OMEGA VSHPe SERIES

Installation and Operation Manual (IOM)

Vertical Stacked
Water Source Heat Pumps
w/ Integrated ERV
Standard Efficiency (SE)

MODEL: VSHPe

DEV. F

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IMPORTANT

READ THE FOLLOWING MANUAL PRIOR TO INSTALLATION, OPERATION and SERVICING THIS UNIT.

1. GENERAL INFORMATION & WARNINGS

SAFETY SYMBOLS – Warnings, Cautions & Notices

There are three advisory symbols used in this document to alert the reader:

Warning: Indicates a potentially dangerous situation which could result in death or serious injury.

Caution: Indicates a possible hazardous situation which could result in possible injuries or damage to unit and/or environmental pollution, or to alert against practices that are unsafe.

Note: Identifies important information to the technician to complete the installation correctly.

Responsible Refrigerant Practices

All technicians who handle refrigerants must be certified in accordance with local codes for reclaiming, recovering, recycling and handling of refrigerants. Technicians must follow all applicable local and federal laws.

Correct field wiring and grounding is required, failure to adhere and follow code could result in death of serious injury. **ALL FIELD WIRING MUST BE PERFORMED ONLY BY A QUALIFIED ELECTRICIAN**. All wiring must be in accordance of with the manufacturer's specifications.

Wiring that is improperly installed and/or grounded could result in FIRE, ELECTROCUTION, and other serious hazards. Manufacturer is not responsible for damage/ equipment or site issues resulting from the improper connections of the unit or the use of improper controls.

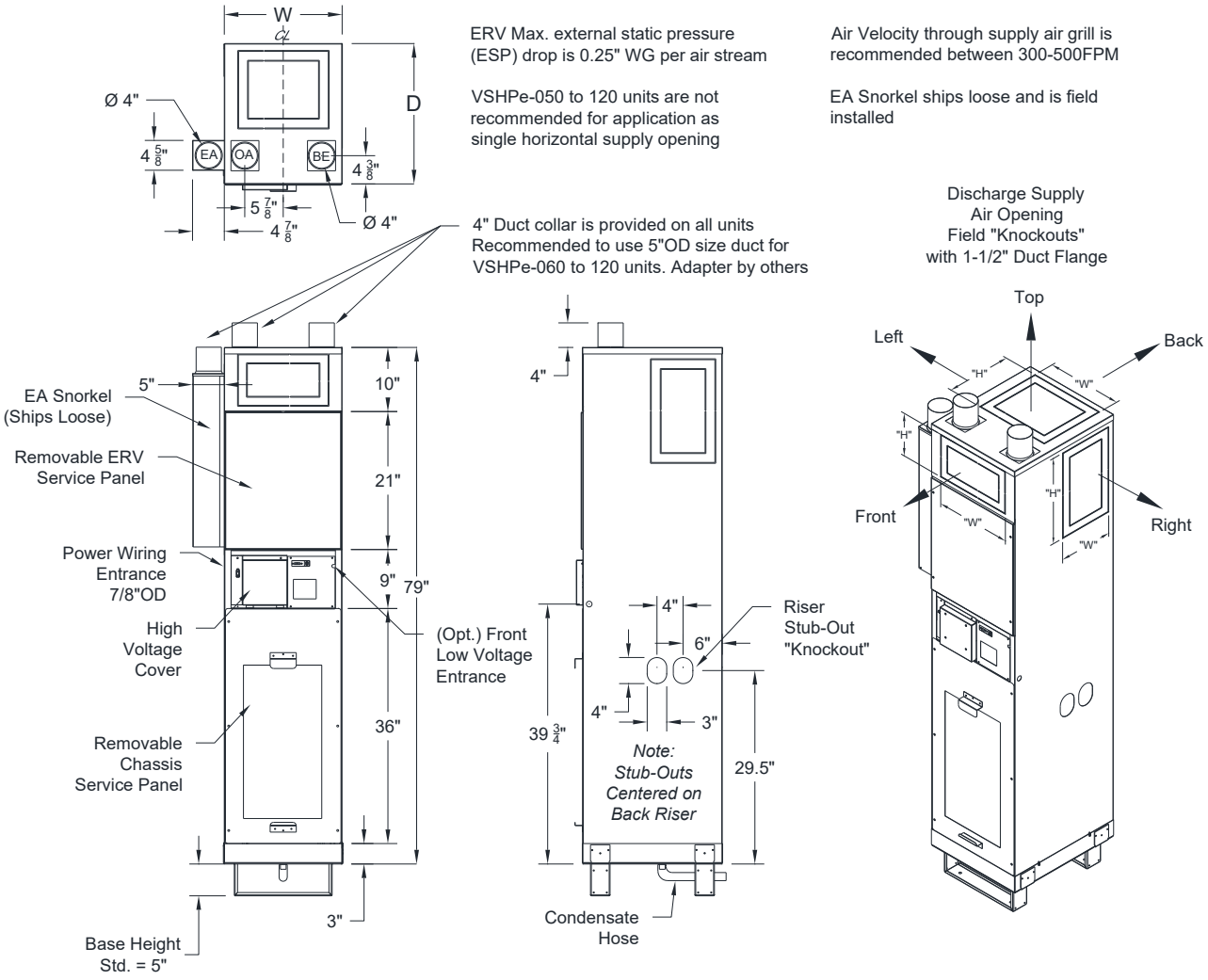
Personal Protective Equipment (PPE) is mandatory. Technicians installing or servicing this unit must use all PPE including but not limited to: hard hats, safety glasses, cut resistant sleeves and gloves, electrical PPE, and fall protection.

Disclaimer

All units are certified and built in accordance to applicable government and industry standards. Any customer modifications performed without the express written approval from the manufacturer are strictly prohibited and will void all warranties expressed or implied.

Modifications to the unit may result in hazardous or unexpected operation of the unit. Modifications to the unit may result in a potentially hazardous situation resulting in equipment damage, property damage, injury or death.

2. CABINET DIMENSIONS



ERV Max. external static pressure (ESP) drop is 0.25" WG per air stream

VSHPe-050 to 120 units are not recommended for application as single horizontal supply opening

Air Velocity through supply air grill is recommended between 300-500FPM

EA Snorkel ships loose and is field installed

A1 ERV Configuration is shown (Refer to ERV Configuration for additional layouts)

EA - Exhaust Air to Outside (Snorkel Ships Loose)
BE - Bathroom Exhaust to ERV
OA - Outside Air to ERV

VSHPe Cabinet Dimensions

Model	Capacity (Tons)	Cabinet Size	Dimensions (in)		VSHPe Supply Discharge Opening ("W" X "H") inches			
			W	D	Front	Back	Right/Left	Top
VSHPe 030	3/4	Y	18	21.5	14 x 8	8 x 14	10 x 12	12 x 12
VSHPe 040	1				14 x 8	8 x 14	10 x 14	12 x 12
VSHPe 050	1 1/4				14 x 8	8 x 14	10 x 16	14 x 12
VSHPe 060	1 1/2				14 x 8	8 x 14	10 x 16	14 x 12
VSHPe 080	2	Z	22	25.5	18 x 8	8 x 18	14 x 18	14 x 14
VSHPe 100	2 1/2				18 x 8	8 x 18	14 x 20	16 x 14
VSHPe 120	3				18 x 8	8 x 18	14 x 20	16 x 14

VSHPe Cabinet and Chassis Weights

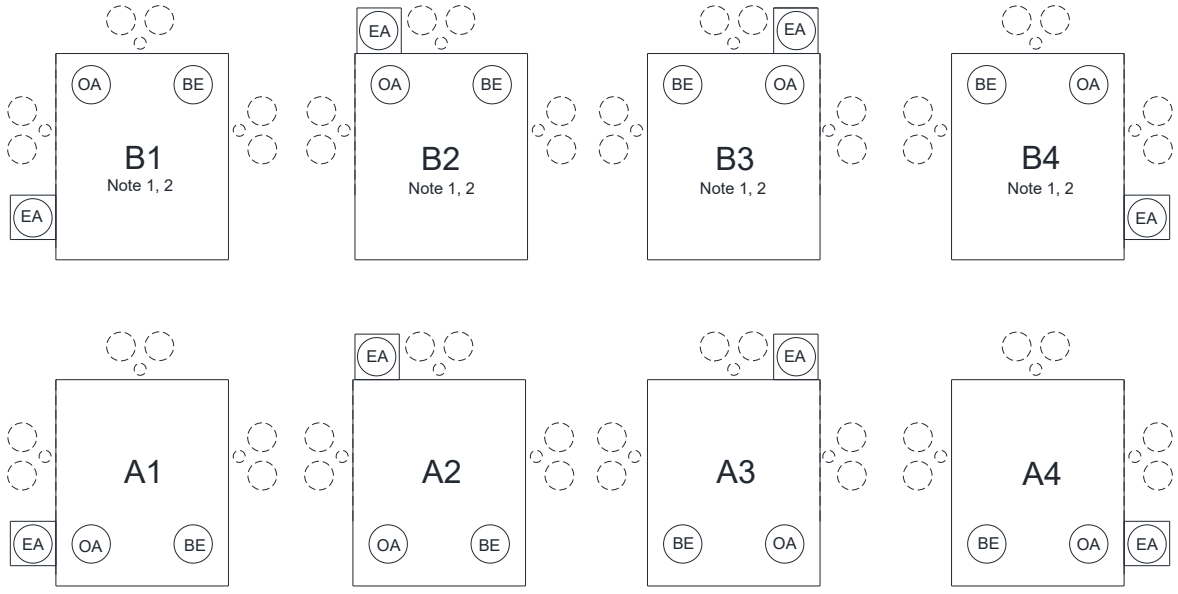
Model	Cabinet	Cabinet (lbs)	Chassis (lbs)
VSHPe 030	Y	175	95
VSHPe 040			
VSHPe 050		178	98
VSHPe 060			
VSHPe 080	Z	243	110
VSHPe 100		243	130
VSHPe 120		253	140

Notes:

- Temporary riser supports provided (Contractor to remove and install permanent riser clamps fastening risers to the building structure).
- Return air opening is on the front of the unit.
- Unit includes hose kits and manual shut off valves.
- Optional risers are furnished with type L, M copper. Available 3 inch deep swage connections on same size piping.
- Contractor to provide couplings where the piping is not swaged or for joining dissimilar piping sizes.
- Use flexible duct connections to supply ducts and registers.

VSHPe - ERV CONFIGURATIONS (TOP VIEW)

Left Hand (Type A1) and Right Hand (Type A4) are standard ERV port configurations..

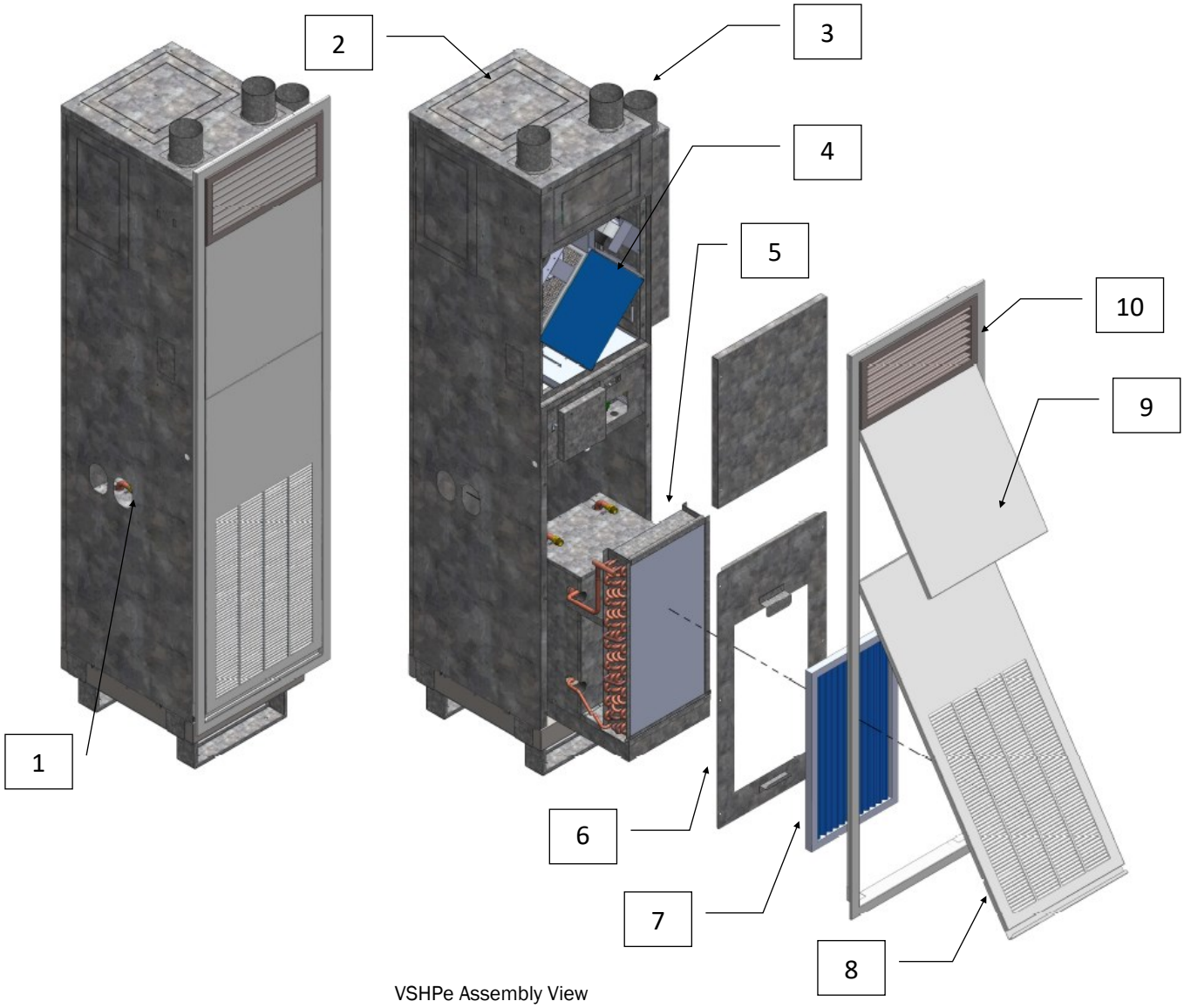


Acceptable Riser Locations:

EA - Exhaust Air to Outside
BE - Bathroom Exhaust to ERV
OA - Outside Air to ERV

Note:
1 - Left supply air discharge option not available
2 - Right supply air discharge option not available

1. Supply, return and condensate riser field “knockouts”.
2. Field “knockout” supply air openings (Front/Back/Side/Top) with 1-1/2” duct flange.
3. ERV Ports—Bathroom Exhaust, Exhaust Air, Outside Air.
4. Removable ERV core.
5. Heat pump chassis.
6. Chassis service cover panel.
7. 1” air filter.
8. Acoustic return air (R/A) panel for chassis, blower and electrical compartments.
9. ERV service panel.
10. Removable optional supply discharge grille panel.



