/O Expansion Communication Fail	Yes	No	No
Incompatible Software/ Invalid Configuration	No	No	No
Compressor Low Voltage Brownout	Yes	No	Yes
A2L Mitigation - Leak/ No Power I Sensor Fail	Yes	No	No
All Sensor Failures	No	No	Yes
Compressor High Pressure/ Compressor Low Pressure	No	Yes	Yes
Compressor Low Suction Temp (Heating Mode)	Yes[2]	Yes	Yes
Compressor Low Suction Temp (Cooling & Dehumidification Mode)	Yes	Yes	Yes
Freeze Fault Detect	No	Yes	Yes
Condensate Overflow (Cooling & Dehumidification Mode)	Yes	No	Yes
Low Entering Water Temp (Heating without Boilerless EH)	Yes	No	No
Waterside Economizer Low Temp Cutout (WSE Control & Call For Cooling Only)	Yes	No	No

[1] See "Remote Reset of Automatic Lockouts" on page 21 for further details.

[2] Indicates auto recover is subject to intelligent alarm reset. Alarm auto recovers on first two occurrences, locked out on third within 24 hour period.

A2L Refrigerant Detection and Mitigation

A2L Refrigerant Detection System

UL 60335-2-40 requires all units with refrigerant charges of 64 oz or greater per circuit to have refrigerant leak detection/mitigation. To meet this requirement, unit sizes WSLV200-300 include a factory installed refrigerant leak detection system consisting of the following parts:

- Refrigerant Sensor(s) (quantity 2)
  Part Number: 910419801
- A2L Refrigerant Detection Controller (quantity 1)
  Part Number: 910419225

The sensors are wired in a daisy chain configuration and terminated at the mitigation board. The A2L Main Control board connects to the MicroTech controller and signal alarms based on this system status. See OM 1364 for a full description of the Refrigerant Detection Controller.

Alarms

- Refrigerant Leak:
  - The Refrigerant Detection Controller will trigger a leak alarm when at least 1 sensor detects a refrigerant concentration above 15% of the refrigerant Lower Flammability Level (LFL).

  - — Upon detection of a leak, the mitigation board ALM and CUST relays are energized and the alarm is indicated to the MicroTech unit controller.
- Refrigerant Sensor Fault:
  - — The Refrigerant Detection Controller will trigger a fault alarm when any connected sensor is determined to be faulty (self-test failure, loss of communications, etc.).
  - — Upon detection of a sensor fault, the fault is indicated to the MicroTech unit controller.

A2L Leak Mitigation

The MicroTech controller performs the following mitigation sequences to maintain safe operation in the event of an alarm condition:

Refrigerant Leak Detected

Upon notification from the refrigerant detection system that a leak was detected, the MicroTech controller will disable compressor operation immediately, turn the fan on at A2L mitigation speed, disable electric heat, and indicate a refrigerant leak alarm.

- The Refrigerant Detection Controller continue to monitor the refrigerant sensors in the system and notifies the MicroTech unit controller when no refrigerant has been detected for five minutes, allowing the unit to resume normal operation.

Sensor Fault Detected

A fault can be caused by a leak sensor malfunctioning or being disconnected or an A2L board malfunction.

Upon notification from the refrigerant detection system that a sensor fault was detected, the MicroTech controller will allow normal operation except that it will turn the fan on at A2L mitigation speed, to maintain adequate airflow through the system to dilute any of the leaked refrigerant, and indicate a sensor fault alarm.

A2L Refrigerant Detection Sensor and Board Service

- The sensors are not considered “Limited Life Sensors” and therefore, under normal operation, are not expected to be replaced within the life expectancy of the unit.
- The sensors have self-reporting diagnostics, which are monitored by the mitigation board. In the event that the sensor fails, the mitigation board will trigger a “Fault” alarm.
- There are no servicing nor maintenance requirements for the sensor(s) and board.

A2L Refrigerant Detection Sensor and Board Troubleshooting and Diagnostics

At power up, the Refrigerant Detection Controller display shows what sensors are detected (SX = 1 , sensor X is active and communicating), and what sensors are not detected (SX = 0, sensor X is not communicating or inactive). Where X, is the sensor number (from 1 to 8).

By pressing and holding the push button for:

- *Less than 2 seconds*
  The Refrigerant Detection Controller display shows the last 10 sensor faults (can be loss of communication or faulted state reported by a specific sensor). General configuration fault (Flt CFG) is also shown when the expected number of sensors does not match the number of sensors detected online.
- *More than 2 seconds and less than 5 seconds*
  The display shows sensor(s) status info:
  - — The current LFL level.
  - — Loss of communication or faulted state reported by a specific sensor.
- *More than 5 seconds and less than 10 seconds*
  The Refrigerant Detection Controller starts a mitigation test. The board will go into alarm mode and the MicroTech controller will begin the mitigation sequence. The mitigation test will last approximately 5 minutes.
- *More than 10 seconds*
  The display shows all the GID values supported by the sensor board. Refer to OM 1364 for additional information.

Refrigerant Guidelines

⚠ WARNING

This unit contains R-32, a class A2L refrigerant that is flammable. This unit should only be installed, serviced, repaired, and disposed of by qualified personnel licensed or certified in their jurisdiction to work with R-32 refrigerant. Installation and maintenance must be done in accordance with this manual. Improper handling of this equipment can cause equipment damage or personal injury.

For installation only in locations not accessible to the general public.

Be aware that R-32 refrigerant may not contain an odor. Place in a well ventilated area to prevent accumulation of refrigerant. When installing the unit in a small room, take measures to keep the refrigerant concentration from exceeding allowable safety limits. Excessive refrigerant leaks, in the event of an accident in a closed ambient space, can lead to oxygen deficiency.

Do not pierce or burn this unit.

Never use an open flame during service or repair. Never store in a room with continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater.), where there is ignitable dust suspension in the air, or where volatile flammables such as thinner or gasoline are handled.

Only use pipes, nuts, and tools intended for exclusive use with R-32 refrigerant in compliance with national codes (ASHRAE15 or IRC).

Do not mix air or gas other than R-32 in the refrigerant system. If air enters the refrigerant system, an excessively high pressure results, which may cause equipment damage or injury.

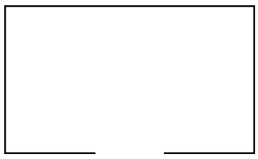
Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

⚠ WARNING

The appliance is designed to activate leak mitigation airflow in the event a refrigerant leak is detected. This is required to ensure dilution and prevent stagnation of any leaked refrigerant. Always ensure the supply fans are able to operate freely. Always maintain proper airflow and do not allow filters, air inlets, or air outlets to become blocked. Refer to Table 13.

⚠ WARNING

The appliance shall be installed, operated, and stored in a room with a floor area not less than the minimum room area.



≥ 152 ft² (14 m²)
Minimum Room Area*

*See the required minimum room area for your specific unit size in Table 13.

NOTICE

Refer to Table 14 for the altitude adjusted room area calculation referenced later in this manual.

The indoor equipment mitigation requirements are calculated at sea level. For higher altitudes, adjust the minimum room area specified on or near the serial plate by the corresponding altitude adjustment factor shown in Table 14. This table is provided as a reference. Adjusted room area (Amin adj) is the product of the minimum room area specified in the serial plate and the minimum room area multiplier, as shown in formula below.

Amin adj = Amin (serial plate) * (minimum room area multiplier)

The minimum room area can also be found in Table 13.

Table 13: Required Minimum Area of the Total Conditioned Space

Unit Size	Minimum Area Required Amin
WSLV200	96 ft² (9 m²)
WSLV240	115 ft² (11 m²)
WSLV300	152 ft² (14 m²)

Table 14: Minimum Room Area Multipliers by Altitude

Altitude	Minimum Room Area Multiplier
0 ft (0 m)	1
1000.66 ft (305 m)	1.047
1640.42 ft (500 m)	1.078
2460.63 ft (750 m)	1.117
3280.84 ft (1000 m)	1.156
4101.05 ft (1250 m)	1.195
4921.26 ft (1500 m)	1.234
5741.47 ft (1750 m)	1.273
6561.68 ft (2000 m)	1.312
7381.89 ft (2250 m)	1.351
8202.10 ft (2500 m)	1.390
9022.31 ft (2750 m)	1.429
9842.52 ft (3000 m)	1.468
10662.73 ft (3250 m)	1.507
11482.94 ft (3500 m)	1.546

Refrigerant Detection System Operation

The RDS is controlled by a refrigerant sensor(s), which is secured to a designated location(s) for active monitoring. If a leak is detected, compressor and electric heat operation is disabled and the supply fan blower fan is activated, providing airflow at or above the minimum required airflow to evacuate excess concentration. Once the time is over, the unit will resume its normal operation. If the sensors detect another refrigerant concentration excess, the unit will go back into mitigation mode and will repeat the same process.

Refrigerant Detection System and Sensors

For additional instructions on how to operate the RDS including how to activate a manual test of the RDS, refer to the unit controller manual.

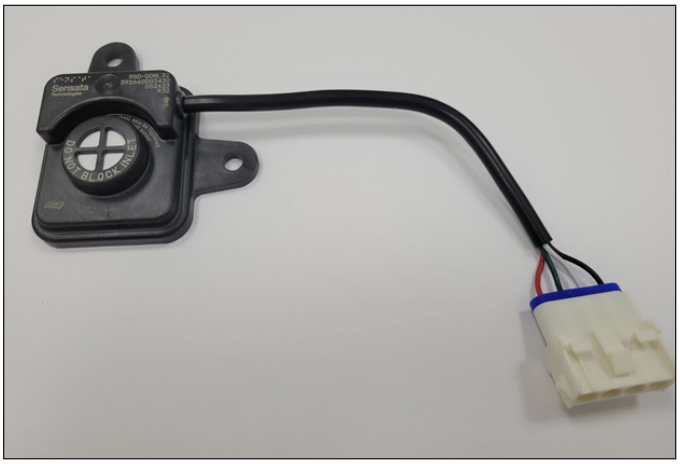
⚠ WARNING

This unit is equipped with a Refrigerant Detection System (RDS). Only components and refrigerant detection sensors specified by Daikin Applied may be used for replacement and maintenance.

⚠ WARNING

Always ensure the refrigerant detection sensors installed in the equipment are free of debris and the inlet is not blocked. If replacing a refrigerant detection sensor, always install in the identical orientation as the original sensor.

Figure 13: Sample Refrigerant Detection Sensor



NOTE: Identify the sensor inlet marked “Do Not Block Inlet,” and ensure it is free of debris.

AHRI Performance Data

Unit Sizes	Capacity Modulation	Rated CFM	Rated GPM	Water Loop (Boiler Tower)				Ground Loop (Geothermal)			
				Cooling 86°F		Heating 68°F		Cooling 77°F		Heating 32°F	
				Btu/h	EER	Btu/h	COP	Btu/h	EER	Btu/h	COP
Horizontal											
072	Full Load	2,400	18.0	71,200	15.7	83,500	5.0	73,500	18.0	53,600	3.6
096	Full Load	3,200	24.0	96,000	15.6	115,000	5.0	98,000	17.9	72,000	3.6
120	Full Load	4,000	30.0	120,000	15.2	140,000	5.0	123,000	17.1	90,000	3.7
Vertical											
072	Full Load	2,400	18.0	74,000	17.0	87,000	5.2	77,000	19.0	53,000	3.7
096	Full Load	3,200	24.0	96,000	16.7	118,900	5.4	99,500	19.4	74,100	3.9
120	Full Load	4,000	30.0	120,000	15.1	146,000	5.0	124,600	17.0	95,600	3.6
200	Full Load	6,000	45.0	208,000	15.1	258,000	4.8	210,000	17.1	166,000	3.5
240	Full Load	7,200	60.0	235,200	15.9	296,900	5.3	242,500	18.3	179,600	3.6
300	Full Load	9,600	75.0	296,000	14.0	418,000	4.8	294,900	15.3	250,500	3.5

NOTE 1: Rated in accordance with AHRI/ASHRAE/ISO Standard 13256-1. Models with capacities greater than 135,000 Btu/h are not included in the ANSI/AHRI/ASHRAE/ISO13256-1 water-to-air and brine-to-air heat pump certification program.

NOTE 2: Cooling capacities based on 80.6° F DB, 66.2° F WB entering air temperature.

NOTE 3: Heating capacities based on 68.0° F DB, 59.0° F WB entering air temperature.

NOTE 4: All ratings based on operation at 208 V for unit sizes 072-120 and 460 V for unit sizes 200-300.

Legend	
Btu/h	British Thermal Units per Hour
CFM	Airflow Rate, Cubic Feet per Minute
COP	Coefficient of Performance
EER	Energy Efficiency Ratio
GPM	Gallons per Minute

Capacity Data

Horizontal Units

Table 15: WSLH072 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	12.0	3.1	7.1	Operation Not Recommended					48700	4.783	32400	89	3.0
	18.0	6.0	13.9						51700	4.827	35200	90	3.1
	24.0	9.7	22.5						54700	4.871	38100	91	3.3
30	12.0	3.0	7.0	74600	51700	2.874	84400	26.0	51500	4.827	35000	90	3.1
	18.0	5.9	13.7	74800	51800	2.864	84600	26.1	54500	4.871	37900	91	3.3
	24.0	9.6	22.1	74900	51800	2.855	84600	26.2	57500	4.915	40700	92	3.4
40	12.0	2.9	6.8	77400	52900	3.056	87800	25.3	58600	4.929	41800	92	3.5
	18.0	5.8	13.3	77500	53000	3.047	87900	25.4	61600	4.973	44600	94	3.6
	24.0	9.3	21.5	77700	53000	3.037	88100	25.6	64600	5.017	47500	95	3.8
50	12.0	2.9	6.6	78000	53200	3.357	89500	23.2	67100	5.044	49900	96	3.9
	18.0	5.6	13.0	78100	53300	3.347	89500	23.3	70100	5.088	52700	97	4.0
	24.0	9.1	20.9	78300	53300	3.338	89700	23.5	73100	5.132	55600	98	4.2
60	12.0	2.8	6.4	77100	52900	3.732	89800	20.7	76100	5.169	58400	99	4.3
	18.0	5.5	12.6	77200	52900	3.722	89900	20.7	79100	5.213	61300	100	4.4
	24.0	8.8	20.4	77400	53000	3.713	90100	20.8	82100	5.257	64100	101	4.6
70	12.0	2.7	6.3	75300	52000	4.159	89500	18.1	84900	5.299	66800	103	4.7
	18.0	5.4	12.4	75400	52100	4.149	89600	18.2	87900	5.343	69700	104	4.8
	24.0	8.7	20.0	75600	52100	4.140	89700	18.3	90900	5.387	72500	105	4.9
80	12.0	2.7	6.2	72800	50800	4.634	88600	15.7	92900	5.431	74400	106	5.0
	18.0	5.3	12.1	73000	50900	4.624	88800	15.8	95900	5.475	77200	107	5.1
	24.0	8.5	19.6	73200	50900	4.615	89000	15.9	98900	5.519	80100	108	5.3
90	12.0	2.6	6.1	70000	49400	5.174	87700	13.5	99300	5.561	80300	108	5.2
	18.0	5.2	12.0	70200	49400	5.164	87800	13.6	102300	5.605	83200	109	5.3
	24.0	8.4	19.3	70300	49500	5.155	87900	13.6	105300	5.649	86000	110	5.5
100	12.0	2.6	6.0	66700	47700	5.815	86600	11.5	Operation Not Recommended				
	18.0	5.1	11.8	66900	47800	5.806	86700	11.5					
	24.0	8.2	19.0	67000	47800	5.796	86800	11.6					
110	12.0	2.6	5.9	62800	45800	6.613	85400	9.5					
	18.0	5.0	11.7	63000	45900	6.604	85600	9.5					
	24.0	8.1	18.8	63100	46000	6.595	85600	9.6					
120	12.0	2.5	5.9	58000	43800	7.645	84100	7.6					
	18.0	5.0	11.5	58100	43800	7.635	84200	7.6					
	24.0	8.1	18.6	58300	43900	7.626	84300	7.6					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools™ (DST) selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Table 16: WSLH096 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	16.0	3.2	7.5	Operation Not Recommended					65200	6.140	44200	89	3.1
	24.0	6.6	15.3						66600	6.170	45500	89	3.2
	32.0	10.9	25.2						68000	6.199	46800	90	3.2
30	16.0	3.2	7.4	96800	67200	4.037	110600	24.0	71000	6.223	49700	90	3.3
	24.0	6.5	15.0	98200	68700	3.853	111400	25.5	72400	6.252	51000	91	3.4
	32.0	10.8	24.8	99500	70200	3.669	112000	27.1	73800	6.282	52300	91	3.4
40	16.0	3.1	7.2	100100	68400	4.360	115000	23.0	83200	6.449	61200	94	3.8
	24.0	6.3	14.6	101400	69900	4.176	115700	24.3	84700	6.478	62600	94	3.8
	32.0	10.4	24.1	102700	71400	3.992	116300	25.7	86100	6.508	63900	95	3.9
50	16.0	3.0	7.0	102000	69600	4.741	118200	21.5	96000	6.710	73100	98	4.2
	24.0	6.1	14.2	103300	71100	4.557	118900	22.7	97400	6.739	74400	98	4.2
	32.0	10.2	23.5	104700	72600	4.374	119600	23.9	98800	6.769	75700	98	4.3
60	16.0	3.0	6.8	102300	70200	5.194	120000	19.7	108600	6.964	84800	101	4.6
	24.0	6.0	13.9	103600	71700	5.010	120700	20.7	110000	6.994	86100	102	4.6
	32.0	9.9	22.9	104900	73200	4.827	121400	21.7	111400	7.023	87400	102	4.6
70	16.0	2.9	6.7	100700	69900	5.731	120300	17.6	120400	7.185	95900	105	4.9
	24.0	5.9	13.6	102000	71400	5.547	120900	18.4	121800	7.215	97200	105	4.9
	32.0	9.7	22.4	103300	72900	5.364	121600	19.3	123200	7.244	98500	105	5.0
80	16.0	2.8	6.5	97400	68500	6.365	119100	15.3	130700	7.361	105600	108	5.2
	24.0	5.8	13.3	98700	70000	6.181	119800	16.0	132200	7.390	107000	108	5.2
	32.0	9.5	22.0	100000	71500	5.997	120500	16.7	133600	7.419	108300	108	5.3
90	16.0	2.8	6.4	92700	66200	7.107	117000	13.0	139000	7.494	113400	110	5.4
	24.0	5.7	13.1	94000	67700	6.923	117600	13.6	140400	7.523	114700	110	5.5
	32.0	9.4	21.6	95300	69200	6.739	118300	14.1	141900	7.552	116100	111	5.5
100	16.0	2.8	6.4	87000	63300	7.971	114200	10.9	Operation Not Recommended				
	24.0	5.6	12.9	88300	64800	7.787	114900	11.3					
	32.0	9.2	21.4	89600	66300	7.603	115600	11.8					
110	16.0	2.7	6.3	81100	60400	8.969	111700	9.0					
	24.0	5.5	12.8	82400	61900	8.785	112400	9.4					
	32.0	9.1	21.1	83700	63400	8.601	113100	9.7					
120	16.0	2.7	6.2	75900	58300	10.113	110400	7.5					
	24.0	5.5	12.6	77200	59700	9.929	111100	7.8					
	32.0	9.1	20.9	78600	61200	9.745	111900	8.1					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Table 17: WSLH120 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	20.0	5.0	11.4	Operation Not Recommended					81500	7.692	55200	89	3.1
	30.0	10.1	23.4						87000	7.803	60400	90	3.3
	40.0	16.8	38.8						92400	7.914	65400	91	3.4
30	20.0	4.9	11.3	121200	86500	5.206	139000	23.3	87700	7.758	61200	90	3.3
	30.0	10.0	23.0	122800	87900	4.945	139700	24.8	93100	7.870	66200	91	3.5
	40.0	16.5	38.2	124300	89400	4.684	140300	26.5	98500	7.981	71200	93	3.6
40	20.0	4.7	10.9	127300	89200	5.670	146700	22.5	102000	8.071	74400	93	3.7
	30.0	9.7	22.3	128800	90600	5.409	147300	23.8	107400	8.182	79500	95	3.8
	40.0	16.1	37.1	130300	92100	5.148	147900	25.3	112800	8.293	84500	96	4.0
50	20.0	4.6	10.6	130000	90300	6.140	151000	21.2	117600	8.467	88700	97	4.1
	30.0	9.4	21.7	131500	91800	5.879	151600	22.4	123100	8.578	93800	98	4.2
	40.0	15.6	36.1	133100	93300	5.618	152300	23.7	128500	8.689	98800	100	4.3
60	20.0	4.5	10.4	129800	90400	6.698	152700	19.4	133300	8.819	103200	101	4.4
	30.0	9.2	21.2	131400	91900	6.437	153400	20.4	138700	8.930	108200	102	4.6
	40.0	15.3	35.2	132900	93300	6.176	154000	21.5	144100	9.041	113200	103	4.7
70	20.0	4.4	10.2	127300	89800	7.396	152600	17.2	147900	9.062	117000	104	4.8
	30.0	9.0	20.8	128900	91200	7.135	153300	18.1	153300	9.173	122000	105	4.9
	40.0	14.9	34.5	130400	92700	6.874	153900	19.0	158700	9.284	127000	107	5.0
80	20.0	4.3	10.0	123000	88600	8.258	151200	14.9	160800	9.195	129400	107	5.1
	30.0	8.8	20.4	124600	90000	7.997	151900	15.6	166200	9.306	134400	108	5.2
	40.0	14.7	33.8	126100	91500	7.736	152500	16.3	171600	9.417	139400	110	5.3
90	20.0	4.2	9.8	117600	87100	9.283	149300	12.7	171700	9.283	140000	110	5.4
	30.0	8.7	20.1	119100	88500	9.022	149900	13.2	177100	9.394	145000	111	5.5
	40.0	14.4	33.3	120700	90000	8.761	150600	13.8	182500	9.505	150000	112	5.6
100	20.0	4.2	9.7	111700	85300	10.441	147400	10.7	Operation Not Recommended				
	30.0	8.6	19.8	113200	86700	10.180	148000	11.1					
	40.0	14.2	32.8	114800	88200	9.919	148700	11.6					
110	20.0	4.1	9.6	106100	83200	11.673	146000	9.1					
	30.0	8.5	19.6	107700	84700	11.412	146700	9.4					
	40.0	14.1	32.5	109200	86100	11.151	147300	9.8					
120	20.0	4.1	9.5	101800	80800	12.894	145800	7.9					
	30.0	8.4	19.4	103300	82300	12.633	146400	8.2					
	40.0	13.9	32.2	104900	83800	12.372	147200	8.5					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Vertical Units

