DAIKIN

Catalog 1105-13

Vertical Stack Water Source Heat Pumps

Model WVHF - Cabinet
Model WVHC - Chassis (Standard Range)
Model WVHW - Chassis (Geothermal Range)

Unit Sizes 009 – 036 • R-410A Refrigerant

Model VHF

Model VHC/VHW

AHRI CERTIFIED

C ETL LISTED US Intertek

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Note: *Text displayed in* ***Bold-Italics*** *designate standard offering.*

Category	Code Item	Code Option	Code Designation & Description *(Bold-Italic = Standard)*
Product Category	**1**	**1**	***W = Water Source Heat Pump***
Model Type	**2**	**2, 3, 4**	***VHC = Vertical Stacked Heat Pump Chassis***
			VHF = Vertical Stacked Heat Pump Cabinet
			VHW= Vertical Stacked Geothermal Chassis only
Design Series	**3**	**5**	3 = 3rd Design
			4 = 4th Design (Sizes 009 & 012 only)
Unit Size	**4**	**6, 7, 8**	009 = 9,000 Btuh Nominal Cooling
			012 = 12,000 Btuh Nominal Cooling
			015 = 15,000 Btuh Nominal Cooling
			018 = 18,000 Btuh Nominal Cooling
			021 = 21,000 Btuh Nominal Cooling
			024 = 24,000 Btuh Nominal Cooling
			030 = 30,000 Btuh Nominal Cooling
			036 = 36,000 Btuh Nominal Cooling
Controls	**5**	**9**	***B = MicroTech III Unitary Controller - Standalone***
			C = Microtech III Unitary Controller w/LonWorks Comm Module
			D = Microtech III Unitary Controller w/BACnet Comm Module
			F = Microtech III Unitary Controller w/BACnet Comm Module - WSHP System
Voltage	**6**	**10**	A = 115/60/1
			E = ***208-230/60/1***
			J = 265-277/60/1
Secondary Drain Pan	**7**	**11, 12**	***GL = Standard Galvanized***
			SS = Stainless Steel - IAQ Option
			YY = None
Refrigerant	**8**	**13**	***A = R410A***
Motorized 2-way Isolation Valve	**9**	**14**	C = 2-Way Motorized 1/2" Iso-Valve, General Close-Off Pressure N.C. (Normally Closed)
			V = 2-Way Motorized 1/2" Iso-Valve, General Close-Off Pressure N.O. (Normally Open)
			H = 2-Way Motorized 1/2" Iso-Valve, High Close-Off Pressure N.C. (Normally Closed)
			D = 2-Way Motorized 3/4" Iso-Valve, General Close-Off Pressure N.C. (Normally Closed)
			K = 2-Way Motorized 3/4" Iso-Valve, General Close-Off Pressure N.O. (Normally Open)
			J = 2-Way Motorized 3/4" Iso-Valve, High Close-Off Pressure N.C. (Normally Closed)
			B = Auto-Reg-PT
			Y = None
Chassis Construction Type	**10**	**15**	A = 1/2" Fiberglass Skin Faced
			E = 3/8" Closed Cell Foam
Note:			F = 1/2" Fiberglass - Foil Faced
A compressor sound blanket is not recommended			Y = None
for units with a rotary compressor		**16**	M = Mass Plate & Comp Blanket (Unit Sizes 024-036 Only)
(Unit sizes 009-021)			S = Mass Plate Only
Coaxial Heat Exchanger Construction	**11**	**18**	C = Copper Inner Tube - Steel Outer Shell
			S = Cupronickel Inner Tube - Steel Outer Shell
Discharge Air	**13**	**20**	B = Primary Supply - Back
			F = Primary Supply - Front
			L = Primary Supply - Left
			R = Primary Supply - Right
			T = Primary Supply - Top
			Y = None
		21	B = Secondary Supply - Back
			F = Secondary Supply - Front
			L = Secondary Supply - Left
			R = Secondary Supply - Right
			T = Secondary Supply - Top
			Y = None
		22	T = Tertiary - Top
Power Connection	**14**	**23**	F = Fused Disconnect with Wire Harness
			N = Non-Fused Disconnect with Wire Harness
			H = HACR Breaker