VSHPe Assembly View

3. GENERAL UNIT INFORMATION

BLOWER & MOTOR

The unit comes with a blower and motor assembly that is mounted to a blower deck inside the unit cabinet, located above the chassis behind the electrical box. Removal of the blower/motor assembly is done through the chassis compartment opening.

UNIT NAMEPLATES

The nameplate contains information about the unit including model and serial numbers, electrical data and refrigerant charge information. Each cabinet and chassis come with a nameplate. Collecting the information on the nameplate will be useful when contacting your local customer service representative or when ordering parts.

CONTROLS

The unit comes with a factory supplied transformer. High voltage connection is made on the left side of the cabinet and low voltage connections enter through the right side of the cabinet, see cabinet dimensions.

ENERGY RECOVERY VENTILATOR (ERV)

Unit comes with integrated ERV. ERV Core is easily removable for servicing through the Return Air panel. All components and controls are factory installed and prewired. ERV bathroom timer is field installed and wired into ERV control board located in electrical box.

MICROPROCESSOR CONTROLLER

Unit comes with an advanced microprocessor controller that monitors the safety switches and controls unit operation. The microprocessor board comes with a terminal strip for wiring thermostat cable pigtails.

REFRIGERANT CONNECTIONS

Low and high pressure side refrigeration service ports are located inside the compressor enclosure. Slide out chassis and remove the top chassis sheet metal enclosure to access fittings.

CABINET

The cabinet is a fully factory assembled one piece cabinet. Use flexible duct connections for connecting to supply ducts to prevent vibration and noise transmission into occupant space.

RETURN AIR PANEL—ACOUSTIC

The **Acoustic Return Air Panel** is insulated with 1/2" thick, acoustic insulation and removable without tools to allow access to the filter and (optional) service disconnect switch. The panel is removed by swinging out and lifting it off the support pegs.

The middle panel is a removable swing panel for accessing and servicing the ERV core, sensors and fans.

The upper panel comes as either a blank panel or with a supply grille. Removal of this panel allows access to outdoor air (OA) actuator.

THERMOSTAT

Unit comes standard with a factory provided 24 inch long, 6-wire thermostat cable whip pre-wired to the control board terminal blocks.

4. INSPECTION & STORAGE

INSPECTION OF UNIT

Prior to the installation of the unit perform the following checks:

- Visually inspect the packaging, cabinet and chassis for signs of shipping damage prior to signing the bill of lading. Check that the units match the sales order by referring to the cabinet and chassis nameplate information.
- Inspect the riser ends for any sign of damage.
- Verify breaker and power supply meet electrical nameplate requirements of the unit.
- Check that the nameplate of the units matches the floor plan layout.

When construction is not complete including concrete core drilling, drywalling, plastering, painting or any work that would contaminate the storage space all necessary precautions are to be taken to prevent the cabinet and chassis from becoming contaminated. Particulate infiltration (i.e. drywall dust) into cabinet and chassis coil could result in equipment damage. Outgassing of construction materials and supplies could result in premature corrosion (formicary corrosion) of the chassis aircoil resulting in refrigeration system leaks. **Chassis should only be brought to job site and installed once construction work is complete.**

STORAGE

Both cabinet and chassis units are designed for indoor use only. Care must be taken to protect the unit from environmental damage. Store the chassis in an environment with a temperature above (32^{o}F). To prevent contamination the units should be stored indoors. For outdoor storage ensure:

- Units should be placed in an area that will not be exposed to moisture damage. Units should be placed on a dry surface and on a raised surface. Do not stack units.
- Cover the units and any accessories with a waterproof tarp.
- Failure to keep the units dry could result in the inte-

rior insulation becoming wet and cause the growth of mold which is known to cause odors and serious indoor air quality problems and health issues.

- Chassis units must be stored in the upright position to keep oil in the compressor.
- Riser ends should be capped if being stored on site to prevent contamination from foreign objects and debris.

Wet insulation can cause the growth of mold. Any sign of mold growth in the interior insulation should be removed, cabinet interior disinfected with anti-microbial cleaner and replaced prior to operating the unit.

Do not store cabinets on their side when chassis units are inside. Chassis units should always be stored and transported in the upright position otherwise damage to chassis may occur.

The refrigeration system of these units contains POE oil. PVC/CPVC piping is prone to failure when in contact with POE oil. PVC/CPVC piping should not be used for water supply and return with any heat pump products as this may result in failure of the system and serious property damage.

<u>Do not rest or lean the unit on the risers.</u> Do not use the risers or stub-outs to pick up the unit. Only designated lift points should be used when moving or lifting cabinets. Do not drop the risers.

5. CABINET & RISER INSTALLATION

Risers are designed to have slight adjustments for riser system expansion and aligning the stub-outs in the cabinet opening. When installing risers, do not let riser stubs bottom out in the riser swage.

Risers are designed to allow for 1-1/2 inches of movement due to expansion and contraction. If the total calculated riser expansion exceeds ±1-1/2 inches the field must provide expansion compensators.

Riser stub-outs should be located as centrally as possible in the cabinet opening. Do not allow stub-outs to rest or contact the sheet metal opening.

Do not allow the risers to bottom out when installing into the swage.

FOR SHIPPED LOOSE RISER SHUT-OFF VALVES

Visually inspect riser stub-outs and shut-off valves for debris or damage.

Follow industry standard soldering practices when soldering shut-off valves to riser stub-outs.

Ensure riser stub-out surface is cleaned of any residue, soot or oils. Failure to adequately clean soldering surfaces can result in water leaks, property damage and physical injury.

When soldering shut-off valves to riser stub outs, adequately protect cabinet, insulation and any other equipment from exposure to flames and heat.

CABINET INSTALL

1. When cabinets are shipped with risers attached, place cabinets in a horizontal position on the floor (do not rest cabinet on the risers).

2. If required, install any field or factory supplied riser extensions to the unit mounted risers.

3. Raise the entire cabinet slowly upright while at the same time lowering the risers through the floor cut-out opening. Align the risers to the matching swaged (optional) section of the riser on the floor below.

4. Optional swaged sections are approximately 3 inches deep. Risers should be inserted at a depth of approximately 2 inches into the 3 inch deep swage. Confirm risers penetrate at a minimum of 1 inch into the swage. Do not allow the riser tailpiece to bottom out fully into the 3 inch deep swage. This will allow for minor floor to floor variations, otherwise riser overlap may not be sufficient on upper floors.

5. Align and center riser positions in the pipe chase and level cabinet as necessary.

6. Secure the cabinet to the floor. Cabinet base comes with factory mounted pads.

7. Center the riser stub-outs in the cabinet openings to allow for riser expansion and prevent contact with cabinet sheet metal. Prevent riser stub-outs from contacting sheet metal pass through otherwise damage to stub-outs may occur, resulting in property damage.

8. Secure risers to building structure as per engineering design specifications. Do not allow the risers to be supported by the cabinets. Field supplied riser compensators are required if the temperature range of the system exceeds the expansion and contraction limit.

9. Using industry accepted soldering and brazing standards and materials to solder or braze the riser joints.

10. Connect supply ducts and discharge grilles.

11. Connect all ERV ducts to their corresponding connections.

RISER LOOP

Servicing

To enable system flushing, servicing and balancing of supply and return risers the following field supplied components are required: shut-off valves, drain tees and drain valves, and flow measuring devices. Refer to the job site engineering design specifications and building drawings for more detailed information.

Flushing & Cleaning

Once the riser system is complete the riser system must be flushed, cleaned and re-filled and chemically treated. Do not connect chassis to the water circulating system when flushing is being conducted to prevent debris and fouling of the water side components of the chassis (i.e. auto balancing valve, auto shut-off valve, coaxial coil).

Do not flush and clean riser system with chassis units connected. Do not allow the flushing and cleansing solutions to flow in the chassis water coil. Damage to water components may occur.

Supply and return pipes must be interconnected, at a minimum in the top and bottom units of each riser, with factory supplied hoses to properly flush system and ensure adequate elimination of foreign material and cleaning of riser system.

1. Use only clean water to fill water circulation system. Fill the water circulating system at the municipal water makeup connection with all air vents opened.

2. After air vents have been sequentially closed and riser system is primed begin water circulation of the system to purge remaining trapped air bubbles.

3. Shut off the circulating pump and open all the drains and vents to completely drain the system.

4. The riser system should be cleaned after the initial flush and flushed a second time to adequately rinse the riser system of cleaning solution.

Chassis installation is permitted once the riser system is thoroughly flushed, cleaned, and water loop is chemically treated and commissioned by the riser treatment company and contractor.

RISER SYSTEM LOOP TEMPERATURE

Correct riser system loop temperature settings are important for optimal unit operation. Temperatures outside of the recommended range will affect overall unit operating performance (capacity and efficiency), long term reliability and sound performance.

Cooling Season

In cooling mode recommended riser loop temperatures should be maintained between 85°F to 90°F. Higher riser loop temperatures reduce unit cooling capacity and efficiency, and increase sound levels.

Operation of riser loop temperatures above 110°F EWT is not permitted, and sustained operation above 100°F will reduce cooling capacity and may increase unit sound levels and maintenance costs.

Heating Season

In heating mode riser loop temperatures must be maintained within 55°F to 90°F for standard range operation. For Low Temperature Water (LTW) operation, riser loop temperature are permitted down to 45°F with water only risers systems. In Geothermal Range operation the system loop must contain an appropriate glycol mixture to protect the system from freezing the water circuit. For Geothermal operation units must come with factory Geothermal Range option. Do not operate riser system below 20°F EWT.

Operating Limits

Design limits can not be combined. Combining maximum or minimum limits is not allowed. This could exceed the operation and design limits of the unit.

For example: It is not allowed to combine maximum entering air temperature (EAT) limits with maximum entering fluid temperature (EFT) limits.

Air Limits	Cooling		Heating
	DB	WB	DB
Std. Entering Air Temperature (EAT)	75°F	63°F	68°F
Min. Entering Air Temperature (EAT)	65°F	55°F	50°F
Max. Entering Air Temperature (EAT)	85°F	71°F	80°F

Fluid Limits	Standard Range		Low Temp Water Range		Geothermal Range	
	Cooling	Heating	Cooling	Heating	Cooling	Heating
Std. Entering Fluid Temperature (EFT)	85°F	70°F	85°F	55°F	85°F	60°F
Min. Entering Fluid Temperature (EFT)	50°F	55°F	50°F	45°F	30°F	20°F
Max. Entering Fluid Temperature (EFT)	110°F	90°F	110°F	90°F	110°F	90°F

CFM Limits	
Min. CFM/Ton	300
Design CFM/Ton	400
Max. CFM/Ton	450

Fluid GPM Limits	
Min. GPM/Ton	1.5
Design GPM/Ton	3
Max. GPM/Ton	4

6. CHASSIS INSTALLATION

Do not apply plumbers putty, pipe dope or sealing tape to NPSM fittings.

Always use a back-up wrench when tightening hoses or fittings. Damage to copper pipes and solder joints could result in serious equipment and property damage.

Check hoses and fittings for any visible damage or debris.

INSTALLATION OF FITTINGS AND HOSES

Upon removal of service cover panel check cabinet interior for construction debris and dust. Clean out all dust and debris.

Close riser shut-off valves and disconnect factory hoses from riser supply or return shut off valves.

Units with NPSM Riser and Chassis Fittings

Connect the supplied hoses to the Male-NPSM riser shut-off valves. Do not apply pipe dope or pipe sealant to NPSM fittings. **Always use a back-up wrench**. **Finger tighten hose and tighten with back-up wrench approximately 1/6 turn. DO NOT OVERTIGHTEN**.

Units with NPT Riser and Chassis Fittings

Connect the supplied male-male (NPT/ NPSM) couplings to the Female-NPT supply and return riser shut-off valves. **Do not apply pipe dope to the NPSM fittings, as these are JIC style fittings.**

Connect the supplied hoses to the riser shut-off valves. **Always use a back-up wrench**. **DO NOT OVERTIGHTEN.**

CHASSIS INSTALL

1. Remove chassis packaging, leaving cardboard shipping cover on the air coil cover in place. Check chassis nameplate to verify chassis model matches cabinet model for compatibility.

2. Align chassis with front of the cabinet and tilt chassis so that the back aligns with the cabinet rails.

3. Slide chassis into cabinet partially. Check to ensure wiring harnesses are not being pinched. Adjust the chassis to ensure it is resting approximately centered in the rails.