Table 18: WSLV072 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	12.0	3.0	7.0	Operation Not Recommended					44700	4.230	30300	87	3.1
	18.0	6.0	13.8						49000	4.304	34300	89	3.3
	24.0	9.6	22.3						53300	4.378	38300	90	3.6
30	12.0	3.0	6.9	82400	58300	2.865	92200	28.8	48800	4.294	34100	89	3.3
	18.0	5.9	13.6	82900	58600	2.604	91800	31.8	53100	4.368	38200	90	3.6
	24.0	9.5	21.9	83400	59000	2.344	91400	35.6	57400	4.442	42200	92	3.8
40	12.0	2.9	6.7	84700	59500	3.064	95200	27.6	57100	4.446	41900	92	3.8
	18.0	5.7	13.2	85200	59800	2.804	94800	30.4	61400	4.520	46000	94	4.0
	24.0	9.2	21.3	85700	60200	2.543	94400	33.7	65700	4.594	50000	95	4.2
50	12.0	2.8	6.5	84900	59700	3.363	96400	25.2	66100	4.619	50300	95	4.2
	18.0	5.6	12.8	85400	60000	3.103	96000	27.5	70400	4.693	54400	97	4.4
	24.0	9.0	20.7	85900	60400	2.842	95600	30.2	74700	4.767	58400	99	4.6
60	12.0	2.8	6.4	83700	59100	3.735	96500	22.4	75900	4.801	59500	99	4.6
	18.0	5.4	12.5	84200	59400	3.474	96100	24.2	80200	4.875	63600	101	4.8
	24.0	8.8	20.2	84700	59800	3.214	95700	26.4	84500	4.949	67600	102	5.0
70	12.0	2.7	6.2	81500	58000	4.164	95700	19.6	86500	4.984	69500	103	5.1
	18.0	5.3	12.3	82000	58400	3.903	95300	21.0	90800	5.058	73500	105	5.3
	24.0	8.6	19.8	82400	58700	3.643	94800	22.6	95100	5.132	77600	106	5.4
80	12.0	2.7	6.1	78400	56600	4.648	94300	16.9	97400	5.166	79800	107	5.5
	18.0	5.2	12.0	78900	57000	4.388	93900	18.0	101700	5.240	83800	109	5.7
	24.0	8.4	19.4	79400	57300	4.127	93500	19.2	106000	5.314	87900	111	5.8
90	12.0	2.6	6.0	74800	55100	5.200	92600	14.4	107900	5.345	89600	111	5.9
	18.0	5.1	11.8	75300	55400	4.940	92200	15.2	112200	5.419	93700	113	6.1
	24.0	8.3	19.1	75800	55800	4.679	91800	16.2	116500	5.493	97700	115	6.2
100	12.0	2.6	5.9	70800	53500	5.844	90800	12.1	Operation Not Recommended				
	18.0	5.1	11.7	71300	53800	5.583	90400	12.8					
	24.0	8.2	18.8	71800	54200	5.323	90000	13.5					
110	12.0	2.5	5.9	66400	51800	6.615	89000	10.0					
	18.0	5.0	11.5	66900	52200	6.355	88600	10.5					
	24.0	8.1	18.6	67400	52500	6.094	88200	11.1					
120	12.0	2.5	5.8	61700	50200	7.566	87500	8.2					
	18.0	5.0	11.4	62200	50500	7.305	87100	8.5					
	24.0	8.0	18.5	62700	50900	7.045	86800	8.9					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Table 19: WSLV096 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	16.0	3.1	7.3	Operation Not Recommended					64100	6.088	43300	88	3.1
	24.0	6.4	14.7						67600	6.166	46500	89	3.2
	32.0	10.5	24.4						71100	6.243	49800	90	3.3
30	16.0	3.1	7.1	95600	69500	4.039	109400	23.7	71700	6.227	50400	91	3.4
	24.0	6.3	14.5	96100	69700	3.770	109000	25.5	75200	6.304	53700	92	3.5
	32.0	10.4	24.0	96700	69900	3.501	108700	27.6	78700	6.382	56900	93	3.6
40	16.0	3.0	6.9	93700	67600	4.370	108600	21.4	86100	6.502	63900	95	3.9
	24.0	6.1	14.1	94300	67800	4.101	108300	23.0	89600	6.580	67100	96	4.0
	32.0	10.1	23.3	94800	68000	3.833	107900	24.7	93100	6.657	70400	97	4.1
50	16.0	2.9	6.7	99500	71400	4.760	115800	20.9	99400	6.772	76300	99	4.3
	24.0	5.9	13.7	100100	71600	4.491	115400	22.3	102900	6.850	79500	100	4.4
	32.0	9.8	22.7	100600	71800	4.222	115000	23.8	106400	6.927	82700	101	4.5
60	16.0	2.9	6.6	104000	74600	5.215	121800	19.9	111700	7.034	87700	102	4.7
	24.0	5.8	13.4	104500	74800	4.946	121400	21.1	115200	7.111	90900	103	4.7
	32.0	9.6	22.1	105100	75000	4.677	121100	22.5	118700	7.189	94100	104	4.8
70	16.0	2.8	6.4	103900	75100	5.748	123500	18.1	123000	7.285	98100	105	4.9
	24.0	5.7	13.1	104400	75300	5.479	123100	19.1	126500	7.363	101400	106	5.0
	32.0	9.4	21.7	105000	75500	5.210	122800	20.2	130000	7.440	104600	107	5.1
80	16.0	2.7	6.3	100000	73300	6.372	121800	15.7	133400	7.522	107700	108	5.2
	24.0	5.6	12.8	100500	73600	6.103	121300	16.5	136900	7.600	110900	109	5.3
	32.0	9.2	21.2	101100	73800	5.834	121000	17.3	140400	7.678	114200	110	5.4
90	16.0	2.7	6.2	94900	70900	7.102	119200	13.4	142900	7.744	116500	111	5.4
	24.0	5.5	12.6	95400	71100	6.833	118700	14.0	146400	7.821	119700	112	5.5
	32.0	9.1	20.9	96000	71300	6.564	118400	14.6	149900	7.899	122900	113	5.6
100	16.0	2.7	6.1	90800	69300	7.948	117900	11.4	Operation Not Recommended				
	24.0	5.4	12.5	91400	69500	7.679	117600	11.9					
	32.0	8.9	20.6	91900	69700	7.410	117200	12.4					
110	16.0	2.6	6.1	87700	68300	8.913	118100	9.8					
	24.0	5.3	12.3	88200	68500	8.644	117700	10.2					
	32.0	8.8	20.4	88800	68800	8.375	117400	10.6					
120	16.0	2.6	6.0	80700	64900	9.992	114800	8.1					
	24.0	5.3	12.2	81300	65100	9.723	114500	8.4					
	32.0	8.7	20.2	81800	65400	9.454	114100	8.7					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Table 20: WSLV120 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	20.0	4.9	11.4	Operation Not Recommended					85800	8.350	57300	90	3.0
	30.0	10.0	23.2						89900	8.433	61100	91	3.1
	40.0	16.6	38.4						94000	8.516	64900	92	3.2
30	20.0	4.9	11.2	114900	83600	5.636	134100	20.4	93400	8.485	64400	92	3.2
	30.0	9.9	22.8	116300	84100	5.297	134400	22.0	97500	8.569	68200	92	3.3
	40.0	16.4	37.8	117800	84600	4.958	134700	23.8	101600	8.652	72100	93	3.4
40	20.0	4.7	10.9	132300	92500	6.036	152900	21.9	108200	8.763	78300	95	3.6
	30.0	9.6	22.2	133700	93000	5.696	153200	23.5	112300	8.846	82100	96	3.7
	40.0	15.9	36.7	135200	93500	5.357	153500	25.2	116400	8.929	85900	97	3.8
50	20.0	4.6	10.6	133100	94400	6.568	155500	20.3	122400	9.047	91500	98	4.0
	30.0	9.3	21.6	134600	94900	6.229	155900	21.6	126500	9.130	95300	99	4.1
	40.0	15.5	35.8	136000	95400	5.889	156100	23.1	130600	9.214	99100	100	4.2
60	20.0	4.5	10.4	129000	92700	7.202	153600	17.9	135900	9.339	104000	101	4.3
	30.0	9.1	21.1	130400	93200	6.863	153800	19.0	140000	9.422	107800	102	4.4
	40.0	15.1	34.9	131900	93700	6.523	154200	20.2	144100	9.505	111600	103	4.4
70	20.0	4.4	10.1	125000	90000	7.920	152000	15.8	148800	9.638	115900	104	4.5
	30.0	8.9	20.6	126400	90500	7.580	152300	16.7	152900	9.721	119700	105	4.6
	40.0	14.8	34.2	127900	91000	7.241	152600	17.7	157100	9.805	123600	106	4.7
80	20.0	4.3	9.9	122000	87800	8.715	151800	14.0	161100	9.945	127100	107	4.7
	30.0	8.8	20.2	123400	88400	8.376	152000	14.7	165300	10.028	131100	108	4.8
	40.0	14.5	33.5	124900	88900	8.037	152300	15.5	169400	10.111	134900	109	4.9
90	20.0	4.2	9.8	118600	86800	9.595	151400	12.4	172800	10.259	137800	110	4.9
	30.0	8.6	19.9	120000	87300	9.256	151600	13.0	176900	10.342	141600	111	5.0
	40.0	14.3	33.0	121500	87800	8.917	152000	13.6	181100	10.425	145500	112	5.1
100	20.0	4.2	9.6	113100	86400	10.578	149200	10.7	Operation Not Recommended				
	30.0	8.5	19.6	114600	86900	10.239	149600	11.2					
	40.0	14.1	32.5	116000	87400	9.900	149800	11.7					
110	20.0	4.1	9.5	105900	85200	11.695	145800	9.1					
	30.0	8.4	19.4	107400	85700	11.355	146200	9.5					
	40.0	13.9	32.2	108800	86200	11.016	146400	9.9					
120	20.0	4.1	9.5	101000	80900	12.988	145400	7.8					
	30.0	8.3	19.2	102500	81400	12.649	145700	8.1					
	40.0	13.8	31.9	103900	81900	12.310	145900	8.4					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Table 21: WSLV200 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	30.0	5.0	11.5	Operation Not Recommended					139400	13.978	91700	91	2.9
	45.0	10.1	23.2						147500	14.176	99100	93	3.0
	60.0	16.5	38.2						155700	14.374	106600	94	3.2
30	30.0	4.9	11.4	218300	153600	9.211	249800	23.7	151300	14.339	102300	93	3.1
	45.0	9.9	22.9	219600	153900	8.555	248800	25.7	159400	14.537	109800	94	3.2
	60.0	16.3	37.6	221000	154200	7.898	248000	28.0	167500	14.735	117200	96	3.3
40	30.0	4.8	11.0	225100	154200	9.608	257900	23.4	176600	15.081	125100	97	3.4
	45.0	9.6	22.2	226400	154500	8.951	257000	25.3	184800	15.279	132600	98	3.5
	60.0	15.8	36.5	227800	154800	8.295	256100	27.5	192900	15.478	140000	100	3.7
50	30.0	4.6	10.7	225100	154200	10.438	260700	21.6	203400	15.839	149300	101	3.8
	45.0	9.4	21.6	226400	154500	9.782	259800	23.1	211600	16.037	156800	102	3.9
	60.0	15.4	35.5	227700	154800	9.125	258900	25.0	219700	16.235	164300	104	4.0
60	30.0	4.5	10.5	220800	153300	11.599	260400	19.0	230700	16.596	174000	105	4.1
	45.0	9.1	21.1	222100	153600	10.942	259500	20.3	238900	16.794	181500	107	4.2
	60.0	15.0	34.7	223400	153900	10.286	258500	21.7	247000	16.992	189000	108	4.3
70	30.0	4.4	10.3	214300	151300	13.006	258700	16.5	257700	17.339	198500	110	4.4
	45.0	8.9	20.7	215600	151600	12.349	257800	17.5	265800	17.537	205900	111	4.4
	60.0	14.7	33.9	216900	151900	11.692	256800	18.6	274000	17.735	213400	112	4.5
80	30.0	4.4	10.1	206900	148300	14.590	256700	14.2	283300	18.053	221600	113	4.6
	45.0	8.8	20.3	208200	148600	13.934	255800	14.9	291500	18.251	229200	115	4.7
	60.0	14.4	33.3	209500	148900	13.277	254800	15.8	299600	18.449	236600	116	4.8
90	30.0	4.3	9.9	199500	144500	16.303	255200	12.2	306800	18.722	242900	117	4.8
	45.0	8.6	19.9	200800	144800	15.647	254200	12.8	314900	18.920	250300	118	4.9
	60.0	14.2	32.8	202100	145100	14.990	253300	13.5	323100	19.118	257800	120	5.0
100	30.0	4.2	9.8	192100	140400	18.112	254000	10.6	Operation Not Recommended				
	45.0	8.5	19.7	193400	140700	17.455	253000	11.1					
	60.0	14.0	32.3	194700	141000	16.799	252100	11.6					
110	30.0	4.2	9.6	184100	136600	20.002	252400	9.2					
	45.0	8.4	19.4	185500	136900	19.346	251600	9.6					
	60.0	13.8	32.0	186800	137200	18.689	250600	10.0					
120	30.0	4.1	9.6	174500	133800	21.976	249600	7.9					
	45.0	8.3	19.3	175900	134100	21.320	248700	8.3					
	60.0	13.7	31.7	177200	134400	20.663	247800	8.6					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Table 22: WSLV240 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	40.0	3.8	8.7	Operation Not Recommended					149600	14.524	100000	89	3.0
	60.0	7.5	17.3						158600	14.676	108500	90	3.2
	80.0	12.2	28.3						167700	14.828	117100	91	3.3
30	40.0	3.7	8.5	221500	164500	10.026	255700	22.1	162200	14.789	111700	91	3.2
	60.0	7.4	17.0	221800	164000	9.444	254100	23.5	171200	14.941	120200	92	3.4
	80.0	12.0	27.8	222000	163600	8.863	252300	25.0	180300	15.093	128800	93	3.5
40	40.0	3.6	8.3	232000	168600	10.552	268000	22.0	193200	15.471	140400	95	3.7
	60.0	7.2	16.5	232200	168200	9.970	266300	23.3	202300	15.623	148900	96	3.8
	80.0	11.7	27.0	232400	167800	9.389	264500	24.8	211400	15.775	157500	97	3.9
50	40.0	3.5	8.1	237800	171500	11.253	276200	21.1	228100	16.229	172700	99	4.1
	60.0	7.0	16.1	238000	171000	10.672	274400	22.3	237100	16.381	181200	100	4.2
	80.0	11.4	26.3	238200	170600	10.090	272700	23.6	246200	16.533	189700	101	4.4
60	40.0	3.4	7.9	239600	172900	12.223	281300	19.6	262900	16.949	205000	104	4.5
	60.0	6.8	15.7	239900	172500	11.641	279700	20.6	272000	17.101	213600	105	4.7
	80.0	11.1	25.7	240100	172000	11.060	277900	21.7	281100	17.253	222200	106	4.8
70	40.0	3.3	7.7	238000	172900	13.512	284100	17.6	295100	17.564	235100	108	4.9
	60.0	6.7	15.4	238300	172500	12.931	282500	18.4	304100	17.716	243600	109	5.0
	80.0	10.9	25.1	238500	172100	12.350	280700	19.3	313200	17.867	252200	110	5.1
80	40.0	3.3	7.6	233500	171500	15.131	285200	15.4	322900	18.045	261300	111	5.2
	60.0	6.5	15.1	233800	171100	14.550	283500	16.1	331900	18.197	269800	112	5.3
	80.0	10.7	24.7	234000	170700	13.969	281700	16.8	341000	18.349	278300	114	5.4
90	40.0	3.2	7.4	226600	168800	17.048	284800	13.3	345800	18.412	282900	114	5.5
	60.0	6.4	14.8	226800	168400	16.467	283000	13.8	354900	18.564	291500	115	5.6
	80.0	10.5	24.3	227100	168000	15.886	281400	14.3	364000	18.716	300100	117	5.7
100	40.0	3.2	7.3	217700	164900	19.188	283200	11.3	Operation Not Recommended				
	60.0	6.3	14.6	218000	164500	18.607	281500	11.7					
	80.0	10.4	23.9	218200	164100	18.026	279800	12.1					
110	40.0	3.1	7.3	207300	160000	21.437	280500	9.7					
	60.0	6.3	14.5	207600	159600	20.856	278800	10.0					
	80.0	10.2	23.7	207800	159100	20.274	277000	10.2					
120	40.0	3.1	7.2	195800	154300	23.636	276500	8.3					
	60.0	6.2	14.3	196000	153900	23.055	274700	8.5					
	80.0	10.1	23.4	196200	153400	22.474	273000	8.7					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Table 23: WSLV300 Capacity Data - Full Load

EWT (°F)	GPM	WPD		Cooling - EAT 80/67°F					Heating - EAT 70°F				
		PSI	ft of W.C.	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	50.0	4.5	10.3	Operation Not Recommended					200000	20.500	130000	89	2.9
	75.0	9.0	20.8						216500	20.790	145500	91	3.1
	100.0	14.8	34.1						233100	21.081	161100	92	3.2
30	50.0	4.4	10.2	226700	166000	13.790	273800	16.4	223000	21.128	150800	91	3.1
	75.0	8.9	20.5	224600	166600	13.074	269200	17.2	239500	21.419	166400	93	3.3
	100.0	14.5	33.6	222400	167300	12.358	264600	18.0	256100	21.710	182000	95	3.5
40	50.0	4.3	9.9	242900	178800	14.891	293800	16.3	268600	22.406	192100	96	3.5
	75.0	8.6	19.9	240700	179500	14.175	289100	17.0	285200	22.697	207700	97	3.7
	100.0	14.1	32.6	238500	180200	13.458	284500	17.7	301800	22.987	223300	99	3.8
50	50.0	4.2	9.6	262800	192800	16.347	318600	16.1	313800	23.705	232800	100	3.9
	75.0	8.4	19.3	260600	193400	15.631	314000	16.7	330400	23.996	248500	102	4.0
	100.0	13.7	31.7	258400	194100	14.914	309300	17.3	347000	24.286	264100	103	4.2
60	50.0	4.1	9.4	280700	204600	18.026	342300	15.6	358400	25.017	273000	104	4.2
	75.0	8.2	18.9	278500	205300	17.309	337600	16.1	375000	25.308	288600	106	4.3
	100.0	13.4	31.0	276300	206000	16.593	333000	16.7	391500	25.599	304100	108	4.5
70	50.0	4.0	9.2	292600	212400	19.840	360400	14.7	402200	26.336	312300	109	4.5
	75.0	8.0	18.5	290400	213100	19.124	355700	15.2	418800	26.626	327900	110	4.6
	100.0	13.1	30.3	288200	213700	18.408	351100	15.7	435300	26.917	343400	112	4.7
80	50.0	3.9	9.0	296400	215200	21.749	370700	13.6	445100	27.652	350700	113	4.7
	75.0	7.9	18.1	294200	215900	21.033	366000	14.0	461700	27.943	366300	114	4.8
	100.0	12.9	29.8	292000	216600	20.317	361400	14.4	478200	28.233	381800	116	5.0
90	50.0	3.8	8.9	292100	213300	23.757	373200	12.3	487000	28.959	388100	117	4.9
	75.0	7.7	17.8	289900	214000	23.041	368600	12.6	503600	29.249	403700	118	5.0
	100.0	12.7	29.3	287700	214700	22.324	363900	12.9	520100	29.540	419200	120	5.2
100	50.0	3.8	8.8	281300	208200	25.913	369800	10.9	Operation Not Recommended				
	75.0	7.6	17.6	279100	208900	25.197	365200	11.1					
	100.0	12.5	28.9	276900	209500	24.481	360500	11.3					
110	50.0	3.7	8.7	267700	202200	28.314	364400	9.5					
	75.0	7.5	17.4	265500	202900	27.598	359800	9.6					
	100.0	12.4	28.5	263300	203600	26.882	355100	9.8					
120	50.0	3.7	8.6	257000	199100	31.102	363200	8.3					
	75.0	7.5	17.2	254800	199700	30.385	358600	8.4					
	100.0	12.2	28.3	252600	200400	29.669	353900	8.5					

NOTE 1: Operation at or below 40°F EWT is based upon a 15% methanol antifreeze solution.

NOTE 2: Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

NOTE 3: See performance correction tables for operating conditions other than those listed.

NOTE 4: Interpolation is permissible; extrapolation is not.

NOTE 5: For performance data outside the EAT listed, refer to the Daikin Select Tools selection program.

NOTE 6: Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

NOTE 7: Data is based on unit at full load operation.