Note: *Text displayed in* ***Bold-Italics*** *designate standard offering.*

Category	Code Item	Code Option	Code Designation & Description *(Bold-Italic = Standard)*
Blower Motor	**15**	**24**	***1*** = ***Standard PSC***
			3 = EC Motor
		25	2 = 2 Speed Fan - T'Stat Controlled
			3 = 2 Speed Fan - Unit Toggle Switch
			4 = 4 Position Fan Speed Selection Switch (Units with EC Motor)
Power & Control Access	**16**	**26**	***S*** = ***Side***
			T = Top
Flow Control	**17**	**27**	B = Auto Flow Regulator 1.5 GPM
			C = Auto Flow Regulator 2.0 GPM
			D = Auto Flow Regulator 2.5 GPM
			E = Auto Flow Regulator 3.0 GPM
			F = Auto Flow Regulator 3.5 GPM
			G = Auto Flow Regulator 4.0 GPM
			H = Auto Flow Regulator 4.5 GPM
			I = Auto Flow Regulator 5.0 GPM
			J = Auto Flow Regulator 5.5 GPM
			K = Auto Flow Regulator 6.0 GPM
			L = Auto Flow Regulator 7.0 GPM
			M = Auto Flow Regulator 8.0 GPM
			N = Auto Flow Regulator 9.0 GPM
			O = Auto Flow Regulator 10.5 GPM
			YY = None
		28	S = Strainer
Filter Type	**18**	**29**	***S*** = ***Standard 1" Fiberglass***
			Y = None
			M = 1" Merv 8
Cabinet Height	**19**	**30, 31, 32**	080 = 80" Cabinet Height
			088 = 88" Cabinet Height
			092 = 92" Cabinet Height
			096 = 96" Cabinet Height
Cabinet Construction Type	**20**	**33, 34**	AY = 1/2" Fiberglass Skin Faced
			EY = 3/8" Closed Cell Foam
			FY = 1/2" Fiberglass - Foil Faced
			YY = None
Riser Mounting	**21**	**35**	F = Factory Supplied Shipped with Cabinet - for Field Installation
			J = Factory Supplied Shipped Separate from Cabinet - for Field Installation
Riser Location	**22**	**36**	L = Left Cabinet Piping
			R = Right Cabinet Piping
			B = Back Cabinet Piping
Heating Options	**23**	**37**	H = Hydronic Heat
			Y = None
Heating Control Option		**39**	A = 3-Way 1/2" Motorized Valve
			B = 3-Way 3/4" Motorized Valve
			Y = None
Wireless T'Stat Option	**24**	**40**	N = Factory Installed Wireless RF Receiver with Non-Programmable Thermostat
			P = Factory Installed Wireless RF Receiver with 7-Day Programmable Thermostat
			Y = None
Packaging	**30**	**50**	1 = Multipack Cabinets - 4 Cabinets with Factory Mounted Risers on one pallet
			2 = Multipack Cabinets - 4 Cabinets without Factory Mounted Risers on one pallet
			3 = Multipack Chassis - 4 Chassis to a pallet
			4 = Single Chassis - one per pallet
			5 = Single Fully Assembled Cabinet - one per pallet
Extended Warranty	**31**	**51**	Y = None
			V = 1 Year Extended Compressor Only Parts Warranty
			W = 1 Year Extended Refrigerant Circuit Parts Warranty
			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