4. Connect the hoses by hand to the chassis supply and return connections. Hand tighten, then using a back-up wrench tighten fittings as necessary. Ensure that the hose supply and return connections are not reversed and matched to correct risers. Water IN and water OUT is stamped on the chassis sheet metal enclosure.

5. If riser loop system has been commissioned and operational open the riser shut-off valves. Check for any signs of water leaks at all water connection points.

6. Connect the chassis electrical plugs to the quick connect mating plugs in the cabinet electrical box.

7. Slide the chassis into the cabinet. Check to ensure wiring harnesses and hoses are not being pinched. Do not push against the air coil surface.

8. Ensure hoses are not pressed against unit cabinet.

9. Remove cardboard shipping cover from the air coil.

10. Install the service cover panel and visually check foam gasket is not damaged and providing an adequate seal.

11. Insert filter into service cover panel.

12. Install Return Air Panel into the closet drywall opening if not already done and secure with screws.

7. UNIT START-UP

Ensure the building fluid loop system has been cleaned, flushed, re-filled, chemically treated and commissioned by the water treatment company. Verify that the main system strainers or mechanical filtration system has been installed and commissioned. **The chassis must be at room temperature (68°F) prior to start up.**

Do not attempt to start unit up when room temperature is below 60°F. Otherwise unit may experience pressure faults. Repeated pressure trips may damage the unit or cause property damage!

Once the installation of the cabinet and chassis units is complete the riser shut-off valves can be opened. The riser loop system should be filled and all trapped air should be bled from the system prior to unit start-up. Water flow failure will cause the unit to trip on the safety devices. Repeated water flow failures can cause equipment damage.

CHECKLIST

Before energizing the unit ensure all steps are verified in the following checklist:

___High voltage power supply is correct and in accordance with unit nameplate ratings.

___Unit is electrically grounded and circuit protection is the correct size.

___Low voltage control wiring is correct as per unit wiring diagram, including ERV bathroom timer.

___Riser loop system is clean, filled, and vented of any air.

___Chassis unit high and low pressure caps are firmly secure and in place.

___Chassis matches the cabinet model number.

___Protective cardboard air coil cover is removed and unit service cover panel and filter are in place.

___There is a proper seal between chassis service cover panel and unit cabinet.

___Riser shut-off valves are in the OPEN position.

___Riser loop system has been vented for any air introduced during chassis installation.

___Riser loop water is circulating through all units and at design conditions.

___Unit condensate drain hose is securely attached to drain pan and condensate riser.

___All ductwork and ERV connections are complete.

___Clean filters are installed.

___All cutting, sanding, drywalling, patching work is complete.

___Unit blower spins freely.

___Thermostat is in the OFF position.

___Room temperature is above 60°F.

INITIAL UNIT START-UP

1. Close disconnect switch.
2. Set thermostat to a high setting (above current room temperature), set system to COOL with fan on AUTO. The compressor should not run.
3. Lower the thermostat temperature setting until the fan and compressor energize. Verify the following results:

- Leaving water temperature (LWT) in the heat exchanger water coil is warmer than the entering water temperature (EWT) by approximately 9°F—12°F.
- Blower is running smoothly.
- ERV fans are running on a low speed.
- Compressor and blower amps are within nameplate data.
- Suction line is cool and no frosting is forming in the refrigeration circuit.

4. Set thermostat to the OFF position. Unit compressor and fan should stop running.
5. Allow the system to equalize for approximately 5 minutes.
6. Set thermostat to the lowest setting and switch to the HEAT position.
7. Adjust thermostat temperature higher until the fan and compressor energize. The following should occur:

- Warm air will flow from the supply register.
- Leaving water temperature (LWT) in the heat exchanger water coil is cooler than the entering water temperature (EWT) by approximately 5°F—9°F.
- Blower and compressor operation is smooth and no frost development is visible in the refrigeration circuit.

8. Set the thermostat to the desired temperature.
9. Turn on bathroom exhaust fan. Verify unit ERV fans are running on high speed.
10. Turn off bathroom exhaust fan and verify unit ERV fans are operating on low fan speed.
11. Check for any water leaks at the hose connections.

8. CONTROLS

8.1 MICROPROCESSOR CONTROLLER

DIP Switch Settings

Controller DIP switch contains 6 switches for setting up thermostat, Fan, and system settings. Microprocessor DIP settings are factory set. Make changes if warranted by site conditions. Below are the 6 settings:

DIP Switch Settings

DIP	DESCRIPTION	OFF	ON
1	Tstat Type	Heat/Cool Tstat	HeatPump Tstat
2	HP Type		Std Heat Pump
3	FlowType	Variable Flow	Constant Flow
4	Coax Valve		Coax Valve NC
5	Reversing Valve (RV)	RV Energized to Heat	RV Energized to Cool
6	FanMode		Fan Auto

NO = Normally Open and NC = Normall Closed

Heat Pump Thermostat

When using Heat Pump Thermostat (recommended setting) set DIP #1 to the “ON” position. See table below for connecting thermostat to unit terminal blocks:

DIP 1 (ON) = HeatPump Thermostat

WIRE	DESCRIPTION
R	24VAC – Line (R)
G1	Whisper Mode
G2	Medium Speed Fan
G3	High Speed Fan
Y	Call for Compressor
O/B	Call for Reversing Valve
C	Common (Optional)

Heat Pump Thermostat Connections

When setting thermostat to HEAT PUMP mode check the following:

“G” Terminal Close (24V) = call for fan

“Y” Terminal Closed (24V) = call for compressor

Heating Mode: “O/B” Terminal Open (0V) = Reversing Valve De-Energized

Cooling Mode: “O/B” Terminal Closed (24V) = Reversing Valve Energized

Heat/Cool Thermostat - Requires Power to G (Fan)

Ensure thermostat provides 24V power to G (fan) terminal during call for heating or cooling. When using HEAT/COOL thermostat set DIP #1 set to the “OFF” position.

See table below for connecting thermostat to unit terminal blocks:

DIP 1 (OFF) = HEAT/COOL Thermostat

WIRE	DESCRIPTION
R	24VAC – Line – (R)
G1	Whisper Mode
G2	Medium Speed Fan
G3	High Speed Fan
Y	Call for Cooling
O/B	"W" Call for Heating
C	Common (Optional)

Heat/Cool Thermostat Connections

When setting thermostat to 1HEAT/1COOL mode check the following:

“G” Terminal Close (24V) = call for fan

Heating Mode: “O/B” Terminal Closed (24V) = Reversing Valve De-Energized

Cooling Mode: “Y” Terminal Closed (24V)= Reversing Valve Energized

Note: If both “Y” and “O” are closed, a call for HEATING is assumed.

Thermostat Cable

Unit comes with a 24 inch long standard 6-wire thermostat cable. This cable is factory wired to the terminal blocks on the controller board. Wire other end of pigtails to thermostat harness. A minimum 4-wire thermostat cable is required for single fan speed thermostats that do not require a common wire connection. See Thermostat Wiring Detail.

Whisper Mode

Whisper mode is factory enabled and runs main blower fan at pre-determined low fan speed for continuous air circulation. A jumper is factory installed between ‘R’ and ‘G1’ terminals on TB1 of control board to enable Whisper mode. With Whisper Mode DIP Switch #6 is set to (ON) Auto. The manual fan speed switch is not used.

Single Fan Speed Thermostat

If connecting thermostats with single fan speed control connect fan speed to either the G2, or G3 terminals:

G1 = “Whisper” Mode

G2 = MEDIUM fan speed

G3 = HIGH fan speed

(Do not wire thermostat fan to G1 terminal)

Multi Fan Speed Thermostat

Up to two fan speeds can be selected from a multi-speed thermostat. Connect two of the thermostat fan speeds to the G2, and G3 terminals:

G1 = “Whisper” Mode

G2 = MEDIUM fan speed

G3 = HIGH fan speed

(Do not wire thermostat fan to G1 terminal)

Fan Control with EC Motors (ECM)

Low voltage PULSE WIDTH MODULATED (PWM) signal is utilized to control motor speed between 0 and 100% of full speed. The controller has been programmed to use 3 preprogrammed speeds for “Whisper” Mode, Medium and High. See electrical schematic in Figure 23. Inside electrical box a label indicates the factory pre-programmed speed settings.

8.2 SEQUENCE OF OPERATION

Call for Heating and Cooling

Demand call for Heating or Cooling are initiated at the thermostat.

When a compressor request is made, the optional auto shut-off control valve (COAX Flow valve) will open. The compressor contactor will then be energized so long as none of the following fault conditions are present:

- High-Pressure Alarm
- Low-Pressure Alarm
- Condensate Over Flow Alarm (Optional)
- Compressor Anti-Short Cycle 7 min. timer has not expired
- Entering Water Temperature is greater than 115°F
- Leaving Water Temperature greater than 127°F
- (Optional) High Water Pressure -

When call for compressor request is terminated, the auto shut-off control valve (COAX Flow Valve) and the blower fan will remain open for an additional 3 minutes.

Low-Pressure Bypass

During a call for compressor, the low-pressure switch is bypassed for the first 2 minutes of compressor operation to prevent nuisance low-pressure start-ups.

Timers and Interlocks

Microprocessor board utilizes a number of timers and interlocks in the control sequence of the unit.

Anti-Short Cycle Timer

The compressor anti-short cycle timer of 7 minutes starts every time a call for compressor is terminated to prevent compressor over cycling.

Fan-On Timer

The Fan-On timer of 3 minutes starts anytime there is a call for fan request.

Fan-Off Timer

The Fan-Off timer of 3 minutes starts anytime a call for compressor is terminated to ensure fan runs for a period of 3 minutes after the compressor turns off.

Valve Open Timer

The valve open timer of 1 minutes starts anytime a fan and compressor request are made to develop flow in the water coil.

Valve Closed Timer

The valve closed timer of 1 minutes starts anytime a call for compressor is terminated to allow for flushing of the water coil.

Random Wait Time on Unit Power Up

Microprocessor controller uses a random wait time during unit start up between 1-30 seconds.

8.3 TROUBLESHOOTING

Refer to the **Table 8: Troubleshooting Guide** for identifying common issues and possible resolutions. The microprocessor control board has a number of LED lights for identification of common alarms and faults. See **Table 9: Microprocessor LED Code Guide** for fault ID information.

If unit trips on Low or High pressure fault into a hard-lock state, **do not disconnect power to unit in an attempt to restart to unit.** The unit will allow 3 faults before it hard-locks. **Failure to diagnose pressure fault and re-starting unit can cause serious equipment and property damage.**

Test Mode

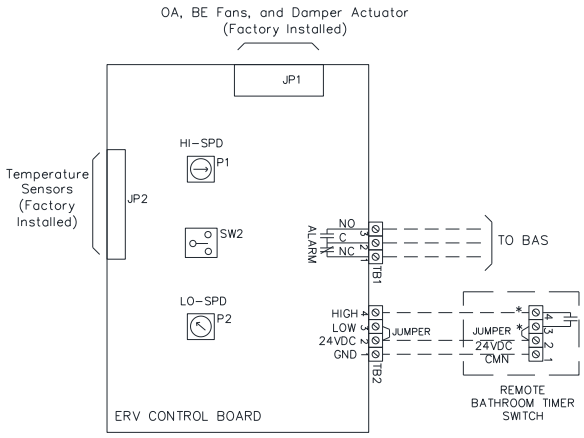
A Test mode feature can be enabled for 10 minutes in order to perform diagnostic testing at reduced time delays. To enable, jumper or short the two “DI1” pins on the microprocessor board. When done test mode remove jumper from “DI1” if used.

Unit status and diagnostics temperature readings can be easily accessed using a web browser based tool as described in the **Web Browser Access** section.

8.4 ERV CONTROLS & OPERATION

ERV Control Board

The ERV control board is powered by a 24VDC switching power supply mounted in the electrical box. DC power is supplied using the 14-pin connector (JP1). This also powers the modulating actuator and outdoor air (OA) & bathroom exhaust (BE) ERV fans. Temperature sensors are connected through the JP2 terminal.



Units features six temperature sensors:

OA – Outside Air

MA – Mixed Air (Mix of Outside Air and Discharge Air)

SA – Supply Air

DA – Discharge Air

BA – Bathroom Exhaust Air (Before Core)

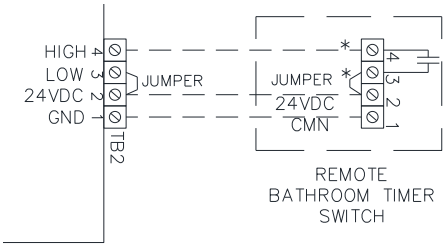
EA – Exhaust Air (After Core)

ERV Timer Switch (24VDC)

The ERV bathroom timer switch consists of a push button and timer option (20,30,40 & 60min).

When the timer switch puts the unit on high speed mode for the set time and the high speed LED (LD2) lights up.

After the timer cycle is expired the unit ERV fans return to low speed (normal) mode and the low speed LED (LD4) lights up on the control board. Low speed mode is default on initial power-up.



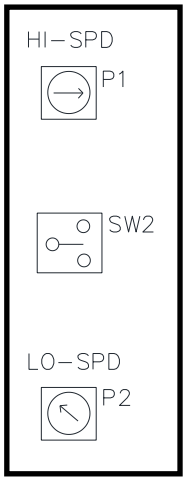
Airflow Balancing—EA Fan Speed Adjustment

Balancing of the ERV unit between the OA and EA flows ensure maximum efficiency. The exhaust air fans should be calibrated on site during start-up and commissioning for both high speed mode (P1) and low speed mode (P2).