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 W.C.	Feet of Water Column	**WPD**	Waterside Pressure Drop

Correction Factors

Airflow Correction Factors

Table 24: Airflow Correction Factors

Airflow		Cooling				Heating		
CFM/Ton	% of Nominal	Total Capacity	Sensible Capacity	Power	Heat of Rejection	Heating Capacity	Power	Heat of Absorption
240	60	0.935	0.765	0.934	0.935	0.967	1.110	0.926
260	65	0.943	0.795	0.943	0.943	0.971	1.096	0.936
280	70	0.951	0.824	0.951	0.951	0.975	1.082	0.944
300	75	0.959	0.853	0.959	0.959	0.979	1.069	0.954
320	80	0.968	0.882	0.967	0.968	0.984	1.055	0.963
340	85	0.976	0.912	0.975	0.976	0.988	1.041	0.972
360	90	0.984	0.941	0.984	0.984	0.992	1.027	0.982
380	95	0.992	0.971	0.992	0.992	0.996	1.014	0.991
400	100	1.000	1.000	1.000	1.000	1.000	1.000	1.000
420	105	1.008	1.029	1.008	1.008	1.004	0.986	1.009
440	110	1.017	1.059	1.016	1.016	1.008	0.973	1.018
460	115	1.024	1.088	1.025	1.025	1.012	0.959	1.027
480	120	1.033	1.117	1.033	1.033	1.017	0.945	1.037
500	125	1.041	1.147	1.041	1.041	1.021	0.931	1.046
520	130	1.049	1.176	1.049	1.049	1.025	0.918	1.055

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

Capacity Correction Factors

Cooling Capacity Correction Factors

Table 25: WSLH Cooling Capacity Correction Table

Entering Air WB °F	Total Cooling Capacity	Sensible Cooling Capacity Multipliers - Engering DB °F						Power	Heat of Rejection
		65	70	75	80	80.6	85		
55	0.799	0.790	1.021	*	*	*	*	1.005	0.838
60	0.883	0.590	0.820	1.050	*	*	*	1.003	0.906
65	0.966		0.620	0.850	1.080	1.108	1.310	1.001	0.973
66.2	0.987		0.572	0.802	1.032	1.060	1.262	1.000	0.989
67	1.000		0.539	0.770	1.000	1.028	1.230	1.000	1.000
70	1.050			0.649	0.880	0.907	1.110	0.999	1.040
71	1.134				0.679	0.707	0.910	0.997	1.108

* Sensible capacity equals total capacity at conditions shown.

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

Table 26: WSLV Cooling Capacity Correction Table

Entering Air WB °F	Total Cooling Capacity	Sensible Cooling Capacity Multipliers - Engering DB °F						Power	Heat of Rejection
		65	70	75	80	80.6	85		
55	0.816	0.847	1.058	*	*	*	*	1.004	0.852
60	0.893	0.648	0.858	1.069	*	*	*	1.003	0.914
65	0.969		0.659	0.869	1.080	1.105	1.290	1.001	0.975
66.2	0.988		0.611	0.821	1.032	1.057	1.243	1.000	0.990
67	1.000		0.579	0.789	1.000	1.025	1.211	1.000	1.000
70	1.046			0.670	0.880	0.905	1.091	0.999	1.037
71	1.123				0.681	0.706	0.891	0.997	1.099

* Sensible capacity equals total capacity at conditions shown.

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

Heating Capacity Correction Factors

Table 27: WSLH Heating Capacity Correction Table

Entering Air Db °F	Heating Capacity	Power	Heat of Absorption
50	1.027	0.799	1.087
55	1.020	0.849	1.065
60	1.014	0.900	1.043
65	1.007	0.950	1.022
68	1.003	0.980	1.009
70	1.000	1.000	1.000
75	0.993	1.050	0.978
80	0.986	1.100	0.957
85	0.980	1.151	0.935

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

Table 28: WSLV Heating Capacity Correction Table

Entering Air Db °F	Heating Capacity	Power	Heat of Absorption
50	1.030	0.792	1.094
55	1.023	0.844	1.070
60	1.015	0.896	1.047
65	1.008	0.948	1.023
68	1.003	0.979	1.009
70	1.000	1.000	1.000
75	0.992	1.052	0.977
80	0.985	1.104	0.953
85	0.977	1.156	0.930

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

Economizer Capacity Data

Table 29: WSLH Waterside Economizer Cooling Capacity

Unit Size	GPM	1800 CFM		2400 CFM		3200 CFM		4000 CFM		5000 CFM		WSE Water Side dP (ft of W.C.)		
		Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Coil Only	Pipes, Valve in By-Pass	Pipes, Valve thru WSE Coil
072	12	42.3	37.8	46.8	45.1	51.9	51.9					1.7	8.1	9.0
	18	52.2	41.7	58.8	51.2	65.1	60.9					3.7	18.2	20.1
	24	59.4	45.0	67.5	54.1	75.9	66.4					6.5	32.4	35.5
	PD (in W.C.)[2]	0.08		0.12		0.17								
096	16			55.3	49.4	61.0	58.7	66.0	65.2			3.0	14.4	15.9
	24			67.5	54.1	75.9	66.4	82.2	75.8			6.5	32.4	35.5
	32			76.4	58.3	86.4	69.8	94.6	82.2			11.5	57.5	62.7
	PD (in W.C.)[2]			0.12		0.17		0.24						
120	20					69.2	63.0	74.5	71.7	80.7	79.5	4.6	22.5	24.8
	30					84.3	68.8	91.9	80.9	99.4	92.1	10.1	50.6	55.2
	40					94.9	74.0	103.9	84.6	113.5	99.6	17.8	89.9	97.4
	PD (in W.C.)[2]					0.20		0.26		0.34				

[1] Capacity is based on 80/67°F entering air and 45°F entering water temperatures. Total and sensible capacities are Mbtu/h.

[2] Air PD is air pressure drop in inches of water column wet coil.

Table 30: WSLV Waterside Economizer Cooling Capacity

Unit Size	GPM	1800 CFM		2400 CFM		3200 CFM		4000 CFM		5000 CFM		WSE Water Side dP (ft of W.C.)		
		Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Coil Only	Pipes, Valve in By-Pass	Pipes, Valve thru WSE Coil
072	12	48.5	40.0	54.0	48.7	59.9	57.1					2.0	8.1	9.0
	18	58.2	44.1	66.2	53.6	74.3	65.5					4.4	18.2	20.1
	24	65.5	47.5	74.8	57.2	84.9	69.3					7.7	32.4	35.5
	PD (in W.C.)[2]	0.07		0.11		0.16								
096	16			62.8	52.1	69.9	63.2	75.7	71.3			3.5	14.4	15.9
	24			74.8	57.2	84.9	69.3	93.0	79.6			7.7	32.4	35.5
	32			83.7	61.4	95.3	73.5	105.2	84.9			13.4	57.5	62.7
	PD (in W.C.)[2]			0.11		0.16		0.23						
120	20					78.4	66.2	84.9	77.1	91.9	86.7	5.4	22.5	24.8
	30					93.1	72.5	102.1	84.0	111.6	96.3	11.8	50.6	55.2
	40					102.6	77.2	112.6	88.3	123.3	102.2	20.7	89.9	97.4
	PD (in W.C.)[2]					0.18		0.24		0.33				
Unit Size	GPM	4500 CFM		6000 CFM		7200 CFM		9660 CFM		12000 CFM		WSE Water Side dP (ft of W.C.)		
		Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Coil Only	Pipes, Valve in By-Pass	Pipes, Valve thru WSE Coil
180	30	122.8	98.6	136.5	116.2	143.7	131.4					4.7	8.0	8.2
	45	148.6	110.5	167.8	131.4	177.0	143.8					10.3	17.6	18.5
	60	166.0	118.1	188.3	140.4	202.9	155.9					18.0	30.8	32.8
	PD (in W.C.)[2]	0.09		0.14		0.19								
215	36			150.0	122.7	159.5	135.3	173.8	161.8			6.7	14.0	14.6
	54			181.0	137.2	194.4	152.2	212.3	176.1			14.7	30.8	32.8
	72			199.1	145.3	213.9	161.0	238.1	188.7			25.5	54.1	58.2
	PD (in W.C.)[2]			0.14		0.19		0.28						
290	48					182.6	146.4	201.8	170.7	215.3	189.4	11.7	21.6	22.8
	72					213.9	161.0	238.1	188.7	253.4	209.4	25.5	47.7	51.2
	96					231.6	169.1	258.8	198.3	278.1	221.6	44.5	83.6	90.9
	PD (in W.C.)[2]					0.19		0.31		0.43				

[1] Capacity is based on 80/67°F entering air and 45°F entering water temperatures. Total and sensible capacities are Mbtu/h.

[2] Air PD is air pressure drop in inches of water column wet coil.

Electrical Data

Table 31: WSLH Unit Electrical Data

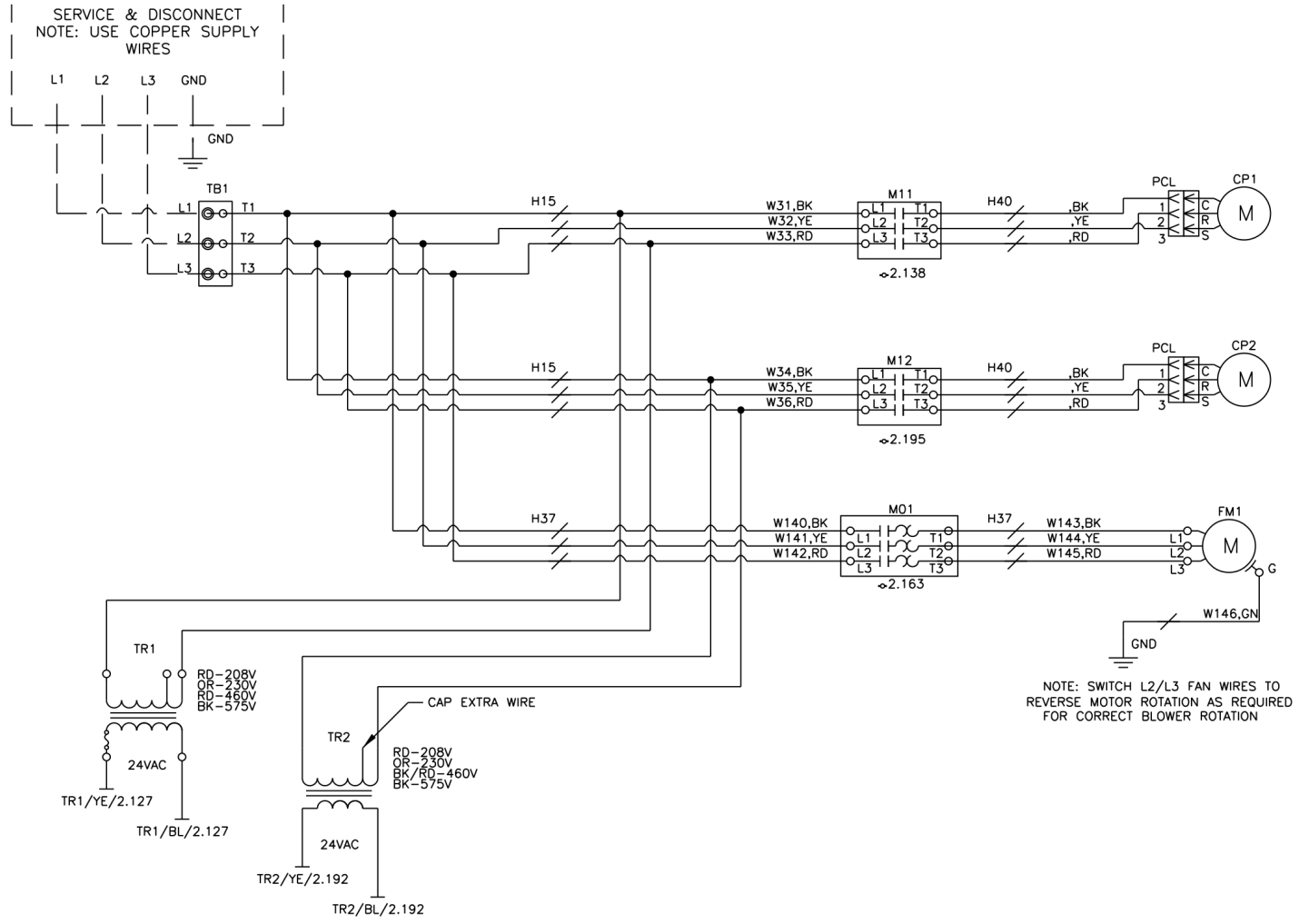
Unit Size	Voltage/Hz/ Phase	Fan Motor (HP)	Compressor 1		Compressor 2		Fan Motor FLA	Total Unit Amps	Min. Voltage	Min. Circuit Ampacity	Max. Fuse Size
			RLA	LRA	RLA	LRA					
072	208/230-60-3	1.5	10.6	97.5	10.6	97.5	5.0	26.2	187	28.8	35
	460-60-3		4.9	44.3	4.9	44.3	2.4	12.1	416	13.4	15
	575-60-3		3.9	27.1	3.9	27.1	1.7	9.4	520	10.4	15
	208/230-60-3	3.0	10.6	97.5	10.6	97.5	8.3	29.5	187	32.1	40
	460-60-3		4.9	44.3	4.9	44.3	3.9	13.6	416	14.9	15
	575-60-3		3.9	27.1	3.9	27.1	3.1	10.8	520	11.8	15
096	208/230-60-3	1.5	12.8	120.4	12.8	120.4	5.0	30.6	187	33.8	45
	460-60-3		6.4	55.1	6.4	55.1	2.4	15.2	416	16.8	20
	575-60-3		5.1	41.0	5.1	41.0	1.7	12.0	520	13.2	15
	208/230-60-3	3.0	12.8	120.4	12.8	120.4	8.3	33.9	187	37.1	45
	460-60-3		6.4	55.1	6.4	55.1	3.9	16.7	416	18.3	20
	575-60-3		5.1	41.0	5.1	41.0	3.1	13.4	520	14.6	15
120	208/230-60-3	3.0	17.3	155.0	17.3	155.0	8.3	42.9	187	47.2	60
	460-60-3		7.7	58.1	7.7	58.1	3.9	19.3	416	21.2	25
	575-60-3		7.1	47.8	7.1	47.8	3.1	17.2	520	19.0	25
	208/230-60-3	5.0	17.3	155.0	17.3	155.0	13.7	48.3	187	52.6	60
	460-60-3		7.7	58.1	7.7	58.1	6.5	21.9	416	23.8	30
	575-60-3		7.1	47.8	7.1	47.8	5.1	19.2	520	21.0	25

Table 32: WSLV Unit Electrical Data

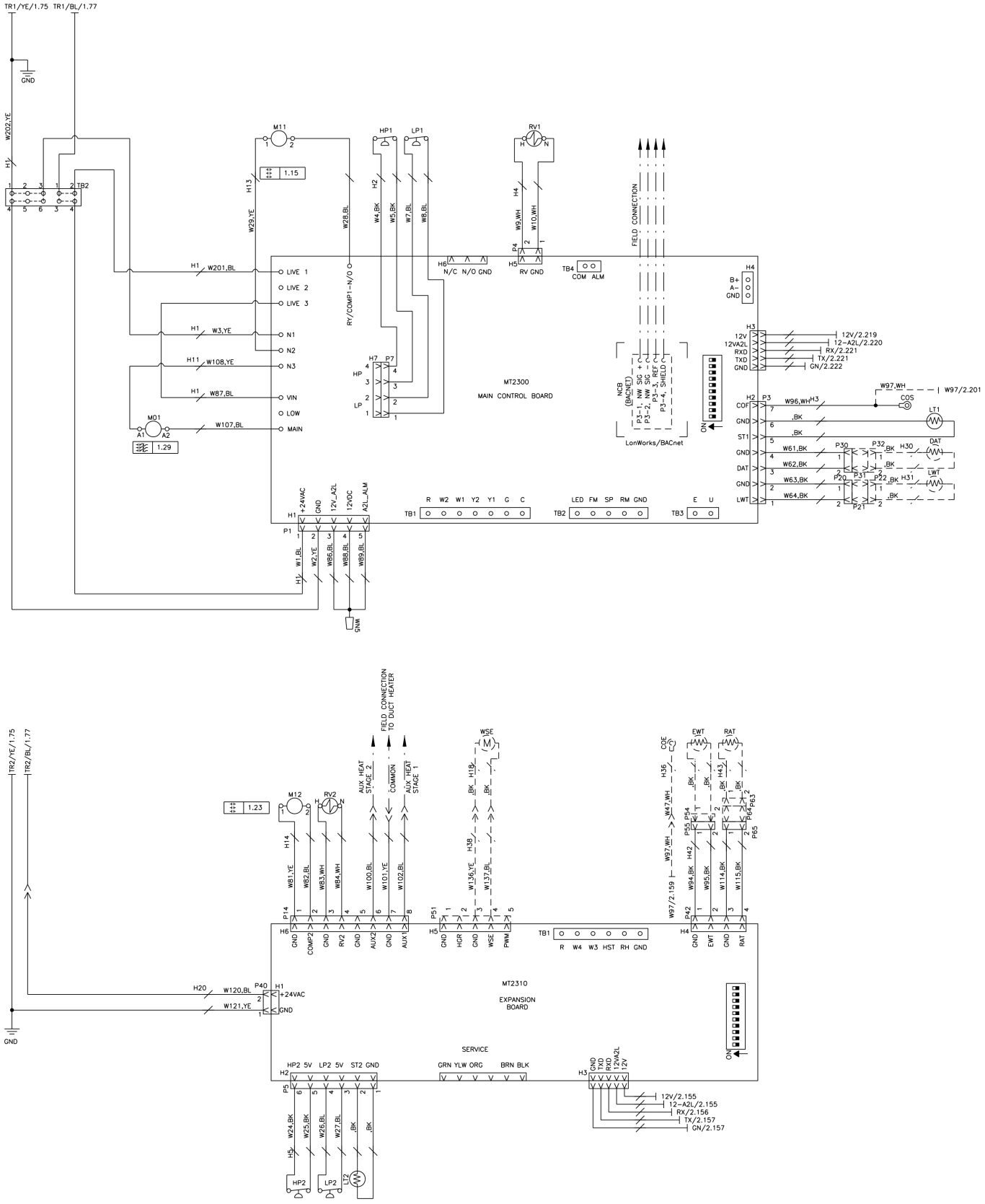
Unit Size	Voltage/Hz/ Phase	Fan Motor (HP)	Compressor 1		Compressor 2		Fan Motor FLA	Total Unit Amps	Min. Voltage	Min. Circuit Amps	Max. Fuse Amps
			RLA	LRA	RLA	LRA					
072	208/230-60-3	1.5	10.6	97.5	10.6	97.5	5.0	26.2	187	28.8	35
	460-60-3		4.9	44.3	4.9	44.3	2.4	12.1	416	13.4	15
	575-60-3		3.9	27.1	3.9	27.1	1.7	9.4	520	10.4	15
	208/230-60-3	2.0	10.6	97.5	10.6	97.5	6.4	27.6	187	30.2	40
	460-60-3		4.9	44.3	4.9	44.3	2.8	12.5	416	13.8	15
	575-60-3		3.9	27.1	3.9	27.1	2.2	9.9	520	10.9	15
	208/230-60-3	3.0	10.6	97.5	10.6	97.5	8.3	29.5	187	32.1	40
	460-60-3		4.9	44.3	4.9	44.3	3.9	13.6	416	14.9	15
	575-60-3		3.9	27.1	3.9	27.1	3.1	10.8	520	11.8	15
096	208/230-60-3	1.5	12.8	120.4	12.8	120.4	5.0	30.6	187	33.8	45
	460-60-3		6.4	55.1	6.4	55.1	2.4	15.2	416	16.8	20
	575-60-3		5.1	41.0	5.1	41.0	1.7	12.0	520	13.2	15
	208/230-60-3	2.0	12.8	120.4	12.8	120.4	6.4	32.0	187	35.2	45
	460-60-3		6.4	55.1	6.4	55.1	2.8	15.6	416	17.2	20
	575-60-3		5.1	41.0	5.1	41.0	2.2	12.5	520	13.7	15
	208/230-60-3	3.0	12.8	120.4	12.8	120.4	8.3	33.9	187	37.1	45
	460-60-3		6.4	55.1	6.4	55.1	3.9	16.7	416	18.3	20
	575-60-3		5.1	41.0	5.1	41.0	3.1	13.4	520	14.6	15
120	208/230-60-3	2.0	17.3	155.0	17.3	155.0	6.4	41.0	187	45.3	60
	460-60-3		7.7	58.1	7.7	58.1	2.8	18.2	416	20.1	25
	575-60-3		7.1	47.8	7.1	47.8	2.2	16.3	520	18.1	25
	208/230-60-3	3.0	17.3	155.0	17.3	155.0	8.3	42.9	187	47.2	60
	460-60-3		7.7	58.1	7.7	58.1	3.9	19.3	416	21.2	25
	575-60-3		7.1	47.8	7.1	47.8	3.1	17.2	520	19.0	25
	208/230-60-3	5.0	17.3	155.0	17.3	155.0	13.7	48.3	187	52.6	60
	460-60-3		7.7	58.1	7.7	58.1	6.5	21.9	416	23.8	30
	575-60-3		7.1	47.8	7.1	47.8	5.1	19.2	520	21.0	25
200	208/230-60-3	3.0	31.0	203.0	31.0	203.0	8.3	70.3	187	78.1	100
	460-60-3		17.1	98.0	17.1	98.0	3.9	38.1	416	42.4	50
	575-60-3		12.0	84.0	12.0	84.0	3.1	27.1	520	30.1	40
	208/230-60-3	5.0	31.0	203.0	31.0	203.0	13.7	75.7	187	83.5	110
	460-60-3		17.1	98.0	17.1	98.0	6.2	40.4	416	44.7	60
	575-60-3		12.0	84.0	12.0	84.0	4.9	28.9	520	31.9	40
	208/230-60-3	7.5	31.0	203.0	31.0	203.0	20.2	82.2	187	90.0	110
	460-60-3		17.1	98.0	17.1	98.0	9.3	43.5	416	47.8	60
	575-60-3		12.0	84.0	12.0	84.0	7.3	31.3	520	34.3	45
240	208/230-60-3	3.0	32.0	203.0	32.0	203.0	8.3	72.3	187	80.3	110
	460-60-3		17.9	98.0	17.9	98.0	3.9	39.7	416	44.2	60
	575-60-3		13.0	84.0	13.0	84.0	3.1	29.1	520	32.4	45
	208/230-60-3	5.0	32.0	203.0	32.0	203.0	13.7	77.7	187	85.7	110
	460-60-3		17.9	98.0	17.9	98.0	6.2	42.0	416	46.5	60
	575-60-3		13.0	84.0	13.0	84.0	4.9	30.9	520	34.2	45
	208/230-60-3	7.5	32.0	203.0	32.0	203.0	20.2	84.2	187	92.2	110
	460-60-3		17.9	98.0	17.9	98.0	9.3	45.1	416	49.6	60
	575-60-3		13.0	84.0	13.0	84.0	7.3	33.3	520	36.6	45
300	208/230-60-3	7.5	44.0	267.0	44.0	267.0	20.2	108.2	187	119.2	150
	460-60-3		22.9	142.0	22.9	142.0	9.3	55.1	416	60.8	80
	575-60-3		17.0	103.0	17.0	103.0	7.3	41.3	520	45.6	60
	208/230-60-3	10.0	44.0	267.0	44.0	267.0	28.1	116.1	187	127.1	150
	460-60-3		22.9	142.0	22.9	142.0	11.9	57.7	416	63.4	80
	575-60-3		17.0	103.0	17.0	103.0	9.8	43.8	520	48.1	60