Water Loop - PSC & EC Motor

Rated in Accordance with ISO Standard 13256-1

In English (IP) Units				PSC Fan Motor				EC Fan Motor			
Vertical Stack				Cooling		Heating		Cooling		Heating	
				EWT 86°F		EWT 68°F		EWT 86°F		EWT 68°F	
Unit Size	Airflow CFM	Fluid Flow Rate GPM	Voltages	Capacity Btuh/hr	EER	Capacity Btuh/hr	COP	Capacity Btuh/hr	EER	Capacity Btuh/hr	COP
009	300	2.5	115-60-1	9,300	13.8	11,200	4.6	9,700	14.7	11,400	4.9
			208/230-60-1								
			265/277-60-1	9,200	12.8	11,900		9,300	12.2	11,900	4.6
012	400	3.0	115-60-1	11,700	12.8	14,500	4.3	12,000	13.4	14,400	4.3
			208/230-60-1				4.5		14.0		4.7
			265/277-60-1		12.2	15,000	4.4		13.1	14,900	4.5
015	500	3.5	208/230-60-1	14,400	13.5	18,300	4.8	14,300	15.0	18,200	5.1
			265/277-60-1	14,000	13.0	18,700			13.7	18,600	4.8
018	600	4.2	208/230-60-1	16,600	13.0	22,500	4.9	16,900	13.6	22,400	5.0
			265/277-60-1	17,500	13.2	23,200	4.8	17,700	13.8	22,900	4.9
021	700	5.4	208/230-60-1	20,300	13.9	24,400	4.8	20,500	14.5	24,100	4.8
			265/277-60-1	20,400		24,800	4.9	20,800	14.7	24,500	5.0
024	800	6.0	208/230-60-1	23,000	14.3	28,000	4.9	23,400	14.8	27,800	5.0
			265/277-60-1		13.4	28,500	4.7	23,300	13.8	28,200	4.9
030	1000	7.3	208/230-60-1	29,400	14.7	34,700	5.0	29,400	15.2	34,300	5.1
			265/277-60-1	29,100	14.4	33,900	4.7	29,100	14.9		5.0
036	1200	9.0	208/230-60-1	35,600	14.1	41,600	4.7	35,300	14.4	42,000	4.7
			265/277-60-1	35,400	13.8	41,900	4.6	35,100	13.9	42,300	4.6

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

Ground Loop - PSC & EC Motor

In English (IP) Units				PSC Fan Motor				EC Fan Motor			
Vertical Stack				Cooling		Heating		Cooling		Heating	
				EWT 77°F		EWT 32°F		EWT 77°F		EWT 32°F	
Unit Size	Airflow CFM	Fluid Flow Rate GPM	Voltages	Capacity Btuh/hr	EER	Capacity Btuh/hr	COP	Capacity Btuh/hr	EER	Capacity Btuh/hr	COP
009	300	2.5	115-60-1	9,700	15.8	7,000	3.2	9,800	16.8	6,900	3.2
			208/230-60-1								
			265/277-60-1	9,800	14.8	7,300	3.2	9,900	15.6	7,300	
012	400	3.0	115-60-1	12,400	14.7	9,100	3.2	12,500	15.7	9,100	3.3
			208/230-60-1								
			265/277-60-1		14.2	9,500			14.6	9,300	3.2
015	500	3.5	208/230-60-1	15,000	15.4	11,000	3.2	15,300	17.1	10,900	3.4
			265/277-60-1	14,600	14.7	11,400	3.3	14,800	16.1	11,200	
018	600	4.2	208/230-60-1	17,400	14.6	13,900	3.3	17,700	15.4	13,600	3.4
			265/277-60-1	18,600	15.3	14,300	3.3	18,800	16.1	14,100	
021	700	5.4	208/230-60-1	21,500	16.2	15,400	3.3	21,500	17.1	15,200	3.4
			265/277-60-1	21,800	16.4	15,600	3.4	21,800		15,400	3.5
024	800	6.0	208/230-60-1	24,000	16.0	16,600	3.3	24,800	17.2	16,400	3.4
			265/277-60-1	23,800	15.7	17,800	3.3	24,500	15.9	17,700	
030	1000	7.3	208/230-60-1	30,800	16.8	21,700	3.4	30,900	17.6	21,400	3.5
			265/277-60-1	30,400	16.3		3.3	30,500	16.7		3.4
036	1200	9.0	208/230-60-1	37,100	16.0	26,200	3.2	37,200	16.4	26,100	3.3
			265/277-60-1	36,600	15.5	27,500	3.3	36,700	15.6	27,500	3.4

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

Daikin Vertical Stack WSHP Models WVHC, WVHF and WVHW

Daikin Vertical Stack units are designed for use in multiple floor apartments, office buildings, hotels, nursing homes and other similar applications. They require a minimum amount of floor space and are designed for multiple discharge arrangements.