Use the ERV board mounted low (**LO-SPD**) and high speed (**HI-SPD**) potentiometers to adjust the fan speed and static to meet site conditions.

SW2 toggle switch is used for service testing the Lo and Hi ERV fan speeds without having to set the bathroom timer. SW2 overrides the bathroom timer input and runs ERV fan on selected Hi or Lo speed. This must be placed back in the middle position after testing.

We recommend the following settings as a starting point for setting ERV fan:



1) Check that SW1 ON/OFF Switch is set to ON.
2) Set Hi-Speed to approx. 3 o'clock for duty at 80%.
3) Set Lo-Speed to 12 o'clock (45% duty).
4) Check toggle switch SW2 is in the middle position.

OA Fan Speed Adjustment

During normal operation the OA fan speed is automatically set by the controller potentiometer settings.

Defrost Mode

If the unit measures OA temperatures to 14°F (-10°C) the unit will enter defrost mode. During defrost mode the unit operates in 40-minute cycles modulating between fresh air and recycled air.

During fresh air cycles, the S/A control will maintain the supply air temperature above 50°F.

S/A Control

When the SA temperature drops below 50°F (10°C) the ERV controller will modulate the OA damper to maintain SA temperatures above this threshold.

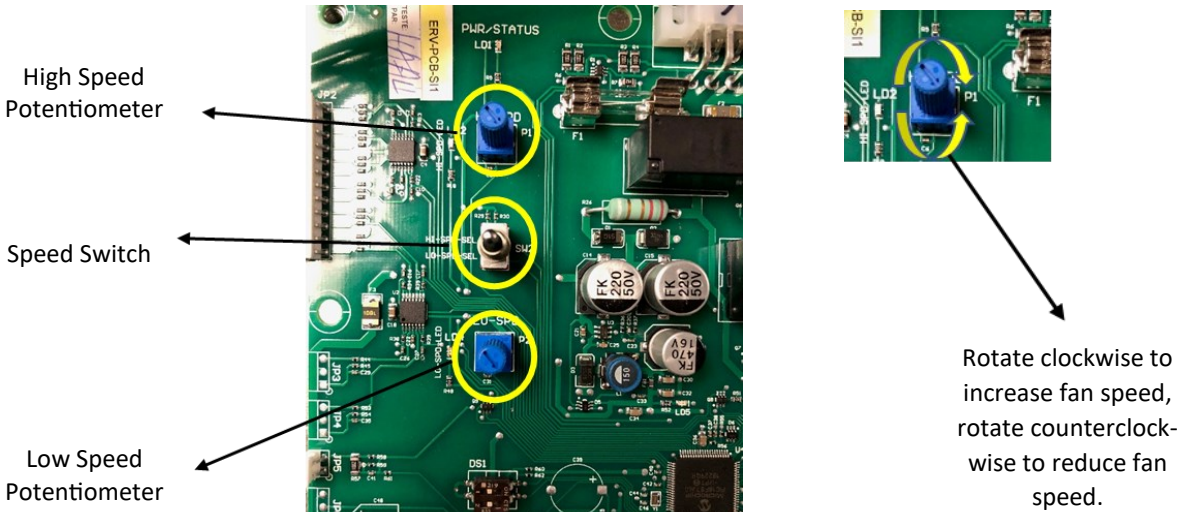
The modulating damper provides maximum fresh air and avoids the dumping of cold air.

This mode is disabled during the recycled air defrost mode.

ERV FAN SETTINGS

ERV Fan Setting

The ERV fans are factory set to default position. It is recommended to perform an air balance to determine required fan speeds - Low and High. The potentiometers located on the ERV board controls the Low and High fan speeds. These speeds are controlled using a PWM signal from 0% to 95% Torque. The range of the potentiometer is 8 o'clock to 4 o'clock.



ERV Fan Performance

% PWM Signal / Power	Potentiometer Dial Setting	ESP (External Static) inwg										
		0.00	0.025	0.05	0.075	0.10	0.15	0.20	0.25	0.30	0.40	0.50
25% Speed @ 6 Watts	10 O'clock	43	34	28	22	18	12	-	-	-	-	-
37% Speed @ 13 Watts	11 O'clock	70	54	43	34	27	15	7	-	-	-	-
45% Speed @ 18 Watts	12 O'clock	85	67	55	44	35	23	15	-	-	-	-
57% Speed @ 30 Watts	1 O'clock	111	95	83	74	68	54	45	37	30	21	15
69% Speed @ 43 Watts	2 O'clock	139	124	114	106	104	91	82	73	63	53	44
82% Speed @ 61 Watts	3 O'clock	168	155	150	141	139	127	119	107	96	85	72
95% Speed @ 82 Watts	4 O'clock	187	172	166	157	156	145	137	124	115	105	91

Notes:
- All airflow ratings are taken at lowest voltage rating of dual rating (ie. 208 volt).
- ERV external static setting is based on exhaust duct run.
- ESP capability shown per fan.
- Recommended ERV fan speeds are field set to match duct static. Default factory settings may not match site conditions and requirements.
- Watts includes both ERV fans.
- Internal Manual OA Slider Damper may be used to control OA introduction in the event of variable OA conditions (i.e. wind stack effect)

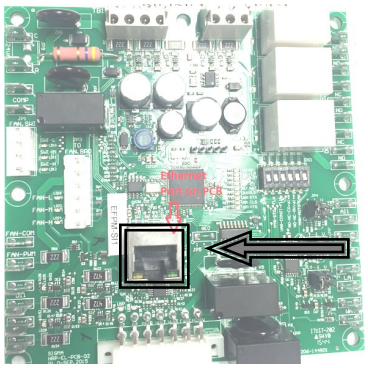
9. WEB BROWSER ACCESS

The Omega controller hosts a webpage configuration and troubleshooting aid. There are two ways to connect: using a mini-wireless router or directly to a laptop. Wireless router is the preferred method for fewer configuration steps.

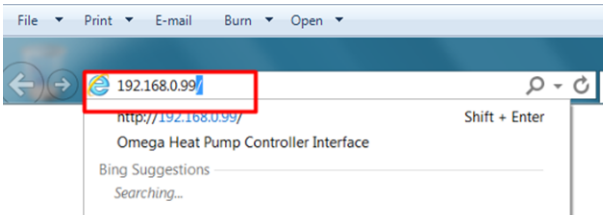
Wireless Router Method

1. To connect to the controller you will need the following: Ethernet cables, Laptop, and wireless router (e.g. TP Link TL-WR802N, shown below).

2. Remove electrical box access panel and connect ethernet cable directly into surface mounted ethernet port (RJ45) on controller board and to wireless router port.



3. <u>You will need to configure your router. Use quick start guide documentation provided with router</u>. Open up your internet browser (i.e. Explorer, Google Chrome) and type in the following address **192.168.0.99**

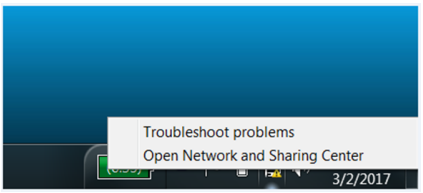


Direct to Laptop Method

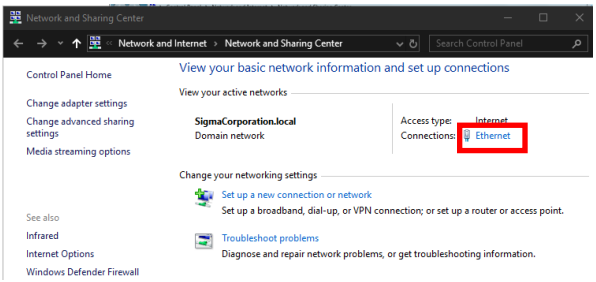
1. To connect to the controller you will need the following: Ethernet cable & Laptop.

2. Remove electrical box access panel and connect ethernet cable directly into surface mounted ethernet port (RJ45) on controller board.

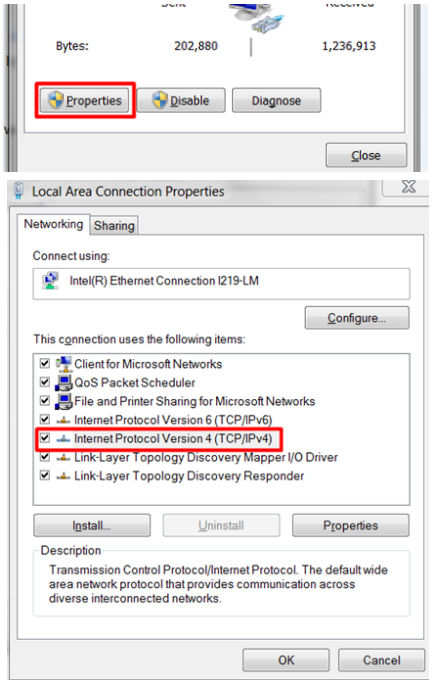
3. On laptop access “Network and Sharing Center“ though the “Network & Internet Settings” icon located in the bottom right taskbar.



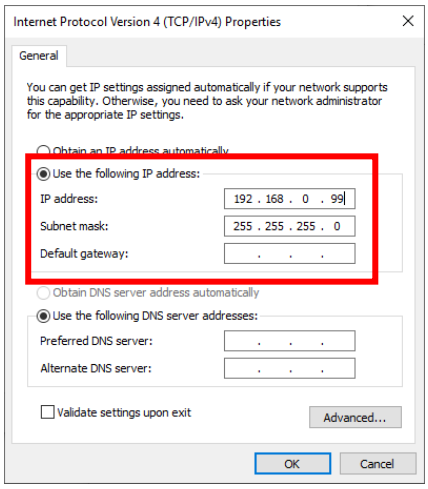
4. In the Network & Sharing Center click on “Ethernet” / “Local Area Connection” as indicated below.



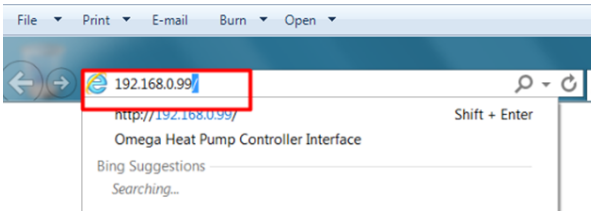
5. Local Area Connection Status will open, click on Properties, then click on “Internet Protocol Version 4 (TCP/IPv4)”, and click on Properties for IPv4.



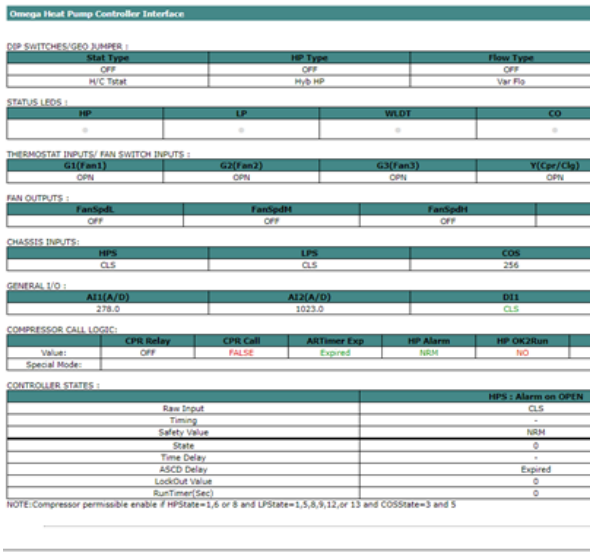
6. With Internet Protocol Version 4 (TCP/IPv4) window open click on “Use the Following IP Address” and change the IP address to 192.168.0.99 and Subnet mask to 255.255.255.0, as shown below. Then click “OK”.



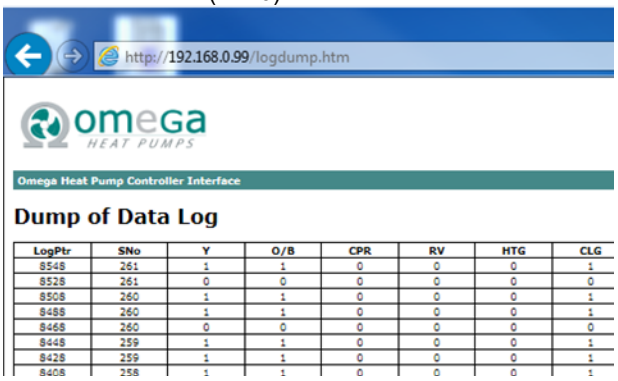
7. Open up your internet browser (i.e. Explorer, Google Chrome) and type in the following address 192.168.0.99.



8. The following home page will load for the controller software. Below is a screen shot of the interface (version 5.4 software is shown).



9. An event log feature called Log Dump allows for recording unit operation information during faults or at start-up as a troubleshooting aid. For example in the figure below the first line item indicates “Y” terminal was energized (Y=1) when the Cooling (CLG=1) and tripped on Low Pressure fault (LP=0).



LogPtr	SNo	Y	O/B	CPR	RV	HTG	CLG
8548	261	1	1	0	0	0	1
8528	261	0	0	0	0	0	0
8508	260	1	1	0	0	0	1
8488	260	1	1	0	0	0	1
8468	260	0	0	0	0	0	0
8448	259	1	1	0	0	0	1
8428	259	1	1	0	0	0	1
8408	258	1	1	0	0	0	1

Captured unit controller details indicate a binary value (0 or 1) to signify if there was a call or not for that parameter. These include:

Y = call from thermostat to Y terminal

O/B = call from thermostat to O/B terminal

CPR = compressor ON or OFF

RV= reversing valve energized or de-energized

HTG = call for heating

CLG = call for cooling

LP = low pressure fault

HP = high pressure fault

Fan = fan ON or OFF

CO = condensate fault

LPALM = low-pressure alarm

HPALM = high-pressure alarm.