Typical Wiring Diagrams

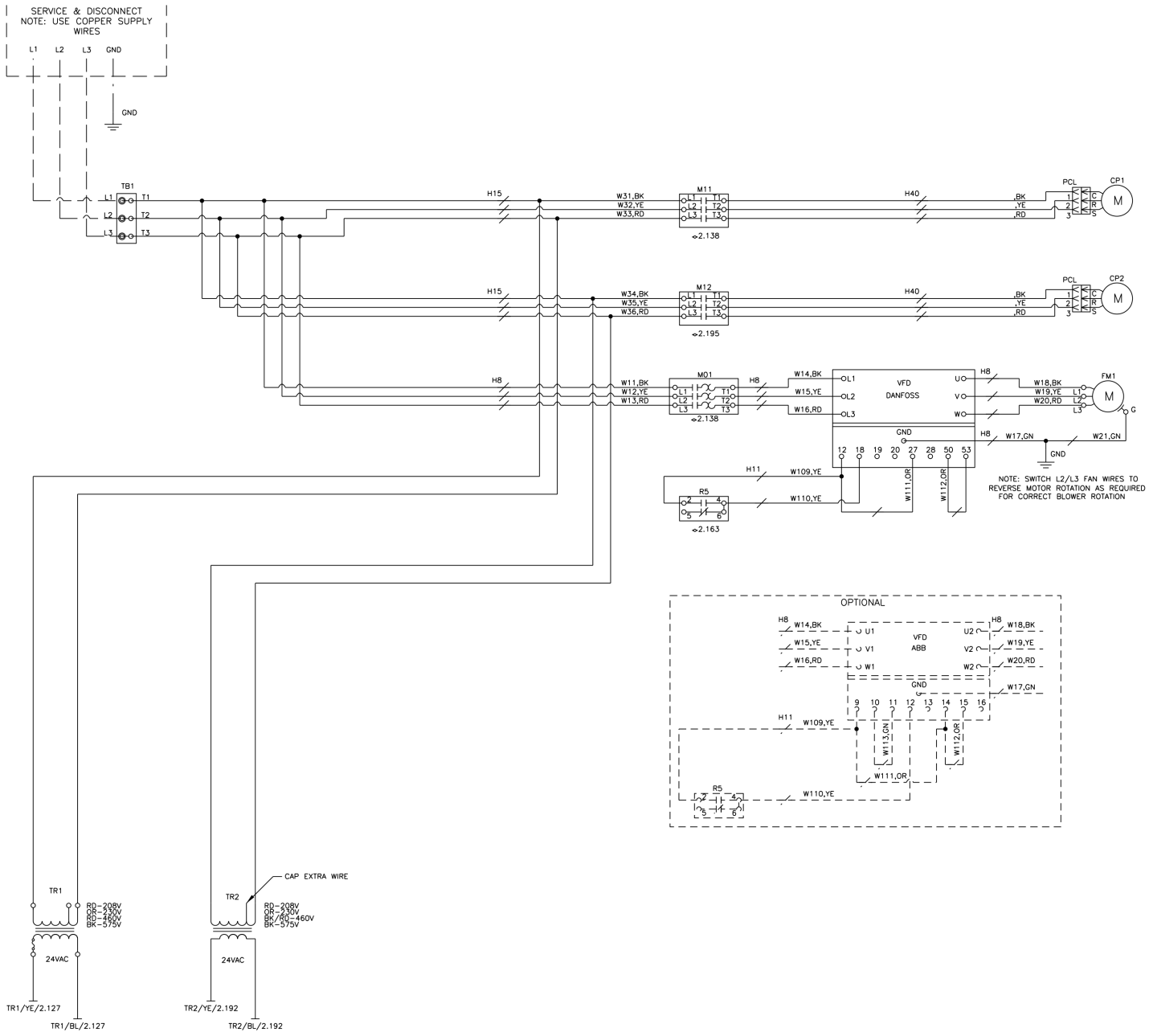
MicroTech Unit Controller with I/O Expansion with WSE



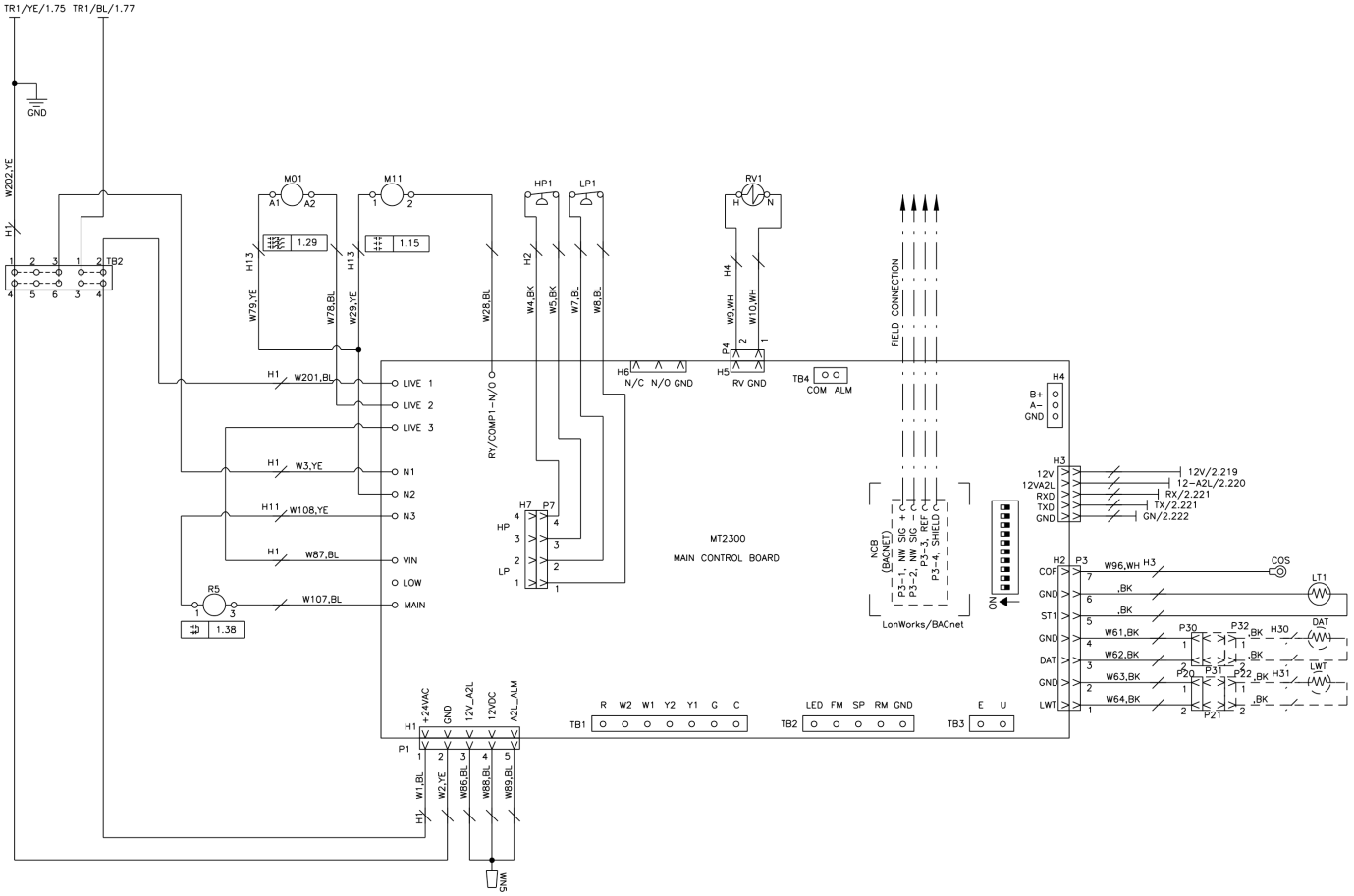
MicroTech Unit Controller with I/O Expansion with WSE, Cont.

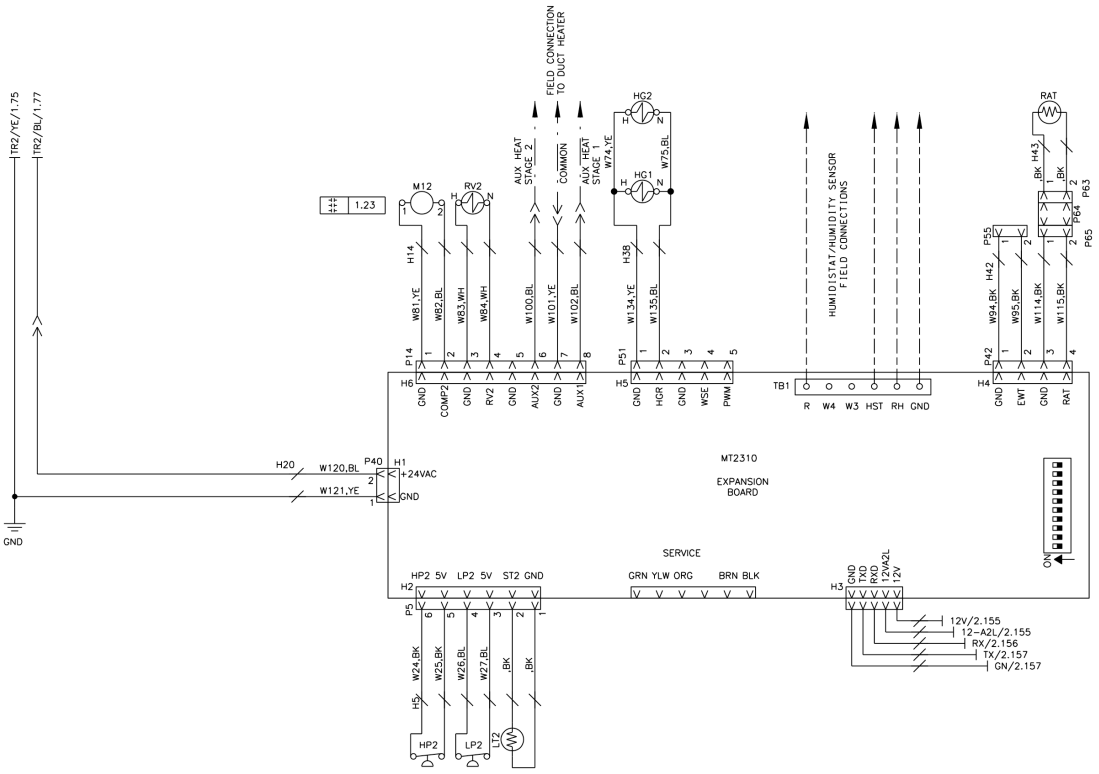


MicroTech Unit Controller with I/O Expansion, HGRH and VFD

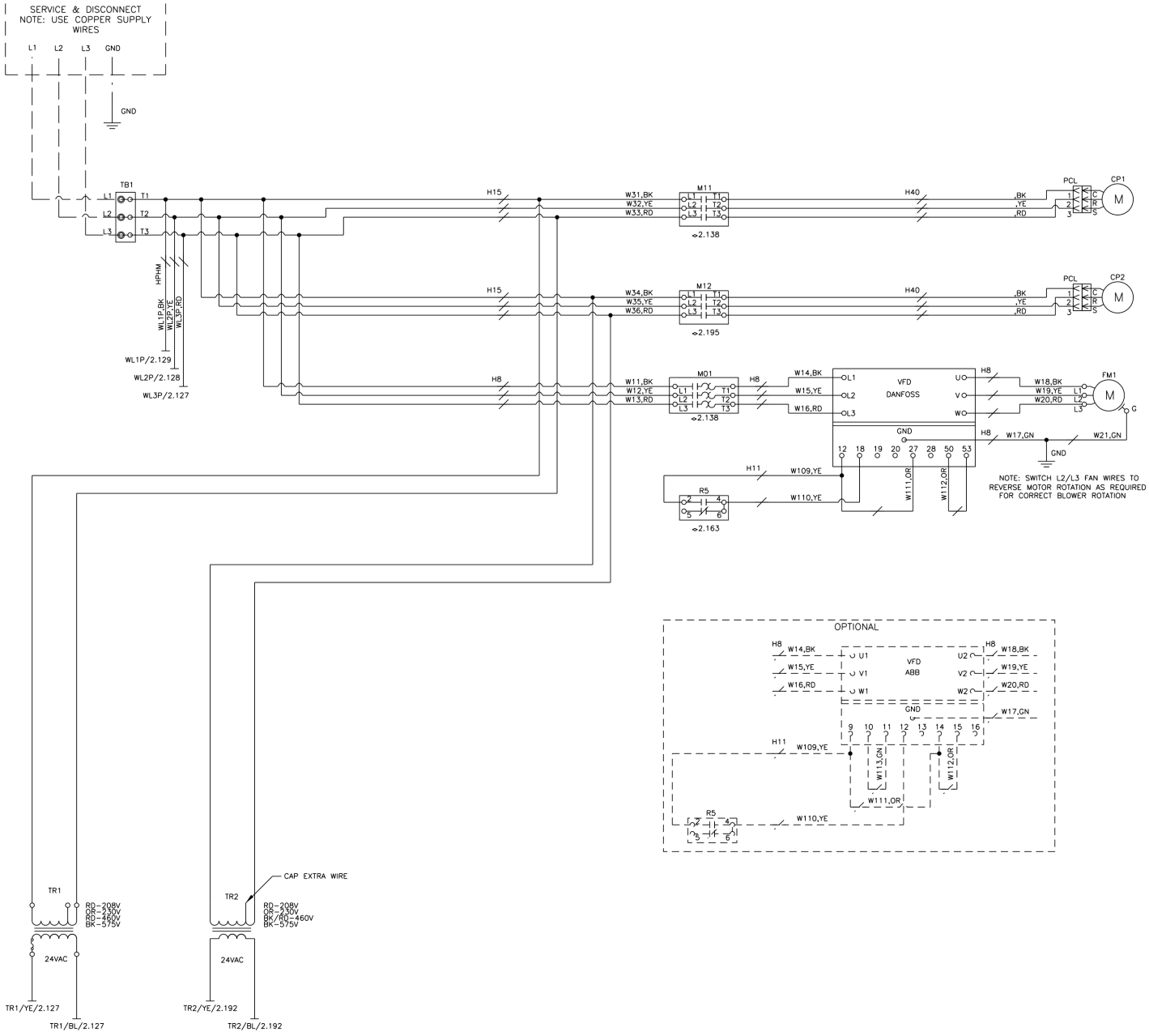


MicroTech Unit Controller with I/O Expansion, HGRH and VFD, Cont.

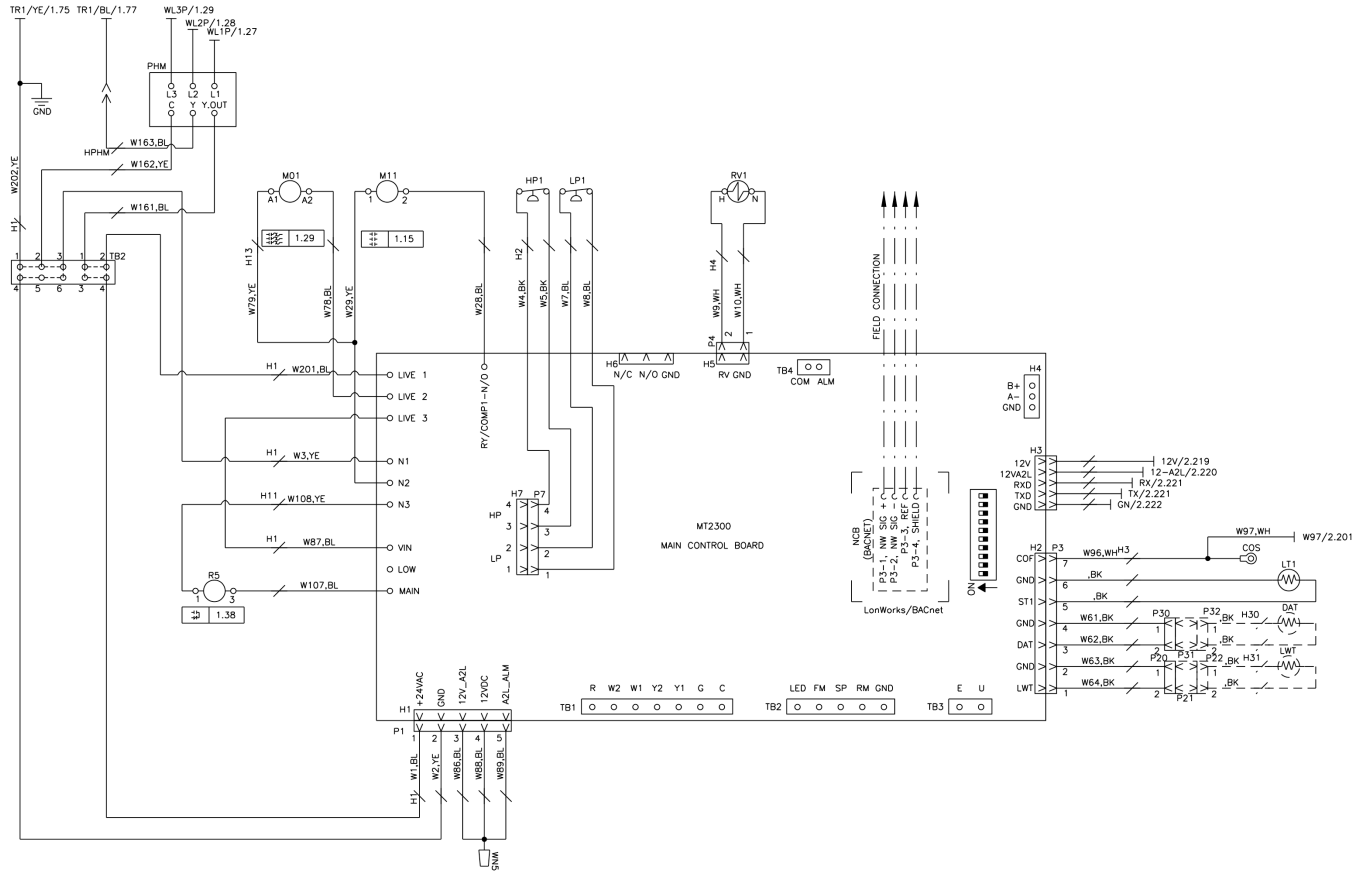


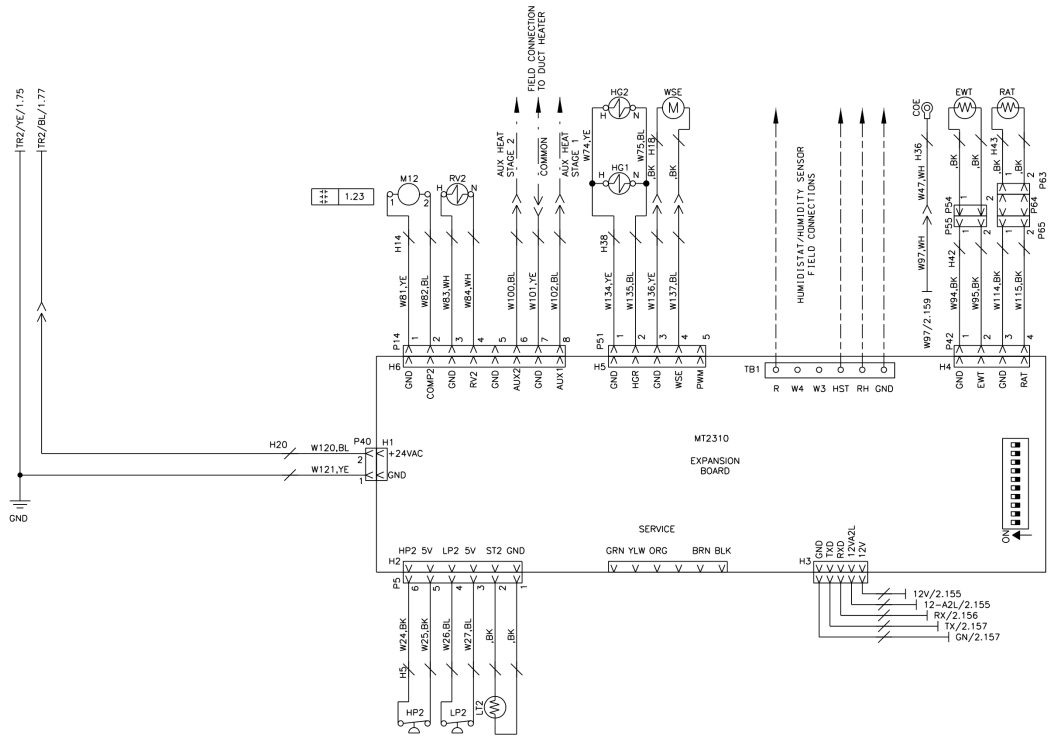


MicroTech Unit Controller with I/O Expansion, WSE, HGRH, VFD and Phase Monitor

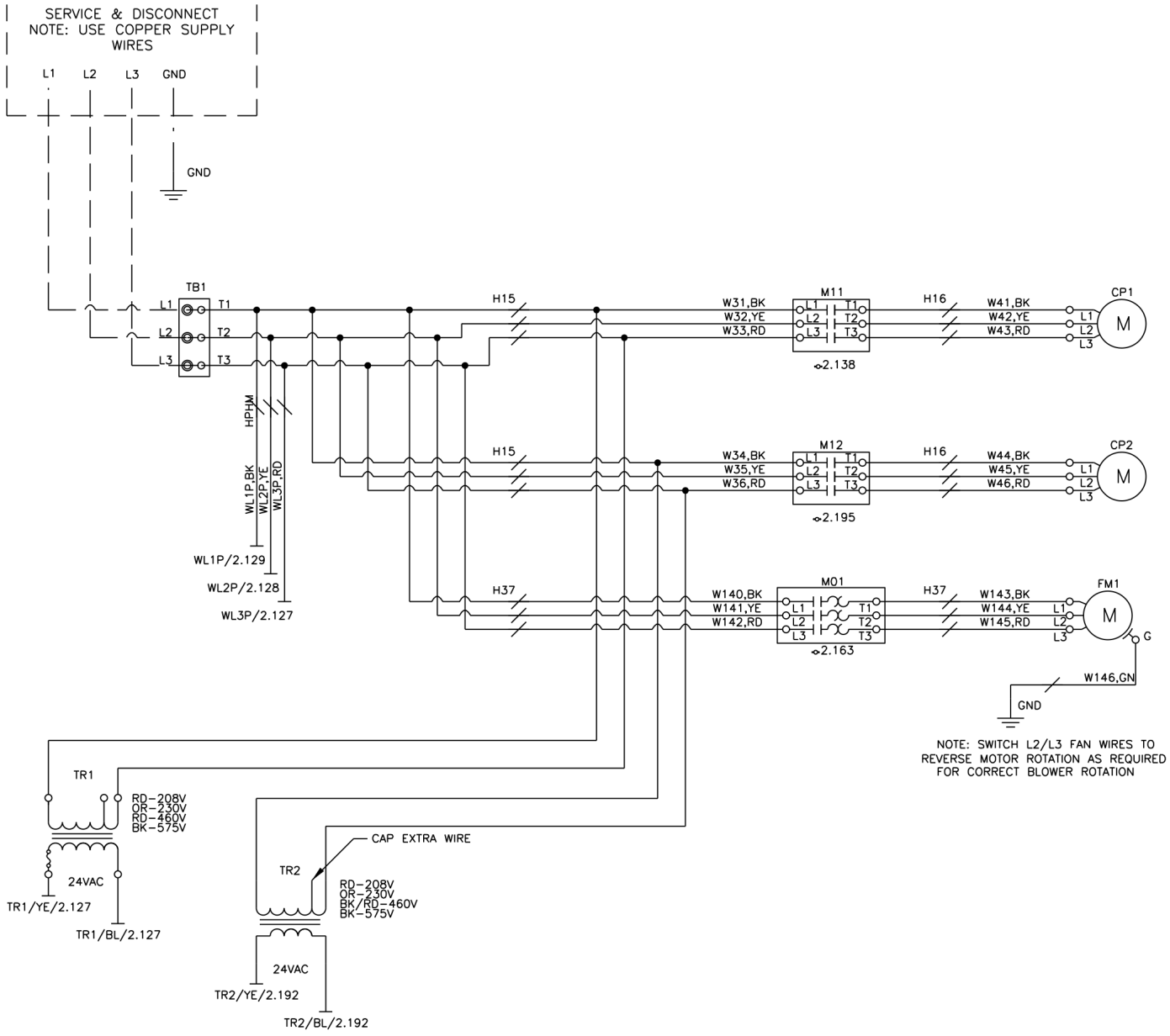


MicroTech Unit Controller with I/O Expansion, WSE, HGRH, VFD and Phase Monitor, Cont.