- Available in multiple unit sizes – 009 (3/4 ton, 2.6kW) through 036 (3 ton, 10.6kW)
- Units exceed ASHRAE 90.1 efficiency levels
- R-410A Refrigerant, environmentally friendly with zero ozone depletion potential

1 Compact cabinets

- Constructed of unpainted galvanized steel, with the smallest possible footprint. 18" × 18" cabinet for unit sizes 009 through 012, 18" × 20" for unit sizes 015 and 018 and 24" × 24" for unit sizes 021 through 036

2 Chassis

- Removable, allows staged installation and ease of service and routine maintenance

3 Motor/blower assembly

- The standard blower motor is a multi-speed, Permanent Split Capacitor (PSC) with thermal overload protection. The fan, motor and housing are easy to remove and slide out from the cabinet front. The fan and motor are attached to an orifice ring, and this assembly is mounted to the fan housing, easily removed should service be necessary.
- All units are available with a variable speed Electronically Commutated Motor (ECM), featuring 4-selectable CFM settings for quiet operation and reduced energy consumption. Perfect for sound sensitive spaces and controlling the amount of air delivery. Unit sizes 009-012 utilize a constant torque EC Motor and unit sizes 015 - 036 utilize a constant CFM EC Motor

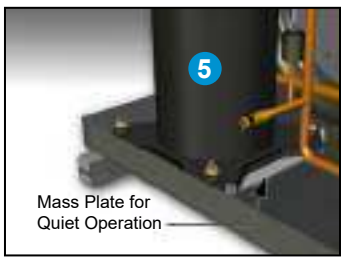
EC motor

4 Supply air plenum

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

5 Compressors

- High efficiency rotary and scroll, available with optional mass plate and/or compressor blanket for quiet operation (unit sizes 024-036)



6 Chassis vibration isolators

- Isolators are integral to the chassis support rails to help minimize noise and vibration transmission resulting in a quiet occupied space

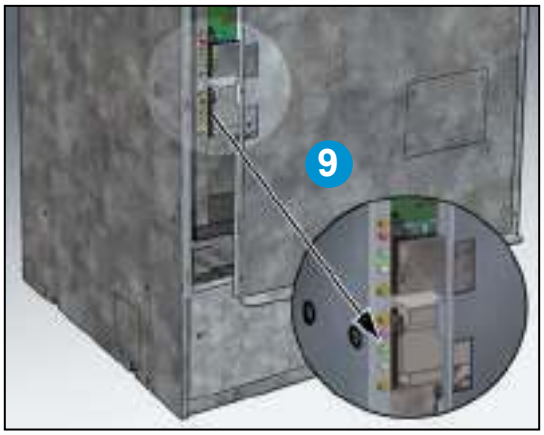
7 Microtech III control system

- Open Choices™ feature allows standalone or easy, low cost network integration using LONWORKS® or BACnet® communications