10. MAINTENANCE GUIDE

Proper unit maintenance will result in optimal unit performance and prevent potentially costly repairs or property damage. Turn unit disconnect switch to off and turn unit off at circuit breaker/fuse panel before starting maintenance procedure.

Do not operate unit without filters or during any temporary construction that could clog the air filter or air coil.

Do not use any cleaning solutions that contain acids on the air-refrigerant coil or any refrigerant components.

30 DAY MAINTENANCE

1. Visually inspect filter monthly for dirt and clogging. Replace as required with a quality filter.
2. Vacuum dust from unit air grilles and surrounding coil area with soft bristle brush attachment as required.
3. Every month visually inspect unit for any signs of water leaks, or water damage around floor or surrounding drywall.

3 MONTH MAINTENANCE

1. Remove ERV filters located at each ERV fan and wash with water or mild soap.
2. Inspect condensate drain every 3 months for signs of stagnant water, microbial growth, and mineral buildup. Clean drain pan with an appropriate cleaning solution as required to prevent condensate hose blockages and microbial growth.
3. Check valves and hoses for signs of leaks, cracking or deterioration.

6 MONTH MAINTENANCE

1. Remove ERV Core and wash with water or mild soap.
2. Check condensate flow to ensure adequate drainage and test for signs of impending blockages.
3. Check that condensate alarm is operating correctly. Alarm trips whenever water level rises above sensor threshold and locks unit operation.
4. Visually inspect the air coil for signs of dirt accumulation. Use a mild detergent or coil-cleaning agent. DO NOT use any cleaning solutions that contain an acid, including acetic acid (vinegar). Damage to the air coil may occur resulting in possible refrigerant leaks.

ANNUAL MAINTENANCE

1. Perform an annual maintenance inspection of the fan and blower motor assembly. All units come with permanently lubricated fan motors. DO NOT oil or lubricate fan motors. Clean up any dirt or debris that may have accumulated.
2. Visually inspect the electrical box annually for signs of component damage due to overheating or poor electrical contact.
3. Completely clean the interior of the cabinet. Vacuum any dust or debris.

REPLACEMENT FILTERS & REFRIGERANT CHARGE

Disposable 1-inch thick replacement filters, sizes listed below and can be obtained from any HVAC parts supplier.

Factory provided filters are MERV 10. Pleated filters rated between MERV 8 to MERV 11 are preferable as they will provide optimal filtration. Higher rated filters (MERV 12, 13+) may reduce airflow and affect unit heating and cooling performance. Verify that the unit can produce the desired airflow before installing high efficiency filters.

Replacement Filter Sizes

Model	Replacement Filter Size (in)
VSHPe 030	14 x 25 x 1
VSHPe 040	
VSHPe 050	16 x 25 x 1
VSHPe 060	
VSHPe 080	20 x 25 x 1
VSHPe 100	
VSHPe 120	

Refrigerant Charge

Model	Charge (oz)
VSHPe 030	16
VSHPe 040	20
VSHPe 050	34
VSHPe 060	35
VSHPe 080	50
VSHPe 100	52
VSHPe 120	60

Table 8: Troubleshooting Guide

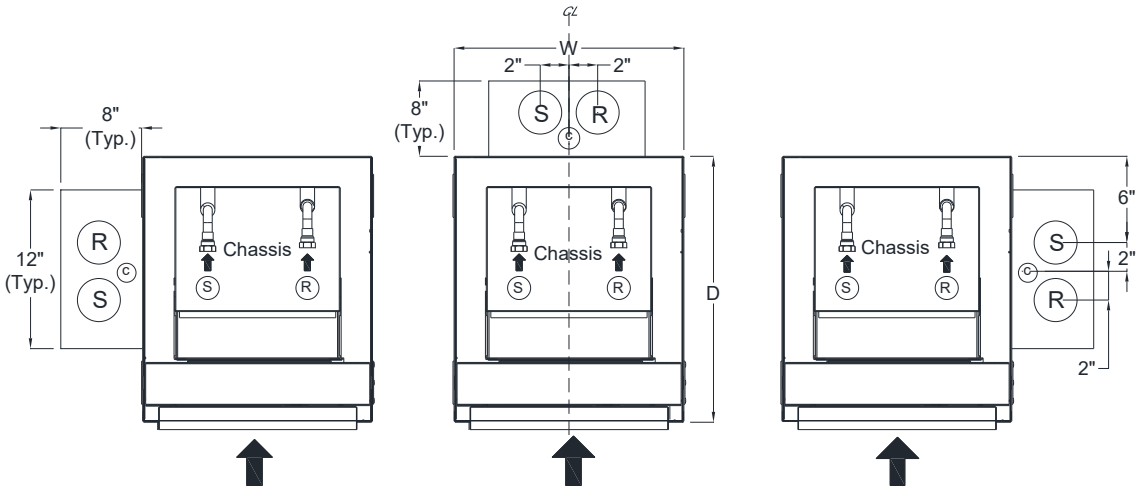
Problem	Mode	Possible Cause(s)	Correction Method
No response to any thermostat setting	Heating/Cooling	Main power off	Check unit disconnect switch/ circuit breaker/ fuses
	Heating/Cooling	Defective control transformer	Confirm thermostat is wired correctly before replacing
	Heating/Cooling	Broken or loose connection	Check for loose thermostat connections. Repair and/or tighten as required.
	Heating/Cooling	Defective thermostat	Check and replace
Unit short cycles	Heating/Cooling	Thermostat improperly located	Relocate thermostat away from supply registers
Only blower runs, but not compres-sor	Heating/Cooling	Defective compressor overload	Check and replace if required (if external)
	Heating/Cooling	Defective compressor contactor	Check and replace if required
	Heating/Cooling	Supply voltage too low	Correct incoming supply voltage setting at Transformer
	Heating/Cooling	Defective compressor capacitor	Check and replace if required
	Heating/Cooling	Defective compressor windings	Check and replace if required
	Heating/Cooling	Limit switches open	Check for faulty pressure switches. Switches are normally closed. Replace if switches are open when unit is shutdown.
	Heating/Cooling	Clogged Drain Pan / Condensate hose / Faulty Sensor	Condensate switch detects overflow condition in drain pan, check for obstruction. If no water, check switch, replace if required.
Insufficient capacity	Heating/Cooling	Dirty filter	Check and replace
	Heating/Cooling	Blower RPM too low	Set to blower to higher fan speed
	Heating/Cooling	Loss of conditioned air due to ductwork leaks	Check for duct leaks and repair
	Heating/Cooling	Low on refrigerant charge	Possible leak in system. Check for leaks at piping joints and coil. Repair if possible, and recharge to unit nameplate charge rating.
	Heating/Cooling	Defective reversing valve	Check and replace
	Heating/Cooling	Thermostat improperly located	Relocate thermostat
	Heating/Cooling	Inadequate water flow	Increase GPM
	Cooling	Entering Water Temperature too hot	Adjust EWT Loop temperature lower
	Heating/Cooling	Entering Water Temperature too cold	Adjust EWT Loop temperature higher
High Pressure Fault	Cooling	Inadequate GPM	If auto shut-off valve is installed, check that control valve actuator opens during call for Heating. Set valve to manual mode and remove power connections from actuator and re -test. If manual mode re-test confirms proper water flow, actuator is likely faulty.
	Cooling	Water too hot	Reduce water loop temperature
	Heating	Inadequate air flow	Check blower. Typical airflow should be 400 cfm/Ton across air coil. Check for dirty or obstructed air coil.
	Heating	Dirty filter	Clean/replace
	Heating/Cooling	Overcharged with refrigerant	Decrease charge/Confirm charge matches nameplate.
	Heating/Cooling	Defective pressure switch	Check or replace
Low Pressure Fault	Heating/Cooling	Undercharged	Possible leak in system. Check for leaks at piping joints and coil. Repair if possible, and recharge to unit nameplate charge rating.
	Cooling	Faulty thermal expansion valve (TXV) operation	Flooding of refrigerant caused by the TX valve not opening/closing correctly. Check TX valve bulb has not come loose.
	Cooling	Inadequate air flow	Check blower. Typical airflow should be 400 cfm/Ton across air coil. Check for dirty or obstructed air coil
	Cooling	Dirty filter	Check and replace
	Heating	Inadequate GPM	Check GPM to unit. If auto-flow reg. valve installed check GPM matches rating of auto-flow reg. valve.
	Heating	Inadequate GPM	If auto shut-off valve is installed, check that control valve actuator opens during call for Heating. Set valve to manual mode and remove power connections from actuator and re -test. If manual mode re-test confirms proper water flow, actuator is likely faulty.
	Heating	Inadequate GPM	Inadequate water flow from riser loop system. Units are nominally rated for 3GPM/Ton. Check water flow from riser system and confirm capability to provide required GPM to unit.
Water Loop Discharge Temp Alarm	Cooling	Inadequate GPM/Too High Riser Loop Temperature	Leaving water temperature from water coil exceeds acceptable operating temperature (127°F). Check for clogged or faulty water components, or too low GPM riser supply or too high entering water temperature.
Water Loop Supply Temp Alarm	Heating/Cooling	Too High Riser Loop Temperature	Entering water temperature to water coil exceeds acceptable operating temperature (115°F). Lower riser water loop temperature.
Condensate Overflow Alarm	Cooling	Clogged Drain Pan / Condensate hose	Condensate switch detects overflow condition in cabinet drain pan. Check for plugged, obstructed or pinched condensate hose.
Refrigerant Suction Alarm	Heating/Cooling	Suction Temperature sensor defective.	Check that sensor is not open or closed. Check for resistance, if reading Zero of Infinity replace sensor.
	Heating/Cooling	Suction Temperature below threshold	Suction temperature is below 50°F in cooling and 70°F in heating. Refer to possible causes under "Low Pressure Fault".

Table 9: Microprocessor LED Code Guide

LED	Description	LED Code	Alarm Description
HP	High Pressure	Red = Solid	High pressure alarm. Hard Lock-Out. 3 Trips
		Red = Blinking	High pressure alarm. Soft Lock-Out
LP	Low Pressure	Red = Solid	Low pressure alarm. Hard Lock-Out. 3 Trips
		Red = Blinking	Low pressure alarm. Soft Lock-Out
WLDT	Water Loop Discharge Temp	Red = Solid	Water loop discharge temperature too hot. Non-latching alarm
		Red = Blinking	Sensor open/missing or close/shorted. Non-latching alarm, replace sensor
CO	Condensate Overflow	Red = Solid	Condensate overflow alarm. Hard Lock-Out. 2 Trips
		Red = Blinking	Condensate overflow alarm. Soft Lock-Out
RST	Refrigerant Suction Temp	Red = Blinking	Sensor open/missing or close/shorted. Non-latching alarm. Replace sensor
WLST	Water Loop Supply Temp	Red = Solid	Water loop supply temperature too hot. Non-Latching fault
		Red = Blinking	Sensor open/missing or close/shorted. Non-latching alarm, replace sensor
STA	PCB Status	Green = Blinking	PCB is operational
CLG	Cooling	Green = Solid	Cooling call from thermostat input
HTG	Heating	Green = Solid	Heating call from thermostat input

Note: LED table applicable to version 5.4.1 software only.

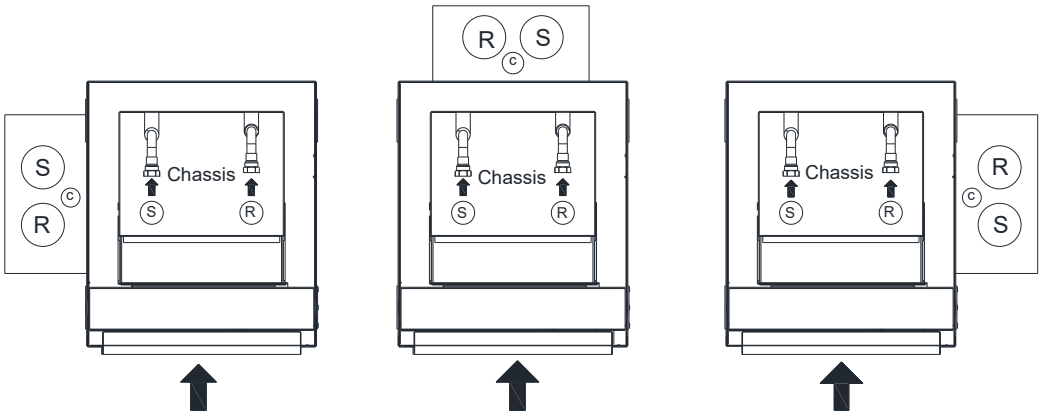
LP Alarm LED	*HP Alarm LED*	*COS Alarm LED*
LP SoftLock = 0, Off	HP SoftLock = 0, Off	COS SoftLock = 0, Off
LP SoftLock = 1 , Blink 1 every 1 Sec	HP SoftLock = 1 , Blink 1 every 1 Sec	COS SoftLock = 1 , Blink 2 every 1 Sec
LP SoftLock = 2 , Blink 2 every 1 Sec	HP SoftLock = 2 , Blink 2 every 1 Sec	COS SoftLock = 2 , Solid = HARD LOCK
LP SoftLock = 3 , Solid = HARD LOCK	HP SoftLock = 3 , Solid = HARD LOCK	



FRONT Return Air
Left Hand Riser (LH-SR)

FRONT Return Air
Back Riser (BK-SR)

FRONT Return Air
Right Hand Riser (RH-SR)



FRONT Return Air
Left Hand Riser (LH-RS)

FRONT Return Air
Back Riser (BK-RS)