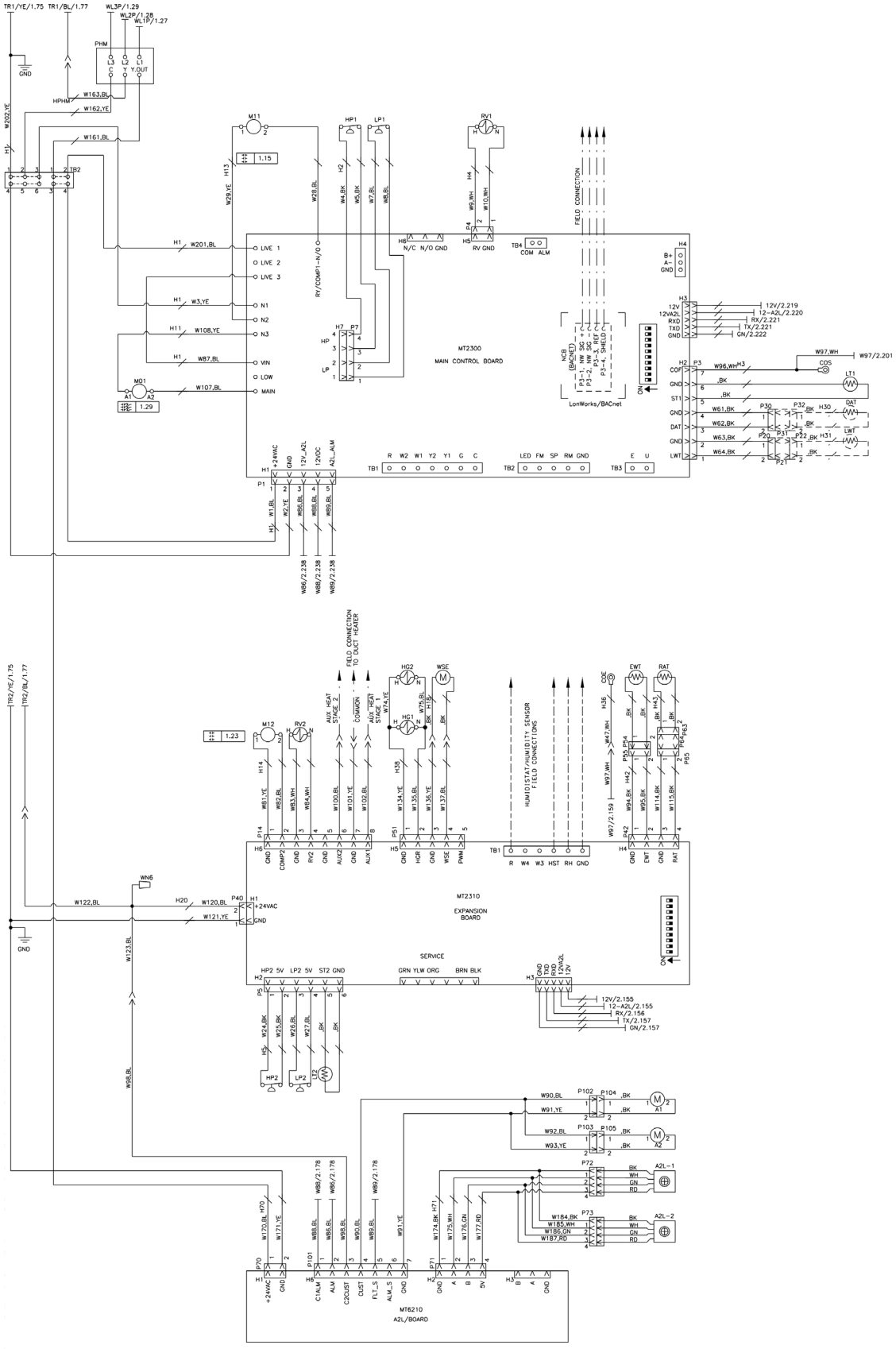




MicroTech Unit Controller with I/O Expansion with WSE, HGRH, Phase Monitor, A2L Mitigation (WSLV200-300)



MicroTech Unit Controller with I/O Expansion with WSE, HGRH, Phase Monitor, A2L Mitigation (WSLV200-300), Cont.



Wiring Schematics Legend for "Typical Wiring Diagrams"

LEGEND			
A1,2	A2L Actuator	**M11-12**	Compressor 1, 2 Contactor
A2L-1,2	A2L Sensor	**MCB**	Main Control Board
A2LB	A2L Mitigation Board	**NCB**	Network Control Board
COE	Condensate Overflow Protection Sensor - WSE	**OLP**	Overload Protector - Compressor Motor
COS	Condensate Overflow Protection Sensor	**P1–^**	Wire Plug
CP1,2	Compressor 1, 2	**PCL**	Wire Plug Assembly - Compressor Power
DAT	Discharge Air Temperature Sensor	**PHM**	Phase Monitor
EB1	Expansion Control Board	**R5**	Relay, VFD
EWT	Entering Water Temperature Sensor	**RAT**	Return Air Temperature Sensor
FM1-4	Fan Motor 1-4	**RV1,2**	Reversing Valve 1, 2
GND	Ground	**TB1**	Terminal Block, Line Voltage
H1–^	Wire Harness	**TB2**	Terminal Block, 24V
HG1,2	Hot Gas Reheat Valve Actuator	**TR1, 2**	Transformer - Control
HP1,2	High Pressure Switch 1, 2	**VFD**	Variable Frequency Drive
LP1,2	Low Pressure Switch 1, 2	**W1–^**	Wire
LT1,2	Compressor Suction Line Temperature Sensor 1, 2	**WN1–^**	Wire Nut
LWT	Leaving Water Temperature Sensor	**WSE**	Waterside Economizer Actuator
M01-04	Fan Motor 1-4 Contactor	**– – – –**	Optional Features

NOTE: Devices in legend may or may not be on unit.

Physical Data Tables

Horizontal Units

Table 33: WSLH Sizes 072 - 120

Unit Size		072	096	120
Fan Wheel - D x W (in)		13 x 12	13 x 12	16 x 15
Fan Motor Horsepower	Standard Static	1.5	1.5	3.0
	High Static	3.0	3.0	5.0
Coil Face Area (sq ft)		9.0	9.0	10.5
Coil Rows		2	3	3
Refrigerant Charge (oz)	Compressor 1	40	49	56
	Compressor 2	40	46	56
Filter (qty), Size (in)		(3) 28" x 19" x 2	(3) 28" x 19" x 2	(3) 28" x 19" x 2
Water Connections		1¼" FPT	1¼" FPT	1¼" FPT
Condensate Connections		7/8" ODM	7/8" ODM	7/8" ODM
Weight Based on Motor HP		**1.5 / 3.0**	**1.5 / 3.0**	**3.0 / 5.0**
Weight, Operating (lbs)		670 / 685	708 / 723	832 / 837
Weight, Shipping (lbs)		769 / 784	820 / 835	926 / 931
Weight, Operating (lbs) with Economizer		770 / 785	808 / 823	932 / 937
Weight, Shipping (lbs) with Economizer		869 / 884	920 / 935	1026 / 1031

Figure 14: WSLH Unit Corner Weight Dimensions

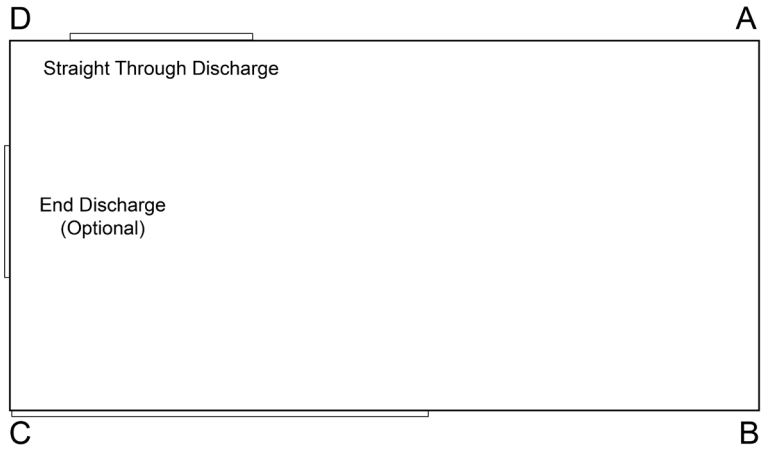


Table 34: WSLH Unit Corner Weights, Percentage of Total Operating Weight (Base Unit Only) for Figure 14

Unit Size	Unit Weight (lbs)	Corner Weight % of Total Operating Weight			
		A	B	C	D
072	657	29%	26%	21%	24%
096	694	28%	28%	15%	29%
120	814	24%	24%	21%	32%

Vertical Units

Table 35: WSLV Sizes 072 - 300

Unit Size		072	096	120	200	240	300
Fan Wheel - D x W (in)		(2) $13^{3}/_{16}$" × $12^{5}/_{8}$"	(2) $13^{3}/_{16}$" × $12^{5}/_{8}$"	(2) $13^{3}/_{16}$" × $12^{5}/_{8}$"	(3) $13^{3}/_{16}$" × $12^{5}/_{8}$"	(3) $13^{3}/_{16}$" × $12^{5}/_{8}$"	(3) $13^{3}/_{16}$" × $12^{5}/_{8}$"
Fan Motor Horsepower	Standard Static	1.5	1.5	2.0	3.0	3.0	7.5
	High Static	2.0	2.0	3.0	5.0	5.0	10.0
	Ultra Static	3.0	3.0	5.0	7.5	7.5	–
Coil Face Area (sq ft)		10.0	10.0	10.0	20.0	20.0	20.0
Coil Rows		2	2	3	2	3	3
Refrigerant Charge (oz)	Comp 1	42	47	47	106	127	168
	Comp 2	42	51	47	106	127	168
Filter (qty), Size (in)		(4) 16" × 25 × 1"	(4) 16" × 25 × 1"	(4) 16" × 25 × 1"	(6) 20" × 25 × 1"	(6) 20" × 25 × 1"	(6) 20" × 25 × 1"
Water Connections, Female NPT		1¼" FPT	1¼" FPT	1¼" FPT	2" FPT	2" FPT	2" FPT
Condensate Connections, Female NPT		1" FPT	1" FPT	1" FPT	1¼" FPT	1¼" FPT	1¼" FPT
Weight Based on Motor HP		**1.5 / 2.0 / 3.0**	**1.5 / 2.0 / 3.0**	**2.0 / 3.0 / 5.0**	**3.0 / 5.0 / 7.5**	**3.0 / 5.0 / 7.5**	**7.5 / 10.0**
Weight, Operating (lbs)		517 / 519 / 532	610 / 612 / 625	732 / 745 / 750	1056 / 1076 / 1086	1105 / 1125 / 1135	1151 / 1156
Weight, Shipping (lbs)		616 / 618 / 631	722 / 724 / 737	826 / 839 / 844	1150 / 1170 / 1180	1200 / 1220 / 1230	1245 / 1250
Weight, Operating (lbs) with Economizer		617 / 619 / 632	720 / 722 / 735	832 / 845 / 850	1156 / 1176 / 1186	1205 / 1225 / 1235	1251 / 1256
Weight, Shipping (lbs) with Economizer		716 / 718 / 731	822 / 824 / 837	926 / 939 / 944	1250 / 1270 / 1280	1300 / 1320 / 1330	1345 / 1350

Dimensional Drawings

Horizontal Units

Figure 15: WSLH Unit Dimensions

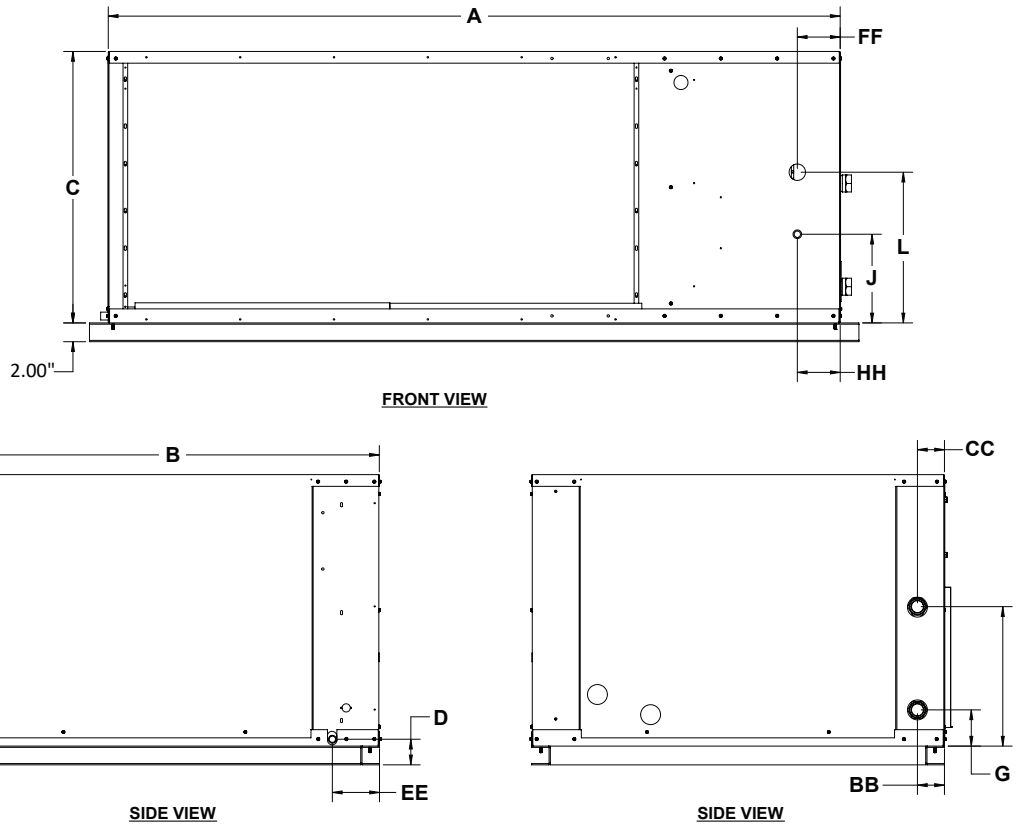


Table 36: WSLH Unit Dimensions

Unit Size	Overall Cabinet Dimensions			Condenser Water Piping Dimensions					Condensate Drain 0.875" ODM		Electrical Connections					
	Width	Depth	Height	Connection Size (FPT)	Water Supply		Water Return				Line Voltage		Low Voltage		Power Connection Size	
	A	B	C		G	BB	H	CC	D	EE	L	FF	J	HH	Line Voltage	Low Voltage
072	78.0"	44.0"	29.0"	1.25"	3.80"	2.88"	13.88"	2.88"	2.82"	5.00"	16.06"	4.57"	9.45"	4.57"	1.75"	0.875"
096																
120																

Figure 16: WSLH Discharge Dimensions

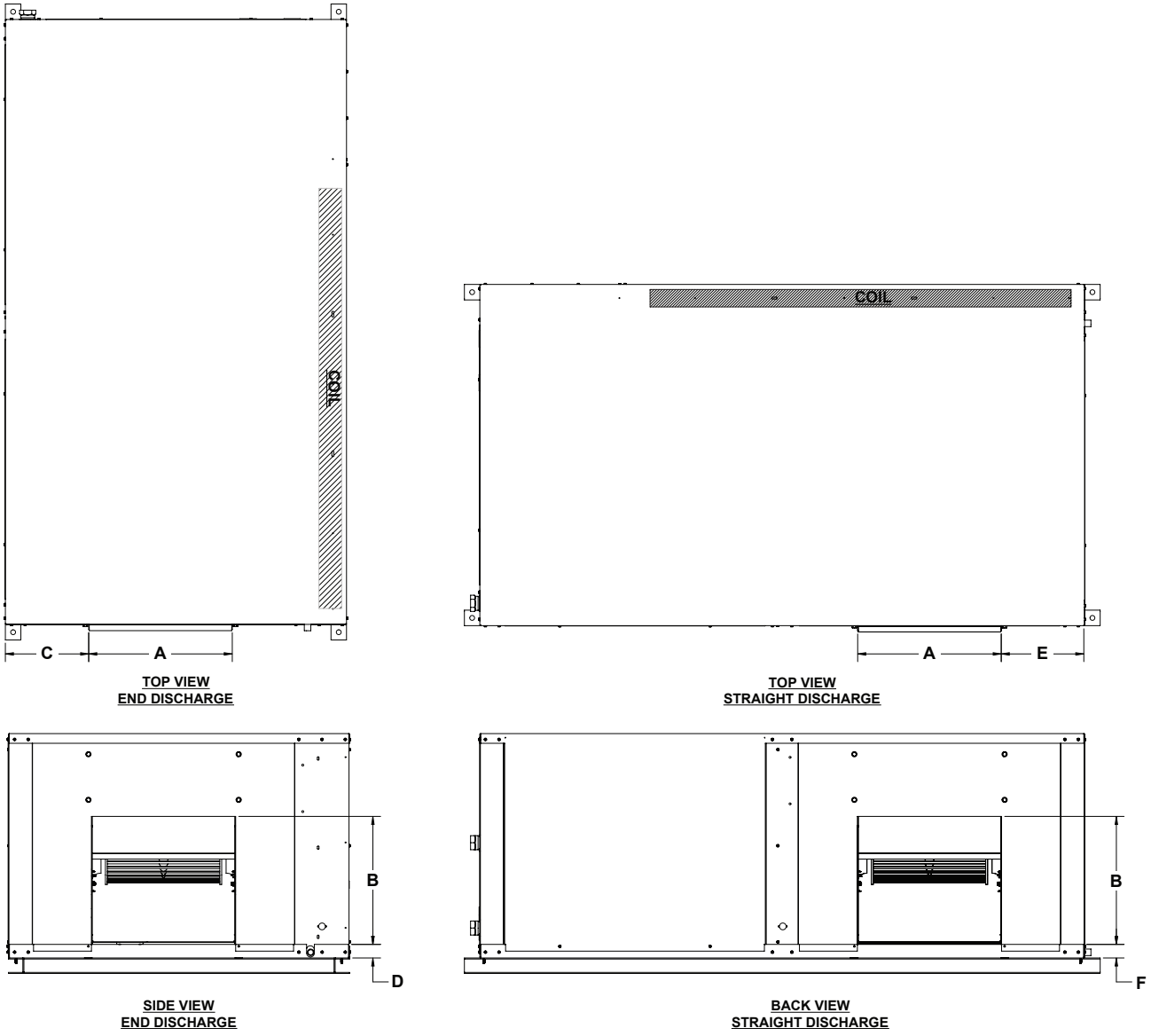


Table 37: WSLH Discharge Air Dimensions

Unit Size	Blower Discharge Opening		End Discharge Offset		Straight-Thru Offset	
			Side	Base	Side	Base
	A	B	C	D	E	F
072	15.64"	13.42"	12.18"	1.75"	12.18"	1.75"
096						
120	18.52"	16.44"	10.69"		10.69"	