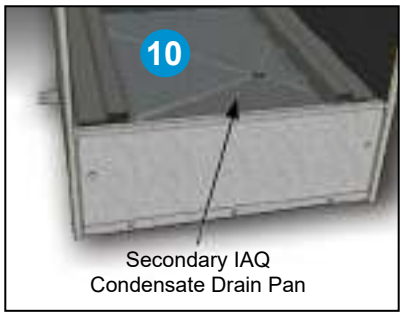
8 Primary condensate drain pan

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

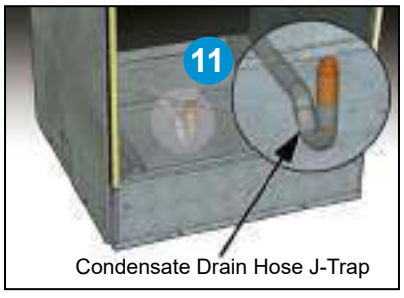
9 LED annunciators
- LED status lights display fault conditions to provide easy troubleshooting and diagnosis. Viewable by opening the return air grille/panel



10 Secondary IAQ condensate drain pan
- Available as an option in corrosion resistant stainless steel or standard galvanized steel and sits below the chassis to prevent condensate or other liquids from dripping into the cabinet and possibly reaching the living space. This drain pan also includes a factory installed condensate overflow sensor



11 Condensate drain hose IAQ J-trap
- Formed, flexible condensate trap helps keep condensate gases from backing up into the occupied space

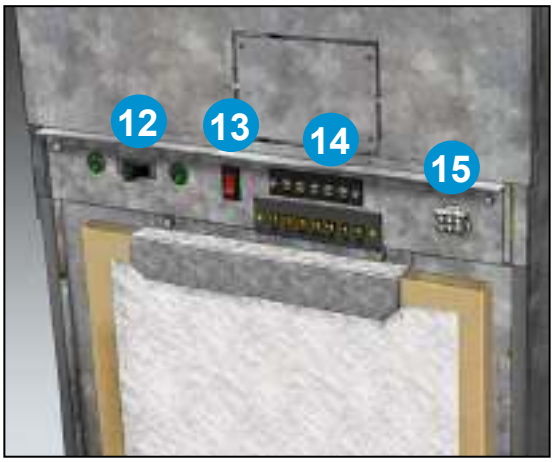


12 Front-mounted disconnect switch
- Easy access disconnect switch allows the user to turn off power to the unit for service / maintenance

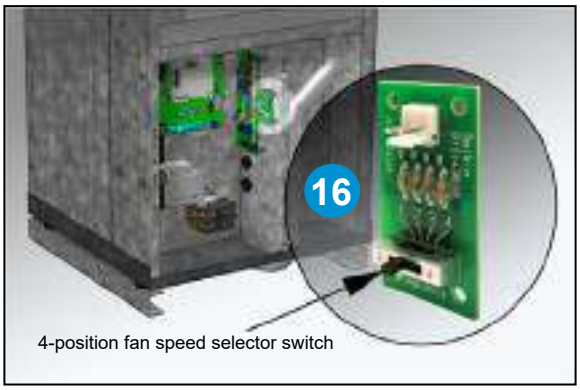
13 Two-speed fan switch (option)
- Convenient location of the fan speed switch allows for easy fan speed change (units with PSC motor)

14 Terminal strip for thermostat or room sensor
- Provides easy connection of wall-mounted thermostat

15 Molex receptacle for thermostat or room sensor
- Provides easy plug-in connection of wall-mounted thermostat or room temperature sensor



16 4-Position fan speed selector switch
- Allows for manually setting an optimal fan speed specific to the application requirements (units with EC Motor)



Cabinet

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

Cabinet Insulation

The standard cabinet insulation is 1/2" thick fiberglass skin-face in the compressor section and 1/2" thick foil-face insulation in the airside section.

An optional Indoor Air Quality (IAQ) insulation package is available with 3/8" thick closed-cell foam insulation in the compressor and airside sections.

A Sound Reduction Package option adds a 1/2" thick fiberglass skin-face insulation in the compressor section with a compressor sound blanket (sizes 024 to 036 only) and 3/4" thick sound insulation in the airside section.

The superior Sound Reduction Package option (sizes 024 to 036 only) adds a 3/4" thick acoustic foam panel of insulation to the fan section and a compressor blanket to help further reduce sound levels.