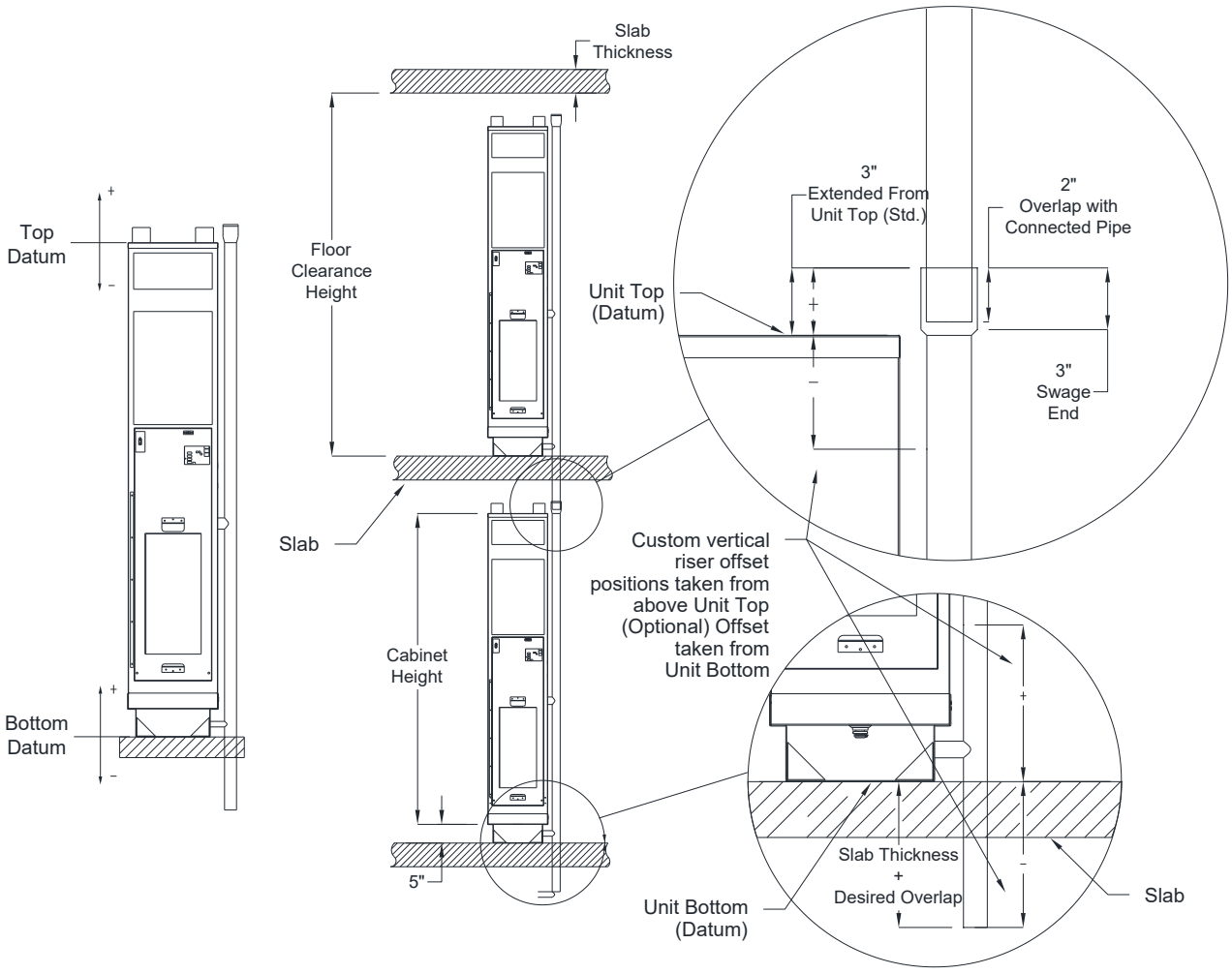
FRONT Return Air
Right Hand Riser (RH-RS)

Riser Handing Configurations

S = Supply Riser
C = Condensate Riser
R = Return Riser

Notes:

- As viewed from top, risers can be order in either SR configuration (supply, condensate, return) or RS (return, condensate, supply).
- Risers can be ordered from factory with 3 inch deep swage.
- Contractor to provide riser transition pieces when joining dissimilar riser sizes.
- All handing's determined by facing front of the unit (return air opening)

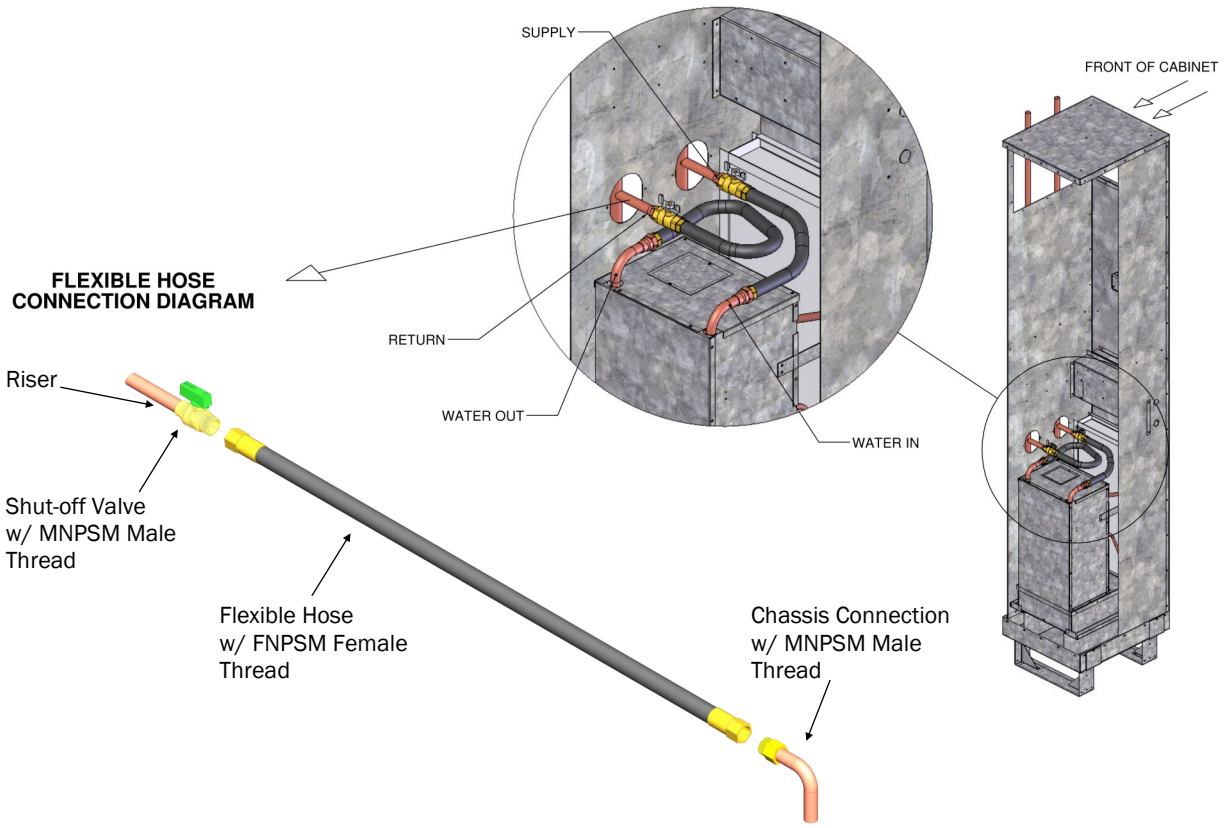


Riser Length Reference Measurements

Notes:

- **Risers are positioned relative to cabinet using a standard "Top" Datum reference (optional "Base" Datum). Top Datum Offset indicates where the top of riser will be located relative to top of cabinet. A Base Datum indicates where bottom of riser will be located relative to base of cabinet.**
- **Upon request Omega will provide 3 inch deep swage on risers of same pipe size (optional for all risers) for connection to units on the floor below.**
- **Risers should insert 2 inches into the 3 inch deep swage connection (minimum 1 inch insertion is required)**
- **Riser Length = Floor Clearance Height + Slab Thickness + 2 inch (overlap) (Rounded up to 120" or 144").**
- **Omega supplies two standard riser lengths, 120" (10') and 144" (12'), to be field cut on-site.**
- **Omega does not supply extension tailpieces or transition riser pieces for joining dissimilar piping sizes. Items are field provided.**
- **Risers available in Type L and Type M/DWV copper.**
- **Condensate riser comes standard with 3/8 inch thick closed cell insulation to prevent condensation.**
- **Optional insulation on supply and return risers is available.**

Right Side Riser Installation shown

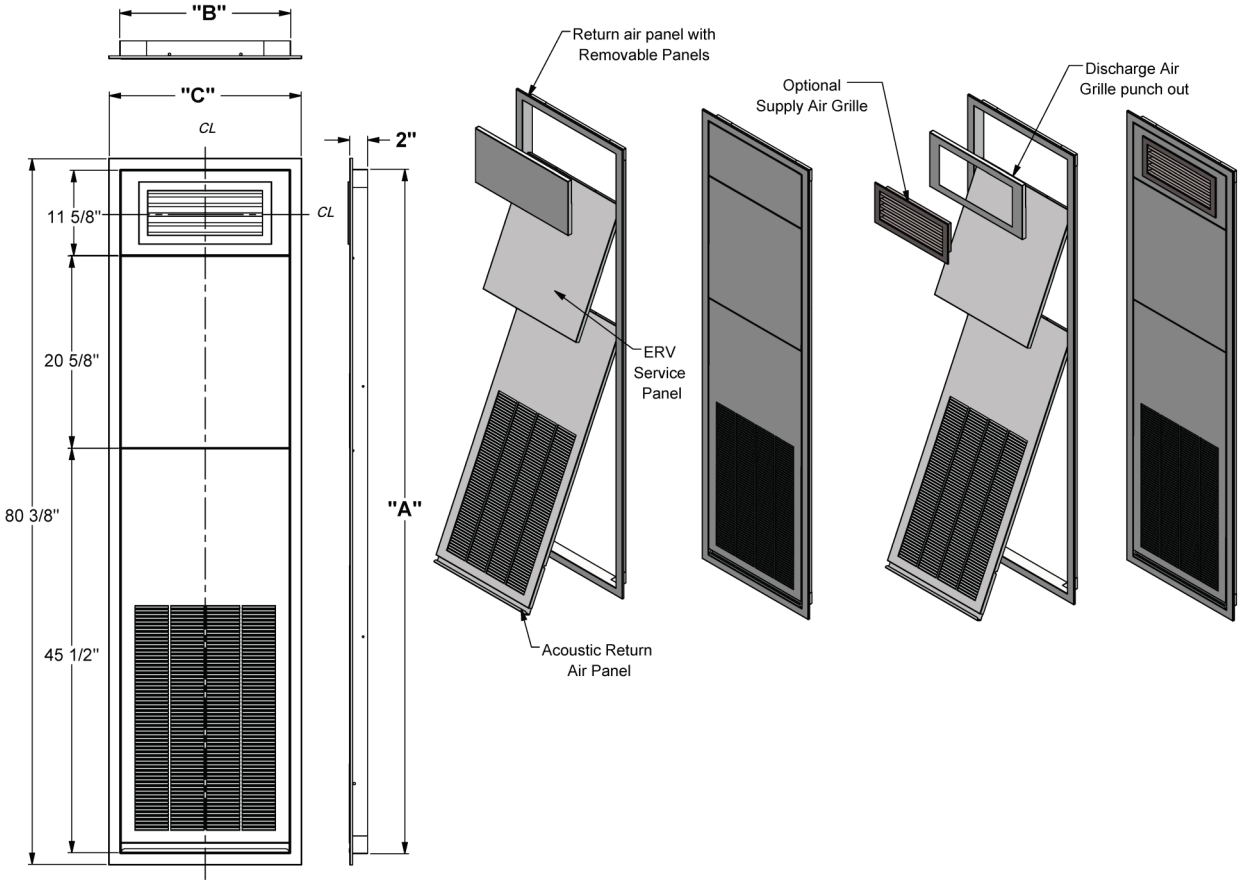


Hose Kit Details

Hose Kit Sizes

Model	Hose Kit	
	Size (in)	Length (in)
VSHPe 030	1/2	24
VSHPe 040	1/2	24
VSHPe 050	1/2	24
VSHPe 060	1/2	24
VSHPe 080	3/4	30
VSHPe 100	3/4	30
VSHPe 120	3/4	30

Hose kits are supplied with each unit. Hose kit configurations vary by unit size as shown.