Figure 17: WSLH Waterside Economizer Dimensions

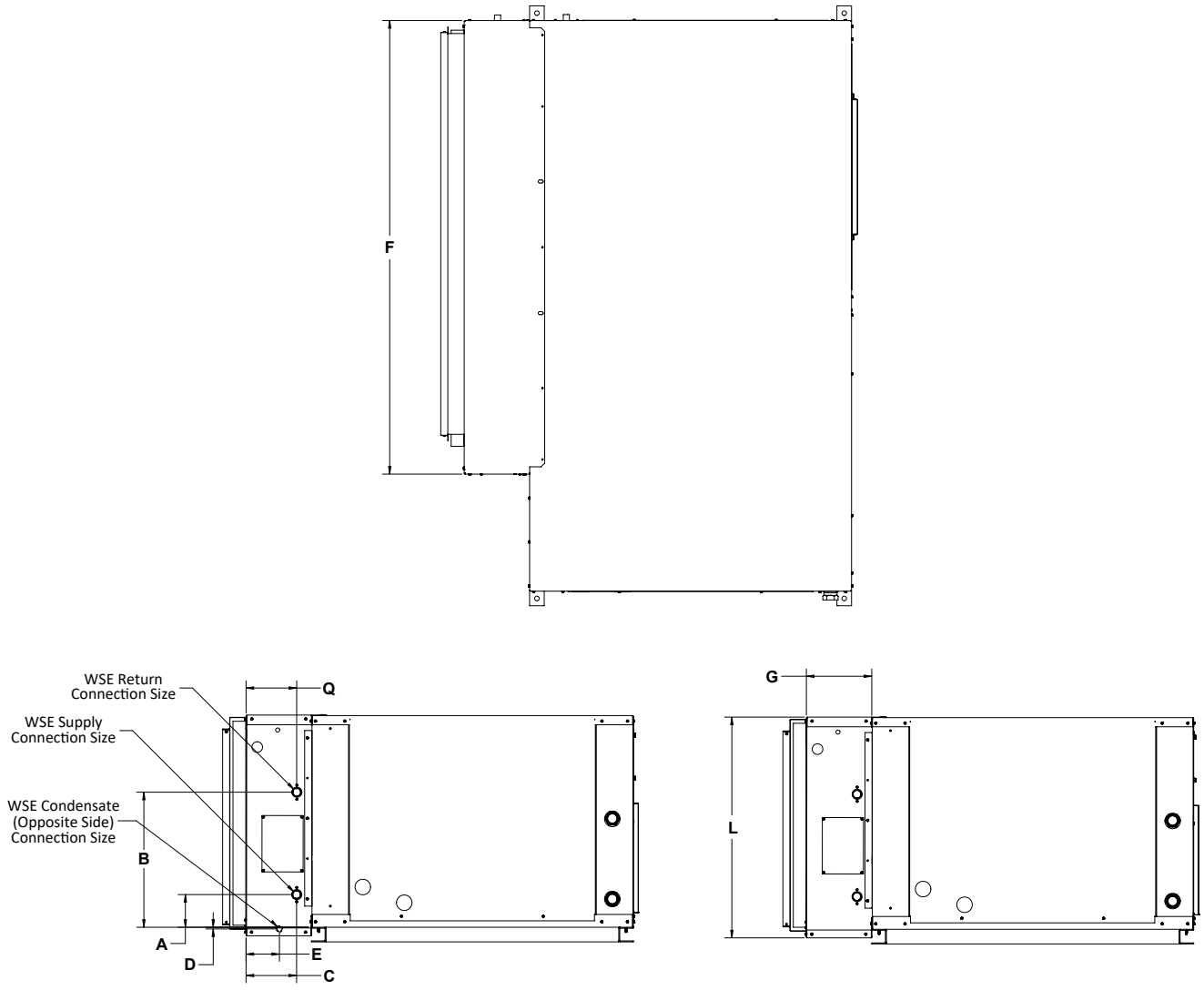


Table 38: WSLH Waterside Economizer Dimensions

Unit Size	Waterside Economizer Dimensions					Condensate Connection Size	Condensate Drain		Waterside Economizer Overall Cabinet Section		
	Connection Size (FPT)	Supply		Return					Width	Depth	Height
		A	C	B	Q		D	E	F	G	L
072	1.0"	4.50"	6.88"	18.5"	6.88"	0.875" ODM	*0.25"	4.38"	62.0"	8.90"	30.17"
096											
120											

NOTE: *Condensate connection dimension "D" is below unit dimensional drawing reference point

Figure 18: WSLH Filter Rack Dimensions

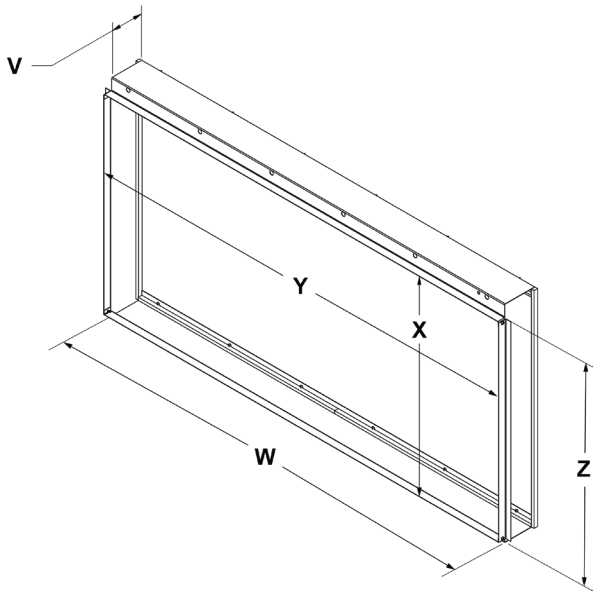


Table 39: WSLH Filter Rack Dimensions

Unit Size	Filter Rack Dimensions (2" or 4")					
	Frame Depth		Frame Width	Frame Height	Duct Flange Width	Duct Flange Height
	2"	4"				
	V		W	X	Y	Z
072	2.20"	4.20"	56.53"	28.82	55.10"	26.65"
096						
120						

Vertical Units

Figure 19: WSLV Unit Dimensions

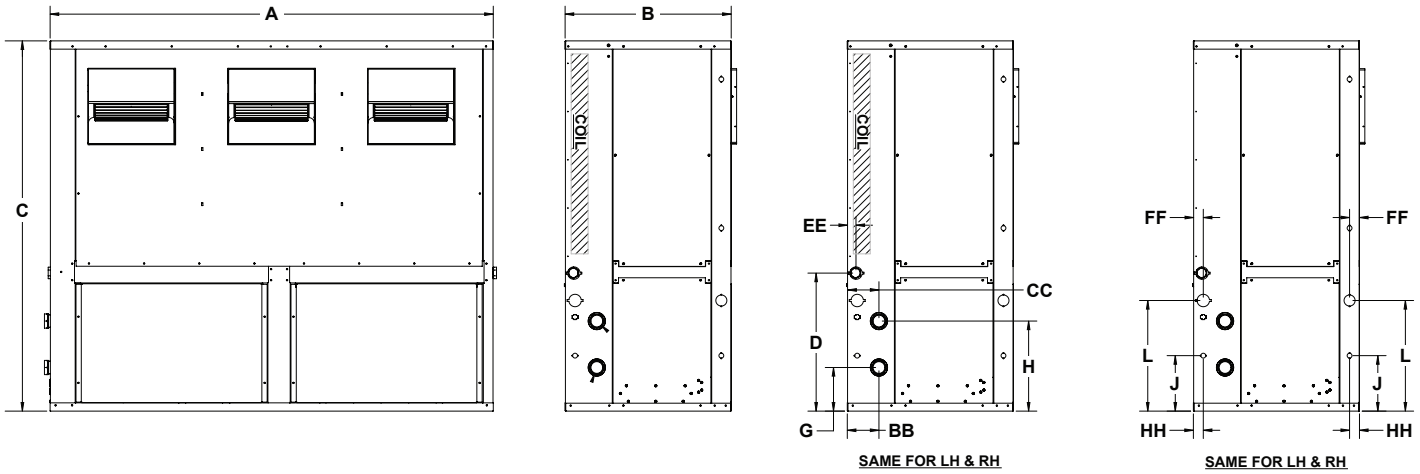
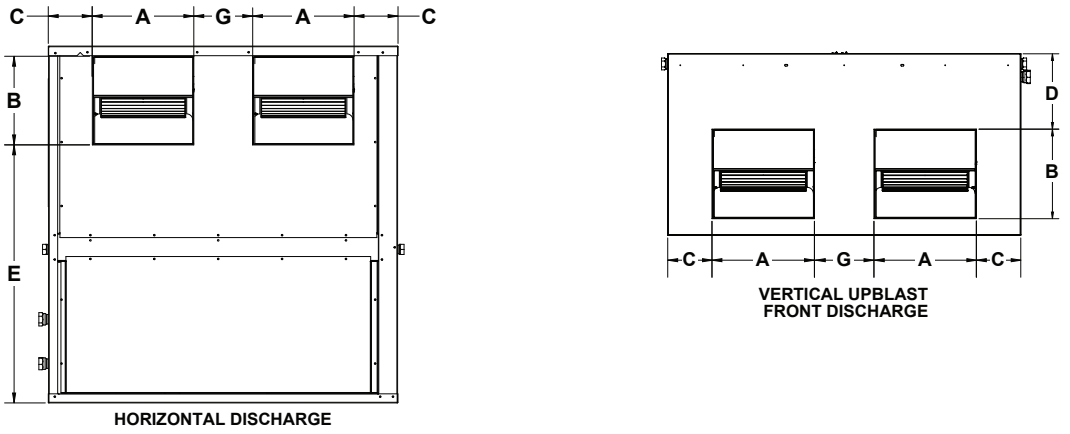


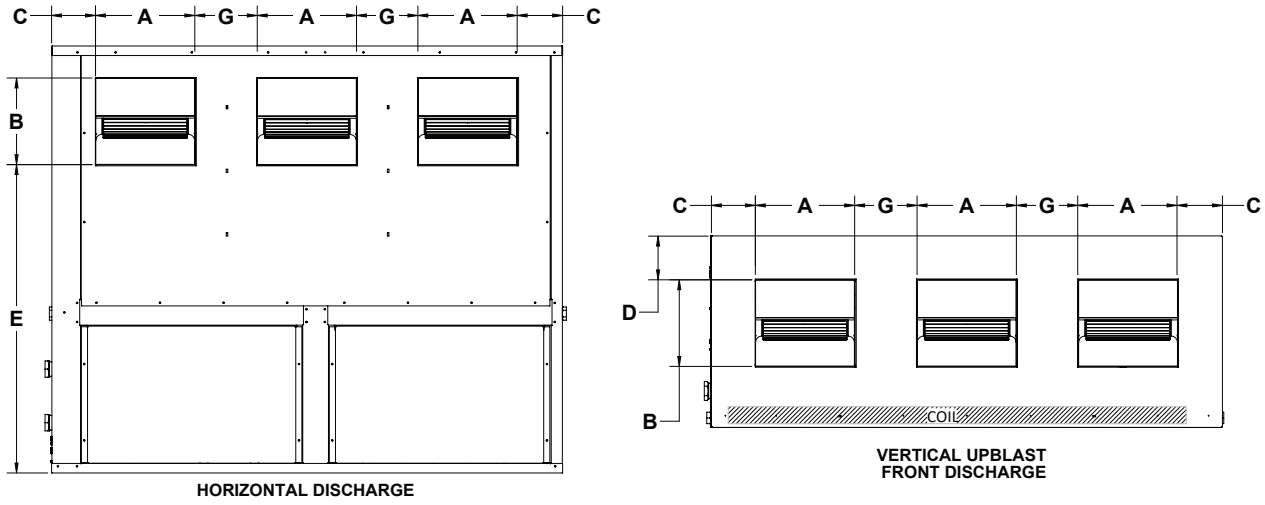
Table 40: WSLV Unit Dimensions

Unit Size	Overall Cabinet Dimensions			Condenser Water Piping Dimensions					Condensate Drain			Electrical Connections					
	Width	Depth	Height	Connection Size (FPT)	Water Supply		Water Return		Connection Size (FPT)	D	EE	Line Voltage		Low Voltage		Power Connection Size	
	A	B	C		G	BB	H	CC				L	FF	J	HH	Line Voltage	Low Voltage
072	54.6"	28.0"	55.8"	1.25"	5.78"	3.6"	12.75"	3.6"	1.0"	24.25"	1.5"	15.67"	3.36"	15.67"	1.67"	1.75"	7/8"
096																	
120																	
200	80.4"	30.0"	67.0"	2.0"	8.0"	5.75"	16.34"	5.75"	1.25"	26.0"	1.5"	20.0"	1.75"	10.0"	1.75"	2.0"	7/8"
240																	
300																	

Figure 20: WSLV Discharge Air Dimensions



SIZES 072–120



SIZES 200–300

Table 41: WSLV Discharge Air Dimensions

Unit Size	Blower Discharge Opening		Vertical Discharge Offset			Horizontal Discharge Offset		
			Vertical Upblast Front			Straight Discharge		
			Side	Rear	Blowers	Side	Base	Blowers
	A	B	C	D	G	C	E	G
072	15.63"	13.63"	7.0"	2.75"	9.22"	7.0"	40.5"	9.22"
096								
120								
200	15.88"	13.88"	7.0"	2.88"	9.47"	7.0"	48.5"	9.47"
240								
300								

Figure 21: WSLV Unit Dimensions - Economizer/Hydronic Heat Connections & Condensate Drain

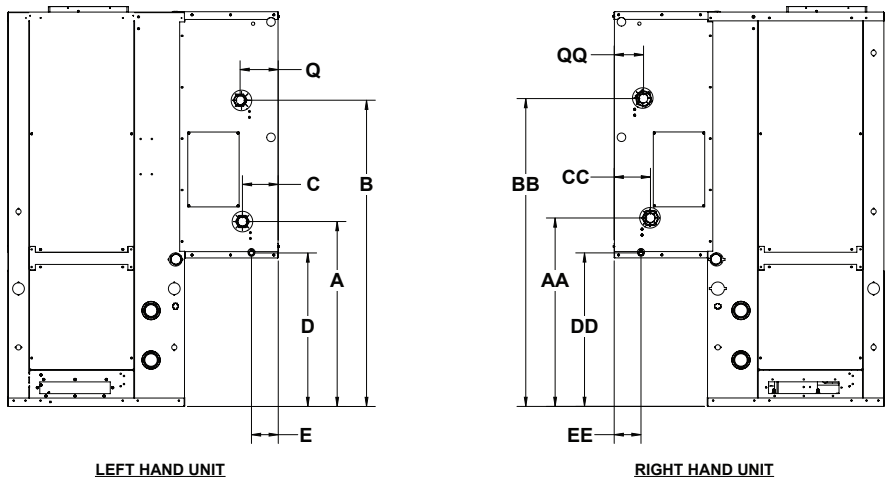
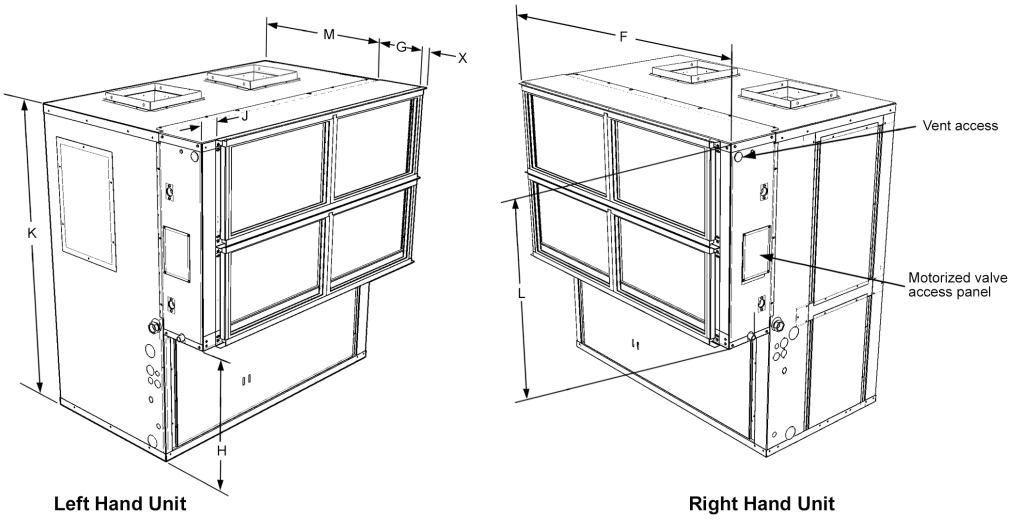


Table 42: WSLV Unit Dimensions - Connections & Condensate Drain

Unit Size	Waterside Economizer / Hydronic Heating Connections								7/8" FPT Condensate Drain			
	Connection Size (FPT)	Supply				Return						
		Left Hand		Right Hand		Left Hand		Right Hand		Left Hand		Right Hand	
		A	C	AA	CC	B	Q	BB	QQ	D	E	DD	EE
072	1.0"	28.8"	7.0"	28.8"	7.0"	47.27"	7.0"	47.19"	7.0"	24.0"	4.5"	24.0"	4.5"
096													
120													
200	1.5"	31.53"	6.08"	32.13"	6.08"	52.06"	6.25"	51.19"	4.84"	26.18"	4.5"	26.18"	4.5"
240													
300													

Figure 22: WSLV Unit Dimensions - Sizes 072–120



Note: *Piping connections from WSE return to unit supply to be field installed*

Figure 23: WSLV Unit Dimensions - Sizes 200–300

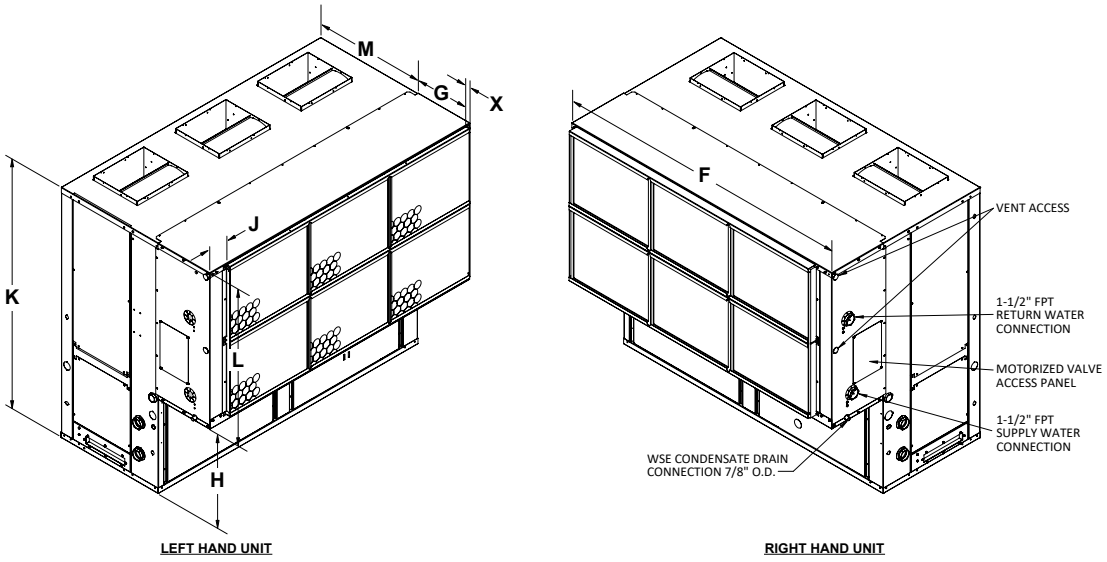


Table 43: WSLV Unit Dimensions

Unit Size	Waterside Economizer / Hydronic Heating Overall Cabinet Section			Floor to WSE	Unit Height	Unit Width	Filter Rack
	Width	Depth	Height				Front Offset
	F	G	L	H	K	M	J
072	54.90"	9.0"	32.67"	23.25"	55.92"	28.10"	2.84"
096							
120							
200	80.63"	16.0"	41.93"	25.24"	67.17"	30.125"	5.16"
240							
300							

Figure 24: WSLV Filter Rack Dimensions

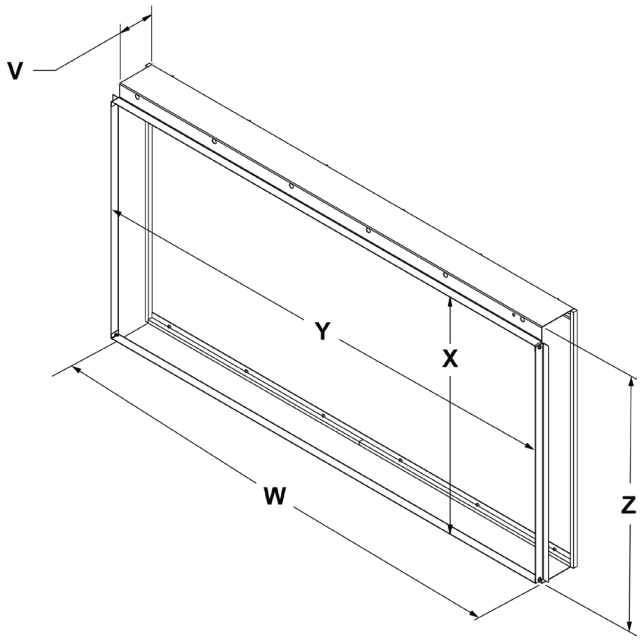


Table 44: WSLV Filter Rack Dimensions

Unit Size	Frame Width	Frame Height	Depth			Duct Flange Width	Duct Flange Height
			1"	2"	4"		
	W	Z	V			Y	X
072	51.94"	32.57"	1.14"	2.29"	4.29"	49.69"	31.53"
096							
120							
200	74.66"	40.06"	1.14"	2.29"	4.32"	74.0"	39.09"
240							
300							

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.

NOTICE

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

NOTICE

The maximum water temperature is 120°F (49°C) and the minimum brine temperature is 25°F (-4°C). The maximum water pressure is 500 psi (3,447 kPa) through the coaxial coil and the minimum water pressure is 0 psi (0 kPa).

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 45: 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)

[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.

[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 46: 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	2.0			
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 will be lower, capacity will be less, and water side 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/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 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 47 for the amount of antifreeze needed. Antifreeze concentration should be checked from a well mixed sample using a hydrometer to measure specific gravity.

Table 47: 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)
Propylene Glycol	38%	25%	22%	15%
Ethanol[1]	29%	25%	20%	14%
Methanol	25%	21%	16%	10%

[1] Must not be denatured with any petroleum product.

Table 48: 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.