Configurations

Figure 1: Single side discharge

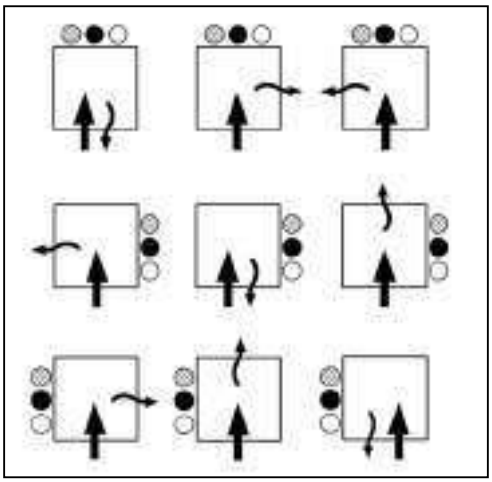


Figure 2: Double side discharge

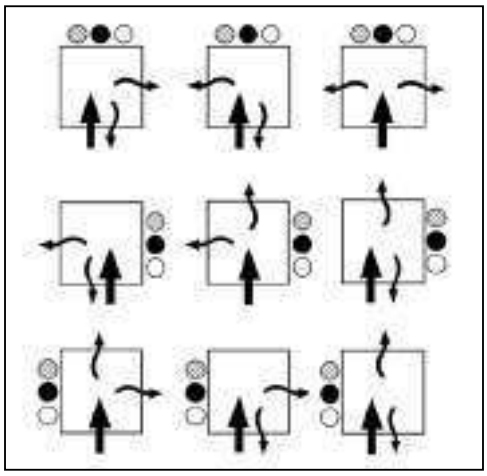


Figure 3: Side & top discharge

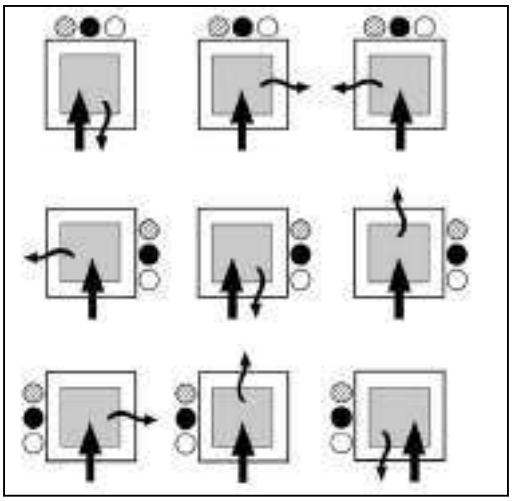


Figure 4: Double side & top discharge

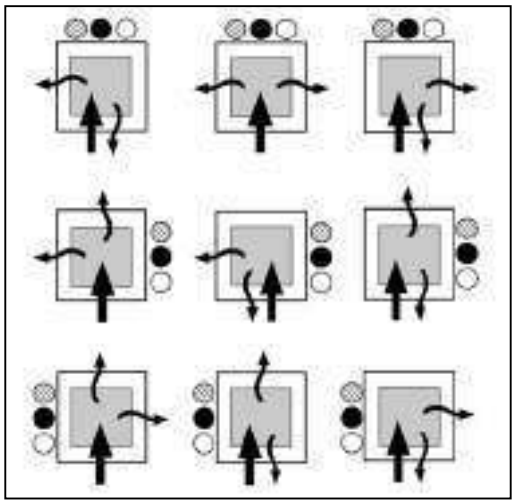


Figure 5: Single discharge – top only

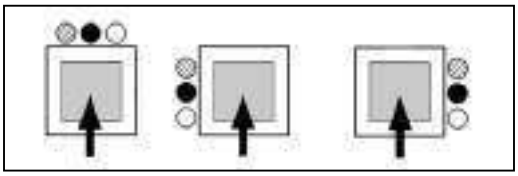
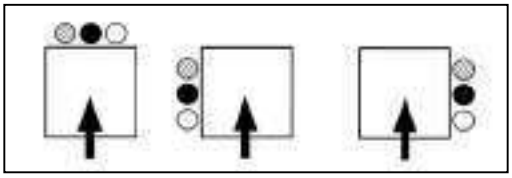