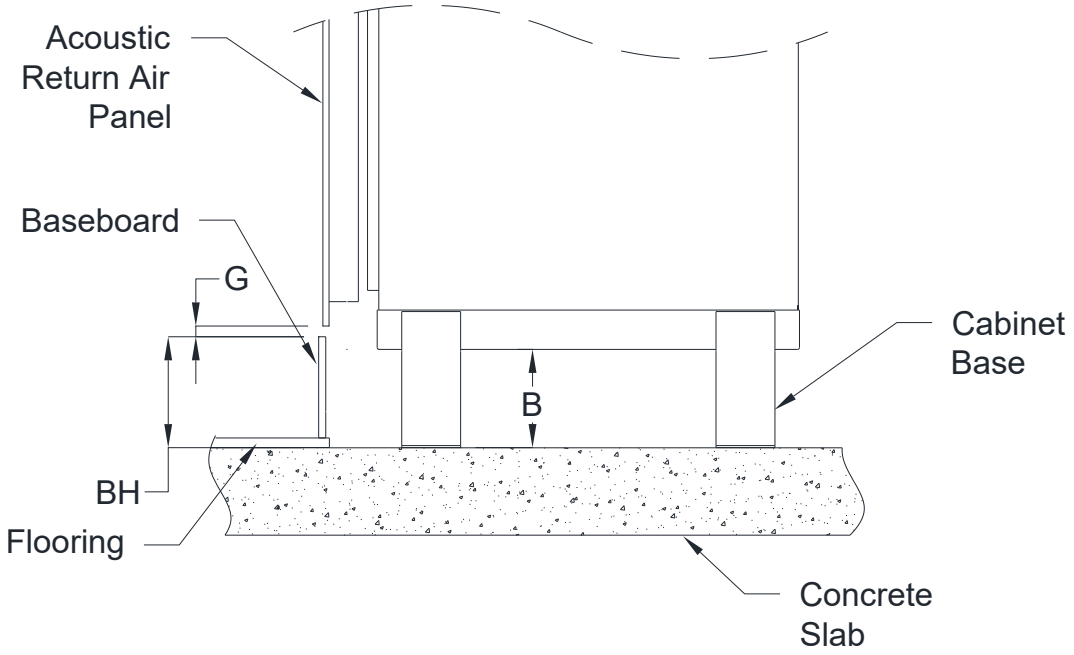
Acoustic ERV RA Panel Dimensional Drawing

Acoustic ERV RA Panel Sizes

Model	Cabinet Size	Acoustic RA Panel Dimensions (inches)		
		A	B	C
VSHPe 030	Y	78	19 5/8	22
VSHPe 040				
VSHPe 050				
VSHPe 060				
VSHPe 080	Z	78	23 5/8	26
VSHPe 100				
VSHPe 120				

NOTES:

- **Center vertically and horizontally RA panel supply opening with unit front "knockout" supply discharge.**
- **For optional RA panels with supply grille: apply gasket tape to supply grille throat to insert into unit supply discharge flange.**



Acoustic Panel Cabinet Base Height Calculation

Acoustic ERV Panel Cabinet Base Height Calculation:

BH = Baseboard Height + Finish Floor Height*

G = Gap (recommend min 0.5”) between baseboard and panel.

B = Cabinet Base Height (Min. 5", 1" increments)

B = BH + G - 1”

Note: *Include flooring thickness, underlayment, and any concrete leveling as part of calculation.

Example:

If using a 6" baseboard, with 1” Finished Flooring height, and 0.5" gap:

B = (6” + 1”) + (0.5”) - 1”

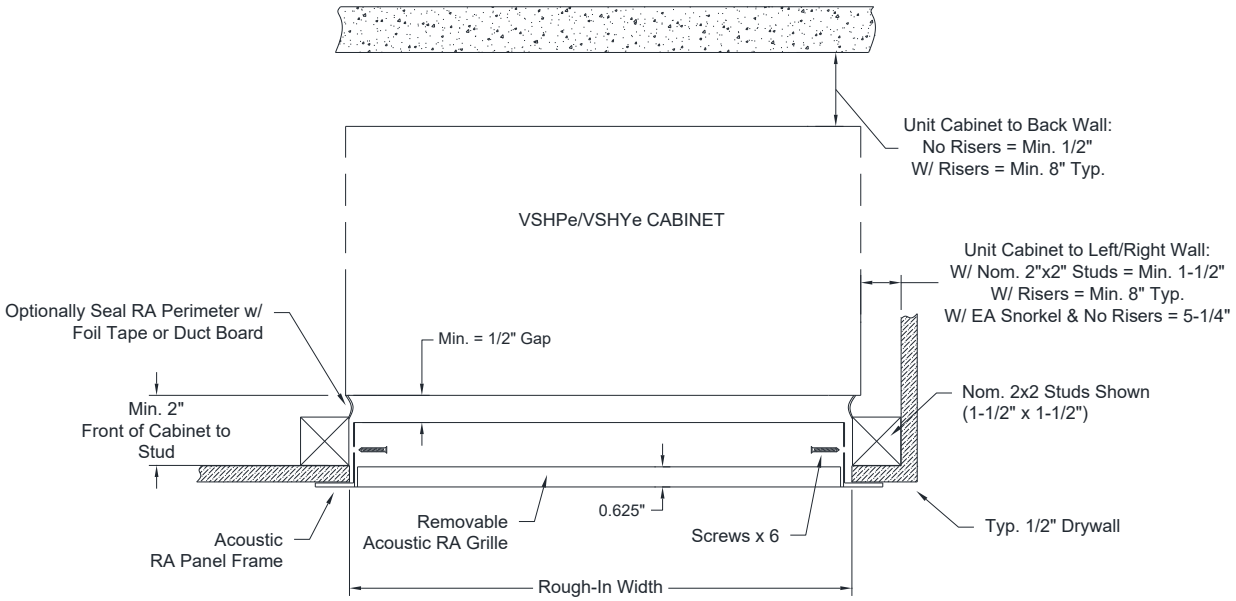
B = 6.5"

Therefore we round up to a 7” Cabinet Base required.

Example: Baseboard - Base Height

Baseboard Height*	Cabinet Base Height
Up to 4-1/2"	5"
>4-1/2 to 5-1/2"	6"
>5-1/2" to 6-1/2"	7"
>6-1/2" to 7-1/2"	8"

*Includes 1" Total Flooring
*Using gap G= 0.5"
(top of baseboard to return panel flange)

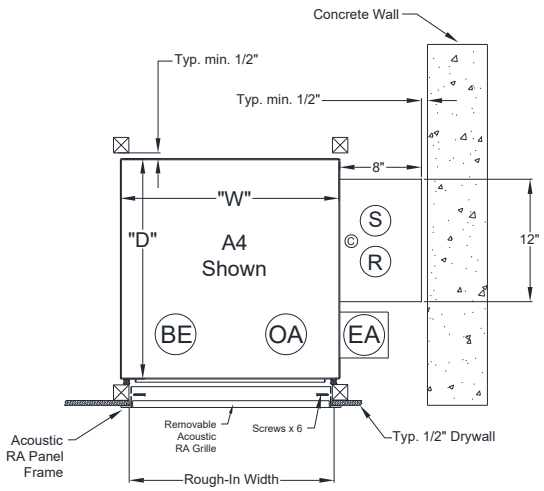


Acoustic Panel Furring Detail—Typ. 2x2 Framing Plan View

Notes:

- The framing should be installed for a min. 1/8" and max. 1" clearance between unit RA flange and RA panel sleeve.
- Return air panel should be centered in front of the unit return air opening.
- With rear/side risers, allow for min. 8" typical clearance at the rear/side of the units.
- Insulate the drywall enclosure with plenum rated acoustical insulation for additional sound attenuation.
- Optionally seal perimeter with foil tape or duct board (such as Thermopan®).

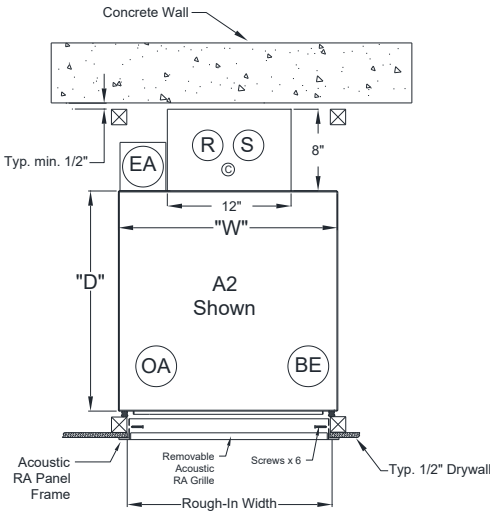
SIDE RISER



Furring Covers A4, B4, C4 & D4 Configurations

A1, B1, C1 & D1 are Mirrored

BACK RISER



Furring Covers A2, B2, C2 & D2 Configurations

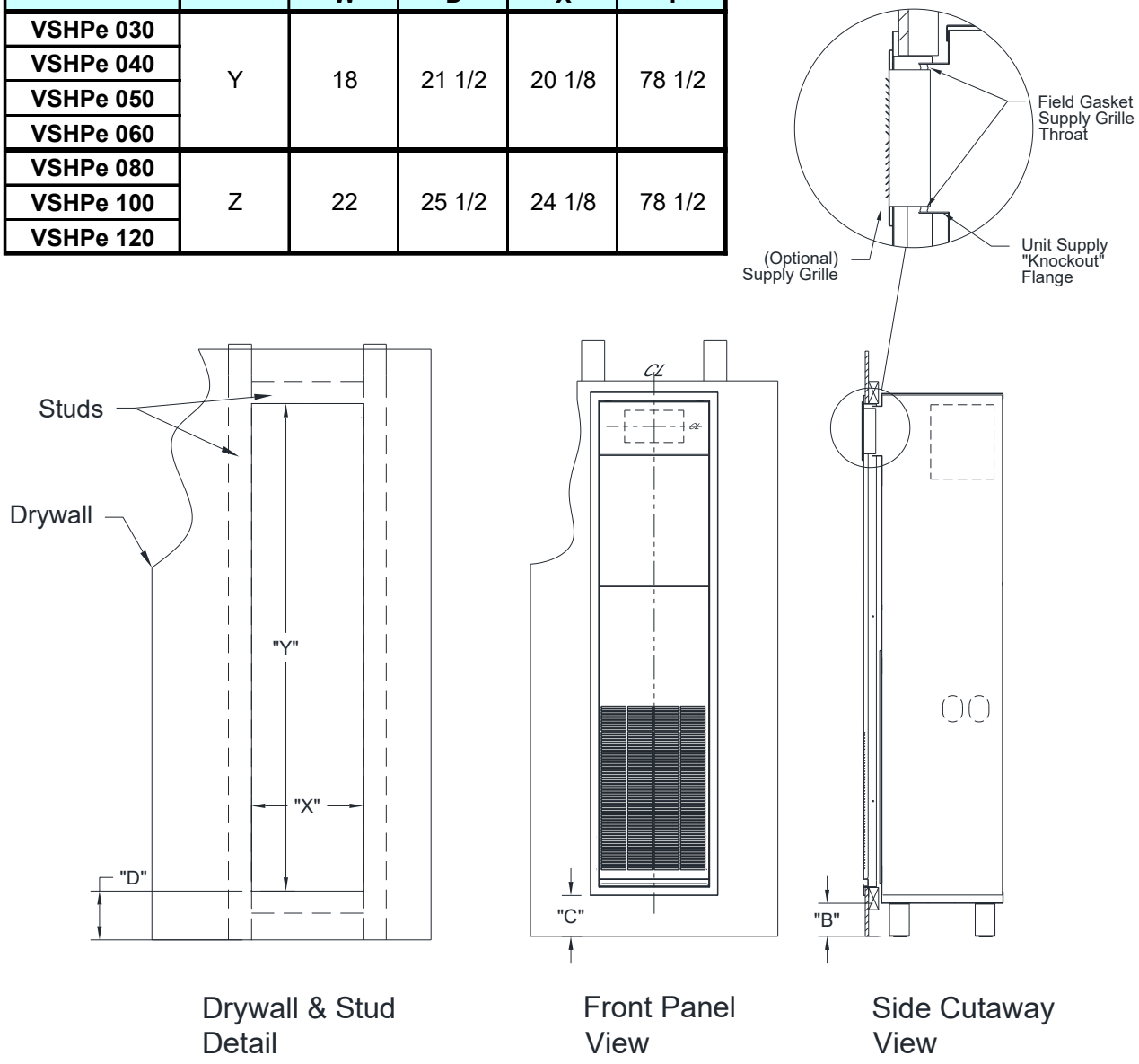
A3, B3, C3 & D3 are Mirrored

EA - Exhaust Air to outside
BE - Bathroom Exhaust to ERV
OA - Outside Air to ERV

R Water Return
© Condensate Drain
S Water Supply

Acoustic RA Panel Furring Sizes

Model	Cabinet Size	Cabinet Dimensions (in)		Rough-In (in)	
		W	D	"X"	"Y"
VSHPe 030	Y	18	21 1/2	20 1/8	78 1/2
VSHPe 040					
VSHPe 050					
VSHPe 060					
VSHPe 080	Z	22	25 1/2	24 1/8	78 1/2
VSHPe 100					
VSHPe 120					