Typical Cooling Refrigeration Cycle – Dual Compressors

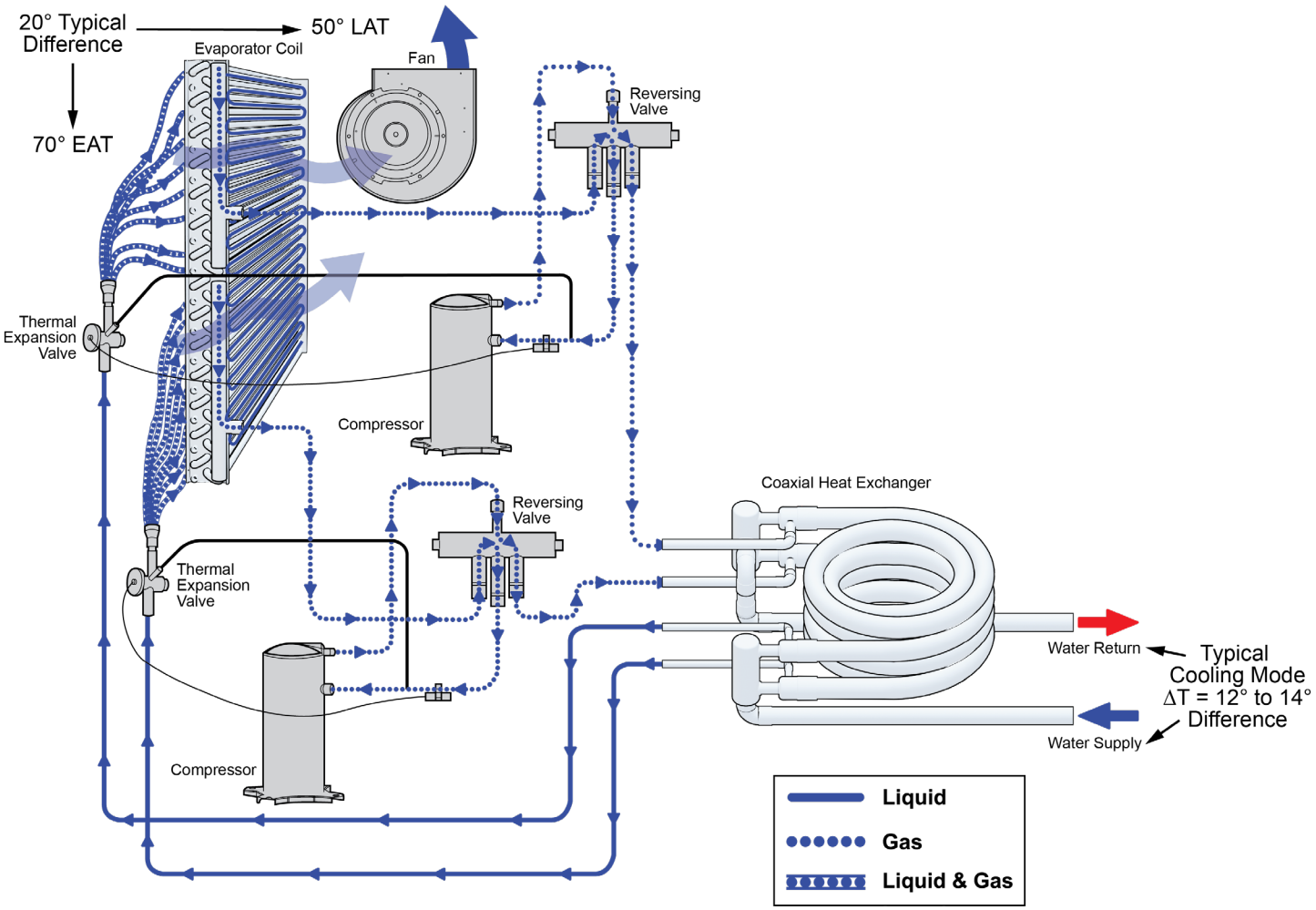
NOTICE

Typical temperature readings are at full load conditions at ISO-13256-1 for boiler-tower applications.

When the wall thermostat calls for COOLING, the reversing valve (de-energized) directs the flow of the refrigerant, a hot gas, from the compressor to the water-to-refrigerant heat exchanger (coaxial heat exchanger).

There, the heat is removed by the water, and the hot gas condenses to become a liquid. The liquid then flows through a thermal expansion valve to the air-to-refrigerant heat exchanger coil (evaporator). The liquid then evaporates and becomes a gas, at the same time absorbing heat and cooling the air passing over the surfaces of the coil. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.

Figure 25: Cooling Refrigeration Cycle



Typical Heating Refrigeration Cycle – Dual Compressors

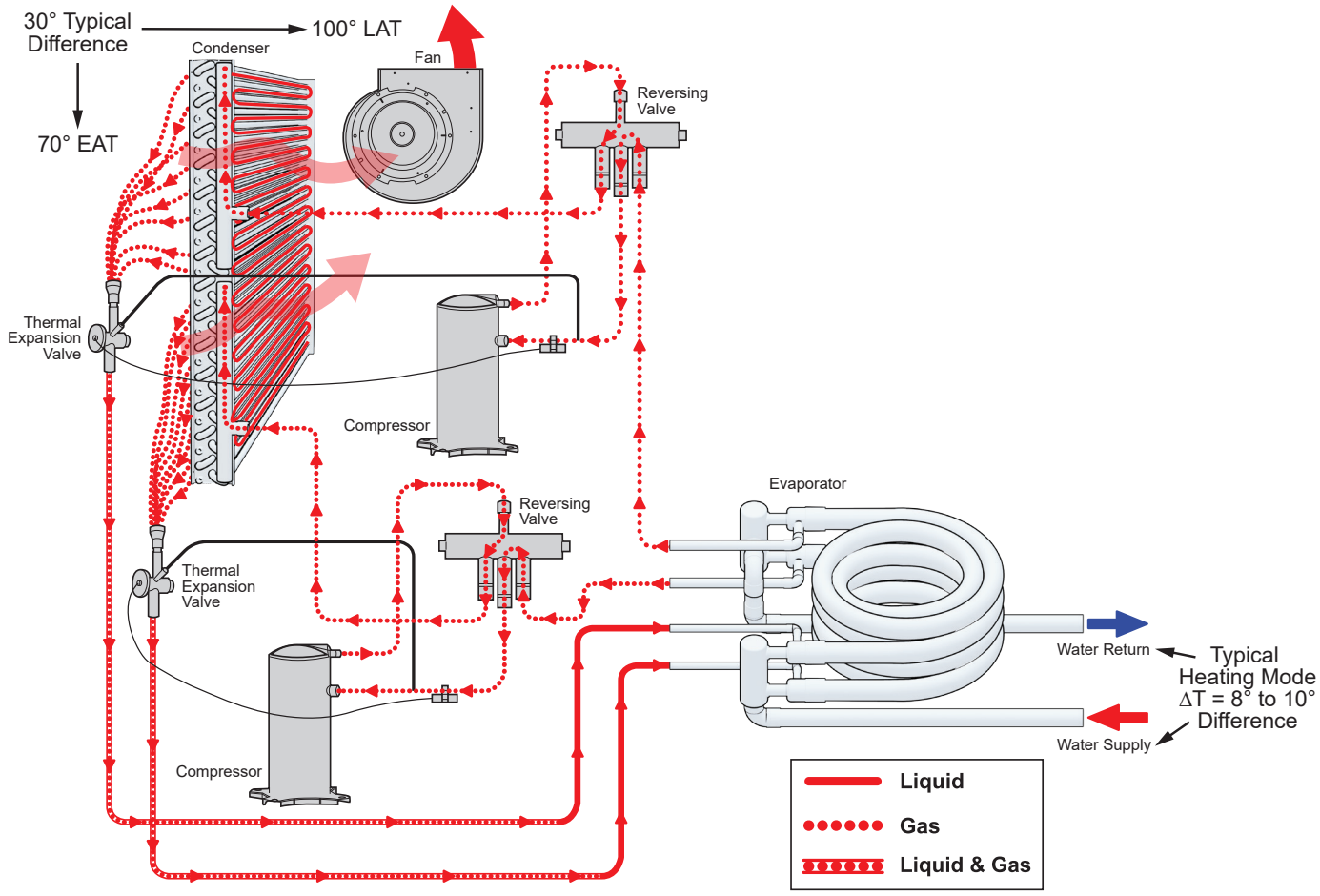
NOTICE

Typical temperature readings are at full load conditions at ISO-13256-1 for boiler-tower applications.

When the wall thermostat calls for HEATING, the reversing valve (energized) directs the flow of the refrigerant, a hot gas, from the compressor to the air-to-refrigerant heat exchanger coil (condenser).

There, the heat is removed by the air passing over the surfaces of the coil and the hot gas condenses and becomes a liquid. The liquid then flows through a thermal expansion valve to the water-to-refrigerant heat exchanger (evaporator). The liquid then evaporates and becomes a gas, at the same time absorbing heat and cooling the water. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.

Figure 26: Heating Refrigeration Cycle

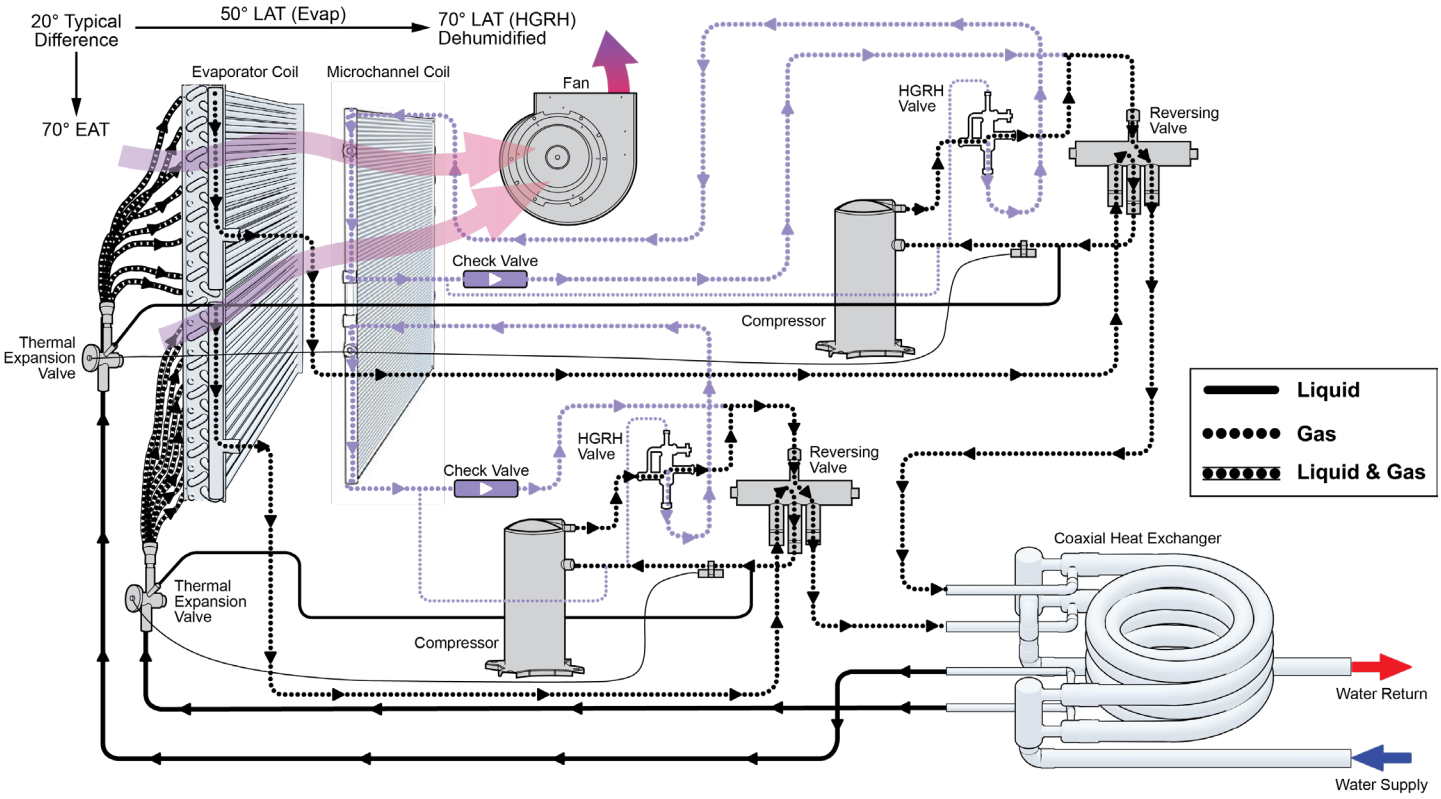


Typical Hot Gas Reheat Refrigeration Cycle – Dual Compressors

When the DEHUMID setting is not satisfied and COOLING has been satisfied the reversing valve remains (de-energized) but the hot gas reheat (HGRH) valve is (energized). This directs the flow of the refrigerant, a hot gas, from the compressor through the hot gas reheat (HGRH) coil thus heat is removed from the refrigerant gas to reheating the cooled air from the evaporator coil.

Then the refrigerant flows to the water-to-refrigerant heat exchanger (coaxial heat exchanger). There, the heat is removed by the water, and the hot gas condenses to become a liquid. The liquid then flows through a thermal expansion valve to the air-to-refrigerant heat exchanger coil (evaporator). The liquid then evaporates and becomes a gas, at the same time absorbing heat and cooling the air passing over the surfaces of the coil. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.

Figure 27: Hot Gas Reheat Refrigeration Cycle

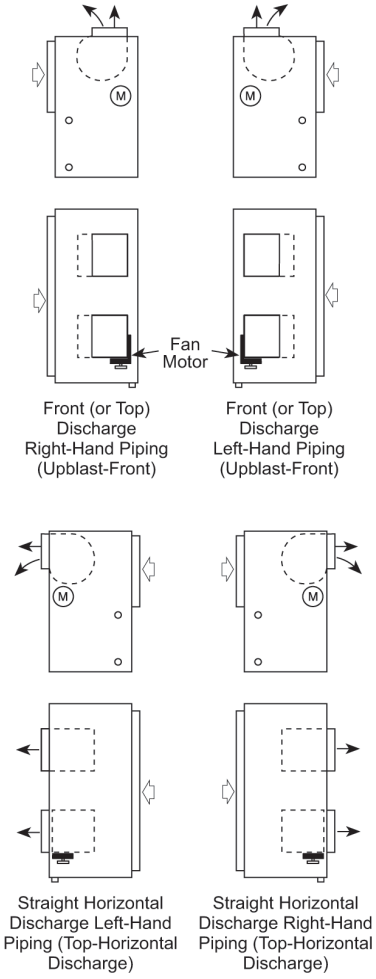


WSLV Fan Deck Arrangements

Four fan discharge arrangements and two piping arrangements are available. With the return air side defined as the “front” of the unit, the water piping connections may be right-hand (side) or left-hand. All units have a single supply and return water connection with a copper FPT type fitting that protrudes through the unit casing for easy connection. The condensate connection is also a copper FPT type and is located on both sides of the unit. The unused connection is plugged.

The main control panel is located in the center front of the unit. The fan discharge is top front, and the fan motor is always located at the piping end. Unit sides opposite the control panel and opposite the piping side may be up against walls and still allow for service and maintenance through the remaining access panels.

Figure 28: Fan Deck Arrangements



NOTE 1: The hand of unit is determined by looking at the return air (filter) side. The piping and electrical connections are always made on the “hand” side of the unit. The return air (filter) side is considered the “front” of the unit.

NOTE 2: The fan motor is always located at the piping/electrical connection (hand) side of the unit.

System Applications

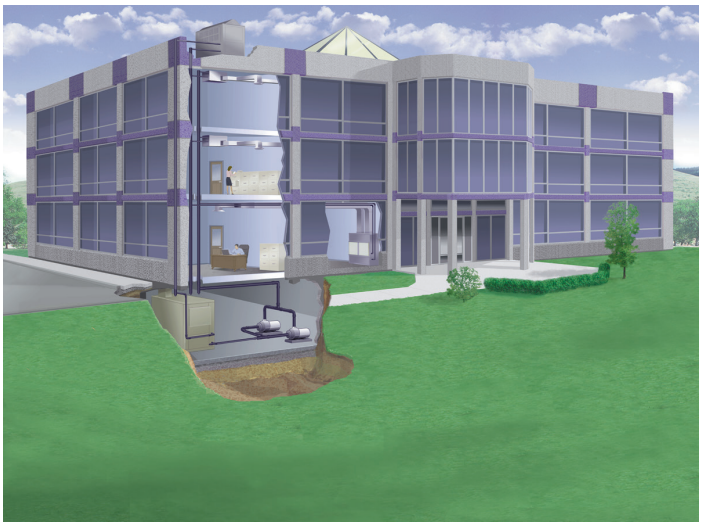
Water source heat pump systems are one of the most efficient, environmentally friendly systems available for heating and cooling buildings. High-efficiency, self contained units (sizes 7,000 btu/h to 300,000 btu/h) can be placed in virtually any location within a building. Each unit responds only to the heating or cooling load of the individual zone it serves. This permits an excellent comfort level for occupants, better control of energy use for building owners and lower seasonal operating costs. The Air-Conditioning Refrigeration Institute (ARI) and the International Standards Organization (ISO) publish standards so that water source heat pumps are rated for specific applications. The ARI/ISO loop options shown in this catalog are typical water source heat pump loop choices available in today’s market. These systems offer benefits ranging from low cost installation to the highest energy efficiency available in the market today.

Boiler / Tower Applications: ISO Standard 13256-1

A “Boiler/Tower” application uses a simple two-pipe water circulating system that adds heat, removes heat or transfers rejected heat to other units throughout the building. The water temperature for heating is generally maintained between 65ºF – 70ºF (18ºC and 21ºC) and is usually provided by a natural gas or electric boiler located in a mechanical room. The condensing water temperature, during cooling months, is maintained between 85ºF (29ºC) and 95ºF (35ºC) and requires the use of a cooling tower to dissipate waste heat. Cooling towers can be located on the roof, or inside or adjacent to the building. This application can be the lowest cost of the loop options available.

NOTICE
ASHRAE 90.1 standards require that circulating pumps over 10 HP will require use of “variable frequency drive” equipment and pipe insulation to be used whenever water temperatures are below 60ºF (16ºC) and above 105ºF (41ºC). See ASHRAE 90.1 Standards for details.

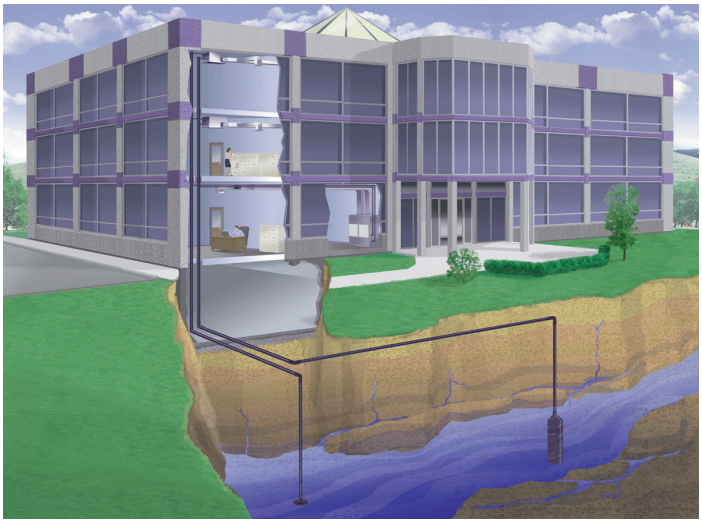
Figure 29: Boiler / Tower Application



Open Loop Well Water Applications: ISO Standard 13256-1

"Open Loop" well water systems use ground water to remove or add heat to the interior water loop. The key benefit of an open loop system is the constant water temperature, usually 50ºF to 60ºF (10ºC to 16ºC), which provides efficient operation at a low first cost. Most commercial designers incorporate a heat exchanger to isolate the building loop from the well water. Using heat exchangers can reduce maintenance issues while still allowing the transfer of heat from unit to unit as with the "Boiler/Tower System". A successful design provides an ample amount of groundwater (approximately 2 GPM per ton) and adequate provisions for discharging water back to the aquifer or surface. Open Loop applications are commonly used in coastal areas where soil characteristics allow reinjection wells to return the water back to the aquifer. Note that some states have requirements on the depths of return water reinjection wells, and such wells must be approved by the United States Environmental Protection Agency. Also, bad water quality can increase problems with heat exchanger scaling. Suspended solids can erode the heat exchanger. Strainers can be used to contain suspended solids.

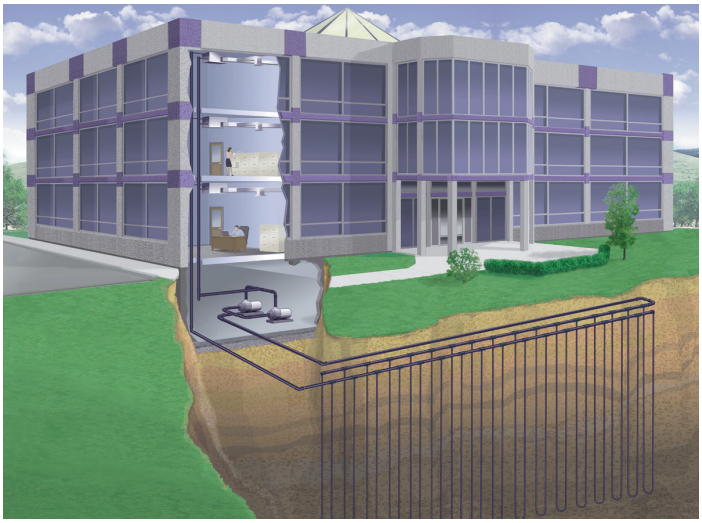
Figure 30: Open Loop Well Application



Closed Loop Geothermal Applications: ISO Standard 13256-1

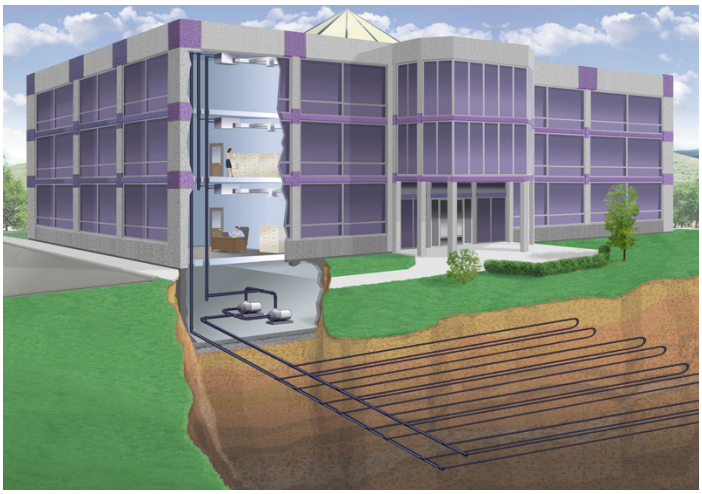
"Vertical Closed Loop" applications are installed by drilling vertical bore holes into the earth and inserting a plastic polyethylene supply/return pipe into the holes. The vertical wells are connected in parallel reverse return fashion to allow the water from the building to circulate evenly throughout the bore field. The circulating fluid dissipates heat to the ground in a similar manner as a "tower" and adds heat back to the loop like a boiler. If properly designed, the loop field can maintain the loop temperatures necessary to condition the building without the use of a boiler or a tower. Loop temperatures usually range from 37ºF to 95ºF (3ºC to 35ºC) in Northern climates. Southern applications can see temperatures ranging from 40ºF to 100ºF (4ºC to 38ºC). The number of bore holes and their depth should be determined by using commercial software that is specifically designed for vertical geothermal applications. Typical bore depths of a vertical loop range from 150 to 400 ft (46 to 122 m) and generally require about 250 ft (76 m) of surface area per ton of cooling.