Figure 6: Closed plenum – field modification required



= Return Riser = Supply Riser = Drain

= Return Air = Discharge Air = Top Discharge

Note: *80" high cabinet not available with side discharge, top discharge only.*

Hinged Perimeter Return Air Panel Door

(See page 71 for details)

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

Louvered Return Air Panel Door with Optional Motorized Damper

(See page 71 for details)

The louvered return air panel door has (2) 1-5/8" x 7" cutouts available to connect ductwork for delivering outdoor air into the space using the optional motorized outdoor air damper. The optional motorized outdoor air damper mounts only on the hinge side of the door which is selectable as right or left hand. Available with electrostatic powder coat finish in colors of cupola white or antique ivory.

Supply Air Diffusers

(See page 69 for details)

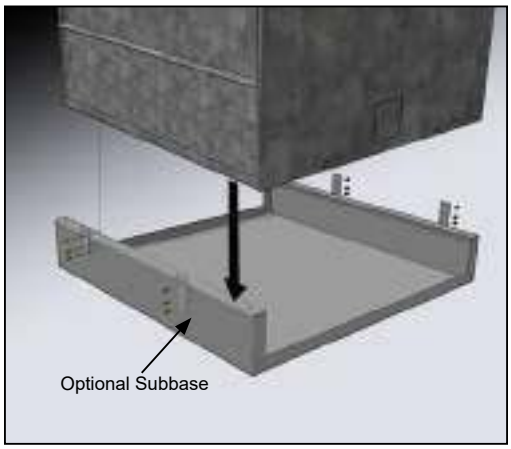
Diffusers are constructed of aluminum with a mill finish or an optional painted finish, available in three variations: double deflection, double deflection with optional extension and double deflection with adjustable damper. Damper blades are positioned vertically and adjust easily for directing the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

Aluminum Diffuser with mill finish

Painted Diffuser (option)

Subbase Kit (Option)

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



TXV Refrigerant Metering Device

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

Fluid-to-Refrigerant Coil

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

Figure 7: Coaxial Heat Exchanger

2 -Way Motorized Valve

2-way or 3-way valves are used for variable pumping applications when more than one unit is installed on a common loop. These valves are also used to conserve water when used for ground water applications. On a call for cooling or heating the valve opens providing full water flow prior to compressor operation. A 24 volt control wire harness is included with the factory provided control valve option. One end of the wire harness plugs into terminal H8 on the MicroTech III unit controlller and the other to the control valve actuator.

Hydronic Heat

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

Variable flow pumping systems are recommended for these systems to further reduce energy consumption, while maintaining sufficient water flow during heating operation.

The unit includes a hydronic heating coil located downstream of the unit's evaporator coil and after the filter. When entering water temperatures are between 70° to 120°F, a 2-stage thermostat or room temperature sensor in conjunction with a factory-installed entering water temperature sensor and a 2-position 3-way diverting valve, determine when loop water can be diverted to the hydronic coil and the unit coax coil for hydronic heating. Smart fan controls further reduce energy consumption and sound levels by delivering optimum air flow during hydronic heat operation.

Filters

1" standard (factory provided) or an optional 1" Merv 8 for improved indoor air quality.

Stainless Steel Braided Hoses

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

See catalog 1196-x for the complete hose and hose kit offering.

Figure 8: Flexible, steel braided supply and return hoses

Field Adjustable EC Fan Motor

EC motors are optional on units sizes 009 through 036. EC motors provide the ultimate in efficiency, performance flexibility with 4 field-selectable CFM settings and 28 programmed CFM values, helping to reduce sound levels and savings on operating energy. The factory installed fan speed selection switch allows for easy commissioning through a simple click of the switch to set the CFM delivered to the space. This allows for field adjustment of air delivery to the space for sound sensitive applications or for increased air distribution.