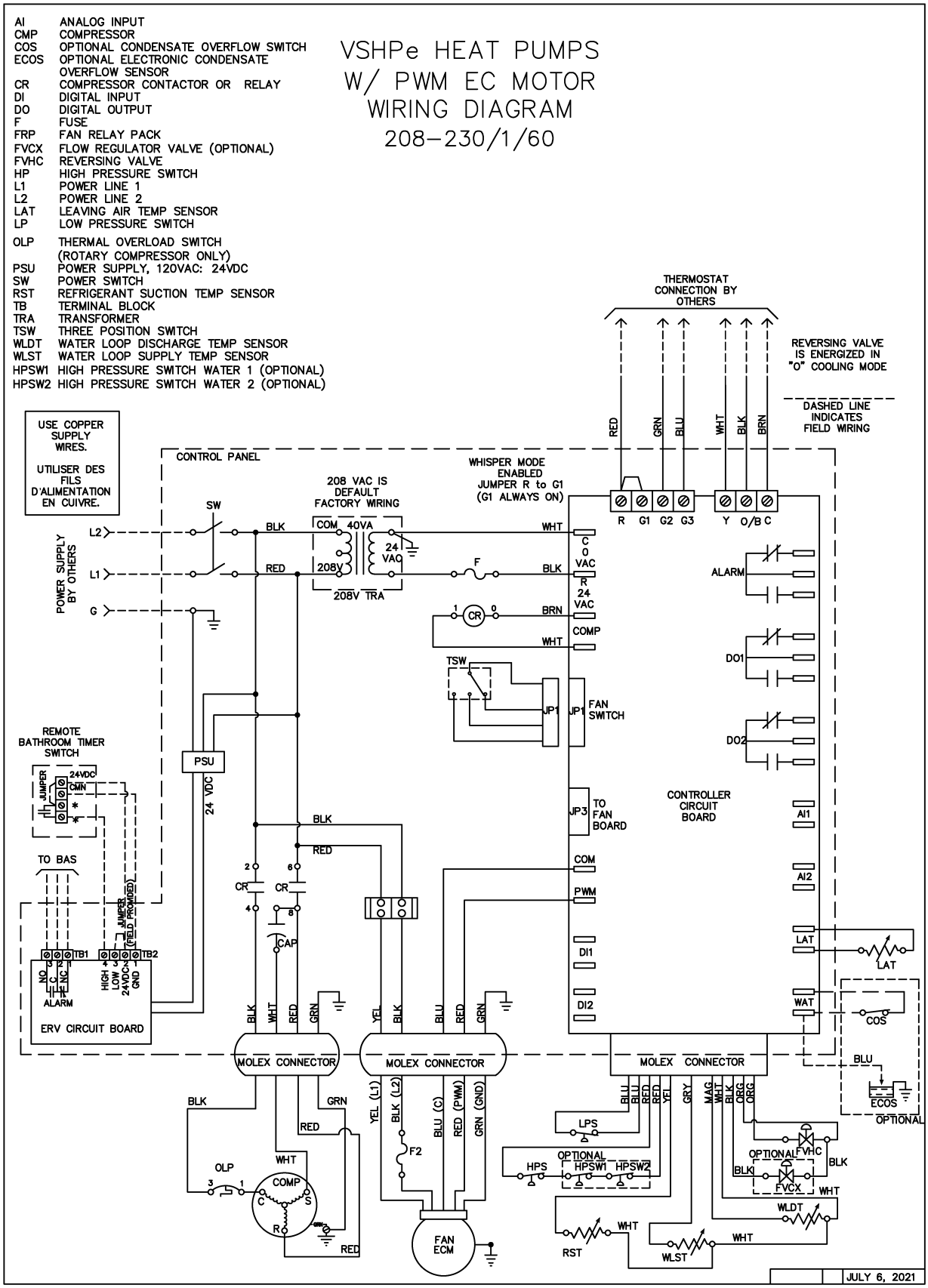
Acoustic Panel Furring Detail—Front & Side View

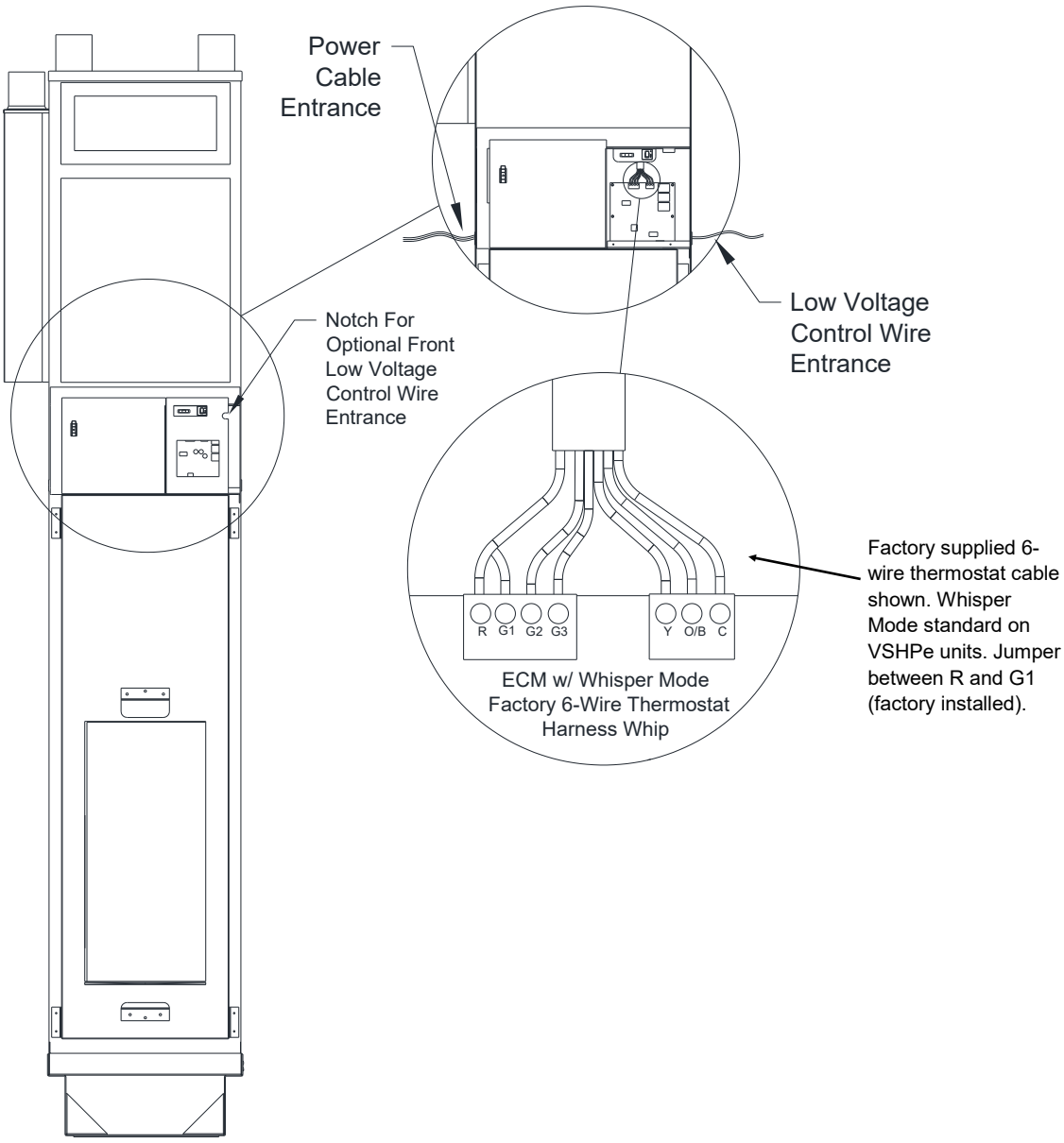
B = Cabinet Base Height (Min 5", increases in 1" increments)
C = Panel Flange Height from Base of Cabinet (**B** + 1")
D = Rough-In Height from Base of Cabinet (**B** + 2")

NOTES:

- **Center vertically and horizontally RA panel supply opening with unit front "knockout" supply discharge**
- **For optional RA panels with supply grille: apply gasket tape to supply grille when inserting into unit supply flange**

VHSPe Electrical Schematic—ECM Fan





Thermostat Wiring Detail

Heat Pump Thermostat:
R = 24VAC
G1 = Whisper Mode (Cont. Fan On)
G2 = Fan Speed 2 (Medium Speed)
G3 = Fan Speed 3 (High Speed)
Y = Compressor On
O/B = Reversing Valve (Energize to Cooling)
C = Common

Heat/Cool Thermostat:
R = 24VAC
G1 = Whisper Mode (Cont. Fan On)
G2 = Fan Speed 2 (Medium Speed)
G3 = Fan Speed 3 (High Speed)
Y = Cooling
O/B = Heating
C = Common

ECM Fan Data

Unit Size	EC Motor Speed	Minimum SCFM	Rated SCFM	External Static Pressure (in w.g.)												
				0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6
				SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM
030	WHISPER* MODE	N/A	N/A	225	210	195	175	160	145	130	115	100	85	70	-	-
	MED	220	350	350	340	335	325	315	305	295	285	275	265	255	245	235
	HIGH			-	-	365	355	350	340	330	320	310	305	295	285	275
040	WHISPER* MODE	N/A	N/A	250	230	225	205	180	160	145	125	110	90	75	-	-
	MED	300	460	460	450	445	440	430	425	415	405	395	385	375	365	355
	HIGH			-	-	-	-	470	465	455	445	435	430	420	410	400
050	WHISPER* MODE	N/A	N/A	450	430	410	390	370	350	320	300	270	250	220	-	-
	MED	375	530	-	-	550	540	520	505	485	470	450	430	410	390	375
	HIGH			-	-	-	-	-	-	555	540	525	510	490	475	460
060	WHISPER* MODE	N/A	N/A	450	430	410	390	370	350	320	300	270	250	220	-	-
	MED	450	630	640	620	610	595	580	565	555	540	525	510	490	475	460
	HIGH			-	-	675	670	655	650	640	620	610	595	580	565	550
080	WHISPER* MODE	N/A	N/A	620	580	560	520	480	440	410	380	340	300	260	-	-
	MED	600	820	880	860	840	820	800	780	750	720	700	670	650	625	600
	HIGH			-	-	-	-	895	880	860	820	805	795	780	770	760
100	WHISPER* MODE	N/A	N/A	620	580	560	520	480	440	410	380	340	300	260	-	-
	MED	750	1010	1080	1060	1040	1010	990	970	950	930	900	880	860	840	820
	HIGH			-	-	-	-	1110	1090	1070	1060	1040	1020	990	980	960
120	WHISPER* MODE	N/A	N/A	620	580	560	520	480	440	410	380	340	300	260	-	-
	MED	900	1200	1230	1200	1185	1170	1150	1130	1110	1095	1080	1055	1040	1020	1000
	HIGH			1320	1290	1275	1260	1240	1225	1205	1190	1175	1160	1140	1120	1100

Note: All airflow ratings are taken at lowest voltage rating of dual rating (ie. 208 volt).
Airflow ratings include resistance of dry coil, Return Air panel and clean MERV10 air filters.
*Standard “Whisper” mode is Fan On, Compressor Off mode for constant fresh air circulation. LOW Fan Speed tap is not available with Whisper mode.

ERV Fan Data

% PWM Signal / Power	Potentiometer Dial Setting	ESP (External Static) inwg										
		0.00	0.025	0.05	0.075	0.10	0.15	0.20	0.25	0.30	0.40	0.50
25% Speed @ 6 Watts	10 O'clock	43	34	28	22	18	12	-	-	-	-	-
37% Speed @ 13 Watts	11 O'clock	70	54	43	34	27	15	7	-	-	-	-
45% Speed @ 18 Watts	12 O'clock	85	67	55	44	35	23	15	-	-	-	-
57% Speed @ 30 Watts	1 O'clock	111	95	83	74	68	54	45	37	30	21	15
69% Speed @ 43 Watts	2 O'clock	139	124	114	106	104	91	82	73	63	53	44
82% Speed @ 61 Watts	3 O'clock	168	155	150	141	139	127	119	107	96	85	72
95% Speed @ 82 Watts	4 O'clock	187	172	166	157	156	145	137	124	115	105	91

Notes:
- All airflow ratings are taken at lowest voltage rating of dual rating (ie. 208 volt).
- ERV external static setting is based on exhaust duct run.
- ESP capability shown per fan.
- Recommended ERV fan speeds are field set to match duct static. Default factory settings may not match site conditions and requirements.
- Watts includes both ERV fans.
- Internal Manual OA Slider Damper may be used to control OA introduction in the event of variable OA conditions (i.e. wind stack effect)

VSHPe UNIT START-UP SHEET

INSTALLATION INFORMATION

Job Name_____

City_____Province/State_____Postal/ZIP Code_____

OMEGA Unit Model #_____

OMEGA Unit Serial #_____

Unit Tag#_____

Technician_____Company_____

Heating	Cooling
Note: Room temperature must be min. 60°F	
Riser Fluid Loop Temperature:	Riser Fluid Loop Temperature:
Entering Water Temperature (EWT):_____F	Entering Water Temperature (EWT):_____F
Leaving Water Temperature (LWT): _____F	Leaving Water Temperature (LWT): _____F
ΔT = EWT - LWT = _____°F	ΔT = LWT - EWT = _____°F
Water Flow Rate (GPM):_____	Water Flow Rate (GPM):_____
(units with optional balancing valve see name-plate for GPM rating)	(units with optional balancing valve see name-plate for GPM rating)
Air Temperature (Measure the difference in tem-perature across air coil) for measuring sensible capacity:	Air Temperature (Measure the difference in tem-perature across air coil) for measuring sensible capacity:
ΔT = LAT - EAT	ΔT = EAT - LAT
Sensible Capacity (Btuh) = ΔT x CFM x 1.08	Sensible Capacity (Btuh) = ΔT x CFM x 1.08
Entering Air Temperature (EAT):_____F	Entering Air Temperature (EAT):_____F
Leaving Air Temperature (LAT): _____F	Leaving Air Temperature (LAT): _____F
ΔT = _____°F	ΔT = _____°F
Sensible Capacity (Btuh) = _____	Sensible Capacity (Btuh) = _____
Fan Speed Used: Low Med High	Fan Speed Used: Low Med High
Compressor Amp: _____	Compressor Amp: _____
Fan Amp: _____	Fan Amp: _____
Run Time For Test: _____	Run Time For Test: _____

VSHPe UNIT START-UP SHEET (CONT'D)

ERV Settings

ERV Board

(Factory Set, confirm that settings have not been adjusted to non-standard settings):

SW1 - ERV Board Power Switch:

Set to "ON": ____ Yes/No

SW2 - ERV Toggle Switch:

Set to Neutral/Middle Position: _____ Yes/No

Fan ERV Settings:

LOW Speed Setting Set: ____ Yes/No

HIGH Speed Setting Set: ____ Yes/No

ERV Air Balance Check: ____ Yes/No

ERV Bathroom Timer On:

ERV Bathroom Timer Wired: ____Yes/No

ERV Fan Speed Ramps to High: ___ Yes/No