Figure 31: Vertical Loop Application



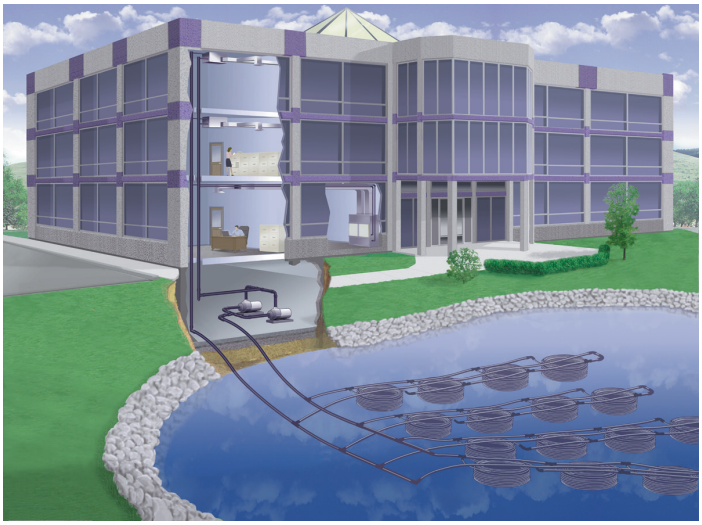
A closed loop "Horizontal" geothermal application is similar to a vertical loop application with the exception that the loops are installed in trenches approximately 5 ft (2 m) below the ground surface. The piping may be installed using a "four-pipe" or "six-pipe" design and could require 1,500 to 2,000 sq ft (139 to 186 sq m) of surface area per ton of cooling. Loop temperatures for a commercial application can range from 35ºF to 95ºF (2ºC to 35ºC) in Northern climates. Southern climates can see temperatures ranging from 40ºF to 100ºF (4ºC to 38ºC). Horizontal loops are generally not applied in urban areas because land use and costs can be prohibitive. New advances in installation procedures have improved the assembly time of horizontal loops while keeping the first cost lower than a vertical loop.

Figure 32: Horizontal Loop Application



A “Surface Water” or “Lake” closed loop system is a geothermal loop that is directly installed in a lake or body of water that is near the building. In many cases, the body of water is constructed on the building site to meet drainage or aesthetic requirements. Surface loops use bundled polyethylene coils that are connected in the same manner as a vertical or horizontal loop using a parallel reverse return design. The size and the depth of the lake is critical. Commercial design services should be used to certify that a given body of water is sufficient to withstand the building loads. Loop temperatures usually range from 35ºF to 90ºF (2ºC to 32ºC) and prove to be the best cooling performer and lowest cost loop option of the three geothermal loops. Some applications may not be good candidates due to public access or debris problems from flooding.

Figure 33: Surface Water Loop Application



Selection Procedure

Achieving optimal performance with water source heat pump systems requires both accurate system design and proper equipment selection. Use a building load program to determine the heating and cooling loads of each zone prior to making equipment selections. With this information, the Daikin Select Tools 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. Select Tools software is available by contacting your local Daikin Applied Representative.

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

The following example illustrates a typical selection for a unit in a boiler/tower system for a commercial building.

The load in this zone requires 193,415 Btu/h of total cooling, 142,721 Btu/h of sensible cooling and 177,692 Btu/h of total heating. The entering water temperatures for the design conditions are 90°F for cooling and 70°F for heating. The return air temperature is 80°F dry bulb with 67°F wet bulb for cooling and 70°F for heating.

Zone Requirement:

Total Cooling Load	=	193,415 Btu/h
Sensible Cooling Load	=	142,721 Btu/h
Heating Load	=	177,692 Btu/h
Design Airflow	=	6,000 CFM
Return Air - Cooling	=	80ºF DB/67ºF WB
Return Air - Heating	=	70ºF DB

Selection:

Model WSLV200

After making the preliminary selection (WSLV200), enter the performance from the unit’s Capacity Data table at the design conditions and read Total Cooling, Sensible Cooling, and Heating Capacity at 45 GPM:

Total Cooling Capacity	=	200,797 Btu/h
Sensible Cooling Capacity	=	144,844 Btu/h
Heating Capacity	=	205,965 Btu/h
Airflow	=	6,000 CFM
Water Flow required to meet capacity	=	45 GPM
Water Pressure drop	=	19.94 (ft H_2O)

Engineering Specifications

SMARTSOURCE® LARGE CAPACITY HORIZONTAL AND VERTICAL WATER SOURCE HEAT PUMPS

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 SUBSTITUTIONS

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 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 and 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, who 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 over-current 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 models with cooling performance ratings less than 135,000 Btu/h shall be certified in accordance with ARI/ISO Standard 13256-1 and shall have the correct ARI/ISO and CUL labels affixed to the chassis. 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 with cooling capacities less than 135,000 Btu/h 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.

[OPTIONAL] Extended range unit shall have insulated refrigerant-to-water heat exchanger and insulated water and refrigerant tubing; all designed to help prevent sweating.

B. Casing and Cabinet – The unit cabinet shall be fabricated from heavy gauge G60 galvanized steel corner posts and steel panel construction with a heavy gauge steel base pan. The base pan shall have pre-drilled holes to accept field installation of external rubber or spring isolators. The interior surfaces shall be lined with 1/2" thick, 1-1/2 lb. density fiberglass insulation. All insulation will have the edges sealed or tucked to prevent introduction of glass fibers into the air stream. Standard cabinet insulation must meet NFPA 90A/90B requirements and have a flame spread of less than 25 and a smoke developed classification of less than 50 per ASTM E-84 and UL 723. All air-side insulation shall conform to mold growth limits in accordance with UL-181, fungi resistance per ASTM C 1338 or ASTM G21 and shall meet zero level bacterial resistance per ASTM G22.

C. Units shall have a factory-installed, 4-sided, 1" duct flange on the discharge of the blower to allow connection of field ductwork and must have multiple panels on front, back and sides to provide access to compressor, control box, fan motor and fan assembly. Access panels with direct contact with conditioned air shall be lined internally with acoustic type dual-density fibrous glass insulation. Unit shall have an insulated panel separating the blower compartment from the compressor compartment.

D. Filter Rack and Filters – [HORIZONTAL UNITS] Units shall have a standard factory installed 2" thick filter bracket for side filter removal. Unit shall have multiple 2" thick throwaway filters factory installed as standard. If units with these factory installed items are not used, the contractor is responsible for any extra costs to field install these provisions, and/or the extra costs for their sub-contractor to install these provisions.

[VERTICAL UNITS] Units shall have a standard factory installed 1" thick filter bracket for side filter removal. Unit shall have multiple 1" thick throwaway filters factory installed as standard. If units with these factory installed items are not used, the contractor is responsible for any extra costs to field install these provisions, and/or the extra costs for their sub-contractor to install these provisions.

[OPTIONAL] Units shall include factory-installed low leakage, 2-inch, 4-sided combination filter rack with 2" thick MERV 8 pleated filter(s) and ¾" return air duct collar for connection of return air ductwork. The combination filter rack shall include a removable, tool-less access door with thumb screws and factory-installed gasketing to prevent air leakage between the filter rack and unit casing.

OR

[OPTIONAL] Units shall include factory-installed low leakage, 4-inch, 4-sided combination filter rack with 4" thick MERV 13 pleated filter(s) and ¾" return air duct collar for connection of return air ductwork. The combination filter rack shall include a removable, tool-less access door with thumb screws and factory-installed gasketing to prevent air leakage between the filter rack and unit casing.

E. Electrical – The control box shall be located within the unit and shall contain controls for compressor, reversing valve, and fan motor operation and shall include a 75VA control circuit transformer and a terminal block for low voltage field wiring connections. Unit control system shall provide heating or cooling as required by the set points of the wall thermostat or space sensor. The unit shall include an alarm relay for providing an output signal to an LED on the thermostat or to a central monitoring panel to indicate a “fault” condition from the activation of any one of the safety devices. The 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. All units shall have a Short-Circuit current rating of 5kA rms symmetrical, 600V maximum. Unit shall be name-plated to accept time delay fuses or HACR circuit breaker for branch over-current protection of the power source. 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
208	3	208	3

Nameplate Voltage	Phase	Distribution Voltage	Service, No. of Conductors
230	3	240	3
460	3	460	3
575	3	575	3

F. Cabinets shall have knockouts for entrance of line voltage and low voltage control wiring.

G. Condensate Drain Pan – The condensate pan must be insulated and made of either G60 galvanized steel or a corrosion resistant, stainless steel. The unit will be supplied with solid-state electronic condensate overflow protection sensor as standard. Mechanical float switches will not be accepted.

H. Configuration – Units shall be provided configured as shown on the plans, in one of the following air-flow arrangements (note: “Right” or “Left” side shall be determined when viewing the air coil side of the unit; water piping connection side will follow the handing configuration); air coil is always mounted on the front of the cabinet:

1. Top Discharge (Upblast-Front)
2. Straight Horizontal Discharge (Top-Horizontal)

I. Fan and Motor Assembly – The fan section shall include a belt-driven fan assembly, multiple DWDI forward curved fan wheels, solid fan shaft, steel ball bearings, single high efficiency OAO (Open Air Over) three phase, standard-static, inverter duty fan motor, adjustable motor sheave, adjustable motor base, fan pulley and insulated divider panel between the compressor section. Field adjustment of sheaves and belt tension shall be required for airflow balancing. The fan motor is always located at the piping end of the unit. The fan housing(s) shall protrude through the cabinet to facilitate field duct connection.

[HORIZONTAL UNITS] The unit shall be available with a high static motor option for applications with higher static airflow requirements. An optional factory installed Variable Frequency Drive shall be available with either motor option (standard static and high-static) for adjustable speed control. The VFD shall be factory programmed and include a keypad for local or remote control.

[VERTICAL UNITS] The unit shall be available with a high static or ultra-high static motor option for applications with higher static airflow requirements. An optional factory installed Variable Frequency Drive shall be available with all three motor options (standard static, high-static, and ultra-high static) for adjustable speed control. The VFD shall be factory programmed and include a keypad for local or remote control.

J. Refrigeration Circuits – Units shall have dual R-32 sealed refrigerant circuits, each consisting of a high efficiency scroll compressor mounted on rubber vibration isolation grommets (spring isolators shall not be accepted between the compressor and the unit base pan), an aluminum lanced-fin and rifled copper tube refrigerant-to-air heat exchanger, a refrigerant flow metering device-thermostatic expansion valve (TXV), high pressure safety cutout and a fusible pressure relief factory-installed on the refrigerant circuit. The Water Source Heat Pump unit shall utilize a solenoid-operated, 4-way refrigerant reversing valve. The reversing valve shall be energized for heating operation. High and low side refrigerant service valves shall be provided. Refrigerant will be HFC R-32 in all units, no exception. Units with zeotropic blend refrigerants are not acceptable.

[OPTIONAL] 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.

OR

[OPTIONAL] The coaxial coil shall be made of a cupronickel 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.

K. Compressors - The compressors shall include thermal overload protection and have a dual level vibration isolation system. The compressors will be mounted on vibration isolation grommets to a heavy gauge compressor mounting plate, which is then isolated from the cabinet base with rubber grommets to minimize vibration transfer.

[OPTIONAL] For additional sound attenuation compressor blankets constructed from high performance sound material with superior sound absorption and deadening properties shall be provided. The sound rated material has a density of 1.5 lb/ft^3 and is made from a loaded vinyl reinforced barrier and is embedded with 0.5" urethane foam.

L. Compressor Safety Controls – Safety controls shall include a minimum of 3 safety devices: high refrigerant pressure switch, low refrigerant pressure switch and a low refrigerant suction temperature sensor. All safety switches shall be normally closed, opening upon fault detection. The low refrigerant suction temperature sensor shall provide freeze protection for both the water coil and the air coil. Refrigerant gauge access fittings shall be factory installed on high- and low-pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent the compressor from operating via a microprocessor lockout circuit. The lockout circuit shall be reset at the thermostat or at the unit disconnect switch.

[OPTIONAL] Unit shall be equipped with an additional sensor located on the leaving water piping to be used to help protect the unit from excessively low water coil temperatures.

M. 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. The airside coils shall be rated at a minimum of 600 psig working pressure.

[OPTIONAL] Units shall have coated air coil to meet ASTM

Std B-117, salt spray test.

N. Cold Start-up - Manufacturer shall guarantee heat pump units to start and operate in an ambient temperature of 40 degrees F with entering air at 40 degrees F, with entering water at 70 degrees F, with both air and water at the flow rates used in the AHRI/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).

O. Supply and return, condenser water connections – Supply return water and condensate connections shall be copper FPT fittings and protrude through the casing. Supply, return, and condensate drain shall be connected to loop and drain piping as detail on mechanical drawings. Piping connections at the unit which require brazing or soldering by the installer (which may damage the unit) shall not be allowed.

P. [OPTIONAL] Dehumidification – Hot Gas Reheat - All units shall have dehumidification control using a hot gas refrigerant reheat system. Each unit shall have an aluminum microchannel hot gas reheat coil, located downstream of the air coil, and a refrigerant reheat valve. Control of the dehumidification mode shall be done by a space thermostat or sensor and a space humidity sensor. If the humidity is above setpoint and the cooling setpoint is satisfied, the compressor shall be energized in the cooling mode and the reheat valve shall open to allow hot gas to enter the reheat coil. The return air is cooled to remove excess moisture and the reheat coil increases the air temperature to deliver room temperature air to prevent over-cooling the space. A call for cooling will stop the dehumidification mode. Integrated low return air temperature control shall be standard.

[OPTIONAL] A corrosion resistant coated hot gas reheat coil shall be available as an option.

Q. Hot Gas Bypass - The optional factory-installed hot gas bypass option shall limit the minimum suction pressure during cooling operation to protect the air coil from freezing. Hot gas bypass is used to keep evaporator temperature from falling below freezing temperatures when the return air temperature drops but a cooling call remains active. When the suction pressure of the unit falls below a pre-set value, the bypass valve starts to open, routing hot compressor discharge gas to the evaporator inlet. This hot gas effectively increases the evaporator temperature such that condensation forming on the coil cannot freeze. The purpose of Hot Gas Bypass valve on units with a factory installed VFD is to maintain a minimum suction pressure (evaporator temperature) under reduced air flow, similar to conditions created as a result of low return air temperatures. The hot gas bypass valve located in the compressor discharge line diverts hot gas to the inlet of the air coil. The setting shall be field adjustable.

R. Waterside Economizer - All units shall be capable of free cooling operation. Each unit shall have a hydronic coil upstream of the refrigerant-to-air DX coil, a 3-way diverting valve and an entering water temperature thermostat (sensor) with 50-70°F adjustable setpoint range. On a call for 1st stage cooling, the temperature sensor measures the entering fluid temperature. If the temperature is below the setpoint, the 3-way valve shall divert the loop water to the hydronic coil in an attempt to satisfy space cooling. On a call for 2nd stage cooling, the compressor shall be energized in the cooling mode. If the temperature of the entering loop fluid rises above the setpoint, the 3-way valve shall stop diverting fluid to the hydronic coil. If the entering fluid is below 35°F, free cooling is disabled.

[OPTIONAL] Economizer coil shall be coated with a corrosion resistant coating that must pass ASTM B-117 1000-hour salt spray test to provide protection against corrosion due to acids, solvents and salt found in the environment.

S. [OPTIONAL] Phase Monitor - The optional factory-installed phase monitor option helps to protect against phase loss, phase reversal and phase unbalance, and ideally suited for protection against reverse rotation of the scroll compressors.

T. Solid-State Control System MicroTech Unit Controller

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: 7 total (Main Fan, Compressor, Reversing Valve, Isolation valve/Pump Request, 1 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 operation 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.

U. 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 Inputs: (Condensate Overflow, Brownout Detection, Suction-Line Temp Sensor, Timed Override Switch, Setpoint Adjust, Fan Mode – (Heat/Cool/Auto)
2. 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.
3. 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.
4. Suction-Line Temp Sensor. Sensing element shall be equivalent to NTC Thermistor – 10K ohms @ 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.
5. Set point Adjust. The Set point 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 degrees F or a range of 55 to 95 degrees F (jumper selectable and scaled accordingly in software).
6. 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.
7. Temperature Input. Sensing element in the MicroTech room temperature sensor is equivalent to NTC Thermistor – 10K ohms @ 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.
8. Binary Inputs. 19 total (Low Pressure, High Pressure, Emergency Shutdown, 10-Board level jumpers, 5-thermostat, Occupied/Unoccupied) that employ the Occupied/Unoccupied control.
9. 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.
10. 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.
11. 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.
12. 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.
13. 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.
14. 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 Set Point 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)

V. 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 Inputs: 3-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: 1 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: 3 total (Heat stage three, Heat stage four, Humidistat)

   a. Heat Stage three and four tells the MicroTech unit controller that 1st and 2nd stage electric heat are required.

   b. Humidistat tells the MicroTech unit controller that dehumidification is required.

4. Binary Output: 6-total (Compressor High Capacity, Auxiliary Heat Stage 1, Hot Gas Reheat dehumidification, Waterside Economizer, Auxiliary Heat Stage 2, 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. Hot Gas Reheat Dehumidification / Waterside Economizer enables the reheat solenoid on a request for dehumidification.

   d. Waterside Economizer enables the 3-way diverting valve upon a call for waterside economizer depending on unit configuration.

   e. Auxiliary heat stage #2 24VAC signal that enables stage #2 electric heat.

   f. 1-tricolor status LED that indicates operating conditions of the I/O expansion module as well as fan speed for variable speed fans.

   g. 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 - Water Side Economizer
      Switch 9 - Single or Two Compressor Unit
      Switch 10 - Single or Two Stage Compressor

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

1. Each communicating unit controller performs the following unit operations:

   a. Enable heating and cooling to maintain space temperature set point at the room sensor

   b. Enable fan and compressor operation

   c. Monitor all safety controls

   d. Monitor discharge and return air temperature

   e. Monitor leaving water temperature

   f. Relay status of all vital unit functions

   g. Support optional control outputs

   h. Adjust fan speed signals for each operating mode

2. Available room sensors include:

   a. Room Sensor with LED Status indicator and timed override/reset button.

   b. Room Sensor with LED Status indicator, temperature Setpoint adjustment slider from Cool to Warm (55° F to 95° F) or (-5° F to +5° F) and timed override/reset button.

   c. Digital Adjustable Room Sensor with digital display for temperature, Occupancy, Alarm, Setpoint and Status indication. Include four button controls for Setpoint (55° F to 95° F) or (-5° F to +5° F), Occupied/Unoccupied request, and Override Reset.

   d. Digital Adjustable Room Sensor with digital display for temperature, Humidity (for units with

Dehumidification) Occupancy, Alarm, Setpoint and Status indication. Include six button controls for Setpoint (55° F to 95° F) or (-5° F to +5° F), System Mode, Occupied/Unoccupied request, and Override Reset.

X. 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.

Y. 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 3rd 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.

Z. MicroTech Unit Controller and I/O Expansion Board Fault and Status LEDs: Separate board mounted tricolor LED’s.

1. Room Sensor Status LED: A 5 VDC signal and 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

AA. Auxiliary Relay Output: When the unit is in alarm mode, a 24 VAC or ground signal (depending on field wiring) switch is activated.

1. Onboard Status LED:

	LED Activity	Type	Color	Description
MT Controller Diagnostic LED	Steady ON	Fault	Red	MCU Not Programmed or Hardware Failure
	1 Flash	Fault	R-Y-G	Invalid Configuration
	2 Flash	Fault	R-Y-G	Incompatible Software
	1 Flash	Fault	R-Y	Expansion Board Communication Error
	2 Flash	Mode	G-Y	Service/Test Mode Active

	LED Activity	Type	Color	Description
MT I/O Expansion Board Diagnostic LED	Rapid Flash	Fault	Yellow	A2L Mitigation Sensor Failure
	1 Flash	Fault	Yellow	Compressor Low Voltage Brownout
	2 Flash	Fault	Yellow	Freeze Fault Detection
	3 Flash	Fault	Yellow	Control Temperature Sensor Failure
	4 Flash	Fault	Yellow	Entering Water Temperature Sensor Failure
	5 Flash	Fault	Yellow	Leaving Water Temperature Sensor Failure
	6 Flash	Fault	Yellow	Relative Humidity Sensor Failure
	7 Flash	Fault	Yellow	Condensate Overflow Sensor Failure
	8 Flash	Fault	Yellow	Space Temperature Sensor Failure
	9 Flash	Fault	Yellow	Return Air Temperature Sensor Failure

AB. 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.

AC. [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

2.02 BASIS OF DESIGN

A. Model type WSLH and WSLV or WSL.

2.03 ACCEPTABLE ALTERNATES

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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